USE: Primary Metering at 2.4kV to 13.8kV

PRIMARY METERED SERVICE



1. PURPOSE

These electric service requirements provide information necessary for metering customers receiving power at primary voltages.

2. APPLICABILITY

This document applies to all customers receiving service at voltages from 2.4kV to 13.8kV. For service at higher voltages, contact the Service Provider Commercial Account Services Department. Availability of primary metered service is at the sole discretion of the Service Provider. Consult with the Service Provider Design Department prior to initiating the project.

3. DEFINITIONS

Distribution System: The infrastructure constructed, operated, and maintained by the Service Provider to deliver electric service to retail customers at 13.8kV and less.

Point of Delivery: The physical location where Service Provider conductors and equipment are connected to Customer conductors.

Point of Service: The physical location where Customer owned facilities terminate and equipment is maintained by the Customer.

Primary Metering: Metering installed at service voltages above 600 volts.

4. STANDARDS

All customer equipment shall conform to the nationally-recognized standards and recommended practices. These include, but are not limited to:

- a. NFPA 70 National Electric Code (NEC)
- b. IEEE C2 National Electical Safety Code (NESC)
- c. Electric Utility Service Entrance Requirements Committee (EUSERC) Manual
- 5. CUSTOMER RESPONSIBILITIES
 - a. Make primary service application to Service Provider and receive approval for location, equipment, and design prior to installation of the service equipment.
 - b. For underground service, furnish detailed drawings of the service conductor termination and metering sections for review and approval by Service Provider.
 - c. Furnish, install, and maintain all service entrance facilities at the point of delivery including any equipment used to house Service Provider instrument metering transformers.
 - d. Provide easements as applicable.
 - e. Sign and return high voltage release document and all contracts.

6. SERVICE PROVIDER RESPONSIBILITIES

- a. Specify the location and voltage for point of delivery. Note: Service Provider distribution system may not be configured to provide the specific primary service requested by the Customer.
- b. Furnish, install, and maintain all primary service conductors and terminations up to the point of delivery.
- c. Furnish, install, and maintain the primary service and metering equipment in accordance with applicable rules, regulations, and rates.



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USE: Overhead Primary Metering at 2.4kV to 13.8kV

PRIMARY METERED SERVICE



7. PROCESS TO ESTABLISH OVERHEAD PRIMARY SERVICE

- a. Customer submits application for new service with Service Provider Design Department.
- b. Service Provider specifies location of primary service.
- c. Customer provides any necessary easements to Service Provider.
- d. Customer installs point of service pole, anchor, disconnect, overhead slack span conductors and all related equipment as specified in the Technical Requirements section of this document.
- e. Customer notifies Service Provider that installation is complete.
- f. Service Provider Design Department inspects and approves Customer installation and releases work orders to install point of delivery pole, primary service line and meter termination cabinet.
- g. Service Provider line construction crew installs primary line to Company point of delivery pole and terminates Customer overhead slack span conductors. Crew also installs pole-mounted primary meter instrument transformer cluster. Primary service remains de-energized and grounded.
- h. Service Provider Metering Department completes metering wiring.
- i. Service Provider Design Department performs final inspection and releases the meter set order if all requirements are met.
- j. Service Provider Metering Department and Customer's electrical contractor meet on site to set the meter and energize the service.

8. TECHNICAL REQUIREMENTS - OVERHEAD PRIMARY SERVICE

- a. Point of service pole installation, including all required related material, shall be as shown in the construction drawing in Figure 1.
- b. Customer must guy and anchor point of service pole, install disconnect and provide customer owned overhead slack span conductors to attach at Company point of delivery pole.

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PRIMARY METERED SERVICE



9. PROCESS TO ESTABLISH UNDERGROUND PRIMARY SERVICE

- a. Customer submits application for new service with Service Provider Design Department.
- b. Service Provider specifies location of primary service.
- c. Customer provides any necessary easements to Service Provider.
- d. Customer submits drawings of primary service enclosure for review and approval by Service Provider. Drawings shall include equipment plan and elevation views of the external equipment and front and side internal elevation equipment views with dimensions. Switchgear manufacturer drawings are sufficient if they provide the required details.
- e. Customer provides and installs the switchgear and any necessary conduit from the Service Provider riser pole or pad-mount equipment to the primary service enclosure. Metering equipment will not be installed on a pole for an underground service, all metering equipment must be contained within the switchgear.
- f. Customer notifies Service Provider that installation is complete.
- g. Service Provider Design Department inspects and approves customer installation and releases work orders to install primary service line.
- h. Service Provider line construction crew terminates underground primary service cable (customer owned) from the designated Service Provider protective device to the primary service switchgear. Primary service remains de-energized and grounded.
- i. Service Provider Metering Department installs instrument transformers and meter wiring.
- j. Service Provider Design Department verifies completion of necessary Service Provider work and releases meter set work order.
- k. Service Provider Metering Department, Line Construction Department, and Customer's electrical contractor meet on site to set the meter and energize the service.
- 10. TECHNICAL REQUIREMENTS UNDERGROUND PRIMARY SERVICE
 - a. General

Primary service enclosure shall be metal-clad switchgear built to the standards developed by EUSERC. Refer to Figure 2 below for specific dimensional information.

- b. Weatherproofing and Locking
 - Outdoor enclosures shall meet NEMA 3R and ANSI requirements.
 - Outdoor enclosures shall have a weatherproof outer door equipped with a three-point latching handle that can accommodate a Service Provider padlock.
 - Meter panel or door shall be hinged on the side opposite that of the weatherproof outer door to permit a 90 degree opening with the meter and test facilities in place.
 - The weatherproof outer door shall be equipped with a device to hold the door open to 90 degrees or more.
 - The weatherproof door may be omitted for equipment located indoors. In this case, the meter panel or door must be lockable.
- c. Ventilation Openings

Ventilation openings shall be provided as per NEMA standard and shall be louvered or screened and guarded with internal barriers to prevent access to energized parts.



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10. TECHNICAL REQUIREMENTS - UNDERGROUND PRIMARY SERVICE (CONT.)

d. Working Space Around Primary Service Enclosures

Medium-voltage switchgear shall be installed with 5 feet of clear, level-standing, working space in the front, rear, or side of any section supporting or providing access to metering, testing equipment, or service cable termination sections.

e. Basic Impulse Level (BIL) Rating

BIL for the metering enclosure shall not be less than that for the customer's associated switchgear. Standard Service Provider voltages are three-phase 4.16kV, 13.2kV, and 13.8kV, depending on location. For 4.16kV primary service, equipment BIL shall be 60kV; for 13.2kV or 13.8kV primary service, equipment BIL shall be 95kV.

- f. Service Cable Termination
 - Underground service cable conduit shall enter the primary service enclosure from the bottom.
 - One landing position shall be provided on each phase and neutral bus for each 400 amps, or portion thereof, of service ampacity.
 - Two 1/2 inch steel bolts on 1-3/4 inch vertical centers shall be provided for each landing position, see Figure 3. These bolts, 2 inches in length, shall be provided with nuts, flat washers, and pressure maintaining spring washers. All parts shall be plated to prevent corrosion.



FIGURE 3 Landing Terminal Detail

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PRIMARY METERED SERVICE



TECHNICAL REQUIREMENTS - UNDERGROUND PRIMARY SERVICE (CONT.) 10.

- Bus Bars and Conductors α.
 - Only copper or plated aluminum bus shall be used in the metering and terminating enclosures. Aluminum bus shall be identified with the plating process where the service cables terminate and the current transformers are mounted.
 - Maximum bus size shall be 3/8 inch by 4 inches; minimum bus size shall be 1/4 inch by 2 inches unless otherwise indicated on specific drawings.
 - Bus installation for current transformers (CTs): When the main switch or circuit breaker enclosure is adjacent to and on the source side of the metering enclosure, connections from the load side of the main switch or circuit breaker to the line side of the current transformers shall be made using bus bars.
 - Conductors passing through compartment walls: Where buses or conductors pass through compartment walls, through-the-wall bushings or insulated construction with full-voltage rating of the switchgear may be used.
 - Vertical bus in the pull section and CT compartment shall be spaced 12-inches on centerlines between phases and the center phase shall be on the enclosure centerline.
 - Bused thru-wall insulators for phase and neutral voltage transformer (VT) taps are to be furnished with lugs on the VT compartment side. Cables or bus conductors may be furnished for the taps to the fuse carriage and to the VT compartment, maintaining bare bus clearance.
 - The neutral termination bus shall be insulated from the metering cubicle
- Safety Grounding Provisions h.

Ball studs (1/2 inch-13 threads with insulating covers) for the attachment of Service Provider safety grounds shall be provided on the line and load side of the current transformer bus units. The studs shall be located no less than 7 inches from the end of the bus unit and oriented toward the compartment access opening.

- Instrument Transformer Mounting Bases and Bus Links İ.
 - Voltage transformer (VT) and adjustable current transformer (CT) mounting platforms are to be provided by the manufacturer. Bus drilling and spacing shall accommodate the ampere rating of 15kV class CTs.
 - VT mounting: The front or leading set of VT mounting holes shall be 9 inches from the VT compartment door.
 - CT and bus link mounting: CT bus units shall be drilled and spaced to accept the current transformers of the proper rating and class and permit installation and removal of individual transformers without disturbing adjacent transformers. Center bus shall include a removable link dimensioned the same as the CT base on the metered phases. See Figure 4 for additional detail.
 - Phase and neutral taps for fuses and VTs: Lugs for VT phase and neutral connections shall be provided in the VT compartment.
 - VT fusing: Manufacturer shall provide mounting clips for indoor current-limiting fuses, nominal voltage rating 14,000V, current range 0.5 to 0.3 amps. The mounting clip separation shall be 11-1/2-inches on center, fuse ferrule diameter shall be 1-5/8-inches.
 - Instrument transformer compartment or cabinet shall be used solely for Service Provider equipment. The compartment or cabinet shall not be used as a raceway for customer load conductors, other service conductors, or any other customer equipment.



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10. TECHNICAL REQUIREMENTS - UNDERGROUND PRIMARY SERVICE (CONT.)

- j. VT Disconnect Requirements
 - Kirk Key interlocking is required between the VT disconnect and the VT compartment door so that, for personnel safety, the VT compartment cannot be entered until the following conditions are met: (1) the disconnect is fully open and visibly grounded, (2) when the VT disconnect is fully open, the disconnect blades must ground automatically, and (3) the disconnect is locked open with a key interlock system.
 - The interlock system must prevent closing of the disconnect without first closing and locking the VT compartment. Two keys shall be provided.
 - Primary contacts for the VT disconnect shall be of the blade and jaw design or equivalent to assure continued adequate contact. Wiping contact or pressure contact is not acceptable.
 - Operating handle or lever of the VT disconnect switch shall be padlockable in the closed position.
 - VT disconnect shall be tapped on the supply side of the utility metering CTs.
 - The VT compartment door shall provide unobstructed access to the VTs and fuses.
 - VT disconnect shall have minimum voltage and BIL ratings equal to the equipment supplied.
- k. Switchgear Metering Section
 - Meter panel and hinges shall be designed to adequately support a 25-pound load applied to the unsupported end with 1/8 inch maximum sag when open. Bond meter door to switchgear enclosure with a #4 AWG flexible braided bond wire. Panel layout shall be as shown in EUSERC Drawing 408, see Figure 5.
 - As an alternative, the meter panel may be mounted in front of the CT/Termination compartment, provided that when the meter panel is opened, the compartment is fully isolated by a removeable or hinged barrier.
 - All external and internal doors providing access to the CT bus including the outer door, meter panel door, and hinged barrier shall be equipped with a device to hold them open at 90 degrees or more.
 - Customer shall furnish and install a 13-terminal meter socket(s) designed for back connections. Customer shall also furnish and install a test switch (Superior Cat. No. 1058-F or exact equivalent) and a cover for the test switch (Superior Cat. No. 7943BC or exact equivalent). Note: the test switch and cover are not supplied by the switchgear manufacturer.

FIGURE 5

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PRIMARY METERING

10. TECHNICAL REQUIREMENTS - UNDERGROUND PRIMARY SERVICE (CONT.)

I. Sealing of Metering and Pull Sections

Service termination pull sections and metering sections shall be fully enclosed. All hinged panels that will give access to these sections or to any secondary meter wiring shall be sealable. Bus ports through the side barriers of the metering section shall be closed with phenolic barriers or otherwise arranged to prevent access to the metering section.

m. Utility Compartment Labeling

Compartments of the metering enclosure shall be permanently labeled with machine engraved laminated phenolic (or equal) tags. Tags shall have 1/4 inch white letters and numbers on red colored material that is readily visible and mechanically attached to the face of the following designated compartment(s). In addition, each panel of the switchgear shall be labeled, using at least 1 inch white letters and numbers, stating the utility serving voltage, e.g., 13800Y/7900-volts or 4160Y/2400-volts.

- Utility voltage transformer (VT) compartment
- Utility voltage transformer (VT) fuse compartment
- Utility service termination compartment
- Utility metering panel.

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