



POLE-TOP PRIMARY METERING INSTALLATION, CLUSTER MOUNTED 058779
(12 OR 21 KV LINE)

Department: Electric T&D **Section:** T&D Engineering and Technical Support

Approved by: W. R. Tirona (WRT4) *William Tirona* **Date:** 05-30-03

Rev. #00: This document replaces Engineering Standard 058779. For a description of the changes, see Page 9.

This document is also included in the following manual:

- *Interconnection Handbook*

Purpose and Scope

This document specifies pole-top metering installations using outdoor-type instrument transformers mounted on a prefabricated aluminum bracket. Pole-top primary metering is permitted only where indoor metering is not practicable. 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.
2. The customer shall furnish a suitable location, either indoors or outdoors for the PG&E meters. When meters are to be installed in outdoor locations, the customer shall furnish and install an outdoor meter enclosure in accordance with Engineering Document 033584.
3. If the load to be metered requires a kilowatt demand recorder, the meter enclosure shall be of the walk-in type illustrated in Engineering Document 033584. (Provision should be made for a walk-in enclosure when there is a probability that a kilowatt demand recorder may be required in the future).
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 practicable. 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 state building standards electrical 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 PG&E will install the necessary materials to cover the meter wiring above the 8-foot level on the metering pole.
9. 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 and 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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References	Document
Installation of Grounds on Wood Pole Transmission and Distribution Lines	021904
Clearance Tables CPUC General Order No. 95	022158
Marking, Guarding, Numbering, and Identification of Line Structures	022168
Installation of Cable Risers on Wood Poles	027742
Diagram of Connections for Metering Polyphase Loads Using Transformer-Rated Meters . . .	028163
Air Switch Installations Distribution Lines	033131
Pole-Top Primary Metering Installations, 2.4 to 17 kV Lines	033584
Triangular Primary Construction Wood Pole Distribution Lines	041541

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)	—	054340
2	Transformer, Potential, Outdoor-Type (rating as required)	—	
3	Insulator, Post-Type (as required)	—	044490
4	Bracket, Pole-Top, for Post Insulator	—	015190
5	Fuse, Bushing Mounted (as required)	—	015225
6	Insulator, Suspension, 9"	344066	015014
7	Link, Strain, Ohio Brass Catalog Number 79688	182086	—
8	Wire, Overhead (size as required)	—	059626
9	Wire, Coded, Meter, #10, 600 V	—	Spec. 26
10	Lead Wire, Connectors (as required)	—	—
11	High Voltage Signs	373038	015070
12	Bonding Material (as required)	—	06567
13	Meter (watthour, watthour demand, etc.) (as required)	—	—
14	Test Switch, Reactiformer (as required)	—	026237
15	Dead-End Attachment, for Aluminum, Document 028851, for Copper, Document 015218	—	—
16	Guy Material (as required)	—	022178
17	Insulator Clearance Bracket, 1" Pin Thread, Code 181215; 1-3/8" Pin Thread, Code 181216	—	015190
18	Insulator, Pin-Type (rating as required)	—	022088
19	Bracket, for Instrument Transformers (Aluma-Form Catalog Number GPMM-6 or Barfield Manufacturing Catalog Number BAPMMG)	181268	—
20	Air Switch, Install per Document 033131 (switch-type, as required)	—	022635
21	Bolt, Machine, 5/8" x Length (as required), With Square Washer	—	058778

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Material (continued)

Table 2 List of Materials to Be Furnished by Customer

Item	Description	Code	Document Number
22	Pole, Wood, Fully Treated and PG&E Inspected (as required)	–	Spec. 57
23	Staple, Steel, Galvanized, 2-1/2" x 29/32" x 0.187" ¹	197156	–
24	Meter Enclosure, Weatherproof (see Document 033584)	–	–
25	Coupling, PVC, 1-1/4", Slip Fit, Sloane Catalog Number CG405 or Equivalent	360410	–
26	Elbow, Type LR, PVC, 1-1/4", Female, Slip Fit, Sloane Catalog Number LR40S or Equiv.	360508	–
27	Bend, PVC, 1-1/4", 90°, R=5-3/4", Slip Fit, Schedule 80, Gray	360509	–
28	Strap, Pipe, Galvanized, Two-Hole (as required)	–	057577
29	Conduit, Rigid Steel, 1-1/4", Galvanized	390121	–
30	Conduit Fitting, Threaded (for armor wire or steel conduit, Item 33)	–	–
31	Conduit Fitting, Threaded, (for Item 29)	–	–
32	Wire, Ground, #6 Minimum Copper, Bare ²	–	–
33	Conduit, Rigid Steel, 1/2", Galvanized (for meter enclosure ground wire) ²	390118	–
34	Conduit, Rigid PVC, 1/2", Schedule 40 With/Coupling 10' Lengths	360368	021924
35	Conduit Grounding Hub and Clamp, (for conduit, Thomas & Betts catalog number 3932 or equivalent; for armor, Thomas & Betts catalog number 3963, or equivalent)	–	–
36	Rod, Ground, 5/8" x 8'-0" Copper Covered Steel Rod	187013	013109
37	Clamp, Ground Rod	187012	
38	Wire, Ground, PT Neutral, #6 Minimum Bare Copper	290033	–
39	Conduit, Rigid PVC, 1-1/4" Schedule 80, Gray	360408	–
40	Adapter, Female, PVC, 1-1/4", Thread to Slip Fit, Sloane Catalog Number FA1303 (or equivalent)	360511	–
41	Cover, Insulating	149042	058778
42	Nail, Galvanized, 10d Common, Code 197036 for Cedar Poles; 6d Common, Code 197034 for Douglas Fir or Pine Poles	–	–
43	Riser Assembly (as required)	–	027742

¹ Substitute pipe strap and nails, Items 28 and 42

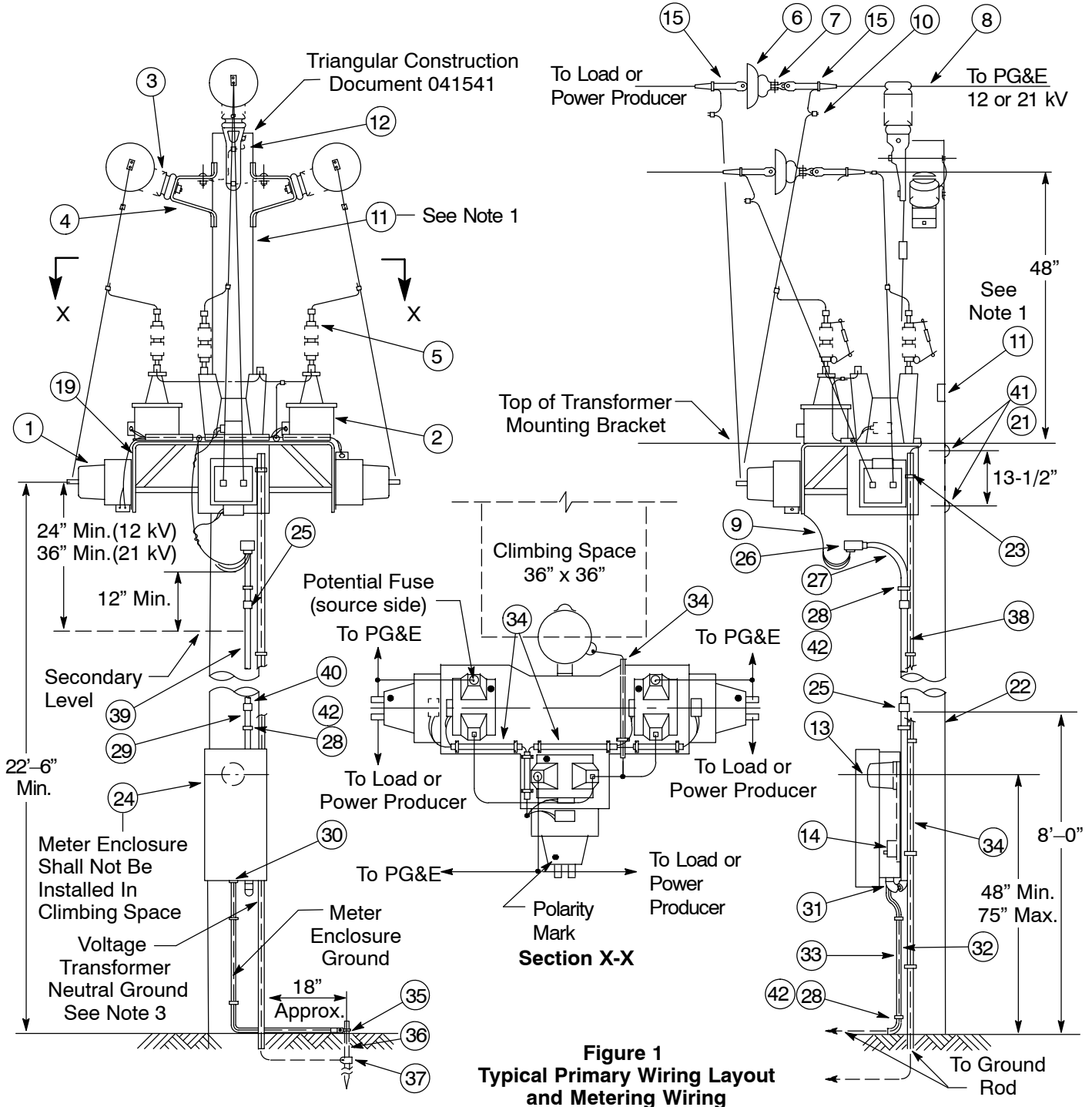
² Armor clad ground wire may be used for meter enclosure ground. Omit rigid steel conduit (Item 33) when armor cladding is used.

Pole-Top Primary Metering Installation, Cluster Mounted (12 or 21 kV Line)

Overhead Service to Customer Line—12 kV Shown (see Note 3)

Notes

1. Attach high voltage signs, Item 11 (see Table 1 on Page 2), 30 inches to 36 inches below the conductors on the climbing side of the pole, and just below the brackets or crossarm mounting bolt on the equipment side of the pole.
2. 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.
3. Connect the voltage transformer ground point to the 21 kV common neutral if one is provided on the pole. Refer to Document 036229 for common neutral grounding requirement.



**Figure 1
Typical Primary Wiring Layout
and Metering Wiring**

Pole-Top Primary Metering Installation, Cluster Mounted (12 or 21 kV Line)

Service to Customer's Riser—12 kV Shown (see Note 3)**Notes**

1. Attach high voltage signs, Item 11 (see Table 1 on Page 2), 30 inches to 36 inches below the conductors on the climbing side of the pole, and just below the brackets or crossarm mounting bolt on the equipment side of the pole.
2. 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.
3. Connect the voltage transformer ground point to the 21 kV common neutral if one is provided on the pole. Refer to Document 027742 for common neutral grounding and other grounding and clearance requirements for 21 kV riser construction.
4. 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.

Pole-Top Primary Metering Installation, Cluster Mounted (12 or 21 kV Line)

Service to Customer's Riser-12 kV Shown (see Note 3)(continued)

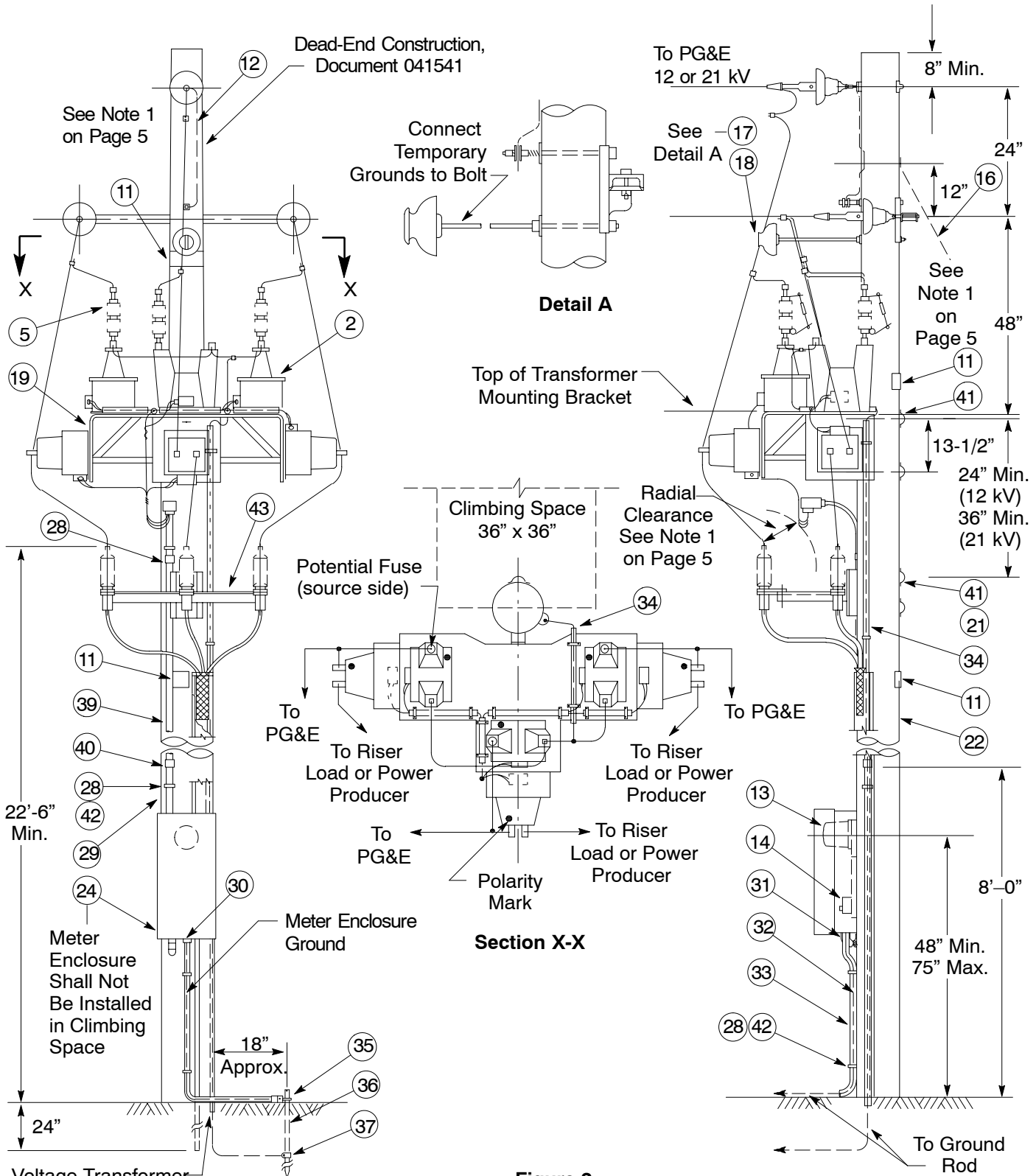


Figure 2
Typical Primary Wiring Layout and Meter Wiring

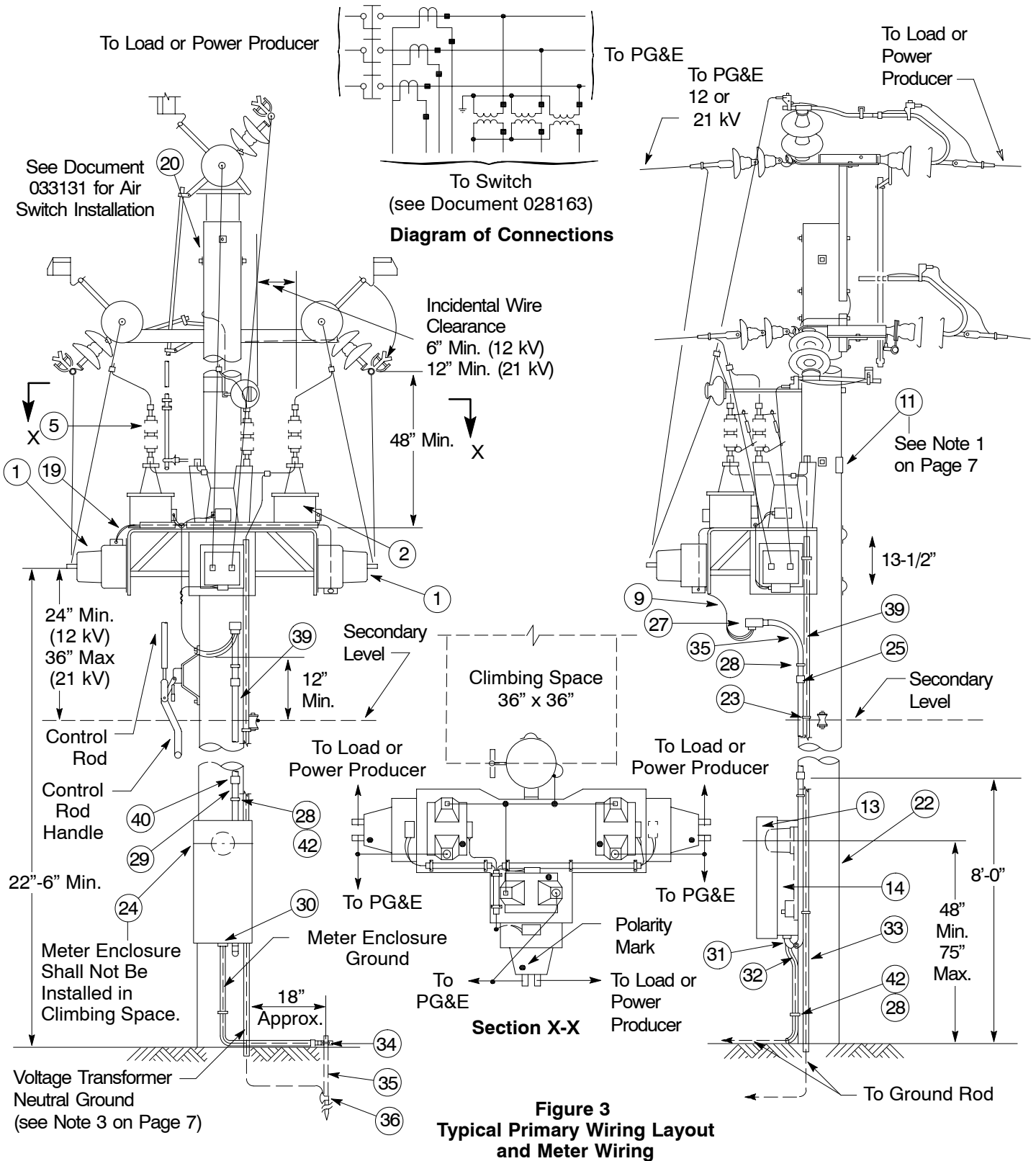
Pole-Top Primary Metering Installation, Cluster Mounted (12 or 21 kV Line)

With Service Switch on Same Pole**Notes**

1. Attach high voltage signs, Item 11 (see Table 1 on Page 2), 30 inches to 36 inches below the conductors on the climbing side of the pole, and just below the brackets or crossarm mounting bolt on the equipment side of the pole.
2. 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.
3. Connect the voltage transformer ground point to the 21 kV common neutral if one is provided on the pole. Refer to Document 027742 for common neutral grounding and other grounding and clearance requirements for 21 kV riser construction.
4. 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.

Pole-Top Primary Metering Installation, Cluster Mounted (12 or 21 kV Line)

With Service Switch on Same Pole (Continued)



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Revision Notes

Revision 00 has the following changes:

1. Converted Engineering Standard 058779 to Interleaf Document 058779.
2. Rearranged contents; completely revised text, tables, and graphics numbering streams.
3. Reset revision number stream to zero.