

## ELECTRIC METER INSTALLATIONS

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### 500. General

Removal, relocation, or performing any work on an electric meter without the Company's permission is prohibited. Tampering with the Company's metering equipment, making an unmetered connection, or making an unauthorized reconnection to the Company's system is prohibited. The penalties for such activities may include fines and imprisonment.

- A. Before ordering or installing electrical metering equipment please obtain, from Power Delivery, available information for establishing system types and service voltage.
- B. Certain types of customer installations require special metering. These include, but are not limited to:
  - 1. Bus-bar installations of all ampacities
  - 2. Service ampacities exceeding 1200 amps
  - 3. Service voltages over 600 volts
  - 4. All metering other than standard self-contained type
  - 5. Multiple services
  - 6. Multiple occupancy and/or multi-story buildings
  - 7. Underground service laterals terminating in metering compartments
  - 8. Mobile homes or mobile offices
  - 9. Pulse sending meters (i.e. power factor, load management)
  - 10. Preassembled metering units
- C. Customers should discuss any of the above-proposed installations with Power Delivery in order to make recommendations and to allow sufficient time to order special equipment.

## 501. Metered And Unmetered Wiring

- a. The service ampacity and service voltage determines the type of meter installation. Service equipment and metering apparatus should conform to the arrangements shown on the Drawings of Section 6. Customers should familiarize themselves with the metering requirements of these typical installations.
- b. Current transformers and voltage transformers are used for metering all installations at voltages of 277/480 volts and higher.
- c. All metering poles and the pole holes must be inspected and approved by a designated Company representative before they are installed. **The pole must be a new and fully treated pole.** The metering pole location, height, class, depth of setting and guying must be checked and approved before the pole can be installed. For inspections call Power Delivery at (513) 651-0444 or 1-800-262-3000 ext. 3866.

## 502. Metering Equipment (600 Volts Or Less)

The metering equipment will be connected before the customer's main disconnect as described in the National Electrical Code. The metering equipment should be arranged as shown in drawings of Section 6. For service and metering equipment arrangements not shown call Power Delivery at (513) 651-0444 or 1-800-262-3000 ext. 3866.

## 503. Self-Contained Metering Installations

- A. All self-contained metering sockets are purchased, installed, maintained and owned by the customer. These meter sockets must be submitted by the manufacturer or the manufacturer's representative to the Company in care of the Manager, Meter Operations Services, 424 Gest Street, Cincinnati, OH, for approval of use on the Company's system.
- B. The customer will furnish, install and maintain the following:
  1. Meter socket (See Meter Base Guidelines, Page vi)
  2. Overhead service drop attachment device
  3. Service entrance conductors in raceways or cable assemblies
  4. Underground Service laterals
  5. Connections to the meter socket terminals or preassembled unit bus bar connectors
  6. Service disconnecting device
  7. Service equipment board where required (See article 508A)
  8. Service grounding system

- C. The Company will furnish, install and maintain:
  - 1. Overhead service drop
  - 2. Connectors for the underground service lateral to the Company's facility
  - 3. Electric meter

## **504. Instrument Transformer Metering Installations**

- A. Where a single-customer is served from a three-phase pad-mounted transformer installation, contact Power Delivery for metering equipment details. (See drawing 627)
- B. All connections to the instrument transformers should be accessible from the top or front. Connectors should not be installed back to back so that any of the connectors are facing the back of the instrument transformer enclosure.
- C. The customer will furnish, install and maintain the following:
  - 1. Service entrance conductors or underground service laterals
  - 2. Service disconnecting device(s)
  - 3. Service equipment board where required
  - 4. Indoor or outdoor rain tight metal cabinet with 2 doors for enclosing the instrument type transformers
  - 5. Conduit for metering cables from instrument transformer cabinet to the metering enclosures or transformer rated meter socket
  - 6. All service grounding and bonding
  - 7. All required insulated supplemental cable supports inside instrument transformer cabinets as required
  - 8. All connectors on the line and load side of current transformers when connecting four or more conductors per phase to each current transformer
  - 9. Primary (line side) conductors and connections to the current and voltage transformers on 2400 volt and higher installations
  - 10. Two separate ¾ inch, non-metallic conduits, one for telephone cable and one for pulse cable, are to be furnished and installed by customer. This installation must be accessible to a telephone line (Contact Power Delivery for specifics).
  - 11. The Company will furnish and maintain and the customer will install the following:
    - 12. Instrument transformers
    - 13. One, two, or three-barrel connectors when the line and load side conductors are 3 or less per phase to each current transformer
    - 14. Transformer-rated meter socket

- D. The Company will furnish, install, and maintain the following:
  - 1. Overhead service drop
  - 2. Connectors for the underground service lateral to the Company's facility
  - 3. Electric meter
  - 4. Cable and connections from the instrument transformer enclosure to the transformer rated meter socket
- E. All conductors must be installed to minimize mechanical stress on the current transformers.
- F. Contact Power Delivery whenever it is proposed to mount the metering transformer(s) in switchgear.

## 505. Meter Locations

- A. Some municipalities have ordinances that restrict the placement of meters on the front or street side of residential buildings.
- B. The location of the meter must be approved by Power Delivery before the Company will make the service connection. At some locations the Company may require the customer to install guards or enclosures to protect the Company's metering equipment from damage. The customer is responsible for any loss and /or damage of the Company's meter(s) on customer's premises.
- C. The meter for a new single-family residential service must be located outside the building at a location approved by the Company. Normally the meter socket should be 4 ½ feet to 5 ½ feet above finished grade. On underground installations, with prior approval, the height may be reduced to 3 feet on center of the meter socket above finished grade.

For multiple occupancy residential, commercial, and industrial installations contact Power Delivery.

- D. Electric meters and associated equipment will not be installed; in store show windows, directly under any window, in restrooms, under or behind pipes, valves, steam traps, or other obstructions; or close to motors, drive belts, other rotating machinery, or in any other place where they will be subject to vibration. Metering equipment should not be located in normally damp or wet locations, or where exposed to gases, fumes, vapors, liquids, or other agents having a deteriorating effect on the equipment, or where exposed to excessively high temperatures.
- E. A clear space at least 3 feet wide, 4 feet deep and 8 feet high must be provided and always be available in front of every meter for reading, inspecting, testing, and maintenance operations.

- F. Electric metering equipment will not be permitted inside transformer vaults or attached to utility-owned poles or equipment. The metering equipment location must be approved by Power Delivery.
- G. The electrical contractor should be familiar with the work of other trades on the premise so that the electric service system and electric meter installation will not be obstructed. Examples of possible obstructions are plumbing, HVAC, or other building structures.

## 506. Arrangement Of Meters

**Multiple meter sockets must be grouped and permanently identified to show which unit is served through each meter position.** The Company will not be responsible for billing errors resulting from improperly identified meter positions. Exceptions to the grouping requirement may be permitted for; duplex units with dual ownership, multi-story buildings 6 floors or higher or where separate services are permitted by the National Electrical Code. Contact Power Delivery for approval of locations.

## 507. Information To Appear On The Service Equipment

- A. Permanent identification must be on the metering equipment and cover of the disconnecting device(s) with the address of the location being served.
  - a. Numerals or letters of durable paint or laminated plastic and metal tags fastened securely are types of permanent identification. The use of marking pens, embossed tape, gummed stickers, paper tags, crayons, chalk or marking scratched or stamped into the enamel finish of the enclosures will not be approved.
- B. Where multiple services are installed or where service disconnecting device(s) are located remotely from the meter, the meter socket cover and disconnecting device(s) must be permanently marked with the phase(s), voltage, and address of the location being served.

## 508. Service Equipment Board – Construction & Installation

- A. If a service equipment board is used on metering installations requiring instrument transformers, the board must:
  - 1. Be constructed of clear, soft, dressed lumber or plywood, at least  $\frac{3}{4}$  inch thick;
  - 2. Be fastened rigidly to a wall of brick, stone, concrete, or similar solid and vibration free construction with an air space of not less than 1 inch between the board and the wall;
  - 3. Be painted with a good grade of paint;
  - 4. Not be suspended from joists or the ceiling.
- B. The metering and service equipment must be installed in accordance with the Drawings of Section 6.

- C. The metering equipment must be installed in a true vertical position.

## 509. Meters and Connections

- A. Meters will be furnished, installed, and maintained by the Company. The Company will install and seal them at the time the service connection is completed.
- B. Metering equipment must not be disconnected, removed, or relocated without the permission of Power Delivery.
- C. No more than one conductor may be attached to a single conductor lug or terminal associated with the metering equipment.
- D. The customer is responsible for properly installing and making the primary connections to the Company's current and voltage transformers on transformer-type metering installations (See article 504C). The customer must not, under any circumstances, make secondary connections or disturb the short-circuiting strap attached to the Company's current transformers.
- E. All unmetered wiring on the customer's premises must be installed in sealable enclosures or sealable service-entrance raceways. On transformer-type metering installations, a separate direct conduit, without junction boxes, must be installed for the metering cable from the metering transformer cabinet to the test-device cabinet or transformer-rated socket. **Switchgear or bus bar installations will require metering cable conduit to terminate near the front of the metering transformer cabinet.** This is to avoid obstructing the pulling of metering cable after the service wiring has been completed.
- F. The electric meter should be located as close as possible to the metering transformer cabinet.
- G. The metering conduit:
  - 1. Must not exceed 25 feet in length, including conduit bends. (If dimension cannot be met, contact Power Delivery)
  - 2. Must be a single 2 inch metallic or non-metallic conduit, or,
  - 3. Two 1 ½ inch conduits in place of the single 2 inch conduit
  - 4. Should have a maximum of four (4) 90° bends in the run
  - 5. Must contain a pulling string
- H. Company personnel will make final connection of the customer's service equipment to the Company's system.

## 510. Metal Cabinets To Enclose Metering Transformers

- A. The customer must furnish, install and maintain metal cabinets for enclosing current and voltage transformers. (See article 504)
- B. The cabinet material, corrosion protection, and painted finish must comply with NEMA and UL standards for outdoor enclosures for electrical equipment. Outdoor cabinets must be rain-tight with a rain lip on the top edge above the door openings.
- C. The cabinet must be either:
  - 1. Mounted on 7/8" uni-struts between the wall and back of the cabinet,
  - 2. Mounted directly to the wall if 7/8" uni-struts are placed on the inside of the cabinet to mount the CT's or
  - 3. Mounted directly to the service equipment board if one is used
- D. Metering transformers installed in metal cabinets:
  - 1. Must be replaceable from the front of the cabinet without disturbing the remainder of the metering assembly or equipment mounting board
  - 2. Are not permitted to be attached with bolts and nuts that extend outside the back of the metal cabinet
  - 3. May be installed on 7/8" uni-struts mounted with 1/4 X 20 bolts and spring nuts or mounted with 3/4" 10-32 self-tapping TEK screws (depth requirements must be considered when installing uni-strut material)
  - 4. If the current transformer cabinet is supplied with a standoff mounting plate, the current transformers must be mounted directly to this plate without the use of uni-struts.
- E. The top of the metering transformer cabinet should not be mounted more than 7 feet above the floor level.
- F. The bottom of the metering transformer cabinet should be mounted a minimum of 4 inches above the floor level.

## 511. Specifications For Metal Cabinets To Enclose Metering Transformers For Installations Not Exceeding 600 Volts Or 1200 Amps

- A. Metal cabinets for enclosing current transformers and voltage transformers must be provided by the customer. The size and type of installations stated in Table IV represent the minimum requirements for proper clearances and working space inside the cabinets. These sizes are adequate for normal installations. Larger cabinets are required when additional wiring space is required.

- B. Doors must be attached at the side of the cabinet with non-removable pins and hinges and have a tamper resistant padlock hasp. They also should have provisions for sealing the doors in place with approved Company padlock-type seals. The method of sealing must satisfy the following conditions:
1. Hinged doors
  2. No special wrenches or tools will be required to open or close doors
  3. The doors must be held firmly against the edge of the enclosure with non-removable studs and wing nuts at the top and bottom of the door.
  4. The opening for the padlock on the hasp must be at least ½” diameter.
- C. The construction of metal cabinets is subject to approval by Power Delivery.

**TABLE IV**  
*Current Transformer Cabinets*

Phase	Wire	Volts	Service Ampacity Amps	No. of Current Transformers	Inside Size of Cabinets, Inches (Min.) W x H x D	U.S. Gauge of Sheet Steel (Minimum)
1	3	120 / 240	Over 320 to 400	2	24 x 18 x 10	14
1	3	120 / 240	Over 400 to 1200*	2	32 x 24 x 10	14
3	4	240/ 120	Up to 300	3	32 x 24 x 10	14
3	4	208Y / 120	Over 200 to 1200*	3	44 x 30 x 10	12
3	4	480Y / 277	Up to 200	3	32 x 24 x 10	14
3	4	480Y / 277	Over 200 to 1200*	3	44 x 30 x 10	12

\* For services having ampacities exceeding 1200 amps contact Power Delivery

