

Two Circuit (One Location) or Multi-Location  
**Multi-Technology Designer Wall Switch Occupancy Sensor with Dual Relays**

California Title 24 2005 Compliant

Cat. No. OSSMD-MD, OSSMD-FT, OSSMD-GD

**Incandescent/Tungsten:** 800W @ 120V Primary/Secondary **Ballast:** 1200VA @ 120V Primary - 800VA @ 120V Secondary

**Ballast:** 2700VA @ 277V Primary - 1200VA @ 277V Secondary **Motor:** 1/4hp @ 120V Primary/Secondary

**Operating Temperature Range:** 0°C to 50°C

**Relative Humidity:** 20% to 90% non-condensing

**No Minimum Load Required**

Compatible with incandescent lamps, low-voltage lighting with electronic and magnetic transformers, electronic and magnetic fluorescent ballasts, and fans.

**INSTALLATION INSTRUCTIONS**

**WARNINGS AND CAUTIONS:**

- To be installed and/or used in accordance with appropriate electrical codes and regulations.
- If you are unsure about any part of these instructions, consult a qualified electrician.
- Controlling a load in excess of the specified ratings will damage the unit and pose risk of fire, electric shock, personal injury or death. Check your load ratings to determine suitability for your application.
- Do not install this unit to control a receptacle.

**WARNINGS AND CAUTIONS:**

- Do not touch the surface of the lens. Clean outer surface with a damp cloth only.
- Disconnect power at circuit breaker or fuse when servicing, installing or removing fixture.
- Use this device only with copper or copper clad wire. With aluminum wire use only devices marked CO/ALR or CU/AL.
- Neutral connection required when used in circuits with GFCIs. Use Cat No.'s OSSMD-MD or OSSMD-FT only.

**TOOLS NEEDED TO INSTALL YOUR SENSOR**

- Slotted/Phillips Screwdriver
- Pliers
- Small Slotted Screwdriver
- Electrical Tape
- Cutters

**FEATURES**

- Leviton's Decora® style design
- Sensor can be ganged together with other units in a multiple-switch wall plate.
- Self-Adaptive Technology adjusts to occupancy patterns of use in auto adapt mode.
- The Adapting Time-out walk-through feature prevents lights from remaining ON for an extended period after only a momentary occupancy.
- Switches two separate load circuits.
- Two (MD and GD models) convenient Push-Buttons provide manual ON/OFF switching at any time.
- Adjustable horizontal field of view.
- Integrated photocell prevents lights from turning ON when room is adequately illuminated by natural light.
- True Zero-Cross for primary relay provides maximum contact life and compatibility with electronic ballasts.
- Dual detection technology, both Passive Infrared and Ultrasonic. Can be configured as Ultrasonic Only and PIR Only.

**DESCRIPTION**

Leviton's Designer Multi-Technology Wall Switch Occupancy Sensor, Cat. No. OSSMD, is designed to detect motion using the passive infrared (PIR) sensor from sources (such as a person entering a room) within its field-of-view (monitored space) and automatically switch lights ON. The Occupancy Sensor senses motion within its maximum coverage area of 2400 sq. ft (223 m<sup>2</sup>). The Ultrasonic (US) sensors work with the PIR to keep the lights ON when occupied. The controlled lights will remain ON until no motion is detected and the scheduled time-delay has expired, at which point the lights will be turned OFF. In adapting time-out mode the sensor adapts its time delay settings to the occupancy patterns of a room.

The OSSMD-MD is an Occupancy Sensor that is designed to control two separate lighting control circuits from a single unit. This allows the user to replace two switches with a single unit that will provide the convenience and energy savings of an occupancy sensor. It is a dual relay device, relay one can be Auto ON or Manual ON and relay two is Manual ON only. The device contains a photocell that provides an Ambient Light Hold Off function for relay number one. Both relays operate as Auto OFF. The device can be configured for Ultrasonic with PIR, Ultrasonic Only, and PIR Only modes of operation.

The OSSMD-GD has all the functionality of the OSSMD-MD without a neutral conductor. It is intended for use in retrofit applications where a neutral is not available in the wall box.

The OSSMD-FT model is intended for applications such as a commercial bathroom where a convenience exhaust fan must be controlled. The two relays turn ON in tandem but remain ON for different durations. The device can be configured to be either in the Auto ON or Manual ON modes. The Auto ON mode utilizes the sensor technology to turn ON while the single push button on the front of the device provides the Manual ON activation. A fixed time delay OFF of 10 minutes, which starts when the first relay turns off, will apply to the second relay in both of these modes of operation. It can be configured for either Ultrasonic with PIR, Ultrasonic Only, or PIR Only modes of operation. This device requires a neutral conductor.

**Cat. No. OSSMD is ETL listed, cETL listed and conforms to California Title 24 requirements.**

The PIR Occupancy Sensor uses a small semiconductor heat detector that resides behind a multi-zone optical lens. This Fresnel lens establishes dozens of zones of detection. The Sensor is sensitive to the heat emitted by the human body. In order to initially trigger the Sensor,

the source of heat must move from one zone of detection to another. The device is most effective in sensing motion across its field-of-view and it is less effective sensing motion towards or away from its field-of-view. Keep this in mind when selecting the installation location (refer to Field-of-View diagrams).

The US Occupancy Sensor uses a non-audible, high frequency (40kHz) to sense Doppler shifts caused by motion in the space. The US is more sensitive to small motion and does not rely on line of sight for detection. If both sensors have not detected any motion for the set timeout period, the relays and their corresponding loads will be turned OFF.

Note that occupancy sensors respond to rapid changes in temperature, so care should be taken not to mount the device near a climate control source (i.e. radiators, air exchanges, and air conditioners). Hot or cold drafts will look like body motion to the device and will trigger it if the unit is mounted too close. **It is recommended to mount the Occupancy Sensor at least 6 feet away from a climate control source.**

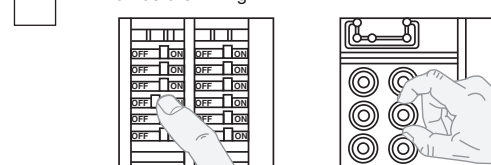
In addition, it is also recommended NOT to mount the Occupancy Sensor directly under a large light source. Large wattage bulbs (greater than 100W incandescent) give off a lot of heat and switching the bulb causes a temperature change that can be detected by the device.

Mount the Occupancy Sensor at least 6 ft. away from large bulbs. If it is necessary to mount the device closer, lower the wattage of the bulb directly overhead.

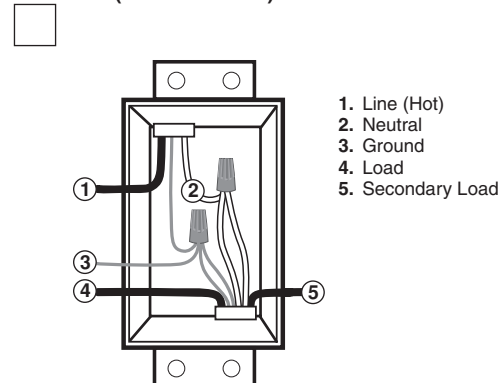
**INSTALLING YOUR SENSOR**

**NOTE:** Use check boxes  when Steps are completed.

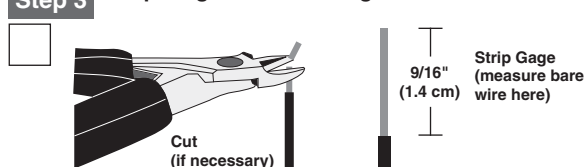
**Step 1** **WARNING: TO AVOID FIRE, SHOCK, OR DEATH; TURN OFF POWER** at circuit breaker or fuse and test that power is off before wiring!



**Step 2** **Identifying your wiring application (most common):**



**Step 3** **Preparing and connecting wires:**



- Pull off pre-cut insulation from sensor leads.
- Make sure that the ends of the wires from the wall box are **straight (cut if necessary)**.
- Remove insulation from each wire in the wall box as shown.

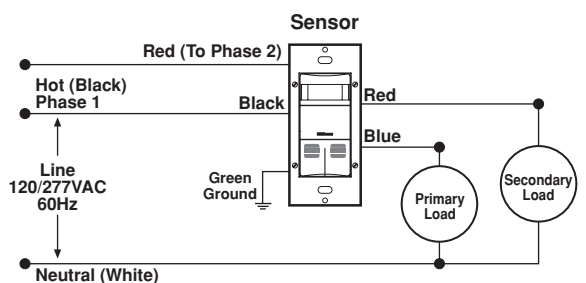
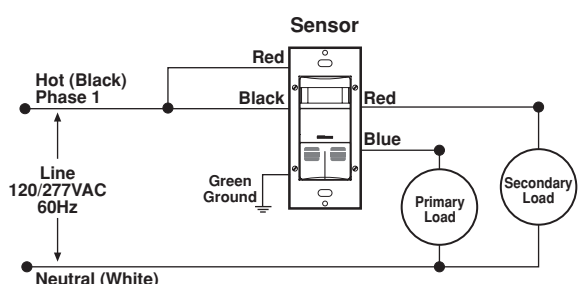
**Step 4** **Installing your Sensor - Single Location Application:**



**WARNING:** If you are unsure about any part of these instructions, consult a qualified electrician.  
**NOTE:** Allow 1 minute for warm-up after connecting and energizing.

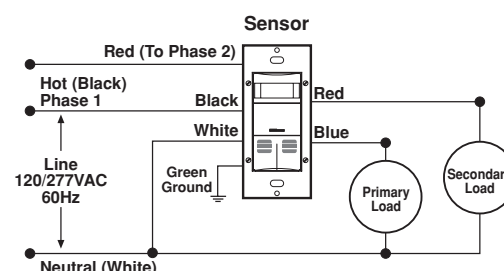
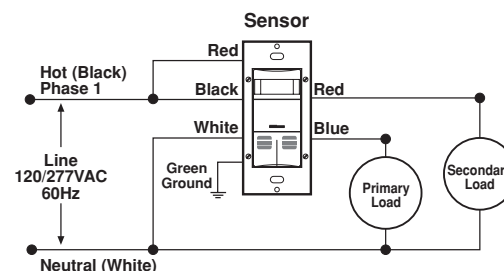
**OSSMD-GD Wiring Methods**

**NOTE:** The occupancy sensor Cat. No. OSSMD-GD does not require a neutral connection in order to operate. It must have a ground connection. Use the ground wire in the electrical box for ground connection. If there is no ground wire, ensure electrical box is grounded and attach ground wire to box by an approved connection method.



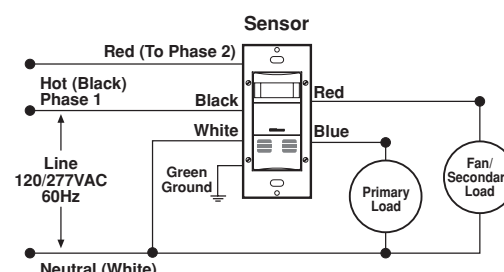
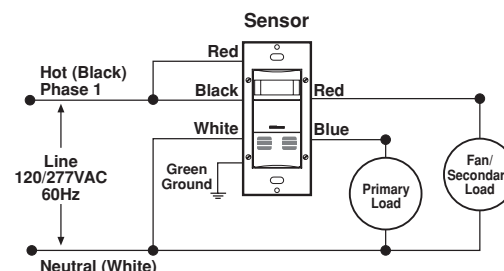
**OSSMD-MD Wiring Methods**

**NOTE:** The occupancy sensor Cat. No. OSSMD-MD requires a neutral connection to operate. Use the ground wire in the electrical box for ground connection. If there is no ground wire, ensure electrical box is grounded and attach ground wire to box with a screw.



**OSSMD-FT Wiring Methods**

**NOTE:** The occupancy sensor Cat. No. OSSMD-FT requires a neutral connection to operate. Use the ground wire in the electrical box for ground connection. If there is no ground wire, ensure electrical box is grounded and attach ground wire to box with a screw.



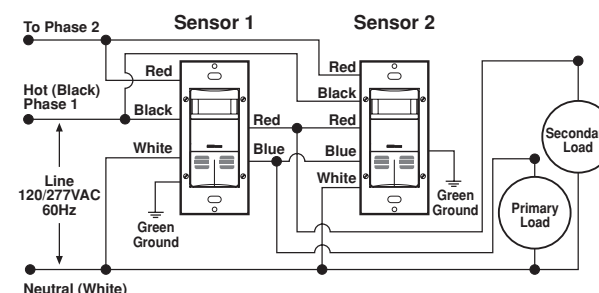
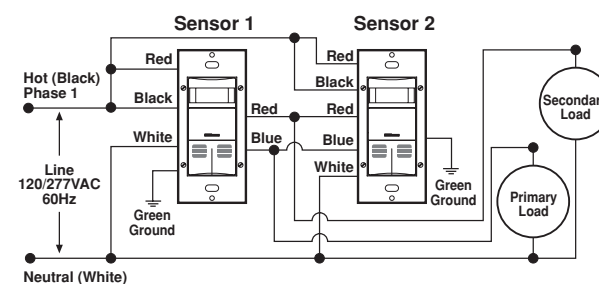
**Step 5** **Installing your Sensor - Multi-Location Wiring Application:**



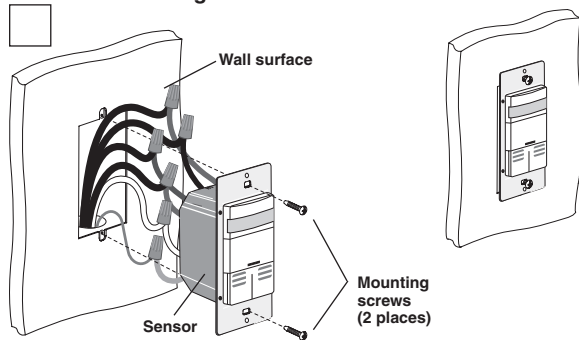
**WARNING:** If you are unsure about any part of these instructions, consult a qualified electrician.

**NOTE:** Either sensor can turn the lights ON. Both sensors must time-out to OFF, or both manual buttons must be pressed for the lights to turn OFF.

**NOTE:** Allow 1 minute for warm-up after connecting and energizing.  
**NOTE:** Both occupancy sensors Cat. No. OSSMD-MD and OSSMD-FT require a neutral connection in order to operate. Use the ground wire in the electrical box for ground connection. If there is no ground wire, ensure electrical box is grounded and attach ground wire to box with a screw.  
**NOTE:** These devices are not true 3 way products.



## Step 6 Testing your Sensor prior to completely mounting in wall box:



**NOTE:** Dress wires with a bend as shown in diagram to relieve stress when mounting device.

- Position all wires to provide room in outlet wall box for device.
- Partially secure device using long mounting screws provided.
- Restore power at circuit breaker or fuse.

**NOTE:** Allow 1 minute for warm-up after energizing.

**NOTE:** All models of the OSSMD are factory preset to work without any adjustments. If necessary, adjust the Blinders and PIR Range Control to stop any unwanted activation of the lights (refer to **FEATURES** section).

- For additional Time Control Settings (refer to the **SETTINGS** section).

**NOTE:** To avoid PERMANENT DAMAGE to the unit, be careful NOT TO OVERTURN the control knobs or levers when setting the Sensor. The controls can be accessed by removing the wallplate (if applicable) and control panel cover (refer to **Control Panel Diagram**). Use a small straight blade screwdriver to adjust knobs and blinder levers.

**NOTE:** DO NOT press in on blinder levers or use excessive force (refer to **Control Panel Diagram**).

- Attach the Control Panel cover when the desired settings are complete.

If lights do not turn ON, refer to the **TROUBLESHOOTING** section.

## FEATURES

**NOTE:** To access control settings, remove the control panel cover. If necessary, remove the warning label that covers the adjustment dials (refer to **Control Panel Diagram**).

**Factory Settings:** The sensor is shipped from the factory to work in almost all situations, without any added adjustments. The factory settings are: Blinders open, 10 minutes fixed Time-Out, Lights always turn ON regardless of existing light levels, Medium passive infrared (PIR) range, and Medium Ultrasonic range. The PIR and Ultrasonic technologies are both active.

**Blindeers:** The blinders are two independent shutters that can narrow the field-of-view from a maximum of 180° down to 60°. The blinders are operated by moving the blinder levers towards or away from the center of the Sensor. The blinder levers can be found above the control dials in the control panel (refer to **Control Panel Diagram**).

**Time-Outs:** The Sensor has three types of Time-Outs: Fixed, Adapting, and Walkthrough.

- **Fixed Time-Out:** The value of this Time-Out is user selected through the use of the Time Control Settings (refer to **Control Panel Diagram and Time-Out Settings**).

- **Adapting Time-Out:** When activated, the value of this Time-Out (30 minutes) is changed by the Sensor based on room occupancy and lighting conditions.

- **Walk-through Time-Out:** The value of this Time-Out is preset to 2.5 minutes and only exists in the Adapting Time-Out mode.

**Vacancy Confirmation:** After lights shut off there is a 30 second vacancy confirmation to on.

**Fixed Time Delay:** The fixed Time-Out value is selected by rotating the Time Control dial. There are four (4) values from which to choose. Each mark around the dial corresponds to a different value as indicated below (refer to **Control Panel Diagram**).

**NOTE:** All time durations are approximate within ±10 seconds.

**Adapting Time Delay:** The Sensor has built in adapting intelligence that modifies the Adapting Time-Out duration in response to the occupancy conditions of the room it is installed in. If the Sensor detects "large," infrequent motion it will INCREASE the Adapting

Time-Out duration. If the Sensor detects "large," frequent motion (as in several persons in a room during a meeting), it will DECREASE the time-out duration only if it was NEVER increased (this is because the built-in intelligence will always proceed in the direction of "increasing" adapting Time-Out once it has increased it for any of the occupancy conditions sensed). The Adapting Time-Out duration will range from 10 to 30 minutes in time plus the Walk-Through Time Delay.

**Walk-Through Time Delay:** The walk-through feature, which is only active in the Adapting Time-Out mode, 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 in the following manner: 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 after 2.5 minutes. If the person stays in the room for longer than 2.5 minutes, the Sensor will instead use the stored Adapting Time Delay.

If the room is occupied for longer than 2.5 minutes, the Sensor will enter the Occupied Mode with the time-out duration specified by the Adapting Time-Out setting.

If the Sensor detects motion within 30 seconds after the lights turn OFF, it will turn the lights ON and increase the time-out value by 1.5 times the existing value.

The Adapting Time-Out may be reset to the base value of 30 minutes by rotating the Time Control to a new time selection value and then back to the Adapting Time-Out value (refer to **Control Panel Diagram**).

**Ambient Light Override:** The Ambient Light Override is used to keep the lights OFF if there is already enough natural light in the room. For proper operation, the Ambient Light Override adjustment must be performed when there is enough natural light (refer to the **SETTINGS** section). If the adjustment is made when there is less natural light, the lights may not turn ON even though they are needed and will require manual activation of the push-buttons to turn the lights ON.

**NOTE:** The ambient light level in the center of a room will be different than the level at the wall where the switch is located.

**Ambient Light Dial:** The ambient light setting is adjusted with the Ambient Light Dial (refer to **Control Panel Diagram**). Turning the Light Dial fully counter-clockwise (CCW), sets the Sensor to manual ON mode (see following section). If the light control is in the fully CW position, the lights will turn ON whenever motion is detected, even in full daylight. Intermediate settings will cause the lights to turn ON only when the ambient light is below the level selected by the light control.

**NOTE:** When the setting is at the minimum CCW level, the lights will stay OFF when the room is dim. When the setting is at the maximum level clockwise (CW), the lights will turn ON when the room is bright.

**Manual ON Mode:** When the light control is in the fully CCW position the lights will never automatically turn ON. In this mode the lights need to be manually turned ON by the push-button, and will turn OFF with the absence of motion.

**PIR RANGE:** To decrease PIR detection range and sensitivity, rotate the knob CCW (refer to **Control Panel Diagram**). The detection range can be adjusted from 100% down to 30%.

**ULTRASOUND (US) SENSITIVITY AND PIR DISABLE:** US sensitivity can be adjusted to HIGH-MEDIUM-LOW by holding the ON button for 15 seconds. The LED will flash to represent the Ultrasonic sensitivity and PIR status. Tapping the Primary or Secondary ON button during the desired LED flash indication will set the sensitivity and PIR status. Use the following chart:

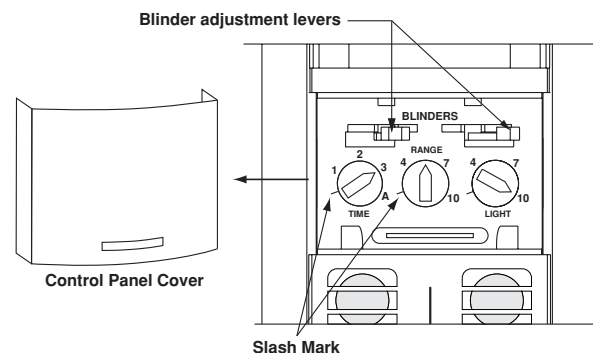
**NOTE:** To disable/enable Ultrasonic Technology:

1. Turn the "light" adjustment knob CCW.
2. Hold the button down for 6-7 seconds.
3. Release button. Red Led blinking = PIR only. Green LED blinking =US active.

US Sensitivity and PIR Disable	
3 amber flashes	High ultrasonic sensitivity, PIR enabled
2 amber flashes	Medium ultrasonic sensitivity, PIR enabled
1 amber flash	Low ultrasonic sensitivity, PIR enabled
3 green flashes	High ultrasonic sensitivity, PIR disabled
2 green flashes	Medium ultrasonic sensitivity, PIR disabled
1 green flash	Low ultrasonic sensitivity, PIR disabled

**NOTE:** The program times out in 30 seconds from the last button press. The factory setting for the US sensitivity is HIGH with PIR and Ultrasonic technologies enabled.

## Control Panel Diagram



## SETTINGS

**NOTE:** To avoid PERMANENT DAMAGE to the unit, be careful NOT TO OVERTURN or use excessive force when setting the control knobs or levers of Cat No. OSSMD. Use a small straight blade screwdriver to adjust the knobs and your finger to adjust the blinder levers.

1. Remove Decora® wallplate and Control Panel Cover from Sensor.
2. Rotate the Time dial to select the desired fixed Time-Out value.
3. If the Sensor is installed within 6 feet of an air duct, rotate the Range Control 1/4 turn counter-clock-wise (CCW).
4. **Set the Ambient Light Level - AMBIENT LIGHT:** Cat. No. OSSMD has an adjustment to determine at what minimum ambient light level the unit will operate. The adjustment should be made when the ambient light is at the level where no artificial light is needed. Follow these steps to make a more accurate adjustment of the light control. This feature will not work in Manual-On mode.
  - A. With the lights ON, rotate the Time Control fully CCW to the set the Time-Out to the thirty (30) second test mode (refer to **Control Panel Diagram**).
  - B. Rotate the Light Control fully CCW.
  - C. Manually turn OFF the lights.
  - D. Rotate the Light Control clockwise (CW) SLOWLY, until the lights turn ON. This is the setting for the current level of light in the room.

**NOTE:** When the light control is in the fully CCW position the lights will never automatically turn ON. This is the Manual-On mode, where the lights need to be manually turned ON by the push-button, and will turn OFF with the absence of motion.

If the light control is in the fully CW position, the lights will turn ON whenever motion is detected, even in full daylight.

Intermediate settings will cause the lights to turn ON only when the ambient light is below the level selected by the light control.

**NOTE:** The ambient light in a room will change with the time of day and the season of the year.

### 5. Time-Out Settings:

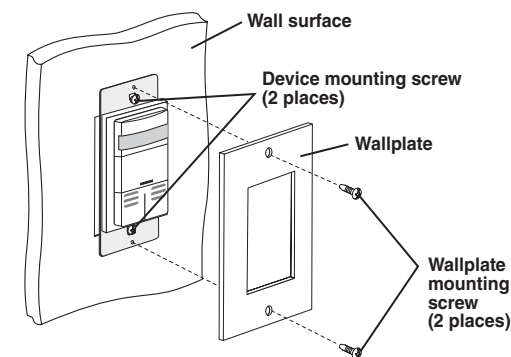
- A. Adjust the Time dial. The Sensor Amber LED will flash twice each time the Time dial is pointed at a new Time-Out value. The Time-Out values for non-adapting mode are:

Face Marking	Value of Time
(/) Slash Mark	30 second fixed time-out for performing a walk test
1	10 minutes fixed time-out
2	20 minutes fixed time-out
3	30 minutes fixed time-out
A	Auto Adapting

**NOTE:** To return to adapting mode, rotate the Time dial to full CW position (A setting). Be sure the Time dial is rotated until an Amber LED flash is issued to be sure a new setting was selected.

6. If desired, adjust the blinders to block any unwanted motion.

## 7. Replace the Control Panel Cover and Decora® wallplate.



- Secure device by firmly tightening mounting screws.
- Install Decora® style wallplate (sold separately).

## OPERATION

### PUSH BUTTON(S)

Cat. No. OSSMD-FT has a single push-button switch that toggles relays and their corresponding loads, ON and OFF. If the relays are OFF, the relays will turn ON when the push-button is pressed, and remain ON in the presence of motion. In the absence of motion, the Sensor Unit will Time-Out and turn relay one OFF. Relay two will remain ON for the fixed 10 minute additional delay. When that period times out, relay two will turn OFF.

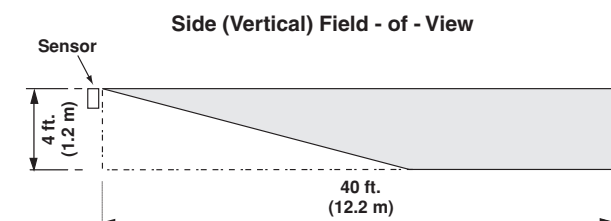
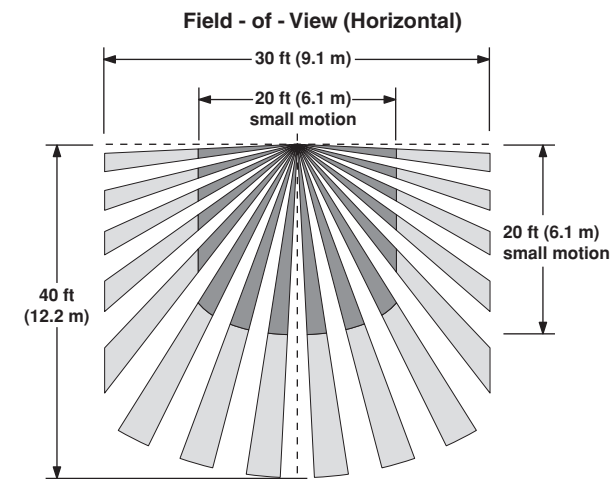
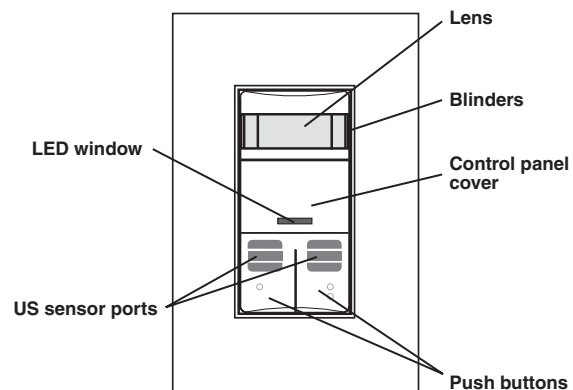
If the relays and their corresponding loads are ON, relay one will turn OFF when the button is pressed. Relay two will remain on for 10 minutes after the Time-Out expires. After these two events, the relays will turn ON with the next detected motion.

Cat. No. OSSMD-MD and OSSMD-GD have two push-button switches that toggle the relays and their corresponding loads, ON and OFF. Button one controls relay one and button two controls relay two. If the relays are OFF, the relays will turn ON when their push-button is pressed, and remain ON in the presence of motion. In the absence of motion, the Sensor Unit will Time-Out and turn both of the relays OFF.

If the relays and their corresponding loads are ON, the relays will turn OFF when their corresponding buttons are pressed. The relays will stay OFF regardless of motion detected, until the Time-Out expires. After the Time-Out expires, the relays will turn ON with the next detected motion.

### NOTES:

- The Motion Indicator LED will blink every 1 second while motion is detected.
- When the Time-Out expires and the relays turn OFF a 30 second vacancy confirmation exists to turn the relay(s) back ON. After this time the device will be placed into a lower detection threshold mode.
- In Manual-On mode, the button must be pressed to turn the lights ON. In the absence of motion, the unit will Time-Out and turn the lights OFF.
- If Manual-On mode is desired, keep the Light knob in the fully counter-clockwise (CCW) position.



## TROUBLESHOOTING

1. If there is no response from the unit and the LED never blinks or the push button does not activate the lights 1-1/2 minutes after power is applied, then uninstall device and verify wiring (**Step 4**).
2. If the lights constantly stay ON, even when the room is unoccupied:
  - A. Check the Time setting. See how this time compares to how long the lights stay ON.
  - B. Try lowering the PIR Range Control. Rotate the knob counterclockwise about 30°.
  - C. If the problem persists, try reducing again.
 

**NOTE:** Do not reduce so much that the Sensor Unit cannot see normal occupancy.
  - D. Try lowering the Ultrasonic Sensitivity.
  - E. Be sure to use the Blinders to block any unwanted hallway traffic.
  - F. Check for reflected heat/motion as the Sensor Unit may be seeing motion through a window.
  - G. Check for adjacent HVAC and/or heater ducts.
  - H. If your OSSMD does not seem to be functioning and has a flashing amber LED, there may be a zero-cross failure. Please call for technical assistance.

## PRODUCT INFORMATION

- For technical assistance contact us at 1-800-824-3005
- Visit our website at [www.leviton.com](http://www.leviton.com)

## FCC COMPLIANCE STATEMENT

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 instruction manual, may cause harmful interference to radio communications. 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.

## LIMITED 5 YEAR WARRANTY AND EXCLUSIONS

Leviton warrants to the original consumer purchaser and not for the benefit of anyone else that this product at the time of its sale by Leviton is free of defects in materials and workmanship under normal and proper use for five years from the purchase date. Leviton's only obligation is to correct such defects by repair or replacement, at its option, if within such five year period the product is returned prepaid, with proof of purchase date, and a description of the problem to Leviton Manufacturing Co., Inc., Att: Quality Assurance Department, 201 North Service Road, Melville, N.Y. 11747, U.S.A. This warranty excludes and there is disclaimed liability for labor for removal of this product or reinstallation. This warranty is void if this product is installed improperly or in an improper environment, overloaded, misused, opened, abused, or altered in any manner, or is not used under normal operating conditions or not in accordance with any labels or instructions. There are no other or implied warranties of any kind, including merchantability and fitness for a particular purpose, but if any implied warranty is required by the applicable jurisdiction, the duration of any such implied warranty, including merchantability and fitness for a particular purpose, is limited to five years. Leviton is not liable for incidental, indirect, special, or consequential damages, including without limitation, damage to, or loss of use of, any equipment, lost sales or profits or delay or failure to perform this warranty obligation. The remedies provided herein are the exclusive remedies under this warranty, whether based on contract, tort or otherwise.