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Main Power Feeder and Feeder Sizing in One- and Two-Family Dwellings

Code: 2014 Electrical Code

Date: August 7, 2017

Section: 310.15(B)(7)

Question 1:

What is a main power feeder and when is the main power feeder allowed to utilize Table 310.15(B)(7) for a one- or two-family dwelling?

Answer 1:

The language for section 310.15(B)(7) including Table 310.15(B)(7) of the 2011 NEC has been substituted by NC amendment in place of the language in the 2014 NEC.

Section 310.15(B)(7) directly defines the main power feeder for a one- or two-family dwelling as “the feeder between the main disconnect and the panelboard that supplies, either by branch circuits or by feeders, or both, all loads that are part of or associated with the dwelling unit.” The definition is typically satisfied when installing a feeder to supply power to a subpanel in the interior of a dwelling from the busbar lugs within an exterior “combo-panel” that are protected by the main breaker. Such feeder is a main power feeder because it is protected from overcurrent only by the main breaker and it feeds a subpanel that supplies all loads that are part of or associated with the dwelling unit.

Question 2:

Breakers have been installed in the “combo-panel” for supplying power to other circuits that are part of or associated with the dwelling unit, and the lugs on the bottom of the busbars supply power to a feeder that serves most of the loads that are part of or associated with the dwelling unit. Now that the feeder between the panels does not supply all loads that are part of or associated with the dwelling unit, is that feeder now prohibited from being sized in accordance with Table 310.15(B)(7)?

Answer 2:

No. The feeder is not defined by section 310.15(B)(7) as a main power feeder, but no feeder to the dwelling is required to have an allowable ampacity rating greater than their service-entrance conductors. For purposes of applying this section, regardless of the service-entrance conductor installation either by utility, contractor, or if nothing that meets the definition of a service-entrance conductor has been installed, the largest size the service-entrance conductors that are allowed to be sized in accordance with Table 310.15(B)(7) for that installation shall be used to determine the allowable ampacity rating of the service-entrance conductors.

Example: The utility supplies an underground lateral to a 200 ampere meter-panel combo on the exterior of a single family dwelling. There is a copper feeder from the busbar lugs, protected by the 200 ampere main breaker, and feeds a subpanel in the house. All circuits for the house are supplied from the subpanel except for a heat pump and irrigation branch circuit that both originate in the meter-panel combo outside of the dwelling.

The feeder from the busbar lugs, protected by the main breaker, and feeds a subpanel in the house cannot be defined by section 310.15(B)(7) as a main power feeder because all loads associated with the dwelling are not supplied from the feeder (the heat pump and irrigation system). According to Table 310.15(B)(16), 3/0 AWG copper is the minimum size at 75°C that the feeder would be sized if not allowed to utilize Table 310.15(B)(7).

Because the utility supplied the underground lateral on a meter-panel combo, there are no service-entrance conductors per Article 100. In an overhead or non-combo installation where service-entrance conductors would have been present, the service-entrance conductors would be allowed to be sized in accordance with Table 310.15(B)(7). If service-entrance cable was present, it would have been allowed to be a minimum size of 2/0 AWG copper.

The electrical code recognizes that there is no logical reason to require a feeder to be larger than the rating of the service-entrance conductors (present or not) or when portions of the dwelling's load are taken off of the feeder that is essentially an extension of the service-entrance conductors, except it possesses overcurrent protection. Therefore, the feeder from the busbar lugs, protected by the main breaker, and feeds a subpanel in the house is not required to be larger than 2/0 AWG copper.

AMENDMENT 310.15(B)(7)

Amend NEC 2014, page 160:

(7) 120/240-Volt, 3-Wire, Single-Phase Dwelling Services and Feeders.

For individual dwelling units of one-family, two-family, and multifamily dwellings, conductors, as listed in Table 310.15(B)(7), shall be permitted as 120/240-volt, 3-wire, single phase service-entrance conductors, service lateral conductors, and feeder conductors that serve as the main power feeder to each dwelling unit and are installed in raceway or cable with or without an equipment grounding conductor. For application of this section, the main power feeder shall be the feeder between the main disconnect and the panelboard that supplies, either by branch circuits or by feeders, or both, all loads that are part of or associated with the dwelling unit. The feeder conductors to a dwelling unit shall not be required to have an allowable ampacity rating greater than their service-entrance conductors. The grounded conductor shall be permitted to be smaller than the ungrounded conductors, provided the requirements of 215.2, 220.61, and 230.42 are met.

Table 310.15(B)(7) Single-Phase Dwelling Services and Feeders for Conductor Types RHH, RHW, RHW-2, THHN, THHW, THW, THW-2, THWN, THWN-2, XHHW, XHHW-2, SE, USE, USE-2		
Service or Feeder Rating (Amperes)	Conductor (AWG or kcmil)	
	Copper	Aluminum or Copper-Clad Aluminum
100	4	2
110	3	1
125	2	1/0
150	1	2/0
175	1/0	3/0
200	2/0	4/0
225	3/0	250
250	4/0	300
300	250	350
350	350	500
400	400	600

Keywords: