Application Example 1

A service is supplied by four 500 kcmil conductors in parallel for each phase. The minimum cross-sectional area of the bonding jumper is calculated as follows:

4 × 500 kcmil = 2000 kcmil

Therefore, the main or system bonding jumper cannot be less than 12½ percent of 2000 kcmil, which results in a 250 kcmil copper conductor. The copper GEC for this set of conductors, based on Table 250.66, is not required to be larger than 3/0 AWG.

Application Example 2

System Bonding Jumpers at Panelboards

A 225-kVA transformer supplies three 3-phase, 208Y/120-V secondary feeders. Two sets of 3/0 AWG copper, THHW, ungrounded conductors terminate in panelboards with 200-A main breakers. One set of 3 AWG copper, THHW, ungrounded conductors terminates in a panelboard with a 100-A main breaker. A system bonding jumper is installed at each of the panelboards. Determine the size of the system bonding jumpers at each panelboard enclosure.

200-A panelboards:

Size of largest ungrounded conductor supplying the two 200-A panelboards:

3/0 AWG copper

System bonding jumper [from Table 250.102(C)(1)]:

3/0 AWG copper ungrounded conductors → 4 AWG copper

or 2 AWG aluminum system bonding jumper

100-A panelboard:

Size of largest ungrounded conductor supplying the 100-A panelboard:

3 AWG copper

System bonding jumper [from Table 250.102(C)(1)]:

3 AWG copper ungrounded conductors → 8 AWG copper

or 6 AWG aluminum system bonding jumper

Application Example 3

System Bonding Jumper at the Transformer

The same electrical equipment arrangement as in the previous example applies. In this case, however, the system bonding jumper is installed at the transformer and connects the transformer neutral terminal (XO) to individual supply-side bonding jumpers that are installed between the panelboard EGC terminals and a terminal bus attached to the transformer enclosure. Determine the size of the system bonding jumper.

Size the system bonding jumper from the terminal bus in the transformer to the transformer neutral terminal (XO). There are two secondary feeder circuits with 3/0 AWG ungrounded conductors and one with 3 AWG ungrounded conductors. Find the cumulative circular mil area of all ungrounded conductors of a phase.

From Chapter 9, Table 8:

3/0 AWG = 167,800 circular mils × 2 (number of sets of secondary conductors) = 335,600 circular mils

3 AWG = 52,620 circular mils

Total = 388,220 circular mils

From Table 250.102(C)(1):

388,220 circular mils copper ungrounded conductors → 1/0 AWG copper or 3/0 AWG aluminum system bonding jumper

(3) Multiphase systems having one wire common to all phases — the neutral conductor
(4) Multiphase systems if one phase is grounded — that phase conductor
(5) Multiphase systems in which one phase is used as in (2) — the neutral conductor

250.28 Main Bonding Jumper and System Bonding Jumper. For a grounded system, main bonding jumpers and system bonding jumpers shall be installed as follows:

The system bonding jumper performs the same electrical function as the main bonding jumper in a grounded ac system by connecting the EGCs to the grounded circuit conductor either at the source of a separately derived system or at the first disconnecting means supplied by the source. The term *system bonding jumper* is used to distinguish it from the main bonding jumper, which is installed in service equipment. See the commentary following the definition of *bonding jumper, system* in Article 100.

(A) Material. Main bonding jumpers and system bonding jumpers shall be of copper, aluminum, copper-clad aluminum, or other corrosion-resistant material. A main bonding jumper and a system bonding jumper shall be a wire, bus, screw, or similar suitable conductor.

(B) Construction. If a main bonding jumper or a system bonding jumper is a screw only, the screw shall be identified with a green finish that shall be visible with the screw installed.