PACIFIC GAS AND ELECTRIC COMPANY
2017 General Rate Case Phase II
Application 16-06-013
Data Response

PG&E Data Request No.:	WMA_001-Q22		
PG&E File Name:	GRC-2017-PhII_DR_WMA_001-Q22		
Request Date:	August 19, 2016	Requester DR No.:	001
Date Sent:	October 7, 2016	Requesting Party:	Western Manufactured Housing Communities Association
PG&E Witness:	Thomas Troup	Requester:	Ed Poole

SUBJECT: DISCOUNT CALCULATION

QUESTION 22

Please provide the Greenbook pages with specifications for mobilehome residential dwellings. If multiple types of dwellings are included in the Greenbook, please provide the Greenbook section for each of these. Please identify where the minimum connection distances is specified.

ANSWER 22

The Greenbook is published electronically in PDF format, and is freely available from PG&E's website, PGE.com. The direct hyperlink to the 2016 Greenbook Manual (the Greenbook) web page is https://www.pge.com/en_US/business/services/building-and-renovation/overview/greenbook-manual-online/greenbook-manual-online.page?WT.mc_id=Vanity_greenbook.

For WMA's convenience, PG&E has attached two excerpts from the Greenbook: (1) the section specifically applicable to installing utility services to mobile homes, as updated in July 2016, and (2) the engineering document "Numbered Document 052521" (likewise updated in July 2016) referenced in the Greenbook in Section 6.4.1. as being included in Appendix C of the Greenbook

- The first attachment, "GRC2017-Ph-II_DR_WMA_001-Q22Atch01.pdf", is the Greenbook excerpt for Section 6.4.1., "Installing Utility Service to Mobile Homes" beginning on page 6-3 and continuing on page 6-4.
- The second attachment, "GRC2017-Ph-II_DR_WMA_001-Q22Atch02.pdf", is the Engineering Document 052521, "Electric Service Requirements for Mobile Home Developments", referenced in the Greenbook Section 6.4.1.

The Greenbook does not explicitly specify minimum service connection distances for mobilehome residential dwellings in mobilehome parks (MHP), but the minimum distance of 10 or 11 feet is implied by the Engineering Document 052521.

As explained in PG&E's 2011 GRC Phase II, Exhibit 107, pp. D-1–D-2:

“[T]he Greenbook implies a Mobilehome Park’s lateral service length minimum would be about 3 feet, with meter pedestals preferably being set directly alongside the main line trench in a minimum 6 foot right-of-way such that 3 feet constitutes the lateral distance of the service line to the bottom of the meter pedestal in an MHP (the service lines in MHPs do not run to the mobilehome itself since it has no foundation, and the meter pedestal cannot be closer to the mobile home than 3 feet). Allowing for the height of the meter pedestal, mainline trench depth, and additional service conductor to ensure sufficient length is available for final meter connection, the total minimum MHP installed service length is about 10 or 11 feet, building from Greenbook MHP service requirements.”

When meters are installed in a confined or enclosed area, applicants must ensure that they design a way for PG&E personnel to read the meters from the **outside** of the enclosures (e.g., window, opening).

The following four, lettered paragraphs provide location requirements that are applicable to residential metering.

A. Locate the meters and metering equipment either in outdoor, unfenced areas **or** mount them on, or recess them in, an exterior building wall. Do **not** mount metering equipment on, or recess metering equipment in, single family residences or inside garages.

B. Locate the meters and metering equipment in a meter room that is accessible through an outside doorway.

C. For a multifamily or residential building, locate the meters and metering equipment in a meter room or other acceptable location. Typically, an acceptable location will be on the ground floor or basement level of the building. The installation must be accessible directly from a public area.

   An applicant who is planning to install metering equipment on any floor above the ground floor in a multistory building must contact a PG&E project coordinator as early as possible during the initial stages of the project. PG&E must approve of any equipment location that is above the building's ground level.

   NOTE: In large, multifamily, multistory residential buildings (typically if the highest occupied floor is over 75 feet high), PG&E may, at its option, approve grouped meter locations on one or more upper floors.

D. When meters will be installed indoors see the PG&E Bulletin TD-7001B-005, "SmartMeter Electric Network Requirements for Indoor Meter Rooms and High-Rise Building Construction," located in Appendix B.

E. Locate electric meters in the same general area as gas meters when designing single-family residences. For clearance specifications refer to Subsection 5.4.3., "Meter Set Clearance Requirements," on Page 5-10, and Section 2, "Gas Service."

6.4.1. Installing Utility Services to Mobile Homes

A. Typically, PG&E will **not** supply utility services and/or metering facilities to mobile homes that are located or set up in any area, including a mobile home park, where utility service facilities are attached directly to the mobile home **except** under the following circumstances.

   1. The mobile home is fixed in place (i.e., no running gear or wheels). The mobile home must **not** be capable of movement.

   2. The mobile home is installed on a foundation system as described in State of California Title 25, Division 1, Chapter 2, Article 7, Section 1333, "Foundation Systems."

B. PG&E will make an **exception** and install utility services to a location where mobile homes may be moved, including mobile home parks, under certain, specific conditions.

1. The mobile homes must be served by meter pedestals or other PG&E-approved services **and** the meter facilities must be installed at a fixed location.
2. Applicants are responsible for connecting their mobile homes to those fixed locations and to the meter pedestals or other utility facilities.

See Numbered Document 052521, "Electrical Service Requirements for Mobile Home Developments," for more information and for specifications. This PG&E document is included in Appendix C, "Electric and Gas Engineering Documents," and also in PG&E's *Electric Underground Construction Manual*, Volume 1.

6.5. Services

6.5.1. Single Meter: Underground Service

A. Services, 0 Amps Through 225 Amps, Single Phase

Figure 6-2, "Typical Underground Service-Termination Enclosure, Combination Meter-Socket Panel (Residential, 0 Amps–225 Amps)," on Page 6-5, illustrates a single, underground, residential, single-phase meter panel (i.e., 4 terminal for a 120/240-volt service and 5 terminal for a 120/208-volt service).

The numbered items below describe the applicant's requirements when designing these types of underground services.

1. Design the socket and enclosure for underground service conductors.
2. Ensure that enclosures designed for either overhead or underground service entry meet all of the requirements for **both** types of service.
3. Ensure that all cable-termination lugs are suitable to use with both aluminum and copper conductors. The lugs must be compatible with a range of conductor sizes.

   The **minimum** conductor size for services up to 125 amps is #6 American wire gauge (AWG) to 1/0 AWG. The **minimum** conductor size for services rated from 126 amps to 225 amps is #2 AWG to 250 thousand circular mils (kcmil).

4. Use separate, independently supported, service-termination lugs that extend from the socket, and connect to it, using a bus bar. Provide a minimum radial clearance of 1-1/2 inches between the hot bus terminals and the ground or neutral surfaces. The termination facilities cannot be side- or angle-mounted in relation to the front of the panel.
5. Ensure that the socket enclosure has a separate lug in the sealable section. Use this lug exclusively for terminating PG&E's neutral conductor. If the neutral terminal is insulated from the enclosure, PG&E will provide the applicant with a bonding screw or jumper.

Prepared by: ABB1

ELECTRICAL SERVICE REQUIREMENTS FOR MOBILE HOME DEVELOPMENTS

052521

Asset Type:	Electric Metering	**Function:**	Construction
Issued by:	Quoc Hoang (QxH1)	**Date:**	07-01-16

Rev. #06: This document replaces PG&E Document 052521, Rev. #05. For a description of the changes, see Page 10.

This document is also included in the following manuals:

- *Electric Meter Work Practices*

Purpose and Scope

This document shows methods of supplying underground electric service to meter equipment (pedestal) serving mobile homes in accordance with Electric Rule 15 and Electric Rule 16 for a park that qualifies as a mobile home development as defined by PG&E. Additionally refer to PG&E's Electric and Gas Service Requirements manual (Greenbook) for additional requirements that may not be listed in this document.

Note: In accordance with Title 25, Article 7, Sections 1322, 1333, and 1333.5, mobile homes installed on foundation systems in locations other than mobile home parks, may be served by PG&E from overhead or underground service to the customer's equipment (service entrance conductors if overhead), which is attached directly to the mobile home. Refer to PG&E Document 063927 for underground service requirements and Documents 025202 and 022169 for overhead service requirements.

Instructions

1. The developer or his contractor shall provide all necessary trenching, secondary and service conduit (when required), and shall be responsible for the location and final grade of the utility islands
2. The required location for the meter equipment is at the front of the mobile home (see Figure 1 on Page 4). Alternate locations for the meter pedestal are indicated by the shaded areas in Figure 1 on Page 4.
3. PG&E shall install the secondary and service lateral cables in accordance with current engineering standards and construction methods.
4. Maintain a 36-inch (minimum) work space clearance from the meter face and from any access panel to PG&E facilities on the enclosure. Maintain a 36-inch (minimum) clearance from the meter equipment to other utility equipment such as gas, water or sewer. Refer to the National Electrical Code and the Authority Having Jurisdiction for the allowed working space requirements and if the 36-inch (minimum) clearance shown in Figure 3 and Figure 4 on Page 5 may be reduced to 12 inches for pedestal designs which have the meter and all access panels (both PG&E's and customer's) located on the same side of the pedestal.
5. After PG&E has installed the cable, and if required, the spare conduit in the trench, the developer or his contractor shall then:
   A. Set the electric meter pedestal in place over the cable and conduit. Position the pedestal so the meter socket faces as shown on Page 5. Remove the pull section panel from the pedestal to allow the cable to extend out of the pedestal. Maintain the work space and clearances as described in Note 4.
   B. Install and connect a copper grounding conductor from the pedestal grounding lug to an N.E.C. approved ground electrode system. The grounding connection shall not be made to a gas piping system. The customer shall be responsible for bonding and grounding all exposed non-current-carrying metal parts in accordance with the applicable electric codes and local ordinances. PG&E prefers, but does not require, the grounding electrode conductor wire to be protected against physical damage by rigid steel conduit or armored cladding.

C. Bond the service neutral termination lug to the meter pedestal by means of a bonding screw, or by continuing the grounding conductor between the grounding lug and the neutral lug.

D. Backfill around the pedestal to provide good support, plumb and level the pedestal, and pour the concrete base support or island. The concrete surface should be no more than 1 - inch above grade and ± 4 inches below the removable pull-section panel of the meter pedestal.

E. Backfill all trenches, and furnish any imported backfill material required.

6. PG&E shall connect the service lateral conductors to the termination lugs in the meter pedestal, install and seal the pull section panel, and blank off and seal the meter socket.
7. PG&E shall set the meter upon request for service, after required permits and inspections have been obtained from city or county inspection authorities.
8. See Figure 1 on Page 4 for a typical electric distribution system layout for a mobile home development.
9. PG&E shall design its facilities so that the short-circuit duty at the electric service entrance will not exceed 10,000 amps.
10. Mobile home pedestal shall have a minimum rating of 100 amps. The socket and enclosure shall be designed in accordance with PG&E Document 051001 and the following:

    A. The minimum meter height shall be 36 inches when the meter is enclosed, or 48 inches if the meter is exposed.

    B. When the meter is enclosed, the enclosing cover shall be hinged for ready access and shall have a shatter-proof reading window. When the meter is enclosed or recessed, the clearance from the meter centerline to any fixed side obstruction shall be a minimum of 6 inches.

    C. The service cable pull and terminating section shall be covered with a sealable removable panel (or panels), extending from a fixed panel 4 inches ± 2 inches above concrete. The removable panel shall allow full access to the service terminating lugs. Access to the service terminating lugs may be from either front or rear of the pedestal.

    D. Service terminating lugs shall be aluminum bodied and of the type specified on Page 7 for a pedestal and Page 8.

    E. Lugs for terminating the user's neutral conductors shall be located outside the sealable section and shall be designed to readily permit his neutral system to be isolated, when necessary, from PG&E's neutral.

    F. The pedestal at grade line shall have the minimum dimensions as specified on Page 9. A fixed panel for the final grade and concrete pour shall extend 2 inches (minimum) and 6 inches (maximum) above grade, and a minimum of 18 inches below grade.

    G. The minimum depth of the pedestal in the ground shall be 24 inches.

    H. Adequate ventilation shall be provided to prevent moisture condensation inside the pedestal, as required by UL414.

    I. Any unmetered bus going through the breaker section shall be completely covered by steel or approved plastic conduit.

11. Installation of PG&E distribution system facilities including service and metering equipment installations shall be designed and constructed in accordance with PG&E's Electric and Gas Service Requirements. Refer to the applicable sections in the Greenbook manual for additional requirements that may not be listed in this document.

Electrical Service Requirements for Mobile Home Developments

References	Location	Document
Connectors for Insulated Cables Underground Distribution Systems	UG–1: Connectors	015251
Clearances for Supply Service Drops	OH: Services	022169
Methods of Attaching Services to Customer Premises	OH: Services	025202
Temporary Underground Electric Service Single-Phase, 120/240 Volt, 200 Amps Maximum	UG-1: Services	036670
Cables for Underground Distribution	UG-1: Cable	039955
Location, Clearances, and Mechanical Protection Details for Pad-Mounted and Subsurface Equipment	UG-1: General	051122
Terminating Underground Electric Services 0 – 600 Volts in Customer-Owned Facilities	UG-1: Services	058817
Methods and Requirements for Installing Residential Underground Electric Services 0 – 600 to Customer-Owned Facilities	UG–1: Services/Greenbook/EDM	063927

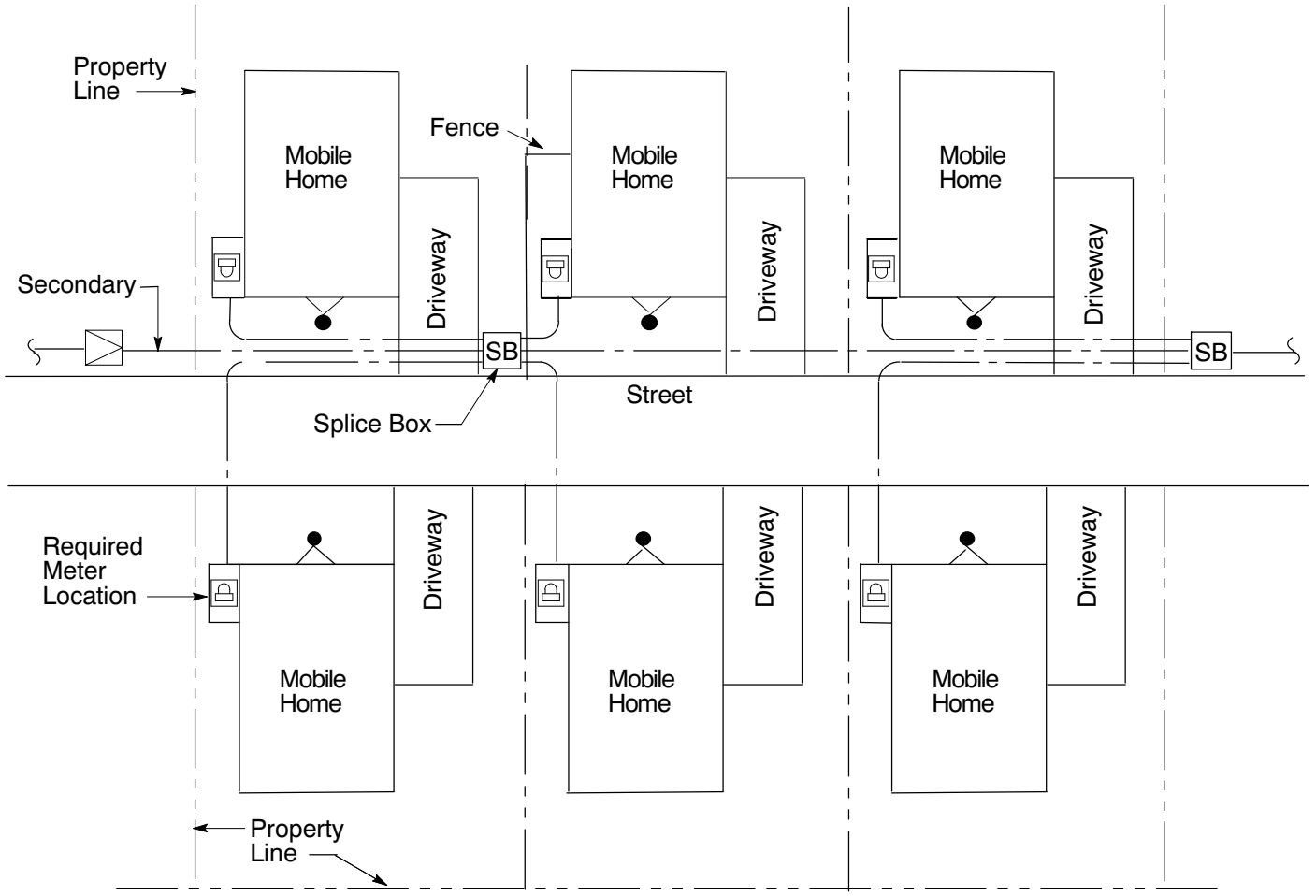
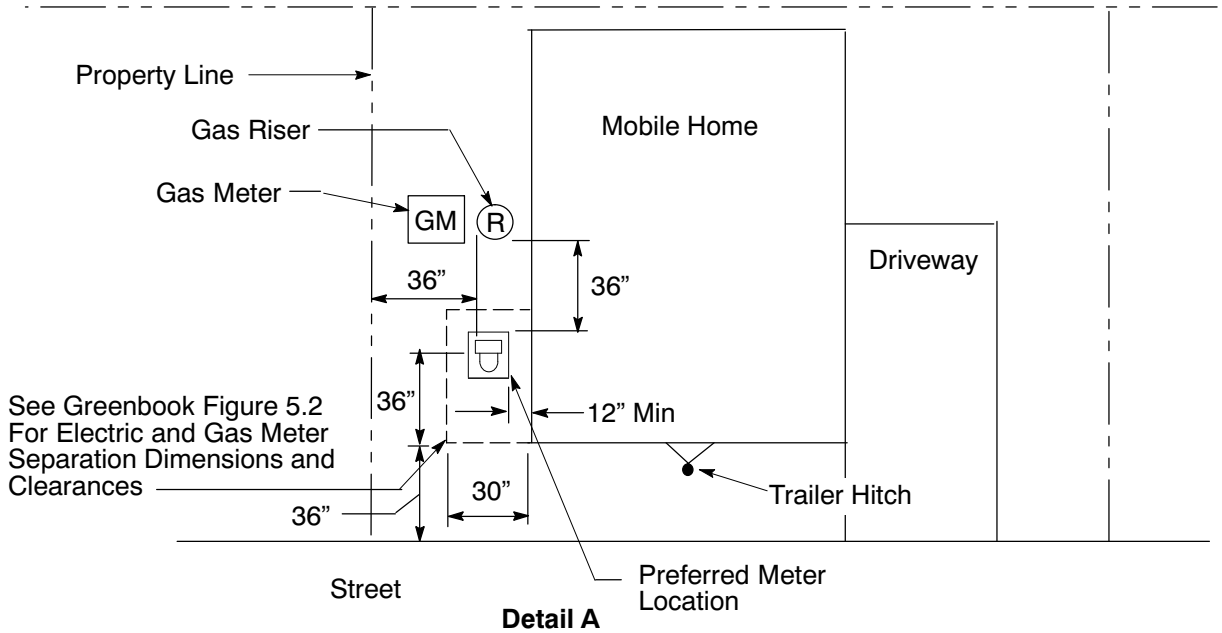


Figure 1 Typical Electric Distribution System for a Mobile Home Development



Detail A
Meter Clearance

Location of Electric Meter Pedestal

Notes

1. Position pedestal so that electric meter is faced toward the street or right of way.
2. Round off trench corners at conduit bends.
3. Position pedestal so that electric meter is facing away from mobile home, towards right of way (see Figure 5 and Detail B).
4. Alternate location for pedestal. Position pedestal so that electric meter is faced toward right-of-way (see Figure 5 and Detail B).
5. Cable arrangement when pedestal is set directly along side of secondary distribution trench (Detail B).
6. Trench depth shall be 30 inches (minimum) with or without gas service, and greater if joint with a gas main.

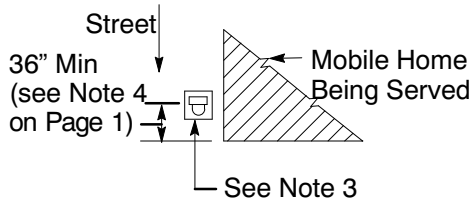


Figure 2 Pedestal (preferred location)

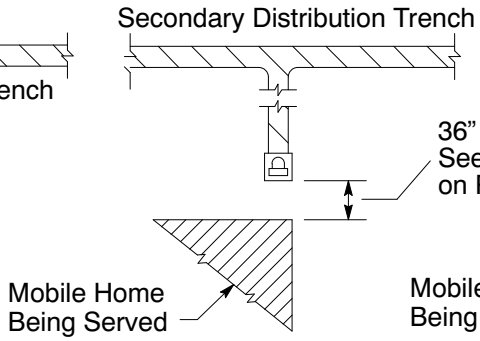


Figure 3 Pedestal (preferred location)

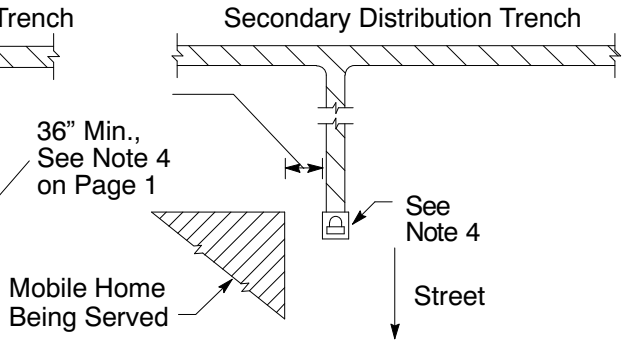


Figure 4 Pedestal (alternate location)

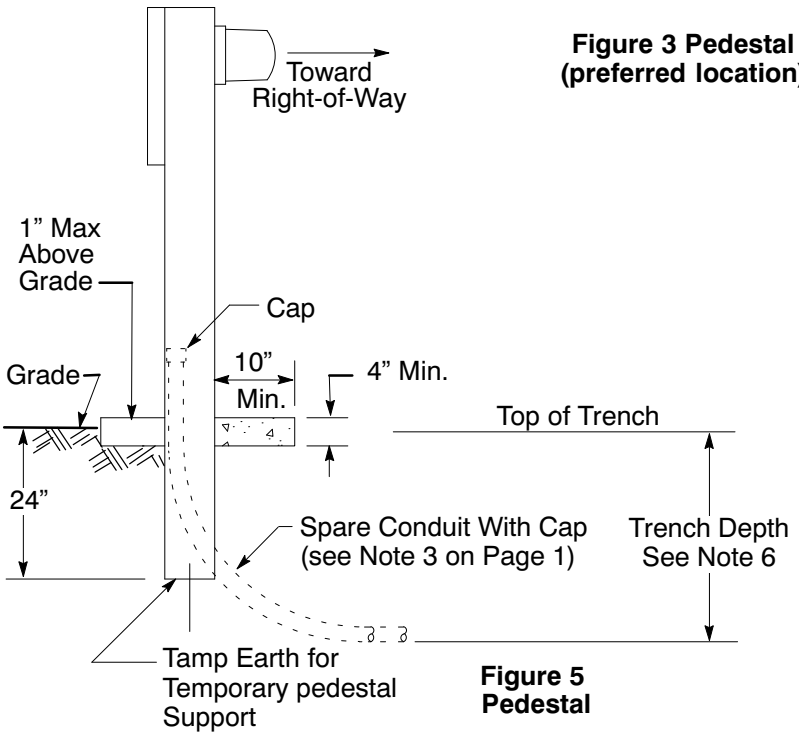
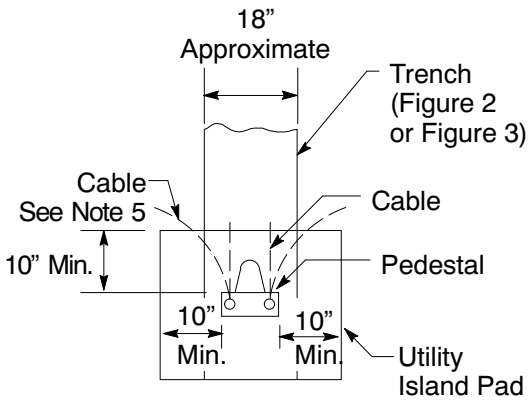


Figure 5 Pedestal



Detail B Plan

Material

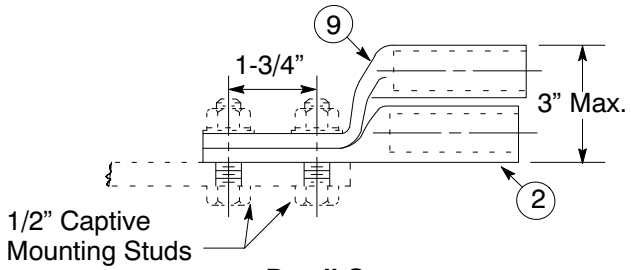
Notes

1. It is recommended that the main circuit breakers used in pedestals have a 10,000-amp short-circuit current rating to insure compliance with state and local codes. These codes require that the main breaker of service equipment be rated at the available short-circuit current. PG&E shall design its facilities to supply all new mobile home customers so that the short circuit duty at the pedestal will not exceed 10,000 amps.
2. See Table 3 on Page 7 for a list of approved meter pedestal manufacturers and catalog numbers.
3. Pedestals are allowed to have rear connection kit.

Table 1 List of Material for Supplying Electric Service to Mobile Home Developments

Item	Description
Material to Be Supplied by Applicant	
1	Meter Pedestal (as required, see Table 3 on Page 7 for the approved list)
2	Compression Connector, Straight Lug (see Table 2 on Page 7)
3	Conduit, Rigid Steel, Galvanized, with Pipe Strap (for bare ground wire, omit if armor clad wire is used)
4	Hub and Clamp, Grounding (to suit Item 3)
5	Conduit Fitting, Threaded, With Cover and Gasket (size to suit Item 3)
6	Ground Rod (see Instruction 5B on Page 1)
7	Ground Wire, Copper, Bare, or Armor Clad (size in accordance with applicable electrical codes and local requirements)
8	Conduit and Cap (as required)
Material to Be Furnished by PG&E	
9	Compression Connector, Stacking Lug (see Table 2 on Page 7)
10	Cable, XLP, 600-V (as required), see Document 039955 (see Table 2)

Material (continued)



Detail C
Compression-Type Terminals

Table 2 Data and Codes for Approved Compression-Type Material (see Detail C)

Type of Terminal	Cond. Size AWG or kcmil	Item	Code	Manufacturer and Catalog Number				Tool Index No.
				ESP [1]	Mac	Homac	Burndy	
Straight Lug (furnished by user)	350	2	–	AHL-350-BN-TP	MLB 350-N	AL 350-NTN	YA31A3	350A
	4/0		–	AHL-4/0-BN-TP	MLB 4/0-N	SA 4/0-NTN	YA28A5	4/0A
	1/0		–	AHL-1/0-BN-TP	MLB 1/0-N	SA 1/0-NTN	YA25A7	1/0A
	#2		–	AHL-2-BN-TP	MLB 2-N	SA 2-NTN	YAK2CA-2G1	1/0A
Stacking Lug (furnished by PG&E)	350	9	303728	See Document 015251 for Approved Supplier				350A
	4/0		303729					4/0A
	1/0		303730					1/0A
	#2		303731					1/0A
	#6		303732					1/0A

1 Electric Specialty Products Company

Table 3 Approved Meter Pedestals [3]

Rating (amps)	Mobile Home Electric Metering Pedestals	
	Manufacturer	Catalog Number
125	Myers Elec. Prod.	MES-M100SE
	MILBANK	U3250-0
200	Myers Elec. Prod.	MES-M200SE
	MILBANK	U3241-0

1 See Notes on Page 6.
2 Pedestals can have rear connection kits.
3 Other meter pedestal that meet EUSERC 307 and PG&E requirements may be allowed.

Service and Meter Pedestal

Notes

1. The meter pedestal shown on Page 9 may be used for a single service only.
2. Termination lugs for a pedestal shall be twin #6 to 350 kcmil range, aluminum bodied pressure type for connecting a single-service lateral and a single streetlight service when needed. Lug height, measured to the bottom of the terminating lug from grade line, shall be 18 inches minimum and 36 inches maximum. The space between terminating lugs, from lugs to sides of pedestal, from lugs to any grounded surface, or from lugs to panel above shall be 1-1/2 inch minimum. Rigid insulating barriers are required and shall project 1/4-inch minimum beyond any energized parts when this space is reduced. Terminating lugs may be positioned either in-line or staggered, and access shall be unobstructed when all service conductors are in place.
3. Meter height may be reduced to 36 inches if it is enclosed or guarded by a hinged protective hood (see Note 10B on Page 2).
4. The pedestal shown on Page 9 may also be used for an underground service to an individual mobile home not in a park.
5. The pedestal shown in Figure 6 on Page 9 is limited by its pull-section size to a maximum of 350 kcmil conductors.

Service and Meter Pedestal (continued)

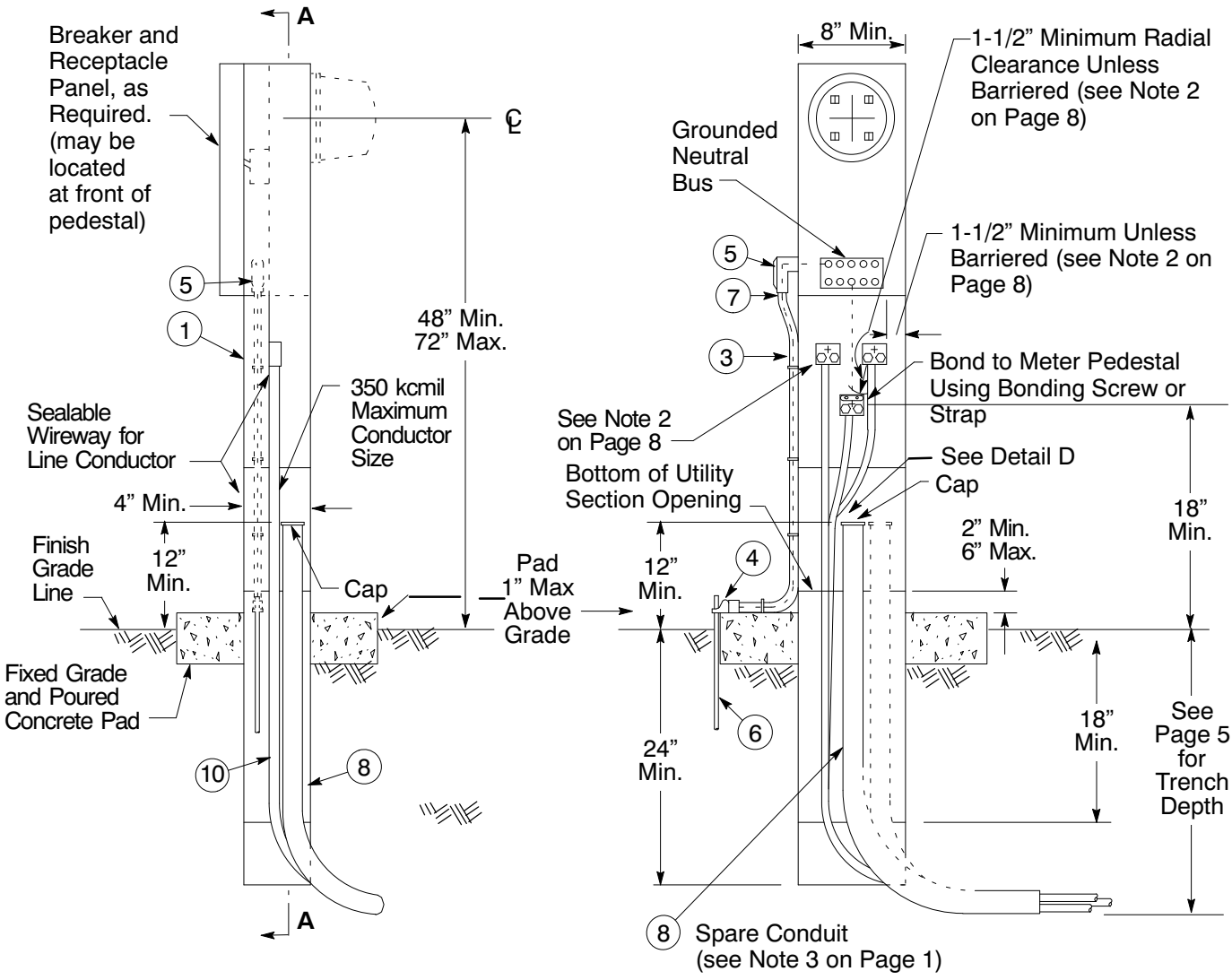
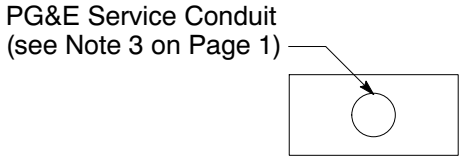


Figure 6
Service and Meter Pedestal

Section A-A



Detail D
Cable and Conduit Arrangement

Revision Notes

Revision 06 has the following changes:

1. Added links and references to Electric Rule 16 and the Greenbook in the Purpose and Scope.
2. Replaced the word “post” with “pedestal” throughout the document.
3. Updated the entire document to with most current electric and gas service requirements.
4. Removed main line service and pedestal information as it does not meet the current requirements.
5. Updated grounding and bonding requirements in Note 6 on pages 1 and 2.
6. Added Note 12 on Page 2 that PG&E facilities serving mobile home parks should be designed and constructed in accordance with PG&E electric and gas service requirements.

PACIFIC GAS AND ELECTRIC COMPANY
2017 General Rate Case Phase II
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Data Response

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PG&E File Name:	GRC-2017-PhII_DR_WMA_001-Q23		
Request Date:	August 19, 2016	Requester DR No.:	001
Date Sent:	October 7, 2016	Requesting Party:	Western Manufactured Housing Communities Association
PG&E Witness:	Thomas Troup	Requester:	Ed Poole

SUBJECT: DISCOUNT CALCULATION

QUESTION 23

Please provide the Greenbook pages with specifications for detached single-family residential dwellings. If multiple types of dwellings are included in the Greenbook, please provide the Greenbook section for each of these. Please identify where the minimum connection distances is specified.

ANSWER 23

The 2016 Greenbook Manual (the Greenbook) is published electronically in PDF format, and is freely available from PG&E's website, PGE.com. The direct hyperlink to the Greenbook web page is https://www.pge.com/en_US/business/services/building-and-renovation/overview/greenbook-manual-online/greenbook-manual-online.page?WT.mc_id=Vanity_greenbook.

For WMA's convenience, PG&E has attached two excerpts from the Greenbook, as updated in July 2016:

• The first attachment, "GRC2017-Ph-II_DR_WMA_001-Q23Atch01.pdf", is the Greenbook excerpt for Section 5, "Electric Metering: General" beginning on page 5-1 and continuing on page 5-35.

• The second attachment, "GRC2017-Ph-II_DR_WMA_001-Q23Atch02.pdf", is the Greenbook excerpt for Section 6, "Electric Metering: Residential" beginning on page 6-1 and continuing on page 6-17.

The Greenbook does not explicitly specify minimum service connection distances for any particular single-family residential dwelling types.

Section 5
Electric Metering: General

5.1. Scope

This section of the manual 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/Company). The information and requirements described are applicable to Section 6 through Section 11.

For help with determining the service rating of customer equipment see Subsection 1.14. located on Page 1-11.

5.2. General Conditions and Responsibilities

5.2.1. Approved Metering and Service Termination Equipment

All service termination and metering equipment must conform to nationally recognized standards and meet all applicable certification requirements. Nationally recognized standard organizations include, but are not limited to, the following: National Fire Protection Association (NFPA), National Electrical Code (NEC), National Electrical Manufacturers Association (NEMA), Underwriters Laboratories (UL), or Occupational Safety & Health Administration's (OSHA's) Nationally Recognized Testing Laboratory (NRTL) Program. The equipment also must meet the requirements specified in the Electric Utility Service Equipment Requirements Committee (EUSERC) manual and be approved by PG&E for use in construction projects.

NOTE: Employees perform an onsite field inspection of the equipment and installation and provide final approval only after ensuring that all of the specified requirements have been met.

5.2.2. Drawing Submittal Requirements for Metering and Service Termination Equipment

Applicants must meet the requirements in Item A. through Item D., below and on Page 5-2, when installing electric metering and service termination equipment. This applies to residential and nonresidential applications and includes meter panels, pedestals, panelboards, and switchboards that are wall-mounted, pad-mounted, pole-mounted, or on panel board construction.

A. Submit drawings for equipment with current ratings of 320 amperes (amps) or above to PG&E in triplicate (i.e., either paper copies or electronically) for review and pre-approval by the local meter shop personnel or meter specialist.

B. Also, submit drawings for newly designed metering equipment or for equipment that has been modified from existing designs as shown in the *Greenbook* or EUSERC manuals. This applies to metering equipment of any current rating. Drawings must be sent to the Meter Engineering Department for review. The review process could take 6 months or longer.

C. Ensure that submittals contain specific references from either the EUSERC manual, this *Electric and Gas Service Requirements* (*Greenbook*) manual, or both. When using *Greenbook* references, include the applicable subsection(s), figure(s), and page number(s). For EUSERC references, use the drawing and sheet numbers.

D. Ensure that submittals contain specific references for each component or section included with the equipment. Provide a detailed summary of the specification information in the beginning of the submittal, as well as on all equipment figure drawings in the submittal.

5.2.3. Applicant Responsibilities

The applicant must provide, install, own, and maintain the following equipment and structures listed in Item 5.2.3.A. through Item 5.2.3.G., starting below.

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 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**

1. **All Meter Panels**: Individual, residential, or nonresidential applicants with a meter panel rating of **any size**, installed inside a meter room or inside a building or other type of 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 meter panel or switchboard and terminate in a NEMA 3R, 6-inch x 6-inch x 6-inch enclosure located 8 feet to 10 feet above grade on the outside surface of the building.

   b. Follow the applicable requirements in PG&E Bulletin TD-7001B-005, "SmartMeter™ Electric Network Requirements for Indoor Meter Rooms and High-Rise Building Construction," located in Appendix B.

c. Do not use the conduit. The conduit is for PG&E's metering equipment only. See additional requirements in Item 5.2.3.G. below.

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, building, or some other structure, must install, own, and maintain **two separate conduits** with pull tape inside each, as described below.

   a. A nominal, **1/2-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 5.2.3.E.1. on Page 5-2.

   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 amps
   - 120/208 volts, 4-wire wye, and minimum 600 amps
   - 120/240 volts, 3-wire delta, and minimum 600 amps
   - 120/240 volts, 4-wire delta, and minimum 600 amps

F. **Outdoor Meter Panels**

Individual, nonresidential applicants with a meter panel rating of **200 kW or greater** must install, own, and maintain a separate, nominal, **1/2-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.

EXCEPTION: Approved meter–panel locations that have adequate wireless radio frequency (RF) signal capabilities may be exempted from installing the 1/2-inch phone line conduit. To request a variance, customers must submit switchboard and meter-panel drawings with the jobsite address to their local project coordinator early in the service application process. The project coordinator submits this information to the local meter shop, enabling meter shop employees to make a field determination as to whether or not the conduit should be required. Without an exemption from the meter shop, the 1/2-inch conduit is required and must be installed. This exception applies only to outdoor meter panels rated up to 600 volts.

G. Conduit installed in the ground, floors, ceilings, walls, or concrete must be made of rigid steel. In any other installation location, the conduit type can be electrical metallic tubing (EMT) or better. For underground installations, the conduit must exit the pad on the outside of the switchgear…**not** inside the switchgear. See Figure 5-5, "Preferred Location of Conduits for Indoor and Outdoor Meter Panels and Switchboards," on Page 5-13.

H. For recommendations on the best locations for equipment, ask your project coordinator 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" (e.g., power leg, stinger leg) conductor located either in the center phase or on the right phase position. This conductor usually is designated as the "C" phase for metering purposes. Mark (i.e., identify) the conductor (e.g., high leg, power leg, stinger leg) properly. The color orange is typically used for this purpose.
On all self-contained services, the power leg must be located in the far-right phase position, usually designated as the "C" phase. Mark (i.e., identify) the conductor (e.g., high leg, power leg, stinger leg) properly. The color orange is typically used for this purpose.

J. Applicant wiring that extends from the distribution section (i.e., branch circuits) must **not** pass through any PG&E-sealed section.

K. Single-metered applicants with single-phase services above 400 amps should consider installing a switchboard as described in Section 10, "Electric Switchboards: 0 Volts Through 600 Volts."

5.2.4. PG&E's Responsibilities

PG&E provides, installs, owns, and maintains all meters and metering transformers for full-service applicants. For direct access applicants, refer to *Direct Access Standards for Metering and Meter Data (DASMMD) 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 project coordinator in the project's preliminary planning stage. All equipment clearance and working space requirements must be met.

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. PG&E **does not accept** cable-termination techniques using pin adaptors, cable ringing, or splicing on additional cable.

The local PG&E meter shop must approve remote meter locations before applicants locate meters away from (i.e., remote from) termination enclosures. Applicants must submit a drawing that shows the distance (in feet) and the accessible path to the remote meter location. Also, describe the size and type of conduit used to attach to the remote meter.

See Figure 6-5, "Typical Underground, Separate-Bused, Current-Transformer Cabinet and Safety-Socket Meter Box Assembly, 201 Amps–400 Amps, 3∅ and 201 Amps–800 Amps, 1∅," 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 with 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.

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 and Service Equipment Locations

The following locations are **not** acceptable for electric meters and service termination equipment.

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 through 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 electronic noise concerns.

   EXCEPTION:

   An exception to this requirement that allows a meter at these locations requires sound isolation construction on the wall area behind the meter panel. The sound isolation construction must have a minimum Sound Transmission Class (STC) rating of 60. The sound isolation wall must extend 12 inches past all four sides of the meter panel. The applicant must submit drawings showing the construction method and materials to be used, as well as the minimum STC rating that will be achieved after completion, to both the local PG&E project coordinator and inspection department.
9. Any area in close proximity to a lake or water area. These locations are unsuitable when the meter faces the water.

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

H. In a room, utility closet, or area where metering facilities or termination enclosures are less than 3 feet away from any water source such as pipes, valves, fire sprinklers or equipment, or other wet facility.

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 2-14, 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 project coordinator 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 clear of obstructions and located inside of buildings on the ground floor or below the ground floor. High-rise buildings can have meter rooms above the ground floor.

D. Meter rooms must have a doorway that opens 90 degrees or more to the outside of the building or into an area that is available to the public.

E. Meter rooms must have a clear and safe working space as described in Subsection 5.4.4., "Working Space," on Page 5-11, and Subsection 5.4.5., "Barricades," on Page 5-14.

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 5-14.

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.

J. Designed and constructed with a means to adequately discharge any excess water that may enter the room from the conduit system.

5.4. Meter Heights, Clearances, Enclosures, and Protection

5.4.1. Meter Heights

A. Pole-, Pad-, and Wall-Mounted Meters

When installing meter enclosures on a pole, on a wall, or on a pad-mounted structure, applicants must ensure that the meters meet the following requirements, except when installing metering equipment on poles for communication services. In that situation, follow the requirements in 5.4.1.B. on Page 5-8. All metering and service-termination facility installations are subject to PG&E review and approval. The meter height must be measured to the horizontal centerline of the meter axis.

1. **PG&E's preferred meter height is 66 inches** for all individual service-termination and meter-panel installations. All electric meters must be located 75 inches maximum above the ground or standing surface. The minimum meter heights are listed below.
   - Meters installed in self-contained panels rated up to 320 amps must be a minimum of 48 inches.
   - Meters installed in outdoor transformer-rated panels 400 amps and above must be a minimum of 60 inches. This applies to wall-mounted and panel board construction.
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. 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 10-24, "Standard Switchboard Service Section With CT Compartment and Filler Panel, 0 Volts Through 600 Volts," on Page 10-34. This applies both to indoor and outdoor installations.
4. In locations where snow accumulates, PG&E may require the minimum installed meter height to be increased. Specific meter-height requirements depend on the meter's location. Ask your local PG&E project coordinator to consult the electric meter department for specific meter-height requirements in snow-accumulation areas.

B. Pole-Mounted Communication Service and Meter Equipment

Applicants must ensure that communication service and meter equipment installed on PG&E or joint poles is placed so the bottom of the enclosure is a minimum of 7 feet to a maximum of 8 feet from the finished grade. If it is not possible to meet the height requirements, install a meter pedestal. Ask your PG&E project coordinator for Numbered Document 027911,"Installation Details for Service to Pole-Mounted Communication Equipment," for specific requirements.

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 5-1, "Meter Cabinet Enclosure Clearances," and Table 5-1, "Meter Cabinet Enclosure Clearance Dimensions," both located on Page 5-9.

Applicants also must ensure that meter cabinet enclosures are maintained and work properly. In corrosive areas a fiberglass enclosure is recommended to help prevent deterioration of the metallic equipment.

Finally, applicants must ensure that when a cabinet enclosure is pad-mounted, a 3-foot clearance is maintained between the edge of the pad and the base of the pole.

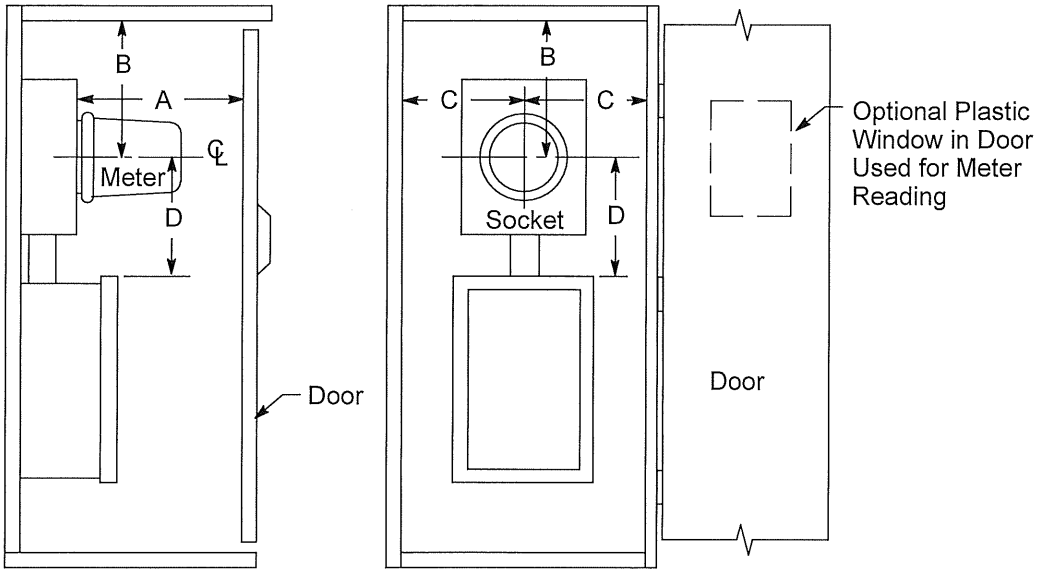


Figure 5-1
Meter Cabinet Enclosure Clearances

Table 5-1 Meter Cabinet Enclosure Clearance Dimensions

Dimension A	11-inch minimum / 15-inch maximum. See Note 1 below.
Dimension B	9-inch minimum to the edge of the access opening.
Dimension C	10-inch minimum to the edge of the access opening.
Dimension D	8-inch minimum from the meter centerline to the top of any protrusion below the meter or to the bottom of the enclosing cabinet.

1. The 11-inch minimum for Dimension A may be reduced to 8 inches only for residential, wall-mounted, meter cabinet enclosures.

5.4.3. Meter Set Clearance Requirements

Figure 5-2, "Electric and Gas Meter Set Separation Dimensions and Clearances," found below, represent various metering facilities' clearance requirements. If applicants install enclosures on their premises, the enclosures must meet the specifications provided in these illustrations.

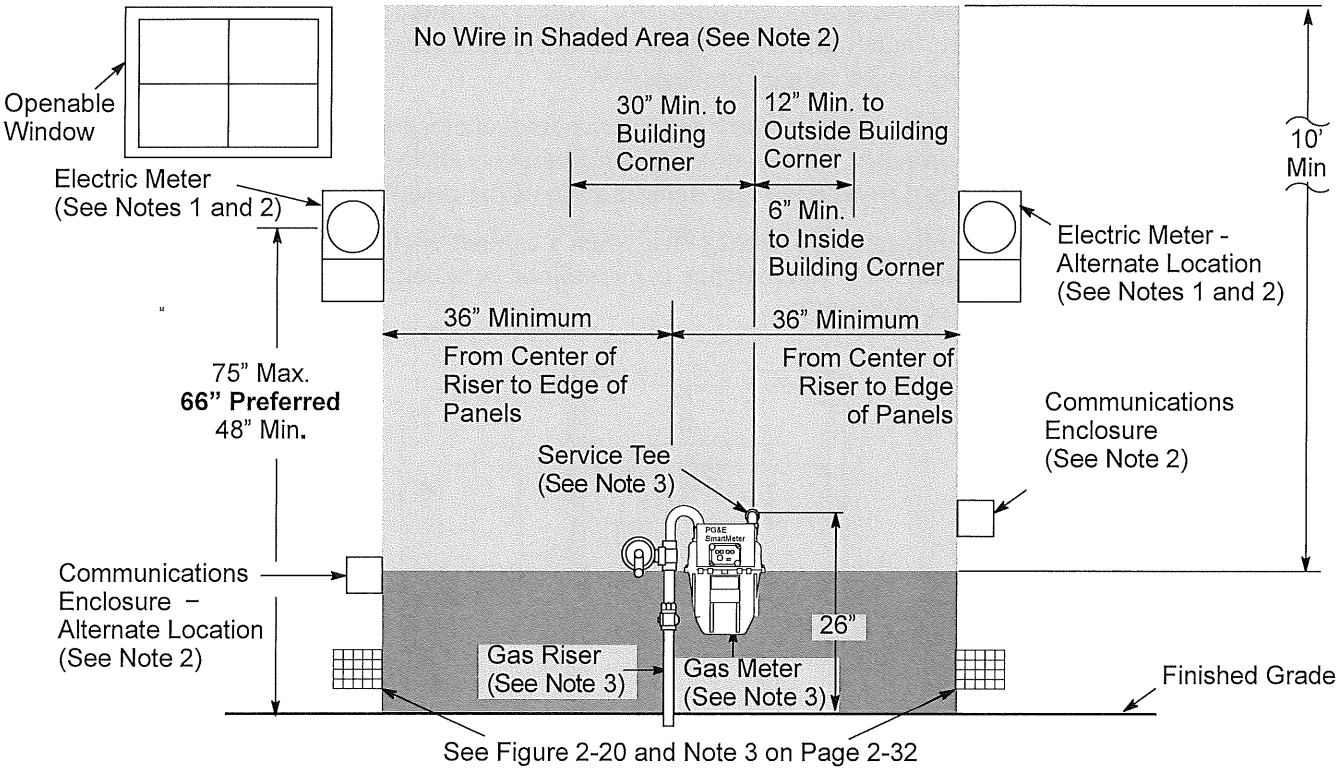


Figure 5-2
Electric and Gas Meter Set Separation Dimensions and Clearances

Notes in reference to Figure 5-2.

1. Electric meter panel locations are subject to utility approval and must comply with the applicable code requirements. PG&E does **not** have specific requirements for the distance from the electric panel to the outside building corner. See Section 5, "Electric Metering: General," for properly locating the electric meters. See Subsection 5.4.4., "Working Space," on Page 5-11, for electric meter working space.
2. Applicants must not install any electrical devices or equipment, including wires, cables, metering enclosures, and telecommunication enclosures, bond wires, clamps, or ground rods within the shaded area around the gas meter. The 36-inch distance can be reduced to 18 inches for electrical devices or equipment certified for NEC Class I, Division 2 locations.
3. See Figure 2-19, Notes 3 and 4, on Page 2-31, regarding gas facilities.
4. Applicants must not install water spigots, lines, gutter systems, or other sources of above-ground water to within 36 inches of the gas or electric facilities.

5.4.4. Working Space

Working space is defined as the whole area in front of the meter panel, the meter enclosure, the CT section, the service-conductor pulling or termination enclosure, or associated equipment. 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 project coordinator 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, level, and unobstructed at all times. See the descriptions below for the minimum required dimensions.

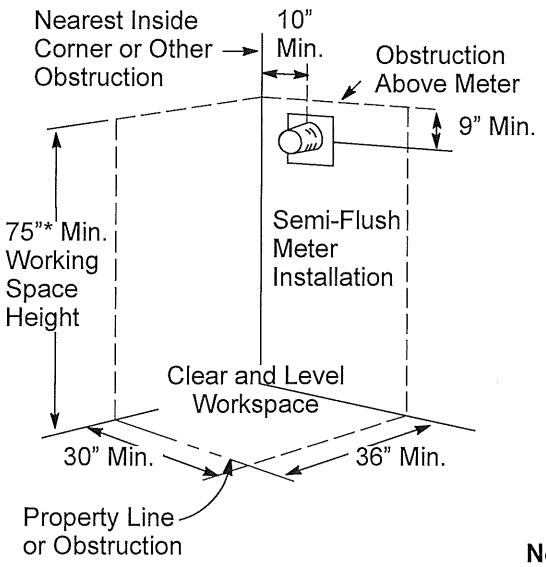
Wall-Mounted: For meter panels and service equipment the working space is **30 x 36 x 75 inches**. See Figure 5-3, "Semi-Flush Meter Installation," and Figure 5-4, "Enclosed Meter Installation," both on Page 5-12.

Floor-Standing (Pad-Mounted): For 600 volt switchboards, metering enclosures, and service termination equipment rated over 225 amps, the working space is **48 inches deep by 102 inches high**. For switchgear 601–25,000 volts, the working space depth is 96 inches. The width is the same dimensional width as the section. Measure the depth from the outside of the equipment's outer door. Concrete floors, housekeeping pads, and elevated platforms must extend out in front of the whole area to the minimum depth. See Figure 5-5 on Page 5-13 for additional requirements.

Table 5-2 Working Space Dimensional Requirements[1]

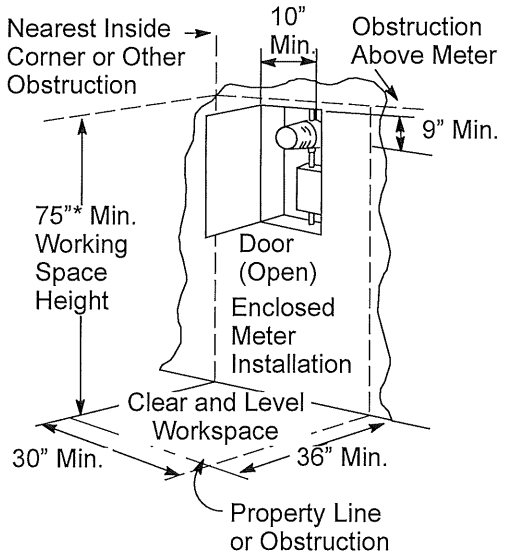
Voltage (Volts)	Equipment Type	Dimensions (Inches)			Figure(s)
		Width	Depth	Height	
0–600	Wall Mounted	30	36	75	5-3 & 5-4
	Floor Standing (Pad-Mounted)	Same as enclosure section	48	102	5-5
601–25,000	Floor Standing (Pad-Mounted)	Same as enclosure section	96	102	5-5

[1] Pad-mounted meter pedestals up to 200 amps require a 30 x 36 x 75-inch work space.



* 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

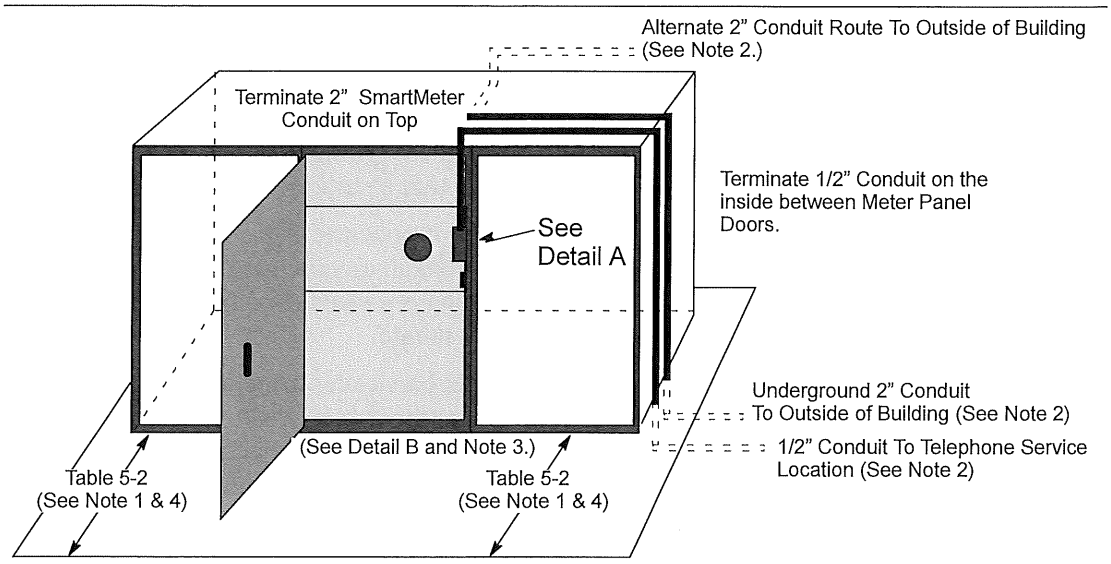
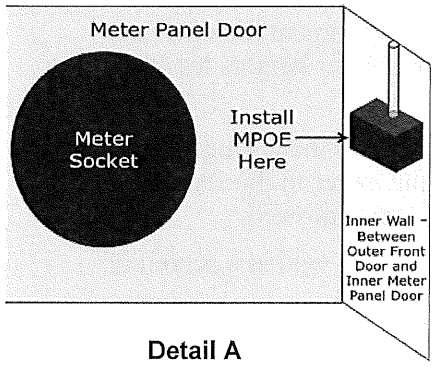
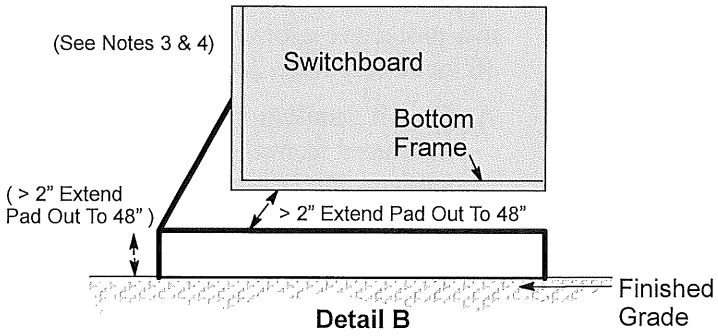


Figure 5-5
Preferred Location of Conduits for Indoor and Outdoor Meter Panels and Switchboards





Notes in reference to Figure 5-5.

1. A level, concrete structure (e.g., floor, pad) must extend out the minimum required distance in front of all sections to which PG&E requires access. This structure is used for floor-standing equipment (e.g., switchboard, termination enclosure). See Subsection 5.4.4., "Working Space," on Page 5-11.
2. A 1/2-inch phone-line conduit is required for all indoor and outdoor meter panels rated 200 kW or greater. A 2-inch SmartMeter™ conduit is required only for indoor, wall-mounted or pad-mounted meter-panel enclosures of any size.
3. The switchboard's bottom horizontal support frame must not protrude more than 3 inches above the floor or pad. This is in front of all PG&E sections (see Detail B).
4. The front edge of the switchboard must not be set back more that 2 inches either from the edge of a pad raised above ground or above the floor. This is from all PG&E sections.

5.4.5. 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 pad 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.

Contact your local PG&E inspector and project coordinator to determine if a barricade is required.

5.4.6. Meter Protection

Applicants must ensure that meters and metering equipment are enclosed in a protective cabinet in the following situations. Meter heights less than 36 inches are **not** allowed.

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. Meter heights less than 36 inches are **not** allowed.

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 corrosion problems are anticipated or present.

E. When vandalism is anticipated.

Any protective structure surrounding meters and metering equipment must be pre-approved by the local meter shop and provide safe working conditions as determined by PG&E. Approval from the local authority having jurisdiction may also be required.

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 they mark sites and identify meters 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 three examples on the following page 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. Manufactured decals that do not peel or fade. Tape-type labels are no longer acceptable.

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. **For meters that serve pumps or other large equipment, the ampacity rating of the service disconnecting means (i.e., breakers, fuses) along with the type of equipment and the nameplate rating must also be marked**. 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 seals 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 *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 of any phase

or ampacity 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 that the clip, with a hole for the lock shaft, is made of a rigid metal. The breaker or switch covers can be nonmetallic. 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 amps are Class 100 ampere services. Services and enclosures rated at 225 amps are Class 200 ampere services.

B. Ensure that transformer-rated meters have a current rating of less than 100 amps (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 amps (continuous) require current-transformer facilities.

D. Ensure that sockets meet the requirements of 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 5-3, "Meter Socket Requirements (Number of Jaws)," on Page 5-17, to find specific meter-socket requirements and to ensure they provide the proper equipment.

Table 5-3 Meter Socket Requirements (Number of Jaws)

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

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

2 Only use a 4-jaw meter socket for a Class 320-ampere meter for single-phase residential applications.

3 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 225 amps. Single-phase loads that exceed the capacity of a 225-ampere main switch or service-entrance rating usually are supplied with a 120/208Y-volt, three-phase, 4-wire service.

4 The 15-jaw socket is acceptable, but not required.

5 Limited availability, at PG&E's discretion. **Not** for new installations.

Figure 5-6, "Connection Diagrams for Self-Contained Meter Sockets," and Figure 5-7, "Connection Diagrams for Transformer-Rated Meter Sockets," below, show the required connections for self-contained and transformer-rated meters.

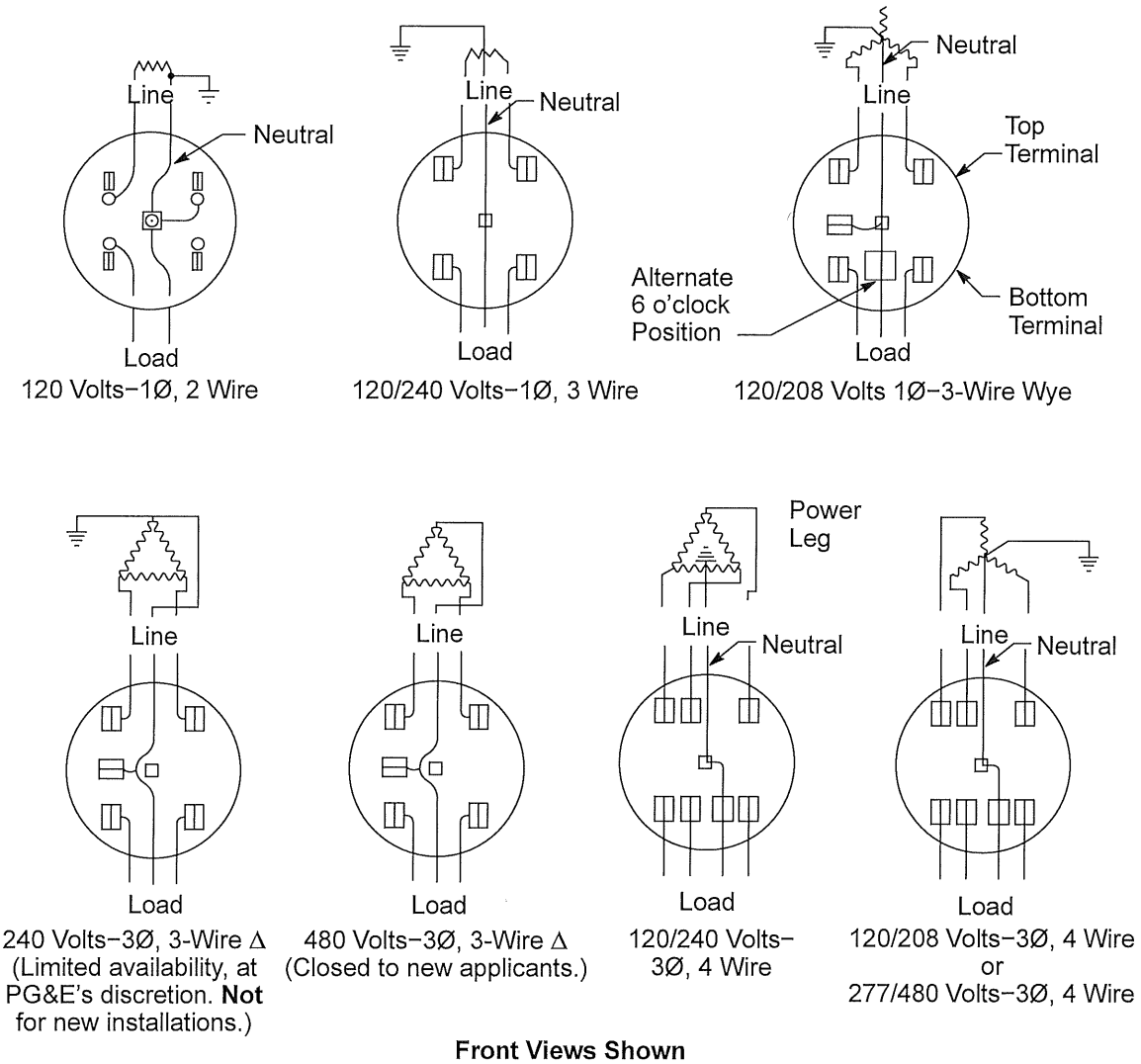


Figure 5-6
Connection Diagrams for Self-Contained Meter Sockets

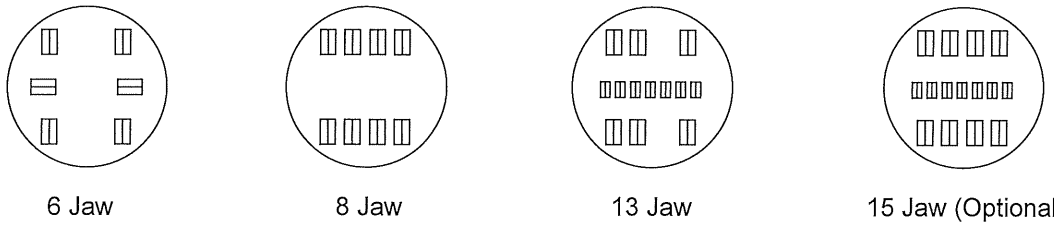


Figure 5-7
Connection Diagrams for Transformer-Rated Meter Sockets

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

5.6.1. Using a Meter Socket Adapter for Overhead-to-Underground Conversion

Applicants may use approved meter socket adapters to convert existing services. Do **not** use them to establish new service. For more information, see PG&E's Numbered Document 061032, "Residential and Small Commercial Overhead to Underground Electric Service Conversion." Consult a PG&E project coordinator 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.

5.6.2. Installing Non-Allowed and Unauthorized Customer Equipment

Applicants must **not** install any type of meter-adapter, surge suppressor or protection device (e.g., TVSS), meter socket adapter, power usage or recording device, security or monitoring equipment, or similar interface device in, on, or between the electric revenue meter and meter sockets or inside any PG&E sealed section, including the instrument transformer (i.e., CT, PT) or service termination sections. These types of installations are not allowed and compromises the applicant's electric service. If safe to do so, PG&E personnel will remove any customer-owned devices and leave them on the applicant's premises if they are discovered.

Only PG&E-approved meter socket adapters used for overhead-to-underground conversions are exempted.

5.6.3. Fire-Pump Connections

PG&E allows the following types of service connections to fire-pump meter panels or switchboards. The requirements are described below.

A. All fire-pump service connections must be approved by the local city, county, or state inspecting Authority Having Jurisdiction (AHJ). Site plans and equipment drawings must be submitted to PG&E for approval.

B. **The service disconnect, meter panel, switchboard, or switchgear for the fire pump must be located in the same electrical room as the main service meter panel, switchboard or switchgear, and utility termination section.** They cannot be located in another room or building. When installed outdoors, the equipment must be located next to each other. They cannot be located in another room or building. When installed outdoors, the equipment must be located next to each other.

   1. For main switchboard (i.e., secondary) service equipment rated up to 600 volts, the following types of connections are allowed:

      a. A fire-pump service tap installed from the utility termination section of the main switchboard to the fire-pump meter panel or switchboard. When fed from a PG&E underground service, the fire-pump service must be installed in rigid steel conduit and exit out of the top of the termination section or out of the upper sides, at least 12 inches above the terminating bus.

Do not place a fire-pump service tap in the termination section in either of the following two situations: (a) When the section is less than 90 inches high (see Figure 10-24, "Standard Switchboard Service Section With CT Compartment and Filler Panel, 0 Volts–600 Volts," on Page 10-34); or (b) When the main switchboard is located below grade and has either a high side or back. (see Figure 10-15, "Switchboard Pull Section, High Entry," on Page 10-26, for an illustration of the PG&E service entry).

b. A fire-pump service connected in a dedicated tap section of the main switchboard.

   If allowed, the local AHJ may require the tap section to be located away from the main breaker on the opposite side of the termination section.

c. A fire-pump service connected to the load-side (i.e., after the main breaker) of the main switchboard.

2. For main switchgear (i.e., primary) service equipment rated between 601–25,000 volts, the following types of connections are allowed:

   NOTE: Do not place fire-pump service taps or connections in the utility termination section of a primary switchgear.

   a. A fire-pump service connected in a dedicated tap section of the switchgear.

   b. A fire-pump service connected to the load-side (i.e., after the main breaker) of the main switchgear.

3. For main switchboard or switchgear service termination equipment rated between 0–25,000 volts, the following type of connection is allowed:

   a. A separate and dedicated utility service that is connected directly to the fire-pump meter panel, switchboard, or switchgear. This is usually referred to as a second PG&E service. (See Figure 5-8, "Fire-Pump Equipment Location and Service Connection Options," on Page 5-21.)

C. Proper access and signage is required for meter panels and switchboards serving fire pumps.

D. Ensure that fire-pump wiring configurations, either 3-wire or 4-wire, are the same as the wiring configurations for the main switch.

Electric Service Termination and Meter Room

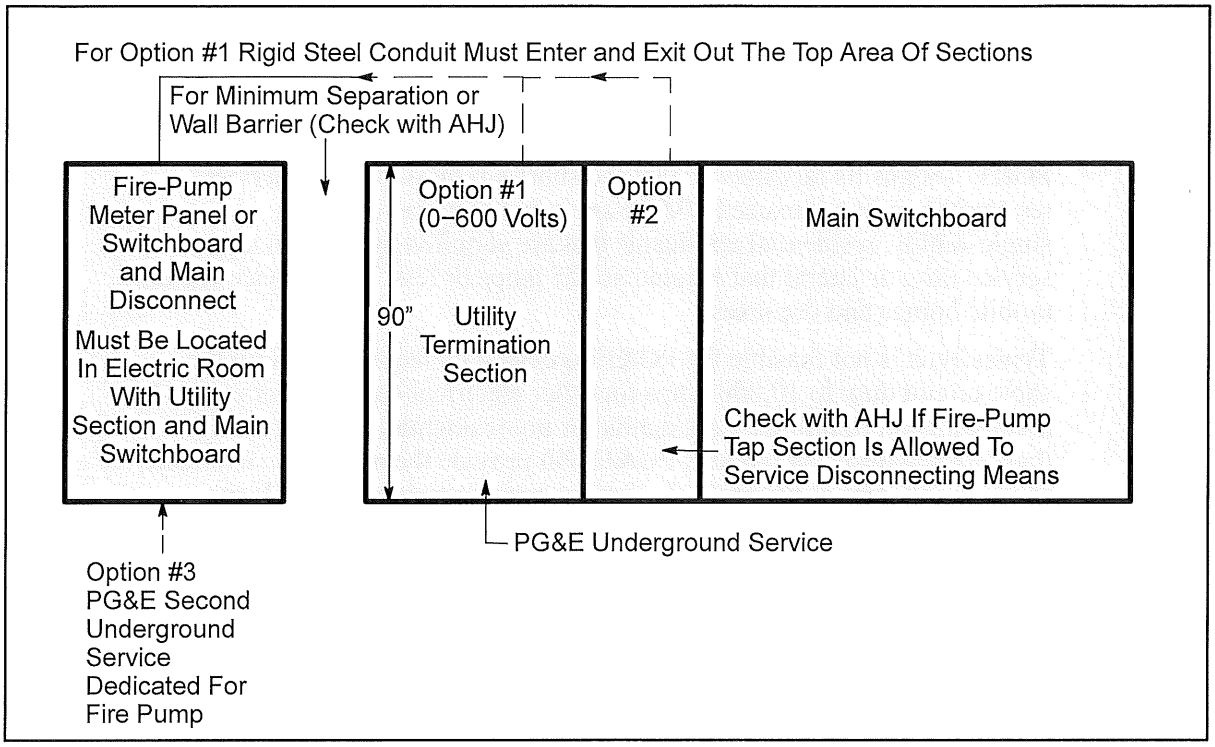


Figure 5-8
Fire-Pump Equipment Location and Service Connection Options

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 disconnecting 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. PG&E requires access to these disconnects.

Except for transformer-rated metering equipment, 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. When the switch is in another building or location, proper access, signage, and maps are required.

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

NOTE: See Paragraph B., in Subsection 1.14., "Determining the Service Rating," when more than one disconnecting means is installed.

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 designs its facilities so that the short-circuit duty at the service termination will not exceed 10,000-amps symmetrical for new, single-family, residential applicants that are supplied by an individual service drop or lateral that is rated at 225 amps 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 amps 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. Arc Flash Assessment

PG&E's electric system is dynamic and continually being reconfigured due to system needs and general maintenance. Therefore due to its many variables a range of impedance's should be considered in an arc flash assessment. To request an arc flash assessment contact your local project coordinator.

5.7.4. Electronic Trip Circuit Breakers

Electronic circuit breakers using a trip unit are programmable devices that measure the current flowing through the circuit breaker and initiate a trip signal, when appropriate. An electronic trip unit has multiple dials that can be adjusted to various settings. The IR setting is the continuous current value and must not exceed the ampacity rating of the enclosure. It is similar to the capacity or ampacity rating on thermal or thermal magnetic circuit breakers. The IR settings must be indicated on the trip unit. The IR settings typically are lettered and identified on a chart with the corresponding ampacity values. Electronic trip units are available with multiple ratings for each standard frame size.

The circuit breaker frame is the housing that contains the current-carrying and current-sensing components, along with the tripping and operating mechanism. The frame size (e.g., 800, 1,200, 1,600 amps) is the largest ampere rating available in a group of circuit breakers of similar physical configuration. Other types of breakers may have different frame sizes.

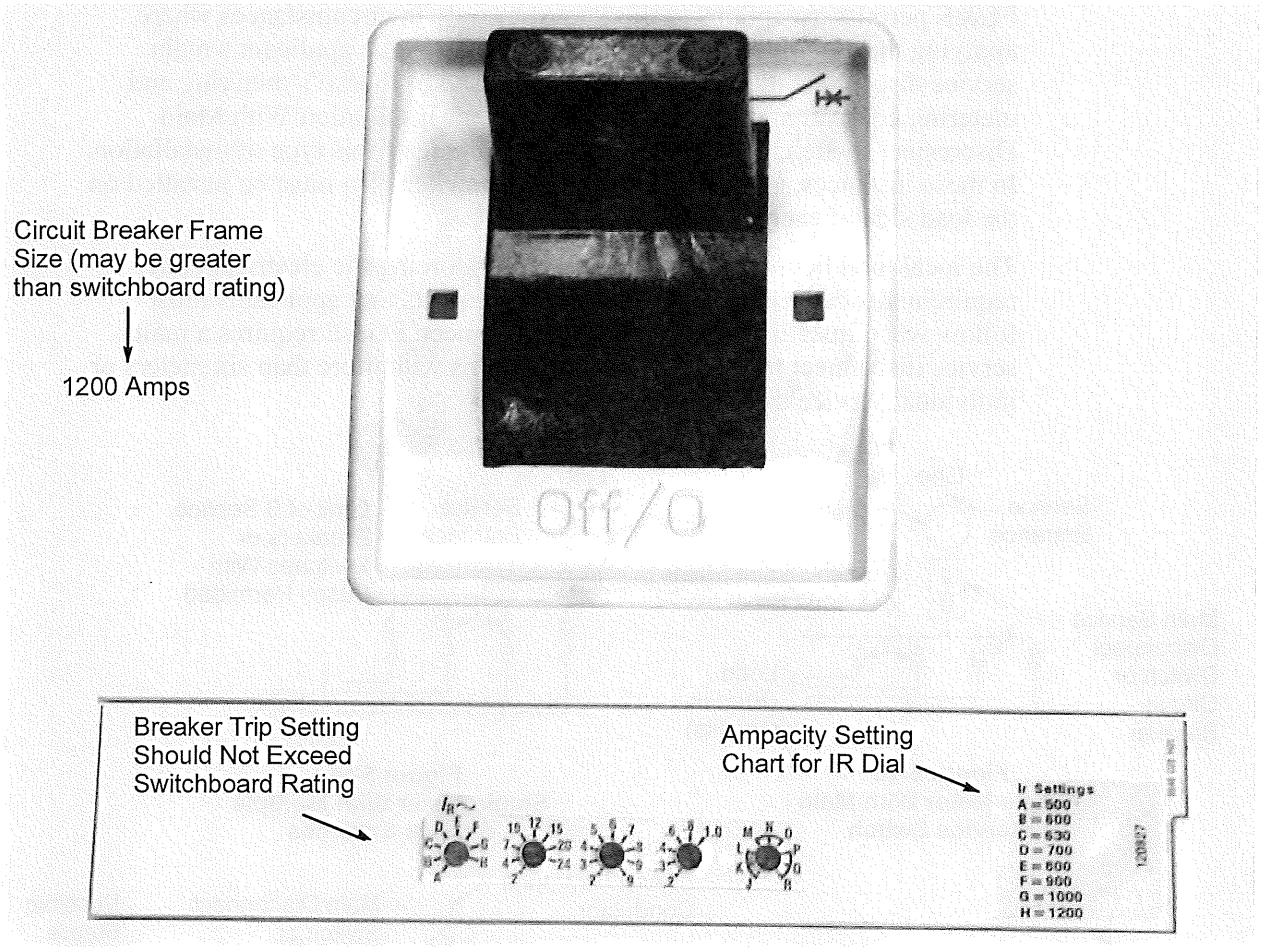


Figure 5-9
Circuit Breakers with Electronic Trip Unit

Notes in reference to Figure 5-9.

1. Match the letter on the IR dial to which the arrow head is pointing with the letter on the IR setting chart to determine the ampacity setting for the breaker.

5.7.5. Meter and Main Service Switch Sequence

PG&E places its meters and metering equipment ahead of (i.e., on the supply side of) the applicant's main service disconnecting means. Figure 5-10, "Single Meter With Main Service Switch," Figure 5-11, "Single Meter With Multiple Service Switches," and Figure 5-12, "Multimeter Disconnect Without Main Switch," below, all provide examples of this type of installation. Figure 5-14, "Multiple Remote Switchboard or Meter Panel Locations," on Page 5-25, also provides an example of meter and main service switch sequences for large projects with multiple meter rooms or buildings.

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 5-13, "Multimeter Installation With Main Disconnect Switch," below, 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 jurisdiction having authority for enforcing the electrical code requirements determines most of the requirements that applicants must follow when installing their means to disconnect. PG&E requires a main service disconnect for multimeter installations with more than six meters or individual service disconnects.

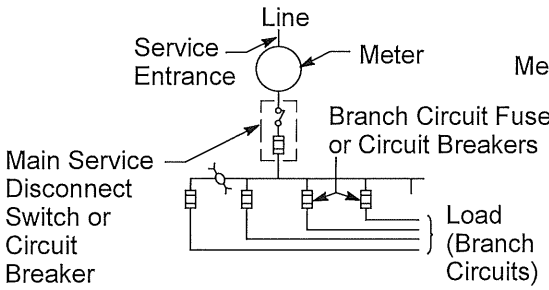


Figure 5-10
Single Meter With Main Service Switch

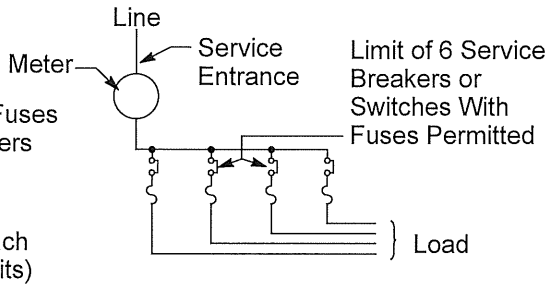


Figure 5-11
Single Meter With Multiple Service Switches

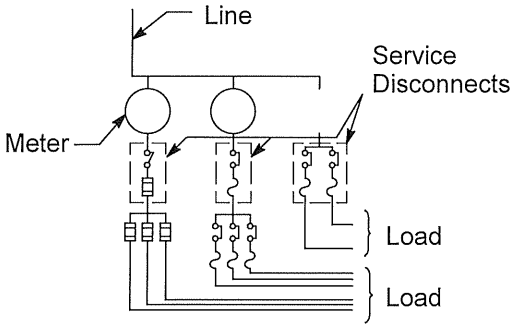


Figure 5-12
Multimeter Installation Without Main Disconnect Switch

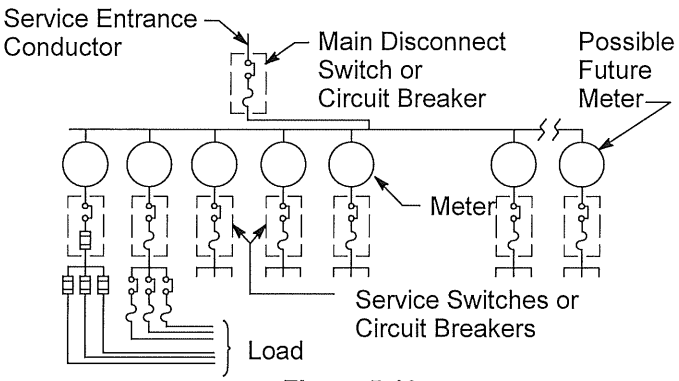


Figure 5-13
Multimeter Installation With Main Disconnect Switch

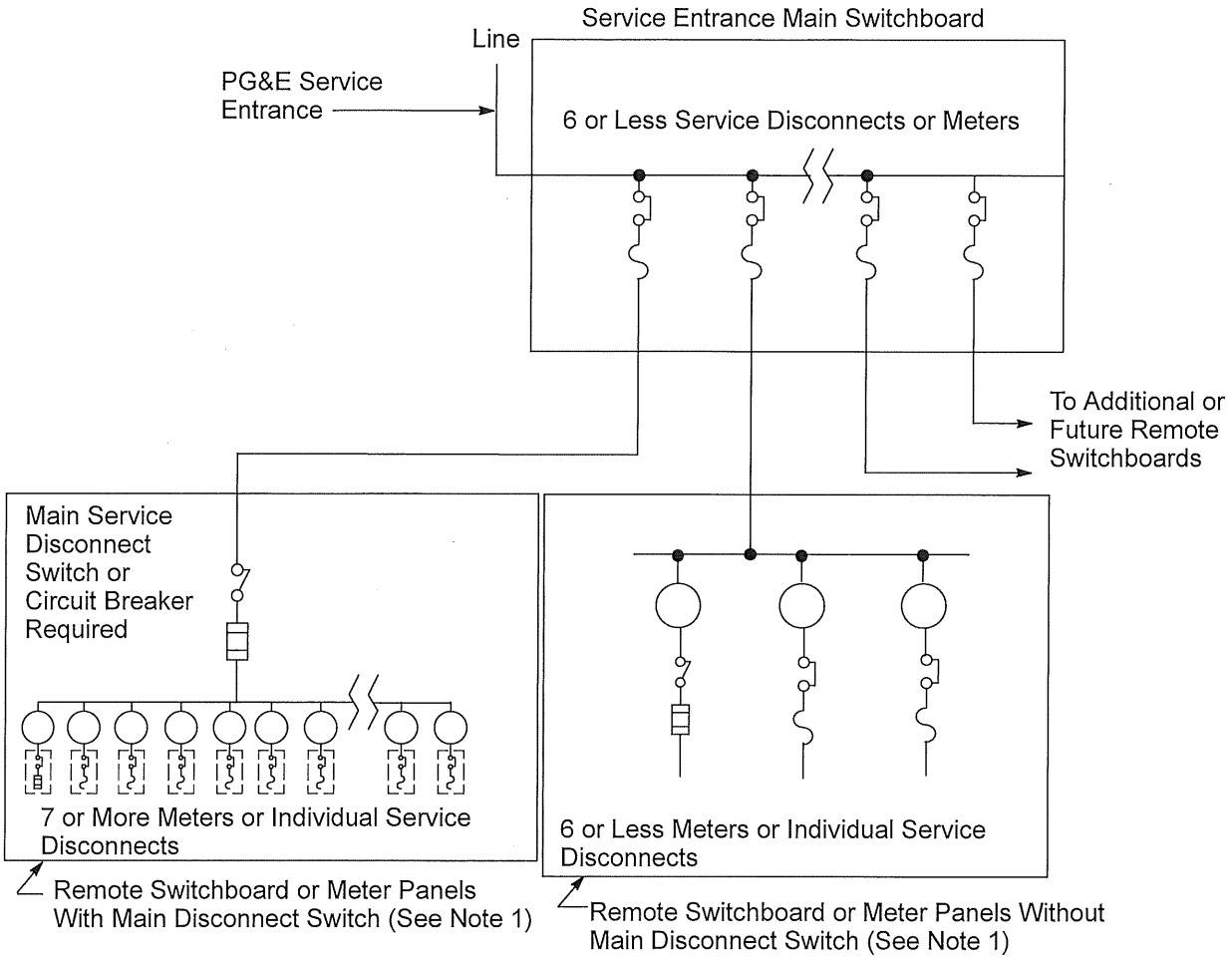


Figure 5-14
Multiple Remote Switchboard or Meter Panel Locations

Notes in reference to Figure 5-14.

1. When a switchboard or meter panel is located in a different room, floor, or building from the main switchboard, it is considered remote.

5.8. Grounding

Applicants must bond and ground their electric services and metering equipment as required by applicable electrical codes, local ordinances, and PG&E requirements.

A. Applicants must **not** use PG&E's gas facilities as part of the electrical grounding system.

1. Do **not** install electrical devices or equipment, wires, cables, bonding or grounding wires, clamps, or ground rods around the gas meter set as shown in Figure 2-19 on Page 2-31 and Figure 2-22 on Page 2-34.
2. Do **not** use PG&E's gas service piping, gas risers, or meter facilities for electric bonding or grounding that allows the gas meter, piping, or other gas facilities to become current-carrying conductors.

3. Do **not** allow gas pipe to be electrically bonded within meter enclosures, cabinets, or meter rooms.

B. 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.

C. **Applicants must locate the terminations (e.g., ground bus) 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. See "Notes in reference to Figure 5-15 and Figure 5-16.," on Page 5-27, specifically Note 2, which requires a continuous bond wire when grounding outside of the PG&E sealed section.

D. As mandated in the applicable sections of the electrical code, applicants may be required to physically protect their grounding electrode conductor against mechanical damage. PG&E prefers, but does not require, the grounding electrode conductor wire to be protected against physical damage by rigid steel conduit or armored cladding. Metal conduit must be bonded to an effective, grounded, fault-current path as described in the electrical code requirements.

E. Applicants must ensure that a grounded neutral connection, which is required for **safety** and metering purposes, exists in the PG&E-sealed section and is terminated in the same enclosure as the grounding electrode conductor.

F. When installing ground rods, applicants must only use approved ground rods and clamps as described in Numbered Document 013109, "Corrosion Resistant Ground Rods and Ground Rod Clamps," located in Appendix C. For homes and buildings, an Ufer grounding system using rebar is an acceptable substitute to the ground rod method. When ground rods are installed for concrete pads, refer to Numbered Document 045292, "Concrete Pad for Three-Phase, Loop-Style, Pad-Mounted Transformers." When ground rods are installed for equipment pads other than transformers (e.g., switchboards), install them according to their application. Finally, when installing ground rods in box pads, use Numbered Document 064309, "Box-Pad for Pad-Mounted Transformers," for installation information.

G. To ensure proper access to PG&E facilities during installation and maintenance, do not attach the bonding and grounding attachments for communication equipment on or near any PG&E sealed sections of the meter panel that would restrict access to the panel doors and meter.

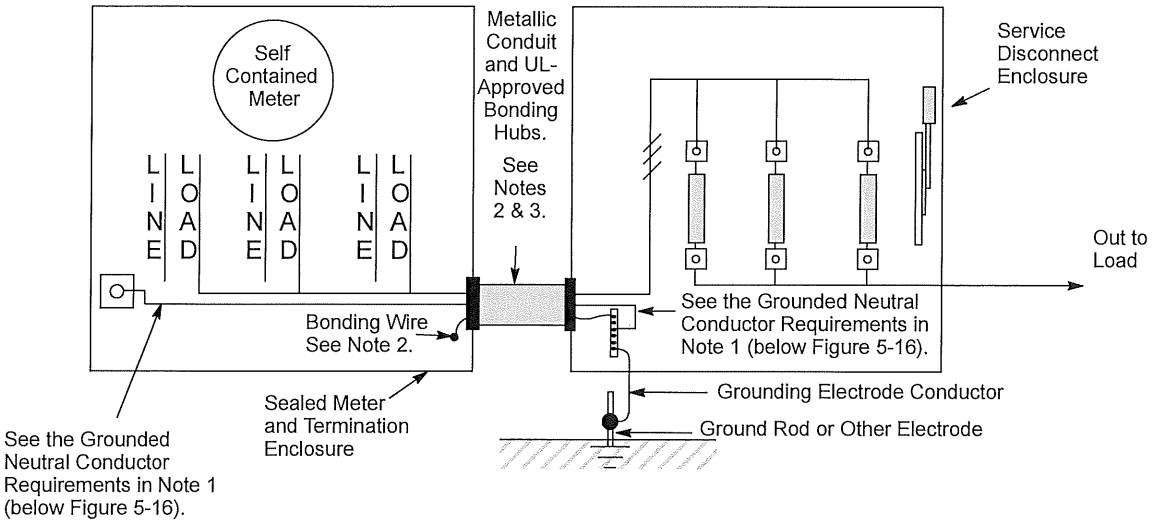


Figure 5-15
Grounding Outside of the Sealed Section–Self Contained Meter

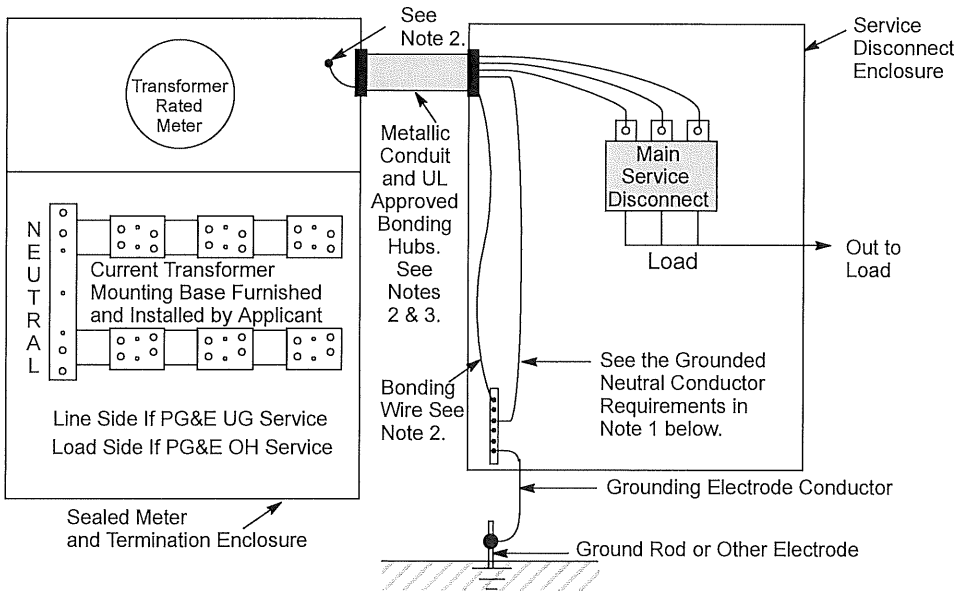


Figure 5-16
Grounding Outside of the Sealed Section–Transformer Rated Meter

Notes in reference to Figure 5-15 and Figure 5-16 are required for the safety of workers and the proper operation of PG&E facilities.

1. It is a requirement that the PG&E neutral conductor be grounded. This can be accomplished by terminating the neutral conductor to a grounded (i.e., non-insulated) neutral bus or to a ground bus in the service disconnect switch, as shown in Figure 5-15 and Figure 5-16. Or if provisions are available, terminate the neutral to a dedicated ground-rod and electrode conductor used solely for a meter panel more than 6 feet away.
2. An Equipment Grounding Conductor (EGC) is required between the PG&E service termination enclosure (e.g., meter panel) and the service disconnect enclosure. This is accomplished by attaching a bonding wire to the inside of the enclosures. A metallic conduit with Myers hub fittings that are U.L. certified for bonding also are required. The conduit and fittings must be approved by PG&E and the local authority having jurisdiction.
3. The metallic conduit diameter size must be equal to, or larger than, the diameter of the maximum knockout manufactured in the panel. The approved bonding hubs should not extend out past the edges of the meter panel.

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 **rigid metal conduit (RMC)** in locations where permanent service facilities will be installed and/or energized before completing the wall. The steel protects 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. If couplers are installed they must be of the same type (RMC) as the conduit. If transitioning from steel to rigid plastic the coupler must not reduce the internal diameter of the conduit. Refer to the steel and steel to plastic couplers in Numbered Document 062288, "Underground Conduits," located in Appendix C. 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.

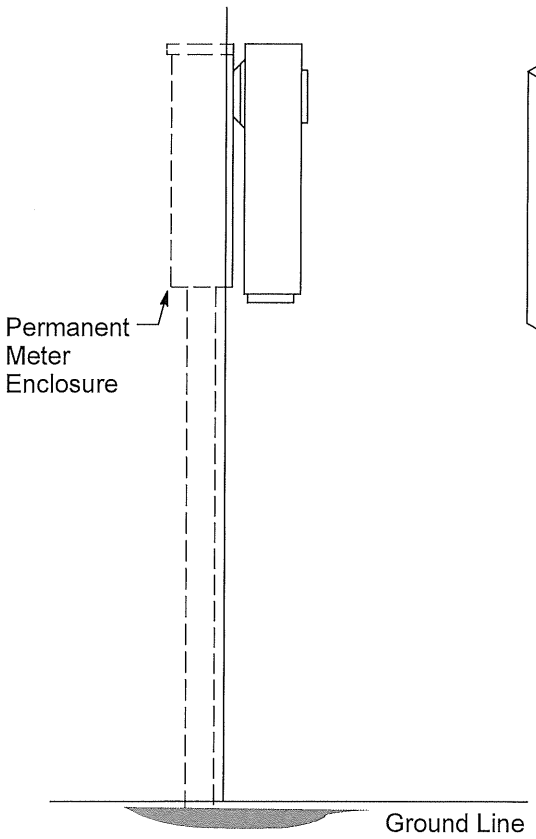


Figure 5-17
Plug-In Temporary Service

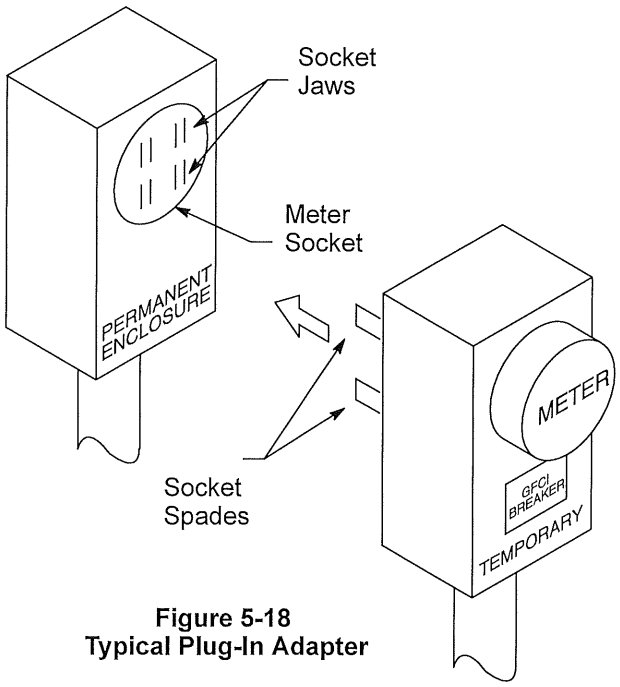


Figure 5-18
Typical Plug-In Adapter

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 project coordinators. **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 5-19, "Temporary-Service Metering Pedestal," below.

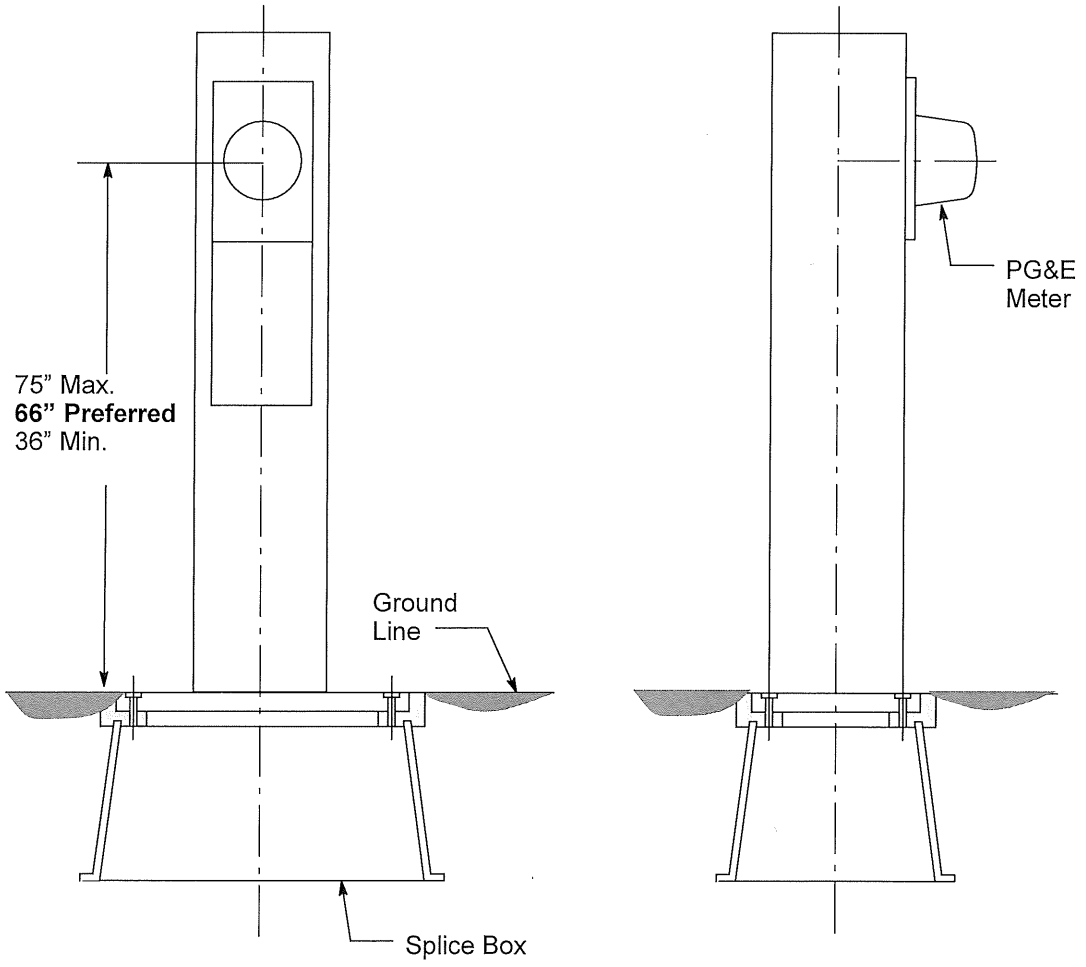


Figure 5-19
Temporary-Service Metering Pedestal

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 5-17, "Plug-In Temporary Service," and Figure 5-18, "Typical Plug-In Adapter," both on Page 5-28.

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 project coordinator for the interconnection requirements specific to the location where it will be used. PG&E's Electric Generation Interconnection (EGI) department may be reached by email at 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.

NOTE: See Numbered Document 060559, "Disconnect Switch Requirements For Distributed Generation Customers," located in Appendix C, when customer generation systems are installed on their premises.

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 meet the following requirements.

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

Table 5-4, "Requirements For AC Disconnect Switches," on Page 5-31, shows the requirements for an alternating current (ac) disconnect.

Table 5-4 Requirements For AC Disconnect Switches

Inverter-Based Generators	Phase(s)	AC Disconnect Required?
Self-Contained Meter Panel, Socket-Based, 320 Amps or Less (Continuous Current Rating) *	Single	No
All Other Self-Contained or Transformer-Rated Meter Panels	All	Yes
Non-Inverter-Based Generators	**Phase(s)**	**AC Disconnect Required?**
All Self-Contained and Transformer-Rated Meter Panels	All	Yes

* An ac disconnect is required for all K-base meter panels of any ampacity rating.

A fusible ac disconnect switch is required for generators that do not have overcurrent protection (e.g., breakers, fuses) at the point of interconnection.

As specified in *Electric Rule 21*, "Generating Facility Interconnections," and as required by PG&E, the generating facility must have an ac disconnect switch that meets the requirements described in Numbered Document 060559 and listed below.

- Easily accessible by PG&E, when requested.
- Manually and gang operated. Lockable in the "open" position.
- Allows visible verification that an air-gap of separation has occurred.
- Located 10 feet or less from PG&E's electric meter at the point of common coupling or interconnection and is seen easily from the panel.
- Permanent, approved sign(s) attached at PG&E's electric revenue meter's point of common coupling. A map showing the location of the ac disconnect switch also may be required.
- Installed in a safe and acceptable location that meets the same height and working space requirements as a meter panel. The height is measured from the ground to the top of the switch.

B. Virtual Net Energy Metering – VNEM (NEMV)

This program allows qualified participants to install a single solar system to cover the electricity load of both common and tenant metered areas connected at the same service delivery point.

This "Electric Schedules" table helps housing owners allocate a solar system's electricity to tenants enabling residents to receive the direct benefits of the building's solar system without requiring the generator to be physically connected to each billing meters.

Refer to PG&E Bulletin TD-6999B-005, "VNEM Installation Requirements," included in Appendix B, which explains the requirements for VNEM installations and illustrates the various metering and connection options for VNEM projects. Check the PG&E Electric Schedules website for the latest information on this program.

C. 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.D., below. An example would be a generator used to provide backup power for equipment maintenance.

D. 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** (see Figure 5-20 on Page 5-33). 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, "Transfer Switch Equipment." 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.

Generator

Please visit "Electric Generator Safety" (http://www.pge.com/generator/) for more information. (From PG&E's home page, click "For My Home," then from the "Education & Safety" drop-down box, click on "Gas & Electric Safety." On the left side of the page, click "Electric Generator Safety."

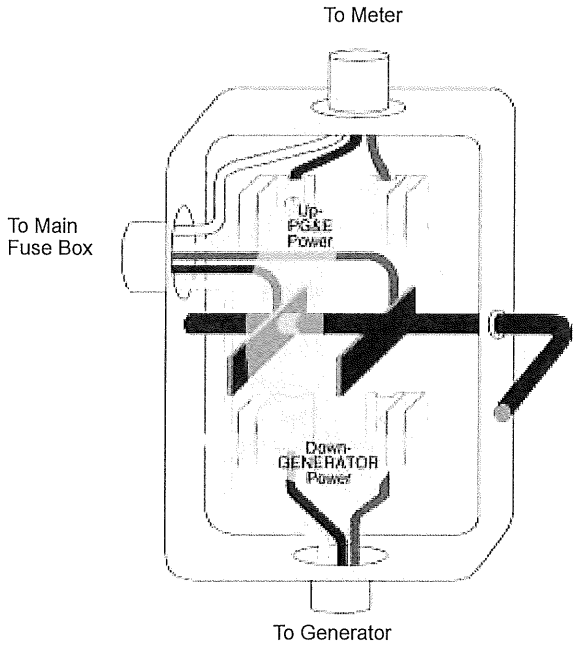


Figure 5-20
Transfer Switch

NOTE: The transfer switch must be installed after the meter panel on the customer's side, **not** before the meter panel on the PG&E side.

E. 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.

F. 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 perform these functions 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, an applicant could install a double throw switch to isolate his or her equipment and power supply and prevent electricity from flowing into the electric metering and supply system.

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 Schedules," PG&E 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 in PG&E's Plug-in Electric Vehicles website 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.

Section 6
Electric Metering: Residential

6.1. Scope

This section of the manual provides the Pacific Gas and Electric Company (PG&E/the Company) service specifications and requirements for residential electric metering. Also, it describes the required locations for those residential meters. This section includes specific information that is **not** covered by the basic requirements in Section 5, "Electric Metering: General."

6.2. Residential Electric Service: Specifications and Requirements

PG&E typically provides electricity for residential and commercial applicants served on a domestic rate schedule with 3-wire, 120/240-volt, single-phase, 60-hertz (Hz), alternating current (ac) service. However, the Company is able to supply 3-wire, 120/208-volt, single-phase, 60 Hz, ac service at some locations. **This service is limited to a service-entrance rating of 225 amperes (amps).** Applicants should contact their local PG&E project coordinators and ask about the type of services that are available for their specific locations.

NOTE: See Table FM-1, "Table FM-1, "Service Planning Office Contact Information," at the front of this manual starting on Page iv, for specific contact numbers listed by area.

6.2.1. Service Classes

The 125-amp-rated panels are classified as Class 100. The 225-amp-rated panels are classified as Class 200.

6.2.2. Test-Bypass Facilities

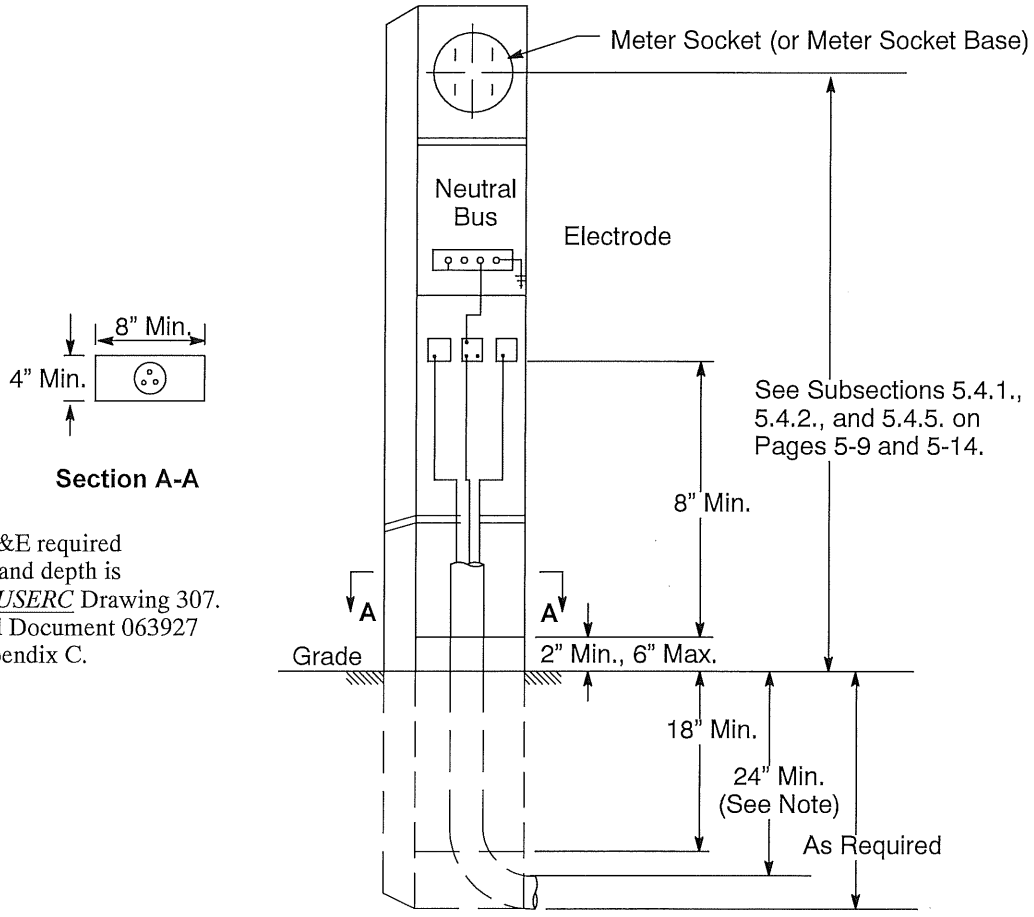
For single-phase residential installations, test-bypass facilities may be provided, but are not required. However, test-bypass facilities **are** required for the following installations.

- Single-family residential Service Class 320 meter, or residential meter panels that are larger than 225 amp, 120/240 volt, single phase, 3-wire.
- Residential meter panels of any size or phase that supply power to elevators.
- All common and tenant area meter panels of any size or phase, at multi-residential buildings with 2 to 5 units, that supply power to fire alarms or equipment, security alarms, laundry rooms, or significant interior lighting. Significant interior lighting is for hallways, storage rooms or areas, and garage areas.
- All common and tenant area meters at multi-residential buildings with 6 or more units.

6.3. Residential Electric Metering Pedestals

Residential electric meter pedestals, as shown in Figure 6-1, "Residential Electric Metering Pedestal," below, must have a minimum rating of 100 amps and a maximum rating of 200 amps. The pedestal also must meet the requirements specified in the *Electric Utility Service Equipment Requirements Committee (EUSERC)* manual, Drawing 307.

For authorization to attach telephone and cable television terminating facilities to the post, contact your local PG&E project coordinators.



Note: The PG&E required conduit cover and depth is greater than *EUSERC* Drawing 307. See Numbered Document 063927 located in Appendix C.

Figure 6-1
Residential Electric Metering Pedestal

6.4. Meter Locations

An applicant must consult a PG&E project coordinator during the initial construction phase of his or her project to determine the appropriate meter panel and current–transformer cabinet (if installed) location and to ensure that adequate space is provided for the metering equipment. PG&E must review and approve all meter installations **before** the meters are installed.

When meters are installed in a confined or enclosed area, applicants must ensure that they design a way for PG&E personnel to read the meters from the **outside** of the enclosures (e.g., window, opening).

The following four, lettered paragraphs provide location requirements that are applicable to residential metering.

A. Locate the meters and metering equipment either in outdoor, unfenced areas **or** mount them on, or recess them in, an exterior building wall. Do **not** mount metering equipment on, or recess metering equipment in, single family residences or inside garages.

B. Locate the meters and metering equipment in a meter room that is accessible through an outside doorway.

C. For a multifamily or residential building, locate the meters and metering equipment in a meter room or other acceptable location. Typically, an acceptable location will be on the ground floor or basement level of the building. The installation must be accessible directly from a public area.

   An applicant who is planning to install metering equipment on any floor above the ground floor in a multistory building must contact a PG&E project coordinator as early as possible during the initial stages of the project. PG&E must approve of any equipment location that is above the building's ground level.

   NOTE: In large, multifamily, multistory residential buildings (typically if the highest occupied floor is over 75 feet high), PG&E may, at its option, approve grouped meter locations on one or more upper floors.

D. When meters will be installed indoors see the PG&E Bulletin TD-7001B-005, "SmartMeter Electric Network Requirements for Indoor Meter Rooms and High-Rise Building Construction," located in Appendix B.

E. Locate electric meters in the same general area as gas meters when designing single-family residences. For clearance specifications refer to Subsection 5.4.3., "Meter Set Clearance Requirements," on Page 5-10, and Section 2, "Gas Service."

6.4.1. Installing Utility Services to Mobile Homes

A. Typically, PG&E will **not** supply utility services and/or metering facilities to mobile homes that are located or set up in any area, including a mobile home park, where utility service facilities are attached directly to the mobile home **except** under the following circumstances.

   1. The mobile home is fixed in place (i.e., no running gear or wheels). The mobile home must **not** be capable of movement.

   2. The mobile home is installed on a foundation system as described in State of California Title 25, Division 1, Chapter 2, Article 7, Section 1333, "Foundation Systems."

B. PG&E will make an **exception** and install utility services to a location where mobile homes may be moved, including mobile home parks, under certain, specific conditions.

1. The mobile homes must be served by meter pedestals or other PG&E-approved services **and** the meter facilities must be installed at a fixed location.
2. Applicants are responsible for connecting their mobile homes to those fixed locations and to the meter pedestals or other utility facilities.

See Numbered Document 052521, "Electrical Service Requirements for Mobile Home Developments," for more information and for specifications. This PG&E document is included in Appendix C, "Electric and Gas Engineering Documents," and also in PG&E's *Electric Underground Construction Manual*, Volume 1.

6.5. Services

6.5.1. Single Meter: Underground Service

A. Services, 0 Amps Through 225 Amps, Single Phase

Figure 6-2, "Typical Underground Service-Termination Enclosure, Combination Meter-Socket Panel (Residential, 0 Amps–225 Amps)," on Page 6-5, illustrates a single, underground, residential, single-phase meter panel (i.e., 4 terminal for a 120/240-volt service and 5 terminal for a 120/208-volt service).

The numbered items below describe the applicant's requirements when designing these types of underground services.

1. Design the socket and enclosure for underground service conductors.
2. Ensure that enclosures designed for either overhead or underground service entry meet all of the requirements for **both** types of service.
3. Ensure that all cable-termination lugs are suitable to use with both aluminum and copper conductors. The lugs must be compatible with a range of conductor sizes.

   The **minimum** conductor size for services up to 125 amps is #6 American wire gauge (AWG) to 1/0 AWG. The **minimum** conductor size for services rated from 126 amps to 225 amps is #2 AWG to 250 thousand circular mils (kcmil).

4. Use separate, independently supported, service-termination lugs that extend from the socket, and connect to it, using a bus bar. Provide a minimum radial clearance of 1-1/2 inches between the hot bus terminals and the ground or neutral surfaces. The termination facilities cannot be side- or angle-mounted in relation to the front of the panel.
5. Ensure that the socket enclosure has a separate lug in the sealable section. Use this lug exclusively for terminating PG&E's neutral conductor. If the neutral terminal is insulated from the enclosure, PG&E will provide the applicant with a bonding screw or jumper.

6. Ensure that the applicant-owned wiring that extends from the distribution section (i.e., branch circuits) does **not** pass through the sealable section(s).
7. Locate the applicant's service-grounding electrode conductor outside of the sealable section and design it to permit the applicant's grounding system to be isolated easily from PG&E's neutral, when necessary.

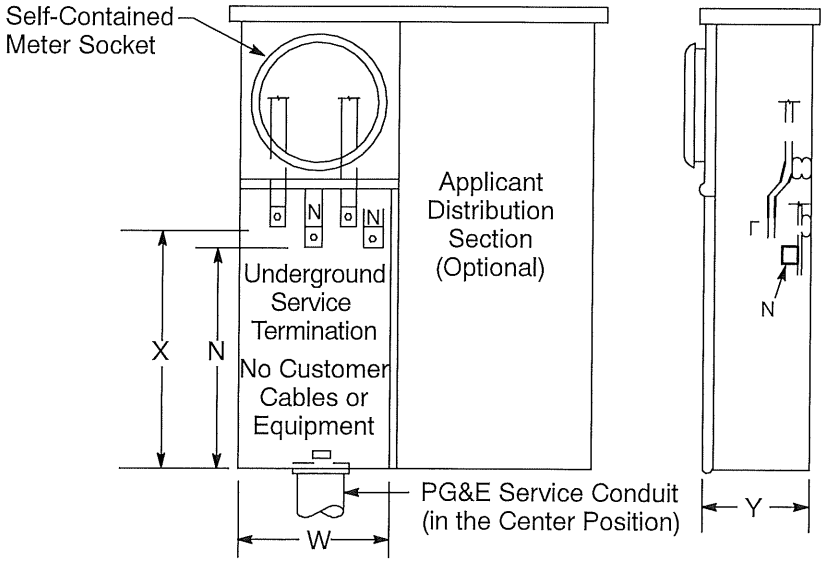


Figure 6-2
Typical Underground Service-Termination Enclosure, Combination Meter-Socket Panel (Residential, 0 Amps–225 Amps)

Table 6-1 Residential (0 Amps–225 Amps) Enclosure

Rating in Amps	X	Y	N	W	Conduit
	Minimum Dimensions (In Inches)				
Up to 125	8	4	6	7	2
126 to 225	11	5-1/2	8-1/2	7	3

B. Services, 226 Amps Through 320 Amps, 120/240 Volts, Single Phase, Residential

Figure 6-3, "Typical Service-Termination Enclosure, Combination Meter-Socket Panel for a Class 320 Meter (Residential, 120/240-Volt, 226-Amp Through 320-Amp Service)," on Page 6-6, illustrates a single, underground, residential, single-phase, 120/240-volt, Class 320-amp meter panel. Applicants must ensure that this panel:

1. Conforms to the requirements for underground-fed, 320-amp metering equipment.
2. Is designed with test-bypass facilities and has provisions for using manual bypass links.
3. Is marked with either a rating of "320 Amperes Continuous" or "400 Amperes Maximum (320 Amperes Continuous)."
4. Is only used with residential services.

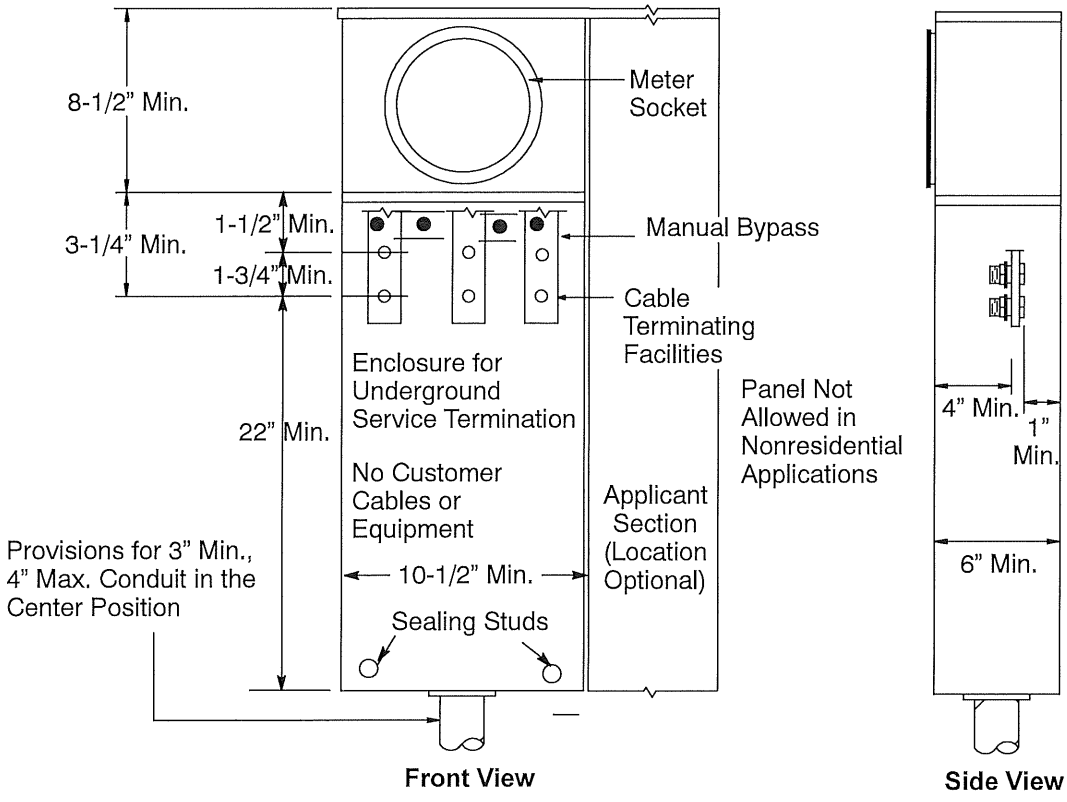


Figure 6-3
Typical Service-Termination Enclosure, Combination Meter-Socket Panel for a Class 320 Meter (Residential, 120/240-Volt, 226-Amp Through 320-Amp Service)

C. Services, 201 Amps Through 800 Amps, Single Phase or 400 Amps Three Phase with Current Transformers

Applicants **must** consult their local PG&E project coordinators when single-phase services exceed 400 amps. Applicants may need to install three-phase service to conform to PG&E's *Electric Rule 2*, "Description of Service," requirements.

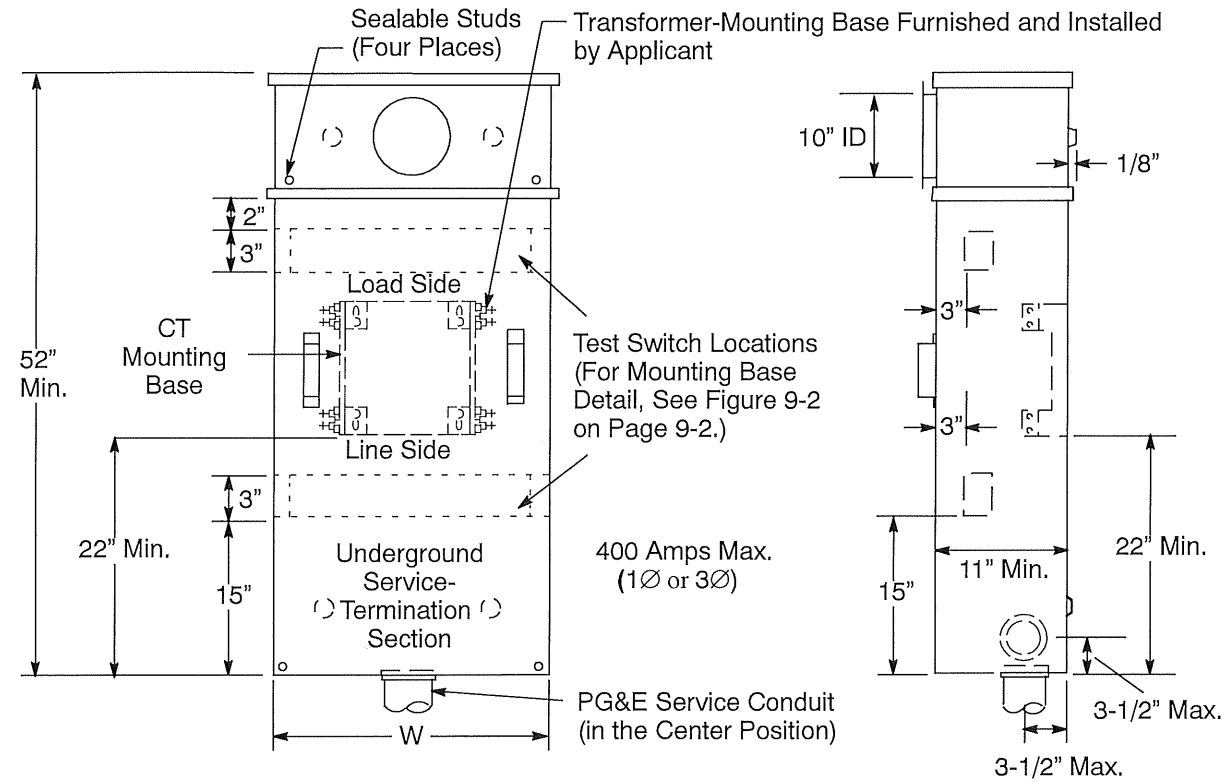
Figure 6-4, "Underground Combination Meter and Current-Transformer Cabinet (201 Amps–400 Amps; 1∅ or 3∅)," on Page 6-8, illustrates a single-metered, underground, residential meter panel.

Figure 6-5, "Typical Underground, Separate-Bused, Current-Transformer Cabinet and Safety-Socket Meter Box Assembly, 201 Amps–400 Amps, 3∅ and 201 Amps–800 Amps, 1∅," on Page 6-8, illustrates how service and metering components can be separated into individual enclosures.

NOTE: See Section 9, "Electric Metering: Components," for details about the components in Figure 6-4 and Figure 6-5.

Applicants must ensure their conductors are installed before PG&E installs the current transformers. Also, applicants must ensure that their service-entrance conductors and equipment meet the following requirements.

1. The current transformer mounting base must include termination bolts, Belleville washers, and nuts on the line and load sides necessary to connect the PG&E current transformers and service conductors to the line side.
2. The conductor must enter the current-transformer cabinet at or within 2 inches of the top or bottom and leave the cabinet **either** at or within 2 inches of the top or bottom of the opposite end of the cabinet **or** enter and exit at or within 2 inches of the same end of the current-transformer cabinet. Route the conductor carefully when using this option.



W Dimensions:
3-Wire 1∅ = 24" Min.
4-Wire 3∅ = 36" Min.

Figure 6-4
Underground Combination Meter and Current-Transformer Cabinet (201 Amps–400 Amps, 1∅ or 3∅)

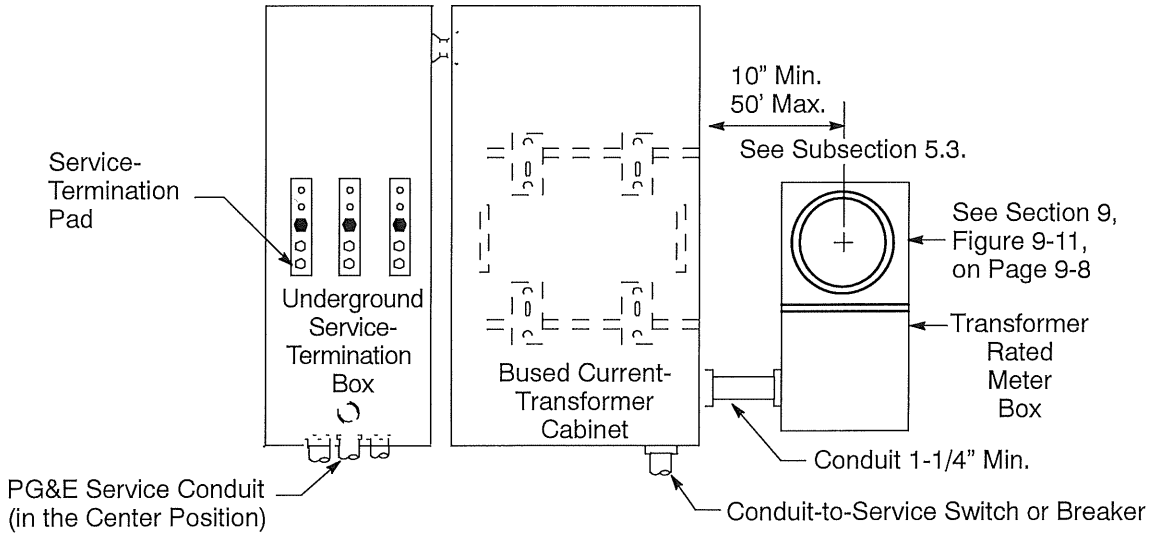


Figure 6-5
Typical Underground, Separate-Bused, Current-Transformer Cabinet and Safety-Socket Meter Box Assembly, (201 Amps–400 Amps, 3∅ and 201 Amps–800 Amps, 1∅)

6.5.2. Single Meter: Overhead Service

A. Services, 0 Amps Through 225 Amps, Single Phase

Figure 6-6, "Individual Meter Socket," and Figure 6-7, "Combination Meter Socket Load Center," both on Page 6-9, illustrate the 4-terminal, 120/240-volt and 5-terminal, 120/208-volt overhead service and meter panel.

Enclosures designed for a combination of overhead and underground conductors must meet **all** of the requirements for both types of conductor entry.

B. Services, 226 Amps Through 320 Amps, 120/240 Volts, Single Phase

Applicants must ensure that this panel:

1. Conforms to the requirements for overhead-fed, 320-amp metering equipment.
2. Is designed with test-bypass facilities and has provisions for using manual bypass links.
3. Is marked with either a rating of "320 Amperes Continuous" or "400 Amperes Maximum (320 Amperes Continuous)."
4. Is only used with residential services.

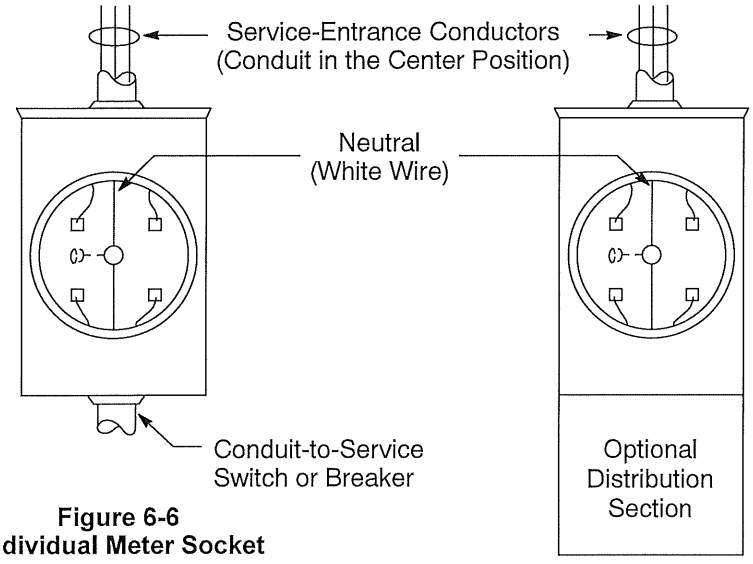


Figure 6-6
Individual Meter Socket

Figure 6-7
Combination Meter Socket Load Center

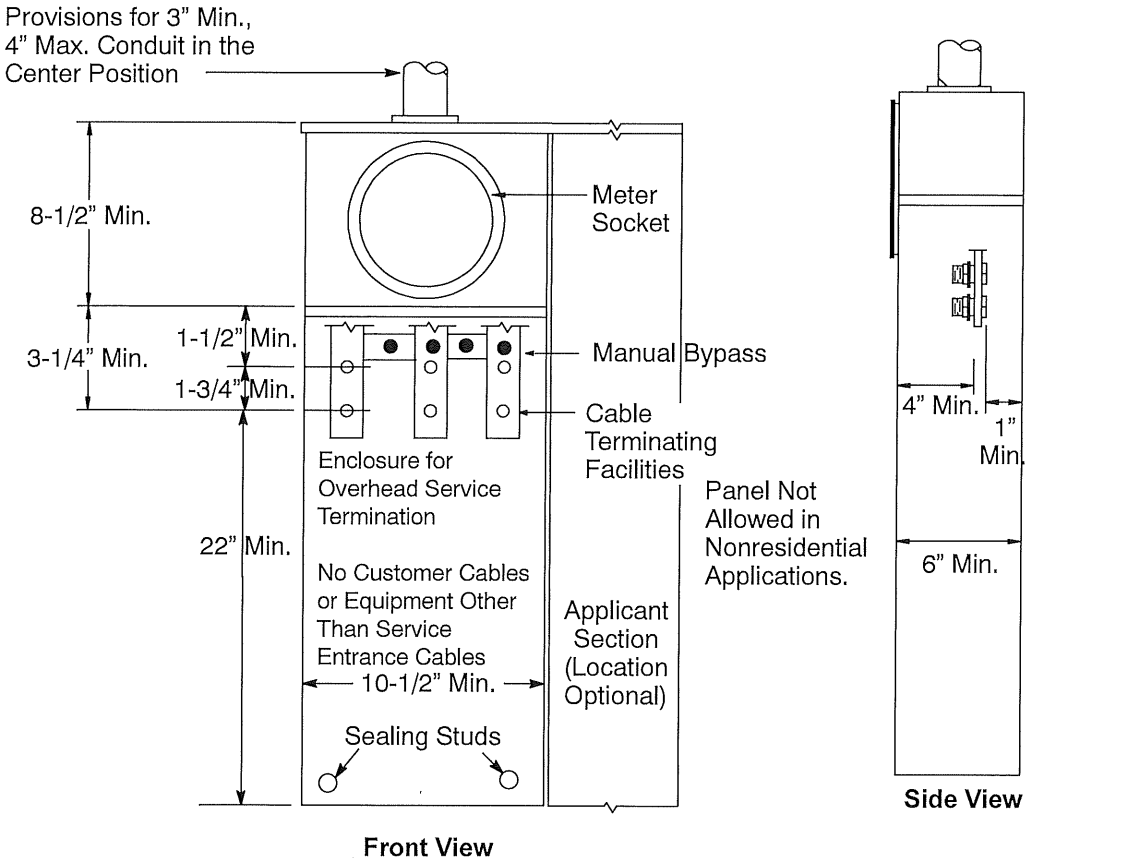


Figure 6-8
Typical Service-Termination Enclosure, Combination Meter Socket Panel for a Class 320 Meter (Residential, 120/240-Volt, 226-Amp Through 320-Amp Service)

C. Services, 201 Amps Through 600 Amps, Single Phase, or 400 Amps, Three Phase, with Current Transformer

Applicants **should** consult with a PG&E project coordinator before installing single-phase services that exceed 400 amps. Applicants may need to install three-phase service to conform to PG&E's *Electric Rule 2* requirements.

Figure 6-9, "Overhead-Fed Combination Meter and Current-Transformer Cabinet, (201 Amps–400 Amps, 3∅ and 201 Amps–600 Amps, 1∅)," on Page 6-11, illustrates a single-metered, overhead, residential meter panel.

Figure 6-10, "Overhead-Fed, Separate-Bused, Current-Transformer Cabinet and Meter Box (201 Amps–400 Amps, 3∅ and 201 Amps–600 Amps, 1∅)," also on Page 6-12, illustrates a single, overhead, residential, single-phase or three-phase service and meter panel with current transformers.

NOTE: See Section 9, for details about the components in Figure 6-9 and Figure 6-10.

Applicants must ensure their conductors are installed before PG&E installs the current-transformers. Also applicants must connect the service entrance conductors to the line and load sides of the current-transformer mounting base.

1. The current transformer mounting base must include termination bolts, Belleville washers, and nuts on the line and load sides necessary to connect the PG&E current transformers. See Section 9, for details about these internal components.
2. The conductor must enter the current-transformer cabinet at or within 2 inches of the top or bottom and leave the cabinet **either** at or within 2 inches of the top or bottom of the opposite end of the cabinet **or** enter and exit at or within 2 inches of the same end of the cabinet. **Applicants must ensure that the conductor is routed carefully when using this option.**

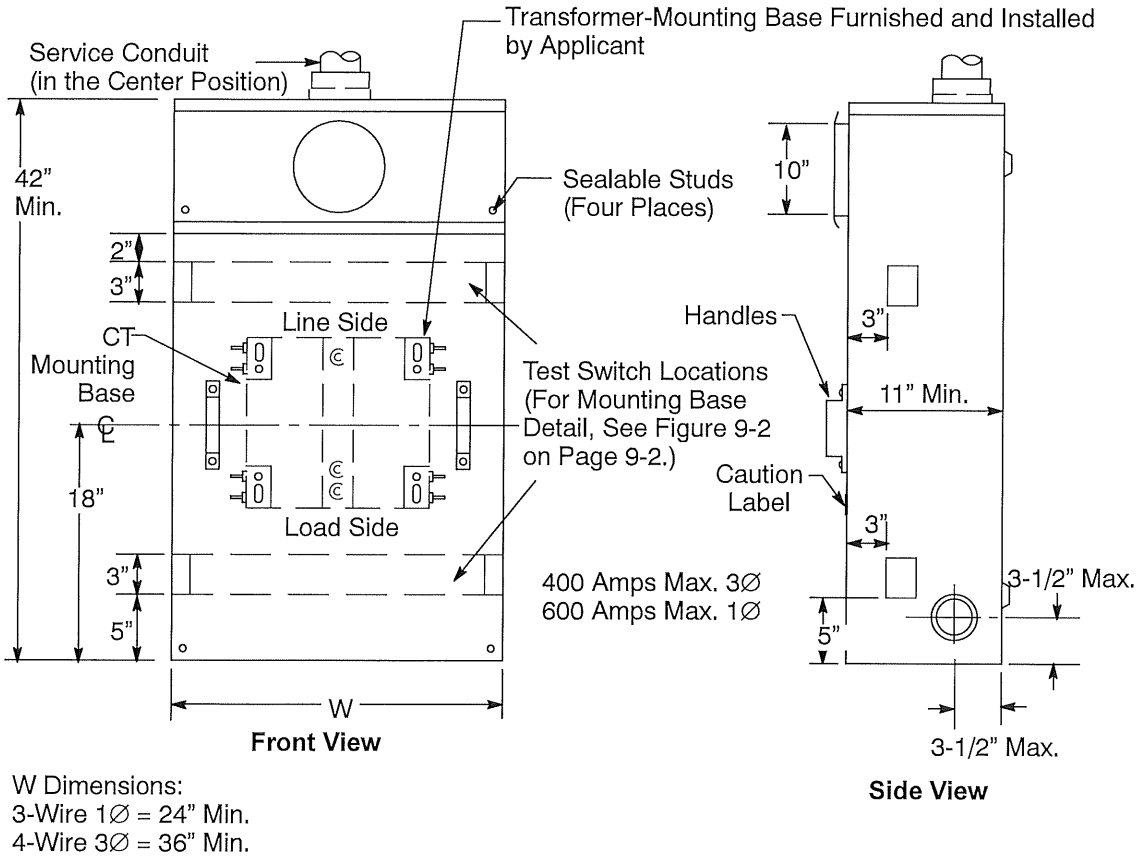


Figure 6-9
Overhead-Fed Combination Meter and Current-Transformer Cabinet, (201 Amps–400 Amps, 3Ø and 201 Amps–600 Amps, 1Ø)

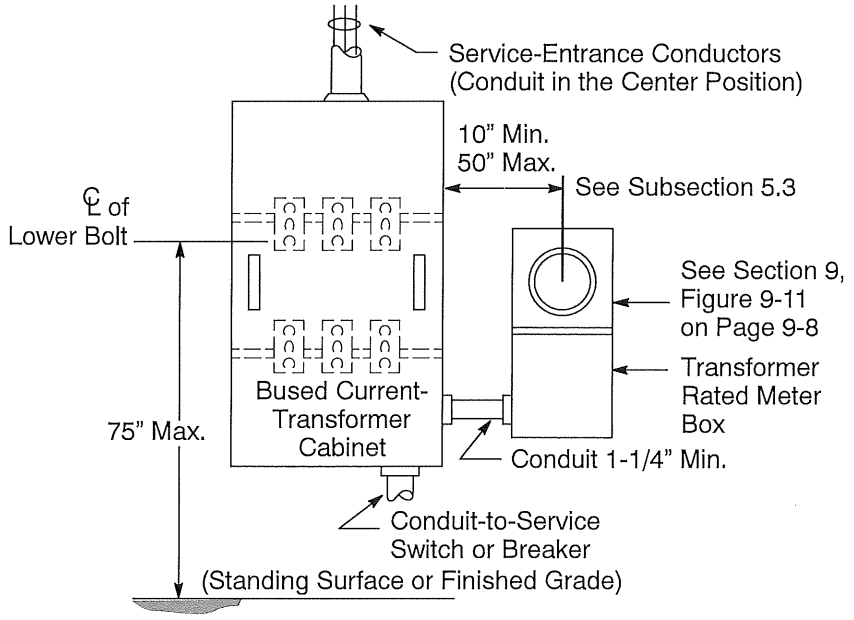


Figure 6-10
Overhead-Fed, Separate-Bused, Current-Transformer Cabinet and Meter Box
(201 Amps–400 Amps, 3∅ and 201 Amps–600 Amps, 1∅)

6.5.3. Multiple Meters

PG&E requires grouped, single-meter installations for multifamily residential buildings.

This requirement excludes row-type condominiums where each unit is considered a single-family residence and is metered individually. Row-type condominiums must meet the applicable metering requirements described in the following subsections.

A. Grouped-Meter Installation Ampacity Ratings

The ampacity rating of a grouped-meter installation must be as described below.

1. For installations **without** a main switch or breaker, the service rating will be the rating of the electrical enclosure or service termination section, pull can, or other service-termination enclosure where PG&E terminates and connects its supply facilities and conductors. Also, see Subsection 1.14.B. on Page 1-11.
2. For installations **with** a main switch or breaker, the rating of the service to be supplied is the rating of the termination section, pull can, service section, or main service switch continuous current rating, typically whichever is greater. Also, see Subsection 1.14.A. on Page 1-11.

B. Grouped Meter-Socket Spacing and Socket Blank-Off Covers

PG&E requires a 7-1/2-inch horizontal and 8-1/2-inch **minimum** vertical center spacing between meter sockets. The Company will provide and install nonconductive, meter-socket, blank-off covers **before** energizing the meter panels with vacant meter sockets. PG&E will **not** energize meter panels and sockets unless blank-off meter covers are installed.

C. Individual Meter Sockets With Wiring Gutters

PG&E will accept meter sockets with wiring gutters, as shown in Figure 6-11, "Meter Sockets With Wiring Gutters," on Page 6-13, only when applicants either are updating and/or adding on to existing installations.

PG&E will accept individual meter sockets in combination with a wiring gutter **only** for an applicant's service-entrance conductors and **only** when unmetered service-entrance conductors and metered-load conductors are **not** installed in the same conduit, raceway, or wiring gutter.

To conserve space and lower equipment costs, applicants should consider installing a combination multimeter, as described in Subsection 6.5.3.D., "Combination Multimeter Installation," on Page 6-14. Or, applicants could install a meter trough, as described in Subsection 6.5.3.E., "Meter Trough Installations," on Page 6-17.

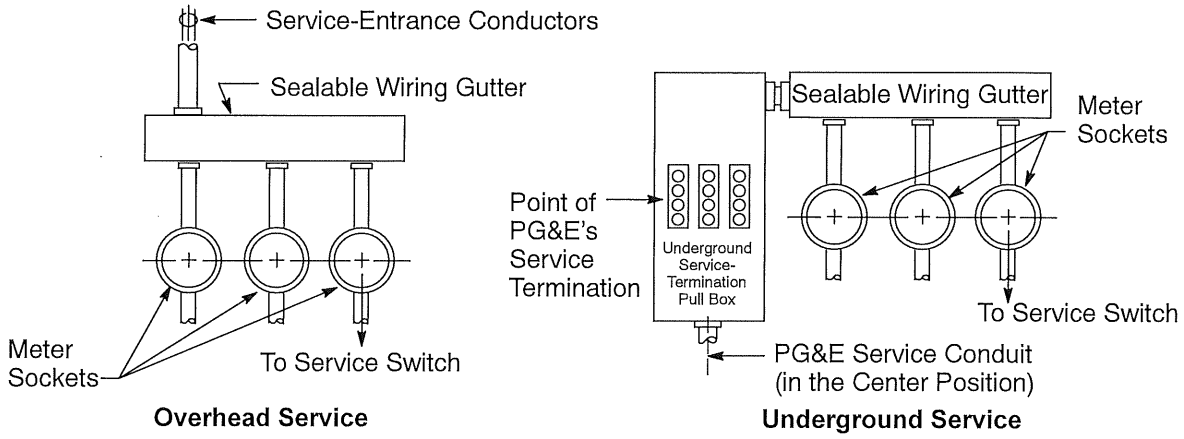


Figure 6-11
Meter Sockets With Wiring Gutters

D. Combination Multimeter Installation

A combination multimeter installation consists of the following equipment.

- A main switch (if one is installed or required by local jurisdiction)
- Unmetered wiring gutter
- Multiple meter sockets
- An appropriate number of circuit breakers

See Section 5, Subsection 5.7., "Main Service Disconnects and Switching Sequences," on Page 5-21, for more information on disconnects and switches.

Examples of PG&E-approved, combination, multimeter installations are illustrated in Figure 6-12, "Typical, Manufactured, Combination, Multimeter Installation: Seven Meters or More," on Page 6-15, and Figure 6-13, "Clearances for a Typical, Manufactured, Combination, Multimeter Installation," on Page 6-16.

Applicants must ensure that all multimeter installations meet the following requirements.

1. Individually meter multiple apartments in one building. Separate metered and unmetered conductors.
2. Use factory (or factory-equivalent), harness-style wiring **or** bus between the unmetered wiring gutter and the line terminals of each meter socket. Harness-style wiring or bus also must be used between the load terminals of each meter socket and the line side of the corresponding circuit breaker.
3. Ensure that the panels are designed to permit any individual meter socket block or jaw assembly to be replaced. Applicants must **not** mount more than two meters on a single, removable panel. Removable meter-panel covers must **not** exceed 6 square feet in area.
4. Ensure that the panel's design and construction meets the clearance requirements provided in Figure 6-13 and in Table 6-2, "Dimension Specifications for Multimeter Installations," on Page 6-16.
5. Increase Dimension B, shown in Figure 6-13 on Page 6-16, by the amount that the main switch door, including the operating handle, reduces the clearance when opened 90°.
6. Ensure that panels are removable so that PG&E personnel can perform wiring inspections.

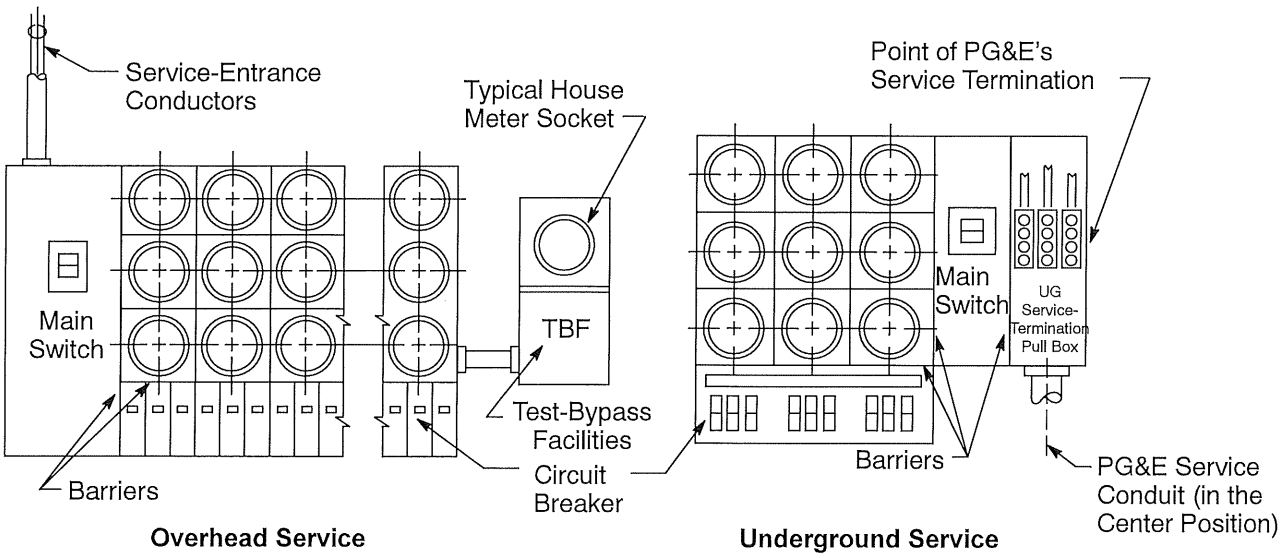


Figure 6-12
Typical, Manufactured, Combination, Multimeter Installation: Seven Meters or More

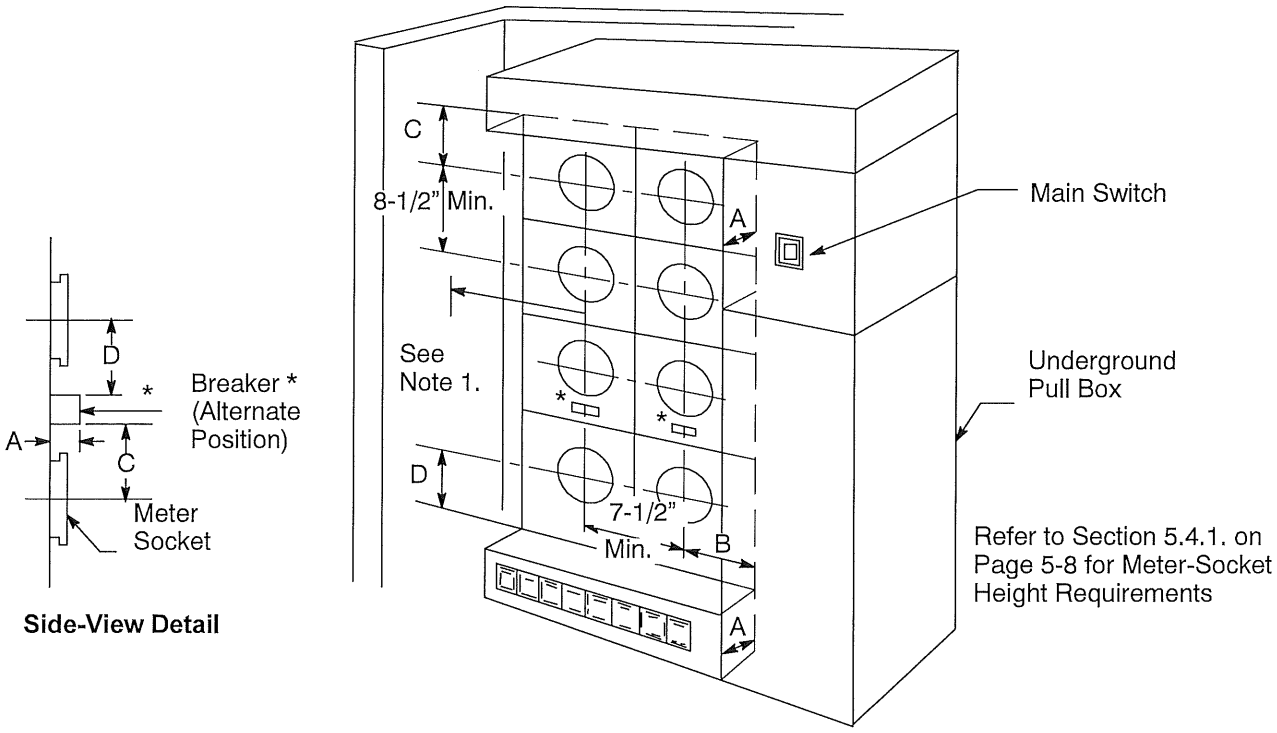


Figure 6-13
Clearances for a Typical, Manufactured, Combination, Multimeter Installation

Notes in reference to Figure 6-13.

1. Where an adjacent wall or other obstruction extends more than 11-inches perpendicular from the face of the meter panel, a 10-inch minimum dimension to the meter socket axis is required. For obstructions extending 11 inches or less from the meter panel, the side clearance must conform to that of Dimension B.

Table 6-2 Dimension Specifications for Multimeter Installations

A–Protrusions (in Inches)	B	C	D
	All Measurements Are Minimum Dimension in Inches		
0 (No Protrusion)	3-3/4	4	4-3/4
Greater Than 0 to 1-1/8	4-1/4	4	4-3/4
Greater Than 1-1/8 to 2	4-1/4	4-1/4	6-1/4
Greater Than 2 to 4	6-1/4	4-1/4	8
Greater Than 4 to 11 (Maximum)	6-1/4	10	8

E. Meter Trough Installations

PG&E accepts meter trough installations using ring-type sockets only for reconstructing and adding to existing installations. In addition to meeting the general requirements for meter sockets, applicants must ensure that meter troughs meet the following general requirements.

1. Where there are four, five, or six sockets in one trough, the incoming service conductors must terminate on a main bus that is supported independently of the socket jaw assembly.
2. The panel design must permit individual, meter-socket blocks or jaw assemblies to be replaced individually. Applicants must **not** mount more than two meters on a single, removable front panel.
3. Metered and unmetered conductors must be separated, clearly showing that the entire load is being metered.
4. The panels must be removable so that wiring inspections can be performed.

Figure 6-14 and Figure 6-15, both located below, illustrate meter trough installations served by underground or overhead service.

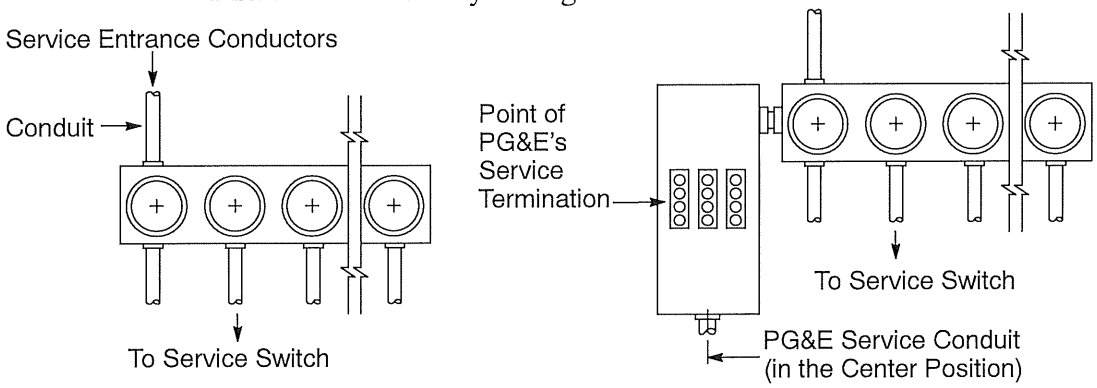


Figure 6-14
Horizontal Meter Trough Installation: Six Meters or Less

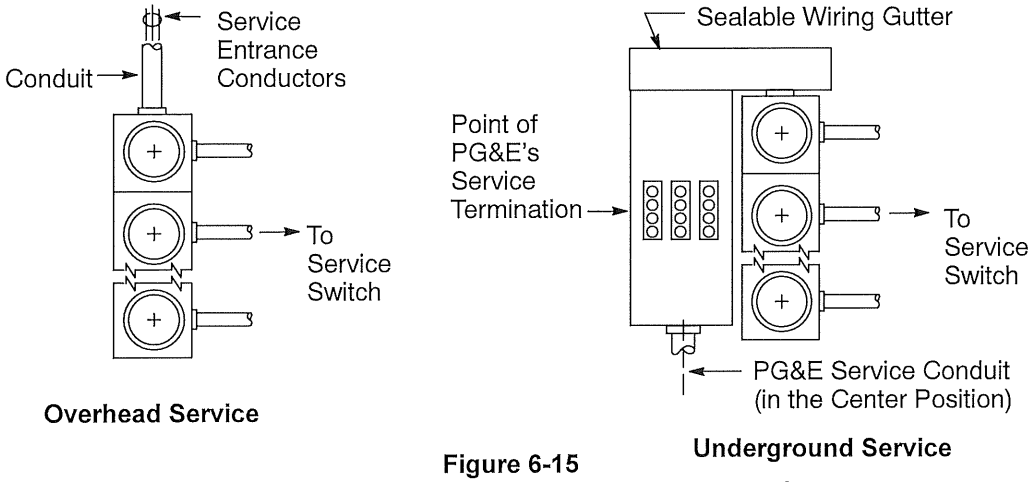


Figure 6-15
Vertical Meter Trough Installation: Five Meters or Less

PACIFIC GAS AND ELECTRIC COMPANY
2017 General Rate Case Phase II
Application 16-06-013
Data Response

PG&E Data Request No.:	WMA_001-Q24		
PG&E File Name:	GRC-2017-PhII_DR_WMA_001-Q24		
Request Date:	August 19, 2016	Requester DR No.:	001
Date Sent:	October 7, 2016	Requesting Party:	Western Manufactured Housing Communities Association
PG&E Witness:	Thomas Troup	Requester:	Ed Poole

SUBJECT: DISCOUNT CALCULATION

QUESTION 24

Please provide the Greenbook pages with similar specifications for common-wall or shared-wall multi-family residential dwellings. If multiple types of dwellings are included in the Greenbook (e.g., apartments vs. condominiums vs. townhouses), please provide the Greenbook section for each of these. Please identify where the minimum connection distances is specified.

ANSWER 24

Please see PG&E's response to Question 23.

The Greenbook does not explicitly specify minimum service conductor lengths for the dwelling types listed in this question.