PIR Occupancy & Motion Sensor

MOS-17C

energy conservation - home and office

Overview

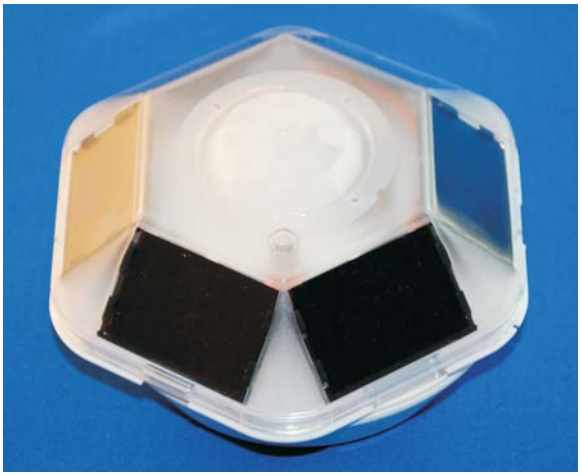
The MOS-17C is a wireless, energy harvesting, ceiling mount, Passive InfraRed (PIR) occupancy sensor. Used for indoor applications, the detector is optimized for ceiling heights of 8 - 12 feet.

The sensor broadcasts an EnOcean telegram when occupancy is detected and repeats transmissions with a minimum 100 second period between subsequent telegrams.

Powered by six solar cells, the MOS-17C can operate without battery backup for over 60 hours. An efficient power supply and tuned sensor circuitry allows the MOS-17C to provide immediate response to new occupancy states making it an ideal solution for auto-ON applications.

A walk-test feature allows installers to test and verify sensor operation on location without extra tools or software. The LINK button is used to initiate the test sequence while an on-board LED blinks whenever motion is detected. Installers can verify correct sensor placement insuring reproducible operations.

False occupancy state tripping through pet movements or from other elements can be reduced with an on-board slide switch selecting a lower sensitivity setting.



Features

- ⇒ Ceiling mount with 360 ° angle of detection
- ⇒ Walk-Test feature allows installers to test operation and installation location during commissioning
- ⇒ Sends occupied and un-occupied (PIR ON/OFF) telegrams per EnOcean profile 07-07-01
- ⇒ Operates in low light - 30 lux or 3 footcandles
- ⇒ Provides immediate response to motion even in a dark room
- ⇒ Instant sensing for Auto-ON applications
- ⇒ Peel and Stick sensor installation provides exceptional space flexibility options
- ⇒ Eliminates conduit and wiring runs
- ⇒ Solar energy harvesting for no batteries or maintenance burden
- ⇒ Available with 315 and 868 MHZ EnOcean radios

Ordering Information

Model #	Description	Part #
MOS-17C	315MHz PIR Occupancy Sensor	002-0202
MOS-17	868MHz PIR Occupancy Sensor	002-5202

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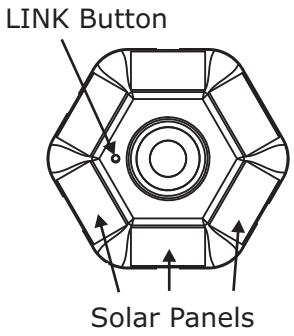
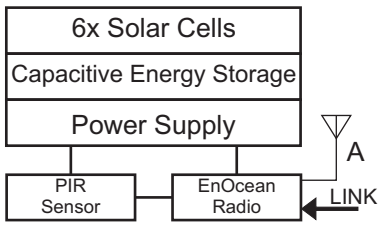
MOS-17C

Functional Diagram



Dimensional Drawing

Block Diagram



EnOcean Equipment Profiles

EEP: 07-07-01	Occupancy Sensor - PIR ON, PIR OFF

Technical Specifications

Power Supply	Solar cell, optional battery backup
Operational Light Level	30 lux (3 footcandles) minimum
Charging Period	6 hours full charge
Initial Operation	60 seconds in 30 lux (3 footcandles)
Full Charge Operation	approximately 60 hours in 0 lux
Telegram Transmission	on motion or on heartbeat period
Telegram Heartbeat Period	110 seconds ± 20 seconds
Communications	
Radio Type	315 MHz or 868MHz EnOcean radio
Antenna	Integrated whip
Transmission Range	30m (100 ft.) - commercial office space
Inputs	LINK button for assignment to receiver
Outputs	Walk-Test LED

Mechanical Specifications

Operating Temperature	-13°F to 145°F (-25°C to 65°C)
Relative Humidity	5% to 95% RH (non-condensing)
Weight	x oz. (xx gms.)
Dimensions	4.8" diameter, 1.5" height (122 mm x 38 mm)
Mounting	mount with screws or tape (Velcro®), not supplied

Agency Listing and Compliance

Radio Frequency	FCC Part 15.231 - Remote Control Transmitter
	IC RSS-210

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Part # 8DC-0276 | Revision 1.0

enocean® alliance
No Wires. No Batteries. No Limits.

MOS-17C

PIR Motion Detection

The PIR sensor is an optical sensor that detects motion by measuring the infrared heat given off by objects. The sensor is calibrated to detect the heat range of human body temperature.

The sensor has a lens that breaks the viewing angle of the sensor into zones that focus the light onto different sections of the sensing element. It is the movement of the infrared frequency moving in and out of a zone that defines motion.

The infrared light emitted is stronger when people are closer to the sensor. Sensor range is measured in two planes; the ceiling height to 36" off the floor or table/desk height and the second, the linear distance from the sensor.

Sensor Range

In the diagrams, two areas are defined surrounding the centrally located 8 foot ceiling mounted sensor. The internal blue sections are the areas that the sensor can detect small movement such as a hand waving, picking up a coffee cup or answering the phone . The outer sections show a diluted focal pattern where larger movement is needed to trigger occupancy such as walking.

The small movement effective area will decrease as the ceiling height increases. Do not use the MOS-17 sensor for ceiling height applications where small movement detection is needed and the ceiling height is greater than 10 feet.

Sensor Installation

There are three primary concerns when finding a suitable location for the sensor.

1) Placing the sensor for proper occupancy detection.

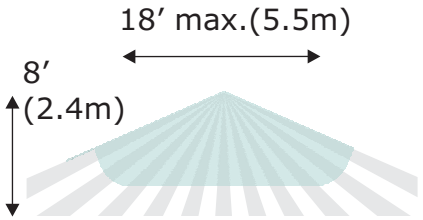
2) Placing the sensor so the receiver in within radio range.

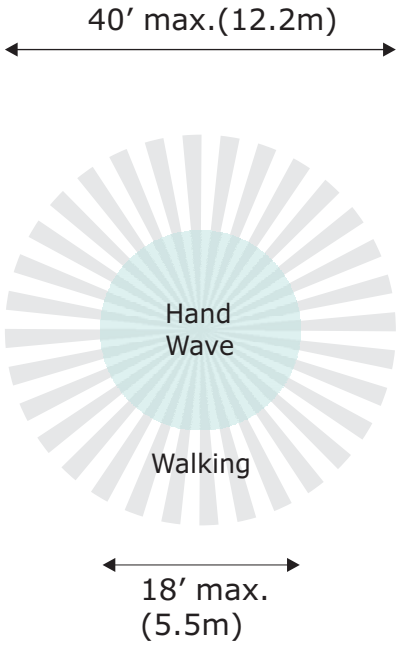
3) Placing the sensor so it can harvest adequate light energy.

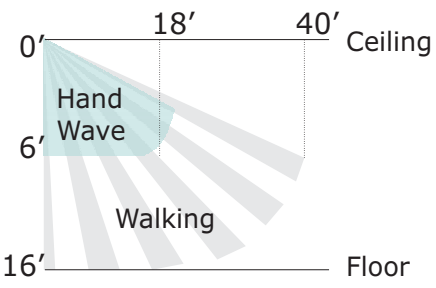
Occupancy Detection Zone:

- ⇨ The sensor can not detect occupancy through solid objects including items placed by the tenant such as file cabinets and book shelves.
- ⇨ Do not locate the sensor near forced air vents as hot moving air will cause the sensor to false trigger. Leave at least 4' minimum between air vents and the sensor.
- ⇨ Incandescent lights can cause false trips when turning on.
- ⇨ Movement perpendicular to the sensors detection zones create stronger signals than movement directly towards or away from the sensor.

Detection Range and Zones







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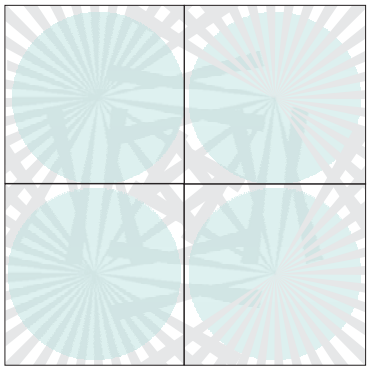
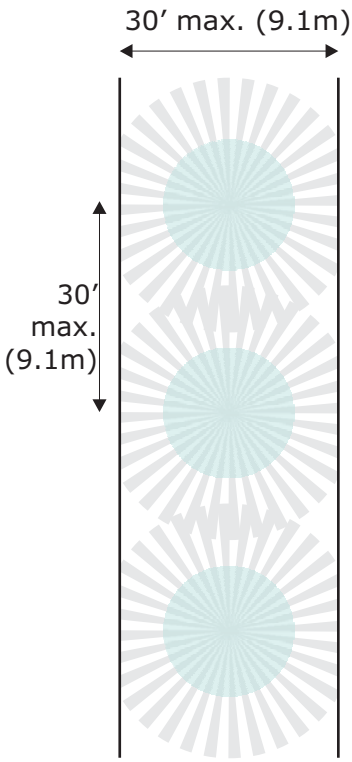
Large open floor plans require multiple sensors arranged in a grid





Hallway Application

Try to locate the sensor so movement is across the detection pattern.

⇨ Determine what kind of primary motion will trigger the sensor - walking or hand movements. Hand waving and other small motion is only detectable at 9’ (2.7m) maximum from the sensor location when mounted on a 8’ ceiling. Walking and large motion is detectable up to 20’ (6.1m) from the sensor.

⇨ In offices and classrooms that measure 40’ by 40’ (12.2m by 12.2m) or less, one sensor is often sufficient. Centrally located, the sensor picks up the motion on the spaces peripheral.

⇨ Larger spaces will require some planning before positioning the sensors. Determine the type of traffic patterns, where occupants will be seated, and where doors are located. Locate the sensor so the detection patterns do not extend out doorways.

⇨ Open office space or other open floor plan designs require additional sensors. Place the sensors in a grid adjusting for walls and furniture, see diagram.

⇨ Hallway applications are mostly walking traffic parallel with the detection pattern so sensors should be mounted 30’ (9.1m) maximum from each other as sensitivity will be decreased, see diagram. An alternative hallway solution includes mounting the MOS-17 sensor on alternating walls 30’ apart at approximiatly 8’ height. This solution provides greater sensitivity as occupants will be walking across the detection pattern.

⇨ Sensitivity Setting, the MOS-17 sensor has a slide switch that the user can use to select max. or min. sensitivity levels. False occupancy states caused by other elements can be reduced by selecting the min. sensitivity level. The default setting is max. sensitivity.

⇨ Walk-Test Feature

The walk-test feature allows the installer to test the placement of the sensor with the intended space usage patterns. An area where small hand movements shall trigger the sensor can be tested during installation to insure that the sensor is close enough to the area for this detection pattern.

NOTE: The MOS-17 sensor should be allowed to charge in a strong light source before using the walk-test feature.

1) Press the link button to start the walk test.

2) An on-board led will blink when motion is detected. The led should be

clearly visible as the walk test is performed.

3) The walk test will time out after 60 seconds and resume normal operation.

Radio Range

The MOS-17 is a wireless transmitter intended to be used with Echoflex lighting control products. Locating the wireless transmitters to work with the lighting controller requires planning. Careful consideration should be made for locating the controllers and transmitters based on the construction materials in the space and possibility of tenant's furniture disrupting the transmissions. Fire doors, elevator shafts, stairwells, storage areas and any large metal products create radio shadows and will disrupt wireless transmissions.

Signal Attenuation

The radio signal is attenuated by the materials that it passes through. Dense materials require more power to pass a radio signal consuming more of the signal strength and reducing the signal range.

Range Planning

On floor-plan drawings, draw 100 feet (30m) diameter circles to identify optimal transmitter and controller locations. Refer to the table for range considerations with other building materials.

Use an EPM100C for on-site range testing and location suitability. The EPM100C provides the convenience of a hand-held device indicating signal strength from transmitters. The EPM100C will verify proper signal reception at your intended controller locations.

For more information about range planning, please refer to the range planning guide downloaded from

"http://www.echoflexsolutions.com/files/downloads/Reliable Range Planning_0308.pdf"

Material	Attenuation
Wood	0 - 10%
Plaster	0 - 10%
Glass	0 - 10%
Brick	5 - 35%
MDF	5 - 35%
Ferroconcrete	10 - 90%
Metal	90 - 100%
Aluminum	90 - 100%

Material	Range-typical
Line of site:	100' (30m) corridors
Line of site:	330' (100m) open halls
Plasterboard:	100' (30m) through 5 walls
Brick	65' (20m) through 3 walls
Concrete:	65' (20m) through 3 walls
FerroConcrete:	33' (10m)
Ceiling:	1 ceiling

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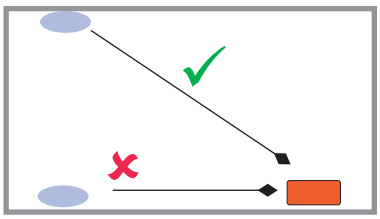

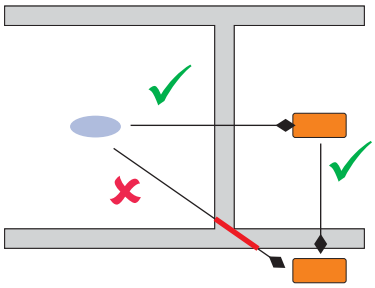

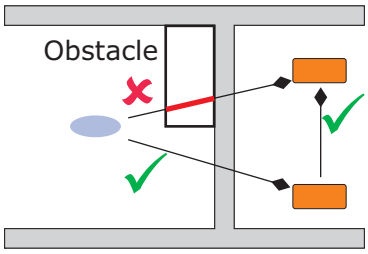

Transmission

Transmitter

Receiver and Repeater

Linking the MOS-17C

Linking the MOS-17C to a receiver creates the communication link between the sensor and a controller.

1) Place the receiver in LINK mode, consult the manufactures instructions if necessary.

2) Press the LINK button on the MOS-17C sensor. The sensor will transmit the TEACH telegram to the receiver.

3) Exit LINK mode.

Layout Hints

⇨ Avoid transmitting down a length of wall to reduce signal reflection.

⇨ Avoid transmissions that must penetrate walls at acute angles. This increases the wall material the telegram must pass through, greatly reducing the signal power.

⇨ Avoid large obstructions. Place receivers in alternate locations to avoid the radio shadow or use repeaters to go around the obstacle.

⇨ Do not locate receivers close to other high frequency transmitters. Leave at least 2' between the receiver and any other source of interference including, computers, video equipment, Wi-Fi/LAN routers, GSM modems and monitors. Transmitters are not affected by these sources of interference.