

## SECTION 262413.00

### SWITCHBOARDS

#### 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), ground-fault protection, accessory, and components indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

#### PART 2 - PRODUCTS

##### 2.1 MANUFACTURED UNITS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Square D; a brand of Schneider Electric
  - 2. Eaton Electrical Inc.; Cutler-Hammer Business Unit
  - 3. General Electric Company; GE Consumer & Industrial - Electrical Distribution
  - 4. Siemens Industry, Inc.
- B. 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, field conditions, etc.
- C. Provide integral factory-installed power supply system(s) to prevent electronic-trip breakers from tripping under conditions where load current may at any time fall below operational thresholds. Provide factory-wired power supply system(s), powered from the respective switchboard with integral overcurrent protection, control power transformer(s), etc. as necessary for complete operational system(s) without requiring any external or field wiring.
- D. Front-Connected, Front-Accessible Switchboards:
  - 1. Main Devices: Panel or Fixed, individually mounted.
  - 2. Branch Devices: Panel mounted.
  - 3. Sections front and rear aligned.
- E. Nominal System Voltage: Refer to single-line diagram for system voltage.
- F. Main-Bus: Refer to single-line diagram for main bus sizing.
- G. Indoor Enclosures: Steel, NEMA 250, Type 1. Provide factory-applied finish in manufacturer's standard gray finish over a rust-inhibiting primer on treated metal surface.
- H. Barriers: Between adjacent switchboard sections.
- I. Customer Metering Compartment: A separate customer metering compartment and section with front hinged door, for indicated metering, and current transformers for each meter. Current transformer secondary wiring shall be terminated on shorting-type terminal blocks. Include

potential transformers having primary and secondary fuses with disconnecting means and secondary wiring terminated on terminal blocks.

- J. Bus Transition and Incoming Pull Sections: Matched and aligned with basic switchboard.
- K. Removable, Hinged Rear Doors (if applicable) and Compartment Covers: Secured standard bolts for access to rear interior of switchboard.
- L. Hinged Front Panels: Allow access to circuit breaker, metering, accessory, and blank compartments.
- M. Pull Box on Top of Switchboard (if indicated or needed):
  - 1. Adequate ventilation to maintain temperature in pull box within same limits as switchboard.
  - 2. Set back from front to clear circuit-breaker removal mechanism if required.
  - 3. Removable covers shall form top, front, and sides. Top covers at rear shall be easily removable for drilling and cutting.
  - 4. Bottom shall be insulating, fire-resistive material with separate holes for cable drops into switchboard.
  - 5. Cable supports shall be arranged to facilitate cabling and adequate to support cables indicated, including those for future installation.
- N. Buses and Connections: Three phase, four-wire unless otherwise indicated on drawings.
  - 1. Bus Material: Hard-drawn copper of 98 percent conductivity, silver-plated (or tin-plated), with copper overcurrent-protection-device line connections.
  - 2. Main and Neutral Lugs: Mechanical type.
  - 3. Terminals: Insulated, rigidly braced, runback bus extensions, of same material as through buses, equipped with mechanical connectors for outgoing circuit conductors. Provide load terminals for future overcurrent-protection-device positions at full-ampere rating of position.
  - 4. Ground Bus: Minimum size required by UL 891, fifty percent minimum, equipped with mechanical connectors for feeder and branch-circuit equipment grounding conductors. For busway feeders, extend insulated equipment grounding cable to busway ground connection and support cable at intervals in vertical run.
  - 5. Buses: Uniform capacity for entire length of switchboard's main and distribution sections. Provide for future extensions from both ends.
  - 6. Neutral Buses: Minimum 100 percent of the ampacity of phase buses unless otherwise indicated, equipped with mechanical connectors for outgoing circuit neutral cables. Brace bus extensions for busway feeder neutral bus where applicable.
  - 7. Isolation Barrier Access Provisions: Permit checking of bus-bolt tightness.
- O. Future Devices: Equip compartments with mounting brackets, supports, bus connections, and appurtenances at full rating of circuit-breaker compartment.

## 2.2 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with rating and 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. 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<sub>2t</sub> response
- 4. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).
- 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. Ground-Fault Protection: Integrally mounted relay and trip unit for solid state trip units and Remote mounted relay and trip unit for thermal magnetic unit. Provide with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator. Provide for all 480V services 1000 Amps and greater.
  - e. Auxiliary Contacts: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts and "b" contacts operate in reverse of circuit-breaker contacts.
  - f. Alarm Switch: Single-pole, normally open contact that actuates only when circuit breaker trips.
  - g. .
  - h. Multi-pole units enclosed in a single housing or factory assembled to operate as a single unit.

### **2.3 INSTRUMENTATION**

- A. Instrument Transformers: IEEE C57.13, NEMA EI 21.1, and the following:
  - 1. Potential Transformers: IEEE C57.13; 120 V, 60 Hz, single secondary; disconnecting type with integral fuse mountings. Burden and accuracy shall be consistent with connected metering and relay devices.
  - 2. Current Transformers: IEEE C57.13; 5 A, 60 Hz, secondary; single secondary winding and secondary shorting device. Burden and accuracy shall be consistent with connected metering and relay devices.
  - 3. Control-Power Transformers: Dry type, mounted in separate compartments for units larger than 3 kVA. Exact size shall be selected by manufacturer.
- B. Multifunction Digital-Metering Monitor: Refer to Section 26 27 13.00 – “Electricity Metering” for metering requirements.

### **2.4 CONTROL POWER**

- A. Control Circuits: 120V ac, supplied through secondary disconnecting devices from control-power transformer.

### **2.5 ACCESSORY COMPONENTS AND FEATURES**

- A. Provide barriers required for separating sections compliant with NFPA 70.
- B. Provide construction and bracing as required to permit shipping, rigging, etc. of products in any physical position or orientation without compromising product warranty.
- C. Provide factory-installed laminated diagram of bussing within board at face of board.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Install switchboards on concrete base, 4-inch nominal thickness. Comply with requirements of concrete specified in 26 05 29. Install overcurrent protective devices and accessories. Install finished filler plates in unused spaces of panel-mounted sections.
- B. Frame and mount the printed basic operating instructions for switchboards, including control and key interlocking sequences and emergency procedures. Fabricate frame of finished metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.
- C. Identify field-installed conductors, interconnecting wiring, and components. Nameplate-label each compartment/section, nameplate-label each disconnecting and overcurrent protective device, and provide warning signs complying with requirements for identification specified in Section 26 05 53.00 "Identification for Electrical Systems", and compliant with prevailing codes and standards.

**END OF SECTION 262413.00**