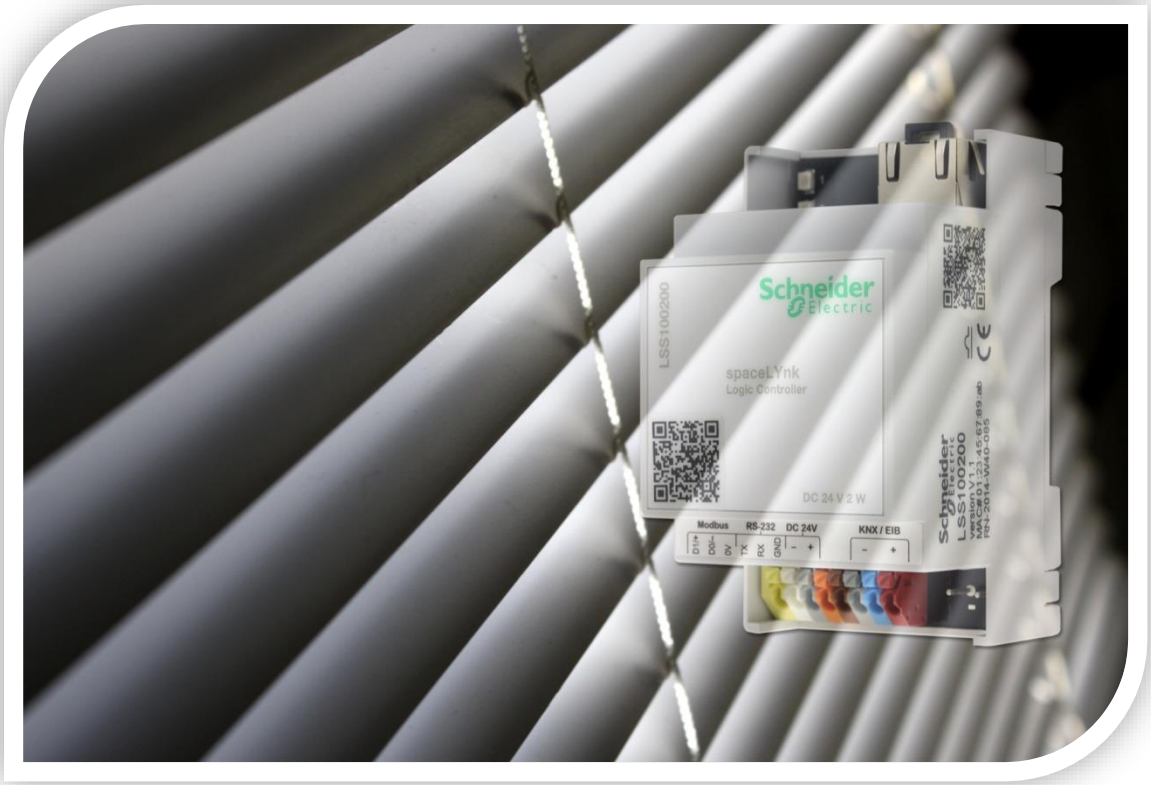
★★★

Basic / Advanced / **Expert**

Application note

Lighting solution for comfortable environment using spaceLYnk I

Integration of blinds and artificial lighting with constant light control



Schneider Electric

Safety Information

Important Information



Read these instructions carefully before trying to install, configure, or operate this software. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠DANGER
DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠WARNING
WARNING indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.

⚠CAUTION
CAUTION indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.

NOTICE
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Safety Precautions

⚠WARNING

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- Do not base your maintenance or service actions solely on messages and information displayed by the software.
- Do not rely solely on software messages and reports to determine if the system is functioning correctly or meeting all applicable standards and requirements.
- Consider the implications of unanticipated transmission delays or failures of communications links.

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7.1 Glossary 51

1 Introduction

This application note describes how to integrate and configure blinds, dimming actuators and presence detectors (PIR) with constant light control function using spaceLYnk controller. Proper cooperation between brightness sensor in PIR and dimmer helps you to maximize usage of the daylight and to reduce the energy costs of artificial lighting. Moreover you achieve a better lighting comfort. Integrating blinds with light control allows you to:

- Reduce energy costs by controlling lights to constant light level or switching them off when room is not occupied
- Get more benefits from daylight and reduce the intensity of artificial lighting according to individual needs of users
- Adjust optimal lighting conditions for efficient and comfortable work
- Protect workplaces from direct sunlight and disruptive reflections

Competencies

This document is intended for readers who have been trained on Wiser for KNX, spaceLYnk products. The integration should not be attempted by someone who is new to the installation of either products. In addition we recommend that you are familiar with:

- Concepts of the KNX bus
- The ETS configuration software
- Lua scripting

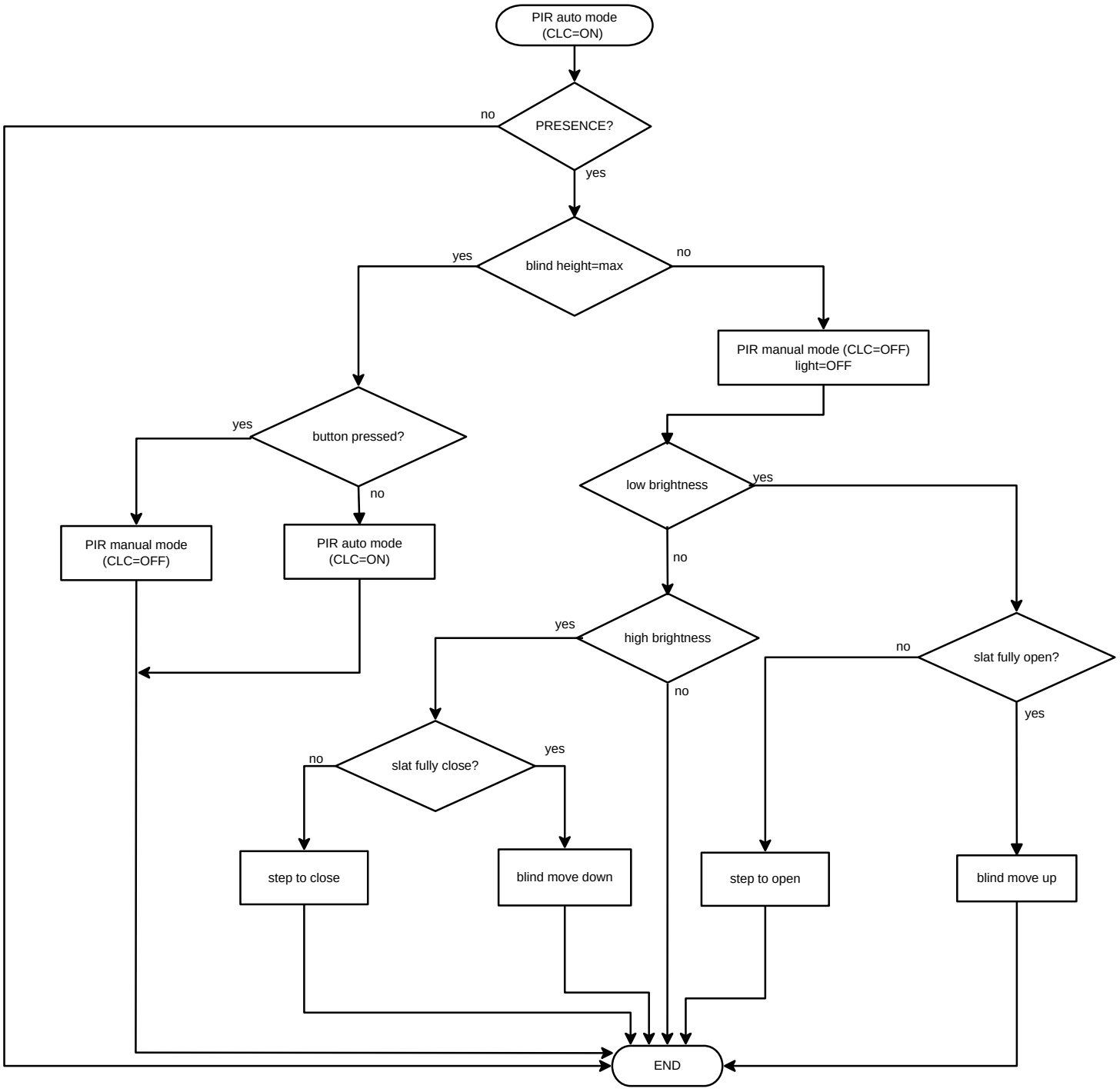
Software	Version	Download
spaceLYnk	2.1 and newer	http://www.schneider-electric.com
ETS	5.0.1	http://www.knx.org/
Hardware	**Order number**	**Manufacturer**
Blind actuator REG-K/4x/10 with manual mode	MTN649804	Schneider Electric
Universal dimming actuator REG-K/4x230/250W	MTN649325	Schneider Electric
KNX ARGUS Presence with light control + IR	MTN630919	Schneider Electric
spaceLYnk logic controller	LSS100200	Schneider Electric
KNX Push-button, 2-gang	MGU3.531.12	Schneider Electric
Power supply	MTN684016	Schneider Electric

Table 1: System prerequisites

NOTE: It is not possible to use combined switch/blind actuators (MTN649908 a MTN649912)

2 Design

2.1 Flowchart



Picture 1: Blind & Light control algorithm

2.2 Flowchart description

The main script for blind control is resident. It changes the height of blinds and tilt angle of slats depending on brightness measured by brightness sensor in the PIR. It also enables the PIR constant light control function (CLC) if blinds are fully open and there are still insufficient light conditions.

Assuming the light control was not switched OFF in manual mode by pressing push-button, the CLC is active if the room is occupied and the blinds are in the top position. Pressing the push-button switches the light control to manual mode. The manual mode is switched back to the automatic one after time out.

If the CLC is turned OFF (PIR in manual mode) via push button, the light conditions are regulated by adjustment of the blinds. If there are inadequate light conditions in the room the blind actuator first tries to adjust slat angle. If the slat angle is maximal (slats are opened) and there are still poor light conditions the blind starts to move up until the light conditions are acceptable or blinds reached the top position.

Otherwise if there is too much light the blind actuator also first tries to adjust slat angle. If the slat angle is minimal (slats are closed) and there is still too much light, the blinds starts to move down until the light conditions are acceptable or blinds reached the bottom position.

NOTE: It is not possible to change slat angle at the minimal height of blind. Therefore, if the blind height is less than 3%, at first the minimum height is set to 3% before the slat angle is changed.

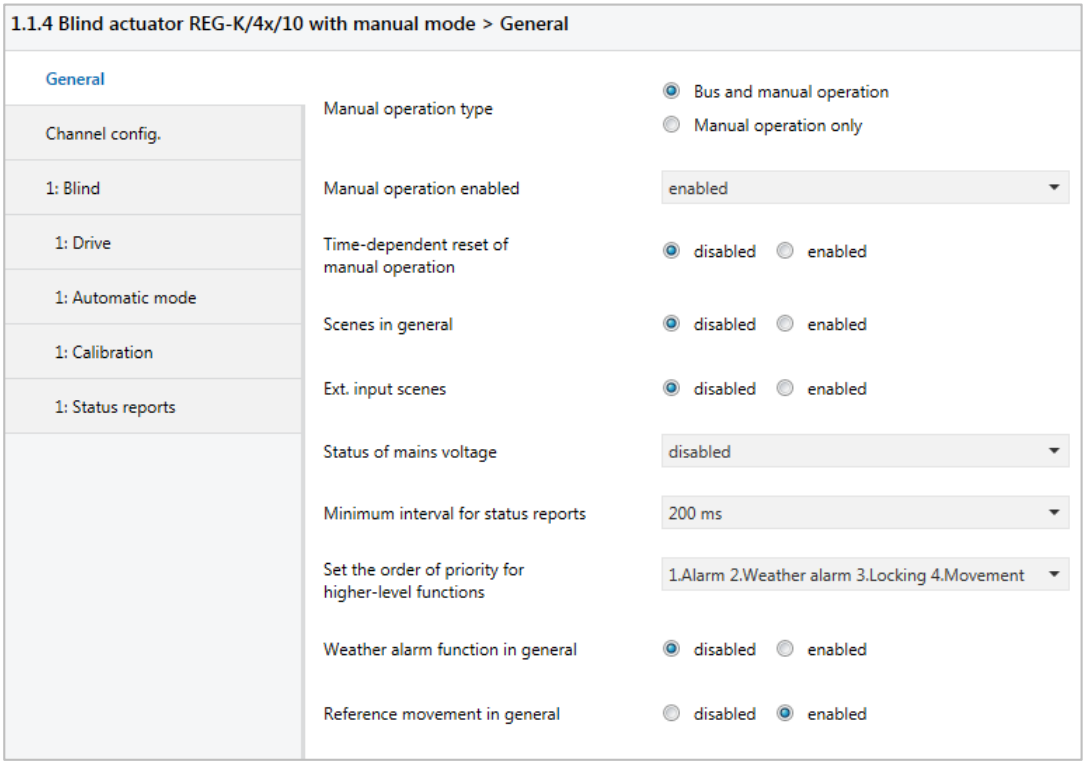
The maximum opening angle is set to 95% and the minimum opening angle to 5%. If your slats can work in full range change values to 0% and 100%.

3 ETS Configuration

First of all import required devices to ETS project (see Table 1) and set properly all parameters as it is described in the following chapters.

3.1 Blind actuator

3.1.1 General



Picture 2: General setting for blind actuator

For proper calibration enable **Reference movement** for calibration of all channels at once.

Go to → **Parameter → General → Reference movement in general → enabled**

3.1.2 Channel configuration

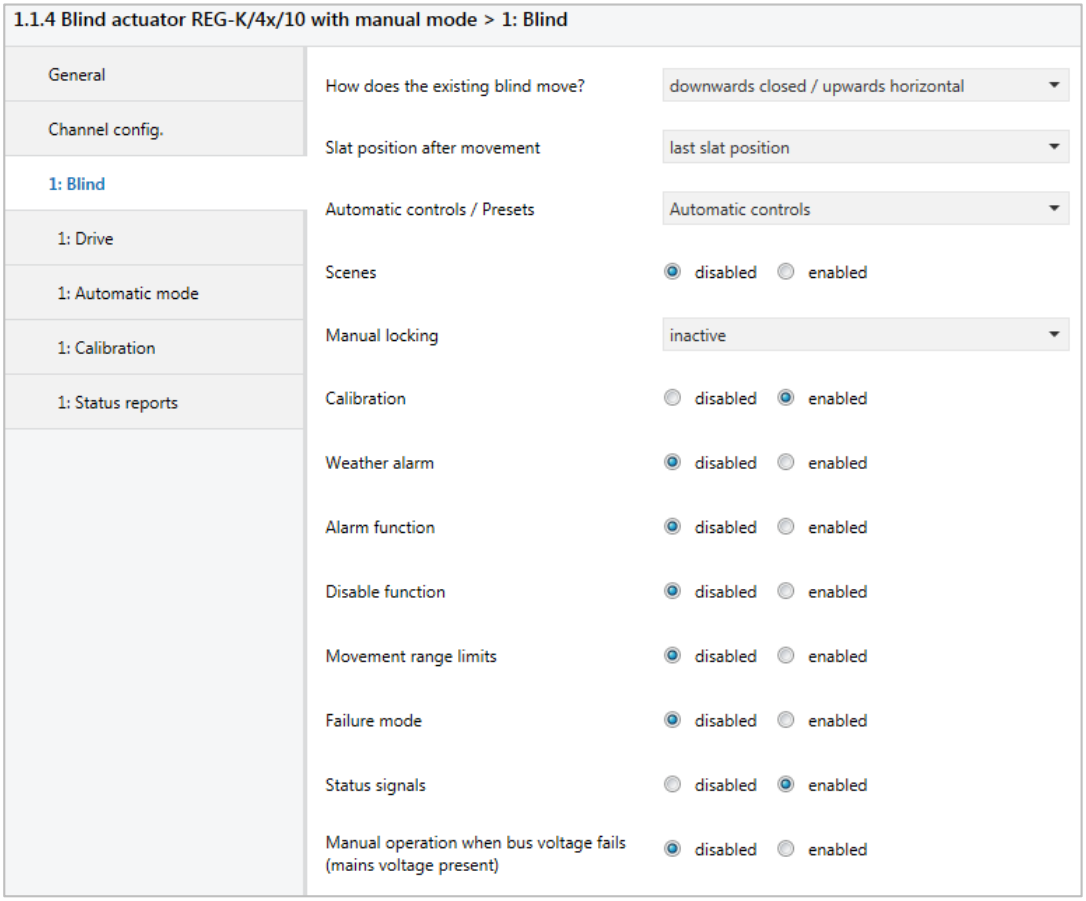
At channel configuration tab set at least one channel operation mode to Blind

Go to → **Parameter → Channel config. → Channel 1 operation mode→ Blind**

The following settings must be performed individually for each channel.

3.1.3 Blind

Set the required behavior of the blind channel. Enable automatic mode, calibration and status messages.



Picture 3: Setting for blind actuator channel

Go to → **Parameter → Blind → Automatic mode / Presets → Automatic controls**

Go to → **Parameter → Blind → Calibration → enabled**

Go to → **Parameter → Blind → Status signals → enabled**

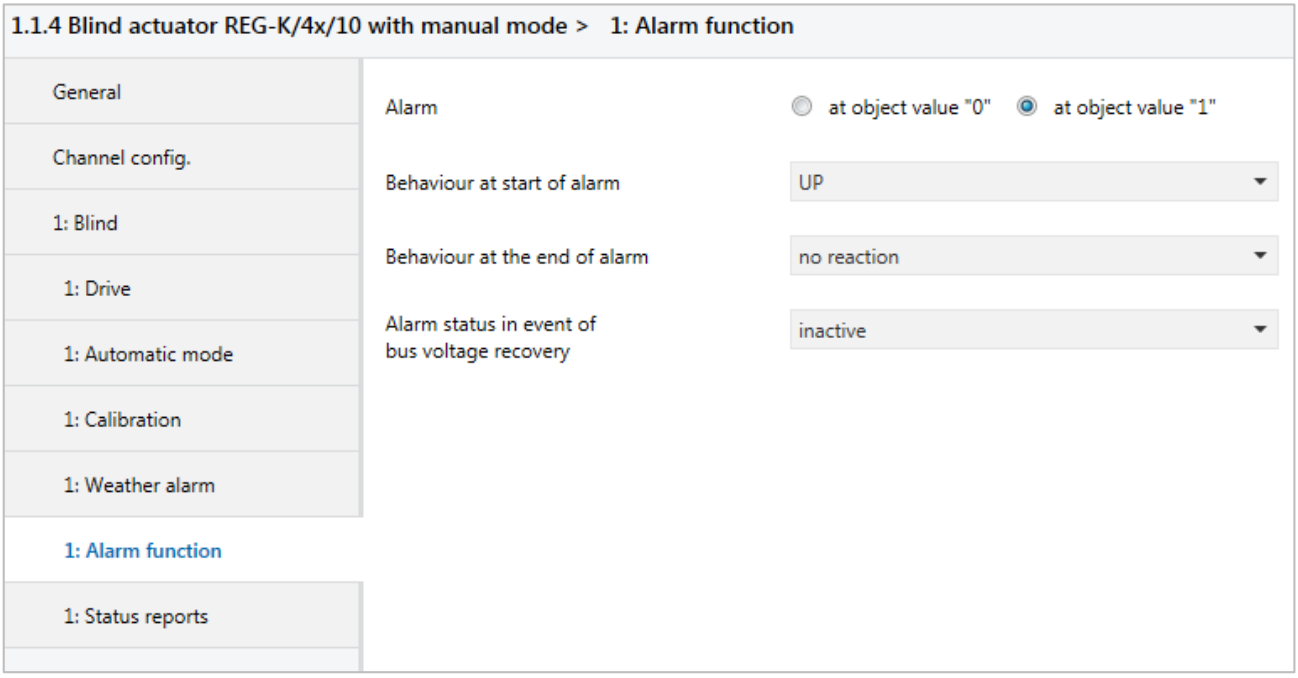
Height and the slat position are periodically detected.

Optionally you can set the alarm function if there is a device which is able to detect dangerous conditions (fire, wind, frost etc.) to avoid damaging the blinds or easy access of firefighters in case of fire.

Go to → **Parameter → Blind → alarm function → enable**

Go to → **Parameter → Blind → weather alarm → enable**

In the **Alarm function** tab set behavior of the blinds when the alarm is triggered.



Picture 4: Alarm function for blind actuator channel

Go to → **Parameter → Alarm function → behavior at the start of alarm → up**

Go to → **Parameter → Alarm function → behavior at the end of alarm → no reaction**

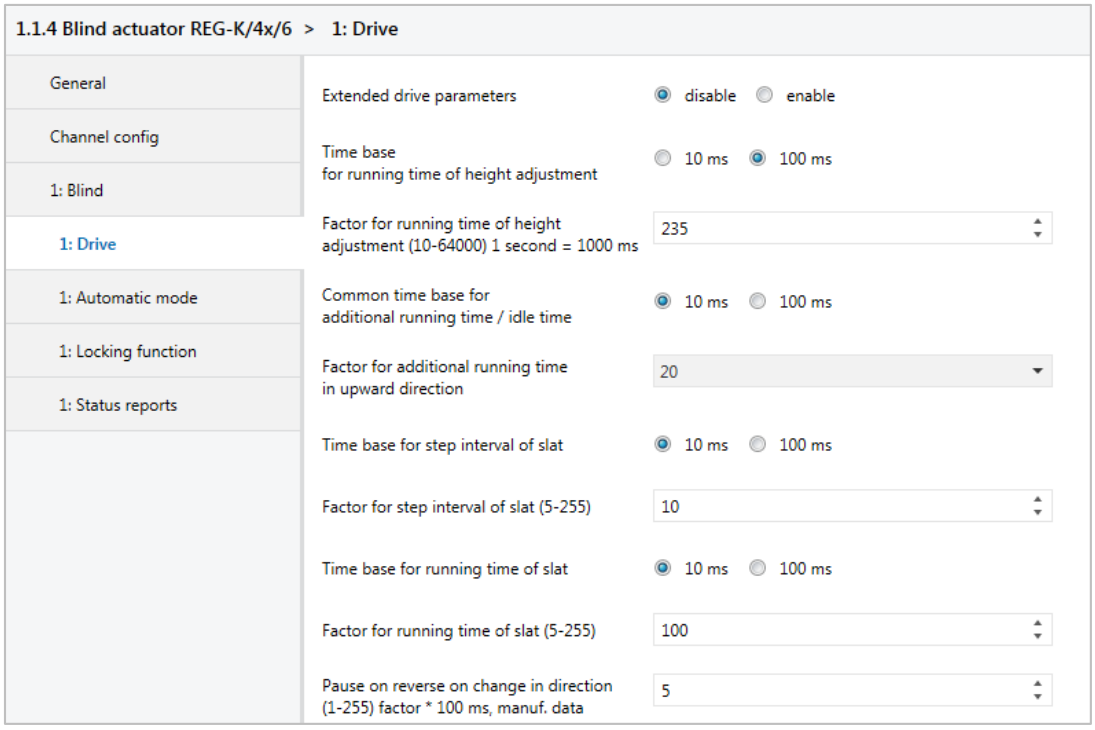
Blinds will move up to maximum height position in case of alarm.

3.1.4 Drive

Following setting is important for correct positioning of the blinds!

In the **Drive** tab set downward running time for blinds and additional time for moving upward.

The factor of running time of height adjustment is measured time of blinds when move from upper to bottom position in *ms* divided by **Time base.**



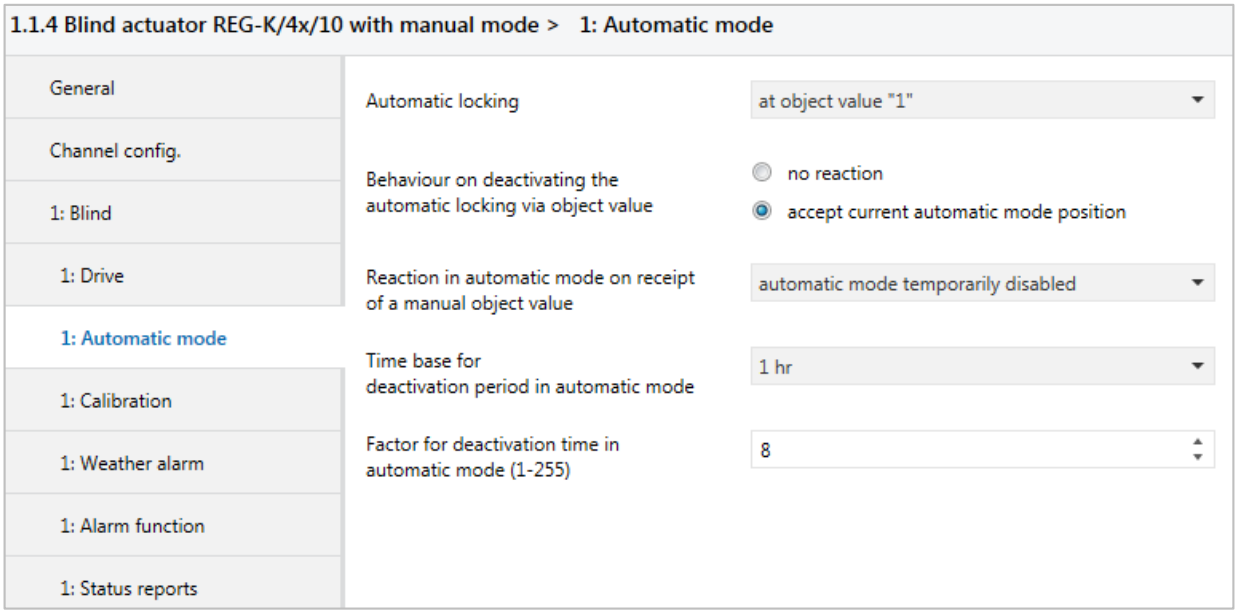
Picture 5: Blind drive setting

After correct setting real height of blinds and slats angle corresponds to the values of status objects.

3.1.5 Automatic mode

In tab **Automatic mode** make sure that the automatic locking mode is at object value 1.

Go to → **Parameter** → **Automatic mode** → **Automatic mode locking** → **at object value 1**



Picture 6: Automatic mode

Set behavior on deactivating the automatic locking.

Go to → **Parameter** → **Automatic mode** → **Behavior on deactivating…** → **accept current automatic…**

Set behavior on manual control (push buttons).

Go to → **Parameter** → **Automatic mode** → **Reaction in …** → **automatic mode temporarily disabled**

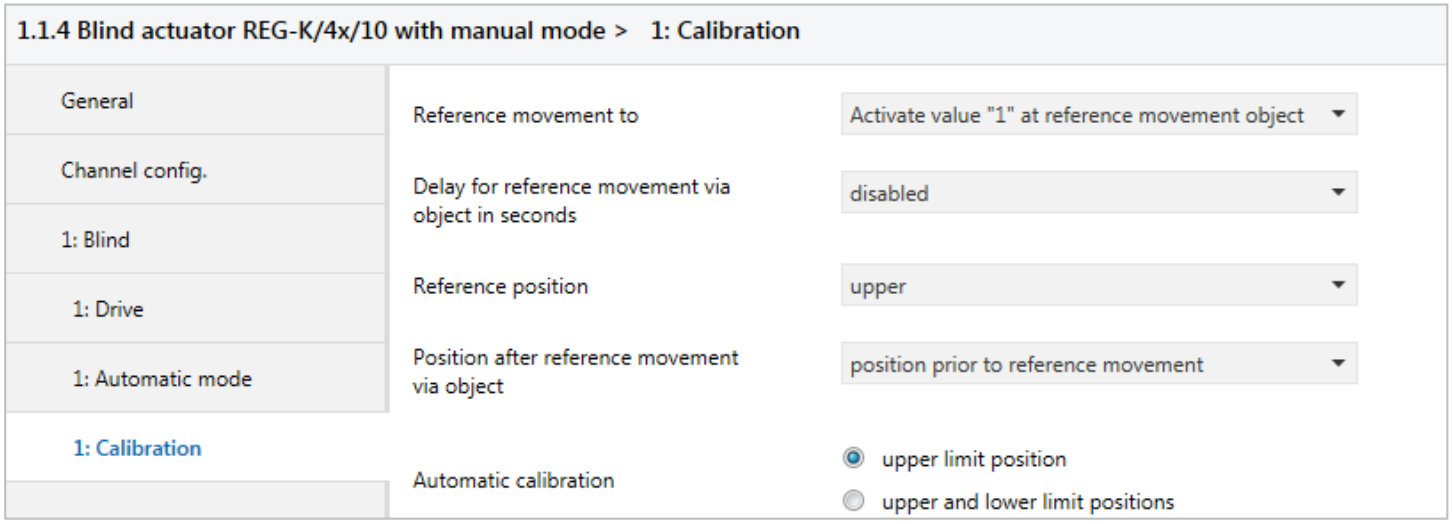
Set how long will be automatic mode disabled after manual action.

Go to → **Parameter** → **Automatic mode** → **Time base for deactivation time…** → **1 hr**

Go to → **Parameter** → **Automatic mode** → **Factor for deactivation time…** → **8**

3.1.6 Calibration

Set the calibration of blinds.



Picture 7: Calibration of blind

Go to → **Parameter → Calibration → Reference movement to → Activate value "1"…**

Go to → **Parameter → Calibration → Delay for reference… → disabled**

Go to → **Parameter → Calibration → Reference position → upper**

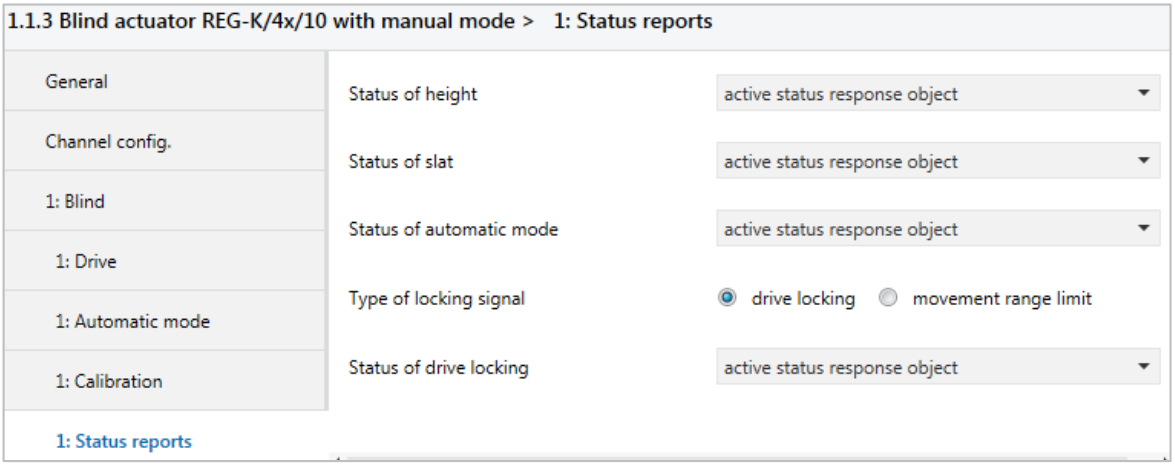
Go to → **Parameter → Calibration → Position after… → position prior to reference movement**

Go to → **Parameter → Calibration → Automatic mode calibration → upper limit position**

The blinds will be calibrated when the value of reference movement object is 1.

3.1.7 Status reports

In the **Status reports** tab set all columns to **active status**.



Picture 8: Status reports of dimming actuator

Go to → **Parameter → Status report → Status of height → active status response object**

Go to → **Parameter → Status report → Status of slat → active status response object**

Go to → **Parameter → Status report → Status of automatic mode → active status response object**

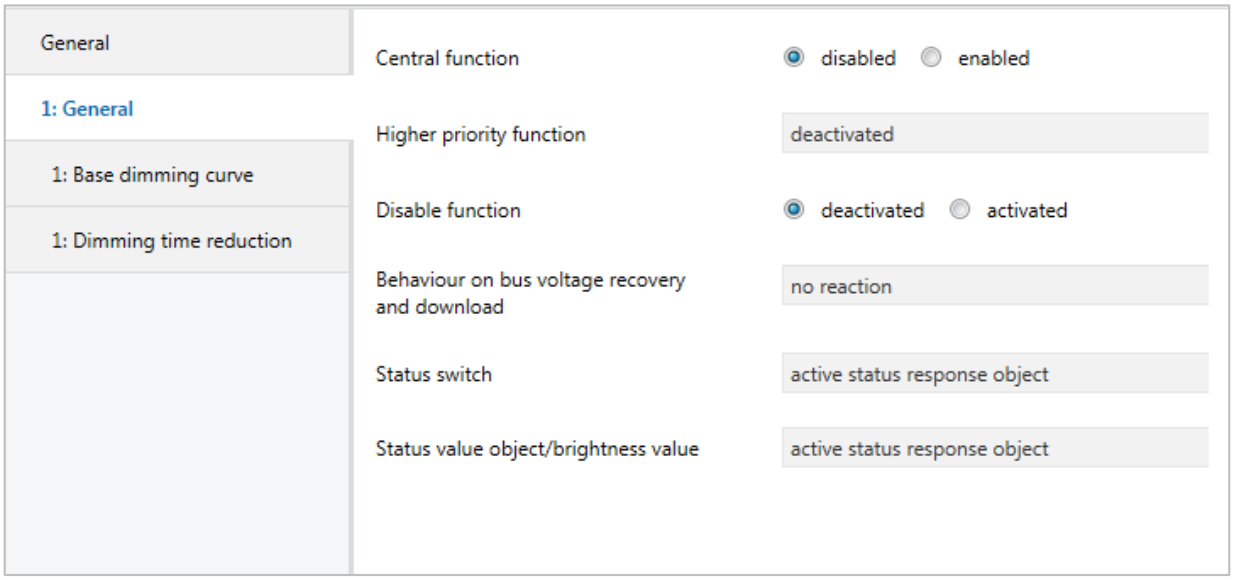
Go to → **Parameter → Status report → Type of locking signal → drive locking**

Go to → **Parameter → Status report → Status of drive locking → active status response object**

3.2 Dimming actuator

Configure dimmer actuator for periodical detection of its status.

Activate at least one channel to be able to set following parameters.



Picture 9: Status objects of dimming actuator

In **General tab** set both status objects.

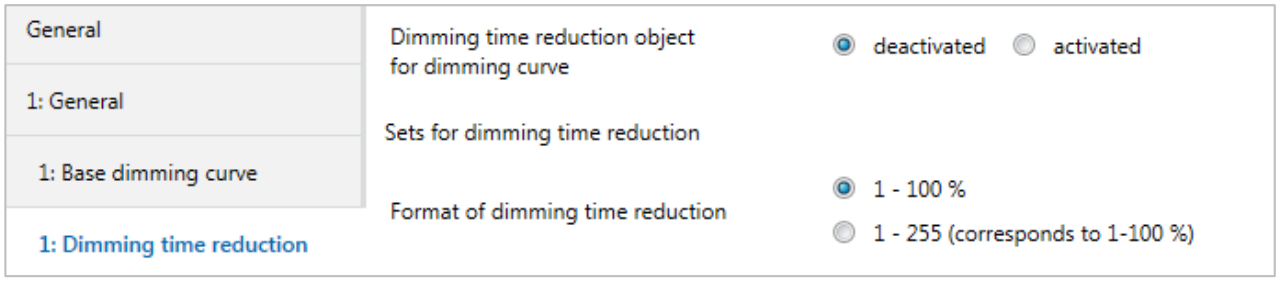
Go to → **Parameter → General → Status switch→ active status response object**

Go to → **Parameter → General → Status value object/brightness value→ active status response object**

The status feedback objects follow status of dimmer.

3.2.1 Dimming time reduction

There is necessary to choose the format of dimming time in the **Dimming time reduction** tab. This format will be used for communication with PIR.



Picture 10: Dimming time reduction format of dimming actuator

Go to → **Parameter** → **Dimming time reduction** → **Format for dimming actuator** → **1 -100 %**

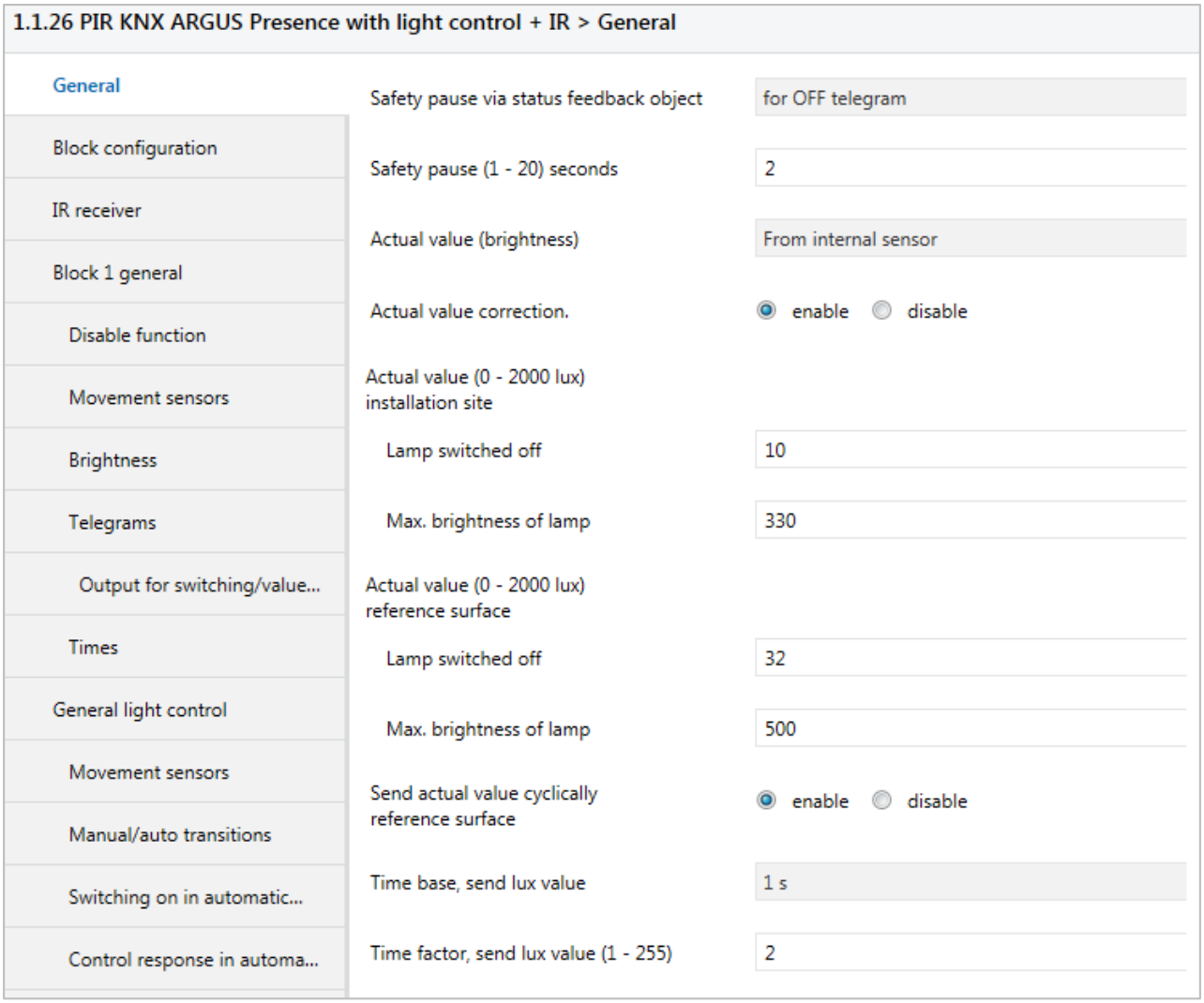
The communication between PIR and dimmer actuator is in the relative format.

3.3 PIR with CLC

This chapter is focused on constant light control configuration in the PIR.

3.3.1 General (PIR calibration)

Calibrate the PIR brightness to reference surface in **General tab**.



Picture 11: PIR general setting

Go to → **Parameter → General → Actual value correction → enable**

Measure the brightness at installation site and reference surface for declared states and fill the inputs.

Measured brightness corresponds to the reference surface brightness.

NOTE: PIR calibration is described in the System user manual for PIR (MTN630919). Pay attention to proper calibration of PIR to get correct brightness value in measured location.

Set how often will be brightness evaluated.

Go to → **Parameter → General → Send actual value cyclically reference surface → enable**

NOTE: The value (2 sec) in the Picture 11 is great for moving blind up and down and fast blind movement stopping according the brightness (the blind can be stopped in any position if brightness is sufficient). This value can be used for small installation (up to 5 PIR).

For large installation (up to 20 PIRs) the evaluating time should be at least 30 second to prevent spaceLYnk overload. With this setting the blind will not be stopped in the middle of height (movement to upper or bottom position with slats adjusting are still possible).

3.3.2 Block configuration

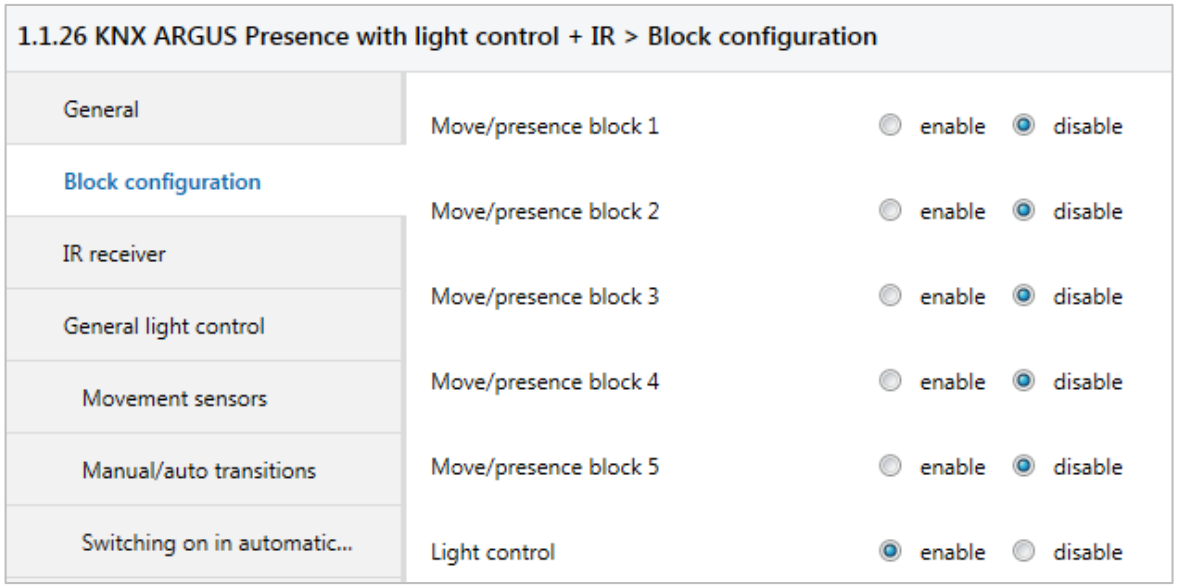
Enable light control.

If there is no need to control another device by PIR disable Move/presence block 1.

Go to → **Parameter → Block configuration → Move/presence block 1 → disable**

Enable the constant light control to allow PIR regulation at constant light level.

Go to → **Parameter → Block configuration → Light control → enable**



Picture 12: Enabling light control

3.3.3 The General light control tab has been enabled. Settings for dimming behavior are described in section General light control (General parameters for light control)

3.3.4 General light control (General parameters for light control)

The lighting is regulated only when the room is occupied. If the PIR is in manual mode, light control is OFF. (light control does not transmit any telegrams).

Set PIR to control light if the movement is detected.

Go to → **Parameter → General light control → Controller is → Depending on movement**

Set the value at which the Automatic/manual object enable automatic mode.

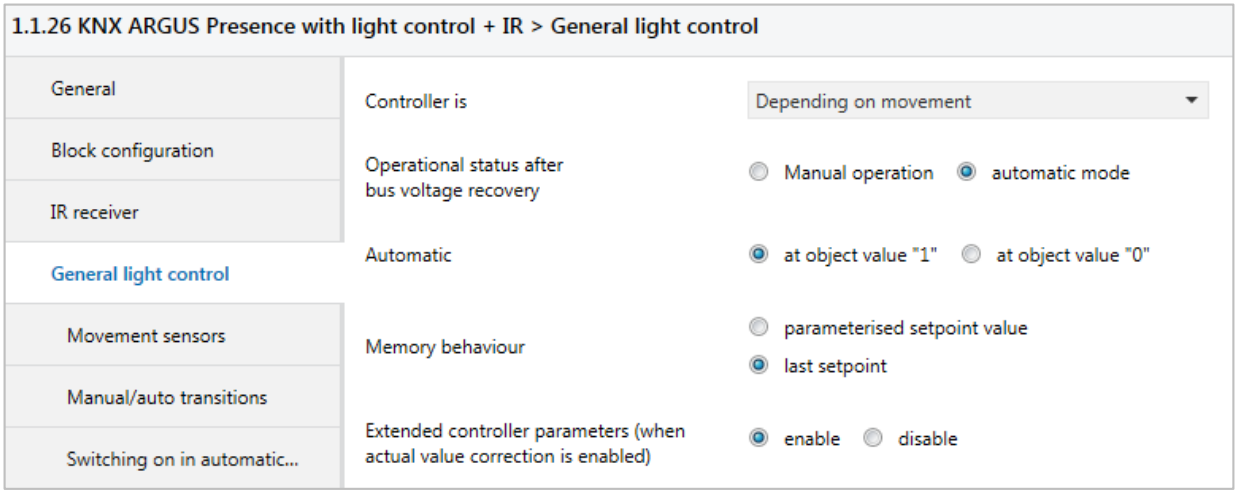
Go to → **Parameter → General light control → Automatic → at object value "1"**

Set PIR to remember the last required light level.

Go to → **Parameter → General light control → Memory behavior → last setpoint**

Enable **Extended controller parameters** which which allows you to access to other tabs.

Go to → **Parameter → General light control → Extended controller parameters → enable**



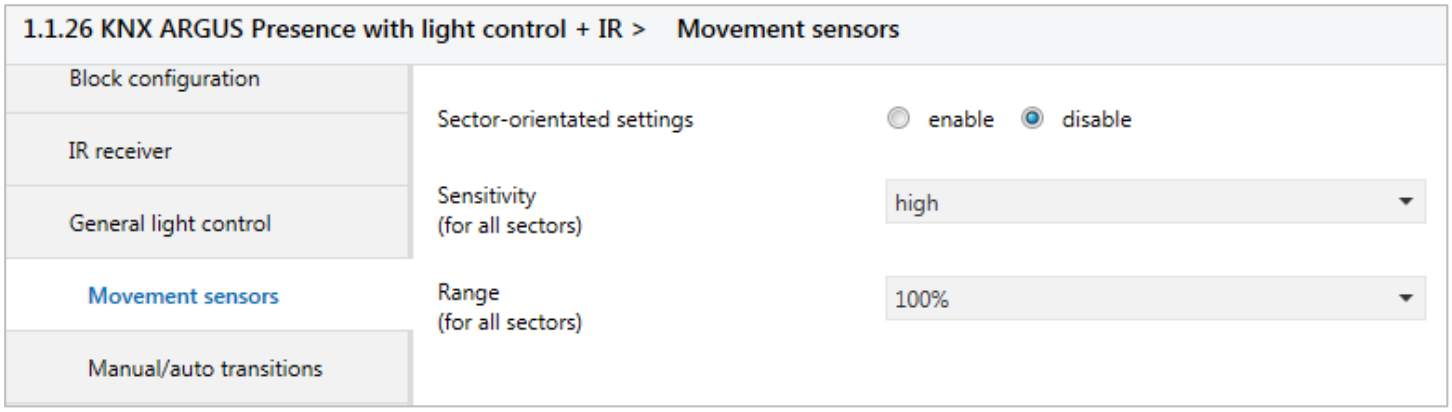
Picture 13: General light control

The light is controlled only if the room is occupied and if the Automatic/manual object is switched to “1”.

3.3.5 Movement sensor (Sensor sensitivity)

Set the sensor sensitivity and range according your preferences. You can set different sensitivity and range for each of four sectors. This can be used for switch and control light only in designated work area without the detection of persons in neighboring areas or passing persons. This parameter helps you to focus movement detection in area.

Go to → **Parameter** → **Movement sensors**

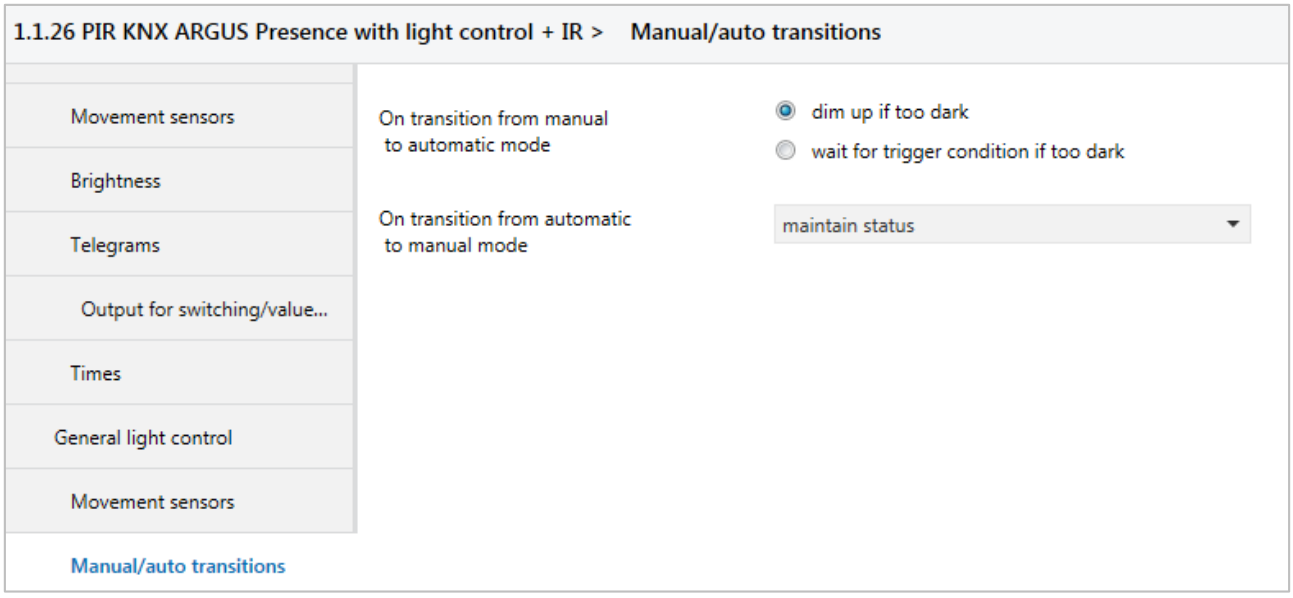


Picture 14: Movement sensors (non sector-orientated setting)

3.3.6 Manual / auto transitions

Set the lighting to dim up if the light conditions are insufficient on transition to automatic mode.

Set the light to maintain status on transition to manual mode.



Picture 15: Manual/auto mode transition

Go to → **Parameter** → **Manual/auto transitions** → **On transition from manual to automat…** → **dim up if too dark**

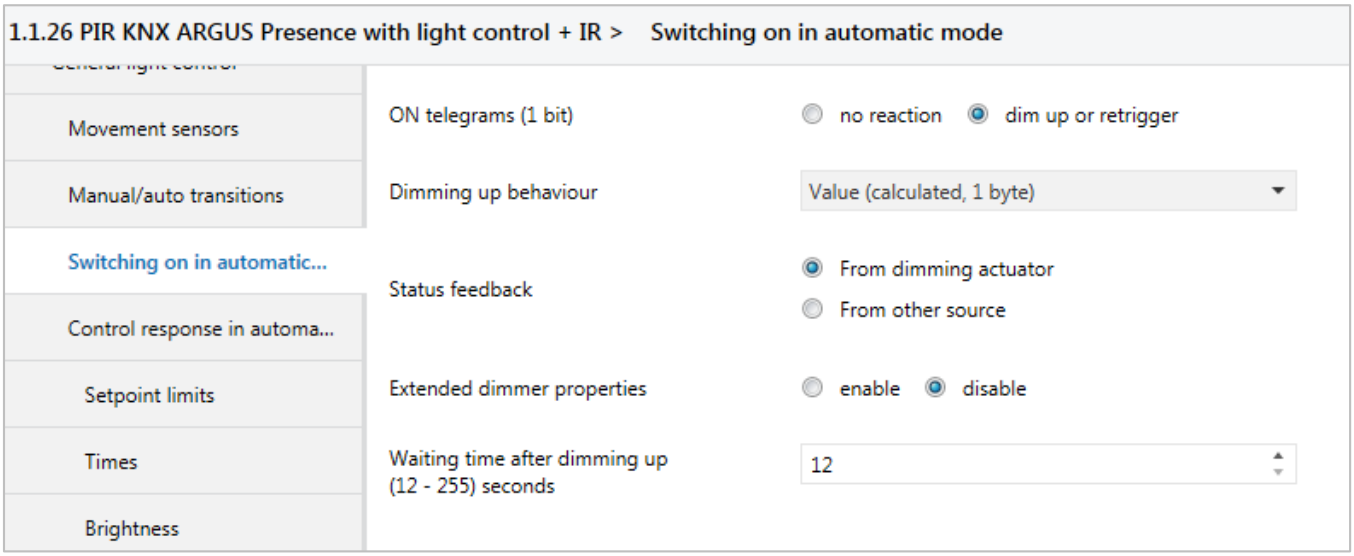
Go to → **Parameter** → **Manual/auto transitions** → **On transition from automat to manual…** → **maintain status**

After switching to automatic mode, the light intensity is amplified in the case of insufficient light conditions.

When manual mode is activated, the light intensity is not changed.

3.3.7 Switching ON in automatic mode

Set the dimming behavior after switching light ON. The setpoint value for dimming up is calculated using actual value of brightness and the status feedback from dimming actuator.



Picture 16: Switching on in automatic mode

Go to → **Parameter → Switching on in auto… → ON telegrams (1 bit) → dim up or retrigger**

Go to → **Parameter → Switching on in auto… → Dimming up behavior → Value (calculated)**

Go to → **Parameter → Switching on in auto… → Status feedback → From dimming actuator**

Go to → **Parameter → Switching on in auto… → Extended dimmer prosperities → disable**

3.3.8 Control response in automatic mode

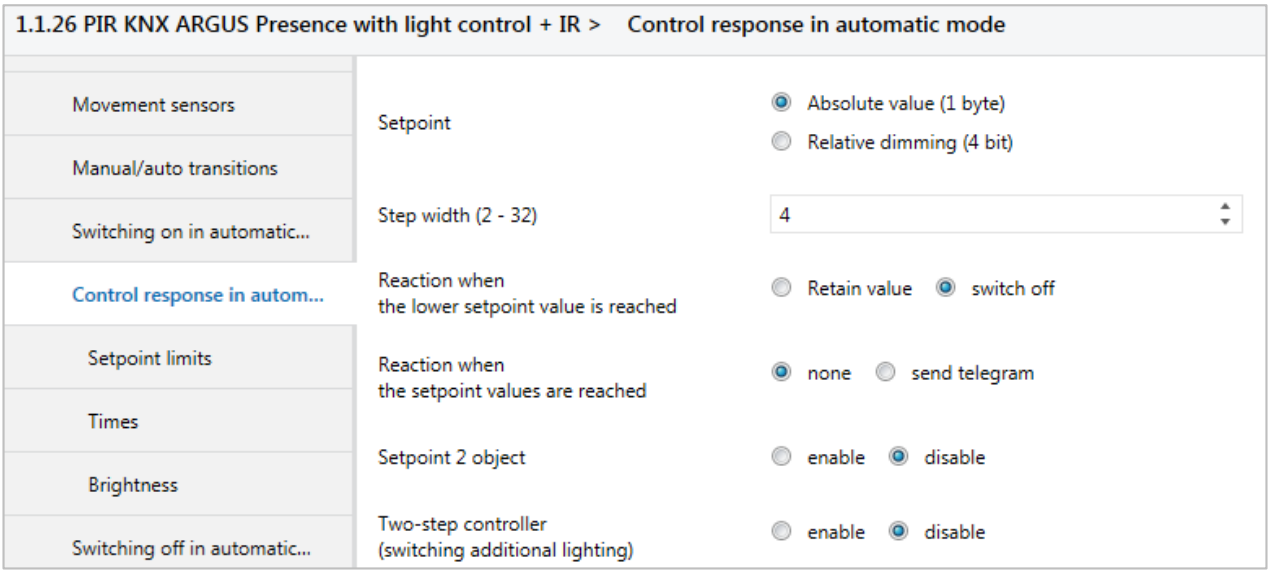
Configure setpoint to absolute value.

Go to → **Parameter** → **Control response in auto…** → **Setpoint** → **Absolute value**

Set reaction if the lower setpoint is reached to switch off.

Go to → **Parameter** → **Control response in auto…** → **Reaction when the setpoint …** → **switch off**

This situation can occur if there is enough daylight and therefore there is no need artificial lighting in the room.



Picture 17: Control response in automatic mode

The lights are switched OFF after reaching the lowest light intensity.

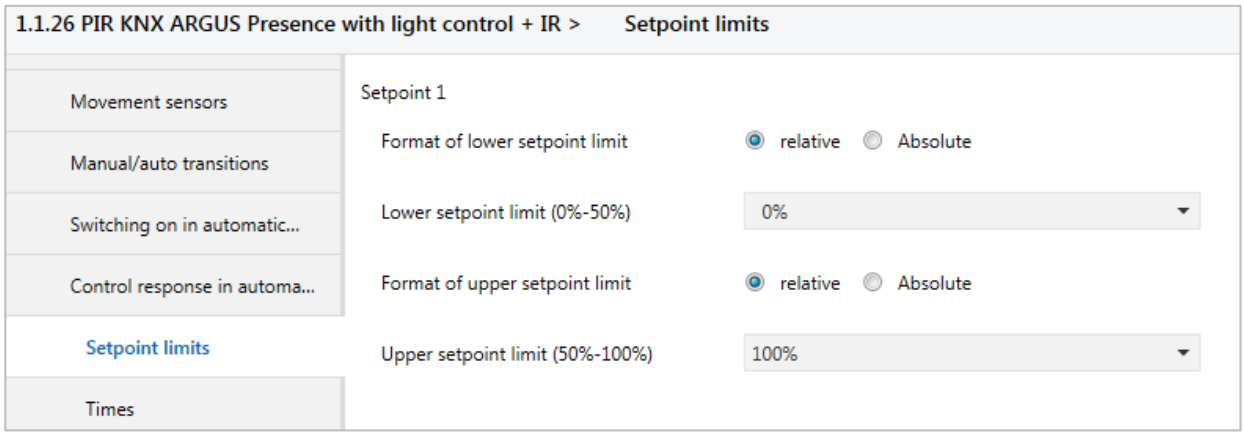
3.3.9 Setpoint limits (Setpoint format)

Set the setpoint format to relative to display percentage values.

Go to → **Parameter** → **Setpoint limits** → **Format of lower setpoint limit** → **relative**

Go to → **Parameter** → **Setpoint limits** → **Format of upper setpoint limit** → **relative**

Set the lower and upper limit for regulation (default 0-100%)



Picture 18: Setpoint limits

The dimmer and PIR communicate in the same (relative) format.

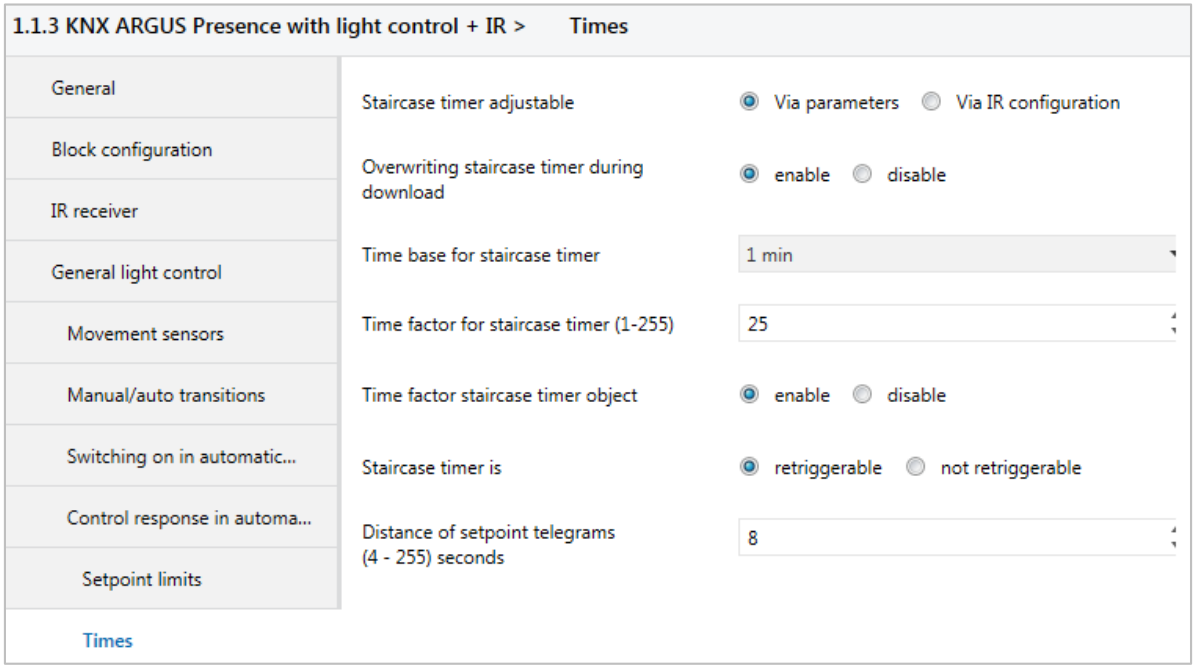
3.3.10 Times (Light switch-off timer setting)

Enable time factor staircase timer object for changing staircase time by object.

Go to → **Parameter** → **Times** → **Time factor staircase timer object** → **enable**

Allow retriggering for reset countdown when movement is detected.

Go to → **Parameter** → **Times** → **Staircase timer is** → **retriggerable**

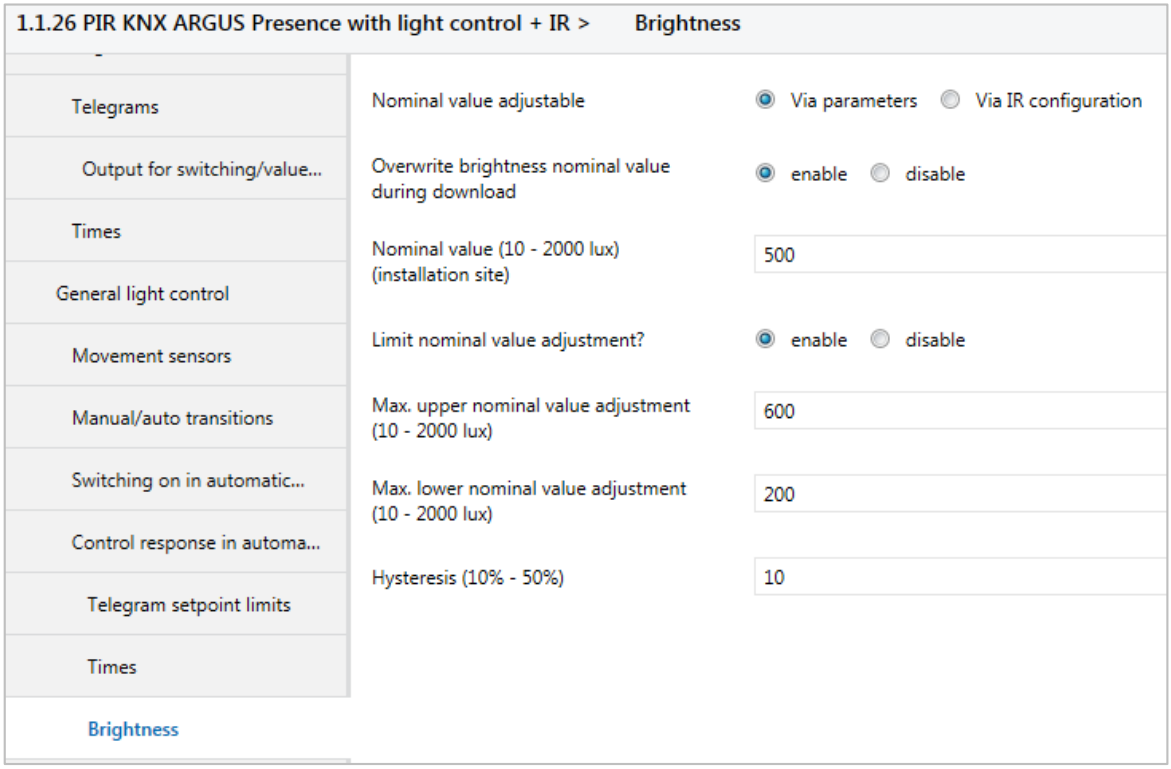


Picture 19: Times configuration

User can adjust time during which the light is switched ON by changing **time factor object**.

3.3.11 Brightness (Brightness adjustment)

Set the minimal and maximal brightness which is allowed to adjust.



Picture 20: Brightness adjusting

Go to → **Parameter → Brightness → Limit nominal value adjustment → enable**

Go to → **Parameter → Brightness → Max. upper nominal**

Go to → **Parameter → Brightness → Max. lower nominal**

User can change the brightness only in the defined range.

3.3.12 Switching off in automatic mode

Set the reaction on receipt OFF telegram

Go to → **Parameter** → **Switching off in auto…** → **Reaction on receipt** → **Dim down..**

Set the reaction when staircase timer has elapsed

Go to → **Parameter** → **Switching off in auto…** → **Reaction when staircase timer has elapsed** → **Dim down..**

Set the behavior for dimming down after timer has elapsed

Go to → **Parameter** → **Switching off in auto…** → **Reaction when dimming down time has elapsed** → **switch off**

Enable retriggering

Go to → **Parameter** → **Switching off in auto…** → **After dimming down, triggering is** → **possible**

Set the dimming behavior to absolute

Go to → **Parameter** → **Switching off in auto…** → **Dimming down behavior** → **Absolute value**

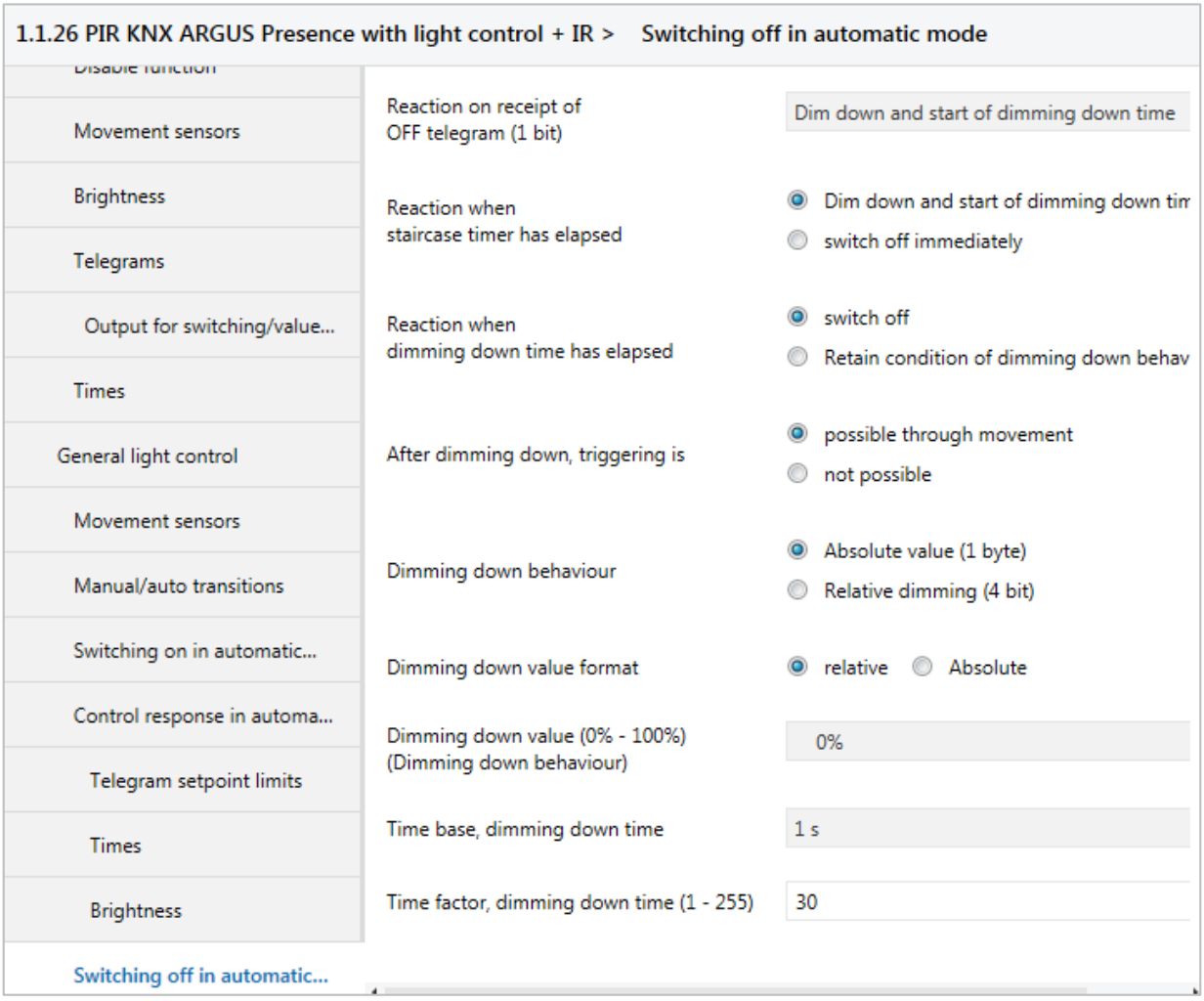
Set the dimming format to relative

Go to → **Parameter** → **Switching off in auto…** → **Dimming down value format** → **relative**

Set the dimming down time (time before switch off).

Go to → **Parameter** → **Switching off in auto..** → **Time factor, dimming down time**

This prevents the sudden shutdown of light.



Picture 21: Switch off in automatic mode

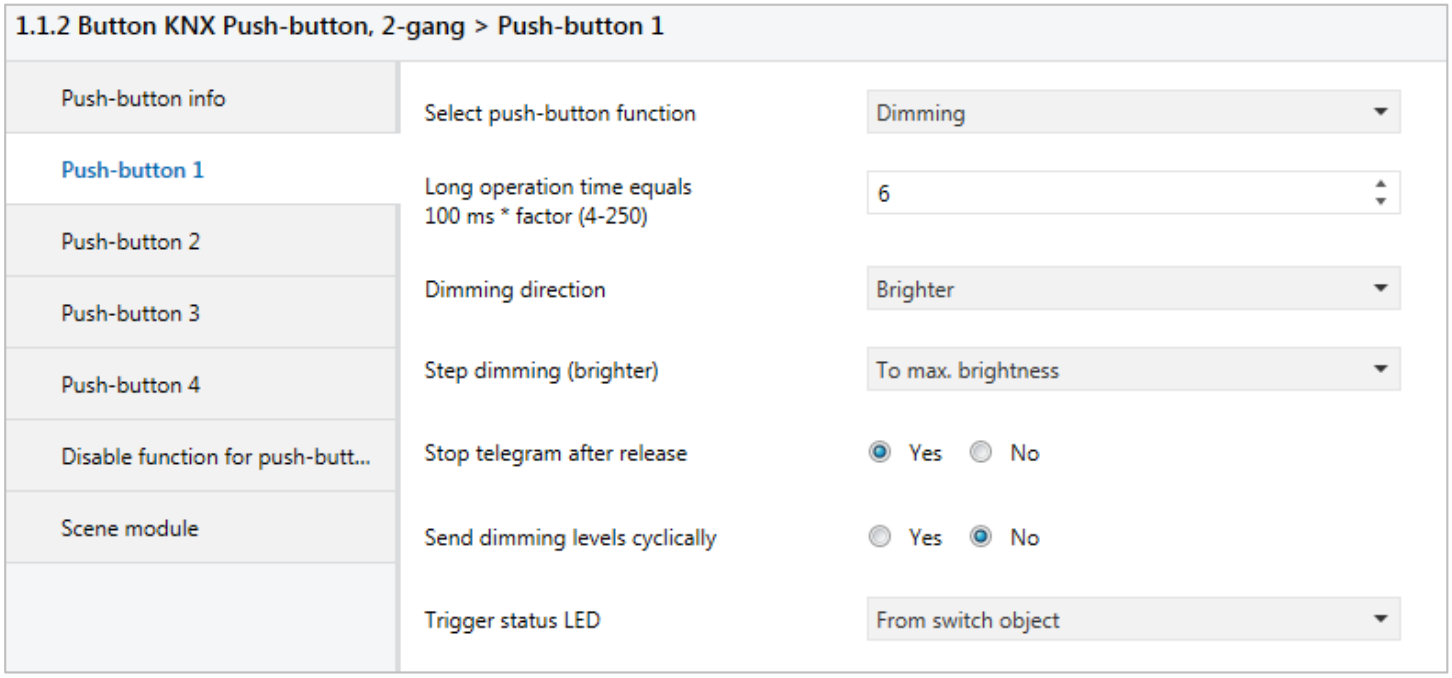
NOTE: After staircase timer expires the dimming down time should be at least 30 seconds.

After the staircase timer expires the light will be dimmed down for defined time (30 sec) before being switched off and the timer can be retriggered during this period by motion.

3.4 Push-buttons

Configure push-buttons for manual control

3.4.1 Button for dimming up



Picture 22: Push-button dimming up

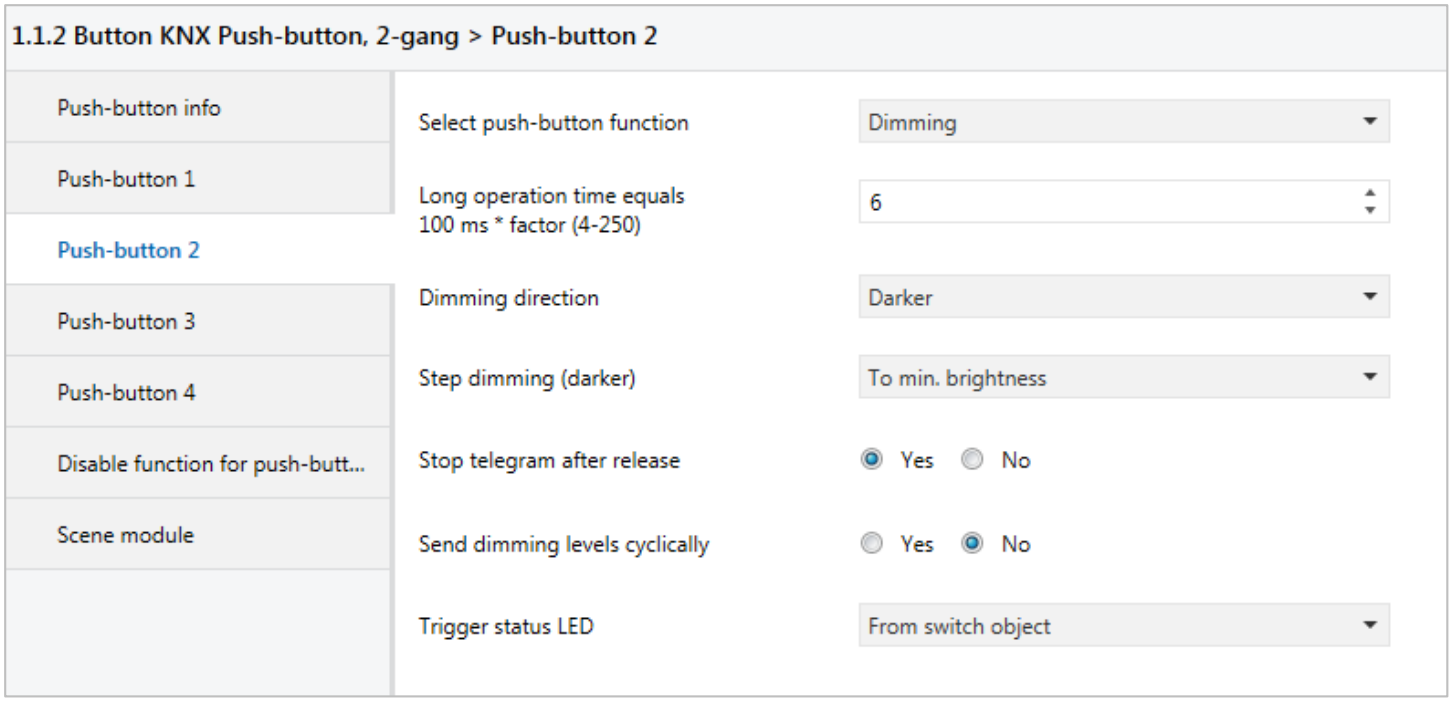
Go to → **Parameter → Push-button 1 → Select push-button function → dimming**

Go to → **Parameter → Push-button 1 → dimming direction → brighter**

Go to → **Parameter → Push-button 1 → step dimming → to max. brightness**

Go to → **Parameter → Push-button 1 → stop telegram after release → Yes**

3.4.2 Button for dimming down



Picture 23: Push-button dimming down

Go to → **Parameter → Push-button 1 → Select push-button function → dimming**

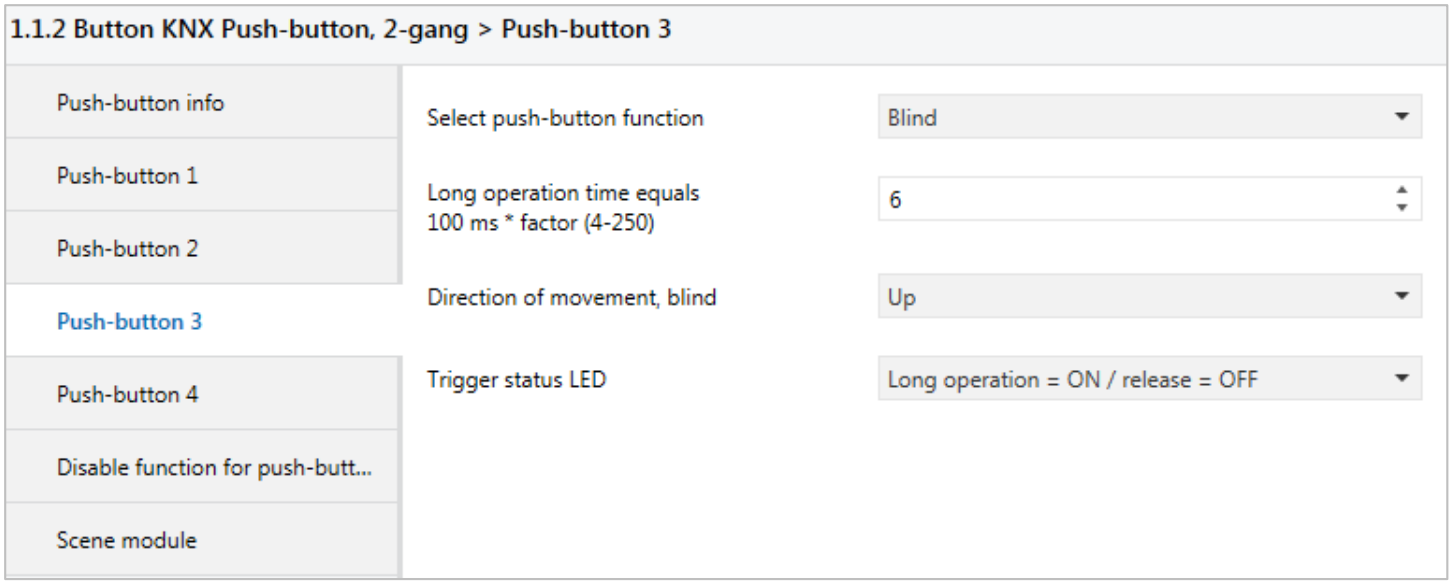
Go to → **Parameter → Push-button 1 → dimming direction → darker**

Go to → **Parameter → Push-button 1 → step dimming → to min. brightness**

Go to → **Parameter → Push-button 1 → stop telegram after release → Yes**

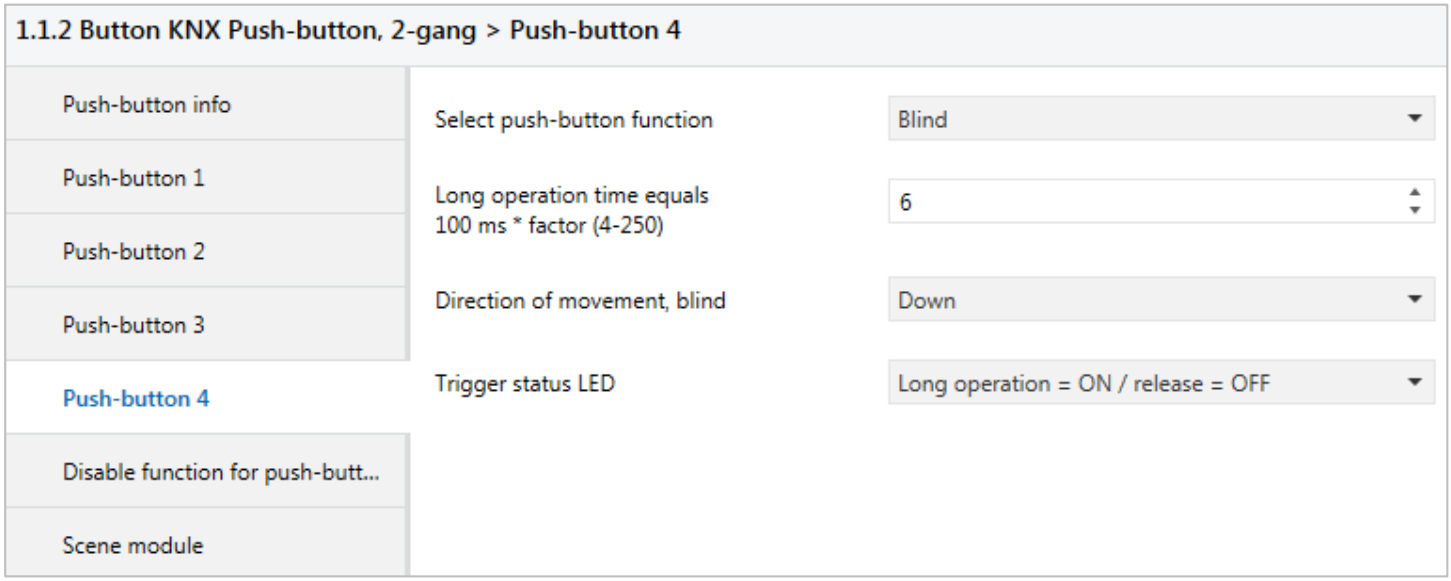
The button objects are ready for connection with dimming actuator.

3.4.3 Button for blind movement up



Picture 24: Push-button blind movement up

3.4.4 Button for blind movement down



Picture 25: Push-button blind movement down

The button objects are ready for connection with blind actuator.

3.5 Creating group addresses

Create topology for designed room. Create the group addresses for all important objects in the device.

NOTE: We strongly recommend you to follow group addresses during testing possibilities of this solution. Later on you can change addresses according project needs. BTN = button, PIR= presence sensor, BL= blind actuator

group name	group address	Group description
BL_movement manual	0/0/1	Moving blinds in manual mode
BL_stop/step manual	0/0/2	Stopping blind movement in manual mode
BL_height manual	0/0/3	Setting height of blind in manual mode
BL_slat position manual	0/0/4	Changing slats angle in manual mode
BL_movement auto	0/0/5	Moving blinds in automatic mode
BL_stop/step auto	0/0/6	Stopping blind movement in automatic mode
BL_height auto	0/0/7	Setting height of blind in automatic mode
BL_slat position auto	0/0/8	Changing slats angle in automatic mode
BL_automatic locking	0/0/9	Locking automatic movements
BL_calibration	0/0/10	Calibration of blinds
BL_height feedback	0/0/11	Status of blind height
BL_slat feedback	0/0/12	Status of slats angle
BL_drive locking feedback	0/0/13	Status of blind drive locking
PIR_switch output	0/0/14	Motion detection and switching light on
PIR_dimming output	0/0/15	Dimming output from PIR to dimmer
PIR_setpoint 1	0/0/16	PIR setting calculated dimmer value
PIR_feedback operation mode	0/0/17	Status of operation mode (auto/man)
PIR_switch input	0/0/18	Input for forced switch
PIR_value input	0/0/19	Input for forced value of dimmer
PIR_lux value setting	0/0/20	Setting of required brightness
PIR_auto/man setting	0/0/21	Setting of operation mode (auto/man)
PIR_time factor	0/0/22	Time before switch off when motion is not detected
PIR_resulting actual value	0/0/23	Actual value of brightness on surface
PIR_status feedback switch	0/0/24	Status of PIR switch (motion detection)
PIR _status feedback brightness	0/0/25	Status of dimmer value
BTN_dimming brighter	0/0/26	Long button press - dimming light brighter
BTN_dimming darker	0/0/27	Long button press - dimming light darker
BTN_switch light ON	0/0/28	Short button press – switch light on
BTN_switch light OFF	0/0/29	Short button press – switch light off
BTN_blind movement UP	0/0/30	Long button press – blind move up
BTN_blind movement DOWN	0/0/31	Long button press – blind move down
BTN_slat step to open	0/0/32	Short button press - step to open slats
BTN_slat step to close	0/0/33	Short button press - step to close slats

Table 2: Group addresses summary

3.6 Linking group addresses

Link ETS objects to appropriate group addresses.

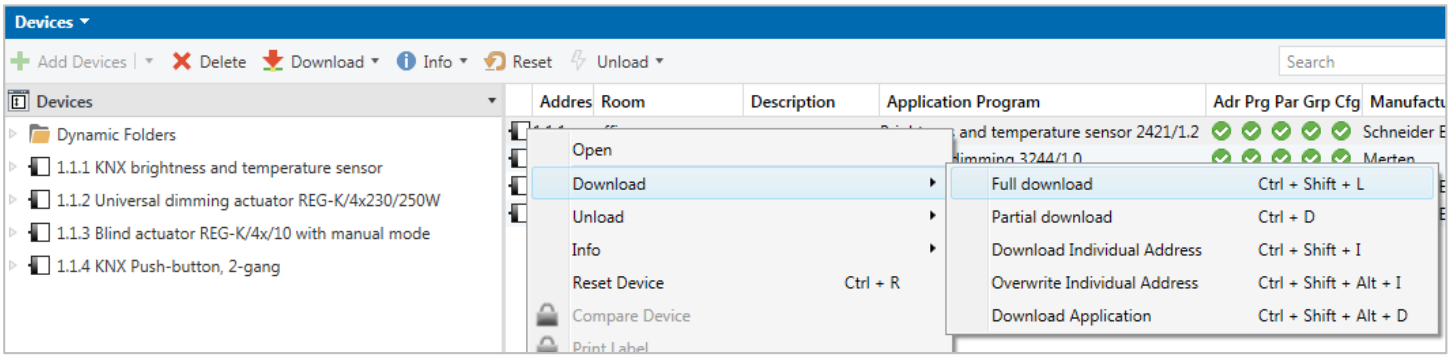
Group name	group address	Objects
BL_movement_manual	0/0/1	Blind actuator REG-K/4x/10 with manual mode 0: Movement object for manual mode - Channel 1
BL_stop/step manual	0/0/2	Blind actuator REG-K/4x/10 with manual mode 1: Stop/step object in manual mode - Channel 1
BL_height manual	0/0/3	Blind actuator REG-K/4x/10 with manual mode 2: Height in manual mode - Channel 1
BL_slat position manual	0/0/4	Blind actuator REG-K/4x/10 with manual mode 3: Slat in manual mode - Channel 1
BL_movement auto	0/0/5	Blind actuator REG-K/4x/10 with manual mode 4: Movement object for automatic mode - Channel 1
BL_stop/step auto	0/0/6	Blind actuator REG-K/4x/10 with manual mode 5: Stop/step object in automatic mode - Channel 1
BL_height auto	0/0/7	Blind actuator REG-K/4x/10 with manual mode 6: Height in automatic mode - Channel 1
BL_slat position auto	0/0/8	Blind actuator REG-K/4x/10 with manual mode 7: Slat position in automatic mode - Channel 1
BL_automatic locking	0/0/9	Blind actuator REG-K/4x/10 with manual mode 12: Automatic locking - Channel 1
BL_calibration	0/0/10	Blind actuator REG-K/4x/10 with manual mode 233: Activate reference movement – Calibration of all channels
BL_height feedback	0/0/11	Blind actuator REG-K/4x/10 with manual mode 16: Status feedback for height – Channel 1
BL_slat feedback	0/0/12	Blind actuator REG-K/4x/10 with manual mode 17: Status feedback for slats - Channel 1
BL_drive locking feedback	0/0/13	Blind actuator REG-K/4x/10 with manual mode 18: Status feedback for drive locking - Channel 1
PIR_switch output	0/0/14	KNX ARGUS Presence with light control + IR 60: Switch output - Closed-loop control Universal dimming actuator REGK/4x230/250W 0: Switch object - Channel 1, general
PIR_dimming output	0/0/15	KNX ARGUS Presence with light control + IR 61: Dimming output - Closed-loop control Universal dimming actuator REGK/4x230/250W 1: Dimming object - Channel 1, general
PIR_setpoint 1	0/0/16	KNX ARGUS Presence with light control + IR 62: Setpoint 1 - Closed-loop control Universal dimming actuator REGK/4x230/250W 2: Value object - Channel 1, general

PIR_feedback operation mode	0/0/17	KNX ARGUS Presence with light control + IR 64: Feedback, operation mode – Closedloop control
PIR_switch input	0/0/18	KNX ARGUS Presence with light control + IR 68: Switch input - Closed-loop control
PIR_value input	0/0/19	KNX ARGUS Presence with light control + IR 70: Value input - Closed-loop control
PIR_lux value setting	0/0/20	KNX ARGUS Presence with light control + IR 71: Lux value setting - Closed-loop control
PIR_auto/man setting	0/0/21	KNX ARGUS Presence with light control + IR 72: Automatic/manual object – Closedloop control
PIR_time factor	0/0/22	KNX ARGUS Presence with light control + IR 75: Time factor, staircase timer – Closedloop control
PIR_resulting actual value	0/0/23	KNX ARGUS Presence with light control + IR 107: Resulting actual value – Send
PIR_status feedback switch	0/0/24	KNX ARGUS Presence with light control + IR 109: Status feedback object – Safety pause Universal dimming actuator REGK/4x230/250W 8: Status feedback switch - Channel 1, status feedback
PIR _status feedback brightness	0/0/25	KNX ARGUS Presence with light control + IR 110: Status feedback object – Brightness value, dimming act. Universal dimming actuator REGK/4x230/250W 9: Status feedback value object/brightness value - Channel 1, status feedback
BTN_dimming brighter	0/0/26	KNX Push-button, 2-gang 1: Dimming object - Push-button 1 KNX ARGUS Presence with light control + IR 69: Dimming input - Closed-loop control
BTN_dimming darker	0/0/27	KNX Push-button, 2-gang 4: Dimming object - Push-button 2 KNX ARGUS Presence with light control + IR 69: Dimming input - Closed-loop control
BTN_switch light ON	0/0/28	KNX Push-button, 2-gang 0: Switch object - Push-button 1 Universal dimming actuator REGK/4x230/250W 0: Switch object - Channel 1, general
BTN_switch light OFF	0/0/29	KNX Push-button, 2-gang 3: Switch object - Push-button 2 Universal dimming actuator REGK/4x230/250W 0: Switch object - Channel 1, general
BTN_blind movement UP	0/0/30	KNX Push-button, 2-gang 7: Movement object - Push-button 3 Blind actuator REG-K/4x/10 with manual mode 0: Movement object for manual mode - Channel 1
BTN_blind movement DOWN	0/0/31	KNX Push-button, 2-gang 10: Movement object - Push-button 4 Blind actuator REG-K/4x/10 with manual mode 0: Movement object for manual mode - Channel 1
BTN_slat step to open	0/0/32	KNX Push-button, 2-gang 6: Stop/step object - Push-button 3 Blind actuator REG-K/4x/10 with manual mode 1: Stop/step object in manual mode - Channel 1
BTN_slat step to close	0/0/33	KNX Push-button, 2-gang 9: Stop/step object - Push-button 4 Blind actuator REG-K/4x/10 with manual mode 1: Stop/step object in manual mode - Channel 1

Table 3: The assignment of objects to group addresses

3.7 Download devices

- Go to **Devices**
- Right click device you want to download.
- Click **Download**
- Click **Full download**



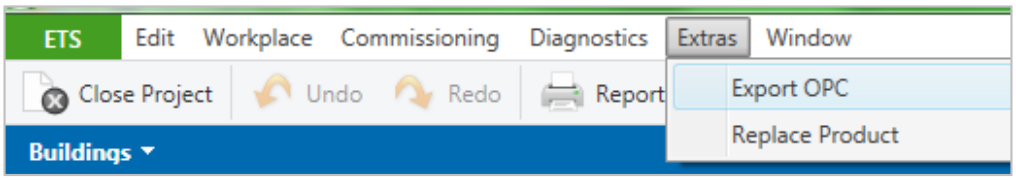
Picture 26: ETS downloading

Follow the ETS instruction. Repeat for all the devices.

3.8 Export *.ESF file and import to the spaceLYnk

STEP 1: Export created group addresses to ESF file.

Go to → **Extras → Export OPC**

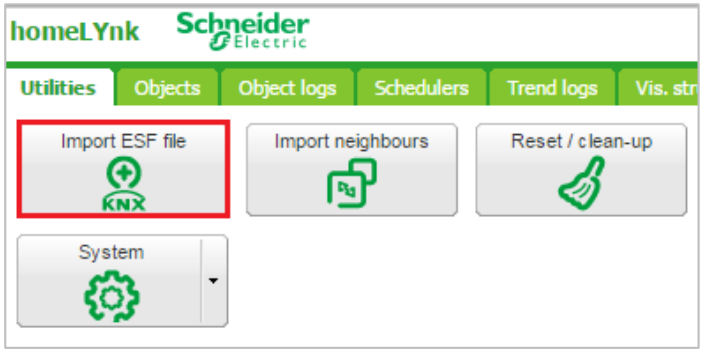


Picture 27: Exporting objects from ETS

RESULT: ESF file was created.

STEP 2: Import ESF to the spaceLYnk.

Go to → **Configurator → Utilities → Import ESF file → Choose your ESF file**



Picture 28: Importing *.esf file to spaceLYnk

RESULT: ESF file was imported.

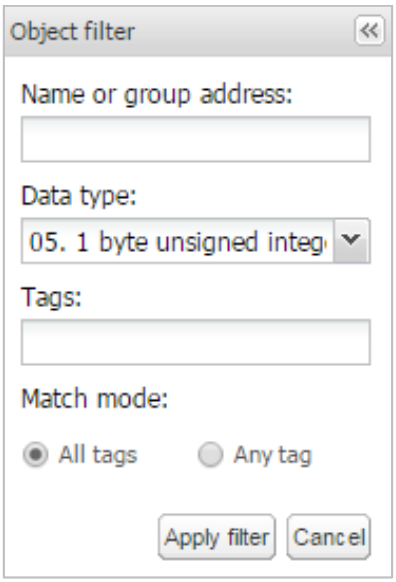
4 spaceLYnk configuration

4.1 Data type

Change the all (except PIR_time factor) **1 byte unsigned** objects' data type to **scale** to display values in percentages.

You can use **Mass edit** function

STEP 1: Filter all **1 byte unsigned** objects



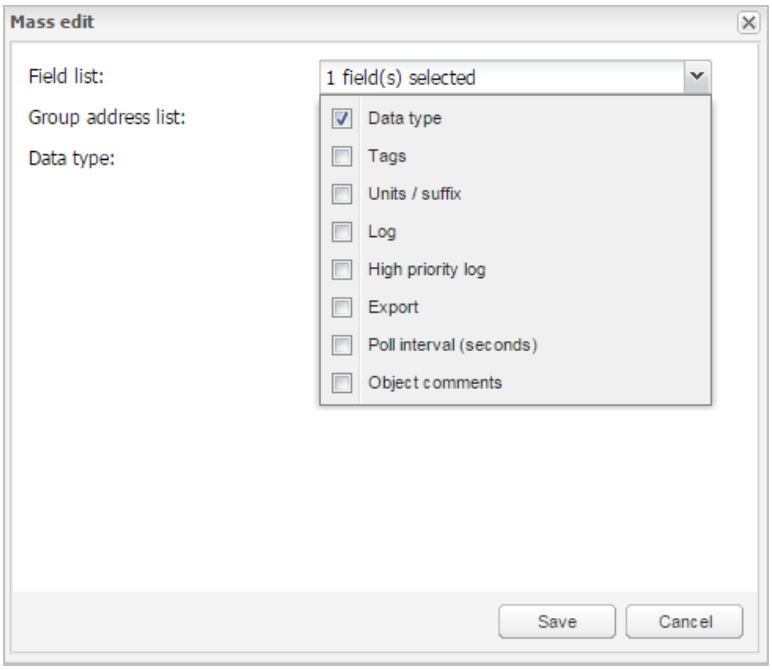
Picture 29: Object filter

STEP 2: Click **Mass edit** button



Picture 30: Mass edit step 1

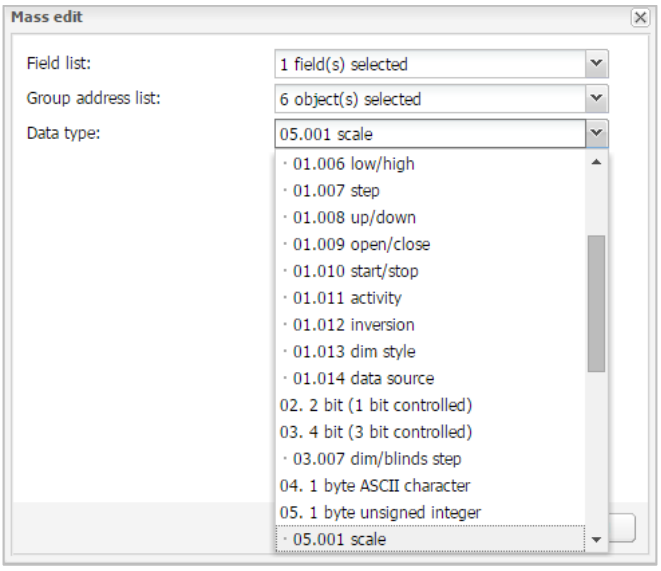
STEP 3: Set Field list to **Data type**



Picture 31: Mass edit step 2

STEP 4: In group address list deselect the addresses which you do not want to change (PIR_time factor)

STEP 5: Set Data type to **scale**



Picture 32: Mass edit 3

STEP 5: Click **SAVE**

4.2 Creating objects in the spaceLYnk

Create additional objects for user customization and proper script functionality.

It is necessary to create these objects for each separately controlled blind or for the group of blinds with identical behavior. CUS = custom

CUS_Button pressed –1 bit - If variable is true, the manual mode is enabled and countdown timer is triggered.

For user customization you can also create:

CUS_Maximal brightness – 2 byte floating point - Maximum brightness acceptable by user

4.3 Blind calibration

After *.ESF file import the blind height feedback and slat angle feedback does not show correct values. Set value of the object **BL_calibration** to **1** and wait until the calibration is complete. **BL_status feedback for height** and **BL_status feedback for slats** will be updated. After calibration set value of the object **BL_calibration** to **0.**

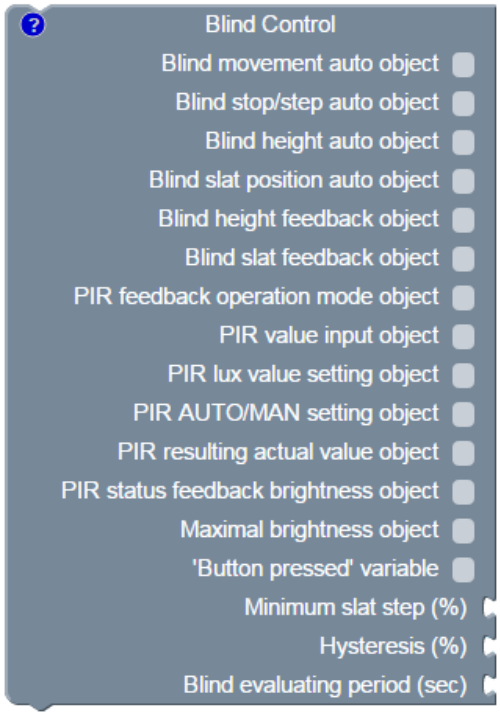
4.4 Creation of block function

- Go to **Scripting → Block functions**
- Copy code from the text file **AN032BlockFunction.txt.**
- Click **Save**

New functions blocks are in Block editor in tab **Custom functions.**

4.5 Function block for blind control

For proper function of blind control block is necessary to fill all objects which are linked with automatic mode.



parameter name	description
Blind movement auto object	Moving blinds in automatic mode
Blind stop/step auto object	Stopping blind movement in automatic mode
Blind height auto object	Setting height of blind in automatic mode
Blind slat position auto object	Changing slats angle in automatic mode
Blind height feedback object	Status of blind height
Blind slat feedback object	Status of slats angle
PIR feedback operation mode object	Status of operation mode (auto/man)
PIR value input object	Input for forced value of dimmer
PIR lux value setting object	Setting of required brightness
PIR auto/man setting object	Setting of operation mode (auto/man)
PIR resulting actual value object	Actual value of brightness on surface
PIR status feedback brightness object	Status of dimmer value
Maximal brightness object	Threshold at which the brightness is disruptive.
Button pressed variable	Variable for indicating of the button press
Minimum slat step	Minimum step percent when adjusting the slats.
Hysteresis	Allowable difference from desired brightness
Blind evaluating period	Time before next change of the blind position

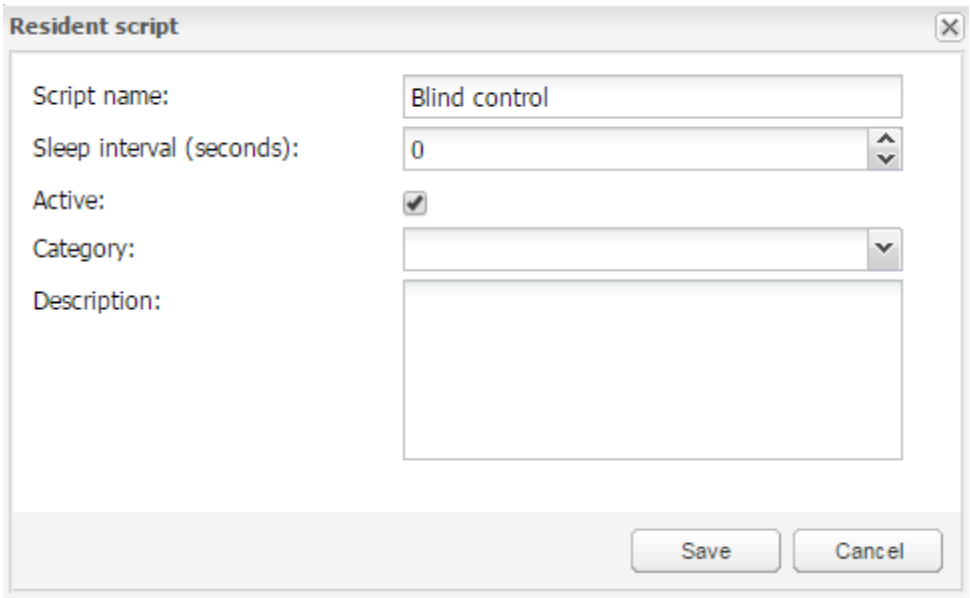
Table 4: Parameters for Blind Control function block

4.6 Scripts setting

4.6.1 Blind control

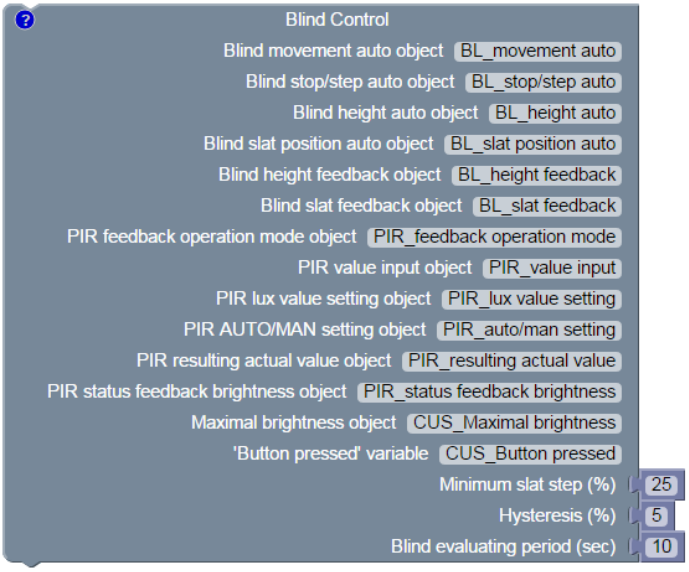
Create resident script for blind control

Go to → **spaceLYnk web interface → Configurator → Scripting → Resident → Add new script**



Picture 33: Creating blind control script

Insert **Blind Control function block** and fill all the parameters.



Picture 34: Blind Control function block

4.6.2 Push buttons

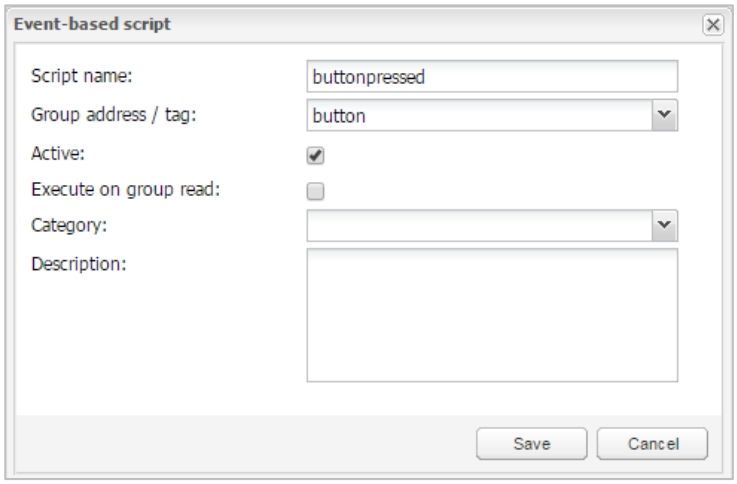
Create **button** tags on push buttons which control the lights.

Group address	Object name	Event sc...	Data type	Current value	Log	Export	Tags
0/0/26	BTN_dimming brighter		03.007 dim/blinds step	Stop			button
0/0/27	BTN_dimming darker		03.007 dim/blinds step	Stop			button
0/0/28	BTN_switch light ON		01. 1 bit (boolean)	1			button
0/0/29	BTN_switch light OFF		01. 1 bit (boolean)	0			button

Picture 35: Creation of button tags

Create event script on **button** tag

Go to → **spaceLYnk web interface** → **Configurator** → **Scripting** → **Even-based** → **Add new script**



Picture 36: Creating of event script on button tag

Script will set **CUS_Button pressed** to true and switch to manual mode every time when the button is pressed.

PIR remains in manual mode (CLC OFF) until the value of object **CUS_Button pressed** is changed to **0**.

Copy code to script editor:

```
grp.write('1/1/1', true)
grp.write('1/1/2', false)
```

Address of CUS Button pressed object

Address of PIR_Auto/man setting object

4.6.3 Manual/auto mode transition

Due to the fact that PIR staircase timer does not work in manual mode, it is necessary to switch to automatic mode in another way. To automatic mode can be switched by changing the **Automatic/manual object**. This can be done via a dedicated button or script that will do so after a certain time. The following section is an example using scheduled script.

STEP 1: Create script on **'CUS_Button pressed'** object which will set your own timer if the button is pressed.

```
if (grp.getvalue('1/1/1') == true) then

storage.set('Timer1', 1)

end
```

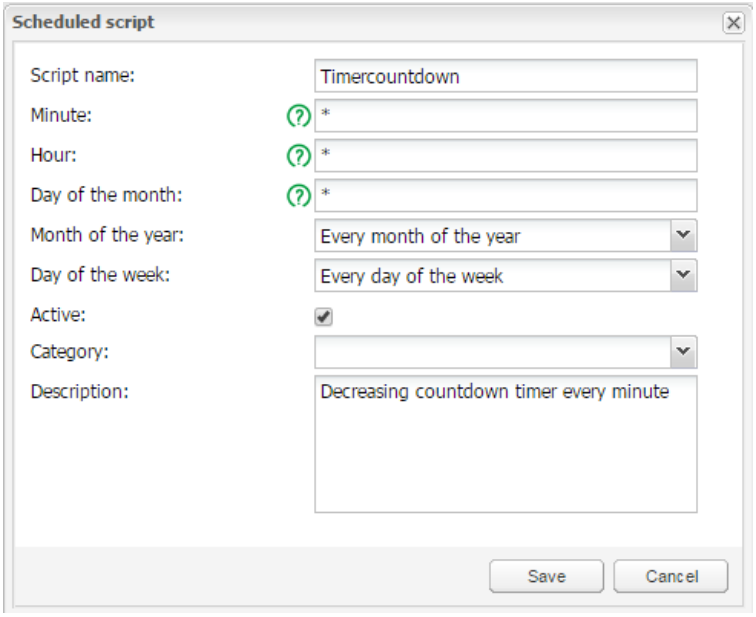
Address of CUS Button pressed object

Time factor (quantity of time unit)

Unique variable name for timer

NOTE: Time factor results in total time before the mode is switched back to automatic mode

STEP 2: Create a scheduled script that will countdown your timer



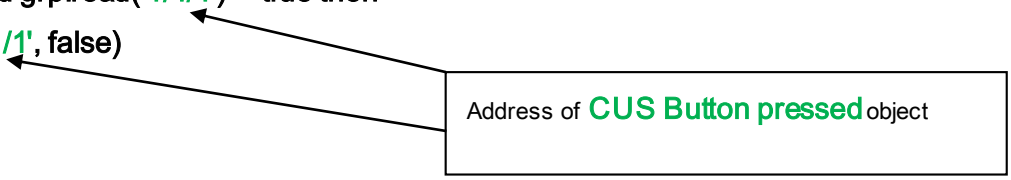
Picture 37: Countdown timer setting for Time base 1 minute

NOTE: You can set the script evaluation to every minute or every hour according the Time base.

Total time = Time factor x Time base

STEP 3: Fill in the scheduled script

```
local timer = storage.get('Timer1',0)
if timer==0 and grp.read('1/1/1')==true then
  grp.write('1/1/1', false)
  os.sleep(2)
else
  timer=timer-1
  os.sleep(2)
  storage.set('Timer1', timer)
end
```



Save and activate script.

RESULT:

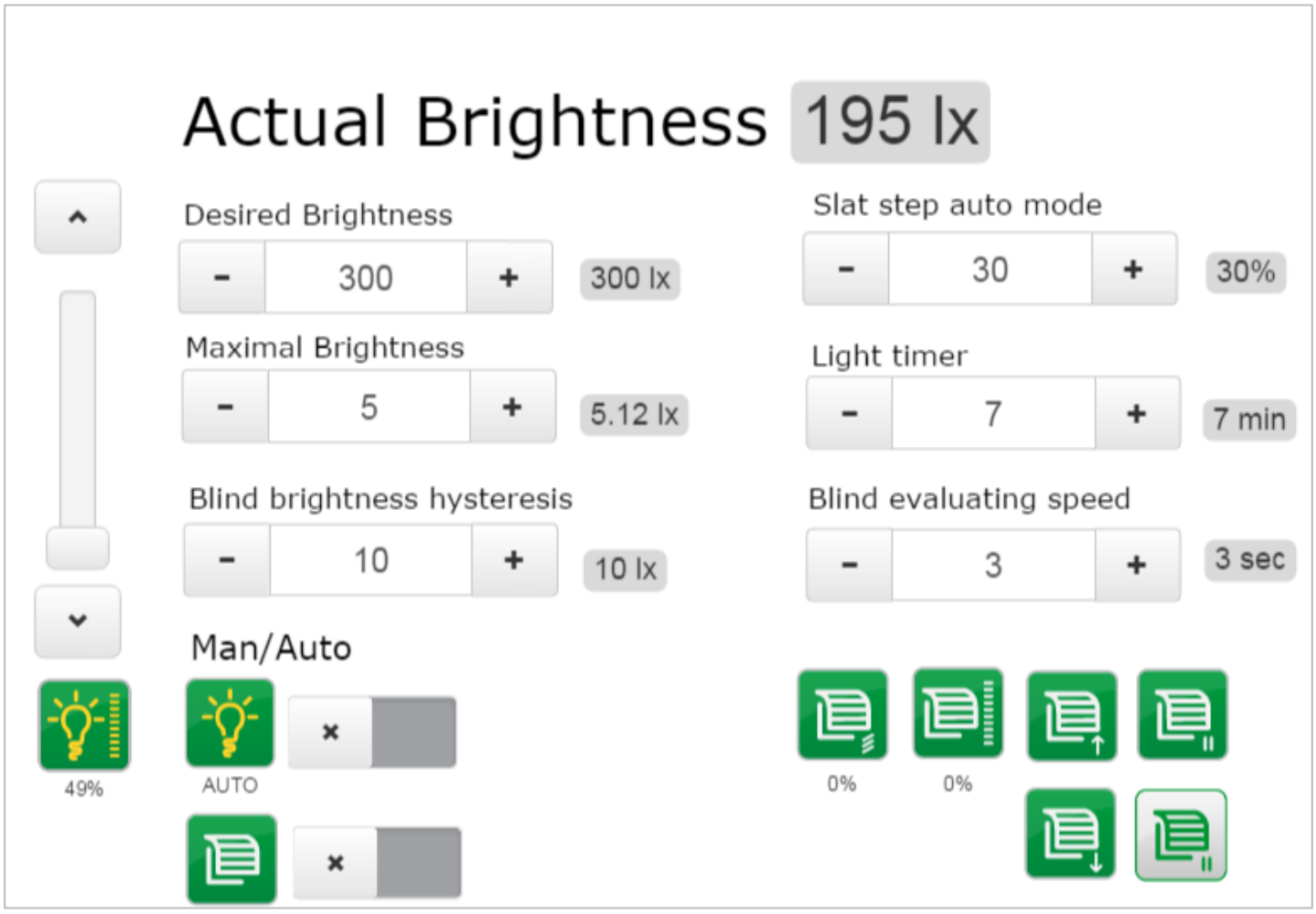
After pressing of push button the **countdown timer** is set to defined time.

Scheduled script is counting timer down.

After countdown the **CUS_Button pressed object** is changed to 0 which cause transition to automatic mode.

5 User interface

The following picture shows the possibilities of user control. The user can fully control both lights and blinds or can turn on the automatic mode to keep defined brightness level.



Picture 38: Example of basic user interface

Setting of parameters to customize light control according to user needs:

The **Actual brightness** shows the actual level of brightness.

The **Desired brightness** determines the minimal level of brightness. CLC keep intensity of artificial lighting at this level of brightness. Nevertheless the actual brightness can be higher if the lighting is off and daylight doesn't exceed maximal brightness.

The **Maximal brightness** determines the limit beyond which light intensity is disruptive.

The **Blind brightness hysteresis** determines how much can be desired brightness lower than actual brightness and how much can be actual brightness higher than maximal brightness before the blinds starts to move.

The **Slat step auto mode** determines minimal percent of slat tilt in one step in automatic control mode.

The **Light timer** determines how long the light stays ON without motion detection.

The **Blind evaluating speed** determines the period of blind adjustment.

NOTE: Blinds and light can be switched to manual mode and fully controlled by the user interface or physical pushbuttons.

6 Conclusion

The brightness of workplaces should be between 200 and 600 lx according to the work activity. Avoid excessively small range between the desired and the maximal brightness. Hysteresis should be set sufficiently large in order to avoid too frequent movements of the blinds. The blind evaluating period should be greater than brightness evaluating period.

7 Appendix

7.1 Glossary

The following table describes the acronyms and defines the specific terms used in this document.

Abbreviation	Description
CLC	Constant light control
LUA	Programming language
ETS	Engineering Tool Software
KNX	Network communications protocol for intelligent buildings
PIR	Passive infrared sensor

Table 5: specific terms

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