

Preface

This handbook is a guide to assist you in acquiring electrical power to your property or residence from Lakeview Light & Power. It presents general specifications and information for new or altered electrical services. Detailed explanation for Lakeview Light & Power construction standards can be found on our web site at www.lakeviewlight.com

The Electric Service Handbook does not cover all possible applicable codes. You should also consult the **National Electrical Code (NEC)**, **Washington Administrative Code 296-46B (WAC)**, **Revised Code of Washington 19.28 (RCW)**, **Electric Utility Service Equipment Requirements Committee (EUSERC)**, **National Electric Safety Code (NESC)**, **Lakeview Light & Power Customer Service Policies**, and other standards governing electrical equipment and installations.

Contact Information

Telephone Numbers

L&I Inspection	253-596-3800
Main Office	253-584-6060
Superintendent Office	253-327-6122
LLP Meter Shop	253-327-6129

General Information

Types of Service

The types of service Lakeview Light & Power provides are **Temporary**, **Residential**, **Commercial**, and **Primary**. Information for each type of service is included in each chapter.

Service Availability

Please contact Lakeview Light & Power at the start of your project. They will determine the location and service availability for your project.

Added Loads

If a change of an existing service involves an increase in load contact our office 253-584-6060.

Codes

This handbook shall not be used as a substitute for the current version of the **NEC**, **WAC**, **RCW** or other applicable codes. It is your responsibility to ensure that your electrical system is installed and maintained in a safe operating condition. Failure to maintain electrical equipment may be cause for the disconnection of service.

General Information Cont.

Electrical Permit

L&I Phone 253-596-3800 or web link

<http://www.lni.wa.gov/TradesLicensing/Electrical/FeePermlnsp/default.asp>

An electrical permit must be obtained before the start of the electrical installation. The permit may be obtained from the Labor and Industries office, or online. When emergency work must be done after regular business hours, a permit is required to be purchased the next regular working day.

Plan Review

A plan review is required for services in excess of 400 amps. Electrical plans must be submitted to Lakeview Light & Power office with sufficient time to complete the review before the start of construction.

Metering

Metering requirements can be found in **Chapter 11: Meter and CT Configurations**. Contact Lakeview Light & Power office for metering in excess of 480 volts.

Locating Underground Utilities

The customer must call the Utilities Underground Location Center (UULC) at 811 or 1-800-424-5555 before trenching or excavating two full working days before you dig (per WAC19.122). UULC will notify all member utilities that locates are required. In areas where utilities are not members it is the customer's responsibility to contact each individual utility. Digging within 24" of location marks must be done by hand.

Color Coding

Red Electric
Yellow Gas, Oil, Steam
Orange Telephone, Cable TV, Fiber Optics
Blue Water
Purple Reclaimed water
Green Sewer
Pink Temporary survey marks
White Proposed excavation

Employee Identification

Lakeview Light & Power employees who are authorized to visit customer's premises carry photo identification that they will show on request.

Chapter 1

Applying for a New Service

Contact Lakeview Light & Powers main office prior to installing a new electrical service. Lakeview Light & Powers Electric Service Application can be obtained at the main office or online.

Applications may be submitted by e-mail, fax, mail, or in person.

Phone 253-584-6060 Web link www.lakeviewlight.com.

Service availability and Characteristics

Lakeview Light & Power will determine what voltage is available for your site.

- 120/240 volt, single phase, 3 wire
- 120/208 volt, 3- phase, 4 wire wye
- 277/480 volt, 3- phase, 4 wire wye
- 120/208 volt, 2- phase, 3 wire
- Primary voltages

Chapter 2

Overhead Temporary Service

The customer must supply all temporary power posts or poles and equipment within 150' of Lakeview Light & Powers pole. Figure 1 shows an example of an overhead temporary service. Proper clearances must be maintained per **NEC 230.24B**. The temporary installation and **GFCI protection** must comply with **NEC article 590**. Lakeview Light & Power will provide the meter and the overhead service drop after, membership application has been completed and the electrical and service inspections have been approved and all fees have been paid.

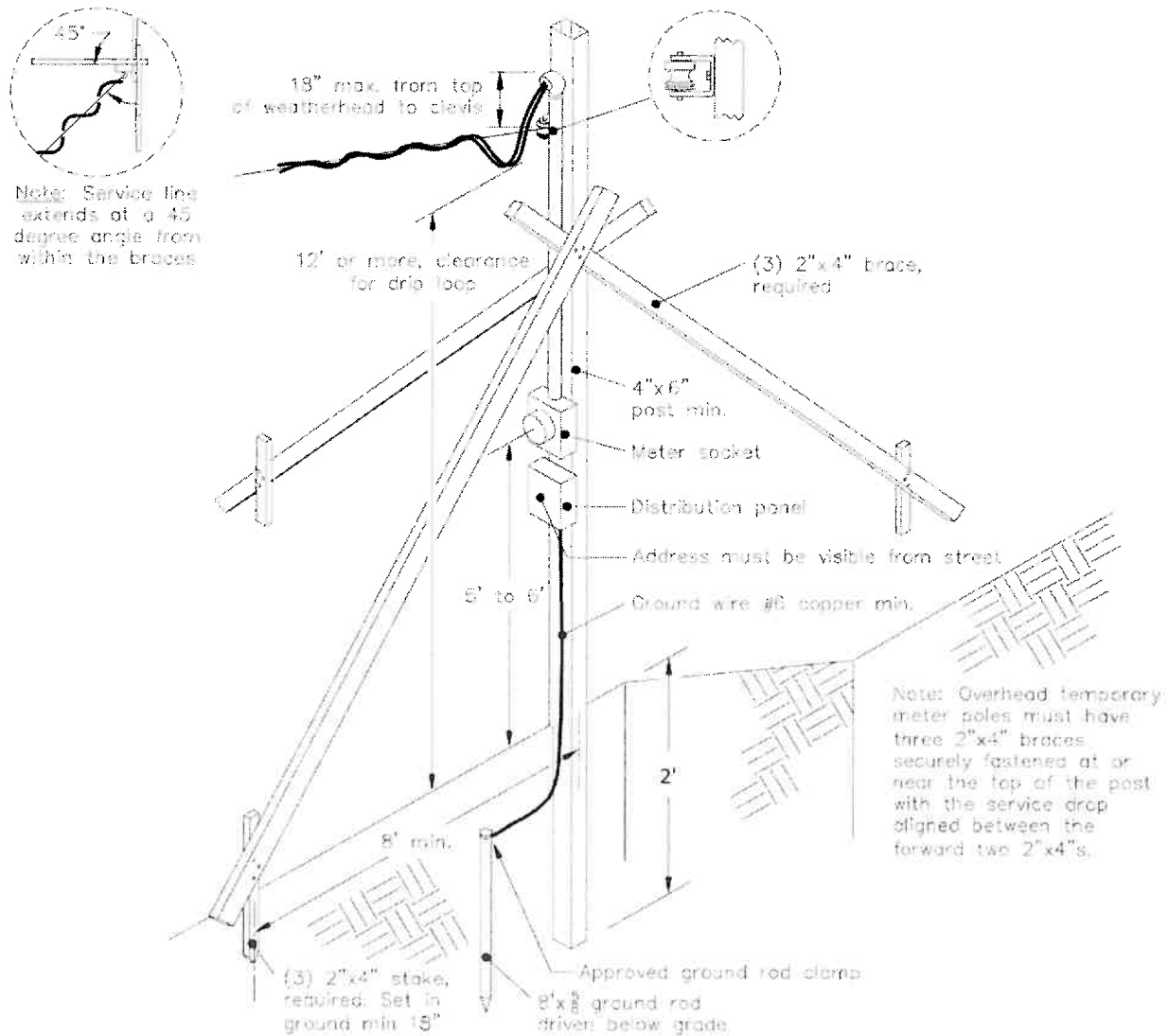


Figure 1

Chapter 3 Underground Temporary Service

Contact Lakeview Light & Power to determine availability of underground power if there are no overhead lines in the vicinity or if you have a temporary service larger than 200 amps. Call before you dig. An example of an underground temporary service is shown in figure 2 below. Temporary services must be installed so as not to interfere with ditches for the permanent services.

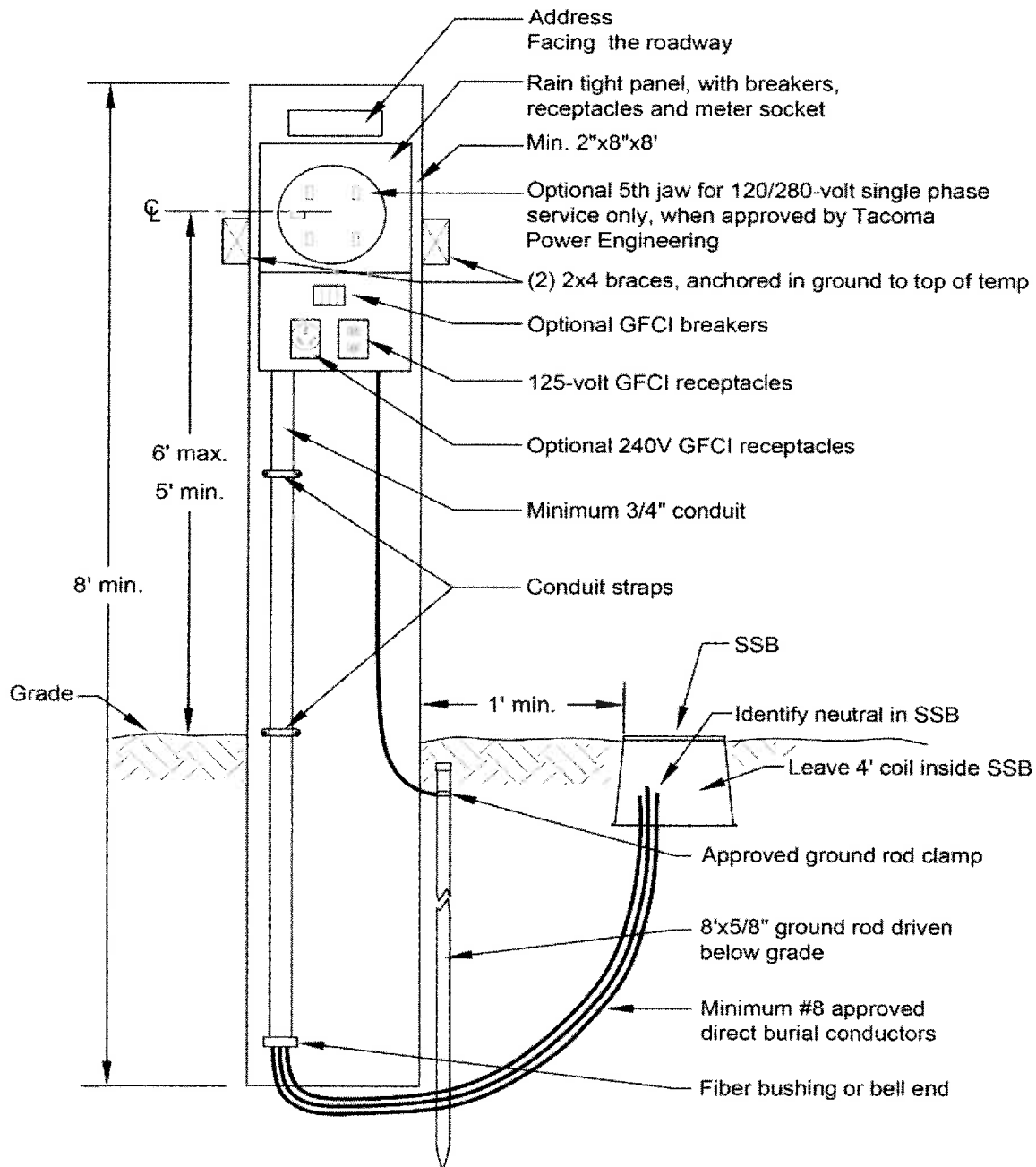


Figure 2

Chapter 4

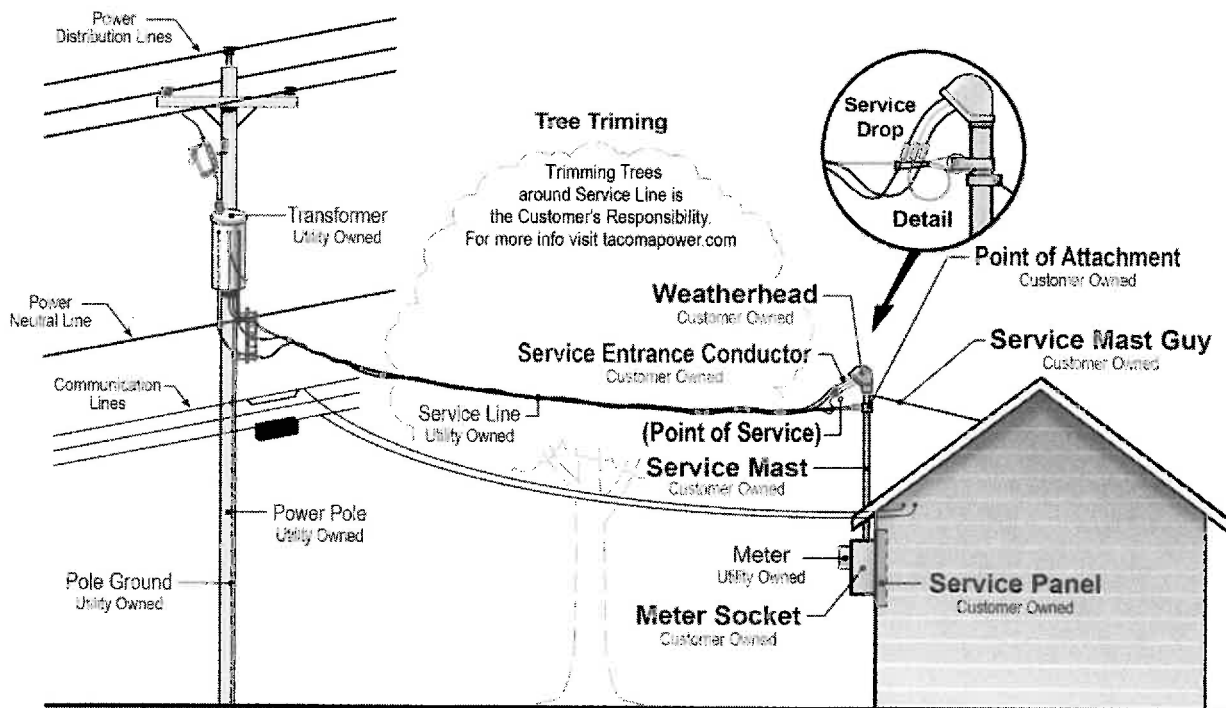
Overhead Services

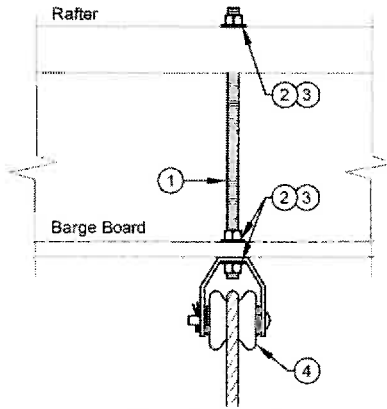
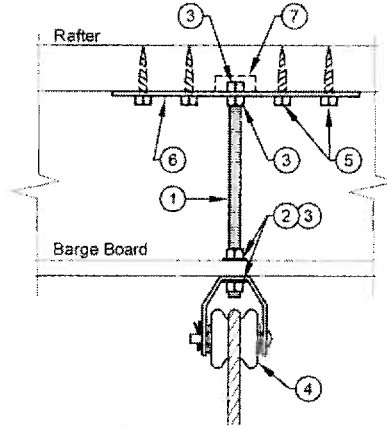
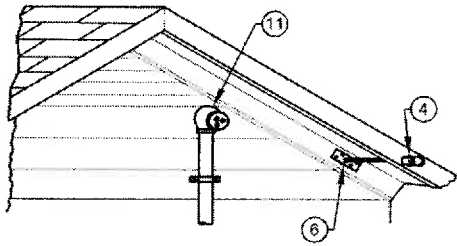
Residential

Residential overhead services must comply with **WAC 296-46B-230** and the installation details for the service mast installations are shown in following drawings. The minimum service size is 200 amps for single family dwelling units and duplex units. The minimum height of the service drop point of attachment is 12' and the remaining clearance requirements are found in the **NEC Article 230**. The maximum service drop length is 100' with no back guy or 150' with back guy. The service line must have clear space between the pole and point of attachment to the structure (see *vegetation management policy 308*).

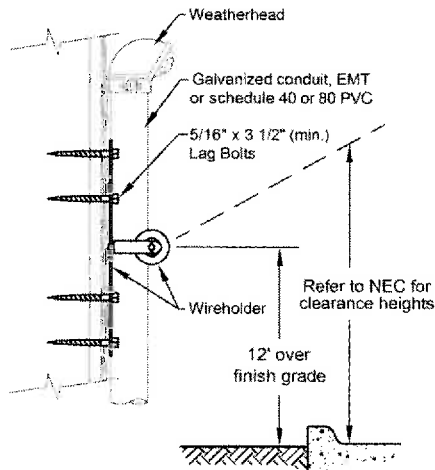
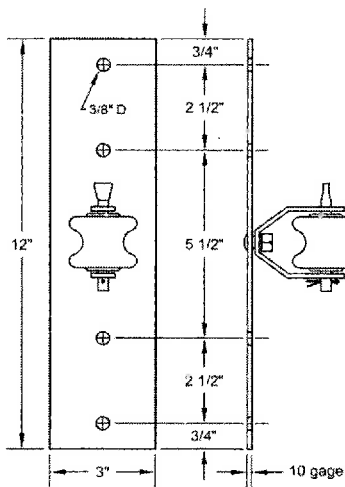
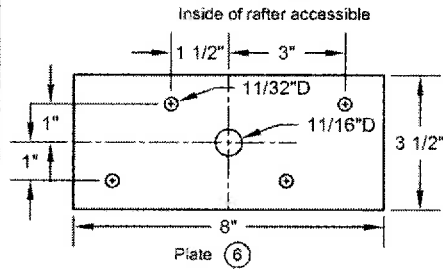
Commercial

All overhead commercial services need to be reviewed by Lakeview Light & Power. The maximum size overhead service is 400 amps unless pre approved. If current transformers are necessary due to loading, see Chapter 13 Meter and CT configurations. The same criteria as the **residential** installation apply to commercial except the minimum size service is determined by the load being served and the minimum point of attachment is 18'. A typical back guyed service is shown below.





NOTES:	
1.	5/8" bolt or steel rod, threaded both ends, galvanized, length as required.
2.	flat washer, galvanized.
3.	5/8" nut, galvanized.
4.	Dead end clevis, insulated.
5.	5/16" x 2" lag screws, galvanized.
6.	10 gauge galvanized plate.
7.	Countersink hole in rafter, 1" dia. x 5/8" deep
8.	Pull on dead end clevis should be as nearly as possible in line with bolt. Angle must not exceed 10° vertically or 20° horizontally.
9.	1,000# max. line pull.
10.	This drawing supplements figure 33 and authorizes barge board attachment where appropriate.
11.	Weatherhead should be located above the dead end clevis. (NEC 230-54)



Chapter 5

Residential Underground Services

The underground Secondary Service Box (**SSB**) can obtain power from an overhead transformer or pad mount transformer. The customer installs the continuous conduit from the SSB to the meter socket (left or right side only) per **NEC**. Minimum burial depth is 24 inches. Call Lakeview Light & Power for information on the installation of the SSB and riser if no SSB is present. Two 2-1/2" conduits or one 3" conduit is required for a 320 amp service. Contact the Utilities Underground Locate Center (**811**) before digging. All conduit must be rigid, schedule 40 or 80 PVC.

Chapter 6

Commercial Underground Services

Install the primary and secondary conduits per Lakeview Light & Power construction Standards. The utility secondary, primary, and vaults are inspected by the Lakeview Light & Power. Call two days in advance to request an inspection before backfilling. Customer owned and installed electrical systems are inspected by Labor and Industries Inspection. Schedule your electrical inspection before backfilling.

Commercial electrical service entrance conductors shall have a capacity not less than the rating of the service equipment being supplied. The conduit shall be continuous between the utility and customer equipment and shall be sized per the **NEC**. Services supplied by a pad mount transformer shall meet Lakeview Light & Power Construction Standards for vault installation and for clearance from vegetation. Services supplied underground from pole (**UGP**) shall be installed per Lakeview Light & Powers Construction Standards. All UGP pole service equipment shall be installed on standoff brackets. Contact Lakeview Light & Power for underground service availability. Services greater than 800 amps shall be installed in a **UL** approved switchboard and the metering section must meet **Lakeview Light & Power** standards.

Chapter 7 Meter Poles

Meter poles are installed when the service drop exceeds 150', or the underground service is not practical per Lakeview Light & Power. The customer is responsible for purchasing installing and maintaining the meter pole. The meter must be installed on the meter pole and the pole needs to be the first pole contact from the Lakeview Light & Power pole. The distance from Lakeview Light & Powers service pole to the customer pole cannot exceed 150' and cannot cross adjoining properties without obtaining easements. The disconnect location for manufactured homes must comply with **WAC 296-46B** and the **NEC**. Lakeview Light & Power crews must have access to the pole and meter without obstructions. All pole mounted service equipment shall be installed on standoff brackets.

The meter pole shall be a full length pressure treated wood pole per the **American Wood Preserves Association (AWPA)** standard. The pole must be a minimum of 20' long installed with a butt gain marker at 10' from the bottom of the pole. Nailing a washer to the pole at this location is acceptable. The table below will assist you in determining the adequate meter pole length and pole setting depth. See **NEC article 230** for clearance height requirements.

Round poles require a 6" minimum top diameter. Square timbers for a service length of less than 100' require a 6x6 minimum timber and service length greater than 100' require an 8x8 minimum timber.

Pole Requirements

If the meter pole is	And the service conductor	The minimum pole length is	And the pole setting depth is
Within 50' of Lakeview's pole	Does not pass over driveway or parking area	20'	4'
	Passes over driveway or parking area	25'	4.5'
Between 50' and 100'	Does not pass over driveway or parking area	25'	4.5'
	Passes over a driveway or parking area	30'	5'
	Crosses over a city or county road or state highway	35'	5.5'
Between 100' and 150' maximum	Does not pass over driveway or parking area	30'	5'
	Passes over a driveway or parking area	35'	5.5'
	Crosses over a city or county road or state highway	35'	5.5'

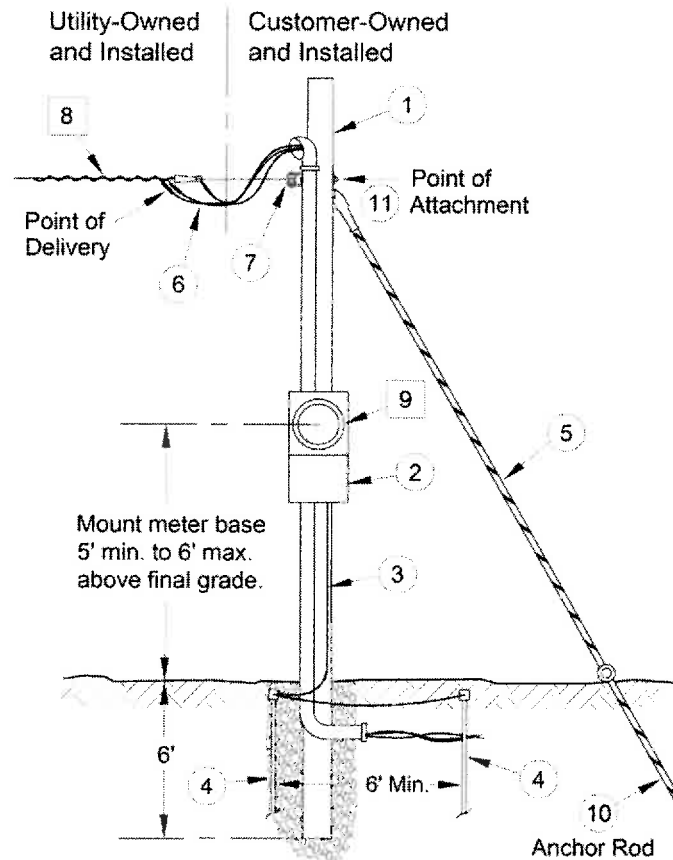
Meter Pole Guying

Meter poles must be guyed per the following table:

Span longer than	Max service conductor size	Max span length
100'	#2 Triplex	150'
80'	#1/0 Triplex	120'
60'	#4/0 Triplex	80'

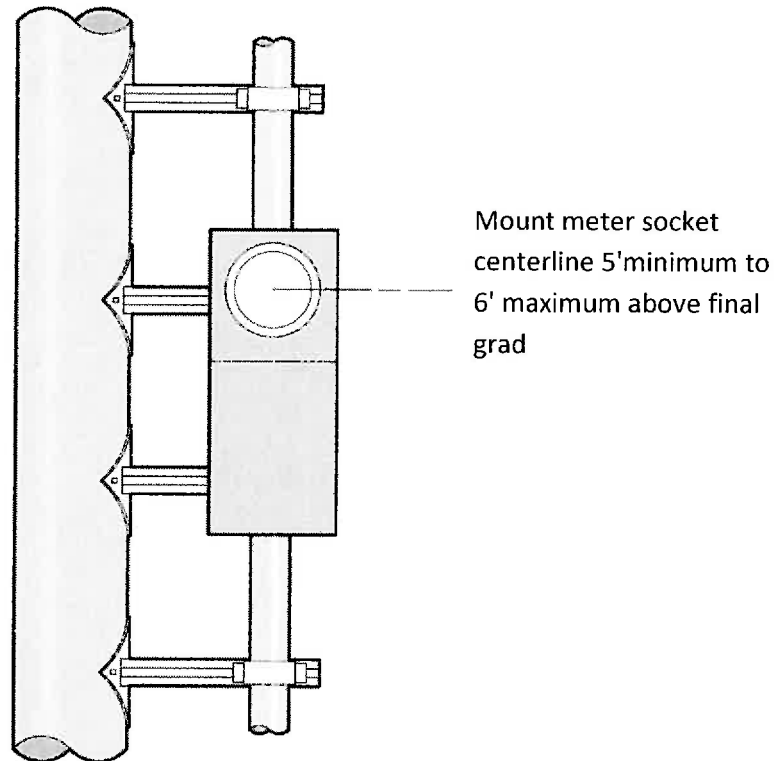
Meter Poles Cont.

Meter Pole Equipment



- 1) Meter pole
- 2) Meter socket and disconnect switch
- 3) Ground wire per NEC
- 4) Ground rods per NEC
- 5) Guy wire (if required), 5/16 minimum
- 6) Service entrance conductors
- 7) Insulated clevis
- 8) Service wire
- 9) Meter
- 10) Anchor rod
 - Anchor rod, 1/2" min diameter, 6' to 8' long
 - Anchor, any approved type (helix, expanding type, plate, etc.)
 - Anchor to be set a minimum depth of 5' and in line with the service
- 11) Preformed wire grip or wire rope clamps

Chapter 8 Standoff Brackets

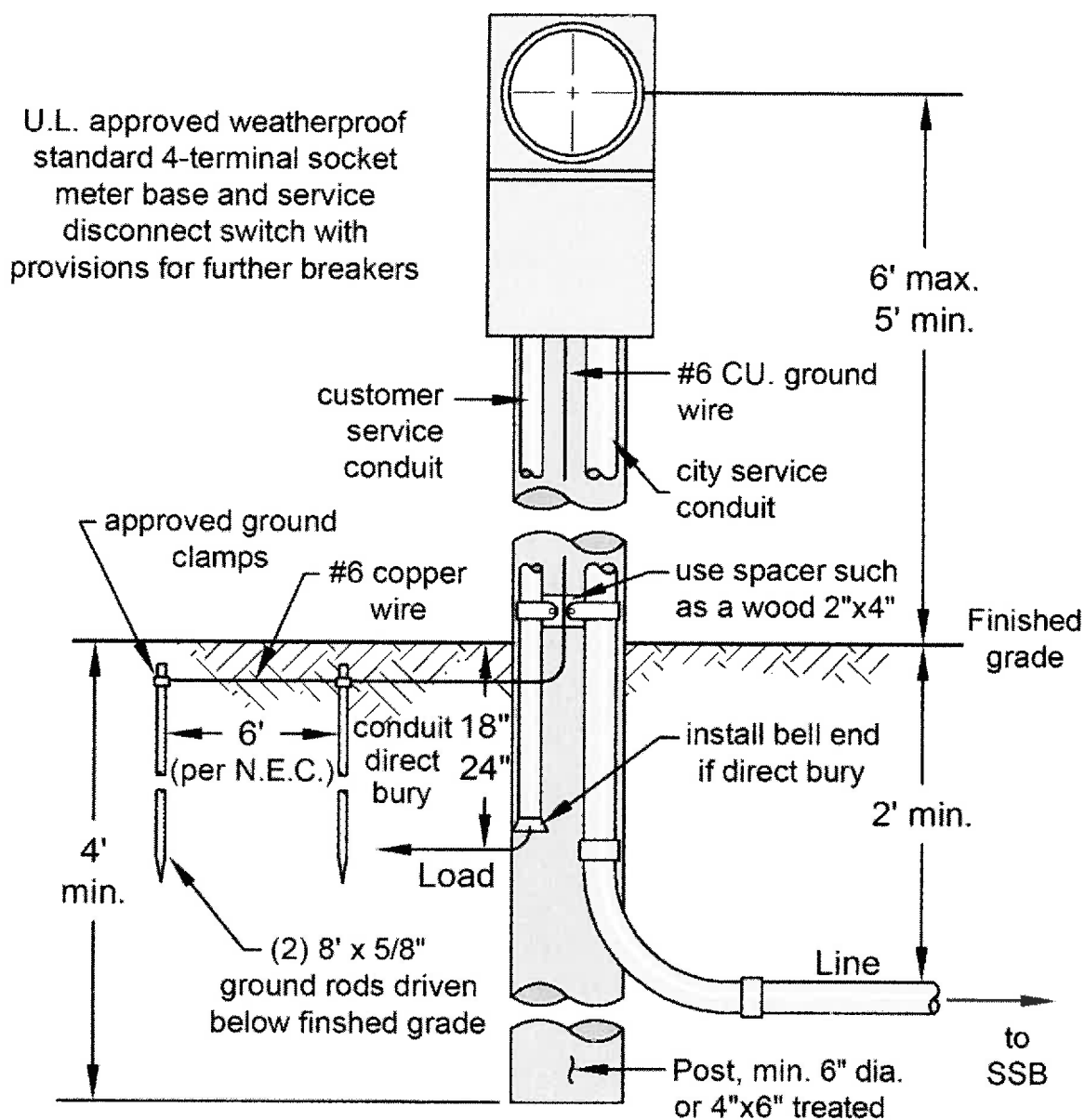


All conduits, metering equipment and service equipment shall be mounted on standoff brackets when Lakeview Light & Power owns and maintains the overhead conductors at the top of the pole. Approved standoff brackets with two piece galvanized clamps suited to the pipe size and type will be firmly lag bolted to the pole. Clearance between the pole and conduit riser or equipment shall be a minimum of 4 inches. Meter poles shall be constructed to maintain at least one quarter of the pole for climbing space. Climbing space will be determined by the location of existing conductors, enclosures, attachment hardware and conduit risers. Refer to **NESC** and **WAC 296-44-21273**.

Chapter 9

Underground Service to a Meter Post

Figure 6 is an underground meter post that supports the service equipment. This installation may be used to serve a mobile home only when installed per **NEC article 550**. Customer Service conduit no longer required.



Chapter 10

Meter Heights

Maximum Height

Meters shall not be installed at a height greater than 6 feet from the working surface or grade to the midpoint of the meter. *Preferred height is 5 1/2 feet to the midpoint of the meter.*

Minimum Height

Meters shall not be installed at a height below 5 feet from the working surface or grade to the midpoint of meter **except for:**

A. **Commercial** multi-metering installed in a vertical configuration shall not be installed below 36 inches from the working surface or grade to the midpoint of the meter.

B. **Residential** multi-metering installed in a vertical configuration shall not be installed below 28 inches from the working surface or grade to the midpoint of the meter.

New Construction

Meter must be installed at heights mentioned above. No platforms are permitted.

Chapter 11

Meter and CT Configurations

Self-Contained Meters

Self-contained or direct connect meters carry the full load and connect directly across line voltage. Self-contained, socket type meters are required for the following services:

- Single-phase, up to 320 amp continuous
- Three-phase, up to 200 amps

Customer Responsibility:

Customer provides the following equipment: cabinets and enclosures for the metering CTs, terminal lugs, conduit, grounding, and protection equipment. The customer must connect the line and load conductors to the terminals on the mounting bracket located inside the CT enclosure, and the line conductors to the transformer secondary. Always check with Lakeview Light & Power for equipment location. The customer is also responsible for installing the provided current transformers, and meter base.

Lakeview Light & Power's Responsibility:

Lakeview Light & Power provides meter socket, meter, current transformers, test switch, and local wiring associated with the meter, test switch, and CTs.

Current Transformer Cabinets

The customer provides and installs a cabinet for the current transformers and the conduit between the CT cabinet and the meter enclosure. The CT cabinet is to be metal, NEMA 3R rated, and securely mounted on a fixed surface.

The top of the cabinet must be no higher than 7' above grade all must have a hinged cover. The bottom of the cabinet must be at least 6" above grade.

Required CTs		Cabinet Dimensions		
Service Size	Number of CTs	Width	Height	Depth
1-phase, 400-800 amps	2	30"	48"	11"
3-phase, 200-800 amps	3	36"	48"	11"
Over 800 amps	Requires switchboard			

CT-Type Meter Socket and Enclosures

Both single-phase and three-phase meters must be connected by a 1¼" rigid, IMC or EMT conduit within 2' and within sight of the CT cabinet.

Meter and CT Configurations Cont.

Mounting Base for Current Transformers

- The customer installs the CT mounting base. This mounting base accepts bar-type current transformers only.
- The customer must connect the line and load conductors to the terminals on the mounting bracket located inside the CT enclosure.
- The CT cabinet must contain only the service conductors. The type and number of conductors are determined by the bracket used.
- Cable bracing must be installed by the customer per the manufacture recommendations.
- The customer is required to mount the current transformers provided by Lakeview Light & Power.

Labeling

In multiple meter installations, each meter must be clearly marked with an identification plate at least 1/2" high with permanent lettering that identifies its service location address.

General Requirements for Meter Sockets

Meter sockets must be:

Installed level, plumb, and rigidly secured to the supporting surface.

Covered when socket is energized.

Ring style meter socket, ringless meter bases are not acceptable.

Meter socket configurations

Meter sockets are available in six configurations. The services used with each configuration are shown in following pages.

On multi-family or multi-commercial gang meter sockets are required, exception would be if a CT rated socket was needed it could be standalone the remainder would be required to be gang style sockets.

The following Diagram Figure 27 listed under the Meter base/socket minimum clearances is required for all meter installation

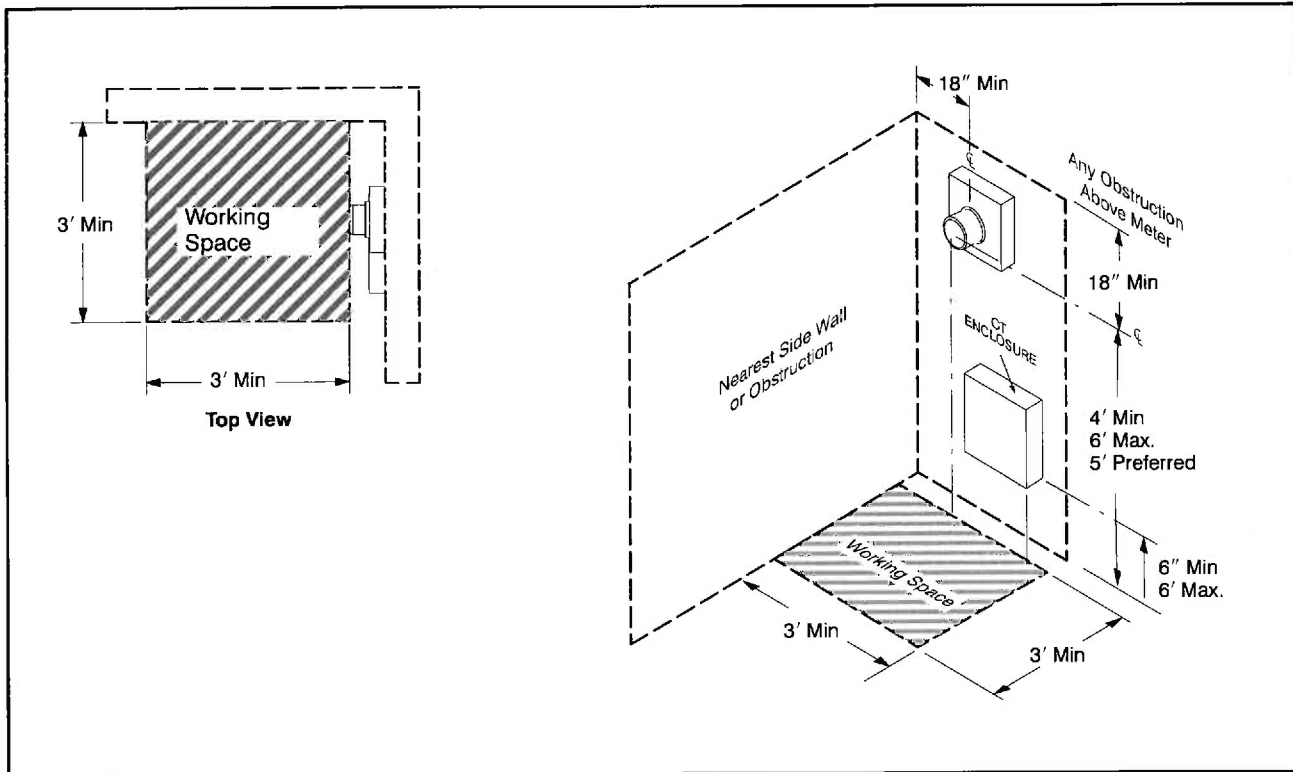
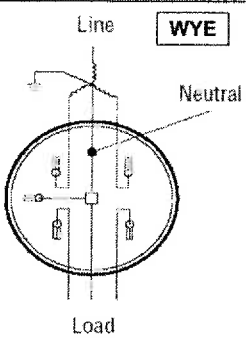


Figure 27 Meter base/socket minimum clearances

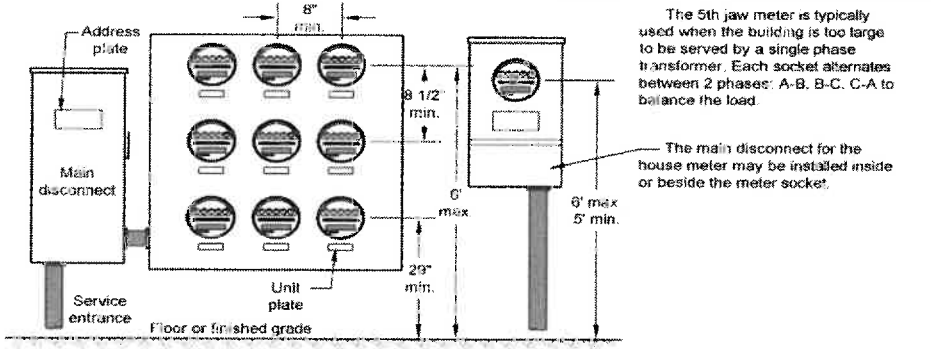
120 / 240V and 480V 1-Phase, 3-Wire System

4 JAW SOCKET	BUILDING TYPE	SERVICE VOLTAGE	SERVICE SIZE	METER AMPS	METER HEIGHT	MANUAL METER BYPASS	METER SAFETY SOCKET
	TEMPORARY POWER	120/240V	60 - 400	125/200/320 A	5' - 6' TO CENTER	NOT REQUIRED	NOT REQUIRED
	SINGLE FAMILY	120/240V	200	200 A	5' - 6' TO CENTER		NOT REQUIRED
		120/240V	400	320 A	5' - 6' TO CENTER	INCLUDED	NOT REQUIRED
	DUPLEX	120/240V	200	200 A	5' - 6' TO CENTER		NOT REQUIRED
	SEPTIC SYSTEM	120/240V	30 - 125	125 A	5' - 6' TO CENTER	NOT REQUIRED	NOT REQUIRED
	TRAFFIC CONTROL SYSTEM	120/240V	125/200	125/200 A	5' - 6' TO CENTER	REQUIRED	NOT REQUIRED
	STREET LIGHTS	120/240V	125/200	125/200 A	5' - 6' TO CENTER	REQUIRED	NOT REQUIRED
	DOT ONLY STREET LIGHTS	480V	125/200	125/200 A	5' - 6' TO CENTER	REQUIRED	REQUIRED
	SMALL COMMERCIAL	120/240V	125/200	125/200 A	5' - 6' TO CENTER	REQUIRED	NOT REQUIRED
	SMALL INDUSTRIAL	120/240V	125/200	125/200 A	5' - 6' TO CENTER	REQUIRED	NOT REQUIRED
	PEDESTAL	120/240V	125/200	125/200 A	3' - 6' TO CENTER	NOT REQUIRED	NOT REQUIRED
	PEDESTAL	480V	125/200	125/200 A	TO CENTER	REQUIRED	REQUIRED

5-Jaw Sockets 120/208V 2-Phase and Neutral 3-Wire WYE

5-Jaw Sockets 120/208V 2 Phase and Neutral 3-Wire WYE							
5 JAW SOCKET	BUILDING TYPE	SERVICE VOLTAGE	SERVICE SIZE	METER AMPS	METER HEIGHT	MANUAL METER BYPASS	SAFETY SOCKET
	TEMPORARY POWER	120/208V	60 - 200 A	100/200 A	5' - 6' TO CENTER	NOT REQUIRED	NOT REQUIRED
	APARTMENT / CONDOMINIUM	120/208V	100/200 A	100/200 A	6' max. 30" min. TO CENTER	NOT REQUIRED	NOT REQUIRED
	SMALL COMMERCIAL	120/208V	60 - 200 A	100/200 A	5' - 6' TO CENTER	REQUIRED	NOT REQUIRED
	SMALL INDUSTRIAL	120/208V	60 - 200 A	100/200 A	5' - 6' TO CENTER	REQUIRED	NOT REQUIRED
	PEDESTAL	120/208V	60 - 200 A	100/200 A	3' - 6' TO CENTER	NOT REQUIRED	NOT REQUIRED

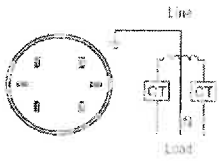
NOTE: INSTALL 5TH JAW IN 9 O'CLOCK POSITION AS SHOWN AND ATTACH JUMPER WIRE BETWEEN 5TH JAW AND NEUTRAL

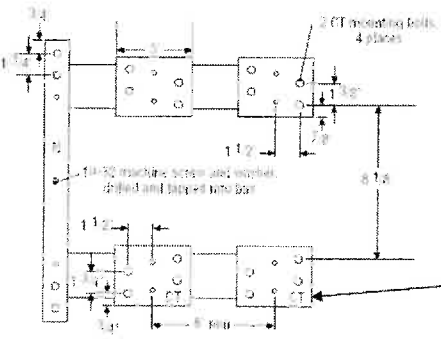


The 5th jaw meter is typically used when the building is too large to be served by a single phase transformer. Each socket alternates between 2 phases: A-B, B-C, C-A to balance the load.

The main disconnect for the house meter may be installed inside or beside the meter socket.

6-Jaw Sockets for 120/240V 1-Phase, 3-Wire Bar-Type CT Systems CT Enclosure

120 / 240 V 1 PHASE 3 WIRE							
6 JAW SOCKET	BUILDING TYPE	SERVICE VOLTAGE	SERVICE SIZE	METER AMPS	METER HEIGHT	SPACE FOR TEST SWITCH	CT CAN HEIGHT
	TEMP POWER, COMMERCIAL, INDUSTRIAL	120/240 V	400 - 800 A	201 - 800 A	5' - 6' TO CENTER	REQUIRED	7' to TOP
	TEMP POWER, COMMERCIAL, INDUSTRIAL	480 V	400 - 800 A	201 - 800 A	5' - 6' TO CENTER	REQUIRED	7' to TOP
	30" X 48" HINGED CT ENCLOSURE	600 V	400 - 800 A	201 - 800 A	N / A	N / A	7' to TOP



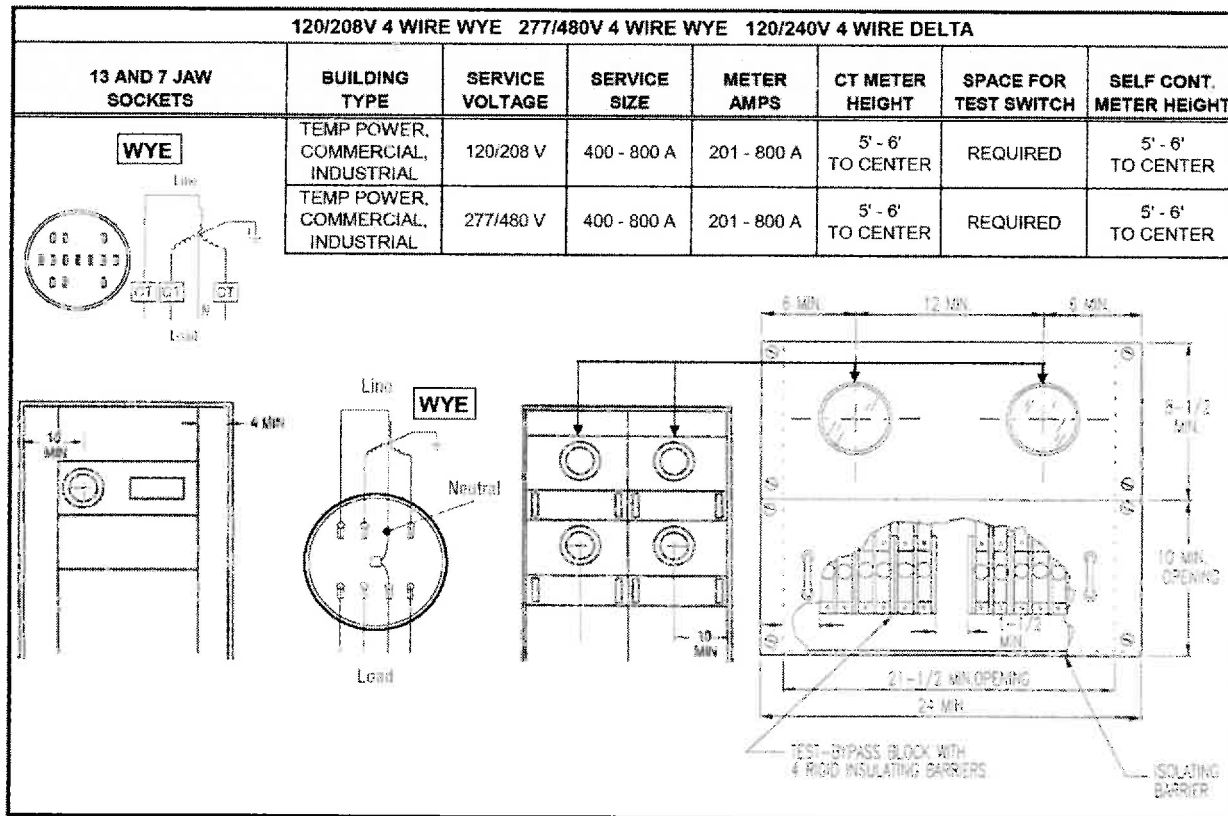
If service conductors enter CT can from underground, please maintain a minimum of 4" of clearance from this side of CT bracket.

NOTE 1: CT BRACKET SHOULD BE RATED FOR 50K AIC
NOTE 2: 1 1/4" RIGID, IMC OR EMT NIPPLE BETWEEN 6 POINT METER SOCKET AND CT ENCLOSURE
NOTE 3: METER AND CT'S SHALL BE WITHIN 2' AND IN SIGHT

13-Jaw Sockets for 120/208V, 277/480V 4-wire WYE and 120/240V 4-wire DELTA systems CT Enclosure

	120/208V 4 WIRE WYE	277/480V 4 WIRE WYE	120/240V 4 WIRE DELTA				
13 JAW SOCKET	BUILDING TYPE	SERVICE VOLTAGE	SERVICE SIZE	METER AMPS	METER HEIGHT	SPACE FOR TEST SWITCH	CT CAN HEIGHT
<div style="text-align: center; border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">WYE</div>	TEMP POWER, COMMERCIAL, INDUSTRIAL	120/208 V	400 - 800 A	201 - 800 A	5' - 6' TO CENTER	REQUIRED	N / A
	TEMP POWER, COMMERCIAL, INDUSTRIAL	277/480 V	400 - 800 A	201 - 800 A	5' - 6' TO CENTER	REQUIRED	N / A
	36" X 48" HINGED CT ENCLOSURE	600 V	400 - 800 A	201 - 800 A	N / A	N / A	4' 6" - 7' to TOP
<div style="text-align: center; border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">DELTA</div>							
							<p>If service conductors enter CT can from underground, please maintain a minimum of 4" of clearance from this side of CT bracket.</p>
<p>NOTE 1: CT BRACKET SHOULD BE RATED FOR 50K AIC</p> <p>NOTE 2: 1 1/4" RIGID, IMC OR EMT NIPPLE BETWEEN 13 POINT METER SOCKET AND CT ENCLOSURE</p> <p>NOTE 3: METER AND CT'S SHALL BE WITHIN 2' AND IN SIGHT</p>							

7 and 13-Jaw Sockets 120/208V, 277/480V 4-Wire WYE and 120/240V 4-wire DELTA systems Switchgear



Switchboard Metering

A switchboard is required for services over 800 amperes. Switchboard metering may also be used on 201-800 amp services, at the customer's option.

The switchboard must include a utility pull section, CT mounting base(s), meter socket(s), provisions for a test switch (installed by Lakeview Light & Power), and means for locking the meter enclosure for exclusive access by Lakeview Light & Power. The customer must submit one set of drawings for plan review approval **prior** to ordering the switchboard from the manufacturer. The metering section must comply with current EUSERC standards. Refer to approved plans for requirements.