ARTICLE

210 BRANCH CIRCUITS

Introduction to Article 210—Branch Circuits

This article contains branch-circuit requirements such as those for conductor sizing and identification, GFCI and AFCI protection, and receptacle and lighting outlet requirements. It consists of three parts:

- Part I. General Provisions
- Part II. Branch-Circuit Ratings
- Part III. Required Outlets

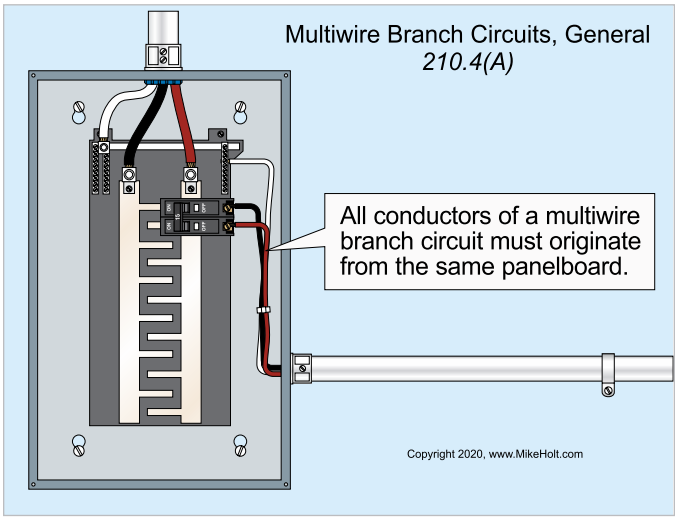
Table 210.3 in this article identifies specific-purpose branch circuits. Its provisions for those that supply the equipment listed amend or supplement the requirements in Article 210 for branch circuits, so it is important to be aware of the contents of this table.

Part I. General Provisions

210.4 Multiwire Branch Circuits

Scan this QR code for a video of Mike explaining this topic; it's a sample from the videos that accompany this textbook. www.MikeHolt.com/20UN1videos

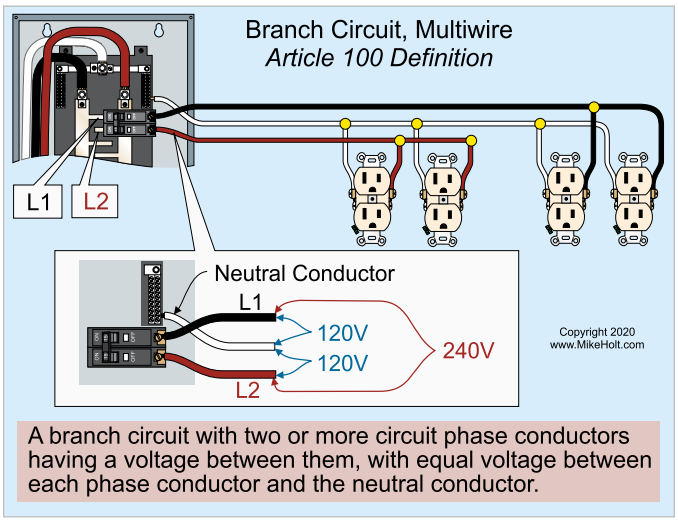
(A) General. All conductors of a multiwire branch circuit must originate from the same panelboard. ▸Figure 210–3



▸Figure 210–3

Author's Comment:

- According to Article 100, a "Multiwire Branch Circuit" consists of two or more circuit phase conductors with a common neutral conductor. This type of circuit has a voltage between the phase conductors and an equal difference of voltage from each phase conductor to the common neutral conductor. ▸Figure 210–4

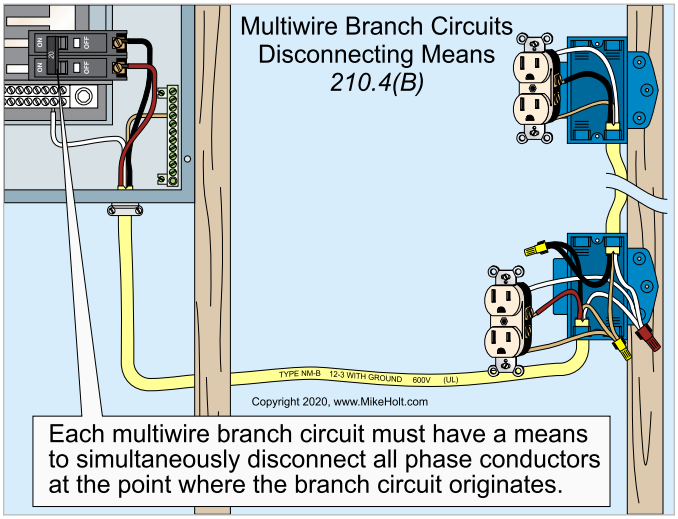


▸Figure 210–4

All conductors of a circuit (including the neutral and equipment grounding conductors) must be installed together in the same raceway, cable, trench, cord, or cable tray [300.3(C)], except as permitted by 300.3(C)(1) through (4)

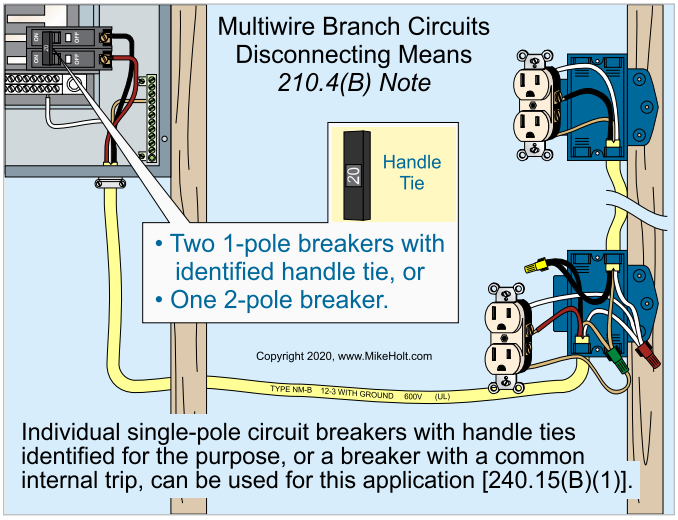
Note 2: See 300.13(B) for the requirements relating to the continuity of the neutral conductor on multiwire branch circuits.

(B) Disconnecting Means. Each multiwire branch circuit must have a means to simultaneously disconnect all phase conductors at the point where the circuit originates. ▸Figure 210–5



▸Figure 210–5

Note: Individual single-pole circuit breakers with handle ties identified for the purpose or a circuit breaker with a common internal trip can be used for this application [240.15(B)(1)]. ▸Figure 210–6



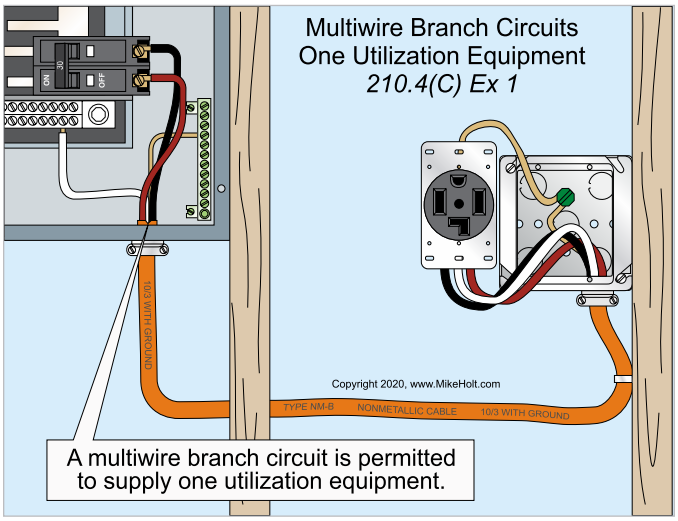
▸Figure 210–6

Caution

This rule is intended to prevent people from working on energized circuits they thought were disconnected.

(C) Line-to-Neutral Loads. Multiwire branch circuits must supply only line-to-neutral loads.

Ex 1: A multiwire branch circuit can supply an individual piece of line-to-neutral utilization equipment such as a range or dryer. ▸Figure 210–7



▸Figure 210–7

Ex 2: A multiwire branch circuit can supply both line-to-neutral and line-to-line loads if the circuit is protected by a device such as a multi-pole circuit breaker with a common internal trip that opens all phase conductors of the multiwire branch circuit simultaneously under a fault condition.

(D) Grouping. Phase and neutral conductors of a multiwire branch circuit must be identified or grouped together by cable ties or similar means in every enclosure in accordance with 200.4(B). ▸Figure 210–8

Author's Comment:

- Grouping is not required where the circuit conductors are contained in a single raceway or cable unique to that circuit making the grouping obvious [200.4(B) Ex 1].
- If the conductors pass through a box or conduit body without any splices or terminations, then grouping is not required [200.4(B) Ex 2].

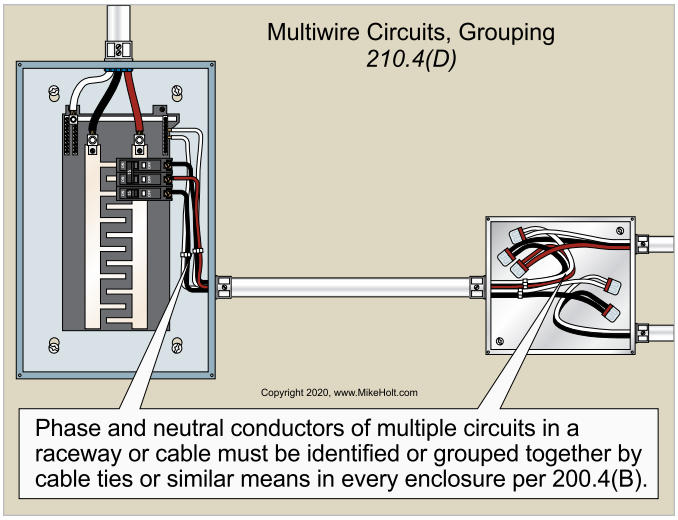


Figure 210–8

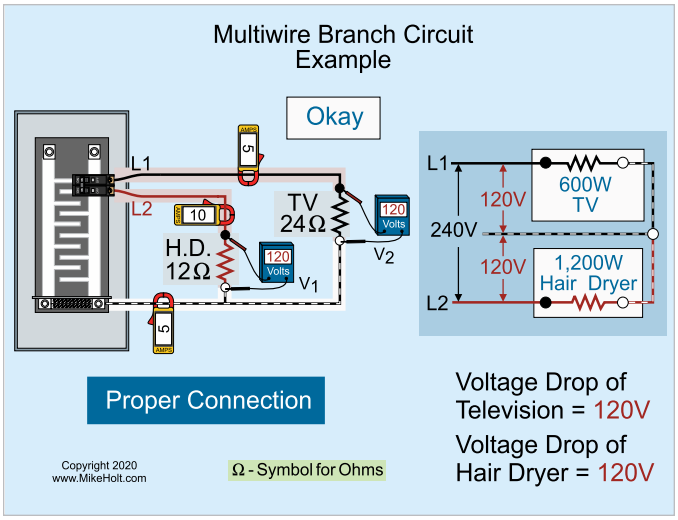


Figure 210–9

Author's Comment:

- Grouping all associated conductors of a multiwire branch circuit together by cable ties or other means at the point of origin makes it easier to visually identify the conductors of each multiwire branch circuit. The grouping assists in ensuring the correct neutral is paired with the intended circuit conductors at junction points, and in correctly connecting multiwire branch-circuit conductors to circuit breakers. If proper care is not exercised when making these connections, two circuit conductors can be accidentally connected to the same phase or line.

Caution

If the phase conductors of a multiwire branch circuit are not terminated to different phases or lines, the currents on the neutral conductor from the phase conductors will be additive and will not cancel. This increased current may exceed the rating of the neutral conductor which in turn might damage the insulation and create a fire or other hazard. Figure 210–9 and Figure 210–10

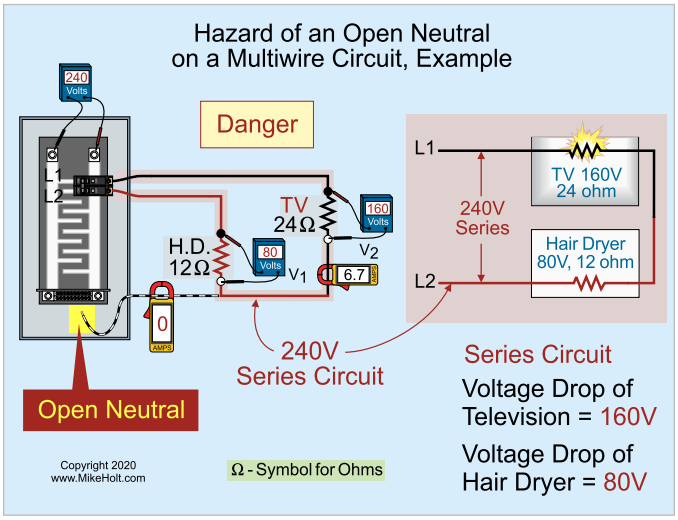


Figure 210–10