

SECTION 26 28 23
DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:

1. Drawings and general provisions of the Subcontract apply to this Section.
2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes:

1. Low-voltage fused and non-fused switches.
2. Fuses for fused switches.

C. Related Sections:

1. Division 01 Section "General Requirements."
2. Division 01 Section "Special Procedures."
3. Division 26 Section "Common Work Results for Electrical".
4. Division 26 Section "Secondary Grounding for Electrical Systems".

1.2 REFERENCES

A. General:

1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.
4. Refer to Division 26 Section "Common Results for Electrical" for codes and standards, and other general requirements.

B. ANSI/NFPA 70 - National Electrical Code.

C. NFPA - National Fire Protection Association:

1. Standard for Electrical Safety in the Workplace (NFPA 70E)

D. NEMA - National Electrical Manufacturers Association:

1. NEMA 250 Enclosures for Electrical Equipment
2. NEMA KS1 Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Max.)

E. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems

- F. UL - Underwriters' Laboratories:
 - 1. UL 98 Enclosed and Dead-Front Switches
 - 2. UL 198C High-Interrupting Capacity Fuses, Current Limiting Type
 - 3. UL 198E Class R Fuses.

1.3 SUBMITTALS

- A. Submit five (5) copies of product data and shop drawings for equipment and component devices. Include time-current curves of fuses.
- B. Include dimensional outline drawings; conduit entrance locations and requirements; voltage rating, continuous and short-circuit current ratings; horsepower rating; fuse type and rating; cable terminal sizes and temperature ratings.
- C. Operation and Maintenance Data:
 - 1. Maintenance Data: Furnish five (5) copies of recommended maintenance procedures and intervals. Include spare parts data listing; source and current prices of replacement parts and supplies.
 - 2. Furnish Time-Current curves of fuses. Time-Current curves shall be first generation originals on full size 11 by 17 inches paper.

1.4 QUALITY ASSURANCE

- A. Products shall be tested, approved and labeled/listed by Underwriters Laboratories, Inc., or by a nationally recognized testing laboratory (NRTL) as listed in Division 26 Specification "Common Work Results for Electrical."
- B. Electrical equipment and materials shall be new and within one year of manufacture, complying with the latest codes and standards. No used, re-built, refurbished and/or re-manufactured electrical equipment and materials shall be furnished on this project.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to equipment and material from dirt, water, construction debris, and traffic.
- B. Handle in accordance with manufacturer's written instructions. One copy of these instructions shall be included with the equipment at time of shipment.

1.6 EXTRA MATERIALS

- A. Spare fuses: Furnish two (2) spares of each type and rating of fuse and fusible devices required.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Eaton/Cutler-Hammer.
- B. General Electric.
- C. Siemens Energy & Automation, Inc.

2.2 HEAVY DUTY SAFETY SWITCHES

- A. Provide switches as shown on drawings, with the following ratings:
 - 1. 30 to 1200 amperes.
 - 2. 250 volts AC; 600 volts AC.
 - 3. 2, 3, 4 and 6 poles (2, 3 and 4 poles on 800 A; 2 and 3 poles on 1200 A).
 - 4. Fusible and non-fusible.
 - 5. Mechanical lugs suitable for copper conductors.
- B. Construction:
 - 1. Switch blades and jaws shall be visible and plated copper.
 - 2. Switches shall have a handle that is easily pad-lockable with three 3/8-inch shank locks in the OFF position.
 - 3. Switches shall have defeatable door interlocks that prevent the door from opening when the handle is in the ON position (except for double-throw switches). Defeater mechanism shall be front accessible.
 - 4. Switches shall have deionizing arc chutes.
 - 5. Switch assembly and operating handle shall be an integral part of the enclosure base.
 - 6. Switches rated 30 A to 600 A shall have reinforced fuse clips.
 - 7. Switch blades shall be readily visible in the "ON" and "OFF" position.
 - 8. Switch operating mechanism shall be non-teasable, positive quick-make/quick-break type. Bail type mechanisms are not acceptable.
 - 9. Fusible switches shall be suitable for service entrance equipment (except for 4-pole switches and 1200 A when used on 480Y/277 WYE systems). Switches shall have line terminal shields (except for non-fusible double throw switches).
 - 10. Switches shall be suitable for systems capable of 200 kA at 480 V with Class J, L, R, or T fusing as applicable for single-throw switches; 100 kA at 600 V for double-throw switches.
 - 11. Embossed or engraved ON-OFF indication shall be provided.
 - 12. Double-make, double-break switch blade feature shall be provided.
 - 13. Fuse pullers shall be provided on all NEMA 4X and 12 switches through 200 A.
 - 14. Renewal parts data shall be shown on the inside of the door.
- C. Enclosures:
 - 1. All enclosures shall be NEMA 1 unless otherwise noted.
 - 2. Other types, where noted, shall be:
 - a. NEMA 3R rainproof
 - b. NEMA 4X watertight corrosion-resistant
 - 1) 30 A to 200 A - [304 stainless steel] [316 stainless steel]
 - 2) 400 A to 1200 A - [304 stainless steel] [316 stainless steel]

- c. NEMA 12 dust-tight and oil-tight special industry (dual NEMA 12/3R rating through 800 A).
 - 3. Factory installed ground terminal block.
 - 4. Paint color shall be ANSI 61 gray.
 - 5. Nameplate shall be front cover mounted, containing a permanent record of switch type, ampere rating, and maximum voltage rating.
 - 6. 30 A to 100 A NEMA 4X and 12 enclosures shall be provided with draw-pull latches.

- D. The following factory modifications are to be included, if required:
 - 1. Phenolic nameplates
 - 2. Special paint color
 - 3. Key interlock system
 - 4. Full viewing window (30 - 100 A)
 - 5. Upper viewing window (200 - 800 A)
 - 6. Lower viewing window (200 - 600 A)
 - 7. Factory installed neutral assemblies
 - 8. Class R fuse clips factory installed
 - 9. Class T fuse clips factory installed
 - 10. Class J fuse clips factory installed
 - 11. Factory installed fuse pullers
 - 12. Factory installed auxiliary contacts
 - 13. Cover mounted controls [indicating lights] [selector switches][pushbuttons]
 - 14. Factory installed UL listed switching neutral bonding kit for 3 or 4 pole double throw switches requiring a switching neutral.

- E. Receptacle Switches:
 - 1. Provide 30- to 100-ampere, 3-pole, 600 volts ac, [fusible] [non-fusible] switches with an interlocked receptacle. Fuse clips designed to accommodate Class [R] [J] fuses.
 - 2. Receptacle shall be the following: [Crouse-Hinds ARKTITE] [M-R-S (Russellstoll) MAX-GARD] [Appleton POWERTITE]
 - 3. Enclosures shall be:
 - a. NEMA 12/3R dust-tight and oil-tight special industry
 - b. NEMA 4X [304] [316] grade stainless steel corrosion resistant.

2.3 FUSES

- A. [Dual element,] current limiting, [time delay,] one-time fuse, [250] [600] volt, [UL 198E, Class [RK-1.] [RK-5.]] [UL 198c, Class J.]
- B. Interrupting rating: 200,000 rms amperes.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install switch enclosures plumb with suitable supports and per manufacturer's recommendations. Where mounted on concrete wall, install with 1/2 inches (13 mm) steel

spacers behind the switch enclosure. All mounting attachments and connections shall be designed in conformance with the minimum lateral seismic force of 0.5W per CBC.

- B. Height: Install top of switch enclosure 78 inches (1980 mm) above finished floor, unless otherwise noted on drawings.
- C. Install fuses in fusible disconnect switches.

3.2 FIELD QUALITY CONTROL

- A. Comply with requirements of NETA Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems and the manufacturer's inspection, testing, calibration and start-up procedures. The manufacturer's technician shall perform inspection, testing, calibration and start-up, with assistance from the Subcontractor as necessary, and in the presence of the University's representative. Schedule testing and start-up with at least 10 working days advance written notification.
- B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and check tightness of connections with a calibrated torque wrench.
- C. Electrical Tests: Measure and record insulation resistance of switch and its components (phase-to-phase and phase-to-ground) prior to energization. The Subcontractor shall not be responsible for defective insulation in equipment that has been supplied by the University, unless such damage is due to negligence or incorrect handling or installation workmanship of the Subcontractor.
 - 1. The insulation resistance of each circuit phase-to-phase and phase-to-ground shall be measured. For circuits rated less than 600 volts, the resistance shall not be less than 100 megohms.
 - 2. Systems rated above 240 volts shall be tested with a 1000-volt Megohmmeter. Circuits rated 240 volts and below shall be tested with a 500-volt Megohmmeter. The D.C. potential shall be applied for thirty (30) seconds.
 - 3. Test and record phase rotation (clockwise) and sequence (A-B-C).
- D. Provide the University with five (5) certified copies of all field test reports.

END OF SECTION 26 28 23