

UT-300

v3

Ultrasonic • Low Voltage Occupancy Sensor

with Light Level, Isolated Relay and Manual On feature



Installation Instructions

Specifications

Voltage18-28VDC/VAC, half wave rectified AC

Current Consumption

Model UT-300-1, Model UT-300-2..... 25 mA

Model UT-300-3 25 mA

Power SupplyWattStopper Power Packs

Isolated Relay Rating 1A @30VDC/VAC

Operating Temperature..... 32° to 131°F (0° to 55°C)

Light Level One-Step Adjustment 10FC - 300FC

Time Delay Adjustment..... 30 seconds to 30 minutes

Walk-Through Mode ...3 minutes if no activity after 30 sec.

Test Mode 5 sec. upon DIP switch reset

Ultrasonic Coverage

Model UT-300-1 up to 500 ft²

Model UT-300-2 up to 1000 ft²

Model UT-300-3 up to 2000 ft²

Sensitivity Adjustment..... Minimum to Maximum (trimpot)

Frequency 40kHz

UL & CUL Listed for use with WattStopper Power Packs

WattStopper®

U.S. Patents: 7,277,012

Santa Clara, CA 95050

UNIT DESCRIPTION

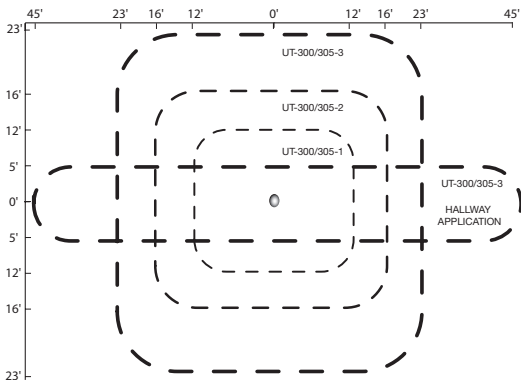
The WattStopper UT-300 sensors turn lighting systems on and off based on occupancy.

The UT-300 can be configured to turn lighting on, and hold it on as long as it detects occupancy. After no movement is detected for a user specified time (30 seconds 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 UT-300 operates on 24V supplied by WattStopper Power Packs. The sensors can operate on 24VDC, 24VAC, or half wave rectified AC. UT-300 sensors also have an isolated relay with Normally Open and Normally Closed contacts for interfacing with HVAC or EMS systems.

COVERAGE PATTERN

The UT-300 is available in 3 models. Each model has a different size coverage pattern. The coverage shown represents walking motion at a mounting height of 8 to 10 feet. For building spaces with lower levels of activity or with obstacles and barriers, coverage size may decrease.



Drawings not to scale.

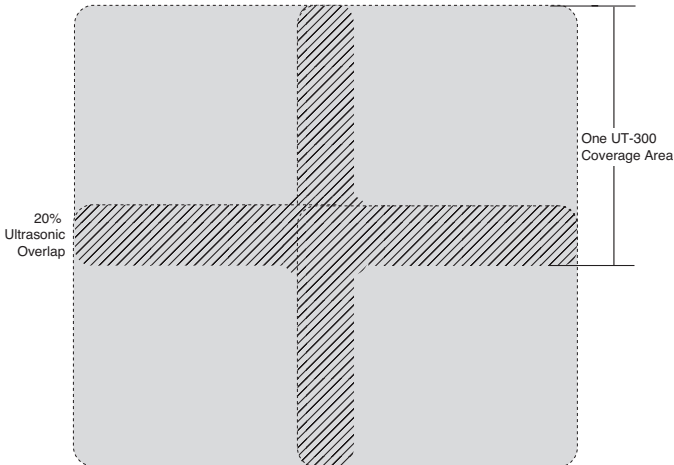
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PLACEMENT GUIDELINES

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 UT-300 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.

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.



WIRING DIRECTIONS



CAUTION



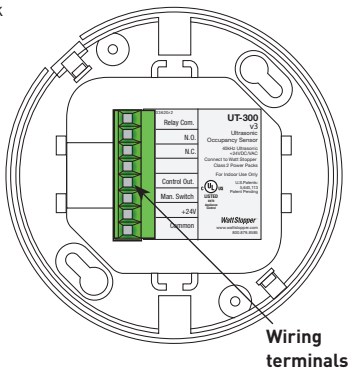
TURN POWER OFF AT THE CIRCUIT BREAKER BEFORE INSTALLING POWER PACKS OR SENSORS.

Each WattStopper BZ series power pack can supply power for 5 UT-300 sensors. When using more sensors than this, multiple power packs are required.

Refer to the wiring diagram on the next page for the following procedures:

Connect the **low voltage**:

- RED wire (+24VDC) from power pack to the **+24V** terminal on the sensor.
- BLACK wire (Return) from power pack to **Common** terminal on the sensor.
- BLUE wire from power pack to **Control Out** terminal on sensor.



To add a MANUAL SWITCH such as the LVS-1 Momentary Toggle Switch, or RS2-3 Low Voltage Momentary Switch to the above applications—connect:

- Wire from one side of switch to +24V terminal on sensor.
- Wire from other side of switch to Man Switch terminal on sensor.

Wiring the ISOLATED RELAY: (The Isolated Relay is rated for 1A@30VAC/VDC)

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

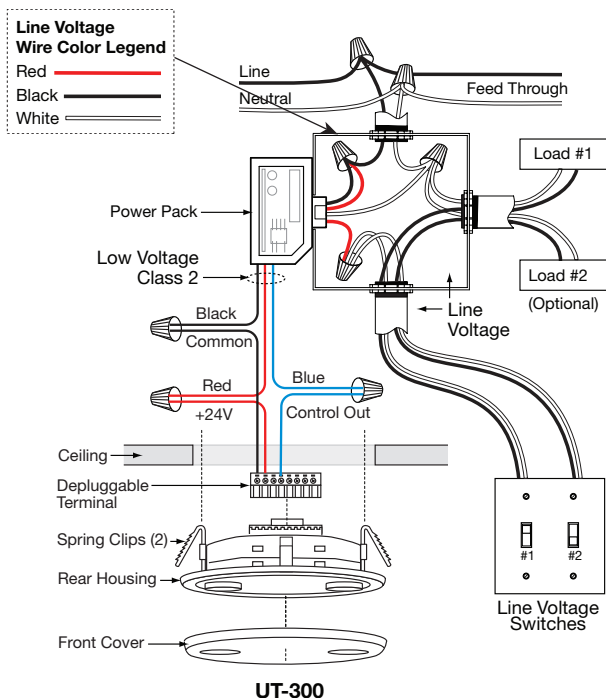
- Relay Common (must be used for proper operation)
- N.O. (Normally Open)—Closed when occupancy is detected
- N.C. (Normally Closed)—Open when occupancy is detected

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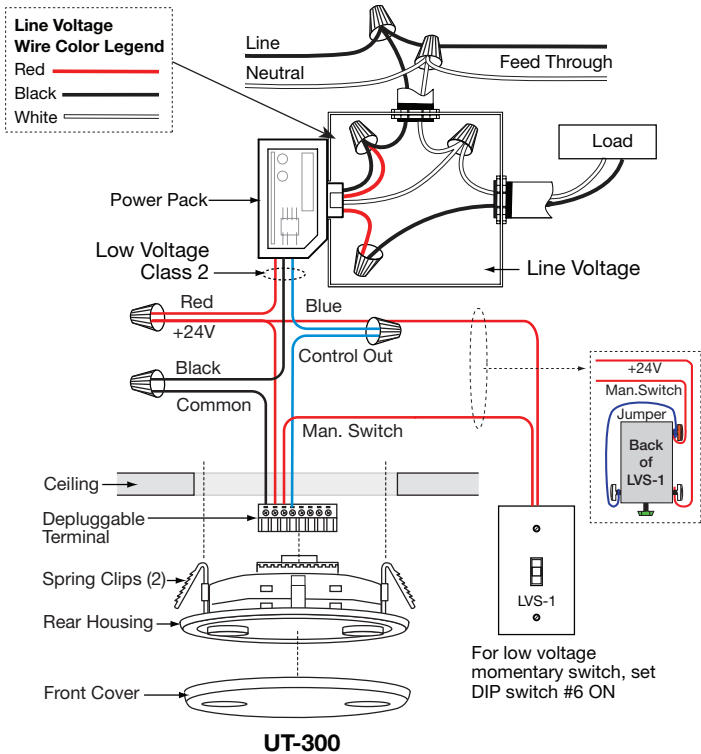
CONNECTING WIRES

- Care should be taken to separate high voltage power from low voltage (Class 2) control wiring.
- All connections to sensor are low voltage, Class 2.

Standard wiring with local off switch



Manual-On wiring with low voltage momentary switch

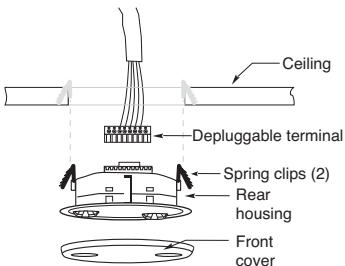


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MOUNTING THE SENSOR

Directly to Ceiling

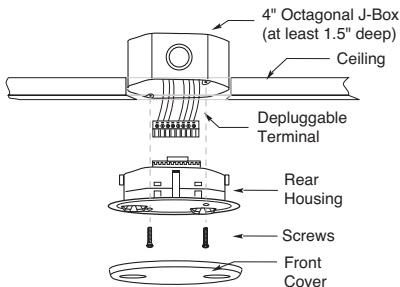
1. Attach the plastic spring clips to the edge of the sensor in the slots provided.
2. Cut a 3.5" to 4" round hole in the acoustic ceiling tile at the mounting location. A 3.5" hole is recommended for a secure fit.
3. Pull the low voltage wire from the power pack to the sensor through the hole.
4. Connect the low voltage wires to the appropriate terminals on the sensor.
5. Push the sensor up through the hole until the Spring Clips hold the sensor securely in place.
6. Snap the front cover onto the sensor.



Ceiling Mount

Using an Octagonal J-Box

1. Pull the low voltage wires from the power pack into the J-Box through the conduit knockout.
2. Connect the low voltage wires to the appropriate terminals on the sensor.
3. Loosen the appliance mounting screws attached to the J-Box
4. Align the sensor in the J-Box so that the mounting screws on the box match the key holes on the sensor's rear housing.
5. Push the sensor up into the J-Box and twist it so that the mounting screws are seated in the keyhole slots.
6. Tighten the two screws to secure the sensor to the J-Box.
7. Snap the front cover onto the sensor.

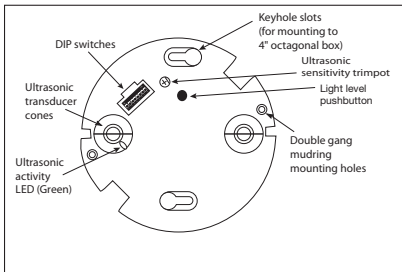


SENSOR ADJUSTMENT

This unit is pre-set for basic operation as described in this guide. Adjustment is optional.

The sensors are factory preset to allow for quick installation in most applications. Verification of proper wiring, coverage, and customizing the sensor's settings can be done using the following procedures. To make adjustments, open the Front Cover by pulling on the cover tab.

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 Time Delay to the desired settings. See "DIP Switch Setting".



To Test Occupancy Sensors

1. Ensure the Time Delay is set for Test Mode* using the "Test Mode/20 minutes" setting (DIP switches 1, 2 & 3 are off).
2. Ensure that the Ultrasonic Sensitivity trimpot is set to about 70%, clockwise.
3. Ensure that the Light Level is at default (maximum). See the Light Level Feature section of this document for instructions.
4. Remain still. The green LED should not flash. The lights should turn off after 5 seconds. (If not, see "Troubleshooting.")
5. 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.

* **Test Mode** is a temporary state that starts when you first set the sensor's DIP switches for the "Test Mode/20 minutes" (switches 1, 2, 3 **OFF**). If you need to invoke the **Test Mode** and the DIP switches are already set for Test Mode/20 minutes, toggle DIP switch 1 **ON** then back to the **OFF** position. This provides a 10 minute test period. During the test period, the Time Delay is only 5 seconds.

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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.

Notes on Functionality

- Avoid mounting the sensor close to lighting fixtures
- Adjust during daylight hours when ambient light in the area is at desired level.
- Light Level cannot be enabled while Test Mode is active. Either wait for Test Mode to expire or select any of the other Time Delay settings before enabling the Light Level feature.
- Ultrasonic occupancy indicator LED is disabled when the Light Level feature is enabled. LED will also flash periodically to indicate the sensor has Light Level enabled.
- Light Level settings are only saved in the event of a power loss. Disabling Light Level and then reenabling it will not return it to previous settings.
- If Test Mode is enabled after Light Level has been set, Light Level functionality will cease to function throughout the duration of Test Mode. When Test Mode period expires, the Light Level functionality will resume, even if the Dip Switches remain set to Test Mode.

Setting Light Level

1. Make sure Test Mode is not active.
2. Toggle the state of the sensor, by briefly pressing the Light Level button, to include or exclude the lighting load from the light level calibration. Open the Front Cover and locate the Light Level pushbutton. See Sensor Adjustment.
3. Press and hold the Light Level button for 2 or more seconds, or until the detection LED turns On. Do not exceed 5 seconds.* The sensor enters setup mode, as indicated by the rapidly flashing LED. The LED will flash throughout the setup process. Occupancy indications from the LED is disabled during setup.
4. Move away from the sensor to avoid interference with light level detection. The sensor measures the light level for a 10 second period, then averages the readings and automatically sets the level that will be used as the new setting. The sensor will hold lights off when the ambient light exceeds this setting.

5. When the LED stops flashing, replace the Front Cover.

***Disabling Light Level**

Pressing the pushbutton for 5 seconds or more resets the light to default (maximum).

Press and hold the Light Level button for 5 seconds or until the detection LED turns ON and then OFF. the LED flashes rapidly for 10 seconds after the setting has changed.

DIP SWITCH SETTING

Logic Configuration Chart

The UT-300 has 6 DIP switches under the cover.

Time Delay: Switches 1, 2, 3

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**.

Walk Through Switch 4

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.

Service: Switch 5

To override all sensor functions, set DIP switch 5 to the **ON** position. The green LED will come on and stay on for the duration of the override.

This bypasses the light level and occupancy detection control functions of the sensor, but still allows the lights to be manually controlled with a light switch, low voltage switch, or Light Level button.

On Mode: Switch 6

The Manual **ON** function is facilitated by installing a momentary switch such as a WattStopper LVS-1 Momentary Toggle Switch, or RS2-3 Low Voltage Momentary Switch. This switch connects to the sensor's Manual (Man.) Switch and +24V terminals as shown in the wiring diagram. Each time the switch is pressed, the load changes state. The sensor's operation as related to the manually operated switch is determined by the setting for DIP switch 6.

Manual On: In this mode, the switch **is required** to turn on the load. The sensor is then used to keep the load on, based on occupant activity. After the time delay ends, if there is no movement detected within the 30 second re-trigger period the manual switch must be used to turn **ON** the load.

Automatic On: This mode uses occupancy as well as switch activation to turn the load **ON**. A manual switch provides the following additional functionality:

- The load can be turned **ON** by manual switch activation and it stays on as long as occupancy is detected. The sensor time delay operates as programmed. When the load turns **OFF** due to lack of occupancy detection, the load can be turned **ON**

Time Delay	Switch#		
	1	2	3
Test Mode/20 min	↓	↓	↓
30 seconds	↓	↓	↑
5 minutes	↓	↑	↓
10 minutes	↓	↑	↑
15 minutes	↑	↓	↓
20 minutes	↑	↓	↑
25 minutes	↑	↑	↓
30 minutes	↑	↑	↑

Walk-Through	4
Enabled	↑
Disabled	↓ ◀

Service	5
Service	↑
Normal	↓ ◀

On Mode	6
Manual On	↑
Auto On	↓ ◀

◀ = Factory Setting

↑ = ON

↓ = OFF

again by occupancy detection or switch activation.

- b. Activating the manual switch while the load is **ON** turns the load **OFF**.
- When the load is turned **OFF** manually, as long as the sensor continues to detect occupancy the load stays **OFF**. For the selected time delay, the lights stay off and the sensor reverts to the automatic-on mode.
 - When the load is turned **OFF** manually, pressing the switch again turns the load **ON** and the sensor reverts to the automatic-on mode.

OVERLOAD PROTECTION

The occupancy sensor has a built in overload protection function that will automatically turn off the control output when the load current exceeds 200mA. The sensor LED will then blink rapidly (~ 10Hz) to provide a visual indication of an overload condition. When the load current is corrected or returns to normal, the control output will turn back on.

TROUBLESHOOTING



CAUTION



**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 DIP Switch Setting chart.

Lights do not turn on with occupancy, and the LED does not flash:

1. Check that the circuit breaker has been turned back on.
2. The Ultrasonic Sensitivity setting may need to be increased. Turn clockwise as needed.
3. Check all sensor and power pack wire connections.
4. Check for 24V input to the sensor.
 - If 24V is present, replace the sensor.
 - If 24V is not present, check that high voltage is present to power pack. If it is, replace power pack.

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” below).
2. Check all sensor 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).
4. Set 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. The ultrasonic sensitivity may be too high causing detection outside of desired coverage area.
2. Sensor located too close to HVAC or VAV vents with heavy air flow.
3. If LED is flashing rapidly (~10Hz), an overload condition exists. When this is corrected, the sensor will return to normal operation.
4. Check if Light Level is enabled.
 - If occupancy indicator LED blinks every few seconds, sensor is using Light Level feature.
 - If Light Level functionality is not desired, press and hold for 5 seconds to return sensor to the default setting (maximum).

• Possible solutions

1. Reduce the ultrasonic sensitivity (counterclockwise) as needed (see “Sensor Adjustment”).
2. Relocate the sensor.
3. Check the blue wire connection. If necessary, replace the power pack.

ORDERING INFORMATION

Catalog #	Description
UT-300-1	Ultrasonic Occupancy Sensor, up to 500 sq ft coverage, Low Voltage w/Isolated Relay and Manual On feature
UT-300-2	Ultrasonic Occupancy Sensor, up to 1000 sq ft coverage, Low Voltage w/Isolated Relay and Manual On feature
UT-300-3	Ultrasonic Occupancy Sensor, up to 2000 sq ft coverage, Low Voltage w/Isolated Relay and Manual On feature
UT-305-1/2/3	Ultrasonic Occupancy Sensor, Low Voltage
BZ-50	Power Pack: 120/277VAC, 50/60Hz, 225mA, 20A ballast or incandescent, 1HP@120/250VAC
BZ-150	Power Pack: 120/277VAC, 50/60Hz, 225mA, 20A ballast or incandescent, 1HP@120/250VAC
S120/277/347E-P	Auxiliary Relay Pack: 120/277VAC, 60Hz, 20A Ballast 347VAC, 60Hz, 15A Ballast

All sensors are white.

BZ series power packs supply power for up to 5 UT-300 sensors.

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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[®]

2800 De La Cruz Boulevard, Santa Clara, CA 95050

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