

Section 7

Electric Metering: Commercial and Industrial

7.1. Scope

This section of the manual provides the service specifications and requirements for commercial and industrial electric meters. Also, it describes the required locations for those meters.

7.2. Service Specifications and Requirements

The following three subsections describe service specifications and requirements for commercial and industrial electric meters.

7.2.1. Permitted Types of Electric Service

PG&E does *not* permit overhead service connections in areas zoned for underground service by local ordinance, or where underground service is required by California Public Utility Commission- (CPUC-) approved tariffs.

7.2.2. Required Approvals for Meter Equipment and Test-Bypass Facilities

The following approvals are required *before* installing meter equipment and test-bypass facilities.

- A. Applicants must furnish, install, and maintain a meter socket with PG&E-approved, manual, test-bypass facilities. See Figure 7-1., “Bused, Safety-Socket Meter Box for Self-Contained Metering (0 Through 225 Amperes),” on Page 7-3. This equipment is used for the following types of services.
1. All three-phase, nonresidential service *without exception*.
 2. All single-phase, commercial and industrial service except when *all* of the three following conditions are met:
 - The main disconnect switch’s rating does *not* exceed 225 amperes.
 - Service to another meter or service will *not* be interrupted when de-energizing the meter socket without test-bypass facilities.
 - The metered service is used *exclusively* for temporary power or nighttime lighting loads.

7.2.3. Required Test-Bypass Facilities

Test-bypass facilities are required, regardless of the panel ampacity, for both single-phase and three-phase, nonresidential installations.

7.2.4. Services, 0 Through 225 Amperes, Single Applicant, Overhead and Underground

PG&E must approve the locations for meter and current-transformer cabinets. Additionally, the following, *specific* location requirements apply to commercial and industrial metering.

- A. Applicants must locate meters on exterior, ground-floor walls or other permanent structures nearest PG&E's distribution facilities. When outdoor meter locations are *not* practical, PG&E will approve interior locations if they are accessible during PG&E's normal working hours *and* if the interior location meets PG&E's access requirements, as described in Subsection 5.3., "Electric Meters: General Location Requirements," on Page 5-2.
- B. Typically, applicants *must* group meters for multiple-occupancy buildings at one common location; however, PG&E allows the following *exceptions* to this requirement.
 - 1. PG&E may permit applicants to have individual meters located on their premises if the installations comply with all applicable codes. When buildings contain unmetered wiring, applicants must place that wiring in PG&E-approved conduit and/or in sealable wireways.
 - 2. In high-rise buildings (e.g., typically more than 75 feet high), PG&E may permit grouped-meter locations on one or more floors.
 - 3. PG&E may permit meters to be located at a point away from the service disconnect means, allowing the applicants to separate the meter and metering transformers. In these cases, applicants must provide clearances and working space, as described in Subsection 5.4., "Meter Clearances, Enclosures, and Protection," on Page 5-5, for both the meter and metering transformer installations.

Applicants must supply and install rigid steel conduit for the meter wiring between the meter and the metering transformers. The conduit must be 1-1/4-inch minimum diameter and must be limited to 50 circuit feet with a maximum of three 90° bends, *unless* sealable, accessible, exposed conduits are furnished.

When meters are separated by more than 50 circuit feet, PG&E requires a special review and approval for the installation.

7.2.5. Services, 0 Through 225 Amperes, Single Applicant, Overhead and Underground

Applicants must meet the following requirements when installing services.

- A. PG&E's service conductors must be pulled into the enclosure and connected to the bypass-test facility's line-termination lugs.
- B. The load conductors must be routed and formed to allow PG&E to pull their service laterals without encountering any obstructions.

- C. For overhead service, applicants must provide and install service-entrance conductors from the weatherhead to the enclosure. Applicants must connect the conductors to the bypass-test facility's line-termination lugs.
- D. The right side, test-bypass blocks (i.e., two poles) are identified as the power leg (i.e., high phase) for metering three-phase, 4-wire, delta service. The power leg is identified by using the color orange.

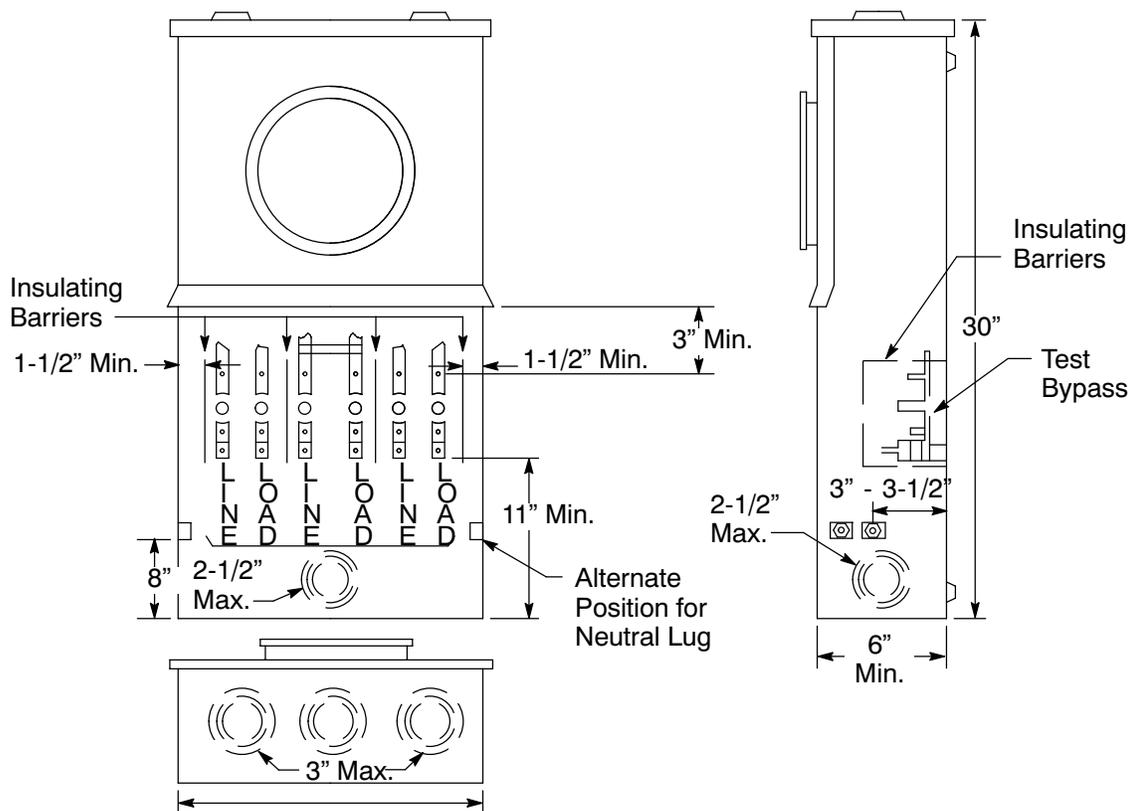


Figure 7-1
Bused, Safety-Socket Meter Box for Self-Contained Metering (0 Through 225 Amperes)

7.2.6. Services, Over 225 Amperes, Single Applicant, Underground

Applicants must meet the following requirements when installing self-contained services that are 226 amperes through 320 amperes, 120/240 volts.

A. Services, 226 Amperes Through 320 Amperes, 120/240 Volts, Self Contained

1. When planning a single-phase, 120/240-volt service, applicants must furnish, install, own, and maintain service-termination and meter-mounting devices, as illustrated in Figure 7-2, “Meter and Service-Termination Enclosure, Combination Meter-Socket Panel for a Class 320 Meter (Residential/Commercial, 120/240-Volt, Single Phase, 226-Ampere Through 320-Ampere Service),” on Page 7-4.

2. Applicants must equip the meter-mounting device with a socket for a 320-ampere, self-contained meter.
3. Applicants must ensure that metered conductors exit **above** the mounting base. Applicant-owned wiring must **not** re-enter any section sealed by PG&E.

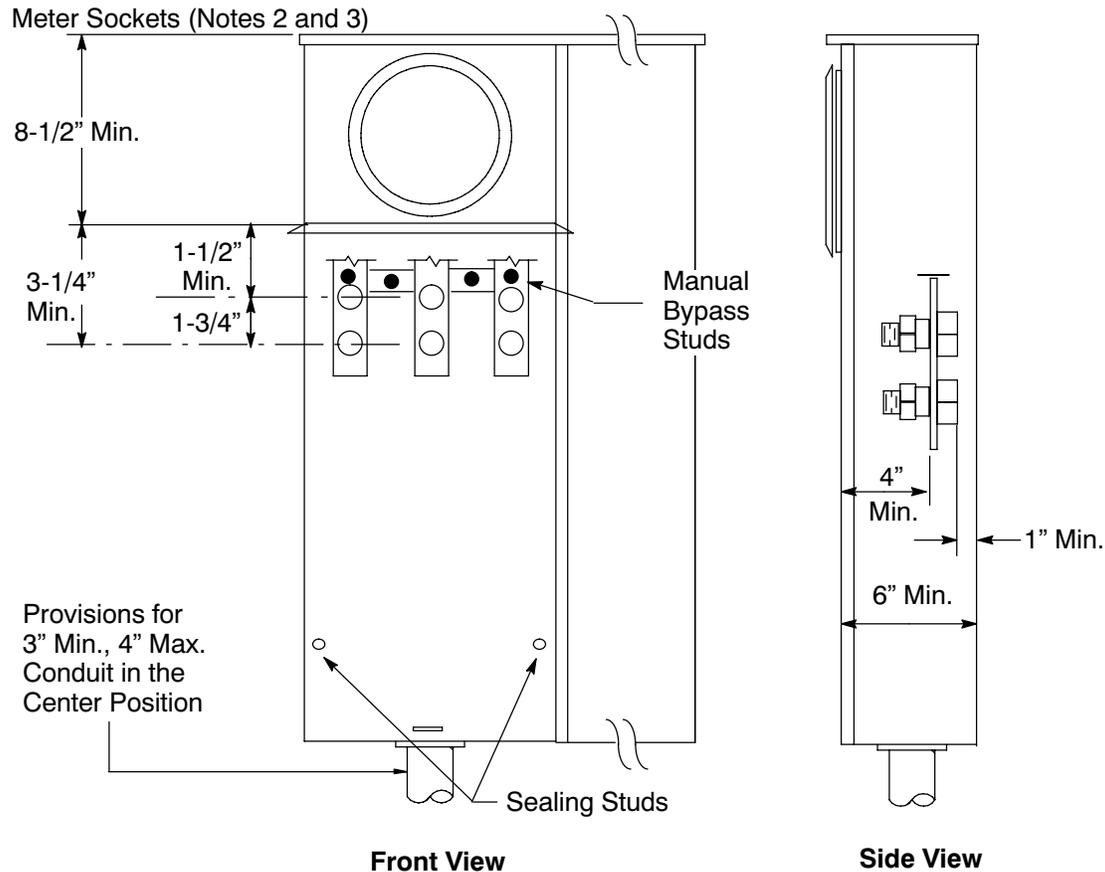


Figure 7-2
Meter and Service-Termination Enclosure, Combination Meter-Socket Panel for a Class 320 Meter (Residential/Commercial, 120/240-Volt, Single-Phase, 226-Ampere Through 320-Ampere Service)

Notes in reference to Figure 7-2.

1. Mark the panel with either a rating of “320 Amperes Continuous” or “400 Amperes Maximum (320 Amperes Continuous).”
2. Only a ring-type socket is acceptable.
3. Locate the meter socket above, to the left of, or to the right of the terminating pull section.
4. Ensure that manual-bypass access panels can be padlocked and sealed.
5. Ensure that pull-section cover panels are removable, sealable, provided with two lifting handles, and limited to a maximum size of 9 square feet in area.
6. The dimension shown for the access opening is measured between the return flanges.
7. Ensure that cable-terminating facilities consist of single-position studs that meet Electric Utility Service Equipment Requirements Committee ([EUSERC](#)) clearance and access requirements, as provided in EUSERC Drawing 347.

B. Services, 201 Amperes Through 400 Amperes, Three Phase

1. When planning a single, underground, commercial or industrial, three-phase service, applicants must furnish, install, own, and maintain combination meter and current-transformer cabinets, as illustrated in Figure 7-3, “Combination Meter and Current-Transformer Cabinet, Three-Phase Service, 201 Amperes Through 400 Amperes,” on Page 7-6.
2. The conductor must include the lugs necessary to connect the service-entrance conductors to the load side of the current-transformer’s mounting base.
3. An applicant’s service-entrance conductor must leave the cabinet by one of the following two methods.
 - Above the current-transformer mounting base.
 - At or within 2 inches of the bottom of the underground termination pull section.

Service-entrance conductors must enter current-transformer cabinets either at or within 2 inches of the top or bottom and leave the cabinets 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 conductors are routed carefully when using this option.***

Applicants must ensure that the load conductors are routed and formed to allow PG&E to pull their service laterals without encountering any obstructions.

4. Applicants must ensure that provisions are made for the underground service neutral when installing an insulated, bondable termination in the current-transformer cabinet.
5. Applicants must mark the power leg of a 240/120-volt, three-phase, 4-wire delta service.

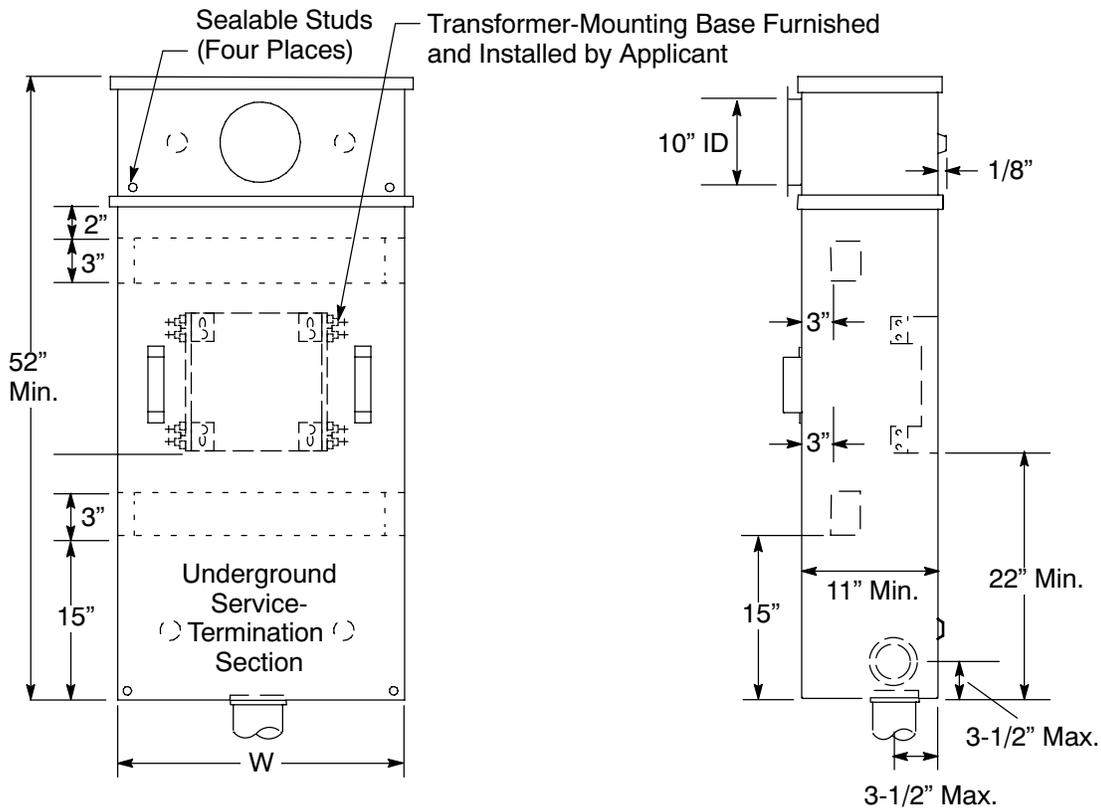


Figure 7-3
Combination Meter and Current-Transformer Cabinet,
Three-Phase Service, 201 Amperes Through 400 Amperes

**C. Services, 401 Amperes Through 800 Amperes,
 Current-Transformer Metering in Bused, Current-Transformer
 Cabinets**

1. When applicants meter a single, underground, commercial or industrial service using current transformers, they must furnish, install, own, and maintain underground, service-termination pull boxes with separate, current-transformer cabinets and meter boxes, as illustrated in Figure 7-4, “Separate-Bused Current-Transformer Cabinet and Meter Box With Underground Service-Termination Pull Box (401 Amperes Through 800 Amperes),” on Page 7-7.

NOTE: See [Section 9](#) “Electric Metering: Components,” for dimensional details.

2. Applicants must furnish lugs and connect the service-entrance conductors to the line and load sides of the current-transformer mounting base and to the load side of the termination facilities in the underground, service-termination pull box.
3. PG&E will pull and terminate its service-entrance conductor directly to the applicant-furnished, service-termination facility in the underground service-termination pull box.

- Service-entrance conductors must enter current-transformer cabinets either 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 conductors are routed carefully when using this option.**

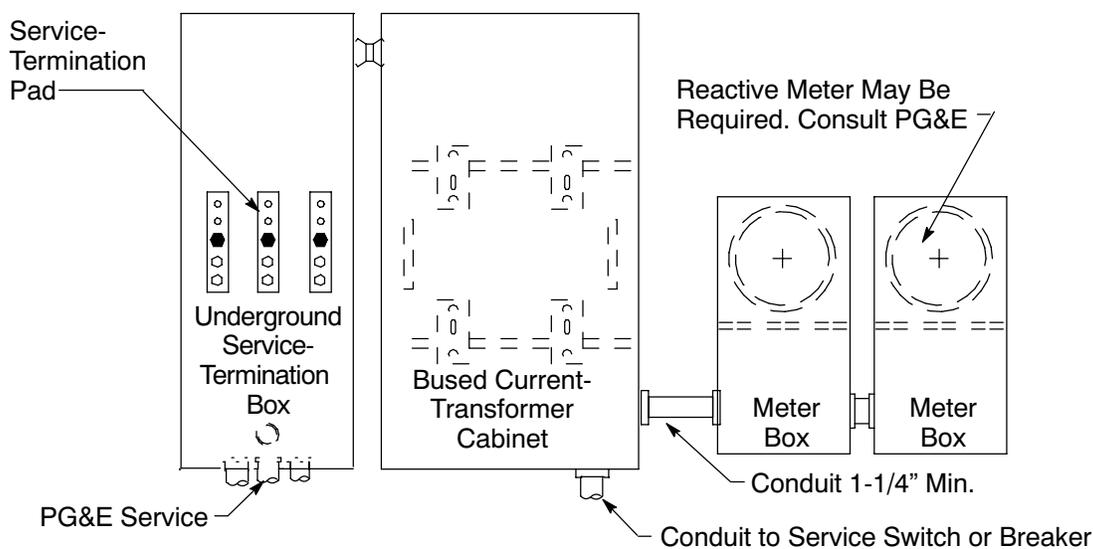


Figure 7-4
Separate-Based Current-Transformer Cabinet and Meter Box
With Underground Service-Termination Pull Box (401 Amperes Through 800 Amperes)

D. Services, 201 Amperes and Above, Current-Transformer Metering in Switchboard Service Sections

- When applicants meter a single, underground, commercial or industrial service using current transformers, they must furnish, install, own, and maintain a switchboard service section and facilities for terminating underground service conductors.
- Figure 7-5, "Switchboard Pull Section," Figure 7-6, "Separate Pull Box," and Figure 7-7, "Bottom-Fed Service Section," all on Page 7-8, illustrate typical arrangements of the switchboard service sections that are used in conjunction with a pull section or pull box for underground service-conductor termination.

NOTE: See [Section 10](#), "Electric Switchboards: 0 Through 600 Volts," for details.

- PG&E will pull and terminate its service conductors directly to the applicant-furnished service-termination facilities in the underground service-termination pull section, pull box, or service section.

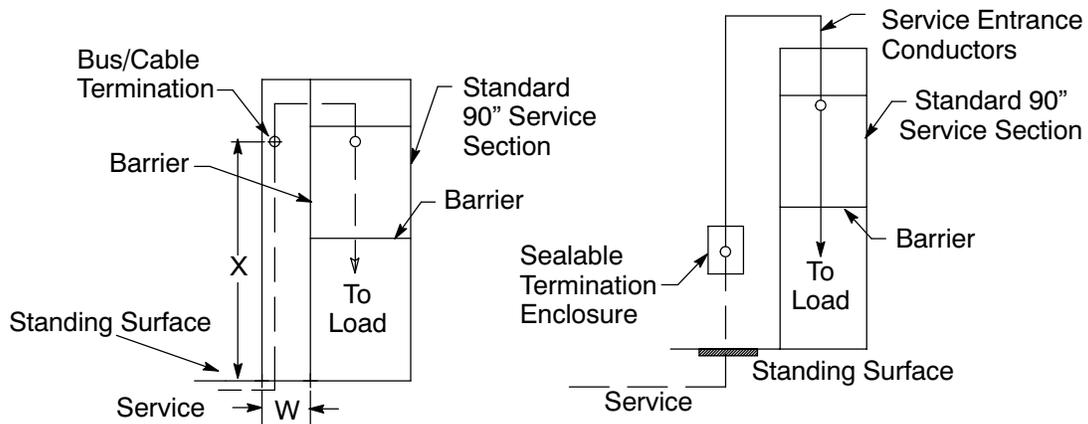


Figure 7-5
Switchboard Pull Section

Figure 7-6
Separate Pull Box

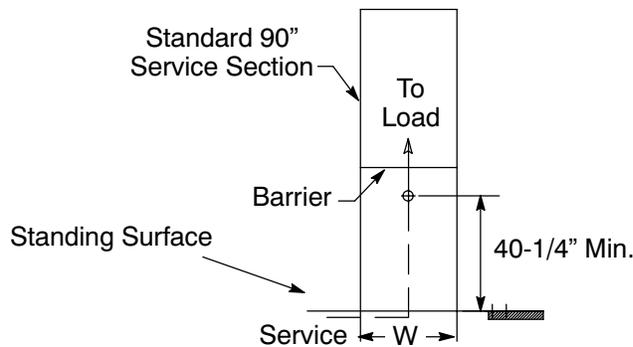


Figure 7-7
Bottom-Fed Service Section

7.2.7. Services, Over 200 Amperes, Single Applicant, Overhead

Applicants must meet the following requirements when installing single-applicant, overhead services that are over 200 amperes.

A. Services, 226 Amperes Through 320 Amperes, 120/240 Volts, Self Contained

1. When installing a single-phase, 120/240-volt, commercial or industrial service, applicants must furnish, install, own, and maintain the following items.
 - A meter-mounting device, as illustrated in Figure 7-8, "Typical Meter and Service-Termination Enclosure, Combination Meter-Socket Panel for a Class 320 Meter (Residential/Commercial, 120/240-Volt, 226-Ampere Through 320-Ampere Service)," on Page 7-9.
 - Service-entrance conductors.
 - Conduit and weatherhead to the point where it attaches to PG&E's overhead service.

2. Applicants must equip the meter-mounting device with a socket for a 320-ampere, self-contained meter.
3. For a 320-ampere meter enclosure, applicants must ensure that the overhead service entrance conductors enter at the bottom of the enclosure.

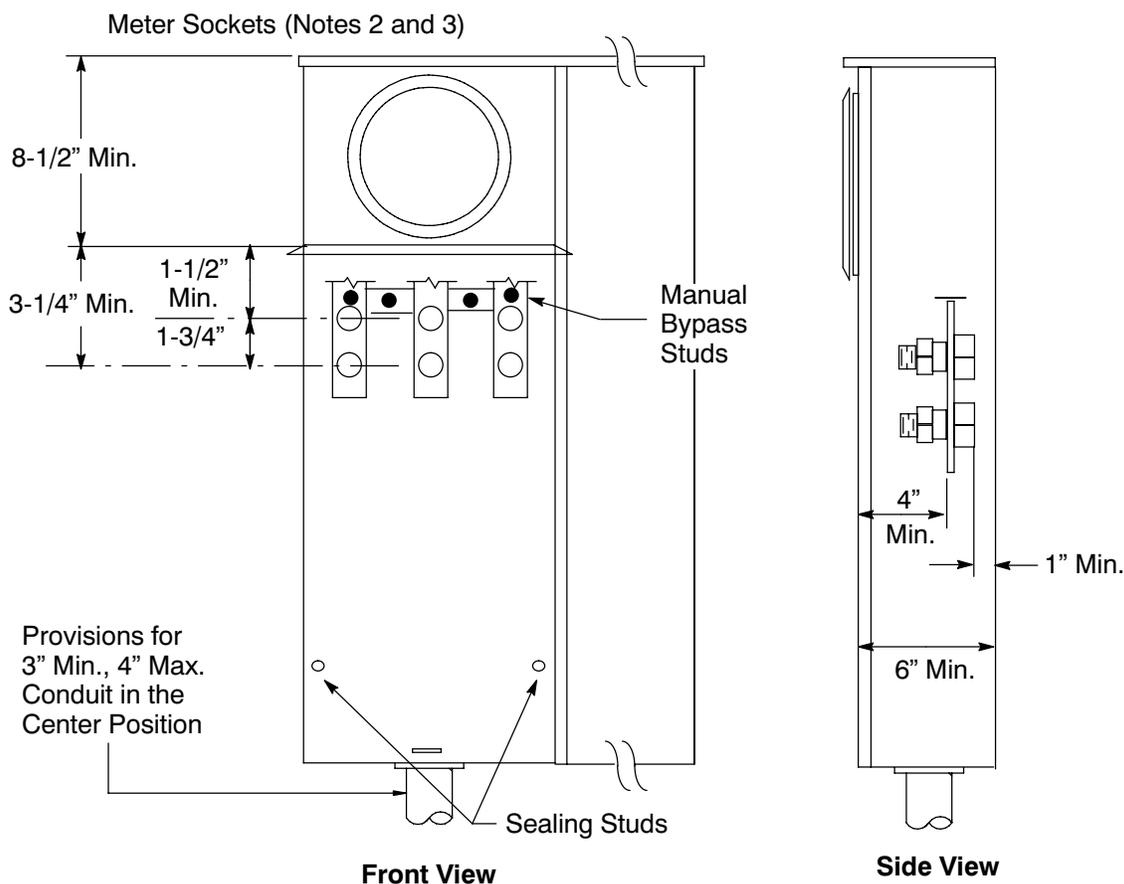


Figure 7-8
Typical Meter and Service-Termination Enclosure, Combination Meter-Socket Panel for a Class 320 Meter (Residential/Commercial, 120/240-Volt, 226-Ampere Through 320-Ampere Service)

Notes in reference to Figure 7-8.

1. Only a ring-type socket is acceptable.
2. Locate the meter socket above, to the left of, or to the right of the terminating pull section.
3. Do *not* use an automatic bypass.
4. Ensure that manual-bypass access panels can be padlocked and sealed.
5. Ensure that pull-section cover panels are removable and sealable, are provided with two lifting handles, and are limited to a maximum size of 9 square feet in area.
6. The dimension shown for the access opening is measured between the return flanges.
7. Ensure that cable-terminating facilities consist of single-position studs that meet [EUSERC](#) clearance and access requirements, as show in [EUSERC](#) Drawing 347.

B. Services, 201 Amperes Through 400 Amperes, Three Phase

1. When installing a single, overhead, commercial or industrial, three-phase service, applicants must furnish, install, own, and maintain combination meter and current-transformer cabinets, as illustrated in Figure 7-9, "Overhead-Fed Combination Meter and Current-Transformer Cabinet, Three Phase (201 Amperes Through 400 Amperes)," shown below.

NOTE: See [Section 9](#), "Electric Metering: Components," for dimensional details.

2. Applicants must furnish lugs and connect the service entrance conductors to the line and load sides of the current-transformer mounting base.
3. Service-entrance conductors must enter current-transformer cabinets either 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 conductors are routed carefully when using this option.***

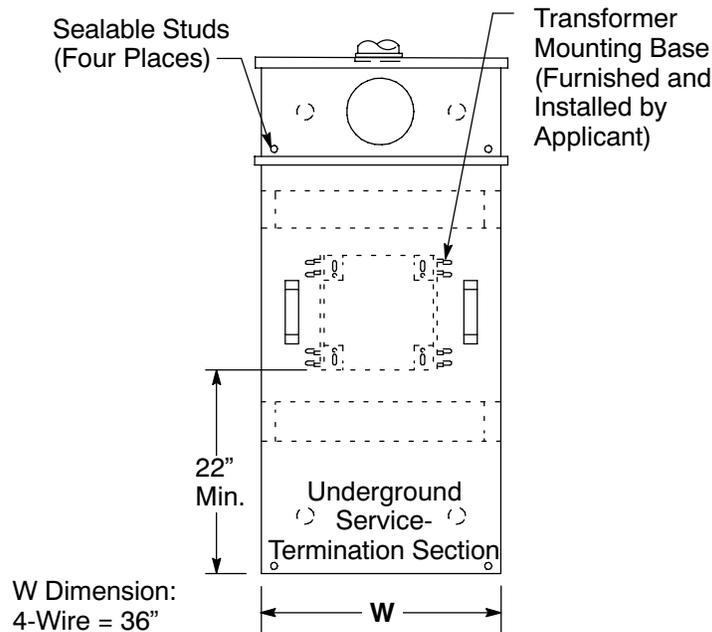


Figure 7-9
Overhead-Fed Combination Meter and Current-Transformer Cabinet, Three Phase (201 Amperes Through 400 Amperes)

C. Services, 401 Amperes Through 800 Amperes, Current-Transformer Metering

1. When installing a single, overhead, commercial or industrial service using current transformers, applicants must furnish, install, and maintain separate current-transformer cabinets and meter boxes, as illustrated in Figure 7-10, "Overhead-Fed, Separate-Bused, Current-Transformer Cabinet and Safety-Socket Meter Box (401 Amperes Through 800 Amperes)," shown below. Also required are service-entrance conductors, conduit, and weatherhead to the point of attachment to PG&E's overhead service.

NOTE: See [Section 9](#) for dimensional details.

2. Applicants must furnish lugs and connect the service-entrance conductors to the line and load sides of the current-transformer mounting bus bars.
3. Service-entrance conductors must enter current-transformer cabinets either 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 conductors are routed carefully when using this option.***

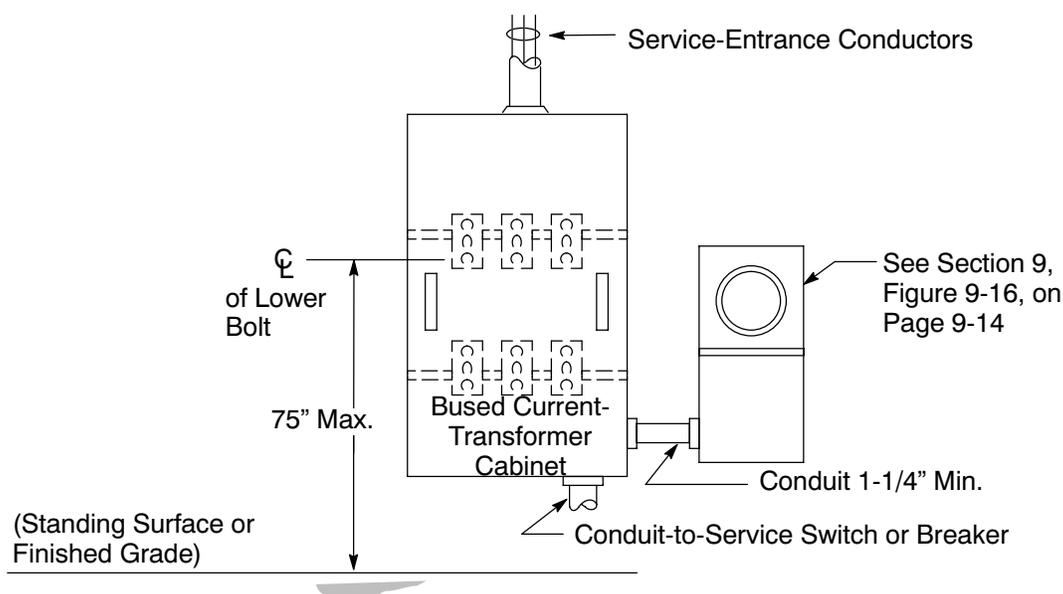


Figure 7-10
Overhead-Fed, Separate-Bused, Current-Transformer Cabinet
and Safety-Socket Meter Box (401 Amperes Through 800 Amperes)

D. Services, 201 Amperes and Above, Current-Transformer Metering in Switchboard Service Sections

1. When installing a single, overhead, commercial or industrial service using current transformers, applicants must furnish, install, own, and maintain a switchboard service section with provisions for the overhead service termination.
2. Typical switchboard service-section arrangements are illustrated in Figure 7-11, "Overhead, Service-Termination, Standard Switchboard Service Section (0 Through 600 Volts)," located below.
NOTE: See [Section 9](#) for dimensional details.
3. Applicants must furnish and install service-entrance conductors and either cable or bus bars, as described below.
 - When switchboards are served through bus-bar conductors, the conductors must enter through the top or at the side or back in the upper 10-inch section.
 - When switchboards are served through cable conductors, the conductors must enter through the top of the switchboard. Figure 7-11 illustrates an extension that allows for horizontally incoming conduits from the side or rear of the standard switchboard service section.
4. Applicants must ensure that the service-entrance conductors feed from top to bottom. Load conductors must leave *below* the metering compartment barrier. Applicants must ensure that service entrance conductors are connected to the busing in the service sections with lugs approved for the type of conductors used.

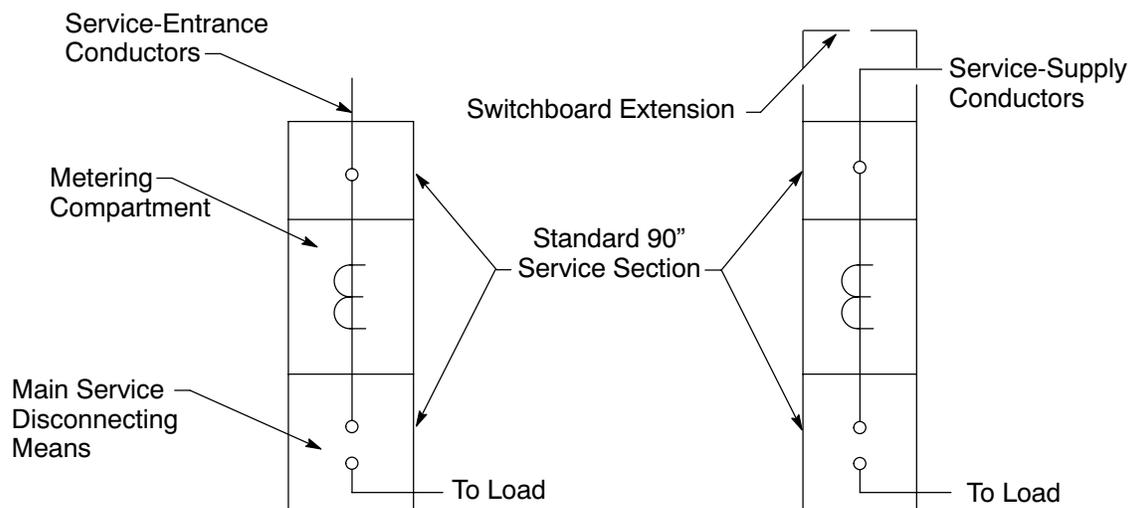


Figure 7-11
Overhead, Service-Termination, Standard Switchboard Service Section
(0 Through 600 Volts)

7.2.8. Multi-Applicant Meter Installations

Applicants must meet the following requirements when installing multi-applicant meters.

- A. Applicants must install grouped, commercial or industrial meters for multi-applicant buildings where each occupant is metered individually.
- B. Each unit of a multi-applicant installation must be considered a single applicant and must meet the metering requirements described in Subsection 7.2.4., “Services, 0 Through 225 Amperes, Single Applicant, Overhead and Underground,” on Page 7-2.
- C. Applicants must ensure that service entrance conductors for multi-applicant installations extend from PG&E’s service termination point to the line side of the meter socket jaw of each socket.
- D. Applicants must ensure that the minimum centerline spacings between meter sockets are 7-1/2 inches horizontal and 8-1/2 inches vertical.

NOTE: PG&E will provide and install nonconductive, meter socket blank-off covers before energizing meter panels with vacant meter sockets. *PG&E will not energize meter panels and sockets unless blank-off meter covers are installed.*

1. Multimeter Installation Ampacity Ratings

PG&E will determine the ampacity rating of a grouped multimeter installation using one of the following two methods.

- Use the rating of the termination facility.
- When termination is made at a main service switch, use the ampere rating of the main service switch.

2. Grouped-Meter Installations *Without* a Main Switch or Breaker

When a sealable gutter protrudes beyond the meter-mounting surface by more than 4 inches, applicants must maintain 10 inches of clearance from the centerline of the meter face. Otherwise, applicants must have a minimum 4-1/4 inches of vertical clearance.

NOTE: See [Section 9](#) for dimensional details.

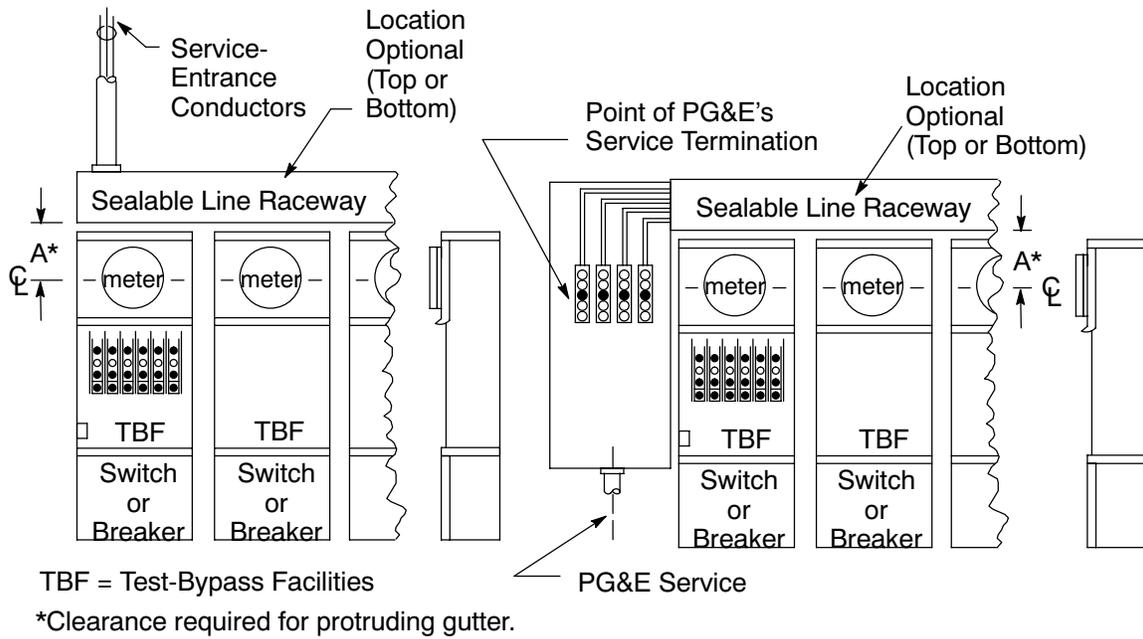


Figure 7-12
Overhead Service, Grouped-Meter
Installation Without a Main Switch

Figure 7-13
Underground Service, Grouped-Meter
Installation Without a Main Switch

3. Grouped-Meter Installations With a Main Switch or Breaker

When a sealable gutter protrudes beyond the meter-mounting surface by more than 4 inches, an applicant must maintain 10 inches of clearance from the centerline of the meter face. Otherwise, applicants must have a minimum 4-1/4 inches of vertical clearance.

NOTE: See [Section 9](#) for dimensional details.

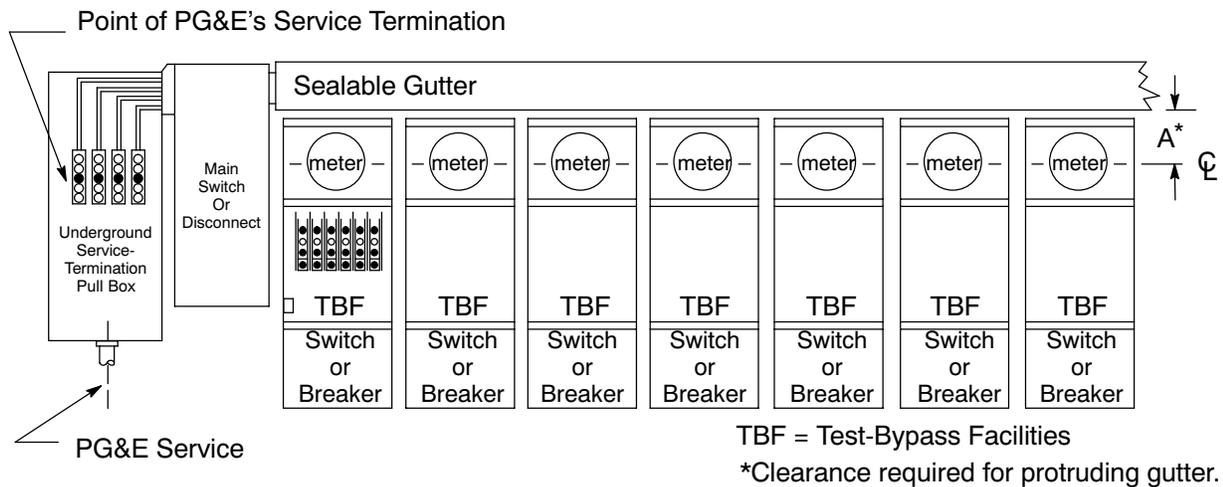


Figure 7-14
Grouped-Meter Installation With a Main Switch