



CITY OF  
*Lethbridge*

CUSTOMER METERING  
REQUIREMENTS  
Electric Department  
Metering Section

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MOST RECENT VERSION

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# CUSTOMER METERING REQUIREMENTS

# CUSTOMER METERING REQUIREMENTS

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## CUSTOMER METERING REQUIREMENTS

### **GLOSSARY**

Electrical terms used in this manual are based on accepted electrical industry practice and the company's "Terms & Conditions".

**AEUC** - Alberta Electrical Utility Code

**AMR** - Automatic Metering Reading

**AWG** - American Wire Gauge: a wire sizing standard.

**Bulk-Metering** - Where a single utility revenue meter is used to measure the consumption of more than one clearly defined area.

**CEC** - Canadian Electrical Code, Part 1 and Amendments.

**Clearly Defined Area** - Defined as an individual building, unit, bay, or apartment.

**CSA** - Canadian Standards Association

**Cold Metering** - A disconnect is located immediately on the line side of each LEU meter, and only isolates that meter.

**Disconnecting Device** - Breaker, fused-disconnect switch

**CT** - Current Transformer

**Demand** - The average value of power over a specified interval of time. The most common unit of measures are kilowatt (kW) and kilovolt Amperes (kVA) demand.

**Double Metering** - Where more than one utility revenue meter is used to measure the consumption of only one clearly defined area.

**Duplex** - A single building occupying two separate lots intended for two separate occupancies separated by a common wall.

**EMT** - Electrical Metallic Tubing

**Energy** - The integral of active power over time. E.g. kilowatt-hours (kWh).

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**Finished Grade** - Elevation of earth surface after all earthworks and landscaping have been completed.

**Ground** - The connection to earth obtained by a grounding electrode, not to be used as neutral connection.

**Harmonics** – Distortions to the voltage and current waveforms from their normal sinusoidal shape.

**Hot Metering** - Utility supply is connected directly to meter / metering installation.

**Instrument Transformer Enclosure** - The enclosure supplied and installed by the customer for the housing of instrument transformers.

**Instrument Transformer Metering** - Using a transformer in a metering circuit to step down the current and/or the voltage to a level that can be accommodated safely by the meter.

**Interval Metering** - Energy values are recorded for a specific time period on a continual basis. Typically, 15 minute intervals.

**LEU** – Lethbridge Electric Utility

**Meter Enclosure** - The enclosure supplied and installed by the customer for the housing of a meter.

**Meter Socket** - A meter mounting device for the purpose of installing a self-contained meter.

**Meter Socket and Test Switch Enclosure** - Meter socket combined with a test switch for use with current and/or voltage transformers enclosed in metal housing.

**Multiple Service** - A service to a building, such as an apartment building or shopping center, that has two or more units and a common service entrance in which each unit is served and metered separately.

**Network Service** - Three-wire service obtained from two-phase wires and a neutral of a three-phase four-wire wye system (120/208 volts).



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**Neutral** - The conductor from the transformer star point that carries the imbalanced load current and provides a reference point for the metering potentials.

**Polarity Mark** - Marked indicators on a transformer to show the instantaneous direction of current flow through the windings. Current flow into the primary marker causes current flow out of the secondary marker.

**PT** – Potential transformer.

**Primary Metered Service** - A metered site with service voltage over 750 volts.

**Rough Grade** – Elevation earth surface at the time the foundation is installed.

**Temporary Meter** - Temporary electrical meter only used for construction purposes that is removed after building is complete.

**Secondary Metered Service** - A metered site with service voltage less than 750 volts.

**Self-contained Meter** - A meter designed to accommodate the full line current and voltage of the circuit.

**Single Phase** - A service comprised of a 120/240 volt three wire circuit.

**Three Phase** - A service with three phase conductors and a neutral.

**SCA** - Alberta Safety Codes Act

# CUSTOMER METERING REQUIREMENTS

## **1 GENERAL REQUIREMENTS**

### **1.1 GENERAL**

This document is issued as a guideline for customers, architects, engineers and contractors planning or constructing buildings or installing, repairing or renewing apparatus or equipment to be connected to the LEU's distribution system.

If you have any questions about these requirements, please contact Distribution Engineering at [electricdesign@lethbridge.ca](mailto:electricdesign@lethbridge.ca).

These practices are subject to additions and changes at any time as developments and progress in the electrical industry may require. A copy of subsequent approved changes will be furnished to each holder of this manual upon request. Any print copy of this document may be out dated and therefore incorrect. It is your responsibility to ensure you have the most recent copy, which can be found at:

<http://www.lethbridge.ca/living-here/Utilities-Waste-Recycling/Pages/Residential-and-Commercial-Servicing.aspx>

All meter and service equipment installations shall comply with the service requirements of Lethbridge Electrical Utility and with rules and regulations of the inspection authorities having jurisdiction.

In the event customer construction results in violations of the CSA, AEUC or any of the LEU's standards; the service must be brought into compliance.

### **1.2 ACCESS TO METERING EQUIPMENT**

LEU employees, or agents, must have reasonable and unhindered access to all LEU equipment at all times for the purpose of reading, testing, and changing that equipment. Where ready access to the metering equipment is not given due to locked doors; LEU may require the meter to be relocated or the LEU shall be provided a key for its use. LEU may install a lock-box for the purpose of keeping the key on site.

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### **1.3 RIGHT TO REFUSE TO ENERGIZE**

LEU reserves the right to refuse energizing any service or meter installation within its service territory at its discretion. Some of the potential causes for refusal may include: unsafe installation conditions, identification of any hazardous conditions at a work site, or the service entrance equipment, more specifically, its location and application.

In the event a site is deemed unsafe by an LEU representative, the owner is required to bring the service up to safety standards within 30 days or have the service disconnected.

### **1.4 MAIN DISCONNECT REQUIREMENTS**

All new commercial services shall be cold metered. Existing hot metered commercial services may be grandfathered in, at the LEU's discretion. All new residential services 200A or smaller in size shall be hot metered unless approved by LEU design staff.

Customer transformers are not permitted to be installed on the line side of a LEU meter. A meter may not be enclosed inside a box, closet, or any construct deemed by LEU to restrict utility employee access.

### **1.5 METER SOCKETS SHALL NOT BE RECESSED.**

Residential meters originally installed outdoors that, due to alterations, or additions to the residence become enclosed within the building structure, shall be relocated to an outdoor location. The relocated service shall conform to LEU standards.

### **1.6 SAFETY REQUIREMENTS**

There shall be provided, above and beside each meter distribution center, a clear space in width no less than 15 cm (6") extending from the floor to a point above the highest unit of the distribution center. In front of each meter distribution center, a clear space no less than 75 cm (30") from the outmost protruding surface of the grouped equipment.

A minimum working space of 1 m wide by 1 m deep by 2.2 m

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high is required in front of all electrical equipment, and to the sides and back, where access is required.

A minimum passageway of 1 m wide by 2.2 m high must be maintained as an entrance or exit from all electrical areas. If 1200 A or more, or rated over 750 V (CEC Part I, 2-310 (2)), there shall be two points of exit, or a minimum of 1.5 meters, of unobstructed working space.

Metering equipment cannot be located in areas that are hazardous to anyone working on that equipment, or to the metering equipment itself. Hazardous locations are defined as any area involving moving machinery, dust, vibration, fumes, water and/or moisture.

No meter shall be located in an environment that is considered dangerous due to H<sub>2</sub>S or flammable gases, or where H<sub>2</sub>S or flammable gasses may be present and hazardous.

No meter shall be located in a biologically hazardous location, for example, livestock and poultry facilities. This requirement is in place to protect LEU staff from the danger of contracting or spreading any disease or virus.

It is not permissible to mount water, sewer, gas, equipment, or other pipes foreign to the electrical metering installation directly above electrical metering equipment; or, to encroach on minimum working space around electrical metering equipment.

Meters will not be installed above window wells.

The areas where electrical metering equipment is installed indoors, must have adequate illumination and ventilation to carry out all work safely.

### **LEU will not install meters:**

- In areas where the meter is less than 1 m from moving equipment.
- In the path of water from eaves or rainspouts.
- Where the meter may be subject to steam, flammable or corrosive hazardous vapors.

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- Where the metering equipment is less than 1 m from any property line, fence, adjacent structure, or vegetation.
- In areas that are difficult to access such as open pits, near moving machinery, hatchways, closets, stairways, or where there are noticeable vibrations.

### **1.7 CARE OF METERING EQUIPMENT**

The customer is required to exercise reasonable care for the protection of LEU equipment installed on the customer's premises. Should any damage occur, or the metering equipment is lost or stolen after installation, the customer shall be liable for the cost of repair or replacement.

### **1.8 TEMPORARY METER REMOVAL**

The customer must call LEU Metering to request for the removal of a meter from an energized, metered service. Meters shall only be disconnected and re-connected by LEU employees or agents

### **1.9 NON-STANDARD SERVICES**

#### **1.9.1 Acceptance Procedures**

The customer must follow this Standard, however, some situations may require a deviation from this Standard. If the customer feels the requirements of this Standard cannot be met, a letter requesting a Non-Standard Service, along with drawings, must be submitted to LEU Design for approval. The required drawings should be submitted as early as possible, before the ordering and installation of service entrance equipment or other associated equipment. Approval may, or may not, be granted. Please note that any approval granted applies only to the service in question and is not a general approval for future services.

#### **1.9.2 Drawings and Specifications**

Equipment drawings, specifications, and site plans are required by LEU for non-standard services. In some cases, a hand drawn sketch that clearly shows the layout and

## CUSTOMER METERING REQUIREMENTS

dimensions are all that is needed. Drawings submitted must clearly show all equipment related to the metering, including service entrance equipment and revenue metering enclosures. These drawings should show elevations and enclosures sizes. Drawings are to be sent to electric design at [electricdesign@lethbridge.ca](mailto:electricdesign@lethbridge.ca).

In the event of a dispute, only LEU APPROVED prints and LEU written communications will be considered binding.

### **1.10 DISTRIBUTED GENERATION (DG) AND MICRO GENERATION (MG)**

#### **1.10.1 DG and MG Applications**

In some cases, the customer may want to install electric power generation resources on site. Customers must obtain approval from LEU before installing and energizing this type of equipment. For more information about this, or how to apply, please review this website:

<http://www.lethbridge.ca/living-here/electric/Pages/Documents-Links.aspx>.

Or you can email your questions to:

[electricdesign@lethbridge.ca](mailto:electricdesign@lethbridge.ca).

#### **1.10.2 Seeking DG and MG Approval**

MG customers must follow the process for connection outlined in the latest version of the LEU Distributed Generation Guidelines.

#### **1.10.3 Backup Generators**

Backup generators are acceptable. Meter mounted transfer equipment is not acceptable.

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## **1.11 CONSTRUCTION REQUIREMENTS**

### **1.11.1 Electrical Modifications to Existing Services**

Customers planning any modifications or additions to their electrical system, shall notify LEU at [electricdesign@lethbridge.ca](mailto:electricdesign@lethbridge.ca) before modifying an existing service. These additions include: increased load, back-up power supplies, on site generation resources, and transfer switches. Early contact with LEU will help ensure that any additions, or changes, are not effecting LEU infrastructures and capability to supply the service safely. The customer may be charged or be responsible for, costs associated with any change required to LEU equipment due to the service modification. Customers requesting approval, may be required to make upgrades to their existing electrical equipment to meet LEU Metering standards. The customer is responsible to make the required changes.

### **1.11.2 Temporary Services**

All temporary construction services where the service disconnect rating does not exceed 200 A, may be hot metered.

#### *1.11.2.1 Temporary Overhead Services*

**The temporary pole and installation must meet the following requirements:**

- The temporary pole is a treated 6"x6"x20' pole or a 20ft class 5 pole (or larger) with a 4' set depth.
- The overhead service attachment shall meet the clearance requirements specified in the overhead service section of this document. Contact electric design to determine appropriate pole heights.
- Meter sockets are to be mounted with the centerline of the meter socket at a height of 1.5 m to 1.8 m above the finished grade.

## CUSTOMER METERING REQUIREMENTS

### *1.11.2.2 Temporary Underground Services*

Install the temporary meter base in an approved location on your property. All meter bases must be approved by the LEU inspector prior to energization.

Provide appropriately sized conductor from your meter base to the LEU connection point. Provide sufficient conductor to reach the transformer or handhole plus an additional 2 meters of conductor (wire) to make connections. LEU servicemen will route your conductor (wire) into the box and make connections.

The temporary service may be a temporary pole as per section 1.12.2.1 or an A-Frame board that is securely affixed to the ground and may not be moved while the service is connected.

The contractor may not use the same raceway for the temporary and permanent service.

Note: We do not splice customer conductors. If your conductor (wire) is too short to be connected in the transformer or handhole, it will be required to be replaced by the customer or customer's electrician.

Provide all trench and backfill to the edge and leave your conductor (wire) exposed. The trench must be a minimum of 24 inches deep for proper burial of conductor (wire).

Underground temporary conductor (wire) shall not be installed in conduit intended for permanent conductor (wire).

### **1.11.3 Customer's Service Mast Location**

The service mast and attachment point are owned by the Customer and are governed by Canadian Electrical Code Pt 1.

## **1.12 METERED & UNMETERED CONDUCTORS**

All service entrances must be designed and constructed so that metered and unmetered conductors are not run in the same conduit or raceway.



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### **1.13 METER SERVICE AREA DEFINITION**

A meter used for revenue purposes shall not cover more than one clearly defined area. Conversely, more than one revenue meter may not service one clearly defined area (Double-Metering is not allowed).

A clearly defined area is constituted by, for example, an apartment building, duplex unit, fourplex, bay, commercial unit, or dwelling unit. Each clearly defined area must have a unique address in accordance with the City of Lethbridge. Each clearly defined area must have a unique Site ID.

**Only one meter per area shall be permitted with the following exceptions:**

- Changes may be made to an area which creates a need for an additional meter to be installed in an existing area.
- Changes to the existing service shall not be made without the express consent of the LEU Design office (refer to section 1.9 Non-Standard Services for further instructions).

The purpose of this regulation is to ensure that LEU Metering meters accurately and measures the customer's consumption.

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## **2 TYPES OF METERING**

### **2.1 SELF-CONTAINED METERING**

#### **2.1.1 Load Limit**

The maximum load for a self-contained meter is 200 A per phase.

#### **2.1.2 Voltage Limit**

The maximum voltage limit for a self-contained meter is 600 V phase to phase. Refer to Table 1 for details.

#### **2.1.3 Meter Socket Specifications**

**Meter sockets shall meet the following criteria:**

- As close as possible to the service box.
- In a clean, readily accessible area that is satisfactory to LEU.
- Free from severe or continual vibration.
- Level on the horizontal and vertical planes (buildings with sloping sides require special provisions).
- If mounted outside, mounted with the centerline of the meter at a height of 1.5 m to 1.8 m above finished grade (the preferred height is 1.5 m).
- If mounted inside, mounted with the centerline of the meter socket at a height of 1.5 m to 1.8 m above the finished grade.
- The main service disconnect, splitter box, and sub-service disconnects must have provision for LEU padlocks.

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### 2.1.4 Supply of Self-contained Metering Equipment

#### The Customer shall:

- Supply and install an approved meter socket complete with a screw type sealing ring for LEU use that conforms to recognized industry standards (CSA, ULC).
- Make all load side connections within the meter socket.

#### LEU shall:

- Supply the meter, install the meter in the socket and make all line side connections.

Note: Ringless meter sockets and sockets with current bypass switches (automatic circuit closures) will not be accepted for metering at any installation serviced by LEU.

## 2.2 INSTRUMENT TRANSFORMER METERING

### 2.2.1 General

Instrument transformer type metering is required on all services exceeding 200 A per phase. If it is required to enter an instrument transformer enclosure, you must contact LEU Metering.

### 2.2.2 Instrument Transformer Metering Equipment Location

For LEU owned distribution transformer installations, meter and metering equipment installation shall be connected on the load side of the distribution transformer.

For customer owned distribution transformer installations, meter and metering equipment shall be connected on the line side of the distribution transformer.

Customer equipment is not allowed within the Instrument Transformer enclosure.

The instrument transformer cabinet shall not be used as a splitter box. The instrument transformer enclosure is reserved for LEU Metering equipment only.

## CUSTOMER METERING REQUIREMENTS

### 2.2.3 Supply of Instrument Transformer Metering Equipment

#### The Customer shall:

- Supply and install an approved meter enclosure.
- Supply and install a current transformer enclosure according to specifications shown in Table 2.
- Supply and install a 31.75 mm (1 1/4") conduit between the current transformer and the meter enclosure for multi-phase installations, or a 25.4 mm (1") conduit for single phase installations.
- Supply and install all hardware, bus-work, termination and/or cable required to complete the primary connections to the current transformers.
- Supply and install a 19 mm (3/4") plywood sheet behind all enclosures.

#### LEU shall:

- Supply instrument transformers.
- Supply and install the secondary wiring.
- Supply and install the meter.

The instrument transformers are available to the customer for installation upon request from LEU Metering. Customer shall provide site ID, service address, and Electrical Permit number to LEU when requesting instrument transformers.

### 2.2.4 Mounting of Instrument Metering Equipment

#### CTs are to be mounted in the following manner:

- Fastened to the back panel of the current enclosure and must be removable from the front. All mounting holes on the CT must be utilized. All bolts must be torqued to manufacturer's specifications by the customer.
- Ensure that the CT nameplates are clearly visible when the enclosure is open.

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- Ensure that the CTs are positioned with the primary polarity mark toward the source of supply and in an arrangement that will not obstruct access to the secondary terminals (Figure 1).
- For single phase 3 wire CTs, the supply (line1/line2) shall be connected to the same side of the CT.

### 2.2.5 Connection of Instrument Metering Equipment

The customer is responsible to make all the connections to the instrument transformer primary. These connections should be properly secured and conductors shall be shaped or formed and supported so that no tension is applied to the current transformers.

The customer is also required to install an isolated neutral bar in line with the supply neutral and ensure that it is accessible to LEU Metering.

Damaged current transformers are required to be replaced before energization.

LEU Metering will make all the connections to the current transformer secondary, testing switch, and the meter.

### 2.2.6 Meter Enclosure

A separate meter enclosure is required for each instrument transformer service. This enclosure is an approved manufactured meter enclosure. This includes a 13-jaw meter socket (for 3-phase services) or 4-jaw meter socket (for single phase services), a test switch, and wiring from the test switch to the socket.

#### Location

**Meter enclosure shall meet the following criteria:**

- Be indoors in a clean readily accessible area that is satisfactory to LEU.
- Be located in the same room as the current transformer enclosure.
- Be within a maximum of 7 m (23') of continuous

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conduit run from the current transformer enclosure.

- Each meter position shall be Cold Metering equipped with a circuit breaker / fused disconnect on the line side of the socket meter for each individual unit it supplies.
- The circuit breaker / fused disconnect must have provision for a LEU padlock.

### Mounting

#### Meter enclosures shall be mounted:

- With the center line of the enclosure 1.5 m to 1.8 m above the floor.
- On  $\frac{3}{4}$ " sheet of plywood.
- Level on both the horizontal and vertical planes.
- Free of severe or continual vibration.

### 2.2.7 Current Transformer Enclosures

A separate current transformer enclosure is required for each instrument transformer service according to the specifications shown in Table 2.

### 2.2.8 Sub-services

Where a transformer rated service is a sub-service, the meter must be installed on the load side of a sub-service disconnect. The sub-service disconnect must have provision for a LEU padlock (Figure 2).

### 2.2.9 3 Phase / 3 Wire / Delta Customer Loads

For all services feeding a delta load configuration, the incoming service must still be metered as a 3 Phase 4 Wire Wye service. Therefore, a non-current carrying neutral conductor must be pulled into the main disconnect from an LEU Transformer and brought into the CT cabinet for metering purposes, and terminated by means of an Isolated Neutral Bar. This neutral conductor must be a minimum size of insulated #6 AWG and must be identified (white). Loads must be approved by LEU Design prior to install.

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### 2.2.10 Current Transformer Enclosures

#### **Current transformer enclosures shall:**

- Be located indoors in a clean, readily accessible area that is satisfactory to LEU.
- Be located in the same room as the meter enclosure.
- Be located within a maximum of 7 m (23') of continuous conduit run from the meter enclosure.
- Be mounted so the bottom of the enclosure is no less than 7.6 cm (3") above the finished grade.
- Be mounted so the bottom of the enclosure is no more than 1.5 m (60") above the finished grade.
- Conform to all other LEU Metering Standard requirements.

The CT enclosure shall be equipped with vertically hinged doors, which are non-removable, in the closed position. These doors shall be equipped with a latch and have provisions for securing the door with an LEU padlock. Cover plates are not acceptable on current transformer enclosures.

### 2.2.11 Latches and Locking Mechanisms

Provisions for securing the padlock shall be metal. Plastic latches or locking mechanisms are not acceptable.

### 2.2.12 Conduit Requirements

A conduit, of 31.75 mm (1 1/4") minimum diameter and a maximum length of 7 m (23'), is required between the current transformer enclosure and meter enclosure. This conduit shall be terminated with lock nuts and bushings except where threaded hubs are supplied.

A reserved conduit shall be installed through each compartment for the exclusive use of LEU. This conduit shall be run continuously and uninterrupted. It shall be equipped with a continuous length of poly pull string and identified as for use by "LEU METERING".

The number of bends shall be kept to a minimum, but in no

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case shall there be more than three 90 degree bends (or the equivalent of three 90 degree bends).

The metering conduit run within the switchgear and between the switchgear and the meter cabinet shall not have fittings with removable covers. If LB's, or similar conduit fittings must be used, then they shall be sealable and clearly visible. Permission must be granted by LEU Metering for the use of LB's or similar fittings.

### **2.2.13 Splitter Trough Applications**

A lockable, suitably rated splitter trough for the application, located immediately after, and on the load side of the main disconnect for the building shall be provided. Each service coming out of the splitter trough must go directly into a lockable disconnect before proceeding to the individual socket type meter base (Figure 2).

## **3 RESIDENTIAL SERVICES**

### **3.1 SINGLE PHASE RESIDENTIAL SERVICES - SINGLE METER INSTALLATIONS**

These services are generally single-phase 120/240 volt, 200 A or less, self-contained services supplying residential houses in urban and rural areas.

#### **3.1.1 Front Serviced Lots**

**Meter locations shall meet the following criteria:**

- Be located 0.15 m minimum to 1.5 m maximum from the closest point on the dwelling nearest to the point of service coil location measured to the nearest edge of the meter.
- Mounted 1.5-1.8 m above finished grade to center point of meter.
- Maintain 1 m clearance in all directions from any obstruction not attached to the same structure as the meter (structure, vegetation, deck, stairs, etc.) as shown in Figure 3.



## CUSTOMER METERING REQUIREMENTS

- Maintain 0.5 m horizontal clearance from a door, window, wall, vents, pipes, etc. on the same structure as the meter. See Figure 3.
- Maintain 1 m vertical clearance from any external piping or exhaust vents.
- Not be over a window, window well, stairs, deck, or veranda.
- Be accessible for reading and maintenance without requiring passage through restricted areas, gates, or fences.
- On an exterior wall; not under a carport, in a breezeway, porch, or other area that can be enclosed with building expansion or fence.
- Within 10m of service box. The LEU will not splice secondary service wires.

If the final grade is to be completed at a future date, the customer must supply a platform to meet the height requirements.

A meter whose height above any finished grade becomes greater or less than the specified limits or a meter that is otherwise rendered inaccessible due to alterations to the building or finished grade level, must be moved and be brought into the limits specified above within 30 days after receipt of notification.

The customer's conductor will connect to the bottom meterbase jaws; the customer's neutral will connect to the top neutral jaw. LEU's conductor will connect to the top meterbase jaws, the LEU neutral wire will connect to the bottom neutral jaw. Exception, when using a meterbase that includes a main disconnect, all LEU's conductors and neutral connects to the top jaws and the customers connect to the bottom jaws.

### **The Customer shall:**

- Ensure the address registered with the customer's site ID is spray painted on the foundation.

## CUSTOMER METERING REQUIREMENTS

- Supply and install a CSA or ULC approved low voltage, socket type meterbase..
- Supply and install 50 mm line conduits to a depth of 0.75 m from final grade and load side conduits, frost expansion sleeves, and all service entrance equipment.

### **LEU Shall:**

- Supply and install the meter.
- Install utility conductor, and terminate on line side of meter.
- Backfill trench.

### **3.1.2 Rear Serviced Lots**

All servicing and meter locations for rear serviced lots must be planned and approved by the Electric Design Department. Please contact [electricdesign@lethbridge.ca](mailto:electricdesign@lethbridge.ca) to arrange servicing and plan meter and line locations a minimum of 4-6 weeks prior to the desired service connection date.

The LEU encourages meters to be mounted as close to the source as possible to limit exposure of utility assets to private property. Meters mounted on the alley facing side of garages are acceptable and require 0.1 m clearance from garage doors and edge of building.

#### *3.1.2.1 Overhead Services*

A service mast may be 3.5-5.5m in attachment height and the conductor must meet AEUC sag requirements. Contact [electricdesign@lethbridge.ca](mailto:electricdesign@lethbridge.ca) for attachment height requirements.

As overhead wires exert significant forces when under design loads, service masts must be located within the following distances from the nearest available overhead line to ensure the service mast is subjected to less than 3100 N under design load conditions. Longer spans may be accepted by the LEU upon written application, including allowed design

## CUSTOMER METERING REQUIREMENTS

tensions and connection heights.

*Table 1 Maximum Overhead Service Lengths*

Maximum Overhead Service Conductor Lengths	
Service Size/Voltage	Allowable Conductor Length (m)
100A – 120/240 V – 1ph	30
200A – 120/240 V – 1ph	20
200A – 208/120V – 3ph	20
400A – 208/120V – 3ph	15

### **Meter locations shall meet the following criteria:**

- Mounted 1.5-1.8 m above finished grade to center point of meter.
- Maintain 1 m clearance in all directions from any obstruction not attached to the same structure as the meter (structure, vegetation, deck, stairs, etc.) as shown in Figure 3.
- Maintain 0.5 m horizontal clearance from a door, window, wall, vents, pipes, etc. on the same structure as the meter. See Figure 3.
- Maintain 1 m vertical clearance from any external piping or exhaust vents.
- Not be over a window, window well, stairs, deck, or veranda.
- On an exterior wall; not under a carport, in a breezeway, porch, or other area that can be enclosed with building expansion.

If the final grade is to be completed at a future date, the customer must supply a platform to meet the height requirements.

## CUSTOMER METERING REQUIREMENTS

A meter whose height above any finished grade becomes greater or less than the specified limits or a meter that is otherwise rendered inaccessible due to alterations to the building or finished grade level, must be moved and be brought into the limits specified above within 30 days after receipt of notification.

The LEU conductors terminate at the customer supplied weatherhead.

### **The Customer shall:**

- Ensure the address registered with the customer's site ID is spray painted on the foundation.
- Supply and install a CSA or ULC approved low voltage, socket type meterbase.

### **LEU Shall:**

- Supply and install the meter.
- Install utility conductor, and terminate on line side of meter.

### *3.1.2.2 Underground Services*

### **Meter locations shall meet the following criteria:**

- As close as possible to the rear of the lot.
- Mounted 1.5-1.8 m above finished grade to center point of meter.
- Maintain 1 m clearance in all directions from any obstruction not attached to the same structure as the meter (structure, vegetation, deck, stairs, etc.) as shown in Figure 3.
- Maintain 0.5 m horizontal clearance from a door, window, wall, vents, pipes, etc. on the same structure as the meter. See Figure 3.
- Maintain 1 m vertical clearance from any external piping or exhaust vents.
- Not be over a window, window well, stairs, deck, or

## CUSTOMER METERING REQUIREMENTS

veranda.

- Be accessible for reading and maintenance without requiring passage through restricted areas, gates, or fences.
- On an exterior wall; not under a carport, in a breezeway, porch, or other area that can be enclosed with building expansion or fence.

If the final grade is to be completed at a future date, the customer must supply a platform to meet the height requirements.

A meter whose height above any finished grade becomes greater or less than the specified limits or a meter that is otherwise rendered inaccessible due to alterations to the building or finished grade level, must be moved and be brought into the limits specified above within 30 days after receipt of notification.

The customer's conductor will connect to the bottom meterbase jaws; the customer's neutral will connect to the top neutral jaw. LEU's conductor will connect to the top meterbase jaws, the LEU neutral wire will connect to the bottom neutral jaw. Exception, when using a meterbase that includes a main disconnect, all LEU's conductors and neutral connects to the top jaws and the customers connect to the bottom jaws.

Meterbase location and trench line assignment must be approved by electric design ([electricdesign@lethbridge.ca](mailto:electricdesign@lethbridge.ca))

### **The Customer shall:**

- Ensure the address registered with the customer's site ID is spray painted on the foundation.
- Supply and install a CSA or ULC approved low voltage, socket type meterbase.
- Supply and install 50 mm line conduits to a depth of 0.75 m from final grade and load side conduits, frost expansion sleeves, and all service entrance equipment.

## CUSTOMER METERING REQUIREMENTS

- Supply 1-50 mm conduit for electric and 2-20 mm for communication as needed.
- Trench 0.6 m deep from rough grade in private property to property line. Finished grade depth is 1-1.2 m.
- Backfill and compact on private property.

### **LEU Shall:**

- Supply and install the meter.
- Install utility conductor, and terminate on line side of meter.
- Excavate, backfill and compact trench in public right of way.

### **3.2 SINGLE PHASE RESIDENTIAL SERVICES - INSTRUMENT TRANSFORMER METERING**

These services are required where the load will exceed 200 A.

#### **3.2.1 Installation**

##### **Such meter installations shall:**

- Be cold metered.
- Have the metering equipment mounted on the outside of the house.
- Be located 0.15 m minimum to 1.5 m maximum from the closest point on the dwelling nearest to the point of service coil location measured to the nearest edge of the meter,
- Be mounted 1.5-1.8 m above finished grade to center point of meter.
- Maintain 1 m clearance in all directions from any obstruction not attached to the same structure as the meter (structure, vegetation, deck, stairs, etc.) as shown in Figure 3.
- Maintain 0.5 m horizontal clearance from a door,

## CUSTOMER METERING REQUIREMENTS

window, wall, vents, pipes, etc. on the same structure as the meter. See Figure 3.

- Maintain 1 m vertical clearance from any external piping or exhaust vents.
- Not be over a window, window well, stairs, deck, or veranda.
- Be accessible for reading and maintenance without requiring passage through restricted areas, gates, or fences.
- Be on an exterior wall; not under a carport, in a breezeway, porch, or other area that can be enclosed with building expansion or fence.
- Have location of metering equipment be determined and approved with LEU Design and Metering staff.

### **The Customer shall:**

- Ensure the address registered with the customer's site ID is spray painted on the foundation.
- Supply and install the service disconnect on the outside of the house.
- Supply and install CT/Metering cabinet and a 4-jaw meter socket.
- Supply and install 75 mm line conduits to a depth of 0.75 m from final grade and load side conduits, frost expansion sleeves, and all service entrance equipment.
- Trench 0.6 m deep from rough grade in private property to within 1 m of service coil provided finished grade depth are 1-1.2 m.

### **LEU shall:**

- Supply the required current transformers.
- Supply and install the secondary metering wiring.
- Supply and install the meter.

## CUSTOMER METERING REQUIREMENTS

- Backfill trench.

### **3.3 SINGLE PHASE MULTIPLE RESIDENTIAL SERVICES**

These services are generally single-phase 120/240 volt or 120/208 volt self-contained services supplying a building that has several meters mounted on or in a single structure.

#### **3.3.1 Duplexes**

Each unit of a duplex is treated as a single detached dwelling.

#### **Meter locations shall meet the following criteria:**

- Be located 0.15 m minimum to 1.5 m maximum from the closest point on the dwelling nearest to the point of service coil location measured to the nearest edge of the meter.
- Mounted 1.5-1.8 m above finished grade to center point of meter.
- Maintain 1 m clearance in all directions from any obstruction not attached to the same structure as the meter (structure, vegetation, deck, stairs, etc.) as shown in Figure 3.
- Maintain 0.5 m horizontal clearance from a door, window or wall on the same structure as the meter. See Figure 3.
- Maintain 1 m vertical clearance from any external piping or exhaust vents.
- Meter cannot be over a window, window well, stairs, deck, or veranda.
- Accessible for reading and maintenance without requiring passage through restricted areas, gates, or fences.
- On an exterior wall; not under a carport, in a breezeway, porch, or other area that can be enclosed with building expansion or fence.



## CUSTOMER METERING REQUIREMENTS

If the finished grade is to be completed at a future date, the customer must supply a platform to meet the height requirements.

A meter whose height above any finished grade becomes greater or less than the specified limits; or, meter that is otherwise rendered inaccessible due to alterations to the building or finished grade level, must be moved and be brought into the limits specified above within 30 days after receipt of notification.

The customer's conductor will connect to the bottom meterbase jaws; the customer's neutral will connect to the top neutral jaw. LEU's conductor will connect to the top meterbase jaws, the LEU neutral wire will connect to the bottom neutral jaw. Exception, when using a meterbase that includes a main disconnect, all LEU's conductors and neutral connects to the top jaws and the customers connect to the bottom jaws.

### **The Customer shall:**

- Ensure the address registered with the customer's site ID is spray painted on the foundation.
- Supply and install a CSA or ULC approved low voltage, socket type meter base.
- Supply and install 50 mm line conduits to a depth of 0.75 m from final grade and load side conduits, frost expansion sleeves, and all service entrance equipment.

### **LEU Shall:**

- Supply and install the meter.
- Install utility conductor, and terminate on line side of meter.
- Backfill trench.

## CUSTOMER METERING REQUIREMENTS

### 3.3.2 Multiplexes

It is mandatory the developer/builder contact LEU's design office prior to lot servicing and architectural plans are prepared in order to achieve proper servicing.

Servicing styles will be determined by the Developer of the residential subdivision. If the builder wishes to change the servicing style, the Builder will bear all costs for removing existing infrastructure and installing new.

A multiplex may be serviced using a meter bank mounted on the side opposite the gas service. There must be a minimum 150mm clearance between the meter bank and the main disconnect.

OR

The multiplex may be serviced with individual meters on each unit.

**In either case such meter installations shall meet the following criteria:**

- All units must have the meter mounted closest to the service coil location. If end units have meters mounted on side of building, meters must be mounted 0.15 m minimum to 1.5 m maximum from the front of the unit measured to the nearest edge of the meter.
- Be mounted 1.5-1.8 m above finished grade to center point of meter. If vertical stack meterbases are used, the bottom of the meter base must have 0.5m clearance from finished grade.
- Maintain 1.0 m clearance in all directions from any obstruction not attached to the building (structure, vegetation, deck, stairs, etc.) as shown in Figure 3.
- Maintain 0.5m horizontal clearance from a door, window deck, stairs, or wall on the same structure as the meter. See Figure 3.

## CUSTOMER METERING REQUIREMENTS

- Maintain 1 m vertical clearance from any external piping or exhaust vents.
- Meter cannot be over a window, window well, stairs, deck or veranda.
- Be accessible for reading and maintenance without requiring passage through restricted areas, gates, or fences.
- Be on an exterior wall; not under a carport, in a breezeway, porch, or other area that can be enclosed with building expansion or fence.

If the finished grade is to be completed at a future date, the customer must supply a platform to meet the height requirements.

A meter whose height above any finished grade becomes greater or less than the specified limits; or a meter that is otherwise rendered inaccessible due to alterations to the building or finished grade level, must be moved and be brought into the limits specified above within 30 days after receipt of notification.

### **The Customer shall:**

- Ensure the address registered with the customer's site ID is spray painted on the foundation.
- Supply and install a CSA or ULC approved low voltage, socket type meter base.
- Supply and install 50 mm line and load side conduits, frost expansion sleeves, and all service entrance equipment.

### **LEU Shall:**

- Supply and install the meter.
- Install utility conductor, and terminate on line side of meter.
- Backfill trench

## CUSTOMER METERING REQUIREMENTS

### **3.4 APARTMENTS AND ASSISTED LIVING FACILITIES WITH MULTIPLE METERS**

These services are generally single-phase 120/240 volt or 120/208 volt self-contained services within a building that has several meters supplied from a single service entrance. Meters are typically located inside the building. LEU must have access to meters at all times. This may involve supplying keys to LEU to ensure access. For meter configuration see Figure 2.

## CUSTOMER METERING REQUIREMENTS

### **4 COMMERCIAL OR INDUSTRIAL SECONDARY SERVICES**

#### **4.1 GENERAL**

For commercial services in which the service entrance/metering is not located on the main floor, an approved stairway, elevator, and/or escalator must be installed to facilitate the transfer of equipment to, and from, the electrical room. Ladders do not provide appropriate access and are, therefore, not acceptable.

Contractors should make every attempt to mount the meter base at 1.5-1.8 m in height.

Metering shall be mounted within or on the outside of the building it is servicing. No buildings shall be subfled from another.

#### **4.2 COMMERCIAL SERVICES - SELF-CONTAINED NETWORK METERING**

It is mandatory the developer/builder contact LEU design office prior to lot servicing and architectural plans are prepared in order to achieve proper servicing.

**Such meter installations shall meet the following criteria:**

- Maintain 1.0 m clearance in all directions from any obstruction not attached to the building (structure, equipment, stairs, etc.) as shown in Figure 3.
- Maintain 0.5 m horizontal clearance from a door, window, stairs, or wall on the same structure as the meter. See Figure 3.
- Meter cannot be over a window or stairs.

If the finished grade is to be completed at a future date, the customer must supply a platform to meet the height requirements.

A meter whose height above any finished grade becomes greater or less than the specified limits; or, meter that is otherwise rendered inaccessible due to alterations to the

## CUSTOMER METERING REQUIREMENTS

building or finished grade level, must be moved and be brought into the limits specified above within 30 days after receipt of notification.

The main service disconnect, splitter box, and sub-service disconnects must have provision for LEU padlocks.

### **The customer shall:**

- Supply and install an approved meter socket.
- Supply and install all service entrance equipment.
- Identify all meter sockets and disconnects by address (or unit number) with a permanent, legible label (and unit electrical panels if site has more than one electric meter).
- Mount the meter with the centerline of the meter at a height of 1.5 m to 1.8 m above the finished grade.
- Supply a neutral conductor that must be pulled into and terminated at an isolated neutral block.

### **LEU shall:**

- Supply the meter.
- Install the meter.

### **4.2.1 Multiplex Units on Condominium Sites**

These sites shall be metered using banked meters on the side opposite the gas service entrance.

### **such meter installations shall meet the following criteria:**

- Maintain 1.0 m clearance in all directions from any obstruction not attached to the building (structure, vegetation, deck, stairs, etc.) as shown in Figure 3.
- Be mounted 1.5-1.8 m above finished grade to center point of meter. If vertical stack meterbases are used, the bottom of the meter base must have 0.5m clearance from finished grade.

## CUSTOMER METERING REQUIREMENTS

- Maintain 0.5m horizontal clearance from a door, window deck, stairs, or wall on the same structure as the meter. See Figure 3.
- Maintain 1 m vertical clearance from any external piping or exhaust vents.
- Meter cannot be over a window, window well, stairs, deck or veranda.
- Be on an exterior wall; not under a carport, in a breezeway, porch, or other area that can be enclosed with building expansion or fence.

If the finished grade is to be completed at a future date, the customer must supply a platform to meet the height requirements.

A meter whose height above any finished grade becomes greater or less than the specified limits; or a meter that is otherwise rendered inaccessible due to alterations to the building or finished grade level, must be moved and be brought into the limits specified above within 30 days after receipt of notification.

### **The Customer shall:**

- Ensure the address registered with the customer's site ID is spray painted on the foundation.
- Supply and install a CSA or ULC approved low voltage, socket type meter base.
- Supply and install 100 mm line and load side conduits, frost expansion sleeves, and all service entrance equipment.
- Ensure 150mm clearance from the meter base and the main disconnect.

### **LEU Shall:**

- Supply and install the meter.

### **4.2.2 Small Commercial Services**

Small commercial services, typically <60A single phase

## CUSTOMER METERING REQUIREMENTS

services are exempt from cold metering requirements. This applies to services like irrigation controllers and small lighting services. Contact LEU Metering for approval of exemption.

Irrigation controllers shall have the metering mounted on the outside of the controller box.

### **4.3 THREE-PHASE COMMERCIAL SERVICES – INSTRUMENT TRANSFORMER METERING**

These are services not exceeding 150kVA. Metering shall be located on the load side of the customer's breaker. Meters and instrument transformer enclosures shall be located in the same room inside the building (Figure 2).

The main service disconnect, splitter box, and sub-service disconnects, must have provision for LEU padlocks.

#### **The customer shall:**

- Supply and install a 13-jaw meter.
- Supply and install an instrument transformer enclosure as specified in Table 2.
- Be responsible to make the primary connections to the instrument transformers.
- Identify all meter sockets, disconnects, and unit electrical panels by address (or unit number) with a permanent legible label.
- Mount the meter with the centerline of the meter at a height of 1.5 m to 1.8 m above the finished grade.

Note: Where the customer's installed capacity is above 200 A, refer to section 4.4.1 for additional requirements.

#### **LEU shall:**

- Supply and install any needed Circuit Transformers
- Make all the secondary connections.
- Supply the meter.
- Install the meter.



## CUSTOMER METERING REQUIREMENTS

### **4.4 COMMERCIAL/INDUSTRIAL SECONDARY SERVICING – INTERVAL METERING**

#### **4.4.1 Existing Site**

Where a customer's peak load is above 300 kVA twice in the previous 365 days, or upon a customer's request, an interval meter, that is capable of remote interrogation, will be installed. At an existing site, where modifications are made to the infrastructure requiring a Demand greater than 300 kVA, an interval meter will be installed.

LEU will cover the cost of interval metering equipment if the customer's peak load is above 300 kVA twice in the previous 365 days. Otherwise, LEU does not require interval metering and the customer shall assume the cost of interval metering upgrade, communication line, and raceway installation. Please contact LEU Metering at 311 or email [electricdesign@lethbridge.ca](mailto:electricdesign@lethbridge.ca) for more details.

#### **4.4.2 New Site**

An interval meter will be installed at all new sites with a planned installed capacity of 300 kVA or greater. To allow for automatic meter reading, a 32 mm (1-1/4") EMT communication conduit shall be installed from the meter enclosure to an antenna box located outside the building. There shall be a 1-1/4"x 2" (32 mm x 50 mm) nipple.

In all cases, the box dimensions shall be 10"x12"x6" (254 mm x 300 mm x 150 mm) PVC or fiberglass. There shall be a 120 Vac duplex outlet installed in the top right hand corner of the box.

The customer may be required to run a 3/4" telephone line conduit from the telephone company demarcation point to the meter cabinet if other suitable communication methods are not available. This requirement will be determined by LEU Metering.

### **4.5 SHOPPING MALLS**

Metering shall be located on the load side of the customer's breaker. For services where the load exceeds 200 A, meters

## CUSTOMER METERING REQUIREMENTS

and instrument transformer enclosure shall be located in the same room inside the building (Figure 2).

The main service disconnect, splitter box, and sub-service disconnects, must have provision for LEU padlocks.

### **The customer shall:**

- Supply and install a meter socket as specified in Tables 1 & 2.
- Supply and install an instrument transformer enclosure as specified in Table 2.
- Be responsible to make the primary connections to the instrument transformers.
- Identify all meter sockets, disconnects, and unit electrical panels by address (or unit number) with a permanent, legible label.
- Mount the meter with the centerline of the meter at a height of 1.5 m to 1.8 m above the finished grade.

Note: Where the customer's installed capacity is above 300 kVA, refer to section 4.3 for additional requirements.

### **LEU shall:**

- Supply and install any needed Circuit Transformers
- .
- Make all the secondary metering connections.
- Supply the meter.
- Install the meter.

## **4.6 RESISTIVE GROUNDED SERVICES**

The customer must obtain approval from LEU before installing a resistive grounded system. LEU must be contacted for service requirements.

## CUSTOMER METERING REQUIREMENTS

### **5 COMMERCIAL OR INDUSTRIAL PRIMARY METERED SERVICE**

#### **5.1 SERVICE APPLICATION AND ACCEPTANCE**

For Primary Metered Services, a kick-off meeting must be arranged prior to project initiation that includes LEU Metering, and Electric Design.

High voltage, main service switchgear shop drawings, and a single line diagram with the metering point clearly marked, must be submitted for acceptance, as soon as completed. This is to ensure LEU Metering can order any necessary equipment required to complete metering arrangements without delay. The lead time between the placement of an order of high voltage equipment and delivery can be up to 6 months.

Manufacturing of equipment should not start until all final drawings have been reviewed and accepted by LEU and CEC Part 1 Inspectors. This will avoid costly alterations to equipment already built.

#### **5.2 OUTDOOR PRIMARY METERING REQUIREMENTS**

All primary metered customers will be serviced using an outdoor Primary Metering Unit (PMU) that will be supplied and installed by LEU.

##### **The Customer will:**

- Supply all customer owned cables running between the metering unit and the customer's switchgear, including terminations. Terminations must be approved by LEU to ensure they will mate with PMU.
- Provide a permanent location for the PMU including easements for metering and City owned conductor on private property.
- Perform all excavation on private property

##### **The City will supply:**

- A complete PMU.

## CUSTOMER METERING REQUIREMENTS

- All metering CTs and PTs.
- Power supply for PMU.
- Utility cables running to metering station.
- Bollards or other mechanical protection as deemed necessary by LEU design.

### **6 USE OF METERING SIGNALS FOR CUSTOMER LOAD MANAGEMENT SYSTEM**

LEU may provide metering signals to customers, commonly within the commercial and industrial rate classes, for their load management system upon receipt of a written request. In those circumstances, where the metering signal is not an integral part of the customer's existing metering installation, LEU Metering may require the customer to make necessary installation changes and/or upgrades at the cost of the customer. The customer may be required to provide a 120 V AC power supply with a duplex receptacle.

Note: If the customer requires pulse outputs and there is no auxiliary panel, they shall provide the panel complete with a dedicated duplex receptacle.

Any required auxiliary metering equipment necessary shall be electrically isolated from LEU Metering facilities. LEU Metering will maintain its metering installation during normal working hours. However, it accepts no liability for the operation of customer's auxiliary metering equipment and continuity of such signals.

LEU will not supply a time interval pulse under any circumstances.

The standard metering signals that may be available from LEU metering installations, are watt-hour (Wh), and Volt-Amperes Reactive hour (VARh). The customer shall assume all incremental costs incurred by LEU in order for the provision of metering signals and maintenance of such equipment, including auxiliary metering equipment.

## CUSTOMER METERING REQUIREMENTS

*Table 2 - Voltage/Meterbase Configuration Requirements*

Self-Contained Meters (up to 200 A)				
Voltage	Phase	Wire	Connection	Socket
120/240	1	3		4 Jaw
120/208	1	3	Network	5 Jaw*
120/208	3	4	Star (Y)	7 Jaw
277/480**	3	4	Star (Y)	7 Jaw
347/600	3	4	Star (Y)	7 Jaw

\* The fifth jaw of the network meter must be located at the 9 o'clock position

\*\*This voltage class is non-typical and will require long lead times for installation.

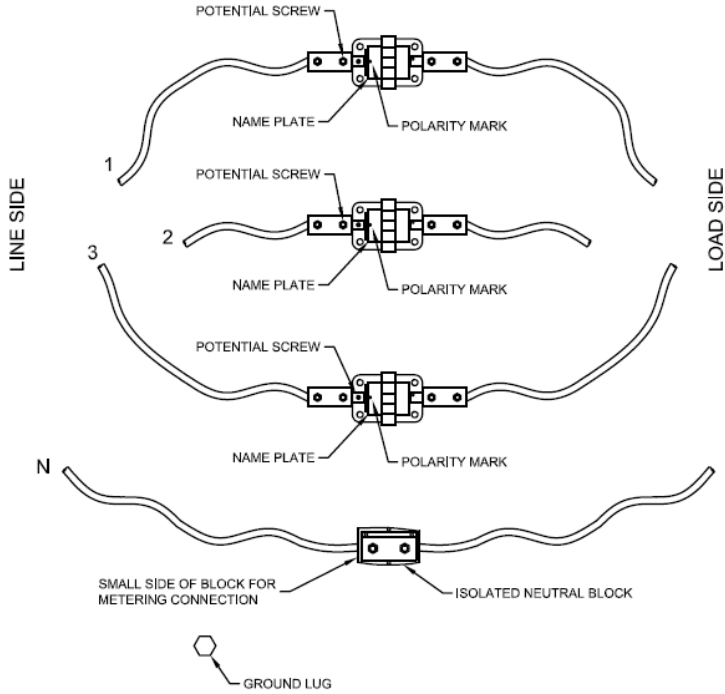
# CUSTOMER METERING REQUIREMENTS

*Table 2 - Current Transformers (CTs) And Enclosures*

Service			Service Size in Amps	Current Transformer Enclosure			No. of CTs Required
Voltage	Phase	Wire		Size cm (in)			
				H	W	D	
120/240	1	3	200-400	61 (24)	61 (24)	25 (10)	1 3-wire
120/240	1	3	401-600	76 (30)	76 (30)	25 (10)	1 3-wire
120/208 Y	3	4	200-600	76 (30)	76 (30)	25 (10)	3 2-wire
120/208 Y	3	4	601-1200	91 (36)	91 (36)	30 (12)	3 2-wire
120/208 Y	3	4	1201-1500	122 (48)	122 (48)	30 (12)	3 2-wire
277/480 Y	3	4	200-1200	91 (36)	91 (36)	30 (12)	3 2-wire
277/480 Y	3	4	1201-3000	122 (48)	122 (48)	30 (12)	3 2-wire
347/600 Y	3	4	200-1200	91 (36)	91 (36)	30 (12)	3 2-wire
347/600 Y	3	4	1201-3000	122 (48)	122 (48)	30 (12)	3 2-wire

Note: All dimensions are minimums.

## CUSTOMER METERING REQUIREMENTS

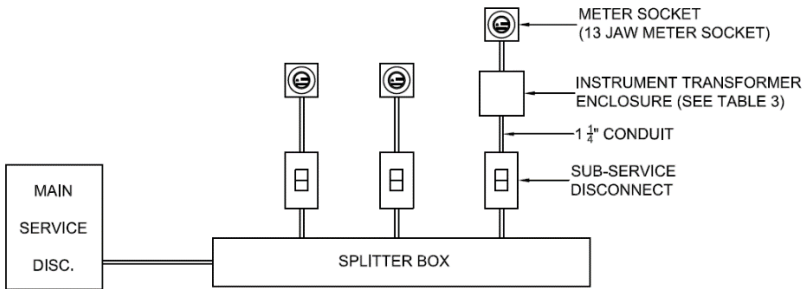


### Notes:

1. The neutral conductor must be run into the instrument transformer enclosure. The customer must install an isolated neutral block to facilitate connection of the potential wire for metering.
2. If load and line are reversed, the CT's must be reversed so that the polarity marks are always on the line side.
3. The isolated neutral block must be insulated from the enclosure and cannot be grounded.
4. Where parallel conductors are used for greater ampacity, only one neutral conductor need be connected to the isolated neutral block.

*Figure 1 – CT Wiring Design*

# CUSTOMER METERING REQUIREMENTS



- All meter sockets and sub-service disconnects must be identified by address and/or unit number with permanent legible label
- Main service disconnect, splitter box, and sub-service disconnects must have provision for City of Lethbridge padlocks or seals.

*Figure 2 – Splitter Trough Configuration*



# CUSTOMER METERING REQUIREMENTS

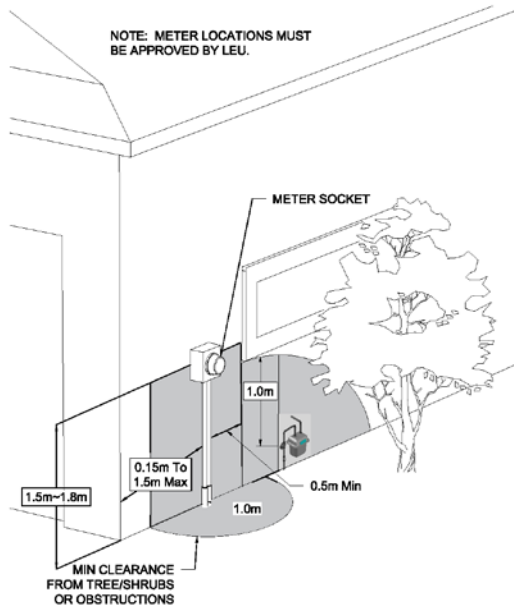


Figure 3 – Meterbase Clearance Requirements