



METERING STANDARD

ENMAX POWER CORPORATION (EPC)

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NOTE: THE CONTENTS OF THIS DOCUMENT MAY CHANGE, AND AS SUCH, IT IS THE RESPONSIBILITY OF THE READER TO ENSURE THEY ARE ACCESSING THE MOST RECENT VERSION.

Summary of Changes

Rev. #	Section	Change
2	Glossary	Updates to definitions for clarity
2	1.4 – Meter Location Standard	Clarified requirement for 98% nameplate efficiency of transformers installed line side of the utility meter
2	1.9 – DG& MGs	Corrected Email Link, group updated to GetConnected
2	1.10.3	Added that Minimum height is CEC requirement
2	1.12 - Meter Service Area Definition	Updated bulk metering verbiage for clarity
2	2.2.3 – Instrument Transformer Metering	Clarified type of conduit required
2	2.2.10 – Current Transformer Enclosures Table	Added note 2 for clarity
2	2.2.11 – Current Transformer Enclosures	Max Height allowed to be 1.7m
2	3.3.1 – Single Phase/Multiple Residential Services	Maximum number of services is now 4
2	7.2 – Interval New Site	Correction for Maximum Conduit Height
2	9 – Connectivity	Updated requirement – Customer must ensure city approved, up to date addressing plan on site
2	10 – Appendices	Figures 1, 3b, 8, 13, 17 Updated for Clarity

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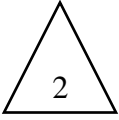
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Glossary

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

AECUC - Alberta Electrical and Communications Utility Code.



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

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 – Current version of Canadian Electrical Code, Part 1 and Amendments.

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

CSA - Canadian Standards Association.



Cold Sequence Metering - A disconnect is located immediately on the line side of each ENMAX meter, and is the designated disconnect for that meter and other downstream circuits

Disconnecting Device- Breaker, or 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.

EMT - Electrical Metal Tubing.

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

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 Sequence 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 1 minute, 5 minute, 15 minute, or 1 hour intervals.

LB's - An "L" shaped fitting which is a part of the conduit run that has a removable access cover.

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 ring - The distribution system is fed by multiple primary circuits whose secondaries are tied together to form a power grid or "network".

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.

SAW 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.

Time of Use Metering - Energy and demand registrations are segregated into time blocks during each day. Each time block is assigned a rate period. These rate periods are scheduled by time, day of the week, holidays, and/or season.

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

SCA - Alberta Safety Codes Act.

1 GENERAL REQUIREMENTS

1.1 General

The purpose of this Standard is to assist customers requiring information regarding ENMAX Metering standards. This section describes general requirements and is applicable to all subsequent sections within this Standard. If you have any questions about this Standard, please contact ENMAX Metering at 403-514-2807 or email revmetorder@enmax.com. A copy of this Standard can be found at:

https://www.ENMAX.com/ForYourBusinessSite/Documents/Revenue_Metering.pdf

Note: Services above 3000 Amps must notify Revenue Metering a minimum of 16 weeks in advance of installation requirement.

1.2 Access to Metering Equipment

ENMAX employees, or agents, must have reasonable and unhindered access to all ENMAX equipment for the purpose of reading, testing, and changing that equipment. Where ready access to the metering equipment is not given due to locked doors, ENMAX may request a key for its use. ENMAX may install a lock-box for the purpose of keeping the key on site.

1.3 Right to Refuse to Energize

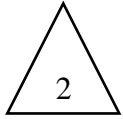
An electrical inspection and approval by the local authority having jurisdiction must have taken place prior to ENMAX meter installation.

ENMAX 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.

1.4 Meter Location Standard

ENMAX meters must be located on the load side of the customer's breaker / fused-disconnect (Cold Sequenced Metering). The only Hot Sequence installations allowed by ENMAX are single phase, residential meters that are self-contained and not serviced by the ENMAX network ring bus.

All new residential meters serviced by the ENMAX network ring bus, must be Cold Sequenced.



Customer transformers are not permitted to be installed on the line side of an ENMAX meter unless the transformer has a nameplate efficiency rating of 98% or greater. If the rating is not shown on the transformer nameplate, the customer must provide documentation which shows that the transformer conforms to this requirement.

A meter may not be enclosed inside a box, closet, or any construct deemed by ENMAX to restrict utility employee access.

Meter sockets may be recessed providing that 25 mm (2") clear space around the circumference of the socket is provided for every 25 mm (1"); or, fraction thereof that the rear face of the socket extends into the recess. When the building finish is meant to come flush around the circumference of meter sockets, the back of the ring shoulder of the socket shall protrude at least 6 mm (1/4") from the building finish. The meter socket must be mounted so that the jaws are plumb through all vertical planes and the socket cleaned of all foreign matter before the connection will be made.

The minimum allowable installation height of the bottom of the meter base is 0.46m (1.5ft) above finished grade

The maximum allowable installation height of the top of the meter base is 1.8m (5.9ft) above finished grade. (Preferred height is 1.5m above finished grade)

1.5 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 2.2 m high is required in front of all electrical equipment, and to the sides and back, where access is required. (CEC Part I, 2-2308 (1,5))

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 amps or more, or rated over 750V (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 H₂S gas, or where H₂S gas 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 ENMAX 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.

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

ENMAX will not install meters:

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

1.6 Care of Metering Equipment

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

The customer may not tamper with ENMAX owned equipment in any manner.

1.7 Temporary Meter Removal

The Customer must call ENMAX to request for the removal of a meter from an energized, metered service. Meters shall only be disconnected or re-installed by qualified ENMAX employees or agents.

1.8 Non-Standard Services

1.8.1 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 ENMAX Metering 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.

1.8.2 Drawings and Specifications

Equipment drawings, specifications, and site plans are required by ENMAX for non-standard services. In some cases, a hand drawn sketch that clearly shows the layout and 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 ENMAX Metering at RMPlanner@enmax.com

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

1.9 Distributed Generation (DG) and Micro Generation (MG) (also known as Distributed Energy Resources - DER)

1.9.1 DG and MG Applications



In some cases, the customer may want to install electric power production sources on site. Customers must obtain approval from ENMAX before installing and energizing this type of equipment. See Section 1.10 for more details on obtaining approval from ENMAX. For more information about this, or how to apply, please review this web site: <https://www.enmax.com/business/meter-services/distributed-generation>. Or you can email your questions to: GetConnected@enmax.com.

1.9.2 Seeking DG and MG Approval



Customers must obtain approval from ENMAX Get Connected Group (see above email for contact information) before installing and energizing on site electrical power sources.

1.9.3 Recognized Points of Isolation

ENMAX electrical equipment, which requires maintenance work upon it, shall have a Disconnecting Device to isolate it from all ungrounded conductors of all sources of supply; this includes the utility supply and any on site electrical power production sources. ENMAX does not recognize any type of Transfer Switch as a suitable means of disconnect.

1.9.4 Warning Notice and Diagrams

Sites with on-site electrical power production sources shall install warning notice of an interconnected system at the meter socket and at the *Disconnect Mean* location.

A permanent, legible, and accurate single line diagram of the interconnected system to be installed in a conspicuous place at the supply authority *disconnecting means*.

1.9.5 Onsite Generation Metering

For customers with a DG system between 1MW to 5MW, a separate non-revenue metering system may be required to meter the generation output. The generation source is required to be metered separately from the rest of the load sources. Please note that the metering instrument CTs and Pts from the ENMAX Metering system cannot be utilized for the generation non-revenue meter. The customer is required to provide specific data. For more details, please contact generationinterconnection@enmax.com.

1.10 Construction Requirements

1.10.1 Electrical Modifications to Existing Services

Commercial customers planning any modifications or additions to their electrical system, shall notify ENMAX at (403)514- 2807 or email to revmetorder@enmax.com before modifying an existing service. These additions include: increased load, back-up power supplies, on site power production sources, and transfer switches. Early contact with ENMAX will help ensure that any additions, or changes, are not effecting ENMAX infrastructures and capability to supply the service safely. The customer may be charged or be responsible for, costs associated with any change required to ENMAX equipment due to the service modification. Customers requesting approval, may be required to make upgrades to their existing electrical equipment to meet ENMAX Metering standards. The customer is responsible to make the required changes.

1.10.2 Temporary Services

All temporary construction (SAW) services must be located on the load side of the customers' HRC fused-disconnect (Cold Sequence Metering).

The SAW pole and installation must have approval and proof of inspection by the local jurisdiction having authority.

1.10.3 Customer's Service Head/Mast Location

The Customer's service head, or equivalent, must be located at a height no greater than 18 ft. (5.5 m) above finished grade. The service head and attachment point are owned by the Customer. The minimum height is dictated by the CEC Part 1.

1.11 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.

1.12 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 of a contained unit, for example:

- A dwelling unit within an apartment building, duplex, or fourplex, or
- A bay within a commercial complex.

Each clearly defined area must have a unique municipal address. Each clearly defined area must have a unique Site ID.

All units in new multi-unit buildings (residential or commercial) will be metered and billed on an individual basis unless EPC agrees otherwise

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 ENMAX Metering (refer to section 1.8 Non-Standard Services for further instructions).

The purpose of this regulation is to ensure that ENMAX Metering, meters accurately and measures the customers' consumption.

2 TYPES OF METERING

2.1 Self-Contained Metering

2.1.1 Load Limit

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

2.1.2 Voltage Limit

The maximum voltage limit for a self-contained meter is 600-volt phase to phase.

Table 1

Self-Contained Meters (up to 200 amps)					
Voltage	Phase	Wire	Connection	Socket	Figure
120/240	1	3	Residential	4 Jaw	5
120/208	3	3	Apartment	5 Jaw	6
120/208	3	4	Star (Y)	7 Jaw	7
277/480	3	4	Star (Y)	7 Jaw	7
347/600	3	4	Star (Y)	7 Jaw	7

Meter sockets are to be mounted:

- As close as possible to the service box.
- In a clean, readily accessible area that is satisfactory to ENMAX.
- Free from severe or continual vibration.
- Level on the horizontal and vertical planes (buildings with sloping sides require special provisions).
- The main service disconnect, splitter box, and sub-service disconnects must have provision for ENMAX padlocks.

2.1.3 Supply of Self-contained Metering Equipment

The Customer shall:

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

ENMAX shall:

- Supply the meter and install the meter in the socket.

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

2.2 Instrument Transformer Metering

2.2.1 General

Instrument transformer type metering is required on all services exceeding 200 amps per phase. Contact ENMAX Metering if you require instrument transformers for an installation. A Site ID and Electrical permit are required prior to ordering instrument transformers.

2.2.2 Instrument Transformer Metering Equipment Location

For ENMAX 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 ENMAX Metering equipment only.

The instrument transformer enclosure and meter base shall be installed in the same room as the main disconnect that feeds the respective meter.

2.2.3 Supply of Instrument Transformer Metering Equipment

The Customer shall:

- Supply and install a manufacturer pre-wired meter enclosure according to specifications shown in Table 2.
- Supply and install a current transformer enclosure according to specifications shown in Table 3.



- Supply and install a 31.75 mm (1 1/4") EMT conduit between the current transformer and the meter enclosure for poly-phase installations, or a 25.4 mm (1") EMT 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.

ENMAX 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 ENMAX Metering. Customer shall provide site ID, service address, and Electrical Permit number to ENMAX when requesting instrument transformers.

ENMAX METERING
141 50 Ave SE
Calgary, Alberta, T2G 4S7
Phone: (403) 514-2807

2.2.4 Mounting of Instrument Metering Equipment

The Customer is required to mount:

- A meter enclosure.
- A current transformer enclosure.
- All current transformers.
- An EMT conduit between current transformer enclosure and meter enclosure.

The customer shall assume the cost of installing the above metering equipment.

The current transformers 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 current transformer must be utilized.
- Ensure that the current transformer nameplates are clearly visible when the enclosure is open.
- Ensure that the current transformers 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 4).
- For single phase 3 wire CT's, the supply, (line1/line2) shall be connected to the same side of the CT (Figure 2, pg 35)).

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 that is accessible to ENMAX Metering. Please refer to diagram 'N' in figure 4.

Damaged current transformers are required to be replaced before energization.

ENMAX Metering will make all the connections to 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 a manufactured, pre-wired, 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. Only the exact models listed in table 2 are allowed.

Table 2

Socket Type #	Service Type	Service Size (> 200 Amps)	Specifications	Approximate Dimensions H x W x D (cm)	Manufacturer Model No.	Manufacturer
1	3 ϕ , 4Wire, Wye	120/208, 277/480, 347/600	13 Jaw c/w Test switch	48 x 30 x 14	CT113-SWL	Thomas & Betts, Microelectric Canada
1	3 ϕ , 4Wire, Wye	120/208, 277/480, 347/600	13 Jaw c/w Test switch	51 x 31 x 12	602C3040C13- 603	Meter Devices
2	1 ϕ , 3Wire	120/240	4 Jaw c/w Test Switch 120/240 Volt	49 x 31 x 14	CT104-6SWL	Thomas & Betts, Microelectric Canada
2	1 ϕ , 3Wire	120/240	4 Jaw c/w Test Switch 120/240 Volt	51 x 31 x 13	C3435-O-WC-31	Millbank Mfg. Co.
2	1 ϕ , 3Wire	120/240	4 Jaw c/w Test Switch 120/240 Volt	51 x 31 x 11	URSTL5-2C446	The Durham Company

Note: Meter enclosures are available through local distributors.

Location

Meter enclosure shall be located:

- Indoor in a clean readily accessible area that is satisfactory to ENMAX.
- In the same room as the current transformer enclosure.
- Within a maximum of 7 m (23') conduit run from the current transformer enclosure.
- Each meter position shall be "Cold Sequence 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 an ENMAX padlock.

Mounting

Meter enclosures shall be mounted:

- With the height of the enclosure no lower than 0.46m and no higher than 1.8 m above finished grade (as per section 1.4)
- On ¾" sheet of plywood.
- Level on both the horizontal and vertical planes.
- Free of severe or continual vibration.

2.2.7 Grounding

Each meter enclosure must be bonded to system ground.

2.2.8 Current Transformer Enclosures

A separate current transformer enclosure is required for each instrument transformer service according to the specifications shown in Table 3.

2.2.9 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 an ENMAX padlock (Figure 3B).

2.2.10 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 ENMAX 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 #6 AWG and must be identified (white).

Table 3

CURRENT TRANSFORMERS (CT's) AND ENCLOSURES							
Service			Service Size in Amps	Current Transformer Enclosure			No. of CT's Required
				Size cm(in)			
Voltage	Phase	Wire		H	W	D	
120/240	1	3	200-400	61(24)	61(24)	25(10)	1 3-wire
120/240	1	3	400-600A	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	600-1200	91(36)	91(36)	30(12)	3 2-wire
120/208 Y	3	4	1200-1500	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	1200-3000	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	1200-3000	122(48)	122(48)	30(12)	3 2-wire

Note 1: All dimensions are minimums.

Note 2: Where there is an ambiguity, the larger of the enclosure sizes shall be used – for example, if there is a 400A, 120/240V service, CT enclosure size shall be 76x76x25 cm

2.2.11 Current Transformer Enclosures

Current transformer enclosures shall:

- Be located indoors in a clean, readily accessible area that is satisfactory to ENMAX.
- Be located in the same room as the meter enclosure.
- Be located within a maximum of 7 m (23') 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 1.7 m (67") above the finished grade.
- Conform to all other ENMAX Metering Standard requirements.

The current transformer 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 ENMAX padlock. Cover plates are not acceptable on current transformer enclosures.

2.2.12 Latches and Locking Mechanisms

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

2.2.13 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.

When it is necessary to route Metering secondary wires through compartments other than those reserved for ENMAX use, a metal conduit, or suitable metal raceway, shall be installed through each compartment for the exclusive use of ENMAX. The conduit run shall be continuous, uninterrupted, and it is not permitted to have any fittings with removal covers. It shall be equipped with a continuous length of poly pull string and identified as for use by "ENMAX METERING".

The number of bends shall be kept to a minimum, but in no 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, they must be sealable and clearly visible. Permission must be granted by ENMAX Metering for the use of LB's or similar fittings.

2.2.14 Splitter Trough Applications

In cases where a splitter is required, a lockable (with large padlock rings), suitably rated splitter trough for the application shall be located immediately after, and on the load side of the main disconnect for the building. 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 1).**

3 RESIDENTIAL SERVICES

3.1 Single Phase Residential Services - Single Meter Installations

These services are generally single-phase 120/240 volt **(Figure 5)** or Apartment 120/208 volt **(Figure 6)**, 200 amp or less, self-contained services supplying residential houses in urban and rural areas. For meter configuration see **Figure 14.**

3.1.1 Installation

Such meter installation shall be:

- On the outside wall of the house.
- Connected on the line side of service disconnect.

If the finished grade is to be completed at a future date, the customer must supply a platform to meet the height requirements. This platform must have proof of meeting building code standards. A minimum height of 0.5 m above finished grade must be maintained when a permanent structure, such as a deck, is built in the clear access area of the meter.

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 to move said meter.

The Customer shall:

- Supply and install a CSA, ULC approved low voltage, socket type meter base.
- Supply and install conduit, wire and all service entrance equipment.

ENMAX Shall:

- Supply and install the meter.

3.2 Single Phase Residential Services - Instrument Transformer Metering

These services are required where the load will exceed 200 amps (**Figure 12**).

3.2.1 Installation

Such meter installations shall have:

- The meter mounted on the outside of the house.
- Instrument transformer mounted indoors, within an enclosure specified in Table 3 (**Figure 2**).
- The instrument enclosure and meter shall be connected by a 25.4 mm (1") conduit – conduit length may not be more than 7m.
- The meter connected on the load side of service disconnect.

The Customer shall:

- Supply and install a 4-jaw meter socket as listed in Table 2-Socket Type #2.
- Supply and install an instrument transformer enclosure as listed in Table 3.

ENMAX shall:

- Supply the required current transformer.
- Supply and install the secondary wiring.
- Supply and install the meter.

3.3 Single phase / Multiple Residential Services – Multiple Meter Installations (Duplexes/Townhouses)

These services are generally single-phase 120/240 (**Figure 5**) volt or 120/208 volt (**Figure 6**) self-contained services supplying a building that has several meters supplied from a single service entrance. For meter configuration see **Figure 14**.

3.3.1 Installation

Such meter installations shall be:

- Grouped together in an approved area.
- Identified by address (or unit number) with a permanent legible label on all meter sockets, disconnects and unit electrical panels.
- The main service disconnect, splitter box, and sub-service disconnects must have provision for ENMAX padlocks.
- The number of Customer's services of the same voltage and characteristic terminating at any one supply service, run to, on, or in any building, shall not exceed four.
- Any "house", "public" or "common" service for the building is considered to be a commercial service, and this service's meter must be cold sequenced



The customer shall:

- Supply and install the meter sockets.
- Supply and install all the service entrance equipment.
- Identify all meter sockets, disconnects, and unit electrical panels by address (or unit number) with a permanent legible label.
- For a 120/208 service a white neutral conductor must be pulled from the ENMAX transformer and terminated at the 9 o'clock terminal of the meter socket (**Figure 6**). The neutral conductor shall be sized at # 12 AWG or greater.

ENMAX shall:

- Supply the meters.
- Perform connectivity test.
- Install the meters in the sockets.

To request a connectivity test, please contact ENMAX SOC (Service Order Control) at: 403-514-2807. Refer to Section 9 for further details.

3.4 Single phase /Apartment/ Commercial/Retailing/Residential Services - Multiple Meter Installations (Apartments)

These services are generally single-phase 120/240 volt or 120/208 volt self-contained services supplying a building that has several meters supplied from a single service entrance. For meter configuration see **Figures 1&16**.

3.4.1 Installation

Such meter installations shall be:

- Located indoors.
- Grouped together in an approved area.
- Connected on the load side of the sub service disconnect.
- Identified by address (or unit number) with a permanent legible label on all meter sockets, disconnects, and unit electrical panels.
- Mounted with the centerline of the meter at a height of 1.5 m to 1.8 m above the floor level.

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

The customer shall:

- Supply and install the meter sockets.
- Supply and install all the service entrance equipment.
- Identify all meter sockets, disconnects, and unit electrical panels by address (or unit number) with a permanent legible label.
- For a 120/208 service a white neutral conductor must be pulled from the ENMAX transformer and terminated at the 9 o'clock terminal of the meter socket (**Figure 6**). The neutral conductor shall be sized at # 12 AWG or greater.

ENMAX shall:

- Supply the meters.
- Perform connectivity test.
- Install the meters in the sockets.

To request a connectivity test, please contact ENMAX SOC (Service Order Control) at 403-514-2807. Refer to Section 9 for further details.

3.5 Laneway Housing & Secondary Suites

This section outlines details for the case where a property owner wishes to create a secondary residence on their property and meter both buildings separately.

- The meters must be installed on separate meter bases; ganged meter bases are not permitted
- The separate meter bases are allowed to both be installed on the same building (garage or main unit)

4 FARM SERVICES

Single phase farm services/ Self-contained Metering

These services are single-phase 120/240-volt (**Figure 5**) services supplying farm operations, where the main breaker does not exceed a rating of 200 amps. The centerline of the meter shall

be mounted at a height of 1.65m above finished grade. The meter shall be mounted on a customer owned pole.

The customer shall:

- Supply and install an approved meter socket.
- Supply and install all the service entrance equipment.

ENMAX shall:

- Supply the meter.
- Install the meter.

5 COMMERCIAL SERVICES

5.1 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.

5.2 Single-phase/ Comm. Services - Self-contained Metering (Single Meter)

These are commercial services where the service disconnect rating does not exceed 200 amps.

The meter shall be mounted:

- The meter shall be located on the load side of the service disconnect.
- On the outside wall of the building.

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

The customer shall:

- Supply and install an approved meter socket.
- Supply and install all the service entrance equipment.
- For a 120/208 service, a white neutral conductor must be pulled from the ENMAX transformer and terminated at the 9 o'clock terminal of the meter socket (**Figure 6**). The neutral conductor shall be sized at #12 AWG or greater.

ENMAX shall:

- Supply the meter.
- Install the meter.

5.3 Single-phase/ Comm. Services - Self-contained Metering (Multi-Meter)

These are commercial services where the service disconnect rating does not exceed 200 amps and the meter shall be located on the load side of the service disconnect. For meter configuration see **Figures 1 & 15**.

The meters shall be mounted:

- Grouped together in an approved area.
- Identified by address (or unit number) with a permanent, legible label on all meter sockets, disconnects, and unit electrical panels.

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

The customer shall:

- Supply and install approved meter sockets.
- Supply and install all the service entrance equipment.
- Identify all meter sockets, disconnects, and unit electrical panels by address (or unit number) with a permanent legible label.
- For a 120/208 service, a white neutral conductor must be pulled from the ENMAX transformer and terminated at the 9 o'clock terminal of the meter socket (**Figure 6**). The neutral conductor shall be sized at # 12 AWG or greater.

ENMAX shall:

- Supply the meter.
- Perform connectivity test.
- Install the meter.

To request a connectivity test, please contact ENMAX SOC (Service Order Control) at 403-514-2807. Refer to Section 9 for further details.

5.4 Single-phase Comm. Services - Instrument Transformer Metering

These are commercial services where the service disconnect exceeds a rating of 200 amps. The meter shall be mounted in an approved area. The instrument transformer enclosure shall be located indoors. The meter shall be located on the load side of the service disconnect.

The main service disconnect, splitter box, and sub-service disconnects must have provision for ENMAX padlocks, and they must all be located in the same room as the meter & CT Cabinet as per section 2.2.1

The customer shall:

- Supply and install a four-jaw meter socket as specified in **Table 2-Socket Type #2**.
- Supply and install an instrument transformer enclosure as specified in **Table 3**.
- Supply and install all the service entrance equipment.
- Identify all meter sockets, disconnects, and unit electrical panels by address (or unit number) with a permanent, legible label.

ENMAX shall:

- Supply and install secondary wiring.
- Supply the meter.
- Install the meter.

5.5 Three-phase Commercial Services - Self-contained Metering

These are commercial services where the service disconnect rating does not exceed 200 amps. The meter shall be located on the load side of service disconnect.

The main service disconnect, splitter box, and sub-service disconnects must have provision for ENMAX 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).
- A white neutral conductor must be pulled from the ENMAX transformer into and terminated at the 3rd bottom jaw of the meter socket (**Figure 7**) (from the transformer).

In the case of multiple meters, request a connectivity test by contacting: ENMAX SOC at 403-514-2807. Refer to Section 9 for further details.

ENMAX shall:

- Supply the meter.
- Install the meter.

5.6 Three-phase Commercial Services - Instrument Transformer Metering

These are services where the service disconnect rating exceeds 200 amps. 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 as its respective disconnect inside the building (**Figure 3A & 3B**).

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

The customer shall:

- Supply and install a 13-jaw meter socket as specified in **Table 2-Socket Type #1**.
- Supply and install an instrument transformer enclosure as specified in **Table 3**.
- 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.

Note: Where the customer's installed capacity is above 200KVA, refer to section 7.2 for additional requirements.

ENMAX shall:

- Install the secondary wiring.
- Make all the secondary connections.
- Supply the meter.
- Install the meter.

Resistive Grounded Services

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

5.7 Shopping Malls

Metering shall be located on the load side of the customer's breaker. The meters and instrument transformer enclosures shall be located in the same room as its respective disconnect inside the building (**Figure 3A & 3B**). For meter configuration see **Figure 17**.

The main service disconnect, splitter box, and sub-service disconnects, must have provision for ENMAX 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 3**.
- 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.

Note: Where the customer's installed capacity is above 200KVA, refer to section 7.2 for additional requirements.

ENMAX shall:

- Install the metering secondary wiring.
- Make all the secondary metering connections.
- Supply the meter.
- Install the meter.

6 COMMERCIAL OR INDUSTRIAL PRIMARY METERED SERVICE

6.1 Service Application and Acceptance

For Primary Metered Services, a kick-off meeting must be arranged prior to project initiation that includes ENMAX Metering, Customer Projects, System Planning and Asset Management. 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 ENMAX 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 ENMAX. This will avoid costly alterations to equipment already built.

6.2 Primary Switchgear Specifications (Figure 8)

- A separate metering transformer cell for each service must be provided. The size of the metering transformer cell must meet CSA standards. The metering transformer cell must have a hinged door, be pad-lockable, and is reserved for utility use only.
- The metering transformer cell door must not be electrically, or mechanically, interlocked with any other cells.
- Only 1 single point of isolation is permitted on the load side of the metering cell.
- A protection / isolation cell (i.e. Fused disconnect / breaker) must be provided upstream of the metering transformer cell and an isolation means (i.e. Visible isolation switch or breaker) must be provided immediately downstream of the metering transformer cell, and ahead of any customer equipment.
- High voltage, main service switchgear incorporating metering equipment, must be constructed so that all ENMAX instrument transformers, required for metering, are readily accessible.
- Barriers are required between all sections of the equipment, including metered and unmetered conductors, and between sections reserved for the customer and ENMAX.
- There shall be no customer energy consuming equipment (e.g. space heater) connected before the metering transformers.
- ENMAX Metering will supply eight ground ball studs to be installed by the customer. There will be two ground balls per phase: one ground ball is located on the bus at the entrance to the metering transformer cell, and the other is on the same bus exiting the cell. The Current and Potential Transformer for each phase, are to be installed between these two ground balls. All phase bus ground balls must be accessible from the front door entrance to the cell.
- Two ground ball studs shall be mounted on the ground bus. The ground ball studs shall be arranged in a way that all grounding connections are accessible and can be safely installed from the front door of metering transformer cell entrance.
- The ground bus shall be located near the bottom, front of the metering transformer cell front door opening.

- A working space of 3 m (10') clearance is required in front of the metering transformer cell in order for ENMAX Metering personnel to safely install the grounds.

6.3 Supply of Primary Metering Equipment

The customer is required to supply:

- A meter enclosure according to specifications shown in **Table 2-Socket Type #1**.
- A section of high-voltage main service switchgear for installation of instrument transformers that is acceptable to ENMAX (see section 6.2).
- A conduit between the instrument transformer compartment and the meter enclosure (see section 6.8).
- All hardware, bus-work, termination and/or cable, required for primary connections to the Current and Potential Transformers.
- A plywood sheet behind the meter enclosure (see section 6.6).
- Meter communication requirements (see section 6.9).

For more details and specifications, please call ENMAX Metering at 403-514-2807 or email to RMPlanner@enmax.com

In addition, at sites with Preferred/Alternate feeders, the customer is required to supply: **(Figure 11)**

- Separate meter sockets for each meter
- A conduit, run from each meter socket to the outside of the building. This 19 mm (3/4") EMT conduit shall terminate at a 6" x 6" x 4" (minimum size) weatherproof, pad-lockable box, for the external antenna. The box shall be mounted on the outside wall at a height between 1.5 m and 1.8 m above finished grade.
- A duplex receptacle (120V, 15A) supplied by a dedicated circuit on the load side of the meter is to be mounted on the plywood where the meter sockets are installed.

For more details and specifications please call ENMAX Metering at 403-514-2807 or email to RMPlanner@enmax.com.

ENMAX will supply:

- Revenue meters.
- Instrument transformers (current and potential).
- Metering secondary wiring.

The instrument transformers are available to the customer for installation at ENMAX Metering, located in its South Services Center.

6.4 Mounting of Primary Metering Equipment

The customer is required to mount:

- A meter enclosure.
- All instrument transformers in the instrument transformer compartment (**Figure 8**).
- A conduit between instrument transformer and meter enclosure.
- A conduit between the meter and the antenna box mounted on the buildings external wall, if it is a **single meter installation (Figure 9)**.
- If it is a **preferred/alternate site**, an auxiliary cabinet with conduit running to both meters and, a conduit running to the antenna box mounted on the buildings external wall (**Figure 11**).
- The ground balls on each phase and the ground bus as described in Section 6.2 (**Figure 8**).

The customer shall assume the cost of installing the above metering equipment.

The instrument transformers, both current and potential, are to be mounted in the following manner:

- Securely mounted in the instrument transformer compartment. All mounting holes on the instrument transformers must be utilized.
- The Instrument transformer nameplates are clearly visible when the compartment door is open.
- Current transformers shall be positioned with the primary polarity mark toward the source of supply, between two ground ball studs, and in an arrangement that will not obstruct access to the secondary terminals.
- Potential transformers shall be connected to the bus-work on the line side of the Current transformers, between two ground ball studs, and shall be of a “non-draw out” style.
- Potential transformer H2 connections shall be connected to the neutral from the ENMAX supply using white wire.
- All utility instrument transformer mounting base-plates shall be bonded to ground.

6.5 Connection of Instrument Transformers

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

ENMAX Metering will make all the connections to current and potential transformer secondary, testing switch, and the meters.

6.6 Meter Enclosure Requirements

A separate meter enclosure is required for each instrument transformer service. This enclosure is a manufacturer pre-wired meter enclosure including a 13-jaw meter socket, a test switch and wiring from the test switch to the socket. Meter enclosure specifications are shown in **Table 2-Socket Type #1**.

Location - Meter enclosures should be located:

- In a clean, readily accessible area that is satisfactory to ENMAX.
- In the same room as the instrument transformer compartment and respective disconnect that feeds the meter
- In the high voltage room within a maximum of 7 m (23') of conduit from the instrument transformer compartment (**Figure 9**).
- To conform to all other requirements.
- In such an area as to maintain a 1 m clear zone around the Meter enclosure to facilitate the mounting of any other auxiliary panels that might be required for auxiliary metering equipment, or load management equipment.

If the arrangement specified above is impractical, the following less desirable alternatives may be considered:

- In an electrical room adjacent to the high voltage room within a maximum of 7 m (23') of conduit from instrument transformer compartment; or
- In the high voltage room and located on a wall adjacent (within 3 m or 10') to the entrance door.

Mounting - Meter enclosures shall be mounted:

- With the center line of the enclosure 1.5 m to 1.8 m above the floor.
- Level on both the horizontal and vertical planes.
- Mounted on 19 mm (3/4") sheet of plywood.
- Free of severe or continual vibration.

Grounding - Each meter enclosure must be bonded to the system ground.

6.7 Outdoor Primary Metering Requirements

A separate, non-interlocked, compartment of high voltage main service switchgear is required for each instrument transformer service. The size of such switchgear shall meet CSA standards. The switchgear requires hinged doors over all live electrical equipment. The door of the instrument transformer compartment shall be equipped with a latch and have provisions for securing the door with an ENMAX padlock – no other locking mechanism is permitted.

For outdoor high voltage main service switchgear installation, the instrument transformer compartment and meter enclosure must be weather proof (**Figure 10**).

The instrument transformer compartment shall be equipped with a heater. The heater shall be on the same circuit and control as the adjacent compartments. The power supply feeding the heating elements for the whole outdoor switchgear must come from the load side of the utility metering equipment.

The Meter enclosure shall not be mounted on any part of the outdoor switchgear.

6.8 Conduit Requirements

A metal conduit, of 31.75 mm (1 ¼") minimum diameter and a maximum length of 7 m (23'), is required between the instrument transformer enclosure and the meter enclosure. This conduit shall be terminated with lock nuts and bushings, except where threaded hubs are supplied. The conduit must be a continuous run.

The metering conduit run within the primary switchgear and between the primary switchgear and the meter enclosure, shall not have fittings with removable covers. The conduit is for the exclusive use of ENMAX. When it is necessary to route Metering secondary wires through compartments, other than those reserved for ENMAX use, a metal conduit, or suitable metal raceway, shall be installed through each compartment for the exclusive use of ENMAX.

6.9 Meter Communication Requirements (Figures 9 & 11)

To allow for remote meter communication, a conduit shall be installed from the meter enclosure to the outside of the building. This 19 mm. (3/4") EMT conduit, shall terminate at a 150 x 150 x 100 mm (6"x 6" x 4") (minimum size), weatherproof, pad-lockable box. The box shall be mounted on the outside wall at a height between 1.5 m. and 1.8 m. above finished grade.

This box shall be in a location approved by ENMAX.

7 INTERVAL METERING REQUIREMENTS

7.1 Existing Site

Where a customer's peak load is above 150 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 150 kVA, an interval meter will be installed.

ENMAX will cover the cost of interval metering equipment if the customer's peak load is above 150 KVA twice in the previous 365 days. Otherwise, ENMAX does not require interval metering and the customer shall assume the cost of interval metering upgrade, communication line, and raceway installation. Please contact ENMAX Metering at 403-514-2807 or email RMC@enmax.com for more details.

7.2 New Site

An interval meter will be installed at all new sites with a planned installed capacity of 200 kVA or greater. See **Table 4** below for details. To allow for automatic meter reading, a 19 mm (3/4") EMT communication conduit shall be installed from the meter enclosure to an antenna box located outside the building. The 19 mm (3/4") EMT communication conduit shall not exceed 30 m (100') in length. If junction boxes, or LBS' are used in this conduit run, they shall not be installed at a height over 2 m (6.56 ft.) above finished grade. The antenna box shall be a

150x150x100 mm (6" x 6"x 4"), weatherproof, pad-lockable, hinged box. The antenna box shall be mounted on the outside wall at a height between 1.5 m and 1.8 m above finished grade.

In some cases, the building exterior construction is not completed at the time the meter and antenna box are to be installed. In this scenario, a temporary box may be installed, outside the building and not fixed to the outside wall. The customer must provide this commitment in writing to ENMAX Metering, stating that the antenna box will be moved to its final location once the building exterior construction is complete.

In all cases, the box dimensions and elevation must comply with this Standard. The customer must contact ENMAX Metering to request permission to install the antenna box in a temporary location, and to make arrangements to move the box to its final location.

The customer may be required to run a ¾" 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 ENMAX Metering.

Table 4

Interval Meter Table			
Service Volts		Service Disconnect Size	
120/208	Volts	800	Amps
277/480	Volts	400	Amps
347/600	Volts	300	Amps

8 USE OF METERING SIGNALS FOR CUSTOMER LOAD MANAGEMENT SYSTEM

ENMAX 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, ENMAX 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-volt 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 ENMAX Metering facilities. ENMAX 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.

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

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

9 CONNECTIVITY

ENMAX will complete a connectivity test on all sites which meet the following criteria:

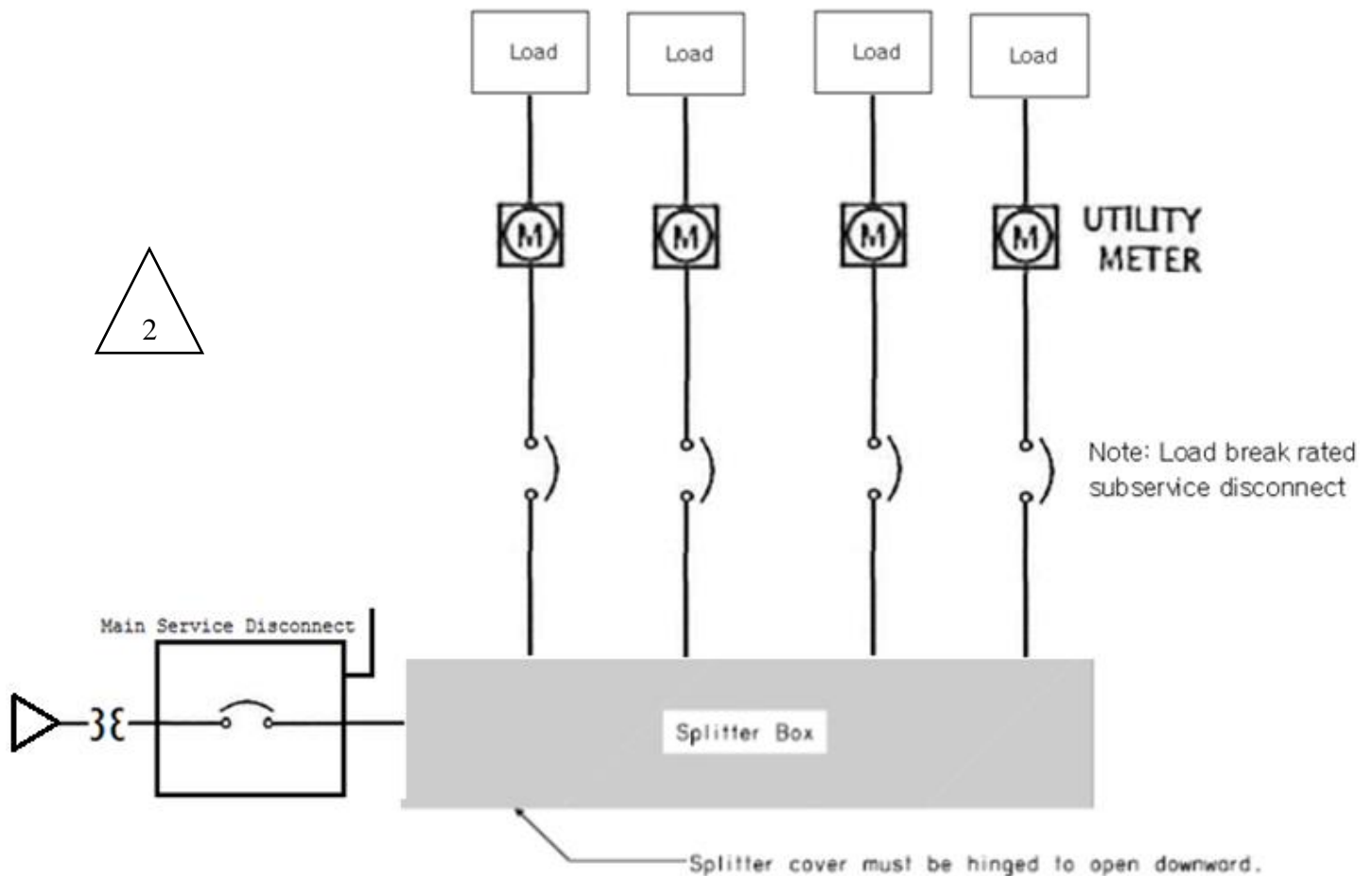
- Residential buildings with 2 or more units with unique addresses (e.g. townhomes or condominiums with 2 or more units).
- Commercial buildings with 2 or more units with unique addresses.



The connectivity test must be requested by the customer. The connectivity test must pass before ENMAX meters are installed. If the connectivity test fails, the customer is responsible to make the necessary corrections and request an additional test. The customer must ensure that an up to date city approved addressing plan is required to be on site.

10 APPENDICES

Figure 1: Multiple Meter Installation



Note:

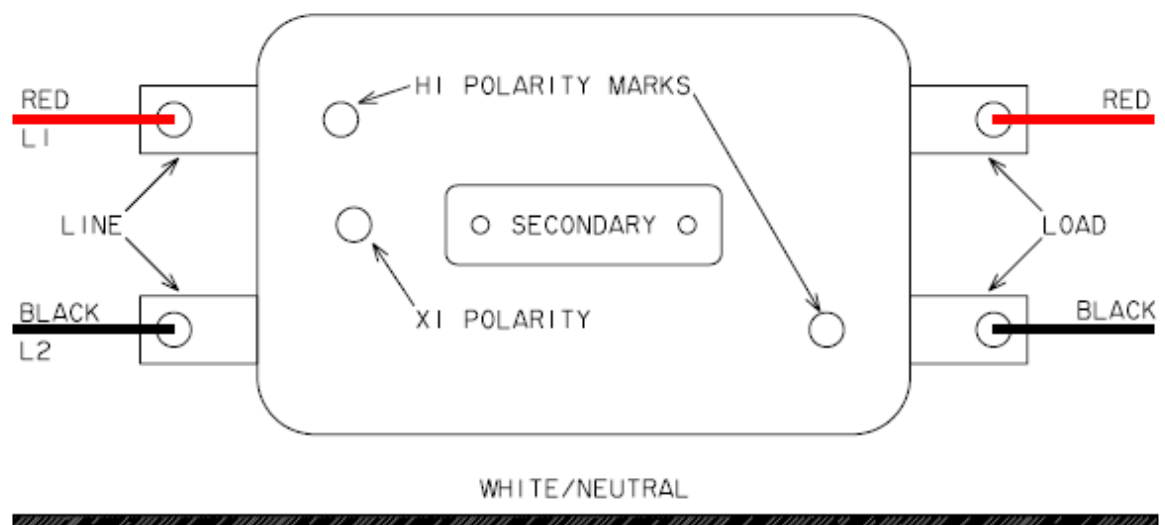
All meter sockets and sub-service disconnects must be identified by an address and/or unit number with a permanent legible label.

Meter sockets must be mounted between 1.5 metres to 1.8 metres from the floor.

Main service disconnect, splitter box and sub-service disconnects must have provision for Enmax padlocks.

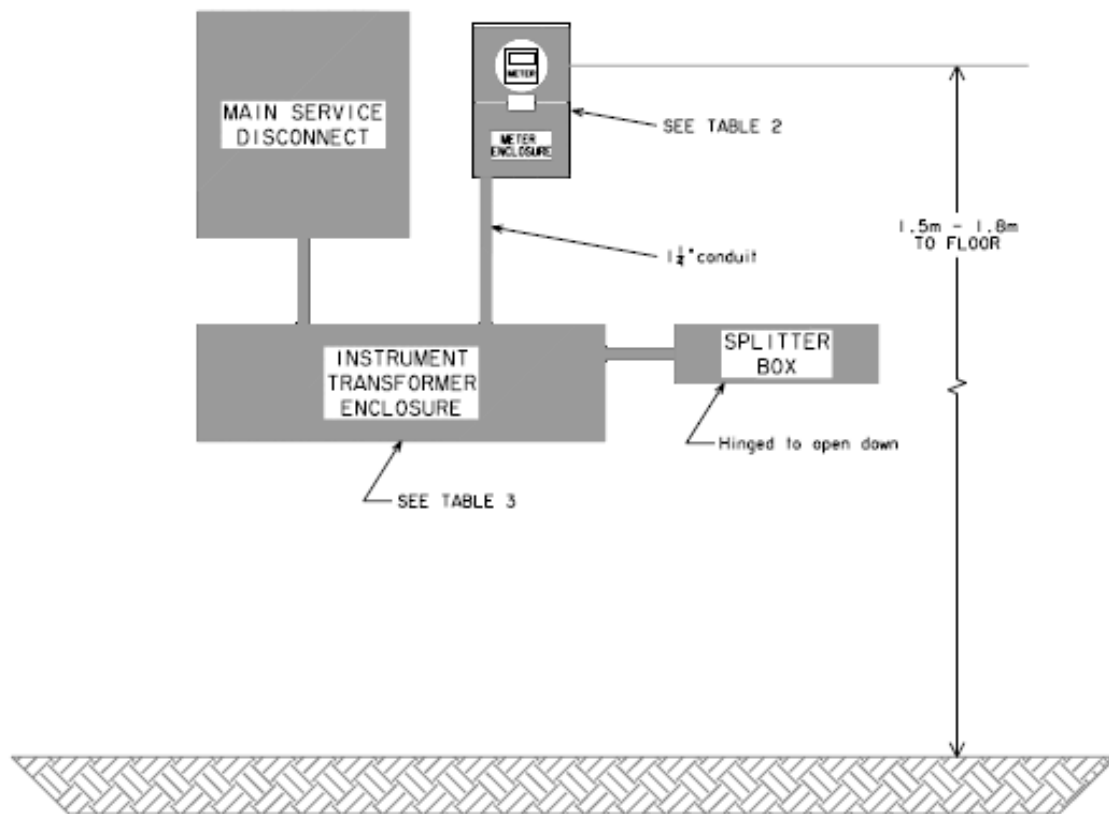
All enclosures to be mounted on $\frac{3}{4}$ " plywood

Figure 2: Single Phase Transformer Rated CT Connection



NOTE: Connect the incoming supply to the line side terminals

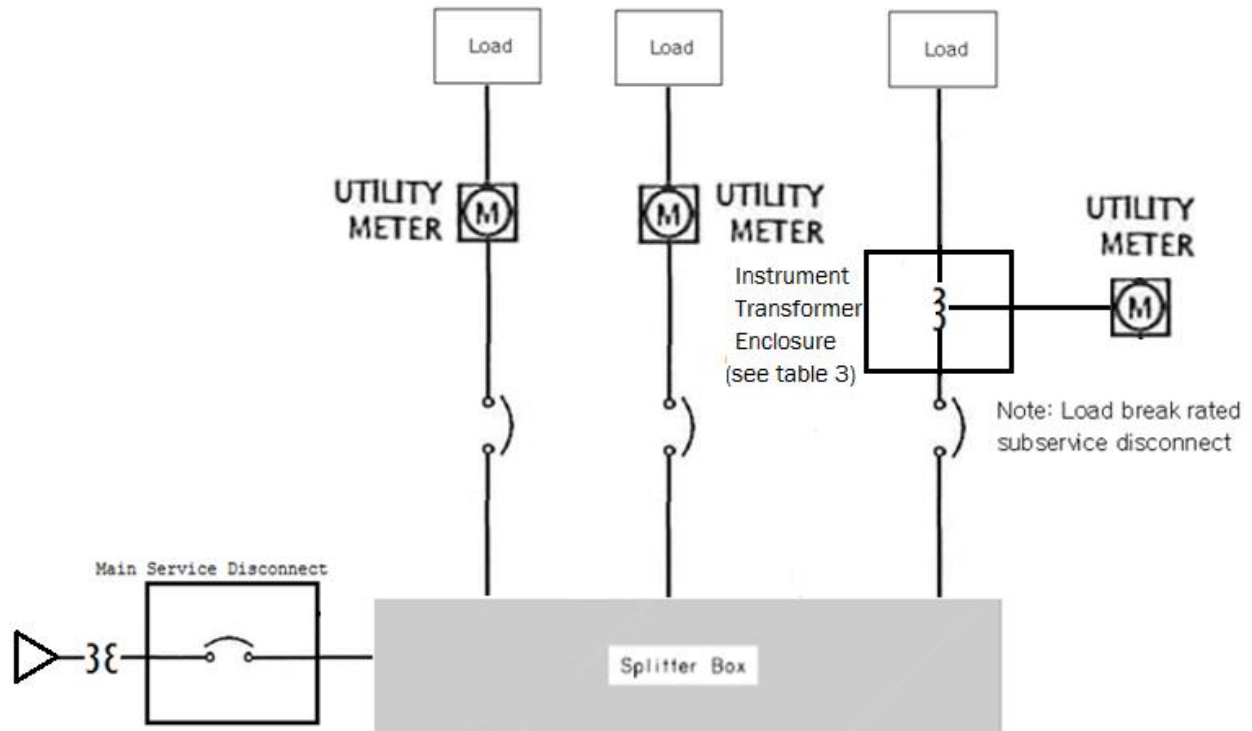
Figure 3A: Single meter, Instrument Transformer Layout Commercial Three phase service



Note: All enclosures to be mounted on $\frac{3}{4}$ " plywood.



Figure 3B: Multiple meter with Instrument Transformer Layout Three phase service



Note: TR subservices must have a Subservice disconnect
All enclosures to be mounted on $\frac{3}{4}$ " plywood.

Figure 4: Three Phase CT Layout

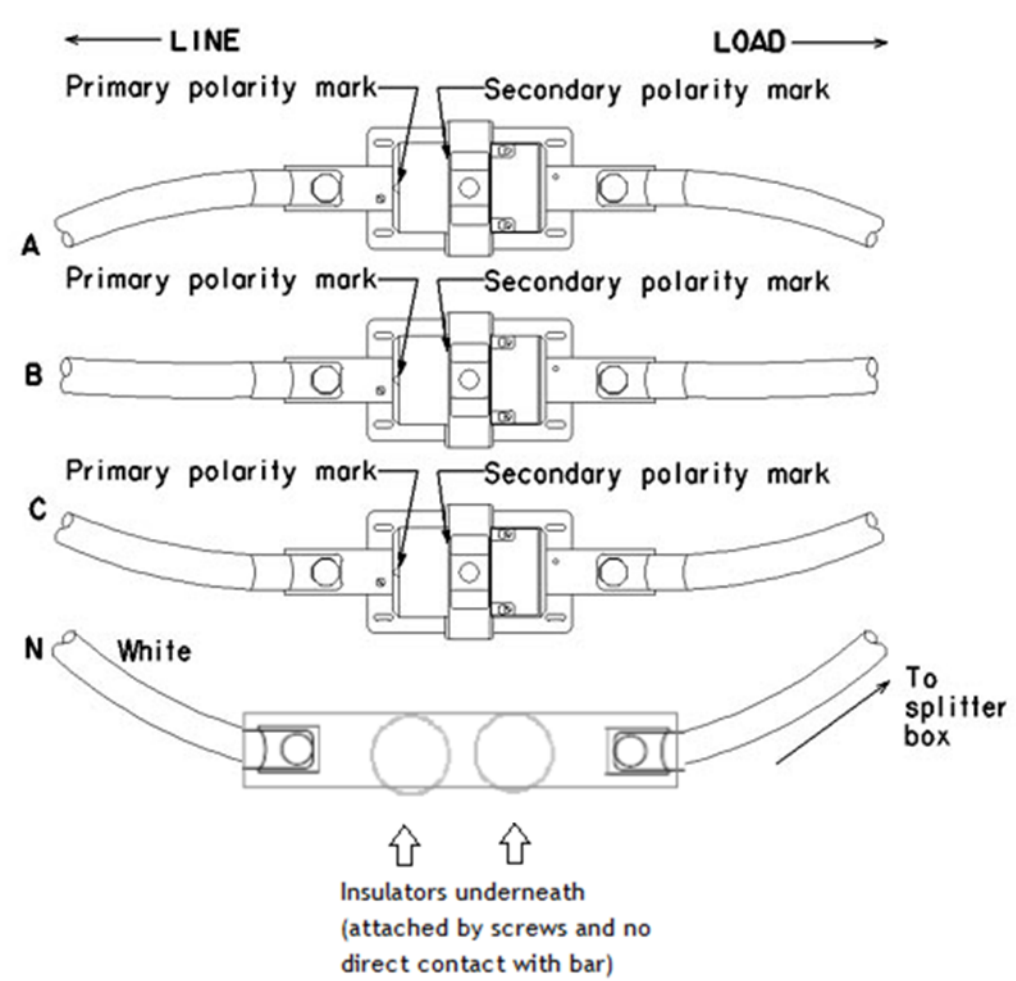
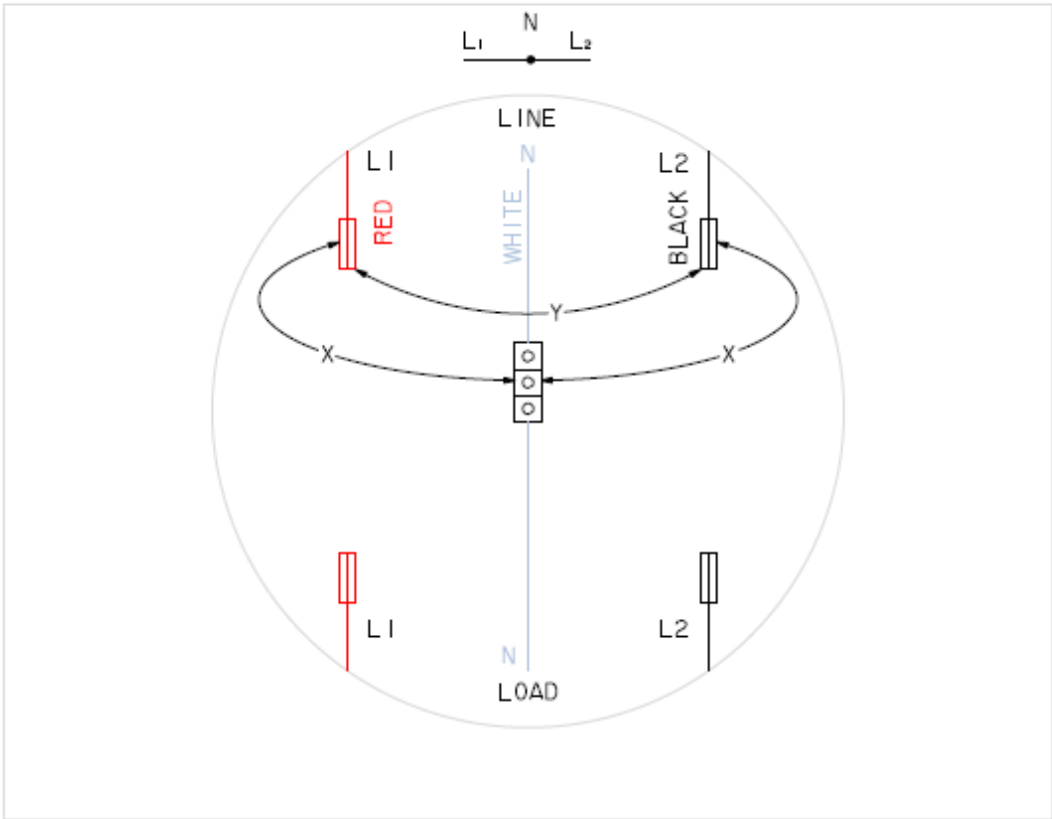
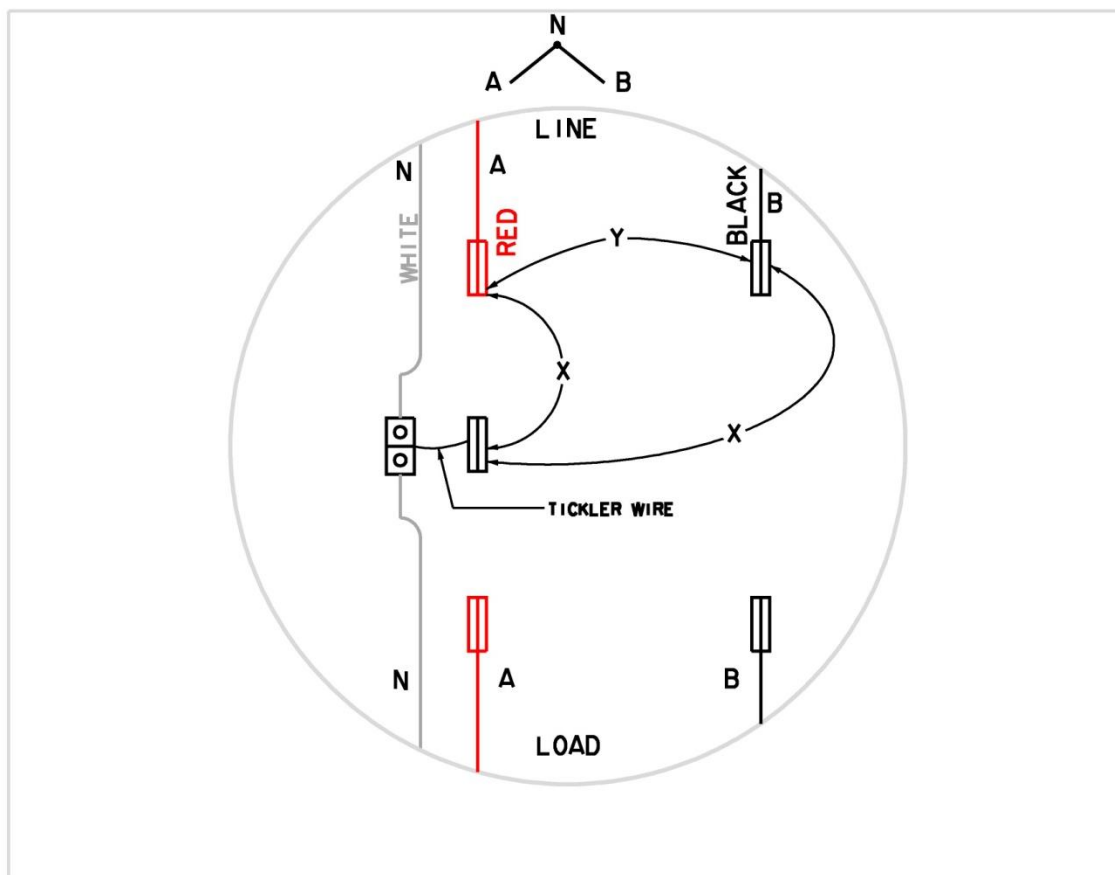


Figure 5: Self-Contained, Single-phase, Three Wire Circuit 120/240 volts



LINE VOLTAGE	MEASURED VOLTAGE	
	x	y
120 / 240	120	240

Figure 6: Three Wire circuit, Apartment circuit 120/208 volts



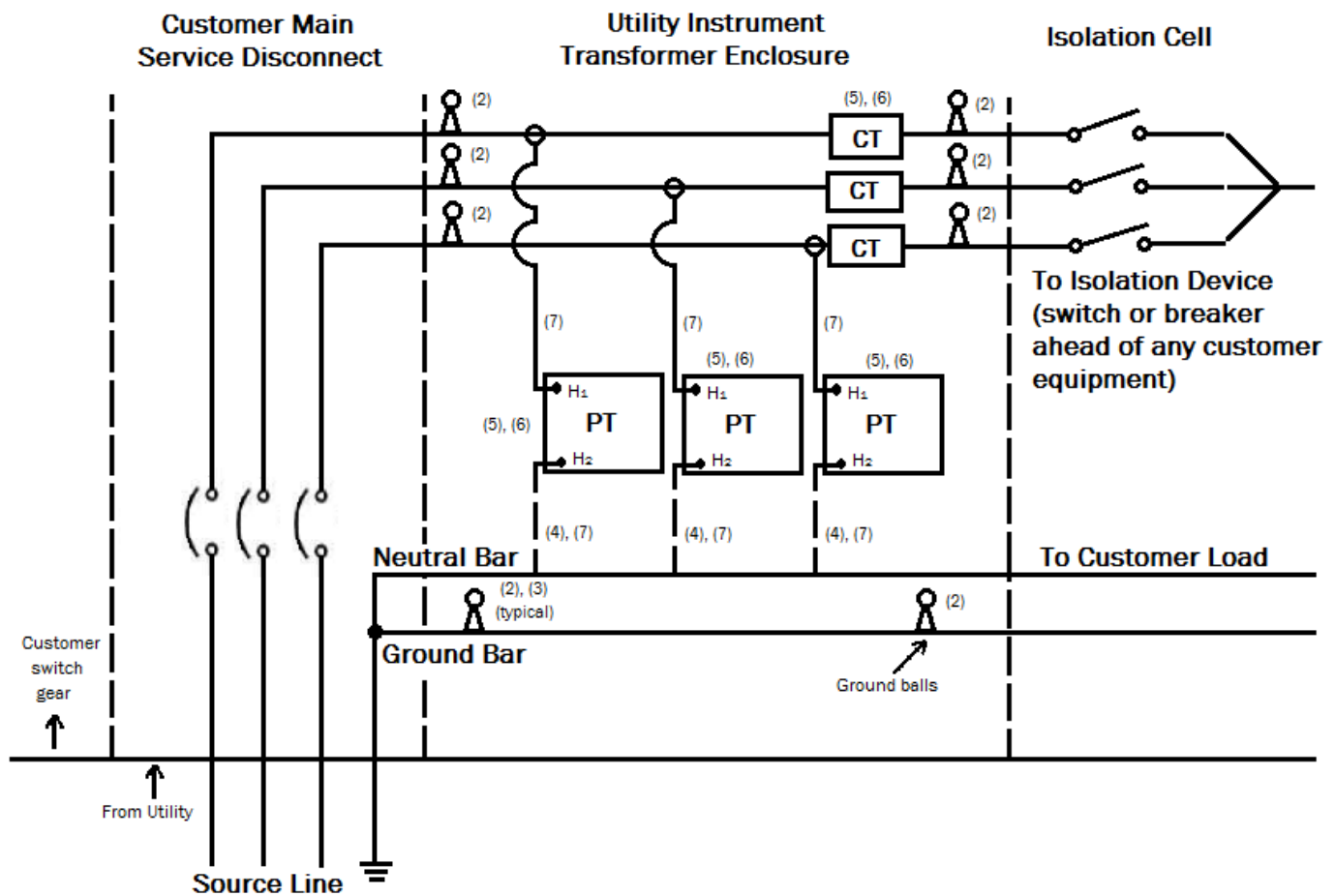
LINE VOLTAGE	MEASURED VOLTAGE	
	x	y
120 / 208	120	208

The diagram illustrates a three-phase induction motor circuit with a star-delta switch. At the top, a small schematic shows three lines (A, B, C) connected to a central point 'N'. The main circuit is enclosed in a large circle. It features three input lines: A (red), B (black), and C (blue). These lines pass through a switch mechanism. The switch has two positions: 'LINE' (top) and 'LOAD' (bottom). In the 'LINE' position, the motor is connected in a star configuration, with the neutral point 'N' connected to a 'TICKLER WIRE'. In the 'LOAD' position, the motor is connected in a delta configuration. The motor is represented by three coils (A, B, C) connected in a triangular loop. The 'TICKLER WIRE' is shown as a separate line connected to the neutral point 'N' in the star configuration.

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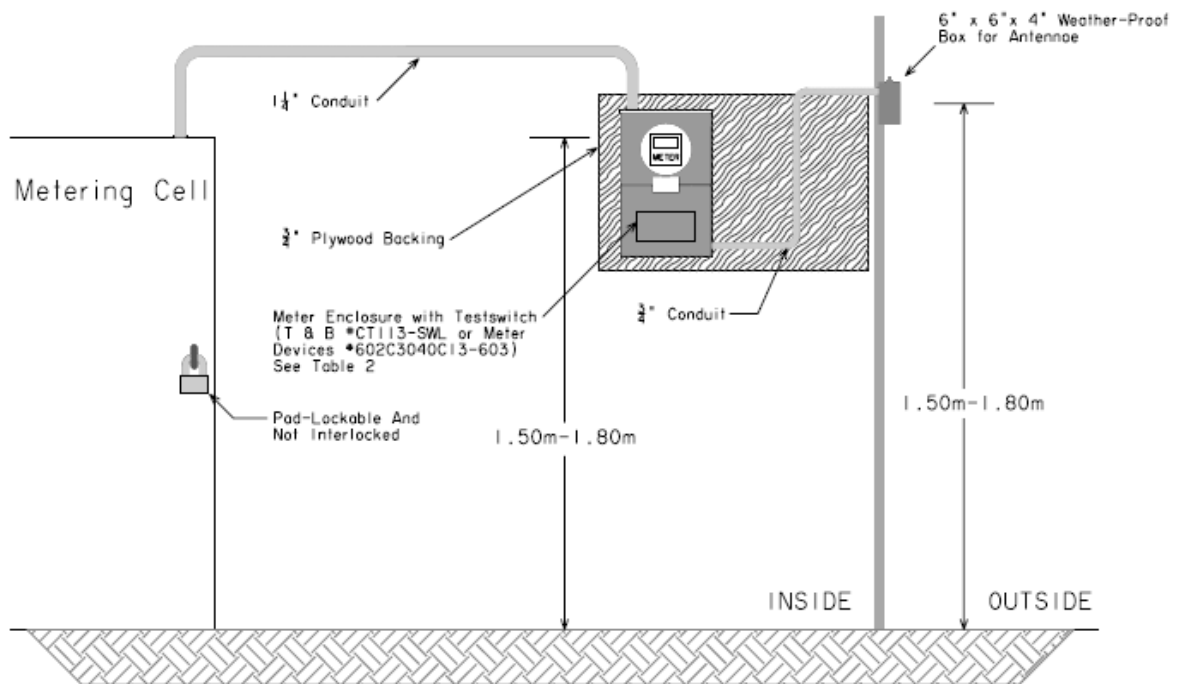
Figure 8: Primary Metering Wiring Diagram



Note:

- (1) All ground balls are to be accessible from the same cell opening, with the ground bus immediately inside that opening.
- (2) Ground ball locations installed by customer.
- (3) Ground balls must be installed on ground bar which must extend across the front of the Utility Enclosure, and not obstruct access to PT terminals. Ground balls shall be minimum 6" distance from the cell wall.
- (4) Neutral shall be white, rated for appropriate service voltage, minimum #10 AWG.
- (5) Instrument Transformers supplied by ENMAX, pick up and installed by customers.
- (6) Customers shall bond CT and PT base plates to ground.
- (7) For PT, H₁ and H₂ connections to neutral shall be completed by customers.

Figure 9: Primary metering Arrangement (One Meter)



The diagram illustrates the installation of a meter cabinet. Key dimensions and components are labeled as follows:

- Center Line of Meter:** Indicated by a horizontal line at the top of the meter unit.
- Height:** The distance from the finished grade to the center line of the meter is specified as 1.5m - 1.8m.
- Grounding:** A ground lug with a stainless steel bolt, washer, and nut is shown. It is connected to a #4 AWG Cu Ground wire, which runs through the cabinet and is continuous to the HV Metering Cell. The length of this ground wire is limited to a maximum of 7m (23ft).
- Conduit:** A 1/2" EMT Conduit is used for the ground connection, with a maximum length of 7m (23ft).
- Door:** The cabinet door is 30" (762mm) high and 30" (762mm) wide, with a minimum depth of 16" (407mm). It is a NEMA 3R Hinged/Padlockable Door with a Backing Plate.
- Internal Components:** The door is 12" (305mm) high and 10" (254mm) wide, with a minimum depth of 6" (152mm). It is hinged/padlockable.
- Mounting:** The cabinet is mounted on a 5" (127mm) minimum base.
- Conduit Entry:** A 3/4" EMT conduit is shown entering the cabinet.

Diagram illustrating the installation of a communications cabinet (hinged/padlockable) with meter enclosures and associated wiring.

Components and Specifications:

- 120VAC 15A CKT**: Power source connection.
- 6" x 6" x 4" minimum Padlockable Weather-Proof Box (Metal)**: For outside antennae (mounted at 1.5-1.8m above finished grade).
- 1 1/4" Conduit**: Used for meter enclosures.
- 3/4" Conduit (for Coax Cable)**: Used for coaxial cable connection.
- See Table 2**: Reference for mounting and wiring details.
- 1.5m - 1.8m**: Mounting height above finished grade.
- 2 1/2" Plywood**: Cabinet material.
- 120V 15A Receptacle (Dedicated)**: Power outlet for the cabinet.
- 24" (610mm) H x 24" (610mm) W x 10" (254mm) D (minimum)**: Cabinet dimensions.
- Communications Cabinet (Hinged/Padlockable)**: Main equipment housing.
- Meter Enclosure with Testswitch (T & B *CT113-SWL or Meter Devices *602C3040C13-603)**: Monitoring devices.

Figure 12: Transformer Rated, Single-Phase, Three Wire Circuit, 120/240V

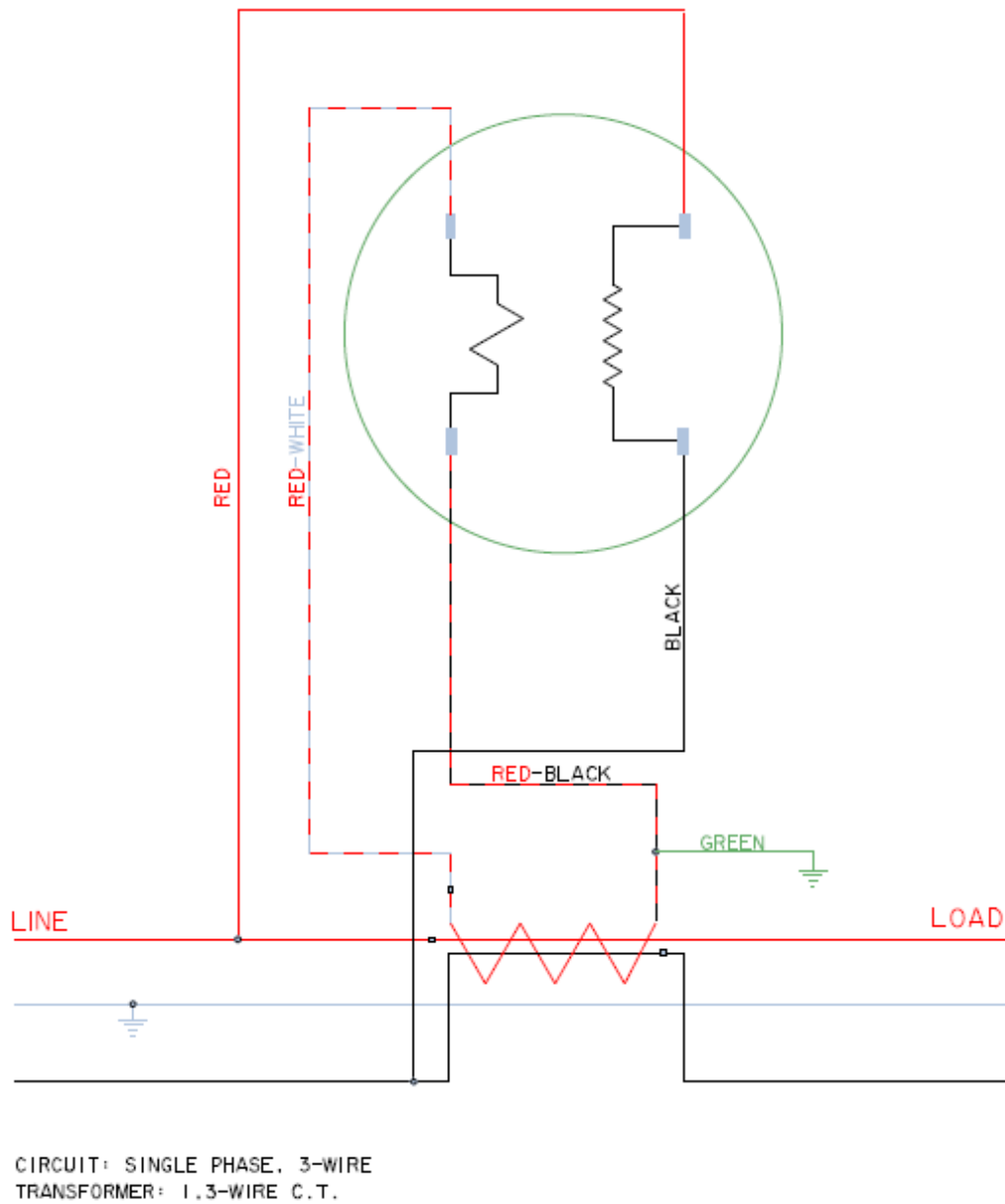
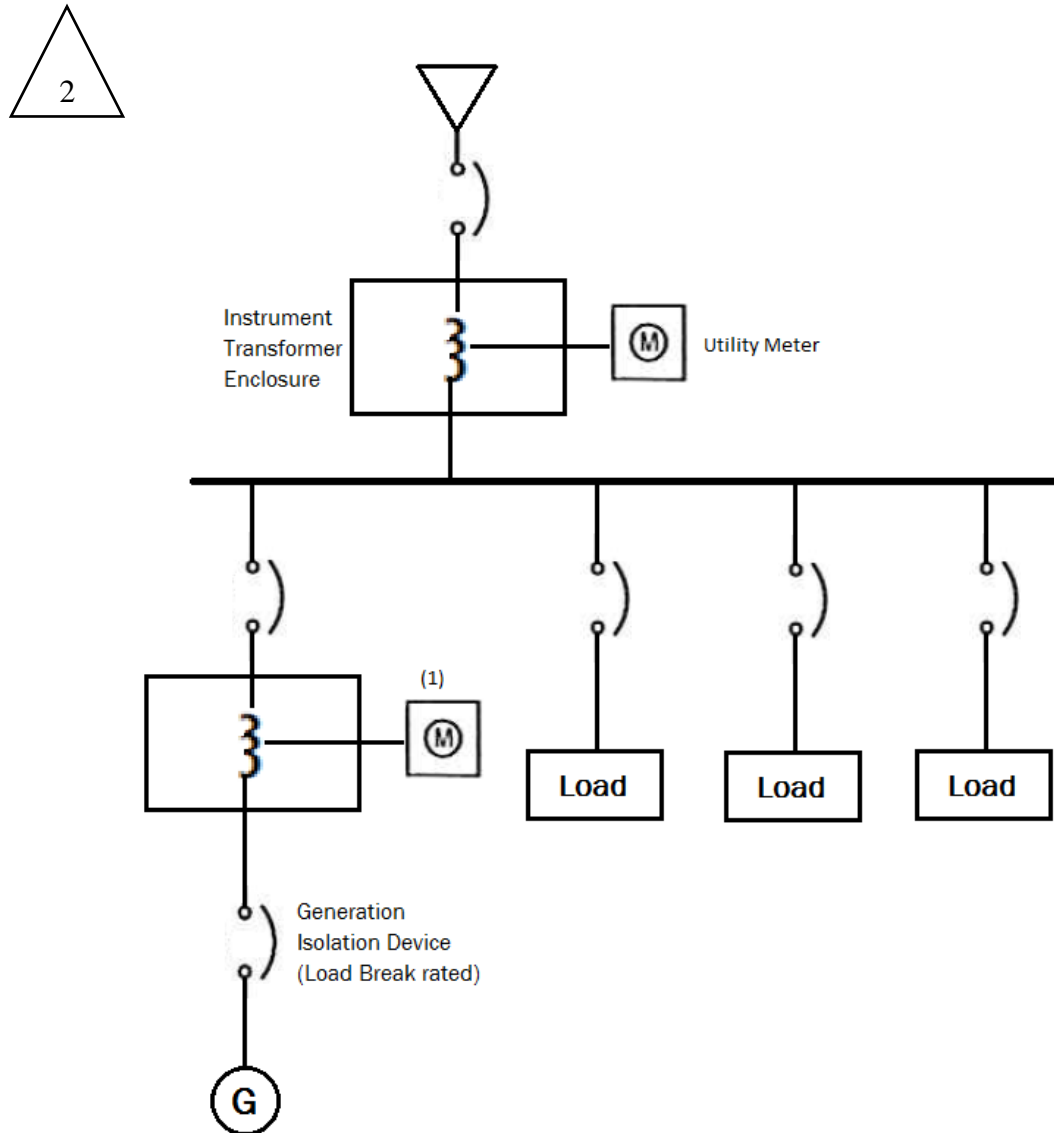


Figure 13: Layout of Metering Requirements - Distributed Generation (DG) sites



Note 1: Depending on Generation size, utility metering device may be required for telemetry purposes.

Figure 14: Single Residential Dwellings (rate code D100)

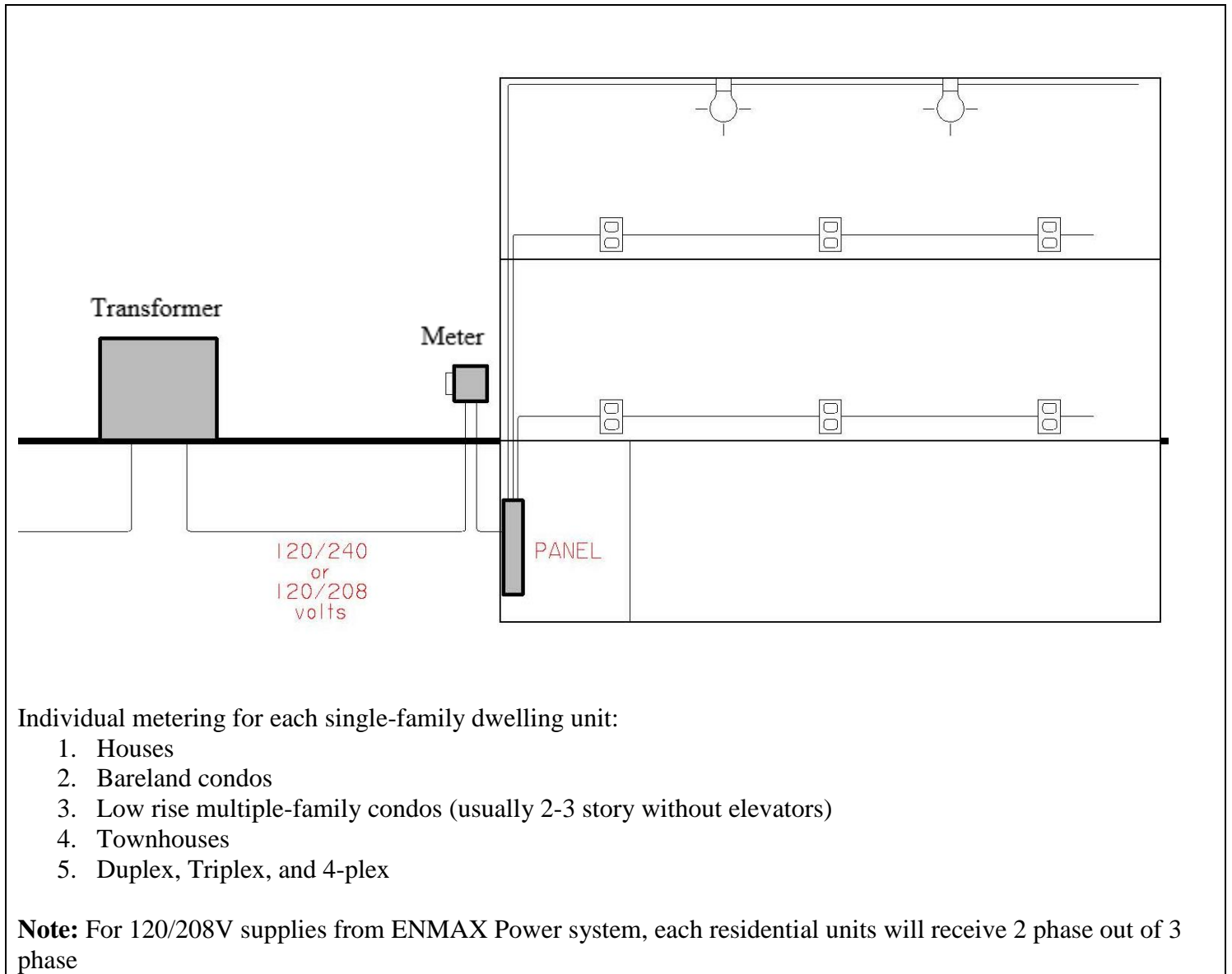
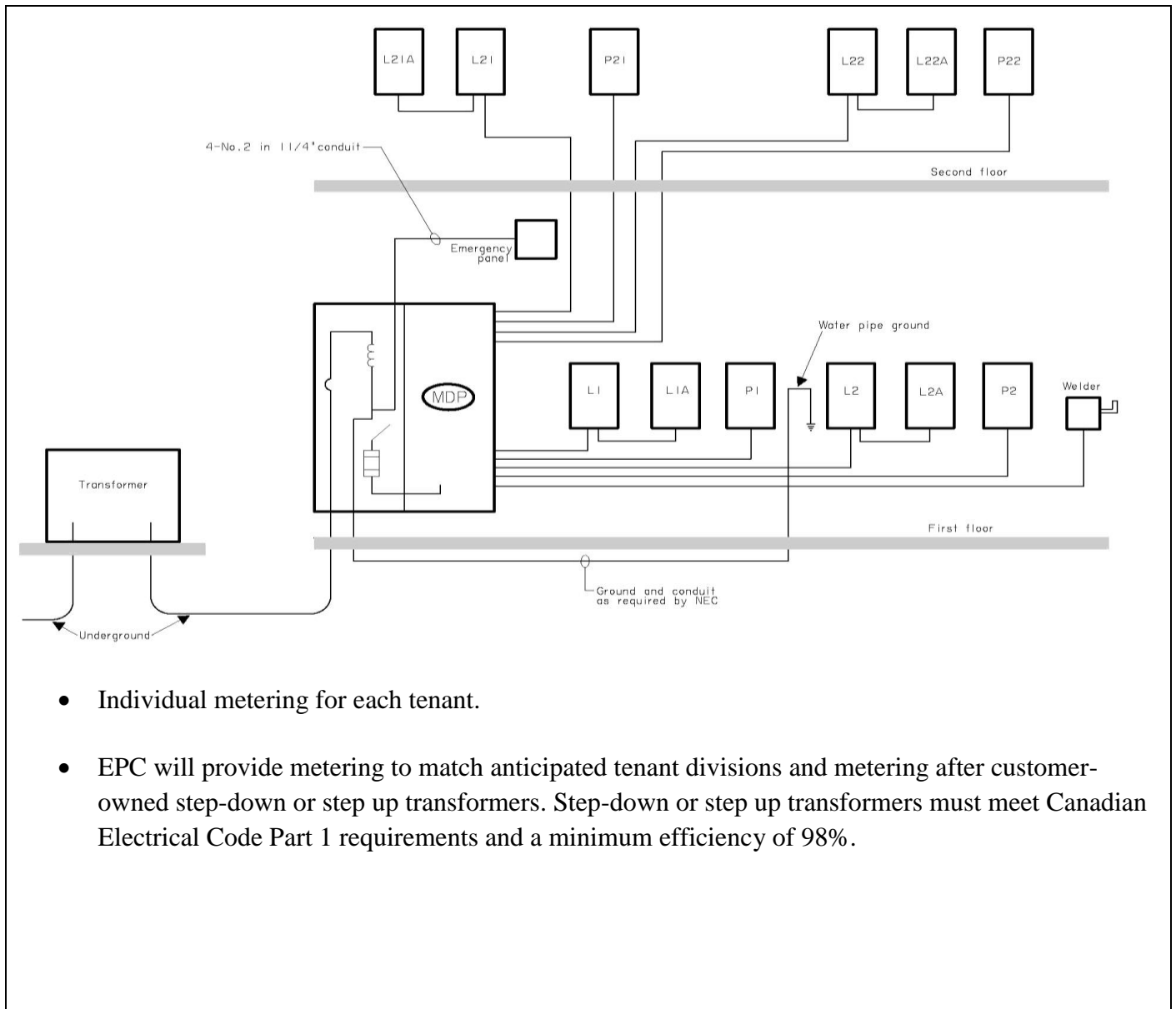
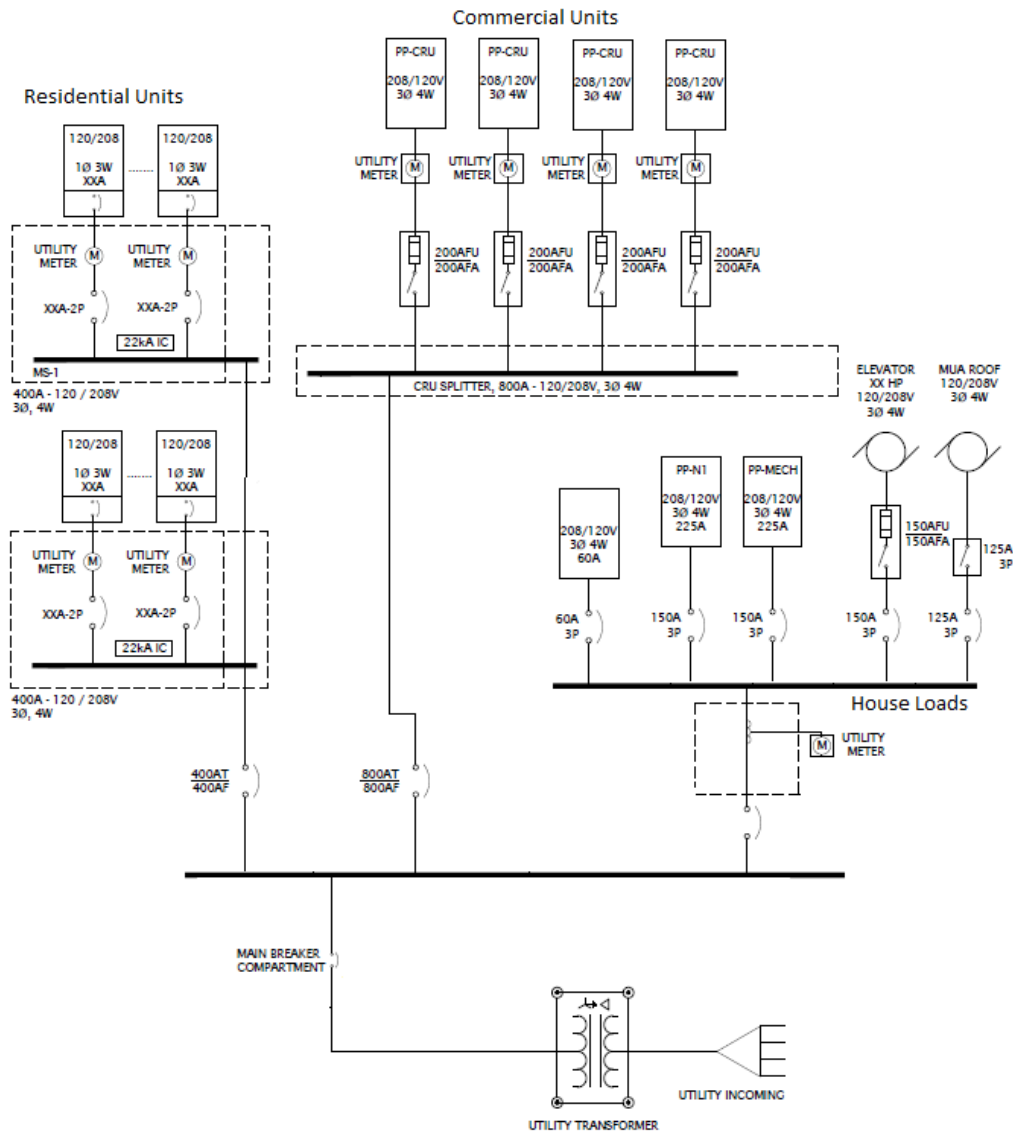


Figure 15: Small/Medium Commercial Services <150KVA (rate code D200 & D300)



- Individual metering for each tenant.
- EPC will provide metering to match anticipated tenant divisions and metering after customer-owned step-down or step up transformers. Step-down or step up transformers must meet Canadian Electrical Code Part 1 requirements and a minimum efficiency of 98%.

Figure 16: Large Commercial/Retailing/Residential Services (rate code D310)

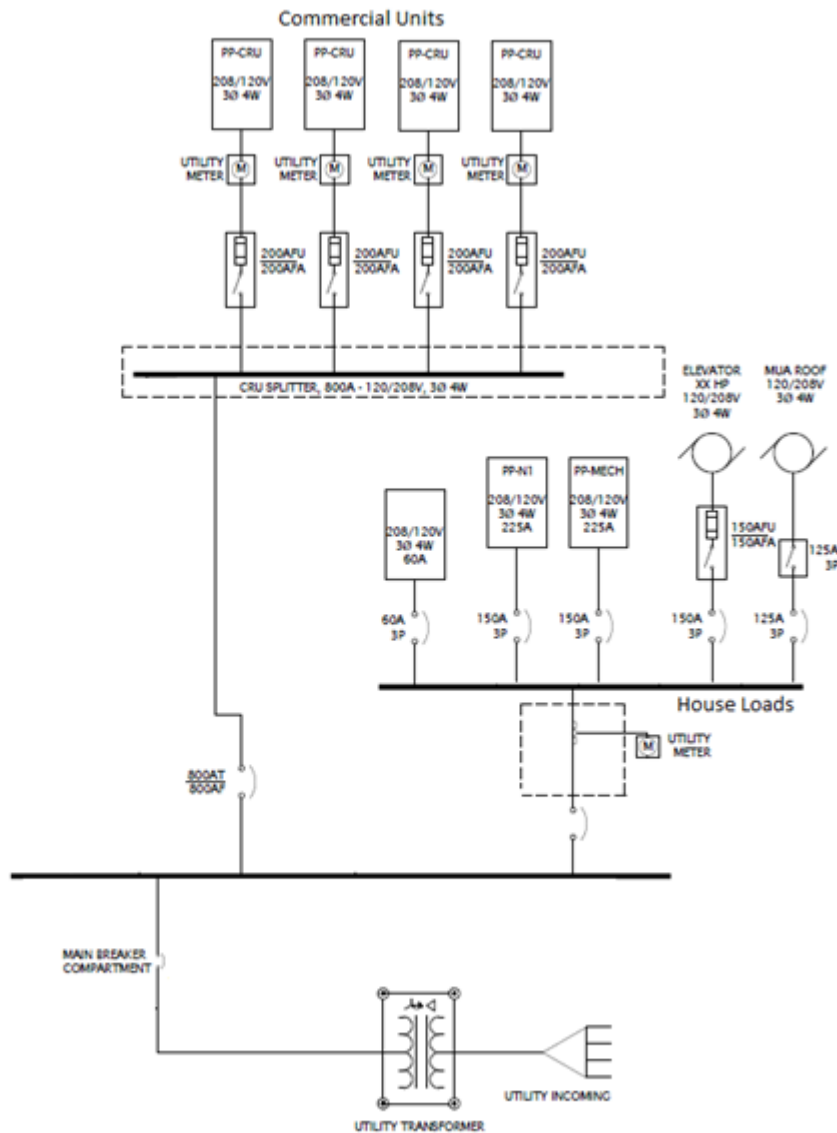


Notes

- Individual metering for each tenant/retailer with fixed separations (e.g., permanent walls).
- Individual metering for condos and long term rental units. EPC will meter after customer-owned step-down transformers as required. Step-down or step up transformers must meet Canadian Electrical Code Part 1 requirements and a minimum efficiency of 98%.
- EPC will provide metering to match anticipated tenant divisions and metering after customer-owned step-down or step up transformers. Step-down or step up transformers must meet Canadian Electrical Code Part 1 requirements and a minimum efficiency of 98%.

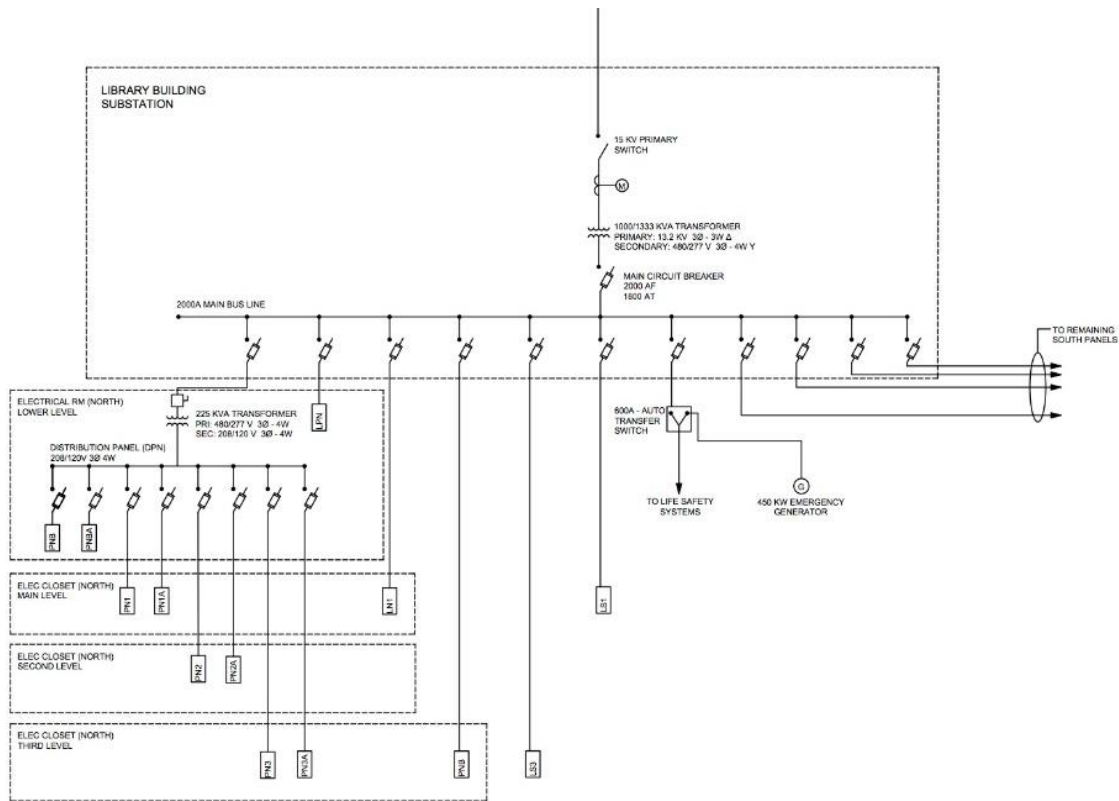
Figure 17: Shopping Malls (rate code D310)

2



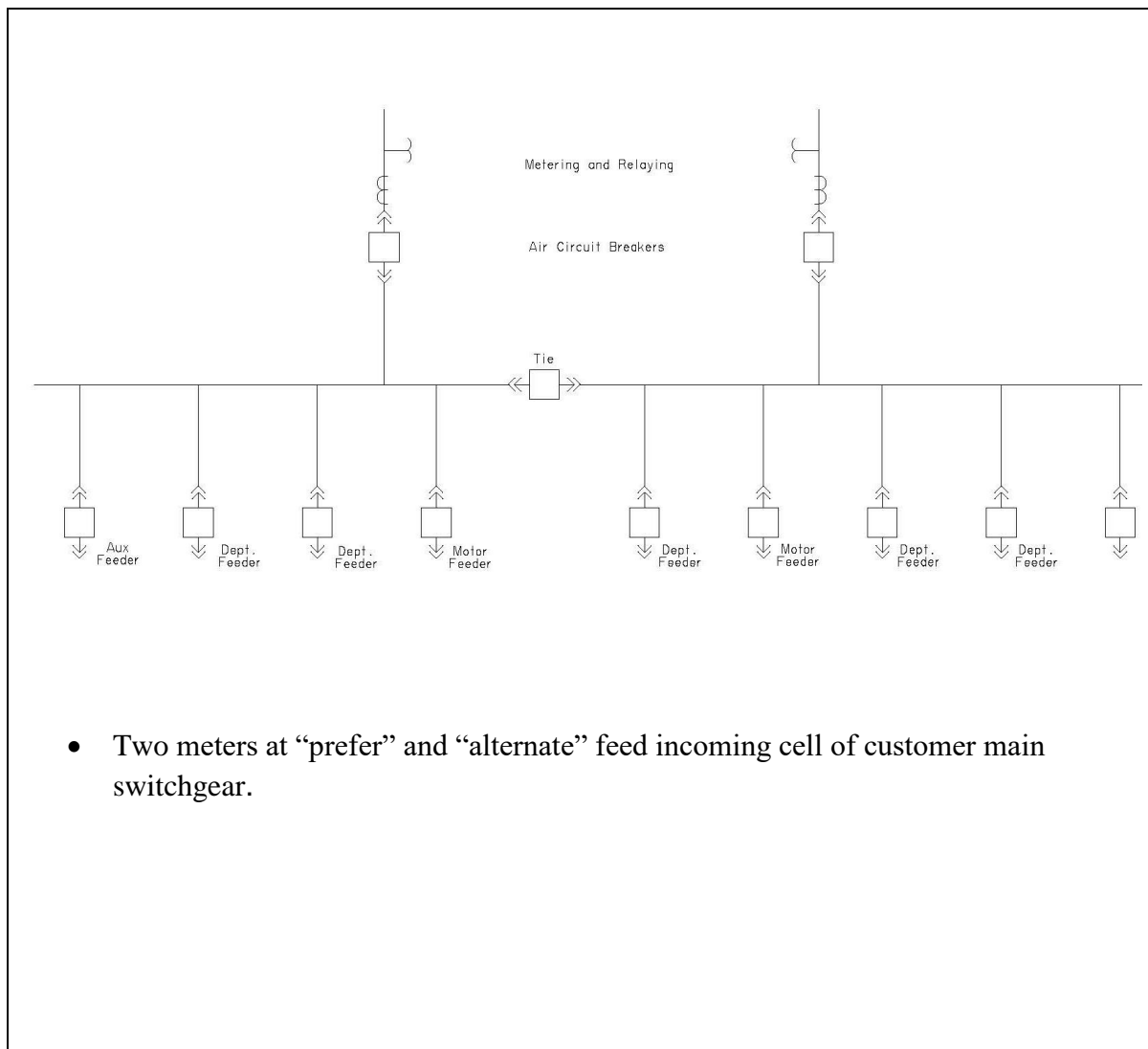
- Individual metering for fixed large tenants,
- EPC will provide metering to match anticipated tenant divisions and metering after customer-owned step-down or step up transformers. Step-down or step up transformers must meet Canadian Electrical Code Part 1 requirements and a minimum efficiency of 98%.

Figure 18: Primary Metered Services (rate code D410)



- One meter at the incoming cell of customer's main switchgear.

Figure 19: Primary Metered Services prefer & alternate feed (rate code D410)



11 FREQUENTLY ASKED QUESTIONS

Question?	How do I get a Temporary Disconnect / Reconnect?
Answer	Contact ENMAX Trouble (403) 514-6100.

Question?	My meter base is falling off the wall or needs to be moved due to my renovation, what do I do?
Answer	The customer owns the meter base, however, all meter installations must comply with the Canadian Electrical Code. Therefore it is the customers' responsibility to hire a qualified electrician at the customers' expense to correct the problem.

Question?	My electric meter was changed recently, Why?
Answer	Some electric meters must be changed periodically as mandated by Measurement Canada.

Question?	How do I get a Resplice and Reseal?
Answer	Contact ENMAX Trouble (403) 514-6100.

Question?	How do I obtain a Site ID?
Answer	If you are installing a new service, you will require a Site ID to identify your service to your retailer. This step may take up to 5 business days and must be completed prior to your date of energization. Phone ENMAX Service Order Control (403) 514-2807.

Question?	How do I choose a Retailer?
Answer	A retailer is your electrical provider. You must call your retailer with a Site ID number to coordinate the connection request and installation of a new electrical meter. Visit the following web site for more information on choosing a retailer: http://ucahelps.alberta.ca/energy-companies.aspx