

Part IX. Disconnecting Means

430.101 General. Part IX is intended to require disconnecting means capable of disconnecting motors and controllers from the circuit.

430.102 Location.

(A) Controller. An individual disconnecting means shall be provided for each controller and shall disconnect the controller. The disconnecting means shall be located in sight from the controller location.

Exception No. 1: For motor circuits over 1000 volts, nominal, a controller disconnecting means lockable in accordance with 110.25 shall be permitted to be out of sight of the controller, provided that the controller is marked with a warning label giving the location of the disconnecting means.

Exception No. 2: A single disconnecting means shall be permitted for a group of coordinated controllers that drive several parts of a single machine or piece of apparatus. The disconnecting means shall be located in sight from the controllers, and both the disconnecting means and the controllers shall be located in sight from the machine or apparatus.

Exception No. 3: The disconnecting means shall not be required to be in sight from valve actuator motor (VAM) assemblies containing the controller where such a location introduces additional or increased hazards to persons or property and conditions (a) and (b) are met.

- (a) The valve actuator motor assembly is marked with a warning label giving the location of the disconnecting means.
- (b) The disconnecting means is lockable in accordance with 110.25.

(B) Motor. A disconnecting means shall be provided for a motor in accordance with (B)(1) or (B)(2).

(1) Separate Motor Disconnect. A disconnecting means for the motor shall be located in sight from the motor location and the driven machinery location.

(2) Controller Disconnect. The controller disconnecting means required in accordance with 430.102(A) shall be permitted to serve as the disconnecting means for the motor if it is in sight from the motor location and the driven machinery location.

Exception to (1) and (2): The disconnecting means for the motor shall not be required under either condition (a) or condition (b), which follow, provided that the controller disconnecting means required in 430.102(A) is lockable in accordance with 110.25.

- (a) Where such a location of the disconnecting means for the motor is impracticable or introduces additional or increased hazards to persons or property

Informational Note: Some examples of increased or additional hazards include, but are not limited to, motors rated in excess of 100 hp, multimotor equipment, submersible motors, motors

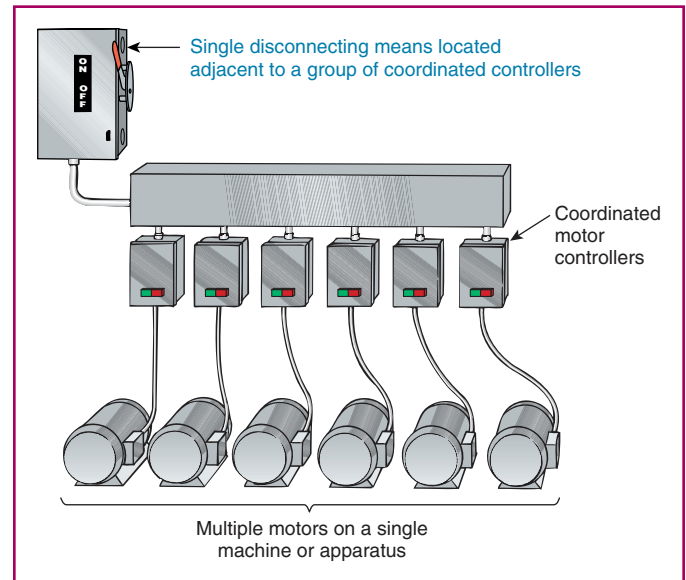


EXHIBIT 430.16 A single disconnecting means located adjacent to a group of coordinated controllers mounted on a multimotor continuous process machine.

associated with adjustable speed drives, and motors located in hazardous (classified) locations.

- (b) In industrial installations, with written safety procedures, where conditions of maintenance and supervision ensure that only qualified persons service the equipment

Informational Note: For information on lockout/tagout procedures, see NFPA 70E-2015, *Standard for Electrical Safety in the Workplace*.

The main rules of 430.102(A) and (B) require that the disconnecting means be in sight of the controller, the motor location, and the driven-machinery location. The exceptions to these rules permit the disconnecting means to be out of sight under certain conditions, which include that it be capable of being locked in the open position.

A single disconnecting means may be located adjacent to a group of coordinated controllers, as illustrated in Exhibit 430.16, where the controllers are mounted on a multimotor continuous process machine.

According to 430.102(B)(2), Exception, the disconnecting means is permitted to be out of sight of the motor — as illustrated in Exhibit 430.17 — if the controller disconnecting means is individually capable of being locked in the open position and the criterion of either (a) or (b) 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 600 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.

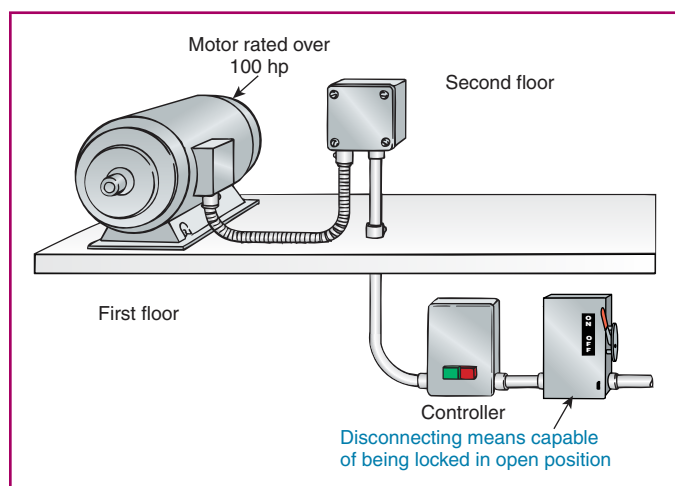


EXHIBIT 430.17 A controller disconnecting means that is out of sight of the motor — only for cases that meet the requirements of (a) or (b) of 430.102(B), Exception.

NFPA 70E®, *Standard for Electrical Safety in the Workplace*®, 120.2(A), 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 applicable 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 through the use of an approved voltage tester. Further, it states, “Lockout/tagout requirements shall apply to fixed, permanently installed equipment; to temporarily installed equipment; and to portable equipment.” The principles and procedures in NFPA 70E establish strict work rules requiring 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 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.

430.109 Type. The disconnecting means shall be a type specified in 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 Controller. Listed self-protected combination controller.

(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 permitted in 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.”