Wattstopper®

Ultrasonic Multi-Way Vacancy Sensor

No: 24302 – 09/16 rev. 1

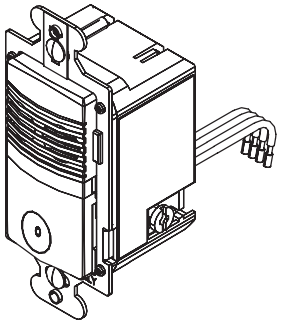
Installation Instructions • Instructions d'Installation • Instrucciones de Instalación

Catalog Number • Numéro de Catalogue • Número de Catálogo: CU-250

Country of Origin: Made in China • Pays d'origine: Fabriqué en Chine • País de origen: Hecho en China

DESCRIPTION AND OPERATION

CU-250 Ultrasonic Multi-Way Vacancy Sensors are designed to replace standard single pole and multi-way (3-way, 4-way) switches. They are ideal for any indoor space where vacancy sensor-based controls with manual **ON/OFF** capability are desirable and where detection with passive infrared (PIR) technology wall switch sensors is inappropriate. For instance, in an L-shape room or an area filled with multiple blocking objects. Unlike PIR wall switch sensors, ultrasonic wall switches do not rely on clear line of sight to detect human motion. They emit and receive harmless low power ultrasonic waves that allow detection throughout an enclosed area, regardless of its shape.



SPECIFICATIONS

Voltage 120VAC, 60Hz
Load
- Incandescent or fluorescent ..... 0-600 Watts
- Fan motor ..... 1/6 hp

Time Delay Adjustment .... 15 sec., 5 min., 15 min., 30 min.
Sensor Technology ..... Ultrasonic
- Frequency 40KHz

Environment ..... Indoor use only
- Operating Temperature .....32° to 122°F (0° to 50°C)

Tools Needed
- Insulated Screwdriver
- Wire Strippers

Like standard switches, you can press the **ON/OFF** button to turn the light or fan (controlled load) **ON** and **OFF**. Unlike standard switches, the CU-250 automatically turns **OFF** the controlled load after the coverage area has been vacant for a period of time (Time Delay). If motion is detected within 30 seconds after it automatically turns **OFF**, the CU-250 automatically turns the load back **ON**.

The CU-250 can be wired with up to three additional CU-250s for multi-way **Manual ON/Auto OFF** of one or several loads (up to one load connected to each CU-250). It can also be wired to up to four RH-253 single pole momentary wall switches for multi-way **Manual-ON/OFF Automatic-OFF** control of one load.

Lighted Switch

To help you locate the CU-250 in a dark room, the amber LED illuminates the **ON/OFF** button while the controlled load is **OFF**. When the controlled load is **ON**, the LED is **OFF**.

Time Delay

The time delay can be selected by the user during set up. It can be adjusted to any of these fixed values:15 seconds/5 minutes/
15 minutes/30 minutes. We recommend that the time delay be the same in all sensors related to the same load. For additional information on how to adjust it, please read the SENSOR ADJUSTMENT section of this installation manual.

Ultrasonic Sensitivity Level

The ultrasonic detection sensitivity can be adjusted by the user from minimum (approximately 40%) to maximum (100%) during set up. Factory setting is approximately 70% . To adjust the ultrasonic sensitivity level, please read the SENSOR ADJUSTMENT section of this installation manual.

Coverage Area

The CU-250 ultrasonic detection covers an area of 15' x 15' for minor (hand) motion, and an area of 20' x 20' for major (walking) motion. For coverage pattern refer to Fig.1.

For best performance, use in enclosed spaces not larger than 15' x 15'.

Depending upon obstacles such as furniture, the area of coverage may be less or more than the sensing distances shown in the coverage pattern.

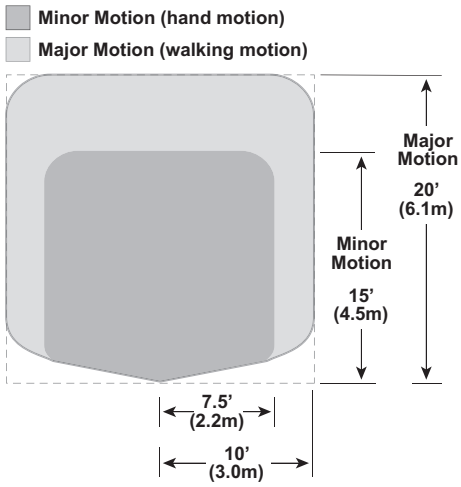


Fig. 1: Sensor Coverage

INSTALLATION AND WIRING

These instructions describe single pole, 3-way and multi-way circuit applications.

If you are unable to clearly identify some or all of the wires identified in step 2 of the instructions, you should consult with a qualified electrician.

Steps 3a, 3b, and 3c describe each circuit application.

For information about other applications, consult technical support or the Wattstopper website.

WARNING: DISCONNECT POWER TO THE WALL SWITCH BOX BY TURNING OFF THE CIRCUIT BREAKER OR REMOVING THE FUSE FOR THE CIRCUIT BEFORE INSTALLING THE CU-250, REPLACING LAMPS, OR DOING ANY ELECTRICAL WORK.

1. **Prepare the switch box.**
   After the power is turned **OFF** at the circuit breaker box, remove the existing wall plate and mounting screws. Pull the old switch out from the wall box.
2. **Identify the type of circuit.**
   You may connect the CU-250 to a single pole (see Fig. 2) or multi-way circuit. If you are unable to clearly identify some or all of the wires mentioned in this manual, you should consult with a qualified electrician.

   In a 3-way circuit (see Fig. 2a), two traveler wires connect to both switches. Another wire provides power from the circuit box to one of the switches. A wire connects from one switch to the load. A ground wire may also be connected to a ground terminal on the old switches. A neutral wire should also be present in both wall boxes.

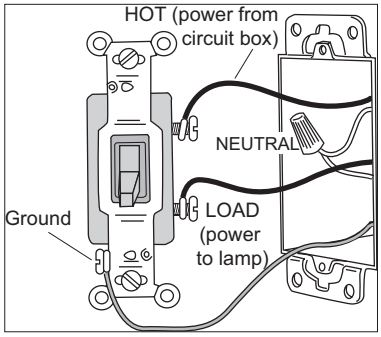


Fig. 2: Typical Single-Pole Switch

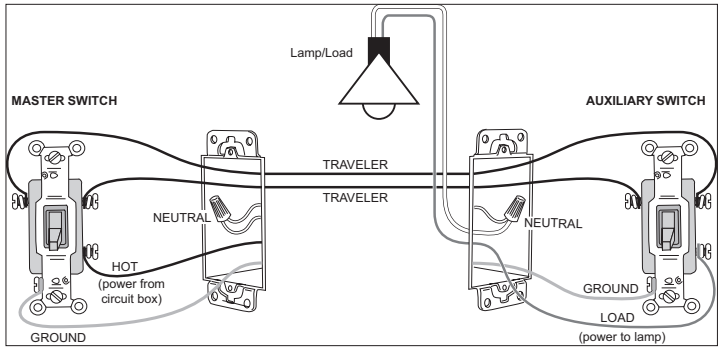


Fig. 2a: Typical 3-Way Switch Wiring

CAUTION

For your safety: Connecting a proper ground to the sensor provides protection against electrical shock in the event of certain fault conditions. If a proper ground is not available, consult with a qualified electrician before continuing installation.

3. **Prepare the Wires.**
   Tag the wires currently connected to the existing switch so that they can be identified later. Disconnect the wires. Make sure the insulation is stripped off of the wires to expose their copper cores to the length indicated by the "Strip Gage," in Fig. 3. (approx. 1/2 inch).

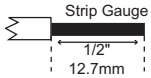


Fig. 3: Wire Stripping

   a. **Single pole wiring:**
   Twist the existing wires together with the wire leads on the CU-250 sensor as indicated below. Cap them securely using the wire nuts provided (See Fig 3a).

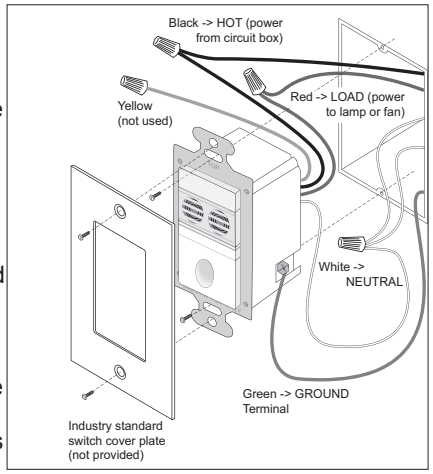


Fig. 3a: Sensor orientation, wire connections, and wall box assembly

- Connect the green or non-insulated (copper) GROUND wire from the circuit to the green terminal on the CU-250.
- Connect the NEUTRAL wire from the circuit and from the lamp (LOAD) to the white wire on the CU-250.
- Connect the power wire from the circuit box (HOT) to the black wire on the CU-250.
- Connect the power wire from the lamp (LOAD) to the red wire on the CU-250.
- Cap the yellow wire on the CU-250. It is not used in single pole applications.

   b. **3-way wiring using two CU-250s:**
   Twist the existing wires together with the wire leads on the CU-250 sensors as indicated below. Cap them securely using wire nuts provided. (See Fig. 3b)

- Connect the green or non-insulated (copper) GROUND wire from the circuit to the green terminal on each CU-250.
- Connect the NEUTRAL wire from the circuit and from the lamp (LOAD) to the white wire on the master CU-250.
  The load can be connected to either sensor. The sensor that is connected to the load is designated as the master sensor.
- Connect the NEUTRAL wire from the circuit in the other wiring box to the white wire on the auxiliary CU-250.
- Connect the power wire from the circuit box (HOT) to the black wire (TRAVELER 1) on the master CU-250.
- Connect the black wire of the auxiliary CU-250 to the black wire of the master CU-250.
- Connect the lamp power (LOAD) to the red wire on the master CU-250.
- Cap the red wire on the auxiliary CU-250.
- Connect the yellow wire of the CU-250 to the yellow wire (TRAVELER 2) of the CU-250 that you are wiring.

c. **Multi-way wiring using one CU-250 and up to four RH-253s:**
One CU-250 can be connected with up to 4 RH-253 single pole momentary wall switches for multi-way **Manual-ON/OFF** control of one single load. **The CU-250 must be installed in the wiring wall box that connects to the load.**

- Connect the existing wires to the wire leads on the CU-250 sensor as indicated below (See Fig. 3c). Cap them securely using wire nuts provided.
- Connect the green or non-insulated (copper) GROUND wire from the circuit to the green wire on each CU-250.
- Connect the NEUTRAL wire from the circuit and from the lamp (LOAD) to the white wire on the CU-250.
- Connect the power wire from the circuit box (HOT) to the black wire on the CU-250 (TRAVELER 1) and to one terminal on each RH-253 single pole momentary switch.
- Connect the lamp power (LOAD) to the red wire on the CU-250.
- Connect the yellow wire on the CU-250 (TRAVELER 2) to the other side of each RH-253 single pole momentary wall switches.

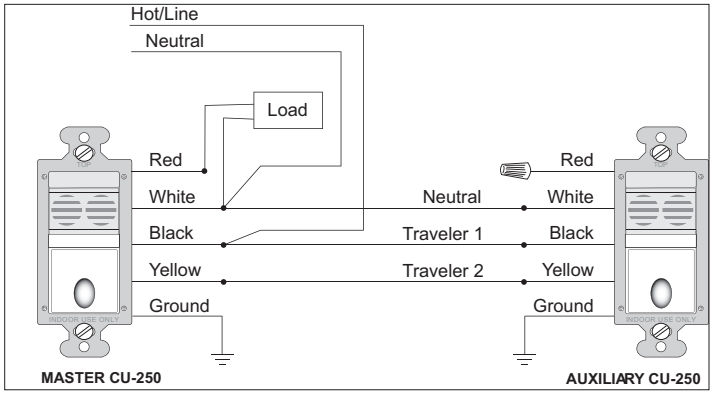


Fig. 3b: Reference wiring diagram, 3-way using two CU-250s

4. **Put the CU-250s (and RH-253s if applicable) into their respective wall boxes.**
Position them with the lens positioned above the **ON/OFF** button (lens at top, **ON/OFF** button at bottom). Secure to the wall box with the screws provided.
5. **Make any necessary adjustments.**
See the SENSOR ADJUSTMENT section for information.
6. **Install cover plate.**
Install industry standard decorator wall switch cover plate (not included).
7. **Restore power to the circuit.**
Turn on the breaker or replace the fuse.

IMPORTANT: Wire the auxiliary unit to the same branch circuit as the master unit and the load. If the load cannot be controlled from the auxiliary unit check wiring to be sure both the units and the load are on the same branch circuit.

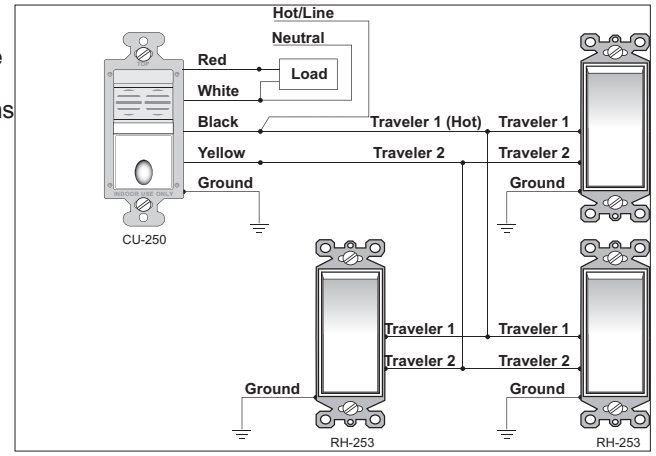


Fig. 3c: Multi-way wiring using one CU-250 and three RH-253s

INITIAL POWER-UP DELAY

There is an initial warm-up and calibration period the first time power is applied to the unit, after a power failure lasting more than 5 minutes and after the load is replaced. However, the lights can be turned **ON/OFF** manually by pressing the **ON/OFF** button at any time when power is supplied to the unit.

SENSOR ADJUSTMENT

To adjust the CU-250, you use controls located under the **ON/OFF** button. The wall switch cover plate must be removed to gain access to the adjustment dials under the **ON/OFF** button.

NOTE: For multi-way operation, the Time Delay adjustments should be the same in all sensors related to the same load.

1. Firmly grasp the side edges of the Lock Bar and gently pull it away from the switch face until it clicks. Do NOT attempt to pull the Lock Bar off of the switch!
2. Firmly grasp the side edges of the **ON/OFF** button. Slide the button downward approximately 1/2 inch to expose the adjustment dials.

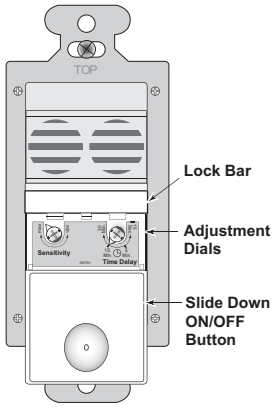


Fig. 5: Sensor Adjustment Controls

Adjusting the Time Delay

Turn the right dial counter-clockwise to reduce the amount of time the lights will remain **ON** after the last motion detection (minimum = 15 seconds). Turn the dial clockwise to increase this time delay (maximum = 30 minutes).
You can select the following values:
15 seconds • 5 minutes • 15 minutes • 30 minutes.

NOTE: Do not overturn the Time Delay adjustment dial!

Adjusting the Ultrasonic Sensitivity Level

This feature is factory set at around 70% of maximum. Turn the left dial counter-clockwise to reduce ultrasonic detection sensitivity. Turn the same dial clockwise to increase the ultrasonic detection sensitivity.

NOTE: Do not overturn the ultrasonic sensitivity adjustment dial!

TEST MODE

To test the detection coverage:

1. Press and hold the **ON/OFF** button. After 10 seconds the lighted switch turns off. The load turns **ON** if it was not already **ON**. The sensor is now in a TEST mode that lasts 5 minutes. (You can end the TEST mode sooner by pressing the **ON/OFF** button for another 10 seconds).

   During the TEST mode, the controlled load turns **ON** for 5 seconds each time the sensor that initiated the TEST mode detects occupancy.
2. Move out of the coverage area or stand very still. The controlled load turns **OFF** after 5 seconds if no motion is detected.
3. Move into the coverage area for the unit that initiated the TEST mode. The controlled load turns **ON** for 5 seconds each time the sensor detects motion. After 5 seconds expire without motion detection, the load turns **OFF**. The controlled load turns **ON** automatically with the next motion detection and stays **ON** for 5 seconds.
4. Repeat as necessary to ensure that the desired coverage areas are within detection range.
5. Increase or decrease the ultrasonic sensitivity level as needed.

   You can do this test for each CU-250 in your multi-way configuration. So that you can determine the actual coverage area for each multi-way switch individually, only the CU-250 that is in TEST mode will control the load.

TROUBLESHOOTING

Lighted switch is OFF, no load response to ON/OFF button press:

- Make certain that the circuit breaker is **ON** and functioning.

Lighted switch is ON, no load response to ON/OFF button press:

- Check the light bulb and/or motor switch on the fan mechanism.

Lighted switch is OFF, no load response to ON/OFF button press:

- Make certain that the circuit breaker is **ON** and functioning.

Lighted switch is ON, no load response to ON/OFF button press:

- Check the light bulb and/or motor switch on the fan mechanism.

Load will not turn OFF automatically:

- Press **ON/OFF** button. If the controlled load turns **OFF**, go to next step.
- The time delay can be set from 15 seconds to 30 minutes. Check the time delay setting for each CU-250 in your multi-way configuration. Ensure that all CU-250s have the same time delay setting.
- Ensure the front of the sensor is not blocked.
- Ensure that there is no movement within the coverage area for all the sensors related to the load for the set time delay. Air currents can cause false detection. Make sure the sensor is at least 6 feet (2 meters) away from air supply ducts, open windows, fans and exhaust fans. Reduce the ultrasonic sensitivity level slightly to eliminate false detection.

If load does not respond properly after following troubleshooting, turn OFF power to the circuit then check wire connections or call technical support.

COVER PLATES

Wattstopper CU wall switches fit behind industry standard decorator style switch cover plates.

WARRANTY INFORMATION

Wattstopper warranties 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.

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