AMENDMENT
(Pages 20, 43, 50, 72, 74, 75, 76, 78, 83, 86, 99)

ELECTRIC SERVICE MANUAL
2014
### Conductor Sizing

It is recommended that customer-installed service conductor ampacity be matched to the main breaker size.

The minimum size allowed for service entrance conductors is #8 AWG.

Although it is not recommended, the grounded neutral may be reduced in ampacity in accordance with the *NEC*. However, if the neutral is reduced more than two sizes, calculations justifying the reduction must be accepted by the Company. The grounded neutral may be bare copper conductor or may be insulated and marked with a white or natural gray color. (*NEC* Section 200.6, 200.7, 230.41).

### Equipment Specifications

All service entrance equipment shall be UL listed.

Meter sockets shall meet Company specifications and shall be UL Listed. See Appendix A.

Contact your Company representative for an approved meter socket list or see MidAmerican Energy website.

Service entrances for residential customers shall have a rated ampacity of at least 100 amperes at 120/240 volts, three-wire, single-phase. A minimum 200 amp meter socket is required for all underground residential services smaller than 200 amps.

If the service size is 400 amps or less, self-contained metering will be used.

### Service Entrance Conductors

Only service entrance conductors shall be installed in the service entrance conduit.

Service entrance conductors shall not exceed 10 per phase.

The service drop and attachment point shall not be enclosed within any buildings, alteration, facade or addition.

The point of attachment shall be on the side of the structure adjacent to the distribution facilities.

### Clearance Requirements

If changes occur to a customer's property, such as grade changes or construction of decks or garages, which result in inadequate clearance, the customer will be required to relocate or bring the service into compliance with current *NEC* and/or *NESC* requirements. Refer to Figures 1 and 2.
# TYPICAL OVERHEAD SERVICE MAST REQUIREMENTS

<table>
<thead>
<tr>
<th>ENTRANCE SIZE</th>
<th>RISER MAST CONDUIT SIZE FOR ABOVE THE ROOFLINE (Rigid or Intermediate)</th>
<th>SERVICE ATTACHMENT HEIGHT ABOVE SUPPORT (Ft.)</th>
<th>MAXIMUM SERVICE DROP LENGTH (Ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100A</td>
<td>2”</td>
<td>125</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>2-1/2” or 3”</td>
<td>150</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>3-1/2” or 4”</td>
<td>150</td>
<td>75</td>
</tr>
<tr>
<td>200A</td>
<td>2”</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>2-1/2” or 3”</td>
<td>150</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>3-1/2” or 4”</td>
<td>150</td>
<td>50</td>
</tr>
<tr>
<td>400A</td>
<td>2-1/2” or 3”</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>3-1/2” or 4”</td>
<td>125</td>
<td>50</td>
</tr>
</tbody>
</table>

## APPLICATION AND CONDITIONS FOR ABOVE TABLE

1. The maximum service drop lengths shown are for triplex and quadruplex services attached to unguyed riser masts. ▲ Marked span lengths indicated that 25 ft. must be subtracted from the indicated span length if service is quadruplex.

2. Conductor supports for spans longer than the maximum service drop lengths, for a given condition listed in the above table, must be guyed or braced to withstand the following maximum actual service drop tension:

<table>
<thead>
<tr>
<th>Entrance Size</th>
<th>Maximum Actual Tension</th>
</tr>
</thead>
<tbody>
<tr>
<td>100A</td>
<td>1500 Lbs.</td>
</tr>
<tr>
<td>200A</td>
<td>2000 Lbs.</td>
</tr>
<tr>
<td>400A</td>
<td>3500 Lbs.</td>
</tr>
</tbody>
</table>

The customer should consider providing additional strength as a “Safety Factor” (NEC Section 230.28).

3. The service conductor type and span length will be selected by the Company representative as part of their inspection to determine the service entrance location. This information will be made available to the customer on request.

4. EMT (thinwall conduit) is not acceptable for any portion of the service mast.

5. Conduit couplings are not allowed above the roofline or less than 2 feet below the soffit line. Reducing down to a smaller conduit size must adhere to local jurisdictional requirements.
NOTES:

1. Contact the Company for approved conduit position prior to each installation. Normally the riser should be mounted on the side of the pole that is opposite the direction of traffic.

2. Installations requiring larger conduit capacity or different conduit orientation than shown must be approved in advance by your Company representative.

3. Conduits are to be installed so that the top end is 4”- 6” above final grade.

4. PVC conduit is recommended. Sweeps are to be rigid steel or fiberglass. If rigid steel is used, it must be effectively grounded.

5. Contact the Company for recommended length of conductor to be coiled at base of pole so sufficient length is available to reach apparatus.

6. See Section 6.3 for conduit installation requirements.

7. Where conduit is to be extended to a location requiring a new or replacement pole, such extensions shall not be made until the pole work is completed by the Company.

8. Spare conduit to be capped with permanent cap.
CAUTION
Source conductors shall be positioned along the sides of the meter socket, utilizing adequate bending radius, to provide maximum clearance from other socket terminals. Source conductors shall be looped to the top jaws shown in figures 27 (c) and (d).

1. The meter sockets shall meet Company specifications, see Appendix A.
2. Working space in front of service entrance equipment and meter sockets shall be in accordance with NEC Section 110.26. Refer to page 21 for Meter Clearances.
3. When using aluminum conductors, wire brush the conductors and apply oxide inhibitor on all connections.
4. When the neutral is not continuous through the meter socket, a dual lug neutral connector shall be used.
5. Use one of the two outside conduit knockouts for the underground service riser lateral.
6. Spring, clip type add-on 5th terminals are not allowed.
7. Commercial installations require a manual clamping jaw lever bypass.
1. The meter sockets shall meet Company specifications, see Appendix A.
2. Working space in front of service entrance equipment and meter sockets shall be in accordance with NEC Section 110.26. Refer to page 21 for Meter Clearances.
3. When using aluminum conductors, wire brush the conductors and apply oxide inhibitor on all connections.
4. When the neutral is not continuous through the meter socket, a dual lug neutral connector shall be used.
5. 120/208 V 3-wire is normally available only from a 3-phase 120/208 V 4-wire service entrance. 200 ampere service may be available in certain areas. Consult your Company representative.
6. Spring, clip type add-on 5th terminals are not allowed.
7. Commercial installations require a manual clamping jaw lever bypass.
1. If the service size is 400 amps or less, self-contained metering will be used.

2. The meter sockets shall meet Company specifications, see Appendix A.

3. Working space of not less than 36 inches in front of service entrance equipment and meter sockets and 30 inches wide shall be maintained in accordance with NEC Section 110.26. (Reference page 21)

4. When using aluminum conductors, wire brush the conductors and apply oxide inhibitor on all connections.

5. The neutral, if insulated, shall be identified by a white or gray covering, or white paint or tape. (Reference page 30)

6. The high phase of a 120/240 V installation shall be identified by orange color, either insulation, paint, or tape, in accordance with NEC Section 110.15 and Section 230.56. (Reference page 30)

7. The high phase (wild leg) of a 120/240 V installation must be on the right hand terminals of the self-contained meter socket. (Reference page 30)

8. Commercial installations require a manual clamping jaw lever bypass.

Effective April 1, 2015
1. If the service size is 400 amps or less, self-contained metering will be used.

2. The meter sockets shall meet Company specifications, See Appendix A.

3. 277/480 V self-contained meter settings are limited to installations rated 400 A or less.

4. A disconnect switch shall be installed on the source side, immediately adjacent to each 277/480 V self-contained meter setting in a cold sequenced “switch-meter-load” configuration. The switch shall have provisions for padlocking in the open position and for installing a Company seal in the closed position. The disconnect may be fused or unfused depending on what is needed to meet MEC and NEC fault current requirements for the particular application. It is the customer’s responsibility to determine if the disconnect switch should be fused or unfused. (Reference page 63)

5. A “480 VOLTS” identification (decal or permanently painted orange or yellow letters) shall be applied in a conspicuous location on the front exterior surface of the meter socket enclosure. Lettering is to be legible and 3/4” minimum height.

6. The neutral, if insulated, shall be identified by a white or gray covering, or white paint or tape. (Reference page 30)

7. When using aluminum conductors, wire brush the conductors and apply an oxide inhibitor on all connections.

8. Working space of not less than 36 inches in front of service entrance equipment and meter sockets and 30 inches wide shall be maintained in accordance with NEC Section 110.26. (Reference page 21)

9. The neutral shall be installed from the source to the overcurrent device.

10. Commercial installations require a manual clamping jaw lever bypass.
1. If the service size is 400 amps or less, self-contained metering will be used.

2. The meter sockets shall meet Company specifications, see Appendix A.

3. A disconnect switch shall be installed on the source side, immediately adjacent to each 277/480 V self-contained meter setting in a cold sequenced “switch-meter-load” configuration. The switch shall have provisions for padlocking in the open position and for installing a Company seal in the closed position. The disconnect may be fused or unfused depending on what is needed to meet MEC and NEC fault current requirements for the particular application.

4. Working space in front of service entrance equipment and meter sockets shall be in accordance with NEC Section 110.26.

5. When using aluminum conductors, wire brush the conductors and apply an oxide inhibitor on all connections.

6. The neutral, if insulated, shall be identified by a white or gray covering, or white paint or tape. (Reference page 30.)

7. The high phase (wild leg) of a 120/240 V installation shall be identified by orange color, either insulation, paint or tape. (Reference page 30.)

8. A “480 VOLTS” identification (decal or permanently painted orange or yellow letters) shall be applied in a conspicuous location on the front exterior surface of the meter socket enclosure. Lettering is to be legible and 3/4” minimum height.

1. The CTs and PTs, if required, shall be mounted so that the polarity marks are arranged facing source side.

2. Insulated bushings are required on all conduits.

3. Instrument transformer enclosures shall be grounded per NEC Article 250.

4. Covers on all instrument transformer cabinets shall be hinged on the side with heavy-duty hinges.

5. Bar type CTs will be used in instrument transformer enclosures and will be provided by the Company.

6. The high phase conductor of a 120/240 V Delta installation shall be identified by orange insulation, paint or tape at the weatherhead, CT connections, and all other terminations.

7. The neutral shall be available in the instrument transformer enclosure for connection of the meter potential leads. The neutral connector shall be UL listed and insulated from the instrument transformer cabinet.

8. In unusual conditions, contact your Company representatives.

9. PT cabinets required only for 277/480 V installations (See Appendix C-1 for dimensions). Contact a Company representative for details.

10. In a metering device, defined as a meter socket or CT cabinet, one conductor may be secured in a lug; multiple lugs, each with a single conductor, may be used to parallel conductor to a device or may run to other devices in the same area.

11. CT’s shall be installed so they may be removed without access to the back of the cabinet.
1. ENCLOSURE MATERIALS
   • Meter sockets shall meet Company specifications and shall be UL Listed.
   • Shall be steel (plated or made of galvanized steel) or aluminum.
   • The finish shall be tough, non-fading and have a long service life.
2. INSULATING MATERIALS
   • Bus Support – Shall be high strength and track-resistant.
   • Sheet Insulation – High dielectric strength.
   • Insulating materials meet UL requirements.
3. MOUNTING BASES
   • Shall be high impact strength, track-resistant.
4. SAFETY SHIELD BARRIERS
   • Shall be track-resistant.
5. CONNECTORS
   • Shall have high strength tops.
   • Single hex screw and floating pressure pad; shall be tin-plated, suitable for copper or aluminum wire; shall have a built-in, anti-turn provision.
   • Shall meet UL requirements for electrical connectors.
   • Only one conductor per lay in connector is allowed.
6. JAWS
   • Shall be tin-plated electrolytic copper. Jaws rated at 100 A and above shall be spring reinforced.
   • Spring, clip type add-on 5th terminals are not allowed.
7. COVERS
   • Shall be one piece.
   • Shall be lockable using a hasp-type lock.
   • Shall be ringless type.
8. INSTALLATION EASE
   • Door shall be removable for installation ease.
   • Terminals shall accept copper or aluminum wire for installation flexibility.
   • Enclosure shall have a broad range of concentric knock-outs to accommodate varied wiring needs.
   • Residential meter sockets rated greater than 200 amps require a manual clamping jaw bypass.
   • Commercial installations require a manual clamping jaw lever bypass.

**NOTE:** METER MOUNTING EQUIPMENT IS NOT ACCEPTABLE IF:
   • Designed for flush-mounting only.
   • Equipped with automatic bypass or sliding bar bypass.
   • Equipped with ring-type mounting cover.
   • Used for UG application when specifically manufactured only for overhead application.
   • Not UL approved.
HINGED INSTRUMENT TRANSFORMER ENCLOSURES

TYPICAL CT ARRANGEMENT
CTs may be installed horizontally (as shown) or vertically.

TYPICAL CT DIMENSIONS

CT for
Entrance Rating Dimensions (inches)
1200 A or less A B C
1600 A thru 4000 A 14 1/2 8 1/2 10 1/4

ONE-BAR CT

TOP VIEW

SIDE VIEW

Current/Potential Transformer Enclosure Bonding

Effective April 1, 2015
<table>
<thead>
<tr>
<th>2014 MANUAL PAGE</th>
<th>SECTION</th>
<th>ITEM</th>
<th>REVISION</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>6.0 Service and Service Entrances (General)</td>
<td>Equipment Specifications</td>
<td>Changed last sentence to read: &quot;A minimum 200 amp meter socket is required for all underground residential services smaller than 200 amps.&quot;</td>
</tr>
<tr>
<td>43</td>
<td>Typical Overhead Service Mast Requirements</td>
<td>Maximum Service Drop Lengths Table</td>
<td>Changed column heading from &quot;Riser Mast Conduit Size (Rigid or Intermediate)&quot; to &quot;Riser Mast Conduit Size For Above the Roofline (Rigid or Intermediate).&quot;</td>
</tr>
<tr>
<td>43</td>
<td>Typical Overhead Service Mast Requirements</td>
<td>Application and Conditions for Above Table - Item 5</td>
<td>Added sentence to #5: &quot;Reducing down to a smaller conduit size must adhere to local jurisdictional requirements.&quot;</td>
</tr>
<tr>
<td>50</td>
<td>Underground Conduit Installations at Risers</td>
<td>Figure (b)</td>
<td>Changed Figure (b) to show conduits on opposite sides of the pole and changed the 5&quot; minimum to 15&quot;.</td>
</tr>
<tr>
<td>72</td>
<td>Self-Contained Meter Socket Wiring, 1-Phase 120V, 2-Wire, 60A Max., 1-Phase 120/240 V, 3-Wire, 100 A - 200 A</td>
<td>Figure 27 - Item 7</td>
<td>Changed sentence #7 to read: &quot;Commercial installations require a manual clamping jaw lever bypass.&quot;</td>
</tr>
<tr>
<td>74</td>
<td>Self-Contained Meter Socket Wiring, 1-Phase 120/240 V, 3-Wire, 320 A Socket 400 A Entrance</td>
<td>Figure 28 - Item 7</td>
<td>Changed sentence #7 to read: &quot;Commercial installations require a manual clamping jaw lever bypass.&quot;</td>
</tr>
<tr>
<td>75</td>
<td>Self Contained Meter Socket Wiring, 3-Phase 120/240V, 4-Wire, 400 A Max.; 3-Phase 120/208 V, 4-Wire, 400 A Max.</td>
<td>Figure 30 - Item 8</td>
<td>Changed sentence #8 to read: &quot;Commercial installations require a manual clamping jaw lever bypass.&quot;</td>
</tr>
<tr>
<td>76</td>
<td>Self-Contained Meter Socket Wiring, 3-Phase 277/480 V, 4-Wire, 400 A or Less</td>
<td>Figure 31 - Item 10</td>
<td>Changed sentence #10 to read: &quot;Commercial installations require a manual clamping jaw lever bypass.&quot;</td>
</tr>
<tr>
<td>78</td>
<td>Self Contained Meter Socket Wiring, 3-Phase 120/240V, 4-Wire, 400 A Max.; 3-Phase 120/208 V, 4-Wire, 400 A Max.; 3-Phase 277/480 V, 4-Wire, 400 A Max.</td>
<td>Figure 32 Notes - Item 9</td>
<td>Changed sentence #9 to read: &quot;Commercial installations require a manual clamping jaw lever bypass.&quot;</td>
</tr>
<tr>
<td>2014 MANUAL PAGE</td>
<td>SECTION</td>
<td>ITEM</td>
<td>REVISION</td>
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</tr>
<tr>
<td>83</td>
<td>Instrument Transformer Wiring, 3-Phase 120/240 V, 4-Wire Delta; 3-Phase 120/208 V, 4-Wire Wye; 3 -Phase 277/480 V, 4-Wire; Greater Than 400 A</td>
<td>Figure 35 - Transformer Enclosure Graphic</td>
<td>Moved the 1&quot; conduit to meter and test switch to the right side of the PT cabinet.</td>
</tr>
<tr>
<td>86</td>
<td>Requirements for Meter Mounting Equipment</td>
<td>8. Installation East - last bullet point</td>
<td>Changed sentence last bullet point to read: &quot;Commercial installations require a manual clamping jaw lever bypass.&quot;</td>
</tr>
<tr>
<td>99</td>
<td>Hinged Instrument Transformer Enclosures</td>
<td>Current/Potential Transformer Enclosure Bonding graphics</td>
<td>Relocated the meter socket to the right side of the PT cabinet and added 3&quot; minimum separation between the cabinets. Added note &quot;PT cabinet and meter socket may be mounted on the right or left side of the CT cabinet.&quot; Also added an alternate location for meter socket mounting to graphics.</td>
</tr>
</tbody>
</table>