

## **ITEM 680.0406 25 - MOTOR CONTROLS**

### **1. DESCRIPTION:**

- 1.01 This work shall consist of furnishing and installing motor controls for all electric motor driven equipment at locations indicated on the plans unless furnished under other sections of these specifications.
- 1.02 Coordinate the control equipment, circuits and specific requirements with the actual equipment to be controlled and the respective trade.
- 1.03 Furnish and install motor protection switches of the appropriate NEMA size. For units not using NEMA rating use equivalent NEMA size.
- 1.04 Submit product data including starter voltage, current and horsepower ratings. For starters with automatic control, provide complete wiring diagrams.

### **2. MATERIALS:**

- 2.01 **Acceptable Manufacturers:** The following manufacturers shall be considered as acceptable provided the requirements and intent of the drawings and specifications are complied with.

#### **Motor Starters:**

Square D	<a href="http://www.squared.com">www.squared.com</a>
General Electric	<a href="http://www.ge.com">www.ge.com</a>
Cutler Hammer	<a href="http://www.cutlerhammer.com">www.cutlerhammer.com</a>
Siemens	<a href="http://www.siemens.com">www.siemens.com</a>

**Substitutions:** Items of equal quality, function and performance may be proposed for substitution by following the procedures outlined.

- 2.02 **Magnetic Motor Starters:** Magnetic motor starters, selected for full-voltage, single-speed starting of three-phase, 60 Hz, induction motors with bimetallic manually reset overload protection, and forward/reverse push buttons shall be furnished as indicated. NEMA size shall be as required for motor to be served with NEMA 0 being minimum. Starter shall have auxiliary NC and NO run contacts and NO overload relay contact as a minimum. One run contact of each type shall be provided as an installed spare.
- 2.03 **Enclosures:** Enclosures shall be as follows:

NEMA 4X – Corrosion resistant.

### **3. CONSTRUCTION DETAILS:**

- 3.01 All work as prescribed herein shall be done in accordance with the current adopted edition of NFPA-70 (National Electrical Code) with any modifications made by the adopting agency on the date of contract award.
- 3.02 Surface mount motor starters and install suitable cover plates.
- 3.03 Install thermal overloads correlated with full-load current of motors provided.

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### **3. CONSTRUCTION DETAILS:** (cont'd)

- 3.04 Set overload devices to suit motors provided. If motors have integral power factor protection capacitor this should be taken into account.
- 3.05 Motor starters shall be mounted as indicated on the Drawings.
- 3.06 Provide all necessary conduit, wiring, switches, etc., for the proper operation of the equipment.
- 3.07 **Grounding and Bonding:** All equipment enclosures, control panels, motor frames, conduit systems, exposed structural steel and similar items shall be bonded in accordance with the National Electrical Code. Connections shall be made using connectors listed for the application. Exposed connections shall be made with compression connectors only, unless approved otherwise by the Engineer. Grounding conductor shall be provided in all power circuits and sized in accordance with NEC as a minimum. Supplemental bonding shall meet the requirements of the National Electrical Code.
- 3.08 The power conductors and contact assemblies associated with the motor starter shall be megger tested prior to functional testing. Items not rated for the testing voltage such as transient voltage suppressors must be removed from the system during the testing phase.
- 3.09 All motor starters shall be functionally tested prior to connection to the line side overcurrent device for the motor. After confirmation that the motor starter and control system operate as intended, the motor starter shall be tested as an integrated system with the motor and driven equipment. Provisions shall be made to protect the public, employees, visitors and installation personnel and to preclude damage from occurring to structures, systems and components should a malfunction occur.

### **4. METHOD OF MEASUREMENT:**

- 4.01 Motor controls will be measured for payment as the number of each motor control furnished and installed in accordance with the Contract Documents.

### **5. BASIS OF PAYMENT:**

- 5.01 The unit price bid per each motor control shall include the cost of furnishing all labor, materials and equipment to satisfactorily complete the work.