

## WIRING DESIGN AND PROTECTION

### Chapter E 200

#### USE AND IDENTIFICATION OF GROUNDED CONDUCTORS

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**E 200.01 Scope.** This chapter provides requirements for the use and identification of a grounded conductor in interior wiring systems. (See definitions of "grounded conductor" and "grounding conductor" in chapter E 100.)

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 200.02 General.** All interior wiring systems shall have a grounded conductor which is continuously identified throughout the system except as follows:

(1) **EXCEPTION NO. 1:** A grounded conductor is not required in certain circuits or systems as provided in sections E 200.05, E 250.003, E 250.005, E 250.006, E 250.007, E 250.008, E 503.13, E 517.06, and E 680.04.

(2) **EXCEPTION NO. 2:** Continuous identification throughout a length of a conductor between terminals is not required for certain conductors under sections E 200.06 (1) and (2).

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 200.03 Connection to grounded system.** No interior wiring shall be electrically connected to a supply system unless the latter contains, for any grounded conductor of the interior system, a corresponding conductor which is grounded.

**Note:** Electrically connected implies connection capable of carrying current as distinguished from connection through electromagnetic induction.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 200.04 Circuits derived from auto-transformers.** Branch circuits as described in chapter E 210 shall not be supplied through auto-transformers (transformers in which a part of the winding is common to both primary and secondary circuits) unless the system supplied has an identified grounded conductor which is solidly connected to a similar identified grounded conductor of the system supplying the auto-transformer.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

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**E 200.05 Unidentified circuits.** (1) Two-wire branch circuits and AC circuits of 2 or more conductors may be tapped from the ungrounded conductors of circuits having identified grounded neutrals. Switching devices in each tapped circuit shall have a pole in each ungrounded conductor. These poles shall manually switch together where the switching devices serve as the disconnecting means required by section E 422.23.

(a) *Exception:* For motor controllers see section E 430.084, and for heating equipment see section E 422.46.

(2) Polyphase circuits need not have one conductor grounded and identified, except as required by section E 250.005, but where one conductor is grounded it shall be identified.

(3) Other unidentified ungrounded systems or circuits may be used only by special permission.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 200.06 Means of identification of grounded conductors.** Identification for grounded conductors shall be as follows:

(1) Insulated conductors of No. 6 or smaller, except conductors of type M1 cable, shall have an outer identification of white or natural gray color as specified in section E 310.02 (7). The grounded conductors of type M1 cable shall be identified by distinctive marking at the terminals during the process of installation.

(2) Insulated conductors larger than No. 6 shall have an outer identification of white or natural gray color or shall be identified by distinctive white marking at terminals during process of installation.

(3) Where, on a 4-wire delta-connected secondary, the midpoint of one phase is grounded to supply lighting and similar loads, that phase conductor having the higher voltage to ground shall be indicated by tagging or other effective means at any point where a connection is to be made if the neutral conductor is present.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 200.07 Identified conductor in grounded circuits only.** Conductors having white or natural gray covering shall not be used other than as conductors for which identification is required by section E 200.02, except under the following conditions, and then only where they are, in other respects, suitable for use as ungrounded conductors in the circuit:

(1) **EXCEPTION NO. 1:** Identified conductors, rendered permanently unidentified by painting or other effective means at each outlet where the conductors are visible and accessible, may be used as unidentified conductors.

*Note:* The foregoing permits the use of 2-wire cable having one black and one white conductor on 2-wire circuits tapped from the outside legs of a 3-wire system or any 2 conductors of a multi-wire system where the identified conductor of the 2-wire cable is rendered permanently unidentified at terminals.

(2) **EXCEPTION NO. 2:** Cable containing an identified conductor may be used for single-pole, 3-way or 4-way switch loops where the connections are so made that the unidentified conductor is the return conductor from the switch to the outlet.

*Note:* This exception makes it unnecessary to paint the terminal of the identified conductor at the switch outlet.

(3) **EXCEPTION NO. 3:** A flexible cord, for connecting a portable appliance, having one conductor identified as required by section E 400.13 may be used even though there is no grounded conductor in the circuit supplying the outlet to which it is connected.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 200.08 Connections to screw-shells.** An identified conductor, where run to a screw-shell lampholder, shall be connected to the screw-shell.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 200.09 Means of identification of terminals.** The identification of terminals to which a grounded conductor is to be connected shall be by means of a metallic plated coating substantially white in color, such as nickel or zinc, or the terminals may be of material substantially white in color. The other terminals shall be of a readily distinguishable different color.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 200.10 Identification of terminals.** (1) **DEVICE TERMINALS.** All devices provided with terminals for the attachment of conductors and intended for connection to more than one side of the circuit shall have terminals properly marked for identification except as follows:

(a) *Exception No. 1:* Marking may be omitted where the electrical connection of a terminal intended to be connected to the grounded conductor is clearly evident.

(b) *Exception No. 2:* Single-pole devices. Devices to the terminals of which only one side of the line is connected need not have terminals marked for identification.

(c) *Exception No. 3:* Panelboards and devices. The terminals of lighting panelboards and of devices having a normal current rating of over 30 amperes need not be marked for identification, except as required in subsection (2) for polarized receptacles for attachment plugs and polarized attachment plugs.

(2) **PLUGS AND RECEPTACLES.** Two-wire polarized receptacles for attachment plugs and polarized attachment plugs shall have the terminal intended for connection to the grounded conductor marked for identification.

(a) *Exception No. 1:* Two-wire attachment plugs, unless of the polarity type, need not have their terminals marked for identification.

(b) *Exception No. 2:* Three-wire and four-wire receptacles and attachment plugs. Three-wire and four-wire receptacles and attachment plugs, other than those of the grounding type which are rated within the limits outlined and required under section E 210.21 (2), but on which one terminal may be used for the connection of either a grounding conductor or a grounded circuit conductor, shall have such a terminal marked to show other than a white or green finish.

(3) **SCREW-SHELLS.** In the case of devices with screw-shells, the identified terminal shall be the one connected to the screw-shell. This does not apply to screw-shells which serve as fuseholders.

(4) **SCREW-SHELL DEVICES WITH LEADS.** In the case of screw-shell devices with attached leads, the conductor attached to the screw-shell shall have white or natural gray finish. The outer finish of the other

conductor shall be of a solid color that will not be confused with the white or natural-gray finish which is to identify the grounded conductor.

(5) **FIXED APPLIANCES.** The terminals of fixed appliances need not be marked to indicate the proper connection to the grounded conductor unless a single-pole switch forms an integral part; then the terminal connected to the switch shall be the unidentified terminal.

(6) **PORTABLE APPLIANCES.** The terminals of portable appliances need not be marked for identification.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.