

DATE: October 19, 1998
TO: Gale Greenleaf, Instructor
FROM: Tom Penick, Student
SUBJECT: Instructions for installing an electrical outlet

INTRODUCTION

The purpose of these instructions is to enable the non-electrician to safely install an electrical outlet in an existing sheetrock wall.

BEFORE YOU BEGIN

These instructions are for the installation of an electrical outlet on an interior sheetrock wall. The electrical outlet will be connected to an existing circuit. If the intended load on this outlet is too high, it will require a separate circuit. Before continuing, answer the following questions:

- Is the intended load a washing machine, microwave oven, toaster oven, space heater, hair dryer, or vacuum cleaner?
- Is the intended load a motor of ½-horsepower or greater?

If the answer to either of these questions is yes or if the intended load is greater than 10 amps, then a separate circuit is required. The installation of a separate circuit is beyond the scope of these instructions.

MATERIALS REQUIRED FOR INSTALLATION

- Electrical cable, 12-2 NM with ground, of sufficient length to reach from the existing electrical outlet to the new electrical outlet plus four feet
- 1 single-gang, snap-in, electrical box
- 1 receptacle, 115-volt, 15-amp
- 3 wire nuts, red (color denotes size)
- pencil
- keyhole saw or saber saw
- medium-tip flat blade screwdriver
- small-tip flat blade screwdriver
- awl
- electrician's pliers or other heavy-duty pliers
- wire strippers, suitable for #12 wire
- electrician's knife or utility knife

SELECTING A LOCATION

The new electrical outlet must be located near an existing electrical outlet. The existing outlet may be on the opposite side of the wall, but must be between the same two studs as the new electrical outlet. Studs are typically spaced on 16" centers but there will be additional studs at door frames, window frames, and wall intersections. Existing outlets are usually mounted against a stud. For selecting a location, you will need a tape measure and a pencil.

1. PROCEDURE FOR SELECTING A LOCATION

- A. Select a prospective existing electrical outlet. It must be a receptacle, not a switch.
- B. At the breaker box, turn off power to the existing outlet. If you don't know which breaker, then turn off the smaller, single-handled breakers one at a time. It is preferable to leave them off until you have found the breaker for the existing outlet. Removing and

restoring electrical power quickly can cause power surges that may be harmful to some equipment.

TIP *If you are working alone and the breaker box is at some distance from the existing electrical outlet, plug a clock radio into the outlet, turn it on, and turn the volume up so that you can hear the radio from the breaker box. When you have turned off the proper breaker, the radio will go silent. Note that most radios will not go silent immediately but will take a second or two to consume residual power in the internal supply.*

- C. Test the existing electrical outlet to verify that the power is off. This can be done with a voltmeter or by trying to operate a working appliance from the outlet.
- D. Remove the outlet cover mounting screw and remove the outlet cover.
- E. It may be possible to see the stud on one side of the outlet box. If not, work an awl into the sheetrock against the outlet box on the left- and right-hand sides until it can be determined on which side the stud is located.
- F. The new electrical outlet must be mounted in the wall space on the same side of the stud as the existing electrical outlet. It may be mounted on either side of the wall.
- G. Select a tentative location for the new electrical outlet. If the new outlet is to be adjacent to the existing outlet, allow about 3" of separation to permit secure mounting of the new outlet box. Mark the location lightly in pencil.

2. VERIFYING AND PREPARING THE LOCATION

- A. Using the awl, punch a small hole in the sheetrock in the center of the location you have selected for the new electrical outlet.
- B. Cut a 12" piece of 12-2 NM electrical cable and remove one of the insulated conductors from the cable.
- C. Form a "handle" on one end of the insulated conductor by bending a loop.
- D. Using the wire strippers, remove about two inches of insulation from the straight end of the wire. Continue removing two-inch sections of insulation until you have removed about eight inches of insulation.
- E. Use the wire from steps 9-11 to probe the inside of the wall through the small hole that you made in step 8. Determine if there is sufficient depth to mount the snap-in electrical box. If not, then select a different location for the new electrical outlet box that meets the criteria in steps nine and ten, and make a new hole for your probe. When a location having adequate depth has been found, proceed to the next step.
- F. Enlarge the hole to about 3/8" diameter using a screwdriver.
- G. Use the wire from steps 9-11 to probe the interior of the wall. This time, bend the bare portion of your wire into a curve and probe to all sides of the hole to insure that there are no obstacles to interfere with the installation.

INSTALLING THE ELECTRICAL OUTLET

You have determined that the location is appropriate for mounting a new electrical box. The opening may be cut into the wall.

3. CUTTING OUT THE OPENING FOR THE NEW OUTLET

- A. If the hole is near a stud, then do not cut away any more sheetrock in the direction of the stud. The snap-in box requires about a half-inch of space on either side for its retaining bracket, so it cannot be mounted against a stud. Enlarge the hole to 1-1/2" diameter by using a knife to shave away sheetrock from the sides of the hole.
- B. Probe the wall space with your finger to make sure there are no cables or pipes that could be damaged when sawing the opening for the snap-in electrical box.
- C. Using the snap-in electrical box as a template, draw an outline of the opening to be cut for mounting the snap-in box. Do not cut out for the metal tabs at the top and bottom of the snap-in box. These tabs will rest against the sheetrock to stop the box from passing completely through the opening.
- D. The outline you have marked should be a rectangle with a slight bump on the top and bottom. It may be necessary to cut the opening slightly wider to accommodate the retaining bracket. Carefully cut out the opening with a keyhole saw.

4. INSTALLING THE NEW ELECTRICAL CABLE

WARNING! To prevent serious injury, the electrical power must be turned off at the breaker box before removing the existing receptacle.

- A. Remove the existing receptacle by unscrewing the two mounting screws and pulling the receptacle out as far as the attached wires will permit.
- B. If there is only one cable entering the existing electrical box, then kink the cable close to the box so that the attached receptacle is out of the way and proceed to the next step. If there are two or more cables entering the existing electrical box, then detach them from the receptacle. If the conductors have been attached by pushing them into the back of the receptacle, remove them one at a time by grasping the conductor in one hand and the receptacle in the other and pulling straight out while vigorously rotating the receptacle back and forth about the axis of the wire. No, it isn't easy.
- C. Make a new cable entry in the existing electrical box or enlarge an existing entry.
- D. Pass the new 12-2 NM cable through this entry and into the wall space.
- E. From the new receptacle location, retrieve the end of the new 12-2 NM cable and pull the end of the cable out of the wall.

5. INSTALLING THE NEW ELECTRICAL OUTLET

- A. On the new snap-in electrical box, turn the mounting bracket screw counterclockwise until there are only a few threads left in the bracket.
- B. Insert the end of the 12-2 NM cable into the snap-in electrical box through one of the cable entries.
- C. Remove 8" of the outer sheath from this end of the 12-2 NM cable.
- D. On the new receptacle, break off the four circular tabs near the two mounting screws.
- E. Strip the ends of the black and white conductors. Attach the white wire to the silver terminal, the black wire to the brass terminal, and the bare wire to the green terminal of the new receptacle.

- F. Insert the new snap-in electrical box into the opening in the wall. When it is seated, use a screwdriver to push the mounting bracket screw flush with the back of the snap-in box. Then turn the screw clockwise until the box is secured firmly in the wall.
- G. Fold the 12-2 NM cable neatly into the new snap-in electrical box, insuring that some of the sheathed portion of the cable remains inside the snap-in box.
- H. Mount the new receptacle in the snap-in electrical box using the two integral mounting screws. Install the cover plate.

6. REINSTALLING THE EXISTING ELECTRICAL OUTLET

- A. Remove the outer sheath from the new 12-2 NM cable so that only about ½-inch of the sheathed portion of the cable remains in the existing electrical box.
- B. Cut an eight-inch length of bare wire from the new cable. Trim the existing bare ground wire(s) to six inches in length. Twist the existing bare wire(s) and the new length of bare wire together tightly and trim the ends off square. Twist a red wire nut tightly onto this junction.
- C. Terminate the remaining bare wire at the green screw on the existing receptacle.
- D. Use procedure A below if there is only one existing cable in the existing electrical box. Otherwise use procedures B through E.
- A. Trim the black and white wires of the new 12-2 NM cable to eight inches. Terminate the new white wire to a silver terminal. Terminate the new black wire to a brass terminal. Proceed to step 43.
- B. Free the ends of the existing black and white wires and straighten them. From the new 12-2 NM cable, cut one eight-inch length from each of the black and white wires. Strip ¾-inch of insulation from each end of these two wires.
- C. Trim all black and white wires entering the existing electrical box to six inches. Strip ¾-inch of insulation from the ends of these wires.
- D. Twist the ends of the white wires together, including one end of the eight-inch piece from step B. Trim the ends square and secure tightly with a red wire nut. Repeat this step for the black wires.
- E. Terminate the free ends of the black and white wires to the existing receptacle, connecting white to the silver terminal and black to the brass terminal.
- E. Fold the wires neatly and compactly into the existing electrical box, taking care that bare ground wires are routed away from terminals.
- F. Secure the existing receptacle with its two mounting screws and reinstall the receptacle cover.
- G. Turn on the breaker and check that both the existing outlet and the new outlet are functional.

IN CASE OF DIFFICULTY

If either the existing outlet or the new outlet fails to function, turn off the breaker and then recheck all electrical connections. A wiring problem at either outlet can cause trouble at the new

electrical outlet. If you need assistance, contact an electrical service company such as Fox Service at 442-6782.