

Service and Metering Guide



8/31/2021

**EQUS**

**DELIVERING
MORE THAN POWER**

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1.0 Introduction

About EQUUS

EQUUS provides safe and reliable electrical distribution services to commercial and industrial developments, oil and gas operations, telecommunication towers, production facilities and farms throughout 26 Alberta municipal districts and counties. Serving nearly 12,000 members, EQUUS is the largest member-owned utility in Canada.

EQUUS is a Rural Electrification Association (REA) and is a distributor, a regulated rate supplier and carries out for its members any function that is required or permitted to be carried out by a retailer.

EQUUS operates offices in Innisfail, Claresholm, Medicine Hat and Onoway, with our Main Office located in Innisfail.

Purpose

The EQUUS Service and Metering Guide is intended to be used by EQUUS Members and their electrical contractors as a reference towards the installation of metering services within the EQUUS Service Area. The information within this guide supersedes all information previously provided by EQUUS on the subject.

Members should apply for a service as soon as possible in the planning stage of a project. This will help ensure that EQUUS can meet the Member's project schedule and that the installation will satisfy all requirements of the inspection authority and of EQUUS. Members will also need to schedule time for EQUUS to inspect the meter equipment installed by the Member/contractor.

This guide covers most Member projects that may be requested for install on the EQUUS system. In the event a Member project does not meet the requirements covered in this publication, the member shall reference and abide by the requirements detailed in Section 4.0: Non-Standard Services.

Comments and questions regarding the EQUUS Service Metering Guide can be submitted by e-mail to EQUUS. Please contact the local EQUUS office nearest to your service location:

- North Area Office (Onoway):
 - Phone: 1.888.627.4011
 - Email: Onoway_Area@equus.ca
- Central Area Office (Innisfail):
 - Phone: 1.877.527.4011

- Email: Innisfail_Area@equs.ca
- South Area Office (Claresholm and Medicine Hat):
 - Phone: 1.888.565.5445
 - Email: Claresholm_Area@equs.ca

For engineering and technical clarifications, please contact the Standards Department.

- Standards Department:
 - Phone: 1.888.211.4011
 - Email: sdept@equs.ca

2.0 General Requirements

This section covers EQUUS' general requirements for electrical installations and revenue metering. The requirements outlined in this guide apply to the construction of all new installations, as well as to any installations in which the existing service drop or meter socket is to be changed or relocated. These requirements must be met before EQUUS will provide electrical service.

All Member supplied electrical equipment must conform to CSA Standards. In addition, the Member's project must comply with the Safety Codes Act, all applicable regulations, and the EQUUS Member Terms and Conditions. The Member's service entrance or switch-gear equipment shall only be energized once its design, construction, location and application are deemed acceptable to both the inspection authority and to EQUUS.

2.1 Safety Codes Act and Related Regulations

EQUUS shall not connect or allow a Member's service to be connected to the electrical utility system unless all the following criteria are met:

1. The metering equipment and location is acceptable (see Section 2.2: Meter Location and Installation).
2. The attachment point for conductors used on overhead systems to supply the Member's service is located such that the conductors maintain all required clearances.
3. The member or the member's contractor has assured EQUUS that the installation is ready for connection and no obvious hazards should result.
4. EQUUS has received a copy of a valid permit or authorization to connect, issued by the inspection authority having jurisdiction.
 - A valid permit requires the following information:
 - The Safety Codes Officer's name
 - The Safety Codes Officer's designation number
 - The agency to which the Safety Codes Officer is employed with, including the applicable intended purpose, e.g., "service connection".

The member is encouraged to contact a licensed electrician and the local permitting authority to ensure that all Canadian Electrical Code requirements are met.

2.2 Meter Location and Installation

A meter shall be installed according to the following requirements:

1. The meter must be located between 50 to 75 meters from the front property line or EQUUS service transformer located on the Member's property (reference Figure 2.2.1: Meter Locations, 50 m – 75 m Guideline).
 - For all residential lots or acreages with service drops exceeding 50 m on the Member's property, see Section 2.1 further requirements, or apply for an exception.
 - All exceptions to this guideline must be approved in writing by the EQUUS Standards Department in advance. Exceptions shall be granted on a case by case basis only.
2. The meter must not be recessed into walls, enclosed, boxed-in or otherwise obstructed in such a way as to impede the removal, reading, testing and/or re-installation of meters.
3. The meter must not be located on or within a 5 m radius of EQUUS transformers or poles, with the exception of EQUUS-owned meter boxes.
4. The meter must be located in a clean and readily accessible area, and must not be in a location that is hazardous to anyone installing *or* working on the metering equipment *or* reading the meter.
 - Hazardous locations are defined as areas that involve moving machinery, dust, vibration, fumes, water/moisture and H2S.
5. The meter must not be located in any biologically hazardous areas such as poultry or livestock facilities. EQUUS metering shall be located far enough away from production areas so as to eliminate any danger of EQUUS staff (that may visit the site) contacting any disease or virus.
6. The meter must be upstream from any Member dry-type step down transformers (unless EQUUS has issued written permission otherwise).
7. The meter must not be installed in carports or breezeways, or under sundecks or balconies.
8. The meter must be clear of any vapor producing outlets. For example: furnace or hot water tank exhaust vents, or dryer vents.
9. The meter must be mounted in accordance with the heights outlined in Table 2.2.1.
 - The minimum height of the meter, as specified in Table 2.2.1, must also be maintained when a permanent structure such as a deck is built in the clear access area of the meter.
10. The meter must be level on both the horizontal and vertical planes.
11. The meter must not be exposed to severe or continual vibration.

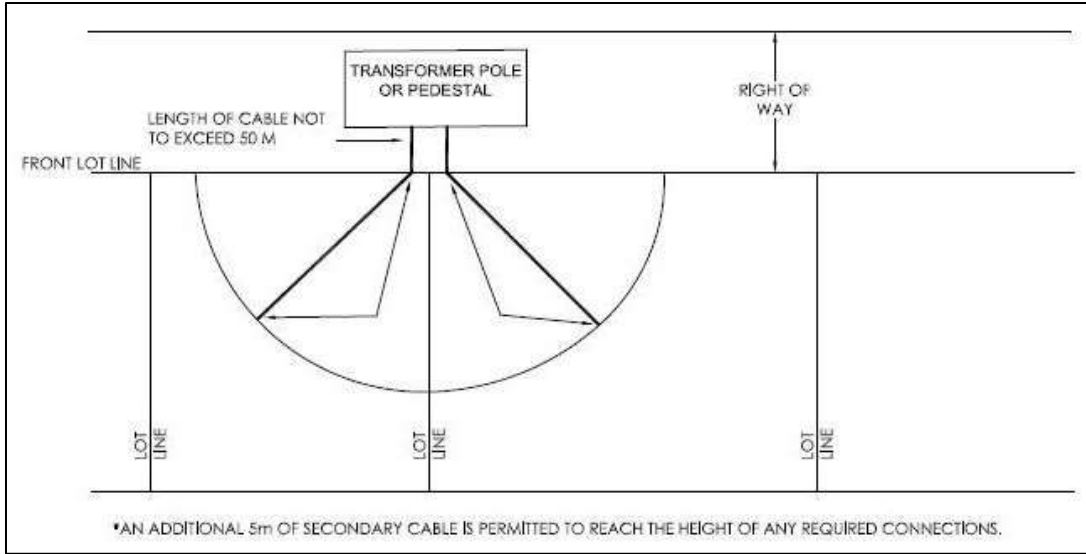


Figure 2.2.1: Meter Locations, 50 m – 75 m Guideline

Table 2.2.1: Equipment Mounting Heights

	Outdoor Mounted Equipment (Above Final Grade)	Indoor Mounted Equipment (Above Floor)
Residential Service*	1.5 m min. 1.8 m max.	1.0 m min. 1.8 m max. (developments greater than 5 units)
Commercial Service*	1.5 m min. 1.8 m max.	1.0 m min. 1.8 m max.
Instrument Meter*	1.5 m min. 1.8 m max.	1.0 m min. 1.5 m Standard 1.8 m max.
Instrument and CT Cabinet	0.9 m Cabinet bottom min. 2.0 m Cabinet top max.	0.3 m Cabinet bottom min. 2 m Cabinet top max.

** Measurements are to the center line of the meter.*

2.3 Access to Metering Equipment

The Member shall ensure that EQUUS staff have reasonable access to all metering equipment for the purpose of reading, changing, and testing meters.

If EQUUS does not have ready access to the metering equipment due to locked doors (as with indoor mounted equipment or gates), EQUUS will require a key. A lockbox may be installed by EQUUS for the purpose of keeping the key on site. In the event the lockbox is damaged or stolen, EQUUS shall be absolved of all liability.

2.4 Disconnects and Reconnects

All disconnects and reconnects must have prior approval from EQUUS. Disconnects and reconnects must not be done at the meter by any person other than EQUUS personnel, unless prior permission has been granted by EQUUS.

For services that are no greater than 200 amps and 200 volts:

- A qualified electrician is permitted to carry out the disconnection of an existing electrical service.
 - The disconnection requires prior approval from EQUUS, and must not be done at the meter.
 - When the disconnection is completed by cutting the hot wires at the weather head, reconnection must be completed by EQUUS.

All other disconnects and reconnects shall be completed by EQUUS.

All meter recertification costs and/or damages associated with the removal, installation, or handling of meters by unauthorized persons will be the responsibility of the person(s) responsible.

2.5 Lot-Line Metering

All residential lots or acreages that have service drops exceeding 50 m on a Member's property must have the meter mounted on a pedestal or other approved metering structure, with the meter and pedestal located 1.5 m inside the front property line. This "Lot-Line Metering" eliminates any restrictions on the length of secondary conductor; however, the voltage drop requirements described in Section 2.9 remain in effect.

EQUS does not require a breaker panel at the Lot-Line Metering location unless there is either a decrease in conductor size or branch circuit(s) are connected at the meter pedestal.

2.6 Services That Do Not Require Metering

EQUS requires all services to be metered.

Any exceptions (eg: applications such as emergency warning sirens) must be requested in writing and approved by EQUS. See Section 4.0: Non-Standard Services for more information.

2.7 Modifications to Existing Services

Members who are considering modifications and/or additions to their electrical system must notify EQUS. Members will be expected to comply with the most current requirements for the planned modifications and/or additions, including requirements for:

- Increased load
- Increased service conductor size
- Installation of back-up or supplementary power supplies (including microgeneration and/or other power generation)
- Installation of a transfer switch

2.8 Meter Socket Requirements

Meter sockets and any additions (e.g. isolated neutral blocks, additional lugs, etc.) must be CSA approved. The manufacturer of the meter socket shall supply any additions to the meter socket.

2.9 Voltage Drop Requirements for Member-Owned Secondary Cable

Member service entrance conductors must be sized to ensure that any voltage drop is limited to a maximum of 2% between the points at which EQUUS makes its final connection to the Member's conductors and to the line side of the Member's main service.

2.10 Member-Owned Secondary Poles

Member-owned secondary poles shall adhere to the following requirements:

- The first secondary pole must be installed between 5 m – 10 m from the transformer pole.
- EQUUS will not install any overhead secondary conductor past the point of demarcation on the EQUUS pole. This will be the responsibility of the Member.
- When an overhead secondary conductor is connected to the EQUUS transformer pole, the conductor size and span lengths must be approved by EQUUS prior to installation.

2.11 Service Entrance Equipment: Design and Requirements

All service entrance equipment shall adhere to the following requirements:

- All service entrances shall be designed and constructed so as to ensure that metered and un-metered conductors are not run in the same conduit or raceway.
- Barriers must be placed between all metered and unmetered conductors. Barriers must also be placed between sections reserved for EQUUS use and sections for Member use.
- All service entrance equipment must have hinged doors over all bare electrical parts.
 - Hinged doors must open either to the left or right, and both outer and inner doors must open a minimum of 90 degrees.
 - The only exception to the direction for which doors may open is for horizontal mounted splitter boxes; for these boxes, the doors must open downward.
 - All hinged doors ahead of the metering point must have sealing screws.

2.12 Electrical Equipment Room: Design and Location Requirements

All electrical rooms in which EQUUS metering is installed must be located at ground level, and must have outdoor access. Electrical rooms shall, additionally, comply with the following:

1. Working Space - A minimum clear working space of 1 m wide by 2.2 m high must be maintained in front of all electrical equipment, and to the sides and back where access is required.

2. Entrance and Exit - A minimum passageway of 1 m wide by 2.2 m high must be maintained for entrance and exit from all electrical areas.
3. Hazardous Locations - Electrical equipment must not be located in areas that are hazardous to anyone working on electrical equipment or in areas which are hazardous to the metering equipment itself. Hazardous locations include those which contain moving machinery, dust, vibration, fumes, water, humidity, and H2S. Hazardous locations also include those in which EQUUS employees, contractors, and vehicles may be at risk from hazards associated with transporting viruses or contaminants.
 - Electrical rooms shall not be located in a bathroom or stairway.
4. Illumination and Ventilation - All electrical rooms or areas must have adequate illumination and ventilation as required in order to carry out all work safely
5. Proximity to Other Equipment - Water, sewer, gas, or other pipes or equipment foreign to the electrical installation shall not be mounted directly above electrical equipment, and shall not encroach on the minimum working space required around electrical equipment.

2.13 Member Instrumentation and Protection

Member instrumentation and protection shall adhere to the following requirements:

- Member instrumentation and protection equipment may not be mounted within or on the cabinets reserved for EQUUS' use.
- Member instrumentation, including metering circuits, transfer relays, and step-down transformers, and fire alarms must be connected on the load side of EQUUS' meter. These circuits cannot be connected into EQUUS' metering circuits.
- Electronics which are built into the main breaker, lightning arrestors, and passive-type surge suppressors may be located in the main breaker section of the Member's switchgear and connected ahead of the EQUUS meter.

2.14 Three-Phase Services

All three-phase services shall be four-wire, grounded wye. The grounded conductor shall run into the main breaker and be bonded to the ground electrode, and must be connected directly to the supply transformer X0 bushing (not to the ground bus or case ground). Services that vary from this standard will not be energized unless a written exception has been issued by EQUUS.

The grounded conductor shall be grounded at the main service disconnect. At all points beyond this (i.e.: downstream), the neutral shall be isolated from the ground. When the metering point (for either self-contained or instrument type metering) is on the load side of the main service disconnect, isolated neutral blocks are required.

2.15 Neutral Grounding Resistors (NGR)

NGRs are not permitted on services with self-contained meters.

Should a Member wish to install an NGR, the Member must:

- Advise EQUS of their intent to install an NGR.
- Provide EQUS with the rating and location of the grounding resistor.

2.16 Self-Contained Metering

The maximum limits for self-contained metering are:

- 200 amps per phase; and/or
- 240 volts phase to phase for 1 \emptyset ; and/or
- 480 volts phase to phase for 1 \emptyset ; and/or
- 600 volts phase to phase for 3 \emptyset ; and/or
- 120 HP continuous duty motor load at 480 volts phase to phase (as per CEC Rule 28-106 and 28-704)

Self-contained metering shall be used for all services smaller than 200 amps.

All services larger than 200 amps will require instrument metering involving CT's. Refer to Section 2.17: Instrument Metering for further information.

Table 2.16.1: Standard Voltage and Metering Configurations

Voltage	Phase	Socket	Form	Remarks
120/240	1	4 JAW	2S	Self-contained meter up to 200A (Figure 2.16.2)
240/480	1	4 JAW	2S	Self-contained meter up to 200A (Figure 2.16.2)
120/240	1	6 JAW	4S	Instrument meter over 200A (Figure 2.17.1)
240/480	1	6 JAW	4S	Instrument meter over 200A (Figure 2.17.1)
120/208	3	7 JAW	16S	Self-contained meter up to 200A (Figure 2.16.3)
277/480	3	7 JAW	16S	Self-contained meter up to 200A (Figure 2.16.3)
347/600	3	7 JAW	16S	Self-contained meter up to 200A (Figure 2.16.3)
120/208	3	13 JAW	9S	Instrument meter over 200A (Figure 2.17.2a)
277/480	3	13 JAW	9S	Instrument meter over 200A (Figure 2.17.2a)
347/600	3	13 JAW	9S	Instrument meter over 200A (Figure 2.17.2a)

2.16.1 Provision of Self-Contained Metering Equipment

EQUS shall supply a meter socket complete with a screw-type sealing ring. Sockets with bypass switches shall not be permitted.

2.16.2 Connection of Self-Contained Metering Equipment

For all single-phase 240/480V services, locate the meter socket after the main breaker, and isolate the neutral from its case.

- The only exception to this requirement is situations where the meter socket is located on the load side of the service disconnect and the neutral is not required for the Member's equipment. In this case, run a tap with a minimum size of #6 AWG conductor (colour-coded white) from the isolated neutral block in the socket and back to the neutral bonding point at the main service disconnect.

Isolate all neutral connections after the main service disconnect from the ground (as per CEC Rule 10-204-1c). When meter sockets are located after the main disconnect, an isolated neutral block is required.

NGR's (Neutral Grounding Resistors) shall not be used on services with a self-contained meter.

Member Responsibilities

The Member shall ensure that there are no junction boxes ahead of the EQUS meter.

EQUS Responsibilities

EQUS shall make all connections within the meter socket. The main service neutral shall be connected to the neutral socket lug within the meter socket. EQUS is responsible for the source side of the meter and connections.

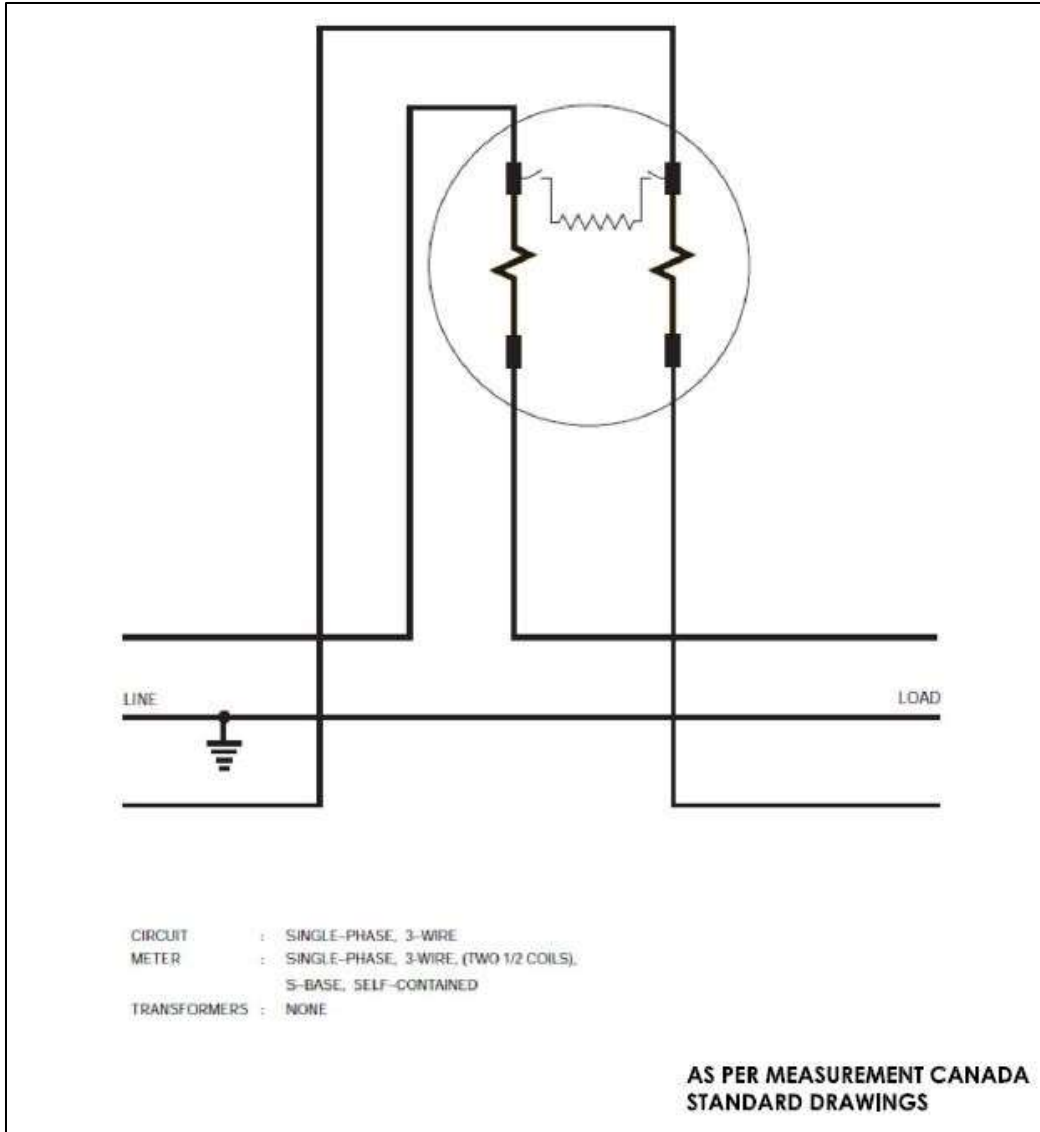


Figure 2.16.2: Single-Phase Self-Contained Meter Wiring

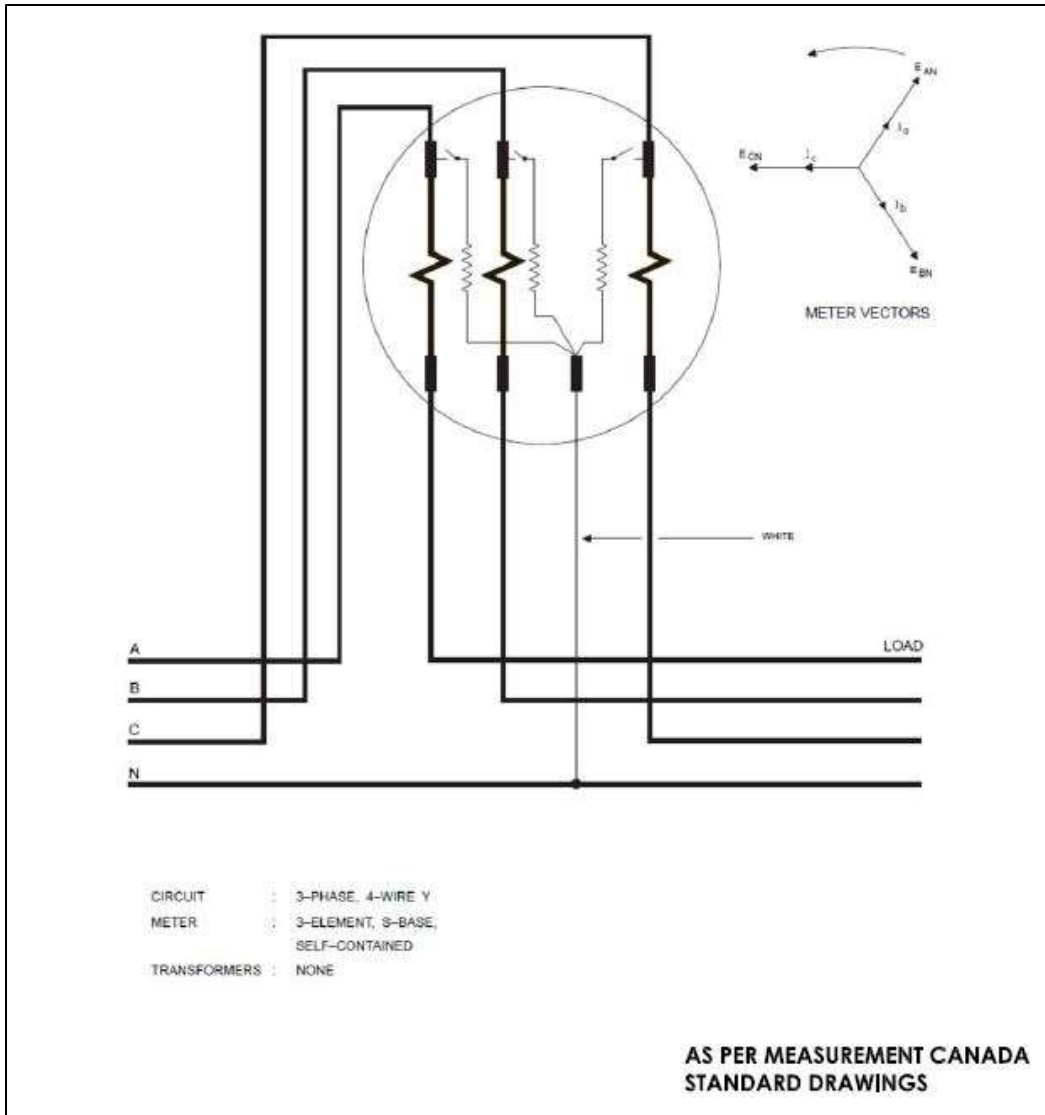


Figure 2.16.3: Three-Phase Self-Contained Meter, 4-Wire

2.17 Instrument Metering

All services that exceed 200 amps per phase must have Instrument transformer type metering.

All services that require instrument metering and which are supplied from a dedicated pad-mount transformer shall have pad-mount metering. The pad-mount metering will be installed by EQUUS.

All services that are supplied from an overhead transformer or which are supplied by a shared pad-mount transformer shall have instrument metering as per the requirements outlined in this guide, unless EQUUS' Standards Department has issued permission for an exception (see Section 4: Non-Standard Services for information about exceptions).

2.17.1 Instrument Metering Equipment Location and Mounting Requirements

The instrument meter socket and instrument transformer enclosure must be located:

- Both indoors or both outdoors
- In the same room (if located indoors)
- Within a maximum length of 7 m of conduit between the meter socket and the instrument transformer enclosure
 - Conduit shall be 30 mm (1 ¼ in.)

The following additional requirements for instrument meter sockets and transformer enclosures must also be met:

- If the instrument meter socket and instrument transformer enclosure are located indoors, a 1 in. conduit must be installed from the electrical room to the nearest above-grade outside wall.
 - The conduit must be in a location not subject to mechanical damage.
- One end of the conduit must be stubbed out and installed within 1 m of the revenue meter in the basement electrical room. The other end of the conduit must enter a 150 mm × 150 mm × 100 mm (6 in. × 6 in. × 4 in.) outlet box mounted on the nearest exterior wall of the building.
- The complete run of conduit must be installed without fittings or junction boxes.
 - If the conduit run cannot be carried out without fittings or junction boxes, the electrical contractor must install LMR-400, or equivalent, cable within the conduit. A 120 V receptacle must be installed within 1 m of the conduit stub-out in the basement utility room.
- “LB” style fittings are permitted only if there is no other means to route the conduit.
 - This conduit shall be terminated with lock nuts and bushings except where thread hubs are supplied.
 - If LB's or similar conduit fittings are used, they must be seal-able and clearly visible.

2.17.2 Connections of Instrument Metering Equipment

EQUUS supplies a three-phase, grounded YY, four-wire service.

The neutral bus bar shall run from the main service disconnect into the instrument enclosure, and a hole shall be tapped for a 10/32 in. screw.

- If insulated cable is used instead of a bus bar, an approved, isolated neutral block shall be used, and the neutral conductor within the instrument transformer enclosure shall enable the connection of the potential wire for the meter.

- If the neutral consists of two or more conductors, then only one of the conductors must be tapped for the metering neutral connection.

All three-phase services shall be three-phase, four-wire grounded-wye (except when an NGR is installed); therefore, the ground conductor (required under CEC Rule 10-204) shall be run from the X0 bushing of the supply transformer to the bonding terminal block in the main service disconnect, and also to the switchgear case ground.

An insulated conductor with a minimum size of #6 AWG (colour-coded white) shall run from the bonding terminal block to an isolated neutral block in the instrument transformer enclosure (reference Figure 2.17.1). The white colour-coding of the conductor to the instrument transformer enclosure shall indicate the neutral reference for metering.

EQUS Responsibilities

EQUS shall make all connections to the current transformer primaries. These connections shall be properly secured and conductors shall be shaped or formed and supported so that no tension is applied to the current transformers.

EQUS shall make all connections to current transformer secondaries, fuse blocks, and the meter socket (refer to Figure 2.17.2a).

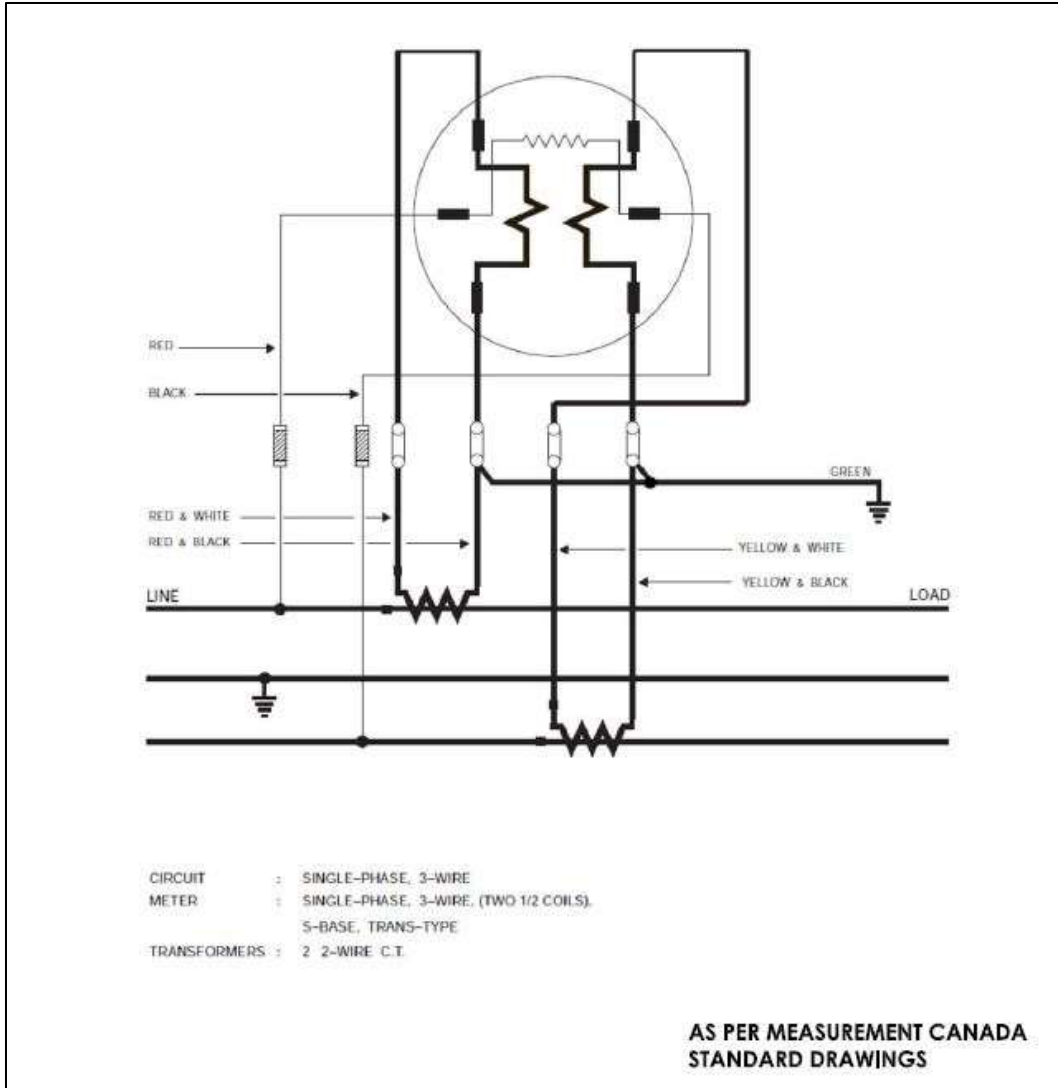


Figure: 2.17.1: Single-Phase Instrument Metering, 3-Wire

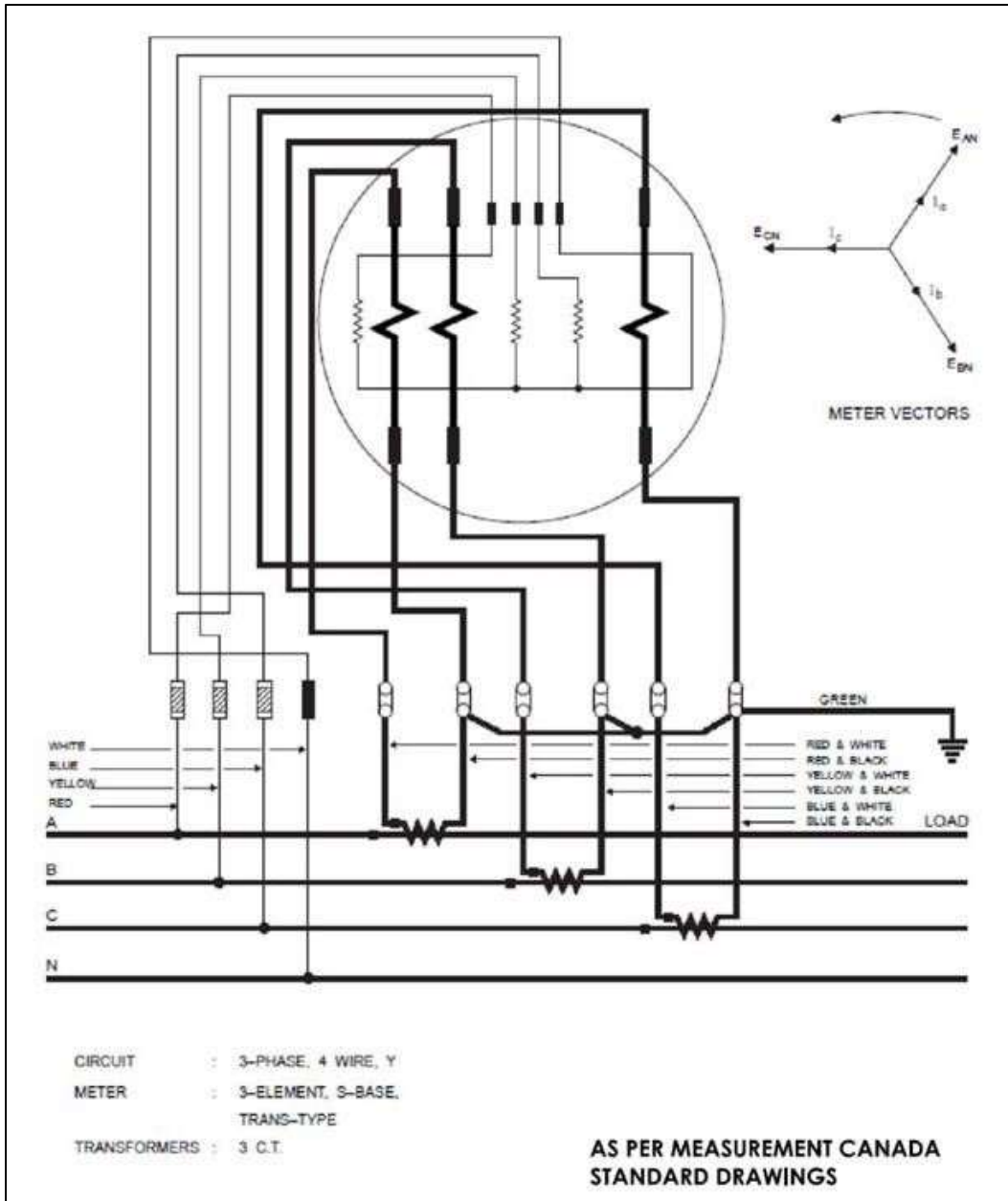


Figure 2.17.2a: Three-Phase Instrument Meter, 4-Wire

2.17.3 Instrument Meter Socket and Enclosure Grounding

Each meter socket shall be grounded to the system ground. The conduit requirements are:

- A metal conduit, 30 mm (1 ¼ in.) diameter and a maximum length of 7 m shall be used between the instrument transformer enclosure and meter socket.
 - This conduit must be terminated with lock nuts and bushings unless thread hubs are supplied.
- If LB's or similar conduit fittings are used, they must be seal-able and clearly visible.

- The conduit is for EQUUS' exclusive use. If metering secondary wires must be run through other compartments which are not reserved for EQUUS' use, a metal conduit must be passed through each compartment.

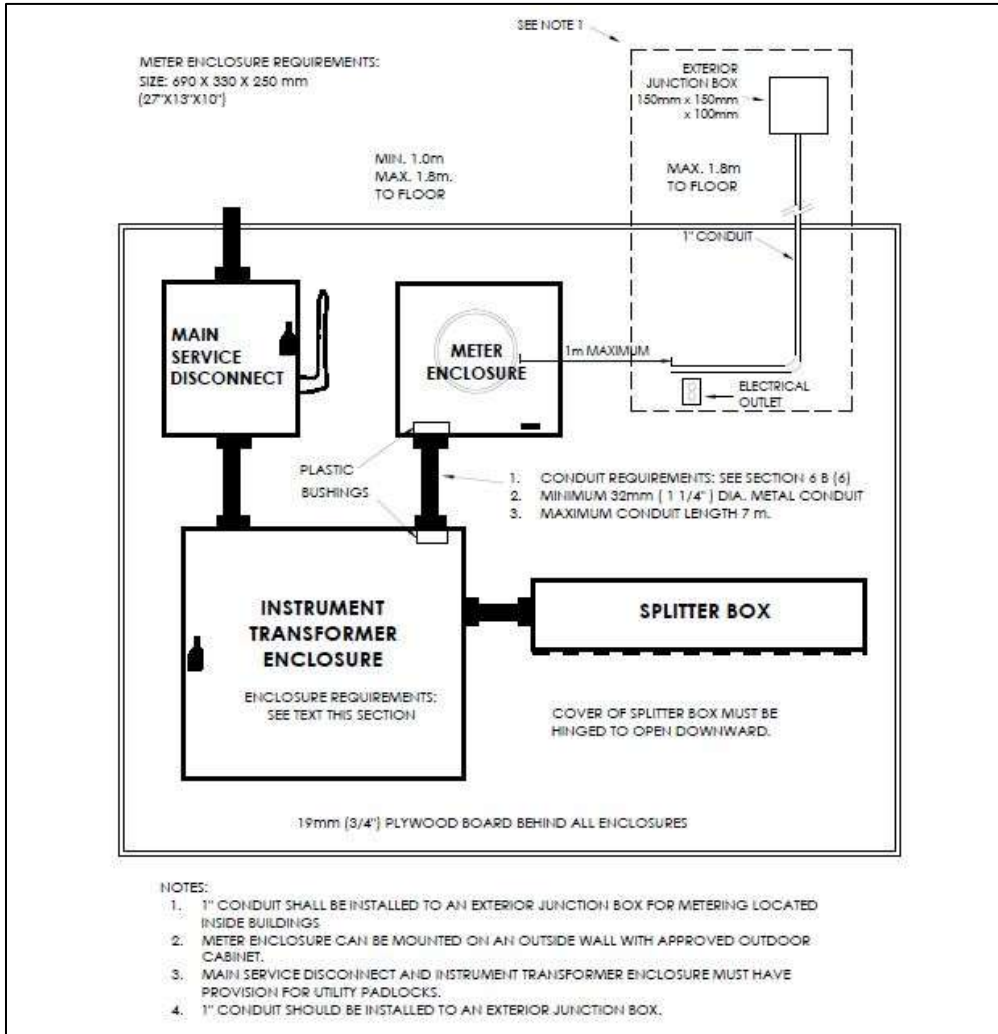


Figure 2.17.3: Instrument Transformer Enclosure Setup

2.17.4 Indoor Instrument Transformer Enclosures

Indoor Instrument Transformer Enclosures shall adhere to the following requirements:

- The bottom of the enclosure must be a minimum of 30 mm above the floor and/or there must be a minimum vertical separation of 30 mm between cabinets mounted above/below it.
- The enclosure must be mounted with top of the enclosure no higher than 2 m above the floor
- Adhere to the instrument transformer requirements of Section 2.17.6.

2.17.5 Outdoor Instrument Transformer Enclosures

Outdoor Instrument Transformer Enclosures shall adhere to the following requirements:

- The bottom of the enclosure must be 0.9 m (36 in.) minimum above the final grade.
- The top of the enclosure must be a maximum of 2 m (79 in.) above the final grade.
- Each instrument transformer service must have a separate instrument transformer enclosure.

2.17.6 Instrument Transformer Cabinet Requirements:

All transformer cabinets shall be made of 16-gauge steel, and shall meet the minimum requirements for enclosure sizes, as shown in Table 2.17.1.

Transformer cabinets shall adhere to the following additional requirements:

Location:

Instrument transformer enclosures shall be located:

- Indoors, in a clean, readily accessible area
- In the same room as the meter enclosure
- Within a maximum of 7 m conduit from the meter enclosure
- In a location that is satisfactory to both the inspection authority and EQUUS

Door requirements:

- The instrument transformer enclosure shall be equipped with vertically hinged doors. The doors must be non-removable when closed, and must have stops/checks that will prevent the doors from accidentally coming off the hinges when the doors are open.
- Doors shall be equipped with a latch and must be securable with a padlock
- Cover plates shall not be used on instrument transformer enclosures

Conduit Requirements:

- 1 in. conduit must be installed from the electrical room to the nearest above-grade outside wall, in a location not subject to mechanical damage.
 - One end of the conduit must be stubbed out and installed within 1 m of the revenue meter in the basement electrical room. The other end of the conduit must enter a 150 mm × 150 mm × 100 mm (6 in. × 6 in. × 4 in.) outlet box mounted on the nearest exterior wall of the building.
 - The complete run of conduit must be installed without fittings or junction boxes. If the conduit run cannot be carried out without fittings or junction boxes, the electrical contractor must install LMR-400, or equivalent, cable within

the conduit. A 120 V receptacle must be installed within 1 m of the conduit stub-out in the basement utility room.

- A metal conduit, of 1 1/4 in. minimum diameter and 7 m maximum length is required between the instrument transformer enclosure and meter enclosure. This conduit shall be terminated with lock nuts and bushings, except where thread hubs are supplied.
- If LB's or similar conduit fittings are used, they must be sealable and clearly visible.
- The conduit is for exclusive use by EQUUS. Where it is necessary to route revenue metering secondary wires through other compartments (except those reserved for EQUUS' use), a metal conduit or suitable metal raceway shall be installed through each compartment for EQUUS' exclusive use.

Table 2.17.1: Instrument Transformer Enclosure Sizes

				Instrument				Number of Instruments		
Service				Transformer Enclosure				Transformer required		Potential
Voltage	P h a s e	W i r e	Size in amps	Size mm			Gauge			
				H	W	D				
120/240Y	1	2	200-400	610	610	254	16	1-2 wire		
120/240	1	2	410-800	760	760	254	16	2-2 wire		
120/208Y	2	4	200-600	760	760	254	16	2-2 wire		
120/208Y	2	4	601-1200	915	915	205	14	2-2 wire		
120/208Y	2	4	1201-1500	1200	1200	205	14		2	
277/480Y	2	4	200-1200	915	915	205	14	2-2 wire		2
277/480Y	2	4	1201-2000	1220	1220	205	14		2	2
347/600Y	2	4	200-1200	915	915	205	14	2-2 wire		2
347/600Y	2	4	1201-2000	1220	1220	205	14		2	2

Notes:

1. Instrument transformer enclosure dimensions shown in Table 2.17.1 are minimums.
2. Meter enclosure minimums for equipment in Table 2.17.1 are 69cm, 22cm, and 25cm.

2.18 Distorting Loads

Members must notify EQUUS if they will be utilizing or adding devices that could add distorting load to their service that is greater than or equal to 150 kW. Distorting load may come from power electronic equipment (such as drives, inverters, rectifiers, computers, etc) arching devices (such as fluorescent lighting, welders, arc furnaces, etc) and some other devices. If there will be distorting load, EQUUS may require harmonic mitigation techniques to be used.

Table 2.18: Voltage Fluctuations

Fluctuations	Volts	Recurrence
Infrequent	8 volts	< 6 times in 24 hours

Frequent	6 volts	> 6 times in 24 hours and < 3 times per hour
Very Frequent	4 volts	> 3 times per hour

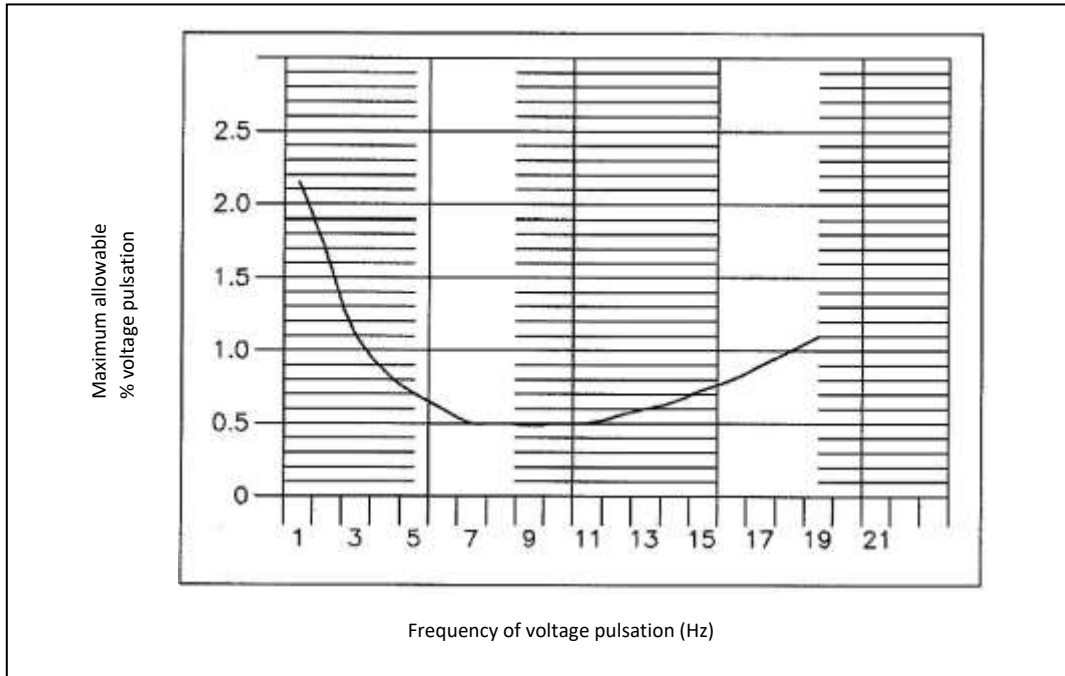


Figure 2.18: Voltage flicker chart for primary distribution facilities measured at point of interconnection; maximum allowable cyclic variation of voltage.

3.0 EQUUS Meter Configurations

3.1 EQUUS Meter Configurations, Single and Three-Phase

EQUUS services shall be metered according to the configurations described in Table 3.1.1: EQUUS Meter Configurations.

Table 3.1.1: EQUUS Meter Configurations

Configurations		O.H	U/G
Single Phase 120/240V 240/480V	Instrument Over 200A	Section 3.2 (Figures 2.17.3, 3.2.1)	Section 3.6 (Figures 2.17.3, 3.2.1, 3.6.1a/b)
	Self-Contained meter <200A	Section 3.3 (Figure 3.7.1)	Section 3.7 (Figures 3.7.1, 3.7.2, 3.7.3)
Three Phase 120/208V 277/480V 347/600V	Instrument Over 200A	Section 3.4 (Figures 2.17.3, 3.4.1, 3.4.2, 3.8.1a/b)	Section 3.8 (Figures 2.17.3, 3.4.1, 3.4.2, 3.8.1a/b, 3.9.3)
	Self-Contained meter <200A	Section 3.5 (Figure 3.5.1)	Section 3.9 Figures (3.7.3, 3.9.1, 3.9.2, 3.9.3)

3.2 Single-Phase Instrument Meter Over 200A, Overhead

Connection Type: Single-phase instrument metering over 200 amps

- This is a pole-mounted transformer located on private property. Typical installations include medium to large commercial, light industrial, houses, and irrigation farms.
- The meter and the CT would be installed on an outdoor or weatherproof meter enclosure, or inside buildings.
 - Refer to Instrument Transformer Metering for more information

Member Responsibilities

- Supply and install secondary cable from each service entrance to the metering pole.
- Install secondary conductors up to the transformer.
- Connect the underground cable at the meter box.
- The Member owns and maintains all secondary works on private property.

EQUS Responsibilities

- Complete any required civil work on private property; includes all trenching, ducting, pull boxes, concrete bases for any pad-mount equipment, grounding, and guardrails.
 - In the event the Member wishes to arrange for any required civil work personally, this must be requested and approved in advance by EQUS. Any civil work completed by the Member must also be reviewed and approved by EQUS prior to further construction.
- Supply and install revenue metering equipment.
- Supply current transformers.
- Supply the primary cable.
- Inspected the meter installation completed by the Member.
- EQUS owns and maintains all transformers, switching cubicles, and primary cable.

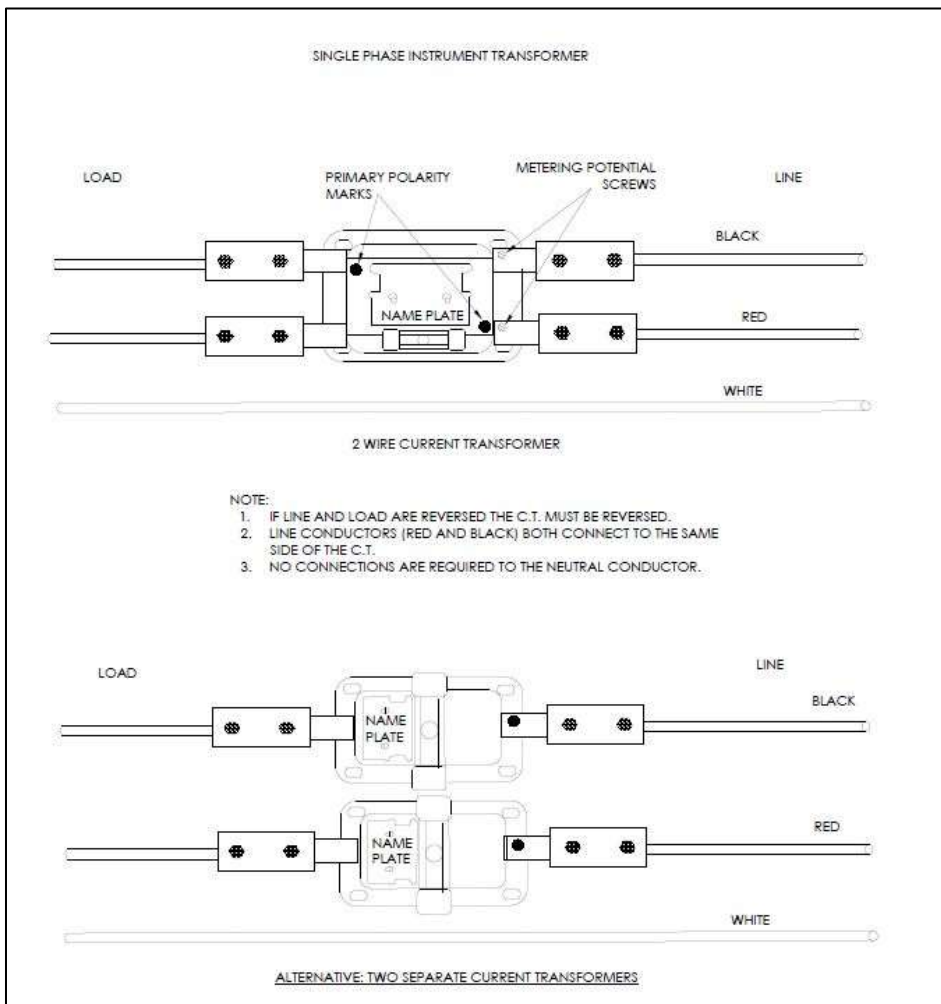


Figure 3.2.1: Single-Phase Instrument Transformer, and 2-Wire Current Transformer

3.3 Single-Phase Self-Contained Meter Under 200A, Overhead

Connection Type: Single-Phase self-contained meter up to 200 amps, on a pole-mount transformer.

- This type of installation is a pole-mounted transformer located on private property, or meter inside a house. Typical installations include small to medium houses or businesses, light commercial and industrial services, and services supplying farming type operations in rural areas.

Member Responsibilities

- Supply the overhead service wire from each service entrance to the metering pole.
- Supply and install secondary cable.
- All neutral connections after the main service disconnect must be isolated from ground.
- In the case of meter sockets located after the main disconnect, an isolated neutral connector must be used.

EQUS Responsibilities

- Supply and install the meter and the meter box on pole-mounted meters.
- For all connections on self-contained metering equipment, EQUS shall make all connections within the meter socket. On services requiring a neutral connection to the meter, the main service neutral shall be connected to the neutral socket lug within the meter socket.
 - The only exception is where the meter socket is located on the load side of the service disconnect, and the neutral is not required for the Member's equipment. In this case, a tap of equivalent size that is color coded white must be run from the neutral socket lug in the meter socket, back to the neutral terminal in the service disconnect.
- Connect the overhead service wire at the transformer pole.
- EQUS owns and maintains all transformers, switching cubicles, and primary cable.

3.4 Three-Phase Instrument Meter Over 200A, Pad-Mount

Connection Type: Three-Phase instrument, over 200 amps

- This is a pad-mounted transformer-type service, located on private property. Typical installations houses, include medium to large commercial, businesses, oil and gas, and industrial services. The meter and the CT for these services would be installed on the pad-mount transformer bushings.

Member Responsibilities

- Supply and install secondary cable.
- The Member owns and maintains all secondary works on private property.

EQUS Responsibilities

- Complete any required civil work on private property; includes all trenching, ducting, pull boxes, concrete bases for any pad-mount equipment, grounding, and guardrails.
 - In the event the Member wishes to arrange for any required civil work personally, this must be requested and approved in advance by EQUS. Any civil work completed by the Member must also be reviewed and approved by EQUS prior to further construction.
- Supply and install current transformers.
- Supply and install revenue metering equipment.
- Supply the primary cable.
- EQUS owns and maintains all transformers, switching cubicles, and primary cable.

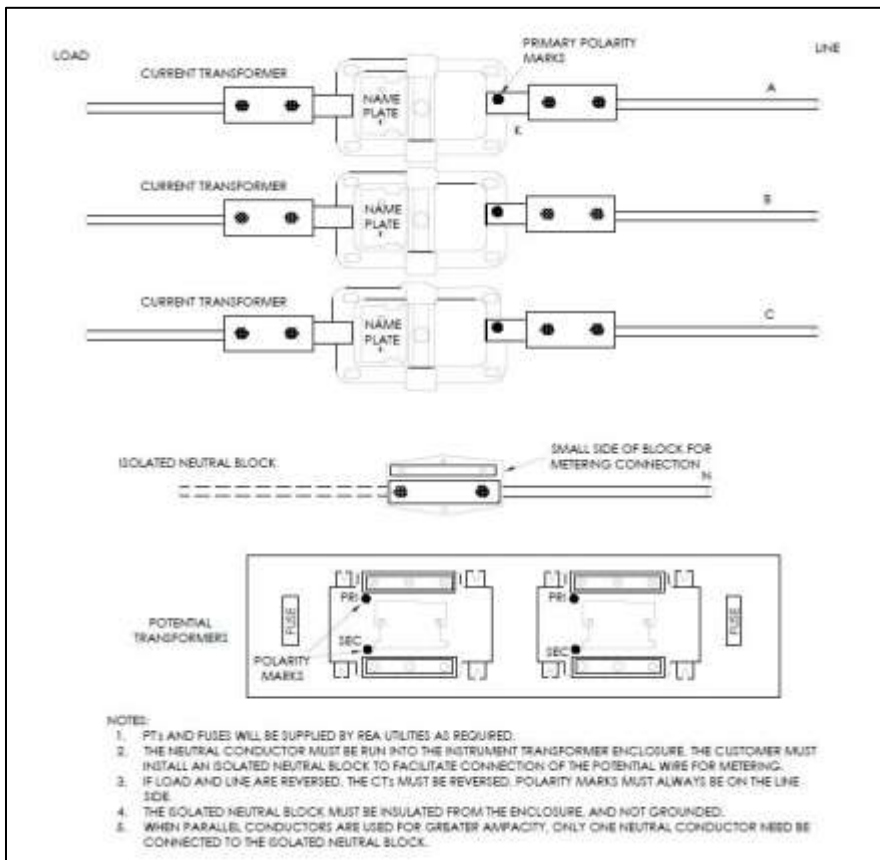


Figure 3.4.1: Three-Phase Instrument Transformer

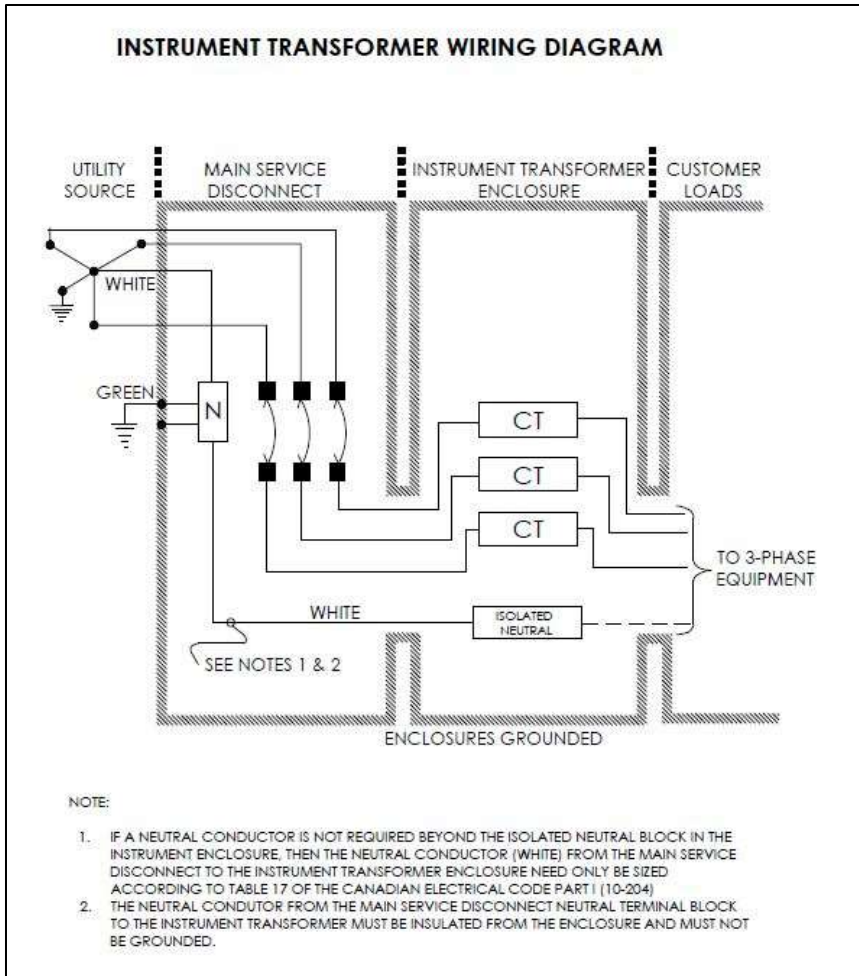


Figure 3.4.2: Instrument Metering Wiring Detail

3.5 Three-Phase Self-Contained Meter Under 200A, Overhead

Connection Type: Three-Phase self-contained meter, up to 200 amps on a pole-mount transformer.

- This is a pole-mounted transformer service located on private property. Typical installations include small to medium houses, businesses, commercial and industrial services.

Member Responsibilities

- Supply and install secondary cable.
 - The Member shall run overhead quad-plex or tech cable to a Member-owned secondary pole with a meter on it, or underground secondary to a meter box on a pedestal more than 5 m away from the EQU S pole.
- Supply and install the meter box.

- Supply the overhead service wire from each service entrance to the metering pole.
- Ensure that all neutral connections after the main service disconnect are isolated from the ground.

EQUS Responsibilities

- Connect the overhead service wire at the transformer.
- Supply and install the meter.
- EQUS owns and maintains all transformers, switching cubicles, and primary cable.

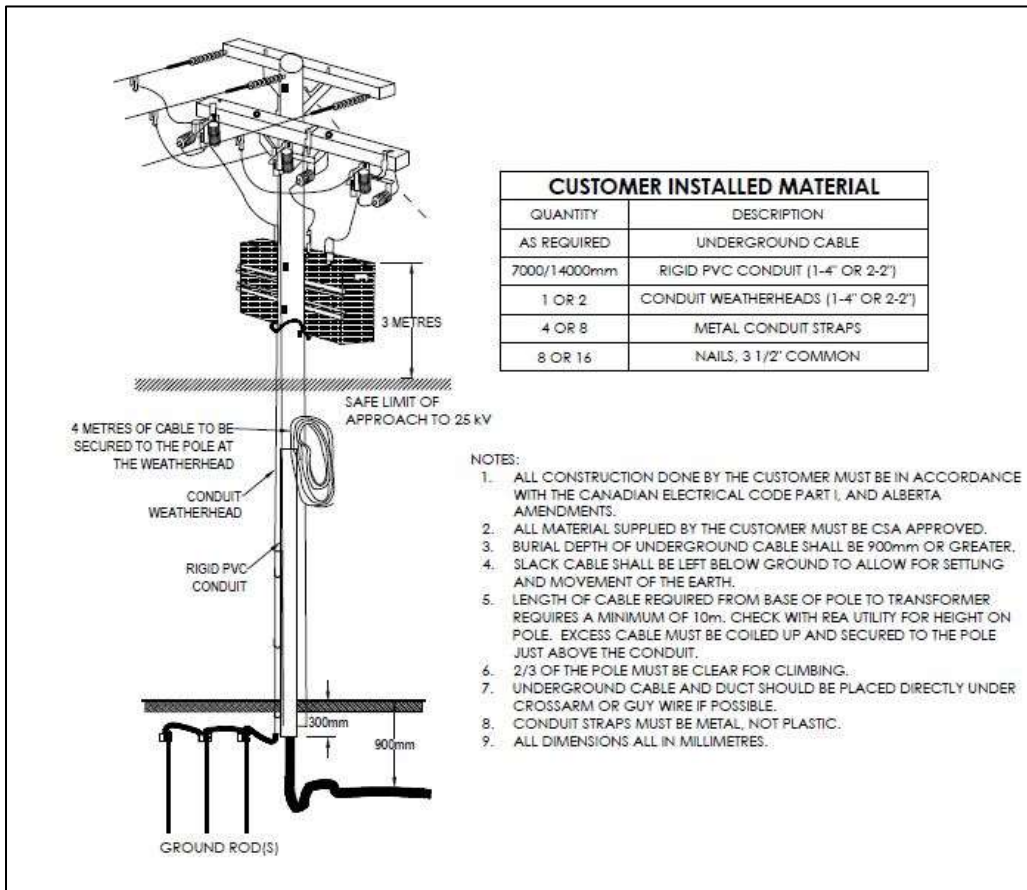


Figure 3.5.1: Three-Phase Underground Service from Overhead Pole

3.6 Single-Phase Instrument Meter Over 200A, Underground

Connection Type: Single-Phase instrument meter, over 200 amps on a pad-mount transformer.

- This is a pad-mounted transformer located on private property. Typical installations include medium to large commercial, houses, business, and multi-family sites.

Member Responsibilities

- Supply and install underground load secondary cable up to the pad-mount transformer.
- Install the underground load secondary cable into the pad-mount transformer (Refer to Section 3.1.2).
 - A written working clearance must be obtained from EQUUS before entering the transformer enclosure. Once a written working clearance has been obtained, the Member may then connect the underground secondary cables to the transformer secondary terminals.
- The Member supplies and installs all transformer bases, switching cubicle bases, ground grids, primary ducts, and all secondary works on private property.

EQUUS Responsibilities

- Complete required civil work on private property; includes all trenching, ducting, pull boxes, concrete bases for any pad-mount equipment, grounding, and guardrails.
 - In the event the Member wishes to arrange for any required civil work personally, this must be requested and approved in advance by EQUUS. Any civil work completed by the Member must also be reviewed and approved by EQUUS prior to further construction.
- Supply and install the meter and the metering pedestal.
- Supply and install the pad-mount transformer at an approved location.
- Supply and install a ground grid as per EQUUS specifications.
- Supply current transformers.
- Supply and install revenue metering equipment.
- Supply the primary cable.
- EQUUS owns and maintains all transformers, switching cubicles, and primary cable.

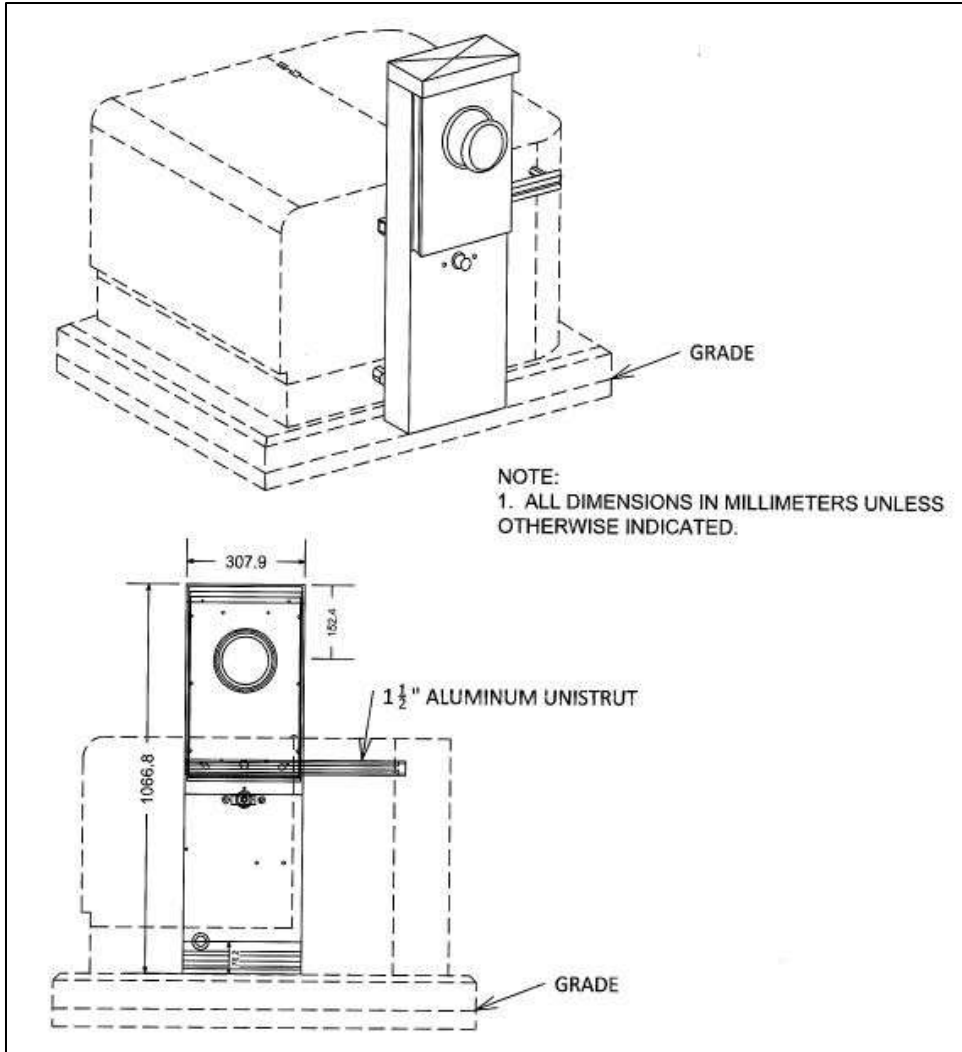


Figure 3.6.1a: Single-Phase Instrument Metering Stand on Pad-Mount Transformer (1)

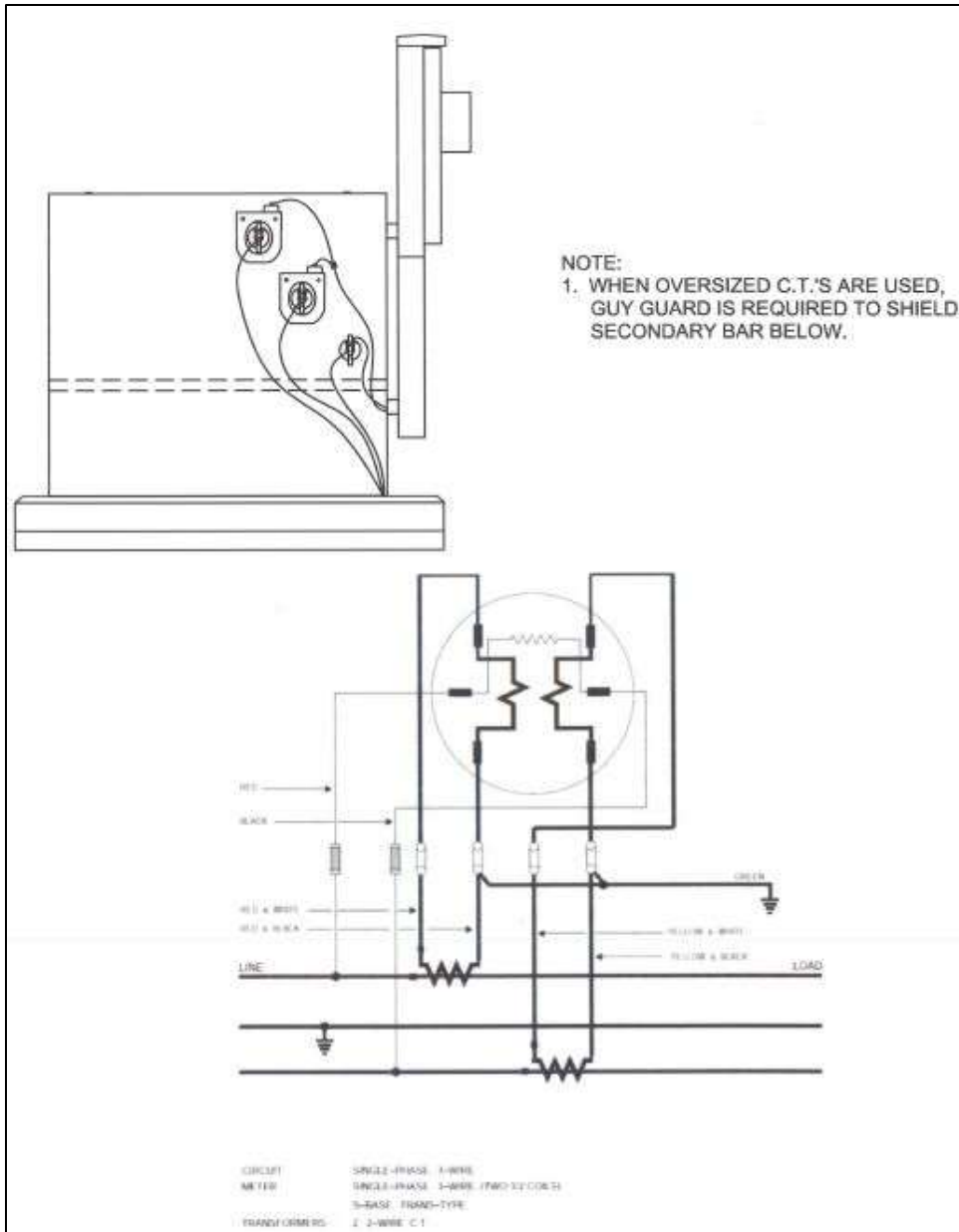


Figure 3.6.1b: Single-Phase Instrument Metering Stand on Pad-Mount Transformer (2)

3.7 Single-Phase Self-Contained Meter Under 200A, Underground

Connection Type: Single-phase self-contained meter, under 200 amps on a pad-mount transformer, OR an underground service supplied from an overhead transformer.

- This is a pad-mounted transformer service located on private property, or an overhead transformer that supplies an underground service. Typical installations include medium to large commercial houses, businesses, and multi-family sites.

Member Responsibilities

- Supply and install underground load secondary cable up to the metering pedestal located near the underground pad-mount transformer.
- Install the underground load secondary cable into the metering pedestal.

EQUS Responsibilities

- Complete required civil work on private property; includes all trenching, ducting, pull boxes, concrete bases for any pad-mount equipment, grounding, and guardrails.
 - In the event the Member wishes to arrange for any required civil work personally, this must be requested and approved in advance by EQUS. Any civil work completed by the Member must also be reviewed and approved by EQUS prior to further construction.
- Supply and install the meter and the metering pedestal.
- Install line-side cable into the metering pedestal.
- Supply and install the pad-mount transformer and base at an approved location.
- Supply and install a ground grid.
- EQUS owns and maintains all transformers, switching cubicles, and primary cable.

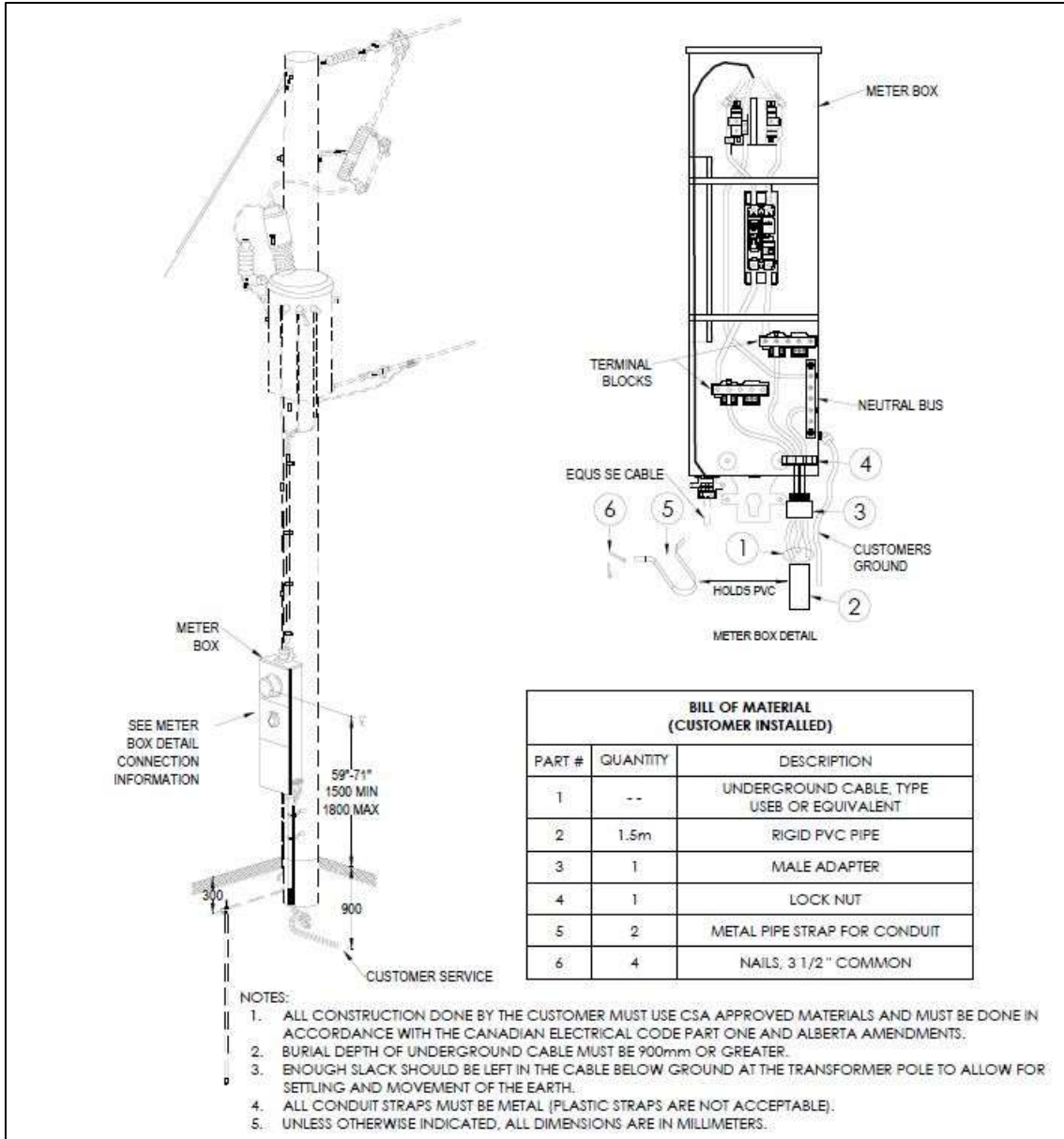


Figure 3.7.1: Single-Phase Underground Service from Overhead Pole

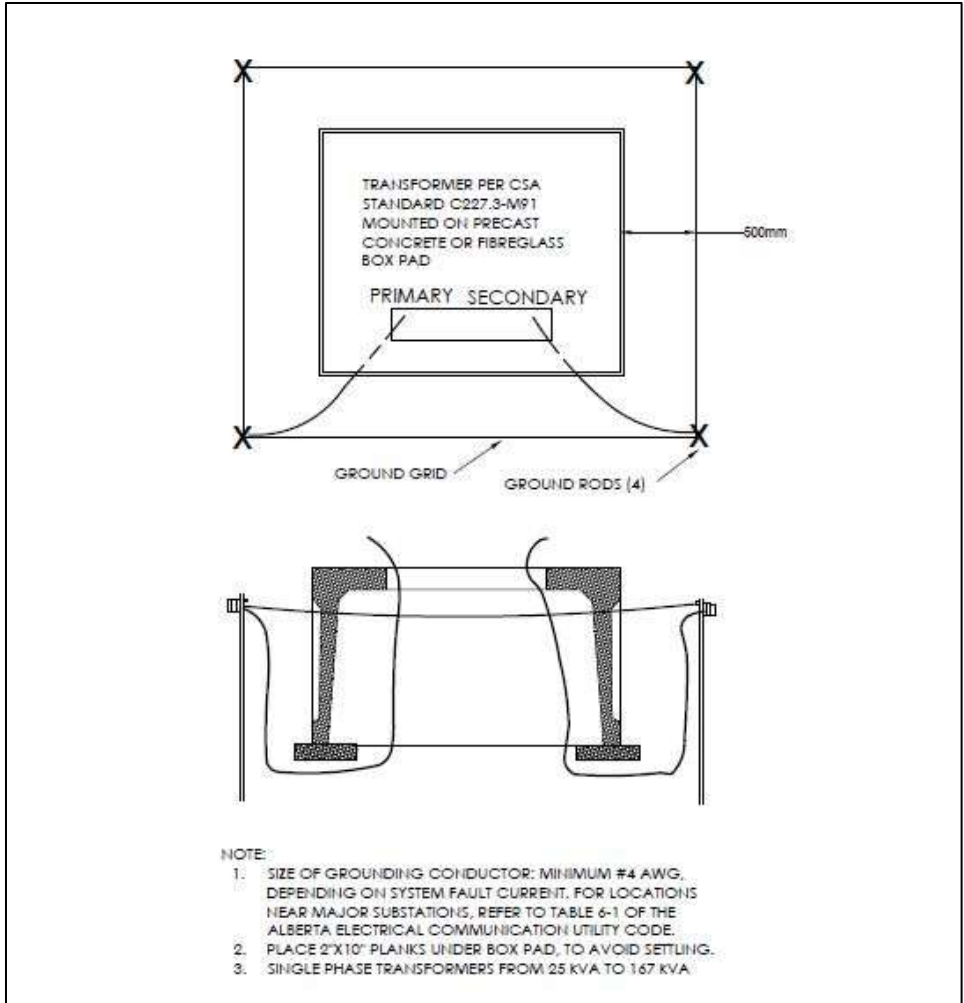


Figure 3.7.2: Single-Phase Transformer Pad and Grounding

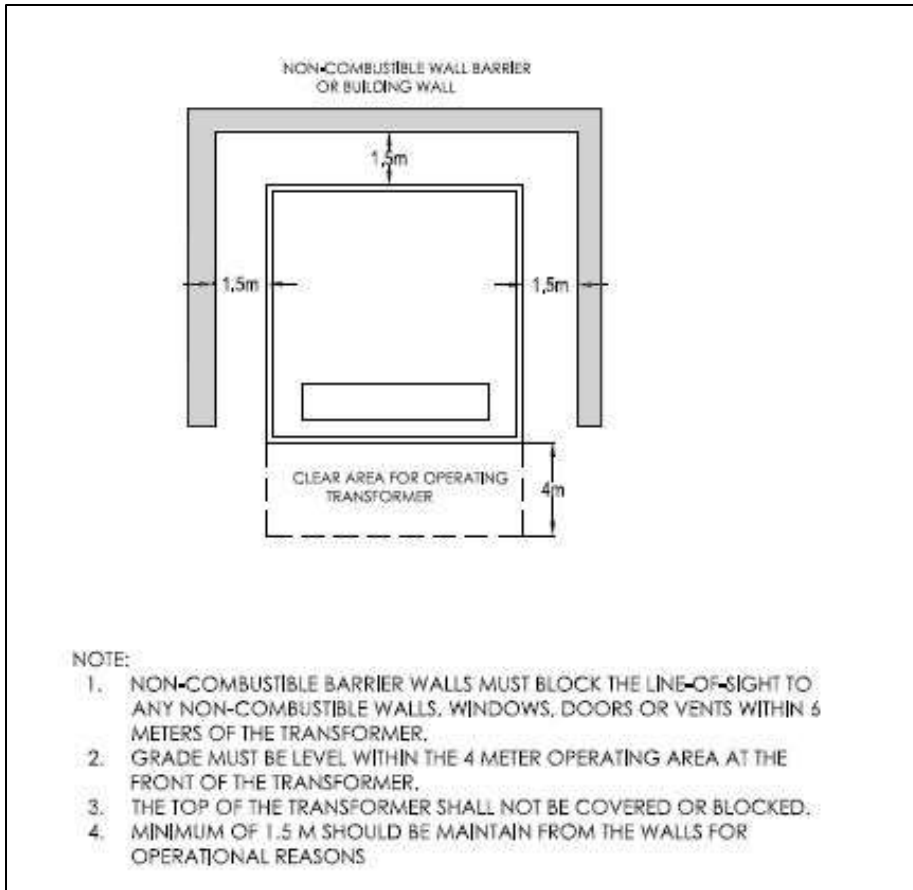


Figure 3.7.3: Location of Pad-Mount Transformers near Buildings

3.8 Three-Phase Instrument Metering Over 200A, Underground

Connection Type: Three-phase instrument over 200 amps on a pad-mount transformer.

- This is a pad-mounted transformer located on private property. Typical installations include medium to large commercial, houses, businesses, and multi-family sites.

Member Responsibilities

- Supply and install the underground load secondary cable up to the pad-mount transformer located near the underground pad-mount transformer.
- Supply and install all duct material for secondaries as per EQU S specification.
- Connect the underground cable to the transformer secondary terminals.
- Supply connectors and underground secondary cable up to the transformer secondary terminals.
 - The connectors must be inspected by EQU S.

- The cables must be supported below the transformer terminals; the transformer terminals cannot carry the weight of the cables.
- A written working clearance must be obtained from EQUUS before entering the transformer enclosure. Once a written working clearance has been obtained, the Member may then connect the underground secondary cables to the transformer secondary terminals.
- Install the underground cable up the transformer pole under the supervision of EQUUS.
 - Height shall be determined by EQUUS.
 - Note: safe limits of approach to high voltage for non-utility workers apply.
- Supply and install guard posts if the transformer pad is located in an area that could expose it to vehicle damage. Guard posts must be installed on all sides of the transformer that are exposed to potential vehicle transformer, as per EQUUS specifications.
- Ensure that the transformer pad is accessible to EQUUS employees and their vehicles.

EQUUS Responsibilities

- Complete any required civil work on private property; includes all trenching, ducting, pull boxes, concrete bases for any pad-mount equipment, grounding, and guardrails.
 - In the event the Member wishes to arrange for any required civil work personally, this must be requested and approved in advance by EQUUS. Any civil work completed by the Member must also be reviewed and approved by EQUUS prior to further construction.
- Approve the locations of the primary and secondary ducts.
- Supervise and inspect the installation of underground cables into the transformer secondary compartment.
- Supervise and inspect the connection of the underground cable to the transformer secondary terminals.
- Install current transformers.
- Supply and install revenue metering equipment.
- EQUUS owns and maintains all transformers, switching cubicles, and primary cable.

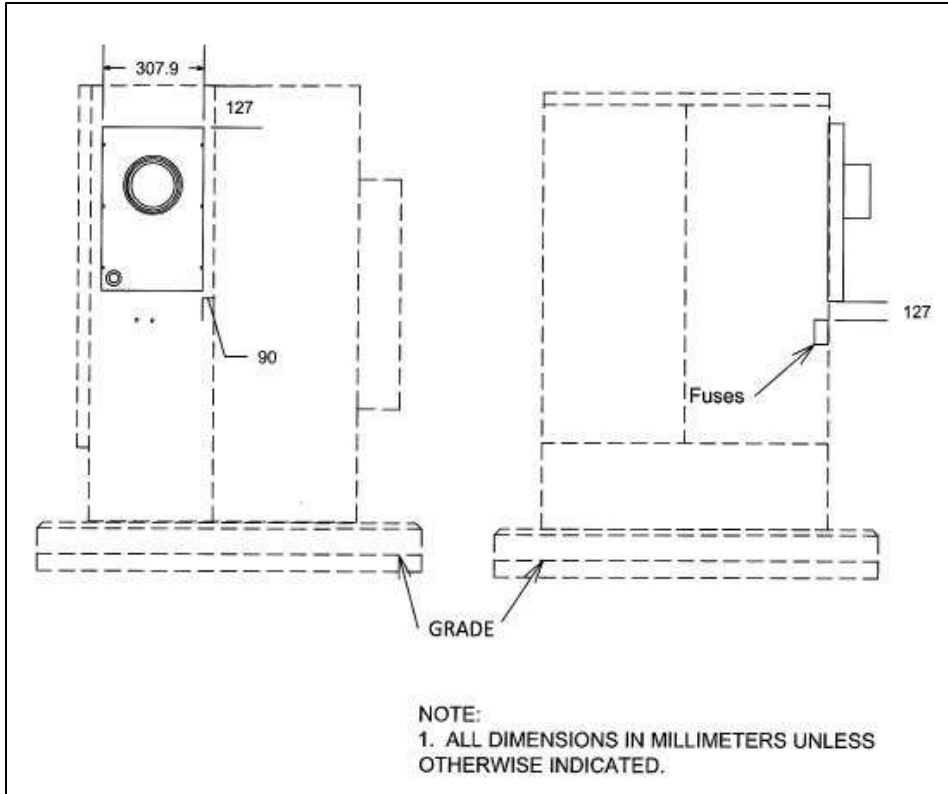


Figure 3.8.1a: Three-Phase Instrument Metering Stand on Pad-Mount Transformer (1)

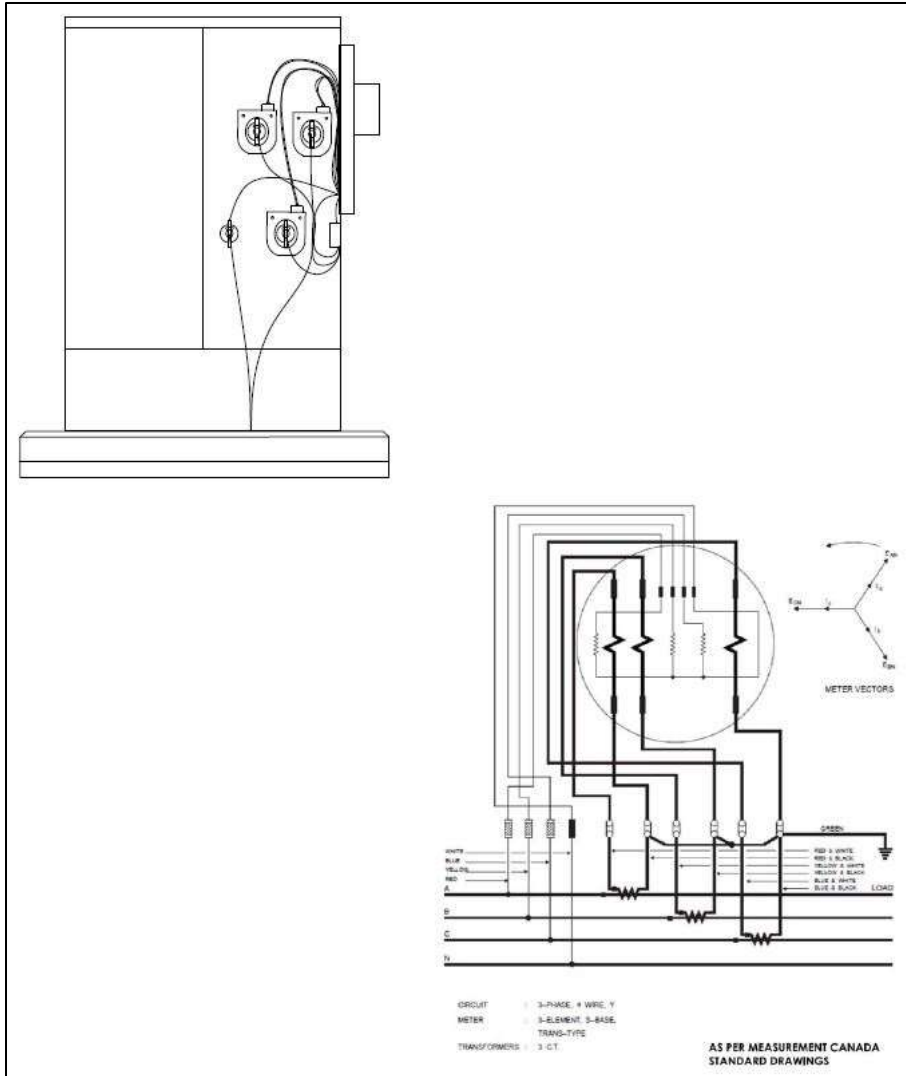


Figure 3.8.1b: Three-Phase Instrument Metering Stand on Pad-Mount Transformer (2)

3.9 Three-Phase Self-Contained Meter Under 200A, Underground

Connection Type: Three-phase self-contained meter, under 200 amps on a pad-mount transformer.

- This is a pad-mounted transformer located on private property. Typical installations include medium to large commercial, houses, businesses, and multi-family sites.

Member Responsibilities

- Supply and install the underground load secondary cable up to the metering pedestal located near the underground pad-mount transformer.
- Supply and install all duct material for secondaries as per EQU S specification.

- Supply connectors and underground secondary cable up to the transformer secondary terminals.
 - The connectors must be installed under the supervision of EQUUS.
 - The cables must be supported below the transformer terminals; the transformer terminals cannot carry the weight of the cables.
 - A written working clearance must be obtained from EQUUS before entering the transformer enclosure. Once a written working clearance has been obtained, the Member may then connect the underground secondary cables to the transformer secondary terminals.
- Install the underground cable up the transformer pole under the supervision of EQUUS.
 - Height to be determined by EQUUS
 - Note: safe limits of approach to high voltage for non-utility workers apply
- Supply and install guard posts if the transformer pad is located in an area that could expose it to vehicle damage. Guard posts must be installed on all sides of the transformer that are exposed to potential vehicle transformer.
- Ensure that the transformer pad is accessible to EQUUS employees and their vehicles.

EQUUS Responsibilities

- Complete any required civil work on private property; includes all trenching, ducting, pull boxes, concrete bases for any pad-mount equipment, grounding, and guardrails.
 - In the event the Member wishes to arrange for any required civil work personally, this must be requested and approved in advance by EQUUS. Any civil work completed by the Member must also be reviewed and approved by EQUUS prior to further construction.
- Install self-contained meter.
- Supply the primary cable.
- Approve the locations of the primary and secondary ducts.
- Supervise the installation of underground cables into the transformer secondary compartment.
- Supervise the connection of underground cable to the transformer secondary terminals.
- Connect the underground cable to the transformer secondary terminals.
- Supply and install revenue metering equipment.
- EQUUS owns and maintains all transformers, switching cubicles, and primary cable.

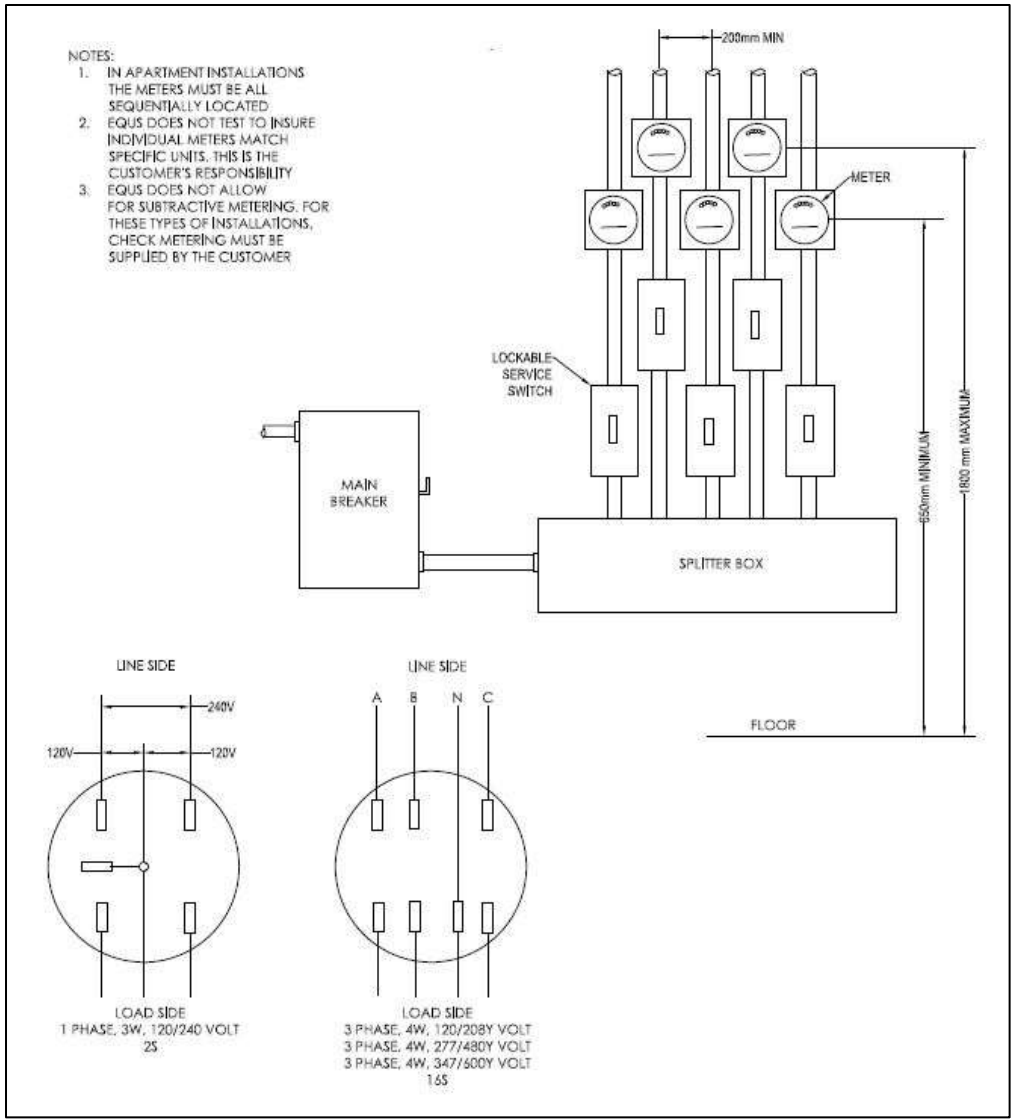


Figure 3.9.1: Multi-Meter Installation

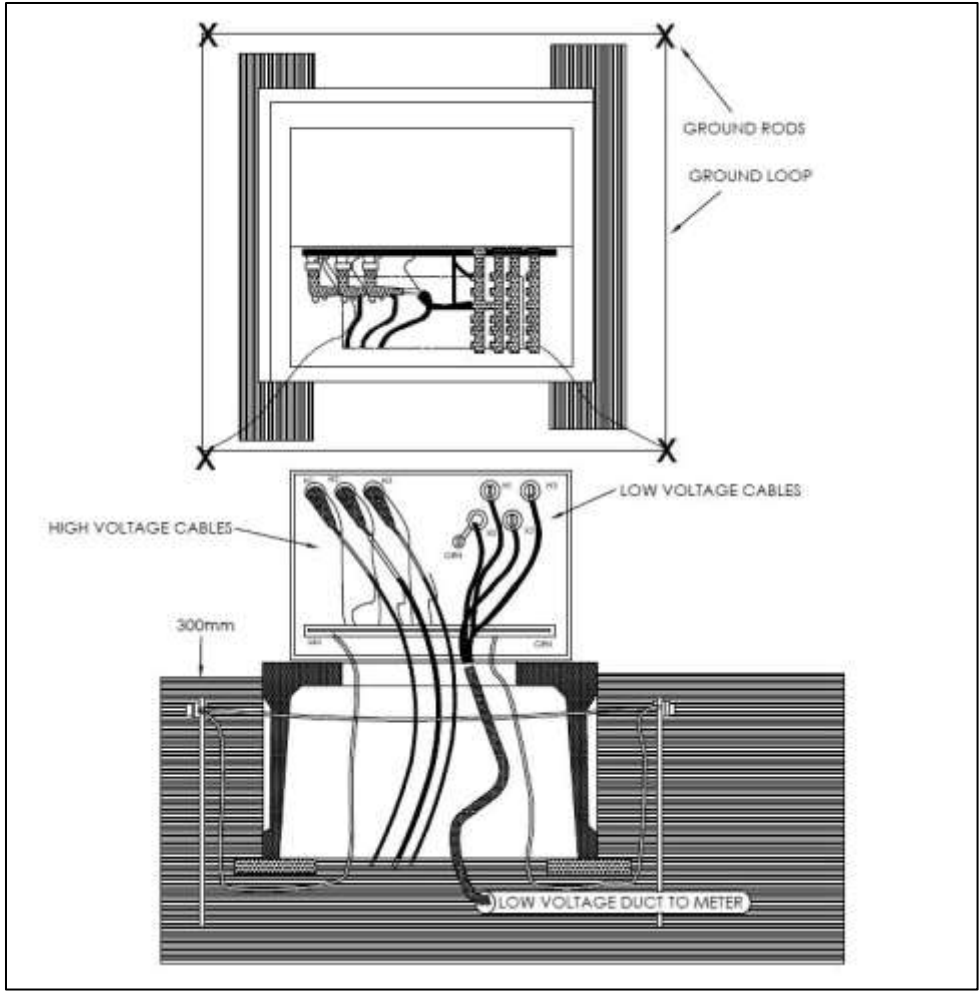


Figure 3.9.2: Pad-Mount Transformer Installation

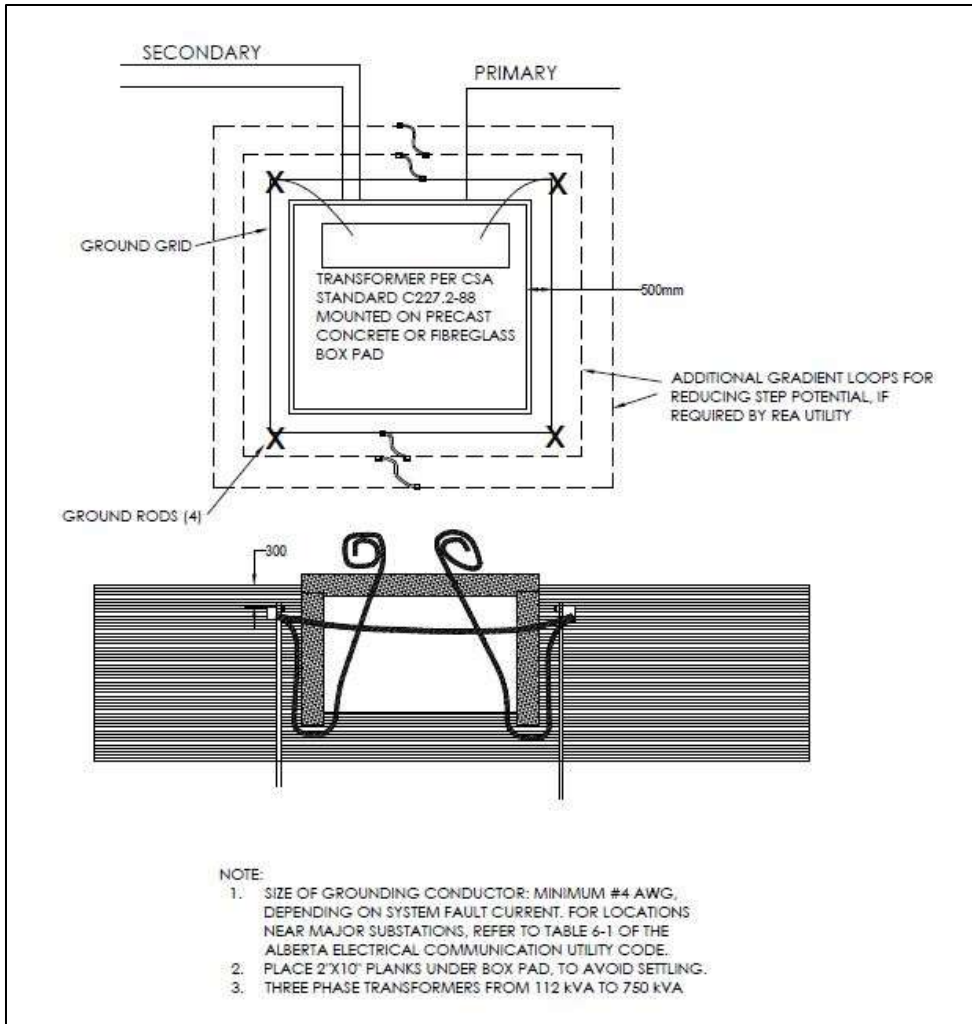


Figure 3.9.3: Three-Phase Transformer Pad and Grounding

4.0 Non-Standard Services

4.1 Requests for Non-Standard Services

For services where the requirements of this guide cannot be met, the Member must submit a request for approval of a non-standard service to the local EQUUS Area Office. Requests must be submitted before ordering and installing service entrance equipment or associated equipment, and must include equipment drawings, specifications, and site plans.

Drawing Requirements for Non-Standard Service Requests:

- Two copies of equipment drawings, specifications, and site plans for non-standard services must be submitted to EQUUS.
- An electrical site plan, approved and stamped by an engineer registered and in good standing with APEGA and/or ASET.
- Drawings must clearly show all equipment related to the revenue metering, including service entrance equipment and revenue metering enclosures.
- Drawings should show elevations and enclosure sizes.
- Drawings should be submitted as early in the process as possible.

Note: If the member is considering a primary metered service, please review detailed requirements in Section 8.

EQUUS' Standards Department will evaluate the request for a non-standard service and the accompanying documents, and shall determine if the non-standard service will be accepted. The service shall only be considered as approved once the Member has received written approval from EQUUS.

Approvals shall be issued on a case-by-case basis only. Any approval issued shall apply only to the service in question, and shall not be considered a general approval for further services.

4.2 Non-Standard Services: Dispute Resolution

Documented approval by EQUUS must be received for the service in question. In case of a dispute, verbal agreements shall not be considered sufficient. Documented approval shall consist of a letter and/or print signed and approved by EQUUS' Standards Department with the details of the service in question. Documented approval is required prior to any non-standard services being energized.

5.0 Residential Services

5.1 Residential Services: General Requirements

Metering equipment for residential services is required to meet the General Requirements outlined in Section 2.0, as well as the following requirements:

1. The meter shall be installed on either:
 - the outside wall of a house or suitable building
 - a transformer pole
 - at the pad-mount transformer
 - a separate suitable pedestal or post (if lot-line metering)
2. The meter shall be connected on the line side of the service disconnect.

5.2 Overhead Service Supplied by an Overhead Transformer

The Member shall:

- Supply and install a metallic service entrance mast, including the weather head, clevis insulator, and cable.
 - The service mast or clevis insulator (including bolt) must be securely fastened to the building.
 - Screw-type insulators (service knobs) shall not be accepted on either new or upgraded construction.
- Supply and install service pole, if required.
- For Member pole metering, supply and install the metering pole

EQUUS shall:

- Supply and install the meter.
- Supply and install the meter socket(s).
- Supply the connection on the transformer pole.

5.3 Underground Service Supplied by an Overhead Transformer

The Member shall:

- Supply and install the service entrance conduit.
- Provide all trench excavation on Member property and lease property; this shall also include all backfilling required for the trenches.
- Provide an open trench approximately 1 m deep and 1 m wide at the base of the pole. This trench shall be located below the transformer and shall be used for mounting the conduit.
- Supply and install a sufficient length of underground cable up to the base of the pole, with enough cable remaining to reach the transformer secondary terminals.
 - The Member should seek advice from an EQUUS representative on the length of cable required.
 - Refer to Table 5.3.1 for the acceptable secondary cable sizes by voltage and transformer size.
- Where required, supply the appropriate length of 2 in. or 4 in. rigid PVC conduit up to the equipment at the pole.
 - The Member should seek advice from an EQUUS representative on the length of conduit required.
 - EQUUS only accepts 2 in. and 4 in. conduit sizes for underground services.
- Supply the weather head, if the conduit is extended to the base of the service transformer.
- For Member lot-line metering, supply and install lot-line metering apparatus.

EQUUS shall:

- Supply and install the meter.
- Supply and install the meter socket.
- Assemble the full-height conduit riser way, pull in the cable, and install a weather head and mount (if applicable).
- Supply and install standoff brackets and mounting hardware suitable for 2 in. and 4 in. conduit (if applicable).
- Secure remaining cable to the pole using cable straps supplied by the Member (in cases where only 10 ft. of conduit is required).
- Connect the underground cable to the transformer secondary terminals.
- Complete the final transformer connection.

Only EQUUS personnel are permitted to climb the transformer pole.

5.3.1 Acceptable Secondary Cable Sizes vs Transformer Size - Residential

The acceptable secondary cable sizes are outlined in Table 5.3.1.

Table 5.3.1: Residential Single-Phase Service, Secondary Cable Sizes

120/240 V	240/480 V	Secondary Terminals
15 kVA	25 kVA	Clamp type terminal for #6 to 2/0 conductor size
25 kVA	50 kVA	Clamp type terminal for #2 to 350 MCM conductor size
50, 75, 100, and 167 kVA	75 and 100 kVA	Single barrel or double barrel mechanical terminal for 1/0 to 750 MCM conductor size

5.3.2 Residential Services: Use of Conduit and Standoff Brackets

For rural applications where:

- Multiple services are fed from a single overhead transformer, or
- A single conductor type USEI, SE cable is used, or
- There is an existing communication conduit sharing the pole

The cable shall be installed in a conduit to the base of the service transformer. EQUUS-supplied standoff brackets and straps will be used to secure the conduit to the pole.

For rural applications where:

- Type USEB, SE or armored cable is used, and/or
- Only a single service is fed by an overhead transformer

The first 10 ft. of cable must have conduit. The conduit must be sized appropriately for the installation

- In some cases, this may result in an exception to the 2 in. and 4 in. conduit guideline described in Section 5.3. The Member should speak to their EQUUS representative if this is the case.

The Member will pull the cable through the rigid PVC conduit and secure it to the pole via straps supplied by the Member. If there is SE or armored cable remaining, the cable shall be coiled and secured to the pole with appropriately sized cable straps (the weather head is not required), and bagged.

If the Member uses multi-conductor armored cable, the last 2 m of the cable must be stripped of the cable armor, and the PVC inner jacket exposed; then, colour-coded heat shrink tubing shall be used to cover the PVC jacket.

- The conductor that is intended as the neutral must be clearly identified using white vinyl tape or heat shrink tubing.
- **Caution:** PVC colour-coded insulation used for TECK 90 (copper) cables is not suitable for UV exposure. Over time it will deteriorate, breaking down the insulation and exposing the conductor.

In urban applications:

All Member secondary cable must be installed in rigid PVC conduit to the base of the service transformer. EQUUS supplied standoff brackets and straps shall be used to secure the conduit to the pole.

5.4 Underground Service Supplied by a Pad-Mount Transformer

The Member shall:

- Supply and install the service entrance conduit.
- Supply the transformer terminal connectors.
- Supply and install the required length of underground cable up to the property line. Enough cable must remain to reach the transformer or pedestal secondary terminals.
 - If the transformer or pedestal is not located on the Member's property, the Member should contact EQUUS and their municipality to determine whether they are permitted to install underground cable past their property line.
- Pay any additional costs associated with the installation of pad-mount metering, if the Member has requested EQUUS to install pad-mount metering on the transformer.
 - Pad-mount metering will be quoted as Optional Facilities if the Member's service is eligible (i.e.: supplied by a dedicated transformer).
- Install and connect the underground secondary cable at the transformer secondary terminals or pad-mount meter (if the Member's service is supplied with a dedicated transformer).
 - A written "Guarantee of Isolation" must be obtained from EQUUS before entering the transformer enclosure. Only after a written "Guarantee of Isolation" has been obtained, may the Member proceed with connecting the underground secondary cables to the transformer secondary terminals
 - The cables must be supported below the transformer terminals; the transformer terminals cannot support the weight of the cables.
- In the case of Member lot-line metering, supply and install the lot-line metering apparatus

EQUUS shall:

- Supply and install the meter.

- Supply and install the meter socket if pad-mount metering is not requested.
- If the Member has requested pad-mount metering, supply and install the pad-mount metering.
- Install the transformer on pad and perform all primary connections.
- Issue a “Guarantee of Isolation” upon request.
- Inspect the installation and connection of the underground cable into the transformer secondary compartment.
- Reserve the right to inspect the installation of any Member installed facilities.

6.0 Commercial Services

The following applies to Single-Phase and Three-Phase Commercial Services, including industrial, oil & gas, irrigation, bare land, and apartment building services.

6.1 Overhead Service Supplied by an Overhead Transformer

The Member shall:

- Supply and install a metallic service entrance mast, including weather head, clevis insulator, and cable.
 - The service mast or clevis insulator (including the bolt), shall be securely fastened to the building.
 - Screw-type insulators (service knobs) shall not be accepted on either new or upgraded construction.
- Supply and install the secondary (metering) pole, for Member pole metering.

EQUUS shall:

- Supply and install the meter.
- Supply and install the meter socket.
- Supply and install up to 60 m of secondary cable. Any one span shall only be a maximum of 30 m.
 - EQUUS will not supply any secondary pole(s) for commercial, industrial, oil & gas, irrigation, bare land, or apartment building services.

6.2 Underground Service Supplied by an Overhead Transformer

The Member shall:

- Supply and install the service entrance conduit.
- Provide all trench excavation on Member property and lease property; this shall include all backfilling required for the trenches.
- Provide an open trench approximately 1 m deep and 1 m wide at the base of the pole. This trench shall be located below the transformer and shall be used for mounting the conduit.
- Supply and install a sufficient length of underground cable up to the base of the pole, with enough cable remaining to reach the transformer secondary terminals.

- The Member should seek advice from an EQUUS representative on the length of cable required.
- Refer to Table 6.2.1 and Table 6.2.2 for the acceptable secondary cable sizes by voltage and transformer size.
- Where required, supply the appropriate length of 2 in. or 4 in. rigid PVC conduit up to the equipment at the pole.
 - The Member should seek advice from an EQUUS representative on the length of conduit required.
 - EQUUS only accepts 2 in. and 4 in. conduit sizes for underground services.
- Supply the weather head, if the conduit is extended to the base of the service transformer.
- For Member lot-line metering, supply and install lot-line metering apparatus.

EQUUS shall:

- Supply and install the meter.
- Supply and install the meter socket.
- Supply and install standoff brackets and mounting hardware suitable for 2 in. and 4 in. conduit (if applicable).
- Assemble the full-height conduit riser way, pull in the cable, and install a weather head and mount (if applicable).
- Secure remaining cable to the pole using cable straps supplied by the Member (in cases where only 10 ft. of conduit is required).
- Connect the underground cable to the transformer secondary terminals.
- Complete the final transformer connection.

Only EQUUS personnel are permitted to climb the transformer pole.

6.2.1 Acceptable Secondary Cable Sizes vs Transformer Size, Commercial

Refer to Table 6.2.1 and 6.2.2 for the acceptable secondary cable sizes for single-phase and three-phase services.

Table 6.2.1: Commercial Single-Phase Service, Secondary Cable Sizes

120/240 V Transformer	240/480 V Transformer	Secondary Terminals
15 kVA	25 kVA	Clamp type terminal for #6 to 2/0 conductor size
25 kVA	50 kVA	Clamp type terminal for #2 to 350 MCM conductor size

50, 75, 100, and 167 kVA	75 and 100 kVA	Single barrel or double barrel mechanical terminal for 1/0 to 750 MCM conductor size
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Table 6.2.2: Commercial Three-Phase Service, Secondary Cable Sizes

Transformer Size	Secondary Terminals
30-75 kVA	Clamp type terminal for #6 to 4/0 conductor size
150 kVA	Clamp type terminal for #2 to 350 MCM conductor size

6.2.2 Commercial Services: Use of Conduit and Standoff Brackets

For rural applications where:

- Multiple services are fed by a single overhead transformer, or
- The Member uses a single conductor type USEI SE cable, or
- There is an existing communication conduit sharing the pole

The cable shall be installed in conduit to the base of the service transformer. EQUIS-supplied standoff brackets and straps will be used to secure the conduit to the pole.

For rural applications where:

- Type USEB SE or armored cable is used, and/or
- There is only one service fed from an overhead transformer

The first 10 ft. of cable must have conduit. The conduit must be sized appropriately for the installation

- In some cases, this may result in an exception to the 2 in. and 4 in. conduit guideline described in Section 5.3. The Member should speak to their EQUIS representative if this is the case.

The Member will pull the cable through the rigid PVC conduit and use Member-supplied straps to secure it to the pole. Any remaining SE or armored cable shall be coiled and secured to the pole with appropriately sized cable straps (the weather head is not required), and bagged.

If the Member uses multi-conductor armored cable, the last 2 m of the cable must be stripped of the cable armor exposing the PVC inner jacket; then, colour-coded heat shrink tubing shall be used to cover the PVC jacket.

- The conductor that is intended as the neutral must be clearly identified using white vinyl tape or heat shrink tubing.

- **Caution:** the PVC colour-coded insulation used for TECK 90 (copper) cables is not suitable for UV exposure. Over time it will deteriorate, breaking down the insulation and exposing the conductor.

6.3 Underground Service Supplied by a Pad-Mount Transformer

The Member shall:

- Contact EQUUS and arrange to meet on-site with an EQUUS design representative prior to any construction.
- Supply the EQUUS representative with a preliminary site plan complete with building locations, transformer location, and duct location.
- Ensure all service details have been accepted by EQUUS before starting construction.
- Provide all required trench excavation on Member property.
- Maintain a clear operating area.

EQUUS shall:

- Determine if the Member's construction details are acceptable, and confirm acceptance with the Member.
- Determine the offsite facilities that will be required based on the preliminary plan.
- Determine the location for the point of entry to the Member's property.
- Provide all offsite work.
- Provide the required type of grounding system (either single-ring, or three-ring)
- Pull the primary cables through the duct from the property line to the transformer location.
- Install the transformer on the pad, and perform all primary connections.
- Issue a "Guarantee of Isolation" upon request.
- Inspect the installation and the connection of the underground cable into the transformer secondary compartment.
- Supply and install the underground cable on public property (if Member lot-line metering is used).
- If the ground testing and report is not done by the Member, EQUUS shall test the Member's grounds and upgrade them if necessary.
 - If testing and upgrading of grounds is required, this shall be done at the Member's expense.
- Supply and install the meter.

- Reserve the right to inspect the installation of any Member-installed facilities.

6.4 Metering Requirements for Services Less Than 300V

The metering equipment for single meter commercial services rated less than 300 volts shall adhere to the following requirements:

- The meter shall be located outdoors on either:
 - the outside wall of a suitable building, with an area that is clear and free of vents; or
 - a separate, suitable stand-alone metering structure that is located at least 5m from the transformer pole or concrete pad.
- The meter shall be connected on the line side of the service disconnect.
- The meter shall be mounted with the center line of the meter in accordance with the heights specified in Table 2.2.1. The minimum required height must be maintained when the final grade is reached.

6.5 Metering Requirements for Services Greater Than 300V

The metering equipment for commercial services exceeding 300 volts shall adhere to the following requirements:

- The meter shall be located indoors; or
 - If it is an oilfield or irrigation service, the meter may be either:
 - a. located on the outside wall of a suitable building, in which case the install location must be an area that is clear and free of vents directly opposite and connected downstream from the main breaker, or
 - b. located outdoors on a stand-alone metering structure that is at least 5m away from the transformer pole
- Irrigation service must have the distribution center for the motors installed at the meter location; otherwise, an extra service disconnect shall be required on the load side of the meter
- The metering equipment shall be mounted with the center line of the meter in accordance with the heights specified in Table 2.2.1.
- The metering equipment shall be equipped in such a way as to allow EQUS to seal all service entrance equipment ahead of the metering point.

7.0 Temporary Services

This section applies to temporary connections required by the Member for 12 months or less on Single-Phase or Three-Phase electric services. Applicable service types include residential, commercial, industrial, oil & gas, bare land, apartment building services, and rural subdivisions.

Temporary services may be extended for longer than 12 months in special circumstances. Should a member require a temporary connection for longer than 12 months, the member must submit a written request to their EQUUS Area Office, asking that their temporary service agreement be extended. Extension of temporary services shall be granted at EQUUS' discretion.

7.1 Basic General Requirements

7.1.1 Member Requirements

The Member shall:

- Supply and install the meter socket.
- Supply and install the temporary pole or temporary stub.
- Supply and install the secondary protection.

In addition to these requirements, the standard requirements for each service type must be met.

When continuous electricity consumption is greater than 30 Amps (for example, as with electric heater loads used during construction), the Member will be required to apply for the installation of a temporary service connection that is capable of handling the higher load.

7.1.2 Unique or Specific Requirements

Two standard configurations of temporary services exist, the requirements of which are described in Section 7.2 and 7.3. These two configurations are designed with a transformer pole and switch, as shown in Figure 7.1.1. Other configurations may be considered, provided they comply with current EQUUS standards and are approved by EQUUS' Standards Department.

Any unique or specific requirements shall be evaluated and approved by EQUUS' Standards Department.

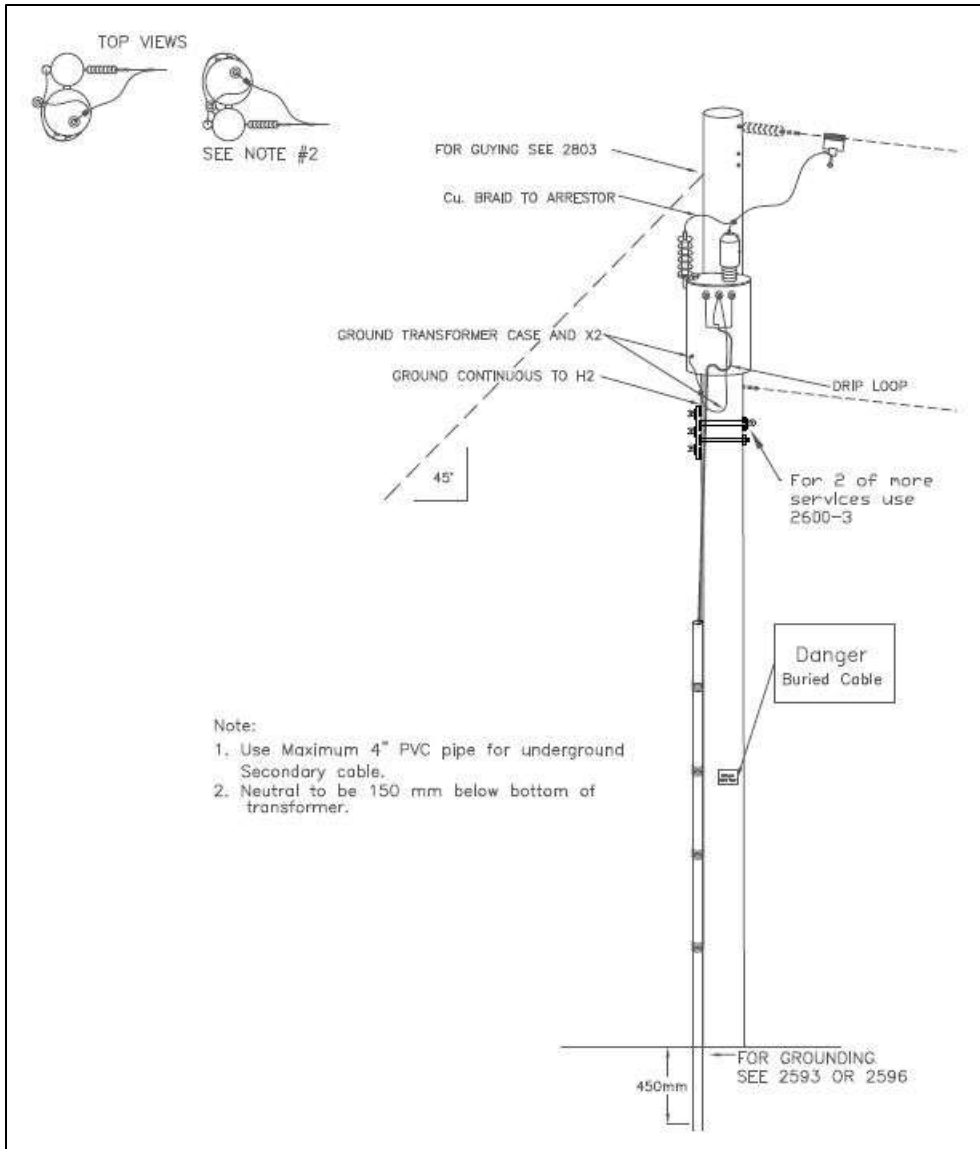


Figure 7.1.1: Temporary Service, Transformer Pole

7.2 Overhead Temporary Services Supplied From an Overhead Transformer

The Member shall:

- Supply and install the meter socket.
- Supply and install the temporary pole.
- Supply and install the overhead service wire.

Refer to Figure 7.2.1: Overhead Temporary Services.

EQUUS shall:

- Connect the overhead service wire at the transformer.
- Supply and install the meter.

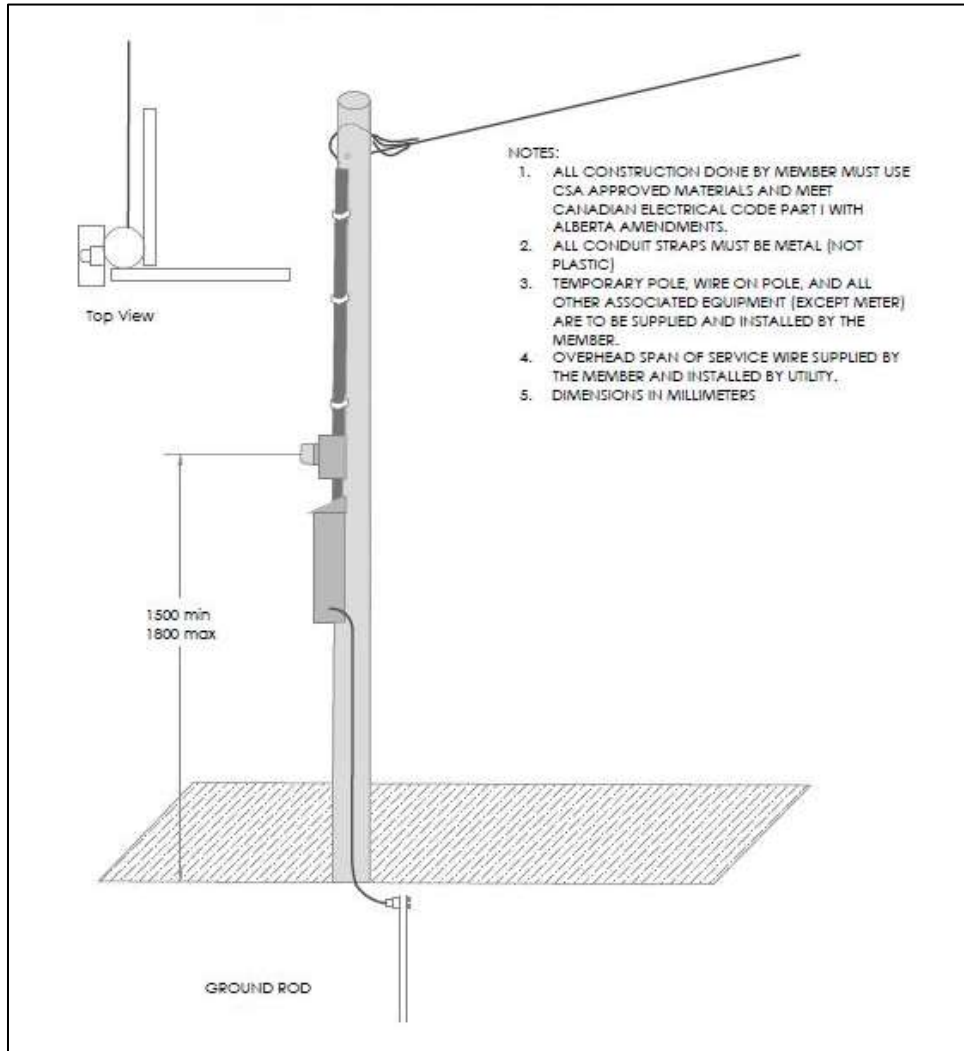


Figure 7.2.1: Overhead Temporary Services

7.3 Underground Temporary Services Supplied From an Overhead Transformer

The Member shall:

- Supply and install the meter socket.
- Supply and install the temporary stub.

- Supply and install the underground cable from the temporary stub to EQU'S' point of delivery.

Refer to Figure 7.3.1: Underground Temporary Services.

EQU'S shall:

- Connect the underground cable at EQU'S' point of delivery.
- Supply and install the meter in the meter socket provided by the member.

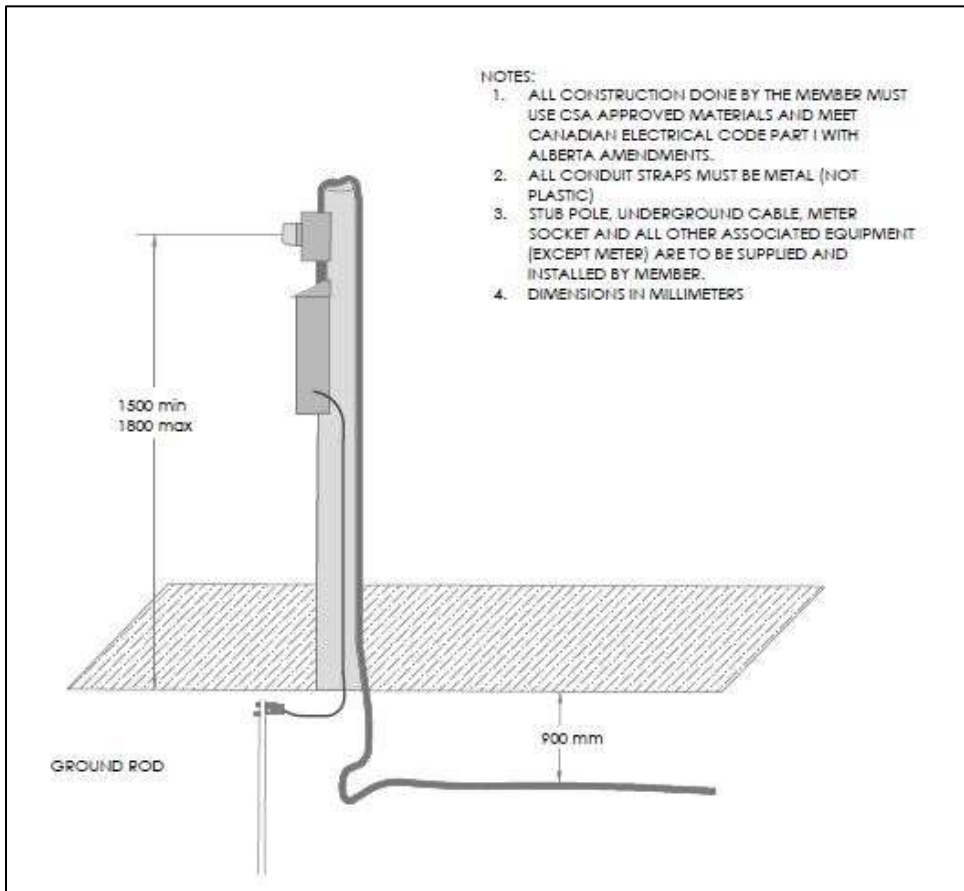


Figure 7.3.1: Underground Temporary Services

8.0 Primary Metered Services

8.1 General Information

8.1.1 Service Sizes

Primary metered services are typically large commercial or industrial services with a demand load of at least 2,000 kVA or greater.

Primary metered services are only available for connection to 3 phase - 25kV distribution areas.

8.1.2 Legislation and Codes

Nothing in these primary metering standards is intended to supersede relevant legislation and codes. In the event of any differences, legislation and codes (including the Canadian Electrical Code, the Alberta Electrical Utility Code, Alberta Safety Codes Act, and Alberta Occupational Health and Safety Act) shall take precedence.

8.2 Timelines

The minimum lead time for connection of a primary metered service is between 6 months and 1 year. Order timelines for some primary service equipment may be up to one year after service details are finalized, estimates are approved, and any required documents are completed. Members are advised to submit all applications and planning documents as soon as possible to ensure primary metered services can be connected at the desired time.

8.3 Standard Supply Voltages

Primary metered services shall only be connected where EQUUS' distribution system supports 3 phase - 25kV.

Contact EQUUS' Standards Department for more information on allowable service sizes and supply voltages.

8.4 Permit and Inspection Requirements

The Member or their contractor shall be responsible for:

- Obtaining all permits, licenses, certificates, inspections, reports, or other required authorizations in order to install and operate the service connection.

- Note: EQUS shall not connect or operate a primary metered service connection unless the member has received and submitted proof of all required permits and related documents.
- Submitting a copy of the electrical wiring permit, electrical inspection (if required) and final electrical inspection report to the EQUS Area Office.
- Ensuring that a Safety Codes Officer (accredited in the Electrical discipline) inspects all internal wiring before it is concealed, and all transformer and switching cubicles, ground grids, underground wiring and ducts are inspected before trenches are filled.
 - EQUS will not energize the service connection unless inspection approval has been received.
- Conducting all required utility searches and Alberta One-Call notifications before any ground disturbance occurs.

8.5 Drawings and Site Plans

The member must submit site plans and drawings for the proposed service installation to EQUS. EQUS reserves the right for final approval of the location of facilities prior to construction approval. EQUS will not begin construction of the new connection until all drawings and site plans have been received and approved.

Members requesting a primary metered service must submit (or have their contractor submit):

- A request for a non-standard service, specifying the request for a primary metered service (see Section 4: Non-Standard Services).
- An architectural site plan.
- An engineer approved electrical site plan.
 - The electrical site plan must be stamped by an engineer registered and in good standing with APEGA and/or ASET.
- Mechanical plans showing all water, sewer, and gas lines on the affected property.

Plans and drawings submitted must contain the following information:

- Title, block, border, scale, date, and legend.
- All legal property lines.
- The locations of all existing buildings, and the locations of any new buildings/structures planned for construction or existing buildings planned for alteration or redevelopment if the new or altered buildings could impact the electrical service.

- The location of all streets, avenues or other roads or public thoroughfares on or adjacent to the property.
- All easements and right-of-ways located on the member's property.
- A description and the location of all other utilities who shall cross or who are located within 3 meters of the proposed power facilities and conductors.
- The size and location of primary conductors on the source side of the meter.
- The size and location of pull boxes.
- The location of padmount transformers and cubicles, including the directions the doors open.
- The location and size of the main distribution panel inside the building. Include the voltage, amperage, phase, wire size, temperature rating (eg: 75 or 90 degrees), and type.
- A detailed drawing of the electrical room layout.
- Electrical permit number and legal address of the service.

All equipment and conductor locations on the drawing shall be scaled based on the building and property lines, and must have real-world (i.e. GPS) coordinates. Curb lines, if relevant, should also be included.

Drawings must be submitted in a scale and resolution that allows for the readability of multiple conductors. It is permissible to submit the drawings on multiple pages if required in order to maintain readability; in such cases each page must be self-contained (i.e drawings shall not break across pages) and each page shall contain the relevant title block, date, legend, etc, and engineer's stamp.

All plans and drawings must be submitted in electronic (.pdf) format, and follow industry accepted drafting standards.

8.6 Switchgear Drawings

The member or their designated contractor must submit switchgear site plans and drawings. The drawings must include:

- A site plan which includes the duct routing for the main feeder. The site plan shall include the location and angle of duct bends, the corner-to-corner distance between all bends, any changes in elevation, and detailed manhole drawings (if relevant) with drainage.
- Plans of the switchgear layout in the electrical room. The plans should include the duct and cable routing and cable termination cell, as well as provisions for pilot wire relaying, if required.
- Drawings of the proposed switchgear.

- Confirmation of the direct current (DC) power supply for EQUUS' pilot which relay (if applicable).
- The main breaker specifications and operating conditions.
- Single Line Diagrams (SLD), with control and protection schematics. The SLD should show the DC breaker control wiring, as well as the transfer scheme between the main feeder, standby feeders and pilot wire contacts where required. In addition, the SLD must show:
 - The interlock
 - All instrument and power transformers
 - All fuses and relays
 - Any standby generation
 - The mVA rating of the switchgear
 - Transformer sizes and types of winding
 - Other information, if relevant

EQUUS must approve the switchgear.

8.7 Clearances and Special Location Requirements

8.7.1 Clearances to Other Utilities

Services must maintain the following horizontal clearances to other utilities from underground service lines and equipment. This includes padmount transformers, switching cubicles, guardrails, and ground grids:

- 2.0 meters to all valves, hydrants, manholes, vaults, sanitary and storm sewer lines, septic tanks and fields, and catch basins. Primary cable must not cross through septic fields.
- 1.8 meters to all water lines and cc valves.
- 1.0 meters to all gas lines.

8.7.2 Service Location Restrictions

The installation of primary service cable under buildings shall not be permitted. Similarly, buildings shall not be constructed or moved over locations with primary service cable.

8.7.3 Special Land Requirements or Easements

Additional clearances and/or easements may apply depending on the member's land and service location. Examples of special land requirements may include (but are not limited to)

crown land, indigenous lands, green zone, and/or wildlife corridors. The member and their designated contractor are responsible for completing all required land surveys, consultations, and government approvals as required on the member's land.

8.8 Access to Equipment

EQUS requires access to equipment on the member's property for the purpose of initial construction and also ongoing maintenance. Both truck and personnel access to the member's property is required for maintenance purposes; road only access may not be sufficient.

Additional access requirements include:

- Access to transformers, switching cubicles, poles and pull boxes, where EQUS is installing the cable.
- Equipment shall be placed beside an access road 4.6 meters wide, with an area of 6.5 meters in diameter of unimpeded access space. The access road should be capable of supporting a service truck (approximately 18,000 kg) carrying a transformer (up to 6,900 kg).
 - Note: Overall road allowance must accommodate the extension of outriggers on a truck up to a width of 7.0 meters.
- Switching cubicles must be located such that they do not exceed maximum setbacks from driving surfaces. Maximum setbacks are 7.0 meters. Minimum setbacks are 3.0m.
- All overhangs or other obstacles/equipment above the access road (eg: signs) must have a minimum of 5.0 meters of vertical clearance to accommodate service truck access.
- Equipment should not be placed in a location that could create a line-of-sight concern for pedestrians or other traffic.
- If access to the member's property and/or service site is restricted by a gate or other locked enclosure, the member shall provide lock and key access to EQUS.
- EQUS reserves the right for final approval on the location of facilities prior to giving approval for construction.

8.9 Service Entry Points

Before beginning construction, the member must contact EQUS to determine the site-specific entry point (i.e. the point where EQUS' distribution equipment meets the member's property line) or service pole.

8.10 General Service Construction and Operation Requirements

EQUUS shall:

- Reserve the right for final approval of the install location of facilities prior to approving construction.
- Own the meter on the tank, the line into the tank, and all equipment upstream from it. The point of demarcation shall be the elbow, and all equipment downstream from it shall be owned by the member.

The Member shall:

- Provide access to EQUUS, including the space and easements required for utility equipment to access and maintain electrical distribution equipment.
- Be responsible for the installation and maintenance of all civil work on private property, as well as maintenance for the equipment. This includes:
 - Trenching
 - Ducting
 - Transformer and/or cubicle pads
 - Ground grids
 - Guardrails
 - Pull boxes
 - Secondary service poles
- Own all equipment downstream from the point of demarcation (the elbow).
- Ensure that loading is balanced across all three phases of the service.
- Ensure that loading is balanced across all main feeders (if there is more than one).
- Comply with the Institute of Electrical and Electronics Engineers (IEEE) standard 519-1992 with respect to loads producing harmonic distortion.
- Comply with CAN/CSA standard C61000-3-7 Electromagnetic Compatibility (Part 3-7) with respect to short and long-term flicker limits.

8.10.1 Maintenance and Work Authorizations

Only EQUUS or its authorized agents shall be allowed to

- Operate or maintain distribution equipment and electrical facilities owned by EQUUS.
- Complete connections or disconnections

8.11 Main Switch or Breaker Minimum Interrupting Capacity

The interrupting capacity of main switches and breakers shall be sized as follows:

- For a 3 phase - 25 kV system: 12,000 A (500 mVA)

The minimum interrupting capacity applies to all service entrance equipment.

8.12 Breaker Specifications for Main Service

A primary metered service has the following breaker requirements:

- A maximum total clearing time of five cycles on the breaker.
- A direct current (DC) supply from storage batteries, for tripping the 25kV circuit breakers on main incoming feeders coming from EQUUS' distribution system.
 - Note: Battery control power shall comply with Rule 14-308 of the Canadian Electrical Code, Part 1.
- Protection and alternating current (AC) tripping-current transformers shall be rated sufficiently to operate the relays, and must be designed to function properly under maximum fault conditions.

8.13 Meter Specifications

EQUUS utilizes AMI (Advanced Metering Infrastructure) meters. For primary metered services, the meter type used is a Form 9S meter (13-jaw 997-400 meter).

Figure 8.13.1 contains a detailed drawing of the meter tank and connections.

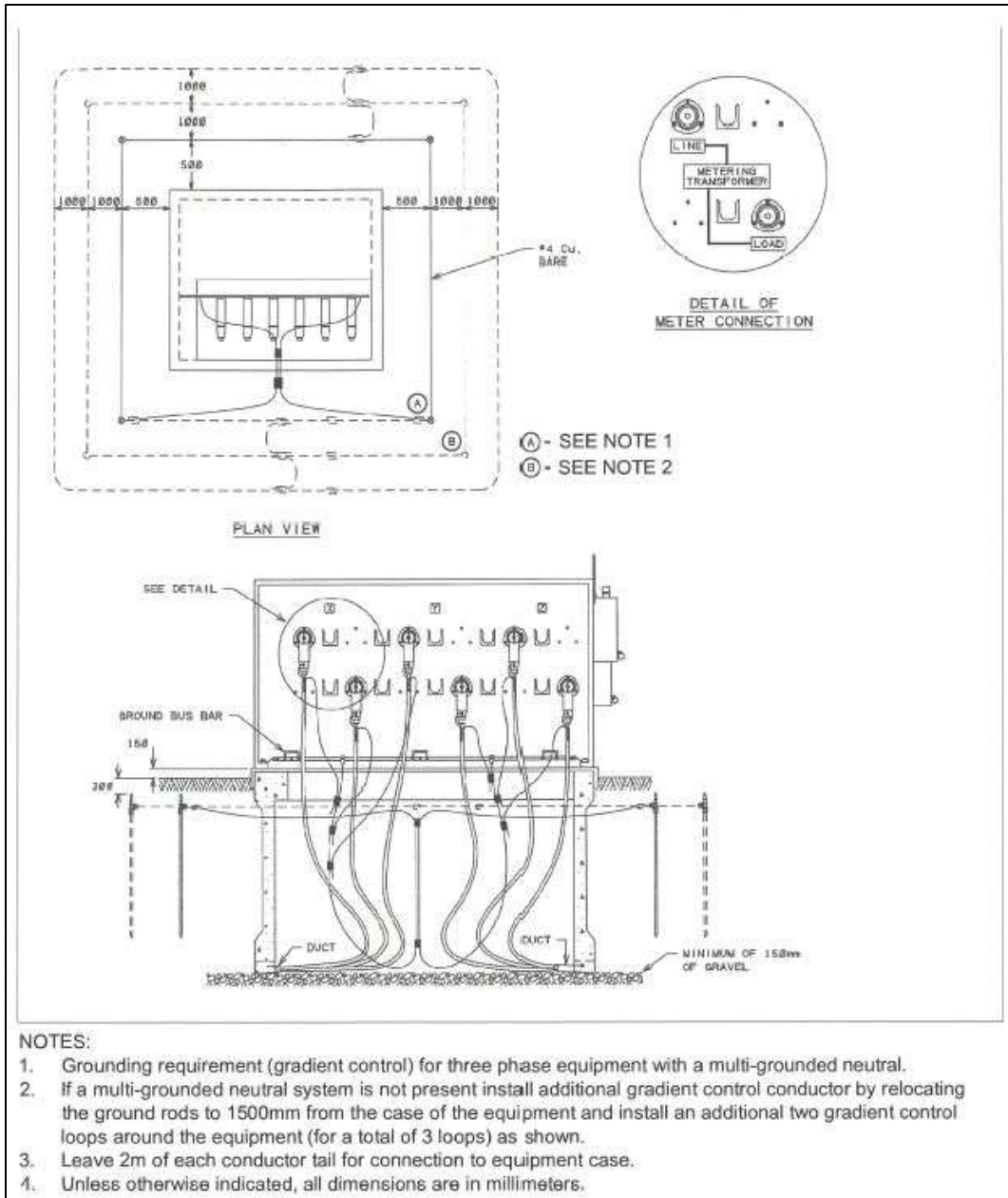


Figure 8.13.1: Three-Phase Primary Metering, Padmount

8.14 Switching Cubicles

EQUUS shall supply, install, and maintain any switching cubicles required upstream of the point of demarcation (the elbow and meter/line into the tank). All primary conductor terminations at the switching cubicle and main switchgear shall be completed by EQUUS.

Members shall be responsible for maintaining all transformer and switching cubicle bases on their property, including the level of the equipment.

8.14.1 Switching Cubicle Access and Location

Switching cubicles must:

- Be located so that they do not exceed maximum setbacks from the road (refer to section 8.8).
- Have a utility right-of-way (easement) registered if the switching cubicle is located on private property.
- Have a minimum of 3.0 meters of unobstructed working space to allow for safe high-voltage switching.
 - Obstructions could include rocks, trees, fences, decorations, concrete parking blocks or other barriers.
 - Note: both sets of doors on the switching cubicle must be unobstructed.
- Have any curbs located within 3.0 meters of the cubicle doors reviewed and approved by EQUUS prior to construction to ensure there is no obstruction.
- Not be at risk from flooding (including seasonal and/or runoff conditions).

8.14.2 Switching Cubicle Construction Requirements:

- Switching cubicles must be connected to EQUUS' main line in such a way that it provides a loop feed. Radial-fed switching cubicles are not acceptable.
- The member must provide precast concrete bases, an appropriate ground grid, and guardrails for transformers and switching cubicles.
 - Note: concrete bases, ground grids and guardrails must meet EQUUS approved specifications.
 - EQUUS must approve drawings showing how the cubicle base shall be constructed prior to construction.
 - If a precast base cannot be used due to ground conditions or other restrictions, the member must submit engineered drawings, stamped by a civil engineer, showing the plan for poured pilings or other method. These drawings must be approved by EQUUS prior to construction.
- Fault indicator lights beside the "B" compartment of a switching cubicle must be facing the main road. Any exceptions must be approved by EQUUS in advance of construction.
- To prevent deformation of the ground grid or rods breaking during backfill, it is recommended that the excavation for bases is stepped, so native backfill is not disturbed under the ground grid.
- The bottom of the excavation where the base is to be installed should have approximately 300mm of compacted ¾ inch road crush. Road crush should be tamped in 1 ft. lifts.

- The member must supply compaction test reports for all pad installations. Piles may be required if adequate compaction cannot be reached.
- EQUUS reserves the right to request additional compaction tests in order to ensure adequate compaction, in the case of concerns.
- All switching cubicles and single phase transformer bases must have 2x10 pressure-treated lumber under the base.
- The top of the concrete base must be between 250mm and 300mm above grade when finished.
- Landscaping must slope away from the base of pad mounted equipment at a 3-10% grade to allow for proper drainage and safe switching. The slope must begin within 3.0 meters of the equipment.
- If a new switching cubicle base is installed on private property, the member must install a pull-string between the cubicle and the member's switchgear.

8.15 Coordination Studies

The member and/or their designated contractor must submit a coordination study to EQUUS for approval. The study must be certified by an engineer who is registered and in good standing with either APEGA and/or ASET, and must contain:

- The relay time/current characteristics from the member's incoming feeder, and at least one level downstream from the feeder.
- EQUUS' relay time/current characteristics.
 - Note: The member must contact EQUUS' Standards and Engineering Department for a copy of EQUUS' protection information.
- The types of relays, including proposed settings, and the size and type of fuses.
 - Note: Fuses shall be ANSI type.
- The size and characteristics of any other protective devices.
- A single-line diagram showing all protective elements in the coordination study.
- Drawings for both the phase current and the residual current, plotted on a graph.

8.16 Protection and Control Requirements (Overcurrent Protection)

The member or their designated contractor must ensure that the following protection requirements are met:

- The electrical systems on the member's side of the service (i.e. point of demarcation) must have overcurrent protection.

- Refer to the Canadian Electrical Code, Part 1.
- Relay curves must not exceed the equivalent of an EEI-NEMA #100 k fuse (for 3 phase - 25 kV systems) in order to coordinate with EQUUS' system relays.
- There must be a protection Coordinating Time Interval (CTI) of 0.3 seconds for relays, and 0.2 seconds for fuses.
- The main breaker must have phase and residual overcurrent relays with instantaneous and inverse time characteristics.

If the member or their designated contractor is not sure if the above protection requirements can be met, it is the member's responsibility to contact EQUUS Standards and Engineering to determine potential acceptable alternatives.

8.17 Service Interruptions

EQUUS makes all reasonable efforts to prevent service interruptions; however EQUUS does not guarantee uninterrupted service. EQUUS reserves the right to disconnect or otherwise limit or interrupt electrical distribution service to members, in the event EQUUS reasonably determines or is told by the AESO (Alberta Electric System Operation) that such a disconnection or limitation is necessary. Disconnections or service limitations could occur as a result of (though are not limited to):

- Required construction, inspection, or other maintenance of EQUUS' distribution facilities.
- Limitations necessary to maintain the safety and reliability of EQUUS' distribution system.
- Emergency or hazardous situations

For more information, please consult the EQUUS terms and conditions of service.

8.18 Overhead Services

Primary metered services are most commonly connected via a padmount transformer service; however, an overhead service connection may be acceptable for primary metering in some circumstances. Members who are considering a primary metered overhead service should contact EQUUS' Standards and Engineering Department directly to discuss design and approval requirements.

- Email: sdept@equs.ca

8.19 Commissioning

Before the member's electrical service can be energized, the member must submit the following documents to EQUUS. The documents must be signed and sealed by a professional engineer registered and in good standing with APEGA and/or ASET.

- As-built drawings.
- Documented test reports of the member's protection equipment, including verification of the main breakers' transfer characteristics and verification that the key-interlock system is safe and functional.
- Documented reports from field calibration tests of the overcurrent relays. Reports must verify the response time for 1.5, 6, and 20 times the tap setting.
- Documented field saturation checks for the current transformers, including measurement of the direct current (DC) resistance burden on each current transformer.
- Documented confirmation that trip checks have been performed for protection schemes to circuit breakers (before energization).
- Documented confirmation of the direct current (DC) power supply for pilot wire relays.
- Confirmation that load and vector checks are scheduled and will be performed at the relay terminals upon energization of the electrical service.
- Confirmation that the main service equipment is ready and safe for operation.

Note: EQUS reserves the right to witness checking and testing at its discretion, and meet with the member's operator to confirm the rules for operating the main incoming feeder.

9.0 Standby Generators and Transfer Switches

9.1 Services with Standby Generators

In addition to the standard requirements for each type of service, a Member who chooses to install a standby generator shall be responsible to adhere to the following requirements. These requirements are applicable to new services with standby generators.

The Member shall ensure:

- Maintenance and repair of the switching equipment is completed as required.
- The size and type of switch must be suitable for the installation.
- The supply circuit from the standby plant to the transfer switch shall not be run overhead to the pole where the switch is mounted. The supply circuit must be either an underground circuit or a plug-in type connection.
- Secondary cables on the load side of the generator shall not be attached to the transformer pole.
- Secondary connection boxes shall not be attached to the transformer pole.
- Supply and install the standby service structure (i.e. pole stub, or building) which is used to support the double throw transfer switch.
- The standby service structure and the generator shall not be installed within a 5 m radius of the transformer pole, and the distribution point shall not be located on the EQUUS-owned service structure.
- If the transfer switch has two molded case breakers, they must be secured together (inter-locked) in such way as to prevent both breakers from being closed at the same time.
- Supply and install the weatherproof double throw transfer switch.
- Ensure the double throw transfer switch is attached to the standby service structure.
- Source circuits from EQUUS' and the Member's standby shall not be installed in the same conduit.
- The enclosure must be sealable.
- Receive a completed electrical permit or a signed Connection Authorization Form for the installation. The authorization form must be completed and submitted to EQUUS before EQUUS will complete the connection.
- Notify EQUUS to request the connection.

EQUUS shall:

- Verify all of the connections in the double throw transfer switch.
- Install warning stickers on the transfer switch and warning labels indicating that a standby plant exists on the meter box.

9.2 Overhead Standby Generator Service Supplied by an Overhead Transformer

The Member shall:

- Supply the required length of overhead service wire from the standby generator service up to the transformer's secondary bushing.
- Connect the overhead service wire at the standby service structure.

EQUUS shall:

- Connect the overhead service wire at the transformer pole.

9.3 Underground Standby Generator Service Supplied by an Overhead Transformer

The Member shall:

- Supply and install sufficient underground cable from the transformer pole to the standby service structure.
- Supply and install the required length of conduit up the pole to the meter box.
- Connect the underground cable at the meter box.

EQUUS shall:

- Supply and install the meter and the meter box.
- Connect the meter box to the transformer.

9.4 Underground Standby Generator Service Supplied by a Pad-Mount Transformer

The Member shall:

- Supply and install the required length of underground cable from the metering pedestal to the double throw transfer switch.

- Connect the underground secondary cable at the double throw transfer switch.
- Install the underground secondary cable into the metering pedestal.

EQUUS shall:

- Supply and install the meter and the metering pedestal.
- Inspect the installation of the underground secondary cable into the secondary compartment.

10.0 Micro-Generation

10.1 Micro-Generation Definitions

Micro-generation is defined (in the Alberta micro-generation regulation) as a generating unit that:

- Exclusively uses sources of renewable or alternative energy,
- Is intended to meet all or a portion of the Member's total energy consumption at the Member's site or aggregated sites,
- Has a total nameplate capacity that does not exceed the lesser of 5 MW or the rating of the Member's service,
- Supplies electric energy only to a site that is located on property that the Member owns or leases, and
- Is located:
 - on the property referred to in the preceding bullet (that which the Member owns or leases), or
 - on a property that the Member owns or leases that is adjacent to the property referred to in the preceding bullet (that which the Member owns or leases)

Micro-generation units must also use electricity generated by a renewable or alternative energy from either:

- Products having current Eco Logo certification, or
- Solar, wind, hydro, fuel cell, geothermal, biomass or
- Other generation sources, if the greenhouse gas intensity is less than or equal to 418 kg per MWh of:
 - The electric energy produced, or
 - The total energy produced from the simultaneous generation of electric energy and production of thermal energy from the same fuel source

10.2 General Requirements for Micro-Generation Services

Before a micro-generation service can be connected to the grid, the following documents must be completed by the Member and received by EQUUS:

- Standard application for micro-generation (provided by EQUUS)

- Certificate of compliance for the inverter
 - The generator unit must satisfy the CSA standard for safety reasons
 - The manufacturer or installer typically provides the certificate of compliance
- Copy of the electrical permit and a signed electric single line diagram by the inspector (for services up to 50 KW)
 - For services bigger than 50 KW, the SLD must be signed and stamped by an Engineer (member/installer's engineer)
- Signed operating agreement between EQUUS and the Member
- An electrical permit, and any municipal approvals (this is the responsibility of the Member to obtain)

10.3 Small Micro-Generation

Small micro-generation services are defined as those which have a generating unit with a total nameplate capacity of less than 150 kW.

The Member shall:

- Submit all required documentation to EQUUS and ensure the micro-generation service meets the requirements described in section 4.1 and 4.2
- Contact EQUUS to ensure the service connection details follow the Alberta Utilities Commission guidelines along with EQUUS requirements.

EQUUS shall:

- Supply and install the bi-directional meter(s).

10.4 Large Micro-Generation

Large micro-generation services are defined as those which have a generating unit with a total nameplate capacity of at least 150 kW but not exceeding 5 MW.

The Member shall:

- Submit all required documentation to EQUUS and ensure the micro-generation service meets the requirements described in section 4.1 and 4.2
- Contact EQUUS to ensure the service connection details follow the Alberta Utilities Commission guidelines along with EQUUS requirements.

EQUUS shall:

- Supply and install the bi-directional meter(s).

Glossary of Terms

CEC: Canadian Electrical Code, Part One (CSA Standard No. C22.1 - Latest Edition).

CSA: Canadian Standards Association.

CT Cabinet: An enclosure, supplied and installed by the Member, used to house EQUUS current transformers.

Commercial Service: Commercial and Industrial services that are three-phase services, and which may use 120/208, 277/480, or 347/600 volt self-contained metering.

Distribution Connection Point: An electrical line, at secondary or primary voltage (120 V up to 25 kV) which is used to serve multiple Members.

Farm Service: A service, generally single-phase 120/240 volt self-contained, which supplies farming operations in rural areas. The service may contain a residence and includes agricultural activities which are conducted with the intent of deriving revenue.

Industrial Service: A service, generally three-phase, up to 200 amps self-contained metering, or with greater than 200 amps instrument metering.

Inspection Authority: A local municipality, or the province, or an accredited agency which is authorized to sign-off electrical permits.

Installed Capacity: The rated capacity in kilo-volt-amperes (kVA) of the EQUUS transformer that supplies the service.

Instrument Transformers: High accuracy current or voltage transformers that have been approved by Measurement Canada for revenue metering.

Instrument Transformer Enclosure: The enclosure, supplied and installed by the Member, used to house instrument transformers.

Light Commercial: A service, generally single-phase 120/240 or 240/480 volt self-contained, which supplies typical businesses. This includes multi-family services with a commercial meter.

Light Industrial: A service, generally single phase 120/240 or 240/280 volt self-contained up to 200 amps, or single-phase instrument metering over 200 amps.

Lot-Line Metering: Metering that is located close to the front property line and is on a self-supporting structure.

Meter Box: A meter mounting device that includes a meter socket and secondary breaker, and which is attached to a pole or stub.

Meter, Instrument Type: A 20-amp meter used in conjunction with instrument transformers (i.e.: CT's).

Meter, Network: A two-element meter that is designed for use on a three-wire network service obtained from two-phase wires and a neutral of a three-phase, four-wire, wye system.

Meter Pedestal: A meter mounting device that includes a meter socket; in some cases it will also include a breaker that is self-supporting.

Meter, Self-Contained: A meter rated to carry the total current and full voltage of the circuit that is to be metered.

Meter Socket: A meter mounting device used to install an EQUUS 200-amp self-contained meter or 20-amp instrument meter.

Multiple Meter Installation: Any installation in which a building has multiple meters fed from a single service entrance. For example: apartment buildings, office buildings, light industrial complexes, or warehouses.

Oilfield Service: A service, generally three-phase, with self-contained metering up to 200 amps or instrument metering greater than 200 amps.

Pad-Mount Metering: A metering configuration designed to be mounted onto the side of the secondary compartment of an underground transformer that sits on a precast pad or vault.

Point of Service Termination (Electrical Connection Point): The electrical connection point at which EQUUS service conductors are connected to the conductors or apparatus of a Member.

Residential Service: A service, generally single-phase 120/240 volt self-contained, for individual houses, apartment buildings or condominium complexes.

Service Connection Point (Service Entry Point): The point at which the Member's facilities physically connect to the EQUUS distribution system to permit the Member to obtain electricity. For an underground service, this could also be described as the specific point that EQUUS' civil work ends and the Member's begins.

Service Disconnect and Main: An approved metal box or cabinet containing either service fuses and a service switch, or a circuit breaker; the design is such that either the service switch or circuit breaker may be manually operated when the box is closed.

Service Entrance: The portion of the Member's installation from the pedestal (or its equivalent) up to and including the point that the supply authority makes its connection.

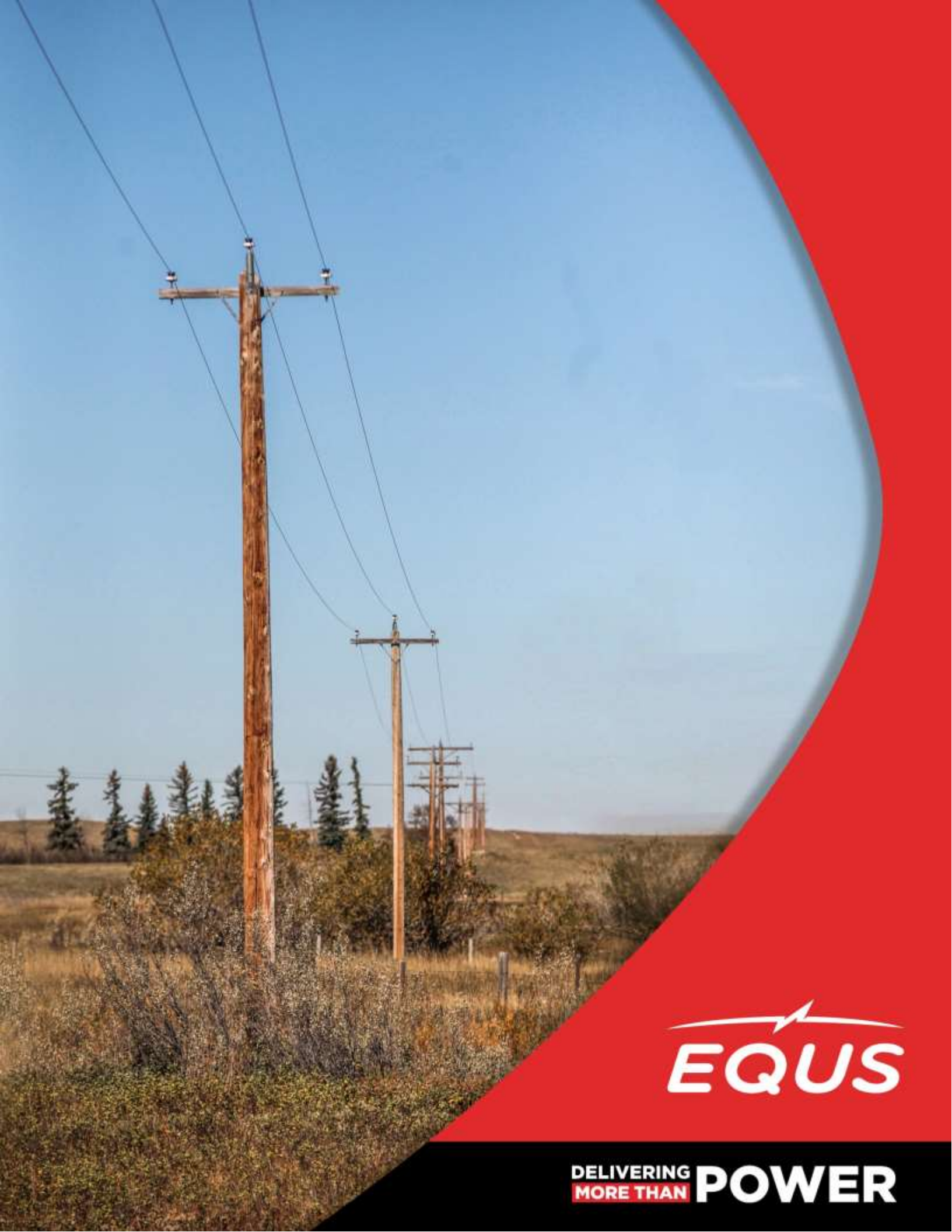
Service, Temporary: A service intended to operate for a limited period of time (generally less than one year). For example: construction sites.

Service, Three-Phase/Four-Wire: All services that are supplied by three-phase conductors and a grounded neutral conductor to the service entrance and on to the meter.

Contact EQUUS

If you have further questions regarding EQUUS' metering standards or other construction requirements, please contact the EQUUS Area Office closest to you for more information.

- North Area Office (Onoway):
 - Phone: 1.888.627.4011
 - Email: Onoway_Area@equs.ca
- Central Area Office (Innisfail):
 - Phone: 1.877.527.4011
 - Email: Innisfail_Area@equs.ca
- South Area Office (Claresholm and Medicine Hat):
 - Phone: 1.888.565.5445
 - Email: Claresholm_Area@equs.ca



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