



## Identification and Mounting of Electrical Device Boxes 26106

**Program:** Electrician Technician

**Course:** EL130

**Objectives:** Under the supervision of your instructor, you should be able to do the following:

- Size and Install outlet boxes
- Identify boxes and their applications

**Lab Equipment:**

- Wood and metal bays

**Required Tools:**

- Hammer
- Hand drill
- Ladder
- Tape Measure
- Philipps screwdriver

**Materials:**

- 1 - Bath exhaust fan
- 3 - Single gang side nail boxes
- 1 - New construction Recessed light
- 1 - 4/S metal box
- 1 - ½" raised ring cover
- 1 - 4/O box on hanger bar
- 1 - 2 gang plastic side nail box
- 1 - Pencil
- 10 - drywall screw
- 10 - staples

**Safety:**

- Hard Hat
- Safety glasses

**Resources:** N/A



**Time Required:** One Day (300 min.)

**Shop Maintenance:**

- All work will cease 20 minutes prior to the end of class.
- All work areas must be cleaned.
- Tools and equipment must be cleaned and returned to the designated areas (cage, tool room, cabinets etc.)
- Any broken or missing tools must be reported immediately.
- Tools and equipment are student's responsibility

**Procedures:** *(Eye protection must always be worn)*

- Enforce all safe work practices including eye and hand protection.
- Set out an assortment of various sized and types of boxes to have students identify and state their purpose. (Based on what is available in lab)
- Emphasize the importance of verifying that nothing will interfere with drilling holes in any blind or hollow surfaces.
- Check the level of the box after installation.

*This performance project first requires you to identify various types of device boxes and state their usage. Then properly mount different boxes according to code. Follow the layout given to you by your instructor*

**Switch Box: *(Single gang box), Side nail box***

- Measure 45" from the floor and mark with pencil on the stud.
- Hold the single gang box using the thumb and index finger placed on the front and back of the box and hold ½" out from stud and the top of the box lined up with the pencil mark.
- Nail the top nail first until the box is flush with the stud and the nail is flush to the box.

**Switch Box: *(Single gang box), Front nail box***

- Measure 45" from the floor and mark with pencil on the stud, on the next bay over from the switch.
- Line up the front top of the box with the line you just made
- Use drywall screws (if on wood), or self-tap screws (if on metal), to secure the box in place

**GFCI Outlet: *(Single gang box)***

- Measure 45" from the floor and mark with pencil on the stud, on the next bay over from the switch.
- Hold the single gang box using the thumb and index finger placed on the front and back of the box and hold ½" out from stud and the top of the box lined up with the pencil mark.
- Confirm the top of the box lines up with the top of the switch box.
- Nail the top nail first until the box is flush with the stud and the nail is flush to the box.

**Lower Outlet: *(Single gang box)***



- Measure 16" from the floor and mark with pencil on the stud.
- Hold the single gang box using the thumb and index finger placed on the front and back of the top of the box and hold  $\frac{1}{2}$ " out from stud and the top of the box lined up with the pencil mark.
- Nail the top nail first until the box is flush with the stud and the nail is flush to the box.

**Wall light: (4/O box on hanger bar):** when a ceiling box spans two joists, this two-piece bar can be narrowed or expanded to fit the space between them. As a plus, the box will slide along the bar, allowing you to create the perfect placement for a lighting fixture.

- Measure to the center of where the lights height will be on the closest stud, and mark with a pencil.
- Measure to the center of where the lights height will be on the opposite stud of the bay the light will be in, and mark with a pencil.
- Make sure the front of the 4/O box is  $\frac{1}{2}$ " past the front of the stud, and then secure the bar using bent flat portion by using either a staple or drywall screw to the studs on both sides.
- Measure to the center of the location of the light will be and slide the box over, then tighten the screw.

#### **Wall light on stud:**

- **4/O side nail light:**
  - Mark the stud with an arrow to which side of the stud the box needs to be at a height of 76", this will be the center of the light
  - Make sure the front of the 4/O box is  $\frac{1}{2}$ " past the front of the stud, and then nail the box in place. Make sure the box is flush with the side of the stud.
- **Pancake:**
  - Mark the stud at a height of 76", then mark a line going down the middle, perpendicular, to the line you just made. Should have a cross mark.
  - Mound the pancake so the center of the box is where the two lines meet with two drywall screws. Make sure the wire entry point is open and not blocked behind the stud.
  - A good rule of thumb is to mount the pancake box so the two screws where the light fixture will attach are diagonal and not horizontal or vertical. This allows the light to be hugged easier.

#### **Recessed Light:**

- Measure both the length and width of the room/bay you are working with and mark the center. To do this:
  - Find the stud that goes parallel with the way you are measuring, then mark where the center is on the stud.
  - Measure the other distance of the ceiling that is perpendicular to the stud you just marked.



- Once you find the center, mark on the stud where you have center how far the new center will be from the edge of the stud and write that measurement on the stud.
- Hold the recessed light in the center of the lighting area of the fixture even with your first center mark.
- Hold both the recessed light and the stud with one hand, fingers in the can opening and thumb on the outside of the stud.
- Nail in the two arms, making sure the lip around the fixture is  $\frac{1}{2}$ " below the stud. And the bottom of the arms is flush with the bottom of the stud.
- Slide the other two arms across to the opposite stud and finish nailing those arms with the bottom flush with the stud.
- Once secure, slide the light until the center is even with the measurement you had on the stud.
- Secure the light by tightening the screw on the side of the fixture with the arms.

#### **Outlet on opposite wall (4/S metal box)**

- Measure 45" from the floor and mark with pencil on the stud, on the next bay over from the switch.
- Hold the box so the front of the metal box is flush with the front of the stud, make sure the top of the square part of the box is even with the marked line.
- Secure it into place using 3 drywall screws.
- Place ring cover on box and tighten screws. Front of ring should be  $\frac{1}{2}$ " past the front of the stud.

#### **Fan**

- Find the stud closest to the center of where the toilet will be installed and mark it with a pencil.
- Hold both the fan against the stud with the center of the fan lining up with the center of the mark, with your fingers inside the fan and your thumb on the outside of the stud.
- With the bottom edge of the fan  $\frac{1}{2}$ " below the bottom of the stud secure in place by using drywall screws (3), or three staples, through the small mounting holes in the fan