

SECTION 26 1116
SECONDARY UNIT SUBSTATIONS

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. IEEE C37.04 - IEEE Standard Rating Structure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis; 2005 (R2007).
- B. IEEE C57.12.00 - IEEE Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers; 2010.
- C. IEEE C57.12.28 - IEEE Standard for Pad-Mounted Equipment -- Enclosure Integrity; 2014.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Eaton Corporation; _____: www.eaton.com.
- B. General Electric Company; _____: www.geindustrial.com.
- C. Schneider Electric; Square D Products; _____: www.schneider-electric.us.

2.02 UNIT SUBSTATIONS

- A. Description: Secondary unit substation comprising air terminal primary section, transformer section, and medium-voltage switchgear secondary section.
- B. Configuration: Radial type, with indoor-outdoor arrangement.

2.03 SERVICE CONDITIONS

- A. Meet requirements for usual service conditions and for the specified unusual service conditions.

2.04 PRIMARY CIRCUIT BREAKER RATINGS

2.05 TRANSFORMER RATINGS

2.06 INCOMING SECTION EQUIPMENT

2.07 LIQUID-FILLED TRANSFORMERS

- A. Liquid-Filled Transformers: IEEE C57.12.00, three phase, pad mounted, self-cooled transformer unit.
- B. Cooling and Temperature Rise: IEEE C57.12.00; Class OA. 55 degrees C, self-cooled.
- C. Insulating Liquid: Oil.

2.08 OUTGOING SECTION EQUIPMENT

2.09 POWER CIRCUIT BREAKERS AND CIRCUIT BREAKER SWITCHGEAR

- A. Circuit Breaker: IEEE C37.04.
- B. Circuit Breaker Operator: Spring-charged stored energy with electric operator.
- C. Rated Maximum Voltage: 15.0 kV.
- D. Rated Voltage Range Factor: 1.3.
- E. Rated Frequency: 60 Hz.

2.10 PROTECTIVE RELAYS AND INSTRUMENTS

- A. Protective Relays: Provide relaying instruments as indicated for each circuit breaker.

2.11 FABRICATION

- A. Enclosure: Conform to the requirements of IEEE C57.12.28.
- B. Construction: Indoor.
- C. Main Bus: Copper.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install substation plumb and level and with each section aligned properly.
- B. Make electrical connections between equipment sections using connectors furnished by manufacturer.

END OF SECTION

SECTION 26 1200
MEDIUM-VOLTAGE TRANSFORMERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Liquid-filled pad-mounted distribution transformers.
- B. Dry-type pad-mounted distribution transformers.

1.02 REFERENCE STANDARDS

- A. IEEE 386 - IEEE Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600 V; 2011.
- B. IEEE C57.12.00 - IEEE Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers; 2010.
- C. IEEE C57.12.01 - IEEE Standard for General Requirements for Dry-Type Distribution and Power Transformers; 2015.
- D. IEEE C57.12.90 - IEEE Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers and IEEE Guide for Short Circuit Testing of Distribution and Power Transformers; 2010.
- E. IEEE C57.12.91 - IEEE Test Code for Dry-Type Distribution and Power Transformers; 2011.
- F. IEEE C57.94 - IEEE Recommended Practice for Installation, Application, Operation, and Maintenance of Dry-Type General Purpose Distribution and Power Transformers; 1982 (R2006).
- G. NEMA 260 - Safety Labels for Padmounted Switchgear and Transformers Sited in Public Areas; 1996 (2004).
- H. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.
- I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 SUBMITTALS

- A. Shop Drawings: Indicate electrical characteristics and connection requirements, outline dimensions, connection and support points, weight, specified ratings and materials.
- B. Product Data: Provide electrical characteristics and connection requirements, standard model design tests, and options.
- C. Project Record Documents: Include copy of manufacturer's certified drawings.

1.04 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect dry-type transformers from moisture by using appropriate heaters as instructed by the manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Cooper Power Systems, a division of Eaton Corporation: www.cooperindustries.com.
- B. General Electric Company: www.geindustrial.com.
- C. Schneider Electric; Square D Products: www.schneider-electric.us.
- D. Siemens Industry, Inc: www.usa.siemens.com.

2.02 LIQUID-FILLED TRANSFORMERS

- A. Liquid-Filled Transformers: IEEE C57.12.00, three phase, pad-mounted, self-cooled transformer unit.
- B. Cooling and Temperature Rise; IEEE C57.12.00; Class OA. 55 degrees C, self-cooled.
- C. Insulating Liquid: Oil.

2.03 DRY-TYPE TRANSFORMERS

- A. Dry-Type Transformers: IEEE C57.12.01; single phase, pad-mounted, self-cooled transformer unit with solid-cast windings.
- B. Cooling and Temperature Rise: IEEE C57.12.01; Class AA. 220 degree C insulation class with 150 degree C rise over 40 degree C ambient.

2.04 ACCESSORIES

- A. Primary Terminations: Bushing wells to IEEE 386; provide three for radial feed. Include bushings for insulated loadbreak connectors.
- B. Primary Switching: Fused air switch, gang operated.
- C. Secondary Terminations: Spade lugs.

2.05 SOURCE QUALITY CONTROL

- A. Provide factory tests to IEEE C57.12.91 and IEEE C57.12.01. Include the routine tests as defined in the standards and the following other tests:

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with IEEE C57.94.
- B. Install plumb and level.
- C. Install safety labels to NEMA 260.

3.02 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.2. In addition to the basic requirements of Section 7.2, include the following:

3.03 ADJUSTING

- A. Adjust primary taps so that secondary voltage is above and within 2 percent of rated voltage.

END OF SECTION

SECTION 26 1300
MEDIUM-VOLTAGE SWITCHGEAR

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Circuit breaker switchgear.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Pads for transformer support.

1.03 REFERENCE STANDARDS

- A. IEEE C37.04 - IEEE Standard Rating Structure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis; 2005 (R2007).
- B. IEEE C37.20.1 - IEEE Standard for Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear; 2002 (R2007).
- C. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate electrical characteristics and connection requirements, outline dimensions, connection and support points, weight, specified ratings and materials.
- C. Manufacturer's Installation Instructions.
- D. Project Record Documents: Include copy of manufacturer's certified drawings.
- E. Maintenance Data: Include maintenance instructions for cleaning methods; cleaning materials recommended; instructions for circuit breaker removal, replacement, testing and adjustment, and lubrication.

1.05 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Eaton Corporation: www.eaton.com.
- B. General Electric Company: www.geindustrial.com.
- C. Schneider Electric; Square D Products: www.schneider-electric.us.

2.02 DESCRIPTION

- A. Switchgear: IEEE C37.20.1, metal-clad switchgear assembly including horizontal draw-out circuit breakers in free-standing cubicles formed into an integrated structure.

2.03 SERVICE CONDITIONS

- A. Meet requirements for usual service conditions described in IEEE C37.20.1 and for the specified unusual service conditions.
- B. Meet requirements for use as service disconnecting means.

2.04 CIRCUIT BREAKERS

- A. Circuit Breaker: IEEE C37.04, air-magnetic type.
- B. Circuit Breaker Operator: Spring-charged stored energy with electric operator.

2.05 PROTECTIVE RELAYS AND INSTRUMENTS

- A. Protective Relays: Provide relaying instruments as indicated for each circuit breaker.

2.06 ACCESSORIES

- A. Surge Arrestors: Station class, rated _____ kV; mount in incoming line compartment.
- B. Circuit Breaker Lifting Device: Portable, floor supported, elevating carriage with a roller base, for movement of circuit breakers in and out of switchboard structure.

2.07 FABRICATION

- A. Construction: Indoor.
- B. Main Bus: Aluminum.

2.08 FACTORY FINISHES

- A. Clean surfaces before applying paint.
- B. Apply corrosion-resisting primer to all surfaces.
- C. Apply finish coat of baked enamel paint to 2 mils thick.
- D. Finish Color: Manufacturer's standard gray finish.

2.09 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Test in accordance with IEEE C37.20.1.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that support pads furnished under Section 03 3000 are ready to receive products.
- B. Verify that field measurements are as indicated on shop drawings.

3.02 INSTALLATION

- A. Install in accordance with IEEE C37.20.1.
- B. Install switchgear plumb and level and with each section aligned properly.
- C. Make electrical connections between equipment sections using connectors furnished by manufacturer.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.1 and 7.6.

3.04 ADJUSTING

- A. Adjust protective relays in accordance with recommendations in Owner's coordination study.
- B. Adjust protective relays as directed.

3.05 CLOSEOUT ACTIVITIES

- A. Demonstrate operation of circuit breakers.

END OF SECTION

SECTION 26 1321
AIR INTERRUPTER SWITCHES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Medium-voltage air interrupter switches.
- B. Medium-voltage fuses.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete pads and foundations.
- B. Section 26 0573 - Power System Studies: Additional criteria for the selection and adjustment of equipment and associated protective devices specified in this section.

1.03 REFERENCE STANDARDS

- A. IEEE C37.20.3 - IEEE Standard for Metal-Enclosed Interrupter Switchgear (1 kV-38 kV); 2013.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate outline dimensions, enclosure construction, shipping splits, lifting and supporting points, electrical single line diagram, and equipment electrical ratings.

1.05 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Eaton Corporation; _____: www.eaton.com.
- B. General Electric Company; _____: www.geindustrial.com.
- C. Schneider Electric; Square D Products; _____: www.schneider-electric.us.
- D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 AIR INTERRUPTER SWITCHES

- A. Description: IEEE C37.20.3, switchgear assembly of individual air interrupter switches in free-standing cubicles, securely bolted together to form an integrated structure, suitable for installation where accessible by general public.
- B. Enclosure: Indoor.
 - 1. Include continuous ground bus through switchgear assembly, securely connected to frame of each cubicle.
 - 2. Finish: Manufacturer's standard baked enamel paint 2 mils thick.

2.03 COMPONENTS

- A. Interrupter Switch: Nonfused two position load interrupter switch.

2.04 ACCESSORIES

- A. Surge Arrestors: Station class, rated ____ kV; mount in incoming line compartment.
- B. Incoming Cable Terminations: Clamp-type.
- C. Electric Switch Operator: 48 volts AC; operable manually with removable handle or through motor and gear train. Interlock fuse compartment door to prevent opening with switch in CLOSED position.

2.05 MEDIUM-VOLTAGE FUSES

- A. Manufacturers:

1. Bussmann, a division of Eaton Corporation; _____: www.cooperindustries.com.
2. Littelfuse, Inc; _____: www.littelfuse.com.
3. Substitutions: See Section 01 6000 - Product Requirements.

- B. Description: Enclosed current limiting, non-expulsion type suitable for use indoors in enclosure.
- C. Fuse Rating: E rated fuse, size as indicated.
- D. Voltage: 2.4 kV.

2.06 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Provide factory inspection and testing in accordance with IEEE C37.20.3.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install on concrete pad as indicated on Drawings.

3.02 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.

END OF SECTION