SECTION 262913- MOTOR CONTROLLERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including general and supplementary conditions and Division 1 specification section, apply to this section.

1.2 SUMMARY

A. This section includes A.C. motor control centers and devices rated 600v and below.

1.3 DEFINITIONS

A. Motor control center: A packaged enclosure in a NEMA 1 enclosure that contains devices that control, protect, and energize an electric motor or other loads, and where required, controls its speed or the torque or power delivered by it. It is prewired.

1.4 SUBMITTALS

A. General: Submit the following in accordance with conditions of contract and Division 1 specification sections or herein.

B. Product data for products specified in this section. Include dimensions, ratings, and data on features and components.

C. Certified reports of field tests and observations specified in "Field Quality Control" in this section.

D. Maintenance data for products for inclusion in operating and maintenance manuals specified in Division 1 and in Division 26.

E. Qualification data for field-testing organization certificates, signed by the contractor, certifying that the organization complies with the requirements specified in "Quality Assurance" below. Include list of completed projects with project names, addresses, names of architects and owner, plus other information specified.

1.5 REFERENCE AND QUALITY ASSURANCE

A. Components and installation: NFPA 70 "National Electrical Code", latest edition.

B. Listing and labeling: Provide products specified in this section that are listed and labeled.

1. The terms "Listed" and "Labeled" shall be defined as they are in the National Electrical Code, article 100.

C. NEMA compliance: NEMA ICS 2, "Industrial Control Devices, Controllers and Assemblies".

D. UL compliance: UL 508, "Electric Industrial Control Equipment".

E. Single-source responsibility: Obtain similar motor-control devices from a single manufacturer.

1.6 COORDINATION

A. General: Coordinate features of controllers and control devices with pilot devices and control circuits provided under Division 23 sections covering control systems.

1.7 EXTRA MATERIALS

A. Spare fuses and incandescent indicating lamps: Furnish one spare for every 5 installed units, but not less than one set of 3 of each kind.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include the following:

1. Siemens
2. Square D
3. General Electric
4. Cutler Hammer
5. Allen Bradley

2.2 MOTOR CONTROLLERS, GENERAL

A. Coordinate the features of each motor controller with the ratings and characteristics of the supply circuit, the motor, the required control sequence, the duty cycle of the motor, drive, and load, and the pilot device, and control circuit affecting controller functions. Provide controllers that are horsepower rated to suit the motor controlled.

B. Contacts shall open each ungrounded connection to the motor.

C. Overload relays: Solid state or BI-metal overload protection with trip class 20. Unit shall be manual reset.

2.3 MAGNETIC MOTOR CONTROLLERS

A. Description: Provide full-voltage, nonreversing, across-the-line, magnetic controller, except where another type is indicated.

B. Control circuit: 120 V. provide control power transformer integral with controller where no other supply of 120 v control power to controller is indicated. Provide control power transformer with adequate capacity to operate connected pilot, indicating and control devices, plus 100 percent spare capacity.

C. Combination controller: Circuit breaker type; factory assembled with controller and

arranged to disconnect it. Interlock switch with unit cover or door.

2.4 AUXILIARY CONTROL DEVICES

A. Hand-off-auto selector, green and red pilot lights and 2 N.O. and 2 N.C. auxiliary contacts. Heavy duty type.

B. Phase-failure for 3 phase motors and undervoltage relays: Solid-state sensing circuit with isolated output contacts for hard-wired connection. Provide adjustable undervoltage setting.

2.5 APPLICATION

A. Manual controllers: Use as noted on drawings.

B. Hand-off-automatic selector switches: Except as otherwise indicated, install in covers of manual and magnetic controllers of motors started and stopped by automatic controls or interlocks with other equipment. Make control connections so only the manual and automatic control devices that have no safety functions will be bypassed when the switch is in the hand position. Connect motor-control circuit in both hand and automatic positions for safety type control devices such as low and high-pressure cutouts, high-temperature cutouts, and motor-overload protectors. Make control-circuit connections to a hand-off automatic switch or to more than one automatic control device in accordance with an indicated wiring diagram or one that is manufacturer approved.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install in accordance with manufacturer's written instructions.

B. Manufacturer's field services: Arrange and pay for the services of a factory-authorized service representative to inspect the field assembly and connection of components, and supervise the pretesting and adjustment of solid-state controllers.

3.2 IDENTIFICATION

A. Identify motor control components and control wiring in accordance with section 260553.

3.3 CONTROL WIRING INSTALLATION

A. Install wiring between motor control devices and control/indicating devices.

B. Install wiring in enclosures neatly bundles, trained, and supported.

3.4 CONNECTIONS

A. Tighten connectors, terminals, bus joints, and mountings. Tighten field connected connectors and terminals, including screws and bolts, in accordance with equipment

manufacturer's published torque tightening values. Where manufacturer's torquing requirements are not indicated, comply with tightening torques specified in UL 486A and UL 486B.

3.5 FIELD QUALITY CONTROL

A. Reports: Prepare written reports by testing organization of tests and observations. Report defective materials and workmanship and unsatisfactory test results. Include records of repairs and adjustments made.

B. Labeling: On satisfactory completion of tests and related effort, apply a label to tested components indicating test results, date, and responsible organization and person.

C. Schedule visual and mechanical inspections and electrical tests with at least one week's advance notification.

D. Pretesting: On completing installation of the system, perform the following preparations for tests:

1. Make insulation resistance tests of conducting parts of motor control components; and of connecting supply, feeder, and control circuits. For devices containing solid-state components, use test equipment and methods recommended by the manufacturer.

2. Make continuity tests of circuits.

3. Provide set of contract documents to test personnel. Include full updating on final system configuration and parameters where they supplement or differ from those indicated in original contract documents.

4. Provide manufacturer's instructions for installation and testing of motor control devices to test personnel.

E. Visual and mechanical inspection: Include the following inspections and related work.

1. Motor-control device ratings and settings: Verify that ratings and settings as installed are appropriate for final loads and final system arrangement and parameters. Recommend final protective-device ratings and settings where differences are found. Use accepted revised ratings or settings to make the final system adjustments. Prepare and submit the load current and overload relay heater list.

2. Inspect for defects and physical damage, NRTL labeling, and nameplate compliance with current project drawings.

3. Exercise and perform operational tests of mechanical components and other operable devices in accordance with manufacturer's instructions.

4. Check tightness of electrical connections of devices with calibrated torque wrench. Use manufacturer's recommended torque values.

5. Clean devices using manufacturer's approved methods and materials.

6. Verify proper fuse types and ratings in fusible devices.

F. Electrical tests: Perform the following in accordance with manufacturer's instructions:

1. Insulation resistance test of motor control devices conducting parts to the extent permitted by the manufacturer's instructions. Insulation resistance less than 100 megohms is not acceptable.

2. Make adjustments for final settings of adjustable-trip devices.

3. Test auxiliary protective features such as loss of phase, phase unbalance and undervoltage to verify operation.

4. Check for improper voltages at terminals in controllers that have external control wiring when controller disconnect is opened. Any voltage over 30v is unacceptable.

G. Correct deficiencies and retest motor control devices. Verify by the system tests that specified requirements are met.

3.6 CLEANING

A. Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish. Clean devices internally using methods and materials as recommended by manufacturer.

3.7 DEMONSTRATION

A. Training: Arrange and pay for the services of a factory authorized service representative to demonstrate solid-state and variable-speed controllers and train owner's maintenance personnel.

END OF SECTION 262913

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