

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 SUBMITTAL REQUIREMENTS

A. Product Data

1. For each provide bus configuration, current ratings, voltage ratings, SCCR Ratings, overcurrent protective device(s), surge suppression device(s), accessory, and components indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution
3. Siemens Industry, Inc.
4. Square D; a brand of Schneider Electric

B. Enclosures: Refer to electrical drawings and coordinate with field conditions for cabinet mounting types (i.e. flush, surface, flush and surface).

1. Rate for environmental conditions at installed location.
2. Front Cover: Entire front trim neatly bolted to box (or equivalent concealed clamping or similar method), and with standard door within trim cover. Provide dead front behind standard trim door, bolted in place, to cover bare wiring, lugs, bussing and terminal bars. Provide concealed hinges. Provide concealed hinges, secured with flush latch with tumbler lock and keyed alike.
3. Provide additional features where indicated on drawings or needed due to field or architectural conditions. Such features include, but are not limited to, the following.
 - a. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
 - b. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.

4. Panel and Trim Finish: Galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
 5. Back Box Finish: Galvanized steel
 6. Directory Card: Provide neatly typewritten circuit directory card for each panelboard upon completion of installation work. Include the actual room names/numbers that are selected for interior signage/designation.
- C. Incoming Mains Location: Provide incoming main locations (top or bottom, or top and bottom) based on means and methods and conduit/raceway layouts that are planned for installation.
- D. Phase, Neutral, and Ground Buses: Refer to electrical drawings, single line diagram and schedules for additional information on requirements for buses, as applicable.
1. Material: Tin-plated copper or aluminum.
 2. Grounded ("Neutral") Bus: Provide 100% rated bus with sufficient lugs to accommodate grounded conductors for all circuits and pole spaces.
 3. Equipment Grounding Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box; minimum 50 percent rated. Bond to grounded ("neutral") bus for service entrance applications only.
- E. Conductor Connectors: Suitable for use with conductor material and sizes.
1. Material: Tin-plated aluminum
 2. Main and Neutral Lugs: Mechanical type.
 3. Ground Lugs and Bus-Configured Terminators: Mechanical type.
 4. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
 5. Subfeed (Double) Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
 6. Gutter-Tap Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
 7. Extra-Capacity Neutral Lugs: Where 200 percent rated bussing is called for on single line diagram; provide 200 percent rating of phase lugs mounted on extra-capacity neutral bus.
- F. Service Equipment Label: NRTL/ULSE labeled for use as service equipment for units with one or more main service disconnecting and overcurrent protective devices.
- G. Future Devices: Provide all mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
- H. Fault Current Ratings
1. Provide electrical distribution related equipment with appropriately braced bussing and properly rated breakers, fuses, etc. for the available fault currents.

- I. Provide panelboard branches as scheduled on the drawings. Provide circuit breaker panelboard bus assemblies with distributed (sequence) type bussing throughout, so that any two adjacent single-pole breakers, or spaces, are replaceable by a two-pole internal common trip breaker, and so that any three adjacent single-pole breakers, or spaces, are replaceable by a three-pole internal common trip breaker. This applies for branch breakers sized 15-amp through 70-amp inclusive, without disturbing any other breaker.
- J. Provide dead-front safety type panelboards as indicated, with panelboard switching and protective devices in quantities, ratings, types, and with arrangement shown. Provide with lug connectors approved for use with copper or aluminum conductors. Provide lugs, lug kits and related accessory work as required to accommodate the conductor sizes and quantities needed for each application. Coordinate with single-line diagram, schedules, field conditions, etc.

2.2 PANELBOARDS

- A. Provide Distribution Panel construction for panelboard applications where indicated on drawings or where otherwise required based on power distribution requirements. Provide Panelboard construction for branch panelboards.
- B. Provide circuit breaker panelboards unless indicated otherwise on drawings.
 - 1. Circuit Breaker Branch Overcurrent Protective Devices: Bolt-on type, replaceable without disturbing adjacent units.

2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Molded-Case Circuit Breakers (MCCB): Comply with UL 489, with series-connected rating 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 250 A and larger.
 - 2. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
 - 3. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).
 - 4. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
 - 5. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:
 - a. Standard frame sizes, trip ratings, and number of poles.
 - b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
 - c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.

- d. Shunt Trip: Trip coil voltage as required to achieve intended control scheme with coil clearing contacts (or equivalent configuration), energized from separate circuit
- e. Multipole units enclosed in a single housing or factory assembled to operate as a single unit.
- f. Handle Padlocking “Lock-Out/Tag-Out” Device: Fixed attachment, for locking circuit-breaker handle in off position.
- g. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.
- h. Mounting: Designed to be mounted and operated in any physical position, and to be operated in a minimum ambient temperature of 40 degrees C.; with mechanical screw type removable connector lugs, AL/CU rated.
- i. Size: Full size, no "tandem" or "split" breakers.
- j. Position: All load-side box lugs of each breaker in the same gutter.
- k. Common Trip: Common trip for multi-pole breakers so overload on one pole will trip all poles simultaneously. Provide multi-pole breakers with common trip (or with handle-ties, only if needed because breakers are existing) for applications where it is determined that a common disconnecting means is required for multi-wire branch circuits serving, or within, the same enclosure, outlet box, equipment, or device.
- l. SWD Type: Provide for 15 and 20 ampere branch circuit breakers (UL Listed).
- m. HACR Type: Provide for 15 through 70 ampere branch circuit breakers.
- n. Spares: Place all spare circuit breakers in the ‘OFF’ position, provide with breaker locks, and schedule them as “Spare” on directory card.

2.4 ACCESSORY COMPONENTS AND FEATURES

- A. Provide panelboard accessories and devices including, but not necessarily limited to, overcurrent protection devices, ground-fault protection, etc., as recommended by panelboard manufacturer for ratings and applications indicated. Provide distribution equipment with ground bus bars. Provide a minimum of 20 handle, lock-on devices of the non-padlocking type for life safety, special systems and other essential circuits.
- B. Provide construction and bracing as required to permit shipping, rigging, etc. of products in any physical position or orientation without compromising product warranty.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount top of trim 90 inches above finished floor unless top-most breaker handle would end up being above 79 inches in which case the top of trim shall be mounted so that the top-most breaker handle will be below 79 inches. Install overcurrent protective devices and controllers not already factory installed. Set field-adjustable, circuit-breaker trip

ranges and other applicable settings. Arrange conductors in gutters into groups. Install filler plates in unused spaces.

- B. Provide neatly computer-typed/printed circuit directory card for each panel upon completion of installation work. Include the actual room names/numbers that are selected for interior signage and/or designation. Scheduling shown on drawings is shown to indicate feeder and branch circuiting requirements. Determine exact numbering sequence of circuits in field after performing final balancing.
- C. Stub four 1-inch empty conduits from recessed branch panelboards into accessible ceiling space or overhead structural space in areas with no finished ceilings.

END OF SECTION 262416