

ELECTRIC LIGHT &  
POWER DEPARTMENT

# CUSTOMER METERING REQUIREMENTS



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# SCOPE

## 1.0 SCOPE

This guide has been compiled to inform electrical contractors, consultants and others in the electrical trade of the Electric Light and Power Department's requirements for the installation of customer services and revenue metering. This guide includes specific requirements for services operating at less than 750 volts.

In the case of services which operate in excess of 750 volts, EL&P will supply and install all revenue metering equipment. If such a service is being planned, EL&P must be contacted 16 weeks prior to project start. Additional time may also be required to allow for procurement of specialized equipment.

If there are any differences between this information and EL&P's Terms and Conditions, the Terms and Conditions will govern. In addition, regulations contained in the Canadian Electrical Code, Alberta Electrical Utility Code, Alberta Safety Codes Act, and Alberta Occupational Health and Safety Act must be followed.

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# DEFINITIONS

## 2.0 DEFINITIONS

**AEUC** Alberta Electric Utility Code

**CEC** Canadian Electrical Code, Part 1

**COLD METERED** Metering connected to the load side of the service entrance disconnect.

**CSA** Canadian Standards Association

**EL&P** City of Red Deer Electric Light & Power Department

**HOT METERED** Metering directly connected to the utility supply.

**INSTALLED CAPACITY** The rated capacity in kilo-volt-amperes (kVA) of the EL&P transformer supplying the service.

**INSTRUMENT TRANSFORMERS** Highly accurate current or voltage transformers approved for revenue metering by Measurement Canada.

**INSTRUMENT TRANSFORMER ENCLOSURE** The enclosure supplied and installed by the customer for the housing of instrument transformers.

**METER ENCLOSURE** The enclosure supplied and installed by the customer for the housing of a meter.

**METER, NETWORK** A two element meter designed for use on a single phase, 120/208V three wire network service metering from two phase wires and a neutral of a three phase, four wire, wye system.

**METER, SELF-CONTAINED** A socket mounted meter rated for carrying the current and voltage of the circuit to be metered.

**METER SOCKET** A meter mounting device for the purpose of installing EL&P's revenue meter.

**METER, TRANSFORMER TYPE** A meter used in conjunction with instrument transformers.

**MULTIPLE METER INSTALLATION** Any installation where a building has several meters fed from one service entrance such as apartment buildings, shopping centres, office buildings, warehouse or light industrial complexes, etc.

**REVENUE METERING EQUIPMENT** All meters, instrument transformers, secondary wiring, and associated devices, including test facilities used exclusively for the purpose of billing.

**SERVICE BOX** An approved assembly consisting of a metal box or cabinet constructed so that it may be effectively locked or sealed, containing either service fuses and a service switch or a circuit breaker and of such design that either the switch or circuit breaker may be manually operated when the box is closed. This device is also referred to as the main service disconnect, main switch or main panel.

**SERVICE ENTRANCE** The point of termination of EL&P supply conductors and the connections to the customers service conductors.

**SERVICE, COMMERCIAL SAW** A temporary electrical service for the construction of a commercial property provided at the customer's expense for a period not to exceed one year.

**SERVICE, RESIDENTIAL SAW** A temporary electrical service for the construction of a residential dwelling for a period not to exceed one year. This shall be available for residences served by overhead service only.

**SERVICE, TEMPORARY** Service for a limited period of time (generally less than 1 year)

**SERVICE, THREE PHASE - FOUR WIRE (WYE)** Any service in which EL&P supplies the 3 phase conductors and a grounded neutral conductor to the service entrance, regardless of the type of load connected.

# GENERAL INFORMATION

## 3.0 GENERAL INFORMATION

### 3.1 SUPPLY AND METERING VOLTAGES

Although every effort will be made to comply with the customer's request, EL&P reserves the right to decide the voltage at which the service shall be provided and the voltage at which it shall be metered. This will depend on the voltage and phase of existing distribution facilities.

- 120/240V single phase to a maximum of 400A
- 120/208V single phase (network)
- 120/208V three phase
- 347/600V three phase

All three phase services will be supplied as three phase, four wire wye.

### 3.2 NON-STANDARD SERVICES

#### 3.2.1 Acceptance Procedure

Whenever the requirements of this guide are not met due to a non-standard installation, drawings must be submitted to EL&P for approval of the installation. These should be submitted as early as possible, before the installation of service entrance equipment or other associated work commences.

If modifications are requested by EL&P the customer shall indicate the changes on the drawings and resubmit the revised drawings for approval.

Approval may or may not be granted. When such an approval is granted by EL&P, it is valid only for the particular service in question and is not a general approval for future services.

#### 3.2.2 Drawing and Specifications

Electronic submission of equipment drawings, specifications, and site plans shall be made to [elpdesign@reddeer.ca](mailto:elpdesign@reddeer.ca) for approval.

Plans, elevation and section views of the physical arrangement of the service entrance equipment, including switchgear, shall be provided. Dimensions shall be shown in sufficient detail to clearly illustrate provision for revenue metering equipment.

Drawings of the area which will contain the revenue metering equipment, switchgear and service entrance equipment, shall be provided, complete with details including the number and size of customer's services and the positioning of switchgear and/or service entrance equipment.

#### 3.2.3 Alterations to Existing Services

EL&P shall be notified of any proposed changes and/or additions to load.

No alteration shall be made to revenue metering and/or service entrance equipment without the permission of EL&P.

### 3.3 SAFETY REQUIREMENTS

#### 3.3.1 EL&P has the right to refuse installation of any equipment if clearances are not maintained or if the conditions onsite are deemed unsafe or inaccessible in any way.

#### 3.3.2 Safe Working Space

A minimum clear working space of 1.0 metre shall be provided and maintained in front of all metering equipment.

When access to equipment in switchgear is required through a side or rear panel or door, an unobstructed minimum working space of 1.0 metre shall be maintained at the side and/or rear of the switchgear.



An open and unobstructed headroom of not less than 2.2 metre shall be maintained for the area defined above.

An open passageway at least 1 m wide, and not less than 2.2 metre high shall be maintained as an exit route from the area defined above. Any exit door from the passageway shall be a minimum of 0.75 metre wide x 2.0 metre high.

Where a hinged door or panel in an open position would block an exit route, a minimum clear space of 0.6 m shall be maintained to enable a worker to pass by the edge of the open door or panel.

### **3.3.2 Hazardous Locations**

Where there is possibility of danger to workers or damage to equipment from moving machinery, explosive or flammable materials or gases, dust, fumes, water, moisture, etc., protective arrangements shall be provided by the customer. These arrangements shall be satisfactory to both EL&P and the Inspection Authority. Where the hazardous environment occurs within the building the metering may be installed outside in an approved weather-proof enclosure with special permission (see "Acceptance Procedures" 3.2.1).

### **3.3.3 Proximity of Other Equipment**

Water pipes, gas pipes, sewer pipes or other pipes or other non-electrical equipment shall not be mounted directly above the service entrance, distribution equipment or revenue metering equipment. Non-electrical equipment shall not intrude into the area designated as "Safe Working Space".

### **3.3.4 Illumination and Electrical Outlets**

All electrical rooms and areas defined as "Safe Working Space" shall have adequate illumination.

Lighting shall be controlled by wall switches located at the point of entry to electrical rooms and to areas defined as "Safe Working Space". Switches shall be positioned on the inside wall of electrical rooms, on the latched side of the door, within reaching distance of the entrance way.

One duplex receptacle is required within the electrical room or in close proximity of the area defined as "Safe Working Space".

## **3.4 SERVICE ENTRANCE EQUIPMENT REQUIREMENTS**

Hinged doors or cover plates shall be installed over all live electrical equipment where EL&P staff may be required to work. This shall include live splitters, unmetered sections of switchgear, breakers and switches. All such hinged doors and cover plates shall have provision for sealing or padlocking. Where bolts are used they shall be of the captive knurled type.

All outer hinged doors shall open either left or right no less than 110 degrees. All inner hinged doors shall open either left or right to 90 degrees. All cover plates shall be removable from the front. One exception to the direction of opening is the horizontally mounted splitter box which shall open downwards.

Barriers shall be provided in each section of switchgear or service entrance equipment, between metered and unmetered conductors, and between those sections reserved for EL&P use and sections reserved for customer use.

### **3.5 ACCESS TO METERING EQUIPMENT**

In all metering installations, EL&P staff and / or their agents must have unhindered access to all equipment for the purpose of changing, servicing and reading such equipment.

Where EL&P is not readily able to gain access to metering equipment due to locked doors, EL&P shall require a key for its use and may install a lock box for the purpose of keeping the key onsite. At the time of connection, the customer shall provide a key for the electrical room or facilities. This key shall be for the exclusive use of authorised EL&P personnel. Whenever the locks are changed a new key shall be immediately provided to EL&P.

### **3.6 MULTI-RESIDENCE METERING POLICY**

Single (bulk) metering will not be acceptable for any new multi-residence or apartment building services. Each unit must be metered separately in accordance with the requirements in this guide. The only exception to this policy will be in the case of specialized assisted living facilities where bulk metering is acceptable.

Existing bulk metered services may continue to be metered as such.

### **3.7 CUSTOMER INSTRUMENTATION**

#### **3.7.1 Customer Instrumentation**

Customer relays, instruments or other devices shall not be connected in EL&P revenue metering circuits and shall not be mounted on any meter enclosures, instrument transformer enclosures or any other equipment supplied for the use of EL&P.

All customer instrumentation shall be connected on the load side of EL&P revenue metering circuits, except with special permission as outlined in 3.2.1 "Acceptance Procedures".

Signals for the purpose of customer load control may be provided from EL&P revenue metering equipment or any associated electrical circuits subject to review and approval by EL&P.

### **3.8 TEMPORARY SERVICES**

#### **3.8.1 Residential Saw Service**

A temporary overhead electrical service will be supplied for up to one year for construction of a residential dwelling. The cost for this service will be provided in a formal quote letter from EL&P and estimated on an individual basis.

##### **3.8.1.1 Overhead Residential Saw Service**

The customer shall supply:

- a) A pole with a service box and meter base c/w meter ring
- b) An appropriate ground in accordance with CEC
- c) A mast with Weatherhead and secure point of attachment
- d) A valid electrical permit

EL&P will provide:

- a) Connection and disconnection of the service during normal working hours
- b) A revenue meter
- c) The triplex conductor

**3.8.2 Commercial Saw Service**

A temporary electrical service for the construction of a commercial property will be provided at the customer's expense for a period not to exceed one year. The cost for this service will be provided in a formal quote letter from EL&P and estimated on an individual basis.

The customer shall supply:

- a) A pedestal with a service box and meter base c/w meter ring
- b) An appropriate ground in accordance with CEC
- c) An appropriate cable to the property line if the service is to be supplied from the underground system
- d) A mast with a Weatherhead and secure point of attachment if the service will be supplied from the overhead system.
- e) If the service requires an addition or extension to the existing electrical system, EL&P will provide this at the customer's expense.

**3.8.3 Work Scheduling and Additional Costs**

The electrician must call the EL&P office to notify when electrical connection is ready. If the service is not acceptable based on appropriate standards, a service call fee will be assessed.

# 4.0

## SERVICES REQUIRING SELF-CONTAINED METERS

## 4.0 SERVICES REQUIRING SELF-CONTAINED METERS

### 4.1 GENERAL

Self-contained meters may be used for services of 200 Amps per phase or less.

Where a self-contained meter is to be used, the customer or contractor shall supply a meter socket as described in section 4.4 and install it in a location in accordance with section 4.3.

Table 1 includes all self-contained meter types used and normally available supply voltages. Refer to meter wiring diagrams Fig. 4-1 through 4-3.

**TABLE 1**

### SELF-CONTAINED METERS (UP TO 200 AMPS)

PHASE	WIRE	SERVICE VOLTAGE	COIL VOLTS	SOCKET MTC.	REMARKS	FIGURE NO.
1	3	120/240	240	4 Jaw		4-1
Network	3	120/208	120	5 Jaw	5th Jaw at 9 o'clock	4-2
3	4	120/208Y	120	7 Jaw		4-3
3	4	347/600Y	347	7 Jaw		4-3

### 4.2 SPACE REQUIREMENTS FOR SELF-CONTAINED METERS

EL&P does not normally require a meter enclosure for self-contained meters except in locations where the meter may be subject to damage.

The space requirements for self-contained meters used on multiple metered services shall be as per Fig. 4-4. For all other services the minimum required space for self-contained meters shall be 300 mm wide by 550 mm high.

A safe working space as described in section 3.3.1 must also be maintained for all self-contained metering installations.

### 4.3 LOCATION OF SELF-CONTAINED METERS

#### 4.3.1 General

Meters shall be located as close as possible to the service box in a clean, readily accessible area free from severe or continual vibration and in accordance with the Canadian Electrical Code, latest edition.

Meters shall not be installed in any location which may be hazardous to persons engaged in reading, installing or testing such meters. In the case of fenced unmanned oilfield services where the possible presence of hydrogen sulphide gas exists, the meter may be installed on a pole outside the fenced area.

All meters must be mounted level on the horizontal and vertical planes in a location acceptable to EL&P

NOTE: ON BUILDINGS WITH SLOPING SIDES SPECIAL PROVISIONS MUST BE MADE TO MEET THE ABOVE REQUIREMENTS.



#### **4.3.2 Single Meter Installation - Indoors**

All new services shall be cold metered. Existing hot metered services may be grandfathered at EL&P discretion. An exception may be made for fenced unmanned oilfield services where possible hydrogen sulphide gas presence restricts access. In these cases, the meter may be connected on the line side of the service box if it is located on a pole outside the fenced area. Inside meters shall be mounted at a height such that the centre line of the meter is between 0.65 m and 1.8 m above floor level.

#### **4.3.3 Single Meter Installation - Outdoors**

All residential meters shall be hot metered, located outdoors and firmly attached to the building. The meter shall be located in an area near the service entrance and readily accessible for EL&P personnel. The meter shall be mounted such that the centre line of the meter is between 1.5 metre and 1.8 metre above the floor, ground, and sidewalk or deck level.

#### **4.3.4 Multiple Meter Installation**

Generally, all meters in a multiple meter installation shall be located indoors, grouped together in an approved location and connected on the load side of the sub-service box. The only exception to this is in the case of small apartments of the duplex and fourplex type, where it is usually acceptable to locate the meters outdoors and connect them on the line side of the service box. The mounting height of meters shall be in accordance with those of a single meter outdoor installation (see section 4.3.3).

Large apartments may have all meters located in one central meter room or there may be several metering points each having a number of meters. It is desirable to keep the number of metering points to a minimum.

Where metering space is provided in shallow recesses in hallways rather than proper meter rooms, these recesses may be provided with sliding or folding doors. Special care shall be taken to ensure that meters can be read and changed without trouble due to placement of door frames, etc. and that switches, etc. can be opened. See Fig. 4-4 for minimum space requirements.

For all multiple meter installations the customer shall correctly identify all metered services with respect to the address and/or unit number of each customer's service as established by The City of Red Deer's municipal addressing standards. This identification shall be permanent and legible and shall be applied to all main switches and breakers and to all enclosures or meter sockets that are not immediately adjacent to the main switches or breakers.

Other components of any service arrangement that EL&P deems necessary shall be identified.

The mounting height of meters in a multiple meter installation shall be in accordance with those of a single meter indoor installation (see section 4.3.2).

Where factory-assembled switching and metering centres are used, all requirements with regard to spacing, location, and connection etc. as outlined in this section shall apply.

#### **4.4 METER SOCKETS**

##### **4.4.1 General**

All meter sockets supplied for use by EL&P shall conform to the latest edition of CSA Specification and be provided with a screw type sealing ring.

NOTE: SOCKETS AND A-TYPE METERING DEVICES WITH CURRENT BYPASS SWITCHES ARE NOT ACCEPTABLE.

##### **4.4.2 Neutral Connection in Meter Sockets**

On services which require a neutral connection to the meter, the main service neutral shall be connected to the meter socket lug from within the meter socket. The only exception will be where the meter socket is on the load side of the service box and the neutral is not required for the customer's equipment. In these cases a tap of equivalent size, and coded white, must be run from the neutral terminal in the service box and connected to the meter socket lug from within the meter socket.

On all services in which the meter socket is located on the load side of the service box a neutral connection which is insulated from the meter socket case shall be used to ensure that the neutral conductor is not grounded within the meter socket.

# 5.0

## SERVICES REQUIRING INSTRUMENT TRANSFORMER TYPE METERS

## 5.0 SERVICES REQUIRING INSTRUMENT TRANSFORMER TYPE METERS

### 5.1 GENERAL

Instrument transformer type metering must be used on all services exceeding 200 amps per phase.

### 5.2 SUPPLY OF METERING EQUIPMENT

#### 5.2.1 General

EL&P will supply all revenue meters, instrument transformers, test blocks, secondary wiring and associated equipment, unless otherwise stated.

The customer shall supply the following equipment:

- A meter enclosure in accordance with section 5.2.2.
- An instrument transformer enclosure in accordance with section 5.2.3.
- All conduits in accordance with section 5.2.4.
- All hardware, bus work, termination and/or cable required for the primary connections to the current transformers.

The instrument transformers will be made available to the customer or the contractor through the EL&P office, during normal working hours.

#### 5.2.2 Meter Enclosures

A separate, pre-wired, CSA approved, manufactured meter enclosure shall be provided for each service requiring instrument transformer type metering. This includes a 13-jaw meter socket (for 3-phase services), or 5-jaw meter socket with 5th jaw oriented at 9 o'clock (for single phase services); a test switch and wiring from the test switch to the socket.

**TABLE 2**

Socket Type #	Service Type	Service Size (> 200 Amps)	Specifications	Manufacturer Model No.	Manufacturer
1	3 Ø, 4Wire, Wye	120/208, 347/600	13 Jaw c/w Test switch	CT113-SWL	Thomas & Betts, Microelectric Canada
1	3 Ø, 4Wire, Wye	120/208, 347/600	13 Jaw c/w Test switch	602C3040C13-603	Meter Devices
2	1 Ø, 3Wire	120/240	5 Jaw c/w Test Switch 120/240 Volt	JS4B	Thomas & Betts, Microelectric Canada
2	1 Ø, 3Wire	120/240	5 Jaw c/w Test Switch 120/240 Volt	CT4	Hydel
2	1 Ø, 3Wire	120/240	5 Jaw c/w Test Switch 120/240 Volt	TCC5	Eaton

### 5.2.3 Instrument Transformer Enclosures

A separate instrument transformer enclosure shall be provided for each set of instrument transformers (the number required to meter a single circuit only).

The instrument transformer enclosure shall be made of sheet steel and be constructed in accordance with the appropriate CSA Specifications. Minimum dimensions and metal gauges shall be as outlined in Table 3.

All instrument transformer enclosures shall be equipped with a sheet steel, removable, interior mounting plate of a minimum of 12 gauge. The plate shall be 150 mm narrower than the width and 75 mm shorter than the height of the enclosure, and mounted to permit a clearance of 6 mm behind it.

The instrument transformer enclosure shall be equipped with vertically hinged doors which are non-removable when in the closed position. These doors shall have provision for the attachment of an EL&P padlock or seal. Where a seal is to be used the door must be provided with a method of installing utility seals.

NOTE: COVER PLATES ARE NOT ACCEPTABLE ON INSTRUMENT TRANSFORMER ENCLOSURES

### 5.2.4 Conduit

A conduit of not less than 32 mm (1 1/4 inches) nominal diameter shall be installed between the instrument transformer enclosure and the meter enclosure for the exclusive use of EL&P. The conduit may be rigid metal, electrical metallic tubing or rigid PVC. Rigid metal conduit shall be terminated with lock nuts and bushings, except where threaded hubs are supplied. No L.B.'s or similar conduit fittings which allow access to the metering circuits shall be allowed except when a CSA approved sealable "L" fitting is used. If such fittings are used they must be clearly visible.

A separate conduit is required between the instrument transformer enclosure and meter enclosure for each separately metered service. When potential transformers are located in the same enclosure as the current transformer, only one conduit is required.

When it is necessary to route revenue metering secondary wires through compartments other than those reserved for EL&P use, a conduit or suitable metal raceway shall be installed through such compartments for the exclusive use of EL&P

When rigid PVC conduit is used, the customer must ensure that the cabinet is bonded as per the latest version of the CEC.

## 5.3 LOCATION OF INSTRUMENT TRANSFORMER TYPE METERING

### 5.3.1 General

All instrument metering equipment shall normally be installed indoors, in a location satisfactory to both EL&P and the Inspection Authority and which conforms to all safety requirements outlined in Section 3.3.

Instrument metering equipment may be installed outdoors with special permission from EL&P (see "Acceptance Procedures" 3.2.1). Any outdoor equipment must be rated for the application.

All instrument metering must be located according to the following requirements:

- a) The meter must be level on the horizontal and vertical planes.
- b) The centre line of the meter enclosure must be at a height between 1.0 m and 1.8 m above the floor.
- c) The secondary metering conductors running between the meter and instrument transformer enclosures must be 8 m or less in length.
- d) The instrument transformers must be as close as possible to, and connected on the load side of, the service box.



- e) The meter enclosure and the instrument transformer enclosure must not be separated by a wall of any type or be located in different rooms.
- f) All equipment must be located in a clean readily accessible area free from severe or continual vibration.

A typical layout of metering equipment is shown in Fig. 5-1.

## **5.4 MOUNTING AND CONNECTION OF METERING EQUIPMENT**

### **5.4.1 General**

The customer will be responsible for mounting all enclosures, instrument transformers, meter boards, fuses, and other equipment required for EL&P revenue metering.

EL&P will be responsible for mounting and connection of the meter itself, all secondary wiring, and the primary wiring of the potential transformers where required.

### **5.4.2 Instrument Transformer Mounting and Connection**

The customer shall ensure that all instrument transformers are mounted and the current transformer primaries are properly connected and secured. Figures 5-2a, 5-2b (bar CTs), 5-3a (donut CTs), 5-3b (window CTs) and 5-4 (PTs) show dimensional details of typical metering instrument transformers used on services up to and including 600 Volts.

Mounting bolts for all instrument transformers shall be installed in a manner which will permit the complete removal or installation of such transformers from within the compartment in which they are installed (see Fig. 5-5). All instrument transformer mounting holes as supplied by the manufacturer must be utilized when mounting the instrument transformers.

All instrument transformers must be mounted such that the name plates are clearly visible from the enclosure opening.

Current transformers shall be positioned with the primary polarity of supply (see Fig. 5-6 & 5-7). Where this arrangement will obstruct access to the secondary terminals, they may be mounted with the polarity reversed, subject to EL&P approval. All current transformer primary connections shall be properly secured and conductors shall be shaped or formed and supported so that no tension is applied to the current transformers.

Where EL&P supplies a three phase, four wire service, the neutral bus must be run into the instrument transformer enclosure and be provided with a solderless copper connector capable of accommodation 1 x #10 wire connection. When insulated cable is used instead of bus bar, an approved connector must be provided on the neutral conductor within the instrument transformer enclosure to facilitate the connection of the potential wire for the meter (see Fig. 5-6 & 5-7). If the neutral consists of two or more conductors in parallel only one of the conductors need be tapped for metering neutral connection.

TABLE 3

Voltage	Phase	Wire	Service Size in Amperes	Instrument Transformer Enclosure		Number of Instrument Transformers Required	
				Minimum HxWxD mm (inches)	Gauge	Current	Potential
120/240	1	3	200-400	762x762x254 (30"x30"x10")	16	1-3W	-
120/208Y	3	4	200-600	914x914x305 (36"x36"x12")	16	3-2W	-
120/208Y	3	4	800 & Above	1219x1219x305 (48"x48"x12")	14	3-2W	-
347/600Y	3	4	400	914x914x305 (36"x36"x12")	14	3-2W	3
347/600Y	3	4	600 & Above	1219x1219x305 (48"x48"x12")	14	3-2W	3

## NOTES:

1. Enclosures adequate for potential transformers.
2. Must be constructed to the appropriate CSA Specification.
3. All dimensions shown are minimum values.
4. Pre-manufactured combination distribution centres are acceptable. Contact EL&P for approval.

**5.5 INTERVAL METERING**

Where a customer's peak load is anticipated to be above 500 KVA; or, for existing services, exceeds 500 kVA twice in the previous 365 days; or upon a customer's request (and at EL&P's discretion), an interval meter will be installed. EL&P will cover the typical costs of interval metering equipment; however, unique installations may require some customer contribution. Please contact EL&P for more details.

**5.6 PADMOUNT METERING**

Padmount metering is available for services greater than 200 Amp and the padmount transformer serves only a single customer. If padmount metering is desirable, the customer is not responsible for metering. EL&P will supply and install all the metering materials. However all padmount metering installations are at the discretion of EL&P.

**5.7 PRIMARY METERING**

When a service exceeds 750 Volts a Primary Service may be required and customers should contact EL&P staff for pre-planning their service needs.

**5.7.1 Service Application and Acceptance**

For Primary Metered Services, a kick-off meeting must be arranged prior to project initiation that includes EL&P Metering & Design Staff. 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 EL&P 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 EL&P. This will avoid costly alterations to equipment already built.

All equipment supplied and installed by the Customer downstream of the primary metering

tank is to be owned and maintained by the customer.

### **5.7.2 EL&P Supplied Outdoor Primary Metering Unit**

The preferred service method for primary metered customers is to use an outdoor Primary Metering Unit (PMU) that will be supplied and installed by EL&P.

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 EL&P 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 which will include all metering CTs and PTs.
- Power supply for PMU.
- Utility cables running to metering station.
- Bollards or other mechanical protection as deemed necessary by EL&P design.

### **5.7.3 Outdoor Primary Switchgear 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 EL&P 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.

#### **5.7.3.1 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 EL&P. When it is necessary to route Metering secondary wires through compartments, other than those reserved for EL&P use, a metal conduit, or suitable metal raceway, shall be installed through each compartment for the exclusive use of EL&P.

#### **5.7.3.2 Meter Communication Requirements**

EL&P provides all utility communication requirements.

### **5.7.4 Indoor Primary Metering Requirements**

EL&P may consider indoor Primary Metering requests on a case by case basis. For project planning, details and specifications, please call EL&P.

## 5.8 DISTRIBUTED GENERATION (DG) AND MICRO GENERATION (MG)

In some cases, the customer may want to install electric power generation resources on site. Customers must obtain approval from EL&P before installing and energizing this type of equipment. Please email questions to: [ELPmeters@reddeer.ca](mailto:ELPmeters@reddeer.ca).

### 5.8.1 Recognized Points of Isolation

EL&P 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. EL&P does not recognize any type of Transfer Switch as a suitable means of disconnect.

### 5.8.2 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/or at the Disconnect Mean location.

#### Customer Metering Requirements

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

### 5.8.3 Onsite Generation Metering

For customers with a DG system between 1 MW to 5 MW, 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 EL&P Metering system cannot be utilized for the generation non-revenue meter. The customer is required to provide specific data. For more details, please contact [ELPmeters@reddeer.ca](mailto:ELPmeters@reddeer.ca).

## 5.9 USE OF METERING SIGNALS FOR CUSTOMER LOAD MANAGEMENT SYSTEM

EL&P 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, EL&P 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 EL&P Metering facilities. EL&P 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.

EL&P will not supply a time interval pulse under any circumstances. The standard metering signals that may be available from EL&P metering installations, are watt-hour (Wh), and volt-amperes reactive hour (VARh). The customer shall assume all incremental costs incurred by EL&P in order for the provision of metering signals and maintenance of such equipment, including auxiliary metering equipment.


After commissioning, the customer may not make changes, additions or modifications to EL&P equipment.

## 5.10 CONNECTIVITY

EL&P will complete a connectivity test on all sites which meet the following criteria:

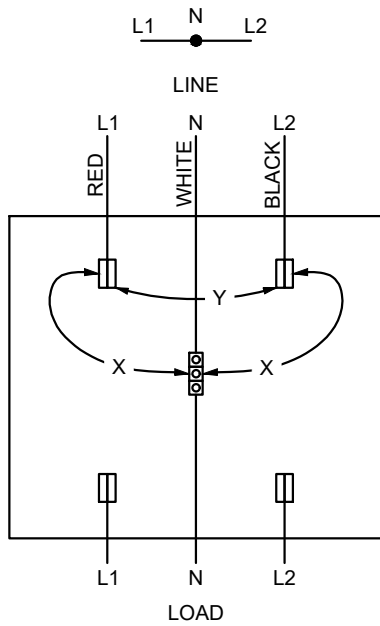
- Residential buildings with 2 or more units with unique addresses (e.g. townhomes or condominiums with 2 or more units).
- Commercial buildings with 2 or more units with unique addresses.

The connectivity test must be requested by the customer. The connectivity test must pass before EL&P meters are installed. If the connectivity test fails, the customer is responsible to make the necessary corrections and request an additional test.



# TABLE OF FIGURES





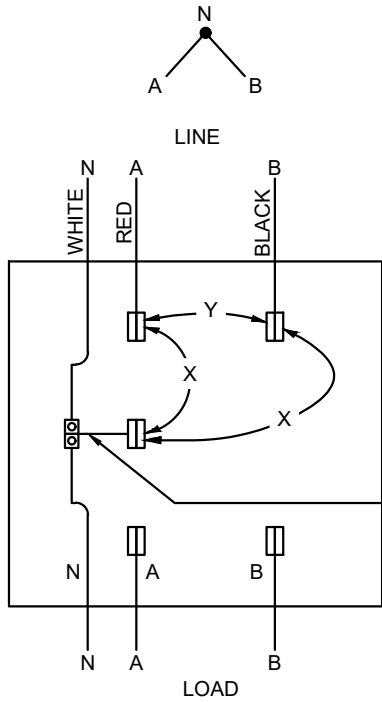
LINE VOLTAGE	MEASURED VOLTAGE	
	X	Y
120 / 240	120	240

FIG 4-1

NOTES:

1. SEE METERING GUIDELINES FOR DETAILS ON NEUTRAL CONNECTION.

			<b>THE CITY OF RED DEER      ELECTRIC LIGHT AND POWER DEPARTMENT</b>	
			DRAWN BY: M.A	<b>CONSTRUCTION SPECIFICATION DRAWINGS OVERHEAD INFRASTRUCTURE</b>
			DATE: DEC 2019	
			SCALE: N.T.S	<b>SINGLE PHASE THREE WIRE CIRCUIT 120/240 VOLTS (200 AMP MAX)</b>
1	Dec 2019	Reviewed / Updated / Revised	APPROVED BY:  ENGINEER	
NO.	DATE	REVISION	DRAWING NO. <b>70001</b>	



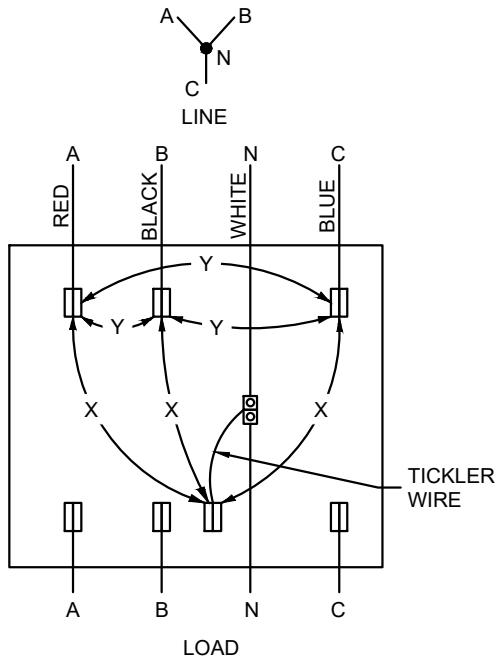
LINE VOLTAGE	MEASURED VOLTAGE	
	X	Y
120 / 208	120	208

FIG 4-2

NOTES:

1. SEE METERING GUIDELINES FOR DETAILS ON NEUTRAL CONNECTION.

			<b>THE CITY OF RED DEER    ELECTRIC LIGHT AND POWER DEPARTMENT</b>	
			DRAWN BY: M.A	<b>CONSTRUCTION SPECIFICATION DRAWINGS OVERHEAD INFRASTRUCTURE</b>
			DATE: DEC 2019	
			SCALE: N.T.S	<b>3 WIRE NETWORK CIRCUIT 120/208 VOLTS (200 AMP MAX)</b>
				APPROVED BY:  ENGINEER
1	Dec 2019	Reviewed / Updated / Revised		DRAWING NO. <b>70002</b>
NO.	DATE	REVISION		



LINE VOLTAGE	MEASURED VOLTAGE	
	X	Y
120 / 208	120	208
347 / 600	347	600

FIG 4-3

NOTES:

1. SEE CONNECTION OF SELF CONTAINED METERING EQUIPMENT SECTION.

			<b>THE CITY OF RED DEER ELECTRIC LIGHT AND POWER DEPARTMENT</b>	
			DRAWN BY: M.A	<b>CONSTRUCTION SPECIFICATION DRAWINGS OVERHEAD INFRASTRUCTURE</b>
			DATE: DEC 2019	
			SCALE: N.T.S	<b>3 PHASE 4 WIRE CIRCUIT 120/208 OR 347/600 VOLTS (200 AMP MAX)</b>
				APPROVED BY:  ENGINEER
1	Dec 2019	Reviewed / Updated / Revised		DRAWING NO. <b>70003</b>
NO.	DATE	REVISION		

METER SOCKETS MUST BE MOUNTED  
NO MORE THAN 1800mm FROM  
FLOOR (PREFERRED HEIGHT 1500mm)  
SERVICE SWITCHES MUST HAVE PROVISION  
FOR EL&P SEALS AND MUST BE IDENTIFIED BY  
CUSTOMER NAME OR LOCATION

THIS DIMENSION MUST  
NOT BE LESS THAN 200mm  
CENTER TO CENTER

MAIN SERVICE DISCONNECT  
SPLITTER BOX AND SUB-SERVICE  
DISCONNECTS MUST HAVE  
PROVISION FOR EL&P WIRE SEAL

MAIN  
SERVICE  
DISCONNECT

SPLITTER

BOX

COVER OF SPLITTER BOX MUST BE  
HINGED TO OPEN DOWNWARD

50mm MIN.

180mm

75mm MIN.

IDENTIFY BY  
ADDRESS OR  
UNIT NUMBER  
(SEE NOTE 1)

FIG 4-4

NOTES:

1. ALL METER SOCKETS AND DISCONNECTS MUST BE IDENTIFIED BY ADDRESS OR UNIT NUMBER WITH A PERMANENT LEGIBLE LABEL.
2. DISCONNECT MUST BE LINE SIDE OF METER (COLD METERED).
3. 1M CLEARANCE MUST BE MAINTAIN IN FRONT OF EQUIPMENT.

			<b>THE CITY OF RED DEER    ELECTRIC LIGHT AND POWER DEPARTMENT</b>	
			DRAWN BY: M.A	<b>CONSTRUCTION SPECIFICATION DRAWINGS OVERHEAD INFRASTRUCTURE</b>
			DATE: DEC 2019	
			SCALE: N.T.S	<b>INSTALLATION MULTIPLE METERS</b>
1	Dec 2019	Reviewed / Updated / Revised	APPROVED BY:  ENGINEER	
NO.	DATE	REVISION	DRAWING NO. <b>70004</b>	

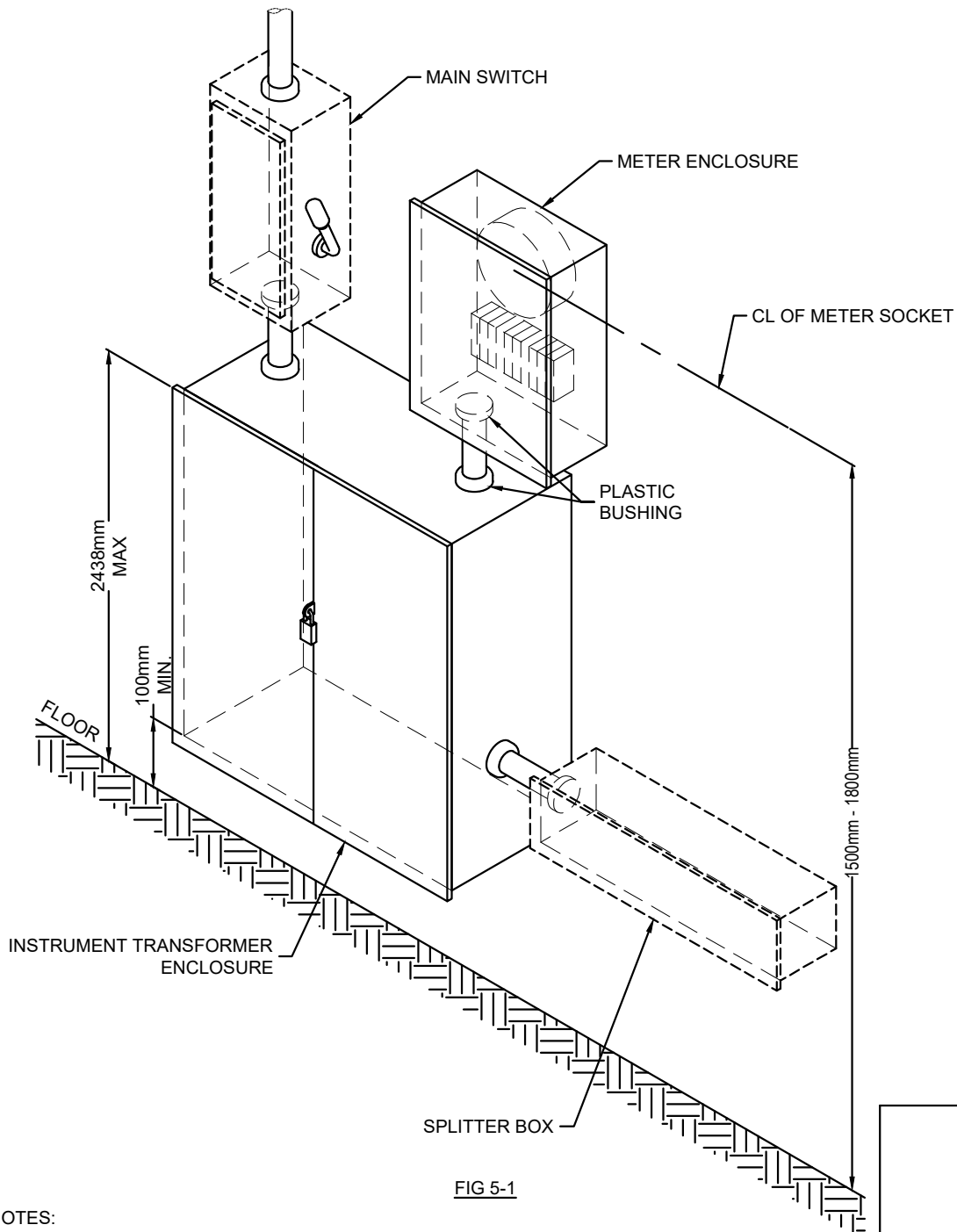


FIG 5-1

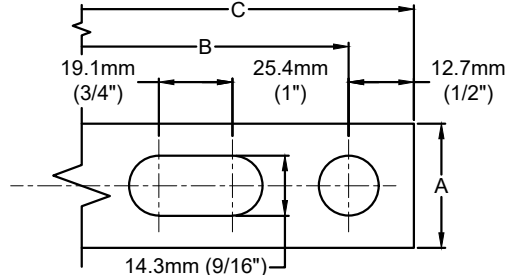
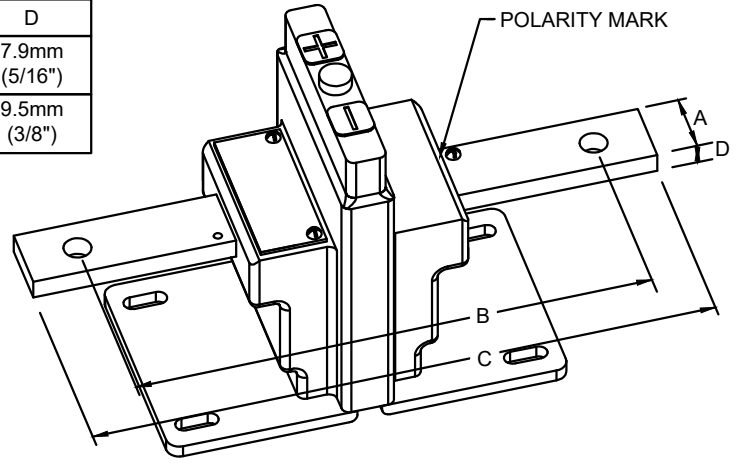
NOTES:

1. MINIMUM 1-1/4" DIAM. CONDUIT.
2. CONFIGURATION MAY DIFFER PER INSTALLATION.
3. 1M CLEARANCE MUST BE MAINTAINED IN FRONT OF EQUIPMENT.

			<b>THE CITY OF RED DEER    ELECTRIC LIGHT AND POWER DEPARTMENT</b>		
			DRAWN BY: M.A	<b>CONSTRUCTION SPECIFICATION DRAWINGS OVERHEAD INFRASTRUCTURE</b>	APPROVED BY:
			DATE: DEC 2019		ENGINEER
			SCALE: N.T.S	<b>METER &amp; INSTRUMENT TRANSFORMER ENCLOSURES &amp; TYPICAL INSTALLATION FOR INDOOR METERING ONLY</b>	DRAWING NO.
1	Dec 2019	Reviewed / Updated / Revised			<b>70005</b>
NO.	DATE	REVISION			

PRIMARY BAR DIMENSIONS

CAPACITY AMPS.	A	B	C	D
5-400 AMPS.	25.4mm (1")	196.9mm (7-3/4")	238.1mm (9-3/8")	7.9mm (5/16")
500-1200 AMPS.	50.8mm (2")	266.7mm (10-1/2")	292.1mm (11-1/2")	9.5mm (3/8")



500-1200 AMPS

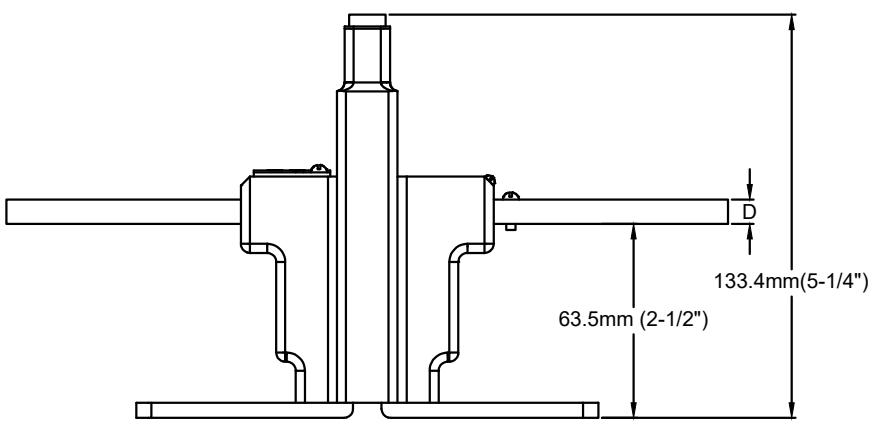
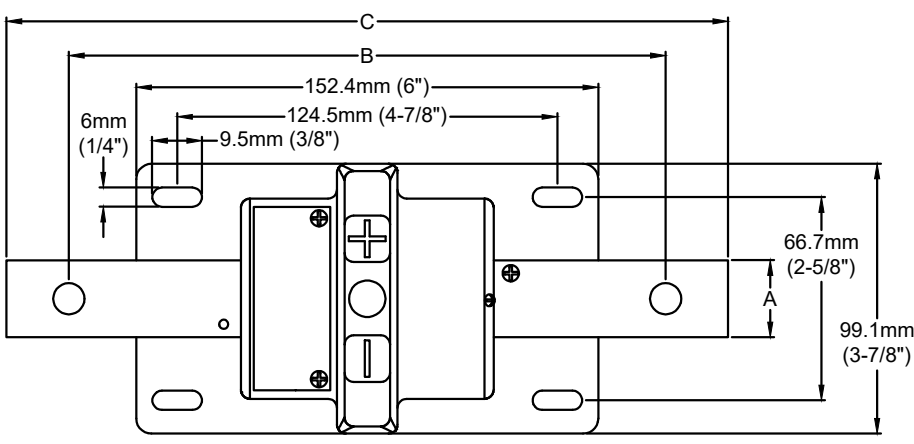


FIG 5-2A

			<b>THE CITY OF RED DEER ELECTRIC LIGHT AND POWER DEPARTMENT</b>	
			DRAWN BY: M.A	<b>CONSTRUCTION SPECIFICATION DRAWINGS OVERHEAD INFRASTRUCTURE</b>
			DATE: DEC 2019	
			SCALE: N.T.S	<b>2 WIRE CURRENT TRANSFORMERS 5 TO 1200 AMPERES</b>
1	Dec 2019	Reviewed / Updated / Revised	APPROVED BY:  ENGINEER	
NO.	DATE	REVISION	DRAWING NO. <b>70006</b>	

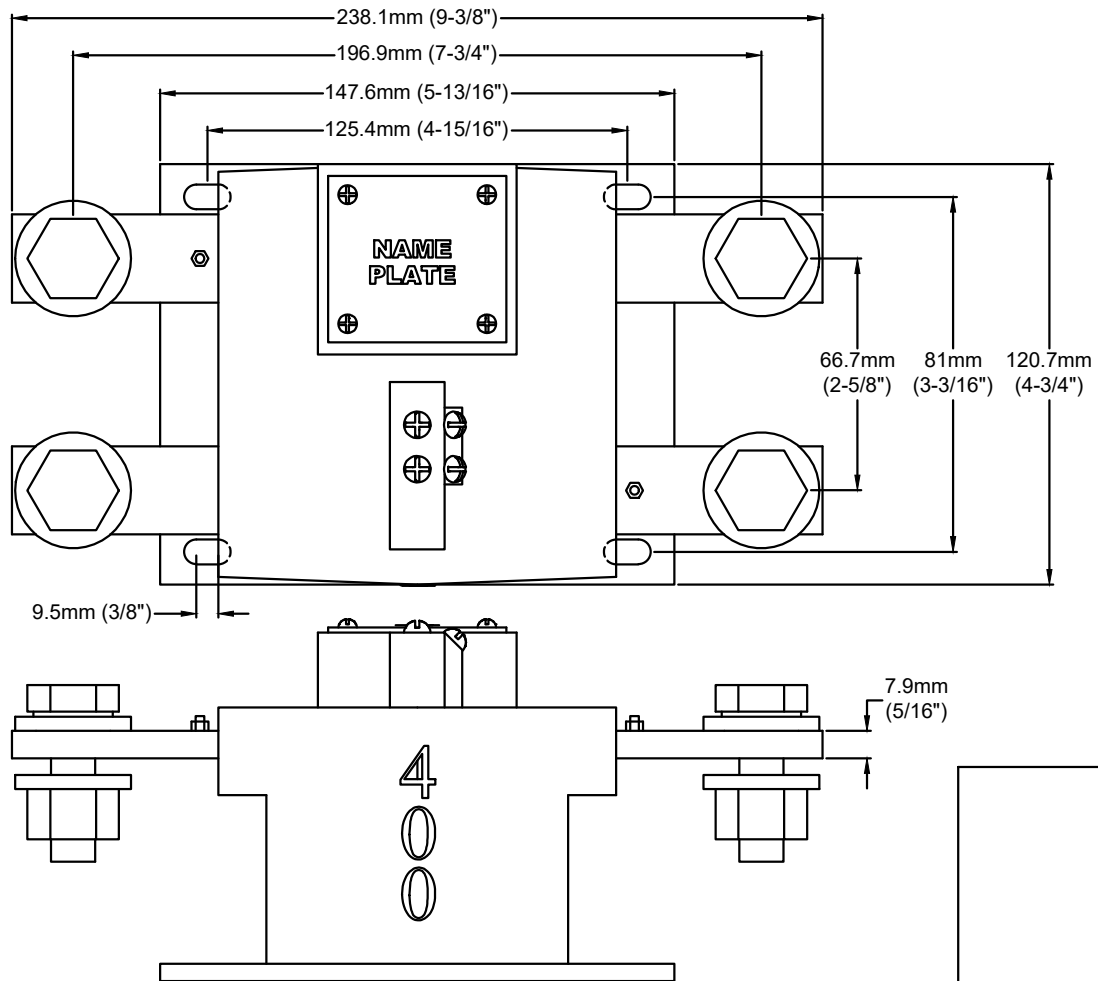
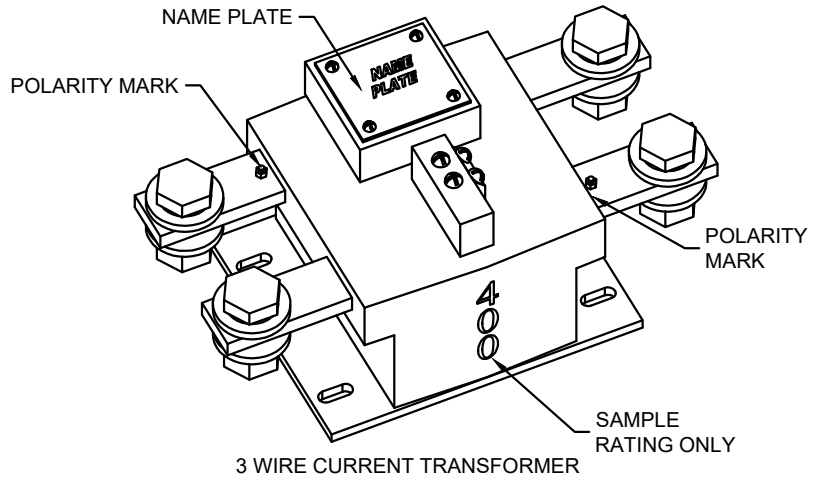


FIG 5-2B

			<b>THE CITY OF RED DEER    ELECTRIC LIGHT AND POWER DEPARTMENT</b>	
			DRAWN BY: M.A	<b>CONSTRUCTION SPECIFICATION DRAWINGS OVERHEAD INFRASTRUCTURE</b>
			DATE: DEC 2019	
			SCALE: N.T.S	<b>3 WIRE CURRENT TRANSFORMER</b>
1	Dec 2019	Reviewed / Updated / Revised		
NO.	DATE	REVISION		APPROVED BY:  ENGINEER DRAWING NO. <b>70007</b>



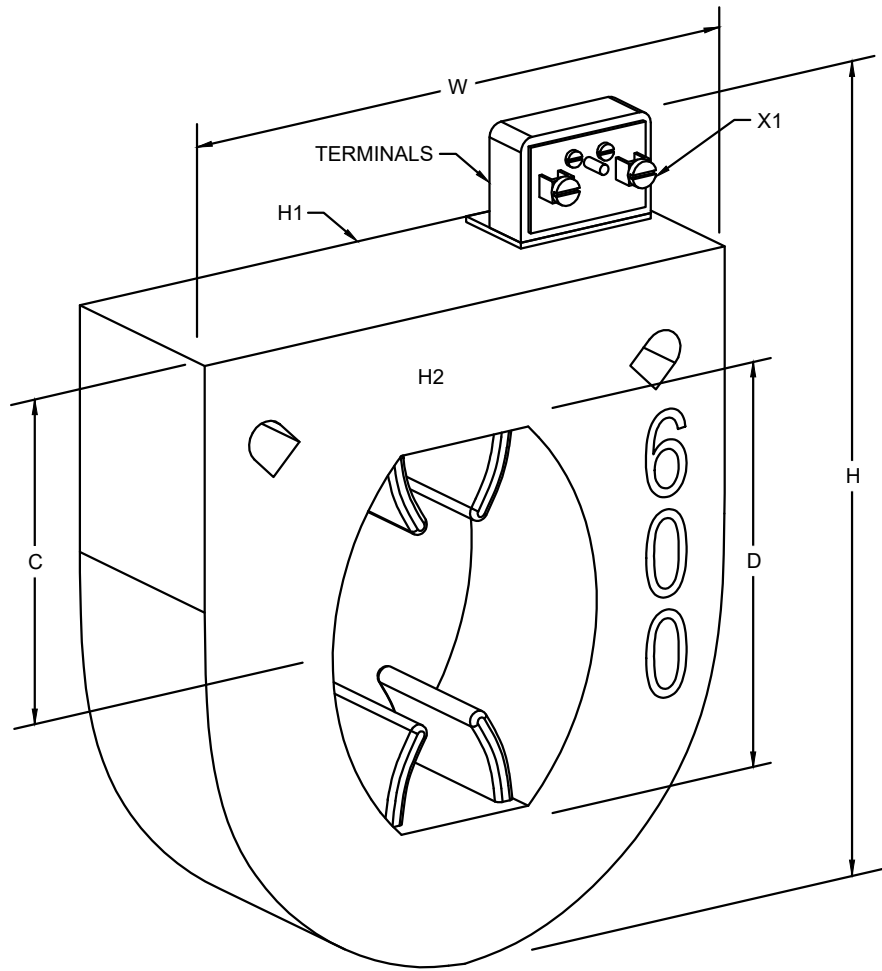


FIG 5-3A

RATED CURRENT	"D" MINIMUM WINDOW DIAMETER	"W" MAXIMUM DIAMETER WIDTH	"H" MAXIMUM OVERALL HEIGHT	"C" WINDOW CENTRE HEIGHT
400-5 A TO 1,200-5 A	105 mm (4-1/8")	154 mm (6-1/16")	209 mm (8-1/4")	63 mm (2-1/2")

NOTES:

- DONUT TYPE CURRENT TRANSFORMERS REQUIRE AN INSTRUMENT TRANSFORMER ENCLOSURE OF AT LEAST 1200x900x300mm (HxWxD).

			<b>THE CITY OF RED DEER ELECTRIC LIGHT AND POWER DEPARTMENT</b>	
			DRAWN BY: M.A	<b>CONSTRUCTION SPECIFICATION DRAWINGS OVERHEAD INFRASTRUCTURE</b>
			DATE: DEC 2019	
			SCALE: N.T.S	<b>TYPICAL DONUT TYPE CURRENT TRANSFORMER 600V METERING</b>
1	Dec 2019	Reviewed / Updated / Revised	APPROVED BY:  ENGINEER	
NO.	DATE	REVISION	DRAWING NO. <b>70008A</b>	

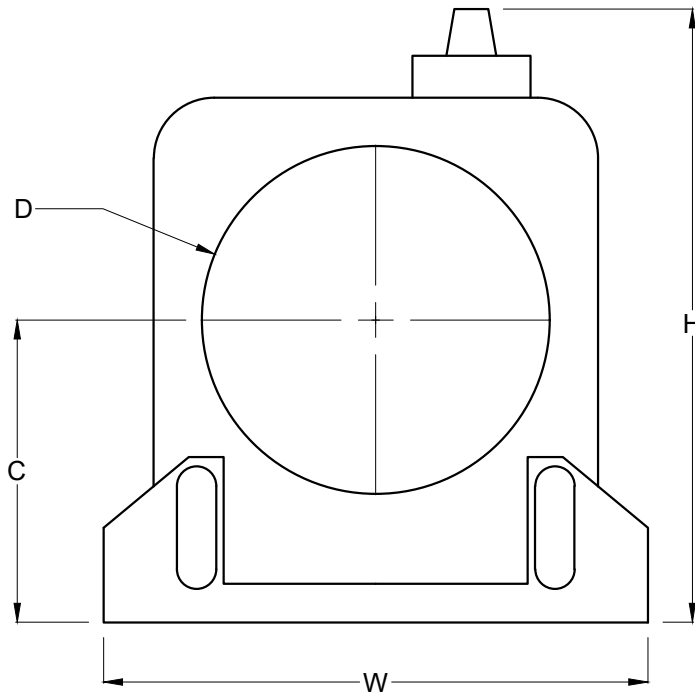


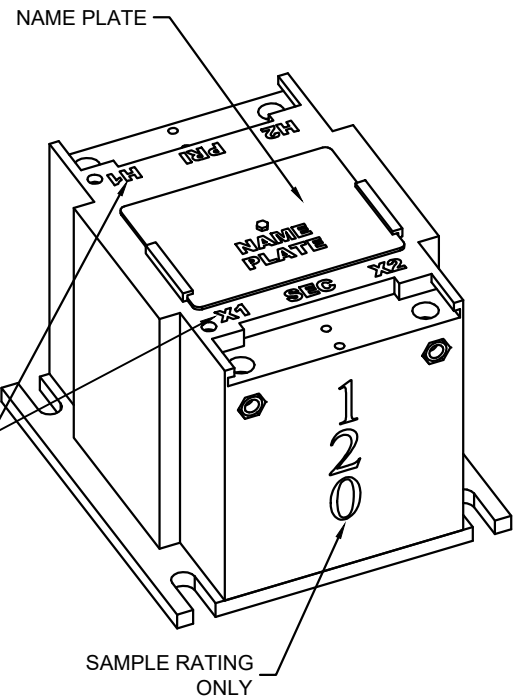
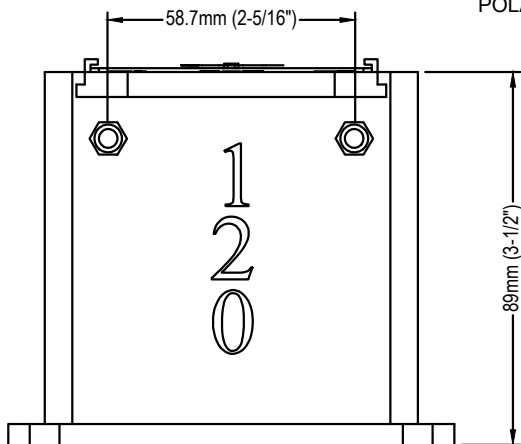
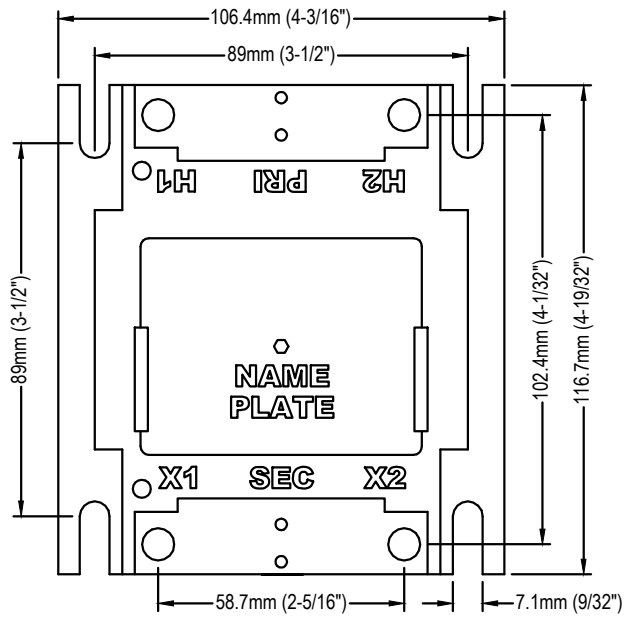
FIG 5-3B

RATED CURRENT	"D" MINIMUM WINDOW DIAMETER	"W" MAXIMUM DIAMETER WIDTH	"H" MAXIMUM OVERALL HEIGHT	"C" WINDOW CENTRE HEIGHT
1,500-5 A 2,000-5 A	146 mm (5-3/4")	229 mm (9")	292 mm (11-1/2")	ADJUSTABLE FROM 114 mm TO 140 mm (4-1/4" TO 5-1/2")
3,000-5 A 4,000-5 A	146 mm (5-3/4")	229 mm (9")	330 mm (13")	ADJUSTABLE FROM 146 mm TO 178 mm (5-3/4" TO 7")
5,000-5 A 6,000-5 A	206 mm (8-1/8")	292 mm (11.5")	330 mm (13")	145 mm +3mm (5-11/16" +0.125")

NOTES:

- DONUT TYPE CURRENT TRANSFORMERS REQUIRE AN INSTRUMENT TRANSFORMER ENCLOSURE OF AT LEAST 1200x900x300mm (HxWxD).

			<b>THE CITY OF RED DEER      ELECTRIC LIGHT AND POWER DEPARTMENT</b>	
			DRAWN BY: D. DIEHL	<b>CONSTRUCTION SPECIFICATION DRAWINGS OVERHEAD INFRASTRUCTURE</b>
			DATE: 2020/02/26	
			SCALE: N.T.S	<b>TYPICAL WINDOW TYPE CURRENT TRANSFORMER 600V METERING</b>
1	FEB 2020	DRAWING CREATION	APPROVED BY:  ENGINEER	
NO.	DATE	REVISION	DRAWING NO. <b>70008B</b>	



POLARITY MARKS

SAMPLE RATING ONLY

FIG 5-4

			<b>THE CITY OF RED DEER    ELECTRIC LIGHT AND POWER DEPARTMENT</b>	
			DRAWN BY: M.A	<b>CONSTRUCTION SPECIFICATION DRAWINGS OVERHEAD INFRASTRUCTURE</b>
			DATE: DEC 2019	
			SCALE: N.T.S	<b>TYPICAL POTENTIAL TRANSFORMERS 600V CLASS</b>
1	Dec 2019	Reviewed / Updated / Revised		
NO.	DATE	REVISION		APPROVED BY:  ENGINEER DRAWING NO. <b>70009</b>

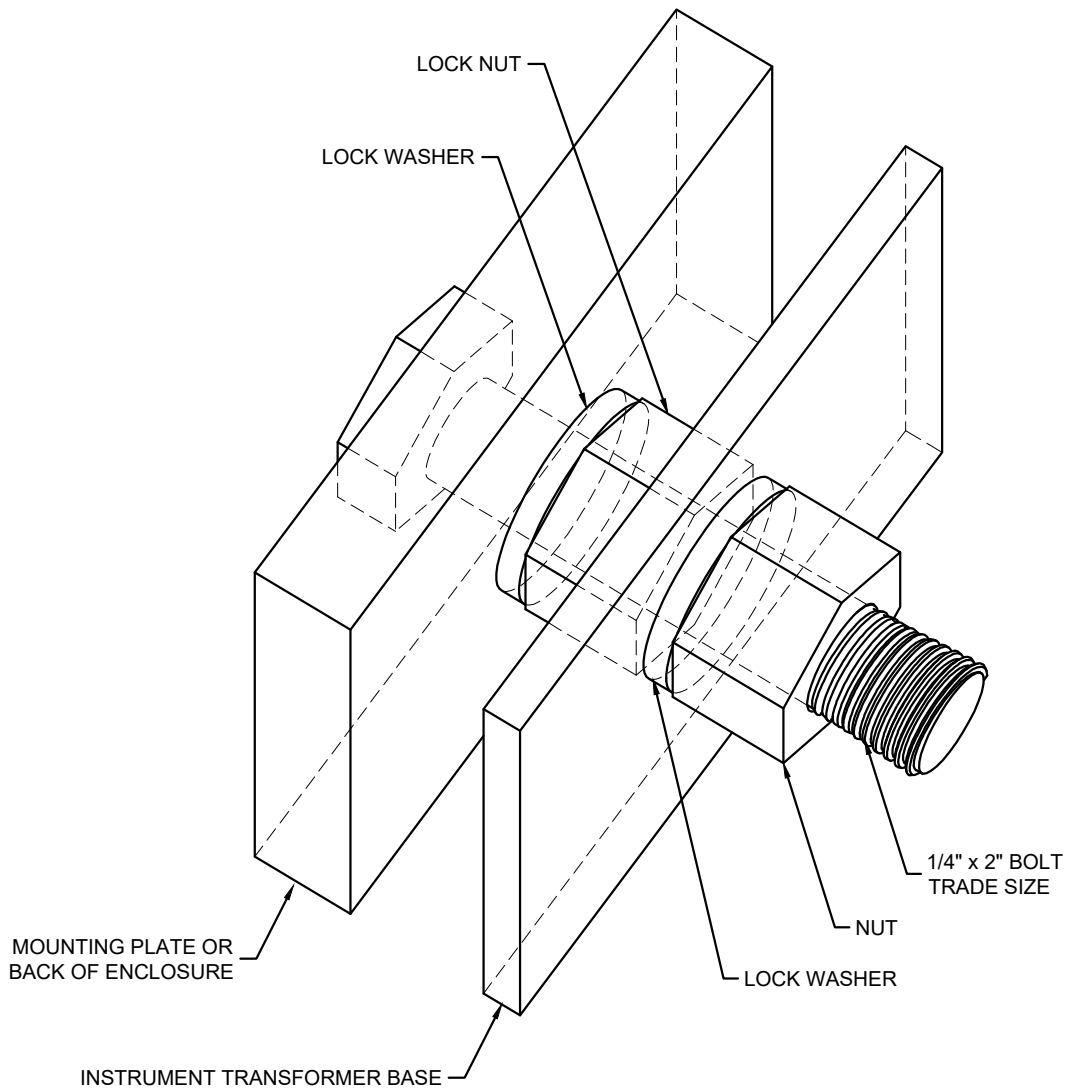


FIG 5-5

NOTES:

1. INSTRUMENT TRANSFORMER MUST BE MOUNTED USING ALL MOUNTED HOLES SUPPLIED BY MANUFACTURER.
2. NUMBER #10, SELF TAPPING SCREW IS ALSO ACCEPTABLE.

			<b>THE CITY OF RED DEER    ELECTRIC LIGHT AND POWER DEPARTMENT</b>		
			DRAWN BY: M.A	<b>CONSTRUCTION SPECIFICATION DRAWINGS OVERHEAD INFRASTRUCTURE</b>	APPROVED BY:
			DATE: DEC 2019		ENGINEER
			SCALE: N.T.S	<b>INSTRUMENT TRANSFORMER MOUNTING BOLT</b>	DRAWING NO.
1	Dec 2019	Reviewed / Updated / Revised			<b>700010</b>
NO.	DATE	REVISION			

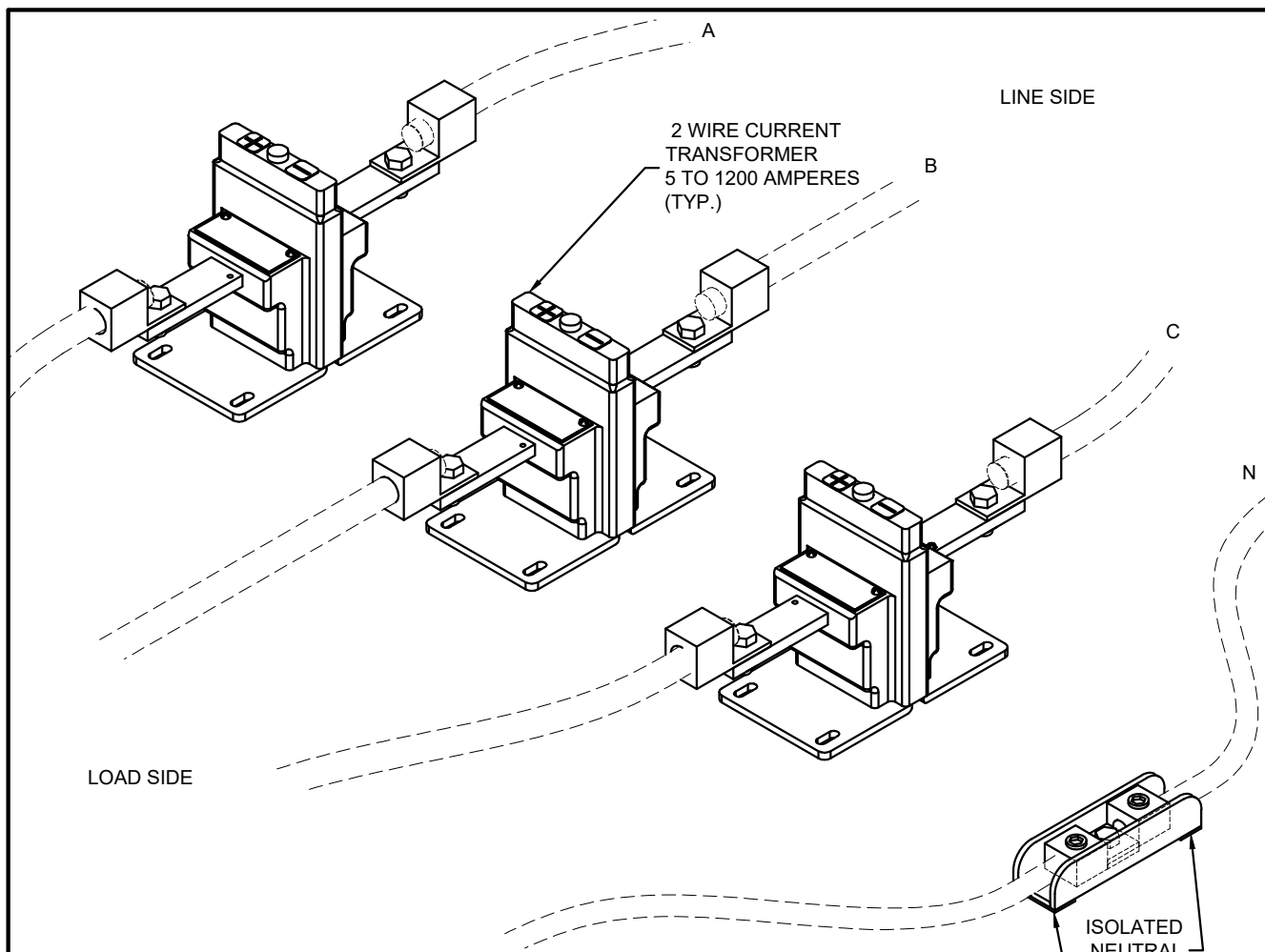
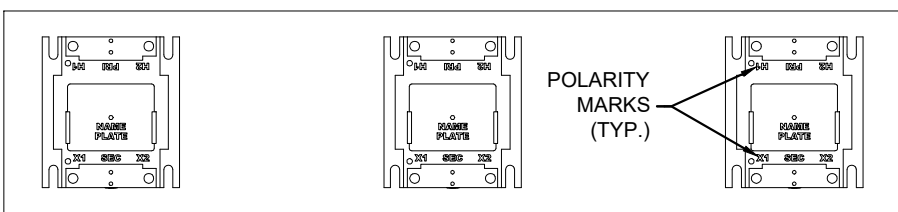


FIG 5-6



PT'S NOT REQUIRED FOR 120/208Y V, 3PHASE, 4 WIRE SUPPLY  
(TO BE MOUNTED ON ENCLOSURE BACKPAN)

NOTES:

1. PT'S AND FUSES WILL BE SUPPLIED WHERE NECESSARY.
2. THE NEUTRAL CONDUCTOR MUST BE CONNECTED TO AN ISOLATED NEUTRAL BLOCK TO FACILITATE CONNECTION OF THE POTENTIAL WIRE FOR METERING.
3. IF LOAD AND LINE ARE REVERSED THE CT'S MUST BE REVERSED SO THAT THE POLARITY MARKS ARE ALWAYS ON THE LINE SIDE.
4. THE NEUTRAL CONNECTOR MUST BE INSULATED FROM THE ENCLOSURE AND CANNOT BE GROUNDED.
5. ALLOW FOR ONE #10 CONDUCTOR TERMINATION.

			<b>THE CITY OF RED DEER    ELECTRIC LIGHT AND POWER DEPARTMENT</b>	
			DRAWN BY: M.A	<b>CONSTRUCTION SPECIFICATION DRAWINGS OVERHEAD INFRASTRUCTURE</b>
			DATE: DEC 2019	<b>LAYOUT</b>
			SCALE: N.T.S	<b>THREE PHASE INSTRUMENT TRANSFORMERS TERMINATION</b>
NO.	DATE	REVISION		
1	Dec 2019	Reviewed / Updated / Revised		
				APPROVED BY:  ENGINEER DRAWING NO. <b>70011</b>

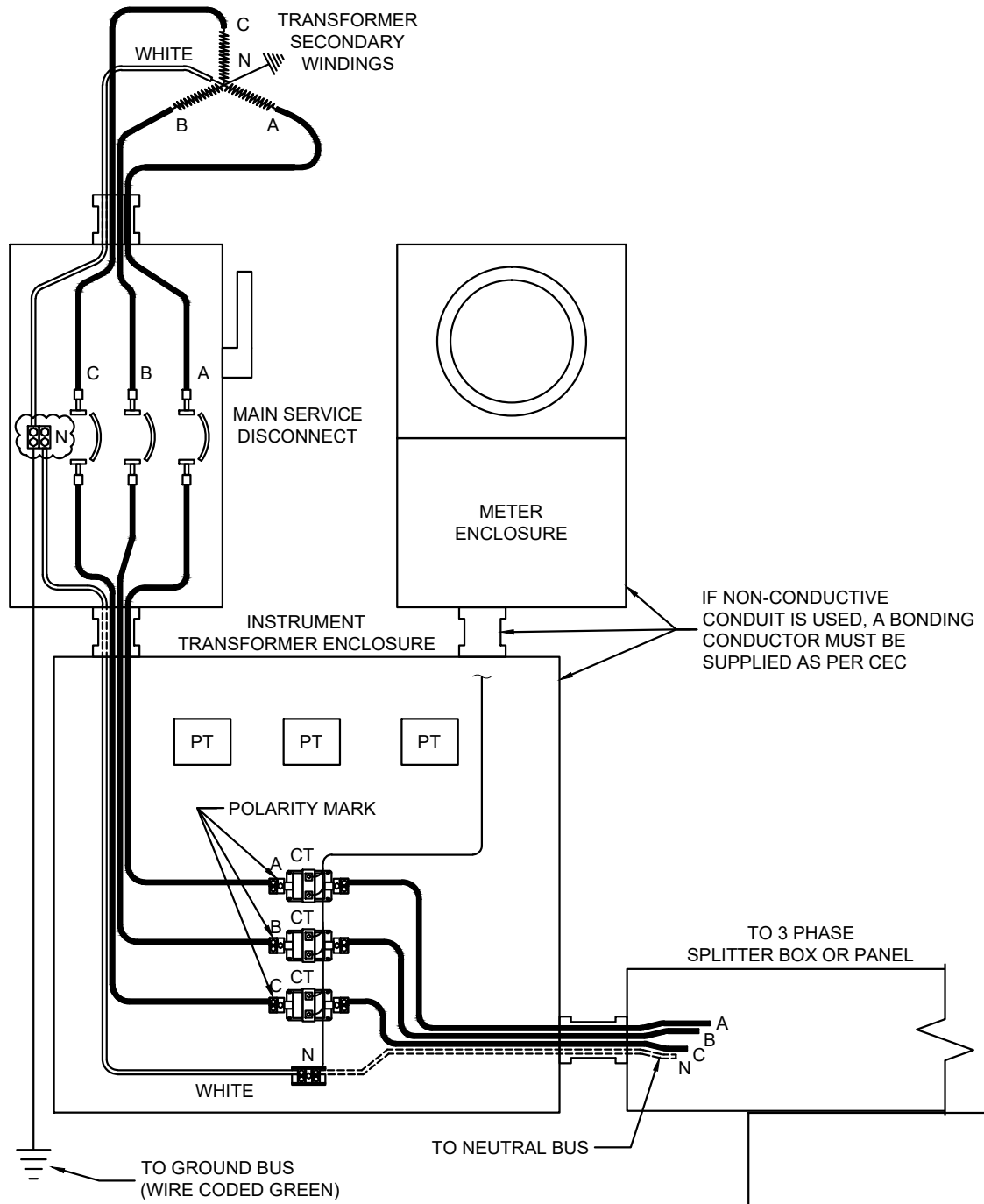


FIG 5-7

NOTES:

1. NEUTRAL CONNECTOR TO BE ISOLATED FROM ENCLOSURE AND PROVISION FOR #10 METERING CONNECTION.
2. 3 PT'S ONLY REQUIRED WHEN SERVICE VOLTAGE IS 347/600 VOLTS.

			<b>THE CITY OF RED DEER ELECTRIC LIGHT AND POWER DEPARTMENT</b>	
			DRAWN BY: M.A	<b>CONSTRUCTION SPECIFICATION DRAWINGS OVERHEAD INFRASTRUCTURE</b>
			DATE: DEC 2019	
			SCALE: N.T.S	<b>LAYOUT THREE PHASE INSTRUMENT TRANSFORMERS WIRING</b>
1	Dec 2019	Reviewed / Updated / Revised		
NO.	DATE	REVISION		
			APPROVED BY:  ENGINEER DRAWING NO. <b>70012</b>	