

SECTION 26 28 16 – DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Disconnect Switches.
- B. Molded-Case Circuit Breakers and Switches.
- C. Enclosures.

1.2 REFERENCES

- A. FS W F 870 Fuse Holders (For Enclosed Cartridge Fuses).
- B. FS W S 865 Switch, Box, (Enclosed), Surface Mounted.
- C. NEMA KS 1 Enclosed Switches.

1.3 SUBMITTALS

- A. Include outline Drawings with dimensions, and equipment ratings for voltage, capacity, horsepower, and short circuit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Square D Company. – Base Bid
- B. GE by ABB equivalent. – Alternate Bid
- C. No Other Manufacturers will be considered.

2.2 HEAVY DUTY TYPE FUSED AND NON-FUSED DISCONNECT SWITCHES

- A. All switches shall have switch blades which are visible when the switch is OFF and the cover is open.
- B. Lugs shall be mechanical type, front removable and UL listed for 60°C or 75°C conductors in switches rated 30 through 100 ampere, 75°C conductors in switches rated 200 through 1200 ampere, copper conductors.
- C. Switches rated over 1200 amperes shall be provided as switchboard sections, with all applicable accessories.
- D. All current carrying parts shall be plated to resist corrosion.

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- E. Switches shall have removable arc suppressors to facilitate easy access to line side lugs.
- F. Switches shall have provisions for a field installable electrical interlock.
- G. 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.
- H. The operating handle shall be an integral part of the box, not the cover.
- I. The handle position shall travel at least 90 degrees between OFF and ON positions to clearly distinguish and indicate handle position.
- J. 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 an 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.
- K. The enclosure shall have ON and OFF markings on the cover to clearly identify the position of the switch.
- L. All switches shall have provisions to lock the operating handle in the OFF position.
- M. Switches shall be horsepower rated for ac and/or dc as indicated on the plans.
- N. The UL listed short circuit current rating of the switches shall be: 200,000 rms symmetrical amperes when used with or protected by Class R fuses (30 through 600 ampere switches employing appropriate fuse rejection schemes).
- O. Switch Accessories:
 - 1. Provide the following where required/indicated on the documents:
 - a. Where switches are designated to be used as service entrance, the switch shall be labeled for such use.
 - b. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - c. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - d. Isolated Ground Kit: Internally mounted; insulated, labeled for copper and aluminum neutral conductors.
 - e. Where fused switches are designated to have type "R" fuses, the switch shall be provided with rejection clips.
 - f. Provide fuse clip adaptors as required to accommodate smaller fuses when required.
 - g. Auxiliary Contact Kit: Two NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open. Provide contact rating as required to accommodate application.

2.3 MOLDED-CASE CIRCUIT BREAKERS AND SWITCHES

- A. Circuit breakers shall be constructed using glass-reinforced insulating material. Current carrying components shall be completely isolated from the handle and the accessory mounting area.
- B. Circuit breakers shall have a toggle operating mechanism with common tripping of all poles, which provides quick-make, quick-break contact action. The circuit-breaker handle shall be over center, be trip free, and

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reside in a tripped position between on and off to provide local trip indication. Circuit-breaker escutcheon shall be clearly marked on and off in addition to providing international I/O markings. Equip circuit breaker with a push-to-trip button, located on the face of the circuit breaker to mechanically operate the circuit-breaker tripping mechanism for maintenance and testing purposes.

- C. The maximum ampere rating and UL, IEC, or other certification standards with applicable voltage systems and corresponding interrupting ratings shall be clearly marked on face of circuit breaker. Circuit breakers shall be 100 percent rated.
- D. MCCBs shall be equipped with a device for locking in the isolated position.
- E. Lugs shall be suitable for 60 deg C 125 ampere circuit breakers and below and 75 deg C over 125 ampere.
- F. Switches rated over 1200 amperes shall be provided as switchboard sections, with all applicable accessories.
- G. Standard: Comply with UL 489 with interrupting capacity to comply with available fault currents.
- H. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:
 - 1. Instantaneous trip.
 - 2. Long- and short-time pickup levels.
 - 3. Long- and short-time time adjustments.
 - 4. Ground-fault pickup level, time delay, and I-squared t response, when ground-fault is required or indicated.
- I. Ground-Fault Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip). Provide where indicated or required by code.
- J. Ground-Fault Equipment-Protection (GFEP) Circuit Breakers: With Class B ground-fault protection (30-mA trip). Provide where indicated.
- K. Features and Accessories:
 - 1. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.
 - 2. Ground-Fault Protection: Comply with UL 1053; integrally mounted type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.
 - 3. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact.
 - 4. Auxiliary Contacts: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.
 - 5. Electrical Operator: Provide remote control for on, off, and reset operations.

2.4 ENCLOSURES

- A. Switch and breaker enclosure shall be NEMA 1 unless otherwise on the Drawings or required by the NEC in accordance with the project conditions.
 - 1. Exterior switches and breakers shall be rated NEMA 3R, unless noted otherwise.
 - 2. Kitchen and wash-down areas shall be provided with NEMA 4X with stainless steel enclosure, unless noted otherwise.

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- B. The enclosure shall be finished with Gray baked enamel paint which is electrodeposited on cleaned, phosphate pretreated steel (Type 1), or Gray baked enamel paint which is electrodeposited on cleaned, phosphate pretreated galvanized steel (Type 3R).
- C. Tangential knockouts shall be provided to facilitate ease of conduit entry for switches rated 30 through 200 amperes.
- D. Enclosures for Type 3R switches through 200 amperes shall have provisions for interchangeable bolt on hubs in the top end wall.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install disconnect switches to meet N.E.C. working clearance requirements.
- B. Install fuses in fusible disconnect switches.

3.2 IDENTIFICATION

- A. The requirements listed below are in addition to the requirements listed in Division 26 "Electrical Identification."
- B. Provide labeling on the exterior of each disconnect switch Stating the following:
 - 1. What the piece of equipment is fed from the switch.
 - 2. Where the piece of equipment is fed from the switch.
 - 3. Size, type and quantity of fuses within cabinet.

3.3 FIELD QUALITY CONTROL

- A. Subsequent to completion of installation of disconnects, energize circuits and demonstrate capability and compliance with requirements. Demonstrate switch operation through six (6) opening/closing cycles with circuit unloaded. Open each switch enclosure to display interior, mechanical and electrical connections and fuse installation, and for verification of type and rating of fuses installed. Where possible, correct deficiencies at project site, then retest or demonstrate compliance; otherwise, remove and replace with new units and retest.

END OF SECTION 26 28 16