

**American Railway Engineering and Maintenance of Way Association  
Letter Ballot 38 21-10**

**1. Committee and Subcommittee:**

**AREMA C&S Committee 38**

**2. Letter Ballot Number: 38 21-10**

**3. Assignment:**

**MP's revised at Fall 2021 meeting.**

**4. Ballot Item:**

Ballot 38 21-10: This ballot contains the MP approved at the Fall 2021 meeting:

**11.1.1 - Recommended Functional/Operating Guidelines for Electrical Safety**

**Rationale:**

**Revised Manual Parts**

Draft Not Yet Approved

**Recommended Functional/Operating Guidelines for Electrical Safety**

Revised 2023 (3 Pages)

**A. Purpose**

This Manual Part recommends functional/operating guidelines for electrical safety.

**B. Exceptions**

1. These recommendations are not intended to apply in areas with electrified railroad operations.
2. These recommendations are not intended to apply to railroad electrical power transmission or distribution systems.

**C. Wiring Practices for Signal Enclosures**

1. AC electrical power wires entering a signal enclosure should terminate in a service ~~entrance~~ entrance rated panel or other type of panel with appropriately rated disconnect means ahead of the panel. ~~circuit breakers panel.~~
2. Binding post terminals used for circuits of 50 volts or higher (ac rms or dc) shall be protected by the use of insulated nuts or insulated cap and shield assemblies.
3. Binding post terminals with applied voltages of 50 volts or higher (ac rms or dc) ~~should~~ shall be grouped together and away from lower voltage terminals and equipment. Terminals should be clearly marked with the applied voltage.
4. The exposed non-current carrying metal parts of fixed equipment, including cores of transformers operating ~~on~~ at 50 volts or higher (ac rms or dc), shall be grounded.
5. Individual component chassis and equipment racks shall be connected to the signal enclosure's ground system.
6. Fuses or circuit breakers should be used in all power circuits and buses operating at 50 volts or higher (ac rms or dc).
7. Fuses or circuit breaker values and wire sizes shall have the appropriate rating for the anticipated load.

8. Fuses and circuit breakers should be selected with a short circuit interrupting capacity sufficient for the circuit voltage employed and ~~for the expected maximum~~ current ~~that shall to~~ be interrupted.
9. Equipment, such as fuses and surge protective devices (SPD(s)), which operate at 50 volts or higher (ac rms or dc), ~~and have~~ and have exposed ~~current-current~~-carrying metal parts shall be equipped with protective covers or installed in protective enclosures.
10. Power off indicator lights shall operate at less than a nominal 120 volts ac rms, shall not have exposed ac terminals, and when appropriate, shall have their protective enclosures grounded.
11. Employee call lights and call horns should preferably be operated on less than 50 volts ac rms or dc. When operated on voltages higher than 50 volts ac rms or dc, devices shall not have exposed terminals and, when appropriate, shall have their protective enclosures grounded.
12. Signal enclosures should be equipped with grounding-type ac receptacles designed to accept grounding-type attachment plugs.
13. Each signal enclosure shall be grounded for personnel safety.
14. Ground wires and neutral wires shall not be interrupted through disconnect switches, fuses, surge protectors, or circuit breakers.

**D. Additional Wiring Practices**

1. External equipment heaters should be supplied from ungrounded secondaries of isolation transformers located in the signal enclosure.
2. Convenience outlet receptacles installed in devices outside the signal enclosure, e.g., switch machines, hot box detectors, junction boxes, etc. or installed in weather-resistant enclosures, shall be equipped with ground fault interrupter capability.
3. Where equipment at track-side is operated on 120 volts ac rms or higher, such as snow melters, then:
  - a. The circuits should be powered through a ground fault circuit interrupter.
  - b. ~~Where operation of the track circuit or the equipment shall must not be affected,~~ Ithe metal housing or chassis of such equipment should be grounded.

4. The ground bus, and ~~when applicable,~~ the signal enclosure, ~~should~~ be bonded to an adjacent external ground rod system.
5. The made ground system for a signal enclosure shall provide the lowest practical impedance to earth.

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