# GENERAL

## RELATED DOCUMENTS

### Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

### Related Sections: Separate electrical components and materials required for field installation and electrical connections are specified in Division 26.

## SUMMARY

### This section specifies the basic requirements for electrical components which are an integral part of packaged fire protection equipment. These components include, but are not limited to factory installed motors, starters, and disconnect switches furnished as an integral part of packaged fire protection equipment. In addition, this section covers necessary coordination issues between fire protection and electrical disciplines. All fire protection and electrical construction documents must be completely reviewed by the Fire Protection and Electrical Contractors prior to the submission of bids. Any discrepancies in the documents should be brought to the Architect/Engineer's attention at that time. Failure to properly coordinate or review documents in advance of submission of bids will not be valid cause for changes to the overall Contract amount.

### Specific electrical requirements (i.e. horsepower and electrical characteristics) for fire protection equipment are scheduled on the Drawings.

## REFERENCES

### The design, manufacture, testing and method of installation of all equipment and materials furnished under the requirements of this specification section shall conform to the following:

#### NEMA Standard ICS 2: Industrial Control Devices, Controllers, and Assemblies.

#### NEMA Standard 250: Enclosures for Electrical Equipment.

#### NEMA Standard KS 1: Enclosed Switches.

#### National Electrical Code (NFPA 70).

## SUBMITTALS

### No separate submittal is required. Submit product data for motors, starters, and other electrical components with submittal data required for the equipment for which it serves, or as required by the individual equipment specification sections.

## QUALITY ASSURANCE

### Electrical components and materials shall be UL labeled and listed.

# PRODUCTS

## MOTORS

### The following are basic requirements for simple or common motors. For special motors, more detailed and specific requirements are specified in the individual equipment specifications.

#### Torque characteristics shall be sufficient to satisfactorily accelerate the driven loads.

#### Motor sizes shall be large enough so that the driven load will not require the motor to operate in the service factor range. Minimum service factors shall be as follows:

|  |  |  |
| --- | --- | --- |
| **Motor Service Factor Schedule** | | |
| **Horsepower:** | **3600 RPM:** | **1800 RPM:** |
| 1/6 – 1/3 | 1.35 | 1.35 |
| 1/2 | 1.25 | 1.25 |
| 3/4 | 1.25 | 1.25 |
| 1 – 1.25 | 1.25 | 1.15 |
| 1.5 - 150 | 1.15 | 1.15 |

#### Two‑speed poly-phase motors shall have two separate windings served by a single point electrical connection to the two speed starter. Two speed starters shall be located at the motor location unless otherwise noted.

#### Temperature Rating: Rated for 40 deg. C environment with maximum 50 deg. C temperature rise for continuous duty at full load (Class A Insulation).

#### Starting capability: Frequency of starts as indicated by automatic control system, and not less than five (5) evenly timed starts per hour for manually controlled motors.

#### Motor construction: NEMA Standard MG 1, general purpose, continuous duty, Design "B", except "C" where required for high starting torque.

##### Frames: NEMA Standard No. 48 or 54; use driven equipment manufacturer's standards to suit each specific application.

##### Bearings: Ball or roller bearings with inner and outer shaft seals; regreasable; designed to resist thrust loading where belt drives or other drives produce lateral or axial thrust in motor; for fractional horsepower, light duty motors, sleeve type bearings are permitted.

##### Enclosure Type: Unless otherwise indicated, open drip‑proof motors for indoor use where satisfactorily housed or remotely located during operation; guarded drip‑proof motors where exposed to contact by employees or building occupants; weather protected Type I for outdoor use, Type II where not housed.

##### Overload protection: Built‑in thermal overload protection (in accordance with NEC requirements) and, where indicated, an internal sensing device suitable for signaling and stopping the motor at the starter.

#### Noise rating: "Quiet"

#### Efficiency: "Premium efficiency" motors, as defined in NEMA MG 1, most recent edition.

#### Nameplate: Indicate the full identification of manufacturer, ratings, characteristics, construction, special features and similar information.

#### Motors Used With Variable Frequency Drives: Ratings, characteristics, and features coordinated with and approved by drive manufacturer. Motor shall be designed and labeled for use with variable frequency drives. Motor shall be designed with critical vibration frequencies outside the operating range of the drive output and shall be suitable for use throughout speed range without overheating.

##### Provide shaft grounding ring/system to divert adverse shaft currents away from the motor bearings.

## SHEAVES

### All sheaves shall conform to NEMA Standard MG1-14.42, which lists minimum diameters and maximum overhangs. Locate motors to minimize overhang.

### When replacing sheaves, use sheaves of at least the originally supplied sizes.

### Contractor shall be responsible for replacement sheaves required to achieve specified performance. Coordinate with testing and balancing of the equipment.

## STARTERS, ELECTRICAL DEVICES, AND WIRING

### Motor-Starter Characteristics: Motor starters shall be compatible with the equipment they serve. In general, motor starter characteristics shall meet the requirements of Division 26 specification sections

### MOTOR CONNECTIONS

#### Provide connections to motors in accordance with the requirements listed in the electrical specifications.

#### See Division 26 for the use of lugs for motor connections.

## SAFETY SWITCHES

### Furnish and install heavy duty type safety switches, having the electrical characteristics, ratings and modifications shown on the drawings. All switches shall have:

#### NEMA 1 general purpose enclosures unless otherwise noted for all interior applications.

#### NEMA 3R rainproof enclosures unless otherwise noted for all exterior applications.

#### Metal nameplates, front cover mounted that contain a permanent record of switch type, catalog number and H.P. ratings with both standard and time delay fuses.

#### Handle that is padlockable in "OFF" position.

#### Non-teasible, positive quick-make, quick-break mechanism.

#### UL approval and shall bear the UL label.

#### All fusible switches shall have Class R Fuse rejection clips.

## DIVISION-26 RESPONSIBILITY

### Unless otherwise noted, furnish and install single phase starters with thermal overload protection for all single phase motors not indicated as part of the Division 21 responsibility. Furnish and install all full voltage, non-reversing, single speed motor starters for appropriate three phase equipment. Furnish and install disconnect switches for all three phase motors. Provide the following additional equipment as required.

### Provide auxiliary motor starter contacts as shown on the drawings or as required for proper control of equipment.

### Furnish and install all motor power circuit conduit and wiring.

### Install power factor correction capacitors furnished by the Division 21 Contractor.

### Furnish and install all junction boxes.

## DIVISION-21 RESPONSIBILITY

### Furnish and set all motors.

### Furnish and install all electrical control circuit conduits and wiring and control devices required to perform the equipment control functions as specified in Division-21.

### All electrical equipment provided, including the wiring and installation of electrical equipment shall be in strict accordance with the requirements of this Section and Division-26.

# EXECUTION

## INSTALLATION

### All rotating shafts and/or equipment shall be completely guarded from all contact. Partial guards and/or guards that do not meet all applicable OSHA standards are not acceptable. Contractor is responsible for providing this guarding if it is not provided with the equipment supplied.

### For flexible coupled drive motors, mount coupling to the shafts in accordance with the coupling manufacturer’s recommendations. Align shafts to manufacturer’s requirements or within 0.002 inch per inch diameter of coupling hub.

### For belt drive motors, mount sheaves on the appropriate shafts per manufacturer’s instructions. Use a straight edge to check alignment of the sheaves. Reposition sheaves as necessary so the straight edge contacts both sheave faces squarely. After sheaves are aligned, loosen the adjustable motor base so the belt(s) can be added, and tighten the base so the belt tension is in accordance with the drive manufacturer’s recommendations. Frequently check belt tension and adjust if necessary during the first day of operation and again after 80 hours of operation.

## CONTRACTOR COORDINATION

### Unless otherwise indicated on drawings, all equipment, controls, etc. shall be furnished, set in place and wired in accordance with this specification section and the following schedule. Attached notes shall apply to schedule.

| **ITEM:** | **FURNISHED BY:** | **SET BY:** | **POWER WIRING BY:** | **TEMPERATURE CONTROL WIRING BY:** |
| --- | --- | --- | --- | --- |
| Fire protection solenoid valves, supervisory switches, etc. | FPC | FPC | EC | -- |
|  |  |  |  |  |

SCHEDULE KEY: FPC = Fire Protection Contractor

EC = Electrical Contractor

END OF SECTION 21 05 13