SECTION 26 29 14 motor starters

1. GENERAL
	* + 1. RELATED DOCUMENTS
				1. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.
			2. SUMMARY
				1. This Section specifies the requirements for motor control with full voltage non-reversing and combination magnetic motor starters.
			3. REFERENCE STANDARDS
				1. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
				2. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.
				3. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:

ANSI C19 - Industrial Control Apparatus.

ANSI/NEMA ICS 6 - Enclosures for Industrial Controls and Systems.

NEMA ICS 2 - Industrial Control Devices, Controllers, and Assemblies.

NEMA AB 1 - Molded Case Circuit Breakers.

NEMA KS 1 - Enclosed Switches.

NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.

UL 508 - Industrial Control Equipment.

* + - 1. SUBMITTALS
				1. Product Data:

Submit manufacturer’s product data, including the following: Contractor:

Ratings including voltage, and horsepower or continuous current.

Dimensioned outline drawings.

Conduit entry/exit locations.

Cable terminal sizes.

Wiring diagrams.

* + - * 1. Owner Manuals. Provide owner manuals per the requirements of Division One and Section 26 01 00.
				2. Record Documents:

Submit dimensioned Drawings showing size, circuit breaker, fusible switch and combination starter arrangement and equipment ratings including, but not limited to, voltage, bus ampacity, integrated short circuit ampere rating.

Provide data on relays, pilot devices, switching and overcurrent protection.

Indicate enclosure NEMA rating and material.

* + - * 1. Operation and Maintenance Data:

Provide operating and maintenance manuals.

1. PRODUCTS
	* + 1. GENERAL
				1. All materials shall meet or exceed all applicable referenced standards, federal, state, and local requirements, and conform to codes and ordinances of authorities having jurisdiction.
			2. MANUFACTURERS
				1. ABB/General Electric Company.
				2. Square D.
				3. Eaton.
				4. Siemens.
			3. MOTOR STARTERS
				1. Each motor shall be provided with proper starting equipment.

Starting equipment, unless specified or scheduled to the contrary, shall be provided by the trade furnishing the motor.

All motor starting equipment provided by any one trade shall be of the same manufacturer unless such starting equipment is an integral part of the equipment on which the motor is mounted.

The Division 23 Subcontractor shall furnish all starters for Division 23 Work, except those started scheduled to be provided in 26 24 19, Motor Control Centers. Motor control centers shall be provided under this Section.

All applicable motors shall be compatible with variable speed motor controller. Variable speed motor controllers shall be furnished with the drive equipment, run tested and certified at factory prior to shipping. Certified tests shall be submitted to Owner with submittals.

Short circuit rating of switch/starter must exceed available fault current as determined by 26 05 73 short circuit study.

* + - * 1. Magnetic Motor Starter:

Type: Provide magnetic, full-voltage, nonreversing motor starters unless otherwise indicated.

Overload Relays: Provide an ambient-compensated thermal overload relay in each phase leg.

Contactor:

Size contactors according to NEMA standards or as shown; however, minimum shall be size 1.

Provide main pole in each phase leg, the number and type of auxiliary contacts to perform the required functions, and two (2) spare auxiliary contacts, one (1) normally open and one (1) normally closed.

Use double break contacts of silver-cadmium oxide or similar material to minimize sticking or welding.

Provide contactor coils suitable for continuous operation at 120 volts, 60 hertz.

Control Power Transformer:

Voltage: Provide in each enclosure a single-phase control power transformer with a 480-volt primary and a 120-volt secondary.

Fuses:

Fuse both primary lines of the transformer and connect to Line 1 and Line 2.

Fuse the secondary line leaving transformer terminal X1.

Ground the line leaving terminal X2.

Use rejection-type fuse clips and RK-1 type current limiting fuses on the primaries.

Coordinate primary fuses with secondary fuse to clear a faulted transformer but not blow on magnetizing in-rush current or MCP breaker like Sq D Mag Guard.

Size: Provide manufacturer’s standard size transformer unless the manufacturer of vibration switches requires a larger size.

Enclosure: Provide a NEMA 1 enclosure unless otherwise indicated on Drawings.

Power Factor Correction Capacitors.

Make provision for connection of conductors for power factor correction capacitors at load side terminals of motor contactor, and online side of thermal overload relay.

Provide adequate space and quantity of terminals between motor contactor and thermal overload relay for connection of conductors for power factor correction capacitor.

Refer to Section 26 35 33, Low Voltage Power Factor Correction.

Control Devices: Provide control devices as indicated on the Drawings, in front of enclosure as follows:

Selector Switches: Heavy-duty, oil-tight, maintained contact, 3-position, with marked nameplate HAND-OFF-AUTOMATIC, unless otherwise indicated on two speed motors provide OFF-LOW-HI selector switch.

Indicating Lights: Indicating lights shall be heavy-duty LED type. Neon lamps are not acceptable. Provide red (running) lens.

* + - * 1. Combination Fused Switch/Starter:

Type: Provide combination fused switch and magnetic motor started as indicated on the Drawings.

Fuses: Provide fuses sized per the Drawings and in accordance with Section 26 28 13.

Starter: Provide magnetic motor starter as specified herein.

Enclosure: Provide a NEMA 1 enclosure unless otherwise indicated on Drawings.

* + - * 1. Manual Motor Starters: Provide line voltage manual motor starters for each single-phase motor. Include bimetallic thermal overload protection in each ungrounded phase leg. Provide the toggle-operated starter in a NEMA 1 enclosure unless otherwise indicated.
				2. Controls Integration: System shall integrate with an open protocol network architecture for system control and monitoring via the Building Automation System (BAS).

Required communication protocol: BACnet/IP or Modbus/IP (preferred).

For communication via BACnet/IP, provide:

Equipment capable of integrating with BACnet/IP communication network that is BACnet Testing Lab (BTL) listed.

BACnet Protocol Implementation Conformance Statement (PICS) for each type of controller and operator interface.

No BACnet/MSTP or other non-IP type controller shall be used without Owner approval prior to installation.

Provide point list matrix of available points for integration that includes: Point name, device ID, object ID, point type and point type number.

Support both COV subscription-based binding and polling interval binding for integrated control devices.

Provide support and coordination for integration with Building Automation System as specified in Division 25 specifications. Assist in system setup (addressing, naming, etc.).

Include latest version of protocol profiles used.

Coordinate polling rate requirements to minimize network traffic of integrated equipment.

1. EXECUTION
	* + 1. INSTALLATION
				1. Installation shall meet or exceed all applicable federal, state, and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
				2. All installation shall be in accordance with manufacturer’s published recommendations.
				3. Anchor assembly to housekeeping pad.
				4. Select overload heaters for motor in accordance with manufacturer’s recommendations for the voltage and full load amperes listed on the nameplate data of each motor actually installed.
				5. Arc-Flash. Include manufacturer’s label indicating incident energy levels associated with calculated arc-flash event(s) for motor starter fault conditions.
				6. Power Factor Correction Capacitors.

Where indicated on Drawings, provide power factor correction capacitors. Select capacitor rating per recommendations of the supplier of the driven equipment and the motor manufacturer.

Connect capacitors between the motor contactor and the thermal overload relay so that the capacitors discharge through the motor windings when the motor is off. Connect capacitors online side and ahead of thermal overload relay so that the thermal overload relay senses uncorrected motor full load current.

 Refer to Section 26 35 33.

* + - * 1. Adjust operating mechanisms for free mechanical movement.
				2. Touch-up scratched or marred surfaces to match original finish.
				3. Individual motor starters are furnished under Section 20 05 13; however, the installation and all connections are to be done under Division 26, similar to the Work done for motors served from a Motor Control Center.
				4. Where motor horsepower is at the upper limit of capacity for standard starter size, use next larger size starter.
				5. Field Setting. Set overload relays at maximum values permitted by NEC 430.32, based on actual installed motor nameplate full load amperes.
				6. Fuses. Provide one spare set of fuses for each size and type fuse used in the installed equipment. A “set” of fuses shall be one fuse for each phase leg installed.
			1. TESTING
				1. Subsequent to wire and cable connections, energize motor control centers and demonstrate functioning in accordance with manufacturer’s requirements.
				2. Test all integrated functions after install using external controls, BAS, Fire Control shutoff, etc.

END OF SECTION 26 29 14

**FOR MDACC USE ONLY. ARCHITECT OR ENGINEER DELETE THIS PAGE BEFORE ISSUING DOCUMENTS.**

|  |
| --- |
| **DOCUMENT REVISION HISTORY** |
| **Issue** | **Date** | **Revision Description** | **Author or SME** | **Approved By** | **Edited By** |
| **Rev. 1** | **20221020** | **2022 Annual Review and Revisions** |  | **Tom Shewan** |  |
| **Rev. 2** | **YYYMMDD** | **X** | **Name** | **Name** | **Name** |
| **Rev. 3** |  |  |  |  |  |
| **Rev. 4** |  |  |  |  |  |
| **Rev. 5** |  |  |  |  |  |
| **Rev. 6** |  |  |  |  |  |