



ABB BUILDING & HOME AUTOMATION SOLUTIONS

ABB I-BUS® KNX PRESENCE & MOVEMENT DETECTORS

Unmatched accuracy through any surface

ENGINEERED
TO OUTRUN

Agenda

01.

Introduction

Motivation



02.

Technical Information

Technology description

High Frequency vs. Passive
Infrared



03.

ABB Portfolio

Value propositions

Applications

Features

Order codes

KNX Data Secure



01

INTRODUCTION

Motivation

High-Frequency Presence & Movement Detectors

Motivation

Challenge

- For some applications **PIR sensors** are not the best solution to detect presence. False alarms or missed detection are triggered by:
 - Rapid temperature changes and non-living heating sources (e.g., sun, radiators)
 - White spots in the detection area (difficulty in detecting slow or stationary objects)
 - Not sensitive enough (high switch-off delay)

Solution

- New presence detector portfolio, based on **microwave technology**, to cover new building applications
 - Bathrooms or offices with room separators
 - Curved floors or staircases



Covering new applications with new technology

02

TECHNICAL INFORMATION

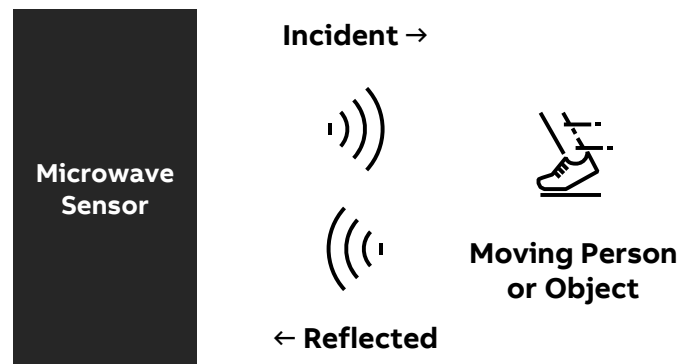
Technology Explanation & Comparison

High-Frequency Presence & Movement Detectors

Technology Explanation – High Frequency (HF)



How does it work?



The technology that makes microwave sensors work is based on the principles of electromagnetic radiation (“doppler effect”). The sensor emits a wave that travels through the air and bounces off objects in its path. The wave then returns to the sensor, where it is detected and analyzed.



Pros

- **High Sensitivity:** HF detectors are very sensitive and can detect even slight movements within their coverage area
- **No Line-of-Sight Required:** HF waves can penetrate through obstacles such as walls, doors, or furniture, allowing for more flexible placement options
- **Works in Various Environments:** HF detectors are not affected by temperature changes or air movements, making them suitable for various environments including outdoor use



Cons

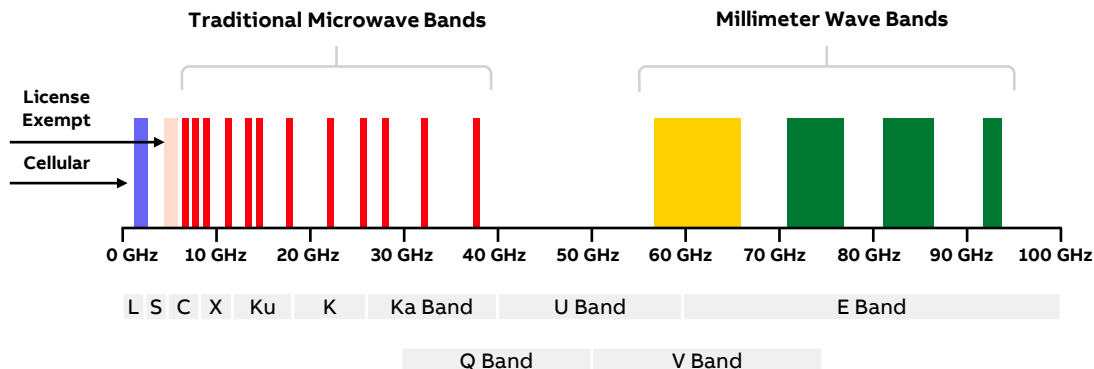
- **Complex Installation:** HF detectors may require more complex installation due to their higher sensitivity and the need for fine-tuning to avoid false alarms
- **Power Consumption:** They may consume more power compared to PIR detectors due to continuous wave emission and signal processing
- **Cost:** HF detectors tend to be more expensive than PIR detectors, making them less cost-effective for some applications
- **Interference:** They may experience interference from other electronic devices operating on similar frequencies, potentially leading to false alarms or reduced effectiveness

High-Frequency Presence & Movement Detectors

Technology Explanation – High Frequency (HF)

Microwave Bands

- The microwave spectrum is usually defined as a range of frequencies ranging from 1 GHz to over 100 GHz. This range has been divided into several frequency bands, each represented by a letter. The most common being the IEEE Radar Bands followed by NATO Radio Bands and ITU Bands
- Commonly used bands for detectors:
 - C band: 5.8 GHz
 - K band: 24 GHz
 - V band: 60 GHz (Millimeter wave band)



5.8 GHz and 24 GHz High Frequency Detection

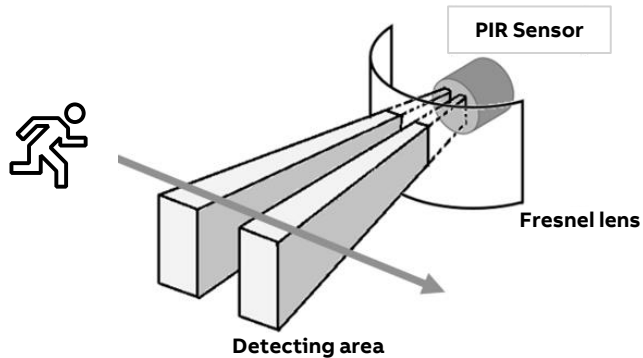
- C-band microwave technology works on 5.8 GHz frequency while the K-band microwave technology works on 24 GHz frequency
- **Lower frequencies are better for longer-range detection, while higher frequencies are better for short-range detection**
- This enables the **K-band to deliver sharper detections. It could detect body's micro movements as well as human vital functions**, such as breathing and shoulder movements. It could have uniform coverage of the detection area, through reduced wall penetration, and minimizing false alarms from external movement
- Additionally, the higher frequency enables us to reduce the signal and still reach the same distance, which means that the **antenna of the K-band microwave is smaller than the C-band**
- **C-band can penetrate glass/wooden/plaster walls and cement walls less 30cm+, but K-band penetration ability is weak**

High-Frequency Presence & Movement Detectors

Technology Explanation – Passive Infrared (PIR)



How does it work?



The PIR detects movement by measuring the temperature difference between the background and a warm body. Usually, plastic optical reflection system or plastic Fresnel lens used as a focusing system for infrared radiation.



Pros

- **Low Power Consumption:** PIR detectors consume less power compared to HF detectors since they only activate when detecting changes in infrared radiation
- **Simple Installation:** PIR detectors are generally easier to install and set up, requiring less fine-tuning
- **Cost-Effective:** PIR detectors are often more cost-effective than HF detectors, making them a preferred choice for budget-conscious projects
- **Less Susceptible to Interference:** Since they rely on infrared radiation, PIR detectors are less susceptible to interference from other electronic devices



Cons

- **Limited Detection Range:** PIR detectors typically have a more limited detection range compared to HF detectors, which may require more units for adequate coverage
- **Line-of-Sight Required:** PIR detectors require a clear line of sight to detect motion, which can limit placement options and effectiveness behind obstacles
- **Affected by Temperature Changes:** PIR detectors can be affected by sudden temperature changes, potentially leading to false alarms or missed detections
- **Not Suitable for Outdoor Use:** PIR detectors may not perform well in outdoor environments due to their sensitivity to temperature changes and limited range

High-Frequency Presence & Movement Detectors

Technology Comparison – High Frequency vs. Passive Infrared

HF Presence Detectors			PIR Presence Detectors	
	Pros	Cons	Pros	Cons
Performance	No difference between radial and vertical movement		Very good in radial movement	Less range for vertical movement
Environment	Not affected by temperature or brightness	Electromagnetic signals (e.g., WiFi) can affect the performance		Less good performance in high temperature environments
Market		More expensive and not widely known and accepted	Cost effective and established solution	
Design	No lens needed – possibly flat and small design			Visible lens needed
Detection	Very reliable detection. Can also sense minor movements. Penetrates material (glass, wood, plaster walls)	Penetration of material can lead to false alarms	Very fast	Can not detect minor movements. Direct contact between lens and people needed

03

ABB PORTFOLIO

Features, Functions, Applications

HIGH- FREQUENCY PRESENCE & MOVEMENT DETECTORS

High-Frequency Presence & Movement Detectors

Value Propositions



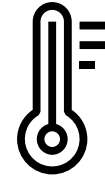
Invisible Design

- Small size and flat profile without bump (PIR must have dome lens)
- Around 1 mm thickness outside ceilings
- Could integrate and hide into false ceilings, almost invisible
- Supports ceiling- and flush-mounted installations using VDE and BS installation boxes



Advanced Detection Capabilities

- 5.8 GHz detectors could detect movement even beyond thin walls and behind doors
- 24 GHz detectors could detect body's micro movements as well as human vital functions, such as breathing and shoulder movements



Robust Performance

- Could be used in harsh environments where heat cycles are irregular and keep constant detection over all temperatures
- Could achieve high IP levels to prevent damage to the detector
- Incorporating sensors for brightness, temperature, and humidity for a comprehensive environmental monitoring

High-Frequency Presence & Movement Detectors

Applications



OPEN SPACE OFFICE / RESTROOMS

- HF is useful in scenarios where PIR technology falls short
- No direct contact with the presence detector is required
- Where reliable detection of minor movements is needed
- Recommended technology: 5,8 GHz / 24 GHz

HOTELS

- Automatic lighting and HVAC control during occupancy
- Occupancy function replaces card holder
- Service department support
- Adjustable detection range to avoid false triggers
- Recommended technology: 24 GHz



SEMI – OUTDOORS

- Movement detection independent of body temperature
- IP55 functionality for semi-outdoor applications (dust and water-proof)
- Recommended technology: 5,8 GHz



High-Frequency Presence & Movement Detectors

Portfolio Overview



5.8 GHz Technology

Movement Detector HF KNX, Basic, white/black
Movement Detector HF KNX, Basic, white/black, IP55
Movement Detector HF KNX, Premium, white/black
Movement Detector HF free@home, Basic, white/black

24 GHz Technology

Presence Detector HF KNX, Basic, white/black
Presence Detector HF KNX, Premium, white/black
Presence Detector HF free@home, Premium, white/black

Accessoires

Presence detector HF, VDE mounting kit, white/black
Presence detector HF, BS mounting kit, white/black
Presence detector HF, SM box, white/black



High-Frequency Presence & Movement Detectors

Portfolio Overview

Product Definitions

- Installation:
 - Ceiling mounted with false ceiling
 - Surface mounting
 - Flush mounted support VDE and BS installation box
- ETS Applications in line with existing PIR portfolio
 - Constant brightness control
 - Support RTC function
- Support KNX Data Secure
- Support KNX and ABB-free@home®

Type	Version	Channel x 2	Channel x 4	Movement detection	Detection range	Brightness sensor switching	Brightness sensor dimming	RTC logics Master/ Slave	Temperature sensor	Humidity sensor	Logic channel x 1	Logic channel x 5
5.8 GHz	Standard	x		x movement	10-12m diameters	x			x	x	x	
5.8 GHz	IP55	x		x movement	10-12m diameters	x					x	
5.8 GHz	Premium		x	x movement	10-12m diameters	x	x	x	x	x		x
24 GHz	Standard	x		x presence	8-10m diameters	x			x	x	x	
24 GHz	Premium		x	x presence	8-10m diameters	x	x	x	x	x		x

5.8 GHz Movement Detector HF KNX & free@home (IP55)

Common features:

- HF technology: 5.8 GHz
- Application: Movement detection
- Detection range: Ø 10-12 m / 360°
- Sensor:
 - Brightness
 - Temperature*
 - Relative Humidity*

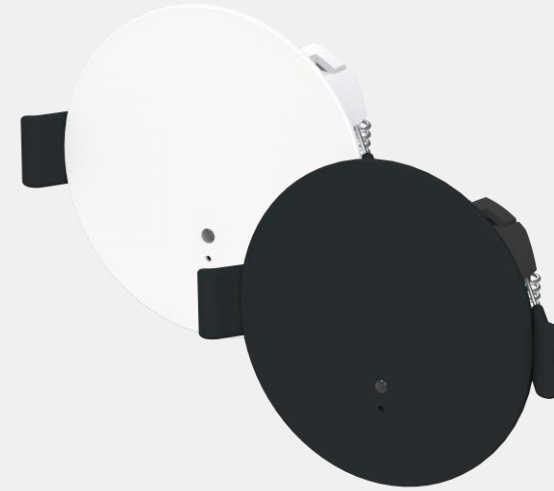


Applications:

- Movement detection
- 2 channels
- Constant Light Switching
- Value sender
- Logic channel (1x)
- Master/Slave configuration
- KNX Data Secure
- (IP55)



- Movement detection
- 1 channel
- IP55



*=not in the IP55 version

5.8 GHz Presence Detector HF KNX – Premium

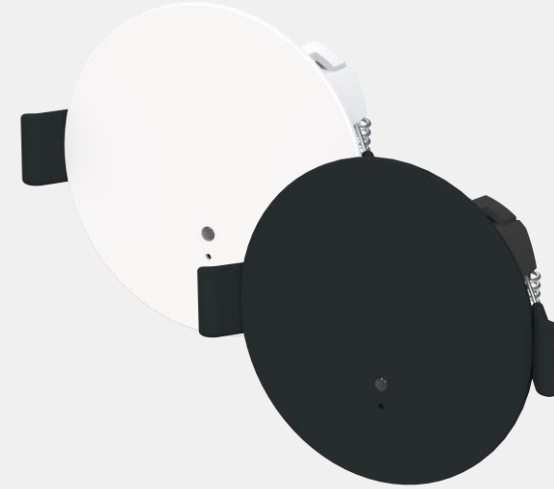
Common features:

- HF technology: 5.8 GHz
- Application: Presence detection
- Detection range: Ø 6-8 m / 360°
- Sensor:
 - Brightness
 - Temperature
 - Relative Humidity



Applications:

- Presence detection
- 4 channels
- Constant Light Switching
- Constant Light Control
- Room Temperature Controller (RTC)
- Logic channel (5x)
- Master/Slave configuration
- KNX Data Secure



24 GHz Presence Detector HF KNX Standard

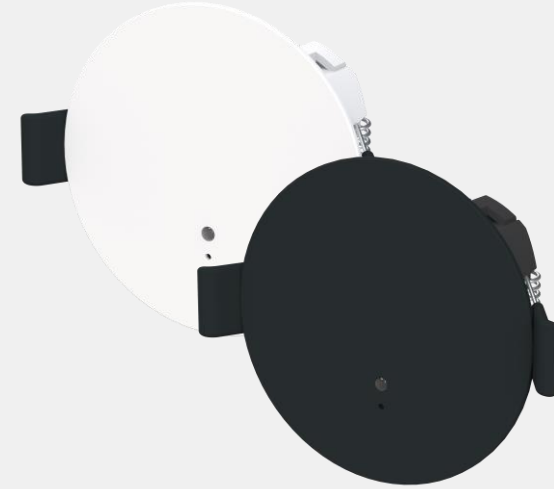
Common features:

- HF technology: 24 GHz
- Application: Presence detection
- Detection range: Ø 6-8 m / 360°
- Sensor:
 - Brightness
 - Temperature
 - Relative Humidity



Applications:

- Presence detection
- 2 channels
- Constant Light Switching
- Value sender
- Logic channel (1x)
- Master/Slave configuration
- KNX Data Secure



24 GHz Presence Detector HF KNX & free@home – Premium

Common features:

- HF technology: 24 GHz
- Application: Presence detection
- Detection range: Ø 6-8 m / 360°
- Sensor:
 - Brightness
 - Temperature
 - Relative Humidity

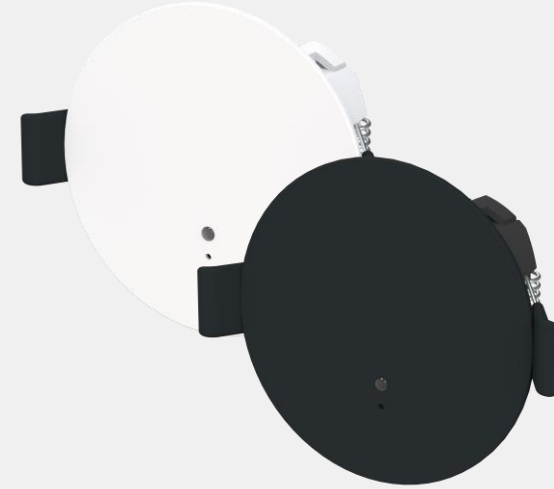


Applications:

- Presence detection
- 4 channels
- Constant Light Switching
- Constant Light Control
- Room Temperature Controller (RTC)
- Logic channel (5x)
- Master/Slave configuration
- KNX Data Secure



- Presence detection
- 2 channels (1x Light, 1x HVAC)
- Value sender

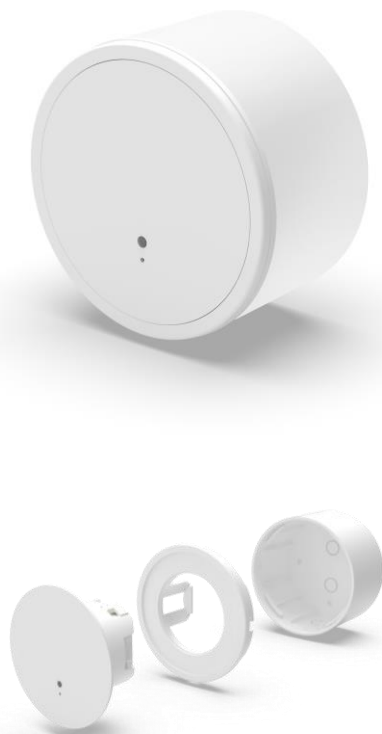


Accessories Presence Detector HF KNX & free@home

False Ceilings:



Surface Mounting:



VDE:



British Standard:



High-Frequency Presence & Movement Detectors

Ordering Information

5.8 GHz Movement Detectors

Product Type	Product ID	Product Name
5.8 GHz Movement Detectors		
BMH/U2.1.1-884	2TYZ510205G0601	Movement Detector HF KNX, Basic, white
BMH/U2.55.1-884	2TYZ510505G0601	Movement Detector HF KNX, Basic, white, IP55
BMH/U4.5.1-884	2TYZ510215G0601	Movement Detector HF KNX, Premium, white
BMH/U2.1.1-885	2TYZ510205G0701	Movement Detector HF KNX, Basic, black
BMH/U2.55.1-885	2TYZ510505G0701	Movement Detector HF KNX, Basic, black, IP55
BMH/U4.5.1-885	2TYZ510215G0701	Movement Detector HF KNX, Premium, black
BMH/U2.1.11-884	2TYZ510205G0611	Movement Detector HF KNX, Basic, white, BJE
BMH/U2.55.11-884	2TYZ510505G0611	Movement Detector HF KNX, Basic, white, IP55, BJE
BMH/U4.5.11-884	2TYZ510215G0611	Movement Detector HF KNX, Premium, white, BJE
BMH/U2.1.11-885	2TYZ510205G0711	Movement Detector HF KNX, Basic, black, BJE
BMH/U2.55.11-885	2TYZ510505G0711	Movement Detector HF KNX, Basic, black, IP55, BJE
BMH/U4.5.11-885	2TYZ510215G0711	Movement Detector HF KNX, Premium, black, BJE
MDH-F-1.0.1-884	2TYZ510505G0621	Movement Detector HF free@home, Basic, white
MDH-F-1.0.1-885	2TYZ510505G0721	Movement Detector HF free@home, Basic, black
MDH-F-1.0.11-884	2TYZ510505G0631	Movement Detector HF free@home, Basic, white, BJE
MDH-F-1.0.11-885	2TYZ510505G0731	Movement Detector HF free@home, Basic, black, BJE

24 GHz Presence Detectors

Product Type	Product ID	Product Name
24 GHz Presence Detectors		
PMH/U2.1.1-884	2TYZ510202G0601	Presence Detector HF KNX, Basic, white
PMH/U4.5.1-884	2TYZ510212G0601	Presence Detector HF KNX, Premium, white
PMH/U2.1.1-885	2TYZ510202G0701	Presence Detector HF KNX, Basic, black
PMH/U4.5.1-885	2TYZ510212G0701	Presence Detector HF KNX, Premium, black
PMH/U2.1.11-884	2TYZ510202G0611	Presence Detector HF KNX, Basic, white, BJE
PMH/U4.5.11-884	2TYZ510212G0611	Presence Detector HF KNX, Premium, white, BJE
PMH/U2.1.11-885	2TYZ510202G0711	Presence Detector HF KNX, Basic, black, BJE
PMH/U4.5.11-885	2TYZ510212G0711	Presence Detector HF KNX, Premium, black, BJE
PDH-F-1.0.1-884	2TYZ510202G0621	Presence Detector HF free@home, Premium, white
PDH-F-1.0.1-885	2TYZ510202G0721	Presence Detector HF free@home, Premium, black
PDH-F-1.0.11-884	2TYZ510202G0631	Presence Detector HF free@home, Premium, white, BJE
PDH-F-1.0.11-885	2TYZ510202G0731	Presence Detector HF free@home, Premium, black, BJE

Accessories

Product Type	Product ID	Product Name
Accessories		
PMA/K2.1-884	2TYZ510000G0603	Presence Detector HF, VDE mounting kit, white
PMA/K1.1-884	2TYZ510000G0601	Presence Detector HF, BS mounting kit, white
PMA/A1.1-884	2TYZ510000G0602	Presence Detector HF, SM box, white
PMA/K2.1-885	2TYZ510000G0703	Presence Detector HF, VDE mounting kit, black
PMA/K1.1-885	2TYZ510000G0701	Presence Detector HF, BS mounting kit, black
PMA/A1.1-885	2TYZ510000G0702	Presence Detector HF, SM box, black
PMA/K2.11-884	2TYZ510000G0613	Presence Detector HF, VDE mounting kit, white, BJE
PMA/A1.11-884	2TYZ510000G0612	Presence Detector HF, SM box, white, BJE
PMA/K2.11-885	2TYZ510000G0713	Presence Detector HF, VDE mounting kit, black, BJE
PMA/A1.11-885	2TYZ510000G0712	Presence Detector HF, SM box, black, BJE

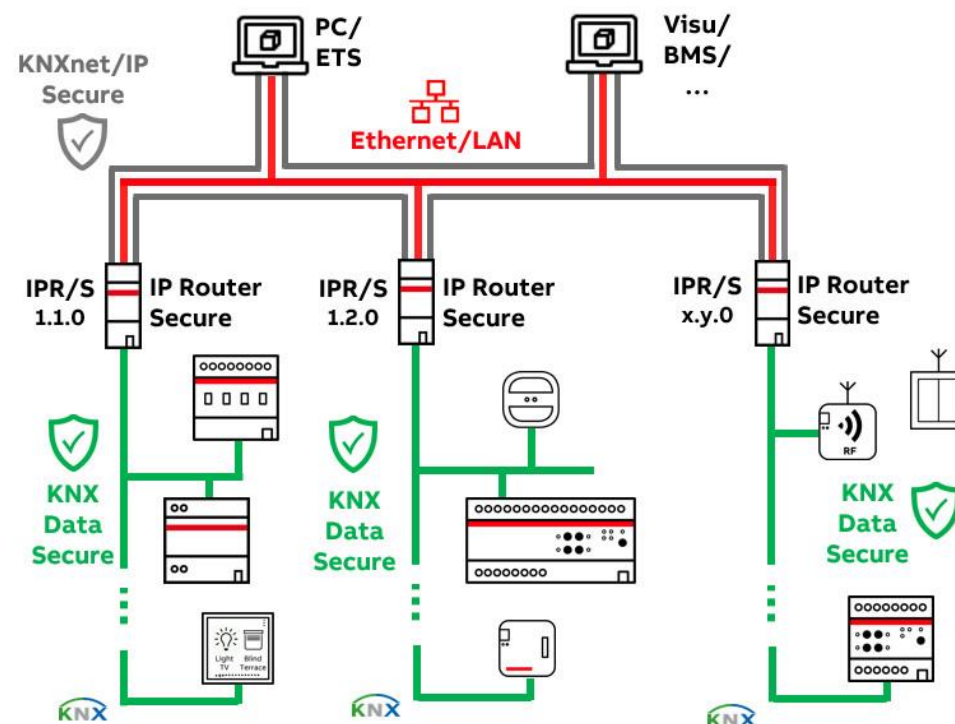
High-Frequency Presence & Movement Detectors

KNX Data Secure



Overview

- KNX Data Secure ensures the encryption of telegrams on twisted pair (TP)
- KNX Data Secure is recommended for KNX TP
- In a KNX TP system, secure and plain devices can be used in parallel
→ Not all devices have to be secure
- In a KNX installation, KNXnet/IP Secure and KNX Data Secure devices can be used in parallel
- Secure commissioning (download of individual address and application)
- Secure devices are protected against unauthorized programming
- KNX Secure is based on “Advanced Encryption Standard” (AES 128 bit) and is standardized according to ISO/IEC 18033-3



For more information about KNX Data Secure watch our Webinar recording!

PIR PRESENCE & MOVEMENT DETECTORS

PIR Presence & Movement Detectors

Value Propositions



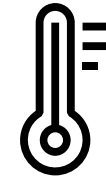
Variety

- Versions with different detection ranges and functions available to select the best fitting solution for any application
- Different colors available for the perfect integration into any interior: white, silver with black lens, black matt with black lens



Accuracy

- Sharp separation of different zones by switchable PIRs per channels



One Sensor Multiple Functions

- Powerful application including RTC, logic functions, zones, etc.

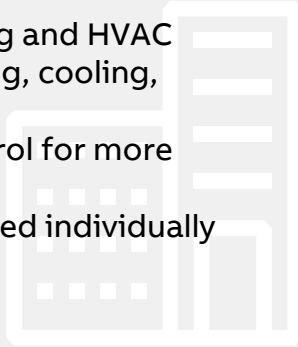
PIR Presence & Movement Detectors

Applications



OFFICES / RESTROOMS

- Switching of lighting and HVAC applications (heating, cooling, ventilation)
- Constant light control for more comfort
- Areas can be switched individually through zones



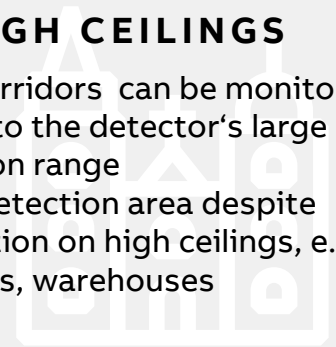
SINGLE FAMILY HOMES

- Presence dependent control of lighting to increase comfort, safety and save energy, e.g., in staircases



CORRIDORS & BUILDINGS WITH HIGH CEILINGS

- Long corridors can be monitored thanks to the detector's large detection range
- Large detection area despite installation on high ceilings, e.g., in churches, warehouses



PIR Presence & Movement Detectors

Portfolio Overview

Presence Detector

Presence Detector, Mini, Basic, white/silver/black
Presence Detector, Mini, Premium, white/silver/black
Presence Detector, Basic, white/silver/black
Presence Detector, Premium, white/silver/black

Movement Detector

Movement Detector, Sky, white/black
Movement Detector, Corridor, Basic, white/silver/black
Movement Detector, Corridor, Premium, white/silver/black

Accessoires

Housing for Presence Detector, Mini, white/silver/black
Housing for Presence Detector, white/silver/black
Intermediate Ring for Presence Detector, white/silver/black

PIR Presence & Movement Detectors

Portfolio Overview

Version	Detection Range	Channels	Movement Detector	Constant Light Switch	Constant Light Control	Monitoring Function	2-stage power-off (EN15232)	RTC + Sensor	Logical Channel	Brightness Sensor Inputs	IR channel	HVAC	PIR/individually detectable
Mini Basic	8m	2	2	2x2 channel	-	2	Yes (only movement detector)	-	-	2	-	-	4
Mini Premium	8m	4	4	4x2 channel	2x2 channel	4	Yes (movement detector + constant light controller)	Yes	5	2	12/24 and programming mode	Yes	4
Basic	12m	2	2	2	-	2	Yes (only movement detector)	-	-	2	-	-	4
Premium	12m	4	4	4x2 channel	2x2 channel	4	Yes (movement detector + constant light controller)	Yes	5	2	12/24 and programming mode	Yes	4
Sky	24m	2	2	2	-	2	Yes (only movement detector)	-	-	2	Only programming mode	-	4
Corridor Basic	30m	2	2	2	-	2	Yes (only movement detector)	-	-	2	-	-	4 2 Pairs (1+2/3+4)
Corridor Premium	30m	4	4	4x2 channel	2x2 channel	4	Yes (movement detector + constant light controller)	Yes	5	2	12/24 and programming mode	Yes	4 2 Pairs (1+2/3+4)

Presence Detector Mini

Common features:

- Detection range: 8m presence detection at 3m installation height (up to 10,5m depending on installation height)
- 2 power off stages (EN15232)
- Integrated monitoring function
- Integrated KNX bus coupler

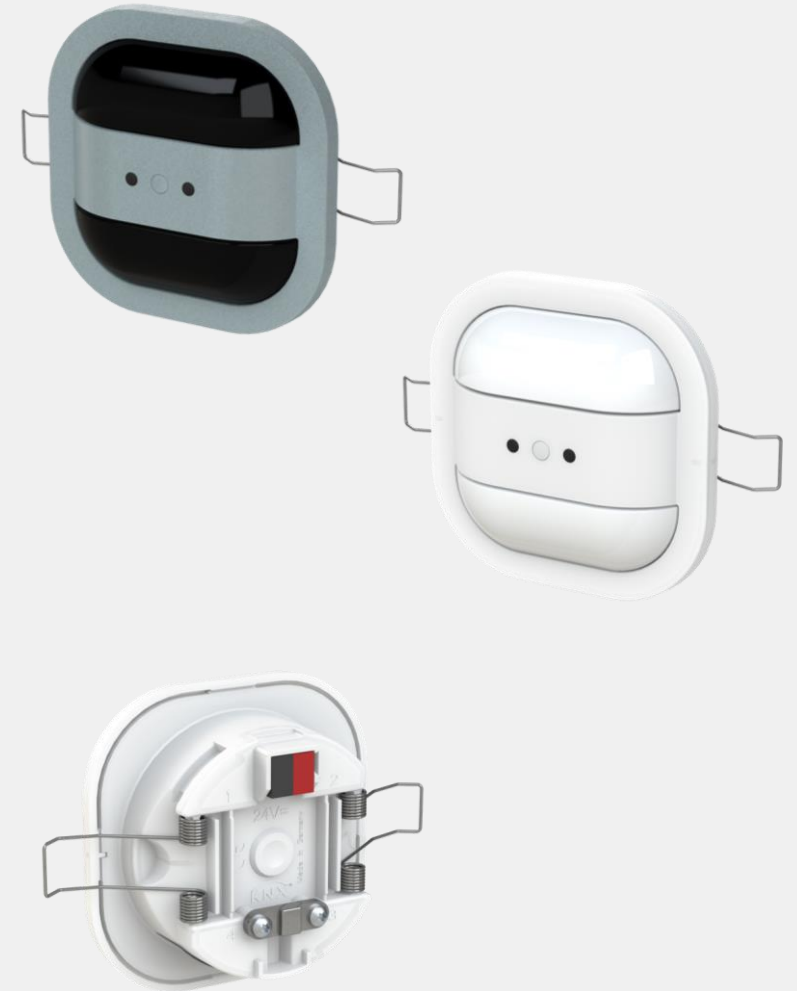
Installation Height	2.5m	3m	4m
Sitting	5m	6.5m	9m
Walking	6.5m	8m	10.5m

Basic:

- 2 channels
- 2x constant light switches

Premium:

- 4 channels
- HVAC function
- 2x 2-channel constant light controller
- 4x constant light switches
- Integrated RTC
- 12/24 IR channels
- 5 logic channels
- 2x brightness sensor inputs



Presence Detector

Common features:

- Detection range: 12m presence detection at 3m installation height (up to 16m depending on installation height)
- 2 power off stages (EN15232)
- Integrated monitoring function
- Integrated KNX bus coupler

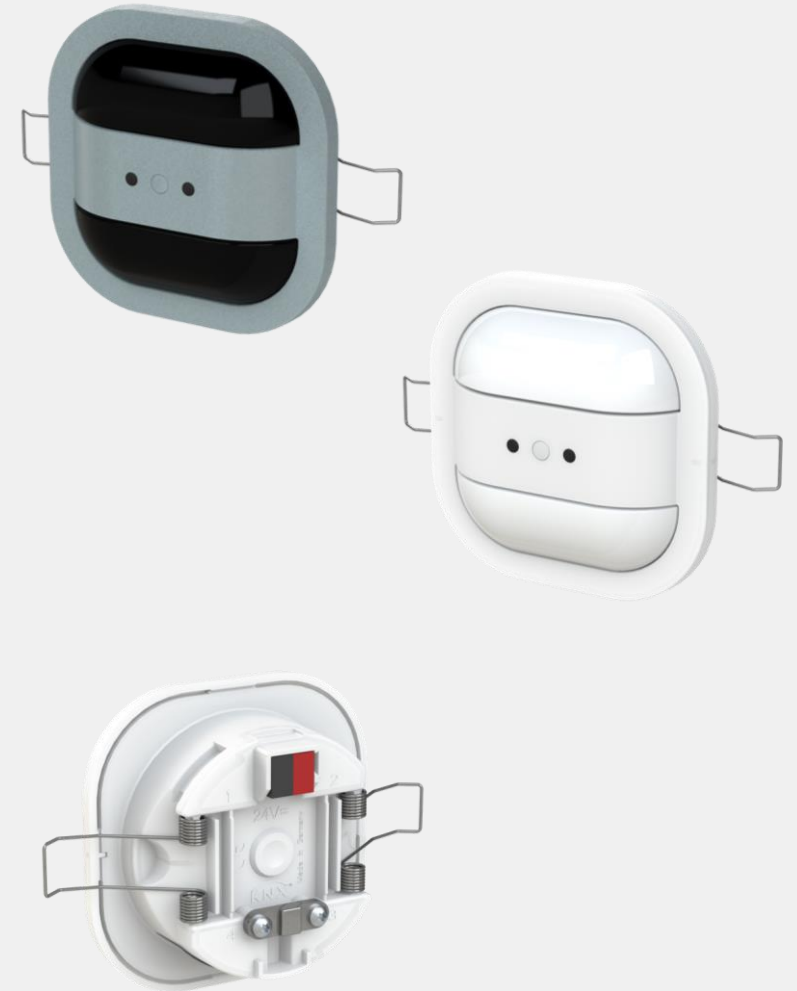
Installation Height	2.5m	3m	4m
Sitting	8m	10m	14m
Walking	10m	12m	16m

Basic:

- 2 channels
- 2x constant light switches

Premium:

- 4 channels
- HVAC function
- 2x 2-channel constant light controller
- 4x constant light switches
- Integrated RTC
- 12/24 IR channels
- 5 logic channels
- 2x brightness sensor inputs



Movement Detector Sky

Common features:

- Made for heigh ceilings
- Detection range: 24m detection at 12m installation height
- 2x channels
- 2 power off stages (EN15232)
- Integrated monitoring function
- Constant light switch with max. 2 outputs
- Integrated KNX bus coupler
- Activating the programming mode also via IR remote controller

Installation Height	4m	6m	12m
Walking	16m	18m	24m

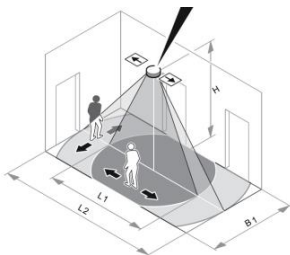


Movement Detector Corridor

Common features:

- Detection range: 30m presence detection at 3m installation height
- 2 power off stages (EN15232)
- Integrated monitoring function
- Integrated KNX bus coupler

Installation Height	2.5m	3m	4m
Length [L2] x Width [B1] crosswise to the detector	max. 24 m x 2.5 m	max. 30 m x 3 m	max. 30 m x 3 m
Length [L1] x Width [B1] frontal to the detector	max. 18 m x 2.5 m	max. 20 m x 3 m	max. 20 m x 3 m



Basic:

- 2 channels
- 2x constant light switches

Premium:

- 4 channels
- HVAC function
- 2x 2-channel constant light controller
- 4x constant light switches
- Integrated RTC
- 12/24 IR channels
- 5 logic channels
- 2x brightness sensor inputs



Accessories PIR Presence & Movement Detectors

Surface Mounting Box:



Intermediate Ring:



PIR Presence & Movement Detectors

Ordering Information

Presence & Movement Detectors

Product Type	Product ID	Product Name
6131/20-24-500	2CKA006132A0342	Presence Detector, Mini, Basic, white, 8 Meter
6131/20-183-500	2CKA006132A0343	Presence Detector, Mini, Basic, silver, 8 Meter
6131/20-885-500	2CKA006132A0436	Presence Detector, Mini, Basic, black matt, 8 Meter
6131/21-24-500	2CKA006132A0344	Presence Detector, Mini, Premium, white, 8 Meter
6131/21-183-500	2CKA006132A0345	Presence Detector, Mini, Premium, silver, 8 Meter
6131/21-885-500	2CKA006132A0438	Presence Detector, Mini, Premium, black matt, 8 Meter
6131/30-24-500	2CKA006132A0346	Presence Detector, Basic, white, 12 Meter
6131/30-183-500	2CKA006132A0347	Presence Detector, Basic, silver, 12 Meter
6131/30-885-500	2CKA006132A0440	Presence Detector, Basic, black matt, 12 Meter
6131/31-24-500	2CKA006132A0348	Presence Detector, Premium, white, 12 Meter
6131/31-183-500	2CKA006132A0349	Presence Detector, Premium, silver, 12 Meter
6131/31-885-500	2CKA006132A0443	Presence Detector, Premium, black matt, 12 Meter
6131/40-24-500	2CKA006132A0350	Movement Detector, Sky, white
6131/40-885-500	2CKA006132A0446	Movement Detector, Sky, black matt
6131/50-24-500	2CKA006132A0399	Movement Detector, Corridor, Basic, white
6131/50-183-500	2CKA006132A0400	Movement Detector, Corridor, Basic, silver
6131/50-885-500	2CKA006132A0449	Movement Detector, Corridor, Basic, black matt
6131/51-24-500	2CKA006132A0413	Movement Detector, Corridor, Premium, white
6131/51-183-500	2CKA006132A0414	Movement Detector, Corridor, Premium, silver
6131/51-885-500	2CKA006132A0452	Movement Detector, Corridor, Premium, black matt

Accessories

Product Type	Product ID	Product Name
6131/29-24-500	2CKA006132A0351	Surface Mounting Box, Mini, white
6131/29-183-500	2CKA006132A0352	Surface Mounting Box, Mini, silver
6131/29-885-500	2CKA006132A0454	Surface Mounting Box, Mini, black matt
6131/39-24-500	2CKA006132A0353	Surface Mounting Box, white
6131/39-183-500	2CKA006132A0354	Surface Mounting Box, silver
6131/39-885-500	2CKA006132A0455	Surface Mounting Box, black matt
6131/38-24-500	2CKA006132A0403	Intermediate ring for Presence/Movement Detector Basic, Premium, Sky and Corridor
6131/38-183-500	2CKA006132A0404	Intermediate ring for Presence/Movement Detector Basic, Premium, Sky and Corridor
6131/38-885-500	2CKA006132A0459	Intermediate ring for Presence/Movement Detector Basic, Premium, Sky and Corridor

ABIB