



## POLE-MOUNTED PRIMARY METERING INSTALLATION, (12 OR 21 KV LINE)

058779

Asset Type: Electric Metering

Function: Design

Approved by: Negash, Lominat (LMNd)

Date: 07-01-14

Rev. #03: This document replaces PG&E Document 058779, Rev. #02. For a description of the changes, see Page 8.

### This document is also included in the following manual:

- [PG&E Distribution Interconnection Handbook](#)

### Purpose and Scope

This document specifies pole-top metering installations using outdoor-type instrument transformers cluster mounted on a prefabricated aluminum bracket. PG&E will construct all pole-top primary metering installations and will furnish and install the outdoor-type instrument transformers and aluminum mounting brackets, all necessary meters, test switches, and wiring between the instrument transformers and meters, provided the customer pays the excess costs over an indoor metering installation of equivalent capacity.

### General Information

1. Metering transformers will be located on a PG&E-approved pole or structure. This pole or structure shall be provided and maintained by the customer. See [Document 025055](#) Requirements for Customer-owned Poles.
2. The customer shall furnish a suitable location, either indoors or outdoors for the PG&E meter(s). When meter(s) are to be installed in outdoor locations, the customer shall furnish and install an outdoor meter enclosure in accordance with PG&E "Electric and Gas Service Requirements" ([Greenbook](#)).
3. If the PG&E meter(s) are installed indoors the structure must be located close to the instrument transformer pole and meet all of the PG&E "Electric and Gas Service Requirements" ([Greenbook](#)) for meter rooms.
4. The meter enclosure shall be installed in a suitable, approved location. It may be installed on the metering pole located on the customer's property. It should be located so that the secondary wires from the instrument transformers to the meter will be as short as practical. Under no circumstances should the secondary wires be longer than 50 feet in order to avoid impairment of meter accuracy.
5. The customer shall furnish and install a meter enclosure ground in accordance with the California or National Electric Code and with city and county ordinances.
6. The minimum size ground wire for the meter enclosure shall be #6 AWG copper and shall be fastened securely to an approved grounding electrode. Where installed on a pole, the meter enclosure ground wire shall be protected against mechanical injury by rigid steel conduit or armor cladding connected to the ground electrode by means of an approved conduit-grounding hub and clamp or an approved armor-grounding hub and clamp.
7. The connection of the meter enclosure ground wire to the grounding electrode must be above ground or otherwise readily accessible for inspection.
8. The customer shall furnish and install a 1-1/4 inch rigid steel galvanized conduit for meter wiring from the meter enclosure to the 8-foot level on the metering pole. The customer shall furnish and install the necessary materials to cover the meter wiring above the 8-foot level on the metering pole.
9. Typically the required wiring method from the instrument transformers to the meter and to the service disconnect switch (if separate) will be 4-wire. This is for PG&E metering purposes. There may be special circumstances when 3 wire delta will need to be used instead of 4-wire.
10. Fusing of the potential transformers for outdoor primary metering shall be in accordance with the following:
  - A. Service from distribution feeder – Fuse potential transformers when tap is not fused (fuse tap if load is not too large for standard fuses).
  - B. Service from substation buses – Fuse potential transformers.
  - C. Service from PG&E transformers which supply an individual customer - Fuse potential transformers when load is supplied by transformer bank larger than 1,500 kVA (when transformer bank is 1,500 kVA or less, fuse the primary of supply transformers only).

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11. Placement of the PTs and CTs on the cluster bracket can be interchanged to suit the job application.
12. High-voltage sign, Item 12 (see Table 1 on Page 3). When high-voltage supply equipment is installed on the pole, the high-voltage sign may be located on the climbing side of the pole no more than 6 inches below the bottom of the equipment. Refer to [Document 022168](#).
13. Orient the current and voltage transformers on the bracket so that the polarized primary terminal leads are connected to the incoming line without interference as shown.
14. Connect the voltage transformer ground point to the common neutral if one is provided on the pole. Refer to Document 036229 for common neutral grounding requirement.
15. Do **not** ground or bond the instrument transformer bracket.
16. The primary conductor open point may be constructed using tension dead-end construction ([Document 015116](#)) (Figure 1), slack span dead-end construction (Figure 2), air switch ([Document 066195](#)) (Figure 3), or flying bells.
17. The air switch should be installed as a disconnect switch in the normally closed (energized) position. Jumpers should be installed on the load (customer) side of the switch, to allow the PT's/CT's and customer to be isolated when the switch is opened.
18. The minimum radial clearance between the primary wire and instrument transformer secondary wires is 17-1/2 inches for 12 kV and 24 inches for 21 kV line.

| <b>References</b>   | <b>Location</b>                                    | <b>Document</b>            |
|---|--|----------------------------|
| <a href="#">Requirements for Customer-Owned Poles</a> .....   | <a href="#">OH: Services</a> .....                 | <a href="#">025055</a>     |
| <a href="#">Technical Requirements for Electric Service Interconnection at Primary Distribution Voltages</a> .....                        | <a href="#">Bulletins</a> .....                    | <a href="#">2004PGM-11</a> |
| <a href="#">3-Wire Crossarm Construction 12, 17, and 21 kV Circuits</a> .....   | <a href="#">OH: Framing</a> .....                  | <a href="#">015116</a>     |
| <a href="#">Installation of Grounds on Wood Pole Transmission and Distribution Lines</a> .....  | <a href="#">OH: Transformers</a> .....             | <a href="#">021904</a>     |
| <a href="#">Clearance Tables CPUC General Order 95</a> .....  | <a href="#">OH: Clearances</a> .....               | <a href="#">022158</a>     |
| <a href="#">Marking, Numbering, and Identification of Line Structures</a> .....   | <a href="#">OH: Marking</a> .....                  | <a href="#">022168</a>     |
| <a href="#">Installation of Cable Risers on Wood Poles</a> .....  | <a href="#">OH: Risers/UG-1 Terminations</a> ..... | <a href="#">027742</a>     |
| <a href="#">Diagram of Connections for Metering Polyphase Loads Using Transformer-Rated Meters</a> .....                                  | <a href="#">OH: Meters/UG-1: Services</a> .....    | <a href="#">028163</a>     |
| <a href="#">Slack Span Construction for Distribution Lines</a> .....  | <a href="#">OH: Framing</a> .....                  | <a href="#">061112</a>     |
| <a href="#">25 kV Underarm Side-Break Switch, Manual and Automated</a> .....  | <a href="#">OH: Switches</a> .....                 | <a href="#">066195</a>     |
| <a href="#">Engineering Material Specification #57 "Preservative Treated Wood Poles, Stubs, and Anchor Logs for Overhead Lines"</a> ..... | <a href="#">TIL</a> .....                          | <a href="#">EMS57</a>      |

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**Material****Table 1 List of Materials to Be Furnished and Installed by PG&E**

| Item | Description   | Code   | Document Number        |
|------|---|--------|------------------------|
| 1    | Transformer, Current, Outdoor-Type (rating as required)   | -      | <a href="#">054340</a> |
| 2    | Transformer, Potential, Outdoor-Type (rating as required)   | -      |                        |
| 3    | Insulator, Pin or Post (as required)  | -      | <a href="#">022088</a> |
| 4    | Pin, Insulator Steel  | -      | <a href="#">022473</a> |
| 5    | Cutout 75H  | -      | <a href="#">015225</a> |
| 6    | Fuse, (Table 15, <a href="#">Document 015225</a> )  | -      | <a href="#">015225</a> |
| 7    | Insulator, Composite, Dead-End Type (as required)   | -      | <a href="#">022088</a> |
| 8    | Washer, Spring Clip, Galvanized, for 5/8" Bolt  | 033320 | <a href="#">058778</a> |
| 9    | Wire, Overhead (size as required)   | -      | <a href="#">059626</a> |
| 10   | Wire, Coded, Meter, #10, 600 V  | -      | <a href="#">EMS26</a>  |
| 11   | Connectors, Lead Wire (as required)   | -      | -                      |
| 12   | High-Voltage Signs  | 373038 | <a href="#">022168</a> |
| 13   | Crossarm Assembly, 8' 0" or 9' 0", Single or Double-Arm (as required)   | -      | <a href="#">015116</a> |
| 14   | Meter (watthour, watthour demand, etc.) (as required)   | -      | -                      |
| 15   | Test Switch, Reactiformer (as required)   | -      | <a href="#">026237</a> |
| 16   | Dead-End Attachment, for Al, See <a href="#">Document 028851</a> , for Cu, See <a href="#">Document 015218</a>          | -      | -                      |
| 17   | Guy Material (as required)  | -      | <a href="#">022178</a> |
| 18   | Insulator Clearance Bracket, 1" Pin Thread <sup>1</sup>   | 181215 | <a href="#">015190</a> |
| 19   | Insulator Clearance Bracket, 1-3/8" Pin Thread <sup>1</sup>   | 181216 | <a href="#">015190</a> |
| 20   | Bracket, for Instrument Transformers (Aluma-Form Catalog Number GPMM-6 or Barfield Manufacturing Catalog Number BAPMMG) | 181268 | -                      |
| 21   | Air Switch, (switch-type, as required)  | -      | <a href="#">066195</a> |
| 22   | Bolt, Machine, 5/8" x Length (as required)  | -      | <a href="#">058778</a> |
| 23   | Bolt Cover, Insulating  | 149042 | <a href="#">058778</a> |
| 24   | Washer, Curved, 3", for 3/4" Bolt   | 195293 | <a href="#">058778</a> |
| 25   | Conduit, Rigid PVC, 1/2", Schedule 40 With/Coupling 10' Lengths   | 360368 | <a href="#">021924</a> |

<sup>1</sup> Items 18 and 19 may be used if additional jumper clearance is required.

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**Material (continued)**

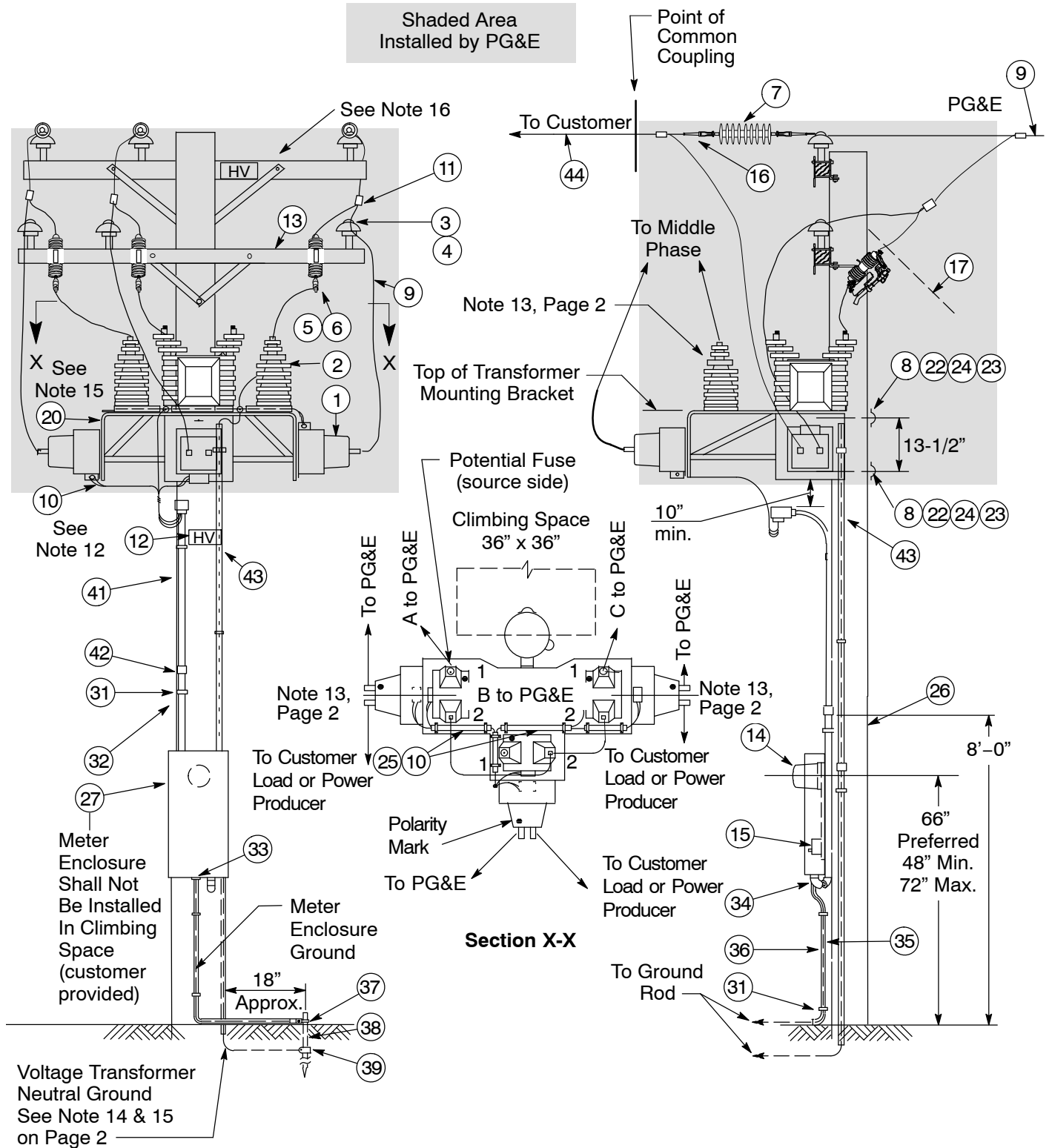
**Table 2 List of Materials to Be Furnished and Installed by Customer**

| Item | Description  | Code   | Document Number        |
|------|--|--------|------------------------|
| 26   | Pole, Wood, Fully Treated and PG&E Inspected (as required)   | -      | <a href="#">025055</a> |
| 27   | Meter Panel Enclosure, Outdoor Rated ( <a href="#">Greenbook</a> )   | -      | -                      |
| 28   | Coupling, PVC, 1-1/4", Slip Fit, Sloane Catalog Number CG405 or Equivalent   | 360410 | -                      |
| 29   | Elbow, Type LR, PVC, 1-1/4", Female, Slip Fit, Sloane Catalog Number LR40S or Equivalent   | 360508 | -                      |
| 30   | Bend, PVC, 1-1/4", 90°, R=5-3/4", Slip Fit, Schedule 80, Gray  | 360509 | -                      |
| 31   | Strap, Pipe, Galvanized, Two-Hole (as required)  | -      | <a href="#">057577</a> |
| 32   | Conduit, Rigid Steel, 1-1/4", Galvanized   | 390121 | -                      |
| 33   | Conduit Fitting, Threaded (for armor wire or steel conduit, Item 36)   | -      | -                      |
| 34   | Conduit Fitting, Threaded, (for Item 32)   | -      | -                      |
| 35   | Wire, Ground, #6 Minimum Copper, Bare <sup>1</sup>   | -      | -                      |
| 36   | Conduit, Rigid Steel, 1/2", Galvanized (for meter enclosure ground wire) <sup>1</sup>  | 390118 | -                      |
| 37   | Conduit Grounding Hub and Clamp, (for conduit, Thomas & Betts catalog number 3932 or equivalent; for armor, Thomas & Betts catalog number 3963, or equivalent) | -      | -                      |
| 38   | Rod, Ground, 5/8" x 8' 0" Copper Covered Steel Rod   | 187013 | <a href="#">013109</a> |
| 39   | Clamp, Ground Rod  | 187012 |                        |
| 40   | Wire, Ground, PT Neutral, #6 Minimum Bare Copper   | 290033 | -                      |
| 41   | Conduit, Rigid PVC, 1-1/4" Schedule 80, Gray   | 360408 | -                      |
| 42   | Adapter, Female, PVC, 1-1/4", Thread to Slip Fit, Sloane Catalog Number FA1303 (or equivalent)   | 360511 | -                      |
| 43   | Grounding Assembly GR-5 With PVC Conduit   | 160080 | <a href="#">021904</a> |
| 44   | Customer Wire, Overhead (size as required)   | -      | -                      |

<sup>1</sup> Armor clad ground wire may be used for meter enclosure ground. Omit rigid steel conduit (Item 36) when armor cladding is used.

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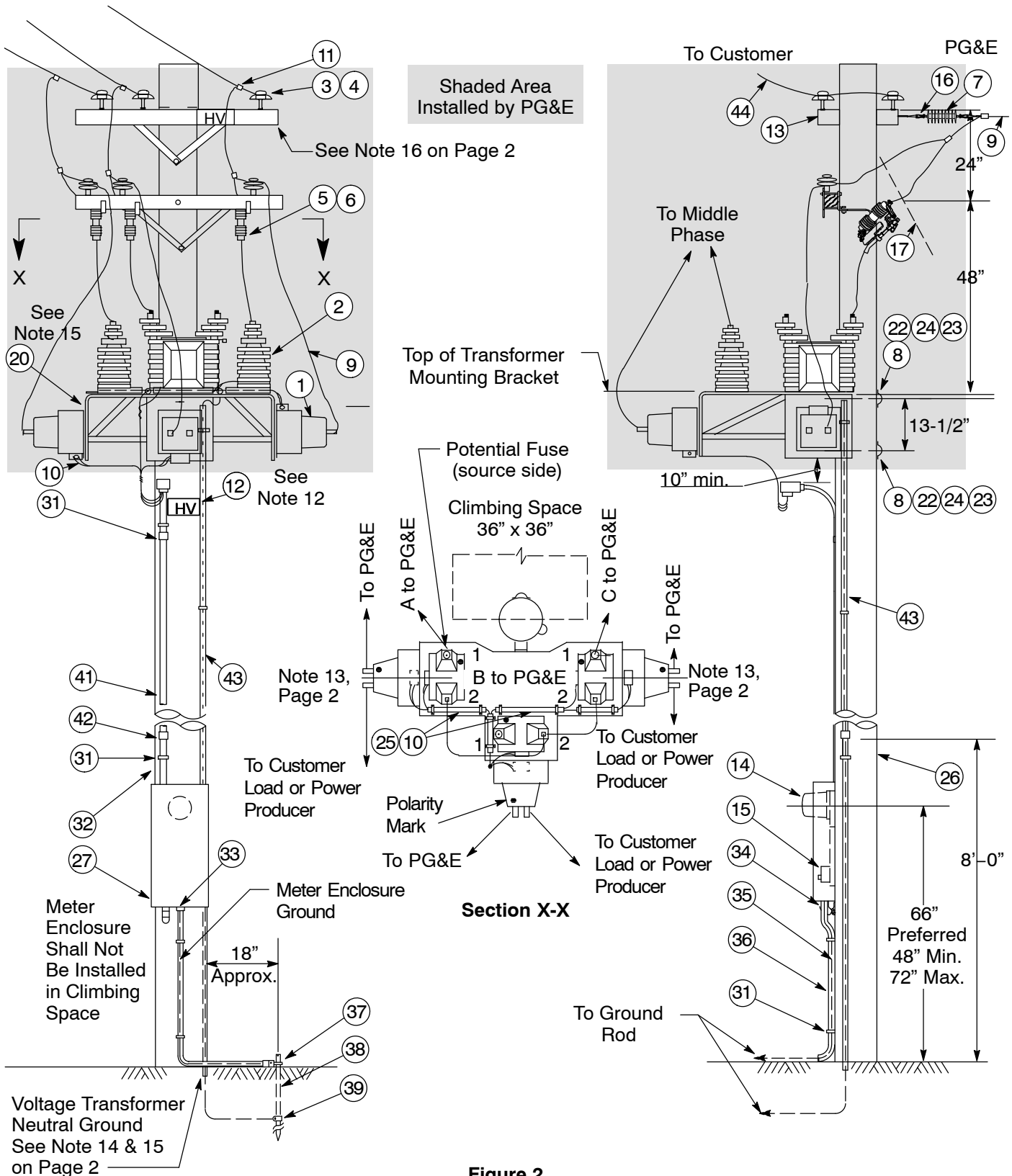
**Overhead Service to Customer Line—12 kV Shown**



**Figure 1**  
**Typical Primary Wiring and Metering Wiring Layout – Deadend Construction**

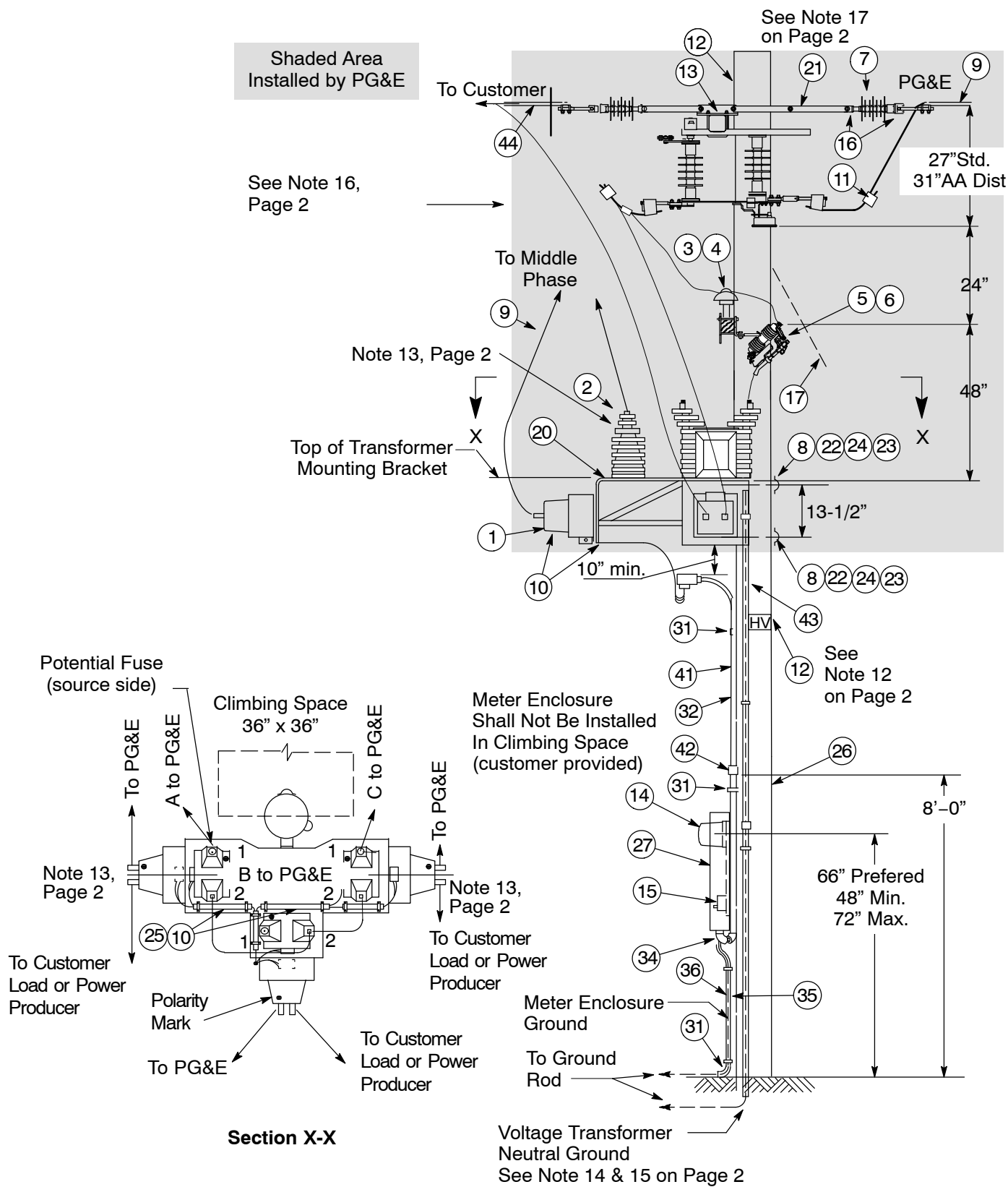
**Pole-Mounted Primary Metering Installation,  
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**Overhead Service to Customer Line-12 kV Shown**



**Pole-Mounted Primary Metering Installation,  
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**Overhead Service to Customer Line—12 kV Shown**



**Figure 3  
Typical Primary Wiring and Metering Wiring Layout – with Switch**

**Revision Notes**

Revision 03 has the following changes:

1. Revised Figure 1 on Page 5 and Figure 2 on Page 6, added Reference Document for List of Materials for Item No. 24 in Table 2, Page 3.
2. Added Item 6, Table 1, Page 3.