

is individually capable of being locked in the open position and the condition of either (1) or (2) is met. Locating disconnect switches or panelboards within locked rooms or circuit breakers behind the locked door of a panelboard does not meet the requirements of 430.102.

If locating the disconnecting means close to the motor location and driven machinery is impracticable due to the type of machinery, the type of facility, lack of space for locating large equipment such as disconnecting means rated over 1000 volts, or any increased hazard to persons or property, the disconnecting means is permitted to be located remotely. Industrial facilities that comply with OSHA 29 CFR 1910.147, "The Control of Hazardous Energy (Lockout/Tagout)," are permitted to have the disconnecting means located remotely.

Section 110.2 of *NFPA 70E®*, *Standard for Electrical Safety in the Workplace®*, requires in part that all "electrical conductors and circuit parts shall not be considered to be in an electrically safe work condition until all of the requirements of Article 120 have been met." The work process specified in Article 120 includes removing the sources of energy, locking, and tagging out the disconnecting means, and verifying the absence of voltage using an approved voltage tester. Further, 120.1(A)(3) states that lockout/tagout requirements shall "apply to fixed, permanently installed equipment, temporarily installed equipment and portable equipment." The principles and procedures in *NFPA 70E* establish strict work rules requiring the locking off (out) and tagging out of disconnect switches.

430.103 Operation. The disconnecting means shall open all ungrounded supply conductors and shall be designed so that no pole can be operated independently. The disconnecting means shall be permitted in the same enclosure with the motor controller. The disconnecting means shall be designed so that it cannot be closed automatically.

Informational Note: See 430.113 for equipment receiving energy from more than one source.

A switch, circuit breaker, or other device serves as a disconnecting means for both the controller and the motor, thereby providing safety during maintenance and inspection shutdown periods. The disconnecting means also disconnects the controller; therefore, it cannot be a part of the controller.

However, separate disconnects and controllers may be mounted on the same panel or contained in the same enclosure, such as combination fused-switch, magnetic-starter units.

Depending on the size of the motor and other conditions, the type of disconnecting means required may be a motor circuit switch, a circuit breaker, a general-use switch, an isolating switch, an attachment plug and receptacle, or a branch-circuit short-circuit and ground-fault protective device, as specified in 430.109.

If a motor stalls or is under heavy overload and the motor controller fails to properly open the circuit, the disconnecting means, which must be rated to interrupt locked-rotor current, can be used to open the circuit. In accordance with 430.109(E), for motors larger than 100 horsepower ac or 40 horsepower dc, the disconnecting means is permitted to be a general-use or an

isolating switch that is plainly marked "Do not operate under load."

430.104 To Be Indicating. The disconnecting means shall plainly indicate whether it is in the open (off) or closed (on) position.

430.105 Grounded Conductors. One pole of the disconnecting means shall be permitted to disconnect a permanently grounded conductor, provided the disconnecting means is designed so that the pole in the grounded conductor cannot be opened without simultaneously disconnecting all conductors of the circuit.

430.107 Readily Accessible. At least one of the disconnecting means shall be readily accessible.

430.108 Every Disconnecting Means. Every disconnecting means in the motor circuit between the point of attachment to the feeder or branch circuit and the point of connection to the motor shall comply with the requirements of 430.109 and 430.110.

Δ **430.109 Type.** The disconnecting means shall be a type in accordance with 430.109(A), unless otherwise permitted in 430.109(B) through (G), under the conditions specified.

(A) **General.**

(1) **Motor-Circuit Switch.** A listed motor-circuit switch rated in horsepower.

(2) **Molded Case Circuit Breaker.** A listed molded case circuit breaker.

(3) **Molded Case Switch.** A listed molded case switch.

(4) **Instantaneous-Trip Circuit Breaker.** An instantaneous-trip circuit breaker that is part of a listed combination motor controller.

(5) **Self-Protected Combination Motor Controller.** Listed self-protected combination motor controller.

Δ (6) **Manual Motor Controller.** Listed manual motor controllers additionally marked "Suitable as Motor Disconnect" shall be permitted as a disconnecting means where installed between the final motor branch-circuit short-circuit protective device and the motor. Listed manual motor controllers additionally marked "Suitable as Motor Disconnect" shall be permitted as disconnecting means on the line side of the fuses in accordance with 430.52(C)(5). In this case, the fuses permitted in 430.52(C)(5) shall be considered supplementary fuses, and suitable branch-circuit short-circuit and ground-fault protective devices shall be installed on the line side of the manual motor controller additionally marked "Suitable as Motor Disconnect."

(7) **System Isolation Equipment.** System isolation equipment shall be listed for disconnection purposes. System isolation equipment shall be installed on the load side of the overcurrent