

Salem Electric

Service Requirements & Guidelines



Revised 7/02/2013



Salem Electric
SERVING KEIZER AND SALEM

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Electric Service Requirements & Guidelines

I. GENERAL INFORMATION

1.01 PURPOSE

It is the desire of Salem Electric, and the local electrical code enforcing authority, to provide our members with high-quality, safe electric service. This booklet was prepared to aid you in establishing electric service for new and remodeled structures. The requirements in this booklet apply to new services, relocated services, rewired services, and house moves, unless specific written exception is granted.

If you any questions, please contact Salem Electric's Engineering Department at 503 362-3601.

1.02 CODES AND ORDINANCES

The construction of new or remodeled installations must conform to applicable provisions of the National Electrical Code, National Electrical Safety Code, State of Oregon rules and regulations, city and county ordinances and codes, and rules on file with or issued by the Public Salem Electric Commission. This includes OSHA rules during both construction and maintenance.

1.03 CHANGES OR CONFLICTS IN REQUIREMENTS AND GUIDELINES

Information in this booklet is based on the aforementioned governmental codes and ordinances as well as Salem Electric requirements. These requirements and guidelines are issued with the intent of complying with all applicable codes and ordinances; however, in the case of conflict, the appropriate code or ordinance will supersede the interpretation offered in this booklet. In addition, these requirements are subject to change in the event that the governing codes or ordinances are changed. Salem Electric does not assume responsibility for keeping this book current and should be consulted in case of doubt on the applicability of any item.

When the term "consult Salem Electric" is used in this booklet, it will mean for each and every installation, not a single contact.

1.04 APPLICATION FOR SERVICE

As early as possible in the process, Salem Electric's Engineering Department must be provided with accurate load information and the date when the Member requires service so necessary arrangements are made. Requests for service to commercial and industrial Members normally require considerable advance planning in order to serve the load. A lead time of at least 60 days is normally necessary. Installations requiring transformers or other equipment not in stock may require six months, or more, lead time.

For commercial, industrial, residential subdivisions, mobile home parks, and apartment complex applications, requests for service should include a plot plan. Commercial or industrial plot plans should show preferred service and meter locations and a single-line diagram of the electrical layout. The

request must also show all load information, including lighting, receptacle, water heating, cooking, electric heat, air conditioning, and motor load, plus sufficient information on equipment operations so the kilowatt demand of the load can be estimated.

Salem Electric staff is available to give advice on service requirements and related problems relative to electric energy utilization for new, existing, and reconstructed installations. The Member or contractor may be held liable for any damage to Salem Electric equipment or personnel unless adequate notice is given to Salem Electric and approval granted regarding changes or additions.

When conditions encountered during construction require changes in the service arrangements, Salem Electric must be notified so mutually satisfactory alternative arrangements can be made.

1.05 TYPES OF SERVICE

Electric service available is 60-hertz, alternating current, single or three-phase. The nominal secondary voltages from overhead distribution lines and underground distribution lines in the overhead service area are:

Overhead Service

- Single-phase, 120 volt, two-wire, grounded
- Single-phase, 120/240 volt, three-wire, grounded
- Three-phase, 208Y/120 volt, four-wire, grounded wye
- Three-phase, 240/120 volt, four-wire, grounded delta
- Three-phase, 480Y/277 volt, four-wire, grounded wye

Underground Service

- Single-phase, 120 volt, two-wire, grounded
- Single-phase, 240/120 volt, three-wire, grounded
- Three-phase, 208Y/120 volt, four-wire, grounded wye
- Three-phase, 480Y/277 volt, four-wire, grounded wye

In certain designated underground districts, the nominal secondary voltage is 208Y/120 volt, four-wire, grounded wye. With prior agreement by Salem Electric, 480Y/277 volt, four-wire, grounded wye, may be made available. The nominal primary voltage of Salem Electric's distribution system is 12470GrdY/7200 volt. Under certain conditions, primary delivery will be supplied at the distribution voltage.

1.06 APPROVAL FOR SERVICE

Local ordinances or state laws require that a permit procedure be followed before Salem Electric can establish service. In addition, Oregon State law requires that an electrical installation must be approved by the electrical inspection authority having jurisdiction before it can be energized by Salem Electric except as specifically exempted by ORS 479.570. Approval for service will be granted only after all service requirements have been met. This includes all requirements referenced in Article 1.02, as well as the requirements of this book and all other Salem Electric standards and practices.

1.07 PERMANENT SERVICE CONNECTION

Only authorized Salem Electric employees will make the permanent connection or disconnection of Salem Electric's electrical service to a building or structure.

1.08 SEALS

The purpose of seals placed by Salem Electric on meters and associated service equipment is to prevent injury and/or tampering. In normal circumstances, these seals are not to be removed except by Salem Electric. If an emergency should require seal removal without prior notification, Salem Electric must be notified as soon as possible, so the installation can be inspected and the seal replaced.

When this occurs, the party removing the seal will accept all liability for damage or alteration to equipment, injury to persons or property, and loss of revenue to Salem Electric from the time the seal is removed until 72 hours after Salem Electric has been notified that the equipment is ready to be resealed.

1.09 WORK ACTIVITY NEAR HIGH VOLTAGE OVERHEAD POWER LINES (OVER 600V)

Oregon law (ORS 757.800 and 757.805) requires that no work take place within 10 ft. of a high voltage overhead power line until the following two requirements are met:

1. The responsible party must notify Salem Electric operating the line of the intended work activity.
2. The responsible party and Salem Electric must agree to a mutually-satisfactory method to accomplish the activity safely.

II. SERVICES

2.01 GENERAL

The service entrance must be located so that the meter and service is easily accessible from distribution lines and convenient for the installation, operation, and maintenance of Salem Electric's meters and equipment. Salem Electric must be consulted in order to designate the point of attachment for overhead service drops, underground service laterals, preferred meter and service outlet locations, current transformer, and terminal cabinet enclosures. Contact Salem Electric if any variation from these designated locations is desired.

For secondary voltage service, Salem Electric will provide, install, and maintain transformers, meters, and conductors that are defined in Article 100 of the National Electrical Code as service drops or service laterals. The Member will provide, install, and maintain all service equipment, including switches, service entrance conductors, raceways, enclosures, and meter sockets, and will provide right-of-way and space for the installation and maintenance of Salem Electric facilities.

Normally, a building will be supplied through only one set of main service conductors of the same voltage classifications. In a building of multiple occupancies, taps may be taken from these main service conductors where more than one meter installation is necessary.

Where two or more meters are grouped, each meter position must be clearly and permanently identified by means of a metal or hard plastic engraved type label to indicate the particular location supplied by it. Service will not be established until the marking is completed.

Unmetered service wires and metered load wires will not run in the same conduit, raceway, or wiring gutter. All service entrance conductors must be installed in continuous, PVC conduit (preferred), rigid metallic conduit, or IMC conduit.

The Members principle grounding conductor cannot be terminated in the sealed Salem Electric termination compartment.

Member wires installed in self-contained meter bases, CT cans, terminal cans, and other enclosures which will also contain Salem Electric wires, must be installed in a manner which allows a clear wireway for the installation of Salem Electric wires.

2.02 POINT OF DELIVERY

The "point of delivery," unless otherwise specified by Salem Electric, is the location on the Member's structure where Salem Electric's circuit and the Member's system are interconnected. The exact location of the point of delivery will be at Salem Electric's discretion. Any additional service supplied to the same Member at other points of delivery at a different voltage or phase classification will be separately metered and billed.

2.03 SEALING OF CABINETS AND GUTTERS

All cabinets and gutters containing unmetered conductors, other than mainline switches required by applicable electrical codes, must be arranged for sealing with Salem Electric's seal. Removable conduit

fittings may be installed between the service outlet and the meter when approved by Salem Electric. These fittings must be visible from the meter location or from an exterior ground position and must be arranged for sealing.

Unmetered conductors passing through a service disconnect compartment in mobile home service equipment must be in an enclosed raceway and arranged for sealing.

2.04 CONDUCTOR IDENTIFICATION

Neutral or grounded conductors, if insulated, will be identified with the color white or gray. In a four-wire delta service, the conductor with the higher voltage to ground will be identified with the color orange.

2.05 LOCATION OF METERS

Suitable space and provisions for mounting meters must be provided by the Member at a location acceptable to Salem Electric. The minimum unobstructed wall space for a single meter is 75 inches high from ground level, 36 inches deep and 30 inches wide cabinets (see page I-19). Additionally, a 48 inch deep working space is required for installations using cabinets.

The size of the space will be larger when instrument transformers are used. Minimum dimensions are 75 inches high from ground level, 36 inches deep (48 inches deep if meters are in a cabinet), and 70 inches wide. Meters and metering equipment must be at least 36 inches horizontally from a gas meter. (see page I-2)

On ganged socket installations, the distance from the outside of the enclosure will not be less than 7 inches from a wall or obstruction (see page I-19).

The top of any meter socket located outdoors will not be more than 6 feet above the finished grade or floor immediately in front of the meter and the bottom will not be less than 4 feet, except the center of meter sockets in mobile home pedestals, which will not be less than 42 inches above finished grade. Meters in pedestals must be suitably protected from physical damage. In the case of vertical four-gang meter bases, the bottom of the lowest meter socket will be at least 36 inches above final grade (see page I-20).

Meter sockets located indoors will normally be at the same height as specified for outdoor meter sockets. Ganged meter sockets may be mounted lower, provided they are properly protected from physical hazard and permission is obtained from Salem Electric prior to installation. In no case is the bottom of a ganged meter socket to be less than 24 inches above finished grade.

It is in the mutual interest of the Member and Salem Electric that a suitable location is provided to facilitate reading, testing, and replacement of meters with the least inconvenience to the Member and Salem Electric.

Residential meters must be installed outdoors at a location that is readily accessible to Salem Electric's employees. The meter should be located on the side of the structure closest to Salem Electric lines or within 10 feet of that side. It is recommended that exterior bedroom or bathroom walls, patios, or carports be avoided, as well as exterior walls that are likely to be fenced. The meter will not be

installed over window wells, steps in stairways, or in other unsafe or inconvenient locations (consult Salem Electric for rewire of back lot service).

Non-residential meters will be located outdoors unless Salem Electric confirms prior to installation that an acceptable outdoor location is not available. Any indoor location must have prior approval by Salem Electric. An indoor meter must be accessible to Salem Electric during daytime hours (8:00 a.m. to 4:30 p.m.), and cannot be located in show windows, closets, bathrooms, over sinks or laundry tubs, or in any other location that is unsafe, inconvenient, or not readily accessible to Salem Electric employees. In addition, locked meter rooms are not considered accessible unless keyed for a Salem Electric lock or equipped with a Member-provided lock box for each meter room.

If, in the opinion of Salem Electric, a meter is made inaccessible (i.e. by the installation of a fence or enclosure), the Member will, at his expense, move the meter to an accessible location. Salem Electric, at its option, may install a pole meter to alleviate an accessibility problem, with the cost paid by the Member in accordance with Salem Electric's Schedule of Charges.

Except by special permission, meters are not allowed on mobile structures such as trailers, barges, cranes, dredges, draglines, or any mobile pumping equipment. Mounting meters and service equipment on floating dwellings (houseboats) is prohibited.

2.06 TEMPORARY SERVICE

Temporary service is available when requested. In addition to the cost of energy used, the Member will be billed for the cost of installation and removal in accordance with Salem Electric's Schedule of Charges.

Temporary services for construction work must be located so the meter is protected from mechanical injury; and, when practical, a location usable throughout the construction period. Should relocation become necessary, the relocation cost will be paid by the contractor or Member, in accordance with Salem Electric's Schedule of charges.

2.07 DISCONNECTION AND RECONNECTION OF SERVICE

Salem Electric will disconnect and reconnect any service supplying Member-owned service equipment that, for safe working conditions, must be de-energized prior to modification. There will be no charge for the disconnection during regular working hours. The reconnection will be done without charge if it can be completed on the initial trip or on a second trip scheduled during regular working hours and at Salem Electric's convenience; otherwise, the Member will be billed according to Salem Electric's Schedule of Charges.

2.08 RELOCATION OF SERVICES AND FACILITIES

If relocation of Salem Electric's facilities located on or adjacent to the Member's premises is necessary, there may be a charge for such relocation.

2.09 MEMBER EQUIPMENT ON SALEM ELECTRIC POLES

Member-owned metering equipment, switching devices, conduits, conductors, luminaries, cameras,

signs, etc., are not to be mounted on Salem Electric's poles, except by special permission of Salem Electric.

III. OVERHEAD SERVICE, 480 VOLT AND UNDER

3.01 GENERAL

New overhead service will be supplied to any building or premises except in the area designated by local government jurisdiction and/or Salem Electric as an underground district restricted to underground service. It is the Member's responsibility to comply with local underground ordinances.

3.02 SERVICE DROP

In areas served from overhead lines, an overhead service drop will be installed by Salem Electric from Salem Electric's distribution line to the point of connection to the Member's service entrance conductors at the service entrance on the Member's residence, building or structure.

The Member will provide a point of attachment for the service drop which can be reached with a single span of service drop cable from an adjacent Salem Electric line. The point of attachment will be high enough above both initial and finished grade, and in a proper position to provide not less than minimum clearances as specified in Article 3.03. Under certain conditions of terrain and distance, Salem Electric may supply a pole for clearance. There should not be a significant overhang of adjacent property, and the route of the service drop must be without obstruction by buildings, trees, or other objects. The point of attachment will normally be on the building wall facing the nearest Salem Electric line or on a service mast capable of withstanding the tension of the service drop. Supports for service drops must be extended from and tied into the main structural members of the building. The service mast should extend through the roof on a typical single-story building.

If a Member encounters problems in meeting these clearances, Salem Electric will aid in determining specific requirements that will comply with the code.

3.03 INSTALLATION CLEARANCES FOR SERVICE DROPS, 480Y/277 VOLT AND BELOW

The minimum clearances for service drops being installed are as follows and, in some cases, requirements exceed NESC requirements:

Clearance in Feet

Over roads, streets, and other areas subject to truck traffic (Note 1) ----- 18

Over or along alleys, parking lots, and non-residential driveways ----- 18

Over or along residential driveways:

 If height of attachment permits----- 18

 If not, for 120/240 and 208Y/120 volt (provided trucks are not reasonably anticipated)---- 14

 Drip loops of service drops 120/240 and 208Y/120 volt----- 10

Over spaces and ways subject to pedestrians or restricted traffic only (Note 2):

 If height of attachment permits----- 14

 If not, for 480Y/277 volt ----- 12.5

If not, for 120/240 and 208Y/120 volt-----	12
Drip loops of service drops 480Y/277 volt -----	10.5
Drip loops of service drops 120/240 and 208Y/120 volt-----	10

Clearances for Service Drops Attached to a Building or other installation

(over or along the installation to which they are attached):

From the highest point of roofs, decks, or balconies over which they pass:

If readily accessible (Note 3)-----	10
If not readily accessible (Note 3)-----	5

Above a not readily accessible roof, where not more than 4' of the service drop, measured horizontally, passes over the roof to terminate at a (through-the-roof) raceway ----- 1.5

In any direction, except above, from operable windows ----- 3

In any direction from doors, porches, fire escapes, etc.----- 3

Clearances from Buildings for Service Drops Not Attached to the Building:

Over or under balconies and roofs accessible to pedestrians and roofs of manufactured homes (Note 3)----- 13

Over or under roofs or projections not accessible to pedestrians (Note 3)----- 8

Horizontal clearance to walls, projections, and windows; and to balconies and areas accessible to pedestrians (Note 3)----- 5

NOTES:

- 1) Trucks are defined as any vehicle 8-14' in height. Areas not subject to truck traffic are areas where truck traffic is not normally encountered or not reasonably anticipated.
- 2) Spaces and ways subject to pedestrians or restricted traffic only are areas where equestrians, vehicles, or other mobile units, exceeding 8' in height, are prohibited by regulation or permanent terrain configurations or are otherwise not normally encountered or not reasonably anticipated.
- 3) A roof, balcony, or area is considered accessible to pedestrians if the means of access is through a doorway, ramp, window, stairway, or permanently-mounted ladder. A permanently-mounted ladder is not considered a means of access if its bottom rung is 8' or more from the ground or other permanently-installed accessible surface.

The clearances listed are minimum requirements and apply under the following conditions:

- a) At time of installation, at moderate temperatures, and moderate span lengths.
- b) To multiplex service drop cables having a bare neutral messenger; otherwise, consult Salem Electric.

The height of the point of attachment of Salem Electric's service drop will be determined by these

clearance requirements. The Member must bring his service entrance conductors to this point for connection to the service drop by Salem Electric.

This table does not cover every situation that may exist. Where there are unusual conditions, consult Salem Electric.

NOTE: OSHA requires that no person, tool, or equipment operated by a non-Salem Electric employee come within 10' of a high voltage conductor (over 600 V).

Salem Electric strongly suggests that, if at all possible, the service entrance be located to avoid having conductors pass over swimming pools, buildings, trees, or other obstructions. Where swimming pools, bridges, or railroads are close by, Salem Electric must be consulted to determine clearance requirements.

3.04 MULTIPLE-FAMILY OVERHEAD SERVICES

Salem Electric will extend an overhead service drop from its distribution lines to the point of connection to the Member's service entrance conductors at the service head. Salem Electric prefers the grouping of service heads at a common location and will not extend service drop conductors from the point of attachment to the individual service heads. It is the Member's responsibility to bring his service entrance conductors from the service head to Salem Electric's service drop. By special permission, Salem Electric will install more than one service drop to a building. It will be the Member's responsibility to obtain permission from the electrical code enforcing authority having jurisdiction.

3.05 NONRESIDENTIAL OVERHEAD SERVICE

The point of attachment for non-residential installations must be approved by Salem Electric prior to the installation of the Member's service equipment. Where more than one service entrance of the same voltage and phase to a building is necessary, the service entrance(s) must be grouped so they may be served from the same set of service drops. Any additional service wire attachment must be approved by the electrical code enforcing authority and by Salem Electric.

Pole-mounted transformer installations are limited to a size which can be safely supported. Installations requiring transformers which cannot be safely mounted on poles must be served by transformers located in vaults, on pads, platforms or in fenced enclosures on the Member's premises. A Member whose load may require 500 kilovolt-amperes or more of installed transformer capacity must consult Salem Electric to determine what the installation requirements are.

3.06 OVERHEAD SERVICE TO MANUFACTURED HOMES

The Member must install the meter base and service equipment on a wood pole, pressure or thermally-treated with a Salem Electric-approved preservative. The pole must have sufficient height to provide all required clearance for Salem Electric's service drop and any phone or cable attachments, and must not be less than 6" x 6" in cross-section, if square, not less than 5-1/2" in diameter at the top, if round (see pages I-6 and I-7).

3.07 OVERHEAD SERVICE TO MANUFACTURED HOMES WITH FACTORY INSTALLED METER BASES

Overhead service to manufactured homes with factory installed meter bases will be provided under the same requirements as residential occupancies (3.02) provided the home is site specific, occupies a private lot, and has a permanent base.

IV. UNDERGROUND SERVICE

4.01 GENERAL

Underground service may be provided in lieu of overhead service.

Before making preparation for underground service, the Member or his representative must obtain approval and specifications from Salem Electric covering the proposed installation and the Member's responsibilities.

Members adequately served by existing overhead distribution facilities, but desiring underground service in accordance with these requirements should contact Salem Electric for conversion policy details. In core areas of cities where underground service is specified by local ordinances, special rules may apply.

4.02 MEMBER-PROVIDED TRENCHES AND RACEWAYS

GENERAL

Service raceway, trench and backfill will be provided by the Member from the service entrance to the nearest point of Salem Electric's service, as directed by Salem Electric. Raceways will be electrical grade schedule 40 gray PVC (preferred) or stronger, rigid galvanized steel, or IMC and will meet the requirements of the electrical code enforcing authority. Raceways will not be less than 24" below final grade. Under certain conditions, with prior approval of Salem Electric, the raceway may be buried with less than 24" of cover provided that mechanical protection is installed by the Member to Salem Electric's specifications. Trench and raceway will terminate 24" from point of service and such termination will be left exposed. Not more than three bend segments will be allowed. All 90-degree bends are to be a minimum of 36" radius (*do not substitute LB's for elbows*). All conduits must contain a suitable non-conductive pull line.

In case of rock or other conflicts, consult Salem Electric. When the raceway terminates at a Salem Electric pole, consult Salem Electric for exact conduit location.

CALL BEFORE YOU DIG

Oregon law requires that all utilities be notified at least 48 hours prior to excavation and that excavation must not be started until locates have been made or Salem Electric has notified the excavator that they have no facilities in the area. This notification may be made by calling 1-800-332-2344 or 811.

JOINT USE

Communication, signal, and other electrical conductors may be placed in the same trench as Salem Electric conductors, provided the installation is in accordance with Salem Electric specifications and is mutually-agreed upon by all parties concerned.

4.03 CLEARANCES FROM SWIMMING POOLS

Underground raceways should not be located under a swimming pool or within 5' of the inside wall of a pool. Where space limitations require the conductors to be closer than 5', consult Salem Electric.

4.04 RESIDENTIAL UNDERGROUND SERVICE

For underground services to residential structures, (including single, multiple-family, and mobile home parks), underground conductors will be installed in Member-provided raceways. The Member or developer will be responsible for the cost of all trenching, duct, and backfill on the premises or within the confines of the project or subdivision to be served. If a transformer installation is necessary, consult Salem Electric for Member responsibilities and detailed specifications. If a pad-mounted transformer is installed in a location where it might be struck by a motorized vehicle, the Member is required to install and maintain Salem Electric-approved barrier posts to protect the transformer.

The underground service lateral will be installed, owned, and maintained by Salem Electric from Salem Electric's distribution line to the Member's termination facility. Salem Electric will also install, own and maintain the transformer and the primary voltage cable.

For 200 ampere or smaller service, Salem Electric will terminate the service lateral on the line-side terminals of the Member's meter socket, provided the Member's raceway is a minimum of 3" in diameter, the meter socket enclosure has a minimum dimension of 11x14x4-1/8", and the line-side meter socket lugs will accept a minimum of 1/0 aluminum conductor.

A 320 ampere, continuous-rated meter socket is normally required for code-calculated loads not exceeding 320 amperes. Salem Electric will terminate the service lateral on the line-side of the meter socket provided the Member's raceway is a minimum of 3" in diameter, the meter socket enclosure has minimum dimensions of 13x22x4-1/2", and the line-side meter socket lugs will accept a minimum of 4/0 aluminum conductor.

When the combination-type sockets with disconnects are used, a narrower enclosure may be acceptable providing the terminations are on the same side of the socket as the conductor entrance.

For code-calculated loads greater than 320 amperes, current transformer metering will be required. The Member is to provide and install a current transformer cabinet located on the exterior of the building. See Article 6.05 for cabinet size.

Where a current transformer cabinet is installed for underground service, Salem Electric will terminate the service lateral on the line-side of the current transformers and the Member's service entrance conductors will be terminated on the load side of the current transformers.

The Member's service entrance equipment should be located on the building structure so that the connection point of the equipment to Salem Electric's service lateral is on the side closest to where Salem Electric's facilities originate. The Member or contractor should contact Salem Electric for the location and routing of the service raceway prior to the start of construction.

4.05 UNDERGROUND SERVICE TO MANUFACTURED HOMES

For underground service to a manufactured home, the Member's service entrance equipment must be located in a pedestal approved for the purpose, or located on a wood post not less than 6" square, pressure treated with a Salem Electric-approved preservative, which is furnished, installed, and maintained by the Member. The bottom of the enclosure containing the service equipment is to be not less than 24" above finished grade.

When the meter may be subject to physical damage, barrier posts or other suitable protection must be installed and maintained by the Member.

Trenches and raceways in mobile home parks provided for Salem Electric conductors must be located so as to avoid passing under the pad, foundation, or area provided for the mobile home.

4.06 UNDERGROUND SERVICE TO MANUFACTURED HOMES (FACTORY-INSTALLED METER BASES)

Underground service to manufactured homes with factory-installed meter bases follow the same requirements as residential occupancies (4.04) provided the home is site specific, occupies a private lot and has a permanent base. Flexible non-metallic duct (schedule 40 or stronger electrical grade PVC) will be permitted within the physical perimeter of the structure.

4.07 NON-RESIDENTIAL UNDERGROUND SERVICE

For underground service to commercial or industrial buildings or projects, the Member or developer is responsible for all lateral trenching, backfilling and raceways. If a transformer installation is necessary, the Member is to provide space for the transformer which meets the current requirements of governmental authorities and Salem Electric. In most cases, the underground service lateral from Salem Electric's distribution line or transformer to the Member's termination facility (which will normally be on or within his building), plus transformers and primary voltage cable when required, will be installed, owned, and maintained by Salem Electric. Consult Salem Electric for specific applications. All raceways into padmounted transformers must enter through the bottom in Salem Electric-designated location.

Where a padmounted transformer, current transformer enclosure, or other equipment is installed in a location where it might be struck by a motorized vehicle, the Member must install and maintain Salem Electric-approved barrier posts to protect this equipment.

Salem Electric conductors will be installed in Member-provided raceways. The minimum raceway acceptable for Salem Electric service lateral conductors is specified in Table I.

Where a Member's raceway is to extend to a Salem Electric pole, the Member is to install the 90-degree bend at the base of the pole. Salem Electric will provide and install the raceway up the pole. Salem Electric will designate the proper position on the pole for the raceway prior to the installation of the 90-degree bend at the base of the pole. See Article 4.02 for approved raceway material.

All raceways will be capped at both ends at the time of installation to keep free of dirt and debris.

For single-phase service equipment rated 400 amperes or less, with a code-calculated load of 320 amperes or less, Salem Electric will terminate the service lateral on the line side of the Member's meter socket if the Member provides the following: (See Article 6.03 for circuit closing device requirements.)

- A. For 200 ampere or smaller service: 3" conduit, meter socket enclosure with minimum dimensions of 11 x 14 x 4-1/8" and line-side meter socket lugs which will accept a minimum of 1/0 aluminum conductor.

- B. For 400 ampere service (code-calculated load of 320 amperes or less) 3" raceway, meter socket enclosure with minimum dimensions of 13 x 22 x 4-1/2" and line-side meter socket lugs which will accept a minimum of 4/0 aluminum conductor. (Not available for 208Y/120 volt, single-phase service.)

For three-phase service equipment rated 200 amperes or less, Salem Electric will terminate the service lateral on the line side of the Member's meter socket. The Member will provide a minimum 3" raceway, meter socket enclosure with minimum dimensions of 11 x 14 x 4-1/8" and line-side meter socket lugs which will accept a minimum of 1/0 aluminum conductor.

For single-phase service equipment rated in excess of 400 amperes (code-calculated load more than 320 amperes), and for three-phase service equipment rated in excess of 200 amperes, Salem Electric will terminate the service lateral in an enclosure installed by the Member, provided the enclosure has adequate space. This enclosure will normally be the metering transformer cabinet. See Article 6.05 for cabinet dimensions.

Salem Electric will provide bar-type current transformers for service equipment rated up to and including 800 amperes. The current transformers are to be installed by Salem Electric. Salem Electric service lateral will be terminated on the line side bar-type current transformer by Salem Electric, and the Member's service entrance conductors will be terminated on the load side bar-type current transformer by the contractor. The neutral or grounded conductors will be terminated by each party respectively. The current transformer (CT) mounting base is to be rated for available fault current (consult Salem Electric).

For service rated over 800 amperes, the Member is to provide and install an entrance compartment with adequate space and provide a bus extension into the compartment. Salem Electric will terminate the service lateral on the bus extension. Through-type CTs provided by Salem Electric may be installed in the CT compartment by the contractor. Consult Salem Electric for entrance compartment and termination requirements. Salem Electric requires the entrance compartment be a switchboard service section for new construction (see page I-17). For additional information see EUSERC 320, 325 and 326. For outdoor applications see EUSERC 354.

Compartments for termination of Salem Electric service laterals that are indoors must be accessible and must be located at or as close as practical to where the conductors enter the building as defined by the local code enforcing agency. In no case may a service lateral extend inside the building space more than 5' 6" before entering a meter enclosure or terminal compartment. Conductors will be considered to be outside of the building when they are covered or enclosed by 2" (or more) of concrete or brick.

Salem Electric's termination of load carrying conductors must be at ground floor level. Termination compartments for Salem Electric conductors must meet the EUSERC 343 requirements. If terminal blocks are used, they are to be supplied by the Member. The doors to rooms in which Salem Electric metering or termination equipment is located must open outward.

Where it is necessary to connect two or more sets of service equipment to a single service lateral, the Member must provide seal-able terminal box. Member-owned devices (such as limiters, fuses, etc.) will not be installed in terminal boxes.

SERVICE ENTRANCE CONDUCTOR AMPACITY	MINIMUM TERMINAL BOX-SIZE (W x H x D)
400 and Below	18" x 44" x 7"
401 to 800	24" x 48" x 11"
801 and Above	Consult Salem Electric

In the case of an upgrade of an existing service where limited space makes installation of standard size boxes impractical, consult Salem Electric to determine the size of a mutually-acceptable box that meets all code requirements. Free-standing switchboards will have drawings submitted for Salem Electric approval. When more than one Salem Electric service lateral feeding ganged meter bases are served from a common transformer, each ganged service will have a main disconnect in front of the meters. The wiring must be complete to all meter sockets before the main is energized.

V. DOWNTOWN AREA SERVICE

5.01 DOWNTOWN SALEM AREA

Salem Electric maintains an underground distribution system in the downtown Salem area. In addition to the rules outlined in this booklet, special rules apply. Salem Electric must be consulted regarding the details of service for new installations or changes to existing installations before work is started. A detailed plan of the service entrance equipment must be submitted to Salem Electric by the Member. Because each Member may have different requirements and load conditions, Salem Electric engineers will supply detailed information on items that must be supplied by the Member for installation of Salem Electric termination equipment. The Member will also furnish and install the raceway from a point on the Member's property line, specified by Salem Electric, to his termination equipment.

If, after installation of Salem Electric equipment, the Member finds the space originally assigned to this equipment must be used for some other purpose, a new and mutually-acceptable location must be approved. Relocation of Salem Electric equipment may be at the Member's expense.

Salem Downtown Area nominal service voltage will be single-phase, 120/208 volts, three-wire, grounded or three-phase, 208Y/120 volt, four-wire, grounded wye.

VI. METER INSTALLATIONS

6.01 GENERAL

Salem Electric rate schedules require the delivery of each class and type of electrical service through one meter to one Member at one location.

Members or contractors are not authorized to relocate any meter belonging to Salem Electric or interfere in any way with the meter or its connection.

6.02 ACCEPTABLE METER SOCKETS

Acceptable meter sockets will be manufactured in accordance with the current Standards for Safe Meter Sockets, UL/ANSI-414 or ANSI-C12.7. Sockets intended for underground service are not to be used with overhead service and all conductors are to enter and leave the enclosure through the appropriate openings. The meter socket, complete with terminal lugs, meter jaws, manual circuit-closing devices when required, and sealing means will be provided by the Member.

Salem Electric conductors will enter underground service self-contained meter sockets through the bottom knockout.

6.03 SELF-CONTAINED METER SOCKETS

Salem Electric requires a self-contained, socket-type meter installation on the line side of the single-phase service equipment when the ampacity of the service entrance conductors is 400 amperes or less. Three-phase services of 200 amperes or less also require a self-contained, socket-type meter. All meter sockets will be ring type complete with screw type sealable ring.

EXCEPTION:

On self-contained meter sockets for motor loads, the continuous duty will be limited to:

1. 60 hp at 208/120 volt
2. 75 hp at 240/120 volt
3. 150 hp at 480/277 volt

Motor size above these horsepower values will be metered with instrument transformers.

TYPE OF SERVICE	NUMBER OF TERMINALS
Two-wire, single-phase	4
Three-wire, single-phase	4
Three-wire, 120/208 volt, single-phase	5
Four-wire, three-phase, grounded	7

Circuit Closing Device

1. Meter sockets for residential service, rated 200 amperes and below, do not require circuit-closing devices. If a manual circuit-closing device is installed, it will be of the type approved for non-residential service.

2. Sockets for residential service rated in excess of 200 amperes require a manual circuit-closing device of type approved for non-residential service.
3. Self-contained meter sockets for non-residential single phase service will be equipped with manual circuit-closing devices (link bypass only). All other types of bypass means will be disallowed for any new installations or for modifications of existing installations.
4. Self-contained meter sockets for three phase services will use a "safety socket" box with factory installed test bypass facilities. Any modification or reconnection of an existing installation will require a "safety socket".

Meter sockets for single-phase temporary service rated 100 amperes and below are an exception and will not require circuit closing devices.

6.04 MOUNTING OF METER SOCKETS

Sockets must be plumb in all directions and securely mounted to a rigid surface. Conductors must be securely fastened to their respective terminals and must be arranged in a manner which will not interfere with the installation of the meter or cover or with the operation of a circuit-closing device. If the socket is to be recessed in the building wall, a flush-type box or meter cabinet designed specifically for that purpose must be installed and the face of the socket must project outward beyond the building surface.

Meter sockets mounted on or in buildings must have clearances as shown in drawings on page I-19. The Occupational Safety and Health Code requires 36 inches of clear working space in front of live parts. No barrier will be installed that will be within 36 inches of the front of the meter panel when a meter is removed and energized parts are exposed. Meter sockets and other metering equipment must be located at least 36 inches horizontally from a gas meter.

Meters, subject to Salem Electric approval, when mounted on poles should be attached with a suitable pole-mounting bracket designed for that purpose.

If subject to physical damage, the meter will be adequately protected.

While Salem Electric does not encourage the use of enclosures over meters, they will be permitted when, in the judgment of Salem Electric, the meters are readily accessible for meter reading or resealing, without requiring the use of tools or the removal of the enclosure (preferably hinged to one side).

Permission to enclose the meter will remain in effect only as long as the Member maintains the enclosure in good working condition.

6.05 CURRENT TRANSFORMER METERING

Current transformer metering is required where the conductor ampacity of three-phase service entrances exceeds 200 amperes and the conductor ampacity of single-phase entrances exceeds 400 amperes.

The current transformers are to be provided by Salem Electric and installed by the Member in a

Member-owned, sealable metallic cabinet securely mounted on a rigid surface (2x4 stud or equivalent). This cabinet is to contain only the service conductors and Salem Electric equipment and is to be mounted in a readily-accessible location acceptable to Salem Electric. The top of the CT cabinet will not be more than 8 feet above floor level. The cover will have factory installed hinges for side opening with lockable sealing provisions. Make sure that the hinged door, when open, does not block access and egress from the room. The preferred location of all Salem Electric metering equipment will be on the ground floor. However, if the ground floor is found to be unsuitable by Salem Electric, stairs ONLY (NOT LADDERS) will provide access to and from any equipment containing Salem Electric metering.

TYPE OF SERVICE	MINIMUM CABINET SIZE W X H X D	MOUNTING BASE
401-800 amp 3 Wire (single-phase)	24" x 48" x 12"	2 C.T. BASE, EUSRC 328 and 328A
201-800 amp 3 or 4 wire (three phase)	36" x 48" x 12"	3 C.T. BASE, EUSRC 329 and 329A
Above 800 ampacity	EUSERC Switchboard (see page I-17) or consult Salem Electric	Consult Salem Electric

In the case of an upgrade of an existing service where limited space makes installation of standard-size boxes impractical, consult Salem Electric to determine the size of a mutually acceptable box which will meet all code requirements.

New free-standing switchboards will have drawings submitted for Salem Electric approval.

The Member is to provide the meter socket and the conduit, with a non-conductive pull line installed between the current transformer cabinet and meter socket, along with bonding by code-approved methods. Conduit will normally be limited to runs of 50 feet or less with not over 270 degrees in bends (consult Salem Electric if over 270 degrees in bends are required), and will have a minimum diameter of 1-1/4 inches. All conduit runs from CT cabinet to meter sockets will be metallic. Removable conduit cover fittings must be secured by metal screws with "break-off" type heads or by "one-way" screws, or arranged for sealing. Only Salem Electric conductors will be permitted in metering conduit.

Conduit runs longer than 50 feet in length must have Salem Electric approval prior to installation and will be granted only if, in the opinion of Salem Electric, a satisfactory meter location is unattainable within the normal length. Conduit sizing will be specified by Salem Electric for each extra length run, based on the total length and number of bends. CT secondary conduit is to be brought into the cabinet to a point in front of all energized buses.

The meter socket enclosure for current transformer metering is to have space below the socket for a Salem Electric test switch 9-1/2 inches in length. The minimum width of the enclosure is to be 11 inches. The enclosure is to contain a perch, drilled and tapped, for a test switch. The test switch will be furnished and installed by Salem Electric. Meter sockets with circuit closers or bypass clips will not

be approved for new installations or for modifications of existing service.

The number of terminals required, in the meter socket are:

TYPE OF SERVICE	NUMBERS OF TERMINALS
Three-wire, single-phase	6
Four-wire, three-phase, grounded	13

6.06 SOCKET FOR REACTIVE DEMAND METER

A double socket will be installed by the Member when service is three-phase and instrument transformers are required (over 200 amperes) and the following conditions exist:

If the connected inductive type load (motor, uncompensated lights, etc.) is 70% or more of the total load, and; If the service voltage is 480Y/277 and the service ampacity is in excess of 200 amperes, or;

If the service voltage is 208Y/120 or 240/120 delta and the service ampacity is in excess of 400 amperes.

6.07 METERING ON A POLE OR IN A SALEM ELECTRIC ENCLOSURE

Salem Electric, at its option, may provide and install the metering equipment on a pole or in a Salem Electric enclosure at the Member's expense. Where current transformers or other equipment are installed in a location where they might be struck by a motorized vehicle, the Member is to install and maintain Salem Electric approved barrier posts to protect this equipment.

VII. MEMBER EQUIPMENT, DEVICES AND CHARACTER OF SERVICE

7.01 GENERAL

The Member's electrical equipment and devices are to have characteristics such that Salem Electric distribution system is efficiently utilized and undue interference with Salem Electric service to other Members does not occur.

The Member's equipment will be designated to perform satisfactorily within the standard voltage ranges and frequency provided on Salem Electric's system. Insofar as is practical, Salem Electric will endeavor to maintain standard voltages and frequency on its distribution system, subject to variations within reasonable limits.

Salem Electric reserves the right to inspect and test any equipment connected to its lines and to require any information necessary to determine the operational characteristics of the equipment. Prior to purchase, the Member will submit information to Salem Electric regarding any equipment which might cause interference with service to other Members or require additional facilities for its satisfactory operation.

Electric service supplied by Salem Electric may be subjected to voltage disturbances which will not normally affect the performance of lighting, appliances, heating, motors or other typical electrical equipment, but may result in the improper operation of voltage-sensitive equipment such as computers or microprocessors. Voltage-sensitive equipment is defined as equipment which is adversely affected by power disturbances (ie; sags, spikes, interruptions) of less than 0.5 seconds duration. It is the responsibility of the Member to provide those power conditioning devices that may be required to provide the quality of "power" necessary for optimum performance of voltage-sensitive equipment.

7.02 SINGLE-PHASE SERVICE

Any single-phase piece of equipment having a rated capacity of 2 kilowatts or more will be operated at not less than 208 volt.

Loads with aggregate ratings of the permanently connected equipment in excess of 4 kilowatts will not be served from a 120 volt, two-wire service. When the aggregate rating exceeds 4 kilowatts, or the rating of any single piece of equipment exceeds 2 kilowatts, service will be 208Y/120 or 120/240 volt and the load will be balanced on the ungrounded conductors as closely as practical.

Loads with an aggregate rating of the permanently connected equipment in excess of 10 kilowatts that are served from a 208Y/120 volt supply will not be served 208Y/120 volt, three-wire, but must be connected to a four-wire service.

No individual motor larger than 5 horsepower may be connected without prior approval from Salem Electric. In addition, air conditioners and heat pumps larger than 3 tons require prior Salem Electric approval. (Single-phase motors larger than 3 horsepower may cause unavoidable voltage dips objectionable to some Members.)

Salem Electric, at its option, may limit the maximum single-phase load served through one point of

delivery to the capacity of the largest size single-phase transformer designated as a "Salem Electric standard." In general, prior agreement should be obtained for service to single-phase loads larger than 167 kilovolt-amperes. Three-phase service may be required in lieu of single-phase service where, in Salem Electric's judgment, the Member's connected load is of a size that three-phase is necessary.

7.03 THREE-PHASE SERVICE

Three-phase service, if available, will normally be provided in accordance with Salem Electric's current policy to nonresidential Members upon request.

The manner in which single-phase load is connected by the Member is critical with three-phase service. On 208Y/120 volt or 480Y/277 volt three-phase services, all single-phase loads should be split evenly among the three phases. On 240/120 volt delta three-phase service, all single-phase load, both 120 and 240 volt, will be connected only to the 120 volt-to-ground legs, except 240 volt resistance heating equipment may be balanced across all three phases by permission of Salem Electric. Connections made otherwise may result in an overload or single-phase condition with the possibility of damage to the Member's three-phase equipment.

Three-phase, 480 volt service will not be supplied where the total load to be served is less than 50 kilowatts except where the load consists of a single motor such as irrigation pumping, with a nameplate rating of at least 30 horsepower.

Three-phase service, if available, will be supplied to residential Members upon request, provided three-phase service is necessary, such as to operate a motor larger than 5 horsepower. A Line Extension Contract may be required for extension of Salem Electric primary and secondary voltage conductors and the transformer installation. Refer to Salem Electric Service Policy Manual.

Salem Electric, at its option, may limit the maximum load served through a single point of delivery to the capacity of the largest size transformer designated as a "Salem Electric standard." In general, prior agreement should be obtained for service to three-phase loads larger than 500 kilovolt-amperes.

7.04 MOTOR PROTECTION

To assure adequate safety to personnel and equipment, the Member will provide and maintain code-approved protective devices in each phase to protect all motors against overloading, short circuit, ground faults and low voltage, and to protect all three-phase motors against single-phasing.

7.05 MOTOR STARTING

Reduced voltage starters are usually required on all motors rated in excess of 35 horsepower and motors that are frequently started that are rated in excess of 10 horsepower, except as follows:

1. Reduced voltage starters will not be required in group motor installations for motors rated at two-thirds less than the rating of the largest motor requiring a reduced voltage starter unless a motor is normally started more than four times per hour.
2. Permission is granted by Salem Electric to omit the reduced voltage starter.

Salem Electric will furnish information regarding permitted starting currents. The starting currents permitted will depend upon the frequency of start of the motor, the size and character of the

Member's load, and the design of Salem Electric's distribution system in the area, and will generally be equivalent to the maximum starting current which, in Salem Electric's opinion, can be supplied without undue interference with service to other Members.

No additional Salem Electric facilities will be installed to reduce voltage fluctuations on an individual Member's service, caused by the starting of that Members' motors, until after approved reduced voltage starters have been installed by the Member. If additional Salem Electric facilities are required, they may be installed at the Member's expense.

7.06 INTERFERING LOADS

Whenever a Member's utilization equipment has characteristics which cause undue interference with Salem Electric service to other Members, the Member will make changes in such equipment or provide, at Member expense, additional equipment to eliminate the interference. Where practicable, Salem Electric will furnish additional equipment.

Additional facilities such as separate Salem Electric transformers and a separate service can be used to minimize voltage fluctuations on secondary voltage circuits for devices such as welders, induction heating equipment, and X-ray machines. Where the operation of this type of equipment causes undue voltage fluctuations on Salem Electric primary voltage lines, the additional equipment required may include a separate primary voltage line. Where practicable, Salem Electric will furnish additional equipment.

High-frequency equipment such as electronic heating equipment, spark discharge devices, radio transmitting equipment, etc., and equipment that generates harmonics, such as an induction furnace, will be designed and operated so as not to create disturbances on Salem Electric electrical system which might interfere with the proper operation of communication, radio, television, remote control, or other utilization equipment of other Members.

7.07 POWER FACTOR

Salem Electric's rate schedule specifies a charge for excessive reactive demand. Low power factor may cause inferior performance of the Member's electrical system. It is recommended that the Member install corrective devices to make the most effective use of the electrical system.

7.08 EMERGENCY OR STANDBY GENERATORS

Permanently installed emergency or standby generators are to be connected to the Member's wiring system by a permanently installed transfer switch intended for that purpose. The transfer switch is to disconnect all ungrounded conductors connected to Salem Electric system prior to connecting the generator to the conductors supplying the load. The transfer switch is to be designed and installed so that connection of the generator to Salem Electric system is prevented for any mode of operation. Compliance with these provisions is necessary to prevent serious or possibly fatal accidents. Portable generators will not be connected to a permanent wiring system at any time, unless the interconnection is made with a permanently installed transfer switch.

When the switch is in the position which disconnects Salem Electric service, it must have a visible opening and be lockable in that position. All transfer switches and/or transfer operating schemes must meet applicable building codes and be inspected by the appropriate governmental electrical inspector.

7.09 COGENERATION

Cogeneration is the joint production of electric energy and useful thermal energy in a combined process. It includes, but is not limited to: gas turbines and diesel-driven generators (with waste heat recovery) and steam or back-pressure turbines. Each proposal for cogeneration will be handled on an individual basis by means of a special contract with Salem Electric.

The operation of the Member's cogeneration system is to be approved by Salem Electric. The metering location, type of metering, and the method of interconnecting the Member and Salem Electric's system will be designated by Salem Electric. Refer to Salem Electric Service Policy Manual.

7.10 AVAILABLE FAULT CURRENT

Upon request, Salem Electric will supply the information on available fault current at the Member's service entrance. It is the Member's responsibility to furnish equipment which will withstand the fault current.

VIII. OTHER MEMBER RESPONSIBILITIES

8.01 MEMBER'S RESPONSIBILITY FOR SAFETY

The Member will comply with all federal, state, and local laws and regulations, as well as all applicable laws of negligence concerning all activities in the vicinity of Salem Electric's electrical lines and equipment, whether on Member premises or used to deliver electricity from the transmission/distribution facilities to his premises. The Member will comply with laws and regulations to protect himself, his family, his employees, Salem Electric, and all third parties from injury, loss, or damage.

8.02 RIGHTS-OF-WAY

The applicant will provide without cost to Salem Electric all rights-of-way and easements required for the installation of facilities necessary or convenient for the supplying of electric service and free access at reasonable times to applicant's premises for all work necessary to maintain continuity of such service.

8.03 TEMPORARY SHUTDOWN

It may be necessary to require a temporary shutdown of a Member's service in order to safely maintain or upgrade Salem Electric facilities. These shutdowns will normally be scheduled at Salem Electric convenience. A Member may request that the shutdown be scheduled at Member convenience, but the Member will be billed for the extra cost incurred by Salem Electric.

IX. ILLUSTRATIONS AND TABLE

TABLE I
MINIMUM RACEWAY REQUIRED FOR SALEM ELECTRIC CONDUCTORS
Secondary Voltage (Under 600 V)

See Article 4.02 for approved raceway material. Do not specify other than electrical grade PVC Schedule 40 (preferred), rigid galvanized steel, or IMC, without specific approval of Salem Electric Engineering.

For up to three bends *270 degrees or less, and up to 200' in length:

Service Entrance Ampacity	Single-Phase Three-Wire	Three-Phase Four-Wire
200 or less	1 - 3"	1 - 3"
201 - 400	1 - 3"	1 - 4"
401 - 600	2 - 4"	2 - 4"
601 - 1,000	3 - 4"	3 - 4"
1,001 - 1,200	3 - 4"	4 - 4"
1,201 and up	Consult Salem Electric	

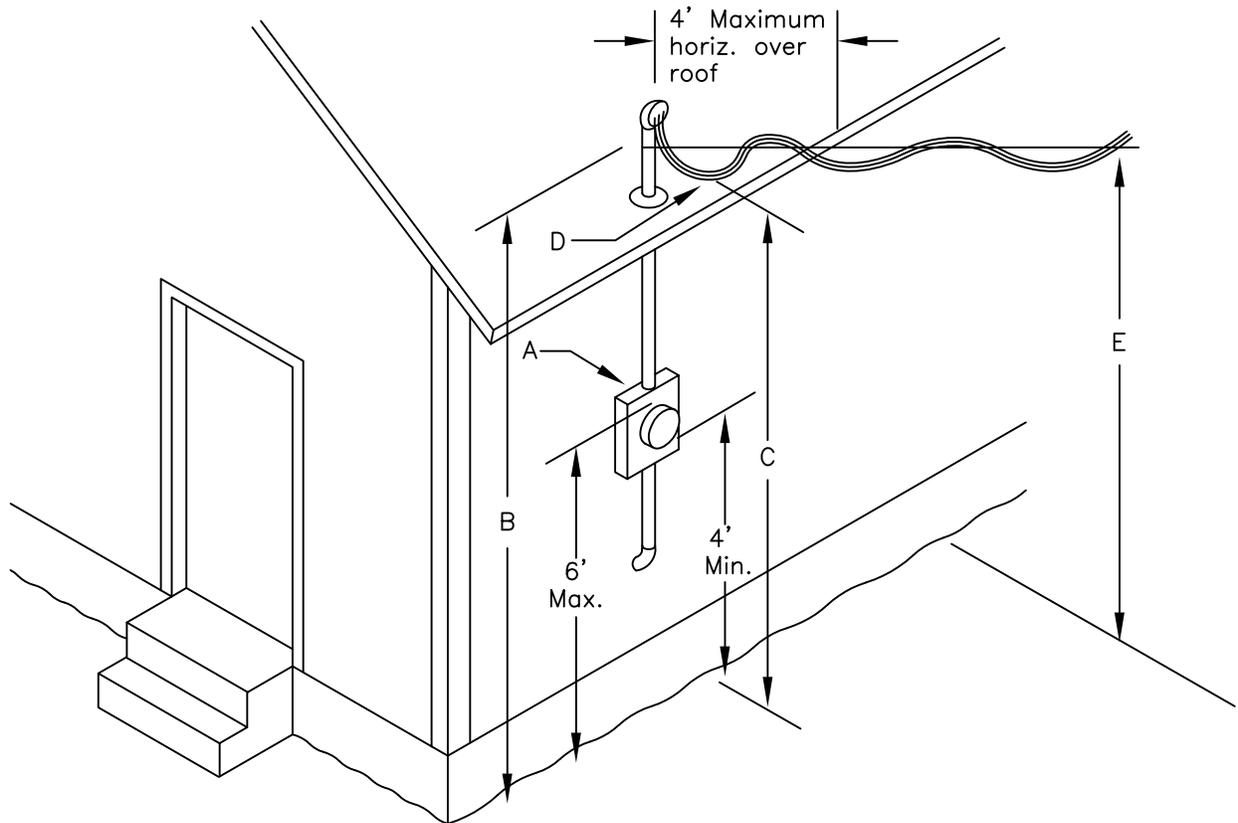
* Bends to be minimum 36-inch sweep radius. If more than two bends or if run is longer than 150 feet, bends must be IMC or rigid galvanized steel.

Larger conduit size or bend radius may be required for longer runs, more bends, four-wire full neutral, direct connection to Salem Electric conduit, or service conductor matching 100% of rated main service ampacity. Contractor will consult Salem Electric for specific requirements. All conduits must contain a suitable non-conductive pull line.

For runs of less than 25' and no more than two bends, the sweep radius may be reduced to a minimum of 18" for 3" conduit or 24" for 4" conduit.

Normal raceway depth is 24 inches (see Article 4.02).

TYPICAL RESIDENTIAL OVERHEAD SERVICE

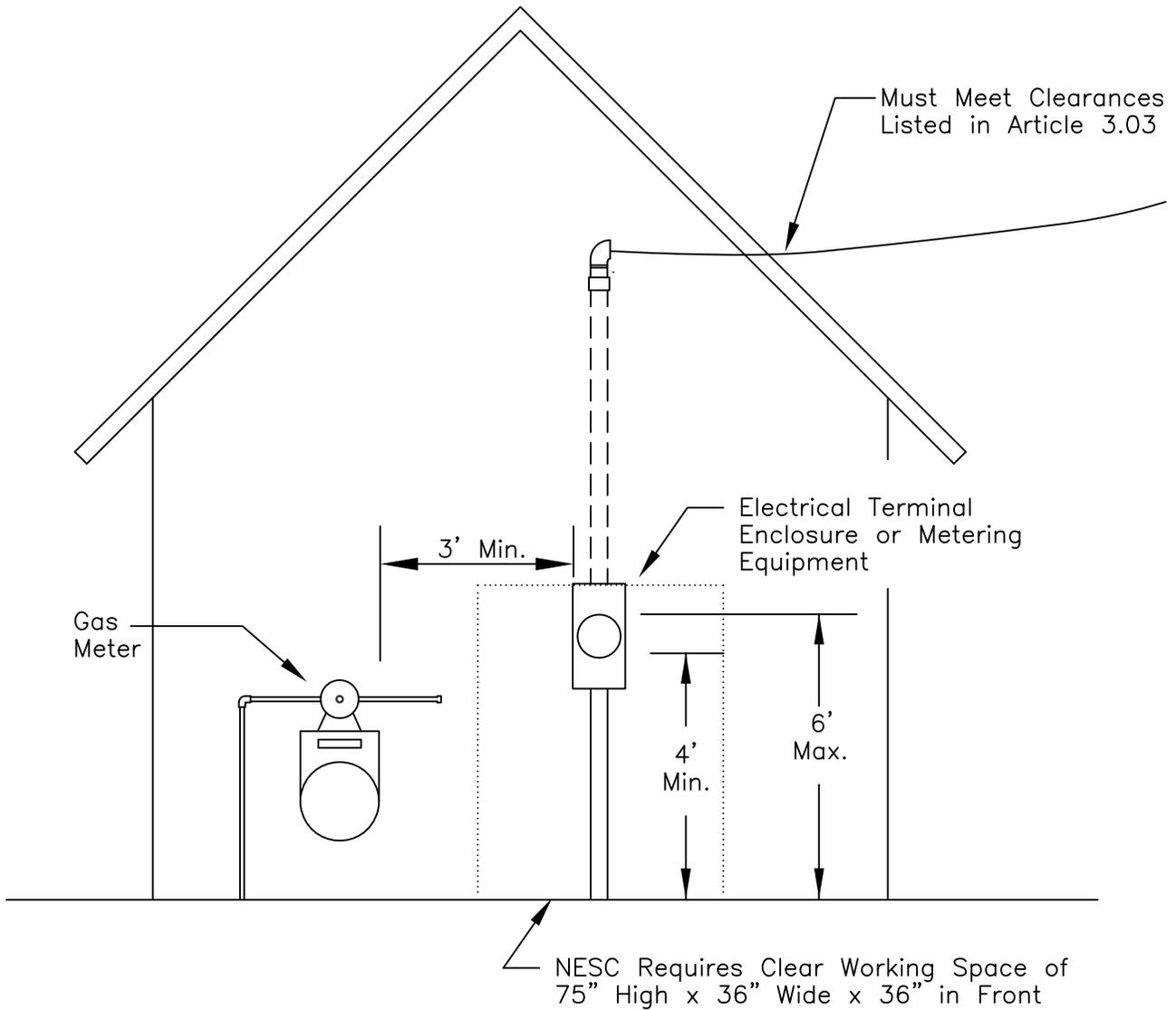


- A. Meter location must be approved by Utility prior to installation. See Article 2.05.
- B. Point of attachment 12' minimum above finished grade, or from any platform or projection from which conductors can be reached.
- C. The service entrance must be located so that the open conductors are a minimum of 10' above finished grade, or from any platform or projection from which they can be reached.
- D. The cable drip loop must be 18" minimum above roof.
- E. Service wire clearances – 12' minimum above finished grade, 14' minimum over driveways, 18' over streets, more if practical. See Article 3.03 .
- F. See pages I-3 and I-4 for weatherhead extending through roof.

NOTE: Clearances B, C, D and E are based on the current National Electrical Safety Code and are applicable where the voltage is limited to 150 volts to ground.

CLEARANCE BETWEEN ELECTRICAL METER BASE AND GAS METER (OR OTHER OBSTRUCTIONS)

UNDERGROUND/OVERHEAD RESIDENTIAL SERVICES



3-foot minimum clear working space required between electric meter and gas meter.

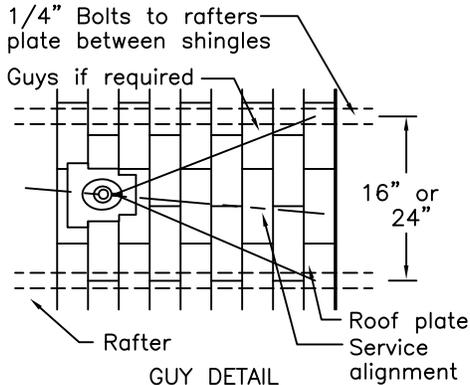
SUGGESTED METHOD OF INSTALLING OVERHEAD SERVICE TO LOW BUILDING

(SELF-CONTAINED METERING – EXTERIOR METHOD)

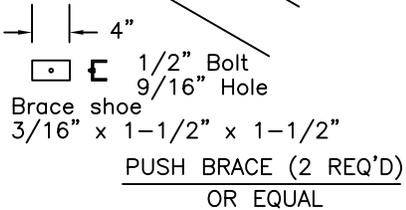
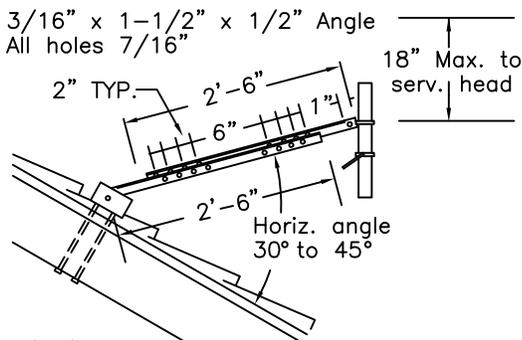
GUYED EXAMPLE

NOTE:

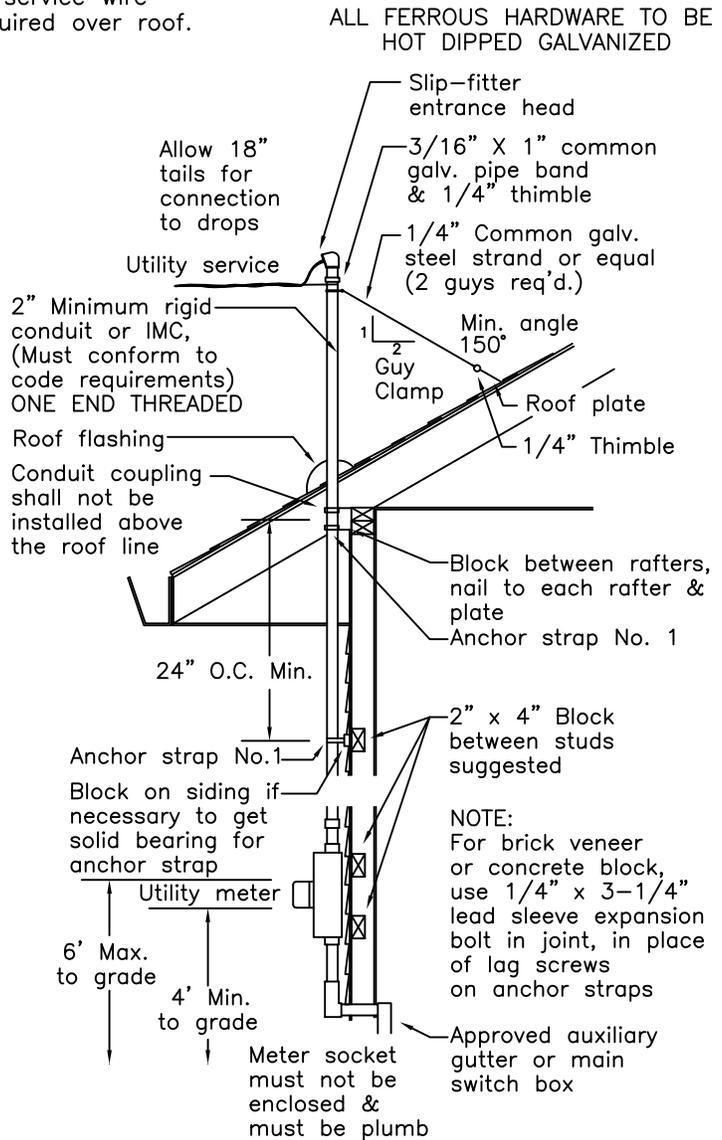
Service mast must be mounted on side nearest distribution pole. Can be located near rear corner if clear path exists between service attachment and pole. Avoid service wire overhang over roof or provide clearance required over roof. Service entrance must be rigidly secured. See Article 3.03 for clearance required.



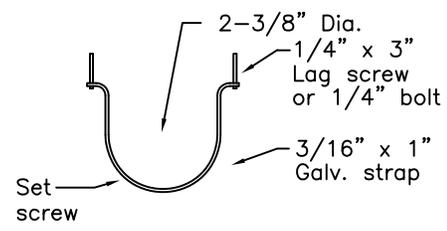
Roof plate must be installed so that service alignment extension falls within angle of guys



ROOF PLATE (OR EQUAL)



NOTE:
For brick veneer or concrete block, use 1/4" x 3-1/4" lead sleeve expansion bolt in joint, in place of lag screws on anchor straps



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

SUGGESTED METHODS OF INSTALLING OVERHEAD SERVICE TO LOW BUILDING

(SELF-CONTAINED METERING – RECESSED METHOD)

UNGUYED EXAMPLE

NOTES:

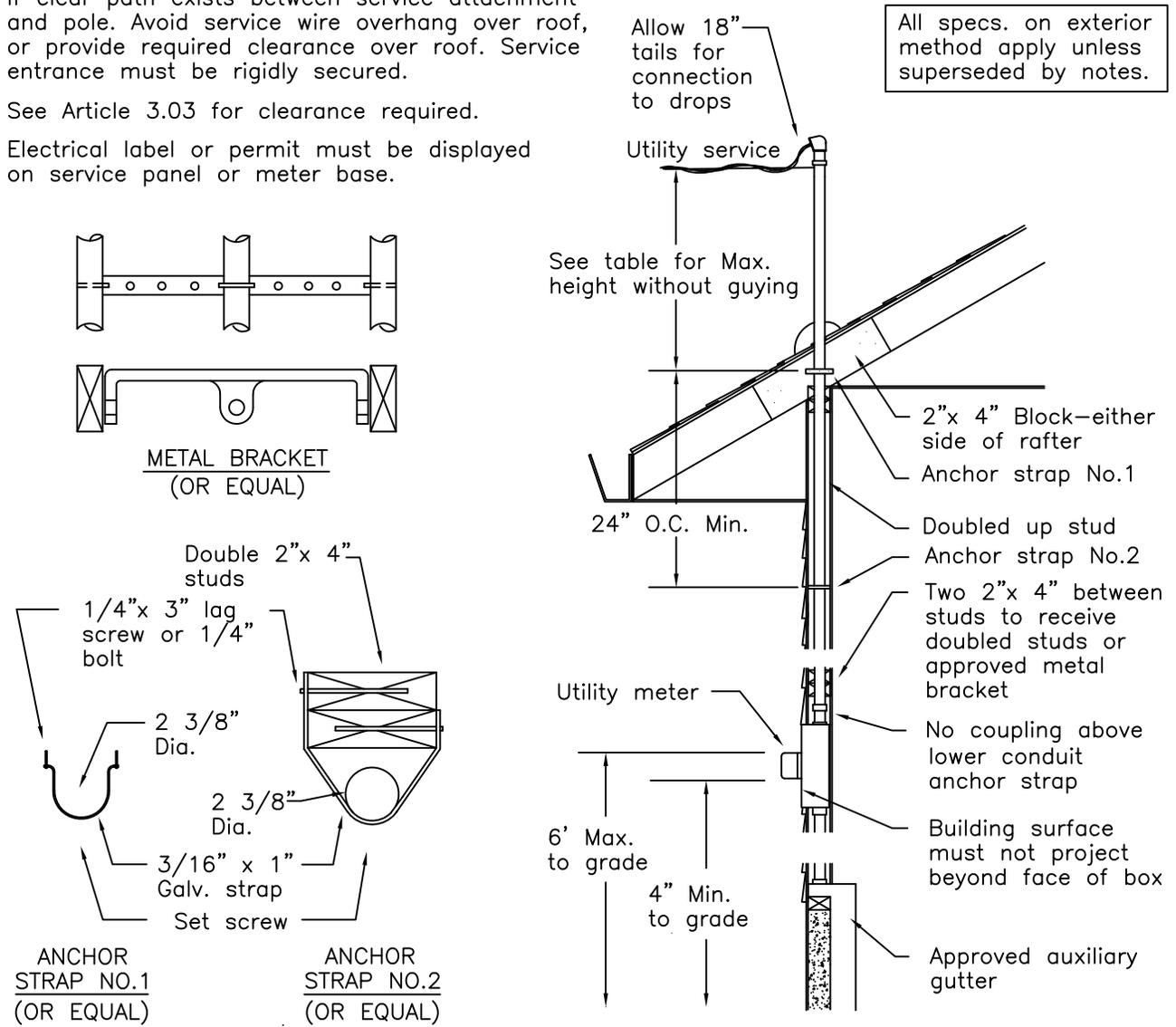
Service mast must be mounted on side nearest distribution pole. Can be located near rear corner if clear path exists between service attachment and pole. Avoid service wire overhang over roof, or provide required clearance over roof. Service entrance must be rigidly secured.

See Article 3.03 for clearance required.

Electrical label or permit must be displayed on service panel or meter base.

For guying see exterior method

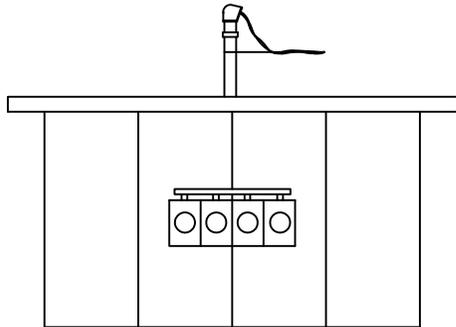
All specs. on exterior method apply unless superseded by notes.



MAXIMUM HEIGHT WITHOUT GUYING	
	Utility Service Length
200 Amp Service 2" conduit	Less than 150'
320 Amp Service 2-1/2" conduit	Less than 135'

Based on 1/0 TPX conductor and 2" diameter mast for 200 Amp service and 4/0 TPX conductor and 2-1/2" diameter mast for 320 Amp service.

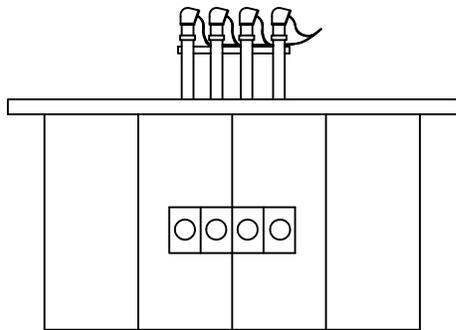
OVERHEAD SERVICE SERVICE DETAILS MULTIPLE OCCUPANCY RESIDENTIAL AND COMMERCIAL BUILDINGS



Utility overhead service

GROUPED METERS -- SINGLE SERVICE MAST

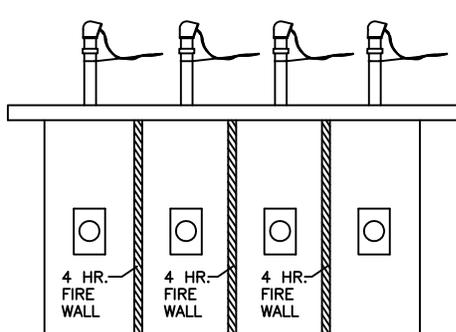
A sealable service gutter is required by this arrangement



Utility overhead service

GROUPED METERS -- INDIVIDUAL SERVICES MASTS

Individual service masts must be arranged so that all service entrance tails will reach a single point of attachment



Utility overhead service

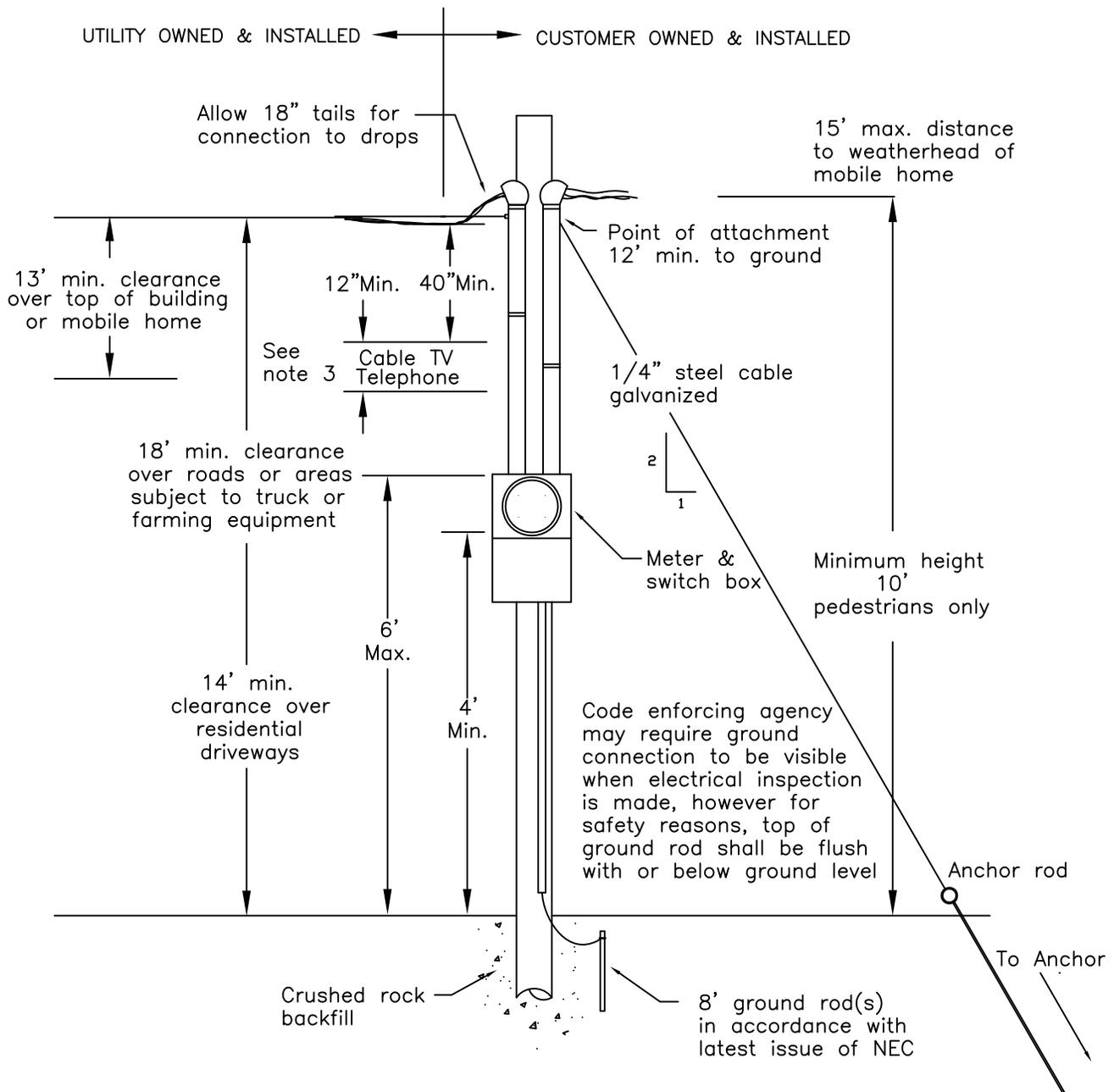
INDIVIDUAL METERS -- INDIVIDUAL UTILITY SERVICE

Requires fire walls between occupancies as shown. This arrangement must have prior approval of electrical inspection authority and Utility

NOTES:

1. Service mast(s) must be mounted on side nearest utility distribution pole. Avoid overhang of roof or provide required clearance over roof. See Article 3.03 for clearances or refer to currently approved edition of National Electric Safety Code.
2. Guying service masts will usually be required. Contact Utility for guying requirements.

OVERHEAD SERVICE FOR MANUFACTURED HOME

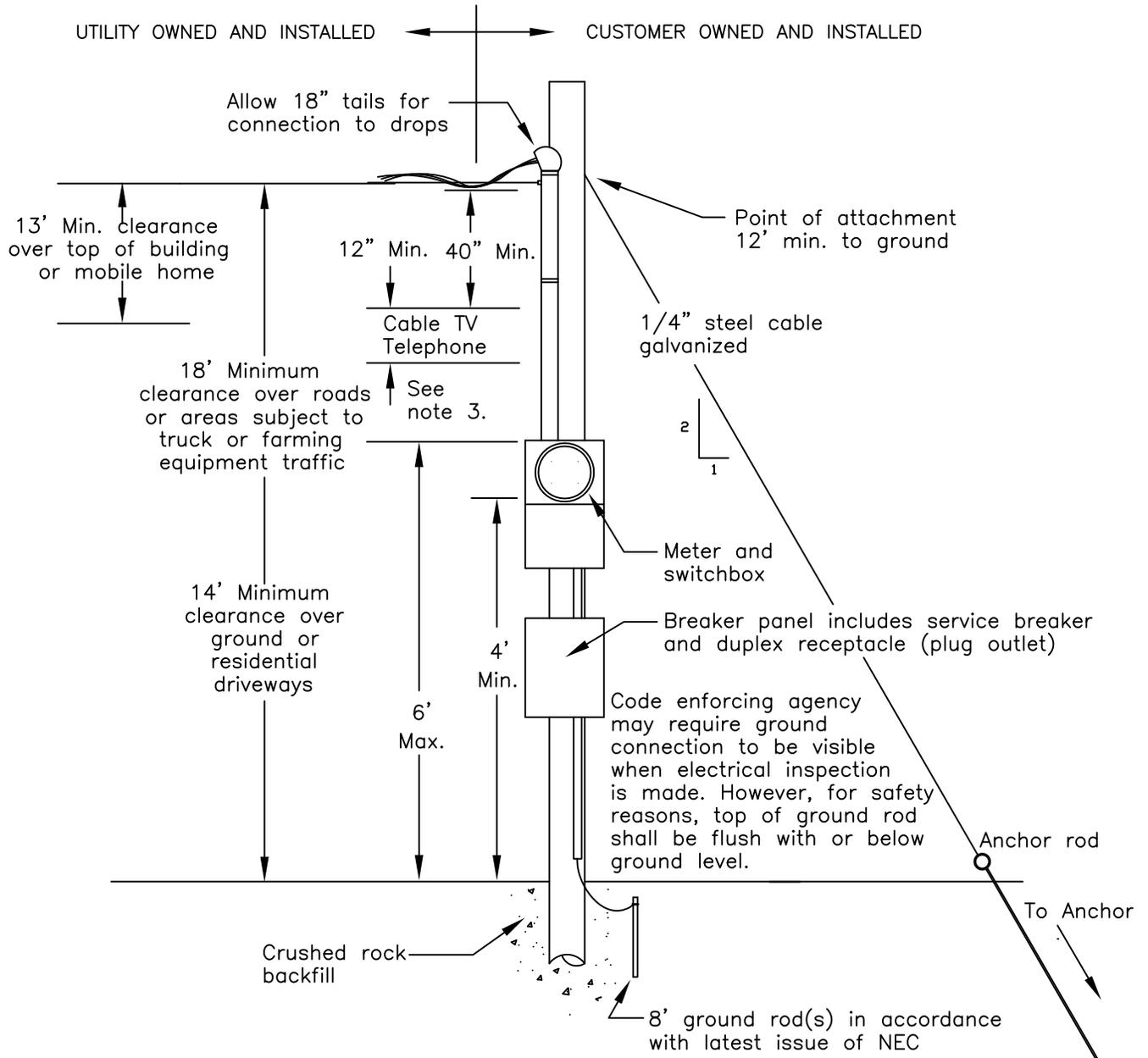


NOTES:

1. Customer to provide guying if span length exceeds 100' or if span crosses mobile home or building or if other conditions require guying.
2. Pole to be 20' minimum length. Class 6 (17" minimum top circumference, 23" minimum circumference 6' from butt), or better, pressure or thermally treated, set no less than 5' below ground level, with gravel backfill. Pole to be 25' minimum length if service drop crosses a road or traffic area. A 6" x 6" pressure-treated post is acceptable as an alternative to a Class 6 pole.
3. Additional height may be required to accommodate overhead telephone service or cable TV. Contact telephone and CATV companies for their required clearances.
4. Different types of meter bases may require the line side conduit and the load side conduit to be reversed.
5. For additional information, call the Utility.
6. Electrical label or permit must be displayed on the service panel or meter base.

OVERHEAD SERVICE FOR MANUFACTURED HOME

CUSTOMER UNDERGROUND SERVICE LATERAL



NOTES:

1. Customer to provide guying if span length exceeds 100' or if span crosses mobile home or building or if other conditions require guying.
2. Pole to be 20' minimum length. Class 6 (17" minimum top circumference, 23" minimum circumference 6' from butt), or better, pressure or thermally treated, set no less than 5' below ground level, with crushed rock backfill. Pole to be 25' minimum length if service drop crosses a road or traffic area. 6" x 6" pressure treated post is acceptable as an alternate to class 6 pole.
3. Additional height may be required to accommodate overhead telephone or cable TV. Contact Telephone and CATV companies for their required clearances.
4. Different types of meter bases may require that the line side conduit and the load side conduit may be reversed.
5. For additional information, call the Utility.
6. Electrical label or permit must be displayed on service panel or meter base.

SUGGESTED METHOD OF INSTALLING UNDERGROUND SERVICE

SELF-CONTAINED METERING
See Article 4.01 through 4.04
for written requirements

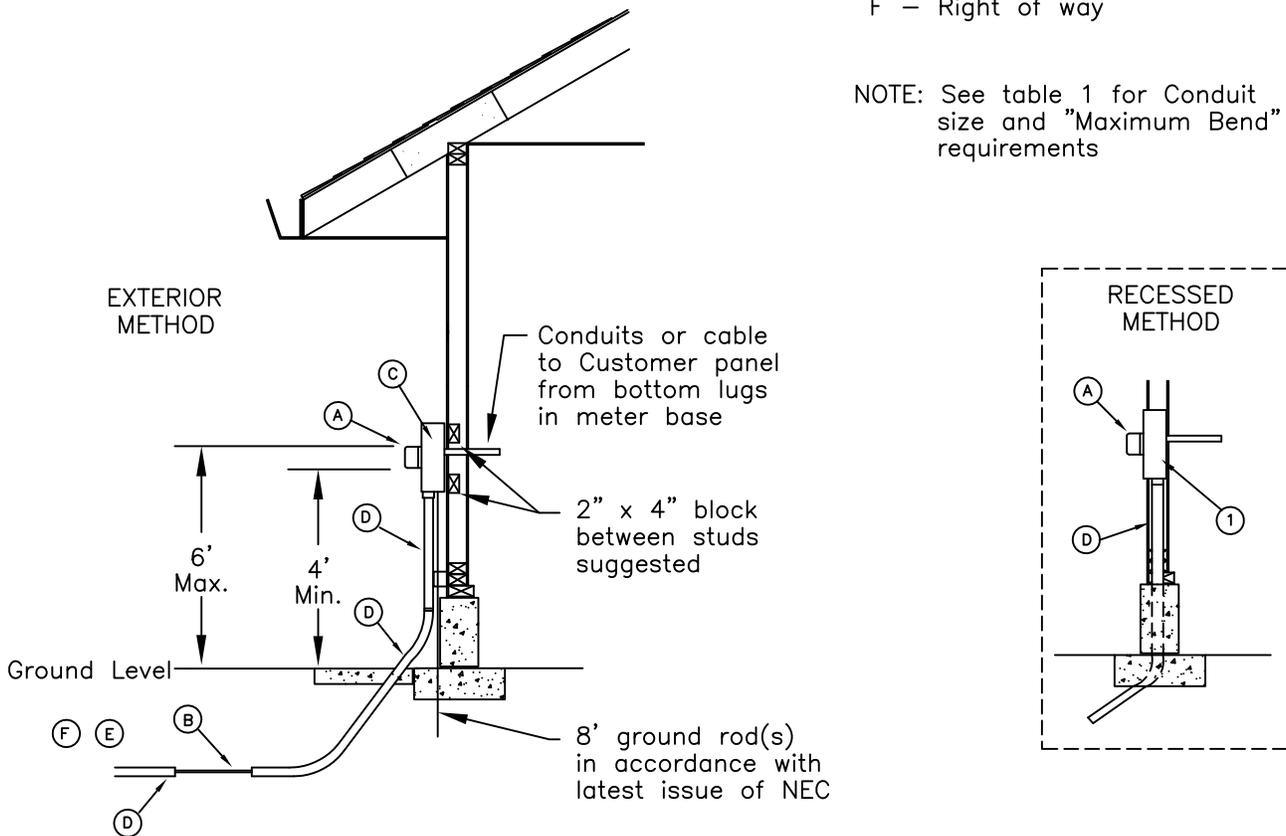
THE UTILITY WILL FURNISH

- A – Meter
- B – Service wire

CUSTOMER WILL FURNISH

- C – Meter base and ring
- D – Conduit, continuous from meter base to designated point of service with non-conductive pull string
- E – Trench and backfill
- F – Right of way

NOTE: See table 1 for Conduit size and "Maximum Bend" requirements

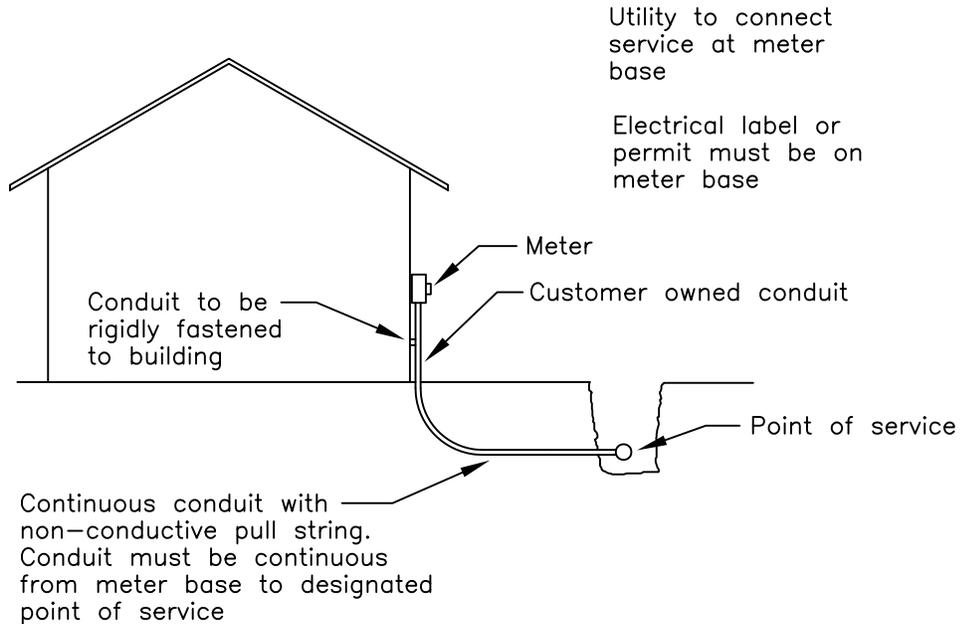


NOTES:

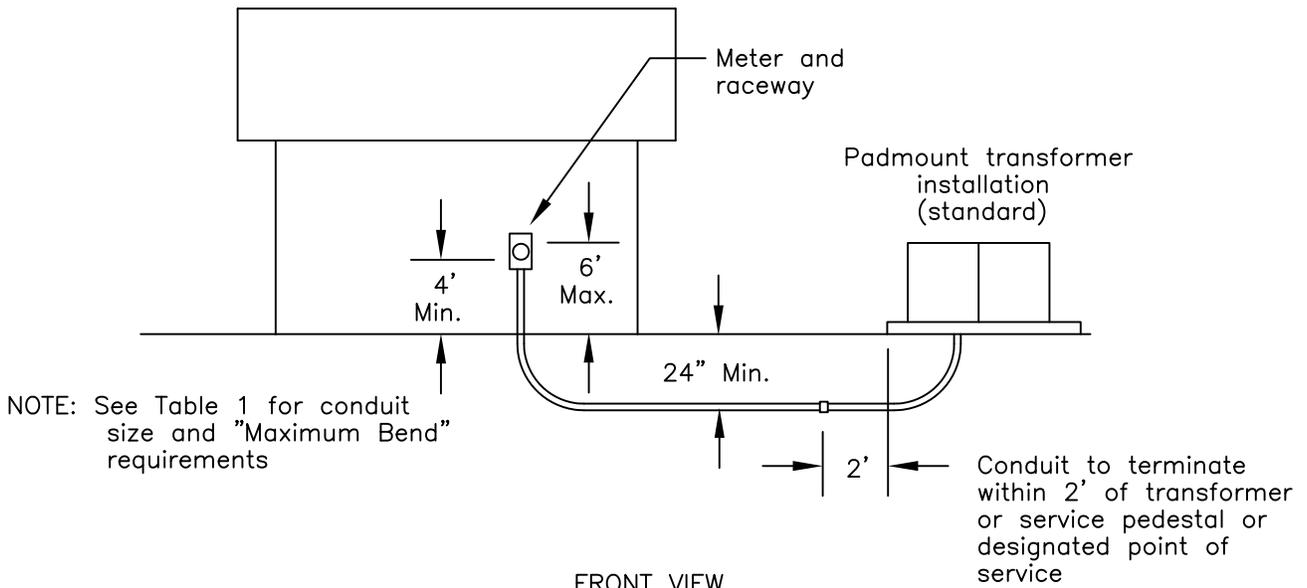
1. Electrical label or permit must be displayed on service panel or meter base.
2. Meter base and conduit must be securely attached to structure.
3. Socket must be plumb and switch box must be covered when inspected.
4. For 200 ampere or smaller services, the Utility will terminate the service lateral on the line-side terminals of the Customer's meter socket, provided the Customer's raceway is a minimum of 3" (3" for 3-phase), the meter socket enclosure has a minimum dimension of 11" x 14" x 4-1/8", and the line-side meter socket lugs will accept a minimum of 1/0 aluminum conductor.
A 320 ampere continuous rated meter socket is normally required for code calculated loads not exceeding 320 amperes. The Utility will terminate the service lateral on the line-side of the meter socket provided the Customer's raceway is a minimum of 3" in diameter, the meter socket enclosure has a minimum dimension of 13" x 22" x 4-1/2" and the line-side meter socket lugs will accept a minimum of 4/0 aluminum conductor.

UNDERGROUND SERVICE

SERVICE DETAIL
SINGLE FAMILY DWELLING
CUSTOMER SUPPLIED TRENCH AND CONDUIT
See Article 4.01 through 4.04 for written requirements



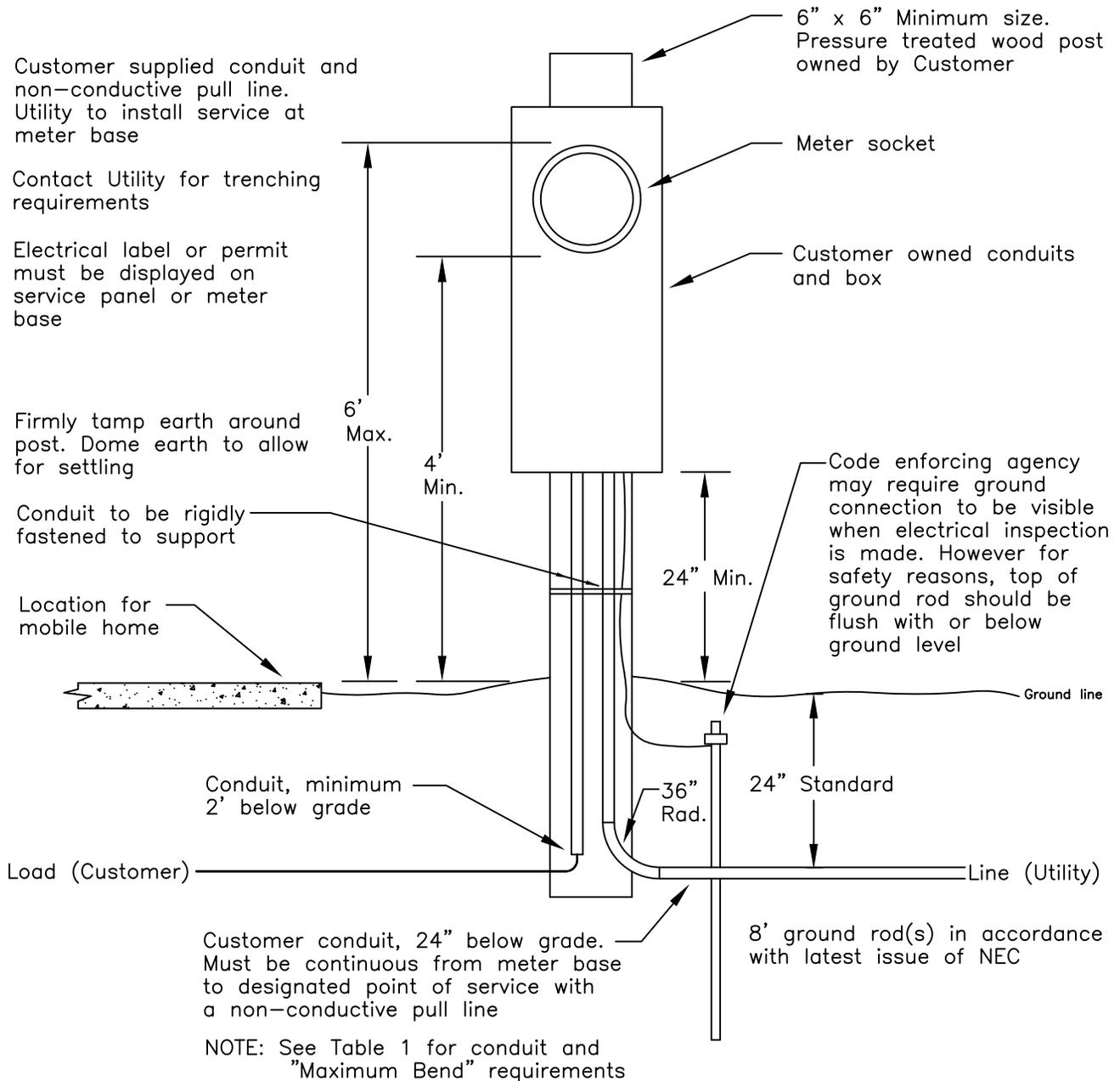
SIDE VIEW



FRONT VIEW

UNDERGROUND SERVICE FOR MANUFACTURED HOME

POST-MOUNTED INSTALLATIONS



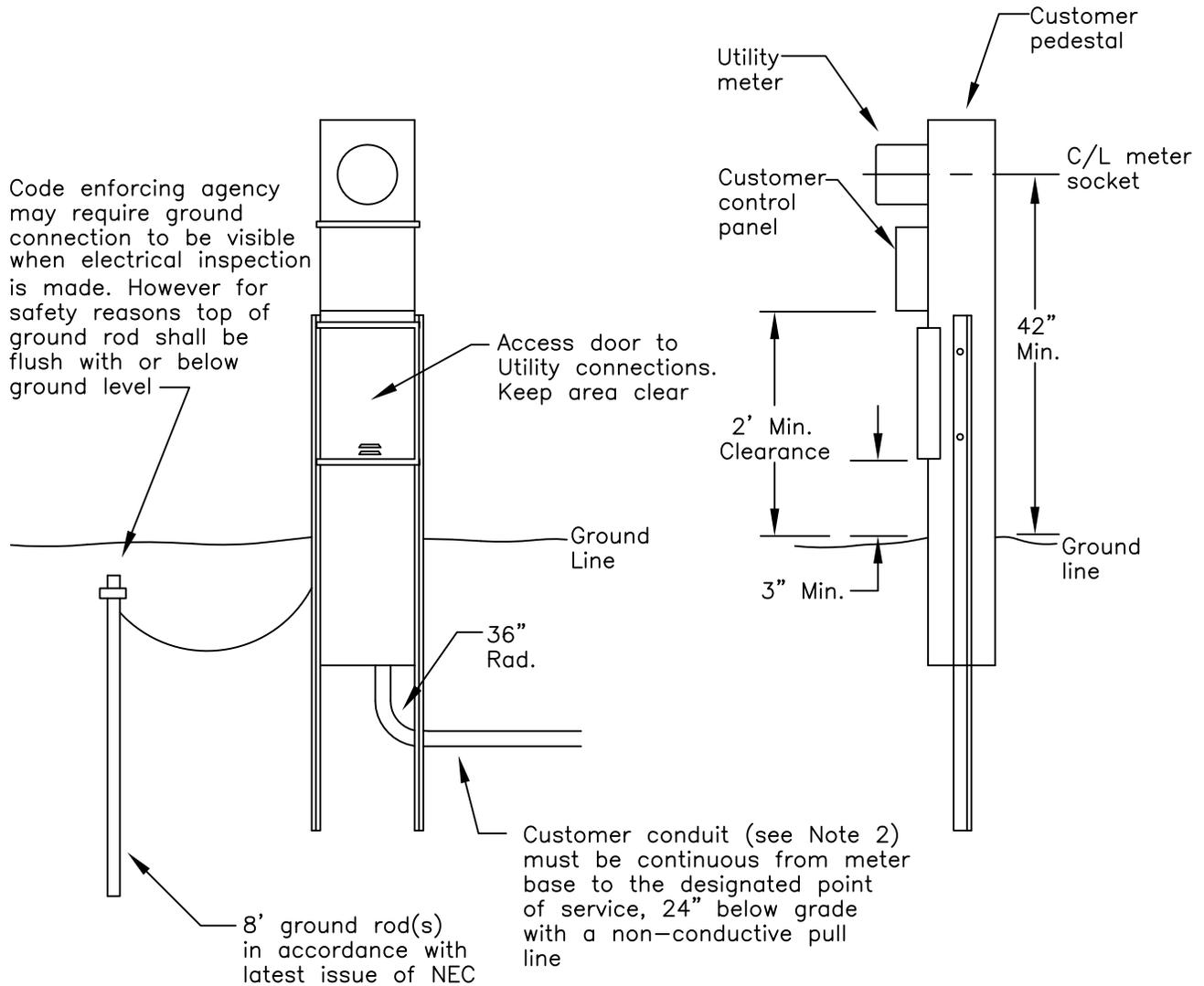
For 200 ampere or smaller services the Utility will terminate the service lateral on the line-side terminals of the Customer's meter socket, provided the Customer's raceway is a minimum of 2-1/2" (3" for 3-phase), the meter socket enclosure has a minimum dimension of 11"x14"x4-1/8", and the line-side lugs will accept a minimum of 1/0 aluminum conductor.

A 320 ampere, continuous-rated meter socket is normally required for code calculated loads not exceeding 320 amperes. The Utility will terminate the service lateral on the line-side of the meter socket provided the Customer's raceway is a minimum of 3" in diameter, the meter socket enclosure has minimum dimensions of 13" x 22" x 4-1/2", and the line-side meter socket lugs will accept a minimum of 4/0 aluminum conductor.

Unmetered wires between Utility connections and the top side of the meter base must be accessible only to the Utility.

UNDERGROUND SERVICE FOR MANUFACTURED HOME

PEDESTAL INSTALLATIONS



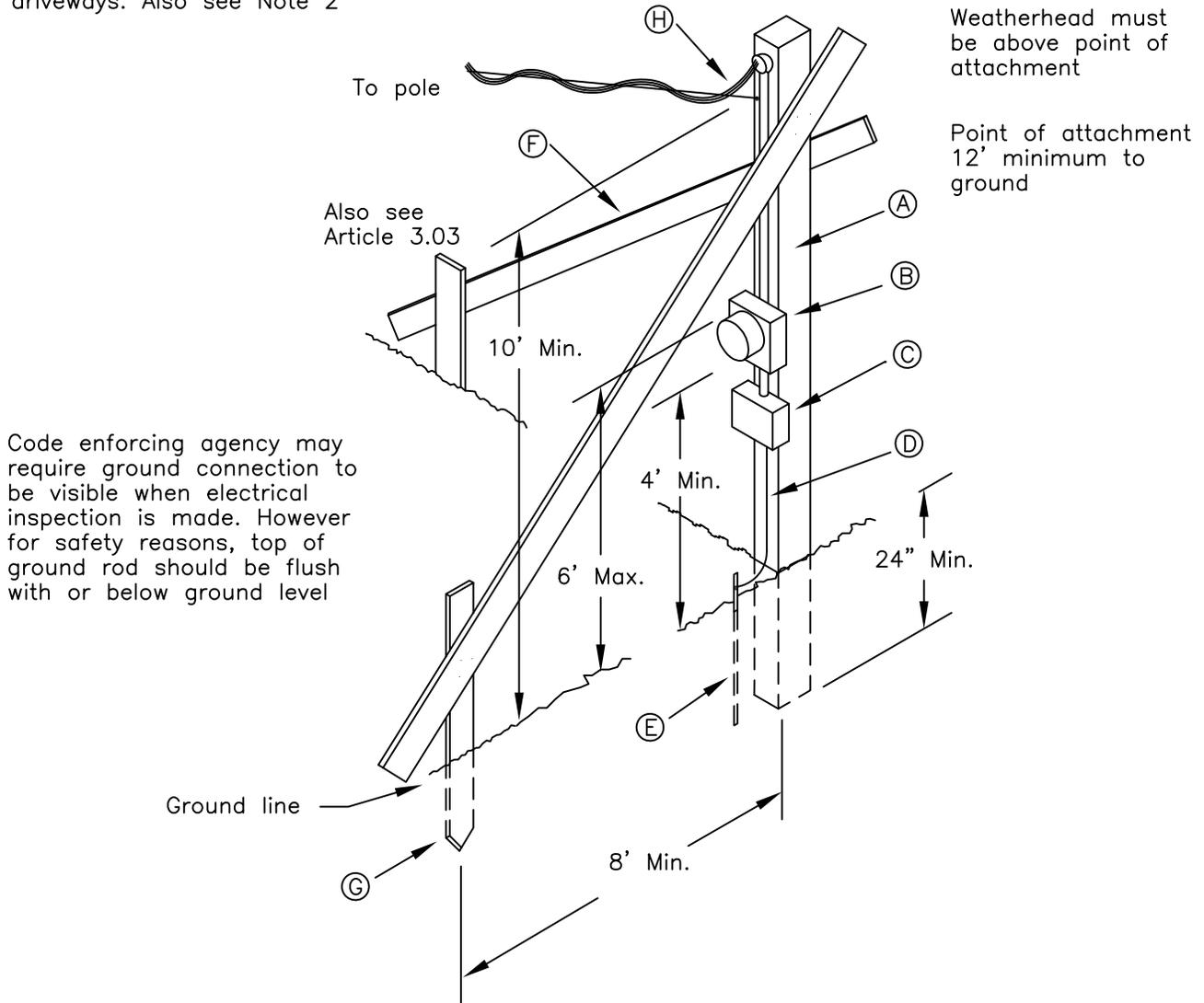
NOTE: See Table 1 for Conduit and "Maximum Bend" requirements

NOTES:

1. Pedestal must be set with front door to Utility connections remaining accessible.
2. Customer conduit shall not be installed across front of Utility access door on pedestal.
3. Access door to Utility connections on pedestal must be able to be secured using a Utility meter seal. Meter seal locations on door must be accessible.
4. Use corrosion inhibitor for all aluminum connections.
5. Unmetered wires between Utility connections and the top side of the meter base must be accessible only to the Utility.
6. Meter must be installed plumb in all directions.
7. Electrical label or permit must be displayed on service panel or meter base.
8. Contact Utility for trenching requirements.

TYPICAL INSTALLATION FOR OVERHEAD TEMPORARY SERVICE POLE

Service drop to be aligned between braces
12' minimum above ground line and residential
driveways. Also see Note 2



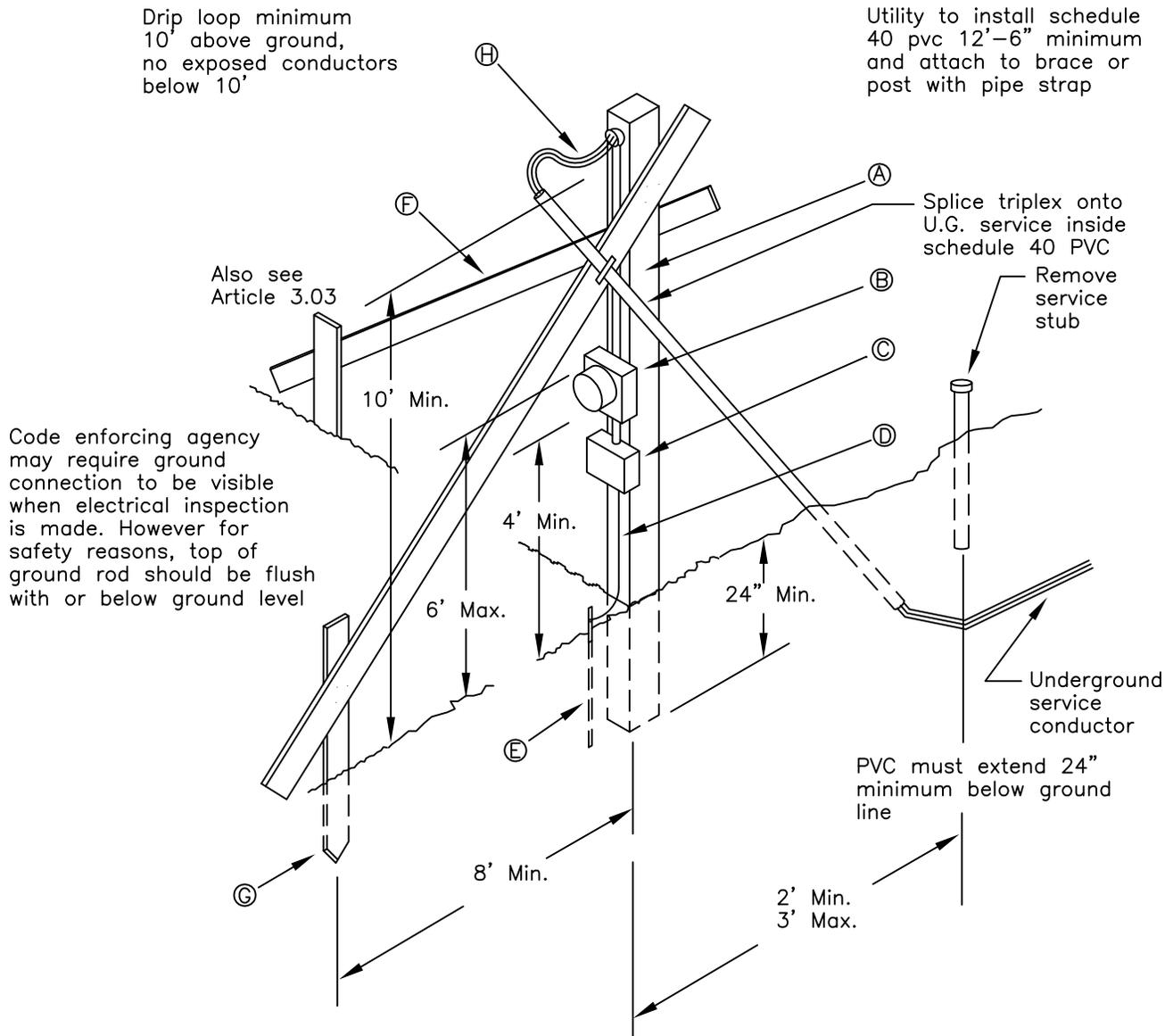
CUSTOMER REQUIREMENTS:

- A - 4" X 4" post or 2" x 6" strongback. Set in ground a minimum of 2 feet.
- B - Meter socket must be plumb in all directions.
- C - Service equipment—weathertight—minimum ampacity 30 amperes. Switch box must be covered when inspected.
- D - Ground wire - No. 6 copper minimum.
- E - Ground rod - 8 feet long in accordance with latest issue of NEC.
- F - 2" x 4" brace - minimum 12 feet.
- G - 2" x 4" stake. Set in ground minimum of 2 feet.
- H - Minimum conductor No. 8 copper or No. 6 aluminum. Must be 18" in length outside weatherhead.

NOTES:

1. A permit for temporary service or a label approving the service for connection must be obtained and placed on the service panel or meter base before the Utility can provide service.
2. Service drop must have 18 feet clearance over roads or areas subject to truck or farming equipment traffic. When necessary, a similar structure should be used to provide adequate intermediate clearance support for Utility's service drop.

TYPICAL INSTALLATION FOR UNDERGROUND TEMPORARY SERVICE POLE



CUSTOMER REQUIREMENTS:

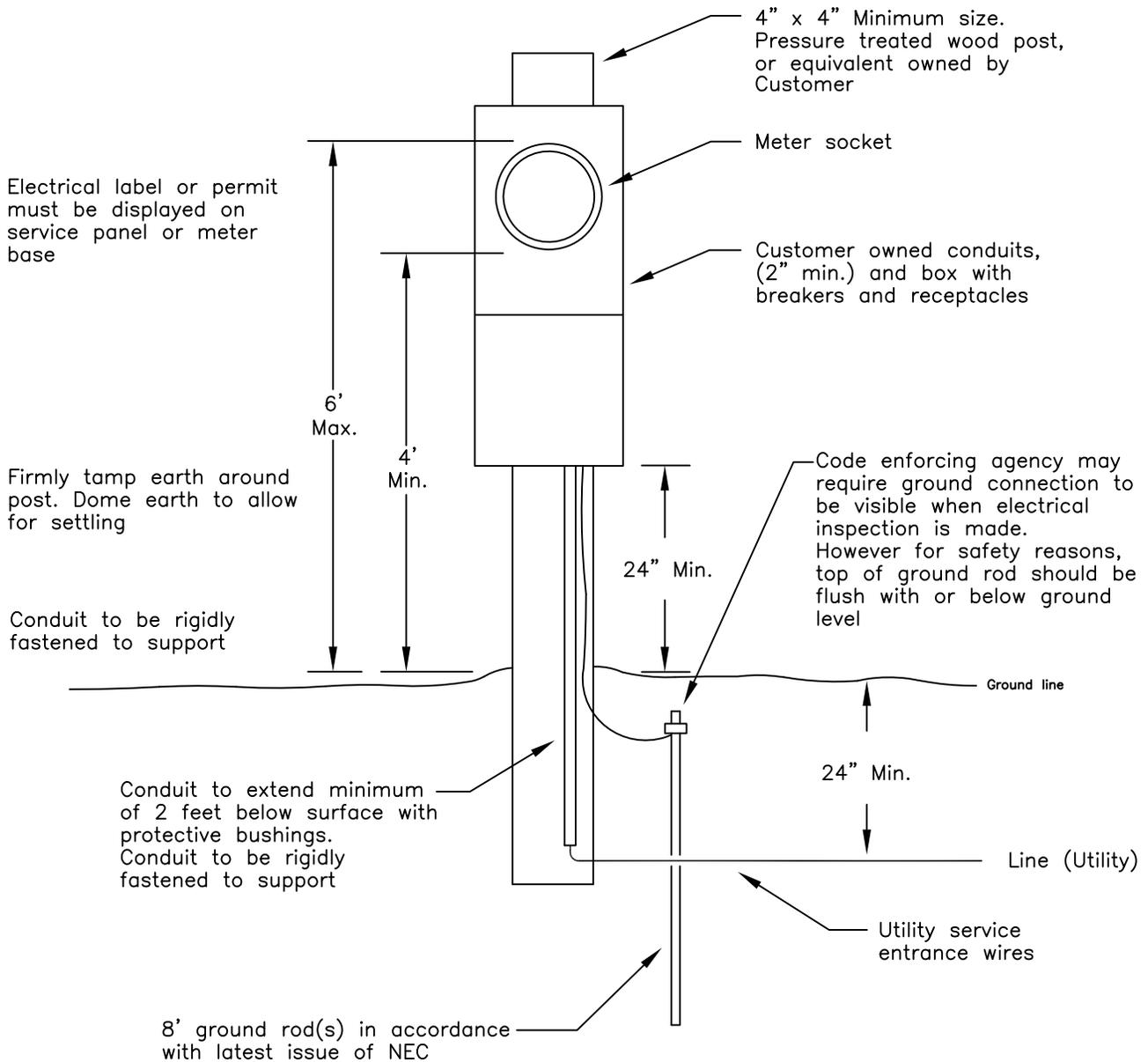
- A - 4" X 4" post or 2" x 6" strongback. Set in ground a minimum of 2 feet.
- B - Meter socket must be plumb in all directions.
- C - Service equipment-weathertight-minimum ampacity 30 amperes. Switch box must be covered when inspected.
- D - Ground wire - No. 6 copper minimum.
- E - Ground rod - 8 feet long in accordance with latest issue of NEC.
- F - 2" x 4" brace - minimum 12 feet.
- G - 2" x 4" stake. Set in ground minimum of 2 feet.
- H - Minimum conductor No. 8 copper or No. 6 aluminum. Must be 18" in length outside weatherhead.

NOTE:

A permit for temporary service or a label approving the service for connection must be obtained and placed on the service panel or meter base before the Utility can provide service.

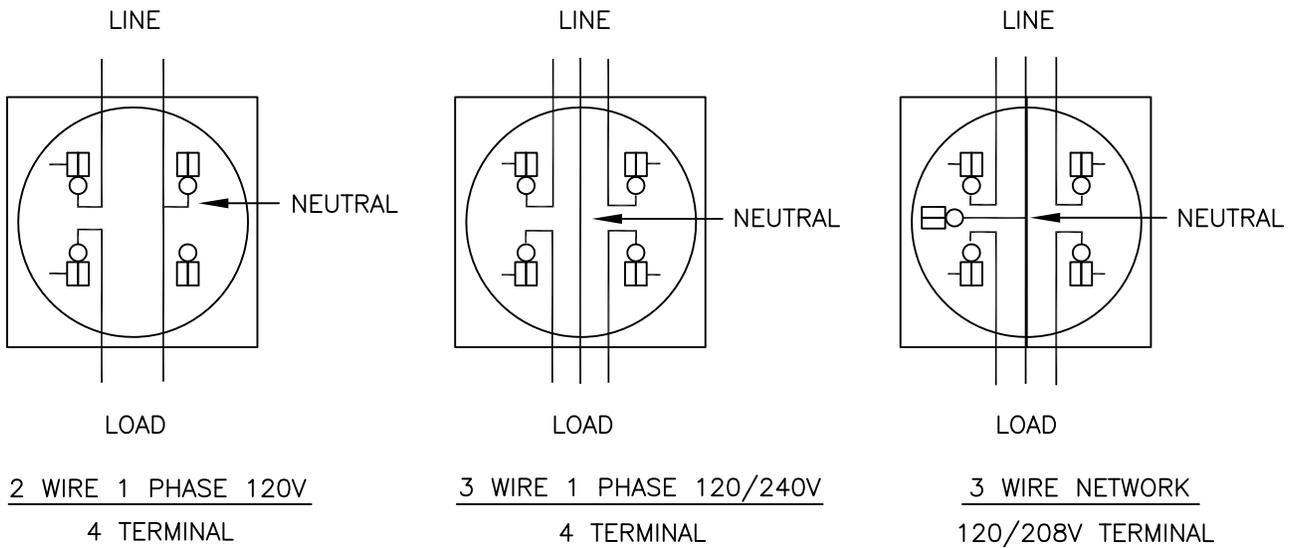
TYPICAL INSTALLATION FOR UNDERGROUND TEMPORARY SERVICE

POST-MOUNTED INSTALLATIONS



METER SOCKET CONNECTIONS FOR SELF-CONTAINED METERS

(RING TYPE)

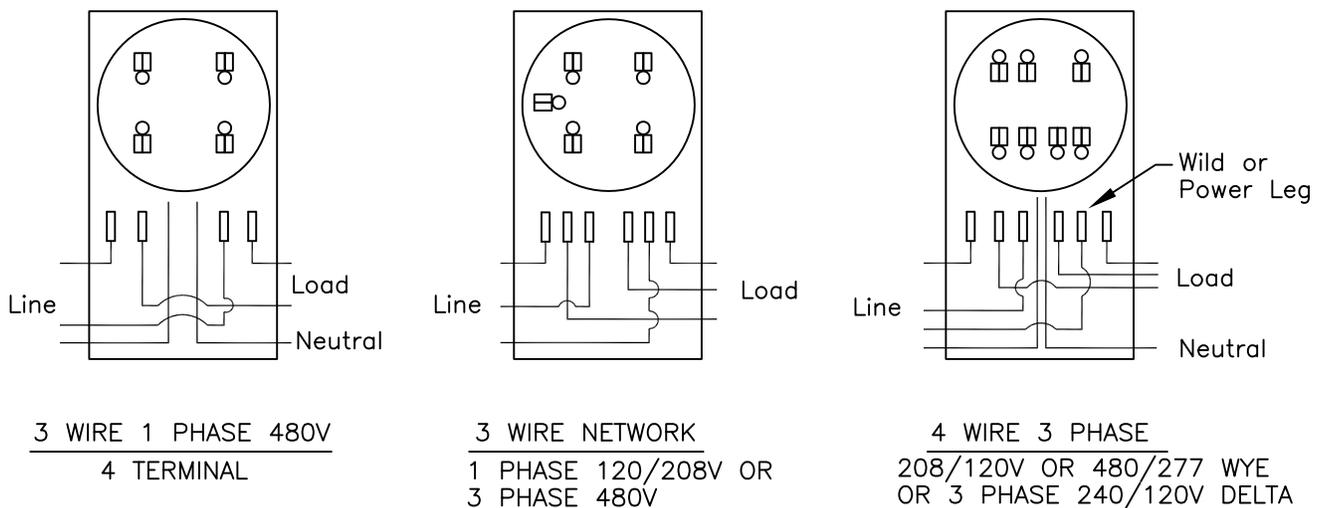


NOTE:

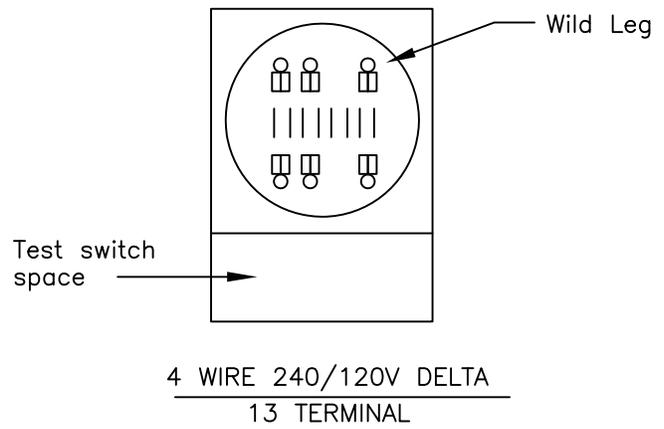
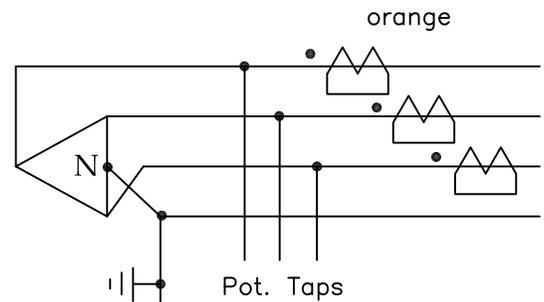
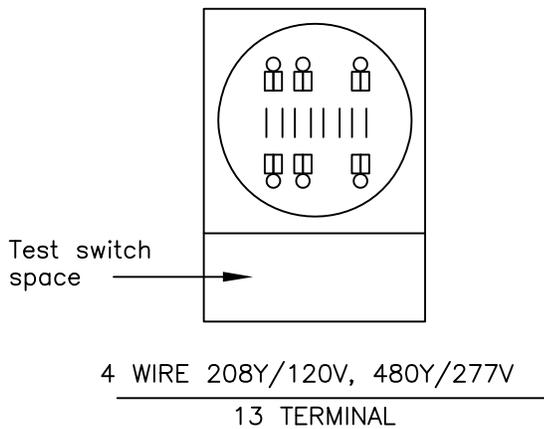
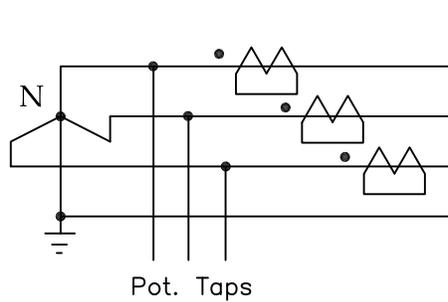
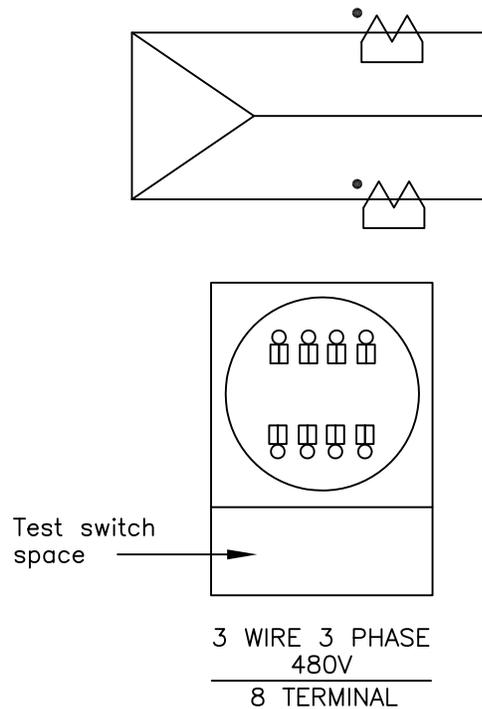
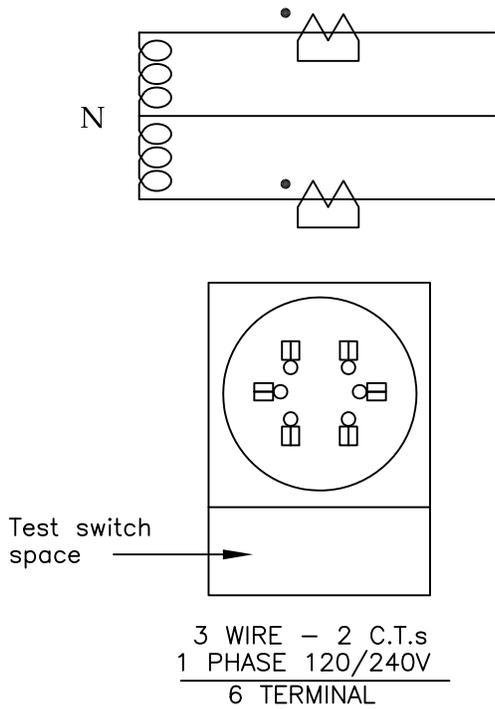
1. Manual circuit closing devices are required on non-residential and all 320 amperes services.
2. Manual circuit closing devices are not required on residential services of 200 amperes or less.

METER SOCKET CONNECTIONS FOR SELF-CONTAINED METERS

(WITH SAFETY SOCKET)



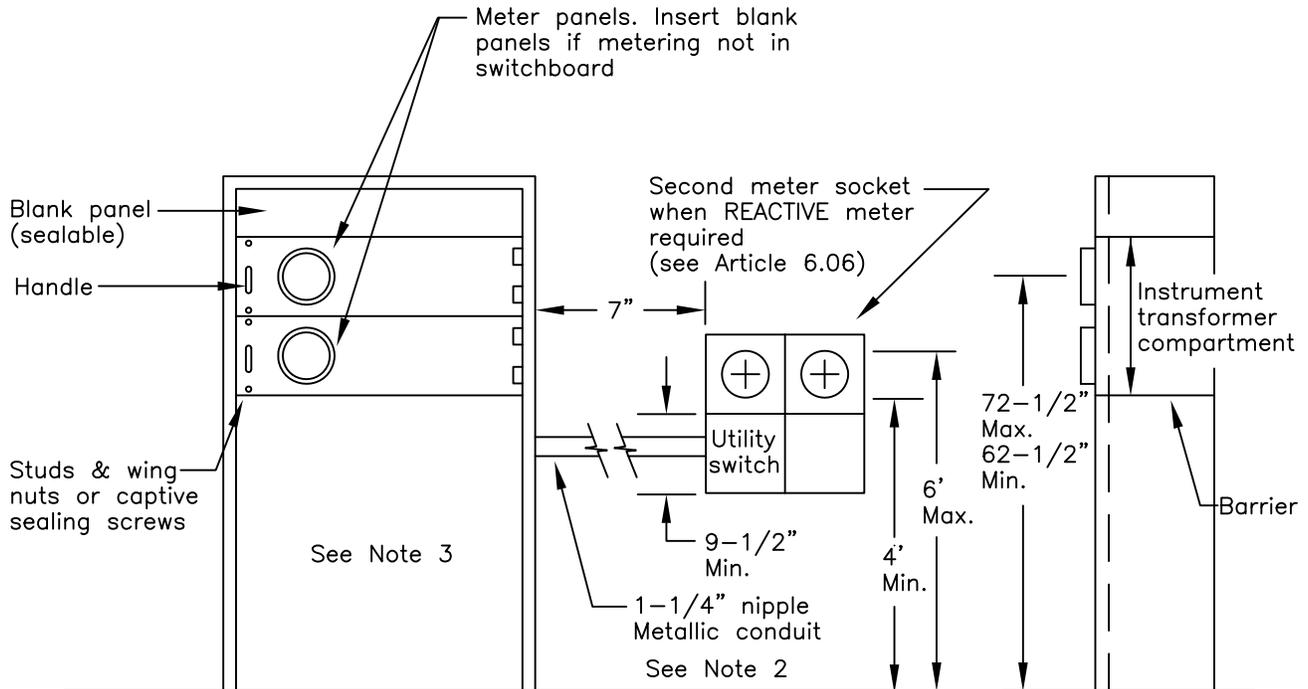
METER SOCKET REQUIREMENTS FOR CURRENT TRANSFORMER METERS



NOTE: Socket or panel must have space for Utility supplied test switch.

TYPICAL SWITCHBOARD SERVICE SECTION WITH INSTRUMENT TRANSFORMER COMPARTMENT

600 VOLTS AND BELOW
800 AMPS AND ABOVE
EUSERC 325

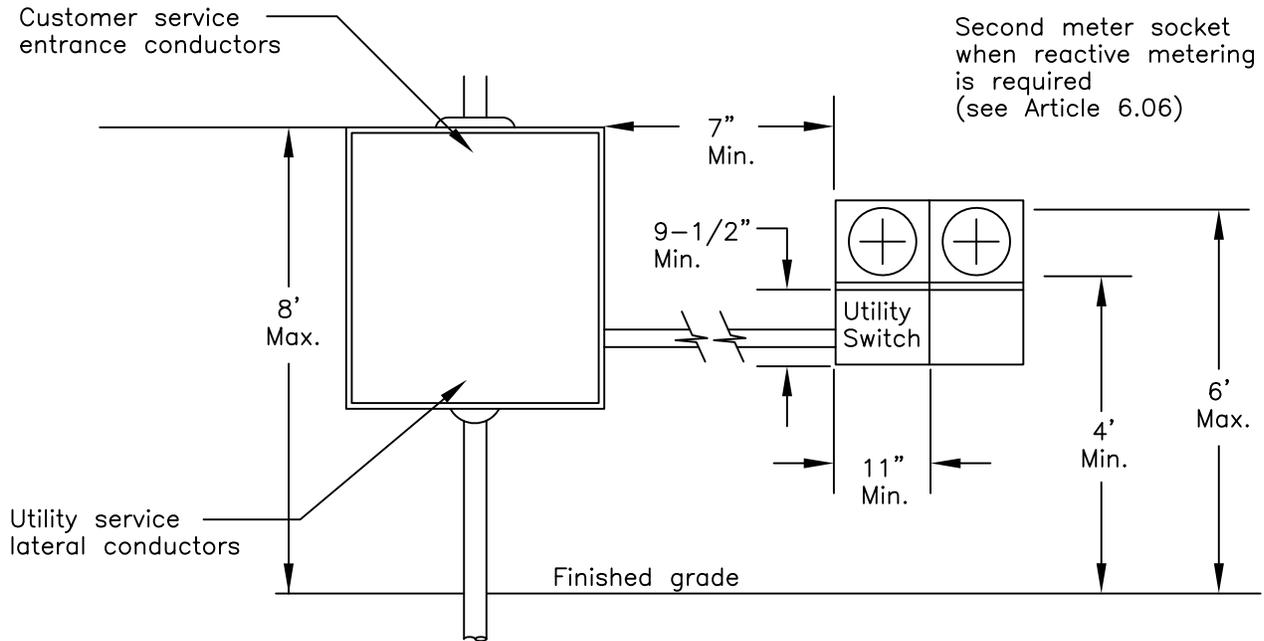


NOTES:

1. Switchboard service section is required when device entrance rating is greater than 800 amperes. It may be provided for service entrance ratings of 800 amperes and below. Consult Utility for switchboard requirements.
2. If switchboard service section is installed outdoors or if prior approval has been obtained from Utility for an indoor meter location, meters may be installed in switchboard. Consult Utility for meter panel requirements.
3. The area below the instrument transformer compartment barrier may be used as a main switch (breaker) compartment, a load distribution compartment, or a bottom fed terminating pull section. Consult Utility for bottom fed terminating pull section requirements. No metered conductors are allowed in this section.
4. EUSERC 326 is available for larger ampacity. For outdoor applications see EUSERC 354.
5. Code requires a clear work space of 75" high x 70" wide x 48" deep in front of this equipment.

THREE-PHASE CURRENT TRANSFORMER METERING

SERVICE BELOW 600 VOLTS
800 AMPS AND BELOW
EUSERC 329A & B

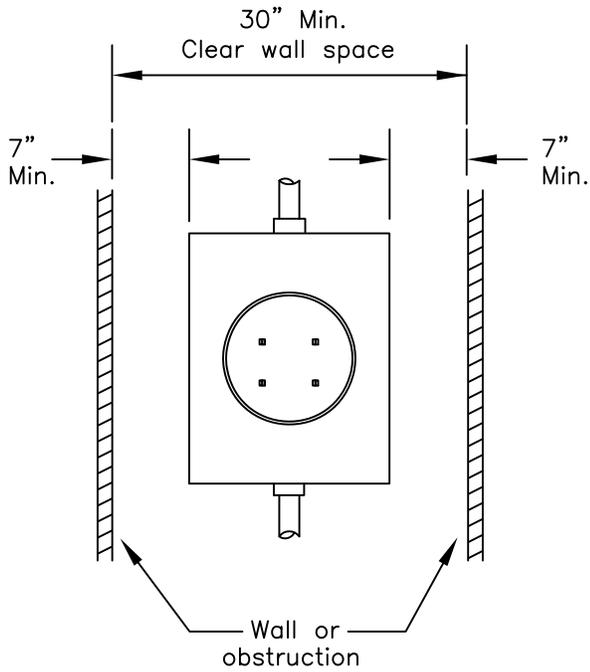


SERVICE ENTRANCE AMPACITY	MINIMUM ENCLOSURE SIZE W x H x D
201-800	36" x 48" x 12"

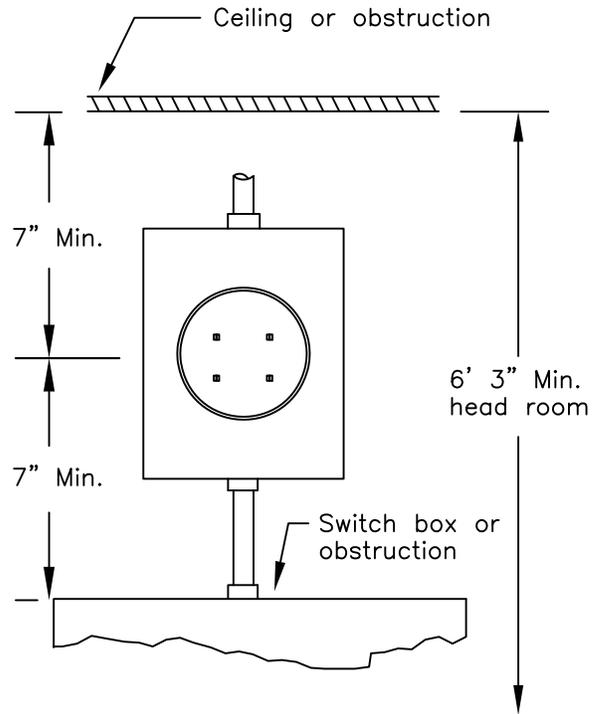
NOTES:

- A current transformer enclosure may be used as a combination current transformer and Utility underground service terminating pull box. When used in this manner, the Utility service conduit will enter the center * bottom of the enclosure. Customer service entrance conduits shall exit the enclosure on the load side of the current transformers. Customer's conductors will not be permitted in the Utility terminating and pull space. For all other underground service applications, a separate terminating pull box will be provided for the Utility service lateral. Consult Utility for terminating pull box requirements.
 - *A. When current transformer enclosure is designed for horizontal mounted CT's, Utility service conduits shall enter enclosure as far to either side of center as possible, to minimize cable bends.
 - *B. Salem Electric would prefer to have a stud connection but will accept a mechanical lug connection on the line side of the CT.
- Only conductors associated with metering or grounding shall be permitted in the current transformer enclosure. No connections shall be made in any current transformer enclosure to supply any other meter. Except as required by the Utility, only one load circuit shall be permitted to leave a current transformer enclosure.
- Customer to provide approved connectors for connecting his conductors to the current transformers. Bolts shall be provided with nuts, flat washers and a pressure-maintaining spring washer as necessary. All parts must be compatible with the bus bar and connectors.
- Customer will mount the current transformers with suitable hardware. Current transformer must be installed so that polarity marks or letters are on the side of the incoming feed or supply.
- Current transformer enclosure covers shall be hinged for side opening with lockable door.
- Metallic conduit for meter leads to be minimum 1-1/4" and limited to a run of 50' or less with not more than 270 degrees in bends. Only Utility conductors will be permitted in metering conduit.
- Exposed conduit for the Utility service lateral shall not extend more than 5'-6" or less than 1' into building.
- When exposed to weather, cabinet shall be raintight.
- Where current transformers or other equipment are installed in a location where it might be struck by a motor vehicle, the customer is to install and maintain Utility approved barrier posts to protect the equipment.
- For single-phase see EUSERC 328A.

METER SOCKET CLEARANCE REQUIREMENTS

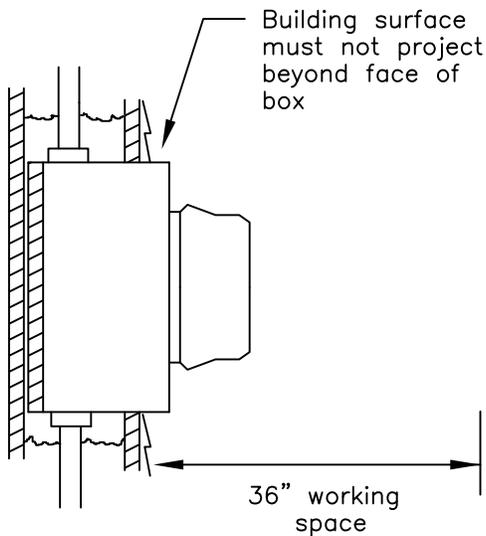


HORIZONTAL CLEARANCE
Surface, flush or recessed

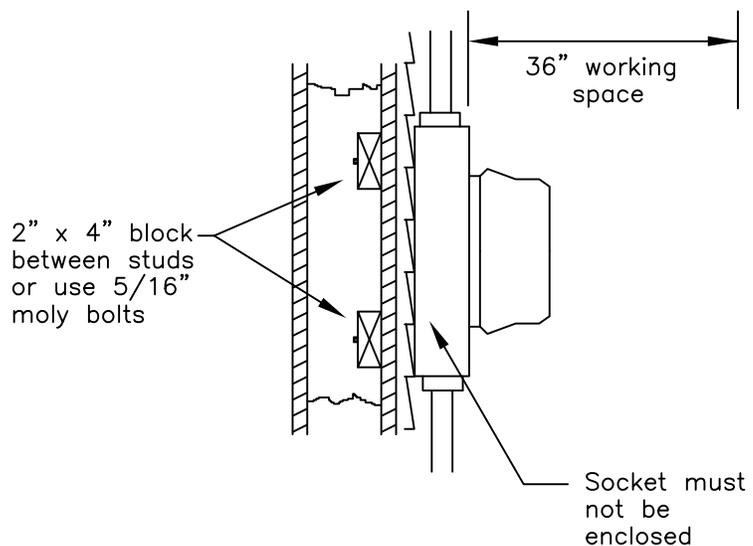


VERTICAL CLEARANCE
Surface, flush or recessed

NOTE: Code requires a clear work space of 75" high x 30" wide x 36" deep in front of meters



RECESSED MOUNTING

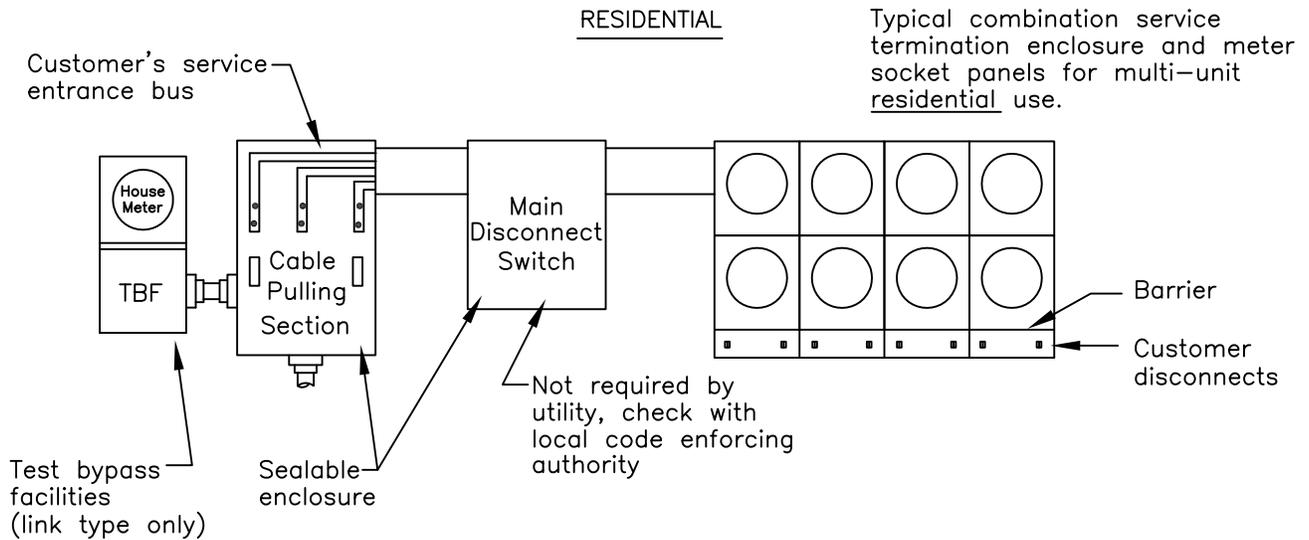


SURFACE MOUNTING

NOTE: See Article 2.05 and Section VI for written requirements.

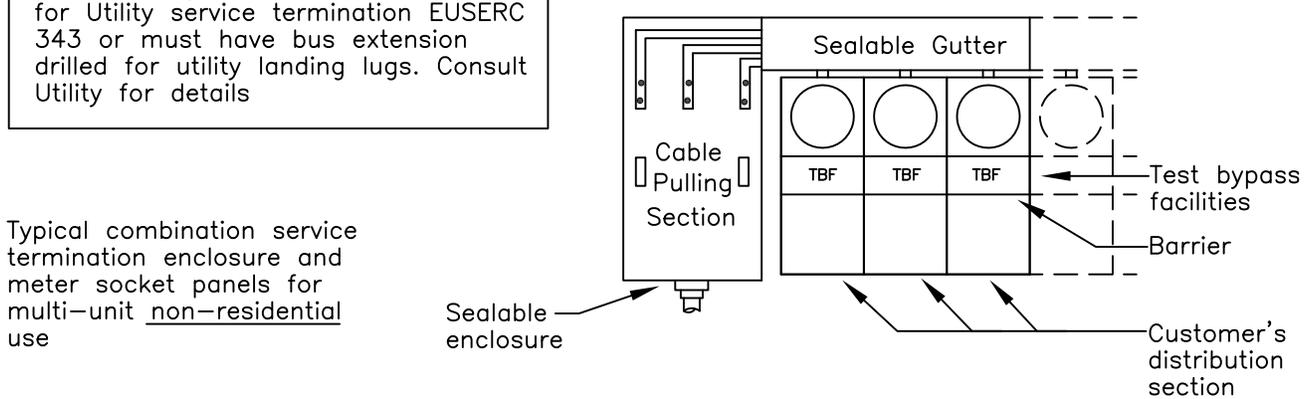
MULTIPLE METER SOCKET INSTALLATIONS

RESIDENTIAL



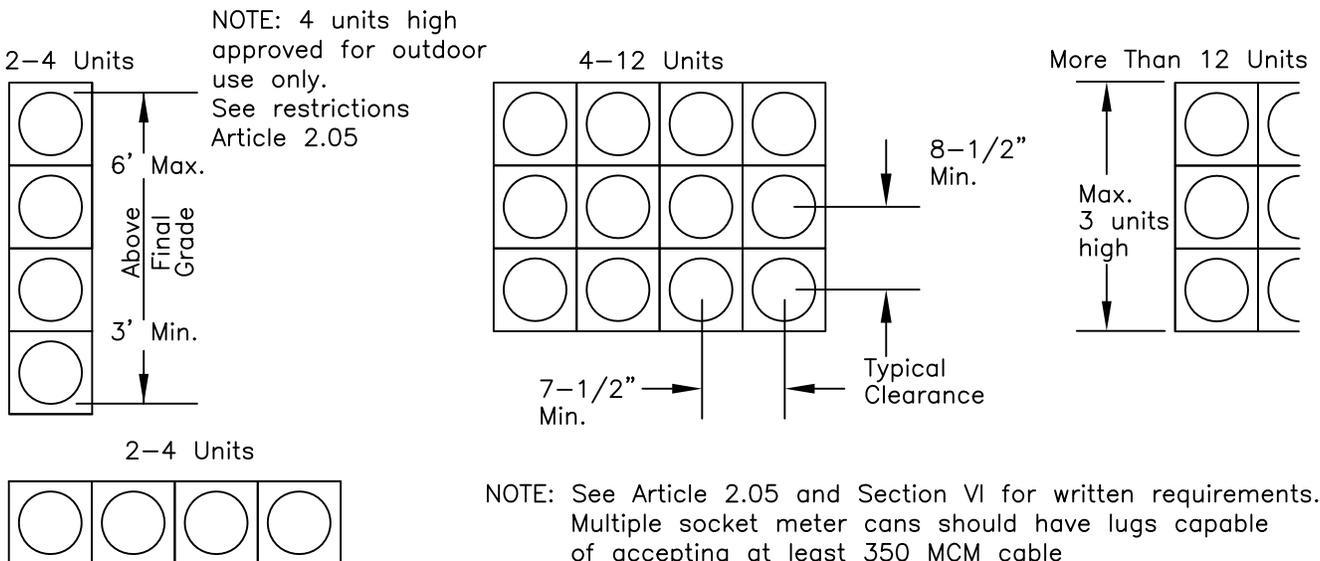
Cable pulling section must be sized for Utility service termination EUSERC 343 or must have bus extension drilled for utility landing lugs. Consult Utility for details

NON-RESIDENTIAL



Note: Sum of distribution section ampacities must not exceed pulling section ampacities

ACCEPTABLE MULTIPLE METER SOCKET CONFIGURATION

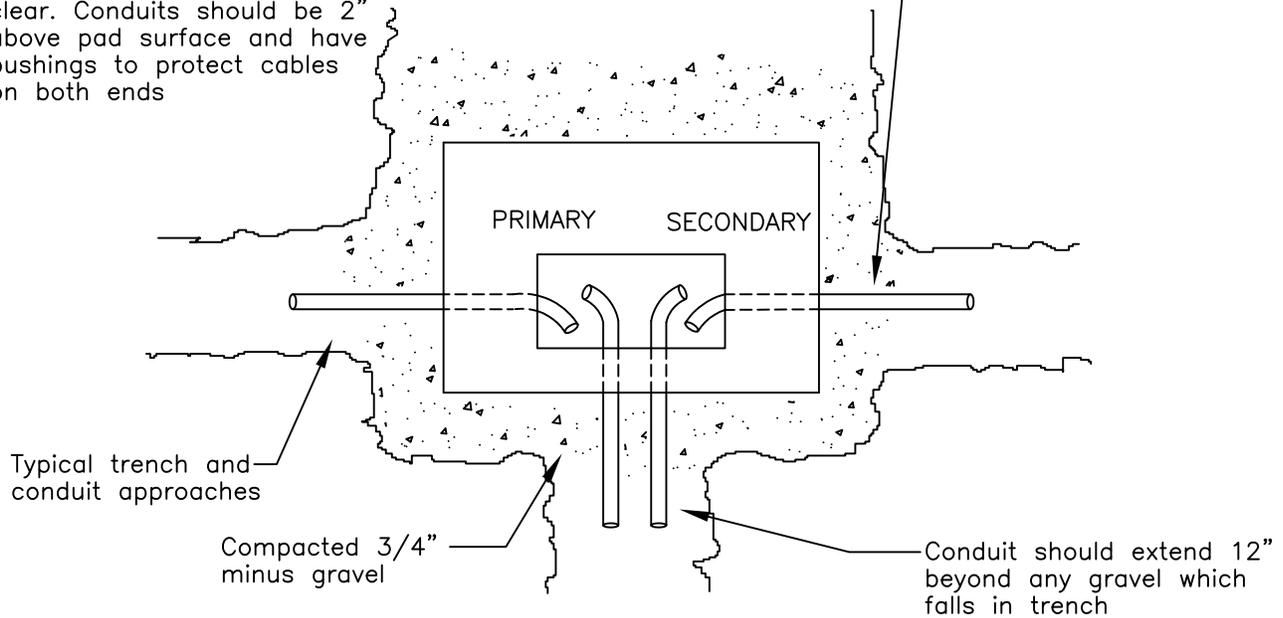


CONCRETE PADS FOR THREE-PHASE PADMOUNT TRANSFORMERS

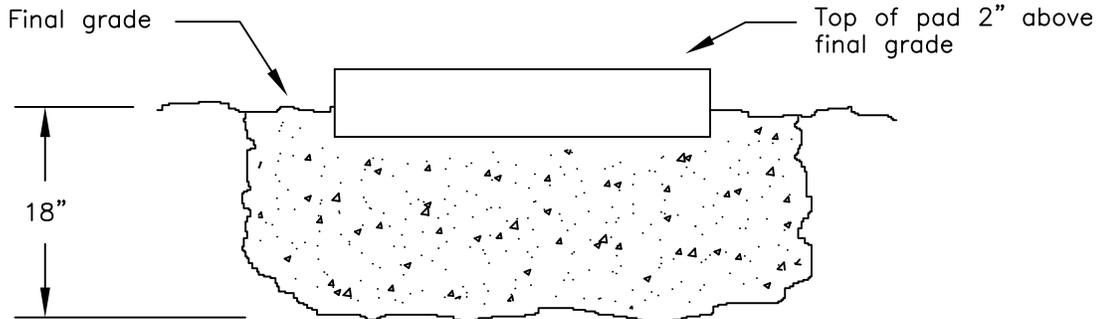
CONSULT UTILITY

Crowd conduit to ends of opening to keep center area clear. Conduits should be 2" above pad surface and have bushings to protect cables on both ends

Install non-conductive pull line in all conduits



TOP VIEW



PROFILE FRONT VIEW

CONCRETE

Slabs to be trowelled smooth to a flat and level surface. Chamfer all exposed edges.

STEEL REINFORCEMENT

All reinforcing steel shall be new concrete reinforcement steel.

EXCAVATION

Excavate entire area beneath pad to a depth of 18" below grade.

Ducts to extend above rock fill.

Backfill to sub-grade with 3/4" crushed rock.

BARRIER POSTS

Place concrete filled posts on all sides exposed to vehicles.

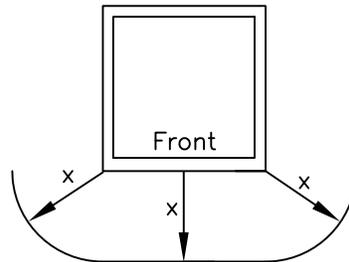
Consult Utility for specifications.

VAULTS

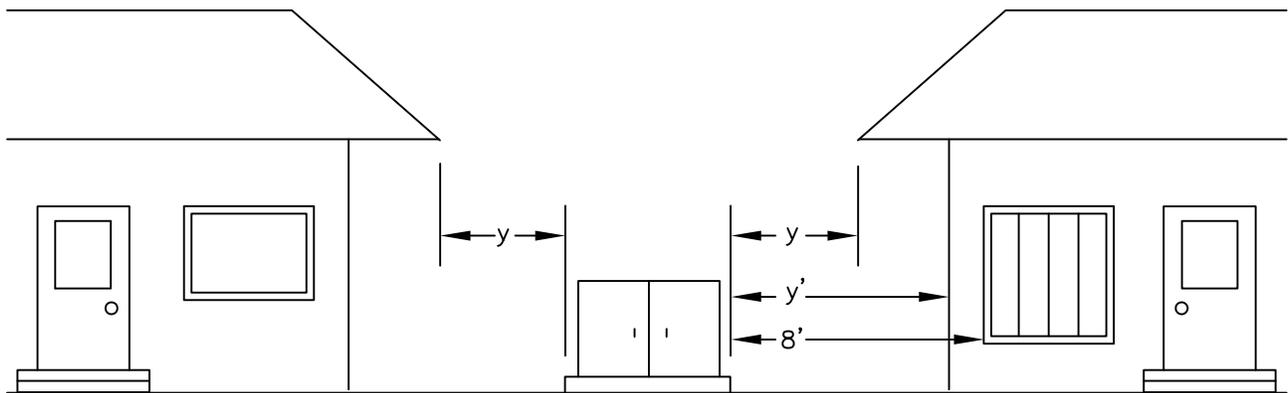
Vaults may be required under cable compartments if more than 4 secondary conduits are required.

Consult Utility for transformer vault dimensions.

PADMOUNTED TRANSFORMER CLEARANCES



Top view with
doors closed



Front view with
doors closed
(See Note 2)

MINIMUM DISTANCE REQUIRED

- $x = 10'$ clear area in front of unit to allow the use of hot sticks (see Note 2).
- $y = 8'$ if structure is of combustible material.
- $y' = 2'$ to non-combustible building surfaces having no openings closer than 8'.

NOTES:

1. Consult OREGON ADMINISTRATIVE RULES 814-22-100 and local building and fire codes for more information.
2. Front of padmounted transformer to be located away from building walls or other barriers to allow for safe working practices. If front of transformer must face wall, allow "x" dimension for working area.
3. Consult Utility for additional clearances that may be required to building doors, windows, fire escapes, and air vents etc. .
4. Where padmounted transformers or other equipment is installed in a location where it might be struck by a motorized vehicle, the Customer is to install and maintain Utility approved barrier posts to protect the equipment.