CX-100

PIR Occupancy Sensor

SPECIFICATIONS

Voltage	24VDC
Current Consumption	19mA*
Power Supply	WattStopper Power Pack
Isolated Relay Rating	1A@24VDC
Time Adjustment	15 seconds—30 minutes
Sensitivity Adjustment	Minimum—Maximum
Light Level Adjustment	3—200FC

*Current consumption can be slightly higher when only one sensor per power pack is used.

Watt Stopper®

Santa Clara, CA 95050

UNIT DESCRIPTION

The CX-100 is a 24VDC passive infrared (PIR) occupancy sensor which controls lighting and HVAC systems based on occupancy and has a light level feature that can be used to keep sections of lights from turning on if the ambient light level is sufficient. The CX-100 contains an isolated relay with Normally Open and Normally Closed outputs for interfacing with HVAC or EMS.

PIR sensing systems are passive systems which react to changes in infrared energy (moving body heat) within the coverage area. PIR sensors must directly "see" motion of an occupant to detect them, so careful consideration must be given to sensor placement.

COVERAGE PATTERNS

Coverages shown are maximum and represent coverage for walking motion. Actual coverage will vary slightly depending on mounting height and furnishings.

Masking the lens: Opaque adhesive tape is supplied so that sections of the sensor's lens can be masked. This restricts the sensor's view and allows you to eliminate coverage in unwanted areas.
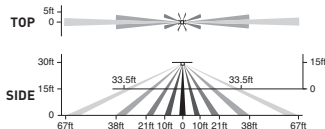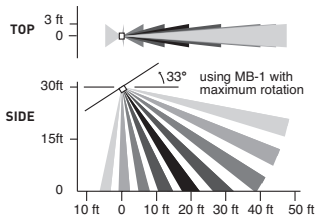
Dense Wide Angle Lens (Standard)
up to 2000 sq ft for walking motion
up to 1000 sq ft for desktop motion
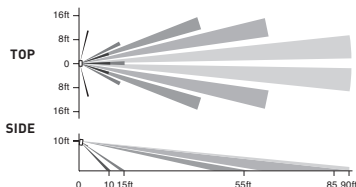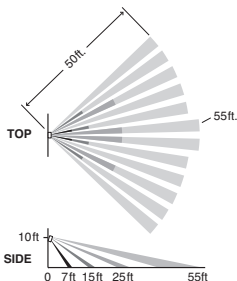
Long Range Lens (-1)
up to 90 linear ft for walking motion

Two-Sided Aisleway Lens (-3)
up to 134 linear ft for walking motion

One-Sided Aisleway Lens (-4)
up to 50 linear ft for walking motion

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INSTALLATION

The CX-100 sensors can be mounted to walls or ceilings with the supplied swivel bracket, and the supplied junction box cover plate if necessary (see figure C).

Mounting at fixture height is most effective. The -3 & -4 sensors can also be mounted to industrial fixtures by using the MB-1 industrial mount bracket.


fig. A

Mounting

Ceiling: It is best to leave approximately six inches between the sensor and the wall so that the Tightening Screw can be easily accessed. Orient the Base Bracket's Half-Circle Notch in the direction that the sensor will point.
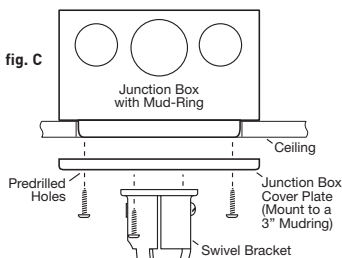**Wall:** Orient the Base Bracket's Half-Circle Notch, up.

Procedures:

1. Mount the Base Bracket to the mounting surface with screws.
2. At the center of the Base Bracket, drill a hole in the ceiling or wall (unless mounting to a junction box) large enough to thread the sensor's wires through.
3. Guide the sensor's wires into the Base Bracket and through the hole in the ceiling or wall.
4. Connect the sensor to the Base Bracket by angling the Post Bracket so that it is in line with the half circle notch, as illustrated in figure A. Push the ball into the Base Bracket opening until it snaps into place, being careful not to pinch the wires. The brackets can be easily connected or disconnected using this orientation.

fig. B
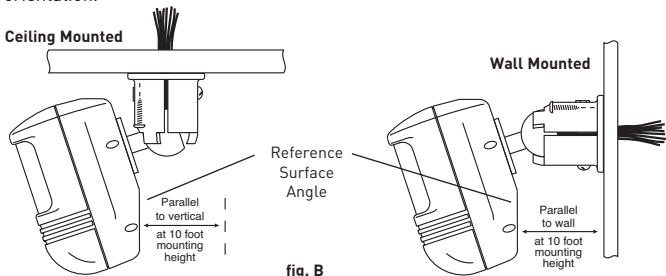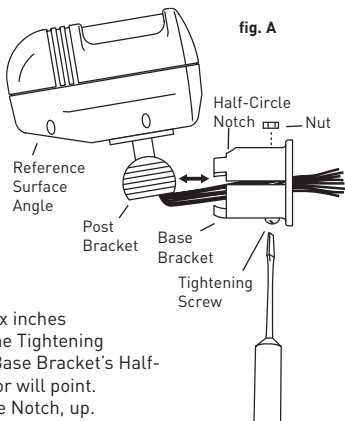
5. Insert the Tightening Screw and Nut into the Base Bracket as illustrated.

6. Use the Reference Surface Angle to adjust the sensor for optimum coverage. When mounted at ten feet, the Reference Surface Angle should be parallel to the wall or the vertical (see figure B). (As the mounting height decreases, the sensor will be tilted up slightly; as the mounting height increases, the sensor will be tilted down slightly).

7. Tighten the Tightening Screw.

Junction Box Cover Plate Installation

fig. C

Junction Box with Mud-Ring

Ceiling

Predrilled Holes

Junction Box Cover Plate (Mount to a 3" Mudring)

Swivel Bracket

Industrial Mount Bracket MB-1

In an industrial setting, the MB-1 can be used to mount the CX-100-3 or CX-100-4 to a variety of structures or fixtures, including fluorescent fixtures.

The MB-1 features an L-shaped bracket and sensor housing. The housing can be positioned so that the sensor's view is straight down (CX-100-3), or directioned down an aisle (CX-100-4).

When mounting the CX-100-4 with the MB-1 bracket fully rotated, the coverage pattern will extend slightly behind the sensor's mounting position (see, Coverage Patterns). The chart at right can help to position the MB-1 for the coverage desired.

MB-1

CX-100-4
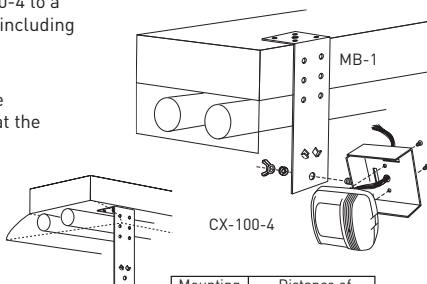
Mounting height	Distance of coverage behind
12'	2.5'
18'	4'
24'	5'
30'	6.5'

Sensor Angle Adjustment

While watching the PIR sensing indicator (red LED) for flashes, have a person walk back and forth at the far end of the space. Increase or decrease mounting angle as needed until the desired coverage is achieved.

Tighten the Tightening Screw to hold this position.

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WIRING DIRECTIONS

Each WattStopper BZ series power pack can supply power for up to 6 CX-100 sensors.

When using more sensors than this, multiple power packs are required.

REFER TO THE WIRING DIAGRAMS ON THE NEXT PAGE FOR THE FOLLOWING PROCEDURES:

FIRST–connect the **low voltage**:

- RED wire (+24VDC) from power pack to VIOLET wire on sensor.
- BLACK wire (Return) from power pack to GREEN wire on sensor.

Wiring a **SINGLE LIGHTING LOAD CONTROLLED BY OCCUPANCY ONLY**– connect:

- BLUE wire from power pack to YELLOW wire on sensor.

Wiring a **SINGLE LIGHTING LOAD CONTROLLED BY OCCUPANCY, DEPENDENT ON LIGHT LEVEL (AMBIENT LIGHT)**– connect:

- BLUE wire from power pack to BLUE wire on sensor.

Wiring **ONE LIGHTING LOAD FOR OCCUPANCY CONTROL, AND A SECOND LOAD FOR OCCUPANCY AND LIGHT LEVEL (AMBIENT LIGHT) CONTROL**–connect:

- BLUE wire from power pack to YELLOW wire on sensor.
- BLUE wire from slave pack to BLUE wire on sensor.
- BLACK wire from slave pack to GRAY wire on sensor.

Wiring the **ISOLATED RELAY**: (The Isolated Relay is rated for 1A @24VDC)
Connect the wires necessary to the application that requires this output.

- RED (Common) (must be used for proper operation)
- BROWN (Normally Closed)–Open when occupancy is detected
- ORANGE (Normally Open)–Closed when occupancy is detected

Occupancy and Light Level Controlled Lighting
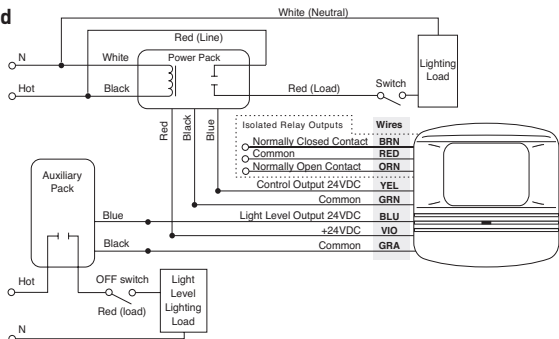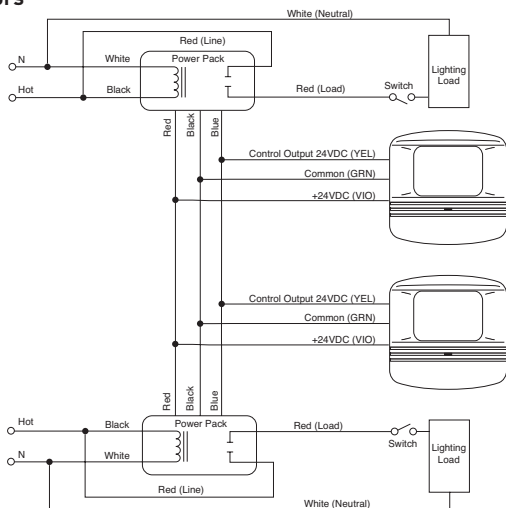

Multiple Sensors and Lighting

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SENSOR ADJUSTMENT

THE SENSORS ARE FACTORY PRESET* TO ALLOW FOR QUICK INSTALLATION IN MOST APPLICATIONS. However, verification of proper wiring or coverage, or customizing of the sensor's settings can be done through the following steps.

Before starting, make sure the office furniture is installed, lighting circuits are turned on, and the HVAC systems are in the overridden/on position. VAV systems should be set to their highest airflow.

There is a warm-up period when power is first applied to the sensor for one to two minutes.

1. For testing, set the Time Delay to minimum, 15 seconds. See chart below for DIP switch configurations.

2. Ensure that the Sensitivity and Light Level trimpots are set to maximum, fully clockwise.

3. Remain still. The lights should turn off after approximately 15 seconds (If not, see Troubleshooting).

4. Set the desired Time Delay.

5. Readjust the angle of the sensor if necessary.

Time Delay:

• The Time Delay is set with DIP Switches 1 thru 4.

Light Level feature:

• The Light Level feature holds lights off upon initial entry into the space if adequate ambient light exists. It will not turn the lights off if they are on.

• Adjust the Light Level during daylight hours when ambient light in the area is adequate.

• Avoid mounting the sensor too close to lighting fixtures.

1. Set the Time Delay to minimum, 15 seconds.

2. Set the Light Level trimpot to minimum, fully counterclockwise.

3. Be still and allow the lights to turn off.

4. Move a hand in front of sensor every 10 seconds (to keep sensor activated), and without blocking any light from reaching the sensor, in small increments, turn Light Level adjustment toward maximum, waiting at least 5 seconds between increments, until the lights turn on. Then turn it back slightly. At this setting the lights will not turn on with occupancy if the ambient light is above the current level.

5. Set the desired Time Delay.

6. Readjust the angle of the sensor if necessary.

* Time Delay=18 minutes / Sensitivity & Light Level settings=Maximum.

LED

Sensitivity Adjustment

Light Level Adjustment

on
1 2 3 4 5
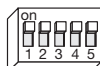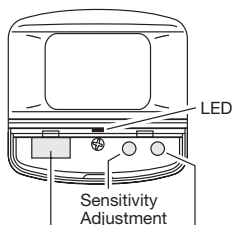
Time Delay DIP Switch

Time Delays	DIP Switch #				
	1	2	3	4	5
15 seconds	●	●	●	●	–
2 minutes	–	●	●	●	–
4 minutes	●	–	●	●	–
6 minutes	–	–	●	●	–
8 minutes	●	●	–	●	–
10 minutes	–	●	–	●	–
12 minutes	●	–	–	●	–
14 minutes	–	–	–	●	–
16 minutes	●	●	●	–	–
▸ 18 minutes	–	●	●	–	–
20 minutes	●	–	●	–	–
22 minutes	–	–	●	–	–
24 minutes	●	●	–	–	–
26 minutes	–	●	–	–	–
28 minutes	●	–	–	–	–
30 minutes	–	–	–	–	–
Override	–	–	–	–	●

● = on   – = off

▸ = factory preset

TROUBLESHOOTING

CAUTION

**Turn power off at the circuit breaker
before working with or near high voltage.**

Lights do not turn on with occupancy, and the following condition exists:

- **LED does NOT flash:**

  When power is initially applied to the sensor, there is a warm-up period of up to 60 seconds before the LED is active.

  1. Check that the circuit breaker has been turned back on.
  2. Check the Sensitivity settings. Increase (clockwise) as needed.
  3. Check all sensor and power pack wire connections.
  4. Check for 24VDC at sensor (violet and green or gray wires).
     - If 24VDC is present, replace the sensor.
     - If 24VDC is not present, check that high voltage is present to power pack. If it is, replace power pack.

- **LED does flash:**

  1. The Light Level setting or the Sensitivity may be set too low.
  2. If the sensor's Light Level feature has been utilized, the lights connected to the Light Level Output might be held off because of the level of ambient light in the controlled area.
     - To test whether the Light Level adjustment is the problem, cover the PIR lens with your hand for 5 seconds to see if the lights turn on, or turn the Light Level adjustment toward maximum (clockwise). If the lights turn on, the Light Level setting was keeping the lights off.
       - Increase the Light Level setting slightly or follow the procedures under "Sensor Adjustment" to adjust the Light Level setting.
     - The Sensitivity adjustment should be set to maximum, unless a decrease is made due to an "Unwanted Sensor Activations" adjustment.
  3. Check all sensor and power pack wire connections.
  4. Check for 24VDC at the power pack's blue wire connection to sensor while someone moves in front of sensor to activate the LED. If there is no voltage, replace the sensor. If there is voltage, replace the power pack.

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Lights do not turn off automatically:

1. The sensor may be experiencing activations from outside the controlled area or from some type of interference (see "Unwanted Sensor Activations" next page).
2. Check all sensor and power pack wire connections.
3. Disconnect power pack's blue wire:
   If the lights do not turn off, replace power pack. Reconnect blue wire.
   If the lights turn off, the problem may be in the sensor–to check:
   - Reconnect the blue wire.
   - Turn sensitivity and time delay to minimum and allow the sensor to time out. If the lights turn off, the sensor is working properly (see number 1., above, and "Sensor Adjustment" for readjustment of sensor).

Unwanted Sensor Activations (LED flashes):

- **Possible causes**
  1. Improper sensor location or angle adjustment causing detection outside of desired coverage area.
  2. Sensitivity set too high.
  3. Sensor located too close to HVAC or VAV vents with heavy air flow.
- **Possible solutions**
  1. Mask the lens to reduce PIR coverage (see "Masking the lens", under "Coverage Patterns").
  2. Reduce the sensitivity (counterclockwise) as needed (see "Sensor Adjustment").
  3. Adjust the sensor angle (see "Sensor Adjustment").
  4. Relocate the sensor.

Override:

To override all sensor functions, set DIP switch #5 to on.

This bypasses the occupancy and light level control functions of the sensor, but still allows the lights to be manually controlled with a light switch.

ORDERING INFORMATION

CX-100	Occupancy Sensor, Dense Wide Angle Lens (Std)
CX-100-1	Occupancy Sensor, Long Range Lens
CX-100-3	Occupancy Sensor, Two-Sided Aisleway Lens
CX-100-4	Occupancy Sensor, One-Sided Aisleway Lens
MB-1	Industrial Mount Bracket
BZ-50	Power Pack: 120/277VAC, 50/60Hz, 24VDC, 225mA w/relay connected, 20A ballast/20A incandescent
BZ-150	Power Pack, Hold ON/OFF, Manual ON: 120/277VAC, 50/60Hz, 24VDC, 225mA w/relay connected, 20A ballast/20A incandescent

All sensors are white.

A Group brand **legrand**

WARRANTY INFORMATION

WattStopper warranties its products to be free of defects in materials and workmanship for a period of five (5) years. There are no obligations or liabilities on the part of WattStopper for consequential damages arising out of, or in connection with, the use or performance of this product or other indirect damages with respect to loss of property, revenue or profit, or cost of removal, installation or reinstallation.

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