PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Motor Starters.

.2 Miscellaneous Control Devices.

1.2 RELATED SECTIONS

.1 Section 26 05 00 - Common Work Results - for Electrical.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Submit product data sheets for sills, bus bars, and compartments. Include product characteristics, physical size, and finish.

.3 Manufacturer's Instructions: provide to indicate special handling criteria, installation sequence and cleaning procedures.

.4 Submit shop drawings and indicate:
.1 Outline dimensions.
.2 Configuration of identified compartments.
.3 Floor anchoring method and dimensioned foundation template.
.4 Cable entry and exit locations.
.5 Dimensioned position and size of bus bars and details of provision for future extension.
.6 Schematic and wiring diagrams.

.5 Closeout Submittals: provide operation and maintenance data for starters of all types and styles for incorporation into manual specified in Section 01 78 00.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials in accordance with Section 01 74 20.

1.5 QUALITY ASSURANCE

.1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06.

1.6 MAINTENANCE MATERIALS

.1 Provide maintenance materials in accordance with Section 26 05 00.

.2 Provide listed spare parts for each different size and type of starter.
.1 1 starter heater.
.2 1 control transformer.
.3 5 pilot lights.
.4 3 contacts, stationary.
.5 3 contacts, movable.
.6 1 contact, auxiliary.
.7 1 operating coil.
.8 5 fuses.
.9 1 breaker of each type used in the motor control centre (MCC).

PART 2 - PRODUCTS

2.1 MOTOR STARTERS

.1 All motor starters supplied under Division 26 shall be of the same manufacturer.

.2 Motor starters are indicated in the Mechanical Equipment Schedule (Appendix B) by letter types in conjunction with numerical suffixes. The letters indicate the type of starter and the numerals indicate special features which must be incorporated into or placed adjacent to the starters as specified.

.3 The following letter types shall apply:
.1 Type A - Magnetic in general purpose enclosure.
.2 Type B - Magnetic in Motor Control Centre.
.3 Type C - Manual starter in general purpose enclosure.
.4 Type D - Manual open type flush mounted in switchbox and fitted with plate to match other switch plates in the area.
.5 Type E - Manual with special features.
.6 Type F - Combination breaker/magnetic starter in an EEMAC I enclosure. Overcurrent device rating shall be as noted in the Mechanical Equipment Schedule. Overcurrent devices to be capable of being locked "OFF" and "ON".
.7 Type G - Combination unfused switch/magnetic starter in an EEMAC I enclosure.
.8 Type H - Fusible switch in Motor Control Centre.
.9 Type R-2(2SP) - Two-speed relay type starter w/o overload heaters. Locate in EEMACI

2.1 MOTOR STARTERS (Cont'd)

.3 (Cont'd)
.9 (Cont'd)
enclosure. Refer to drawings for wiring diagrams.

.4 The following suffixes shall apply:
.1 Reset only in cover.
.2 Reset and HAND-OFF-AUTOMATIC or LOCAL-OFF-REMOTE switch in cover.
.3 Reset and START-STOP pushbuttons in cover.
.4 Run (red) and Stop (green) PUSH-TO-TEST pilot lights in cover.
.5 Fitted with special features - see Mechanical Equipment Schedule.
.6 Reset and ON-OFF selector switch in cover.

.5 All individual starters shall have RUN and STOP pilot lights, with PUSH-TO-TEST feature, and START/STOP pushbuttons or selector switches as required or indicated.

.6 Starters located in finished areas (other than service spaces) shall be of a flush-mounted type with stainless steel cover.

.7 Fit all motor starters supplied under Division 26 with adjustable electronic overload trips in all normally ungrounded lines.

.8 All magnetic starters, including combination starters provided under Division 26 shall be complete with 4 sets of spare auxiliary contacts (2 sets N/C, 2 sets N/O, all sets reversible). Each and every starter shall have a separate control transformer complete with fused secondary protection at 120 volt, 60 Hz AC. Transformer volt-ampere rating will be confirmed with Mechanical Division prior to ordering. Where line over current protection exceeds 15 amperes, provide primary fuses for the control transformers.

.9 Minimum magnetic starter size shall be CEMA Size 1.

.10 Coordinate with the BMS Controls contractors. Interposing relays required to interface BMS system to the wiring in motor starters shall be provided by BMS Controls Contractor.

.11 Provide interposing relays for fire alarm shutdown of motors as noted in the Mechanical Equipment Schedule.

2.2 MISCELLANEOUS CONTROL DEVICES

.1 Pushbuttons: Heavy Duty Oil-Tight.

.2 Selector Switches: Heavy Duty Oil-Tight.

.3 Indicating (Pilot) Lights: Transformer Base PUSH-TO-TEST Type, 12 volt LED indicator lamps. Coordinate the pilot light transformer and circuit voltages such that not more than 12 volts are available at the lamp terminals.

.4 Control Circuit Transformers: Confirm the volt-ampere rating of the control transformer with Mechanical Division prior to ordering.

2.3 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00.

.2 Manual starter designation label, white plate, black letters, Type B, engraved as indicated.

.3 Magnetic starter designation label, white plate, black letters, Type B, engraved as indicated.

PART 3 - EXECUTION

3.1 MOTOR STARTERS

.1 Install, and wire adjacent to the starters, all devices, equipment, and enclosures described in the Mechanical Equipment Schedule with applicable special letter types and suffixes.

.2 Furnish and install for every motor in the building, unless otherwise noted, either a manual or magnetic motor starter as indicated in the Mechanical Equipment Schedule.

.3 Check the actual nameplate current rating of all motors installed before ordering the electronic overloads for motor starters.

3.2 MOTOR CONTROL WIRING

.1 All motor control wiring (120 V line voltage and 24 V low voltage) including conduit as well as supply and installation of control devices will, except where specifically noted on the electrical drawings, in the Mechanical Equipment Schedule, or outlined below, be provided as described in Mechanical Division of the

3.2 MOTOR CONTROL WIRING (Cont'd)

.1 (Cont'd)
Specification. Except where specifically directed to the contrary, motor control wiring, associated conduits, and control devices do not form a part of Division 26 work.

.2 The motor control work which shall be provided under Division 26 shall include the following:
.1 All conduit and control wiring specifically noted on the drawings and outlined in the different parts of the Specification.
.2 All control wiring as specified in the Mechanical Equipment Schedule.
.3 Control wiring related to air handling shutdown during fire alarm.

3.3 MOTOR POWER WIRING

.1 Connect all motors shown on the drawings or mentioned in this Specification. The locations of motors are approximate only. Check to determine correct locations and install wiring to these points.

.2 Responsibility of supplier and installer is indicated in the Mechanical Equipment Schedule. Related mechanical responsibility is indicated on the Mechanical Equipment Schedule on mechanical drawings.

.3 Check motor rotation before mechanically coupling to load.

.4 Except where otherwise directed, connect all motors with flexible conduits. Ground the conduit system with a separate grounding conductor installed in the flexible conduit.

3.4 STARTER VERIFICATION

.1 Field check motor starters supplied prior to commissioning equipment. As a minimum, verify the following:
.1 Check of control circuits.
.2 Verify that overload relay installed is correctly sized for motor used.
.3 Record overload relay size and motor nameplate amperage.
.4 Visual inspection of fuses and contactors.
.5 Ensure all connections are tight.

.2 Measure and record motor amps, under load conditions and compare with full load amps and motor service factor. Report any excessive

3.4 STARTER VERIFICATION (Cont'd)

.2 (Cont'd) readings and unbalance. Measure voltage as close to motor terminals as possible while motor is running.

.3 Set all motor circuit protectors to the minimum level which will consistently allow the motor to start under normal starting conditions.

3.5 OVERLOAD RELAYS

.1 For starters provided, select overload relays in accordance with relay and motor manufacturers' recommendations, considering motor service factors, ambient temperature, temperature differences between motor and starter locations. Monitor motor operation during start-up to ensure motor operation is satisfactory and relays provide proper protection. For side inlet fans and other long acceleration time loads, provide special overload relays to suite the start-up condition. Provide manufacturers' curves and data sheets where necessary to provide supporting data for motor protection.

3.6 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 98 00 and manufacturer's instructions.

.2 Operate switches and contactors to verify correct functioning.

.3 Perform starting and stopping sequences of contactors and relays.

.4 Check that sequence controls, interlocking with other separate related starters, equipment, control devices, operate as indicated.

END