

## Section 5 Electric Metering: General

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### 5.1. Scope

This section is designed to help applicants, engineers, and contractors plan acceptable electric metering installations for the electric service supplied by Pacific Gas and Electric Company (PG&E/the Company).

### 5.2. General Conditions and Responsibilities

#### 5.2.1. Applicant Responsibilities

The applicant must provide, install, own, and maintain the following equipment and structures listed in Item 5.2.1.A. through Item 5.2.1.G.

- A. All meter sockets and enclosures, metering transformer cabinets, and switchboard service sections intended for utility use, unless PG&E permits a specific exception.
- B. Use only ring-type meter sockets, enclosures, switchboards, and other metering equipment approved both by PG&E and the Electric Utility Service Equipment Requirements Committee ([EUSERC](#)).
- C. For Overhead Service: Service entrance conductors, conduit, and a weatherhead to the point of attachment to PG&E's overhead service conductors.
- D. For Current-Transformer Panels and Switchboards: Lugs, an underground service-termination pull box, and a separate current-transformer cabinet and meter box.
- E. **Indoor Meter Panels** (New Requirement)
  1. **All Meter Panels:** Individual, residential, or nonresidential applicants with a meter panel rating of **any size**, installed inside a meter room or other structure, must follow all of the requirements described below.
    - a. Install, own, and maintain a separate, nominal, **2-inch** diameter conduit with pull tape inside. The conduit and pull tape must extend from the outside surface of the building and terminate outside the meter panel or switchboard at the top of the meter section.
    - b. Ensure the **2-inch** diameter conduit and pull tape exit the outside of the building a minimum of 8 feet and a maximum of 10 feet above ground. The open end of the conduit that is exposed to the outside must have a removable, temporary cap or plug.
    - c. Do not use the conduit. The conduit is for PG&E's metering equipment only. See additional requirements in Item 5.2.1.G. on Page 5-2.

2. **Meter Panels 200 Kilowatts (kW) or Greater:** Individual, nonresidential applicants with a meter-panel rating of 200 kW or greater, installed inside of a meter room or some other structure, must install, own, and maintain **two separate conduits** with pull tape inside each, as described below.
- a. A nominal, **1-inch** diameter conduit extending from the telephone-service location and terminating in the meter section of the electric panel.
  - b. A nominal, **2-inch** diameter conduit as described in Item 5.2.1.E.1. on Page 5-1.

**NOTE: A 200 kW minimum, 3-phase(Ø) meter panel is defined as one of the following:**

- 277/480 volts, 4-wire wye, and minimum 400 amperes
- 120/208 volts, 4-wire wye, and minimum 600 amperes
- 120/240 volts, 3-wire delta, and minimum 600 amperes
- 120/240 volts, 4-wire delta, and minimum 600 amperes

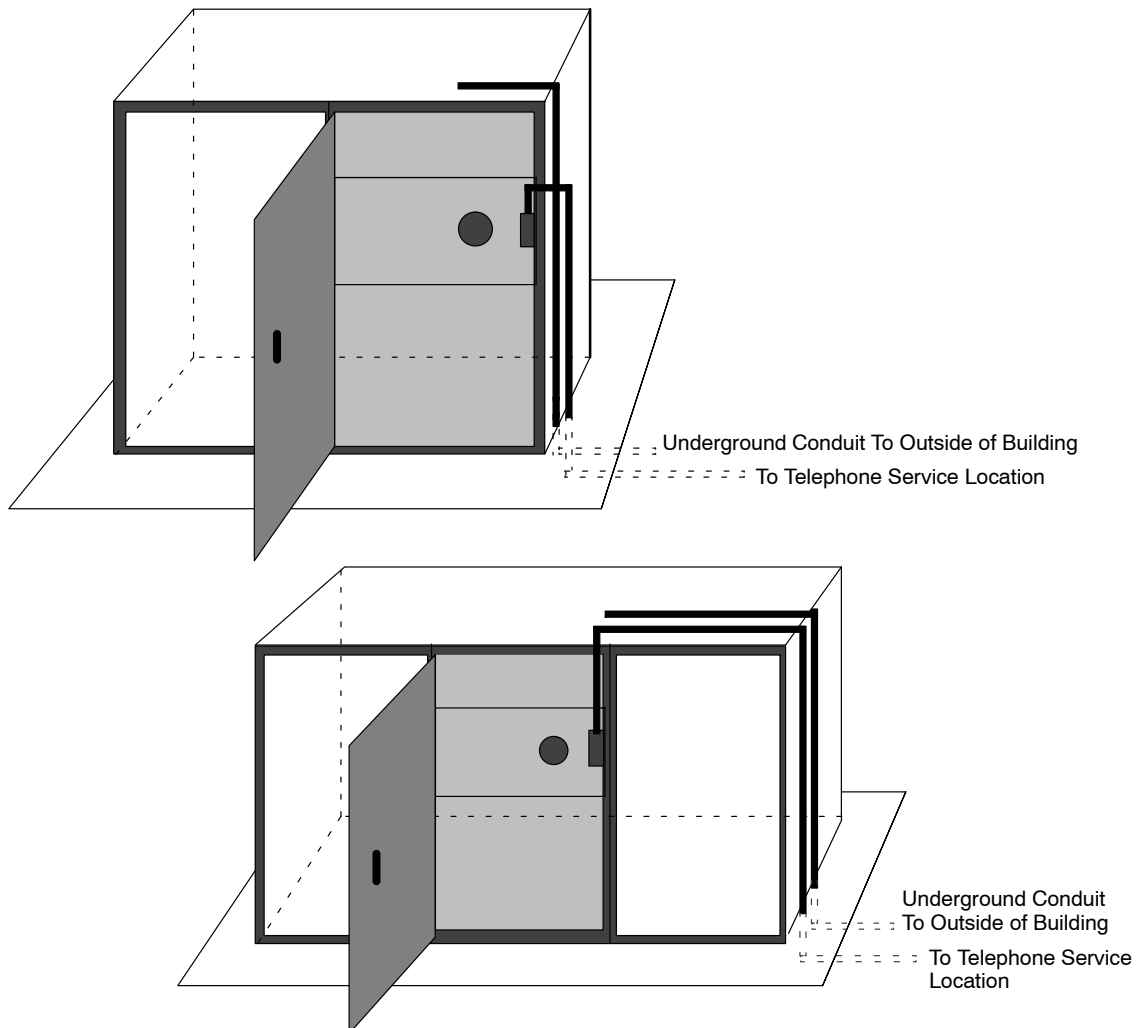
**F. Outdoor Meter Panels (Updated Requirement)**

Individual, nonresidential applicants with a meter panel rating of **200 kW or greater** must install, own, and maintain a separate, nominal, **1-inch** diameter conduit with pull tape inside. The conduit and pull tape must extend from the telephone service location and terminate in the meter section of the electric panel.

See additional conduit requirements in Item 5.2.1.G. below.

- G. For conduits installed above ground, the conduit type can be electrical metallic tubing (EMT) or better. For conduits installed underground, in floors, or in concrete, the conduit must be made of rigid steel. For underground installations, the conduit must exit the pad on the outside of the switchgear...**not** inside the switchgear. See Figure 5-1, “Preferred Location of Conduits,” on Page 5-3.
- H. For specifications regarding the best locations for equipment, ask your local service planner to **contact PG&E’s electric metering department**. Questions may include the prime location for a phone interface box, the required point for conduit to exit the meter room or building, or, your options in a remote location when a telephone line is unavailable.

- I. Transformers rated at 120/240 volts, three-phase, 4-wire, with delta-connected service installed, must have the “high leg” (i.e., power leg) conductor located either in the center phase or on the right phase position. This conductor must be marked (i.e., identified) properly and designated as the “C” phase for metering purposes. On all self-contained services, the power leg must be located in the far right phase position, usually designated as the “C” phase.
- J. Applicant-owned wiring that extends from the distribution section (i.e., branch circuits) must *not* pass through any section sealed by PG&E.
- K. Single-metered applicants with single-phase or three-phase services above 400 amperes should consider installing a switchboard service section as described in [Section 10](#), “Electric Switchboards: 0 Through 600 Volts.”



**Figure 5-1**  
**Preferred Location of Conduits**

### 5.2.2. PG&E's Responsibilities

PG&E will provide, install, own, and maintain all meters and metering transformers for full-service applicants. For direct access applicants, refer to [\*Direct Access Standards for Metering and Meter Data \(DASMMMD\) in California \(March 1999\)\*](#).

### 5.3. Electric Meters: General Location Requirements

To determine the most satisfactory meter location and to ensure that adequate space is provided for the meter, consult a PG&E service planner in the project's preliminary planning stage.

When an electric panel is being relocated or replaced, and PG&E's existing service conductor will be used, as determined by PG&E, the panel must be positioned so the service conductor can be reconnected properly. The existing service conductor must be able to be reconnected to the underground electric panel termination lugs or the external service-entrance conductors coming out of the weatherhead for overhead services. If PG&E needs to install additional service conductors or cables to perform the reconnect, the work and material would be at the applicant's expense.

**Applicants must have approval by the local meter shop before locating meters away from (remote from) the termination enclosure. See Figure 6-5 on Page 6-8 as an example of remote metering.**

*Applicants can avoid the time and expense of installing additional facilities or relocating existing facilities by consulting PG&E early in the process.*

#### 5.3.1. Basic Meter Location Requirements

The following five lettered items explain PG&E's basic meter location requirements and are subject to PG&E's review and approval to ensure compliance. Applicants must ensure that:

- A. Locations have at least one clear and unobstructed path or entrance providing access to the working space.
- B. Nonportable illumination is provided for the working spaces around meters, metering-related equipment, and associated facilities when meters are located indoors. Also, applicants must provide a hallway or aisle leading to the meter(s) and metering equipment.
- C. Locations in elevated areas (e.g., balconies or mezzanines) or in depressed areas (e.g., basements, cellars, or underground rooms) must be accessible by either a ramp or clear stairway that conforms to building-code requirements.
- D. PG&E has provided advanced approval when potential locations are not in conflict with prohibited meter locations and are on walkways, alleys, or driveways that provide access to commercial or industrial property. PG&E may grant exceptions if other suitable locations are not available.

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- E. PG&E personnel have full access to inspect, read, or test metering facilities, whether the facilities are located indoors or outdoors. Applicants must ensure that all metering and service facilities are accessible and free of obstacles at all times when the metering equipment is energized. Applicants must maintain these accesses both *during* and *after* landscaping activities, fence installations, building construction, building renovation, remodeling activities, etc.

### 5.3.2. Prohibited Meter Locations

The following locations are *not* acceptable for electric meters.

- A. Locations deemed hazardous to either personnel or equipment, or locations found to be unsuitable for entry. These locations include:
1. Inside any residence.
  2. Directly over any stairway, ramp, or steps.
  3. Any area where personnel may contact either exposed, high-voltage conductors or equipment in motion.
  4. Any area that is accessible only through a trapdoor.
  5. Any elevator shaft.
  6. Any doorway, hatchway, or drive-through pathway designed for picking up goods via a window, where opening the meter panel will block the through-area.
  7. Areas where entry may be restricted or controlled because of medical, health, environmental, or other safety-related issues.
  8. Any exterior bedroom wall or bedroom closets. These locations are unsuitable because of noise concerns.
- B. Underground vaults or enclosures.
- C. Areas where vibration, moisture, excessive temperature, fumes, or dust may damage the meter or interfere with its operation.
- D. Areas within or requiring access through any restroom, bathroom, shower, powder room, toilet, or private-type room.
- E. Portions of buildings where landscaping, fencing, or other construction activities will make the meter inaccessible.
- F. Inside garages for single-family residences.
- G. In a metallic cabinet (including doors), room, enclosure, or location that blocks or interferes with the radio frequency signal transmissions that are necessary for PG&E to operate its SmartMeter™ Advanced Meter Reading system. This applies only to meter panels that meet all of the following criteria.
- Single metered
  - Less than 400 amps continuous rating
  - Wall mounted

### **5.3.3. Locating and Grouping Multiple Meters**

When it is practical, PG&E will supply two or more meters from one service and will group the meters at one location. Also, see [Section 2](#), “Gas Service,” Subsection 2.3.5., “Multiple Buildings Located on One Lot,” on Page 2-11, and [Section 3](#), “Electric Service: Underground,” Subsection 3.2.5., “Installing Overhead and Underground Service for Two or More Buildings on One Lot,” on Page 3-4.

### **5.3.4. Electric Meter Rooms**

Applicants must ensure that meter rooms meet the following requirements.

**NOTE:** Meter rooms may be used for communications equipment.

- A. Meter room specifications must be approved during the initial stages of construction. Submit drawings to your local service planner for the planner’s review and for review by the local meter shop.
- B. Designs must include a designated room for electric service, meters, and metering equipment.
- C. Meter rooms must be located inside of buildings and must be clear of obstructions.
- D. Meter rooms must have a doorway that opens to the outside of the building or into an area that is available to the public.
- E. Meter rooms must have a clear working space as described in Subsection 5.4.4., “Barricades,” on Page 5-9.
- F. Meter rooms must *not* include gas meters.
- G. Meter rooms may be locked if the applicant provides PG&E with independent access to the room. Consequently, the meter room must be locked in one of the following ways.
  - 1. Using a double-lock arrangement, provided by the applicant, with one lock for the applicant and one lock for PG&E.
  - 2. Using an acceptably located key box, provided and installed by PG&E, to hold the applicant’s key.
- H. Meter rooms must be identified by appropriately marking the doors or doorways as described in Subsection 5.5.1., “Properly Identifying and Marking Meters,” on Page 5-10.
- I. **Meter rooms must have conduit(s) and pull tape installed as described in Subsection 5.2.1, “Applicant Responsibilities,” on Page 5-1 through Page 5-3.**

## **5.4. Meter Clearances, Enclosures, and Protection**

### **5.4.1. Pole-Mounted Communication Service and Meter Equipment**

Applicants must ensure that communication service and meter equipment is placed so that the bottom of the enclosure is a minimum of 7 feet to a maximum of 9 feet from the finished grade.

## A. Non-Pole-Mounted Meters

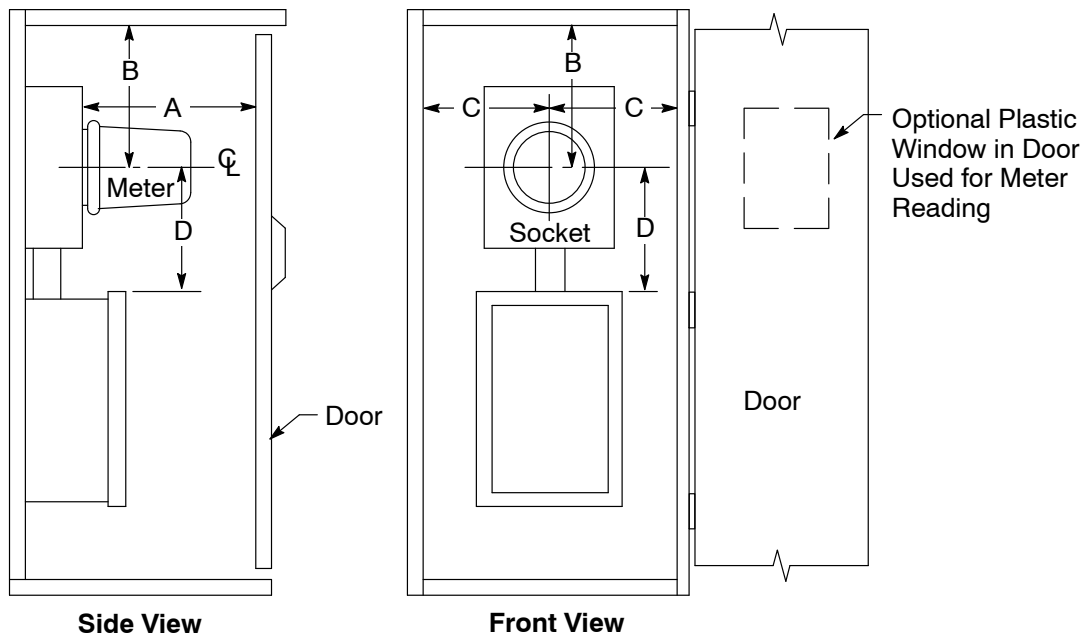
When installing non-pole-mounted meters in an outdoor location, applicants must ensure that the meters meet the following requirements.

1. Electric meters must be located 75 inches maximum and 48 inches minimum above the ground or standing surface. The meter height must be measured to the horizontal centerline of the meter axis.
2. When meters either are enclosed in a cabinet or installed indoors in a meter room, the *maximum* meter height is the same as for outdoor installations, or 75 inches maximum. The *minimum* meter height must be 36 inches as measured from the ground or standing surface to the centerline of the meter.
3. For switchboard service with a current transformer (CT) compartment, the maximum meter height is 72-1/2 inches, as illustrated in [Section 10](#), Figure 10-21, “Standard Switchboard Service Section With CT Compartment and Filler Panel, 0 Through 600 Volts,” on Page 10-30. This applies both to indoor and outdoor installations.
4. PG&E’s installed meter height is 66 inches as measured from the standing surface to the horizontal centerline of the meter axis. For all individual service-termination and meter-panel installations that are field mounted, see [Section 6](#), “Electric Metering: Residential,” Figure 6-2, “Typical Underground Service-Termination Enclosure, Combination Meter Socket Panel (Residential, 0 Through 225 Amperes), on Page 6-5, and Figure 6-3, “Typical Service-Termination Enclosure, Combination Meter Socket Panel for a Class 320 Meter (Residential/Commercial, 120/240-Volt, 226- Through 320-Ampere Service),” on Page 6-6. The 66-inch meter height only applies to individual service terminations and meter-panel, single-family installations.

All metering and service-termination facility installations are subject to PG&E review and approval. Taps for fire pump equipment must be installed on the supply (i.e., line) side of the main service switch/disconnecting means. Fire pump wiring configuration, either 3-wire or 4-wire, should be the same as the main switch.

### 5.4.2. Meter Cabinet Enclosure Clearances

Applicants must ensure that meter cabinet enclosures are large enough to provide easy access to the meter and have an adequate working space for maintaining the meter. The cabinet requires a side-hinged door that can be latched open at 90° or more. Also, the enclosure and service equipment must comply with local code requirements. Detailed dimensional requirements are shown in Figure 5-2, “Meter Cabinet Enclosure Clearances,” and Table 5-1, “Meter Cabinet Enclosure Clearance Dimensions,” on Page 5-8. Finally, applicants must ensure that a 3-foot clearance is maintained between a pad-mounted cabinet enclosure and the base of the pole.



**Figure 5-2**  
**Meter Cabinet Enclosure Clearances**

**Table 5-1 Meter Cabinet Enclosure Clearance Dimensions**

<b>Dimension A</b>	11-inch minimum / 15-inch maximum.
<b>Dimension B</b>	9-inch minimum to the edge of the access opening.
<b>Dimension C</b>	10-inch minimum to the edge of the access opening.
<b>Dimension D</b>	8-inch minimum from the meter centerline to the top of any protrusion below the meter or to the bottom of the enclosing cabinet.

### 5.4.3. Meter Height and Working Space

Applicants must ensure that the meter's height is not more than 75 inches from the standing surface to the centerline of the meter. For indoor installations, the minimum height is 36 inches. For outdoor installations, the minimum height is 48 inches.

**EXCEPTION:** In locations where snow accumulates, the minimum installed meter height may be increased. Specific meter height requirements depend on the meter's location. Consult the local PG&E electric meter department for specific meter height requirements in snow-accumulation areas.

**Working space is defined as an area in front of the meter, the meter enclosure, the CT section, and the service-conductor termination and pulling facilities.** A working space permits access to the equipment and provides a safe working environment for personnel.

**A working space must be located entirely on the applicant's property.** Ask your local service planner to contact the PG&E electric meter department to review and approve of any exceptions to the Company's requirements for metering work spaces and locations.

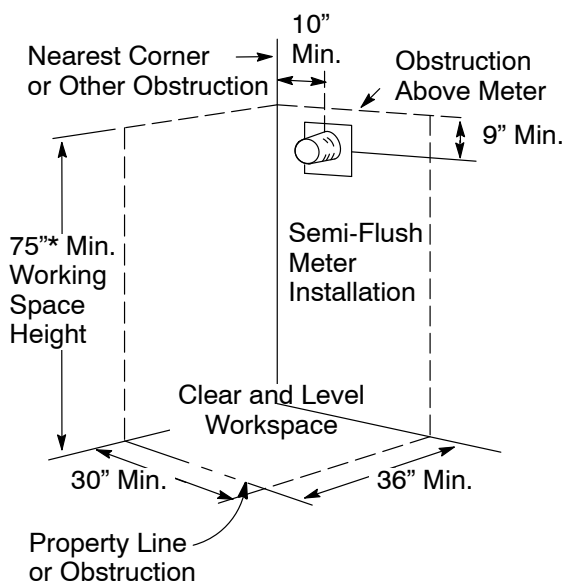
**The working space must be clear and unobstructed at all times.** See Figure 5-3, “Semi-Flush Meter Installation,” and Figure 5-4, “Enclosed Meter Installation,” below, for the dimensional requirements of working spaces.

See Figure 2-20 on Page 2-31 for electric and gas meter set separation dimensions and clearances.

In some installations, meters are installed in one of three ways.

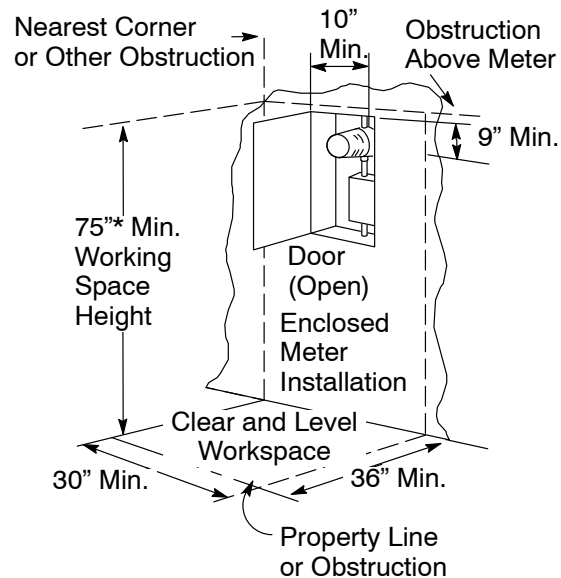
- Above concrete pads (i.e., housekeeping pads)
- Above elevated platforms
- In switchboards mounted on concrete support pads

**When using one of these three types of installations, the concrete pads and platforms must extend a minimum of 48 inches as measured from the outside of the equipment’s outer door.**



\* 78" minimum for installations other than individual, field-installed meter panels.

**Figure 5-3  
Semi-Flush Meter  
Installation**



**Note:** To allow the cabinet door to open fully (90° or more), increase the 30" minimum-width dimension of the meter working space, as necessary.

**Figure 5-4  
Enclosed Meter  
Installation**

#### 5.4.4. Barricades

In some instances, a meter may be located in an area where the meter or working space is exposed to vehicles or hazardous conditions. In these cases, a permanent barricade outside of the working space is required. For vehicular traffic, applicants must ensure that a suitable barricade is erected. A suitable barricade for vehicular traffic is concrete-filled steel pipes, 3 inches or greater in diameter, securely set in an adequate concrete pour for support. Also suitable for these conditions is a sleeve-mounted vehicle barricade where the sleeves are set in concrete.

Applicants also must ensure that suitable barricades are erected to protect personnel. A suitable barricade for this purpose is a heavy, wire-mesh fencing that is securely supported and is capable of protecting people from the hazards created by the moving parts of stationary machinery.

#### **5.4.5. Meter Protection**

Applicants must ensure that meters and metering equipment are enclosed in a protective cabinet in the following situations.

- A. For *all* installations, when the meter is less than 48 inches high, as measured from the horizontal centerline of the meter to the standing surface.
- B. When the meter is mounted on, or recessed in, any wall at a school or similar establishment and public safety is an issue.
- C. When environmental problems are anticipated.
- D. When vandalism is anticipated.

### **5.5. Meter Identification and Seals**

#### **5.5.1. Properly Identifying and Marking Meters**

Where individual meters serve a remote location, or where meters are grouped at a common location (both residential and nonresidential), applicants must ensure that the mark sites and meters are identified properly. Applicants must ensure that each individual meter position, its service disconnecting means, and the unit or dwelling being served is marked clearly and permanently. The following three examples describe acceptable permanent markings.

- A. An identification plate attached by screws, rivets, or weatherproof adhesive.
- B. Paint that cannot be removed using common solvents. Apply the paint either by using a stencil or by carefully hand-lettering the meter.
- C. Commercially available decals.

The identification must be legible. It must include a specific apartment number, a street number, use, or location. Ensure that the information is verified. A store name or other generic description may be included, but does *not* constitute acceptable identification when used alone. PG&E will *not* install meters without a permanent address or location mark at each meter location.

When it is appropriate, applicants should include the area being served by the meter when permanently marking the site.

PG&E may make an *exception* to the rules for permanent marking when the Company is requested to set a meter for a single-family home that is under construction. In this case, PG&E will set the meter if the home's address is noted clearly and legibly either on the street side of the dwelling or on the lot in front of the dwelling. PG&E understands that during construction, the "permanent" address sometimes is not available when the dwelling is ready for the meter to be set.

### 5.5.2. Sealing Meters and Metering Equipment

PG&E will seal all meters and enclosures for *utility* meters, metering equipment, and service-entrance equipment using PG&E's seals.

**Applicants cannot locate or install equipment within meter sections, meter panels, switchboard sections, or equipment enclosures with existing PG&E seals unless they receive authorization from the PG&E electric meter group.**

*EXCEPTION:* Equipment that provides access for replacing over-current protection fuses is exempted.

Only an authorized PG&E representative can break the PG&E seal.

Certified meter service providers (MSPs) also will seal all meters and enclosures for meters, metering equipment, and test-bypass switches owned by their respective companies with their companies' seals, as described in the [Direct Access Standards for Metering and Meter Data \(DASMMD\)](#) in California (March 1999) document.

### 5.5.3. Locking Provisions

All transformer-rated and all three-phase installations must have provisions for sealing or locking all of the main service switches or breakers in a permanent (off) position. When installing service equipment that contains multiple service (disconnect) switches, the applicant must ensure that provisions for locking each individual service (disconnect) switch are provided. The applicant must ensure that the locking mechanism is a permanent installation and is made of a rigid metal. Finally, the applicant must ensure that these provisions are sealable and lockable with a padlock having a 5/16-inch lock shaft.

## 5.6. Meter Types and Connections

The following requirements refer specifically to meter types and connections. Applicants must follow the guidelines listed below.

- A. When installing a new service, ensure that the panel enclosures rated at 125 amperes are Class 100 ampere services. Services and enclosures rated at 225 amperes are Class 200 ampere services.
- B. Ensure that transformer-rated meters have a current rating of less than 100 amperes (e.g., CL5, CL10, or CL20).

- C. Do **not** use K-based (i.e., bolt-in) meters when designing new installations. Services that need 400 amperes (continuous) require current-transformer facilities.
- D. Ensure that sockets meet the requirements of Underwriters Laboratories (UL) Standard UL-414, “Standard for Meter Sockets.”
- E. Locate potential taps, including the neutral connection, behind a sealed panel.
- F. Ensure that the meter manufacturer designs and fabricates transformer-rated meter sockets that are installed on hinged panels for back connection.

Applicants should use Table 5-2, “Meter Socket Requirements (Number of Jaws),” below, to find specific meter-socket requirements and to ensure they provide the proper equipment.

**Table 5-2 Meter Socket Requirements (Number of Jaws)**

Service			0–225 Amperes	226–320 Amperes <sup>1</sup>	400 Amperes and Above
Voltage	Phase	No. of Wires	Self-Contained	Self-Contained	Transformer Rated
120/240	1	3	4	4 <sup>2</sup>	6
120/208 <sup>3</sup>	1	3	5	—	—
120/208Y	3	4	7	—	13 or 15 <sup>4</sup>
240 <sup>5</sup>	3	3	5	5	8
120/240	3	4	7	—	13 or 15 <sup>4</sup>
277/480Y	3	4	7	—	13 or 15 <sup>4</sup>

<sup>1</sup> A socket-based, Class 320-ampere (continuous) meter will be installed on a Class 400 meter panel, rated at 80% continuous (i.e., 320 amperes). Do **not** use Class 400, bolt-in meters on new installations. Service rated at 400 amperes continuous requires current transformers to be installed.

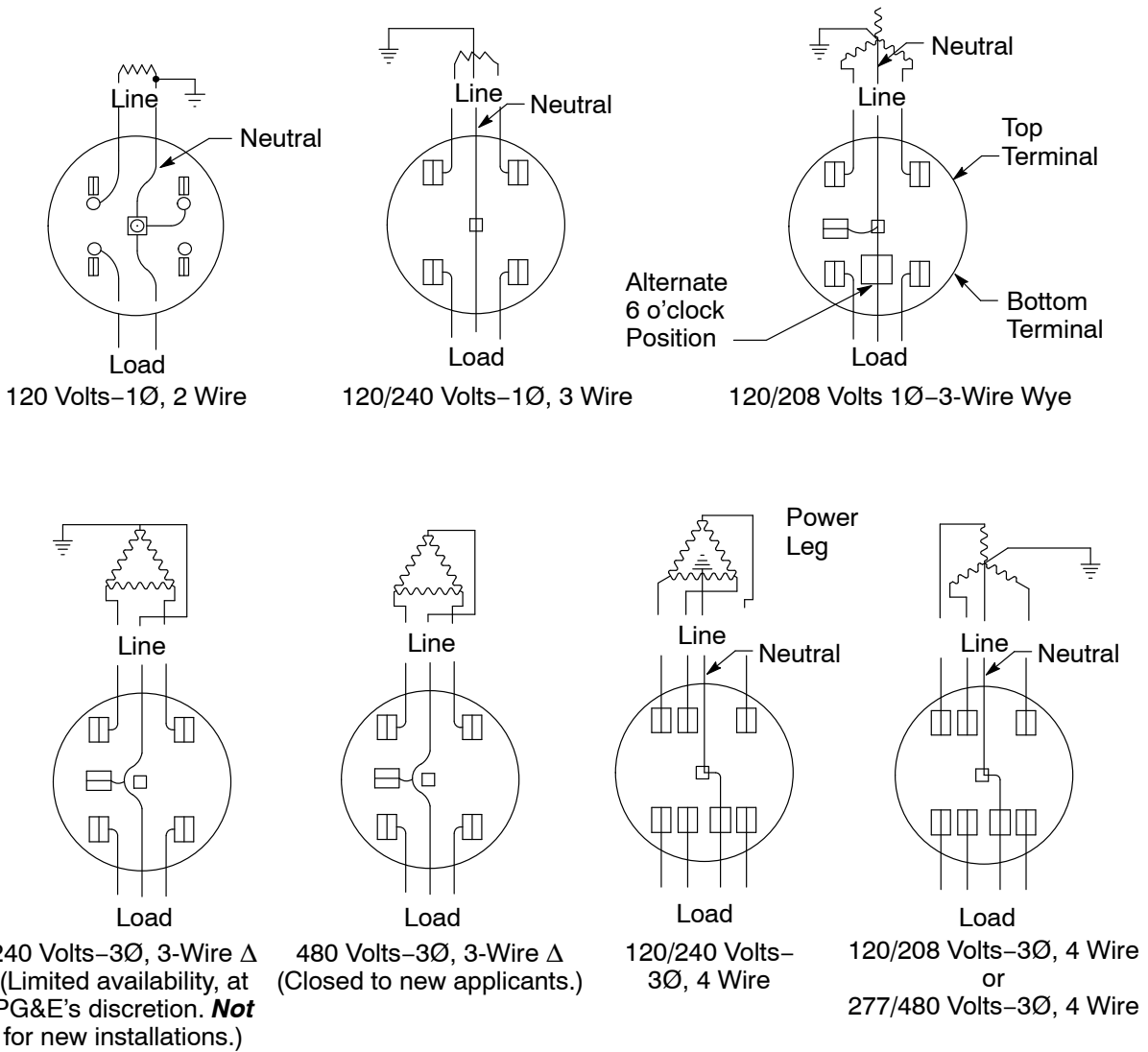
<sup>2</sup> Only use a 4-jaw meter socket for a Class 320-ampere meter for single-phase residential and commercial applications.

<sup>3</sup> In locations where PG&E maintains a 120/208-volt secondary system, 3-wire, single-phase service, typically the service is limited to what can be supplied by a main switch or service entrance rating of 200 amperes. Single-phase loads that exceed the capacity of a 200-ampere main switch or service-entrance rating usually are supplied with a 120/208Y-volt, three-phase, 4-wire service.

<sup>4</sup> The 15-jaw socket is acceptable, but not required.

<sup>5</sup> Limited availability, at PG&E’s discretion. **Not** for new installations.

Figure 5-5, "Connection Diagrams for Self-Contained Meter Sockets," and Figure 5-6, "Connection Diagrams for Transformer-Rated Meter Sockets," below, show the required connections for self-contained and transformer-rated meters.



Front Views Shown

Figure 5-5  
Connection Diagrams for Self-Contained Meter Sockets

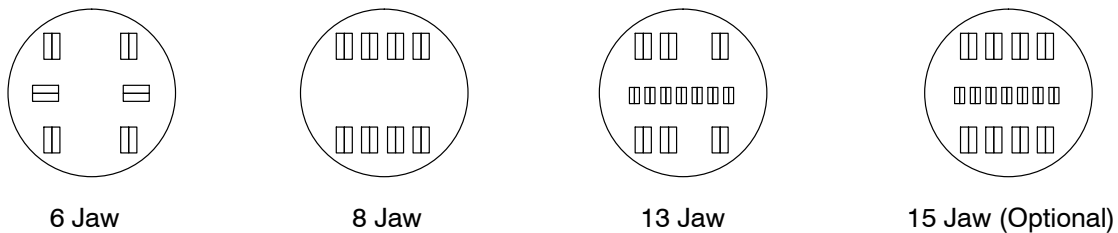


Figure 5-6  
Connection Diagrams for Transformer-Rated Meter Sockets

NOTE: PG&E is responsible for wiring transformer-rated meter sockets.

### **5.6.1. Meter Socket Adapter for Overhead-to-Underground Conversion**

Applicants may use meter socket adapters to convert existing services. Do *not* use them to establish new service. For more information, see PG&E's Document [061032](#), "Residential and Small Commercial Overhead to Underground Electric Service Conversion." Consult a PG&E service planner to determine which conversion method to use. The applicant must ensure that the meter socket adapter's grounding strap is connected to the grounded wire within the meter panel.

## **5.7. Main Service Disconnects and Switching Sequences**

### **5.7.1. Main Service Disconnects**

For each installed meter, the applicant, in compliance with applicable codes, must furnish and install a fusible switch, circuit breaker, or other approved disconnect means for controlling all of (and *only*) the energy registered by that meter. When the governing code or ordinance permits, the disconnect means may consist of a group of fusible or circuit-breaker disconnects.

Applicants do *not* have to place the main service disconnect switch adjacent to the meter. The switch may be located inside or outside of the building being served, as described in the applicable electrical codes.

PG&E prefers applicants to have provisions for individual disconnects when they use switchboards with multimeter installations.

### **5.7.2. Main Service Disconnect Switch Rated for Amperes Interrupting Capacity (AIC)**

State and local codes require the service equipment's main disconnect switch and fuse, or the circuit breaker, to be rated at the available short-circuit current value.

PG&E will design its facilities so that the short-circuit duty at the service termination will not exceed 10,000-amperes symmetrical for new, single-family, residential applicants that are supplied by an individual service drop or lateral that is rated at 225 amperes or less. This service includes mobile homes and duplexes.

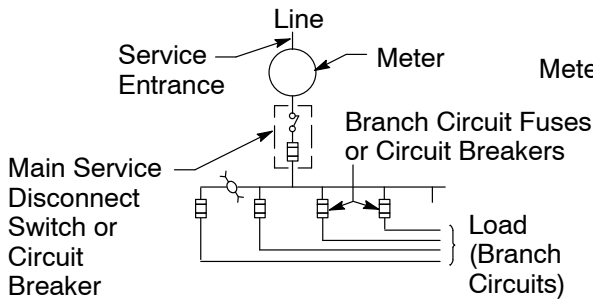
Typically, it is not feasible for PG&E to design its facilities to limit the short-circuit duty to 10,000 amperes for other electrical services; for example, a 400-ampere, multimeter, residential or nonresidential installation. For these installations, on request, PG&E will provide the maximum available short-circuit current based on the service equipment's capacity. If the applicant increases the service equipment's capacity, the maximum-available short-circuit current may be higher.

### 5.7.3. Meter and Main Service Switch Sequence

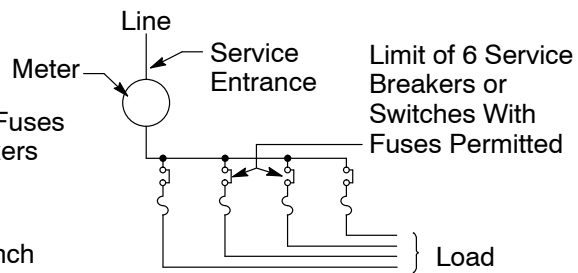
PG&E will place its meters and metering equipment ahead of (i.e., on the supply side of) the applicant's main service disconnecting means. Figure 5-7, "Single Meter With Main Service Switch," Figure 5-8, "Single Meter With Multiple Service Switches," and Figure 5-9, "Multimeter Disconnect Without Main Switch," all provide examples of this type of installation.

PG&E permits exceptions to this sequence only in circumstances where applying the electrical code requirements result in the applicant's main service disconnect means being installed ahead of PG&E's metering and metering equipment. Figure 5-10, "Multimeter Installation With Main Disconnect Switch," provides an example of this type of installation. In these instances, an individual disconnect switch also must be installed on the load side of each meter.

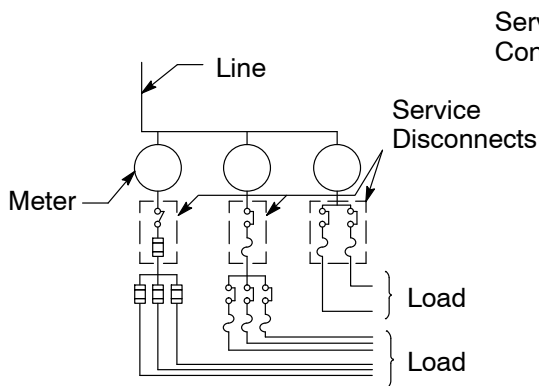
The local code jurisdiction having authority for enforcing the electrical code requirements will determine the requirements that applicants must follow when installing their means to disconnect.



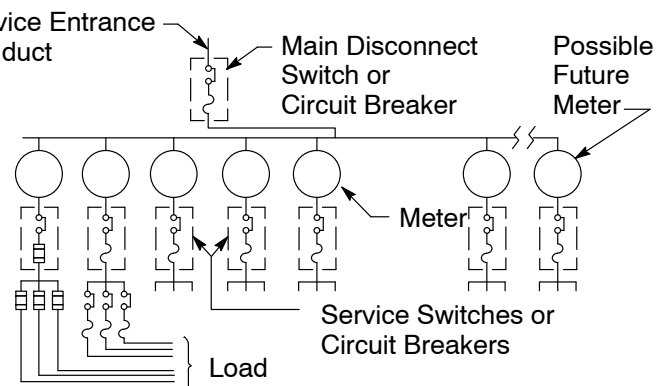
**Figure 5-7**  
Single Meter With Main Service Switch



**Figure 5-8**  
Single Meter With Multiple Service Switches



**Figure 5-9**  
Multimeter Installation Without Main Disconnect Switch



**Figure 5-10**  
Multimeter Installation With Main Disconnect Switch

## 5.8. Grounding

Applicants must bond and ground their electric services and metering equipment as required by applicable electrical codes.

Applicants must **not** use PG&E's gas piping system as the grounding electrode.

PG&E does **not** allow applicants to use either of the following two methods for grounding electric services and metering equipment.

- A. Do **not** use PG&E's gas service piping, gas risers, or meter facilities to perform electric bonding.
- B. Do **not** use PG&E's gas service piping, gas risers, or meter facilities for electric grounding. This includes using PG&E equipment in any manner that would cause the gas piping or other gas facilities to become current-carrying conductors.

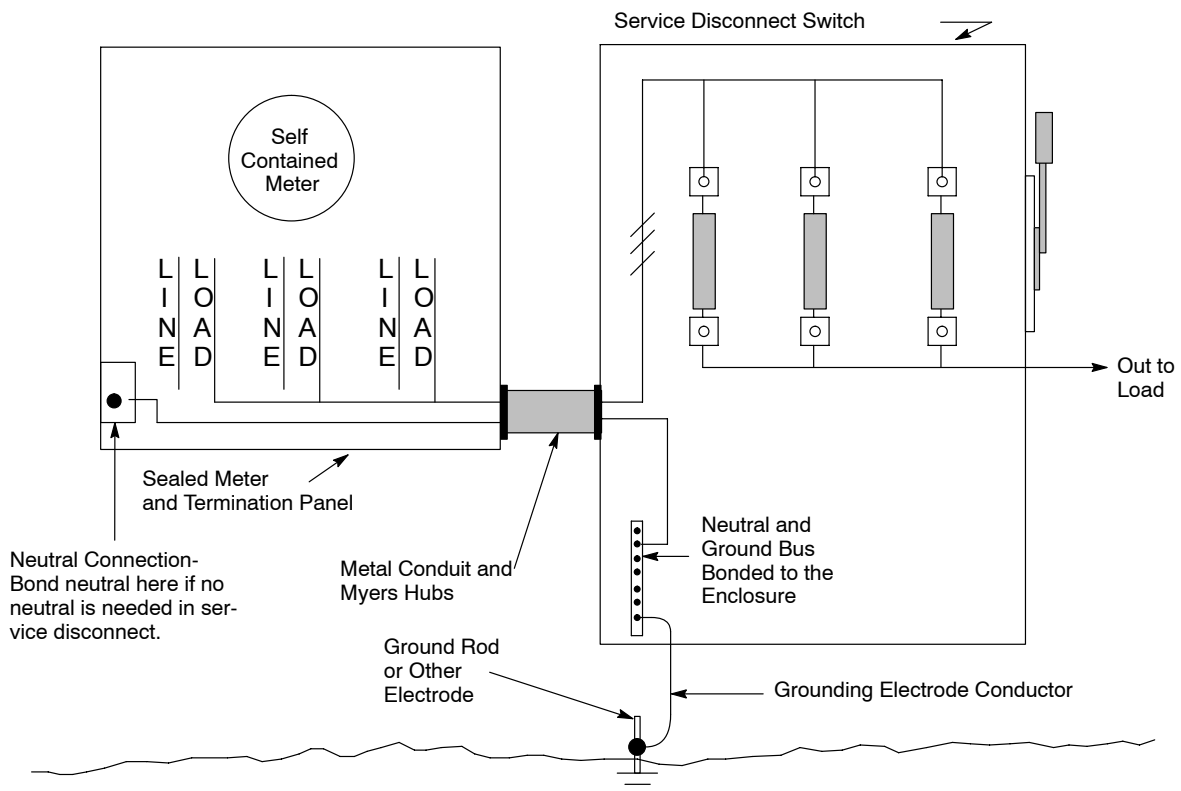
PG&E supplies single-phase, 120/240-volt and 120/208-volt services **and** three-phase, 4-wire wye and delta services with a grounded service neutral conductor. When PG&E permits a three-phase, 3-wire, 240-volt service, one phase conductor must be grounded.

***Applicants must locate the terminations for their grounding electrode conductors outside of any section that PG&E seals.*** Applicants must ensure that their terminations are designed to permit their grounding systems to be isolated, when necessary, from PG&E-supplied services.

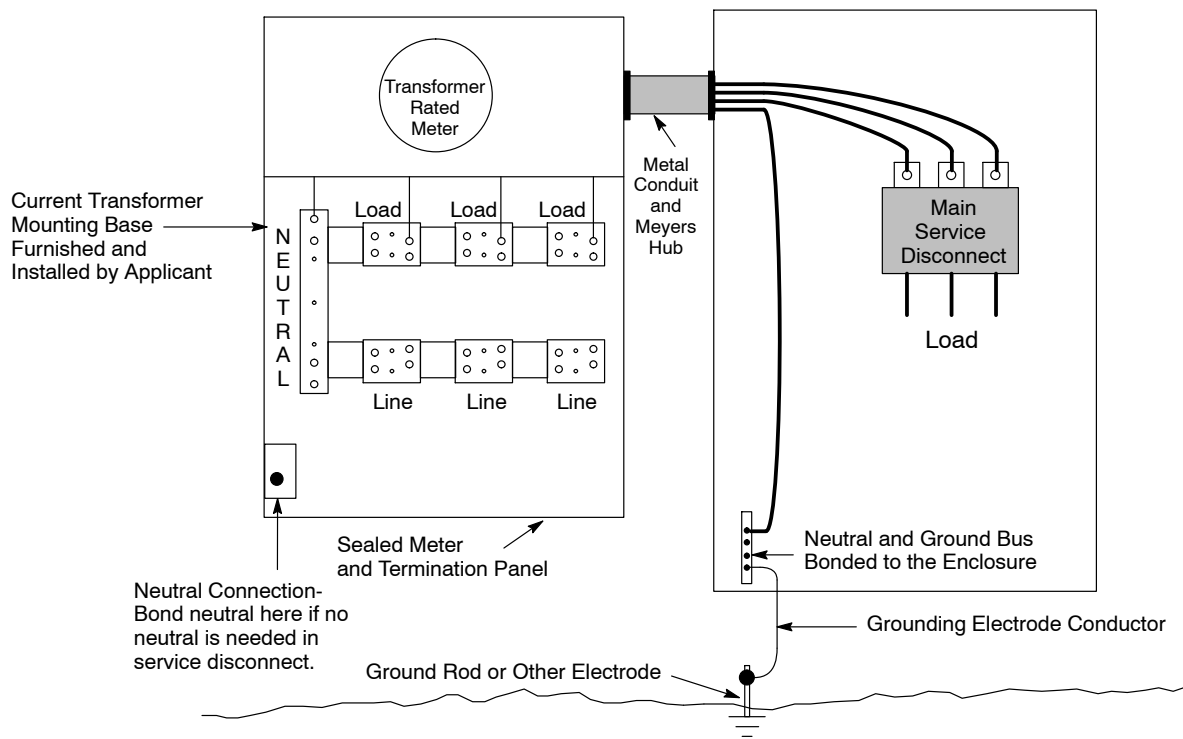
Applicants must insulate their grounding electrode conductors as mandated in the applicable section of the state of *California Electrical Code*. Applicants also must protect their grounding conductors against mechanical damage by rigid steel conduit or armor cladding. National Electric Code (NEC) requirements are satisfied when applicants place the grounding conductor inside a rigid conduit that is embedded in concrete and runs from the main panel to a subterranean location (e.g., garage). All metal poles must be bonded to an effective, grounded, fault-current path as described in the NEC requirements.

Applicants must ensure that a grounded neutral connection, which is required for metering purposes, exists in the PG&E-sealed section.

Applicants must not use re-bar as a grounding rod. Reference the following engineering documents listed in [Appendix B](#) of this manual when installing ground rods. Information about approved ground rods and clamps can be found in Document [013109](#), "Corrosion Resistant Ground Rods and Ground Rod Clamps." When ground rods are installed in concrete pads, use Document [045292](#), "Concrete Pad for Three-Phase, Loop-Style, Pad-Mounted Transformers". When ground rods are installed in equipment pads other than transformers (e.g., switchboards) install them according to their application. Finally, when installing ground rods in box pads, use Document [064309](#), "Box-Pad for Pad-Mounted Transformers," for installation information.



**Figure 5-11**  
**Grounding Outside of the Sealed Section - Self Contained Meter**

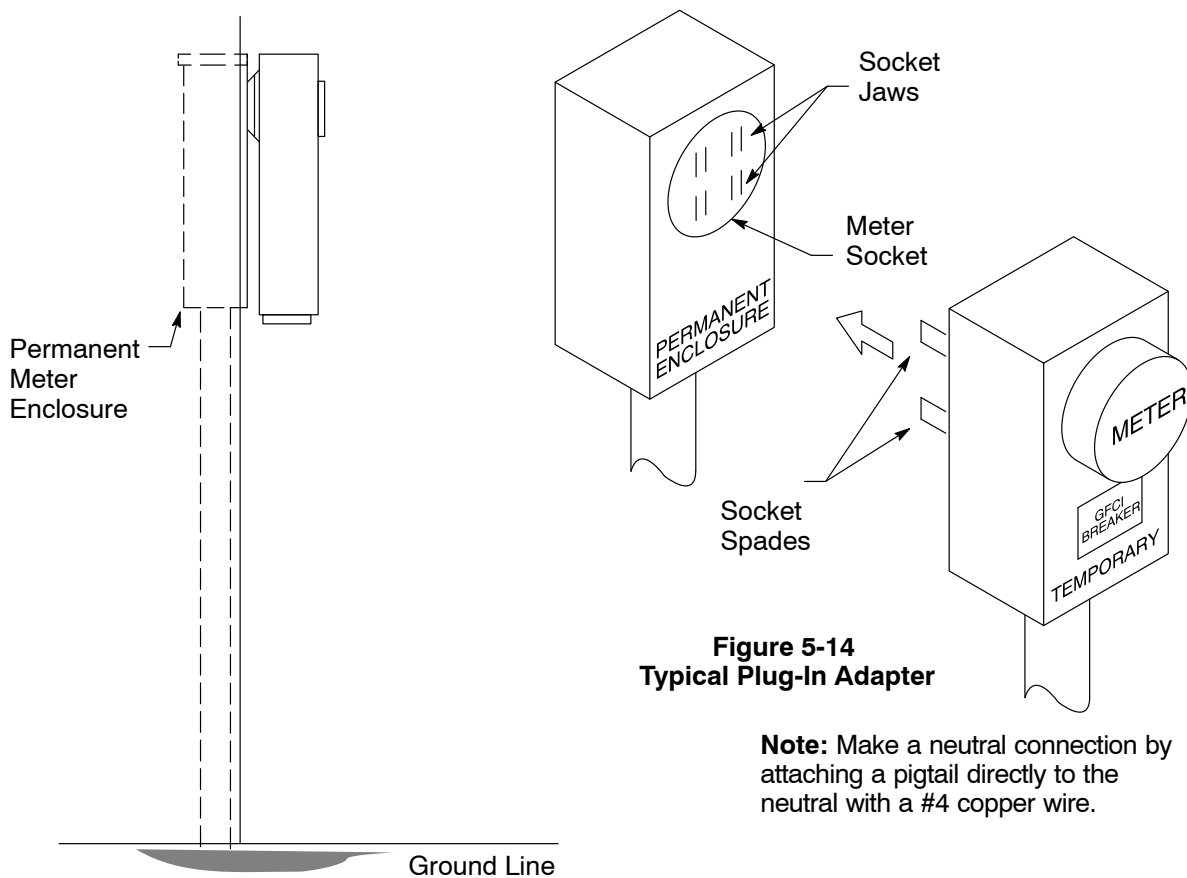


**Figure 5-12**  
**Grounding Outside of the Sealed Section - Transformer Rated Meter**

## 5.9. Temporary Service

### 5.9.1. Temporary Service Using Permanent Service Panels

To lessen the potential for damage by staples and nails during the construction phase, applicants must use only Schedule 40 or greater *rigid steel conduit* in locations where permanent service facilities will be installed and/or energized before completing the wall. The steel will protect the conduit and/or cables from damage. Applicants also must protect their grounding conductors against mechanical damage by rigid steel conduit or armor cladding that runs from the main panel to a subterranean location and is embedded in concrete (e.g., garage). The service facilities and the wall must be a permanent and stable structure. The service panel and facilities must meet all PG&E and local jurisdiction requirements. The service facilities must pass inspection by a PG&E inspector before being energized.



**Figure 5-13**  
Plug-In Temporary Service

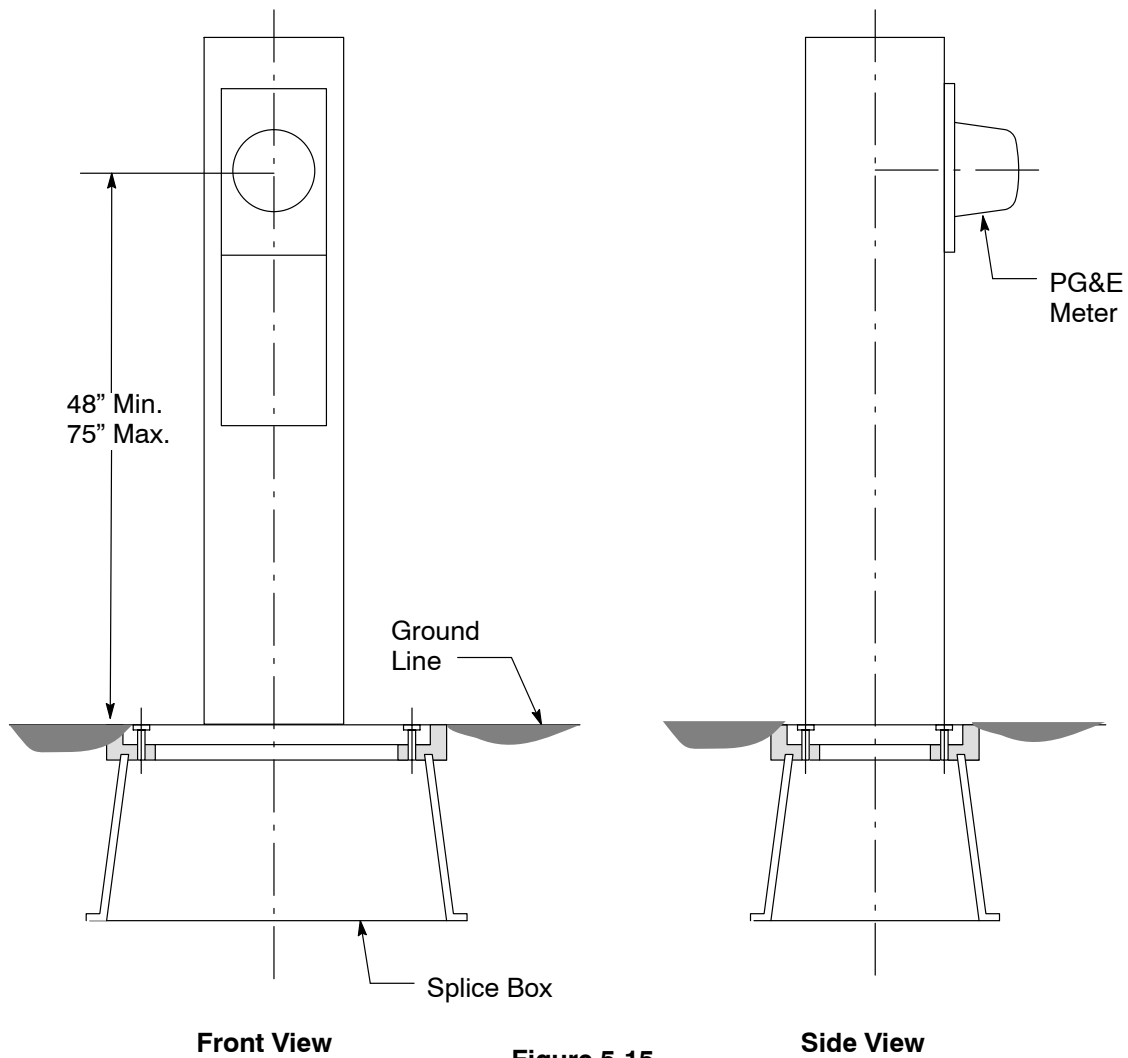
**Figure 5-14**  
Typical Plug-In Adapter

**Note:** Make a neutral connection by attaching a pigtail directly to the neutral with a #4 copper wire.

### 5.9.2. Temporary-Service Metering Pedestal

Applicants must coordinate the connection of pedestal service conductors with PG&E service planners. **Before** installing temporary-service metering pedestals, applicants must obtain any inspections and permits that are required from the local authority having jurisdiction.

Applicants must install temporary-service metering pedestals as shown in Figure 5-15, “Temporary-Service Metering Pedestal,” below.



**Figure 5-15**  
**Temporary-Service Metering Pedestal**

### 5.9.3. Temporary Plug-In Service

The local inspection authority having jurisdiction must approve all of the permanent service connections to the main service disconnect *before* an applicant installs a temporary service adapter. Additionally, the local authority having jurisdiction must approve the applicant's plan for installing and using temporary service adapters.

Applicants must install temporary plug-in service as shown in Figure 5-13, "Plug-In Temporary Service," and Figure 5-14, "Typical Plug-In Adapter," both on Page 5-18.

## 5.10. Connecting Non-Utility Power Sources to Utility Services

By enacting the [California Health and Safety Code, Division 104, Part 15, Chapter 5, Sections 119075 through 119090](#), the legislature of the state of California intended to prevent electricity generated by permanent or portable electric generators from backfeeding into a utility's electrical distribution system. In addition, [California Code of Regulations \(CCR\) Title 8, Section 2320.9](#), "Backfeeding or Interconnection," says that electrical power sources, both permanent and temporary, can *not* be connected to a premises' wiring system, or parts of such a system, unless positive means are used to prevent electricity from being transmitted beyond the premises' wiring system, or beyond any intentionally segregated parts of such a system.

**EXCEPTION:** The service utility can authorize an interconnection.

A *positive means* is defined in this CCR subpart as a device that, when used or operated, interrupts or prevents the flow of current to or from the electrical system. Also, a positive means provides the device operator or user with a visual or definite indication of the existing condition or state of the electrical system.

Before installing an applicant-owned and operated generator that may or may not operate in parallel with PG&E's system, the applicant must contact a local PG&E service planner for the interconnection requirements specific to the location where it will be used. PG&E'S Generation Interconnection Services may be reached at [gen@pge.com](mailto:gen@pge.com), or leave a message on their hotline at 415-972-5676. Also, for interconnection requirements, applicants should refer to PG&E's [Distribution Interconnection Handbook](#), which is available on PG&E's Internet website at <http://www.pge.com/mybusiness/customerservice/nonpgeutility/generateownpower/distributedgeneration/interconnectionhandbook/index.shtml>.

### 5.10.1. Specific Interconnection Requirements for Services Up to 600 Volts

Residential and small commercial applicants with generating facilities on their premises who want to take advantage of PG&E's standard net energy metering (NEM) program must become familiar with the following requirements.

## A. Requirements for Small Power Generators (Qualifying Facilities) and Co-Generation Interconnections Including NEM Interconnection Installations

Table 5-3, “Requirements For AC Disconnect Switches,” shows the requirements for an alternating current (ac) disconnect.

**Table 5-3 Requirements For AC Disconnect Switches**

<b>Inverter-Based Generators</b>	<b>Phase(s)</b>	<b>AC Disconnect Required?</b>
Self-Contained Meters, 320 Amps or Less	Single	No
All Other Self-Contained or Transformer-Rated Meters	All	Yes
<b>Non-Inverter-Based Generators</b>	<b>Phase(s)</b>	<b>AC Disconnect Required?</b>
All Self-Contained and Transformer-Rated Meters	All	Yes

A fusible AC disconnect switch will be required for generators that do not have overcurrent protection at the point of interconnection.

As specified in [Electric Rule 21](#), “Generating Facility Interconnections,” and by PG&E, the generating facility is required to have a ganged, manually-operated ac disconnect switch that meets the following requirements:

- Accessible 24 hours a day and lockable in the open position.
- Allows visible verification that separation has been accomplished.
- Located 10 feet or less from PG&E’s electric revenue meter at the point of common coupling and must be easily seen from the panel.
- Has a permanent approved sign(s) with a map to show the location of the ac disconnect switch. Applicants must attach the sign next to PG&E’s electric revenue meter at the point of common coupling.
- Do not have a switch installed at a height greater than the electric meter.

## B. Requirements for Generators That Are *Not* Permanently Connected (i.e., Temporary Connections)

Portable electric generators must be connected as described in the [California Health and Safety Code, Section 119075\(b\)](#). This code says that any portable electric generator that can be connected temporarily to an applicant’s electrical system, and that is supplied typically by an electrical corporation or state or local public agency, can be connected only after separating the applicant’s electrical system from that of the electrical corporation or state or local agency.

This rule applies to any generator connected as a temporary (i.e., nonroutine, nonscheduled) or emergency source of power.

Connect any portable electric generator that is used periodically as a source of power, either on an as-needed or scheduled basis, as described in Subsection 5.10.1.C. on Page 5-22. An example would be a generator used to provide backup power for equipment maintenance.

**C. Requirements for Generators That Are Connected Either Permanently or Periodically to an Electrical Service and Used on a Planned, Routine, or Scheduled Basis, but Do Not Operate in Parallel with the PG&E System.**

Generators falling under this category must have a disconnect switch that is accessible to, and in a location approved by, the serving utility.

These generators must be connected as described in PG&E's [Electric Rule 2](#), "Description of Service," Item E.6, and in the [California Health and Safety Code, Section 119075\(c\)](#). These rules state that any electrical generator that can be permanently connected to an applicant's electrical system must be connected only by means of a **double throw switch**. This switch isolates the applicant's electrical system from that of the electrical corporation or state or local agency.

**EXCEPTION:** Generators that are designed to run in parallel with the servicing utility's system, and that are approved by that utility, are exempt from these rules.

The double throw switch may be either a manual or automatic transfer switch meeting the requirements of UL Standard 1008. The switch may be an integral part either of the generator assembly or of the service facilities, and must be approved by the authorities having jurisdiction.

**D. Requirements for NEM Revenue Metering With a 4-Wire System at the Point of Common Coupling**

NEM revenue metering that has a 4-wire system at the point of common coupling also must have a NEM meter panel configured for a 4-wire system (three phases and a neutral).

When the normal source of voltage supplying PG&E co-generation metering potentially can be interrupted, PG&E, at its option, may install metering with an auxiliary source of power at the applicant's expense.

**E. Requirements for Generators Powering 10 kW (or Less), Stand-Alone, Field-Installed Telecommunication Facilities and Special Applications**

Applicants can own 10 kW (or less) generators used for stand-alone, field-installed, telecommunication facilities and special applications. However, PG&E field personnel perform maintenance and routine testing on electric supply and meter facilities, and must be able to test applicant-owned generators even when applicants are unable to be present. Therefore, applicants must provide a positive means to prevent their generators from backfeeding into the utility system. This requires installing special equipment, as described in the [PG&E Distribution Interconnection Handbook](#).

Usually, these equipment installations are performed in the field. The generator or alternate power source either is integrated with or is made a part of stand-alone equipment and metering facilities. For example, applicants could install a double throw switch to isolate their equipment and power supply and prevent electricity from flowing into the electric metering and supply system.

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### 5.10.2. Warning Statements and Labels for Interconnected Services

[California Health and Safety Code, Section 119080\(a\)](#), requires that every manufacturer of a portable or permanent electrical generator that is capable of being connected either permanently or temporarily to a commercial, industrial, or residential structure's electrical system include a warning statement.

The warning statement must be published in the generator's instruction manual and a legible warning label must be present on the generator. The warning statement must contain the requirement of [California Health and Safety Code, Section 119075](#) and explain potential electrical hazards that backfeed can create when it flows into a utility's distribution system.

The same warning information must be included in all advertisements offering portable electrical generators.

[California Health and Safety Code, Section 119080\(b\)](#), also requires that portable electrical generators display a legible warning label on a visible surface of the generator. It goes on to say that individuals or public agencies can *not* sell or rent to another person or public agency, or offer for sale or rent to another person or public agency, a portable generator that does not have a warning labeled displayed on the equipment.

### 5.10.3. Violation

[California Health and Safety Code, Section 119090](#), states that violating the requirements of [Section 119075 through Section 119085](#), "Electrical Hazards," is a misdemeanor offense, subject to a fine of not more than \$500.00 or not more than 6 months imprisonment.

## 5.11. Plug-In Electric Vehicle Interconnections

Residential customers with Plug-In Electric Vehicles (PEVs) can connect the Electric Vehicle Supply Equipment (EVSE) to their residences under PG&E's existing [electric rates and rules](#). Company Bulletin [TD-7001B-002](#), "PG&E Standards and Requirements for Plug-In Electric Vehicle Interconnections," included in [Appendix B](#), explains the requirements for installing PEV supply equipment and illustrates the various metering and connection options to serve PEVs.

Additional PEV information can be found at <http://www.pge.com/electricvehicles/>. For questions regarding PG&E's PEV requirements, please contact the [Building and Renovation Service Center \(BRSC\)](#) at 877-743-7782.

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