

SENSOR ADJUSTMENT

The sensor comes factory preset and ready for operation. If testing of operation is desired:

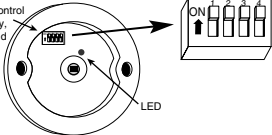
- Remove the sensor's cover (twist).
- Refer to the **DIP switch settings** chart below for switch configurations.
- Make sure that office furniture and fixtures are in place.

- Confirm the Override DIP switch is set to Normal (DIP switch #4 to OFF)
- Restore power and turn on the system interfacing with the Isolated Relay.
 - There is a **one minute warm-up** when power is initially restored to the sensor before the sensor works properly.
- Set **Time Delay** to minimum: DIP switches #1 and 2 to ON (30 seconds).
- Set **Sensitivity** to maximum: DIP switch #3 to ON.
- Replace the sensor's cover.
- Move away from sensor and be still. The sensor should time-out after 30 seconds and the isolated relay contacts should return to their "normal" condition (Normally Open or Closed), see Wiring Directions diagram.

Note: If the sensor does not time-out or the isolated relay does not return to its normal condition, move farther away or out of sight of the sensor, or see Unwanted Sensor Activations under Troubleshooting.
- Reset the **Time Delay** to the desired delay (DIP switches #1 and 2).

DIP SWITCH SETTINGS

DIP Switch Control for Time Delay, Sensitivity, and Override





LED

DIP Switch #	1	2	3	4
Time Delays				
30 seconds	●	●		
10 minutes	●	—		
20 minutes		●		
▶ 30 minutes	—	—		
Sensitivity				
Minimum				—
Maximum				●
Override				
▶ Normal				—
Override				●

●=ON —=OFF
▶=Factory Presets

TROUBLESHOOTING

**CAUTION**

USE PROPER SAFETY PRECAUTIONS WHEN WORKING WITH OR NEAR HIGH VOLTAGE

LED does not flash with motion:

- Determine if the lens is masked in the direction being tested (see Masking).
- Check that the Sensitivity setting is set to maximum (DIP switch #3 to ON).
- Check that the RED and BLACK wire connections from sensor are secure.
- Check that 12VDC is between the RED and BLACK wire from the sensor.
 - If it is present, the problem may be with the sensor. Try another sensor (if available).

Isolated relay not functioning properly:

- Check that Time Delay settings are correct (DIP switches #1 and 2).
- Check Sensitivity setting. Also see Unwanted Sensor Activations, below.
- Check that all wire connections from sensor are correct and secure.
- Using proper precautions, check that there is voltage to the isolated relay.
- Check that 12VDC is between the RED and BLACK wire from the sensor.
- 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 GREEN and ORANGE wires is open.
 - With motion in front of the sensor's lens, check that the connection between the YELLOW and ORANGE 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 GREEN and ORANGE wires is closed.
 - Check that the connection between the YELLOW and ORANGE wires is open.

Unwanted sensor activations (LED flashes):

Possible causes

- 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 Placement).
- HVAC vents with heavy air flow.

Possible solutions

- Masking (see Masking).
- Setting the Sensitivity to minimum if necessary (DIP switch #3).
- Relocating the sensor.

Sensor Override:
If the sensor fails, set DIP switch #4 to Override position (DIP Switch # 4 to ON). This overrides the sensor and sets the circuits to "on".

ORDERING INFORMATION

Catalog#	Description
CI-12	12VDC Occupancy Sensor with Extended Range Lens (Standard)
CI-12-1	12VDC Occupancy Sensor with High Density /Reduced Range Lens
CI-24	24VAC or 24VDC Occupancy Sensor with Extended Range Lens (Standard)
CI-24-1	24VAC or 24VDC Occupancy Sensor with High Density /Reduced Range Lens

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.



Santa Clara CA 95050 USA ☎ 1(800)879-8585 1(972)578-1699

86-0467-00r3 9/99

SPECIFICATIONS

Voltages. 12VDC, +2V/-0.5V
Current Consumption. @12VDC, 28mA Maximum
Isolated Relay Rating. 1A @24VDC or 24VAC
Time Adjustment. 30 seconds–30 minutes
Sensitivity Adjustment minimum/maximum



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U.S. Patents:
4,757,204
4,787,722
Des360,842

Installation Instructions

CI-12
360° PIR Occupancy Sensor



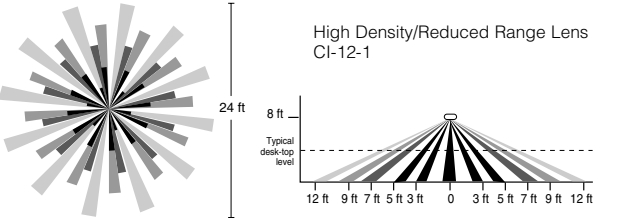
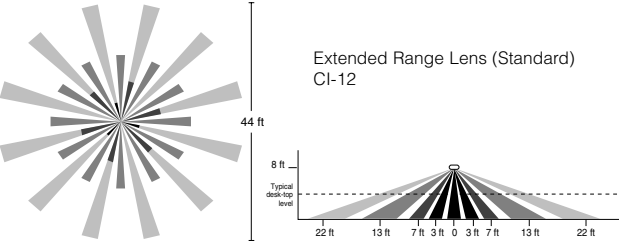
DESCRIPTION

The CI-12 is a 12VDC Passive Infrared (PIR) occupancy sensor which integrates with HVAC or EMS systems. The CI-12 provides isolated relay contacts that are Normally Open or Normally Closed, based on occupancy. 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

The CI-12 has a multi-cell, multi-tier Fresnel lens with a field of view of 360°. The sensor has two lens pattern options. The Extended Range Lens will cover up to 1200 sq ft and 22 feet from the sensor when mounted at 8 feet. The High Density/Reduced Range Lens will cover up to 500 sq ft and 12 feet from the sensor when mounted at 8 feet. Coverage shown in the diagrams below is maximum and represents coverage for half-step, walking motion, with no barriers or obstacles.

DRAWING NOT TO SCALE



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PLACEMENT

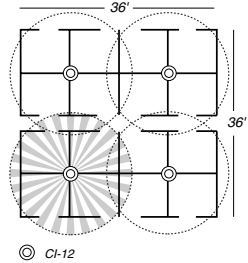
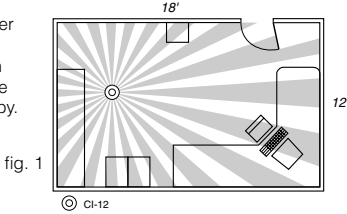
The effective coverage distances may be slightly less than the maximum sensing distance (see Coverage Patterns), depending upon obstacles such as furniture or partitions, and this must be considered when planning the number of sensors and their positioning. See the list below for approximate coverage distances for different types of motion.

Approximate coverage, for a mounting height of 8 feet:

Lens option	Walking motion	Workstation (hand motion)
Extended Range	up to 22 ft radius (1200 sq ft)	12 ft radius (500 sq ft)
High Density	up to 12 ft radius (500 sq ft)	9 ft radius (300 sq ft)

The CI-12 sensor can be mounted at various heights. When you will be mounting at heights other than 8 feet, be aware that as you decrease the mounting height, you will decrease the range and increase the sensitivity to smaller motions. Conversely, when you increase the height, you will increase the range and decrease the sensitivity to smaller motions. At heights of more than 12 -14 feet, you may start to significantly reduce sensitivity.

Often the best location to install a CI-12 in a **closed office** is off-center (see fig. 1). Avoid placing a sensor directly in line with an open door in which it has a clear view out, as the sensor may detect people walking by.



For **open office** areas with partitions it is best to place sensors over intersections of four workstations (see fig. 2).

Also avoid placing the sensors close to **air ducts**, as rapid air currents or the differences in temperatures may cause false activations. For large areas of coverage use multiple sensors.

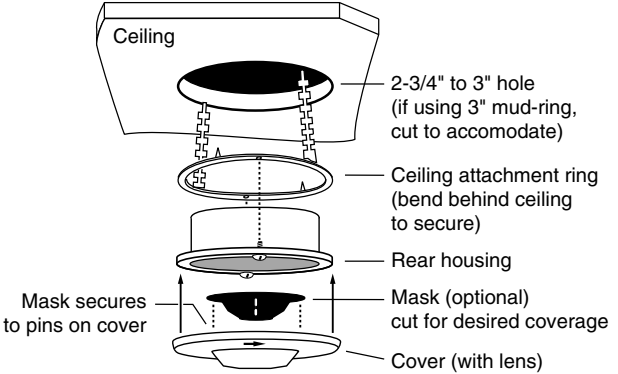
fig. 2

Call 1(800)879-8585 For Technical Support

INSTALLATION



TURN POWER OFF AT CIRCUIT BREAKER BEFORE INSTALLING SENSOR



A 4-S junction box can be used with a 3" mud-ring when local building codes mandate that low voltage connections be contained in a junction box. Otherwise a 3" mud-ring or the provided ceiling attachment ring can be used.

IMPORTANT: If the lens will be masked, the junction box or mud ring may need to be positioned so that the mask is oriented properly when the sensor is installed (see Masking).

Cut a hole in the ceiling tile—if using a:

- Ceiling attachment ring (provided)—cut about 2-3/4" to 3" in diameter.
- 3" mud ring—cut the hole to accommodate.

To assemble the sensor:

1. If using the ceiling attachment ring, bend the securing straps up so the sensor housing can be inserted, and attach it to the sensor with the provided screws.
2. Attach the mask, if using, into the lens recess and onto the securing pins of the cover.
3. Attach the cover to the rear housing—align tabs on inside of cover to notches on outside perimeter of rear housing, place cover on sensor, and twist clockwise to lock.
4. Insert the assembled sensor into the ceiling hole, and **if using the mask**, turn the sensor so that the unmasked part of the lens is toward and centered on the area to be covered.
5. Bend the ceiling attachment ring straps behind the hole to secure (or attach sensor to mud ring with screws).

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MASKING

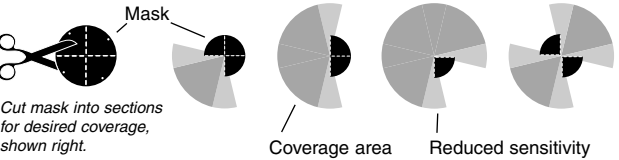
An insert (mask) is supplied to allow elimination of coverage in unwanted areas. The mask is cut as needed and mounted onto anchor pins in the sensor's cover.

IMPORTANT: Do not use the mask if full coverage is desired.

IMPORTANT: Before securing the sensor in the mounting location, the assembled **sensor must be turned so the unmasked portion of the lens faces the coverage area** (the blue masked area is visible through the lens).

IMPORTANT: For an already installed sensor—If the sensor can NOT be turned, then the mask must be cut so that when installed it will be oriented correctly (note the **location of the securing pins** in the cover and note that the **cover turns** as it locks into position).

Note: At the edges of the masking, there is a small area of **reduced sensitivity**, illustrated as the lighter area in the examples below.



WIRING DIRECTIONS



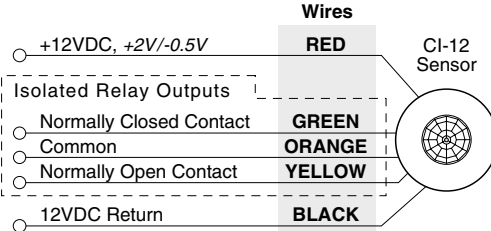
TURN POWER OFF AT CIRCUIT BREAKER BEFORE WIRING SENSOR

- Connect +12VDC Supply to the RED and Return to the BLACK wire from the sensor.

Isolated Relay: (Rated for 1A @24VDC or 24VAC)

Connect the wires necessary to the application that requires this output.

- GREEN (**Normally Closed**)—Open when occupancy is detected
- ORANGE (**Common**) (must be used for proper operation)
- YELLOW (**Normally Open**)—Closed when occupancy is detected



Call 1(800)879-8585 For Technical Support

The sensor comes factory preset and ready for operation.

If testing of operation is desired:

- Remove the sensor's cover (twist).
- Refer to the **DIP switch settings** chart below for switch configurations.
- Make sure that office furniture and fixtures are in place.

1. Confirm the Override DIP switch is set to Normal (DIP switch #4 to OFF).
2. Restore power and turn on the system interfacing with the Isolated Relay.
 - There is a **one minute warm-up** when power is initially restored to the sensor before the sensor works properly.
3. Set **Time Delay** to minimum: DIP switches #1 and 2 to ON (30 seconds).
4. Set **Sensitivity** to maximum: DIP switch #3 to ON.
5. Replace the sensor's cover.
6. Move away from sensor and be still. The sensor should time-out after 30 seconds and the isolated relay contacts should return to their "normal" condition (Normally Open or Closed), see Wiring Directions diagram.

Note: If the sensor does not time-out or the isolated relay does not return to its normal condition, move farther away or out of sight of the sensor, or see Unwanted Sensor Activations under Troubleshooting.

7. Reset the **Time Delay** to the desired delay (DIP switches #1 and 2).

DIP Switch #	1	2	3	4
Time Delays				
30 seconds	●	●		
10 minutes	●	—		
20 minutes		●		
▶ 30 minutes	—			
Sensitivity				
Minimum				—
▶ Maximum			●	
Override				
▶ Normal				—
Override				●

● = ON — = OFF
 ▶ = Factory Presets

4 CAUTION 4

**USE PROPER SAFETY PRECAUTIONS WHEN
WORKING WITH OR NEAR HIGH VOLTAGE**

LED does not flash with motion:

1. Determine if the lens is masked in the direction being tested (see Masking).
2. Check that the Sensitivity setting is set to maximum (DIP switch #3 to ON).
3. Check that the RED and BLACK wire connections from sensor are secure.
4. Check that 24VAC or 24VDC is between the RED and BLACK wire from the sensor.
 - If it is present, the problem may be with the sensor. Try another sensor (if available).

1. Check that Time Delay settings are correct (DIP switches #1 and 2).
2. Check Sensitivity setting. Also see Unwanted Sensor Activations, below.
3. Check that all wire connections from sensor are correct and secure.
4. Using proper precautions, check that there is voltage to the isolated relay.
5. Check that 24VAC or 24VDC is between the RED and BLACK wire from 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 GREEN and ORANGE wires is open.
 - With motion in front of the sensor's lens, check that the connection between the YELLOW and ORANGE 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 GREEN and ORANGE wires is closed.
 - Check that the connection between the YELLOW and ORANGE wires is open.

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 Placement).
2. HVAC vents with heavy air flow.

1. Masking (see Masking).
2. Setting the Sensitivity to minimum if necessary (DIP switch #3).
3. Relocating the sensor.

If the sensor fails, set DIP switch #4 to Override position (DIP Switch # 4 to ON). This overrides the sensor and sets the circuits to "on".

Catalog#	Description
CI-24	24VAC or 24VDC Occupancy Sensor with Extended Range Lens (Standard)
CI-24-1	24VAC or 24VDC Occupancy Sensor with High Density /Reduced Range Lens
CI-12	12VDC Occupancy Sensor with Extended Range Lens (Standard)
CI-12-1	12VDC Occupancy Sensor with High Density /Reduced Range Lens

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.

Putting a Stop to Energy Waste®

Santa Clara CA 95050 USA ☎ 1(800)879-8585 1(972)578-1699
86-0468-00r3 9/99

Voltagess	24VAC or 24VDC, ±10%
Current Consumption	@24VAC, 37mA Maximum @24VDC, 30mA Maximum
Isolated Relay Rating	1A @24VDC or 24VAC
Time Adjustment	30 seconds–30 minutes
Sensitivity Adjustment	Minimum/Maximum



Santa Clara, CA 95050 USA
1(800)879-8585 1(972)578-1699

U.S. Patents:
4,757,204
4,787,722
Des360,842

Installation Instructions

CI-24

360° PIR Occupancy Sensor



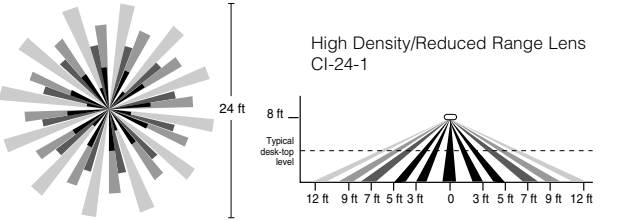
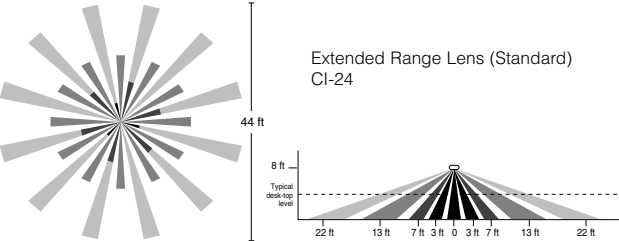
DESCRIPTION

The CI-24 is a 24VAC or 24VDC Passive Infrared (PIR) occupancy sensor which integrates with HVAC or EMS systems. The CI-24 provides isolated relay contacts that are Normally Open or Normally Closed, based on occupancy. 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

The CI-24 has a multi-cell, multi-tier Fresnel lens with a field of view of 360°. The sensor has two lens pattern options. The Extended Range Lens will cover up to 1200 sq ft and 22 feet from the sensor when mounted at 8 feet. The High Density/Reduced Range Lens will cover up to 500 sq ft and 12 feet from the sensor when mounted at 8 feet. Coverage shown in the diagrams below is maximum and represents coverage for half-step, walking motion, with no barriers or obstacles.

DRAWING NOT TO SCALE



PLACEMENT

The effective coverage distances may be slightly less than the maximum sensing distance (see Coverage Patterns), depending upon obstacles such as furniture or partitions, and this must be considered when planning the number of sensors and their positioning. See the list below for approximate coverage distances for different types of motion.

Approximate coverage, for a mounting height of 8 feet:

Lens option	Walking motion	Workstation (hand motion)
Extended Range	up to 22 ft radius (1200 sq ft)	12ft radius (500 sq ft)
High Density	up to 12 ft radius (500 sq ft)	9ft radius (300 sq ft)

The CI-24 sensor can be mounted at various heights. When you will be mounting at heights other than 8 feet, be aware that as you decrease the mounting height, you will decrease the range and increase the sensitivity to smaller motions. Conversely, when you increase the height, you will increase the range and decrease the sensitivity to smaller motions. At heights of more than 12-14 feet, you may start to significantly reduce sensitivity. Often the best location to install a CI-24 in a **closed office** is off-center (see fig. 1). Avoid placing a sensor directly in line with an open door in which it has a clear view out, as the sensor may detect people walking by.

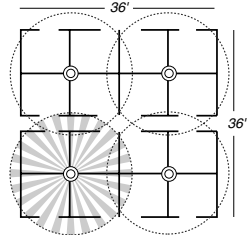


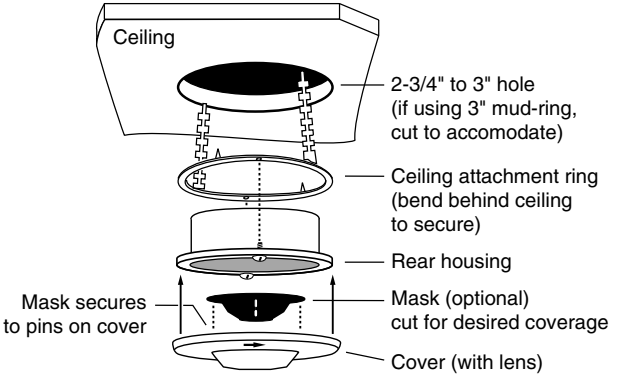
fig. 1

For **open office** areas with partitions it is best to place sensors over intersections of four workstations (see fig. 2). Also avoid placing the sensors close to **air ducts**, as rapid air currents or the differences in temperatures may cause false activations. For large areas of coverage use multiple sensors.

INSTALLATION



TURN POWER OFF AT CIRCUIT BREAKER BEFORE INSTALLING SENSOR



A 4-S junction box can be used with a 3" mud-ring when local building codes mandate that low voltage connections be contained in a junction box. Otherwise a 3" mud-ring or the provided ceiling attachment ring can be used. **IMPORTANT: If the lens will be masked**, the junction box or mud ring may need to be positioned so that the mask is oriented properly when the sensor is installed (see Masking).

Cut a hole in the ceiling tile—if using a:

- Ceiling attachment ring (provided)—cut about 2-3/4" to 3" in diameter.
- 3" mud ring—cut the hole to accommodate.

To assemble the sensor:

1. If using the ceiling attachment ring, bend the securing straps up so the sensor housing can be inserted, and attach it to the sensor with the provided screws.
2. Attach the mask, if using, into the lens recess and onto the securing pins of the cover.
3. Attach the cover to the rear housing—align tabs on inside of cover to notches on outside perimeter of rear housing, place cover on sensor, and twist clockwise to lock.
4. Insert the assembled sensor into the ceiling hole, and **if using the mask**, turn the sensor so that the unmasked part of the lens is toward and centered on the area to be covered.
5. Bend the ceiling attachment ring straps behind the hole to secure (or attach sensor to mud ring with screws).

MASKING

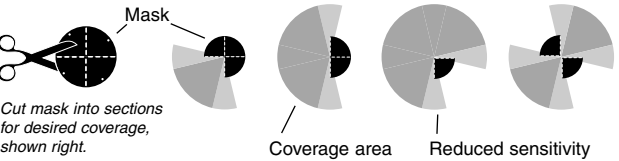
An insert (mask) is supplied to allow elimination of coverage in unwanted areas. The mask is cut as needed and mounted onto anchor pins in the sensor's cover.

IMPORTANT: Do not use the mask if full coverage is desired.

IMPORTANT: Before securing the sensor in the mounting location, the assembled **sensor must be turned so the unmasked portion of the lens faces the coverage area** (the blue masked area is visible through the lens).

IMPORTANT: For an already installed sensor—If the sensor can NOT be turned, then the mask must be cut so that when installed it will be oriented correctly (note the **location of the securing pins** in the cover and note that the **cover turns** as it locks into position).

Note: At the edges of the masking, there is a small area of **reduced sensitivity**, illustrated as the lighter area in the examples below.



WIRING DIRECTIONS



TURN POWER OFF AT CIRCUIT BREAKER BEFORE WIRING SENSOR

- Connect 24VAC or +24VDC Supply to the RED and Return to the BLACK wire from the sensor.

Isolated Relay: (Rated for 1A @24VDC or 24VAC)

Connect the wires necessary to the application that requires this output.

- GREEN (**Normally Closed**)—Open when occupancy is detected
- ORANGE (**Common**) (must be used for proper operation)
- YELLOW (**Normally Open**)—Closed when occupancy is detected

