

# Echoflex Installation Guide

## Wall Occupancy Sensor ROS

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### Overview

The Wall Occupancy Sensor (ROS) is a wireless passive infrared (PIR) motion detection sensor powered by energy from natural and artificial light sources.

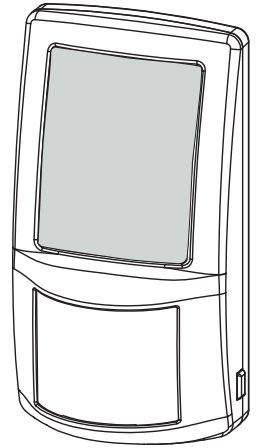
The ROS is available in wide-angle, hallway, and corner-mount models to maximize coverage of target areas.

The ROS is ready to work quickly. The efficient solar cell responds to just a few minutes of light exposure, or it can operate immediately with battery power. When fully charged, the ROS can operate for up to 225 hours.

This document covers installation, testing, and settings that apply to all ROS models. The product package includes the sensor and mounting plate.

A selection of mounting brackets are sold separately.

- Swivel bracket EWM-BR, part number: 8188K1000
- Wall-mount bracket BR-1, part number: 7188K1001
- Corner-mount bracket BR-2, part number: 7188K1002
- Ceiling-mount bracket BR-3, part number: 7188K1003



### Prepare for Installation

To ensure optimal function, consider the installation environment and the following guidelines:

- For indoor use only. Operating temperature -10°C to 45°C (14°F to 113°F), 5%–92% relative humidity (non-condensing).
- High density construction materials and large metal appliances or fixtures in the space may disrupt wireless transmissions.
- Install the sensor within range of linked receivers or controllers, 24 m (80 ft). Consider adding a repeater to extend reception range.
- Ensure the model is suitable for the detection application.
- PIR sensing must have an unobstructed view of the space. Do not mount behind or near tall cabinets, shelves, or hanging light fixtures.
- Do not install within 2.5 m (8 ft) of an HVAC airflow duct or vent.
- Ideal wall-mounted height is 1.8–2.2 m (6–7 ft) from the floor.



Corporate Headquarters ■ Middleton, WI, USA | +1 608 831 4116

Web [echoflexsolutions.com](http://echoflexsolutions.com) | Email [info@echoflexsolutions.com](mailto:info@echoflexsolutions.com) | Support [service@echoflexsolutions.com](mailto:service@echoflexsolutions.com)

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Product information and specifications subject to change.

Echoflex intends this document to be provided in its entirety.

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### Installation

The ROS can be attached directly to a wall or to any surface using one of the mounting bracket options sold separately. Determine the installation method and follow the instructions.

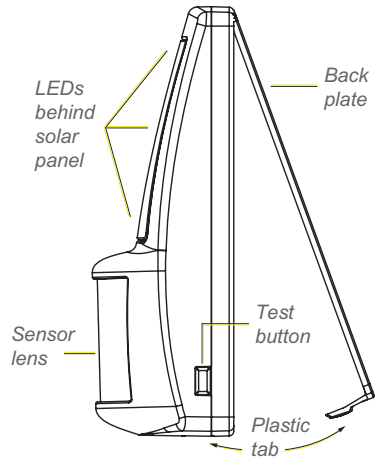


**Note:** Consider linking the sensor while you have access and before replacing the cover; see [Link to a Controller on page 4](#).

### Mount on a Wall

The ROS can be mounted with screws (not supplied) through the removable back plate.

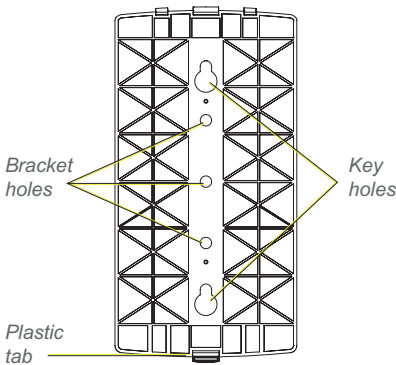
1. Press the plastic tab on the bottom of the ROS to separate the sensor body from the back plate.
2. Mount the back plate to the wall surface in a vertical orientation with the plastic tab on the bottom.
3. Align the two top tabs on the back plate with the sensor body and press until the plastic tab clicks in place on the bottom of the ROS.



Sensor side view

### Mount on a Bracket

The sensor's removable back plate has three bracket mounting holes and two key holes that are spaced for mounting on a standard electrical box.



Removable back plate

Any of the Echoflex bracket models can be attached to the sensor using the center three holes or, for maximum angle adjustment, using the bottom two bracket holes and the bottom key hole. See the installation guide for your bracket for information about mounting the bracket to your target location.

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### Sensor Operation

The sensor's solar cell harvests and stores energy from natural or artificial light sources and provides sufficient power to operate without a battery for up to 225 hours. It can operate with a brief exposure to light, however for best results the sensor should be exposed to two hours of natural or artificial light (160 lux or 15 footcandles) on a daily basis. A CR2032 coin battery must be installed when sufficient light is not available to power the sensor. See the [Light Level Test on page 5](#).

PIR sensing is calibrated to detect motion in the heat range of the human body. The lens divides the viewing angle into zones to detect when infrared energy moves in and out of a zone. Movement detection is stronger when people are closer to the sensor.

When motion is detected, the red LED blinks and a message is sent as follows:

- Transmits an occupied message immediately when the state changes from vacant to occupied.
- Transmits a vacant message if no motion is detected for 200 seconds after last occupied message.
- Transmits the current occupancy state every 100 seconds (heartbeat message rate).

### Sensor Applications

**Hallways:** Mount the ROS-HW model on a wall at 1.8–2.2 m (6–7 ft) from the floor, centered, and facing the hallway. For mounting at higher levels, use the BR-1 or EWM-BR swivel bracket which provide 30° vertical adjustment, i.e. positioned over doorways or at hallway intersections. The BR-3 bracket may also be used when mounting on ceilings.

**High Bay End-of-Aisle:** The ROS-HW model can be used for high bay end-of-aisle applications. Mount the sensor to an electrical box and adjust the angle of the attached conduit to position the sensor.

**Corner Mount:** Mount the ROS-KM model on a wall at 1.8–2.2 m (6–7 ft) from the floor using the BR-2 corner mount bracket or EWM-BR swivel bracket. The bracket provides vertical and horizontal adjustment for the sensor. For full motion detection coverage, position the sensor on the bracket so it faces directly out of the corner.

**Wide Angle:** Mount the ROS-WA model on a wall 1.8–2.2 m (6–7 ft) from the floor. For mounting at higher positions, use the BR-1 or EWM-BR swivel bracket which provide 30° vertical adjustment. The BR-3 bracket may also be used when mounting on ceilings.

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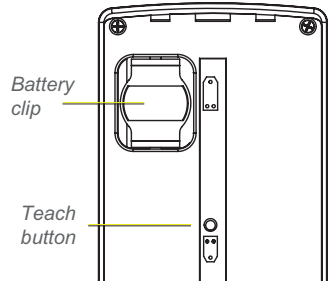
## Wall Occupancy Sensor

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### Link to a Controller

The target controller must be installed, powered, and within range of the ROS. Repeating the linking process can also be used to unlink the device.

1. Press the tab on the bottom edge of the sensor body to remove the back plate and access the **[Teach]** button.
2. Press the **[Learn]** button on the controller to activate Link mode. If necessary, refer to the controller product documentation.
3. Press the **[Teach]** button on the ROS once to send a message. An LED blinks to confirm a successful transmission.
4. Deactivate Link mode on the controller before attempting to link to any other controllers.



*Sensor back view*

### Battery Power

A CR2032 battery is not required for normal operation if the sensor receives adequate natural or artificial light. See the table in the [Light Level Test on the facing page](#). A battery may be required to run installation tests or when the artificial light is insufficient to power the sensor.

1. Press the tab on the bottom edge of the sensor body to remove the back plate from the sensor.
2. Insert a flatblade screwdriver under the clear plastic battery clip and gently pry the battery free.
3. Insert a new battery in the clip with the positive side (+) facing up.
4. Align the straight edges of the clip with the holder and press the clip in place with your finger.
5. Replace the back plate.

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## Wall Occupancy Sensor

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### Tests and Settings

Use the **[Test]** button and color LEDs to navigate the Tests and Settings Menu. The **[Test]** button is on the side of the sensor and the LEDs display through the right side of solar panel.



**Note:** A battery is required to run tests or change settings. If you cannot access the LED blink menu, replace the battery. See [Battery Power on page 4](#) for installation instructions.

- **Light Level Test** (green LED)
- **Range Confirmation** (blue LED)
- **Walk Test** (red LED)
- **Sensor Setting** (red and blue LEDs)
- **LED Display** (green and red LEDs)

The menu times out after two minutes of inactivity.

### Light Level Test

The Light Level Test quantifies the amount of energy produced by the solar cells and confirms a good installation location.

1. Press and hold the **[Test]** button until the green LED appears. Release the button to enter the menu and display the first item, blinking green LED.
2. Press and hold the **[Test]** button again until the green LED stops blinking. The green LED then repeats a number of blinks according to the detected light level. If you move the sensor, it reevaluates the light level every two seconds.

Blinks	Ambient Light Lux (Footcandles)	Time to Fully Charge	Discharge Time
0	< 20 (< 2)	Non-operational	N/A
1	25–50 (2.3–4.6)	Operational	N/A
2	50–100 (4.6–9.3)	48 hours	100 hours
3	100–200 (9.3–18.6)	24 hours	150 hours
4	200–500 (18.6–46.5)	12 hours	200 hours
5	> 500 (> 46.5)	6 hours	225 hours

The time to fully charge the storage capacitor is from a non-operational condition. Discharge time indicates how long a fully charged sensor operates in the dark. The test repeats every two seconds and runs for 100 seconds. To exit before the time-out, press and hold the **[Test]** button.

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### Range Confirmation

The Range Confirmation test quantifies the wireless signal strength with a linked controller that has range confirmation capability.

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**Note:** *Only one controller can be linked to the ROS to run the test properly. Disable repeaters in range.*

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1. Press and hold the **[Test]** button until the green LED appears. Release the button to enter the menu and display the first item, blinking green LED.
2. Press and release the **[Test]** button to cycle through the menu of color LEDs and stop when the blue LED is blinking.
3. Press and hold the **[Test]** button until the LED stops blinking to initiate the Range Confirmation test.

After the ROS transmits and receives a Range Confirmation message, the signal strength status is displayed as an LED blink color.

LED Blink	Signal Strength
Green	-41 to -70 dBm (best)
Blue	-70 to -80 dBm (good)
Red	-80 to -95 dBm (poor, move closer)
No LED	No linked controllers detected

The test repeats every five seconds and runs for 50 seconds. To exit before the time-out, press and hold the **[Test]** button.

### Walk Test

The Walk Test verifies the boundaries or limits of the sensor's range.

1. Press and hold the **[Test]** button until the green LED appears. Release the button to enter the menu and display the first item, blinking green LED.
2. Press and release the **[Test]** button to cycle through the menu of color LEDs and stop when the red LED is blinking.
3. Press and hold the **[Test]** button until the LED stops blinking to initiate the Walk Test.
4. Move throughout the space including corners and areas that may be obscured from line of sight to the sensor. Each time the sensor detects movement, the red LED blinks.

The Walk Test times out after 100 seconds of inactivity. To exit before the time-out, press and hold the **[Test]** button for 10 seconds.

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### Sensor Setting

The Sensor Setting adjusts the motion detection sensitivity. To reduce false occupancy states caused by external elements, consider adjusting the sensitivity setting.

1. Press and hold the **[Test]** button until the green LED appears. Release the button to enter the menu and display the first item, blinking green LED.
2. Press and release the **[Test]** button to cycle through the menu of color LEDs and stop when the red and blue LEDs are both blinking.
3. Press and hold the **[Test]** button until the LEDs stop blinking to select Sensor Setting.
4. Press the **[Test]** button to cycle through the options:

Setting	Indication
High (default)	Green LED blinking
Medium	Blue LED blinking
Low	Red LED blinking

5. Press and hold the **[Test]** button for 10 seconds to save and exit.



**Note:** *The low sensitivity setting is used as a baseline for the lens detection diagrams provided on the ROS datasheet at [echoflexsolutions.com](http://echoflexsolutions.com).*

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### LED Display

The LED Display setting enables or disables the LEDs. Blinking LEDs are informative but not suitable for every location. Disabling the LEDs eliminates distractions as well as conserves battery power. If disabled, the LEDs still operate to run tests and indicate low battery.

1. Press and hold the **[Test]** button until the green LED appears. Release the button to enter the menu and display the first item, blinking green LED.
2. Press and release the **[Test]** button to cycle the menu of color LEDs and stop when the green and red LEDs are both blinking.
3. Press and hold the **[Test]** button until the LEDs stop blinking to select LED Display.
4. Press the **[Test]** button to toggle between the two states:
  - Red LED blinking - enable LEDs for motion detection
  - Green LED blinking - disable LEDs for motion detection
5. Press and hold the **[Test]** button for five seconds to save and exit.

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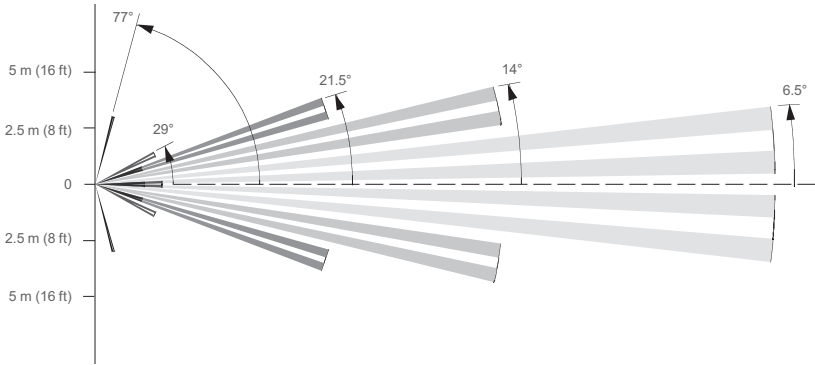
### Sensor Coverage

The following diagrams illustrate the sensor coverage for each of the lens models. Optimal mounting height is 2.1 m (6.8 ft).

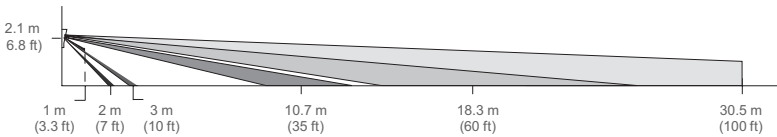
#### ROS-HW

Wall-mount hallway lens. Separate mounting bracket recommended.  
Hallway coverage: 30.5x6 m (100x20 ft)

#### Top View



#### Side View





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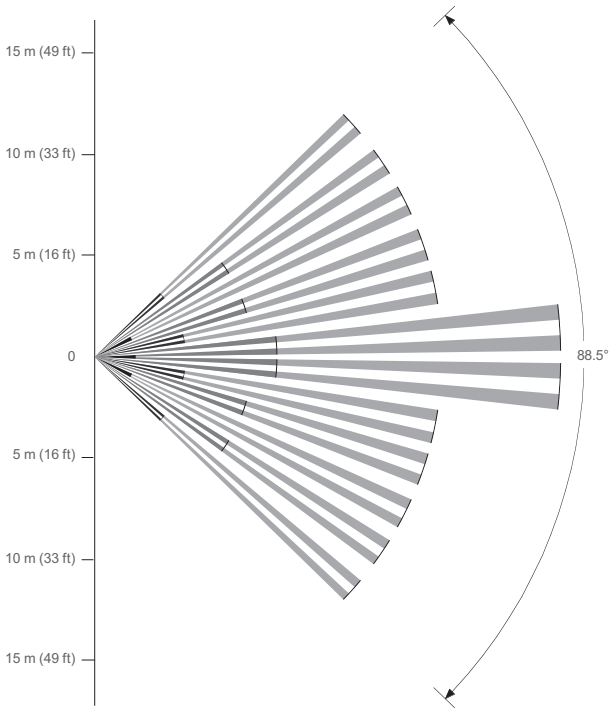
### ROS-KM

Corner-mount wide angle lens. Separate mounting bracket required.

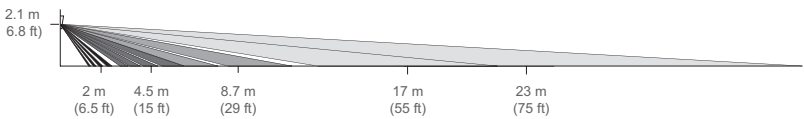
Minor motion coverage: 93 m<sup>2</sup> (1000 ft<sup>2</sup>)

Major motion coverage: 260 m<sup>2</sup> (2646 ft<sup>2</sup>)

### Top View



### Side View



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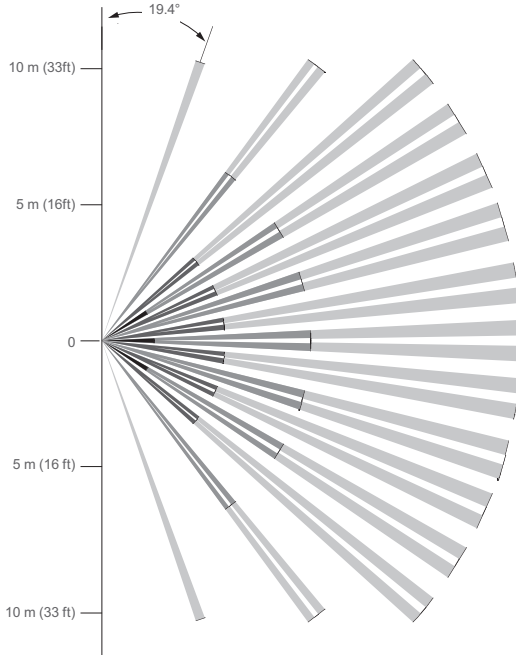
### ROS-WA

Wall-mount wide angle lens. Separate mounting bracket recommended.

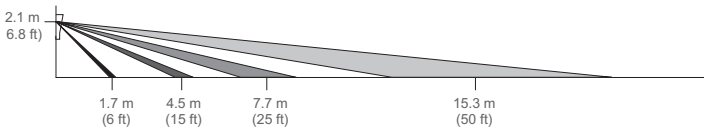
Minor motion coverage: 103 m<sup>2</sup> (1100 ft<sup>2</sup>)

Major motion coverage: 258 m<sup>2</sup> (2770 ft<sup>2</sup>)

#### Top View



#### Side View



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### Compliance

For complete regulatory compliance information, see the Echoflex Wall Occupancy Sensor datasheet at [echoflexsolutions.com](http://echoflexsolutions.com).

#### FCC Compliance

Echoflex Wall Occupancy Sensor

(For any FCC matters):

Echoflex Solutions, Inc.

3031 Pleasant View Road

Middleton, WI 53562

+1 (608) 831-4116

[echoflexsolutions.com](http://echoflexsolutions.com)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received; including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Any modifications or changes to this product not expressly approved by Electronic Theatre Controls, Inc. could void the user's authority to operate the product. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.

Contains FCC ID: TCM300U

#### ISED Compliance

This device contains a license-exempt transmitter/receiver that complies with Innovation, Science, and Economic Development Canada's license-exempt RSSs. Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Contains IC ID: 5713A-STM300U

#### Conformité ISDE

Cet appareil contient un émetteur/récepteur conforme aux CNR d'Innovation, Sciences et Développement économique Canada (ISDE) applicables aux appareils radio exempt de licence. Son fonctionnement est soumis aux deux conditions suivantes:

1. L'appareil ne doit pas produire d'interférences.
2. L'utilisateur de l'appareil doit accepter toute interférence, même si l'interférence est susceptible d'en compromettre le fonctionnement.

Contient ID IC: 5713A-STM300U

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