SECTION 16443

MOTOR-CONTROL CENTERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes motor control centers.

1.2 REFERENCES


B. NEMA FU 1 (National Electrical Manufacturers Association) – Low Voltage Cartridge Fuses.


D. NEMA ICS 2 (National Electrical Manufacturers Association) – Industrial Control and Systems Controllers, Contactors, and Overload Relays Rated 600 Volts.

E. NEMA ICS 2.3 (National Electrical Manufacturers Association) – Instructions for the Handling, Installation, Operation, and Maintenance of Motor Control Centers Rated Not More Than 600 Volts.

F. NEMA ICS 3 (National Electrical Manufacturers Association) – Industrial Control and Systems: Medium Voltage Controllers Rated 2001 to 7200 Volts AC.


1.3 SUBMITTALS

A. Shop Drawings: Indicate front and side views of enclosures with overall dimensions shown; conduit entrance locations and requirements; nameplate legend; size and number of bus bars per phase, including neutral if required; and ground electrical characteristics including voltage, frame size and trip ratings, withstand ratings, and time/current curves of all equipment and components.
B. Product Data: Submit electrical characteristics including voltage, frame size and trip ratings, and fault current withstand ratings, and time-current curves of all equipment and components.

C. Test Reports: Indicate/identify field test and inspection procedures and test results.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations by contractor’s record drawing requirements, configurations, and ratings of motor control centers and major components.

B. Operation and Maintenance Data: Submit recommended replacement parts and major control parts.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years motor control center manufacturing experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver in maximum width shipping splits, individually wrapped for protection, and mounted on shipping skids.

B. Store in clean dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle in accordance with NEMA ICS 2.3. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to motor control center components, enclosure, and finish.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Conform to NEMA ICS 2 service conditions during and after installation of motor control centers.

PART 2 -PRODUCTS

2.1 MOTOR CONTROL CENTER

A. Manufacturers: Square D Class 8999, General Electrical Co., Cutler-Hammer, Allen Bradley or approved equal.

B. Product Description: NEMA ICS 3, Class I, Type B motor control center with separate wiring compartment with terminal blocks for control wires.

D. Main Overcurrent Protection: As shown on drawings.

E. Feeder Tap Units (no motor starter): Molded case thermal-magnetic circuit breakers. See circuit breakers specification section. Breakers larger than 200A shall be bolted in. Breakers 100A and below may be twin mounted, plug-in.

F. Starter size 4 and larger shall be bolt in. Starter size 3 below shall be plug-in.

G. Motor Overcurrent Protection: Motor circuit protector (MPC) conforming to UL 489 / NEMA AB 1, with integral instantaneous magnetic trip in each pole.

H. Voltage Rating: 480 volts, three phase, three wire, 60 Hertz or as shown on the drawings.

I. Horizontal Bus: Tin-plated copper, with minimum continuous current rating of 600 amperes or as shown on drawings. Include copper ground bus the entire length of control center.

J. Vertical Bus: Tin-plated copper.

K. Integrated Equipment Short Circuit Rating: 65,000 amperes rms symmetrical at 480 volts or as shown on drawings.

L. Configuration: Units front mounting only, accessible from the front, only suitable for mounting against a wall.

M. Enclosure:
   1. NEMA 1, gasketed, indoor. NEMA 3R outdoor.
   2. Finish: Manufacturer’s standard gray enamel.

N. Control power shall be from individual control transformers located in each starter compartment. Control transformers shall be fused on primary and secondary. Auxiliary control relays shall be located in separate compartments and not in the compartment with the starter.

2.2 FULL-VOLTAGE NON-REVERSING CONTROLLERS

A. Product Description: NEMA ICS 2, AC general-purpose Class 1 Type B magnetic or solid-state controller for induction motors rated in horsepower.

2.3 REDUCED VOLTAGE START CONTROLLERS

A. Product Description: NEMA ICS 2, AC general-purpose Class A magnetic or solid-state controller for induction motors rated in horsepower.

2.4 VARIABLE FREQUENCY CONTROLLER

A. When feeding a VFD MCC2 have breaker only all controls connected to VFD.
2.5 TRANSPORT VOLTAGE SUPPRESSION DEVICES (TVSS)

A. Product Description: IEEE C62.41, factory-mounted transient voltage surge suppressor, selected to meet requirements for medium exposure and to coordinate with system circuit voltage.

B. Provide TVSS when control is by PLC or EMCS and as shown on drawings.

2.6 SOURCE QUALITY CONTROL

A. Provide option to Stanford Project Engineer for inspection at manufacturer’s factory prior to shipment. Notify Stanford Project Engineer at least seven days before inspection is allowed.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with NEMA ICS 2.3 and NEMA 3.1.

B. Tighten all accessible bus connections and mechanical fasteners after placing motor control center.

C. Provide fuses in primary and secondary of control transformers.

D. Provide heater elements in motor controllers to match installed motor service factor and full load amps. Set motor circuit protectors (MCP) to match motor inrush amps.

E. Provide engraved plastic nameplates as specified elsewhere in Electrical specifications.

F. Ground and bond motor control centers per California Electrical Code.

END OF SECTION