

**SECTION 26 24 13i**  
**SWITCHBOARDS - INSTALL**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Summary Includes
  - 1. Installation of freestanding main and distribution switchboards with arrangement, control, monitoring and accessories as specified herein and as indicated on the drawings.
- B. Meet the following performance requirements:
  - 1. Wind, Snow, Ice, Flood and Earthquake Performance: Switchboards shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
  - 2. Environmental Limitations:
    - a. Do not deliver or install switchboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above switchboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- C. System Description:
  - 1. Install and test Owner furnished switchboards.

**1.2 RELATED WORK**

- A. Section 26 00 10 – Basic Electrical Requirements, is an integral part of this Section. Requirements and work indicated in 26 00 10 are not repeated in this Section.
- B. Section 26 08 00 – Electrical General Commissioning Requirements. Provide support as required to coordinate with the Commissioning Agent and support all commissioning efforts and paperwork, Acceptance and Integrated Systems Testing.

**1.3 COORDINATION**

- A. Coordinate work under provisions indicated in Section 26 00 10.
- B. Installation Pathway: Remove and replace access fencing, doors, lift-out panels, and structures to provide pathway for moving switchboards into place.
- C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
  - 1. Notify Construction Manager, General Contractor, and Owner no fewer than seven days in advance of proposed interruption of electric service.
  - 2. Indicate method of providing temporary electric service.
  - 3. Do not proceed with interruption of electric service without Construction Manager's, General Contractor's, and Owner's written permission.
  - 4. Comply with NFPA 70E.

**1.4 QUALIFICATIONS / QUALITY ASSURANCE**

- A. Conform to requirements indicated in Section 26 00 10.
- B. Coordinate delivery of products to the site under provisions of Section 26 00 10.

- C. Coordinate delivery in shipping splits that can be maneuvered through the building (both size and weight), individually wrapped for protection, and mounted on shipping skids. Coordinate maximum widths and weights with the facility's ability to safely handle and accommodate. Make modifications to shipped equipment or rigging methods as required.
- D. Store and protect products under provisions of Section 26 00 10. Comply with NFPA 70B storage requirements.
- E. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- F. Handle in accordance with NEMA PB2.1 and manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to switchboard internal components, enclosure, and finish.

### **1.5 REGULATORY REQUIREMENTS AND STANDARDS**

- A. Conform to requirements indicated in Section 26 00 10.
- B. Conform to requirements indicated in the following:
  - 1. ANSI C12 - Code for Electricity Metering.
  - 2. ANSI C39.1 - Requirements for Electrical Analog Indicating Instruments.
  - 3. ANSI C57.13 - Requirements for Instrument Transformers.
  - 4. FS W-C-375 - Circuit Breakers, Molded Case, Branch Circuit and Service.
  - 5. FS W-F-870 - Fuseholders (For Plug and Enclosed Cartridge Fuses).
  - 6. FS W-S-865 - Enclosed Knife Switch
  - 7. NEMA AB 1 - Molded Case Circuit Breakers
  - 8. NEMA KS 1 - Enclosed Switches.
  - 9. NEMA PB 2 - Dead Front Distribution Switchboards.
  - 10. NEMA PB 2.1 - Instructions for Safe Handling, Installation, Operation and Maintenance of Deadfront Switchboards Rated 600 Volts or Less.
  - 11. UL 489 - Protective Device Series Ratings.

### **1.6 SUBMITTALS**

- A. Submit as required here in and under Section 26 00 10.
- B. Submit nameplate schedule with proposed text and color coding for review.

### **1.7 EXTRA MATERIALS**

- A. Furnish under provisions indicated in Section 26 00 10.

### **1.8 PROJECT RECORD DOCUMENTS**

- A. Submit under provisions indicated in Section 26 00 10.

### **1.9 OPERATION AND MAINTENANCE DATA**

- A. Submit under provisions indicated in Section 26 00 10.
- B. O&M manuals shall include hard copies and electronic copies of the Final control program and operating instructions.

### **1.10 WARRANTY**

- A. Provide under provisions indicated in Section 26 00 10.

## **PART 2 - PRODUCTS**

- A. Refer to shop drawings for details of pre-purchased switchboards.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Receive, inspect, handle, and store switchboards according to NECA 400, NEMA PB 2.1 and NFPA 70B. Fill out forms for commissioning level 2.
- B. Examine switchboards before installation. Reject switchboards that are moisture damaged or physically damaged.
- C. Examine elements and surfaces to receive switchboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION**

- A. Install switchboards and accessories according to NECA 400, NEMA PB 2.1 and Manufacturer's instructions.
- B. Equipment Mounting: Install switchboards on concrete base, 4-inch (100-mm) nominal thickness. Comply with requirements for concrete base specified in Division 03.
  - 1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
  - 2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
  - 3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 4. Install anchor bolts to elevations required for proper attachment to switchboards.
- C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from switchboard units and components.
- D. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
- E. Operating Instructions: Frame and mount the printed basic operating instructions for switchboards, including control and key interlocking sequences and emergency procedures. Fabricate frame of finished wood or metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.
- F. Install filler plates in unused spaces of panel-mounted sections.
- G. Install overcurrent protective devices, transient voltage suppression devices, and instrumentation.
  - 1. Set field-adjustable switches and circuit-breaker trip ranges.
- H. Install spare-fuse cabinet.
- I. Comply with NECA 1.
- J. Mount the final electrical one line in each electrical form under plexiglass.

### **3.3 CONNECTIONS**

- A. Comply with requirements for terminating feeder bus specified in Division 26 Section "Enclosed Bus Assemblies." Drawings indicate general arrangement of bus, fittings, and specialties.
- B. Comply with requirements for terminating cable trays specified in Division 26 Section "Cable Trays for Electrical Systems." Drawings indicate general arrangement of cable trays, fittings, and specialties.
- C. All feeder phase, neutral and grounding conductors connections shall be two hole, long barrel compression fittings with an inspection window.
- D. Tighten accessible bus connections and mechanical fasteners after placing switchboard torque to manufacturer's and NRTL recommendations.

### **3.4 IDENTIFICATION**

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
- B. Switchboard Nameplates: Label each switchboard compartment with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
- C. Device Nameplates: Label each disconnecting and overcurrent protective device and each meter and control device mounted in compartment doors with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

### **3.5 FIELD QUALITY CONTROL**

- A. Testing Agency: A qualified testing agency shall perform tests and inspections.
- B. Refer to and perform tests in accordance with Section 26 08 13 Testing of Electrical Systems.
- C. Perform tests and inspections.
  - 1. Assist the factory-authorized service representative and the commissioning agent to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- D. Acceptance Testing Preparation:
  - 1. Test insulation resistance for each switchboard bus, component, connecting supply, feeder, and control circuit.
  - 2. Test continuity of each circuit.
- E. 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.
  - 3. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- F. Switchboard will be considered defective if it does not pass tests and inspections.

- G. Prepare test and inspection reports, including a certified report that identifies switchboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

### **3.6 ADJUSTING**

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as indicated and as specified in the Overcurrent Protective Device Coordination Study.
- C. Synchronize time in all devices that have internal clocks to local time within 1/100<sup>th</sup> of a second and to match BMS systems.

### **3.7 PROTECTION**

- A. Temporary Heating: Apply temporary heat, to maintain temperature according to manufacturer's written instructions, until switchboard is ready to be energized and placed into service.

### **3.8 DEMONSTRATION**

- A. Assist the factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain switchboards, overcurrent protective devices, instrumentation, and accessories, and to use and reprogram microprocessor-based trip, monitoring, and communication units.

### **3.9 INTEGRATED SYSTEMS TESTING**

- A. Provide support for Integrated Systems Testing (commissioning Level 5) in addition to and after successful completion of acceptance testing (Level 4).

**END OF SECTION**