Grounding and Bonding lab

Program: Electrician Technician

Course: EL120 Introduction to Electrical Theory

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

- Explain the purpose of grounding and bonding and the scope of NEC Article 250
- Define the National Electrical Code® (NEC®) requirements relating to bonding and grounding.
- Distinguish between grounded systems and equipment grounding.
- Use NEC Table 250.66 to size the grounding electrode conductor for various AC systems.
- Explain the function of the main and system bonding jumpers in the grounding system and size the main and system bonding jumpers for various applications.
- Using the proper fitting, connect one end of a bare copper grounding wire to a ground rod, to a length of galvanized water pipe, and the other end to the neutral terminal in a main panelboard.
- Size the minimum required grounding electrode conductor for a 100A service.
- Properly
  attach a ground clip to a metal 4S box

Lab Equipment:

- Project board (sheet of plywood or equivalent)
- Armored ground clamps
- Metal 4S box

Required Tools:

- Flat head screwdriver
- Phillips head screwdriver
- Tape Measure
- MC cutter
- Wire cutters

Materials:

- A section of bare grounding electrode conductor wire (8 AWG).

Safety (PPE):

- Goggles or safety glasses

Required Time: 300 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.

Procedures: (Eye protection must always be worn)

Step #1

1. Measure the amount of 8 AWG bare armored copper needed to go from panel to ground rod to water pipe.
2. Cut the armored shielding to proper sizes so wire is protected except where it connects to a device or enters the panel. The wire must remain continuous.
3. Install one ½" 2-screw connector into the bottom of the panel.
4. Remove enough shielding so that when the copper enters the panel and terminates in the neutral buss that the armored shielding is no longer than
5. ½" inch showing on the inside of the panel.
6. After connecting to buss, tighten the 2-screw connector.
7. Connect two ground clamps on the ground rod in opposite directions so the armored shielding can be secured as the wire enters and exits both clamps.
8. Tighten the clamps on the bare copper.
9. Terminate one end into the clamp that is mounted on the water pipe.
10. Tighten the clamp and have the instructor inspect your work.

Step #2

1. Mount a 4-S box on a stud.
2. Install a 2-screw connector in one of the KOs on the box 3. Secure a 2' piece of Romex in the clamp, tighten snuggly.

4. Strip the Romex.
5. Put a ground clip on the ground, using a flathead screwdriver, resecure to the edge of the box.

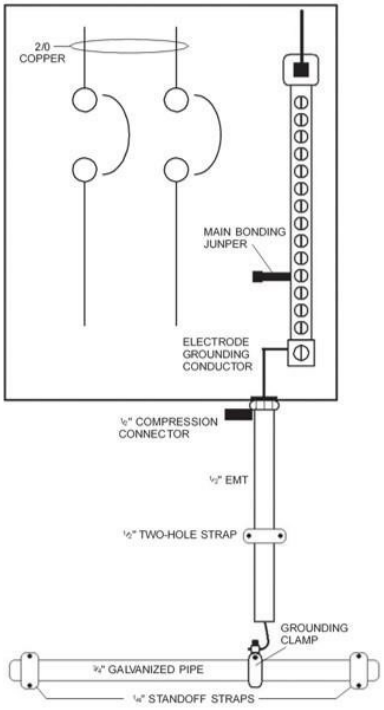

Figure 1 ■ Panelboard Installation Diagram