

SECTION 16476 - DISCONNECT SWITCHES AND CIRCUIT BREAKERS**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes individually mounted switches and circuit breakers used for the following:
 - 1. Service disconnect switches.
 - 2. Feeder and equipment disconnect switches.
 - 3. Feeder branch-circuit protection.
 - 4. Motor disconnect switches.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 16 Section "Wiring Devices" for attachment plugs and receptacles, switch-rated receptacles, and snap switches used for disconnect switches.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for disconnect switches, circuit breakers, and accessories specified in this Section.
- C. Wiring diagrams detailing wiring for power and control systems and differentiating between manufacturer-installed and field-installed wiring.
- D. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of engineers and owners, and other information specified.
- E. Field test reports indicating and interpreting test results.
- F. Maintenance data for tripping devices to include in the operation and maintenance manual specified in Division 1.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: In addition to the requirements specified in Division 1 Section "Quality Control," an independent testing agency shall meet OSHA criteria for accreditation of testing laboratories, Title 29, Part 1907, or shall be a full member company of the InterNational Electrical Testing Association (NETA).

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1. Testing Agency's Field Supervisor: Person currently certified by NETA or the National Institute for Certification in Engineering Technologies, to supervise on-site testing specified in Part 3.
- B. Source Limitations: Obtain disconnect switches and circuit breakers from one source and by a single manufacturer.
- C. Comply with NFPA 70 for components and installation.
- D. Listing and Labeling: Provide disconnect switches and circuit breakers specified in this Section that are listed and labeled.
 1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

PART 2 – PRODUCTS**2.1 MANUFACTURERS**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering disconnect switches and circuit breakers that may be incorporated into the Work include, but are not limited to, the following:
 1. Disconnect Switches - Equipment
 - a) Mennekes
 - b) Hubbell
 - c) Allen Bradley
 2. Fusible Switches - Service & Distribution:
 - a) Eaton Corp.; Cutler-Hammer Products.
 - b) General Switch Corp.
 - c) Siemens Energy & Automation, Inc.
 - d) Square D Co.
 3. Manual Motor Starters
 - a) Eaton Corp.; Cutler-Hammer Products.
 - b) Siemens Energy & Automation, Inc.
 - c) Square D Co.
 4. Molded-Case Circuit Breakers:
 - a) American Circuit Breaker Corp.
 - b) Eaton Corp.; Cutler-Hammer Products.
 - c) General Switch Corp.
 - d) Siemens Energy & Automation, Inc.
 - e) Square D Co.
 5. Combination Circuit Breaker and Ground Fault Trip:
 - a) American Circuit Breaker Corp.
 - b) Eaton Corp.; Cutler-Hammer Products.
 - c) Siemens Energy & Automation, Inc.
 - d) Square D Co.

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6. Molded-Case, Current-Limiting Circuit Breakers:
 - a) Eaton Corp.; Cutler-Hammer Products.
 - b) Siemens Energy & Automation, Inc.
 - c) Square D Co.

2.2 DISCONNECT SWITCHES – EQUIPMENT (MOTORS LESS THAN 50 HP @480V)

- A. Mennekes (800-882-7584)
 1. Bulletin No. HDIMS-501
- B. Hubbell (203-882-4800)
 1. Circuit-Lock, Catalog No. HBLDS
- C. Allen Bradley Equivalent to Above
 1. 194R Series Rotary Disconnect

2.3 DISCONNECT SWITCHES - SERVICE & DISTRIBUTION

- A. Enclosed, Nonfusible Switch: NEMA KS 1, Type HD, with lockable handle.
- B. Enclosed, Fusible Switch, 800 A and Smaller: NEMA KS 1, Type HD, clips to accommodate specified fuses, enclosure consistent with environment where located, handle lockable with 2 padlocks, and interlocked with cover in CLOSED position.
- C. Enclosure: NEMA KS 1, Type 1, unless otherwise specified or required to meet environmental conditions of installed location as outlined in the Area Classification Table on Electrical Symbols Legend.
 1. Switch shall be of dead front construction with permanent arc suppressors and dual cover interlock (to prevent unauthorized opening of switch in "ON" position).

2.4 MANUAL MOTOR STARTERS

- A. UL Listed starters consisting of a manually operated pushbutton or toggle switch.
- B. See equipment schedule for NEMA enclosure type, number of poles, and thermal overloads.
- C. Equip with melting alloy type thermal overload relays as indicated on the schedule. Thermal units of one-piece construction, trip-free, and shall render the starter inoperative if removed.
- D. Sufficient horsepower, or fractional horsepower rating to operate the connected motor.

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. Install disconnect switches and circuit breakers in locations as indicated, according to manufacturer's written instructions.
- B. Install disconnect switches and circuit breakers level and plumb.
- C. Connect disconnect switches and circuit breakers and components to wiring system and to ground as indicated and instructed by manufacturer.

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1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- D. Identify each disconnect switch and circuit breaker according to requirements specified in Division 16 Section "Basic Electrical Materials and Methods."

3.2 FIELD QUALITY CONTROL

- A. Testing Agency: Provide the services of a qualified testing agency to perform specified field quality-control testing.
- B. Testing: After installing disconnect switches and circuit breakers and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
 1. Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Section 7.5 for disconnect switches and Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.
- C. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.

3.3 CLEANING

- A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish including chips, scratches, and abrasions.

END OF SECTION 16476