

**SECTION 16050**

**INSTALLATION OF ELECTRICAL EQUIPMENT**

**PART 1 - GENERAL**

1.1 GENERAL

- A. The provisions of Section 16010 General Requirements for Electrical Work apply to the work of this section.
- B. Included in the work of this section is the assembly, installation and wiring of all parts, subassemblies and shipping sections of the electrical switchgear, panels, motor control centers, control panels, motors, disconnect switches, variable speed drives and similar equipment.
- C. Testing shall be performed in accordance with Section 16030 Electrical Acceptance Testing.

**PART 2 - PRODUCTS**

2.1 GENERAL

- A. Equipment to be installed under this section is generally furnished under other specification sections.

**PART 3 - EXECUTION**

3.1 GENERAL

- A. All equipment shall be completely assembled, installed and connected and shall be fully prepared and made ready for operation. The Contractor may employ the use of any special tools furnished with the equipment specifically for installation purposes, but shall not use tools furnished with the equipment for maintenance purposes. The Contractor shall acquaint himself with and follow special instructions of the Manufacturer for the care, handling and installation of the equipment.
- B. After installation, all operating parts shall be inspected to insure correct mechanical operation.
- C. Internal wiring within any equipment, which as been disconnected for shipping purposes shall be reconnected. Any wiring not installed by reason of shipping requirements shall also be installed. The Contractor may disconnect internal wiring as necessary for installation purposes, and shall reconnect all wiring so disconnected.
- D. After installation, all equipment shall be left in clean conditions. In particular, all insulators, bushings, insulating materials, and other parts which are depended upon for their insulating qualities shall be thoroughly cleaned.
- E. No overall painting of equipment will be required, but housing surfaces which have been soiled or marred shall be touched up or refinished with primer and color coat.

- F. Drilling, tapping, cutting, or welding of equipment required for mounting or for conduit and cable entrances to suit particular conditions of installation shall be considered as part of electrical equipment installation.
- G. All equipment shall be provided with engraved nameplates in accordance with Section 16010 and the drawings.

### 3.2 SUPPORTS

- A. The Contractor shall size and provide all supports necessary for the installation of the electrical equipment.
- B. Supports shall be designed for seismic forces in accordance with the 1996 BOCA National Building Code, Section 1610.
- C. Channel framing shall be manufactured by Unistrut, Kindorf, B-Line or approved equal.
- D. In dry, non-corrosive areas, channel framing shall be galvanized steel or aluminum and all nuts, bolts and hardware shall be carbon steel, cadmium plated or hot dipped galvanized.
- E. In outdoor, wet or damp areas channel framing shall be aluminum or 304 stainless steel and nuts, bolts and hardware shall be 304 stainless steel.
- F. In corrosive areas, channel framing shall be 316 stainless steel, PVC coated steel or PVC coated aluminum. Nuts, bolts and hardware shall be 316 stainless steel.
- G. Supports shall be sized with a minimum safety factor of four or 200 lbs. whichever is greater.
- H. Fastening to steel may be welded or bolted. Fastening to solid masonry or concrete shall be machine bolts with expansion shields. Fastening to hollow masonry shall be by toggle bolts.

### 3.3 WIRING

- A. All external connections to electrical equipment shall be completed by the Contractor. Wiring shall be neatly formed, trained and tied with nylon cable ties in all equipment.
- B. All power conductors shall be color-coded. All control wiring shall be identified with sleeve type wire markers with wire numbers matching those on the manufacturers schematic and connection diagrams.
- C. All bus work shall be properly phased "A", "B", "C" left to right, front to back or top to bottom.

### 3.4 PANELBOARDS

- A. The Contractor shall mount equipment at locations shown on the drawings, install all interiors, branch circuit protective devices, complete all external connections and install exterior trim.

- B. The panelboard circuit directory card shall be completed in accordance with Section 16010.
- C. Mount panelboards so that top of trim is at 6'-2" above finished floor. If panelboard is taller than the highest circuit breaker shall not exceed 6'-6" above finished floor.
- D. Mount panelboards plumb and rigid without distortion of box. Mount recessed panels uniformly flush with wall finish. Install panels securely mounted to building structure or to steel channel framing fastened to building structure.
- E. For all recessed panelboards stub and four spare 1" conduits from panelboard to an accessible ceiling space for future access to panelboards.
- F. Wiring in panel gutters to be trained neatly into groups, bundled and wrapped with wire ties.
- G. Install electrical equipment to resist seismic forces determined in accordance with the latest edition of BOCA Building Code and based on applicable seismic zone for project geographical location.

### 3.5 MOTOR SAFETY SWITCHES AND LOCAL MOTOR STARTERS

- A. Equipment shall be installed at locations shown on the drawings. The Contractor shall provide all support material and framing required for proper support.
- B. Enclosures installed on concrete surfaces or surfaces where condensation is likely to occur shall clear the mounting surface by at least 1/4 inch.
- C. Conduit shall be bottom entry to all enclosures installed outdoors or in wet or damp areas.

### 3.6 MOTORS

- A. Motors shall be set plumb and aligned with shafts or pulleys.
- B. Motor connections shall be made with compression lugs installed on the motor leads and the motor branch circuit conductors, bolted together.
- C. Motor connections shall be wrapped with varnished cambric tape, then insulated with Super 33 Scotch Vinyl electric tape or insulated with motor connection kits as manufactured by Raychem or 3M.

**END OF SECTION 16050**