

**(B) Busbars.** For power source connections to distribution equipment with no specific listing and instructions for combining multiple sources, one of the following methods shall be used to determine the required ampere ratings of busbars:

- (1) The sum of 125 percent of the power source(s) output circuit current and the rating of the overcurrent device protecting the busbar shall not exceed the busbar ampere rating.

Informational Note: This general rule assumes no limitation in the number of the loads or sources applied to busbars or their locations.

- (2) Where two sources, one a primary power source and the other another power source, are located at opposite ends of a busbar that contains loads, the sum of 125 percent of the power-source(s) output circuit current and the rating of the overcurrent device protecting the busbar shall not exceed 120 percent of the busbar ampere rating. The busbar shall be sized for the loads connected in accordance with Article 220. A permanent warning label shall be applied to the distribution equipment adjacent to the back-fed breaker from the power source that displays the following or equivalent wording:

**WARNING:**

**POWER SOURCE OUTPUT**

**DO NOT RELOCATE THIS OVERCURRENT DEVICE.**

The warning sign(s) or label(s) shall comply with 110.21(B).

- (3) The sum of the ampere ratings of all overcurrent devices on panelboards, both load and supply devices, excluding the rating of the overcurrent device protecting the busbar, shall not exceed the ampacity of the busbar. The rating of the overcurrent device protecting the busbar shall not exceed the rating of the busbar. Permanent warning labels shall be applied to distribution equipment displaying the following or equivalent wording:

**WARNING:**

**EQUIPMENT FED BY MULTIPLE SOURCES.  
TOTAL RATING OF ALL OVERCURRENT DEVICES  
EXCLUDING MAIN SUPPLY OVERCURRENT DEVICE  
SHALL NOT EXCEED AMPACITY OF BUSBAR.**

The warning sign(s) or label(s) shall comply with 110.21(B).

- (4) A connection at either end of a center-fed panelboard in dwellings shall be permitted where the sum of 125 percent of the power-source(s) output circuit current and the rating of the overcurrent device protecting the busbar does not exceed 120 percent of the busbar ampere rating.
- (5) Connections shall be permitted on busbars of panelboards that supply lugs connected to feed-through conductors or are supplied by feed-through conductors. The feed-through conductors shall be sized in accordance with 705.12(A). Where an overcurrent device is installed at either end of the feed-through conductors, panelboard busbars on either side of the feed-through conductors shall be permitted to be sized in accordance with 705.12(B)(1) through (B)(3).

- (6) Connections shall be permitted on switchgear, switchboards, and panelboards in configurations other than those permitted in 705.12(B)(1) through (B)(5) where designed under engineering supervision that includes available fault-current and busbar load calculations.

Informational Note: Specifically designed equipment exists, listed to UL 1741, *Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources*, for the combination and distribution of sources to supply loads. The options provided in 705.12(B) are for equipment with no specific listing for combining sources.

The required ampacity of a feeder or bus connected to the interactive inverter is based on the inverter output circuit current, rather than on the overcurrent protective device (OCPD) in the inverter. Except where 705.12(A)(2)(b) and (B)(3) apply, the required conductor ampacity is determined by adding the ampacity of the primary OCPD protecting a busbar or feeder and 125 percent of inverter output current.

Where a tap is made to a feeder supplied by the inverter and the normal source, the calculated sum is used as the rating of the overcurrent device to determine the ampacity of the tap conductors in 240.21(B).

Unlike in service equipment where the number or rating of overcurrent devices is not limited, 705.12(B)(3) places a limit on panelboard overcurrent devices. The sum of the ratings of all overcurrent devices (excluding the main overcurrent device) supplying and/or being supplied by the panelboard is limited to the busbar rating. In addition, the main overcurrent device also must be limited to the ampacity of the busbar.

- **Δ 705.13 Energy Management Systems (EMS).** An EMS in accordance with 750.30 shall be permitted to limit current and loading on the busbars and conductors supplied by the output of one or more interconnected electric power production or energy storage sources.

Informational Note: A listed power control system (PCS) is a type of EMS that is capable of monitoring multiple power sources and controlling the current on busbars and conductors to prevent overloading. See UL 1741, *Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources*, and UL 916, *Energy Management Equipment*, for information on PCS and EMS.

The use of a power control system (PCS) (see Exhibit 705.3) that involves monitoring and control of all the individual sources can prevent the feeder or busbar from being overloaded while making efficient use of the variable resources.

- **Δ 705.20 Source Disconnecting Means.** Means shall be provided to disconnect power source output conductors of electric power production equipment from conductors of other systems. A single disconnecting means shall be permitted to disconnect multiple power sources from conductors of other systems.

Informational Note: See 480.7, Part II of Article 445, Part III of Article 690, Part III of Article 692, Part III of Article 694, and Part II of Article 706 for specific source disconnecting means requirements.