



# Replacing Wall Switches and Receptacles

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## Editor's note

The printed version of this publication includes illustrations.

This guide will help you safely and successfully replace a defective electrical switch or receptacle. For other wiring problems beyond the scope of this publication, consult the National Electric Code.

To begin these replacements, shut off the electricity to the circuit where you will be working. If you have circuit breakers, trip the appropriate breaker to the "off" position. If you have fuses, remove the fuse for the circuit. It's a good idea to attach a note telling why the circuit is shut off.

If in doubt, shut off the power at the main switch. Lock it in the "off" position if there is a chance that someone may turn it back on.

Usually the only tools you'll need are a medium-sized screwdriver and needle-nosed pliers. Pliers are helpful for removing and attaching wires to screws.

You may need a small-bladed screwdriver to disengage wire from the "push-in" terminals on some switches and receptacles.

## Single pole switches

Most lighting loads are operated by single pole snap switches. The switch is always placed in the hot line. Replacing a single pole switch is illustrated in the printed version of this publication.

Steps for replacing a single pole switch:

1. Shut off power to the circuit.
2. Remove cover plate.
3. Remove screws holding device in wall box.
4. Pull device from box.
5. Loosen terminal screws.
6. Remove conductor wires. You may need needle-nosed pliers.

7. In case of push-in terminals, push small screwdriver into the slot near the conductor to release the conductor.
8. After removing the defective switch, install the new switch using the reverse procedure from that described in the steps above.

You can use a white wire as a hot wire in switch loops when wiring with cable provided that the white wire is not the return conductor from the switch to the outlet. The grounded conductor must always be white and must be connected to the silver-colored screw on the outlet. The hot wire must be connected to the brass screw. It is not permissible to connect more than one wire to the screw terminal.

## Three-way switches

A light or other electrical load can be operated from two locations by using two three-way switches. These switches have three terminals, one of which is called a common terminal. Two lighting outlets can be connected for operation of both lights from either of two locations. If wired with cable, it would require a two-wire cable from the source to the first light, three-wire cables from the lights to the switches and two two-wire cables between the lights.

Note that the grounded wire is connected to the silver-colored terminals of the lights, the hot wire from the source is connected to the common terminal of one three-way switch, the common terminal of the other three-way switch is connected to the lights and the two remaining terminals of one switch are connected to the two remaining terminals of the other switch. Replacing a three-way switch is illustrated in the printed version of this publication.

Steps for replacing a three-way switch:

1. Follow the procedure for single pole switches in removing the switch from the box.
2. Note that one terminal is darker than the other two and that three wires are connected to the switch. Remove the conductor from the dark terminal and attach it to the dark terminal of the new switch. Attach the other two conductors to the light colored terminals and replace them in the wall box in the opposite way from how you removed them.

## Four-way switches

Four-way switches are normally constructed so that a switching action occurs. A light can be operated from any of three locations by connecting two three-way switches and a four-way switch. Replacing a four-way switch is illustrated in the printed version of this publication.

Steps for replacing a four-way switch:

1. Follow the procedure for single pole switches in removing the switch from the wall box.
2. Note that four conductors are connected to this switch. Remove two wires from one end and attach them to the corresponding terminals of the new switch. Then remove the other two and connect them to the remaining terminals.

Before replacing the switch, test to make certain that light may be turned on and off from any switch regardless of the position of the other switches. If it does not perform properly, interchange any two wires on the four-way switch diagonally opposite each other. Replace in the wall box.

### **Control from more than three locations**

Lights may be controlled from more than three locations by placing additional four-way switches in the circuit between the three-way switches.

## **Receptacle outlets**

The National Electric Code (NEC) requires that all outlets in new construction be of the grounding type. When receptacle outlets of the nongrounding type are replaced, the NEC requires that they be replaced with grounding-type outlets if the receptacle outlet can be grounded to an equipment grounding conductor. (NEC Section 210-7(d).)

### **Note**

An equipment-grounding conductor must either be bare or have green insulation. The green screw on the outlet must not be connected to the white, grounded conductor.

A grounding-type receptacle outlet may also be grounded to a properly bonded water pipe (NEC Section 250-50(b)). Where a grounding means does not exist in the receptacle enclosure, either a nongrounding receptacle or a ground-fault circuit-interrupter (GFCI) type of receptacle must be used, provided that the GFCI does not supply other outlets. Replacing a wall receptacle is illustrated in the printed version of this publication.

Steps for replacing wall receptacle:

1. The procedure for removing a receptacle from the wall box is the same as that for a single pole switch.
2. Note that the screws on the one side are silver and that the screws (or the plate under the screws) on the other side are brass or copper colored. The white conductors (grounded) should be attached to the silver screws and the black or red (hot) conductors to the brass. If there are only push-in terminals, those for the white conductors will be marked "white."
3. The bare or green grounding conductor, if any, should be connected to the grounding screw, usually painted green.
4. Replace the receptacle in the wall box.

### **Test the circuit**

Once a device has been replaced, turn the circuit on and test it to make sure it works.