

# DT-355

360° Dual Technology • Line Voltage  
Occupancy Sensor  
with Light Level feature



## SPECIFICATIONS

Voltages	120/230/277/347VAC, 50/60Hz
Load Requirements	
@120VAC, 50/60Hz	0-800W Ballast/Tungsten
@230 or 277VAC, 50/60Hz	0-1200W Ballast
@347VAC, 50/60Hz	0-1500W Ballast
Operating Temperature	32° to 131°F (0° to 55°C)
Terminal Torque Rating	4.428 inch pound-force. (0.5Nm)
Light Level One-Step Adjustment	10FC-300FC
Time Delay Adjustment	5 to 30 minutes
Walk-Through Mode	.3 minutes if no activity after 30 sec.
Test Mode	5 sec. upon initial power-up or DIP switch reset
PIR Coverage (Typical)	1200 ft2
Sensitivity Adjustment	Automatic or Low (DIP switch setting)
Ultrasonic Coverage (Typical)	800-1200 ft2
Sensitivity Adjustment	Minimum to Maximum (trimpot)
Frequency	40kHz

**WattStopper®**

U.S. Patents: 5,189,393  
and Patent Pending

Installation Instructions

## UNIT DESCRIPTION

The WattStopper DT-355 360° Dual Technology occupancy sensors combine advanced passive infrared (PIR) and ultrasonic technologies into one unit. The combination of these technologies helps to eliminate false triggering problems even in difficult applications.

The DT-355 turns lighting systems on and off based on occupancy and ambient light levels. The light level feature can be used to keep lights from turning on if the ambient light level is sufficient.

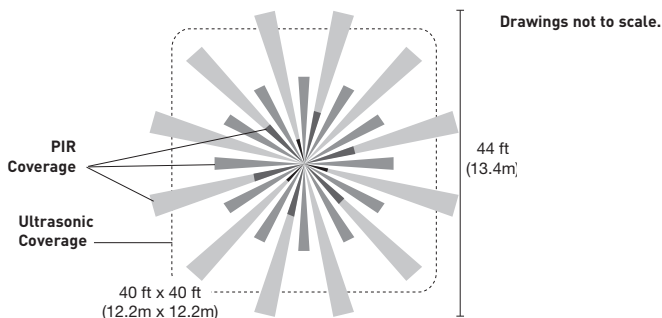
SmartSet™ technology allows the sensor to be installed with minimal adjustments. SmartSet automatically adjusts the time delay and PIR sensitivity to usage patterns in the controlled space.

The DT-355 offers numerous operating modes that can be combined to create the ideal custom control. The sensors can be configured to turn lighting on, and hold it on as long as either or both technologies detect occupancy. After no movement is detected for the user-specified time or the SmartSet time (5 to 30 minutes) the lights are switched off. A “walk-through” mode can turn lights off after only 3 minutes, if no activity is detected after 30 seconds of an occupancy detection.

The DT-355 operates on 120VAC, 230VAC, 277VAC, or 347VAC line voltage.

## COVERAGE PATTERN

The DT-355 provides a 360° coverage pattern. The coverage shown represents walking motion at a mounting height of 10 feet. For building spaces with lower levels of activity or with obstacles and barriers, coverage size may decrease.



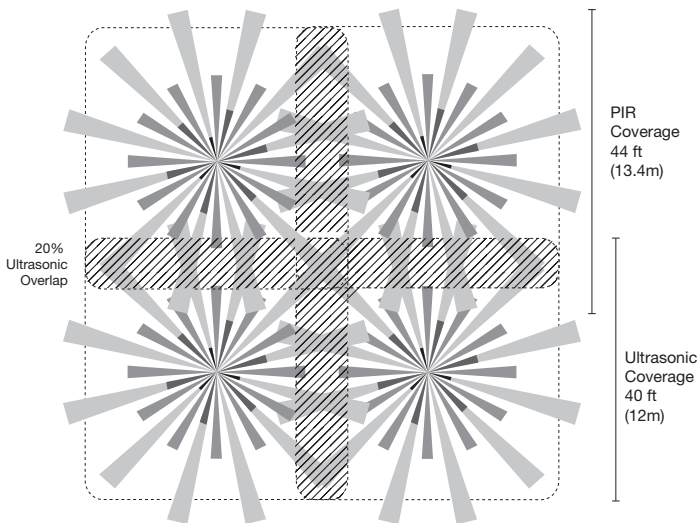
**Call 800.879.8585 for Technical Support**

## PLACEMENT GUIDELINES

Depending upon obstacles such as furniture or partitions, the area of coverage may be less or more than the sensing distances shown in the coverage pattern. This must be considered when planning the number of sensors and their placement. It is also recommended to place the sensor 4 to 6 feet away from air supply ducts. Mount the sensor to the ceiling. The DT-355 is designed for a ceiling height of about 8-10 feet. Mounting above or below this range will significantly affect the coverage patterns. As a general rule, each occupant should be able to clearly view the sensor.

**Masking the PIR Lens:** Opaque adhesive tape is supplied so that sections of the PIR lens can be masked. This restricts the sensor's view and allows you to eliminate PIR coverage in unwanted areas such as hallways outside of the desired coverage area. Since masking removes bands of coverage, remember to take this into account when troubleshooting coverage problems. The Ultrasonic coverage cannot be masked, but you can adjust its sensitivity to reduce the coverage area.

**Open Office Area Coverage:** To get complete coverage in an open office area, install multiple sensors so that there is approximately 20% overlap with each adjacent sensor's ultrasonic coverage area.



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## WIRING DIRECTIONS



**WARNING**

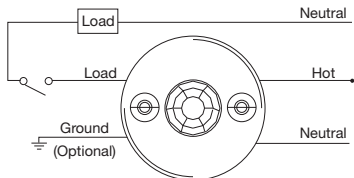


**TURN POWER OFF AT THE CIRCUIT BREAKER  
BEFORE INSTALLING SENSORS.**

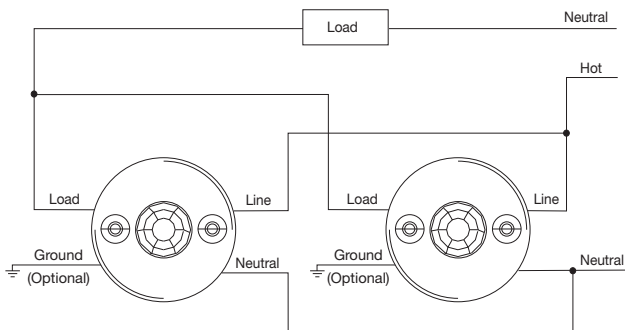
#12 to #16 AWG

Strip Gauge

Cu Wire Only



**Single sensor, single load**



**Three-way wiring**

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## LIGHT LEVEL FEATURE

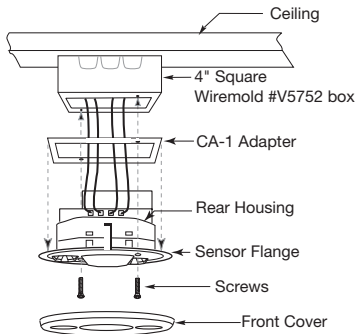
The Light Level feature holds lights off upon initial occupancy if adequate ambient light exists. It will not turn the lights off if they are on. The default setting is for maximum, meaning that even the brightest ambient light will not hold the lights off. When the light level is set it is written to memory so that in the event of a power failure the setting is not lost.

- Avoid mounting the sensor close to lighting fixtures.
  - Adjust during daylight hours when ambient light in the area is at desired level.
1. Open the Front Cover and locate the Light Level pushbutton. See Sensor Adjustment.
  2. Momentarily press the Light Level pushbutton. Do not exceed 4 seconds. \* The sensor enters setup mode, as indicated by the rapidly flashing Red LED. The LED will flash throughout the setup process. Occupancy indications from the LEDs are disabled during setup.
  3. Move away from the sensor to avoid interference with light level detection. The sensor measures the light level for a 25-second period, then averages the readings and automatically sets the light level function.
  4. When the Red LED stops flashing, replace the Front Cover.
- \* Pressing the pushbutton for 5 seconds or more resets the light level to the default. The Green LED flashes rapidly for 10 seconds after the setting has changed.

## MOUNTING THE SENSOR

### Using a 4-Inch Square Junction Box

1. Pull the high voltage wires into the J-Box through the conduit knockout.
2. Run the wires through the CA-1 adapter then connect the high voltage wires to the appropriate terminals on the sensor.
3. Align the CA-1 and the sensor with the J-Box so that the mounting screw tabs on the box match the mounting holes on the sensor's rear housing and the CA-1.
4. Use two machine screws (included with the sensor) to attach the sensor to the mounting tabs on the J-Box.
5. Snap the front cover onto the sensor.

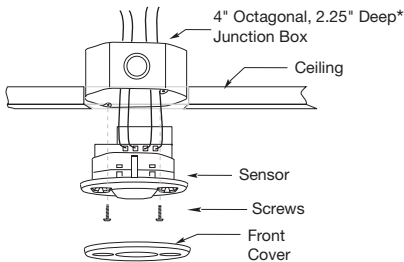


**Mounting to a 4" Square Wiremold V5752 box or 4" Square Junction Box with Double-Gang Mudring**

### Using an Octagonal Junction Box

1. Pull the high voltage wires into the J-Box through the conduit knockout.
2. Connect the high voltage wires to the appropriate terminals on the sensor.
3. Align the sensor in the J-Box so that the mounting screw tabs on the box match the key holes on the sensor's rear housing.
4. Use two machine screws (included with the J-Box) to attach the sensor to the mounting tabs on the J-Box.
5. Snap the front cover onto the sensor.

**\* The Junction Box must be at least 2.25" deep. If it is not, an extension ring is required.**



**Mounting to an Octagonal Junction Box**

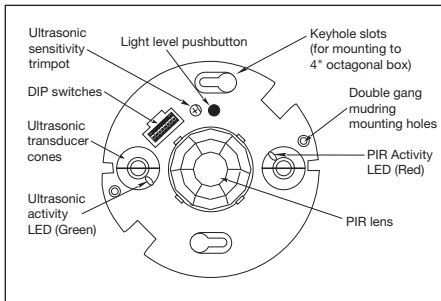
**Call 800.879.8585 for Technical Support**

## SENSOR ADJUSTMENT

The sensors are factory preset to allow for quick installation in most applications. Verification of proper wiring or coverage, or customizing the sensor's settings can be done using the following procedures. To make adjustments, open the Front Cover with a small screwdriver.

### **There is a 30 second warm-up period when power is first applied.**

Before making adjustments, 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. Set the Logic Configuration and Time Delay to the desired settings. See "Logic Configuration Chart", next page.



### **To Test Occupancy Sensors**

1. Ensure the PIR and Ultrasonic Activity LEDs are enabled (DIP switch 7 ON) and PIR Sensitivity is set to MAX (DIP switch #8 ON).
2. Ensure the Time Delay is set for Test Mode\* using the "5 seconds/SmartSet" setting. (DIP switches 4, 5, & 6 are OFF).
3. Ensure that the Light Level is at default (maximum). See the Light Level Feature section of this document for instructions.
4. Ensure that the Ultrasonic Sensitivity trimpot is set to about 90%, clockwise.
5. Remain still. The red and green LEDs should not flash. The lights should turn off after 5 seconds. (If not, see "Troubleshooting.")
6. Move about the coverage area. The lights should come on. Adjust the Ultrasonic Sensitivity as necessary to provide the desired coverage (Green LED indicates activation from the ultrasonic sensor).

When testing and adjustment is complete, reset DIP Switches and Light Level to the desired settings, and replace the cover on the sensor.

\* If you need to invoke the Test Mode and the DIP switches are already set for 5 seconds/SmartSet, toggle DIP switch #5 ON then back to the OFF position. This provides a 5 minute test period. During the test period, the Time Delay is only 5 seconds.

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## OCCUPANCY LOGIC

The DT-355 has 6 logic configurations for occupancy triggers, set with DIP switches 1, 2 & 3. Determine the appropriate Occupancy Logic Option using the Trigger matrix, then set the DIP switches accordingly.

**Initial Occupancy:** The method that activates a change from “Standby” (area unoccupied and loads are off) to “Occupied” (area occupied and loads are on).

- **Both** requires motion detection by the PIR and the Ultrasonic.
- **Either** requires motion detection by only one technology.
- **PIR** requires motion detection by the PIR.
- **Ultra** requires motion detection by the Ultrasonic.

**Maintain Occupancy:** The method indicating that the area is still occupied and the lights should remain on.

**Re-trigger:** After the time delay elapses and the lights turn off, detection by the selected technology within the number of seconds indicated turns the lights back on.

Logic Configuration Chart





Occupancy Logic	Trigger	Initial Occupancy	Maintain Occupancy	Re-trigger (seconds duration)
		Standard	Both	Either
Option 1	Either	Either	Either(n/a)	
Option 2	PIR	Either	Either(n/a)	
Option 3	Both	Both	Both(5)	
Option 4	PIR	PIR	PIR(5)	
Option 5	Ultra	Ultra	Ultra(5)	

◀ = Factory Setting

● = ON

- = OFF

Occupancy Logic	Switch#		
	1	2	3
Standard	-	-	-
Option 1	●	-	-
Option 2	-	●	-
Option 3	●	●	-
Option 4	-	-	●
Option 5	●	-	●

Time Delay	4	5	6
5 sec/SmartSet 	-	-	-
5 minutes	-	-	●
10 min. 	-	●	-
10 minutes	-	●	●
15 min. 	●	-	-
15 minutes	●	-	●
20 minutes	●	●	-
30 min. 	●	●	●

 = walk-through mode

LEDs	7
Disabled	-
Enabled	●


PIR Sensitivity	8
Minimum	-
Max./SmartSet	●



## **Time Delay: Switches 4, 5, 6**

The sensor will hold the lights on as long as occupancy is detected. The time delay countdown starts when no motion is detected. After no motion is detected for the length of the time delay, the sensor will turn the lights off. The sensor can select the time delay using SmartSet, or you can select a fixed time delay.

- SmartSet records occupancy patterns and uses this history to choose an optimal time delay from 5 to 30 minutes. SmartSet behavior starts immediately and is refined continually as history is collected.

 Walk-through mode turns the lights off three minutes after the area is initially occupied, if no motion is detected after the first 30 seconds. If motion continues beyond the first 30 seconds, the selected time delay applies.

## **LEDs**

When enabled, the red PIR and green Ultrasonic Activity LEDs on the sensor will light when the associated sensor detects motion.

## **PIR Sensitivity**

- Minimum forces a reduced detection range for the PIR.
- Max./SmartSet causes the DT-355 to monitor the controlled environment and automatically select the maximum sensitivity that will provide reliable operation without false detection. This setting is constantly updated.

## TROUBLESHOOTING



**WARNING**



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

### **For any unexpected operation**

1. Check DIP switch settings.
2. Make sure the switches are set according to the defined settings in the Logic Configuration Chart.

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

- **Both LEDs do not flash: (DIP switch #7 must be ON to enable the LEDs)**

1. Check that the circuit breaker has been turned back on.
2. Check all sensor wire connections.
3. Check for line voltage input to the sensor.
  - If line voltage is present, replace the sensor.
  - If line voltage is not present, check line wiring.

- **Red LED does not flash:**

When power is initially applied to the sensor, there is a warm-up period of 30 seconds before the red LED is active.

1. Make sure that PIR Sensitivity is set to 100% (DIP switch #8 set to on).
2. If it still does not flash, call 800.879.8585 for Technical Support.

- **Green LED does not flash:**

1. The Ultrasonic Sensitivity setting may need to be increased.  
Turn clockwise as needed.

- **Both LEDs flash:**

1. If the sensor's Light Level feature has been turned on, 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 area around the green LED (see diagram) with your hand to see if the lights turn on. If the lights turn on, the Light Level setting was keeping the lights off (see, "Sensor Adjustment" for readjustment).
2. Check all sensor wire connections.
3. Check for line voltage input to the sensor.

### **Lights do not turn off automatically:**

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1. One or both of the sensor technologies (PIR or ultrasonic) may be experiencing activations from outside the controlled area or from some type of interference (see “Unwanted Sensor Activations” below).
2. Check all sensor wire connections.
3. 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 inadequate masking causing detection outside of desired coverage area.
2. The ultrasonic sensitivity may be too high.
3. The PIR sensitivity may be set too high.
4. Sensor located too close to HVAC or VAV vents with heavy air flow.

- **Possible solutions**

1. Reduce the ultrasonic sensitivity (counterclockwise) as needed (see “Sensor Adjustment”).
2. Mask the lens to reduce PIR coverage (see “Masking the lens”, under “Coverage Patterns”).
3. Change the logic configuration setting, see “Logic Configuration”.
4. Relocate the sensor.

#### **Override**

To override all sensor functions, set the Ultrasonic Sensitivity trimpot to the fully counterclockwise (Override) position.

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

Catalog #	Description
DT-355	360° Dual Technology Occupancy Sensor, Line Voltage, w/light level sensor
CA-1	Cosmetic adapter for ceiling installation with 4" square j-box or Wiremold #V5752 box.

All sensors are white.

## WARRANTY INFORMATION

WattStopper warrants 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.

# ***WattStopper***<sup>®</sup>

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