

**SECTION 26 24 19**  
**MOTOR CONTROL CENTERS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies the furnishing, installation, connection, and testing of the motor control centers.

**1.2 RELATED WORK**

- A. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS:  
Requirements that apply to all sections of Division 26.
- B. Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES:  
Low-voltage conductors.
- C. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS:  
Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.
- D. Section 26 29 11, MOTOR CONTROLLERS: Control and protection of motors.

**1.3 QUALITY ASSURANCE**

- A. Refer to Paragraph, QUALIFICATIONS (PRODUCTS AND SERVICES), in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

**1.4 SUBMITTALS**

- A. Submit six copies of the following in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS:
1. Shop Drawings:
    - a. Submit sufficient information to demonstrate compliance with drawings and specifications.
    - b. Prior to fabrication of motor control centers devices, submit the following data for approval:
      - 1) Single line diagram showing each bus, instrument and control power transformer, relay, motor starter, circuit breaker, fuse, motor circuit protector, overload, and other components.
      - 2) Control wiring diagram for each motor starter.
      - 3) Complete electrical ratings for all components.
      - 4) Interrupting ratings.
      - 5) Dimensioned section views of the motor control centers.
  2. Manuals:
    - a. Submit, simultaneously with the shop drawings, companion copies of complete maintenance and operating manuals, including technical data sheets, wiring diagrams, and information for ordering replacement parts.
      - 1) Schematic control diagrams, with all terminals identified, matching terminal identification in the motor control centers.

- 2) Include information for testing, repair, troubleshooting, assembly, disassembly, and factory recommended periodic maintenance procedures and their frequency.
- 3) Provide a replacement and spare parts list. Include a list of tools, and instruments for testing and maintenance purposes.
- b. If changes have been made to the maintenance and operating manuals originally submitted, submit updated maintenance and operating manuals two weeks prior to the final inspection.
3. Test Reports:
  - a. Two weeks prior to the final inspection, submit certified field test reports and data sheets to the Contracting Officers Representative (COR).
4. Certifications: Two weeks prior to final inspection, submit the following.
  - a. Certification by the manufacturer that the motor control centers conform to the requirements of the drawings and specifications.
  - b. Certification by the Contractor that the motor control centers have been properly installed, adjusted, and tested.

#### **1.5 APPLICABLE PUBLICATIONS**

- A. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by designation only.
- B. International Code Council (ICC):  
IBC-12.....International Building Code
- C. National Electrical Manufacturers Association (NEMA):  
ICS 1-08.....Industrial Control and Systems: General Requirements  
ICS 2-05.....Industrial Control and Systems: Controllers, Contactors and Overhead Relays Rated 600 volts  
ICS 6-06.....Industrial Control and Systems: Enclosures  
FU 1-07.....Low-Voltage Cartridge Fuses  
250-08.....Enclosures for Electrical Equipment (1000 Volts Maximum)
- D. National Fire Protection Association (NFPA):  
70-11.....National Electrical Code (NEC)
- E. Underwriters Laboratories, Inc. (UL):  
845-05.....Motor Control Centers

## **PART 2 - PRODUCTS**

### **2.1 GENERAL REQUIREMENTS**

- A. Motor control centers shall comply with NFPA, NEMA, UL, and as shown on drawings.
- B. Ratings shall be not less than shown on drawings. Interrupting ratings shall be not less than the maximum short circuit currents available at the motor control center location, as shown on drawings.
- C. Enclosure shall be NEMA-type rated 1, 3R, or 12 as indicated on drawings or as required per the installed environment.
- D. Motor control centers shall conform to the arrangements and details of drawings and to the spaces designated for installation.
- E. Wiring: The motor control centers shall be NEMA Standard, Class 1, Type B.

### **2.2 MOTOR CONTROLLERS**

- A. Product of the same manufacturer as the motor control centers.
- B. Shall conform to the applicable requirements in Section 26 29 11, MOTOR CONTROLLERS.
- C. Plug-in, draw-out type up through NEMA size 4. NEMA size 5 and above require bolted connections.
- D. Doors for each space shall be interlocked to prevent their opening unless disconnect is open. A "defeater" mechanism shall be incorporated for inspection by qualified personnel.

### **2.3 FEEDER UNITS**

- A. Circuit breaker: shall conform to the applicable portions of Section 26 24 16, PANELBOARDS.
- B. Fusible Switches: shall conform to the applicable portions of Section 26 29 21, ENCLOSED SWITCHES AND CIRCUIT BREAKERS.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install motor control center equipment in accordance with the NEC, as shown on the drawings, and as recommended by the manufacturer.

### **3.2 ACCEPTANCE CHECKS AND TESTS**

- A. Perform in accordance with the manufacturer's recommendations. In addition, include the following:
  - 1. Visual Inspection and Tests:
    - a. Compare equipment nameplate data with specifications and approved shop drawings.
    - b. Inspect physical, electrical, and mechanical condition.
    - c. Verify appropriate anchorage and required area clearances.

- d. Verify that circuit breaker, fuse, motor circuit protector, and motor controller sizes and types correspond to approved shop drawings.
  - e. Use calibrated torque-wrench method to verify the tightness of accessible bolted electrical connections.
  - f. Vacuum-clean motor control center enclosure interior. Clean motor control center enclosure exterior.
  - g. Inspect insulators for evidence of physical damage or contaminated surfaces.
  - h. Exercise all active components.
  - i. Verify the correct operation of all indicating devices.
  - j. If applicable, inspect control power transformers.
2. Electrical Tests:
- a. Perform insulation-resistance tests on each bus section.
  - b. Perform insulation-resistance test on control wiring. Do not perform this test on wiring connected to electronic components.

### **3.3 FOLLOW-UP VERIFICATION**

- A. Upon completion of acceptance checks, settings, and tests, the Contractor shall demonstrate that the motor control centers are in good operating condition and properly performing the intended function.

### **3.4 TRAINING**

- A. Furnish the services of a competent, factory-trained engineer or technician for a 2-hour period to instruct VA personnel in operation and maintenance of the equipment, including review of the operation and maintenance manual, on a date requested by COR.

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