Infrared Wall Mounted Occupancy Sensor
Cat. Nos. OSWHB-I, OSWLR-I, OSWWV-I
To be used with 24VDC OSPxx Series, OPB15, miniZ and CN100 Power Pack Class II Low-Voltage Wiring
INSTALLATION INSTRUCTIONS

LEVITON ®

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.
- Sensors must be mounted on a vibration free surface.
- All sensors must be mounted at least 6 feet away from air vents.
- Do not touch the surface of the lens. Clean outer surface with a damp cloth only.

CATALOG ITEMS

Catalog No.	Description	Current Consumption	Coverage
OSWHB-I0W	High Bay	20mA	55 ft. mounted at 30 ft
OSWLR-I0W	Long Range	20mA	100 ft. mounted at 10 ft.
OSWWV-I0W	Wide View	20mA	2500 sq. ft.

FCC COMPLIANCE STATEMENT:
This device complies with part 15 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
Pliers
Cutters
Electrical Tape
Pencil

Parts included list

Sensor (1)
#8-32 x 1/2" Screw (2)
#8-32 x 1-1/2" Screw (2)
#8-32 Washer and Nut (2)

DESCRIPTION

The Occupancy Sensor is a low-voltage infrared sensor that works with the OSPxx Series, OPB15, miniZ and CN100 power pack to automatically control lighting. The sensor turns the lights on and keeps them on whenever occupancy is detected and will turn them off after the 'delayed-off time' has expired.

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.

Infrared motion detection gives higher false triggering immunity that 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!
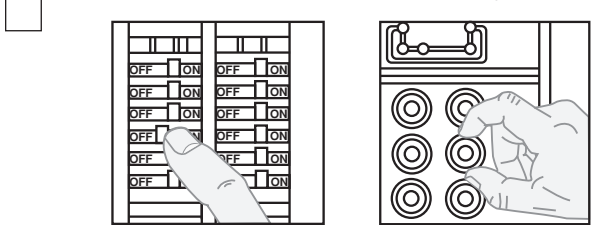
Step 2 **Preparing and connecting wires:**

1/2" (1.3 cm)

Strip Gage (measure bare wire here)

Step 3 **Typical Installations:**

Listed are 3 typical installation options (A, B and C). Choose one that best suits your needs. Other methods of installation may be possible but they have not been described here. Note that the wall sensor can be wall mounted or ceiling mounted simply by rotating the neck. This gives greater flexibility in attaining the desired coverage.
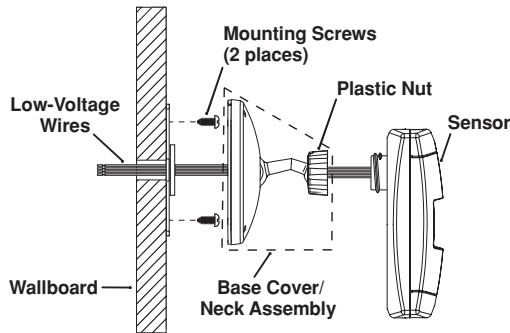
A. **Wall or Ceiling Installation Using Screws (Mounting Option A):**
  NOTE: You may use the mounting screws, nuts and washers included, or screws in combination with commercially available wall anchors.
  1. Select location for mounting of sensor for your application **(refer to Mounting Location Diagram)**.
  2. Make a hole in the wallboard or ceiling large enough to pass the wire connections and wire nuts through (approximately 1" diameter).
  3. Drill holes for mounting screws using mounting base as template.
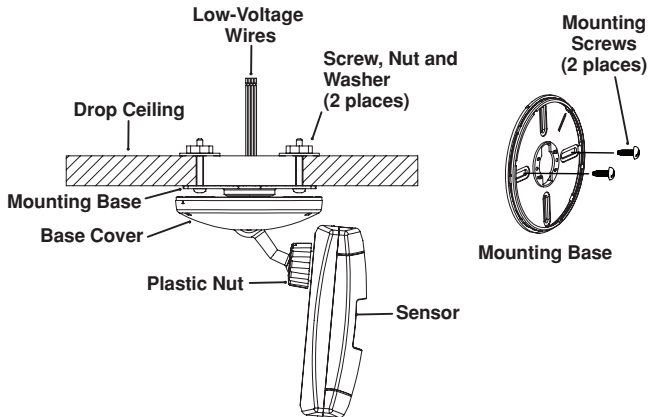

Step 3 cont'd

4. Install the mounting base of the wall sensor to the wallboard or ceiling using the included screws, nuts and washers.
5. Pass wires through the base cover/neck assembly **(refer to Mounting Option Diagram A)**.
6. **Class II Wiring:** Connect low-Voltage wires from Power Pack to Sensor per WIRING DIAGRAM as follows: Twist strands of each lead tightly and, 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.
7. Push wire connections through the center hole of the back cover and into the wall or ceiling.
8. Snap neck and base cover onto mounting base in the desired orientation. Align arrows on mounting base and base cover, push on and turn to lock base cover to mounting base.
9. Push wires through the hole and begin to fasten the plastic nut around the back of the sensor body. Move the sensor body to the desired orientation and then continue to tighten the nut around the sensor body. **NOTE:** The neck is a two position assembly with catches to hold it in position for either ceiling or wall mounting.
10. Restore power at circuit breaker or fuse to Power Pack. **INSTALLATION IS COMPLETE**.

Mounting Option Diagram A
Occupancy Sensor Mounted to Wallboard Using Screws

Mounting Screws (2 places)
Plastic Nut
Low-Voltage Wires
Sensor
Wallboard
Base Cover/ Neck Assembly

Occupancy Sensor Mounted to Wallboard or Drop Ceiling Using Screws, Nuts and Washers

Low-Voltage Wires
Screw, Nut and Washer (2 places)
Mounting Screws (2 places)
Drop Ceiling
Mounting Base
Base Cover
Plastic Nut
Sensor
Mounting Base

Step 3 cont'd

B. **Wall or Ceiling Using Junction Box or Surface Mount Raceway Installation (refer to Mounting Diagrams):**
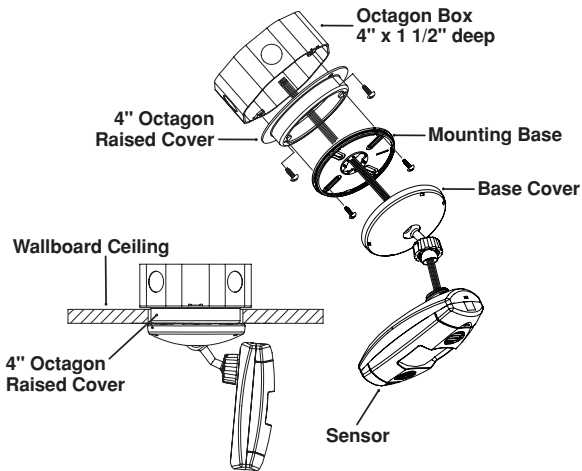 **NOTE:** You may use the mounting screws, nuts and washers included, or screws in combination with commercially available wall anchors.
  NOTE: Listed below are suggested JUNCTION BOX installation applications which require mounting to conduit in one of the following ways.

Mounting Option Diagram B
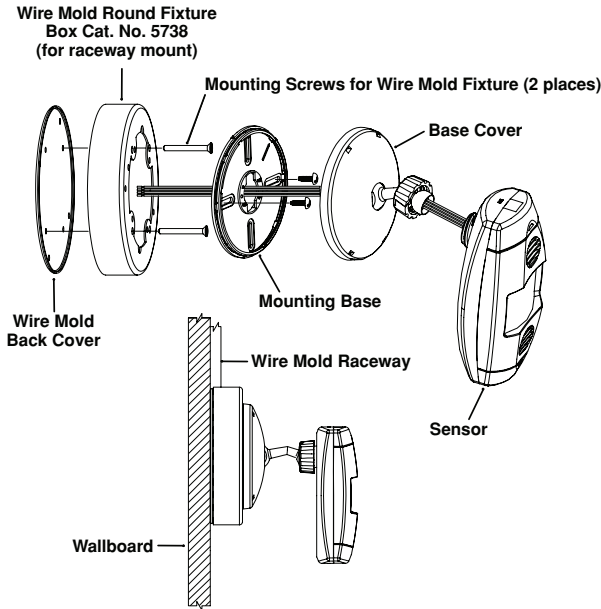**Occupancy Sensor Mounted to Octagon Box Installed Flush to Wallboard**

Octagon Box 4" x 1 1/2" deep
Mounting Screws (2 places)
Mounting Base
Base Cover
Sensor
Wallboard
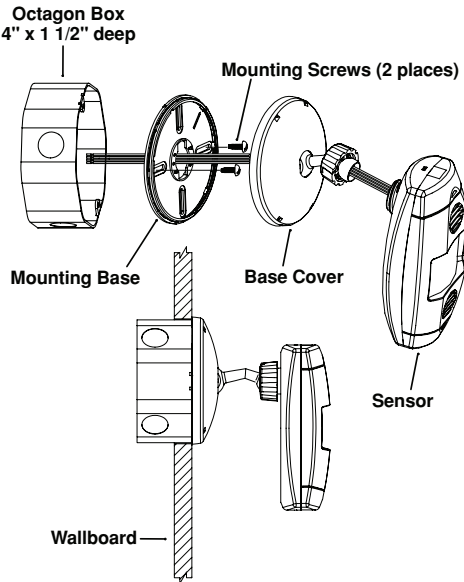
Occupancy Sensor Mounted to Octagon Box Installed Flush to Wallboard Ceiling or Drop Ceiling

Octagon Box 4" x 1 1/2" deep
4" Octagon Raised Cover
Mounting Base
Base Cover
Wallboard Ceiling
4" Octagon Raised Cover
Sensor

Step 3 cont'd

Occupancy Sensor Mounted to Wallboard Using Round Fixture with Raceway

Wire Mold Round Fixture Box Cat. No. 5738 (for raceway mount)
Mounting Screws for Wire Mold Fixture (2 places)
Base Cover
Mounting Base
Wire Mold Back Cover
Wire Mold Raceway
Sensor
Wallboard

C. OPB15 Power Base Installation:
In addition to the regular mounting methods shown, the OSWxx can be mounted to the OPB15 Power Base.
1. Install the OPB15 per the installation sheet included with the OPB15.
2. Remove the OSWxx from the box and pass the low-voltage wires through the neck/base cover assembly.
3. Screw the neck plastic nut to the sensor body to hold assembly together while connecting the wire leads.
4. Remove the two-part connector from the OPB15 noting the orientation it was in before removal.
5. Connect the wires from the sensor to the appropriate locations on the terminal block.
6. Push the terminal block on to the OPB15 pins.
7. Align the raised arrow on the side of the base cover with the arrow on the mounting ring of the OPB15 and push on and twist to install.
8. Rotate the assembly and adjust the neck for either ceiling or wall configuration aiming per the diagram.
9. Tighten the plastic nut on the neck to lock the position of the sensor.

4" Octagon 2.125" Deep Electrical Box
8-32 Screws (2 places)
Sensor Power Base
Two-Part Terminal Connector
Base Cover
Sensor
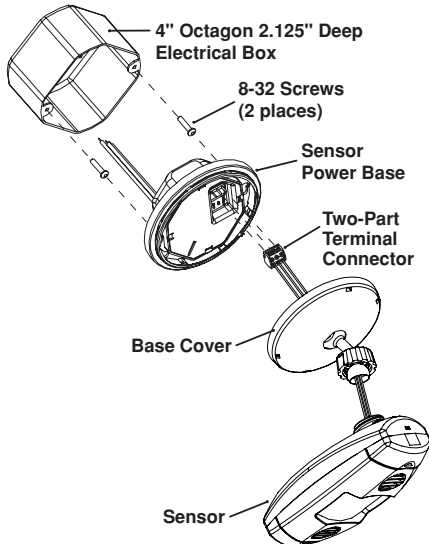
OPERATION

Motion detection by the infrared sensor 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. This length of time is called the delayed-off time and is set using the timer (Black) knob on the sensor. The adapting patterns 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 default walk-through time-out of 2.5 minutes, the sensor will turn the lights off. If the person stays in the room for longer than 2.5 minutes, the sensor will proceed to the standard 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 **(refer to Table 2)**. 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 effects of noise (electrical noise, air currents, temperature changes, etc…).

Operation:

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 exits 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 Time 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 subsequently turns on, the value of the delayed-off time will be the adapted 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 will automatically change the delayed off time in response to the occupancy and environmental conditions 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 Infrared Technology:

The sensor learns the occupancy patterns of a space during the course of a day, for a seven day period. At any given time, the sensor will look at the collected data and adjust its infrared sensitivity. 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.

Default Settings:

Adjustment knob settings as per "Factory Default Setting", **(refer to Table 1 and Figure 1)**.

All switches in the OFF position, except A4, which is in the ON position **(refer to Table 2)**.

TABLE 1 : AJUSTMENT KNOB SETTINGS

Knob Color	Symbol	Function	Knob Setting	Factory Default Setting
Red	👁	Sets the infrared range	Range Setting Full CCW = min. (OFF) Full CW = max.	75 %
Black	⏱	Delayed - Off Time	Full CCW = min. (30 sec.) Full CW = max. (30 min.)	50 % (10 min)
Blue	☀	Ambient Light Override (Gray wire only)	Full CCW - Lights stay OFF Full CW - Lights always turn ON (NO ambient light override) Range - 100-3000 LUX	100 %

TABLE 2: SWITCH SETTINGS

Switch	Switch Functions	Switch Settings	
	Bank A	**OFF**	**ON**
A1	N/A	N/A	N/A
A2	N/A	N/A	N/A
A3	Manual Mode	Auto Adapting Enabled	Auto Adapting Disabled
A4	Walk-Through Disable	Walk-Through Enabled	Walk-Through Disabled
	Bank B	**OFF**	**ON**
B1	Override to ON	Auto Mode	Lights Forced ON
B2	Override to OFF	Auto Mode	Lights Forced OFF
B3	Test Mode	OFF ➜ ON ➜ OFF = Enter/Exit Test Mode	
B4	LEDs Disable	LEDs Enabled	LEDs Disabled

Test Mode: To 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 ON position, then test mode can be entered by just moving it to the OFF position.

NOTES:

1. 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 setting as defined by the black timer knob.
2. To manually take the timer out of the 6 second test mode, simply toggle the switch B3 from OFF to ON and back to OFF.
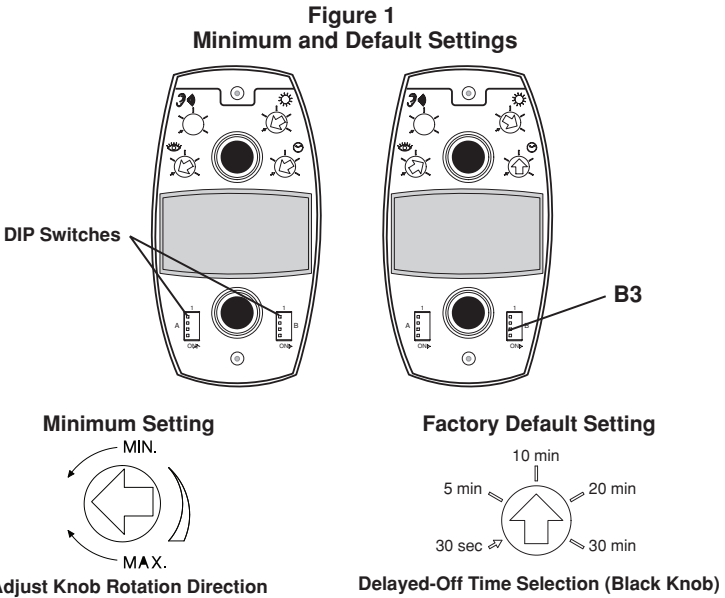
Photocell (Ambient Light Override) adjustment:

In order to use the Ambient Light Override functionality of the sensor, the sensor must be wired to the power pack (OSPXX) 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 amount of ambient light in the installed area and keeping the controlled lights off 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 knob. Rotate the Red knob full CCW and enter the sensor's Test mode as described above.
3. Rotate the Blue knob full CCW.
4. Wait for the lights to turn OFF.
5. Rotate the Red knob full CW.
6. Slowly rotate the blue knob clockwise until the lights turn ON. This is the correct setting.
7. Return the Red knob to its original position.
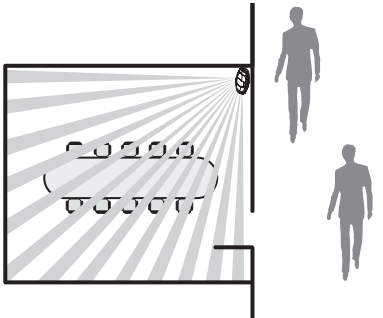8. Replace cover. **Setting is complete.**

Figure 1
Minimum and Default Settings

DIP Switches

B3

Minimum Setting

MIN.

MAX.

Adjust Knob Rotation Direction

Factory Default Setting

10 min

5 min — 20 min

30 sec — 30 min

Delayed-Off Time Selection (Black Knob)

Mounting Location Diagram

Figure 2 (Cat. No. OSWHB)
Field-of-View Ranges

TOP VIEW

3.4 / 0 / 3.4

0 3 13 25 52

SIDE VIEW

30

0 3 13 25 52
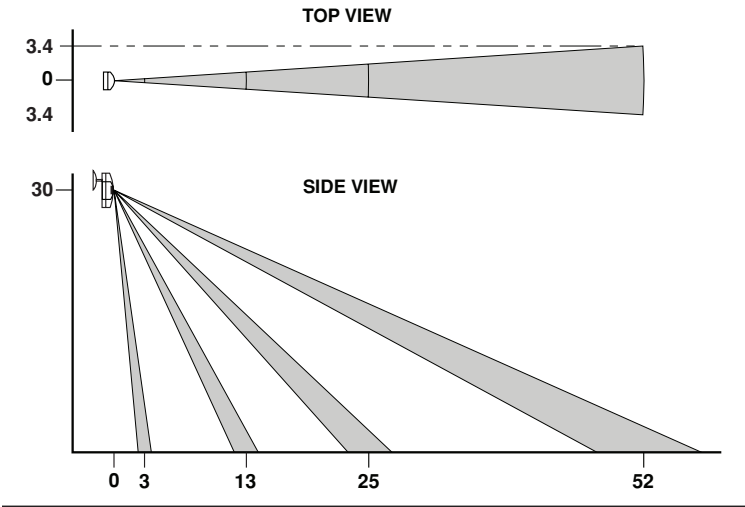
Figure 3 (Cat. No. OSWLR)
Field-of-View Ranges

TOP VIEW

16.6 / 0 / 16.6

0 14 42 71 100

SIDE VIEW

10 / 0

0 14 42 71 100
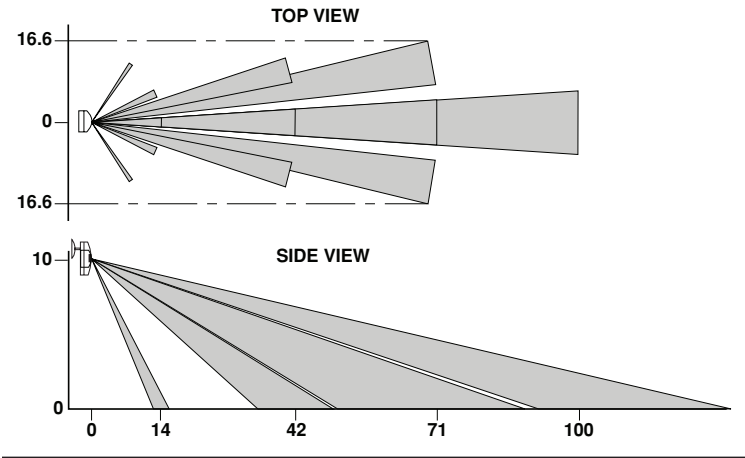
Wiring Diagram
Multiple Sensor, Single Power Pack

OSPxx Series Power Pack

Sensor

- NC - Brown
- Common - Green
- NO - Brown/White

To HVAC System

Red (24VDC)
Black
Blue (Control)

Red — Gray*
Black
Blue — Black

Red
Black — Gray*
Blue — Load

Black (Hot)
Blue
Blue
Black

Line 120/277/347VAC 60Hz

White — White

Neutral (White)
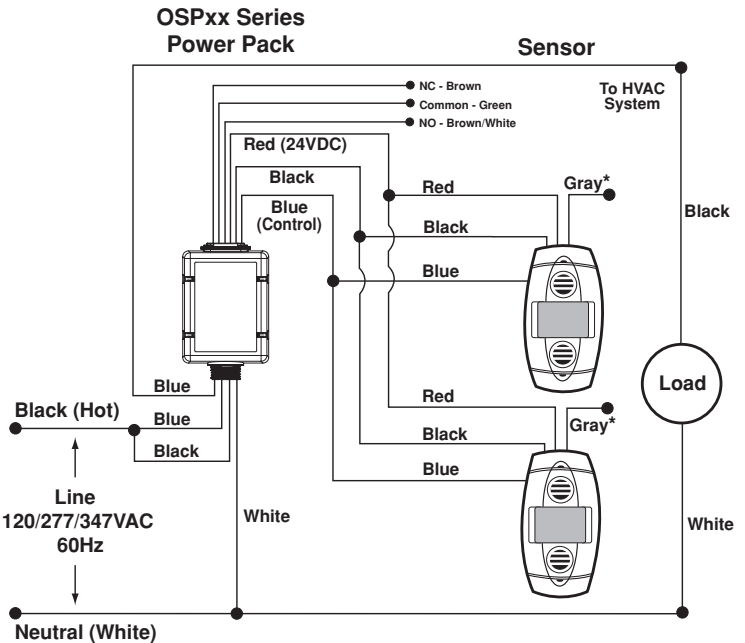
Figure 4 (Cat. No. OSWWV)
Field-of-View Ranges

TOP VIEW

58 / 29 / 0 / 29 / 58

■ Minor Motion, IR
□ Major Motion, IR

SIDE VIEW

8 / 0

03 8 15 31 68
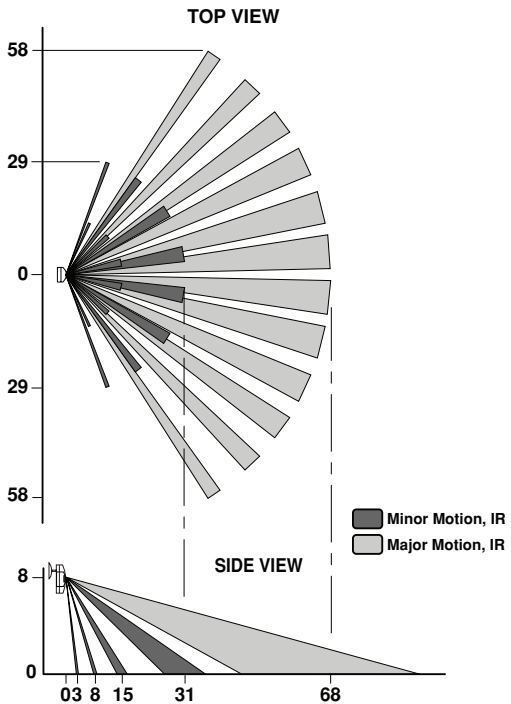
TROUBLESHOOTING

- **Lights do not turn ON**
  - Circuit breaker or fuse has tripped.
  - Low-voltage miswired. **To Test:** Connect RED to BLUE wire at power pack to force lights ON.
  - Line voltage miswired. **To Test:** Connect BLUE to BLUE relay wires (of power pack) to force the lights ON.
- **Lights stay ON**
  - Constant motion. **To Test:** Reduce RED knob by 15%; remove motion source. If unsatisfactory, move sensor.
  - Infrared sensor can "see" into hallway. **To Test:** Put sensor in timer test mode walk and walk hallway. If lights continue to come ON, move sensor.
- **Light turns ON too long**
  - Timer setting too high. **To Test:** Check switch settings. Typical setting is 10 minutes.

TABLE 3: WIRE DESIGNATIONS

Name	Color	Gauge	Temp/Voltage
Power (+24V)	Red	24	200° C/ 600V
DC Return	Black	24	200° C/ 600V
Occupancy	Blue	24	200° C/ 600V
Occupancy/Photocell	Gray	24	200° C/ 600V

* 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 sensor.

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

PRODUCT INFORMATION

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

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