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Replacing switches and receptacles is simple.

The Basics of Switches and Receptacles

Skill Level: Intermediate

Maybe you'd like to replace your old light switches with attractive new decorator models. Or maybe you want to take advantage of the many specialty switches and receptacles available; dimmer switches, timer switches or child proof receptacles, for example. And if you live in an older home with no [GFCI \(ground fault circuit interrupter\) receptacles](#) in potentially wet areas like bathrooms and kitchens, this is a problem you'll want to address immediately in order to increase the safety of your family. Lowe's is happy to provide this information as a [service](#) to you.

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Safety Tips

Before you start this project, [click here](#) for a basic electrical overview.

When working with electricity always:

- Turn off the power.
- Test the wires to ensure the power is off.
- Lock out the panel box, so no one can accidentally turn the power back on while you are working.
- Check with local authorities to see if a permit is required.
- Have your work checked by an inspector.
- Wear eye goggles and a dust mask.
- To avoid overloading the circuit, consult a licensed electrician.



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Working with Electricity

- The first rule when working with home electricity is to **always turn off the power to the circuit you on which plan to work**. Do this at the service panel (breaker box), and check the circuit to make sure it is off. Use a circuit tester to confirm that the power is off. Circuit

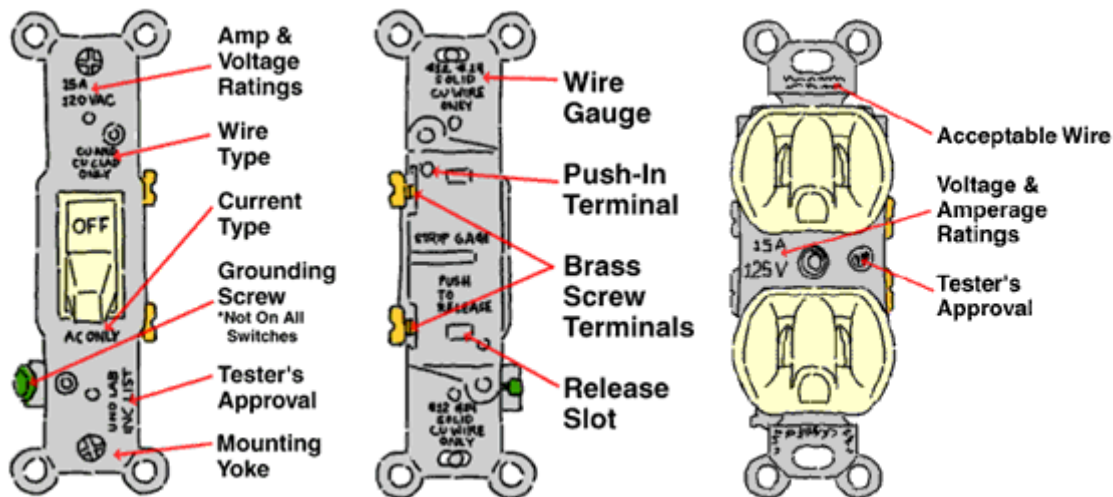
testers are used to test ground and hot wires, as well as for determining whether a receptacle or switch is still carrying current. They are also necessary for testing circuits when you are replacing bad switches or receptacles. The probes must be touched to the wires themselves (bypassing the switch or receptacle) to determine if current is still available to the circuit. Once the circuit has been turned off at the breaker and has been checked, there is no need to fear working with the wiring on that particular circuit.

- The second rule to remember when replacing receptacles and switches is to **wire the new one back in the same way the old one came out!** It really can be that simple. Take note of the connections before you disconnect them. Make yourself a sketch of how the switch or receptacle is wired or mark the wires with masking tape and a pencil so you will know how to put them back.

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Reading Switches and Receptacles

Use the diagrams below to decode the information on your switches and receptacles.



Receptacles (Outlets)

Unlike switches, which come in several different varieties, most receptacles look pretty much the same. There are differences in amperage and voltage ratings. And receptacles may be either CU CLAD or CO/ALR (for aluminum) rated.

Ground Fault Circuit Interrupter (GFCI) Receptacles

Ground Fault Circuit Interrupters should be installed in circuits which are located in potentially wet areas such as kitchens, bathrooms, garages, workshops and outdoor locations. Although they are now required by code in such areas, older homes were built without them. They are inexpensive, easy to install and they may save your life!

- Electricity always wants to find a ground, and it attempts to reach that ground in the shortest route possible. A ground fault is a short circuit in which current travels through a path you don't want it to in order to find a ground. The path could be you! Being wet causes you to be a better electrical conductor, and this is the reason damp locations should have a GFCI receptacle at the beginning of the circuit. GFCI's monitor the current going to and coming from the receptacle. Within a fraction of a second of detecting a current imbalance, a properly installed GFCI shuts that circuit down. You may get shocked, but you should be safe from electrocution. All receptacles installed in line after the GFCI are also protected.
- GFCI's have test and reset buttons. Once the circuit has been broken, the receptacles in line after the GFCI will not work until it has been reset. So, in the room you are trying to protect, install the GFCI in the receptacle closest to the service panel end of the house. Hopefully, this

will be closer to the beginning of the circuit. Then, to determine which receptacles are protected by the GFCI, restore the power and push the test button. The GFCI receptacle and any others that follow it in the circuit will be dead. If you are lucky, that will include all of the other receptacles in the room. If the other receptacles you wish to protect are still active, turn off the power to the circuit, remove the GFCI, and install it in place of another receptacle on the other side of the room. Retest as before.

- GFCI receptacles may come with wire leads instead of screw terminals. The leads are connected to the wires with plastic wire nuts.

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Basic Switch Types

Replace switches with replacements of the same type. For example, a single pole decorator switch will directly replace a conventional single pole switch. You cannot replace a three way switch with a single pole switch. Replacement switches should also be of the same amperage and voltage ratings as those they replace. This information is listed on [the face of both switches and receptacles](#). The same holds true with specialty switches; replace double-pole switches with double-pole dimmers, and three-way switches with three-way dimmers. There is a difference, however, with many specialty switches. They may come with wire leads and no screw terminal connections. In this case the wires are connected with wire nuts, just like [pigtails](#). Switches with leads may look different from the switches they replace, but they are basically the same. When drawing your diagram for replacement, keep these things in mind. The black wire coming from the new switch is the same as a brass colored terminal connector on the old switch. A red wire, if present, represents another brass colored terminal. The white wire is the same as the silver terminal, and the green wire is the ground, just like the grounding screw terminal of the old switch.

Single Pole Switches

Single pole switches are the simplest and most often used switches. They are used to switch receptacles or fixtures from a single location. So, unless you can turn on a light or a series of receptacles from more than one place in your home, it should be wired with a single pole switch. These switches have on and off markings, and should be installed so the on marking faces up.

Double Pole Switches

Double pole switches work like single pole switches except that they can receive two hot wires. For this reason, they are often used as switches for 240-volt receptacles and appliances. These switches have on and off markings, and should be installed so the on marking faces up.

Three-Way Switches

Three-way switches are usually used to provide two separate switching points for a single fixture. These switches must always be installed in pairs and do not have on and off markings. Three-way switches have three screw terminals. One of the terminals is darker than the others and is called the common screw terminal. When replacing these switches, be sure to mark the common wire before removing the old switch so you'll know which wire to hook to this terminal. The other two terminals are called traveler terminals. Each of the two remaining wires can be attached to either of these terminals. It doesn't matter which wire goes to which terminal.

Dimmer Switches

These specialty switches allow you to increase or decrease the brightness of an incandescent light. They come in single pole and three-way models and can be used for incandescent lights only. Dimmers can come with control knobs, sliders or toggles. When choosing a dimmer, be sure that your fixture wattage does not exceed that which can be handled by the dimmer. Three-position toggle dimmers can handle a maximum of 300 watts. Knob-controlled rheostat models can handle up to 600 watts. Dimmers often come with wire leads instead of screw terminals. A three-way dimmer switch has an extra wire lead which should be connected to the wire previously connected to the brass terminal (common) on the old switch. Only one of the three-way switches going to a light can be replaced with a dimmer.

Time Delay Switches

These switches have timers which allow you to set a period of time that the circuit will remain on. These switches have two black wire leads which are each tied to one of the two black wires in the box. The two white wires in the box are tied together in this installation, and the ground wires are tied to themselves and pigtailed to the metal box.

Timeclock Switches

These switches can be set to turn themselves on or off based on a programmed timer. They can be used to control your lights while you are away from home to make it look like someone is at home. They may only be installed in the middle of the run circuits. These switches have three wire leads; white, black and red. The white lead is connected to the other neutral wires (white). The black lead is connected to the hot wire (black) coming into the box. The red wire is connected to the black wire going to the fixture to be controlled with the timer.

Pilot Light Switches

These switches have a light to indicate when the circuit is active so you'll know at a glance. They may only be installed in the middle of the run circuits.

Receptacle Switches

Receptacle switches allow you to have both a switch and a receptacle in one box. These switches must be wired into the middle of a circuit. They have one silver terminal, and three darker ones. The incoming hot wire (black) is attached to a terminal on the side where two brass terminals are connected with a tab. The black wire going to the fixture is attached to the copper terminal on the side which has both a copper and silver colored terminal. The two white wires are pigtailed together and to the silver terminal. A ground wire is pigtailed to the other ground wires and the metal box ground terminal.

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Was this information helpful? Please [let us know](#) your do-it-yourself experiences. We'd love to hear from you!

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