ARTICLE

430 MOTORS, MOTOR CIRCUITS, AND CONTROLLERS

Introduction to Article 430—Motors, Motor Circuits, and Controllers

Article 430 contains the specific rules for conductor sizing, overcurrent protection, control circuit conductors, controllers, and disconnects for electric motors. The installation requirements for motor control centers are covered in Part VIII, and air-conditioning and refrigeration equipment are covered in Article 440.

This is one of the longest articles in the *NEC*. It is also one of the most complex, but motors are complex equipment. They are electrical and mechanical devices, but what makes motor applications complex is the fact that they are inductive loads with a high-current demand at start-up that is typically six (or more) times the running current. This makes overcurrent protection for motor applications necessarily different from the overcurrent protection employed for other types of equipment. So, do not confuse general overcurrent protection with motor protection—you must calculate and apply them differently using the rules in Article 430.

You might be uncomfortable with the allowances for overcurrent protection found in this article, such as protecting a 10 AWG conductor with a 60A overcurrent protective device. As you progress through Article 430, you will learn to understand how motor overcurrent protection works and realize just why these allowances are not only safe, but necessary.

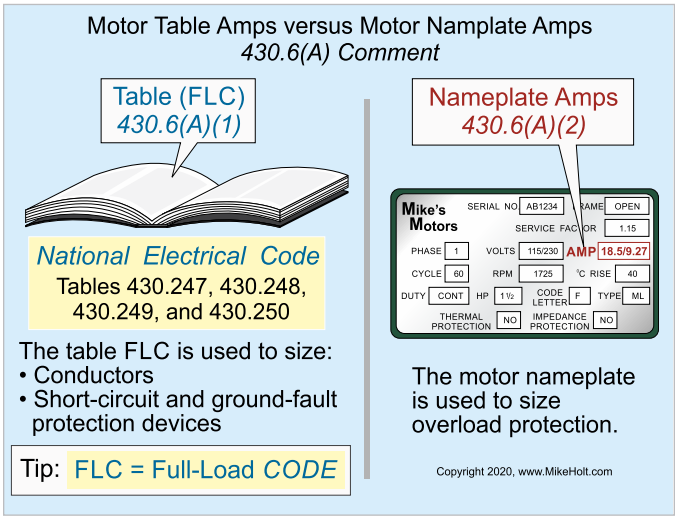
Part I. General

430.6 Table FLC versus Motor Nameplate Current Rating

The size of conductors supplying equipment covered by Article 430 must be selected from the ampacity tables in accordance with 310.15 or be calculated in accordance with 310.14(B). Where flexible cord is used, the size of the conductor must be selected in accordance with 400.5.

(A) General Requirements. Motor current ratings used for the application of this article are determined by (A)(1) and (A)(2). ▶**Figure 430–5**

(1) Table Full-Load Current (FLC). The motor full-load current ratings contained in Tables 430.248 and 430.250 are used to determine conductor sizing [430.22] and the branch-circuit short-circuit and ground-fault overcurrent protection size [430.52 and 430.62].



▶**Figure 430–5**

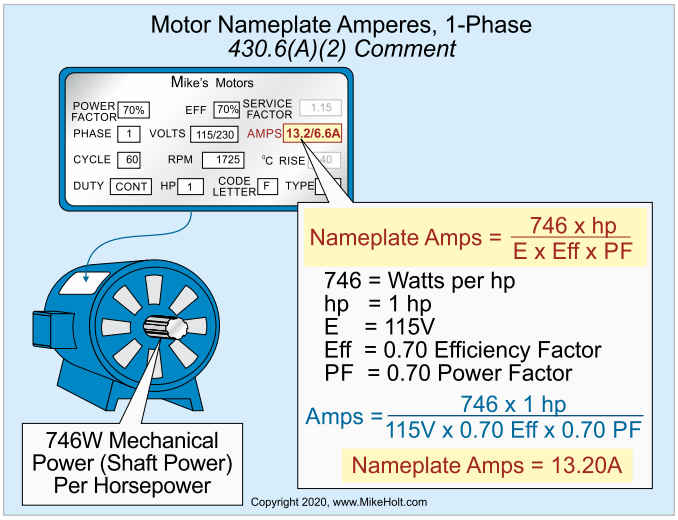
Author's Comment:

- The motor full-load amperes (FLA) identified on the motor nameplate [430.6(A)(2)] is not permitted to be used to determine the conductor size and the motor short-circuit and ground-fault overcurrent protective device except for other than continuous duty motor applications as covered in 430.22(E).

(2) Motor Nameplate Current Rating (FLA). Overload devices and conductor sizing for intermittent duty motors must be sized based on the motor nameplate full-load ampere (FLA) rating in accordance with 430.31.

Author's Comment:

- The motor nameplate current rating is identified as full-load amperes (FLA). The FLA rating is the current in amperes the motor draws while producing its rated horsepower load at its rated voltage, based on its rated efficiency and power factor. ▸Figure 430–6



▸Figure 430–6

Author's Comment:

- The actual current drawn by the motor's FLA depends on the load on the motor and the actual operating voltage at the motor terminals. If the load increases, the current also increases, or if the motor operates at a voltage below its nameplate rating, the operating current will increase.

Caution

To prevent damage to motor windings from excessive heat (caused by excessive current), never load a motor above its horsepower rating and be sure the applied voltage is within 10 percent of the motor's voltage rating.