PACIFICORP
A BERKSHIRE HATHAWAY ENERGY COMPANY

2022 Electric Service Requirements Manual

(R1, 2024)

Service and metering requirements for residential, commercial, agricultural and industrial customers

PACIFIC POWER

California
Oregon
Washington

ROCKY MOUNTAIN POWER

Idaho
Utah
Wyoming

2022 Electric Service Requirements Manual, R1 (2024)

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Printed versions of this document may be out of date.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.

Cover photo: Astoria-Megler Bridge, Astoria Oregon

This first minor revision of the 2022 Electric Service Requirements manual supersedes all previous editions. The publication date of this manual is November 20, 2024. The requirements in this publication will be enforced for any installation made after January 1, 2025.

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 February 1, 2022, are marked with revision bars. Revised table content is rendered in lighter text and with revision bars.

Noteworthy changes in this edition include:
- Updated emphasis on access, service type, disconnect locations across the ESR in text and figures.
- Tables 1, 3, 12 have been slightly modified.
- A new section, Section 2.4, has been added for additional load (e.g., EV chargers)
- Revenue-protective language has been added to Section 3.5.1 to require sealing means for non-metered conductors.
- Two dwellings on a single lot requires a single point of service – Keep metering equipment together (Section 7.3, Note 10).
- Conduit requirements have been modified in several sections, including requirements that conduit be a straight sweep into the meter socket.
- Working clearances, Figure 71, have been added for underground primary metering enclosures.
- In Section 10.2, meter room requirements formerly in the ESR now reference Policy 368.

Pacific Power and Rocky Mountain Power strongly recommend contacting the Power Company with questions concerning the requirements in this manual. 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 workload. Please contact the Power Company early in your construction process.

Pacific Power and Rocky Mountain Power Service Territory Map

WASHINGTON

OREGON

CALIFORNIA

NEVADA

PACIFIC OCEAN

YAKIMA
TOPPENISH
SUNNYSIDE
DAYTON
ASTORIA
SEASIDE
GOODNOE HILLS
WALLA WALLA
PORTLAND
HOOD RIVER
PENDLETON
LINCOLN CITY
DALLAS
ENTERPRISE
INDEPENDENCE
STAYTON
ALBANY
CORVALLIS
LEBANON
MADRAS
SWEET HOME
JUNCTION CITY
REDMOND
PRINEVILLE
CRESWELL
BEND
COTTAGE GROVE
COOS BAY/NORTH BEND
ROSEBURG
COQUILLE
MYRTLE CREEK
GRANTS PASS
EAGLE POINT
ROGUE RIVER
CENTRAL POINT
KLAMATH FALLS
CAVE JUNCTION
MEDFORD
LAKEVIEW
CRESCENT CITY
YREKA
MT. SHASTA

PACIFICORP
A BERKSHIRE HATHAWAY ENERGY COMPANY

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

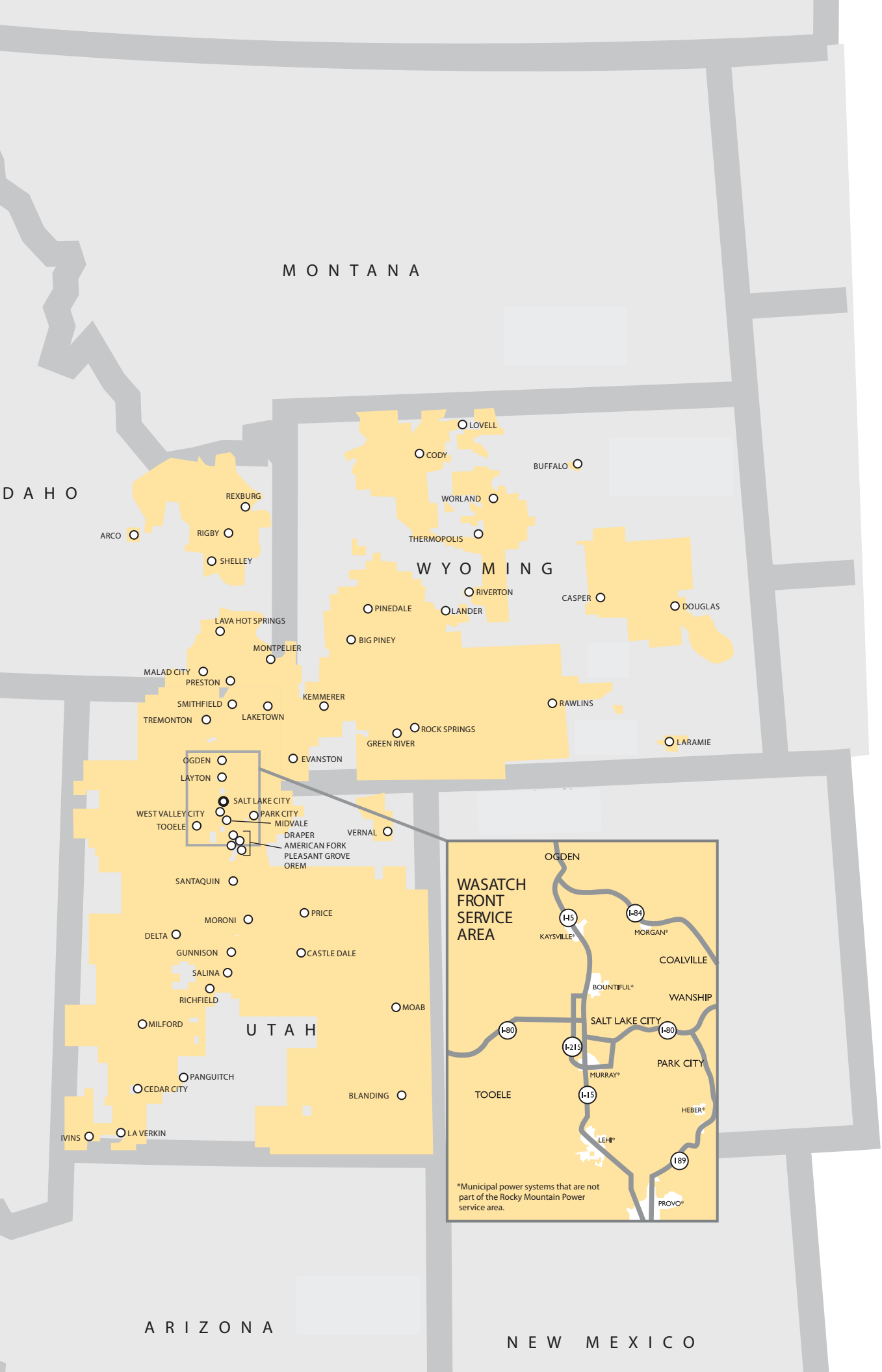
Customer service: 1-888-221-7070

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
DAHO
WYOMING
UTAH
ARIZONA
NEW MEXICO
LOVELL
CODY
BUFFALO
REXBURG
WORLAND
ARCO
RIGBY
THERMOPOLIS
SHELLEY
RIVERTON
CASPER
DOUGLAS
PINEDALE
LANDER
LAVA HOT SPRINGS
BIG PINEY
MONTPELIER
MALAD CITY
PRESTON
KEMMERER
RAWLINS
SMITHFIELD
LAKETOWN
TREMONTON
ROCK SPRINGS
GREEN RIVER
LARAMIE
OGDEN
EVANSTON
LAYTON
SALT LAKE CITY
WEST VALLEY CITY
PARK CITY
TOOELE
MIDVALE
DRAPER
AMERICAN FORK
PLEASANT GROVE
OREM
VERNAL
SANTAQUIN
PRICE
MORONI
DELTA
GUNNISON
CASTLE DALE
SALINA
RICHFIELD
MOAB
MILFORD
PANGUITCH
CEDAR CITY
BLANDING
IVINS
LA VERKIN
WASATCH FRONT SERVICE AREA
OGDEN
I-15
I-84
KAYSVILLE*
MORGAN*
COALVILLE
BOUNTIFUL*
WANSHIP
SALT LAKE CITY
I-80
I-80
I-215
PARK CITY
MURRAY*
TOOELE
I-15
HEBER*
LEHI*
189
PROVO*
*Municipal power systems that are not part of the Rocky Mountain Power service area.

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Residential One- and Two-Family Dwelling Connection Checklist

A customer building a new residential one- or two-family dwelling (including manufactured and mobile homes) and connecting to the Power Company's electrical system may use this checklist as a guide. This checklist is only a general guide, and it is a customer's responsibility to comply with all applicable provisions of these Electric Service Requirements.

☐ Obtain all necessary building and zoning permits.

☐ Complete the company application for new electric service at:
https://www.rockymountainpower.net/working-with-us/builders-contractors.html
https://www.pacificpower.net/working-with-us/builders-contractors.html

☐ 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 1, *Permits and Applications*.

☐ Read Section 1, *Services and Meter Installations*.

☐ Determine single-phase service size:

- ☐ 200 amp
- ☐ 400 amp

☐ Check the type of service:

- ☐ Temporary service. (See Section 1 for temporary construction service requirements.)
- ☐ Overhead service. (See Section 1 for clearances and Section 1 for service requirements.)
- ☐ Underground service. (See Section 1 for clearances, Section 1 for trenching requirements, and Section 1 for service requirements.)

☐ Select the meter socket enclosure (see Section 1.3).

☐ 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 1-800-469-3981 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.

Table of Contents

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 nonresidential 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 overhead service conductor. 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.

Electric Vehicle Supply Equipment (EVSE) / aka Chargers — Electric vehicle supply equipment refers to device(s) with one or more charging ports and connectors for charging electric vehicles (EV).

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 (per company Material Specification ZG 033, *Fiberglass Conduit*, posted at www.pacificpower.net/con/ESR.html and www.rockymountainpower.net/con/ESR.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.

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 — Overhead conductors from the utility pole to the customer's equipment.

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.

Readily Accessible —To be capable of being reached quickly for operations, maintenance, testing and meter reading, or inspection without the need to climb over, remove obstacles, or resort to portable ladders, chairs, etc. The installation must be readily accessible 24 hours per day, seven days per week in all weather situations.

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 Power Company or customer equipment.

Rewire — Work performed on electrical wiring that includes reinstallation of the meter socket and/or 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.

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 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, including metering equipment enclosures such as meter sockets, CT and switchboard cabinets, 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 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 underground service conductors.

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 — 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.

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 (VT) — 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 overhead service conductor entry point where overhead power lines enter a building, or where wires transition between overhead and underground cables.

Acronyms

A — Amperes, amps

AHJ — Authority Having Jurisdiction

AIC — Ampere Interrupting Capacity

ANSI — American National Standards Institute

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 Equipment Committee

EV — Electric Vehicle

EVSE — Electric Vehicle Supply Equipment

FEMA — Federal Emergency Management Agency

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

NRTL — Nationally Recognized Testing Laboratory

OSHA — Occupational Safety and Health Administration

PUE — Public Utility Easement

PVC — Polyvinyl chloride

RMC — Rigid Metallic Conduit

TBF — Test Block Facility

V — Volts

Reference Documents

The following publications represent a number of the documents that are referenced in the Electric Service Requirements Manual that may be useful in conjunction with this publication. Additional OSHA, local, and state documents that are not referenced here may also be relevant to the building process When a referenced publication is superseded by an approved revision, the revision shall apply.

External Reference Documents

40 Code of Federal Regulations (CFR) 112, Oil Pollution Prevention

California General Order (GO) 95, Rules For Overhead Electric Line Construction

Electric Utility Service Equipment Requirements Committee (EUSERC), Drawings: 301, 302B, 304, 305, 308, 316-320, 322, 324, 327-329, 339, 343, 345, 347-348, 353-354, 400

HUD-4930.3G, Permanent Foundations Guide for Manufactured Housing

National Electrical Code (NEC), NFPA 70

National Electric Safety Code (NESC)

ANSI C12

UL 414, UL Standard for Safety Meter Sockets

Power Company Reference Documents

Engineering Handbook 1C.4.1 Harmonic Distortion

Engineering Handbook 1C.5.1, Voltage Fluctuation and Flicker

Material Specification ZG 033, Fiberglass Conduit

Pacific Power Policy 343, Underground Conduit Systems for Primary and Secondary Conductors

Rocky Mountain Power Policy 242, Underground Conduit Systems for Primary and Secondary Conductors

1. General Requirements

1.1 Manual Purpose and Scope

The purpose of this manual is to aid customers in obtaining service from the Power Company. To obtain service, the customer must comply with all provisions of this Electric Service Requirements (ESR) Manual. The customer is solely responsible 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, damaged services, and upgraded services. If additional information is required, please contact the Power Company at 1-800-469-3981 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 and locally saved versions of this document may be out of date. Please consult the Power Company websites for the most recent version.

1.2 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, including without limitation any agent acting on behalf of such party, requesting electrical service from the Power Company.

1.3 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. Any deviations from ESR Manual requirements must be approved in writing by the Power Company prior to installation. Failure to receive prior written approval may result in denial of service if the requirements are not met until the nonconforming installation is modified to meet Power Company requirements. The customer is solely responsible for any damage, including without limitation to the customer, the customer's property, or to a third party, caused by a nonconforming installation, regardless of whether the Power Company has inspected the same and/or connects service.

Prior written approval also 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).

1.4 Changes or Conflicts in Requirements

This manual is written with the intent to comply with all current 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 or that require clarification.

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.

1.5 Maximum Available Fault Current Requirement

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

1.6 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.

1.7 Work Activity Near High-Voltage Overhead Power Lines (Over 600 V)

High-voltage overhead power lines are dangerous, and any person working in proximity to a power line must exert the utmost care to prevent accidental contact. States have enacted laws addressing work around high voltage overhead lines and required minimum clearance distances while any work is performed. In addition, government agencies, including the Occupational Safety and Health Administration (OSHA), have regulations applicable to work near a power line.

The customer must comply with any and all applicable laws and regulations at all times, and the customer is solely responsible to verify compliance with all current legal obligations whenever a customer undertakes work near any power line.

Because of the inherent dangers in a high voltage power line, the Power Company strongly recommends that members of the public consult Power Company information provided on our websites here: https://www.pacificpower.net/outages-safety/electrical-safety.html and here: https://www.rockymountainpower.net/outages-safety/electrical-safety.html.

1.8 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 1-800-469-3981 to coordinate disconnection.

All physical disconnects shall be done by Power Company personnel. Customers or their agents shall not physically disconnect their service. This creates a safety risk for customers and their agents and may, per Power Company regulations, incur a cost to the customer.

1.9 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:

1.10 Vegetation and Accessibility

Prior to any installation, the customer shall prepare the premises so that trees, shrubs, or other vegetation do not interfere with Power Company access or operation of its facilities, including poles, pad-mounted equipment, overhead equipment, underground conduit or cable, or metering equipment. (See Section 4 *Clearance and Access*.) The customer remains obligated to maintain access consistent with all electrical service regulations. The Power Company reserves the right to remove, or require removal of, vegetation at the customer's expense.

1.11 Barrier Posts

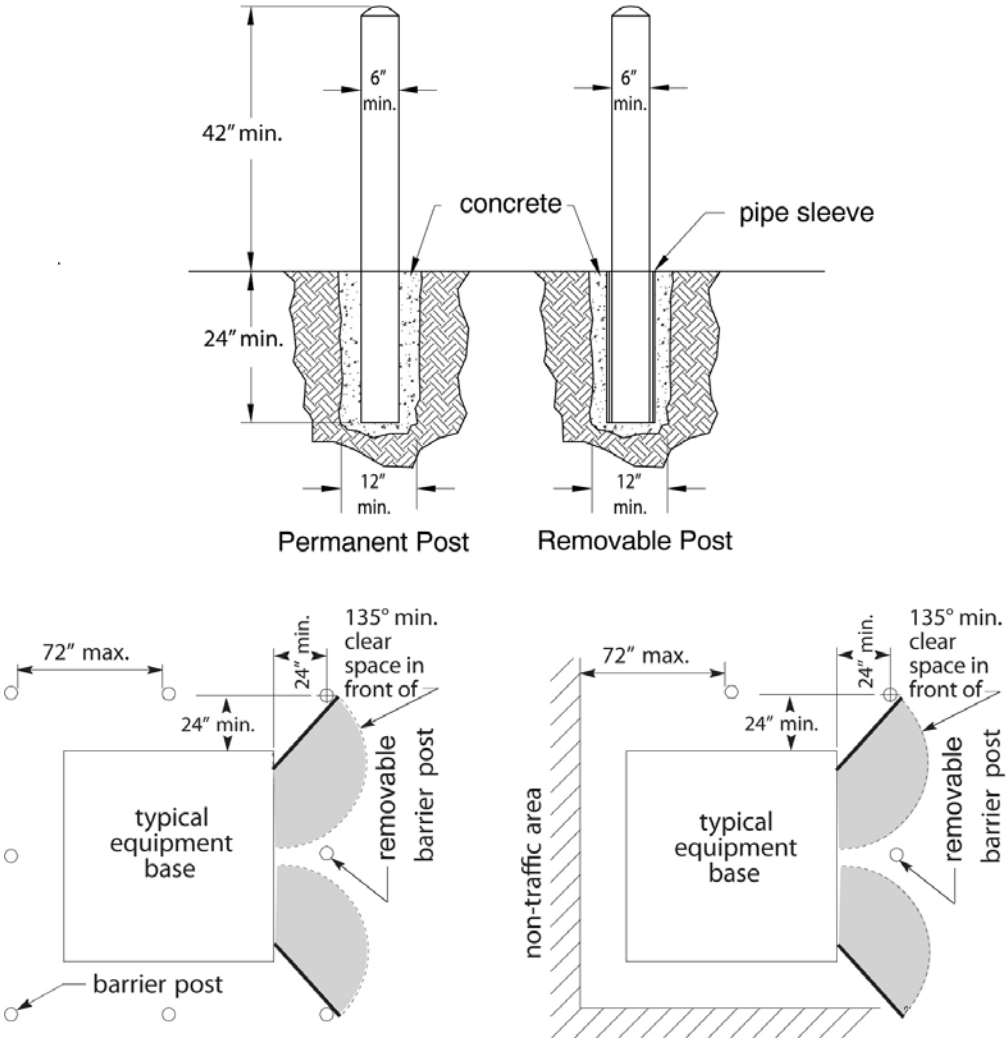
Barrier posts shall be provided by the customer in locations where traffic may pose a threat to utility equipment.

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 6-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. Removable posts shall be placed in a noncorrosive pipe sleeve.
6. Each barrier post shall be set in a concrete foundation at least 12 inches in diameter and 24 inches in depth below grade. See Figure 1 for additional space and dimension requirements.
7. Enough barrier posts shall be installed to adequately protect utility equipment from damage.
8. Temporary barrier posts may be required during construction.

Figure 1—Barrier Post Details



1.12 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.

1.13 Call Before You Dig

State laws require the customer/excavator call 8-1-1 for underground utility cable locations at least two full business days before 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.

1.14 Power Quality

1.14.1 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 standards are located online at: https://www.pacificpower.net/about/power-quality-standards.html and https://www.rockymountainpower.net/about/power-quality-standards.html.

1.14.2 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.

1.14.3 Harmonics

The effects of the design and operation of high-frequency equipment (electronic heating systems, spark discharge devices, radio transmitting equipment, etc.) and equipment that generates harmonics shall not create disturbances on the Power Company's electrical system that interfere with the proper operation of any 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 Power Company's power quality standard 1C.4.1, Harmonic

Distortion. 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.

1.15 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 1-800-469-3981.

1.16 Motors

1.16.1 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, voltage imbalance, and single-phasing of three-phase motors.

1.16.2 Starting

Motor starts may cause unacceptable voltage dips to other customers. Some motors, dependent on frequency of start and size, may require reduced-voltage, variable frequency drives or soft-start motor controls to comply with Company power quality standard 1C.5.1, Voltage Fluctuation and Flicker.

Upon the customer's request, the Power Company will furnish permitted starting currents that are based on frequency of starts and time of day the motors will be started 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 installing a motor start device on the customer's motor or modifications to the Power Company's facilities at the customer's expense, in compliance with current local laws, ordinances, and state tariffs.

1.17 Customer Generation

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. The Power Company will work with customers to interconnect local distributed generation consistent with regulations of the Federal Energy Regulatory Commission (FERC) and state law.

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

1.17.1 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 interlock 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. Contact the Power Company for advance review and preapproval 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 interlock 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. The authority having jurisdiction (AHJ) must approve all transfer switches and/or transfer operating schemes.

1.17.2 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.

1.17.3 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.

The customer is solely responsible to comply with all governing laws. A customer may not rely on approval by the Power Company to conclude that the customer is in compliance with any governing laws. An inspection by a representative of a local jurisdiction that administers an applicable code or ordinance is very likely required before operation, and the Power Company may refuse to connect service if the necessary approvals from the local jurisdiction that administers an applicable code or ordinance have not been obtained.

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.

1.18 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 Regulation" web pages at https://www.pacificpower.net/about/rates-regulation.html and https://www.rockymountainpower.net/about/rates-regulation.html.

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 on the perimeter of all parcels, is typically created at the time of a property subdivision, consistent with local ordinance; the customer must grant any other easements necessary for service, and the Power Company may, in its discretion, require a customer to execute an easement in recordable form. 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 easements. 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 easement 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 an easement.

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 Application for Additional Load

Before adding load beyond what existed when service was established, the customer shall contact the Power Company to provide detailed load information regarding the proposed additions. This will allow the Power Company to assess whether the added load will exceed the capacity of existing facilities, or cause impairment to the service of other customers. The Power Company may require the applicant to enter into a line extension contract before making the change. Examples of loads that could impact service may include, but are not limited to: instantaneous hot water heaters, hot tubs, car chargers, heat pumps, etc.

2.5 Electric Service Requirement Agreement

Following the application for service, a Power Company representative may contact the customer to coordinate a site meeting as required. 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.

Nonresidential 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 Power Company will typically provide the customer with a proposed Electric Service Requirements Agreement (ESRA) that describes specific installation details. An agreement must be fully executed 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.

2.6 Permits

Local ordinances or state laws require applicants to obtain appropriate permits before the Power Company establishes service. It is the customer's sole responsibility to obtain necessary permits and approvals.

3. Services and Meter Installations

3.1 Types of Secondary Service Furnished

Available service voltages and service transformer kVA ratings are provided in Table 1. The Power Company will determine the required service transformer size based on load and generation information provided by the customer.

Table 1—Types of Secondary Service

Phase	Service Voltage(s)	Largest Available Service Transformer (kVA)	
		Pole-Mounted Overhead Delivery	Pad-Mounted Underground Delivery
Single	120V, 2-Wire	25 kVA	25 kVA
Single	120V/240V, 3-Wire	167 kVA	167 kVA
Single	240V/480V, 3-Wire	167 kVA	167 kVA
Three	208Y/120V, 4-Wire	500 kVA	1,000 kVA
Three	480Y/277V, 4-Wire	500 kVA	2,500 kVA

Notes:

1. Some states may allow additional voltages, consult state tariff information on https://www.pacificpower.net/about/rates-regulation.html or https://www.rockymountainpower.net/about/rates-regulation.html.
2. Primary voltage service is available for qualified requests.
3. Other voltages will be maintained to the extent deemed practical by the company. When a customer modifies their service entrance and it requires Power Company facility modifications, service will be provided at one of the standard voltages.

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 1 lists the largest available standard transformers. These transformers may not be available in all areas.

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 2 apply to single-phase services.

Table 2—Load Requirements and Limitations for Single-Phase Service

Equipment or Load	Requirements and Limitations
Loads > 3 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 3 apply to three-phase services.

Table 3—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 for single service
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 readily 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 reseal the meter.

3.5.1 Acceptable Meter Sockets

Acceptable meter sockets are those manufactured in accordance with current EUSERC, ANSI-C12, and UL 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 non-meter conductors and bypass 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

Meter sockets that are not on the approved list require a Power Company review period that may take several weeks for evaluation.

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 unmetered 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. Clearance and Access of this manual.
4. The unmetered 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, resealing or maintenance 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 (AHJ) 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 Service Disconnect

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 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 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 defined in Section 3.5.7.

3.5.7 Meter-Mounted Devices

The Power Company will permit the installation of no more than one meter-mounted device between the meter and the meter socket. Approval from the authority having jurisdiction (AHJ) is required prior to installation of any meter-mounted device. The following conditions shall be met:

1. The meter socket is not part of two or more ganged meter sockets.
2. Meter socket is plumbed and secured in all directions.
3. Meter socket is rated 100 amps or greater and is not a banjo type (see Figure 2).
4. The device must be installed by a qualified individual.
5. Meter socket must allow the removal of the meter without having to remove or dismantle the meter-mounted device (e.g., ringless meter sockets are not allowed).

The Power Company reserves the right to remove any meter-mounted device that inhibits the Power Company's ability to provide service or read the meter.

Figure 2—Banjo-Type Meter Socket

3.6 Connection, Disconnection, and Re-Establishment of Service

The customer must coordinate any connection or disconnection of service with the Power Company. The customer shall pay a fee for connection or disconnection according to the fee schedule in effect.

The Power Company has the right to remove unused facilities at their discretion when there is no one signed for service based on the duration in Table 4. 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 4.

Table 4—Durations Defining Unused Facilities, by State

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

Services are considered "unused" when there is no one signed for service for a period of months as specified in Table 4. 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. All provisions of this Electric Service Requirements manual apply to any relocation of facilities.

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4. Clearance and Access

This section provides information on required clearance and access for meter sockets and other Power Company service equipment, 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 and service equipment shall be installed in common locations that are readily accessible to Power Company employees and their equipment for reading, testing, and inspection at all times.

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. On the drive-through side of a building
6. Within 36 inches of a window that has a view of living space or restrooms, or within 36 inches of a door.
7. 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.
8. On any surface subject to excessive vibration, as determined by the Power Company.
9. On Power Company poles or equipment.
10. In an area where metering equipment is likely to be fenced in.
11. Where the meter face or the door to the metering equipment is obstructed
12. Where the door to the metering equipment is on (or recessed in) an external surface built within 7 feet of a property line, alleyway, or driveway, except when expressly permitted in advance by the Power Company.
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. Power-operated gates do not meet the requirements for a readily accessible service installation.
16. Closer than 36 inches horizontally from gas meters, gas valves, fixed or threaded fittings, separable valves or unions, or regulators. (See *ESR White Paper—Pipe Fittings*.)

17. Areas adjacent to fuel storage units, including permanently-mounted generator fuel tanks. (See *ESR White Paper—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 3 and Figure 4.
2. In installations of two or more adjacent meter sockets, additional horizontal clearance is needed; see Figure 4.
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 6 or Section1.2.3 , Figure 9. The meter shall be located within 10 feet 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 legally permitted by the authority having jurisdiction 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 *Gated and Enclosed Spaces*.

4.1.4 Meter Ingress and Egress

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.

Meters shall be installed in locations that permit a continuous and unobstructed way of egress travel.

Devices mounted below the meter are not acceptable.

Meter sockets in Figure 3 and Figure 4 are used to demonstrate clearances only. Approved meter sockets are defined in other sections of the ESR.

Figure 3—Meter Socket Clearance Requirements

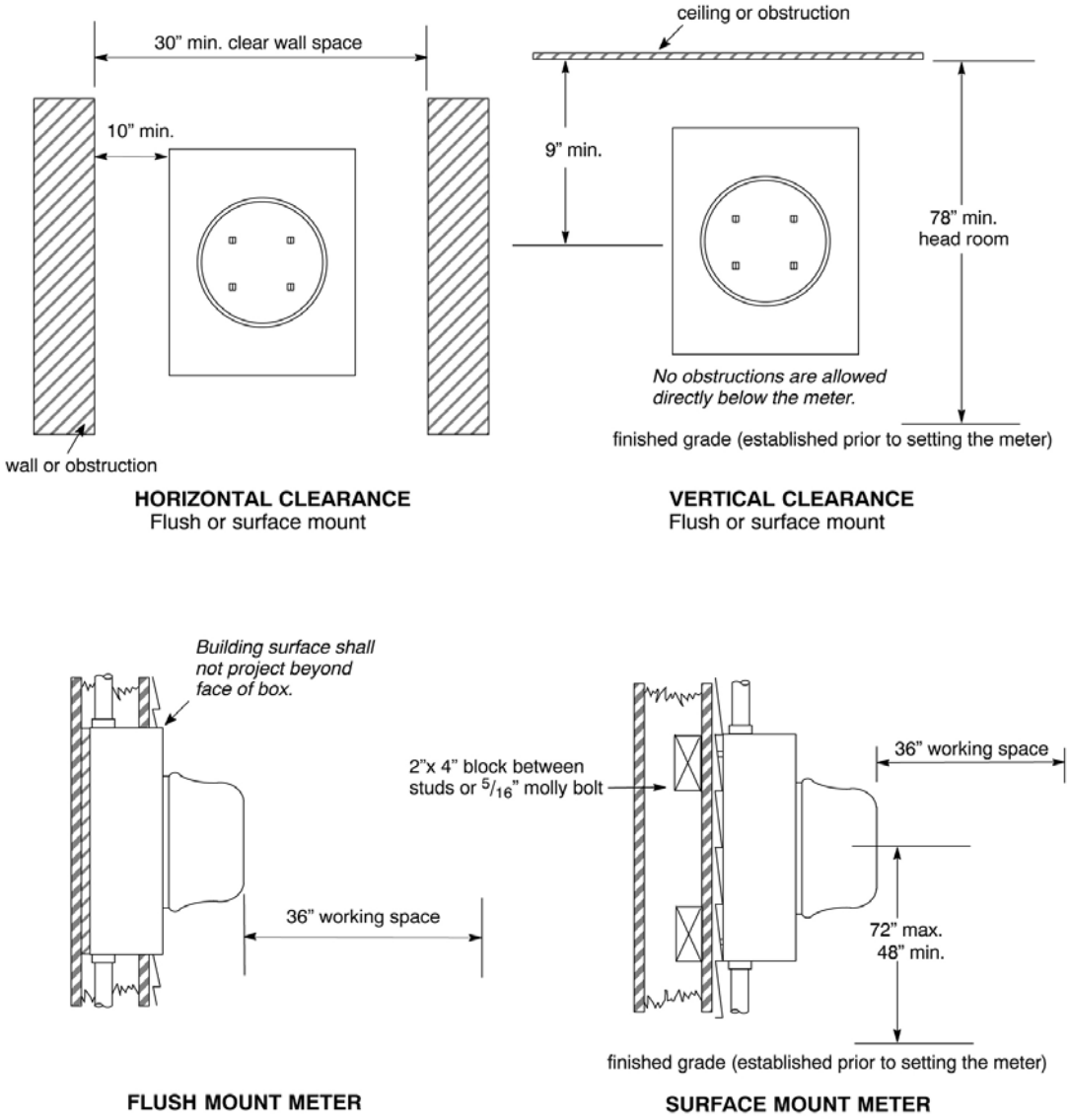
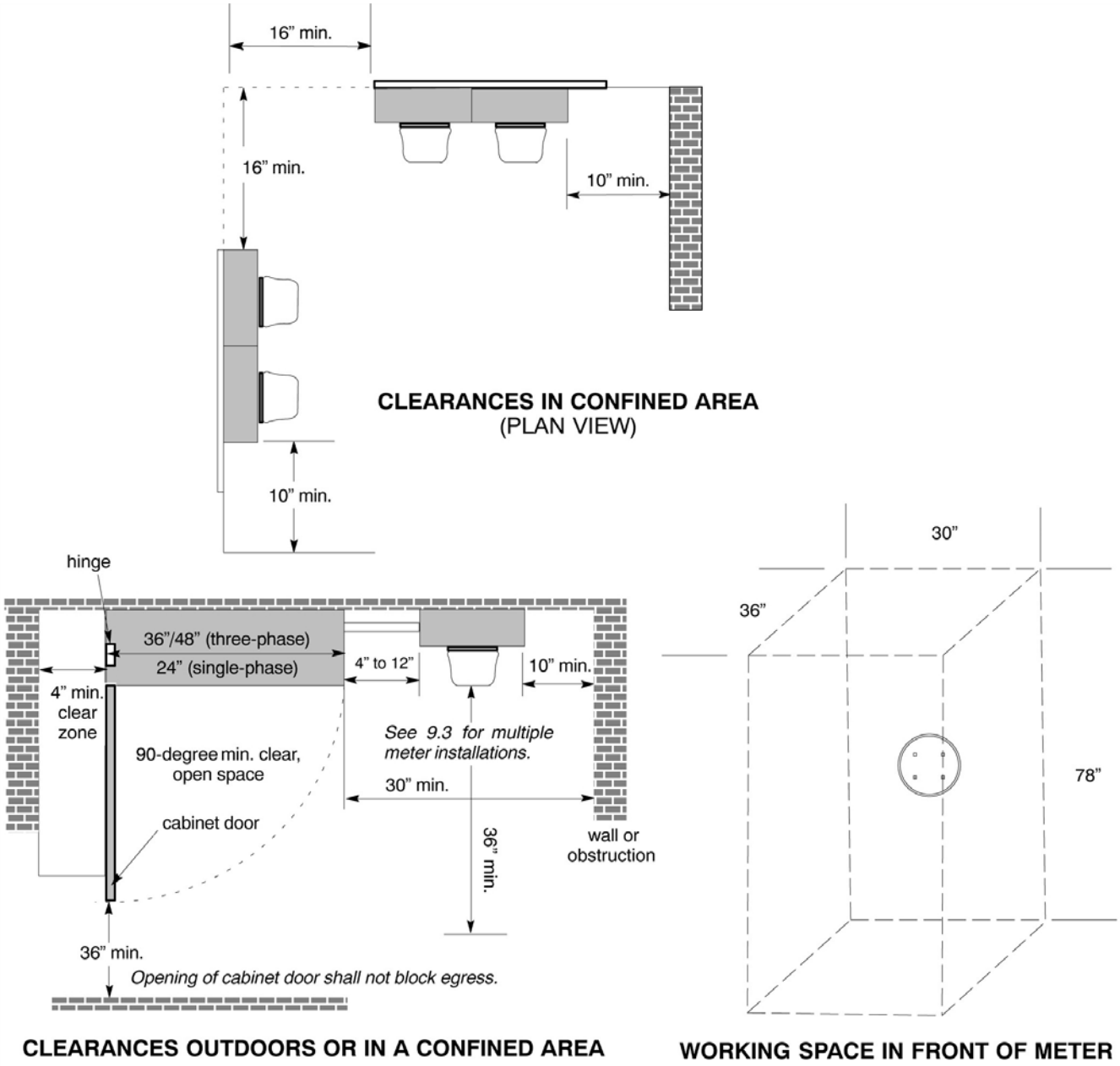


Figure 4—Clear Workspace Requirements



4.2 Clearance and Access for Overhead Service

The customer shall provide a point of attachment at a sufficient height to ensure that the overhead service conductor from the Power Company pole shall meet NESC minimum clearances under ***all*** conditions. Conditions include, but are not limited to, temperature, ice or snow loading, wind, and electrical demand-related loading. The final sag under all conditions shall meet or exceed the NESC clearance; see Figure 5.

The clearances listed in Table 5 are required for overhead installations in all states except California. For California clearances, see Table 6. See notes for both clearance tables following Table 6.

Long services or other special cases may require additional clearance. Consult the Power Company if the service:

- exceeds 45 feet in length
- crosses a road, or uneven or sloped terrain
- crosses an adjacent property not owned by the applicant
- does not apply to the situations listed in Table 5 and Table 6

Figure 5—Overhead Service Conductor Clearances

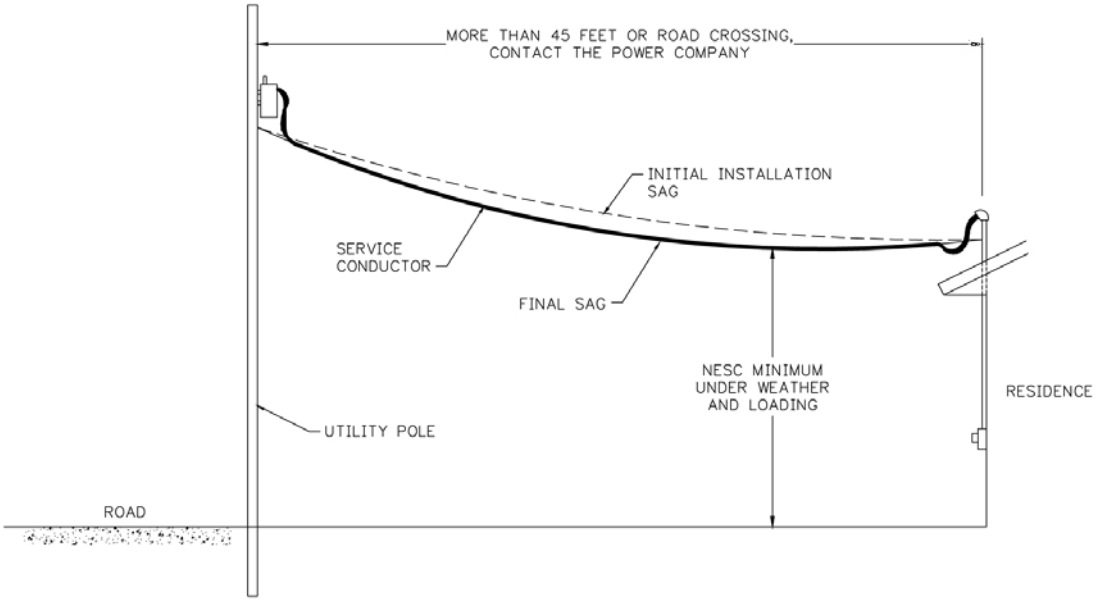


Table 5—Minimum Clearances for Overhead Service Conductors at Initial Installation (600 V and Below)

The customer shall provide a point of attachment that allows NESC minimum clearances to be met in all conditions. A 2-foot addition to certain NESC values is included to ensure minimum clearances in extreme conditions. These heights are noted as "clearance required at the time of construction" in Table 6 and are marked with asterisks. Long services, or other special cases, may require clearance additions greater than 2 feet. Consult the Power Company for services crossing uneven or sloped terrain, if service length exceeds 45 feet, or if crossing a road or adjacent property.

	Clearance required at the time of construction
Minimum overhead service conductor clearance	
•Over roads, streets, and other areas subject to truck traffic	18 Feet *
• Over or along alleys, parking lots, and nonresidential driveways	18 Feet *
• Over land traveled by vehicles	18 Feet *
Minimum clearances over or along residential driveways	
• If height of attachment will permit (If not, see NESC Table 232- 1, Note 7; clearances plus 2 feet)	18 Feet *
• For overhead service conductors 120/240 and 208Y/120 V, provided trucks are not anticipated	14 Feet *
• For drip loops of overhead service conductors 120/240 and 120/208 V	12 Feet *
Minimum clearances over spaces and ways subject to pedestrians/restricted traffic only	
• At height of attachment	14 Feet *
Drip loops of overhead service conductors	
• For 480Y/277 volt	12.5 Feet *
• For 120/240 and 208Y/120 volt	12 Feet *
Minimum clearances from buildings for overhead service conductors not attached to the building	
Vertical clearance over or under balconies and roofs	
• Accessible to pedestrians	13 Feet *
• Not accessible to pedestrians if cabled with a grounded bare neutral (not available in coastal areas)	3.5 Feet
• Not accessible to pedestrians if open wire or cabled with the insulated neutral (coastal areas only)	10.5 Feet
Horizontal clearance to walls, projections, windows, balconies, and areas accessible to pedestrians	
• If cabled with grounded bare neutral (not available in coastal areas)	5 Feet
• If open wire or cabled with an insulated neutral (coastal areas only)	5.5 Feet
Minimum clearances for overhead service conductors 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	
• If readily accessible (see NESC 234.C.3.d.1, exception 1)	10 Feet *
• If not readily accessible (see NESC 234)	3.5 Feet
Above a not-readily-accessible roof and terminating at a (through-the-roof) service conduit or approved support, the service and its drip loops set no less than eighteen inches above the roof. No more than six feet of the service cable passes over the roof	
• or within four feet of the roof edge (see NESC 234.C.3.d, Exceptions 1 and 2)	1.5 Feet
• In any direction from windows designed to open (except from above) (see NESC 234.C.3.d.2)	3 Feet
• In any direction from doors, porches, fire escapes, etc. (see NESC 234.C.3.d.2)	3 Feet

* NESC clearance plus an additional two feet for ice and wind loading.

Table 6—Minimum Clearances for Overhead Service Conductors and Drip Loops at Initial Installation, California Only 277/480 V and Below

The customer shall provide a point of attachment that allows GO 95 minimum clearances to be met in all conditions. A 2-foot addition to certain GO 95 values is included to ensure minimum clearances in extreme conditions. These heights are noted as "clearance required at the time of construction" in Table 7 and are marked with asterisks. Long services, or other special cases, may require clearance additions greater than 2 feet. Consult the Power Company for services crossing uneven or sloped terrain, if service length exceeds 45 feet, or if crossing a road or adjacent property.

	Clearance required at the time of construction
Overhead service conductor clearance	
• Crossing or along thoroughfares in urban districts or crossing thoroughfares in rural districts	20 feet*
• Above ground along thoroughfares in rural districts, or across other areas traversed by vehicles or agricultural equipment	17 feet*
• Over private driveways, lanes, or other private property areas accessible to vehicles used for industrial or commercial purposes	18 feet*
• Over private driveways, lanes, or other private property areas accessible to vehicles used for residential purposes only	12 feet*
• Above ground in areas accessible to pedestrians only	10.5 feet*
Clearances from buildings for overhead service conductors not attached to the building	
• Vertical clearance above walkable surfaces on buildings, bridges, or other structures that do not ordinarily support conductors, whether attached or unattached	10 feet*
• Vertical clearance above non-walkable surfaces on buildings, bridges, or other structures that do not ordinarily support conductors, whether attached or unattached	10 feet*
Horizontal and radial clearances	
• From fire escapes, exits, windows, and doors	3 feet
• Horizontal clearance of the conductor at rest from building, bridges, or other structures where such conductor is not attached	3 feet
Clearances for overhead service conductors near swimming pools	
• Consult the Power Company prior to the installation of pools, spas, or hot tubs	

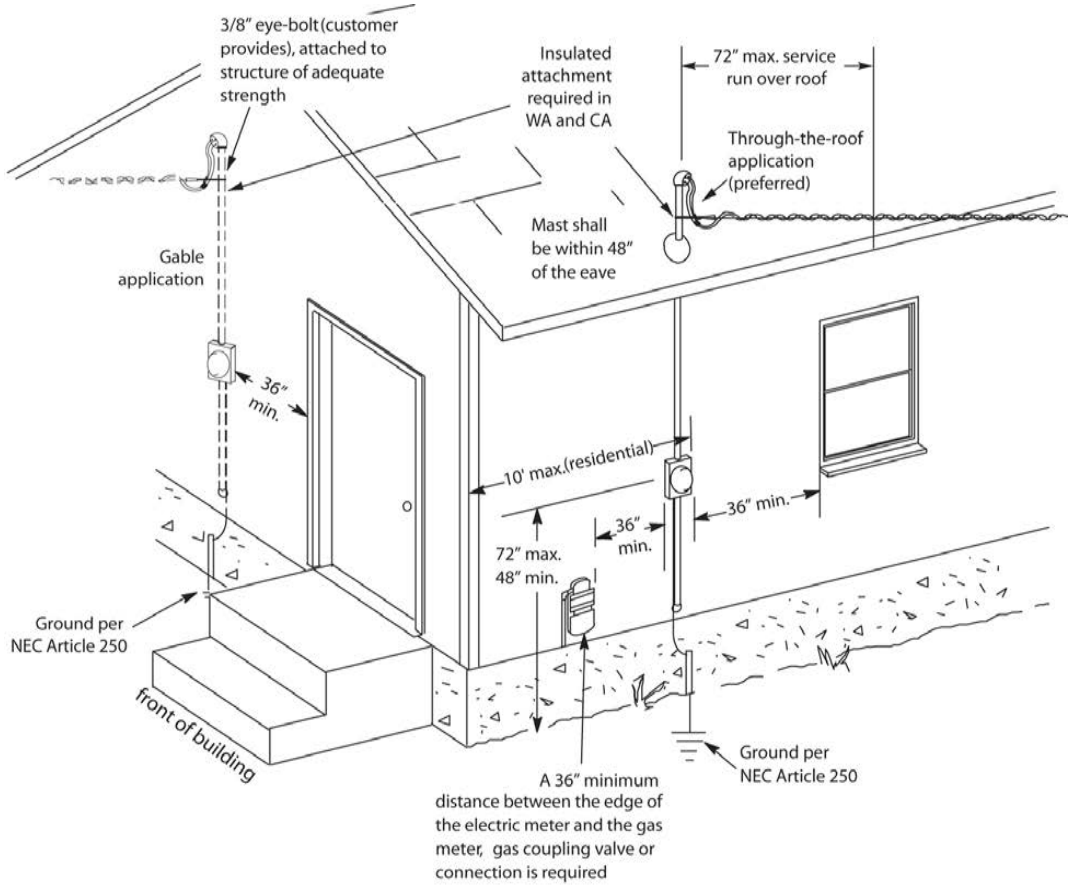
* GO 95 clearance plus an additional two feet for ice and wind loading.

Notes for Clearance Table 5 and Table 6:

1. A "truck" is any vehicle exceeding 8 feet 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 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 8 feet 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 6—Clearances for Buildings Supporting an Overhead Service



Requirements:

1. Buildings shall not be constructed under or adjacent to power lines.
2. Table 5 and Table 6 list the minimum drip loop and service drop clearance requirements.
3. The cable and drip loop (lowest point) shall be at least 18 inches above a non-accessible roof (NESC 234.C.3.d, Exceptions 1 and 2).
4. The customer must install residential meters outdoors at a location acceptable to the Power Company that is readily accessible and in accordance with Figure 6.
5. For gabled applications obtain prior Power Company approval.
6. A 10-foot maximum distance from the front corner of a residential building to the far side of the meter is allowed.
7. Meters shall not be installed within 36 inches of a window that has a view of living space or restrooms, or within 36 inches of a door.
8. 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 above a point of support on the mast, two independent guys are required to secure the masthead. Figure 7 and Figure 8 show guyed masts, a braced mast, and anchoring options.

Table 7—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 ½″ min.	201 - 400 A Service	45′ Maximum	90′ Maximum
	401 A and Above	Consult the Power Company	

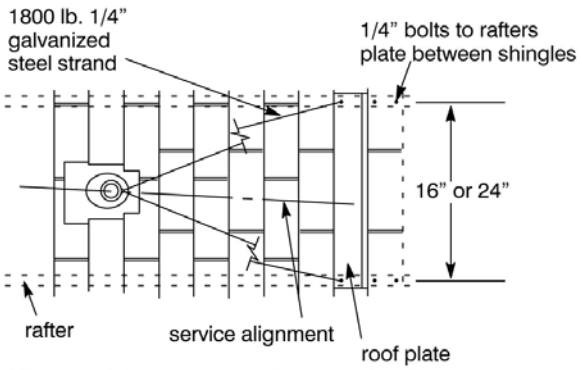
Note: For clearances, see Section 4.2.

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 5 and Table 6.
2. Where the mast has service cable attached to it, the mast shall be Rigid Metallic Conduit (RMC), or if allowed by the authority having jurisdiction (AHJ), Intermediate Metallic Conduit (IMC).
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 8 feet 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 above the roof line.
7. Guying shall be ¼ -inch 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.

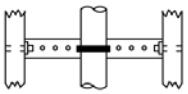
Figure 7—Mast Guying, Anchoring, and Bracing

GUYING and BRACING



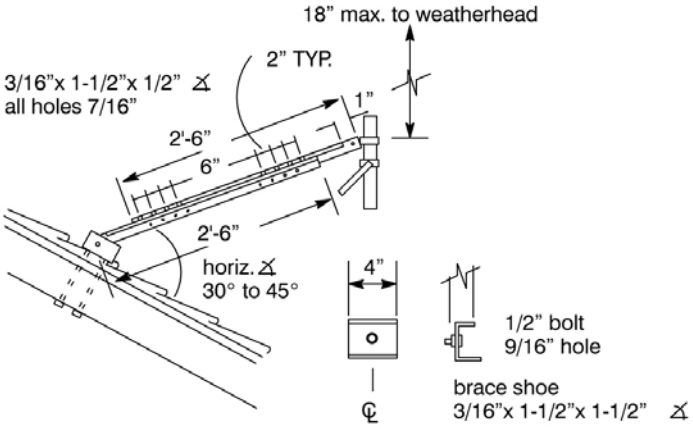
The roof plate must be installed such that the service alignment extension falls within the angle of guys.

MAST ANCHOR

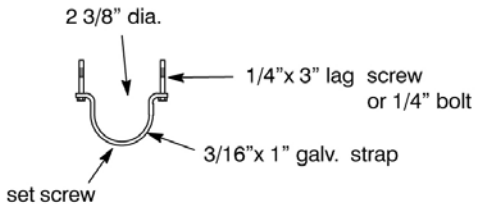


METAL BRACKET (OR EQUAL)

PUSH BRACE (OR EQUAL) (2 REQ'D)

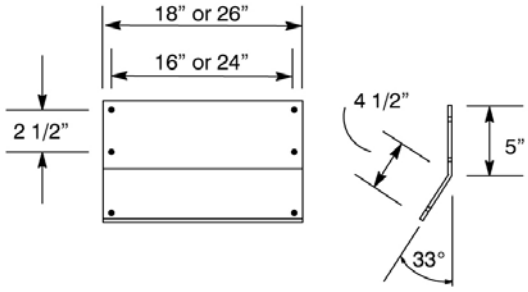


ANCHOR STRAP NO. 1 (OR EQUAL)



3/8" eye bolts and washers with header block between rafters are acceptable, but eye lags are not acceptable.

ROOF PLATE (OR EQUAL)



ANCHOR STRAP NO. 2 (OR EQUAL)

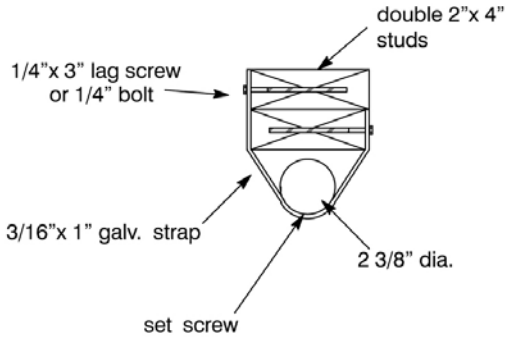
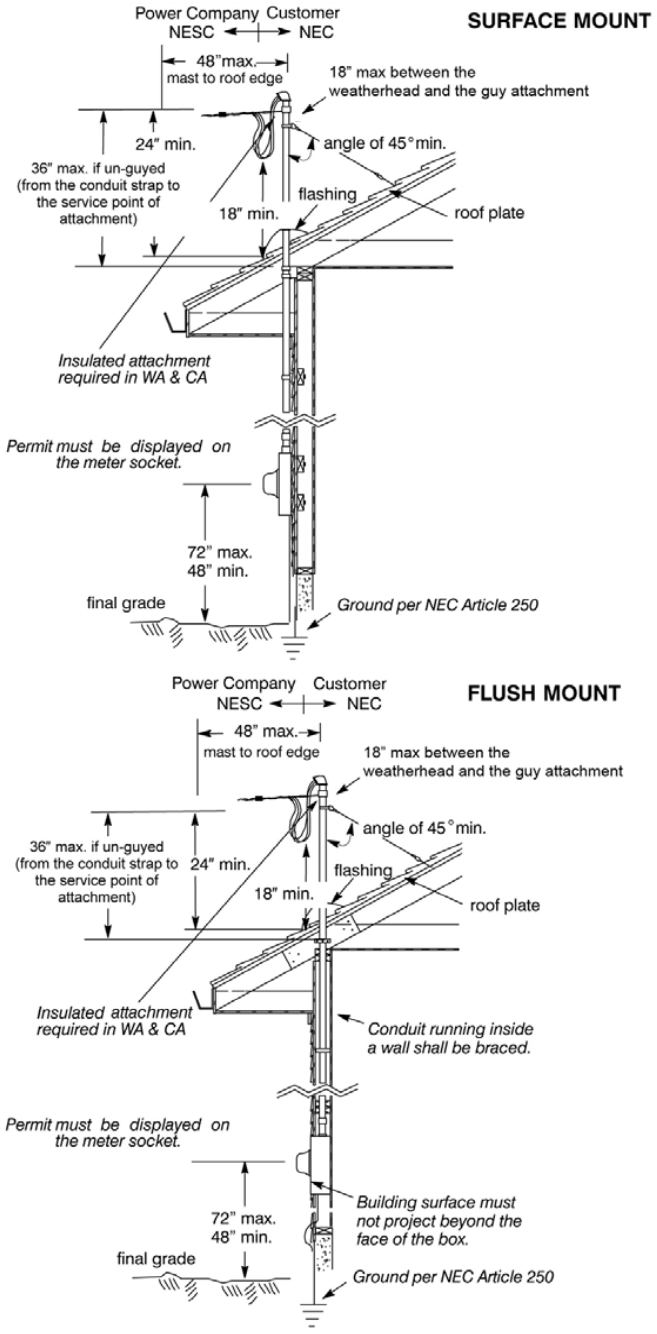


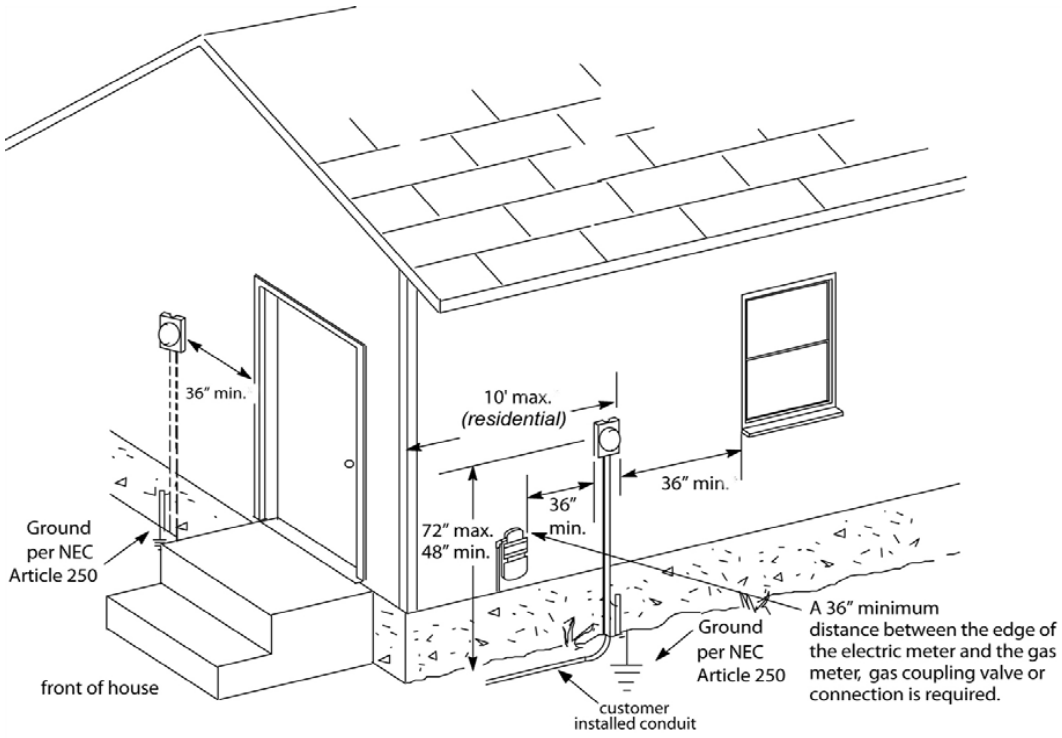
Figure 8—Overhead Service to Wall-Mounted Meters

Surface or Flush-Mount Metering (New and Rewire)



4.2.3 Clearance and Access for Underground Service

Figure 9—Clearances for Underground Service



Requirements:

1. The customer shall obtain Power Company approval for a readily accessible meter location prior to installation.
2. A minimum of 24 inches of backfill above underground conduit is required. See Figure 15.
3. For further details regarding meter clearances, see Section 4.1.
4. A 10-foot maximum distance from the front corner of a residential building to the far side of the meter is allowed.
5. Meters shall not be installed within 36 inches of a window that has a view of living space or restrooms, or within 36 inches of a door.

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 horizontally from the inside wall of a pool or spa. Likewise, pools or spas shall not be installed over or within 60 inches 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 Article 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 Article 500.4 (A).

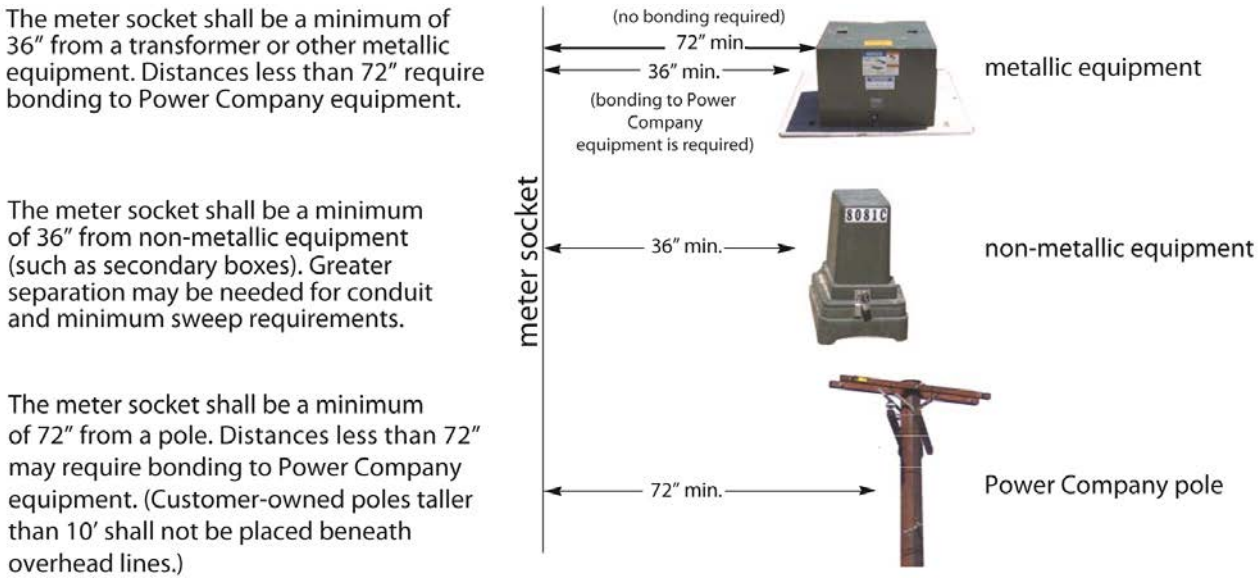
4.4.1 Clearance from Fuel Storage Tanks

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

4.5 Free-Standing Meter Socket Clearance and Access 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 10—Free-Standing Meter Socket Clearances from Permanent Power Company Equipment



4.6 Clearance and Access Between Equipment Pads and Buildings

The customer shall comply with the distances listed in the figures below. In addition, the customer must comply with all state and local requirements regarding clearance between equipment pads and buildings.

Figure 11—Minimum Fire Code Clearances Between Equipment Pads and Buildings

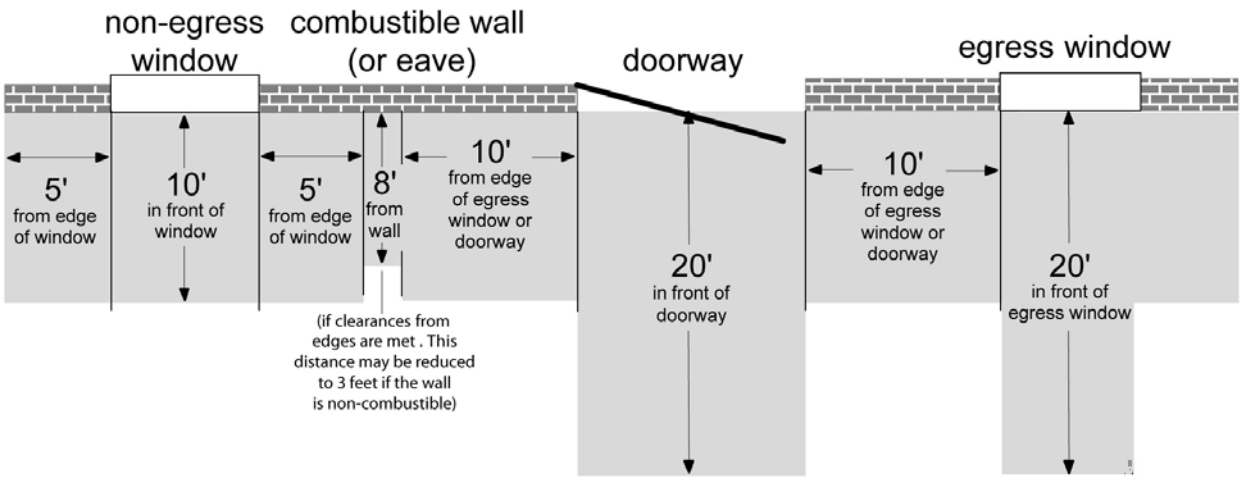
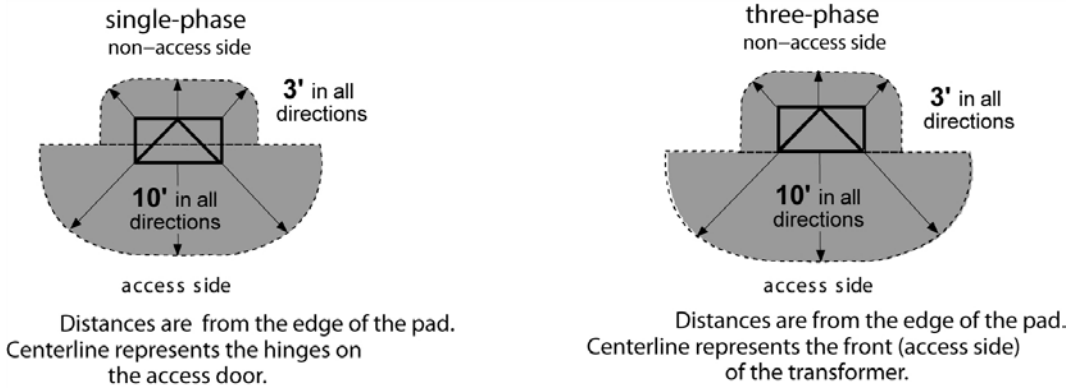


Table 8—Minimum Clearances Between Oil-Filled, Pad-Mounted Equipment and Structures, and Structure Openings

Type of Framing	Clearance in Front of Framing (ft.)	Clearance to Side of Framing (ft.)	Vertical Clearance from the Pad Surface (ft.)
Fire escape	20	10	
Doorway	20	10	
Egress window (for emergency escape)	20	10	
Non-egress window	10	5	10
Air vent intake	20	10	25
Air vent exhaust	10	10	25
Combustible wall or eave	8	10	
Non-combustible surface	3	10	

Figure 12—Minimum Workspace Clearances



Requirements:

1. Pad-mounted transformers shall be readily accessible and located within 10 feet of a drivable surface.
2. Distances noted in Figure 11 and Table 8 are from the edge of the equipment pad.
3. If the building has an overhang, the distance is measured from the outside edge of the overhang.
4. Outside edges of any attachments to the building, such as ramps, and stairs, will be considered part of the building perimeter.
5. Distances less than those specified in Table 8 (but not less than the required working space) may be allowed if approved by the authority having jurisdiction (AHJ). This may require alternate means of fire protection per NEC Article 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 (AHJ).
6. 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.
7. The customer shall conform to all local building codes, insurance regulations, and/or ordinances affecting the transformer location.
8. Combustible/non-combustible construction types are defined by respective state building codes.
9. No vegetation over 6 inches in height shall be present in the clear workspace (see Figure 12).
10. Trip hazards such as gutters, spigots, etc., shall not exist within the clear workspace (see Figure 12). Curbs may be acceptable in the clear workspace; consult the Power Company during site scoping.
11. A minimum 72-inch clearance between fire hydrants and metallic pad-mounted equipment shall be maintained. This clearance may be reduced to 48 inches for non-metallic equipment. Greater separation may be required by local ordinances.
12. Where equipment is exposed to vehicle traffic, barrier posts are required; see Section , and consult the Power Company for installation-specific requirements.

13. Additional clearances and access may be required for other pad-mounted equipment.

4.7 Firewalls (Blast Walls)

At locations where the clearances in Table 9 cannot be met, a firewall (also called a blast wall) may be constructed, so long as it has been approved by the authority having jurisdiction (AHJ). 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.

See *ESR White Paper—Firewalls.*

4.8 Conduit Clearances to Foundations

There shall be a minimum 60-inch horizontal distance between the building foundation and parallel conduit. (When conduit is installed before the foundation is laid, a clearance of at least 120 inches from the planned foundation is recommended.).

4.9 Power Company Vehicle Access

Permanent vehicle access to the service equipment is required for the installation and maintenance of service cables and Power Company equipment see Figure 13.

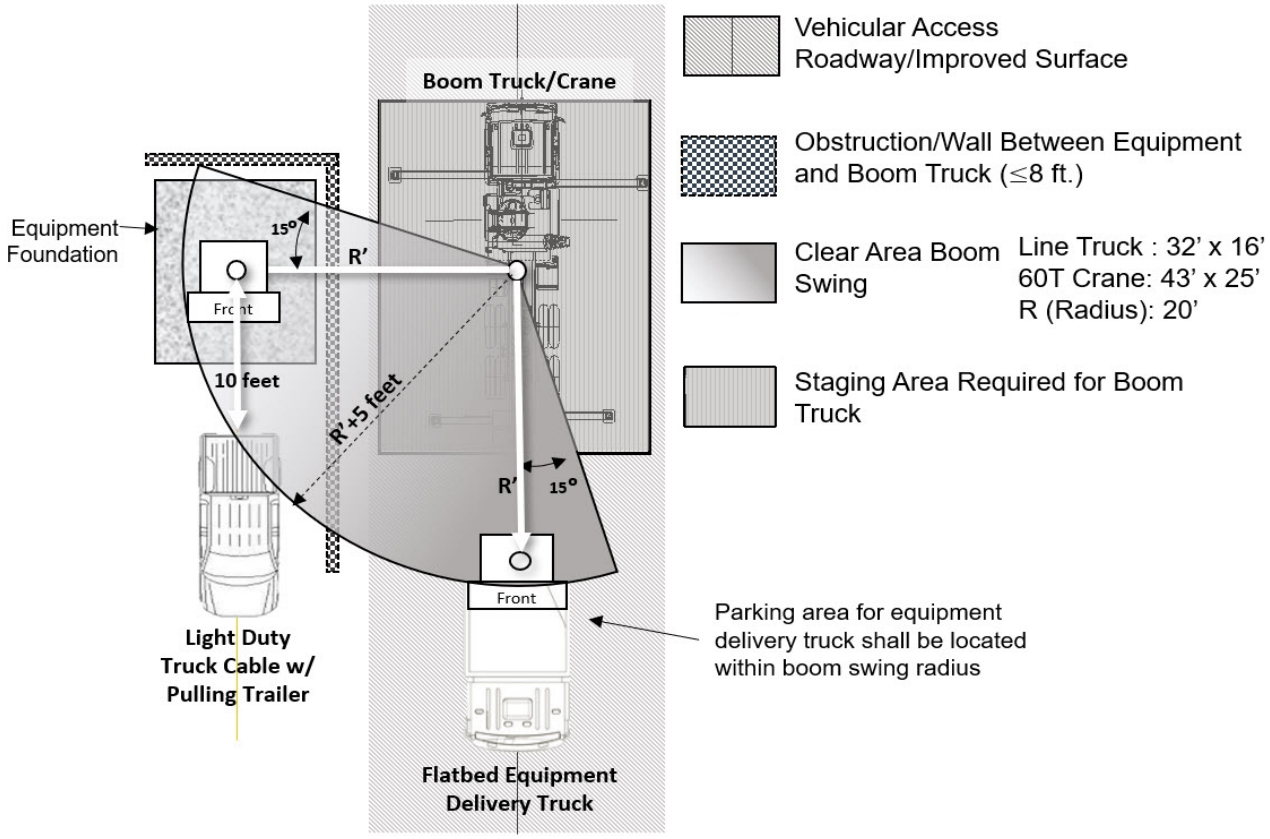
Requirements:

1. Vehicle access shall be readily accessible and free of vegetation and large rocks.
2. The underground service conductor and access pathway, unless paved, will not have a maximum average slope that exceeds ± 5% except for short distances. In no instance will the slope exceed 10% grade. Frequent grade changes will not be allowed.
3. Power-operated gates do not meet the requirements for a readily accessible service installation.

Table 9—Vehicular Access to Service Transformers, Service Entrances, and Metering Points

Service Type	Minimum Roadway Width (ft.)	Minimum Vertical Clearance (ft.)	Maximum Distance From the Vehicle to the Equipment (ft.)
Metering Point (remote from service entrance)	12	16	100
Service Entrance	12	16	20
Single-Phase Transformer	12	16	20
Three-Phase Transformer	23	16	20
Note: The purpose of this requirement is to ensure that the company can access equipment at all times with heavy equipment, without blocking fire lanes or being impeded by parked vehicles or other obstructions. Width may be reduced to 16 feet if dedicated routes and parking is provided for staging of equipment within the load handling radius.			

Figure 13—Service Transformer Vehicular Access Requirements



4.10 Utility-Owned, Oil-Filled Equipment on Customer Property

Customers who own private property that contains Power Company oil-filled equipment may be required to accommodate a Spill Prevention, Control, and Countermeasure (SPCC) Plan. SPCC plans are required by federal regulation 40 CFR § 112, which is enforced by the U.S. Environmental Protection Agency. The customer shall be responsible for providing oil-containment systems, as specified by the Power Company, to meet the site-specific SPCC plan. See ESR White Paper—*SPCC* for more information.

4.11 Areas Subject to Flooding or Adjacent to Bodies of Water

In areas subject to flooding or adjacent to bodies of water, the service transformer and service point shall be located in a manner to minimize the risk of submersion. Customers shall evaluate and adhere to the FEMA base flood elevations and any other base flood elevations established by any authority having jurisdiction (AHJ).

- In any flood plain, equipment shall be installed at an elevation of 2 feet above the base flood elevation.
- Equipment adjacent to bodies of water shall be installed at an elevation of 2 feet above and 5 feet horizontally from the point identified as the prevailing high-water mark or an equivalent benchmark based on seasonal or storm-driven flooding from the authorities having jurisdiction (AHJ).

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.

All equipment bases, whether Power Company- or customer-owned, will be level with no more than 2 degrees slope. The customer is solely responsible that the installation remains structurally sound throughout the term of service; to this end, the customer should consider local ground and frost conditions. The Power Company may refuse to install facilities if a base is not structurally sound.

The customer is responsible for ensuring that all conduit system installations comply with Power Company requirements and are located consistent with drawings, when provided, as part of the agreement between Power Company and customer. Any conduit installed before receiving a job sketch from the Power Company may be subject to rejection or revision.

5.2 Conduit Requirements

All underground service conductors shall be installed in conduit.

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

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

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); for Rocky Mountain Power see Policy 242, section 4.3 (available here: https://www.rockymountainpower.net/working-with-us/builders-contractors/electric-service-requirements.html), for Pacific Power see Policy 343, section 4.3 (available here: https://www.pacificpower.net/working-with-us/builders-contractors/electric-service-requirements.html). See Section 10 for possible variance approvals.
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 listed electrical grade conduit, fittings, and long radius sweeps (elbows). See Table 12. 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—Below-Grade Conduit and Sweep Applications

Application	Type of Conduit[1]	Sweep Material[1]
Three-phase primary	PVC, Fiberglass, HDPE[3]	Fiberglass
Single-phase primary	PVC, Fiberglass, HDPE[3]	Fiberglass or PVC[2]
Secondary	PVC, Fiberglass, HDPE[3]	Fiberglass or PVC[2]

Notes:

1. Steel conduit, casings, and sweeps may be required for special applications

2. Fiberglass can tolerate higher sidewall pressures than PVC and resist burn-through from pulling ropes. Longer conduit runs or conduit with multiple sweeps may require fiberglass.

3. HDPE is only allowed when directional boring or cable plowing installation methods are used.

Table 11—Above-Grade Conduit and Sweep Applications

Application	Type of Conduit[1]	Sweep Material[1]
Three-phase primary	Fiberglass or PVC	Fiberglass
Single-phase primary	Fiberglass or PVC	Fiberglass or PVC[2]
Secondary	Fiberglass or PVC	Fiberglass or PVC[2]

Notes:

1. Steel conduit, casings, and sweeps may be required for special applications

2 Fiberglass can tolerate higher sidewall pressures than PVC and resist burn-through from pulling ropes.

Table 12—Sweep Specifications

Conduit Diameter	Long Radius Sweep
2″	24″
3″	36″
4″	36″
6″	48″

Additional Requirements for Conduit Elbows and Sweeps:

a. Fiberglass elbows require special couplings; see company Material Specification ZG 033, *Fiberglass Conduit*, for details. ZG 033 is posted 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. HDPE is discussed in company specification ZG 031. ZG 031 is posted 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.

c. Elbows and sweeps must be certified by a Nationally Recognized Testing Laboratory (NRTL). Manufactured sweeps shall not be altered. Field form sweeps are not permitted.

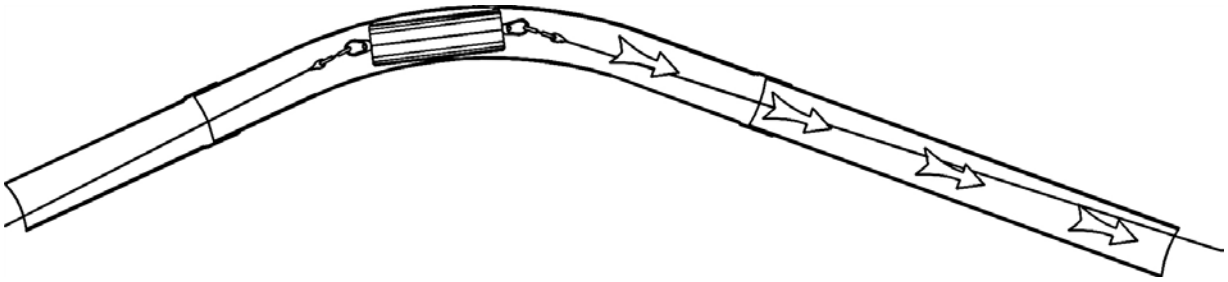
5. All joints shall be compressed to the depth of the coupling system, and glued. Where straight ends and bell ends are joined, the straight end shall be beveled so as not to become an obstacle to mandrels or pulled cable.
6. The customer shall supply smooth-walled conduit reducers (swedges) when required.
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 2 feet 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 or place any materials, including without limitation 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 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 13 and Figure 14.

Table 13—Required Mandrel Sizes for Conduit Proofing

Conduit Nominal Diameter	Mandrel Diameter	Minimum Mandrel Length	Maximum Mandrel Length	Proof
2″	1.5″	3.25″	8″	85%
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 14—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 14 and Table 15.
3. An aerial extension (primary or secondary) to connect a new underground service should be avoided, 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 an authority having jurisdiction (AHJ)
   c. Geological barriers such as deep canyons, water ways, solid rock, steep slopes, or unstable soil conditions prohibit trenching or boring

Table 14—Single-Phase Service Conduit Size, Run Lengths, and Bend Limits

Panel Ampacity	Maximum Conduit Length	Max Degree of Bends	Single Family Residential		Multi-Family and Non-Residential	
			Number of Conduit Runs	Conduit Trade Size	Number of Conduit Runs	Conduit Trade Size
125 or less	150	270	1	2"	1	2"
200	150	270	1	3"	1	3"
400	150	270	1	3"	2	3"
600	100	270	2	3"	2	3"
800	100	270	3	3"	3	3"

Table 15—Three-Phase Service Conduit Size, Run Lengths, and Bend Limits

Panel Ampacity	Maximum Conduit Length	Max Degree of Bends	120/208		277/480	
			Number of Conduit Runs	Conduit Trade Size	Number of Conduit Runs	Conduit Trade Size
200 or less	150	270	1	3"	1	3"
400	150	270	2	4"	2	3"
600	100	270	2	4"	2	4"
800	100	270	3	4"	3	4"
1,000	50	180	4	4"	4	4"
1,200	50	180	5	4"	5	4"
1,600	50	180	6	4"	6	4"
2,000	50	180	7	4"	6	6"
2,400	50	180	6	6″	6	6"
2,800	50	180	8	6″	8	6"
3,000	50	180	10	6″	10	6"
3,200	50	180	10	6″	10	6"
3,600	50	180	12	6″	12	6"
4,000	50	180	12	6″	12	6"

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 5 feet.

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.

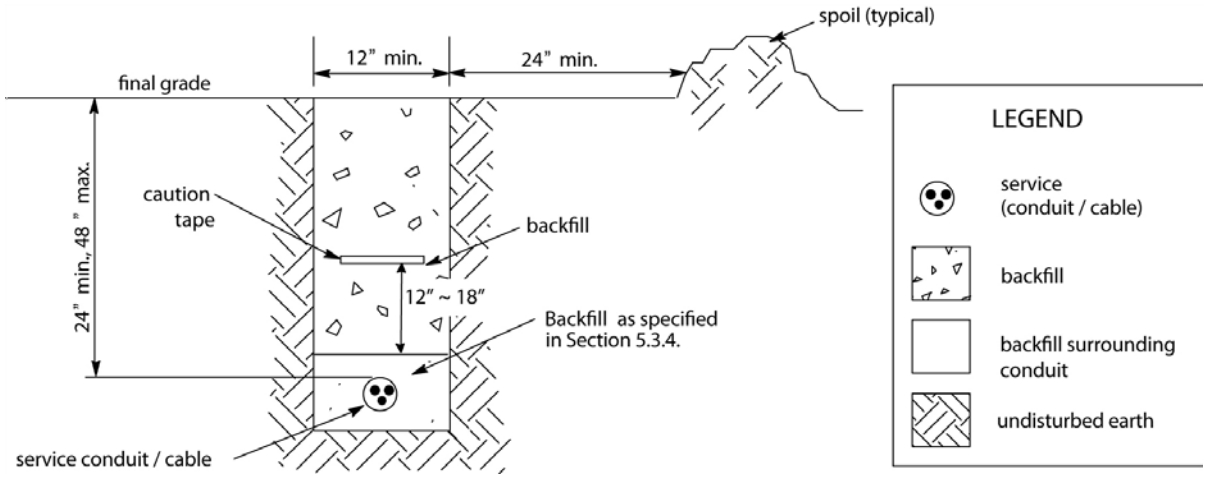
5.3.1 Call Before You Dig

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.

5.3.2 Service Trench

When installing only underground service conduit in the trench, follow the dimensions in Figure 15.

Figure 15—Service Trench (Only)



5.3.3 Joint Use Service Trench

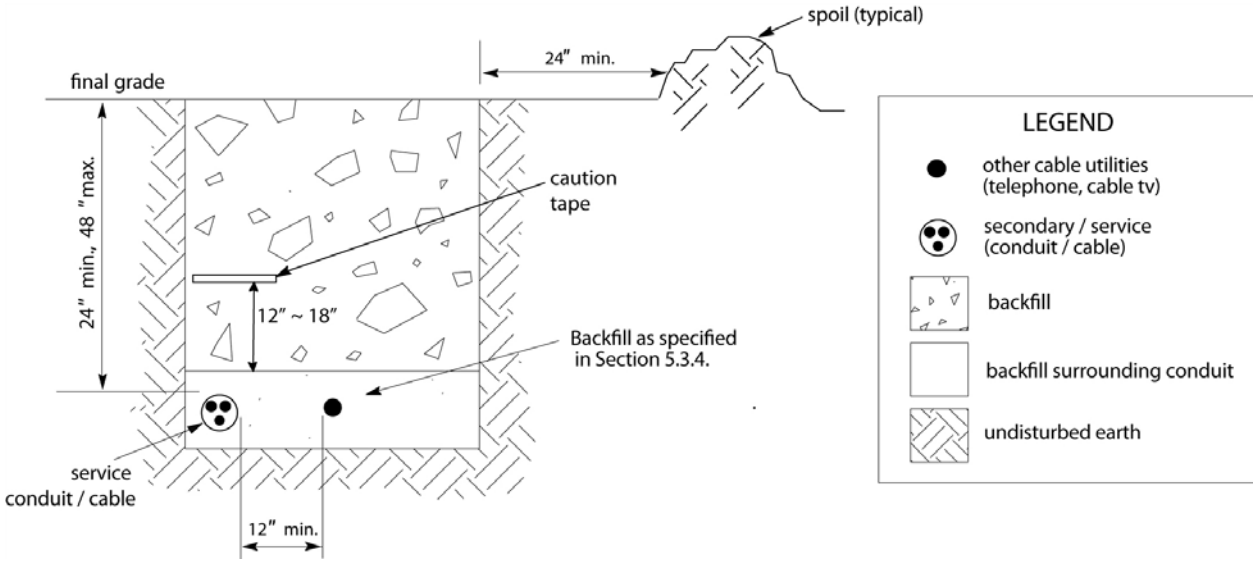
*Joint use trenching requirements may vary by area; consult the Power Company for requirements before installation.*The customer may be allowed to place communication, signal, and other electrical supply conductors in the same trench as Power Company conductors, provided that the installation meets Power Company requirements, and all concerned parties agree on the placement.

The Power Company will not install electrical conductors in a common trench with water lines, sewer lines, or other drainage lines. In general, a minimum distance of 12 inches shall exist between the underground service conduit and other utility lines, unless superseded by the requirements of other utilities involved (and/or unless local requirements differ).

For a joint use trench with gas lines, consult the Power Company for requirements. The minimum distance between the underground service conduit and gas lines may be greater than 12 inches if required by the gas utility.

When installing an underground service conduit in a joint use trench, follow the dimensions in Figure 16.

Figure 16—Joint Use Service Trench



5.3.4 Backfill Requirements

The following list of requirements applies to all installations requiring backfill:

1. The customer shall provide trench backfill and site restoration.
2. All backfill shall be free of materials that may damage the conduit system. Backfill within 4 inches of the conduit shall be select (capable of passing through a 3/4-inch sieve).
3. Extra caution should be taken when refilling trenches.
4. The Power Company may not energize conductors until the customer completes the backfill to Power Company satisfaction.

The cost to repair a conduit is the responsibility of the customer.

5.4 Underground Utility Equipment Signs and Markers

Above-grade signage, buried radio frequency (RF) markers, and buried caution tapes assist utility location services. Their presence may also provide a supplemental level of protection against service interruptions from dig-ins. General requirements are provided below:

Requirements:

1. Caution tape shall be installed 12 to 18 inches above all electrical conduits and duct banks, if trenching or other open excavation methods are used.
   a. Caution tape shall be red in color with black text "CAUTION BURIED ELECTRIC LINE BELOW," tape shall be a minimum of 6 inches wide by 0.004 inches thick. (3M Scotch #368 or equivalent).
2. Red-dyed concrete shall be used if concrete encasement is used to encase electrical conduits or duct banks.

3. Radio frequency (RF) markers shall be installed above 4- to 8-inch electrical conduits at stub-outs and transition points between bored and trench installations. (3M #1256 Passive Mid-Range Marker Power Encoded or equivalent). If these markers are required, they will be provided by the Power Company with locations specified on the job sketch.
4. Above-grade signage, if required, will be provided by the Power Company with locations specified on the job sketch.
5. Additional signs or markers may be required for unique installations.

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 17, Figure 18, and Figure 19 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 (AHJ) 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, *Nonresidential 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

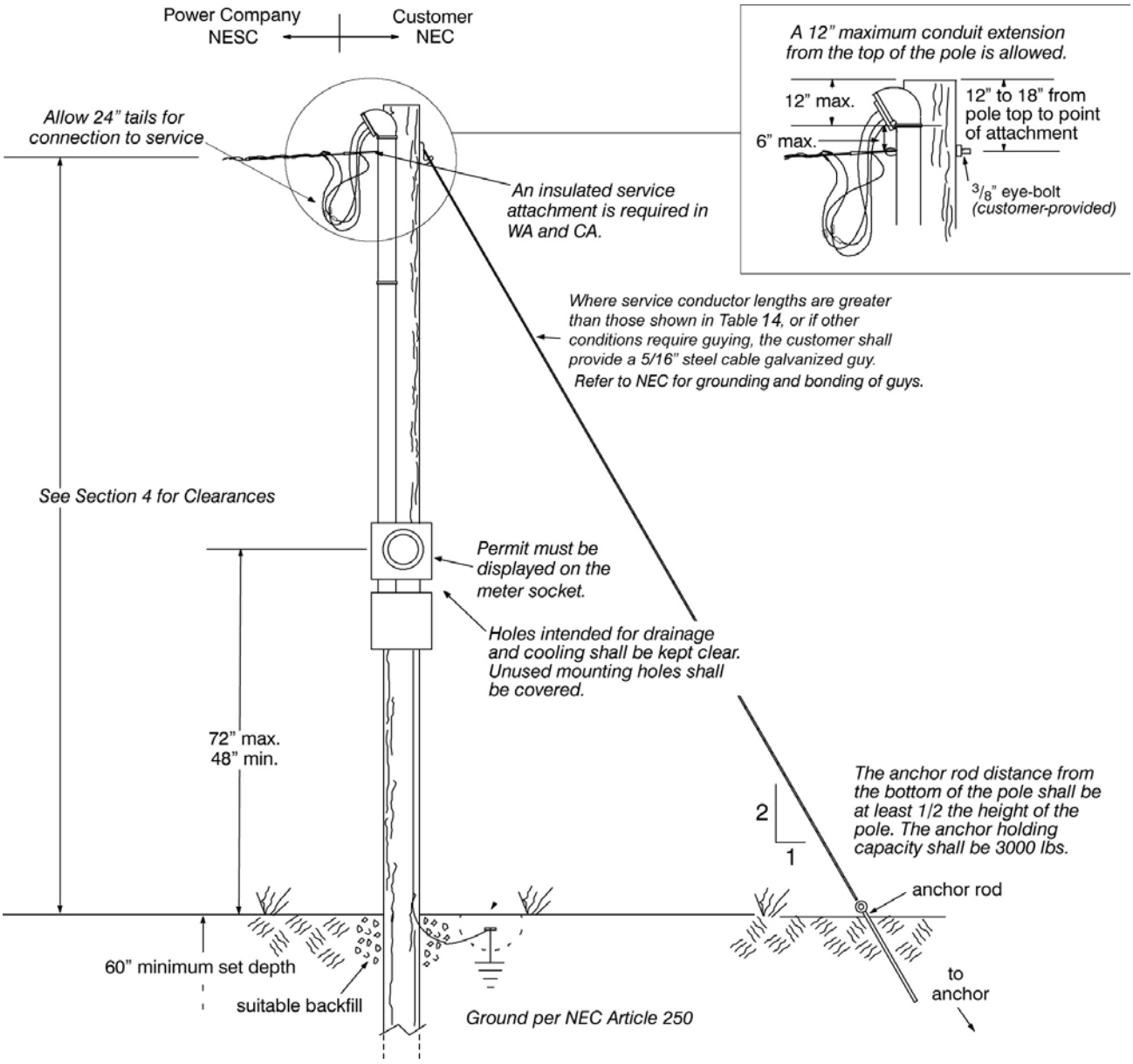
1. The customer shall install the meter socket and service equipment on a wood pole or timber.
2. Wood poles shall be of sound timber. To ensure strength, the pole or timber must be free of any defects that may weaken the wood, such as sucker knots and spike knots larger than ⅓ of any face. Cracks greater than ½ -inch wide are not permitted. No visible wood decay is allowed.
3. The pole or timber shall be no less than 20 feet long and provide proper ground clearance. A pole shall be no less than 5 ½ inches in diameter at the top, or a minimum (nominal) 6″ × 6″ pressure-treated timber. The pole or timber shall be set no less than 60 inches below ground level and suitably backfilled. The pole or timber length minimum is 25 feet if the overhead service conductor 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 in length outside the weatherhead.
6. The temporary service pole or timber shall be readily accessible by Power Company power-lift aerial equipment.
7. Overhead temporary service construction dimensions shall meet those identified in Figure 17. Acceptable temporary service conductor lengths are shown in Table 16.

Table 16—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 17—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 pressure-treated wood with a minimum nominal size of 4″× 4″.
6. Clearances between metallic equipment, non-metallic equipment and poles shall be maintained as specified in Section 1.2.
7. Underground temporary service construction dimensions shall meet those identified in Figure 18 or Figure 19.

Figure 18—Underground Temporary Construction Service - Post

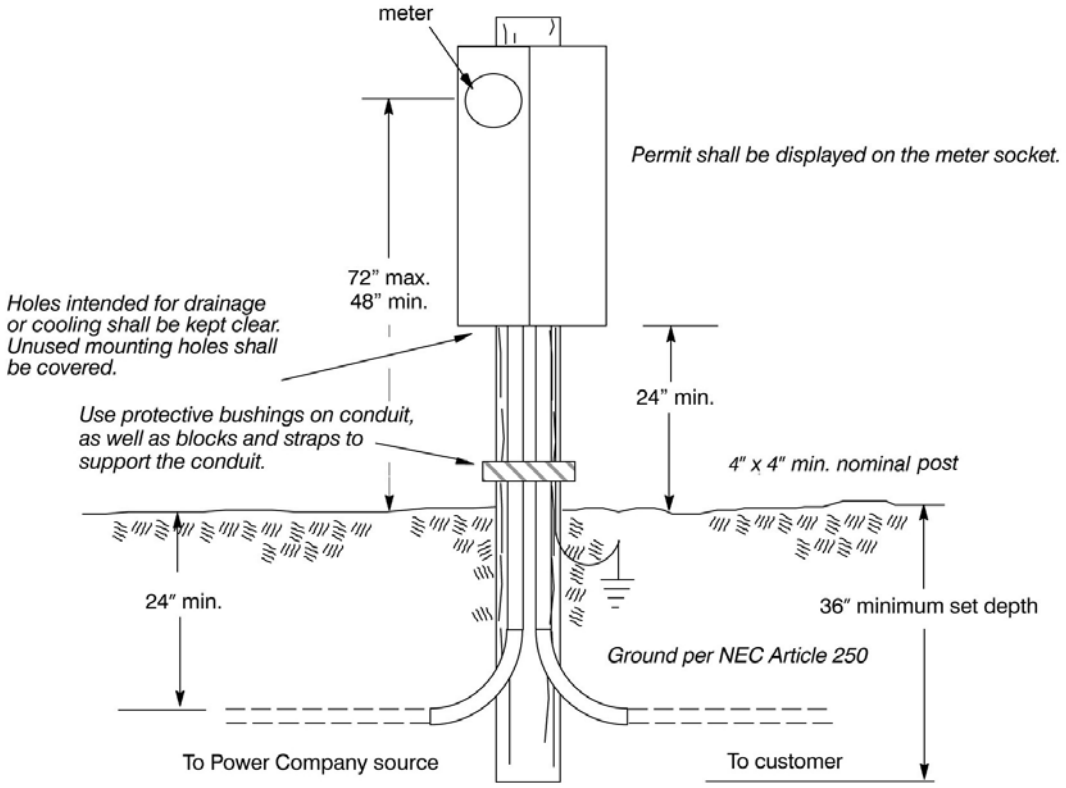
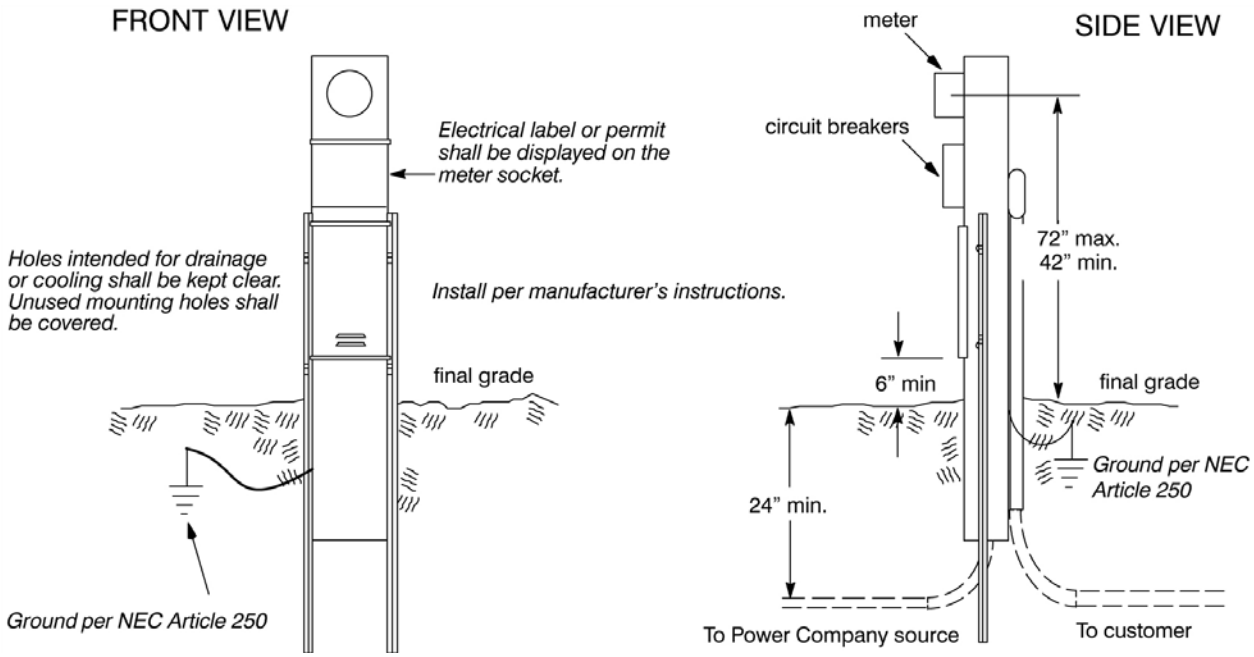


Figure 19—Underground Temporary Construction Service, Free-Standing Meter Socket, Manufactured Package



6.3 Meter Socket Requirements for Temporary Construction Services

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

Table 17—Customer-Supplied Meter Socket Types

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

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7. Residential One- and Two-Family Dwellings

7.1 General

This section covers the requirements for permanent service to residential one- and two-family dwellings, including manufactured and mobile home dwellings. The *Residential One- and Two-Family Dwelling Connection Checklist* at the front of this manual should be used as a guide when preparing 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

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 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

Service disconnect requirements have changed in the latest NEC. Consult your local inspector for current NEC requirements for your area when selecting 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. All class 320 residential meter sockets require a manual link bypass.

6. Holes intended for drainage or cooling shall be kept clear. Unused mounting holes shall be covered. Mounting shall be per the manufacturer's provisions.
7. The grounding conductor shall not be connected to the Power Company's neutral in the meter socket.
8. Panel covers shall be properly secured.
9. 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.
10. Two dwelling units (e.g., duplexes) on a single tax lot requires a single point of residential service.

A safety meter socket, which comes with a manual link bypass, is 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 20 and Figure 21.

Figure 20—Residential Overhead Approved Meter Sockets

(Overhead Only)

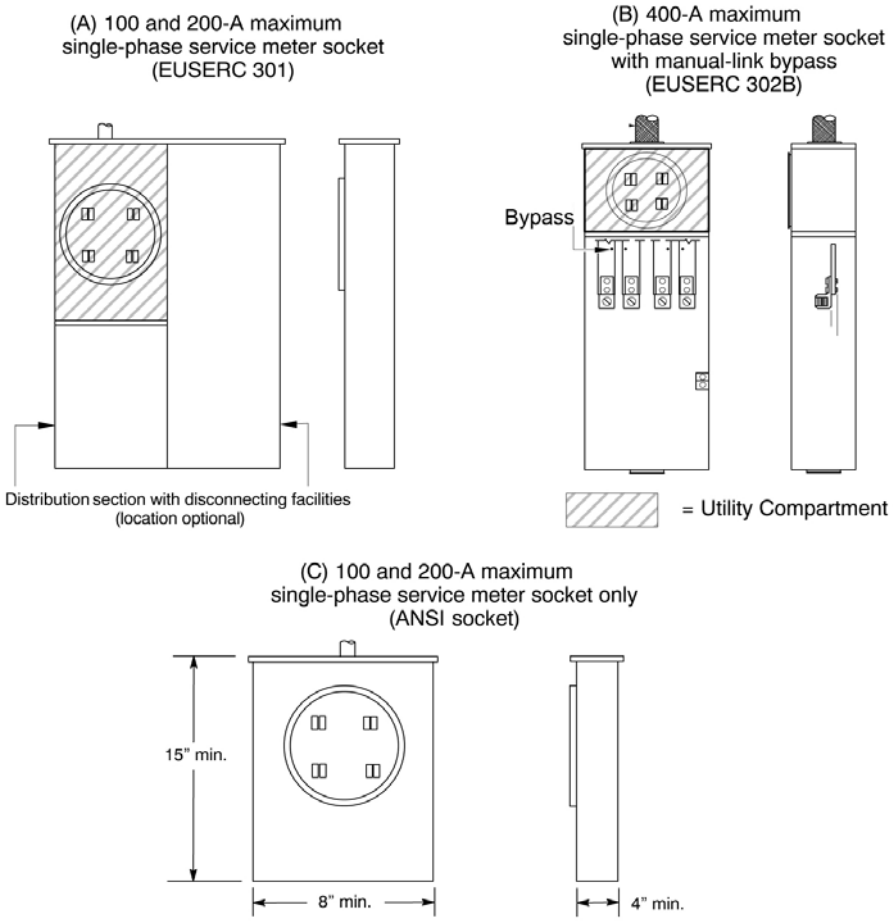
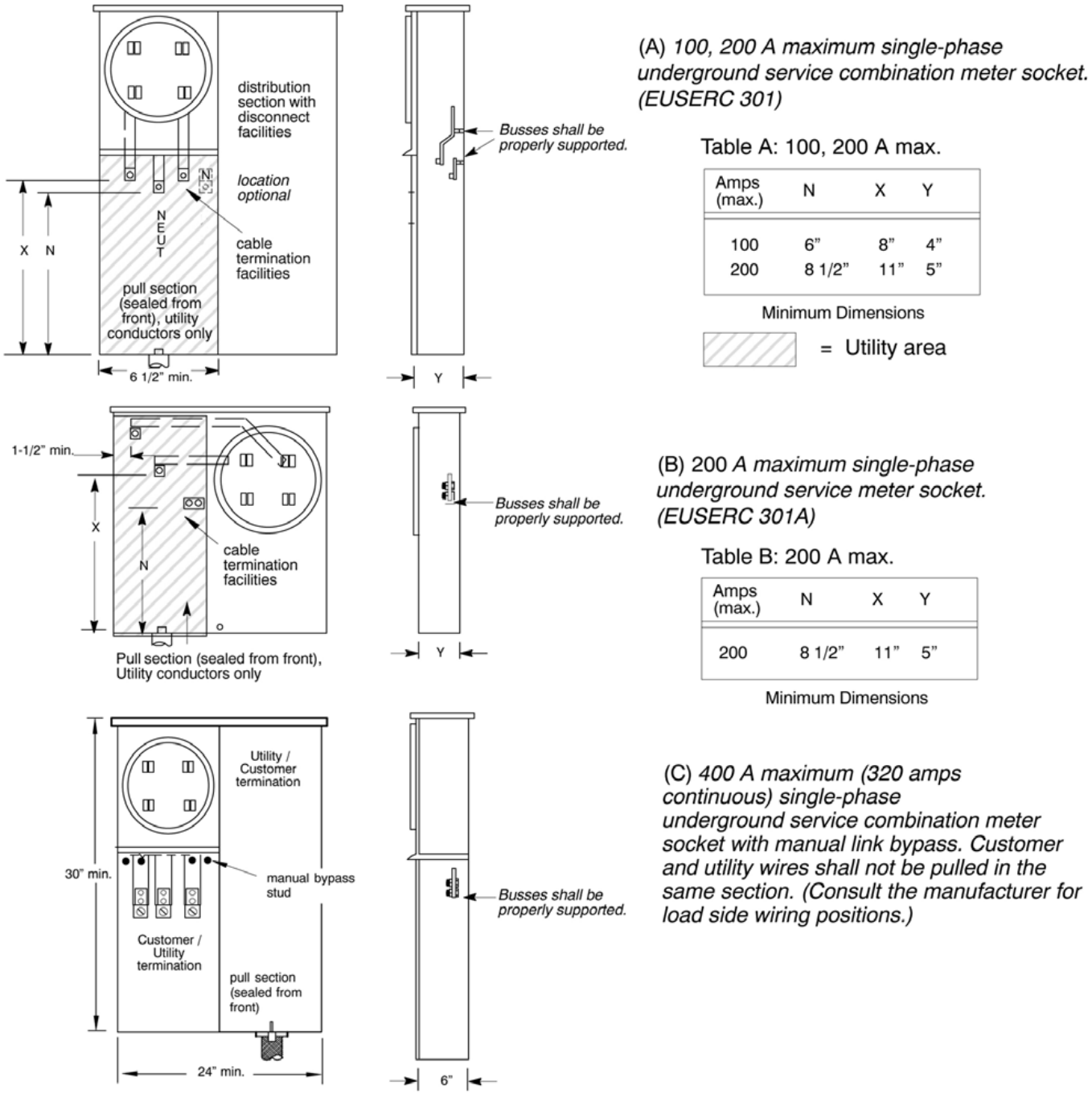


Figure 21—Residential Underground Approved Meter Sockets



(A) *100, 200 A maximum single-phase underground service combination meter socket. (EUSERC 301)*

Table A: 100, 200 A max.

Amps (max.)	N	X	Y
100	6"	8"	4"
200	8 1/2"	11"	5"

Minimum Dimensions

= Utility area

(B) 200 *A maximum single-phase underground service meter socket. (EUSERC 301A)*

Table B: 200 A max.

Amps (max.)	N	X	Y
200	8 1/2"	11"	5"

Minimum Dimensions

(C) *400 A maximum (320 amps continuous) single-phase underground service combination meter socket with manual link bypass. Customer and utility wires shall not be pulled in the same section. (Consult the manufacturer for load side wiring positions.)*

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 label made of metal or hard plastic to identify the customer's service unit/dwelling designation. The label must be permanently attached to the meter enclosure for the life of the installation.

To ensure each unit/dwelling is assigned the correct meter, the inside main panel of each unit/dwelling must be clearly marked with its designated unit/dwelling number.

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, *Clearance and Access*. Consult the Power Company to determine the point of attachment for overhead and underground service conductors.

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

Figure 22 illustrates the proper location for a wall-mounted meter with overhead service. Figure 23 shows the proper location for a wall-mounted meter with underground service.

Figure 22—Wall-Mounted Meter Socket Location for Overhead Service

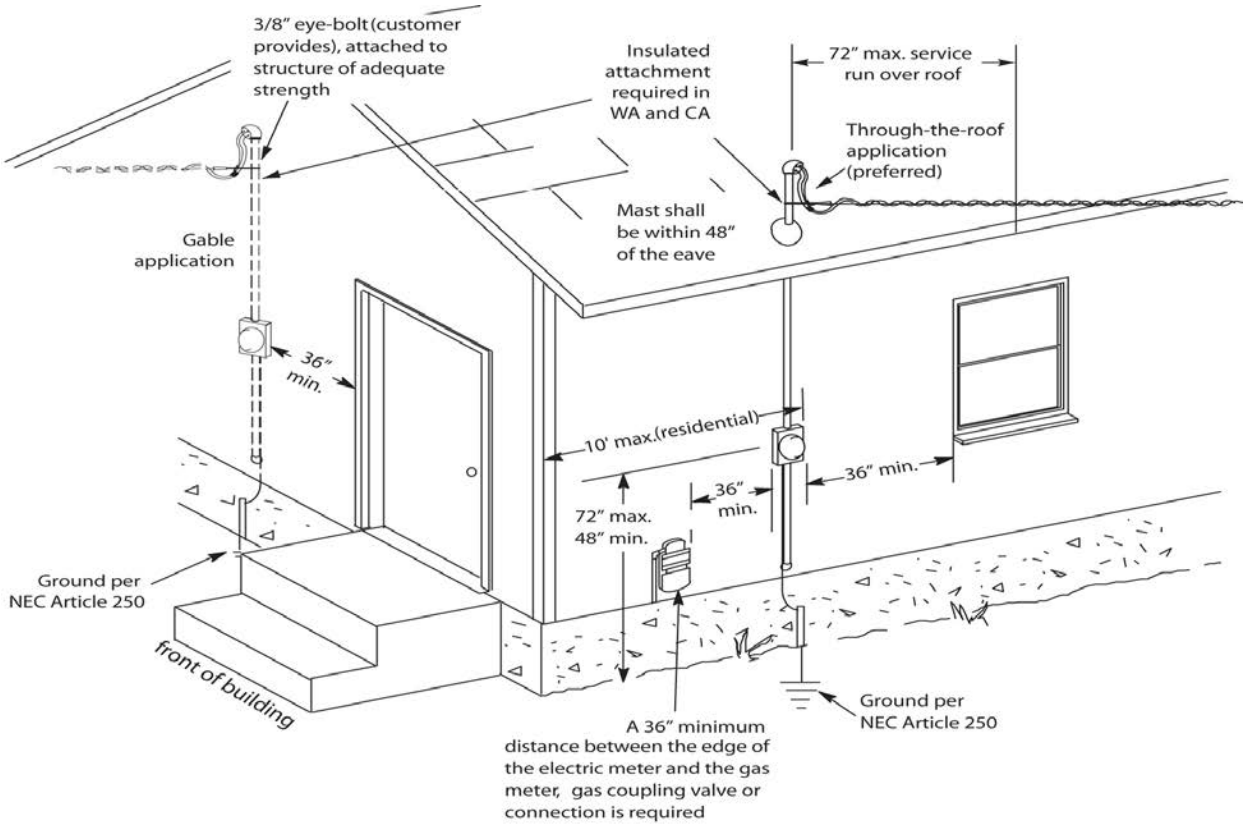
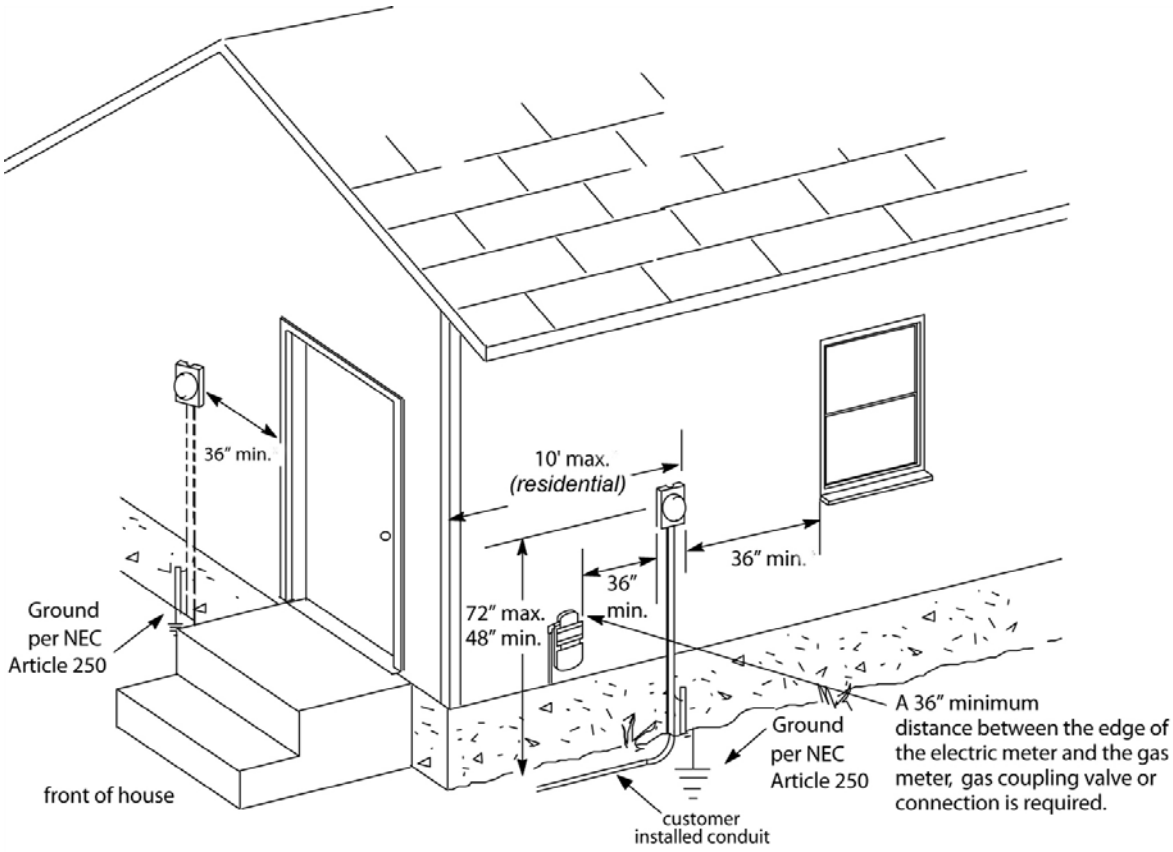


Figure 23—Wall-Mounted Meter Socket Location for Underground Service



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.

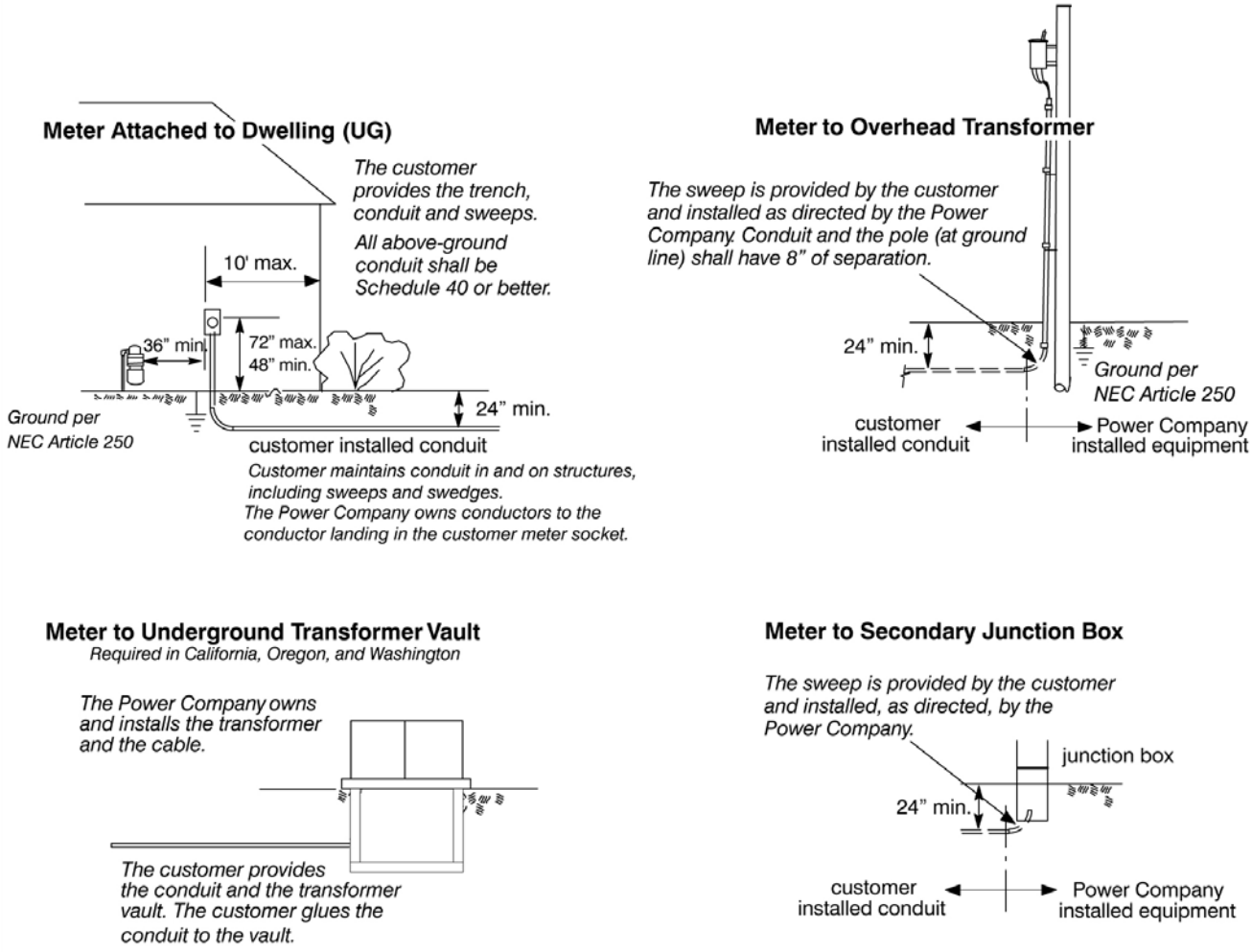
Requirements:

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 required 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.
6. The conduit must be straight with the sweep below grade when connecting to the meter socket.

Figure 24 shows the installation of an underground service extension from the Power Company source to the house.

Figure 24—Underground Service to Dwellings with Permanent Foundations



7.7.2 Underground Service to Wall-Mounted Meters

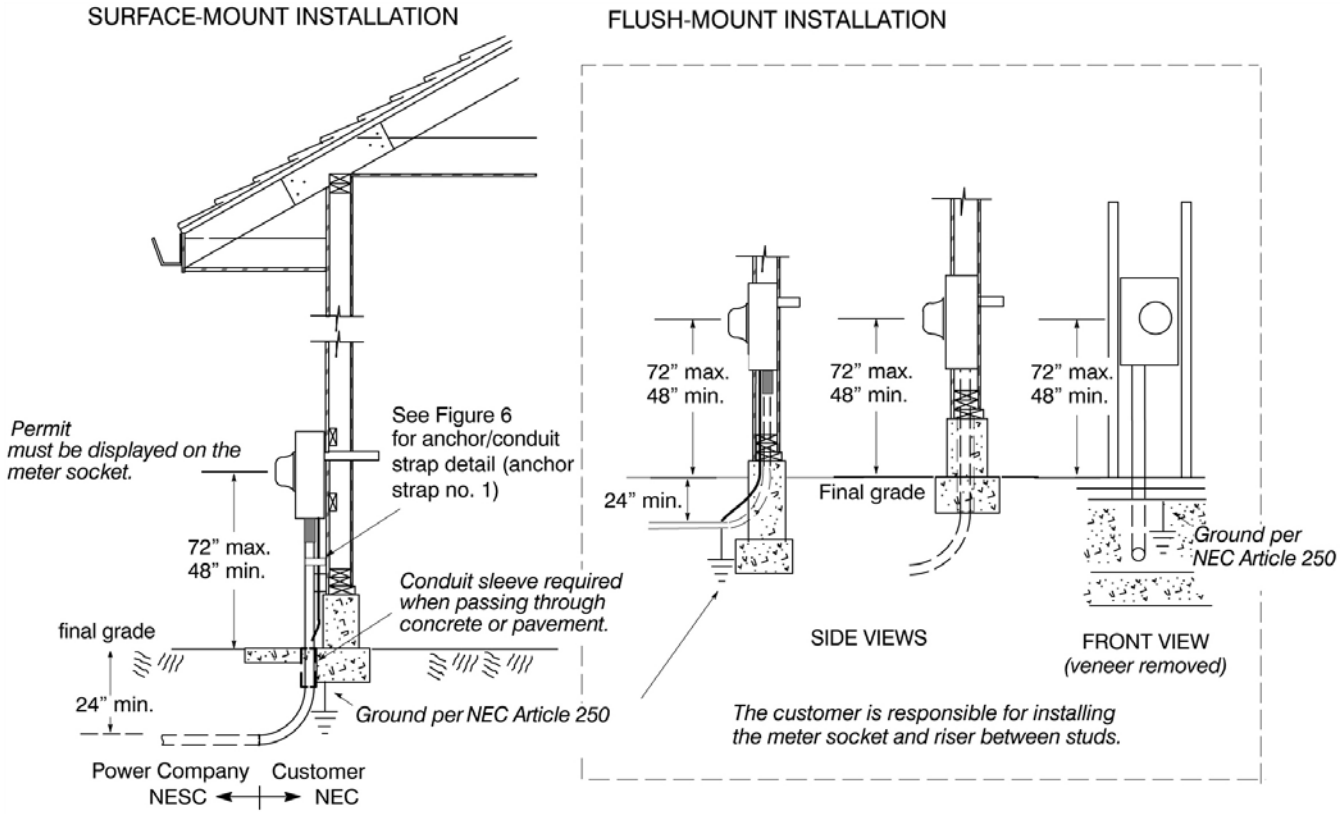
Installation requirements for underground service to wall-mounted meters are listed below. These requirements are in addition to the requirements given in Section 5, Section 7.6, and Section 7.7.1.

Requirements:

1. The meter socket and conduit shall be securely attached to the structure. Refer to Figure 6 for anchor/conduit strap detail, *Anchor strap no. 1 (or equal)*.
2. The meter socket shall be plumb.
3. When a 3-inch 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 2 inches.

Figure 25 shows typical installations of a meter socket and associated hardware for surface and flush wall-mounted meter sockets.

Figure 25—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 a readily accessible 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 6 inches 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 26, Figure 27, and Figure 28 illustrate typical meter installations for steel posts, wood posts, and manufactured meter pedestal packages.

Figure 26—Underground Service to a Free-Standing Meter Socket, Steel Post

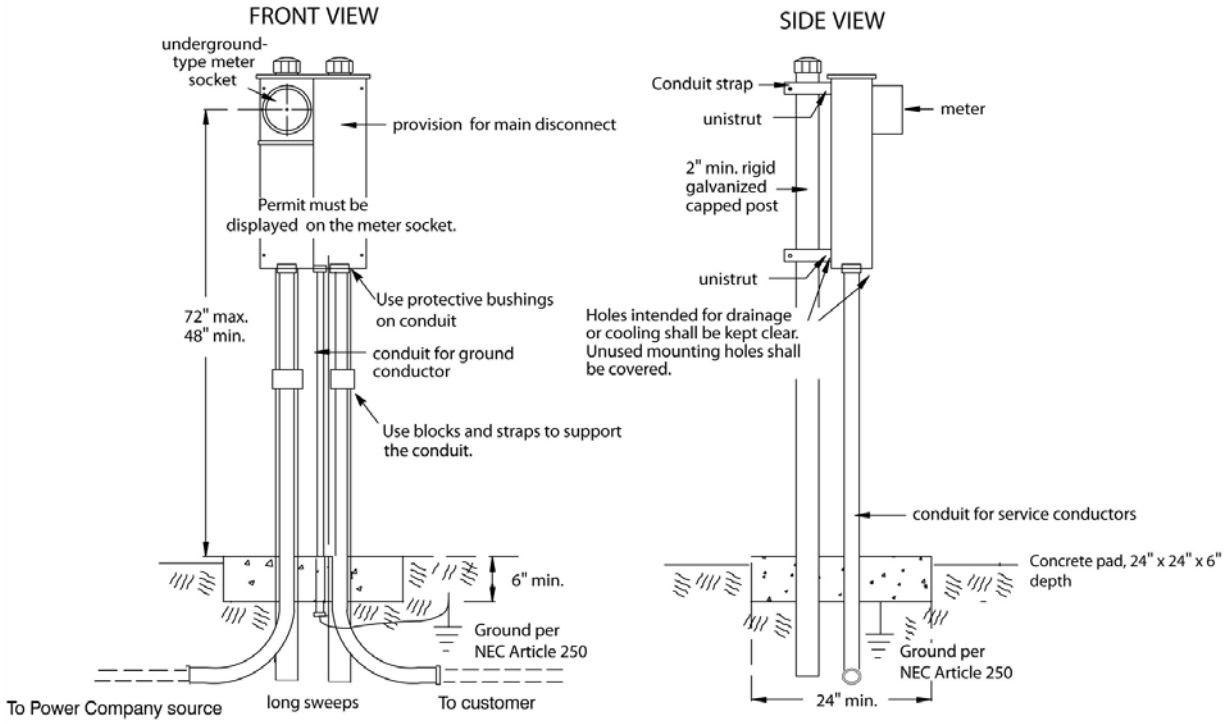


Figure 27—Underground Service to a Free-Standing Meter Socket, Wood Post

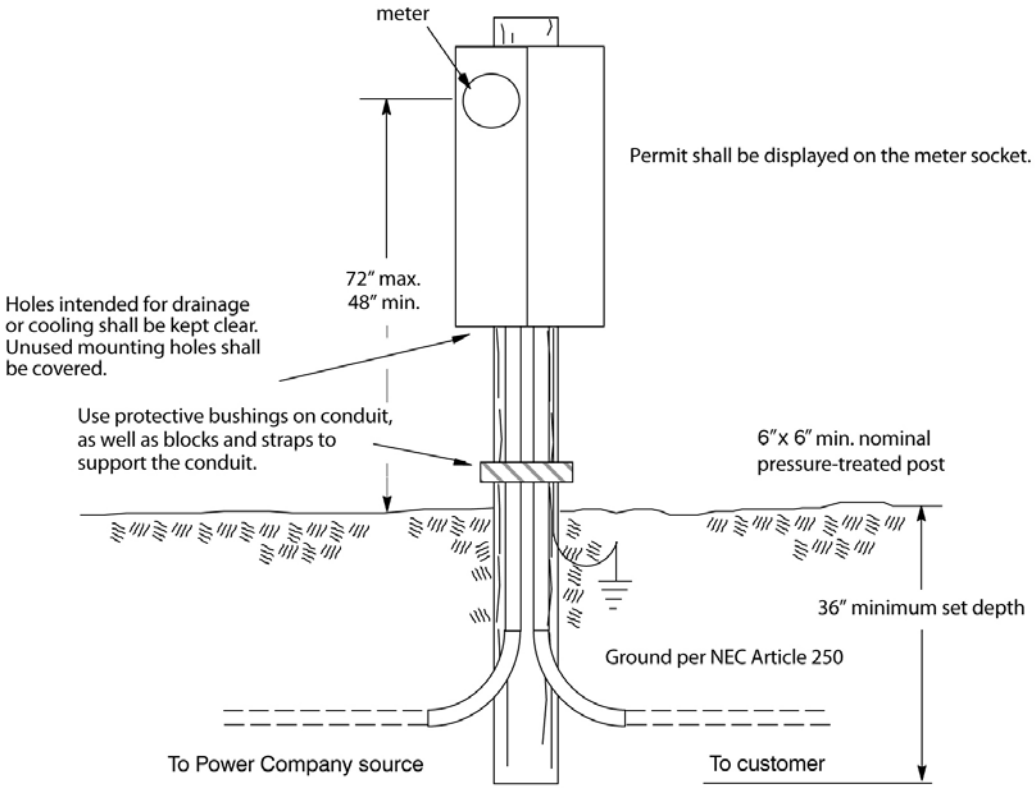
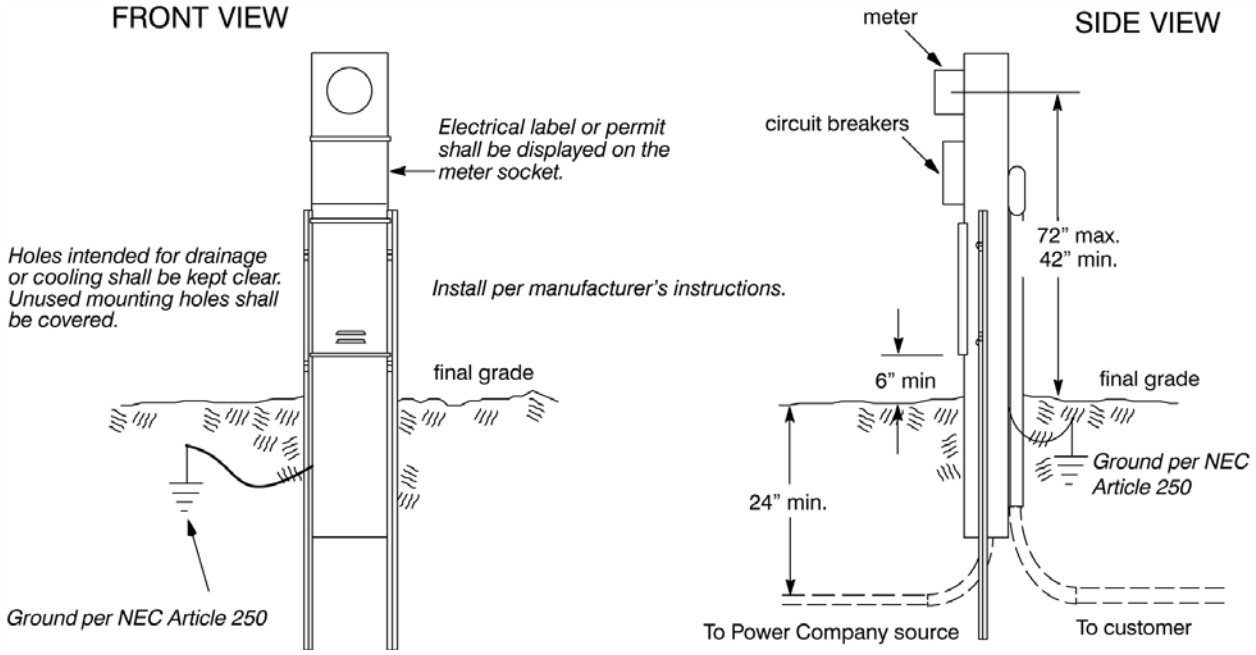


Figure 28—Underground Service to a Free-Standing Meter Socket, Manufactured Package



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, as specified in Section 2.2.

General Overhead Service 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 18 (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, if allowed by the authority having jurisdiction (AHJ), Intermediate Metallic Conduit (IMC).
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.

Before installation, the customer must also consult with the Power Company under any of the following conditions:

1. The service crosses over a road or street.
2. The service runs along an alley, or crosses an alley, parking lot, or nonresidential 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.

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.

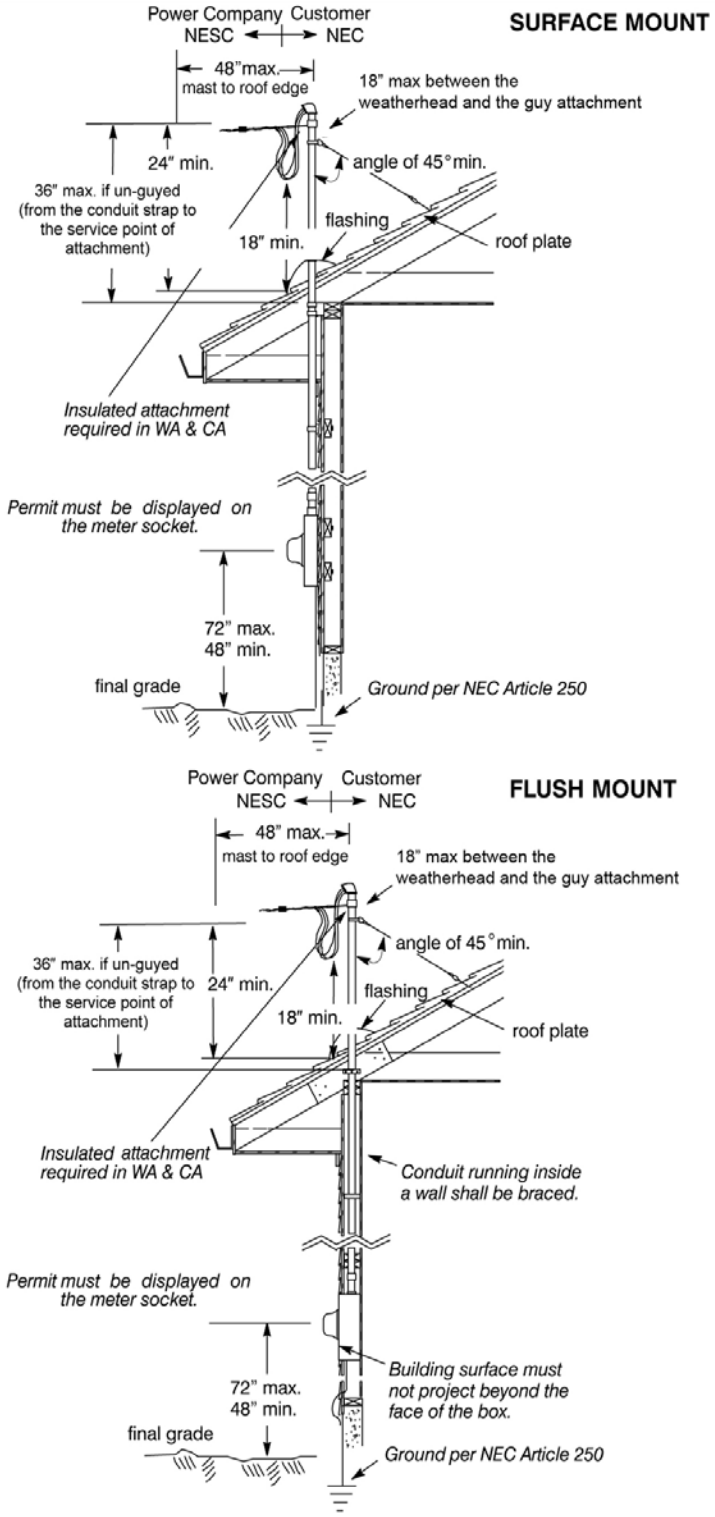
Requirements:

1. The service mast shall be mounted such that it is within 10 feet 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, *Clearance and Access*, 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 22.)
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, ¼″ x 3 ¼″ 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 8 feet of the weatherhead.
7. The mast shall be guyed if the point of attachment is more than 36 inches above the roof line.
8. Guying shall be ¼-inch 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.
10. Metering installations and service equipment shall be readily accessible to the Power Company.

Figure 29 shows a typical installation of overhead service to surface and flush wall-mounted meters.

Figure 29—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 ⅓ of any face. Cracks greater than ½ -inch wide are not permitted. No visible wood decay is allowed.
2. The pole height must provide required clearance for the Power Company's overhead service conductor 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 long and 5 ½ inches in diameter at the top, or a (nominal) 6″ × 6″ × 25′ timber, set no less than 60 inches 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 in length outside the weatherhead.

Figure 30 shows a typical installation of overhead service to a meter mounted on a pole.

Figure 30—Overhead Service to Meters Mounted on Poles

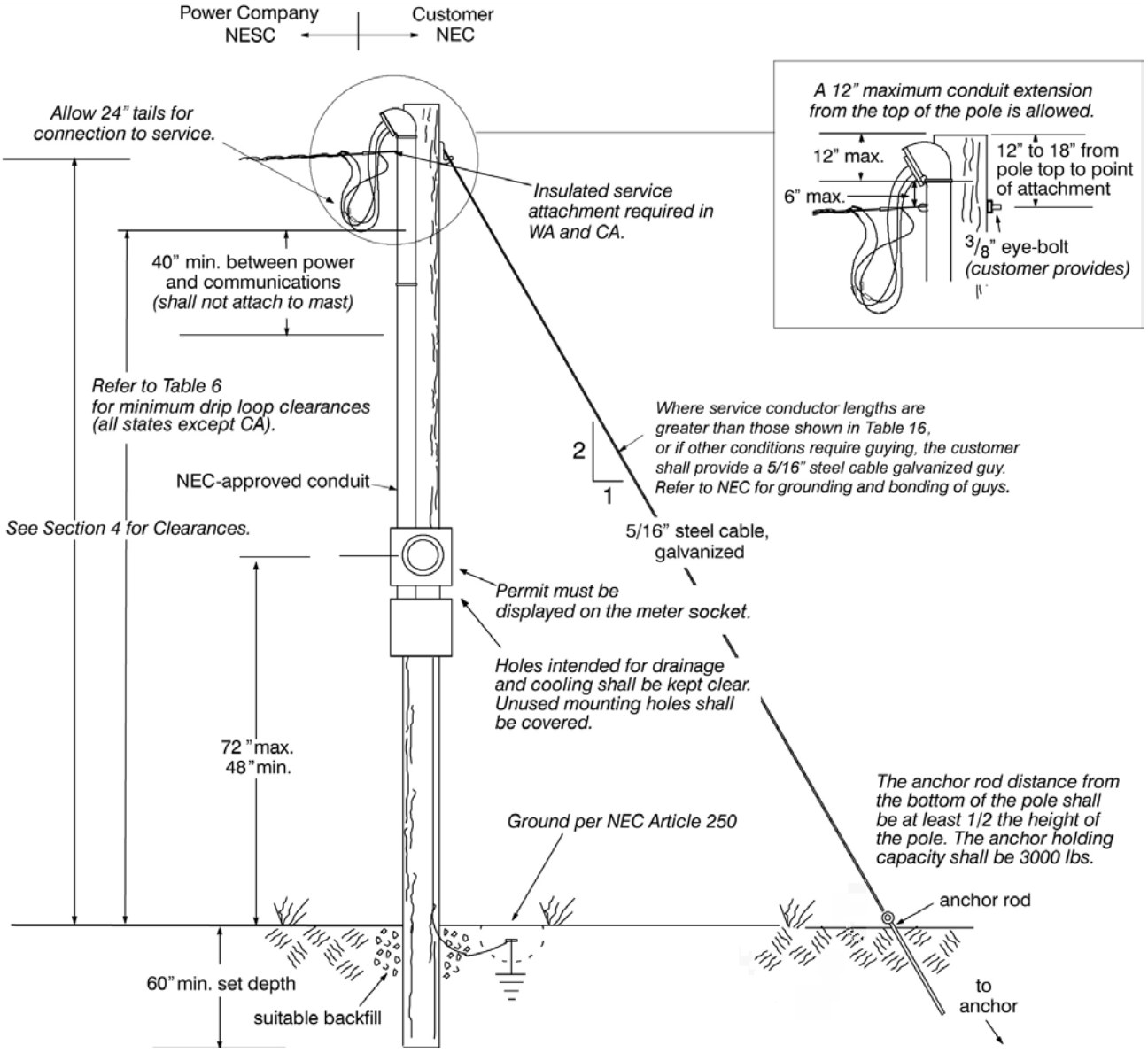


Table 18—Acceptable Service Conductor Lengths for Meters Mounted on Poles

Service Size	Utility Service Length without Guying	Utility Service Length with Guying
200 A or Less	60′ Maximum	90′ Maximum
201 - 400 A Service	45′ 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. Residential Multifamily Dwellings

8.1 General

This section describes service with separate meters for residential multifamily dwellings including high-rise and mixed-use applications. Refer to Section 9 for commercial requirements for mixed-use services. The Power Company requires grouping of service entrance equipment 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.

Requirements:

1. All meters should be outside and readily accessible to the Power Company.
2. Location of meters from the transformer must meet the conduit distances outlined in Table 12 and Table 13.
3. The Power Company may allow an additional pull section when 1200 amps are exceeded to a maximum of three pull sections per transformer, see Figure 31 and Figure 32. For multiple pull sections, consult the Power Company before any design considerations are made.
4. All meters shall be readily accessible to the power company and without obstructions – see clearances in Section 4.
5. Pad-mounted transformers shall be readily accessible.
6. Additional requirements such as labeling of the service entrance equipment maybe required. Consult the Power Company.
7. The conduit must be straight with the sweep below grade when connecting to the meter socket.
8. The customer shall clearly label and identify which pull section is served by each conductor.
9. The Power Company does not intend to pull conductor under a customer foundation.

Figure 31—Meters Located Within 50 Feet of the Transformer

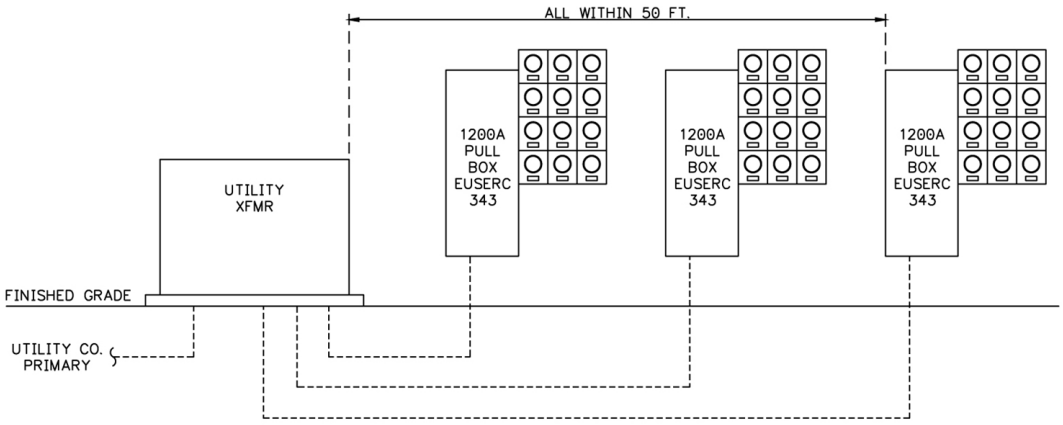


Figure 32—Meters Located More Than 50 Feet From The Transformer

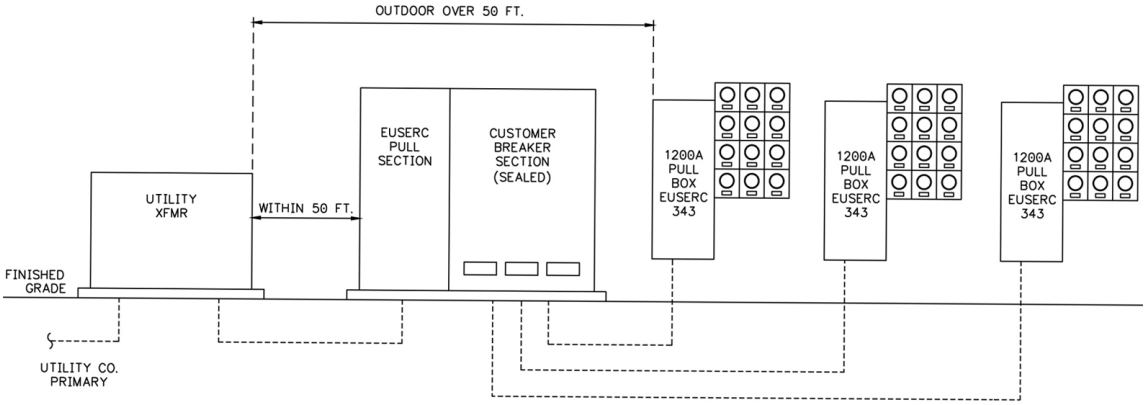


Table 19—Number of Pull Boxes Allowed by Amperage

Amps	Number of Pull Boxes Allowed
0 – 1,200	1
1,201 – 2,400	2
2,401 – 3,600	3

Notes:

1. When a switchboard meter is required, the metering scheme in Figure 32 is used when the meters are located greater than 50 feet from the transformer.
2. Figure 31 and Figure 32 are block diagrams representing pull sections and does not include all required equipment.

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 service equipment with multiple meter sockets shall meet the following requirements.

Service disconnect requirements have changed in the latest NEC. Consult your local inspector for current NEC requirements for your area when selecting meter sockets.

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, see Section 3.5.5 for more details. 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. Metering installations and service equipment shall be readily accessible to the Power Company
11. It is the responsibility of the customer to ensure the meter sockets are correctly labeled. 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

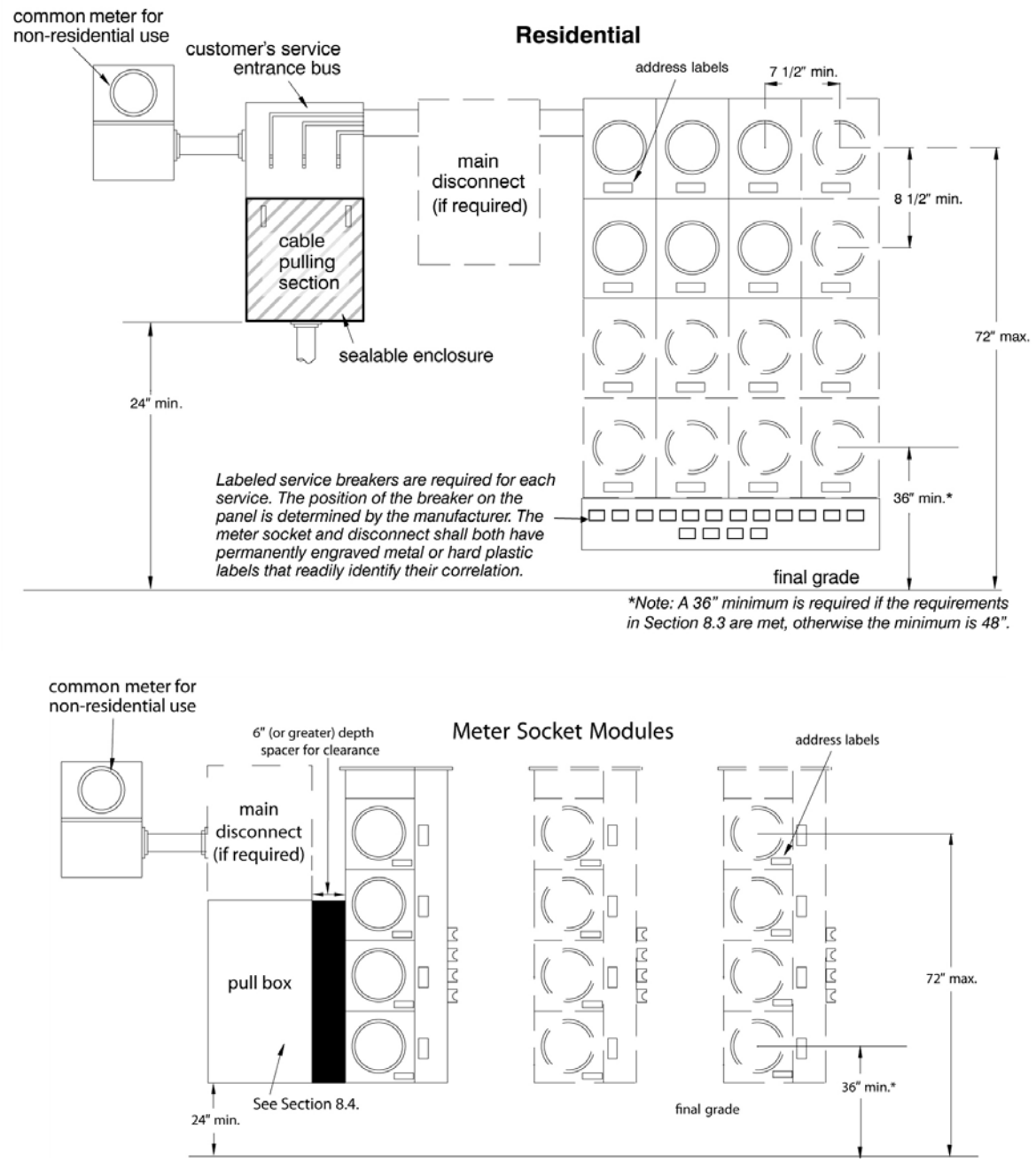
12. Each metered service and associated breaker shall be labeled to identify the unit. To ensure each unit is assigned the correct meter, the inside main panel of each unit must be clearly marked with its designated unit identifier (number, letter, etc.). Service will not be connected until units are clearly identified.
13. 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.
14. A minimum vertical clearance of at least 48 inches from the center of the lowest meter to the final grade is required. However, a minimum vertical clearance of 36 inches to the center of the lowest meter is acceptable if a minimum 36 inches wide, flat, concrete pad below the meter is provided at the final grade and extends at least 18 inches on either side of the meter cabinet.
15. 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 overhead service conductor.
16. For underground service, the Power Company will provide line-side cable and connectors, and will terminate on the line-side of the equipment.
17. All unused openings shall be covered and secured by the customer.
18. Meters and metering equipment shall be located outdoors.
19. Locate the main disconnect handle a sufficient distance from the meter and the pull box to allow full operation without interference.
20. 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.htm, and https://www.rockymountainpower.net/working-with-us/builders-contractors/electric-service-requirements.html.

Figure 33 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 33—Multiple Meter Socket Installations, Overhead and Underground

(Typical Combination Service Termination Enclosure and Meter Socket Panels for Complex Multiunit Dwelling Applications)



8.3.1 Maximum Available Supply

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

8.4 Pull Box Requirements

A pull box is required for complex multiunit dwelling services. EUSERC 343 specifies dimensions of the cable pulling section for 0-1200 A. See Figure 34 and Table 20.

Refer to the switchboard section in Section 9 for pull section requirements over 1,200 amps.

Figure 34—Pull Box Requirements
0-600 V, 0-1200 A, EUSERC 343, 343A, 347

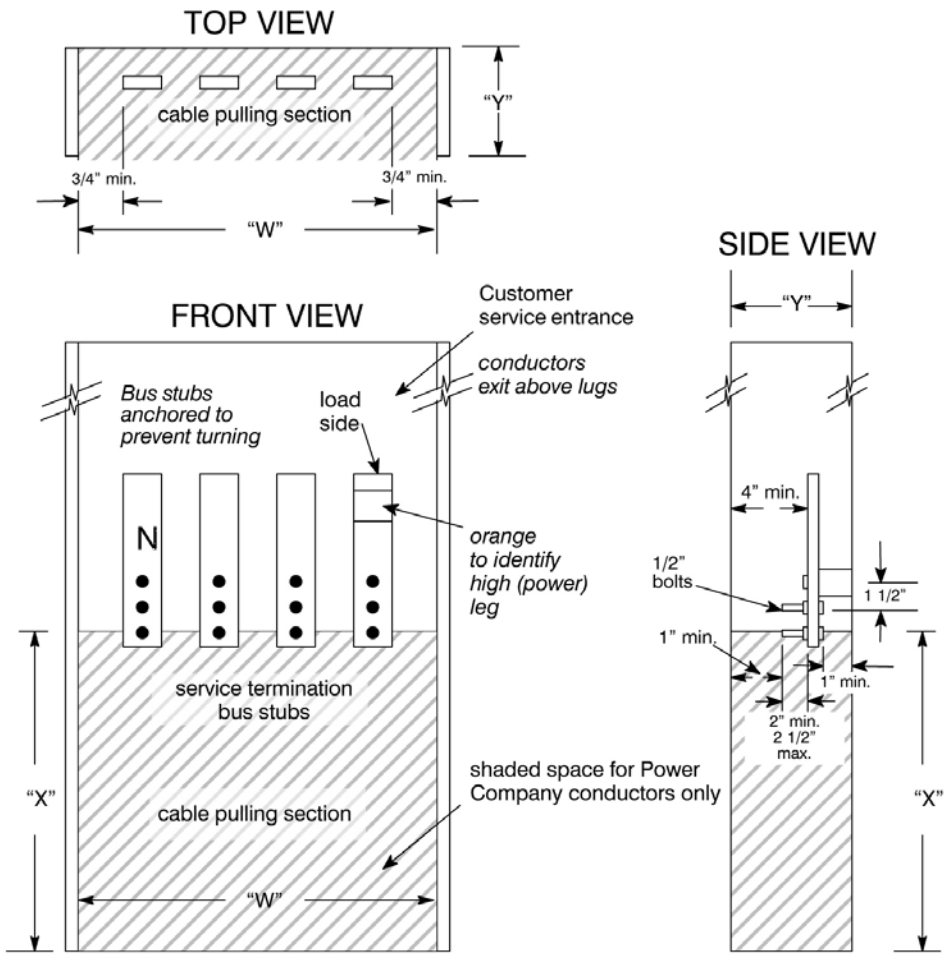


Table 20—Minimum Pull Box Dimensions

(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 Complex Multiunit Dwelling Meter Locations

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

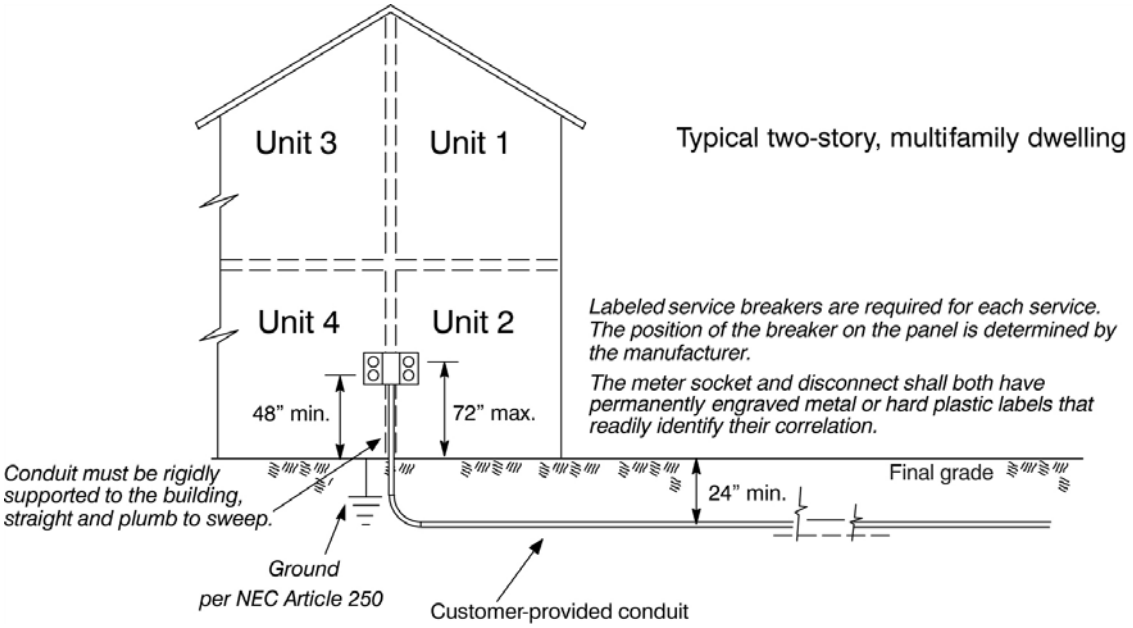
Requirements:

1. All meters shall be in a common location and readily accessible to the Power Company.
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, *Clearance and Access*.
4. The service entrance shall be sealed, as described in Section 3, *Services and Meter Installations*.

8.5.1 Complex Multiunit Dwelling Meter Location, Underground Service

Conduit shall be installed per Section 5.

Figure 35—Multiunit/Multifamily Underground Service

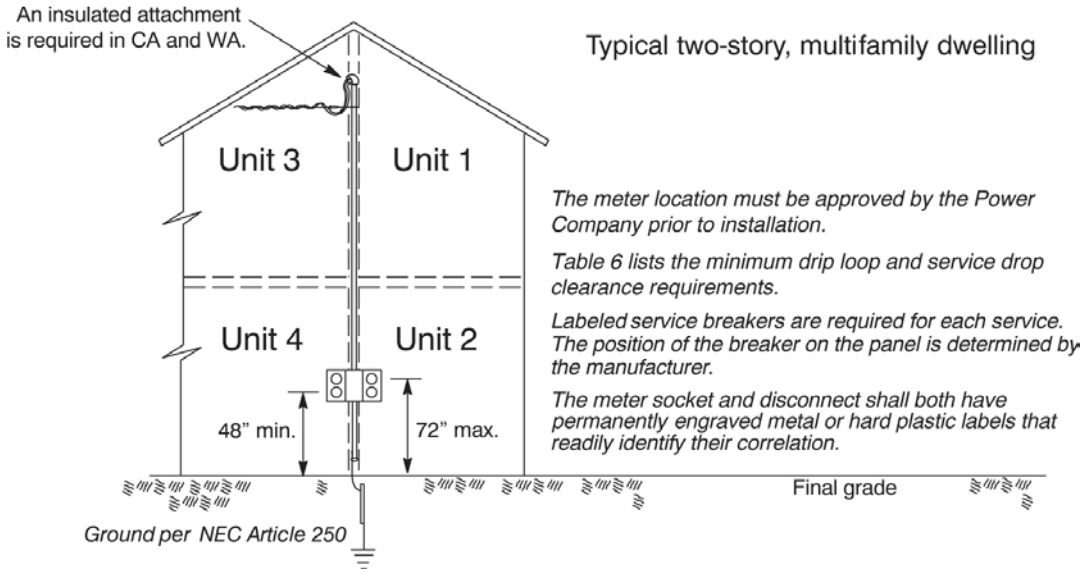


8.5.2 Complex Multiunit Dwelling Meter Location, Overhead Service

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

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

Figure 36—Multiunit Overhead Service



9. Nonresidential Services (Commercial, Industrial, and Agricultural)

This section describes Power Company requirements for single-phase and three-phase direct-connect or CT-rated nonresidential services. CT-rated equipment is required for single-phase service greater than 400 A and three-phase services greater than 200 A.

All nonresidential 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.rockymountainpower.net/working-with-us/builders-contractors/electric-service-requirements.html and https://www.pacificpower.net/working-with-us/builders-contractors/electric-service-requirements.html.

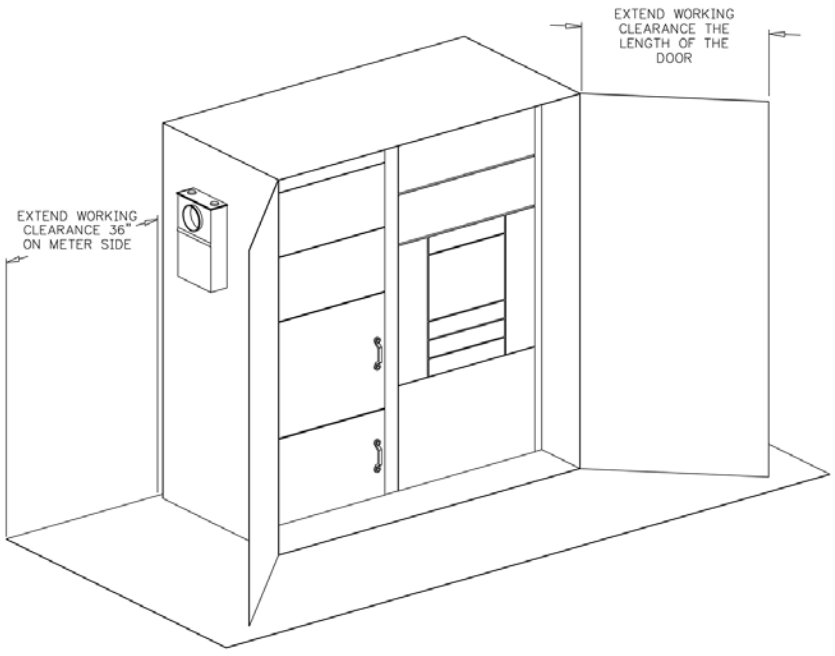
Service disconnect requirements have changed in the latest NEC. Consult your local inspector for current NEC requirements for your area when selecting meter sockets.

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, see Section 3.5.5 for more details. 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. It is the responsibility of the customer to ensure the meter sockets are correctly labeled. 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. To ensure each unit is assigned the correct meter, the inside main panel of each unit must be clearly marked with its designated unit number.
8. A minimum vertical clearance of at least 48 inches 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 to the center of the lowest meter is acceptable if a minimum 36 inches wide, flat, concrete pad below the meter is provided at the final grade and extends at least 18 inches 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 overhead service conductor.
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. The conduit must be straight with the sweep below grade when connecting to the meter socket.
12. Cable termination connectors should have two bolts per connector. When mechanical lugs are used, two setscrews per conductor should be used where feasible.
13. All unused openings shall be covered and secured by the customer.
14. Meters and metering equipment shall be readily accessible to the Power Company located outdoors.
15. A concrete mounting pad shall be placed for the switchboard enclosure
16. A flat permanent surface (such as a concrete pad) extending a minimum of 36 inches out from the front of the working section of the metering equipment. The width of the pad must include when the doors are opened. See Figure 37.

Figure 37—Flat Surface Around a Switchboard Enclosure



Note: See Figure 3 in Section 4.1.4 for additional clear workspace requirements.

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 A or less, or when the ampacity of a three-phase service is 200 A

or less. Required types are summarized in Table 21. 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.

Service disconnect requirements have changed in the latest NEC. Consult your local inspector for current NEC requirements for your area when selecting meter sockets.

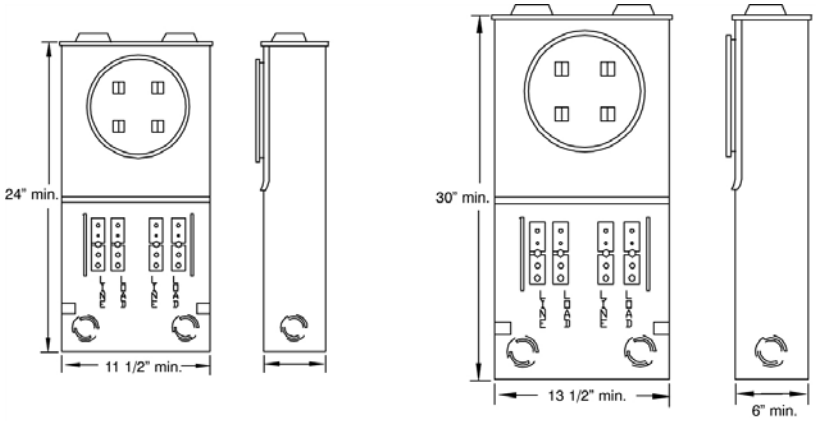
Table 21—Direct-Connect Socket Requirements

Direct-Connect	Amperage	Socket Requirement	Figure
Single-phase	100 A max.	EUSERC 304	Figure 38
Single-phase	200 A max.	EUSERC 305	Figure 38
Single-phase, overhead only	201 - 400 A	EUSERC 302B	Figure 40
Single-phase, overhead and underground	201 - 400 A	No EUSERC drawing exists	na
Network	200 A max.	EUSERC 305	Figure 39
Three-phase	100 A max.	EUSERC 304	Figure 38
Three-phase	200 A max.	EUSERC 305	Figure 38

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 existing 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 38—Nonresidential, Single-Phase, Direct-Connect Socket with Required Safety Socket, EUSERC 304 and 305



A. 100 A (EUSERC 304) **B.** 200 A (EUSERC 305)

Figure 39—Nonresidential, Three-Phase, Direct-Connect Socket with Required Safety Socket, EUSERC 304 and 305

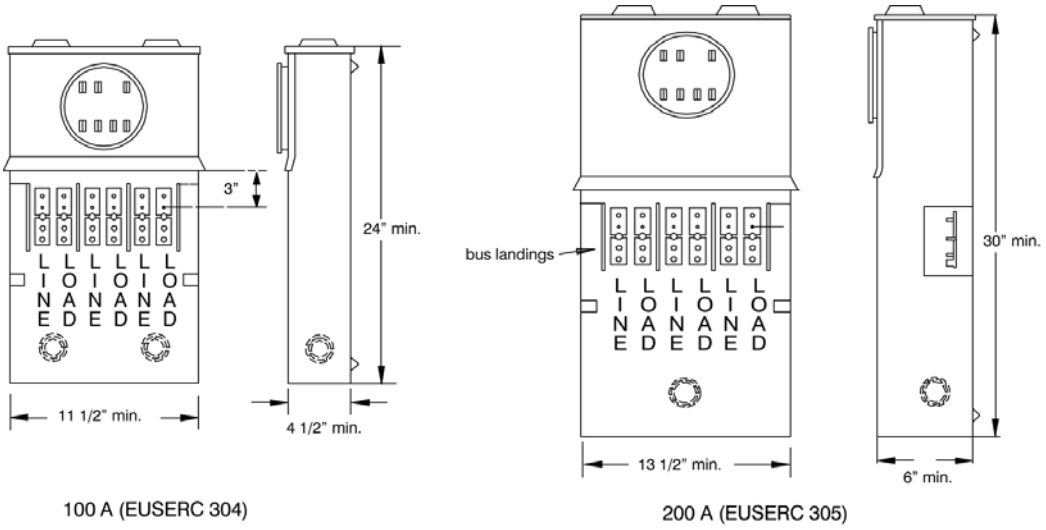
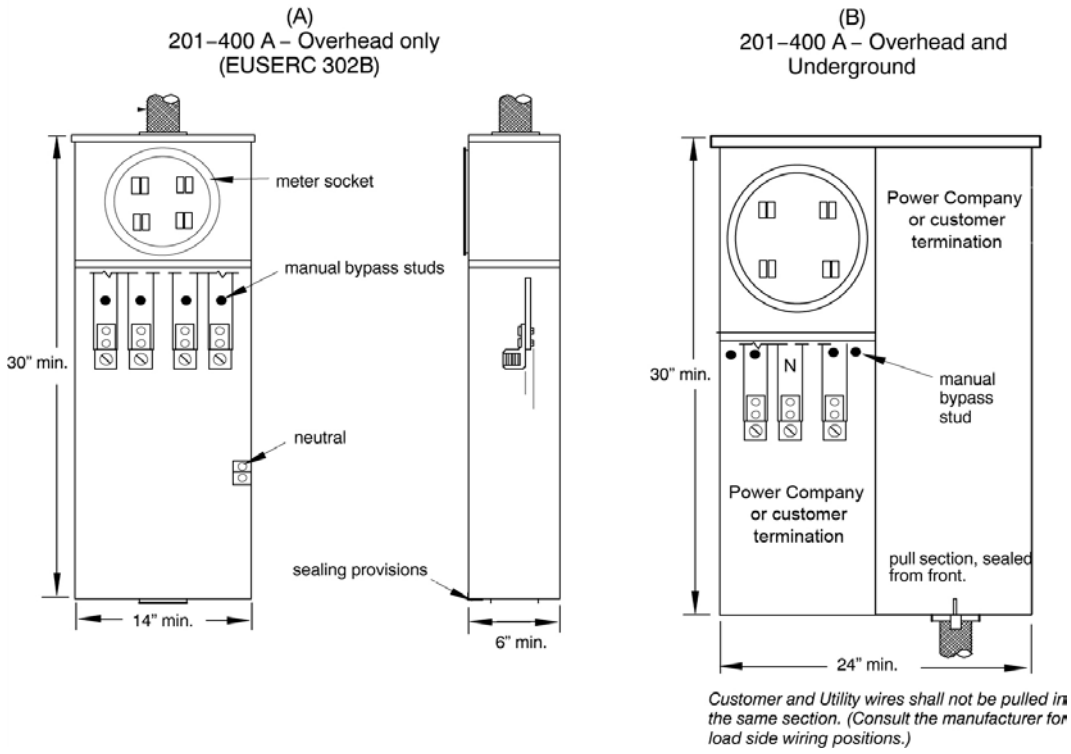


Figure 40—Nonresidential, Single-Phase, Direct-Connect Socket with Required Manual-Link Bypass, for 240/120 V, 201−400 A Services Only, EUSERC 302B



Typical Services Connections

The figures below show typical service connections.

Figure 41—Single-Phase Socket Connection Diagram, Front View

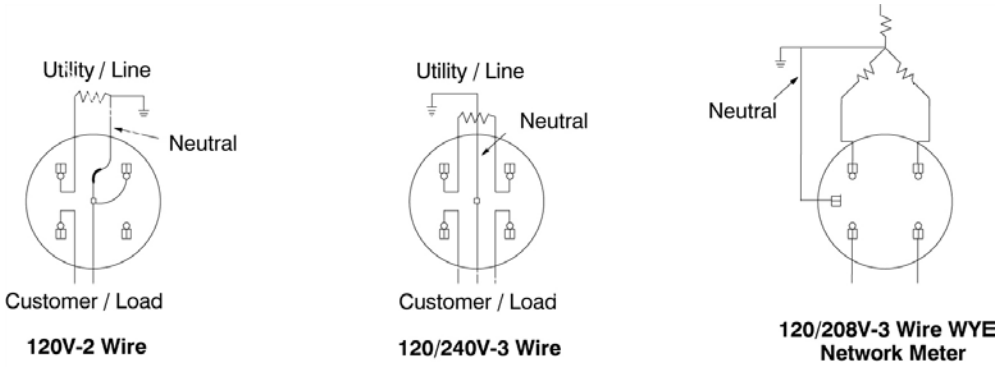
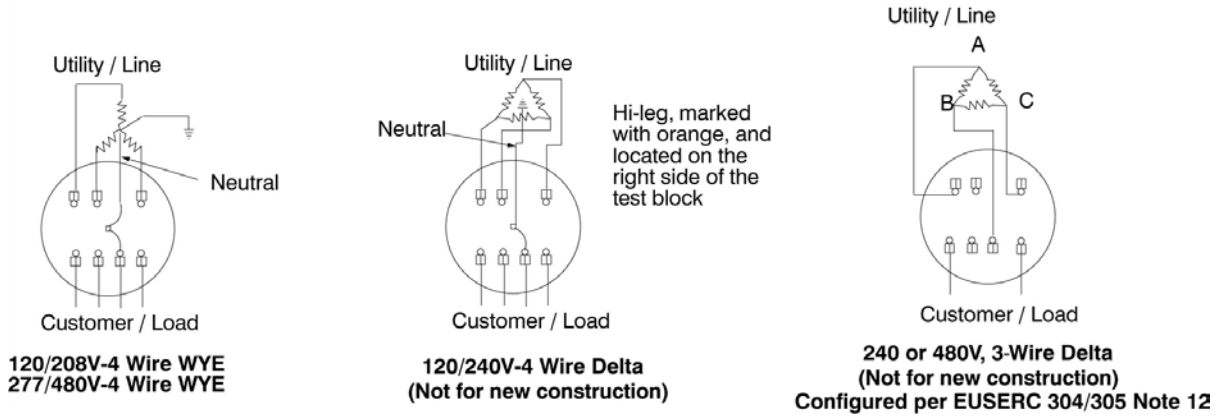


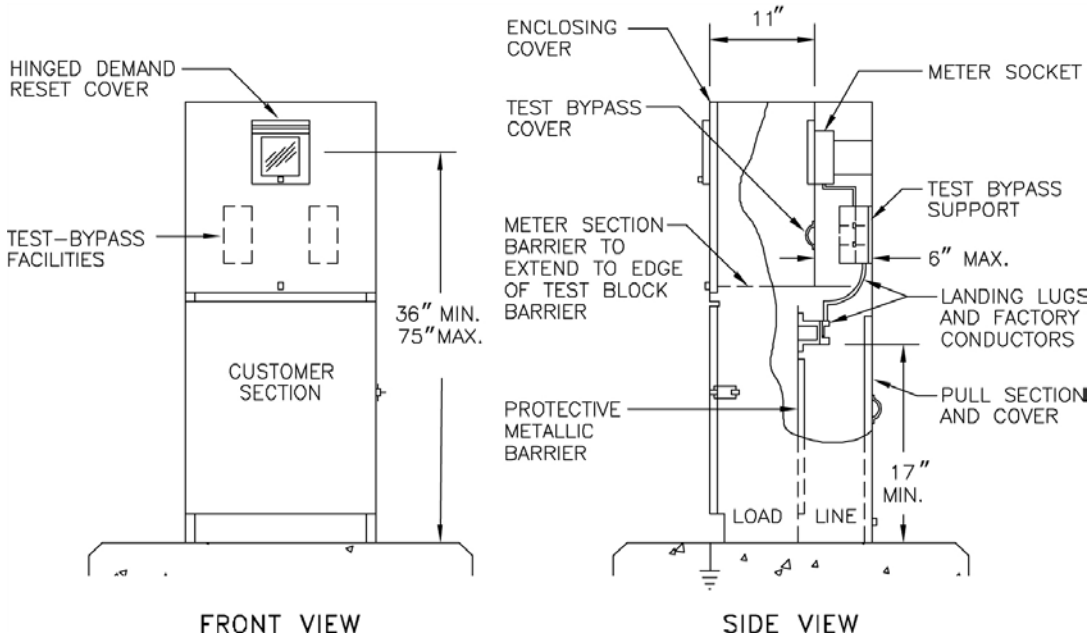
Figure 42—Three-Phase Socket Connection Diagram, Front View



9.2.1 Nonresidential Underground Service Meter Pedestals

Pedestals may be used for nonresidential underground service installations. Figure 43 shows the approved pedestal (EUSERC 308).

Figure 43—Underground Service, Nonresidential Meter Pedestals, EUSERC 308



9.2.2 Nonresidential Underground Service, Free-Standing Meter

Free-standing installations may be used for nonresidential 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″ × 6″ (nominal) and pressure-treated with an American Wood Preservative Association approved preservative.
5. Metering installations and service equipment shall be readily accessible to the Power Company

The typical meter installations for steel posts and wood posts are illustrated in Figure 44 and Figure 45.

Figure 44—Underground Service to a Free-Standing Meter Socket, Steel Post

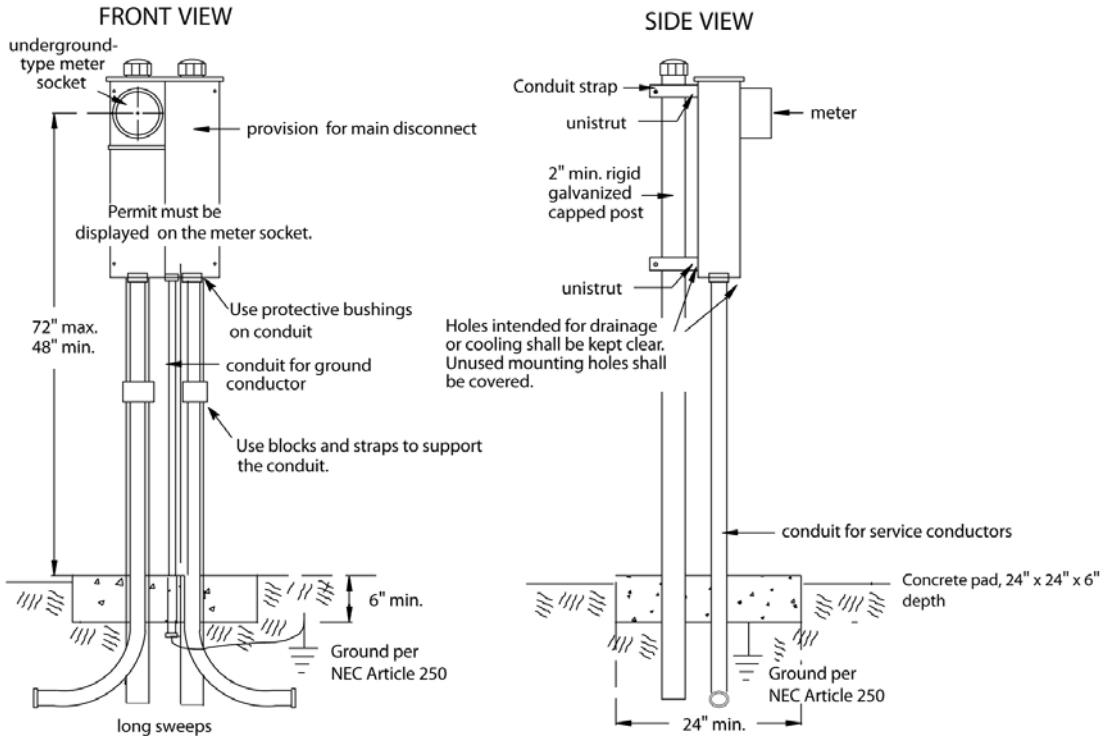
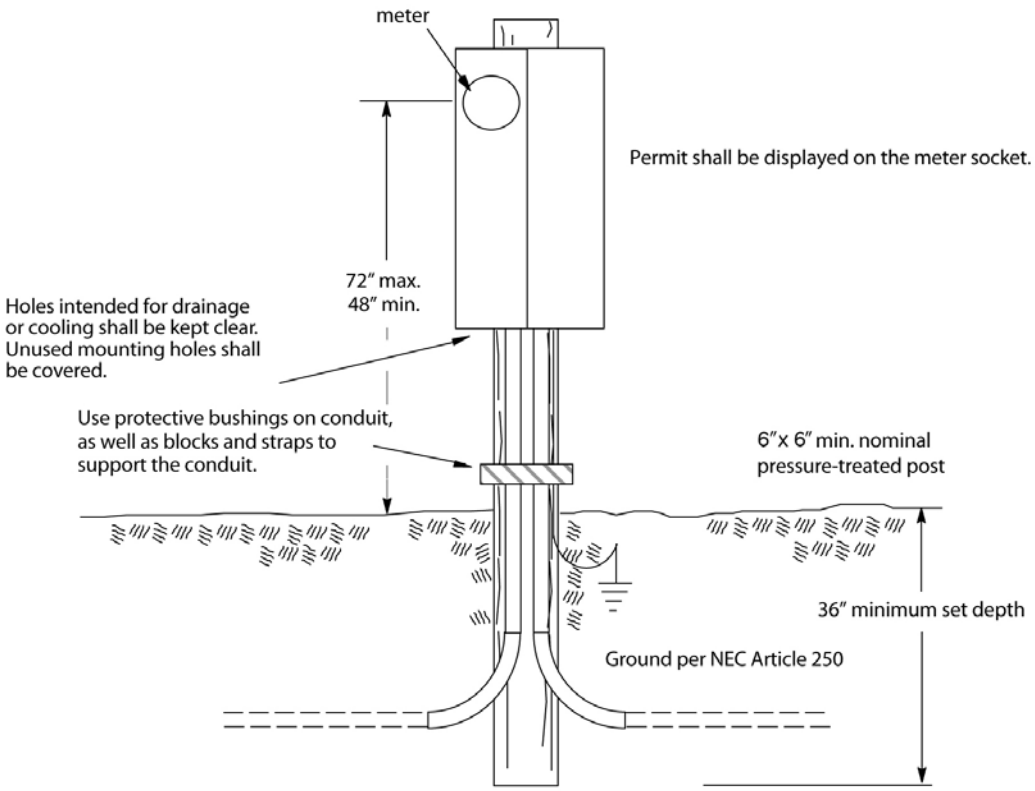


Figure 45—Underground Service to a Free-Standing Meter Socket, Wood Post



9.2.3 Nonresidential Overhead Service, Free-Standing Meter

Free-standing installations may be used for nonresidential 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 ⅓ of any face. Cracks greater than ½ -inch wide are not permitted. No visible wood decay is allowed.
2. The pole height must provide required clearance for the Power Company's overhead service conductor and any other attachments. The customer shall install the meter socket and service equipment on a wood pole no less than 25 feet long and 5 ½ inches in diameter at the top, or a (nominal) 6″× 6″ × 25′ timber, set no less than 60 inches 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 22 may be reduced; guying or bracing shall be required.

5. The conductor must be at least 24 inches in length outside the weatherhead.
6. Metering installations and service equipment shall be readily accessible to the Power Company

Figure 46 shows a typical installation of overhead service to a meter mounted on a pole.

Figure 46—Overhead Service to Meters Mounted on Poles

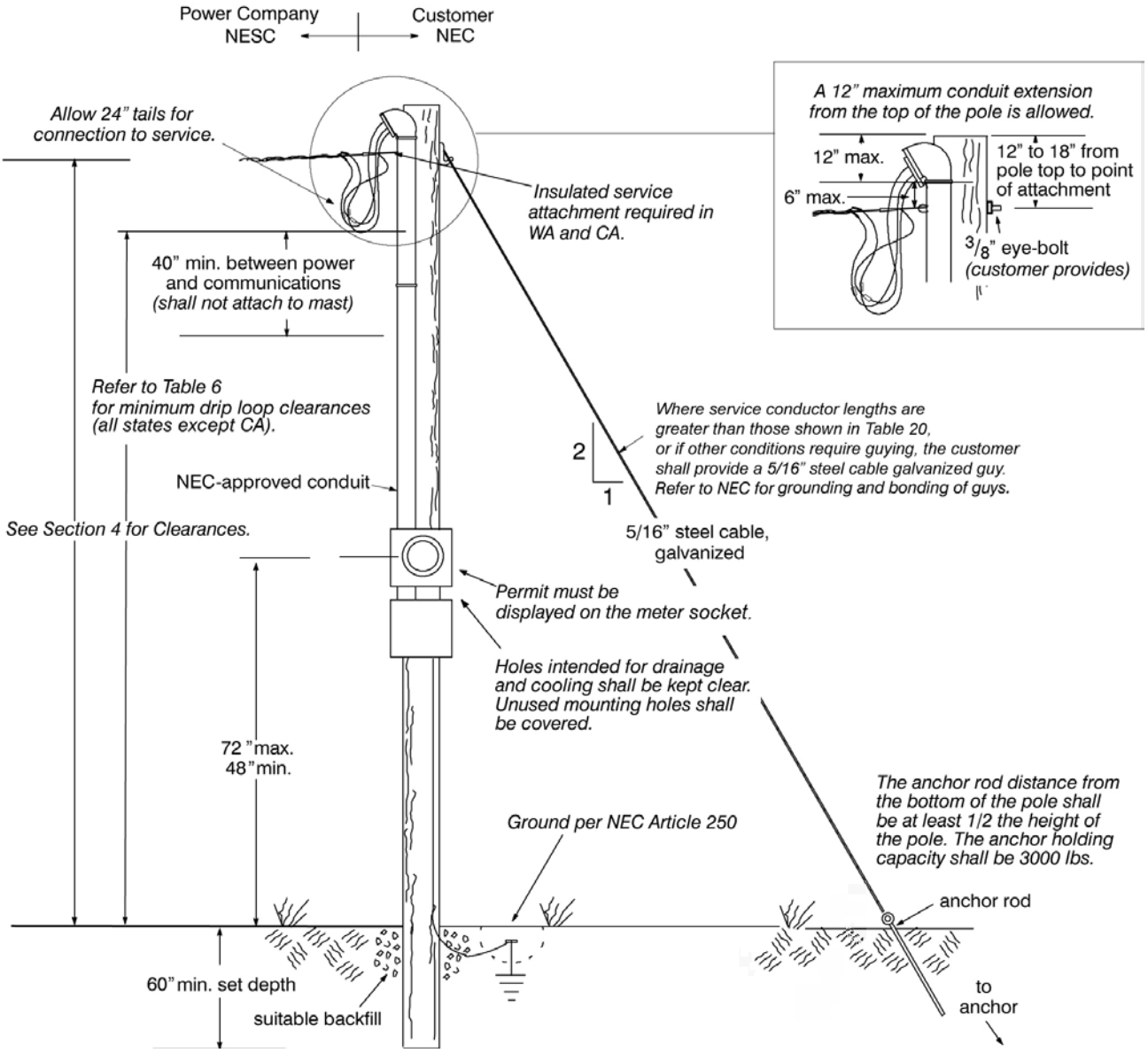


Table 22—Acceptable Service Conductor Lengths for Meters Mounted on Poles

Service Size	Utility Service Length without Guying	Utility Service Length with Guying
200 A or Less	60′ Maximum	90′ Maximum
201 - 400 A Service	45′ 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, nonresidential, 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 47, Figure 48, and Figure 49 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 is required for ganged or modular style installations, refer to Section 9.3.1. A pull section is also required for switchboard metering installations, refer to Section 9.5.2.
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 refer to Section 9.1.
6. Metering installations and service equipment shall be readily accessible to the Power Company

Figure 47—Nonresidential Ganged Meter Socket Installation

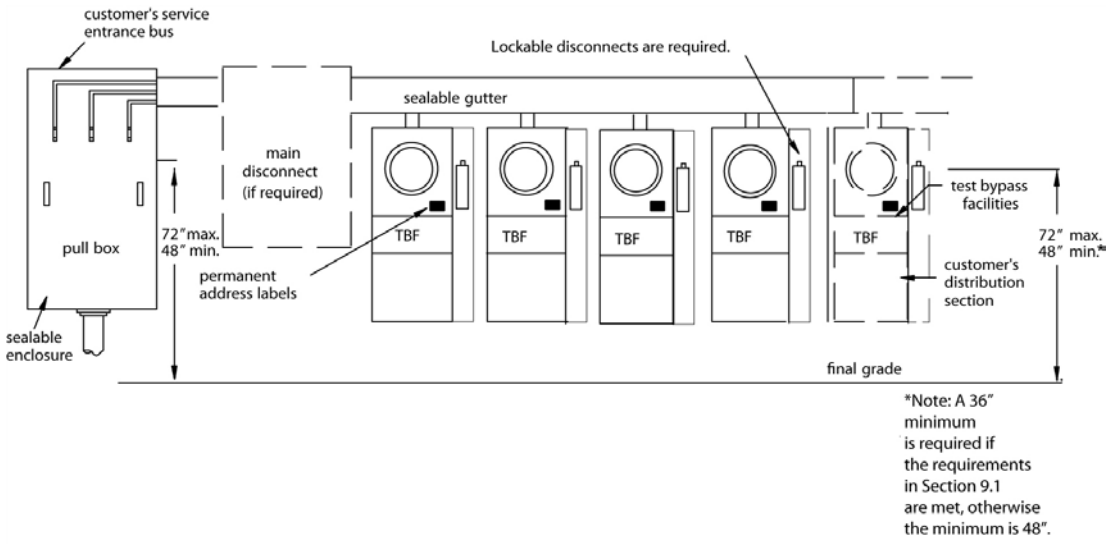


Figure 48—Nonresidential Modular Meter Socket Installation

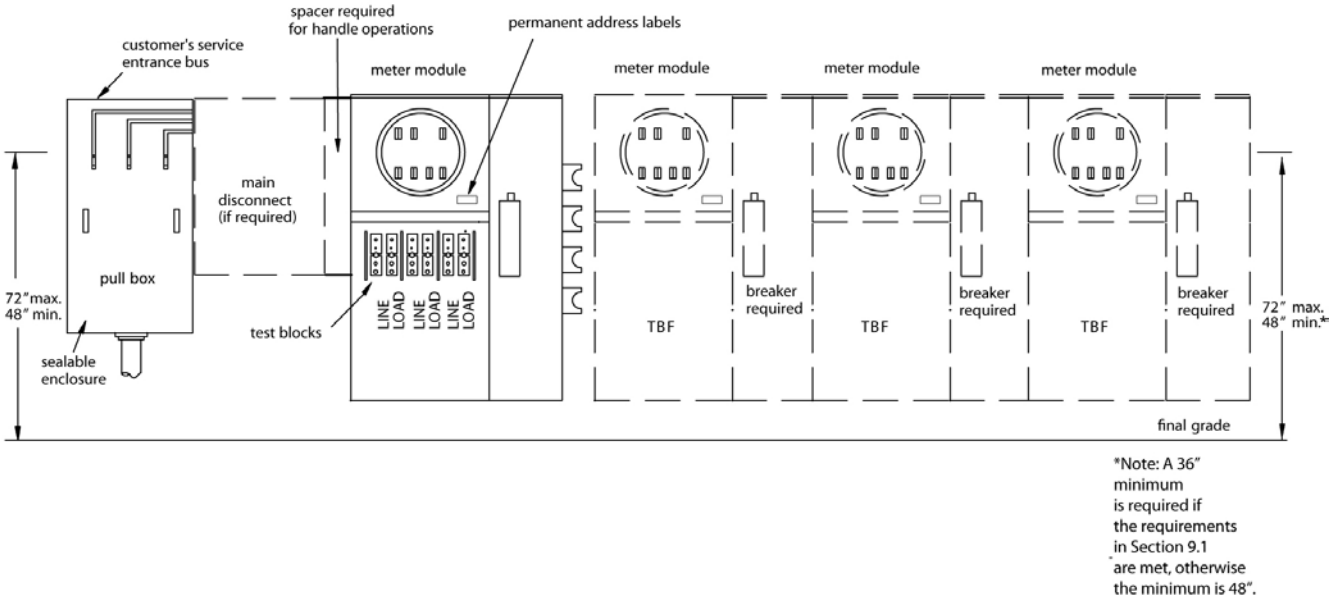
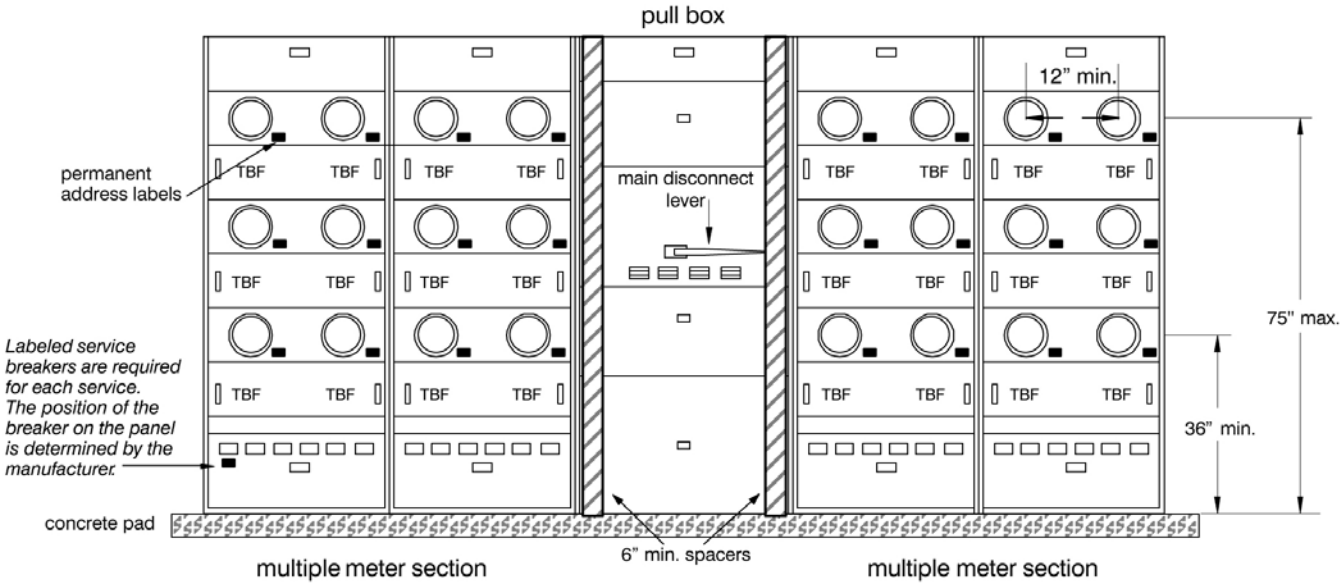


Figure 49—Nonresidential Switchboard (Floor-Mounted) Metering, Direct-Connect, EUSERC 306



9.3.1 Pull Box

Pull box for ganged and modular installations 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 50—Pull Box
0-600 V, 0-1200 A, EUSERC 343

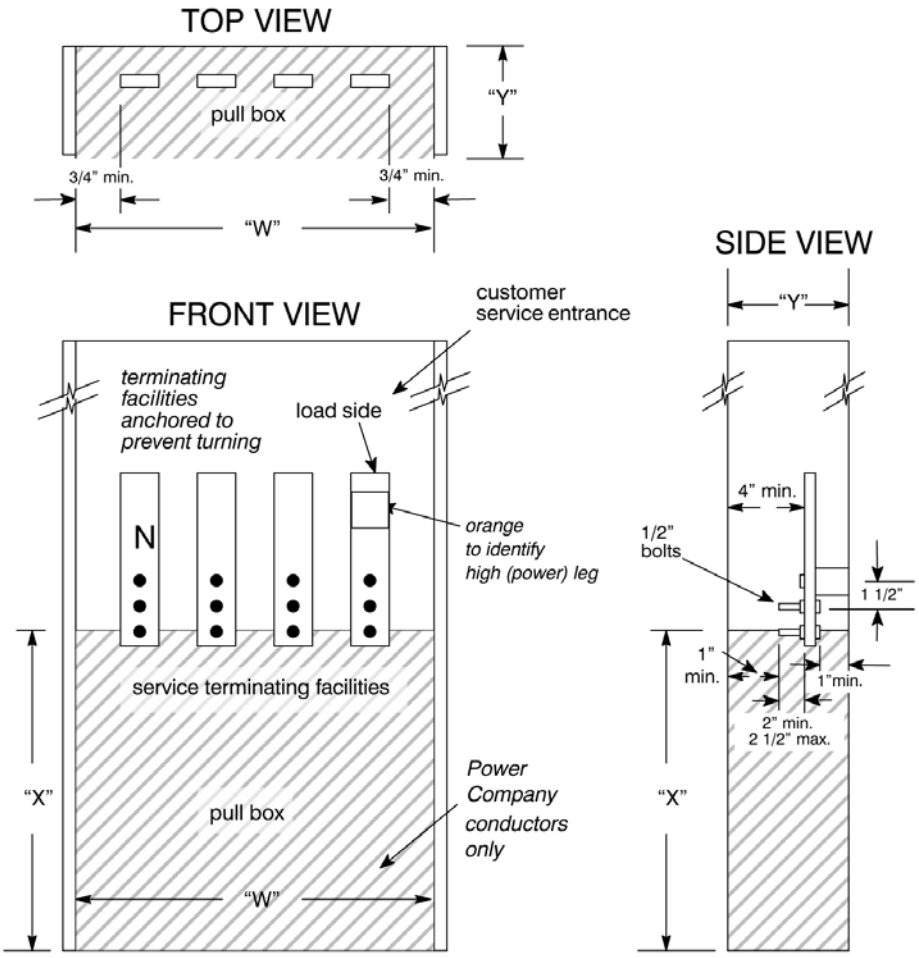


Table 23— Minimum Pull Box Dimensions

(Applies to the Power Company Portion of the Pull Box)

Total Service	"W"		"Y"	"X"
Amps	3-Wire	4-Wire	Depth	Lug Height
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.

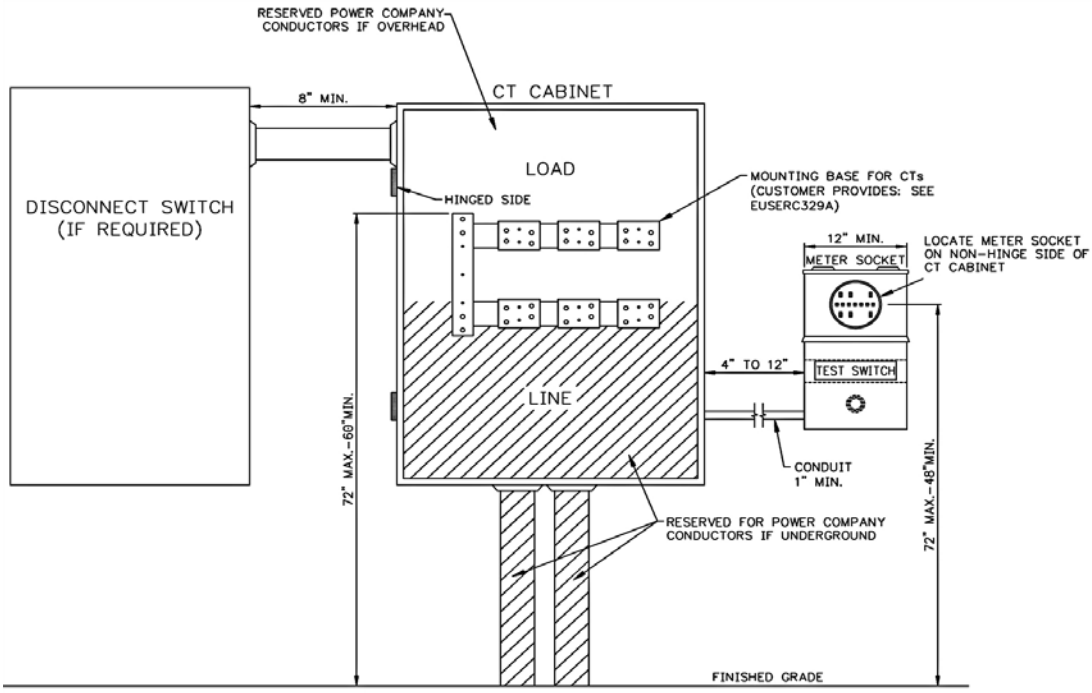
Motor loads with horsepower values greater than 60 hp at 120 V/208 Y, three-phase, and 125 hp at 277 V/480 Y, three-phase shall be metered with current transformer metering.

Table 24 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 24—Customer-Provided Material

Provided by Customer	See	Notes
Meter socket	EUSERC 339	CT-metering socket
CT cabinet	Table 25	• A weather-tight, NEMA 3R-rated EUSERC CT cabinet sized in accordance with Table 25. • The door shall be hinged and capable of being sealed
CT mounting base	Section 9.4.1	• 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 9.4.4	The conduit between the meter socket enclosure and the CT cabinet; the CT conduit shall terminate below the test switch, see Section 9.4.4.
Connectors / terminations		Connectors for the load-side conductors to CT mounting base, as well as overhead service.
Bonding	Section 9.4.5	Bonding per Section 9.4.5 for all meter and CT enclosures.

Figure 51—Typical Installation of 800 A CT Metering Installation



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

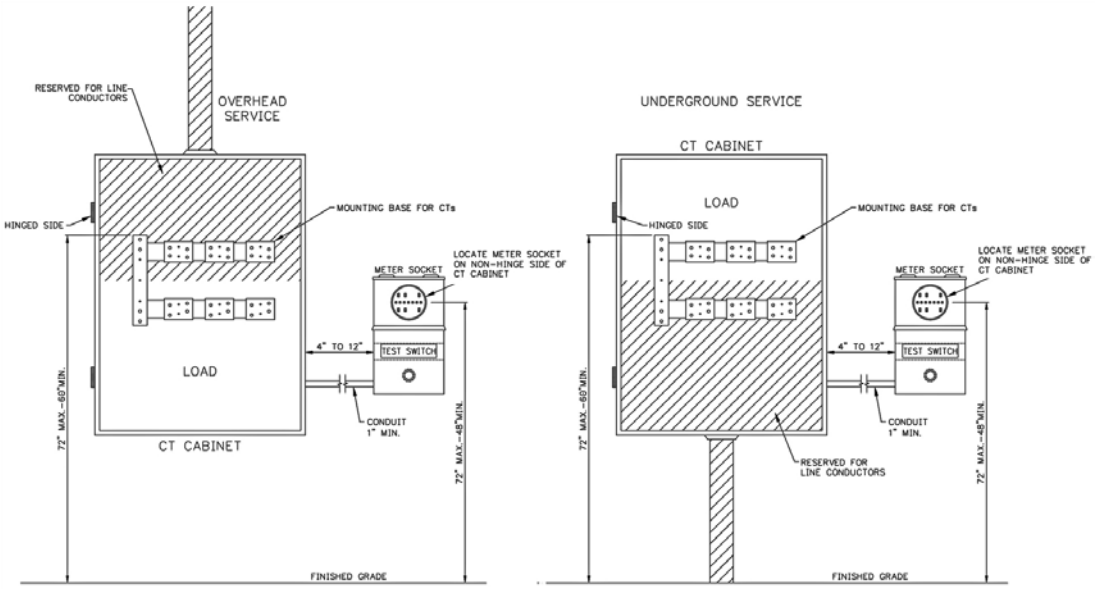
Table 25—CT Cabinet Requirements

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

Requirements:

1. Only equipment associated with Power Company metering shall be permitted in the CT cabinet.
2. The door shall have factory-installed handles and 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°.
4. For underground services, the bottom half of the CT can is reserved for line side conduit and conductors. For overhead services, the top half of the CT can is reserved for line side conduit and conductors. For an alternate configuration, refer to Larger CT Can section.
5. The customer's load side conduits must exit the cabinet on the load side of the CT can.
6. The CT cabinet should be installed such that it remains plumb for the duration of the service and does not hinder/imped the opening and closing of the door.
7. The top of the CT mounting base shall not be more than 72 inches above the finished grade.
8. Customer conductors are not permitted in the Power Company's termination space.
9. 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.
10. For multiple metered circuits, a separate termination pull box must be provided for the Power Company underground service conductors. The CT cabinet shall not be used as a load distribution center, junction box, or splice cabinet.
11. The meter socket shall be located opposite the hinged side, and not above or below the cabinet.

Figure 52—CT Cabinet, Mounting Base Orientation

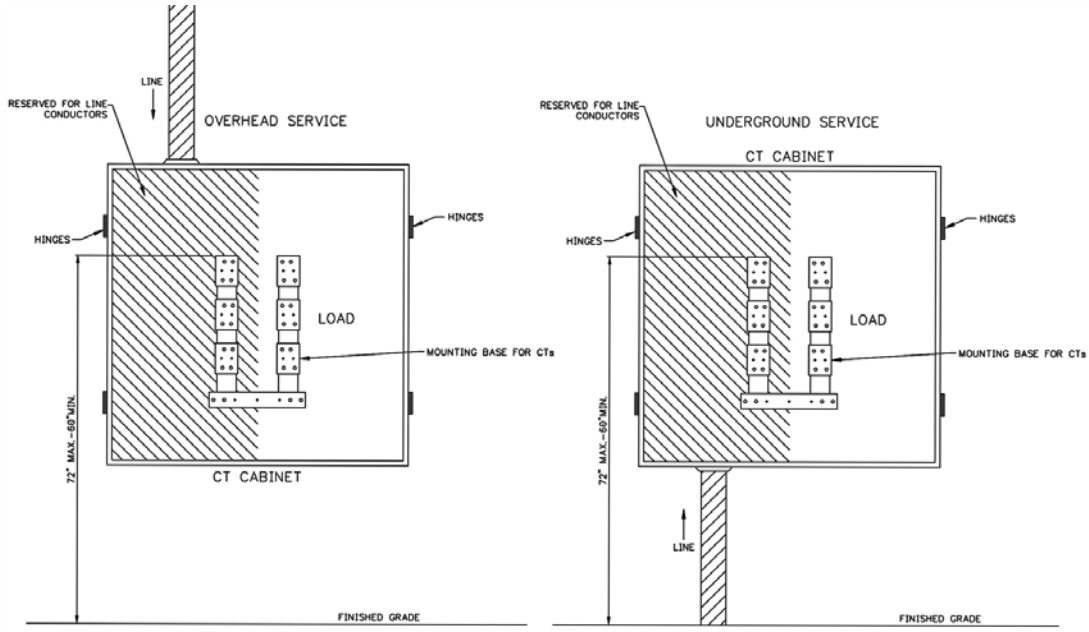


9.4.1 Alternate CT Can Configuration

Requirements:

1. Where both line and load conductors enter or exit from the top or bottom of the cabinet a cabinet is required. The dimension of the cabinet shall be 48″W × 48″H × 14″D. (These dimensions are greater than EUSERC 316 and 318 minimums.)
2. The door shall have factory-installed handles and hinges for side opening and shall be sealable.
3. The doors shall be equipped with a device to hold them in the open position at 90°.
4. The meter socket can be mounted on either side, but not above, below, or behind the cabinet.
5. For double-door CT installations, the meter shall be mounted on the side the utility conductors enter the cabinet to prevent secondary conductors from crossing over customer conductors.
6. The position of the conduits will determine which side of the can is reserved for line and which side for load. If the line side of the conduit is on the left half of the can, the left half of the can shall be reserved for the line conductors. If the line side of the conduit is on the right half of the can, the right half of the can shall be reserved for the line conductors.
7. The customer's load side conduits must exit the cabinet on the load side of the CT can.
8. The CT cabinet should be installed such that it remains plumb for the duration of the service and does not hinder/imped the opening and closing of the door.

Figure 53—Alternate CT Can Configuration



9.4.2 CT Mounting Base

CT mounting bases shall conform to EUSERC 328A, Figure 54, or EUSERC 329A, Figure 55. EUSERC 328B and 329B are also acceptable.

Requirements:

1. The CT mounting base shall meet the ratings for the available fault current at the location installed (50,000 A minimum).
2. For existing 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. The mounting base shall accept bar-type current transformers only.
4. No alteration of the mounting base is allowed.
5. Line and load-side cable terminations on EUSERC 328A or 329A CT landing pads require two bolts per connector.
6. Cable termination can only be made on the manufacturer-supplied studs of the transformer mounting base.

Figure 54—CT Mounting Base Single-Phase, Three-Wire, 800 A Maximum, EUSERC 328A

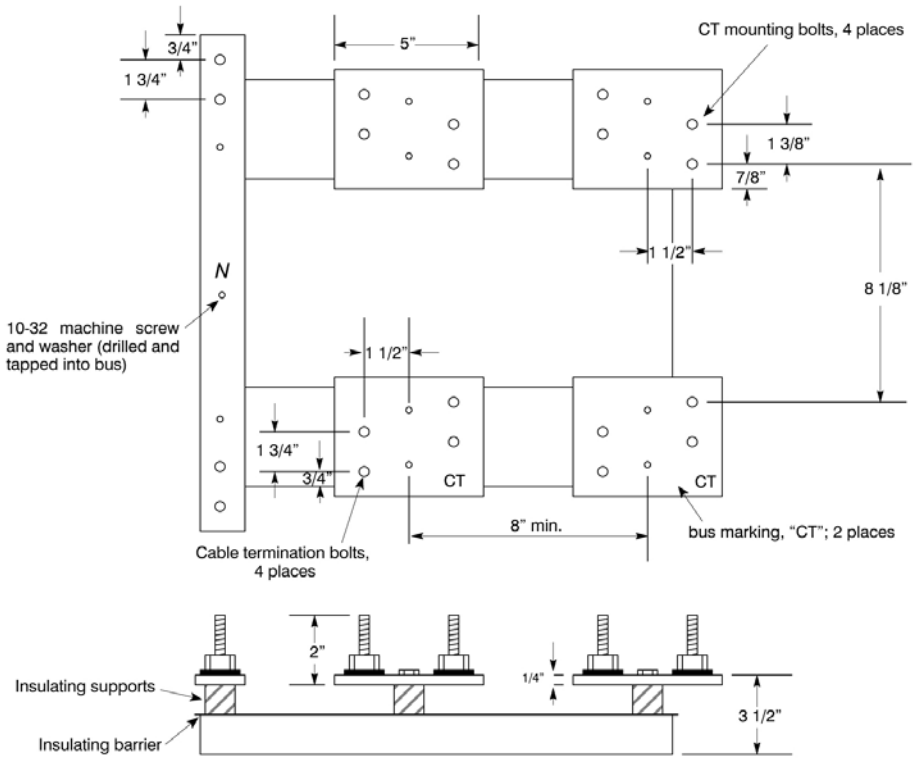
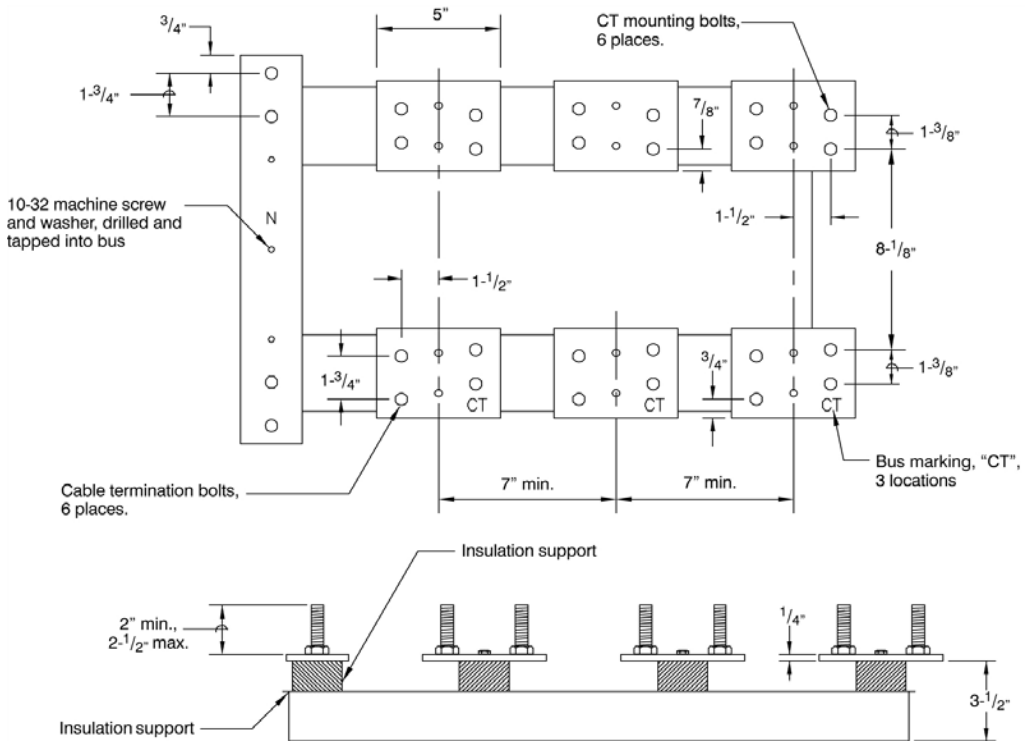


**Figure 55—Mounting Base,
Three-Phase, Four-Wire, 800 A Maximum, EUSERC 329A**



9.4.3 Meter Socket Enclosures for CT Meters

**Figure 56—CT Metering for Free-Standing Installations,
600 V, 800 A Maximum**

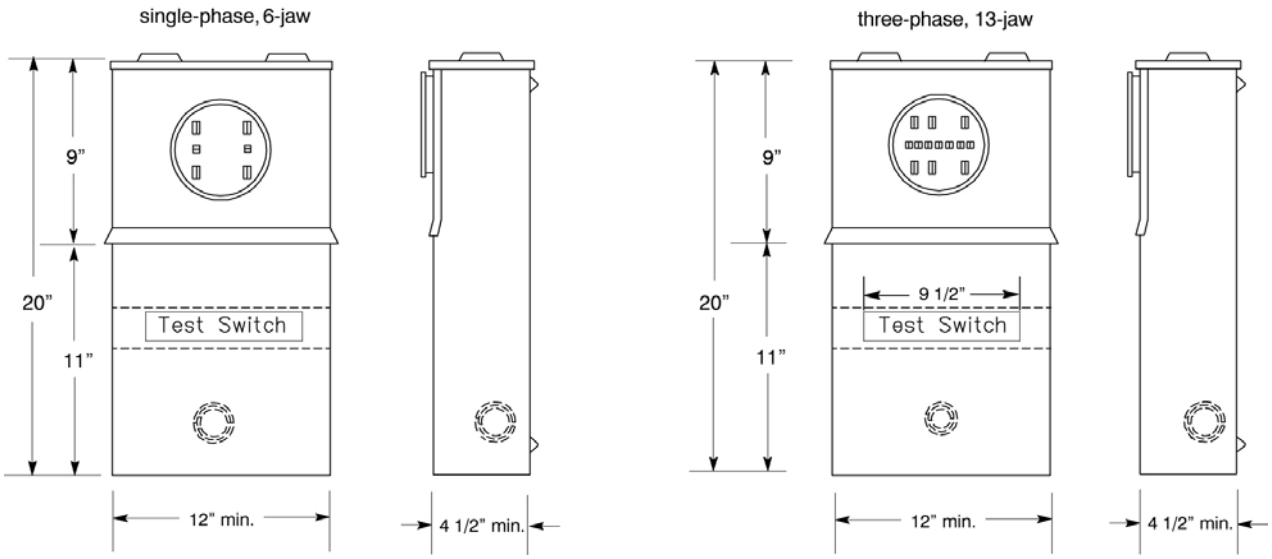


Table 26—CT Meter Socket Types, EUSERC 339

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

9.4.4 CT Metering, Free-Standing

The Power Company allows free-standing installations on posts.

Free-standing installations are owned by the customer.

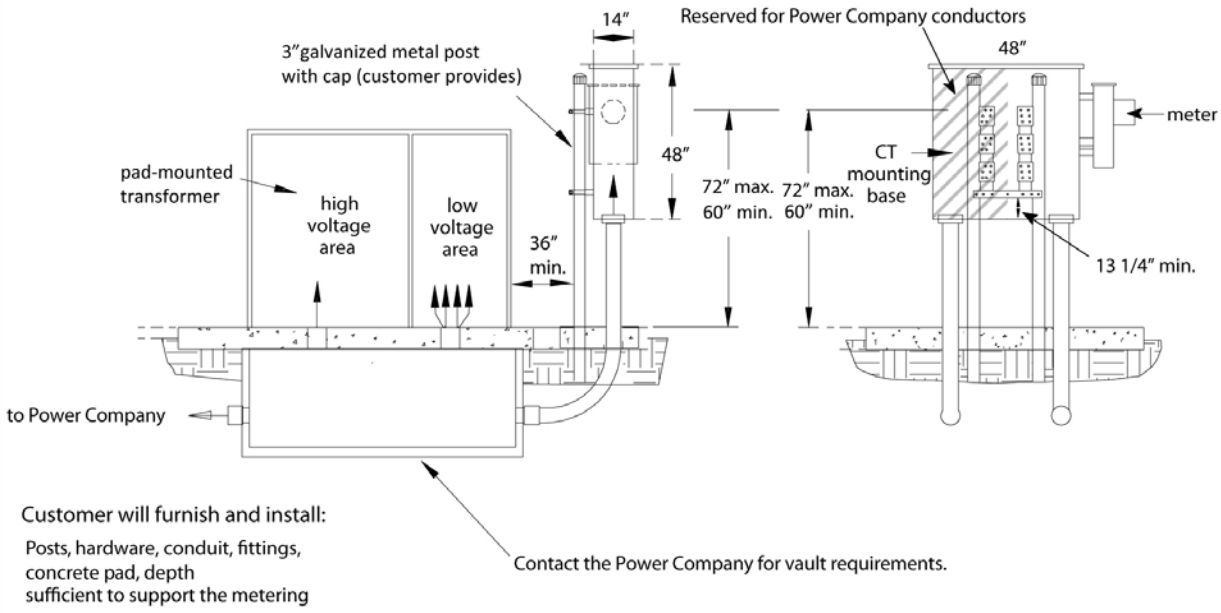
Installation requirements for service to free-standing installations are listed below. These requirements are in addition to the general requirements given in this section.

Requirements:

1. The customer shall consult the Power Company to determine a readily accessible 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 3-inch steel posts with installed caps, or two wood post no less than 6″ × 6″ (nominal) and pressure-treated with an American Wood Preservative Association approved preservative. When equipment is less than 72 inches 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 57 illustrates a typical meter installation using steel posts.

Figure 57—CT Metering for Free-Standing Installations, 600 V, 800 A Maximum



9.4.5 CT Metering Conduit

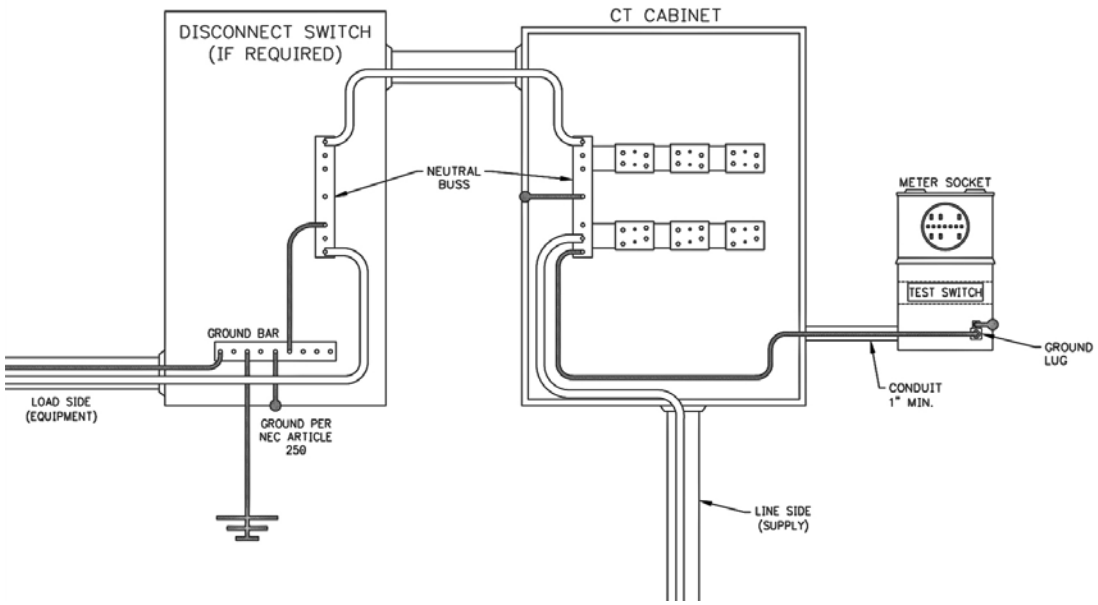
The customer must provide conduit between the meter socket and the CT cabinet. When installing conduit, the following requirements shall be met:

1. Conduit shall be 1-inch IMC, Schedule 40 PVC, or greater.
2. The meter socket must be within 12 inches from the CT cabinet.
3. Proper fittings and bushings shall protect metering conductors.

9.4.6 CT Cabinet Bonding

The CT cabinet must have a supply side bonding jumper and must be grounded per the NEC. Figure 58 illustrates one acceptable solution.

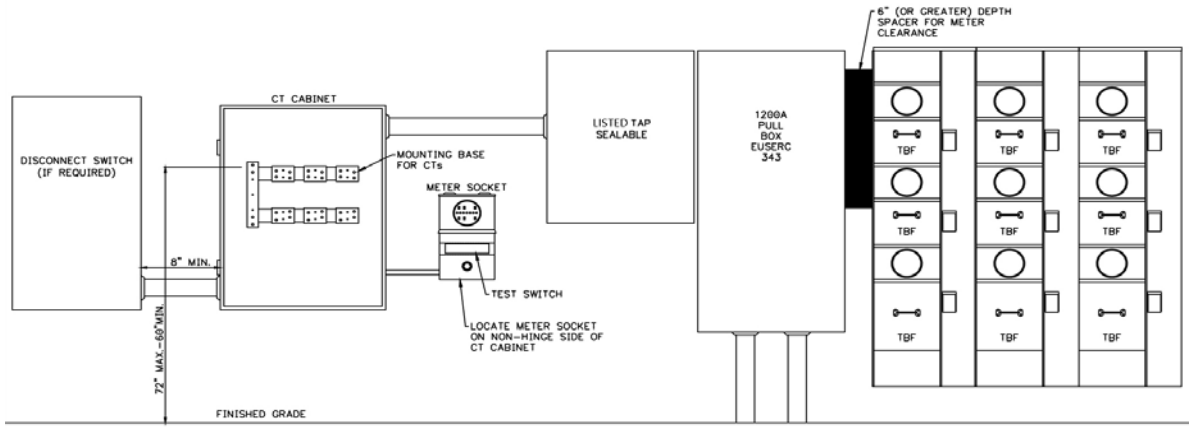
Figure 58—NEC-Accepted CT Cabinet Bonding, 600 V, 800 A Maximum



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 59—Combination Direct-Connect and CT Metering



9.5 Switchboard Metering up to 4000 A

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 27—EUSERC Switchboard References

		EUSERC No.	Figure References
Switchboard	with remote meter socket	325, 326, 345	Figure 60
Termination	underground service	345	Figure 61
	overhead service	348	Figure 61
CT compartment	0 to 800 A, 1-phase 0 to 1000 A, 3-phase	319 320	Figure 64, Figure 65
	1001 to 3000 A	322	Figure 66
	above 3000 A	324	Figure 67
Meter socket	remote mount	339	Figure 60

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–1-inch minimum electrical non-metallic tubing (ENT) or flexible PVC for the metering secondary conductors; consult the Power Company for placement

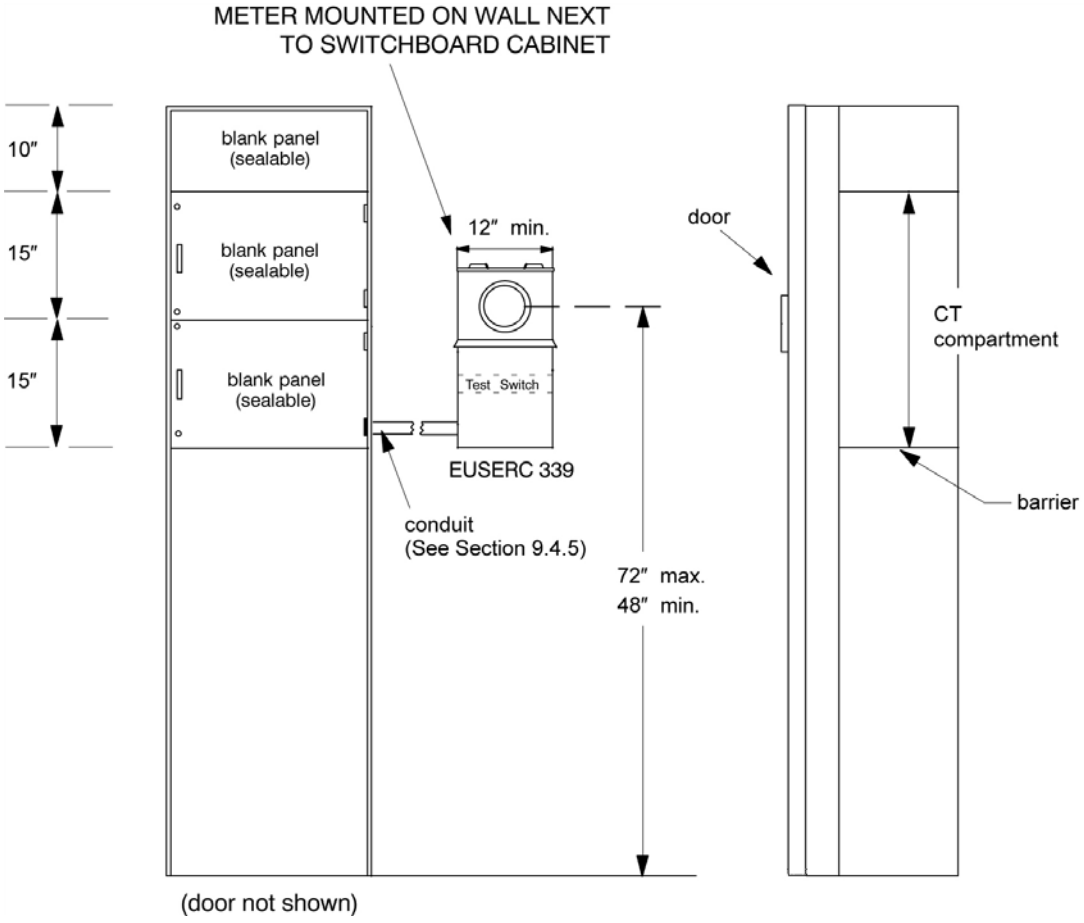
d. locking equipment for the meter enclosure

e. concrete mounting pad for the switchboard enclosure. Refer to Section 9.1

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 60—Switchboard with Remote Meter Socket
EUSERC 325, 326, 339, and 345



9.5.2 Service for Switchboard Enclosures

Table 28—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 61—Installation for Combination Switchboard Sections with a Termination Enclosure, EUSERC 345

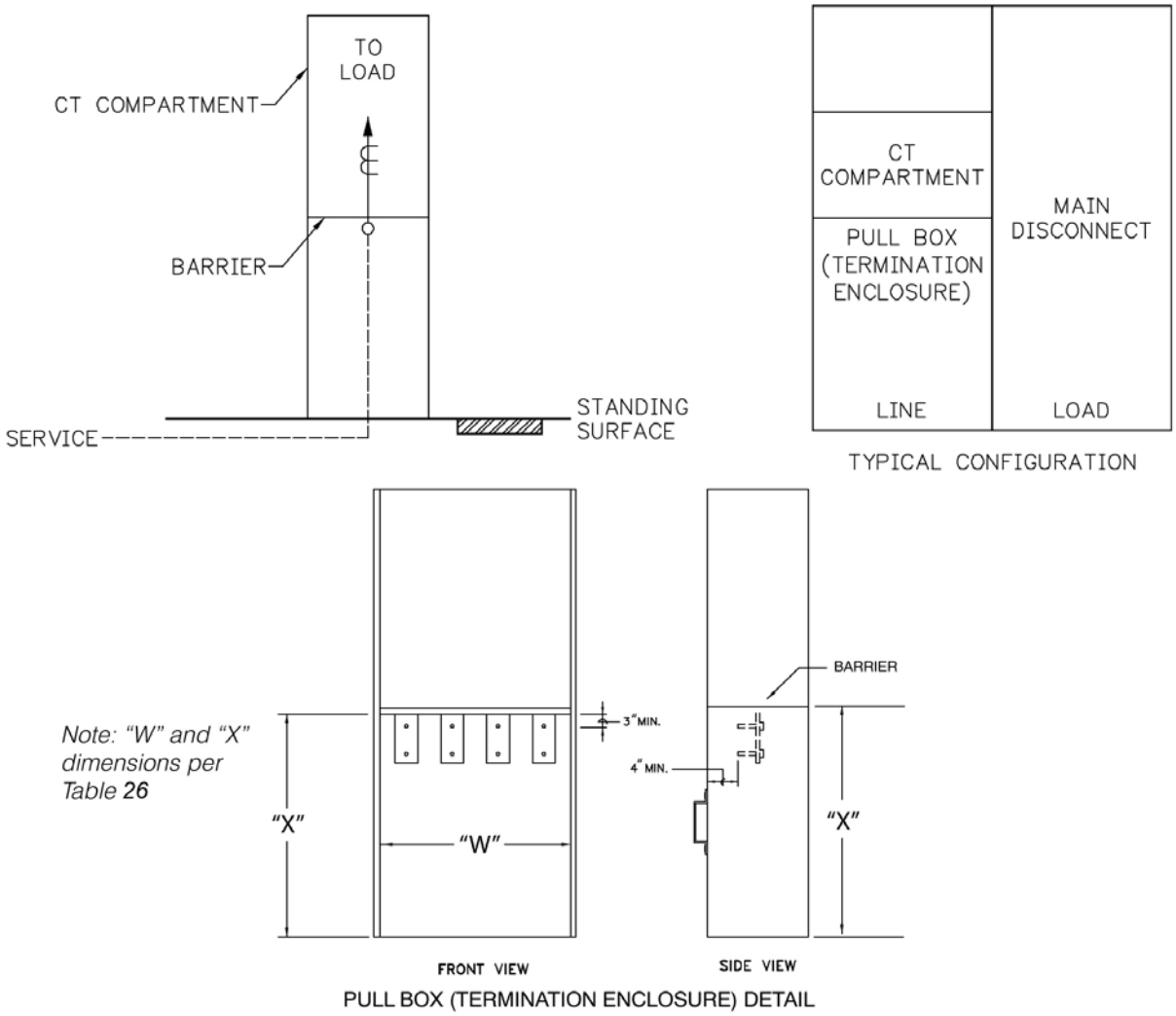
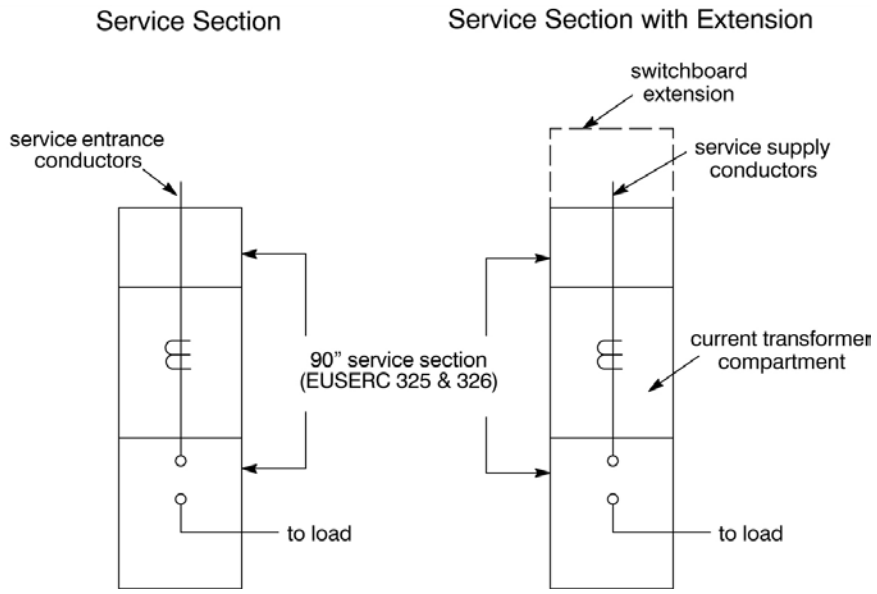
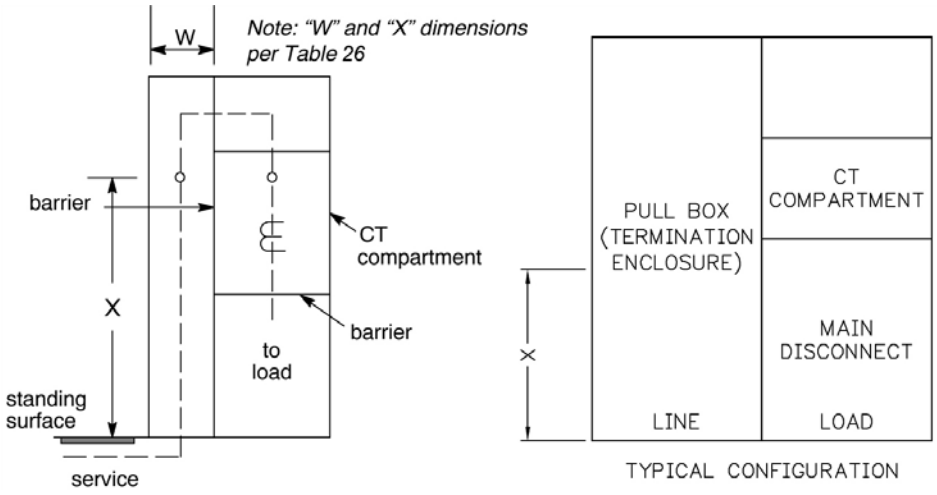


Figure 62—Overhead Service Termination, Switchboard Service Section, EUSERC 348



9.5.2.2 Switchboard Metering, 4000 A Maximum

Figure 63—Typical Installation for Switchboard Metering, EUSERC 345



9.5.3 CT Compartment for Switchboards

A CT compartment is required for all switchboard enclosures.

Table 29—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 64—CT Metering for Switchboards 0-800 A, Single-Phase, Three-Wire, EUSERC 319

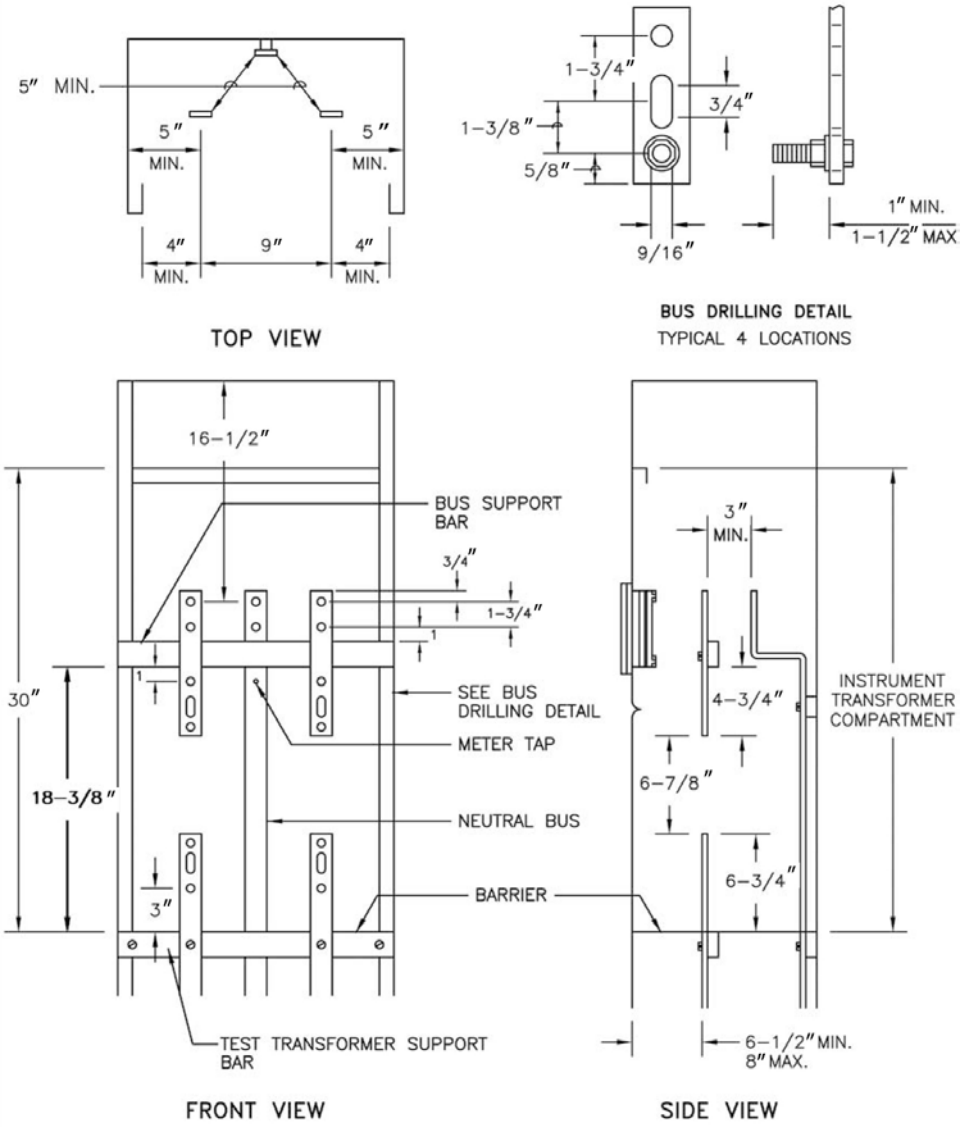


Figure 65—CT Metering for Switchboards
0-1000 A, Three-Phase, Three- and Four-Wire, EUSERC 320

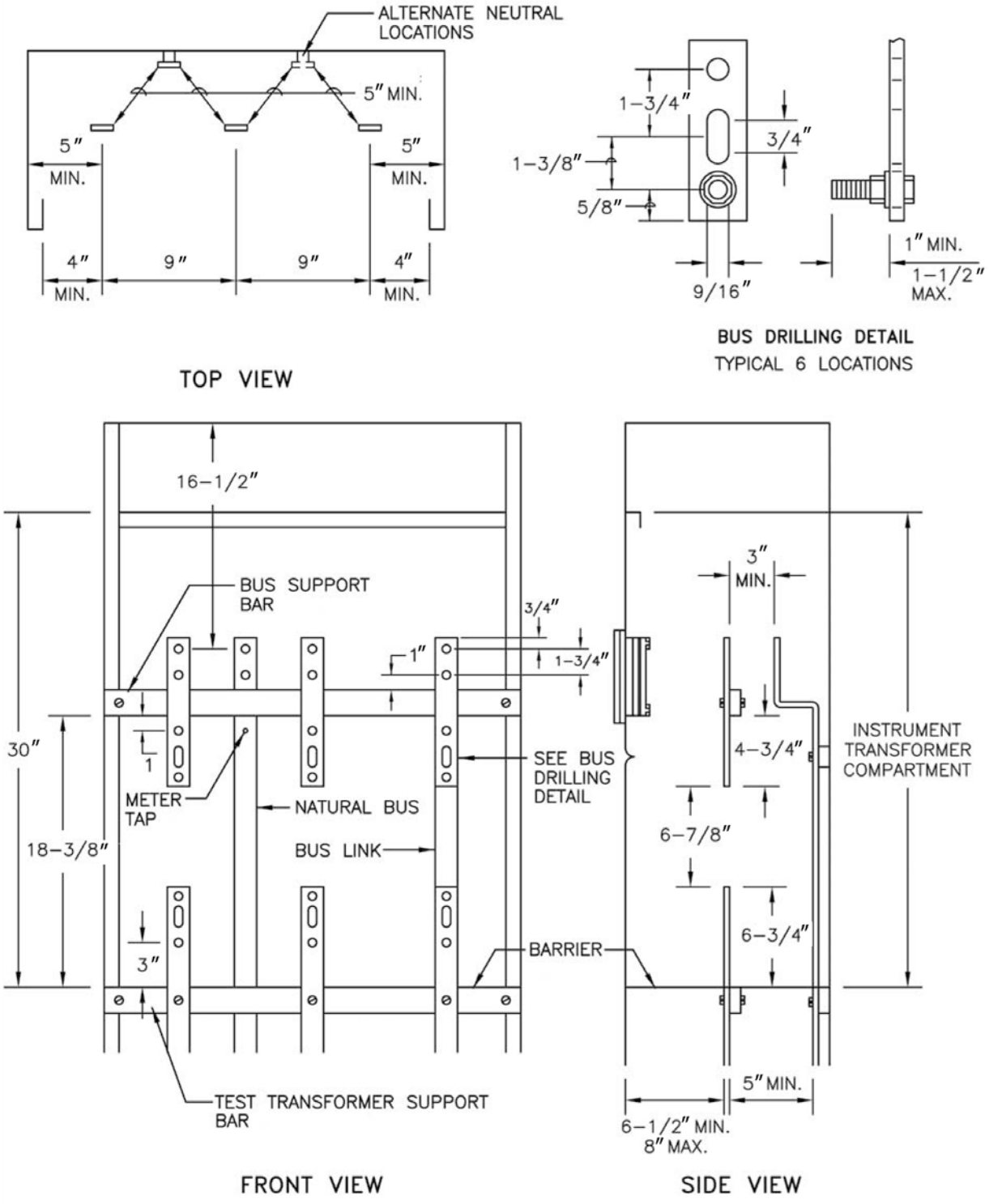


Figure 66—CT Metering for Switchboards 1001-3000 A, Three-Phase, Four-Wire Service, EUSERC 322

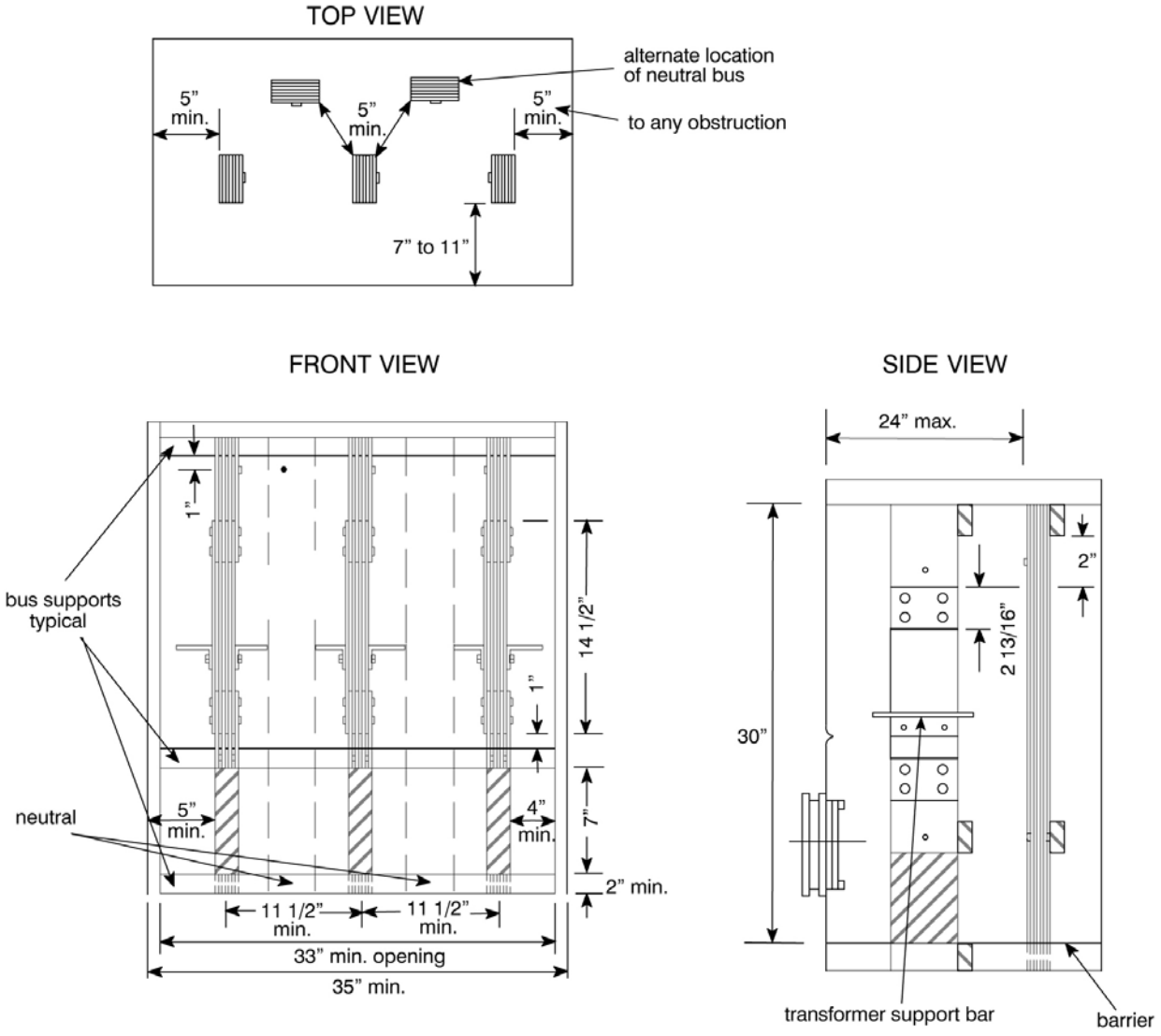
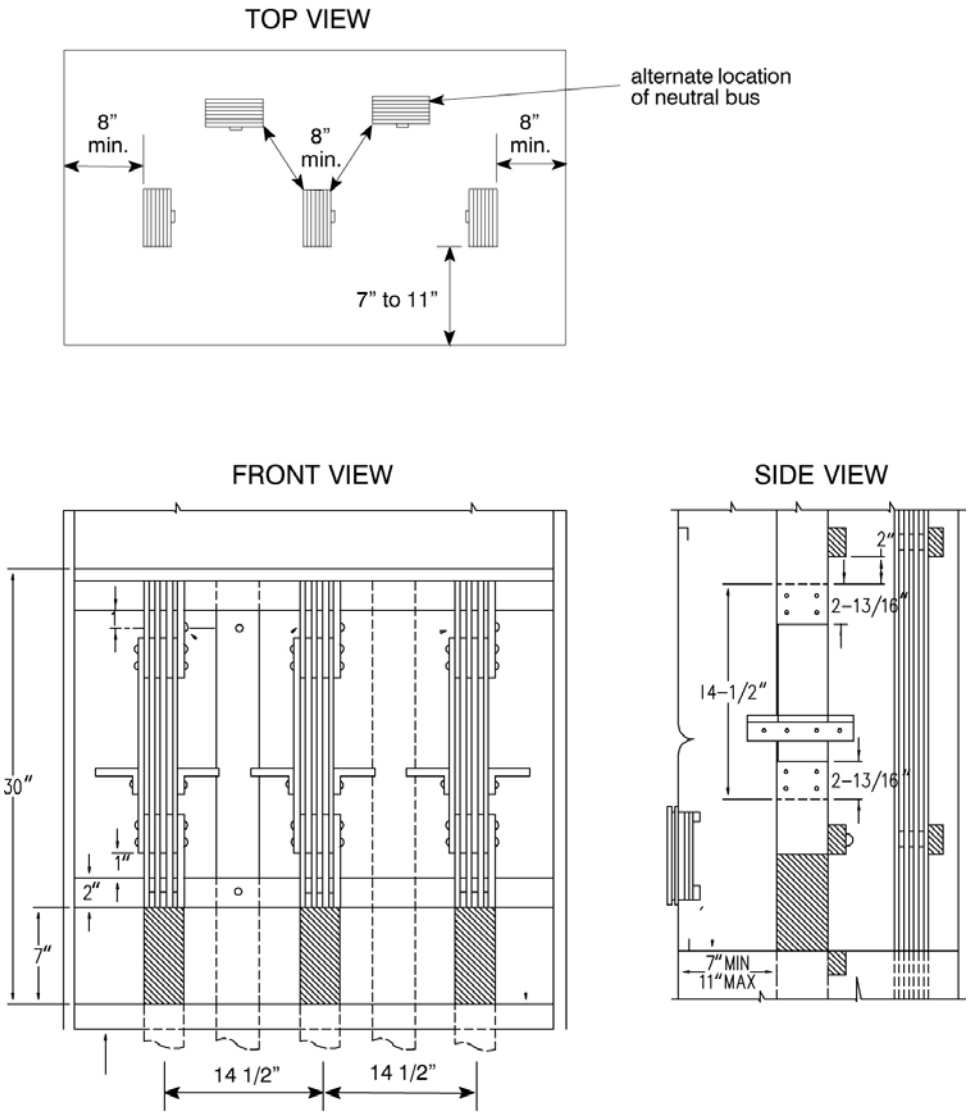


Figure 67—CT Compartment for Switchboards 3001 to 4000 A, Three-Phase, Four-Wire Service, EUSERC 324



9.6 Primary Metering for Service Up to 34.5 kV

Prior to making site plans for primary voltage services consult the Power Company. The following guidelines are intended to assist with preliminary planning. For service greater than 34.5 kV consult with the Power Company for specific requirements.

Required clearances are provided in Section 4, *Clearance and Access*.

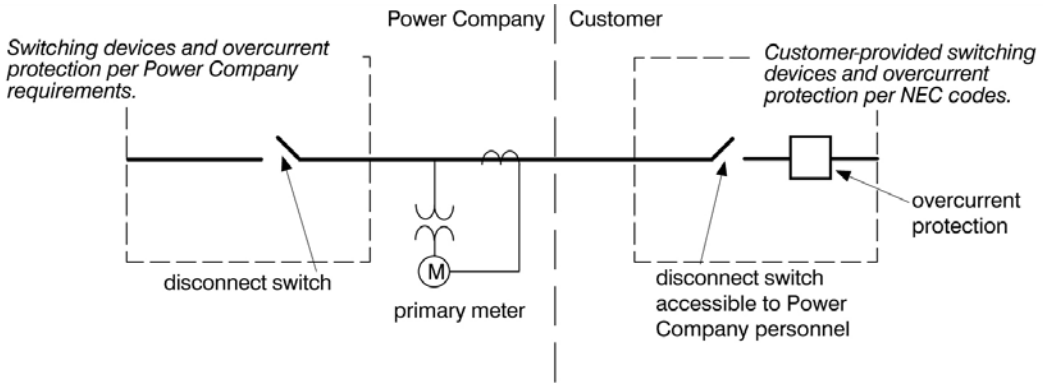
A customer may obtain directly from Power Company primary voltage delivery, without transformation, from the high-voltage or "primary" distribution system. Such service is at the standard distribution voltage for the location in which service is requested. Primary voltage delivery is contingent on meeting the following conditions

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.

9 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 68—Connection Diagram, Primary Delivery Voltage

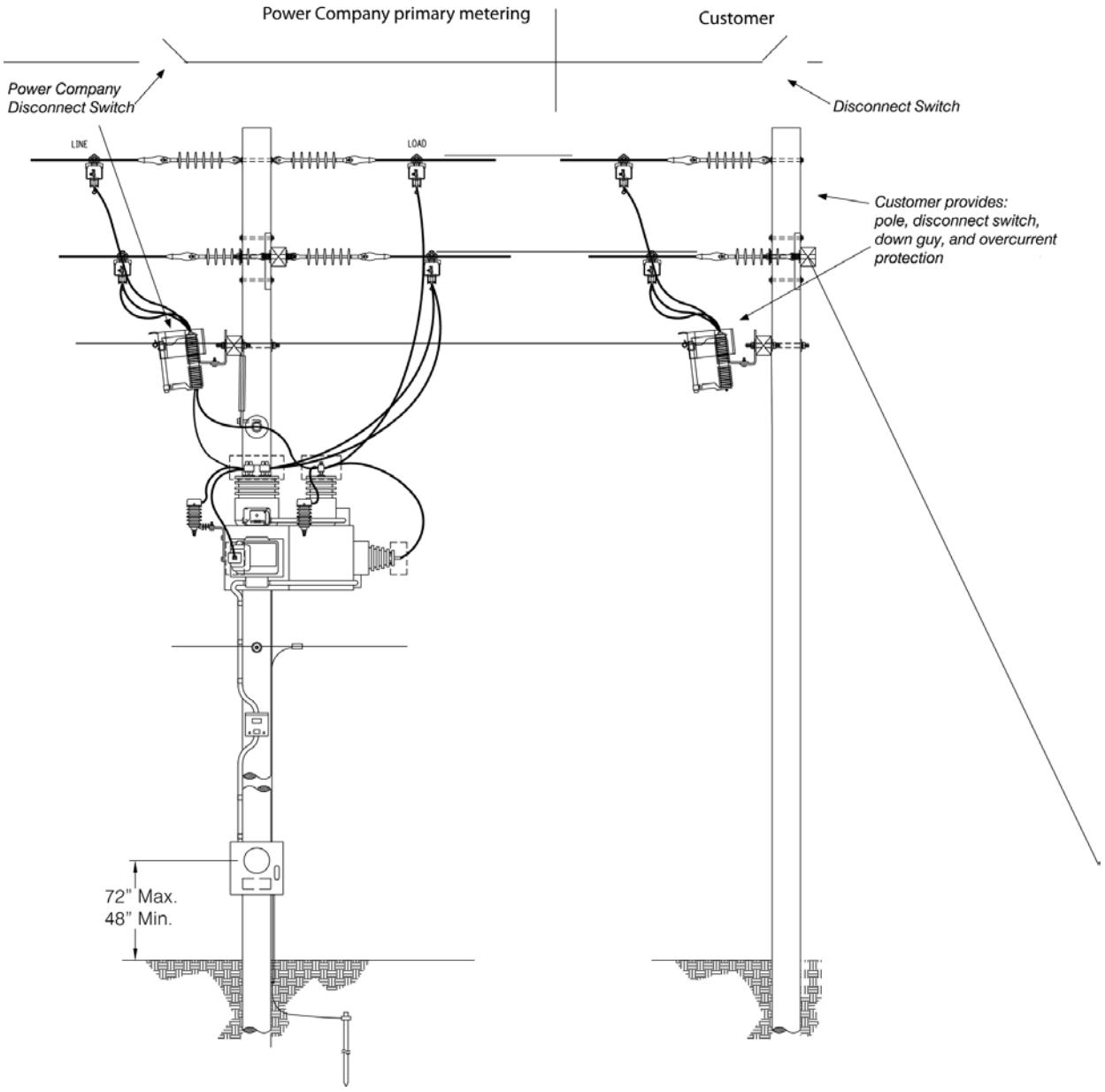


9.6.1 Overhead, Pole-Mounted Primary Metering (34.5 kV Maximum)

The primary metering pole is the service point. If an agreement for primary voltage delivery is reached, the Power Company will provide and connect one span of overhead primary conductors to the customer's pole.

Note: For customer generation see Section 1.17

Figure 69—Overhead, Pole-Mounted Primary Metering, 200 A or Below



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 customer's pad-mounted enclosure containing the metering equipment.

Typically, the Power Company will order the enclosure at the customer's expense. Customers who prefer to order the enclosure directly must consult the Power Company for enclosure specifications and approved manufacturers.

Figure 70—Underground Pad-Mounted Primary Metering Enclosure

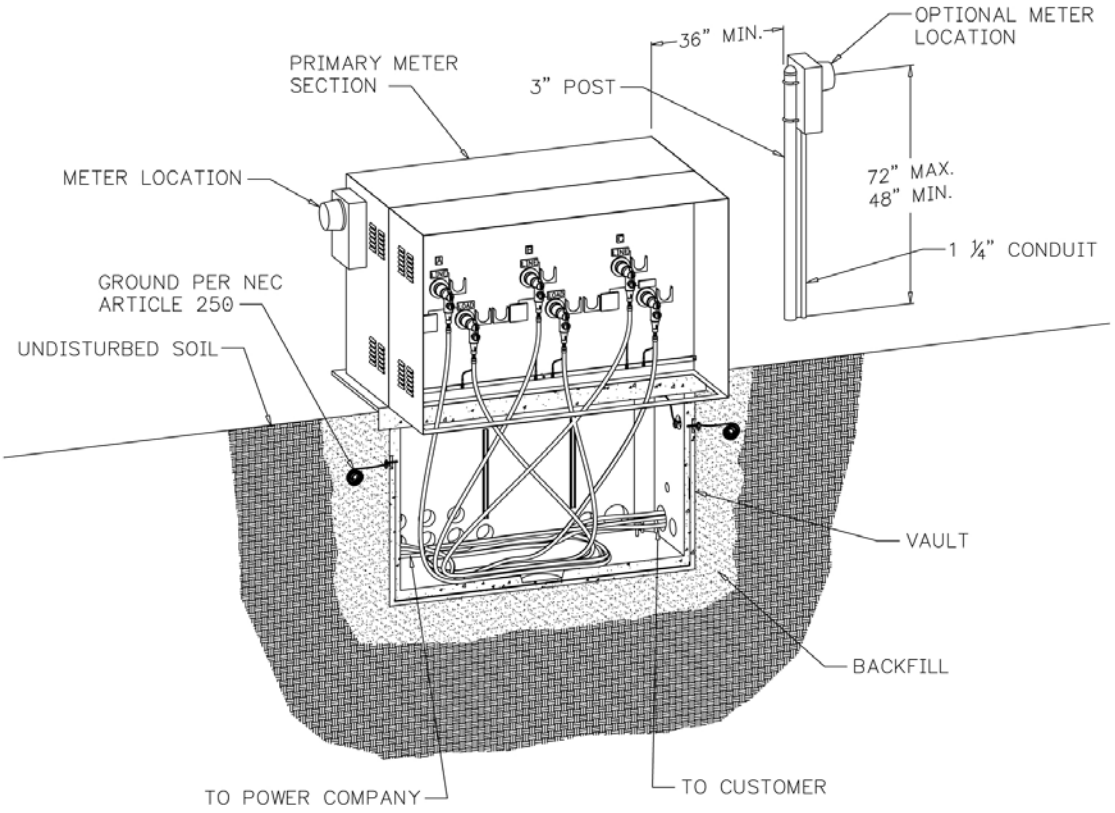
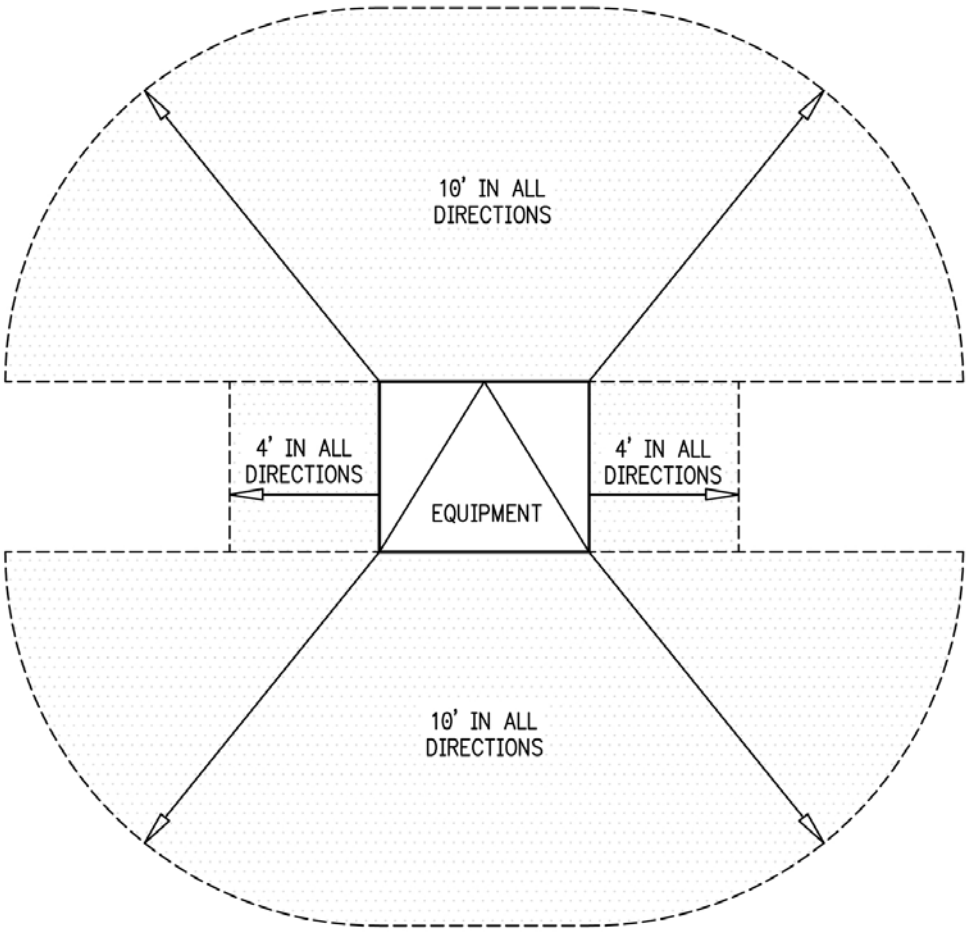


Figure 71—Underground Pad-Mounted Primary Metering Enclosure, Working Clearances



Requirements:

1. The meter may be located on the primary metering enclosure, or post-mounted as shown in Figure 70.
2. Working clearances are shown in Figure 71
3. 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. In certain situations advanced security for the metering equipment may be required.

10. Special Installations

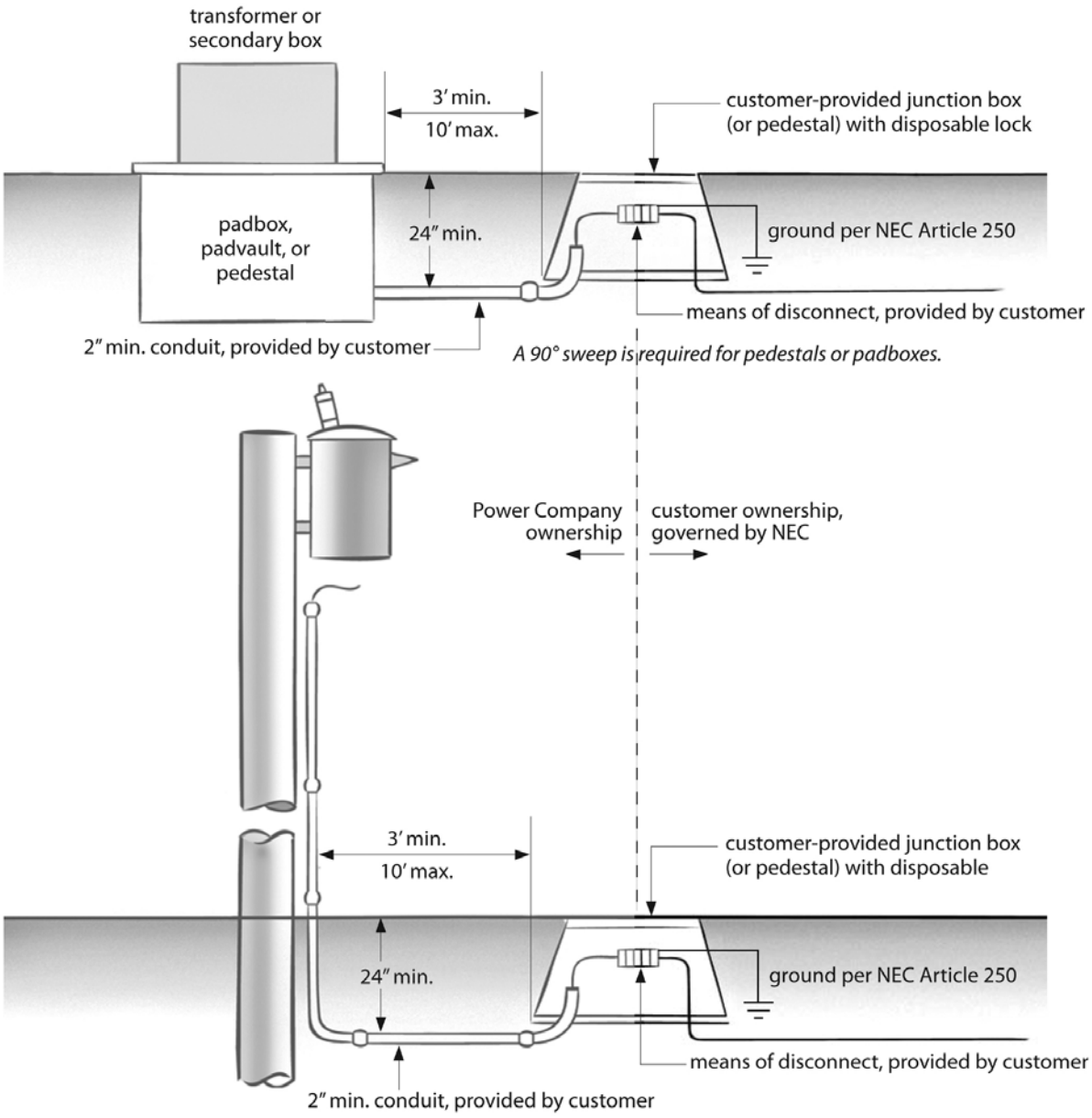
This chapter discusses special installations, that must be approved in writing by the Power Company before installation. The customer shall consult the Power Company on these special installations. All special installations covered in this section shall adhere to applicable requirements of this manual.

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 of the Power Company's metallic equipment shall be bonded.
4. The minimum dimensions of the junction box are 11 ¾ inches wide (at the top), 17 inches long, and 12 inches 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 72.

Figure 72—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/workingwith-us/municipalities.html.

10.2 Meter Rooms

The Power Company's standard construction practice is to not cross customer foundation with Power Company conductors. This design aligns with industry best practices and the Power Company's obligation to build a safe, reliable, and cost-effective electric system.

Service requests incorporating meter rooms should only be made when extenuating circumstances exist that make outdoor service equipment impractical or unfeasible.

Customer is responsible for submitting engineering conditions that justify meter rooms.

If meter rooms are approved, the customer shall follow the design requirements stated in Engineering Standards Policy 368.

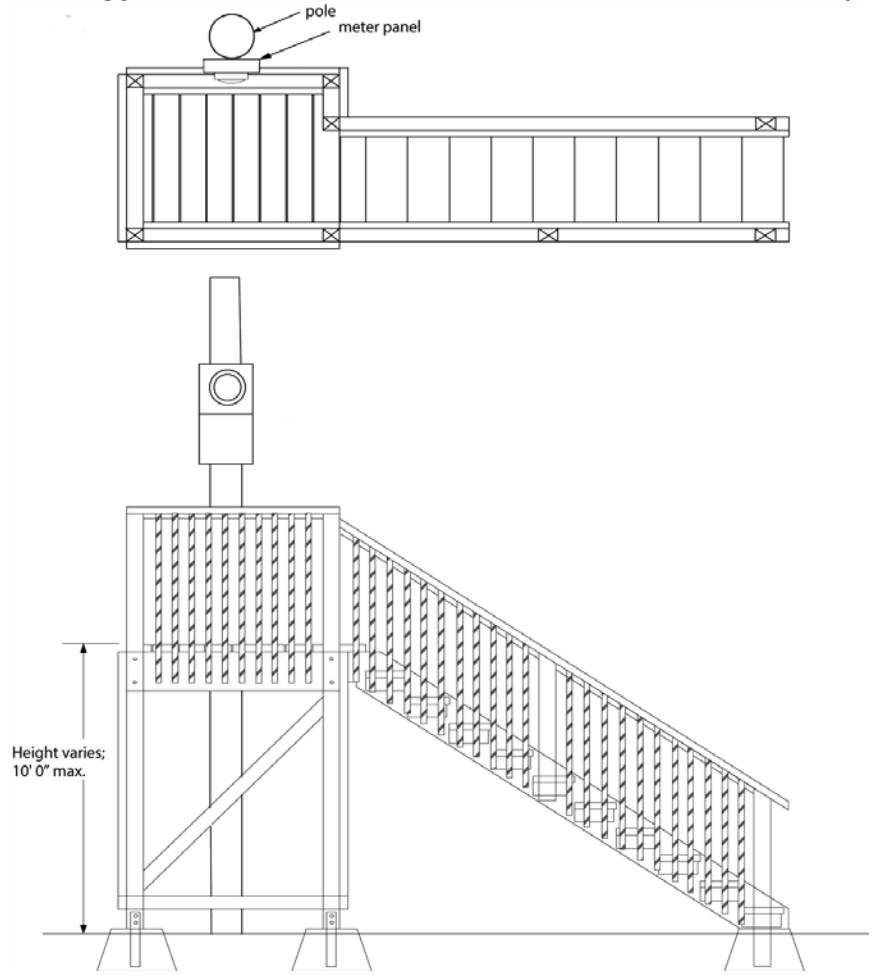
10.3 Meter Access Platforms

In flood plains or other locations where the center of the meter socket is greater than 72 inches above ground level, a suitable platform and stairs shall be provided and maintained by the customer for meter access. See the following requirements for areas subject to flooding or adjacent to natural or man-made bodies of water:

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, as approved by the authority having jurisdiction (AHJ), for Power Company review prior to installation.
3. The customer shall obtain all land use approvals required for a meter access platform.

Figure 73—Typical Meter Access Platform, Customer-Installed (Example)



10.4 Marinas

The following specific requirements apply to electrical service to marinas.

Requirements:

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

10.5 Kiosks and Skid-Mounted Structures

Kiosks and skid-mounted portable structures require a free-standing meter enclosure with a nonresidential meter socket.

10.6 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.

As electric vehicles (EV) become more prevalent, customers may choose to implement load management systems (software or hardware) to manage charging facility peak loads by pre-programming equipment to charge during specific time periods, charge EVs sequentially instead of concurrently, or charge EVs concurrently at a lower power level.

Load management systems are acceptable pursuant to National Electric Code (NEC) 625.42. In summary, a new service, branch circuit, and breakers supporting chargers can be sized based on the maximum load permitted by the load management system. When load management systems are used, the adjusted ampere rating must be labeled at the breaker panel, load management equipment (when separate management hardware is used), and at the charger stations. Labels shall meet the requrements of NEC 110.21 (A)(1).

Customers are responsible for notifying the Power Company when adding EV charging to an existing service in accordance with Section 2.4, Application for Additional Load.

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 *Electric Vehicle Charging Stations.*

10.7 Recreational Vehicles Parks

Services to recreational vehicle parks (RV parks) are classified nonresidential and all nonresidential requirements shall apply. RV parks are billed on a general service rate schedule and are metered at strategic locations depending on demand and geography. The Power Company determines the point(s) of service. Individual electrical outlets for recreational vehicles shall not be individually metered in a RV park.

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