

CB-100

Low Temperature • Indoor/Outdoor
Low Voltage PIR Occupancy Sensor



Specifications

Voltage	24VDC
Current Consumption	.20mA
Power Supply	Watt Stopper Power Pack
B series power packs supply power for up to 5 CB-100 sensors	
BZ series power packs supply power for up to 7 CB-100 sensors	
Isolated Relay Rating	1A@30VDC
Time Delay Adjustment	15 seconds, 5 minutes, 10 minutes
Sensitivity Adjustment	4 settings
Temperature Range	-40°F to 95°F



U.S. Patent: 4,787,722

Installation Instructions

UNIT DESCRIPTION

The CB-100 is a Passive Infrared (PIR) occupancy sensor which can operate at low temperatures to control indoor or outdoor lighting and/or HVAC systems by turning them on or off, based on occupancy in the coverage area. PIR sensing systems are passive systems that react to changes in infrared energy (heat) within their coverage areas. These sensors are specially engineered to be installed in cold and damp conditions and are suitable for outdoor use when used with a light level sensor.

The CB-100 is rated for temperatures as low as -40°F and damp conditions. The CB-100 provides a 24VDC Isolated Relay with contacts that are Normally Open (NO) or Normally Closed (NC), based on occupancy.

The CB-100 is a 24VDC sensor designed for use with Watt Stopper Power Packs.

PLACEMENT GUIDELINES

When deciding the placement of these sensors, the most important point to remember is that the sensor must be able to “see” the coverage area clearly. Any obstacles, such as walls, shelves, partitions, or trees, will block the sensor's view. Also remember, when placing these sensors, that they are more sensitive to motion across the field of view, than motion moving directly into or away from the sensor.

Do not place sensor within 15' of any high powered blowers or heaters, as this will cause the sensor to function improperly. These sensors should not be placed so that they are directly exposed to rain, ice, or direct sunlight.

Warehouse and Storage Areas

When using sensors in warehouses and storage areas that have long shelves and aisles there are two lens options: the Long Range Lens (CB-100-1) and the Aisleway Lens (CB-100-3). Depending on the building's construction and ceiling height, the sensor can be mounted on the wall or ceiling.

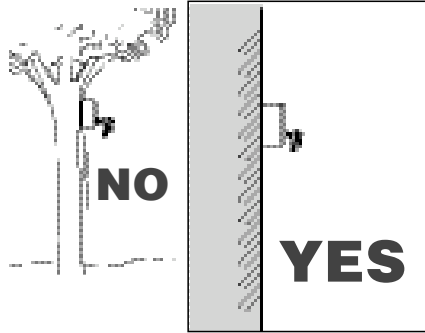
High Mounting Heights (over 15')

As the mounting height of the CB-100 (standard) and CB-100-1 sensor increases over 15', the maximum coverage distance will decrease. At 15', the coverage area is, in most cases, as described in the Coverage Patterns section. For every 2' increase in mounting height over 15', assume the coverage area will decrease 10-15%. The maximum mounting height for CB-100 (standard) and CB-100-1 sensors is 30'. Coverage at that height is half the area shown in the Coverage Patterns diagrams.

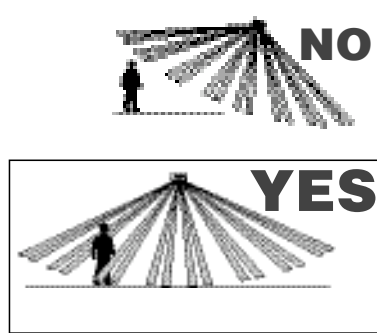
The CB-100-3 two-sided aisleway lens pattern is optimized at a ceiling mounting height of 30' as shown in the Coverage Patterns section.

Call 800.879.8585 or 972.578.1699 for Technical Support

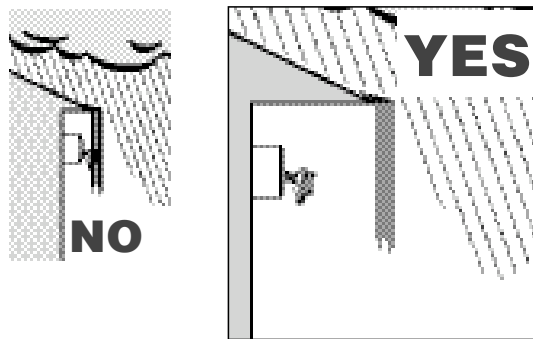
Mount to flat, stable, vibration-free surface



Mount motion sensor level



Avoid runoff; sheltered locations preferred

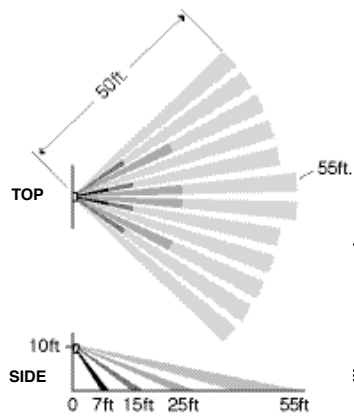


Do not mount by vents or above lamps

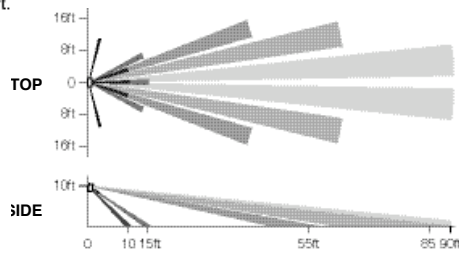


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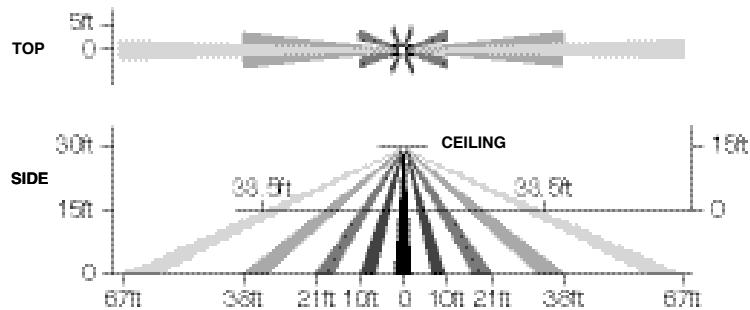
COVERAGE PATTERNS



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

Note: Actual coverage may vary, due to obstacles, barriers and variances in ambient temperature.

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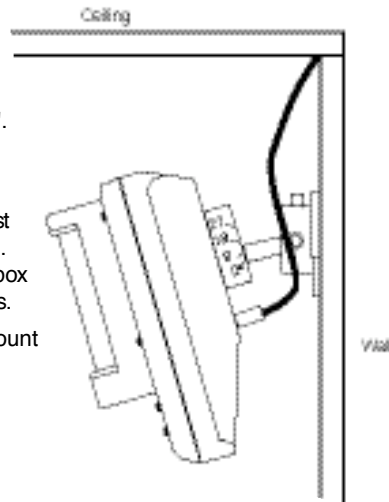
MOUNTING THE SENSOR

The CB-100 (standard) and CB-100-1 are designed to be mounted at a height of 10'-15'.

The sensors come with a swivel bracket already installed.

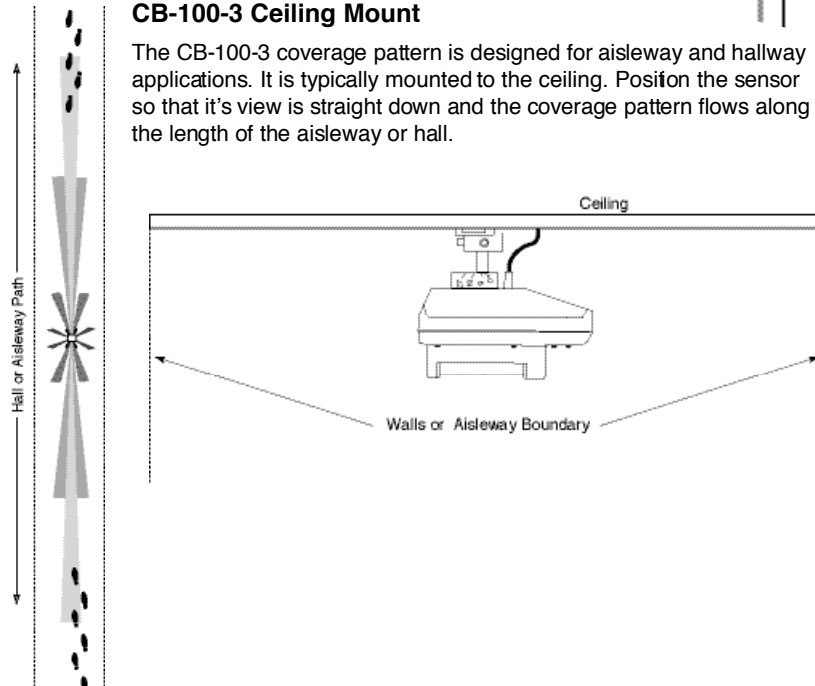
This swivel mount allows the installer to adjust the sensor as needed to get proper coverage. Firmly secure the swivel bracket to a wall or box and wire as described in the Wiring Directions.

Note: Do not tighten set screws on swivel mount bracket until sensor has been adjusted following the Adjustment Procedures.



CB-100-3 Ceiling Mount

The CB-100-3 coverage pattern is designed for aisleway and hallway applications. It is typically mounted to the ceiling. Position the sensor so that its view is straight down and the coverage pattern flows along the length of the aisleway or hall.



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WIRING DIRECTIONS

 **CAUTION** 
**TURN POWER OFF AT THE CIRCUIT BREAKER BEFORE
INSTALLING POWER PACKS OR SENSORS.**

Each Watt Stopper B series power pack can supply power for up to 5 CB-100 sensors. A Watt Stopper BZ power pack can supply power for up to 7 CB-100 sensors. When using more sensors than this, multiple power packs are required.

The CB-100 is designed to work with the The Watt Stopper Power Packs and Auxiliary Relay Packs. Please read the instructions that came with the Power Pack or Auxiliary Relay Pack before proceeding.

Isolated Relay Note:

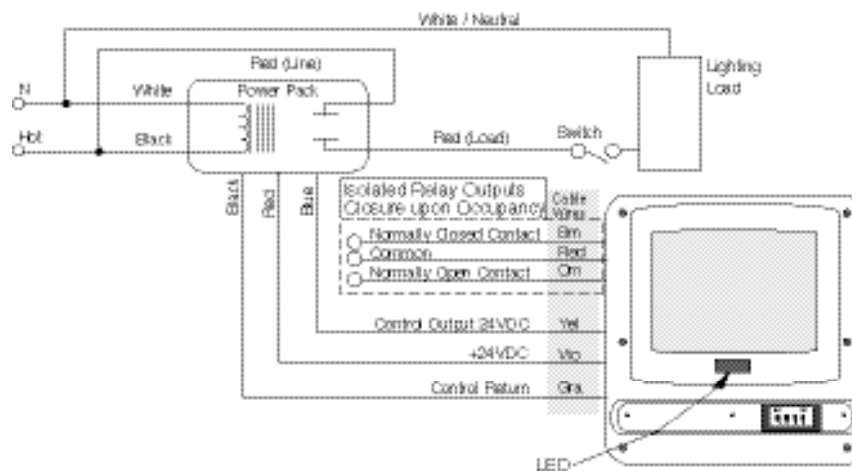
- The Normally Closed Contact is OPEN when occupancy is detected, and until the Time delay has timed out after occupancy is no longer detected.

Conversely,

- The Normally Open Contact is CLOSED when occupancy is detected, and until the Time delay has timed out after occupancy is no longer detected.

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WIRING DIAGRAM



Normal Installation

Connect the:

- BLUE wire from the Power Pack to YELLOW wire from the sensor.
- RED wire from the Power Pack to PURPLE wire from the sensor.
- BLACK wire from Power Pack to GRAY wire from the sensor.

Using the isolated relay in the unit, as well as the relay in the Power Pack

Wire as described for Normal Installation plus:

- For NORMALLY OPEN (NO) contacts – use the ORANGE and RED (Common) wires from the sensor.
- For NORMALLY CLOSED (NC) contacts – use the BROWN and RED (Common) wires from the sensor.

Using just the isolated relay in the unit and not the relay in the Power Pack

Follow the instruction above, except:

- DO NOT connect the BLUE wire from the Power Pack to the YELLOW wire from the sensor. Tape or cap the ends of the wires to prevent sparking.

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DIP SWITCHES

All sensor adjustments are made using the DIP switches located under the unit's front panel.

Sensitivity

There are four sensitivity adjustment settings. The CB-100 is shipped from the factory preset at maximum sensitivity.

Time Delay

The CB-100 uses a digital timer and comes with three time delay setting choices. The CB-100 is shipped from the factory preset at 10 minutes.

Note: For best operation, do not leave the time delay set at 15 seconds. The 15 second time delay is for testing purposes only.

Recommended Time Delay settings:

- General Outdoors5 minutes
- Small Garages5 minutes
- Large Garages10 minutes
- Small Cold Storage5 minutes
- Large Cold Storage10 minutes
- Large Cold Storage with Forklifts in use10 minutes

Sensitivity	1	2
Minimum	●	●
Med Low	●	-
Med High	-	●
Maximum	-	-

Time Delay	3	4
15 seconds	●	●
5 minutes	-	●
10 minutes	-	-

● = ON
- = OFF
◀ = Factory Setting

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 the adjustment process, make sure that furniture, shelving, signs, and anything that may obstruct the view of the sensor 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.

Refer to "DIP Switch Settings" for DIP switch location and Time Delay and Sensitivity settings.

There is a warm-up period when power is first applied to the sensor of up to one and a half minutes.

1. Set the time delay to minimum, 15 seconds.
2. Aim the sensor toward the desired coverage area. Use the alignment marks on the swivel mount to assure that the sensor is level and not tilted toward one side. Tighten the set screws just enough to prevent the sensor from moving.
3. Confirm that sensitivity is set at maximum.
4. Move out of the coverage area and wait for the lights to turn off (about 15-30 seconds)
 - If the lights do not turn off, verify that there is no one in the coverage area and try again.
 - If the lights still do not turn off, set the sensitivity to medium high and try again.
 - If the lights still do not turn off, refer to the troubleshooting section for more in depth procedures.
5. Walk around the desired coverage area to confirm that the sensor is aligned correctly. Watch the RED LED. The LED blinks when movement is detected. Move the sensor up or down, or from side to side until the desired coverage is achieved. Tighten the set screws.

Make sure that the sensor is not tilted right or left. Use the alignment lines on the swivel bracket to determine if the sensor is tilted.
6. Set the Time Delay.

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TROUBLESHOOTING



CAUTION



**TURN POWER OFF AT THE CIRCUIT BREAKER
BEFORE WORKING WITH OR NEAR HIGH VOLTAGE.**

LIGHTS WILL NOT TURN ON:

*LED does **not** flash with motion*

1. Check Sensitivity settings. Adjust up as needed (DIP switches #1 & 2).
2. Check that wire connections from sensor to power pack are correct and secure.
3. Check for +24VDC at the Red wire from the power pack to the sensor.
 - If 24VDC is present, call (800) 879-8585 for Technical Support.
 - If there is no voltage, see "Power Pack High Voltage Checklist" on the next page.

LED flashes with motion

1. Check that wire connections from sensor to power pack are correct and secure.
2. Try another sensor (if available).
3. See "Power Pack High Voltage Checklist" on the next page.

LIGHTS WILL NOT TURN OFF:

1. Check that Time Delay settings are correct (DIP switches #3 & 4).
2. Check Sensitivity settings. Decrease as needed (DIP switches #1 & 2).
3. Check that wire connections from sensor to power pack are correct and secure.
4. Disconnect Blue wire on power pack from Yellow on sensor.
 - If the lights turn off, the problem may be in the sensor.
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 correctly. See, "Unwanted Sensor Activations" on the next page, then go through the "Sensor Adjustment" process again.
- If the lights stay on, the problem may be in the power pack. See "Power Pack High Voltage Checklist" on the next page.

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ISOLATED RELAY NOT FUNCTIONING PROPERLY:

Use proper high voltage precautions, if applicable.

1. Check that Time Delay settings are correct (DIP switches #3 & 4).
2. Check Sensitivity setting. Also see, "Unwanted Sensor Activations", below.
3. Check that all wire connections from sensor are correct and secure.
4. Check that there is voltage to the Isolated Relay.
5. Check that +24VDC is at the Red wire from the power pack to the sensor.
6. **Use an ohmmeter to check the function of the Isolated Relay:**
 - Turn off the power connected to the Isolated Relay wires (if applicable).
 - With motion in front of the sensor's lens, check that the connection between the Brown and Red wires is open.
 - With motion in front of the sensor's lens, check that the connection between the Orange and Red wires is closed.
 - Turn Sensitivity and Time Delay to minimum, cover the sensor's lens with a cloth (not your hand), be still and allow the sensor to time-out.
 - Check that the connection between the Brown and Red wires is closed.
 - Check that the connection between the Orange and Red wires is open.

POWER PACK HIGH VOLTAGE CHECKLIST:

Use proper high voltage precautions.

1. Check that power pack high voltage wire connections are correct and secure.
2. Check that the power pack is rated at the correct voltage.
3. Check that there is high voltage going into the power pack.
4. Try another power pack (if available).

UNWANTED SENSOR ACTIVATIONS (LED FLASHES):

Possible causes

1. People moving or walking outside of the desired coverage area, but in view of the sensor and within it's range (see "Coverage Patterns" and "Sensor Placement").
2. HVAC vents with heavy air flow.

Possible solutions

1. Masking: place opaque tape over the edge of the lens to block sensitivity in certain directions.
2. Set the sensitivity lower.
3. Relocate the sensor.

Sensor Override:

If the sensor fails, connect the power pack's 24VDC blue and red wires together. This will bypass the sensor and allow the lights to work manually.

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ORDERING INFORMATION

Catalog #	Description
CB-100	Occupancy Sensor, Dense Wide Angle Lens (Std)
CB-100-1	Occupancy Sensor, Long Range Lens
CB-100-3	Occupancy Sensor, Aisleway Lens
BZ-100	Power Pack: 120/277VAC, 60Hz, 150mA, 20A ballast or incandescent, 1HP@120/240VAC
B120E-P	Power Pack: 120VAC, 60Hz, 150mA, 20A ballast/13A incandescent
B230E-P	Power Pack: 230VAC, 50/60Hz, 150mA 20A ballast/13A incandescent
B277E-P	Power Pack: 277VAC, 60Hz, 150mA, 20A ballast
B347D-P	Power Pack: 347VAC, 60Hz, 150mA. 15A ballast
S120/277/347E-P	Auxiliary Relay Pack: 120/277VAC, 60Hz, 20A Ballast 347VAC, 60Hz, 15A Ballast

Sensors are beige

WARRANTY INFORMATION

The Watt Stopper, Inc. warrants its products to be free of defects in materials and workmanship for a period of five years. There are no obligations or liabilities on the part of The Watt Stopper, Inc. 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.

The Watt Stopper®

Putting a Stop to Energy Waste®

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