



Smoke Detector Lab

Program: Electrician Technician

Course: EL140 Residential Applications

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

- Describe the characteristics and functions of various fire alarm system components
- Identify the different types of circuitries that connect fire alarm system components
- Connect selected fire alarm system(s)

Lab Equipment:

- 3 – Smoke detectors (hard wire with battery backup interconnected)
- Lab Bays

Required Tools:

- 1 - Six-foot step ladder
- 1 – Screwdriver set



- 1 – Pair of Wire cutters
- 1 – Pair of Wire strippers
- 1 – Pair of Lineman pliers
- 1 - Tape measure
- 1 – Pencil or Marker

Materials:

- 3 – 4/0 side nail light, or
- 3 – Single gang side nail boxes
- 15 – Romex staples
- 10 – wire nuts
- 30' – 14/3 Romex
- 15' – 14/2 Romex



Safety (PPE) Student Notes:

- Goggles or safety glasses with side shields must be worn when cutting or stripping wires.
- Do not energize the circuit (plug in the 120V pigtail) until your instructor has checked your work and has approved energizing the circuit.

Resources: N/A

Required Time: 180 minutes

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

Procedure: *(Eye protection must always be worn, and power must be turned off till testing)*

1. Layout the smoke detectors in each room (3 minimum, with one on the wall and two on the ceiling).
2. Install all the boxes.
3. Run 14/2 Romex from power source to first smoke detector.
4. Run 14/3 Romex from smoke detector to smoke detector until all smoke detectors have wire been wires.
5. Staple Romex to studs required by code.
6. Strip the outer coating of insulation from all the wires.
7. Tie off the grounds in each box.
8. Connect each smoke detector using the following steps
 - i. Strip about a half inch from each wire (black, white, and red).
 - ii. Connect the white wire(s) from the junction box to the white wire from the smoke detector.
 - iii. Connect the black wire(s) from the junction box to the black wire from the smoke detector.
 - iv. Connect the red wire(s) from the junction box to the red wire from the smoke detector.
 - v. Fold in all the wires leaving the smoke detector connection outside of the box.
 - vi. Install the mounting base for the smoke detector using two 6/32 (for single gang boxes), or 8/32 (for 4/0 boxes) screws
 - vii. Connect the wire base to the back of the smoke detector.
 - viii. Install smoke detector to mounting base by twisting
9. Power circuit from breaker in sub panel.
10. To Test proper installation, press, and hold the test button, on one smoke detector at a time, until you can hear the smoke detector alarm sound from both the one you're pressing and the other smoke detectors simultaneously. Repeat for each smoke detector.
11. Troubleshoot any problems that arise.

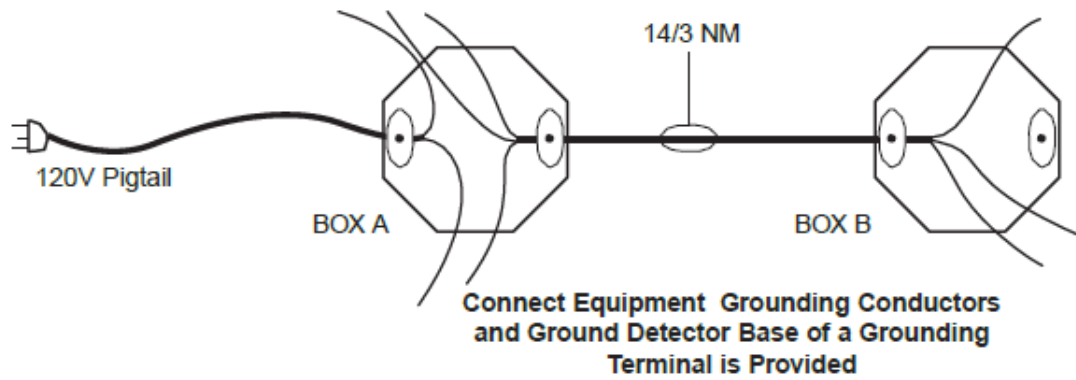


Figure 1 ■ Smoke Detector Box and Wiring Layout

