



## Switching Lab

**Program:** Electrician Technician

**Course:** EL140 Residential Applications

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

- Properly install a master and companion dimmer light control

**Lab Equipment:**

- Residential Lab Bays

**Required Tools:**

- 1 – Phillips screwdriver
- 1 – Flathead screwdriver
- 1 – Pair of diagonal cutters
- 1 – Pair of wire strippers
- 1 – Needle nose pliers
- Voltage tester (non-contact)
- Utility knife

**Materials:**

- 2 – 3-way switches
- 2 – Plastic single gang boxes
- 1 – 4/O side nail plastic box
- 1 - 6' pigtail cord for power
- 15' – 14/2 Romex
- 10' – 14/3 Romex
- 9 – Wire nuts
- 1 – Roll of Black electrical tape
- 1 – Keyless fixture
- 1 – Light bulb

**Safety (PPE):**

- Safety glasses/goggles
- Hard hat

**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 students' responsibility

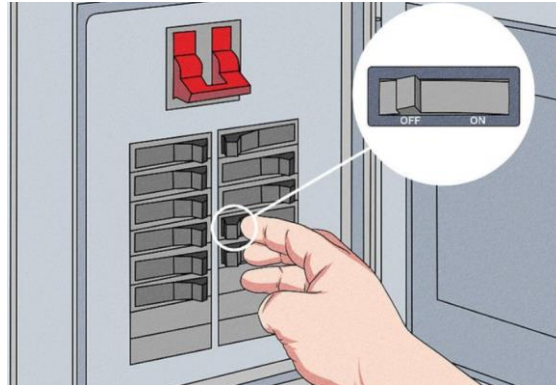


**Resources:**

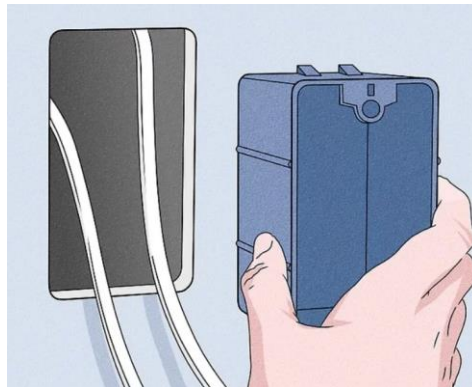
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**Required Time:** 180 minutes

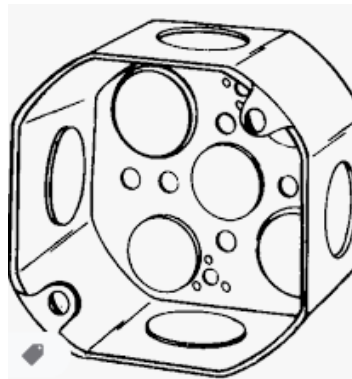
**Procedures:** (Eye protection must be worn at all times)



1. Switch off the circuit. Ensure that the circuit for the room you are working in has been flipped off. This will prevent accidental electrocution and reduce the risk of fire.
  - a. Use a voltage tester to check that power is no longer flowing to that room.
2. Install two single gang boxes, 45" to top of box, one on each side of the residential bay.

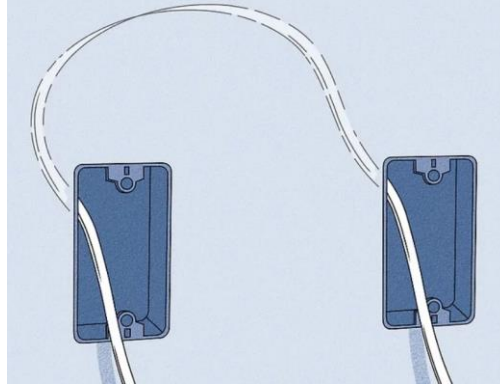


3. Install one 4/O box in the ceiling of the residential bay.

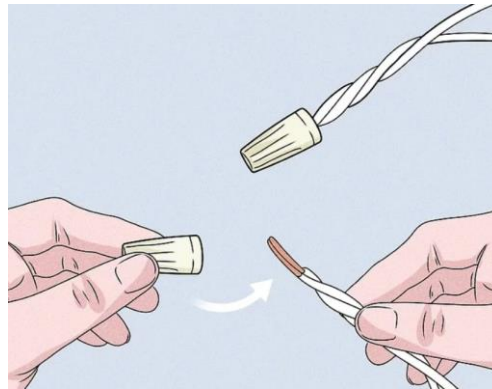




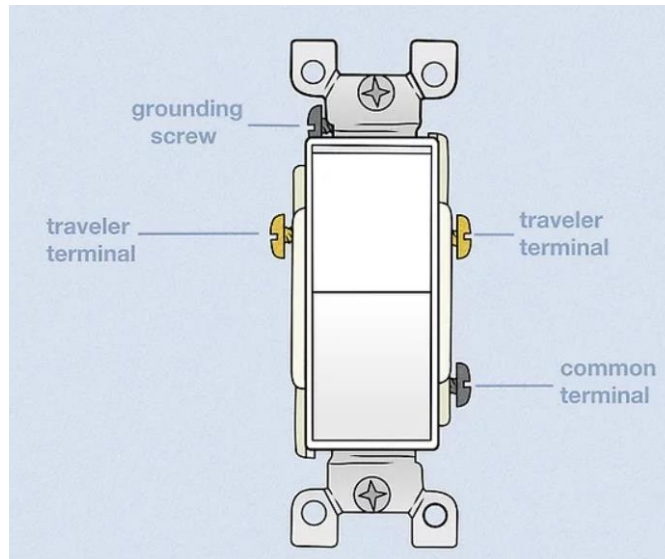
4. Run the 14/3 Romex, through the pre-drilled holes from one single gang box to the other single gang box leaving about 12" of wire at each end.



5. Run the 14/2 Romex from one of single gang boxes to the 4/O box, leaving about 12" of wire at each end.
6. Install the 6' pigtail in the single gang box that does not have the 14/2 Romex.
7. In both single gang boxes make-up will be done the same.



- a. Pigtail all the grounds with a wire nut.
  - b. Tie off the neutrals with a wire nut.
  - c. Pigtail the black hots if necessary.
8. Install the master 3-way switch by following these steps:



- a. Terminate the green/bare wire to the green screw/wire on the device.
  - b. Terminate the red wire to the blue screw on the device
  - c. Terminate the black wire from the 14/3 Romex to the brass screw on the device
  - d. Terminate the remaining black wire to the black screw on the device Install the companion switch by following these steps:
  - e. Terminate the green/bare wire to the green screw/wire on the device.
  - f. Terminate the red wire to the blue screw on the device
  - g. Terminate the black wire from the 14/3 Romex to the brass screw on the device
9. Terminate the remaining black wire to the black screw on the device Install the keyless light in the 4/O ceiling box.
10. Terminate the black wire on the gold screw.
11. Terminate the white wire on the silver screw.
12. Terminate the green/bare wire onto the green screw on the 4/O box.
13. Test the dimming 3-way switches to verify correct wiring.

