

Technical Manual

MDT Presence Detector



SCN-P360D3.01
SCN-P360K3.01
SCN-GP360D3.01
SCN-G360K3.01
SCN-P360D4.01
SCN-P360K4.01

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2 Overview

2.1 Overview Devices

The Manual refers to the following devices (Order ID respectively printed in bold letters):

- **SCN-P360D4.01** Presence Detector, 4 Pyro Detectors
 - 4 Pyro-Detectors, individually programmable detection sensitivity for standby state day, night and presence, switching options for movement and lightness, separate communication object for night, Master/Slave function, Standby-/Orientation light, 2 area mode

- **SCN-P360K4.01** Presence Detector, 4 Pyro Detectors, constant level light control
 - 4 Pyro-Detectors, individually programmable detection sensitivity for standby state day, night and presence, switching options for movement and lightness, separate communication object for night, Master/Slave function, Standby-/Orientation light, 2 area mode, extended constant level light control with proportional Master/Slave function for up to 3 light groups

- **SCN-P360D3.01/ SCN-G360D3.01** Presence Detector, 3 Pyro Detectors
 - 3 Pyro-Detectors, individually programmable detection sensitivity for standby state day, night and presence, switching options for movement and lightness, separate communication object for night, Master/Slave function, Standby-/Orientation light, 2 area mode

- **SCN-P360K3.01/ SCN-G360K3.01** Presence Detector, 3 Pyro Detectors, constant level light control
 - 3 Pyro-Detectors, individually programmable detection sensitivity for standby state day, night and presence, switching options for movement and lightness, separate communication object for night, Master/Slave function, Standby-/Orientation light, 2 area mode, constant level light control

2.2 Usage & Areas of use

The MDT Presence Detector switches the light accordingly to the brightness and presence. It can be used for switching on demand to switch the light economically. Especially in public buildings, but also in rarely used rooms as bath and WC, the presence detector can be used to minimize the non-essential switching periods. An additional channel transmits information about presence in the room to other subsections as Heating-control, air-conditioning, ventilation or shutter controlling. So the presence detector can also be employed in a subsection comprehensive use. The presence detectors SCN-P360K3.01 und SCN-P360K4.01 contains of an additional intelligent constant level light control. The constant level light control can control up to 3 light bands in a way to hold the lightness in a room continuously at a constant value.

2.3 Exemplary circuit diagram

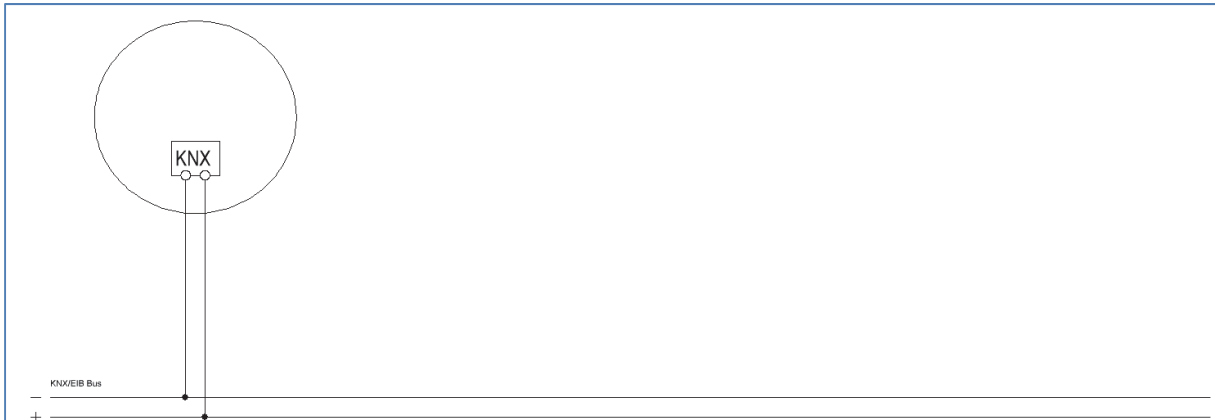


Figure 1: Exemplary circuit diagram

2.4 Installation & instructions for mounting

The following figure shows the adjustment of the particular sensors, identified with S1=sensor 1 to S4, for the presence detector with 4 pyro sensors. The LEDs are marked with R for the red LED and G for the green LED:

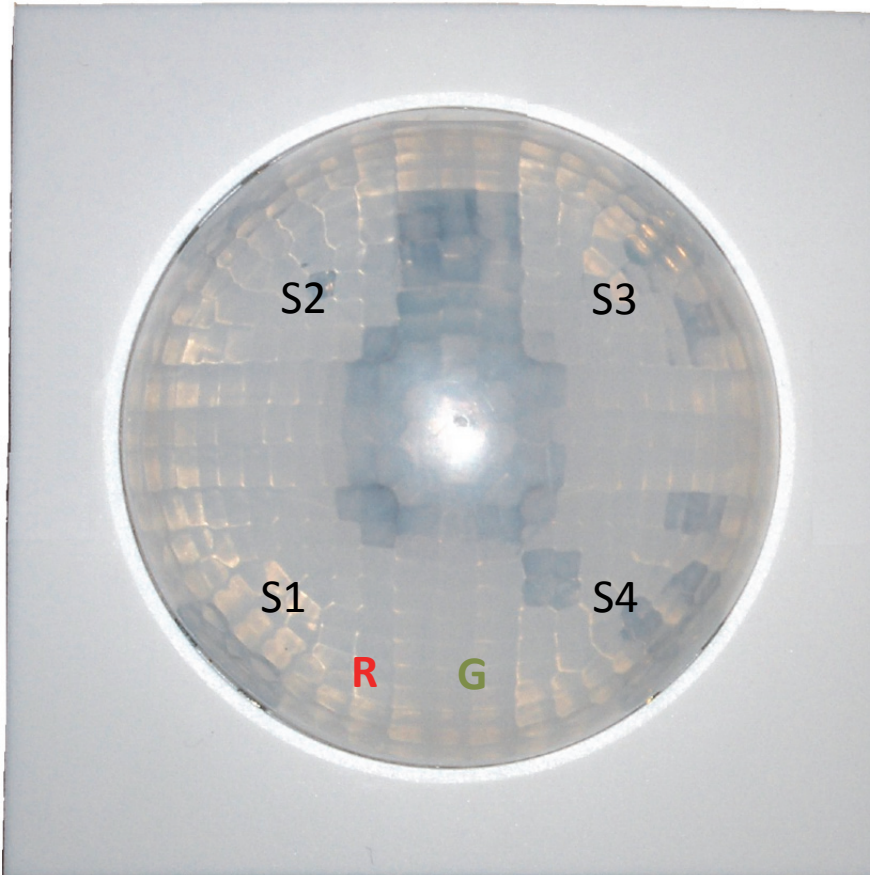


Figure 2: Adjustment of the sensors and LEDs – SCN-P360X4.01

The following figure shows the adjustment of the particular sensors, identified with 1=sensor 1 to 3 for sensor 3, for the presence detector with 3 pyro sensors. The bus connector is marked with BC:

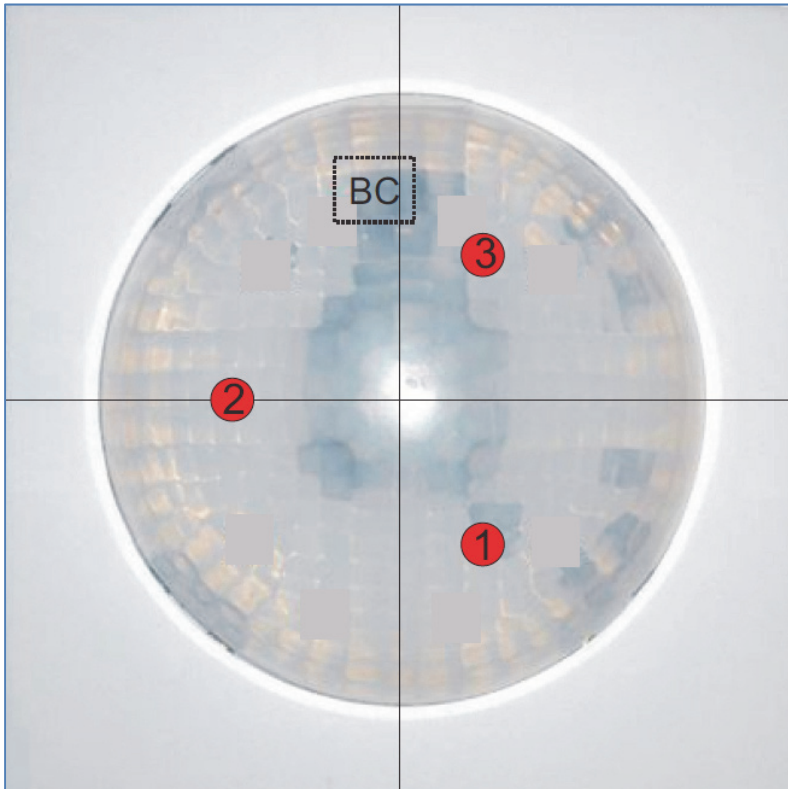


Figure 3: Adjustment of the sensors – SCN-P/G360X3.01

The presence detector should be placed in the middle of the room. It is important for the constant level control to install the detector in a minimum distance of 60 cm to the next lamp and in the line of the middle light band.

The following figure shows the detection area of the presence detector:

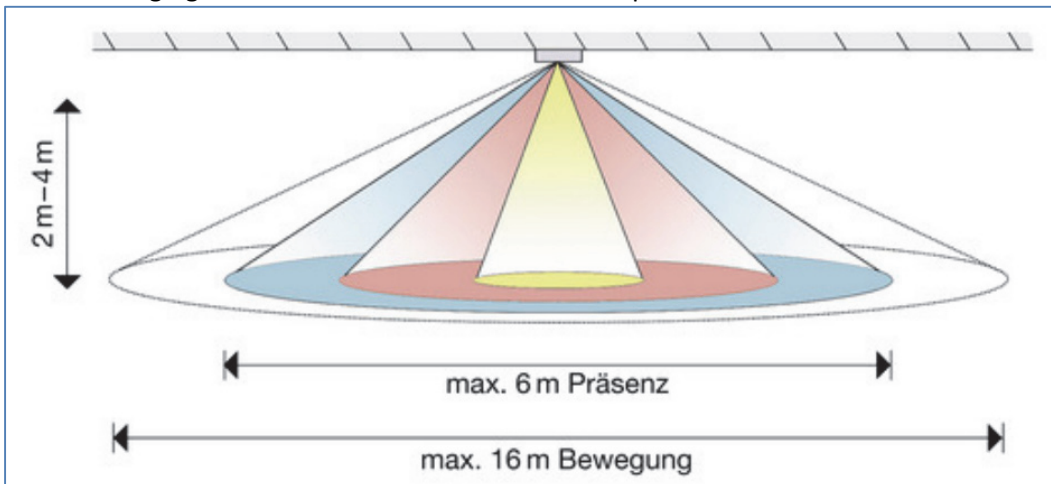


Figure 4: Detection area SCN-P360x4.01

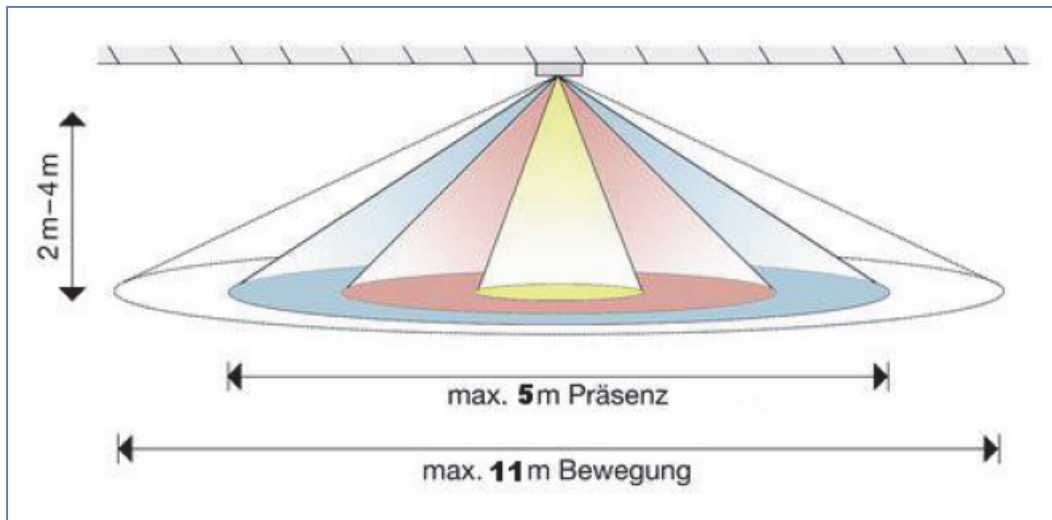


Figure 5: Detection area SCN-P360x3.01

2.5 Functions

The functions of the presence detector are divided in the areas general settings, settings for the light control, the HCV-channel, the sending behavior, the calibration for the brightness value and according to the hardware type, the constant level light control.

The following menus are shown and can be parametrized further:

- **General**
The general settings are used for the basic settings of the presence detector. The using of the day/night object, and the presence object as well as the force control release time and a cyclic heartbeat can be configured in this menu.
- **Selection light groups**
Up to 2 light groups can be activated or one light group and one HVC channel can be activated in this menu.
 - **Lightgroup 1/2** (at the SCN-PM360K3.01 only one light group can be activated)
The settings for the presence mode can be done here. So the operating mode of the light group, the sending behavior and a brightness threshold can be adjusted.
 - **HVC**
The Heating-, Ventilation-, Clima-channel is the interace of the presence detector to other subsections. The HVC-channel contains of the same options as the light groups.
- **Brightness**
Settings for the sending of the measured brightness value and a treshold value can be adjusted here.
- **Calibration brightness value**
The correction of the measured brightness value can be adjusted by a steady parameter or via the Teach-In object.
- **Constant level light** (*nur bei SCN-P360Kx.01*)
In this menu all settings for the control of the constant level light function can be done. So the presence detector can control up to 3 light bands (only SCN-P360K4.01), which are divided into main, wall and window. The detector achieves constant light in the whole room via an intelligent, proportional Master/Slave control. So the detector can compensate outer factors as sun light.

2.5.1 Overview Functions

General settings	general	<ul style="list-style-type: none"> • cyclic heartbeat telegram • force control release time • active sensors • number of light groups (only at SCN-P360K4.01) • Day-/Night-object
Light groups	Detector settings	<ul style="list-style-type: none"> • Operating mode adjustable • LED-display adjustable • Follow-Up time adjustable • Brightness threshold adjustable • Blocking object/ Force control object
	Sending behavior	<ul style="list-style-type: none"> • Object type adjustable • Polarity adjustable • Dependency of day/night adjustable • sending filter adjustable • cyclic sending
HLK	Detector settings	<ul style="list-style-type: none"> • Operating mode adjustable • LED-display adjustable • Follow-Up time adjustable • Brightness threshold adjustable • Blocking object/ Force control object
	Sending behavior	<ul style="list-style-type: none"> • Object type adjustable • Polarity adjustable • Dependency of day/night adjustable • sending filter adjustable • cyclic sending
Brightness value	Sending behavior	<ul style="list-style-type: none"> • at changes • cyclic sending • threshold adjustable • Hysteresis adjustable • Object value adjustable • sending filter adjustable
	Calibration	<ul style="list-style-type: none"> • via Parameters • via Teach-In
Constant level light function	Constant level light settings	<ul style="list-style-type: none"> • up to 3 light bands controllable • intelligent zone control • control parameter adjustable • Start-Up behavior adjustable • extended individual settings available
	Sending behavior	<ul style="list-style-type: none"> • cyclic sending activatable

Table 1: Overview functions

2.6. Settings at the ETS-Software

Selection at the product database:

Manufacturer: MDT Technologies

Product family: Presence Detectors

Product type: Ceiling

Medium Type: Twisted Pair (TP)

Product name: addicted to the used type, e.g.: SCN-PM360K4.01, Presence Detector 360° Ceiling CL
4 sensors

Order number: addicted to the used type, e.g.: SCN-PM360K4.01

The available parameters depend to the chosen product type. The additional functions for the plus variant are not shown at the normal push buttons.

2.7. Starting up

After wiring the allocation of the physical address and the parameterization of every channel follow:

- (1) Connect the interface with the bus, e.g. MDT USB interface
- (2) set bus power up
- (3) Press the programming button at the device (red programming LED lights)
- (4) Loading of the physical address out of the ETS-Software by using the interface (red LED goes out, as well this process was completed successful)
- (5) Loading of the application, with requested parameterization
- (6) If the device is enabled you can test the requested functions (also possible by using the ETS-Software)

3 Communication objects

3.1 Overview

The communication objects are divided into the categories of the submenus. The objects 0-12 are reserved for the lightgroups. The displayed objects and the length of the objects change in accordance of the adjusted settings. The object 14 is for the day/night switchover and can be activated via the general settings. Also the object 15 – “Presence” can be activated in the general settings. The objects 16 and 17 refer to the menu brightness in which the specific settings for this object can be done. They contain the current measured brightness value and the threshold value. After these objects, the objects for the Teach-In function follows. The Teach-In function is for the internal brightness compensation, especially for the constant light function. Then the objects 20-28 follows, which are responsible for the constant light function. The object 29-“Output Heartbeat” can be parametrized in the general settings.

3.2 Default-settings of the communication objects

The following table shows the default settings of the communication objects:

Default settings									
Nr.	Name	Function	Length	Priority	C	R	W	T	U
0	Output – Lightgroup 1	Switch	1 Bit	Low	X	X		X	
0	Output – Lightgroup 1	Dimming absolute	1 Byte	Low					
0	Output – Lightgroup 1	Scene	1 Byte	Low					
1	Output – Lightgroup 1 night mode	Switch	1 Bit	Low	X	X		X	
2	External Input – Lightgoup 1	Switch	1 Bit	Low	X		X		
3	Input external Movement – Lightgoup 1	Switch	1 Bit	Low	X		X		
4	Input – Lightgroup 1	Force control	2 Bit	Low	X		X		
5	Input – Lightgroup 1	Lock	1 Bit	Low	X		X		
6	Input – Lightgroup 1	Lock object On	1 Bit	Low	X		X		
+7	Light group 2								

7	Output – HLK	Switch	1 Bit	Low	X	X		X	
7	Output – HLK	Dimming absolute	1 Byte	Low	X	X		X	
7	Output – HLK	Scene	1 Byte	Low	X	X		X	
9	External Input – HLK	Switch	1 Bit	Low	X		X		
10	Input external Movement – HLK	Switch	1 Bit	Low	X		X		
11	Input – HLK	Force control	2 Bit	Low	X		X		
12	Input – HLK	Lock	1 Bit	Low	X		X		
13	Input – HLK	Lock object On	1 Bit	Low	X		X		
14	Input Day/Night	Switch	1 Bit	Low	X	X		X	
15	Presence	Switch	1 Bit	Low	X	X		X	
16	Threshold switch brightness	Switch	1 Bit	Low	X	X		X	
17	Brightness value	Brightness value	2 Byte	Low	X	X		X	
18	Input TeachIn	Start calibration	1 Bit	Low	X		X		
19	Input TeachIn	Status absolute dimming value	1 Byte	Low	X		X		
20	Constant light	Switch On/Off	1 Bit	Low	X		X		
21	Constant light	Dimming relative	4 Bit	Low	X		X		
22	Constant light	Dimming absolute	1 Byte	Low	X		X		
23	Constant light	Force control	2 Bit	Low	X		X		
24	Constant light	Lock object	1 Bit	Low	X		X		
25	Constant light	Scene	1 Byte	Low	X		X		
26	Constant light	Output dimming absolute main	1 Byte	Low	X	X		X	
27	Constant light	Output dimming absolute wall	1 Byte	Low	X	X		X	
28	Constant light	Output dimming absolute window	1 Byte	Low	X	X		X	
29	Output heartbeat	Status	1 Bit	Low	X	X		X	

Table 2: Default settings communication objects

You can see the default values for the communication objects from the upper chart. According to requirements the priority of the particular communication objects as well as the flags can be adjusted by the user. The flags allocates the function of the objects in the programming thereby stands C for communication, R for Read, W for write, T for transmit and U for update.

4 Reference ETS-Parameter

4.1 General

The following figure shows the submenu for the general settings:

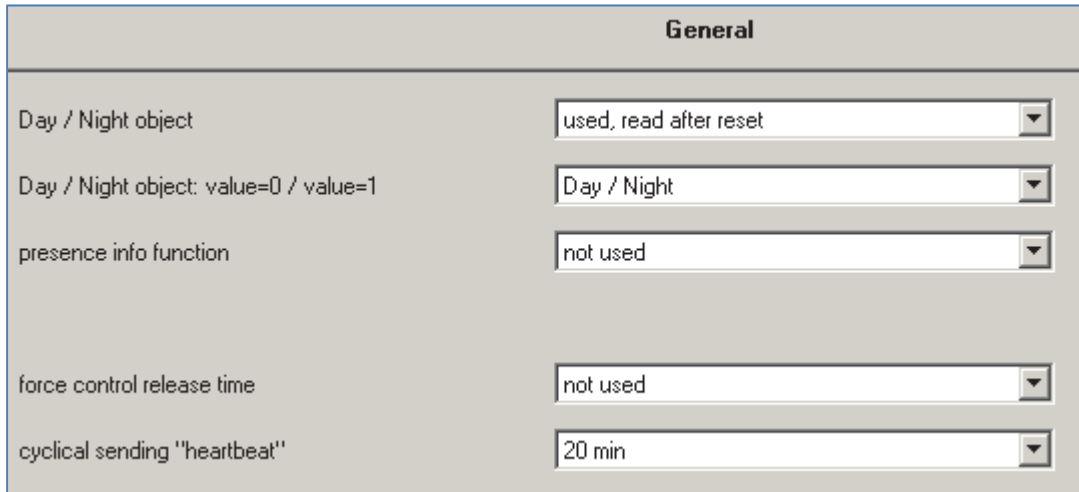


Figure 6: General settings

The following table shows the available settings for this submenu:

ETS-Text	Dynamic range [Default value]	Comment
Day/Night object	<ul style="list-style-type: none"> not used use use, read after reset 	Adjustment if a day/night object shall be used and definition of the usage after reset
Day/Night object value = 0/ value = 1	<ul style="list-style-type: none"> Day/Night Night/Day 	Polarity of the day/night object
Presence info function	<ul style="list-style-type: none"> not used send on day only send on night only send on day and night 	Activates the notification if a presence was detected
cyclical sending of presence	<ul style="list-style-type: none"> not used 5min -12h 	Adjustment if the presence shall be send cyclically
Force control release time	<ul style="list-style-type: none"> not used 5 min – 12 h 	Time which must ran out until the detector changes tot he automatic mode again
Cyclical sending “heartbeat”	<ul style="list-style-type: none"> not used 2min -24h 	shows object for the cyclic observation of the detector

Table 3: Dynamic range general settings

The functions are described at the following pages:

- **Day/Night object**

By using the day/night object, the presence detector can be switched into a day or night mode. So extended functions in the submenus are available for configuring the presence detector for a day and a night mode. For example different dimming levels can be adjusted for day (e.g. 100%) and night (e.g. 30%) or a orientation light can be switched on via a second switching object at night.
- **Presence info function**

The presence info function can show an additional object for notificating presence. If the day/night object is active, a relation between these both objects can be adjusted. The presence info function can trigger an alarm function or being used for statistic purpose.
- **Force control release time**

The force control release time defines the time which must expire until the presence detector changes from the manual mode into the automatic mode.
- **Cyclical sending "heartbeat"**

The function Cyclical sending "heartbeat" shows an object, which can be used for the cyclically observation of the presence detector. By using a superior control, it can be supervised if the presence detector is still on the bus or not. Especially in complex systems, the cancellation of lines or devices can be detected automatically.

4.2 Light/ HCV

Up to 2 lightgroups (only at presence detectors with 4 sensors, SCN-P360K4 or SCN-P360D4) or one lightgroup and one Heating, Cooling, Ventilation (HVC) can be switched by the presence detector.

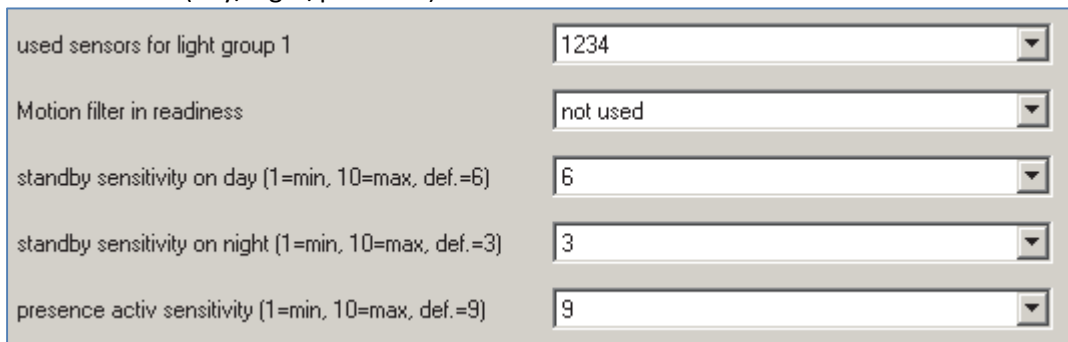
Die nachfolgende Tabelle zeigt die möglichen Einstellungen:

ETS-Text	Dynamic range [Default value]	Comment
Selection Group	<ul style="list-style-type: none"> • One light group/zone • Two light groups/zones • One light group and climate HCV 	defines which groups shall be switched from the presence detector

Table 4: Selection Lightgroups

4.2.1 Sensor configuration

The active sensors can be defined for each light group. Further more the sensitivity can be adjusted for each mode (day/night/presence):



The screenshot shows a configuration window with the following settings:

- used sensors for light group 1: 1234
- Motion filter in readiness: not used
- standby sensitivity on day (1=min, 10=max, def.=6): 6
- standby sensitivity on night (1=min, 10=max, def.=3): 3
- presence activ sensitivity (1=min, 10=max, def.=9): 9

Figure 7: Sensor configuration

The functions are described in detail below:

- used sensors**
 This setting defines which sensors are relevant for the evaluation of this lightgroup/HVC channel.
 The alignment of the sensors is described in the chapter “2.4 Installation & instructions for mounting”.
- Motion filter in readiness**
 For filtering movements with little intensity in the standby mode, a motion filter can be activated. This motion filter filters motions of short time periods, e.g. movements on he corridor by opened door.
 This parameter should be activated if the detector triggers an action repeatedly in the standby mode.

- Standby sensitivity on day/night**
 The presence detector is in the standby mode if no presence was detected and so the detector is switched off. If the day/night object is active, different sensitivities can be adjusted for the day and the night mode. A lower sensitivity prevents faulty activations.
- Presence active sensitivity**
 In order that the presence detector detects every movement at the presence mode (= detector has detected a motion and is switched on), a higher sensitivity can be adjusted for this case.

The following figure demonstrates the motion sensitivity:

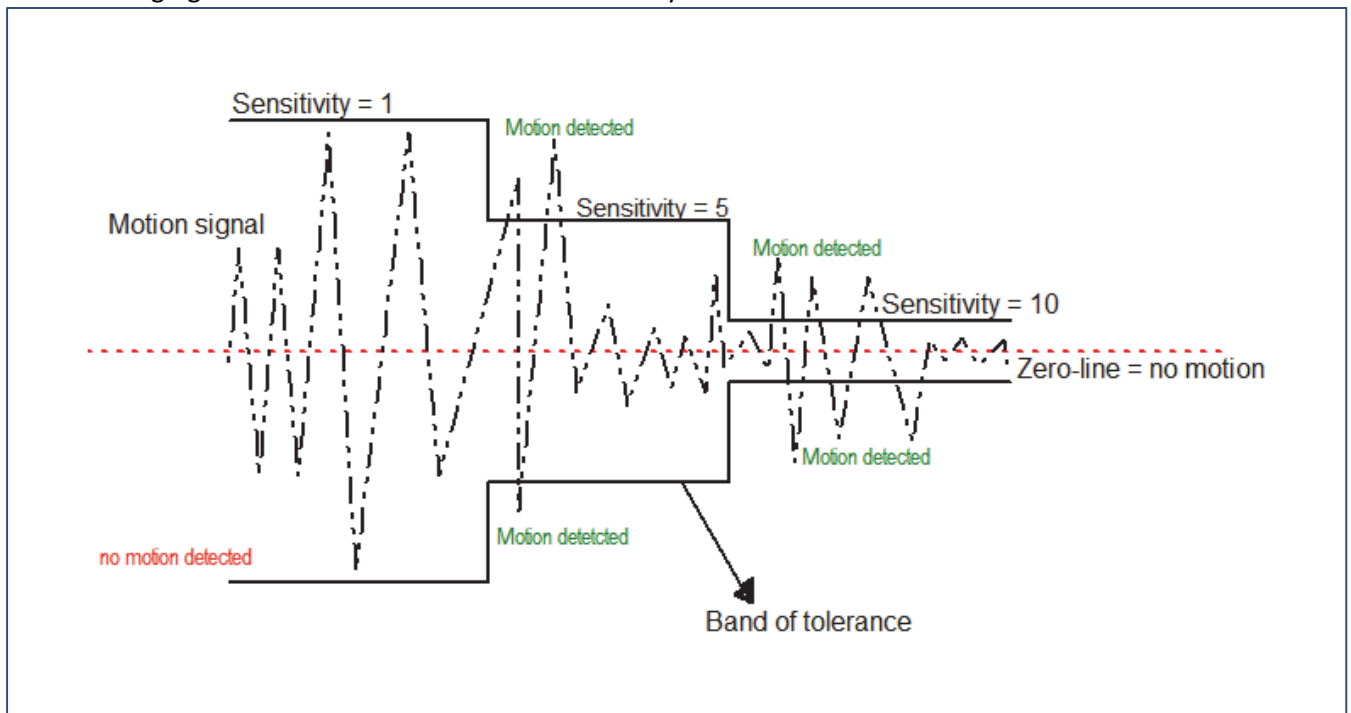


Figure 8: Motion sensitivity

The upper figure shows the effect of the different settings to the motion sensitivity. A lower motion sensitivity causes a larger range of tolerance. A higher motion sensitivity causes a smaller range of tolerance. Every infrared signal (dotted line), which is out of the range of tolerance is detected as motion.

For configuring the detector in a way that small signals, e.g. passing a door, not cause an activation, the sensitivity must be set to a lower value, so the range of tolerance is set to a higher value.

4.2.2 Detector configuration

The following illustration shows the available settings for detector at a light group:

operating mode of detector	fully automatic
LED green	show movement
follow-up time	5 min
lower active brightness threshold	400 Lux
upper disable brightness threshold	not used
force or lock object	force control object

Figure 9: Settings light group

At the HVC Mode the brightness treshold is replaced by the parameter “number of monitoring time slot” and “length of monitoring time slot(s)”:

operating mode of detector	fully automatic
follow-up time	5 min
number of monitoring time slot	3
length of monitoring time slot (s)	30
force or lock object	force control object

Figure 10: Settings HVC

The following chart shows the available settings for these parameters:

ETS-Text	Dynamic range [Default value]	Comment
Operating mode of detector	<ul style="list-style-type: none"> • fully automatic • semi automatic 	Adjustment of the operating mode
LED green (only at light group 1&2)	<ul style="list-style-type: none"> • Off • show movement • show movement on day only 	Definition of the switching behavior of the green LED
Follow-up time	1s – 4h [5 min]	Definition of the On-period
Lower active brightness threshold (only at light groups)	0-2000 Lux [400 Lux]	Adjustment below the detector shall work; the sensor is not active at greater brightness values
Upper disable brightness threshold (only at light groups)	not used , 10-2000 Lux	Adjustment at which upper value the detector is disabled
Number of monitoring time slots (only at HCV)	0-32 [3]	Definition how much motions must be detected before the presence detector switches on
Length of monitoring time slot (only at HCV)	0-3000s [30s]	Adjustment of the length of the monitoring time slot
Force or lock object	<ul style="list-style-type: none"> • Force control object • Lock object universal • Lock object universal and force object ON 	Adjustment if a force control object or a lock object shall be used

Table 5: Setting detector

The parameters are described in detail as follows:

- **Operating mode**

The operating mode is divided into fully automatic and semi automatic. So the presence detector can be configured for greater rooms as Master/Slave. The Master/Slave mode is described in detail in an extra chapter.

- **fully automatic**

If the presence detector is configured as fully automatic, every detected presence causes power-on of the output.

- **semi automatic**

At the semi automatic mode, the output is only switched on if the detector detects a presence and the object External Input – light group 1/2 /HCV receives an on-signal at the same time.

- **Follow-up time**
The follow-up time defines the power-on time. The detector switches on at detected presence until the adjusted follow-up time runs out.
- **Sensor activation/-deactivation**
The sensor activation/deactivation is only available at light groups. By using this setting, the detector can get a determined working zone. The parameter "Lower active brightness threshold" defines the brightness threshold below the detector works as normal presence detector. If the brightness is higher than this threshold, no motion will be detected. The sensor is not switched off upper this brightness threshold. This behavior can be achieved by using the parameter "Upper disable brightness threshold". This value should not be adjusted to low, because this could effect a steady switching of the output.
- **Monitoring time slots**
The Monitoring time slots are only available for the HCV channel. This setting causes that a longer detection is necessary for switching the detector on. For switching the channel on, in every time slot at least one motion must be detected.
- **Force control /Lock object**
The object can be used as well as force control object or as lock object. The force control object has 3 different states:
 - Force control ON (control = 1, value = 1)
At this mode an on-command is sent to the output. The evaluation is stopped and the follow-up time starts. If no command is received at the force control object after the follow-up time, the detector switches back into the normal mode.
 - Force control OFF (control = 1, value = 0)
At this command an off-command is sent to the output. The evaluation is stopped and the follow-up time starts. If no command is received at the force control object after the follow-up time, the detector switches back into the normal mode.
 - Force control AUTO (control = 0 value = 0)
After sending this command, the normal mode of the detector starts.

The lock object can be used with the following settings for the activation and deactivation:

- Force control ON
Same functionality as described at Force Control ON.
- Force control OFF
Same functionality as described at Force Control OFF.
- Automatic mode
The detector switches again to the automatic mode.
- Lock (actual state)
The detector is locked in the current state.

Additionally a second lock object can be shown for the lock object, the lock object ON. This object switches the output continuous ON.

4.2.3 Communication object settings

The following chart shows the available settings for the communication objects of the light groups/HCV group:

Das nachfolgende Bild zeigt die Einstellmöglichkeiten für die Kommunikationsobjekte für Licht/HLK:

object type for output - light	Switching
object value on day for On	On
object value on day for Off	Off
object value on night for On	On
object value on night for Off	Off
use 2. switch object for night	No
switching object send at	On and Off
cyclical sending of object value ON	not used
external input reacts on	On and Off
idle time after switch off	10 s

Figure 11: Communication object settings light groups/HCV group

The following table shows the available settings for these parameters:

ETS-Text	Dynamic range [Default value]	Comment
Object type for output - light	<ul style="list-style-type: none"> • Switching • Dimming absolute • Scene 	Adjustment of the switching object of the light group output
Object type for output – climate(HCV)	<ul style="list-style-type: none"> • Switching • Send value • Scene 	Adjustment of the switching object of the HCV output
Object value on day for On	<ul style="list-style-type: none"> • On/Off • 0-100% [100%] • Scene 1-32 [5] 	Adjustment of the sending at this state
Object value on day for Off	<ul style="list-style-type: none"> • On/Off • 0-100% [0%] • Scene 1-32 [6] 	Adjustment of the sending at this state
Object value on night for On	<ul style="list-style-type: none"> • On/Off • 0-100% [100%] • Scene 1-32 [7] 	Adjustment of the sending at this state
Object value on night for Off	<ul style="list-style-type: none"> • On/Off • 0-100% [0%] • Scene 1-32 [8] 	Adjustment of the sending at this state
Use 2. switch object at night (only at light groups and object type switch)	<ul style="list-style-type: none"> • Yes • No 	shows a second switching object for the night mode, e.g. for switching an orientation light
Standby/Orientationlight (only at light groups and object type dimming absolute)	<ul style="list-style-type: none"> • used • not used 	Activation of a standby function, which starts after expiration of the follow-up time
Standby time on day/night	<ul style="list-style-type: none"> • no delay • 1s – 60min 	Adjustment of the duration of the standby time
Standby dimming value on day/Night	1- 100% [1%]	Adjustment of the dimming value for the standby function
Switching object send at (only at object type switching)	<ul style="list-style-type: none"> • send nothing • only ON • only OFF • ON and OFF 	Sendefilter für das Ausgangsobjekt
Cyclical sending of object value ON	<ul style="list-style-type: none"> • not used • 1min – 60min 	Activation of cyclic sending
External input reacts on	<ul style="list-style-type: none"> • send nothing • only ON • only OFF • ON and OFF 	Input filter for the object External Input – light group 1/2/HCV
Idle time after switch off	1s – 60s [10s]	Time, which must expire after switching off for detecting a new movement

Table 6: Communication object setting presence function

The following chart shows the relevant communication objects for the first light group:

Number	Name	Length	Usage
0	Output – light group 1	1 Bit/ 1Byte	Output for the first light group; Length and type depends to the parameter Object type for output
1	Output – light group 1 night mode	1 Bit	Output for the orientation light at night mode
2	External Input – light group 1	1 Bit	External input for Push Buttons/Indication object of an actuator for switching the light
3	Input external movement – light group 1	1 Bit	External input for second detector
4	Force control	2 Bit	Force control object; switches the detector as described above
4	Lock	1 Bit	Lock object; switches the detector as the adjusted settings
5	Lock object ON	1 Bit	Lock object, which switches the detector on with a 1-command

Table 7: Communication objects light

If a second light group is activated, the same communication objects with the same functionality are shown.

The following table shows the relevant communication objects for a HCV channel:

Number	Name	Length	Usage
7	Output – climate (HCV)	1 Bit/ 1Byte	Output for the HCV group; Length and type depends to the parameter Object type for output
8	External Input – climate (HCV)	1 Bit	External input for Push Buttons/Indication object of an actuator for switching the HCV group
9	Input external movement – climate (HCV)	1 Bit	External input for second detector
10	Force control	2 Bit	Force control object; switches the detector as described above
11	Lock	1 Bit	Lock object; switches the detector as the adjusted settings
12	Lock object ON	1 Bit	Lock object, which switches the detector on with a 1-command

Table 8: Communication objects HCV

4.3 Brightness

The following figure shows the available settings for the brightness detection:

Brightness	
send brightness on change of	50 Lux
cyclical sending of light value	not used
value for switching the threshold switch	300 Lux
hysteresis of threshold switch	30 Lux
object value on day for On	On
object value on night for On	On
object value for Off	Off
send on day only	On and Off
send on night only	On and Off

Figure 12: Settings brightness

The following table shows the available settings for these parameters:

ETS-Text	Dynamic range [Default value]	Comment
Send brightness on change of	<ul style="list-style-type: none"> not used 20 Lux – 1800 Lux [50 Lux] 	Minimum rate of change for sending the current brightness
Cyclical sending of light value	<ul style="list-style-type: none"> not used 5s – 30min 	Adjustment of a determined time span for sending the current brightness
Value for switching the threshold switch	60Lux – 1000 Lux [30 Lux]	Adjustment of the threshold for switching
Hysteresis of threshold switch	5 Lux– 200 Lux [30 Lux]	Distance between value for switching ON and OFF
Object value on day for On	<ul style="list-style-type: none"> ON OFF 	Adjustment of the polarity
Object value on night for On	<ul style="list-style-type: none"> ON OFF 	Adjustment of the polarity
Object value for off	<ul style="list-style-type: none"> ON OFF 	Adjustment of the polarity

Send on day only	<ul style="list-style-type: none"> • send nothing • only ON • only OFF • ON and OFF 	Sending filter at day mode
Send on night only	<ul style="list-style-type: none"> • send nothing • only ON • only OFF • ON and OFF 	Sending filter at night mode

Table 9: Settings brightness

At the Menu brightness the sending behavior for the measured brightness value can be adjusted. The measured brightness value can be send at determined changes or at determined times. Additional a treshold can be defined. This threshold can be adjusted with a hysteresis for preventing of frequently switching. The effect of the hysteresis shows the following figure:

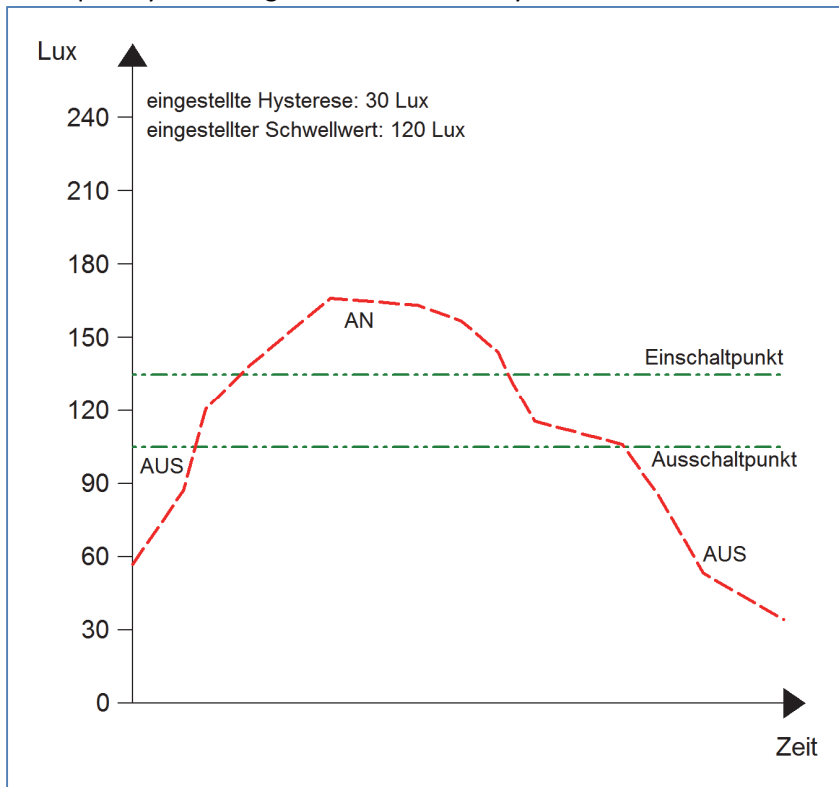


Figure 13: Hysteresis brightness threshold

Further more the polarity and the sending behavior can be adjusted by the parameters Object value for day/night/off and “Send on day/night only”.

The following table shows the relevabt communication objects:

Number	Name	Length	Usage
16	Threshold switch brightness	1 Bit	sends the adjusted value at exceedance or undercut
17	Brightness value	2 Byte	measured brightness value

Table 10: Communication objects brightness

4.4 Calibration brightness value

The following figure shows the available settings for the calibration of the brightness value:

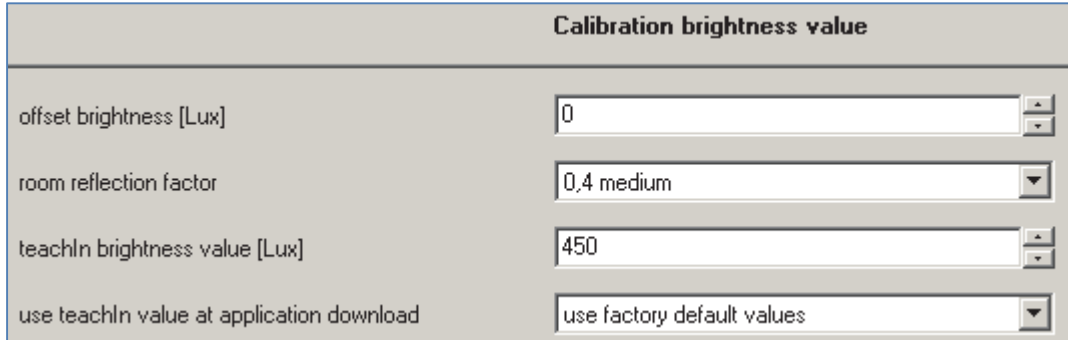


Figure 14: Calibration brightness value

The following chart shows the available settings for this parameter:

ETS-Text	Dynamic range [Default value]	Comment
Offset brightness [Lux]	-100 – 100 [0]	Increasing/Decreasing by the adjusted value
Room reflection factor	<ul style="list-style-type: none"> • 1 • 0,7 very high • 0,5 high • 0,4 medium • 0,3 low • 0,25 low • 0,2 very low 	Reflection factor of the environment; indicates how much light is reflected back (1=100% / 0=0%)
TeachIn brightness value[Lux]	200-1000 [450]	Comparison value for external import
Use TeachIn value at application download	<ul style="list-style-type: none"> • hold TeachIn values • Use factory default values 	Adjustment if the presence detector shall keep the TeachIn values after a download or use the factory default values

Table 11: Calibration brightness value

Consecutively the parameters are described in detail:

- **Offset brightness**

The correction of the brightness value is a simple offset of the measured brightness value. So at a value of -50, the measured value is reduced by 50. By this setting the presence detector would send at a value of 400 at measured value of 450.

- **Reflection factor**

The reflection factor indicates how much of the emitted light is reflected by the environment back to the light source. The value 1 means that 100% of the emitted light is reflected back to the light source. At dark floors, a value of 0,25, is recommended.

Die nachfolgende Tabelle dient als Orientierung um den Reflexionsfaktor an Ihren Raum anzupassen:

Metalle, Farbanstriche, Baustoffe	Reflexionsgrad
Aluminium, hochglänzend	0,80-0,85
Aluminium, mattiert	0,50-0,70
Stahl, poliert	0,50-0,60
Weiß	0,70-0,80
Hellgelb	0,60-0,70
Hellgrün, hellrot, hellblau, hellgrau	0,40-0,50
beige, ocker, orange, mittelgrau	0,25-0,35
Dunkelgrau, dunkelrot, dunkelblau	0,10-0,20
Putz, weiß	0,70-0,85
Gips	0,70-0,80
Beton	0,30-0,50
Ziegel, rot	0,10-0,20
Glas, klar	0,05-0,10

Table 12: List of reflection factors

If no TeachIn is performed, the measured brightness can be corrected with the reflection factor. If a TeachIn is performed, the brightness value is corrected automatically. The TeachIn must not be changed after the TeachIn process.

The TeachIn process for presence detectors with constant level light or without constant level light is different in execution and effect.

Especially at presence detectors with constant level light, the TeachIn should be performed for improving the accurateness of the constant level light.

The process for the TeachIn with constant level light (SCN-P360K3.01 und SCN-P360K4.01) is described in the following chapter, the TeachIn process for presence detector without constant level light (SCN-P360D3.01 und SCN-P360D4.01) is described in the next but one.

4.4.1 Approach at Teach-In with constant level light

For using the whole advantages of the intelligent constant light control, the presence detector must be adjusted once via the Teach-In process. Therefore a luxmeter is needed.

The approach is as follows:

1. Adjust the parameter "TeachIn brightness value" to the desired brightness value.
Mostly 400-500 Lux are used.
2. Adjust the Parameter "Use TeachIn value at application download" from "Use factory default values" to "hold TeachIn values".den gewünschten Wert.
3. Make the desired settings for the constant light function. (have a look at chapter 4.5)Aktivieren Sie die Regelung mit den gewünschten Einstellungen
4. Connect the communication objects for the different light groups with the objects of the dimming actuator
5. Connect the object "19-Status absolute dimming value" with the status object of the dimming actuator for the light group in the middle.
6. Connect the object "18-Calibration start" with a new group address, if the calibration shall be activated via the ETS (Group monitor) or with a push button.
7. Download the application.
8. The room must be darkened or the measurement must be performed in the twilight. The presence detector teaches the brightness and dimming values via the Teach-In function. If the Teach-In is performed at day-/sunlight the measurement is disturbed and the saves wrong values.
9. Activate the Teach-In function by sending a logical 0 to the object 18. The green LED in the presence detector starts flashing with a 1s rhythm. Sending a logical 0 again causes an interruption of the Teach-In process.
10. Change the brightness value by sending dimming values (absolute or relative) until the Luxmeter shows the adjusted value (TeachIn brightness value) at the desired height.
11. Now send a logical 1 to the object 18. The red and green LED flashes alternating.
12. The presence detector adjusts now the brightness measurement, teaches the appropriated dimming value and learns the brightness value at different dimming values.
13. After successful end of the Teach-In process, the green LED flashes fast for 10 seconds. The control is started again automatically and adjusts the brightness to the reference value. If an error occurs, the process is aborted and the red LED flashes fast for 10 seconds. This can occur if for example no valid dimming value is available (status). Check point 5 and start the process again.
14. If the parameter "use switch on dimming value" is adjusted to "calculate switch on value", the switch on value is calculated automatically now.

The behavior of the LED and its meaning can be extracted from the chart below:

LED behavior	State
green LED flashes slowly	TeachIn is activated; detector is at the TeachIn modeZ
green and red LED flash alternating	TeachIn process is running
green LED flashes fast for 10 seconds	TeachIn process is completed successful
red LED flashes fast for 10 seconds	TeachIn process causes an error

Table 13: LED behaviour at Teach-In

The following chart shows the relevant communication objects:

Number	Name	Length	Usage
18	Calibration start	1 Bit	starts the alignment via Teach-In
19	Status absolute dimming value	1 Byte	must be connected to the status value of the dimming actuator

Table 14: Communication objects Teach-In

4.4.2 Approach at Teach-In without constant level light

The TeachIn process at presence detectors without constant level light is for correcting the measured value.

The process is as described below:

1. Adjust the parameter "TeachIn brightness value" to the desired brightness value.
The best way doing the Teach-In process is to darken the room and switch the artificial lights on. Now the brightness must be measured via a luxmeter and the measured value must be set for the parameter "TeachIn brightness value".
2. Adjust the Parameter "Use TeachIn value at application download" from "Use factory default values" to "hold TeachIn values".den gewünschten Wert.
3. Connect the object "18-Calibration start" with a new group address, if the calibration shall be activated via the ETS (Group monitor) or with a push button.
4. Download the application.
5. Activate the Teach-In function by sending a logical 1 to the object 18.
6. Now the presence detector has adopted the adjusted value as new measurand and corrects its measurement from now according to the TeachIn value.

4.5 Constant level light

By using the new proportional Master/Slave Constant level light regulation, the light of the room can be controlled intelligent so that outer light has no influence to the light in the room. Up to three light groups can be controlled in a way that the brightness all over the room has the same level independent of outer influences of the sun or other lights. The light control helps saving energy.

Notice: The light groups should be set to one light group or one light group and HCV. A Constant level light regulation of to light groups/zones is not reasonable.

The following figure shows the principal of the constant level light control:

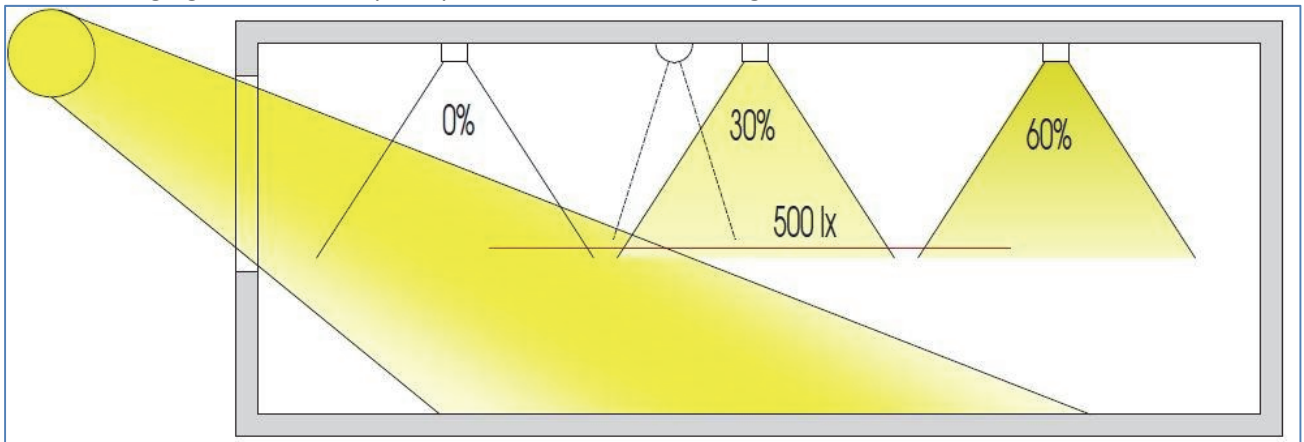


Figure 15: Overview proportional zone control

4.5.1 General settings/ Main principle regulation

The following figure shows the available settings for the general settings of the constant level light regulation:

Constant light	
constant light control	enabled
Control out sun light	normal
select light-band	light group main + wall + window
influence proportional wall control	medium (x0,7)
influence proportional window control	medium (x1,6)

Figure 16: General settings constant level light regulation

The following table shows the available settings for configuring the constant level light regulation:

ETS-Text	Dynamic range [Default value]	Comment
Constant light control	<ul style="list-style-type: none"> • disabled • enabled 	Activation/Deactivation of the constant level light regulation
Control out sunlight	<ul style="list-style-type: none"> • normal • few • very few 	defines the influence of the solar radiation to the regulation
Selection light band	<ul style="list-style-type: none"> • 1 light group • light group main + wall • light group main + window • light group main + wall + window 	Selection of the light bands, which shall be controlled
Influence proportional wall control	<ul style="list-style-type: none"> • no change (x 1) • very low (x 1,2) • low (x 1,4) • medium (x 1,6) • high (x 1,8) • very high (x 2) 	defines the influence of the light group wall to the constant level light regulation
Influence proportional window control	<ul style="list-style-type: none"> • no change (x 1) • very low (x 0,9) • low (x 0,8) • medium (x 0,7) • high (x 0,6) • very high (x 0,5) 	defines the influence of the light group window to the constant level light regulation

Table 15: General settings of the Constant level light regulation

The parameter “Influence proportional zone control” indicates the influence of the light group to the constant light control. The setting “no change” (x 1) switches the linearity of the regulation off and all light groups light always with the same brightness. The setting “very high” (x 0,5 at window and 2 at wall) deactivates means that the difference between the absolute dimming values of wall and window is very high.

If a room shall be controlled via the constant level light control, it is recommended to use the TeachIn function to get best results.

The influences of the light groups wall and window must be adapted to the specific conditions in the room. Simplified you can say as larger the room as greater must be the difference of the controlling parameter to 1. But it is recommended to check the parameters always locally and adapt them if necessary.

The regulation can be aligned via the parameter “Control out sunlight”. If the presence detector compensated solar radiation too strong, the value of this parameter should be set to few or very few. An alternative method is installing the presence detector more into the middle of the room.

The following diagram shows the dimming behavior for the 3 light groups at different solar irradiation. The TeachIn value is achieved, at this example, at an absolute dimming value of 80% with 450Lux. The influences are both set to medium.

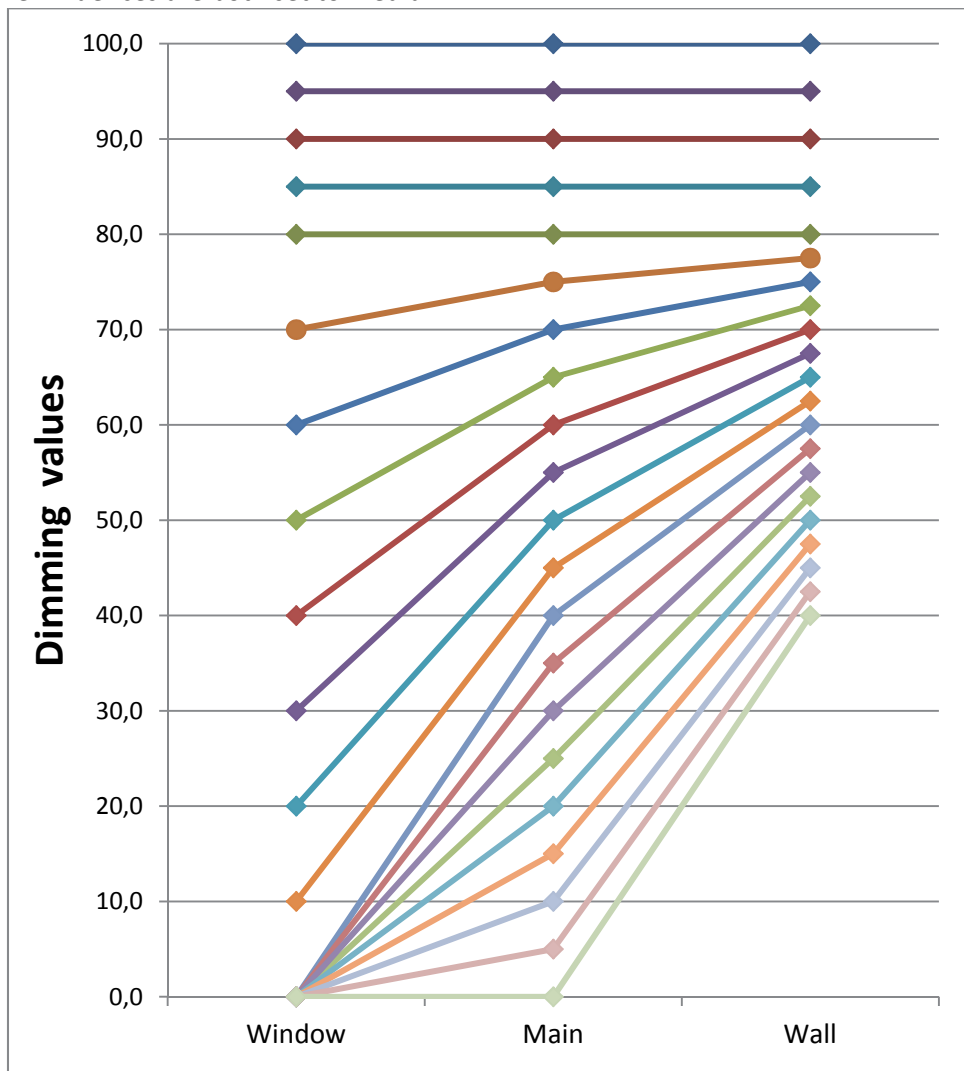


Figure 17: Behavior proportional zone control

The diagram shows that the light at the window is dimmed more than the light at the main band and the wall.

If the solar irradiation decreases, all light bands will be dimmed again to 80%.

If the illumination is set from e.g. 450Lux to 300Lux (via relative dimming, absolute dimming or scene), the comprehension of the control factor will automatically set at the right dimming value. In this case, e.g. at 50%. Without solar irradiation the three light bands regulate to 300 Lux with a dimming value of 50%. With solar irradiation, the dimming values below 50% shift appropriate.

By using the new “proportional Master/Slave Constant level light regulation” all disadvantages of the commercially available “Offset Master/Slave Constant level light regulation” with constant offset are fixed.

The following diagram shows the influence of the different control parameters to the regulation:

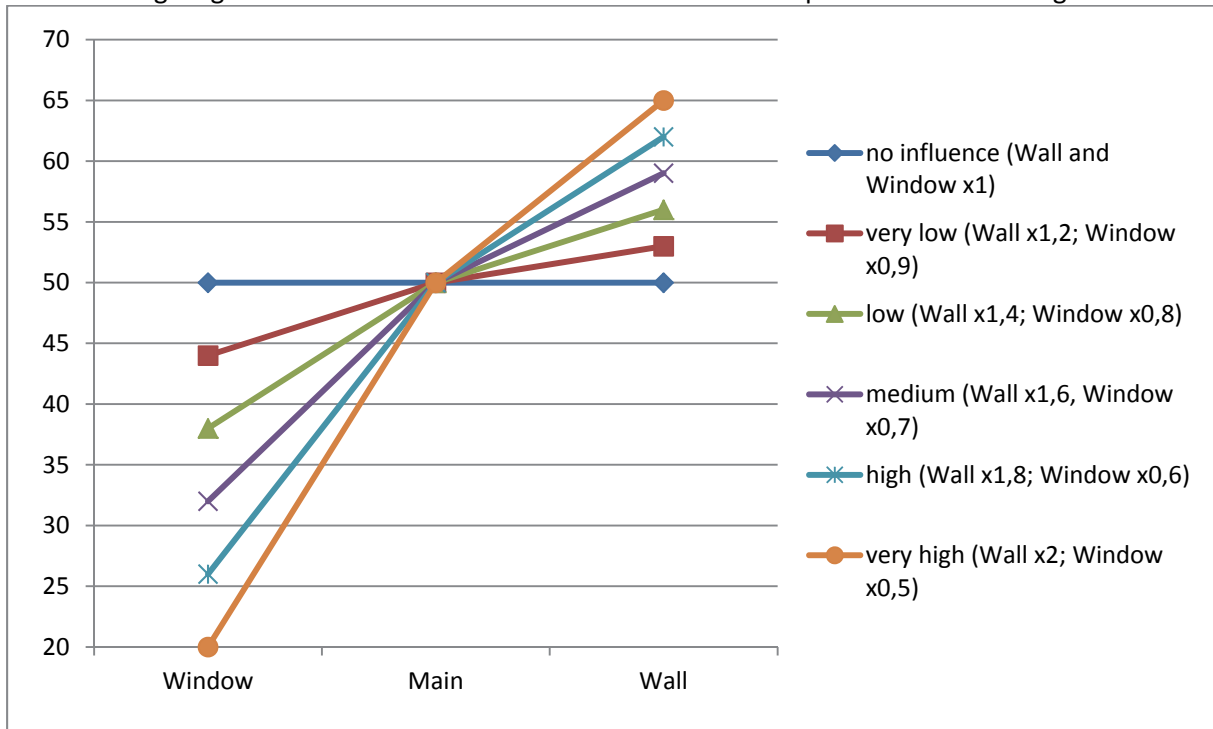


Figure 18: Influence control parameters

4.5.2 Available settings

The following figure shows the available specific settings for the constant level light control:

constant light controlled by	external object
switch On control delay	5 s
use switch on dimming value	calculate switch on value
brightness value [Lux] for switch on	use parameter value
Controller switches the light off	locked
use Day / Night object	not used
preset setpoint	450 lx
cyclical sending of dimming value	not used
send dimming value on change of	1%
CL behavior at relative dimming	use new dimming value
relative dimming time	20 s
standby / orientationlight	not used
lock object active	No
scenes	not used

Figure 19: Available settings constant light control

The following table shows the available settings:

ETS-Text	Dynamic range [Default value]	Comment
Settings switching behavior/Regulation		
Constant light controlled by	<ul style="list-style-type: none"> external object Presence 	Adjustment of the switch on behavior
Switch on control delay	1s – 5min [5s]	Adjustment of the delay between activation and start of regulation
Use switch on dimming value	<ul style="list-style-type: none"> Parameter (select dimming value) TeachIn (tached dimming value) Calculate switch on value 	Adjustment of the power up value
Brightness value [Lux] for switch on	<ul style="list-style-type: none"> use last dimming setpoint use parameter value 	Adjustment if the last setpoint shall be calculated from relative dimming, the scenes or being load from the parameters
Use day/night object	<ul style="list-style-type: none"> not used use for next switch on use directly and for next switch on 	Activates the usage of the day/night switchover. At activated day/night switchover, two setpoints (day and night) are shown otherwise only one setpoint is shown
Preset setpoint at day	100 – 750 Lux [450 Lux]	Setpoint for day mode
Preset setpoint at night	100 – 750 Lux [100 Lux]	Setpoint for night mode
Controller switches light off	<ul style="list-style-type: none"> locked enabled 	Adjustment if the controller may switch the light off at a strong sun radiation
Settings for the dimming behavior		
Cyclical sending of dimming value	<ul style="list-style-type: none"> not used 12 s -10 min 	defines the time for the cyclic sending of the dimming value
Send dimming value on change of	0-20% [2%]	defines the minimal change for sending the dimming value
CL behavior at relative dimming	<ul style="list-style-type: none"> use new dimming value Disable CL control 	Adjustment if regulation stays active at relative dimming
Relative dimming time	5 – 60s [20 s]	defines the time for dimming from 0 to 100%

Table 16: Settings Constant light control - 1

ETS-Text	Dynamic range [Default value]	Comment
Settings standby/orientation light		
Standby/Orientationlight	<ul style="list-style-type: none"> not used used 	Setting if the light shall stay on after switching off
Standby setpoint	100 – 750 Lux [100 Lux]	Value for the standby mode
Standby time	<ul style="list-style-type: none"> 1s – 60min [15s] 	Length of standby mode
Settings lock object		
Force control active	<ul style="list-style-type: none"> Yes No 	activates the force control
Lock object value = 1	<ul style="list-style-type: none"> off on (100%) no change (hold value) select value 	Adjustment of the action at activation
Value set (nur bei „Wert einstellbar“)	0-100% [0%]	defines the value for active force control
Lock object value = 0	<ul style="list-style-type: none"> off on (100%) no change (hold value) restore previous state 	Adjustment of the action at deactivation

Table 17: Settings Constant light control - 2

The parameters are described below:

- Adjustment switching behavior/Regulation**

The general settings for the constant level light regulation can be done here.

The parameter “Constant light controlled by” defines whether the constant light shall be switched via presence or an external object, which could be connected to push button, etc.

The parameter “Use switch on dimming value” defines the start-up value of the regulation. It can be calculated directly by the internal calculating routine or power up with a fixed value. Also the time between powering up and starting calculation can be defined.

The parameter “Brightness value [Lux] for switch on” defines if the regulation shall work with the parameterized value or the last setpoint, which can be set by a relative or absolute dimming value or via the scene function.

Further more the regulation can be parameterized with different values for day and night via the parameter “Use day/night object”.

The parameter „Controller switches light off” defines if the controller switches the light off at a strong sun radiation. If the parameter is set to locked, the output will not be set to 0% even if the sun radiation is strong enough. The output is set to a minimum value. This setting is very useful in offices or workrooms, because a switch-off of the lights is felt as annoying for most people. However, the energy saving aspects is still valid, because at dimming to e.g. 20%, 80% of the normal energy consumption is saved.

- **Settings dimming behavior**

The dimming value can be sent as well cyclical as at a fixed percental rate of change. The parameter “CL behavior at relative dimming” defines if the regulation shall be switched off at relative dimming or work with the new value.

- **Settings standby/orientation light**

The standby/orientation light defines shading of the room after cutout of the constant light control. That means, that the controller does not switch the lights off, but switches to the adjusted value.

- **Settings lock object**

This parameter activates an additional lock object, which locks the constant level light control and switches the output in a fixed state.

The following states are available:

- Off: The output is switched off (0%).
- On: The output is switched on (100%):
- No change: The current absolute value is hold.
- Select value(only at lock): The adjusted absolute value is called.
- Restore previous state(only at unlock): The absolute value which had the constant light before locking is called again.

The following table shows the relevant communication objects for the constant light control:

Number	Name	Length	Usage
20	Switch on/off	1 Bit	external object for activating the regulation
21	Dimming relative	4 Bit	manual adjustment of the current brightness
22	Dimmin absolute	1 Byte	Adjustment current brightness of new absolute value
24	Lock object	1 Bit	Locking the regulation
26	Output dimming absolute main	1 Byte	Output for main group
27	Output dimming absolute wall	1 Byte	Output for wall group
28	Output dimming absolute window	1 Byte	Output for window group

Table 18: Communication objects constant light control

4.5.3 Scenes

The following figure shows the available settings for the scene function of the constant light control:

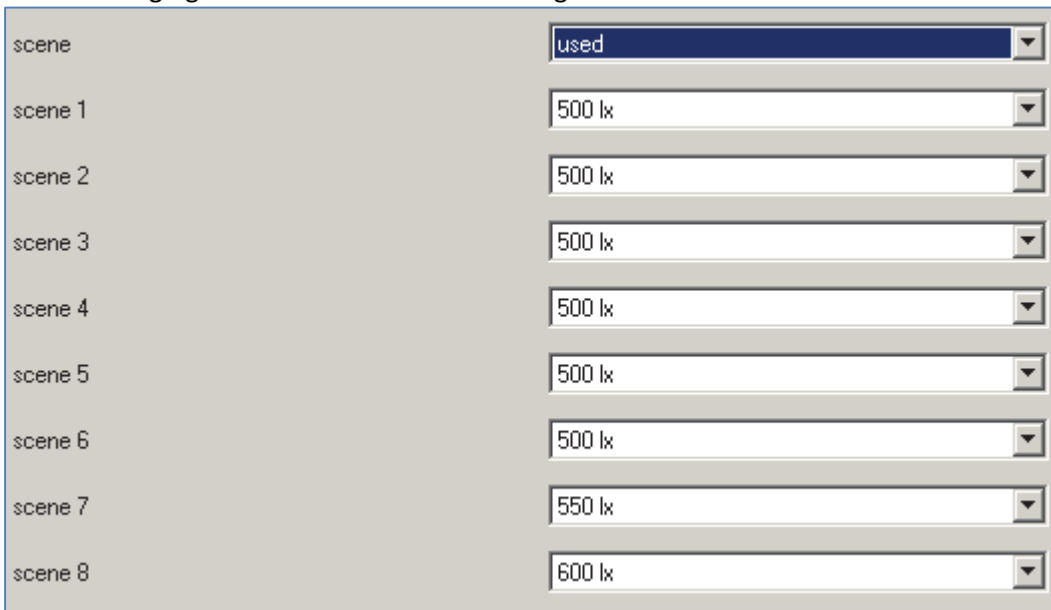


Figure 20: Scene function constant light control

The constant light control can get a new setpoint via the scene function, by sending the scene number at the communication object for the scenes. The regulation takes the adjusted value as new setpoint.

The following table shows the communication object for the setpoint of the scene function:

Number	Name	Length	Usage
25	Scene	1 Bit	Reading in of the scene

Table 19: Communication object scene function

4.5.4 Approach at Start-Up

For activating the constant level light regulation, the following steps are necessary:

1. Parameterizing the presence detector as desired including TeachIn function (Submenu Calibration brightness value), Constant light and General.
2. Connecting of all necessary objects
3. Run TeachIn function as described in 4.4.1 Approach at Teach-In
4. Now the constant light control is adjusted completely

4.6 Master/Slave

4.6.1 Light groups

In larger rooms often more than one presence detector is required. For detecting presence all over the room, presence detectors must be allocated in the whole room. But also in this case a detected presence shall cause always the same settings independent of the place of detection. In this case one detector operates as Master and a arbitrary number of presence detectors work as Slave.

The settings for the Master/Slave mode can be done in the submenu "light groups".

The Slaves must be configured as follows:

- Adjustment to fully automatic (every movement shall be sent)
- Set follow-up time to the same value as the Master
- Activate cyclic sending for the output
 - Parameter: Cyclical sending of object value ON
 - Guidance value: 1min, at greater Follow-up time, e.g. 15min, the cyclical sending can be set up to a greater value, e.g. 5min, for minimizing the bus load
- Brightness value for "lower active brightness threshold" to maximum value
- Brightness value for "upper disable brightness threshold" to not used

The Master can be parameterized as desired as fully automatic or semi automatic.

For the follow-up time a value of 10 min is recommended.

The connection of the objects must be done as follows:

- all output objects of the Slaves (object 0) must be connected with the object external movement (object 3) of the Master.

Now the Master evaluates every detected presence of itself and the detected presence of every Slave and switches the light according to its settings, regardless which presence detector has detected a movement.

4.6.2 HVC

The Master/Slave circuit can also be used for HVC channels. In this case, the slave must be adjusted in the same way as the slaves for the light groups. But the settings for the brightness values have not to be applied. The settings for the monitoring time slots must be made according to the individual desires.

The connection of the communication objects must be done as follows:

- All output objects of the slaves (object 0) must be connected to the object external movement (object 10) of the Master.

4.7 Other/ Examples of use

At this chapter, examples of use/areas of use for the presence detector are given. The examples are only suggestions and if necessary they must be adapted to the actual state.

4.7.1 Blackboard light via second light group

For switching the light in a classroom according to its specific use, a presence detector is used for switching the room light. But often a second light at the blackboard is necessary for which a second light group can be used. This light must also switch on request and shall switch off automatically, when the teacher/lecturer leaves the area before the blackboard again. For realizing this scenario in small rooms, only one presence detector is needed. At greater rooms a second presence detector, which is used as Slave can be useful.

The first presence detector for the blackboard light must be parameterized as follows:

Selection of lightgroups:	2 light groups
1. light group:	
Operating mode:	fully automatic
Active sensors:	1234
other parameters:	according to usage
2. light group:	
Operating mode:	semi automatic
Active sensors:	1234
other parameters:	according to usage

The output objects of the light group must be connected to the switching objects of these light groups.

The object "external input" of the second light group must be connected to the push button, which sends the requirement for the blackboard light. The push button must send an 1-signal to the object.

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6 Attachment

6.1 Statutory requirements

The above-described devices must not be used with devices, which serve directly or indirectly the purpose of human, health- or lifesaving. Further the devices must not be used if their usage can occur danger for humans, animals or material assets.

Do not let the packaging lying around careless, plastic foil/ -bags etc. can be a dangerous toy for kids.

6.2 Routine disposal

Do not throw the waste equipment in the household rubbish. The device contains electrical devices, which must be disposed as electronic scrap. The casing contains of recyclable synthetic material.

6.3 Assemblage



Risk for life of electrical power!

All activities on the device should only be done by an electrical specialist. The county specific regulations and the applicable EIB-directives have to be observed.

MDT Presence Detector, flush mounted

Version		
SCN-P360D4.01	Presence Detector, 4 pyro detectors	Light sensor (Presence max. 8m)
SCN-P360K4.01	Presence Detector, 4 pyro detectors	Light sensor, constant level light intensity (Presence max. 8m)
SCN-P360D3.01	Presence Detector, 3 pyro detectors	Light sensor (Presence max. 5m)
SCN-P360K3.01	Presence Detector, 3 pyro detectors	Light sensor, constant level light intensity (Presence max. 5m)
SCN-G360D3.01	Glass Presence Detector, White, 3 pyro d.	Light sensor, (Presence max. 5m)
SCN-G360K3.01	Glass Presence Detector, White, 3 pyro d.	Light sensor, constant level light intensity (Presence max. 5m)
SCN-P360D1.01	Presence Detector, 1 pyro detectors	Light sensor (Presence max. 3-4m)

The MDT Presence Detector is available in 2 versions, Presence Detector with light sensor and Presence Detector with light sensor plus constant level light intensity. Both Presence Detectors capturing the smallest movements with their built in pyro detectors and high resolution lens. The illuminance value is measured by a sensor and can be read out directly in lux. After presence detection a 1-bit or dimming value (0...100%) is send to the bus, the sensitivity is adjustable in 10 steps. The light sensor releases a telegram if the brightness value differs from the programmed value. Additionally the MDT Presence Detector has block objects for light and HVAC channel and offers a module for scene control. The MDT Presence Detector with constant level light intensity can control up to 3 light rows (SCN-P360K3.01: 1 light row).

The MDT Presence Detector is a installation device for fixed installation in dry rooms, the preferred installation height is 2 up to 4 meters.

4 pyro detectors: Covered area for movement max. 16m (Diameter), the covered area for presence max. 8m (Diameter).

3 pyro detectors: Covered area for movement max. 11m (Diameter), the covered area for presence max. 5m (Diameter).

1 pyro detector: Covered area for movement max. 5m (Diameter), the covered area for presence max. 3-4m (Diameter).

For project design and commissioning of the MDT Presence Detector it is recommended to use the ETS3f/ETS4 or later. Please download the application software at www.mdt.de/Downloads.html

SCN-P360D4.01



SCN-P360D3.01



SCN-P360D1.01



SCN-G360D3.01

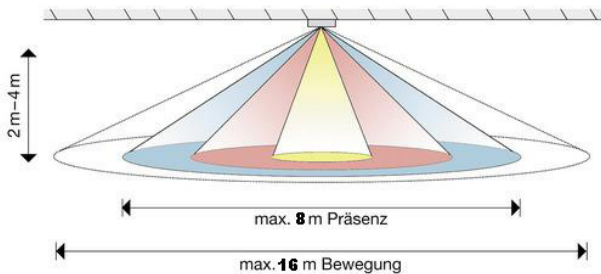


- Production in Germany, certified according to ISO 9001
- Presence detector with light sensor
- 1-4 pyro detectors with high resolution lens
- Programmable sensibility (Not SCN-P360D1.01)
- Switching function depending on brightness and movement
- Brightness value can be read out
- Master/slave function programmable
- Scene functions
- Day/Night function, monitoring with messages
- 2 zone operation (SCN-P360x4.0 only)
- HVAC control channel (adjustable over a certain period)
- Block and forced setting functions
- Orientation light (Brightness and time adjustable)
- Lowerable Sensitivity during night and for standby
- Integrated bus coupling unit
- 3 years warranty

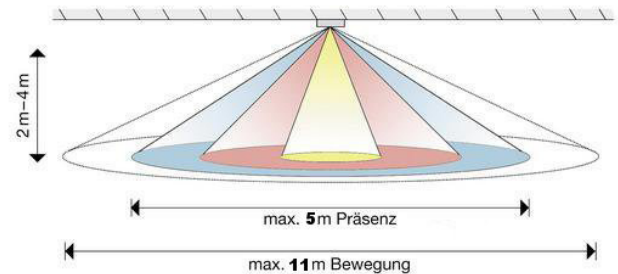
Technical Data	SCN-P360D4.01 SCN-P360K4.01	SCN-P360D3.01 SCN-P360K3.01	SCN-G360D3.01 SCN-G360K3.01	SCN-P360D1.01
Covered area (Diameter)				
Movement *	16m	11m	11m	5m
Presence *	8m	5m	5m	3-4m
Sensitivity	adjustable in 10 steps	adjustable in 10 steps	adjustable in 10 steps	fixed, not adjustable
Angular coverage	360°	360°	360°	360°
Range of light sensor	5 - 1000 Lux	5 - 1000 Lux	5 - 1000 Lux	5 - 1000 Lux
Permitted wire gauge				
KNX busconnection terminal	0,8mm Ø, solid core	0,8mm Ø, solid core	0,8mm Ø, solid core	0,8mm Ø, solid core
Power supply	KNX bus	KNX bus	KNX bus	KNX bus
Power consumption KNX bus typ.	<0,3W	<0,3W	<0,3W	<0,3W
Operation temperature range	0 to + 40°C	0 to + 40°C	0 to + 40°C	0 to + 40°C
Enclosure	IP 20	IP 20	IP 20	IP 20
Dimensions (W x H x D)	85mm x 85mm x 38mm	75mm x 75mm x 35mm	92mm x 92mm x 32mm	43mm x 43mm x 30mm

* at maximum mounting height of 4m (See images below).

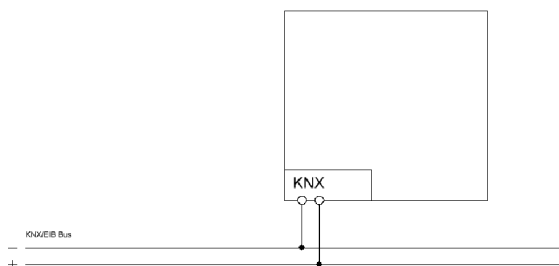
Covered area SCN-P360x4.01



Covered area SCN-x360x3.01



Exemplary circuit diagram SCN-x360xx.01



Covered area SCN-P360x1.01

