

Electric Service Requirements Manual

4th Edition

Service and Metering Requirements for
Residential, Commercial, Agricultural, and Industrial Customers

Pacific Power | Rocky Mountain Power

Oregon
Washington
California

Utah
Wyoming
Idaho



*This book, supporting documents and approved meter service equipment are posted on the web at:
<https://www.pacificpower.net/working-with-us/builders-contractors/electric-service-requirements.html> **and**
<https://www.rockymountainpower.net/working-with-us/builders-contractors/electric-service-requirements.html>*

2016 Electric Service Requirements Manual 4th Edition

This manual shall be distributed and interpreted in its entirety.
Individual pages will not represent all the requirements necessary for an
installation.

Printed versions of this document may be out of date.
Please consult our websites for the most recent version.

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Revision Sheet:

(Published September 2019, following July 2018; following the January 2016 1st edition; and the November 1, 2016 2nd edition)

Fourth Edition Administrative Update: Website addresses have been updated throughout to match a recent company rollout of new web pages.

Third Edition Changes: Section 4:

Page 24: In Section 4.2, Table 6 has been modified to reflect 2017 NESC guidelines.

Corrections Included in the 2nd Edition

Section 4:

Page 20: In Section 4.1, the italicized text has been added to paragraph three: "Metering equipment shall not be installed in the following locations, *unless approved by the Power Company;*" In requirement 5 in the same section, the word (*guideline*) has been added, in italics as follows: "Meters shall not be installed within 36 inches (36") of a window that has a view of living space or restrooms, or within 36 inches (36") of a door (*guideline*)."

Page 21-22: In Section 4.1.2 The italicized text has been added to the end of the second sentence of the first paragraph: The meter shall be located within 10 feet (10') of the front (street side) corner of the dwelling, on the side of the dwelling closest to the Power Company's source, *except for remodel of existing services, in which case the meter location must be permitted by the AHJ and approved before installation by the Power Company.*

Page 27: Section 4.2.1. In Figure 4, a note has been added to the 10' dimension from the front of the building and to the 36" dimension from the meter socket to the window and door with the explanation, "This distance is for new construction."

In requirement 2 in the same section, the word (*guideline*) has been added, "Meters shall not be installed within 36 inches (36") of a window that has a view of living space or restrooms, or within 36 inches (36") of a door (*guideline*)."

Page 28: In Section 4.2.2, requirement number 1, has been modified to read: "The service mast shall extend through the roof line except when sufficient height can be obtained to meet the clearances given in Table 6 or Table 7." Requirement number 5 has been modified to read: "Guying is required if a coupling is within eight feet (8') of the weatherhead and located above the last point of securement to the structure."

Page 31: In Section 4.2.3, Figure 7 a note has been added to the 10' dimension from the front of the building and to the 36" dimension from the meter socket to the window and door with the explanation that: "This distance is for new construction."

In requirement 4 in the same section, the word (*guideline*) has been added, "Meters shall not be installed within 36 inches (36") of a window that has a view of living space or restrooms, or within 36 inches (36") of a door (*guideline*)."

Section 5:

Page 37: In Section 5.2, requirement number 15, the "shall" in the first sentence has been changed to "should."

Page 38: In Section 5.2.1, Table 12, the first row was changed to read, "Single; 100 A or less; 150; one 2-inch; 270;" the second row now reads, "Single; 101 to 400 A; 150; one 3-inch; 270."

Page 40: In Section 5.3.4, the last sentence of the last paragraph now reads: "The cost to repair a conduit is the responsibility of the customer."



Section 7:

Page 51: In Section 7.5 In Figures 18 and 19, a note has been added to the 10' dimension from the front of the building and to the 36" dimension from the meter socket to the window and door with the explanation, "This distance is for new construction."

Page 53: In Section 7.7.2, requirement number 3 has been changed to read, "When a three-inch (3") meter socket knockout is not available, a swedge may be used on the vertical riser or ahead of the elbow to transition to a smaller conduit size, no less than two inches (2")."

Page 55: In Section 7.7.3 In Figure 22, side view, and Figure 23 the minimum vertical dimension of 24" to the bottom of the underground type meter socket has been removed.

Page 57: In Section 7.8.1, requirement number 4, has been modified: "The conduit and weatherhead should be directly above the meter socket, and conduit material shall be continuous from the weatherhead to the meter socket."

Page 58 In Section 7.8.2, The second sentence in requirement number 1 has been changed to read: "Consult the Power Company regarding cases where the service mast cannot be mounted to meet this requirement." In requirement number 2, the italicized text has been added: "The service mast shall extend through the roof line *except when sufficient height can be obtained to meet the clearances given in Table 6 or Table 7.*"

Page 59: In Section 7.8.3, the first sentence now reads: "When overhead service meter sockets are not mounted on the dwelling unit, the meters may be installed on customer-owned poles."

Page 61 In Section 7.8.3, the service mast conduit size column has been removed from Table 15.

Section 9:

Page 74-75: Section 9.2.2, Figures 37 and 38: In Figure 37, side view, and Figure 38 the minimum vertical dimension of 24" to the bottom of the underground type meter socket was removed.

Page 76: In Section 9.2.3, the service mast conduit size column has been removed from Table 18.

Page 77-78: In Section 9.3, Figures 40 and 41, the minimum vertical clearance dimension has been changed from 24" from the bottom of the pull box to "72" max-48" min" as referenced to the lugs in the pull box.

Page 82-84: Section 9.4.2, Figures 45 and 46: In Figure 45, the minimum vertical clearance dimension of 24" from the bottom of the CT cabinet has been replaced with the dimension of "72" max-48" min" shown to the CT mounting base lugs. In Figure 46, the minimum vertical clearance dimension of 24" from the bottom of the CT cabinet was removed.

Page 87: In Section 9.4.4 In Figure 49, the minimum vertical clearance dimension of 24" from the bottom of the CT cabinet was replaced with the dimension of "72" max-48" min" shown to the CT mounting base lugs.

Page 88: Section 9.4.7 In Figure 51, the minimum vertical clearance dimension of 24" from the bottom of the CT cabinet was replaced with the dimension of "72" max-48" min" to the pull section lugs on the left side of the figure.



This 4th edition of the 2016 *Electric Service Requirements* manual supersedes all previous editions. The publication date of this manual is September 21, 2019. The changes are purely administrative and involve no alteration to the requirements in this publication. Substantive modifications in the 2018, 3rd edition were enforced for any installation made after September 30, 2018.

The intent of this manual is to clarify electric service requirements for Pacific Power and Rocky Mountain Power customers prior to and during construction. This manual may require different electrical equipment than was previously used in Pacific Power and Rocky Mountain Power service areas.

This manual complies with the National Electric Safety Code (NESC), the National Electrical Code (NEC), and the Electric Utility Service Equipment Requirements Committee (EUSERC). Revisions to this publication since January 1, 2016, are marked with revision bars. Revised table content is rendered in lighter text and with revision bars.

Noteworthy changes in the 4th edition include:

Web page URL updates.

Noteworthy changes in the 3rd edition included:

Clearance Table 6 has been revised to reflect NESC 2017 modifications.

Pacific Power and Rocky Mountain Power strongly recommend contacting the Power Company with questions concerning the requirements in this manual. To submit suggestions for future editions of this manual, email esrfeedback@pacificorp.com.

We will do our best to meet your needs for electrical service both safely and economically.

Please keep in mind, construction lead time varies with work load. Please contact the Power Company early in your construction process.

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Residential Single Family and Duplex Building Connection Checklist

A customer building a new single-family or duplex building and connecting to the Power Company's electrical system may follow this checklist as a guide. This checklist applies to manufactured and mobile homes as well.

- Obtain all necessary building and zoning permits.
- Complete the company application for new electric service at:
<https://csapps.pacificpower.net/public/working-with-us/builders-service>
<https://csapps.rockymountainpower.net/public/working-with-us/builders-service>
- Verify electrical inspection requirements for your jurisdiction.
- Meet with a Power Company representative to design your service.
- Review the definitions in the preface of this manual.
- Read Section 1, *General Requirements*.
- Read Section 2, *Permits and Applications*.
- Read Section 3, *Services and Meter Installations*.
- Determine single-phase service size:
 - 200 amp
 - 400 amp
- Check the type of service:
 - Temporary service. (See Section 6 for temporary construction service requirements.)
 - Overhead service. (See Section 4 for clearances and Section 7 for service requirements.)
 - Underground service. (See Section 4 for clearances, Section 5 for trenching requirements, and Section 7 for service requirements.)
- Select the meter socket enclosure (see Section 7.3).
- Discuss additional requirements with a Power Company representative if your service is greater than 100 feet from Power Company facilities, if your service is over 400 amps, or if your service involves other special considerations.
- Call the underground locating services number 8-1-1 before you dig.
- Call the Power Company at 1-888-221-7070 to request trench and conduit inspection prior to backfilling.
- Request electrical inspection by state/county/city.
Date approved: _____
- Call the Power Company to request installation of the meter and attachment of the service conductors.

NOTE: Completing this list does not guarantee Power Company approval of the installation. Customers building multi-family dwellings should review all sections of this manual.



Pacific Power and Rocky Mountain Power Service Territory Map

P A C I F I C O C E A N



- Pacific Power service area
- Rocky Mountain Power service area
- Principal communities served

PacifiCorp headquarters:

825 NE Multnomah St.
 Portland, OR 97232
 503-813-5000
pacificorp.com
pacificpower.net
rockymountainpower.net

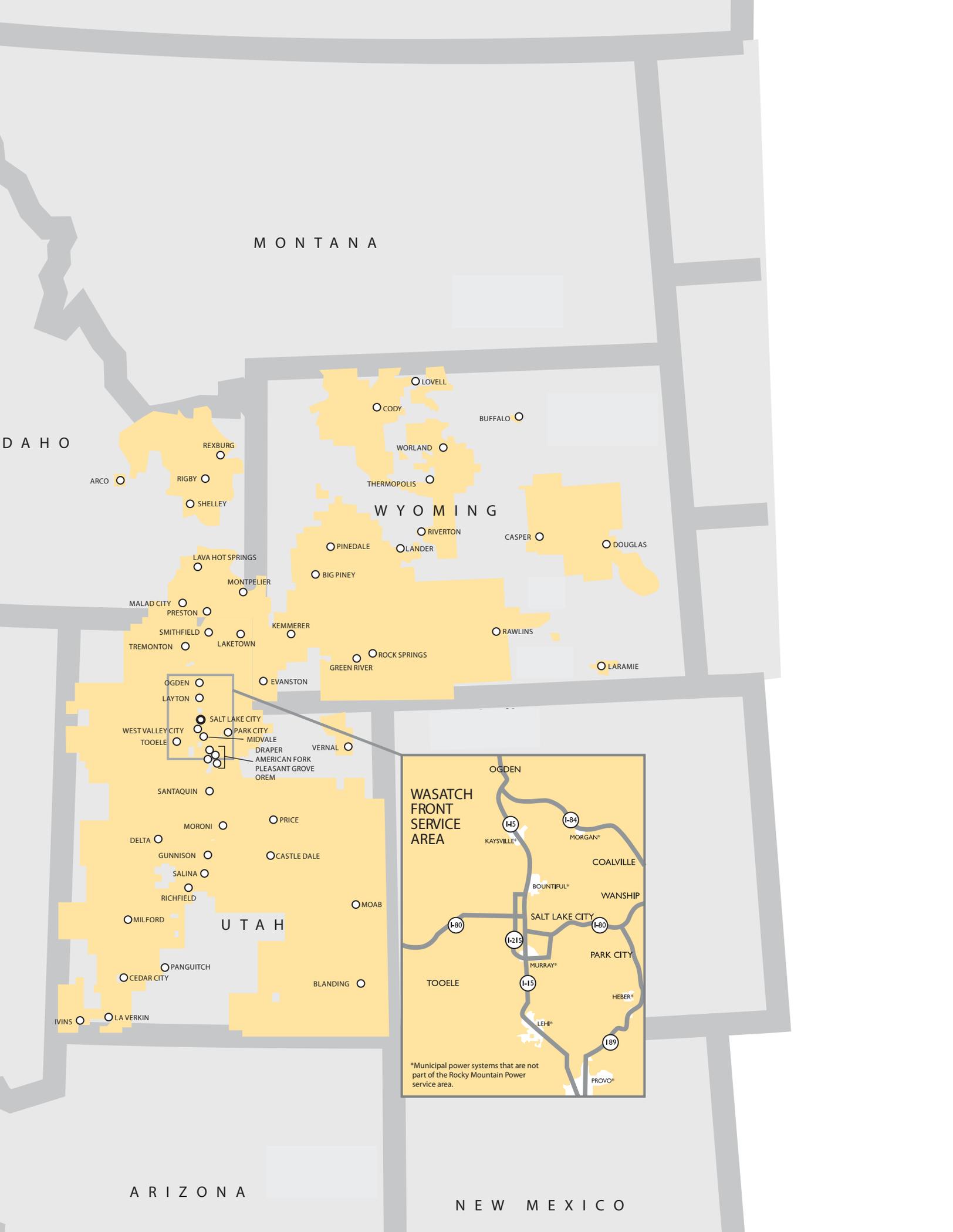
Customer service: 1-888-221-7070

Builder's Hotline: 1-800-883-3124

En español: 1-888-225-2611

Outage reporting: 1-877-508-5088

Free electric safety materials or presentations: 1-800-375-7085



MONTANA

IDAHO

WYOMING

UTAH

ARIZONA

NEW MEXICO

WASATCH FRONT SERVICE AREA



*Municipal power systems that are not part of the Rocky Mountain Power service area.

ARCO

REXBURG

RIGBY

SHELLEY

LOVELL

CODY

BUFFALO

WORLAND

THERMOPOLIS

RIVERTON

CASPER

DOUGLAS

PINEDALE

LANDER

LAVA HOT SPRINGS

BIG PINEY

MONTPELIER

MALAD CITY

PRESTON

KEMMERER

RAWLINS

SMITHFIELD

TREMONTON

LAKETOWN

ROCK SPRINGS

GREEN RIVER

LARAMIE

OGDEN

LAYTON

EVANSTON

WEST VALLEY CITY

TOOELE

SALT LAKE CITY

PARK CITY

MIDVALE

DRAPER

AMERICAN FORK

PLEASANT GROVE

OREM

VERNAL

SANTAQUIN

MORONI

PRICE

DELTA

GUNNISON

CASTLE DALE

SALINA

RICHFIELD

MOAB

MILFORD

PANGUITCH

CEDAR CITY

BLANDING

IVINS

LA VERKIN

OGDEN

KAYSVILLE

MORGAN*

COALVILLE

BOUNTIFUL*

WANSHIP

SALT LAKE CITY

PARK CITY

MURRAY*

HEBER*

LEHI*

PROVO*

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Definitions

Ampere Interrupting Capacity (AIC) — The highest available current at which the protective device has been tested, and which it has interrupted safely under standardized test conditions. Interrupting rating is another term commonly used.

Authority Having Jurisdiction (AHJ) — An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

Bonding — The permanent joining of metal parts together to form an electrically-conductive path with the capacity to safely conduct any fault current likely to be imposed on it.

Building — A structure that stands alone, or a structure that is cut off from adjoining structures by fire walls, with all openings therein protected by approved fire doors.

Bushings — Plastic or nylon rings that attach to the ends of conduit to protect the electrical cable from sharp edges.

Bypass — A method that allows for service continuity to the customer while the meter is removed for test or inspection.

Common meter — A non-residential meter for general energy use in apartment complexes, multi-use, or other multi-occupancy buildings. General energy use includes common area and exterior lighting, irrigation, laundry rooms, etc. Also called a house meter.

Conduit body — A separate portion of a conduit or tubing system that provides access through a removable cover(s) to the interior of the system at a junction of two or more sections of the system or at a terminal point of the system. Boxes such as FS and FD or larger cast or sheet metal boxes are not classified as conduit bodies. Conduit bodies include the short-radius type as well as capped elbows and service-entrance elbows. Some conduit bodies are referred to in the trade as “condulets” and include the LB, LL, LR, C, T, and X designs.

Current transformer (CT) — A set of coils that reduce the primary current to the meter by a known ratio to an amount within the rated current capacity of the meter.

Current transformer-rated meter — A meter that requires CTs, also known as instrument current transformers, due to an insufficiency of the meter's current capacity.

Direct-connect meter — A meter energized to line voltage that carries all the load current. Also called a self-contained meter. No CT or voltage transformer is used.

Direct-connect socket — A meter socket connected to service wires, energized to line voltage and in series with the customer's load without external CTs. A direct-connect meter is used in a direct-connect socket.

Drip loop — The loop formed by the customer conductors that connects to the Power Company service drop. The conductors are formed in a downward “loop” so water will not enter the customer's service mast (weatherhead).



Dwelling unit — A single unit, providing complete and independent living facilities for one or more persons, including permanent provisions for living, sleeping, cooking, and sanitation.

Dwelling, single-family — A building that consists solely of one dwelling unit.

Dwelling, two-family (Duplex) — A building that consists solely of two dwelling units.

Dwelling, multi-family — A building that contains three or more dwelling units.

Electric Service Requirements Agreement (ESRA) — A formal written agreement between the Power Company and the customer that describes the details of each installation.

Electric Utility Service Equipment Requirements Committee (EUSERC) — An association of electric utilities and manufacturers that creates standard designs for the interface between the electric utility's service and the customer's facility.

Fault current — The maximum available current under short-circuit conditions in which the current bypasses the normal load to a path of minimal impedance.

Fiberglass conduit — Rigid conduit made of UV-resistant fiberglass, colored black with red stripes (per company Material Specification ZG 033, *Fiberglass Conduit*, posted beneath this manual at <https://www.pacificpower.net/working-with-us/builders-contractors/electric-service-requirements.html> and <https://www.rockymountainpower.net/working-with-us/builders-contractors/electric-service-requirements.html>)

Free-standing metering assembly — A metering assembly not attached to a building.

GO 95 — California Public Utilities Commission General Order 95 (California state rules for overhead line construction).

Grounding — Connecting to, or in contact with, earth or connected to some extended conductive body that serves instead of the earth.

Gutter — Enclosure used to supplement wiring spaces at meter centers, distribution centers, switchboards, and similar points of wiring systems. The enclosure has hinged or removable covers for housing and protecting electrical wires, cable, and bus bars. The enclosure is designed for conductors to be laid or set in place after the enclosures have been installed as a complete system.

Guying — The use of a cable to secure, steady, or guide.

House meter — See *common meter*.

Hub — A water-tight conduit attachment in, or out of, a meter socket or other enclosure.

IMC — Intermediate metallic conduit.

Instrument transformer — See *voltage transformer*.

Interrupting rating — The highest current at a rated voltage that a device is identified to interrupt under standard test conditions. Interrupting ratings must be greater than the fault current.

Living space — An area within a structure where the environment is controlled for cooking, cleaning, entertaining, or sleeping. A garage is not considered living space.

Mandrel — A device that is pulled from one end of a duct or conduit to the other end to determine the integrity of the duct and the bends, to determine whether any sharp or damaging contour is present inside the duct, and to clean the duct.

Manual link bypass — A bypass facility requiring the physical act of placing links across the line and load bypass studs, for the purposes of removing the meter and preventing an outage while maintaining service continuity.

Manufactured home — A factory-assembled structure or structures, site-specific and transportable in one or more sections, designed to be used as a dwelling unit with a permanent foundation.

Meter — A device that measures and records the summation of electrical quantity over a period of time.

Meter socket — The mounting device for socket-type meters consisting of jaws, connectors, and an enclosure. The meter socket is also referred to as a meter base. The socket may have a cast or drawn enclosure. A mounting device may be a single socket or an assembled enclosure that may be extendable to accommodate more than one mounting device.

Meter socket ring — A metallic ring secured to the meter socket that can be sealed by the Power Company.

Meter pedestal — A commercially-built pedestal that contains a meter socket and customer disconnect switches.

Metered service conductor — A conductor carrying customer load that is recorded by the Power Company's billing meter.

Mobile home — A factory-assembled structure or structures transportable in one or more sections, built on a permanent chassis and designed to be used as a dwelling unit without a permanent foundation.

NEC — National Electrical Code.

NEMA — National Electrical Manufacturers' Association.

NEMA 3R — Enclosures constructed for either indoor or outdoor use to provide a degree of protection to Power Company personnel against access to hazardous parts; to provide a degree of protection for the equipment inside the enclosure against ingress of solid foreign objects (falling dirt); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow); and that will be undamaged by the external formation of ice on the enclosure.

Net metering — Metering that measures power both received from and delivered to a customer that owns and operates a qualified generating device that interconnects with the Power Company's electrical facilities.

Network metering — Single-phase service obtained from two of the phase wires and the neutral of a four-wire system.

Non-residential service — Service to any customer who does not qualify for residential service.



On-demand water heater — See *tankless water heater*.

Overhead service — See *service drop*.

Panic bar — A device for unlocking a door in an emergency. Also known as a crash bar.

Plumb — Having the sides and front of the meter socket perfectly vertical from both the front and side views. This term refers to the meter socket and other enclosures.

Point of delivery — See *service point*.

Post — A pressure- or thermally-treated wooden or steel structure that supports an underground service meter socket.

Primary service — Service with delivery voltage greater than 600 volts.

Primary voltage — Over 600 volts.

PVC conduit — Common name for polyvinylchloride pipe. The conduit approved for electrical applications is typically gray-colored pipe.

Pull box — The area where the Power Company terminates its conductors.

Raceway — An enclosed channel of metallic or nonmetallic materials designed expressly for holding wires, cables, or bus bars.

Residential service — Service furnished to customers for domestic purposes in single-family, duplex or multi-family dwelling units, or as defined by tariff.

Relocation — A change in location of any of the following electrical system components: 1) the meter socket, 2) the service drop, 3) the service lateral, or 4) the service entrance conductors.

Rewire — Work performed on electrical wiring that requires any of the following: 1) re-installation of the meter socket, 2) replacement of the service drop, 3) replacement of the service lateral, or 4) replacement of the service entrance conductors.

Safety socket — A device consisting of a manual link bypass facility and a circuit-closing nut and bolt assembly which de-energize the meter socket while the meter is removed for test or inspection.

Secondary service — Service with delivery voltage of 600 volts or less.

Secondary voltage — 600 volts and under.

Self-contained meter — A watt-hour meter connected directly to the supply voltage that is in series with the customer's load without external instrument transformers.

Select backfill material — Material used to bed and cover conduits, consisting of screened native soil or sand free of sharp or foreign objects.

Service — The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

Service conductors, underground — The underground conductors between the service point and the first point of connection to the service-entrance conductors in a terminal box, meter, or other enclosure, inside or outside the building wall.

Service drop — The overhead service conductors from the utility's pole, including the splices that connect to the customer's service entrance conductors.

Service entrance conductors (customer-owned) — The conductors between the terminals of the service equipment connecting to the service point. In an overhead system, the customer installs and owns the wires (service entrance conductors) from the splices at the service head (weatherhead). In an underground system, the customer installs and owns the wires (service entrance conductors) from the meter.

Service equipment — Customer-owned equipment, usually consisting of circuit breakers (or switches) and fuses, and their accessories, connected to the load end of service conductors to the customer's structure, and intended to constitute the main control and cutoff of the supply.

Service lateral — The underground conductors between the utility electric supply system and the service point.

Service point — The point of connection between the facilities of the serving utility and the premises' wiring. Also known as point of delivery.

Service trench — A trench provided by the customer for a service lateral.

Socket — A mounting device consisting of jaws, connectors, and enclosure for socket-type meters.

Spoil — Native material removed from a hole or trench that is piled above grade, adjacent to the hole or trench.

Swedge — A smooth-walled reducer used to aid transitions between conduit and meter socket knockout sizes.

Sweep — A PVC, fiberglass, or steel bend that changes the direction of the conduit.

Switchboard — A large panel, frame, or assembly of panels on which are mounted metering equipment, switches, and protective devices.

Tankless water heater — A water heating system (for hot water production and water heating systems) that heats only as needed, without the use of a storage tank. Also called an "on-demand," "instantaneous," "continuous-flow," "in-flow," or "instant-on" water heater.

Tariff — A set of policies/rules, and rates written by the Power Company, approved by the Public Service and Public Utility Commissions of each state served. All sections of the tariff are subject to updates at any time. Individual state rules may affect the Power Company's tariff. Tariff policy provides the working rules by which the Power Company serves its customers.

Test block or test bypass facility (TBF) — An assembly used to bypass a self-contained meter socket.

Test switch — A device used by the Power Company to isolate the meter from current and voltage sources.

Timber — A pressure- or thermally-treated wooden structure that supports an overhead service.



Underground cable — Electrical cable approved by a Nationally Recognized Testing Laboratory (NRTL) suitable for direct burial in the ground or in conduit.

Underground service — Electric service supplied to the customer from the Power Company utilizing underground conductors.

Unmetered service conductor — Conductor carrying the customer's load that is not measured by the Power Company's billing meter.

Unused facility — A facility that exists with no recorded customer or contractual obligation for a length of time (specified by the state).

Voltage transformer — A transformer that converts the primary voltage only, by a known ratio that is within the meter's threshold, usable for metering purposes. Also known as an instrument transformer.

Weatherhead — The weatherproof service drop entry point where overhead power lines enter a building, or where wires transition between overhead and underground cables.

Acronyms

- A** — Amperes, amps
- AIC** — Ampere Interrupting Capacity
- ANSI** — American National Standards Institute
- AHJ** — Authority Having Jurisdiction
- CT** — Current Transformer
- EMT** — Electrical Metallic Tubing
- ENT** — Electrical Nonmetallic Tubing
- ESR** — Electric Service Requirements
- ESRA** — Electric Service Requirements Agreement
- EUSERC** — Electric Utility Service Requirements Committee
- EV** — Electric Vehicle
- EVSE** — Electric Vehicle Supply Equipment
- FERC** — Federal Energy Regulatory Commission
- GO 95** — General Order 95 (California)
- HDPE** — High Density Polyethylene
- IMC** — Intermediate Metallic Conduit
- kV** — Kilovolts
- kVA** — Kilovolt amperes
- NEC** — National Electrical Code
- NEMA** — National Electrical Manufacturers' Association
- NESC** — National Electrical Safety Code
- NFPA** — National Fire Protection Association
- OSHA** — Occupational Safety and Health Administration
- PUE** — Public Utility Easement
- PVC** — Polyvinyl chloride
- RMC** — Rigid Metallic Conduit
- TBF** — Test Block Facility
- V** — Volts



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I. General Requirements

I.1 Manual Purpose and Scope

The purpose of this manual is to aid customers in obtaining service from the Power Company. It is the customer’s responsibility to ensure compliance with this manual; the customer is liable for all work performed by, or on behalf of, the customer, and any resulting loss or damage. This manual applies to new services, relocated services, house relocations, rewired services, and upgraded services. If additional information is required, please contact the Power Company at 1-888-221-7070 or via the internet at www.pacificpower.net or www.rockymountainpower.net.

This manual shall be distributed and interpreted in its entirety. Individual pages will not represent all the requirements necessary for an installation. Printed versions of this document may be out of date. Please consult our websites for the most recent version.

I.2 Customer and Power Company Defined

The term *Power Company* in this book refers to PacifiCorp, doing business as Pacific Power or Rocky Mountain Power.

The term *customer* is the party (or their agent) requesting electrical service from the Power Company.



I.3 Consulting the Power Company

The instruction “consult the Power Company” indicates that the customer shall initiate discussion with a Power Company representative and shall obtain written approval from the Power Company prior to installation for special situations, meter socket locations, metering equipment locations, and any deviations from the requirements set forth in this book. Failure to receive prior written approval may result in denial of service until the nonconforming installation is modified to meet Power Company requirements. The customer shall be solely liable for any damage caused by a nonconforming installation, regardless of whether the Power Company has inspected the same and/or connects service.

Prior written approval requires that the customer and a Power Company representative discuss the project details before or during construction. Construction shall be conducted in accordance with the Electric Service Requirements Agreement (ESRA).

I.4 Changes or Conflicts in Requirements

This manual is written with the intent to comply with all applicable codes, ordinances, and tariffs, as well as to implement common practices throughout the Power Company’s service territory. Common practices are implemented to:

- meet or exceed minimum safety codes and municipal building ordinances
- ensure fair and impartial requirements for all customers
- use safe work procedures by following established Power Company standards
- facilitate the privacy and security of current and future customers and occupants

This manual cannot address every possible situation. Consult the Power Company for situations not addressed by this manual that require clarification to meet the intent of this manual.

Electric service requirements may change if governing codes, ordinances, or tariffs change. Power Company standards shall be used to design a solution that meets (or exceeds) the minimum requirements of the tariff, code, or ordinance

I.5 Maximum Available Fault Current

The customer shall furnish equipment to withstand available fault current. Upon request, the Power Company will supply information on the maximum fault current available at the customer’s service entrance.

I.6 Customer’s Responsibility for Safety

The customer shall comply with federal, state, and local laws and regulations concerning activities in the vicinity of the Power Company’s electrical lines and equipment. The customer shall comply with all laws and regulations to protect themselves, their family, their employees, the Power Company and its employees, contractors, and all third parties from injury, loss, or damage.



I.7 Work Activity Near High-Voltage Overhead Power Lines (Over 600 V)

To protect those working near overhead power lines from accidental contact, states have enacted laws and rules addressing work around high voltage overhead lines.

Please refer to the states' statutes and Occupational Safety and Health Administration (OSHA) regulation that clearly identify the distance you must maintain while performing any work near overhead power lines.

If you or your contractor are going to be working near overhead lines, please contact the Power Company at 1-888-221-7070. The Power Company will work with you on appropriate precautions that may include the following:

- Coordinate work activity schedules
- Place temporary mechanical barriers
- Temporarily de-energize and ground the lines
- Temporarily raise or move the lines

The customer is responsible for the cost of implementing satisfactory precautions.

I.8 Temporary Service Disconnect

Ensuring safe work practices on customer-owned equipment may require a temporary service disconnect from the Power Company's facilities; please contact the Power Company at 1-888-221-7070 to coordinate disconnection.

I.9 Grounding and Bonding

Grounding and bonding are critical for safety and electrical reliability. The customer is responsible for ensuring electrical wiring and service equipment are grounded and bonded in accordance with applicable NEC requirements.

All grounding is per NEC Article 250 and is represented by the following symbol in the figures in this manual:



I.10 Vegetation and Accessibility

The customer shall prepare and maintain the premises such that trees, shrubs, or other vegetation do not interfere with Power Company access to all facilities, including poles, pad-mounted equipment, overhead equipment, underground conduit or cable, or metering equipment. (See Section 4, *Clearances*.)

I.1.1 Barrier Posts

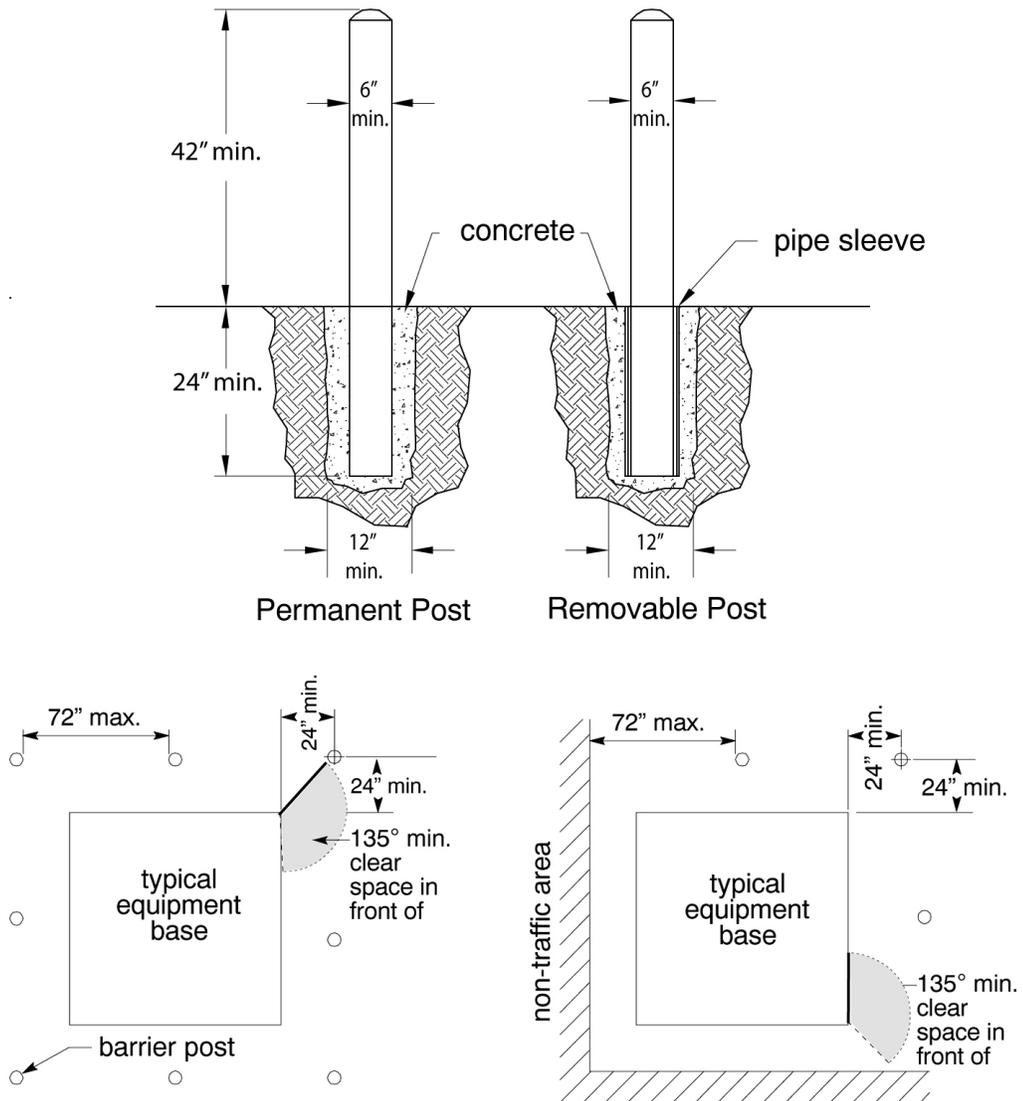
Barrier posts shall be provided by the customer in locations where vehicular traffic may pose a threat to utility equipment.

See Figure 1 for details on barrier posts. Consult the Power Company regarding barrier post location prior to installation.

Requirements:

1. Barrier posts shall be six-inch-diameter steel or concrete suitable for local environmental conditions.
2. Steel posts may be filled with concrete.
3. Posts shall have a domed top, free of burrs and sharp edges.
4. Barrier posts shall be placed so as not to obstruct the opening of the equipment doors (doors shall open at least 135 degrees), nor to impede the operation of the equipment. If such positioning is not possible, removable posts shall be used in the obstructive location(s).
5. Each barrier post shall be set in a concrete foundation at least 12 inches (12") in diameter and 24 inches (24") in depth below grade. See Figure 1 for additional space and dimension requirements.
6. Enough barrier posts shall be installed to adequately protect utility equipment from damage.
7. Temporary barrier posts may be required during construction.

Figure I—Barrier Post Details



I.12 Customer Equipment on Power Company Poles

Customer-owned metering equipment, switching devices, conduits, conductors, luminaires, etc., shall not be mounted on a Power Company pole.

I.13 Call Before You Dig

State laws require the customer/excavator call 8-1-1 for underground utility cable locations at least 48 hours prior to any excavation. Excavation shall not start until facilities have been marked by an underground locator service, or until the service confirms that no facilities exist in the area.



I.14 Power Quality

I.14.1 General

The characteristics of the customer's electrical equipment and devices must allow the Power Company distribution system to operate efficiently without undue interference to the Power Company's service or to other customers. When a customer's equipment has characteristics that cause undue interference with Power Company service to other customers, the customer shall make equipment changes or provide, at customer expense, additional equipment to eliminate the interference.

To eliminate the possibility of equipment interference, the customer should submit to the Power Company prior to installation all information regarding equipment that might cause power quality problems.

The Power Company's power quality, voltage, and harmonics standards are located online at: <https://www.pacificpower.net/about/power-quality-standards.html> and <https://www.rockymountainpower.net/about/power-quality-standards.html>.

I.14.2 Voltage Performance

Electric service supplied by the Power Company may be subject to voltage disturbances that may, but do not normally, affect the performance of typical electrical equipment. These disturbances may cause voltage-sensitive equipment, such as computers or microprocessors to shut down. The customer shall provide any power-conditioning devices needed to obtain the quality of power necessary for optimum performance of voltage-sensitive equipment.

I.14.3 Harmonics

The effects of the design and operation of high-frequency equipment such as electronic heating systems, spark discharge devices, radio transmitting equipment, etc., and equipment that generates harmonics, such as an induction furnace, shall not create

disturbances on the Power Company's electrical system that interfere with any other customer's proper operation of communication, radio, television, remote control, or other equipment.

Devices that can produce harmonic distortion (such as adjustable speed drives, electronic ballasts for fluorescent lighting, and switching power supplies for computers and electric vehicles) shall be filtered such that the harmonic distortion caused by these devices is kept within the limits specified in the Institute of Electrical and Electronics Engineers (IEEE) Standard 519, Section 10. Compliance with this requirement is judged by the Power Company's measurement at the service point, otherwise known as "the point of common coupling."

The customer can more easily stay within harmonic distortion limits by requiring their supplier to provide "low harmonic current distortion" equipment.

I.15 Power Factor

The Power Company's currently-filed tariffs charge for "low power factor" for certain commercial, agricultural and industrial customers. Low power factor may cause inferior performance of the customer's electrical system. The Power Company recommends that the customer install corrective devices to make the most effective use of the electrical system. If the customer would like to determine potential savings during design, the tariff can be obtained online at <https://www.pacificpower.net/about/rates-regulation.html> or <https://www.rockymountainpower.net/about/rates-regulation.html> or contact the Power Company at 1-888-221-7070.

I.16 Motors

I.16.1 Protection

To ensure adequate safety and protection, the customer is responsible for providing and maintaining code-approved protective devices to protect motors against overloading, short circuits, ground faults, low voltage, and single-phasing of three-phase motors.

I.16.2 Starting

Motor starts may cause unacceptable voltage dips to other customers or on the customer's premises. Frequently-started motors, or large motors on certain systems, may require reduced-voltage or soft-start motor controls.

Upon the customer's request, the Power Company will furnish permitted starting currents that are dependent upon motor size, starting amperage, frequency of starts, and impedance of the distribution system.

When the customer's motor creates unacceptable voltage dips, the customer is responsible for correcting the issue. This may include modifications to the Power Company's facilities at the customer's expense, in compliance with current local laws and ordinances and state tariffs.



I.17 Customer Generation

The Power Company will work with customers to interconnect local distributed generation according to the Federal Energy Regulatory Commission (FERC) and state rules. Interconnections will be evaluated on a case-by-case basis. Consult the Power Company before making any type of interconnection with any type of generating device.

Types of interconnects and their requirements are described here for convenience only.

I.17.1 Emergency or Standby Generators

An emergency, or standby, generator is permanently connected to the customer's wiring system and provides energy when the normal source is lost. This type of generator typically has a transfer switch ("break-before-make") or a code-approved, secure inter-lock scheme that disconnects ungrounded conductors from the Power Company's system prior to connection to the generator.

The transfer switch prevents connection of the generator to the Power Company's system during any mode of operation. The customer shall comply with the following requirements and all applicable electrical codes:

Requirements:

1. The Power Company shall be notified before an emergency or standby generator is installed.
2. The customer shall not connect portable generators to a permanent wiring system unless the interconnection uses a permanently installed transfer switch ("break-before-make") or a code-approved secure inter-lock scheme. Failure to use this type of switch could create a hazardous situation.
3. A closed transition switch ("make-before-break") may be approved by the Power Company for this type of installation, but the requirements for parallel generation shall be met. Written approval and operating agreements from the Power Company shall be obtained prior to installation.
4. Government electrical inspectors must approve all transfer switches and/or transfer operating schemes.

I.17.2 Parallel Generation and Cogeneration

Parallel generation is defined as customer-owned production of electric energy connected to the Power Company's system for distribution. Cogeneration is defined as the joint production of electric energy and useful thermal energy in a combined process.

Power Company approval shall be obtained prior to operation of the customer's parallel generation or cogeneration system. The Power Company will also designate the metering type and location, and the method of interconnection between the customer's system and the Power Company's system. Please consult the Power Company for additional information on this topic.

I.17.3 Net Metering

Net metering is a debit and credit metering process for an account in which the customer owns and operates a qualified generating device that interconnects with the Power Company's electrical facilities. Interconnection requirements vary from system to system; consult the Power Company to determine the requirements for interconnection prior to acquiring equipment. For general requirements described by state, see the appropriate website listed below.

Customers requesting net metering service shall submit an application for a net metering agreement, available at <https://www.pacificpower.net/savings-energy-choices/customer-generation.html> and <https://www.rockymountainpower.net/savings-energy-choices/customer-generation.html>. Lists of state-approved types of generators and other requirements are also available at these websites.

The customer must obtain Power Company approval for the interconnection before construction. Inspection from the authority having jurisdiction is required before operation.

Generation shall not be connected to the Power Company's electrical distribution system until written notification authorizing net metering system activation is given by the Power Company.

I.18 Supporting Documentation

The Power Company has published “ESR white papers” to provide more information on certain topics in this manual. These white papers are posted online at <https://www.pacificpower.net/working-with-us/builders-contractors/electric-service-requirements.html> and <https://www.rockymountainpower.net/working-with-us/builders-contractors/electric-service-requirements.html>. When a white paper is available on a topic in this manual, it is noted with the following symbol:



The white papers are provided as additional helpful information and commentary. In the event of any inconsistencies between this manual and the white papers, the information and requirements in this manual supersede the white papers.

In addition to the white papers, customers may reference the Power Company’s tariffs, located on the “Rates and Regulations” web pages at <https://www.pacificpower.net/about/rates-regulation.html> and <https://www.rockymountainpower.net/about/rates-regulation.html>.



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2. Permits and Applications

2.1 Codes, Ordinances, and Tariffs

The construction of new or remodeled installations and the maintenance of electrical facilities shall conform to all applicable codes, provisions, rules, ordinances, and requirements set forth by governments, agencies, and the Power Company.

2.2 Rights-of-Way

The applicant shall provide, without cost to the Power Company, all permits, rights-of-way, and easements required for the installation and maintenance of the electrical facilities that serve the applicant. In new subdivisions, a Public Utility Easement (PUE), 10 feet wide, is typically required; all other easements, permits and rights-of-way shall be on forms approved in advance by the Power Company. Safe, unobstructed access shall be provided to the Power Company at all times.

The Power Company may install, maintain, and operate its equipment above- and below-ground within PUEs. This allowance includes the right of access and the right to require removal of any obstructions, including structures, trees, and vegetation. The Power Company may require the lot owner to remove obstructions within the PUE at the lot owner's expense, or the Power Company may remove such obstructions at the lot owner's expense. At no time may a permanent structure or obstruction be placed within the PUE without the prior written approval of the Power Company and all other utilities with facilities in the PUE.

2.3 Application for Service

The applicant shall provide accurate load information and the requested service date to the Power Company in a timely manner. Requests for service to commercial and industrial customers normally require advanced planning by the Power Company. All applicants shall give a 60-day minimum lead time prior to starting construction. Commercial and industrial customers, and other installations requiring special transformers or other equipment not in stock, may require a six-month lead time or longer.

Application for a new service can be completed by calling 1-800-469-3981, or by applying online at: <https://www.pacificpower.net/working-with-us/builders-contractors.html> or <https://www.rockymountainpower.net/working-with-us/builders-contractors.html>

A site address and billing address are required at the time the application is made.



2.4 Electric Service Requirement Agreement

Following the application for service, a Power Company representative will contact the customer to coordinate a site meeting. Customers shall supply documentation on ownership of the property and a legal description of the property. Customers shall provide a plot plan that shows the preferred service and meter locations. For new subdivisions, a municipally-approved plat map and CAD drawing(s) shall be submitted to the Power Company representative.

Non-residential applicants shall also indicate the secondary voltage requested and shall provide all load information (on Power Company load sheets) including lighting, water heating, cooking, space heating, air conditioning (HVAC in tons), and motor loads; plot and site plans; and electrical one-line drawings.

The customer will be given a proposed Electric Service Requirements Agreement (ESRA) that describes specific installation details. This agreement will be provided by a Power Company representative during the design process and must be signed by the customer or their designee before work proceeds.

If changes in the ESRA are requested, the customer shall give written notice to the Power Company of the proposed changes, which must be approved in writing by the Power Company before they will become effective.

2.5 Permits

Local ordinances or state laws require applicants to obtain appropriate permits before the Power Company establishes service. This may include approval of an electrical installation by the authority having jurisdiction. In addition to the specific requirements of this manual, approval for service will be granted, and the service connection will be scheduled, only after all necessary permits have been obtained.



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3. Services and Meter Installations

3.1 Types of Secondary Service Furnished

Available electric services include 60-hertz, alternating current, single-phase or three-phase. Nominal secondary voltages are listed below:

Table I—Types of Secondary Service

Configuration	Available Voltage	Service Conductor Configuration	Loading Limitations
Single-phase	120 V	two-wire, grounded	≤ 2 kW
Single-phase/ poly-phase	120/208 V	three-wire, grounded network metered; 5-jaw	≤ 500 kVA (1400 amps [A] total load) and distributed evenly on phases
Single-phase	120/240 V	three-wire, grounded	≤ 167 kVA per service, or ≤ 700 A per single meter
Three-phase	120 V/208 Y	four-wire, wye grounded	≤ 500 kVA (1400 A)
Three-phase	277 V/480 Y	four-wire, wye grounded	≤ 2500 kVA (3000 A)

Consult with the Power Company to determine if three-phase, 120/240 volt, four-wire, delta grounded is available at the desired location. Some state tariff rules do not include this type of service.

Primary voltage service is available for qualified requests.

3.2 Maximum Transformer Size

The Power Company will determine the size of the transformer based on load or generation information received from the customer. Table 2 lists the largest available standard transformers. These transformers may not be available in all areas.



Table 2—Largest Available Standard Transformer

Pad-Mounted Transformers—Standard	Secondary Voltage (V)	Size (kVA)
Largest single-phase, pad-mounted transformers	120/240	167
Largest three-phase, pad-mounted transformers	120/208Y	500
	277/480Y	2500
Overhead Transformers—Standard	Secondary Voltage (V)	Size (kVA)
Largest single-phase, overhead transformers	120/240	167
Largest three-phase, overhead transformers (three single-phase transformers)	120/208Y	500
	277/480Y	1500

3.3 Load Requirements

3.3.1 Single-Phase Service

Large single-phase loads may have operational problems or may cause objectionable voltage dips to other customers. To minimize these impacts, the requirements in Table 3 apply to single-phase services.

Table 3—Load Requirements and Limitations for Single-Phase Service

Equipment or Load	Requirements and Limitations
Loads > 2 kW	shall be supplied at 240 V
Single-phase motors	≤ 3 horsepower (hp); > 3 hp requires Power Company review
Any single air conditioner	≤ 5 tons
Any single heat pump	≤ 5 tons
Electric heating, indoor or outdoor	No more than 48 A of load at 240 V when switched No more than 24 A of load at 120 V when switched
Electric tank style water heaters	No more than 48 A of load at 240 V when switched No more than 24 A of load at 120 V when switched
Electric tankless water heater	Consult the Power Company
Service rated > 400 A	CT metering required

3.3.2 Three-Phase Service

The requirements and limitations in Table 4 apply to three-phase services.

Table 4—Load Requirements and Limitations for Three-Phase Service

Equipment or Load	Requirements and Limitations
Three-phase service	Must meet requirements identified in Section 9
Three-phase service > 200 A but ≤ 800 A	Current transformer (CT) metering required
Three-phase service > 800 A	Switchboard metering required
Motors > 3 hp	Should be supplied with three-phase service, unless reviewed and approved for single-phase service by the Power Company
Continuous duty motors > 60 hp at 120 V/208 Y or 120 V/240 V	CT metering required
Continuous duty motors > 125 hp at 277 V/480 Y	CT metering required
Total expected load (as determined by the Power Company) ≥ 1000 kVA	Study required by the Power Company
Three-phase-service with single-phase load	Single-phase load shall be distributed evenly on all phases

3.4 Permanent Service Connection

Only authorized Power Company employees shall make a permanent connection or disconnection of the Power Company's electric service. Services shall not be jumpered prior to local inspection and permanent connection by the Power Company. Services will not be energized without properly secured, ANSI-approved covers.

3.5 General Meter Installations

The Power Company's tariff and rate schedules require the delivery of each voltage class and type (single-phase or three-phase) of electrical service through one meter to the customer at one location.

Meter location is subject to Power Company approval.

The customer is responsible for providing, installing, and maintaining all service equipment (including overhead service entrance conductors, conduit, enclosures, and meter sockets). Service equipment shall be installed and maintained to accommodate rights-of-way and provide space for the installation and maintenance of Power Company facilities.

Meters shall be accessible by the Power Company at all times for reading, maintenance, and emergencies.



The customer must consult the Power Company prior to any work that involves relocation, rewiring, removal, or installation of a meter. Customers are not authorized to perform any work on any Power Company meter, including removing or interfering in any way with the meter or its connection.

The customer shall notify the Power Company promptly upon completion of repairs or modifications, so the Power Company can inspect, reinstall, and re-seal the meter.

3.5.1 Acceptable Meter Sockets

Acceptable meter sockets are those manufactured in accordance with current EUSERC, ANSI-C12, and UL/ANSI-414 requirements. The customer must provide and install the meter socket, complete with terminal lugs, meter jaws, manual link bypasses or safety sockets (when required), and sealing means for all sections. All sockets shall be ring-type. The meter socket and service equipment shall be NEMA type 3R (rainproof), in good condition with no holes, dents or damage, and plumb in all directions. The installation shall be made with sufficient materials and installed such that it remains plumb for the duration of the service.

Consult the Power Company for approved meter socket types, or refer to the lists of acceptable meter sockets online at <https://www.pacificpower.net/working-with-us/builders-contractors/electric-service-requirements.html> and <https://www.rockymountainpower.net/working-with-us/builders-contractors/electric-service-requirements.html>.

Stainless steel meter enclosures are recommended for coastal areas and corrosive atmospheres. This will prevent early failure due to corrosion.

3.5.2 Sealing Provisions to Deter Unauthorized Access

1. The Power Company uses screw-type meter ring seals and associated service equipment.
2. Sealing provisions for service equipment require a stud/wing-nut assembly or a clip suitable for use with a seal.
3. Cabinets and gutters containing unmetereed conductors shall be sealable.
4. If vacant meter positions are not securely sealed, or the meter is not in position, the Power Company may decline to energize the panel.
5. All removable panels and covers to compartments used for metering shall be sealable.

3.5.3 Meter Socket Mounting

Meter socket mounts must meet the following requirements.

Requirements:

1. Sockets must be plumb in all directions and securely mounted to a rigid surface.
2. Conductors must be securely fastened to their respective terminals and arranged in a manner that will not interfere with the installation of Power Company conductors, the meter or cover, or with the operation of manual link bypasses.
3. Meter clearances shall comply with Section 4 of this manual.
4. The unmetereed service conductor and the metered service conductor shall not be run in the same conduit, raceway, or gutter.



5. The customer must obtain the Power Company's prior approval for installation of meters in enclosures. When such installations are permitted, the meter must be accessible for meter reading or resealing without requiring the use of tools or removal of the enclosure. The enclosure shall be hinged on one side. Permission to enclose the meter will remain in effect as long as the customer maintains the enclosure in good working condition and in accordance with this paragraph.
6. Adequate protection for meters subject to physical damage must be provided.
7. To ensure that the meter socket is mounted securely, and will remain so for the duration of the service, specialized anchors, such as stainless steel anchors, are required when mounting meter sockets to concrete, brick, or cinder block. Stucco or sheet metal mounting surfaces also require specialized anchoring methods. The customer shall consult the authority having jurisdiction for approved mounting and anchoring practices.

3.5.4 Flush Mount

If the meter socket is recessed into a building's exterior wall, a flush-type box or meter socket designed specifically for that purpose shall be installed such that the face of the meter socket projects beyond the building's exterior surface.

3.5.5 Location of Service Equipment

In areas where protective devices (and associated disconnects) are not required to be adjacent to the metering point:

1. Breakers or fuses shall be within 15 feet (15') of the metering point when the customer's service equipment panel is inside the building and the metering point is on the exterior.
2. Exterior service equipment shall be visible and not more than 30 feet (30') from the metering point in any direction.

3.5.6 Additional Fixtures on Meter Installations

The meter socket, cabinet, and enclosure are provided by the customer for the exclusive use of the Power Company. The customer shall not make or allow the attachment of any device or fixture on any meter socket, cabinet, or enclosure, except as indicated below.

Where permitted by the authority having jurisdiction, one inter-set device may be installed between the meter socket and the meter. The customer must obtain approval from the authority having jurisdiction for the device and its listed and intended application. The company reserves the right to remove the device and return it to the customer if it adversely affects its ability to deliver power to any customer. Contact the Power Company at 1-888-221-7070 to request the specific requirements for installing an inter-set device.

3.6 Connection, Disconnection, and Re-Establishment of Service

Connection and disconnection of any service shall be coordinated with the Power Company. The customer will be billed according to the fee schedule in effect.

If a service drop or lateral has been removed at the customer's request, or the facility is "unused," the installation must be upgraded to current Power Company requirements if it is re-established. A re-established service requires a new application for service and will require inspection prior to reconnection. The length of time that defines a facility as unused differs by state; see Table 5.

Table 5—Durations Defining Unused Facilities, by State

California	Idaho	Oregon	Utah	Washington	Wyoming
15 Months	12 Months	15 Months	12 Months	15 Months	12 Months

Services not using power are not considered unused if the facility remains in place and the customer is registered for service and paying applicable rate fees. If the Power Company finds the facility unsafe, the Power Company shall have the right to disconnect the service, and the service will be subject to re-establishment requirements.

3.7 Relocation of Services and Facilities

A fee will be charged if the customer requests or requires relocation of existing Power Company facilities, according to the applicable tariff.



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4. Clearances

This section provides information on required clearances for meter sockets, clear working space, overhead services, and underground services.

4.1 Meter Clearances and Locations

The customer must provide suitable location, space, and provisions for mounting a meter socket, which must be approved in advance by the Power Company.

All metering equipment shall be installed in locations that are accessible to Power Company employees and their equipment.

Metering equipment shall **not** be installed in the following locations unless approved by the Power Company:

1. Any unsafe location, as determined by the Power Company
2. Any hazardous location, as defined by the NEC, for electrical equipment
3. Directly over any window well, stairway, ramp, or steps
4. In any entryway
5. Within 36 inches (36") of a window that has a view of living space or restrooms, or within 36 inches (36") of a door (*guideline*).
6. In any place where moisture, fumes, or dust may interfere with the meter's operation or may damage the meter, as determined by the Power Company
7. On any surface subject to excessive vibration, as determined by the Power Company



8. On Power Company poles or equipment
9. In an area where metering equipment is likely to be fenced in
10. Where the meter face or the door to the metering equipment is obstructed
11. Where the door to the metering equipment is on (or recessed in) an external surface built within seven feet (7') of a property line, alleyway, or driveway, except when expressly permitted in advance by the Power Company
12. On the drive-through side of a building
13. On mobile structures such as, but not limited to trailers, barges, cranes, dredges, draglines, mobile pumping equipment, boat slips, or floating dwelling units such as houseboats
14. Meters shall not be blocked by any materials, including shrubs, landscaping, or other vegetation
15. Closer than 36 inches (36") horizontally from gas meters, gas valves, fixed or threaded fittings, separable valves or unions, or regulators (See *ESR White Paper 4—Pipe Fittings*)



16. Areas adjacent to fuel storage units, including permanently-mounted generator fuel tanks. (See *ESR White Paper 4—Fuel Storage Tanks.*)



4.1.1 Meter Clearance Dimensions

Requirements:

1. An unobstructed level working space shall be provided per NEC 110.26 A, and as shown in Figure 2 and Figure 3.
2. In installations of two or more adjacent meter sockets, additional horizontal clearance is needed; see Figure 3.
3. For minimum vertical clearance requirements in installations of three or more ganged meters, refer to Sections 8.3 and 9.1.
4. Equipment or other material that may obstruct the working space is not allowed, including the space below the meter.

4.1.2 Residential Meters

The customer must install residential meters outdoors at a location acceptable to the Power Company and in accordance with Section 4.2.1, Figure 4 or Section 4.3.1, Figure 7. The meter shall be located within 10 feet (10') of the front (street side) corner of the dwelling, on the side of the dwelling closest to the Power Company's source, except for remodel of existing services, in which case the meter location must be permitted by the AHJ and approved before installation by the Power Company.

Where there is no suitable location available on the structure, a free-standing metering installation may be used, at a location approved in advance by the Power Company.

4.1.3 Meters in Gated Areas and Enclosed Spaces

Gated outdoor areas and enclosed spaces are not considered accessible. Metering equipment located within a gated area may be approved on a case-by-case basis; consult the Power Company prior to installation.

If prior approval for a gated entry is granted by the Power Company, it shall be keyed for a Power Company key or equipped with a Power Company-provided lock box.

For more information, see *ESR White Paper 4—Gated and Enclosed Spaces*.

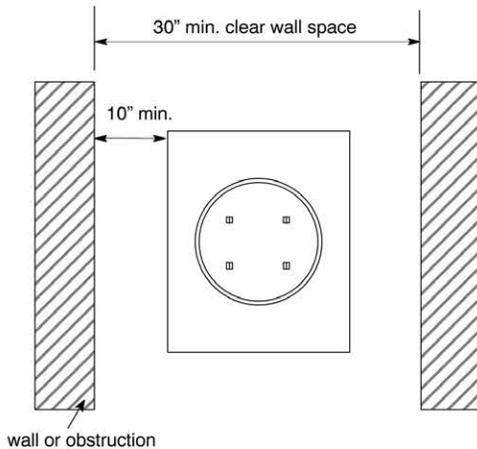


4.1.4 Access

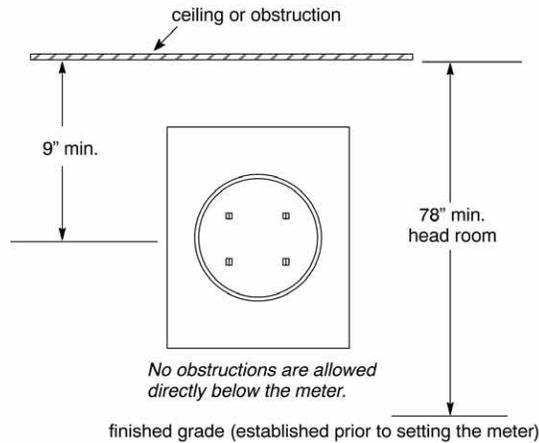
If a meter is inaccessible (as determined by the Power Company), for example, by installing a deck, fence, or enclosure, the customer shall, at their expense, either modify the area to provide safe, unobstructed access to the meter, or move the meter socket to a location acceptable to the Power Company.

Devices mounted below the meter are not acceptable.

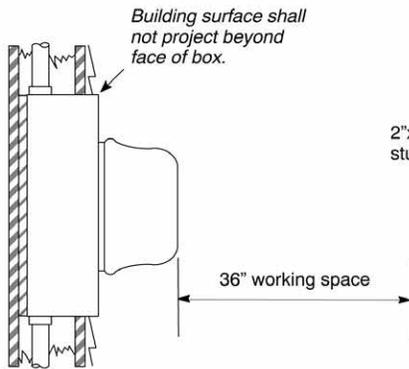
Figure 2—Meter Socket Clearance Requirements



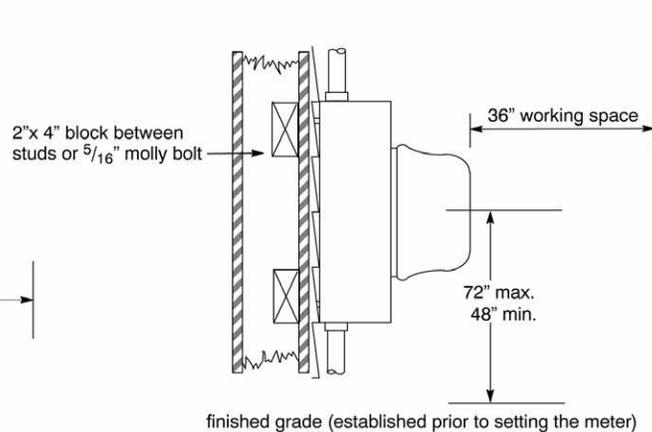
HORIZONTAL CLEARANCE
Flush or surface mount



VERTICAL CLEARANCE
Flush or surface mount

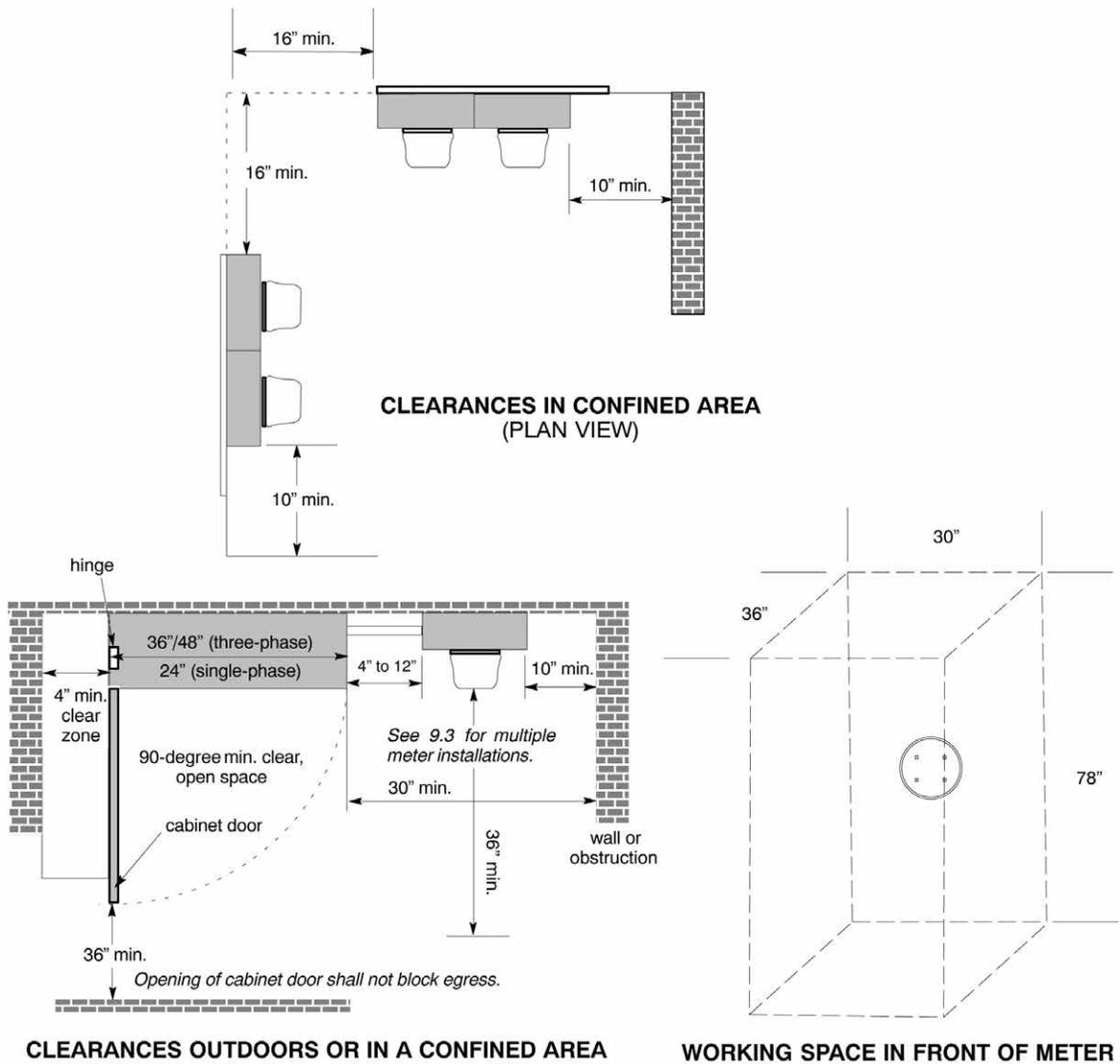


FLUSH MOUNT METER



SURFACE MOUNT METER

Figure 3—Clear Workspace Requirements



4.2 Clearances of Overhead Service

The customer shall provide a point of attachment that allows minimum clearances to be met in all conditions. The clearances listed in Table 6 are required for overhead installations in all states except California. For California clearances, see Table 7. See notes for both clearance tables following Table 7.

Long services or other special cases may require additional clearance. Consult the Power Company if the service length may exceed 45 feet (45'), if the service will cross uneven or sloped terrain, or for situations not listed in the following tables.

**Table 6—NESC C2-2017 Clearances for Service Drops and Drip Loops,
750 V and Below**

Description	Minimum Clearance (Ft.)	
	Non-Coastal	Coastal*
Service drop clearance (NESC Table 232-1)		
Over roads, streets, and other areas subject to vehicle traffic over eight feet (8') in height	16	16.5
Over or along alleys, parking lots, and non-residential driveways	16	16.5
Over land traveled by vehicles	16	16.5
Clearances over residential driveways only (NESC Table 232-1)		
If installation is subject to vehicle traffic over eight feet (8') in height	16	16.5
If installation is not subject to vehicle traffic over eight feet (8') in height:		
• for service drops 120/240 & 120 V/208 Y	12	12.5
• for drip loops of service drops 120/240 and 120/208 V	10	10.5
Clearances over spaces and ways subject to pedestrians/restricted traffic only (NESC Table 232-1. See note 2, Table 7)		
For nonresidential buildings	12	12.5
For residential buildings only:		
• for 277 V/480 Y (NESC Table 232-1 and applicable notes)	10.5	10.5
• for 120/240 and 120/208 Y (NESC Table 232-1 and applicable notes)	10	10.5
Clearances from building for service drops not attached to the building (NESC Table 234-1)		
Vertical clearance over or under balconies and roofs and:		
• accessible to pedestrians	11	11.5
• not accessible to pedestrians	3.5	10.5
Horizontal clearance to walls, projections, windows, balconies, and areas accessible to pedestrians	5	5.5
Clearances for service drops attached to a building or other installation (over or along the installation to which they are attached)		
From the highest point of roofs, decks, or balconies over which they pass and:		
• readily accessible (see NESC 234.C.3.d.1)	10	10
• not readily accessible (see NESC 234.C.3.d.1, exception 2)	3	3
• above a not-readily-accessible roof and terminating at a (through-the-roof) service conduit or approved support, the service and its drop loops set no less than 18" above the roof. No more than 72" of the service cable passes over the roof or within 48" of the roof edge (see NESC 234.C.3.d.1.b)	1.5	1.5
• in any direction from windows designed to open (does not apply to non-coastal service cable above the top level of a window; see NESC 234.C.3.d.2)	3	3
• horizontally from porches, fire escapes, etc. (see NESC 234.C.3.d.3)	5	5
• vertically below porches, fire escapes, etc. (see NESC 234.C.3.d.4)	3	3

* **Coastal:** Coastal areas, such as Clatsop, Lincoln, and Coos counties in Oregon, the northern California seacoast are subject to area-wide contamination. In these coastal areas, the company uses service cable that includes a covered neutral to prevent corrosion. This cable conforms to the definition of covered conductors in NESC Rule 230.D. Elsewhere service cables conform to NESC Rule 230.C.3 rules for supply cables.

Table 7—Minimum Clearances for Service Drops and Drip Loops, California Only (GO 95), 277/480 V and Below

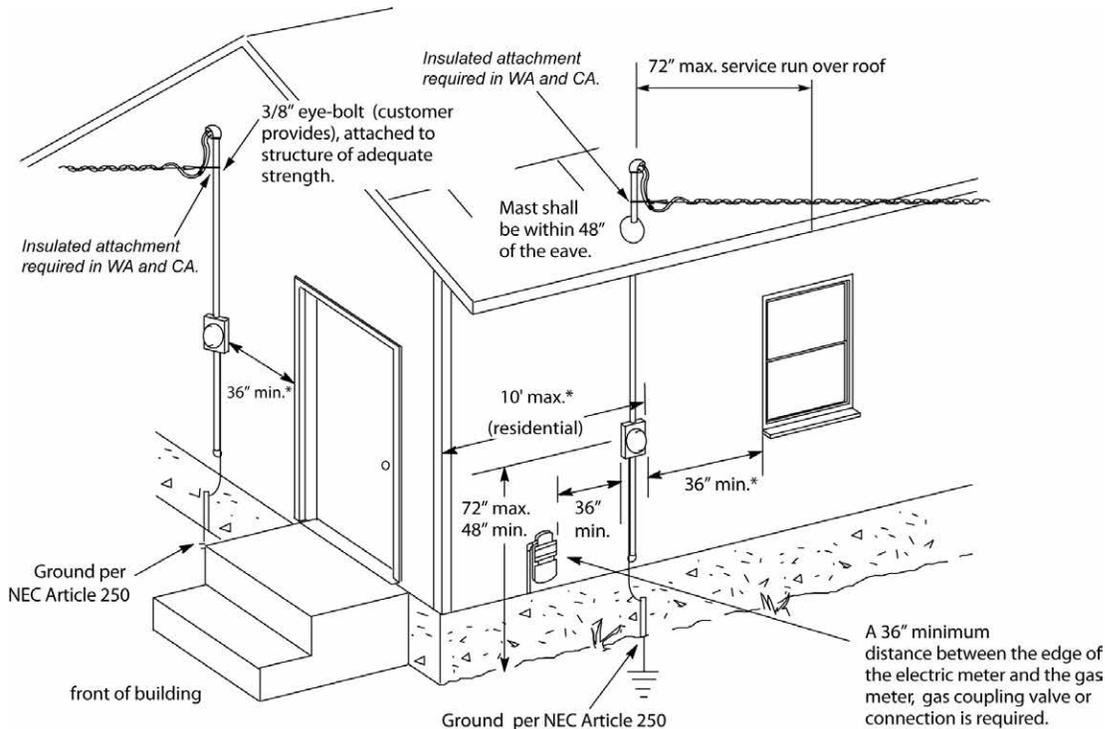
	GO 95 Minimum Clearance (ft.)
<i>Service drop clearance</i>	
• Crossing or along thoroughfares in urban districts or crossing thoroughfares in rural districts	18
• Above ground along thoroughfares in rural districts, or across other areas traversed by vehicles or agricultural equipment	15
• Over private driveways, lanes, or other private property areas accessible to vehicles used for industrial or commercial purposes	16
• Over private driveways, lanes, or other private property areas accessible to vehicles used for residential purposes only	12
• Above ground in areas accessible to pedestrians only	10
<i>Clearances from buildings for service drops not attached to the building</i>	
• Vertical clearance above walkable surfaces on buildings, bridges, or other structures that do not ordinarily support conductors, whether attached or unattached	8
• Vertical clearance above non-walkable surfaces on buildings, bridges, or other structures that do not ordinarily support conductors, whether attached or unattached	8
<i>Horizontal and radial clearances</i>	
• From fire escapes, exits, windows, and doors	3
• Horizontal clearance of the conductor at rest from building, bridges, or other structures where such conductor is not attached	3
<i>Clearances for service drops near swimming pools</i>	
• Consult the Power Company prior to the installation of pools, spas, or hot tubs	

Notes for Clearance Table 6 and Table 7:

1. A “truck” is any vehicle exceeding eight feet (8’) in height. Areas not subject to truck traffic include places where truck traffic normally doesn’t occur or is not reasonably anticipated.
2. “Spaces and ways subject to pedestrians or restricted traffic only” include those areas where equestrians, vehicles, or other mobile units that exceed eight (8’) feet in height are prohibited by regulations, permanent terrain configurations, or are otherwise not normally encountered or anticipated.
3. Roofs, balconies, or other areas shall be considered readily accessible to pedestrians if they can be casually accessed through a doorway, ramp, window, stairway, or permanently-mounted ladder, by a person on foot who neither exerts extraordinary physical effort nor employs special tools or devices to gain entry. A permanently-mounted ladder is not considered a means of access if its bottom rung is eight feet (8’) or more from the ground or other permanently-installed accessible surface (NESC 234.C.3.d, Exception 1).

4.2.1 Clearances for Buildings Supporting an Overhead Service

Figure 4—Clearances for Buildings Supporting an Overhead Service



* This distance is for new construction.

Requirements:

1. A ten-foot maximum distance from the front corner of a residential building to the far side of the meter is allowed.
2. Table 6 and Table 7 list the minimum drip loop and service drop clearance requirements.
3. The cable and drip loop (lowest point) shall be at least 18 inches (18") above a non-accessible roof (NESC 234.C.3.d, Exceptions 1 and 2).
4. Meters shall not be installed within 36 inches (36") of a window that has a view of living space or restrooms, or within 36 inches (36") of a door (*guideline*).
5. The customer must install residential meters outdoors at a location acceptable to the Power Company and in accordance with Figure 4.
6. Buildings shall not be constructed under or adjacent to power lines.
7. For further details regarding meter clearances and locations, see Section 4.1.

4.2.2 Mast Guying and Bracing

If the point of attachment is more than 36 inches (36") above a point of support on the mast, two independent guys are required to secure the masthead. Figure 5 and Figure 6 show guyed masts, a braced mast, and anchoring options.

Table 8—Acceptable Service Conductor Lengths for Wall-Mounted Meters

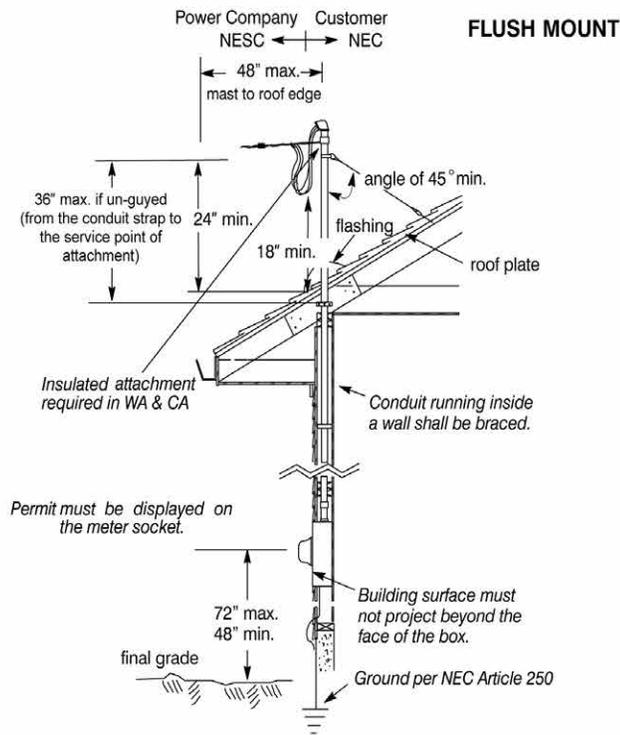
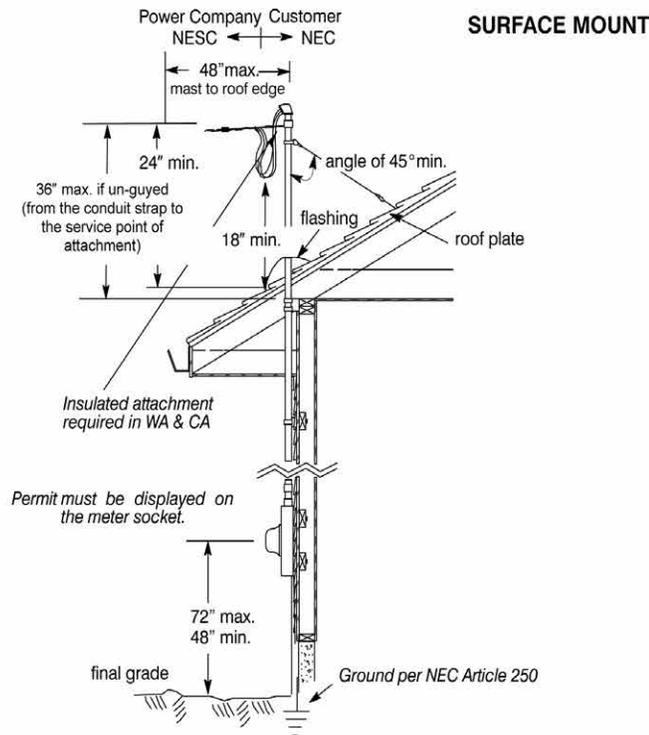
Service Mast (Steel Conduit)	Service Size	Utility Service Length without Guying	Utility Service Length with Guying
2" min.	200 A or Less	60' Maximum	90' Maximum
2 1/2" min.	201 - 400 A Service	45' Maximum	90' Maximum
	401 A and Above	Consult the Power Company	

Note: For clearances, see Section 4.2.

Requirements:

1. The service mast shall extend through the roof line except when sufficient height can be obtained to meet the clearances given in Table 6 or Table 7.
2. Where the mast has service cable attached to it, the mast shall be Rigid Metallic Conduit (RMC) or Intermediate Metallic Conduit (IMC). IMC may not be allowed by the authority having jurisdiction.
3. The mast shall be securely fastened to the building.
4. Conduit coupling shall not be installed between the roof line and the point of attachment.
5. Guying is required if a coupling is within eight feet (8') of the weatherhead and located above the last point of securement to the structure.
6. The mast shall be guyed if the point of attachment is more than 36 inches (36") above the roof line.
7. Guying shall be 1/4" common galvanized steel strand or equivalent, rated at 1,800 lbs. Two guys are required.
8. Building-mounted masts shall use a rigid steel pipe clamp as the point of attachment between the guy wire and the service mast (except in contaminated and coastal areas stainless steel pipe clamp is required). The point of attachment shall be securely fastened to a significant structural member.

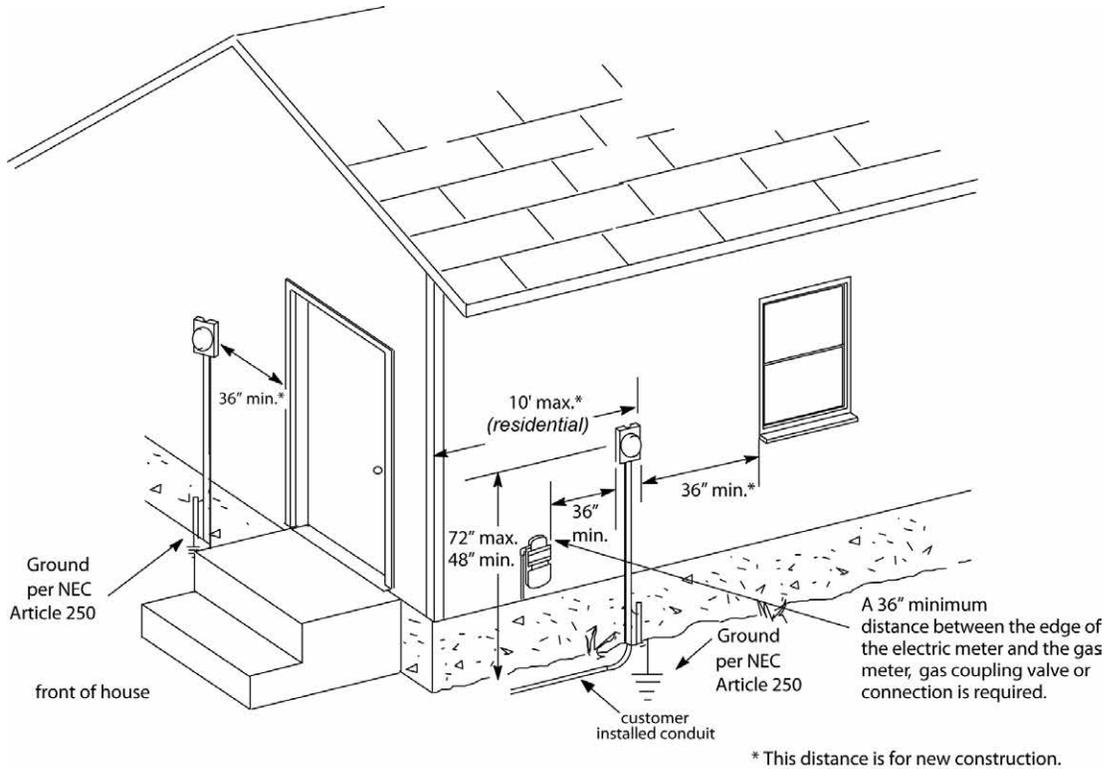
Figure 6—Overhead Service to Wall-Mounted Meters
Surface or Flush-Mount Metering (New and Rewire)



4.2.3 Clearances for Underground Service

Clearances for Underground Service

Figure 7—Clearances for Underground Service



Requirements:

1. A ten-foot maximum distance from the front corner of a residential building to the far side of the meter is allowed.
2. Meters shall not be installed within 36 inches (36") of a window that has a view of living space or restrooms, or within 36 inches (36") of a door (guideline).
3. The customer shall obtain Power Company approval for the meter location prior to installation.
4. A minimum of 24 inches (24") of backfill above underground conduit is required. See Figure 11.
5. For further details regarding meter clearances, see Section 4.1.

4.3 Conductors Near Pools, Spas, or Hot Tubs

4.3.1 Overhead

The Power Company recommends that pools, spas, or hot tubs not be placed below or near overhead conductors. Consult the Power Company before placing pools, spas, or hot tubs

below or near overhead conductors.

4.3.2 Underground

Never locate underground conductors under or within 60 inches (60") horizontally from the inside wall of a pool or spa. Likewise, pools or spas shall not be installed over or within 60 inches (60") horizontally from an existing underground conductor.

4.4 Clearance from Hazardous (Classified) Locations

Power Company distribution equipment will not be installed in any location classified as hazardous per NEC 500. Customers must provide adequate working clearance (for construction and maintenance) to ensure that neither Power Company equipment nor personnel are in locations classified as hazardous. Upon Power Company request, customers shall provide documentation as defined in the NEC 500.4 (A).

4.4.1 Clearance from Fuel Storage Tanks

For information about clearances around fuel storage tanks see *ESR White Paper-4—Fuel Storage Tanks*.



4.5 Free-Standing Meter Socket Clearances from Permanent Power Company Equipment

The customer shall comply with the distances listed in the figures below, in addition to state and local requirements.

Figure 8—Free-Standing Meter Socket Clearances from Permanent Power Company Equipment

The meter socket shall be a minimum of 36" from a transformer or other metallic equipment. Distances less than 72" require bonding to Power Company equipment.

The meter socket shall be a minimum of 36" from non-metallic equipment (such as secondary boxes). Greater separation may be needed for conduit and minimum sweep requirements.

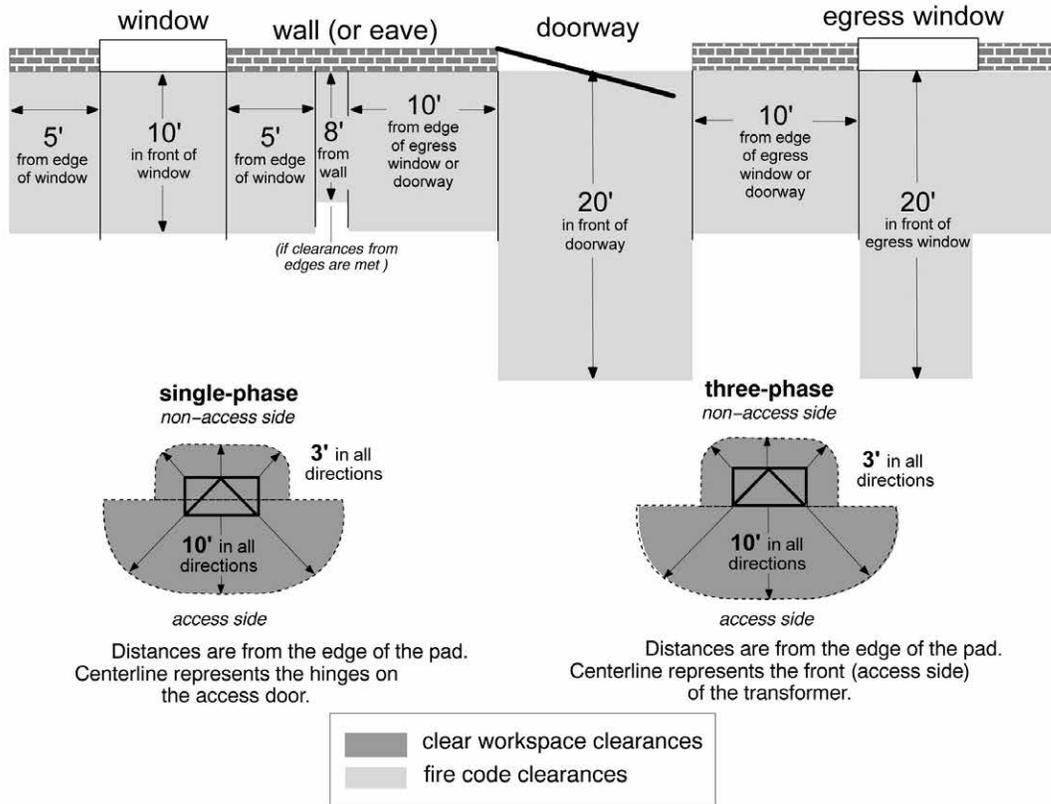
The meter socket shall be a minimum of 72" from a pole. (Customer-owned poles taller than 10' shall not be placed beneath overhead lines.)



4.6 Clearances Between Equipment Pads and Buildings

The customer shall comply with the distances listed in the figures below, in addition to state and local requirements.

Figure 9—Minimum Clearances Between Equipment Pads and Buildings



Requirements:

- Distances noted in Figure 9 and Table 9 are from the edge of the equipment pad.
- If the building has an overhang, the distance is measured from the outside edge of the overhang.
- Outside edges of any attachments to the building, such as ramps, and stairs, will be considered part of the building perimeter.
- Distances less than those specified in Table 9 (but not less than the required working space) may be allowed if approved by the appropriate code enforcement authority. This may require alternate means of fire protection per NEC Section 450.27 and NESC Section 152(A)(2), including fire barriers, fire-rated walls, sprinkler systems, oil-containment means, or other measures. Use of alternate means of fire protection must be approved by the authority having jurisdiction.
- The final grade at the location of the transformer should provide oil drainage away from the building. Otherwise, an adequate oil containment means is required.

6. The customer shall conform to all local building codes, insurance regulations, and/or ordinances affecting the transformer location.
7. Combustible/non-combustible construction types are defined by respective state building codes.
8. No vegetation over six inches (6") in height shall be present in the clear workspace (see Figure 9).
9. Trip hazards such as gutters, spigots, etc., shall not exist within the clear workspace (see Figure 9). Curbs may be acceptable in the clear workspace; consult the Power Company during site scoping.
10. A minimum 72 inch (72") clearance between fire hydrants and metallic pad-mounted equipment shall be maintained. This clearance may be reduced to 48 inches (48") for non-metallic equipment. Greater separation may be required by local ordinances.
11. Where equipment is exposed to vehicle traffic, barrier posts are required; see Section 1.11, and consult the Power Company for installation-specific requirements.
12. Additional clearances may be required for other pad-mounted equipment.

Table 9—Minimum Clearances Between Oil-Filled, Pad-Mounted Equipment and Structures, and Structure Openings

Type of Framing	Clearance in Front of Framing (ft.)	Clearance to Side of Framing (ft.)	Vertical Clearance from Framing (ft.)
Fire escape	20	10	
Doorway	20	10	
Window that can be opened	20	10	
Solid window	10	5	10
Air vent intake	20	10	25
Air vent exhaust	10	10	25
Combustible surface	8	10	
Non-combustible surface	3	10	

4.7 Firewalls (Blast Walls)

At locations where the clearances in Table 9 are not met, a firewall (also called a blast wall) may be constructed. The firewall shall be constructed such that the heat and flame from a dynamic event are deflected away from a combustible surface or a storage tank.

The firewall shall be approved by the authority having jurisdiction. Consult the Power Company for information on firewalls. Also see *ESR White Paper 4—Firewalls*.



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5. Underground Requirements

5.1 General

The customer is responsible for providing all trenches, backfill, compaction, conduit, and equipment foundations. The customer is responsible for boring if that method is used. The customer shall meet the requirements described in this section to complete construction for underground installation of services. Consult the Power Company for conduit layout, and for equipment foundation requirements for secondary and primary extensions.

The customer shall give consideration to local ground and frost conditions such that the installation remains structurally sound.

The customer is responsible for ensuring that all conduit complies with Power Company requirements.

Before installing any conduit system, the customer shall enter into a contract with the Power Company and obtain a job sketch from a Power Company representative. The customer is responsible for ensuring that all conduit system installations comply with Power Company requirements and with the provided job sketch. Any conduit system or any part of a conduit system installed before receiving a job sketch from the Power Company may be subject to rejection or revision.

5.2 Conduit Requirements

All underground services shall be installed in conduit.

Following installation, the Power Company shall own and maintain the customer-installed service lateral conduit up to the sweep and riser connected to the meter socket.

The Power Company will install the underground cable from the Power Company's source to the service point.

Requirements:

For all conduit installations, the customer shall:

1. Ensure that Power Company conduit is located away from (and never underneath) buildings, building foundations, or other structures (including retaining walls).
2. Be responsible for recognizing potential surface and subgrade water flows and consulting the Power Company to minimize potential runoff problems.
3. Seal all raceways and conduit to prevent the infiltration of water into the electrical equipment.
4. Provide and install electrical grade PVC, HDPE, or fiberglass conduit, and long radius sweeps (elbows). See Table 10. Above-ground conduit shall be Schedule 40 PVC or better.



HDPE conduit cannot be exposed above grade. Some jurisdictions may require conduit grades better than Schedule 40; consult the local governing code.

Table 10—Sweep Specifications

Conduit Diameter	Long Radius Sweep
3"	36"
4"	36"
6"	48"

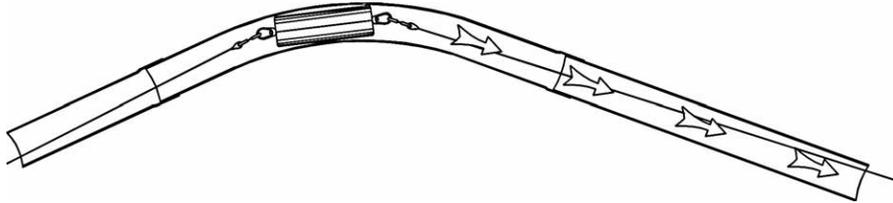
Additional Requirements for Fiberglass Elbows:

- a. Fiberglass elbows require special couplings; see company Material Specification ZG 033, *Fiberglass Conduit*, for details. ZG 033 is posted beneath this manual at <https://www.pacificpower.net/working-with-us/builders-contractors/electric-service-requirements.html> and <https://www.rockymountainpower.net/working-with-us/builders-contractors/electric-service-requirements.html>
- b. Elbows must be certified by a Nationally Recognized Testing Laboratory (NRTL).
5. All joints shall be compressed to the depth of the coupling system, and glued. Where straight ends and bell ends are joined, the straight end shall be beveled so as not to become an obstacle to mandrels or pulled cable.
6. The customer shall supply smooth-walled conduit reducers (swedges) when required.
7. When conduit terminates at Power Company equipment, the customer shall consult the Power Company for the exact conduit location. The customer shall not install conduit within two feet (2') of Power Company facilities, unless requested by the Power Company. Coordinate final conduit or sweep installation with the Power Company.
8. An expansion coupling shall be provided in the riser below the metering enclosure in areas where frost heaves and settling are likely to pull the surface-mounted meter socket from the wall.
9. When conduit extends vertically through a paved or concrete surface, a sleeve shall be placed around the conduit to prevent direct contact with the pavement or concrete to help prevent damage to conductors and service equipment caused by soil settling.
10. The customer shall keep the conduit free of dirt and debris during installation.
11. The customer shall provide backfill, compaction, and surface restoration that conforms to city, county, and state requirements.
12. The customer is responsible for repairing crushed conduit, including any costs for Power Company crews to return to the job site.
13. The customer shall not install customer-owned conductors in the same conduit/vault system with Power Company conductors.
14. The customer shall provide a flat pull line (preferred) or poly rope (alternative) capable of withstanding 1000 lbs. of tension, installed with 72 inches (72") of extra line capable of extending from each end of the conduit. The pull line shall be secured inside the ends of the conduit and both conduit ends shall be capped.
15. All underground raceways should be proofed with a mandrel to remove obstructions, and to confirm at least 80% of the nominal conduit diameter. When requested by the Power Company, the customer shall perform a "witnessed proofing" of conduit systems. See Table 11 and Figure 10.

Table 11—Required Mandrel Sizes for Conduit Proofing

Conduit Nominal Diameter	Mandrel Diameter	Minimum Mandrel Length	Maximum Mandrel Length	Proof
3"	2.5"	3.25"	8"	83%
4"	3.5"	4.25"	8"	87%
6"	5.5"	6.25"	10"	92%

Note: The reduced inner diameter of HDPE conduit requires a smaller mandrel diameter than listed. Use a mandrel that confirms at least 80% of the nominal inner diameter.

Figure 10—Mandrel Proofing

5.2.1 Service Conduit Requirements

The customer shall meet the following requirements when preparing a service conduit system:

1. A stronger conduit material, larger conduit size, or larger sweep radius may be required for long runs or where more than three bends are needed. The customer shall obtain prior written approval from the Power Company for exceptions.
2. The customer must meet minimum conduit size requirements. See Table 12.
3. An aerial extension (primary or secondary) to connect a new underground service is not allowed, unless one or more of the following conditions exist, and the customer obtains the Power Company's prior approval:
 - a. Physical obstacles such as large culverts or sewer lines prohibit boring or trenching
 - b. Boring is prohibited by the municipal, county, or state authority
 - c. Geological barriers such as deep canyons, water ways, solid rock, steep slopes, or unstable soil conditions prohibit trenching or boring

Table 12—Service Conduit Sizes, Run Lengths, and Bend Limits

Phase	Load	Maximum Conduit Length (ft.)	Conduit Size	Max. Degree of Bends
Single	100 A or less	150	one 2-inch	270
Single	101 to 400 A	150	one 3-inch	270
Single	401 A or more	100	two 4-inch	270
Three	200 A or less	150	one 3-inch	270
Three	201 to 400 A	150	one 4-inch	270
Three	401 to 600 A	100	two 4-inch	270
Three	601 to 800 A	100	three 4-inch	270
Three	801 A or more	50	Consult the Power Company	

Note: For sizes or quantities different than those listed in this table, consult the Power Company.

5.3 Trench and Backfill Requirements

The customer shall provide all trenching. All trenching work shall comply with all OSHA requirements, including shoring required when the combined height of the trench and the spoil exceeds five feet (5').

To the extent possible, trench bottoms shall be level and made of well-tamped earth or selected backfill without sharp rises and drops in elevation. Rock spurs or ridges shall not project into the trench. The customer is responsible for ensuring a clean trench prior to conduit installation.

5.3.1 Call Before You Dig

State laws require the customer or excavator call for underground utility locations. Excavation may not be started until locations have been marked or the utilities have informed the excavator that there are no facilities in the area. Notify the local underground locating services (8-1-1) before you dig.

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6. Temporary Construction Service

6.1 General

Upon request, the Power Company will supply temporary service at a location adjacent to the Power Company's facilities in accordance with applicable rules and tariffs.

Always locate temporary services for construction work so as to protect the meter from accidental damage. When practical, install temporary services in a location usable throughout the entire construction period. When the Power Company must relocate a temporary service, the customer shall bear the relocation cost in accordance with the Power Company's applicable tariffs.

6.2 Construction Criteria For Temporary Service

Figure 13, Figure 14, and Figure 15 show typical installations for overhead and underground temporary construction services. These structures must meet the following requirements or the Power Company may decline to provide service.

Requirements:

1. The authority having jurisdiction may require the grounding connection to be visible when an electrical inspection is made.
2. All temporary services except single-phase, 120/240 V, 200 amp (A) or less, shall be constructed in accordance with Section 9, *Non-Residential Services*.
3. The duration of a temporary service cannot exceed 180 days (120 days in California).
4. The meter socket and service equipment shall be NEMA type 3R (rainproof), in good condition, with no holes, dents, or damage, and plumb in all directions. The installation shall be made with sufficient materials and installed such that it remains plumb for the duration of the temporary service.
5. Installations in unstable soil, or where proper depth cannot be obtained, require guying or bracing in conformance with applicable codes.
6. A main breaker is required.

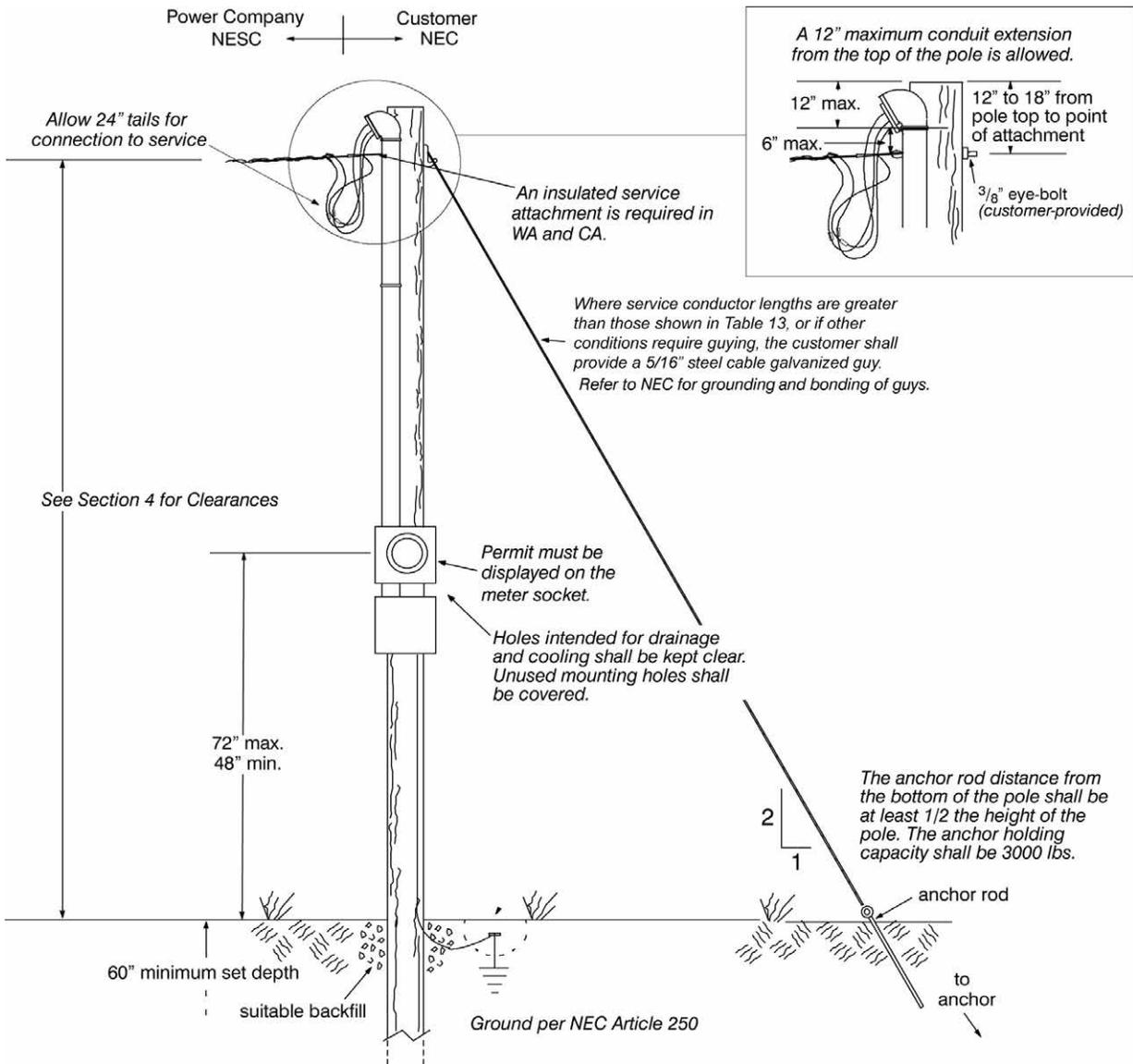
6.2.1 Overhead Temporary Construction Service Requirements

1. The customer shall install the meter socket and service equipment on a wood pole or timber.
2. Wood poles shall be of sound timber. To ensure strength, the pole or timber must be free of any defects that may weaken the wood, such as sucker knots and spike knots larger than $\frac{1}{3}$ of any face. Cracks greater than $\frac{1}{2}$ -inch ($\frac{1}{2}$ ") wide are not permitted. No visible wood decay is allowed.
3. The pole or timber shall be no less than 20 feet (20') long and provide proper ground clearance. A pole shall be no less than 5 $\frac{1}{2}$ inches (5 $\frac{1}{2}$ ") in diameter at the top, or a minimum (nominal) 6" \times 6" timber. The pole or timber shall be set no less than 60 inches (60") below ground level and suitably backfilled. The pole or timber length minimum is 25 feet (25') if the service drop crosses a road or traffic area.
4. Customer-provided service conductor size shall be at least No. 8 copper or No. 6 aluminum.
5. The conductor must be at least 24 inches (24") in length outside the weatherhead.
6. The temporary service pole or timber shall be easily accessible by Power Company power-lift aerial equipment.
7. Overhead temporary service construction dimensions shall meet those identified in Figure 13.

Table 13—Acceptable Temporary Service Conductor Lengths
Without Guying, Bracing, or Mid-Span Support

Service Size	Utility Service Length
100 A	80' Max.
101 - 200 A	60' Max.
Above 200 A	Consult the Power Company

Figure 13—Overhead Temporary Construction Service - Pole



6.2.2 Underground Temporary Construction Service Requirements

1. The customer shall provide all trenching.
2. The customer-provided service conductor size shall be at least No. 8 copper or No. 6 aluminum.
3. The customer-supplied conductor shall be long enough to connect to the Power Company terminals.
4. Conduit must be rigidly fastened to the post.
5. The post is customer-owned and shall be made of wood with a minimum nominal size of 4" x 4".
6. Clearances between metallic equipment, non-metallic equipment and poles shall be maintained as specified in Section 4.2.
7. Underground temporary service construction dimensions shall meet those identified in Figure 14 or Figure 15.

Figure 14—Underground Temporary Construction Service - Post

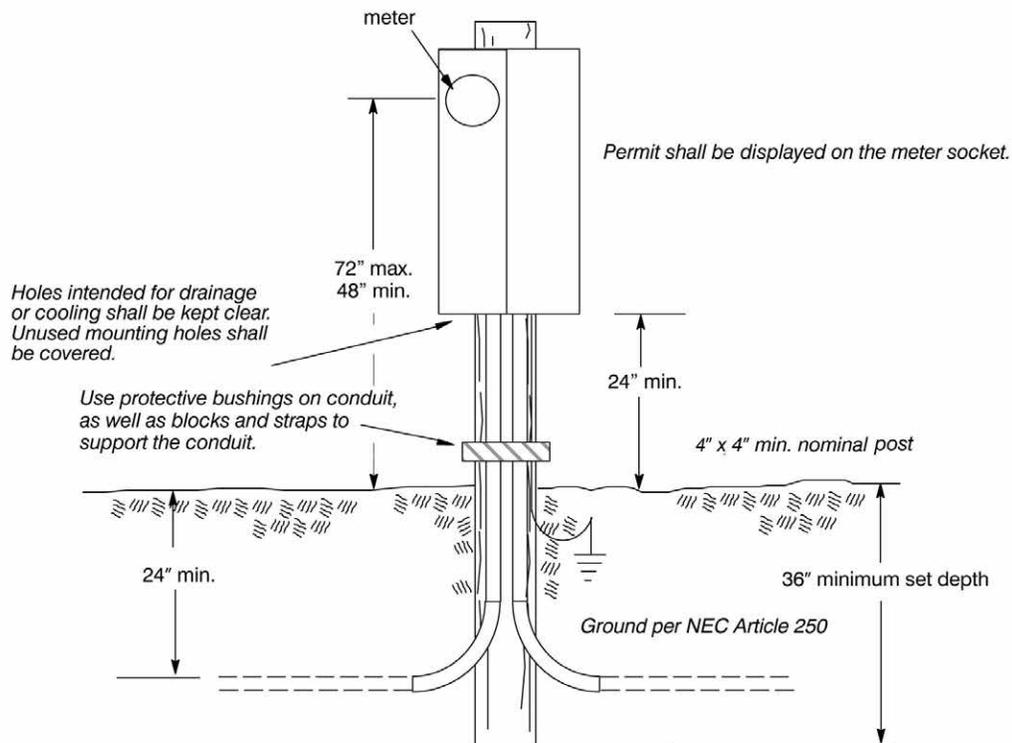
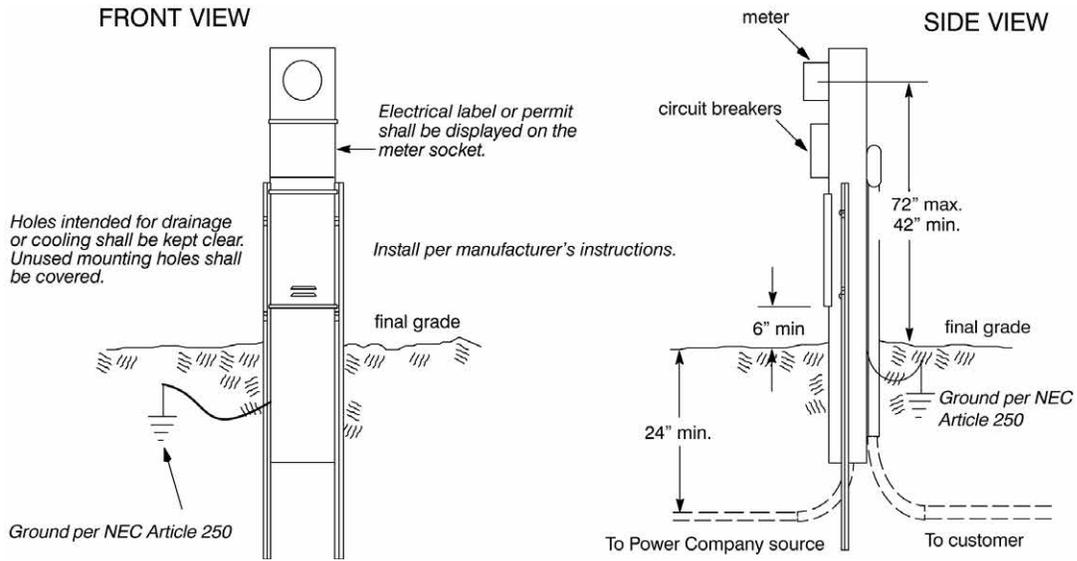


Figure 15—Underground Temporary Construction Service, Free-Standing Meter Socket, Manufactured Package



6.3 Meter Socket Requirements for Temporary Construction Services

The following table outlines meter socket requirements for various temporary construction services.

Table 14—Customer-Supplied Meter Socket Types

Temporary Construction Service	Meter Socket Type
Single-phase, 120/208 V, 200 A or less	5-Jaw
Single-phase, 120/240 V, 200 A or less	4-Jaw
All other temporary construction services	per Section 9

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7. Residential Single-Family and Duplex Buildings (Dwellings)

7.1 General

Section 7 covers the requirements for permanent service to residential single-family and duplex buildings, including manufactured and mobile homes. The *Residential Single Family and Duplex Building Connection Checklist* at the front of this manual can be used as a guide when preparing single-family and duplex buildings for electrical service.

Any deviations from the requirements in this section must be approved in writing by the Power Company prior to installation. Permanent power will not be connected if the requirements are not met.

7.2 Maximum Available Fault Current

The maximum available fault current depends on the type of service being provided. The customer shall furnish equipment to withstand maximum available fault currents. Upon request, the Power Company will supply information on the maximum available fault current at the customer's service entrance.

7.2.1 Services 200 A or Less

For single-family and duplex buildings with services of 200 amperes (A) or less, the customer shall furnish equipment with an interrupting rating capable of accommodating the maximum available fault current. The equipment interrupting rating is typically 10,000 A.

Where large transformers are necessary and buildings are in close proximity, the maximum available fault current may exceed 10,000 A.



7.2.2 Services Larger than 200 A

For buildings with services larger than 200 A, the customer shall install equipment that will withstand the maximum available fault current.

7.3 Residential Meter Sockets

All residential meter sockets shall meet the following criteria.

Requirements:

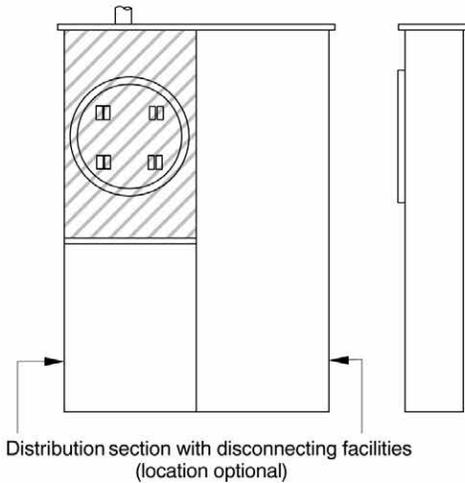
1. Meter sockets shall be rated at a minimum of 100 A.
2. Acceptable meter sockets are those manufactured in accordance with current EUSERC, ANSI-C12, and UL/ANSI-414 requirements.
3. Meter sockets shall be ring-type.
4. Meter sockets shall not be used as junction boxes.
5. Holes intended for drainage or cooling shall be kept clear. Unused mounting holes shall be covered. Mounting shall be per the manufacturer's provisions.
6. The grounding conductor shall not be connected to the Power Company's neutral in the meter socket.
7. Panel covers shall be properly secured.
8. The meter socket and service equipment shall be NEMA type 3R (rainproof), in good condition with no holes, dents or damage, and plumb in all directions. The installation shall be made with sufficient materials and installed such that it remains plumb for the duration of the service.

Safety meter sockets are approved for residential services of 200 A or less, but not required. A safety socket should be considered if the customer wants to avoid interruption of power during routine meter service.

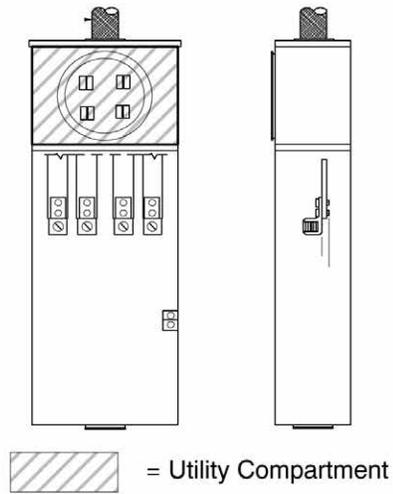
Approved residential meter sockets are shown in Figure 16 and Figure 17.

Figure 16—Residential Overhead Approved Meter Sockets
(Overhead Only)

(A) 100 and 200-A maximum
single-phase service meter socket
(EUSERC 301)



(B) 400-A maximum
single-phase service meter socket
with manual-link bypass
(EUSERC 302B)



(C) 100 and 200-A maximum
single-phase service meter socket only
(ANSI socket)

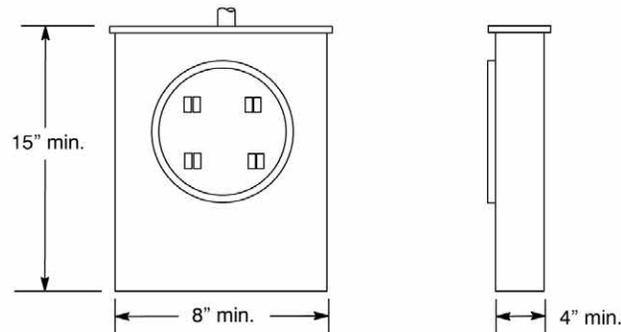
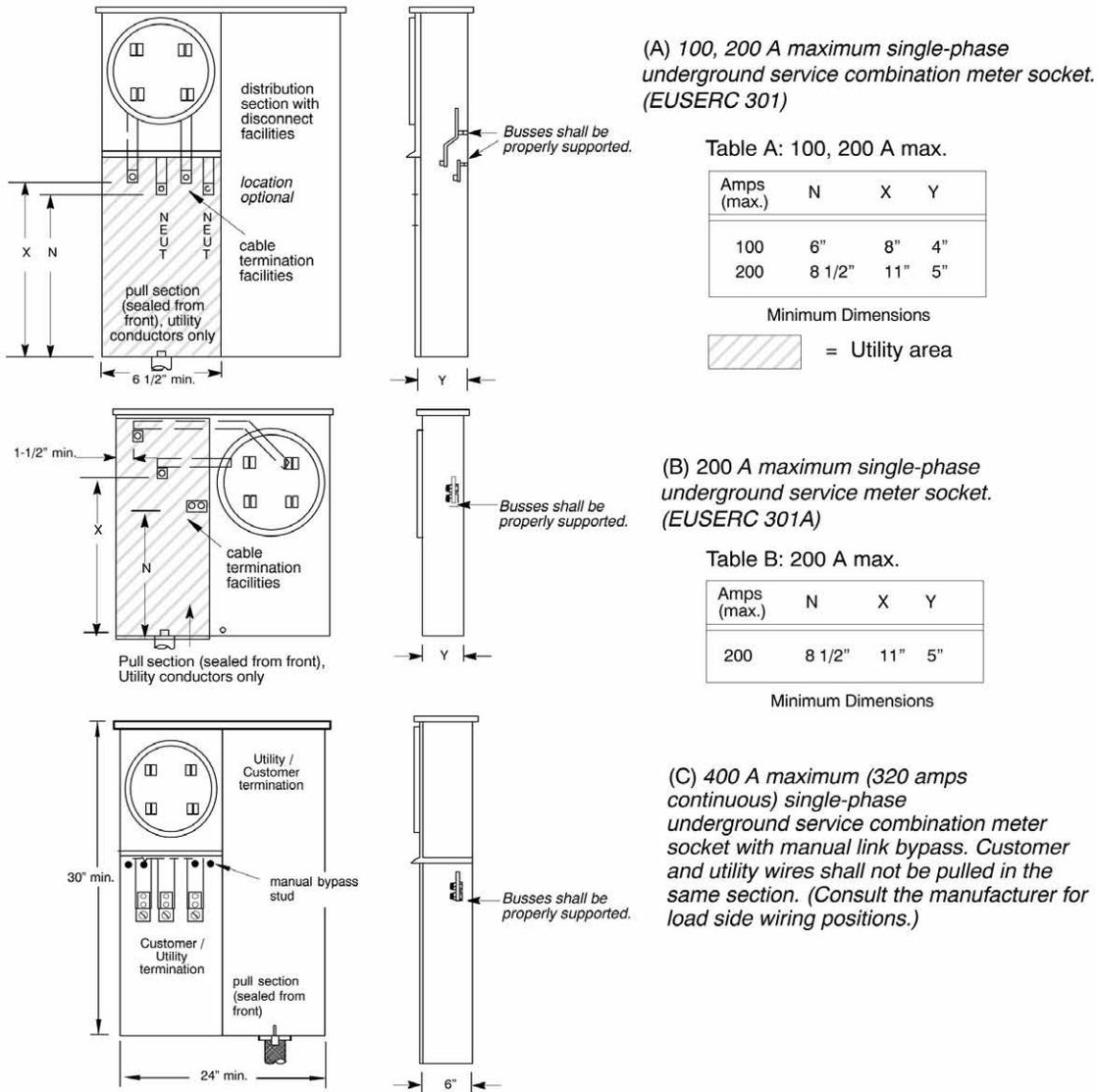


Figure 17—Residential Underground Approved Meter Sockets



Lists of acceptable meter sockets are available online at <https://www.pacificpower.net/working-with-us/builders-contractors/electric-service-requirements.html> and <https://www.rockymountainpower.net/working-with-us/builders-contractors/electric-service-requirements.html>

7.4 Power Company Energization

Before the meter is energized by the Power Company, the meter socket shall be properly grounded and all necessary permits and identification labels shall be in place.

Where two or more services are in close proximity, each metered service shall have a permanently-engraved metal or hard plastic label to identify the customer's address. The label must be permanently attached to the meter enclosure. The Power Company will decline to energize the service until the label is permanently attached.

7.5 Manufactured and Mobile Homes

Meters shall be installed on free-standing meter sockets for services to manufactured and mobile homes without permanent foundations. Dwellings of this type shall follow the requirements listed in Section 7.7.3, *Underground Service to Free-Standing Installations*, or Section 7.8.3, *Overhead Service to Meters Mounted on Poles*.

Manufactured and mobile homes on permanent foundations, as defined by the *Permanent Foundations Guide for Manufactured Housing* (HUD-4930.3G), shall be considered stand-alone buildings and may have meters installed on any qualified meter socket detailed in the following sections.

Unmetered service conductors that pass through a service disconnect compartment for a mobile home service pedestal must be run in conduit. See Section 5 for conduit requirements. The unmetered side of the socket must be sealable.

7.6 Residential Meter Socket Location

The following requirements apply to all single-family and duplex building meter sockets. Additional requirements are given in Section 7.7, *Underground Service*, and Section 7.8, *Overhead Service*. Meter socket installations not meeting the Power Company requirements outlined below may require relocation.

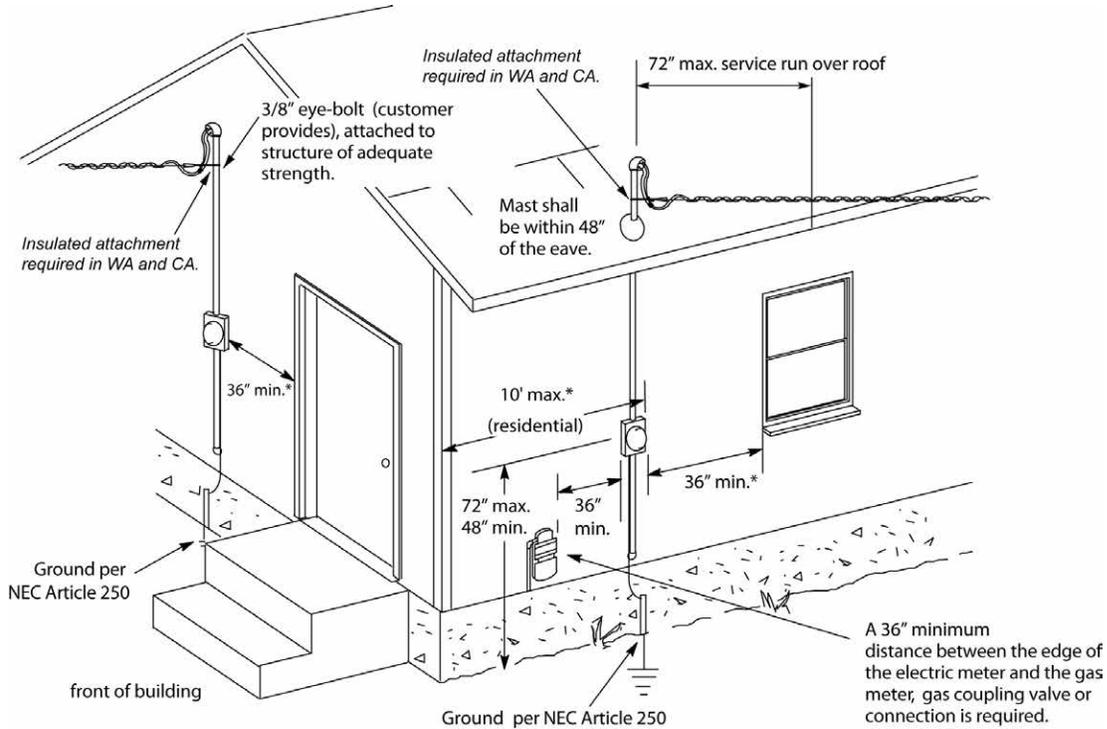
Requirement:

1. All installations shall be in accordance with Section 4, *Clearances*. Consult the Power Company to determine the point of attachment for overhead service drops and underground service laterals.

Written approval from the Power Company is required, prior to installation, for alternative meter socket locations.

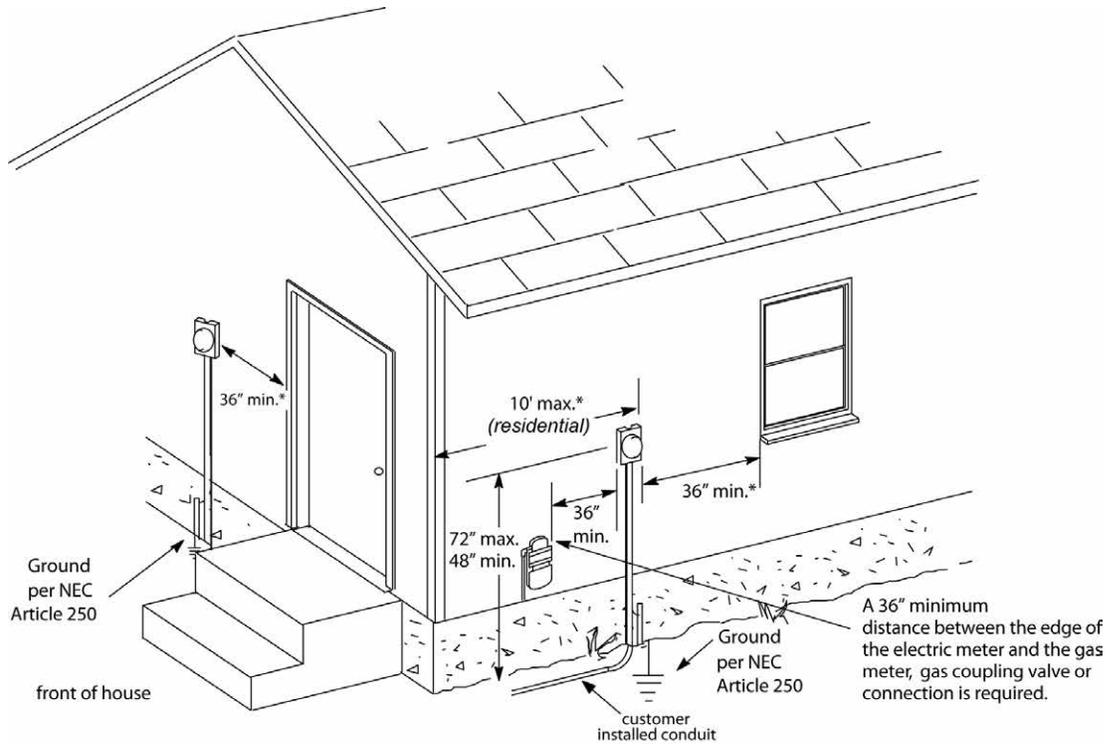
Figure 18 illustrates the proper location for a wall-mounted meter with overhead service. Figure 19 shows the proper location for a wall-mounted meter with underground service.

Figure 18—Wall-Mounted Meter Socket Location for Overhead Service



* This distance is for new construction.

Figure 19—Wall-Mounted Meter Socket Location for Underground Service



* This distance is for new construction.



7.7 Underground Service

7.7.1 General

Call 8-1-1 before you dig.

Underground service can be provided to the customer from either an overhead distribution system or an underground distribution system.

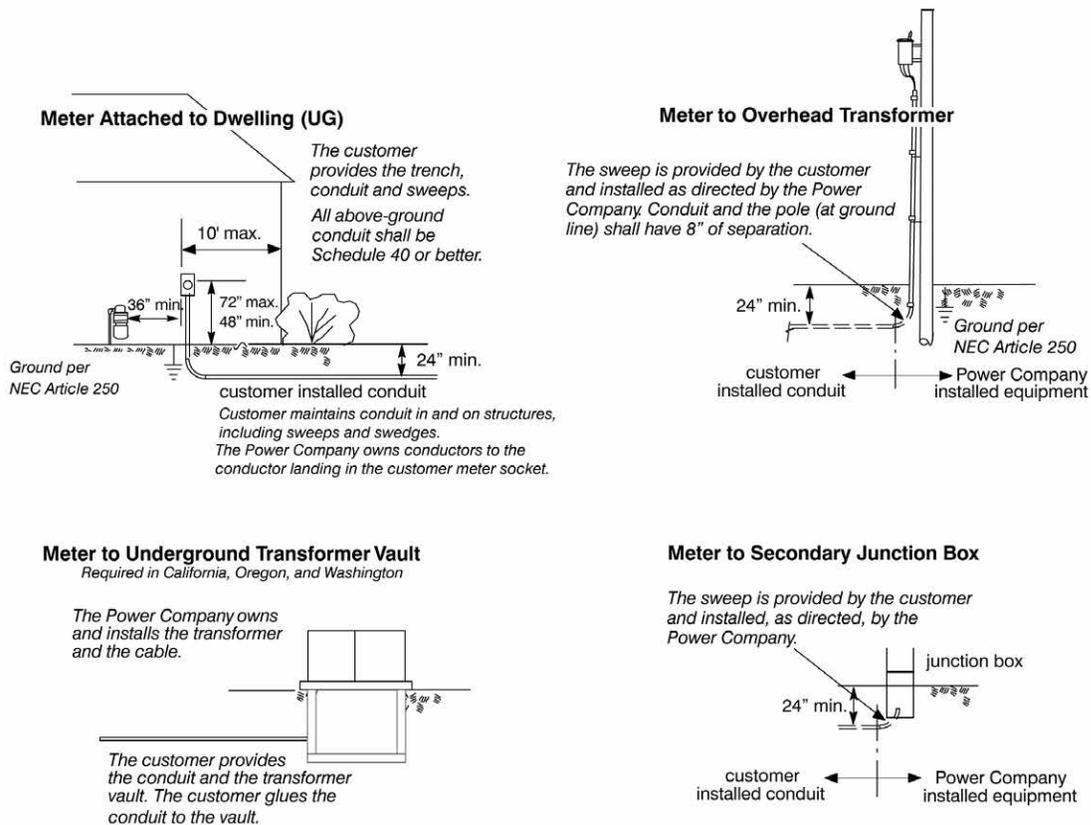
The Power Company owns and maintains the underground service from its distribution source to the customer's service point. The Power Company owns and maintains the cable up to the service point and the conduit up to the riser sweep and also owns and maintains the meter. The customer owns the meter socket and all wiring beyond the meter socket.

Installation requirements for underground service are listed below. These requirements are in addition to the general requirements in Section 7.6.

Requirements:

1. Conduit, trench, backfill, compaction shall be provided as defined in Section 5.
2. Consult the Power Company to determine the appropriate underground facility location before trenching.
3. The customer shall provide and install all conduit from the meter socket to the Power Company's source. The Power Company will identify the distribution source (pole, transformer, pedestal, or secondary junction box) and the recommended route to the meter socket. The Power Company will install the service conductor from its distribution source to the meter socket.
4. Approved bushings or other conductor protectors are required for underground meter socket enclosures.
5. Customer wires shall allow clear space in the meter socket for the installation of Power Company wires.

Figure 20 shows the installation of an underground service extension from the Power Company source to the house.

Figure 20—Underground Service to Dwellings with Permanent Foundations

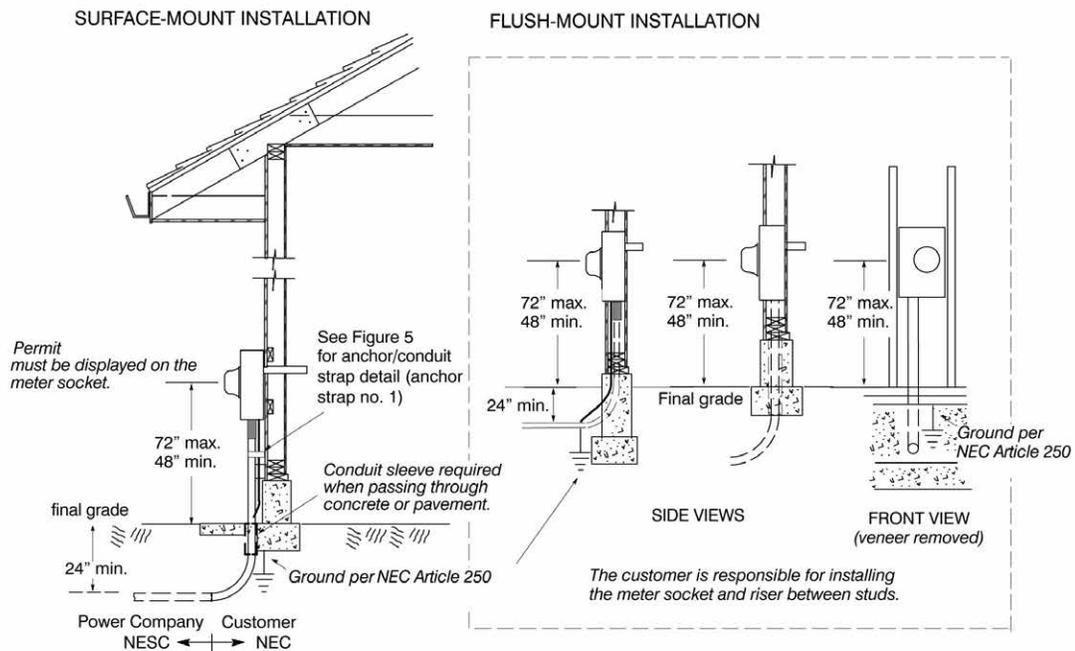
7.7.2 Underground Service to Wall-Mounted Meters

Installation requirements for underground service to wall-mounted meters are listed below. These requirements are in addition to the requirements given in Section 5, Section 7.6, and Section 7.7.1.

Requirements:

1. The meter socket and conduit shall be securely attached to the structure. Refer to Figure 5 for anchor/conduit strap detail, *Anchor strap no. 1 (or equal)*.
2. The meter socket shall be plumb.
3. When a three-inch (3") meter socket knockout is not available, a swedge may be used on the vertical riser or ahead of the elbow to transition to a smaller conduit size, no less than two inches (2").

Figure 21 shows typical installations of a meter socket and associated hardware for surface and flush wall-mounted meter sockets.

Figure 21—Underground Service to Wall-Mounted Meters

7.7.3 Underground Service to Free-Standing Installations

When underground service meter sockets cannot be mounted on the home using the criteria established in the rest of this book, the Power Company allows free-standing meter sockets such as pedestals and posts. Decorative meter pedestals are allowed.

Free-standing meter sockets are owned by the customer.

Installation requirements for underground service to free-standing meter sockets are listed below. These requirements are in addition to the requirements given in Section 5, Section 7.6, and Section 7.7.1.

Requirements:

1. The customer shall consult the Power Company to determine the location of the free-standing meter socket.
2. The free-standing meter socket shall meet all local ordinance requirements.
3. The meter socket shall be protected from damage by use of suitable protection approved before installation by the Power Company.
4. The customer shall furnish, install and maintain an approved pedestal, pole, or wood post. If a wood post is used, it shall be no less than 6" × 6" (nominal) and pressure-treated with an American Wood Preservative Association-approved preservative.
5. The access door to Power Company connections shall be sealable, and shall be kept free of obstructions a minimum of six inches (6") above the final grade.

6. Unmetered service conductor and metered service conductor shall not be run in the same conduit, raceway, or gutter.
7. The meter socket and service equipment shall be NEMA type 3R (rainproof), in good condition with no holes, dents or damage, and plumb in all directions. The installation shall be made with sufficient materials and installed such that it remains plumb for the duration of the service.
8. Conduit and conductor trenches shall be located away from (and never underneath) the building pad and foundation. For mobile homes, trenches shall be located clear of the area provided for the building.
9. Where two or more meters are located side-by-side (such as with duplexes or in mobile home parks), each meter socket shall be permanently labeled with the address, space, or berth number.

Figure 22, Figure 23, and Figure 24 illustrate typical meter installations for steel posts, wood posts, and manufactured meter pedestal packages.

Figure 22—Underground Service to a Free-Standing Meter Socket, Steel Post

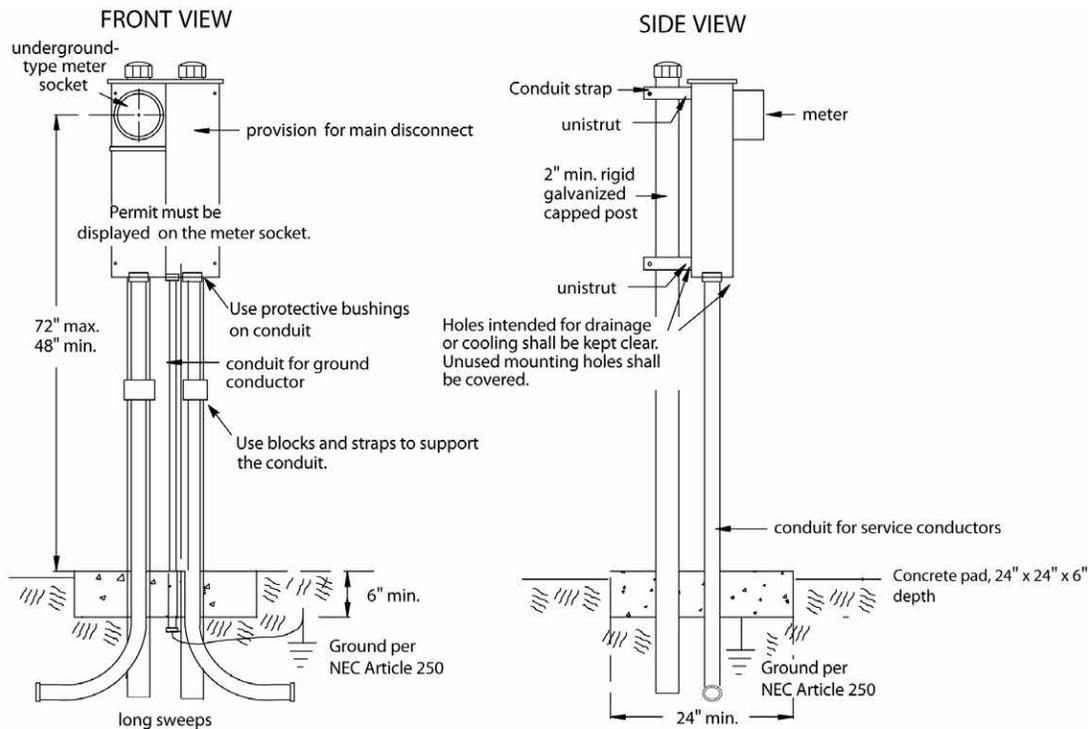


Figure 23—Underground Service to a Free-Standing Meter Socket, Wood Post

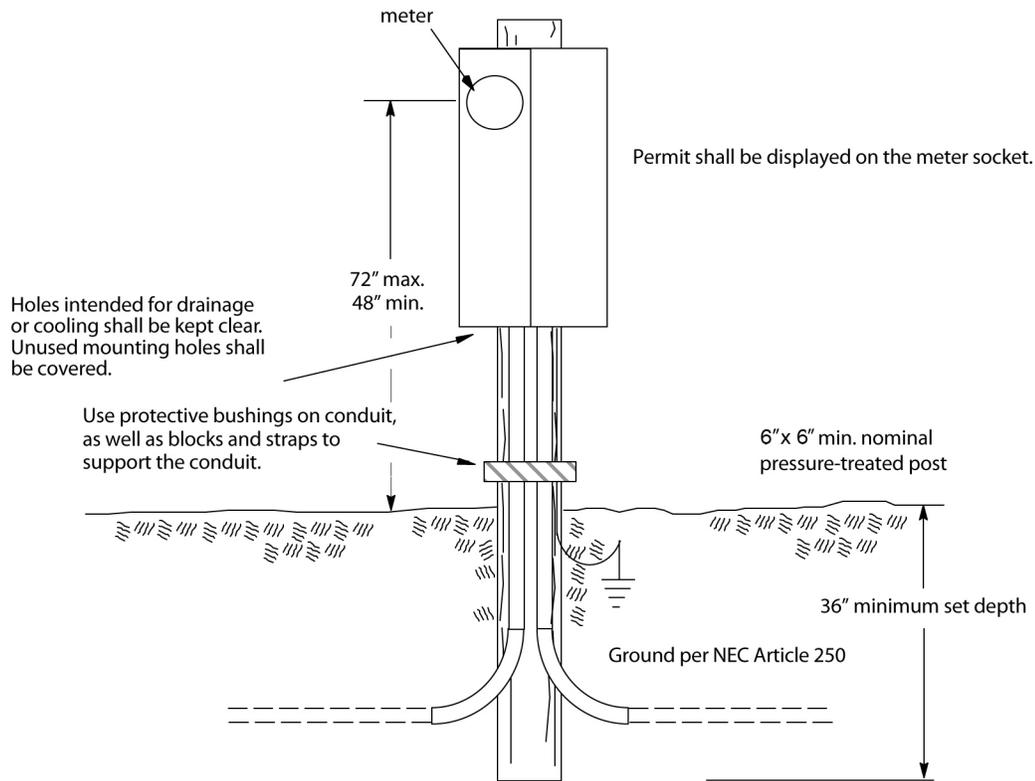
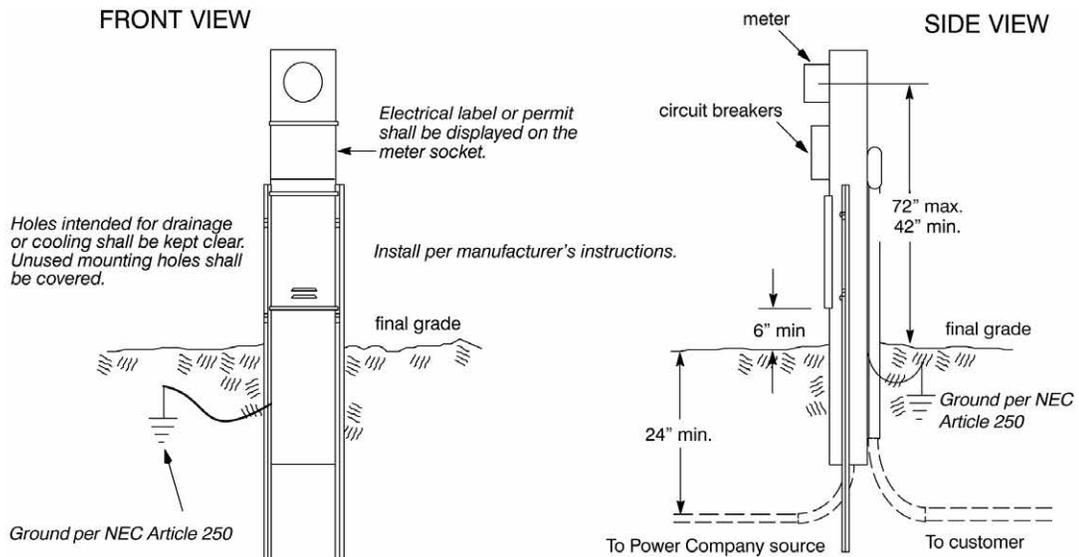


Figure 24—Underground Service to a Free-Standing Meter Socket, Manufactured Package



7.8 Overhead Service



7.8.1 General

The Power Company owns and maintains the overhead service from its source to the connection point at the weatherhead. The Power Company also owns and maintains the meter. The customer owns the meter socket, all wiring from the meter socket to the service point, and all wiring beyond the meter socket.

The customer shall obtain an easement for Power Company-installed facilities that cross any property not owned by customer, and will record the executed easement.

The following is a partial list of conditions that require consultation with the Power Company prior to installation:

1. The service crosses over a road or street.
2. The service runs along an alley, or crosses an alley, parking lot, or non-residential driveway.
3. The service crosses an area traveled by agricultural equipment.
4. The service crosses or runs along other features that may infringe on clearances.
5. A service of 277 V/480 Y.

Installation requirements for overhead service are listed below. These requirements are in addition to the requirements given in Section 7.6.

Requirements:

1. At least 24-inch conductor lead shall be provided for attachment to the service conductor at the weatherhead.
2. If the service length is greater than the values in Table 8 (for wall-mounted meters) or Table 15 (for meters mounted on poles), the Power Company shall be consulted before the mast is installed.
3. Where the mast has service cable attached to it, the mast shall be Rigid Metallic Conduit (RMC) or Intermediate Metallic Conduit (IMC). IMC may not be allowed by the authority having jurisdiction.
4. The conduit and weatherhead should be directly above the meter socket, and conduit material shall be continuous from the weatherhead to the meter socket.
5. For minimum service clearances see the NESC clearances listed in Table 6 and GO 95 clearances listed in Table 7.

7.8.2 Overhead Service to Wall-Mounted Meters

Installation requirements for overhead service to wall-mounted meters are listed below. These requirements are in addition to the requirements given in Section 7.6 and Section 7.8.1.

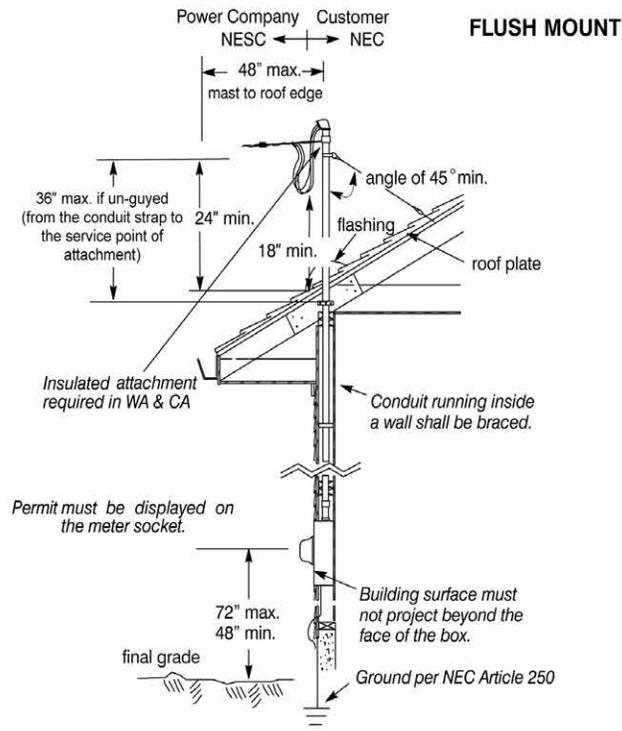
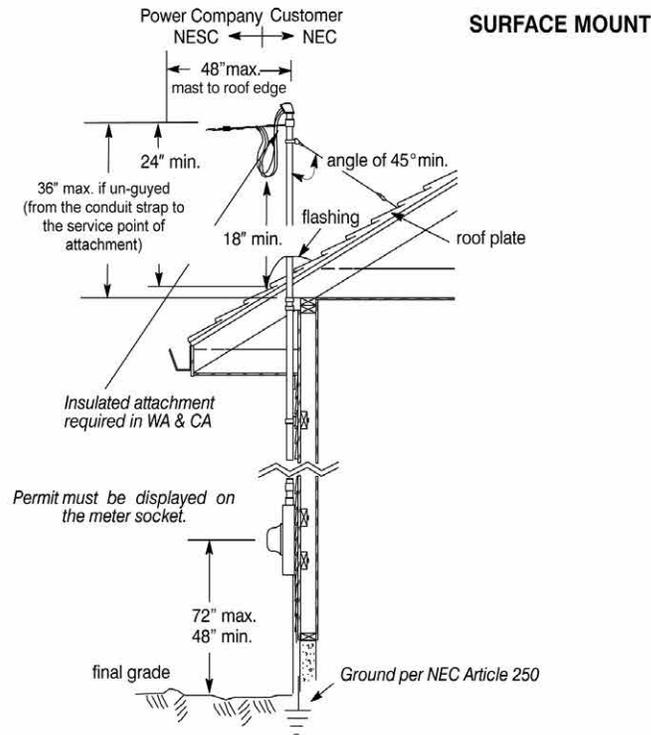


Requirements:

1. The service mast shall be mounted such that it is within 10 feet (10') of the front of the building, on the side nearest the utility source. Consult the Power Company regarding cases where the service mast cannot be mounted to meet this requirement. Refer to Section 4, *Clearances*, to provide the required clearance over the roof.
2. The service mast shall extend through the roof line except when the mast is on the gable end. The service mast shall extend through the roof line except when sufficient height can be obtained to meet the clearances given in Table 6 or Table 7.
(See Figure 18.)
3. On surface mount installations, the mast shall be securely attached to the building with lag screws and anchor straps. For brick veneer or concrete block walls, $\frac{1}{4}$ " \times 3 $\frac{1}{4}$ " lead sleeve expansion bolts and anchor straps or an equivalent strength anchoring system shall be used.
4. On flush mount installations, the mast inside a wall shall be braced.
5. Conduit coupling shall not be installed between the roof line and the point of attachment.
6. Guying is required if a coupling is within eight feet (8') of the weatherhead.
7. The mast shall be guyed if the point of attachment is more than 36 inches (36") above the roof line.
8. Guying shall be $\frac{1}{4}$ " common galvanized steel strand or equivalent, rated at 1,800 lbs. Two guys are required.
9. Building-mounted masts shall use a rigid steel pipe clamp as the point of attachment between the guy wire and the service mast (except in contaminated and coastal areas, stainless steel pipe clamp is required). The point of attachment on a building shall be securely fastened to a significant structural member.

Figure 25 shows a typical installation of overhead service to surface and flush wall-mounted meters.

Figure 25—Overhead Service to Wall-Mounted Meters
 Surface or Flush-Mount Metering (New and Rewire)



7.8.3 Overhead Service to Meters Mounted on Poles

When overhead service meter sockets are not mounted on the dwelling unit, the meters may be installed on customer-owned poles.

Installation requirements for overhead service to meters mounted on poles are listed below. These requirements are in addition to the requirements given in Section 7.6 and Section 7.8.1.

Requirements:

1. Wood poles shall be of sound timber. To ensure strength, the pole or timber must be free of any defects that may weaken the wood, such as sucker knots and spike knots larger than $\frac{1}{3}$ of any face. Cracks greater than $\frac{1}{2}$ -inch ($\frac{1}{2}$ ") wide are not permitted. No visible wood decay is allowed.
 2. The pole height must provide required clearance for the Power Company's service drop and any telephone, cable TV, or other attachments. The customer shall install the meter socket and service equipment on a wood pole no less than 25 feet (25') long and 5 $\frac{1}{2}$ inches (5 $\frac{1}{2}$ ") in diameter at the top, or a (nominal) 6" \times 6" \times 25' timber, set no less than 60 inches (60") below ground level, with suitable backfill. The pole or timber shall be pressure- or thermally-treated with an approved preservative.
 3. The pole or timber shall be easily accessible by Power Company power-lift aerial equipment.
 4. In unstable soil, conductor lengths in Table 15 may be reduced; guying or bracing shall be required.
 5. The conductor must be at least 24 inches (24") in length outside the weatherhead.
- Figure 26 shows a typical installation of overhead service to a meter mounted on a pole.

Figure 26—Overhead Service to Meters Mounted on Poles

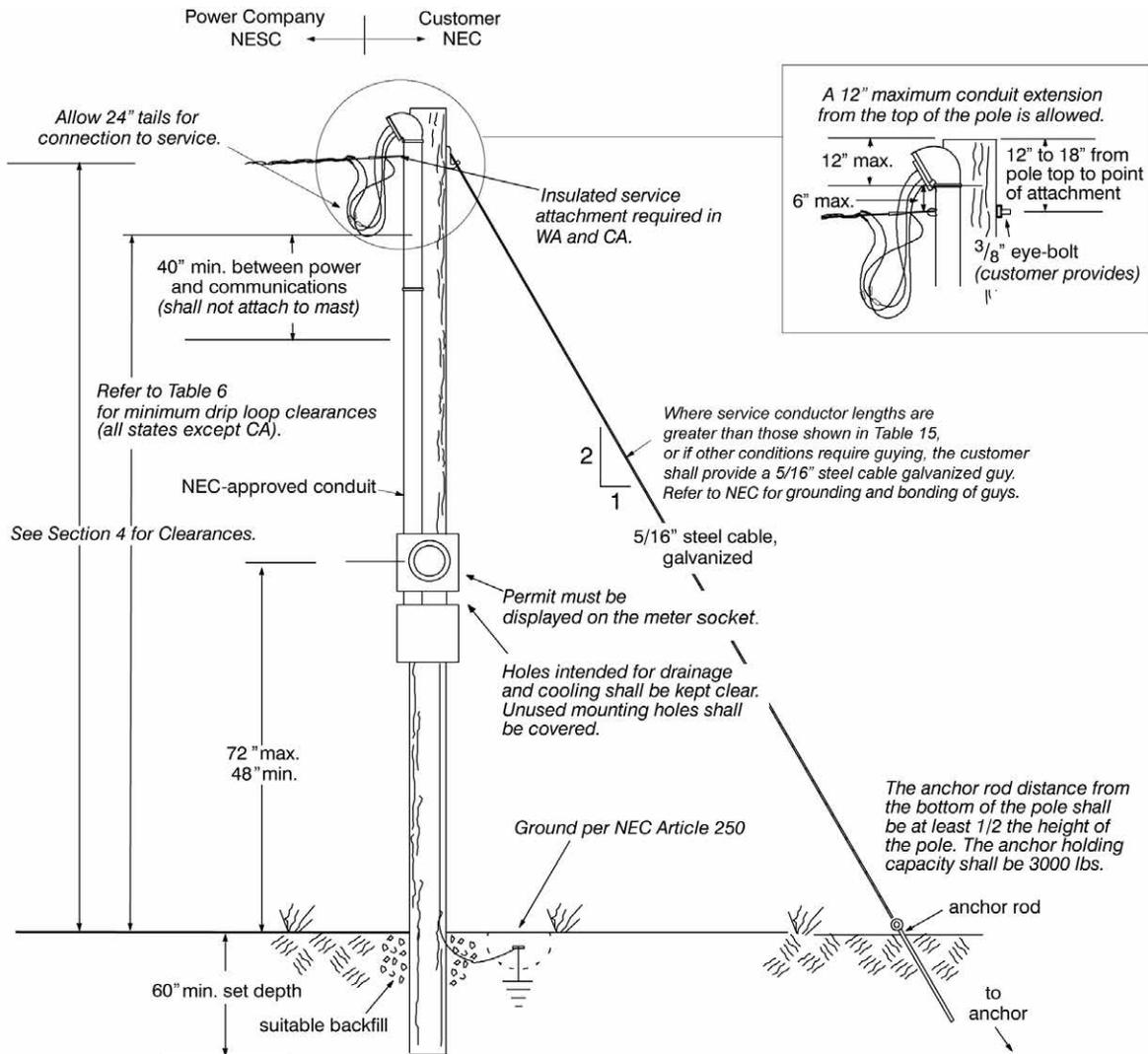


Table 15—Acceptable Service Conductor Lengths for Meters Mounted on Poles

Service Size 200 A or Less	Utility Service Length without Guying	Utility Service Length with Guying
201 - 400 A Service	60' Maximum	90' Maximum
401 A and Above	Consult the Power Company	

Note: Consult the Power Company regarding longer service lengths or other conditions not reflected in the table above. Guying for any service length may be required in unstable soil conditions.



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8. Multi-Family Residential Buildings

8.1 General

This section describes services with separate meters for multi-family residential buildings with three or more units. The Power Company requires grouping of service entrance conductors at a common location.

The customer is responsible for providing, installing, and maintaining all service equipment (including overhead service entrance conductors, conduit, enclosures, and meter sockets). Service equipment shall be installed and maintained to be within rights-of-way and provide space for the installation and maintenance of Power Company facilities.

All necessary permits and ruling governmental approvals shall be in place before connection and energizing.

Any deviations from the requirements in this section must be approved in writing by the Power Company prior to installation. Permanent power may not be connected if the requirements are not met.

8.2 Maximum Available Fault Current

The maximum available fault current depends on the type of service being provided. The customer shall furnish equipment to withstand maximum available fault currents. Upon request, the Power Company will supply information on the maximum available fault current at the customer's service entrance.



8.3 Multiple Meter Sockets

All multiple meter sockets shall meet the following requirements.

Requirements:

1. Meter sockets shall not be used as junction boxes.
2. Acceptable meter sockets are those manufactured in accordance with current EUSERC requirements, as well as ANSI-C12 and UL/ANSI-414.
3. Meter sockets shall be ring-type.
4. Customer conductors installed in meter sockets shall be kept separate from Power Company conductors.
5. The common (or “house”) service requires a safety socket. Single-phase, 100 A common services that include **only** lights and/or irrigation loads do not require a safety socket.
6. The cable pulling section must be sized for Power Company service termination per EUSERC 343.
7. A main disconnect is required when more than six services are connected. If an existing installation expands beyond six services, a main disconnect shall be installed.
8. NEC-approved load calculations are required when the sum of distribution section ampacities exceeds the pulling section ampacities. (See NEC Article 220, *Branch-Circuit, Feeder, and Service Calculations*.)
9. Each service shall have a lockable and easily accessible disconnect in sight of the meter socket location. If the disconnect is not in sight of the meter socket, a label shall be placed at the meter socket location indicating the location of the disconnect.
10. All required labels shall be correctly installed before the service is energized. Labels shall:
 - a. be permanently affixed to the equipment
 - b. be of sufficient durability to withstand the local environment. Engraved metal or hard plastic labels are required.
 - c. not be attached to removeable covers
11. Each metered service and associated breaker shall be labeled to identify the dwelling unit address. Service will not be connected until permanent labels are attached.
12. It is the responsibility of the customer to ensure the meter sockets are correctly labeled. These labels shall be kept current for the life of the facility.
13. A minimum vertical clearance of at least 48” from the center of the lowest meter to the final grade is required. However, a minimum vertical clearance of 36” to the center of the lowest meter is acceptable if a minimum 36” wide, flat, permanent surface (such as a concrete pad or walkway) below the meter is provided at the final grade and extends at least 18” on either side of the meter cabinet.
14. On overhead services, the customer must furnish all lugs and connect conductors to the line-side terminals. The customer is responsible for bringing the service entrance conductor to the connection of the utility service drop.
15. For underground service, the Power Company will provide line-side cable and connectors, and will terminate on the line-side of the equipment.
16. All unused openings shall be covered and secured by the customer.

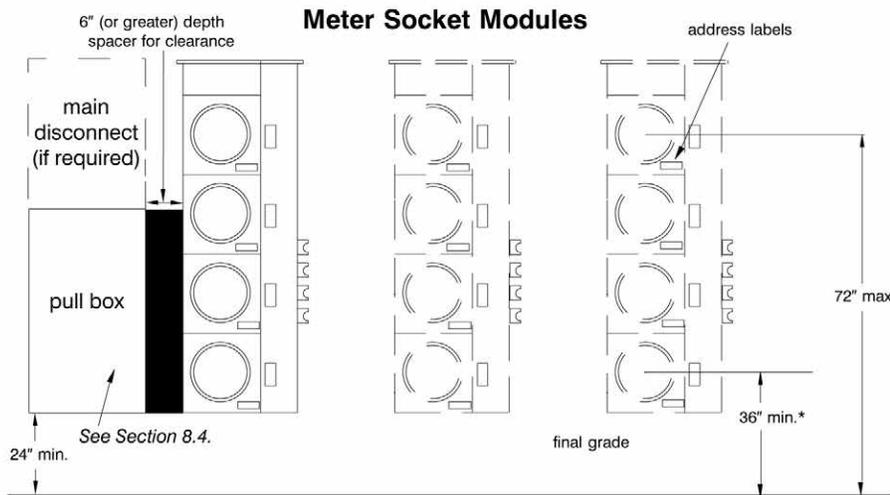
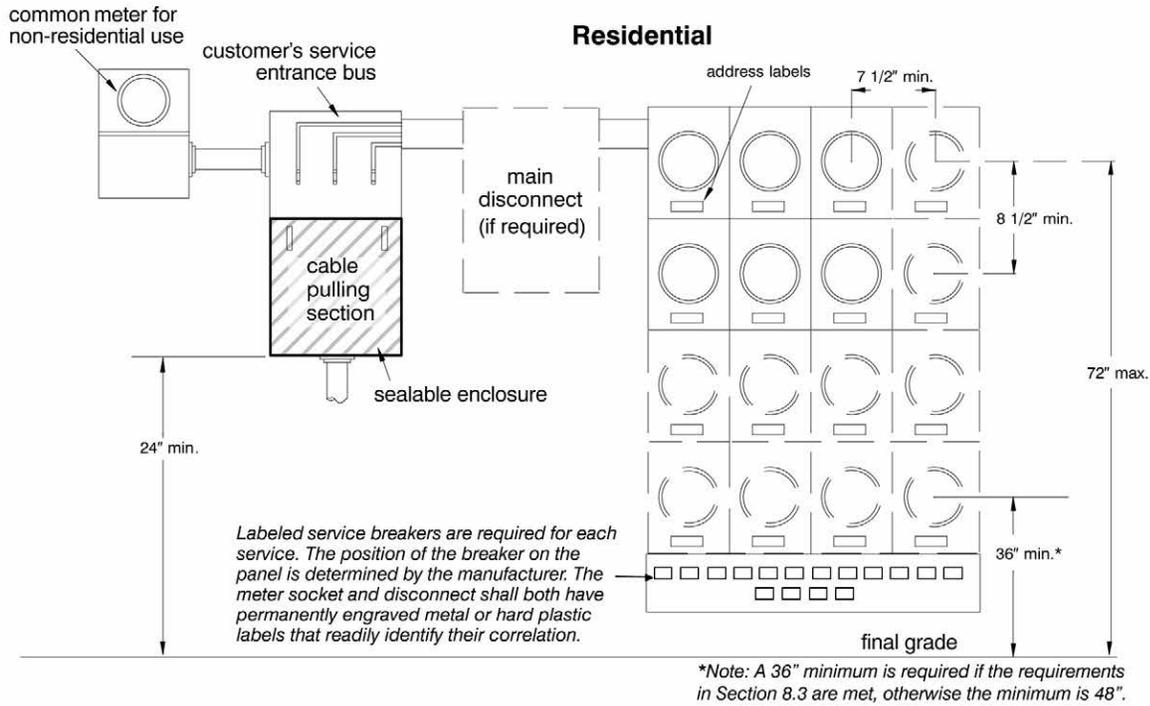


17. Meters and metering equipment shall be located outdoors.
18. Locate the main disconnect handle a sufficient distance from the meter and the pull box to allow full operation without interference.
19. Panel covers must be secured in place prior to service equipment being energized.

A list of acceptable meter sockets is available online at <https://www.pacificpower.net/working-with-us/builders-contractors/electric-service-requirements.html>, and <https://www.rockymountainpower.net/working-with-us/builders-contractors/electric-service-requirements.html>

Figure 27 shows two styles of banked meters. The top half of the figure shows a meter bank with the cable pull section, main disconnect, and meter bank as three separate sections. The lower half of the figure shows a meter socket module in which these sections can be bolted together into one expandable unit.

Figure 27—Multiple Meter Socket Installations, Overhead and Underground
 (Typical Combination Service Termination Enclosure and Meter Socket Panels for Multi-Unit Applications)



8.3.1 Maximum Available Supply

The Power Company will determine the size of the transformer based on expected peak loading.



Table I 6—Minimum Pull Box Dimensions
(Applies to the Power Company portion of the pull box)

Total Service	"W"		"Y" Depth	"X" Lug Height
	3-Wire	4-Wire		
0-200 A	10 ½"	14"	6"	11"
201-400 A	10 ½"	14"	6"	22"
401-800 A	16 ½"	22"	11"	26"
801-1200 A	22 ½"	30"	11"	26"

8.5 Overhead and Underground Multi-Family Meter Locations

Consult the Power Company to determine the point of attachment for service.

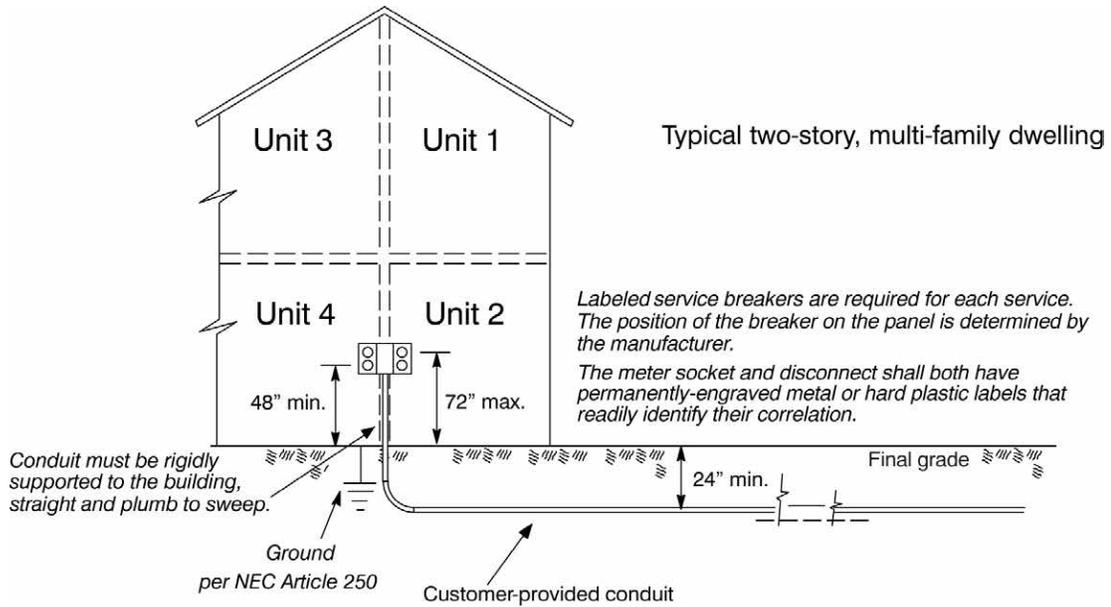
Requirements:

1. All meters shall be in a common location.
2. Meter banks shall be installed on the side of the building closest to the utility source.
3. The service entrance and meter shall be installed as described in Section 4, *Clearances*.
4. The service entrance shall be sealed, as described in Section 3, *Services and Meter Installations*.

8.5.1 Multi-Family Meter Location, Underground Service

Conduit shall be installed per Section 5.

Figure 29—Multi-Unit Underground Service

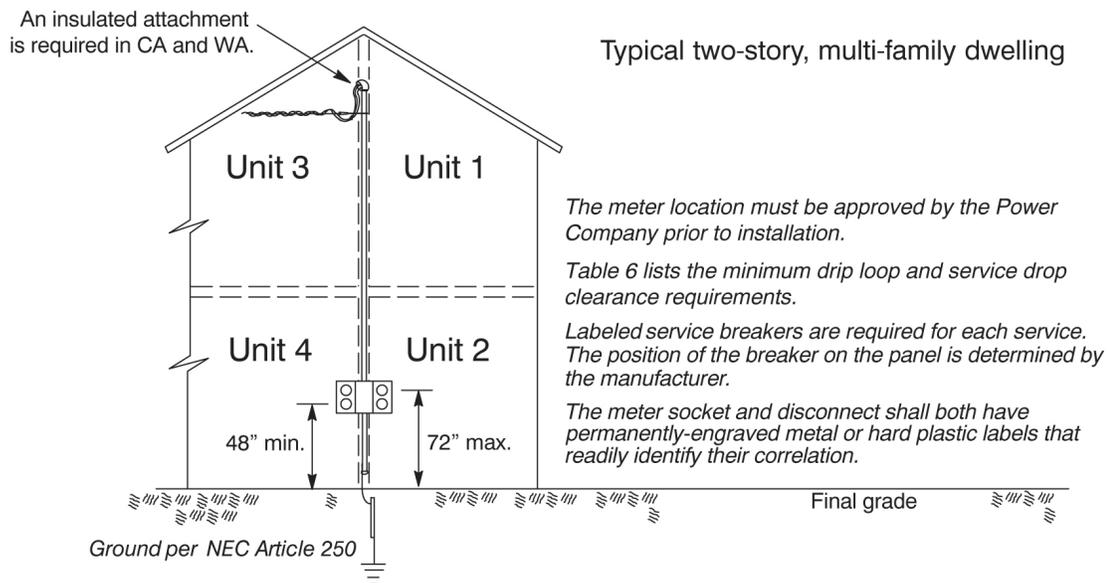


8.5.2 Multi-Family Meter Location, Overhead Service

The customer is responsible for bringing the service entrance conductor from the meter socket to the service point.

The Power Company will extend overhead service to a single weatherhead.

Figure 30—Multi-Unit Overhead Service



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9. Non-Residential Services (Commercial, Industrial, and Agricultural)

This section describes Power Company requirements for single-phase and three-phase direct-connect or current transformer (CT) rated non-residential services. CT-rated equipment is required for single-phase service greater than 400 amps (A) and three-phase services greater than 200 A.

All non-residential customers are responsible for coordinating service requirements with the Power Company prior to material purchase and installation.

A list of approved meter sockets is posted online at: <https://www.pacificpower.net/working-with-us/builders-contractors/electric-service-requirements.html> and <https://www.rockymountainpower.net/working-with-us/builders-contractors/electric-service-requirements.html>.

9.1 General Requirements

1. All meter socket enclosures shall be ring-type.
2. Acceptable meter sockets are those manufactured in accordance with current EUSERC, ANSI-C12, and UL/ANSI-414 requirements.
3. A main disconnect is required when more than six services are connected. If an existing installation expands beyond six services, a main disconnect shall be installed.
4. NEC-approved load calculations are required when the sum of distribution section ampacities exceeds the pulling section ampacities. (See NEC Article 220, *Branch-Circuit, Feeder, and Service Calculations*.)
5. Each service shall have a lockable and easily accessible disconnect in sight of the meter socket location. If the disconnect is not in sight of the meter socket, a label shall be placed at the meter socket location indicating the location of the disconnect.
6. All required labels shall be correctly installed before the service is energized. Labels shall:
 - a. be permanently affixed to the equipment
 - b. be of sufficient durability to withstand the local environment. Engraved metal or hard plastic labels are required.
 - c. not be attached to removeable covers.
 - d. be kept current for the life of the facility.
7. Each metered service and associated breaker shall be labeled to identify the unit address. Service will not be connected until permanent labels are attached.



8. A minimum vertical clearance of at least 48 inches (48") from the center of the lowest meter to the final grade is required. However, in installations of three or more ganged meters, a minimum vertical clearance of 36 inches (36") to the center of the lowest meter is acceptable if a minimum 36 inches (36") wide, flat, permanent surface (such as a concrete pad or walkway) below the meter is provided at the final grade and extends at least 18 inches (18") on either side of the meter cabinet.
9. On overhead services, the customer must furnish all lugs and connect conductors to the line-side terminals. The customer is responsible for bringing the service entrance conductor to the connection of the utility service drop.
10. For underground service, the Power Company will provide line-side cable and connectors, and will terminate on the line-side of the equipment.
11. Cable termination connectors should have two bolts per connector. When mechanical lugs are used, two setscrews per conductor should be used where feasible.
12. All unused openings shall be covered and secured by the customer.
13. Meters and metering equipment shall be located outdoors.

9.2 Direct-Connect Metering, Single Installations

The Power Company requires a direct-connect meter socket when the ampacity of a single-phase service entrance is 400 amps or less, or when the ampacity of a three-phase service is 200 amps or less. Required types are summarized in Table 17. Typical sockets and connections are illustrated in the figures in this section.

Direct-connect meter sockets serving continuous duty motors are limited to 60 hp or less at 120 V/208 Y or 120 V/240 V, three-phase, and 125 hp or less at 277 V/480 Y, three-phase.

Table 17—Direct-Connect Socket Requirements

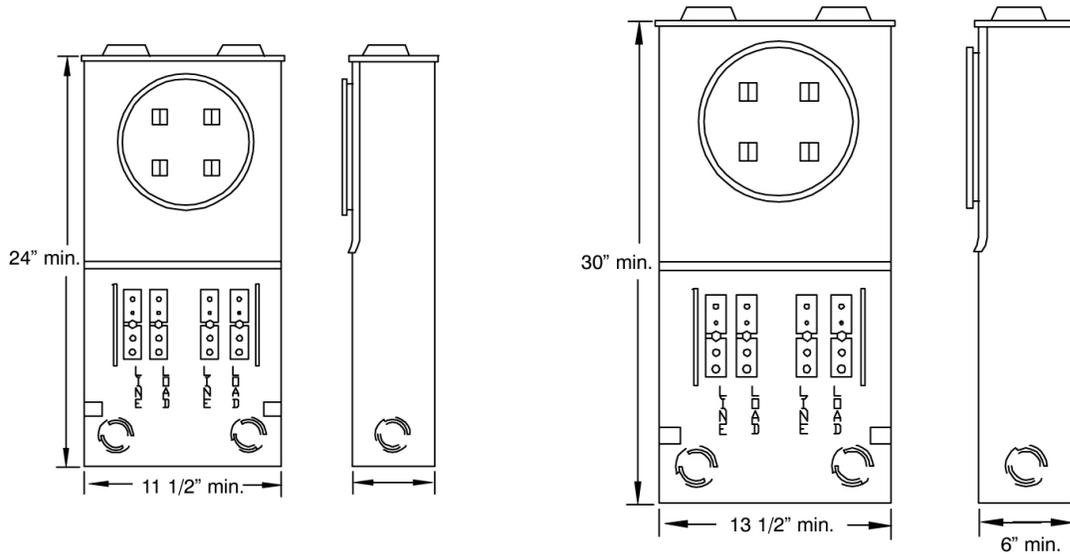
Direct-Connect	Amperage	Socket Requirement	Figure
Single-phase	100 A max.	EUSERC 304	Figure 31
Single-phase	200 A max.	EUSERC 305	Figure 31
Single-phase, overhead only	201 - 400 A	EUSERC 302B	Figure 33
Single-phase, overhead and underground	201 - 400 A	na	Figure 33
Network	200 A max.	EUSERC 305	Figure 32
Three-phase	100 A max.	EUSERC 304	Figure 32
Three-phase	200 A max.	EUSERC 305	Figure 32

Notes:

1. If the socket of an existing three-phase, direct-connect, three-wire service is being replaced, a EUSERC seven-jaw safety socket configured for a three-phase, three-wire meter is required (see EUSERC 304/305, Note 12). This type of three-phase, three-wire service is not approved for new construction.

2. For four-wire delta services, the high (power) leg conductor must be identified by orange marking, and located on the right hand bus position. The bus shall also be marked and readily identified.
3. Consult the Power Company for non-typical services that may not require a safety socket.

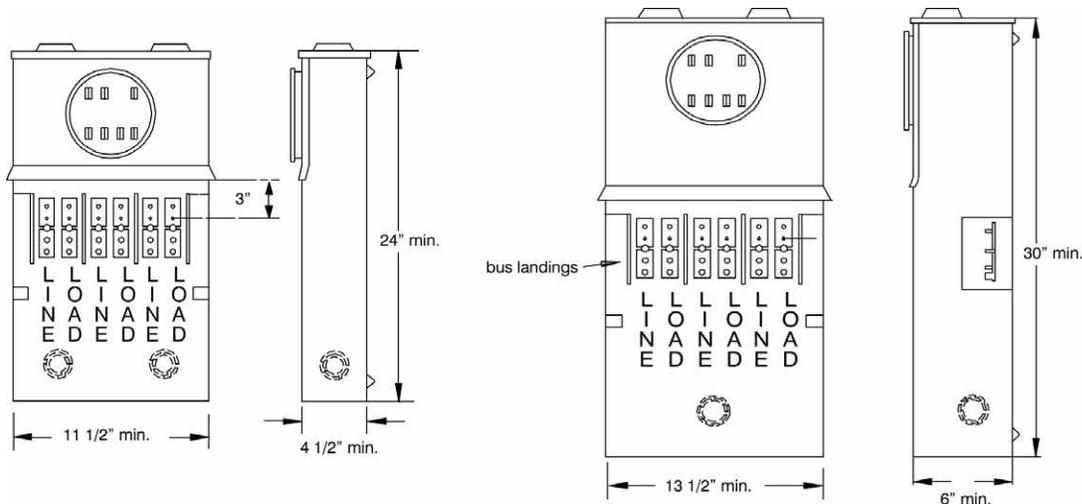
Figure 31—Non-Residential, Single-Phase, Direct-Connect Socket with Required Safety Socket, EUSERC 304 and 305



A. 100 A (EUSERC 304)

B. 200 A (EUSERC 305)

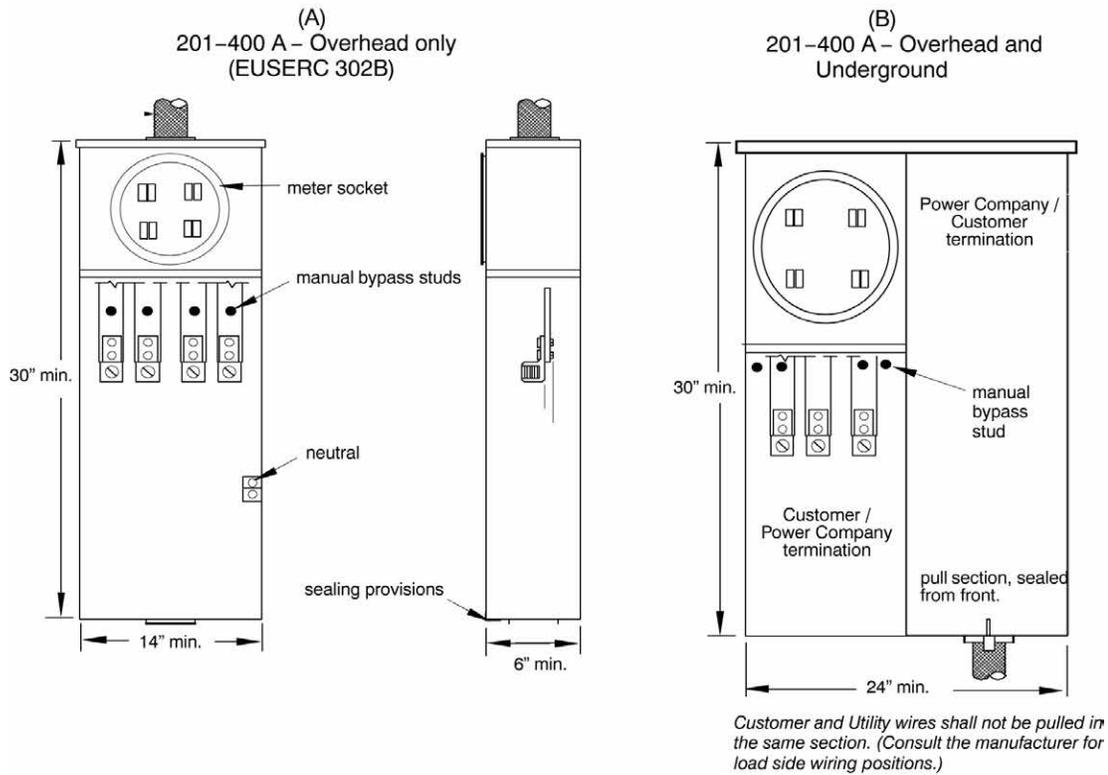
Figure 32—Non-Residential, Three-Phase, Direct-Connect Socket with Required Safety Socket, EUSERC 304 and 305



100 A (EUSERC 304)

200 A (EUSERC 305)

Figure 33—Non-Residential, Single-Phase, Direct-Connect Socket with Required Manual-Link Bypass, for 240/120 V, 201–400 A Services Only, EUSERC 302B



Typical Services Connections

The figures below show typical service connections.

Figure 34—Single-Phase Socket Connection Diagram, Front View

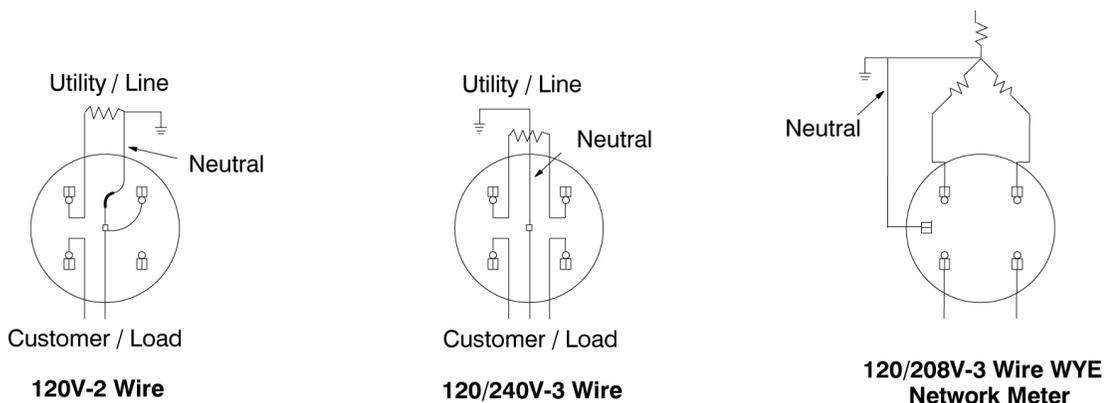
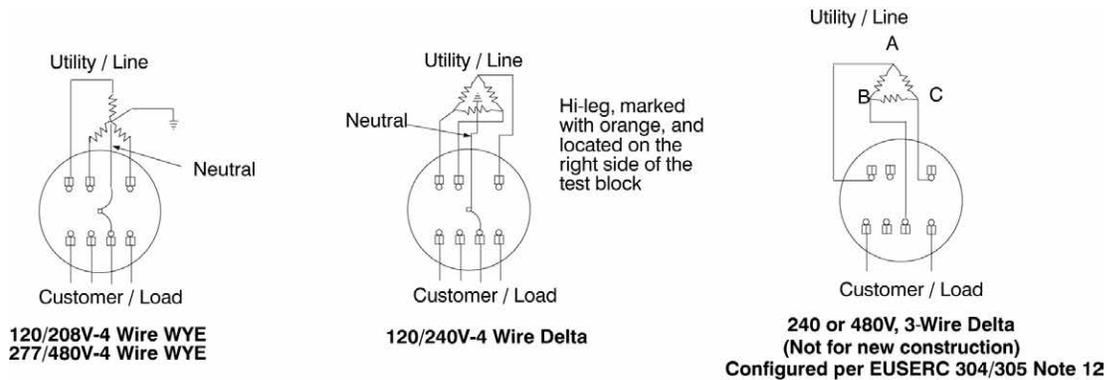


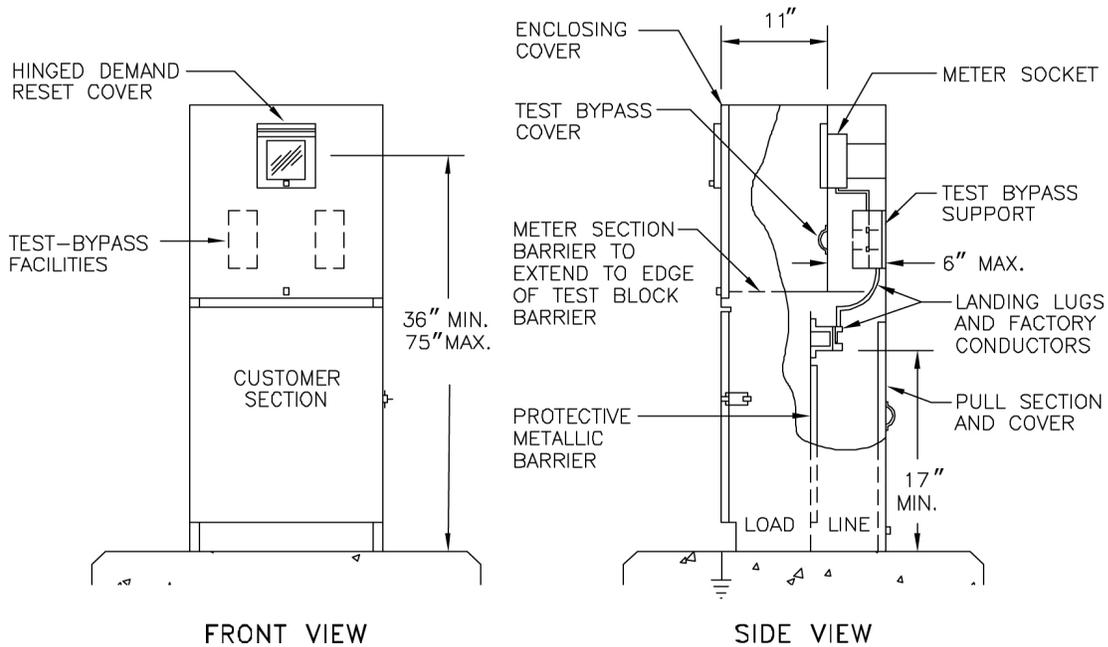
Figure 35—Three-Phase Socket Connection Diagram, Front View



9.2.1 Non-Residential Underground Service Meter Pedestals

Pedestals may be used for non-residential underground service installations. Figure 36 shows the approved pedestal (EUSERC 308).

Figure 36—Underground Service, Non-Residential Meter Pedestals, EUSERC 308



9.2.2 Non-Residential Underground Service, Free-Standing Meter

Free-standing installations may be used for non-residential underground service. The installation requirements for direct connection, underground service, free-standing meters are listed below. These requirements are in addition to the general requirements in this section.

Requirements:

1. The customer shall consult the Power Company to determine the location of the free-standing meter socket.
2. The free-standing meter socket shall meet all local ordinance requirements.
3. The meter socket shall be protected from damage by use of barrier posts or other suitable protection approved by the Power Company.
4. The customer shall furnish, install and maintain approved steel or wood post(s). If a wood post is used, it shall be no less than 6" x 6" (nominal) and pressure-treated with an American Wood Preservative Association approved preservative.

The typical meter installations for steel posts and wood posts are illustrated in Figure 37 and Figure 38.

Figure 37—Underground Service to a Free-Standing Meter Socket, Steel Post

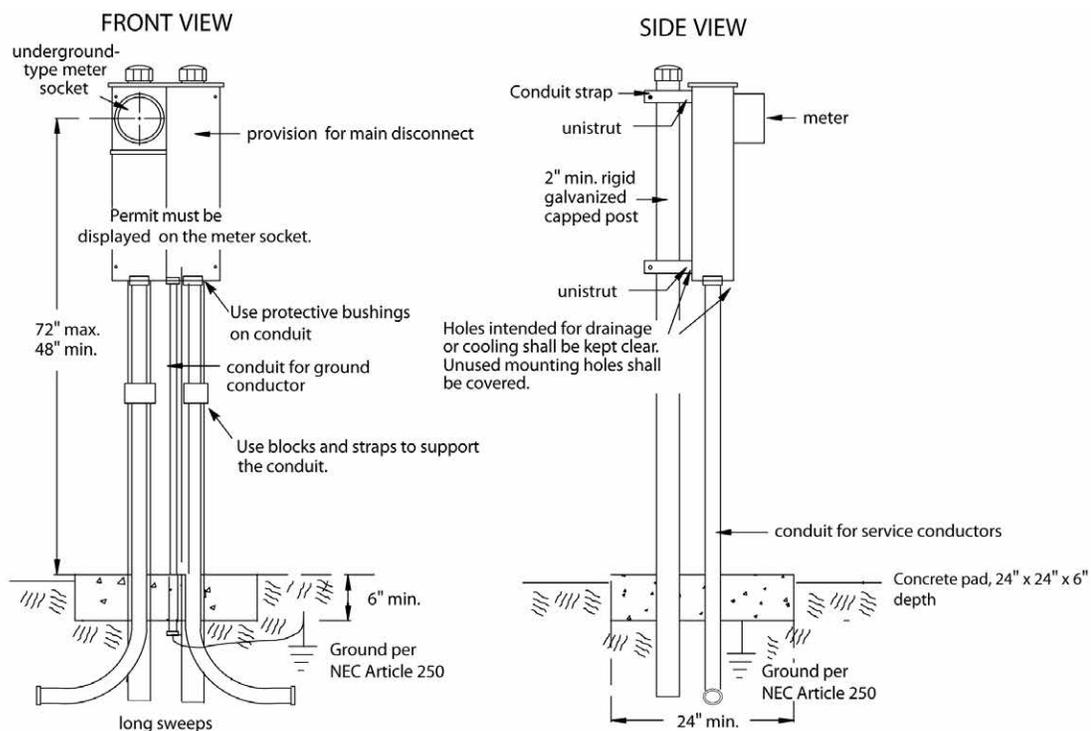
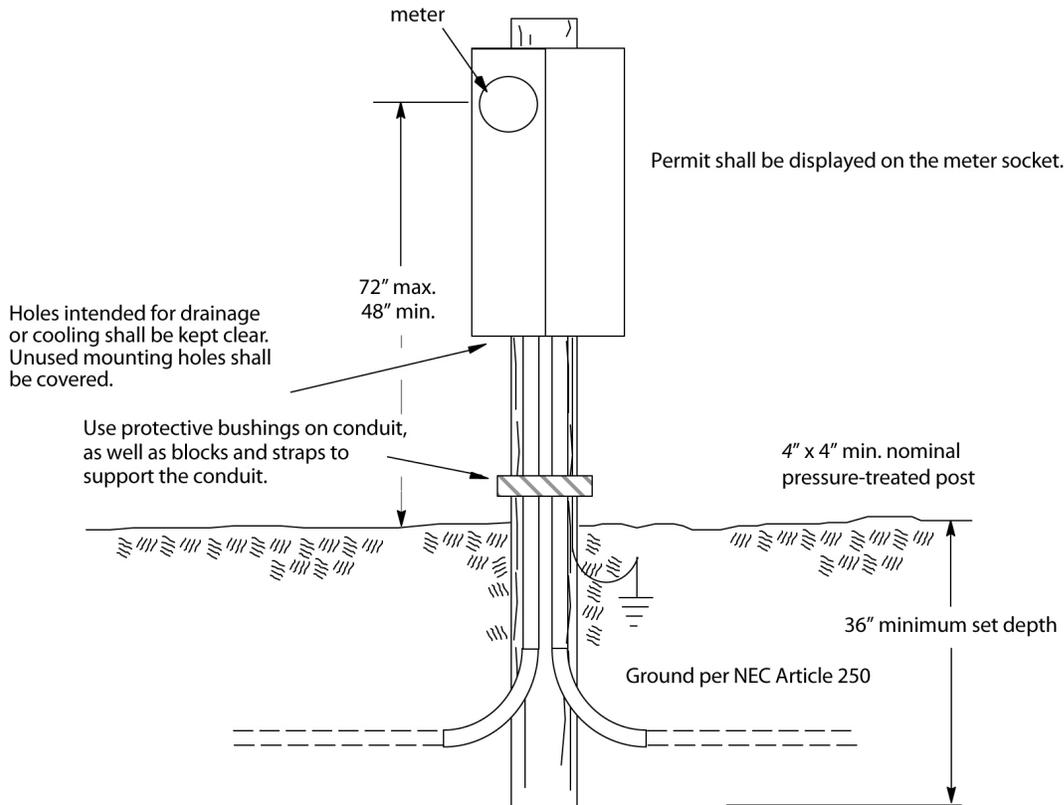


Figure 38—Underground Service to a Free-Standing Meter Socket, Wood Post

9.2.3 Non-Residential Overhead Service, Free-Standing Meter

Free-standing installations may be used for non-residential overhead service. The installation requirements for direct connection, overhead service, free-standing meters are listed below. These requirements are in addition to the general requirements in this section.

Requirements:

1. Wood poles shall be of sound timber. The pole or timber must be free of any defects that may weaken the wood, such as sucker knots and spike knots larger than $\frac{1}{3}$ of any face. Cracks greater than $\frac{1}{2}$ -inch ($\frac{1}{2}$ ") wide are not permitted. No visible wood decay is allowed.
2. The pole height must provide required clearance for the Power Company's service drop and any other attachments. The customer shall install the meter socket and service equipment on a wood pole no less than 25 feet (25') long and 5 $\frac{1}{2}$ inches (5 $\frac{1}{2}$ ") in diameter at the top, or a (nominal) 6" x 6" x 25' timber, set no less than 60 inches (60") below ground level, with suitable backfill. The pole or timber shall be pressure- or thermally-treated with an approved preservative.
3. The pole or timber shall be easily accessible by Power Company power-lift aerial equipment.

4. In unstable soil, conductor lengths in Table 18 may be reduced; guying or bracing shall be required.
5. The conductor must be at least 24 inches (24") in length outside the weatherhead.

Figure 39 shows a typical installation of overhead service to a meter mounted on a pole.

Figure 39—Overhead Service to Meters Mounted on Poles

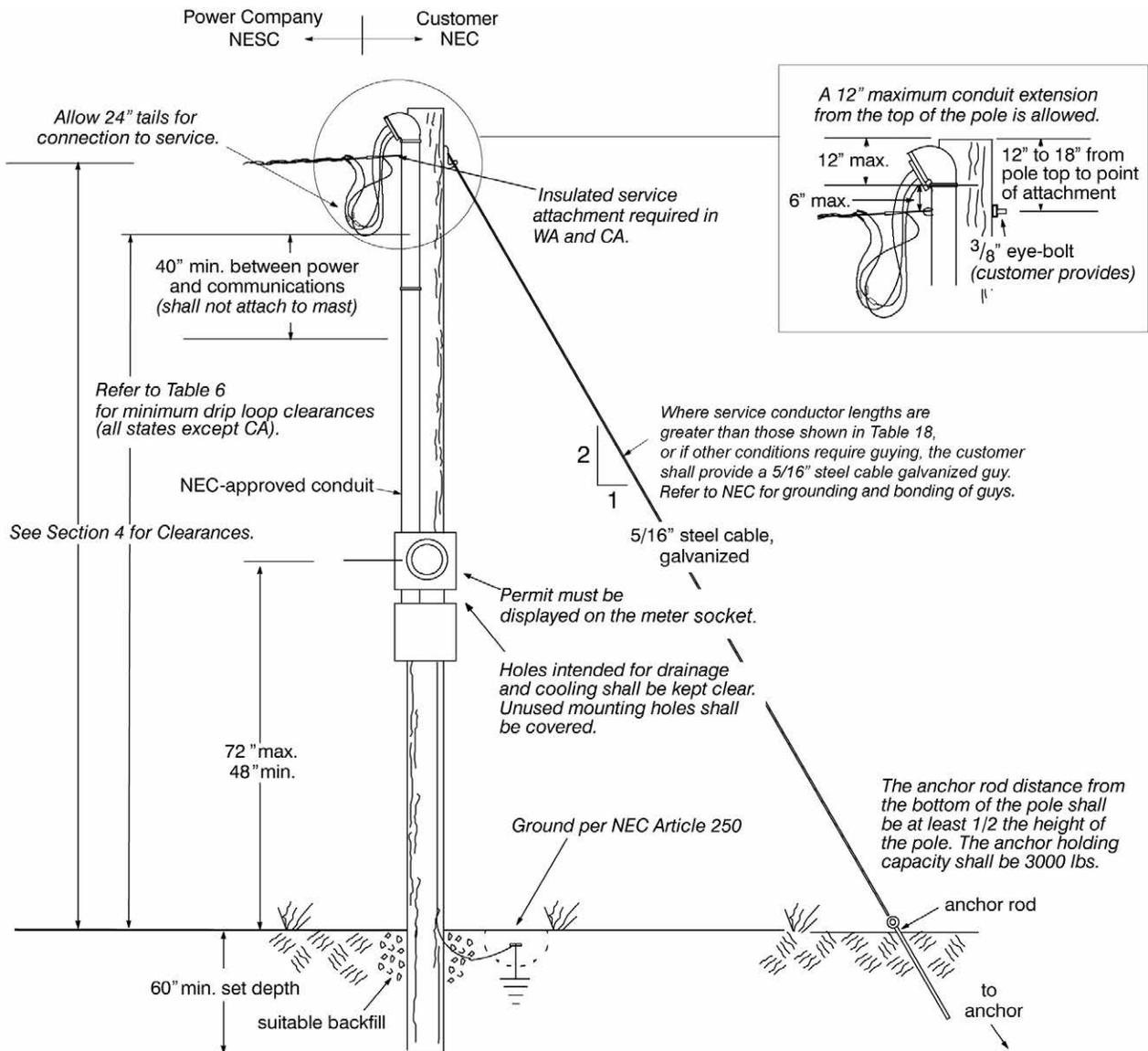


Table 18—Acceptable Service Conductor Lengths for Meters Mounted on Poles

Service Size 200 A or Less	Utility Service Length without Guying	Utility Service Length with Guying
201 - 400 A Service	60' Maximum	90' Maximum
401 A and Above	Consult the Power Company	

9.3 Direct-Connect Metering, Multiple Installations

This section describes the additional requirements for direct-connect, non-residential, single-phase and three-phase installations with more than one metered service.

Before being energized, the meter socket shall be properly wired and grounded, and all necessary permits shall be in place. The three styles of metering socket equipment approved for use are: ganged, modular, and switchboard.

Figure 40, Figure 41, and Figure 42 are examples of multiple metering services for three-phase and single-phase configurations.

These requirements are in addition to the general requirements in this section.

Requirements:

1. Metering conductors shall not pass through adjacent metering compartments except in enclosed wireways.
2. A test bypass facility (TBF) with rigid insulating barriers shall be furnished, installed, and wired or bussed to the meter sockets. TBF cover panels shall be sealable and fitted with a lifting handle.
3. A pull box section is required for two or more services and must meet EUSERC 343.
4. For ganged meters, where the face of a cabinet exceeds the depth of the adjacent meter cabinet, clearances shall be in accordance with EUSERC 353 and Section 4.
5. For switchboard metering installations, the customer must provide a concrete pad for switchboard metering service sections and pull boxes.

Figure 40—Non-Residential Ganged Meter Socket Installation

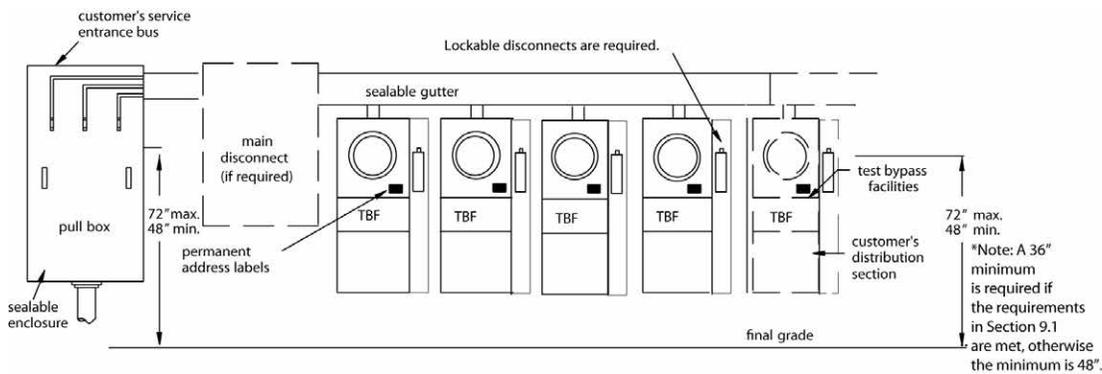
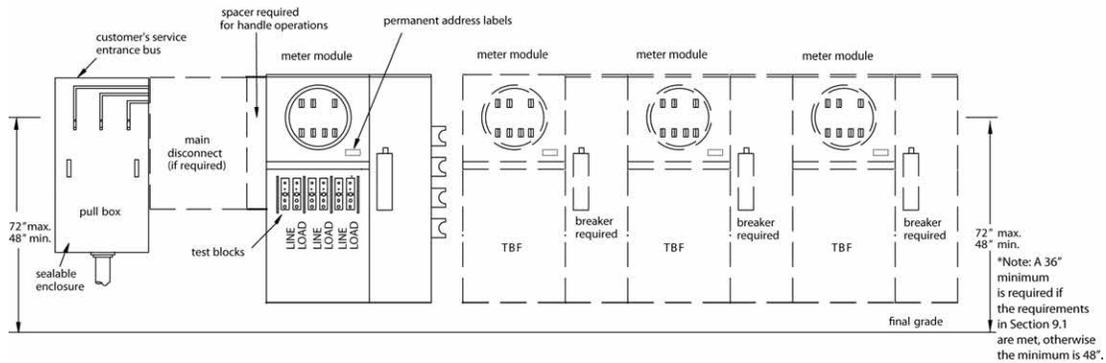
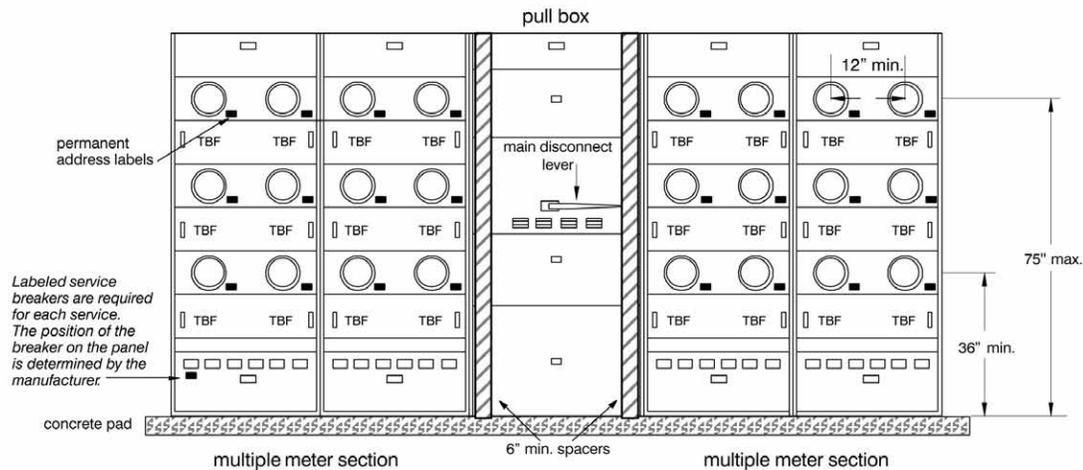


Figure 41—Non-Residential Modular Meter Socket Installation**Figure 42—Non-Residential Switchboard (Floor-Mounted) Metering, Direct-Connect, EUSERC 306**

9.3.1 Pull Box

Pull box requirements are as follows:

Requirements:

1. The termination pull box for Power Company conductors shall meet the requirements of EUSERC 343 and 343A.
2. The customer shall provide an approved method by which to make multiple taps outside of the pull box.
3. Only Power Company conductors are allowed inside the pull box. Customer-owned devices (such as limiters, fuses, etc.) shall not be installed in pull boxes.

The customer shall not:

1. Terminate their principal (main) grounding electrode conductor in the Power Company's sealed termination pull box.
2. Use the termination pull box as a junction point for grounding or to ground the electrode conductors.

Figure 43—Pull Box
0-600 V, 0-1200 A, EUSERC 343, 343A & 347

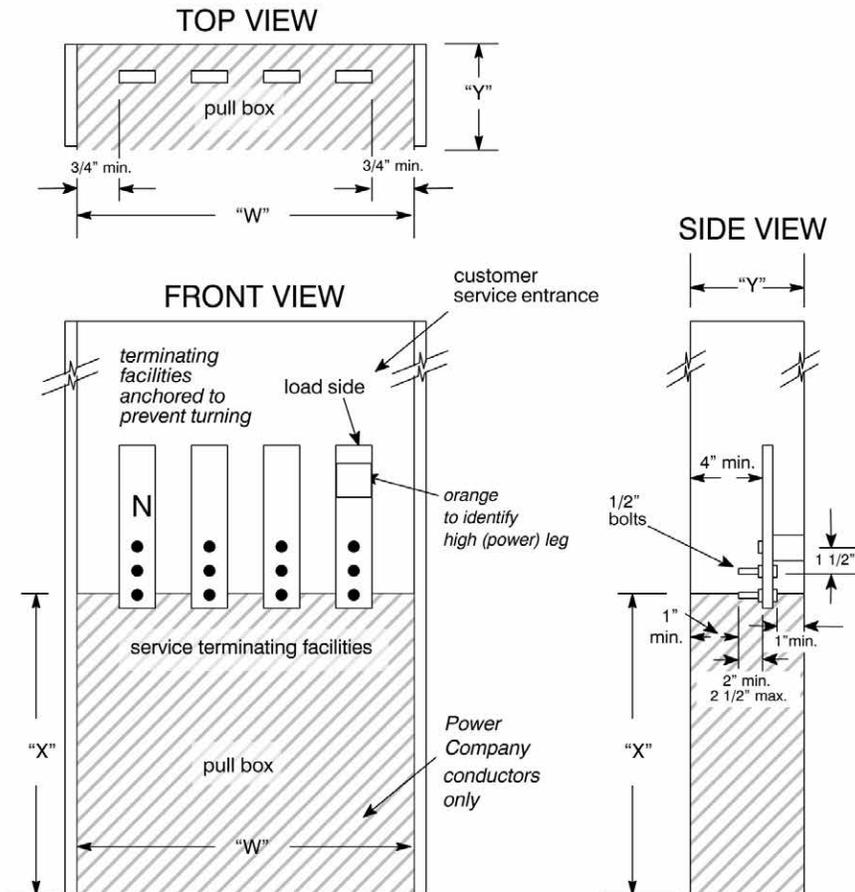


Table 19— Minimum Pull Box Dimensions
(Applies to the Power Company Portion of the Pull Box)

Total Service Amps	"W"		"Y" Depth	"X" Lug Height
	3-Wire	4-Wire		
0-200	10 ½"	14"	6"	11"
201-400	10 ½"	14"	6"	22"
401-800	16 ½"	22"	11"	26"
801-1200	22 ½"	30"	11"	26"

9.4 CT Metering, Up to 800 A

This section describes metering requirements for services rated up to 480 V and 800 A.

Motor loads with horsepower values greater than 60 hp at 120 V/208 Y, three-phase, and 125 hp at 277 V/480 Y, three-phase shall be metered with current transformer metering.

Table 20 identifies customer-provided material for CT metering. The Power Company will provide and install the meter, a meter test switch, current transformers, and secondary metering wiring.

Table 20—Customer-Provided Material

Provided by customer	See	Notes
Meter socket	EUSERC 339	CT-metering socket
CT cabinet	Table 22	<ul style="list-style-type: none"> A weather-tight, NEMA 3R-rated EUSERC CT cabinet sized in accordance with Table 22. The door shall be hinged and capable of being sealed
CT mounting base	Section 9.4.3	<ul style="list-style-type: none"> EUSERC CT mounting base rated for 50,000 A fault current Cable termination can only be made on the manufacturer-supplied studs/connectors of the transformer mounting base. No alteration of the transformer mounting base is allowed
Conduit	Section 9.4.5	The conduit between the meter socket enclosure and the CT cabinet, see Section 9.4.5.
Connectors / terminations		Connectors for the load-side conductors to CT mounting base, as well as overhead service.
Bonding	Section 9.4.6	Bonding per Section 9.4.6 for all meter and CT enclosures.

9.4.1 Meter Socket Enclosures for CT Meters

Figure 44—Meter Socket Enclosure for CT Meters, EUSERC 339

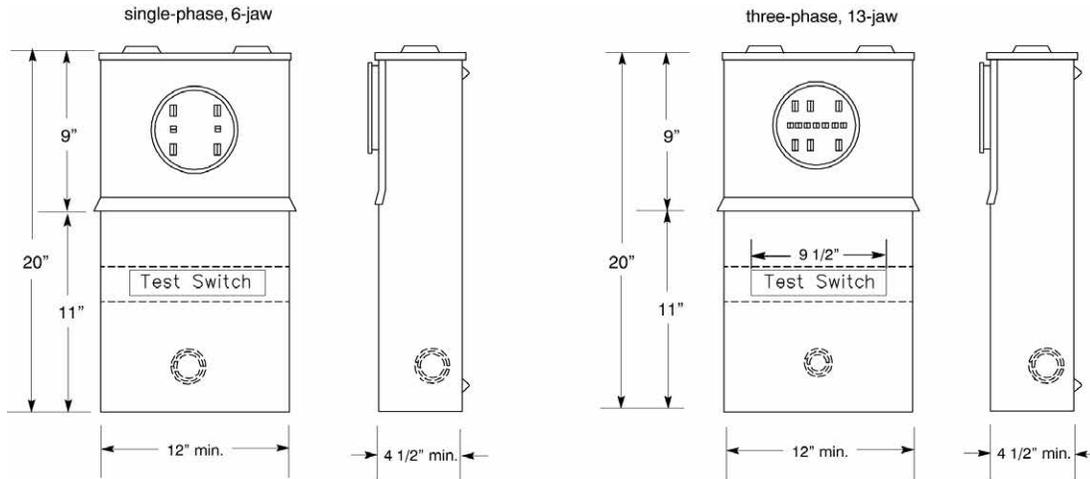


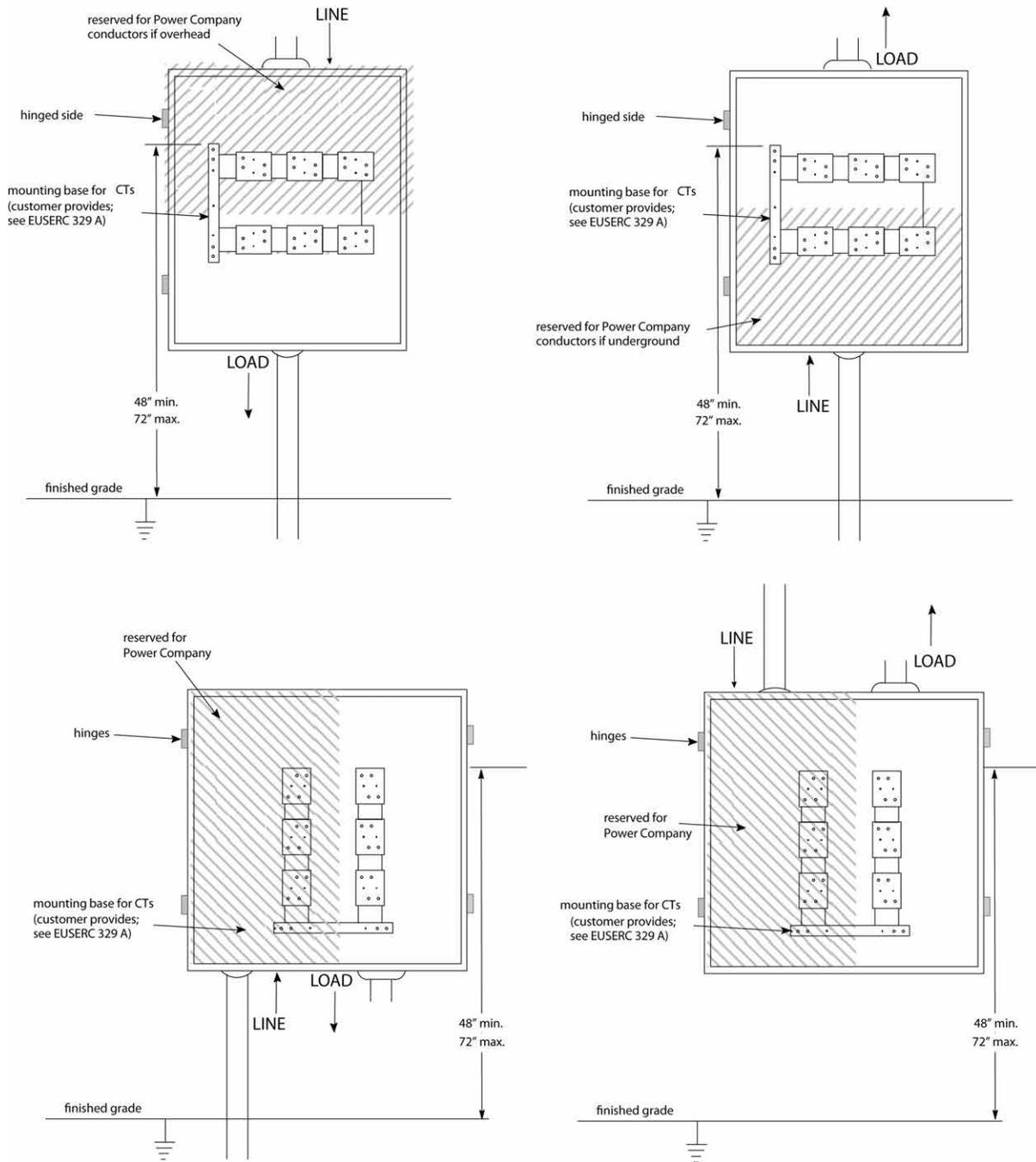
Table 21—CT Meter Socket Types, EUSERC 339

Type of Service	Socket Type
Single-phase	6-jaw
Three-phase	13-jaw

9.4.2 CT Cabinet

The CT cabinet consists of two parts, the enclosure and the mounting base for the current transformers. The cabinet is exclusively for Power Company metering equipment.

Figure 45—CT Cabinet, Mounting Base Orientation Options



Requirements:

1. Only equipment associated with Power Company metering shall be permitted in the CT cabinet.
2. The door shall have factory-installed hinges for side opening and shall be sealable.
3. The door shall be equipped with a device to hold it in the open position at 90° or more.
4. The top of the CT mounting base shall not be more than 72 inches (72") above the finished grade.
5. The customer's service entrance conduits must exit the cabinet on the load side of the CT.
6. Customer conductors are not permitted in the Power Company's termination space.
7. The customer shall not terminate their principal (main) grounding electrode conductor in the CT cabinet or use it as a junction point for grounding or grounding electrode conductors.
8. For multiple metered circuits, a separate termination pull box must be provided for the Power Company service lateral. The CT cabinet shall not be used as a load distribution center.

Table 22—CT Cabinet Requirements

Type of Service	EUSERC # for CT Cabinets	Minimum Cabinet Dimensions			EUSERC # for CT Mounting Base
		Width	Height	Depth	
Single-phase, 401-800 A	316, 317	24"	48"	11"	328A
Three-phase, 201-800 A	316, 318	36"	48"	11"	329A

Notes:

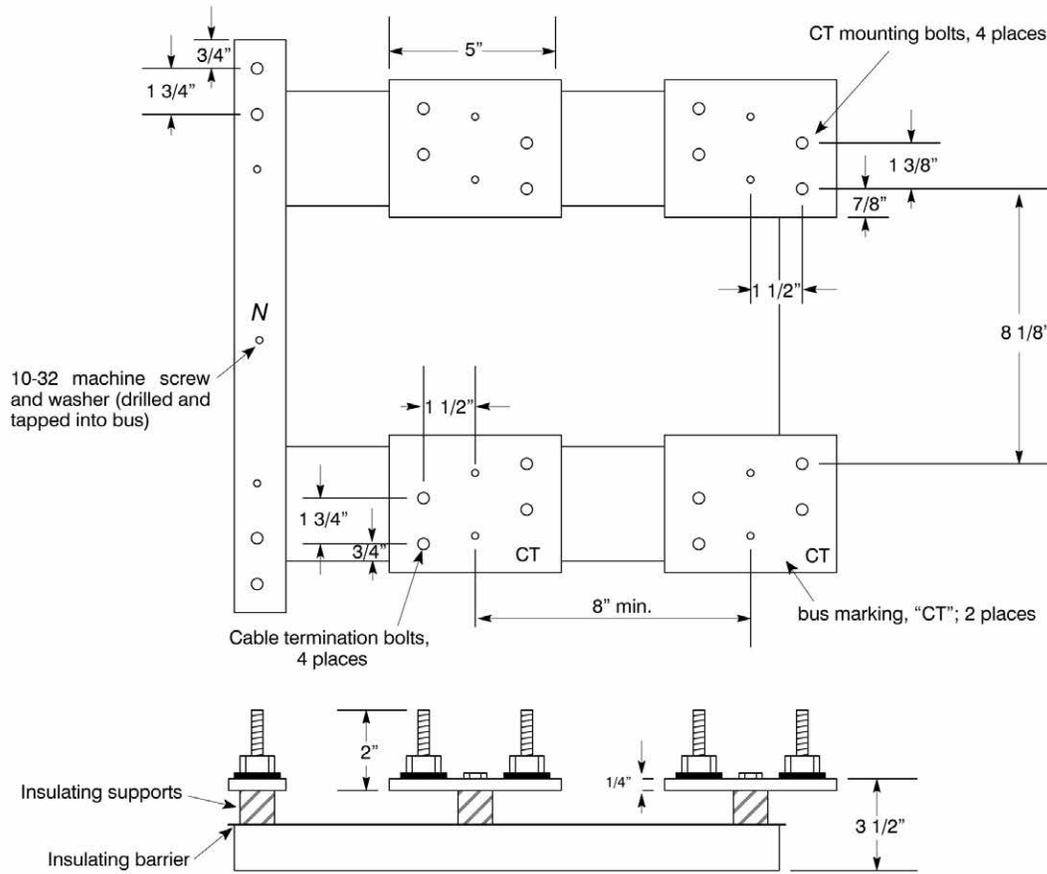
1. Where both line and load conductors enter or exit from the top or bottom of the cabinet a larger cabinet is required.
 - a. The dimension of the cabinet shall be 48"W × 48"H × 14"D. (These dimensions are greater than EUSERC 316 and 318 minimums.)
 - b. The cabinet shall have two sealable, hinged doors with handles.
2. The door shall have factory-installed hinges for side opening and shall be sealable.

Meter Socket Location:

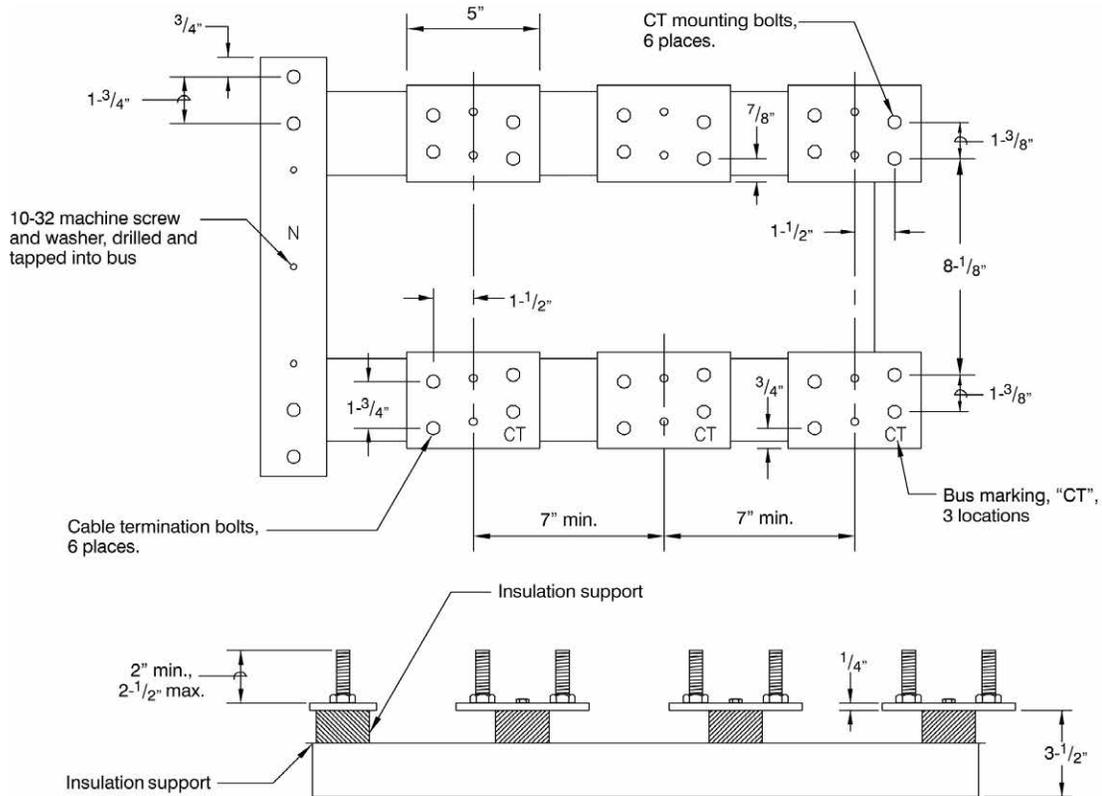
1. For single-hinged CT cabinets the meter socket shall be located opposite the hinged side, and not above or below the cabinet.
2. For dual-hinged CT cabinets, the meter socket can be mounted on either side of the cabinet but not above or below it.

Figure 46 shows a typical installation of wall-mounted CT metering.

Figure 47—CT Mounting Base Single-Phase, Three-Wire, 800 A Maximum, EUSERC 328A



**Figure 48—Mounting Base,
Three-Phase, Four-Wire, 800 A Maximum, EUSERC 329A**



9.4.4 CT Metering, Free-Standing

The Power Company allows free-standing installations on posts.

Free-standing installations are owned by the customer.

Installation requirements for service to free-standing installations are listed below. These requirements are in addition to the general requirements given in this section.

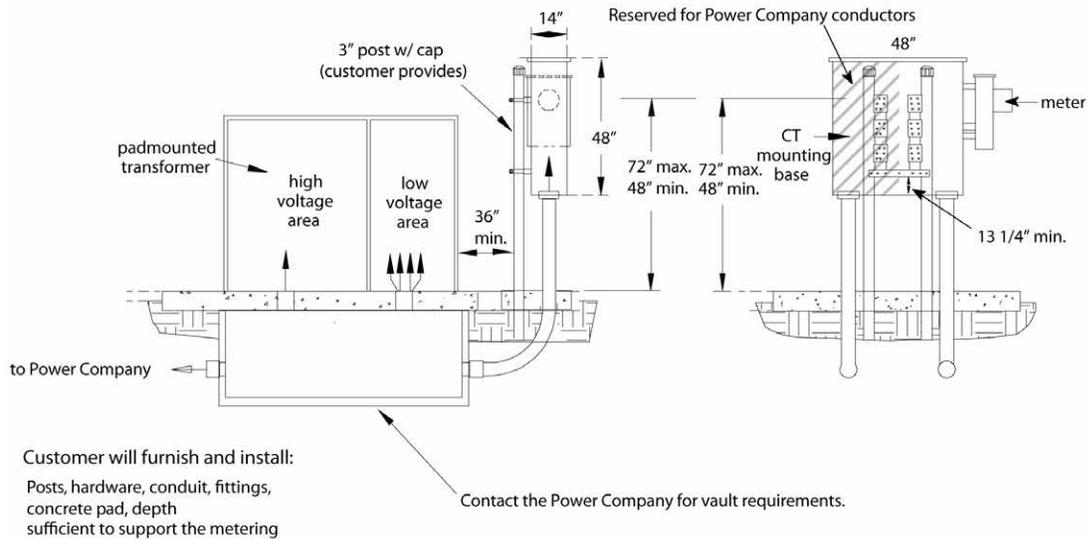
Requirements:

1. The customer shall consult the Power Company to determine the location of the free-standing meter installation.
2. The free-standing meter socket shall meet all local ordinance requirements.
3. The meter socket shall be protected from damage by use of barrier posts or other suitable protection approved prior to installation by the Power Company.
4. The CT cabinet must be properly supported with a minimum of two three-inch (3") steel posts with installed caps, or two wood post no less than 6" x 6" (nominal) and pressure-treated with an American Wood Preservative Association approved preservative. When equipment is less than 72 inches (72") apart, it shall be bonded according to the NESC.

5. The customer shall furnish, install and maintain posts, hardware, conduit, fittings, and concrete pads sufficient to support the metering.

Figure 49 illustrates a typical meter installation using steel posts.

**Figure 49—CT Metering for Free-Standing Installations,
600 V, 800 A Maximum**



9.4.5 CT Metering Conduit

The customer must provide conduit between the meter socket and the CT cabinet. When installing conduit, the following requirements shall be met:

Requirements for a meter within 12" of a CT cabinet:

1. Conduit shall be one-inch (1") IMC, Schedule 40 PVC, or greater.
2. Proper fittings and bushings shall protect metering conductors.

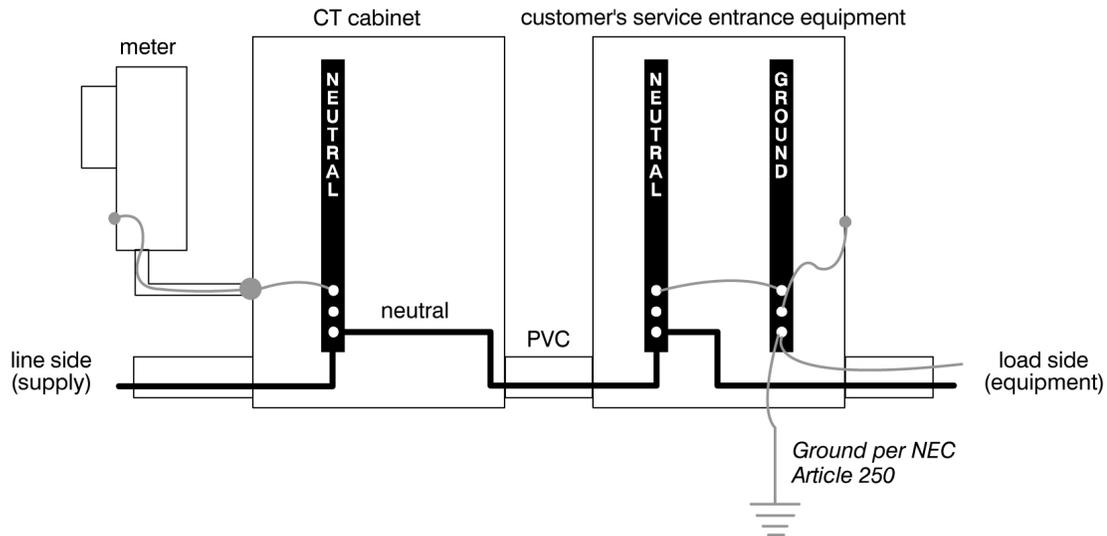
Requirements for a meter greater than 12" and up to 50' from the CT cabinet:

1. The meter socket must be visible from the CT cabinet.
2. Conduit runs must be less than 50 feet (50').
3. Conduit shall be 1 ¼" IMC or greater.
4. Conduit runs may not have more than three bends totaling 270°. No single bend greater than 90° is allowed.
5. Pull lines are required in all conduits.
6. Removable conduit fittings shall have sealing provisions.
7. LB connectors are not allowed between the CT cabinet and the meter socket.

9.4.6 CT Cabinet Bonding

The CT cabinet must be properly bonded and grounded per the NEC. Figure 50 illustrates one acceptable solution.

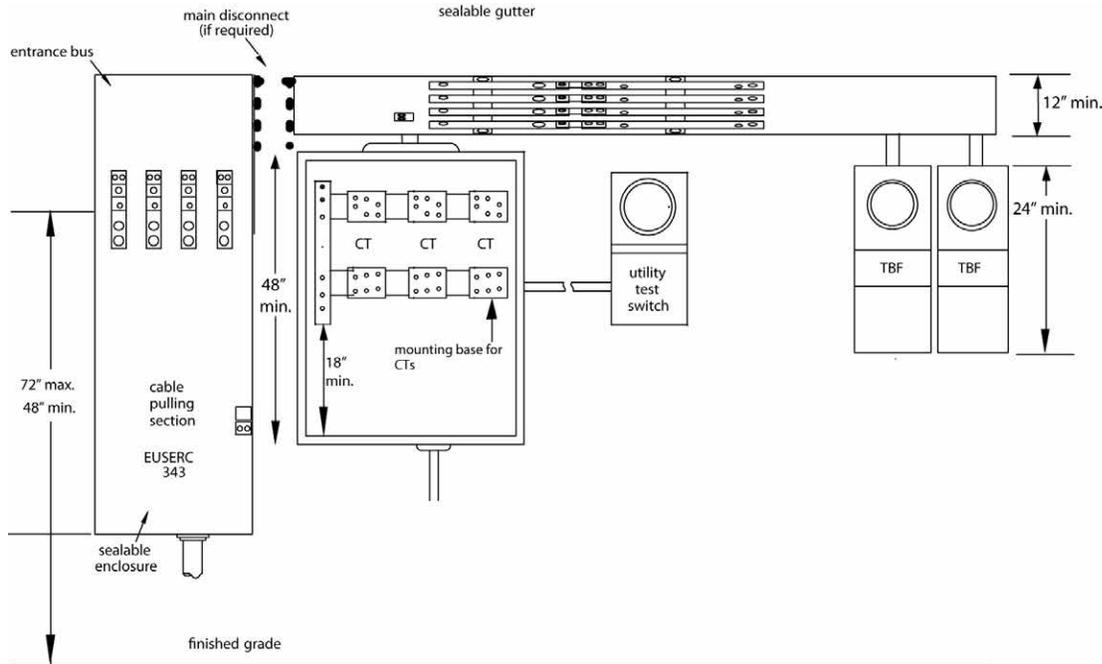
**Figure 50—NEC-Accepted CT Cabinet Bonding,
600 V, 800 A Maximum**



9.4.7 Combination Direct-Connect and CT Metering

Installations requiring both direct-connect and CT metering services shall meet the requirements of both types of services as described in the previous sections. An approved wall-mounted equipment installation is shown below. Switchboard combination units are also allowed. Refer to Section 9.5, *Switchboard Metering up to 4000 A* for requirements.

Figure 51—Combination Direct-Connect and CT Metering



9.5 Switchboard Metering up to 4000 A

A EUSERC-approved switchboard metering section is required when the service entrance rating is greater than 800 A. Switchboard metering may also be used for three-phase services over 200 A or single-phase services over 400 A.

The following table lists applicable EUSERC drawings for switchboard metering:

Table 23—EUSERC Switchboard References

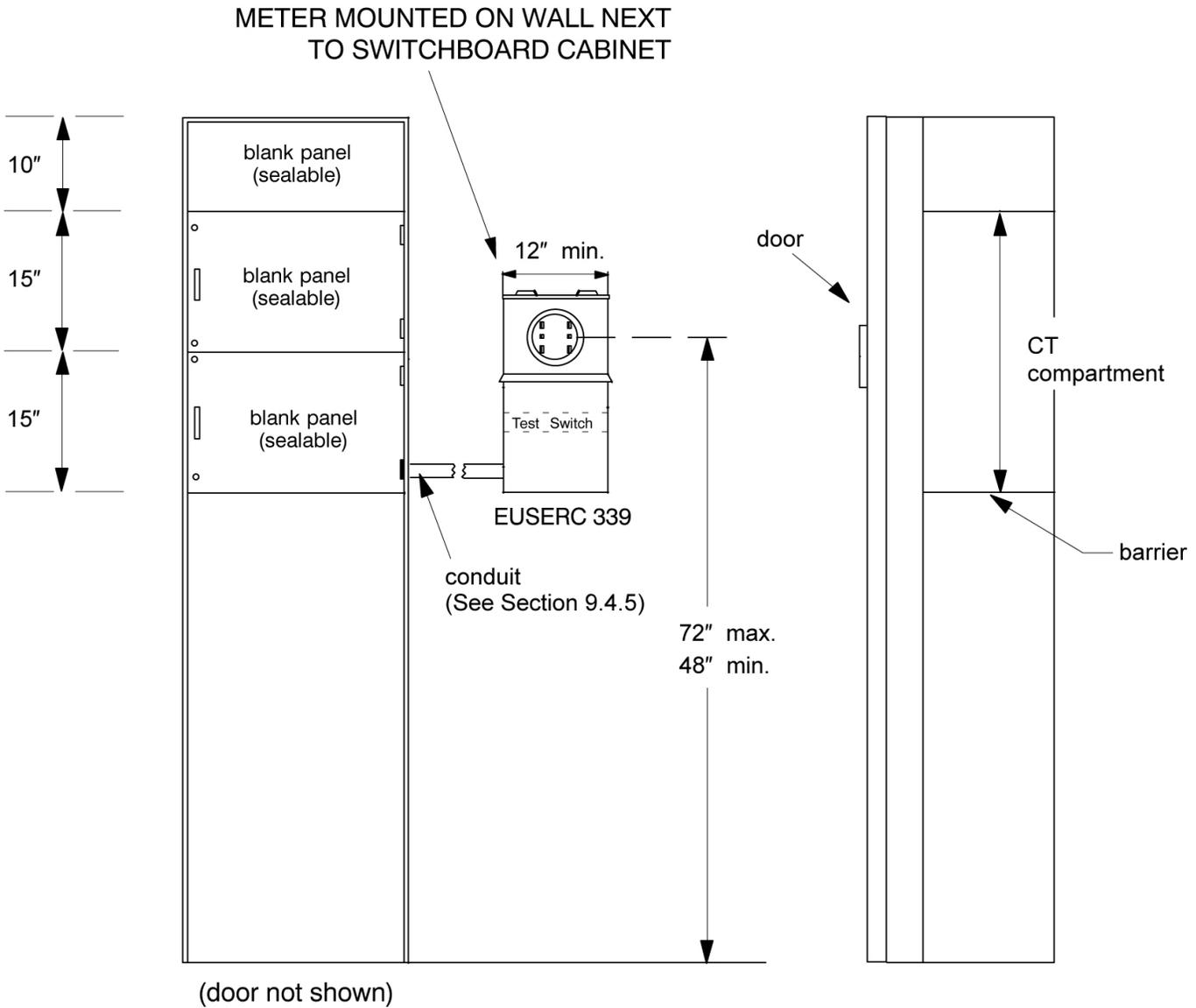
		EUSERC No.	Figure References
Switchboard	with remote meter socket	325, 326, 354	Figure 52
Termination	underground service	345	Figure 53
	overhead service	348	Figure 54
CT compartment	0 to 800 A, 1-phase	319	Figure 56, Figure 57
	0 to 1000 A, 3-phase	320	
	1001 to 3000 A	322	Figure 58
	above 3000 A	324	Figure 59
Meter socket	remote mount	339	Figure 52

Requirements:

1. The customer shall provide a drawing of the proposed service equipment, including EUSERC reference numbers and a mounting pad with dimensions, to the Power Company for review and approval. Power Company approval must be obtained prior to fabrication.
2. The customer shall provide and install:
 - a. Switchboard enclosure with CT compartment
 - b. Meter socket
 - c. Metering conduit—one-inch (1") minimum electrical non-metallic tubing (ENT) or flexible PVC for the metering secondary conductors
 - d. Locking equipment for the meter enclosure
 - e. Concrete mounting pad for the switchboard enclosure
 - f. A flat permanent surface (such as a concrete pad) extending a minimum of 36 inches (36") out from the switchboard in front of the CT compartment
3. The metering CTs shall be located in the CT compartment.
4. The CT compartment shall have a hinged door.
5. For a single service, the meter and test switch shall be mounted remotely (outside the cabinet).
6. Installing two or more metering services requires mounting on the compartments' hinged meter panels.
7. The metering conduit in the switchboard section shall terminate in the CT compartment in front of the CTs.
8. The door shall be equipped with a device to hold it in the open position at 90° or more.
9. Lugs for terminating the customer's ground wire (or other grounding conductors) shall be located outside the sealable section and shall be designed to allow the customer's neutral system to be readily accessible.
10. All pull and termination sections shall have full front access.
11. All removable cover panels shall have two lifting handles, and be limited to a maximum weight of 25 pounds.
12. The Power Company will terminate the line side service conductors using Power Company-provided connectors on lug landings in the pull section.
13. Bus bars are required from the pull section for service above 800 amps. Termination lugs are required and shall meet EUSERC 347.
14. Any customer-owned locking equipment for the metering enclosure must allow independent access by the Power Company.
15. Only Power Company conductors are allowed inside the pull section.

9.5.1 Switchboard with Remote Meter Socket

**Figure 52—Switchboard with Remote Meter Socket
EUSERC 325, 326, 339, and 345**



9.5.2 Service for Switchboard Enclosures

Table 24—Minimum Dimensions for Switchboard Pull Boxes (Termination Enclosures)

Switchboard Rating	Minimum Access Opening (W)		Termination Height (X)	
	3-wire	4-wire	min.	max.
Below 400 A	Consult the Power Company			
400-800 A	24"	24"	42"	72"
801-1200 A	24"	30"		
1201-2000 A	30"	35"		
2001-3000 A	—	42"	60"	
3001-4000 A	—	44"		

9.5.2.1 Switchboard Metering, 2000 A Maximum

Figure 53—Installation for Combination Switchboard Sections with a Termination Enclosure, EUSERC 327, 345

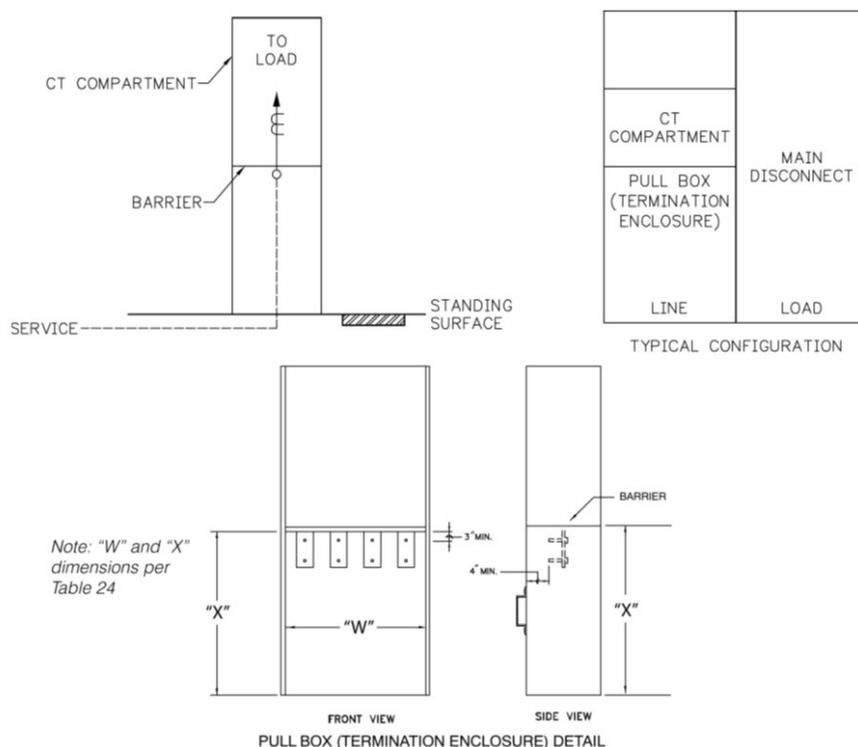
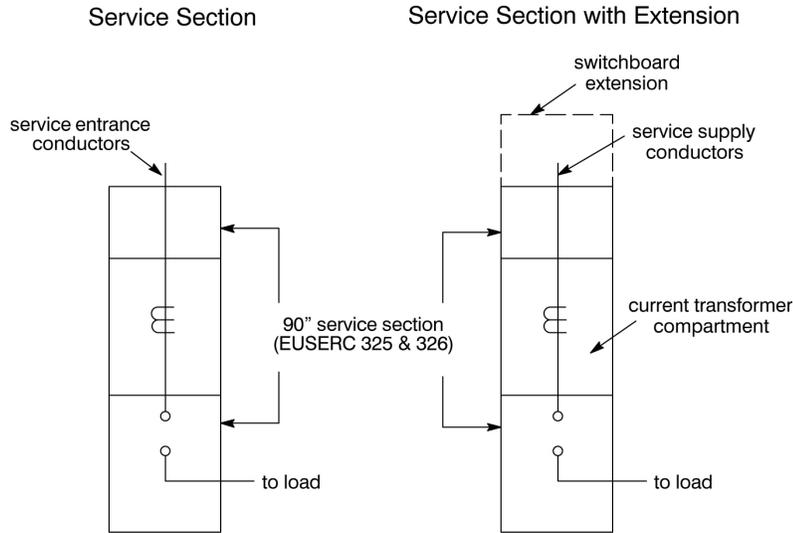
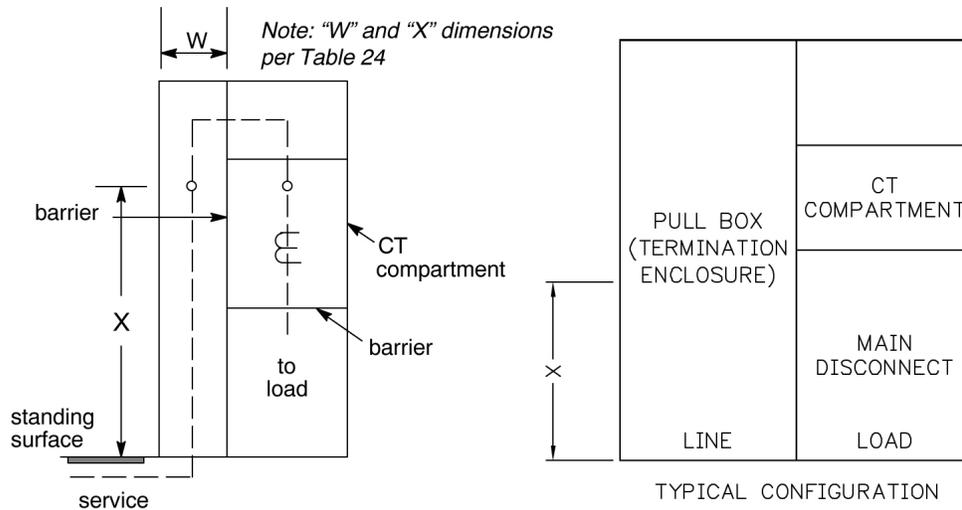


Figure 54—Overhead Service Termination, Switchboard Service Section, EUSERC 348



9.5.2.2 Switchboard Metering, 4000 A Maximum

Figure 55—Typical Installation for Switchboard Metering, EUSERC 345



9.5.3 CT Compartment for Switchboards

A CT compartment is required for all switchboard enclosures.

Table 25—Switchboard CT Compartment Summary

Service Type	Rated Current	EUSERC Drawing
Single-phase, three wire	0 to 800 A	319
Three-phase, three/four-wire	0 to 1000 A	320
Three-phase, four-wire	1001 to 3000 A	322
Three-phase, four-wire	3001 to 4000 A	324



**Figure 56—CT Metering for Switchboards
0-800 A, Single-Phase, Three-Wire, EUSERC 319**

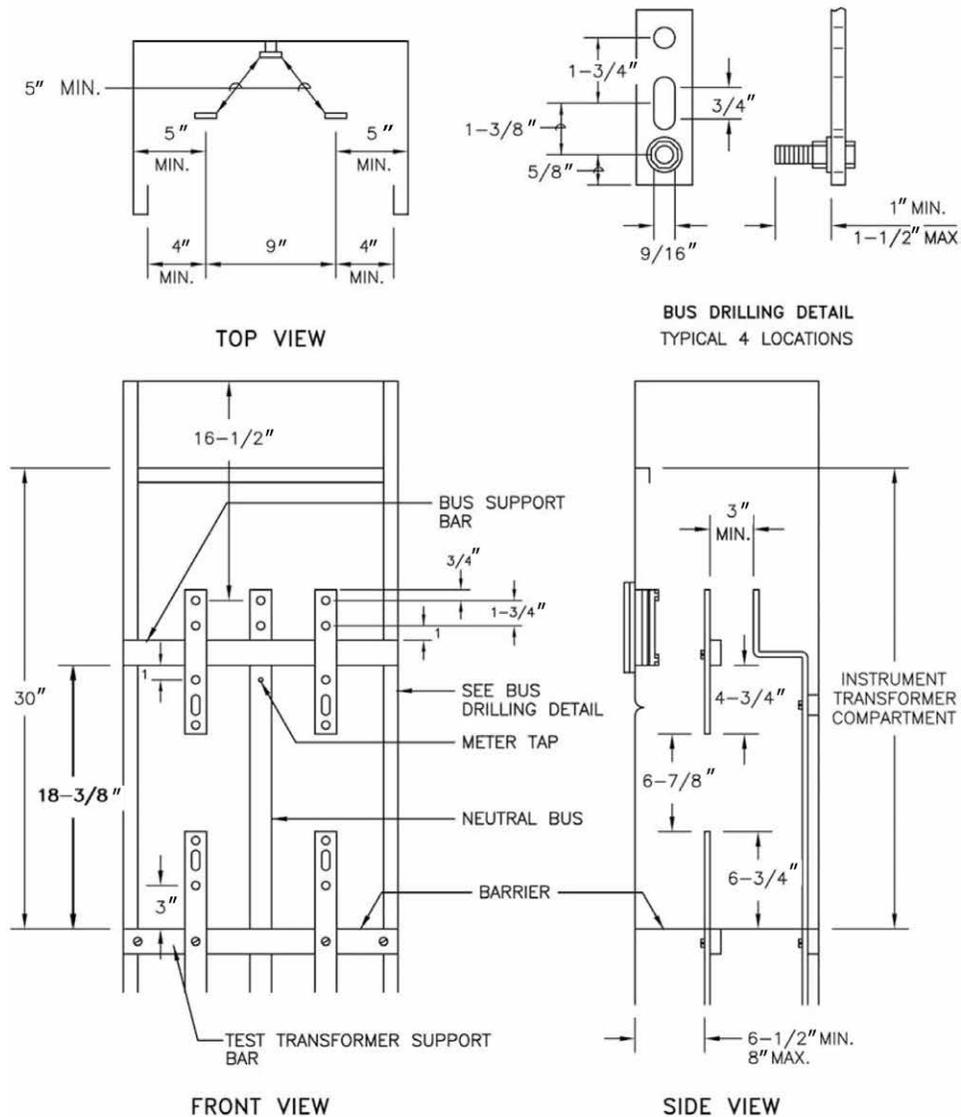
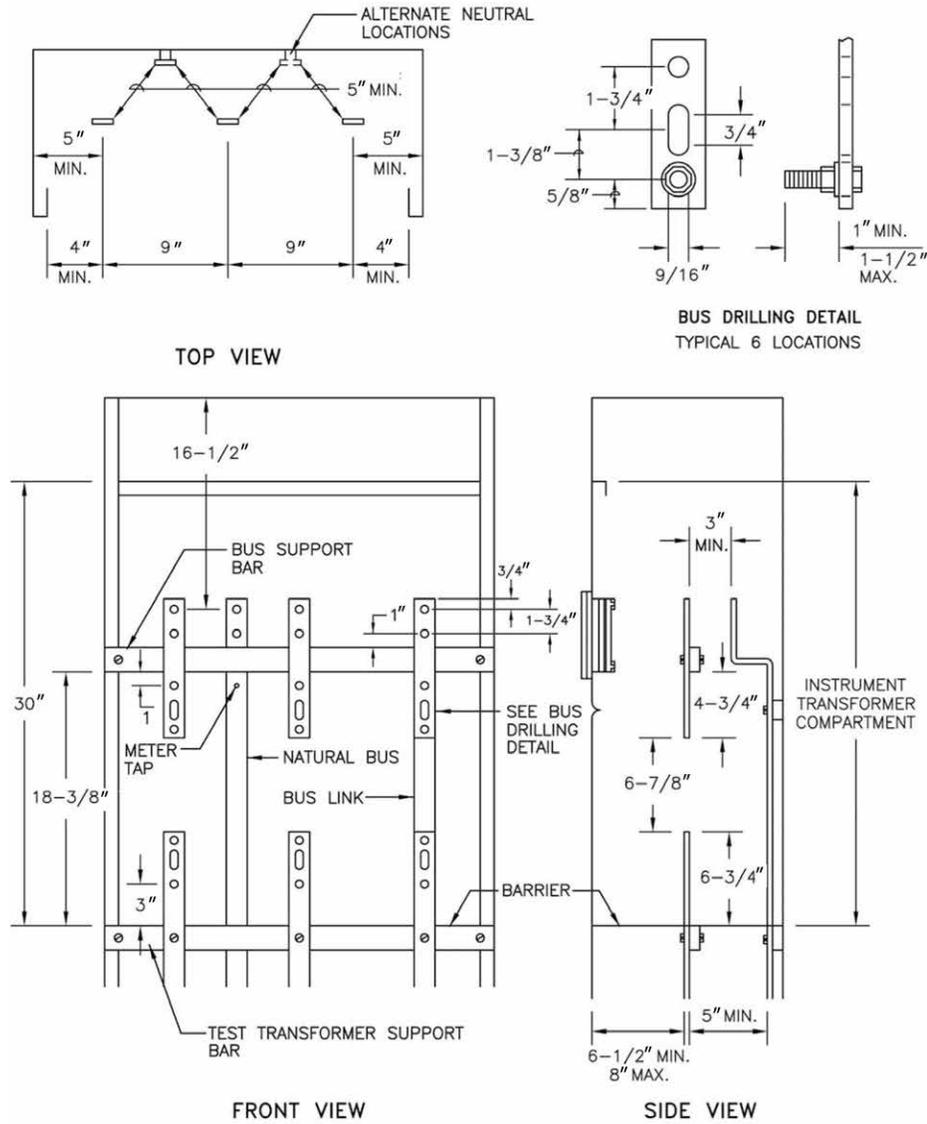
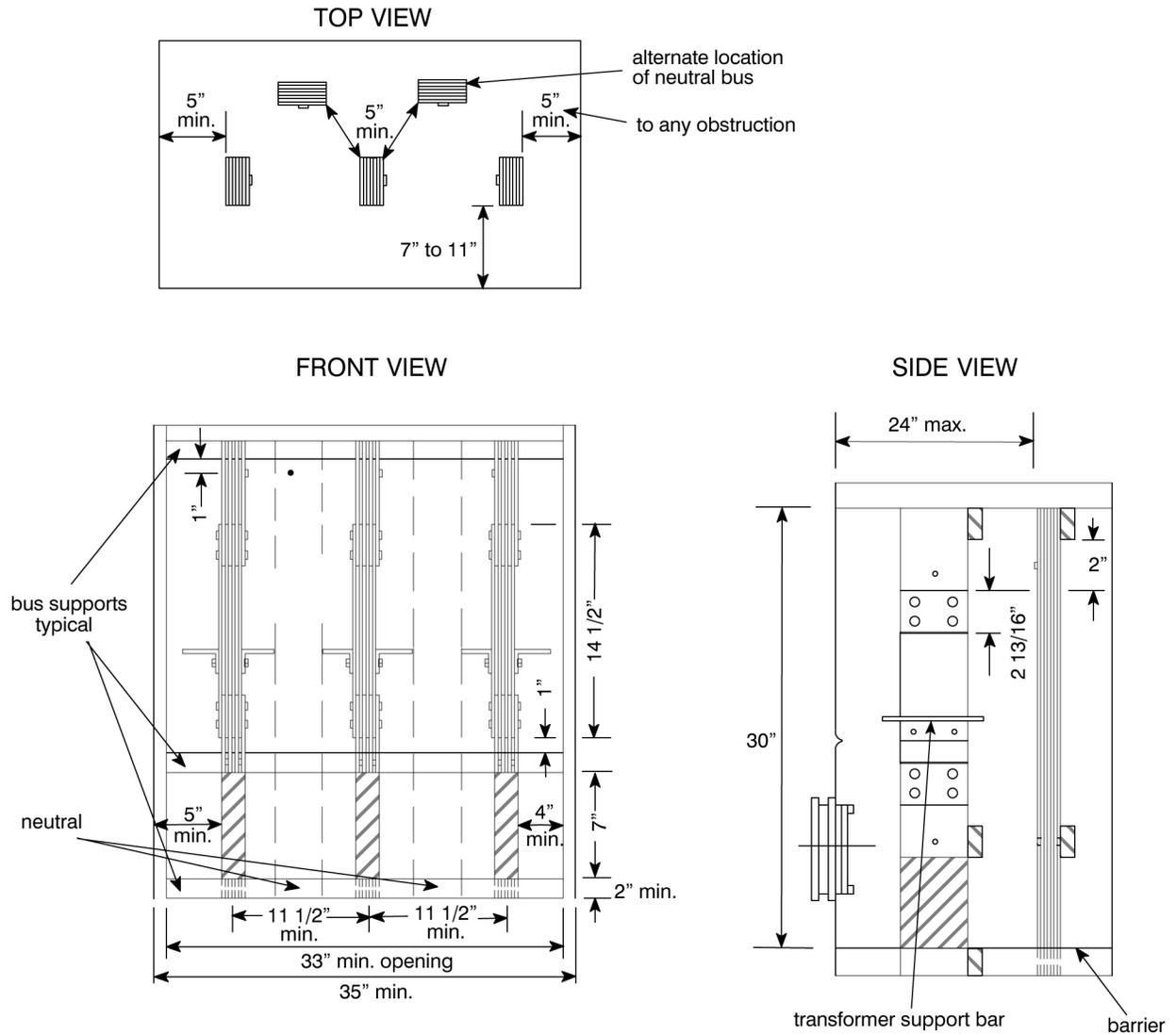


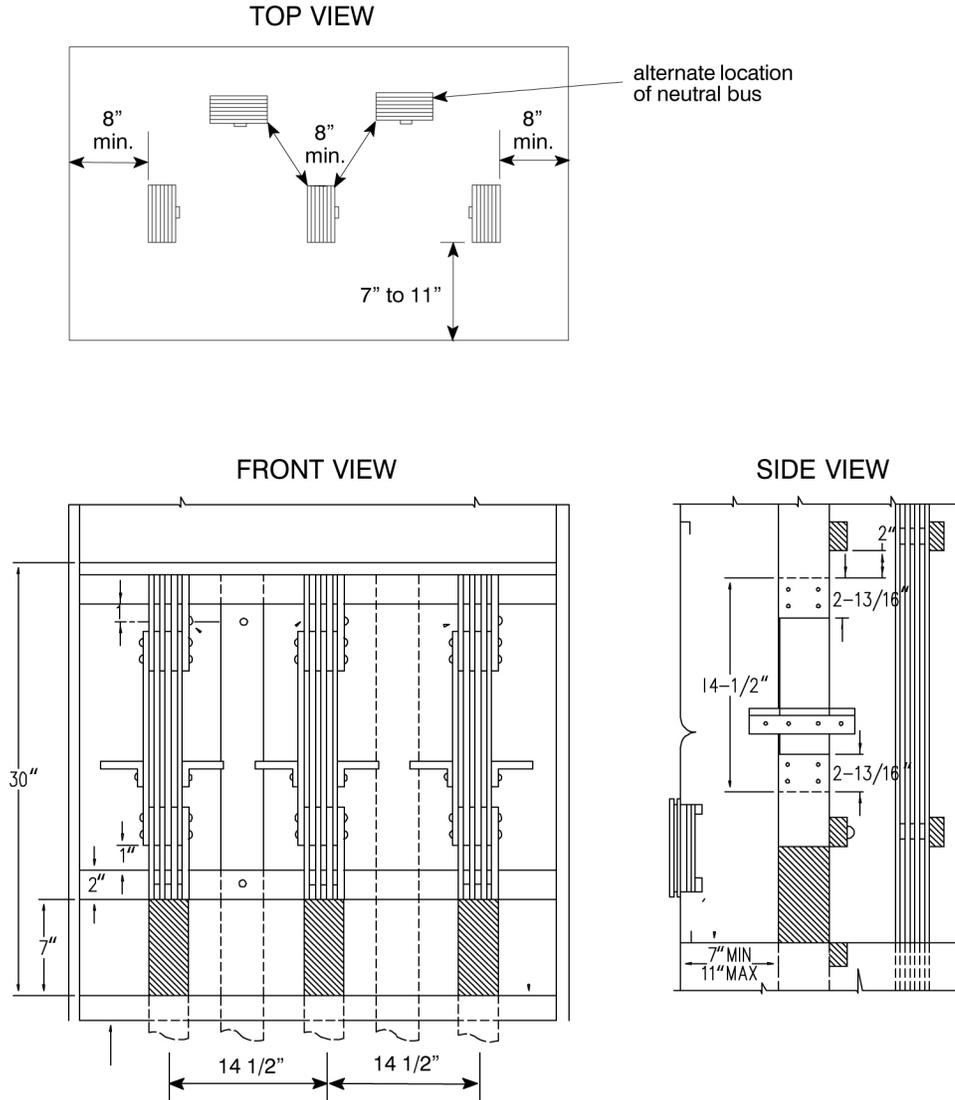
Figure 57—CT Metering for Switchboards
0-1000 A, Three-Phase, Three- and Four-Wire, EUSERC 320



**Figure 58—CT Metering for Switchboards
1001-3000 A, Three-Phase, Four-Wire Service, EUSERC 322**



**Figure 59—CT Compartment for Switchboards
3001 to 4000 A, Three-Phase, Four-Wire Service, EUSERC 324**



9.6 Primary Metering for Service Above 600 V

Prior to making site plans for primary voltage services consult the Power Company. The following guidelines are intended to assist with preliminary planning. Primary metering is available at a maximum of 34.5 kV and 600 A.

Required clearances are provided in Section 4, *Clearances*.

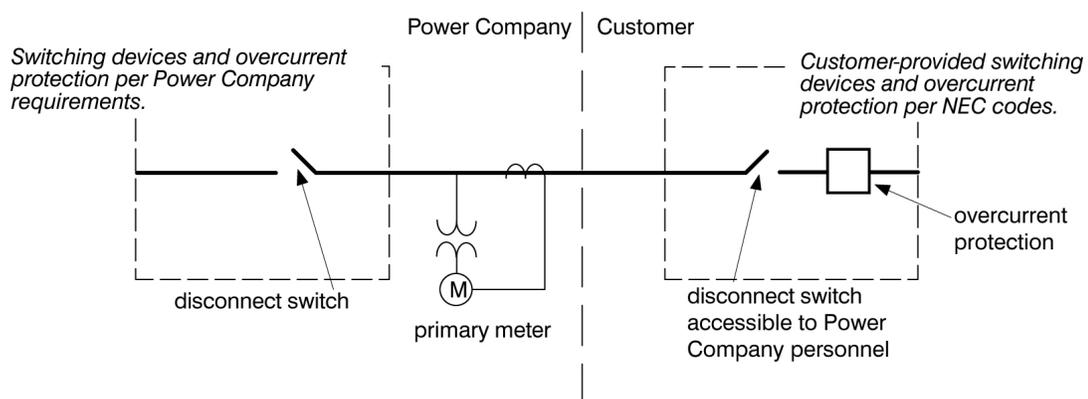
The Power Company will provide primary voltage delivery to customers directly, without transformation, from the high-voltage or “primary” distribution system (standard for the location in which service is requested), if the following conditions apply:

1. Service at primary voltage will not, in the Power Company’s judgment, adversely affect the operation of the Power Company’s electric system or service to other customers.
2. The customer shall provide a means of disconnect and overcurrent protection on the load side and separate from the primary metering location. Such devices shall be in sight of, and not more than 100 feet from the primary metering location.
3. The customer shall provide specifications for protective devices and transformers, including core types and winding configurations with associated wiring, for prior written approval by the Power Company. Consult the Power Company for acceptable transformer configurations.

Figure 60 illustrates the protection and isolation switches required to provide primary service.

The customer is responsible for the operation and maintenance of all customer-owned equipment. The Power Company does not service, maintain, repair, or provide replacement parts for customer-owned equipment.

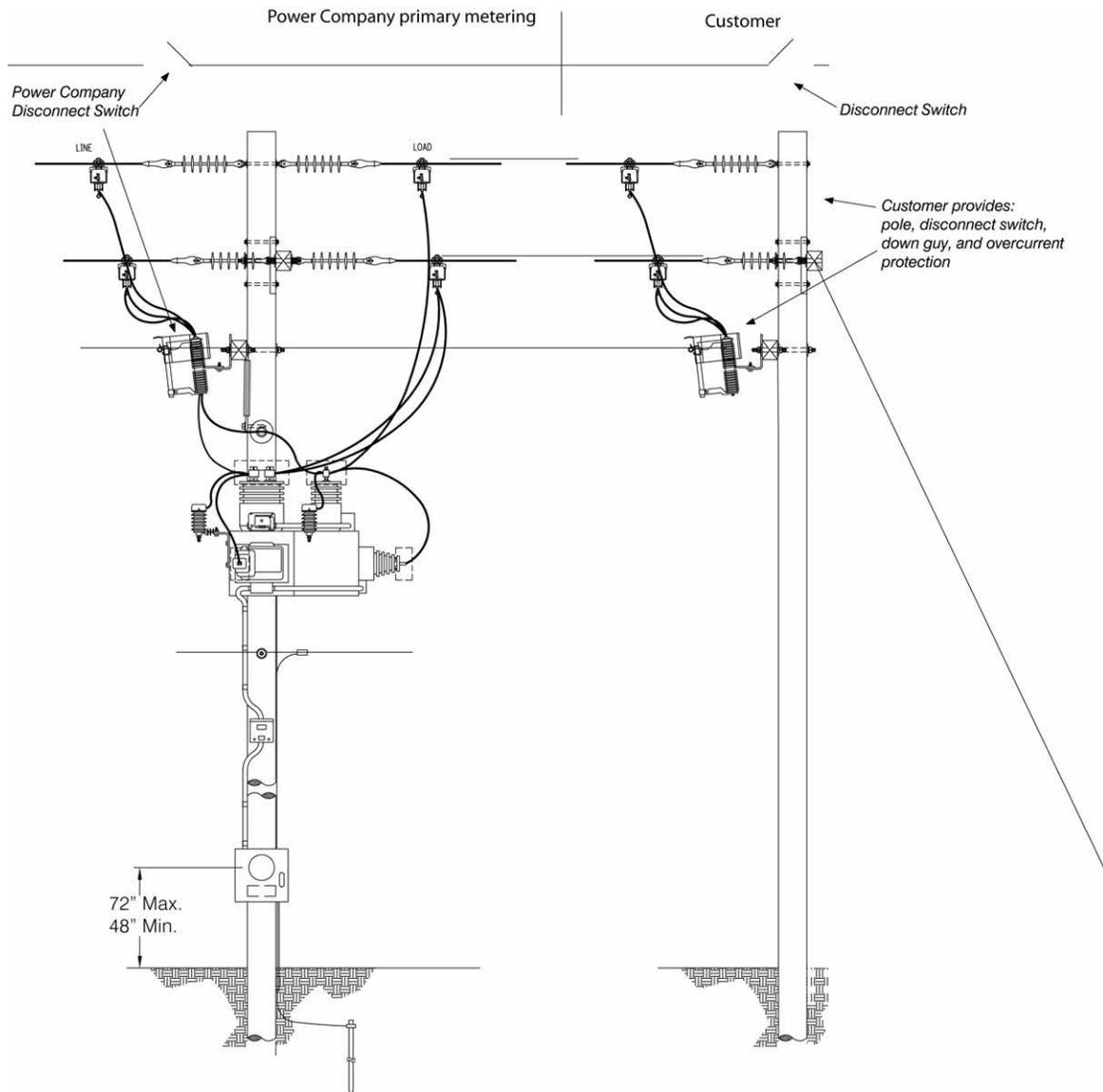
Figure 60—Connection Diagram, Primary Delivery Voltage



9.6.1 Overhead, Pole-Mounted Primary Metering (34.5 kV Maximum)

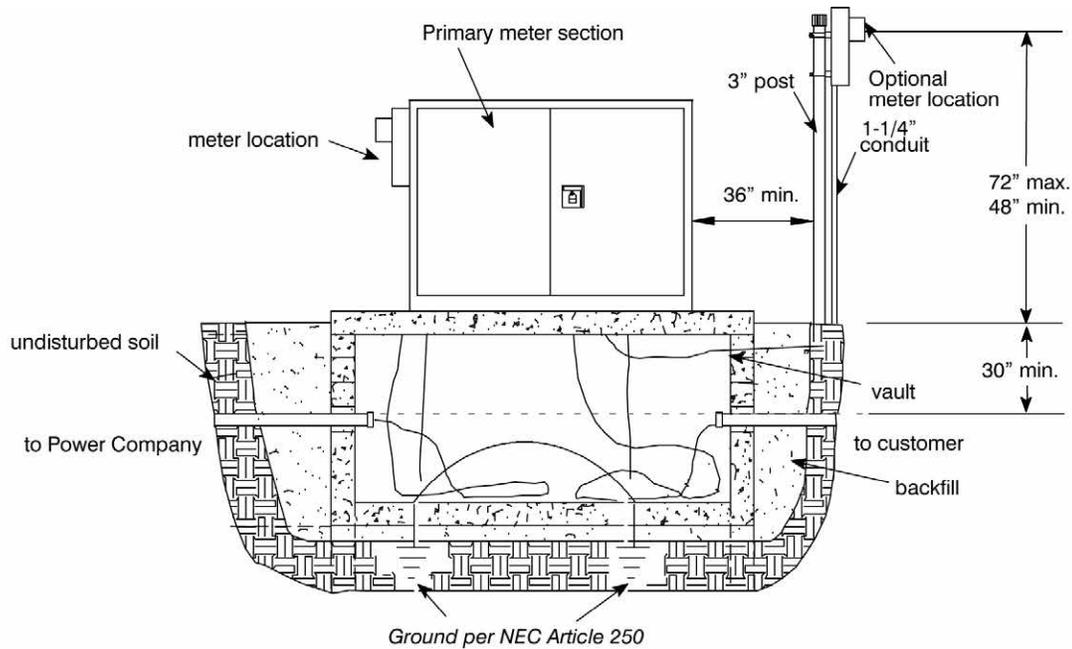
The primary metering pole is the service point. The Power Company will provide and connect one span of overhead primary conductors to the customer's pole.

Figure 61—Overhead, Pole-Mounted Primary Metering



9.6.2 Underground, Pad-Mounted Metering (Up to 34.5 kV, 600 A Maximum)

The service point for underground primary voltage delivery is at the pad-mounted enclosure containing the metering equipment.

Figure 62—Underground Pad-Mounted Primary Metering Enclosure**Requirements:**

1. The meter may be located on the primary metering enclosure, or post-mounted as shown in Figure 62.
2. The location of the metering vault will be mutually agreed upon between the customer and Power Company. The size of the metering vault will be specified by the Power Company.

9.6.3 Switchgear, Pad-Mounted Metering, EUSERC 400

Customers shall meet the requirements of EUSERC Section 400 when switchgear enclosures are required for metering primary voltage delivery services.

Requirements:**The customer shall provide/install:**

1. Enclosure drawings for approval prior to fabrication
2. All necessary hardware per EUSERC, Section 400
3. A concrete vault for the switchgear metering enclosure

9.7 Metering in a Customer-Owned Substation

The customer shall consult the Power Company for the location of metering equipment for customer-owned substations. Power Company metering equipment is not allowed in these substations.

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10. Special Installations

This chapter discusses special installations, that must be approved in writing by the Power Company before installation. The customer shall consult the Power Company on these special installations. All special installations covered in this section shall adhere to applicable requirements of this manual.

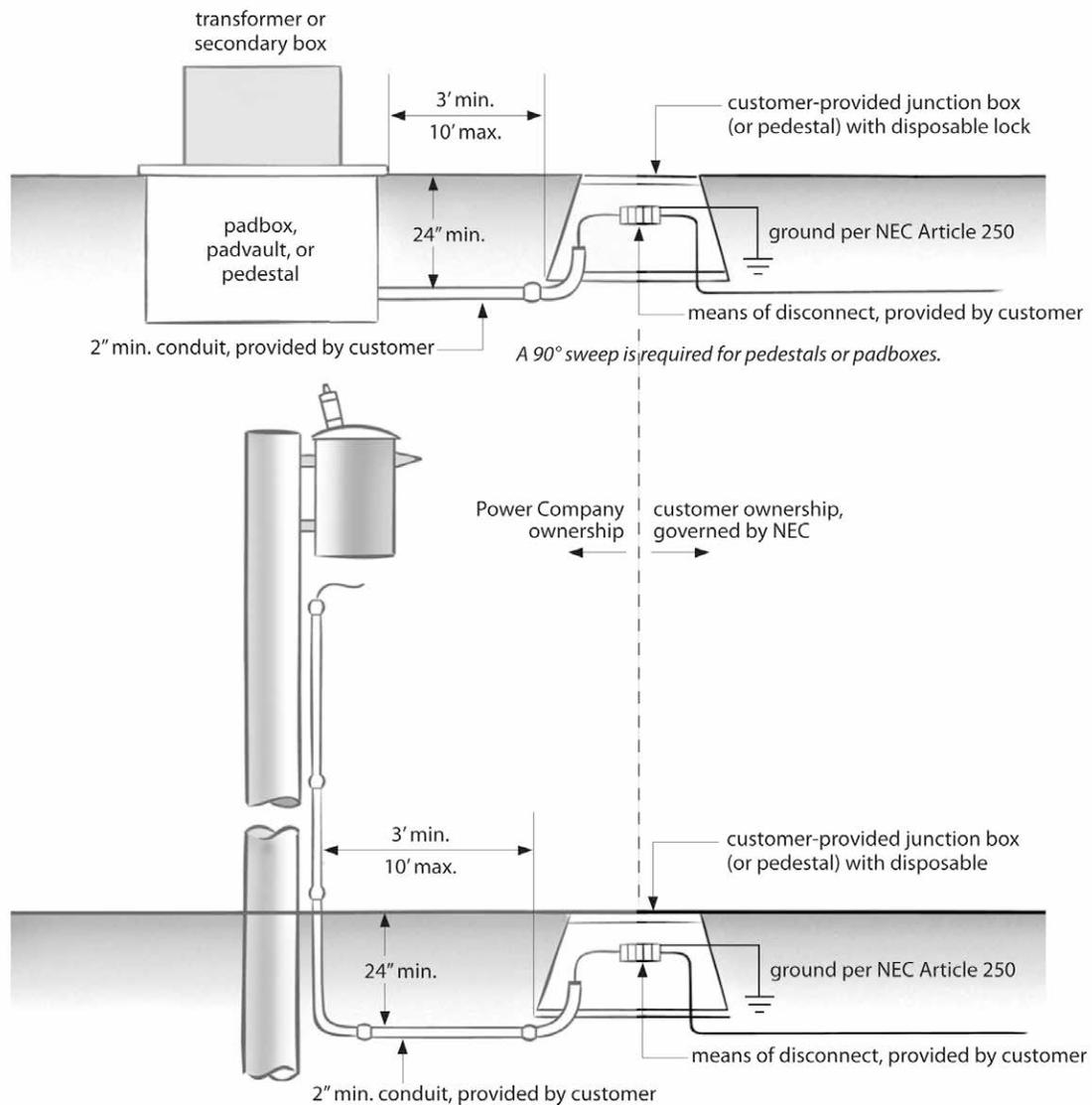
10.1 Street Lighting

Requirements:

1. The customer shall consult the Power Company on the junction box location, pedestal location, conduit location, and digging prior to installation.
2. The customer shall provide and install a junction box or pedestal, conduit, disconnect (fusing), a disposable lock, and customer-owned wire.
3. Any customer-owned metallic equipment within 72 inches (72") of the Power Company's metallic equipment shall be bonded.
4. The minimum dimensions of the junction box are 11 ¾" wide (at the top), 17" long, and 12" high and must be strong enough for incidental traffic areas.
5. Streetlight facilities with associated electrical outlets shall be metered.
6. The customer shall provide all conduit from the Power Company source to the customer-provided junction box or pedestal.
7. The customer's junction box or pedestal shall be located as shown in Figure 63.



Figure 63—Street Lighting Points of Connection Diagram



More information on streetlights is posted online at: <https://www.pacificpower.net/working-with-us/municipalities.html> and <https://www.rockymountainpower.net/working-with-us/municipalities.html>.

10.2 Multi-Use Buildings

This section applies to mixed commercial and residential services such as high-rise residential buildings and residential/retail developments. The Power Company may provide different service voltages: typically 120/208 V for residential and light non-residential services, and 277/480 V for non-residential services.

Requirements:

1. Where the customer requests an indoor service point, it shall be located as close to the transformer as possible.
2. Meter centers for residences shall be located in mutually-agreed-upon locations (for example, on every third floor of a high-rise building).
3. Service entrance overcurrent protection is required at the service point.

10.3 Meter Rooms

Meter rooms are required in certain installations such as upper-story metering facilities. A written agreement will be provided to the customer by the Power Company based on the requirements below.

Requirements:

1. The door to the meter room shall open outward and shall have a panic bar.
2. Multiple meter rooms in high-rises should be located close to an elevator.
3. Access to meter rooms is shared by the customer and the Power Company. The customer shall provide the Power Company with an access key, and the Power Company will provide the lock box.
4. Only metering, service entrance, communications, and electronic equipment that supports the electrical service shall be installed in the meter room.
5. The meter room shall not be used for storage.
6. A 120 V outlet shall be available for Power Company use in the meter room.
7. Provisions for a communication raceway shall be considered during design and construction, and shall be installed by customer if required by the Power Company.
8. The meter room shall have adequate lighting in all work spaces.



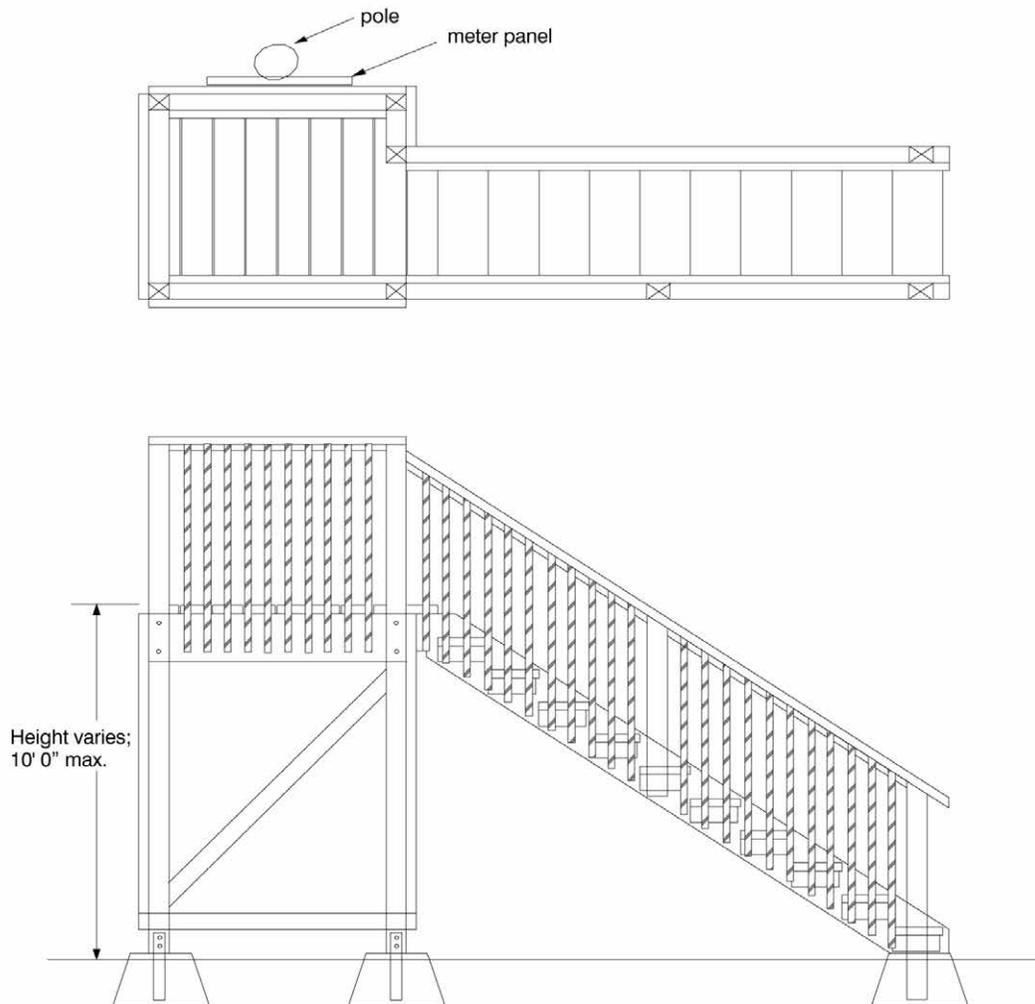
9. Meter rooms for a single metered service, or for any building with only one meter room, shall:
 - a. be located on the side of the building closest to the Power Company source.
 - b. have a door that opens to the exterior of the building.
 - c. not provide any access to the rest of the building.
 - d. be located on the exterior wall of the building.
 - e. be located on the same level as the Power Company source.
10. Meter rooms containing equipment servicing primary voltage (600 V and above) will have additional requirements; consult the Power Company.

10.4 Meter Access Platforms

In flood plains or other locations where the center of the meter socket is greater than 72 inches (72") above ground level, a suitable platform and stairs shall be provided and maintained by the customer for meter access.

Requirements:

1. The deck of the meter platform shall maintain applicable clearances from equipment as specified in Section 4.
2. The customer shall provide permits and plan and profile drawings, approved by the authority having jurisdiction, for Power Company review prior to installation.
3. The customer shall obtain all land use approvals required for a meter access platform.

Figure 64—Typical Meter Access Platform, Customer-Installed (Example)

10.5 Marinas

The following specific requirements apply to electrical service to marinas.

Requirements:

1. Metering equipment shall be located on land, above the flood plain.
2. Meter mounting structures shall be constructed of materials suitable for the environment.

10.6 Kiosks and Skid-Mounted Structures

Skid-mounted portable structures, such as kiosks, require a free-standing meter enclosure with a non-residential meter socket.

10.7 Electric Vehicle Charging Stations

Charging facilities shall comply with all local, state, and national codes and regulations, regardless of the type of installation. The customer is responsible for obtaining all required permits from local authorities.

Electric Vehicle (EV) requirements continue to undergo rapid change. Power Company requirements in this manual shall apply until specific EV requirements are established.

See *ESR White Paper 10—Electric Vehicle Charging Stations*.



10.8 Recreational Vehicles (RV's)

Services to recreational vehicles are considered non-residential and all non-residential requirements shall apply. Recreational vehicle parks are a general service and are metered at strategic locations depending on demand and geography. The Power Company determines the point(s) of service. Recreational vehicles shall not be individually metered in a recreational vehicle park.

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