



SENSORWORX®

LINE VOLTAGE CEILING MOUNT SENSORS

INSTALLATION & OPERATION INSTRUCTIONS

MODEL #	PIR	ACOUSTIC	PHOTOCELL	LENS TYPE
SWX-201-2	•			SMALL MOTION
SWX-211-2	•		•	SMALL MOTION
SWX-221-2	•	•		SMALL MOTION
SWX-231-2	•	•	•	SMALL MOTION
SWX-202-2	•			LARGE MOTION
SWX-212-2	•		•	LARGE MOTION
SWX-222-2	•	•		LARGE MOTION
SWX-232-2	•	•	•	LARGE MOTION

*Additional options include: HE: Humid Environment

OVERVIEW

SENSORWORX line voltage sensors detect movement in the infrared energy that radiates from occupants as they move within the devices field-of-view. Once occupancy is identified the sensor's internal relay switches power on to the connected lighting. If equipped with passive dual technology (PIR/Acoustic), the unit's microphone is then also enabled to further enhance detection while the lights are on. This overlapping passive acoustic occupancy detection is important for rooms with obstructions or where occupant motion will be limited. An internal timer is set to keep lights on during brief periods of inactivity, and is reset every time occupancy is signaled by either the passive infrared or acoustic detection technologies. Additionally, units equipped with ambient daylight detection (photocells) are capable of overriding lights off during periods of occupancy.

FEATURES

- **Digital Passive Infrared (PIR) Detection**
- **Passive Acoustic Detection (Optional)**
- **360° Coverage Pattern**
- **Compact Size and Matte Finish**
- **Convenient Test Mode and Adjustable Time Delays**
- **Ambient Daylight Detection (Optional)**

SENSOR PLACEMENT

Typically, a sensor should be located such that all entrances to the room/space are adequately covered. Ideally, a sensor should be located so that its coverage beams are perpendicular to the door. This ensure that an occupant is detected immediately upon entering. See Diagram 1. Note, however, it is important to locate a sensor such that its coverage pattern can not extend through an open door, which could result in detection of persons walking by, but not into, a room.

If line of sight between a sensor and occupants is blocked (for example by a cubicle wall or stall), dual technology sensors should be alternatively utilized or additional PIR sensors should be added until line of sight is restored. Dual technology is recommended for all spaces where occupants are sitting or where motion within the space is limited (private offices, open offices, restrooms with stalls, libraries). Dual technology is not recommended for hallways or warehouses.

SPECIFICATIONS

ELECTRICAL

OPERATING VOLTAGE
MVOLT (120-277 VAC)

LOAD RATINGS
800W @ 120 VAC
1200W @ 277 VAC

LOAD TYPES
Tungsten
Ballast
LED

PHYSICAL

SIZE
4.00" Diameter x 1.25" H
(10.16 x 3.17 cm)

WEIGHT
4.75 oz

COLOR
White

ENVIRONMENTAL

OPERATING TEMP
-10°F to 122°F (14°C to 50°C)

RELATIVE HUMIDITY
0-95% Non-Condensing,
Indoor Use Only

OPERATION

TIME DELAYS
30 sec to 30 min
10 Minute Default

TEST MODE
5 sec

CODE COMPLIANCE

Sensors can be used to meet ASHRAE 90.1, IECC, & Title 24 energy code requirements

OTHER

LISTINGS
UL/CUL

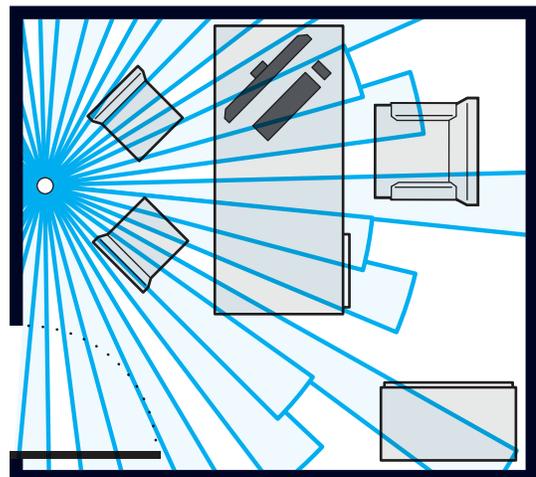


Diagram 1 - Recommended Sensor Placement in a Private Office

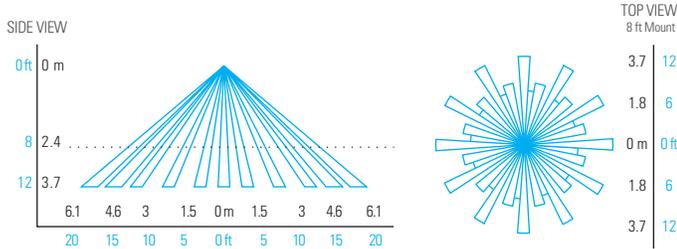
COVERAGE

PASSIVE INFRARED (PIR)

- 8 to 15 ft (2.44 to 4.57 m) mounting height recommended
- Detection range improves when walking across beams as compared to into beams
- Lenses can be swapped in field if necessary, contact technical support for assistance

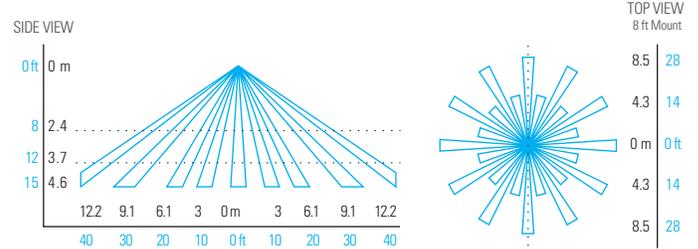
SMALL MOTION 360°

- Best choice for detection of small motions from sitting occupants (e.g., hand motion)
- ~500 ft² of coverage



LARGE MOTION 360°

- Best choice for detection of larger motion (e.g., walking)
- ~2000 ft² of coverage
- Longest segment of coverage pattern aligns with screw hole axis on sensor (shown as dotted line on Top View diagram below)



DUAL TECHNOLOGY (PIR/ACOUSTIC)

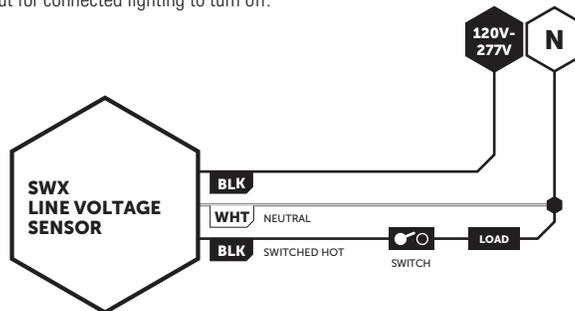
- Units with dual technology (SWX-221-2 and SWX-222-2) have overlapping acoustic detection of the complete PIR coverage area
- A PIR event is required to initially enable Acoustic detection
- Sounds indicating occupancy reset the sensor's time delay while non-occupant noises are filtered out
- Occupant sounds alone will not keep lights on indefinitely, PIR motion must be periodically detected for lights to remain on for an extended time
- After sensor time out expires, acoustic detection remains enabled for 10 seconds to enable voice reactivation of lights for additional convenience and safety

PHOTOCELL OPERATION

Sensors with an integrated photocell will turn lights on/off depending on the amount of ambient light detected. This operation makes them ideal for lighting near skylights or windows.

WIRING

- Sensors can be wired in parallel, although the total switching load remains the same.
- When wired in parallel, both sensors must time out for connected lighting to turn off.



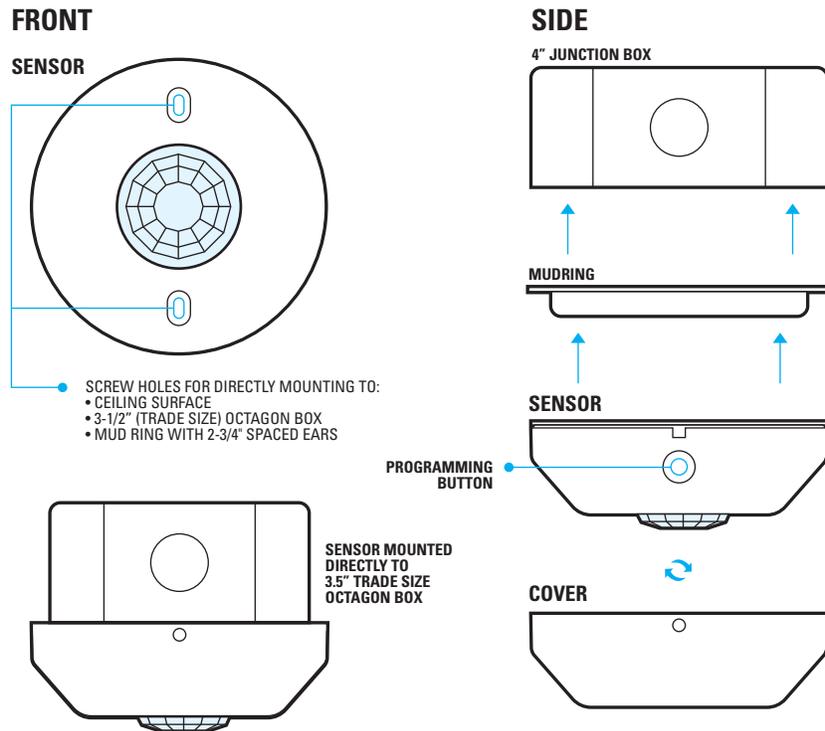
WARNING: TURN POWER OFF AT THE CIRCUIT BREAKER BEFORE WIRING

INSTALLATION NOTES

For supply connections, use wires rated for at least 75°C or equivalent.

INSTALLATION INSTRUCTIONS

- Designed to mount to a mud ring w/ 2.75" spaced ears, screws provided
- Also fits a 3.5" trade size octagon box
- Use model #SWX-299 trim ring to mount sensor directly to a 4.0" octagon box, handy box, or to a single gang mudring.



TESTING & TROUBLESHOOTING

TEST MODE

A test mode with a 5 second time delay is provided in order to efficiently perform walk testing. The sensor will blink White on any detected occupancy (PIR or Acoustic), although its time delay will only be reset by a PIR event. Note that while in test mode all LED activity related to ambient light override (photocell) functionality is overridden.

TO PUT A SENSOR IN TEST MODE FOR 10 MINUTES:

- Press sensor's pushbutton 2 times, then wait two seconds
- Press button 1 time to start test mode. After 10 minutes, the sensor's time delay will revert to previous setting

AMBIENT LIGHT OVERRIDE

Do not mount sensor such that it is directly viewing into the lights it is controlling. This will cause the measured level of controlled/artificial light to be extremely high, thus preventing the sensor from ever turning lights off from ambient light.

RESET

To restore factory settings, press and release the pushbutton 8 times, wait 2 seconds, then press and release the pushbutton 3 times again.

CONFIGURATION SETTINGS

TIME DELAY CONFIGURATION

1. Read through the Time Delay Settings list and note the number of the desired time delay setting (e.g., default is 4 = 10 minutes)
2. Press and release the unit's pushbutton twice, then wait 2 seconds. The White LED will blink back the number of the current setting
3. At any time after blink back starts, enter number of new setting (from Time Delay Settings table on right)
4. New setting is saved after White LED blinks new number back 3 times. If Blue LED double flashes at any time, start process over

OPERATION MODE CONFIGURATION

To disable the operation of the photocell (in equipped units), use the following procedure:

1. Press and release the unit's pushbutton 3 times, then wait 2 seconds. The White LED will blink back the number of the current setting.
3. At any time after blink back starts, enter number of new setting from table on right (e.g., 2 for OCCUPANCY - ON/OFF) from OPERATIONAL MODES table.
4. New setting is saved after White LED blinks back new number 3 times. If Blue LED double flashes at any time, an error condition exists and process must be repeated.

MICROPHONE

Dual technology sensors prevent non-occupant sounds from resetting the time delay by dynamically reducing the microphones sensitivity at specific frequencies. In some environments, decreasing the sensitivity across all frequencies so that lights go off sooner, may be preferred. A unit's microphone can also be disabled (effectively changing sensor to a PIR only version).

TO CHANGE MICROPHONE SETTINGS:

1. Press unit's pushbutton 6 times, then wait two seconds. The White LED will blink back the number of current setting (from table on right).
2. At any time after blink back starts, enter number of new setting by pressing the button equal times to choice from table.
3. New setting will be saved after White LED blinks back new number 3 times. If Blue LED double flashes at any time, start process over.

LED INDICATION

By default, the sensor blinks its White LED whenever it detects PIR motion. A unit with dual technology will also blink the LED white when it acoustically detects occupancy. The intensity of this LED can be increased or disabled. Additionally, the LED can be enabled to blink white for only PIR events and blue for an acoustic event.

TO CHANGE LED INDICATION SETTINGS:

1. Press unit's pushbutton 7 times, then wait two seconds. The White LED will blink back the number of current setting (from table on right).
2. At any time after blink back starts, enter new setting by pressing the button equal times to numbered choices.
3. New setting will be saved after White LED blinks back new number 3 times. If Blue LED double flashes at any time, start process over.

FUNCTION #2 - TIME DELAY SETTINGS

SETTING #	DESCRIPTION
1	Test Mode**
2	30 sec
3	5 min
4	10 min [Default]
5	15 min
6	20 min
7	30 min

** 5 SEC TIME DELAY, EXPIRES AFTER 10 MIN

FUNCTION #3 - OPERATIONAL MODES

SETTING #	DESCRIPTION	MODEL # NOTES
2	Occupancy - On/Off	Default for SWX-20x-2 & SWX-22x-2
3	Occupancy + Ambient Light Override (Photocell)	Default for SWX-21x-2 & SWX-23x-2

FUNCTION #6 - MICROPHONE

SETTING #	DESCRIPTION
2	Normal Operation [Default]
3	Reduced Sensitivity
4	Disabled

SETTING #	DESCRIPTION
2	White LED for all occupancy, normal brightness [Default]
3	White LED for all occupancy, increased brightness
4	Disable LED
5	White LED for PIR, Blue for Acoustic, normal brightness
6	White LED for PIR, Blue for Acoustic, increased brightness

CONFIGURATION SETTINGS CONT.

AMBIENT LIGHT OVERRIDE (PHOTOCELL) OPERATION

During periods of occupancy, sensors with an integrated photocell (models SWX-21x-2, SWX-23x-2) will turn lights on/off depending on the amount of ambient light detected. This operation makes them ideal for lighting in daylight zones (i.e. near windows). Lights will turn off when the measured light level is high enough for 5 min. such that turning the lights off will not drop the level below the selected setpoint. During this 5 min. transition

time the LED will blink blue at 0.5 second intervals. After lights are turned off, the sensor's LED double blinks blue every 15 seconds as an indication that sufficient ambient light is the reason the lights are being held off. If the ambient light level falls below the setpoint for more than 30 seconds, lights will switch back on. During this transition time the LED also will blink blue at 0.5 second intervals.

PHOTOCELL SETPOINT

The minimum overall light level that is to be maintained in a space by the sensor is referred to as the "setpoint". This value is user selectable or can be chosen by the Auto-Setpoint function that is built into the sensor.

SETPOINT CONFIGURATION

1. Read through the below setpoint values list and note the number of the desired setpoint (e.g., default is 7 = 25 fc).
2. Press and release the unit's pushbutton 4 times, then wait 2 seconds. The White LED will blink back the number of the current setting.*
3. At any time after blinking starts, enter number of new setting (from Setpoint Value Table).
4. New setting is saved after White LED blinks new setting back 3 times. If Blue LED double flashes at any time, an error condition exists and process must be repeated.

FUNCTION #4 - SETPOINT VALUE TABLE

SETTING #	DESCRIPTION
2	Run Auto-Setpoint*
3	2.5 fc
4	5.0 fc
5	10.0 fc
6	15.0 fc
7	25 fc (default)
8	35 fc
9	50 fc

Manual Setpoint Options

*If Auto-Setpoint has been previously run, the value will be blinked back in two alternating digits:
Blue LED = 10's digit (1-9 blinks or rapid blink or 0)
White LED = 1's digit (1-9 blinks or rapid blink or 0)

*AUTO-SETPOINT SELECTION DETAILS

- A** Once setting 2 "Run Auto-Setpoint" has been selected (by following above steps 1-4), the sensor's LED will alternate blue and white for 30 seconds. During this time user should move away from sensor.
- B** Lights will then be cycled in order for sensor to calculate the controlled (artificial) light level. This is done by subtracting the light level with the lights off (relay open) from the light level with the lights on (relay closed).
- C** A setpoint will then be chosen using the following conditions:
 - If controlled level is less than 3 fc, the application is considered open loop and the setpoint will be set to 50% of the measured level with the relay closed (plus a margin to prevent cycling). Setting will be between 0.5 fc and 44 fc.
 - If controlled level is between 3 and 50 fc, setpoint will be set to that level times 1.25.
 - If controlled level is greater than 50 fc the setpoint will be set to 50 fc.
- D** Unit will immediately start operating with new setpoint (i.e. blue LED may begin flashing indicating it will transition lights soon)
- E** To check auto selected setpoint, press and release button 4 times. Setpoint will be blinked back in two alternating digits:
Blue LED = 10's digit (1-9 blinks or rapid blink or 0)
White LED = 1's digit (1-9 blinks or rapid blink or 0)

