Wattstopper®

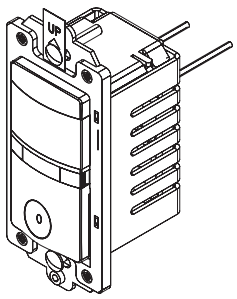
Multi-Way Dimming Wall Switch Vacancy Sensor

No: 24210 – 09/16 rev. 1

Installation Instructions • Instructions d'Installation • Instrucciones de Instalación

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

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



SPECIFICATIONS

Voltage	120VAC,60Hz
Load (Multi-Way)	25-500 Watt
Compatability	Incandescent
Time Delay Adjustment	15 seconds to 30 minutes
Environment	Indoor use only
Operating Temperature	32° to 104°F (0° to 40°C)
Humidity	95% RH, non-condensing
Electrical Supply Wire Requirement	
Minimum temperature rating	75°C (167°F)
Tools Needed	Insulated Screwdriver, Wire Strippers

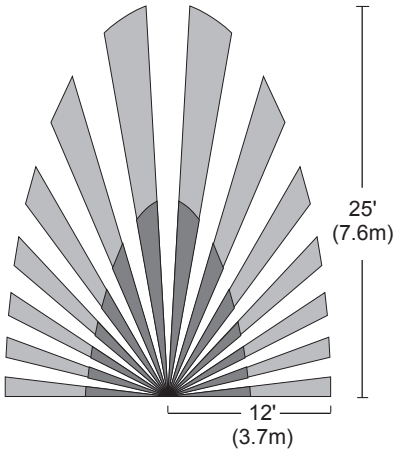
DESCRIPTION AND OPERATION

The CD-250 Multi-Way Dimming Wall Switch Vacancy Sensor is designed to replace a standard single pole or multi-way (3-way, 4-way) switch or dimmer. It is ideal for any indoor area where occupancy sensor-based manual ON/OFF and Dimming control is desirable.

Like a standard switch, you press the ON/OFF/DIM button to turn the dimmable lighting load ON and OFF. Unlike a standard switch, the CD-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 CD-250 automatically turns the load back ON. Like a standard dimmer, once the lighting load is ON, you can dim it UP or DOWN by pushing and holding the ON/OFF/DIM button. When you push the ON/OFF/DIM button to turn the dimmable load ON, the CD-250 recalls the last used dimming level.

The CD-250 can be wired with up to 3 additional CD-250s for multi-way Manual-ON/OFF, Auto-OFF of one or several loads (up to one load connected to each CD-250). It can also be wired to up to 4 RH-253 single pole momentary wall switches for multi-way Manual-ON/OFF Automatic-OFF control of one load.

Fig. 1: Sensor Coverage Area



Lighted Switch

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

The lighted switch ON/OFF/DIM button can be used to manually turn ON and OFF the lighting load and to dim it UP and DOWN.

To turn the load ON, tap firmly on the ON/OFF/DIM button once. The amber LED turns OFF and the load turns ON to the last used dimming level. The lighting load may or may not appear to be ON depending on how low the lights were set the last time they were dimmed.

Once the load has been turned ON, push and hold the ON/OFF/DIM button to dim the lights UP or DOWN. To reverse the dimming direction momentarily release the ON/OFF/DIM button, then push and hold it again. This feature will allow you to reach the desired dimming level quicker.

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. It is recommended to set all of the sensors related to the same load to the same time delay to ease understanding of the multi-way control operation as well as trouble shooting. For additional information on how to adjust it, please read the SENSOR ADJUSTMENT section of this installation manual.

Coverage Area

The CD-250 has a maximum range of 180 degrees and a coverage area of 600 sq. feet (56 sq. meters). The sensor must have a clear and unobstructed view of the coverage area. Objects blocking the sensor's lens may prevent detection thereby causing the light to turn OFF even though someone is in the area.

WINDOWS, GLASS DOORS, AND OTHER TRANSPARENT BARRIERS WILL OBSTRUCT THE SENSOR'S VIEW AND PREVENT DETECTION.

INITIAL POWER-UP DELAY & CALIBRATION

There is an initial one minute 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 dimming load is replaced.
Load Calibration: The CD-250 calibrates its dimming range to the load's wattage rating by briefly dimming the load up and down from its minimum output (approx. 10%) to its maximum.

INSTALLATION & WIRING

CAUTION — WARNING

TO REDUCE THE RISK OF OVERHEATING AND POSSIBLE DAMAGE TO OTHER EQUIPMENT, DO NOT INSTALL TO CONTROL A RECEPTACLE, A MOTOR-OPERATED APPLIANCE, A FLUORESCENT LIGHTING FIXTURE, OR A TRANSFORMER-SUPPLIED APPLIANCE.

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

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 4a, 4b, and 4c describe each circuit application.

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

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 CD-250 to a single pole (see Fig. 2) or 3-way circuit (see Fig. 2a).
   In a 3-way circuit, 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

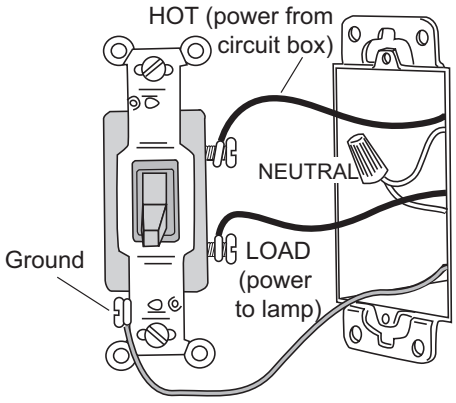
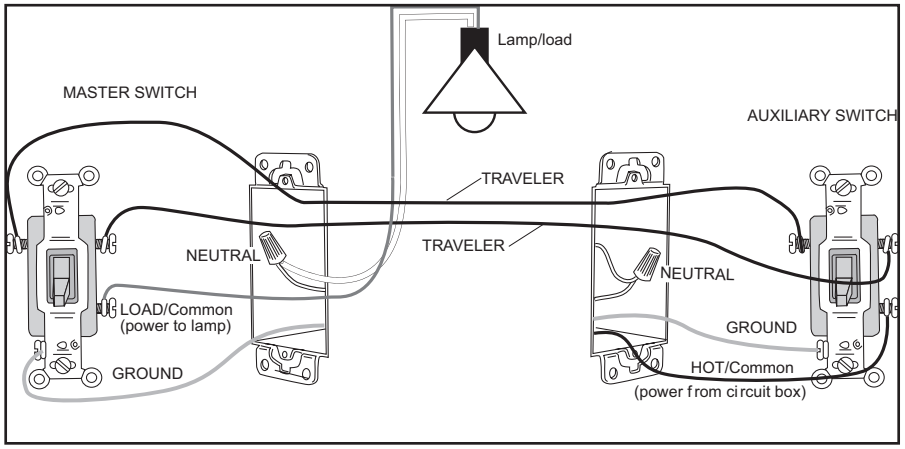


Fig. 2a: Typical 3-way Switch Wiring



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 Gauge," in Fig. 3. (approx. 1/2 inch).

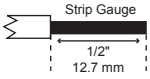


Fig. 3: Wire Stripping

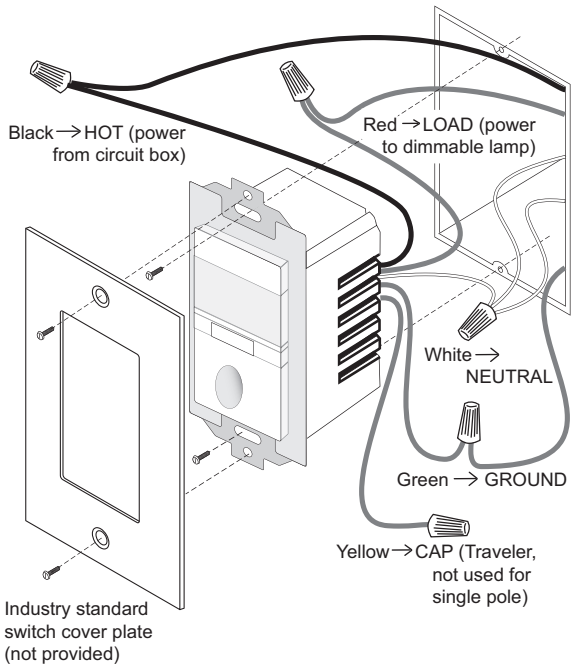
FOR YOUR SAFETY: CONNECTING A PROPER GROUND TO THE SENSOR PROVIDES PROTECTION AGAINST ELECTRICAL SHOCK IN THE EVENT OF CERTAIN FAULT CONDITIONS. IF A PROPER GROUND IS NOT AVAILABLE, CONSULT WITH A QUALIFIED ELECTRICIAN BEFORECONTINUING INSTALLATION.

4. **Circuit Applications**

a. **Single pole wiring:**

- Twist the existing wires together with the wire leads on the CD-250 sensor as indicated below. Cap them securely using the wire nuts provided (See Fig 4a).
- Connect the green or non-insulated (copper) GROUND wire from the circuit to the green wire on the CD-250.
- Connect the NEUTRAL wire from the circuit and from the lamp (LOAD) to the white wire on the CD-250.
- Connect the power wire from the circuit box (HOT) to the black wire on the CD-250.
- Connect the power wire to the lamp (LOAD) to the red wire on the CD-250.
- Cap the yellow wire on the CD-250. It is not used in single pole applications.

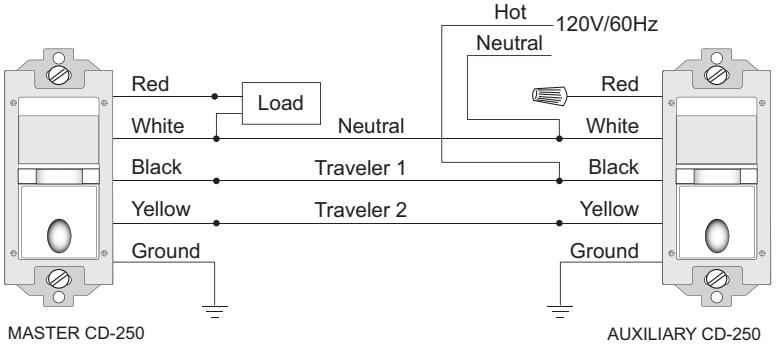
Fig. 4a: Sensor orientation, single pole wire connections and wall box assembly



b. **3-way wiring using two CD-250s:**

- Twist the existing wires together with the wire leads on the CD-250 sensors as indicated below. Cap them securely using wire nuts provided. (See Fig. 4b)
- Connect the green or non-insulated (copper) GROUND wire from the circuit to the green wire on the CD-250.
- Connect the NEUTRAL wire from the circuit and from the lamp (LOAD) to the white wire on the master CD-250.
- The term “master” designates the CD-250 that connects to the load.
- Connect the NEUTRAL wire from the circuit in the other wiring box to the white wire on the auxiliary CD-250.
- Connect the power wire from the circuit box (HOT) to the black wire on the auxiliary CD-250 and to the TRAVELER 1 wire.
- Connect the TRAVELER 1 wire from the black wire of the auxiliary CD-250 to the black wire of the master CD-250.
- Connect the lamp power (LOAD) to the red wire on the master CD-250.
- Cap the red wire on the auxiliary CD-250.
- Connect the TRAVELER 2 wire coming from the yellow wire of another CD-250 to the yellow wire of the CD-250 that you are wiring.

Fig. 4b: Wiring Diagram, 3-Way Using Two DC-250s

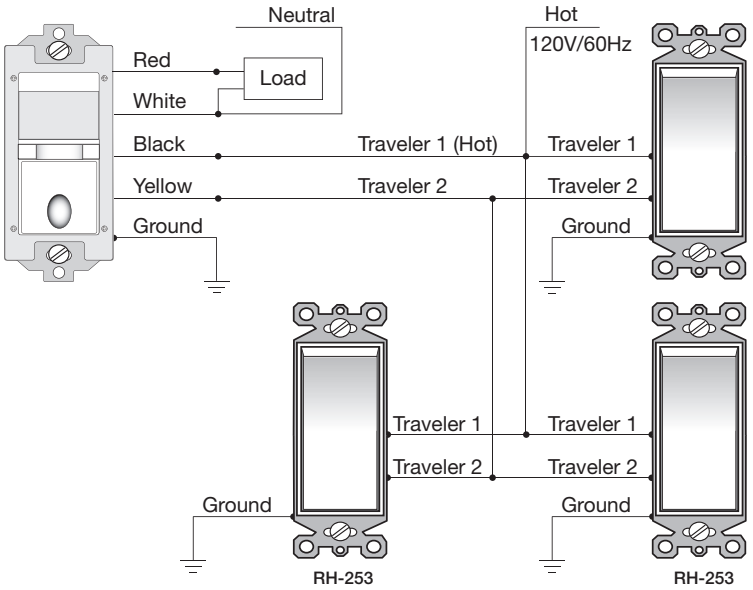


c. **Multi-way wiring using one CD-250 and up to four RH-253s:**

One CD-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 CD-250 must be installed in the wiring wall box that connects to the load.**

- Connect the existing wires to the wire leads on the CD-250 sensor as indicated below (See Fig. 4c). Cap them securely using wire nuts provided.
- Connect the green or non-insulated (copper) GROUND wire from the circuit to the green wire on the CD-250.
- Connect the NEUTRAL wire from the circuit and from the lamp (LOAD) to the white wire on the CD-250.
- Connect the power wire from the circuit box (HOT) to one terminal on each RH-253 single pole momentary wall switch and to the TRAVELER 1 wire.
- Connect the TRAVELER 1 wire coming from each RH-253 wiring box to the black wire of the CD-250.
- Connect the lamp power (LOAD) to the red wire on the CD-250.
- Connect the TRAVELER 2 wire to the other side of each RH-253 single pole momentary wall switch and to the yellow wire of the CD-250.

Fig. 4c: Multi-Way Wiring Using One CD-250 and three RH-253s



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

SENSOR ADJUSTMENT

To adjust the CD-250, you use a control located under the ON/OFF/DIM button. The wall switch cover plate must be removed to gain access to the time adjustment dial under the ON/OFF/DIM button.

For multi-way operation, the Time Delay 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/DIM button. Slide the button downward approximately 1/2 inch to expose the adjustment dials.

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 same dial clockwise to increase this time delay (maximum = 30 minutes). You can only select the following values: 15 seconds/5 minutes/15 minutes/30 minutes.

Warning: Do not overturn the Time Delay adjustment dial!

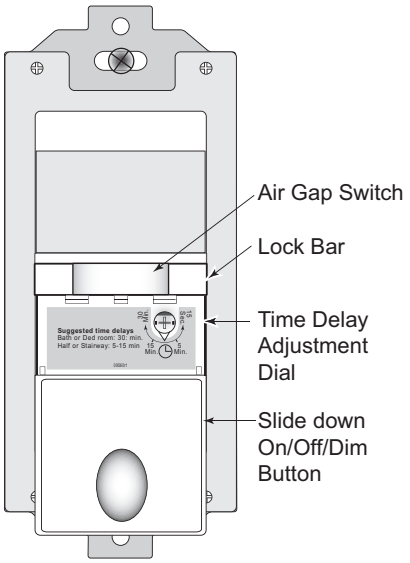


Fig. 5: Sensor Adjustment Controls

TEST MODE

To test the detection coverage:

1. Press and hold the ON/OFF/DIM 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/DIM 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.

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

REPLACING LAMPS

When replacing a lamp connected to an CD-250, use the Air Gap Isolation feature for safety. If you have more than one CD-250 controlling one or various loads in a multi-way wiring configuration, apply the instructions below to all CD-250s for safety.

1. Push in the Air Gap Switch shown in Figure 5 so that it clicks and locks into a depressed position below the surface of the rest of the CD-250. This engages the Air Gap, which stops electricity from flowing to the connected load.
2. After replacing the lamp(s), press the Air Gap Switch so that it returns to a position that is flush with the surface of the rest of the CD-250. This allows the dimming sensor to control the lighting load correctly.
3. The CD-250 then calibrates its dimming range to the load's wattage rating by briefly dimming the load up and down from its minimum output (approx. 10%) to its maximum.

TROUBLESHOOTING

Check the position of the Air Gap Switch on all CD-250s before beginning troubleshooting.

Lighted switch is OFF, no load response to ON/OFF/DIM button(s) press or to any of the RH-253 momentary wall switches (if applicable):

- Make certain that the circuit breaker is on and functioning.

Lighted switch is **ON**, no load response to **ON/OFF/DIM** button(s) press or to any of the RH-253 momentary wall switches (if applicable):

- Check the controlled dimmable lighting load(s). Make sure that the load(s) connected to the CD-250s is (are) between 25- 500 watts.
- The lighting load (s) may not appear to be **ON** if the last used dimming level was very low. To verify if this is the case, firmly tap the **ON/OFF/DIM** button one time. The amber LED should turn off. Next, press and hold the **ON/OFF/DIM** button to turn UP the lighting level. If the lights do not get brighter, call technical support.

Load will not turn OFF automatically:

- Press the **ON/OFF/DIM** 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 CD-250 in your multi-way configuration. Ensure that all CD-250s have the same time delay setting. Ensure that there is no movement within any of the sensors' view for the set time period. Hot air currents and heat radiant devices can cause false detection. Make sure the sensor is at least 6 feet (2 meters) away from devices that are a significant heat source (e.g., heater, heater vent, high wattage light bulb).

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 CD 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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