

## OVERHEAD SERVICES - RESIDENTIAL & GENERAL SERVICE

### 6.01 GENERAL

See Chapter 3, Section 3.01 for more information about point of entrance (POE).

In all cases, the customer installs, owns, and maintains the service entrance in accordance with OPPD's applicable rates and extension rules and requirements. (See Chapters 1 through 4)

OPPD's service drop will terminate at the first point of contact on the building or structure supporting the metering equipment. The attachment point, riser conductors, conduits and fittings for both Residential and General Service customers are the customer's responsibility.

OPPD's ESD designates the point where OPPD's service drop will attach to the home or building (POE). OPPD will make an effort to comply with the customer's preference, but any added costs to do this may be collected by OPPD. Clearances, code compliance, or legal considerations may make OPPD unable to meet the customer's requested point of entrance.

To comply with the requirements of the National Electrical Safety Code, OPPD must install service drops so that specified clearances above ground and from structures are obtained. OPPD must also maintain its electrical distribution system to assure its customers the best possible electric service with minimum interruptions.

To maintain reasonable voltage regulation with the heavy electrical requirements common today, it is necessary that the service drop be brought to the customer from the nearest distribution pole, but not across neighboring adjacent property. This is because OPPD may have problems with obtaining the necessary easements for installing poles, wires, guys, anchors, etc.

**General service self-contained meter sockets shall have a lever bypass. Exceptions: temporary services, residential garages, residential communication pedestals, sign lighting, apartment house meters, and farm services. It should be understood that the consequence of not installing a lever bypass socket is that power will be lost during work on the meter.**

#### Attachment Maintenance of Meter Loops

It is the customer's responsibility to maintain the attachment of the meter loop on the building. If storm damage should loosen the meter loop from the building, the customer should make arrangements to have an electrician reattach it. The customer is also responsible for arranging any necessary electrical inspections. OPPD will be unable to restore service until this has been done. In addition, OPPD will not loosen meter loops for customer painting, or re-siding of their building.

### Clearances Over Pools

**Without exception**, no parts of swimming pools, wading pools, hot tubs, etc. shall be placed under existing service-drop conductors or any other open overhead wiring. Nor shall such wiring be installed above the following:

- A. Swimming pool, wading pool, hot tubs, and the area extending 10 feet horizontally from the inside of the walls of the pool or tub.
- B. Diving structures.
- C. Observation stands, towers, or platforms.

### Other Clearances

The minimum clearance for the service drop conductors to any building or other structure is:

- A. 10.5 feet above finished grade, sidewalks, platforms, decks, or building projections, from which the conductors might be reached (areas subject to pedestrian traffic).
- B. 15 feet over residential driveways.
- C. 15.5 feet over roads, streets, and other areas subject to truck traffic.
- D. Five feet from windows, doors, porches, fire escapes, or similar locations.
- E. Where the voltage between conductors does not exceed 300V and the service drop conductors pass over the roof of an intervening building, clearance of three feet is required.
- F. The service drop attachment shall not be higher than 20feet above finished grade unless it is stipulated in the metering specifications.
- G. The service drop conductors are not to pass over more than four feet of a building's roof to reach the point of attachment.
- H. The point of attachment (POA) shall be placed so the service conductors do not rub, or come in contact with the building, its eaves, or any intervening building or structure. Any intervening trees on the customer's property, which may interfere with the service drop, are the customer's responsibility to trim, or remove.
- I. No part of service drop conductors, their drip loops, or their weather head shall come within 12" of communication cables or conductors.

The maximum sag of OPPD's service drop in either extreme summer heat, or winter icing conditions, must be considered in maintaining necessary clearances.

### Accessible Overhead Point of Attachment

The overhead POA shall be installed in a safe, readily accessible outdoor location. OPPD personnel must be able to access the POA from a ladder resting upon the ground or from a deck with outdoor access reached by permanent stairs. OPPD personnel will not climb upon the roof of the structure to reach the POA. The height limits for reaching the POA from a ladder are between 12.5 feet and 20 feet. Current code requires 10 feet minimum above grade to the bottom of the drip loop.

POA's are not considered readily accessible under the following situations:

- The POA is more than four feet back from the edge of the structure roof.
- The POA is over an intervening roof of the building, such as a porch or addition roof.

The following rules will enable the electrical Contractor to provide proper means for the attachment of OPPD's service drop, and also for the correct installation of the metering and service entrance:

1. OPPD's Customer Sales and Service Division will designate the point of entrance. Please call the Customer Sales and Services Division, the ESD, or OPPD's area office. The telephone numbers are listed in Chapter 1, Section 1.02.
2. The Contractor shall install an approved attachment for OPPD's service drop on every building or structure being wired or rewired, or for any building or structure moved to a new location. OPPD will make every effort to accommodate a moved-in structure's existing POA, and internal wiring, but the cost to OPPD to do this, may be collected from the customer.

## **6.02 SERVICE ENTRANCE CONDUCTORS**

The minimum capacity of the overhead service entrance conductors provided by the customer, from the meter socket in the riser up to the weatherhead, is 100 amperes, for residential service, unless smaller conductors are permitted by written approval of the local inspecting authority.

Service entrance conductors shall be enclosed in a listed (for example: ETL, or UL) Schedule 80 PVC, EMT, intermediate, or Rigid type of raceway. The use of "T" conduit bodies in the service wire conduit riser ahead of the metering is prohibited.

### Conduit Riser

- The overhead conduit riser size for a new residential installation shall not be less than 1¼ inch for a 100 to 150-amp entrance, where the service wire attachment point is other than the conduit.

- 1½-inch rigid steel conduit mast is required for a 100 to 150-amp entrance, when the service wire attachment point is on the conduit.
- 2-inch rigid steel conduit mast for a 200-amp entrance when the service wire attachment point is on the conduit.
- 2½-inch rigid steel conduit mast for a 320-amp entrance when the service wire attachment point is on the conduit.
- In the case of the rehabilitation of an existing residence, having no more than a 100-amp main breaker, and #4 conductors, a pre-existing 1-inch conduit, installed inside of the building wall along with a recessed socket, may be reused. This permission for reuse is conditional that the service wire attachment point is other than on the conduit, and the bottom of the drip loop meets the 10 feet minimum height requirement above grade.

#### Wires Out of Weatherhead

For connection to OPPD's overhead service drop wires, the customer's service entrance conductors shall project beyond the service head for all services, per the following:

- General Service, three-phase; Residential, over 320-amperes; or multiple conductors per phase: 36 inches.
- General Service, single-phase sockets, and Residential sockets: 18 inches.

### **6.03 ATTACHMENT OF SERVICE DROPS - RESIDENTIAL**

For non-residential customers, see meter specification for service drop attachment strength requirements, and for meter location.

Service drop attachment shall not be made to the roof, eave, siding, or flashboard of the residence.

#### Residential Attachment Types

Contingent upon providing proper clearances, the residential point of attachment shall be one of the following types:

1. **Bolt Through Vertical Exterior Wall**  
Refer to Section 6.10.
  - On frame and brick veneer homes, one 5/8" hook-type bolt (j-bolt), furnished and installed by the customer, shall be used. The stem of the bolt being on the far side of the wall stud from the distribution pole, to oppose the pull of the service drop, and prevent possible future splitting of the siding.

- On types of construction that have no wall studs, (such as concrete block), one or more 5/8" machine bolts, shall be furnished and installed by the customer. Bolts shall extend outside the wall at least 2.5 inches, but not over 4 inches. Various length bolts are available, so a proper length should be measured for and used.

Service heads shall be above and adjacent to the highest attachment bolt, but located so as not to interfere with the attachment, or clear approach of the service drop from the distribution pole. The secure service attachment point shall be 6" vertically below the service entrance head, and shall not be more than 18" away, horizontally.

## 2. **Mast Type Riser**

Refer to Section 6.09.

- The mast shall be furnished and installed by the contractor.
- The riser conduit shall be sized per Section 6.02.
- It shall be so constructed and supported that it will withstand the strain imposed by the service drop. There shall not be a splice in the top 10 feet of the riser pipe, to prevent kinking. Masts employing back guying are not allowed in residential applications.
- The riser shall not be located more than 4 feet back from the edge of the roof.
- The service drop conductors shall not cross more than 4 feet of roof, and shall be terminated on an approved pipe-mounted wire holder, which is to be furnished and installed by the contractor. The holder shall be securely fastened to the riser conduit, and located so that the service wire passes at least 18 inches above the surface of the roof. The wire holder shall not be more than 24 inches above the roof. Masts extending more than this above the roof, are not readily accessible from a ladder resting upon the ground, and also may be subject to kinking, so are therefore not allowed in residential applications.

### Rewired Residences

Existing roof plates or house knobs should be replaced with one of the acceptable attachment methods referenced above when a residence is rewired.

In the case of the rehabilitation of an existing residence, having no more than a 100-amp main breaker, and #4 conductors, a pre-existing 1-inch conduit,

installed inside of the building wall along with a recessed socket, may be reused. This permission for reuse is to be given by OPPD'S ESD on a case-by-case basis. Granting of permission is conditional that the service wire attachment point is other than on the conduit, per Section A, the bottom of the drip loop meets the 10 feet minimum height requirement above grade, and all other necessary conditions for proper service are satisfied. Failure to call OPPD for a confirmation of the POE before rewire is not a sufficient reason for OPPD to allow an unacceptable situation.

The electrical contractor shall furnish and install a suitable attachment point using a j-bolt, a machine bolt, or a screw type attachment with eye that will withstand the strain imposed by the service drop. An existing screw type attachment is not to be re-used for service wire over # 4 triplex, for new construction, or where the remodeling is extensive enough to permit the use of a j-bolt, or a machine bolt.

#### Meter-Disconnect Combination on an Existing Home with a New Addition

In the case of an existing single family residence, where the customer is adding an addition, which will enclose the existing POE and meter socket, a combination meter socket-disconnect may be used. The combination meter socket-disconnect shall be provided, installed, and maintained by the customer at a new POE, designated by OPPD's ESD, on the new addition. This will allow the customer to comply with the NEC requirement for a disconnect switch when electrical conductors enter a building (the new addition), and feed to the existing distribution panel in the existing part of the house.

The combination meter socket-disconnect must meet the following requirements:

- There must be a separate cover for both the meter socket, and the disconnect (breaker) compartment. Either cover must be able to be removed without disturbing the other cover.
- The meter socket cover must be of ring-less design, and have a provision for the meter seal. OPPD reserves the right to lock the meter socket cover, in any manner, to insure the security of the socket and meter.

Any other use of the combination meter socket-disconnect must be approved by the meter engineer on an individual basis prior to installation. Work through the AE or ESD to obtain this approval.

#### Height and Strength of Attachment

Roof mounting plates are not to be used as a means of attachment for new overhead services. Customers with existing roof plates shall replace them with another approved attachment method when a rewire or service upgrade is necessary.

The customer's structure must be strong enough to support the service drop and

high enough to provide Code clearance of the service drop and drip loop above ground, buildings, driveways, roads, and other facilities (See Section 6.01). The customer shall provide a secure service attachment point not more than 18" away horizontally, and 6" to 12" vertically below the service entrance head. Masts, risers or wire holders are not furnished by OPPD.

The point where the service drop is to attach to a building or structure must be high enough so that OPPD's service drop will maintain the designated clearances. The service entrance head shall be above and adjacent to this point. OPPD recognizes the occasional problem of obtaining these clearances, particularly with ranch style residences. OPPD will cooperate in solving these problems. Please call Customer Sales and Services Division, the ESD, or outside the metro, OPPD's area office. The telephone numbers are listed in Section 1.02.

If a building or structure to which a service drop is to be run is not high enough to provide the required Code clearance above ground, the customer shall furnish and install a higher support. This could be a pole, or a structure on a building, strong enough to withstand severe ice and wind loading, which will give the required clearance. Specific minimum tensions for the customer's POA will be specified on the meter specification written for the individual project, depending on size of conductors and length of service.

#### **6.04 CONNECTIONS**

All outdoor service raceway or cable connections to meter socket bases, meter enclosures, or switches shall be waterproof. Service entrance cable termination fittings in metering equipment shall be of screw-tightened construction.

#### **6.05 IDENTIFICATION OF CONDUCTORS**

If the neutral or grounded conductor of a service entrance (480 volts and under) is insulated, it shall be identified by a white or gray color.

In overhead applications, if an insulated conductor is being used as a neutral for the overhead service conductors, the insulation must be striped from the last 18" of the neutral extended from the service head. A minimum of 4" of insulation must be left on the conductor extended from the service head.

Any equipment-grounding conductor, when required, shall be bare, or if insulated, it shall be identified by a green color, or with green tape, spiral wrapped a minimum of 3", or by tagging, or another permanent marking method per NEC requirements.

Four wire 120/240 volt delta installations shall have the "wild phase" identified with an orange outer covering, tape, by tagging or another permanent marking method per NEC requirements at a point where OPPD will connect the service entrance.

When the customer provides the service conductors for other than single-phase

situations, they are to use tape; spiral wrapped a minimum of 3", to identify the phase.

For example:

- 120/208V, 3Ph, 4W: Black, Red, and Blue; or Red, Yellow, and Blue
- 277/480V, 3Ph, 4W: Brown, Purple, and Yellow.

An alternate acceptable marking method would be:

- 1 band of colored tape at each end for A phase
- 2 bands of colored tape at each end for B phase
- 3 bands of colored tape at each end for C phase

The use of paint to identify insulated conductors is not acceptable identification, due to the impermanence of this method.

#### **6.06 SEPARATION OF METERED AND UNMETERED CONDUCTORS**

No metered circuit wire shall be enclosed with an unmetered circuit wire in the same raceway or conduit, except as may be necessary in meter equipment assemblies.

#### **6.07 MAXIMUM SERVICE DROP LENGTH**

For safety reasons and prevention of damage to Customer's premises, the maximum length of OPPD's overhead service is 75'. The maximum allowable length may be restricted to less than 75' for installations with large conductors or other limitations. In certain situations, a service longer than 75' may be installed, using an indent pole, after consultation with, and approval by OPPD.

#### **6.08 SERVICE MAST INSTALLATION – RESIDENTIAL, SOCKET 100 THROUGH 320-AMP - 120/240 VOLTS SINGLE-PHASE 3 WIRE**

See drawing 6.08.1 for details.

OPPD furnishes, installs, and maintains: ○

1. Overhead service cable
2. Cable wire grip
3. Compression-type connectors
4. Socket-type meter(s)



The Customer furnishes, installs, and maintains: Δ

5. Meter socket (Use drawing 7.05.3 for a duplex, or drawing 6.08.3 for a 3-plex.)
6. Galvanized rigid steel conduit service mast with 1 ½" diameter for 100 to 150 amp, 2" diameter for 200 amp service entrance or 2½" diameter for 320 amp service entrance, flashing, and storm collar. The mast must be securely bridged between rafters. No coupling is to be in the top 10 feet of conduit.
7. ½" x 8' copper clad supplemental ground rod per current "National Electrical Code".
8. Continuous copper ground wire, not less than a #6 AWG, from ground rod to meter socket.
9. Rain-tight service head.
10. OPPD-approved cable wire holder.

**NOTES:**

- A. Refer to Sections 6.01 – 6.08 for installation and service requirements.
- B. A minimum clear working space of 2'-6" above, below and on both sides of the metering enclosure, for working clearance, as well as 3 feet horizontally in front of the metering, shall be provided and maintained, by the customer, at all times. Reference NEC 110.26.
- C. Leave wire ends a minimum of 18" long for connection by OPPD.
- D. The diagonal distance from the nearest edge of a balcony or deck handrail to the service conductor shall be 8 feet minimum.
- E. The distance between the service attachment and weather head shall be 6" maximum. The service attachment shall always be below the weather head.

**6.09 WALL INSTALLATION – RESIDENTIAL, SOCKET FROM 100 TO 320-AMP - 120/240 VOLTS SINGLE-PHASE 3 WIRE**

See drawing 6.09 for details.

OPPD furnishes, installs, and maintains: ○

1. Overhead service cable

2. Cable wire grip
3. Compression-type connectors
4. Socket-type meter(s)

The Customer furnishes, installs, and maintains:  $\Delta$

5. J-Hooks for attachment to studs, either 8" for veneer, or 12" for brick veneer.
6. Meter Socket (Use drawing 7.05.3 for a duplex, or drawing 6.08.3 for a 3-plex.)
7. Schedule 80 PVC plastic, EMT, or RIGID steel conduit service riser with 1 ½" minimum diameter for 100 or 150-amp service, 2" minimum diameter for 200-amp service, or 2½" minimum diameter for 320-amp service.

The customer is to use no T-condulet conduit bodies in the conduit ahead of the meter.

8. ½" x 8' copper clad supplemental ground rod per current "National Electrical Code".
9. Continuous copper ground wire, not less than a #6 AWG, from ground rod to meter socket.
10. Rain-tight service head.

**NOTES:**

- A. Refer to Sections 6.01 – 6.08 for installation and service requirements.
- B. A minimum clear working space of 2'-6" above, below and on both sides of the metering enclosure, for working clearance, as well as 3 feet horizontally in front of the metering, shall be provided and maintained, by the customer, at all times.
- C. Leave wire ends a minimum of 18" long for connection by OPPD.
- D. The diagonal distance from the nearest edge of a balcony or deck handrail to the service conductor shall be 8 feet minimum.
- E. The clearance between the service attachment and weather head shall be 6" maximum. The service attachment shall always be below the weather head.

## 6.10 OVERHEAD RESIDENTIAL SINGLE-PHASE and GENERAL SERVICE SINGLE and THREE-PHASE, CT INSTALLATION, (400-800-AMPS), UNDER 600 VOLTS

Refer to Section 4.06 for general notes on CT installation.

Refer to Section 7.07 for Residential underground CT installation details.

Refer to Section 8.06 for General Service underground CT installation details.

See drawing 6.10 for installation details.

OPPD furnishes, installs, and maintains: ○

1. Meter and instrument wiring. (See Chapter 4)
2. Overhead service cable.
3. Cable wire grip.
4. Compression-type connectors.

OPPD furnishes and the Customer installs and maintains: □

5. Current transformers. For lug connections on current transformers up to 600 amperes, minimum bolt size is 3/8". For over 600 amperes, minimum bolt size is 1/2". For all services, two-bolt lugs are required, and one-bolt lugs are not allowed.
6. Meter socket for CT application.

The Customer furnishes, installs, and maintains: △

7. J-Hooks for attachment to studs, either 8" for veneer, or 12" for brick veneer.
8. Weatherproof, side-hinged, metering transformer cabinet per "National Electrical Code" grade steel of adequate size for the instrument transformers and all wiring connections. (See Section 4.06).
9. Schedule 80 PVC plastic, EMT or RIGID steel conduit service riser, sized per the NEC. The customer is to use no T-condulet conduit bodies in the conduit ahead of the metering.
10. Conduit straps. (As required per NEC)
11. Rain-tight service head.
12. Grounding, in accordance with applicable codes. Continuous copper ground wire, not to be less than a # 6 AWG. The service

entrance neutral shall be bonded to the current transformer cabinet.

13. 1" conduit from instrument cabinet to meter socket.

**NOTES:**

- A. The Customer shall consult with OPPD before this installation is planned or started.
- B. Minimum 36" clear space must be provided in front of metering transformer cabinet to allow for full door opening.
- C. A minimum clear working space of 2'-6" above, below and on both sides of the metering enclosure, for working clearance, as well as 3 feet horizontally in front of the metering, shall be provided and maintained, by the customer, at all times.
- D. Leave wire ends a minimum of 36" long for connection by OPPD.

**6.11 FREE-STANDING SUPPORT FOR OVERHEAD SERVICE – BY CUSTOMER**

A residential customer in an area with overhead distribution lines may elect to accept overhead service on a customer-provided freestanding service pole on their property instead of on their house. Since OPPD is not responsible for wiring down-stream of the meter, the customer must then install his own overhead or underground wires from the meter pole to the house.

Overhead permanent service pole requirements are similar to temporary overhead service pole requirements, as shown in Chapter 5.

**6.12 GENERAL SERVICE, 100 TO 320 AMP, SINGLE-PHASE SOCKET, MAST OR WALL INSTALLATION**

Mast Installation will be similar to Section 6.08.  
Wall installation will be similar to Section 6.09.

**6.13 GENERAL SERVICE, 100 TO 200 AMP, THREE-PHASE SOCKET, MAST OR WALL INSTALLATION**

Mast installation will be similar to Section 6.08.  
Wall installation will be similar to Section 6.09.

**6.14 GENERAL SERVICE 320 AMP THREE-PHASE 120/208V OR 120/240V 4W OVERHEAD & UNDERGROUND SOCKET METERING**

See drawing 4.02.15.

A 320 amp socket is available for 120/208V, or 120/240V, three-phase 4-wire

service.

The customer furnishes and installs meter sockets. OPPD furnishes, installs and maintains socket-type meters. When service entrance conductors are larger than 250 KCMIL, please call the ESD, or AE. See Section 1.02 for telephone numbers. With sufficient notice, OPPD can provide CT metering at no additional cost, to accommodate the customer's conductors.

Mast Installation will be similar to Section 6.08.

Wall installation will be similar to Section 6.09.