



# Occupancy Sensor with 0-10V Dimming Control INSTALLATION INSTRUCTIONS

## INSTALLATION OVERVIEW

The installation instructions contained in this document are provided as a guide for proper and reliable installation. The mounting location should be selected and prepared based on the application. All electrical wiring and mounting hardware (i.e. electrical mounting box, conduit, etc.) should be prepared with consideration of the requirements outlined in the wiring and mounting diagrams below.

## PRECAUTIONS

- Read and understand all instructions before beginning installation.
- **NOTICE:** For installation by a licensed electrician in accordance with National and/or local Electrical Codes and the following instructions.
- Disconnect switch or a circuit breaker must be provided and marked as the disconnecting device.
- Disconnect switch / circuit breaker must be within reach of operator.
- **CAUTION: RISK OF ELECTRICAL SHOCK.** Turn power off at service panel before beginning installation.  
Never wire energized electrical components.
- **CAUTION: USE COPPER CONDUCTOR ONLY.**
- Confirm that device ratings are suitable for application prior to installation.
- Use only approved materials and components (i.e. wire nuts, electrical box, etc.) as appropriate for installation.
- **NOTICE:** Do not install if product appears to be damaged.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

## SENSOR CONFIGURATION

Sensor Model	Mounting	Input Voltage	Outdoor Rating/Low Temp	Dimming Control	Color
WSP	SM Surface Mount EM End Mount	24V - Low Voltage (24VDC) UNV - 120/277/347VAC, 60Hz 208 - 208/240VAC 480 - 480VAC	Blank - Indoor Only LWO - Low Temp/ Water Tight/ Indoor/ Outdoor	D - Dimming Enabled	Blank - White BK - Black GY - Gray

## LENS CONFIGURATION

Lens Model	Coverage	Mounting	Options
WSP	L360 360° Pattern LA Aisle Pattern L180 180° Pattern LHA Half Aisle Pattern	Blank High Mount LM Low Mount	Blank Indoor LWO Low Temp/ Water Tight/ Indoor/Outdoor

## PRODUCT OVERVIEW

The Dimming Wasp Outdoor Occupancy Sensor is specifically designed to provide 0-10VDC output for the control of dimmable fixtures. Easy to use dipswitches allow the user to set unoccupied and occupied dimming levels. The sensor is available in end mount and surface mount versions in both line and low voltage options. Interchangeable twist-on lenses eliminate need for field masking. All Dimming Wasp sensors feature a daylight sensor for ON/OFF control of fixtures when there is sufficient natural light.

The gasketed design of the enclosure makes it impervious to dust and able to withstand water ingress making it an ideal sensor for outdoor and wet locations including those with temperatures of -40° F/C.

## SENSOR MODULE SPECIFICATIONS

Timer Timeouts:	<ul style="list-style-type: none"> <li>• Primary (8 second test mode, 4, 8, 16, 30 minutes)</li> <li>• Full Off Timer (Disabled, 60 Minutes)</li> </ul>
Passive Infrared:	<ul style="list-style-type: none"> <li>• Dual element pyrometer and lens designed for reliable detection of a walking person.</li> <li>• NOTE: When used with program start ballast and LED drivers, a 1-2 second delay from occupancy detection to turn-on may be experienced. HBA recommends that you consult your fixture/ballast manufacturer for suitability with occupancy sensors.</li> </ul>
Load Ratings (each relay):	<ul style="list-style-type: none"> <li>• UNV models: 120VAC, 60Hz: 0-800W tungsten or standard ballast / 0-600W electronic ballast, 277VAC, 60Hz: 0-1200W ballast, 347VAC, 60Hz: 0-1500W ballast, ¼-HP motor load @ 120V, 1/6-HP @ 347V</li> <li>• 208 models: 208/240VAC, 60Hz: 0-1200W ballast</li> <li>• 480 models: 480VAC, 60Hz: 0-2400W ballast</li> <li>• 24V models: HBA UVPP or MP Series Power pack required (sold separately)</li> </ul>
Daylight Sensor Range:	<ul style="list-style-type: none"> <li>• 1 FC to 50 FC or 5 FC to 500FC</li> </ul>
Operating Environment:	<ul style="list-style-type: none"> <li>• IP65 Compliant</li> <li>• -40° to 149°F (-40° to 65°C)</li> <li>• LWO version: 32° to 149°F (0 to 65°C)</li> </ul>



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## SURFACE MOUNT SENSOR INSTALLATION

1. Turn power off at the service panel before installing sensor.
2. Electrically connect the sensor to the lighting system per the applicable wiring diagram on page 4.
3. Attach sensor to fixture or electrical box using the (2) 8-32 x 1.25 mounting screws provided. Mounting holes should be 2.75" on center (See enclosed mounting diagram template). For indoor box mounting use a standard 31/2" octagon (RACO #110 or similar). Alternately, a 4" octagon box (RACO #125 or similar) may be used along with a 4" offset crossbar fixture strap. For outdoor applications use a 4" round water tight box (BELL #5361-1 or similar) Note: some water tight boxes use #10 screws. These will require the that the mounting holes in the sensor be enlarged to accommodate the #10 screws.
4. Adjust sensor operation by setting dip switches as described on page 3.
5. Attach sensor lens to sensor module and rotate clockwise approximately five degrees to lock into place (See Fig. 1 & 2).
6. Turn power on and allow sensor 2 minutes minimum to stabilize.
7. Verify sensor is functioning by waving hand under lens and observing that the sensor's red light (located under the lens) flashes.

**NOTE: Low Temp/Water Tight/ Indoor/Outdoor Surface Mount sensors feature a water tight gasket on the housing. Sensor must be installed flush onto a flat surface area to insure that a proper water tight seal is made between the sensor and the surface area.**

## END MOUNT SENSOR INSTALLATION

1. Turn power off at the service panel before installing sensor.
2. Insert the sensor's wires and threaded nipple into a 1/2" knockout on the fixture body or an electrical junction box.
3. Thread the sensor's wires through the lock-nut.
4. Verify that the sensor is positioned correctly (i.e. Lens facing downward).
5. Screw lock-nut onto the sensor's threaded nipple and tighten.
6. Electrically connect the sensor to the lighting system per the applicable wiring diagram on page 4.
7. Adjust sensor operation by setting dip switches as described on page 3.
8. Attach sensor lens to sensor module and rotate clockwise approximately five degrees to lock into place (See Fig. 1 & 2).
9. Turn power on and allow sensor 2 minutes minimum to stabilize.
10. Verify sensor is functioning by waving hand under lens and observing that the sensor's red light (located under the lens) flashes.

**NOTE: Low Temp/Water Tight/ Indoor/ Outdoor End Mount sensors feature a water tight gasket that goes onto the chase nipple. Gasket must be installed onto the sensor's chase nipple to insure that a proper water tight seal is made between the sensor and the fixture.**

## SENSOR LENS INSTALLATION/ REMOVAL INSTRUCTIONS

1. Place lens assembly flush onto sensor module and rotate clockwise approximately five degrees to lock into place (see Fig. 1 & 2)
2. To remove lens: Rotate lens assembly counter clockwise approximately five degrees and lift off.



Fig. 1 – Lens Installation

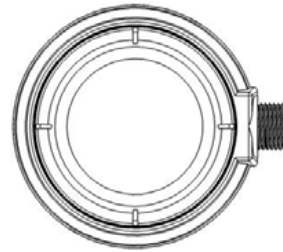


Fig. 2 – 360 Lens Installed

## SENSOR AND RANGE TESTING

Putting the sensor into test mode provides a means to confirm that the sensor's coverage pattern (see Fig. 6 & 7) is aligned properly in the lighted space as well as verifying the basic functionality of the sensor.

1. Remove lens from sensor module by rotating lens assembly counter clockwise approximately five degrees and lift off.
2. Set sensor's switch settings according to desired functionality.
3. Place sensor into Test Mode (8 seconds) by putting Switch 1 into the ON (Test) position.  
**NOTE: The sensor must be powered when placed into Test Mode. If switch is already in the ON position, switch it OFF then back to the ON position. The sensor's LED will blink in bursts of 3 to indicate that Test Mode is active. When testing low voltage sensors, all sensors connected to power pack must be in Test Mode.**
4. Re-install sensor lens to sensor module and rotate clockwise approximately five degrees to lock into place (See Fig. 1).
5. Vacate the sensor detection pattern. Remove obstructions (i.e. ladder or lift) from the sensor detection area as necessary.  
**If DIP Switch #5 is set to OFF** (default) indicating dimming only operation, the light(s) will dim to low approximately 8 seconds after vacating the detection pattern area. **If DIP switch #5 is set to ON** indicating that the desired operation is for the light(s) to go to full off, the light(s) will dim low approximately 8 seconds after vacating the area, then turn off after an additional 8 seconds.
6. Wait for at least 4 seconds, then re-enter sensor detection pattern area and observe that lights turn on.
7. Step out of sensor detection pattern area and observe that lights respond as in Step 5 above.
8. Repeat steps 5 and 6 from different entry points on the detection pattern area as necessary to verify proper detection pattern area coverage.
9. If necessary, modify sensor detection pattern area by adjusting sensor and/or lens orientation.
10. Sensor will automatically exit Test Mode after 1 hour. Sensor detection will be indicated by a single blink of the LED. To manually exit Test Mode: remove lens assembly, set Switch 1 to the OFF (Normal) position and re-install lens. The sensor may also be power cycled in order to take it out of Test Mode.

## SWITCH SETTINGS

State	Switch 1
Normal Mode	OFF
Test Mode	ON

**Switch 1 – Test Mode: Controls the operational mode of the sensor.** When placed in Test Mode (ON Position), the sensors will timeout after 8 seconds of no occupancy. The sensor's LED will blink in bursts of 3 to indicate that Test Mode is active. The sensor must be powered to be set into Test Mode. Default: Normal (OFF Position). **NOTE: If switch is already in the ON position, turn the switch OFF then back to the ON position to enter Test Mode. Sensor will automatically exit Test Mode after 1 hour. Sensor detection will be indicated by a single blink of the LED. To manually exit Test Mode, return switch to the OFF position.**

State	Switch 2
Bypass Disabled	OFF
Bypass Enabled	ON

**Switch 2 – Bypass Override (Forces Light On):** When set to the ON position, sensor is bypassed and load is turned on at 100%. Default: Bypass Disabled (Switch OFF)

State	Switch 3	Switch 4
8 Mins	OFF	OFF
4 Mins	OFF	ON
16 Mins	ON	OFF
30 Mins	ON	ON

**Switches 3 & 4 – Timer Delay:** Controls time interval to dim after the lighted space becomes unoccupied. Available settings are 4, 8, 16 and 30 minutes. Default: 8 minutes (Switches 3 & 4 – OFF Position)

Full Off Timer Delay	Switch 5
Disabled	OFF
60 Mins	ON

**Switch 5 – Full Off Timer Delay:** Controls sensor operation. When set to the ON position sensor will turn off the lights after 60 minutes of no occupancy. When set to the Off position sensor will maintain Unoccupied Dimming Level Setting. Default: Disabled (OFF Position)

Mode	Switch 6
100%	OFF
80%	ON

**Switch 6 – Occupied Dimming Level:** Controls dimming level of the sensor while occupancy is detected. Default: 100% (Switch 6 OFF)

State	Switch 7	Switch 8
50%	OFF	OFF
70%	OFF	ON
60%	ON	OFF
20%	ON	ON

**Switches 7 & 8 – Unoccupied Dimming Level:** Controls the level the sensor will be at when no occupancy is detected. Default: 50% (Switches 7& 8 OFF) **NOTE: The percentage values shown in the chart and selected by the switches are for the dimming control voltage output from the WASP. These values are based on a linear relationship between the control signal and the fixture output. The actual percentage of light or power delivered will be a factor of the lamp and ballast/driver used in the controlled fixture.**

Daylight Sensor	Switch 9
Downward	OFF
Upward	ON

**Switch 9 – Daylight Sensor Selection:** Selects either the downward looking or upward looking daylight sensor. Default: Downward (OFF Position) **NOTE: Upward looking daylight sensor is only available on end mount versions of the sensor.**

**Switches 10, 11 & 12 – Daylight Sensor Set Point Levels:** Enables or disables daylight sensor operation and controls the set point. When enabled, the sensor turns lights on in response to occupancy when light levels are below the daylight sensor set point. Daylight sensor setting should be set to a value that turns off artificial lighting when natural light levels reach the required design level. To determine this value, light level measurements should be taken when the natural light levels are at their highest peak (typically between 10am – 2pm). With artificial lighting on, measure the light level. When the measurement is twice the design level measure the light level at the sensor. Default: Daylight Sensor Disabled (Switches 10-12 – OFF Position)

**NOTE: light meter should be oriented in the same direction as the selected upward or downward looking daylight sensor. Configure switches 10-12 to the value closest to the meter's reading.**

**NOTE: When the daylight sensor is disabled the light fixture will be controlled by occupancy only. When the daylight sensor is enabled, the sensor will turn the light fixture OFF when sufficient daylight is available.**

**NOTE: Dead band is factory set. To prevent unwanted cycling, the light level at the sensor face must exceed the FC set point by the amount of dead band before the lights will turn off. Conversely, the light level must drop below the set point plus the dead band before the lights will turn on.**

### When Set to "Down Looking" Daylight Sensor

Dead Band	Set Point Levels	Switch 10	Switch 11	Switch 12
NA	Daylight Sensor Disabled	OFF	OFF	OFF
20%	50 FC	OFF	OFF	ON
20%	25FC	OFF	ON	OFF
20%	15FC	OFF	ON	ON
20%	10FC	ON	OFF	OFF
20%	05FC	ON	OFF	ON
33%	03FC	ON	ON	OFF
50%	01FC	ON	ON	ON

### When Set to "Up Looking" Daylight Sensor

Dead Band	Set Point Levels	Switch 10	Switch 11	Switch 12
NA	Daylight Sensor Disabled	OFF	OFF	OFF
20%	500 FC	OFF	OFF	ON
20%	250FC	OFF	ON	OFF
20%	150FC	OFF	ON	ON
20%	100FC	ON	OFF	OFF
20%	050FC	ON	OFF	ON
20%	030FC	ON	ON	OFF
30%	010FC	ON	ON	ON

The Dimming WASP will provide a sequence of operation based on the switch settings as indicated in the text below.

**IMPORTANT:** The Daylight Sensor Set Point Level must be set to one of the available choices in order to prevent the lights from turning on during daylight hours.

**High/Low Sequence of Operation**

When the ambient light level drops below the Daylight Sensor Set Point Level (set by switches 10, 11 & 12), the lights will turn ON and dim up to the Unoccupied Dimming Level (set by switches 7 & 8). When motion is detected, the lights will dim up to the Occupied Dimming Level. After the sensor has not detected motion for a selected period of time (set by switches 3 & 4), the lights will dim down and remain at the Unoccupied Dimming Level (set by switches 7 & 8). When the ambient light level rises above the Daylight Sensor Set Point, the lights will turn off.

**High/Low/Off Sequence of Operation**

Regardless of the ambient light level, with the Full Off Timer Delay (switch 5) set to ON, the lights will not turn on until motion is detected. When motion is detected, the lights will dim up to the Occupied Dimming Level. After the sensor has not detected motion for a selected period of time (set by switches 3 & 4), the lights will dim down to the Unoccupied Dimming Level (set by switches 7 & 8). If no motion is detected for an additional 60 minutes, the lights will turn off.

**WIRING DIAGRAMS**

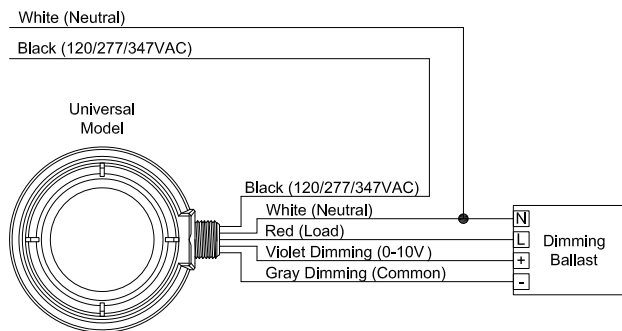


Fig. 3 - Wiring Diagram A – 120/277/347VAC Line Voltage Wiring Diagram

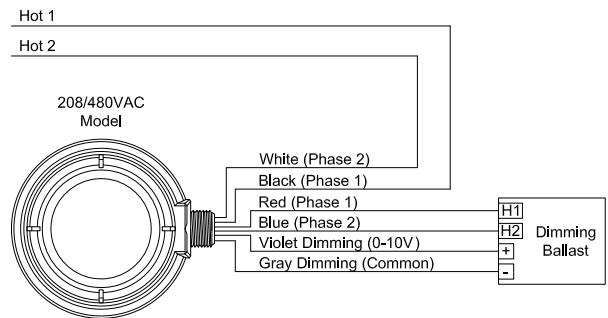


Fig. 4 - Wiring Diagram B – 208/240VAC & 480VAC Line Voltage Wiring Diagram

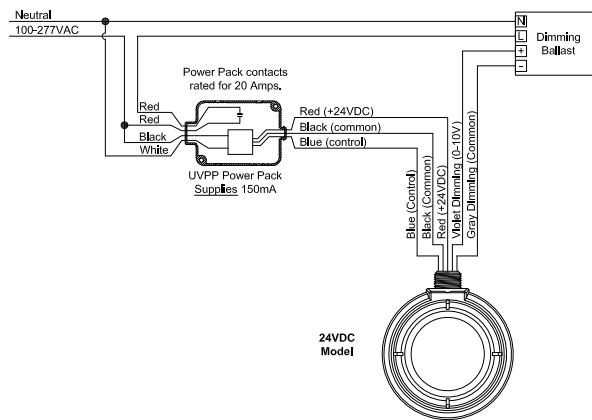


Fig. 5 - Wiring Diagram C – Low Voltage Sensor Wiring Diagram

**SENSOR LENS COVERAGE AND DETECTION PATTERNS (When Mounted at 8ft)**

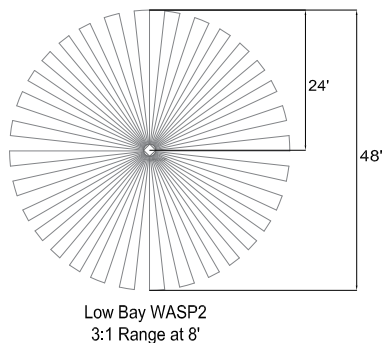


Fig. 6 – Top View of Lens Coverage Pattern at 8 ft

**SENSOR LENS COVERAGE AND DETECTION PATTERNS (When Mounted at 30ft and 45ft with High Mount Lenses)**

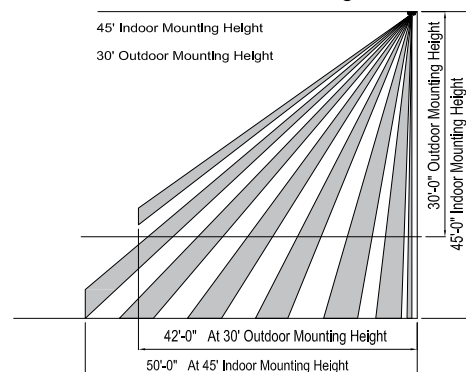


Fig. 7 – Side View of Lens Coverage Pattern at 30ft and 45 ft