

shall originate from the equipment containing the branch-circuit overcurrent protective device or protective devices.

Using a multiwire branch circuit as multiple circuits satisfies the requirement for providing two small appliance branch circuits for countertop receptacle outlets in a dwelling unit kitchen.

Informational Note No. 1: A 3-phase, 4-wire, wye-connected power system used to supply power to nonlinear loads **might** necessitate that the power system design allow for the possibility of high harmonic currents on the neutral conductor.

Informational Note No. 2: See 300.13(B) for continuity of grounded conductors on multiwire circuits.

Power supplies for equipment such as computers, printers, electric-discharge lighting systems, and adjustable-speed motor drives can introduce harmonic currents in the system neutral conductor. The resulting total harmonic distortion current could exceed the load current of the device itself.

See also

310.15(E) commentary for information on neutral conductor ampacity

(B) Disconnecting Means. Each multiwire branch circuit shall be provided with a means that will simultaneously disconnect all ungrounded conductors at the point where the branch circuit originates.

Informational Note: See 240.15(B) for information on the use of single-pole circuit breakers as the disconnecting means.

A simultaneous disconnecting means reduces the risk of shock to personnel working on equipment supplied by the multiwire branch circuit. In former editions of the *NEC*®, this requirement applied only where the multiwire branch circuit supplied equipment mounted to a common yoke or strap.

For a single-phase installation, the disconnecting means could be two single-pole circuit breakers with an identified handle tie or a 2-pole circuit breaker, as shown in Exhibit 210.1. For a 3-phase installation, a 3-pole circuit breaker, three single-pole circuit breakers with an identified handle tie, or a 3-pole switch

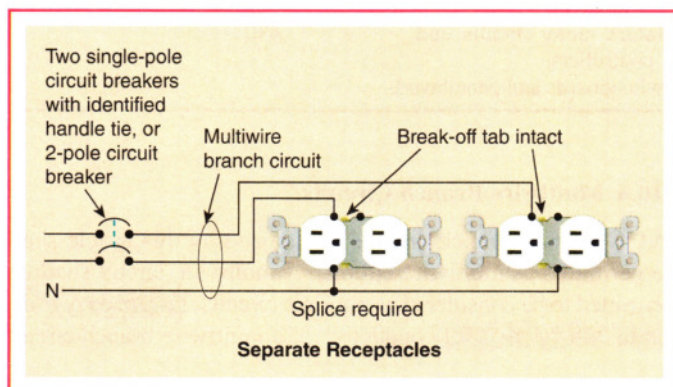


EXHIBIT 210.1 An example where 210.4(B) requires the simultaneous disconnection of all ungrounded conductors in a multiwire branch circuit.

with branch circuit overcurrent protection provides the required simultaneous opening of the ungrounded conductors.

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

Exception No. 1: A multiwire branch circuit that supplies only one utilization equipment shall be permitted to supply line-to-line loads.

Exception No. 2: A multiwire branch circuit shall be permitted to supply line-to-line loads if all ungrounded conductors of the multiwire branch circuit are opened simultaneously by the branch-circuit overcurrent device.

A multiwire branch circuit is a branch circuit that consists of two or more ungrounded conductors that have a voltage between them, and a grounded conductor that has equal voltage between it and each ungrounded conductor of the circuit and that is connected to the neutral or grounded conductor of the system. The most commonly used multiwire branch circuit consists of two ungrounded conductors and one grounded conductor supplied from a 120/240-volt, single-phase, 3-wire system. Such multiwire circuits supply appliances that have both line-to-line and line-to-neutral connected loads, such as electric ranges and clothes dryers, or supply loads that are line-to-neutral connected only, such as the split-wired combination device shown in Exhibit 210.1 (bottom). A single-phase, 120/240-volt multiwire branch circuit is also permitted to supply a device with a 250-volt rated receptacle (line-to-line) and a 125-volt rated receptacle (line-to-neutral), as shown in Exhibit 210.2, provided the branch-circuit overcurrent device simultaneously opens both of the ungrounded conductors.

Multiwire branch circuits have many advantages, including using three wires to do the work of four (in place of two 2-wire circuits), less raceway fill, easier balancing and phasing of a system, and less voltage drop. Multiwire branch circuits can be derived from a 120/240-volt, single-phase system; a 208Y/120-volt and 480Y/277-volt, 3-phase, 4-wire system; or a 240/120-volt, 3-phase, 4-wire delta system. If two ungrounded conductors and a common neutral of a multiwire branch circuit are supplied from a 208Y/120-volt, 3-phase, 4-wire system, the neutral carries the same current as the phase conductor with the highest current and, therefore, should be the same size.

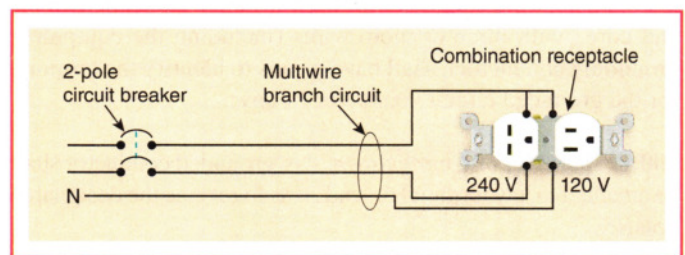


EXHIBIT 210.2 A multiwire branch circuit supplying line-to-neutral and line-to-line connected loads, provided the ungrounded conductors can be opened simultaneously by the branch-circuit overcurrent device.