

Specification Number: 26 11 13.10

Product Name: UNIT SUBSTATION (ARTICULATED)

SECTION 26 11 13.10

UNIT SUBSTATION (ARTICULATED)

A unit substation consists of one or more transformers, an incoming section (primary), and distribution section(s) (secondary). The equipment is designed and coordinated mechanically and electrically. Each section is assembled as multiple self-enclosed pieces to be assembled in the field.

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Primary Unit Substation - secondary voltage rated above 1000 V.
- B. Secondary Unit Substation - secondary voltage rated 1000 V and below.

1.02 RELATED SECTIONS

- A. Section 16270-2 - Transformers, Substation
- B. Section 16460 - Transformers, Lighting and Distribution
- C. Section 16340-1 - Switchgear, Medium Voltage Metal-Clad
- D. Section 16430-1 - Switchgear, Low Voltage Metal Enclosed Drawout
- E. Section 16345-1 - Motor Controllers, Medium Voltage
- F. Section 16340-2 - Switchgear, Medium Voltage, Metal-Enclosed, Air Interrupter
- G. Section 16340-3 - Switchgear, Medium Voltage, Metal-Enclosed, Vacuum Interrupter
- H. Section 16340-2 - Switchgear, Medium Voltage, Metal-Enclosed, Compact and Compartmentalized
- I. Section 16440-2 - Switchboards
- J. Section 16410-1 - Disconnect Switches, Fused Power Circuit Device (Bolt Pressure)
- K. Section 16450-1 - Busway, Feeder and Plug-in
- L. Section 16450-2 - Busway, Metal-Enclosed (Nonsegregated Phase)
- M. Section 16410-5 - Circuit Breakers, Low Voltage Air Power, Drawout
- N. Section 16490-1 - Circuit Breakers, Molded Case
- O. Section 16443 - Motor Control Centers, Low Voltage
- P. Section 16440-5 - Ground Fault Protection Systems
- Q. Section 16290-3 - Power Monitoring and Control Systems
- R. Section 16050-1 - Outdoor Electrical Equipment Housing

1.03 REFERENCES

- A. ANSI C37.121.1989 - Unit Substations, Requirements
- B. In applying unit substations, consider the service (environmental) conditions, system conditions, installation conditions and load requirements as outlined in Section 11 of ANSI C37.121-1989.
- C. Typical arrangements of unit substations are listed in Section 10 of ANSI C37.121-1989.

1.04 SUBMITTALS

- A. Submit shop drawings indicating the following:
 - Front view of enclosure with overall dimensions
 - Single line diagram
 - Top and bottom conduit entrance / exit locations with dimensions
 - Electrical characteristics of the primary equipment, transformer, and secondary equipment
 - Specified ratings
 - Bill-of-material
 - Shipping splits and weights
 - Wiring diagrams (if applicable)
 - Operational instructions for keylock schemes, throw-over schemes, and other special instructions
- B. Submit product data for each component and accessory specified.

1.05 OPERATION AND MAINTENANCE DATA

- A. Submit recommended spare parts list.

1.06 QUALIFICATIONS

- A. The unit substation shall be manufactured by a single manufacturer with a minimum of [10] [] years of [documented] experience thereby providing a single source of supply and responsibility for warranty, technical services, and parts.
- B. The unit substation shall be designed and assembled by a single source as multiple pieces of

equipment and coordinated to create a single product when it is installed at the jobsite.

1.07 STORAGE AND HANDLING

- A. Off load the equipment per the manufacturer's instructions.
- B. Upon arrival, inspect for any shipping damage. Note any damage on the accompanying paperwork, and report to the manufacturer's local representative what was delivered damaged.
- C. Store and protect products from moisture and debris by storing in a clean, dry heated space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect the unit substation components. Provide auxiliary heating in the sections in accordance with the manufacturer's recommendations.

PART 2 PRODUCT

2.01 MANUFACTURERS

- A. The [primary unit substation] [secondary unit substation] shall be manufactured by Square D Company or approved equal.

2.02 UNIT SUBSTATION

- A. These specifications and the associated drawings describe one [single-ended] [double-ended], _____ kVA, 3-phase, 60-cycle unit substation. The sound level of the unit substation shall not exceed _____ dB when the transformer is self-cooled and _____ dB when cooling fans are running. Any items not specifically mentioned but obviously necessary for proper operation are implied in this description.
- B. Service Data: _____ kV, _____ Hz, available fault current _____ kA symmetrical.
- C. System Grounding: [solidly grounded] [resistance/impedance grounded] [ungrounded]
- D. The unit substation consists of three sections: the primary incoming line section, transformer section, and the secondary distribution section. These sections are to be integrated to form a single lineup of metal enclosed structures with metal barriers separating the incoming section from the transformer and the secondary from the transformer. The manufacturer is to furnish the necessary hardware, cable(s) wires and connectors to complete the unit substation's interconnections.
- E. The equipment shall be totally adjusted and tested at the factory and sectionalized for shipment.
- F. The enclosure shall be [indoor, NEMA 1, non-walk-in] [outdoor NEMA 3R, non-walk-in] [outdoor NEMA 3R, walk-in] [Square D POWER ZONE Center, outdoor electrical equipment housing] type. The enclosure shall be fabricated of code gauge steel.
- G. There is [front] [left side] [right side] [rear] access to the unit substation.
- H. The largest shipping split requirement is ___ in W x ___ in D x ___ in H.
- I. Cables enter the [top] [bottom] of the incoming section and exit the [top] [bottom] [top and bottom] of the secondary distribution section(s).
- J. Incoming cable data: _____ kcmil, _____ per phase
- K. Incoming cable termination: [provisions only] [mechanical lugs] [compression lugs] [roof bushings] [pothead termination] [busway].
- L. Provide manufacturer's standard secondary distribution equipment lug connectors to terminate cables per the specifications and plans.
- M. The unit substation shall be painted the manufacturer's [standard paint of ANSI 49] [optional paint of ANSI 61].
- N. The manufacturer will provide [a nameplate depicting the single line diagram of the entire unit substation] [plastic mimic bus] [painted mimic bus].
- O. All nameplates (when required) are to be provided [with a white background with 3/16 inch high black letters] [as specified]. Nameplates should be mounted with [screws] [pop-rivets].
- P. The necessary control power shall be provided by the [customer] [manufacturer]. If the manufacturer is supplying the control power the control transformer will be provided in the secondary distribution section for use in the entire unit substation. The manufacturer will provide the necessary terminal blocks and wiring to complete the circuitry. The wiring diagrams and terminal blocks will be identified so installation will be relatively simple.

2.02 INCOMING (PRIMARY) SECTION

- A. Medium Voltage Metal-Clad Switchgear - Refer to Section 16340-1
- B. Medium Voltage Metal-Enclosed Load Interrupter (Air) Switchgear - Refer to Section 16340-2
- C. Medium Voltage Metal-Enclosed Load Interrupter (Vacuum) Switchgear - Refer to Section 16340-3
- D. Medium Voltage Metal-Enclosed Load Interrupter (Compact/Compartmentalized) Switchgear - Refer to Section 16340-2.2
- E. Low voltage Drawout Switchgear - Refer to Section 16430

F. Low voltage Switchboards with Drawout / Fixed Mounted switches or breakers - Refer to Section 16440

2.03 TRANSFORMER SECTION

PRIMARY UNIT SUBSTATION

- A. Power-Dry (TM) VPI dry-type transformer - Refer to Section 16270-2.1
- B. Power-Cast® cast coil transformer - Refer to Section 16270-2.3
- C. Liquid filled transformer - Refer to Section 16270-2.2

SECONDARY UNIT SUBSTATION

- A. Power-Dry VPI dry-type transformer - Refer to Section 16270-2.1
- B. Power-Cast cast coil transformer - Refer to Section 16270-2.3
- C. Liquid filled transformer - Refer to Section 16270-2.2
- D. Uni-Cast (TM) cast coil transformer - Refer to Section 16270-2.3

2.04 OUTGOING (DISTRIBUTION) SECTION

- A. Medium Voltage Metal-Clad Switchgear - Refer to Section 16340-1
- B. Medium Voltage Metal-Enclosed Load Interrupter (Air) Switchgear - Refer to Section 16340-2
- C. Medium Voltage Metal-Enclosed Load Interrupter (Vacuum) Switchgear - Refer to Section 16340-3
- D. Medium Voltage Metal-Enclosed Load Interrupter (Compact/Compartmentalized) Switchgear - Refer to Section 16340-2.2
- D. Low voltage Drawout switchgear - Refer to Section 16430
- E. Low Voltage Switchboard with Drawout / Fixed Mounted switches or breakers - Refer to Section 16440
- F. Medium Voltage Motor Control Centers - Refer to Section 16345-1
- G. Low Voltage Motor Control Centers - Refer to Section 16443

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that equipment is ready to be installed.
- B. Verify field measurements are as shown on the composite drawings supplied by the manufacturer.
- C. Verify that required utilities are available, in proper location and ready for use.
- D. Beginning of installation means installer has completed the above and accepts the conditions.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions for the incoming, transformer, and secondary sections.
- B. Install safety labels where required.

3.03 FIELD QUALITY CONTROL

- A. Test the incoming section, transformer section, and secondary section per the applicable manufacturer's instructions and referenced standards.
- B. All connections made in the field to assemble the unit substation should be made in strict accordance with the manufacturer's instructions.

3.04 ADJUSTING

- A. Adjust the primary taps of the transformer so the secondary voltage is within 1/2% of the rated voltage.
- B. Installer to ensure all [trip units] [protective devices] are adjusted [per the system study] [as shown in specifications] to provide adequate over current protection and selective tripping with downstream protective devices.

END OF SECTION