Multi-Technology Ceiling Mounted Occupancy Sensor

Cat. No. OSC05-M, OSC10-M, OSC20-M
To be used with 24VDC OSP/xx Series and CN100 Power Pack Class II Low-Voltage Wiring

INSTALLATION INSTRUCTIONS

FCC COMPLIANCE STATEMENT:
This device complies with part 15 and part 18 of the FCC rules. Operation is subject to the following two conditions: (1) This device must not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Tools needed to install your Sensor:
- Slotted Phillips Screwdriver
- Ties
- Pencil
- Electrical Tape
- Cutters

Parts Included List:
- Sensor (1)
- #8-32 x 1 1/2” Screw (2)
- #8-32 Washer and Nut (2)
- Plastic Washer (1)
- #8-32 x 1/2” Screw (2)
- Half Mask (1)
- #8-32 Washer and Nut (2)
- Threaded Rod (1) and Hex Nut (1)
- 360° Perforated Mask (1)
- Plastic Washer (1)

DESCRIPTION

The Occupancy Sensor is a low-voltage infrared and ultrasonic sensor that works with the OSP/xx Series and CN100 power pack to automatically control lighting. The sensor turns the lights on and off when you are present and turns them off after the delayed off time has expired. This sensor can be mounted in the center of the room or on the wall, side, or corner wall. The sensor continually analyzes and adjusts to changing conditions. The sensor uses the latest microprocessor-based technology which permits it to continually adjust and optimize its performance. The combination of ultrasonic (doppler shift) motion detection which gives maximum sensitivity and infrared motion detection which gives high false triggering immunity yields a sensor with excellent performance.

INSTALLING YOUR OCCUPANCY SENSOR

NOTE: Use check boxes when Steps are completed.

Step 1: WARNING: TO AVOID FIRE, SHOCK, OR DEATH: TURN OFF POWER at circuit breaker or fuse and test that power is off before wiring!

Step 2: Preparing and connecting wires:

1. Strip Gage (measure bare wire here)

Step 3: Typical installations:

A. Drop Ceiling Installation (Mounting Option A):

NOTE: Use the threaded rod included.

1. Select location for mounting of sensor and proper masking for your application (Refer to Mounting Location Diagram).
2. Use the supplied threaded rod or other methods to make a hole (1/2” to 1”) in the ceiling tile large enough to pass the body of the threaded rod through.
3. Insert the sensor wires through the flared end of the threaded rod. Position the threaded rod to the base of the sensor.
4. Insert the flared end of the threaded rod into the opening in the bottom of the sensor and twist to lock into place.

1. Class II Wiring: Connect low-Voltage wires from Power Pack to Sensor per WIRING DIAGRAM as follows: Twist strands of each lead tightly (with circuit conductors, push firmly into appropriate wire connector. Screw connectors on clockwise making sure that no bare conductor shows below the wire connectors. Secure each connector with electrical tape.
2. Rotate the sensor to the desired orientation. Note that the sensor base and back cover are keyed. To lock the device in place, ensure that the arrows are not aligned.
3. Restore power at circuit breaker or fuse to Power Pack. INSTALLATION IS COMPLETE.

Mounting Option Diagram B

Occupancy Sensor Mounted to Round Fixture with Raceway for Wallboard Installation

Wiring Diagram: Multiple Sensor, Single Power Pack

TABLE 2: WIRE DESIGNATIONS

<table>
<thead>
<tr>
<th>Name</th>
<th>Color</th>
<th>Gauge</th>
<th>Temp/Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Pack</td>
<td>Red</td>
<td>14 #1</td>
<td>240V C/ 600V</td>
</tr>
<tr>
<td>Occupancy Blue</td>
<td>Blue</td>
<td>14 #1</td>
<td>24V C/ 600V</td>
</tr>
<tr>
<td>Occupancy Green</td>
<td>Gray</td>
<td>14 #1</td>
<td>24V C/ 600V</td>
</tr>
<tr>
<td>Occupancy Red</td>
<td>Red</td>
<td>14 #1</td>
<td>24V C/ 600V</td>
</tr>
<tr>
<td>Occupancy White</td>
<td>White</td>
<td>14 #1</td>
<td>24V C/ 600V</td>
</tr>
<tr>
<td>Low-Voltage Wires</td>
<td>Black</td>
<td>14 #1</td>
<td>24V C/ 600V</td>
</tr>
</tbody>
</table>

NOTE: When using the Photocell function, connect the Gray wire of the sensor to the Black wire of the power pack. DO NOT use the Blue wire of the sensor.

NOTE: Ensure to cap wire that is not being used.

*NOTE: When using the Occupancy sensor, route the Gray wire of the sensor to the Blue wire of the power pack. DO NOT use the Blue wire of the sensor.

NOTE: Ensure to cap wire that is not being used.

*NOTE: When using the Photocell function, connect the Gray wire of the sensor to the Blue wire of the power pack. DO NOT use the Blue wire of the sensor.

NOTE: Ensure to cap wire that is not being used.

*NOTE: When using the Occupancy sensor, route the Gray wire of the sensor to the Blue wire of the power pack. DO NOT use the Blue wire of the sensor.
Only one technology
All switch settings are compatible with the sensor. The sensor accepts any technology that will keep the lights on. If neither technology is detected, the lights turn off after the delayed-off time.

Single-Tech Mode – Only one technology is active in this mode. The technology is selected by the dip switches. Motion detection by the selected technology - PIR or ultrasonic - will turn on the lights as well as keep them on. When motion is not detected, the lights will turn off after the delayed-off time.

**Delayed-Off Time** – The sensor is designed to turn the lights off if no motion is detected after a specified time. The length of time is called the delayed-off time and is set using the timer (Black knob on the sensor). The setting parameter will modify the delayed-off time to fit the parameters of each installation based on environmental conditions and occupancy patterns.

- **Walk-through Mode** – The walk-through feature is useful when a room is momentarily occupied. With this feature, the sensor will turn the lights off shortly after the person leaves the room. The walk-through feature works as follows: When a person enters the room, the lights will turn on. If the person leaves the room before the walk-through time-out of 2.5 minutes, the sensor will turn the lights off if the PIR sensor in the room is still active. The walk-through feature also has a motion test function to test its accuracy. The sensor includes a walk-through test mode in which the sensor performs a 6 second walk-through test after every 1000 minutes. To test, adjust the sensitivity of the sensor (Electronics can be reset using a walk test. When the sensor is in test mode, the LED’s will flash amber once a second). If an error is detected, the sensor will turn off, and a new test will be performed. If the walk-through test function is enabled, the sensor will perform a delayed-off time-out of 6 seconds after detecting a walk-through.

**Green LEDs**
- **Walk-Through Delayed**
- **Walk-Through Disabled**
- **Walk-Through Disabled**
- **Walk-Through Disabled**

**Test Mode**
- **Detects to ON**
- **Lights On**
- **Lights Off**
- **Reset Test Mode**
- **Stop Test Mode**
- **Test Mode**

**Operation**
- **LED Operation**
  - There are two LED indicators that will flash when motion is detected. The LED flash can be disabled using the LED disable switch setting. Green flash indicates detection by ultrasonic technology. Red flash indicates motion detection by infrared technology.

**ADAPTIVE FUNCTIONS**

The sensor continually analyzes the parameters of the motion detection signal and adjusts its internal operation to maximize detection of motion while minimizing the likelihood of false detection (electrical noise, air currents, temperature changes, etc...). When the lights turn on, the sensor initially enters the “walk-through” mode. Once the room is occupied for longer than 2.5 minutes, the sensor will exit the “walk-through” mode and enters the “Occupied” mode. When the sensor is first installed, the delayed off time for the occupied mode is based on the Timer adjustment settings. While the sensor is in use, the delayed off time will change, based on how the sensor adapts to the room conditions. Whenever the sensor reads motion, the delayed-off time of the occupied mode will be the adjusted value (refer to Occupancy Pattern Learning For Delayed Off Time).

The adapted settings can be reset using the DIP switch.

**Occupancy Pattern Learning For Delayed Off Time:**

The sensor automatically changes the delayed off time in response to the occupancy characteristics of the space it is installed in. The sensor analyzes the motion signal properties and will minimize the delayed off time duration when there is frequent motion detection, and lengthen the delayed off time duration when there is weak and infrequent motion detection.

In the case of a false-off condition (lights turn off when the room is occupied), the delayed off time duration will immediately be lengthened to prevent further false turn-offs.

**Occupancy Pattern Learning for Ultrasonic Technology:**

The sensor learns the occupancy patterns of a space over the course of a day, for a seven day period. At any given time, the sensor will use the collected data and apply it to its ultrasonic technology, if the sensor will adjust the sensitivity to make it less likely to turn on during a period of non-occupancy and more likely to turn on during a period of occupancy. This adaptive feature is not applicable when the sensor is in PIR only mode.

**SETTINGS**

**Default Settings:**
Adjustment knob settings as per “recommended manual settings,” (refer to Table 3 and Figure 1). All switches in the off position (refer to Table 4).

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**TABLE 1: SWITCH SETTINGS**

<table>
<thead>
<tr>
<th>Switch</th>
<th>Function</th>
<th>ON</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Hallway</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>A2</td>
<td>Hallway</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>A3</td>
<td>Hallway</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>A4</td>
<td>Hallway</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>B1</td>
<td>Hallway</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>B2</td>
<td>Hallway</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>C</td>
<td>Hallway</td>
<td>OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>

**TABLE 2: SWITCH SETTINGS**

<table>
<thead>
<tr>
<th>Switch</th>
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<th>OFF</th>
</tr>
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<td>A1</td>
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<td>A3</td>
<td>Hallway</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>A4</td>
<td>Hallway</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>B1</td>
<td>Hallway</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>B2</td>
<td>Hallway</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>C</td>
<td>Hallway</td>
<td>OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>

**TABLE 3: ADJUSTMENT KNOB SETTINGS**

<table>
<thead>
<tr>
<th>Knob</th>
<th>Color</th>
<th>Symbol</th>
<th>Function</th>
<th>Knob Setting</th>
<th>Factory Default Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Sets the ultrasonic range</td>
<td>Full CW - min. (OFF)</td>
<td>50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red</td>
<td>Sets the infrared range</td>
<td>Full CW - max.</td>
<td>50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>Delayed Off Time</td>
<td>Full CW - max.</td>
<td>50% (15 min)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue</td>
<td>Ambient Light Override (only when on)</td>
<td>Full CW - light on OFF (60%)</td>
<td>100% (15 min)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DIP Switches**

- **Minimum Setting**
- **Factory Default Setting**

**Adjust Knob Rotation Direction**

**Delayed Off Time Setting (Black Knob)**

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**TABLE 4: SWITCH SETTINGS**

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<td>A1</td>
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<td>OFF</td>
<td>ON</td>
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<tr>
<td>A4</td>
<td>Hallway</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>B1</td>
<td>Hallway</td>
<td>OFF</td>
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</tr>
<tr>
<td>B2</td>
<td>Hallway</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>C</td>
<td>Hallway</td>
<td>OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>

**Note:** This setting is only used if the Single Technology Option (Switch A1) is selected.

**Test Mode**
Set the delayed-off time to 6 seconds for performing a walk test. While the sensor is in test mode, the LED’s will flash amber once a second.

1. **ENSURE POWER IS ON.**
2. Remove front cover.
3. Locate Dip Switch 3 in bank B (B3) (refer to Figure 1). B3 will be in the OFF position from the factory.
4. To enter Test Mode, move switch to ON and back to OFF. The test mode has now been entered with a 6 second time-out. **NOTE:** If B3 is already in the OFF position, then test mode can be entered by just moving it to the OFF position.

**Notes:**
- The timer will remain in the 6 second test mode for 15 minutes, then automatically exit test mode and reset to the delayed-off time settings as defined by the black timer knob.
- To manually turn the timer out of the 6 second test mode, simply toggle the switch B3 from OFF to ON and back to OFF.

**Photocell (Ambient Light Override) adjustment:**
In order to use the Ambient Light Override functionality of the sensor, the sensor must be wired to the power pack (OSP-XX) using the gray wire instead of the blue wire. This feature allows the user to conserve energy by keeping the controlled lights off when not necessary. The sensor does this by measuring the ambient light in the installed area and keeping the controlled lights if there is enough ambient light available. To use this feature, the Photocell adjustment (blue) knob must be adjusted from the default position. Once this adjustment is made, the controlled lights will only turn on if the ambient light present is less than the setting.

**To set the Photocell level (used with the gray wire connection):**
**Note:** This setting must be performed when the natural light is low enough to require artificial light.
1. Remove the cover from the sensor.
2. Make note of the position of the Red and Green knobs. Rotate the Red and Green knobs full CW and enter the sensor’s Test mode as described above.
3. Rotate the Blue knob full CCW.
4. Wait for the lights to turn on.
5. Rotate the Red knob full CCW.
6. Slowly rotate the blue knob clockwise until the lights turn off. This is the correct setting.
7. Return the Red and Green knobs to their original positions.
8. Replace cover. Setting is complete.

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**TRoubleshooting**

- **Lights do not turn ON**
  - Circuit breaker has tripped.
  - Low-voltage miswiring.
  - Test: Connect RED to BLU wire at power pack to force lights ON.

- **Lights stay ON**
  - Constant motion.
  - Test: Reduce RED and GREEN knob by 15%; remove motion source. If unsatisfactory, move sensor.
  - Infrared sensor can “see” into hallway. **Test:** Put sensor in timer test mode and walk hallway. If lights continue to come ON, move sensor.

- **Light turns off too quickly**
  - Timer setting too high. **Test:** Check switch settings. Typical setting is 10 minutes.

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**Product Information**

- For technical assistance, contact us at 1-800-824-3005
- Visit our website at www.leviton.com

**Limited 3-Year Warranty and Exclusions**

Leviton warrants to the original consumer/purchaser and its end user (the “Customer”) that this product will be free from defects in material and workmanship for a period of three (3) years from the purchase date. During the warranty period, Leviton, at its option, will repair or replace, free of charge, any products which fail to conform to this warranty. The Customer must deliver, or cause to be delivered, the defective product, freight prepaid, to Leviton. This warranty does not apply to defects resulting from: (i) improper or inadequate installation or maintenance by the Customer; (ii) misuse, abuse, neglect, or accident; (iii) unauthorized modification or repair; (iv) normal wear and tear; (v) damage resulting from power surges or any electrical current; (vi) any failure caused by the Customer’s equipment or devices to which this product is connected; or (vii) any other cause beyond the reasonable control of Leviton. This warranty is non-transferable.