

or plate on which the arm rests when in the starting position shall have no electrical connection with the resistor.

- (2) Motor-starting rheostats for dc motors operated from a constant voltage supply shall be equipped with automatic devices that will interrupt the supply before the speed of the motor has fallen to less than one-third its normal rate.

430.83 Ratings. The motor controller shall have a rating in accordance with 430.83(A), unless otherwise permitted in 430.83(B) or (C), or in accordance with (D), under the conditions specified.

(A) General.

(1) Horsepower Ratings. Motor controllers, other than inverse time circuit breakers and molded case switches, shall have horsepower ratings at the application voltage not lower than the horsepower rating of the motor.

(2) Circuit Breaker. A branch-circuit inverse time circuit breaker rated in amperes shall be permitted as a motor controller for all motors. Where this circuit breaker is also used for overload protection, it shall conform to the appropriate provisions of this article governing overload protection.

(3) Molded Case Switch. A molded case switch rated in amperes shall be permitted as a motor controller for all motors.

A molded case switch has the same frame appearance as a molded case circuit breaker and is designed to fit in circuit-breaker enclosures. However, the device is marked with only a short-circuit current rating, which indicates that the switch does not provide overcurrent protection. Fused molded case switches that do provide overcurrent protection are marked with a short-circuit current interrupting rating. Both fused and unfused molded case switches can be used in motor circuits.

Molded case switches are permitted as motor disconnecting means per 430.109. In general, molded case switches are rated only in amperes and, where used in a motor circuit, must be sized at 115 percent of the motor full-load current rating. Disconnecting means assemblies are available that employ molded case switches marked with horsepower ratings that can be used, instead of the ampere rating of the molded case switch.

(B) Small Motors. Devices in accordance with 430.81(A) and (B) shall be permitted as a motor controller.

(C) Stationary Motors of 2 Horsepower or Less. For stationary motors rated at 2 hp or less and 300 volts or less, the motor controller shall be permitted to be either of the following:

- (1) A general-use switch having an ampere rating not less than twice the full-load current rating of the motor
- (2) On ac circuits, a general-use snap switch suitable only for use on ac (not general-use ac-dc snap switches) where the motor full-load current rating is not more than 80 percent of the ampere rating of the switch

(D) Torque Motors. For torque motors, the motor controller shall have a continuous-duty, full-load current rating not less than the nameplate current rating of the motor. For a motor controller rated in horsepower but not marked with the foregoing current rating, the equivalent current rating shall be determined from the horsepower rating by using Table 430.247, Table 430.248, Table 430.249, or Table 430.250.

(E) Voltage Rating. A motor controller with a straight voltage rating, for example, 240 volts or 480 volts, shall be permitted to be applied in a circuit in which the nominal voltage between any two conductors does not exceed the motor controller's voltage rating. A motor controller with a slash rating, for example, 120/240 volts or 480Y/277 volts, shall only be applied in a solidly grounded circuit in which the nominal voltage to ground from any conductor does not exceed the lower of the two values of the motor controller's voltage rating and the nominal voltage between any two conductors does not exceed the higher value of the motor controller's voltage rating.

(F) Short-Circuit Current Rating. A motor controller shall not be installed where the available fault current exceeds the motor controller's short-circuit current rating.

Informational Note: The short-circuit current rating might be marked on the device or might be a rating for a tested combination specified in the motor controller's technical manual or instruction sheet.

430.84 Need Not Open All Conductors. The motor controller shall not be required to open all conductors to the motor.

Exception: Where the motor controller serves also as a disconnecting means, it shall open all ungrounded conductors to the motor in accordance with 430.111.

A controller that does not serve as a disconnecting means must open only as many motor circuit conductors as are necessary to stop the motor — that is, one conductor for a dc or single-phase motor circuit, two conductors for a 3-phase motor circuit, and three conductors for a 2-phase motor circuit.

430.85 In Grounded Conductors. One pole of the motor controller shall be permitted to be placed in a permanently grounded conductor if the motor controller is designed so that the pole in the grounded conductor cannot be opened without simultaneously opening all conductors of the circuit.

Generally, one conductor of a 120-volt circuit is grounded, and a single-pole device must be connected in the ungrounded conductor to serve as a controller. A 2-pole controller is permitted for such a circuit, where both conductors (grounded and ungrounded) are opened simultaneously. The same requirement can be applied to other circuits, such as 240-volt, 3-wire circuits with one conductor grounded.

430.87 Number of Motors Served by Each Motor Controller. Each motor shall be provided with an individual motor controller.