

Question of the Month

A 1200 ampere feeder is tapped to supply a 100 ampere main breaker panelboard having a total calculated load of 80 amperes. The panelboard is listed for use with 75°C supply conductors and located adjacent to the enclosure in which the tap is made. The 8 ft. tap conductors are installed in electrical metallic tubing. What is the minimum size required for the copper THHN feeder tap conductors? See the correct answer on Page 2.

Note From José Rodríguez, Assistant Director for Field Services and Public Safety

It is my pleasure to announce that I have appointed Stephen Thornton as Chief Electrical Inspector, effective October 16, 2014.

Steve has over 35 years of experience in business management, supervision, electrical inspection and compliance, general contracting, along with journey level industrial, commercial and residential electrical installations and maintenance. He holds a valid ME01 master electrician certificate and prior to that, he held an AD01 administrators and EL01 general journey level certificate. He began his electrical career as a small business owner of a construction company and worked as a journey level electrician, administrator, general foreman and supervisor in the private sector. Steve has worked for L&I for 20 years, working as an Electrical Inspector, with the last 17 years serving as an Electrical Inspection Supervisor, a position he has held since July 1996.

Steve has the well-earned respect of supervisors, peers and stakeholders as a dedicated, technically proficient and well-rounded leader capable of providing leadership for the electrical program and for enforcing electrical laws. I am confident that he will be able to transition quickly into the job and lead the Electrical Program to even greater success.

I want to express my sincere thanks to Larry Vance for his willingness to assume the duties of Chief Inspector during the recruitment process and to Megan Eriksen for her administrative support.

Interconnected Electric Power Production Sources – Point of Connection Part 2, Feeder Connections – NEC® 705.12(D)(2)(1) & (2)

Point of connection requirements for interconnected electric power production sources have changed significantly in the two recent National Electrical Code® (NEC) revision cycles. Last month's newsletter discussed supply side connections. In this edition, we will discuss conductor ampacity when connecting a utility-interactive inverter to a feeder. Next month, we will discuss requirements for connecting inverter load to busbars in panelboards.

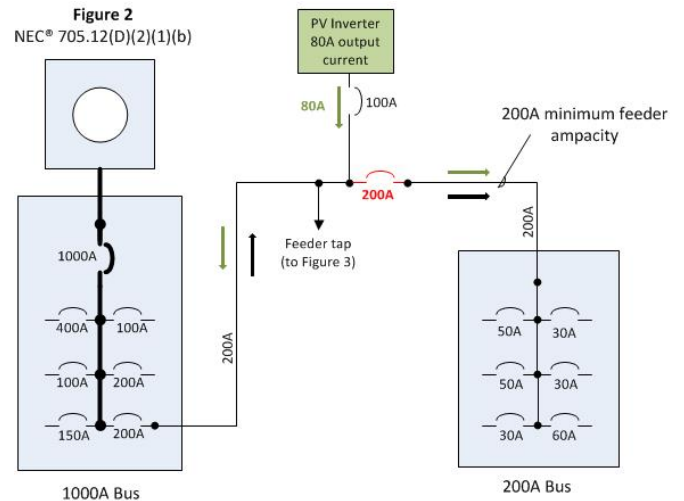
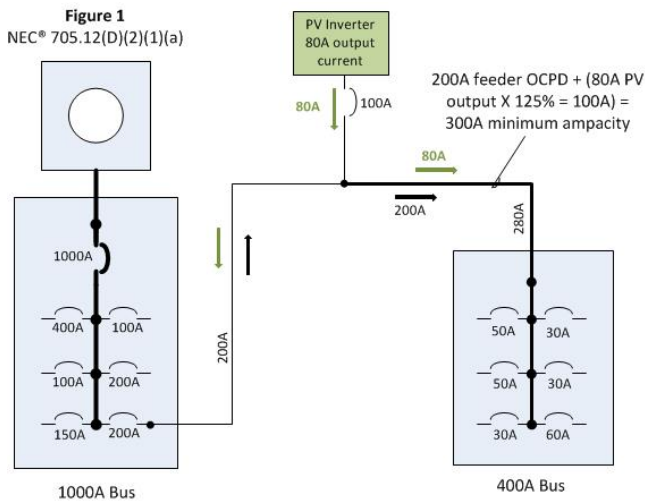
Bus or Conductor Ampere Rating 705.12(D)(2) – A utility interactive inverter connected to the load side of a service disconnecting means must be done in such a way that does not overload the feeder, tap conductors, or busbar, connected to two sources of supply. The previous method of using the overcurrent protective device (OCPD) ampere rating as the basis of calculations for determining rating of a conductor or busbar is no longer used. Instead, the calculation must be made using 125% of the inverter output circuit current. In most cases, this provides system designers greater flexibility in connecting utility interactive inverters to premises wiring systems. NEC® 705.12(D)(2) provides methods for determining bus or conductor rating when connecting to feeders, taps, and busbars.

Safety Tip of the Month

What do cleaning out your rain gutters and replacing your smoke detector batteries have in common? They are both important tasks and may involve the use of a ladder. A fall from a ladder could kill you or disable you permanently.

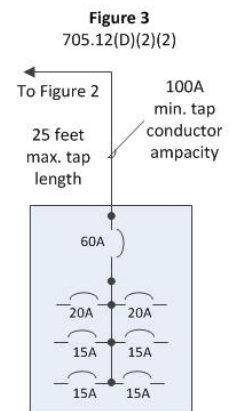
- Always use the right ladder for the job. A chair is not a ladder!
- Get help with heavy or long ladders.
- Make certain your footing is good. Check for concealed holes left by moles and gophers. Avoid ice, mud, and other slippery conditions.
- Review the OSHA ladder bulletin at: <https://www.osha.gov/Publications/OSHA3625.pdf>

Feeders – 705.12(D)(2)(1) – When the connection is made to a feeder at a location other than the opposite end of the feeder from the primary source OCPD, that portion of the feeder supplied by two sources may become overloaded if it is not sized appropriately. The rating of the feeder must not be less than the sum of the primary source OCPD and 125 percent of the inverter output circuit current (See Figure 1), unless an OCPD on the load side of the inverter connection is rated not greater than the ampacity of the feeder (See Figure 2).



Taps – 705.12(D)(2)(2) – When a feeder tap is made to a feeder with an interconnected power production source connected to it, things really get complicated. The general requirements for sizing feeder taps are found in NEC® 240.21(B) and are based upon the rating of the overcurrent device protecting the feeder conductors. For example, tap conductors over 10 feet long but not over 25 feet long must have an ampacity not less than one-third the rating of the OCPD protecting the feeder conductors. The possibility to overload the tap conductors exists if an additional source such as an inverter is connected to the same feeder supplying the tap conductors. In accordance with 705.12(D)(2)(2), tap conductors connected to a feeder with an inverter output connection must be sized based on the sum of 125 percent of the inverter(s) output circuit current and the rating of the OCPD protecting the feeder conductors as calculated in 240.21(B).

Example (See Figure 3): 25 ft. tap conductors connected to a feeder protected by a 200A OCPD and having an 80A inverter output connected must have an ampacity not less than 100 amperes (25 ft. tap rule; one-third of the sum of 200A and 125% of inverter output current). $1/3 \times (200 + (125\% \times 80)) = 100A$.



Ugly picture: Click on the picture to open a larger image.
NM cable splices concealed in wall without enclosure.
Violations include NEC® 300.15, Box required at each splice point; WAC 296-46B-990 Serious non-compliant installation, improper splice concealed within wall. Serious non-compliance may result in suspension or revocation of installer's license/certificate.

Answer to Question of the Month: 1 AWG – NEC® 240.21(B)(1) – minimum tap conductor ampacity for taps not over 10 ft. long is one-tenth of the rating of the overcurrent device protecting the feeder conductors: $1200 \times .1 = 120$ amperes. Per Table 310.15(B)(16), 1 AWG Copper 75° conductor ampacity = 130 amperes.



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