Description of the application programme for KNX occupancy detectors version 3.1

Contents

1. General

1.1 Basics for the KNX/EIB BUS

B.E.G. KNX occupancy detector receives its operating-voltage via the BUS cable. It also sends or receives telegrams via this cable at the same time.

To do this, the communication objects of the occupancy detector must be linked to the desired communication objects of other actuators. The settings are made using the ETS programming tool. To understand these instructions. Users must have completed a KNX startup and configuration course.

In order to work with **B.E.G.** applications, first import them into ETS using the ETS menu item "File → Import", then select and open the file.

⚠ **Attention:**
The data types must be taken into account for the objects. For example, a 1-bit object can only work together with a 1-bit object from another device. The occupancy detector works with 1-bit, 4-bit, 1-byte or 2-byte data types, depending on the object used.

1.2 Application versions

Switchgear application Version 3.1:
BEG_SWI_HKL_V3.1

Part numbers: 92446, 92447, 92448, 92449, 92450, 92451, 92452, 92453, 97052, 97053

Dimmer application Version 3.1:
BEG_DIM_HKL_V3.1

Part numbers: 92430, 92431, 92432, 92433, 92434, 92435, 92436, 92437

The relevant applications can only be executed on the corresponding devices. If the error message "Error writing a memory block" appears, the other application should be used.

1.3 Symbols used

The application description below uses various symbols to provide a better overview. A brief explanation of these symbols is given here.

⚠ **Attention:**
This symbol indicates text passages, which must be read in order to avoid errors during configuration and startup.

ⓘ **Recommendation:**
This symbol indicates recommended parameter setting, which by experience, it would offers the optimum device performance.

1.4 Functions

To ensure an easy introduction to this application description, the general functions of a occupancy detector will be described first. The main function blocks are motion detection, light evaluation and the internally stored logic.

Motion detection with the B.E.G. KNX occupancy detector:
The KNX occupancy detector uses the passive infrared system, which registers heat movements and converts them into signals that can be evaluated by a processor. The most important criterion for motion detection is selecting the right installation location.

⚠ **Installation location**
The occupancy detector should be installed so that the main direction of movement is always tangential (to the side of the device).
For detecting very small movements (e.g. work on a PC keyboard), we recommend installation directly above the desk. This ensures reliable detection.

Avoid sources of interference such as:

1. Radiators
2. Ventilation systems that output warm air
3. Lamps in the immediate detection area (preventing optical feedback)

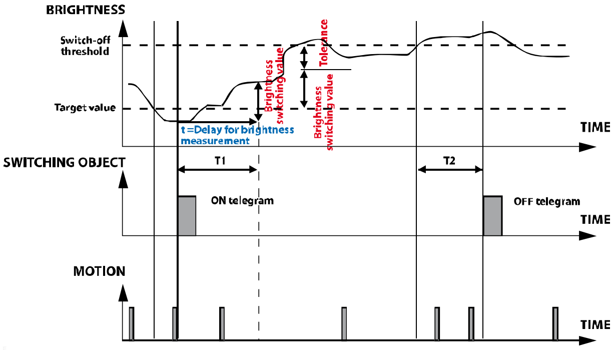
These sources of interference can lead to detection errors due to their heat generation.

Observe the installation height of 2.5 m to ensure the optimum range and sensitivity.

Light evaluation:

This section provides a more detailed description of light measurement for the KNX occupancy detector if it has been parameterised as a switch.

The following diagram is provided to aid understanding (light curve for fluorescent lamp with daylight):



Example:

In the example, the light value is initially above the target value (target value setting via "Brightness Threshold"). The light output shows no reaction when motion is detected. If the light value now falls below the target value and the occupancy detector detects motion, the lamp is switched on.

The curve describes the total luminous intensity in a room with daylight and artificial light.
Time T1 starts when the lighting is switched on. This time can be set in the parameters under "Determining switch-off threshold after". As can be seen in the diagram, fluorescent lamps, for example, take a few minutes to reach their maximum luminous intensity. After the time T1, the switch-off threshold is calculated. The brightness switching value that was determined in time T1 should be added to the parameterised target value. In addition, a tolerance is added to this value. The tolerance can also be set to 50 lux or 100 lux under the Tolerance parameter.

Movements that are made during the dark phase trigger the lag time again so that the lighting stays on.

If the daylight value slowly rises and exceeds the switch-off threshold, delay time T2 starts. This is the daylight-related shutdown, which switches off the lighting even though the lag time has not yet elapsed. The light value must remain above the switch-off threshold constantly during this time. This function is an energy-saving measure.
The lighting switches off after time T2.

Detector operating mode:

The detector operating mode can be set under the main "Light Output" tab in the BEG_DIM_HKL_V3.1 application. The device can be operated in the following operating modes:

1. Standard mode
2. Semi-automatic mode
3. Slave mode
4. Permanent dimmer (DIM application only)

The individual operating modes are explained in the description.

Output light:

This parameter can be used to determine whether the device should switch or dim the lighting in full/semi-automatic mode. If the device is parameterised as a dimmer, the settings described under point 2.1 apply. The parameters for use as a switch are described under point 2.2.

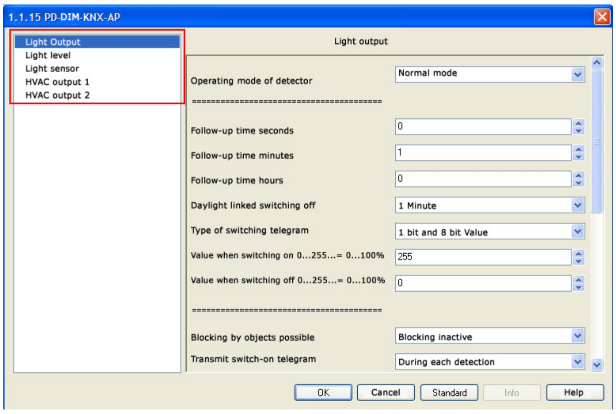
⚠ Internal logic of the detector:

One important point must be noted for the **B.E.G.** KNX occupancy detector. The entire logic is processed internally by the device. This means that other devices such as light sensors, timers or logical devices are not required. Interventions in the light controller are not recommended, as this could cause behaviour that may be interpreted as an error. This applies in particular to higher-level logical devices such as KNX servers or operator panels. Manual interventions should only be made using the locking or pushbutton objects.

2. Guide for initial startup Standard mode

2.1 Occupancy detector as a dimmer:

Settings for the main "Light Output" tab:

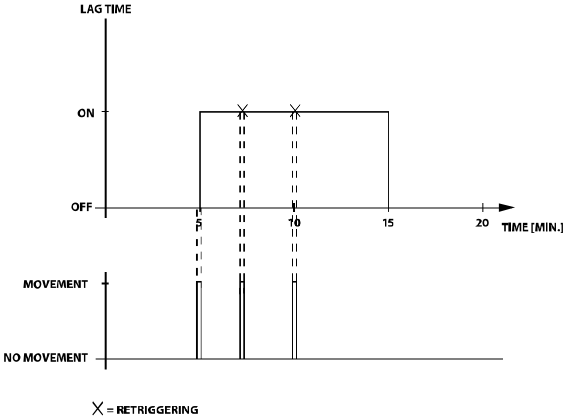


Operating mode of detector: Normal mode
==
Follow-up time seconds: 0
Follow-up time minutes: 1
Follow-up time hours: 0
Daylight linked switching off: 1 Minute
Type of switching telegram: 1 bit and 8 bit Value
Value when switching on 0...255...= 0...100%: 255
Value when switching off 0...255...= 0...100%: 0
==
Blocking by objects possible: Blocking inactive
Transmit switch-on telegram: During each detection

"Lag time" parameter:

The lag time is used to determine how long the lighting stays active after the last detected movement. Each time a movement is detected, the lag time is reset (see diagram). The lag time is set under "Lag time in seconds", "Lag time in minutes" and "Lag time in hours" and is the sum of these three times.

Example for retriggering, lag time of 5 minutes



ⓘ For fluorescent lamps, a lag time of at least 10 minutes is recommended to increase the life of the lighting.

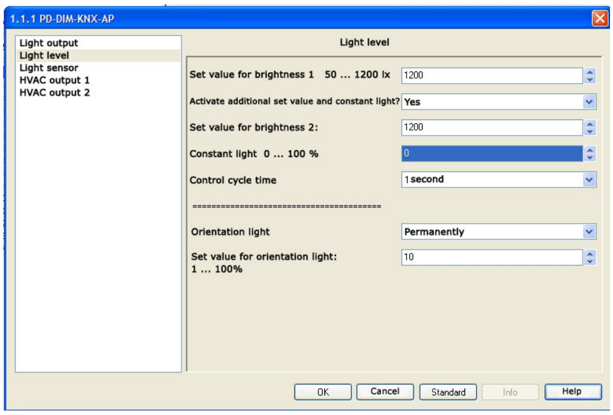
"Offset between brightness 1 and 2" parameter:

If the system requires the separate control of 2 rows of lights, this can be implemented using the offset. The "Brightness 1" communication object is defined as the base channel. If, for example, an offset of -30% is parameterised, the second channel is only activated when the base channel reaches 30%. This provides a fixed control difference of 30% between the two channels. When the base channel reaches 100%, the second channel is raised to 100% automatically.

"Soft start" parameter:

If the soft start is active, the brightness ramps up incrementally from 0% to the target value when movement is detected.
By default the soft start is deactivated, which means the light switch on at 100% full brightness and adjust itself towards the target level after movement is detected.

Settings for the main "Brightness" tab:



Set value for brightness 1   50 ... 1200 lx: 1200
Activate additional set value and constant light?: Yes
Set value for brightness 2: 1200
Constant light 0 ... 100 %: 0
Control cycle time: 1 second
==
Orientation light: Permanently
Set value for orientation light: 1 ... 100%: 10

"Target value for brightness 1 and 2" parameter:

The target value for brightness is the lux value desired in the room. It can be freely selected in the range from 5 - 1200 lux.

ⓘ Experience shows that an ideal target value for the occupancy detector is 500 lux.

"Constant light" parameter:

If the constant light threshold is active, the brightness communication objects are used to transfer a fixed value in % to the BUS. The lighting is no longer adjusted. The value is set between 0 – 100 % in the "Constant light" parameter.

Toggle mode:

If the additional thresholds "Target value for brightness 2" and "Constant light" are activated, the "Toggle target value", "Toggle target value/constant light" and "Current target value" communication objects are displayed. These communication objects respond to 1-bit signals. The selected threshold remains active permanently, even after manual or automatic deactivation.

Telegram to "Toggle target value":
1 = Change target value 1/constant light to target value 2
0 = Change target value 2/constant light to target value 1
Telegram to "Toggle target value/constant light":
1 = Change target value 1/target value 2 to constant light
0 = Change target value 1/constant light to target value 2
"Current target value/constant light":
Status display for the threshold

"Cycle time control" parameter:

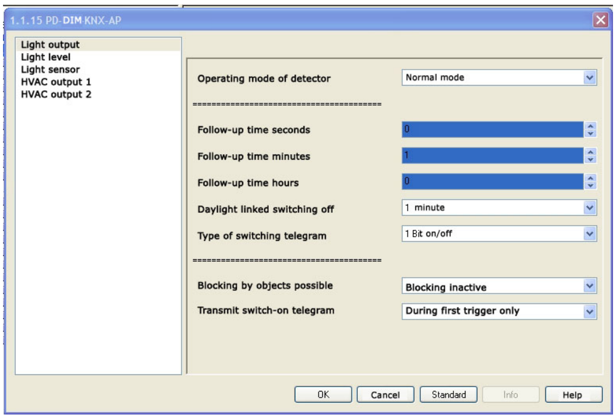
The "Cycle time control" parameter specifies the control speed of the lighting.

⚠ An average time of 3 seconds is recommended. If the control speed is too fast, it may lead to oscillation in the lighting. If the lighting shows signs of oscillation, the "Cycle time control" parameter should be set to a higher value.

For the settings for the light sensor and the HVAC channels, see Sections 6 and 7.

2.2 Occupancy detector as a switch:

The main "Light Output" tab:



1.1.15 PD-DIM-KNX-AP

Light output
Light level
Light sensor
HVAC output 1
HVAC output 2

Operating mode of detector: Normal mode

==

Follow-up time seconds: 0
Follow-up time minutes: 1
Follow-up time hours: 0
Daylight linked switching off: 1 minute
Type of switching telegram: 1 Bit on/off

==

Blocking by objects possible: Blocking inactive
Transmit switch-on telegram: During first trigger only

"Lag time" parameter:

See Section 2.1 Lag time

"Daylight-related shutdown" parameter:

The time T2 in the diagram under Section 1 "Light evaluation" can be set here. Please refer to this section for details.

ⓘ A parameterised time of 5 minutes is recommended.

"Type of switching telegram" parameter:

This parameter can be used to define the signal, which is output to the BUS when a movement is detected. For normal applications, the 1-bit signal is sufficient. An 8-bit signal can also be parameterised, which outputs a value from 0 - 100% to the BUS. The 8-bit signal can be freely parameterised for activation and deactivation.

"Send switch-on telegram" parameter:

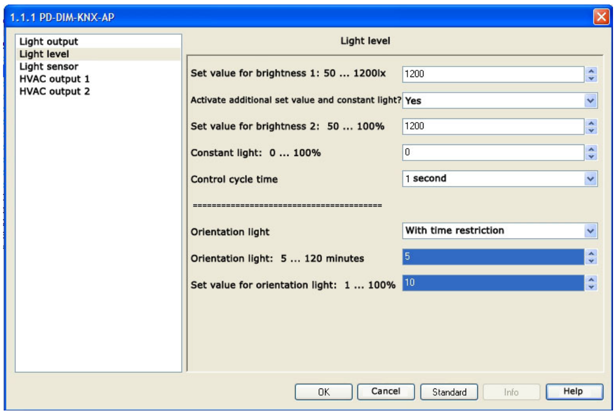
When "Send on every detection" is selected, the signal is output via communication object 0: "Light output" and 1: "Brightness" each time a movement is detected.

When "Only on first trigger" is selected, a signal is output the first time a movement is detected.

This parameter can be used to minimise the BUS load.

ⓘ The "Only on first trigger" setting is recommended to minimise the BUS load. With this setting, the lag time is also retriggered internally each time a movement is detected.

Main "Brightness" tab:



1.1.1 PD-DIM-KNX-AP

Light output
Light level
Light sensor
HVAC output 1
HVAC output 2

Light level

Set value for brightness 1: 50 ... 1200lx: 1200
Activate additional set value and constant light?: Yes
Set value for brightness 2: 50 ... 100%: 1200
Constant light: 0 ... 100%: 0
Control cycle time: 1 second

==

Orientation light: With time restriction
Orientation light: 5 ... 120 minutes: 5
Set value for orientation light: 1 ... 100%: 10

"Brightness threshold" and "Brightness threshold 2" parameters:

See Section 2.1.

"Determining switch-off threshold after" parameter:

This parameter sets the time that elapses before the occupancy detector determines its switch-off threshold.

For details, please refer to the diagram in Section 1.4 Light evaluation.

ⓘ For fluorescent lamps, a time of 5 - 10 minutes is recommended. For resistive loads such as incandescent lamps, a time of 1 minute is sufficient.

Toggle mode:

If the additional threshold "Target value for brightness 2" is activated, the "Toggle threshold" and "Current threshold" communication objects are displayed. These communication objects respond to 1-bit signals. The selected threshold remains active permanently, even after manual or automatic deactivation.

Telegram to "Toggle threshold":

1 = Change threshold 1 to threshold 2
0 = Change threshold 2 to threshold 1

Current threshold:

Status display for the threshold

"Tolerance" parameter:

The tolerance to be added to the calculated switch-off threshold is set here. For details, please refer to the diagram in Section 1.4 Light evaluation.

For the settings for the light sensor and the HVAC channels, see Sections 6 and 7.

3. Guide for initial startup Semi-automatic mode

Semi-automatic mode responds in the same way as standard mode. The parameter settings do not change in this mode.
However, the first switch-on telegram is different. In semi-automatic mode, the lighting is switched on by a 1-bit signal to the pushbutton object, whereas in standard mode it is switched on the first time a movement is detected.

⚠ To switch on the lighting in semi-automatic-mode a pushbutton is **essential**.

The lighting is switched off automatically in the same way as for standard mode.

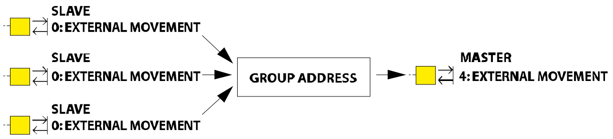
For the precise settings for light channels, the light-sensor and HVAC channels, see Sections 2, 6 and 7.

4. Guide for slave mode

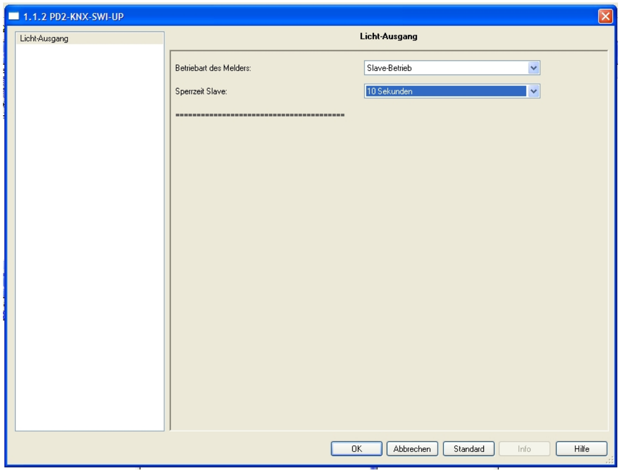
A problem that arises in practical applications is the master/master operation of occupancy detectors. This can lead to errors in the lighting system because both masters perform brightness evaluations and specify lag times.

A solution to this problem is offered by the master/slave system. The master performs all logical evaluations such as brightness detection or the specification of the lag time. The slave is used only to extend the range. Several slave devices can work together with one master.

Explanation of the master/slave principle



"Locking time" parameter:


1.1.2 PD2-KNX-SWI-UP

Licht-Ausgang

Licht-Ausgang

Betriebart des Melders: Slave-Betrieb

Sperrzeit Slave: 10 Sekunden

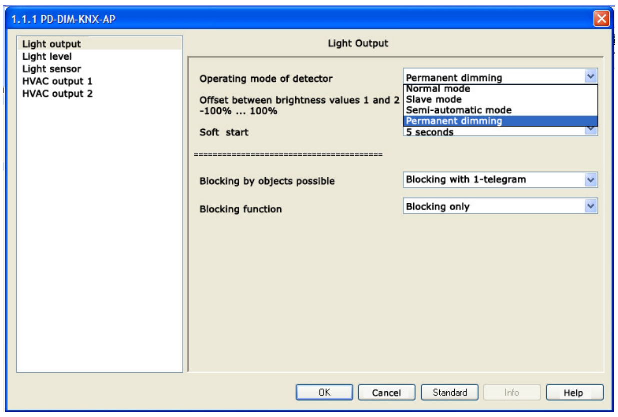
==

The locking time is the only parameter that can be set in slave mode. It specifies the dead time between sending two signals.

ⓘ A dead time > 30 sec. is recommended to ensure the BUS is not overloaded.

5. Guide for permanent dimmer

Permanent dimmer mode is used in areas where a specific lux value should be provided at all times (bank lobby, passage, etc.).
In this mode, the occupancy detector only evaluates the brightness and controls it regardless of movement, i.e. permanently. If permanent light control is not required at certain times, a logical device can send a 1-bit telegram to the locking object, which switches off the permanent dimmer permanently (for more information about locking, refer to Section 9.3 Locking mode).


1.1.1 PD-DIM-KNX-AP

Light output
Light level
Light sensor
HVAC output 1
HVAC output 2

Light Output

Operating mode of detector: Permanent dimming

Normal mode
Slave mode
Semi-automatic mode
Permanent dimming

Offset between brightness values 1 and 2 -100% ... 100%

Soft start: 5 seconds

==

Blocking by objects possible: Blocking with 1-telegram

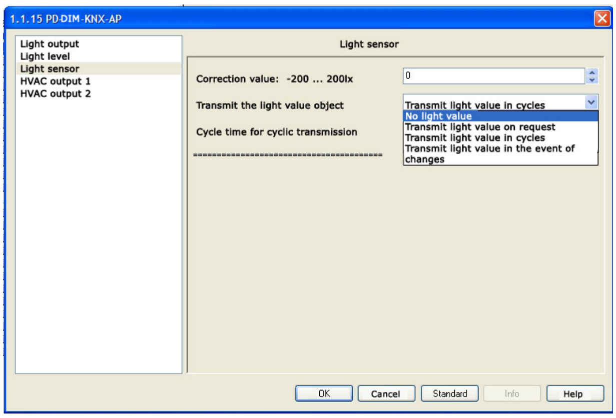
Blocking function: Blocking only

The parameters for the permanent dimmer were described already in Section 2.1. For setting details, please refer to this section.

For the settings for the light sensor and the HVAC channels, see Sections 6 and 7.

6. Guide for light sensor

B.E.G. KNX occupancy detector offers the option of outputting the measured light value in the room to the BUS via a 2-byte object.


1.1.15 PD-DIM-KNX-AP

Light output
Light level
Light sensor
HVAC output 1
HVAC output 2

Light sensor

Correction value: -200 ... 200lx 0

Transmit the light value object: Transmit light value in cycles
- No light value
- Transmit light value on request
- Transmit light value in cycles
- Transmit light value in the event of changes

Cycle time for cyclic transmission

"Send the light value object" parameter:

This parameter is deactivated by default. As soon as the "Send light value cyclically" or "Send light value on change" menu item is activated, the "Light value" communication object appears.

- Send light value cyclically: The light value is sent to the BUS again after the set time has elapsed.
- Send light value on change: The light value is only sent to the BUS after the parameterised change to the light value.

"Correction value" parameter:

This parameter is used to calibrate the light value. A value range from -200 to +200 lux can be freely parameterised

ⓘ **During calibration, please proceed as follows::**

1. Measure light value with lux meter at reference point
2. Output light value to BUS
3. Adjust light value

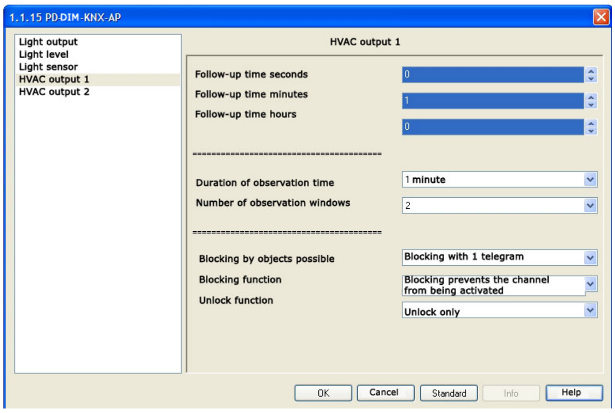
7. Guide for HVAC output

The HVAC channel (Heating Ventilation and Air Conditioning) has been designed so that systems with high energy consumption can be started with a time delay.

In addition, an alarm indicator can be simulated with an HVAC channel.

⚠ **Important:**

The HVAC channels only depend on presence, which means that the brightness evaluation is irrelevant for these channels.


1.1.15 PD-DIM-KNX-AP

Light output
Light level
Light sensor
HVAC output 1
HVAC output 2

HVAC output 1

Follow-up time seconds: 0
Follow-up time minutes: 1
Follow-up time hours: 0

Duration of observation time: 1 minute
Number of observation windows: 2

Blocking by objects possible: Blocking with 1 telegram
Blocking function: Blocking prevents the channel from being activated
Unlock function: Unlock only

"Lag time" parameter:

As described in Section 2.1, the lag time of the HVAC channel can be set under this parameter. It can be programmed with an accuracy of a few seconds.

"Length of observation time" parameter:

The "Length of observation time" item can be used to set the length of an observation window.

"Number of observation windows" parameter:

The "Number of observation windows" parameter can be used to set the number of observation windows.

The observation time and observation windows are directly linked. They are used to set the delay time of the HVAC channel.

Example: Observation time 10 seconds, observation window 3:

The first time a movement is detected, the time for the first window is started. At least one movement must now be detected in each window. The channel switches on in the last window the first time a movement is detected for its lag time. This leads to a delay time of 21 - 30 seconds (depending on the last detected movement).

The lag time is retriggered on each movement in the same way as for the switch or dimmer channel.

If there is no movement in a window, all windows are reset.

8. Presence detection function

There are two options for dedicated presence monitoring:

8.1 Use of an HVAC channel (1 and 0 telegram):

To implement presence monitoring without delay, the following parameters should be set:

Lag time:

The lag time can be freely parameterised.

Length of observation time:
Can be disregarded.

Number of observation windows:
Switch on immediately on movement

If the parameters are set for this option, the first time a movement is detected the occupancy detector can send a 1-bit ON telegram via the relevant parameterised HVAC communication object. New movements restart the lag time. When no further movements are detected, the lag time elapses. Once the lag time has elapsed, the occupancy detector sends a 1-bit OFF telegram.

8.2 Use of the slave as occupancy detector (1 telegram cyclically):

To implement cyclic presence monitoring, KNX occupancy detector must be parameterised as a slave.
The external movement object can then be linked to a logical monitoring device, which expects cyclic signals.

The "Slave locking time" parameter can be used to set the time for cyclic transmission.

When these settings are used, the occupancy detector sends presence signals cyclically via the "External movement object".

9. Explanation of other functions

9.1 Pushbutton object:

The pushbutton object offers the option of establishing a link with a KNX pushbutton.
This enables manual intervention in the light controller. The following functions can be executed:

In full automatic mode:

- When the lighting is off, it can be switched on with a 1-bit signal to the pushbutton object. The lighting remains active for as long as the occupancy detector detects movement. Once the lag time has elapsed, the occupancy detector switches off the lighting.
  - When the lighting is on, it can be switched off with a 1-bit signal to the pushbutton object. The lighting remains inactive for as long as the occupancy detector detects movement. Once the lag time has elapsed, the presence-detector returns to standard mode.

In semi-automatic mode:
In semi-automatic mode a pushbutton is **essential** because it is used to trigger the first switch-on telegram. Then the lag time either elapses or is retriggered by movements.

If the light value exceeds the target value, the occupancy detector detects that it is "too bright" and does not switch to full automatic mode.
If the light value exceeds the target value, this is indicated as follows in dimmer mode:
When the pushbutton is pressed, the occupancy detector switches on and then immediately dims until it switches off again. To switch on the lighting permanently, it must be dimmed manually.

This manual dimmer value is maintained until the lag time has elapsed and the device switches off.

9.2 Manual dimming:

Another application is dimming using the pushbutton. If the lighting is dimmed manually, the occupancy detector only sends a 0% telegram to the BUS after its parameterised lag time.

Principle: For manual dimming, the actuator is dimmed directly using a pushbutton. The occupancy detector only receives a signal via its dimming object, which prevents it from sending telegrams to the BUS via its brightness objects. Only the switch-off telegram is sent to the BUS once the lag time has elapsed. The occupancy detector then returns to its parameterised mode.

9.3 Locking mode:

Locking mode can be used to lock the occupancy detector so that no telegrams are sent to the BUS via the light object or the brightness objects.

It is also possible to still send a defined final signal when locking or unlocking.

The following parameters can be set in switch mode:

"Locking using objects supported" parameter:
Locking mode must be activated under this parameter.
The user can select whether the lock is activated by sending a 1 or a 0 to the locking object. The other telegram is then used to unlock (for example, lock with 1, unlock with 0).

"Lock function" parameter:
The response to locking is specified under this parameter. The following parameters can be selected:

- Lock only (no telegram is sent to the BUS)
- Lock prevents activation of the channel. (If the detector is active, the lag time elapses. The occupancy detector then no longer switches on.)
- Lock and 0 telegram
- Lock and 1 telegram

"Unlock function" parameter:
The response to unlocking is specified under this parameter. The following parameters can be selected:

- Unlock only (**Attention:** If this option is activated, another device must send a 0 telegram if the lighting is already active.)
- Unlock and 0 telegram
- Unlock and 1 telegram

<u>The following parameters can be set in dimmer mode:</u>

"Locking using objects supported" parameter:
Locking mode must be activated under this parameter. The user can select whether the lock is activated by sending a 1 or a 0 to the locking object. The other telegram is then used to unlock (for example, lock with 1, unlock with 0).

"Lock function" parameter:
The response to locking is specified under this parameter. The following parameters can be selected:

- Lock only (no telegram is sent to the BUS)
- Lock prevents activation of the channel. (If the detector is active, the lag time elapses. The occupancy detector then no longer switches on.)
- Lock and send value (a defined dimmer value from 0 – 100 % can be parameterised)

When the device is unlocked it automatically returns to its usual control mode.

⚠<u>Attention:</u>
In <u>semi-automatic mode</u>, please note:
If the unlocking function is set to "Unlock only", the channel has a follow-up function. This means that if a switch-on telegram is sent to pushbutton object 5 when the device is locked, the device will send the parameterised telegrams once it is unlocked. The telegrams are set in the main "Light output" tab.

9.4 Behaviour on bus voltage recovery:

The behaviour of the occupancy detector after programming and after bus voltage recovery <u>cannot</u> be parameterised. After voltage recovery, the occupancy detector automatically returns to its parameterised operating mode.

10. Communication objects

→ Input object | ← Output object

Communication objects in dimmer mode

Standard / semi-automatic mode

Object 0:		Hidden	
Object **1**:	←	**Brightness 1**	1 byte
Object **2**:	←	**Brightness 2**	1 byte
Object **3**:	→	**Locking object**	1 bit
Object **4**:	→	**External movement**	1 bit
Object **5**:	→	**Pushbutton object**	1 bit
Object **6**:	→	**Dimming object**	4 bit
Object **7**:	→	**Toggle target value**	1 bit
Object **8**:	→	**Toggle target value / constant light**	1 bit
Object **9**:	→	**Current target value / constant light**	1 byte
Object **10**:	←	**HVAC output**	1 bit
Object **11**:	→	**Locking object HVAC output 1**	1 bit
Object **12**:	←	**HVAC output 2**	1 bit
Object **13**:	→	**Locking object HVAC output 2**	1 bit
Object **14**:	←	**Light value**	2 bytes

Switch mode (SWI)

Object **0**:	←	**Light output**	1 bit
Object **1**:	←	**Brightness**	1 byte
Object 2:		Hidden	
Object **3**:	→	**Locking object**	1 bit
Object **4**:	→	**External movement**	1 bit
Object **5**:	→	**Pushbutton object**	1 bit
Object 6:		Hidden	
Object **7**:	→	**Toggle threshold**	1 bit
Object 8:		Hidden	
Object **9**:	→	**Current threshold**	1 byte
Object **10**:	←	**HVAC output 1**	1 bit
Object **11**:	→	**Locking object HVAC output 1**	1 bit
Object **12**:	←	**HVAC output 2**	1 bit
Object **13**:	→	**Locking object HVAC output 2**	1 bit
Object **14**:	←	**Light value**	2 bytes

Slave mode

Object **0**:	←	**External movement**	1 bit

Permanent dimmer

Object 0:		Hidden	
Object **1**:	←	**Brightness 1**	1 byte
Object **2**:	←	**Brightness 2**	1 byte
Object **3**:	→	**Locking object**	1 bit
Object 4:		Hidden	
Object **5**:	→	**Pushbutton object**	1 bit
Object 6:		Hidden	
Object **7**:	→	**Toggle target valuee**	1 bit
Object **8**:	→	**Toggle target value / constant light**	1 bit
Object **9**:	→	**Current target value / constant light**	1 byte
Object **10**:	←	**HVAC output 1**	1 bit
Object **11**:	→	**Locking object HVAC output 1**	1 bit
Object **12**:	←	**HVAC output 2**	1 bit
Object **13**:	→	**Locking object HVAC output 2**	1 bit
Object **14**:	←	**Light value**	2 bytes

Description of objects for standard and semi-automatic mode

1. Object 0: **Light output**
Type: 1 bit — Output object
Link with: E.g. actuator 1-bit input object

2. Object 0: **External movement (for slave only)**
Type: 1 bit — Output object
Link with: E.g. external movement master input object

3. Object 1: **Brightness**
Type: 1 byte — Output object
Link with: Actuator 1-byte input object

4. Object 2: **Brightness**
Type: 1 byte — Output object
Link with: E.g. actuator 1-byte input object

5. Object 3: **Locking object**
Type: 1 bit — Input object
Link with: E.g. pushbutton, touch display, logical device

6. Object 4: **External movement**
Type: 1 bit — Input object
Link with: Object 0 external movement from slave device

7. Object 5: **Pushbutton object**
Type: 1 bit — Input object
E.g. pushbutton, touch display, logical device
ⓘ **Note: Essential in** semi-automatic mode

8. Object 6: **Dimming object**
Type: 4 bit — Input object
Link with: E.g. 4-bit dimming object from push-button, touch display

9. Object 7: **Toggle threshold (SWI mode)**
Type: 1 bit — Input object
Link with: E.g. pushbutton, touch display
10. Object 7: **Toggle target value (dimmer mode)**
Type: 1 bit — Input object
Link with: E.g. pushbutton, touch display

11. Object 8: **Toggle target value / constant light**
Type: 1 bit — Input object
Link with: E.g. pushbutton, touch display

12. Object 9: **Current threshold / target value / constant light**
Type: 1 byte — Output object
Link with: E.g. touch display to display the current status

13. Object 10: **HVAC output 1**
Type: 1 bit — Output object
Link with: E.g. actuators that control HVAC (Heating Ventilation Air Conditioning) devices.
Control of logical alarms

14. Object 11: **Locking object HVAC output 1**
Type: 1 bit — Input object
Link with: E.g. pushbutton, touch display, logical device

15. Object 12: **HVAC output 2**
Type: 1 bit — Output object
Link with: E.g. actuators that control HVAC (Heating Ventilation Air Conditioning) devices.
Control of logical alarms

16. Object 11: **Locking object HVAC output 2**
Type: 1 bit — Input object
Link with: E.g. pushbutton, touch display, logical device

17. Object 14: **Light value**
Type: 2 bytes — Output object
Link with: E.g. touch display to display lux value.