CLOSER LOOK: Sizing Main and System Bonding Jumpers

General

In a grounded system, the primary function of the main bonding jumper and of the system bonding jumper is to create the link for ground-fault current between the EGCs and the grounded conductor. Table 250.102(C)(1) is used to establish the minimum size of main and system bonding jumpers. Unlike the GEC, which carries current to the ground (via connection to a grounding electrode), the main and system bonding jumpers are placed directly in the supply-side ground-fault current return path.

Where the largest ungrounded supply conductor exceeds the parameters of Table 250.102(C)(1), Note 1 in the table requires a proportional relationship between the ungrounded conductor and the main or system bonding jumper. Where the service-entrance conductors are larger than 1100 kcmil copper or 1750 kcmil aluminum, the bonding jumper must have a cross-sectional area of not less than 12½ percent of the cross-sectional area of the largest phase conductor or largest phase conductor set. In equipment such as panelboards or switchboards that are listed for use as service equipment, the manufacturer provides a bonding jumper that can be installed as the main or system bonding jumper. It is not necessary to provide an additional bonding jumper.

Main Bonding Jumper for Service with More Than One Enclosure

Where a service consists of more than one disconnecting means in separate enclosures, each enclosure is treated separately, as depicted in Exhibit 250.11. Based on the 3/0 AWG ungrounded service conductors and Table 250.102(C)(1), the minimum-size main bonding jumper for the enclosure on the left is 4 AWG copper. Similarly, the 1/0 AWG main bonding jumper for the enclosure on the right is derived from Table 250.102(C)(1) using the 500 kcmil ungrounded service conductors. The bonding jumper provided by the manufacturer for listed service equipment provides the equivalent current capacity to that of a field fabricated bonding jumper sized per Table 250.102(C)(1).

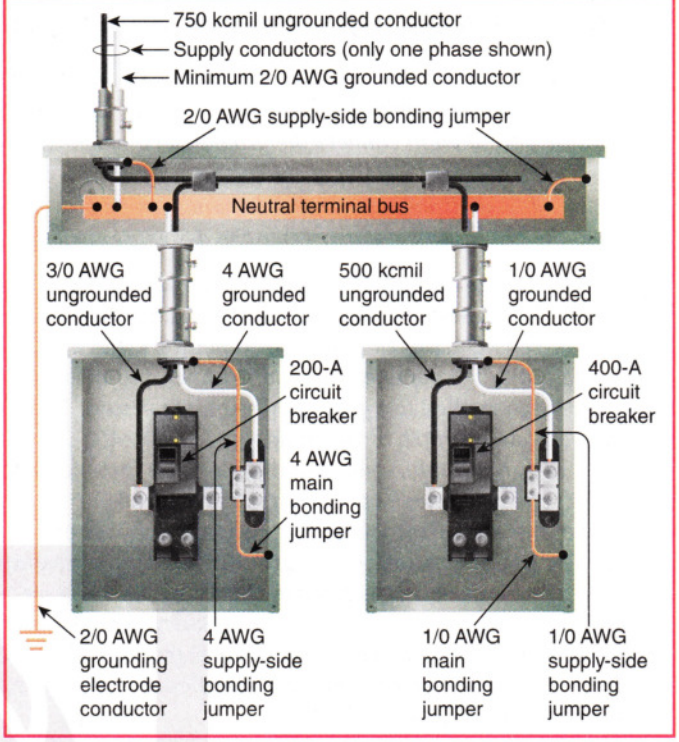

EXHIBIT 250.11 An example of the bonding requirements for service equipment.

Separately Derived System with More Than One Enclosure

To prevent parallel neutral current paths on raceways and enclosures, the system bonding jumper can either be internal to the panelboards or be installed at the separately derived system enclosure so that it connects any supply-side bonding jumpers to the system grounded conductor terminal. The system bonding jumper is not permitted to be installed at both locations.

Energy production systems such as photovoltaic, wind, fuel cells, or engine generators are permitted to make supply-side connections and operate in parallel with the utility service. The disconnecting means required in Article 705 for such systems are service disconnecting means, and the requirements of 250.24 apply to those disconnecting means.

Equipment that is covered by 250.25 includes equipment connected in series with the service conductors on the supply side of the disconnecting means, but are not service equipment or service disconnecting means. Examples of such equipment include meters, meter enclosures, meter disconnect switches, meter-mounted transfer switches, and emergency disconnects per 230.82(2), (3), (10) and (11). The exposed non-current-carrying metal surfaces of enclosures for these types of equipment can be bonded and grounded through connection to the grounded (neutral) service conductor, similarly to the service equipment enclosure.

250.26 Conductor to Be Grounded — Alternating-Current Systems. If an ac premises wiring system is grounded, the conductor to be grounded shall be one of the following:

(1) Single-phase, 2-wire — one conductor
(2) Single-phase, 3-wire — the neutral conductor