

short-circuit and ground-fault protective device to be marked on multimotor equipment.

**430.25 Multimotor and Combination-Load Equipment.** The ampacity of the conductors supplying multimotor and combination-load equipment shall not be less than the minimum circuit ampacity marked on the equipment in accordance with 430.7(D). Where the equipment is not factory-wired and the individual nameplates are visible in accordance with 430.7(D) (2), the conductor ampacity shall be determined in accordance with 430.24.

Computing the load for the minimum allowable conductor size for a combination lighting (or lighting and appliance) load and motor load involves determining the lighting load in accordance with Article 220 (and other applicable articles and sections), the appliance load in accordance with Article 422, and the motor load in accordance with 430.22 (single motor) or 430.24 (two or more motors). The lighting load and the motor load are added together to determine the minimum conductor ampacity.

**430.26 Feeder Demand Factor.** Where reduced heating of the conductors results from motors operating on duty-cycle, intermittently, or from all motors not operating at one time, the authority having jurisdiction may grant permission for feeder conductors to have an ampacity less than specified in 430.24, provided the conductors have sufficient ampacity for the maximum load determined in accordance with the sizes and number of motors supplied and the character of their loads and duties.

Informational Note: Demand factors determined in the design of new facilities can often be validated against actual historical experience from similar installations.

**430.27 Capacitors with Motors.** Where capacitors are installed in motor circuits, conductors shall comply with 460.8 and 460.9.

**430.28 Feeder Taps.** Feeder tap conductors shall have an ampacity not less than that required by Part II, shall terminate in a branch-circuit protective device, and, in addition, shall meet one of the following requirements:

- (1) Be enclosed either by an enclosed controller or by a raceway, be not more than 3.0 m (10 ft) in length, and, for field installation, be protected by an overcurrent device on the line side of the tap conductor, the rating or setting of which shall not exceed 1000 percent of the tap conductor ampacity
- (2) Have an ampacity of at least one-third that of the feeder conductors, be suitably protected from physical damage or enclosed in a raceway, and be not more than 7.5 m (25 ft) in length
- (3) Have an ampacity not less than the feeder conductors

*Exception: Feeder taps over 7.5 m (25 ft) long. In high-bay manufacturing buildings [over 11 m (35 ft) high at walls],*

*where conditions of maintenance and supervision ensure that only qualified persons service the systems, conductors tapped to a feeder shall be permitted to be not over 7.5 m (25 ft) long horizontally and not over 30.0 m (100 ft) in total length where all of the following conditions are met:*

- (1) *The ampacity of the tap conductors is not less than one-third that of the feeder conductors.*
- (2) *The tap conductors terminate with a single circuit breaker or a single set of fuses complying with (1) Part IV, where the load-side conductors are a branch circuit, or (2) Part V, where the load-side conductors are a feeder.*
- (3) *The tap conductors are suitably protected from physical damage and are installed in raceways.*
- (4) *The tap conductors are continuous from end-to-end and contain no splices.*
- (5) *The tap conductors shall be 6 AWG copper or 4 AWG aluminum or larger.*
- (6) *The tap conductors shall not penetrate walls, floors, or ceilings.*
- (7) *The tap shall not be made less than 9.0 m (30 ft) from the floor.*

For a single motor load, the tap conductors are sized the same as the motor branch-circuit conductors — that is, according to 430.22, which requires that motor branch-circuit conductors be sized at least 125 percent of the full-load current value for the motor given in Tables 430.248 through 430.250. The table value, rather than the nameplate value, is the full-load current used for conductor sizing according to 430.6(A).

The tap conductors must terminate in a set of fuses or a circuit breaker, thus limiting the load on the tap conductors. The reduced-size tap conductors are protected from overload by the overcurrent device where the tap conductors terminate but are protected from short circuit and ground fault only from the feeder overcurrent device.

A tap conductor installation also must meet the additional requirements associated with their tap conductor distance limits, that is, 10 feet, 25 feet, or, by exception, 100 feet. The requirements for tap conductors that supply motor loads are similar to the basic tap requirements found in 240.21.

#### See also

**430.53(D)** and associated commentary for additional information concerning a tap supplying a single motor in a group installation

#### Calculation Example

A 15-hp, 230-V, 3-phase, NEMA Design B, squirrel-cage induction motor with a service factor of 1.15 and a nameplate FLC of 40 A is to be supplied by a tap from a 250-kcmil feeder. Assuming three Type THWN copper conductors in a raceway and no ambient correction factor, the feeder has an ampacity of 255 A (from Table 310.16, 75°C column). The tap conductors are not over 25 ft long (see Exhibit 430.5). Determine the required branch-circuit short-circuit and ground-fault protection required by 430.28 and the overload protection required by 430.32.