

## SECTION 16440

### **DISCONNECT SWITCHES – HEAVY DUTY**

#### **PART 1 – GENERAL**

##### **1.01 GENERAL**

- A. Switches shall be furnished and installed at locations as shown on the drawings. Switches shall be of the type approved, indicated and specified herein.
- B. Except as noted on drawings all indoor safety switches shall be NEMA 1 and all outdoor safety switches shall be NEMA 4 stainless steel. All of them shall be for heavy duty services.
- C. An approved disconnect means shall be provided at each motor controller and appliance location. The disconnect means may be omitted if same are incorporated in motor controls supplied under other Sections.
- D. Enclosed quick-break type fused switches, externally operated – shall be used for current protection purposes, and shall be enclosed in suitable metal housing of type required by location. Switches for motor branch circuit use shall be horsepower rated.
- E. Unfused, externally operated safety switches shall be used where disconnecting means only is required and where the current supply to same is protected by a circuit breaker or fused switch at the panel board. Switches shall be Heavy Duty horsepower rated, enclosed type arranged for padlocking in open position.

##### **1.02 REFERENCES**

Switches shall be manufactured in accordance with the following standards:

- A. UL 98 – enclosed and Dead Front Switches
- B. NEMA KS 1 – Enclosed Switches
- C. NEMA 250 – Enclosures for Electrical Equipment

##### **1.03 SERVICE ENTRANCE**

- A. Switches identified for use as service equipment are to be labeled for this application.

##### **1.04 DRAWINGS**

- A. Provide outline drawings with dimensions, and equipment ratings for voltage, amperage, horsepower and short circuit.

**PART 2 – PRODUCTS**

2.01 MANUFACTURERS

- A. Switches shall be manufactured by Square D Company or approved equal.

2.02 SWITCH INTERIOR

- A. All switches shall have switch blades, which are visible when the switch is OFF and the cover is open. NEMA Type as indicated on the drawings.
- B. Lugs shall be front removable and UL Listed for : 60° C or 75° C conductors for 3-100 ampere; 75° C conductors for 200-1200 ampere; aluminum or copper conductors for Type 1, 3R or 4X polyester; copper conductors only for Type 12, 12K, Type 4-4X-5 stainless steel.
- C. 30 through 100 ampere switches shall be equipped with factory installed fuse pullers for Type 12, 12K, Type 4-4X-5 stainless steel or Type 4X Polyester and field installed fuse pullers for Type 1 or Type 3R.
- D. Switches required for Type 12, 12K or Type 4-4X-5 stainless steel applications shall have all copper current carrying parts.
- E. All current carrying parts shall be plated to resist corrosion.
- F. Switches shall have removable arc suppressors to facilitate easy access to line side lugs.
- G. Switches shall have provisions for a field installable electrical interlock.

2.03 SWITCH MECHANISM

- A. Switch operating mechanism shall be quick-make, quick-break such that, during normal operation of the switch, the operation of the contacts shall not be capable of being restrained by the operating handle after the closing or opening action of the contacts has started.
- B. The operating handle shall be an integral part of the box, not the cover.
- C. Provisions for padlocking the switch in the OFF position with at least three padlocks shall be provided.
- D. The handle position shall travel at least 90° between OFF and ON positions to clearly distinguish and indicate handle position.

SWITCH MECHANISM (Cont.)

- E. All switches shall have a dual cover interlock mechanism to prevent unintentional opening of the switch cover when the switch is ON and prevent turning the switch ON when the cover is open. The cover interlock mechanism shall have and externally operated override but the override shall not permanently disable the interlock mechanism. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.

2.04 SWITCH ENCLOSURES

- A. Switch covers shall be attached with welded pin-type hinges for Type 1, 12, 12K, and 4-4X-5 stainless steel; top hinged, attached with removable screws and securable in the open position for Type 3R; attached by molded hinges and type 316 stainless steel hinge pins for Type 4X polyester; and attached by type 316 stainless steel bolts for Type 7/9.
- B. The enclosure shall be finished with gray baked enamel paint which is electrodeposited on cleaned, phosphate pre-treated steel for Type 1; gray baked enamel paint which is electrodeposited on cleaned, phosphate pre-treated galvanized steel for Type 3R, 12 and 12K; A brush finish on Type 304 stainless steel for Type 4-4X-5 stainless steel; and Gray baked enamel on copper free cast aluminum alloy for Type 7/9.
- C. The enclosure shall have ON and OFF markings stamped into the cover for Type 1, 3R, 4-4X-5 stainless steel, 12, and 12K; cast into the cover for Type 7/9; and Inked on a adhesive label for Type 4X polyester.
- D. The operating handle shall be provided with a dual colored, red/black position indication for Type 1, 3R, 4-4X-5 stainless steel, 4X polyester, 12, and 12K.
- E. All switches shall have provisions to accept up to three 3/8 in hasp padlocks to lock the operating handle in the OFF position.
- F. Tangential knockouts shall be provided to facilitate ease of conduit entry for Type 1, 3R, and 12K for switches rated 30-200A.
- G. Type 12 and 4-4X-5 stainless steel enclosure shall contain no knockouts. Supply watertight hubs as indicated on the plans.
- H. Type 4X polyester enclosures shall be provided with polyester conduit hubs for field installation.
- I. Type 7/9 enclosures shall be provided with threaded conduit openings in both end walls.
- J. Enclosures for Type 3R switches through 200 ampere shall have provisions for interchangeable bolt-on hubs in the top end wall. Hubs shall be Square D B-Type hubs sized as indicated on the plans.

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- K. Cover sealing means for switches rated through 200 amperes shall be quick release trunk latches for Type 4-4X-5 stainless steel, 12, and 12K; Type 316 stainless steel captive screws for Type 4X polyester; and Type 316 stainless steel bolts for Type 7/9.
- L. Type 7/9 enclosures shall be furnished with a breather and drain kit to allow their use in outdoor applications.
- M. Type 12, 4-4X-5 stainless steel enclosures shall be dual rated as Type 3R to facilitate their use in outdoor applications.
- N. Cover viewing window will be incorporated on 30-200A NEMA 12, 12K, 4-4X-5 stainless steel, two or three pole switches.

### 2.05 SWITCH RATINGS

- A. Switches shall be horsepower rated for ac and/or dc as indicated on the plans.
- B. The UL Listed short circuit current rating of the switches shall be: 10,000 *rms* symmetrical amperes when used with or protected by Class H or K fuses of 30-600 ampere; 200,000 *rms* symmetrical amperes when used with or protected by Class R or Class J fuses of 30-600 ampere switches employing appropriate fuse rejection schemes; and 200,000 *rms* symmetrical amperes when used with or protected by Class L fuses of 800-1200 ampere.

**END OF SECTION 16440**