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Electric Service Manual

Section 1 - Electric Metering Requirements

Contents

1.1 General

This section contains methods and requirements for metering electrical usage on services supplied by Mcleod Cooperative Power Association (MCPA). While these requirements are applicable for the majority of the interconnections, there are always unique installations which may require deviations from these standards. MCPA reserves the right to deviate from this standard for any reason, including economics, aesthetics, equipment, and safety. Deviation from this standard must be reviewed and approved in writing by the Engineering Department prior to implementation.

1.1.1 Meter Location and Accessibility

The meter socket must be mounted in a location that meets the following conditions.

- The center of the meter shall be located at a height between 4 to 6 feet above the ground
  - There are some exceptions to this for multi-family, and commercial buildings that will be discussed in those sections.
- Location and path to the meter(s) must be clear and free of hazards for anyone accessing the meter
- Accessible by MCPA 24/7, with open walkway to/from the meter, that is clear of shrubs, bushes etc.
- Solidly mounted on a Permanent Structure, not on a fence or other semi-permanent structure, so that they maintain a vertical position
- Free from interference with traffic on sidewalks or driveways
- Located so that it is not subject to damage from excessive moisture or vibrations, snowplows, falling ice from roofs or ice flows etc.
- No metering shall be attached to MCPA owned poles or equipment
- Where meters, originally installed in accessible locations, satisfactory to MCPA, are rendered inaccessible by virtue of alternations or new construction, such meters shall be reinstalled at a new fully accessible location, reviewed and approved by MCPA. The cost for moving the metering to the new accessible location will be the expense of the member or property owner.

MCPA recommends the meter socket is installed on the side of the building which is closest to the Utility Connection Point.
Contact MCPA to determine which side of the lot has the Utility Connection Point. Typically, a residential lot has only one Utility Connection Point.

Mounting the meter socket in an inadequate location will result in longer secondary runs, greater voltage drop, increased installation costs and reduced power quality for the building.

1.1.2 Meter Socket Requirements

The member or their contractor is responsible for purchasing and installing a meter socket that meets the following requirements.

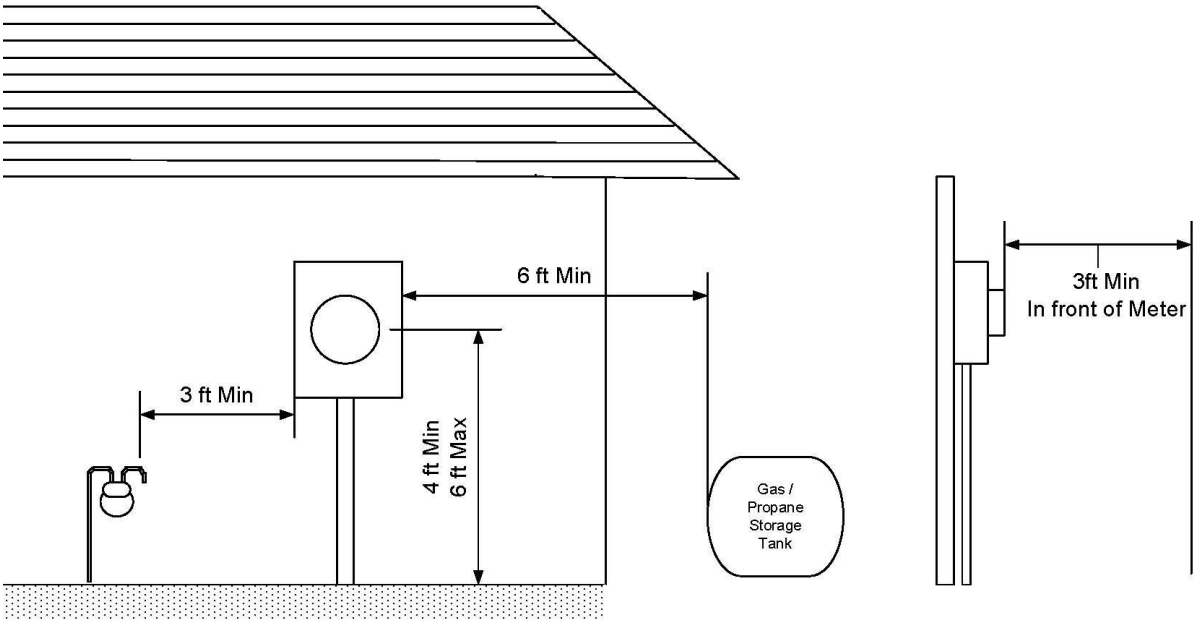
- Must be UL (Underwriters Laboratories) or ARL (Applied Research Laboratories) approved
- All self-contained meter sockets and transformer rated sockets; must use a lever actuated jaw clamping positive by-pass mechanism (*Lever By-Pass*)
- All meter sockets for transformer rated installations using CT's, the socket will be supplied by MCPA.
- Ring-less style
- Wire terminals rated for both copper and aluminum conductors

1.2 Residential Metering

All residential meter socket installations must adhere to the above requirements set in Section 1.1.1 Meter Access, and Section 1.1.2 Meter Socket Requirements. Additionally, there are requirements specific to residential meter sockets below.

- Meters must have unobstructed space at least 3 feet in front and 1 foot to each side.
- Center of meter to be located at a height between 4 to 6 feet above the ground.
- Meter sockets shall not be located above or below decks, along driveways or walkways where they are subject to damage or create a safety hazard.
- It is recommended that residential meter sockets are not mounted on the back of the structure to help avoid future conflicts with decks and other additions.

- Meters must be a minimum of 3 feet away from a gas meter, and 6 feet away from combustible storage. See figure below/top of page 4.



Meter Socket Clearances

1.3 Multi-Family Dwelling Metering

Contact MCPA Operations/Metering department for details.

1.4 Commercial Metering

All Commercial meter socket installations must adhere to the above requirements set in Section 1.1.1 Meter Access, and Section 1.1.2 Meter Socket Requirements. Additionally, there are requirements specific to commercial metering below.

- The meter socket(s) shall be mounted on the outside of the building and shall always be accessible to MCPA Personnel.

- Single phase services with voltages 240 volts and below and with service ratings of 200 amps or less will typically use self-contained meters.

- Single phase 400 amp rated services (320 amp continuous), with voltages not exceeding 240 volts, may use a MCPA approved 400-amp meter socket and self-contained metering.

- Three phase services rated for 200 amps or below with voltages not exceeding 240 volts shall use self-contained metering.

- Three phase services above 240 volts shall use a transformer rated meter with a CT and VT. See Transformer Rated Metering, Section 1.4.1 below.

1.4.1 Transformer Rated Metering

Transformer rated metering, is required to be used when the current level or voltage level exceeds the rating of a self-contained meter. MCPA requires the use of transformer rated metering under the following conditions:

- Single-phase services over 400 amps (320 amps of load)
- Three-phase services over 200 amps and voltages exceeding 240 volts

Below are the requirements for the installation of the metering.

- The current transformers (CT) and voltage transformers (VT) will be provided by MCPA and installed by the Member or contractor.

- No Member wiring (other than the service conductors) shall be installed in the metering transformer cabinet, meter socket, or conduits dedicated for metering wires. Also, to ensure metering accuracy, no Member wiring shall be permitted to be connected to the Association's metering secondary wiring.

- The current transformers and voltage transformers shall not be installed on the Member's side of the service disconnect.

- Metering Transformer Cabinet for CTs and VTs
  - The Member is required to supply a UL or ARL approved cabinet to house the current transformers and voltage transformers. Metering transformer cabinets mounted outside shall be approved for that purpose.
  - All Metering transformer cabinets shall have hinged doors and latching mechanisms whereby MCPA can install a padlock.
  - Metering transformer cabinets shall include provisions for grounding and the cabinet shall be bonded to the grounded service conductor, per NEC.
  - MCPA distribution transformers shall not be used for metering.
    a. No current transformers or voltage transformers shall be mounted within the MCPA distribution transformer.

b. No holes shall be drilled or cut into the side of a MCPA distribution transformer cabinet.
c. No metering sockets or metering transformer cabinets shall be mounted on the MCPA distribution transformer.

- The metering transformer cabinet shall not be used as a junction box or buss gutter.
- To determine type of CT requirements, MCPA must be notified and provided a spec sheet of CT cabinet. This will determine type of CT's whether bar or window type.

- Conduit and Meter Transformer Cabinet Mounting Requirements

- For all services, the conduit from the metering transformer cabinet to the meter is to be at least 1 inch in diameter and provided and installed by the Member or Member's contractor.

- The wiring between the meter socket and the CTs and VTs will be provided and installed by MCPA personnel.

- The recommended distance between the metering transformer cabinet and the meter shall not exceed 50 feet.

a. The meter socket may be mounted to the door of the CT cabinet.

1.5 Service Rebuilds/Upgrades

All service rebuilds or upgrades must comply with these standards in the manual.

- Single phase services being modified and/or upgraded that have existing pole top metering must remove pole top equipment and install approved equipment as listed.

1.6 Technical Information

1.6.1 Glossary

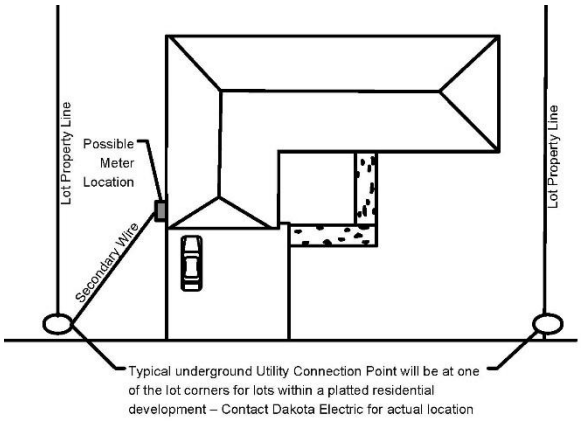
- **Current Transformer** - A current transformer (CT) provides a current on its secondary terminals that is proportional to the current in the primary circuit. Current transformers are used in metering and protective circuits to step down the current to levels which can be easily utilized.

- **Member –** McLeod Cooperative Power Association "customer", as a not for profit cooperative everyone who received electric service from MCPA is a member of the McLeod Cooperative Power Association.

- **Self-Contained Meter** - A self-contained meter is designed to carry the full rated current of the circuit being metered and being energized at the line voltage. It does not require auxiliary instrument transformers to step down line current or voltage.

- **Transformer Rated Meter** - When the electrical supply needs of the load exceed the rating of a self-contained meter, instrument transformers are used. Current and voltage transformers are used to step down the current and voltage of the circuit to levels which then can be measured by the meter.

- **Utility Connection Point** - This is the point where the MCPA owned facilities are connected to the Member owned facilities. For residential this is typically the line side of the meter socket; for underground commercial service this is typically in the MCPA'S distribution transformer.



- **Voltage Transformer** - A voltage transformer (VT) also known as a potential transformer (PT), provides a voltage on its secondary terminals that is in proportion to the voltage of the circuit. Voltage transformers are used in metering and protective circuits to step down the voltage to levels which can be easily utilized.

- **Permanent Structure** – A permanent structure shall be defined as something that will not move such as a post buried in at least three feet of earth or a batter board assembly. This shall also include buildings that are permanent. *MCPA's distribution poles are not to be utilized for mounting equipment.*