

UT-300

Ultrasonic • Low Voltage Occupancy Sensor

with Isolated Relay and Manual On features



Installation Instructions

Specifications

Voltage	18-28VDC/VAC, half wave rectified AC
Current Consumption	
Model UT-300-1, Model UT-300-2.....	40mA
Model UT-300-3	45mA
Power Supply	Watt Stopper Power Packs
Isolated Relay Rating	1A @30VDC/VAC
Operating Temperature.....	32° to 131°F (0° to 55°C)
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	
Ultrasonic Coverage	
Model UT-300-1	up to 500 ft ²
Model UT-300-2	up to 1000 ft ²
Model UT-300-3	up to 2000 ft ²
Sensitivity Adjustment	Minimum to Maximum (trimpot)
Frequency.....	40kHz



U.S. Patents: 4,787,722
5,189,393
and Patent Pending

UNIT DESCRIPTION

The Watt Stopper 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 or 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 UT-300 operates on 24V supplied by Watt Stopper 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.

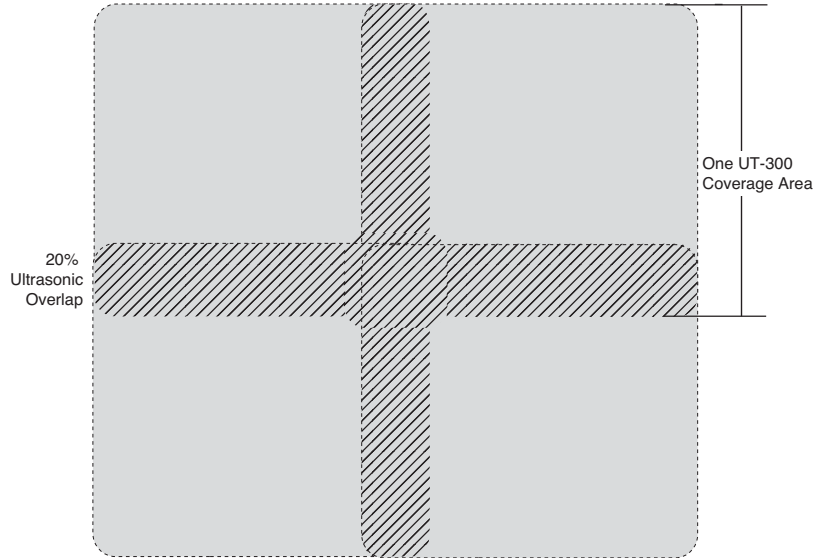
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PLACEMENT GUIDELINES

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.



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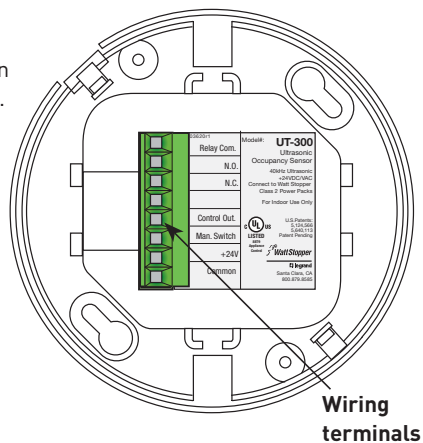
WIRING DIRECTIONS

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

Each Watt Stopper BZ series power pack can supply power for 4 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.



Wiring a **SINGLE LIGHTING LOAD**

CONTROLLED BY OCCUPANCY—connect:

- 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 Common terminal on sensor.
- Wire from other side of switch to Man Switch terminal on sensor.

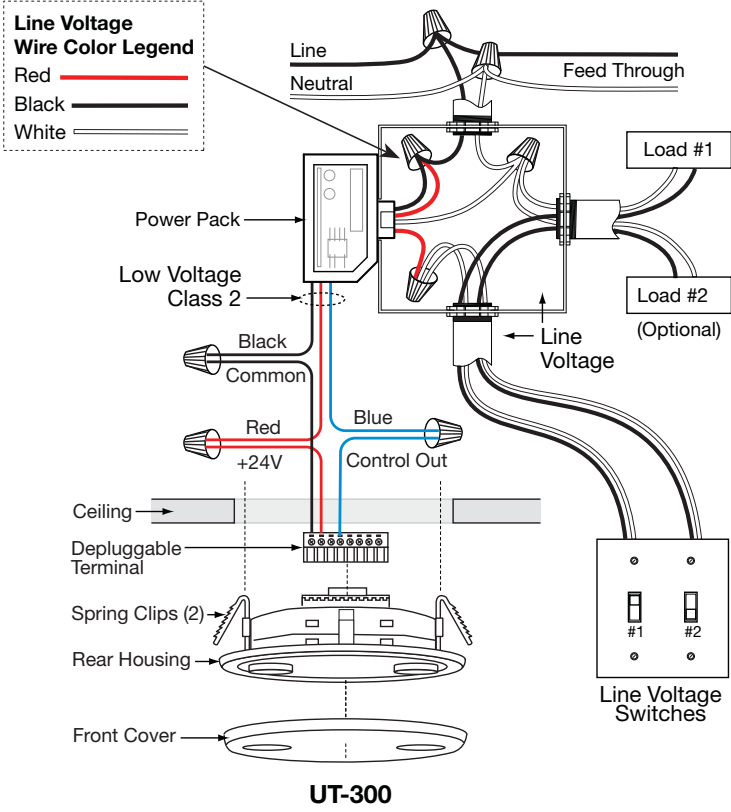
Wiring the **ISOLATED RELAY**: [The Isolated Relay is rated for 1A@30VAC/VDC]

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

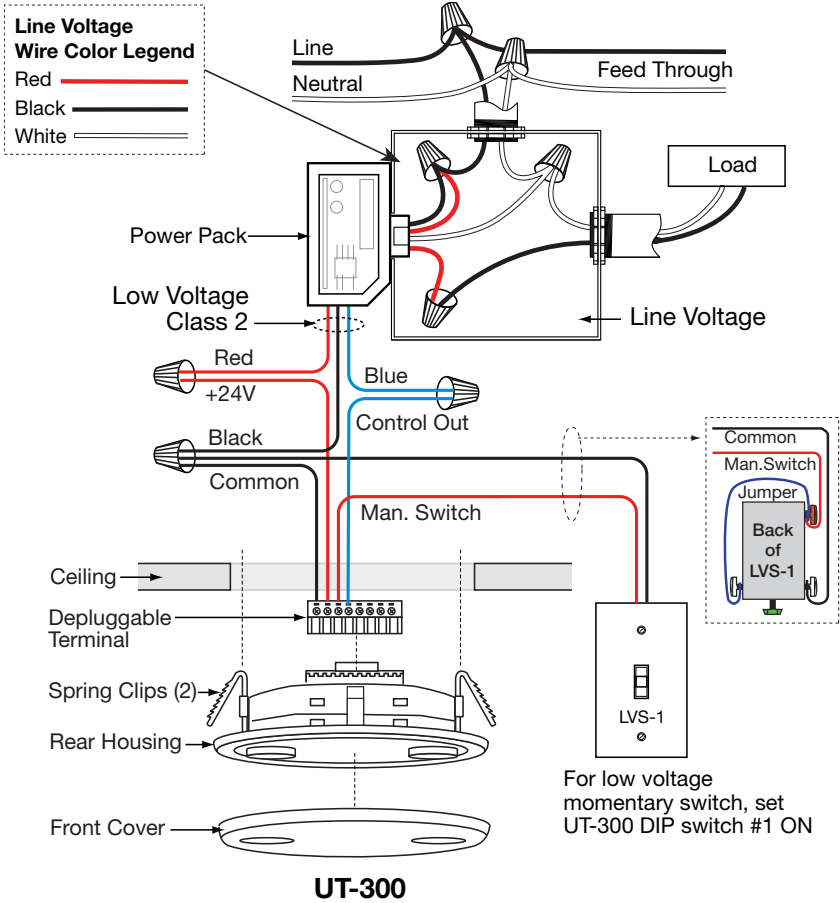
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Standard wiring with local off switch



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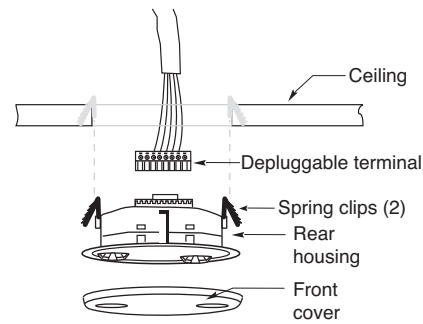
Manual-On wiring with low voltage momentary switch



MOUNTING THE SENSOR

Directly to Ceiling

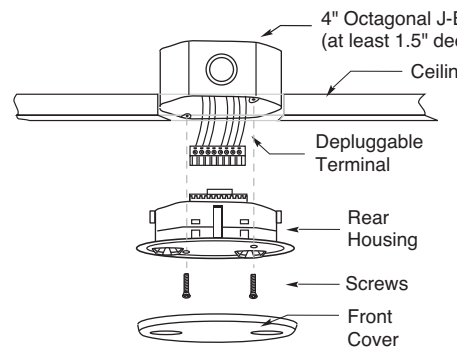
1. Attach the plastic spring clips to the edge of the sensor in the slots provided.
2. Cut a 3.5" to 4" round hole in the acoustic ceiling tile at the mounting location. A 3.5" hole is recommended for a secure fit.
3. Pull the low voltage wire from the power pack to the sensor through the hole.
4. Connect 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.



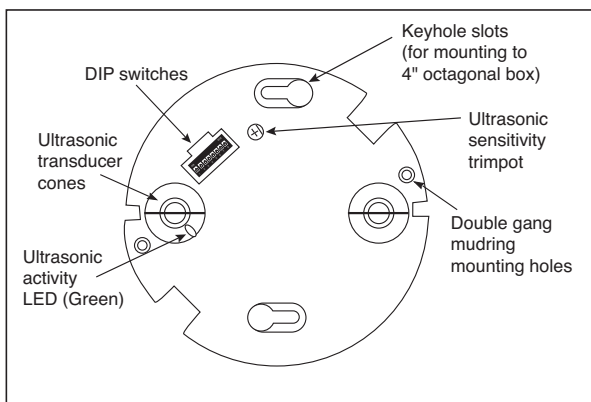
J-Box Mount

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SENSOR ADJUSTMENT

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 with a small screwdriver.

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", next page.



To Test Occupancy Sensors

1. Ensure the Ultrasonic Activity LED is enabled (DIP switch 6 ON).
2. Ensure the Time Delay is set for **Test Mode*** using the "5 seconds/SmartSet" setting. (DIP switches 3, 4, & 5 are OFF).
3. Ensure that the Ultrasonic Sensitivity trimpot is set to about 90%, clockwise.
4. Remain still. The 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 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 "5 sec/SmartSet mode" (switches 3, 4, 5 OFF). If you need to invoke the **Test Mode** and the DIP switches are already set for 5 sec/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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DIP SWITCH SETTING

The UT-300 has 6 DIP switches. They are used to set manual/automatic on/off functions, time delay and sensor activation LED settings.

On Mode: Switch 1

The Manual ON function is facilitated by installing a momentary switch such as a Watt Stopper LVS-1 Momentary Toggle Switch, or RS2-3 Low Voltage Momentary Switch. This switch connects to the sensor's Manual (Man.) Switch and Common 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 1.

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 the manual switch must be used to turn the load on, if there is no movement detected within the 30 second re-trigger period.

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

- a. 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 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. Five minutes after the last occupancy detection, 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.
 - Once the sensor returns to automatic-on mode, either the switch or occupancy detection can turn the load ON.

Logic Configuration Chart

On Mode		1		
Auto On	-	◀		
Manual On	●			
Override		2		
Normal	-	◀		
Override	●			
Time Delay		3	4	5
5 sec/SmartSet	⤴	-	-	-
5 minutes	-	-	-	●
10 minutes	⤴	-	●	-
10 minutes	-	●	-	●
15 minutes	⤴	●	-	-
15 minutes	-	●	-	●
20 minutes	⤴	●	●	-
30 minutes	⤴	●	●	●
⤴ = walk-through mode				
LED		6		
Disabled	-			
Enabled	●	◀		

◀ = Factory Setting

● = ON

- = OFF

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Override: Switch 2

To override all sensor functions, set DIP switch 2 to the ON position. The green LED comes on and stays on for the duration of the override.

This bypasses the occupancy detection control functions of the sensor, but still allows the lights to be manually controlled with a light switch, if one is installed.

Time Delay: Switches 3, 4, 5

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.

LED: Switch 6

When enabled, the green Ultrasonic Activity LED on the sensor will light when the sensor detects motion.

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TROUBLESHOOTING



**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. DIP switch #6 must be ON to enable the LED.
2. Check that the circuit breaker has been turned back on.
3. The Ultrasonic Sensitivity setting may need to be increased.
Turn clockwise as needed.
4. Check all sensor and power pack wire connections.
5. 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).

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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.
- Possible solutions
 1. Reduce the ultrasonic sensitivity (counterclockwise) as needed (see "Sensor Adjustment").
 2. Relocate the sensor.

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: 120/230/277VAC, 50/60Hz, 225mA, 20A ballast or incandescent, 1HP@120/250VAC
BZ-150	Power Pack: 120/230/277VAC, 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.

B series power packs supply power for up to 3 UT-300 sensors.

BZ series power packs supply power for up to 4 UT-300 sensors.

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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.



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