Philips LightMaster

KNX Commissioning Guide

PHILIPS

Philips LightMaster Commissioning Guide version 1.0

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1.2 References

The Philips LightMaster range of products complies with international standards KNX (ISO/ IEC 14543-3) and EMC standard (electromagnetic compatibility/elektromagnetische Kompatibilität).

For further information about KNX and ETS refer to the KNX Association website

http://knx.org/

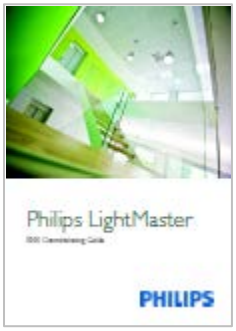
It is assumed that readers have acquired specialist Lighting Control and KNX knowledge before commissioning LightMaster products. In depth technical knowledge is provided in the form of a face-to-face LightMaster training module available internationally from the Philips Controls Training Academy.

1.3 Related Documents

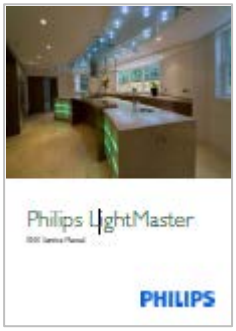
The following PDF documents are available for download via the web at:

http://www.philips.com/knx

Application Guide



Commissioning Guide



Service Manual

Installation Manuals

Data Sheets

1.4 Technical Support Contacts

Contact Controls, Systems & Services, Philips Lighting call desk for assistance with hardware or software questions:

1.4.1 Phone

Call desk +800 7445 4775 Europe

Call desk +61 2 8338 9899 Australia, New Zealand

1.4.2 Email

knx.info@philips.com

1.4.3 Web

http://www.philips.com/knx

1.5 Conventions

Caution: highlights safety issues or where there is a risk of permanent damage to equipment.

Note: highlights important factors you need to consider.

Tip: highlights shortcuts, accepted conventions and best practice.

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2 System Information

Philips LightMaster makes use of industry standard solutions and convergent technology to produce lighting control functions that are both simple to operate and intuitive to commission.

By adding acknowledged lighting and controls expertise, Philips LightMaster provides outstanding functional integration between the KNX and DALI open communication protocols. Users can implement sophisticated, user friendly and energy-efficient lighting control solutions for a wide range of industry sectors.

The Philips LightMaster range brings the following benefits to the KNX world including:

- Light control actuator solutions that allow the user to decide which lighting protocol output they want to work with, including DALI addressable, DALI broadcast, DSI and 1-10v.
- A true structured cabling solution to bring the benefits of faster installation, commissioning and reduced costs.
- The ability to add sensors and dry contact user interfaces to the DALI line, reducing installation costs in parameter wiring.
- Low profile aesthetics to the multifunctional sensor range, reducing ceiling clutter without compromising performance.
- The LightMaster networked control system is fully scalable and suited to both large and small installations.

This guide provides commissioning and programming information as well as configuration procedures and technical details for the Philips LightMaster range of products.

LightMaster Technologies

- DALI (Digital Address Lighting Interface) is a worldwide standard for network-based systems that control lighting in buildings. It was established as a successor for 0-10 V lighting control systems and as an open communication standard, alternative to Digital Signal Interface (DSI). The DALI standard, which is specified in the IEC 60929 standard for fluorescent lamp ballasts, encompasses the protocol and electrical interface for lighting control networks
- KNX is a worldwide standard for applications in home and building control, ranging from lighting, blind and shutter control to full building management systems including HVAC. ETS (Engineering Tool Software) is a manufacturer independent configuration tool to design and configure intelligent home and building control installations with the KNX system

2.1 Safety Instructions

Please read these instructions carefully before starting to work with the products.

1. Electrical devices may only be installed and assembled by specialist technicians
2. The applicable accident prevention regulations must be observed. Failure to follow the instructions could result in electrocution, damage to the device, fire or other hazards
3. Opening a device will render the warranty null and void
4. Keep the device out of the range of sources of disruption
5. Please maintain the proper ambient temperature for the device
6. Avoid moisture, corrosive gases, strong vibration and dust
7. Never allow liquid of any kind to come in contact with the device.
8. If the device nevertheless comes into contact with moisture or other liquids, shut the device off immediately and dry it completely before using again.
9. If any faults occur or for servicing you should contact Philips LightMaster
10. Clean the device regularly. Do not use any alcohol, petrol or petroleum-based cleaners and make sure not to touch connected contacts
11. Check the cables regularly and replace damaged cables in good time.
12. For your own safety make sure every connection is made via a fuse or an MCB (Main Control Block).

2.2 Verify hardware installation

Commissioning can only proceed once the integrity of the wiring has been verified. Ensure the installation observes the following:

- Minimum distance between devices is observed with suitable position for proper ventilation
- The requisite safety devices (e.g. fuses, automatic safety devices, etc.) are connected in order to prevent excessive voltage.
- Devices are connected to the bus
- KNX polarity is correct for each device
- Loads are connected within applicable lamp load limits
- Power supplies are connected
- You can locate the program button on each device and red program LED illuminates

2.3 Device LED indications

Application/ Bootloader	Programming Mode	KNX BUS FAULT	PLOS-CM-KNX SENSOR	PDBC120-DALI-KNX MULTIMASTER	PDLPC416FR –KNX DIMMER	PLPC905GL -KNX DIMMER	PDRC RELAY ACTUATOR	PPM14-KNX DRY CONTACT INTERFACE
Bootloader Mode	Non-Programming Mode	FALSE	Green On (100%)	Green On (100%)	Green On (100%)	Green On (100%)	n/a	n/a
		TRUE	Red flash 10% On / 90% off	Red flash 10% On / 90% off	Red 10% On flash / 90% off	Red flash 10% On / 90% off	n/a	n/a
	Programming Mode	FALSE	Orange On (100%)	Orange On (100%)	Orange On (100%)	Orange On (100%)	n/a	n/a
		TRUE	Red flash 90% On / 10% off	Red flash 90% On / 10% off	Red flash 90% On / 10% off	Red flash 90% On / 10% off	n/a	n/a
Application Mode	Non-Programming Mode	FALSE	Green On with motion	reserved	reserved	reserved	none	Green Flash
		TRUE	Red flash 10% On / 90% off	Red flash 10% On / 90% off	Red flash 10% On / 90% off	Red flash 10% On / 90% off	none	none
	Programming Mode	FALSE	Red On (100%)	Red On (100%)	Red On (100%)	Red On (100%)	Red On (100%)	Red/Orange Flash
		TRUE	Red flash 90% On / 10% off	Red flash 90% On / 10% off	Red flash 90% On / 10% off	Red flash 90% On / 10% off	none	none

2.4 Plug-ins

LightMaster uses the following ETS plug-ins:

Device	Plug in
DALI MultiMaster controller	DALI Configuration
Sensor	Sensor Calibration

2.5 Firmware Download Tool

Firmware updates for LightMaster devices are managed by the KNX Firmware Download Tool.

The tool consists of an upper window that shows detected devices and a lower window that shows an event log.

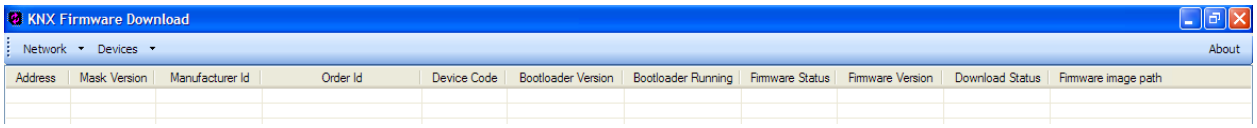
Note: The lower window produces a date stamped log file. The default file location is: C:\Program Files\Dynalite\KNX Firmware Download.

The individual address for each device is required before running the tool. You can use the ETS diagnostic function to find individual addresses.

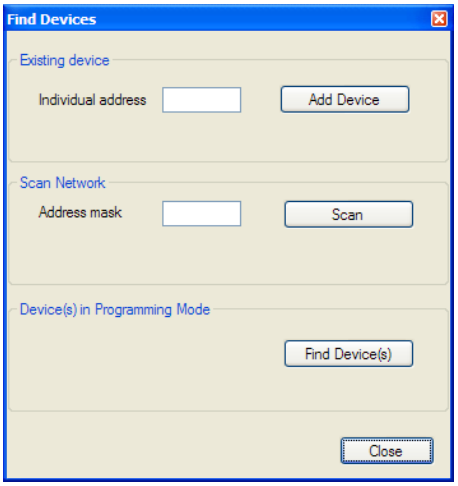
Update Firmware

To update LightMaster Device Firmware

1. Install the KNX Firmware Download Tool by completing the InstallShield Wizard steps
2. Click the Windows Start Button and select KNX Firmware Download from the Dynalite>KNX Firmware Download folder.
3. Click find devices from the Network menu



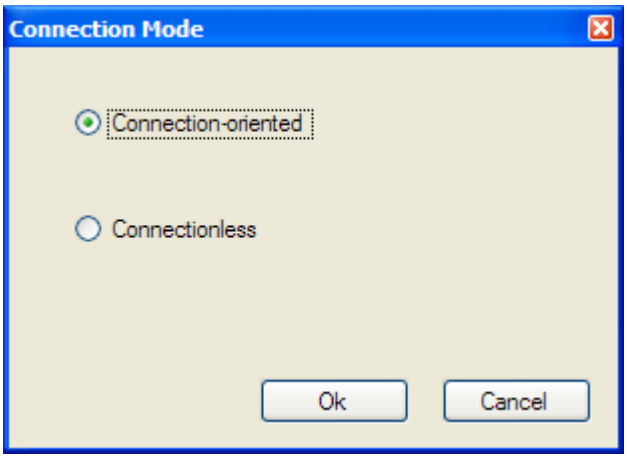
4. Select appropriate configured connection, if applicable and click OK in the ETS Connection Manager dialogue.
5. In the Find Devices dialogue:
    a. Enter the Individual address of the device and click add device r
    b. Scan Network by entering address with mask character. (? or *). In address XX.XX.XXX the ? substitutes for a single digit and the * substitutes for all digits in the address level.
    c. Press the programming button on the device and click the Find Devices button



6. When found, the device(s) should appear in the upper list in the main window
7. Click the Close button
8. Select the devices that require updating (multi-select is available)
9. Click Download Firmware to Selected Devices from the Devices menu (ensure devices are all of the same type)
10. Navigate to the firmware file (*.dfw), select the file and click the Open button
11. Click the Confirm button in the download firmware dialogue
12. The download status percentage is displayed in the upper window list for each device
13. Other devices can be selected while downloading.

Note: Firmware for multiple devices can be downloaded in parallel.
It is not necessary for devices to be in programming mode for firmware download.

Connection mode



Physically these two connections are implemented in the same way. Connectionless mode is preferable, in a well-controlled environment. Even though it is less secure, it is about 50% faster. However, if you are in an operational environment and you wish to have a more secure connection use the Connection-oriented mode.

While a download is being performed in Connection-oriented mode another user cannot access the device and there for cannot interrupt the download.

Note: By default Connection-oriented mode is selected.

2.6 Commissioning Approach

After hardware installation has been verified, the next step is to commission the system by assigning individual addresses, group addresses and configuring the input and output parameters.

1. Press program button on each device (red program LED lights)
2. Load the physical addresses from the ETS software via the interface (red LED goes out, when it is connected successfully
3. Enter applicable group addresses and object parameters
4. Download application into each device
5. Switch on mains voltage to the lighting load
6. Test the operation of each device with the aid of the ETS software
7. Check that all the system functions are operating successfully

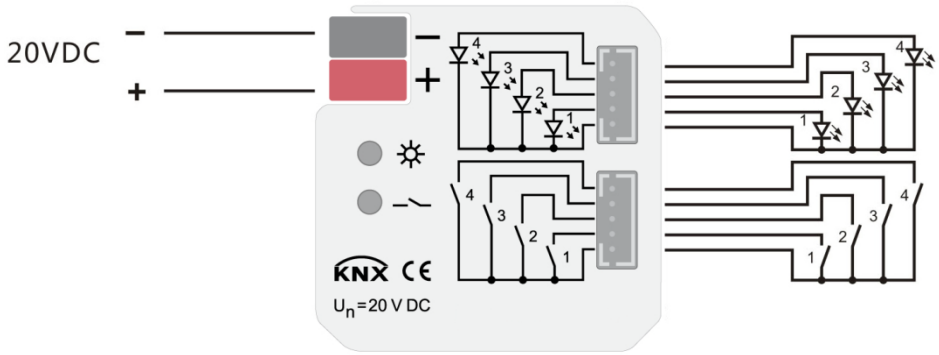
3 LightMaster KNX Dry Contact Interface

- PPMI4-KNX LightMaster Dry Contact Interface
- PPMI4-DALI (refer to DALI MultiMaster controller for configuration steps)

3.1 Description

The Dry Contact Interface provides four programmable inputs to control devices on the KNX network. The extremely compact design enables the device to be inserted into a conventional 60 mm wiring box.

The Interface connects to the bus though the EIB connection terminals and requires no additional supply voltage. ETS and associated database files are required to assign the physical address and set parameters.



Each channel can be independently configured for a wide variety of application areas, such as:

- **Switch sensor** – For switching the lighting or scanning a floating contact; Distinction between short/long operation and cyclical sending of the contact state is possible.
- **Switch/dimming sensor** – For switching/dimming the lighting; start/stop dimming and stepwise dimming, as well as dimming via a single push button is possible.
- **Value/Forced operation** – For sending the value of different data types (e.g. temperature values). It is possible to send different values or data types for short/long operation, or to activate/deactivate actuators.
- **Control scene** – For recalling and storing the states of several actuator groups. The actuator groups can either be controlled via maximum of five individual objects or via an 8 bit scene object.
- **Switching sequence** – For the operation of several actuator groups in a preselected sequence, e.g. a latching relay.
- **Counter** – For counting input pulses. Various data types for the counter can be set. The counting rate can be set, sending the current counting values cyclically and a differential count when an additional counter is enabled. The differential counter can be reset and run a report, to count daily consumption.
- **Push button with multiple operations** – For triggering various functions depending on the frequency of the operation. A long operation can also be detected to trigger a function.
- **Shutter sensor** – For movement and adjustment of a shutter or blind. Eight preset operation modes are possible.
- **Control LED** – For controlling a light-emitting diode indicator, with switching and/or flashing. It can turn off automatically after a preset time and the flashing rate can be set.

3.2 Configuration

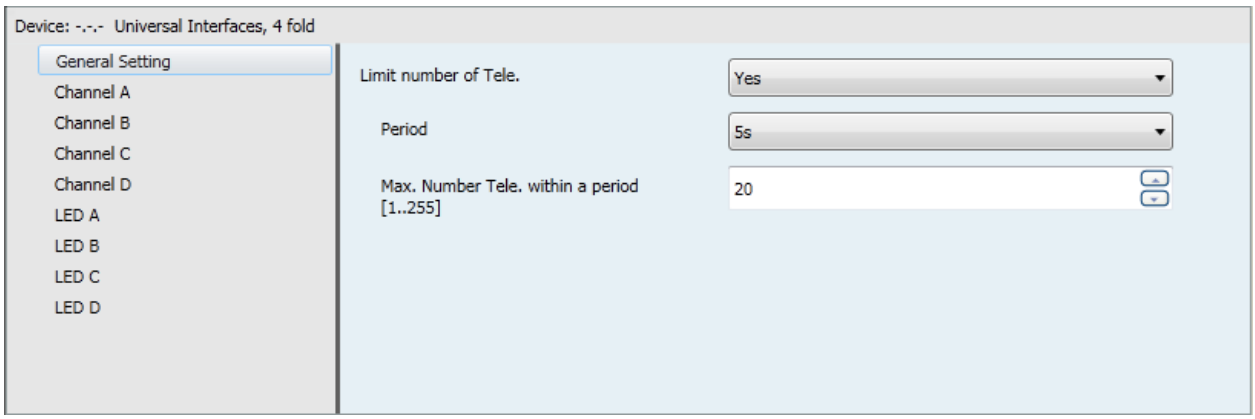
The device objects and parameters and are outlined in this section. The objects and parameters for each channel are equivalent and described in the following sections using output A as an example.

The application table lists the number of available group objects, group addresses and associations. The Dry Contact Interface has the following capabilities:

Application program	Max. Number of Group objects	Max. number of group address	Max. number of associations
Binary Input display, 4f/1	40	80	80

3.2.1 General Settings

Parameters for the functions that affect the entire device are set via the general settings.



3.2.1.1 Parameter "Limit number of Tele."

This parameter limits the number of sent telegrams to decrease the burden on the bus. It is possible to set how many telegrams can be sent within an adjustment period.

Options: Yes / No

3.2.1.2 Parameter "Period"

It is able to set the limit time of sending telegrams.

Options: 100ms, 500ms, 1s, …, 1min, 10min

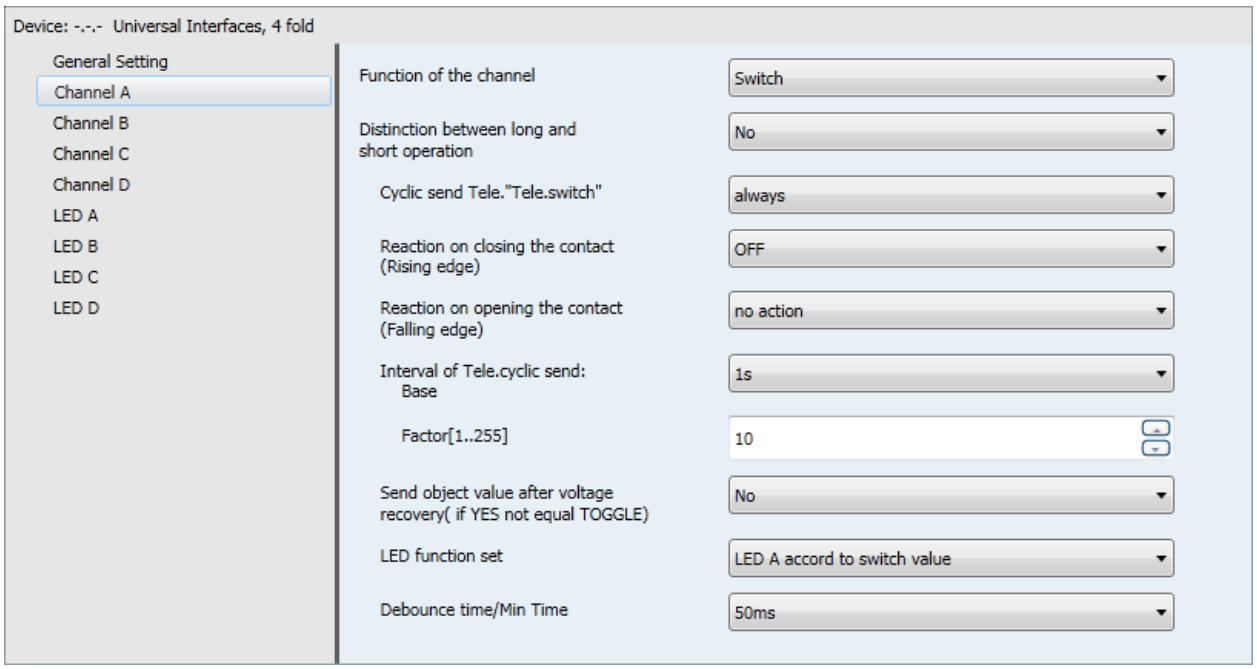
3.2.1.3 Parameter "Max. Number Tele. Within a period [1…255]"

It is able to set the maximum number of sending telegrams within a setting period.

Options: 1~255

3.2.2 Parameter window “Switch X”

Distinction between long and short operation = No



3.2.2.1 Parameter “Function of the channel”

This parameter determines the function option in the channel; the current option is “switch”. If “No function” is selected, it means the channel is disabled.

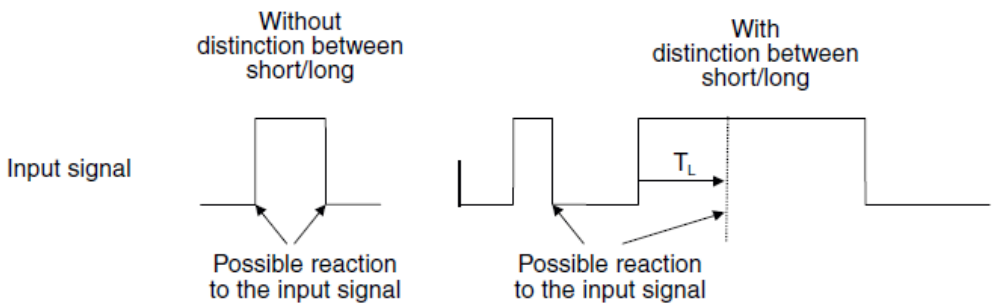
Options:

No function
Switch
Switch/Dimming
Value/Forced output,
Scene control
Switching sequence
Counter
Multiple operations
Shutter Control.

3.2.2.2 Parameter “Distinction between long and short operation”

This parameter sets whether the input distinguishes between a short and long operation. If “yes” is selected, there is a waiting period after the opening/closing of the contact to determine whether the operation is long or short. Only then is a possible reaction triggered.

Options: Yes / No



3.2.2.3 Parameter "Cyclic send Tele. 'Tele. Switch'"

This parameter is visible if there is no distinction between a short and long operation. It is able to set whether to send the current value of object "Tele. Switch, X" cyclically on the bus.

Options: No, Always, If switch off, If switch on

If the parameter value "always" is selected, the object sends cyclically on the bus, regardless of its value is 0 or 1. If the parameter value "if switch off" or "if switch on" is set, only the corresponding object value is sent cyclically.

3.2.2.4 Parameters "Reaction on closing the contact (rising edge)"/ "Reaction on opening the contact (fall edge)"

These two parameters are visible if there is no distinction between a short and long operation. It can be set to operate on opening and/or closing the contact.

Options: No action, OFF, ON, TOGGLE, stop cyclic send

If the parameter "Toggle" is selected, it negates the operation, that means negate the current value. For example, if "On" is selected, negate will carry out "Off" operation. If the parameter "Stop cyclic transmission" is selected, it will stop the cyclical sending telegram till there is a new object value to be sent. If the parameter "No action" is selected, it will not implement any operation.

3.2.2.5 Parameter "Interval of Tele. Cyclic send: Base × Factor"

This parameter is used to set the interval time between two telegrams that are sent cyclically, it is visible if cyclical sending has been set. Transmission cycle time =Base × Factor.

Base options: 1s, 10s, …, 1h

Factor options: 1…255

3.2.2.6 Parameter "Send object value after voltage recovery (if yes not equal toggle)"

This can be set whether to send the value of the object "Tele. Switch, X" on the bus after voltage recovery, this parameter is visible if there is no distinction between a short and long operation.

Options: Yes / No

Note: If the parameter "Yes" is selected, it will send the current value of the object "Tele. Switch, X" on the bus. Only when the value "Toggle" has not been set in either of the two parameters "Reaction on opening/closing the contact", the value of the object "Tele. Switch, X" can be sent on the bus. If one of the two parameters has the value "TOGGLE", no values are sent in general on the bus after bus voltage recovery. If "No reaction" or "Stop cyclic send" is selected, no values are sent on the bus either.

3.2.2.7 Parameter "LED function set"

This parameter sets the LED direction to indicate the status according to the object "Tele. Switch, X". There are 4 LEDs (A, B, C, D) to choose, each LED has 2 options.

- If the parameter “LED X accord to switch value” is selected, the LED status will be the same as the current value of the object “Tele. Switch, X”; ie, LED A will light when switch value of channel A is ON, and LED A will go off when the switch value of channel A is OFF.
- If the parameter “LED X TOGGLE by switch value” is selected, the LED status will be the opposite of the current value of the object “Tele. Switch, X”. ie, LED A will go off when switch value of channel A is ON, and LED A will light when switch value of channel A is OFF

Options: No action
LED A accord to switch value
LED A TOGGLE by switch value
……
LED D accord to switch value
LED D TOGGLE by switch value

Note: If the four channels invoke the same option, the priority of channel A will be the highest; it indicates the status according to the value of the object “Tele. Switch, X” in channel A. Then the priority of channel B is next highest, then channel C, and lastly channel D.

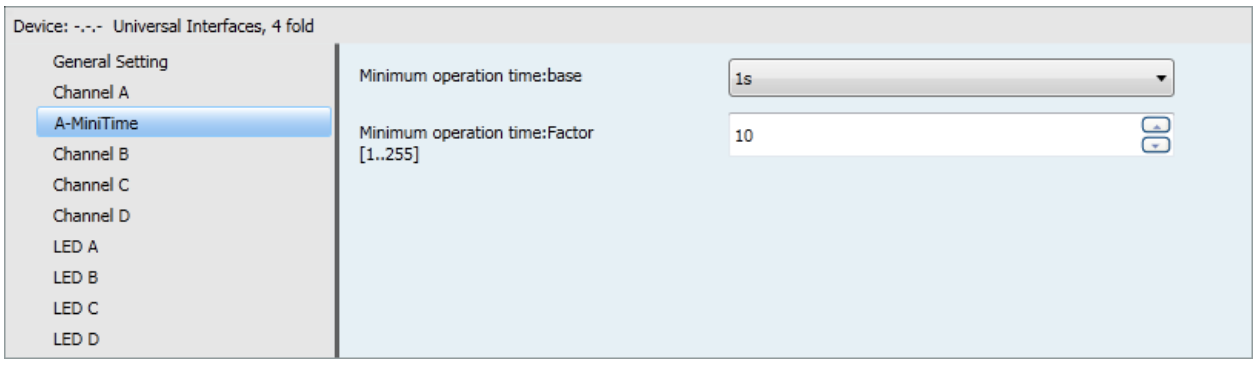
The priority of LED X in channel function page is higher than in the LED X page, If the LED has been configured via the channel pages, the settings in the LED pages are ignored.

3.2.2.8 Parameter “Debounce time”

This sets the vibration time to prevent unwanted multiple operations from the vibration time of bouncing contacts; this is the effective time of the contact operation.

Options: 10ms, 20ms, ……, 150ms, Min. Operation

The “minimum operation” time can only be set when there is no distinction between a short and a long operation. This parameter differs from the others, in that the effective time of the contact operation is not only the time for contact close, but also for contact open. The parameter window is shown below.



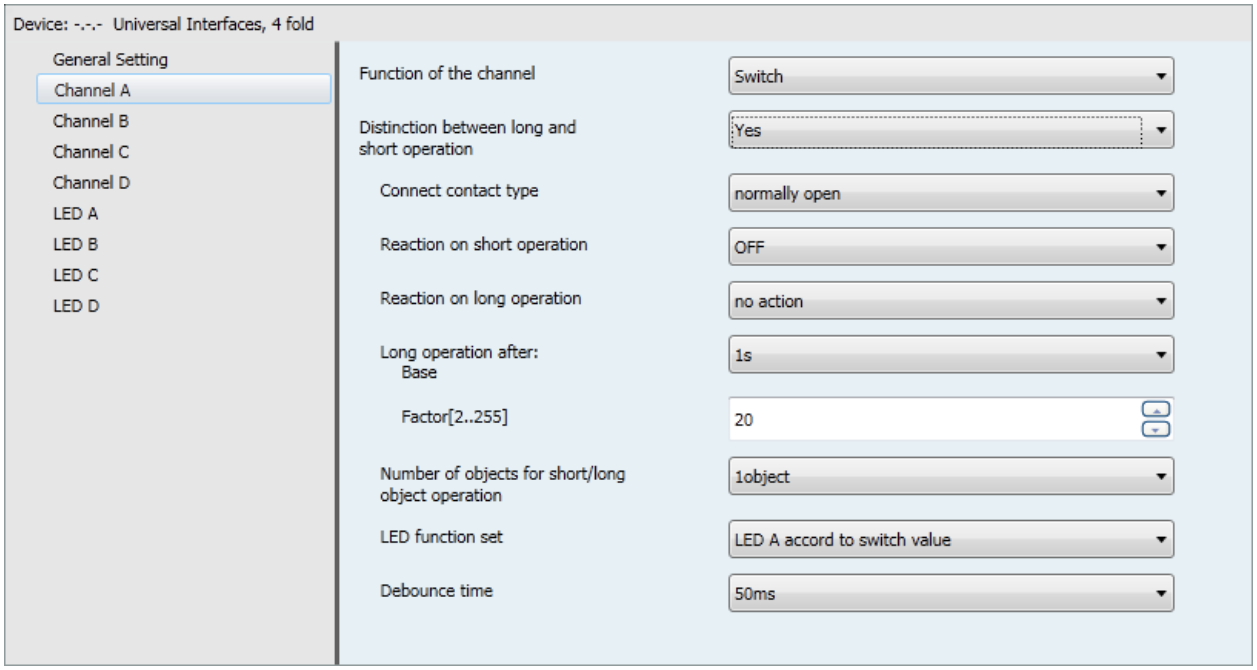
3.2.2.9 Parameter “Minimum operation time: Base × Factor”

These parameters become visible if Debounce time is set to “Min. operation”.
The effective time of the contact operation is: Base × Factor

Base options: 100ms,…. , 1min

Factor options: 1 ~ 255

Distinction between long and short operation = Yes



3.2.2.10 Parameter "Connect contact type"

This parameter is visible when there is a distinction between a short and long operation. It is used to define whether the contact is a normally open or a normally closed. "Normally open" is used in the example.

Options: Normally open, Normally closed

3.2.2.11 Parameter "Reaction on short operation" or "Reaction on long operation"

These parameters are visible when there is a distinction between a short and long operation. It is able to independently set actions based on either a short or a long operation. When the button operation is confirmed as a short or a long operation, the object value is updated immediately.

Options: No action, OFF, ON, TOGGLE

3.2.2.12 Parameter "Long operation after: Base× Factor"

This parameter is visible if there is a distinction between a short and long operation. The effective time of the contact operation is: Base × Factor. The period after which an operation is interpreted as "long". TL = Base× Factor

Base options: 100s, 1s, … , 1h

Factor options: 2 ~ 255

3.2.2.13 Parameter "Number of objects for short/long object operation"

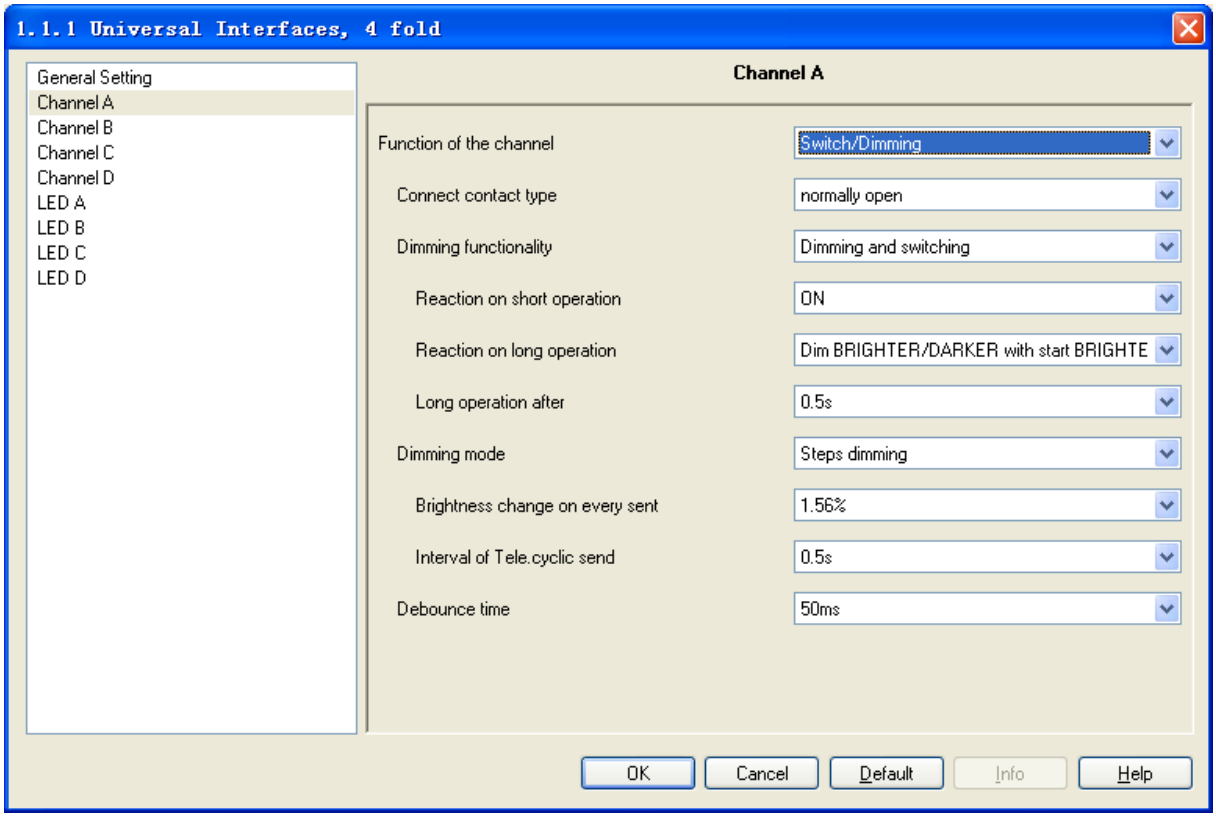
This parameter is visible if there is a distinction between a short and long operation. It is able to set one or two group objects.

- When one group object is set, long and short operations share one group object.
- When two group objects are set, long and short operations each use a separate group object.

Options: 1 object, 2 objects

3.2.3 Parameter window "Switch/dimming, X"

Parameter window "Switch/dimming, X" will be shown in below, it is visible when Function of the channel "Switch/Dimming" is selected. The function enables the operation of dimmable lighting. 1 button operation is also possible.



3.2.3.1 Parameter "Connect contact type"

This parameter defines whether the contact at the input is a normally open or normally closed. "Normally open" is used in the example.

Options: Normally open, Normally closed

3.2.3.2 Parameter "Dimming functionality"

This parameter determines whether the lighting is only dimmed or whether it should also be switched.

Options: Dimming and switching, Only dimming

If the parameter "Only dimming" is selected, there is no distinction between a short and long operation. The dimming command is therefore carried out immediately after the push button action; there is no delay to determine whether the operation is long or short. If the parameter "Dimming and switching" is selected, the push button action will have a delay to determine whether the

operation is long or short. In this case, the lighting is dimmed via a long operation and switched via a short operation.

3.2.3.3 Parameter "Reaction on short operation"

This parameter is visible if the value "Dimming and switching" has been set in the parameter "Dimming functionality". It is able to set a short operation option for the object "Switch, X".

Options: No action, OFF, ON, TOGGLE

3.2.3.4 Parameter "Reaction on long operation"

This parameter is visible if the value "Dimming and switching" has been set in the parameter "Dimming functionality". It is able to set a dim brighter or a dim darker after a long operation.

Options: Dimming brighter, Dimming darker, Dim brighter/darker with start brighter, Dim brighter/darker with start darker

The parameter "Dim brighter/darker with start darker" is selected, it can be dim brighter or dim darker after a long operation. It toggles between dimming darker first and dimming brighter first.

Note: The long and short operations are separate and use two objects.

3.2.3.5 Parameter "Long operation after"

This parameter is visible if the value "Dimming and switching" has been set in the parameter "Dimming functionality". The period TL is defined here, after which an operation is interpreted as "long".

Options: 0.3s, 0.5s, ..., 10s

3.2.3.6 Parameter "Reaction on operation"

This parameter is visible if the value "Only dimming" has been set in the parameter "Dimming functionality". There is no distinction between a short and long operation. The operation and the option of the parameter "Reaction on long operation" are the same. It is able to set a dim brighter or a dim darker after a long operation.

Options: Dimming brighter, Dimming darker, Dim brighter/darker with start brighter, Dim brighter/darker with start darker

3.2.3.7 Parameter "Dimming mode"

This parameter defines the dimming mode is start-stop dimming or steps dimming.

- If "Start-stop dimming" is selected, the dimming mode begins the dimming process with a dim darker or dim brighter telegram and ends the dimming process with a stop telegram. Cyclical sending of the dimming telegram is not required in this case.
- If "Step dimming" is selected, the dimming telegram is sent cyclically during a long operation. Once the operation has finished, a stop telegram ends the dimming process.

Options: Start-stop dimming, Steps dimming

3.2.3.8 Parameter "Brightness change on every sent"

This parameter is only visible for "Dimming steps". It sets the increment, for the change in brightness (percentage value) that will cause a dimming telegram to be sent cyclically.

Options: 100%, 50%, ..., 1.56%

3.2.3.9 Parameter "Interval of Tele. Cyclic send"

This parameter is only visible for "Dimming steps". It is able to set the interval for telegram cyclic sending after a long operation.

Options: 0.3s, 0.5s, …, 10s

3.2.3.10 Parameter "Debounce time"

This sets the vibration time to prevent unwanted multiple operations from the vibration time of bouncing contacts; this is the effective time of the contact operation.

Options: 10ms, 20ms, ……, 150ms, Min. Operation

This parameter differs from the others, in that the effective time of the contact operation is not only the time for contact close, but also for contact open. The parameter window for Min. Operation is shown in Parameter "Debounce time".

3.2.3.11 Parameter "Minimum operation time: Base × Factor"

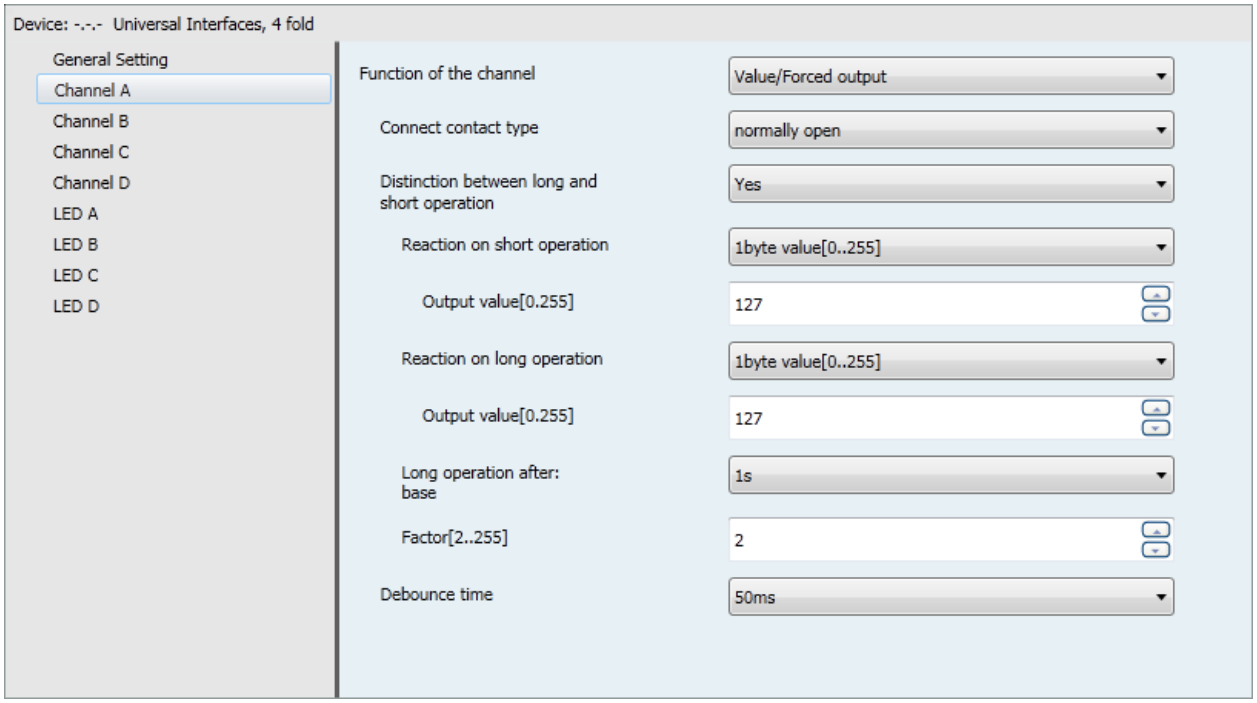
These parameters become visible if Debounce time is set to "Min. operation".
The effective time of the contact operation is: Base × Factor

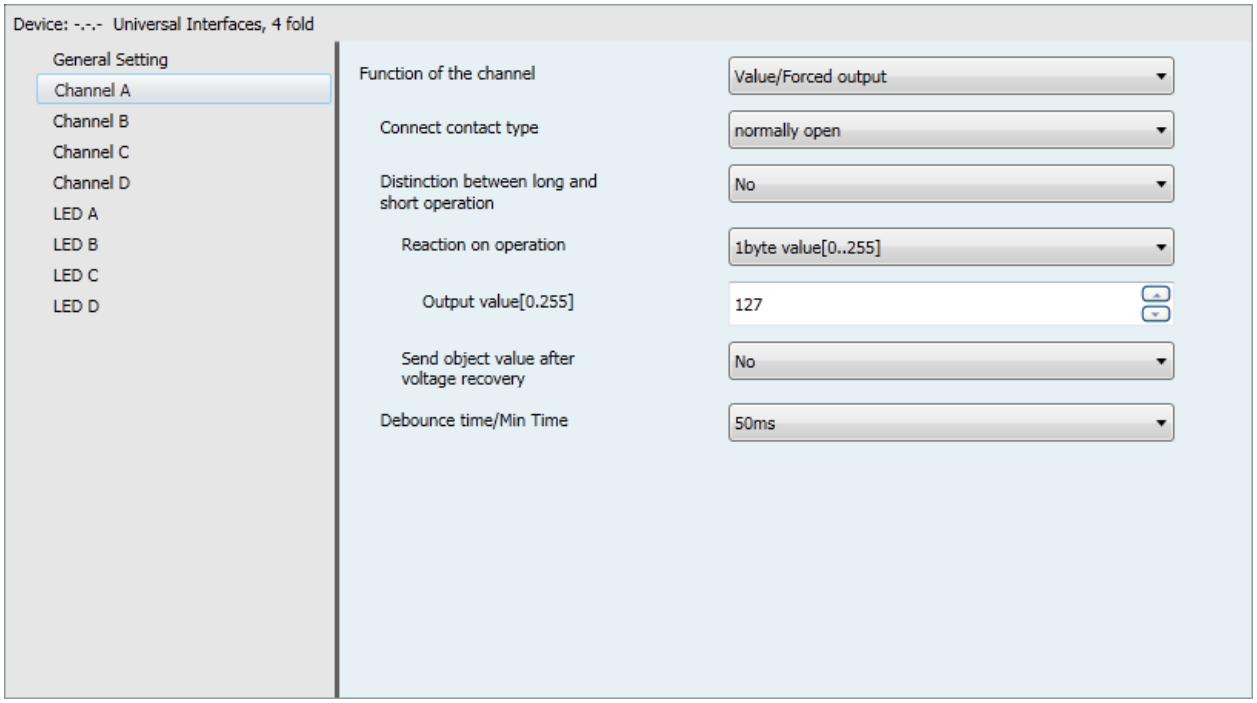
Base options: 100ms,…. , 1min

Factor options: 1 ~ 255

3.2.4 Parameter window “Value/force output, X”

Parameter window “Value/force output, X” is shown below with and without a distinction between a short and long operation.





3.2.4.1 Parameter “Connect contact type”

This parameter defines whether the contact at the input is a normally open or a normally closed. “Normally open” is used as the example

Options: Normally open, Normally closed

3.2.4.2 Parameter "Distinction between long and short operation"

This parameter sets whether the input distinguishes between a short and long operation. If "yes" is selected, there is a waiting period after the opening/closing of the contact to determine whether the operation is long or short.

Options: Yes, No

3.2.4.3 Parameter "Reaction on operation"

This parameter is visible if there is no distinction between a short and a long operation. It defines the data type that is sent when the contact is pressed.

Options: No reaction, 1 bit value [0, 1], …, 4 byte value [0…4294967295]

3.2.4.4 Parameter "Reaction on short operation"/ "Reaction on long operation"

This parameter is visible if there is a distinction between a short and long operation. It defines the data type that is sent after a short or long operation.

Options: 1 bit value [0, 1], …, 4 byte value [0…4294967295]

3.2.4.5 Parameter "Output value […]"

This parameter defines the value which is sent on operation. The value range is dependent on the selected data type. Two values can be set here when there is a distinction between a short and long operation.

3.2.4.6 Parameter "Long operation after: Base× Factor [0…255]

This parameter is visible if there is a distinction between a short and long operation. The period TL is defined here, after which an operation is interpreted as "long". TL = Base x Factor:

Base options: 100s, 1s, .., 1h

Factor options: 2~255

3.2.4.7 Parameter "Send object value after voltage recovery"

This parameter is visible if there is no distinction between a short and long operation.
If "yes" is selected, the device sends the object "Tele. Value, X" on the bus after bus voltage recovery.

Options: Yes, No

3.2.4.8 Parameter "Debounce time"

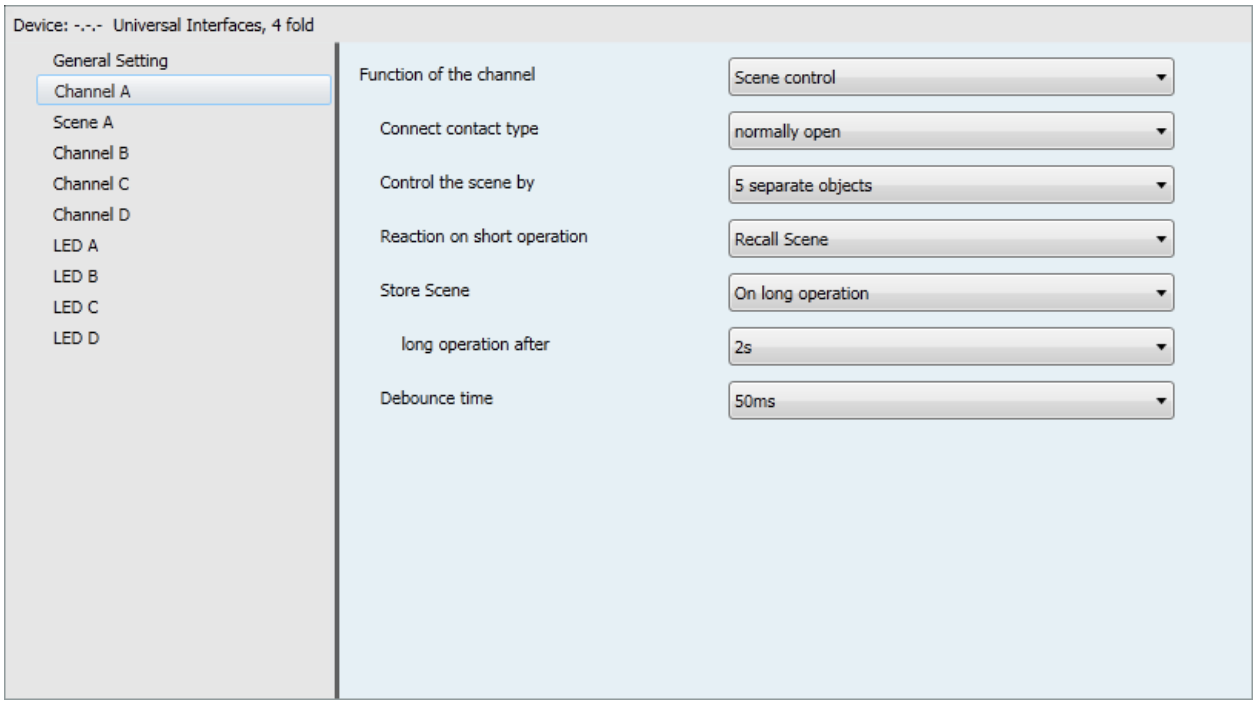
It can set the vibration time to prevent unwanted multiple operation by bouncing of contacts in vibration time, which means the effective time of the contact operation.

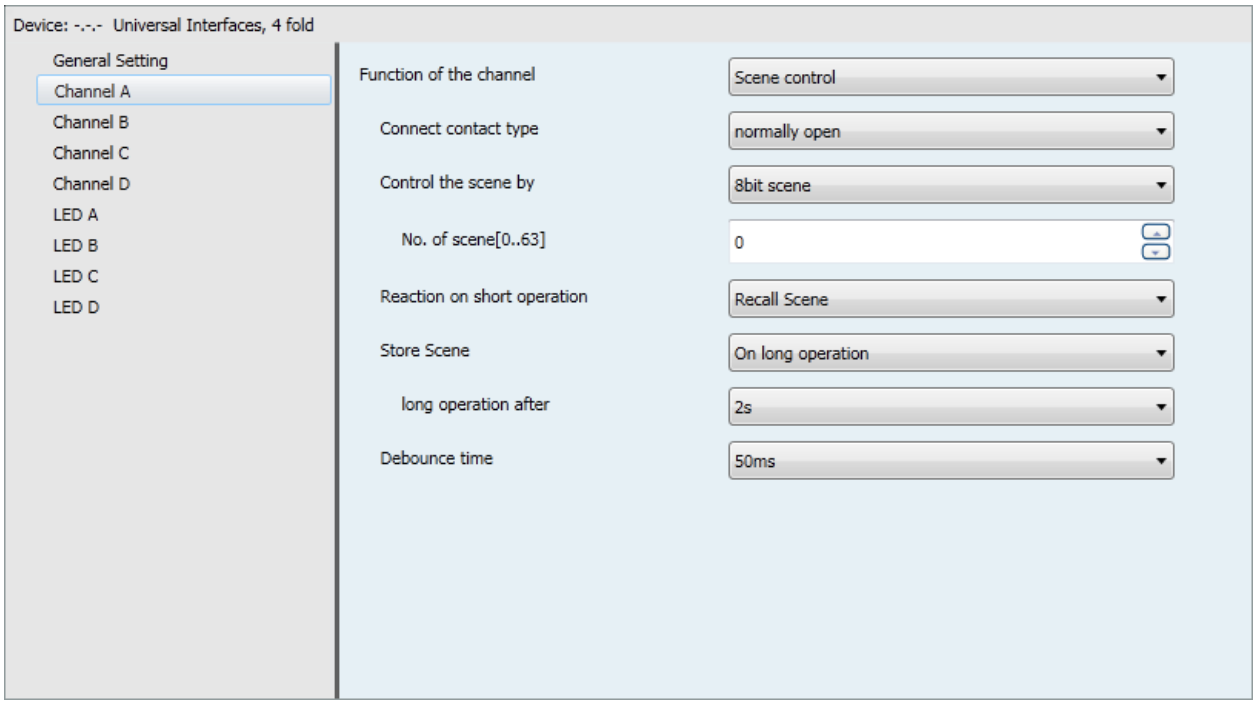
Options: 10ms, 20ms, …, 150ms, Min. operation

A minimum operation time can only be set if there is no distinction between a short and long operation. The parameter window for Min. Operation is shown in Parameter "Debounce time".

3.2.5 Parameter window “Scene control, X”

Parameter window “Scene control, X” is shown below. It is visible when the function channel “Scene control” is selected. This function enables the states of several actuator groups to be recalled and stored.





3.2.5.1 Parameter “Connect contact type”

This parameter defines whether the contact at the input is a normally open contact or a normally closed contact. “Normally open” is used as the example

Options: Normally open, Normally closed

3.2.5.2 Parameter “Control the scene by”

It is possible to select whether the scene control is carried out via “5 separate objects” or whether values that are stored in the actuators are recalled and saved via an “8 bit scene”.

Options: 5 separate objects, 8 bit scene

If the parameter “5separate objects” is selected, it will activate control of the actuator groups, the “5 objects” parameter window will be shown. If the parameter “8 bit scene” is selected, it can control the scene function in a dimming actuator or switch actuator. The “8 bit scene” parameter window will be shown.

3.2.5.3 Parameter “No. of scene [0…63]

This parameter will be visible when the scene control is “8 bit scene”, it can be set the No. of scene. The No. range is 0~63.

Parameter “Reaction on short operation”

This parameter defines whether a short operation of the input causes a light scene to be recalled or no reaction takes place.

Options: No reaction, Recall scene

3.2.5.4 Parameter “Store scene”

This parameter defines how the saving of the current scene.

Options: No, On long operation, With object value= ‘1’, On long operation and object value= ‘1’

The following table provides an overview of scene control behavior:

Control the scene via “8 bit scene”:

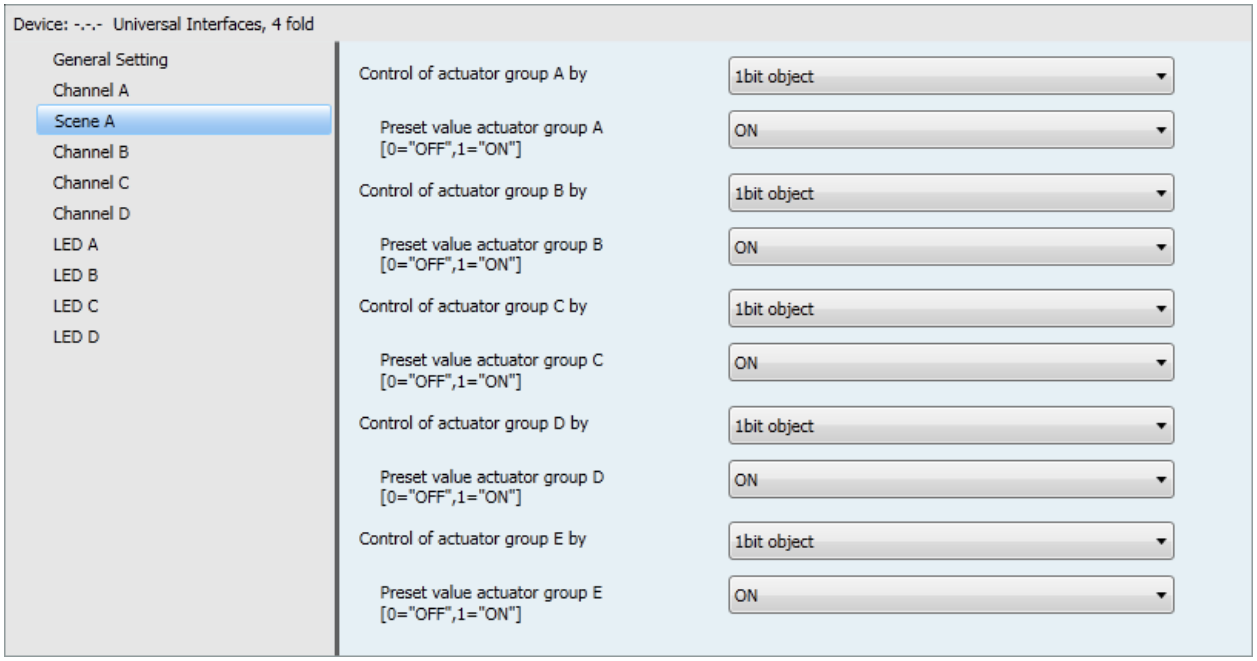
Parameter value	Behavior
On long operation	After a long operation, the object “8 bit scene” sends a save command on the bus and thereby triggers the storing of the current scene in the actuators e.g. dimming actuator, switch actuator.
If object value= ‘1’	If the object “Store scene, X” receives the value “1”, the object “8 bit scene” sends a save command on the bus and save the current scene
On long operation and object value= ‘1’	If the object “Store scene, X” receives the value “1” on the bus, the next long push button action triggers the sending of a save command via the object “8 bit scene”, the current scene will be saved. When the object “store scene, X” receives the value “0”, end up the saving the value of current scene. Provided that a “1” has not been received at the object “Store scene” since the last save, a long operation is interpreted in the same way as a short operation.

Control the scene via “5 separate objects”:

Parameter value	Behavior
On long operation	As soon as a long operation is detected, the object “Store scene, X” sends the value “1” on the bus and the object “Output 1bit/8bit, group A…E” sends a read out telegram. The objects “Output 1bit/8bit, group A…E” can be modified via the bus for the duration of the long operation. Once the long operation has finished, the object “Store scene, X” sends the value “0” on the bus and the current object values can’t be modified On the long operation, If the object “Store scene, X” receives the value “0” on the bus, even if the long operation has not finished, the current object value also can’t be modified.
If object value= ‘1’	If the object “Store scene, X” receives the value “1”, the object values “Output 1bit/8bit, group A…E” are read out via the bus. While the object value is “1”, the objects “Output 1bit/8bit, group A…E” can be modified via the bus. On receipt of the object value “0”, the current object values can’t be modified
On long operation and object value= ‘1’	If the object “Store scene, X” receives the value “1” on the bus, on the next long operation, the object “Output 1bit/8bit, group A…E” sends a read out the telegram. The objects “Output 1bit/8bit, group A…E” can be modified via the bus for the duration of the long operation. After the end of the long operation, the object values can’t be modified, the object “store scene, X” will send value ‘0’ On the long operation, If the object “Store scene, X” receives the value “0” on the bus, even if the long operation has not finished, the current object value also can’t be modified Provided that a “1” has not been received at the object “Store scene, X”, a long operation is interpreted in the same way as a short operation.

3.2.5.5 Parameter window “Scene X”

The parameter window “Scene X” is shown above. It is visible if the control of the light scenes is carried out via “5 separate objects”.



3.2.5.6 Parameter “Control of actuator group A…E”

It can be set for each actuator group whether the control is carried out via a “1 bit object” or an “8 bit object”.

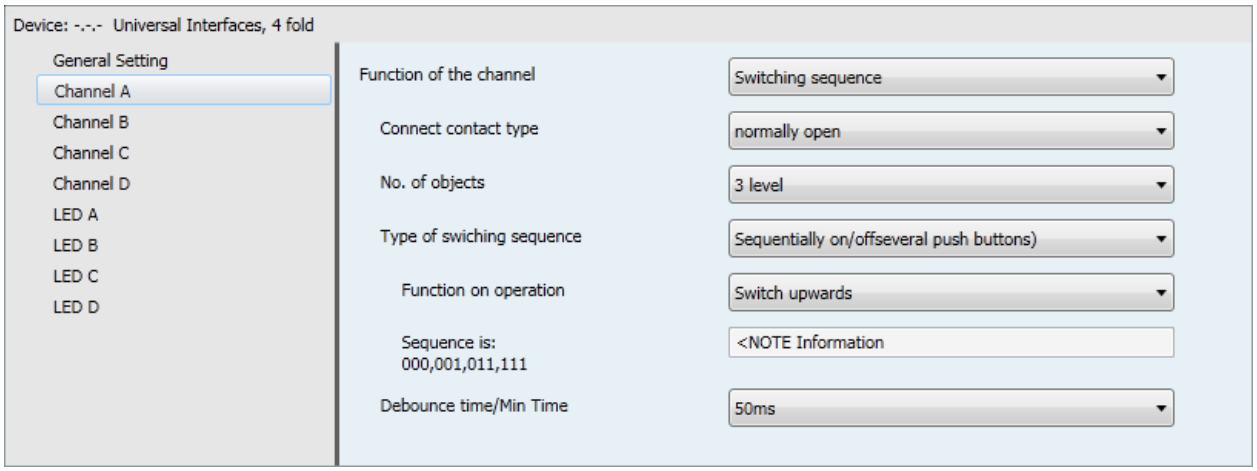
Options: 1 bit object, 8 bit object

3.2.5.7 Parameter “Preset value actuator group A…E”

This parameter sets the preset value of the actuator group. This value can be modified via the bus when saving the scene. During bus voltage recovery this value is modified as preset value.

3.2.6 Parameter window “Switching sequence, X”

The parameter window “Switching sequence” is shown below. It is visible if function “Switching sequence” is selected as the input. A switching sequence enables the stepwise modification of several values via a single operation.



3.2.6.1 Parameter “Connect contact type”

This parameter defines whether the contact at the input is a normally open or a normally closed. “Normally open” is used as the example.

Options: Normally open, Normally closed

3.2.6.2 Parameter “No. of objects”

This parameter defines the number of objects, or levels, which equals the number of output level group objects.

Options: 2level, 3level, 4level, 5level

For example, parameter “3level” means there are 3 group objects: “level-1”, “level-2”, “level-3”. The first operation modifies the value of “level-1”, the second operation modifies the value of “level-2”, the third operation modifies the value of “level-3”, the fourth level is modified from the value of “level-3”……, the switch sequence is: 000,001,011,111,011……The data sent on the bus is the value of the group object after being modified. So after the first press, the three objects would read 0,0,1. After the second press, the three objects would read 0,1,1. And so on.

Switch upwards / Switch downwards sets the direction in which the sequence is changed.

The group object “level increment/decrement, X” is used to increase or decrease the switch level, ‘1’ means increase one level and ‘0’ means decrease one level.

Different options have different group objects and different switch levels, but the configuration is the same in the case of the same switch sequence type.

3.2.6.3 Parameter “Type of switching sequence”

The switching sequence can be selected here. Each sequence has other object values for each switching level.

Options: Sequentially on/off (one push button), Sequentially on/off (several push buttons), All combinations

The table uses "3level" as the example. (send the modified data on the bus, data "0"= OFF, "1"=ON):

Type of switching sequence	Example
Sequentially on/off (one push button)	…-000-001-011-111-011-001-…
Sequentially on/off (several push buttons)	000-001-011-111or 111-011-001-000
All combinations	…-000-001-011-010-110-111-101-100-… (Gray code)

3.2.6.4 Parameter "Function on operation"

Only visible in the switching sequence "Sequentially on/off (several push buttons)". It can be set whether an operation of the push button switches up or down a level. The difference between the one push button and several push buttons is that in the first one the sequence goes up, and then goes down (As shown in the example). When several push buttons is chosen, the sequence goes only in one direction. If upwards, it would stop at 1,1,1. And if downwards, it would stop at 0,0,0.

Options: Switch upwards, Switch downwards

The implement direction of the parameter "Switch upwards" is "000-001-011-111", the implement direction of the parameter "Switch downwards" is "111-011-001-000".After the bus voltage recovery, the current value is 000, if the parameter "Switch downwards" is selected, the effect will be invisible when operation, then it is possible to operation after switch up a few levels by the object "level increment/decrement, X".

3.2.6.5 Parameter "Sequence is …"

This parameter indicate the management process when there are different switching sequences.

3.2.6.6 Parameter "Debounce time/Min. Time"

It can set the vibration time to prevent unwanted multiple operation by bouncing contacts in vibration time, which means the effective time of the contact operation.

Options: 10ms, 20ms, ..., 150ms, Min. operation

The parameter window for Min. Operation is shown in Parameter "Debounce time".

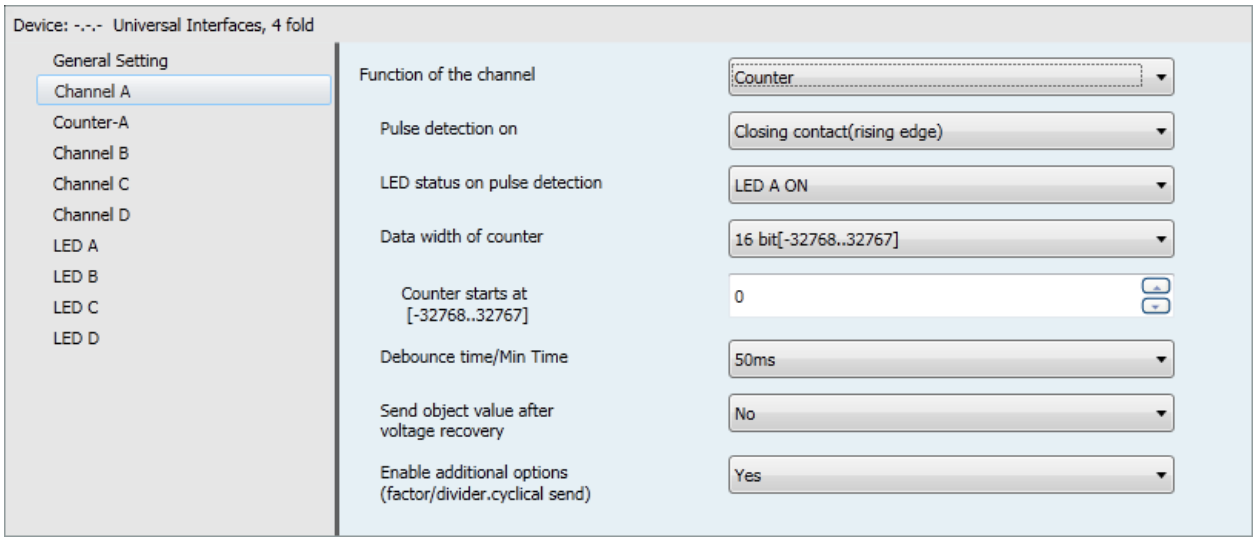
3.2.7 Parameter window “Counter, X”

The parameter window “Counter, X” is shown below. It is visible when the input is set with the function “Counter”.

Using the “Counter” function, the device is able to count the number of pulse edges at the input. A “differential counter” is available if required, in addition to the standard counter. Both counters are triggered by counting pulses but otherwise operate independently of each other. The counter always has the same data width as the differential counter.

The function is similar with the differential counter and the standard counter. The difference is the differential counter can reset the counter value (count from 0) and report bus counter overflow.

Note: When disabling the function, both key scanning and object in/out are disabled. Any key status change will be ignored.



3.2.7.1 Parameter “Pulse detection on”

The type of input signal is defined in this parameter. It can be set whether the contact is an opening contact (pulse trailing edge) or a closing contact (pulse rising edge). “Closing contact (rising edge)” is used as the example.

Options: Closing contact (rising edge), Opening contact (falling edge)

3.2.7.2 Parameter “LED status on pulse detection”

This parameter defines the indication of LED, whether to be on, off or no action when detecting a pulse input.

Options: LED A ON, LED A OFF, ..., LED D OFF, No action

Note: If the four channels invoke the same option, the priority of channel A is the highest, it will carry out the preset operation when detecting an pulse input. Then the priority of channel B is next highest, then channel C, and lastly channel D.

The priority of LED X in channel function page is higher than in the LED X page, If the LED has been configured via the channel pages, the settings in the LED pages are ignored.

3.2.7.3 Parameter "Date width of counter"

The data type of the counter (absolute counter and differential counter) is defined in this parameter. The data type specifies the counting range for the counter.

The type of the objects "Output counter value……" and "Differential counter …" is adapted to the data type of the parameter setting.

Options: 8bit [0…255], 16bit [-32768…32767], 16bit [0…65535], 32bit [-2147483648…2147483647]

3.2.7.4 Parameter "Counter starts at"

The starting value of the absolute counter is defined in this parameter. When the bus powers on, it will calculate the new counter value from this preset starting value.

3.2.7.5 Parameter "Debounce time"

It can set the vibration time to prevent unwanted multiple operation by bouncing of contacts in vibration time, which means the effective time of the contact operation.

Options: 10ms, 20ms, …, 150ms, Min. operation

The parameter window for Min. Operation is shown in Parameter "Debounce time".

3.2.7.6 Parameter "Send object value after voltage recovery"

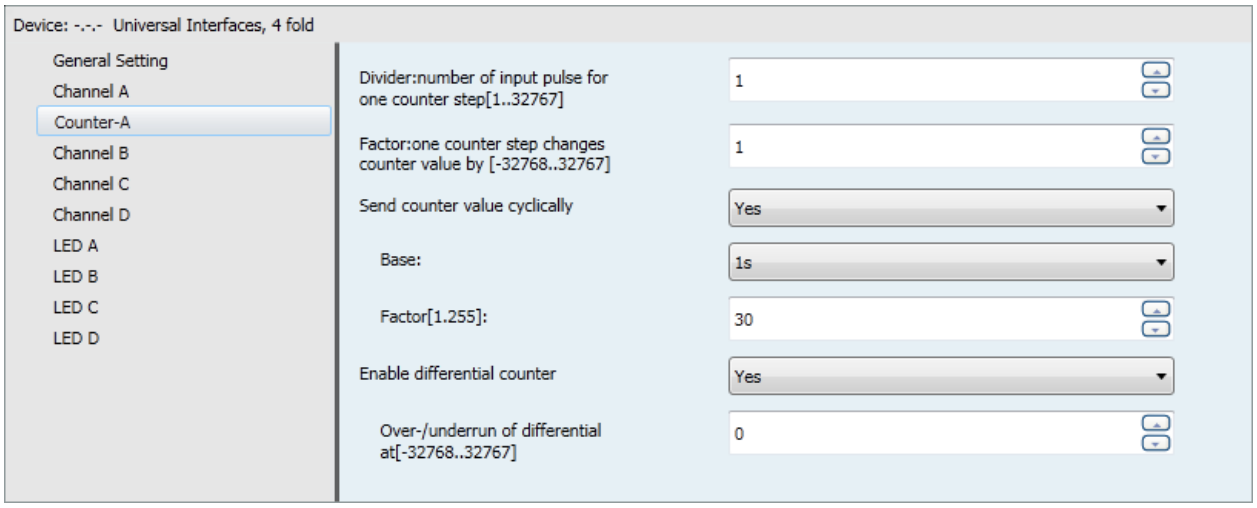
This parameter defines whether to send the current value after bus voltage recovery. If the differential counter has been enabled, it is also sent on the bus and it is reset to zero. During bus voltage failure, the standard counter and the differential counter are reset to the starting value, the standard counter will calculate from the preset starting value.

Options: Yes, No

3.2.7.7 Parameter "Enable additional options (factor/divider. Cyclical send)"

Additional functions are possible here. If this parameter is set to "yes", the following parameter window is displayed.

Options: Yes, No



3.2.7.8 Parameter "Divider: number of input pulse for one counter step[1…32767]"

It can be set via this parameter how many pulses are necessary to generate a counting pulse. The range of pulse importability: 1…32767.

3.2.7.9 Parameter "Factor: one counter step changes counter value by [-32768…32767]"

This parameter defines how much the counter and differential counter should be increased by in the event of a counting pulse. Range:-32768…32767

3.2.7.10 Parameter "Send counter value cyclically"

This parameter defines whether to send the current value cyclically. If this parameter has the value "yes", the values of the counter and the differential counter are sent cyclically on the bus.

Options: Yes, No

3.2.7.11 Parameter "Base"/ "Factor [1…255]"

It is visible if the parameter "Send counter value cyclically" is "Yes". This parameter is used to set the interval time between two telegrams that are sent cyclically, Transmission cycle time =Base× Factor.

Base options: 1s, 10s, ..., 1h

Factor options: 1…255

3.2.7.12 Parameter "Enable different counter"

This parameter defines whether to enable the differential counter function, if "Yes" is selected, it is enabled.

Options: Yes, No

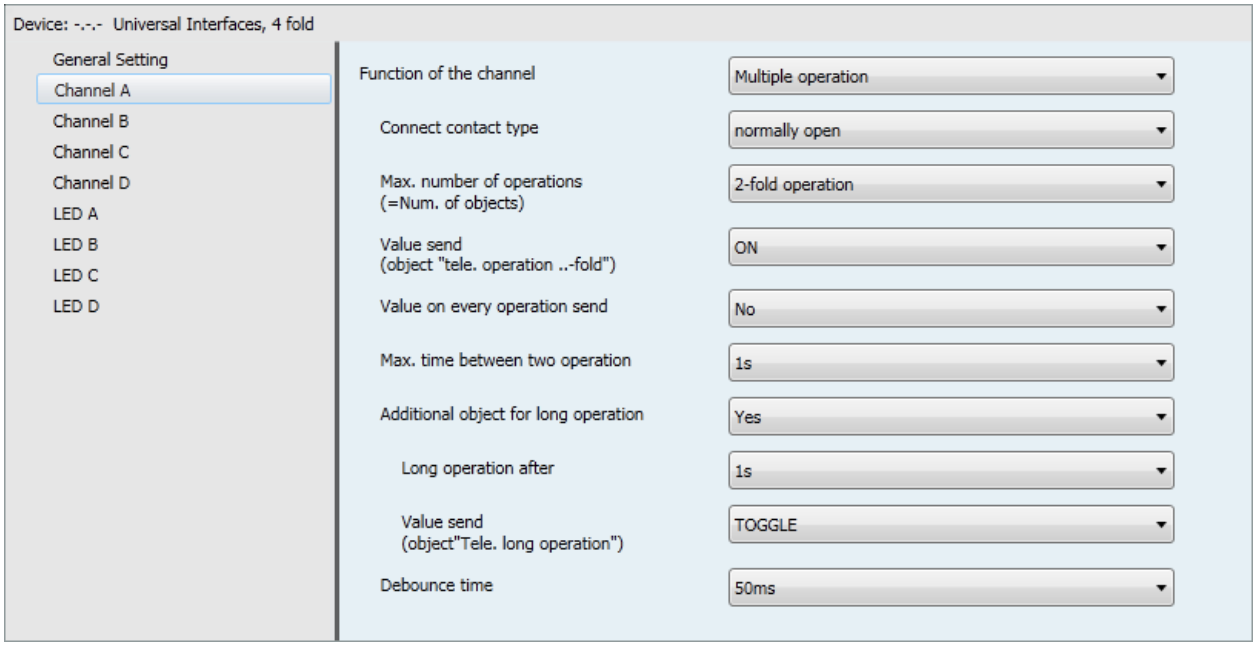
3.2.7.13 Parameter "Over-/under run of differential at […]"

This parameter is visible if the parameter "Enable differential counter" is set to "yes".

This parameter sets which value generates an overflow of the differential counter. The overflow object will send an overflow value "1" on the bus when in the event of an overflow.

3.2.8 Parameter window “Multiple operation, X”

The parameter window “Multiple operation, X” will be shown in below. It is visible if the input is selected with the function “Multiple operation”. Enable the function, if the input is operated several times within a certain period, a specified object value can be modified depending on the number of operations. This enables different light scenes to be implemented with multiple push button actions.



3.2.8.1 Parameter “Connect contact type”

This parameter defines whether the contact at the input is a normally open contact or a normally closed contact.

Options: Normally open, Normally closed

The parameter introduced in this chapter is use “Normally open” as the example, the normally close is just opposite.

3.2.8.2 Parameter “Max. number of operations [=Num. of objects]”

This parameter specifies the maximum permitted number of operations. This number is identical to the number of group objects “Output X-fold”.

Options: Single operation, 2-fold operation, 3-fold operation, 4-fold operation

3.2.8.3 Parameter “Value send (object “Tele. Operation …-fold”)”

It can be set here which object value should be sent.

Options: On, Off, Toggle

The current object value is inverted in the “Toggle” setting.

3.2.8.4 Parameter “Value on every operation send”

This parameter defines whether to send the operation value.

Options: Yes, No

If "yes" is entered in this parameter, the associated object value is updated and sent after each operation in the case of multiple push button actions. Example: For three-fold operations, the objects "output 1-fold" (after the first operation), "output 2-fold" (after the second operation) and "output 3-fold" (after the third operation) are sent. If "No" is selected, the current value will be send on the bus until the last operation delay (the delay time is the interval time between two operations).

3.2.8.5 Parameter "Max. time between two operation"

This parameter sets the interval between two operations. If there are no further operations within this period, the object "output 1-fold" is sent again.

Options: 0.3s, 0.5s, ..., 10s

3.2.8.6 Parameter "Additional object for long operation"

This parameter defines whether to activate the long operation. If a long operation is carried out after one or several short operations within the maximum period, the short operations are ignored.

Options: Yes, No

3.2.8.7 Parameter "Long operation after"

This parameter is visible if long operation activate. The period is defined here, after which an operation is interpreted as "long".

Options: 0.3s, 0.5s, …, 10s

3.2.8.8 Parameter "Value send (object "Tele. Long Operation")"

This parameter is visible if long operation activate. This parameter defines the value sent by the object "output long-fold" on the bus when it is set long operation.

Options: On, Off, Toggle

The current object value is inverted in the "Toggle" setting.

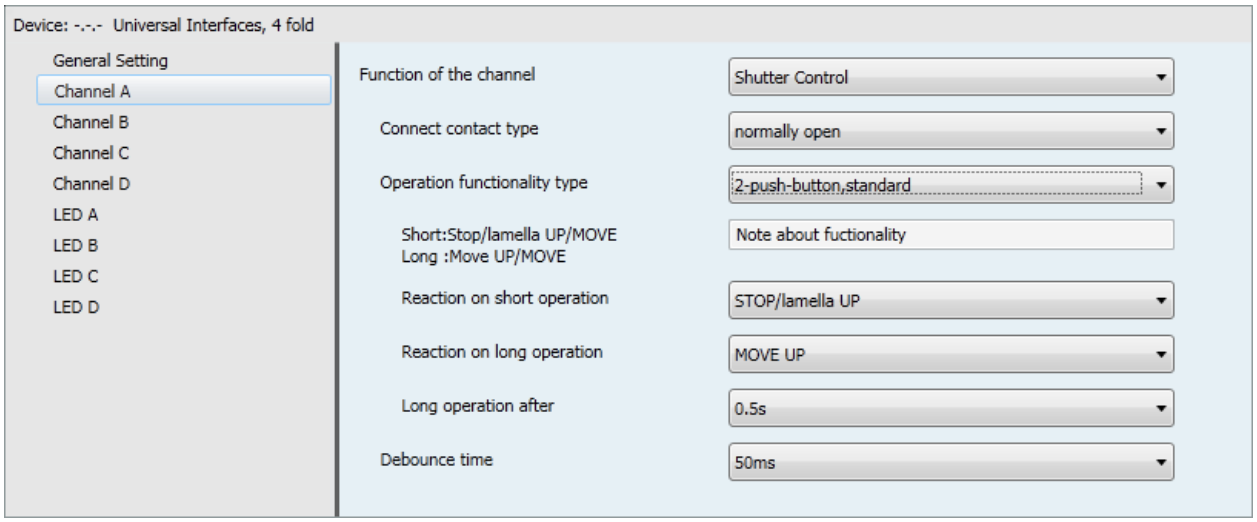
3.2.8.9 Parameter "Debounce time"

It can set the vibration time to prevent unwanted multiple operation by bouncing of contacts in vibration time, which means the effective time of the contact operation.

Options: 10ms, 20ms, ..., 150ms

3.2.9 Parameter window “Shutter control, X”

The parameter window “Shutter control, X” is shown in the following screenshot. It is visible if the channel function “Shutter control” is selected. When this function is enabled, it is possible to control the shutter by one button/switch or two button/switch operation.



3.2.9.1 Parameter “Connect contact type”

This parameter defines whether the contact at the input is a normally open or a normally closed. “Normally open” is used as the example.

Options: Normally open, Normally closed

3.2.9.2 Parameter "Operation functionality type"

This parameter defines the types of the shutter operations with a detailed description each function:

Operation	Functionality
1-push-button,short=stepping, long=moving	
Short operation	Alternate implement "Stop/Adjust upward" or "Stop/Adjust downward" operation (alternates between sending the value of the object "0"and"1")
Long operation	Alternate implement "Move up" or "Move down" operation (alternate send the value of the object "0"and"1")
1-push-button, short=moving, long=stepping	
Short operation	Alternate implement "Move up" or "Move down" operation (alternates between sending the value of the object "0"and"1")
Long operation	Alternate implement "Stop/Adjust upward" or "Stop/Adjust downward" operation (alternates between sending the value of the object "0"and"1")
1-push-button-operation, moving	
Operation	When operating, sends the command in sequence : ->Move up ->Stop/Adjust upward ->Move down -> Stop/Adjust downward ->
1-switch-operation, moving	
Operation start (press the button)	Alternate implement "Move up" or "Move down" operation (alternate send the value of the object "0"and"1")
Operation end (Release the button)	Stop/Adjust (send the value opposite with the operation starting)
2-push-button, standard	
Short operation	"Stop/Adjust upward" or "Stop/Adjust downward" (set by parameter)
Long operation	"Move up" or "Move down" (set by parameter)
2-push-button, moving[shutter]	
Operation	When operation sends the command in sequence : -> Move up -> Stop/Adjust upward -> or ->Move down ->Stop/Adjust downward -> (Move up / down set by parameter)
2-push-button, stepping	
Operation	"Stop/Adjust upward" or "Stop/\Adjust downward" (set by parameter) (keep pressing the button can send cyclic)
2-switch-operation, moving[shutter]	
Operation start	"Move up" or "Move down" (set by parameter)
Operation end	"Stop/Adjust upward" or "Stop/Adjust downward" (the sending value is identical to the value when the operation started)

3.2.9.3 Parameter “Tele. STOP/lamella adj. Cyclical send”

It is visible if the shutter control type is “1-push-button, short=moving, long=stepping” and “2-push-button, stepping”. It is able to set the interval time of sending the object “stop/adjust adj.” cyclical.

Options: 0.3s, 0.5s, …, 10s

3.2.9.4 Parameter “Reaction on short operation”

It is visible if the shutter control type is “2-push-button, standard”. This parameter defines the action of a short operation.

Options: Stop/adjust up, Stop/adjust down

3.2.9.5 Parameter “Reaction on long operation”

It is visible if the shutter control type is “2-push-button, standard”. This parameter defines the action of a long operation.

Options: Move up, Move down

3.2.9.6 Parameter “Reaction on operation”

It is visible if the shutter control type is“2-push-button, moving [shutter]”, “2-switch-operation, moving [shutter]”and “2-push-button, stepping”. The three different control types provide different operation actions. For the first two control types, the options are MOVE UP and MOVE DOWN; for the last control type the options are Stop/lamella UP and Stop/lamella DOWN.

Options: Move up, Move down

Options: Stop/adjust up, Stop/adjust down

3.2.9.7 Parameter “Long operation after”

This parameter is visible if long operation activate. The period is defined here, after which an operation is interpreted as “long”.

Options: 0.3s, 0.5s, ..., 10s

3.2.9.8 Parameter “Debounce time”

It can set the vibration time to prevent unwanted multiple operation by bouncing contacts in vibration time, which means the effective time of the contact operation.

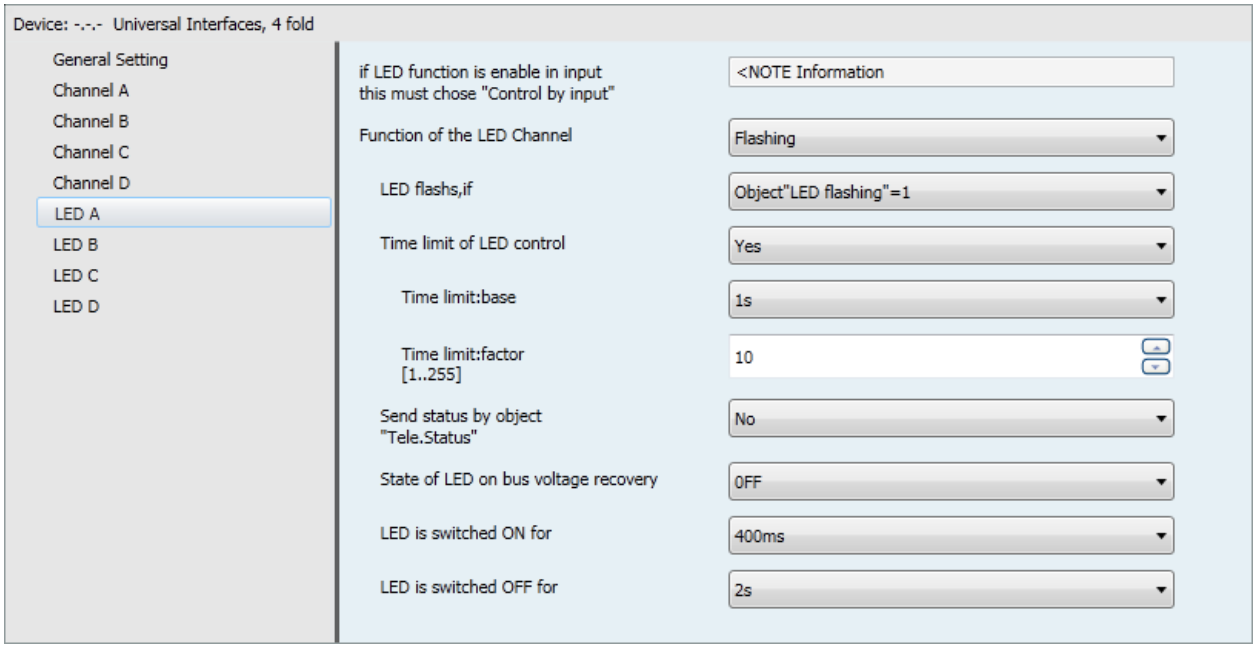
Options: 10ms, 20ms, …, 150ms

3.2.10 Description of setting the system parameter in part of LED channel

The LED priority in the LED channel page is lower than the LED in the device channel. When enabled the LED setting in the device channel, the LED actions in the LED channel will not operate.

3.2.10.1 Parameter window "Flashing, X"

The parameter window is shown below. It is able to set the LED flash function and turn on the LED for a long time simultaneously



3.2.10.2 Parameter "Function of the LED channel"

This parameter defines the function of the LED channel. The default parameter is "Flashing" function. If "No action" is selected, it means this channel disable.

Options: No action

Flashing

Switch

Control by input

Indicate object in

Indicate object out

Indicate object in and out

3.2.10.3 Parameter “LED Flashing, if”

This parameter defines the mode of opening the LED flashing.

Options: Object “LED flashing”=0, Object “LED flashing”=1

3.2.10.4 Parameter “Time limit of LED control”

This parameter defines whether to enable the function to restrict the flashing of the LED.

Options: Yes, No

3.2.10.5 Parameter “Time limit: Base× Factor

This parameter is visible if the time limit is active. It is defines the time of LED flashing: Base × Factor.

Base options: 1s, 10s, …, 1h

Factor options: 1… 255

3.2.10.6 Parameter “Send status by object “Tele. Status””

This parameter defines whether to send the LED status report on the bus.

Options: Yes, No

If “Yes” is selected, the object “Send its status, X” will send value “1” when LED flashing; it will send value “0” when the LED stops flashing.

3.2.10.7 Parameter “State of LED on bus voltage recovery”

It is defines the state of LED during bus voltage recovery.

Options: On, Off

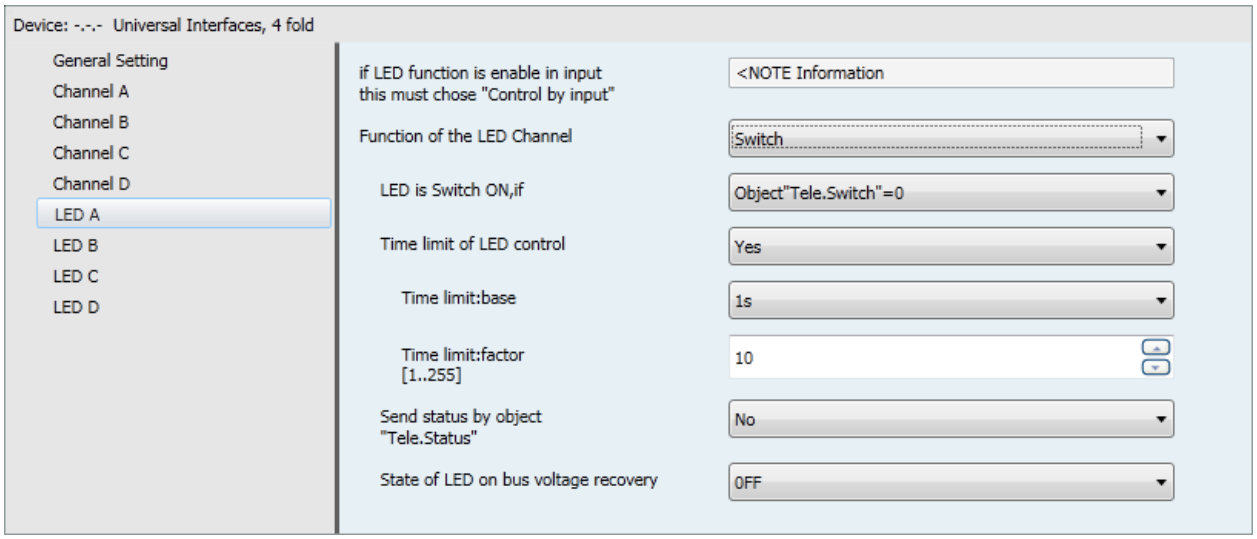
3.2.10.8 Parameter “LED is switched ON/OFF for”

It is defines the time period the LED switched on/off during LED flashing.

Options: 600ms, 800ms, …, 60s

3.2.11 Parameter window “Switch, X”

The parameter window “Switch, X” defines the switch function of the LED. The LED can switch off automatically and/or can remain switched on.



3.2.11.1 Parameter "LED is switch ON, if"

This parameter defines the mode to switch on the LED.

Options: Object "Tele. Switch"=0, Object "Tele. Switch"=1

3.2.11.2 Parameter "Time limit of LED control"

This parameter defines whether to enable the function to restrict the time to switch on the LED.

Options: Yes, No

3.2.11.3 Parameter "Time limit: Base× Factor

This parameter is visible if the time limit is active. It is defines the time of LED flashing: Base × Factor. After this period, the LED switches off automatically.

Base options: 1s, 10s, ..., 1h

Factor options: 1…255

3.2.11.4 Parameter "Send status by object "Tele. Status""

This parameter defines whether to send the LED status report on the bus.

Options: Yes, No

If "Yes" is selected, the object "Send its status, X" will send value "1" when LED switches on; it will send value "0" when LED switches off.

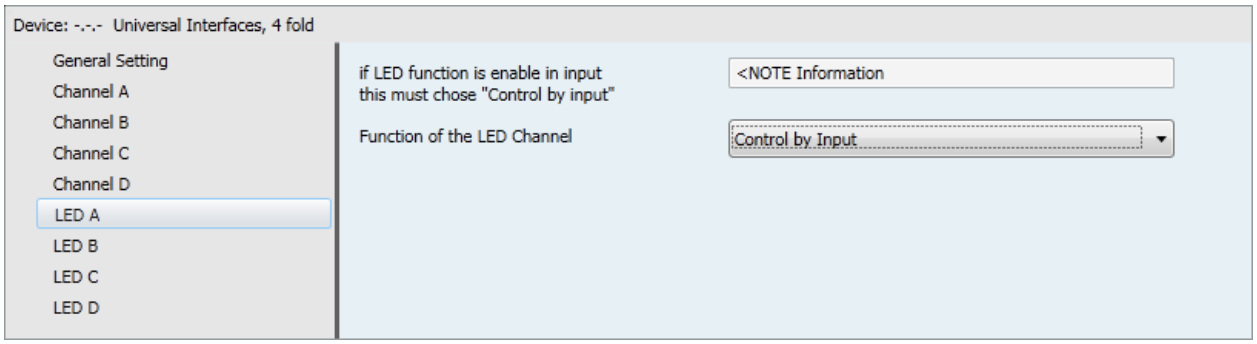
3.2.11.5 Parameter "State of LED on bus voltage recovery"

It is defines the state of LED during bus voltage recovery.

Options: On, Off

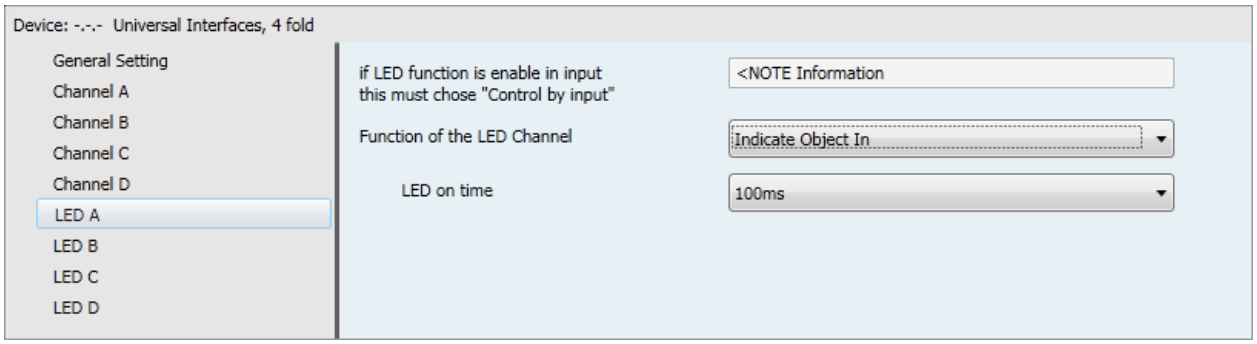
3.2.12 Parameter window "Control by input, X"

The parameter window "Control by input, X" is shown below, the LED is used to indicate the button input.



3.2.13 Parameter window "Indicate object in, X"

The parameter window "Indicate object in, X" is shown below, the LED is used to indicate the input of the group object.



3.2.13.1 Parameter "LED on time"

This parameter defines the indicative time of the LED when there is an input on the group object.

Options: 100ms, 200ms, …, 60s

3.2.14 Parameter window “Indicate object out, X”

The parameter window “Indicate object out, X” will be shown in Fig.20, the LED is used to indicate the output of the group object.

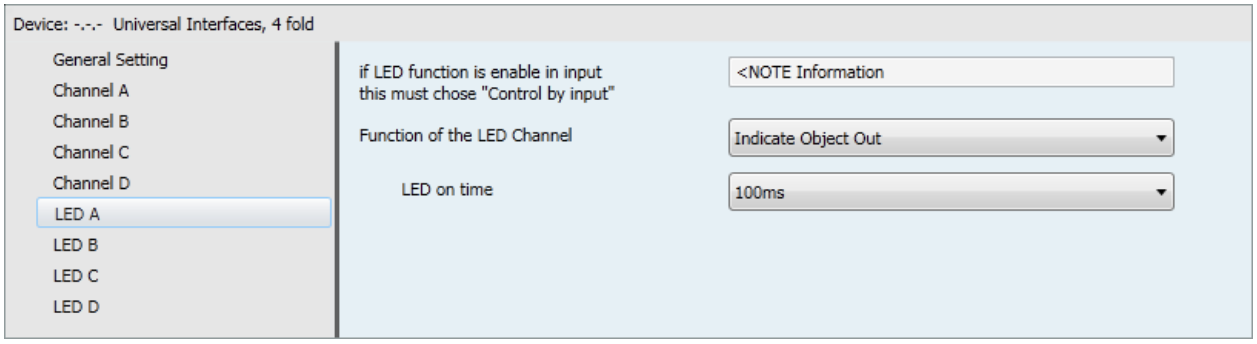


Fig.20 Parameter window “Indicate object out, X”

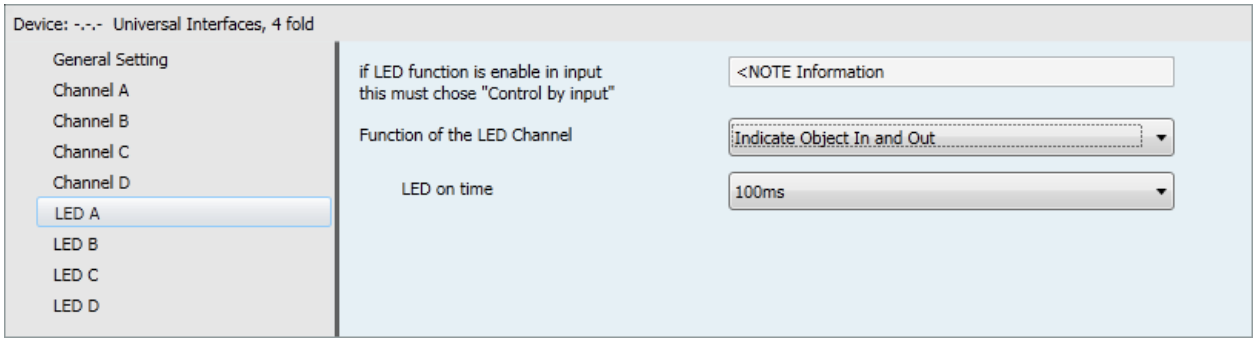
3.2.14.1 Parameter “LED on time”

This parameter defines the indicative LED switch on time when there is output of group object.

Options: 100ms, 200ms, …, 60s

3.2.15 Parameter window “Indicate object in and out, X”

The parameter window “Indicate object in and out, X” shown below. The LED is used to indicate the input and output of the group object.



3.2.15.1 Parameter “LED on time”

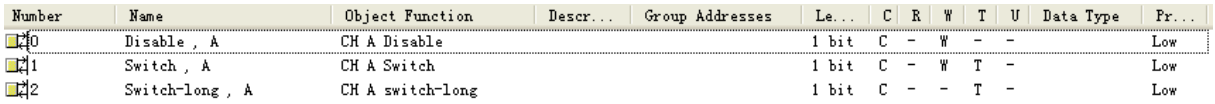
This parameter defines the indicative LED time when there is input or output of group object, which means the switch on time.

Options: 100ms, 200ms, …, 60s

3.3Description of group objects

Only group objects can communicate over the KNX bus. If the group object and the object in each channel are the same, then use channel A as the example to introduce the function of each group object.

3.3.1 Group object “switch”

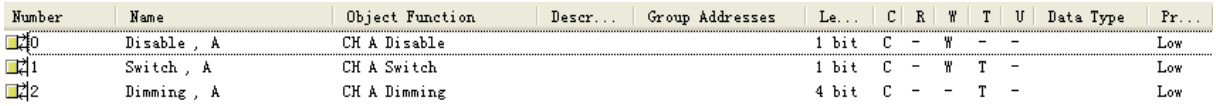


Number	Name	Object Function	Descr...	Group Addresses	Le...	C	R	W	T	U	Data Type	Pr...
0	Disable , A	CH A Disable			1 bit	C	-	W	-	-		Low
1	Switch , A	CH A Switch			1 bit	C	-	W	T	-		Low
2	Switch-long , A	CH A switch-long			1 bit	C	-	-	T	-		Low

Note: “C” in “Flag” column in the below table means enable the group function of the object; “W” means it is able to modify the other devices’ value by the group objects; “R” means the value of the object can be read by the other devices; “T” means the object has the transmission function; “U” means the value of the object can be modified by other devices.

No.	Function	Object name	Data	Flags
0	**CH X Disable**	**Disable, X**	**1bit**	**C,W**
When enable the channel function, this group object will be active to disable/enable the channel function. The group object will disable this function if receive a telegram with logic value “0” while it will enable the channel function if receive a telegram “1”. The control telegram sent by all objects are ineffectiveness when the channel function is disabled. The channel function default to enable when the bus voltage recovery. All group object “Disable” in channel function operate equally.				
1	**CH X Switch**	**Switch, X**	**1bit**	**C,W,T**
This group object is visible if the channel function “Switch” is enable. It is visible no matter to distinguish short/long operation or not. Operate with button input (or a short operation) the object value to carry out the relevant action, such as ON、OFF、TOGGLE.				
2	**CH X Switch-long**	**Switch-long, X**	**1bit**	**C,T**
This group object is visible if parameter “Number of objects for short/long object operation” is “2 objects” and it is distinguish with long and short operation. Operate with a long operation to input the object value to carry out the relevant action, such as ON、OFF、TOGGLE.				

3.3.2 Group object “switch/dimming”



Number	Name	Object Function	Descr...	Group Addresses	Le...	C	R	W	T	U	Data Type	Pr...
0	Disable , A	CH A Disable			1 bit	C	-	W	-	-		Low
1	Switch , A	CH A Switch			1 bit	C	-	W	T	-		Low
2	Dimming , A	CH A Dimming			4 bit	C	-	-	T	-		Low

No.	Function	Object name	Data	Flags
0	**CH X Switch**	**Switch, X**	**1bit**	**C,W,T**
It is visible if parameter “Dimming functionality” selected “Dimming and switching”. Operate with a short operation to input the object value to carry out the relevant action, such as ON、OFF、TOGGLE.				

1	**CH X Dimming**	**Dimming, X**	**4bit**	**C C,T**

This group object input by a long operation to send the command to dim up or dim down. It can control the dimming device on bus to carry out relative dimming. It will send a stop command to stop dimming when the long operation is end.

3.3.3 Group object "value/force output"

There are many data types and group objects, shown in below. This different data types group object have the same operation that transmits the input object value, which the range of transmit object value are different. It is possible to distinguish a long/short operation or not, the two objects enable when distinguished.

Number	Name	Object Function	Descr...	Group Addresses	Le...	C	R	W	T	U	Data Type	Pr...
0	Disable , A	CH A Disable			1 bit	C	-	W	-	-		Low
1	Output 1bit , A	CH A Value 1bit			1 bit	C	-	-	T	-		Low
2	Output 1bit-long , A	CH A Value 1bit-long			1 bit	C	-	-	T	-		Low

No.	Function	Object name	Data	Flags
0	**CH X Value 1bit (1bit/2bit/……/4byte)**	**Output 1bit, X (1bit/2bit/……/4byte)**	**1bit (1bit/2bit/……/4byte)**	**C,T**

This group object is used to transmit the input value. It is only transmit the object value in short operation if distinguish a long and short operation. The value range depends on the data type, if the data type of the group object is different, the importability range of the object value is different. The data type depends on parameter "Reaction on (short) operation".

1	**CH X Value 1bit-long (1bit/2bit/……/4byte)**	**Output 1bit-long, X (1bit/2bit/……/4byte)**	**1bit (1bit/2bit/……/4byte)**	**C,T**

This group object is visible if there is a distinction between long and short operation, it is used to transmit the object input value in long operation. The value range is depending on the data type, if the data type of the group object is different, the importability range of the object value is different. The data type depends on parameter "Reaction on long operation".

3.3.4 Group object "scene control"

The group object "Scene control" is shown in below. It is including the actuator group and the group object in the scene control mode. The control mode of actuator group control by 5 independent group object, it is control by 1bit and 8bit data. The scene control mode control by a 8 bit data.

Number	Name	Object Function	Descr...	Group Addresses	Le...	C	R	W	T	U	Data Type	Pr...
0	Disable , A	CH A Disable			1 bit	C	-	W	-	-		Low
1	Output 1bit, Group-A , A	CH A 1bit, Group-A			1 bit	C	-	W	T	U		Low
2	Output 1bit, Group-B , A	CH A 1bit, Group-B			1 bit	C	-	W	T	U		Low
3	Output 1bit, Group-C , A	CH A 1bit, Group-C			1 bit	C	-	W	T	U		Low
4	Output 1bit, Group-D , A	CH A 1bit, Group-D			1 bit	C	-	W	T	U		Low
5	Output 1bit, Group-E , A	CH A 1bit, Group-E			1 bit	C	-	W	T	U		Low
6	Store scene , A	CH A Store scene			1 bit	C	-	W	T	-		Low

Number	Name	Object Function	Descr...	Group Addresses	Le...	C	R	W	T	U	Data Type	Pr...
0	Disable , A	CH A Disable			1 bit	C	-	W	-	-		Low
1	Output 8bit, Group-A , A	CH A 8bit, Group-A			1 Byte	C	-	W	T	U		Low
2	Output 8bit, Group-B , A	CH A 8bit, Group-B			1 Byte	C	-	W	T	U		Low
3	Output 8bit, Group-C , A	CH A 8bit, Group-C			1 Byte	C	-	W	T	U		Low
4	Output 8bit, Group-D , A	CH A 8bit, Group-D			1 Byte	C	-	W	T	U		Low
5	Output 8bit, Group-E , A	CH A 8bit, Group-E			1 Byte	C	-	W	T	U		Low

No.	Function	Object name	Data	Flags

No.	Function	Object name	Data	Flags
1~5	CH X 1bit/8bit, Group-A…E	Output 1bit/8bit, Group-A…E, X	1bit/1byte	C,W,T,U

It is visible if parameter "Control the scene" selected "5 separate". It is used to control the actuator group, it can control by a 1 bit or 8 bit data (set by parameter). When saving the scene, the value of object "output 1bit/8bit, group A…E" will be read and storage by bus. When the bus voltage recovery, the value of the object resume to the default value and the new storage value will be lost.

1	CH X 8bit Scene	Output 8bit scene, X	1 byte	C,T

This group object is visible if parameter "Control the scene" selected "8bit scene. It is used to control the scene. It is possible to invocate or save the scene by a 8 bit command sent by this object. The definition of the 8-bit command will be described below (This object is only to communicate "C" and transmit "T", do not have the function modify "W" and update "U"):

Assuming an 8-bit command (binary coding) as: FXNNNNNN

F: invocate the scene with "0"; save the scene with "1";

X: 0

NNNNNN: scene number (0…63) 。

6	CH X Store scene	Store scene, X	1bit	C,W,T

This parameter trigger the scene storage or indicate the accomplish of the scene by bus, decided by the mode of the scene storage. The detail storage process will be described in the scene storage parameter chapter.

3.3.5 Group object "switch sequence"

The group object "Switching sequence" is shown in below. It can modify the object value with an operation step by step. Each object corresponding to one switch level.

Number	Name	Object Function	Descr...	Group Addresses	Le...	C	R	W	T	U	Data Type	Pr...
0	Disable , A	CH A Disable			1 bit	C	-	W	-	-		Low
1	Output level-1 , A	CH A level-1			1 bit	C	-	-	T	-		Low
2	Output level-2 , A	CH A level-2			1 bit	C	-	-	T	-		Low
3	Output level-3 , A	CH A level-3			1 bit	C	-	-	T	-		Low
4	Output level-4 , A	CH A level-4			1 bit	C	-	-	T	-		Low
5	Output level-5 , A	CH A level-5			1 bit	C	-	-	T	-		Low
6	Level increment/decrement , A	CH A Level increment/decrement			1 bit	C	-	W	-	-		Low

No.	Function	Object name	Data	Flags
1~5	CH X level-1(1~5)	Output level-1(1~5), X	1bit	C,T

The number of the group object (maximum 5) which the levels of switch set by parameter "No. of object". The group object sent on bus is the object which is modified, which the value of the group object had been changed. The detail process will be described in the switching sequence parameter chapter.

6	CH X level increment/decrement	level increment/decrement, X	1bit	C,W

The group object "level increment/decrement, X" is used to increase/decrease the level of the switch. It will increase one level when sending "1" and decrease a level when sending "0". The detail process will be describe in the switching sequence parameter chapter.

3.3.6 Group object "counter"

The group object "Counter" is shown in below. Including standard counter and differential counter group object, both these group objects are initiated counter by one operation and the counter range are the same, but the counting are independent of each other.

Number	Name	Object Function	Descr...	Group Addresses	Le...	C	R	W	T	U	Data Type	Pr...
0	Disable , A	CH A Disable			1 bit	C	-	W	-	-		Low
1	Output counter value 1byte , A	CH A Counter value			1 Byte	C	-	W	T	-		Low
2	Differential Count 1byte , A	CH A Differential Counter			1 Byte	C	-	W	T	-		Low
3	Request counter value , A	CH A Request counter value			1 bit	C	-	W	-	-		Low
4	Differential counter overflo...	CH A Differential overflow			1 bit	C	-	-	T	-		Low
5	Reset differential counter , A	CH A Rst differential counter			1 bit	C	-	W	-	-		Low

No.	Function	Object name	Data	Flags
1	**CH X Counter value**	**Output counter value 1byte, X (1bit/2bit/……/4byte)**	**1byte (1bit/2bit/……/4byte)**	**C,W,T**
This group object is used to transmit the current counting value of the standard counter, and it can modify the counting value simultaneously. Different data type makes the different counting range, it is defines by parameter "Date width of counter".				
2	**CH X Differential Counter**	**Differential Counter 1byte, X (1bit/2bit/……/4byte)**	**1byte (1bit/2bit/……/4byte)**	**C,W,T**
It is visible if enable the parameter "Enable differential counter". This group object is used to transmit the current counting value of the differential counter, and it can modify the counting value simultaneously. Different data type makes the different counting range, it is defines by parameter "Date width of counter".				
3	**CH X Request Counter value**	**Request Counter value, X**	**1bit**	**C,W**
This group object is used to ask for the current counting value of the standard counter and the differential counter. The group object "CH X Counter value" and "CH X Differential Counter" will transmit the current counting value if receive a logic value "1", it will no reaction if receive a logic value "0" telegram.				
4	**CH X Differential overflow**	**Differential counter overflow, X**	**1bit**	**C,T**
It is visible if enable the parameter "Enable differential counter". Once the counting of the differential counter exceed the overflow value preset by parameter "Over-/under run of differential at [0…255]", it will send telegram "1" on bus to report the overflow.				
5	**CH X Rst Differential Counter**	**Reset Differential Counter, X**	**1bit**	**C,W**
It is visible if enable the parameter "Enable differential counter". It is used to reset the counting value of the differential counter, which counting from 0.It will reset the counting value if receive a logic value "1"telegram, and it will no reaction if receive a "0".				

3.3.7 Group object "multiple operation"

The group object "Multiple Operation" is shown in below. The value of the designate operation object will be modify if detect multiple operation in period.

Number	Name	Object Function	Descr...	Group Addresses	Le...	C	R	W	T	U	Data Type	Pr...
0	Disable , A	CH A Disable			1 bit	C	-	W	-	-		Low
1	Output 1-fold , A	CH A 1-fold			1 bit	C	-	-	T	-		Low
2	Output 2-fold , A	CH A 2-fold			1 bit	C	-	-	T	-		Low
3	Output 3-fold , A	CH A 3-fold			1 bit	C	-	-	T	-		Low
4	Output 4-fold , A	CH A 4-fold			1 bit	C	-	-	T	-		Low
5	Output Long-fold , A	CH A Long-fold			1 bit	C	-	-	T	-		Low

No.	Function	Object name	Data	Flags
1~4	**CH X 1-fold(1~4)**	**Output 1-fold, X(1~4)**	**1bit**	**C,T**
The number of the group object (maximum 4) is set by parameter "Max. number of operations (=Num. of objects)". If there are multiple operations, multiple objects will send the relevant telegram on bus, which the telegram set by parameter "value send (object "Tele. Operation…-fold")". The detail operation process will be describe in the multiple operation parameter chapter.				
5	**CH X Long-fold**	**Output Long-fold, X**	**1bit**	**C,T**
It is visible if parameter "Additional object for long operation" selected "yes". Once detected a long operation the object				

will send telegram on bus, the telegram is set by parameter “value send (object “Tele. Long operation”)”.

3.3.8 Group object “shutter control”

The group object “Shutter Control” is shown in below.

Number	Name	Object Function	Descr...	Group Addresses	Le...	C	R	W	T	U	Data Type	Pr...
0	Disable , A	CH A Disable			1 bit	C	-	W	-	-		Low
1	Output shutter UP/DOWN , A	CH A shutter UP/DOWN			1 bit	C	-	-	T	-		Low
2	Output Stop/lamella adj , A	CH A Stop/lamella adj			1 bit	C	-	-	T	-		Low
3	Upper limit position , A	CH A Upper limit position			1 bit	C	-	W	-	-		Low
4	Lower limit position , A	CH A Lower limit position			1 bit	C	-	W	-	-		Low

No.	Function	Object name	Data	Flags
1	**CH X shutter UP/DOWN**	**Output shutter UP/DOWN, X**	**1bit**	**C,T**
This group object move up/down the shutter by sending command by bus. It will move down if the group object send a “1” telegram, it will move up if sending a “0”.				
2	**CH X Stop/adjust adj**	**Output Stop/adjust adj, X**	**1bit**	**C,T**
It will stop/adjust the shutter by sending command by bus. It will stop/ adjust down if sending a “1” telegram, and it will stop/adjust up if sending “0”.				
3	**CH X Upper limit position**	**Upper limit position, X**	**1bit**	**C,W**
It is used to limit the upper moving. It is limit the upper moving if the object receive a logic value “1”, and negate it if receive “0”.				
4	**CH X Lower limit position**	**Lower limit position, X**	**1bit**	**C,W**
It is used to limit the lower moving. It is limit the lower moving if the object receive a logic value “1”, and negate it if receive “0”.				

3.3.9 Group object “LED X—flashing”

The group object “LED X–Flashing” is shown in below.

Number	Name	Object Function	Descr...	Group Addresses	Le...	C	R	W	T	U	Data Type	Pr...
28	LED. flashing , A	LED A Flashing			1 bit	C	-	W	-	-		Low
29	LED permanent on , A	LED A Permanent on			1 bit	C	-	W	-	-		Low
30	Send its status , A	LED A Send its status			1 bit	C	-	-	T	-		Low

No.	Function	Object name	Data	Flags
28	**LED X Flashing**	**LED. Flashing, X**	**1bit**	**C,W**
It is used to control the LED flashing. It will start flashing if receive “1” or “0” telegram (defines by “LED flashing, if”), the flashing time set by parameter. And it will stop LED if receive “0” or “1”.				
29	**LED X Permanent on**	**LED permanent on, X**	**1bit**	**C,W**
It is used to open LED for a long period and its priority is higher than the group object “LED. Flashing, X”. It will open LED if receive telegram “1”, negate priority and the LED resume the foregoing operation if receive “0”.				
30	**CH X Upper limit position**	**Upper limit position, X**	**1bit**	**C,W**
It is visible if “Send status by object “Tele. Status”” selected “Yes”, it is used to send the status of LED. Sending “1” means LED open or flashing, and sending “0” means the LED is stop. The object LED. Flashing, X” will send telegram “1” if sending open flashing requirement every time.				

3.3.10 Group object “LED X—SWITCH”

The group object “LED X—Switch” is shown in below.

Number	Name	Object Function	Descr...	Group Addresses	Le...	C	R	W	T	U	Data Type	Pr...
28	LED. switch , A	LED A Switch			1 bit	C	-	W	-	-		Low
29	LED permanent on , A	LED A Permanent on			1 bit	C	-	W	-	-		Low
30	Send its status , A	LED A Send its status			1 bit	C	-	-	T	-		Low

No.	Function	Object name	Data	Flags
28	**LED X Switch**	**LED. switch, X**	**1bit**	**C,W**
This group object is used to open LED. It will open LED if the object receive a “1” or “0” telegram (defines by “LED is Switch ON, if”) , the open time can be set by parameter; it will stop LED if receive “0” or “1”.				
29	**LED X Permanent on**	**LED permanent on, X**	**1bit**	**C,W**
It is used to open LED for a long period and its priority is higher than the group object “LED. switch, X”. It will open LED if receive telegram “1”, negate priority and the LED resume the foregoing operation if receive “0”.				
30	**LED X Send its status**	**Send its status, X**	**1bit**	**C,T**
It is visible if “Send status by object “Tele. Status”” selected “Yes”. It is used to send the status of LED. Sending “1” means LED open, and sending “0” means the LED is stop. The object LED. switch, X” will send telegram “1” if sending open requirement every time.				

4 LightMaster Line Coupler

- PLC-KNX LightMaster Line Coupler

4.1 Description

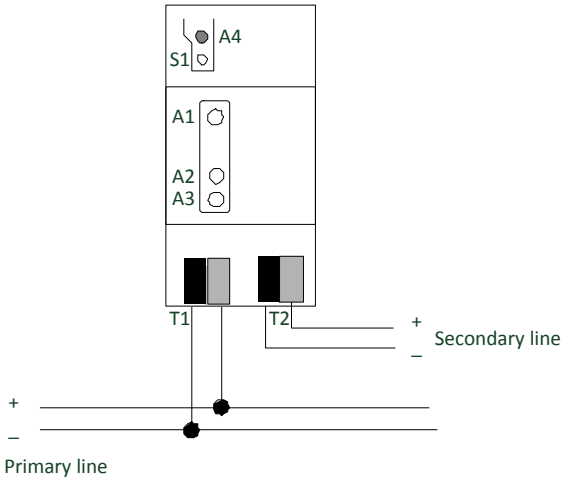
The LightMaster Line Coupler provides a data connection between two separate bus lines and also isolates the bus lines from each other in order to enable the independent local operation of a bus line.

The coupler can be used as a line coupler, as a backbone coupler and a repeater. As a line coupler, it connects a line with a main line. As a backbone coupler, it connects a main line with a backbone line. As a repeater it connects one section of a line to another section of the same line. The corresponding lines are then galvanically isolated from each other.

The filter table is created by the ETS software automatically on commissioning the system.
The filter table determines which telegrams are passed through the coupler. With the LK2 coupler the primary line is connected to a data rail, the LK2-2 coupler has bus terminals for both lines.

The LEDs indicate the operating status of the device

- A1 ON
- A2 secondary line traffic
- A3 primary line traffic
- A4 programming mode
- S1 programming button
- T1 primary line
- T2 secondary line



The primary line is connected via a bus terminal on the left side of the device.

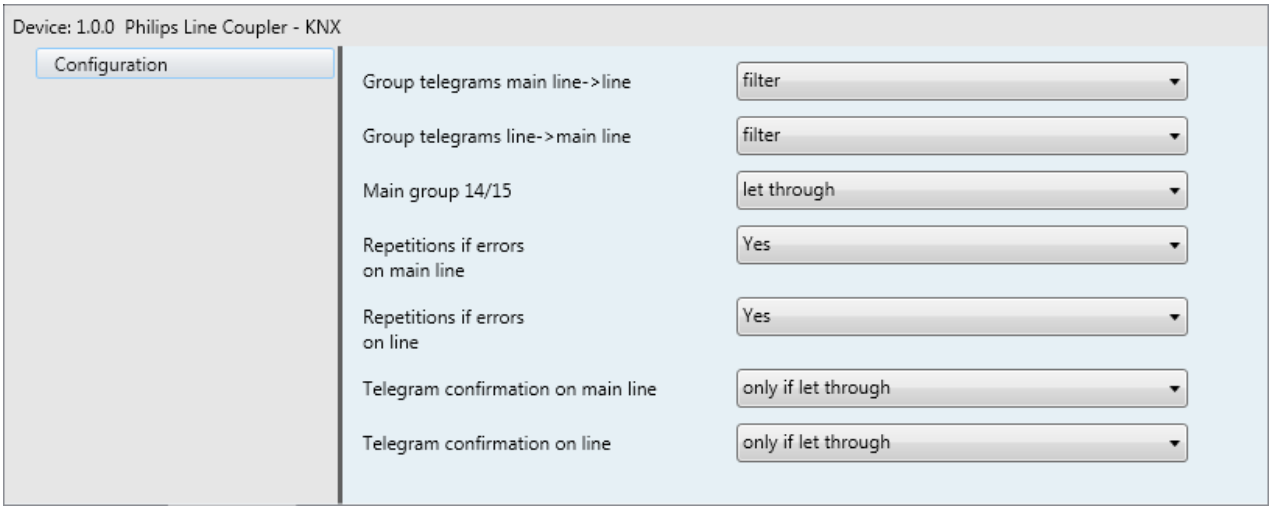
The secondary line is connected via a bus terminal on the right side of the device.

4.2 Configuration

The device is programmed with the ETS Software. Two database application options exist for the line coupler, one for backbone or line coupler and another for line repeater.

Note: As long as the coupler has not been assigned its own physical address, it can cause malfunctions at the initial start-up of other devices.

4.2.1 Line coupler functional parameters



4.2.1.1 Group telegrams main line->line

This parameter defines how the line coupler will handle network telegrams with group addressing from the main line to the line.

Options: transmit all (testing only), block, filter

4.2.1.2 Group telegrams line->main line

This parameter defines how the line coupler will handle network telegrams with group addressing from the line to the main line.

Options: transmit all (testing only), block, filter

4.2.1.3 Main Group 14/15

This parameter defines if telegrams for main groups 14 and 15 will be let through or blocked

Options: block, let through

4.2.1.4 Repetitions if errors on mainline

This parameter defines if the line coupler will transmit a telegram to the main line again if it does not receive an acknowledgment from the initial telegram.

Options: No, Yes

4.2.1.5 Repetitions if errors on line

This parameter defines if the line coupler will transmit a telegram to the line again if it does not receive an acknowledgment from the initial telegram.

Options: No, Yes

4.2.1.6 Telegram confirmation on mainline

If a telegram is transmitted on the mainline and there is no device with the group address of that telegram, the telegram will not be acknowledged and the transmitting device may continue to repeat the telegram. The line coupler can issue missing telegram acknowledgments in order to reduce network traffic. This parameter defines when the line coupler will issue missing acknowledgments on the mainline.

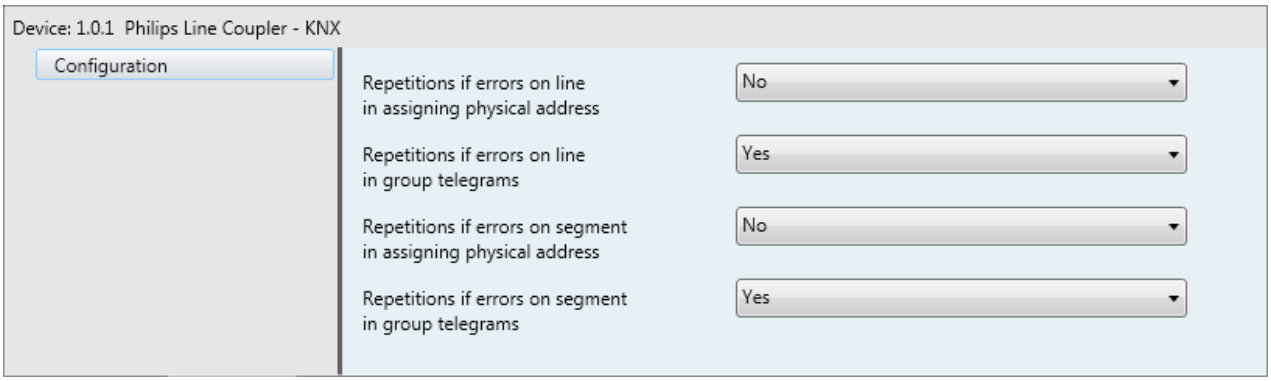
Options: always, only if let through

4.2.1.7 Telegram confirmation on line

If a telegram is transmitted on the line and there is no device with the group address of that telegram, the telegram will not be acknowledged and the transmitting device may continue to repeat the telegram. The line coupler can issue missing telegram acknowledgments in order to reduce network traffic. This parameter defines when the line coupler will issue missing acknowledgments on the line.

Options: always, only if let through

4.2.2 Line repeater functional parameters



4.2.2.1 Repetitions if errors on line in assigning physical address

This parameter defines whether the line repeater will re-transmit a physical address telegram sent to the line if it does not receive an acknowledgement.

Options: No, Yes

4.2.2.2 Repetitions if errors on line in group telegrams

This parameter defines whether the line repeater will re-transmit a group telegram sent to the line if it does not receive an acknowledgement.

Options: No, Yes

4.2.2.3 Repetitions if errors on segment in assigning physical address

This parameter defines whether the line repeater will re-transmit a physical address telegram sent to the segment if it does not receive an acknowledgement.

Options: No, Yes

4.2.2.4 Repetitions if errors on segment in group telegrams

This parameter defines whether the line repeater will re-transmit a group telegram sent to the segment if it does not receive an acknowledgement.

Options: No, Yes

5 LightMaster Network Power Supply

- PPS640-KNX LightMaster Network Power Supply

5.1 Description

The 640ma power supply unit provides the system power necessary for the bus system. The integrated choke prevents the data telegrams from short-circuiting on the bus line. The connection to the bus line is established by clicking the device onto the DIN-rail (installed data-rail) or by using the bus connection terminal (red-black) on the front side. The power supply unit can supply DC24V power from an additional pair of terminals (yellow-white). This DC24V output voltage is only allowed to power an additional line via a separate choke. It is a "passive" device that does not require programming.

5.2 Configuration

Not Applicable

6 LightMaster Relay Actuators

- PDRC416FR-KNX, 4 Channels x 230 VAC, 16A
- PDRC816FR-KNX, 8 Channels x 230 VAC, x 16A
- PDRC1216FR-KNX, 12 Channels x 230 VAC, x 16A

6.1 Description

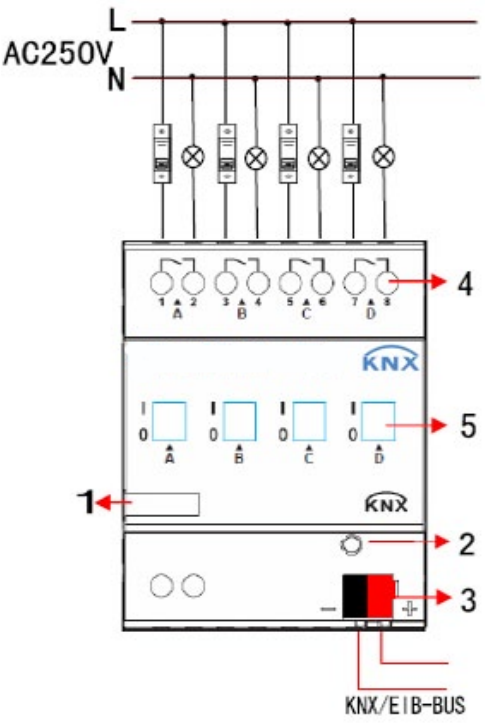
The Philips LightMaster series of Relay Actuators is ideally suited to control lighting, window blinds or other switching functions in a professional KNX bus installation.

The 4, 8 or 12 channels can be switched simultaneously. The autonomous switching of up to twelve devices is enabled by shutter contacts. Outputs can switch a maximum of 16A and can also be manually operated.

The LightMaster Relay Actuators generally require no additional power supply. The 8 channel and 12 channel Relay Actuators only need an additional 24V DC power supply if synchronous (RTS - real time systems) switching of several channels is necessary.

6.1.1 Connections

1. Labeling area
2. Programming knob & LED
3. KNX Bus connection
4. Connection pole
5. Notification window for contact position and manual operation
6. Additional 24 V DC supply max, 24 mA in operation, min. 4 mA in standby (not shown)



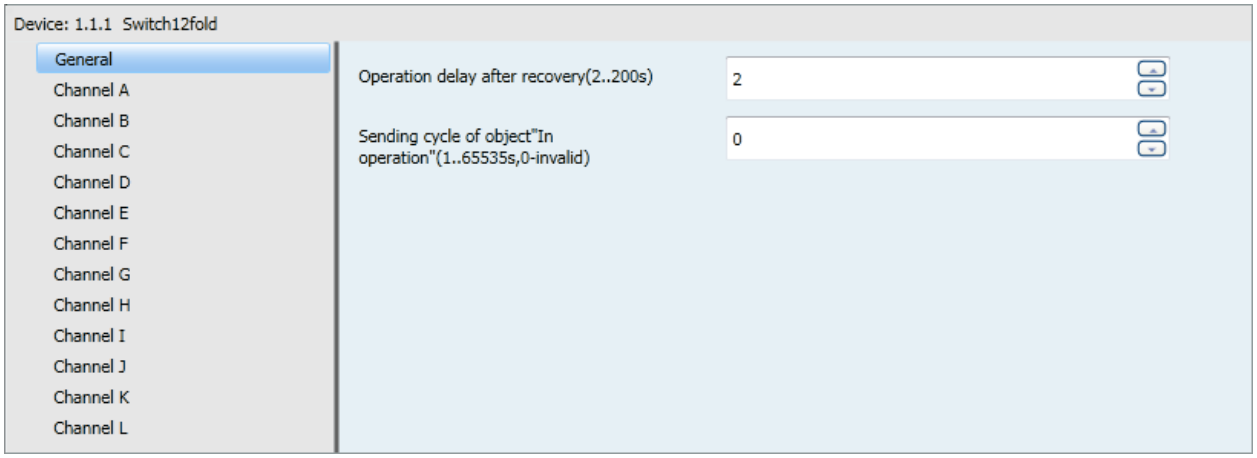
6.2 Configuration

The objects and parameters for the device are outlined in this chapter. The application table lists the number of available group objects, group addresses and connections.

The Relay Actuators have the following capabilities:

Type	SwitchME4 KNX	SwitchME8 KNX	SwitchME12 KNX
max. number of group objects	90	170	250
max. number of group Addresses	254	254	254
max. number of associations	254	254	254

6.2.1 General



Two parameters can be configured in the general parameter configuration window:

1. Operation delay after recovery (2..200s)
2. Sending cycle of object “In operation” (1..65535, 0-invalid)

6.2.1.1 Operation delay after recovery (2..200s)

The relay switches with a delay time of 2...200 s after turning on.
The preconfigured selection is 2 seconds. The delay time is min. 2 s and max. 200 s.

Options: 2…200 s

If the device is set to start the timer counting and once the delay time has expired, the switch will respond.

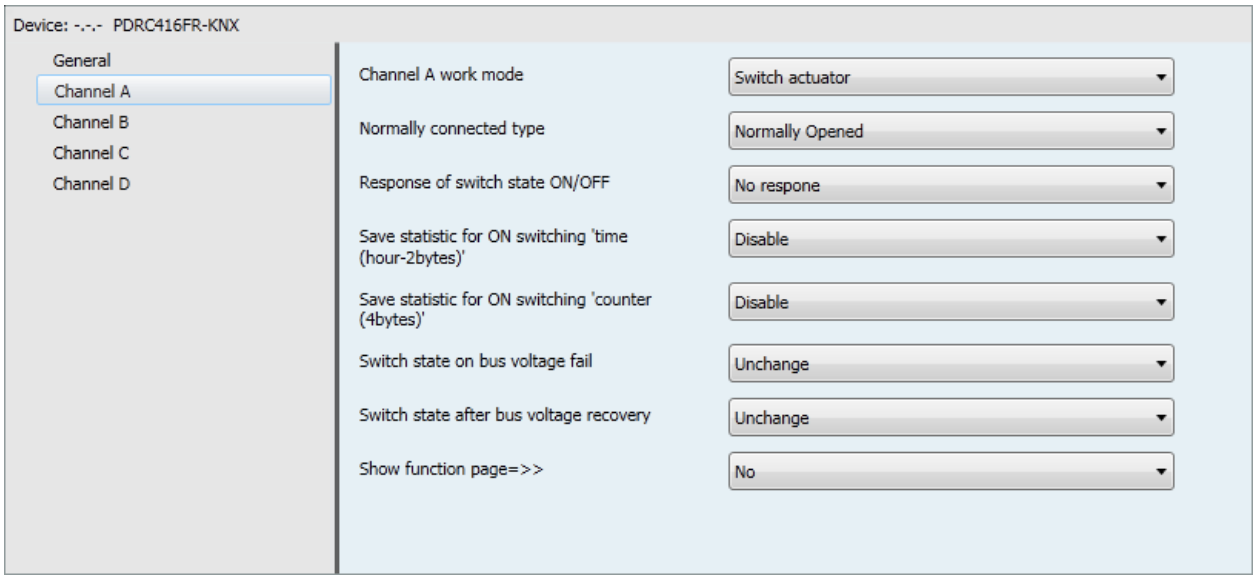
6.2.1.2 Sending cycle of object “In operation” (1..65535, 0-invalid)

The range of the parameter is 0 to 65535 s. With zero as the parameter value the function will be blocked, all other parameters activate it.

Options: 0…65535 s

If the parameter is not set to zero, the device will send a periodical telegram at regular intervals once the time period expires. The values 0 and 1 will be sent alternately.

6.2.2 Channel "N" functional parameters



6.2.2.1 Channel A work mode

The function of the output "N" can accept 3 operating states.

Options: Switch actuator

Heating actuator

Inactivated

If "Inactivated" is selected, the channel "N" function will then be invalid, and one of the other two options can be employed.

6.2.3 Channel as Switch actuator

Under "Channel A work mode" select Switch actuator to use the device as a switch actuator.

6.2.3.1 Parameter “Normally connected type”

This parameter defines whether the contact is a normally opened or normally closed. “Normally Opened” is used in the example.

Options: Normally Opened, Normally Closed

6.2.3.2 Response of the switch state ON/OFF

This parameter decides the working mode by way of a response.

Options: No response

Continuous response

Only after change

If "no response" is selected, the switch status will not be communicated. If "continuous response" is selected, the switch status will be continuously sent and with "only after change" the status will only be reported following performance of a change.

6.2.3.3 Save statistics for ON switching “time (hour-2bytes)”

Save statistics for ON switching time. Saving statistics is useful for controlling and monitoring.

Options: Enable

Disable

6.2.3.4 ->Alarm for time out

Use an alarm for time out.

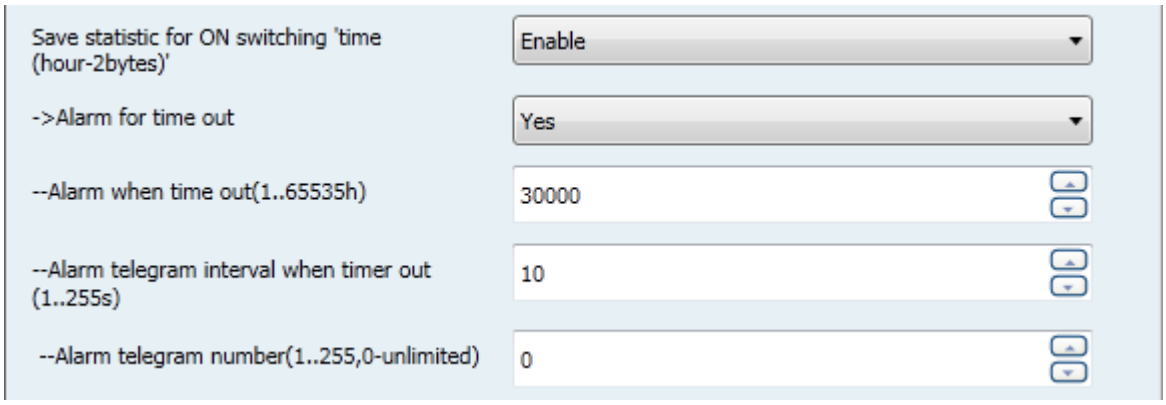
Options: Yes

No

6.2.3.5 Alarm when time out (1..65535h)

6.2.3.6 Alarm telegram interval when timer out (1..255s)

6.2.3.7 Alarm telegram number (1..255, 0-unlimited)



6.2.3.8 Save statistics for ON switching "counter (4bytes)"

Save statistics for ON switching counter. Saving statistics is useful for controlling and monitoring.

Options: Enable

Disable

6.2.3.9 ->Alarm for counter out

Use an alarm for time out.

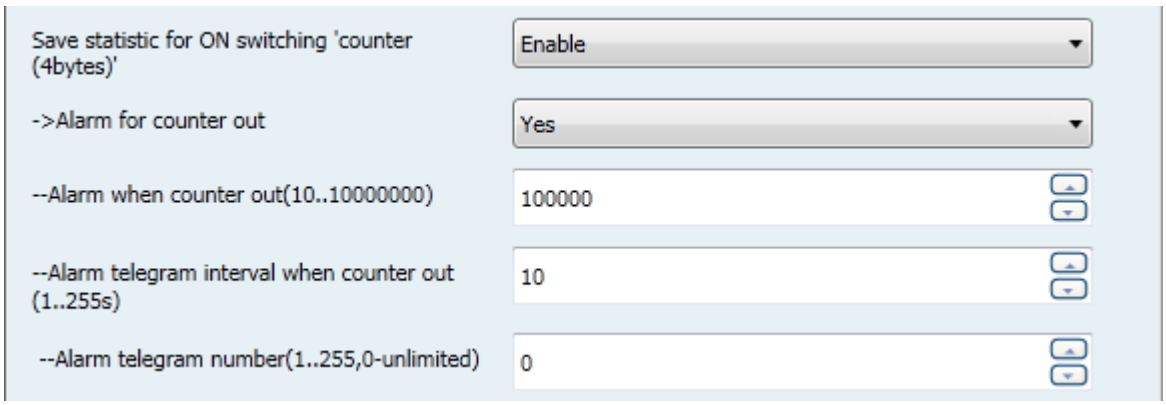
Options: Yes

No

6.2.3.10 Alarm when counter out (10..10000000)

6.2.3.11 Alarm telegram interval when counter out (1..255s)

6.2.3.12 Alarm telegram number (1..255, 0-unlimited)



6.2.3.13 Switch status with bus power failure

You can decide what happens in the event of a bus power failure. In such a case the device still has the required capacity to set the following options.

Options: Unchanged

ON

OFF

With "unchanged" the actuator will maintain the switch status. If you select "ON" or "OFF" the channel will be activated or deactivated.

6.2.3.14 Switch status following bus voltage recovery

If the power returns following a bus power failure, the following options can be selected:

Options: Unchanged

Recovery

ON

OFF

If you select "unchanged" the channel will retain the current switch setting once bus voltage is returned.

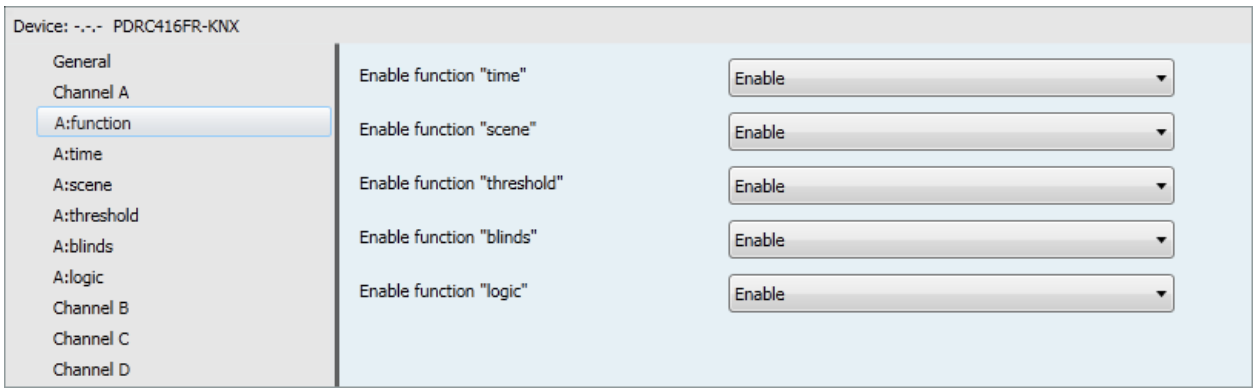
If you select "Recovery" the channel will return to the initial status prior to the power failure. The "ON" and "OFF" options activate and deactivate the channel upon return of the bus voltage.

6.2.3.15 Show function page

If this parameter is set to "Yes" the channel function page will be displayed. The function page contains the following functions:

- Time
- Scenes
- Threshold
- Blinds
- Logic

6.2.4 Functions



Note: Only one function should be enabled for each channel.

6.2.4.1 Activating "Time" function

Options: Enable

Disable

6.2.4.2 Activating "Scene" function

Options: Enable

Disable

6.2.4.3 Activating "Threshold" function

Options: Enable

Disable

6.2.4.4 Activating "Blind" function

Options: Enable

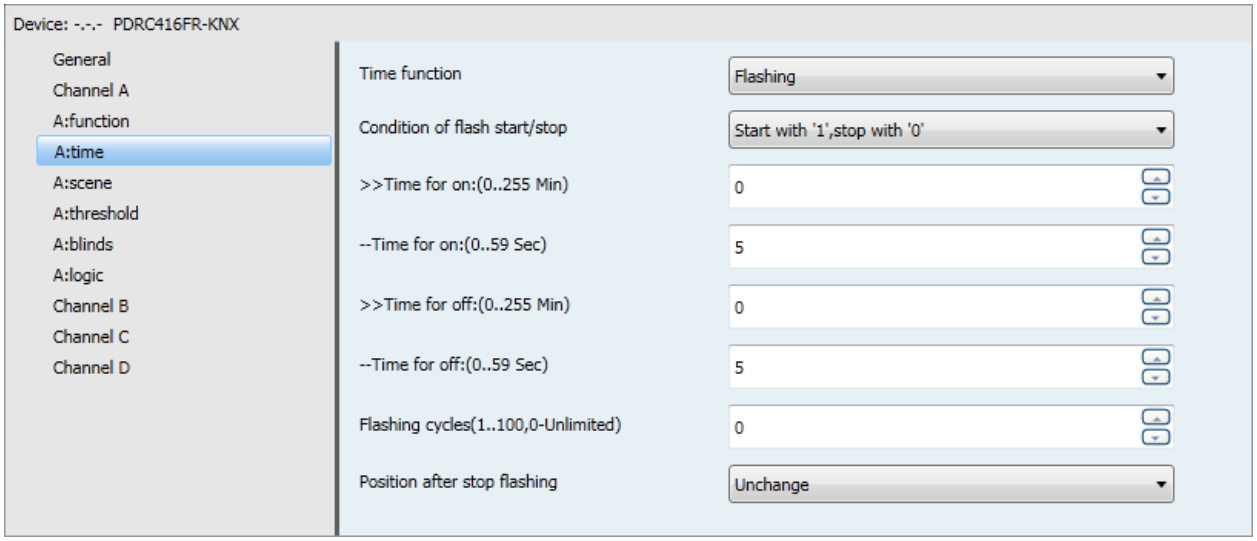
Disable

6.2.4.5 Activating "Logic" function

Options: Enable

Disable

6.2.5 Time function



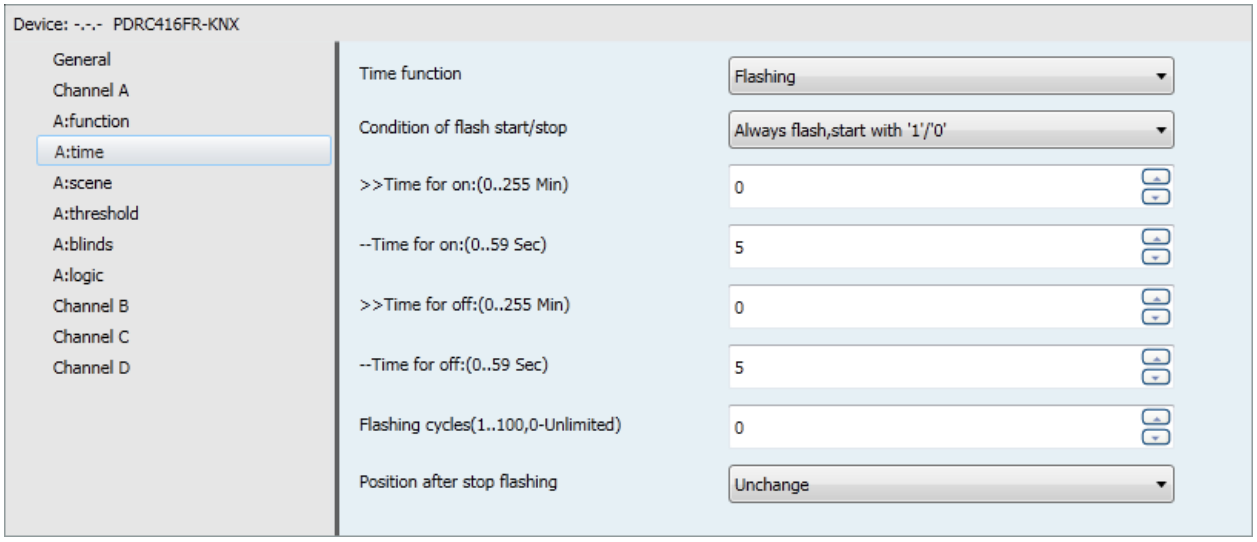
The time function contains three sub-functions available for selection.

Options: Flashing

Staircase lighting

ON/OFF delay

6.2.5.1 Flashing



6.2.5.2 Condition of flash status (Start/Stop)

Options: Start with '1', stop with '0' ('1' - flash starts, '0' - flash stops)

Start with OFF, stop with ON ('0' - flash starts, '1' - flash stops)

Always flash, Start with '1'/'0' (ON or OFF - flashing starts)

6.2.5.3 Time for "ON": (0…255 min.)

Length in minutes for "ON" status

6.2.5.4 Time for "ON": (0…59 sec)

Length in seconds for "ON" status

6.2.5.5 Time for "OFF": (0…255 min.)

Length in minutes for "OFF" status

6.2.5.6 Time for "OFF": (0…59 sec)

Length in seconds for "OFF" status

6.2.5.7 Number of flash cycles (0…100, 0-infinity)

Number of flash cycles in the range from 0 to 100. "0" means unlimited.

6.2.5.8 Position after stop flashing

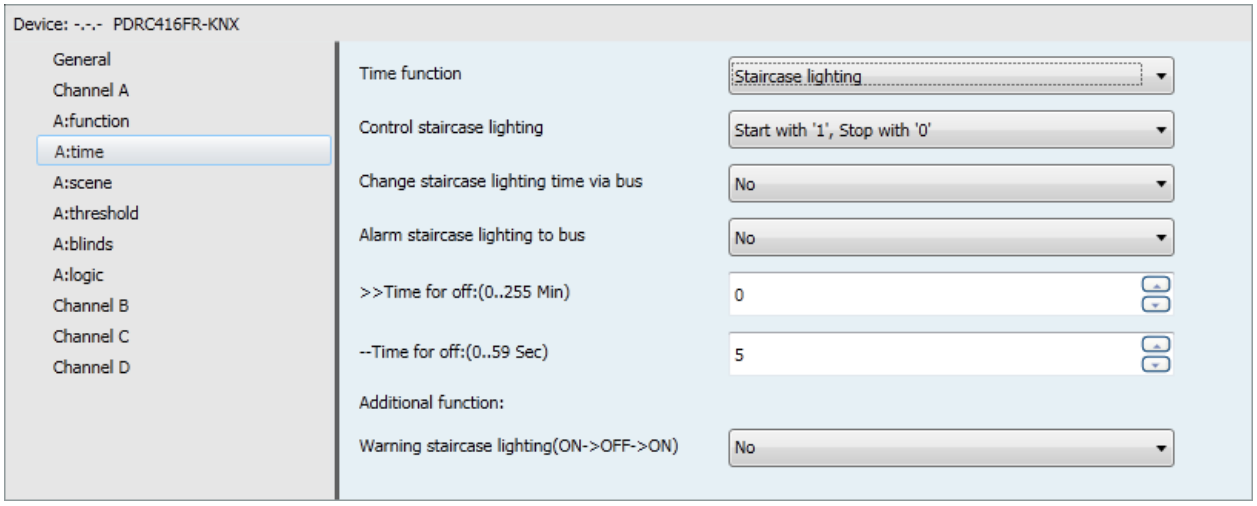
Switch position following flashing once counter overflow ends.

Options: unchanged (after the counter overflow the position remains unchanged)

ON (switches to "ON" after counter overflow)

OFF (switches to "OFF" after counter overflow)

6.2.5.9 Staircase lighting



The staircase function causes the automatic switch-off of the switching procedure after a pre-set time. The staircase time can be parameterized without restriction. There are other optional functions that can be combined with the staircase function; these are described below.

6.2.5.10 Control staircase lighting

Options: Start with '1', stop with '0'

Start with '1', invalid with '0'

Start with '1'/'0', Can't Stop

If the Start with '1', stop with '0' function is selected, and the switch is activated, the light will be turned on and the timer begins counting until the pre-set set point is achieved after which the light will be turned off. The light can be turned off earlier by manually operating the switch.

If the Start with '1', invalid with '0' function is selected, and the switch is activated, the light will be turned on and the timer begins counting until the pre-set set point is achieved after which the light will be turned off. The light cannot be turned off by manually operating the switch.

If the Start with '1'/'0', Can't Stop function is selected, and the switch is activated or turned off, the light will be turned on and the timer begins counting until the pre-set set point is achieved after which the light will be turned off. The light cannot be turned off by manually operating the switch.

6.2.5.11 Change Staircase lighting time via bus

Options: NO
Changing the staircase lighting time is not possible via the bus, this is automatically controlled by the database.

YES
Allows staircase lighting time to be performed by user via bus.

6.2.5.12 Alarm Staircase lighting time to bus

Options: NO
Changing the Alarm staircase lighting time is not possible via the bus, this is automatically controlled by the database.

YES
Allows Alarm staircase lighting time to be performed by user via bus.

6.2.5.13 Time for "OFF": (0…255 min.)

Duration of the delay for the "OUT" switch of the staircase light in minutes.

6.2.5.14 Time for "OFF": (0…59 sec)

Duration of the delay for the "OUT" switch of the staircase light in seconds.

6.2.5.15 Warning staircase lighting (ON->OFF->ON)

Options: NO

YES (activated)

The warning function shows that the staircase light has almost expired and that the output will be deactivated shortly. This occurs by switching off the output for the time period of the parameterized warning time. A small value of 1-3 seconds is recommended.

Once the warning has abated, the light will be turned on again for the pre-set advance warning time. This advance warning time enables the staircase light time to be extended or the staircase to be vacated. It is recommended that there be dynamic programming based on the actual circumstances (length of the staircase, next light switch, etc.).

6.2.5.16 Warning before end of time (3..255 Sec)

Duration of the delay for the "OUT" switch of the staircase light in minutes.

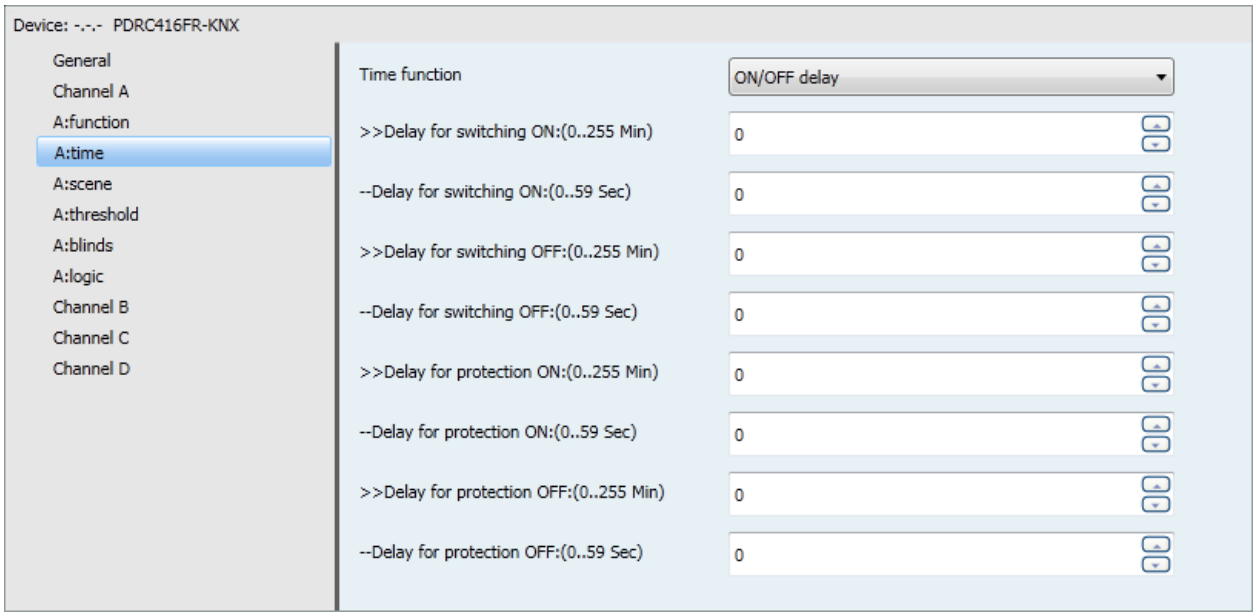
6.2.5.17 Duration time for warning (1..200 Sec)

Duration of the delay for the "OUT" switch of the staircase light in seconds.

6.2.5.18 ON/OFF delay

The ON-delay will time delay the activation of the switching cycle. This means the output will only be activated after a certain time period after the issue of the switch-ON command. The OFF-delay will time delay the switch-off.

These two functions can be combined.



6.2.5.19 Delay for switching ON: (0…255 min.)

Time period for delay of "ON" switch in minutes.

6.2.5.20 Delay for switching ON: (0…59 sec)

Time period for delay of "ON" switch in seconds.

6.2.5.21 Delay for switching OFF: (0…255 min.)

Time period for delay of "OFF" switch in minutes.

6.2.5.22 Delay for switching OFF: (0…59 sec)

Time period for delay of "OFF" switch in seconds.

6.2.5.23 Delay for protection ON: (0…255 min.)

Time period for delay of light protection ON in minutes.

6.2.5.24 Delay for protection ON: (0…59 sec)

Time period for delay of light protection ON in seconds.

6.2.5.25 Delay for protection OFF: (0…255 min.)

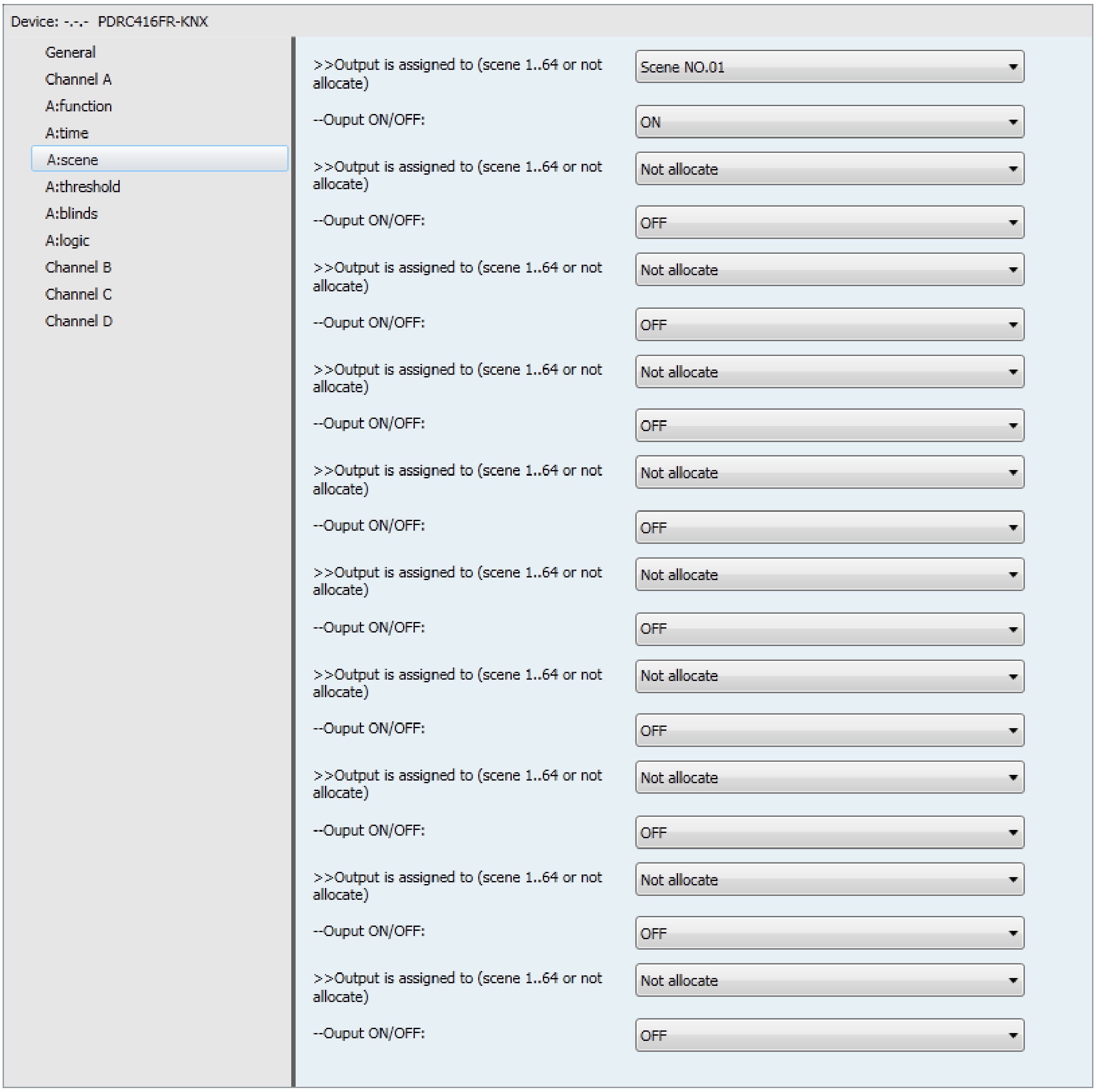
Time period for delay of light protection OFF in minutes.

6.2.5.26 Delay for protection OFF: (0…59 sec)

Time period for delay of light protection OFF in seconds.

Note: The Delay time for Light protection ON' starts once the OFF switch is activated and will only switch to ON once this time has expired. Similarly, The delay for Light protection OFF' starts once the ON switch is activated and will only switch to OFF once this time has expired

6.2.6 Scene function



The scene function is useful if room functions of various elements (e.g. light, heating, blinds) are to be synchronously changed. To enable this, the value must be assigned to the appropriate memory space (Scene A…L). Up to five scenes can be programmed on each switch output.

In order to call-up a particular scene, the value for that scene must be sent to the groups object for the scene function. In this context the value of the scene call-up however is always one number lower than the pre-set scene number. The scene numbers can therefore have the values 1-64, but the values of the call-up for the scene may only be 0-63.

Five scenes memories are available for each channel. The 64 available scene numbers can be freely assigned to these five memories.

A scene will be called up if it receives a binary command (bits 0-6 = scene number, bit 7 = 0) from the bus, corresponding to a scene number. The seventh bit of the dataset must always be "0" in this context.

A scene will be stored if it receives a binary command (bits 0-6 = scene number, bit 7 = 1) from the bus, corresponding to a scene number. The scene status remains unchanged. The seventh bit of the dataset must always be "1" in this context.

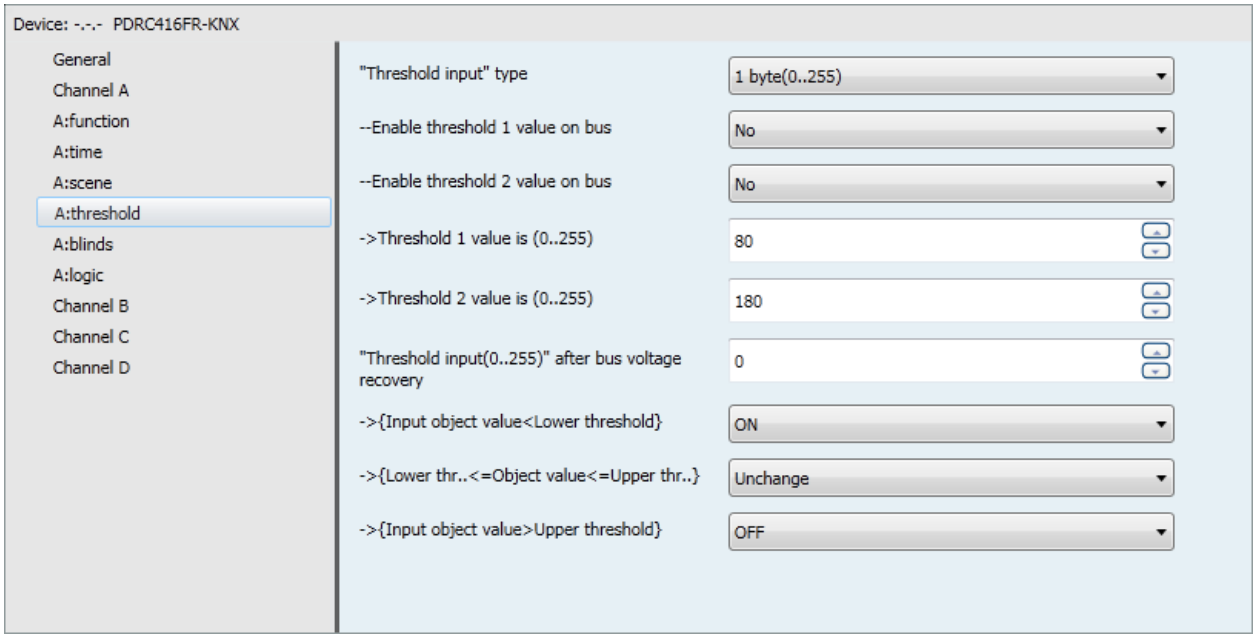
6.2.6.1 Output is assigned to (scene 1..64 or no allocated)

Not allocated, Scene No. 01, Scene No. 02, ..Scene No. 64

6.2.6.2 Output ON/OFF

Scene output ON/OFF

6.2.7 Threshold function



6.2.7.1 "Threshold input" type

The threshold value function enables two threshold values to be set. These two threshold values can be set between 0 and 255 for a 1 byte threshold input type or 0 to 65535 for a 2 byte threshold input type. The switching status changes once a corresponding value is received from the bus. There are three ways in which threshold values can be activated.

Options: 1 byte (0..255)

2 byte (0..65535)

6.2.7.2 Enable threshold 1 value on bus

YES enables threshold value 1 to be changed via the bus.

NO prohibits the change of threshold value 1 via bus.

6.2.7.3 Enable threshold 2 value on bus

YES enables threshold value 2 to be changed via the bus.

NO prohibits the change of threshold value 2 via bus.

6.2.7.4 Threshold 1 value is (0…255)

The selection of the first threshold value is between the range of [0…255]. The pre-set value is 80.

6.2.7.5 Threshold 2 value is (0…255)

The selection of the second threshold value is between the range of [0…255]. The preconfigured value is 180.

6.2.7.6 "Threshold input (0…255)" after bus voltage recovery

Upon bus voltage recovery, the threshold input value is set to this value

6.2.7.7 Input object value < lower threshold

If the object value is less than the lower threshold value, the switch will respond in accordance with the following options:

Options: Unchanged

ON

OFF

6.2.7.8 Lower threshold <= Input object value <= upper threshold

If the object value lies between the preconfigured threshold values, the switch responds in accordance with the following options:

Options: Unchanged

ON

OFF

6.2.7.9 Input object value < upper threshold value

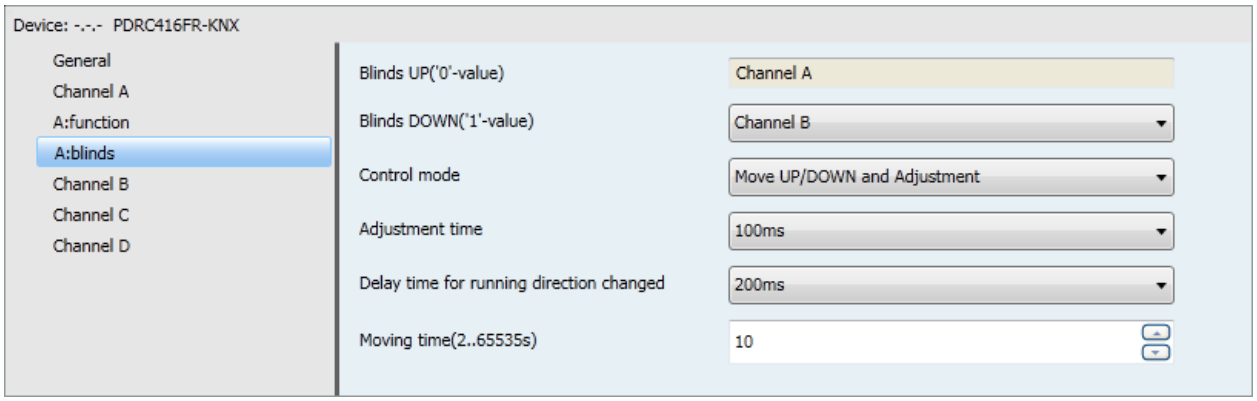
If the received object value is larger than the upper threshold value, the switch responds in accordance with the following options:

Options: Unchanged

ON

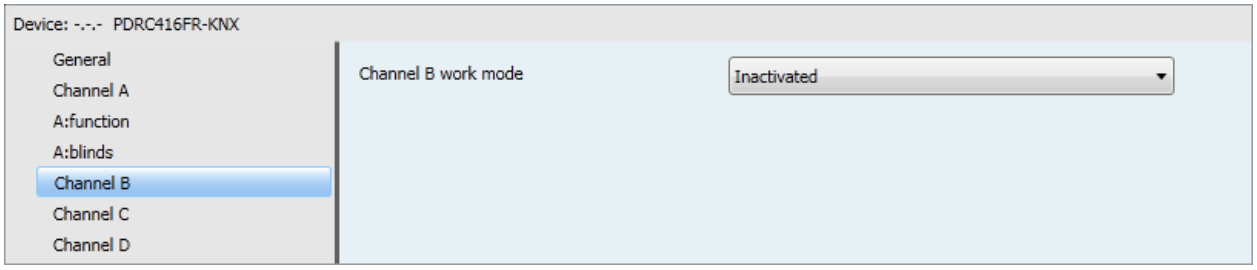
OFF

6.2.8 Blind function



The blind function requires two channels in combination, one of which opens the blind while the second one closes it. The blind will stop after the expiry of the pre-set time period or by way of a corresponding telegram.

Note: If channel A is activated as the blind channel, please be sure to deactivate channel B. Channel B should be exclusively activated for the function of closing the blind.



6.2.8.1 Blinds Up ('0'-value)

The first channel for "blind opens" is currently the active channel.

Channel "N" (N= current channel (N=A, B, C.)) opens the blind.

6.2.8.2 Blinds Down ('1'-value)

Another channel can now be designated for the blind closing function. This should be deactivated as shown in in the screenshot to prevent any dual assignment.

Note: If the first channel is "A" and the maximum number of channels is 4, then only "B", "C" or "D" may be selected as the second channel.

6.2.8.3 Control mode

Options: Move UP/Down and Adjustment

Move UP/Down

The Move UP/Down and Adjustment parameter provides the ability to move the blinds fully up or down in the predefined time. User is also given the option to set the predefined adjustment time for a small blind movement.

The Move UP/Down parameter provides the ability to move the blinds fully up or down in the predefined time. No small adjustment is possible.

6.2.8.4 Adjustment time

The Adjustment time parameter is used to select the adjustment time to control the blinds for small adjustments.

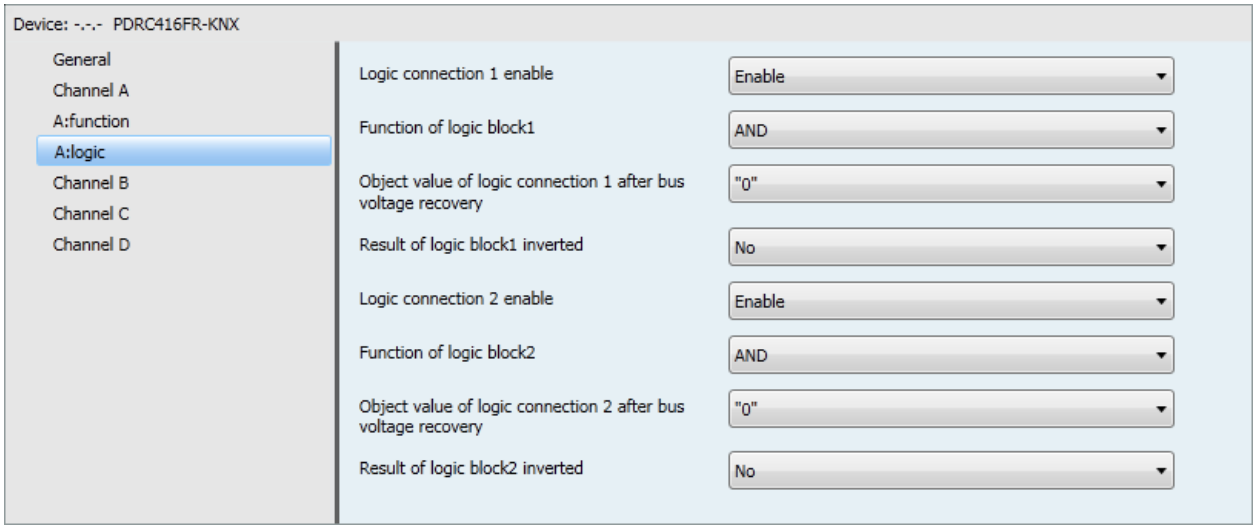
6.2.8.5 Delay time for running direction changed

Whenever user changes the direction of the blind, this delay time is imposed.

6.2.8.6 Moving time (2..65535 s)

This parameter sets the blind open or close full travel time.

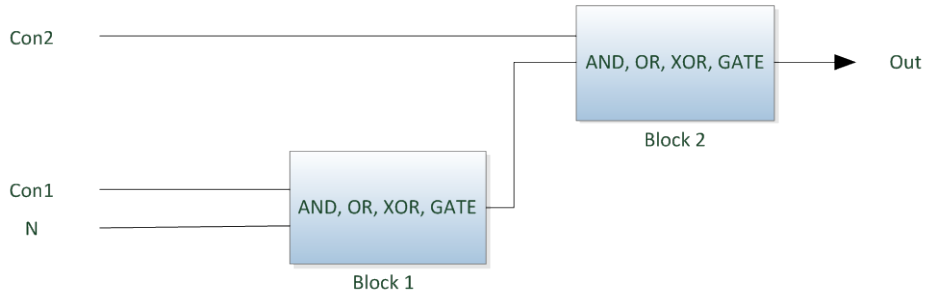
6.2.9 Logic function



The logic function block contains two logical blocks.

- Block1 has two inputs: one of which is "N" (N=A, B, C, D) and the other is "Con1". The logic Block 1 output is linked with the logic Block 2 input.
- Block 2 also has a second input "Con2" and relays the result via the output.

Both logic blocks, logic Block1 and logic Block2, allow the selection of "AND“, "OR", "XOR and "GATE" connections.



6.2.9.1 Logic connection 1 enable

The logic connection Block 1 can be enabled or disabled using this option.

6.2.9.2 Function of logic block 1

The logic block enables the user to choose between Boolean operations such as: "AND", "OR", "XOR" or "GATE".

- Boolean AND 00=0, 01=0, 10=0, 11=1
- Boolean OR 00=0, 01=1, 10=1, 11=1
- Boolean XOR 00=0, 01=1, 10=1, 11=0
- GATE ("N" can only pass the logic block if the value 1 has been configured for "Con1". The output of logic Block1 remains unchanged for this time.)

6.2.9.3 Object Value of logic connection 1 after bus voltage recovery

The selection of the value is triggered by the restoration of the bus power supply; the following options are available to you:

“0”: Initialization of "Con1" with 0

“1”: Initialization of "Con1" with 1

6.2.9.4 Result of logic block 1 inverted

If this parameter is set to "YES", the output from block 1 will be inverted. "NO" on the other hand will result in no change.

6.2.9.5 Logic connection 2 enable

The logic connection Block 2 can be enabled or disabled using this option.

6.2.9.6 Function of logic block 2

The logic block enables the user to choose between Boolean operations such as: "AND", "OR", "XOR" or "GATE".

- Boolean AND 00=0, 01=0, 10=0, 11=1
- Boolean OR 00=0, 01=1, 10=1, 11=1
- Boolean XOR 00=0, 01=1, 10=1, 11=0
- GATE ("N" can only pass the logic block if the value 1 has been configured for "Con2". The output of logic Block2 remains unchanged for this time.)

6.2.9.7 Object Value of logic connection 1 after bus voltage recovery

The selection of the value is triggered by the restoration of the bus power supply; the following options are available to you:

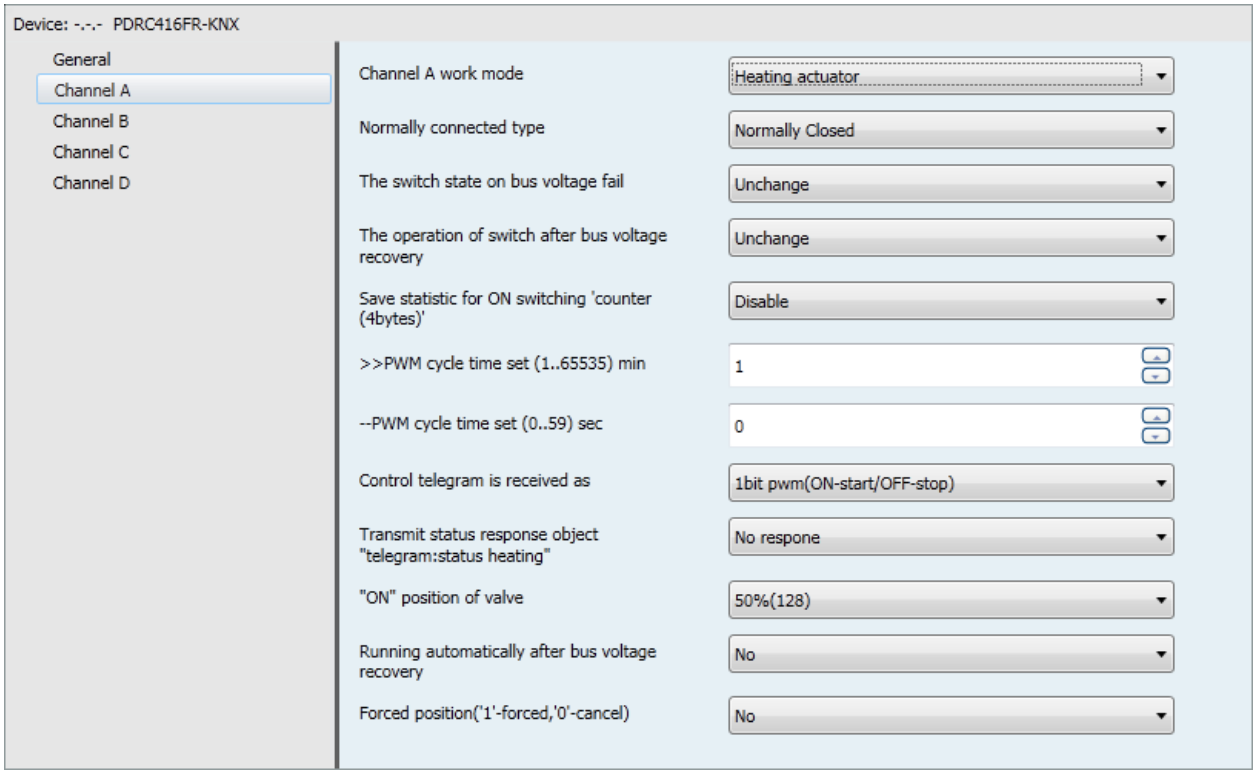
“0”: Initialization of "Con2" with 0

“1”: Initialization of "Con2" with 1

6.2.9.8 Result of logic block 1 inverted

If this parameter is set to "YES", the output from block 2 will be inverted. "NO" on the other hand will result in no change.

6.2.10 Channel as Heating actuator



This channel operates in PWM mode (pulse width modulation, 1 bit or 1byte) and can be used to control a heating valve.

6.2.10.1 Parameter “Normally connected type”

This parameter defines whether the contact is a normally opened or normally closed.
“Normally Closed” is used in the example.

Options: Normally Opened, Normally Closed

6.2.10.2 Switch state on Bus Voltage Failure

Options: Unchanged

ON

OFF

With "unchanged" the actuator will maintain the switch status. If you select "ON" or "OFF" the channel will be enabled or disabled.

6.2.10.3 The operation of switch after bus voltage recovery

If the power is to be returned following a bus voltage failure, the following functions can be selected:

Options: Unchanged

ON

OFF

If you select "Unchanged" the channel will retain its current setting once bus voltage is returned. If you select "Standby" the channel will return to the initial status prior to the power failure.
The "ON" and "OFF" options enable or disable the channel.

6.2.10.4 Save statistics for ON switching "counter (4bytes)"

Save statistics for ON switching counter. Saving statistics is useful for controlling and monitoring.

Options: Enable

Disable

6.2.10.5 PWM cycle time (1..65535 min)

The minimum cycle time amounts to 1 minute.

6.2.10.6 PWM cycle time (0…59 sec)

The cycle time can also be stated in seconds

6.2.10.7 Control telegram is received as

Options: 1bit PWM (ON-Start/OFF-Stop)

1byte (255-ON/0-OFF/other valve)

With the value "255" you permanently switch "ON", with "0" you permanently switch "OFF", the values between (1-254) define the switching points within the PWM cycle.

6.2.10.8 Transmit status response object "telegram: status heating"

Options: No response

Always respond

Only after changed (only respond if status changes)

6.2.10.9 ON position of valve

The following values determine the switching points of the PWM cycle in 1-bit operation (in the 1-byte operation the switching points are defined by the value of the sent telegram):

0% (OFF)
10% (26)
20% (51)
30% (77)
40% (102)
50% (128)
60% (153)
70% (179)
80% (204)
90% (230)
100% (ON)

6.2.10.10 Running automatically after bus voltage recovery

Options: No

Defined Value

Recovery

Selecting NO indicates heating control will not start automatically but only when requested. Defined Value: When this option is selected, the position of valve must be set. Recovery: The channel will return to the initial status prior to the voltage drop.

6.2.10.11 Position of valve

This parameter is visible if 'Defined value' is selected for Running automatically after bus voltage recovery.

0% (OFF)
10% (26)
20% (51)
30% (77)
40% (102)
50% (128)
60% (153)
70% (179)
80% (204)
90% (230)
100% (ON)

6.2.10.12 Forced position (‘1’-forced, ‘0’-cancel)

This option when selected as ‘Yes’, allows forced positioning of the valve via bus. When value 1 is set in ‘Forced position’ object, the heating control is set to the PWM value as set in ‘Value of PWM’. When ‘0’ Value is set, the heating control setting in ‘Forced cancel operation’ will take effect.

6.2.10.13 Value of PWM

This parameter is visible if YES is selected for Forced position (‘1’-forced, ‘0’-cancel).

0%	(OFF)
10%	(26)
20%	(51)
30%	(77)
40%	(102)
50%	(128)
60%	(153)
70%	(179)
80%	(204)
90%	(230)
100%	(ON)

6.2.10.14 Forced cancel operation

This parameter is visible if YES is selected for Forced position (‘1’-forced, ‘0’-cancel).

Options: Stop Heating

Return to normally heating valve

6.3Description of the group objects

In this section we explain the group objects. You will be able to see these objects if you have activated the function. Depending on the function selected, the relevant group objects will be displayed for each of the channels. The group objects can be subsequently used for the assignment of group addresses.

Note: In the following section N=A, B, C, D,…..

Key to Flags: C: Group

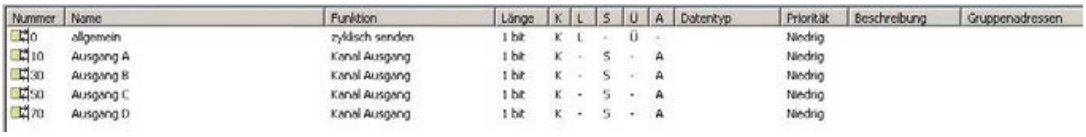
R: Read

W: Write

A: Assign

U: Update

6.3.1 Objects in general and output N



General Objects

Number	Name	Function	Flags	Data types
10,30,…	Output "N"	Channel output	C T U	EIS1 DPT 1.003 1bit
This object is always active and valid. If its value changes then transfer to Bus with the next run, e.g. the last transferred value was "1" so the next one is a "0"- null.				

Output Objects

Number	Name	Function	Flags	Data types
0	General	Send cycles	C R W	EIS1 DPT 1.001 1bit
This channel output objects enable a channel "N" to be turned ON/OFF. A channel output is turned ON/OFF if the object contains the value "1/0".				

6.3.2 All objects of channel "N"

Nummer	Name	Funktion	Länge	K	L	S	Ü	A	D
0	allgemein	zyklisch senden	1 bit	K	L	-	Ü	-	
10	Ausgang A	Kanal Ausgang	1 bit	K	-	S	-	A	
11	Ausgang A	Rückmeldung Schaltzustand	1 bit	K	L	-	Ü	-	
12	Ausgang A	Statistik für AN-Schaltung	2 Byte	K	L	S	Ü	A	
13	Ausgang A	Treppenlichtdauer	2 Byte	K	-	S	-	A	
14	Ausgang A	Warnung Treppenlicht	1 bit	K	L	-	Ü	-	
15	Ausgang A	Szene (8bit)	1 Byte	K	-	S	-	A	
16	Ausgang A	Schwellenwert Eingang	1 Byte	K	-	S	-	A	
17	Ausgang A	Änderung Schwellenwert 1	1 Byte	K	-	S	-	A	
18	Ausgang A	Änderung Schwellenwert 2	1 Byte	K	-	S	-	A	
19	Ausgang A	Jalousie öffnen	1 bit	K	-	S	-	A	
20	Ausgang A	Jalousie schließen	1 bit	K	-	S	-	A	
21	Ausgang A	Logik Verbindung 1	1 bit	K	-	S	-	A	
22	Ausgang A	Logik Verbindung 2	1 bit	K	-	S	-	A	
50	Ausgang C	Kanal Ausgang	1 bit	K	-	S	-	A	
70	Ausgang D	Kanal Ausgang	1 bit	K	-	S	-	A	

6.3.2.1 Object – switch status response

Number	Name	Function	Flags	Data types
11	Output "N"	Switch status response	C R A	EIS1 DPT 1.001 1bit

This object is used to respond to the switch status of channel "N", For channel ON the response is "1", otherwise a "0"-zero is returned.

6.3.2.2 Object – Statistics for ON switch

Number	Name	Function	Flags	Data types
12	Output "N"	Statistics for ON mode	C R W A U	EIS10 DPT 7.007 2byte

This object creates statistics for channel "N". It can be read/written via the bus if this function has been activated.

6.3.2.3 Object - staircase light

Number	Name	Function	Flags	Data types
13	Output "N"	Staircase light duration	C R W	EIS10 DPT 7.005 2byte

This object can be used to regulate the staircase light time; when this function is activated control is permitted via the data bus.

6.3.2.4 Object – warning staircase light

Number	Name	Function	Flags	Data types
14	Output "N"	Warning staircase light	C R A	EIS1 DPT 1.005 1bit
This object is a safety against unwanted ON/OFF switching; if the staircase light goes On or Off, the object sends a warning via the bus: Channel "N" is ON -> a "1", other a "0"-zero				

6.3.2.5 Scene object

Number	Name	Function	Flags	Data types
15	Output "N"	Scene (8bit)	C W U	EIS14 DPT 18.001 1byte

The purpose of this object is to control scenes. See the following explanation:
Telegram value (8-bit): C7 R6 N5 N4 N3 N2 N1 N0
C: By setting the 7th bit to "0" the scene will be called up, "1" continue scene (if scene has been assigned and is valid)
R: Reserved
N: Scene No. (binary: 0504030201000…151413121110=1…64)
e.g.: Hexadecimal

00h	Call up scene1 (if scene assigned)
01h	Call up scene2 (if scene assigned)
3Fh	Call up scene64 (if scene assigned)
80h	Load scene1 (if scene assigned)
81h	Load scene2 (if scene assigned)
BFh	Load scene64 (if scene assigned)

6.3.2.6 Threshold value object

Number	Name	Function	Flags	Data types
16	Output "N"	Threshold value input	C W U	EIS14 DPT 5.004 1byte
If this object is activated, the input value will be compared with threshold values 1 and 2 and the switch status will be determined in accordance with the configuration.				
17	Output "N"	Change threshold value 1	C W U	EIS14 DPT 5.004 1bit
Changing the threshold value1 via the bus only.				
18	Output "N"	Change threshold value 2	C W U	EIS14 DPT 5.004 1bit
Changing the threshold value2 via the bus only.				

6.3.2.7 Blind object

Number	Name	Function	Flags	Data types
19	Output "N"	Open blind	C W U	EIS1 DPT 1.010 1bit
This object opens the blind..				
20	Output "N"	Close blind	C W U	EIS1 DPT 1.010 1bit
This object closes the blind.				

6.3.2.8 Logic object

Number	Name	Function	Flags	Data types
21	Output "N"	Logic connection 1	C W U	EIS1 DPT 1.002 1bit
If this function is activated, the object will be visible and the logic function has validity. The logic function contains: AND, OR, XOR, GATE.				
22	Output "N"	Logic connection 2	C W U	EIS1 DPT 1.002 1bit
If this function is activated, the object will be visible and the logic function has validity. The logic function contains: AND, OR, XOR, GATE.				

6.3.2.9 Heating actuator object

Heating actuator object with bit control

Nummer	Name	Funktion	Länge	K	L	S	Ü	A
0	allgemein	zyklisch senden	1 bit	K	L	-	Ü	-
10	Ausgang A	Schaltung mit Bit-Kontrolle	1 bit	K	-	S	-	A

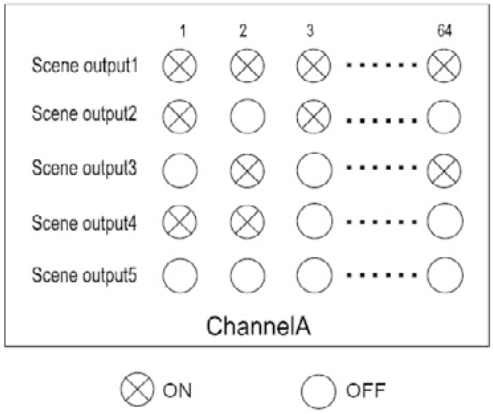
Heating actuator object with byte control

Nummer	Name	Funktion	Länge	K	L	S	Ü	A
0	allgemein	zyklisch senden	1 bit	K	L	-	Ü	-
10	Ausgang A	Schaltung mit Byte-Kontrolle	1 Byte	K	-	S	-	A

Number	Name	Function	Flags	Data types
				EIS1
10	Output "N"	Switching with bit control	C W U	DPT 1.001
				1bit
The PWM will be started when "1" is received and stopped when "0" is received. Runs automatically via the ETS once turned on.				
				EIS1
22	Output "N"	Switching with byte control	C W U	DPT 5.004
				1bit
Output "ON" always if value 255, output "OFF" if value 0. Otherwise the switching points of the PWM cycle will be determined via a value delivered by the bus.				

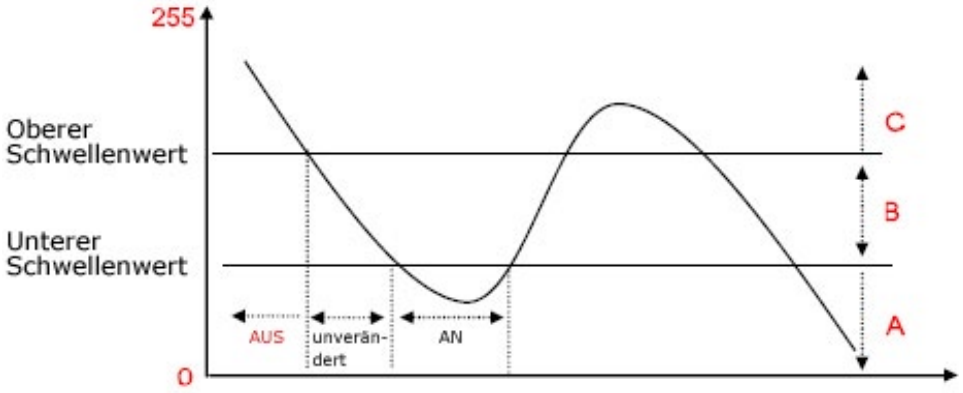
6.4Applications

6.4.1 Scene



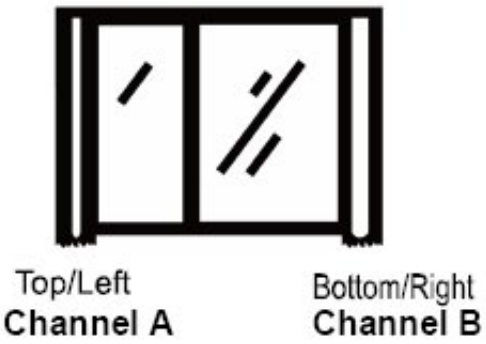
Five scenes per channel can be stored in the device. The scene numbers can be selected between 1 and 64.

6.4.2 Threshold Value



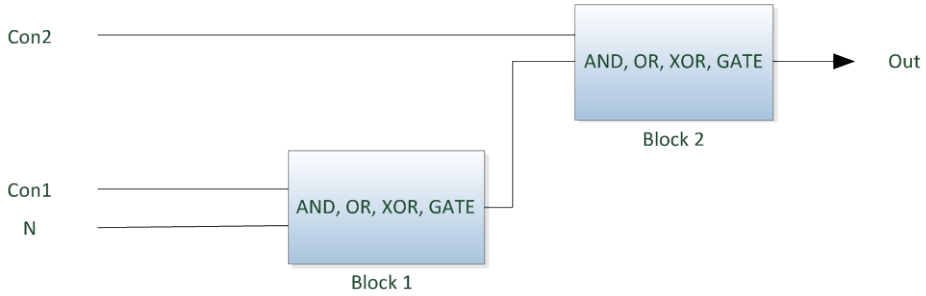
6.4.3 Blind

The blind function contains two threshold values, the upper and lower threshold value, both of which can be defined between 0…25. This function requires two channel outputs, the first of which opens the blind while the second one closes it



If the blind/the curtain is to be opened, channel A switches to ON and channel B to OFF. If the blind/the curtain is to be closed, channel B switches to ON and channel A to OFF. With time-out or a stop command, both channels will be switched to OFF.

6.4.4 Logic



The logic function contains two logic blocks. Both of these logic blocks, logic Block1 and logic Block2, allow the user to choose between the following Boolean operations:
AND, OR, NOT EQUAL TO, GATE.

Note: N = "channel" – "A, B, C,.."

Con1=logic link1

Con2=logic link2

Boolean Operation

AND		
N	L	R
0	0	0
0	1	0
1	0	0
1	1	1

GATE			
N	L	R	
0	1	0	
1	1	1	
1	0	1	Lock
0	0	1	
0	1	0	Unlock
0	0	0	Lock
1	0	0	
1	1	1	Unlock

OR		
N	L	R
0	0	0
0	1	1
1	0	1
1	1	1

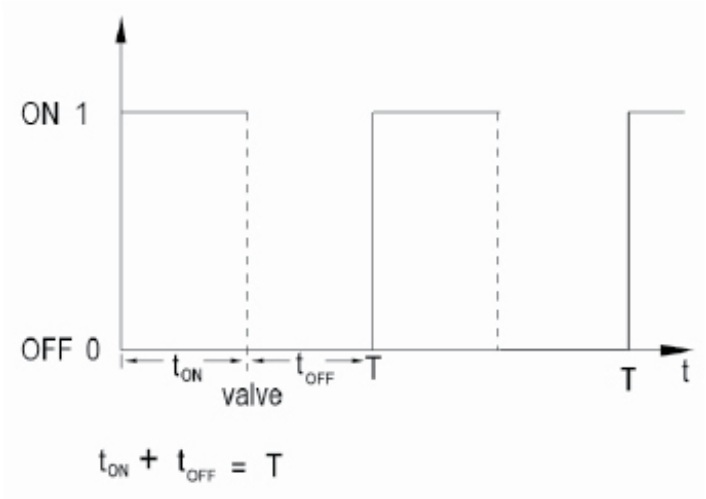
XOR		
N	L	R
0	0	0
0	1	1
1	0	1
1	1	0

Note: N=channel A, B. C…
L=Logic connection
R= result

6.4.5 PWM control

Control can be implemented with 1bit or 1byte.

- 1bit PWM (1-Start/0-Stop) The PWM starts and switches ON if a "1" is received, and will be ended with the receipt of a "0".
- 1Byte (255-Start, 0-Stop, Intermediate values): Switch moves to ON upon receiving the value "255" and to OFF upon receiving the value "0". The intermediate values (1-254) define the switching points within the PWM cycle.



6.4.6 1Bit PWM control: Value = 0% (OFF), 100% (ON)

0%	(OFF)
10%	(26)
20%	(51)
30%	(77)
40%	(102)
50%	(128)
60%	(153)
70%	(179)
80%	(204)
90%	(230)
100%	(ON)

6.4.7 1Byte PWM control: Value = x (x:0…255), x=0 -> OFF

1..25	(0%)
26..50	(10%)
51..76	(20%)
77..101	(30%)
102..127	(40%)
128..152	(50%)
153..178	(60%)
179..203	(70%)
204..229	(80%)
230..254	(90%)
255	(ON)

7 LightMaster Dimmer Actuator

- PDLPC416FR-KNX Philips DIN Rail Lighting Protocol Controller 4 Channels x 16 AMPS Feed through Relays - KNX
- PLPC905GL-3-KNX, LightMaster Structured Cabling Dimmer Controller 9 Channel @ 5 AMPS- General Device Loading 3 Pin Output- KNX
- PLPC905GL-3-HD-KNX, LightMaster Structured Cabling Dimmer Controller 9 Channel @ 5 AMPS- General Device Loading- Heavy Duty Relay 3 Pin Output- KNX
- PLPC905GL-4-KNX, LightMaster Structured Cabling Dimmer Controller 9 Channel @ 5 AMPS- General Device Loading 4 Pin Output- KNX
- PLPC905GL-4-HD-KNX, LightMaster Structured Cabling Dimmer Controller 9 Channel @ 5 AMPS- General Device Loading- Heavy Duty Relay 4 Pin Output- KNX

7.1 Currently under development

8 LightMaster DALI MultiMaster Controller

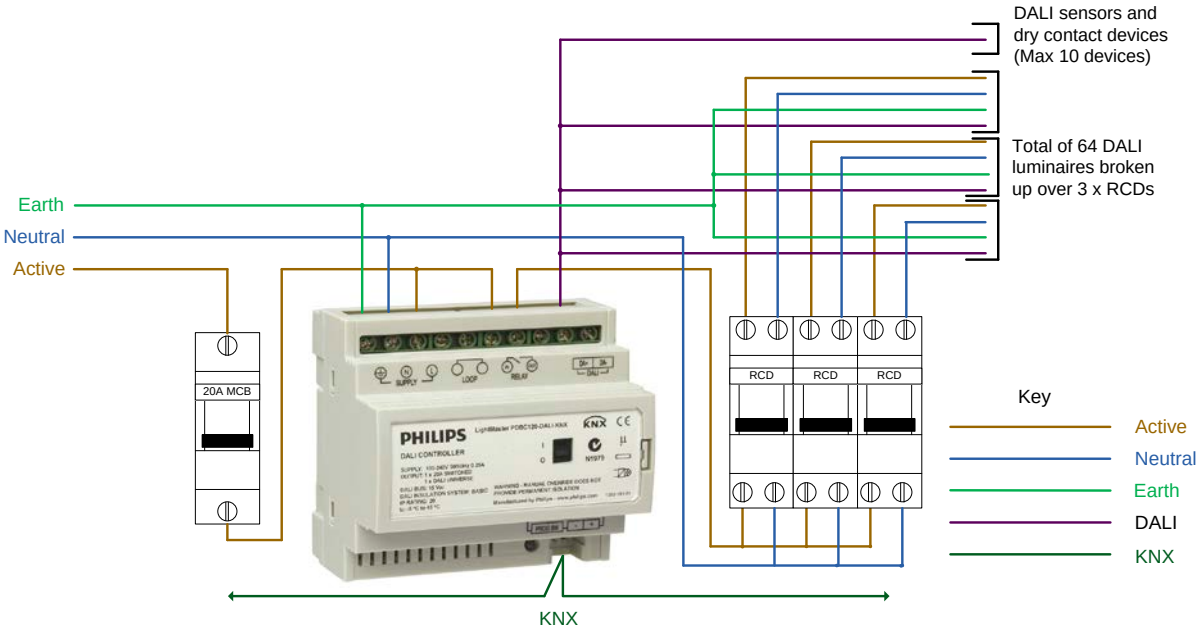
- PDBC120-DALI-KNX, LightMaster DALI MultiMaster Dimmer controller (64 DALI channels + 10 MultiMaster devices), 1 x 20 A relay
- PLOS-CM DALI, MultiMaster Sensor
- PPMI4-DALI, MultiMaster Dry Contact Switch

8.1 Description

The DALI MultiMaster Controller is a fully featured DALI load controller supporting two way groups to DALI lamps, sensors and dry contact input devices.

Each lamp can be individually controlled by the DALI MultiMaster controller through a unique address in each of the light fittings. The controller is able to zone and re zone logical DALI areas without changing network wiring. It can also receive network messages from the light fittings and devices. Multiple universes can be controlled together using additional controllers connected over KNX.

With a built in DALI power supply and 20A lighting power relay, a total of 64 DALI compatible lighting fittings (including emergency) may be controlled. The power relay automatically cuts power to the load when all lamps in a DALI universe that are power via the relay, have been dimmed to OFF. A total of 10 user interfaces (PLOS-CM-DALI and/or PPM14-DALI) may also be connected directly onto the DALI bus.



8.2 Configuration

The objects and parameters for the DALI MultiMaster Controller and DALI MultiMaster devices are outlined in this chapter. The configuration of a DALI MultiMaster system is ideally completed in two phases; Offline and Online.

Offline configuration steps:

1. Enter controller parameters
    a. Actuator count
    b. Scene count
    c. CO Presentation
    d. Lighting scene levels and fade times
    e. DALI Device Settings
2. Enter MultiMaster device parameters (Sensor, Dry Contact)
3. Create Group addresses for each function in each area
4. Link group addresses to input objects and output objects

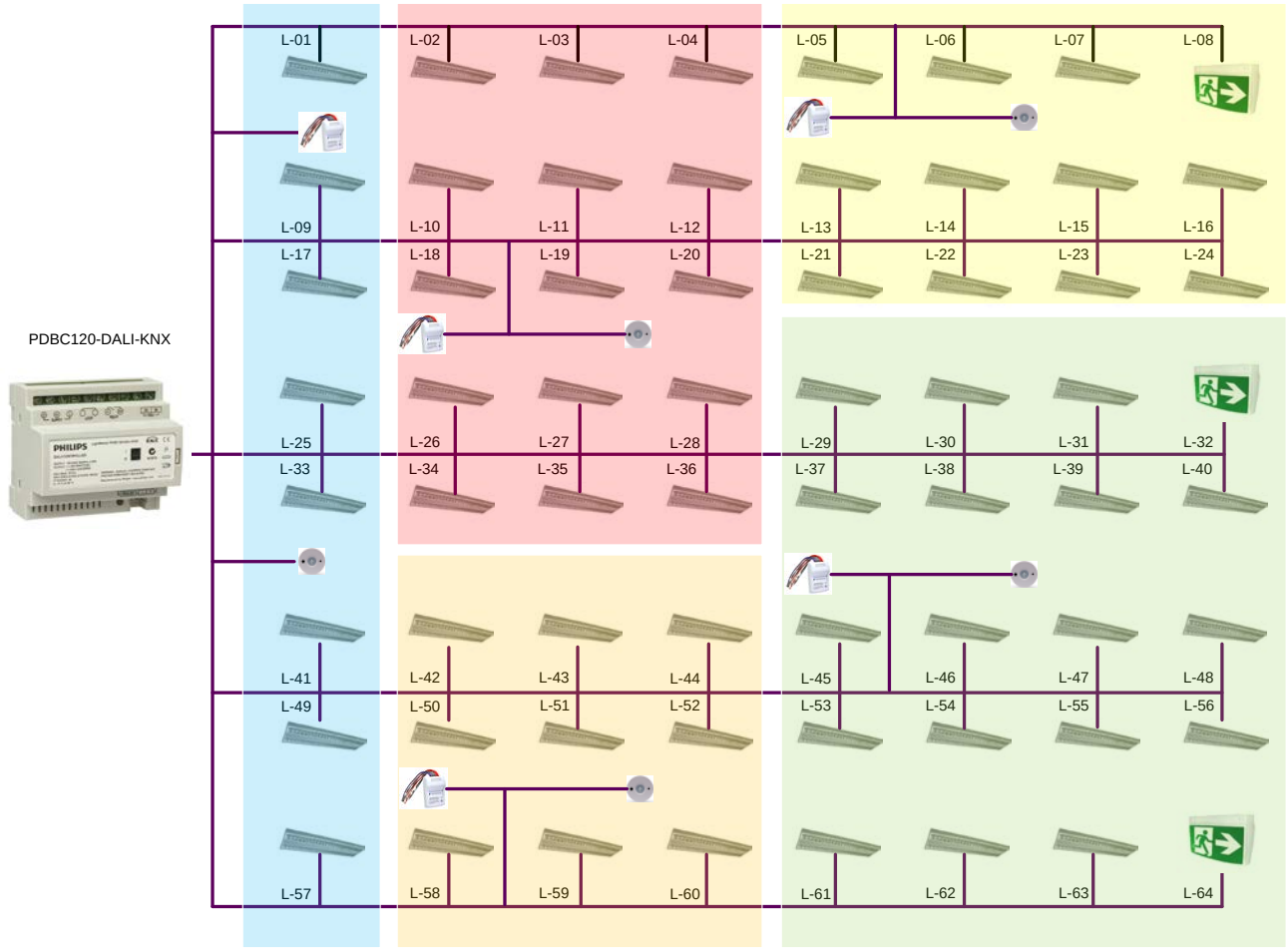
Online configuration steps:

5. Download All KNX information
6. Enumerate DALI network
7. Locate ballasts/devices by flashing
8. Assign short addresses to actuator channels and devices
9. Save to Device and Write group data
10. Maintenance Activities

The application table below lists the number of available group objects, group addresses and connections for the DALI MultiMaster controller:

Type	PDBC120-DALI-KNX
max. number of group objects	254
max. number of group Addresses	252
max. number of associations	254

The PDBC120-DALI-KNX Controller allows lamps (actuator channels) and input devices to be grouped in any configuration within the constraints of KNX, which overcomes the 16 group and 16 scene limits of the DALI specification. For example, each of the five shaded zone in the diagram below indicates a separate area that can be controlled as a group (each DALI lamp can also be controlled individually). The diagram also shows a DALI multifunction sensor and programmable DALI Dry Contact Interface installed in each area.



8.2.1 DALI Actuators Settings

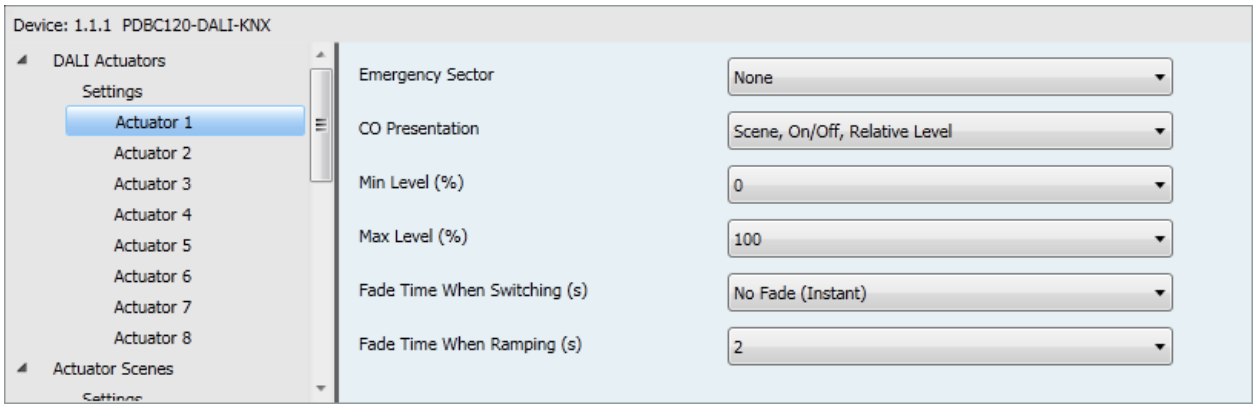
The controller configuration parameters can be accessed by selecting the Settings group in the left column of the parameters page.

8.2.1.1 Actuator count

This parameter sets the number of lighting actuator channels (Control Gears). This corresponds to the number of short addresses used in the DALI universe. DALI short addresses are in the range from 0 to 63 permitting a maximum of 64 DALI devices. Usually less than the 64 address maximum is used due to circuit loading considerations and to leave spare addresses for future modifications.

8.2.2 Parameter Window Actuator X

Parameter window Actuator X will be shown for each actuator channel created by the Settings, Actuator Count Parameter.



8.2.2.1 Emergency sector

This parameter determines if the channel is set as an emergency sector or not.

Options: None

Sector Y

Sector Z

8.2.2.2 CO Presentation

This parameter determines the output functions available for the actuator channel; a group object is used for each function; scene, ON/OFF, Absolute Level, and Relative Level.

Options: On/Off, Absolute Level, Relative Level

Scene, Absolute Level, Relative Level

Scene, On/Off, Relative Level

Scene, On/Off, Absolute Level

Any three of the following four group objects can be provided for each actuator channel:

Number	Name	Object...	Description	Group...	Length	C	R	W	T	U	Data Type	Priority
0	DALI Actuator 1 Scene				1 Byte	C	R	W	-	-	scene number	Low
1	DALI Actuator 1 Absolute Level Control				1 Byte	C	R	W	-	-	percentage (0..100%)	Low
2	DALI Actuator 1 Relative Level Control				4 bit	C	-	W	-	-	dimming control	Low
3	DALI Actuator 2 On / Off				1 bit	C	R	W	-	-	on/off	Low

8.2.2.3 Min Level (%)

This parameter sets the minimum channel level as a percentage.

8.2.2.4 Max Level (%)

This parameter sets the maximum channel level as a percentage.

8.2.2.5 Fade Time When Switching (s)

This parameter is presented when On/Off is included in the selected CO Presentation. This parameter sets the fade time in seconds or no fade (Instant) when switching

8.2.2.6 Fade Time When Ramping (s)

This parameter is presented when Relative Level is included in the selected CO Presentation. This parameter sets the fade time in seconds or no fade (Instant) when ramping

8.2.2.7 Fade Time When Dimming (s)

This parameter is presented when Absolute Level is included in the selected CO Presentation. The parameter sets the fade time in seconds or no fade (Instant) when dimming.

8.2.3 Actuator Scenes Settings

Select the Settings group in the left column of the parameters page to set the number of available scenes.

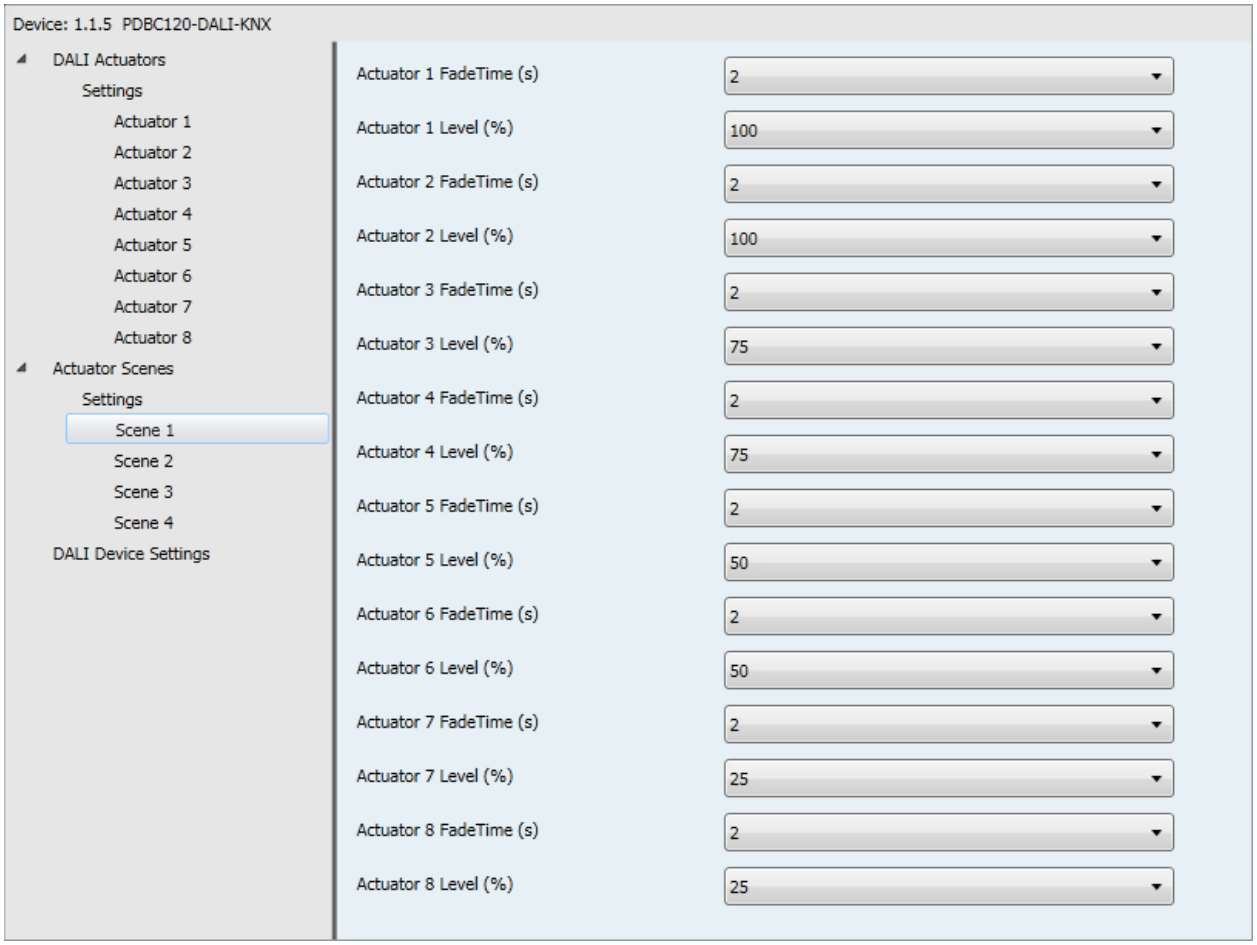
8.2.3.1 Scene count

This parameter sets the number of predefined lighting scenes. A lighting scene specifies the lighting level and fade time for each channel in an area.

8.2.4 Parameter Window Scene X

Parameter window Scene X will be shown for each actuator scene created by the Settings, Scene Count Parameter.

Set up all the preset scenes required in each area of your floor layout. Scenes can be easily added or changed as occupancy and room usage changes.



8.2.4.1 Actuator X FadeTime (s)

This parameter sets the time period for a transition from one level to the next during a scene change. Options are in seconds or no fade (Instant).

8.2.4.2 Actuator X Level (%)

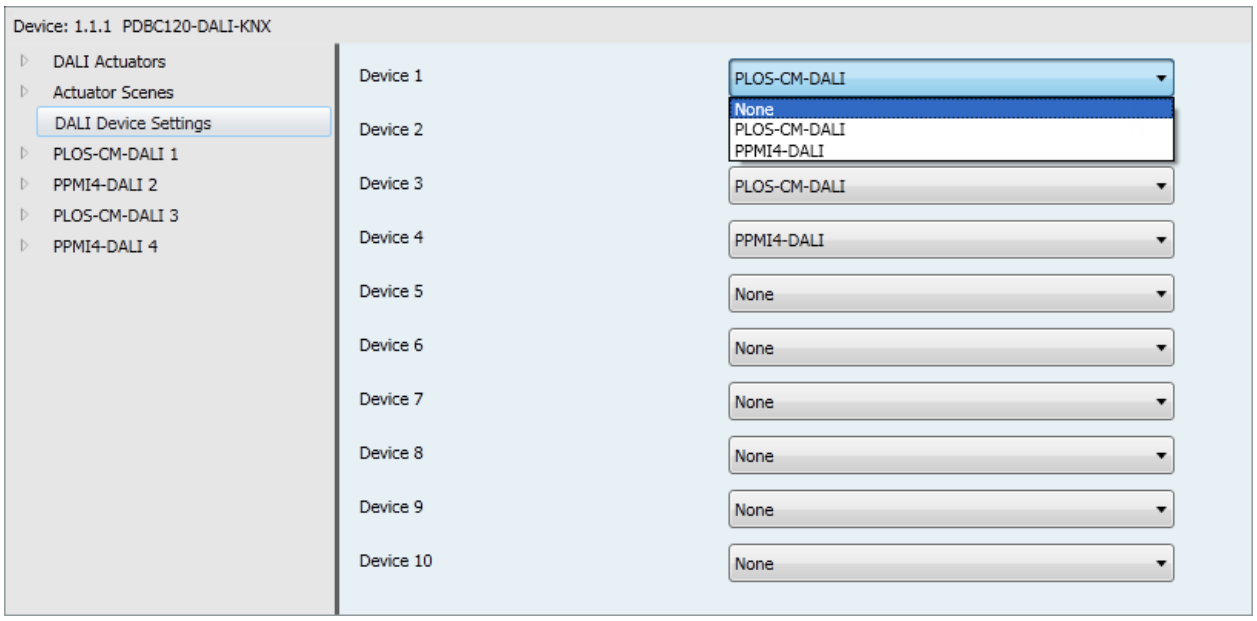
This parameter sets the channel level for the specified scene.

8.2.5 DALI Device Settings

Select the DALI Device Settings group in the left column of the parameters page to set the number of DALI MultiMaster devices.

8.2.5.1 Device X

These parameters is used to select the type of DALI MultiMaster device; PLOS-CM-DALI sensor or PPMI4-DALI dry contact. Up to ten devices can be created.



8.3PLOS-CM-DALI

The Philips LightMaster DALI multifunction sensor combines motion detection (PIR) and ambient light level detection (PE) in the one device. In applications such as homes, lecture theatres and office towers, universal sensors can be utilized to detect motion and switch on the lights.

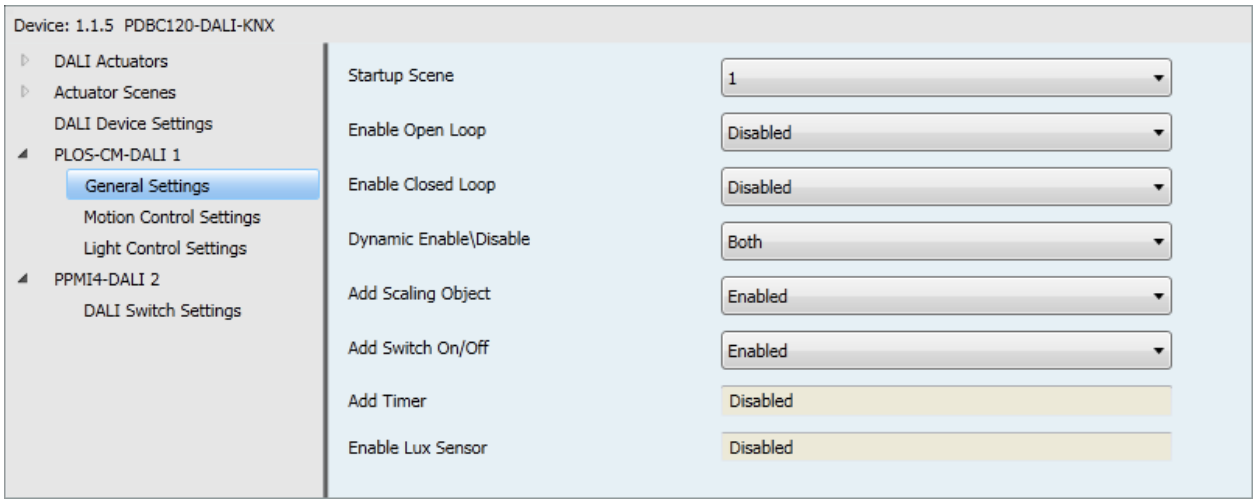
The multifunction sensor is an integrated energy management sensor and group controller. Sensor functions include:

- Occupancy detection.
- Light Level regulation.

When rooms are unoccupied, lights can be automatically dimmed or switched off to provide energy savings.

In situations where it is critical to maintain precise lighting levels for individual workspaces, such as a flight control tower or office workstation, the multifunction sensor facilitates light compensation. The multifunction sensor can be placed in an automatic "Daylight Harvesting" mode for energy savings.

8.3.1 PLOS-CM-DALI X General Settings



8.3.1.1 Startup Scene

The Start-up Scene is the scene that the sensor will start in when powered up, which occurs when network power is restored after a temporary network shutdown or momentary power outage. This is typically set as the occupied scene. When the group that the sensor controls, starts in the occupied scene, it will effectively turn off the lights after the no motion timeout period if the group is unoccupied.

8.3.1.2 Enable Open Loop

This parameter enables or disables Open Loop light control.

Options: Enabled

Disabled

8.3.1.3 Enable Closed Loop

This parameter enables or disables Closed Loop light control.

Options: Enabled

Disabled

Note: Scaling must be enabled to use closed loop application mode.

8.3.1.4 Dynamic Enable/Disable

This parameter allows telegrams to enable or disable the sensor functions.

Options: None

Motion Only

Light Only

Both

8.3.1.5 Add Scaling object

This parameter enables or disables the Sensor X Absolute Level group object.

Options: Enabled

Disabled

8.3.1.6 Add Switch On/Off

This parameter enables or disables the Sensor X On/Off group object.

Options: Enabled

Disabled

8.3.1.7 Add Timer

This parameter enables or disables the Sensor X Timer Start/Stop group object.

Options: Enabled

Disabled

8.3.1.8 Enable Lux Sensor

This parameter enables or disables the Sensor X Lux Sensor group object.

Options: Enabled

Disabled

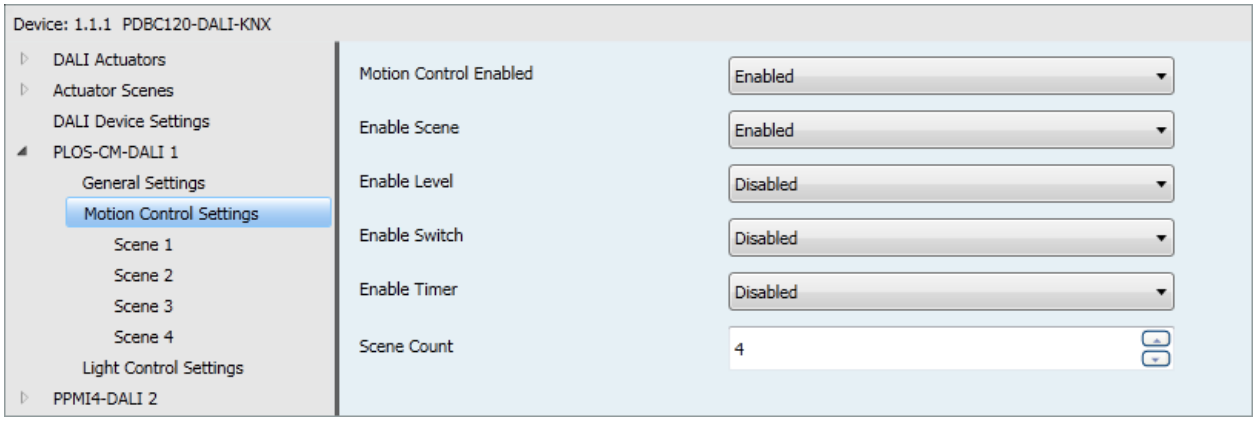
8.4Occupancy detection

The objective of occupancy detection is to automatically illuminate a space when it is occupied, and reduce or extinguish lighting when it is vacant to save energy. Any number of light fixtures may be controlled for occupancy detection from a single sensor.

8.4.1 Motion Control Settings

The Motion Control, Settings group in the left column of the parameters page, displays the parameters illustrated below. These parameters are used to enable/disable the actions that the sensor will execute for motion control.

The Scene option is selected to implement the motion control routine described in the previous example. The Scene Count parameter defines the range of actual Scenes over which the sensor will operate motion control. In the example, scenes 1, 2, and 4 are used. The scene count must be set to the highest scene number used, in this case 4.



8.4.1.1 Motion Control Enabled

To invoke motion control, select Enabled from the drop down list of the Motion Control Enabled parameter. Then select the motion control actions required by enabling the required Action parameters. This section will outline the actions Scene, Level, Switch and Timer. Combinations of any two actions can be deployed by enabling the corresponding actions.

8.4.1.2 Enable Scene

This parameter enables or disables scene control.

Options: Enabled

Disabled

8.4.1.3 Enable Level

This parameter enables or disables level control.

Options: Enabled

Disabled

8.4.1.4 Enable Switch

This parameter enables or disables Switch control.

Options: Enabled

Disabled

8.4.1.5 Enable Timer

This parameter enables or disables the timer control.

Options: Enabled

Disabled

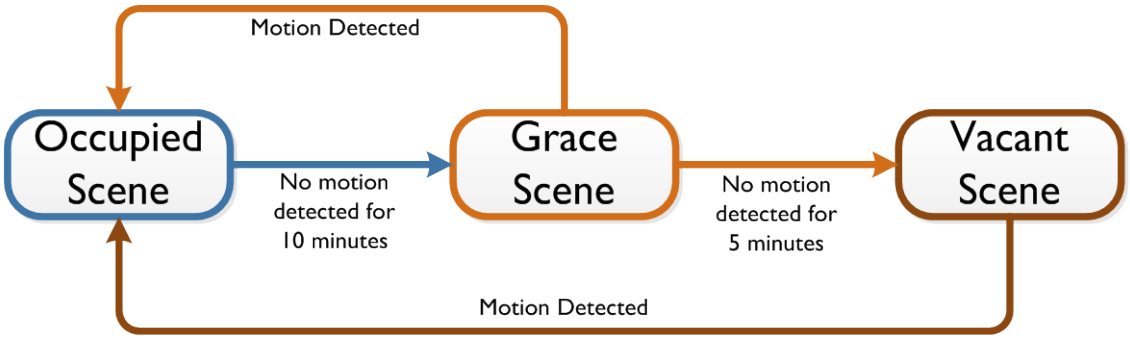
> **Note:** Only two of the above controls (Scene, Level, Switch or Timer) can be enabled at one time. The controls available will depend on objects enabled/disabled in General Settings

8.4.1.6 Scene Count

This parameter sets the number available scenes that can be recalled.

8.4.2 Scene X motion control

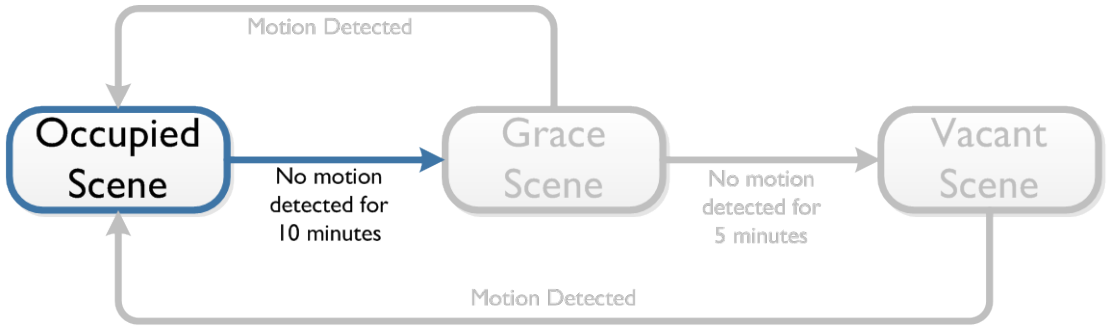
Within the multifunction sensor a set of Scenes are defined, as the Occupancy Monitoring Scenes. Typically three Scenes are defined as shown in the Motion sensor configuration flow chart below.



In this example, they are named 'Occupied', 'Grace' and 'Vacant'. No other scenes are configured.

- For the 'Occupied' Scene (Scene 1) the space is illuminated to provide occupants with suitable lighting levels. The multifunction sensor is configured to change to the 'Grace' Scene after 10 minutes of no motion activity.
- In the 'Grace' Scene (Scene 2) the space is dimmed to warn any occupants that the lights are about to be automatically turned off. The multifunction sensor is configured to return to the 'Occupied' Scene if motion is detected. If a period of 5 minutes of no motion activity passes the multifunction sensor will progress to the 'Vacant' scene.
- For the 'Vacant' scene (Scene 4) the lights are turned off to save energy. The multifunction sensor is configured to select the 'Occupied' Preset when motion is detected.

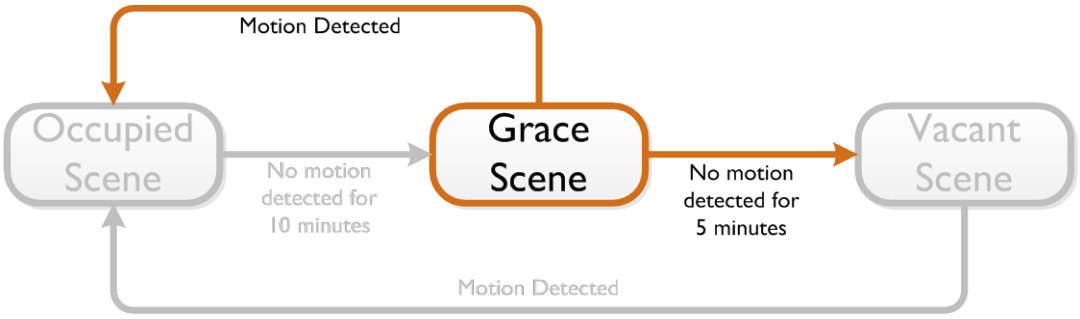
8.4.2.1 Occupied Scene action



'Occupied' Scene (Scene 1) actions should include a 'No-Motion Action' to go to the 'Grace' Scene (Scene 2). The 'Motion Action' should be set to 'No Action'.

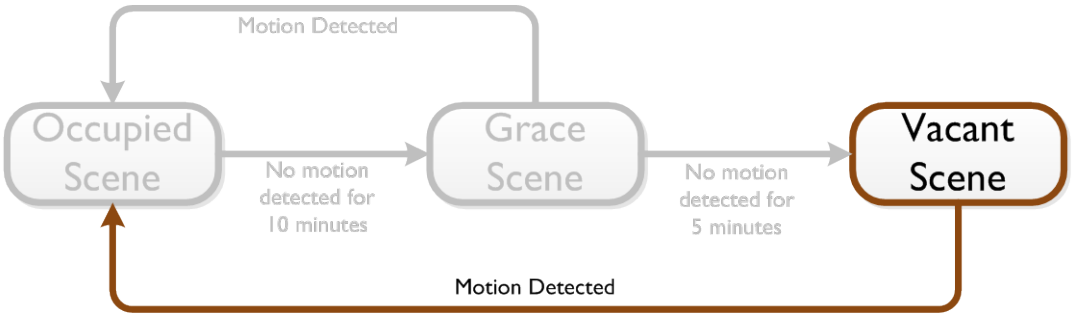
The timeout should be set to 600 seconds (10 minutes).

8.4.2.2 Grace Scene action



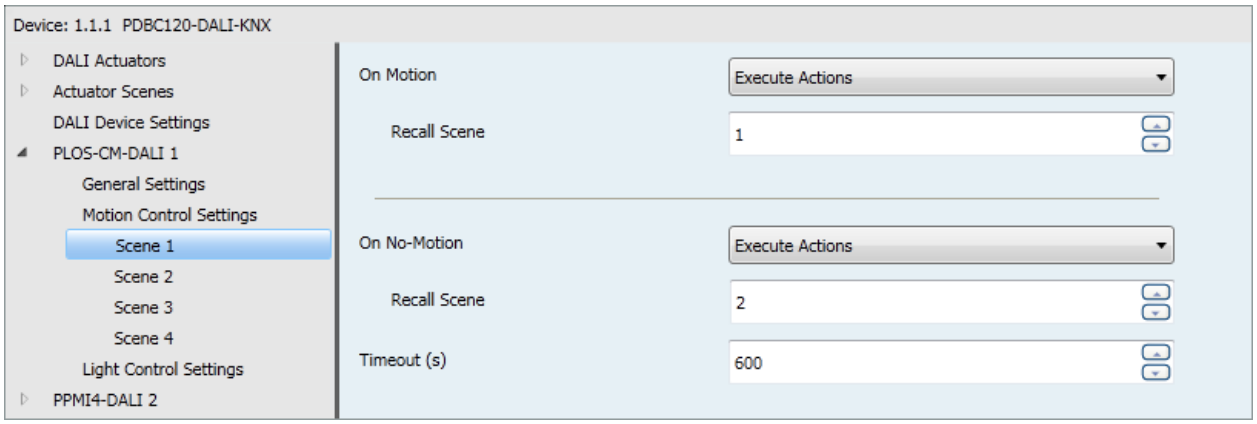
The 'Grace 'Scene (Scene 2) actions should be to revert to the 'Occupied' Scene (Scene 1) when motion is detected, or fall back to the 'Vacant' Scene (Scene 4) when there is no motion detected for the Timeout period.

8.4.2.3 Vacant Scene action



The 'Vacant' Scene (Scene 4) actions should recall the 'Occupied' Scene (Scene 1) when motion is detected. No Action should be configured for the 'No-Motion Action'.

The motion control behavior for each scene can be set by selecting the respective scene in the left hand column of the parameter page. The page below appears when Scene 1 is selected. Control is invoked for either occupancy state by setting the On Motion Action and On No-Motion Action parameters to execute actions from the drop down list, as shown below.



8.4.2.4 On Motion

The On Motion Action permits an action Scene, Level, Switch and/or Timer action to be recalled as enabled in the Motion Control Settings page.

Options: No Action

Execute Actions

8.4.2.5 Recall Scene

This parameter sets the scene number recalled by this action.

8.4.2.6 On No-Motion

The On No-Motion Action permits an action Scene, Level, Switch and/or Timer action to be recalled as enabled in the Motion Control Settings page.

For scene based control, the On No-Motion Action permits a Recall Scene and Timeout period to be entered. As Scene 1 is the Occupied Scene in the example, the On No-Motion Action must be set to Recall Scene 2 which is the Grace Scene. The Timeout of 600 seconds is also be set achieve the required delay of 10 minutes.

Options: No Action

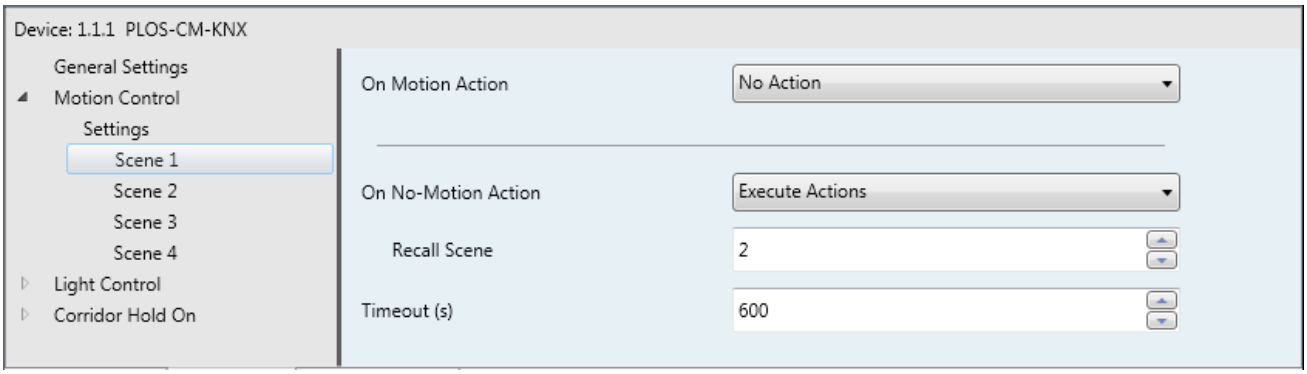
Execute Actions

8.4.2.7 Recall Scene

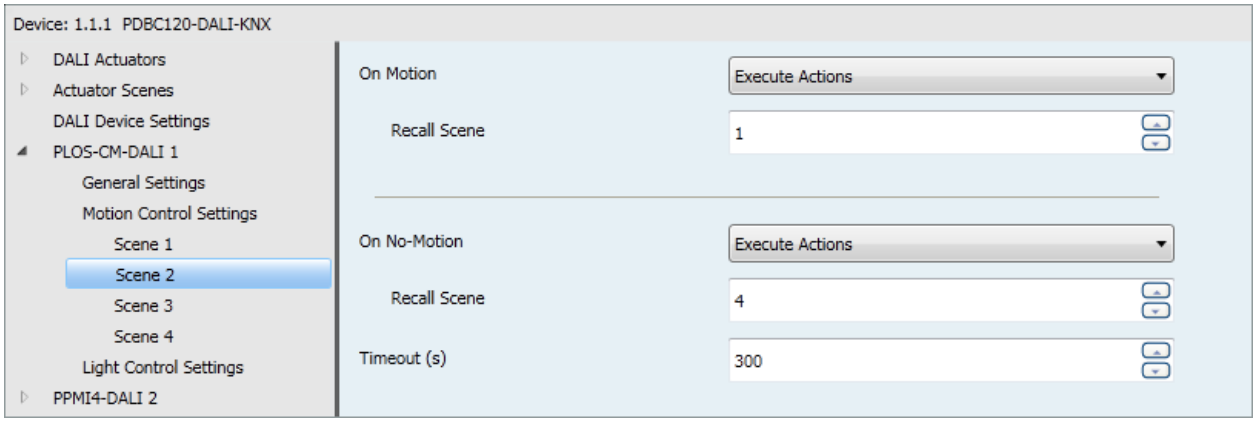
This parameter sets the scene number recalled by this action.

8.4.2.8 Timeout (s)

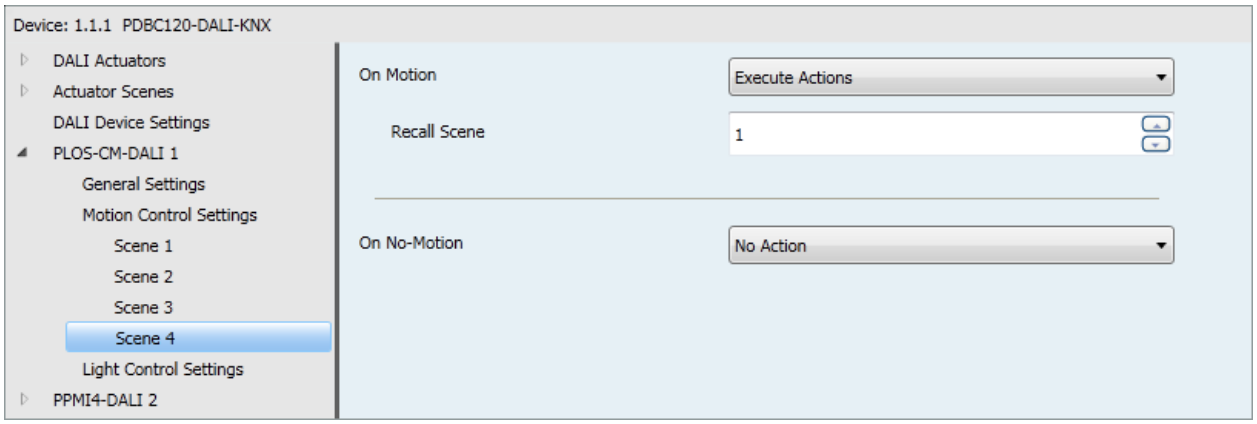
The Timeout is the delay before the On-No-Motion Action will be executed after motion was last detected.



For the example in the Grace Scene 2, the sensor must recall the Occupied Scene 1 again if movement is detected within the Timeout period of 5 minutes; otherwise the sensor must recall the Vacant Scene 4. Following are the parameter settings for Scene 2 to achieve this.



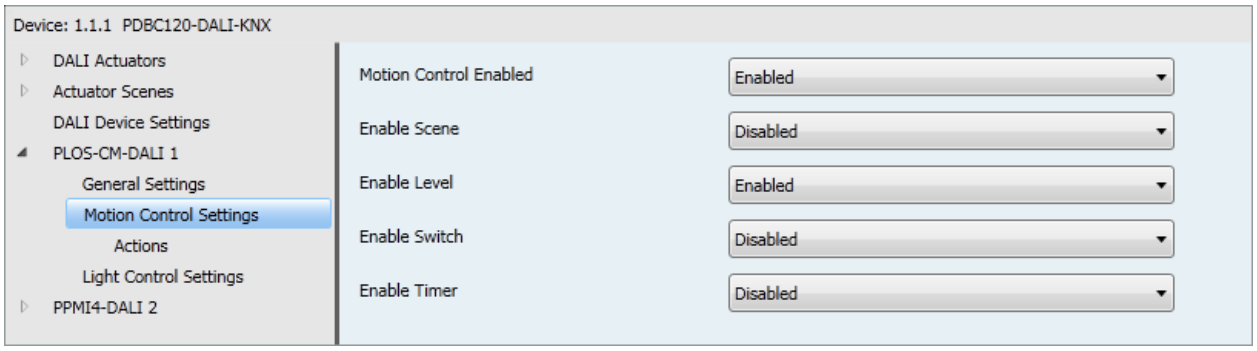
Finally the Vacant Scene 4 will need to be configured so that when motion is detected the sensor will recall the Occupied Scene 1. Following are the parameter settings for Scene 4 to achieve this.



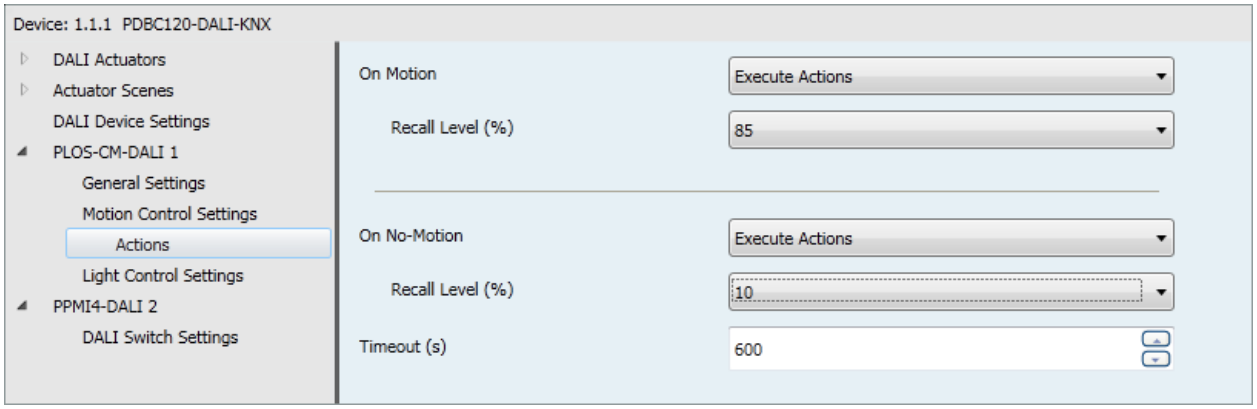
8.4.3 Level motion control

Another approach to motion control is for the sensor to set lighting in a group to specific levels in response to changes in occupancy. An example would be to set lighting to 85% when motion is detected and 10% when no motion has been detected for 10 minutes. Level Actions are used to achieve this.

To invoke level occupancy control, in the Motion Control Settings Page, select Enable Level from the available actions as illustrated below.



The motion control behavior can be set by selecting Actions in the left hand column of the parameter page. The page below appears after selection. Control is invoked for either occupancy state by setting the On Motion Action and On No-Motion Action parameters to Execute Actions from the drop down list, as shown below.



8.4.3.1 Recall Level

This parameter sets the percentage level recalled by this action.

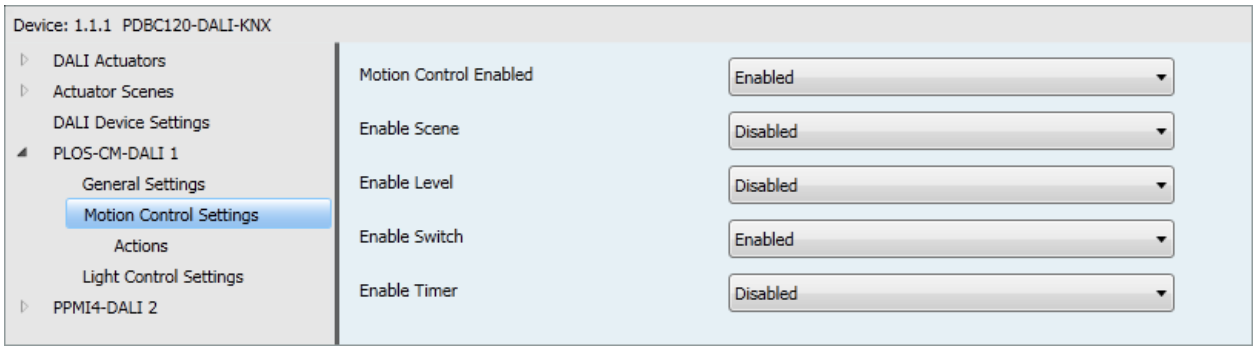
8.4.3.2 Timeout (s)

The Timeout is the delay before the On-No-Motion Action will be executed after motion was last detected.

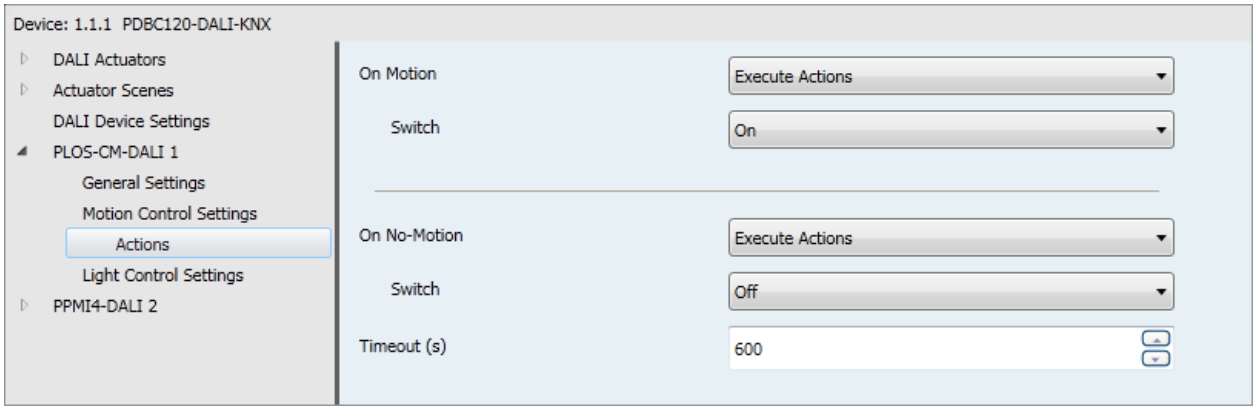
8.4.4 Switch motion control

The most basic approach to Occupancy control is to simply turn the lights ON or OFF in response to changes in occupancy. The obvious example would be to turn lighting ON when motion is detected and OFF when no motion has been detected for 10 minutes. ON/OFF Actions are used to achieve this.

To invoke switch occupancy control, in the Motion Control Settings Page, select Enable Switch from the available actions as illustrated below.



The motion control behavior can be set by selecting Actions in the left hand column of the parameter page. The page below appears after selection. Control is invoked for either occupancy state by setting the On Motion Action and On No-Motion Action parameters to Execute Actions from the drop down list, as shown below.



8.4.4.1 Switch

This parameter sets the Switch state (ON or OFF) recalled by this action.

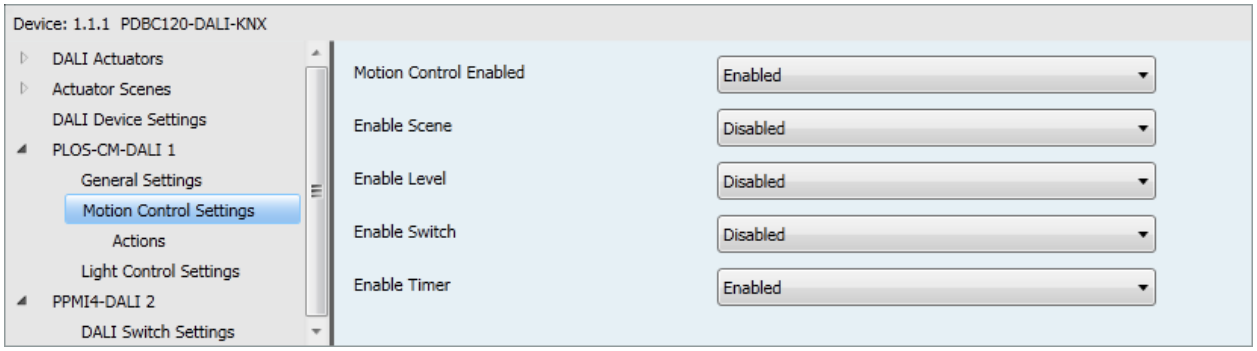
8.4.4.2 Timeout (s)

The Timeout is the delay before the On-No-Motion Action will be executed after motion was last detected.

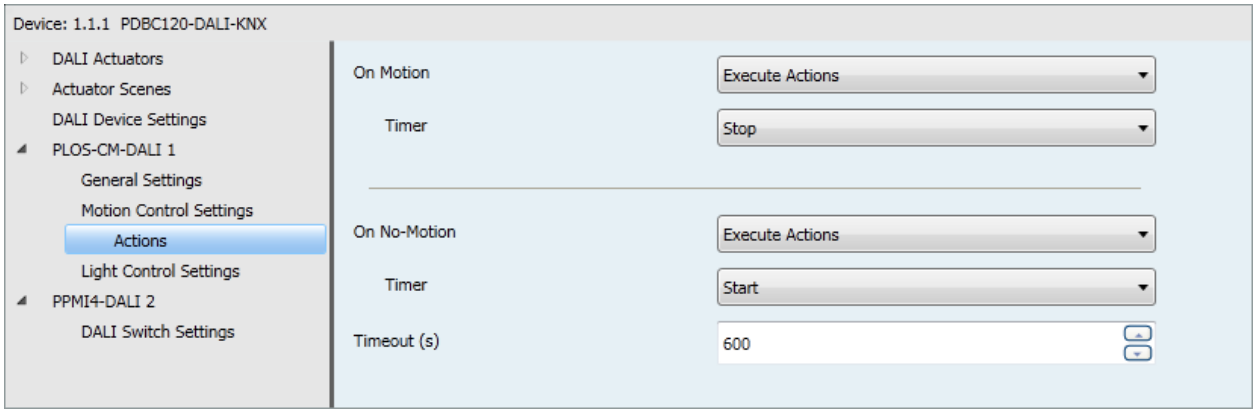
8.4.5 Timer motion control

Timer occupancy control can be used to start and stop a timer in another network device, such as an actuator. An example would be to start a timer when no motion has been detected for a period of 10 minutes and stop the timer if motion is detected.

To invoke level occupancy control, in the Motion Control Settings Page, select Enable Timer from the available actions as illustrated below.



The motion control behavior can be set by selecting Actions in the left hand column of the parameter page. The page below appears after selection. Control is invoked for either occupancy state by setting the On Motion Action and On No-Motion Action parameters to Execute Actions from the drop down list, as shown below.



8.4.5.1 Timer

This parameter starts or stops a timer by this action.

8.4.5.2 Timeout (s)

The Timeout is the delay before the On-No-Motion Action will be executed after motion was last detected.

8.5 Light Control

The objective of light control is to automatically maintain a specific lighting level, which is generally so that it is appropriate for the tasks being conducted in the space of the group under control.

As with motion control the multifunction sensor also enables a set of Scenes to be defined, as light level control Scenes. Typically this would apply to all scenes except the OFF scene. For example, lighting in an enclosed office can be maintained at 400 lux when occupied as appropriate for normal office based tasks. For a grace scene that is typically recalled immediately after the office is unoccupied, a lighting level of 100 lux would be appropriate.

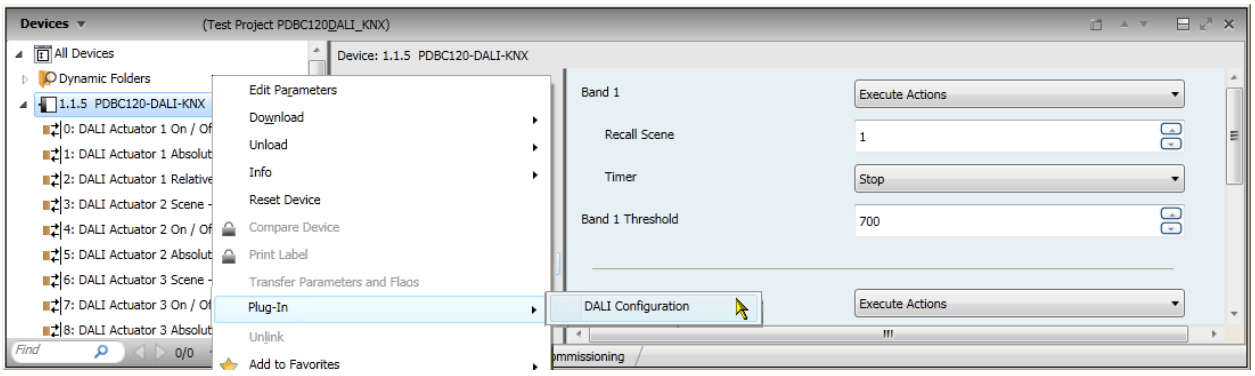
8.5.1 Calibrating the sensor

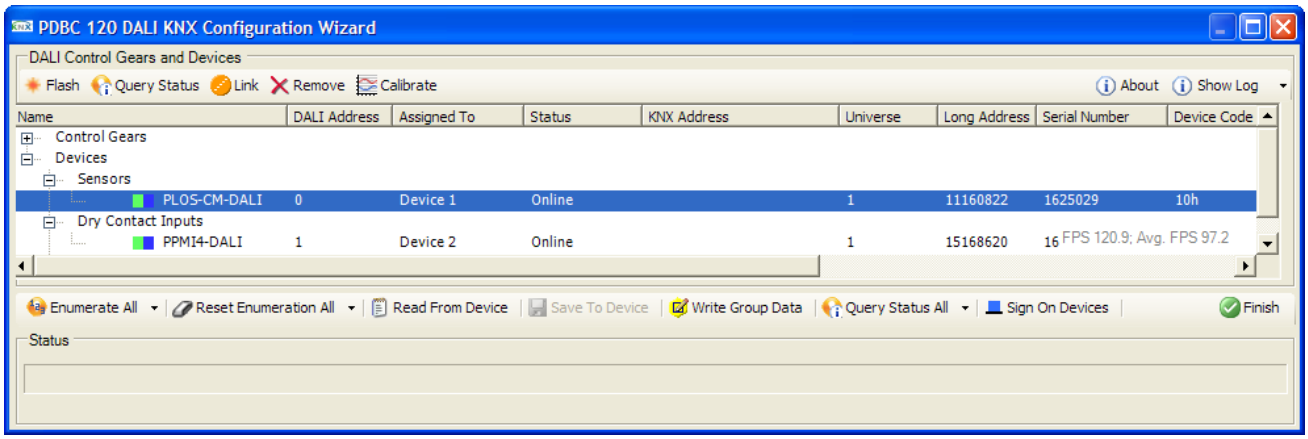
For correct operation of the multifunction sensor in any lighting level control application it must be calibrated. When the sensor is installed in the typical mounting position on a ceiling facing down, the sensor actually measures the light reflected back to it from the surfaces below. However the objective of most lighting control applications is to maintain lighting levels at a specific horizontal working plane height ie on the top of a desk. Therefore if the surfaces below the sensor have a low reflectance, ie dark carpets etc, the level of light measured at the sensor will be quite different to that at the working plane height. The sensor can compensate for this difference by applying a factor to the measured light level to determine the actual light level. The relationship between the two levels is determined through calibration.

The database file for the multifunction sensor includes a plug-in for calibration, which is accessed from the DALI Configuration Wizard

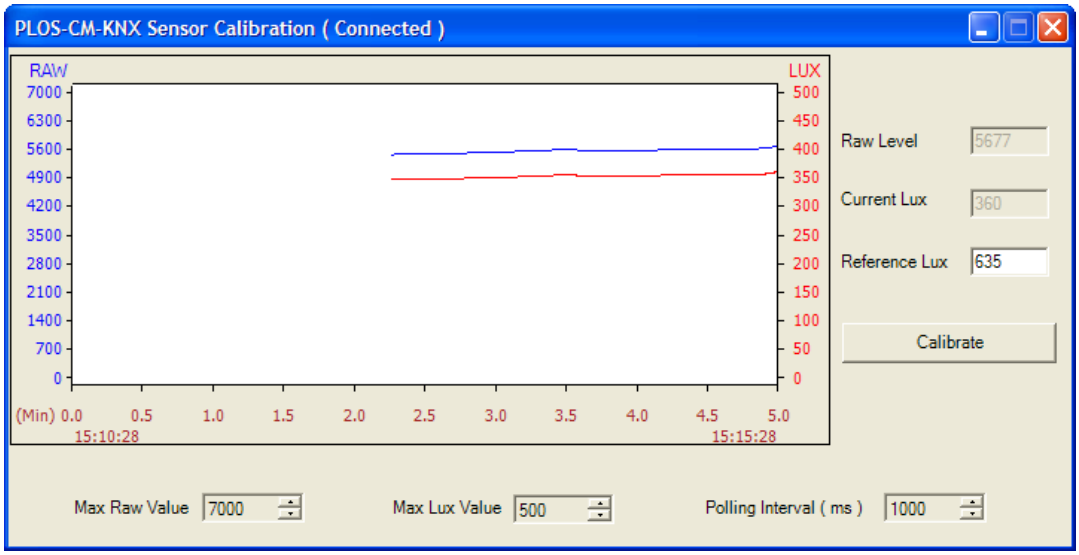
To run Sensor Calibration Plug-in,

1. Right-click on the PDBC120-DALI-KNX controller in the topology tree
2. Select Plug-In, then DALI configuration
3. Select the required PLOS-CM-DALI from the sensor section in the topology tree (must be enumerated)
4. Click Calibrate





The calibration plug-in page displays as below.



The Max Raw Value and Max Lux Value parameters define the upper limits of the graph within the page for display purposes only. Adjust these as necessary to provide the preferred graphing resolution. Using a suitable quality lux meter, measure the light level at the desired working plane height at a reference point in the area below the sensor. Enter the measured value in the Reference Lux parameter and then click Calibrate. Before closing the calibration plug-in page, continue to view the displayed Lux trace to confirm calibration was effective. Providing there has been no change in the lighting level since the reference Lux level was measured and entered, the displayed Lux trace should promptly begin indicating a Lux level around the entered reference value.

Note: Where illumination levels are high, raise the Max Raw Value and Max Lux Value scales to bring the graph traces within the visible range.

8.5.2 Light Control Settings

The application mode displayed depends on whether Open Loop or Closed Loop is enabled in the General Settings page.

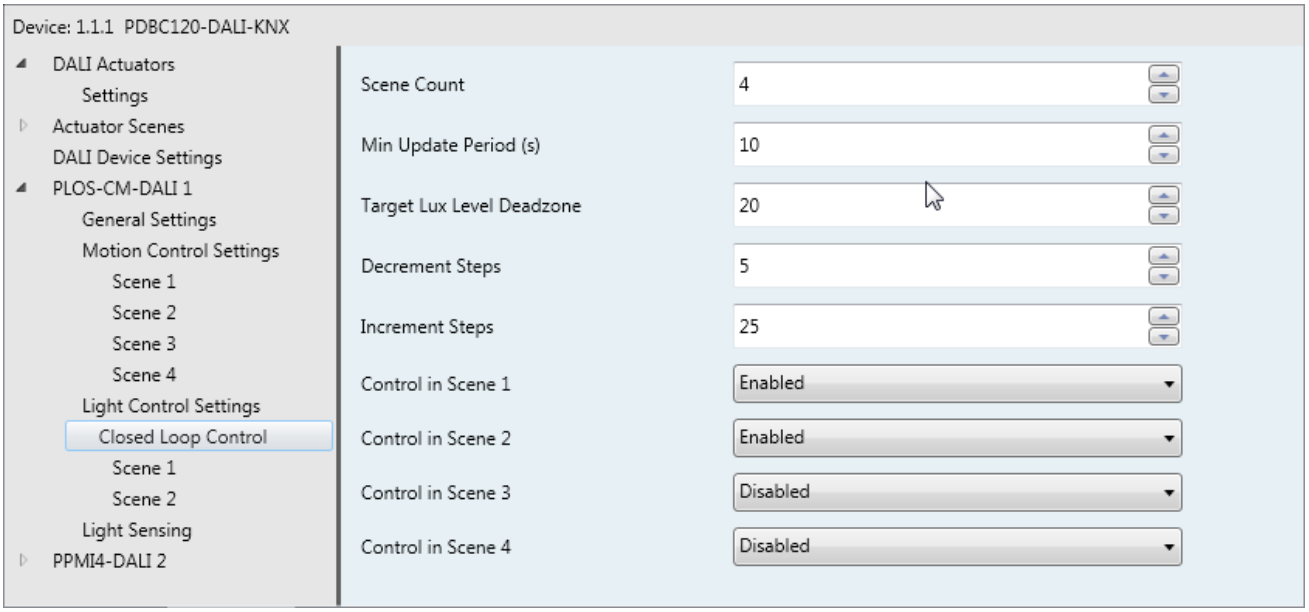
8.5.3 Closed loop light control

Closed loop lighting control should be used where the sensor is located within the same area of the group under control. In this arrangement the control loop is effectively closed as the sensor will directly detect any changes in lighting level from the luminaires that it controls. Closed loop lighting control is generally recommended for enclosed office spaces.

To invoke closed loop light control, in the PLOS-CM-DALI General Settings Page, enable Closed Loop Control from the Application Mode drop down list.

8.5.3.1 Closed Loop Control

The light control behavior can be set by selecting Closed Loop Control in the left hand column of the parameter page. The page below appears after selection.



8.5.3.2 Scene Count

The Scene Count parameter defines the range of actual Scenes over which the sensor will operate light control. In the example, only scenes I and 2, require light control. The scene count must be set to the highest scene number used, in this case 4.

Control is invoked in each scene by setting the respective Control in Scene parameter to Enabled from the drop down list.

8.5.3.3 Min Update Period (s)

The Min Update Period parameter sets the shortest time interval that light level adjustment messages will be issued to the group under control. Consideration of an appropriate period should take into account the responsiveness of required level changes and the corresponding volume of network traffic generated.

Tip: Setting a short period will increase responsiveness however generate higher network traffic. Conversely setting a longer period will decrease network traffic though reduce the responsiveness of control.

8.5.3.4 Target Lux Level Deadzone

This parameter sets the size of the sensed Lux level zone above the target Lux level within which the sensor will not make changes to the light level. It can also be referred to as the hysteresis zone. For example if the sensor has a target Lux level of 300 Lux and a Lux level deadzone of 20 Lux the sensor will not make light level changes when it senses a Lux level between 300 and 320 Lux.

8.5.3.5 Decrement Steps

Defines the rate that the channel level decreases. This parameter sets the size of light level steps the sensor will reduce the light level by when the sensed lux level is higher than the target lux level. The default value is 5 and should suit most applications. It may be fine-tuned in small steps of 1 or 2 at a time. A higher number increases the rate of change.

8.5.3.6 Increment Steps

Defines the rate that the channel level increases. This parameter sets the size of light level steps the sensor will increase the light level by when the sensed lux level is lower than the target lux level. The default value is 25 and should suit most applications. It may be fine-tuned in small steps of 1 or 2 at a time. A higher number increases the rate of change.

8.5.3.7 Control in scene X

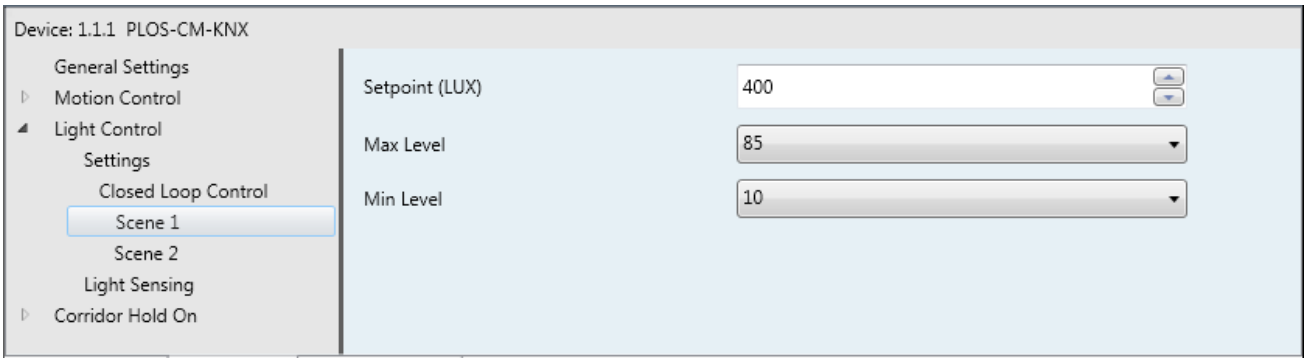
This parameter sets in which scenes closed loop control will operate. The number of parameters visible depends on the scene count. This parameter enables or disables the scenes used for control.

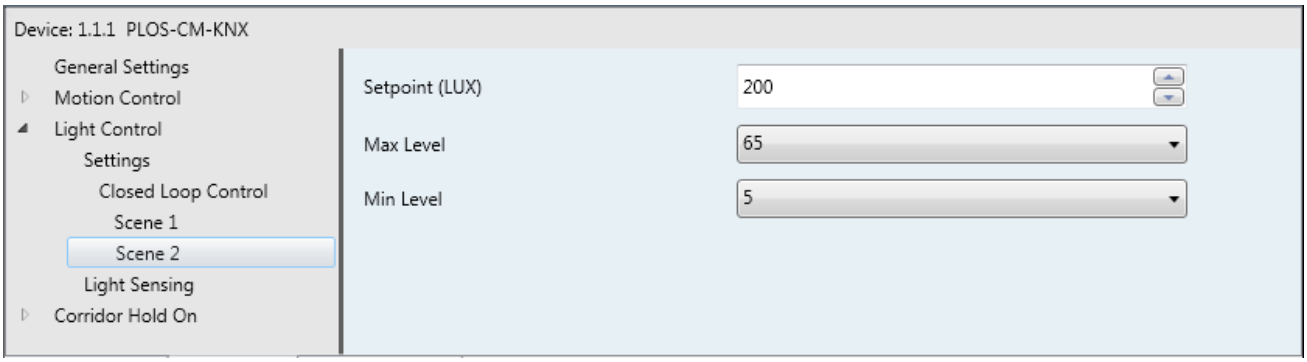
Options: Enabled

Disabled

8.5.4 Scene X light control

The light control parameters for each scene can be set by selecting the respective scene in the left hand column of the parameter page as shown below.





8.5.4.1 Setpoint (LUX)

The Setpoint (LUX) parameter defines the light level that the sensor seeks to achieve by adjusting the level of the associated group under control. .

8.5.4.2 Max Level

The Max Level defines the upper percentage to which a channel can change to achieve the Setpoint (LUX).

8.5.4.3 Min Level

The Min Level defines the lower percentage to which a channel can change to achieve the Setpoint (LUX).

8.5.5 Open loop light control

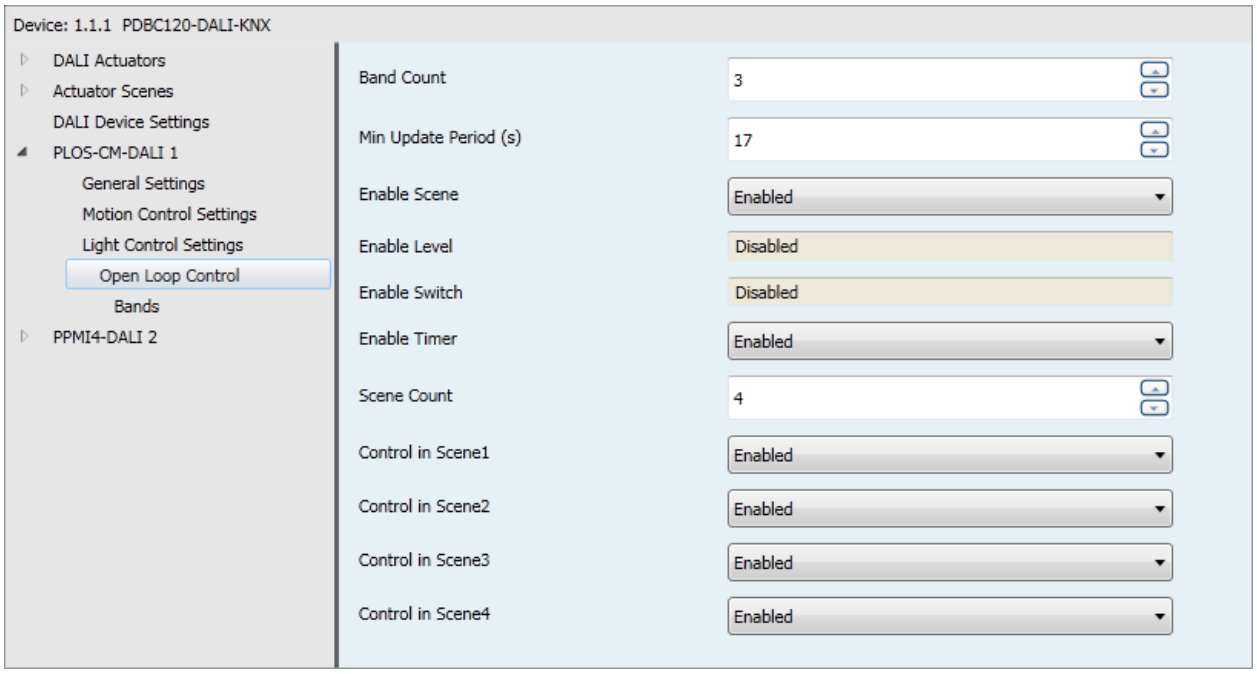
Open loop lighting control should be used where the sensor is not located within the same area of the group under control. With this arrangement, the control loop is open as the sensor will not directly detect any changes in lighting level from the luminaires that it controls. In this Light Control application mode, bands of lighting levels are defined with related actions. When the light level enters a band, the actions defined for that band are executed.

An example would be the level of background lighting on a display located in an area that also receives natural light. In this scenario it may be necessary to increase the background lighting level as natural light increases in the foreground to achieve an appropriate contrast ratio. Specifically this could be achieved by selecting a low background Scene (3) when the lighting level is between 0-350 lux, an intermediate scene (2) when the lighting level is between 350 – 700 lux and a high level scene (1) when the lighting level exceeds 700 lux.

To invoke open loop light control, in the PLOS-CM-DALI General Settings Page, enable Open Loop Control from the Application Mode drop down list.

8.5.5.1 Open Loop Control

The light control behavior can be set by selecting Open Loop Control in the left hand column of the parameter page. The page below appears after selection



Open Loop Light Control actions follow the same conventions as outlined for Motion Control previously.

8.5.5.2 Band Count

The Band Count parameter sets the number of light level bands for which control actions can be defined.

8.5.5.3 Min Update Period (s)

The Min Update Period parameter sets the shortest time interval that light level adjustment messages will be issued to the group under control. Consideration of an appropriate period should take into account the responsiveness of required level changes and the corresponding volume of network traffic generated.

For Open Loop Light Control, the multifunction sensor can execute Scene, Level, Switch and Timer actions.

8.5.5.4 Enable Scene

This parameter enables or disables scene control parameters for each band.

Options: Enabled

Disabled

8.5.5.5 Enable Level

This parameter enables or disables level control parameters for each band.

Options: Enabled

Disabled

8.5.5.6 Enable Switch

This parameter enables or disables Switch control parameters for each band.

Options: Enabled

Disabled

8.5.5.7 Enable Timer

This parameter enables or disables the timer control parameters for each band.

Options: Enabled

Disabled

Note: Only two of the above controls (Scene, Level, Switch or Timer) can be enabled at one time. The controls available will depend on objects enabled/disabled in General Settings

8.5.5.8 Scene Count

This parameter sets the number available scenes that can be recalled.

8.5.5.9 Control in scene X

This parameter sets in which scenes open loop control will operate. The number of parameters visible depends on the scene count. This parameter enables or disables control in the scene.

Options: Enabled

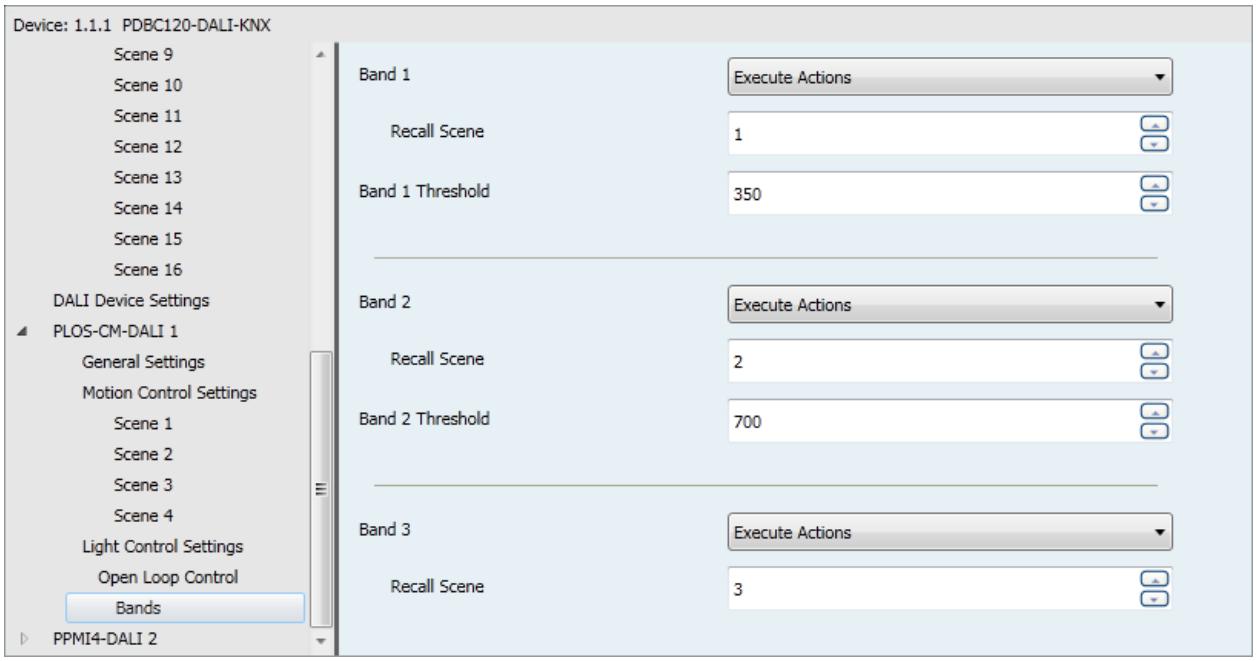
Disabled

8.5.6 Bands

To define the bands and related actions, select Bands in the left hand column of the parameters page. The number of bands displayed depends on the band count. The following page appears.

The first band represents the lowest lux level range. Subsequent bands start from the previous band's threshold level.

Note: Only two of the above controls (Scene, Level, Switch or Timer) can be enabled at one time. The controls available will depend on objects enabled/disabled in General Settings



8.5.6.1 Band X

This parameter enables or disables control in the scene.

Options: No Action

Execute Actions

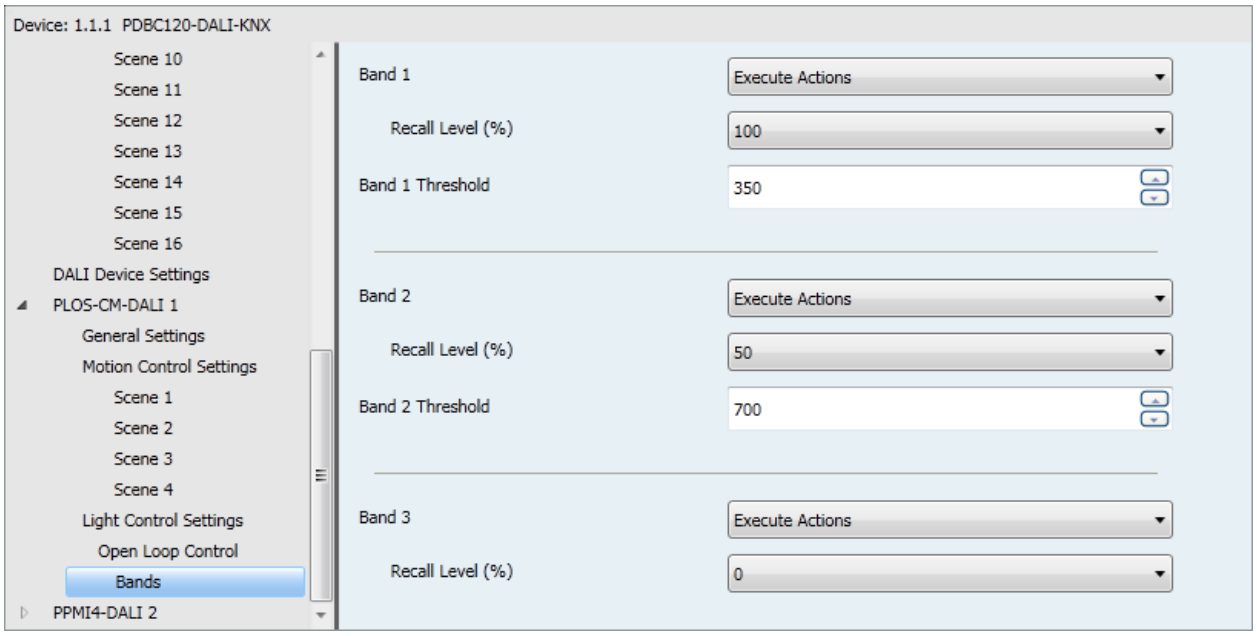
8.5.6.2 Recall scene

This parameter sets the scenes number that is recalled if the lux level is above the threshold.

8.5.6.3 Band X Threshold

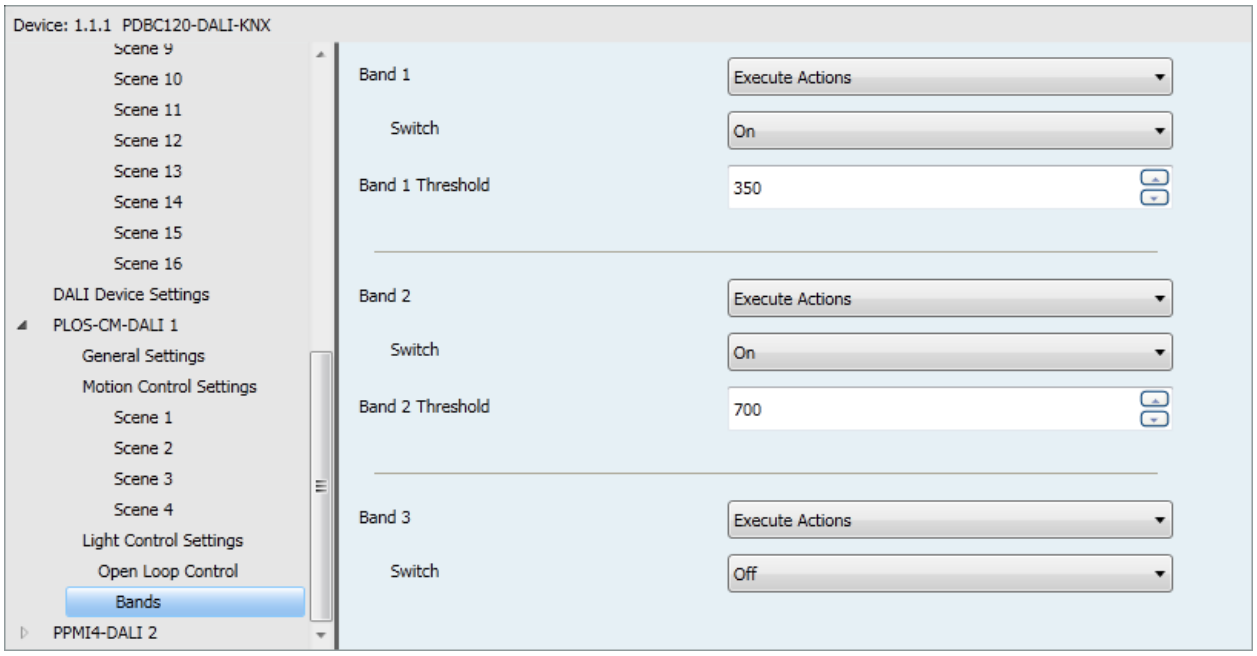
The lux level defines the start of the next band (not applicable for highest numbered band).

8.5.6.4 Recall Level



This parameter recalls an absolute channel level as a percentage.

8.5.6.5 Switch

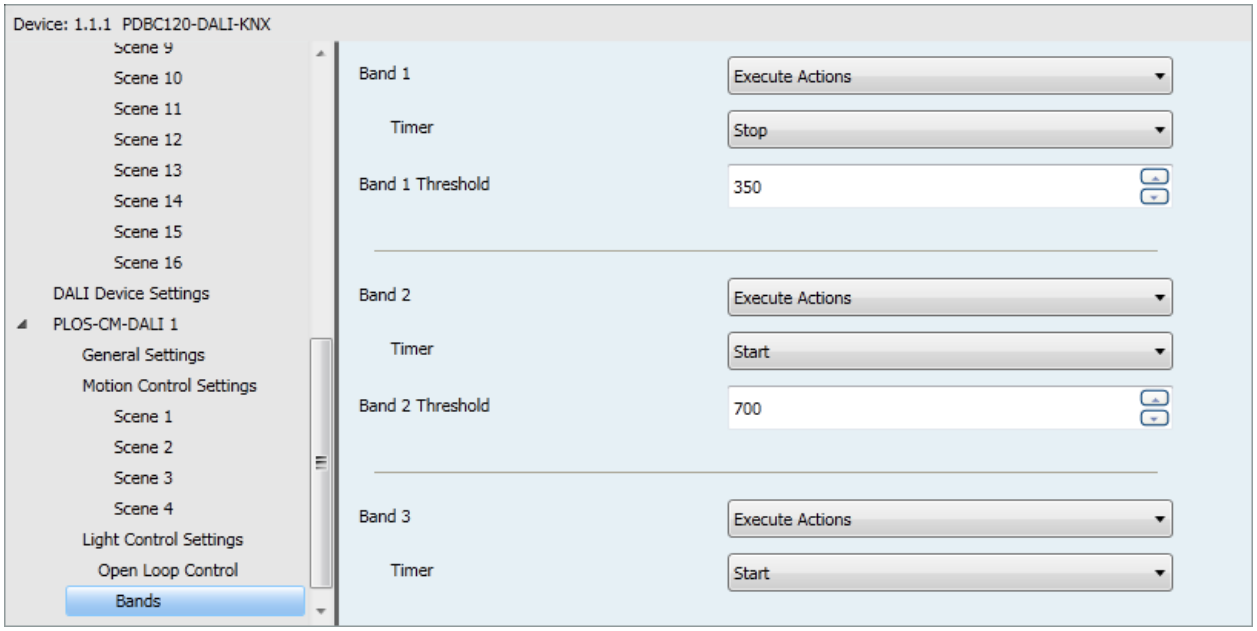


This parameter turns the lights ON or OFF.

Options: On

Off

8.5.6.6 Timer



This parameter starts or stops a delay timer.

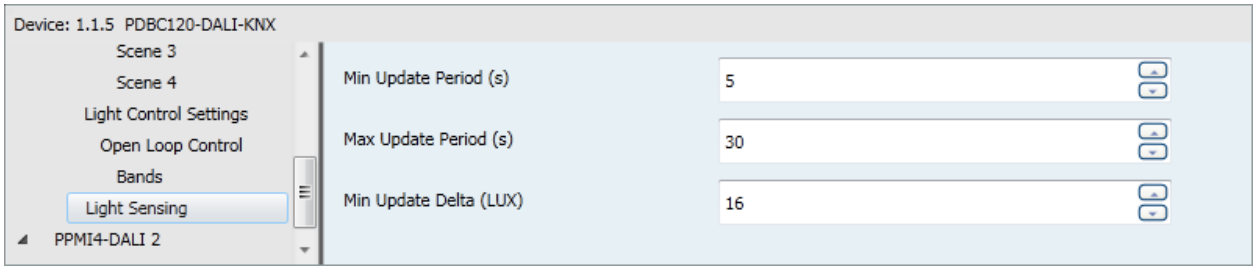
Options: Start

Stop

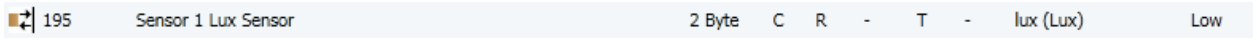
8.6 Light Sensing

The multifunction sensor can also transmit the actual light level it is sensing to other network devices, for example a third party LCD page or dimming controller with light level input.

The light sensing behavior can be set by selecting Light Sensing in the left hand column of the parameter page. The page below appears after selection.



The following group object is provided when this function is selected.



8.6.1.1 Min Update Period (s)

The Min Update Period parameter sets the shortest time interval that light level messages will be issued. Consideration of an appropriate period should take into account the responsiveness of required level changes and the corresponding volume of network traffic generated. Setting a short period will increase responsiveness however generate higher network traffic. Conversely setting a longer period will decrease network traffic though reduce the responsiveness of control.

8.6.1.2 Max Update Period (s)

The Max Update Period parameter sets the longest time interval that light level messages will be issued.

8.6.1.3 Min Update Delta (LUX)

The Min Update Delta parameter defines the minimum change in lighting level that is required from the last level issued before another will be issued. If the change in lighting level has not exceeded the Min Update Delta but the time since the last level issued has reached the timeout period, another level messaged will be issued.

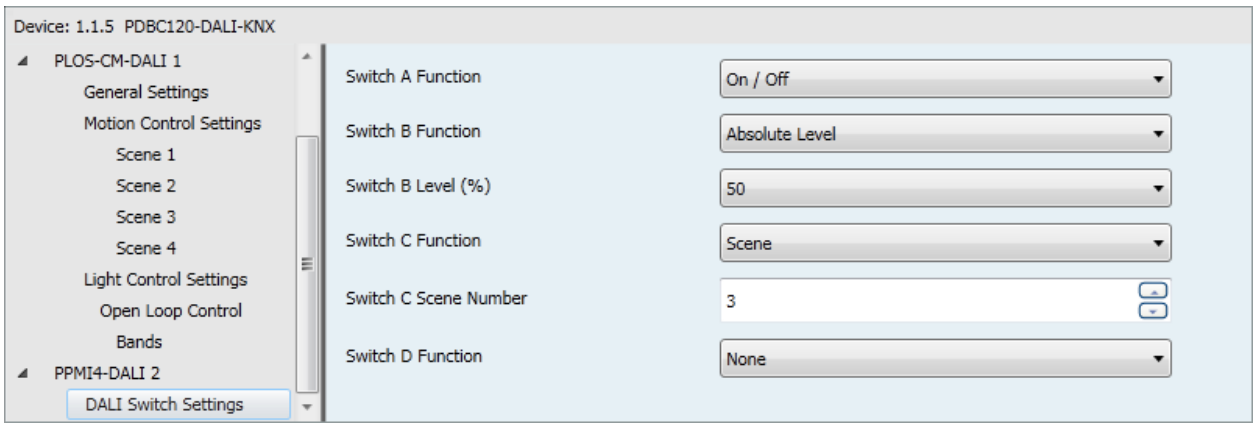
8.7PPMI4-DALI

The Dry Contact Interface provides four programmable inputs to control devices on the DALI network.

Each channel can be independently configured for a wide variety of application areas, such as:

- **Scene** – For recalling and storing the states of several actuator groups.
- **Level** – For dimming the lighting by sending absolute levels to the actuator channels.
- **On/Off** – For switching the lighting

8.7.1 PPMI4-DALI Switch X Settings



8.7.1.1 Switch X Function

This parameter determines the action triggered by the Switch. A group object is used for each selected action; Scene, ON/OFF, Absolute Level, or Relative Level.

Options: None

Scene

Absolute Level

On/Off

8.7.1.2 Switch X level (%)

This parameter is visible if absolute level is chosen. It sets the channel level as a percentage.

8.7.1.3 Switch X Scene Number

This parameter is visible if scene is chosen. It sets the scene number that will be recalled.

8.8 Group Addresses

8.8.1 Group Address Naming

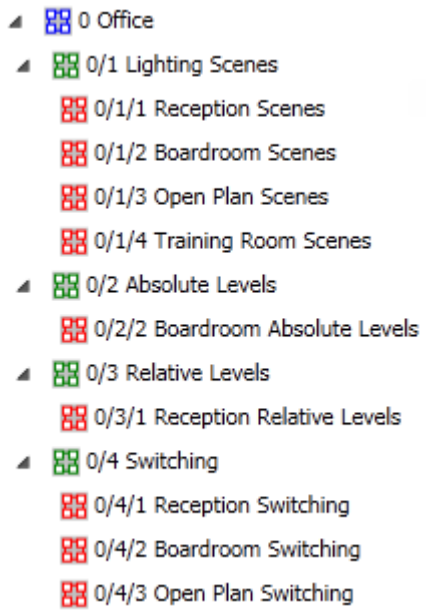
The group address is a two-byte logical address used for all bus group in normal operating mode. Group address can be represented in three different ways:

- three digits x/y/z (x: 0~31 / y: 0~7 / z: 0~255)
- two digits x/z (x: 0~31 / z: 0~2047)
- one digit x (x: 0~65535)

A group object for an input device such as a sensor/user interface can send a single group address but the group object for each Actuator channel can receive many group addresses.

Using the customer requirements, you can identify the lighting functions required in each area.
A range of group addresses can be created for each function type (scene, absolute level, relative level and switching) and then expanded to include those functions in each area.

The example illustrates the naming of group addresses for typical lighting functions using three-digit addressing.



8.8.2 Group Address Linking

Group addresses must be linked to the input and output group objects of each device. Group addresses can be linked by dragging and dropping the object onto the group address in ETS or from the Group Address Assignment Window in the DALI Configuration plug-in. Each group address must only be used with one Datapoint type.

After group addresses have been linked to all inputs and outputs the KNX application can be downloaded to the DALI MultiMaster controller.

The linked group addresses enable each input device such as an occupancy sensor or button press to trigger an action that sends a telegram via the linked group address to the actuator channels to perform the corresponding function. The table below shows a typical configuration:

Group Addresses	Office Functions	Actuator Group Objects	Data Point Type
	Reception Functions		
0/1/1	Reception Scenes	Actuator 1... 3 Scene	1 byte scene number
0/3/1	Reception Relative Levels	Actuator 1... 3 Relative Level Control	4 bit dimming control
0/4/1	Reception Switching	Actuator 1... 3 On/Off	1 bit on/off
	Boardroom Functions		
0/1/2	Boardroom Scenes	Actuator 4... 7 Scene	1 byte scene number
0/2/2	Boardroom Absolute Levels	Actuator 4... 7 Absolute Level Control	1 byte percentage
0/4/2	Boardroom Switching	Actuator 4... 7 On/Off	1 bit on/off
	Open Plan Functions		
0/1/3	Open Plan Scenes	Actuator 8... 48 Scene	1 byte scene number
0/4/3	Open Plan Switching	Actuator 8... 48 On/Off	1 bit on/off
	Training Room Functions		
0/1/4	Training Room Scenes	Actuator 49... 59 Scene	1 byte scene number

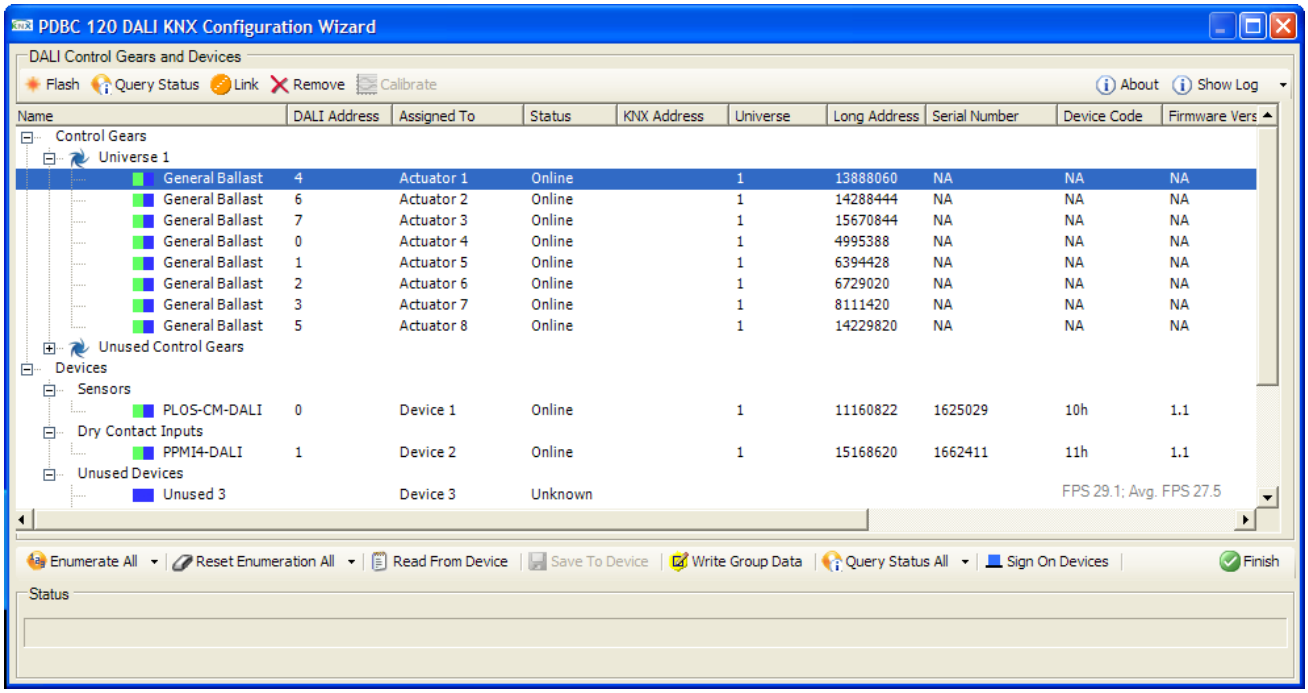
Tip: Each Actuator channel can have multiple group addresses per function type. Actuator channels in different areas will use a different range of group addresses for these functions.

8.9DALI KNX Configuration Wizard

All DALI functions can be configured using the DALI Configuration Wizard.

To run the DALI Configuration Wizard:

1. Right-click the device name in the devices list page
2. Select Plug-in
3. Select DALI Configuration



The DALI Configuration Wizard displays the DALI control gears (ballasts/devices) grouped by universe. The Configuration Wizard Page displays the following information columns:

- Name
- DALI Address
- Linked To (Actuator Channel)
- Status (Online, Offline or Unknown)
- KNX Address
- Universe
- DALI Long Address
- Serial Number
- Device Code
- Firmware Version
- Group Address
- Relay (ballasts connected through controller's power relay)
- DALI Min Level
- DALI Max Level

The Control Gear/Device icons in the main configuration page will show one of the following states:

An enumerated DALI ballast/device not assigned to an Actuator Channel or Device

An un-enumerated DALI ballast/device

A DALI ballast/device assigned to an Actuator Channel or Device

8.9.1 DALI Configuration Toolbar

The following buttons are located on the DALI Configuration Toolbar below the main configuration page.

 Enumerate All

Triggers the enumeration process. Enumeration discovers the DALI addresses for each DALI item in the universe. Clicking the dropdown arrow allows enumeration to be performed for all items, only devices or only control gears (Ballasts).

 Reset Enumeration All

Resets the whole DALI universe. Clears the enumeration data from the controller ballasts/devices in the universe. Clicking the dropdown arrow allows reset enumeration to be performed for all items, only devices or only control gears (Ballasts).

 Read from Device

Reads the enumeration data from the controller.

 Save to Device

saves modified enumeration data to the controller.

 Write Group Data

Creates DALI scenes and groups based on the KNX parameter values and writes the data to the DALI ballasts.

 Query Status All

Queries the status of all ballasts/devices after enumeration.

- Unknown
  the current state of the ballast/device with this short address is unknown to the controller
- Online
  the ballast/device is online and communicating with the controller
- Offline
  the ballast/device is offline and not communicating with the controller

 Sign-On Devices

Enables manual identification of DALI MultiMaster devices such as sensors and dry contacts. Can be used in place of flashing to locate devices (flashing is not available for dry contact devices).
Click this icon then press the service switch on the DALI device. The sign-on icon is displayed next to the corresponding device.

 Finish

Closes the Configuration Wizard Window

8.9.2 Control Gears and Devices Toolbar

Selecting an enumerated ballast/device enables/disables specific buttons on the Control Gears and Devices Toolbar above the main configuration page.

 Flash and  Stop Flash

Flash and Stop Flash are used to find the physical location of lamps and devices in a project by sending messages to alternate levels between 0% and 100%. This information is then used to determine group address links for commissioning.

 Query Status

Queries the status of the selected ballast/device:

- Unknown
  the current state of the ballast/device with this short address is unknown to the controller
- Online
  the ballast/device is online and communicating with the controller
- Offline
  the ballast/device is offline and not communicating with the controller

 Link

Opens the Group Address Assignment Window. This is an alternative method for linking group objects to KNX group addresses.

 Remove

Removes the ballast/device from the controller memory.

 Calibrate

Runs the sensor calibration wizard (Refer to Sensor light control).

 Show Log

Opens a log pane in the lower part of the window. Clicking the dropdown arrow allows Show Log, Start Log, Stop Log, Hide Log, Clear Log actions to be performed.

8.9.3 Enumerate DALI Network

DALI Ballasts/Devices require enumeration before they can be placed into operation. Enumeration is a process where the controller assigns DALI addresses to all the ballasts/devices connected to the DALI network. The DALI controller checks for any "known" ballasts/devices before enumerating and masks them from the enumeration process. Each ballasts/device remembers its own DALI address and the controller remembers the addresses for all ballasts/devices.

If more ballasts/devices appear than are installed, click Reset Enumeration All to clear the enumeration data from the ballasts/devices and then click Enumerate All again.

After enumeration, the Configuration Wizard updates the ballast/device icons and assigns the DALI addresses to the MultiMaster Actuator Channels or MultiMaster Devices. This information is held in the ETS project and in the MultiMaster controller.

Note: A newly installed or replaced ballast may create a short address conflict. A short address conflict is when two or more DALI ballasts have the same short address. In this situation ballast(s) that have the same short address must be re-enumerated to have unique addresses.

8.9.4 Locate ballasts/devices

Flash and Stop Flash are used to find the physical location of ballasts and sensors in a project by sending messages to alternate levels between 0% and 100%. This information is then used to determine actuator channels assignments and group address links for that area.

➤ Locate individual ballasts/devices:

1. Select the ballast/sensor in the configuration window
2. Click Flash and Stop Flash to identify the ballast/sensor
3. Record the currently assigned Actuator Channel number or Device number

Sensor devices have a red LED that can be flashed. However, Dry contact devices do not have a built in LED.

➤ Locate a dry contact device:

1. Click Sign-On Devices
2. Press the service switch on a dry contact device
3. The DALI Configuration Wizard displays the sign-on icon next to the corresponding device.

8.9.5 Assign short addresses to actuator channels and devices

The enumeration process randomly assigns short addresses to Actuator Channels and Devices. This will most likely not be in the order that you have chosen for your floor layout. The DALI addresses can be moved to match the correct Actuator Channel numbers and Device numbers.

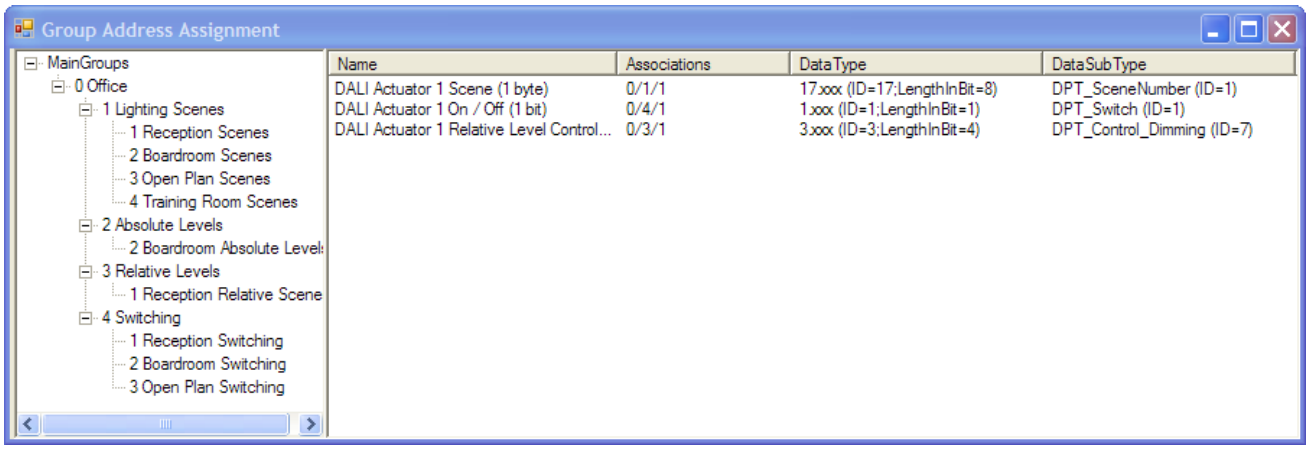
➤ Assign short addresses to Actuator Channel/Device numbers:

1. Click and drag the DALI address that is at the required location to the correct Actuator Channel/Device number
2. The DALI address is moved to the correct Actuator Channel/Device number and shows the swap assignment icon and previous assignment in brackets
3. Repeat moving procedure until all DALI addresses are assigned to the correct Actuator Channel/Device numbers

Tip: click Save to Device to resolve the assignments and refresh the window.

8.9.6 Group Address Assignment Window

The Group Address Assignment Window provides an alternative view for linking group objects to group addresses. This function can also be performed natively in ETS by dragging group objects to the required group addresses.



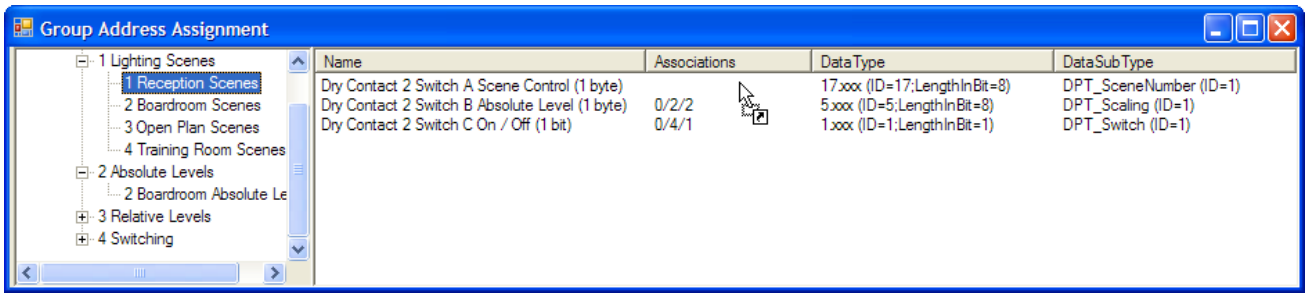
The Group Address Assignment Window displays the following information columns:

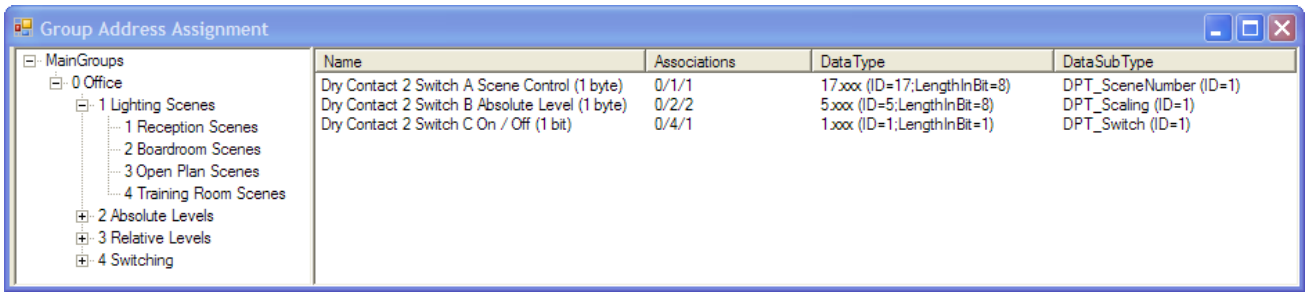
- Name
- Associations
- Data Type
- Data SubType

➤ Link group addresses using the Group Address Assignment Window:

1. Select a ballast/device in the configuration window
2. Click Link to open the Group Address Assignment Window
3. Click and drag a group address to the corresponding group object for the Actuator channel/device
4. The group address is displayed in the Associations column next to the group object
5. Right-click the group object and select Remove Group Address to delete the link, if applicable

Tip: The group address will not link if it is using a different data type to the group object.





8.9.7 Save to Device and Write Group Data

When saving the configuration data for a DALI MultiMaster system the data is saved in three steps.

Download Application writes the KNX configuration to the controller. Saving to device saves the DALI address assignments to the controller. Write group data gives each ballast a DALI group address based on the KNX group addressing. The Controller manages the translation between DALI group addressing and KNX group addressing.

Step 1	Step 2	Step 3
Controller KNX interface	**Controller DALI interface**	**DALI Ballasts**
Download: Downloads the KNX application to MultiMaster controller	**Save to Device:** Assigns DALI addresses to actuator channels and devices	**Write Group Data:** Writes DALI group addresses and DALI scenes to ballasts

Note: To factory reset a DALI MultiMaster controller you need to click Reset Enumeration All in the Plug-in and then right-click the controller and select unload Application.

8.9.8 Maintenance Activities

DALI Network configuration and address assignments are easily maintained using the DALI Configuration Wizard. The Wizard provides a simple step by step method for configuring and addressing DALI ballasts/devices connected to each universe. The DALI Configuration Wizard can be used for the following maintenance tasks:

- Adding Ballasts/Devices
- Removing Ballasts/Devices
- Replacing Ballasts/Devices
- Swapping Ballasts/Devices

Add Ballasts/Devices

1. To add new DALI Ballasts/Devices first enumerate the universe by clicking the Enumerate button.
2. When enumeration is complete any new ballasts/devices found will appear in the list with the or image next to them.
3. New ballasts/devices can be identified by selecting them and clicking the Flash button. They can then be swapped to a different Actuator channel by clicking and dragging them onto the other channel.
4. To link a group address to a new ballast/device, click the Link button.

Swap Ballasts/Devices

1. DALI addresses can be swapped to a different Ballast/Device by dragging them onto another Ballast/Device.
2. When finished click the Save to Device button.

Remove Ballasts/Devices

1. To determine the online status of all DALI Ballasts click the Query Status All button.
2. To remove a DALI Ballast, select it and click the Remove button. An image will be shown next to the DALI physical channel to indicate it has been marked for removal.
3. When finished click the Save to Device button to remove all ballasts marked for removal from the DALI controller.

Replace Ballasts/Devices

1. To determine the online status of all DALI Ballasts/Devices click the Query Status All button.
2. Select the offline DALI ballasts to be replaced and click the Remove button. An image will be shown next to the DALI Ballast Channel to indicate it has been marked for removal.
3. Click the Save to Device button to remove the marked for removal ballasts from the DALI controller.
4. Add the new replacement ballasts by clicking the Enumerate button.
5. When the enumeration is complete any new Ballasts/Devices found will appear in the list with the or image next to them.
6. The new ballasts can be identified by selecting the Ballasts/Device and clicking the Flash button for Ballasts/Sensors or the sign-on button for Dry Contacts. These can then be swapped to a different short address by dragging them onto another Actuator Channel/Device.
7. When finished click the Save to Device button.

8.10 Description of MultiMaster group objects

In this section we list the group objects. You will be able to see these objects if you have enabled the function. Depending on the function selected, the relevant group objects will be displayed for each of the Actuator Channels/Device. The group objects can be subsequently used for the assignment of group addresses.

8.10.1 DALI Actuator X Objects

Number	Name	Object Function	Description	...	Length	C	R	W	T	U	Data Type	Priority
0	DALI Actuator 1 Scene				1 Byte	C	R	W	-	-	scene number	Low
1	DALI Actuator 1 Absolute Level Control				1 Byte	C	R	W	-	-	percentage (0..100%)	Low
2	DALI Actuator 1 Relative Level Control				4 bit	C	-	W	-	-	dimming control	Low
3	DALI Actuator 2 On / Off				1 bit	C	R	W	-	-	on/off	Low

8.10.2 Sensor X Objects

Number	Name	Object Function	Description	...	Length	C	R	W	T	U	Data Type	Priority
192	Sensor 1 Scene				1 Byte	C	R	W	T	-	scene number	Low
193	Sensor 1 Absoulte Level				1 Byte	C	R	W	T	U	percentage (0..100%)	Low
194	Sensor 1 Timer Start / Stop				1 bit	C	R	-	T	-	start/stop	Low
195	Sensor 1 On / Off				1 bit	C	R	-	T	-	on/off	Low

8.10.3 Dry Contact X Objects

Number	Name	Object Function	Description	...	Length	C	R	W	T	U	Data Type	Priority
196	Dry Contact 2 Switch A Scene Control				1 Byte	C	R	W	T	-	scene number	Low
197	Dry Contact 2 Switch B Absolute Level				1 Byte	C	R	W	T	-	percentage (0..100%)	Low
198	Dry Contact 2 Switch C On / Off				1 bit	C	R	W	T	-	on/off	Low

8.10.4 DALI Actuator Failure Objects

Number	Name	Object Function	Description	...	Length	C	R	W	T	U	Data Type	Priority
232	DALI Actuator Lamp Failure				1 bit	C	R	-	T	-	alarm	Low
233	DALI Actuator Ballast Failure				1 bit	C	R	-	T	-	alarm	Low

8.10.5 Sector Y/Z Emergency Test Objects

Number	Name	Object Function	Description	...	Length	C	R	W	T	U	Data Type	Priority
234	Sector Y Emergency Functional Test Start				1 bit	C	R	W	T	-	start/stop	Low
235	Sector Z Emergency Functional Test Start				1 bit	C	R	W	T	-	start/stop	Low
236	Sector Y Emergency Duration Test Start				1 bit	C	R	W	T	-	start/stop	Low
237	Sector Z Emergency Duration Test Start				1 bit	C	R	W	T	-	start/stop	Low

8.10.6 Emergency Fixture X Status Objects

Number	Name	Object Function	Description	...	Length	C	R	W	T	U	Data Type	Priority
238	Emerency Fixture 1 Status				1 bit	C	R	-	-	-	alarm	Low
239	Emerency Fixture 2 Status				1 bit	C	R	-	-	-	alarm	Low
240	Emerency Fixture 3 Status				1 bit	C	R	-	-	-	alarm	Low
241	Emerency Fixture 4 Status				1 bit	C	R	-	-	-	alarm	Low
242	Emerency Fixture 5 Status				1 bit	C	R	-	-	-	alarm	Low
243	Emerency Fixture 6 Status				1 bit	C	R	-	-	-	alarm	Low
244	Emerency Fixture 7 Status				1 bit	C	R	-	-	-	alarm	Low
245	Emerency Fixture 8 Status				1 bit	C	R	-	-	-	alarm	Low
246	Emerency Fixture 9 Status				1 bit	C	R	-	-	-	alarm	Low
247	Emerency Fixture 10 Status				1 bit	C	R	-	-	-	alarm	Low

8.10.7 Preset Table Start Index

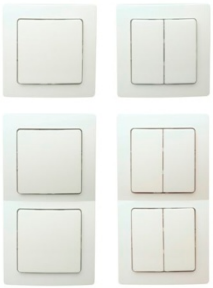
Number	Name	Object Function	Description	...	Length	C	R	W	T	U	Data Type	Priority
248	Preset Table Start Index				1 Byte	C	R	W	-	-	scene number	Low

9 LightMaster Switch Range

- P1PE-KNX-2P LightMaster Button Page, Euro style 2 position.
- P1PE-KNX-2P-2G LightMaster Button Page, Euro style 2 position, double gang.
- P1PE-KNX-4P LightMaster Button Page, Euro style 4 position.
- P1PE-KNX-4P-2G LightMaster Button Page, Euro style 4 position, double gang.

9.1 Description

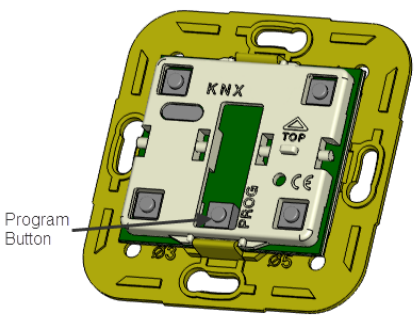
The LightMaster Switch Range button page consists of one or two modules, each offering up to four push button switches.

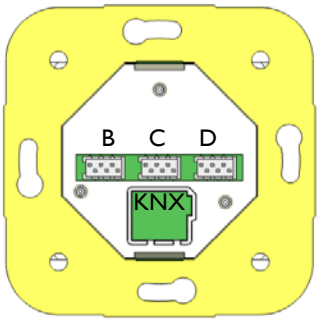


Each module has one or two rockers that can be configured as a single rocker to provide two-button functionality or as a double rocker to provide four-button functionality.

The rear of the button panel contains a KNX bus coupling unit for connection to the KNX bus and connections for three extension modules.

Note: Only one satellite module is pre-connected (to the group C input) for the double gang product variants. The satellite module uses a prefabricated ribbon cable to connect to the rear multi-pin connectors and has no connection to the KNX bus.

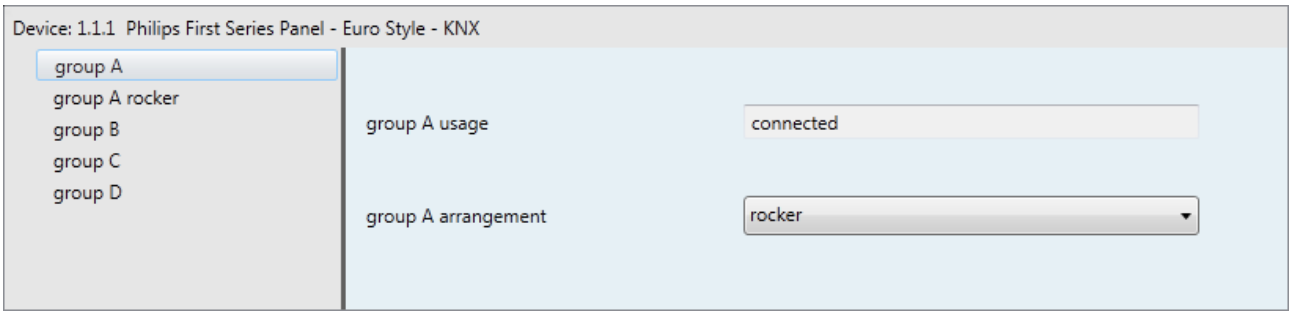




9.2 Configuration

The ETS application is used to configure all combinations of KNX rockers/buttons.

When the application is first opened, the following parameter window is displayed.



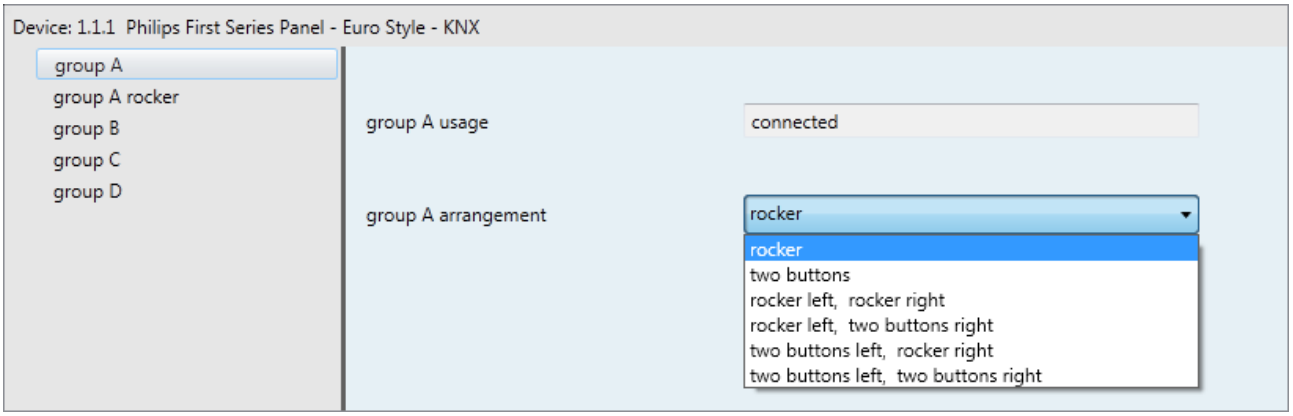
For a single module, only the group A rockers/buttons, are programmable with ETS. For a double module, the main module is always group A, and the extension (satellite) module is group C. Groups B and D are not used.

Each group may be configured with one or two rockers physically. Logically this is described as "rocker" or "rocker left" and "rocker right".

In addition to the logical rocker functionality it is possible to consider a physical rocker as "two buttons", an upper button and a lower button. With two physical rockers (double rockers) this leads to "two buttons left" and "two buttons right".

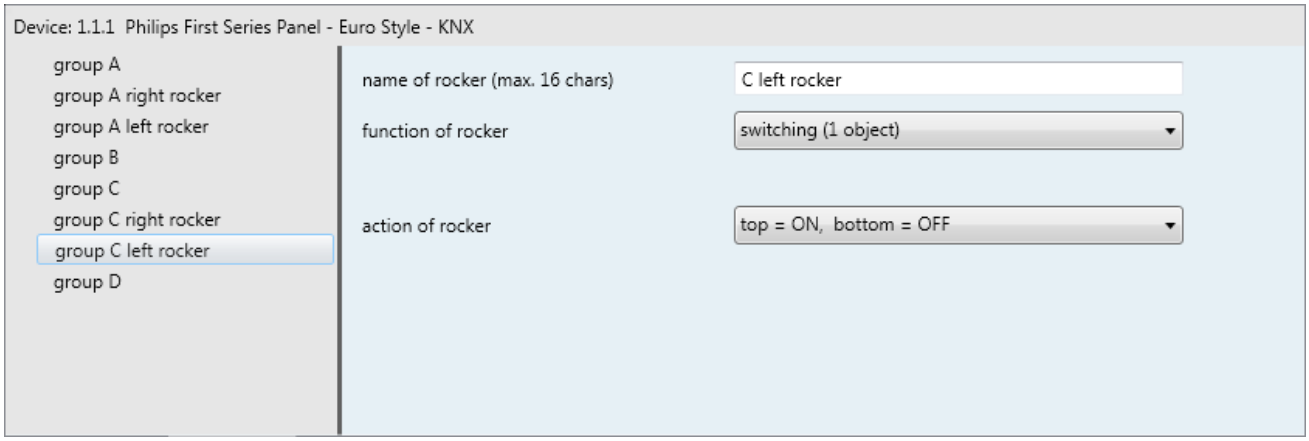
Logical rocker functions allow the configuration of two physical buttons together.

Logical button functions allow the configuration of two physical buttons separately



9.2.1 Rocker Functions

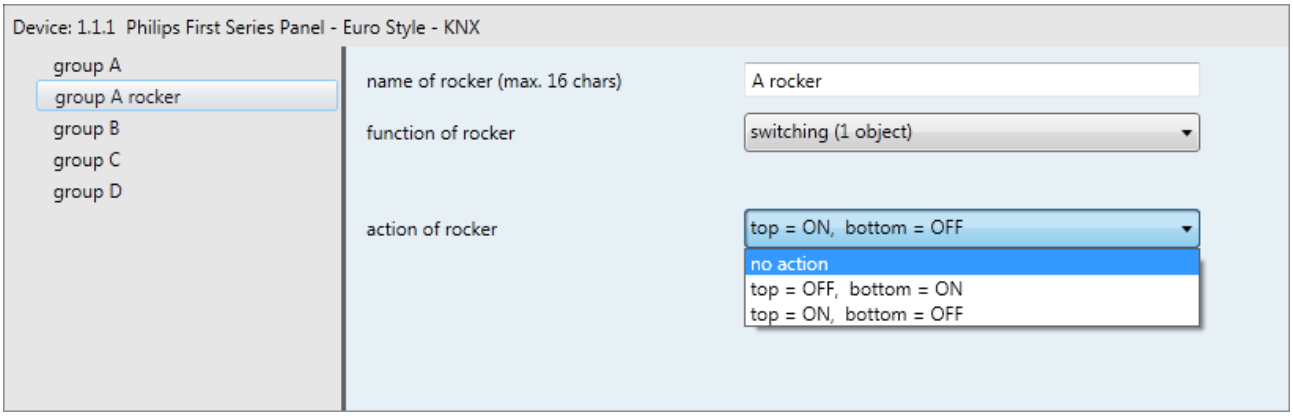
Rocker functions always combine the configuration of two physical push buttons. They are used for faster configuration.



9.2.2 Rocker Function switching (1 object)

This logical function configures two physical push buttons (top and bottom button) to set one KNX group object to OFF (0) or ON (1).

Parameters allow you to configure which physical push button is for switching ON and which is for switching OFF.



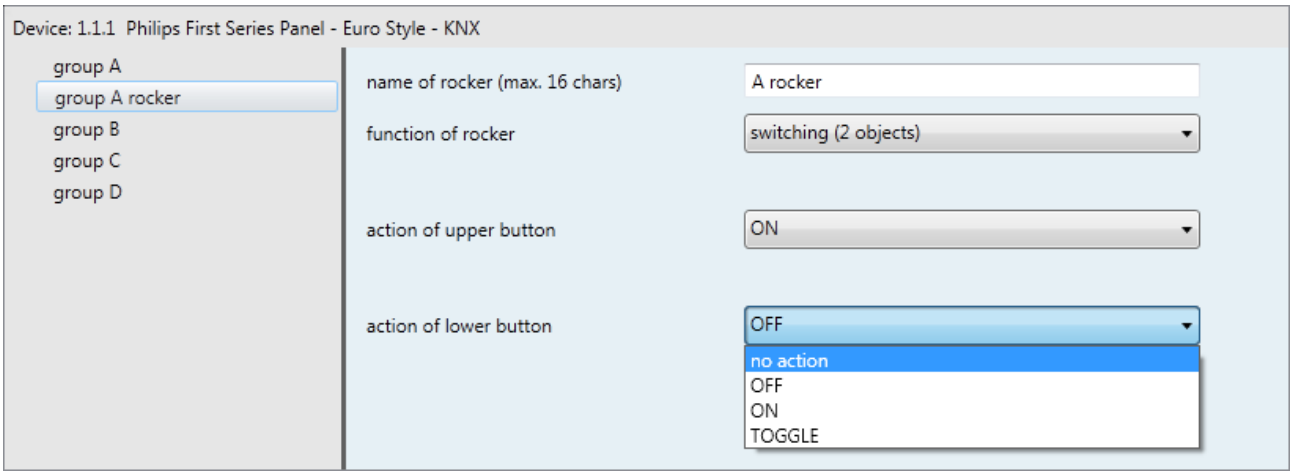
For this function only one KNX group object is provided

9.2.3 Rocker Function switching (2 objects)

This logical function configures two physical push buttons (top and bottom button) to set two KNX group objects to OFF (0) or ON (1) independently.

The upper push button controls the first KNX group object; the lower push button controls the second KNX group object.

Parameters allow you to configure each physical push button separately. ON, OFF or TOGGLE (ON followed by OFF followed by ON and so forth) may be selected.



For this function two KNX group objects are provided.

The first object is controlled by the upper button, the second object by the lower button.

9.2.4 Rocker Function Dimming

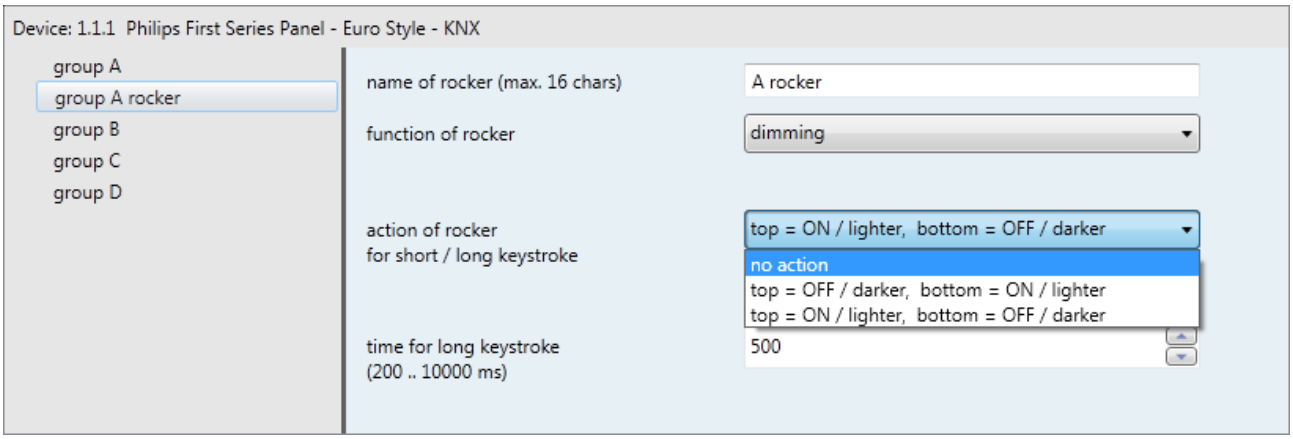
This logical function configures two physical push buttons (top and bottom button) to set two KNX group objects depending on the length of the keystroke.

A short keystroke affects the first object to switch ON (1) or OFF (0).

A long keystroke affects the second object to perform dimming up or dimming down of a light source. When the key is pressed and held, a START DIMMING (up or down) telegram is sent. By releasing the key a STOP DIMMING telegram is sent.

Parameters allow you to configure which physical push button is for switching ON / DIMMING UP and which is for switching OFF / DIMMING DOWN.

The time for a long keystroke may also be configured.



For this function three KNX group objects are provided.

The first object is the ON/OFF rocker switching object and is controlled by a short keystroke of the corresponding button.

The second object is the START/STOP rocker dimming object and is controlled by a long keystroke of the corresponding button.

The third object is a VALUE object and is only controlled via remote web interface (not currently available) to set a certain dimming level.

0	A rocker switching group A object 1	1 bit	C	-	-	T	-		Low
1	A rocker dimming group A object 2	4 bit	C	-	-	T	-		Low
2	A rocker value (FW group A object 3	1 Byte	C	-	-	T	-		Low

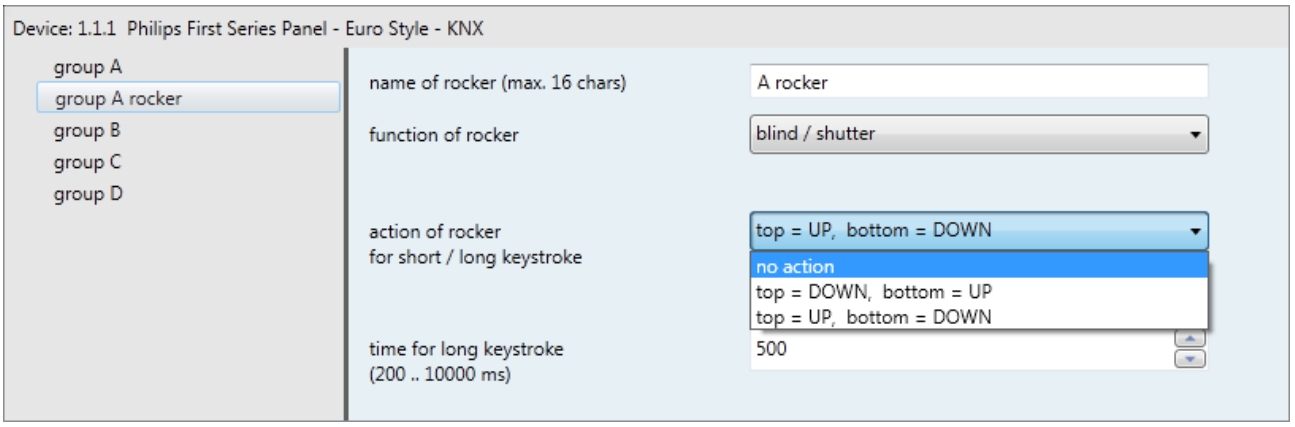
9.2.5 Rocker Function Blind/Shutter

This logical function configures two physical push buttons (top and bottom button) to set two KNX group objects depending on the length of the keystroke.

A long keystroke affects the first object to perform moving up or moving down a blind or shutter. For moving DOWN a 1 telegram is sent, for moving UP, a 0 telegram is sent.

A short keystroke affects the second object to move a louver UP or DOWN. Parameters allow you to configure which physical push button is for moving UP and which is for moving DOWN

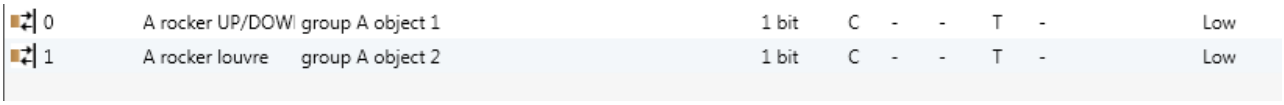
The time for a long keystroke may also be configured



For this function two KNX group objects are provided.

The first object is the MOVE rocker UP/DOWN object and is controlled by a long keystroke of the corresponding button.

The second object is the STEP rocker louvre object to move the louver and is controlled by a short keystroke of the corresponding button

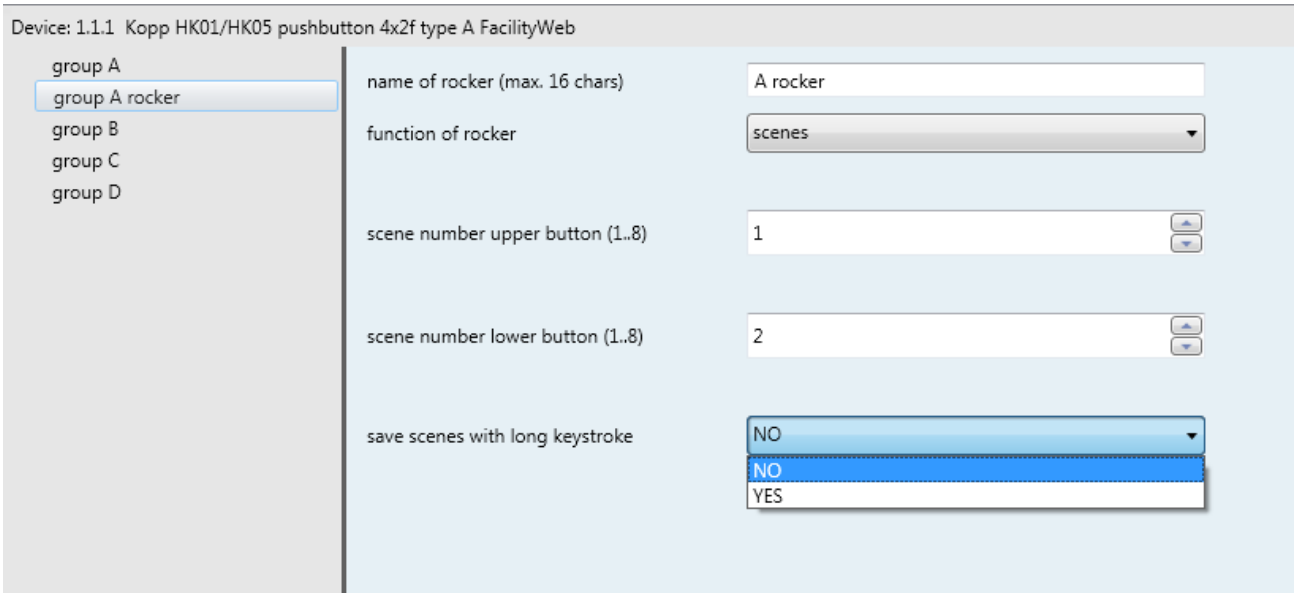


9.2.6 Rocker Function Scene

This logical function configures two physical push buttons (top and bottom button) to set one KNX group object to a predefined scene number.

One scene number has to be configured for each button. Usually scene numbers in the range of 1 to 8 are used. But it is also possible to specify scene numbers up to 128.

Parameters allow you to configure whether the scene may be CALLED only or, with a short and long keystroke CALLED and STORED in the device which receives the scene telegram



For this function one KNX group object is provided.

The object is set to the scene number selected by the corresponding button.

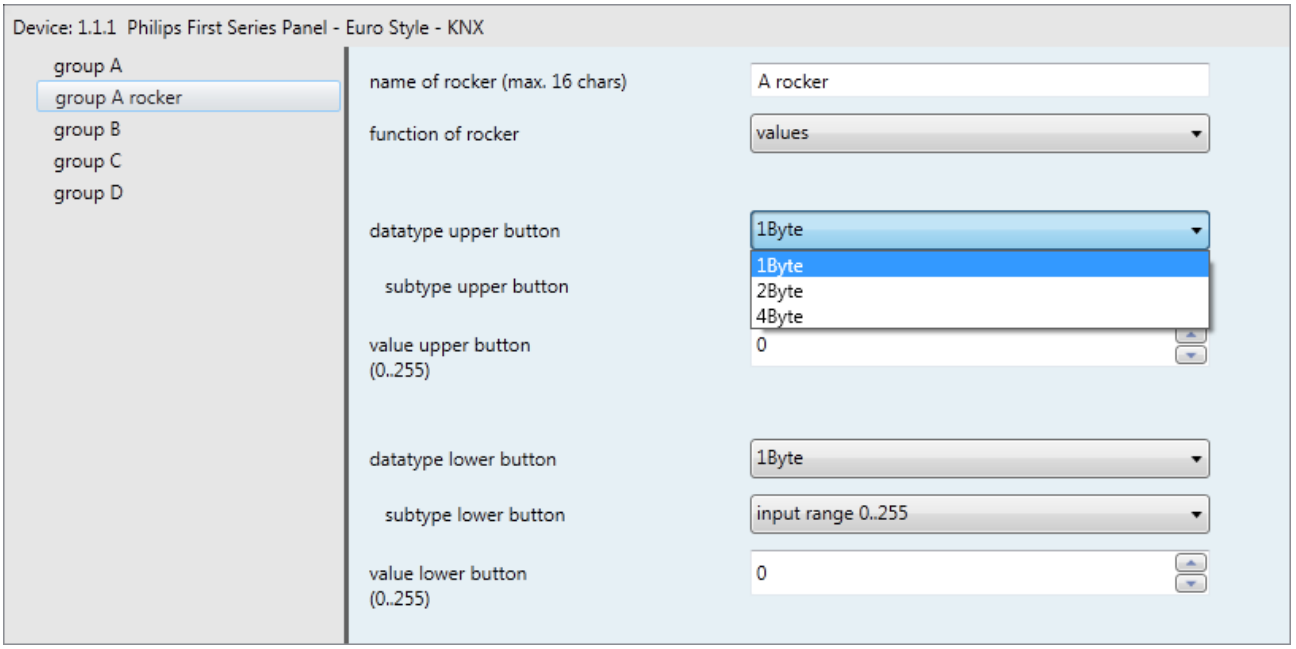
0	A rocker scene	group A object 1	1 Byte	C	-	-	T	-			Low

9.2.7 Rocker Function Value

This logical function configures two physical push buttons (top and bottom button) to set two KNX group objects to a predefined value.

The upper button affects the first object, the lower button affects the second object.

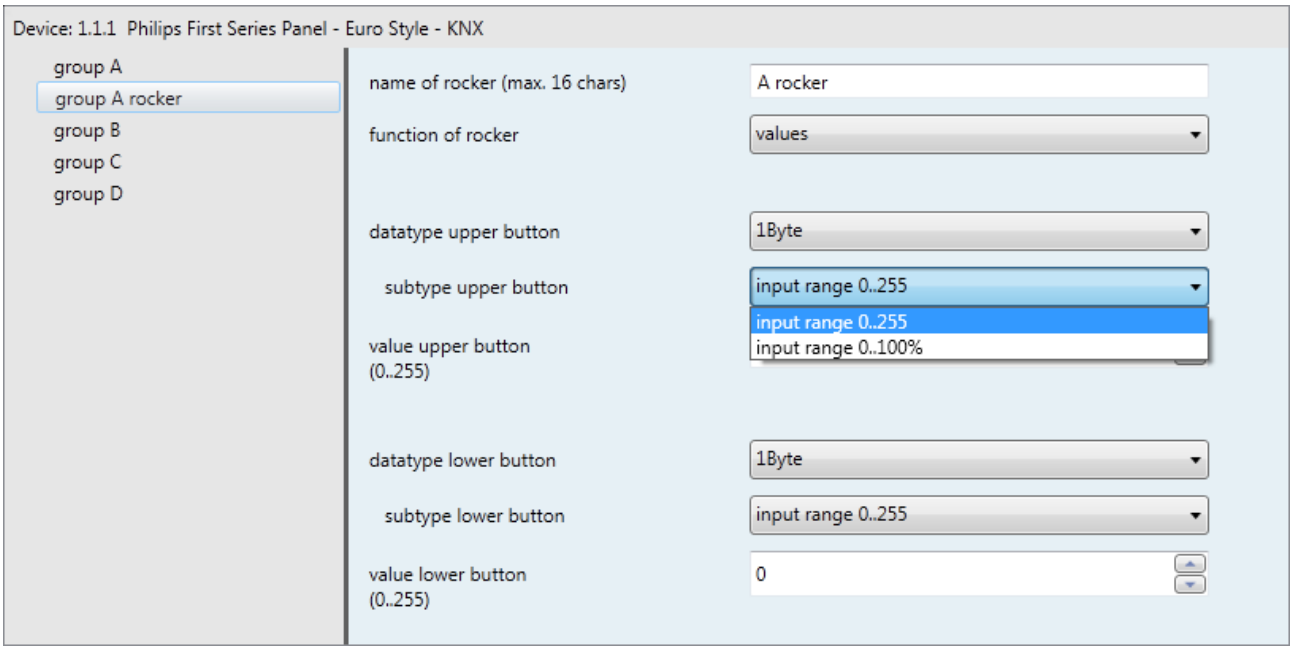
The Datapoint type for the KNX value objects is configurable. It may be 1Byte, 2Byte or 4Byte.



If 1Byte is selected, two subtypes are available for specifying the value.

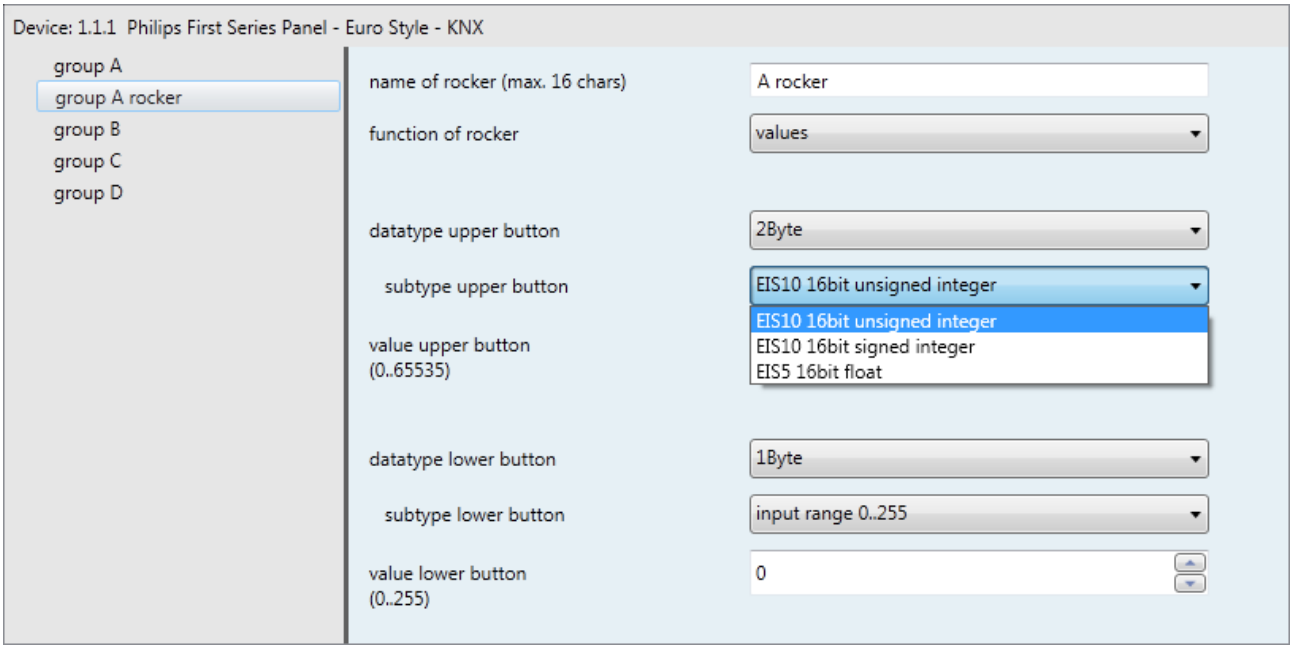
- A selected "input range of 0..255" allows the value to be specified in the range 0 to 255. The value is transferred directly to the KNX group object.
- A selected "input range of 0..100%" allows the value to be specified in the range of 0 to 100. This value is converted to a value in the range of 0..255 whereby 0 remains 0 and 100% corresponds to 255.

Tip: the preferred datatype for LightMaster actuators is 1Byte using 0..255 or 0..100% values.



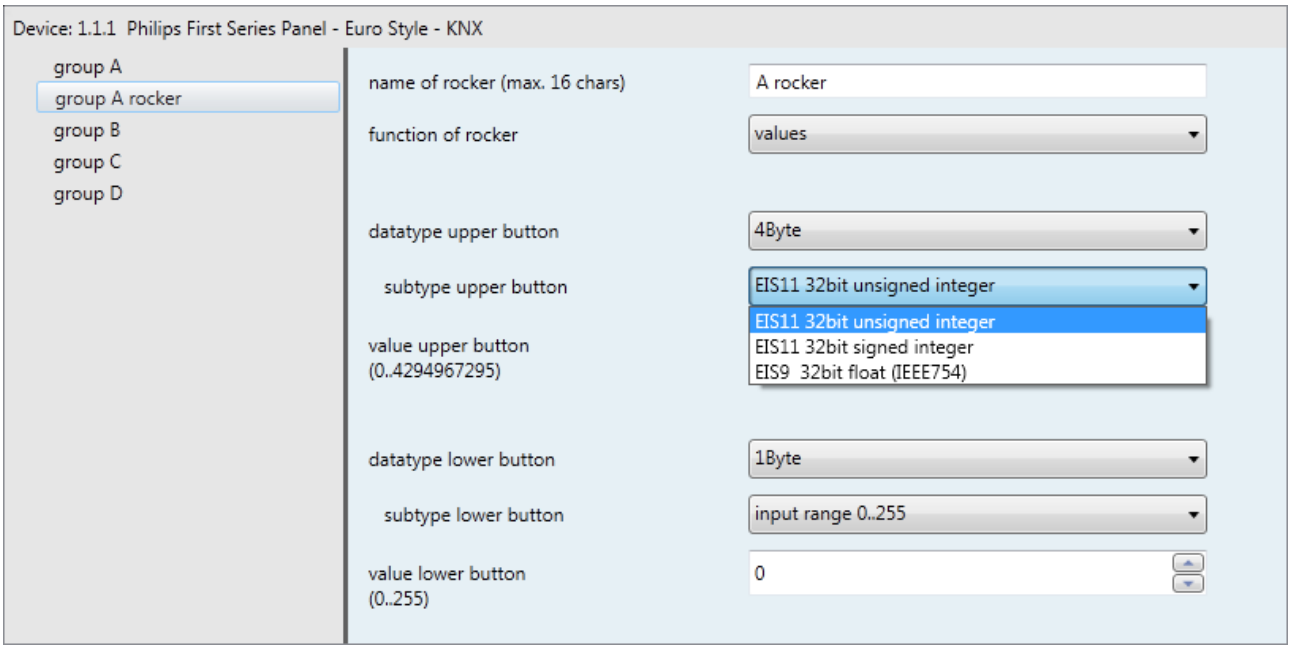
If 2Byte is selected, three subtypes are available for specifying the value.

- A selected subtype of "16bit unsigned integer" offers an input range of 0..65535
- A selected subtype of "16bit signed integer" offers an input range of -32768..32767
- A selected subtype of "16bit float" offers an input range of -671088..670760

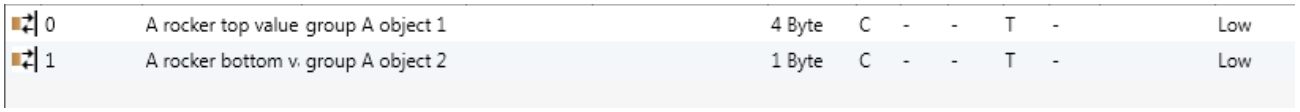


If 4Byte is selected, three subtypes are available for specifying the value.

- A selected subtype of "32bit unsigned integer" offers an input range of 0..4294967295
- A selected subtype of "32bit signed integer" offers an input range of -2147483648..2147483647
- A selected subtype of "32bit float" offers an input range of -99999999..9999999



For this function two KNX group objects are provided. The first object is set to the predefined value for the upper button. The second object is set to the predefined value for the lower button



9.2.8 Push Button Functions

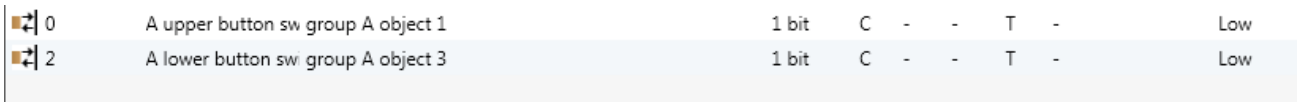
With button functions, the upper and the lower button are always configured separately. Any combination of button functions are possible i.e. the upper button may be used for switching and the lower button may be used to call a scene.

9.2.9 Push Button Function Switching Standard

This logical function configures one single physical push button to set one KNX group object to OFF (0) or ON (1)

Parameters allow you to configure the physical push button to set the object to ON, OFF or TOGGLE (ON followed by OFF followed by ON and so forth).

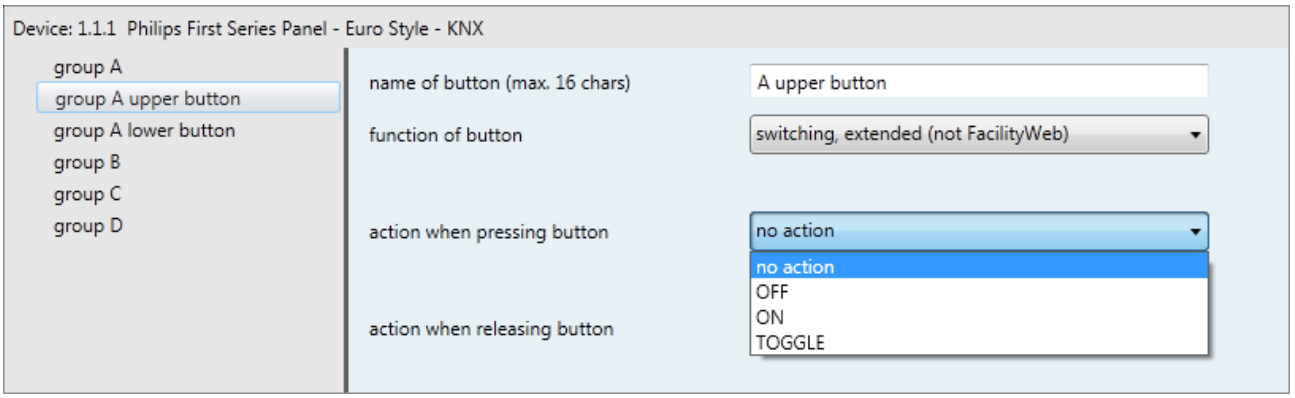
For this function one KNX group object per button is provided



9.2.10 Push Button Function Switching Extended

This logical function configures one single physical push button to set one KNX group object to OFF (0) or ON (1) when the button is pressed and also when the button is released. A first telegram is created when the button is pressed and a second telegram is created, when the button is released.

Parameters allow to configure the physical push button to set the object to ON, OFF or TOGGLE (ON followed by OFF followed by ON and so forth) for pressing and releasing.



For this function one KNX group object per button is provided.

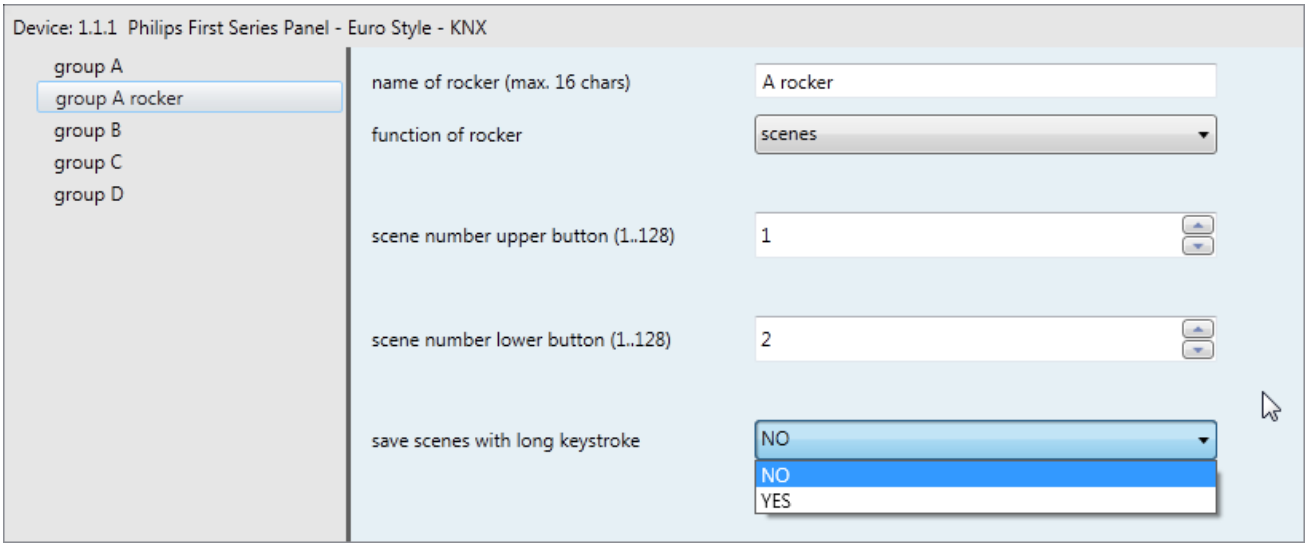
0	A upper button sw	group A object 1	1 bit	C	-	-	T	-	Low
2	A lower button sw	group A object 3	1 bit	C	-	-	T	-	Low

9.2.11 Push Button Function Scene

This logical function configures one single physical push button to set one KNX group object to a predefined scene number.

One scene number has to be configured for the button. Usually scene numbers in the range of 1 to 8 are used. But it is also possible to specify scene numbers up to 128.

Parameters allow you to configure whether the scene may be CALLED only or, with a short and long keystroke CALLED and STORED in the device, which receives the scene telegram.



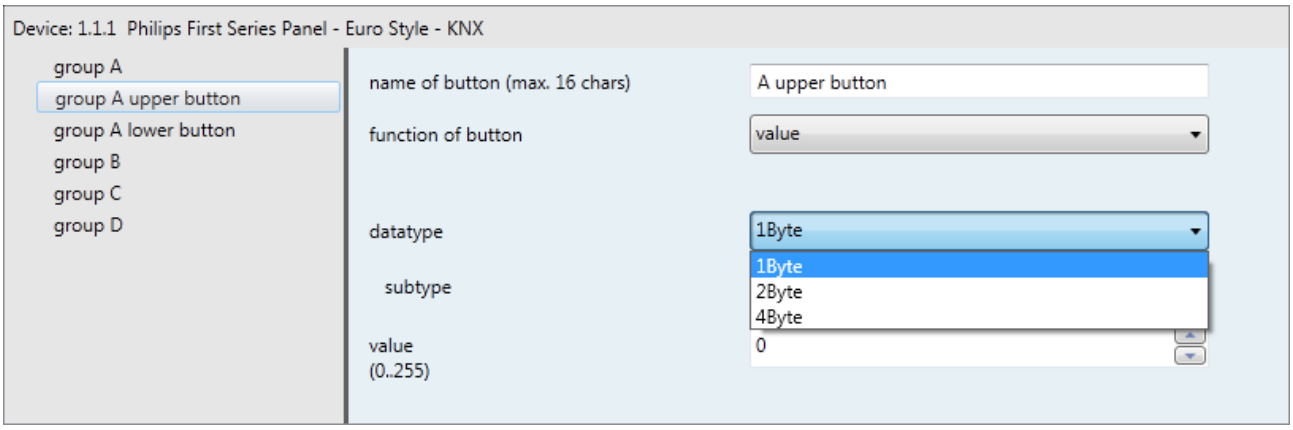
For this function one KNX group object is provided. The object is set to the scene number configured for the button.

0	A upper button sc	group A object 1	1 Byte	C	-	-	T	-	Low
2	A lower button sw	group A object 3	1 bit	C	-	-	T	-	Low

9.2.12 Push Button Function Value

This logical function configures one single physical push button to set one KNX group object to a predefined value.

The Datapoint type for the KNX value object is configurable. It may be 1Byte, 2Byte or 4Byte.

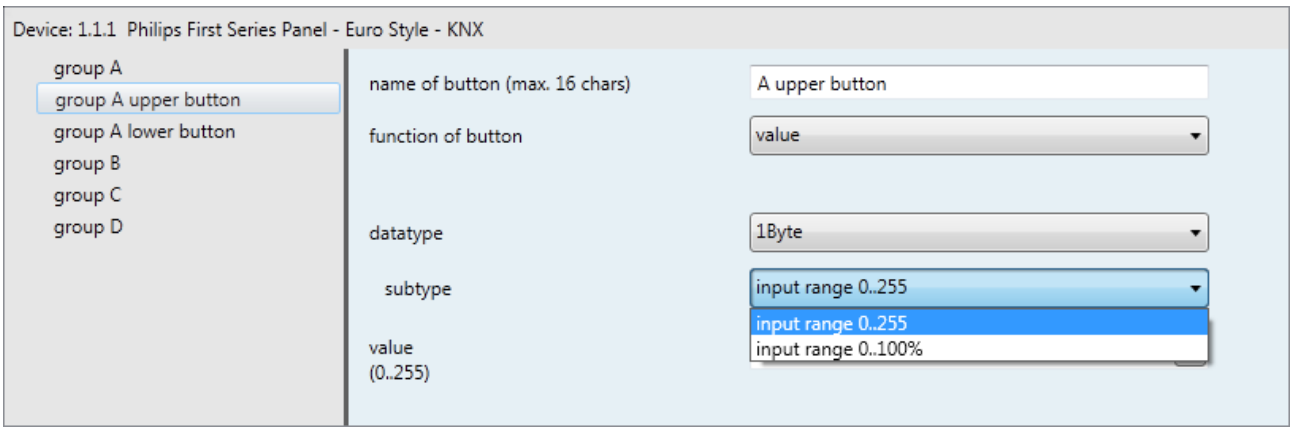


If 1Byte is selected, two subtypes are available for specifying the value.

A selected "input range of 0..255" allows the value to be specified in the range 0 to 255. The value is transferred directly to the KNX group object.

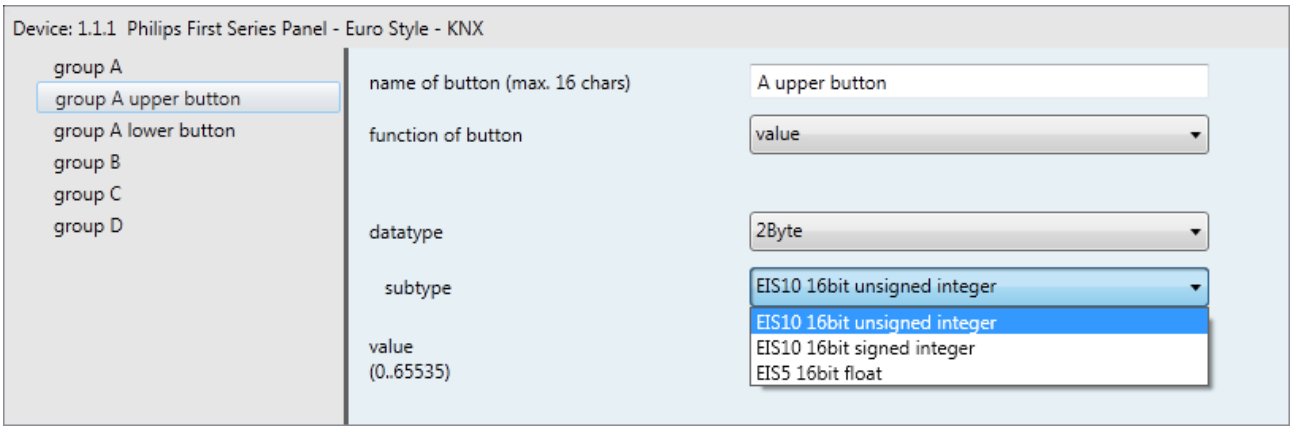
A selected "input range of 0..100%" allows the value to be specified in the range of 0 to 100. This value is converted to a value in the range of 0..255 whereby 0 remains 0 and 100% corresponds to 255.

Tip: the preferred datatype for LightMaster actuators is 1Byte using 0..255 or 0..100% values.



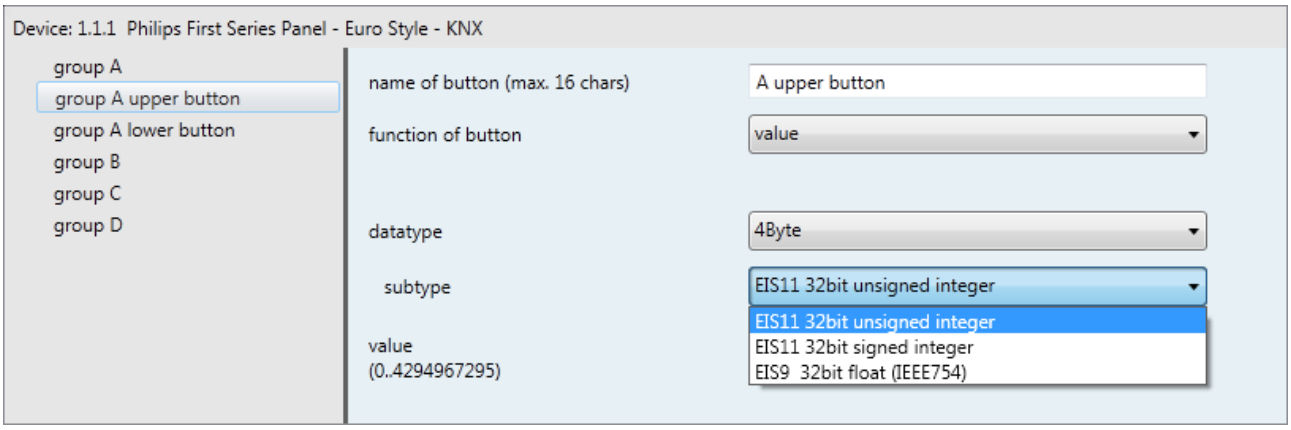
If 2Byte is selected, three subtypes are available for specifying the value:

- A selected subtype of "16bit unsigned integer" offers an input range of 0..65535
- A selected subtype of "16bit signed integer" offers an input range of -32768..32767
- A selected subtype of "16bit float" offers an input range of -671088..670760



If 4Byte is selected, three subtypes are available for specifying the value:

- A selected subtype of "32bit unsigned integer" offers an input range of 0..4294967295
- A selected subtype of "32bit signed integer" offers an input range of -2147483648..2147483647
- A selected subtype of "32bit float" offers an input range of -99999999..99999999



For this function one KNX group object per button is provided. The object is set to the predefined value.

10 LightMaster Multifunction KNX Sensor

- PLOS-CM-KNX

10.1 Description

The Philips LightMaster KNX multifunction sensor combines motion detection (PIR) and ambient light level detection (PE) in the one device. In applications such as homes, lecture theatres and office towers, universal sensors can be utilized to detect motion and switch on the lights.

This chapter covers the set up and configuration of the universal sensor in ETS.

The multifunction sensor is an integrated energy management sensor and group controller. Sensor functions include:

- Occupancy detection.
- Light Level regulation.

When rooms are unoccupied, lights can be automatically dimmed or switched off to provide energy savings.

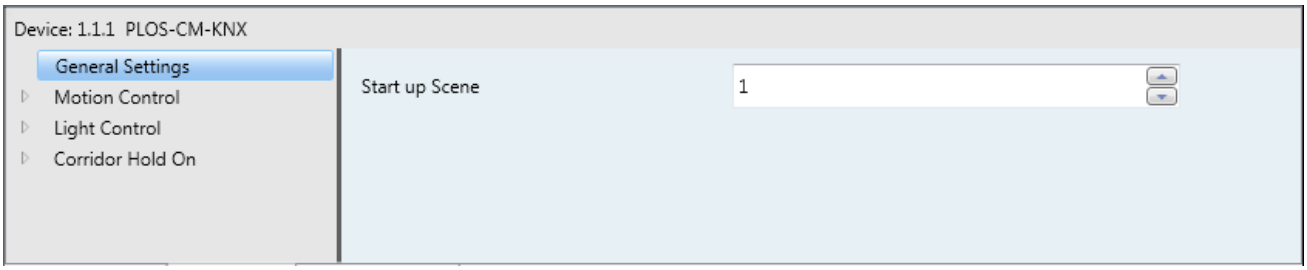
In situations where it is critical to maintain precise lighting levels for individual workspaces, such as a flight control tower or office workstation, the multifunction sensor facilitates light compensation. The multifunction sensor can be placed in an automatic "Daylight Harvesting" mode for energy savings.

Key point: The multifunction sensor is a scene centric device, in that it will respond in accordance with the control behavior defined for each scene. If the sensor receives a scene message for a group with which it is associated it will start the behavior defined for that scene.

10.2 Configuration

10.2.1 General Settings

ETS is used to configure multifunction sensor. When the device is loaded in ETS the following parameter window will be displayed.



10.2.1.1 Startup Scene

The Start-up Scene is the scene that the sensor will start in when powered up, which occurs when network power is restored after a temporary network shutdown or momentary power outage. This is typically set as the occupied scene. When the group that the sensor controls, starts in the occupied scene, it will effectively turn off the lights after the no motion timeout period if the group is unoccupied.

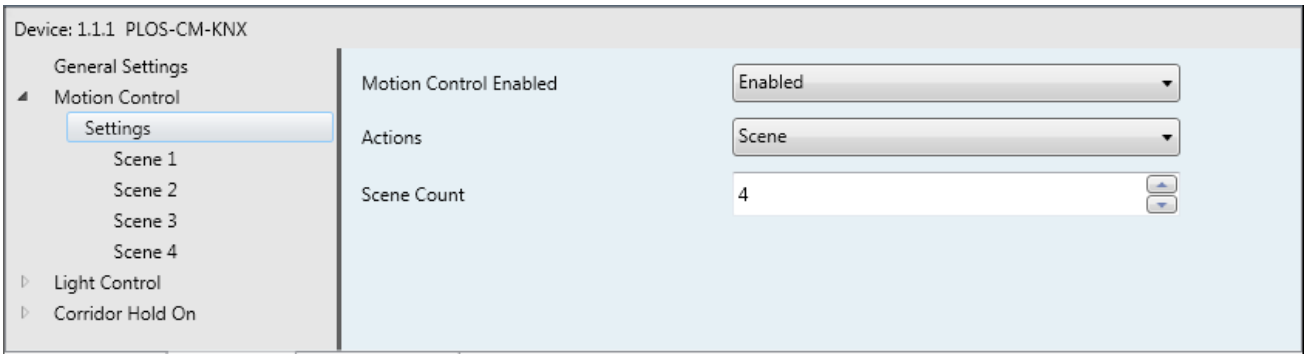
10.3 Occupancy detection

The objective of occupancy detection is to automatically illuminate a space when it is occupied, and reduce or extinguish lighting when it is vacant to save energy. Any number of light fixtures may be controlled for occupancy detection from a single sensor.

10.3.1 Motion Control Settings

The Motion Control, Settings group in the left column of the parameters page, displays the parameters illustrated below. These parameters are used to enable/disable the actions that the sensor will execute for motion control.

The Scene option is selected to implement the motion control routine described in the Scene X occupancy control example. The Scene Count parameter defines the range of actual Scenes over which the sensor will operate motion control. In the example, scenes 1, 2, and 4 are used. The scene count must be set to the highest scene number used, in this case 4.



10.3.1.1 Motion Control Enabled

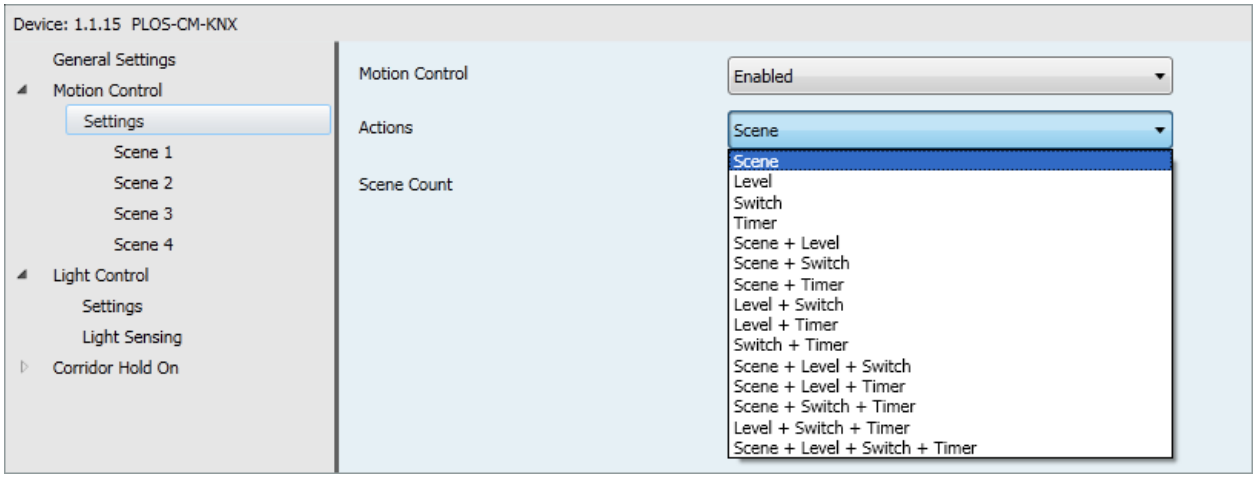
To invoke motion control, select Enabled from the drop down list of the Motion Control Enabled parameter.

Options: Enabled

Disabled

10.3.1.2 Actions

Motion control actions; Scene, Level, Switch and Timer are selected from the Actions parameter drop down list. Combinations of these can be deployed by selecting the corresponding option from the drop down list.

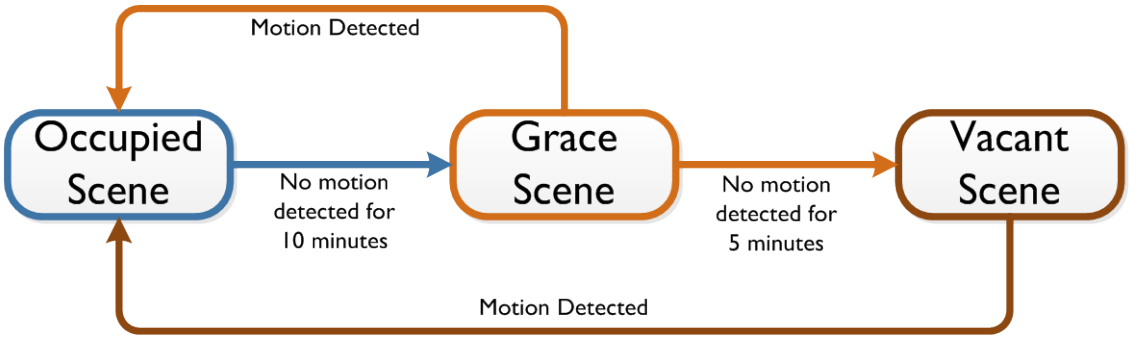


10.3.1.3 Scene Count

This parameter sets the number available scenes that can be recalled.

10.3.2 Scene X motion control

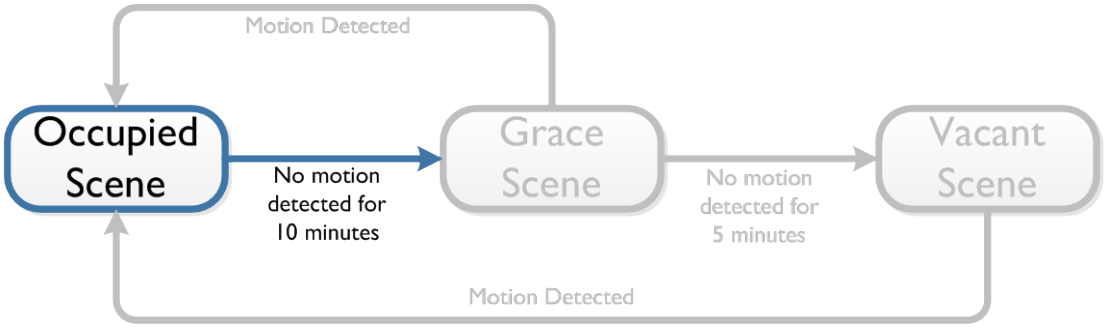
Within the multifunction sensor a set of Scenes are defined, as the Occupancy Monitoring Scenes. Typically three Scenes are defined as shown in the Motion sensor configuration flow chart below.



In this example, they are named 'Occupied', 'Grace' and 'Vacant'. No other scenes are configured.

- For the 'Occupied' Scene (Scene 1) the space is illuminated to provide occupants with suitable lighting levels. The multifunction sensor is configured to change to the 'Grace' Scene after 10 minutes of no motion activity.
- In the 'Grace' Scene (Scene 2) the space is dimmed to warn any occupants that the lights are about to be automatically turned off. The multifunction sensor is configured to return to the 'Occupied' Scene if motion is detected. If a period of 5 minutes of no motion activity passes the multifunction sensor will progress to the 'Vacant' scene.
- For the 'Vacant' scene (Scene 4) the lights are turned off to save energy. The multifunction sensor is configured to select the 'Occupied' Preset when motion is detected.

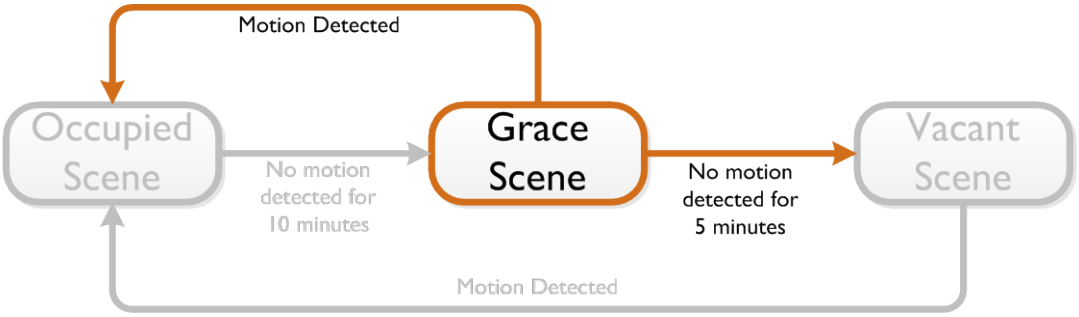
10.3.2.1 Occupied Scene action



'Occupied' Scene (Scene 1) actions should include a 'No-Motion Action' to go to the 'Grace' Scene (Scene 2). The 'Motion Action' should be set to 'No Action'.

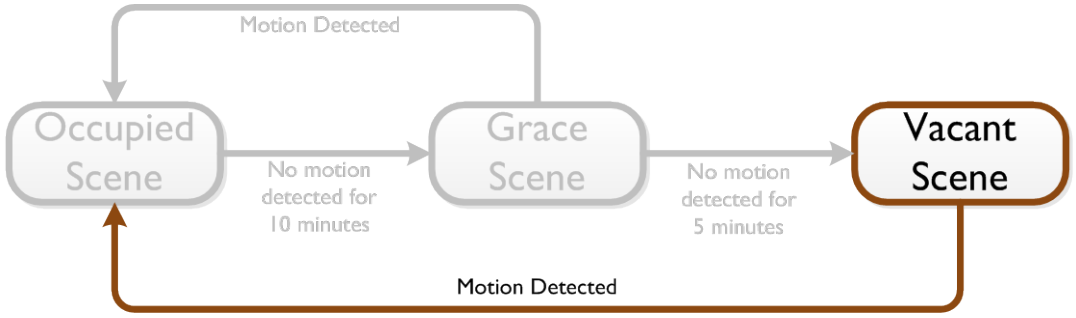
The timeout should be set to 600 seconds (10 minutes).

10.3.2.2 Grace Scene action



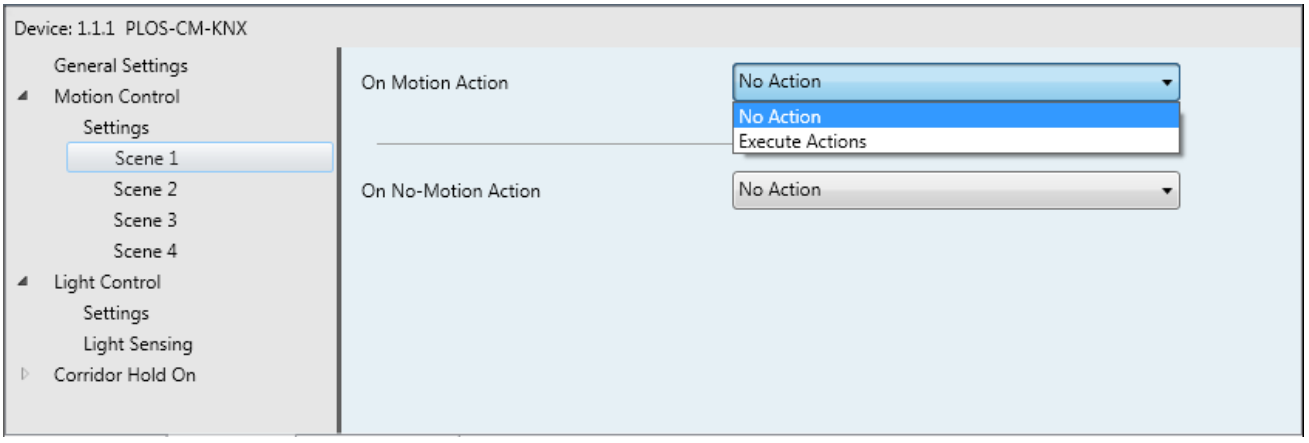
The 'Grace 'Scene (Scene 2) actions should be to revert to the 'Occupied' Scene (Scene 1) when motion is detected, or fall back to the 'Vacant' Scene (Scene 4) when there is no motion detected for the Timeout period.

10.3.2.3 Vacant Scene action



The 'Vacant' Scene (Scene 4) actions should recall the 'Occupied' Scene (Scene 1) when motion is detected. No Action should be configured for the 'No-Motion Action'.

The motion control behavior for each scene can be set by selecting the respective scene in the left hand column of the parameter page. The page below appears when Scene 1 is selected. Control is invoked for either occupancy state by setting the On Motion Action and On No-Motion Action parameters to execute actions from the drop down list, as shown below.



The following group objects are provided when this function is selected.

0	Motion Sensor Scene	1 Byte	C	R	W	T	-	scene number	Low
3	Motion Sensor Enable/Disable	1 bit	C	R	W	-	-	enable	Low
6	Light Sensor Light Level	2 Byte	C	R	-	T	-	lux (Lux)	Low

10.3.2.4 On Motion

The On Motion Action permits an action Scene, Level, Switch and/or Timer action to be recalled as enabled in the Motion Control Settings page.

Options: No Action

Execute Actions

10.3.2.5 Recall Scene

This parameter sets the scene number recalled by this action.

10.3.2.6 On No-Motion

The On No-Motion Action permits an action Scene, Level, Switch and/or Timer action to be recalled as enabled in the Motion Control Settings page.

For scene based control, the On No-Motion Action permits a Recall Scene and Timeout period to be entered. As Scene 1 is the Occupied Scene in the example, the On No-Motion Action must be set to Recall Scene 2 which is the Grace Scene. The Timeout of 600 seconds is also be set achieve the required delay of 10 minutes.

Options: No Action

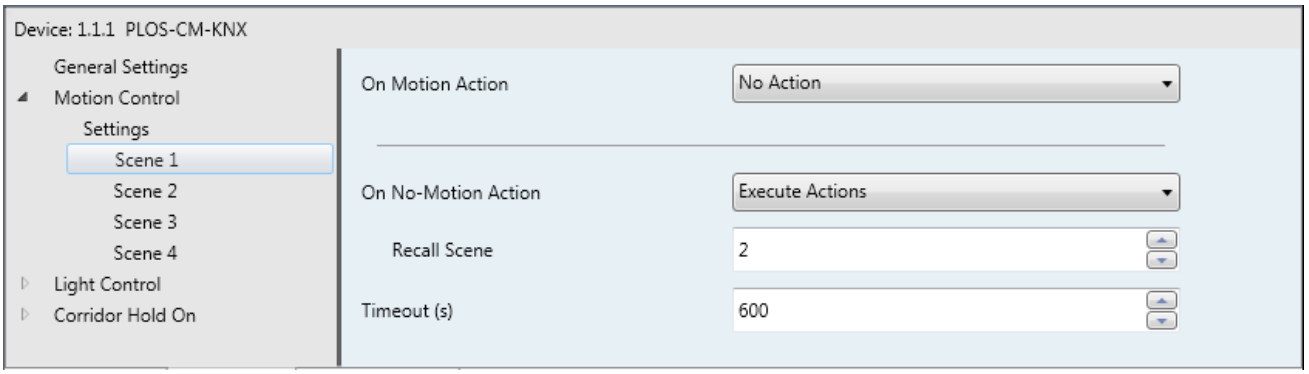
Execute Actions

10.3.2.7 Recall Scene

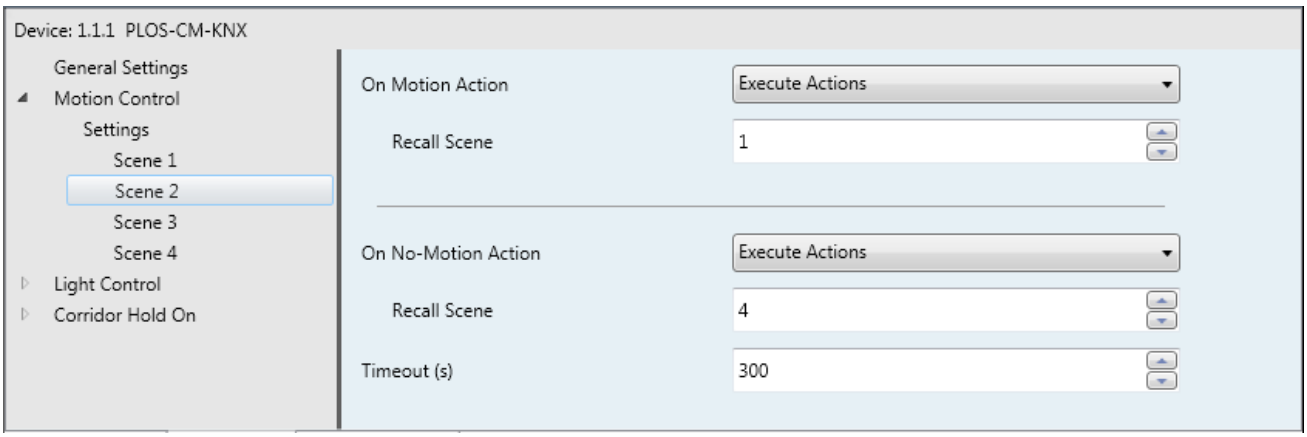
This parameter sets the scene number recalled by this action.

10.3.2.8 Timeout (s)

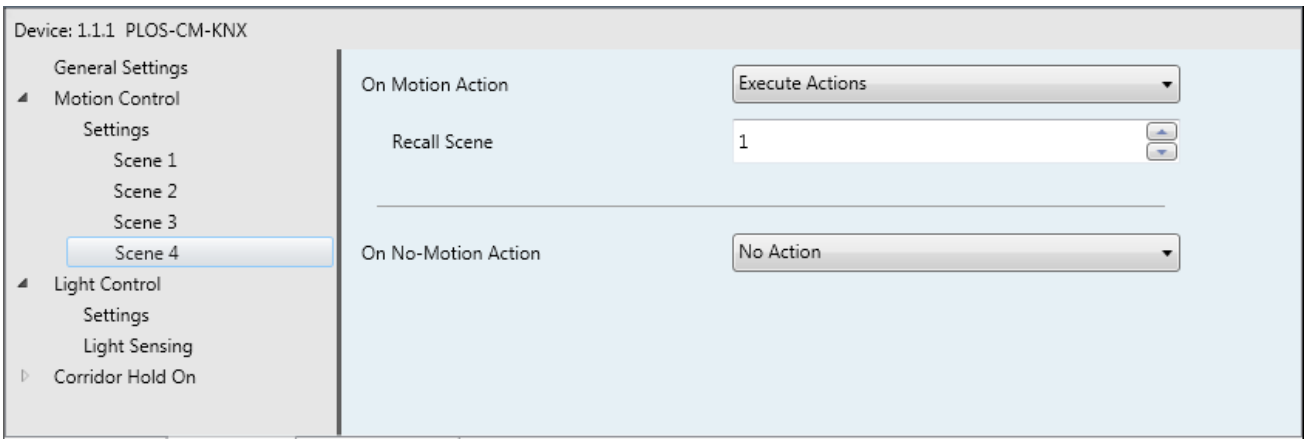
The Timeout is the delay before the On-No-Motion Action will be executed after motion was last detected.



For the example in the Grace Scene 2, the sensor must recall the Occupied Scene 1 again if movement is detected within the Timeout period of 5 minutes; otherwise the sensor must recall the Vacant Scene 4. Following are the parameter settings for Scene 2 to achieve this.



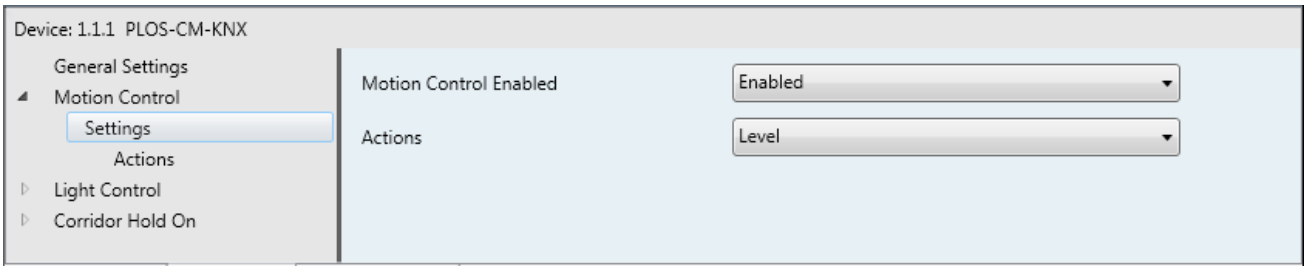
Finally the Vacant Scene 4 will need to be configured so that when motion is detected the sensor will recall the Occupied Scene 1. Following are the parameter settings for Scene 4 to achieve this.



10.3.3 Level motion control

Another approach to motion control is for the sensor to set lighting in a group to specific levels in response to changes in occupancy. An example would be to set lighting to 85% when motion is detected and 10% when no motion has been detected for 10 minutes. Level Actions are used to achieve this.

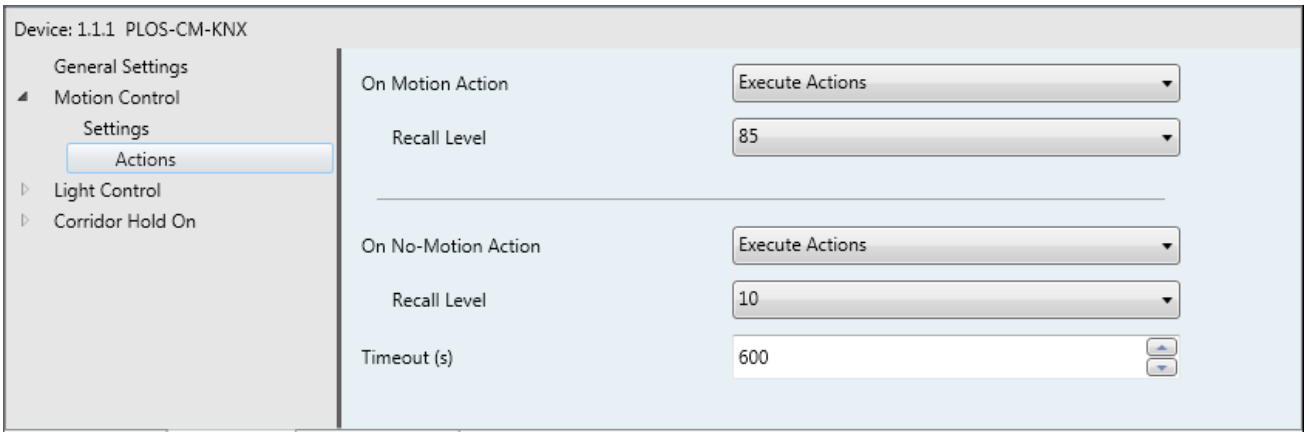
To invoke level occupancy control, in the Motion Control, Settings page, select Level from the Actions parameter drop down list, as illustrated below.



The following group objects are provided when this function is selected.

0	Motion Sensor Scene	1 Byte	C	R	W	T	-	scene number	Low
1	Motion Sensor Absolute Level	1 Byte	C	R	-	T	-	percentage (0..100%)	Low
3	Motion Sensor Enable/Disable	1 bit	C	R	W	-	-	enable	Low
6	Light Sensor Light Level	2 Byte	C	R	-	T	-	lux (Lux)	Low

The motion control behavior can be set by selecting Actions in the left hand column of the parameter page. The page below appears after selection. Control is invoked for either occupancy state by setting the On Motion Action and On No-Motion Action parameters to Execute Actions from the drop down list, as shown below.



10.3.3.1 Recall Level

This parameter sets the percentage level recalled by this action.

10.3.3.2 Timeout (s)

The Timeout is the delay before the On-No-Motion Action will be executed after motion was last detected.

10.3.4 Switch motion control

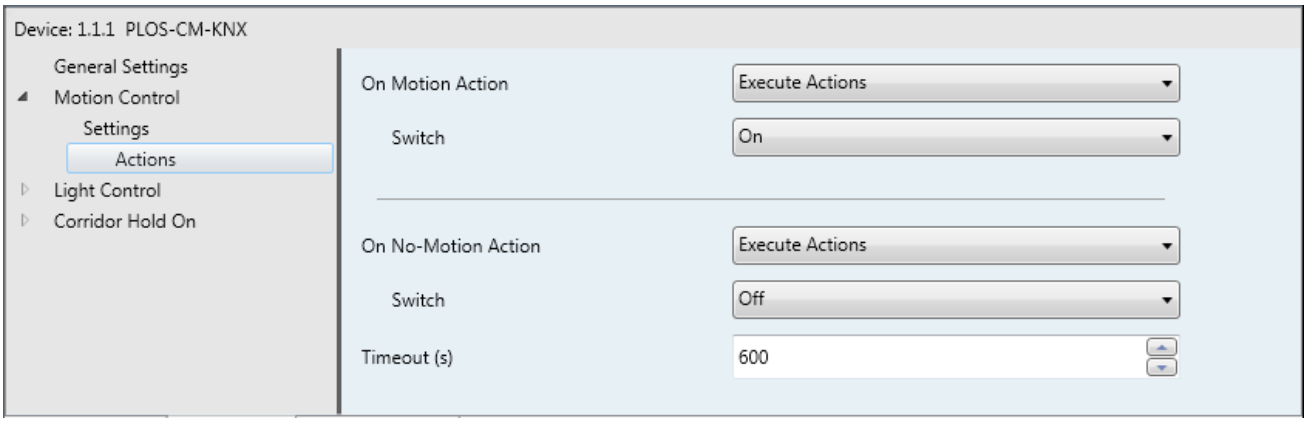
The most basic approach to Occupancy control is to simply turn the lights ON or OFF in response to changes in occupancy. The obvious example would be to turn lighting ON when motion is detected and OFF when no motion has been detected for 10 minutes. Switch Actions are used to achieve this.

To invoke Switch motion control, in the Motion Control, Settings page, select Switch from the Actions parameter drop down list, as illustrated below.

The following group objects are provided when this function is selected.

0	Motion Sensor Scene	1 Byte	C	R	W	T	-	scene number	Low
2	Motion Sensor On/Off	1 bit	C	R	-	T	-	on/off	Low
3	Motion Sensor Enable/Disable	1 bit	C	R	W	-	-	enable	Low
6	Light Sensor Light Level	2 Byte	C	R	-	T	-	lux (Lux)	Low

The motion control behavior can be set by selecting Actions in the left hand column of the parameter page. The page below appears after selection. Control is invoked for either occupancy state by setting the On Motion Action and On No-Motion Action parameters to Execute Actions from the drop down list, as shown below.



10.3.4.1 Switch

This parameter sets the Switch state (ON or OFF) recalled by this action.

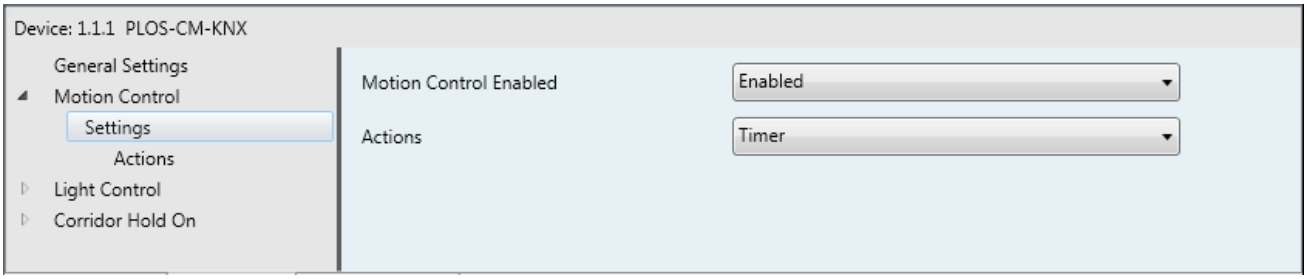
10.3.4.2 Timeout (s)

The Timeout is the delay before the On-No-Motion Action will be executed after motion was last detected.

10.3.5 Timer motion control

Timer occupancy control can be used to start and stop a timer in another network device, such as an actuator. An example would be to start a timer when no motion has been detected for a period of 10 minutes and stop the timer if motion is detected.

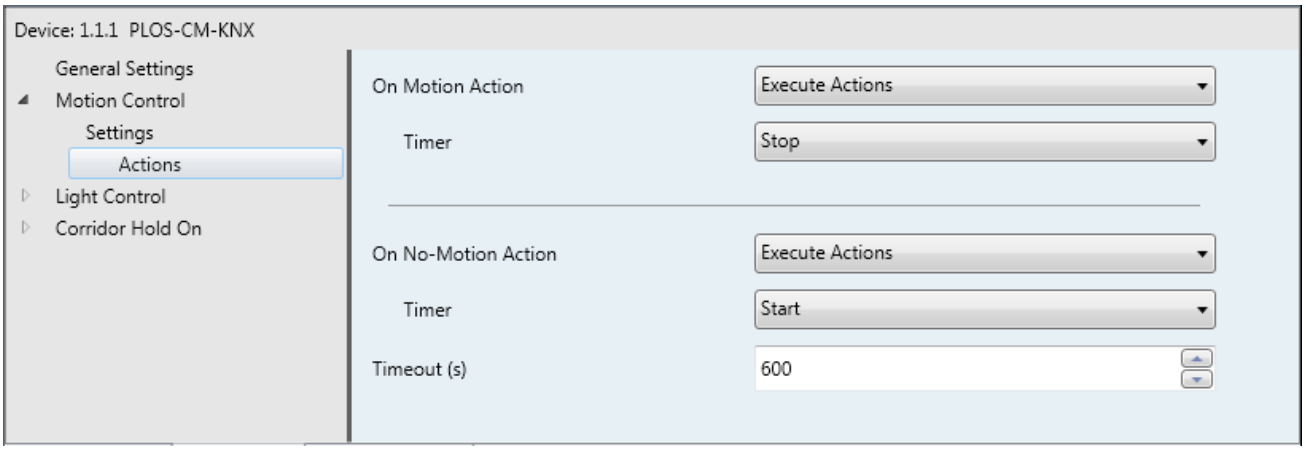
To invoke Timer occupancy control, in the Motion Control, Settings page, select Timer from the Actions parameter drop down list, as illustrated below.



The following group objects are provided when this function is selected.

0	Motion Sensor Scene	1 Byte	C	R	W	T	-	scene number	Low
3	Motion Sensor Enable/Disable	1 bit	C	R	W	-	-	enable	Low
4	Motion Timer Start Stop	1 bit	C	R	-	T	-	start/stop	Low
6	Light Sensor Light Level	2 Byte	C	R	-	T	-	lux (Lux)	Low

The motion control behavior can be set by selecting Actions in the left hand column of the parameter page. The page below appears after selection. Control is invoked for either occupancy state by setting the On Motion Action and On No-Motion Action parameters to Execute Actions from the drop down list, as shown below.



The Timer parameters and Timeout parameter in this page have been set to achieve the control outlined in the example.

10.3.5.1 Timer

This parameter starts or stops a timer by this action.

10.3.5.2 Timeout (s)

The Timeout is the delay before the On-No-Motion Action will be executed after motion was last detected.

10.4 Light Control

The objective of light control is to automatically maintain a specific lighting level, which is generally set to that appropriate for the tasks being conducted in the space of the group under control.

As with motion control the multifunction sensor also enables a set of Scenes to be defined, as Light Control Scenes. Typically this would apply to all scenes except the OFF scene. For example, lighting in an enclosed office can be maintained at 400 lux when occupied as appropriate for normal office based tasks. For a grace scene that is typically recalled immediately after the office is unoccupied, a lighting level of 100 lux would be appropriate.

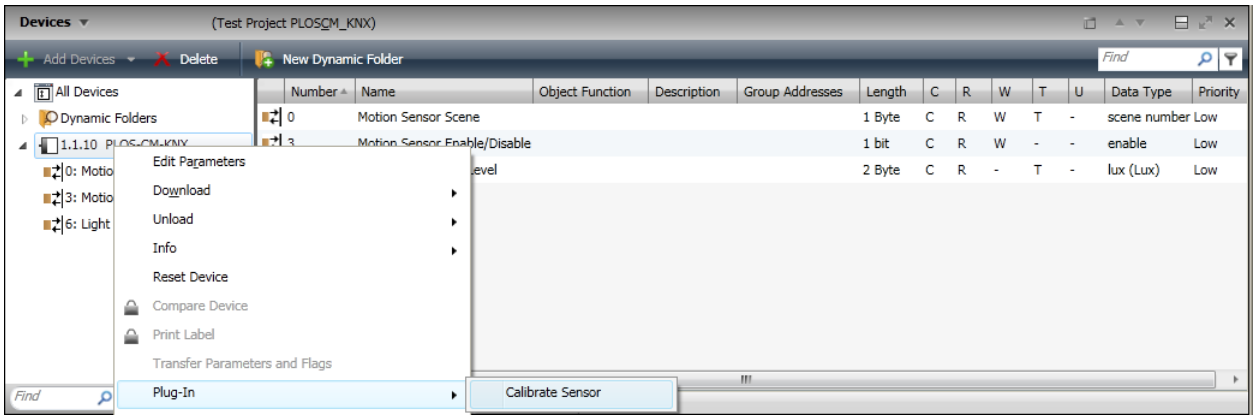
10.4.1 Calibrating the sensor

For correct operation of the multifunction sensor in any lighting level control application it must be calibrated. When the sensor is installed in the typical mounting position on a ceiling facing down, the sensor actually measures the light reflected back to it from the surfaces below. However the objective of most lighting control applications is to maintain lighting levels at a specific horizontal working plane height ie on the top of a desk. Therefore if the surfaces below the sensor have a low reflectance, ie dark carpets etc, the level of light measured at the sensor will be quite different to that at the working plane height. The sensor can compensate for this difference by applying a factor to the measured light level to determine the actual light level. The relationship between the two levels is determined through calibration.

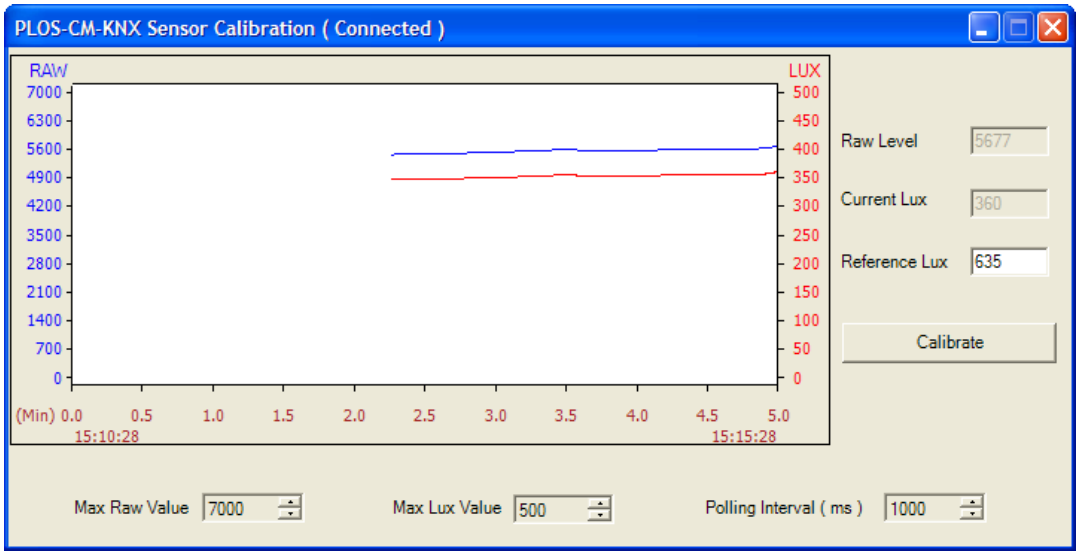
The database file for the multifunction sensor includes a plug-in for calibration.

To run Sensor Calibration Plug-in,

1. Right-click on the sensor in the topology tree
2. Select Plug-In, then Calibrate Sensor



The calibration plug-in page should appear as below.



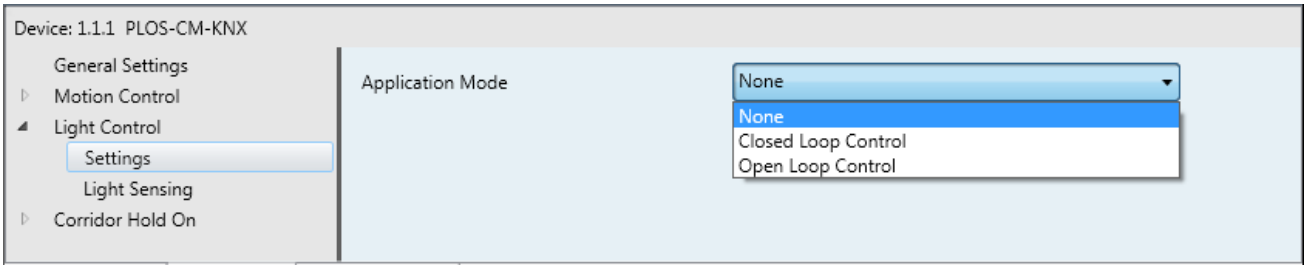
The Max Raw Value and Max Lux Value parameters define the upper limits of the graph within the page for display purposes only. Adjust these as necessary to provide the preferred graphing resolution. Using a suitable quality Lux meter, measure the light level at the desired working plane height at a reference point in the area below the sensor. Enter the measured value in the Reference Lux parameter and then click Calibrate. Before closing the calibration plug-in page, continue to view the displayed Lux trace to confirm calibration was effective. Providing there has been no change in the lighting level since the reference Lux level was measured and entered, the displayed Lux trace should promptly begin indicating a Lux level around the entered reference value.

Note: The title bar of the calibration plug-in page must indicate the sensor status as "Connected" and the graph trace must be stable before attempting calibration.

Note: Where illumination levels are high, raise the Max Raw Value and Max Lux Value scales to bring the graph traces within the visible range.

10.4.2 Light Control Settings

Open Loop or Closed Loop Application Mode can be selected on the Light Control Settings page.



10.4.3 Closed loop light control

Closed loop lighting control should be used where the sensor is located within the same area of the group under control. In this arrangement the control loop is effectively closed as the sensor will directly detect any changes in lighting level from the luminaires that it controls. Closed loop lighting control is generally recommended for enclosed office spaces.

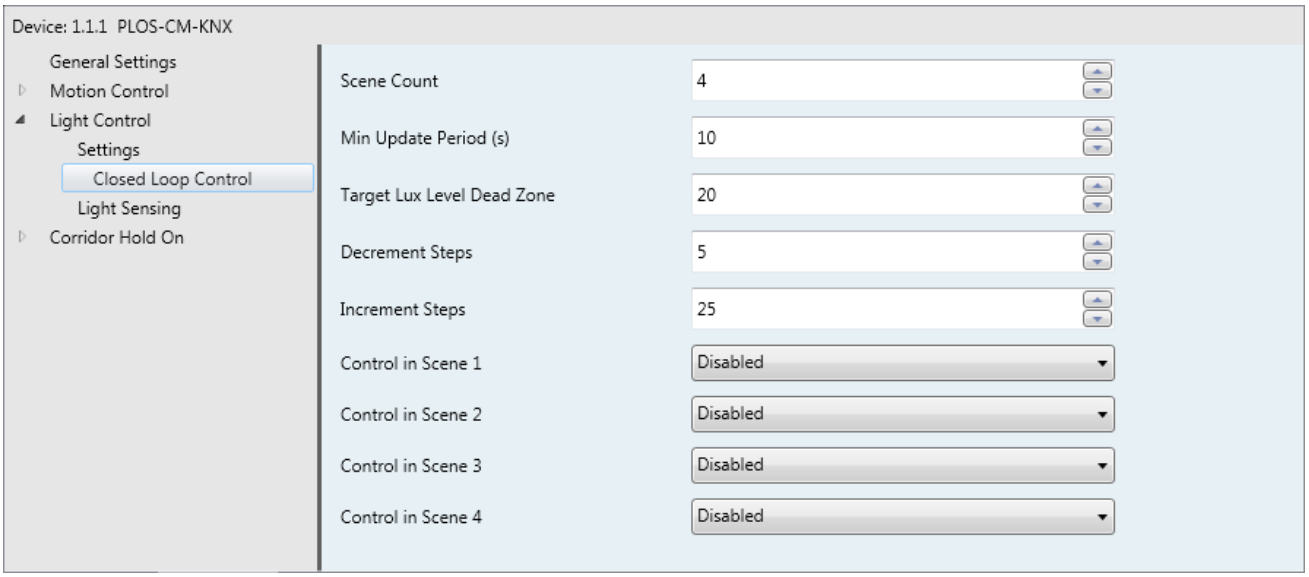
To invoke closed loop light control, in the Light Control, Settings page, select Closed Loop Control from the Application Mode drop down list, as illustrated below.

The following group objects are provided when this function is selected.

5	Light Sensor Scene	1 Byte	C	R	W	T	-	scene number	Low
6	Light Sensor Light Level	2 Byte	C	R	-	T	-	lux (Lux)	Low
7	Light Sensor Absolute Level	1 Byte	C	R	-	T	-	percentage (0..100%)	Low
10	Light Sensor Enable/Disable	1 bit	C	R	W	-	-	enable	Low

10.4.3.1 Closed Loop Control

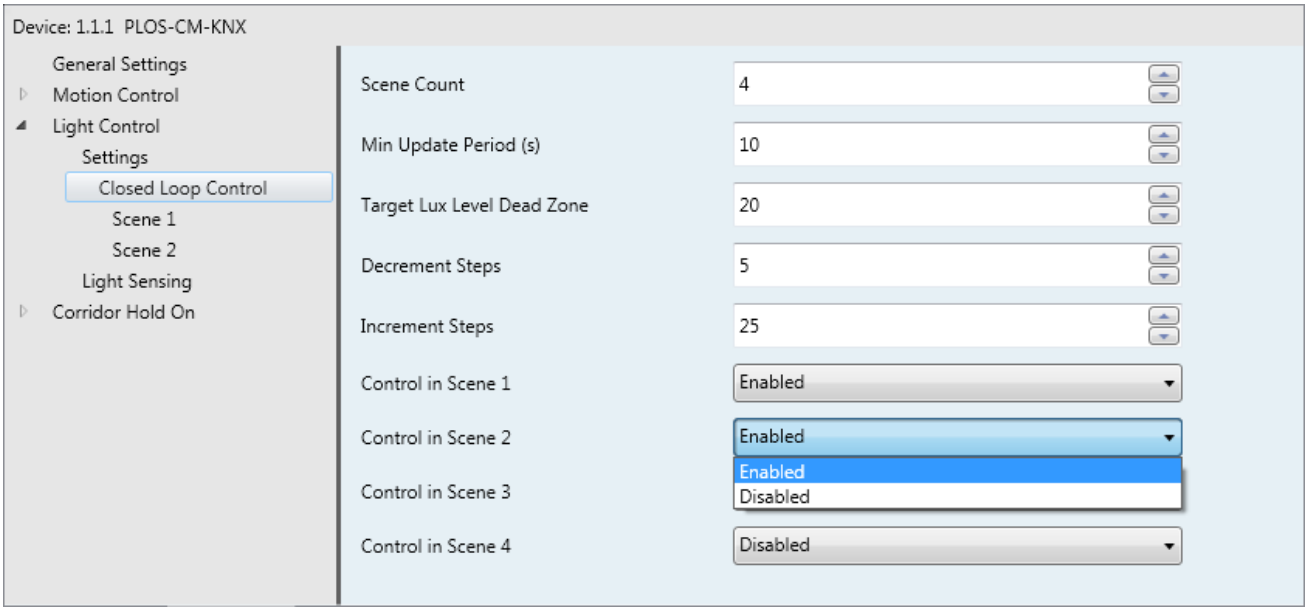
The light control behavior can be set by selecting Closed Loop Control in the left hand column of the parameter page. The page below appears after selection.



10.4.3.2 Scene Count

The Scene Count parameter defines the range of actual Scenes over which the sensor will operate light control. In the example, only scenes 1 and 2, require light control. The scene count must be set to the highest scene number used, in this case 4.

Control is invoked in each scene by setting the respective Control in Scene parameter to Enabled from the drop down list.



10.4.3.3 Min Update Period (s)

The Min Update Period parameter sets the shortest time interval that light level adjustment messages will be issued to the group under control. Consideration of an appropriate period should take into account the responsiveness of required level changes and the corresponding volume of network traffic generated.

Tip: Setting a short period will increase responsiveness however generate higher network traffic. Conversely setting a longer period will decrease network traffic though reduce the responsiveness of control.

10.4.3.4 Control in scene X

This parameter sets in which scenes closed loop control will operate. The number of parameters visible depends on the scene count. This parameter enables or disables the scenes used for control.

Options: Enabled

Disabled

10.4.3.5 Target Lux Level Deadzone

This parameter sets the size of the sensed Lux level zone above the target Lux level within which the sensor will not make changes to the light level. It can also be referred to as the hysteresis zone. For example if the sensor has a target Lux level of 300 Lux and a Lux level deadzone of 20 Lux the sensor will not make light level changes when it senses a Lux level between 300 and 320 Lux.

10.4.3.6 Decrement Steps

Defines the rate that the channel level decreases. This parameter sets the size of light level steps the sensor will reduce the light level by when the sensed lux level is higher than the target lux level. The default value is 5 and should suit most applications. It may be fine-tuned in small steps of 1 or 2 at a time. A higher number increases the rate of change.

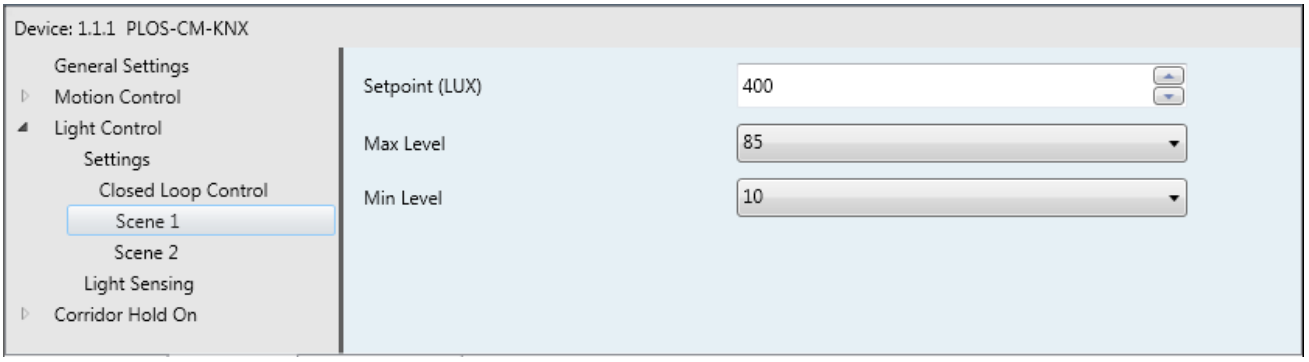
10.4.3.7 Increment Steps

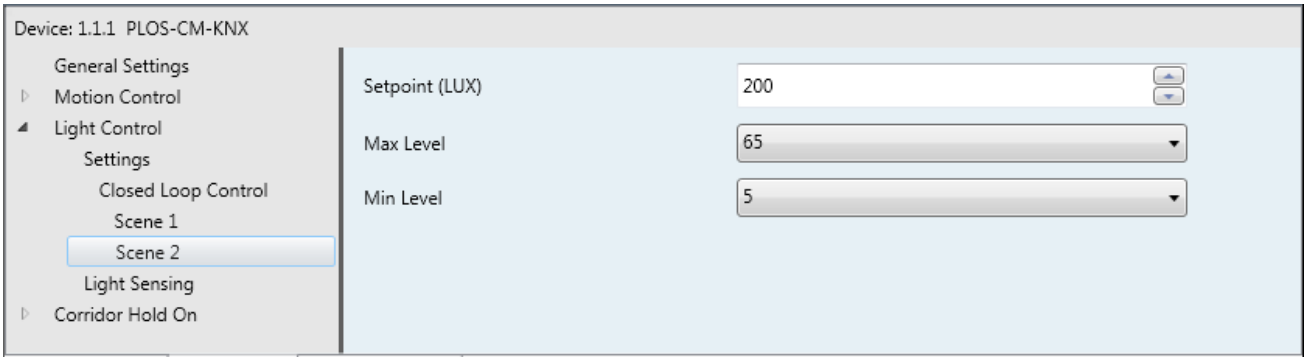
Defines the rate that the channel level increases. This parameter sets the size of light level steps the sensor will increase the light level by when the sensed lux level is lower than the target lux level. The default value is 25 and should suit most applications. It may be fine-tuned in small steps of 1 or 2 at a time. A higher number increases the rate of change.

10.4.4 Scene X light control

The light control parameters for each scene can be set by selecting the respective scene in the left hand column of the parameter page as shown below.

The light control parameters for each scene can be set by selecting the respective scene in the left hand column of the parameter page as shown below.





10.4.4.1 Setpoint (LUX)

The Setpoint (LUX) parameter defines the light level that the sensor seeks to achieve by adjusting the level of the associated group under control. .

10.4.4.2 Max Level

The Max Level defines the upper percentage to which a channel can change to achieve the Setpoint (LUX).

10.4.4.3 Min Level

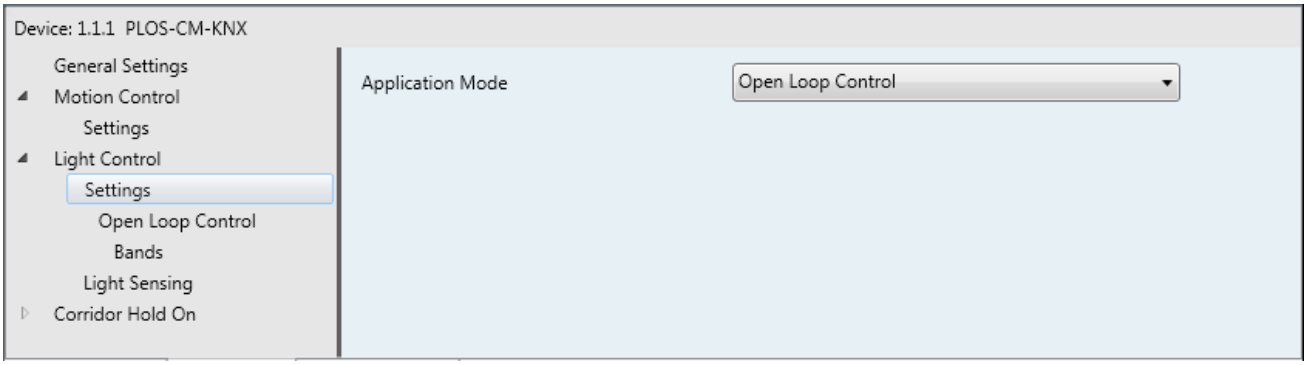
The Min Level defines the lower percentage to which a channel can change to achieve the Setpoint (LUX).

10.4.5 Open loop light control

Open loop lighting control should be used where the sensor is not located within the same area of the group under control. In this arrangement the control loop is open as the sensor will not directly detect any changes in lighting level from the luminaires that it controls. In this Light Control application mode, bands of lighting levels are defined with related actions. When the light level enters a band, the actions defined for that band are executed.

An example would be the level of background lighting on a display located in an area that also receives natural light. In this scenario it may be necessary to increase the background lighting level as natural light increases in the foreground to achieve an appropriate contrast ratio. Specifically this could be achieved by selecting a low background Scene 3 when the lighting level is between 0-350 lux, and intermediate scene 2 when the lighting level is between 350 – 700 lux and a high level scene 1 when the lighting level exceeds 700 lux.

To invoke open loop light control, in the Light Control, Settings page, select Open Loop Control from the Application Mode drop down list, as illustrated below.

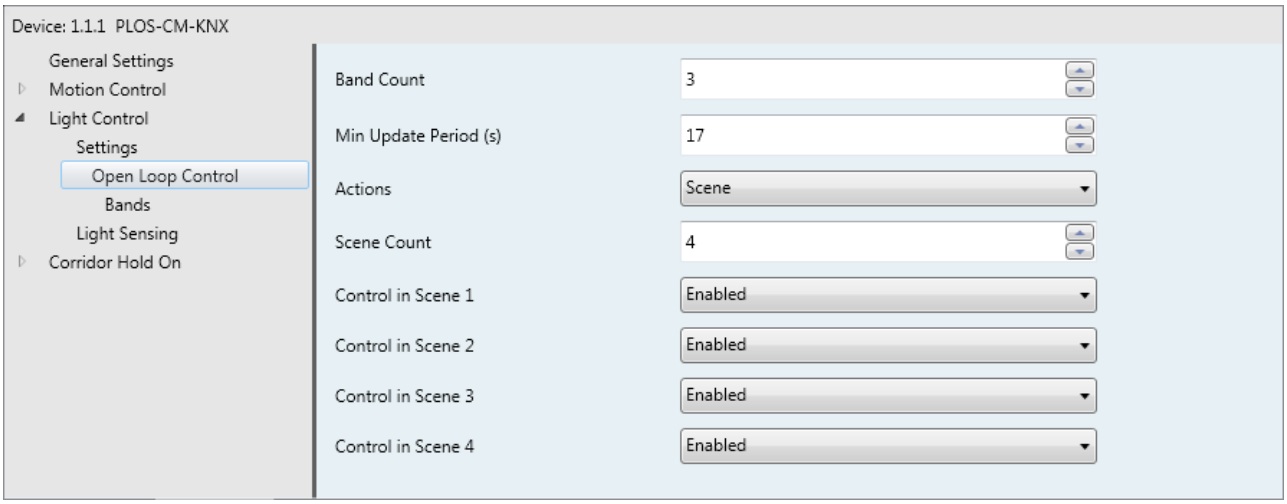


The following group objects are provided when this function is selected.

5	Light Sensor Scene	1 Byte	C	R	W	T	-	scene number	Low
6	Light Sensor Light Level	2 Byte	C	R	-	T	-	lux (Lux)	Low
10	Light Sensor Enable/Disable	1 bit	C	R	W	-	-	enable	Low

10.4.5.1 Open Loop Control

The light control behavior can be set by selecting Open Loop Control in the left hand column of the parameter page. The page below appears after selection.



10.4.5.2 Band Count

The Band Count parameter sets the number of light level bands for which control actions can be defined.

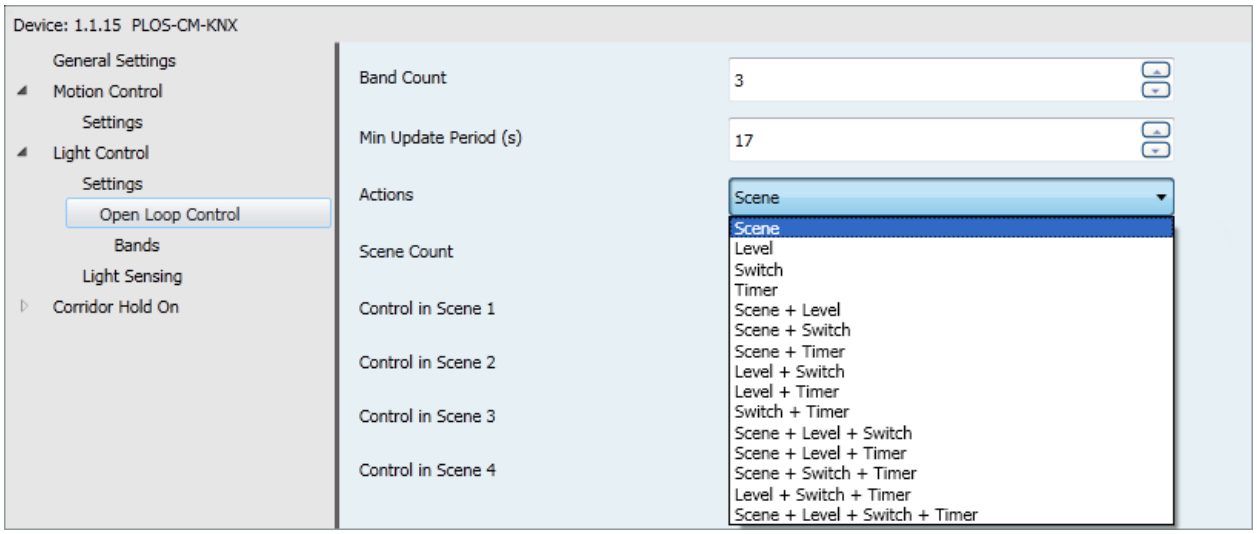
10.4.5.3 Min Update Period (s)

The Min Update Period parameter sets the shortest time interval that light level adjustment messages will be issued to the group under control. Consideration of an appropriate period should take into account the responsiveness of required level changes and the corresponding volume of network traffic generated.

Tip: Setting a short period will increase responsiveness however generate higher network traffic. Conversely setting a longer period will decrease network traffic though reduce the responsiveness of control.

10.4.5.4 Actions

For Open Loop Light Control, the multifunction sensor can execute Scene, Level, Switch and Timer actions, including combinations of these as shown in the drop down list below.



10.4.5.5 Scene Count

This parameter sets the number available scenes that can be recalled.

10.4.5.6 Control in scene X

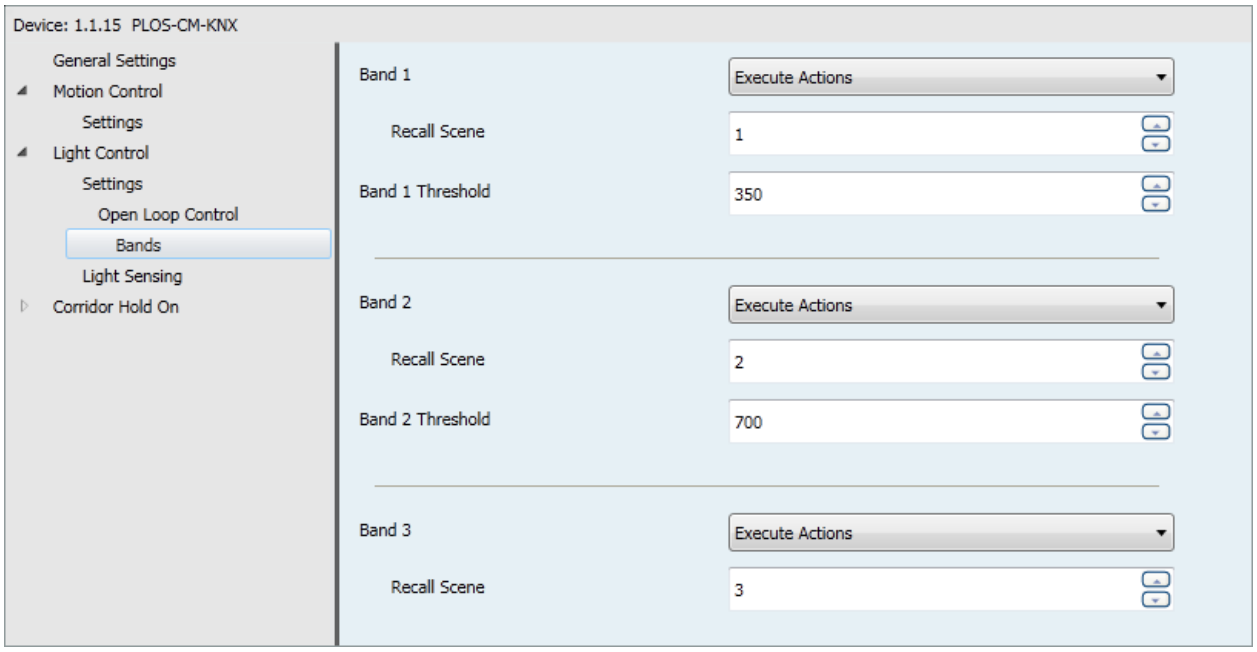
This parameter sets in which scenes open loop control will operate. The number of parameters visible depends on the scene count. This parameter enables or disables control in the scene.

Options: Enabled

Disabled

10.4.6 Bands

To define the bands and related actions, select Bands in the left hand column of the parameters page. The number of bands displayed depends on the band count. The following page appears.



The first band represents the lowest lux level range. Subsequent bands start from the previous band's threshold level.

For Open Loop Light Control, actions follow the same conventions as outlined for Motion Control previously.

For Open Loop Light Control the sensor applies a lux level deadzone of ±10% of the band threshold. The sensor will not execute any actions when sensing lux levels within this zone. This can also be referred to as the hysteresis zone. For example if the sensor has a Band Threshold of 300 lux the sensor will not execute any actions when it senses a lux level between 270 and 330 lux.

10.4.6.1 Band X

This parameter enables or disables control in the scene.

Options: No Action

Execute Actions

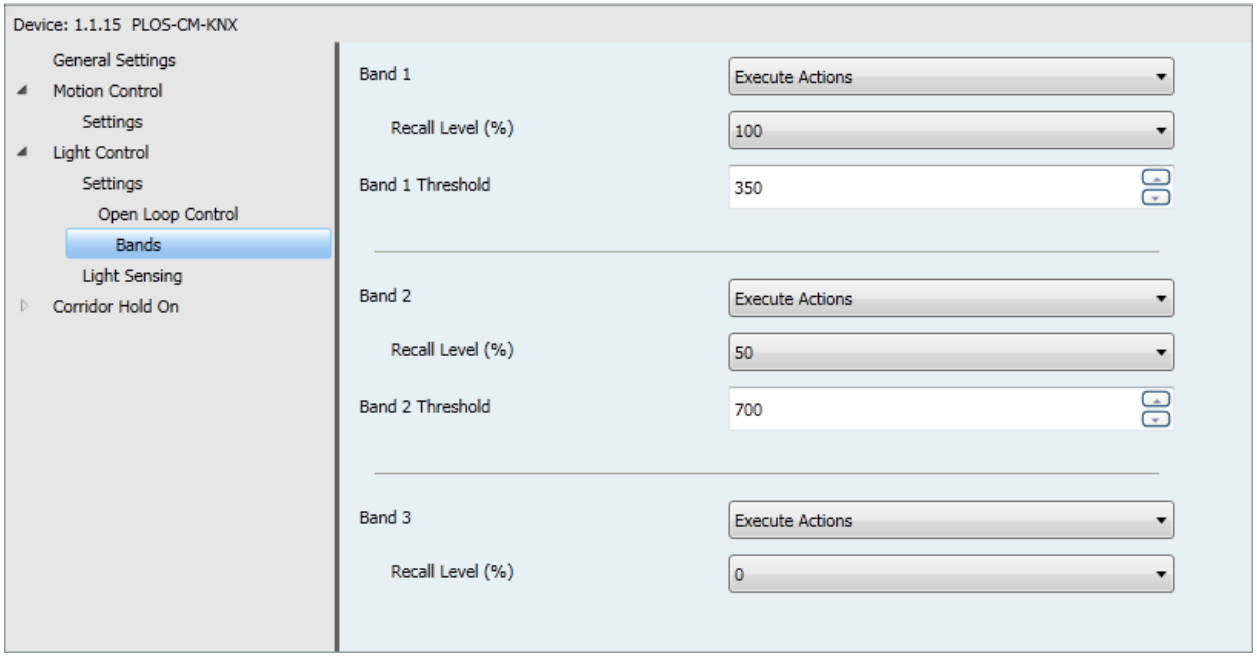
10.4.6.2 Recall scene

This parameter sets the scenes number that is recalled if the lux level is above the threshold.

10.4.6.3 Band X Threshold

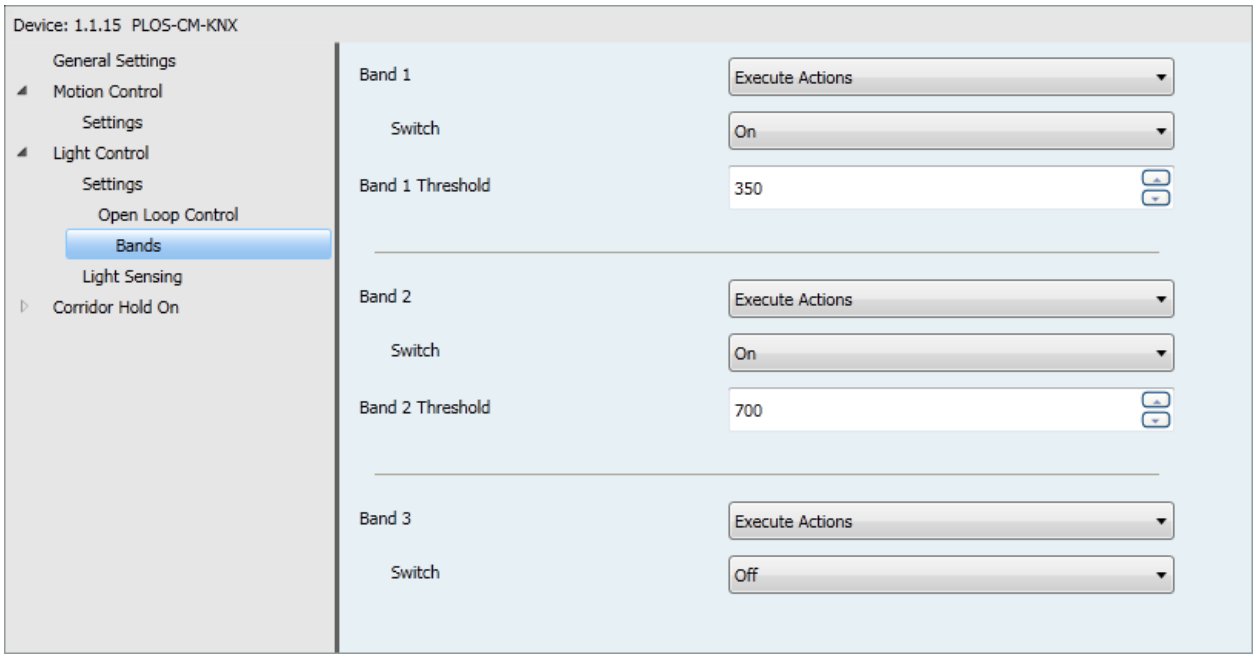
The lux level defines the start of the next band (not applicable for highest numbered band).

10.4.6.4 Recall Level



This parameter recalls an absolute channel level as a percentage.

10.4.6.5 Switch

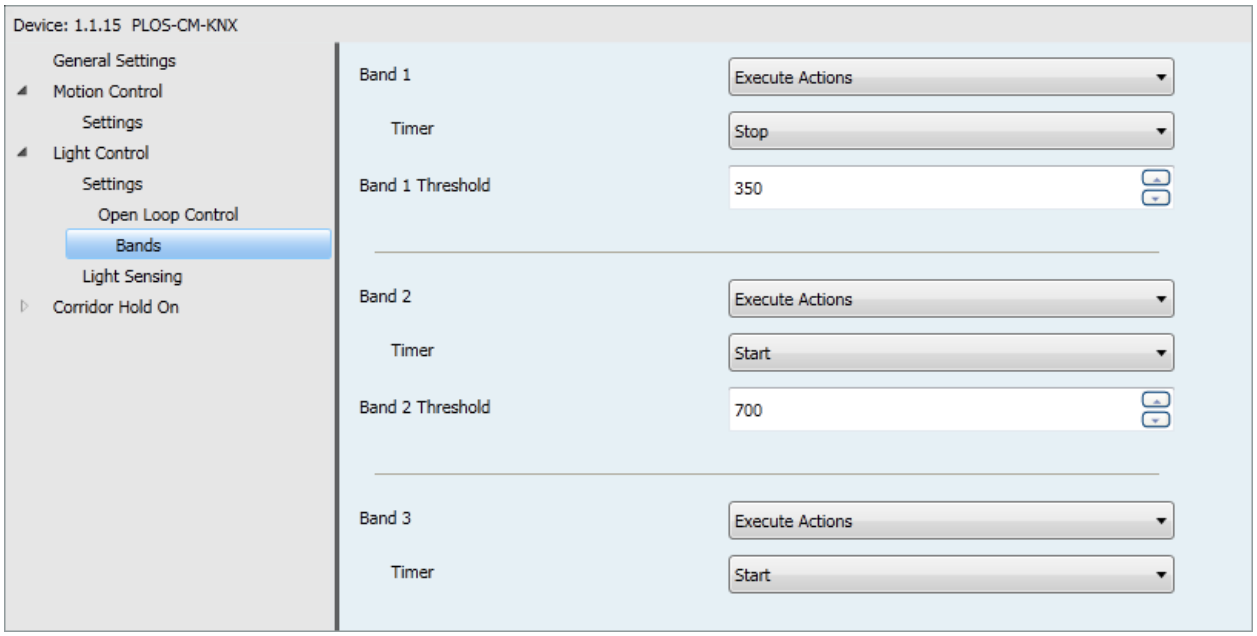


This parameter turns the lights ON or OFF.

Options: On

Off

10.4.6.6 Timer



This parameter starts or stops the delay timer.

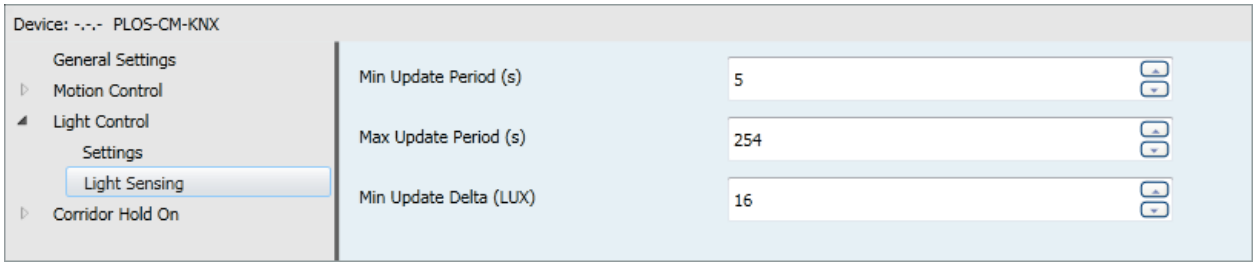
Options: Start

Stop

10.5 Light Sensing

The multifunction sensor can also transmit the actual light level it is sensing to other network devices, for example a third party LCD page or dimming controller with light level input.

The light sensing behavior can be set by selecting Light Sensing in the left hand column of the parameter page. The page below appears after selection.



The following group object is provided when this function is selected.

6	Light Sensor Light Level	2 Byte	C	R	-	T	-	lux (Lux)	Low

10.5.1.1 Min Update Period (s)

The Min Update Period parameter sets the shortest time interval that light level messages will be issued. Consideration of an appropriate period should take into account the responsiveness of required level changes and the corresponding volume of network traffic generated. Setting a short period will increase responsiveness however generate higher network traffic. Conversely setting a longer period will decrease network traffic though reduce the responsiveness of control.

10.5.1.2 Max Update Period (s)

The Max Update Period parameter sets the longest time interval that light level messages will be issued.

10.5.1.3 Max Update Delta (LUX)

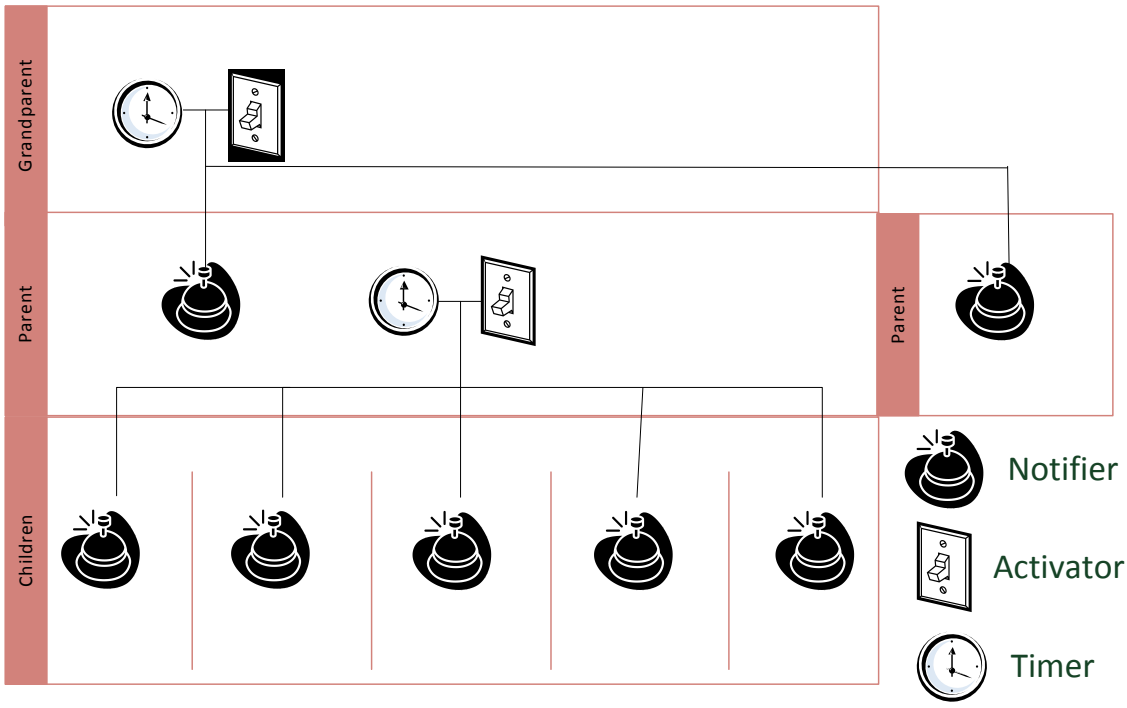
The Min Update Delta parameter defines the minimum change in lighting level that is required from the last level issued before another will be issued. If the change in lighting level has not exceeded the Min Update Delta but the time since the last level issued has reached the timeout period, another level messaged will be issued.

10.6 Corridor Hold-on

With Corridor Hold-on, different dependencies can be created between Groups to perform functions such as:

- Corridor Hold-on (Group cascading)
- Background lighting for open plan offices
- Automatic switch-off timer (Staircase timer)
- Out-of-hours timer
- Switch-off warning
- Step-over patterns

The Notifier, Timer and Activator objects are configured to perform the above functions by associating them to Parent or Child Groups. These objects reside in the KNX Multifunction Sensor. The sensor has a total of 6 objects which can be independently configured as a Notifier, Timer or Activator.



Key point: The Notifier, Timer and Activator are scene centric objects, which require scene based control to be utilized in order to function.

10.6.1.1 Notifier Object (Child Group)

The Notifier sends recurring messages onto the KNX network (heartbeats) notifying its parent Group that its own Group is currently occupied. The data point type DPT_Occupancy is used for these messages. To commission the Notifier Object:

- The Scene group object is associated with its own Group
- The Occupancy group object is associated with the parent Group
- Parameters are entered to define all the active scenes (generally the occupied) for its own Group
- Parameter is entered for the heartbeat period.

When the Notifier receives a scene message for its own Group that is defined as an active scene, it will transmit an occupancy message for the parent Group. The Notifier's heartbeat timer is restarted every time an occupancy signal is sent from the Notifier or received from another Notifier (associated with a different child Group) for the same parent Group.

If the last preset the Notifier received for its own Group is in the active list and the heartbeat timer reaches the heartbeat period, it will transmit another occupancy message. Conversely if the Notifier receives a preset message for its own Group that is not in the active preset list, it will not transmit another occupancy message until another active preset is received.

In order to minimize network traffic it is recommended that a slightly different heartbeat period is used for each Notifier associated with a specific Group. If the same period is used, all Notifiers will attempt to transmit an occupancy message at the same time, creating potential network collisions and unnecessary traffic. When different periods are used the Notifier with the shortest period will transmit an occupancy message first, which resets the timer in all other Notifier's with the same Group association.

10.6.1.2 Activator Object (Parent Group)

The Activator turns its own Group on when it receives an occupancy message from an associated Notifier. To commission the Activator Object:

- The Scene group object is associated with its own Group
- The Occupancy group object is associated with its own Group
- Parameters are entered to define all the active scenes (generally the off state) for its own Group
- Parameter is entered for the Action scene (generally the standby state).

If the last scene message the Activator received for its own Group is in the active list and it receives an occupancy message for its own Group, it will transmit the Action scene message. Conversely if the last scene message the Activator receives for its own Group is not in the active scene list, and it receives an occupancy message it will not transmit an Action preset message.

10.6.1.3 Timer Object (Parent Group)

The Timer turns its own Group off after a defined time delay when all child Groups are unoccupied and its own Group is in a standby scene. To commission the Timer Object:

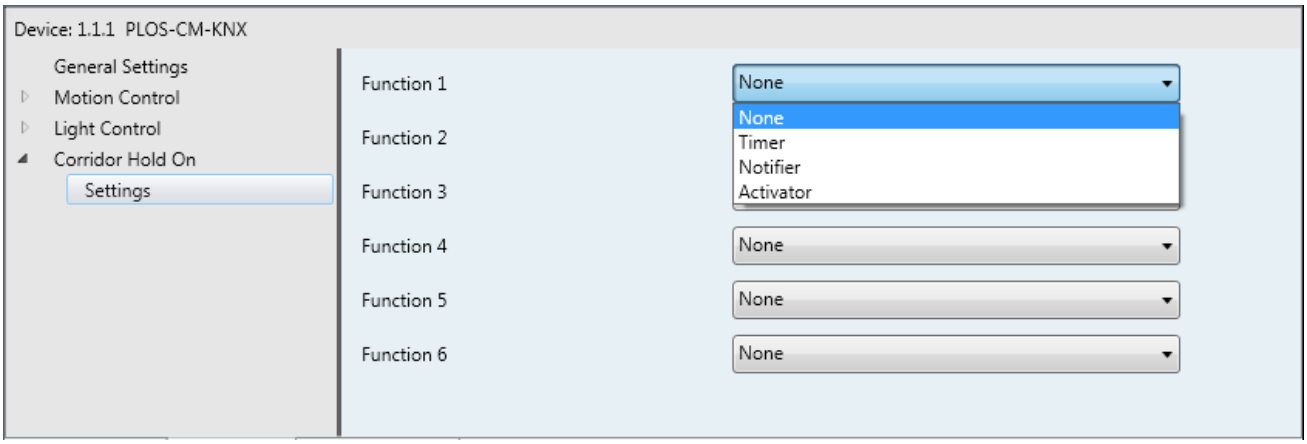
- The Scene group object is associated with its own Group
- The Occupancy group object is associated with its own Group
- Parameters are entered to define all the active scenes (generally the standby state) for its own Group
- Parameter is entered for Hold On Time.
- Parameter is entered for the Action scene (generally OFF scene).

If the Timer receives a scene message for its own Group that is in the active list or an occupancy message for its own Group, it will start or restart the timer. If the last scene message the Timer received for its own Group is in the active list and the timer reaches the Hold On Time it will transmit the Action scene message. Conversely if the Timer receives a scene message for its own Group that is not in the Active Scene list and the timer reaches the Hold On Time, it will not transmit an Action scene message.

10.6.2 Corridor Hold-on Settings

To invoke Corridor Hold-on, select the required function objects in the Corridor Hold On Settings page, up to the six object limit, as illustrated below.

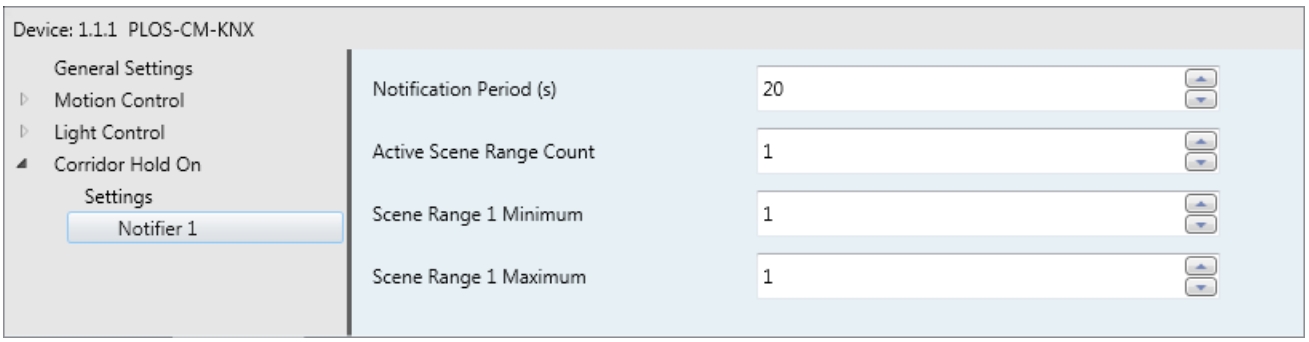
For a Notifier object, select Notifier in the drop down list of the Function 1 parameter as shown below.



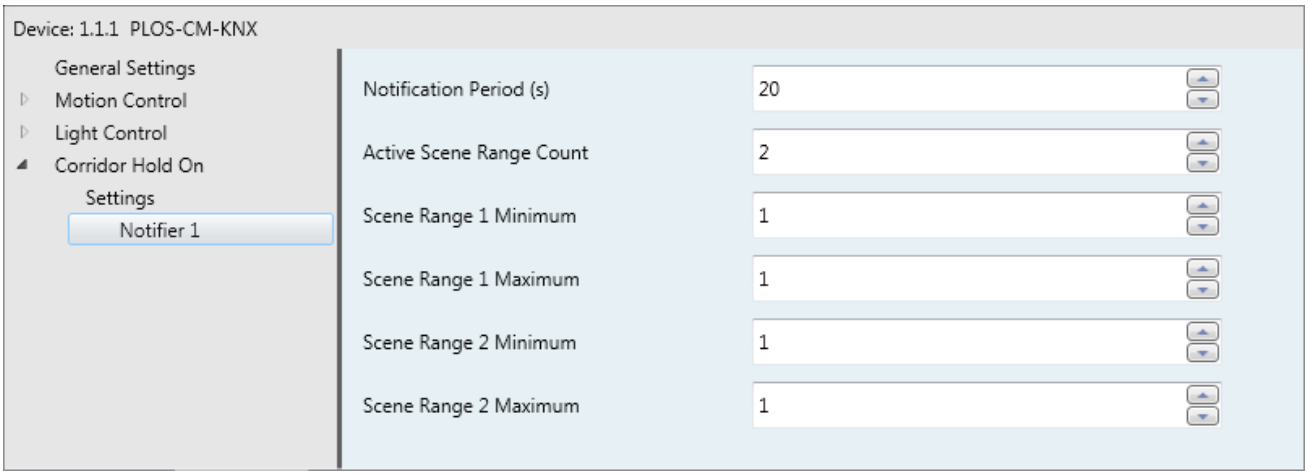
The following group objects are provided when this function is selected.

6	Light Sensor Light Level	2 Byte	C	R	-	T	-	lux (Lux)	Low
11	Corridor Hold On Enabled/Disabled	1 bit	C	R	W	-	-	enable	Low
12	Corridor Hold On Notifier 1	1 bit	C	R	W	T	-	occupied	Low
18	Corridor Hold On Notifier 1 Scene	1 Byte	C	R	W	T	-	scene number	Low

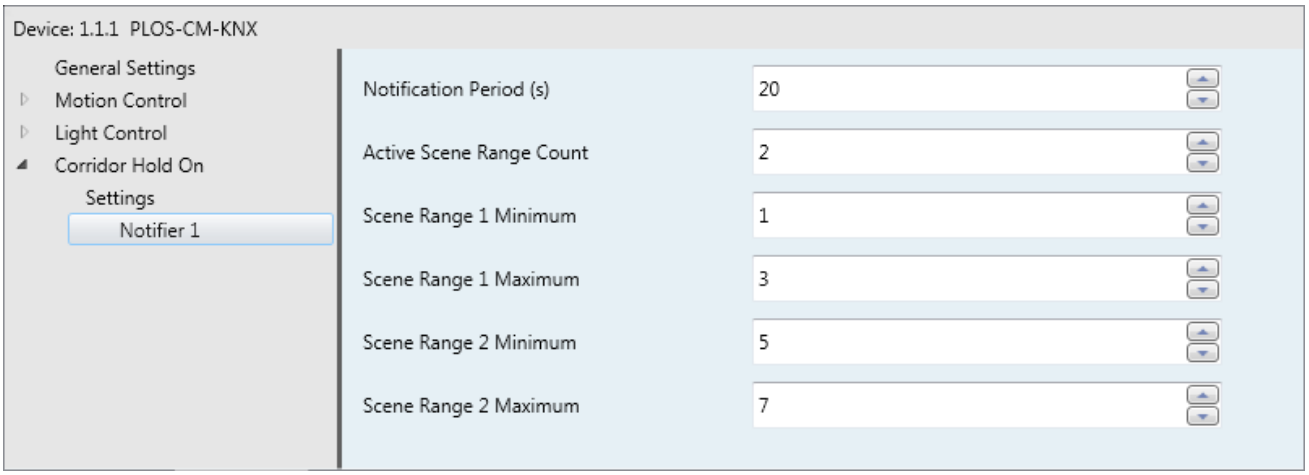
The Notifier 1 behavior can be set by selecting Notifier 1 in the left hand column of the parameter page. The page below appears after selection.



The Notification Period is the timer duration that controls the interval of occupancy sync messages that the Notifier sends when its own group is in an active scene. The Active Scene Range Count defines the number of consecutive Active Scene ranges. In this example we will define 2 ranges. When setting the Active Scene Range Count to 2, the page adds another set of Scene Range Minimum and Maximum parameters as shown below for the second range.



For this example we will set Range 1 as scenes 1 to 3, and range 2 as scenes 5 to 7, as shown below.

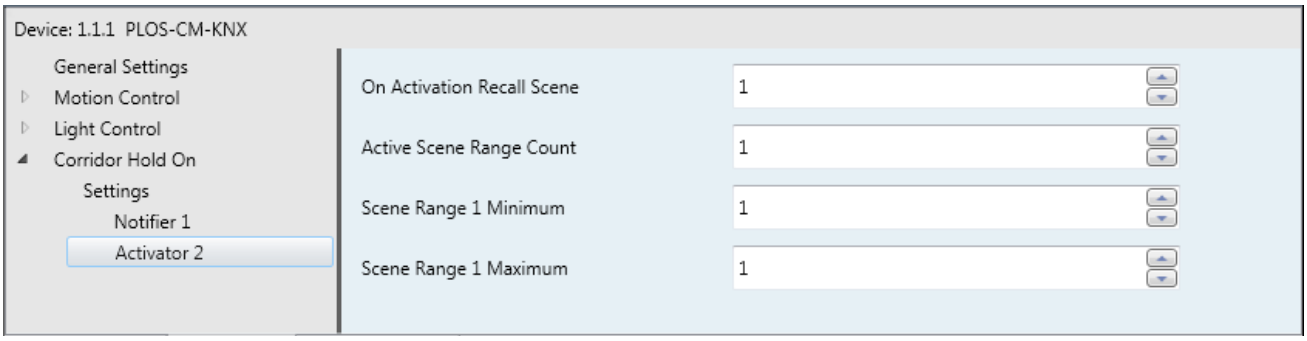


To add an Activator object, select Activator in the drop down list of the Function 2 parameter as shown below.

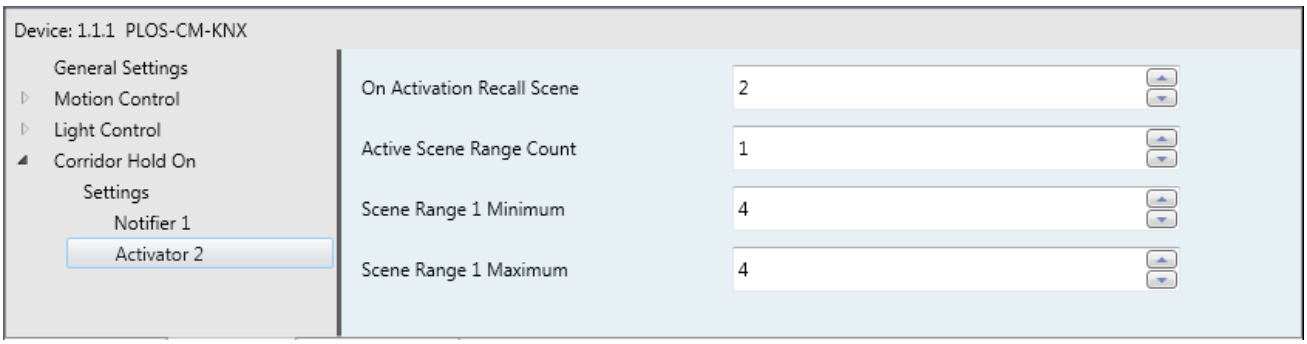
The Activator 2 group objects below are introduced when this function is selected.

6	Light Sensor Light Level	2 Byte	C	R	-	T	-	lux (Lux)	Low
11	Corridor Hold On Enabled/Disabled	1 bit	C	R	W	-	-	enable	Low
12	Corridor Hold On Notifier 1	1 bit	C	R	W	T	-	occupied	Low
13	Corridor Hold On Activator 2	1 bit	C	R	W	T	-	occupied	Low
18	Corridor Hold On Notifier 1 Scene	1 Byte	C	R	W	T	-	scene number	Low
19	Corridor Hold On Activator 2 Scene	1 Byte	C	R	W	T	-	scene number	Low

The Activator 2 behavior can be set by selecting Activator 2 in the left hand column of the parameter page. The page below appears after selection.



The On Activation Recall Scene defines the scene that the Activator will recall upon receiving a Notifier message for its group, when in an active scene. The Active Scene Range Count defines the number of consecutive Active Scene ranges. In this example the default range of 1 will be used, the On Activation Recall Scene will be set to Scene 2 and the Active Scene range as Scene 4 only, as shown below.

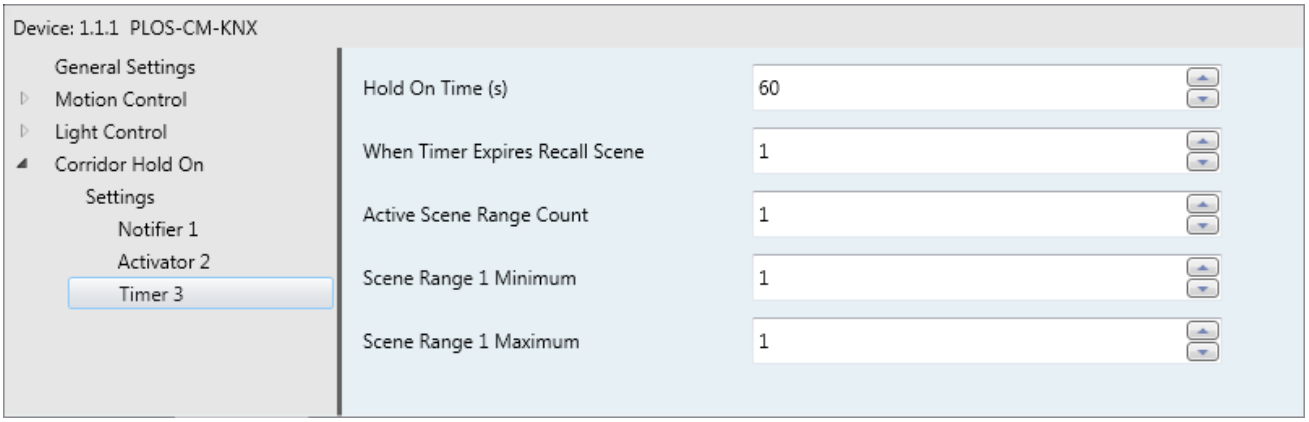


To add a Timer object, select Timer in the drop down list of the Function 3 parameter as shown below.

The Timer 3 group objects below are introduced when this function is selected.

6	Light Sensor Light Level	2 Byte	C	R	-	T	-	lux (Lux)	Low
11	Corridor Hold On Enabled/Disabled	1 bit	C	R	W	-	-	enable	Low
12	Corridor Hold On Notifier 1	1 bit	C	R	W	T	-	occupied	Low
13	Corridor Hold On Activator 2	1 bit	C	R	W	T	-	occupied	Low
14	Corridor Hold On Timer 3	1 bit	C	R	W	T	-	occupied	Low
18	Corridor Hold On Notifier 1 Scene	1 Byte	C	R	W	T	-	scene number	Low
19	Corridor Hold On Activator 2 Scene	1 Byte	C	R	W	T	-	scene number	Low
20	Corridor Hold On Timer 3 Scene	1 Byte	C	R	W	T	-	scene number	Low

The Timer 3 behavior can be set by selecting Timer 3 in the left hand column of the parameter page. The page below appears after selection.



The When Timer Expires Recall Scene defines the scene that the Timer object will recall upon the timer reaching the Hold On Time, when in an active scene. The Active Scene Range Count defines the number of consecutive Active Scene ranges. In this example the default range of 1 will be used, the When Timer Expires Recall Scene will be set to Scene 4 and the Active Scene range as Scene 2 only, as shown below.