

SECTION 164XX

FUSED MOTOR CONTROL CENTERS

PART 1 GENERAL

1.1 SUMMARY

- A. Furnish and install motor control centers as shown on the drawings. Motor control center shall be free-standing, dead-front, with modular unit construction for all components.

1.2 Related Sections:

- A. Section 16491 - Fuses.

1.3 REFERENCES

- A. Motor control centers shall comply with the following:
 1. NEMA KS 1
 2. NEMA FU 1
 3. NEMA ICS 2
 4. UL 508
 5. UL 98
 6. UL 845

1.4 SUBMITTALS

- A. Submit ten copies of items B-D
- B. Detail motor control center construction drawings including:
 1. Front, side and top view with dimensional information
 2. Conduit entrance/exit locations, size, number/phase, and termination type
 3. One-line diagrams, wiring diagrams and equipment schedules for component devices, overcurrent protective devices, and units
 4. Assembly, starter, and other component device or unit nameplate information
 5. Special connection or adjoining equipment information as needed.
- C. Assembly ratings including:
 1. Voltage, ampacity, and short-circuit current (bracing) ratings
- D. Component device and unit ratings including:
 1. Voltage, ampacity, interrupting (for overcurrent protective devices) or short-circuit current (for component devices and units) ratings
 2. Time-current curves of overcurrent protective devices or component devices (such as overload relays) where requested
 3. Product data sheets or bulletins
 4. Metering and instrumentation device information as needed
 5. Miscellaneous devices or features as needed

1.5 CLOSEOUT SUBMITTALS

- A. Submit ten copies of:
 - 1. Final as-built drawings, assembly and component device ratings as required in Section 1.4
 - 2. Assembly and device test reports where required or available
 - 3. Operation and maintenance manuals including replacement parts list

1.6 QUALIFICATIONS

- A. The equipment manufacturer shall have a minimum five years experience in producing electrical distribution equipment.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Equipment shall be shipped without fuses installed, furnish separately.
- B. Deliver equipment in shipping splits as indicated on approved submittals.
- C. Inspect equipment for possible damage during delivery and prior to installation.
- D. Handle in accordance with NEMA ICS 2.3.
- E. Store in clean, dry space and protect from dirt, water, debris, and damage.

1.8 MAINTENANCE MATERIALS

- A. Furnish two sets of fuse pullers.
- B. Furnish operating/maintenance tools/key(s) as supplied by manufacturer.

1.9 ADDITIONAL MATERIALS

- A. Furnish three sets of each rating and type of fuse installed and spare fuse cabinet where not already provided.

PART 2 PRODUCTS

2.1 GENERAL

- A. Manufacturers:
 - 1. Square D Model – Model 6, Class 8998
 - 2. Cutler-Hammer Model – Freedom 2100
 - 3. GE Electrical Model – Spectra Series
 - 4. Allen-Bradley Model - Centerline
- B. Ratings
 - 1. Motor control center shall have a voltage and current rating as indicated on the drawings.
 - 2. Motor control center (and all units within) shall have a short-circuit current rating of 100,000A minimum at the voltage indicated on the drawings.

2.2 CONSTRUCTION

- A. Structure shall be totally enclosed, dead-front, free-standing assemblies.
- B. Structure shall not exceed 90" high. Each section of the structure shall not exceed 20" wide as standard. Sections with widths larger than 20" are permitted for larger component devices. Sections shall be capable of bolting together or to other structures to form a single assembly.
- C. Structure shall be NEMA Type 1 as standard. NEMA Type 3R or 12 shall be supplied as indicated on drawings.
- D. Structure shall have all exterior surfaces painted with manufacturer's standard painting process.
- E. Each section of the structure shall have all hardware and bussing to accommodate modular, interchangeable, front-mounted, plug-in units. Unused spaces shall have hinged blank doors.
- F. Each section of the structure shall contain top and bottom horizontal wireways. These wireways shall run the entire length of the structure.
- G. Each section of the structure shall contain a vertical wireway with a hinged door that connects the top and bottom horizontal wireways.
- H. Wireways shall be easily accessible, isolated from the horizontal and vertical bus, and allow adequate space for power and control cables.
- I. Each section of the structure shall contain a main horizontal tin-plated copper bus with a minimum ampacity of 600A or as shown on the drawings. The horizontal bus shall be isolated and properly supported.
- J. Each section of the structure shall contain tin-plated copper vertical bus to supply power to plug-in units. The vertical bus shall be securely attached to the horizontal bus and have a minimum ampacity of 300A or as shown on the drawings. The vertical bus shall be isolated, insulated, and properly supported. Openings for the vertical bus shall have shutters to completely isolate bus when a plug-in unit is removed.
- K. Each section of the structures shall contain a tin-plated copper ground bus with a minimum ampacity of 300A that runs the entire length of the structure.
- L. Each section of the structure shall contain a fully or ½ rated neutral bus if indicated on the drawings.
- M. All bus ratings shall be based upon temperature rise tests in accordance with UL standards.

2.3 MAIN DEVICE

- A. Provide main lugs only or main fused disconnect switch as shown on the drawings.
- B. Main fused disconnect switch shall comply with the requirements below:
 - 1. Provide fused disconnect switch with Cooper Bussmann LPN-RK/LPS-RK, LPJ, or KRP-C fuses, lockable operating handle (in off position), and positive visual indication of on/off positions.
 - 2. Fused disconnect switch can be mounted separate but adjacent to assembly if required due to assembly space limitations.
 - 3. Above 1200A, provide electrically-tripped switch with open fuse indication.

2.4 METERING DEVICE(S)

- A. Where customer metering is indicated on drawings, provide solid-state customer metering device(s) with accessories as specified on drawings.

2.5 FULL-VOLTAGE NON-REVERSING CONTROLLERS

- A. Full-voltage non-reversing controllers shall include:
 - 1. Fused disconnect switch with Cooper Bussmann LP-CC, LPN-RK/LPS-RK or LPJ fuses, lockable operating handle, and positive visual indication of on/off positions.
 - 2. Magnetic motor controller with overload relay, sized as indicated on drawings. Overload relay shall be ambient compensated bimetallic, melting alloy, or solid state with manual or automatic reset and (2) NO/NC Auxiliary Contacts.
 - 3. Accessories below as indicated on drawings:
 - a. Control power transformer with primary and secondary fuses.
 - b. Heavy duty, oil-tight, flange mounted pushbuttons, indicating lights (LED type), and rotary style selector switches.
 - c. Relays and miscellaneous control devices.
 - 4. Equipment shall be tested and have documentation verifying compliance with Type 2 protection requirements per UL508E or IEC 60947-4.

2.6 FULL-VOLTAGE REVERSING CONTROLLERS

- A. Full-voltage reversing controllers shall include:
 - 1. Fused disconnect switch with Cooper Bussmann LP-CC, LPN-RK/LPS-RK or LPJ fuses, lockable operating handle, and positive visual indication of on/off positions.
 - 2. Magnetic motor controller with overload relay, sized as indicated on drawings. Overload relay shall be ambient compensated bimetallic, melting alloy, or solid state with manual or automatic reset and (2) NO/NC Auxiliary Contacts.
 - 3. Accessories below as indicated on drawings:
 - a. Control power transformer with primary and secondary fuses.
 - b. Heavy duty, oil-tight, flange mounted pushbuttons, indicating lights (LED type), and rotary style selector switches.
 - c. Relays and miscellaneous control devices.
 - 4. Equipment shall be tested and have documentation verifying compliance with Type 2 protection requirements per UL508E or IEC 60947-4.

2.7 VARIABLE FREQUENCY CONTROLLER

- A. Provide device(s) as indicated on drawings

2.8 FEEDER/BRANCH FUSED DISCONNECT SWITCHES

- A. Provide feeder and branch fused disconnect switches as indicated on drawings. Fused disconnect switches shall be equipped with Cooper Bussmann LPN-RK/LPS-RK, LP-J, or KRP-C fuses, lockable operating handle (in off position), and positive visual indication of on/off positions.

2.9 TRANSIENT VOLTAGE SUPPRESSION DEVICES

- A. Provide transient voltage suppression devices as indicated on drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect installation area of motor control center to assure proper clearance and support.

3.2 INSTALLATION

- A. Equipment shall be installed in accordance with NEMA ICS 2.3 and manufacturer's recommendations.
- B. Equipment shall have a nameplate installed and mounted to the front cover and indicate: motor control center type, ampere rating, voltage rating and short-circuit rating, and load served for each unit.
- C. All motor controller units in assembly shall have nameplate on the inside front cover that identifies motor served, service factor, voltage, horsepower, and full load current rating.
- D. Tighten accessible bus connections and mechanical fasteners after placing motor control center.
- E. Install overload heater elements and fuses sized to motor or load characteristics. Install fuses in accordance with Section 2.3, 2.5, 2.6, and 2.8. Refer to Section 16941 for product requirements.
- F. Install labeling that identifies replacement overload heater elements and fuse type/class and rating.
- G. Inspect completed installation for physical damage, alignment, and support.

3.3 START-UP

- A. Inspect and test combination motor starter to assure proper operation. Document findings.

END OF SECTION