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# Customer Metering and Services Guide

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**About this Guide**

The intent of this guide is to provide direction for customers, consultants and electrical contractors either requiring or installing an electrical service that will be energized by ATCO. This guide provides specifications for metering configurations for most services under 750 volts.

The metering and service specifications outlined in this publication must also comply with all applicable requirements of Part I of the current Canadian Electrical Code, the Alberta Safety Codes Act and ATCO's "[Customer Terms and Conditions for Electric Distribution Service](#)". All metering and service installations must meet these requirements. Where the design, application, location, or construction of the installation does not conform to these requirements or violates any other related Act or Code regulations, ATCO will not install metering or energize the service.

Additional copies of this publication are available on the ATCO website at [atco.com](http://atco.com).

**Installations *NOT* covered by this Guide**

Special arrangements can be made for installing service connections not specified in this guide, with approval prior to installation. Consult the local ATCO Electricity Transmission & Distribution customer service representative for more information.

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## GLOSSARY

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**Aggregated sites** – Two or more sites that are (i) located on property that is owned or leased by the same customer, (ii) connected to a single electric distribution system feeder owned by one electric distribution system owner, and (iii) enrolled with the same retailer.

**CEC** – Canadian Electrical Code, Part I and Amendments

**CSA** – Canadian Standards Association

**CT** – Current transformer

**Demand** – The average value of power over a specified interval of time. The most common quantities are kilowatt (kW) and kilovolt-ampere (kVA) demands.

**Energy** – The integral of active power with respect to time, for example, kilowatt-hour (kWh).

**Ground** – The conductor that only carries current under a fault condition, not to be used as neutral.

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

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

**Interval Data Metering** – Revenue meters that have mass memory data storage capability.

**Measurement Canada** – The federal agency that is responsible for ensuring that businesses and consumers receive fair and accurate measure in financial transactions involving goods and services. The agency develops and administers the laws and requirements governing measurement; evaluates, approves and certifies measuring devices; and investigates complaints of suspected inaccurate measurement.

**Meter Base** – Typically a socket style device for the connection to a self-contained meter.

**Metering Services Provider** – Owns and maintains the revenue meters on the distribution system.

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

**Multiple Customer Metering** – Multiple residential metering where the building does not use standard individual meters for each suite. The metering uses “mini” CTs on each branch circuit.

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

**Network** – Two-phase wires and the neutral from a three-phase, 4-wire wye system that forms a 3-wire service for residential type loads.

**Neutral** – The conductor from the transformer star point that carries the unbalanced load current and provides a reference point for the metering potentials, the “grounded” conductor.

**Non-Farm** – A service where the customer is not engaged in a farming application.

**Non-REA** – A service where the customer does not belong to a Rural Electrification Association.

**Point of Service** – The point at which the Company's service conductors are connected to the conductors or apparatus of a customer.

**R.E.A.L** – Rural Electrification Association Limited (REA)

**Retailer** – Markets electrical energy or electrical services to consumers.

**Rural Service** – A service in a rural area where the customer does not farm or belong to an REA.

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

**VT** – Voltage transformer

**The Company** – ATCO

**Wire Service Provider** – Owns and operates the electric distribution system.

## **1 GENERAL INFORMATION**

### **1.1 TYPES OF METERING**

The type of metering specified by the Company shall depend on the class of service, size of load to be served and the applicable rate, for example, energy, kW or kVA demand. The Company shall install, maintain, and own all meters, except for meters on R.E.A.L. member services, where they are owned by the R.E.A.L.

All meters will be sealed, maintained, and tested according to Measurement Canada standards.

#### **1.1.1 SELF-CONTAINED METERING**

Self-contained metering is used for metering loads where the main breaker does not exceed 200 amperes and the phase-to-phase voltage is not greater than 480 volts for single-phase services or 600 volts for three-phase services.

#### **1.1.2 INSTRUMENT METERING**

Instrument metering is used for metering loads where the main breaker is greater than 200 amperes and/or when the phase-to-phase voltage is over 480 volts for single-phase services or 600 volts for three-phase services. On loads over 500 kW, interval data meters are required.

#### **1.1.3 OPTIONAL CUSTOMER PULSE**

Upon request, pulse output meters or devices, such as transducers and pulse duplicating relays, may be installed in the customer metering circuits. The customer shall discuss data acquisition needs with the Company early in the project planning stages. The Company installs the optional pulse devices, and the customer will be billed for costs above the Company's standard installations.

#### **1.1.4 CUSTOMER CHOICE METERING**

Upon request, an interval data meter may be installed on a customer load that is less than 500 kW. The customer shall request the interval meter be installed and will be billed for the additional costs above the Company's standard installation and for a monthly fee amount specified in the Company's "[Customer Terms and Conditions for Electric Distribution Service](#)" to collect the interval data.

### **1.1.5 ENERGY AND DEMAND METERS**

Where a service is billed under a distribution rate with measured demand charge, a demand meter is required. Residential and farm breaker services require energy only meters.

### **1.1.6 BACKUP METERS**

Backup metering may be installed, at ATCO's discretion and at the Customer's expense, to provide interval billing data in the event of the failure of the primary meter.

- Backup metering shall be installed on all new pulse metered accounts over 5 MW contract demand.
- Existing accounts greater than 5 MW billing demand may have backup metering installed upon the recommendation of engineering and with the approval of metering services.
- Backup metering shall be of the same accuracy class and capability as the primary metering and shall include all equipment to provide the necessary billing data.

## **1.2 STANDARD THREE-PHASE METERING CONFIGURATION**

All new three-phase services are to be 4-wire wye (Star) systems, metered three-element, with the neutral (grounded conductor) forming part of the metering circuit. The neutral conductor must be connected between the transformer or point of supply and the metering point of all three-phase, 4-wire wye systems. The neutral must be grounded at the main service disconnect. The use of an isolated neutral block is necessary when the metering point is on the load side of the main service disconnect.

## **1.3 PRIMARY METERING**

Primary metering is available for multi-voltages or services normally over 1000 kVA. If primary metering is desirable, the customer is not responsible for metering. The Company will supply and install all the metering materials.

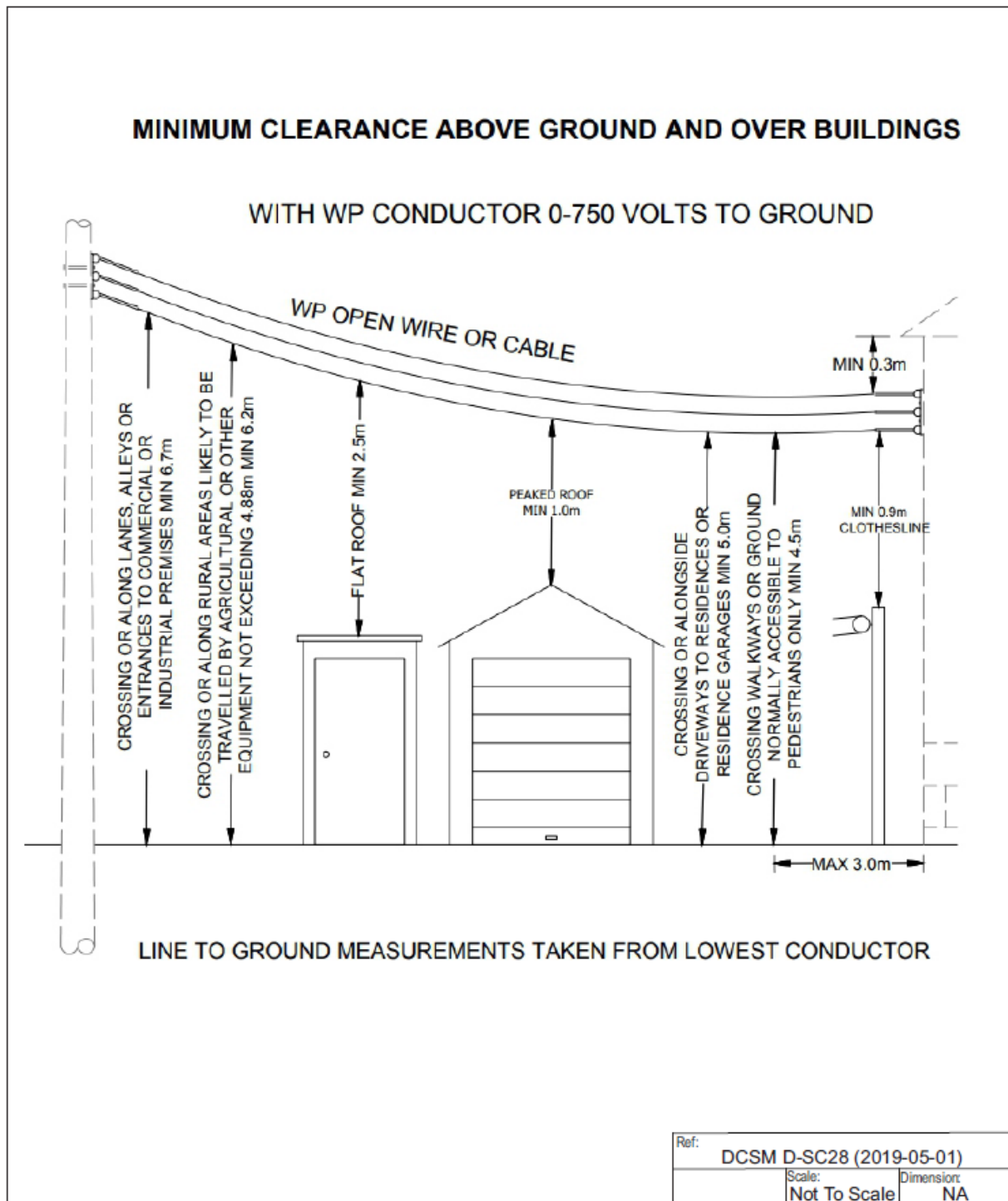
## **1.4 PADMOUNT METERING**

Padmount metering is available for services greater than 200 amperes and the padmount transformer serves only a single customer. If padmount metering is desirable, the customer is not responsible for metering. The Company will supply and install all the metering materials.

**1.5 CLEARANCES FOR CUSTOMER OWNED OVERHEAD CONDUCTORS**

When the customer supplies and installs secondary overhead conductors, the conductor clearance shall satisfy Alberta Electrical STANDATA CEC-12 Rule 12-310 and CEC 6-112. Farms are interpreted as commercial/industrial premises.

Drawing 1-1 Minimum Clearance for Customer Owned Overhead Conductors



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**1.6 STANDARD SUPPLY VOLTAGES**

The following tables show the Company's standard overhead and underground voltage, phase and load configurations. Not all standard voltages are available at all service locations.

Table 1-1 Standard Overhead Supply Voltages

Service Voltage	Phase/Wire	Transformer Load Range (kVA)	Full Load Range Line Amperes (A)	
120/240	single-phase, 3-wire	10 to 167 (may be larger for special loads)	@ 120 V 83 to 1391	@ 240 V 41 to 696
120/208Y	three-phase, 4-wire	30 to 225	83 to 625	
277/480Y	three-phase, 4-wire	30 to 3000	36 to 3608	
347/600Y	three-phase, 4-wire	75 to 5000	72 to 4811	

Table 1-2 Standard Underground Supply Voltages

Service Voltage	Phase/Wire	Transformer Load Range (kVA)	Full Load Range Line Amperes (A)	
120/240	single-phase, 3-wire	25 to 167	@ 120 V 208 to 1391	@ 240 V 104 to 696
120/208Y	three-phase, 4-wire	75 to 750	208 to 2082	
277/480Y	three-phase, 4-wire	75 to 2500	90 to 3007	
347/600Y	three-phase, 4-wire	150 to 2500	144 to 2406	

## 1.7 NON-STANDARD VOLTAGES

Non-standard service may be provided at any required voltage under mutually, satisfactory agreed terms. Requests for non-standard voltage supply must be approved by the Company.

## 1.8 VOLTAGE OPERATING CONDITIONS

All services are alternating current 60 hertz. The normal system voltage and voltage limits at the service entrance are as specified in the CSA CAN3-C235-83 - Preferred Voltage Levels for AC Systems, 0 to 50,000 volts. The Company maintains the steady state voltage within the following limits as stipulated in CSA CAN3 C235.

Table 1-3 Voltages Recommended by CSA CAN3 C235

Type	Low <i>SUPE</i> <sub>99</sub> 99.9%	<i>SUPE</i> <sub>95</sub> 95%	Declared V <sub>d</sub>	<i>SOPE</i> <sub>95</sub> 95%	<i>SOPE</i> <sub>99</sub> 99.9%
single-phase	106	110	120	125	127
	212	220	240	250	254
	424	440	480	500	508
	530	550	600	625	635
three-phase, 4-wire	110/190	112/194	120/208	125/216	127/220
	220/380	224/194	240/416	250/432	254/440
	245/424	254/440	277/480	288/500	293/508
	306/530	318/550	347/600	360/625	367/635
three-phase, 3-wire	212	220	240	250	254
	424	440	480	500	508
	530	550	600	625	635
% 10 minutes	-11.7	-8.3	--	+4.2	+5.5

SUPE – Steady state Under Potential

SOPE – Steady state Over Potential

[Table 1-3](#) states that 99.9% of the time the utility will not drop below *SUPE*<sub>99</sub> and that 95% of the time, the utility will not drop below *SUPE*<sub>95</sub>. According to IEEE standard 1159, long duration voltage variations are greater than 1 minute; thus, the indicators above will capture these variations.



For additional details, refer to ATCO's "System Standard for the Installation of New Loads."

## **1.9 OWNERSHIP OF FACILITIES**

The Company or the R.E.A.L retains full title on all equipment, lines and apparatus which it provides in extending service and metering the electricity supply. Instrument transformers provided by the Company and installed by the customer remain the property of the Company.

## **1.10 "TERMS & CONDITIONS" AND PRICE SCHEDULES**

Information on ATCO's "Terms & Conditions" and Price Schedules are available at any ATCO Electricity office or at [atco.com](http://atco.com).

## **2 APPLICATION FOR SERVICE AND GENERAL REQUIREMENTS**

The customer should apply for service early in the planning stage of the project in order for the Company to meet the customer's needs, to determine the best service arrangement and to provide the time to obtain necessary equipment.

Contact the local customer service representative, call at 1-800-668-2248 or see application requirements on [atco.com](http://atco.com)

The customer shall provide the Company with the necessary information regarding the type of service, connected loads, timing, service voltage, proof of land ownership, legal land description and a detailed site plan. A service agreement may be required with the Company's "Terms & Conditions" and the price schedule applicable to the service. A customer contribution may be required.

### **2.1 SERVICE VOLTAGE AND LOCATION**

The service voltage is the voltage and phase(s) requested by the customer. Each service will be at one of the standard voltages listed in section [1.6 Standard Supply Voltages](#) and will be metered appropriately. Requests for non-standard voltage supply must be approved by the Company. The service location on the customer's premises is subject to approval of the Company.

### **2.2 SERVICE ENTRANCE DRAWING REQUIREMENT**

To ensure the customer does not experience any delays on a service entrance over 200 amperes, three sets of drawings of the service entrance, service location and service, and metering layout shall be submitted to a Company customer service or marketing representative. The drawings shall be stamped final and initialed by the issuing consultant or electrical contractor.

### **2.3 ACCESS**

The Company has the right and will endeavor to make reasonable arrangements to enter the customer's property or premises to install, inspect, read, change, maintain and remove its facilities.

For Company facilities located within locked customer premises, the customer shall provide a means of access.

In subdivisions, the developer shall provide easement at no cost to the Company where required for access and for providing service extensions to each parcel of property.

## 2.4 WORKING SPACE

### **Working Space**

Working space around metering equipment shall comply with CEC Rule 2-308 and 2-312.

The customer shall:

- Provide and maintain a minimum working space of 1 m in front the meter, 1 m wide or panel width whichever is greater and 2.2 m headroom with secure footing.
- Keep passageways and working space clear of obstructions and be sure not to use passageways and working space around metering equipment for storage.
- Ensure the room is permanently and visibly identified.

### **Entrance to, or Exit from, Working Space**

Entrance to, and exit from, working space around metering equipment shall comply with CEC Rule 2-310. The customer shall:

- Provide at least one entrance of sufficient area and clearance to give access to the working space about metering equipment.
- Provide unobstructed means of egress in compliance with the National Building Code of Canada.
- Ensure doors or gates are capable of being readily opened from the equipment side without the use of a key or tool.
- Provide two points of exit or a minimum of 1.5 m of unobstructed working space for service up to 1200 amps or more or rated over 750 volts. The exits shall be arranged in such a manner that a worker would not have to pass by the fault location on the way to exit from the room.

## 2.5 METER LOCATIONS

All metering and service locations shall be approved by the Company prior to installation.

### **Meters and metering equipment shall be:**

- Located in a safe location.
- Located 1.3 to 1.8 meters above finished grade or permanent platform with regards to the meter socket centerline.
- Located at a minimum distance in accordance with the requirements of CSA B149.1-10 from any combustible gas relief device or vent. The minimum distance specified in CSA B149.1-10 is 1 m from natural gas and 3 m from propane gas.
- Readily accessible by the Company personnel to perform meter changes, testing and meter reads.

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- Weatherproof construction or in weatherproof enclosures if mounted outdoors.

**Meters and metering equipment shall not be located in unsafe or unsuitable locations such as:**

- Alleyways or areas where the meters are unprotected from moving equipment, in the path of water from eaves or rain spout or where the meters may be subject to steam or corrosive hazardous vapors;
- Biologically hazardous areas, poultry/pork or any other livestock facilities where the spread of disease or virus is possible including directly under any vents or fans that move air to or from the building;
- Known H<sub>2</sub>S environments;
- Areas where the ambient temperature is high or where there is too much moisture;
- Areas below the flood elevation;
- Open pits;
- Areas near moving machinery;
- Hatchways, closets or stairways;
- Coal bins, rooms or cellars;
- Explosive areas; or
- Areas where there are noticeable vibrations.

## **2.6 SPLITTER BOX LOCATION**

A splitter box must not be installed ahead of the meter or service disconnect.

The instrument transformer enclosure **cannot** be used as a splitter box.

## **2.7 WIRING PERMIT**

A copy of a signed electrical wiring permit shall be presented to the Company before the electrical service is connected on a new, altered or relocated service.

## **2.8 RETAILER**

The customer shall have the site enrolled with a retailer before the service can be energized. A retailer or any other person acting as an agent of a customer may apply for a service connection on behalf of the customer. The retailer or agent must provide the Company, in a form acceptable to the Company, verifiable authorization from the customer to make the application.

## **2.9 RELOCATIONS**

Where a building extension encloses or interferes with existing metering, the Company will relocate the service at the customer's expense.

The Company will, at the request of a customer, relocate the facilities installed to service the customer, provided the customer pays all costs of such relocation. There will be no charge to relocate only the meter and overhead service conductors.

## **2.10 MODIFICATIONS**

Customers shall obtain written approval from the Company before modifying an existing service which may affect the metering. The customer may be charged for costs associated with any change required to the Company's facilities due to the service modification.

## **2.11 CUSTOMER GROUNDING RESISTOR**

For a grounding resistor wiring diagram, refer to [Drawing 11-5 Wiring Diagram for Grounding Resistors](#).

## **2.12 LOAD CHANGES**

The customer shall advise the Company in writing of any changes to the load requirements so that the Company can determine if service changes are required to accommodate the increased load. The customer shall provide sufficient time for the Company to obtain equipment and make the necessary changes. If the customer has not obtained permission from the Company, the customer can be held responsible for any damage to the Company's property or equipment resulting from a major change in the load.

## **2.13 HARMONIC LOADING ADDITIONS**

The customer shall notify the Company when harmonic-generating loads such as Variable Frequency Drive (VFD) motors are added to an existing utility transformer. Harmonic emission limits to the distribution system are presented in the “System Standard for the Installation of New Loads,” found on the ATCO website ([atco.com](http://atco.com)) under “Services” and “Industrial and Oilfield Customers.”

Depending on the new harmonic levels, the utility transformer may need to be replaced with a larger transformer to cope with the additional harmonic emissions. As explained in IEEE C57.110-2008, under harmonic conditions, transformers will experience additional heating and stress, and de-rating may be required. The customer shall be responsible for any incremental costs associated with the transformer change.

**2.14 HARMONIC DISTORTION**

All customers with loads producing harmonic distortion shall comply with the “System Standard for the Installation of New Loads,” found on the ATCO website ([atco.com](http://atco.com)), under “Services” and “Industrial and Oilfield Customers.” This document is largely based on both the IEEE 519–2014 "IEEE Recommended Practices and Requirements for Harmonic Control in Electric Power Systems" and CSA 61000-3-6 with some ATCO adaptations from both standards. ATCO’s standard outlines the procedures, information and technical requirements to be observed from the initial design stages to the energization of the harmonic producing load installation.

**2.15 THREE-PHASE LOADS**

The customer is responsible for single-phase protection on three-phase loads.

**2.16 ELECTRONIC LOADS**

The customer is responsible for protecting all sensitive electronic loads against transients caused by such events as lightning or utility switching.

**2.17 NON-STANDARD SERVICES**

Service and metering requirements not covered in the guide are to be discussed with the local Company representative. The customer shall submit three sets of drawings of the service entrance, service location and service and metering layout to a Company customer service representative. The drawings shall be stamped final and initialed by the issuing consultant or electrical contractor. The Company will make every effort to meet the customer's needs.

**2.18 POWER FACTOR**

The customer shall design, install and operate the customer's facilities in such a manner as to maintain a power factor of no less than 90%. The Company may require any customer who is not satisfying this power factor requirement to furnish, install and maintain at no cost to the Company, such corrective equipment as the Company may deem necessary under the circumstances.

### 3 RESIDENTIAL SERVICES

Residential services are generally self-contained metering services to an urban or rural house or dwelling.

**Note: REA and farm residences** are not covered by this section. See “[Farm Services](#)” for those applications.

#### **General Requirements**

- Self-contained metering shall be located on the line side of the customer's main breaker when the line to line voltage does not exceed 300 volts and the main breaker rating does not exceed 200 amperes.
- Metering shall be located on the load side of the customer's main breaker when the line to line voltage exceeds 300 volts. The neutral conductor shall be isolated from the meter socket case.
- Metering shall be located on the outside wall of the house except for rural residential services which may utilize pole metering.
- Where recessed metering is installed in a wall, a clear space of not less than 0.2 m on either side of the centre line of the meter base and 1.0 m in front of the meter is required, to provide the Company access to the meters.
- The centre line of the meter socket shall be 1.3 to 1.8 m with the preferred height of 1.5 m above the finished grade or permanent platform.

### 3.1 SINGLE-PHASE RESIDENTIAL SERVICES – SELF-CONTAINED METERING

Single-phase, self-contained metering is used for residential services where the main breaker rating does not exceed 200 amperes.

#### **General Requirements**

- The standard supply is single-phase, 3-wire 120/240 volts.
- Metering shall be located on the line side of the customer's main breaker.
- A 4-jaw meter socket shall be used. For connection details, refer to [Drawing 11-1 Socket Connection Diagrams – Single-Phase, 3-Wire 120/240 or 240/480 V](#). Drawing 11-1 Socket Connection Diagrams – Single-Phase, 3-Wire 120/240 or 240/480 V
- Meters can be up to 216 mm (8½") in depth; therefore, sufficient clearance must be taken into consideration when installing the meter on a wall, in a cabinet or in an enclosure.

#### 3.1.1 OVERHEAD URBAN RESIDENTIAL SERVICES ≤ 200 A

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

- Supply and install a CSA approved, low voltage, socket type meter base.
- Supply and install all wiring, equipment, and facilities on the load side of the meter.
- Supply and install conduit, weatherhead, rack and conductors in the mast on the line side of the meter. The conductors shall protrude a minimum of 1 m out of the weatherhead, and the conductors shall be provided with drip loops. Note that the Company will not supply connectors for conductors larger than 500 MCM.
- Supply and install a means of attachment for the Company conductors.

##### **The Company shall:**

- Supply and install conductors up to the customer's conductors at the weatherhead including connectors. The supply conductors shall be terminated leaving the customer conductors protruding a minimum of 0.75 m out of the weatherhead.
- Supply and install the meter.



### 3.1.2 UNDERGROUND URBAN RESIDENTIAL SERVICES $\leq$ 200 A

The Company shall own and supply all facilities up to the line side of the meter base. Customer is responsible for the incremental cost associated with the installation.

**The customer shall:**

- Supply and install a CSA approved, low voltage, socket type meter base.
- Supply and install all wiring, equipment, and facilities on the load side of the meter.
- Supply and install the conduit to the meter socket on the line side. For details, refer to [Drawing 3-1 Underground Residential Pedestal, Service and Cable Stubbing Arrangement](#).

**The Company shall:**

- Supply and install all other facilities required for electrical service up to the line side of the meter base including conductors and connectors from the service pedestal or transformer within 3 m of the nearest corner of the house or attached garage.
- Supply and install the meter.

### 3.1.3 OVERHEAD TO UNDERGROUND URBAN RESIDENTIAL SERVICE $\leq$ 200 A

When Customer requests an underground service from an overhead supply, Customer shall be responsible for the supply and installation of secondary underground facilities from the Company's pole.

For more information refer to [Drawing 6-5 Secondary Overhead to Underground Riser on a Pole](#).

**The customer shall:**

- Supply and install a CSA approved, low voltage socket type meter base.
- Supply and install all wiring, equipment, and facilities on the load side of the meter.
- Supply and install the conduit to the meter base on the line and load sides.
- Supply and install all other facilities required for electrical service up to the line side of the meter base, including the pole where applicable.

**The Company shall:**

- Supply and install all facilities required for electrical service up to the secondary of the overhead conductor.
- Where applicable, supply and install standoff brackets.
- Complete the final connection to the supply service conductors or transformer.

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- Company representative to verify termination is properly connected.
- Supply and install the meter.

### **3.1.4 URBAN MULTIPLE RESIDENTIAL DWELLING**

Each individual unit, within a multiple dwelling (apartment or condominium building), shall be served as a separate Point of Service and metered on an individual basis, unless the Company agrees otherwise. Common use areas such as hallways, lobbies and laundry rooms will be billed under the applicable general service price schedule.

#### **General Requirements**

- All metering shall be located inside of the building in the same room. For details, refer to
- [Drawing 3-2 Multiple Services in a Dwelling.](#)
- For single-phase, 3-wire 120/240 volt services, a 4-jaw meter socket shall be used as shown in [Drawing 11-1 Socket Connection Diagrams – Single-Phase, 3-Wire 120/240 or 240/480 V.](#)
- For network 3-wire 120/208 volt services, a 5-jaw meter socket shall be used as shown in [Drawing 11-2 Socket Connection Diagrams - Network 3-Wire 120/208 V.](#)
- Each individual unit, including common use areas, within a multiple dwelling will be served as a **separate** Point of Service and metered on an individual basis, unless the Company agrees otherwise.

### **3.1.5 OVERHEAD URBAN RESIDENTIAL MULTIPLE DWELLING**

**The customer shall:**

- Supply and install CSA approved, low voltage, socket type meter bases.
- Supply and install all wiring, equipment, and facilities on the load side of the meters.
- Supply and install conduits, weatherhead, rack, and conductors in the mast on the line side of the meter. The conductors shall protrude a minimum of 1 m out of the weatherhead and the conductors shall be provided with drip loops. Note that the Company will not supply connectors for conductors larger than 500 MCM.
- Supply and install a means of attachment for the Company conductors.
- Supply and install the main breaker, conductors, and splitter box.

**The Company shall:**

- Supply and install conductors up to the customer's conductors at the weatherhead including connectors. The supply conductors shall be terminated leaving the customer conductors protruding a minimum of 0.75 m out of the weatherhead.
- Supply and install the meters.

### **3.1.6 UNDERGROUND URBAN RESIDENTIAL MULTIPLE DWELLING**

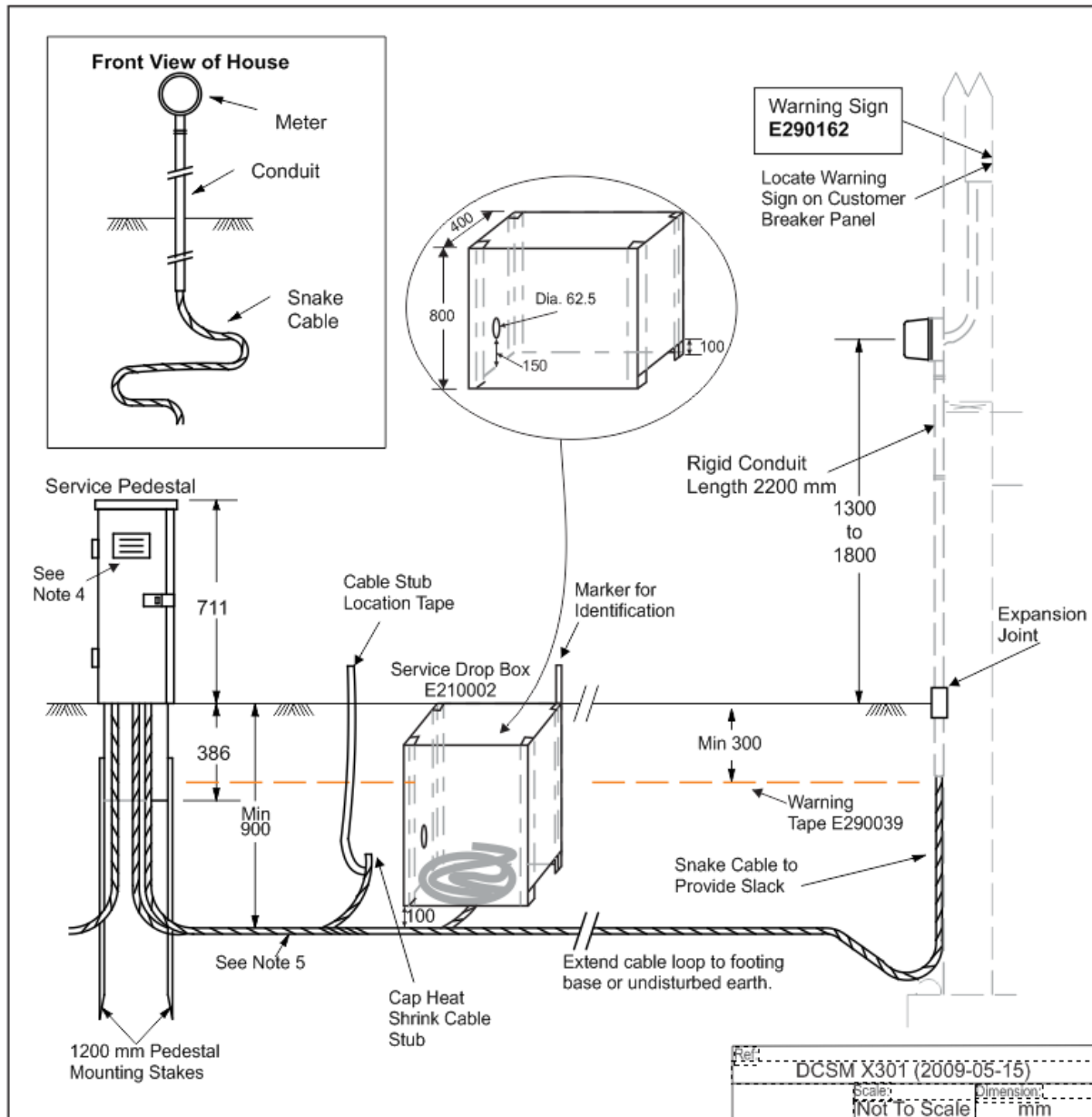
**The customer shall:**

- Supply and install CSA approved, low voltage, socket type meter bases.
- Supply and install all wiring, equipment, and facilities on the load side of the meters.
- Supply and install the conduit and conductors from the service pedestal or transformer secondary bushings to the main breaker.
- Supply and install the main breaker, conductor, and splitter box.

**The Company shall:**

- Supply and install all facilities required for electrical service up to the service pedestal or transformer including the service pedestal or transformer.
- Supply and install the meters.

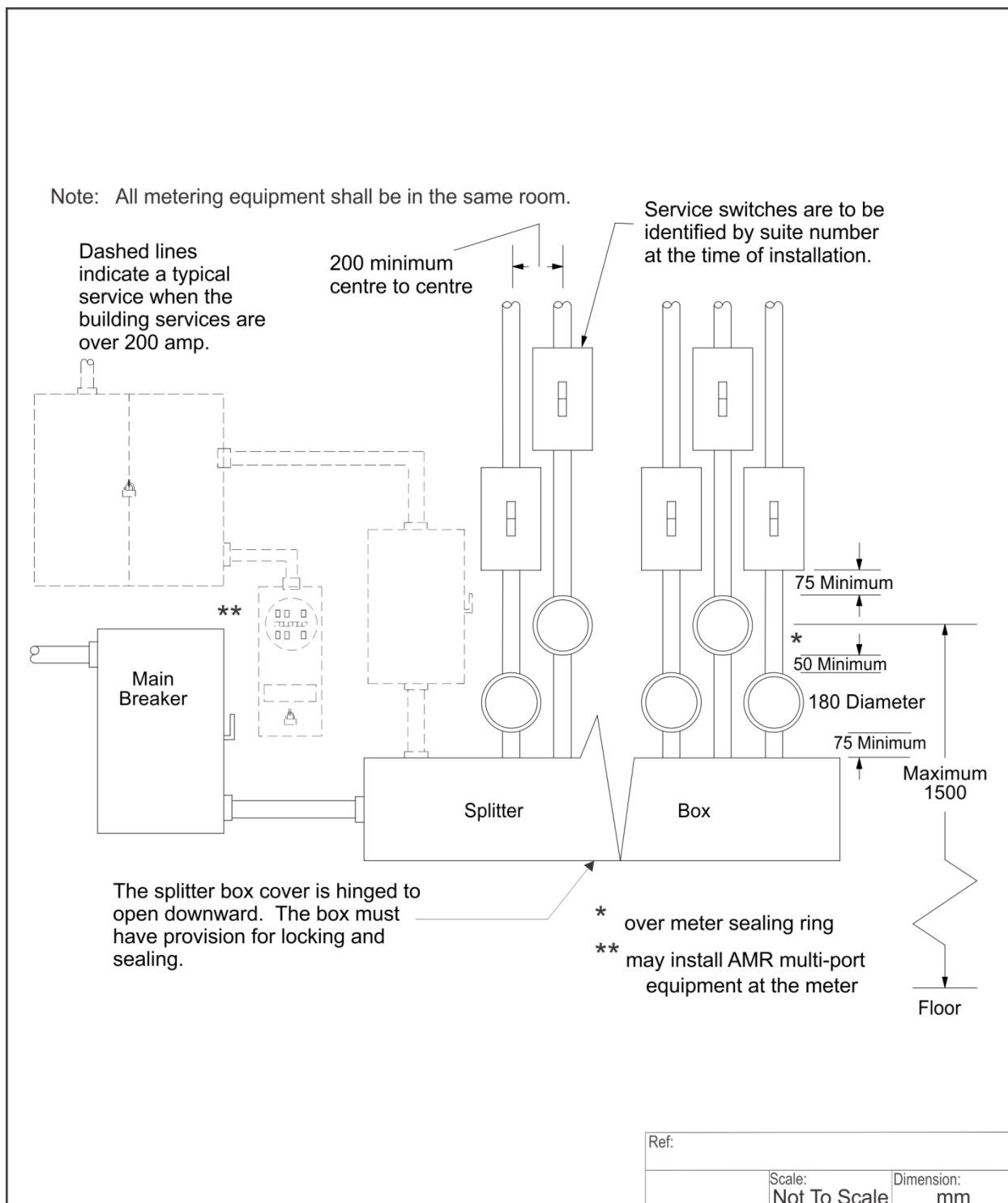
Drawing 3-1 Underground Residential Pedestal, Service and Cable Stubbing Arrangement



### Notes on Cable Stubbing:

- Extend cable end a minimum of 300 mm above highest cable in trench.
- Seal cable end with S.A.P. tape and cover with all-weather tape.
- Attach location tape to cable end and extend location tape to surface.
- Refer to H9 for all tagging, signage & cable marking.
- Random separation for telephone/cable TV/power.

Drawing 3-2 Multiple Services in a Dwelling



### 3.1.7 OPTIONAL TOWNHOUSE MULTI-METERING

Where multi-residential services, such as a townhouse complex, are fed from one source, optional townhouse multi-metering is preferred.

#### **General Requirements**

- The number of meters shall not exceed four per supply service. For details, refer to [Drawing 3-3 Optional Townhouse Multi-Metering Without Disconnect Switch](#).
- If more than four meters are required, a disconnect switch shall be installed ahead of the junction box. For details, refer to [Drawing 3-4 Optional Townhouse Multi-Metering with Disconnect Switch](#). In addition, an approval is also required from the local electrical permit inspections group because it may be a violation of the CEC part 16-104.
- The supply service is underground or overhead.
- Metering shall be located on the outside wall of the building and shall be grouped together.
- A combined total rating shall not exceed 600 amperes and the service shall not exceed 150 volts-to-ground.
- Multiple sets, as per above requirements, may be used provided that:
  - a fire separation, meeting the requirements of the Alberta Building Code, separates each occupancy, and
  - each occupancy has a separate entrance with direct access to ground level.

For additional details, refer to [Drawing 3-5 Multiple Sets of Optional Townhouse Multi-Metering Configuration](#).

**The customer shall supply and install:**

- A CSA approved, weatherproof disconnect switch, if required,
- A CSA approved, weatherproof junction box,
- CSA approved, socket type meter bases,
- All conduits with an expansion joint,
- All secondary connections from the termination blocks or disconnect switch to the meter sockets, and
- Overcurrent protection devices (or combination meter socket and circuit breaker).

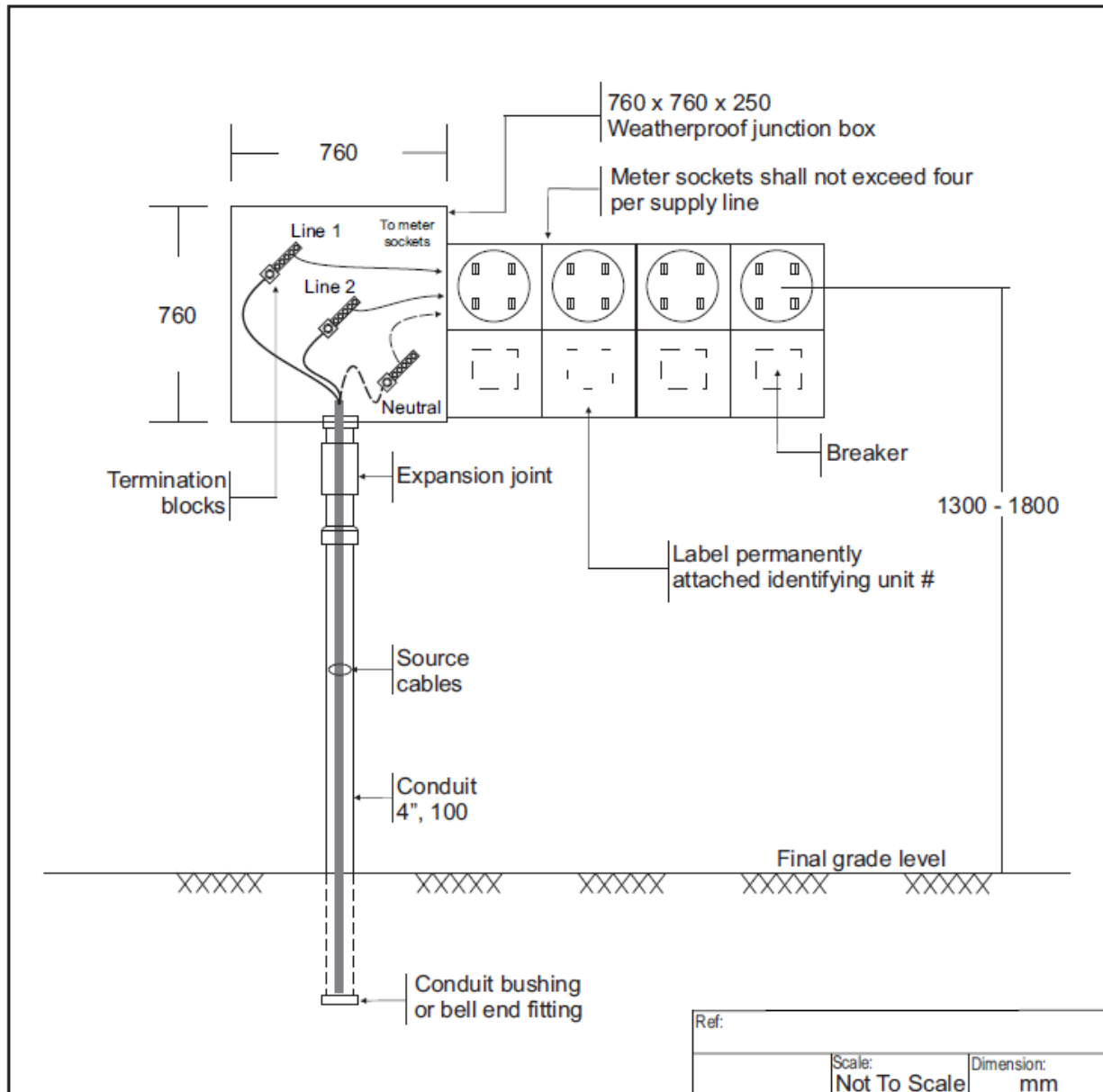
Note: Overcurrent protection devices are not required if the distance of the service conductors that enter the building to make the connection to the service equipment (Alberta Electrical STANDATA CEC-6 [rev-6]):

- is less than 3 m long, or
- does not exceed 7.5 m and the conductors are mechanically protected in rigid metal conduit.

**The Company is responsible for:**

- Supply, installation and connection of the source cable to the junction box or disconnect switch.
- Supply and installation of meters.

Drawing 3-3 Optional Townhouse Multi-Metering Without Disconnect Switch



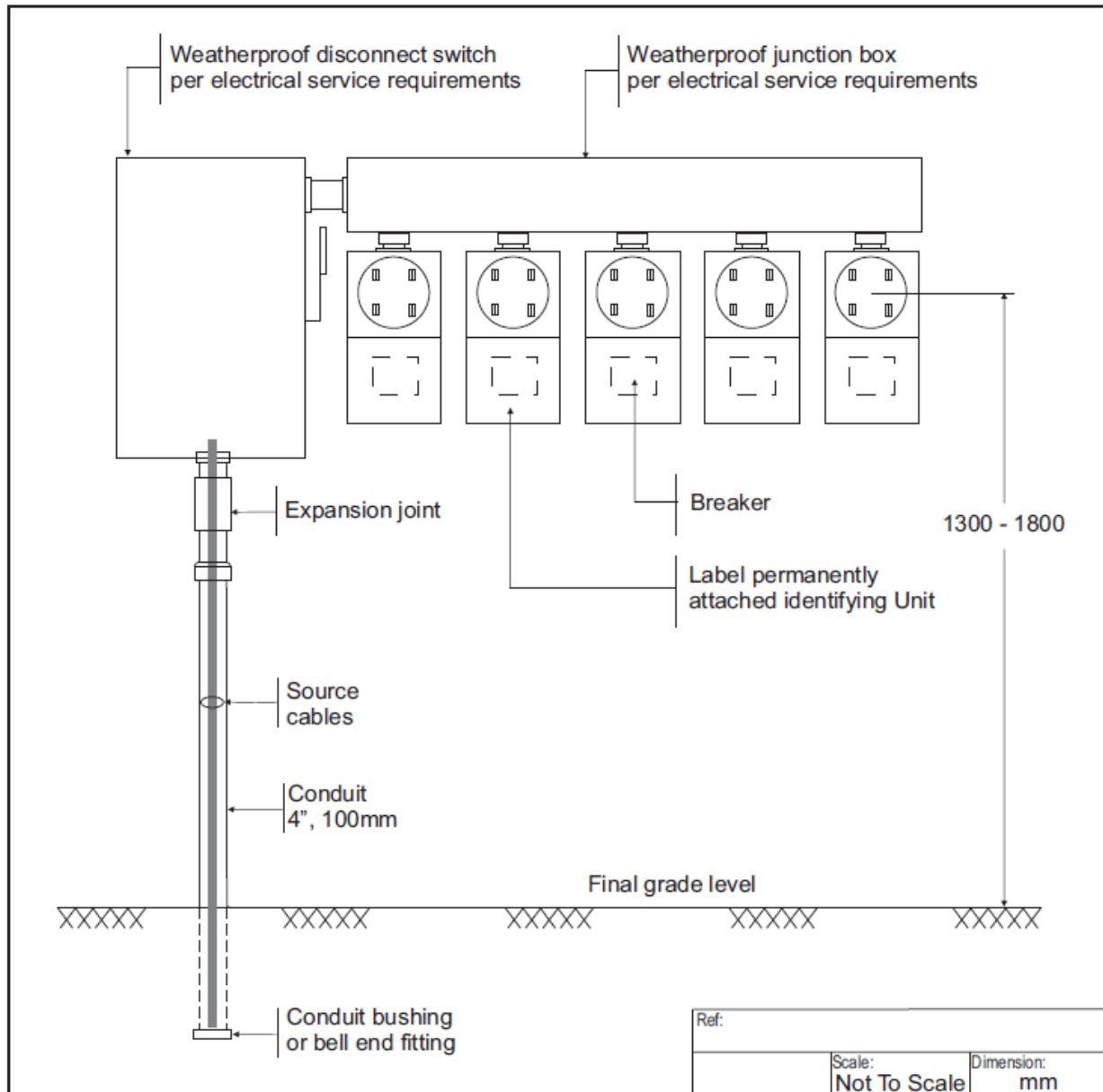
### Notes:

1. Meter sockets can be attached on either side or on top of the junction box.
2. A locking mechanism for a padlock is required on the junction box. The Company will supply the padlock.
3. Termination blocks are to be sized to 300 MCM AL.

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Drawing 3-4 Optional Townhouse Multi-Metering with Disconnect Switch

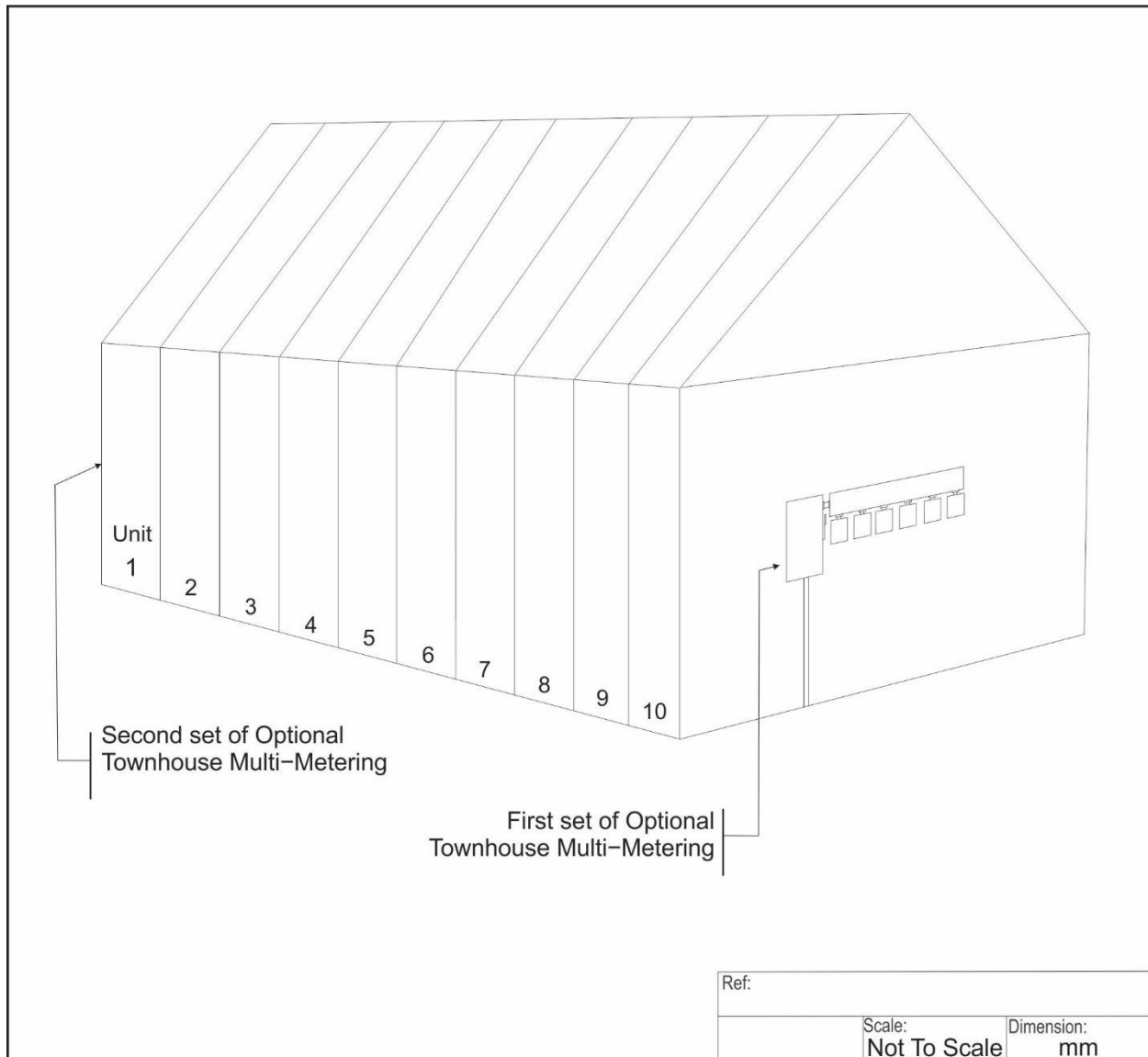


### Notes:

1. Combined total rating shall not exceed 600 amperes and the service shall not exceed 150 volts-to-ground for each set.
2. A locking mechanism for a padlock is required on the junction box. The Company will supply the padlock.
3. Consult the local electrical permit inspections group for their approval.

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Drawing 3-5 Multiple Sets of Optional Townhouse Multi-Metering Configuration

**Notes:**

1. Multiple sets of outdoor multi-metering configurations may be used. Each set shall be supplied by a separate supply service.
2. Combined total rating shall not exceed 600 amperes and the service shall not exceed 150 volts-to-ground for each set.
3. A fire separation, meeting the requirements of the Alberta Building Code, must separate each occupancy.
4. Each occupancy shall have a separate entrance with direct access to ground level.
5. Consult the local electrical permit inspections group for their approval.

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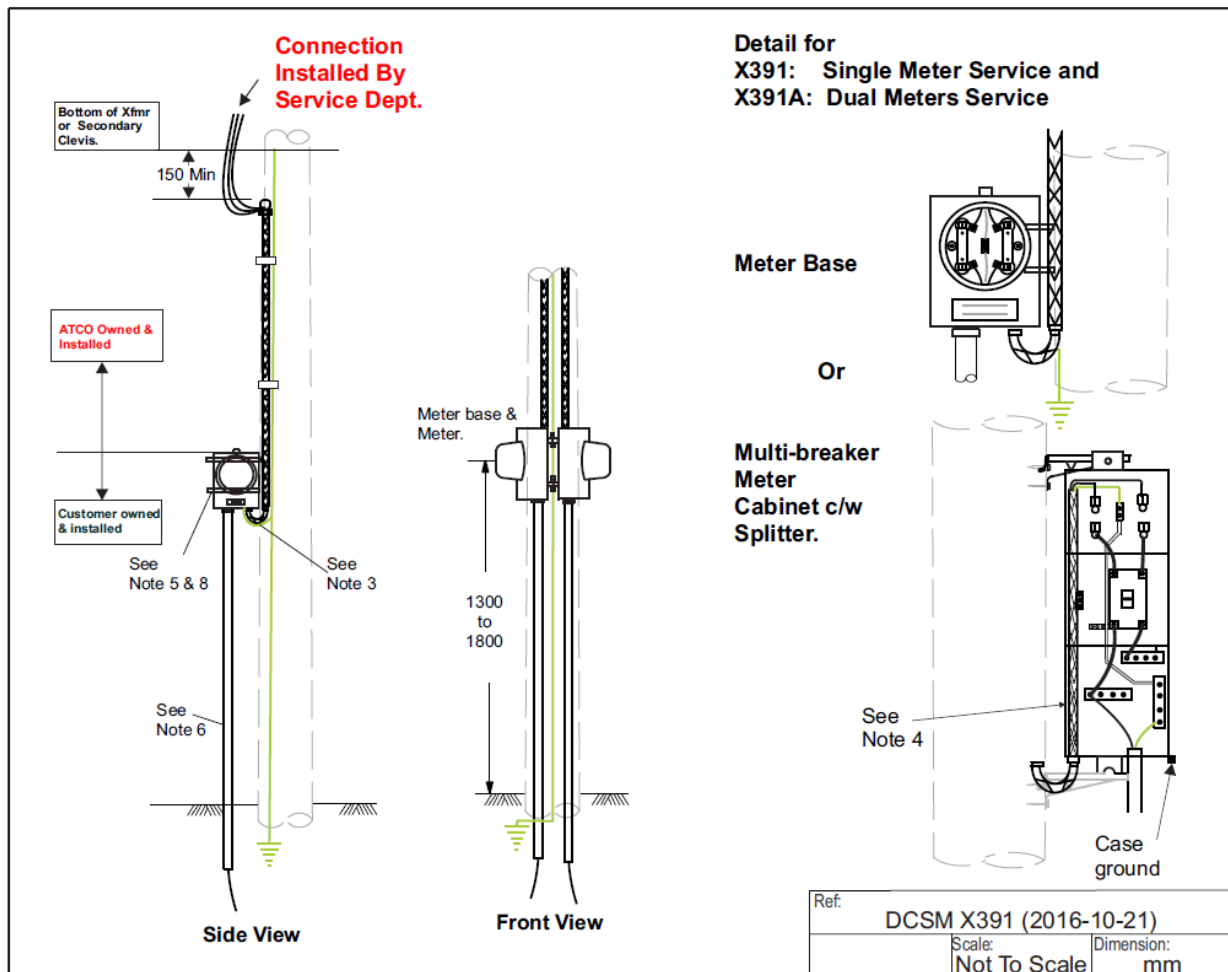
**3.1.8 OVERHEAD RURAL RESIDENTIAL SERVICE  $\leq$  200 A****The customer shall:**

- Supply and install a CSA approved, socket type meter base. The meter socket shall be mounted to the Company pole as shown in [Drawing 3-6 Acreage Customer Owned Secondary Metering Mounted on a Pole](#).
- Supply and install all wiring, equipment, and facilities on the load side of the meter.

**The Company shall:**

- Supply and install all facilities required for electrical service up to the line side of meter base including the pole.
- Supply and install the meter.

### Drawing 3-6 Acreage Customer Owned Secondary Metering Mounted on a Pole



**Notes:**

1. Customer shall contact ATCO when customer secondary connection is ready.
2. Meter socket shall be grounded internally.
3. Customer is responsible to ground the meter base as per CEC code. If Customer installs grounding 2m or less away from ATCO grounding, bonding is required to be installed. Refer to DCSM section E, if ATCO Electric ground is required to be installed.
4. Leave outside jacket intact.
5. Meter orientation – preference – at the back side of a pole.
6. Customer shall comply with the Canadian Electrical Code (CEC) on maximum support spacing and other requirement.
7. If multi-breaker, meter with splitter is required, preference is Thomas&Betts Microelectric CO2-MS. Any other CSA approved multi-breaker, meter with splitter is also acceptable.
8. For single service, the meter or the meter/breaker/splitter may mount on the pole. Any new dual service installations shall be mounted on the stand-off brackets.

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**3.1.9 UNDERGROUND RURAL RESIDENTIAL SERVICE  $\leq$  200 A****General Requirements**

- Metering shall be inside the customer's property on a stub pole, or an approved meter pedestal located 1.5 m from utility right-of-way (URW) and 1.5 m inside the property line.
- For stub pole metering details, refer to [Drawing 3-7 Stub Pole Metering](#).
- The Company's approval is required prior to the ordering or use of a meter pedestal. Meter pedestal shall be installed as per the manufacturer's instructions.
- The Company shall own and supply all facilities up to the line side of the meter base. Customer is responsible for the incremental cost associated with the installation.

**The customer shall:**

- Supply and install a CSA approved, low voltage, socket type meter base with circuit breaker.
- Supply and install all wiring, equipment, and facilities on the load side of the meter.
- Supply and install the stub pole.
- Supply and install the conduits to the meter socket on the line and load sides.

**The Company shall:**

- Supply and install underground secondary service conductors from the service pedestal or transformer to the meter socket on the line side.
- Supply and install all other facilities required for electrical service up to the line side of the meter base including conductors and connectors from the service pedestal or transformer.
- Complete the final connection to the supply service conductors or transformer.
- Company representative to verify termination is properly connected.
- Supply and install the meter.

**Note:** If the developer installs underground electrical distribution facilities in new rural residential subdivisions (underground residential development (URD) turnkey projects),

**The Developer shall:**

- Supply and install underground secondary service conductors from service pedestal or transformer to the meter.

- Provide a certified copy of the registered plan for subdivision and final construction. Plans must show the location of underground utilities together with evidence the Company may require for verifying developer compliance with rules and regulations.
- Supply and install the stub pole.
- Supply and install the conduits to the meter base on the line and load sides.
- Tape or otherwise seal the exposed supply end of the service conductors to prevent the entry of moisture into the cables.
- Secure the cables by inserting the supply end into the load conduit for future use.

### **3.1.10 OVERHEAD TO UNDERGROUND RURAL RESIDENTIAL SERVICE ≤ 200 A**

When Customer requests an underground service from an overhead supply, Customer shall be responsible for the supply and installation of secondary underground facilities from the Company's pole.

Company's approval is required prior to the ordering or use of a meter pedestal. Meter pedestal shall be installed as per the manufacturer's instructions.

For more information refer to [Drawing 6-5 Secondary Overhead to Underground Riser on a Pole](#).

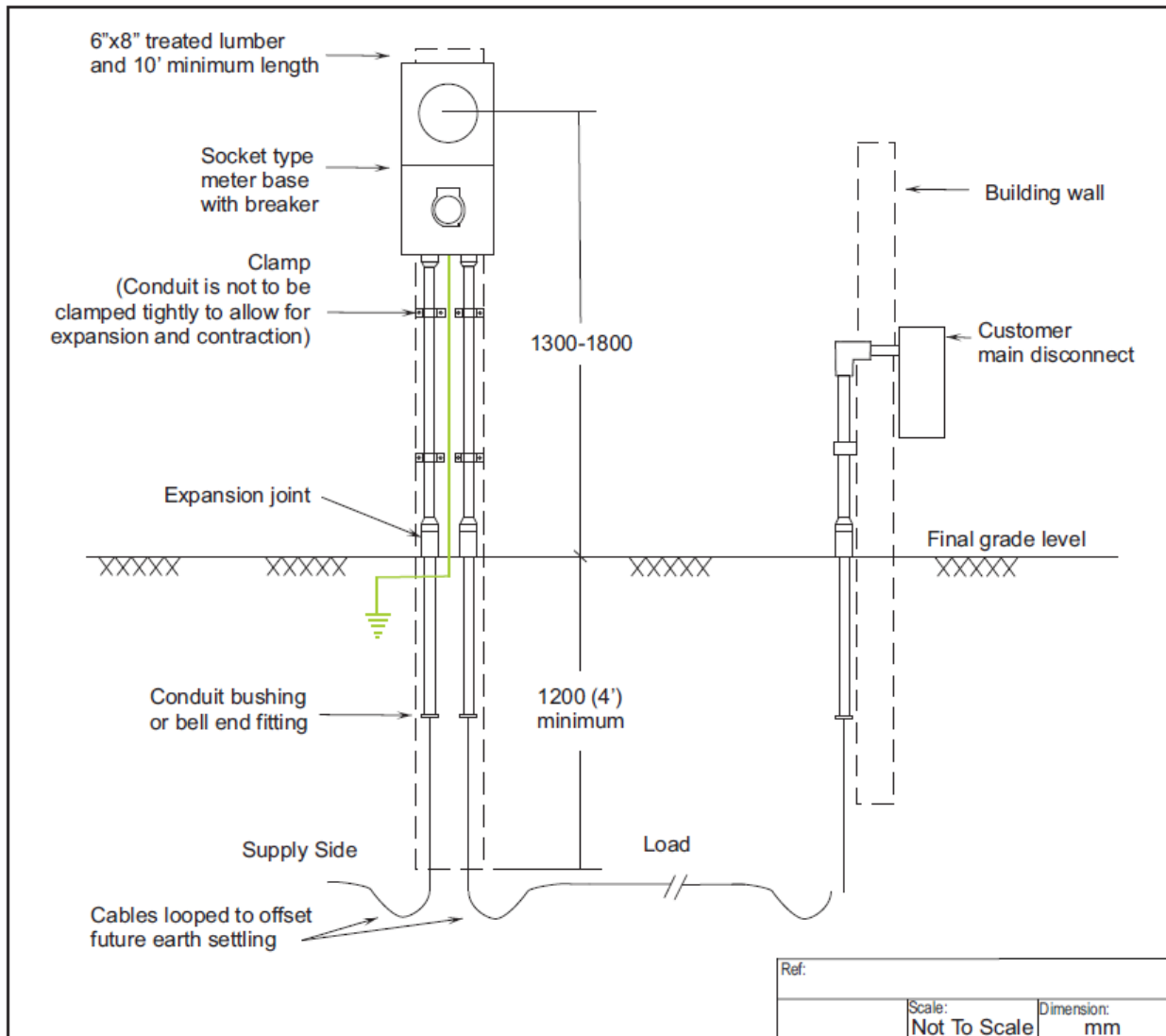
#### **The customer shall:**

- Supply and install a CSA approved, low voltage, socket type meter base with circuit breaker.
- Supply and install all wiring, equipment, and facilities on the load side of the meter.
- Supply and install the stub pole.
- Supply and install the conduits to the meter socket on the line and load sides.
- Supply and install all facilities required for electrical service up to the line side of the meter base, including the pole where applicable.

#### **The Company shall:**

- Supply and install all facilities required for electrical service up to the secondary of the overhead conductor.
- Where applicable, supply and install standoff brackets.
- Complete the final connection to the supply service conductors or transformer.
- Company representative to verify termination is properly connected.
- Supply and install the meter.

Drawing 3-7 Stub Pole Metering



### Notes:

1. The stub pole shall be 6"x8" treated lumber and 10' minimum length. The meter base should be mounted on the 8" side.
2. Clamps are required for conduits.
3. Install expansion joints on both the supply and load sides.
4. Customer shall be responsible to ground the meter base.
5. Customer shall supply and install grounding electrode(s) for the meter base.
6. Customer main disconnect is required inside the building.
7. All construction shall use CSA approved materials and shall be done in accordance with the CEC and Alberta amendments.

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

Instrument transformer metering is used for services where the main breaker rating exceeds 200 amperes. Metering shall be located on the load side of the customer's main breaker.

#### **General Requirements**

- Metered and unmetered cables shall not be installed in the same auxiliary gutter or splitter box.
- There shall be no elbows with covers (LBs) or pull boxes between the instrument transformer cabinet and the meter socket.
- Instrument transformer cabinets shall not be used as junction boxes to connect secondary load conductors.
- The meter shall be located on the inside of a building in the same room as the instrument transformer enclosure, separated by a **maximum of 6.5 m**. For the arrangement of instrument transformer metering, refer to [Drawing 9-1 Typical Arrangement for Instrument Transformer](#).
- If the meter cannot be accommodated inside the building, it may be located outside using a Microelectric FA4B-6T, 6-jaw meter socket and test switch enclosure that houses two 2-wire current transformers.
- For all single-phase instrument transformer metering services, a 6-jaw meter socket and test switch enclosure shall be used. For details, refer to section [9.3.1 Single-Phase Meter Socket And Test Switch Enclosure](#).
- Details of instrument transformer metering are specified in section [9 Instrument Transformer Metering](#).



**3.2.1 OVERHEAD RESIDENTIAL SERVICE > 200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, 6-jaw meter socket and test switch enclosure.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install conduit, weatherhead, rack and conductors in the mast on the line side of the meter. The conductors shall protrude a minimum of 1 m out of the weatherhead and the conductors shall be provided with drip loops. Note that the Company will not supply connectors for conductors larger than 500 MCM.
- Supply and install a means of attachment for the Company conductors.
- Supply and install a Company approved instrument transformer enclosure. For enclosure requirements, refer to section [9.2 Instrument Transformer Cabinets](#).
- Be responsible for the installation of, and primary connection to, the current transformers (lugs). For details, refer to [Drawing 9-9 Typical Arrangement of Single-Phase, 3-Wire 120/240 or 240/480 V Instrument Metering](#).

**The Company shall:**

- Supply and install conductors up to the customer's conductors at the weatherhead including connectors. The supply conductors shall be terminated leaving the customer conductors protruding a minimum of 0.75 m out of the weatherhead.
- Supply and install the meter.
- Supply the current transformers. Upon request, ship them to the electrical contractor or manufacturer.

**3.2.2 UNDERGROUND RESIDENTIAL SERVICE > 200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, 6-jaw meter socket and test switch enclosure.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install underground secondary service conductors from the service pedestal or transformer to the line side of the meter. Connectors shall have NEMA spacing for connection to a spade terminal.
- Supply and install a Company approved instrument transformer enclosure. For enclosure requirement, refer to section [9.2 Instrument Transformer Cabinets](#).
- Be responsible for the installation of, and primary connection to, the current transformers (lugs). For details, refer to [Drawing 9-9 Typical Arrangement of Single-Phase, 3-Wire 120/240 or 240/480 V Instrument Metering](#).

**The Company shall:**

- Supply and install the primary facilities required for electrical service up to and including the padmount transformer or pedestal.
- Supply and install the meter.
- Supply the current transformers. Upon request, ship them to the electrical contractor or manufacturer.

### **3.3 MULTIPLE CUSTOMER METERING**

Multiple Customer Metering is used in apartment and condominium buildings where the developer decides not to use the traditional “meter room” that houses all the “suite” and “house” meters for the building.

It consists of a main meter head and junction box connected to “mini” window type current transformers on the branch circuits to the suites.

**Multiple Customer Metering is no longer approved for new installations.**

## 4 FARM SERVICES

Farm services are generally services supplying farming operations in a rural area. The system, up to the point of metering, is owned either by the Company or the R.E.A.L.

### **General Requirements**

- Pole metering is the standard for overhead farm and R.E.A.L. services. For additional details, refer to [Drawing 4-1 Overhead Farm Type Metering](#) for single service or [Drawing 4-2 Installation of Multi-Breaker Box for Farm Type Metering of Two Services](#) for two services.
- With the Company's approval, an REA customer may install a main breaker and meter socket on a building.
- Pedestal metering is the standard for underground farm services. For details, refer to [Drawing 4-3 Pedestal Metering for Underground Farm Service](#).
- The centre line of the meter socket shall be 1.3 to 1.8 m with the preferred height of 1.5 m above the finished grade or permanent platform.
- The Company owned breaker cannot be considered as the customer service disconnect as per Alberta Electrical STANDATA CEC-6 [rev-6] Rule 6-200.
- For non-breakered farm service, the customer supplies and installs the meter socket and breaker.
- When the customer requests a service capacity greater than 200 amperes, it is considered a non-breakered farm service.

## **4.1 SINGLE-PHASE FARM SERVICES – SELF-CONTAINED METERING**

Single-phase, self-contained metering is used for farm services where the main breaker rating does not exceed 200 amperes.

### **General Requirements**

- The standard supply is single-phase, 3-wire 120/240 volts.
- A 4-jaw meter socket shall be used. For the connection diagram, refer to [Drawing 11-1 Socket Connection Diagrams – Single-Phase, 3-Wire 120/240 or 240/480 V.](#)

### **4.1.1 OVERHEAD FARM SERVICES ≤ 200 A**

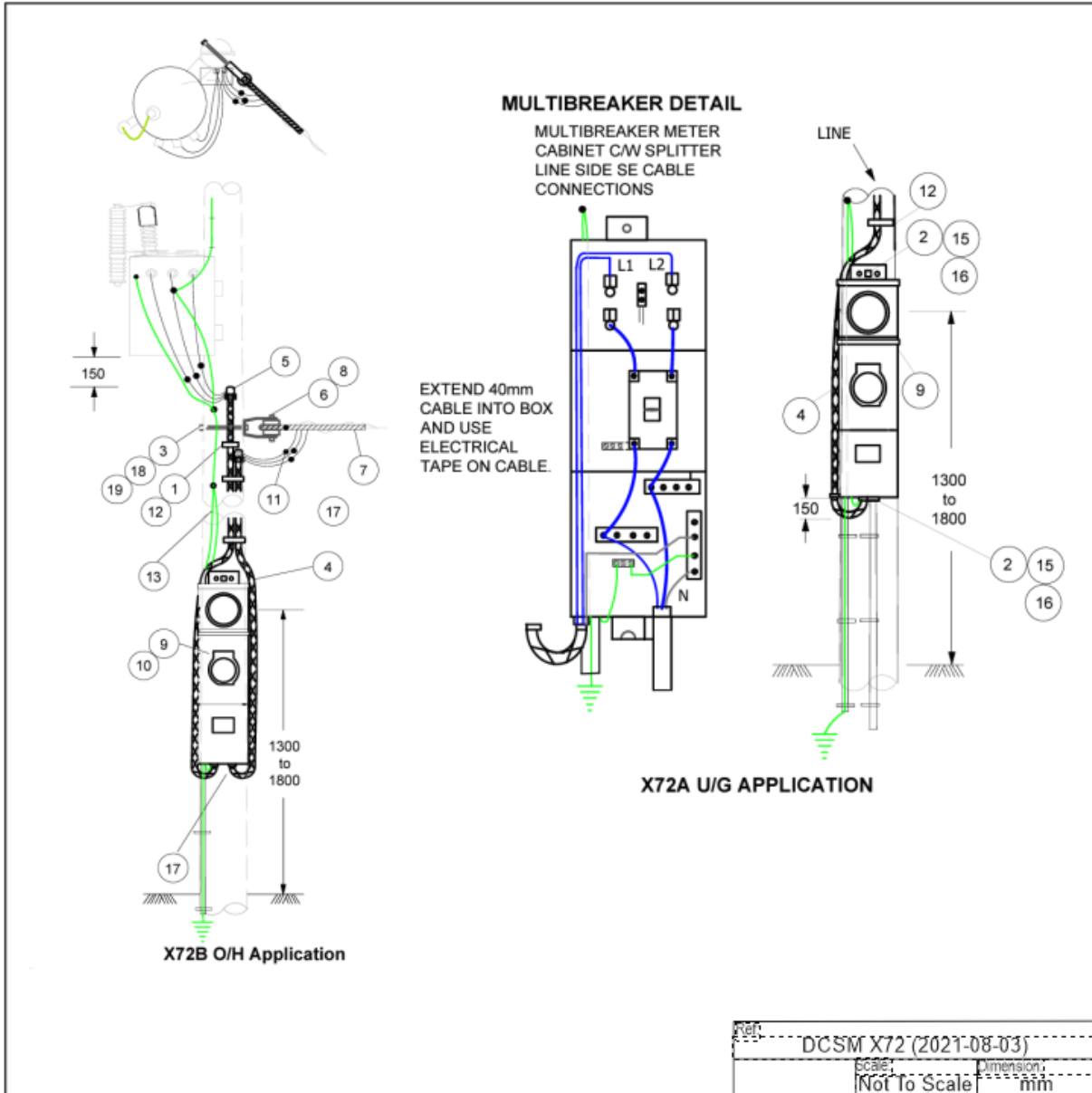
#### **The customer shall:**

Supply and install all wiring, equipment and facilities on the load side of the meter.

#### **The Company shall:**

- Supply and install all primary facilities required for **pole metering** including the multi-breaker meter cabinet, the SE cable and the pole.
- Supply and install the meter.

Drawing 4-1 Overhead Farm Type Metering

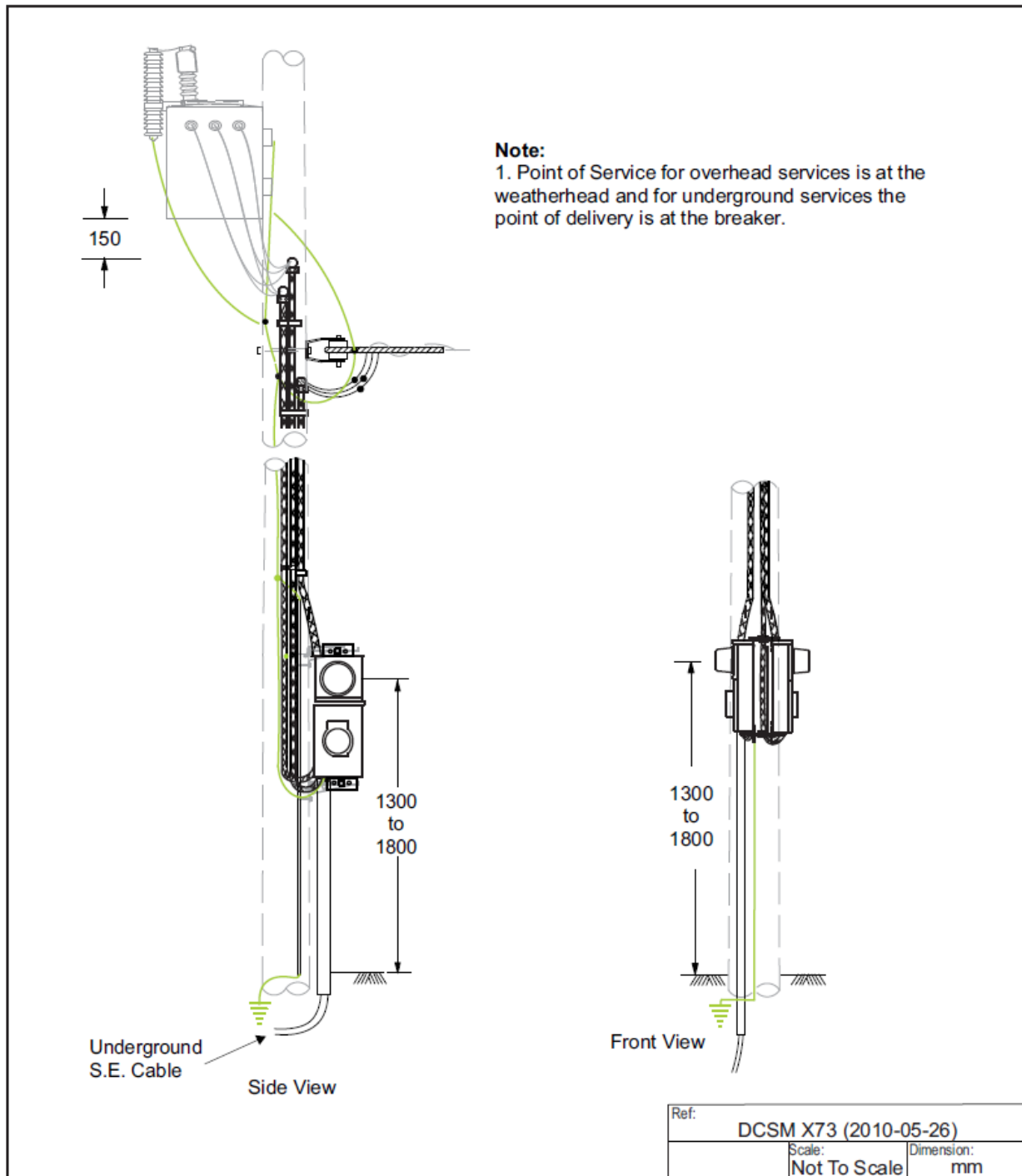


### Notes:

1. With the company's approval, the REA customer may install the main breaker and meter socket in their residence or other building and the REA would own the facilities up to the meter.
2. Meter height can be raised to prevent cattle rubbing.
3. If possible, ensure that placement of equipment is such that it does not obstruct the view of pole details, showing height and class, etc.
4. Point of Service is at the weatherhead for overhead services and is at the breaker for underground services.

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Drawing 4-2 Installation of Multi-Breaker Box for Farm Type Metering of Two Services

**Notes:**

1. Meter height can be raised to prevent cattle rubbing.
2. Point of Service is at the weatherhead for overhead services and the breaker for underground services.

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**4.1.2 UNDERGROUND FARM SERVICE  $\leq$  200 A****The customer shall:**

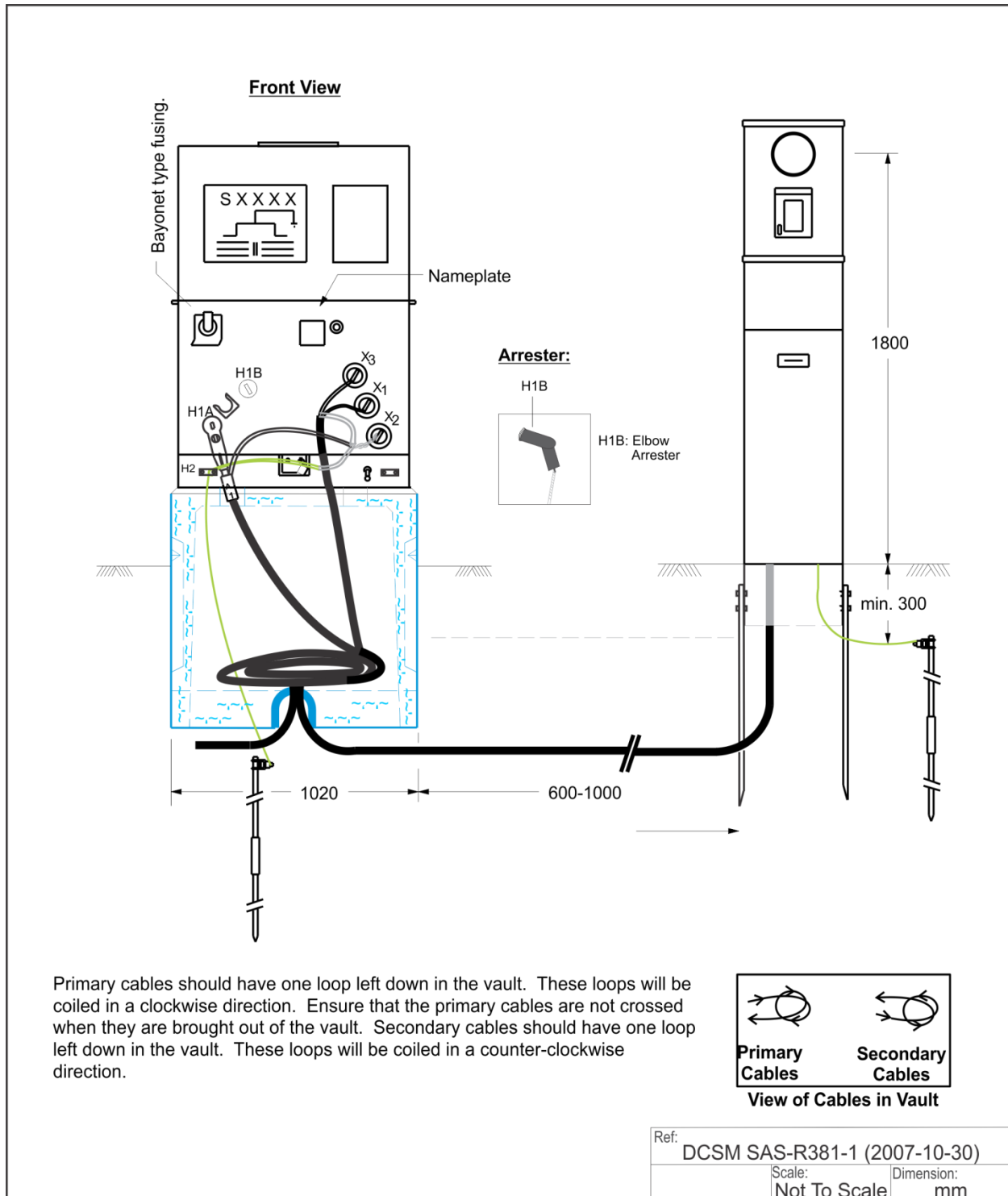
Supply and install all wiring, equipment and facilities on the load side of the meter. For details, refer to [Drawing 4-3 Pedestal Metering for Underground Farm Service](#).

**The Company shall:**

- Supply and install the primary facilities required for electrical service to the line side of the meter including the transformer, the metering pedestal, the line side underground cable and the breaker.
- Supply and install the meter.



Drawing 4-3 Pedestal Metering for Underground Farm Service



Revised Jul 2024

## 4.2 SINGLE-PHASE FARM SERVICES – INSTRUMENT TRANSFORMER METERING

Instrument transformer metering is used for services where the main breaker rating exceeds 200 amperes. Metering shall be located on the load side of the customer's main breaker.

### General Requirements

- Metered and unmetered cables shall not be installed in the same auxiliary gutter or splitter box.
- There shall be no elbows with covers (LBs) or pull boxes between the instrument transformer cabinet and the meter socket.
- Instrument transformer cabinets shall not be used as junction boxes to connect secondary load conductors.
- The meter shall be located on the inside of a building in the same room as the instrument transformer enclosure, separated by a **maximum of 6.5 m**. For the arrangement of instrument transformer metering, refer to [Drawing 9-1 Typical Arrangement for Instrument Transformer](#).
- If the meter cannot be accommodated inside the building, it may be located outside using a Microelectric FA4B–6T, 6-jaw meter socket and test switch enclosure that houses two 2-wire current transformers.
- For all single-phase instrument transformer metering services, a 6-jaw meter socket and test switch enclosure shall be used. For details, refer to section [9.3.1 Single-Phase Meter Socket And Test Switch Enclosure](#).
- Details of instrument transformer metering are specified in section [9 Instrument Transformer Metering](#).

**4.2.1 OVERHEAD FARM SERVICE > 200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, 6-jaw meter socket and test switch enclosure.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install secondary service conductors and facilities on the line side of the meter up to the transformer secondary. Note that the Company will not supply connectors for conductors larger than 500 MCM.
- Supply and install a Company approved instrument transformer enclosure. For enclosure requirements, refer to section [9.2 Instrument Transformer Cabinets](#).
- Be responsible for the installation of, and primary connection to, the current transformers (lugs). For details, refer to [Drawing 9-9 Typical Arrangement of Single-Phase, 3-Wire 120/240 or 240/480 V Instrument Metering](#).

**The Company shall:**

- Supply and install the primary facilities required for electrical service including the transformers.
- Supply and install the meter.
- Supply the current transformers. Upon request, ship them to the electrical contractor or manufacturer.

**4.2.2 UNDERGROUND FARM SERVICE > 200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, 6-jaw meter socket and test switch enclosure.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install secondary service conductors and facilities on the line side of the meter up to the transformer secondary or pedestal. Connectors shall have NEMA spacing for connection to a spade terminal.
- Supply and install a Company approved instrument transformer enclosure. For enclosure requirements, refer to section [9.2 Instrument Transformer Cabinets](#).
- Be responsible for the installation of, and primary connection to, the current transformers (lugs). For details, refer to [Drawing 9-9 Typical Arrangement of Single-Phase, 3-Wire 120/240 or 240/480 V Instrument Metering](#).

**The Company shall:**

- Supply and install all facilities required for electrical service up to and including the service pedestal or padmount transformer.
- Supply and install the meter.
- Supply the current transformers. Upon request, ship them to the electrical contractor or manufacturer.

### **4.3 THREE-PHASE FARM SERVICES – SELF-CONTAINED METERING**

Three-phase, self-contained metering is used for farm services where the main breaker rating does not exceed 200 amperes. For services less than 300 volts line to line, metering shall be located on the line side of the customer's main breaker. For services over 300 volts line to line, metering shall be located on the load side of the customer's main breaker.

#### **General Requirements**

- 120/208 volts is the standard, three-phase supply voltage. With the Company's approval, the customer may request other supply voltages or supply arrangements.
- For three-phase services, a 7-jaw meter socket shall be used.
- For 120/208 volt services, refer to [Drawing 11-3 Diagrams of Socket Connections – Three-Phase, 4-Wire Wye 120/208 V.](#)

#### **4.3.1 OVERHEAD AND UNDERGROUND FARM SERVICES $\leq$ 200 A**

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

- Supply and install a CSA approved, low voltage, socket type meter base.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- For overhead service, supply and install secondary service conductors and facilities on the line side of the meter up to the transformer secondary. Note that the Company will not supply connectors for conductors larger than 500 MCM.
- For underground service, supply and install secondary service conductors and facilities on the line side of the meter up to the transformer secondary or pedestal. Connectors shall have NEMA spacing for connection to a spade terminal.
- Complete the secondary cable connections to the transformer secondary bushings of the padmount transformer.

##### **The Company shall:**

- For underground service, supply and install the primary facilities required for electrical service up to and including the service pedestal or padmount transformer.
- For overhead service, connect the service conductors at the transformer pole.
- Supply and install the meter.

#### 4.4 THREE-PHASE FARM SERVICES – INSTRUMENT TRANSFORMER METERING

Instrument transformer metering is used for services where the main breaker rating exceeds 200 amperes. Metering shall be located on the load side of the customer's main breaker.

##### **General Requirements**

- Metered and unmetered cables shall not be installed in the same auxiliary gutter or splitter box.
- There shall be no elbows with covers (LBs) or pull boxes between the instrument transformer cabinet and the meter socket.
- Instrument transformer cabinets shall not be used as junction boxes to connect secondary load conductors.
- The meter shall be located on the inside of a building in the same room as the instrument transformer enclosure, separated by a **maximum of 6.5 m**. If the meter cannot be accommodated inside the building, it may be located outside in a weatherproof cabinet. For the arrangement of instrument transformer metering, refer to [Drawing 9-1 Typical Arrangement for Instrument Transformer](#).
- For all three-phase instrument services, a 13-jaw meter socket and test switch enclosure shall be used. For details, refer to section [9.3.2 Three-Phase Meter Socket And Test Switch Enclosure](#).
- Details of instrument transformer metering are specified in section [9 Instrument Transformer Metering](#).

**4.4.1 OVERHEAD FARM SERVICES > 200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, 13-jaw meter socket and test switch enclosure.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install secondary service conductors and facilities on the line side of the meter up to the transformer secondary. Note that the Company will not supply connectors for conductors larger than 500 MCM.
- Supply and install a Company approved instrument transformer enclosure. For enclosure requirements, refer to section [9.2 Instrument Transformer Cabinets](#).
- Be responsible for the installation of, and primary connection to, the current transformers (lugs). For details, refer to [Drawing 9-10 Typical Arrangement of Three-Phase, 4-Wire Wye 120/208 or 277/480 V Instrument Metering 200-1200 A Service](#).
- Extend the neutral conductor into the instrument transformer enclosure.

**The Company shall:**

- Supply and install the primary facilities required for electrical service up to and including transformer.
- Supply and install the meter.
- Supply current instrument transformers. Upon request, ship the equipment to the electrical contractor or manufacturer.

**4.4.2 UNDERGROUND FARM SERVICES > 200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, 13-jaw meter socket and test switch enclosure.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install secondary service conductors and facilities on the line side of the meter up to the transformer secondary bushings. Connectors shall have NEMA spacing for connection to a spade terminal.
- Supply and install a Company approved instrument transformer enclosure. For enclosure requirements, refer to section [9.2 Instrument Transformer Cabinets](#).
- Be responsible for the installation of, and primary connection to, the current transformers (lugs). For details, refer to [Drawing 9-10 Typical Arrangement of Three-Phase, 4-Wire Wye 120/208 or 277/480 V Instrument Metering 200-1200 A Service](#).
- Extend the neutral conductor into the instrument transformer enclosure.
- Make the secondary cable connections to the transformer secondary bushings of the padmount transformer.

**The Company shall:**

- Supply and install the primary facilities required for electrical service up to and including the padmount transformer.
- Supply and install the meter.
- Supply current instrument transformers. Upon request, ship the equipment to the electrical contractor or manufacturer.



## **5 COMMERCIAL SERVICES**

Commercial services are typically businesses that provide sales, transportation, packaging, distribution, storage and accounting of goods and services.

### **General Requirements**

- Where recessed metering is installed in a wall, a clear space of not less than 0.2 m on either side of the centre line of the meter base and 1.0 m in front of the meter is required, to provide the Company access to the meters.
- The centre line of the meter socket shall be 1.3 to 1.8 m with the preferred height of 1.5 m above the finished grade or permanent platform, and in a properly lit area.

## **5.1 SINGLE-PHASE COMMERCIAL SERVICES – SELF-CONTAINED METERING**

Single-phase, self-contained metering is used for services where the main breaker rating does not exceed 200 amperes.

### **General Requirements**

- The standard supply is single-phase, 3-wire 120/240 volts.
- Metering shall be located on the line side of the customer's main breaker.
- Meters shall be located on the outside of a building except where transformer pole metering is installed.
- A 4-jaw meter socket shall be used. For the connection diagram, refer to [Drawing 11-1 Socket Connection Diagrams – Single-Phase, 3-Wire 120/240 or 240/480 V.](#)
- Meters can be up to 216 mm (8½") in depth; therefore, sufficient clearance must be taken into consideration when installing the meter on a wall, in a cabinet or in an enclosure.

### **5.1.1 SINGLE-PHASE OVERHEAD COMMERCIAL SERVICES ≤ 200 A**

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

- Supply and install a CSA approved, low voltage, socket type meter base.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install conduit, weatherhead, rack and conductors in the mast on the line side of the meter. The conductors shall protrude a minimum of 1 m out of the weatherhead and the conductors shall be provided with drip loops. Note that the Company will not supply connectors for conductors larger than 500 MCM.
- Supply and install a means of attachment for the Company conductors.

#### **The Company shall:**

- Supply and install conductors up to the customer's conductors at the weatherhead including connectors. The supply conductors shall be terminated leaving the customer conductors protruding a minimum of 0.75 m out of the weatherhead.
- Supply and install the meter.

**5.1.2 SINGLE-PHASE UNDERGROUND COMMERCIAL SERVICES  $\leq$  200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, socket type meter base.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install the conduit for the conductors to the meter socket on the line side.
- Supply and install underground secondary conductors from the service pedestal or transformer to the line side of the meter. Connectors shall have NEMA spacing for connection to a spade terminal.
- Make the secondary cable connections to the padmount transformer secondary bushings or the service pedestal.

**The Company shall:**

- Supply and install all facilities required for electrical service up to and including the padmount transformer or service pedestal.
- Supply and install the meter.

## 5.2 SINGLE-PHASE COMMERCIAL SERVICES - INSTRUMENT TRANSFORMER METERING

Instrument transformer metering is used for services where the main breaker rating exceeds 200 amperes. Metering shall be located on the load side of the customer's main breaker.

### General Requirements

- Metered and unmetered cables shall not be installed in the same auxiliary gutter or splitter box.
- There shall be no elbows with covers (LBs) or pull boxes between the instrument transformer cabinet and the meter socket.
- Instrument transformer cabinets shall not be used as junction boxes to connect secondary load conductors.
- The meter shall be located on the inside of a building in the same room as the instrument transformer enclosure, separated by a **maximum of 6.5 m**. For the arrangement of instrument transformer metering, refer to [Drawing 9-1 Typical Arrangement for Instrument Transformer](#).
- If the meter cannot be accommodated inside the building, it may be located outside using a Microelectric FA4B-6T, 6-jaw meter socket and test switch enclosure that houses two 2-wire current transformers.
- For all single-phase instrument transformer metering services, a 6-jaw meter socket and test switch enclosure shall be used. For details, refer to section [9.3.1 Single-Phase Meter Socket And Test Switch Enclosure](#).
- Details of instrument transformer metering are specified in section [9 Instrument Transformer Metering](#).

**5.2.1 SINGLE-PHASE OVERHEAD COMMERCIAL SERVICES > 200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, 6-jaw meter socket and test switch enclosure.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install conduit, weatherhead, rack and conductors in the mast on the line side of the meter. The conductors shall protrude a minimum of 1 m out of the weatherhead and the conductors shall be provided with drip loops. Note that the Company will not supply connectors for conductors larger than 500 MCM.
- Supply and install a means of attachment for the Company conductors.
- Supply and install a Company approved instrument transformer enclosure. For enclosure requirements, refer to section [9.2 Instrument Transformer Cabinets](#).
- Be responsible for the installation of, and primary connection to, the current transformers (lugs). For details, refer to [Drawing 9-9 Typical Arrangement of Single-Phase, 3-Wire 120/240 or 240/480 V Instrument Metering](#).

**The Company shall:**

- Supply and install the secondary conductors required for electrical service up to the customer's conductors at the weatherhead. The supply conductors shall be terminated leaving the customer conductors protruding a minimum of 0.75 m out of the weatherhead.
- Supply and install the meter.
- Supply the current transformers. Upon request, ship them to the electrical contractor or manufacturer.

**5.2.2 SINGLE-PHASE UNDERGROUND COMMERCIAL SERVICES > 200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, 6-jaw meter socket and test switch enclosure.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install the secondary service conductors from the transformer or the service pedestal to the line side of the meter. Connectors shall have NEMA spacing for connection to a spade terminal.
- Make the secondary cable connections to the padmount transformer secondary bushings or the service pedestal.
- Supply and install a Company approved instrument transformer enclosure. For enclosure requirements, refer to section [9.2 Instrument Transformer Cabinets](#).
- Be responsible for the installation of, and primary connection to, the current transformers (lugs). For details, refer to [Drawing 9-9 Typical Arrangement of Single-Phase, 3-Wire 120/240 or 240/480 V Instrument Metering](#).

**The Company shall:**

- Supply and install the primary facilities required for electrical service up to and including the padmount transformer or the service pedestal.
- Supply and install the meter.
- Supply the current transformers. Upon request, ship the equipment to the electrical contractor or manufacturer.

### 5.3 THREE-PHASE COMMERCIAL SERVICES – SELF-CONTAINED METERING

Three-phase, self-contained metering is used for commercial services where the main breaker rating does not exceed 200 amperes and 600 volts. For services less than 300 volts line to line, metering shall be located on the line side of the customer's main breaker. For services over 300 volts line to line, metering shall be located on the load side of the customer's main breaker.

#### **General Requirements**

- For three-phase services, a 7-jaw meter socket shall be used.
- For 120/208 volt services, refer to [Drawing 11-3 Diagrams of Socket Connections – Three-Phase, 4-Wire Wye 120/208 V.](#)
- For services over 300 volts line to line, the 7-jaw meter socket *must* have an isolated neutral block as per the CEC. For 277/480 or 347/600 volt services, refer to [Drawing 11-4 Diagrams of Socket Connections – Three-Phase, 4-Wire Wye 277/480 or 347/600 V.](#)
- The preferred location for 347/600 volt metering is inside the building.

**5.3.1 THREE-PHASE OVERHEAD COMMERCIAL SERVICES  $\leq$  200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, socket type meter base.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install conduit, weatherhead, rack and conductors in the mast on the line side of the meter. The conductors shall protrude a minimum of 1 m out of the weatherhead and the conductors shall be provided with drip loops.
- For services **up to 150 kVA**, supply and install a means of attachment for the Company conductors.
- For services **greater than 150 kVA**, supply and install secondary service conductors from weatherhead up to the transformer.

Note: The Company will not supply connectors for conductors larger than 500 MCM.

**The Company shall:**

- For services **up to 150 kVA**, supply and install conductors up to the customer's conductors at the weatherhead. The supply conductors shall be terminated leaving the customer conductors protruding a minimum of 0.75 m out of the weatherhead.
- For services **greater than 150 kVA**, supply and install the primary facilities required for electrical service up to and including the transformer.
- Supply and install the meter.



**5.3.2 THREE-PHASE UNDERGROUND COMMERCIAL SERVICES  $\leq$  200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, socket type meter base.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install secondary service conductors up to the padmount transformer or service pedestal. Connectors shall have NEMA spacing for connection to a spade terminal.
- Make the secondary cable connections to the padmount transformer secondary bushings or the service pedestal.

**The Company shall:**

- Supply and install all facilities required for electrical service up to and including the padmount transformer or the service pedestal.
- Supply and install the meter.

## 5.4 THREE-PHASE COMMERCIAL SERVICES - INSTRUMENT TRANSFORMER METERING

Three-phase instrument transformer metering is used for commercial services where the main breaker rating exceeds 200 amperes and/or 600 volts. Metering shall be on the load side of the Customer's breaker.

### General Requirements

- Metered and unmetered cables shall not be installed in the same auxiliary gutter or splitter box.
- There shall be no elbows with covers (LBs) or pull boxes between the instrument transformer cabinet and the meter socket.
- Instrument transformer cabinets shall not be used as junction boxes to connect secondary load conductors.
- The meter shall be located on the inside of a building or in an outdoor weatherproof cabinet. The instrument transformer enclosure and the meter shall be in the same room, separated by a **maximum of 6.5 m**. For the arrangement of instrument transformer metering, refer to [Drawing 9-1 Typical Arrangement for Instrument Transformer](#).
- For all three-phase instrument services, a 13-jaw meter socket and test switch enclosure shall be used. For details, refer to section [9.3.2 Three-Phase Meter Socket And Test Switch Enclosure](#).
- Details of instrument transformer metering are specified in section [9 Instrument Transformer Metering](#).
- Refer to
- [Drawing 6-5 Secondary Overhead to Underground Riser on a Pole](#).

### 5.4.1 THREE-PHASE OVERHEAD COMMERCIAL SERVICES > 200 A

**The customer shall:**

- Supply and install a CSA approved, low voltage, 13-jaw meter socket and test switch enclosure.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install conduit, weatherhead, rack and conductors in the mast on the line side of the meter. The conductors shall protrude a minimum of 1 m out of the weatherhead and the conductors shall be provided with drip loops.
- For services **up to 150 kVA**, supply and install a means of attachment for the Company conductors.
- For services **greater than 150 kVA**, supply and install secondary conductors from weatherhead up to the transformer.
- Supply and install a Company approved instrument transformer enclosure. For enclosure requirements, refer to section [9.2 Instrument Transformer Cabinets](#).
- Be responsible for the installation of, and primary connection to, the current transformers (lugs) and the installation of the voltage transformers.

For 120/208 or 277/480 volt services, refer to [Drawing 9-10 Typical Arrangement of Three-Phase, 4-Wire Wye 120/208 or 277/480 V Instrument Metering 200-1200 A Service](#).

For 347/600 volt services, refer to [Drawing 9-11 Typical Arrangement of Three-Phase, 4-Wire Wye 347/600 V Instrument Metering, 200-1200 A Service](#).

- Extend the neutral conductor into the instrument transformer enclosure.

Note: The Company will not supply connectors for conductors larger than 500 MCM.

**The Company shall:**

- For services **up to 150 kVA**, supply and install conductors up to the customer's conductors at the weatherhead. The supply conductors shall be terminated leaving the customer conductors protruding a minimum of 0.75 m out of the weatherhead.
- For services **greater than 150 kVA**, supply and install the primary facilities required for electrical service up to and including the transformer.
- Supply and install the meter.
- Supply current and voltage instrument transformers. Upon request, ship the equipment to the electrical contractor or manufacturer.

**5.4.2 THREE-PHASE UNDERGROUND COMMERCIAL SERVICES > 200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, 13-jaw meter socket and test switch enclosure.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install secondary service conductors up to the transformer or service pedestal. Connectors shall have NEMA spacing for connection to a spade terminal.
- Make the secondary cable connections to the padmount transformer secondary bushings or the service pedestal.
- Supply and install a Company approved instrument transformer enclosure. For enclosure requirements, refer to section [9.2 Instrument Transformer Cabinets](#).
- Be responsible for the installation of, and primary connection to, the current transformers (lugs) and the installation of the voltage transformers.

For 120/208 or 277/480 volt services, refer to [Drawing 9-10 Typical Arrangement of Three-Phase, 4-Wire Wye 120/208 or 277/480 V Instrument Metering 200-1200 A Service](#).

For 347/600 volt services, refer to [Drawing 9-11 Typical Arrangement of Three-Phase, 4-Wire Wye 347/600 V Instrument Metering, 200-1200 A Service](#).

- Extend the neutral conductor into the instrument transformer enclosure.

**The Company shall:**

- Supply and install all facilities required for electrical service up to and including the padmount transformer or the service pedestal.
- Supply and install the meter.
- Supply current and voltage instrument transformers. Upon request, ship the equipment to the electrical contractor or manufacturer.

## **6 INDUSTRIAL SERVICES**

Industrial services are generally large facilities where the primary function is in oilfield operations, manufacturing and/or producing of a product.

### **General Requirements**

- Where recessed metering is installed in a wall, a clear space of no less than 0.2 m on either side of the centre line of the meter base and 1.0 m in front of the meter is required, to provide the Company access to the meters.
- The centre line of the meter socket shall be 1.3 to 1.8 m with the preferred height of 1.5 m above the finished grade or permanent platform, and in a properly lit area.
- Metering shall not be located on the pumpjack. Metering shall be located on a remote or separate service pole (i.e.: a service pole or transformer pole) away from the pumpjack.

## **6.1 SINGLE-PHASE INDUSTRIAL SERVICES – SELF-CONTAINED METERING**

Self-contained metering is used for services where the main breaker rating does not exceed 200 amperes.

### **General Requirements**

- The standard supply is single-phase, 3-wire 120/240 volts.
- Metering shall be located on the line side of the customer's main breaker.
- Metering shall be located on the outside of a building except where transformer pole metering is installed.
- A 4-jaw meter socket shall be used. For the connection diagram, refer to [Drawing 11-1 Socket Connection Diagrams – Single-Phase, 3-Wire 120/240 or 240/480 V](#).
- Meters can be up to 216 mm (8½") in depth; therefore, sufficient clearance must be taken into consideration when installing the meter on a wall, in a cabinet or in an enclosure.

### **6.1.1 SINGLE-PHASE OVERHEAD INDUSTRIAL SERVICES ≤ 200 A**

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

- Supply and install a CSA approved, low voltage, socket type meter base.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install conduit, weatherhead, rack and conductors in the mast on the line side of the meter. The conductors shall protrude a minimum of 1 m out of the weatherhead and the conductors shall be provided with drip loops. Note that the Company will not supply connectors for conductors larger than 500 MCM.
- Supply and install a means of attachment for the Company conductors.

#### **The Company shall:**

- Supply and install the secondary conductors required for electrical service to the customer's conductors at the weatherhead. The supply conductors shall be terminated leaving the customer conductors protruding a minimum of 0.75 m out of the weatherhead.
- Supply and install the meter.

**6.1.2 SINGLE-PHASE UNDERGROUND INDUSTRIAL SERVICES  $\leq$  200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, socket type meter base.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install the conduit for the conductors to the meter socket on the line side.
- Supply and install underground secondary conductors from the service pedestal or transformer to the line side of the meter. Connectors shall have NEMA spacing for connection to a spade terminal.
- Make the secondary cable connections to the padmount transformer secondary bushings or the service pedestal.

**The Company shall:**

- Supply and install all facilities required for electrical service up to and including the padmount transformer or the service pedestal.
- Supply and install meter.

## 6.2 SINGLE-PHASE INDUSTRIAL SERVICES – INSTRUMENT TRANSFORMER METERING

Instrument transformer metering is used for services where the main breaker rating exceeds 200 amperes. Metering shall be located on the load side of the customer's main breaker.

### General Requirements

- Metered and unmetered cables shall not be installed in the same auxiliary gutter or splitter box.
- There shall be no elbows with covers (LBs) or pull boxes between the instrument transformer cabinet and the meter socket.
- Instrument transformer cabinets shall not be used as junction boxes to connect secondary load conductors.
- The meter shall be located on the inside of a building or in an outdoor weatherproof cabinet. The instrument transformer enclosure and the meter shall be in the same room, separated by a **maximum of 6.5 m**. For the arrangement of instrument transformer metering, refer to [Drawing 9-1 Typical Arrangement for Instrument Transformer](#).
- If the meter cannot be accommodated inside the building, it may be located outside using a Microelectric FA4B–6T, 6-jaw meter socket and test switch enclosure that houses two 2-wire current transformers.
- For all single-phase instrument transformer metering services, a 6-jaw meter socket and test switch enclosure shall be used. For details, refer to section [9.3.1 Single-Phase Meter Socket And Test Switch Enclosure](#).
- Details of instrument transformer metering are specified in section [9 Instrument Transformer Metering](#).



**6.2.1 SINGLE-PHASE OVERHEAD INDUSTRIAL SERVICES > 200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, 6-jaw meter socket and test switch enclosure.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install conduit, weatherhead, rack and conductors in the mast on the line side of the meter. The conductors shall protrude a minimum of 1 m out of the weatherhead and the conductors shall be provided with drip loops. Note that the Company will not supply connectors for conductors larger than 500 MCM.
- Supply and install a means of attachment for the Company conductors.
- Supply and install a Company approved instrument transformer enclosure. For enclosure requirements, refer to section [9.2 Instrument Transformer Cabinets](#).
- Be responsible for the installation of, and primary connection to, the current transformers (lugs). For details, refer to [Drawing 9-9 Typical Arrangement of Single-Phase, 3-Wire 120/240 or 240/480 V Instrument Metering](#).

**The Company shall:**

- Supply and install the secondary conductors required for electrical service up to the customer's conductors at the weatherhead. The supply conductors shall be terminated leaving the consumer conductors protruding a minimum of 0.75 m out of the weatherhead.
- Supply and install the meter.
- Supply the current transformers. Upon request, ship the equipment to the electrical contractor or manufacturer.

**6.2.2 SINGLE-PHASE UNDERGROUND INDUSTRIAL SERVICES > 200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, 6-jaw meter socket and test switch enclosure.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install the secondary service conductors from the transformer or the service pedestal to the line side of the meter. Connectors shall have NEMA spacing for connection to a spade terminal.
- Make the secondary cable connections to the padmount transformer secondary bushings or the service pedestal.
- Supply and install a Company approved instrument transformer enclosure. For enclosure requirements, refer to section [9.2 Instrument Transformer Cabinets](#).
- Be responsible for the installation of, and primary connection to, the current transformers (lugs). For details, refer to [Drawing 9-9 Typical Arrangement of Single-Phase, 3-Wire 120/240 or 240/480 V Instrument Metering](#).

**The Company shall:**

- Supply and install all facilities required for electrical service up to and including the padmount transformer or service pedestal.
- Supply and install the meter.
- Supply the current transformer. Upon request, ship the equipment to the electrical contractor or manufacturer.

### 6.3 THREE-PHASE INDUSTRIAL SERVICES – SELF-CONTAINED METERING

Three-phase, self-contained metering is used for industrial services where the main breaker rating does not exceed 200 amperes and 600 volts. For services less than 300 volts line to line, metering shall be located on the line side of the customer's main breaker. For services over 300 volts line to line, metering shall be located on the load side of the customer's main breaker.

#### **General Requirements**

- The metering may be on a pole, a panel or inside an MCC electrical building, depending on the type of customer application.
- For three-phase services, a 7-jaw meter socket shall be used.
- For 120/208 volt services, refer to [Drawing 11-3 Diagrams of Socket Connections – Three-Phase, 4-Wire Wye 120/208 V](#).
- For services over 300 volts line to line, the 7-jaw meter socket **must** have an isolated neutral block as per the CEC. For 277/480 or 347/600 volt services, refer to [Drawing 11-4 Diagrams of Socket Connections – Three-Phase, 4-Wire Wye 277/480 or 347/600 V](#).
- The preferred location for 347/600 volt metering is inside of a building.

**6.3.1 THREE-PHASE OVERHEAD INDUSTRIAL SERVICES  $\leq$  200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, socket type meter base.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install conduit, weatherhead, rack and conductors in the mast on the line side of the meter. The conductors shall protrude a minimum of 1 m out of the weatherhead and the conductors shall be provided with drip loops
- For services **up to 150 kVA**, supply and install a means of attachment for the Company conductors.
- For services **greater than 150 kVA**, supply and install secondary service conductors from weatherhead up to the transformer.

Note: The Company will not supply connectors for conductors larger than 500 MCM.

**The Company shall:**

- For services **up to 150 kVA**, supply and install conductors up to the customer's conductors at the weatherhead. The supply conductors shall be terminated leaving the consumer conductors protruding a minimum of 0.75 m out of the weatherhead.
- For services **greater than 150 kVA**, supply and install the primary facilities required for electrical service up to and including the transformer.
- Supply and install the meter.

**6.3.2 THREE-PHASE UNDERGROUND INDUSTRIAL SERVICES  $\leq$  200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, socket type meter base.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install secondary service conductors up to the padmount transformer or the service pedestal. Connectors shall have NEMA spacing for connection to a spade terminal.
- Make the secondary cable connections to the padmount transformer secondary bushings or the service pedestal.

**The Company shall:**

- Supply and install all facilities required for electrical service up to and including the padmount transformer or the service pedestal.
- Supply and install the meter.

## 6.4 THREE-PHASE INDUSTRIAL SERVICES - INSTRUMENT TRANSFORMER METERING

Three-phase instrument transformer metering is used for industrial services where the main breaker rating exceeds 200 amperes and/or 600 volts. Metering shall be on the load side of the customer's breaker.

### General Requirements

- Metered and unmetered cables shall not be installed in the same auxiliary gutter or splitter box.
- There shall be no elbows with covers (LBs) or pull boxes between the instrument transformer cabinet and the meter socket.
- Instrument transformer cabinets shall not be used as junction boxes to connect secondary load conductors.
- The meter shall be located on the inside of a building or in an outdoor weatherproof cabinet. The instrument transformer enclosure and the meter shall be in the same room, separated by a **maximum of 6.5 m**. For the arrangement of instrument transformer metering, refer to [Drawing 9-1 Typical Arrangement for Instrument Transformer](#).
- For all three-phase instrument services, a 13-jaw meter socket and test switch enclosure shall be used. For details, refer to section [9.3.2 Three-Phase Meter Socket And Test Switch Enclosure](#).
- Details of instrument transformer metering are specified in section [9 Instrument Transformer Metering](#).
- Refer to
- [Drawing 6-5 Secondary Overhead to Underground Riser on a Pole](#).

**6.4.1 OVERHEAD INDUSTRIAL SERVICES > 200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, 13-jaw meter socket and test switch enclosure.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install conduit, weatherhead, rack and conductors in the mast on the line side of the meter. The conductors shall protrude a minimum of 1 m out of the weatherhead and the conductors shall be provided with drip loops.
- For services **up to 150 kVA**, supply and install a means of attachment for the Company conductors.
- For services **greater than 150 kVA**, supply and install secondary conductors from weatherhead up to the transformer.
- Supply and install a Company approved instrument transformer enclosure. For details, refer to section [9.2 Instrument Transformer Cabinets](#).
- Be responsible for the installation of, and primary connection to, the current transformers (lugs) and the installation of the voltage transformers.

For 120/208 or 277/480 volt services, refer to [Drawing 9-10 Typical Arrangement of Three-Phase, 4-Wire Wye 120/208 or 277/480 V Instrument Metering 200-1200 A Service](#).

For 347/600 volt services, refer to [Drawing 9-11 Typical Arrangement of Three-Phase, 4-Wire Wye 347/600 V Instrument Metering, 200-1200 A Service](#).

- Extend the neutral conductor into the instrument transformer enclosure.

Note: The Company will not supply connectors for conductors larger than 500 MCM.

**The Company shall:**

- For services **up to 150 kVA**, supply and install conductors up to the customer's conductors at the weatherhead. The supply conductors shall be terminated leaving the consumer conductors protruding a minimum of 0.75 m out of the weatherhead.
- For services **greater than 150 kVA**, supply and install the primary facilities required for electrical service up to and including the transformer.
- Supply and install the meter.
- Supply current and voltage instrument transformers. Upon request, ship the equipment to the electrical contractor or manufacturer.

**6.4.2 UNDERGROUND INDUSTRIAL SERVICES > 200 A****The customer shall:**

- Supply and install a CSA approved, low voltage, 13-jaw meter socket and test switch enclosure.
- Supply and install all wiring, equipment and facilities on the load side of the meter.
- Supply and install secondary service conductors up to the transformer or service pedestal. Connectors shall have NEMA spacing for connection to a spade terminal.
- Make the secondary cable connections to the padmount transformer secondary bushings or service pedestal.
- Supply and install a Company approved instrument transformer enclosure. For details, refer to [9.2 Instrument Transformer Cabinets](#).
- Be responsible for the installation of, and primary connection to, the current transformers and the installation of the voltage transformers.

For 120/208 or 277/480 volt services, refer to [Drawing 9-10 Typical Arrangement of Three-Phase, 4-Wire Wye 120/208 or 277/480 V Instrument Metering 200-1200 A Service](#).

For 347/600 volt services, refer to [Drawing 9-11 Typical Arrangement of Three-Phase, 4-Wire Wye 347/600 V Instrument Metering, 200-1200 A Service](#).

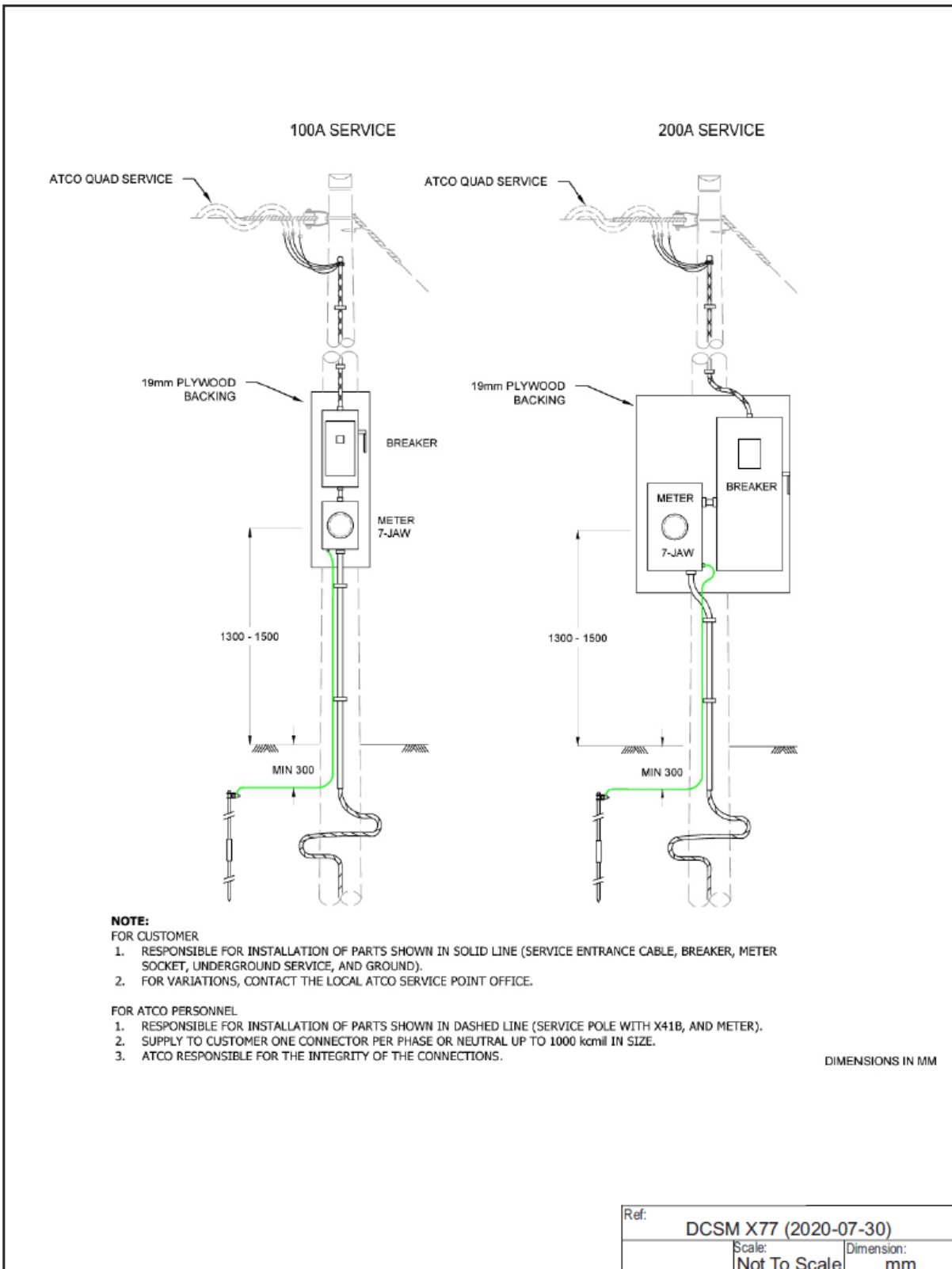
- Extend the neutral conductor into the instrument transformer enclosure.

**The Company shall:**

- Supply and install all facilities required for electrical service up to and including the padmount transformer or the service pedestal.
- Supply and install the meter.
- Supply current and voltage instrument transformers. Upon request, ship the equipment to the electrical contractor or manufacturer.

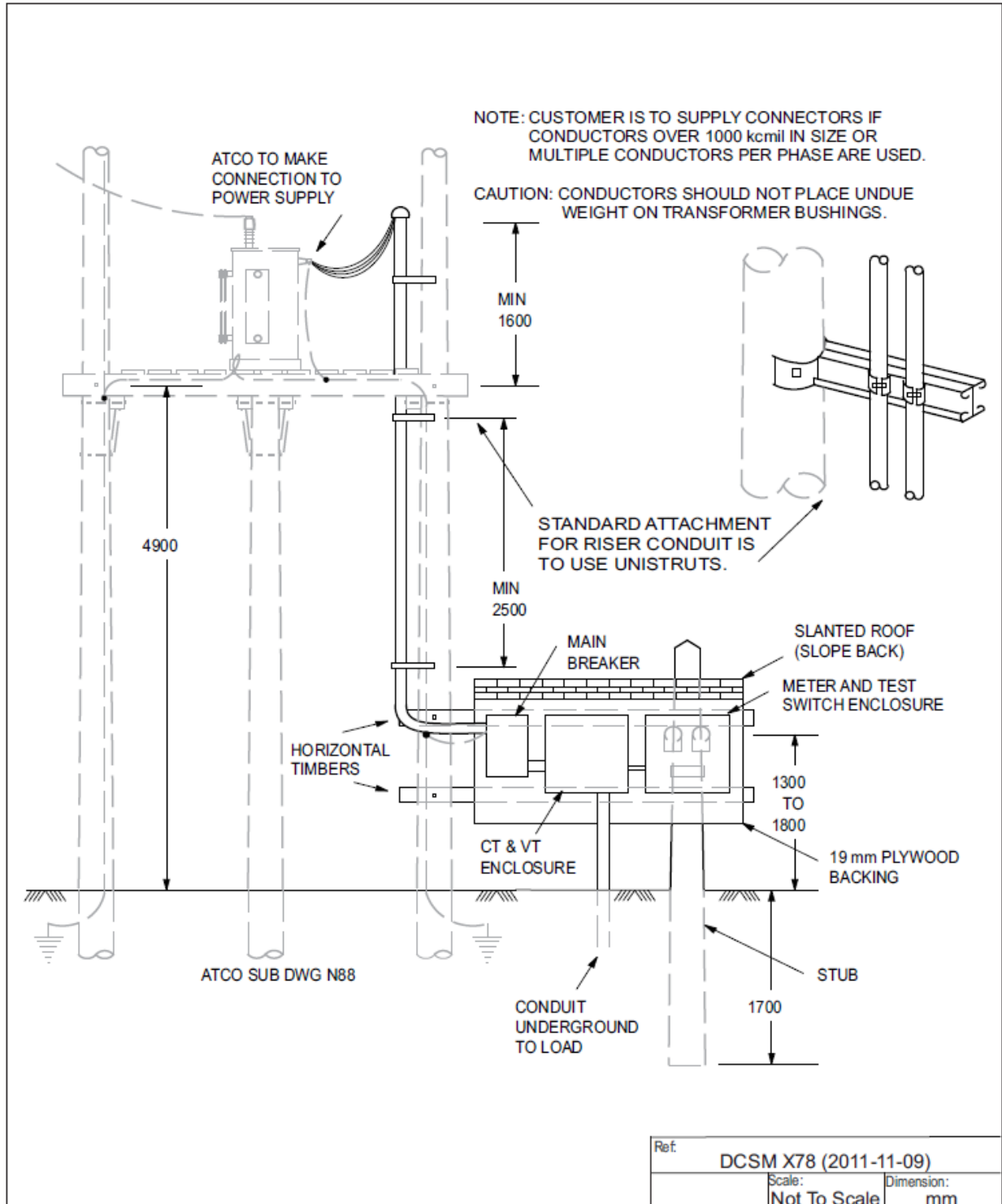


Drawing 6-1 Self-Contained Metering on an Oilfield Service Pole > 300 V Phase to Phase



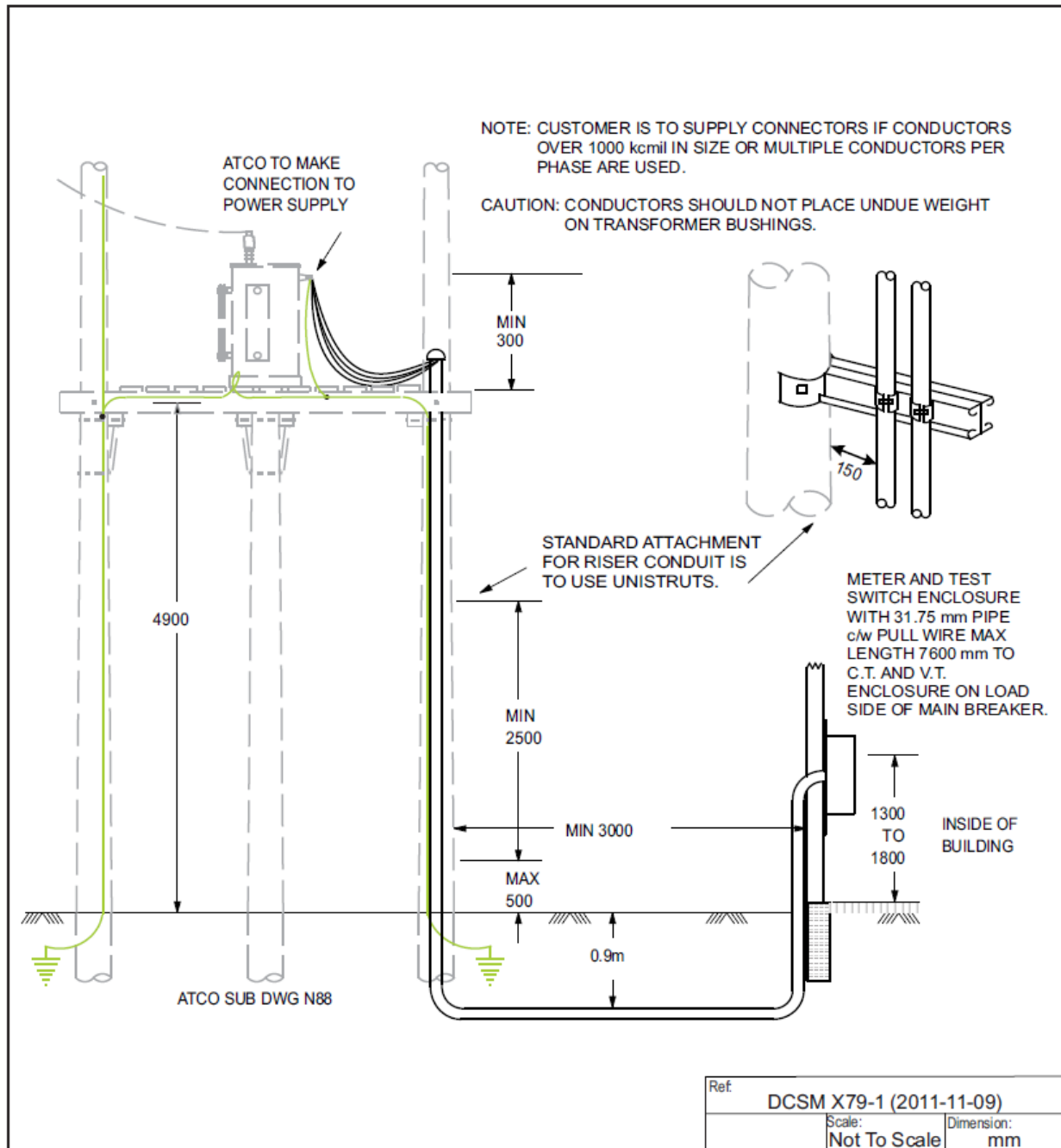
Revised Jul 2024

Drawing 6-2 Pole Metering for Oilfield Loads Over 200 A and Greater 300 V Phase to Phase

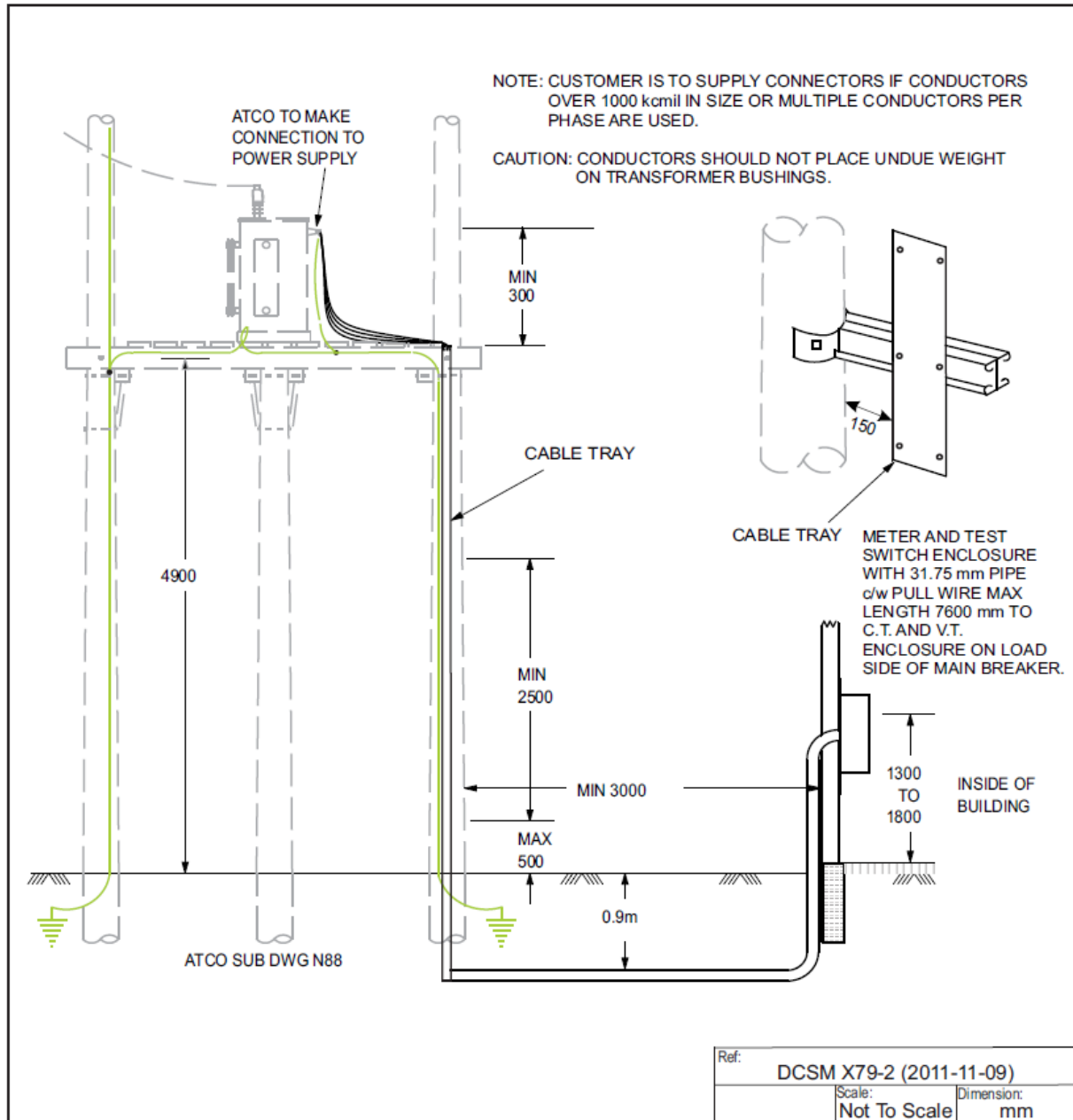


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Drawing 6-3 Customer Owned Metering for Oilfield Loads Over 200 A > 300 V Phase to Phase with Mast up to #4/0

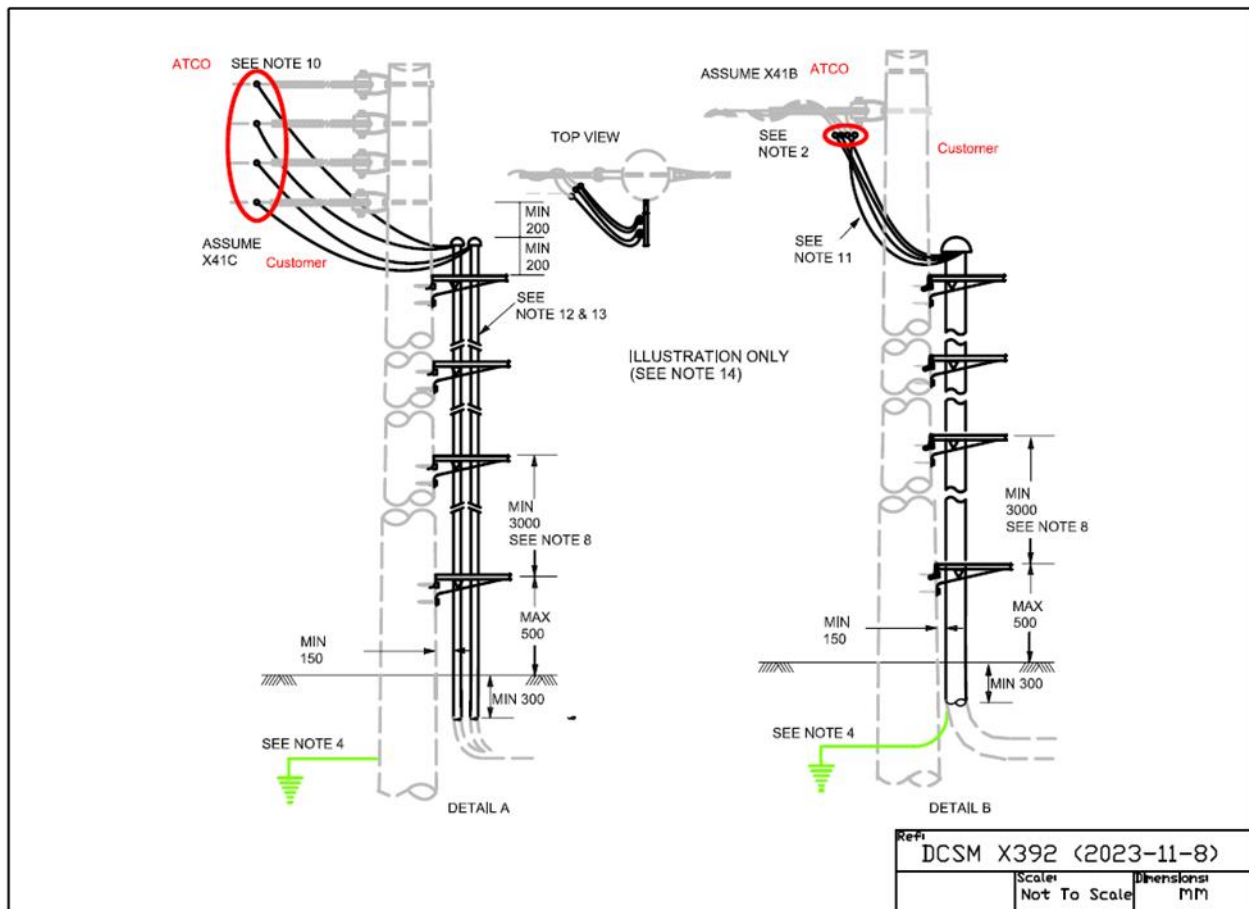


Drawing 6-4 Customer Owned Metering for Oilfield Loads Over 200 A > 300 V Phase to Phase with Cable Tray over #4/0



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Drawing 6-5 Secondary Overhead to Underground Riser on a Pole



See the Notes for this drawing on the next page.

**Notes:**

1. Customer is to supply connectors if conductors over 1000 KCMIL in size or multiply conductors per phase are used.
2. Cover all connections with all-weather tape.
3. Vertical conductors attached to a pole must be suitably protected. If the riser cannot be placed where interference from vehicular traffic or pedestrian activity will be minimal. Steel posts, concrete curbs or other approved means must be used to protect the facilities.
4. The company recommends customer install a ground at pole so no neutral current from the company's circuit will flow to customer's ground at main breaker.
5. All tags should face towards the roadside. Please refer to H9 for more information on signage location.
6. Unistrut comes in two sizes with a 457 or 381 mm stand-off arm and the Company recommends using the shortest that is adequate.
7. Unistrut mounting brackets will be provided by the company.
8. The spacing between (bottom bracket and the one above) shall be 3000 mm as per AEUC. All other spacing shall follow the CEC.
9. Teck Cable is to be installed in rigid conduit. To avoid risers slipping through the conduit, the risers should be planted firmly on the ground or clamped to an approved cable tray.
10. The company will make the final connection to the power supply.
11. The neutral conductor is to have the longest loop, as it is the last to disconnect.
12. Communication conduit and customer service conduit are to be furthest away from the pole.
13. Bond neutral to the ground wire enclosed in the riserway.
14. This drawing is intended for customer owned risers. However, material lists for both ATCO and customer owned risers may be generated through design and material assistant.

## 7 MICRO-GENERATION

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

- i. exclusively uses sources of renewable or alternative energy,
- ii. is intended to meet all or a portion of the customer's total energy consumption at the customer's site or aggregated sites,
- iii. has a total nameplate capacity that does not exceed the lesser of 5 MW or the rating of the customer's service,
- iv. supplies electric energy only to a site that is located on property that the customer owns or leases, and
- v. is located:
  - a) on the property referred to in subclause (iv), or
  - b) on property that the customer owns or leases that is adjacent to the property referred to in subclause (iv)

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

- i. products having current EcoLogo certification, or
- ii. solar, wind, hydro, fuel cell, geothermal, biomass or other generation sources, if the greenhouse gas intensity of:
  - a) the electric energy produced, or
  - b) the total energy produced from the simultaneous generation of electric energy and production of thermal energy from the same fuel source

is less than or equal to 418 kg per MWh

### **General Requirements**

- The customer must comply with the "Application for Service & General Requirements" of this guide for the required service type.
- The customer is responsible for obtaining the electrical permit, any municipal approvals and making commercial arrangements with a Retailer.
- The customer must complete the application process requirement found on the Company web site ([atco.com](http://atco.com)). Further information is available at Alberta Utilities Commission at [auc.ab.ca](http://auc.ab.ca).
- The Company must post a warning label indicating the existence of a dual voltage supply adjacent to the meter(s).

## **7.1 SMALL MICRO-GENERATION**

Small micro-generation is defined as a generating unit with a total nameplate capacity of less than 150 kW.

**The customer is:**

Required to meet with the Company to ensure the service connection details follow the Alberta Utilities Commission guidelines and the Company requirements.

**The Company shall:**

Supply and install the meter(s).

## **7.2 LARGE MICRO-GENERATION**

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

**The customer is:**

Required to meet with the Company to ensure the service connection details follow the Alberta Utilities Commission guidelines and the Company requirements.

**The Company shall:**

Supply and install the meter(s).



## **8 TEMPORARY SERVICES & IDLE SERVICES**

### **8.1 TEMPORARY SERVICES**

Temporary service normally means a service that will be required for two years or less. In some cases, a longer period may be appropriate if both the Company and the customer know that the customer has no intention of remaining on-site permanently. For example, road construction camps sometimes require services for three years while they are constructing a project such as a stretch of highway.

To determine whether a service is temporary, contact your local Company office.

### **8.2 IDLE SERVICES**

An idle service normally means a service that has been temporary disconnected for a period of six to twelve months. The meter will normally have a disconnect sleeve connected or the metering and associated facilities such as the transformer may be temporarily removed. During the idle service period, the customer will be billed on the greater of the contract minimum as agreed upon in their Electric Service Agreement or the rate minimum. In the event the service remains idle for two consecutive seasons, the Company may remove its facilities, unless the customer agrees to pay the minimum charge for the upcoming season. If the site is not enrolled with a retailer, the Company shall assess the idle service charge to the customer at the site.

For service reconnection, contact the local Company office. The local Company office or marketing representative can provide further details on idle services. The retailer may hold all wires related charges until the service is reconnected. The sum of the wires charges will then be passed on to the customer.

## 9 INSTRUMENT TRANSFORMER METERING

Instrument transformer metering requires instrument transformers, an instrument transformer cabinet and a combination meter socket and test switch enclosure. Instrument transformers are typically installed in the instrument transformer cabinet or a switchgear compartment. For typical installation arrangement, refer to [Drawing 9-1 Typical Arrangement for Instrument Transformer](#).

### 9.1 INSTRUMENT TRANSFORMER

The Company will supply Measurement Canada approved instrument transformers for revenue metering. Upon request, the Company will ship the instrument transformers to the electrical contractor or manufacturer.

The customer is responsible for the installation of, and primary connection to, the current transformers, and for the installation of the voltage transformers. Refer to the applicable link in the following table for instrument transformer installation arrangement and connections.

Table 9-1 List of Instrument Metering Arrangement

Service Voltage (volt)	Phase, Wire	Reference
120/240 or 240/280	single-phase, 3-wire	<a href="#">Drawing 9-9 Typical Arrangement of Single-Phase, 3-Wire 120/240 or 240/480 V Instrument Metering</a>
120/208 or 277/480	three-phase, 4-wire	<a href="#">Drawing 9-10 Typical Arrangement of Three-Phase, 4-Wire Wye 120/208 or 277/480 V Instrument Metering</a>
347/600	three-phase, 4-wire	<a href="#">Drawing 9-11 Typical Arrangement of Three-Phase, 4-Wire Wye 347/600 V Instrument Metering</a>

## 9.2 INSTRUMENT TRANSFORMER CABINETS

The customer shall provide and install a Company approved metal instrument transformer cabinet. On three-phase services, the customer is responsible for ensuring that the neutral conductor and all phase conductors are connected inside the cabinet.

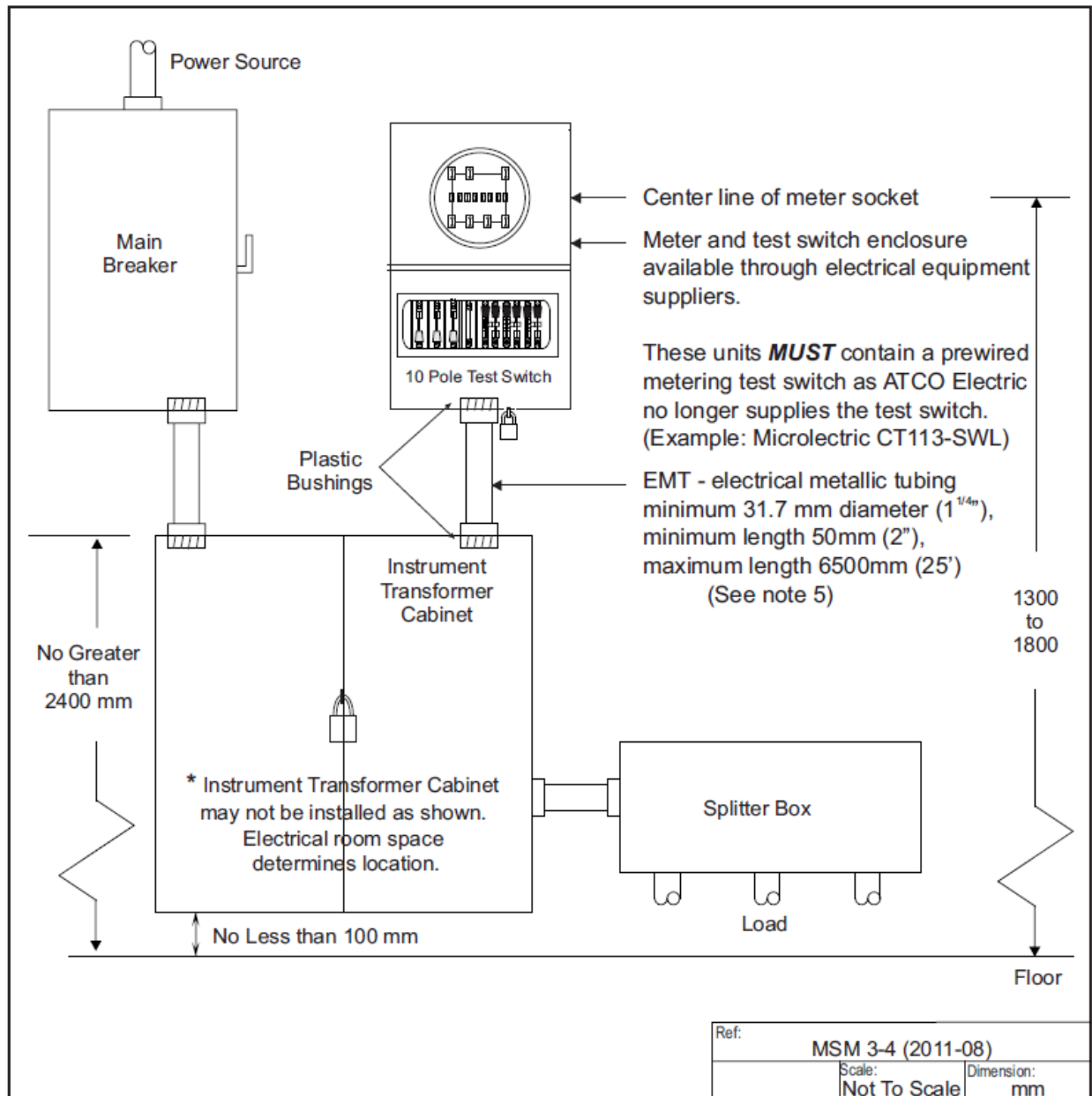
The cabinet shall have a minimum inside dimension of:

- 760 x 760 x 250 mm (length x width x depth) for bar-type current transformers and for 200-1200 ampere service, or
- 1200 x 900 x 300 mm (length x width x depth) for window-type current transformers and for 1201 - 2000 ampere service.

For indoor installation, the cabinet shall have vertically double-hinged doors which swing open at least 110 degrees, or a single-hinged door. If the cabinet is in a high dust area, it **must be** a single weatherproof door type.

For outdoor installation, enclosures shall have a single NEMA R3 weatherproof door.

Drawing 9-1 Typical Arrangement for Instrument Transformer Metering



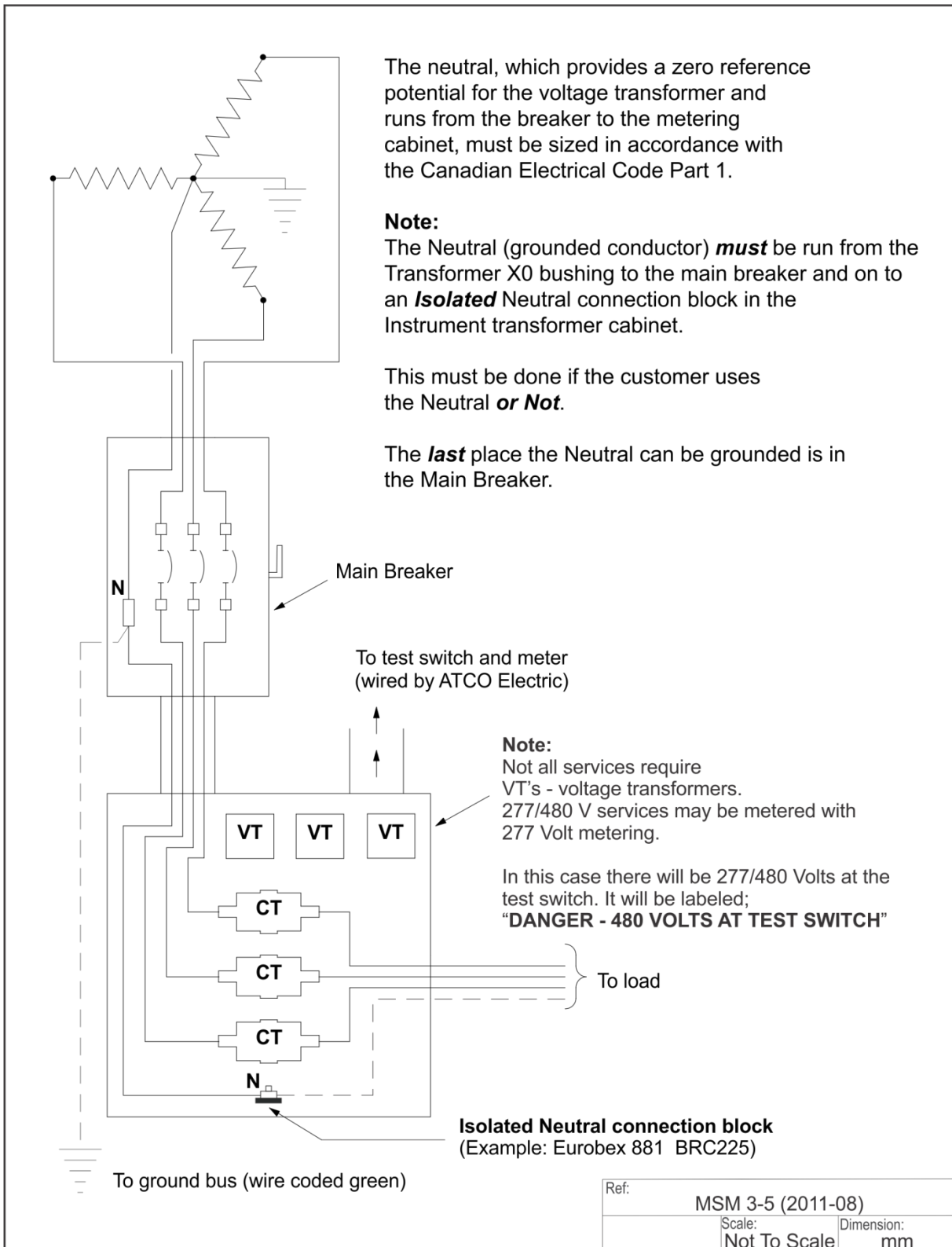
See the Notes for this drawing on the next page.

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**Notes:**

1. The instrument transformer cabinet and the combination meter socket/test switch enclosure shall be in the same room, separated by a **maximum of 6.5 m**.
2. Indoor instrument transformer cabinets shall have vertically double-hinged doors which swing open at least 110 degrees, or a single-hinged door. If the cabinet is in a high dust area, it must be a single weatherproof door type.
3. Metering shall be located inside a building. For oilfield and irrigation pump loads, metering may be located on a service/transformer pole service panel.
4. Metering shall not be located on the pumpjack.
5. The electrical contractor shall not place a LB (elbow with cover) between the meter/test switch enclosure and the instrument transformer cabinet.

Drawing 9-2 Typical Connections for Three-Phase, 4-Wire Wye Services



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## **9.3 METER SOCKET AND TEST SWITCH ENCLOSURE**

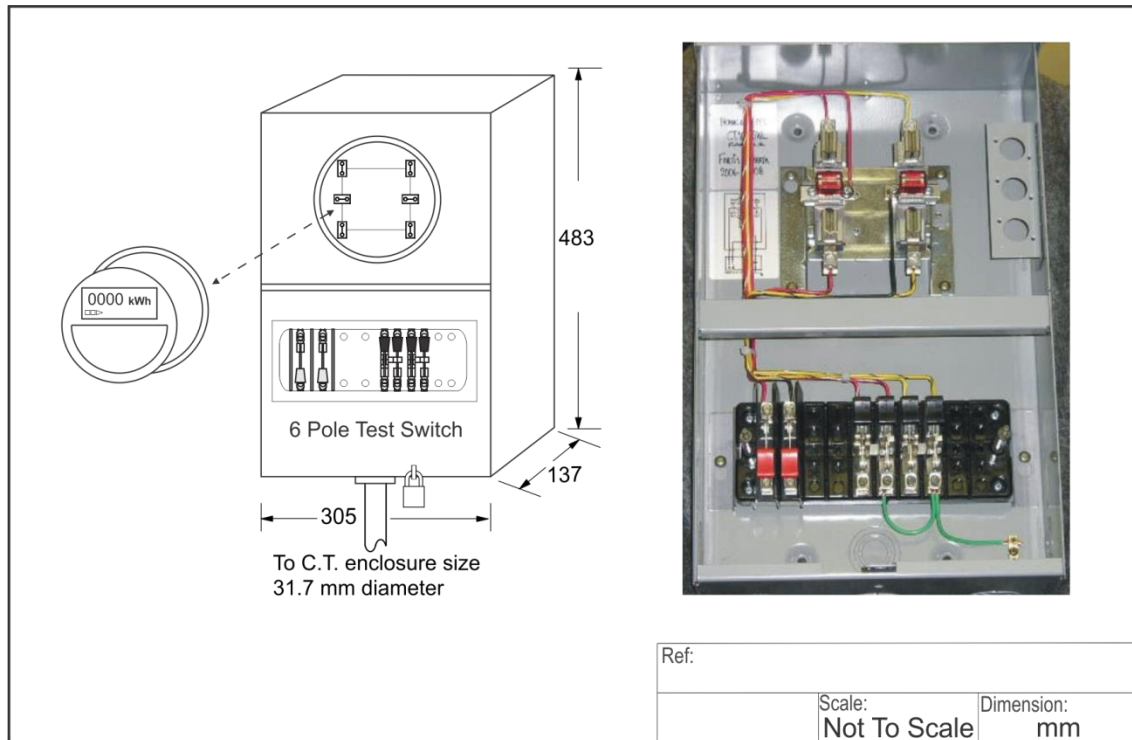
### **General Requirements**

- For outdoor applications, use a NEMA R3 weatherproof enclosure.
- The electrical contractor shall not place a LB (elbow with cover) between the meter socket and test switch enclosure, and the instrument transformer cabinet.
- If the enclosure is on top of the instrument transformer cabinet, the minimum separation shall be 50 mm.
- For single-phase, 3-wire services greater than 200 amperes, the Microelectric FA4B-6T may be used. It is a combination 6-jaw meter socket and test switch enclosure that also houses two 2-wire current transformers. It may be used for outside or inside applications.

### **9.3.1 SINGLE-PHASE METER SOCKET AND TEST SWITCH ENCLOSURE**

The standard instrument meter base for single-phase, 3-wire services greater than 200 amperes, is the 6-jaw meter socket and test switch enclosure. It is an integrated unit consisting of the enclosure, 6-jaw meter socket and 6-point test switch. It is pre-wired from the top of the test switch to the meter socket.

Drawing 9-3 Single-Phase Meter and Test Switch Enclosure



### Prewiring

The top of the 6-point test switch is pre-wired to the 6-jaw meter socket. The colour code and wire sizes are as follows:

- |                           |                              |         |
|---------------------------|------------------------------|---------|
| - Line 1 current polarity | - Red/white spiral tracer    | #12 AWG |
| - Line 1 current return   | - Red/black spiral tracer    | #12 AWG |
| - Line 2 current polarity | - Yellow/white spiral tracer | #12 AWG |
| - Line 2 current return   | - Yellow/black spiral tracer | #12 AWG |
| - Line 1 voltage polarity | - Solid red                  | #12 AWG |
| - Line 2 voltage return   | - Solid black                | #12 AWG |

### Test Switch Configuration

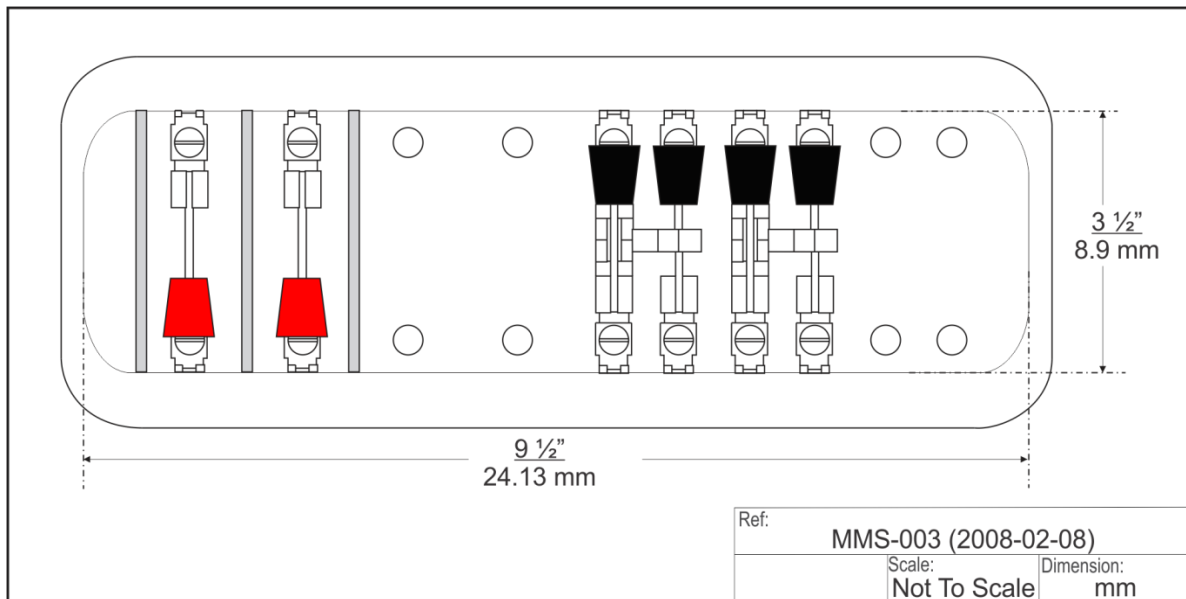
The test switch arrangement shall be made up of the following assemblies, with potential switch handles mounted in reverse so that when the switch is open, the potential blades are not energized:

- Barrier
- Reversed single pole potential (red)
- Barrier
- Reversed single pole potential (red)
- Barrier
- Space



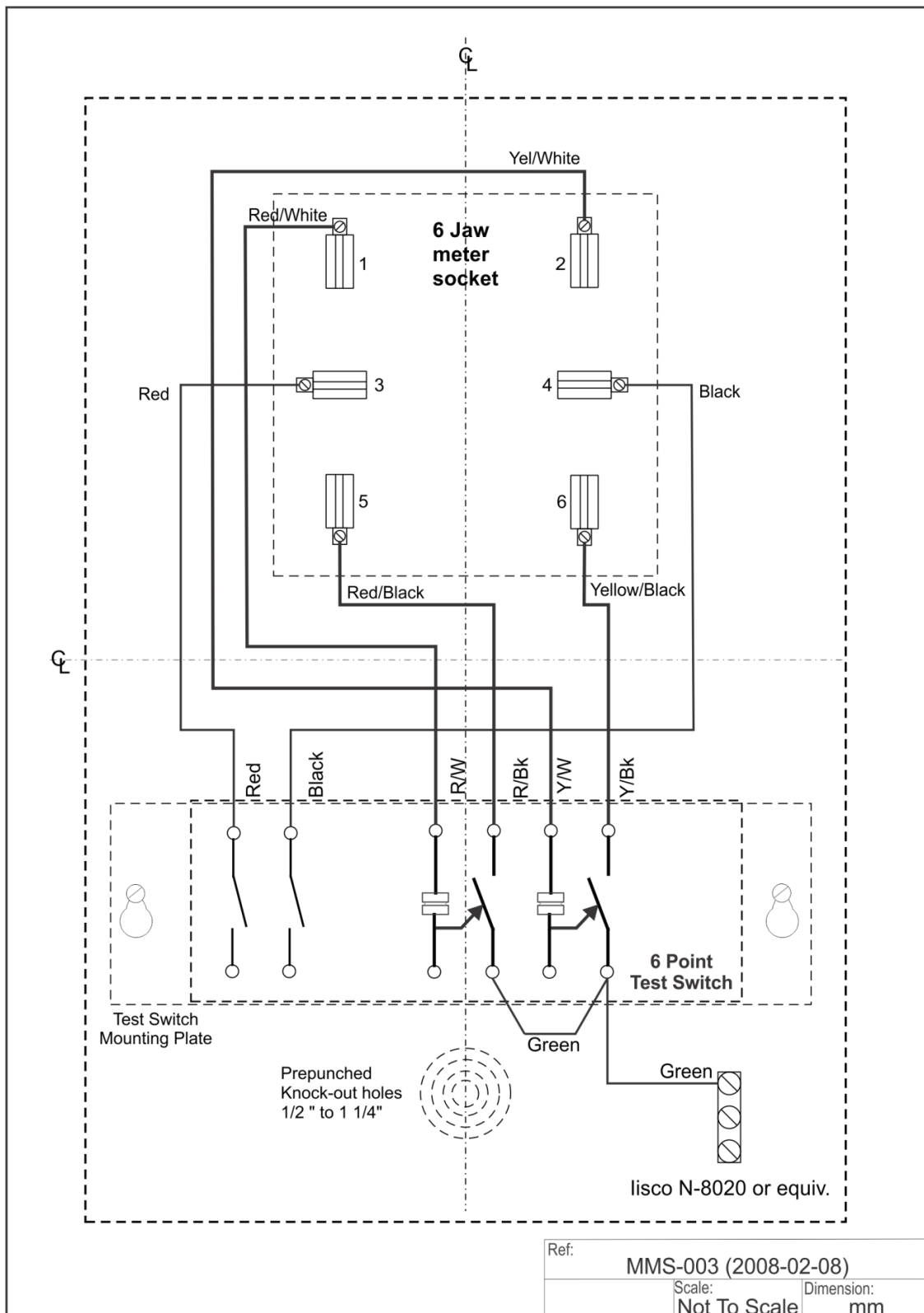
- Space
- Left-hand load test-jack double-pole current element (black)
- Left-hand load test-jack double-pole current element (black)
- Space

Drawing 9-4 6-Point Test Switch



Note: Solid green wire, #12 AWG to be pre-wired, test switch terminal 6 & 8, to the ground lug.

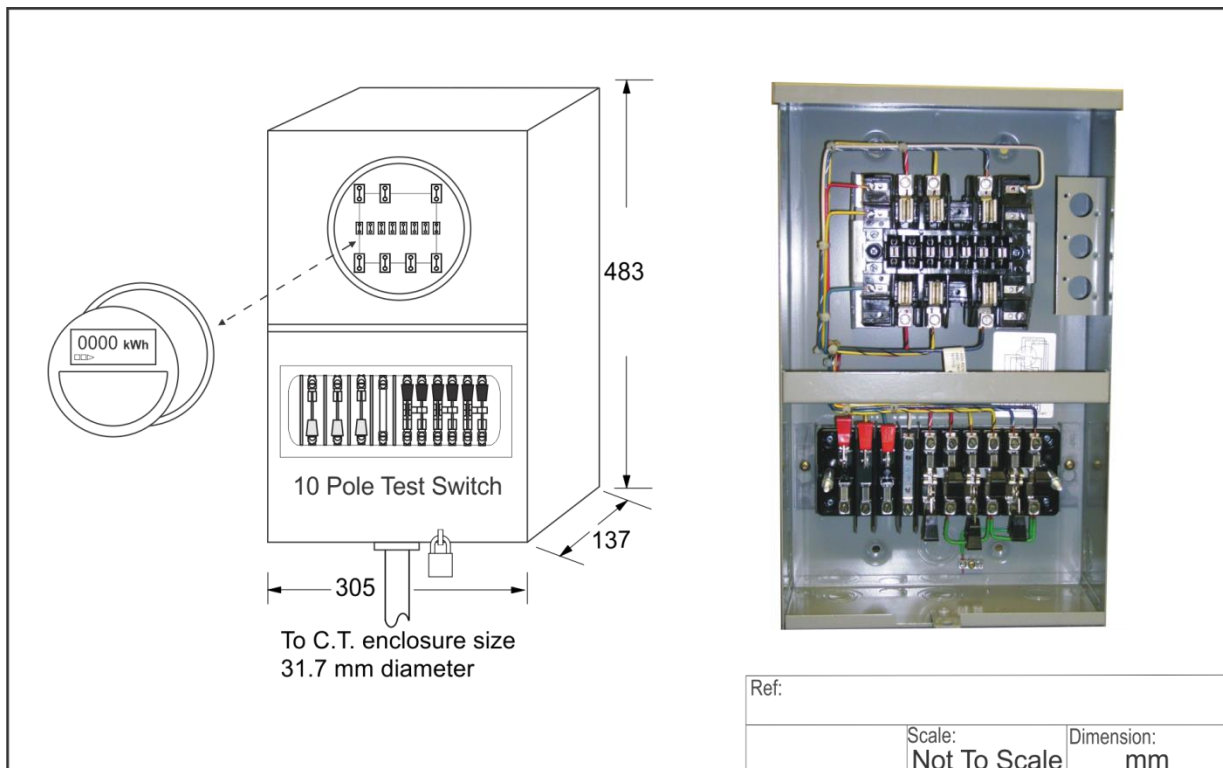
### Drawing 9-5 Single-Phase Meter and Test Switch Wiring



### 9.3.2 THREE-PHASE METER SOCKET AND TEST SWITCH ENCLOSURE

The standard instrument meter base for three-phase, 4-wire wye services is the 13-jaw meter socket and test switch enclosure. It is an integrated unit consisting of the enclosure, 13-jaw meter socket and 10-point test switch and is pre-wired from the top of the test switch to the meter socket.

Drawing 9-6 Three-Phase Meter and Test Switch Enclosure



#### Wiring:

The top of the 10-point test switch is pre-wired to the 13-jaw meter socket. The colour code and wire sizes are as follows:

- |                            |                              |          |
|----------------------------|------------------------------|----------|
| - A phase current polarity | - Red/white spiral tracer    | #12 AWG  |
| - A phase current return   | - Red/black spiral tracer    | #12 AWG  |
| - B phase current polarity | - Yellow/white spiral tracer | #12 AWG  |
| - B phase current return   | - Yellow/black spiral tracer | #12 AWG  |
| - C phase current polarity | - Blue/white spiral tracer   | #12 AWG  |
| - C phase current return   | - Blue/black spiral tracer   | #12 AWG  |
| - A phase voltage polarity | - Solid red                  | #12 AWG  |
| - B phase voltage polarity | - Solid yellow               | #12 AWG  |
| - C phase voltage polarity | - Solid blue                 | #12 AWG  |
| - Neutral                  | - Solid white                | # 12 AWG |

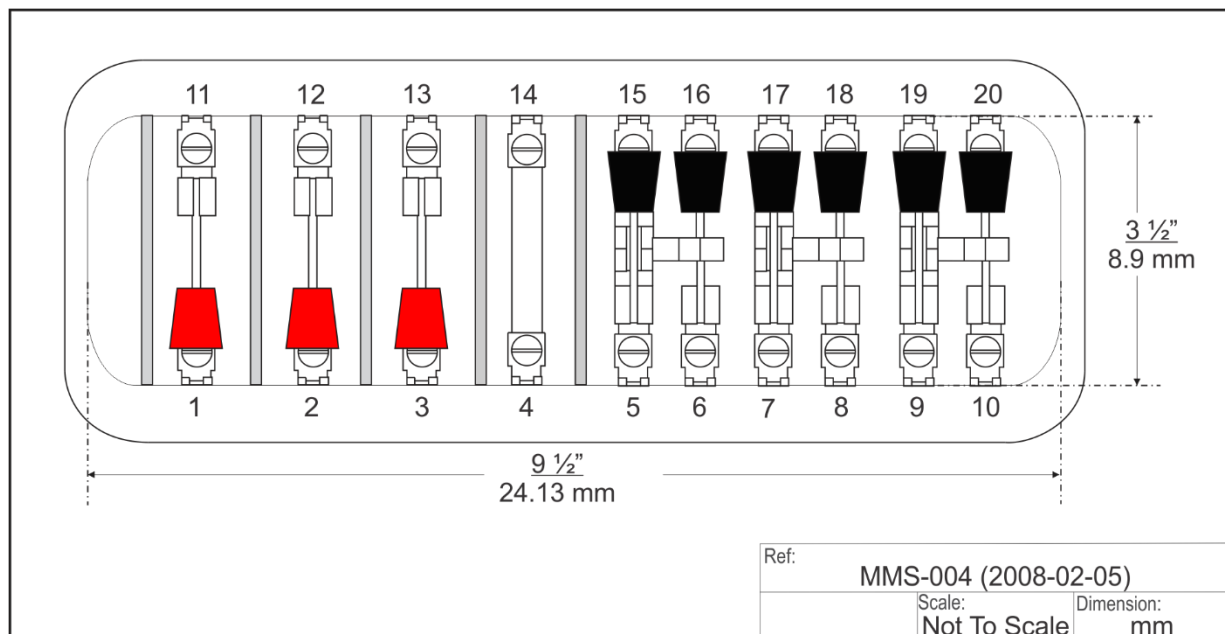
Revised Jul 2024

**Configuration**

The test switch arrangement shall be made up of the following assemblies, with potential switch handles mounted in reverse so that when the switch is open, the potential blades are not energized:

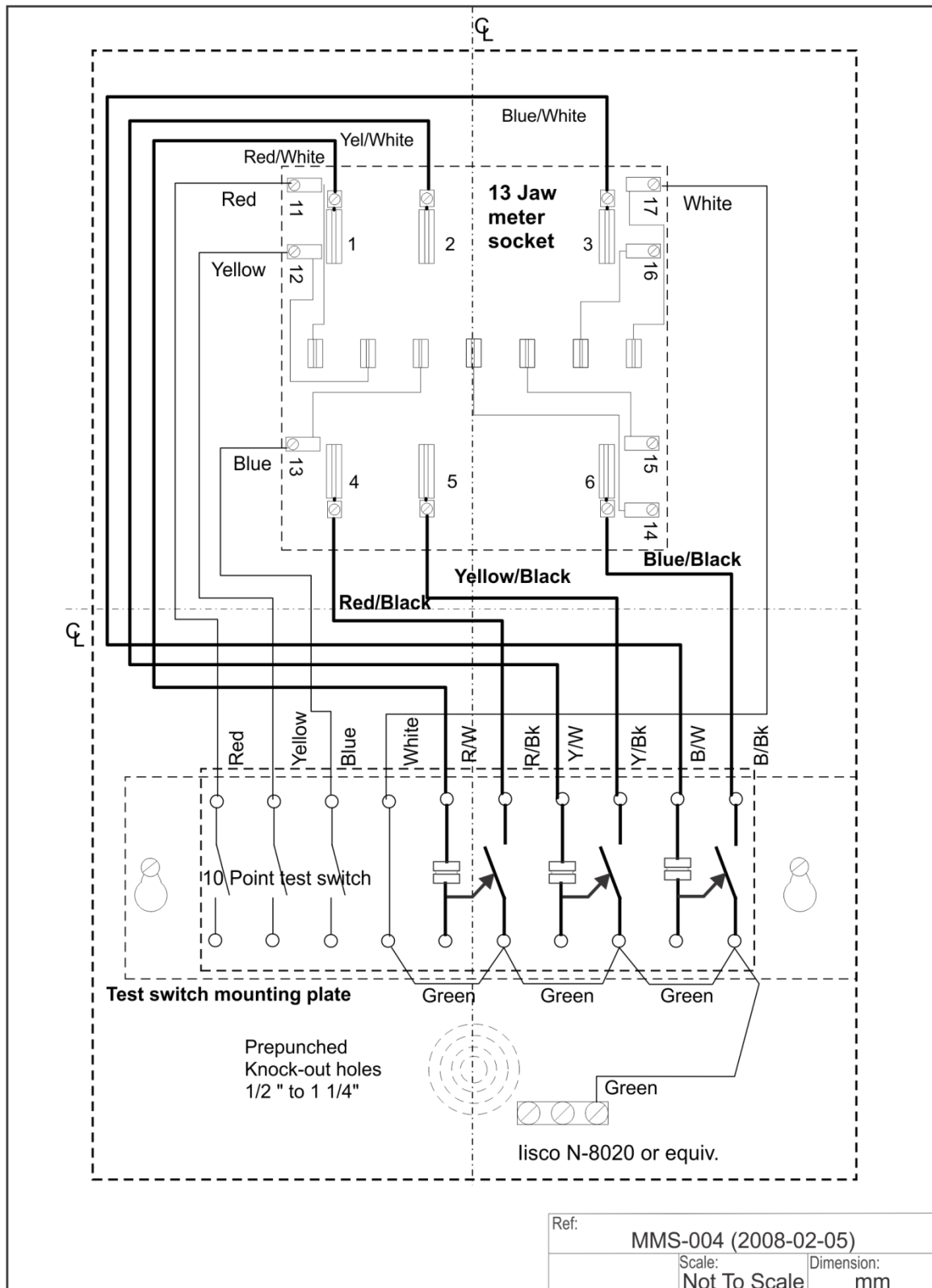
- Reversed single pole potential (red)
- Barrier
- Reversed single pole potential (red)
- Barrier
- Reversed single pole potential (red)
- Barrier
- Solid through neutral bar
- Barrier
- Left-hand load test-jack double-pole current element (black)
- Left-hand load test-jack double-pole current element (black)
- Left-hand load test-jack double-pole current element (black)

Drawing 9-7 10-Point Test Switch



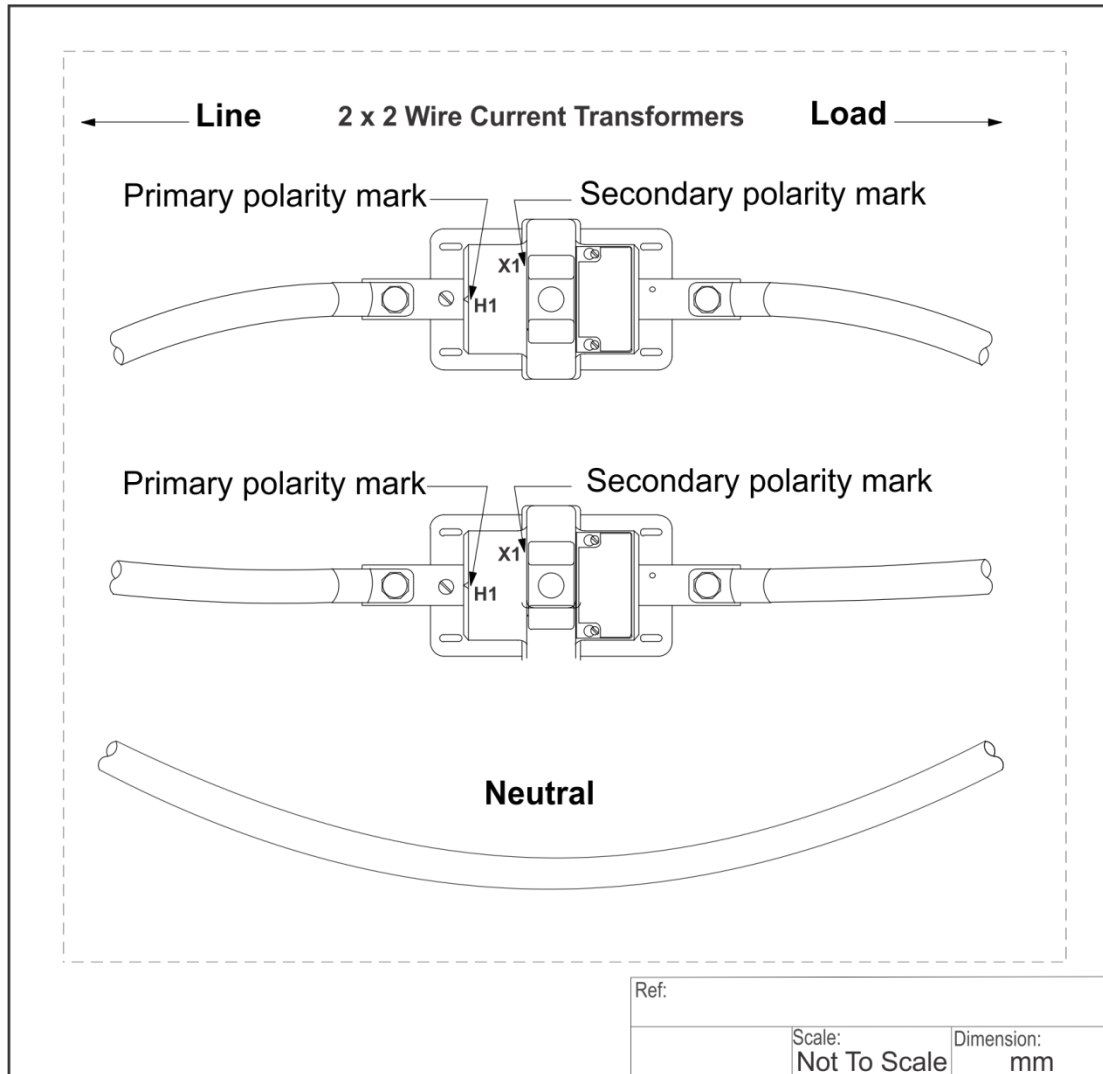
Revised Jul 2024

Drawing 9-8 Three-Phase Meter and Test Switch Wiring



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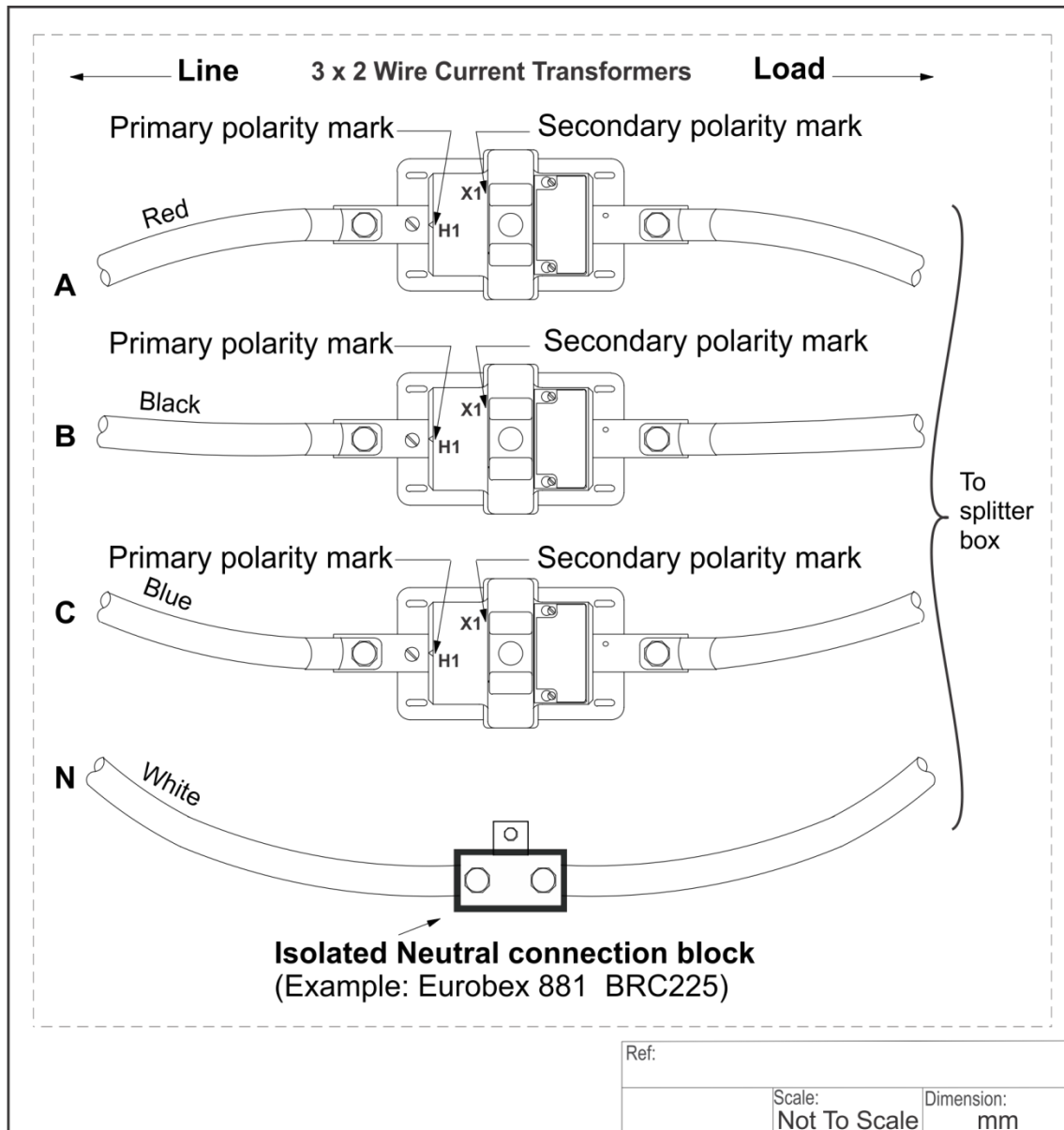
Drawing 9-9 Typical Arrangement of Single-Phase, 3-Wire 120/240 or 240/480 V Instrument Metering

**Notes:**

1. The current transformer secondary polarity mark must always be on the line side.
2. The instrument transformer cabinet must be at least 760 x 760 x 250 mm (H x W x D).
3. A combination 6-terminal meter socket and test switch enclosure is required as shown in section [9.3.1 Single-Phase Meter Socket And Test Switch Enclosure](#).
4. The electrical contractor shall not place a LB (elbow with cover) between the meter socket and test switch enclosure, and the instrument transformer enclosure.
5. The electrical contractor shall ensure that the connection to the current transformer is made with the correct bolt size and is tight.
6. Current transformers shall be mounted according to section [9.49.4 Mounting Or Fastening Instrument Transformers](#).

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Drawing 9-10 Typical Arrangement of Three-Phase, 4-Wire Wye 120/208 or 277/480 V Instrument Metering 200-1200 A Service



See the circuit notes on the next page.

Revised Jul 2024

**Notes:**

1. The current transformer secondary polarity marks must always be on the line side.
2. The instrument transformer cabinet must be at least 760 x 760 x 250 mm (H x W x D).
3. A combination 13-jaw meter socket and pre-wired test switch enclosure is required as shown in section [9.3.2 Three-Phase Meter Socket And Test Switch Enclosure](#).
4. The neutral conductor must be brought into the instrument transformer cabinet from the star point of the transformer to an isolated neutral block as per the CEC.
5. The electrical contractor shall not place a LB (elbow with cover) between the meter socket and test switch enclosure and the instrument transformer cabinet.
6. The electrical contractor shall ensure that the connection to the current transformer is made with the correct bolt size and is tight.
7. Current transformers shall be mounted according to section [9.4 Mounting Or Fastening Instrument Transformers](#).



**Line** **Load**

Secondary X1O Primary H1O

Polarity marks

Primary of VT's points to Ct's

Primary polarity mark Secondary polarity mark

A Red

B Black

C Blue

N White

To splitter box

Isolated Neutral connection block (Example: Eurobex 881 BRC225)

Neutral conductor may carry on if Customer requires

Ref:

Scale: Not To Scale

Dimension: mm

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**Notes:**

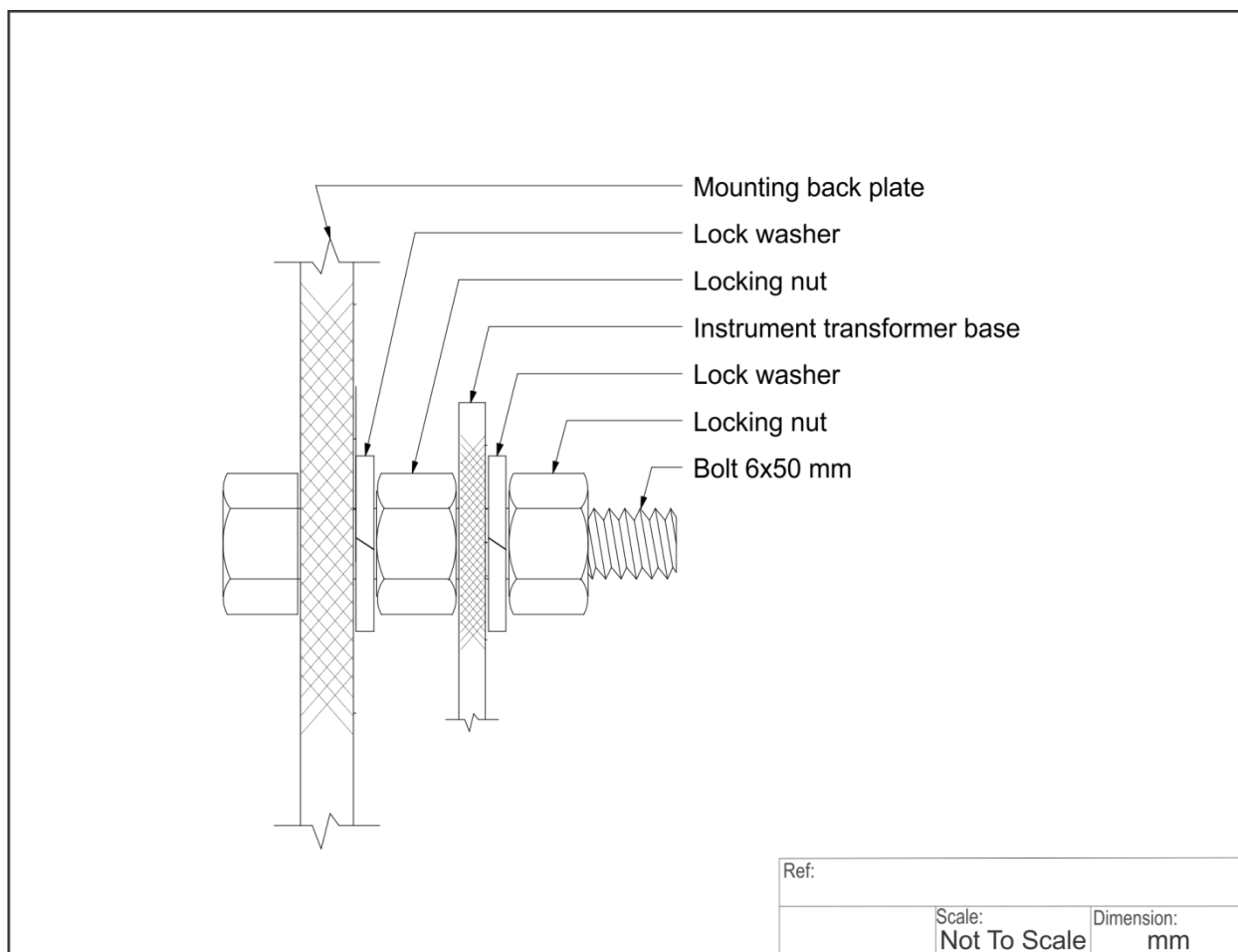
1. The current transformer secondary polarity marks must always be on the line side.
2. The electrical contractor shall ensure that the connection to the current transformer is made with the correct bolt size and is tight.
3. The voltage transformer primary should point towards the CTs.
4. The instrument transformer enclosure shall be at least 760 x 760 x 250 mm (H x W x D).
5. A combination 13-jaw meter socket and pre-wired test switch enclosure is required as shown in section [9.3.2 Three-Phase Meter Socket And Test Switch Enclosure](#).
6. The neutral conductor must be brought into the instrument transformer cabinet from the star point of the transformer to an isolated neutral block as per the CEC.
7. Instrument transformers shall be mounted according to section [9.4 Mounting Or Fastening Instrument Transformers](#).

## 9.4 MOUNTING OR FASTENING INSTRUMENT TRANSFORMERS

The most common method is to attach the instrument transformers to the back plate with **self-tapping metal screws**.

If the instrument transformers are bolted to the back plate, the following method must be used.

Drawing 9-12 Mounting or Fastening Instrument Transformers

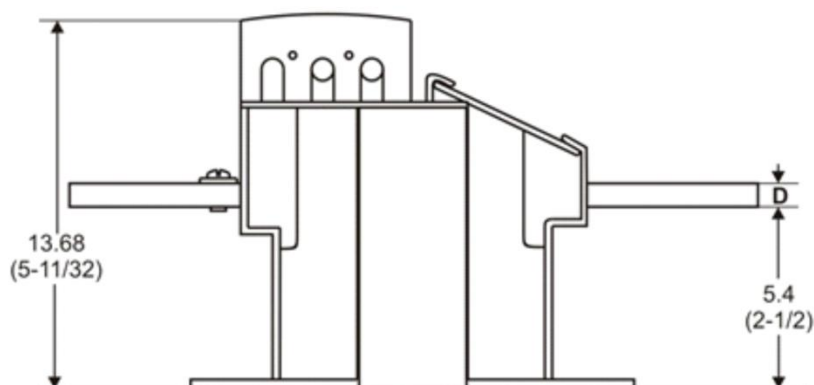
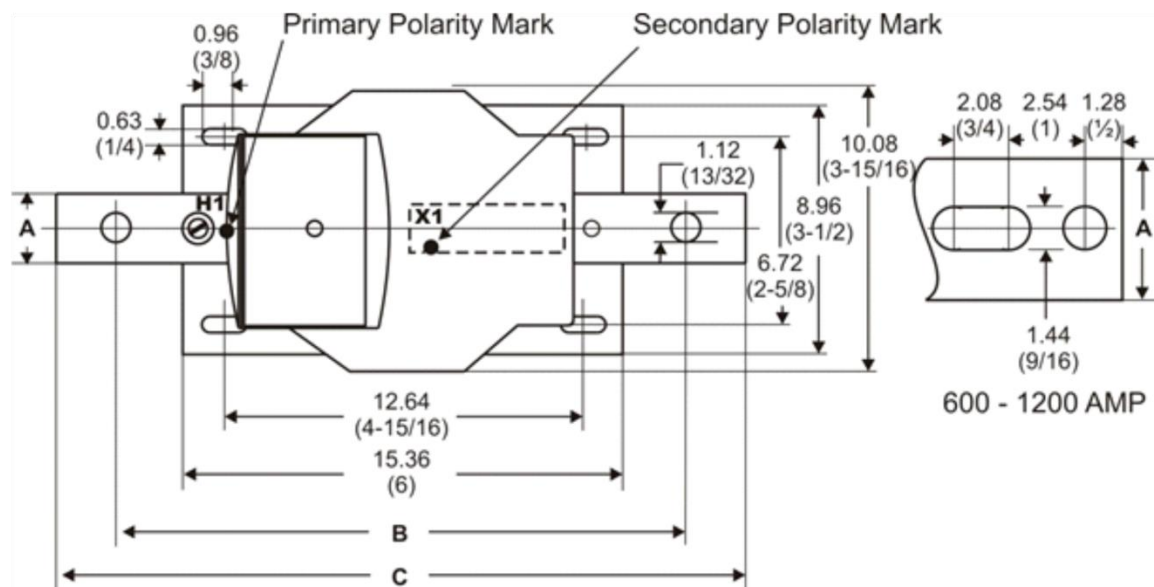


### Notes:

1. The instrument transformers must be mounted using all the mounting holes supplied by the manufacturer.
2. The Company must be able to remove the instrument transformers without removing the back plate.

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Drawing 9-13 Typical Outline of Bar-Type Current Transformer 700 V Class, 50-1200 A



### PRIMARY BAR DIMENSIONS

AMPS	A	B	C	D
5 - 400	2.54 (1)	19.69 (7-3/4)	23.81 (9-3/8)	0.79 (5/16)
600-1200	5.08 (2)	20.67 (10-1/2)	20.67 (10-1/2)	0.95 (3/8)

Ref:

Scale:

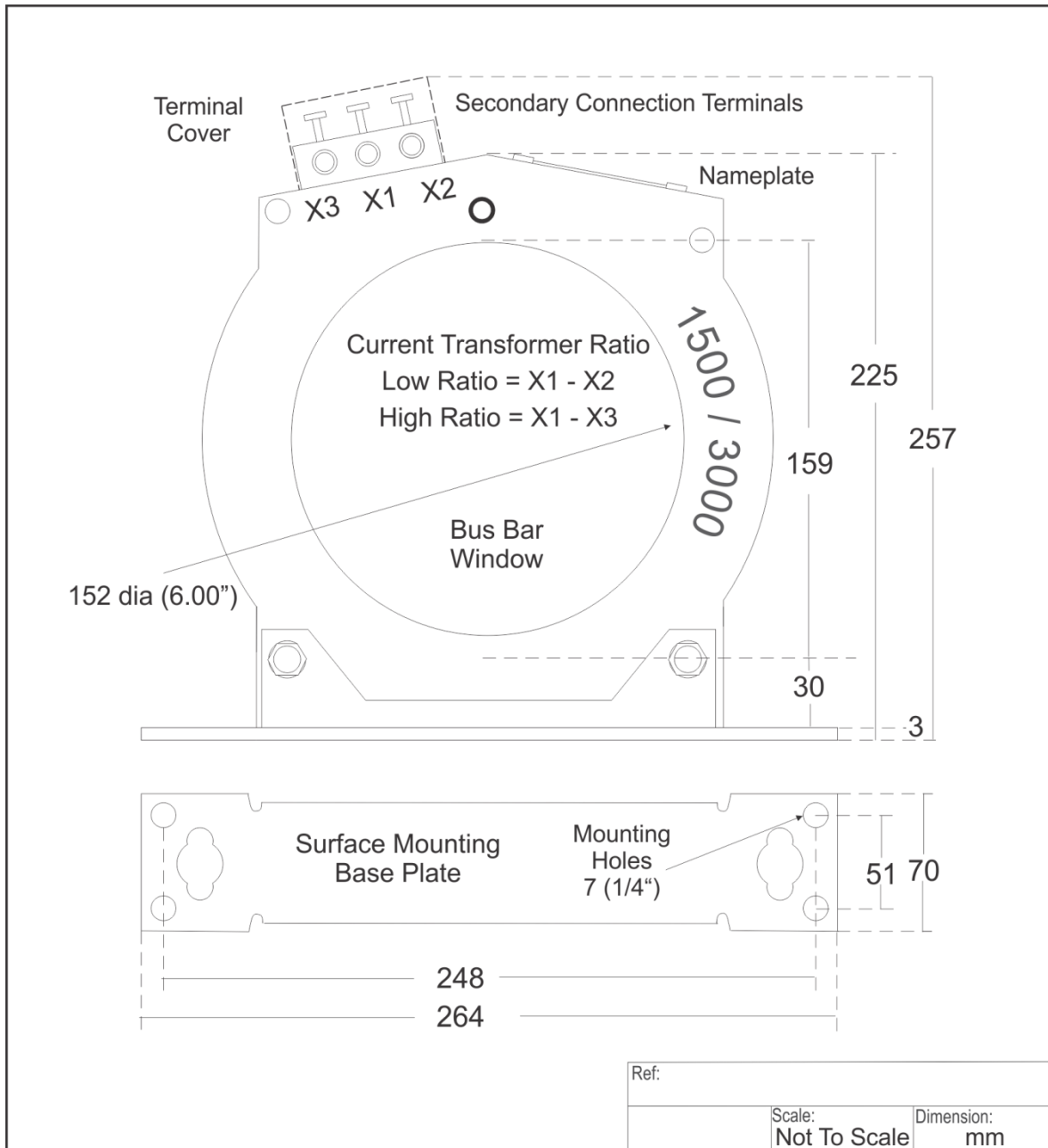
Not To Scale

Dimension:

mm

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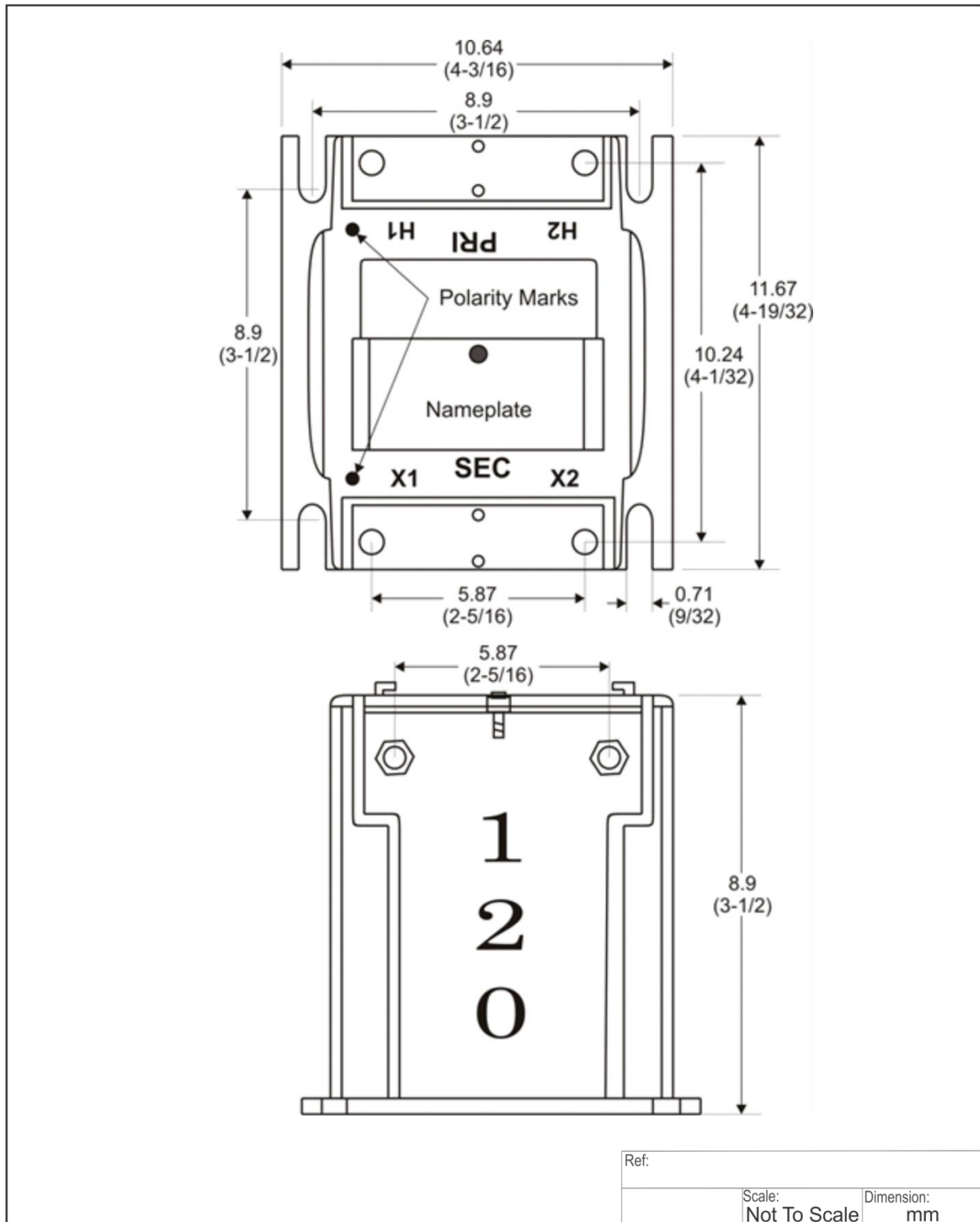
Drawing 9-14 Typical Outline of a Window-Type Current Transformer, 700 V Class, 1200-2000 A



### Note:

Window-type current transformers require an instrument transformer enclosure of at least 1200 x 900 x 300 mm (H x W x D).

Drawing 9-15 Typical Outline of a Voltage Transformer 700 V Class



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## **10 MANUFACTURED SWITCHGEAR FOR SERVICES & METERING**

For 600 volt switchgear, the instrument transformer compartment shall have a minimum height x width x depth of:

- 760 x 760 x 250 mm for 200–1200 amp size,
- 1200 x 900 x 300 mm for 1201–2000 amp size, and
- 1200 x 900 x 450 mm for 2001–4000 amp size.

On CSA approved metal-clad (not cubicle) switchgear, some deviation from the above sizes is permitted with prior approval from the Company.

### **10.1 INDOOR/OUTDOOR SWITCHGEAR**

For service greater than 200 amperes and 600 volts with customer owned switchgear, indoor metering is preferred. Oilfield service metering shall be pole mounted as shown in the [Drawing 6-2 Pole Metering for Oilfield Loads Over 200 A and Greater 300 V Phase to Phase](#). For 5–25 kV services, the Company requires outdoor pole mounted or pad mounted primary metering.

### **10.2 TRANSDUCER/SENSING CONNECTIONS IN SWITCHGEAR**

On indoor customer owned switchgear, the only customer load connections permitted ahead of the Company metering are load characteristic sensing transducers (i.e.: current or voltage and/or phase sequence or ground fault sensing devices) and transfer switch sensing devices required for main breaker control tripping and safety. All other transducers (i.e.: panel display lighting, panel meters, motor trip/close actuators and auxiliary sensing and power supply services) are to be connected on the load side of the Company's metering.

### **10.3 MANUFACTURER/CONSULTANT'S DRAWINGS FOR SWITCHGEAR**

Prior to the manufacturing of the switchgear, the customer shall submit three copies of the manufacturers or consultants drawings including dimensions of the main breaker cubicle, the control and sensing compartment and the metering compartment. Drawings shall include single line diagrams of all customer control and sensing devices connected on the line side of the Company's metering.

**10.4 CT CABINET AND SWITCHGEAR ENCLOSURE**

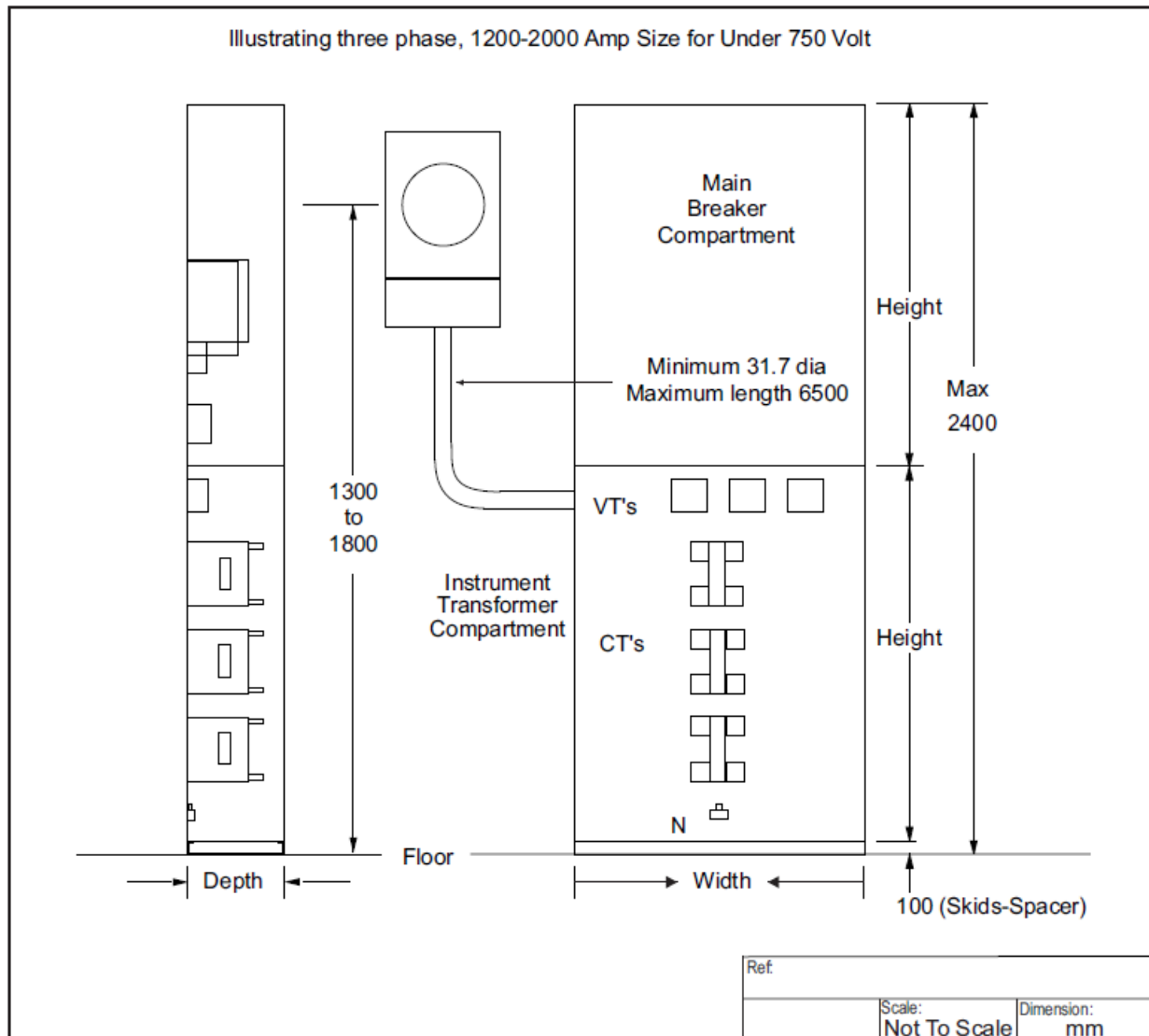
The CT cabinet of the switchgear shall be at least 100 mm above the floor and the switchgear enclosure height shall be no more than 2400 mm above the floor. The enclosure door(s) shall swing open a minimum of 110 degrees. Two vertically hinged doors are preferred; however, a single-hinged door is acceptable. Provisions for locking the door(s) of the CT cabinet must be provided.

**10.5 WARNING SIGNS FOR MANUFACTURED SWITCHGEAR**

The customer shall place a sign warning of live (fused) components, even if the breaker is open in a conspicuous location near the main breaker.



Drawing 10-1 Instrument Transformer Metering Inside the Switchgear

**Notes:**

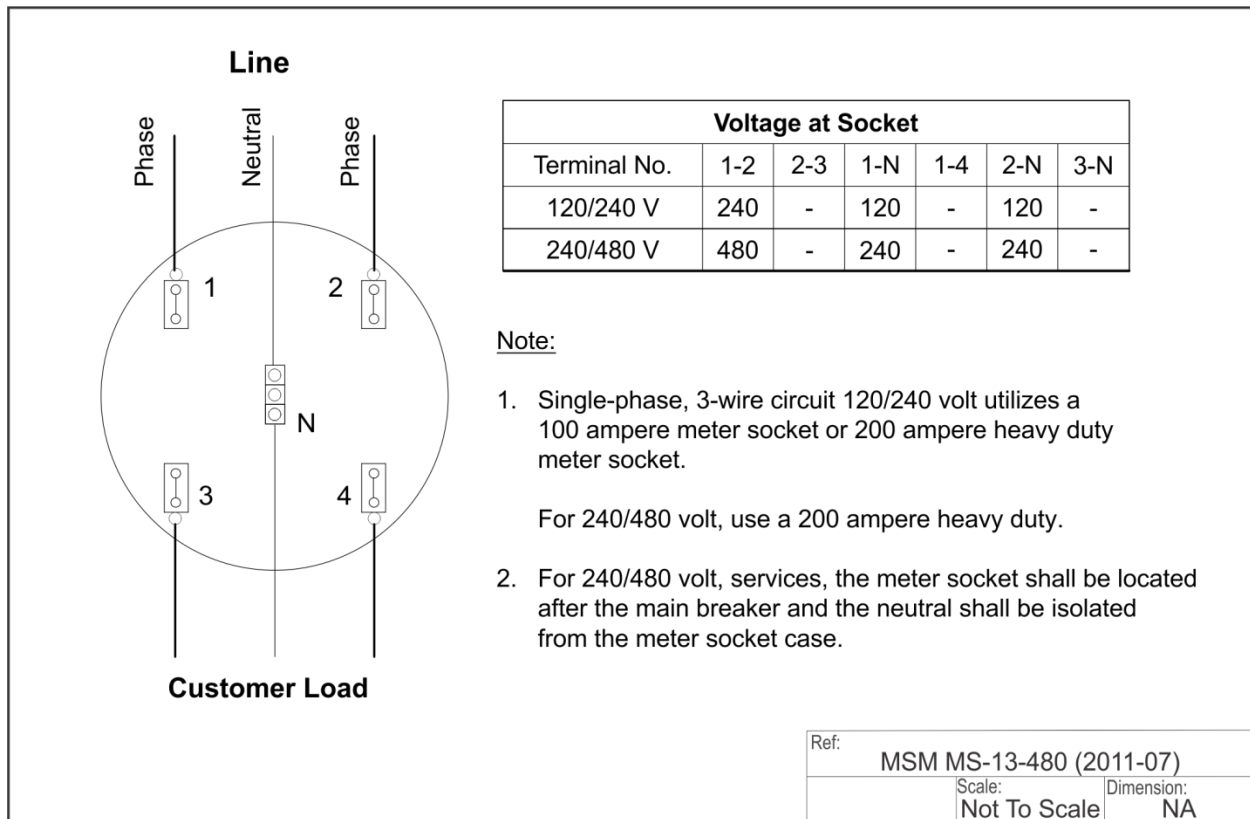
1. The electrical contractor shall not place a LB (elbow with cover) between the meter/test switch enclosure and the instrument transformer cabinet.
2. For more details on the meter/test switch enclosure refer to section [9.3 Meter Socket And Test Switch Enclosure](#).
3. Secondary metering wires shall be extended from the CT cabinet through ¼" conduit to the switch/meter enclosure.

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### 11 APPENDIX

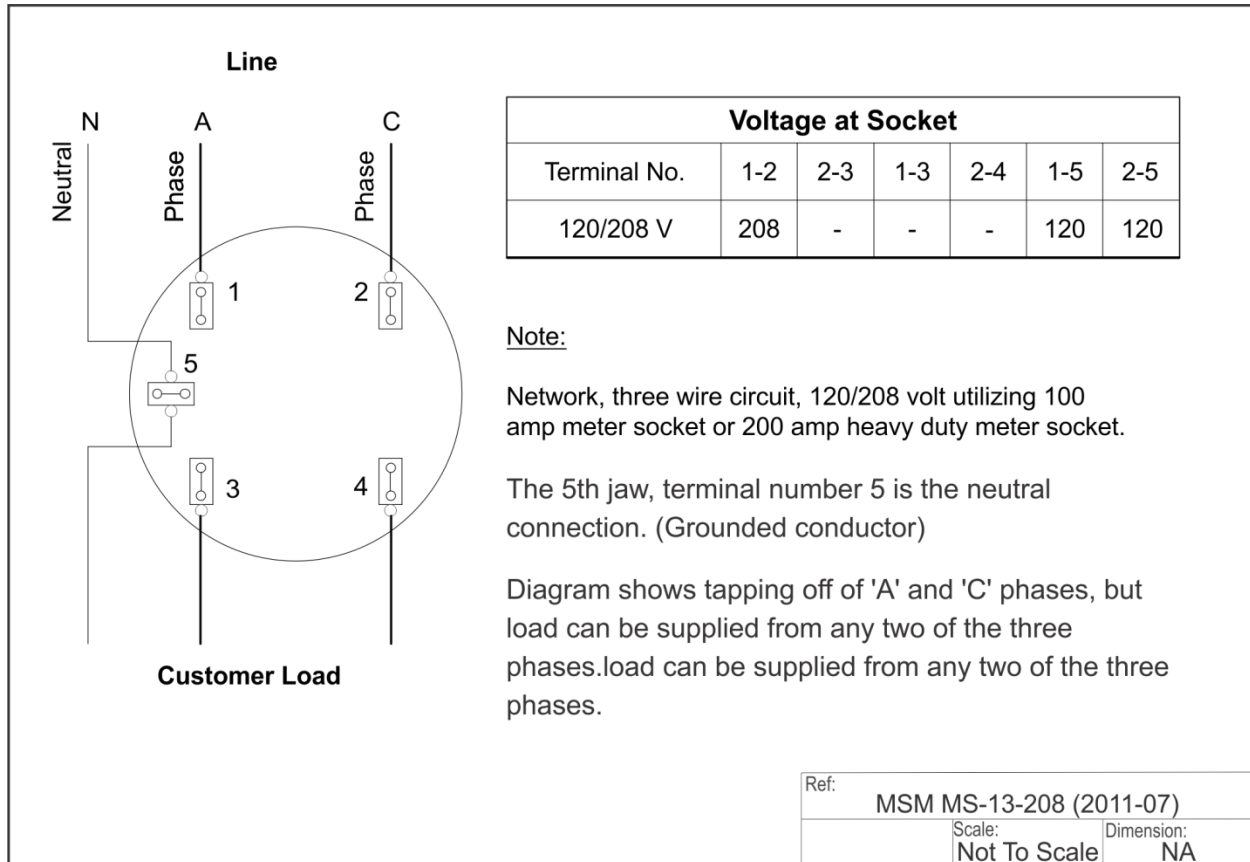
#### 11.1 SOCKET CONNECTIONS – SINGLE-PHASE, 3-WIRE 120/240 or 240/480 V

Drawing 11-1 Socket Connection Diagrams – Single-Phase, 3-Wire 120/240 or 240/480 V



### 11.2 SOCKET CONNECTIONS – NETWORK 3-WIRE 120/208 V

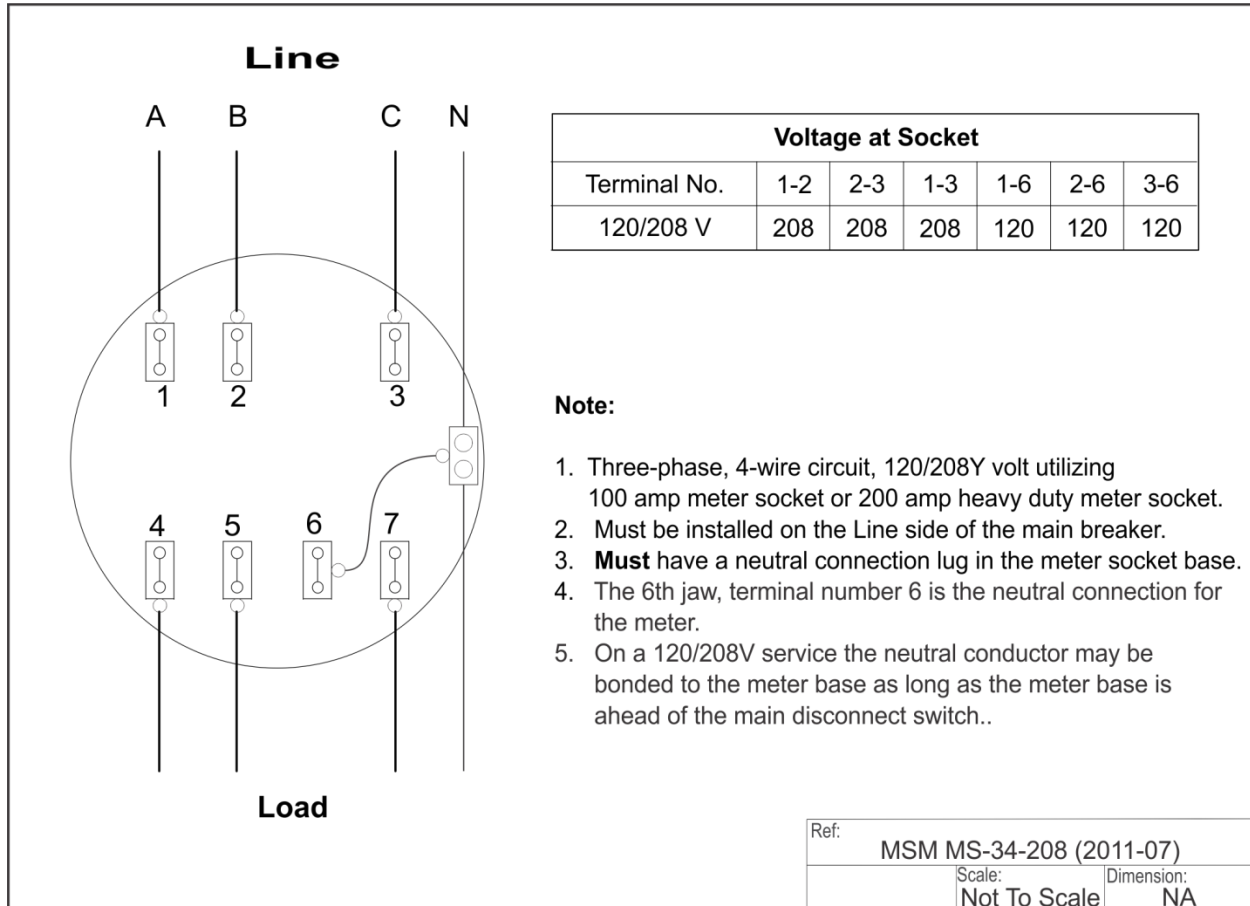
Drawing 11-2 Socket Connection Diagrams - Network 3-Wire 120/208 V



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### 11.3 DIAGRAMS OF SOCKET CONNECTIONS – THREE-PHASE, 4-WIRE 120/208 V

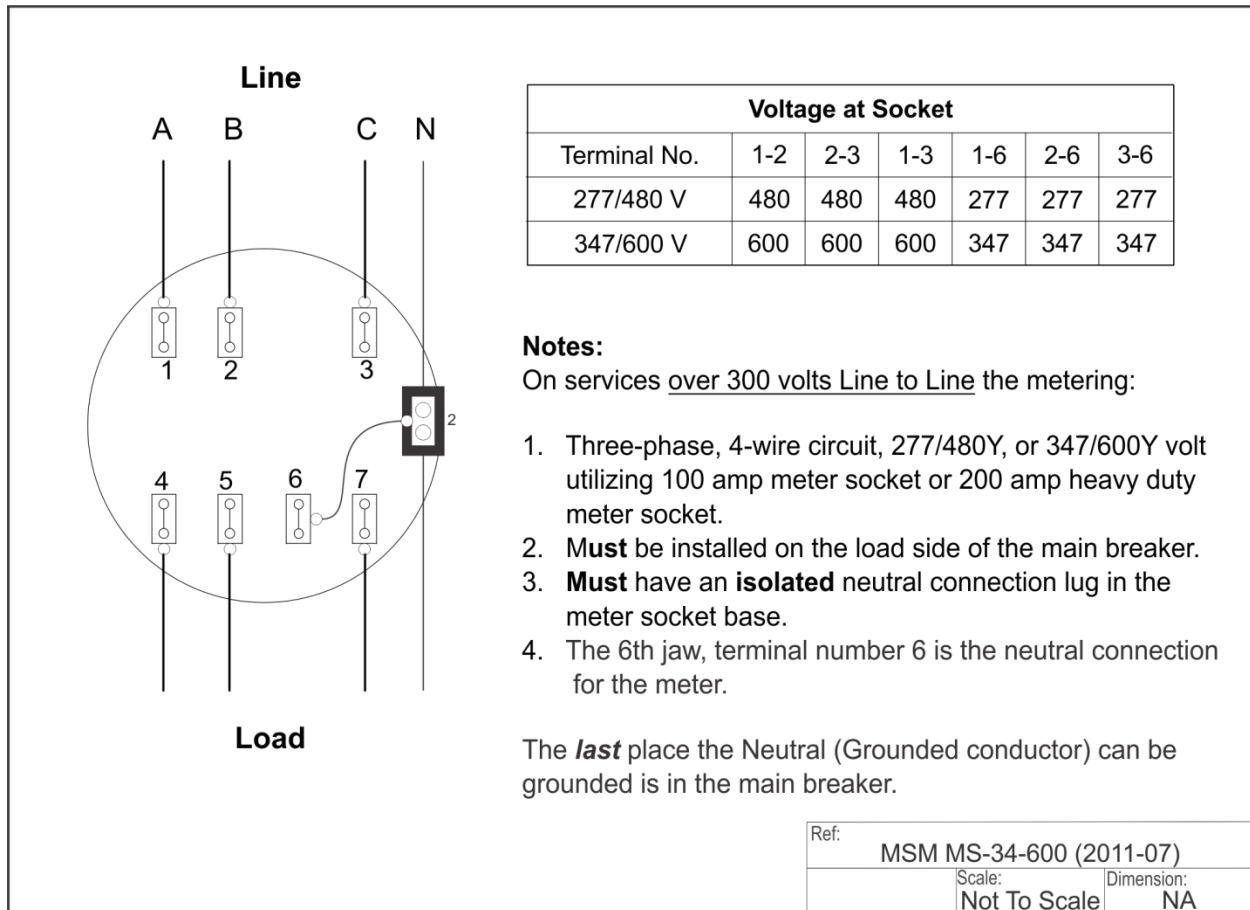
Drawing 11-3 Diagrams of Socket Connections – Three-Phase, 4-Wire Wye 120/208 V



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### 11.4 DIAGRAMS OF SOCKET CONNECTIONS – THREE-PHASE, 4-WIRE 277/480 OR 347/600 V

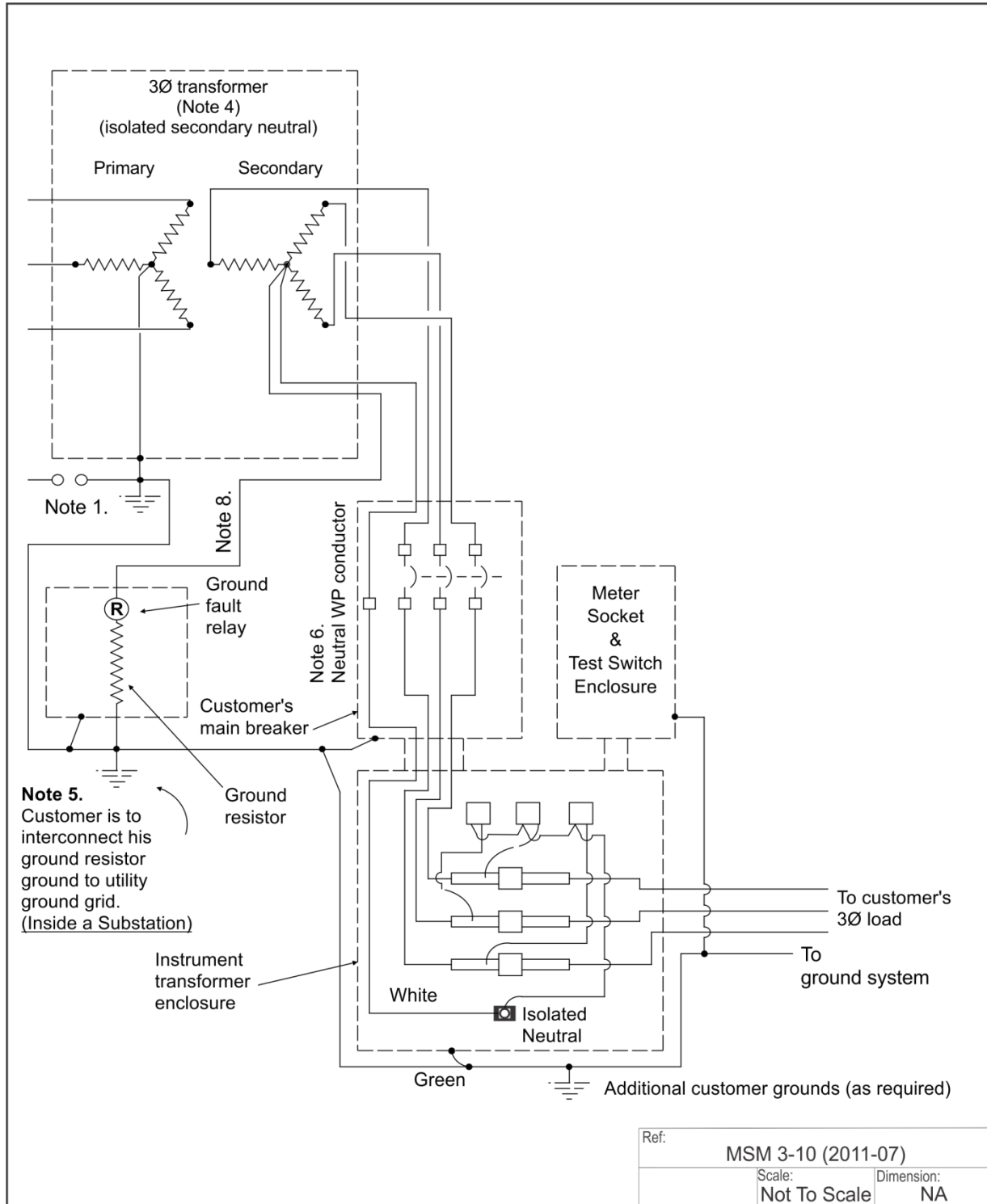
Drawing 11-4 Diagrams of Socket Connections – Three-Phase, 4-Wire Wye 277/480 or 347/600 V



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### 11.5 WIRING DIAGRAM FOR GROUNDING RESISTORS

Drawing 11-5 Wiring Diagram for Grounding Resistors



*See the ground resistor notes on the next page.*

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**Notes:**

1. Transformer primary — Ground the primary star point, transformer case and interconnect with the ground from lightning arrestors, if installed. The secondary neutral is grounded through the ground resistor.
2. At the transformer, customer's main breaker and instrument transformer enclosure, install a sign reading, "Caution grounding resistor installed." Do not tie secondary neutral to case ground." Obtain the sign from the Company meter shop.
3. The design of the ground resistor should be coordinated with Company engineering.
4. On star - star transformers, the internally connected primary and secondary grounds must be separated.
5. Where the ground resistor is installed inside a substation, the resistor case ground and the transformer case should be interconnected to the ground.
6. The customer is to install an insulated bushing for the neutral weatherproof conductor, which is allowed to pass through the main breaker. The neutral is only for the star point for the metering.
7. An installation of 5 kV or 25 kV metering on a secondary service is similar to the above and should include a means for disconnecting the service on the supply side of the metering set.
8. The conductor from the X0 transformer, bushing to the ground resistor to the customer's building, should be mechanically protected from damage with conduit, unless protected by elevation above ground.
9. Refer to the CEC – Part 1, 10–1100 to 10–1108 for conductor sizing and installation of neutral grounding devices.

### 11.6 DESIGN CLEARANCE ON UNDERGROUND DISTRIBUTION

Drawing 11-6 Horizontal Clearance for Padmount Transformers

FIGURE 1. HORIZONTAL CLEARANCE FOR PADMOUNT TRANSFORMERS

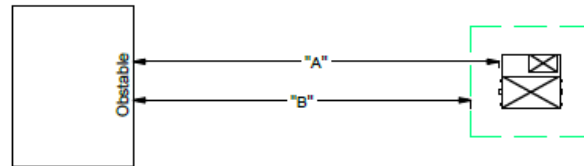


TABLE 1. HORIZONTAL CLEARANCE FOR PADMOUNT TRANSFORMERS  
(Ensure both A and B are maintained with installation)

Obstacle	Min. Separation from Transformer Dimension "A"		Min. Separation from Ground Grid Dimension "B"
	Non-Access Side	Access Side	
Non-Conductive & Non-Combustible Building / Wall / Fence	1.0 m (See Note 18)	3.0 m (See Note 18)	0.5 m
Conductive Building / Wall/ Fence	3.0 m (See Note 2, 3, 4, 5, 18)		MGN System: 2.5 m (See Note 2, 3, 4) SWGR System: 10.0 m (See Note 2, 4, 5)
Vent / Window / Door	1.0 m	3.0 m	0.5 m
Property Line / Side Walk	1.0 m		0.5 m
Roadway	Refer to DSB-017 or As per Local Municipality Requirement		0.5 m
Driveway	1.5 m		0.5 m
Deep Utility (Water, Sewer Line)	3.0 m		3.0 m
Fire Hydrant	3.0 m		3.0 m
Buried Power or Communication Cables	1.8 m (See Note 17)		1.8 m (See Note 17)
LP Gas Pipeline (Note 8)	1.8 m (See Note 17)		1.8 m (See Note 17)
HP Pipeline	5.0 m		5.0 m (See Note 19)
Fuel Storage Tank	7.6 m		
Wellhead	20.0 m		
Cathodic Protection Anode Bed	12.0 m		12.0 m
Ditch or Pad Edge	1.5 m		0.5 m
ATCO Pad-Mounted Equipment	2.5 m	3.0 m (See Note 11)	1.0 m with Bonding

Ref	DCSM D-SC60 (2023-12-12)	
Scale	Not To Scale	Dimensions
		M

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### Drawing 11-7 Horizontal Clearance for Sidewall Mount Transformers

FIGURE 2. HORIZONTAL CLEARANCE FOR SIDEWALL MOUNT TRANSFORMERS

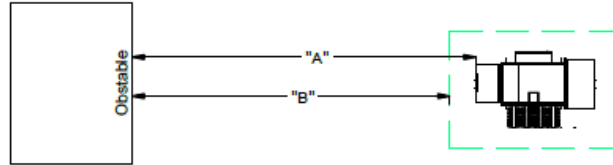


TABLE 2. HORIZONTAL CLEARANCE FOR SIDEWALL MOUNT TRANSFORMERS  
(Ensure both A and B are maintained with installation)

Obstacle	Min. Separation from Transformer Dimension "A"		Min. Separation from Ground Grid Dimension "B"
	Non-Access Side	Access Side	
Non-Conductive & Non-Combustible Building / Wall / Fence	3.0 m (See Note 18)		0.5 m
Conductive Building / Wall / Fence	3.0 m (See Note 2, 3, 4, 5, 18)		MGN System: 2.5 m (See Note 2, 3, 4) SWGR System: 10.0 m (See Note 2, 4, 5)
Vent / Window / Door	6.0 m		0.5 m
Property Line / Side Walk	1.0 m		0.5 m
Roadway	Refer to DSB-017 or As per Local Municipality Requirement		0.5 m
Driveway	1.5 m		0.5 m
Deep Utility (Water, Sewer Line)	3.0 m		3.0 m
Fire Hydrant	3.0 m		3.0 m
Buried Power or Communication Cables	1.8 m (See Note 17)		1.8 m (See Note 17)
LP Gas Pipeline (Note 8)	1.8 m (See Note 17)		1.8 m (See Note 17)
HP Pipeline	5.0 m		5.0 m (See Note 19)
Fuel Storage Tank	7.6 m		
Wellhead	20.0 m		
Cathodic Protection Anode Bed	12.0 m		12.0 m
Ditch or Pad Edge	1.5 m		0.5 m
ATCO Pad-Mounted Equipment	2.5 m	3.0 m (See Note 11)	1.0 m with Bonding

Ref: DCSM D-SC60 (2023-12-12)  
Scale: Not To Scale Dimensions: M

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### Drawing 11-8 Horizontal Clearance for Switch Cubicle

FIGURE 3. HORIZONTAL CLEARANCE FOR SWITCH CUBICLE

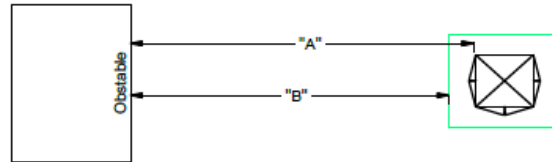


TABLE 3. HORIZONTAL CLEARANCE FOR SWITCH CUBICLE  
(Ensure both A and B are maintained with installation)

Obstacle	Min. Separation from Switch Cubicle Dimension "A"		Min. Separation from Ground Grid Dimension "B"
	Non-Access Side	Access Side	
Non-Conductive & Non-Combustible Building / Wall / Fence	2.0 m (See Note 18)	4.5 m	0.5 m
Conductive Building / Wall/ Fence	3.0 m (See Note 2, 3, 4, 5, 18)	4.5 m	MGN System: 2.5 m (See Note 2, 3, 4) SWGR System: 10.0 m (See Note 2, 4, 5)
Vent / Window / Door	2.0 m	4.5 m	0.5 m
Property Line / Side Walk	1.0 m		0.5 m
Roadway	Refer to DSB-017 or As per Local Municipality Requirement		0.5 m
Driveway	1.5 m		0.5 m
Deep Utility (Water, Sewer Line)	3.5 m		3.0 m
Fire Hydrant	3.5 m		3.0 m
Buried Power or Communication Cables	1.8 m (See Note 17)		1.8 m (See Note 17)
LP Gas Pipeline (Note 8)	1.8 m (See Note 17)		1.8 m (See Note 17)
HP Pipeline	5.0 m		5.0 m (See Note 19)
Fuel Storage Tank	7.6 m		
Wellhead	20.0 m		
Cathodic Protection Anode Bed	12.0 m		12.0 m
Ditch or Pad Edge	1.5 m		0.5 m
ATCO Pad-Mounted Equipment	2.5 m	4.5 m (See Note 11)	1.0 m with Bonding

REF: DCSM D-SC60 (2023-12-12)		
Scale:	Not To Scale	Dimensions: M

### Drawing 11-9 Horizontal Clearance for Pedestal

FIGURE 4. HORIZONTAL CLEARANCE FOR PEDESTAL

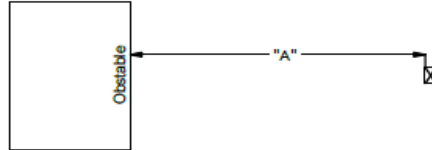


TABLE 4. HORIZONTAL CLEARANCE FOR PEDESTAL

Obstacle	Min. Separation from Pedestal Dimension "A"	
	Non-Access Side	Access Side
Non-Conductive & Non-Combustible Building / Wall / Fence	0.5 m (See Note 18)	1.0 m (See Note 18)
Conductive Building / Wall / Fence	0.5 m (See Note 18)	1.0 m (See Note 18)
Vent / Window / Door	0.5 m	1.0 m
Property Line / Side Walk	1.0 m	
Roadway	Refer to DSB-017 or As per Local Municipality Requirement	
Driveway	1.5 m	
Deep Utility (Water, Sewer Line)	1.0 m	
Fire Hydrant	3.0 m	
Buried Power or Communication Cables	1.0 m (See Note 17)	
LP Gas Pipeline (Note 8)	1.0 m (See Note 17)	
HP Pipeline	5.0 m	
Fuel Storage Tank	7.6 m	
Wellhead	20.0 m	
Cathodic Protection Anode Bed	12.0 m	
Ditch or Pad Edge	1.0 m	
ATCO Pad-Mounted Equipment	0.5 m	1.0 m (See Note 11)

Ref: DCSM D-SC60 (2023-12-12)		
Scale:	Not To Scale	Dimensions: M

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**Notes:**

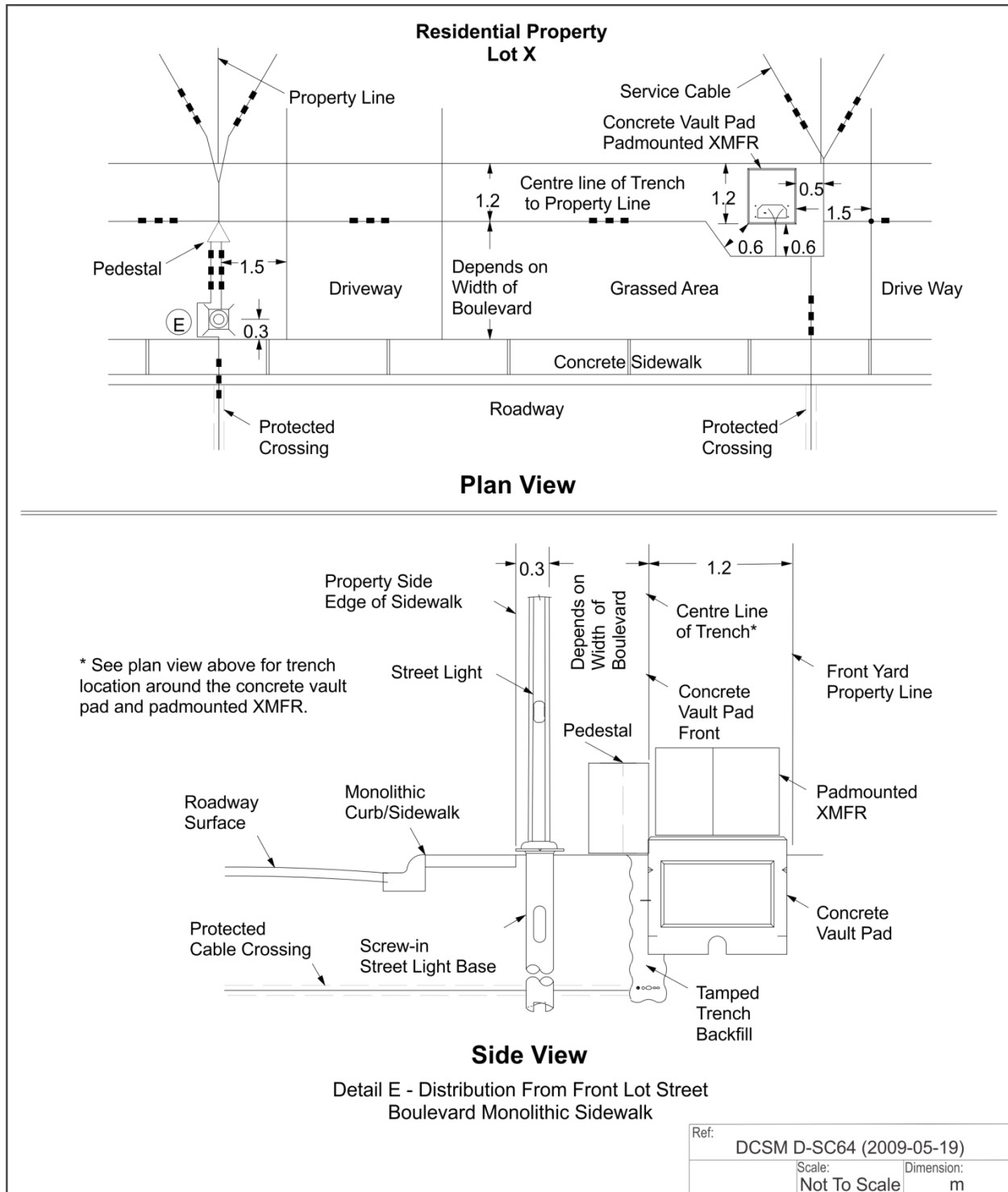
1. All clearances are minimums unless a specific range is given. If multiple clearances apply, the largest must minimum be followed.
2. The clearance between a transformer and a conductive structure can vary widely by factors such as soil resistivity, ground potential rise and fault clearing time. Conductive structure clearances can be reduced to non-conductive structure clearances if everything is effectively grounded and bonded. Please contact Design Technical Support for more information.
3. In urban residential subdivisions with a multi-grounded neutral system, a minimum separation from a chainlink fence to the equipment ground grid shall be at least 2.5 m. If the 2.5 m proximity cannot be achieved, the recommended practice is to bond the metallic fence in with the ground grid. (The touch potential hazard is typically low if the padmount equipment is tied into a larger MGN system)
4. If a ground grid of equipment is placed closer than 3 m to a metallic building, the building owner is required to bury a minimum #4 AWG bare copper conductor as a gradient control wire around and 0.5 to 1 m away from the building, buried 200 to 300 mm below ground level with interconnection/bonding to the building and to the ATCO Electric gradient control wire in two locations.
5. If the equipment ground grid relies on a ground return system, and an adjacent metallic structure cannot be effectively grounded and bonded, 10 m separation from the equipment grounding is required prior to a grounding study.
6. Non-conductive obstacles include non-metal buildings/walls/fences, landscaping, utility boxes or above-ground improvements that may interfere with the operation of equipment.
7. The Canadian Electrical Code Rule 26-242 applies. Equipment should not be installed in front of doors, windows, vents or combustible surfaces unless it is protected by an internal current-limiting fuse and equipped with a pressure relief device, with working spaces around the equipment of at least 3m on the access side. On non-access sides, the separation can be reduced to 1.0 m and 0.6 m for three-phase and single-phase padmount transformers, respectively. Where there is no other alternative, please contact Design Technical Support.
8. It is assumed that LP gas pipelines are non-conductive. If conductive pipes are found, apply setback distances as per conductive building/wall/fence.
9. If a swimming pool is in the proximity of equipment where pedestrians are likely to be walking, please contact Design Technical Support and Standards.
10. If access to a transformer and an adjacent metallic structure is restricted by the installation of non-conductive fence panels or barriers, smaller clearance to the metallic structure may be acceptable.
11. The doors on the switch cubicle and transformer must not face each other without an adequate workspace of at least 4.5 m.
12. If the doors on the switch cubicle are not located on the side of the cubicle adjacent to the building, the distance may be reduced to 2.0 m. Please contact Design Technical Support if the recommended distance cannot be secured.
13. Pedestal: Permission is to be given to communication or cable to extend and interconnect their ground to ATCO Electric ground system. ATCO Electric personnel are to make the final connection to our facilities.
14. Distances from equipment may be extended accordingly by the number of ground grid loops. Designers need to maintain both “A” and “B” for the respective feature.

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15. Where possible, doors should not open into the roadway, and access space should be maintained such that the equipment can be accessed without exposing workers to traffic hazards.
16. Mechanical protection for pad-mounted equipment shall be considered when the location of the equipment leaves it vulnerable to damage from impact from vehicular or maintenance traffic (such as snowplows or loaders). Mechanical protection is required only to protect equipment from the direction of the threat.
17. Clearance can be reduced to 300mm with agreement of both parties and proper marking.
18. Maintain a minimum open-air distance (such as around a corner) of 3.0 m from Propane Gas discharge openings and 0.9 m from Natural Gas discharge openings.
19. If a metal HP pipeline segment is exposed aboveground as a form of a riser, a valve or a yard-piping, it shall be considered as a conductive obstacle where 10 m separation is required from equipment grounding prior to a grounding study for a SWGR system.

### 11.7 ALIGNMENT ON FRONT STREET MONOLITHIC CURB/SIDEWALK

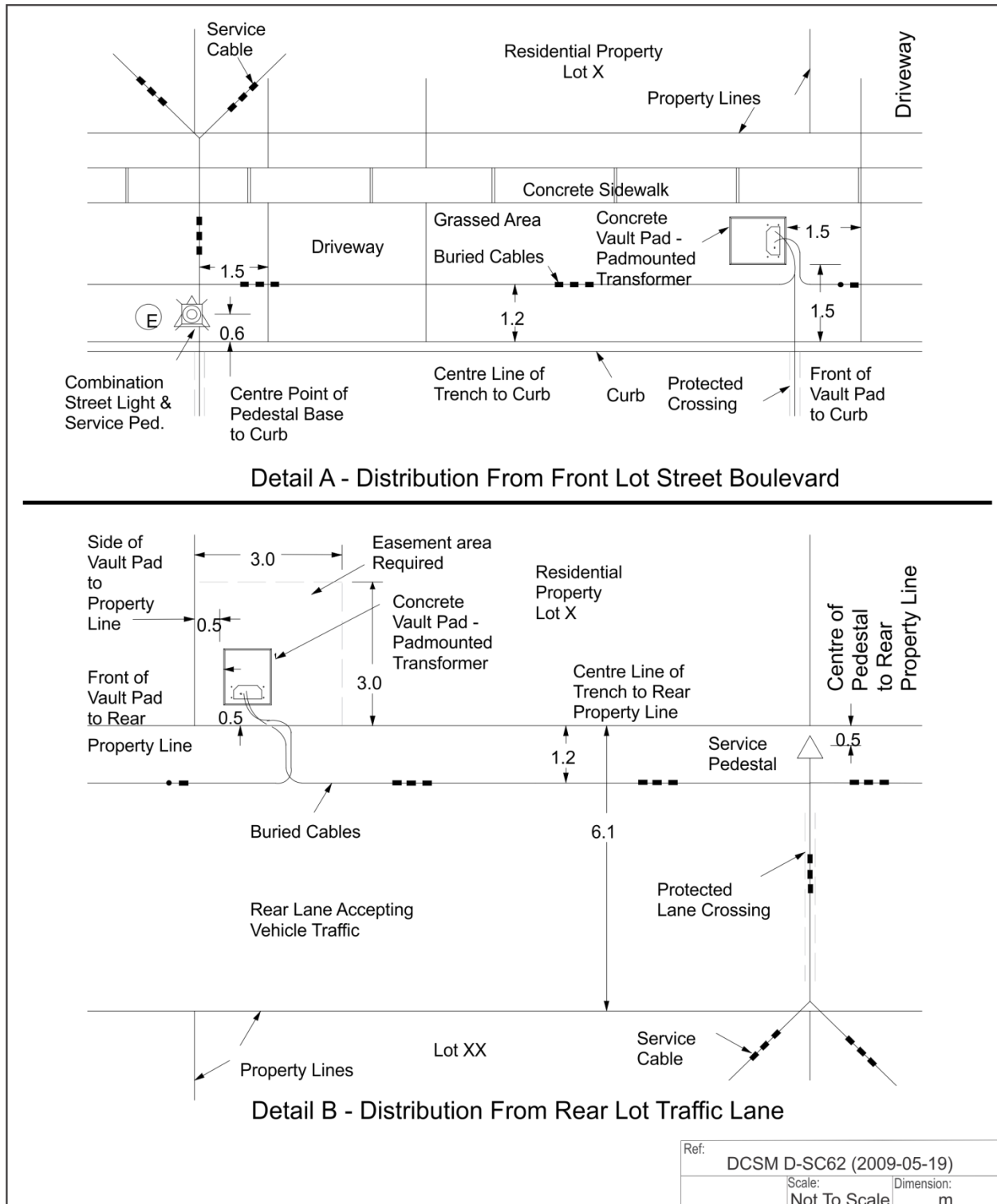
Drawing 11-10 Alignment on Front Street Monolithic Curb/Sidewalk



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### 11.8 ALIGNMENT ON FRONT STREET BOULEVARD / REAR TRAFFIC LANE

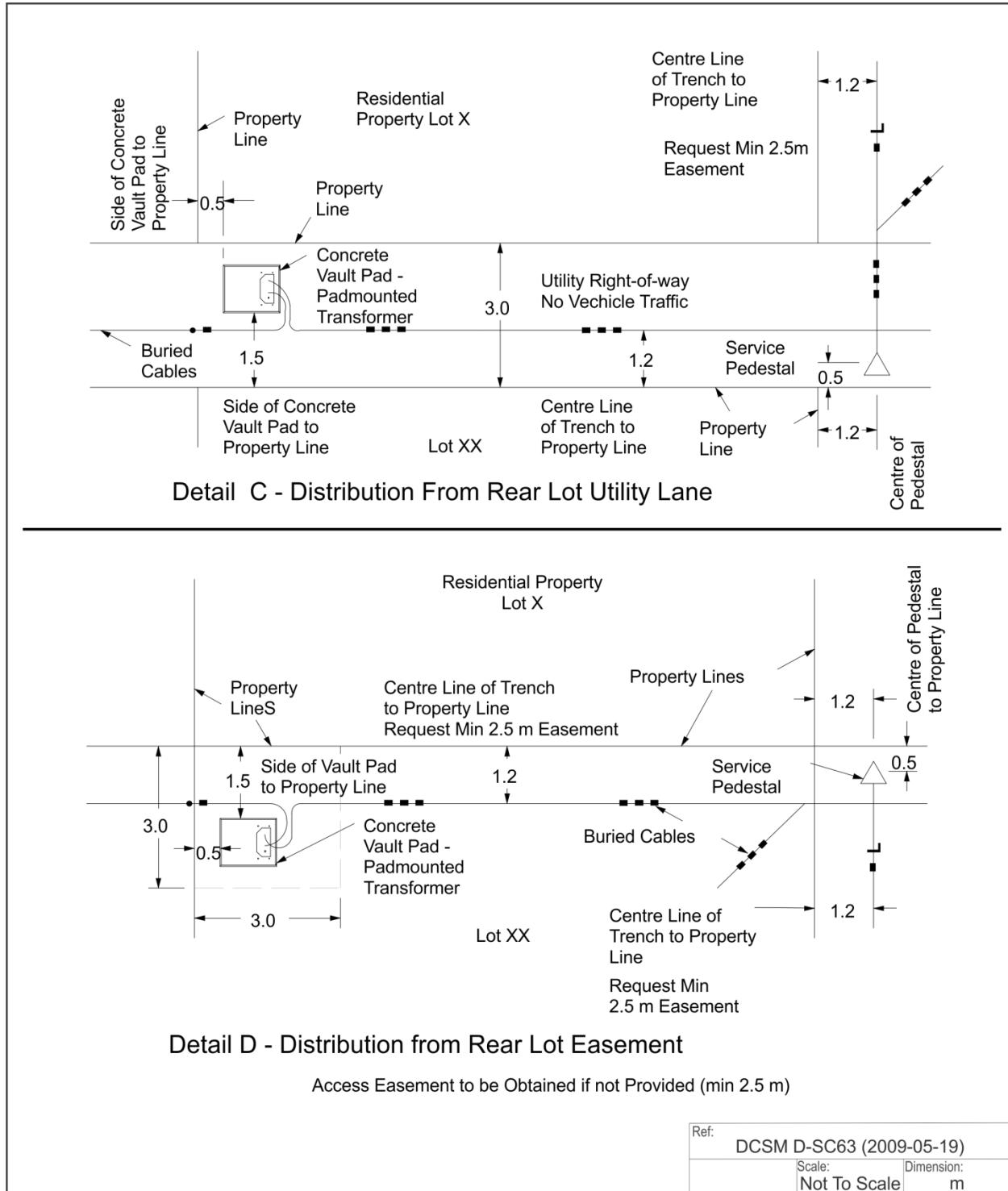
Drawing 11-11 Alignment on Front Street Boulevard / Rear Traffic



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### 11.9 ALIGNMENT ON REAR LOT UTILITY LANE / REAR EASEMENT ACCESS

Drawing 11-12 Alignment on Rear Lot Utility Lane/Rear Easement Access



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### 11.10 LANDSCAPING ADJACENT TO UNDERGROUND ELECTRICAL EQUIPMENT

#### Drawing 11-13 Landscaping Adjacent to Underground Electrical Equipment

THE FOLLOWING IS A GUIDELINE FOR LANDSCAPING WITH BUSHES, SHRUBS, AND TREES ADJACENT TO EQUIPMENT INSTALLED TO PROVIDE UNDERGROUND ELECTRICAL SERVICE:

1. THE SHRUBS PLANTED AROUND THE EQUIPMENT SHOULD BE OF A TYPE THAT CAN EASILY BE TRIMMED. THEY SHOULD HAVE A SHALLOW ROOT SYSTEM.
2. SOME SUITABLE PLANTS ARE: CEDAR, JUNIPER, LILAC, GOLDEN ELDER, AND MUGHO PINE.
3. KEEP THE TREES, SHRUBS, AND GRASS TRIMMED IN ORDER TO REDUCE THE FIRE HAZARD DURING DRY SPELLS.
4. IN ADDITION TO THE CLEARANCE BETWEEN EQUIPMENT AND SHRUBS, THERE SHOULD ALSO BE A PATH TO THE EQUIPMENT. THE LANDSCAPING SHOULD USE LAWN OR LOW GROWING PLANTS IN FRONT OF THE EQUIPMENT DOOR. CLEARANCES ARE SHOWN ON D-H25-2 AND D-H25-3.
5. TO MINIMIZE OBSTRUCTION OF ROADWAY LIGHTING, TREES PLANTED IN BOULEVARDS SHOULD BE KEPT PRUNED IN THE MANNER ILLUSTRATED ON D-H25-3 WHERE:

"h" IS THE TREE PRUNING HEIGHT,

"MH" IS THE LIGHT MOUNTING HEIGHT,

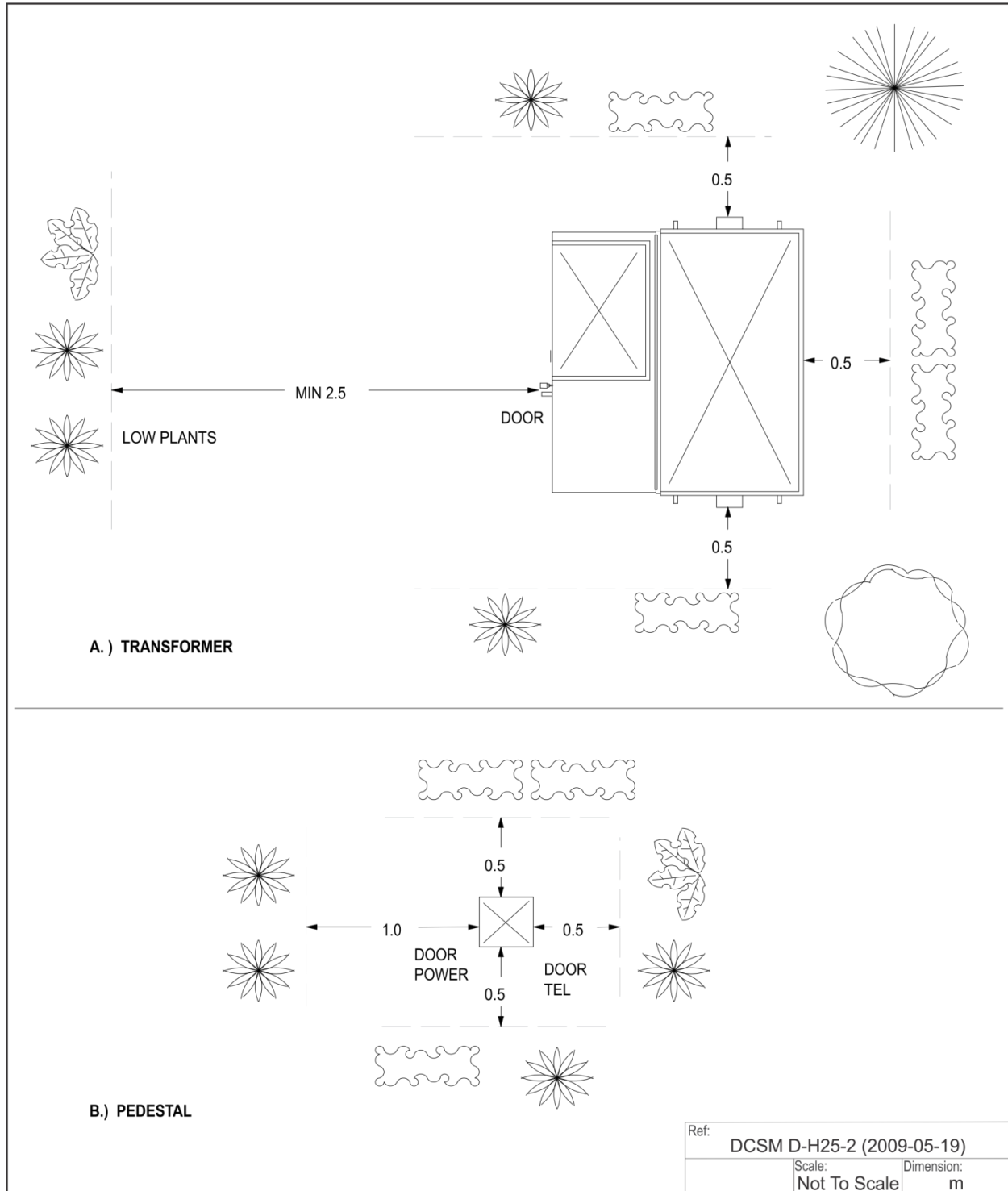
"D" IS THE DISTANCE BETWEEN THE TREE AND THE LIGHT, AND

"A" IS THE LIGHT DISTRIBUTION ANGLE FOR MAXIMUM CANDLE POWER ON THE ROAD. ON TYPE II LIGHTS THIS ANGLE IS BETWEEN  $73^{\circ}$  TO  $80^{\circ}$  AND ON TYPE III LIGHTS IT IS BETWEEN  $70^{\circ}$  TO  $77^{\circ}$ .

Ref: DCSM D-H25-1 (2009-05-19)		
Scale:	Dimension:	
Not To Scale		

### 11.11 LANDSCAPING ADJACENT TO PADMOUNT TRANSFORMER AND PEDESTAL

Drawing 11-14 Landscaping Adjacent to Padmount Transformer and Pedestal



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### 11.12 LANDSCAPING ADJACENT TO PADMOUNT SWITCH CUBICLE AND STREET LIGHT

Drawing 11-15 Landscaping Adjacent to Padmount Switch Cubicle and Street Light

