LUMENTO X4 LED

LED Controller

ZN1DI-RGBX4

INDEX

1. INTRODUCTION

1.1. LUMENTO X4

LUMENTO X4 is a **Zennio** controller that allows handling the operation of mono-color LED modules.

It has 4 independent output channels, with 12-24 VDC and 2.5 A each.

This controller may be programmed with the application **LUMENTO X4 LED**, which allows controlling up to 4 mono-color LED modules.

Figure 1.1. Lumento X4 LED controller

1.2. INSTALLATION

In the figure 1.2, the connection scheme of LUMENTO X4 is shown:

**1.- KNX connector   2.- Programming button   3.- Programming indicator   4.- Test button
5.- Test / Reversed polarity indicator   6.- External power supply terminal block   7.- LEDs control terminal block**
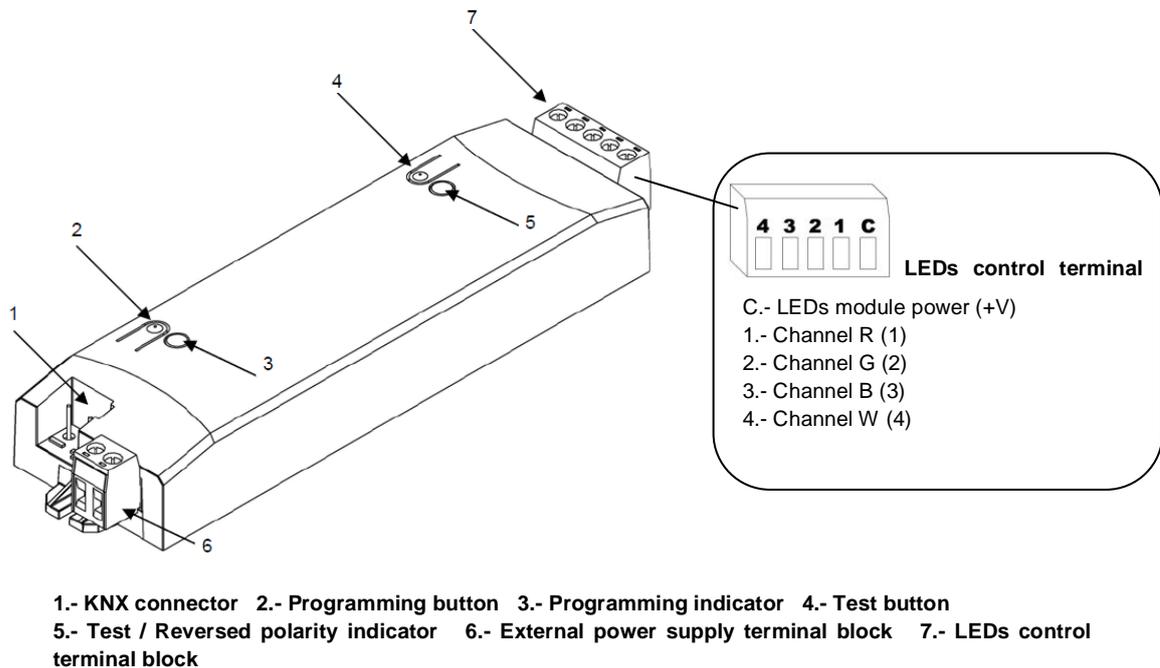
Figure 1.2. LUMENTO X4. Connection scheme

The LED controller LUMENTO X4 connects to the KNX bus via the bus connecting terminal (1) included with the device, from when it receives all the power to work. For its part, the LED module needs to be fed with an external power supply, of 12 or 24 VDC. This power supply is connected to the controller (in order to properly regulate the voltage applied to the LEDs) through the connection terminal block with screws included in the original packaging (6). Every cable must be properly connected: from the positive of the external power supply to the positive (+) of the terminal block and from the negative of the power supply to the negative (-) of the terminal block. If, whatever the reason, the connection of the power supply is carried out in the inverse way, LUMENTO X4 will report this event by switching on (in orange) the Test/Reversed polarity indicator (5).

It is also provided with the controller a second terminal block with screws for controlling the LEDs (7), where to connect every channel and the power of the LEDs module (+V). In the figure 1.2 appears a scheme of the terminal block, with each of its connection points. (**Note:** *These cables can be screwed onto the terminal block before installing the device and then inserted at a later date).*

Note: *It is important to keep always in mind that the* **only charges** *that can be connected to LUMENTO X4 output are the* **LED** *ones.*

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

After the first connection to the KNX bus during the installation process or after the **first download** of the application program to the controller, the programming indicator (3) starts blinking in blue and the Test/Reversed polarity indicator (5) lights blue in a fixed way, for about 25 seconds. Before carrying out any action over the controller, one must wait until both indicator are OFF again (not blue any more), since LUMENTO X4 is carrying out an internal test.

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

Programming button: a short press on this button set the controller in programming mode, and the associated indicator lights red. If this button is held while plugging the device into de KNX bus, LUMENTO X4 goes into secure mode. The indicator blinks red.

Test button: a long press on this button, at least 3 seconds (until the associated indicator lights white) enables the Test Mode of the device, which allows checking the correct connection of the LED module. This test is carried out as follows: once enabled, every time the button is short-pressed, the corresponding channel is enabled (Channel 1-2-3-4-1...) and the associated indicator color will change ("Red-Green-Blue-White-Red..."). To leave the Test Mode, just push the Test button at least 3 seconds (until the associated indicator and the LED module switch off).

Note: *Meanwhile the Test Mode is enabled, any order received from the KNX bus will be ignored until the deactivation of the mode.*

To obtain more detailed information about the technical features of LUMENTO X4, as well as security and installation information, please read the controller **Datasheet**, included in the original package of the device and also available at: http://www.zennio.com.

2. CONFIGURATION

The LUMENTO X4 LED application allows, as shown in the previous section, controlling the luminosity level of up to 4 mono-color LED modules. Moreover, it will be possible to configure a set of additional functionalities, which make the controller a very versatile device:

General features:

🔹 Possibility of configuring the **maximum light level** of the LED modules connected to the output of LUMENTO X4.

🔹 **Error identification:** LUMENTO X4 LED is able to detect some anomalous behaviours that may affect the correct working of the device: <u>external voltage</u> and <u>overheating</u> errors.

Channel features:

🔹 **Dimming type:** at once or smooth.

🔹 **ON/OFF:** possibility of enabling up to 4 different ON/OFF types, configuring the brightness level and their associated dimming type.

🔹 **Simple timer and Flashing:** timed ON/OFF of the LED module(s).

🔹 **Scenes/Sequences:** possibility of enabling up to 5 different scenes/sequences, which can be of two types: **fixed color** or **custom sequence** (5 customizable steps).

🔹 **Block:** option to enable/disable the control ovver the LED module connected to each channel.

🔹 **Start-Up:** allows customizing the configuration of the initial status of the LED module(s) when recovering the KNX bus power and sending (immediate or with delay) the status to the KNX bus.
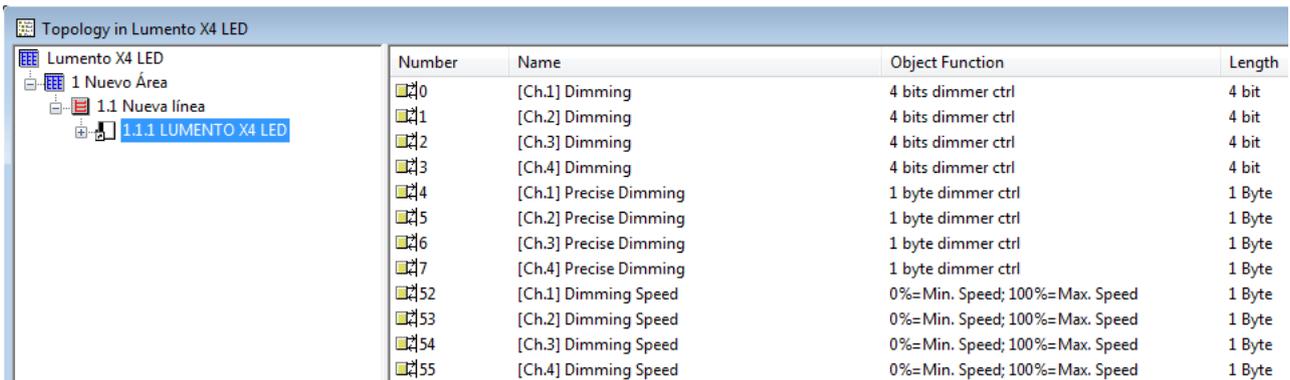
3. ETS PARAMETERIZATION

For starting to parameterize the LUMENTO X4 LED controller it is necessary, once the ETS program has been opened, importing the data base of the product (version 1.0 of the LUMENTO X4 LED 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 LUMENTO X4 LED in ETS.

3.1. DEFAULT CONFIGURATION

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

Figure 3.1. LUMENTO X4 LED. Default topology

The following communication objects appear:

🔵 **[Ch.x] Dimming:** 4 objects (one per channel) of 4-bits each to carry out a precise dimming over the brightness level of every channel independently.

🔵 **[Ch.x] Precise Dimming:** 4 objects (one per channel) of 1-byte each to carry out a precise dimming over the brightness level of every channel independently, by applying a certain brightness percentage.

⚫ **[Ch.x] Dimming Speed:** 4 objects (one per channel) of 1-byte each that allows modifying, in execution time, the dimming speed associated with the Smooth Dimming time (see section 3.3. Channels. Smooth Dimming Time).

When entering for the first time to the parameters edition of LUMENTO X4 LED, the following window will be shown:
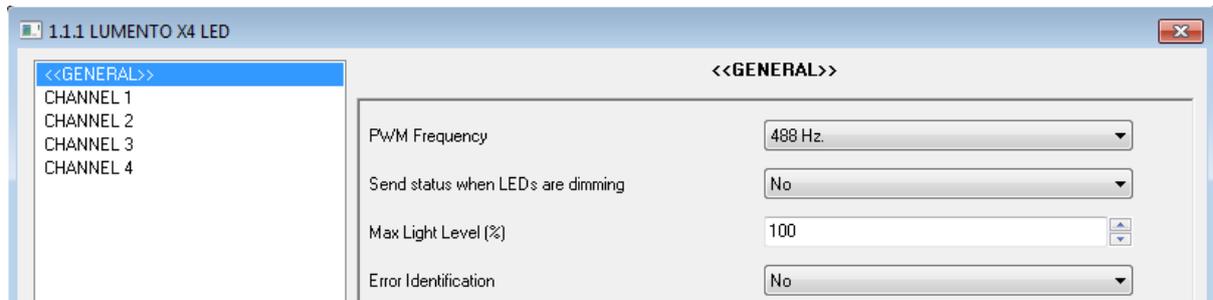

Figure 3.2. Parameterization screen by default

As seen in the figure 3.2, the parameterization screen has two main sections, which will be explained in detail in the next sections:

⚫ **General:** parameterization of the global characteristics of the controller.

⚫ **Channels 1-4:** to enable and configure the specific features of every controller channel.

3.2. GENERAL WINDOW

This section of the settings allows determining several global characteristics of LUMENTO X4 LED:

⚫ **PWM frequency:** allows selecting by parameter the working frequency of the LED controller, choosing one of these values: 150, 300, 488 and 600 Hz. The default working frequency is **488 Hz**.

⚫ **Send Luminosity when LEDs are dimming:** this option allows selecting whether to send the brightness status of the output channel or not (default option).

If the status sending during dimming is enabled, the following option will appear:

➤ **Minimum time between consecutive sendings**: to set the minimum time (in seconds) between consecutive sendings of the brightness status. This sending is carried out through the object "[Ch.x] Luminosity (Status)" of every channel, which will appear if the status objects of the channels are enabled (see section 3.3.1). This limitation is applied in smooth dimming.

● **Max Light level (%)**: to define the maximum brightness percentage (from 5 to 100%) to be applied to the channels when receiving the dimming order. LUMENTO X4 will apply the channels an intensity with a reduction over the maximum allowed intensity (depending on the parameterized in this field).

Note: *Whatever the customized value for the maximum light level is, LUMENTO X4 will send a luminosity percentage of 100% to the bus, through the object(s) "[Ch.x] Luminosity (Status)", for the purpose of connection and communication with other KNX devices of the installation.*

● **Error identification:** this option enables two 1-bit communication objects to inform about anomalous behaviours that may appear when working with LUMENTO X4:

➤ "Error: External voltage". Object through which LUMENTO X4 notifies that the received external power is incorrect, due to any of these events: too low voltage, total absence of power (source disconnected) or inversion in the connection of the power supply (this is also visually notified by switching on (in orange) the Test/Reversed Polarity indicator). When LUMENTO X4 detects any of those anomalous situations, it will send the value "1" through this object. When the event finishes, it will send a "0".

➤ "Error: Overheating". Object through which LUMENTO X4 notifies it is exposed to an excessive temperature (**higher than 90ºC**), by sending the value "1". In that moment, LUMENTO X4 will reduce the brightness level of the channels to 50% (only if they were in a higher percentage) and the working frequency will be set to its minimum value (150 Hz). When the temperature is lower than 80ºC, LUMENTO X4 will send the value "0" through this object, thus marking the end of this event and it will retake the brightness levels and frequency value it had before the error. If 15 minutes after the beginning of the Overheating error, the temperature does not lower, LUMENTO X4 will switch off its output charge, for safety reasons.

Note: *Take into account that, although the error identification is not enabled by parameter, the overheating protection is **always enabled**, although this status is not notified by object.*

3.3. CHANNELS

Every of the four channels of LUMENTO X4 LED has a set of different functions, disabled by default (see figure 3.3). These functions may be selectively enabled, depending on the needs and requirements of the installation.
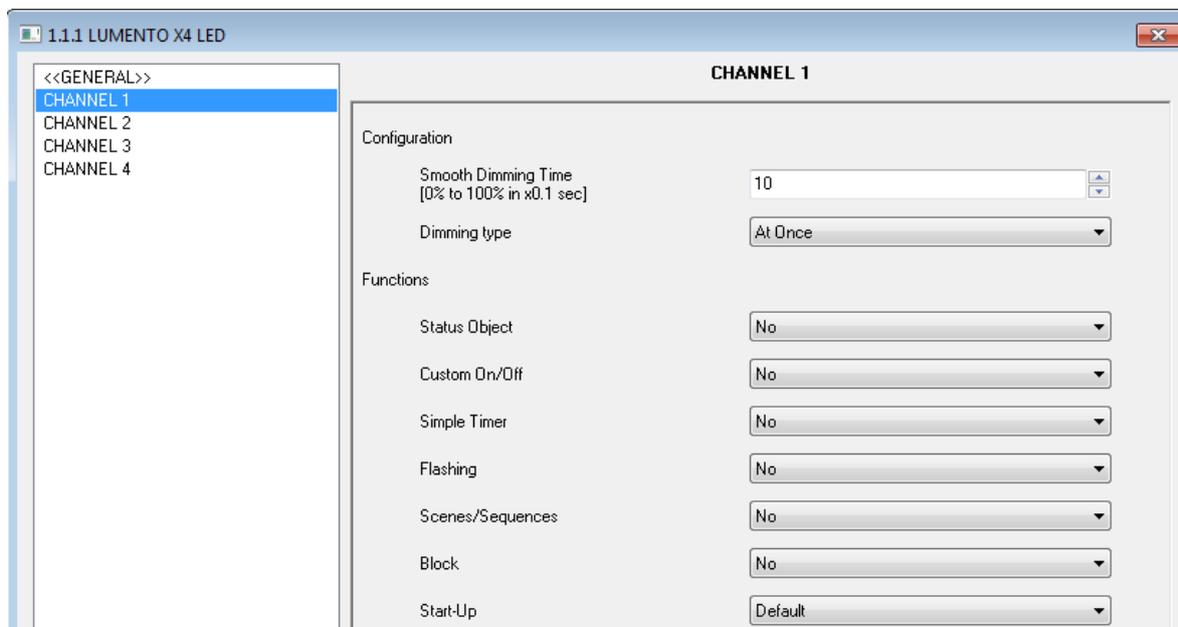
Figure 3.3. Channel configuration

Moreover, it is possible to configure the dimming time and type to be applied to the channel:
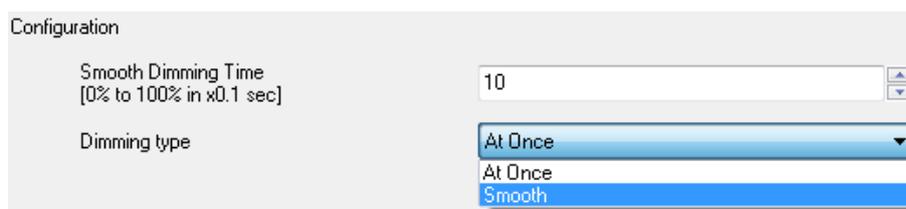
🔵 **Smooth dimming time:** Sets the time LUMENTO X4 takes to softly pass from 0% to 100% of brightness percentage. A time, in tenths of second, between 3 and 65535 can be chosen.

This smooth dimming time may be modified in execution time, via the communication object "[Ch.x] Dimming Speed". Please see the Table 3.1 to know the relation between several dimming speed values (the most common ones) and its associated dimming times.

Dimming speed	Parameterized Smooth Dimming Time (T)
0%	T
25%	¾ T
33%	⅔ T
50%	½ T
75%	¼ T
100%	0*

* The dimming is carried out in the minimum time allowed for this Dimming type: 3 tenths of second.

Table 3.1. Dimming speeds and times

Consider the following application example.

✓ *Example:*

Suppose that a Smooth Dimming Time of 20 seconds is parameterized for the Channel 1. At a given time during the execution, this time must be modified in order to carry out the smooth dimming (no matter the brightness percentage to reach) in half the time, i.e., 10 seconds. To achieve this, the value 50% must be written in the object "[Ch.1] Dimming Speed". If the original time must be reduced to the fourth part (from 20 to 5 seconds) the value 75% must be sent to the mentioned object. To come back to the original smooth dimming time, just write the value 0% through "[Ch.1] Dimming Speed".

The smooth dimming between brightness levels different from the 0%-100% one (on-off) are performed at the same velocity, so the time needed to carry them out will be lower than the parameterized in "Smooth dimming Time".

✓ *Example:*

Suppose that 10 seconds are parameterized in the field "Smooth dimming time". A total ON order is sent to a channel that was OFF. This channel will take 10 seconds to reach its maximum brightness level (if the parameter "Dimming type" has been configured as smooth). If the channel was already in a brightness percentage of 50%, for instance, the time taken to reach 100% brightness level will be 5 seconds (the half part of the 10 seconds parameterized).

Dimming type: In this field it is possible to define the way the transition between different brightness levels will be carried out, after sending the corresponding orders through the communication objects in charge of the dimming of the channels ("[Ch.x] Dimming" and "[Ch.x] Precise dimming"). This dimming can be at once (direct transition between levels) or smooth (the transition will have associated a dimming time equal to the one defined for Smooth Dimming time).

Next, all the available functions are explained.

3.3.1. STATUS OBJECTS

This function allows enabling the 1-bit status object ("[Ch.x] On/Off Status") and the 1-byte status object ("[Ch.x] Luminosity Status") for every channel, responsible for reporting on the channels brightness status at any moment, updating the status of the devices in the KNX installation, if required.
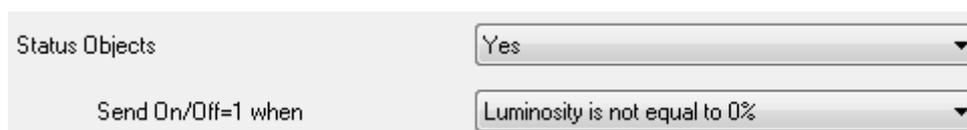
Status Objects	Yes
Send On/Off=1 when	Luminosity is not equal to 0%

Figure 3.4. Status objects

Send On/Off=1 when: to select when the value "1" (ON) is sent through the object "[Ch.x] On/Off (Status)" to the KNX bus, choosing between:

➢ Luminosity is not equal to 0%: when the brightness level is different from 0%, the object "[Ch.x] On/Off (status) = 1" will be sent to the bus. The value "0" will be only sent when the luminosity level is 0%.

➢ Luminosity is equal to 100%: the object "[Ch.x] On/Off (Status)" will only send the value "1" when the brightness level is equal to 100%. The value "0" will be only sent when the luminosity level is 0%.

3.3.2. CUSTOM ON/OFF

When this option is enabled, the following configuration screen is shown in ETS for every channel:

Figure 3.5. Custom On/Off

LUMENTO X4 LED allows customizing up to 4 different on/off types per channel, being able to configure the following parameters for each of them:
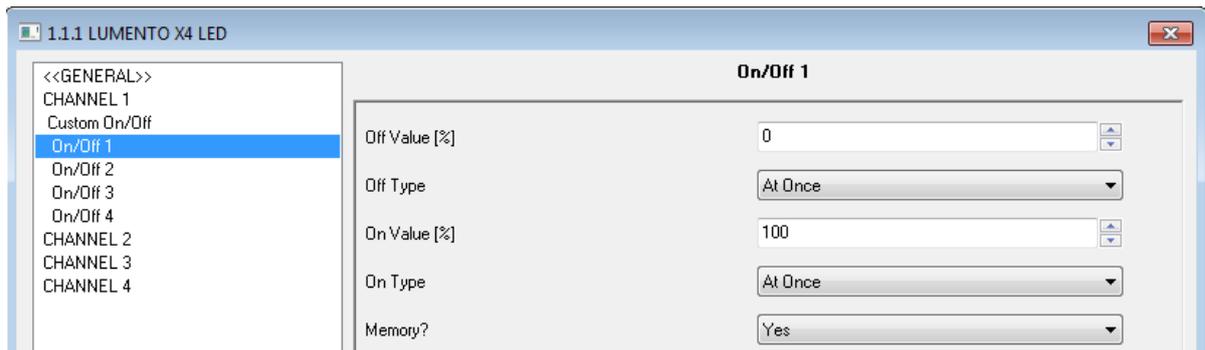
Figure 3.6. Custom On/Off configuration

🔵 **Off value:** to set the brightness percentage (value between 0% and 100%) the corresponding channel will take when LUMENTO X4 receives the value "0" through the 1-bit communication object "[Ch.x] Custom On/Off Y".

🔵 **Off type:** to set the dimming type to be applied in the switch-off of the LED module, to choose among: at once or smooth.

🔵 **On value:** to set the brightness percentage (value between 0% and 100%) the corresponding channel will take when LUMENTO X4 receives the value "1" through the 1-bit communication object "[Ch.x] Custom On/Off Y".

- ● **On type:** to set the dimming type to be applied in the switch on of the LED strip, choosing one of these: at once or smooth.

- ● **Memory:** this parameter allows defining a memory ON. This way, whenever LUMENTO X4 receives a "0" through the corresponding "[Ch.x] Custom On/Off Y" object, it will keep in memory the brightness percentage that the corresponding channel has at that moment (only if this value is different from the one parameterized in "Off value"), and then LUMENTO X3 will set the channel with the brightness percentage defined in the Off value field. When LUMENTO X4 receives an ON order ("[Ch.x] Custom On/Off Y = 1"), it will light the channel with the brightness level it had before the switch-off.

✓ *Example:*

Suppose the Custom On/Off number 2 of Channel 1 is configured this way: Off value = 15% and On value = 90%. Channel 1 is lighting with a 60% brightness percentage when LUMENTO X4 receives the switch-off order (value "0") through the object "[Ch.1] Custom On/Off 2". The LEDs connected to the channel 1 light with a percentage of 15% (Off value). LUMENTO X4 keeps in memory the brightness percentage of the LEDs before they switched off and when it receives the ON order ("[Ch.2] Custom On/Off 2=1"), the LEDs will light with the last value stored before the switch-off (60%).

3.3.3. SIMPLE TIMER

This function allows switching-on/off the LED module connected to the LUMENTO X4 channels in a temporized way, by applying delays for the ON as well as for the OFF.

In addition to this, it is also possible to set the ON duration, the ON value and the ON type, by parameter.
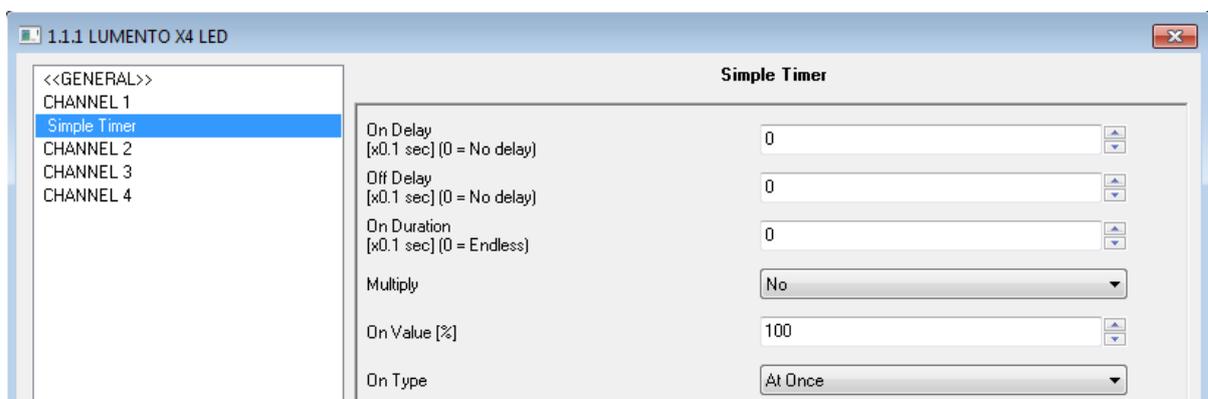

Figure 3.7. Simple timer

🔹 **On Delay:** this parameter sets the elapsed time between the Timer ON order reception and the switch-on of the LEDs module. This value must be set with precision of tenths of a second (e.g. to get 2.5 seconds, set 25). If no delay is needed, please set 0 in this field.

🔹 **Off Delay:** this parameter sets the elapsed time between the Timer OFF order reception and the switch-off of the LEDs module. Similar to the On delay working.

🔹 **On Duration:** this parameter sets the time the LEDs module remains ON before switching off again. A 0 in this field indicates an endless duration, i.e., no timing is applied to the On duration (the LEDs connected to a channel behave as they had received an On order).

These parameters are used in the timer as follows:

- When LUMENTO X4 receives a "1" through the communication object "[Ch.x] Simple Timer", an ON order is sent to the corresponding channel, applying the On Delay and the On Duration (if a value different from 0 has been parameterized in these fields).

- When LUMENTO X4 receives a "0" through the communication object "[Ch.x] Simple Timer", an OFF order is sent to the corresponding channel, 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 of the channel. I.e., when enabling this function, LUMENTO X4 multiplies the defined times as many times as the value "1" or "0" is received through the "[Ch.x] Simple Timer" object. Two situations are distinguished:

➢ **No multiply:** if during a temporized ON, LUMENTO X3 receives a "1" through the object "[Ch.x] Simple Timer", it starts counting again the time set in the On Duration field.

➢ **Multiply:** the timing applied to the controller output is multiplied by "n" when receiving "n" times the timer order through the corresponding object, before the parameterized time for the temporization ends.

🔹 **On Value:** to set the brightness percentage (value between 0% and 100%) that the corresponding channel will have during the timed ON.

🔹 **On type:** to set the dimming type to be applied in the switch-on of the LED module, to choose among: at once or smooth.

3.3.4. FLASHING

This function allows conducting a sequence of type **ON-OFF-ON-OFF...**, as well as setting the ON/OFF duration of the flashing applied to the LEDs connected to each output channel. Moreover, the number of repetitions can be set by parameter, as well as the On value and the final value of the LEDs after the last repetition.

The flashing starts when LUMENTO X4 receives a "1" through the object "[Ch.x] Flashing" and stops when it has executed all the configured repetitions (unless they are endless, because a 0 has been written in the corresponding box, as shown after). It is possible to to end the flashing execution at any time, by sending the value "0" through the "[Ch.x] Flashing" object, or by sending any other control order over the output (like an ON/OFF, a sequence, etc.). If, during the flashing execution, LUMENTO X4 receives a new order to start a flashing ("[Ch.x] Flashing" = 1), this will be reset, no matter the execution point it is.
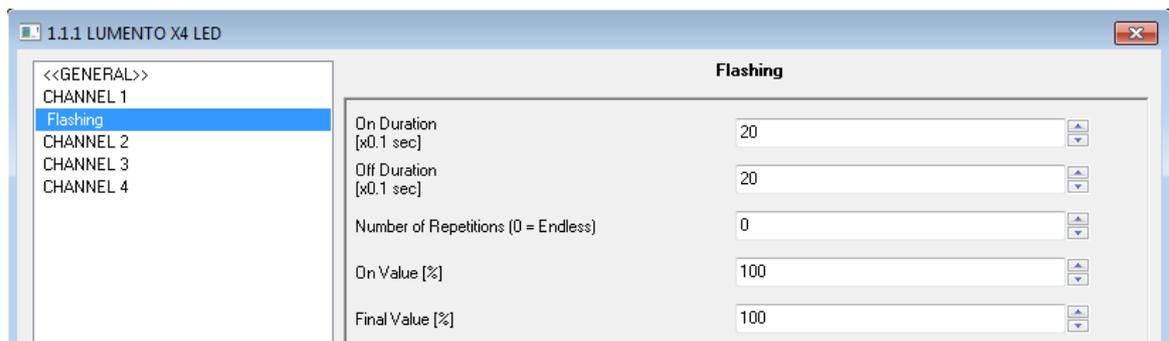

Figure 3.8. Flashing

These are the parameters that can be configured in the flashing function:

- **On Duration:** set the time the output will remain ON when the flashing function is active.

- **Off Duration:** set the time the output will remain OFF when the flashing function is active.

- **Number of repetitions:** select by parameter the number of times the ON/OFF sequence will be repeated when the flashing function is active. For an unlimited number of repetitions, please set the value 0 in this field. (The sequence will be repeated until receiving an order to deactivate the flashing).

- **On value:** to set the brightness percentage (value between 0% and 100%) that the corresponding channel will have during the timed ON.

🔵 **Final value:** set the brightness percentage (0-100%) of the corresponding channel when the last flashing repetition finishes, or when receiving the order "[Ch.x] Flashing=0".

3.3.5. SCENES/SEQUENCES

This function allows sending different dimming and lighting orders to the controller output, through the 1-byte object "Scenes/Sequences", in order to create a specific ambient.

The 1-bit object "[Ch.x] Start/Stop Sequence" also appears (one per channel where the scenes/sequences are enabled). It allows execute the last played sequence (by writing the value "1") or stopping the sequence in execution (with the value "0").

Note: *After a download from ETS, if the value "1" is sent through this object, the first scene/sequence parameterized in ETS will be executed (unless it is a scene/sequence of the type "Fixed Value", in which case the next configured sequence different from this type will be executed).*

LUMENTO X4 LED allows configuring up to **5 scenes/sequences** per channel, which can be individually enabled in the section Scenes/Sequences of ETS.
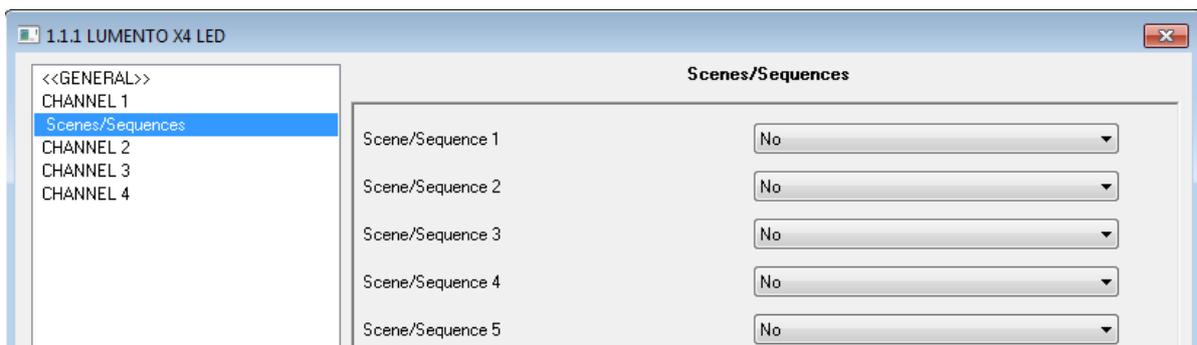
Figure 3.9. Scenes

For each of them there are the following configurable fields:

🔵 **Scene/Sequence number:** this is a number (from 1 to 64) defined by parameter to which the controller output will react.

🔵 **Scene/Sequence type:** to choose the desired configuration for each enabled scene/sequence:

➢ **Fixed value.** To light the LEDs connected to a channel with a specific brightness value (0-100%) when LUMENTO X4 receives through the object "[Ch.x]

Scenes/Sequences" the configured scene number. Also the dimming type can be selected (at once or smooth).

If "Fixed value" is selected, besides running the scene it will be also possible to save it. I.e., if LUMENTO X4 receives an order to save a scene, the current brightness value of the LEDs will be saved, so when the corresponding scene will be executed again, the percentage showed will be the saved one (and not the parameterized in ETS for the corresponding scene).

➢ **Custom sequence.** By selecting this option, it will be possible to customize sequences of up to 5 steps/actions and configuring the following general aspects:

- **Cyclic.** Yes option (Cyclic Sequence: once finished the last parameterized step, the sequence will start executing again, from the first of its parameterized steps).

  No option (Non-Cyclic Sequence: it is possible to choose whether another parameterized sequence is executed after the last step of the current one or not).

- **Luminosity sending:** to choose between Send continuously (the brightness level will be continuously sent, through the object "[Ch.x] Luminosity Status", only if in the General window the option Send status when dimming was enabled, and respecting the minimum time between sendings parameterized) or Send when sequence ends (the brightness level will be sent to the bus once the last step of the sequence finishes, no matter if the status sending when dimming was enabled or not).

For every step, the following parameters can be configured:

- **Value:** The brightness percentage of the LEDs (0-100%).

- **Dimming type:** at once, smooth or Equal to action time. If this last option is chosen, the dimming will be carried out gradually, changing from the last percentage to the defined in the corresponding step in a time equal to the defined in the box "Time", in seconds.

- **Time**: To set the duration of the step (action time), in seconds.

The steps (or actions) will be executed orderly, i.e., when LUMENTO X4 receives the Scene number that enables the sequence, the first configured step will be executed, and

so on. Moreover, if the sequence is cyclical, once the last step finishes, the sequence will be automatically executed, again from the beginning.

See an example of custom sequence configuration in the figure 3.10, where the three first steps of Sequence 1 have been parameterized.
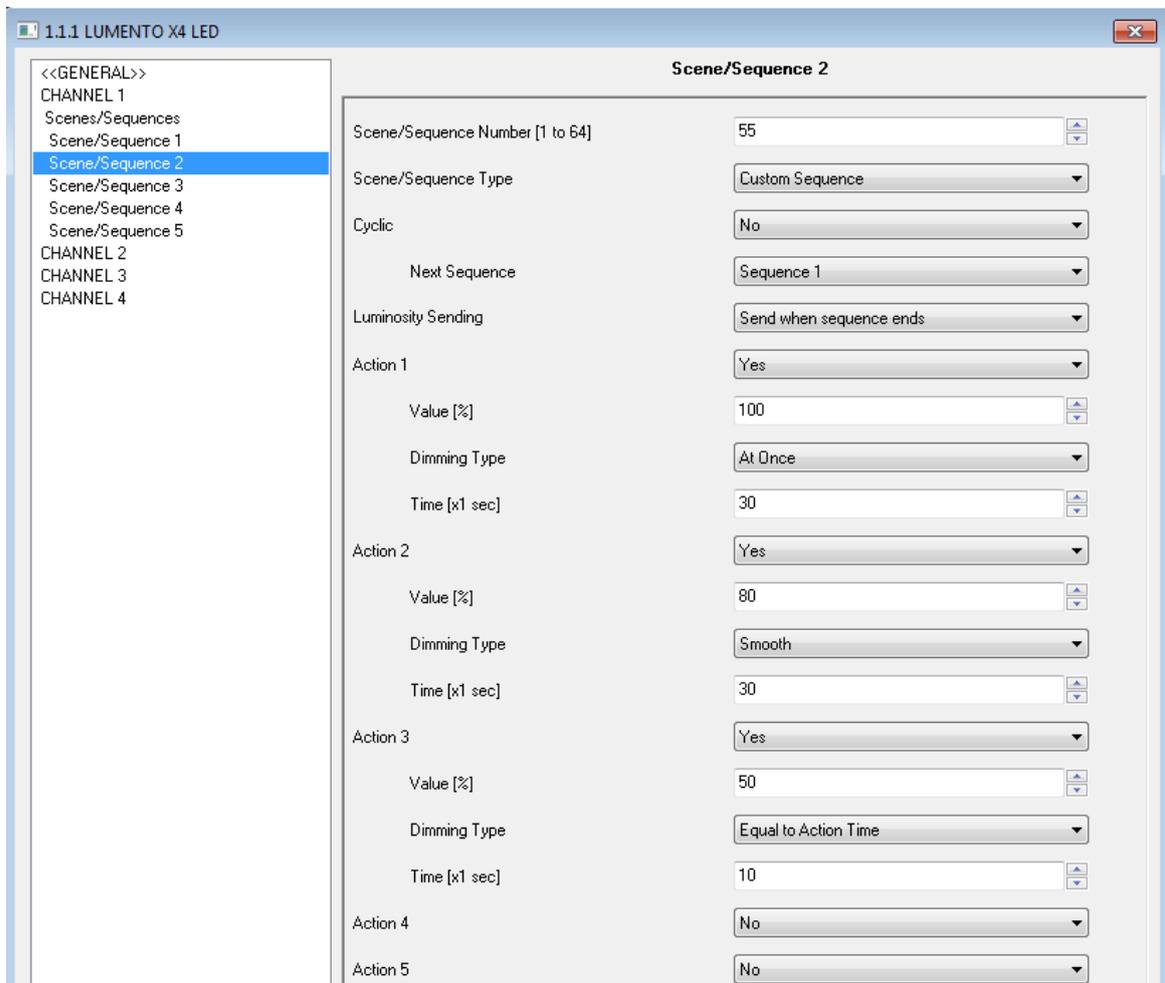

Figure 3.10. Custom sequence.

3.3.6. BLOCK

This function makes possible to block the LED controller; i.e., to disable its control.

LUMENTO X4 will block the corresponding channel when receiving a "1" through the 1-bit communication object "[Ch.x] Block". In this moment, any action in execution will be stopped and the LEDs module will keep the brightness value it had before receiving the blocking order.

In this block status, any order received from the KNX bus will be ignored.

LUMENTO X4 will unblock the channel when receiving a "0" through the object "[Ch.x] Block". The output will keep the brightness value it had before receiving the block order. Any other order received during the block status will not be taken into account until the output will be unblocked.

3.3.7. START-UP

A default or custom configuration can be selected.

If the default configuration is chosen, the LEDs will remain OFF after a download from ETS. On bus voltage recovery, the brightness value of the LEDs will be the last one they had before the bus power failure.

If a custom configuration is chosen, it is possible to select by parameter the status of the LEDs module connected to a channel on bus voltage recovery.
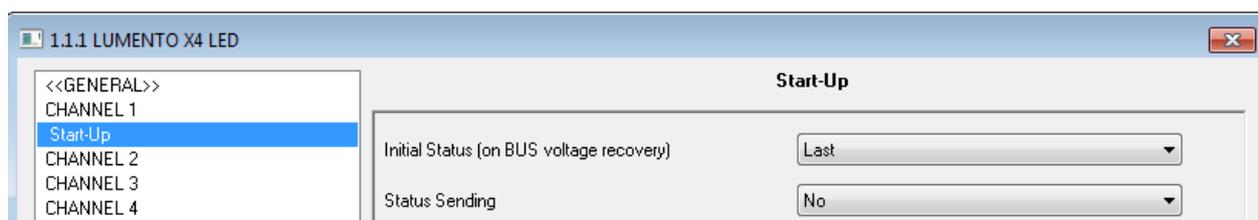

Figure 3.11. Start-up

The following parameters can be configured:

🔵 **Initial Status (on bus voltage recovery):** choose the initial status of the LEDs module connected to a channel when the bus power failure ends or after a download from ETS. It is possible to select one of these statuses:

  ➢ **Last:** the LEDs module will keep the same brightness percentage it had before the bus power failure.

  ➢ **Off:** the LEDs will be OFF after the bus power failure (if they were ON).

  ➢ **On:** after the bus power failure, the LEDs will light with the brightness percentage parameterized in the box that appears below: "Initial value" (0-100%).

🔵 **Status sending:** by enabling this parameter ("Yes"), the status of the LEDs module connected to a channel will be sent to the KNX bus after the bus power failure, thus allowing the up-to-date of the status of the rest of devices in the installation that may need it. When enabling the status sending, a new drop-down box is shown: "Delay", to set the time (in

seconds) LUMENTO X4 waits until sending this status. To get an immediate sending (no delay), set the value 0 in this field. The start-up status sending is performed trough the communication objects "[Ch.x] On/Off (Status)" and "[Ch.x] Luminosity (Status)".

ANNEX I. COMMUNICATION OBJECTS

SECTION	NUMBER	SIZE	IN/OUT	FLAGS	VALUES			NAME	DESCRIPTION
					RANGE	1st TIME	RESET		
DIMMING	0-3	4 bits	I	W	0-15	Indifferent	Indifferent	[Ch.x] Dimming	4-bits dimmer control
	4-7	1 byte	I	W	0-100%	Indifferent	Indifferent	[Ch.x] Precise Dimming	1 byte dimmer control
	52-55	1 byte	I/O	RW	0-100%	0%	Last	[Ch.x] Dimming Speed	0%=Min.Speed; 100%=Max.Speed
STATUS OBJECTS	8-11	1 bit	O	RT	0/1	0	Last	[Ch.x] ON/OFF (Status)	0=Off; 1=On
	12-15	1 byte	O	RT	0-100%	0	Last	[Ch.x] Luminosity (Status)	0-100%
CUSTOM ON/OFF	16-19	1 bit	I	W	0/1	Indifferent	Indifferent	[Ch.1] Custom On/Off x [x=1...4]	0=Off; 1=On
	20-23	1 bit	I	W	0/1	Indifferent	Indifferent	[Ch.2] Custom On/Off x [x=1...4]	0=Off; 1=On
	24-27	1 bit	I	W	0/1	Indifferent	Indifferent	[Ch.3] Custom On/Off x [x=1...4]	0=Off; 1=On
	28-31	1 bit	I	W	0/1	Indifferent	Indifferent	[Ch.4] Custom On/Off x [x=1...4]	0=Off; 1=On
SIMPLE TIMER	32-35	1 bit	I	W	0/1	Indifferent	Indifferent	[Ch.x] Simple Timer	0=Deactivate; 1=Activate
FLASHING	36-39	1 bit	I	W	0/1	Indifferent	Indifferent	[Ch.x] Flashing	0=Deactivate; 1=Activate
SCENES/SEQUENCES	40-43	1 byte	I	W	0-64	Indifferent	Indifferent	[Ch.x] Scenes/Sequences	Scene/Sequence value
	48-51	1 bit	I	W	0/1	Indifferent	Indifferent	[Ch.x] Start/Stop Sequence	0=Stop; 1=Start
BLOCK	44-47	1 bit	I	W	0/1	0	Last	[Ch.x] Block	0=Unblock; 1=Block
ERROR OBJECTS	56	1 bit	O	RT	0/1	-	-	Error: External voltage	0=Normal; 1=Low Ext. Voltage
	57	1 bit	O	RT	0/1	-	-	Error: Overheating	0=Normal; 1=Overheating

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