



**TERMINATING UNDERGROUND ELECTRIC SERVICES
0-600 VOLTS IN CUSTOMER-OWNED FACILITIES**

058817

Asset Type: Electric Distribution **Function:** Design and Construction

Issued by: Alexander P. Yan (APY1) **Date:** 06-29-12

Rev. #07: This document replaces PG&E Document 058817, Rev. #06. For a description of the changes, see Page 10.

This document is also included in the following manual:

- *Electric and Gas Service Requirements (Greenbook)*

Purpose and Scope

This document shows methods and requirements for terminating PG&E-owned underground service conductors in customer-owned service terminating facilities.

General Information

1. Underground service conductors will normally be run in a joint trench with gas and communications service facilities. Where possible, a single service trench will be used to serve two adjacent premises. In order that the most satisfactory meter location may be determined, PG&E should be consulted while the building is in the planning stage.
2. Residential Service Termination Enclosures

The customer may provide any of the following as a service termination enclosure for residential service.

A. Single Family

- (1) Combination service pull termination and meter socket, 0 through 200 amp (see Figure 1 on Page 3), or 201 through 320 amp (see Figure 2 on Page 4).
- (2) Combination service pull section, meter, and CT mounting enclosure, 201 through 400 amp, for single-phase service (see Figure 6 on Page 7).
- (3) Wall-mounted underground service pull and termination box, 401 through 600 amp, single-phase (see Figure 7 on Page 7).
- (4) Floor-standing underground service pull and termination box, 601 and above, single-phase, 401 and above, three-phase (see Figure 10 on Page 9).
- (5) Meter post, for a typical underground service to a mobile home, 0 through 200 amp (see Document 052521).

B. Multi-Family

- (1) Wall-mounted underground service pull section and termination box for service 0 through 600 amp (see Figure 9 on Page 8), or combination service termination enclosure and meter socket panel, 0 through 600 amp (see Figure 8 on Page 8).
- (2) Underground service pull and termination section of a floor-standing switchboard (see Document 063929 to determine when bus duct termination equipment is required).

3. Non-Residential Service Termination Enclosures

The customer may provide any of the following as a service termination enclosure for non-residential service.

A. Single Customer

- (1) Typical safety socket meter panel, 0 through 200 amp (see Figure 3 on Page 5).
- (2) Combination service pull, meter, and CT mounting enclosure, 201 through 400 amp, for single or three-phase service (see Figure 5 on Page 6).
- (3) Underground service pull and termination box (see Figure 10 on Page 9).
- (4) Underground service pull and termination section of a floor-standing switchboard (see Document 063929 to determine when bus duct termination equipment is required).

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B. Multiple Customers

- (1) Underground service pull and termination box (see Figure 10 on Page 9).
- (2) Underground service pull and termination section of a floor-standing switchboard.

4. Service Termination, Bus Stubs, and Connectors

Termination bus stubs and connectors shall be furnished and installed in the termination enclosure as follows.

A. Enclosures Rated 0 – 200 Amps

- (1) The customer shall provide approved range-taking connectors suitable for aluminum conductors.
- (2) One-bolt bus attachment connectors are acceptable for 0 – 200 amp services provided they are anchored to prevent twisting of the connector assembly.

B. Enclosures Rated 201 Amps and Larger

- (1) Aluminum termination bus stubs with NEMA standard mounting bolts (see Paragraphs 4B(3) and 4B(4)) shall be provided for the connection of service lateral conductors in customer's service equipment where the main disconnect (or service equipment rating, if there is no main disconnect) is rated more than 200 amps. PG&E will furnish and install the termination connectors.
- (2) The standard provisions for terminating either phase or neutral conductors shall consist of one pair of 1/2-inch bolts on 1-3/4 inch vertical centers for equipment rated 201 – 400 amp panels. An additional pair of 1/2-inch bolts (on 1-3/4 inch vertical centers) shall be provided on 2-inch horizontal center for each additional 400 amp increments, or multiples thereof, of service capacity up to 2,500-amp panels (e.g., 1 pair for 400 amps, 2 pairs for 600 and 800 amps, 3 pairs for 1,000 and 1,200 amps, etc.) See Figure 4 on Page 5.
- (3) Cable termination mounting bolts shall be 1/2-inch cadmium-plated steel or equivalent and shall extend a minimum of 2 inches from the mounting surface. They shall be supplied with nuts, flat washers, and a pressure maintaining spring washer and shall be secured in place in such a manner that a termination connector can be positioned and connected with the washers and nuts, using one tool only from the front. Bolts shall have a head behind the termination pad and be of a recognized captive or swedge restrainer design.
- (4) A radial clearance of 1-1/2 inch is required between any termination facility (including bolts) and any other termination facility, bus, or grounded surface in the terminal mounting area except (1) the minimum clearance to the back of the pull section or to the front pull section cover may be 1 inch and (2) the neutral termination facility may have a minimum clearance of 1 inch from any grounded surface.

5. Metering Requirements

A. Meters will be furnished by PG&E.

B. When a multi-unit residential meter panel services either a three-phase or a larger than 200-amp single-phase house (utility) load, it shall be equipped with approved test-bypass facilities (see Figure 9 on Page 8).

References	Location	Document
Electrical Service Requirements for Mobile Home Developments	UG-1: Services/Greenbook	052521
Electric Revenue Meters	OH: Meters	062208
Methods and Requirements for Installing Residential Underground Electric Services 0 - 600 V to Customer-Owned Facilities	UG-1: Services/Greenbook	063927
Methods and Requirements for Installing Commercial Underground Electric Services 0-600 Volts to Customer-Owned Facilities	UG-1: Services/Greenbook	063928
Requirements for Bus Duct Entrance Termination Unit for Use With Pad-Mounted Transformers	UG-1: Services/Greenbook	063929
Engineering Material Specification 99, "Underground Electric Duct System (installed by applicant)"	TIL	EMS99
EUSERC Manual	TIL	

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Residential Services

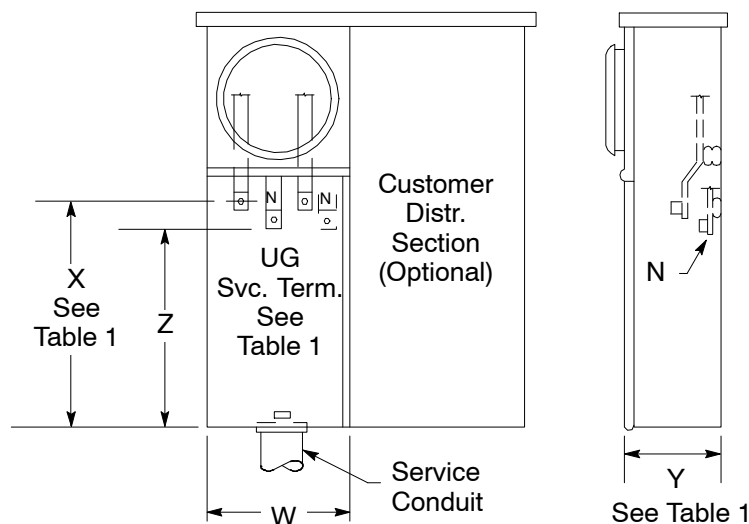


Figure 1
Typical UG Service Termination Enclosure
Combination Meter Socket Panel
(residential 0 - 225 amp)

Table 1 Capacity and Dimensions (see Figure 1 above)

Maximum Capacity	W	X	Y	Z
	Minimum Dimension (Inches)			
125 Amp	7	8	4	6
225 Amp	7	11	5-1/2	8-1/2

Residential Services (continued)

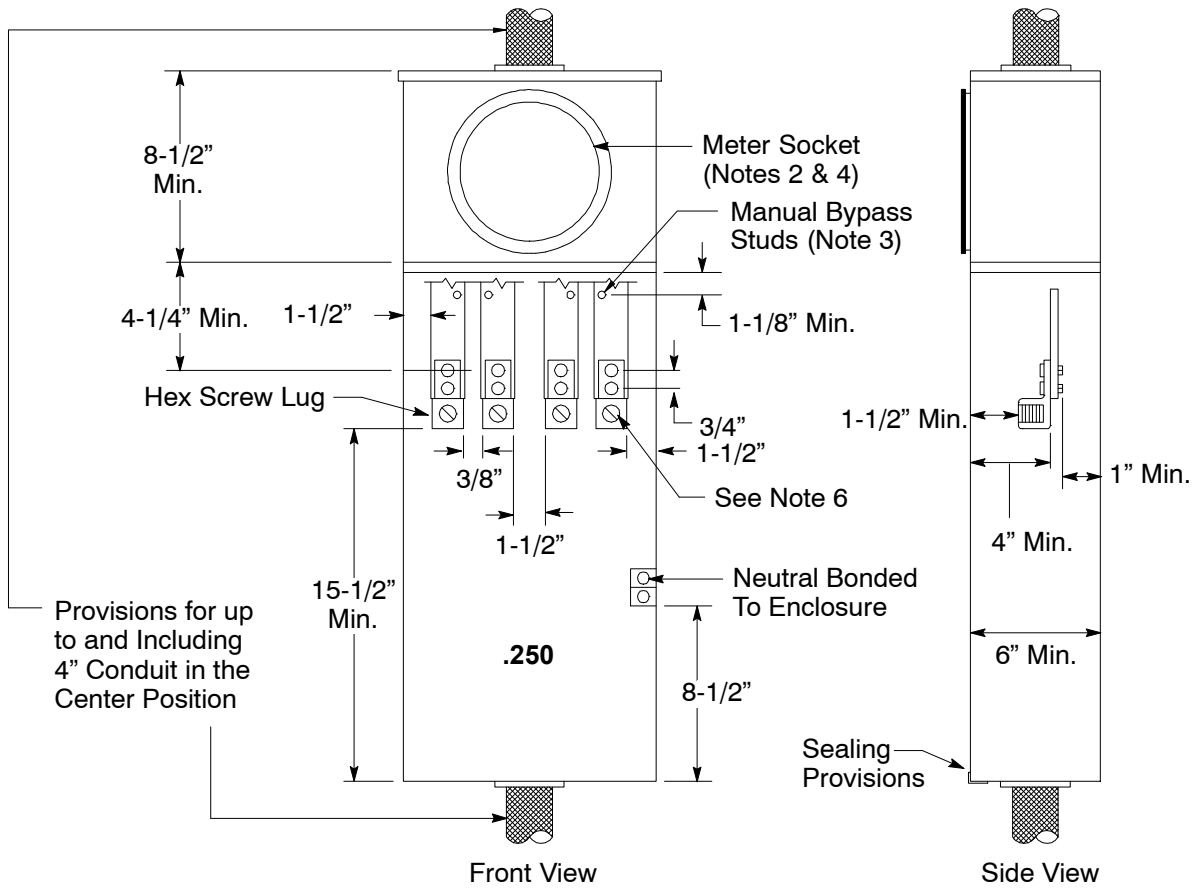


Figure 2
Typical Service Termination Enclosure
Combination Meter Socket Panel for Class 320 Meter
(residential 120/240 V, 201 – 320 amp service)

Notes

1. This service equipment shall be marked with continuous amp rating of 320 amps. Alternatively, it may be marked "400 amp" (320 amps continuous).
2. Ring-type socket only is acceptable per EUSERC Drawing 300.
3. 12-24 bypass studs, 1/2 inches in height with 1/2-inch hex nut (measured across the flat) shall be provided on each phase bus section. The studs shall have a horizontal spacing of 1-1/2 inch (measured from centers) between the line and load bus sections and shall be offset from the line side termination lugs to permit cable entry from the top without interference with the utility-provided manual bypass links.
4. The socket meter panel shall be provided with a sealing ring and shall not be removable with meter in place.
5. The bypass/cable termination compartment cover panel shall be independent of the meter panel, and removable with the meter in place.
6. Terminations for service conductors shall be aluminum-bodied mechanical lugs with a range-taking ability of #1 AWG through 600 kcmil. The lugs shall be secured to assure vertical alignment and line side lugs shall be offset from the face of the bus to permit cable entry from the top. The line and load positions shall be identified in 3/4" high block letters.

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Non-Residential Services

Note

1. PG&E will furnish connectors and terminate its service conductors to the line terminals of the current transformer mounting base.

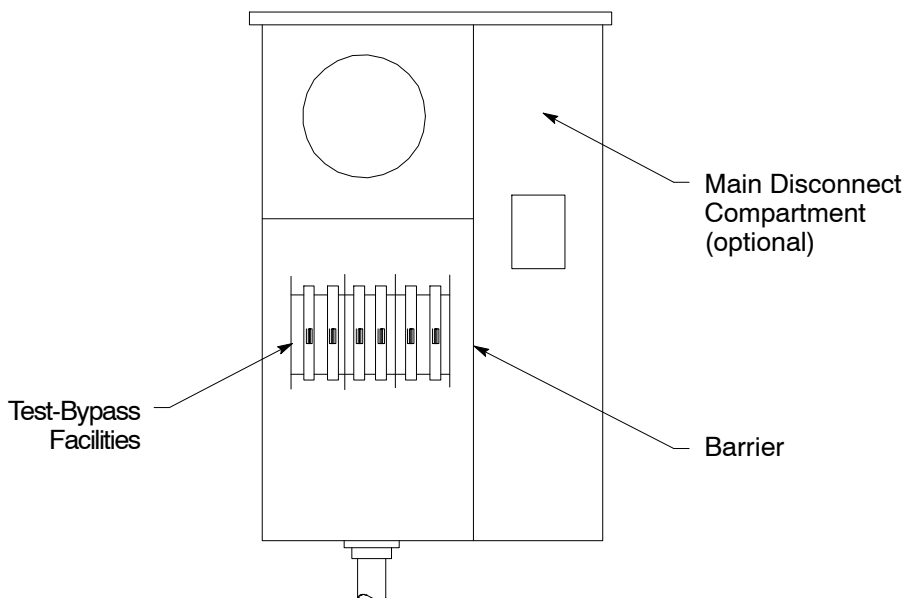


Figure 3
Typical Service Termination Enclosure
Combination Meter Socket Panel
Non-Residential

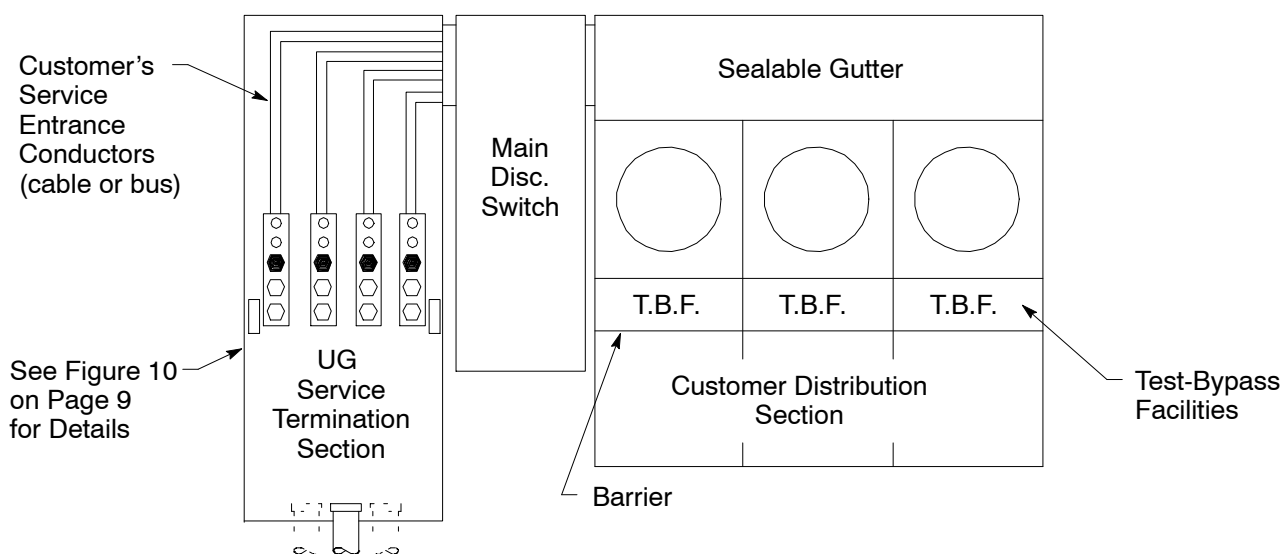


Figure 4
Typical Service Termination Enclosure
Main Disconnect, Meter Socket Assembly
for Multi-Unit Non-Residential Use

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Non-Residential Services (continued)

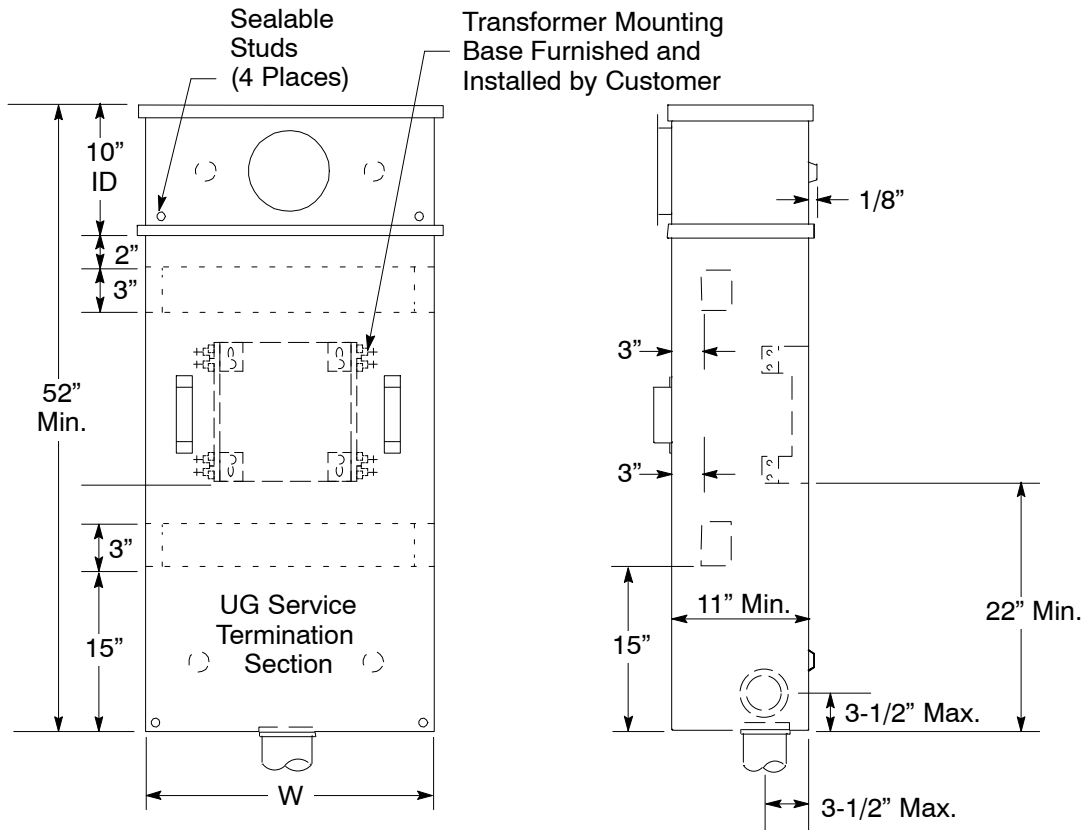


Figure 5
Combination Meter and Current Transformer Cabinet Single-Phase or
Three-Phase Service 201 to 400 Amp
(see Note 1 on Page 5)

Table 2 Minimum Box Dimensions

W Minimum (Inches)	
3Ø 4-Wire Y or Δ	1Ø or 3Ø 3-Wire
36	24

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Single-Family Residential Service (201 - 600 amps)

Note

1. Remote metering only, with prior PG&E approval.

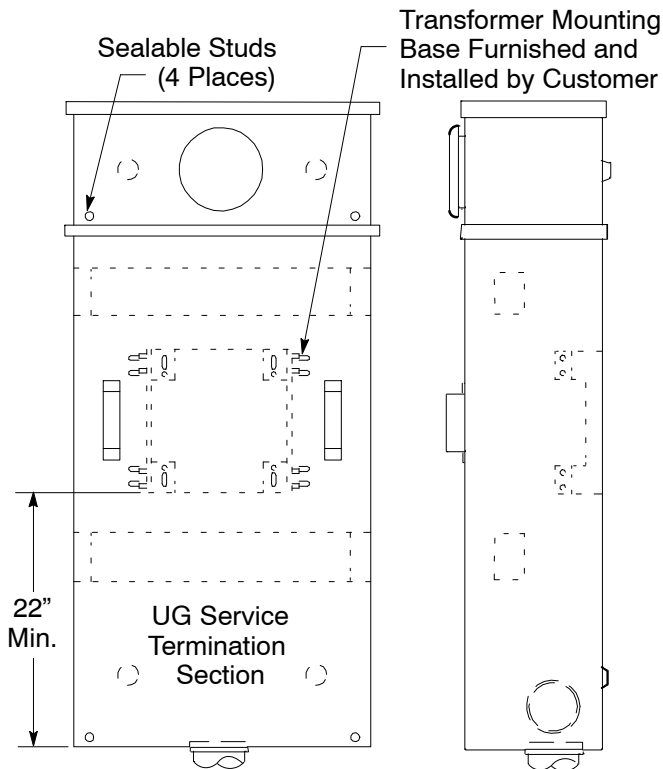


Figure 6
Combination Meter, Current Transformer,
and UG Service Termination Cabinet (single-phase
service 120/240 V, 201 to 400 amp)

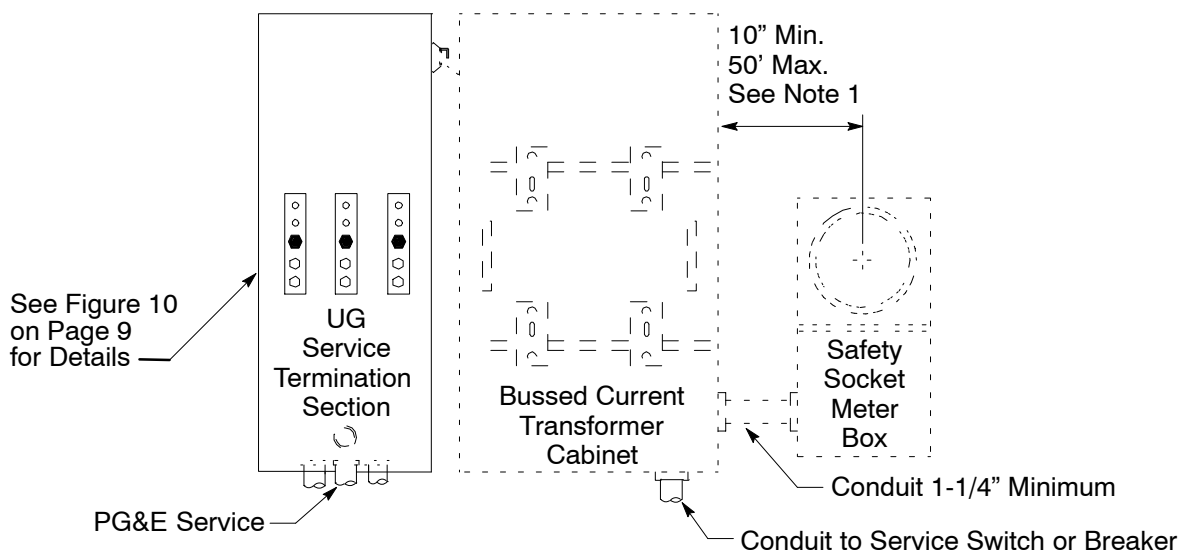


Figure 7
Typical Underground Separate Bussed Current Transformer Cabinet
and Safety Socket Meter Box Assembly, 120/240 V, 401 to 600 Amp Service

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Residential Multi-Unit Service

Note

1. When a multi-unit residential meter socket panel will have either a three-phase, or a larger than 200-amp single-phase house (utility) meter, the socket for this meter shall be equipped with test-bypass facilities (see Figure 9).

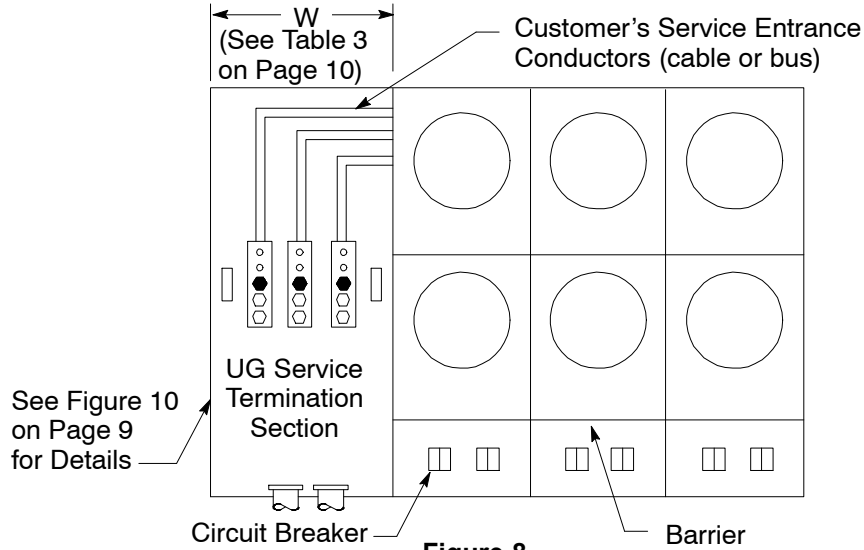


Figure 8
Typical Combination UG Service Termination Enclosure
Meter Socket Panels for Multi-Residential Use (2 to 6 units) 0 - 600 Amp

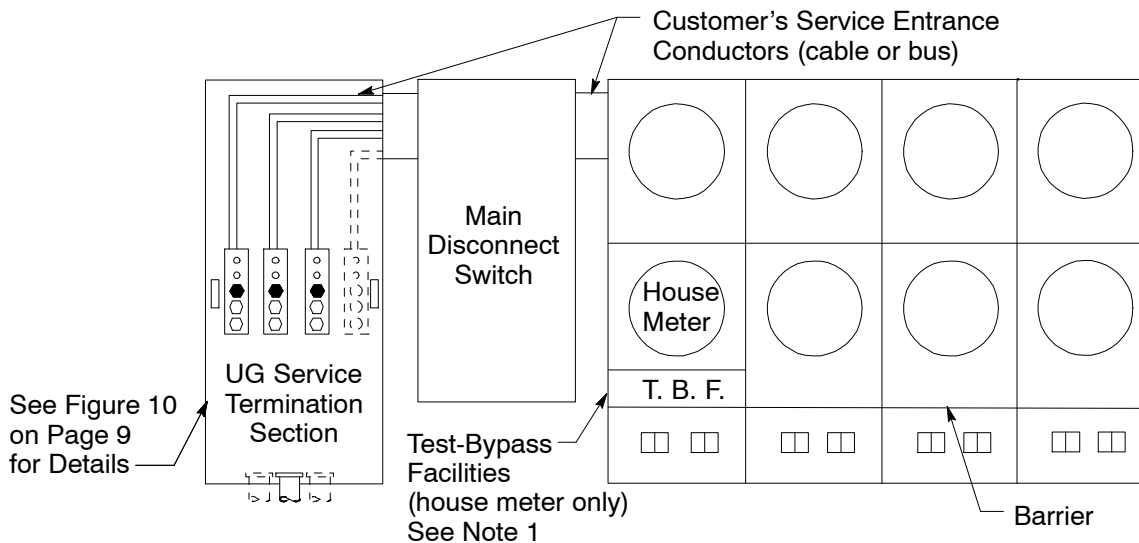


Figure 9
Typical UG Service Termination Enclosure, Main Disconnect, and
Multi-Unit Metering Assembly Residential Use 0 - 1200 Amp

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Underground Service Termination Pull Box

Notes

1. Pull box covers shall be removable, sealable, provided with two lifting handles, and limited to a maximum size of 9 square feet. Sealing provisions shall consist of two drilled stud and wingnut assemblies on opposite sides of the panel. All security screws shall be captive.
2. Clear working space shall be maintained. When return flanges are necessary, they shall not intrude into service conductor space designated by shaded area.
3. The 6" minimum height requirement from grade to panel does not apply for floor-standing switchboard.
4. Main service switch rated 2,501 amps and above shall require bus duct configuration.

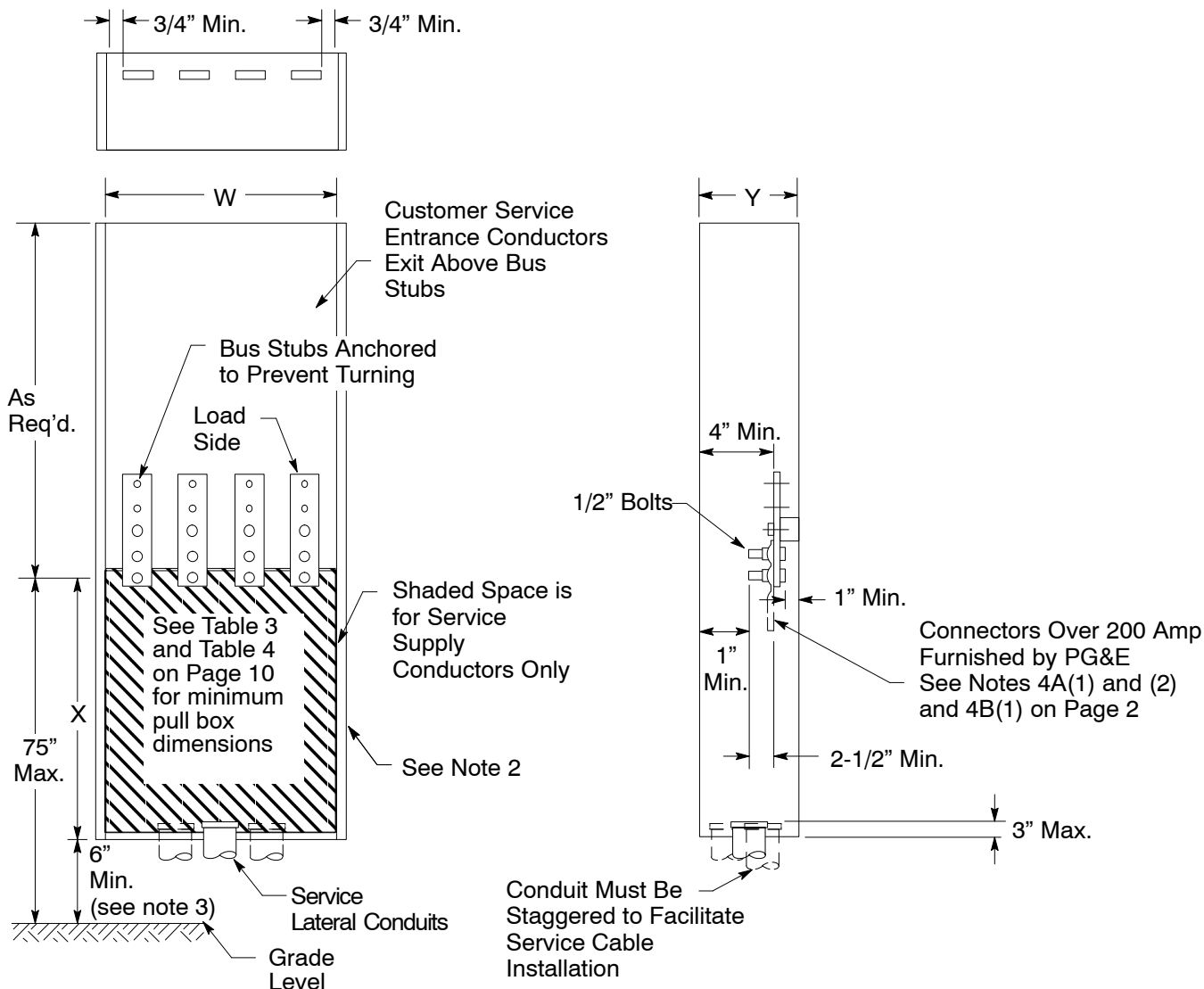


Figure 10
Typical Underground Service Termination Pull Box
(wall-mounted or floor-standing)

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Underground Service Termination Pull Box (continued)

Table 3 Minimum, Wall-Mounted, Pull-Box Dimensions: 80% Rated Service, Residential, Single-Phase and 100% Rated Service, Commercial/Industrial, Single-Phase ¹ or Three-Phase ²

Service Rating (Amperes)	Minimum Access Opening “W”		X		Y	
	3-Wire	4-Wire	Bottom Entry	Side/Rear Entry	Bottom Entry	Rear Entry
	All Measurements in Inches					
0–200	10-1/2	14	11	36	6	15
201–400	10-1/2	14	22	42	6	24
401–600 ³	16-1/2	–	26	48	11	24
Over 600	See Table 4 below for Over 600-Ampere, Single-Phase Services Rated at 100%.					

¹ See “Notes” for Table 3 below.

² Maximum of 400 amperes.

³ For single-phase only.

Table 4 Minimum Switchboard (floor-standing) Pull-Section Dimensions: Over 600 Amperes, Single-Phase Service, 100% Rated and Commercial/Industrial, Three-Phase Service

Service Rating (Amperes)	Minimum Access Opening “W”		Termination Height “X”
	3-Wire	4-Wire	
	All Measurements in Inches		
321–400	24	24	42 Min.–72 Max.
401–800	24	24	
801–1,200	24	30	
1,201–2,000	30	35	
2,001–2,500	—	42	60 Min.–72 Max.

Notes in reference to Figure 10 on Page 9, to Table 3 above, and to Table 4 above.

1. If termination bus-landing stubs are installed perpendicular to the back of the board, a wider enclosure dimension will be required to accommodate the installation of PG&E’s cables.
2. Maintain a clear working space. When return flanges are necessary, ensure they do not intrude into service-conductor space.
3. Dimension W is the minimum width of the pull section access opening.

Revision Notes

Revision 07 has the following changes:

1. Revised Table 3.