Presence Sensor

Installation Manual

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1. Presence Sensor Features

Cascoda's KNX IoT Presence Sensor provides presence and movement sensing.

- Detects the movement of people, even when there is little movement.
- Includes a brightness sensor (in lux).
- Mixed light measurement (daylight and artificial light).
- Battery powered, install anywhere!

There are 2 variants:

- Low profile ceiling installation, 360 degrees detection.
- Low profile wall installation, 170 degrees detection.

Measures the following environmental variables:

- Presence: passive or pyroelectric infrared (PIR) sensors are thermal detectors and suitable as motion sensors. They react to a change in infrared heat radiation in the environment. It can reliably detect small temperature difference between the background (e.g. floor / wall) and the target object (human).
- Luminance

This sensor is the perfect choice for environments where the smallest of movements need to be detected, e.g. in offices, waiting rooms, wellness rooms, sanitary areas, and many more. The sensor can reliably detect people walking from a distance of up to 6 meters, which is typical for reception rooms or warehouses, to name just a few.

Other features:

- Wireless Thread, sleepy end device, using the Chili2S with industry-leading receive sensitivity.
- Battery charge status indicator for any chemistry.
- Configurable with ETS6.3 or later.

Specification:

- Wall or panel mount options
- Dimensions 78 x 78 x 26 mm
- Battery-powered (3 AA)
- 5-year battery life on Alkaline (LR6)
- 6-year battery life on Lithium (FR6)

1.1. Security

This KNX device support the latest KNX IoT standard. This extension of the KNX enables fully encrypted transmission of data telegrams, thus ensuring secure data- and access-proof communication between KNX devices within a single installation. The KNX-specific Engineering Tool Software (ETS) secures both the runtime communication over IP as well as commissioning. This device certificate key, imprinted as a QR code for fast identification, allows the ETS to authenticate the device and perform the Secure commissioning.

2. General information

2.1. Document Version information

This manual is amended periodically and will be brought into line with new software releases. The change status (date) can be found in the contents header. If you have a device with a later software version, please check www.cascoda.com to find out whether a more up-to date version of the manual is available.

2.2. Used Terms

Sign	Description
DANGER!	Indicates an immediately hazardous situation which will lead to death or severe injuries if it is not avoided.
CAUTION!	Indicates a potentially hazardous situation which may lead to trivial or minor injuries if it is not avoided.
WARNING!	Indicates a situation which may lead to damage to property if it is not avoided.
NOTE!	Indicates a situation which may lead to possible (known) side effects.

Table 1: *Used Terms*

2.3. Safety instructions

CAUTION! Risk of explosion if an incorrect battery is installed. Use consumer grade, non-rechargeable alkaline, zinc-carbon or lithium batteries.

CAUTION! Store, transport and dispose of the batteries in compliance with local requirements.

CAUTION! The product is only suitable for mounting at heights of less or equal than 2 meters.

2.4. Issues

Questions about the product?

You can reach the technical service of Cascoda under Tel. +44 (0)2380 638 111 or support@cascoda.com.

We need the following information to process your service request:

- Type of appliance (model name or item number)
- Description of the problem
- Serial number or software version

- Source of supply (dealer/installer who bought the device from Cascoda)

For questions about KNX functions:

- Version of the device application
- ETS version used for the project

2.5. Contact information

info@cascoda.com
Threefield House,
Threefield Lane,
Southampton,
SO14 3LP, UK

3. Technical Information

3.1. Storage Conditions

Parameter	Min	Typ	Max	Unit
Storage Temperature	-25		70	°C
Storage Humidity	0		65	%RH

Table 2: *Storage Conditions*

3.2. Operating Conditions

Parameter	Min	Typ	Max	Unit
Operating Temperature	0		50	°C
Supply Voltage	3.1	4.5	5.5	V

Table 3: *Operating Conditions*

The device is supplied by 3x 1.5V AA Batteries (LR6 or FR6), non-rechargeable.

Parameter	Condition	Min	Typ	Max	Unit
Wakeup Interval			60		Minutes
Battery Life	LR6 Alkaline			5	Years
	FR6 Lithium			6	Years

Table 4: *Battery information*

3.3. Sensor information

3.3.1. Sensor Measurement Ranges

Parameter	Min	Typ	Max	Unit
Luminance	0		20000	Lux

Table 5: *Sensor information*

3.3.2. Sensor Accuracy

Parameter	Condition	Absolute Accuracy	RMS Noise	Unit
Luminance	Over entire Range	±0.4	0.03	Lux

Table 6: *Sensor Accuracy*

3.3.3. Ceiling Detection performance

Detection Area	Value
Horizontal	102°(±51°)
Vertical	92°(±46°)

Table 7: *Detection Range for the Ceiling mounted Presence Sensor.*

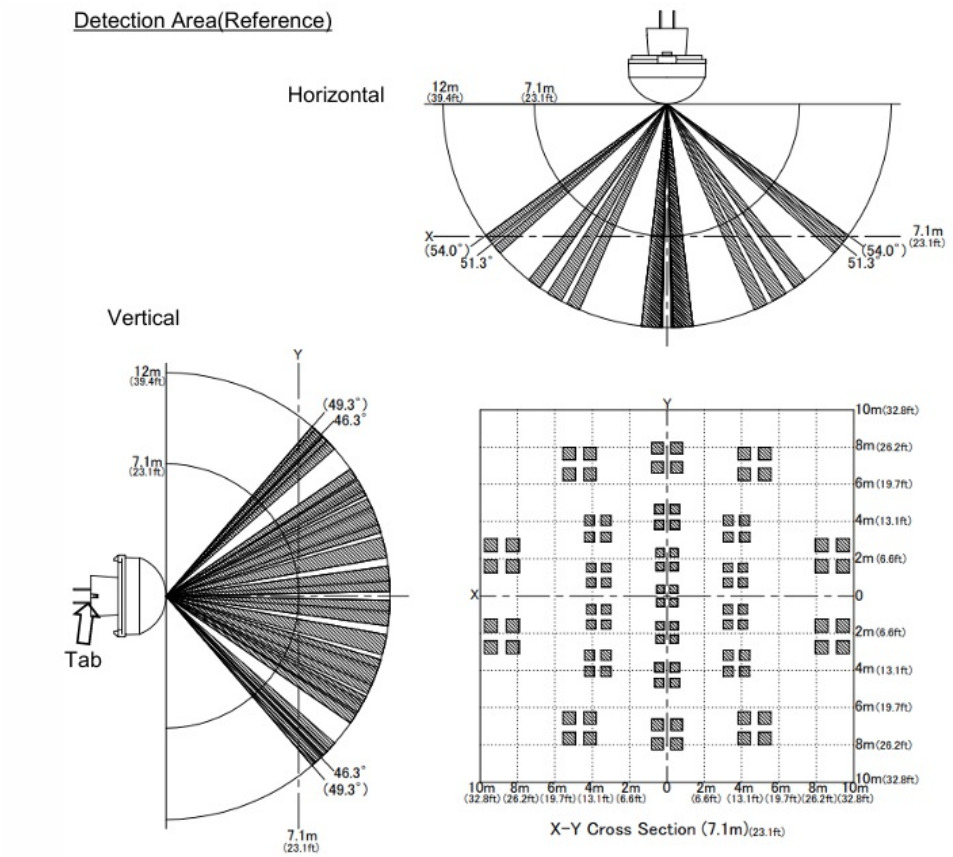

Fig 1: Ceiling Mount detection area

	Temperature Difference	Value
Detection Range	4°C Δ	up to 12 m
	8°C Δ	up to 17 m

Table 8: *Detection Range for the Wall mounted Presence Sensor.*

Typical conditions of the detected target:

- Movement speed: 1.0m/s

- Human body (size 700x250 mm)
- Using 92 detection zones

3.3.4. Wall Detection performance

Detection Area	Value
Horizontal	105°(±52.5°)
Vertical	40°

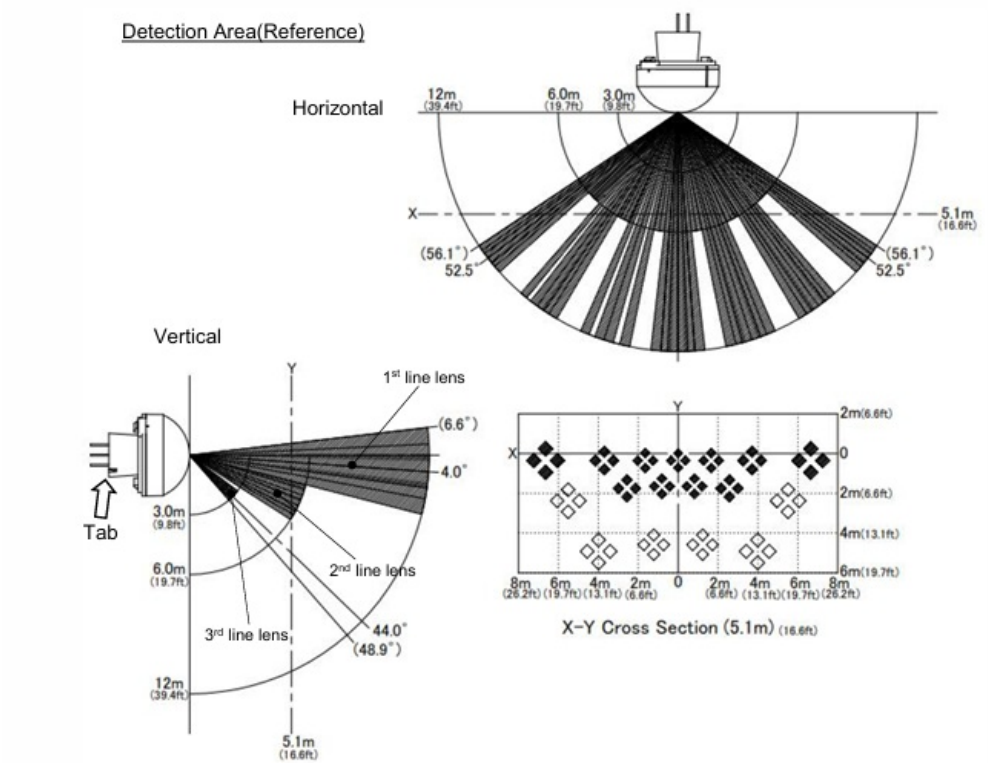

Fig 2: Wall Mount detection area

Lens	Temperature Difference	Range Value
1st Line Lens	4°C Δ	up to 12 m
	8°C Δ	up to 17 m
1nd Line Lens	4°C Δ	up to 6 m
	8°C Δ	up to 8 m
3rd Line Lens	4°C Δ	up to 3 m
	8°C Δ	up to 4 m

Typical conditions of the detected target:

- Movement speed: 1.0m/s
- Human body (size 700x250 mm)
- Cross perpendicularly for the detection zone
- Using 68 detection zones

3.3.5. Typical Luminance

Typical luminance values are listed in in the table below.

Condition	lux
Sunlight at noon in summer	100000
Cloudy sky in summer	10000
Rainy weather with thunder clouds	1000
Office lighting	500
Living room lighting	200
Staircase lighting	100
Street lighting	10
Twilight after sunset	1
Midnight at full moon	0,2
Sky with stars and no moon	0,0005

Table 9: *Typical luminance values*

3.3.6. Luminance Calibration

The luminance is pre-calibrated to a factory default value. This value can be overwritten by selecting "Overwrite" on the "Calibration" parameter of the Luminance section, and by setting the desired calibration factor value.

Follow the steps below to determine what value to use as the calibration factor:

- Select "Overwrite", and enter the value "1000" as the calibration factor (let's call this C_{old}).
- Download the configuration.
- Observe and take note of the luminance values are reported by the device (let's call this R).
- Observe and take note of the luminance values that you are measuring with a calibrated meter (let's call this M).
- Based on all of the above, you can now calculate the calibration factor (let's call this C_{new}) that you have to set in order for your reported values to match the measured calibrated values from the meter. Use the following formula: $C_{new} = (M / R) \cdot C_{old}$
- Set this value as your calibration factor in ETS.
- Download the configuration.
- Observe that the new luminance values now match the measured values from a

calibrated meter.

3.4. Radio Specification

Protocol: KNX-IoT over Thread

MAC Protocol: IEEE 802.15.4

Configuration: 2.4 GHz, O-QPSK, 250 kbps, Channels 11-26

Parameter	Min	Typ	Max	Unit
Frequency Range	2405		2480	MHz
Transmit Power	0		9	dBm

Table 10: *Thread Radio Information*

4. Physical placement of the Presence Sensor

The Presence sensor can measure the presence in a specific place/room. There is a presence sensor for wall mounting or for ceiling mounting. The difference is the range of detection.

Since the device is a radio-based device, it should not be put in a metal surrounding, e.g. a metal filing cabinet. The device should be in range of its parent (router) node, so that it is able to send the measurements over the Thread network.

To install the Presence sensor, the following mounting plate is supplied:

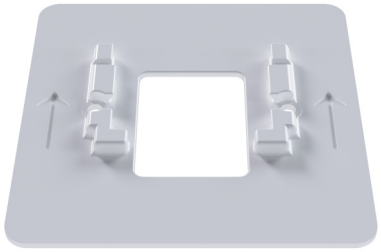

Fig 3: The mounting plate

The installation sequence is depicted in the following diagram:

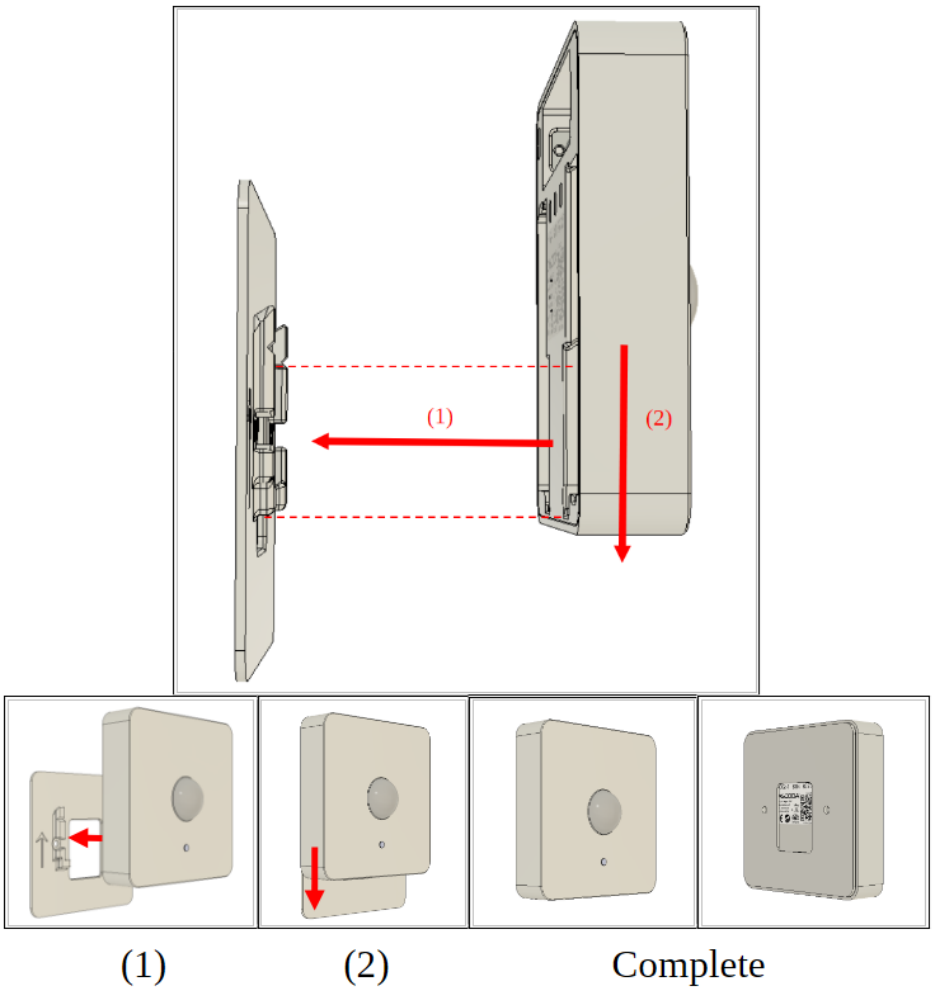

Fig 4: Sequence of steps to install the presence sensor on the mounting plate

4.1. Ceiling mounting

To install the Presence sensor, the mounting plate should be installed on the ceiling. When the bracket is installed on the ceiling, the Presence sensor can be clicked on the mounting plate.

Fig 5: Ceiling Mounted presence sensor

4.2. Wall mounting

To install the Presence sensor, the mounting plate should be installed on the wall. The direction of arrows on the mounting plate must be to the ceiling (e.g. "Up"). When the bracket is installed on the wall, the Presence sensor can be clicked on the mounting plate. Then the luminance sensor will be below the Presence sensor.

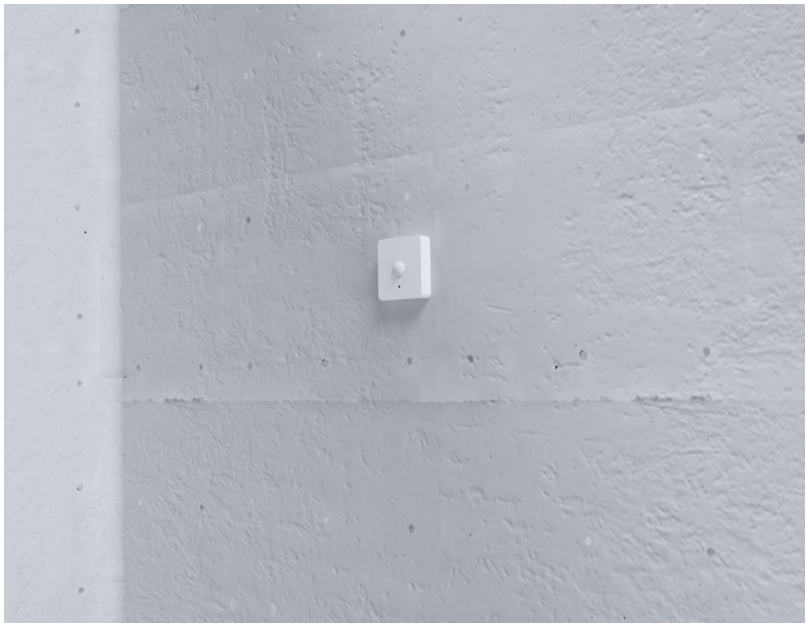

Fig 6: Wall Mounted presence sensor

4.3. Device size

The following diagrams the dimensions of the device. The dimensions are in [mm].

Fig 7: Device dimensions, 3d angle

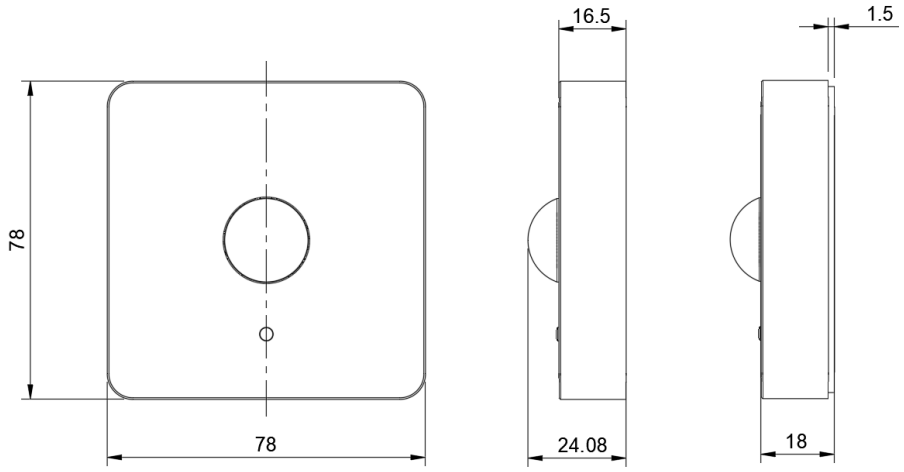

Fig 8: Device dimensions, including mounting plate size

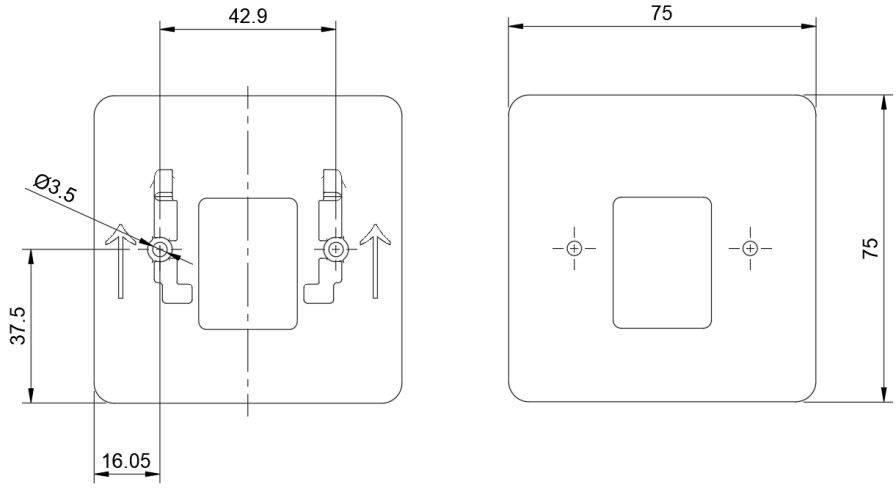

Fig 9: mounting plate dimensions

5. Configuration

5.1. Device Startup

The device will start up when the batteries are inserted. The batteries can be inserted when the device is removed from the mounting plate. The batteries used are **AA** batteries.

Fig 10: Device without mounting plate, showing the placement of the batteries.

Cascoda recommends using quality Alkaline batteries with a 10 year shelf-life such as the Energizer EN91 Industrial or equivalent.

5.2. Commissioning

Configuration is made using the KNX software as of ETS 6.3 or later. The product file can be downloaded from the ETS online catalogue and the Cascoda website. After the batteries has been applied, the device will enter a commissioning phase.

The QR code is placed on the device.

The QR code can be used to for Thread commissioning and KNX commissioning.

> **NOTE!** Thread commissioning needs to be done before KNX commissioning, since this enables the IPV6 communication.

5.2.1. Thread Commissioning

Thread commissioning is adding the device to the thread network. To be able to do so, one needs to have a Thread Border router. Cascoda recommends using the KNX-IOT-HUB

Check out the youtube video here, demonstrating the process of doing Thread and KNX Commissioning using a QR code scanner.

More information about Thread commissioning can be found Here.

5.2.2. KNX Commissioning

KNX commissioning is adding the device to an ETS project. Since KNX IoT is a secure KNX protocol, one needs to have the security credentials and the serial number of the device. This information is contained in the QR code.

The device can only be added to an KNX IoT Area or Line. When the device is added to a KNX IoT area or Line, the credentials can be supplied. ETS can scan the QR code with the camera (or 2D bar code scanner).

Check out the youtube video here, demonstrating the process of doing Thread and KNX Commissioning using a QR code scanner.

5.2.2.1. Channels

The device has 2 channels. The main channel is used to configure the timeouts of the presence detection. The Extra channel can be used to send additional data points/formats at the same time as the main channel.

5.2.2.2. Testing

The Presence sensor has 3 buttons on the back. The middle button can be used to trigger

the sending of a KNX message. The values that are being sent are the current values, read from the hardware at the time of pressing the button. This feature can be used to monitor the communication, without waiting on the configured timeout parameters.

5.2.2.3. Movement Coordination

If the lighting in a larger area is controlled by more than one movement detector, then it shall be avoided that one presence sensor switches the light off, while another presence sensor switches the light on. This can be solved by not controlling the lighting directly, but using the logical OR gate as a direct input to the lighting. The logical OR will make sure that when any of the presence sensors indicates "On", the light will be turned on. The logical operation OR is depicted in the table below.

Input A	Input B	Output (A OR B)
0	0	0
0	1	1
1	0	1
1	1	1

Table 11: *Inputs (A and B) for a logical OR function with the corresponding Output.*

This means that the movement output can be used as input of the logical function "OR" and the output can be used for switching the light. This is depicted in the figure below.

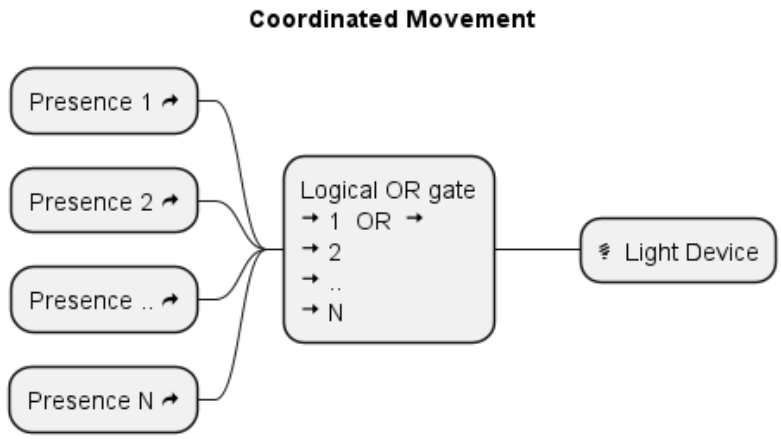

Fig 11: Movement Coordination by means of a logical OR function.

A logical block which includes an OR function (among other functions) is implemented in the KNX IoT Mesh Extender.

5.2.2.4. Downloading the ETS configuration

Downloading the configuration can happen when the ETS data for the data is created, i.e.:

- The parameters are set
- The communication objects are connected

The download can be started in ETS, and one can use either:

- download by serial number
- download by programming mode

The download by serial number does not require any interaction with the device, but one has to wait until the sleep period ends.

The download by programming button requires pressing the programming button. The **PROG** button is on the back of the device and needs to be held down for 1 second, and then released. While the **PROG** button is pressed, the LED is on. When the **PROG** button is released and the device is in programming mode, the LED above will start flashing. Disabling the programming mode can be achieved by pressing **PROG** button again, in exactly the same way that was used to enable it.

> **NOTE!** Please disable programming mode when not in use, since it consumes extra power.

5.2.2.4.1. Reset of the Presence Sensor

The device allows resetting of KNX and Thread in separate steps. This allows the resetting of the KNX configuration to factory default, without resetting the connectivity to the network.

- Reset KNX

Reset of KNX is achieved by pressing and holding down the **PROG** button for 5 seconds, and then releasing. While the **PROG** button is pressed, the LED is on.

When the **PROG** button is released (after 5 sec), the LED will quickly flash 2 times.

> **NOTE!** KNX Reset: this also means that the security credentials are removed. Hence ETS will download newly-created device keys.

- Reset Thread

Reset of Thread is achieved by pressing and holding down the **PROG** button for 10 seconds. While the **PROG** button is pressed, the LED is on. When the **PROG** button is released (after 10 sec), the LED will slowly flash 3 times.

> **NOTE!** Thread Reset: This means that the device needs to be added to the thread network again.

6. Software Bill of Materials

This paragraph contains the list of used open source software in this product.

Name	Version	License
Cascoda SDK	0.25	BSD-3-Clause
tinycbor	v0.6.0	MIT
mbedtls	2.16.2	Apache-2.0
Openthread	knx-v1.0.0	BSD-3-Clause

Table 12: *Software Bill of Materials*

6.1. Cascoda SDK

- Description: Cascoda development
- License: BSD-3-Clause
- Version: 0.25
- URL: https://github.com/Cascoda/cascoda-sdk
- Notes: Chili2D/S SDK, various drivers

6.2. tinycbor

- Description: CBOR implementation
- License: MIT
- Version: v0.6.0
- URL: https://github.com/intel/tinycbor
- Notes: used for CBOR encoding/decoding

6.3. mbedtls

- Description: security constructs
- License: Apache-2.0
- Version: 2.16.2
- URL: https://github.com/ARMmbed/mbedtls
- Notes: used for encryption/decryption

6.4. Openthread

- Description: OpenThread, IPv6
- License: BSD-3-Clause
- Version: knx-v1.0.0

- URL: https://github.com/Cascoda/openthread
- Notes: Cascoda's port of OpenThread

7. KNX device information

Info Field	Value
Manufacturer	Cascoda
Model	Presence Sensor
Order number	0010
GTIN	5060644571149 (Wall Mount) 5060644571156 (Ceiling Mount)
GTIN description	KNX IoT Presence Sensor
Product number	CCA-KNX-IoT-PRE01W (Wall Mount) CA-KNX-IoT-PRE01C (Ceiling Mount)
Hardware type	000000000010
Hardware version	[0, 0, 1]
Firmware version	[1, 0, 1]
Sleepy Device	yes
Sleep time (default)	1800

7.1. Data points

url	name	instance	resource type	interface type	data type
"/p/1_1"	On/Off 1	1	414.51	if.s	DPT_Switch
"/p/2_1"	Presence 1	1	345.51	if.s	DPT_Occupancy
"/p/3_1"	Scene 1	1	403.61	if.s	DPT_SceneControl
"/p/5_1"	HVAC mode 1	1	397.80	if.s	DPT_HVACMode
"/p/6_1"	Switch On/Off 1	1	420.61	if.s	DPT_Switch
"/p/7_1"	Scaling 1	1	420.63	if.s	DPT_Scaling
"/p/8_1"	RGB On/Off 1	1	424.51	if.s	DPT_Switch
"/p/9_1"	RGB 1	1	424.52	if.s	DPT_Colour_RGB
"/p/1_2"	On/Off 2	1	414.51	if.s	DPT_Switch
"/p/2_2"	Presence 2	1	345.51	if.s	DPT_Occupancy
"/p/3_2"	Scene 2	1	403.61	if.s	DPT_SceneControl
"/p/5_2"	HVAC mode 2	1	397.80	if.s	DPT_HVACMode

url	name	instance	resource type	interface type	data type
"/p/6_2"	Switch On/Off 2	1	420.61	if.s	DPT_Switch
"/p/7_2"	Scaling 2	1	420.63	if.s	DPT_Scaling
"/p/8_2"	RGB On/Off 2	1	424.51	if.s	DPT_Switch
"/p/9_2"	RGB 2	1	424.52	if.s	DPT_Colour_RGB
"/p/l1_4"	Luminance 4	1	409.51	if.s	DPT_Value_Lux
"/p/5d_3"	Battery Information 3	1	443.159	if.s	DPT_Battery_Info
"/p/6d_3"	Battery Information (high res) 3	1	50004.3077	if.s	DPT_Percent_U8
"/p/7d_3"	Battery Information (low res) 3	1	50004.3077	if.s	DPT_Scaling
"/p/8d_3"	Battery Alarm 3	1	50004.3077	if.s	DPT_Alarm
"/p/9d_3"	RSSI 3	1	50004.3078	if.s	DPT_Value_1_Count

Table 13: *Data points*

7.1.1. On/Off 1

Movement Detector for Lighting [MDL], Switch

7.1.2. Presence 1

Presence Detector [PRD], Occupancy

7.1.3. Scene 1

Scene Controller [SCCTRL], DPT_SceneControl

7.1.4. HVAC mode 1

User HVAC Room Settings [UHRS], DPT_HVACMode

7.1.5. Switch On/Off 1

Light Dimming Sensor Basic [LDSB], Switch. Used when dimming value is not 0: turn device on.

7.1.6. Scaling 1

Light Dimming Sensor Basic [LDSB], Dimming value, DPT_Scaling

7.1.7. RGB On/Off 1

Colour Setting Sensor RGB [CSSRGB], Switch. Used when Color is not black: turn device on.

7.1.8. RGB 1

Colour Setting Sensor RGB [CSSRGB], DPT_ColourRGB [R,G,B], Color to be set.

7.1.9. On/Off 2

Movement Detector for Lighting [MDL], Switch

7.1.10. Presence 2

Presence Detector [PRD], Occupancy

7.1.11. Scene 2

Scene Controller [SCCTRL], DPT_SceneControl

7.1.12. HVAC mode 2

User HVAC Room Settings [UHRS], DPT_HVACMode

7.1.13. Switch On/Off 2

Light Dimming Sensor Basic [LDSB], Switch. Used when dimming value is not 0: turn device on.

7.1.14. Scaling 2

Light Dimming Sensor Basic [LDSB], Dimming value, DPT_Scaling

7.1.15. RGB On/Off 2

Colour Setting Sensor RGB [CSSRGB], Switch. Used when Color is not black: turn device on.

7.1.16. RGB 2

Colour Setting Sensor RGB [CSSRGB], DPT_ColourRGB [R,G,B], Color to be set.

7.1.17. Luminance 4

The measured Luminance value in [lux] at time of sending. DPT_Value_Lux (16bit float)

7.1.18. Battery Information 3

Battery Status reporting using knx:dpt.battery_Info.

7.1.19. Battery Information (high res) 3

Battery Status in percentage (high res) [0,255]

7.1.20. Battery Information (low res) 3

Battery Status in percentage (low res) [0,100]

7.1.21. Battery Alarm 3

Battery Alarm, Alarm sent periodically. Value is evaluated just before the actual sending of the value.

7.1.22. RSSI 3

The last received RSSI from the Parent. This value indicates the quality of the communication. This is stored during the communication with its parent.

7.2. Parameters

url	name	param type
"/p/p1"	Sleep Period	int
"/p/p0_1"	Repeat motion events 1	int
"/p/p1_1"	Switch On delay 1	time
"/p/p2_1"	Switch Off Delay 1	time
"/p/p3_1"	Output 1	int
"/p/p4_1"	Luminance Level 1	int
"/p/p5_1"	EBI 1	int
"/p/p6_21_1"	Luminance Level 2 1 1	int
"/p/p6_22_1"	Luminance Level 2 2 1	int
"/p/p6_31_1"	Luminance Level 3 1 1	int
"/p/p6_32_1"	Luminance Level 3 2 1	int
"/p/p6_33_1"	Luminance Level 3 3 1	int
"/p/p7_1"	Luminance Levels 1	int
"/p/p8_1"	Scene On 1	int
"/p/p9_1"	Scene Off 1	int
"/p/p10_1"	HVAC On 1	int
"/p/p11_1"	HVAC Off 1	int
"/p/p12_1"	Scaling On 1	int
"/p/p13_1"	Scaling On 1 1	int
"/p/p14_1"	Scaling On 2 1	int
"/p/p15_1"	Scaling On 3 1	int
"/p/p16_1"	Scaling Off 1	int
"/p/p17_1"	Color On 1	color
"/p/p18_1"	Color Off 1	color
"/p/p3_2"	Output 2	int
"/p/p4_2"	Luminance Level 2	int

url	name	param type
"/p/p6_21_2"	Luminance Level 2 1 2	int
"/p/p6_22_2"	Luminance Level 2 2 2	int
"/p/p6_31_2"	Luminance Level 3 1 2	int
"/p/p6_32_2"	Luminance Level 3 2 2	int
"/p/p6_33_2"	Luminance Level 3 3 2	int
"/p/p7_2"	Luminance Levels 2	int
"/p/p8_2"	Scene On 2	int
"/p/p9_2"	Scene Off 2	int
"/p/p10_2"	HVAC On 2	int
"/p/p11_2"	HVAC Off 2	int
"/p/p12_2"	Scaling On 2	int
"/p/p13_2"	Scaling On 1 2	int
"/p/p14_2"	Scaling On 2 2	int
"/p/p15_2"	Scaling On 3 2	int
"/p/p16_2"	Scaling Off 2	int
"/p/p17_2"	Color On 2	color
"/p/p18_2"	Color Off 2	color
"/p/pl_1_4"	On/Off (luminance) 4	int
"/p/pl_2_4"	Luminance sending period 4	int
"/p/pl_3_4"	Luminance calibration overwrite 4	int
"/p/pl_4_4"	Luminance calibration factor 4	int
"/p/pd1_3"	Battery send period (battery value) 3	int
"/p/pd2_3"	Battery Curve 3	int
"/p/pd3_3"	Battery 3	int
"/p/pd4_3"	Battery Alarm Level 3	int

Table 14: *Parameters*

7.2.1. Parameter Sleep Period

Sleep period in Seconds, after each period the device wakes up and maintains its connection

to the network.
Values:

- 1 minute : value 60
- 5 minutes : value 300
- 10 minutes : value 600
- 15 minutes : value 900 **[Default]**
- 30 minutes : value 1800
- 1 hour : value 3600
- 2 hours : value 7200
  Example: 900

7.2.2. Parameter Repeat motion events 1

Repeat motion events enabled. This parameter enables the triggering of a motion event even if it is repeated.
Values:

- Enable : value 1 **[Default]**
- Disable : value 2
  Example: 1

7.2.3. Parameter Switch On delay 1

Presence Detector switch on delay in [sec]. When presence/motion is detected: send out command 'ON' after this delay.
Example: 0

used data range: [0, 65000]

7.2.4. Parameter Switch Off Delay 1

Presence Detector switch off delay in [sec]. When presence/motion is 'On' and no presence is detected, send out command 'OFF' after this delay.
Example: 900

used data range: [60, 65000]

7.2.5. Parameter Output 1

Selection of the datapoint to be used when presence is detected.
Values:

- Movement : value 1
- Presence : value 2 **[Default]**

- Dimming : value 3
- Color : value 4
- Scene : value 5
- HVAC : value 6
  Example: 2

7.2.6. Parameter Luminance Level 1

Brightness Threshold in [Lux], evaluated when presence is detected. Measured Lux value needs to be below this threshold. I.e. the action will only be sent when it is darker than the set value.
Example: 300

used data range: [1, 10000]

7.2.7. Parameter EBI 1

Movement Detector for Lighting [MDL] brightness independency. Use Luminance when the independency = 0
Values:

- Yes : value 0
- No : value 1 **[Default]**
  Example: 1

7.2.8. Parameter Luminance Level 2 1 1

Luminance Threshold 2 Levels, Level 1 [Lux]
Example: 1000

used data range: [300, 10000]

7.2.9. Parameter Luminance Level 2 2 1

Luminance Threshold 2 Levels, Level 2 Channel: 1 [Lux]
Example: 100

used data range: [0, 300]

7.2.10. Parameter Luminance Level 3 1 1

Luminance Threshold 3 Levels, level 1 Channel: 1 [Lux]
Example: 1000

used data range: [400, 10000]

7.2.11. Parameter Luminance Level 3 2 1

Luminance Threshold 3 Levels, Level 2 Channel: 1[Lux]
Example: 300

used data range: [200, 400]

7.2.12. Parameter Luminance Level 3 3 1

Luminance Threshold Levels 3, Level 3 Channel: 1 [Lux]
Example: 50

used data range: [1, 200]

7.2.13. Parameter Luminance Levels 1

Number of Luminance Levels for Channel 1. Each Level has its own threshold value. If the measured luminance value is below that level, then the set brightness value will be used in the action.
Values:

- Brightness Independent : value 0
- 1 : value 1 **[Default]**
- 2 : value 2
- 3 : value 3
  Example: 1

7.2.14. Parameter Scene On 1

Scene number to send when presence is detected (i.e. Scene number for 'On').
Example: 1

used data range: [1, 64]

7.2.15. Parameter Scene Off 1

Scene number to send when presence time is elapsed (i.e. Scene number for 'Off').
Example: 2

used data range: [1, 64]

7.2.16. Parameter HVAC On 1

HVAC enum value to send when presence is detected (i.e. value to send on 'On').
Values:

- Auto : value 0
- Comfort : value 1 **[Default]**
- Standby : value 2
- Economy : value 3
- Building protection : value 4
  Example: 1

7.2.17. Parameter HVAC Off 1

HVAC enum value to send when presence time is elapsed (i.e. value to send on 'Off').
Values:

- Auto : value 0
- Comfort : value 1
- Standby : value 2 **[Default]**
- Economy : value 3
- Building protection : value 4
  Example: 2

7.2.18. Parameter Scaling On 1

Dimming (Scaling) value to send for up to luminance level 1 (On)
Example: 200

used data range: [0, 255]

7.2.19. Parameter Scaling On 1 1

Dimming (Scaling) value to send for luminance level 1 when using more than 1 level (On)
Example: 200

used data range: [0, 255]

7.2.20. Parameter Scaling On 2 1

Dimming (Scaling) value to send for luminance level 2 ('On')
Example: 75

used data range: [0, 255]

7.2.21. Parameter Scaling On 3 1

Dimming (Scaling) value to send for luminance level 3 ('On')
Example: 50

used data range: [0, 255]

7.2.22. Parameter Scaling Off 1

Dimming (Scaling) value to send on 'Off'
Example: 0

used data range: [0, 255]

7.2.23. Parameter Color On 1

Color value (RGB) to send for presence detected (i.e. 'On'), default white. Device is switched 'On' when color is not black.
Example: #FFFFFF

7.2.24. Parameter Color Off 1

Color value (RGB) to send for presence detected (i.e. 'Off'), Device is switched 'Off' when color is black.
Example: #000000

7.2.25. Parameter Output 2

Selection of the datapoint to be used when presence is detected.
Values:

- Movement : value 1
- Presence : value 2 **[Default]**
- Dimming : value 3
- Color : value 4
- Scene : value 5
- HVAC : value 6
  Example: 2

7.2.26. Parameter Luminance Level 2

Brightness Threshold in [Lux], evaluated when presence is detected. Measured Lux value needs to be below this threshold. I.e. the action will only be sent when it is darker than the set value.
Example: 300

used data range: [1, 10000]

7.2.27. Parameter Luminance Level 2 1 2

Luminance Threshold 2 Levels, Level 1 Channel:2 [Lux]
Example: 1000

used data range: [300, 10000]

7.2.28. Parameter Luminance Level 2 2 2

Luminance Threshold 2 Levels, Level 2 Channel:2 [Lux]
Example: 100

used data range: [0, 300]

7.2.29. Parameter Luminance Level 3 1 2

Luminance Threshold 3 Levels, level 1 Channel:2 [Lux]
Example: 1000

used data range: [400, 10000]

7.2.30. Parameter Luminance Level 3 2 2

Luminance Threshold 3 Levels, Level 2 Channel:2 [Lux]
Example: 300

used data range: [200, 400]

7.2.31. Parameter Luminance Level 3 3 2

Luminance Threshold 3 Levels, Level 3 Channel:2 [Lux]
Example: 50

used data range: [1, 200]

7.2.32. Parameter Luminance Levels 2

Number of Luminance Levels for Channel 2. Each Level has its own threshold value. If the measured luminance value is below that level, then the set brightness value will be used in the action.
Values:

- Brightness Independent : value 0
- 1 : value 1 **[Default]**
- 2 : value 2
- 3 : value 3
  Example: 1

7.2.33. Parameter Scene On 2

Scene number to send when presence is detected (i.e. Scene number for 'On').
Example: 1

used data range: [1, 64]

7.2.34. Parameter Scene Off 2

Scene number to send when presence time is elapsed (i.e. Scene number for 'Off').
Example: 2

used data range: [1, 64]

7.2.35. Parameter HVAC On 2

HVAC enum value to send when presence is detected (i.e. value to send on 'On').
Values:

- Auto : value 0
- Comfort : value 1 **[Default]**
- Standby : value 2
- Economy : value 3
- Building protection : value 4
  Example: 1

7.2.36. Parameter HVAC Off 2

HVAC enum value to send when presence time is elapsed (i.e. value to send on 'Off').
Values:

- Auto : value 0
- Comfort : value 1
- Standby : value 2 **[Default]**
- Economy : value 3
- Building protection : value 4
  Example: 2

7.2.37. Parameter Scaling On 2

Dimming (Scaling) value to send for up to luminance level 1 (On)
Example: 200

used data range: [0, 255]

7.2.38. Parameter Scaling On 1 2

Dimming (Scaling) value to send for lumninance level 1 when using more than 1 level (On)
Example: 200

used data range: [0, 255]

7.2.39. Parameter Scaling On 2 2

Dimming (Scaling) value to send for lumninance level 2 ('On')
Example: 75

used data range: [0, 255]

7.2.40. Parameter Scaling On 3 2

Dimming (Scaling) value to send for lumninance level 3 ('On')
Example: 50

used data range: [0, 255]

7.2.41. Parameter Scaling Off 2

Dimming (Scaling) value to send on 'Off'.
Example: 0

used data range: [0, 255]

7.2.42. Parameter Color On 2

Color value (RGB) to send for presence detected (i.e. 'On'), default white. Device is switched 'On' when color is not black.
Example: #FFFFFF

7.2.43. Parameter Color Off 2

Color value (RGB) to send for presence detected (i.e. 'Off'), Device is switched 'Off' when color is black.
Example: #000000

7.2.44. Parameter On/Off (luminance) 4

Luminance Enable. This parameter enables sending of the Luminance value according to a timed period.
Values:

- Enable : value 1 **[Default]**
- Disable : value 2
  Example: 1

7.2.45. Parameter Luminance sending period 4

Luminance sending period in Seconds [sec]. Each period the device sends the current lux value.
Values:

- 1 minute : value 60
- 5 minutes : value 300
- 10 minutes : value 600
- 15 minutes : value 900 **[Default]**
- 30 minutes : value 1800
- 1 hour : value 3600
  Example: 900

7.2.46. Parameter Luminance calibration overwrite 4

Luminance calibration. This parameter is to select whether the default luminance calibration factor will be overwritten or not.
Values:

- Keep Default : value 1 **[Default]**
- Overwrite : value 2
  Example: 1

7.2.47. Parameter Luminance calibration factor 4

This is the calibration factor used to calibrate the luminance readings
Example: 1000

used data range: [1000, 50000]

7.2.48. Parameter Battery send period (battery value) 3

Battery send period in Seconds [sec], after each period the device evaluates and sends the battery value and battery alarm.
Values:

- 1 minute : value 60
- 5 minutes : value 300
- 10 minutes : value 600
- 15 minutes : value 900

- 30 minutes : value 1800
- 1 hour : value 3600 **[Default]**
- 2 hours : value 7200
- 4 hours : value 14400
- 8 hours : value 28800
- 16 hours : value 57600
- 24 hours : value 86400
  Example: 3600

7.2.49. Parameter Battery Curve 3

Battery curve selection. This identifies the battery type so that the battery percentage can be calculated correctly. Using the incorrect battery type will result in incorrect battery percentage reporting.
Values:

- Zinc-Carbon (R6) : value 1
- Alkaline (LR6) : value 2 **[Default]**
- Li-FeS2 (FR6) : value 3
  Example: 2

7.2.50. Parameter Battery 3

choose DPT for battery information.
Values:

- Battery Info : value 0 **[Default]**
- Percentage High Res : value 1
- Percentage Low Res : value 2
  Example: 0

7.2.51. Parameter Battery Alarm Level 3

Send Battery Alarm (boolean) = True, when the battery is below the Alarm level. The Alarm level is set in [%].
Example: 10

used data range: [5, 100]