

**SECTION 26 24 16**  
**PANEL BOARDS (CIRCUIT BREAKER TYPE)**

**PART 1 – GENERAL**

**1.1 SCOPE**

- A. The Contractor shall furnish equipment, materials, tools, labor, transportation and supervision necessary to install branch circuit panelboards as specified in this Section and as called for on the Drawings.

**1.2 STANDARDS AND CODES**

- A. Fabrication and installation shall comply with applicable Sections of NEC and shall bear the UL label.

**1.3 DESCRIPTION**

- A. Panelboards described in this Section shall be dead-front, safety type furnished with thermal magnetic, molded case bolt-in circuit breakers. They shall be for power distribution application and when required, shall be suitable for service equipment. Circuit breakers shall have frame and trip ratings as scheduled. All electrical conductors shall be high conductivity copper (98% conductivity).

**1.4 QUALIFICATION**

- A. Panelboards shall be by Square D or Approved Equal.

**1.5 SUBMITTALS**

- A. Shop drawings shall include fabrication details, lug and bus arrangement, ampere and voltage rating, breaker frame sizes, interrupting ratings and wiring space.

**2.0 PRODUCTS**

**2.1 PANELBOARDS**

- A. Bussing Assembly and Temperature Rise: Panelboard bus structure and main lugs or main breaker shall have current ratings as shown on the panelboard schedule. Such ratings shall be established by heat rise tests with maximum hot spot temperature on any connector to bus bar not to exceed 50 degrees C rise above ambient. Heat rise test shall be conducted in accordance with Underwriters' Laboratories Standard UL 67. The use of conductor dimensions will not be accepted in lieu of actual heat tests. Bus bar connections to the branch circuit breakers shall be the "distributed phase" or "phase sequence" type. Single-phase, three-wire panelboard bussing shall be such that any two adjacent single-pole breakers are connected to opposite polarities in such a manner that two-pole breakers can be installed in any location.

Three-phase, four-wire bussing shall be such that any three adjacent single-pole breakers are individually connected to each of the three different phases in such a manner that three-pole breakers can be installed at any location. All Current-carrying parts of the bus assembly including the ground and neutral bars shall be tin-plated copper. Mains ratings shall be as shown in the panelboard scheduled on the plans. Full equipment ground bus shall be provided for all panels. The ground bus shall be mechanically and electrically isolated from the neutral bus.

- B. Safety Barriers: The panelboard interior assembly shall be dead front with panelboard front removed.
- C. Cabinets and Fronts: Panelboard assembly shall be enclosed in a steel cabinet. The rigidity and gauge of steel to be as specified in UL Standard 50 for cabinets. Wiring gutters shall be in accordance with UL Standard 67, Nema Publication PBI 57 for panelboards and the NEC. Minimum gutter size is six inches (6") on each side, five inches (5") on the top and bottom. Fronts shall include doors and have flush, brushed stainless steel, cylinder tumbler-type locks with catches and spring-loaded door pulls. The flush lock shall not protrude beyond the front of the door. All panelboard locks shall be keyed alike. The front shall have adjustable indicating trim clamps which shall be completely concealed when the doors are closed. Doors shall be mounted by completely concealed steel hinges. Fronts shall not be removable with door in locked position. A circuit directory frame and card with a clear plastic covering shall be provided on the inside of the door. The directory card shall provide a space at least one-quarter inch high by three inches long (1/4" x 3") or equivalent for each circuit. The directory shall be typed to identify the load fed by each circuit. Fronts shall be of code gauge, full finished steel with rust-inhibiting primer and baked enamel finish.
- D. Wiring Terminals: Terminals for feeder conductors to the panelboard mains and neutral shall be UL listed as suitable for the type of conductor specified. Terminals for branch circuit wiring, both breaker and neutral, shall be UL listed as suitable for the type of conductor specified. Equipment terminal lugs shall be of sufficient size to accept the cable sizes specified by the Engineer.
- E. Circuit Breakers: Circuit breakers shall be quick-make, quick-break, thermal-magnetic, trip indicating and have common trip on all multiple breakers unless noted otherwise. Circuit breakers shall be bolt-on type equipped with individually insulated, braced and protected connectors. No "Plug-On" breaker and panelboard construction will be permitted. The front faces of circuit numbers shall be flush with each other. Large permanent individual circuit numbers shall be affixed to each breaker in a uniform position. Tripped indication shall be clearly shown on the breaker handle taking a position between ON and OFF. Provisions for additional breakers shall be such that no additional connectors will be required to add breakers.
- F. Integrated Equipment Rating: Each panelboard, as a complete unit, shall have a rating equal to or greater than the integrated equipment rating shown on the single line drawing. Such rating shall be established by test with the circuit breakers mounted on the panelboard. The short-circuit tests on the circuit breaker shall be made simultaneously by connecting the fault to each panelboard breaker with the

panelboard connected to its rated voltage source. The method of testing shall be per UL Standards pertaining to listing of molded case circuit breakers for high-interrupting capacity ratings. The source shall be capable of supplying the specified panelboard short-circuit current or greater. Test data showing the completion of such tests upon the entire range of distribution and power panelboards to be furnished to Engineer with the submittal drawings. Testing of panelboard circuit breakers for short-circuit rating only with the breaker individually mounted is not acceptable. Also, testing of the bus structure by applying a fixed fault to the bus structure alone is not acceptable.

### 3.0 EXECUTION

#### 3.1 INSTALLATION

- A. Unless otherwise indicated on the drawings, mount protective devices with top of cabinet or enclosure 6 feet 6 inches above the finished floor, properly align, and adequately support independently of the connecting raceways. Furnish and install all steel shapes, etc., necessary for the support of equipment where the building structure is not suitable for mounting the equipment directly thereon.
- B. Install four (4) spare 3/4" conduits from flush mounted panels into the ceiling space.
- C. All panelboards, motor starters, junction boxes, wireways, etc., shall be spaced off the concrete structure by using a unistrut P-1060 series square washer, or approved equal, between the mounting surface and the equipment at each mounting point. Equipment as listed above, mounted on unistrut channel, or approved equal, shall have unistrut P-1060 series square washer, or approved equal, installed between the unistrut channel, or approved equal, and the equipment at each mounting point. All bolted connections and equipment mountings shall utilize a flat washer, lockwasher and hex head A-325 bolting hardware, unless noted otherwise.

#### 3.2 TESTING

- A. The Contractor shall test all electrical equipment.

END OF SECTION 262416

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