SECTION 26 24 13

SWITCHBOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Switchboards.

B. Switchboard accessories.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete for supporting foundations and pads.

B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

C. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

D. Section 26 27 01 - Electrical Service Entrance.

E. Section 26 28 13 - Fuses.

F. Section 26 43 00 - Surge Protective Devices.

1.03 REFERENCE STANDARDS

A. ANSI C12.1 - American National Standard Code for Electricity Metering.

B. ANSI C39.1 - American National Standard Requirements for Electrical Analog Indicating Instruments.

C. IEC 60051-1 - Direct Acting Indicating Analogue Electrical Measuring Instruments and Their Accessories - Part 1: Definitions and General Requirements Common To All Parts;.

D. IEC 60051-2 - Direct Acting Indicating Analogue Electrical Measuring Instruments and Their Accessories - Part 2: Special Requirements for Ammeters and Voltmeters.

E. IEEE C12.1 - American National Standard Code for Electricity Metering; Institute of Electrical and Electronic Engineers.

F. IEEE C57.13 - IEEE Standard Requirements for Instrument Transformers; Institute of Electrical and Electronic Engineers.

G. NECA 400 - Standard for Installing and Maintaining Switchboards (ANSI); National Electrical Contractors Association.

H. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum); National Electrical Manufacturers Association.

I. NEMA PB 2 - Deadfront Distribution Switchboards; National Electrical Manufacturers Association.

J. NEMA PB 2.1 - General Instructions for Proper Handling, Installation, Operation, and Maintenance of Deadfront Distribution Switchboards Rated 600 Volts or Less; National Electrical Manufacturers Association.

K. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association.

L. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide electrical characteristics including voltage, frame size and trip ratings, fault current withstand ratings, and time-current curves of all equipment and components.

C. Shop Drawings: Indicate front and side views of enclosures with overall dimensions shown; conduit entrance locations and requirements; nameplate legends; size and number of bus bars per phase, neutral, and ground; and switchboard instrument details.

D. Test Reports: Indicate results of factory production tests.

E. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

F. Project Record Documents: Record actual locations of switchboards.

G. Maintenance Data: Include spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

H. Maintenance Materials: Furnish the following for Red Clay Consolidated School District's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Enclosure Keys: Two of each different key.

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver in 48 inch maximum width shipping splits, individually wrapped for protection and mounted on shipping skids.

B. 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.

C. Handle in accordance with NEMA PB 2.1 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.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Siemens Industry, Inc: www.sea.siemens.com.

B. Eaton Corporation; Cutler-Hammer Products: www.eaton.com.

C. Schneider Electric; Square D Products: www.schneider-electric.us.

D. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ↔SWITCHBOARDS

A. Description: NEMA PB 2 switchboard with electrical ratings and configurations as indicated and specified.

B. Ratings:
   1. Voltage: 120/208; 277/480 volts.
   2. Configuration: Three phase, four wire, grounded.
   3. Main Bus: 2000 amps.277/480 v, 2000 amps, 208/120v .
   4. Integrated Equipment Rating: 100000 rms amperes symmetrical.

C. Main Section Devices: Individually mounted and compartmented.

D. Distribution Section Devices: _Group mounted- double row sections.

E. Bus Material: Copper with tin plating, standard size.

F. Bus Connections: Bolted, accessible from front for maintenance.

G. Fully insulate load side bus bars

H. Ground Bus: Extend length of switchboard.

I. Insulated Ground Bus: Extend length of switchboard.

J. Molded Case Circuit Breakers: Integral thermal and instantaneous magnetic trip in each pole.
   1. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.
   2. Include shunt trip where indicated.

K. Solid-State Molded Case Circuit Breakers: With electronic sensing, timing and tripping circuits for adjustable current settings; UL listed.
   1. Ground fault trip, ground fault sensing integral with circuit breaker.
   2. Instantaneous trip.
   3. Adjustable short time/ long time trip.
   4. Stationary mounting.
   5. Include shunt trip where indicated.

L. Line and Load Terminations: Accessible from the front only of the switchboard, suitable for the conductor materials and sizes indicated.

M. Ground Fault Sensor: Zero sequence type.

N. Ground Fault Relay: Adjustable ground fault sensitivity from 200 to 1200 amperes, time delay seconds. Provide monitor panel with lamp to indicate relay operation, TEST and RESET control switches.

O. Future Provisions: Fully equip spaces for future devices with bussing and bus connections, suitably insulated and braced for short circuit currents. Provide continuous current rating as indicated.

P. Enclosure: Type _NEMA 1-Indoors.
   1. Align sections at front and rear.
   2. Switchboard Height: 91.5 inches, excluding floor sills, lifting members and pull boxes.
   3. Finish: Manufacturer's standard light gray enamel over external surfaces. Coat internal surfaces with minimum one coat corrosion-resisting paint, or plate with cadmium or zinc.
   4. Structure: Free standing, self supporting, totally front accessible.

2.03 SURGE PROTECTIVE DEVICES

A. See Section 26 43 00 for factory-installed, internally mounted surge protective devices. List and label switchboards containing surge protective devices as a complete assembly including surge protective device.

2.04 POWER METERS

A. Manufacturers:
   1. Square D - Powerlogic Series 800 power meters or equal.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Watt-Hour Meters and Wattmeters: ANSI C12.1, three phase induction type with two stators, each with current and potential coil, rated 5 amperes and 120 volts at 60 Hertz.
   1. Meter suitable for connection to 3- and 4-wire circuits.
   2. Potential indicating lamps.
   3. Adjustments for light and full load, phase balance, and power factor.
   4. Digital register.
   5. Integral demand indicator.
   6. Ratchets to prevent reverse rotation.
   7. Removable meter with draw-out test plug.
   8. Semi-flush mounted case with matching cover.

C. Provide meters with appropriate multiplier tags.

2.05 METERING TRANSFORMERS

A. Manufacturers:
   1. Square D or equal.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Current Transformers: IEEE C57.13, 5 ampere secondary, wound; bushing; bar or window type, with single secondary winding and secondary shorting device, primary/secondary ratio as required, burden and accuracy consistent with connected metering and relay devices, 60 Hertz.

C. Potential Transformers: IEEE C57.13, 120 volt single secondary, disconnecting type with integral fuse mountings, primary/secondary ratio as required, burden and accuracy consistent with connected metering and relay devices, 60 Hertz.

2.06 SOURCE QUALITY CONTROL

A. Shop inspect and test switchboard according to NEMA PB 2.

B. Make completed switchboard available for inspection at manufacturer's factory prior to packaging for shipment. Notify Red Clay Consolidated School District at least 7 days before inspection is allowed.

PART 3 EXECUTION

3.01 PREPARATION

A. Provide concrete housekeeping pad under the provisions of Section 03 30 00.

B. Verify that field measurements are as instructed by manufacturer.

3.02 INSTALLATION

A. Install switchboard in locations shown on drawings, according to NEMA PB 2.1.

B. Install in a neat and workmanlike manner, as specified in NECA 400.

C. Tighten accessible bus connections and mechanical fasteners after placing switchboard.

D. Identify switchboards in accordance with Section 26 05 53.

3.03 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01 40 00.

B. Inspect and test in accordance with NETA STD ATS, except Section 4.

C. Perform inspections and tests listed in NETA STD ATS, Section 7.1.

3.04 ADJUSTING

A. Adjust all operating mechanisms for free mechanical movement.

B. Tighten bolted bus connections in accordance with manufacturer's instructions.

C. Adjust circuit breaker trip and time delay settings to values indicated.

D. Adjust circuit breaker trip and time delay settings to values as instructed by Architect.

3.05 CLEANING

A. Touch up scratched or marred surfaces to match original finish.

END OF SECTION