SECTION 26 24 16
PANELBOARDS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes distribution panelboards, lighting and appliance branch-circuit panelboards.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For each panelboard and related equipment.
   1. Include dimensioned plans, current, and voltage ratings. Show tabulations of installed devices, equipment features, and ratings.
   2. Short-circuit current rating of panelboards and overcurrent protective devices.

C. Field quality-control reports.

D. Panelboard schedules: For installation in panelboards. Submit final versions after load balancing.

E. Operation and maintenance data.

1.03 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NEMA PB 1.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Cutler-Hammer.
   2. General Electric.
   3. Siemens Energy & Automation, Inc.
   4. Square D.

B. Panelboards: Dead-front type with automatic short-circuit and overcurrent protective devices (OCPD), assembled into a single interior unit mounted in a sheet-steel enclosure, consisting of a box and front cover, and designed to be placed in/against a wall or partition.

C. Enclosures: Flush- and surface mounted cabinets as shown on the drawings.
   1. Rated for environmental conditions at installed location.
      a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
      b. Outdoor Locations: NEMA 250, Type 3R.
   2. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
   3. Directory Card: Inside panelboard door, mounted in transparent card holder.

D. Incoming Mains Location: Top and/or bottom as determined by the Contractor.

E. Phase, Neutral, and Ground Buses:
   1. Phase and Neutral Buses: Tin-plated aluminum.
   2. Equipment Ground Bus: Copper, adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
   3. Isolated Ground Bus: Where shown on the drawings, adequate for branch-circuit isolated ground conductors; insulated from box.
   4. Extra-Capacity Neutral Bus: Where shown on the drawings, neutral bus rated 200 percent of phase bus and UL listed as suitable for nonlinear loads.
   5. Feed-Through Lugs: Where shown on the drawings, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
   6. TVSS: Where shown on the drawing, provide factory- installed, integral TVSS device as specified

F. Service Equipment Label: NRTL labeled for use as service equipment for panelboards with one or more main service disconnecting and overcurrent protective devices.

G. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

H. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.02 DISTRIBUTION PANELBOARDS

A. Panelboards: NEMA PB 1, power and feeder distribution type.

B. Mains: Circuit breaker or main lugs only, as shown on the drawings.

C. Overcurrent Protective Devices: Thermal-magnetic molded case, bolt-on circuit breakers. Circuit breakers with trip ratings larger than 100 amperes shall have interchangeable trips.

D. Where shown on the drawings, provide electronic type or HACR rated circuit breakers.

2.03 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

B. Mains: Circuit breaker or main lugs only, as shown on the drawings.

C. Branch Overcurrent Protective Devices: Thermal-magnetic molded case, bolt-on circuit breakers, replaceable without disturbing adjacent units.

D. Tandem circuit breakers shall not be used. Multi-pole breakers shall have a common trip.

E. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.04 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.
   1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 100 A and larger.
   2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
   3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:
      a. Instantaneous trip.
      b. Long- and short-time pickup levels.
      c. Long- and short-time time adjustments.
      d. Ground-fault pickup level, time delay, and I^2t response.
   4. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (5-mA trip).
   5. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).
   6. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
   7. Shunt Trip: 120V trip coil energized from separate circuit where shown on the drawings.
   8. Handle Padlocking Device: Fixed attachment for locking circuit-breaker handle in On position where shown on the drawings.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Receive, inspect, handle, store and install panelboards and accessories according to NEMA PB 1.1.

B. Mounting Heights: Distance to the handle of the top most circuit breaker shall not exceed 6'-6" above finished floor to comply with referenced Electrical Code.

C. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

D. Install overcurrent protective devices not already factory installed. Set field-adjustable, circuit-breaker trip ranges.

E. Install filler plates in unused spaces.

F. Provision for Future Circuits at Flush Panelboards: Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future.

G. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

H. Branch circuit numbering: Shown on the drawings for identification and convenience only, and is not intended to designate connecting sequence. The contractor is responsible for proper load balance at each panel.

3.02 IDENTIFICATION

A. Identify panelboards, branch circuit device in distribution panelboards, field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Division 26 Section "Identification for Electrical Systems."

B. Create a directory to indicate installed circuit loads and incorporating Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable.

3.03 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:
1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

C. Tests and Inspections:
1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

D. Prepare test and inspection reports.

END OF SECTION 26 24 16