National *Metering Installation* Requirements

Version 2.0

1 FOREWORD

On 1 December 2017, the Power of Choice (PoC) changes to the National Electricity Rules (NER) were introduced to the National Electricity Market (NEM), representing all jurisdictions of Australia, except Western Australia and Northern Territory. As a result of this change, the Electricity Retailer (Financially Responsible Market Participant, abbreviated as FRMP) became responsible for all new and upgraded metering in the NEM, with the exception of NMI Classification SMALL customers in Victoria, which remained the responsibility of the Distribution Network (Local Network Service Provider, abbreviated as LNSP).

Under the PoC rule changes a NER compliant smart meter is required to be installed for new or upgraded metering installation. The customer's retailer for a given site – uniquely identified by its National Metering Identifier or NMI, will appoint and contract a Metering Coordinator (MC) who, as a registered participant in the National Electricity Market (NEM) takes on the overall responsibility for metering at the customer's premise. The MC in turn will appoint:

- an AEMO accredited Metering Provider (MP) who is responsible for the installation, maintenance, and ongoing inspection and accuracy testing of metering installations, and
- an AEMO accredited Metering Data Provider (MDP) who is responsible for collecting and validating metering data from the smart meter and estimating and substituting data when not available or it fails validation. The MDP must then send this data to all parties that have a financial interest in the site for market settlement and billing purposes, primarily the LNSP, FRMP and AEMO for market settlement.

The PoC changes will see responsibility for metering at a customer's premise transition from the Network (LNSP) to the Retailer (FRMP) and their appointed MC at every smart meter installation, as a result of either customer-initiated requests (new connections, alterations, tariff change requests), Retailer meter replacement programs, and when the Network metering malfunctions (individually, or as a meter family failure) and requires replacement.

This document describes the requirements of CMIG Metering Providers and are intended to promote a consistency in metering arrangements across the NEM, to better ensure that the installation of metering will proceed without issue, and that a metering installation can be safely accessed, maintained, and remain accurate as required by the NER.

These requirements draw heavily on those previously published by distribution businesses and are intended to provide guidance for use by manufacturers, distributors, retailers, customers, and customers' electrical contractors, in order to meet regulatory and electricity supply obligations. The requirements apply to the extent that they do not override existing jurisdictional regulation and Service & Installation Rules obligations.

The MIRs have been developed through industry consultation and are subject to ongoing development. While care has been taken in their preparation, they may not cover all circumstances and to ensure a metering installation can proceed without issue, it is recommended that the relevant Metering Provider be contacted to determine how to proceed in these scenarios.

2 REVISION HISTORY

Version	Comment	Date
1.0	Initial release Includes updates to drawings in Appendix B & C	30/06/2020
2.0	Revised for QECM revision	10/01/2024

3 TABLE OF ACRONYMS

Acronym	Description
AEMO	Australian Energy Market Operator
CB	Circuit Breaker
CID	Customer Isolation Device
CN	Customer Neutral
CP	Connection Point (Network Boundary)
GPO	General Power Outlet
HRC	High Rupture Capacity
HV	High Voltage
HVCT	High Voltage Current Transformer
IPC	Insulation Piercing Connector
LNSP	Local Network Service Provider
LVCT	Low Voltage Current Transformer
MEN	Multiple Earth Neutral
MIL	Meter Isolation Link
MNL	Metering Neutral Link
MPD	Metering Protective Device
MS	Main Switch
NER	National Electricity Rules
NMI	National Metering Identifier
PB	Property Boundary
PoA	Point of Attachment (on building fascia) or other approved structure by the LNSP
SN	Service Neutral
SPD	Service Protective Device
VT	Voltage Transformer
WC	Whole Current

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5 APPLICATION OF THE MIRS

The *Metering Installation*, is a term defined by the *National Electricity Rules* (NER) as:

> *The assembly of components including the instrument transformer, if any, measurement element(s) and processes, if any, recording and display equipment, communications interface, if any, that are controlled for the purpose of metrology and which lie between the metering point(s) and the point at or near the metering point(s) where the energy data is made available for collection.*
>
> *Note:*
>
> *(1) The assembly of components may include the combination of several metering points to derive the metering data for a connection point.*
>
> *(2) The metering installation must be classified as being for revenue purposes and/or as a check metering installation.*

The NER determines that the Metering Provider (as nominated under the rules) is the party responsible for the installation, maintenance, regular inspection, and accuracy testing of the *Metering Installation* to ensure ongoing compliance.

While the *Metering Installation* is generally located within the customer's electrical installation, it forms part of the interface with the local electricity network, and as such, its design and construction must meet.

- the supply requirements of the Network,
- the requirements of the jurisdictional regulator,
- the jurisdictional regulations covering the work of an electrician (e.g. AS/NZS 3000)
- the requirements of the National Electricity Rules (NER) and Metrology procedures

The impact of these requirements is dependent on the type of connection. For example, for a whole current (WC) connection, the *Metering Installation* directly forms part of the electrical supply circuit to the customer and therefore are affected by the Network's electrical protection and electrical isolation policies, is subject to the LNSP's access requirements for embedded network equipment and requirements for isolation, jurisdictional neutral connection convention, and the use of customer equipment for load side isolation. In contrast, for Low Voltage Current Transformer (LVCT) connections and High Voltage (HV) connections, the *Metering Installation* interfaces with the electrical supply, rather than making up part of electrical supply to the customer and therefore are less directly affected by LNSP's supply policy and more on the convention that has been historically agreed for a given jurisdiction for the secondary circuitry used for the metering.

These requirements can be considered as a form of ***interface specification*** that defines the junction between the network, the *Metering Installation* and the Customer's exclusive use part of the electrical installation. For this reason, existing Australian Standards such as AS/NZS 3000 Wiring Rules alone, are not adequate to cover all aspects of this interface. These Metering Requirement should be read in conjunction with all other relevant regulations and requirements to be fully informed as to requirements to meet to have metering installed.

The ownership of the various components of the electrical supply between the *Connection Point*, via the *Metering Installation* through to the customer's main switch(es) vary between Customer, LNSP, and Metering Provider. The following diagrams provide a representation of this ownership for a typical metering arrangement. Distribution of responsibilities and ownership are described by the colour coding of **LNSP Ownership**, **Customer or LNSP Ownership**, **Customer Ownership** and **Metering Provider Responsibility**

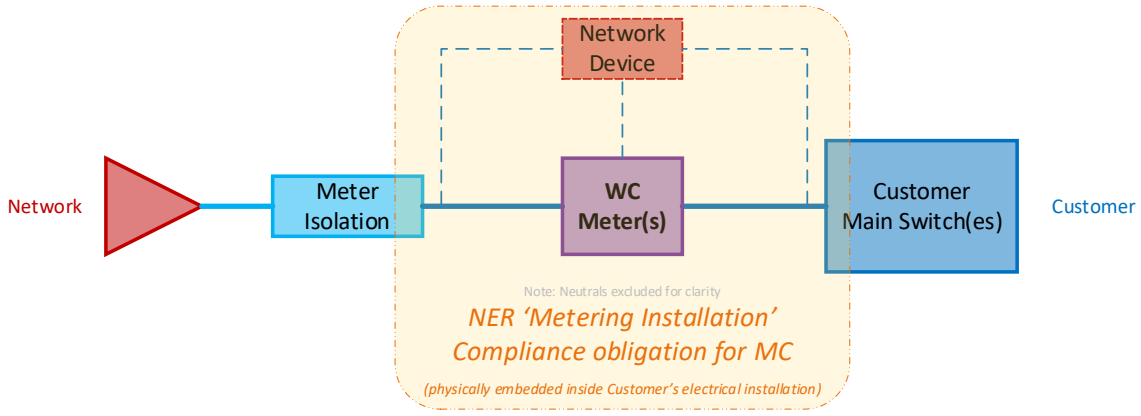


Figure 1 - WC Metering Installation Responsibilities and Ownerships

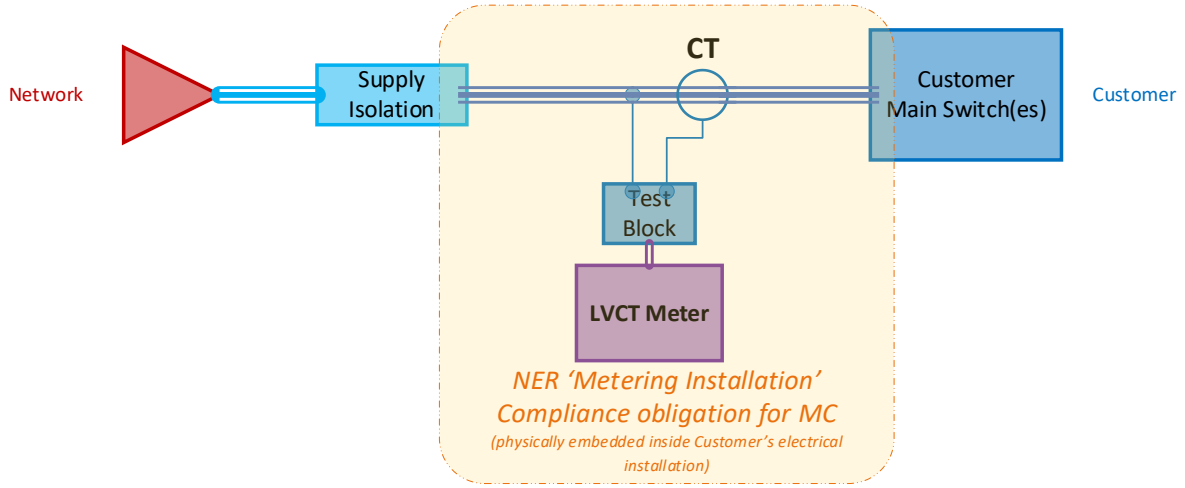


Figure 2 - LVCT Metering Installation Responsibilities and Ownerships

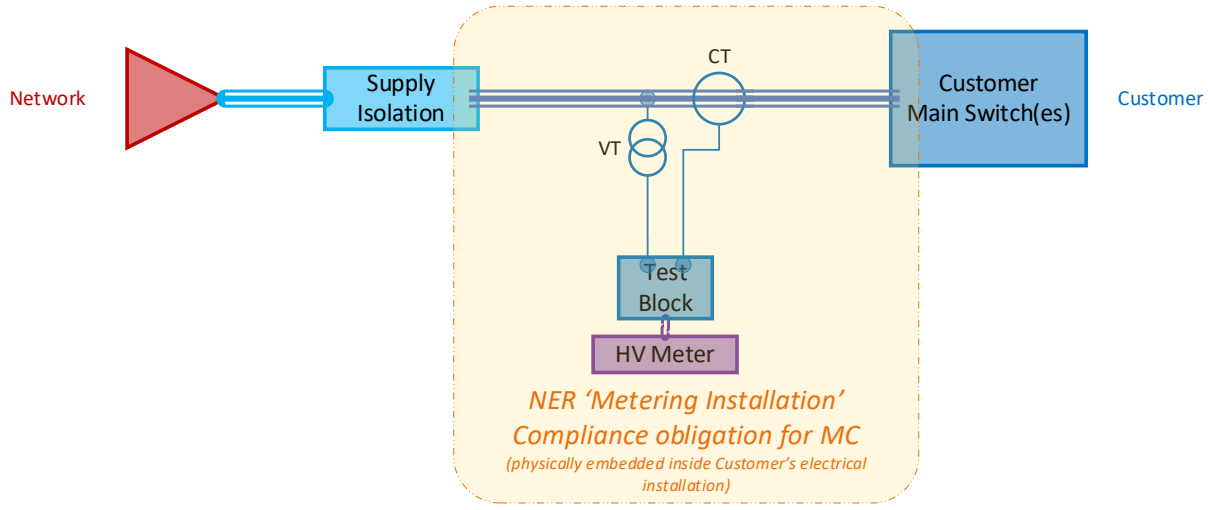


Figure 3 - HV Metering Installation Responsibilities and Ownerships

6 SCOPE

(1) To the extent that they do not conflict with existing jurisdictional Rules, the requirements described within this document apply metering installations in the NEM jurisdictions where the PoC Rule Change applies, that being Queensland, New South Wales, Australian Capital Territory, Tasmania, and South Australia for all NMI Classifications and in Victoria for all NMI Classifications excluding SMALL.

6.1 FAILURE TO COMPLY WITH THESE REQUIREMENTS

(1) Customers whose installations do not comply with these Requirements may have the installation of metering equipment delayed or withheld until the non-compliances have been rectified.

(2) These Requirements are in addition to and do not override AS/NZS 3000 Wiring Rules.

6.2 INNOVATION

(1) These Requirements do not preclude alternative methods, innovation, or technology that achieves the same outcomes as the specifications detailed in this document. However, any such proposal requires approval by the respective Metering Coordinator and/or Metering Provider (Refer to 6.11 VARIATIONS TO THESE REQUIREMENTS) .

6.3 DEFINITIONS

(1) Any terms used within this document are consistent with the definitions in the NER and AS/NZS 3000 Wiring Rules.

6.4 METERING INSTALLATION REQUIREMENTS

(1) The general reference to these Metering Installation Requirements within this document is with the capitalised word 'Requirements'.

6.5 RESPONSIBILITY FOR EQUIPMENT

(1) Customers are responsible for provision and maintenance of facilities to house metering and network equipment required by Metering Providers and the LNSP.

(2) Enclosures and panels must be provided with sufficient space to mount all the required equipment such that each NMI is individually metered and does not require the Metering Provider to alter the Electrical Installation's facilities or wiring to install the metering, other than that required to connect, fix or repair the metering equipment.

(3) Facilities and wiring must be in accordance with current AS/NZS 3000 Wiring Rules, the applicable Acts, Regulations, Codes and these Requirements.

(4) Where required, customers must provide to the metering provider upon request, all documentary evidence related to compliance for work and equipment that they are responsible for. This includes but is not limited to

a) Instrument Transformers Type test certificates

b) Instrument Transformers Accuracy certificates

c) Earthing design and statement of compliance, where applicable

d) Electrical Safety compliance certificate, where applicable

(5) Appropriate isolation devices are also required to be provided so that the metering provider can isolate supply and remove all load from a meter installation to safely install and maintain the meter equipment under a deenergised state.

(6) Where the jurisdictional regulations allow customer owned equipment to be installed on a metering panel e.g GPO, it must be done in accordance with these requirements. Not doing so risks the meter provider requiring the

customer to remove or relocate this equipment. To avoid this, it is recommended that customer equipment be installed separately to the meter panel.

(7) Instrument transformers and associated equipment must be provided by the customer.

(8) Metering Providers are responsible for meters and communications equipment connected and located between the individual NMI supply Isolation Point (SPD, MPD, MIL) and the Customer Isolation point (Main switch/es) for Whole Current metering installations, and downstream of the Meter Test Block for Low Voltage and High Voltage current transformer metering. See Figures 1,2 and 3 above for clarification.

(9) LNSPs are permitted to install Network equipment on a metering installation. These remain the property and responsibility of the LNSP and will be installed in accordance with their requirements.

6.6 Full Compliance

(1) These Requirements specify the minimum set of requirements that must be met to allow the orderly installation of smart metering. Work that requires compliance to these Requirements in full include:

a) Establishing a *Metering Installation* for a new supply connection to the Network i.e. a new connection.

b) Relocation of the position of a WC *Metering Installation.*

c) Conversions between WC and low voltage current transformer (LVCT) metering.

d) Where the existing WC metering panel and metering enclosure cannot accommodate the required *Metering Installation*.

e) Where jurisdictional obligations require that an existing metering installation meet all current regulations.

f) *Any* modification of a LVCT or HV metering installation primary conductors.

6.7 Partial Compliance

(1) Metering Providers recognise that it is not practical to require full compliance to these requirements in situations where a smart meter is being installed at an existing metering installation. The following principles drive the requirements for alterations at existing metering installations. It must have:

a) A secure, intact and weatherproof metering position – Refer to section 7.2 Location of the Metering Installation and its Components.

b) A meter panel that is in good condition, can accommodate and allow for the safe installation of all metering equipment - Refer to section 8 Metering Equipment Panels, Surrounds and Enclosures.

c) No friable asbestos present (6.9 Asbestos) .

d) A metering isolation point upstream of the metering to allow for the individual isolation of each NMI. Refer to sections 9.2 Equipment Protection and Isolation and 10.2 Primary Circuit Isolation as applicable.

e) A serviceable customer main switch (or switches) downstream of the metering to enable de-loading for each NMI. Refer to sections 9.2 Equipment Protection and Isolation and 10.2 Primary Circuit Isolation as applicable.

f) A separate meter neutral link terminal for each metering and Network device - refer to section 9.4 Whole Current Meter Wiring.

g) Confirmed maintenance of neutral integrity for the installation at the conclusion of the repair at whole current metering installations. (i.e repair – replacement of network meter – does not result in any deterioration of service loop impedance and customer neutral voltage remains below levels specified by the jurisdiction).

h) Metering Equipment that is clearly labelled in accordance with these requirements – Refer to Section 8.4 Labelling.

i) Alignment with AS/NZS 3000 where applicable, specifically the *Repairs* clause.

j) Alignment with any minimum jurisdictional requirements

k) Where existing surface wiring is present, it must be appropriately double insulated and protected

(2) In part compliance with these requirements is acceptable where changes to the existing *Metering Installation*s can be accommodated without changing the metering enclosure. Examples are:

a) addition of a tariff such as controlled load

b) the installation of embedded generation

c) change of supply size such as changing between single phase and three phase supply

d) the consolidation of multi-single-phase metering to polyphase metering required as part of any customer requested advanced metering installation

(3) Where metering work requires that the existing facilities that house metering and network equipment be altered or upgraded to meet these Requirements, the customer is responsible for arranging for these alterations before the metering installation can proceed.

6.8 DEFECTIVE METERING INSTALLATIONS

(1) At the time of the metering installation the metering provider will perform an assessment of the metering installation to determine if the requirements have been met and the metering installation can proceed.

(2) Where issues exist that require the customer to resolve, the metering provider will document these in the CMIG Defect form (see appendix F) providing the necessary information regarding the nature of the issue that the customer will need to resolve before the metering installation can proceed. The metering provider will also report this to the customers retailer.

(3) Customers will need to engage an electrical contractor to perform the necessary works to resolve the issue. Once the issue has been resolved the customer should notify their retailer so that the metering provider can re-attend to install the meter.

(4) Common defects raised against a metering installation include (but are not limited to):

a) Hazards that prevent the metering provider from gaining safe access to the metering installation.

b) Missing or non-operable isolation point for the NMI.

c) Missing or faulty Main switch (resulting in meter provider not being able to isolate the load)

d) Unserviceable metering enclosure

(5) Unserviceable metering panel

a) Unsafe Electrical wiring (exposed live parts/ damaged insulation/ No MEN etc)

b) Presence of friable asbestos

c) Flammable or hygroscopic material used for meter panel

6.9 ASBESTOS

(1) In *Metering Installation*s where *friable* asbestos is present, the customer must arrange for its removal before the installation of metering can proceed.

(2) While metering provider technicians are trained to work with asbestos and will do so where it does not present an unacceptable risk of exposure to asbestos, any asbestos material that does create an unacceptable Occupational Health & Safety risk must be removed from the *Metering Installation* before metering can be installed. Should there be uncertainty on the integrity of any asbestos panels or equipment known to contain asbestos, or where the opportunity allows, it is recommended that this material be removed to ensure that a defect notice is not issued, and the installation of the metering is not delayed.

(3) Information related to asbestos removal is available from the jurisdictional safe work regulator, which will detail the relevant industry safety guidelines and model procedures.

6.10 Determination of Metering Requirements for Electrical Loads

(1) Metering providers routinely monitor customer's installation to ensure that the load characteristics remain within the specifications for which the metering was designed. Where load characteristics have changed the Metering provider may contact the customer via their retailer to inform them that they are operating outside the specification of the metering.

(2) Where the customer is made aware that their load is exceeding the limits of the metering equipment, they must either take steps to either reduce their load such that it is within the limits of Table 1, or they must contact their Retailer to have the *Metering Installation* upgraded such that it is sufficient for the installations load requirements.

(3) The customer or their agent should consult with the customer's Retailer at the earliest opportunity in order to determine their Retail Tariff / Network Tariff and Metering requirements.

(4) Excluding LNSP approved unmetered supply and AEMO registered Type 7 loads, all customer Electrical Installations must be metered in accordance with the NER, these Requirements, and to meet the Retail and Network tariff requirements.

(5) The customer or their agent are responsible for determining the Electrical Installation's load requirements, and method of metering (i.e. whole current, low voltage current transformer metering, or high voltage metering)

6.10.1 Low Voltage

(1) Table 1 provides guidance on the typical load groups for low Voltage metering.

Calculated Maximum Demand per AS/NZS 3000 for Connection point for Metering per phase	**CT requirements**	**Metering Equipment**
LV 0 - 80A	None	Whole Current meter single or three phase
LV>80 to 400 A	Type S 200/5 metering extended 200% range Current Transformer with 5VA burden rating	CT Meter
LV between >200 - 1600 A	Type T 800/5 metering extended 200% range Current Transformer with 15VA burden rating	CT Meter
LV between >800 – 3000 A	Type W 1500/5 metering extended 200% range Current Transformer with 15VA burden rating	CT Meter
LV between >1500 – 4000 A	Type U 2000/5 metering extended 200% range Current Transformer with 15VA burden rating	CT Meter

Table 1 - Typical Load Groups for Low Voltage Metering

6.10.2 High Voltage

See 11 High Voltage Metering for details on the determination of metering requirements for high voltage.

6.11 Variations to these Requirements

(1) In exceptional circumstances, parts of these Requirements may be waived and/or modified by the submission of a written request to the relevant Metering Provider. The customer or customer's electrical contractor should contact the retailer to determine who the Metering Provider responsible for any metering work will be.

(2) The request must include the following:

a) A detailed statement of the reasons why non-compliance with these Requirements is sought.

b) Full details, photos and diagrams, as necessary, showing the specific aspect of a requested variation.

c) The installations National Metering Identifier (NMI) and location details.

(3) No action or variation must be undertaken until a written approval from the Metering Provider has been given.

7 METERING INSTALLATION ACCESS, LOCATION AND SECURITY

REFER TO SECTION **12 SPECIFIC JURISDICTIONAL REQUIREMENTS AND TRANSITIONAL ARRANGEMENTS** FOR ADDITIONAL OR VARIATION TO THE REQUIREMENTS DESCRIBED WITHIN THIS SECTION

7.1 ACCESS TO METERING EQUIPMENT

(1) Under retail and network connection agreements, the customer must provide the Metering Provider with safe and unhindered access to the *Metering Installation* for purposes associated with the metering of electricity and testing of the customer's Electrical Installation including connection, interruption, disconnection or reconnection of supply.

(2) Safe and unhindered access is required to be provided during normal business hours.

7.2 LOCATION OF THE METERING INSTALLATION AND ITS COMPONENTS

(1) The metering point of a *Metering Installations* must be as close as practical to the Connection Point for the premise, in accordance with the NER.

(2) The Meter Board and, where applicable, the LVCT chamber, HV marshalling point and HV CTs and Voltage Transformers (VTs) must be protected from the elements and situated such that persons approaching or working on the metering installation are not exposed to hazards. Where those metering installation components are not protected by an existing structure e.g. veranda, or indoors etc, the metering must be housed in dedicated, weatherproof metal metering enclosure free of corrosion or damage with serviceable lid/door.

(3) Equipment must be mounted at heights such that it is *readily accessible* and allows safe access to read and maintain the equipment and must be in accordance with the current AS/NZS 3000 Wiring Rules section on Location of Switchboards.

(4) For new *Metering Installations*, all metering equipment located at a metering panel or marshalling point for HV metering must be mounted between 500mm and 2000mm from the floor or platform. This includes:

   a) Revenue meters
   b) Fuses, links and terminals
   c) Communications equipment
   d) MIL/MPD & meter neutral links
   e) Network equipment including control devices

(5) All single and dual NMI site main switches must not be mounted below 500mm and must not exceed 2000mm.

(6) For multi-NMI installations (more than two) the main switches must be located at a minimum height of 300mm and maximum height of 2000mm from floor or platform so as to facilitate safe operation, inspection, testing and maintenance.

(7) For existing Meter installations until such time that the requirements for either Partial or Full compliance of these requirements are met the metering equipment must be protected from the elements and situated such that persons approaching or working on the metering installation are not exposed to hazards.

7.3 UNSUITABLE LOCATIONS

(1) Metering equipment must not be installed behind locked gates or doors unless the obstructions are fitted with acceptable access arrangements.

(2) The following locations are considered unsuitable for mounting service and metering equipment. New metering installations must avoid these locations. For existing metering installations, the Metering Provider will perform an assessment to determine that access to the metering installation location is adequate and that the metering work can be performed safely. Where this is not the case the Metering Provider may require a customer to relocate the metering position before the meter installation can proceed. Customers and electrical contractors

who are concerned about the current metering position should contact the Metering Provider via the customer's Retailer to discuss. Unsuitable locations are:

a) Over stairways or ramps, in narrow passageways, or in confined spaces.
b) In vehicle docks, driveways, factory passageways where the equipment or a person working on it would not be effectively protected.
c) In close proximity to, or over, machinery or open type switchgear.
d) Locations which are liable to be affected by fumes, vibration, dampness, or dust, which may cause deterioration of equipment or unsatisfactory working conditions.
e) In hazardous or prohibited switchboard locations as defined in the AS/NZS 3000.
f) Where the normal ambient temperature exceeds 50°C.
g) Where there is insufficient light.
h) Where equipment would be exposed to direct sunlight.
i) Where the use of a ladder would be necessary.
j) Where projections at head height are a hazard.
k) In pool or spa zones as defined in AS/NZS 3000.
l) On *enclosed* verandas without ready access.
m) In areas enclosing dogs.
n) In areas to which access is normally restricted - for security, health or other reasons. (This would include areas in which animals are kept for security reasons).
o) Behind a fence without a gate.
p) Within gas emitting devices exclusion zone as detailed in AS 5601.
q) Within LPG cylinder minimum clearance to ignition sources refer to AS 5601.
r) In fire isolated stairways, passageways, or corridors.
s) Where access is restricted by vegetation.
t) On a LNSP asset without the authorisation of the Network.
u) Where workplace specific induction or training is required.
v) In area where noise levels exceed jurisdictional HS&E standards e.g. QLD Health and Safety Regulation and the Standard AS/NZS 1269.1 Occupational noise management.
w) For multi-occupancy metering, inside a secured or private tenancy.

7.4 Locking Facilities

(1) Where the Metering Provider's metering equipment is enclosed or within a low security area that the customer wishes to secure with a lock, access to the area or enclosure must be fitted with an approved lock which provides universal access to the LNSP and Metering Provider, in accordance with jurisdictional requirements.

7.5 Access to customer installation (sub-boards)

(1) Where access to sub-boards within tenancies is required for testing purposes and to verify installations are correctly metered, the customer must give ready access to the sub-boards during normal business hours.

7.6 Security Seals

(1) The NER requires that *Metering Installation*s have facilities to keep them secure from interference. Provision must be made for the application of security seals to any un-metered portion of a *Metering Installation*.

(2) Sufficient access must be allowed for sealing each point and in any case not less than 20mm clearance around each sealing point. Sealing facilities should not rely on holes to be aligned through nuts and threaded studs.

(3) Provision must be made for the sealing of all metering panels where security requires it, dedicated Current Transformer and Voltage Transformer chambers, and High Voltage metering panels.

8 METERING EQUIPMENT PANELS, SURROUNDS AND ENCLOSURES

REFER TO SECTION **12 SPECIFIC JURISDICTIONAL REQUIREMENTS AND TRANSITIONAL ARRANGEMENTS** FOR ADDITIONAL OR VARIATION TO THE REQUIREMENTS DESCRIBED WITHIN THIS SECTION

8.1 GENERAL

(1) All metering equipment panels, surrounds and enclosures must be suitable to withstand the mechanical, electrical and thermal stresses that are likely to occur in service and the environments in which it is to be installed.

(2) All *new* metering panels, marshalling points, LVCT chambers, enclosures, surrounds and supplementary equipment must be designed and installed to comply with AS/NZS 3000 Wiring Rules. Where not part of a switchboard, any standalone LVCT chamber, marshalling point or similar enclosure containing metering equipment shall be treated as a switchboard, with regards to interpretation under the Wiring Rules. Enclosures that contain metering equipment, including as part of a switchboard are also required to comply with the relevant requirements of AS/NZS 61439 or AS/NZS 3439.

(3) Enclosures that contain metering equipment shall be ground, platform, wall or similarly mounted, such that safe, natural access to the metering equipment for maintenance is achieved from a standing (vertical) position and reaching out in the horizontal direction.

(4) Meter mounting facilities must be of a type and location that is accessible and prepared for the meter's installation. Mounting facilities must be one of:

a) a metering equipment enclosure also including the customer's Switchboard equipment; or

b) a metering equipment only enclosure; or

c) on a surround, or within or on facilities that are approved by the Metering Provider. (Refer to 6.11 VARIATIONS TO THESE REQUIREMENTS for exemptions)

8.2 METER PANELS

(1) New Meter panels must be constructed of insulating material:

a) to an equal or better standard than that required by AS/NZS 61439.1

b) all meter panel materials must comply with the glow-wire test to 650°C according to AS/NZS 61439.1.

(2) Existing Meter panels must:

a) be in good condition.

b) be free from corrosion and/or water damage.

c) not contain friable asbestos.

d) be of a size that can accommodate and allow for the safe installation of all metering and necessary network equipment, and isolation equipment.

(3) Where the above requirements cannot be met a panel upgrade is required.

8.3 FIXING ARRANGEMENTS

(1) Where metering work requires the upgrade of an existing panel, the panel must:

a) except where fixed panels are allowed, be hinged mounted on one vertical edge of the panel and secured to the metering enclosure or surround, or double-hinged where the panel is recessed inside the enclosure.

b) be capable of being opened to an angle of not less than 90 degrees from the closed position with all metering equipment installed and when opened, maintains a minimum distance of 200mm from the edge of the panel to any fixed object when the panel is opened at 90 degrees on its hinges.

c) constructed of a suitable non-corroding material that will maintain a structural and dimensional fit after metering equipment has been installed

d) secured in the closed position by a fastener/s which requires the use of a tool to gain access

e) meet sealing requirements – refer to section 7 METERING INSTALLATION ACCESS, LOCATION AND SECURITY

(2) Where the Jurisdiction allows, fixed meter equipment panels must meet the following requirements:

a) All parts of the metering equipment panel must be accessible within 400 mm from the nearest means of access; and

b) The distance from the back of the metering equipment panel to the wall or immovable structure must be not less than 150 mm; and

c) Where access to the rear of the panel is via removable panels, these must be the width of the chamber/ enclosure /panel plus a minimum of 200 mm in height, and clear of obstructions.

d) Access may be obtained by the removal of covers designed to provide access.

e) Metering active and neutral links may be installed behind access covers provided clear access to the rear of the panel is maintained.

f) No metering equipment or other equipment is permitted to be installed on the access covers.

(3) Where a fixed panel in a free-standing enclosure is used, a door must be provided to allow access the rear of the panel and the door must maintain a minimum distance of 200mm from the face of any object when the door is open 90 degrees on its hinges.

8.4 LABELLING

(1) Where the metering installations for multiple occupancies occur at the same street address, each of the occupancies metering must be labelled or identified in a manner acceptable to the MP. Labels must be displayed on the metering panel to indicate the relationship of meters, fuses and other equipment.

(2) Every label required by these Requirements must be permanent, indelible, legible and suitable for the purpose for which it is intended. For example, labels should be of laminate and manufactured with letters and numbers of not less than 6mm in height.

(3) Any meter isolation device must be correctly labelled with Line and Load sides clearly identifiable.

8.5 WIRING

(1) Meter panels must be wired in accordance with these Requirements, the Metering Provider specifications and the current AS/NZS 3000 Wiring Rules.

(2) Unused meter wiring must be appropriately insulated and terminated at the rear of the panel or within a junction box, and in accordance with AS/NZS 3000 Wiring Rules

(3) All Conductors connected to metering equipment on the metering panel must be:

a) provided with sufficient free length to permit the panel to be moved into a position to allow work to be carried out.

b) suitably fixed or otherwise retained in position to avoid undue movement or stress at terminals of metering/electrical equipment when the panel is moved or is fixed in position; and

c) arranged to prevent undue pressure on electrical equipment mounted behind the panel or risk of being sandwiched between panel and surround.

(4) Surface wiring is not permitted unless allowed under clause 6.7

8.5.1 Wiring Holes

(1) Metering Providers may install a variety of metering equipment that may require wiring holes in different locations. There is no requirement to pre-drill holes in the meter panel.

(2) Holes for ELV and communications cabling must be separate from LV *Cable* holes. Refer to AS/NZS 3000 Wiring Rules section on "Prevention of mutual detrimental effects between services for requirements for communication cabling".

(3) All un-utilised perforations that permit direct contact with any component or wiring at the rear of panel must meet the requirements of AS/NZS 3000.

8.6 Mounting of Equipment

(1) The meter panel is dedicated for revenue metering equipment, Network Devices and equipment directly associated with supply and isolation of the metering system. Examples of equipment on the meter panel include:

a) line side meter isolation

b) minimum number of switches or circuit breakers are permitted when required to isolate/de-load on the load side of the metering or where not permitted, in accordance with section 9.2.2

c) neutral or active links on the back of the panel and

d) network devices such as load control relays, customer owned load contactors, controlled by the metering equipment or network devices.

(2) Customer owned GPO's and sub-circuit protection must not be mounted on the metering panel.

(3) Bolts/screws used to mount and fix equipment on *insulated* meter panels must be fit for purpose.

(4) Fixing screws and fasteners must not protrude through the rear of the panel in a manner that could damage conductors or create un-earthed exposed metal. Where conductive mounting bolts/screws do protrude through the meter panel and can be contacted from the front of the panel (i.e. not IP2X) and can come into contact with wiring at the rear of the panel then a non-conducting bolt/screw (e.g. nylon or plastic) must be used.

Note: Metal screws with needle points and self-drilling tips that protrude through the rear of the panel are not permitted. The practice of insulating of metal screws using silicone or other material is not permitted.

8.7 Metering Communications

8.7.1 General

(1) When metering enclosures are being positioned within or on a building, consideration must be given to ensuring mobile phone signal is available at the metering equipment. Where equipment is installed in a secure location indoors, the use of metering surrounds is encouraged such that mobile phone signal is not impeded by metal enclosures and doors.

(2) When metering equipment is enclosed in metal enclosures, provision must be made for the installation of an external antenna.

(3) Where equipment is installed in switch rooms and robust communication signal cannot be maintained including when the door to the room is closed, conduits including draw wire to allow for antenna's to be run outside the room to obtain signal must be provided.

8.7.1.1 Segregation of wiring

(4) Antenna or communications cabling associated with metering equipment is generally considered to be operating at extra-low *Voltage*. AS/NZS 3000 Wiring Rules requires that *cables* of low *voltage circuits* and *cables* of extra-low *voltage circuits* must only be enclosed in the same wiring system where one of the following arrangements is employed:

a) The low voltage cables are of a type providing the equivalent of double insulation.

b) All cables or each conductor of a multi-core cable are insulated for the highest voltage present.

c) The low voltage cables are installed in a separate compartment of a common cable trunking system having fixed and continuous barriers between compartments.

(5) Antenna or Communications cabling must be installed and fixed, loomed and/or cable tied in a manner that will not obstruct any other *electrical equipment* (*Switchboard* escutcheons and meter panels) and their operational requirements and run in a manner to maximise separation with low *voltage circuits*.

8.7.1.2 Location of Communication Equipment

(1) With the exception of antennae, metering communications equipment must be located on the meter panel of the associated meter, such that it will not obstruct any other electrical equipment, including the meter, MIL / SPD, Neutral link and must allow unhindered opening of the meter panel, and or enclosure door, removal of door where applicable.

8.7.1.3 Customer and third party provided Communication Equipment

(1) Customer and third-party provided communication equipment must not be installed on the meter panel or obstruct access to the meter panel. The installed equipment must not obstruct or cause interference to other equipment, including the meter, MIL / SPD, Neutral link and metering communications equipment.

(2) Where a mobile repeater is installed to improved communication signal, steps shall be taken to ensure it cannot be inadvertently disabled.

8.8 METERING SURROUNDS AND ENCLOSURES

8.8.1 General

(1) For new *Metering Installations*, Meter Surrounds and *Enclosures* must be constructed:

a) to accommodate a meter panel in accordance with these Requirements:

b) to prevent the spread of fire in accordance with the requirements of AS/NZS 3000 Wiring Rules in relation to the construction of Switchboard cases and surrounds.

c) to prevent direct contact by persons with wiring at the rear of the escutcheons, doors and meter panels when the meter panels are in the closed position.

d) to provide a minimum clearance at the back of the meter panel not less than 75mm.

e) provided a clearance between the front of the meter panel and the inside of the enclosure door of not be less than 175mm.

f) to provide suitable fixing devices to allow the meter panel to be fixed and sealed in position in accordance with sealing requirements.

g) to ensure movement of the meter panel is not obstructed and the device used to retain the hinged meter panel in the closed position is in correct alignment when all necessary equipment is mounted on the meter panel.

h) with an IP rating suitable for the installed environment, and a minimum degree of protection of IP23 for Enclosures and IP2X for surrounds, in accordance with AS/NZS 3000 Wiring Rules.

8.8.2 Temperature Rise Considerations

(1) For new *Metering Installations*, Metering Facilities and Enclosures must be designed to ensure the meter is not at any time subjected to temperatures more than its specified operating range conditions as defined by table 5 of AS/NZS 62052.11.

(2) Appropriate air circulation, ventilation, shading or siting of the metering equipment should be considered in meeting those operating temperature limits. Where metering is enclosed within the customer's switchboard, a temperature rise limit (above ambient) of 10 Kelvin is to be used for LVCT and HV connected meters, and 25 Kelvin for whole current meters. Temperature rise limits may be determined using actual type testing procedures in accordance with AS/NZS 61439 or assessment by under AS60890-2009.

9 WHOLE CURRENT METERING INSTALLATIONS

REFER TO SECTION **12 SPECIFIC JURISDICTIONAL REQUIREMENTS AND TRANSITIONAL ARRANGEMENTS** FOR ADDITIONAL OR VARIATION TO THE REQUIREMENTS DESCRIBED WITHIN THIS SECTION

9.1 GENERAL REQUIREMENTS

(1) Where metering or control equipment is no longer required, the Retailer must be contacted to arrange for the Metering Provider to coordinate its removal.

(2) Customer's ancillary equipment such as surge diverters, voltmeters, phase failure relays etc. must be connected on the load side of the revenue metering equipment.

(3) Customer owned CTs used for energy management are permitted on the line side of revenue metering equipment however must be installed in a way that does not impede the requirements of the Metering Provider and LNSP.

9.2 EQUIPMENT PROTECTION AND ISOLATION

9.2.1 Protection and Isolation of Whole Current Metering

(1) All whole-current metering and associated network device must have a line side isolation device that can be operated independently for each NMI.

(2) Provision of isolation devices is the customer's responsibility.

(3) The isolation point must be adjacent to the metering equipment.

(4) The isolation device must be a Type IIb fault current limiting (HRC) fusible link manufactured in accordance with IEC60269-3 and IEC60269-1 with maximum nominal current rating of 80 A[1]

(5) Where the jurisdictional regulations do not permit the use of an 80A HRC fuse as the isolation device(s), a switch or *Circuit-breaker* or meter isolation link may be used as the *isolation* point provided the metering equipment is appropriately protected by an upstream HRC *Fuse* preferably rated at 80A but not more than 100A[2].

(6) All *Isolation* equipment must be able to be sealed in accordance with 7 METERING INSTALLATION ACCESS, LOCATION AND SECURITY section of these Requirements.

9.2.2 De-loading of Whole Current Metering

(1) Isolating switches on the load-side of the meter must be provided for each customer, clearly labelled and identified and located in the same switchboard as the metering that it is isolating.

(2) For all new or upgraded metering installations, meters must be positioned in the same location as the Main switch and MEN point to allow for the required testing to be undertaken by the Metering Provider.

9.3 SPACING REQUIREMENTS

9.3.1 General

(1) Meter panels must be of a size to adequately accommodate the metering equipment to be installed upon it and be of an equal or greater size than the meter panels dimensions detailed in these Requirements.

(2) The minimum size panel for new *Metering Installation* permitted on a single residential dwelling must be 480mm (H) x 460mm (W).

1 Whole Current metering equipment used in Australia is required to comply with AS62052.31 which defines the overload and fault current tolerance of a meter with a supply control switch (SCS) – the arrangement for a NER compliant smart meter. The 80A HRC fuse meets this protection requirement of clearing a 3kA and 6kA fault within half a cycle – 10 ms – and supporting an overload of 128A for 2 hours. In contrast, while the circuit breaker will detect the fault quickly, its operate time remains in the order of 30-150 ms

2 The jurisdiction may mandate the use of an 100A HRC fuse as the service protection and isolation located upstream of the metering installation, such as on the barge board of the property, or in an underground pillar or on a power pole. The 100A fuse will offer fault current protection superior to that of a circuit breaker but may take longer than 10 ms to clear.

(3) Consideration should be given to utilise a larger size meter panel to accommodate:

a) extra metering equipment for possible future tariff changes

b) LNSP equipment such as load control equipment and network devices as required

c) additional communication equipment as provided by approved Metering Provider

d) meter neutral and/or active links

e) meter isolation/protection devices

9.3.2 Sizes of equipment to be accommodated

(1) A single tariff two or three phase load will be metered with a single polyphase meter to ensure the correct measurement of the load. Space must be provided to accommodate this arrangement.

(2) The minimum space requirements to accommodate mounting of individual meters and control equipment are shown in Table *2* below:

Meter and Network Equipment types	Height (mm)	Width (mm)	Depth (mm)
Single Phase Meter	255	150	135
Polyphase Meter	300	185	135
Metering Protection Device / *Isolation* Link	90	40	90
LNSP Control Equipment	175	110	135
Minimum clearance between metering equipment	10	10	--
Minimum clearance around protection and isolation devices	20	20	--
Minimum distance from edge of panel	20	20	--

Table 2 – Space Requirements for Equipment

9.3.3 Minimum Metering Equipment Combinations

(1) Each new *Metering Installation* must make provision for the following minimum equipment combinations.

Installation Type	Minimum Metering and Network Equipment Types to be accommodated	Typical Minimum Panel Size
Residential House	1 x Polyphase Meter 1 x Single Phase Meter 1 x LNSP Control Equipment 3 x Metering Protection Device / *Isolation* Link 1 x Main Switch	480mm (H) x 460mm (W)

Installation Type	Minimum Metering and Network Equipment Types to be accommodated	Typical Minimum Panel Size
Residential Duplex	2 x Polyphase Meter 2 x Single Phase Meter 2 x LNSP Control Equipment 7 x Metering Protection Device / *Isolation* Link 2 x Main Switches	480mm (H) x 550mm (W)
Residential apartment buildings	1 x Polyphase Meter per apartment 3 x MPD / MIL (one per phase) 1 x main switch per meter Refer to clause 9.3.4 for additional space for LNSP Equipment.	Select panel size using building blocks
Commercial buildings	1 x Polyphase Meter 1 x Single Phase Meter 1 x LNSP Control Equipment 4 x Metering Protection Device / *Isolation* Link 1 x main switch per meter Refer to clause 9.3.4 for additional space for LNSP Equipment.	Select panel size using building blocks

Table 3 – Metering Equipment to be Accommodated

(2) Smaller panels maybe permitted by the Metering Provider in accordance with section 6.11 VARIATIONS TO THESE REQUIREMENTS if the customer can demonstrate that the installation is unlikely to be upgraded in the future.

(3) Refer to APPENDIX B – TYPICAL PANEL LAYOUTS for examples of how panels can be laid out to accommodate equipment.

9.3.4 Provision for Network Equipment for new *Metering Installation*s

(1) Each single residential dwelling or commercial installation must make space for the installation of one piece of network equipment.

(2) Where load at multiple occupancy residential dwellings or commercial installations is to be controlled by a device external to the meter, a space for the installation of network equipment and an isolation device for every three meter positions must be made available. Commonly available load control equipment can typically support the control of up to three independent loads.

(3) Where load control is not required, multiple occupancy residential dwellings and commercial installations must leave one in every ten meter positions available for the installation of network equipment.

9.3.5 Equipment dimension and placement examples

(1) Refer to APPENDIX A – WC EQUIPMENT DIMENSION AND PLACEMENT EXAMPLES

9.4 WHOLE CURRENT METER WIRING

(1) Conductors for Whole Current metering must not be less than 4mm^2 and must not exceed 25mm^2 with the insulation of Conductors coloured in accordance with AS/NZS 3000 Wiring Rules to facilitate identification of Neutral and Active Conductors.

(2) The metering neutral conductors for Whole Current metering must be not less than 4mm^2.

(3) In all circumstances, the bared Conductor for insertion into the meter terminals must be of sufficient length to be clamped under all terminal screws.

(4) Not more than one Active Conductor may be connected to any single terminal of a Whole Current meter.

(5) For multi occupancies and commercial builds where more than one NMI may be facilitated on a single hinged panel, consideration must be given to limiting the numbers of meters on a panel to reduce the risk of damage to wiring insulation in large looms when the panel is opened and closed.

(6) Compressed (compacted) or hard drawn conductors must not be used as meter wiring due to the flexibility required for the hinged panel and bend radii required connecting to the metering terminals.

(7) Aluminium cables must not be connected directly into meter terminals.

(8) Insulated Flexible Cables may only be used provided they are terminated with un-insulated bootlace pins of a minimum length of 25mm such that all terminal screws contact the bootlace pins.

9.4.1 Metering Active and Neutral Requirements

9.4.1.1 Connection of Metering Neutral Conductors to Main Neutral

(1) Integrity and continuity of the Neutral of the Electrical Installation must be maintained at all times.

(2) The Metering Neutral Link (which may be combined with the Service Neutral Link dependant on local service rules requirements) must be constructed such that:

a) it is connected to the main Neutral of the Electrical Installation in such a manner that it cannot be disconnected or removed without breaking seals or disturbing the Neutral integrity of the Electrical Installation.

b) metering equipment Neutrals can be disconnected and reconnected without disturbing the integrity of the Neutral of the Electrical Installation.

9.4.1.2 Metering Active and Neutral Links

(1) Metering Active and Neutral links must:

a) incorporate a separate connecting device for the incoming and each outgoing Circuit; and

b) consist of Tunnel-type terminals in accordance with the requirements of AS/NZS 3000.

(2) Where metering Active or Neutral links are used, they must be sealable or, where this facility does not exist (for larger sized consumer's mains), the links must be installed within a suitable dedicated enclosure fitted with a sealable cover.

(3) All metering and Network Device Neutral terminals must be connected to a dedicated terminal of the metering Neutral link via a separate Neutral Conductor. Soldered meter and Network Device Neutral connections are not permitted.

9.4.1.3 Metering Active and Neutral Link Mounting

(1) Where metering Active and Neutral links are mounted on the rear of the meter panel, they must be mounted in such a way that they do not interfere with the mounting of the metering equipment.

(2) Where metering Active and Neutral links are mounted on the rear of the meter enclosure and the material on which they are mounted is conductive, they must be mounted on insulating material with low water absorption properties that will extend past the live parts of the link by a minimum of 25mm in all directions. This mounting arrangement is not required where the link has been specifically designed and approved for installation onto metal surfaces.

(3) Access to metering links must not be obstructed by any structure or wiring within the Switchboard.

9.4.1.4 Metering Active and Neutral Link Labelling

(1) Metering Active and Neutral links must be identified as such.

(2) It is recommended that black coloured links are not used as Active Links.

9.4.2 Metering requirements for a Builder's Temporary Service (BTS)

(1) Builder's Temporary Services are required to comply with these Requirements. These requirements include but are not limited to:

a) All metering and control equipment must be back-wired and mounted on a hinged panel attached to a metering enclosure.

b) A metering Isolation link per phase must be connected to the line side of the metering.

(2) Builder's Temporary Services meter panels do not need to be dedicated to revenue metering equipment unless they are intended to be installed in the permanent position.

(3) Attention is drawn to the requirement to also comply with AS/NZS3012 Electrical Installations - Construction and demolition sites

9.4.3 Plug-in Metering

(1) Plug-in kilowatt hour meters are discouraged and only optionally available on existing single phase metering installations where existing socket bases are already installed and cannot be removed without significant switchboard modification or without affecting adjacent customers. Plug in metering may not be supported by some Metering Providers which may require the replacement of the plug-in base and/or the metering panel such that bottom connect metering equipment can be installed on a panel that complies with these Requirements.

10 LOW VOLTAGE CURRENT TRANSFORMER METERING

REFER TO SECTION **12 SPECIFIC JURISDICTIONAL REQUIREMENTS AND TRANSITIONAL ARRANGEMENTS** FOR ADDITIONAL OR VARIATION TO THE REQUIREMENTS DESCRIBED WITHIN THIS SECTION

10.1 GENERAL REQUIREMENTS

(1) These requirements specify the acceptable arrangements for low voltage current transformer metering (230/400V) with a maximum current specified in section 6.10 6.10.

(2) In conjunction with this, low voltage current transformer metering installations should also be constructed in accordance with the full requirements of the relevant jurisdictions Service & Installation Rules and AS 3000 Wiring Rules.

(3) It is recommended that a metering installation with a Current Transformer be designed with a margin for future load growth. Selecting Current Transformers to operate at the limit of their extended range (e.g. 200/5 CT with 200% extended range, selected for a 400A load) eliminates any scope for load growth and will require upgrading should the customer's future load exceeds the maximum rated load current for the CT.

(4) All new Current Transformers must meet the following requirements:

a) Be manufactured and type tested to the relevant Standards referenced the NER Metrology Procedure Part A (at June 2022 - AS 61869.1 and AS 61869.2).

b) Have documentary evidence of compliance from an NATA accredited test laboratory or other accredited body that is a signatory to the ILAC MRA , or from a Metering Provider accredited for CT accuracy testing via:

i. type test certificates

ii. accuracy test report meeting measurement uncertainty as detailed in the NER.

10.2 PRIMARY CIRCUIT ISOLATION

(1) Isolation is required on both sides of each set of current transformers to facilitate de-energisation during testing and/or replacement and to prevent back energisation from any backup supplies that may be present in the *electrical installation*. Only one of the isolation devices is required to provide fault protection for the electrical installation.

(2) All isolation equipment must be clearly identified and readily *Accessible* and must be installed and maintained by the customer and be capable of being operated by the Metering Provider and locked in the off position.

10.3 SECONDARY CIRCUIT ISOLATION

(1) Provision must be made for voltage circuit protection and isolation, by way of fuse links, to be installed within the current transformer chamber.

(2) Fuses installed within the current transformer chamber must:

a) comply with IEC 60269-3 and IEC 60269-1,

b) be HRC with a maximum rating of 10 amps and mounted in such a manner that the fuse carriers can be removed and replaced without undue risk to personnel when the switchboard is energised (facing the front of the chamber and in front of the plane of the primary conductors) Refer to Figure 29 – Typical CT Meter Panel Equipment Placement

(3) The voltage circuit fuses must be connected to the busbars in such a manner that the energising current of the meter will not be registered through the current transformers (i.e. should be connected to line side of the current transformers).

(4) Care must be taken with unprotected supply conductors between the busbar and voltage circuit fuses. The supply conductors from the busbars to the voltage circuit fuses must:

a) Be as short as practicable,

b) Be double insulated and a minimum of 4mm² stranded cable of not more than 7 strands.

c) Not have any joints in the conductors

d) Originate from within the current transformer chamber

e) Be adequately supported,

f) Not exceed 1 metre in length,

g) Be adequately separated from busbars or conductors operating at higher temperatures (12mm is considered adequate separation).

(5) Where colour coded cables are unavailable, colour coding must be provided by the use of appropriate coloured sleeving at both ends with a minimum sleeve length of 150mm.

10.4 Potential Links on Meter Panel

(1) To achieve local isolation of voltage circuits, to allow work to be safely carried out at the metering panel, without accessing the CT chamber, 4 x 32 A offset tag fuse bases, complying with IEC 60269-3 and IEC 60268-1, must be installed on the metering panel, but fitted with white fuse holders with links, and wired between the incoming voltage circuit and the test block.

(2) Potential links installed on the meter panels must be mounted on the front of the meter panel beside the test block and in such a manner that the fuse carriers can be effectively sealed, removed, and replaced without undue risk to personnel.

(3) Refer to Appendix D – Low Voltage CT Layouts and Appendix E – Specification for Test Blocks for Transformer-Operated Meters for examples of metering fuse sealing blocks and typical CT meter panel equipment placements.

10.5 Current Transformer Chambers

(1) Metering current transformers (CT's), potential fuses and their associated wiring must be mounted in a dedicated chamber within a switchboard enclosure. Each current transformer chamber is a dedicated chamber for one NMI and as such, no other equipment or wiring is permitted in or to pass through the chamber.

(2) MEN connection, busbars, wiring or equipment other than that required for metering purposes must not be located within a CT chamber. Exceptions that may be permitted by jurisdictional requirements, include neutral and earthing conductors, or other conductors fully enclosed within conduit passing through the chamber. All other exceptions are only by agreement with the Metering Provider.

(3) Access to the CT chamber must be:

a) Available without the need to interrupt supply to a customer.

b) Via doors/escutcheon that are easily able to be safely opened and are preferably via doors hinged on a vertical side, with a handle or lock on the opposite side or

c) Escutcheons or covers with at least two handles that are easily and safely removed.

d) Such access covers or doors must incorporate a means to be sealed and/or be locked with a minimum 5.5 mm diameter hasp. (Refer to Section 7.6 Security Seals)

e) If hinged, doors/escutcheons must be capable of opening to 90 degrees or be removable.

f) Labelled "Revenue Metering Current Transformers".

(4) All live conductors within current transformer chambers must be individually insulated to prevent inadvertent contact with live parts.

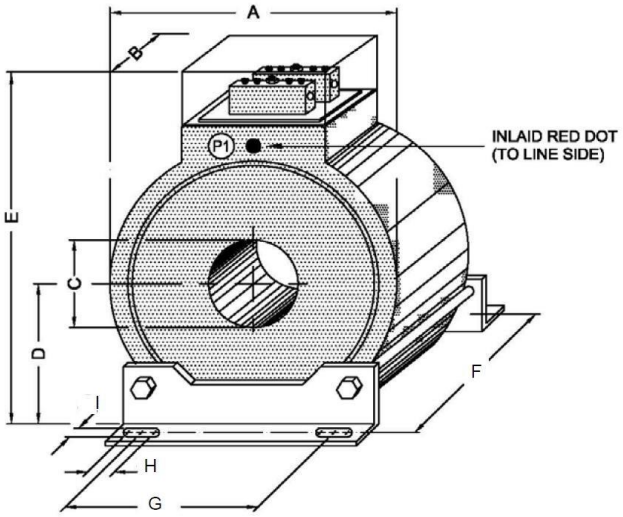
(5) All busbar or cable connection bolting points which cannot otherwise be effectively covered with insulation must be covered with non-adhesive insulation secured in place with cable ties.

(6) The current transformer secondary terminals must be readily accessible.

(7) Where space allows Current Transformers and busbars must be mounted vertically.

(8) Current Transformer chambers must be constructed in accordance with AS/NZS 61439 to accommodate the Current Transformers of the dimensions detailed in Table *4*. below.

TYPICAL ENCAPSULATED
CURRENT TRANSFORMER
TYPE S, T, W & U



Typical Current Transformer Dimensions (Measurements in millimetres**)**									
CT Type	Width A	Thickness B	Aperture Diameter C	Aperture Centre Height D	Height E	Mounting height F	Mounting width G	Mounting slot size H	Mounting hole size I
S	130	70	45	85	180	80	75	25	10
T	165	65	80	85	210	80	75	25	10
W	170	65	112	85	220	80	75	25	10
U	248	57	170	134	311	123	190	25	10

Table 4 - Typical Current Transformer Maximum Dimensions

(9) Busbars or cables must be evenly spaced to facilitate current transformer removal and replacement.

(10) The overall dimensions of the Current Transformer chamber must allow adequate clearances to safely apply a tong ammeter or flexible Rogowski coil sensor around the primary conductor for testing.

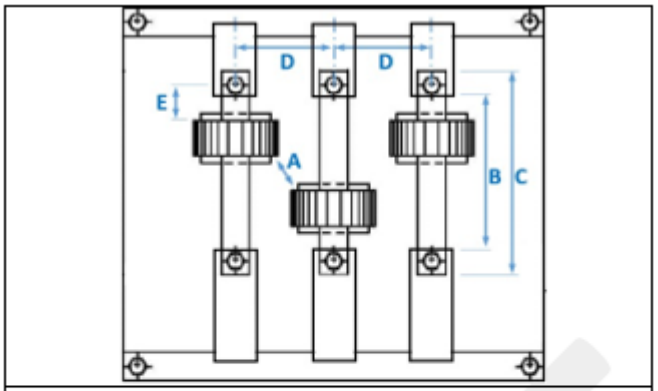
(11) The opening through which access to the CT's is obtained must not be less than:

a) 560mm H/W x 340mm H/W with a depth not less than 300mm for in-line mounting and

b) 440mm H/W x 540mm H/W with a depth not less than 300mm for staggered mounting

(12) Potential fuses must be located forward of the CT secondary terminals and must not obstruct the clear opening dimensions.

(13) The CT Chamber general dimensions must be:



A:	20mm	
B:	200mm	
C:	In line Min 250mm Max 350mm	Staggered Min 350mm Max 450mm
D:	200mm	125mm
E:	70mm	

Figure 10 - CT Chamber general dimensions

10.6 Current Transformer Installation Requirements

(1) Current transformers must:

a) be mounted such that their nameplates are readily visible and with secondary terminals positioned between 500mm and 1800mm from the floor or ground level to allow clear access without undue risk to personnel when the switchboard is energised.

b) be installed in a manner that facilitates replacement and mounted with suitably sized bolts, nuts and washers (self-tapping screws are not permitted). A readily removable section of busbar as shown in Figure 31 - Typical CT chamber arrangements must be provided within the current transformer chamber.

c) have adequate clearance between the outside of the primary conductor and inside of CT aperture (20-30mm gap) to allow for a small conductor of approximately 4mm2 to be easily passed through the aperture for the connection of testing equipment.

10.6.1 Current Transformer Metering Panels

(1) Each current transformer *Metering Installation* must:

a) meet the requirements of sections 7 Metering Installation Access, location and Security and 8 Metering Equipment Panels, Surrounds and Enclosures.

b) be constructed with a minimum size panel 600mm (H) x 600mm (W) and a minimum clearance from the back of the meter panel to the back of the enclosure of 75mm.

c) not have whole current metering installed behind or on the same panel as current transformer metering except where the Whole Current meter is for a secondary supply meter associated with the same customer (i.e. for the same NMI).

(2) Refer to Figure 29 – Typical CT Meter Panel Equipment Placement for examples of how equipment may be placed on the meter panel.

10.7 Spacing between Meters and Heavy Current Carrying Conductor

(1) AS62053.21/22 provides limits for the maximum AC magnetic field that metering equipment can be exposed to from nearby heavy current carrying conductors without causing errors in meters registration. To ensure

maximum accuracy of the metering installation it is necessary to take adequate precautions against the effects of external magnetic fields.

10.7.1 Grouped Conductors

(1) There are no special requirements for spacing or shielding where the current is carried by a three-phase cable or three single core cables in a trefoil formation.

10.7.2 Separated Conductors

(1) Where conductors of a circuit are physically separated, as in spaced single core cables or busbars, meters and meter wiring must be suitably spaced from the conductors to reduce the effect of the magnetic field. Exception: A distance not exceeding two metres at each end to facilitate termination of the cables is permitted

(2) Where spacing alone cannot be achieved, magnetic shielding of suitable thickness may be used to reduce the minimum clearance by enclosing the conductors in a mild steel pipe or duct or enclosing the meters/meter wiring within a mild steel enclosure. Stainless steel, some alloy steels, aluminium, copper and other non-ferrous metals are not to be used for magnetic shielding.

(3) Table 5 provides the minimum spacing between revenue meters, meter wiring and conductors carrying heavy currents. Intermediate points may be obtained by interpolation. Where the spacing in Table 5 cannot be maintained within the switchboard, the meter panel must be installed remote from the switchboard.

Conductor Current (A)	**Min Spacing (mm)**			
	No Shielding	**Thickness of Shielding (mm)**		
		1.2	**2.5**	**5.0**
Up to 150	100	-	-	-
400	500	375	250	125
600	700	525	350	175
1000	900	675	450	225
1500	1200	900	600	300
2000	1400	1050	700	350
3000	1700	1275	850	425
4000	2000	1500	1000	500

Table 5 - Spacing between revenue meters/meter wiring and conductors carrying heavy currents

(4) For current transformer meter wiring:

a) Each loom of CT Metering wiring must be separated from all other CT meter wiring looms and not grouped with any other conductor, and

b) be contained within a separate conduit or cable trunking when run externally to the switchboard enclosure.

10.8 Current Transformer Metering Test Block

(1) The test block must:

a) Comply with Appendix E – Specification for Test Blocks for Transformer-Operated Meters for Transformer-Operated Meters of these Requirements must be incorporated in all metering installations with current transformer metering.

b) be mounted immediately below, and in the same plane as or adjacent to the current transformer meter, such that the voltage connection terminals are on the right-hand side when viewed from the front of the test block, and that the CT secondary links fall closed and the voltage circuit links fall open.

(2) Refer to FIGURE 29 – TYPICAL CT METER PANEL EQUIPMENT PLACEMENT for examples of how test blocks are expected to be placed on the meter panel.

10.9 WIRING TO CURRENT TRANSFORMERS, TEST BLOCKS ETC.

(1) Current transformer metering installations must be wired in accordance with FIGURE 32 - WIRING DIAGRAM FOR CT METERING in APPENDIX D – LOW VOLTAGE CT LAYOUTS. Note: The following design justifications have been incorporated:

a) Independent wiring for each CT (10-wire system);

b) Earth and associated bridging link on CT side of test block, in order to achieve earth reference for CT at all times, for improved safety.

c) Fuse links at meter board to allow more appropriate electrical isolation of LVCT meter, immediately adjacent to the meter.

d) Neutral and earth links in the CT chamber, to better accommodate the installation of secondary conductors between CT chamber and meter board.

e) Encouragement of the use of coloured CT secondary conductors of a larger cross section (4mm2) than voltage secondaries, for ease of identification of individual cores, remote from the CT chamber.

(2) All connecting wiring must be enclosed under the test block cover (surface wiring is not permitted).

10.9.1 Current Transformer wiring

(1) Current Transformer wiring must be unbroken (without joints) and individually and suitably identifiable (numbers, colours) along the entire length from CT chamber to metering panel in accordance with FIGURE 32 - WIRING DIAGRAM FOR CT METERING within the CT chamber must be double insulated if the micro ambient is more than 55 degrees.

(2) where maximum route lengths permit, an 11 core 2.5mm2 multicore cable with numbered cores and earth, identifiable along the entire length is recommended between the current transformer chamber and meter panel.

(3) have a maximum route length of a standard wiring loom must be in accordance with Table 7 of these Requirements.

(4) have a minimum 32mm conduit to accommodate a standard loom where the meter panel and the current transformer chamber are remote from one another. Unless otherwise agreed with the metering provider, the conduit must be:

a) rigid

b) bends must be used to negotiate corners however their number must be kept to a minimum

c) Elbows must not be used

d) a draw wire must be provided where the loom is not installed at the time of the conduit's installation

(5) The conductors in the cores must be PVC insulated, 7-stranded copper conductor.

(6) Where numbered cores are used, the following convention must be implemented.

Core Number	Designation
1	A Phase CT Polarity
2	A Phase CT Return
3	B Phase CT Polarity
4	B Phase CT Return
5	C Phase CT Polarity
6	C Phase CT Return

Core Number	Designation
7	A Phase Voltage Circuit
8	B Phase Voltage Circuit
9	C Phase Voltage Circuit
10	Neutral
Green/Yellow	Earth

Table 6 – Multi-Core Cable core designations

(7) To remain within the rated burden, the maximum route lengths for CT secondary circuits is as per table 7 below.

Rated Burden of CT	Max Route Length for 2.5 mm²	Max Route Length for 4 mm²	Max Route Length for 6 mm²	Max Route Length for 10 mm²
5 VA	6m	10m	15m	25m
15 VA	18m	30m	44m	75m
Note: • 200/5 (S) ratio CTs are typically supplied with a rated burden of 5 VA • 800/5 (T), 1500/5 (W) and 2000/5 (U) ratio CTs are supplied with a rated burden of 15 VA.				

Table 7 – CT Secondary wiring length requirements

(8) In circumstances where larger gauge conductors (e.g. 6mm^2 and 10mm^2) are used to achieve the longer route lengths, in order to terminate the conductors correctly where conductor diameter is larger than terminal tunnel:

a) Gauge reducing lugs shall be used at the CT terminals; and

b) Marshalling links shall be used at the metering panel, with a transparent sealable link cover that is sealed.

(9) Within a switchboard, provision for the loom must be provided in the form of channels, holes, knockouts or conduit of adequate sizes to install the loom.

10.9.2 Customer Transformer Neutrals

(1) A fixed neutral terminal comprising of a 6mm tapped hole with a brass metal thread equipped with a flat and lock washer and nut where required must be provided for the connection of the metering neutral in each current transformer chamber.

(2) The terminal must be connected to the neutral associated with the active conductors being metered or the consumer's mains neutral prior to the current transformers.

(3) A meter neutral label must be attached to the meter neutral conductor adjacent to its connection to the main neutral.

(4) Where the neutral conductor does not pass through a connection within the current transformer chamber, the conductor supplying the terminal must be double insulated and a minimum size of 4mm2 and terminated at a link.

(5) The tee off connection must be located in an area which is segregated from all other wiring and equipment, labelled ''metering neutral", and provided with facilities to seal the area with a seal.

10.9.3 Current Transformer Earthing

(1) Earthing of metal metering and current transformer enclosures must conform with the requirements of AS/NZS3000, including size of earthing conductor. Where earthing of a separate metering enclosure is required, the earthing conductor may be installed within the conduit containing the loom.

(2) Current transformer metering secondary non-polarities must be starred and earthed as shown in Figure 32 - Wiring Diagram for CT Metering. The earth conductor must be connected directly to the main earth conductor or earth bar and not to a separate earthed medium such as the switchboard frame.

(3) The earthing conductor must be PVC insulated stranded cable of no more than 7 strands and can be 2.5mm^2 cable for all current transformer metering installations. The earthing conductor used to 'star and earth' the returns at the test block, cannot be used as an equipotential bond.

10.10 Changes to Existing Current Transformer Metering Installations

(1) When all or part of the existing LVCT metering installation is affected by the upgrade of an electrical installation (e.g. upgrading of a switchboard, change to the type of supply), the metering provider and Metering Coordinator must be consulted prior to commencement of any work.

11 HIGH VOLTAGE METERING

REFER TO SECTION **12 SPECIFIC JURISDICTIONAL REQUIREMENTS AND TRANSITIONAL ARRANGEMENTS** FOR ADDITIONAL OR VARIATION TO THE REQUIREMENTS DESCRIBED WITHIN THIS SECTION

11.1 GENERAL REQUIREMENTS

(1) The requirements for high voltage (HV) metering applies where the customer's electrical installation is supplied from the network at high voltage (>1kV) and the metering installation is located within the customer's electrical installation.

(2) In addition to complying with the relevant parts of these MIRs the HV metering installation must also comply with *AS 2067 Substations and high voltage installations exceeding 1 kV a.c.*

(3) Apart from the electricity meters and their associated communications, the customer is responsible for the procurement and installation of all electrical infrastructure making up the *metering installation*, including voltage transformers (VTs), current transformers (CTs), the equipment, mounting facilities, meter panels, auxiliary power supplies for meters and enclosure heaters, and enclosures for meters and associated communications equipment, plus any secondary cabling routed between CTs and VTs and the meters.

(4) The customer is responsible for ensuring that a Retailer (FRMP) and Metering Coordinator (MC) have been engaged for the metering installation.

(5) The customer's retailer is responsible for ensuring that there is a valid National Metering Identifier (NMI) for the Connection Point.

(6) Prior to the procurement and installation of any electrical infrastructure making up the metering installation, the Metering Provider (who is nominated by the Meter Coordinator) and the LNSP are first consulted in regard to the specification of the metering installation to ensure the specification delivers a NER compliant installation.

(7) The customer is responsible for ensuring that the ratings and specification of all equipment installed are suitable for the intended purpose.

(8) Prior to energisation access to all parts of the metering installation including CT/VT equipment must be given to the Metering Provider in order to conduct visual inspection and pre-commissioning checks.

11.2 LOCATION

(1) The HV CTs and VTs must be located on the customer's side of the connection point but as close as practicable to the connection point.

(2) The HV metering panel and any metering transformer marshalling point shall

a) not be installed in unsuitable location as described in section 7.3 UNSUITABLE LOCATIONS; and

b) be located in an area which ensures the accessibility of the MP to meet their obligations under the NER Rules for testing of metering equipment and rectifying faults; and

c) not be located within HV enclosures, where entry to the area requires the issue of Electrical Access Authority.

11.3 VOLTAGE TRANSFORMER AND CURRENT TRANSFORMER SELECTION

(1) All HV CTs and VTs must be manufactured and type-tested in accordance with chapter 7 of the NER and the referenced AEMO Procedures and specifically AEMO Metrology Procedure Part A[3]

3. At time of printing, new CTs must meet the relevant requirements of AS 61869.1 (General Requirements) and AS 61869.2 (Current Transformer). New VTs must meet the relevant requirements of AS 61869.1 (General Requirements) and AS 61869.3 (Voltage Transformer) For single phase magnetic VT's, AS 61869.1 (General Requirements) and AS 61869.5 for Capacitor VT's, or AS 1243 for 3-phase VT's . New combined transformers must meet the relevant requirements of AS 61869.1 (General Requirements) and AS 61869.4 (Combined Transformers).

(2) Type test certificates for CTs and VTs shall be supplied to the MP, MC and LNSP for approval prior to their installation.

(3) Individual CT and VT accuracy test report shall be supplied to the MP prior to their installation.

(4) Individual CT and VT accuracy test reports shall detail individual phase and amplitude accuracy test results with the results traceable and sourced from a laboratory that is qualified under ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories and is accredited for that qualification by NATA or another accreditation body that is a signatory of the ILAC MRA or AEMO Metering Provider accredited for CT & VT testing, and to the measurement uncertainty requirements defined by the NER.

(5) CTs shall be solely for metering purposes and are not to be used for other purposes such as protection or load monitoring, unless approved by the Metering Provider.

(6) CTs whether single or multi tap and respective ratios shall be selected to, as a minimum, meet the maximum demand of the part of the electrical installation that it is metering. Consideration should also be given to possible change in future electrical loading for both minimum and maximum expected load.

(7) VTs shall be suitable for metering purposes and where shared for other purposes in a substation, have separately fused secondary circuits to ensure independence of metering circuits.

(8) VT's shall have a nominal secondary voltage rating of 110V line–line (3-phase VT) or 110/√3 V phase–neutral, a minimum burden rating of 25VA (per phase for polyphase VT) and, in the absence of direction from the LNSP, a minimum voltage factor of 1.9.

(9) Depending on projected maximum annual consumption for the installation the number of, and accuracy class of CT and VT classes shall be at least as follows:

Metering Installation	**Type 4 & Type 3**	**Type 2**	**Type 1**
Annual Consumption	≤ 100GWh	≤ 1000GWh	>1000GWh
Revenue	Class 0.5	Class 0.5	Class 0.2
Check	N/A	Class 1	Class 0.2

Table 8 – Consumption threshold and accuracy class requirements

(10) Consideration of the route length from CT/VT secondary terminals to the remote metering point, when selecting a secondary winding (1 Ampere or 5 Ampere rating) to maintain the burden within the correct operational range.

(11) For type 2 metering installation VTs, two secondary windings are recommended but as a minimum single winding with separate fusing for revenue and check metering must be provided.

(12) For type 1 metering installation VTs, two secondary windings are required.

11.4 CT AND VT CONSTRUCTION ARRANGEMENT

(1) HV CTs and VTs shall be located within a high voltage chamber or area to which security of access by only authorised personnel can be ensured.

(2) The layout of the CTs and VTs shall be such that identification of the metering transformers polarities can be readily determined.

(3) HV CTs and VTS primary terminals shall be connected immediately after and on the load side of the main incoming circuit breaker.

(4) Provision shall be made to enable the application of short circuit and earthing of all high voltage conductors to facilitate safe work on the metering transformers when out of service.

(5) Provision shall be made for the ready access to HV CTs and VTs primary conductors when not in service, to allow for primary injection accuracy testing. For example, it must be possible to connect high current injection test leads to the primary conductor immediately either side of the CT. Similarly, it must be possible to connect external high voltage test leads to the primary terminals of a VT.

(6) The nameplate details of each metering transformer shall be indelibly and legibly marked in a location where they are visible while the installation is in service. Where the metering transformers are installed within switchgear, duplicate nameplates shall be installed on the outside of the switchgear or at the metering position.

11.5 CT AND VT SECONDARY MARSHALLING

(1) A suitable marshalling point for CT & VT secondaries shall be provided and designed to give access while the CTs and VTs are in service, with consideration given to minimum safe working distances from in-service HV.

(2) The marshalling terminals shall be installed as close as practical to the location of the metering transformers and within 3 metres route length of the metering transformer secondary terminals or, immediately outside of the safe working distance limits for the voltage present.

(3) The metering transformer terminal box may be used as the marshalling point only if it is accessible while the equipment is in-service with consideration given to minimum safe working distances from in-service HV equipment.

(4) The marshalling terminals shall be located where there is sufficient space to allow the easy termination of conductors and adequate space for the required secondary circuit cable/s with consideration to the minimum bending radius of these cables.

(5) Depending on the metering transformer type that will be marshalled within, the marshalling point shall be of adequate size to accommodate the following equipment:

a) For the VTs

i. 3 x 32 amp HRC offset tag fuse bases, complying with IEC 60269-3 and IEC 60268-1, fitted with a 10 amp fuse link and 1 x white fuse holder with link – for each revenue and check metering point respectively

ii. Suitable terminals to terminate the VT secondary wiring which also provides for the test connection using a spade lug or 4mm test plug on each of the VT secondary conductors without needing to loosen or remove the permanent wiring termination

b) For the CTs, Suitable terminals to terminate the secondary wiring, which also allows provision for a test connection using a spade lug or 4mm test plug without having to loosen or remove the permanent wiring termination – for each revenue and check metering point respectively

(6) The marshalling point or terminals and fuses within, shall have facilities to be appropriately sealed by the Metering Provider to prevent unauthorised access to the secondary circuits.

(7) An appropriately IP rated enclosure of suitable material must be used for the marshalling point, with consideration given to weather, salt or dust laden air, corrosion, and vandalism. A minimum IP55 rated enclosure is recommended where the enclosure is installed outside.

(8) The enclosure for the marshalling point shall have an adequate number of conduit entry points that can accept the required secondary circuit cable(s).

(9) All fuses and links at the marshalling point shall be numbered and indelibly labelled including, where required, a corresponding function table with each item's function.

11.6 HV METERING SECONDARY CABLING

(1) All wiring between the marshalling point and the meter location for each separately metered part of the installation must be of sufficient length to allow connections to the meters.

(2) The wiring must be 0.6/1 kV, PVC insulated, stranded copper conductor. Each of the insulated conductors must be visually distinguishable by size, colour and/or number marked on the insulation at all terminations.

(3) A schematic of the metering circuity, including cabling identification utilised, must be permanently provided at the metering point.

(4) The conductors must be either single insulated conductors enclosed in conduit, or multi core sheathed cables.

(5) The conduit or sheath protecting the metering transformer secondary cables must only contain conductors for this purpose but can include an earth conductor.

(6) Wherever possible, the protective enclosure for the metering transformers secondary cables wiring should be surface-run PVC conduit, or the PVC sheath of multicore cable.

(7) The conduit or sheath must be installed in accordance with AS/NZS 3000.

(8) Where surface run wiring is not practicable or additional protection is required, the cable must be installed in heavy duty UPVC conduit.

(9) The cross-sectional area required for the CT & VT secondary circuits is dependent upon the route length of the wiring between the marshalling point and meter panel, and the characteristics of the CTs & VTs, in accordance with the following tables:

Conductor csa mm^2	1A 5VA Rated CT (metres)	1A 15VA Rated CT (metres)	5A 5VA Rated CT (metres)	5A 15VA Rated CT (metres)
2.5	180	430	6	18
4	230	700	10	30
6	350	1050	15	44
10	590	1750	25	75
16	930	2800	40	119

Table 9 – Maximum route length of current transformer secondary wiring (m)

Conductor csa mm^2	Length
2.5	105
4	170
6	255
10	425
16	680

Table 10 Maximum route length of voltage transformer secondary wiring (m)

11.7 HV Metering Panels

(1) In addition to the following requirements, HV metering panels shall also comply with the relevant parts of these MIRs detailed in sections 7 Metering Installation Access, location and Security and 8 Metering Equipment Panels, Surrounds and Enclosures

(2) Only HV metering and associated equipment is permitted on the HV metering panel.

(3) Any door fitted to an enclosure in which the metering panel is located, must be labelled “Electricity Meters”

11.8 HV Metering Test Block and Fuses

(1) A test block must be provided at the front of the meter panel. The test block must have the following:

a) Facilities for the bridging/shorting of the CT secondary circuits.

b) Facilities for the isolation of secondary VT circuit at a fuse, if not accommodated elsewhere on the metering panel.

c) Isolation and test links shall be of a slide type that allows for an isolation and test point for current circuits and voltage circuits.

d) Test links shall contain sockets at the top and bottom of the link to allow for the insertion of a 4mm test plug.

e) The current circuit slide links shall be arranged that the slide link will fall to the closed position if released.

f) A transparent, insulated cover that, when in position, leaves no single insulated conductor exposed and has a facility for sealing.

(2) Fuses for the isolation of secondary VT circuits must be:

a) 32-amp HRC off set tag fuse bases, complying with IEC 60269-3 and IEC 60269-1;

b) black in colour and containing a HRC fuse of maximum rating 10A for conductors above earth potential; and

c) white in colour and containing links for conductors at earth potential

11.9 Metering Provider Required Information

(1) The following information must be provided to the MP prior to the installation of any HV metering equipment at the site.

a) The National Metering Identifier (NMI) for each connection point that requires a metering installation.

b) The metering type (Type 1 – 4) of each connection point as per Chapter 7 of the National Electricity Rules.

c) Metering transformers nameplates details including rated burden, connected CT ratio, other available CT ratios, serial numbers.

d) A single line diagram of the supply connection showing the location of the metering transformers.

e) Detailed wiring schematics of all metering secondary circuits from the metering transformers to the meter.

f) Panel layout drawing showing the location of all metering links and terminals contained on the meter panel(s).

g) Copy of Type Test and accuracy test report for each metering transformer.

11.10 Earthing Requirements

(1) Metering transformer secondary circuits must be referenced to earth.

(2) The location of the earthing must be at the marshalling point.

(3) The absence of an earth reference may result in an electrostatic potential on the secondary circuits which could cause damage to connected equipment and would pose a hazard for personnel who may come into contact with the circuit[4].

(4) Consideration must be given to 'Step and touch' potentials around meter panel and effective earthing.

4 Adapted from IEEE Std C57.13.3-2014, IEEE Guide for Grounding of Instrument Transformer Secondary Circuits and Cases

11.11 Typical HV Metering Schematic General Arrangements

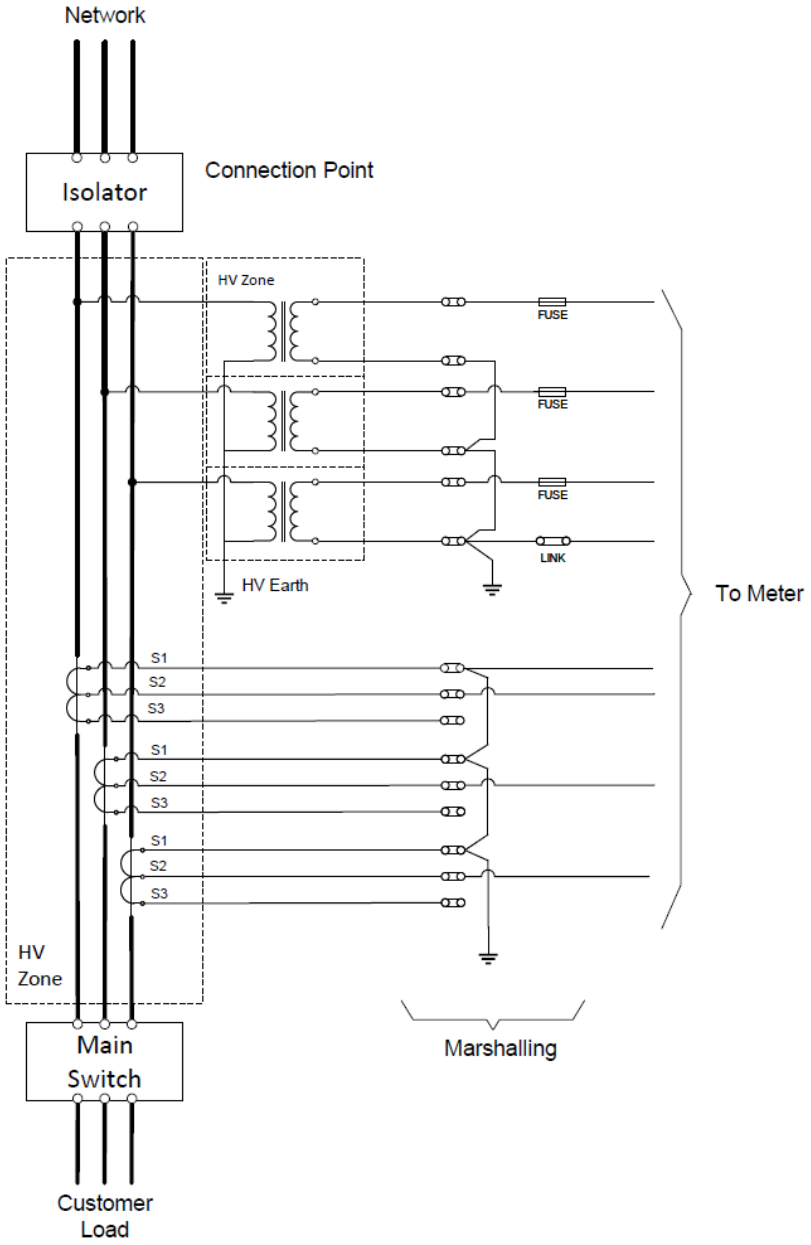


Figure 4 - Metering Arrangement with CTs and VT Star Point Earth (3 x single phase VT's)

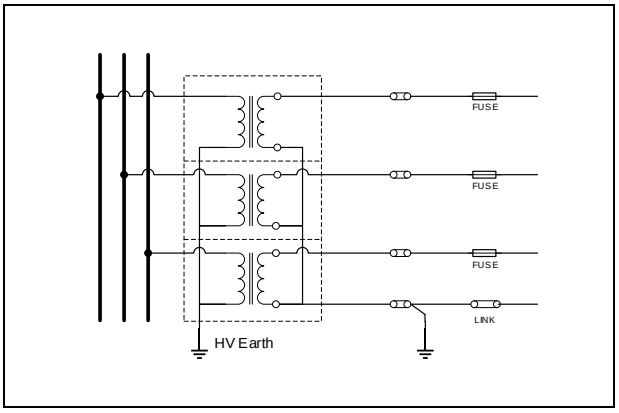


Figure 5 - Star Point Earth (3-phase Cat B VT)

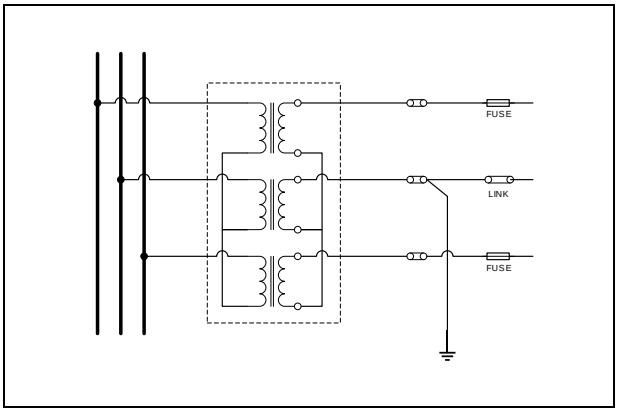


Figure 6 - Reference Polarity Earth (3-phase Cat A VT)

12 SPECIFIC JURISDICTIONAL REQUIREMENTS AND TRANSITIONAL ARRANGEMENTS

Metering requirements are subject to jurisdiction differences. These must be taken into account when establishing a metering installation. This section identifies the material variations for each jurisdiction.

12.1 QUEENSLAND

12.1.1 Queensland Reference instruments

(1) In addition to the requirements described within this document, Jurisdictional instruments also describe local variation to metering requirements. A list of relevant jurisdictional documents includes but is not limited to the table below.

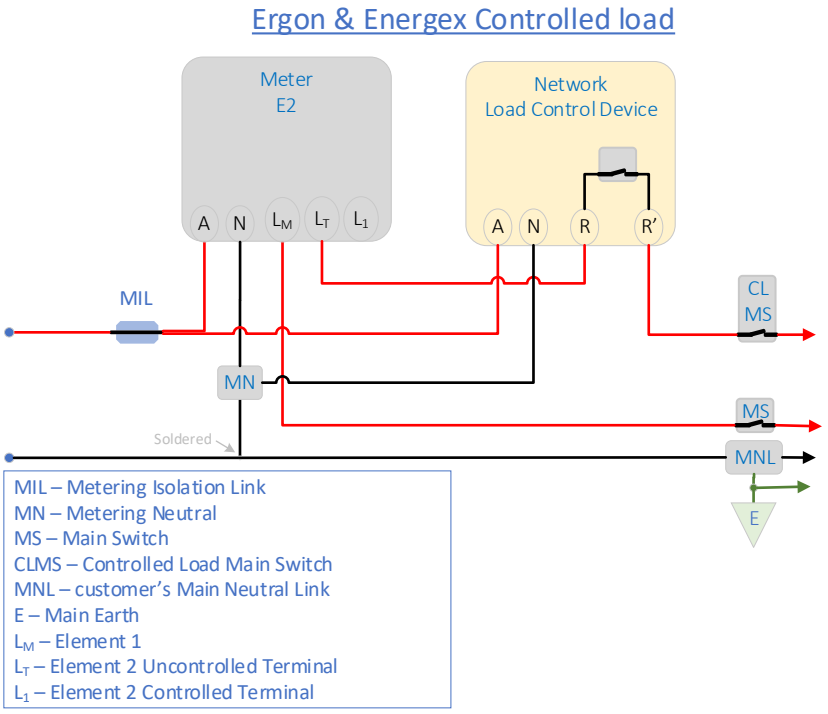
Instrument
Queensland Energy Connection Manual
Endeavour Energy Retailer & Market Guide

12.1.2 Local Generation

(1) Where a customer installs a Small Inverter Energy System (IES) at their premises the metering installation shall be treated as an upgrade and all relevant requirements must be met.

12.1.3 Load Control Arrangement

(2) For Ergon and Energex, the typical connection arrangement is as follows:



(3) Where a network meter being replaced is a two-element meter (E2) and there is inadequate space for the Load Control Device, approval can be sought from Energex/Ergon to connect the controlled load directly to the L_1 terminal of the meter.

12.1.4 Card Operated Metering

(1) In Ergon Energy's Far North Queensland region, card operated meters (COMs) will be supplied for designated remote communities and most *isolated* generation sites in the Torres Strait Islands.

(2) Commercial installations requiring special tariffs or current transformer metering must not use card operated meters.

(3) Temporary Builder's Supplies in card operated meter areas must have card operated meters installed with commercial tariffs to apply.

(4) Requests for exemptions can be lodged for critical loads (e.g. sewerage pumps, unmanned communications sites etc) so that card operated meters are not used.

(5) A metering *Isolation* link is required to be installed on the line side of all card operated meters.

(6) In general Ergon Energy will provide one service to a community title scheme or cluster development installation with card operated meters.

(7) Where a cluster or community title scheme development with card operated meters consists of a number of tenanted buildings a meter position located on common ground for each building may be permitted.

(8) The following meter positions will also be acceptable:

a) The *main Switchboard* located on common ground and all metering equipment installed at this position.

b) The main Switchboard and the first metering point located on common ground and subsequent metering points located either on each building or as otherwise approved by Ergon Energy.

Note: - A single community meter position is preferred, however approval may be granted for an additional community meter where a single position is not practical. Each community meter will be treated as a separate account for billing purposes.

(9) To clarify the required metering type in the remote communities and *isolated* generation sites in Far North Queensland contact Ergon Energy Customer Service.

12.1.5 LVCT Metering Requirements

(1) The earth connection to the CT secondary conductors and the bridging link on the test block be located to the meter side of the CT links.

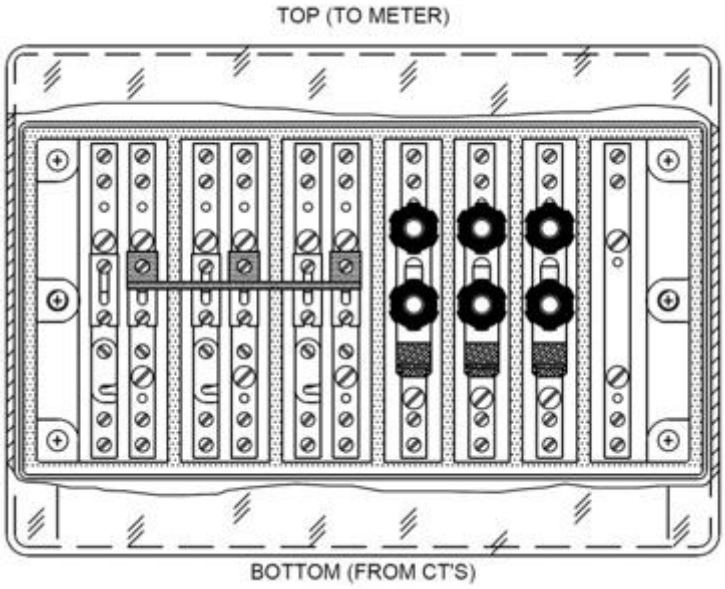


Figure 7 – QLD Legacy

(2) It is not permitted to have breaks (such as links in the CT chamber) in the neutral or earth secondary conductors between the CT chamber and meter test block.

12.2 New South Wales

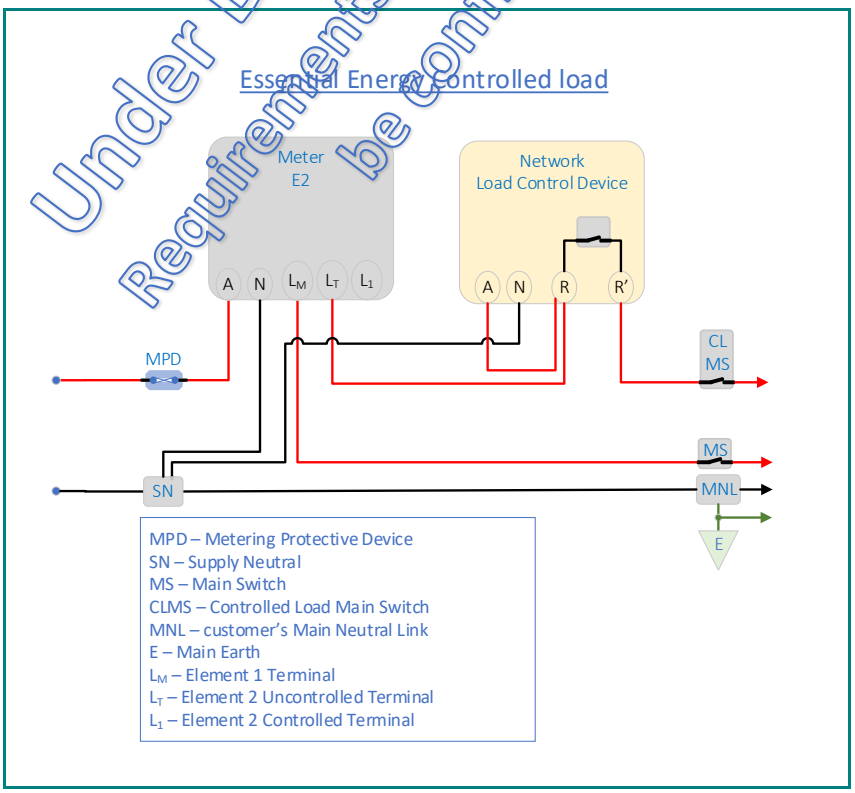
12.2.1 New South Wales Reference instruments

(1) In addition to the requirements described within this document, Jurisdictional instruments also describe local variation to metering requirements. A list of relevant jurisdictional documents includes but is not limited to the table below.

Document
NSW Service & Installation Rules (incorporating annexure for Metering Installation Rules)
Ausgrid ES12 Metering Contestability
Endeavour Energy Metering Contestability Network Standard
Essential Energy Metering Contestability Network Standard

12.2.2 Load Control Arrangement.

(1) For Essential Energy area, the typical connection arrangement is as follows:



(2) For Essential Energy area, where there is inadequate room for the Load Control Device, approval can be sought to install an active link between the L_T terminal and the Controlled Load Main Switch. The LNSP will subsequently install a Load Control Device external to the metering enclosure, without needing to break the seals on the meter terminal cover.

(3) For Ausgrid and Endeavour Energy area, Load Control must be operated by the meter. Excluding shared load control devices at multi-tenanted installations, existing Load Control Devices must be removed as part of a Type 4 meter installation.

12.2.3 Customer Owned Equipment

(1) Customer owned GPOs and subcircuit equipment is permitted to be installed on the shared main switchboard metering panel.

12.2.4 LVCT metering requirements

(1) Presently, where the neutral conductor of the voltage circuit terminates inside the chamber, it must be terminated with a sealable link clearly identified as the neutral.

(2) Presently there is no requirement for earthing of CT secondary non-polarity conductors, nor bridging of CT non-polarity at test block

(3) Presently there is no requirement for additional fuse link isolation of the CT metering voltages at the meter panel.

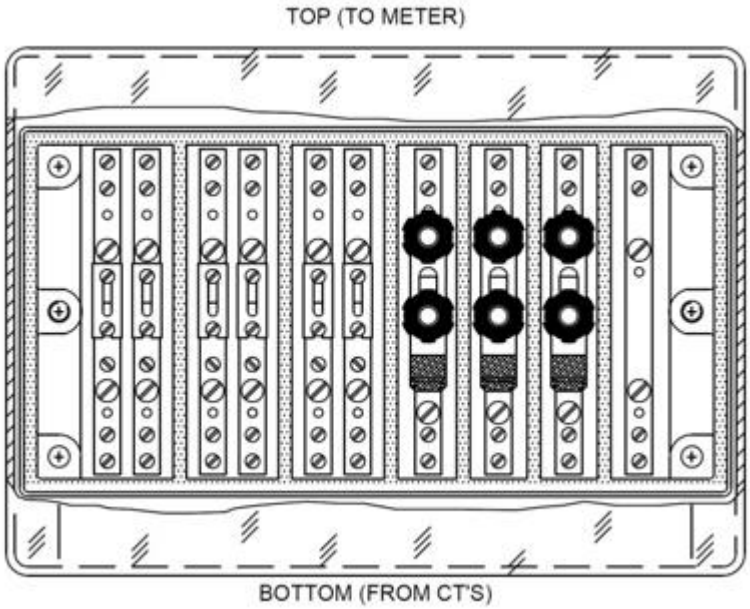


Figure 8 – NSW Legacy

12.3 SOUTH AUSTRALIA

12.3.1 South Australian Reference instruments

(1) In addition to the requirements described within this document, Jurisdictional instruments also describe local variation to metering requirements. A list of relevant jurisdictional documents includes but is not limited to the table below.

Document
SA Power Networks Service Installation rules
SAPN Retailer & Meter Services Provider Handbook
OTR Technical Regulator Guideline – Smart Meter Minimum Technical Standards

12.3.2 Meter Panel repairs, modifications, and replacement requirements

(1) Where a meter replacement is required, all existing timber, Masonite or asbestos meter panel are to be replaced in accordance with the panel upgrade requirements except where the meter replacement is the result of:

a) a meter fault or repair, or

b) the installation of Inverter Energy System

(2) Meter Isolators in South Australia must be a circuit breaker and meet the requirements of the SAPN SIRS.

12.3.3 CT requirements - Secondary Circuit Isolation

(1) Where the neutral conductor of the voltage circuit terminates inside the chamber, it must be terminated with a sealable link clearly identified as the neutral.

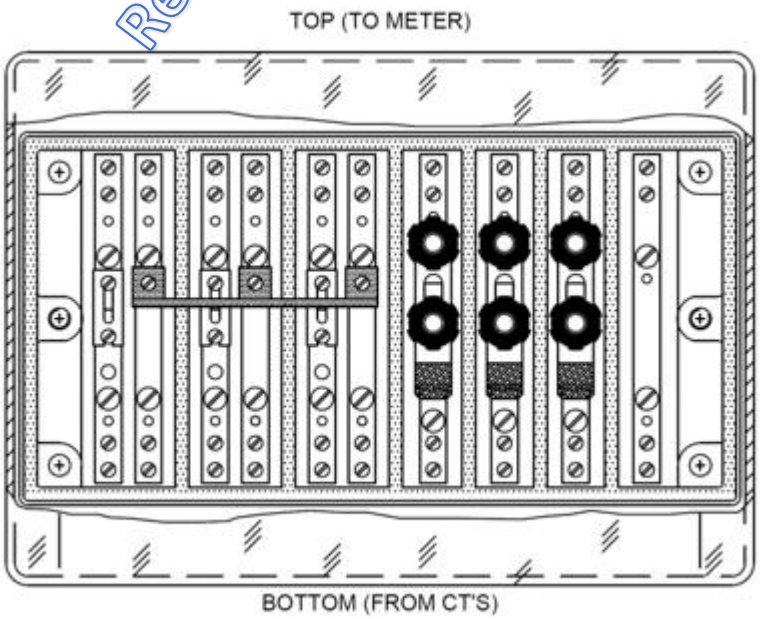


Figure 9 – VIC, SA, TAS Legacy

12.4 TASMANIA

12.4.1 Tasmanian Reference instruments

(1) In addition to the requirements described within this document, Jurisdictional instruments also describe local variation to metering requirements. A list of relevant jurisdictional documents includes but is not limited to the table below.

Document
Service and Installation Rules v 8.2 (1 July 2022)
Occupational Licencing (Electricity Consumption Metering) Code of Practice
CBOS Electricity Consumption Metering Safety Requirements (Tasmania) (DOC/17/85250(V1.0)

12.4.2 Background

(1) All metering panels are to be hinged and must make allowance for consumer wiring to be run behind the hinged panel.

12.4.3 Repairs and faults

(1) If the metering enclosure is to be replaced because of damage (e.g. corrosion), then the replacement enclosure and panel must fully comply with these requirements.

(2) Replacement of faulty metering or LNSP equipment may be installed on the legacy standard flat panel. If the panel is constructed from material containing Asbestos, Amber or is broken, the fixed panel itself must be replaced.

12.4.4 Service Protection

(1) The TasNetworks Service and Installation rules require that a 100A NHRC fuse for service protection and the replacement of the fuse to a lower rating is not permitted. Refer to clause 8.2.1.

12.4.5 Location of Panels

(1) For all new connections, and meter relocations restrictions in the TasNetworks SIR's and the DOJ Electricity Consumption Metering Safety Requirements can be relaxed to allow for panels to be mounted 2000cm to the top of the meter Panel and 500cm minimum height to the bottom of the meter panel. Existing metering enclosures box can stay between 180cm & 210cm per the DOJ Electricity Consumption Metering Safety Requirements.

12.4.6 CT requirements - Secondary Circuit Isolation

(1) Where the neutral conductor of the voltage circuit terminates inside the chamber, it must be terminated with a sealable link clearly identified as the neutral.

12.5 AUSTRALIAN CAPITAL TERRITORY

12.5.1 ACT Reference instruments

(1) In addition to the requirements described within this document, Jurisdictional instruments also describe local variation to metering requirements. A list of relevant jurisdictional documents includes but is not limited to the table below.

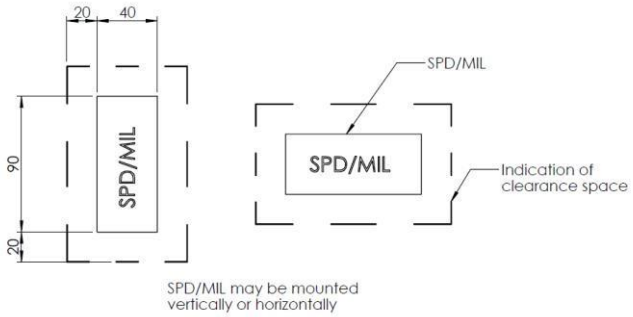
Document
Evo Energy Service & Installation Rules - 2022 - PO07173 - V11.2

12.5.1 CT requirements - Secondary Circuit Isolation

(1) Where the neutral conductor of the voltage circuit terminates inside the chamber, it must be terminated with a sealable link clearly identified as the neutral.

APPENDIX A – WC EQUIPMENT DIMENSION AND PLACEMENT EXAMPLES

(1) These equipment examples are developed from the dimensions of equipment commonly used in the NEM



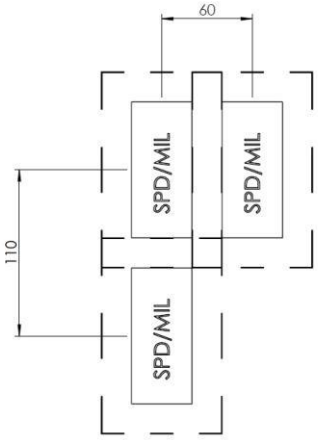


Figure 10 - Meter Protection / Isolation Devices

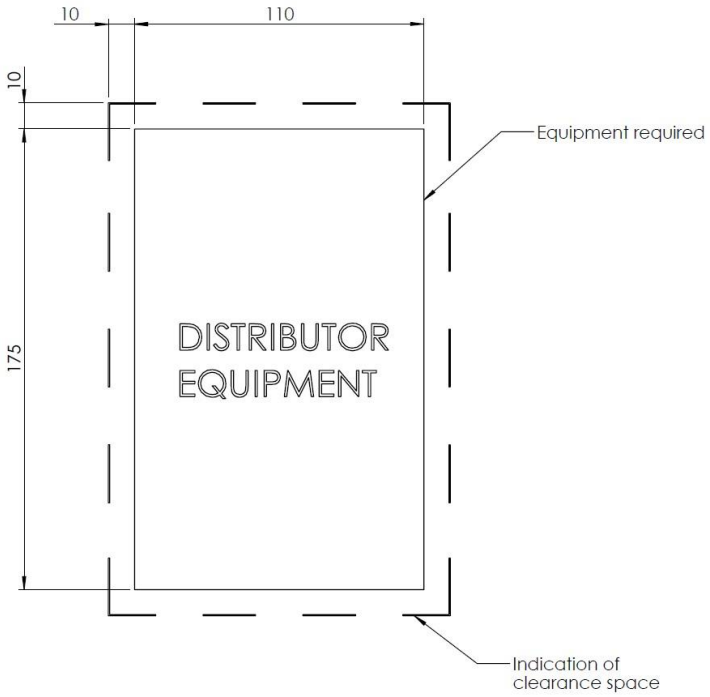


Figure 11 – LNSP Network Equipment

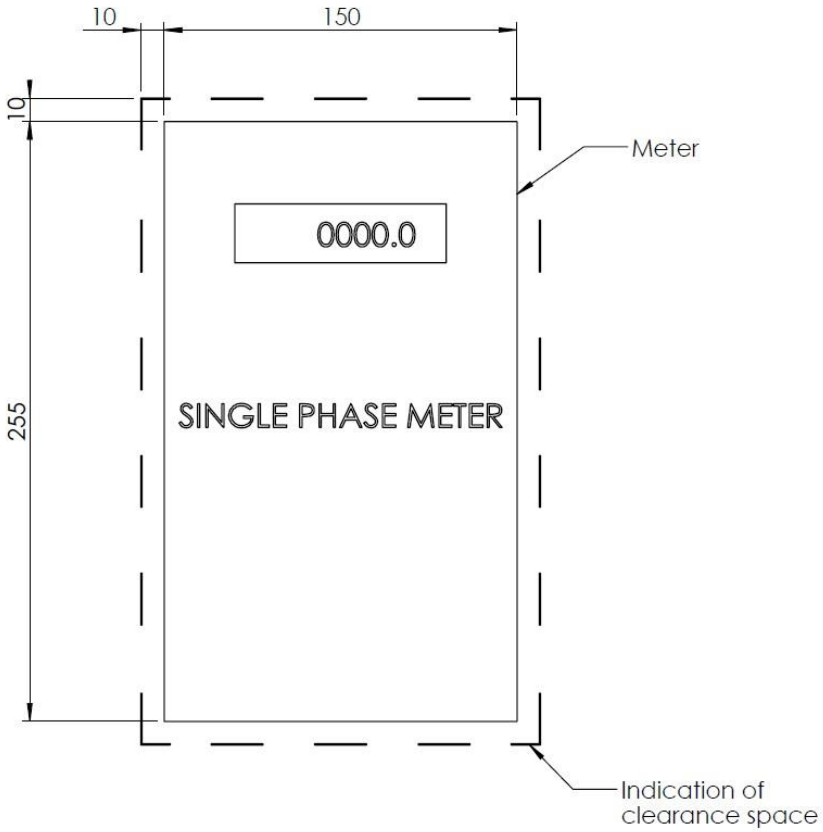


Figure 12 - Single Phase Meter

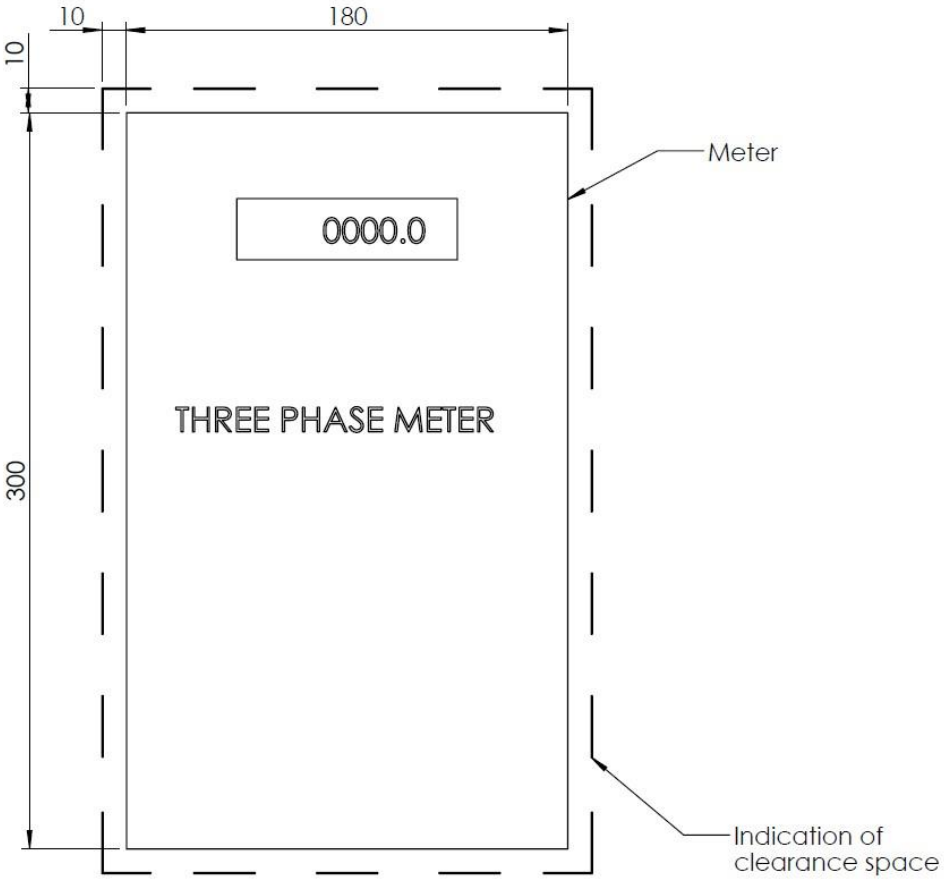


Figure 13 - Three Phase Meter

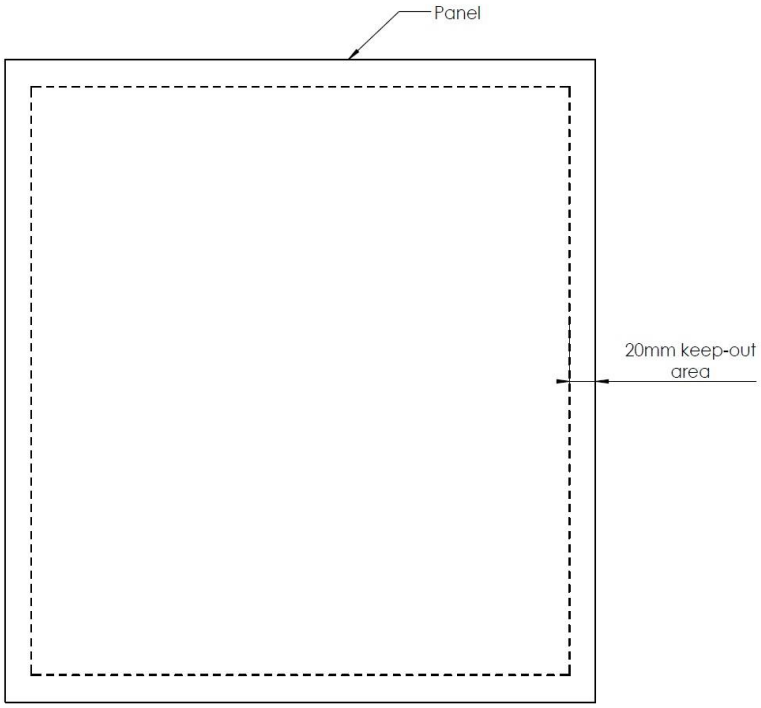
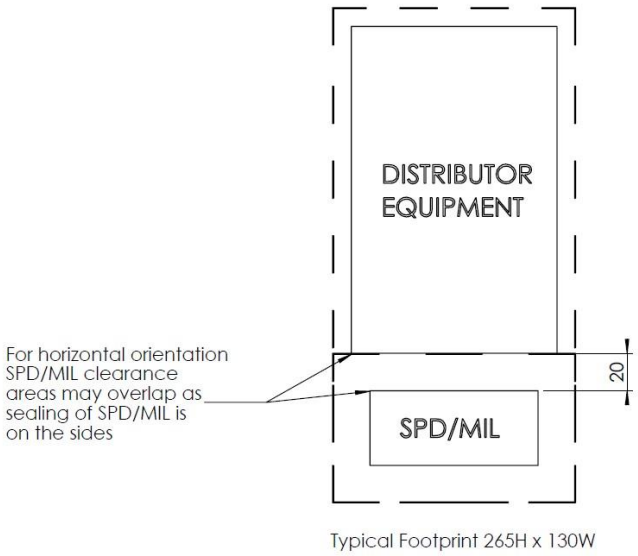


Figure 14 - Minimum Distance from edge of Panel

(2) These equipment building blocks are examples provided to help switchboard manufacturers design boards that can efficiently accommodate the required equipment.



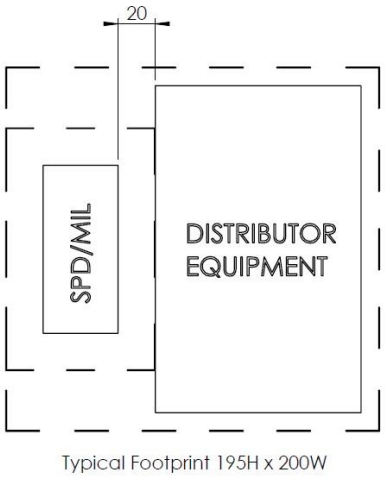
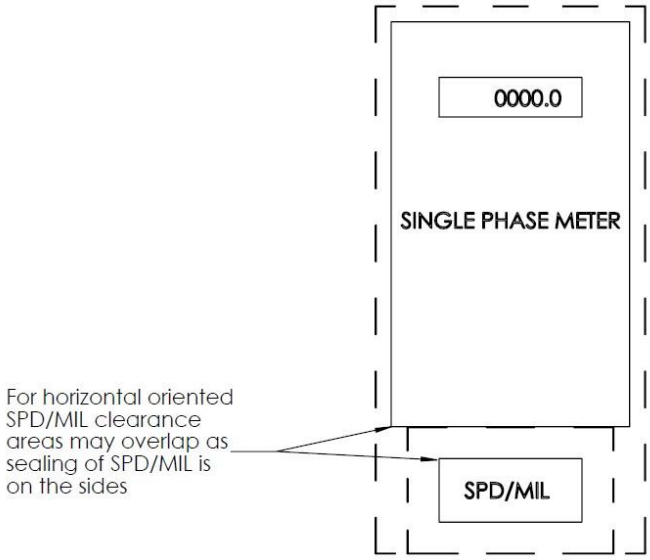
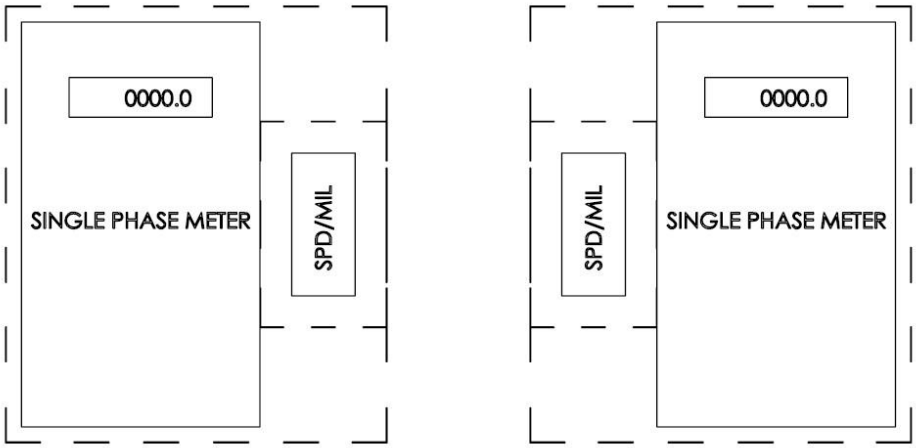


Figure 15 - LNSP Equipment with Isolation link

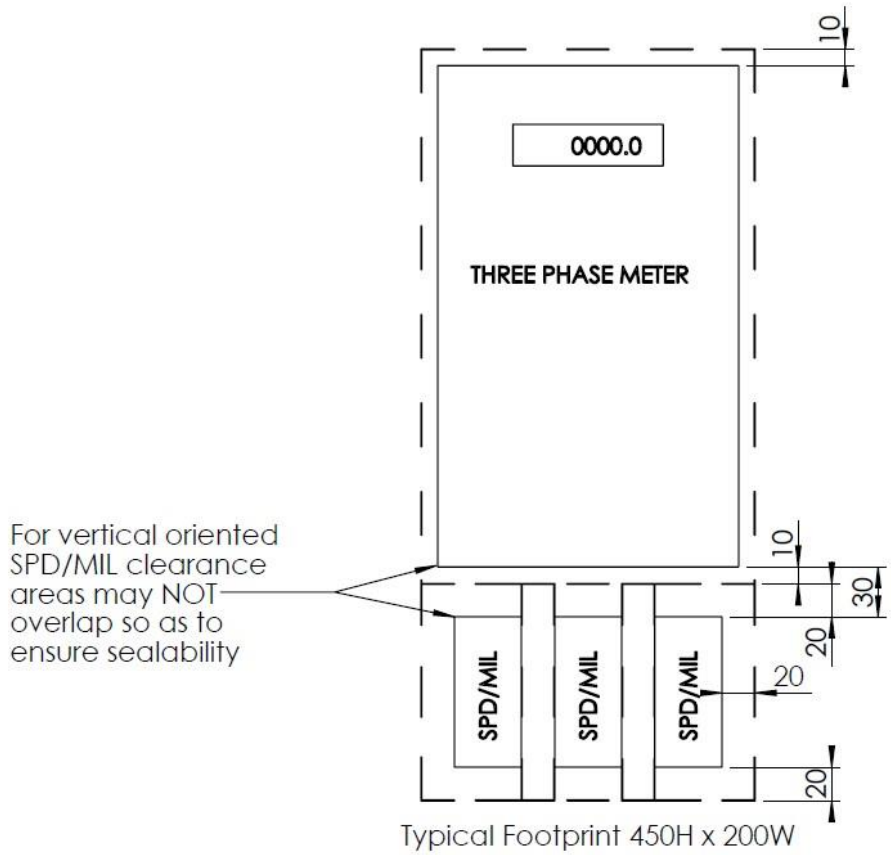


Typical Footprint 345H x 170W



Typical Footprint 275H x 240W

Figure 16 - Single Phase meter with Isolation Link



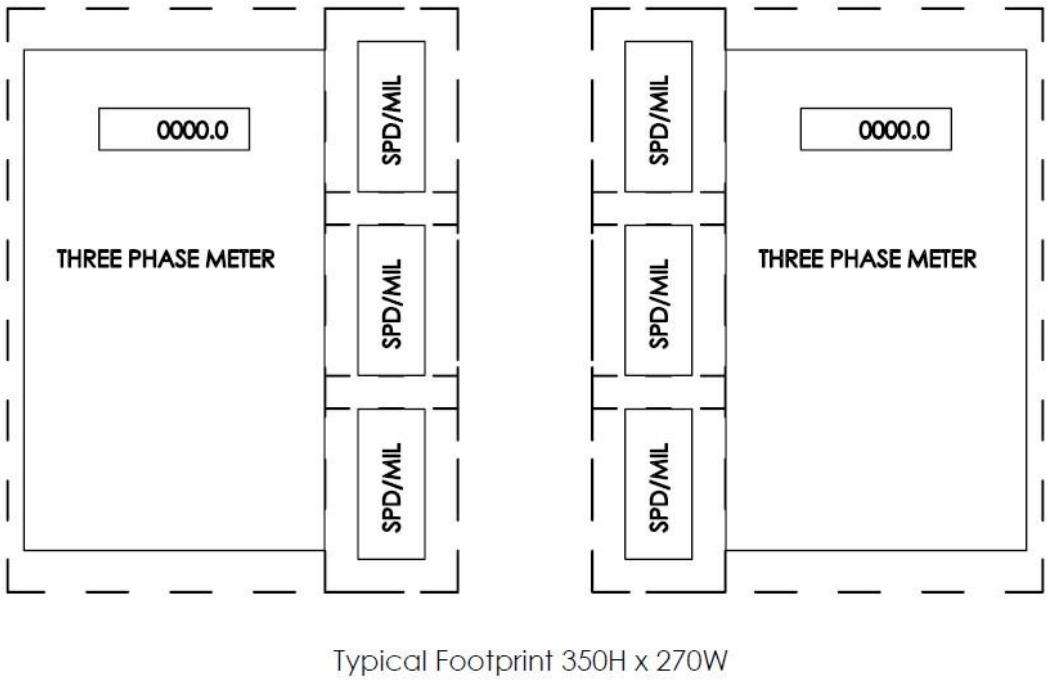


Figure 17 - Three Phase meters with Isolation links

APPENDIX B – TYPICAL PANEL LAYOUTS

1. SINGLE OCCUPANCIES

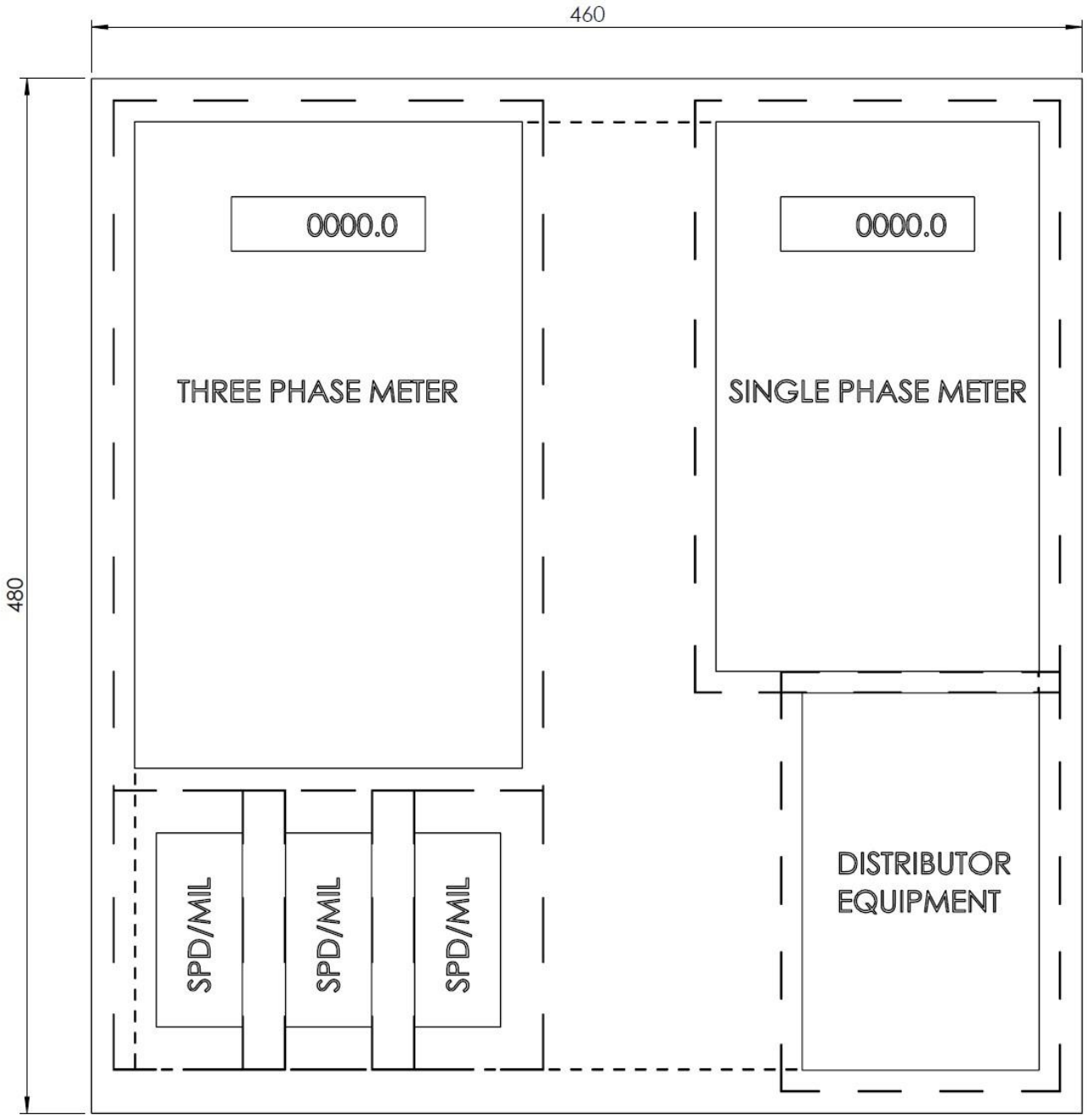


Figure 18 - Typical Panel Layout for Residential House with Multi-phase, single phase meters and load control

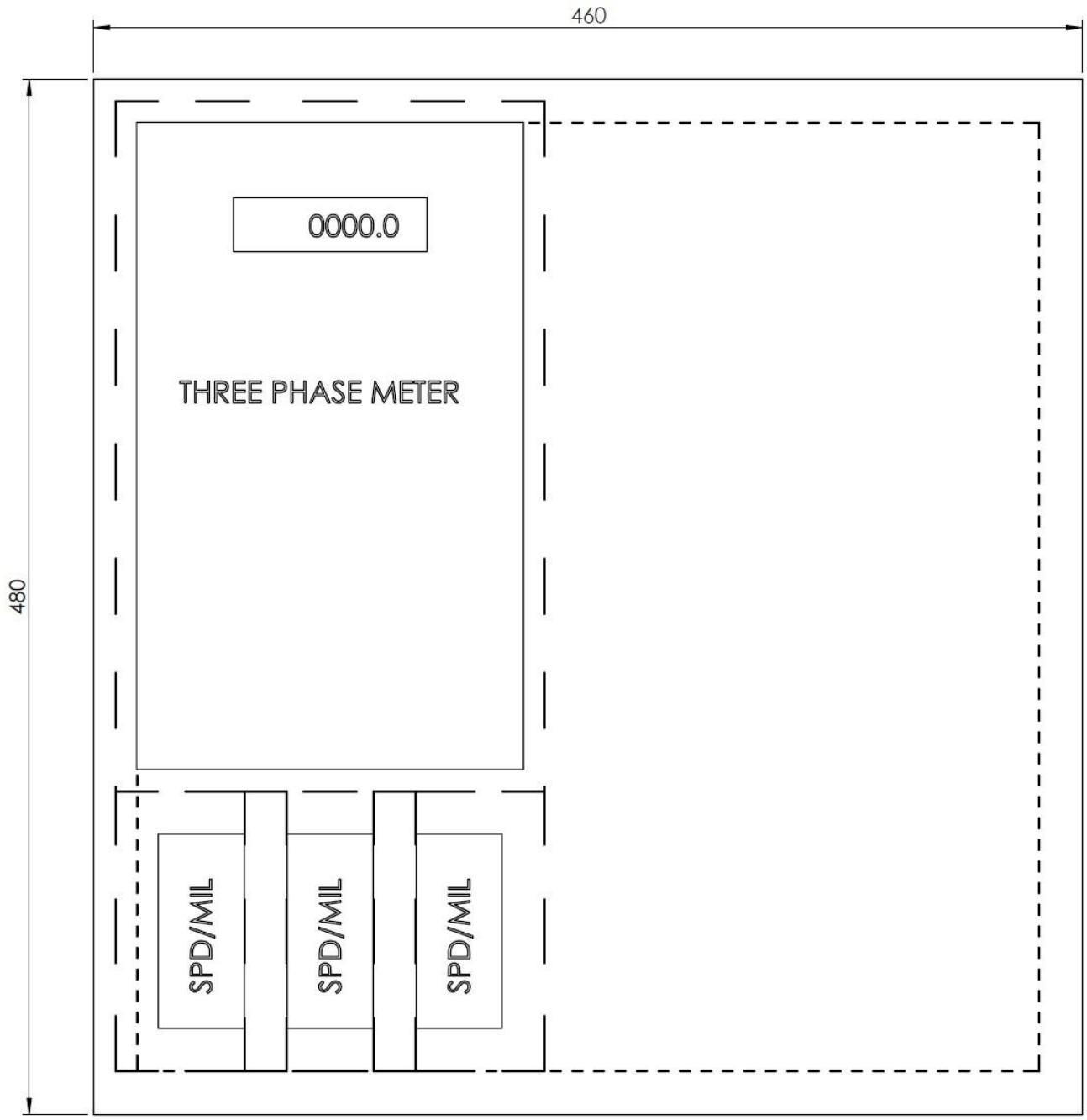


Figure 19 - Typical Panel Layout for Residential House with Multi-phase meter

2. MULTIPLE OCCUPANCIES

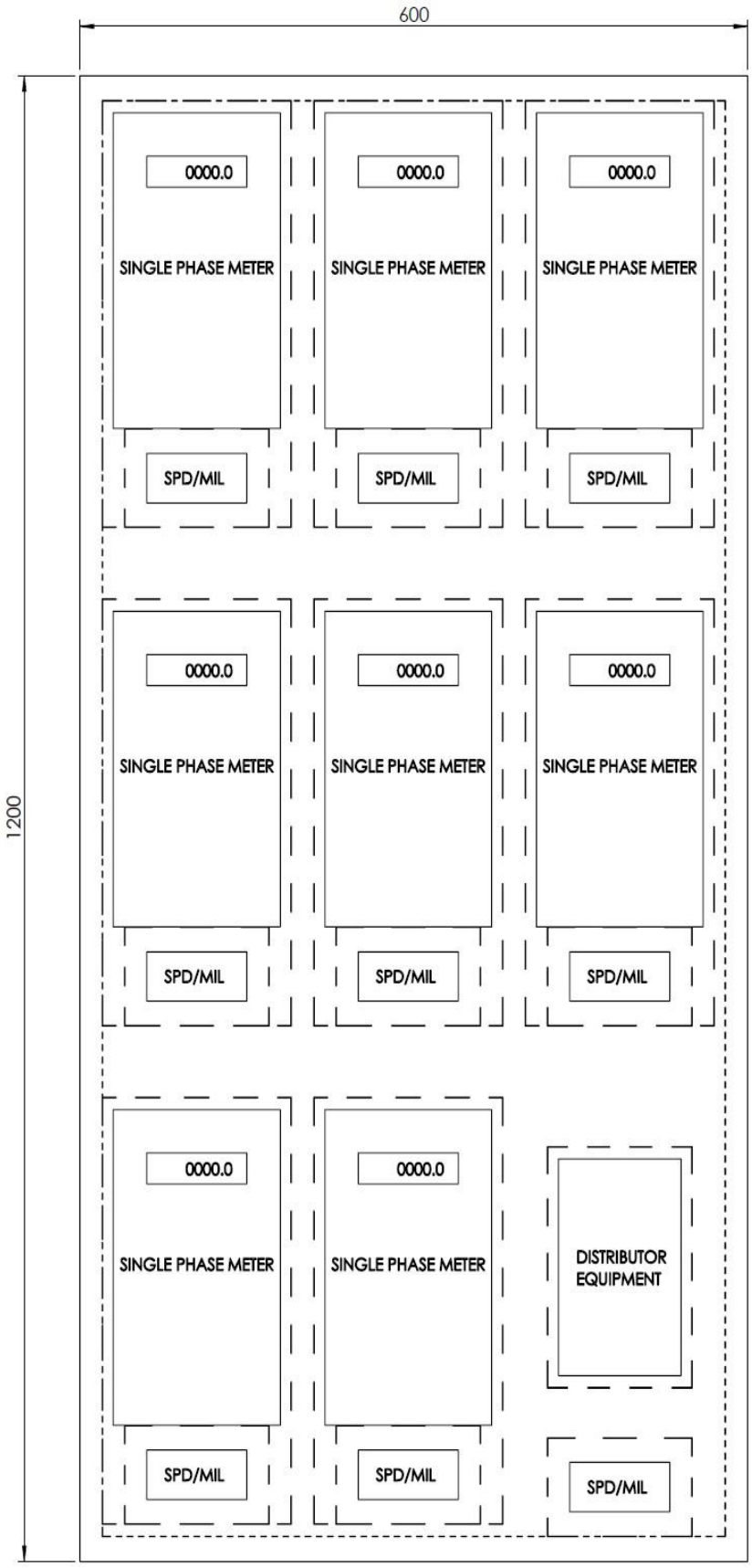


Figure 20 - Typical Panel Layout for Multi Occupancy, Single phase, 1200 x 600 panel

Figure 21 - Typical Panel Layout for Multi Occupancy, multiphase, 1200 x 600 panel

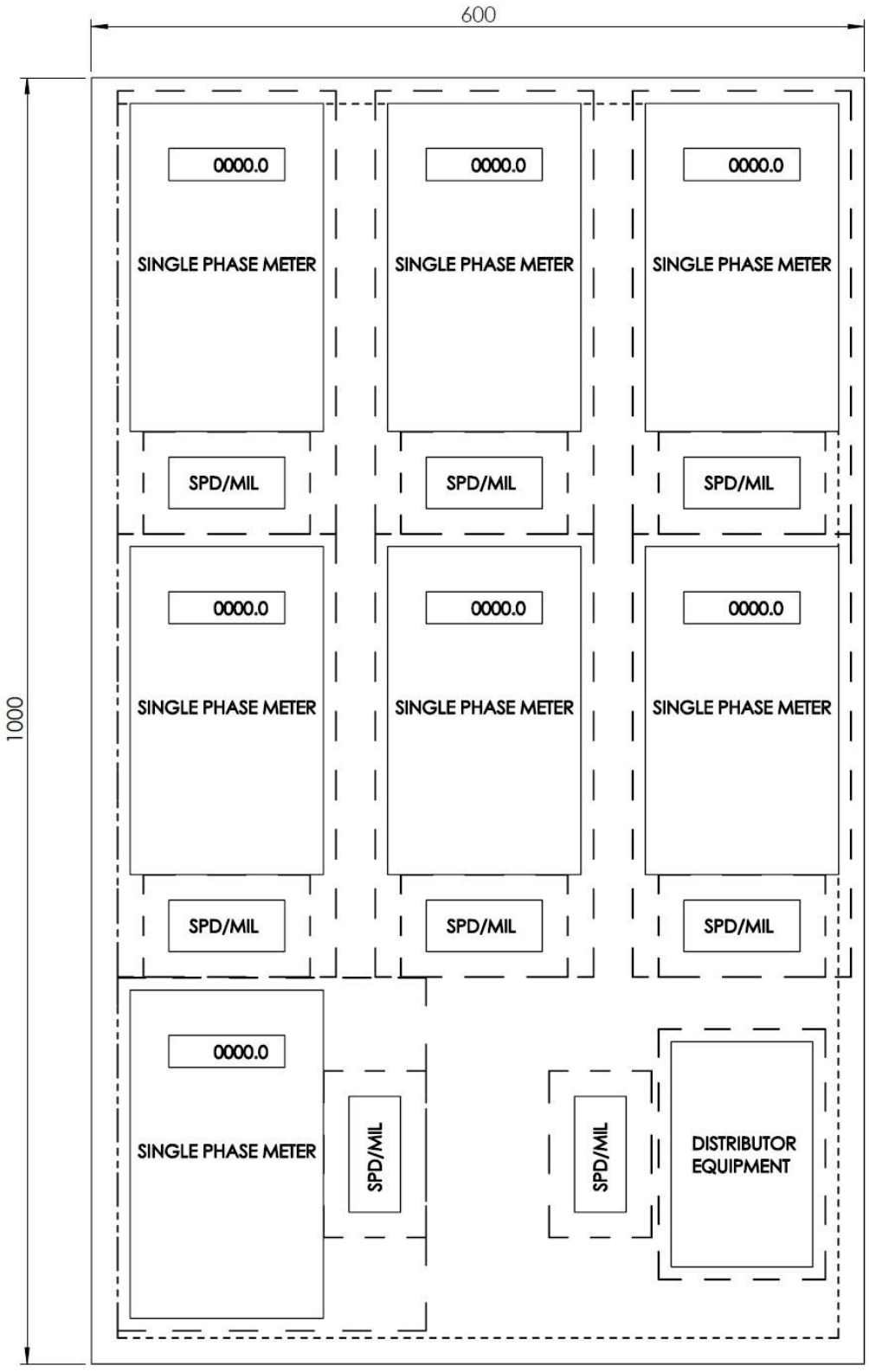


Figure 22 - Typical Panel Layout for Multi Occupancy, Single phase, 1000 x 600 panel

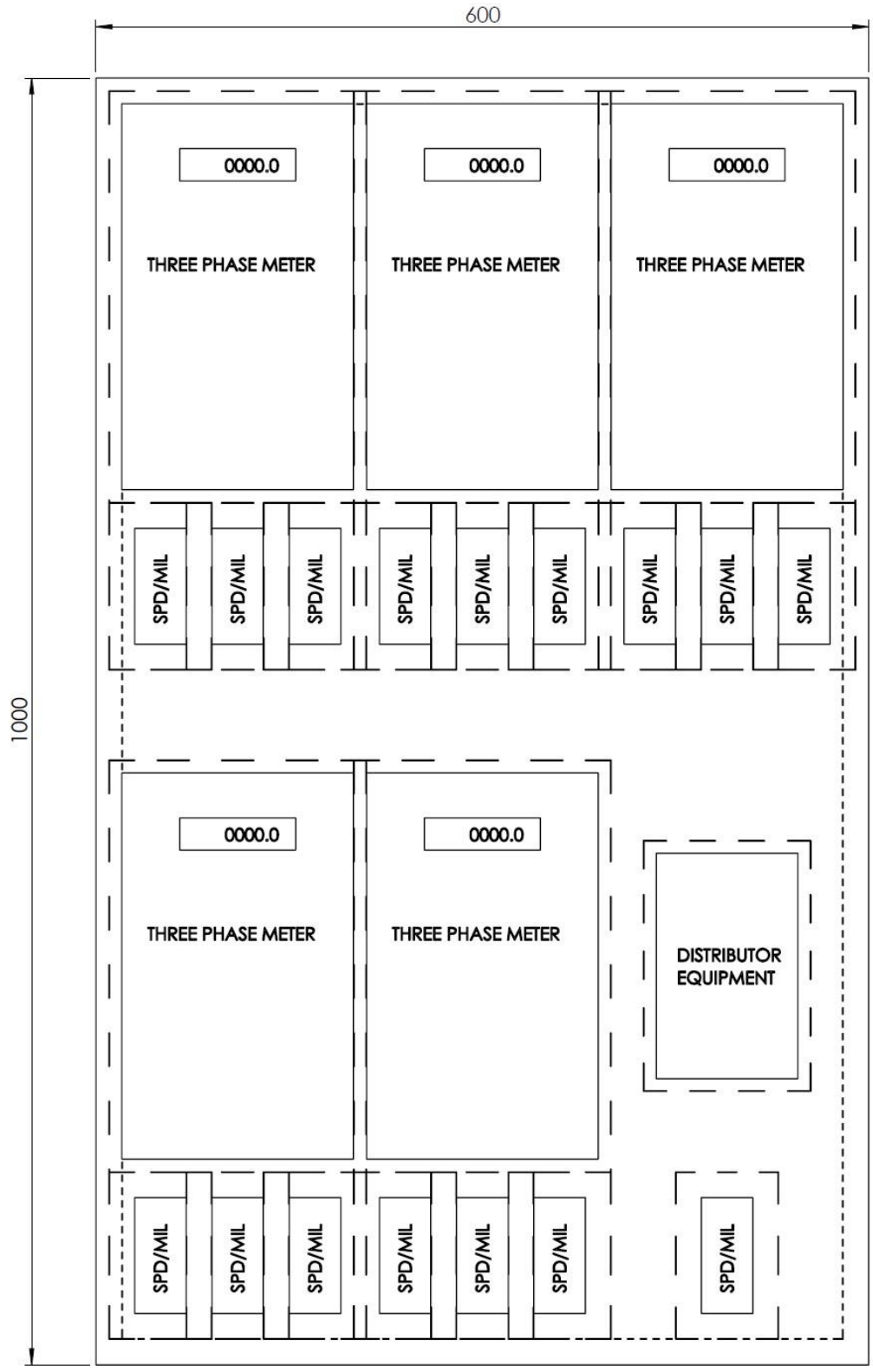


Figure 23 - Typical Panel Layout for Multi Occupancy, multiphase, 1000 x 600 panel

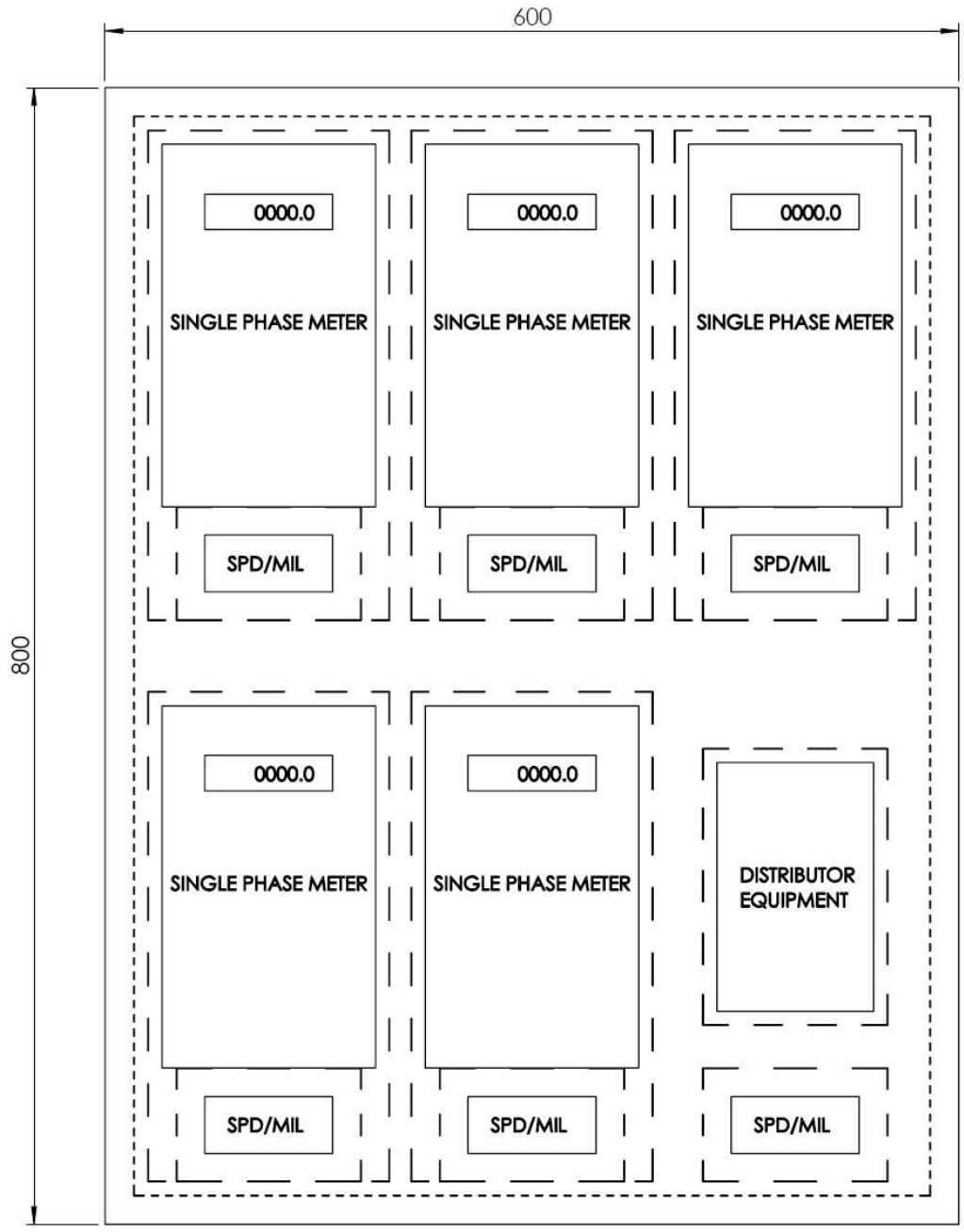


Figure 24 - Typical Panel Layout for Multi Occupancy, Single phase, 800 x 600 panel

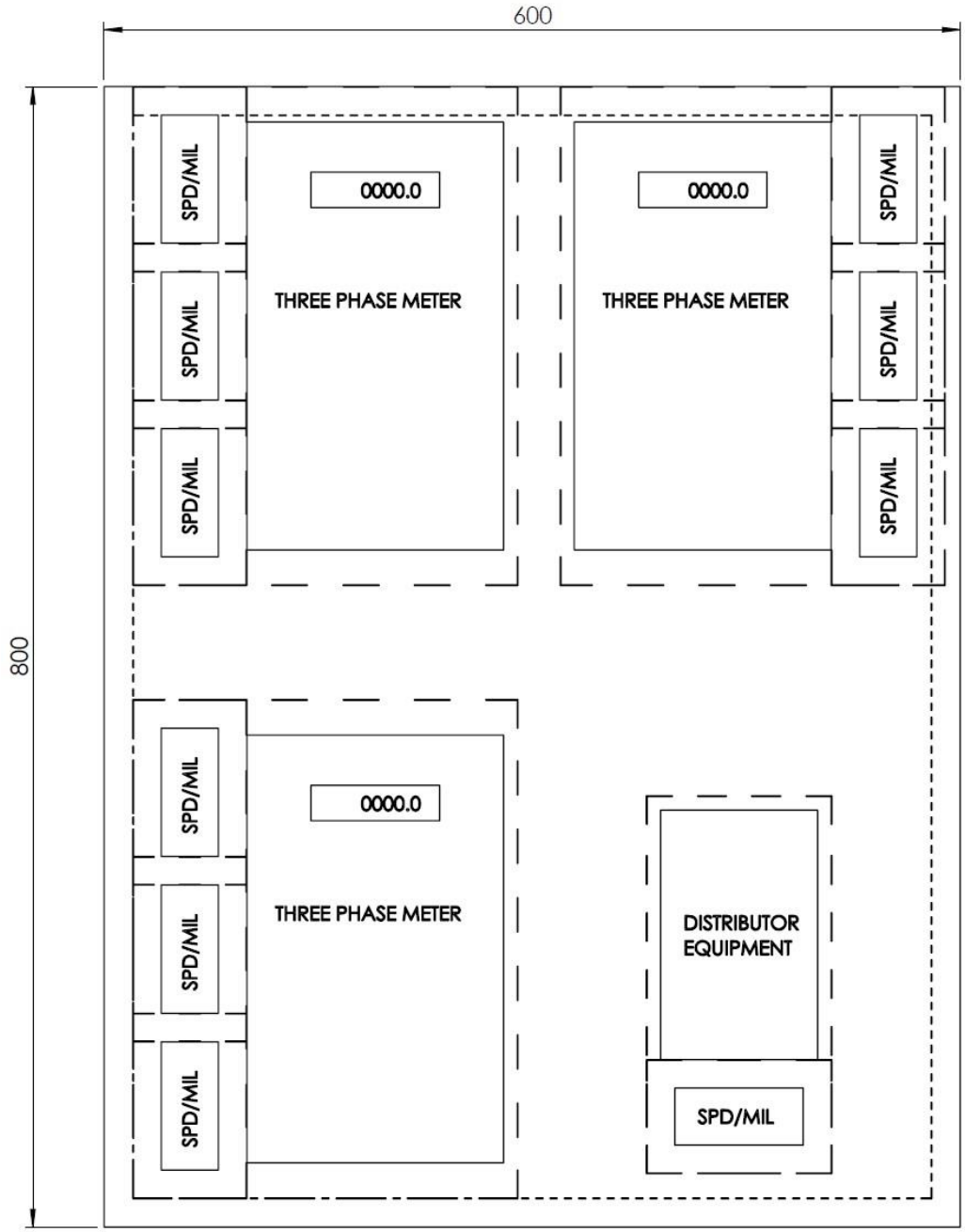


Figure 25 - Typical Panel Layout for Multi Occupancy, multiphase, 800 x 600 panel

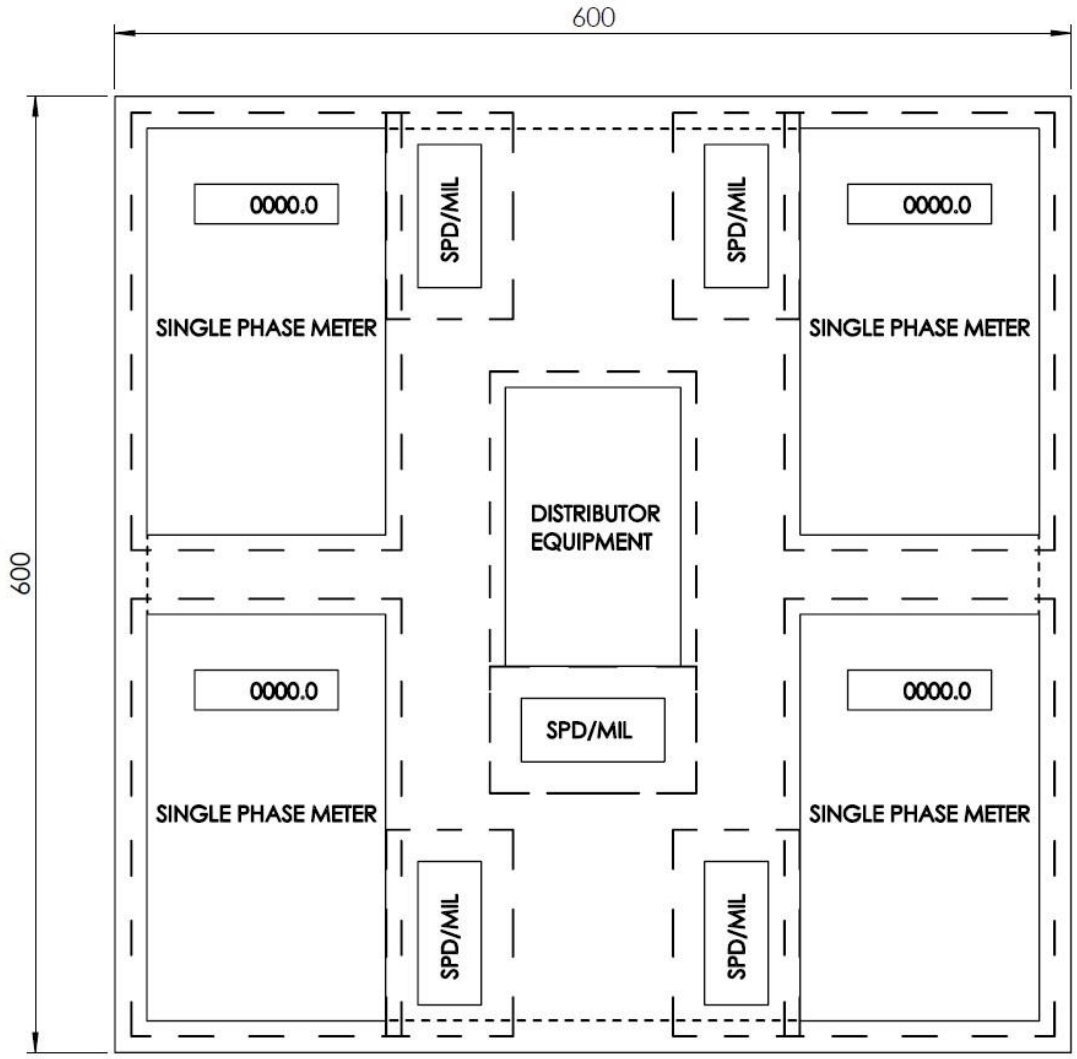


Figure 26 - Typical Panel Layout for Multi Occupancy, Single phase, 600 x 600 panel

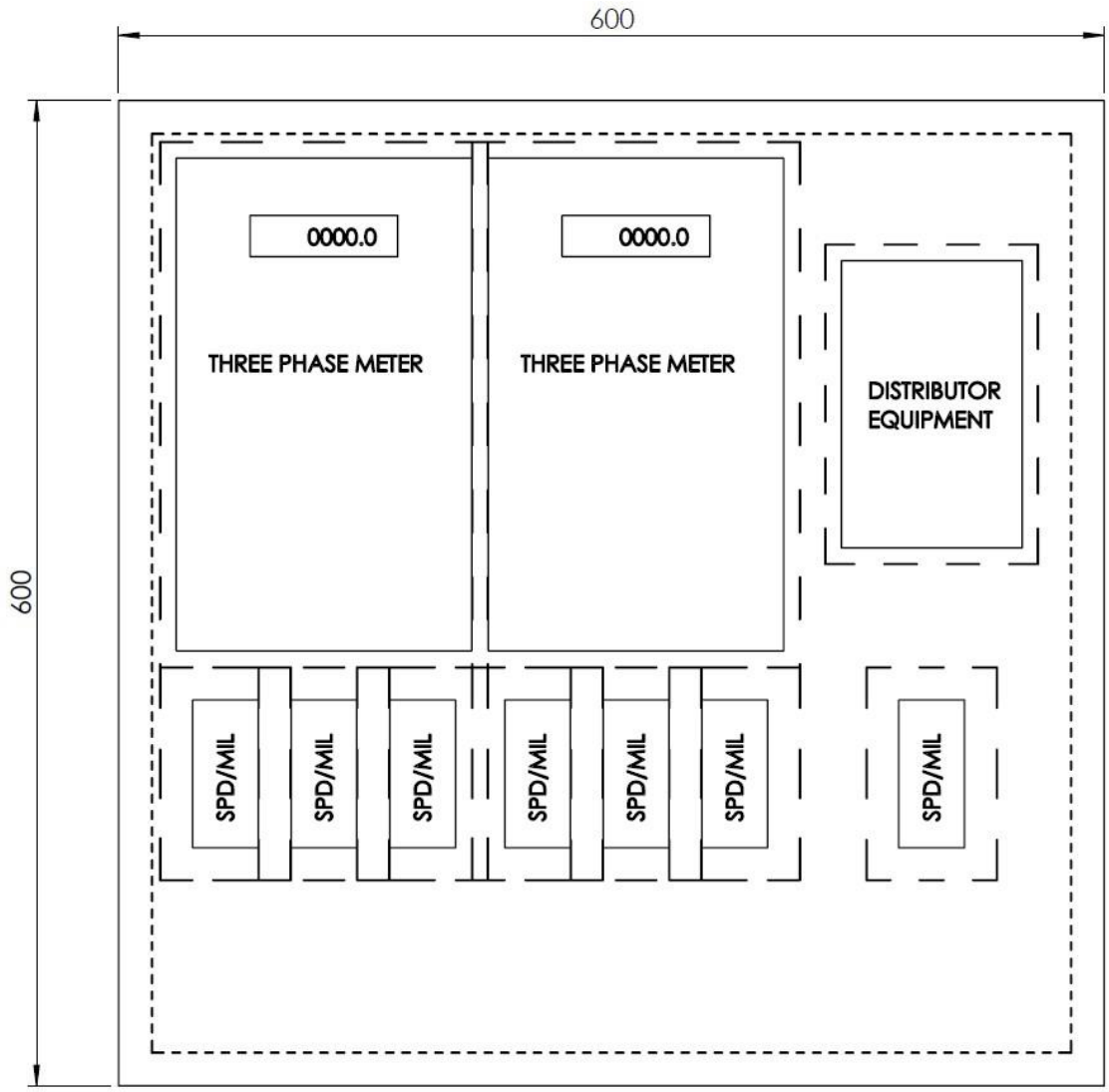


Figure 27- Typical Panel Layout for Multi Occupancy, multiphase, 600 x 600 panel

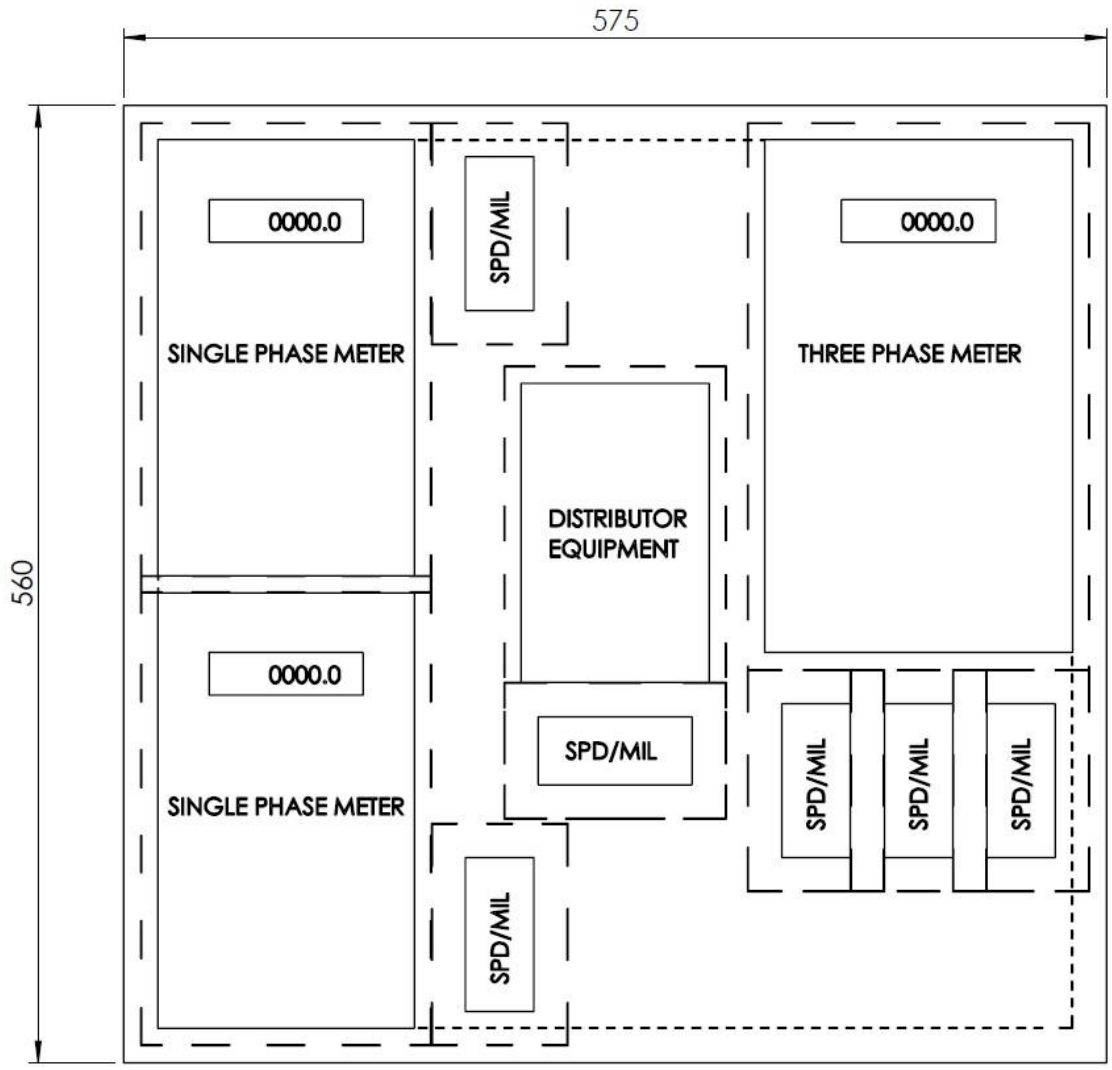


Figure 28 - Typical Panel Layout for Multi Occupancy, multiphase and single phase, 560 x 575 panel

3. CURRENT TRANSFORMER METERING

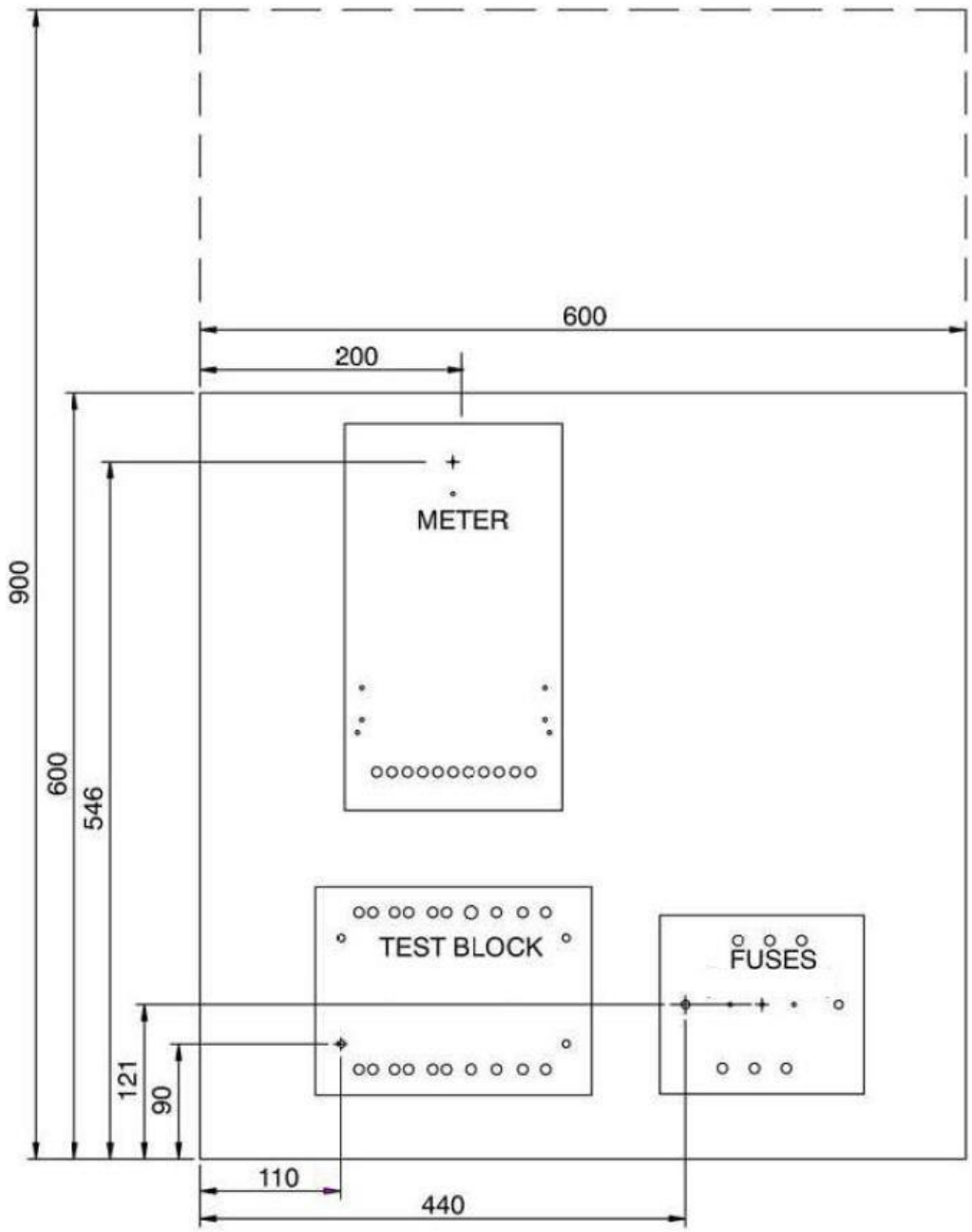


Figure 29 – Typical CT Meter Panel Equipment Placement

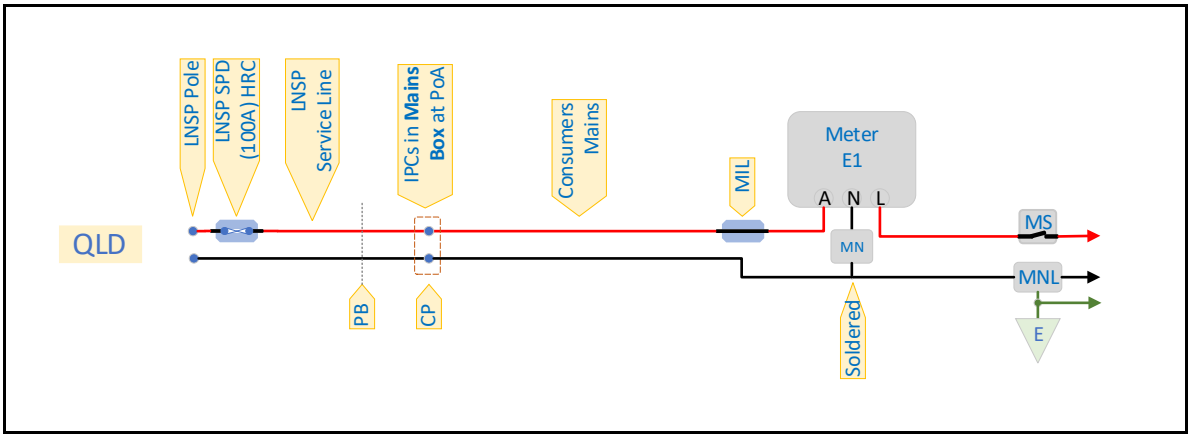
APPENDIX C – WHOLE CURRENT TYPICAL CONNECTION ARRANGEMENTS

(1) This section provides indicative metering arrangements for each jurisdiction. These are representative only.

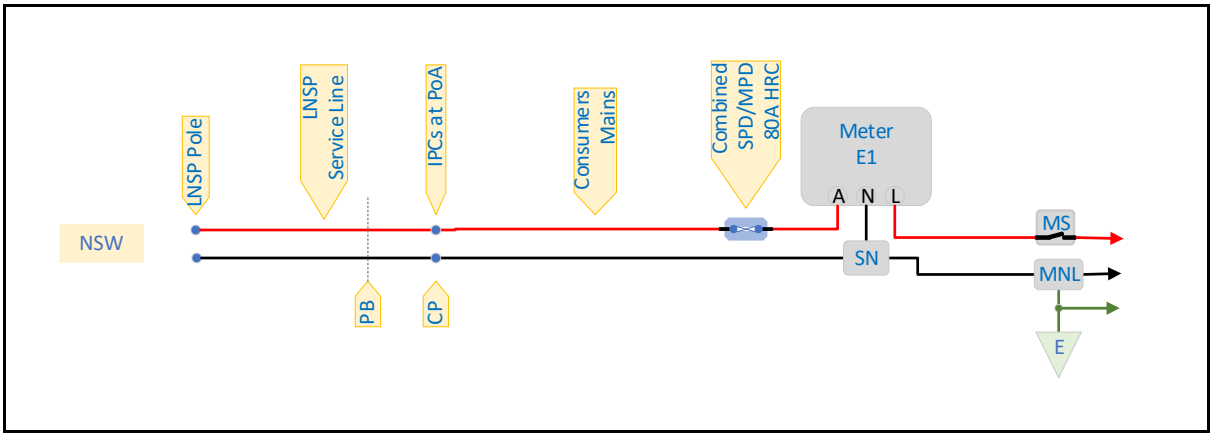
Legend: SPD – Service Protective Device | MPD – Meter Protective Device | MIL – Meter Isolation | Link | CID – Customer Isolation Device | CB – Circuit Breaker | PoA – Point of Attachment (on building fascia) | CP – Connection Point (Network Boundary) | PB – Property Boundary | HRC – High Rupture Capacity | IPC – Insulation Piercing Connector | MS – Main Switch | MNN – customer's Main Neutral Link | SN – Supply Neutral | MN – Metering Neutral Link | LNSP – Local Network Service Provider | E – Main Earth

SINGLE PHASE SINGLE ELEMENT WHOLE CURRENT OVERHEAD SERVICE

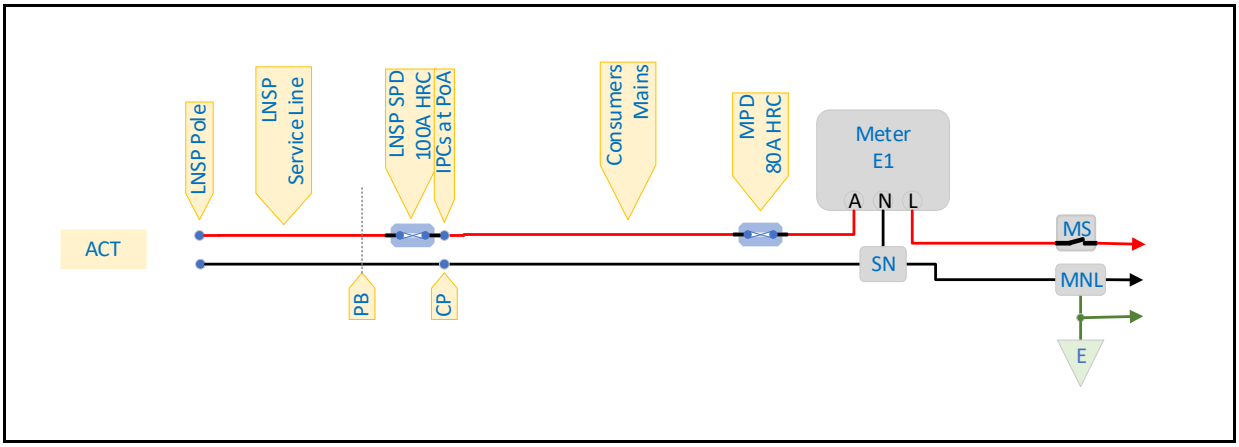
Queensland (QLD)



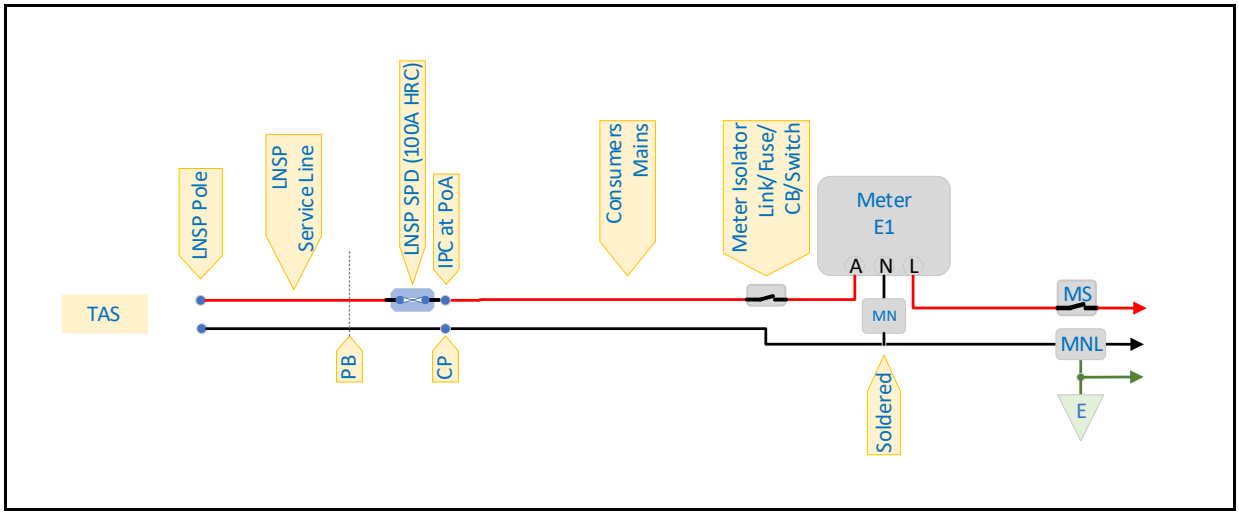
New South Wales (NSW)



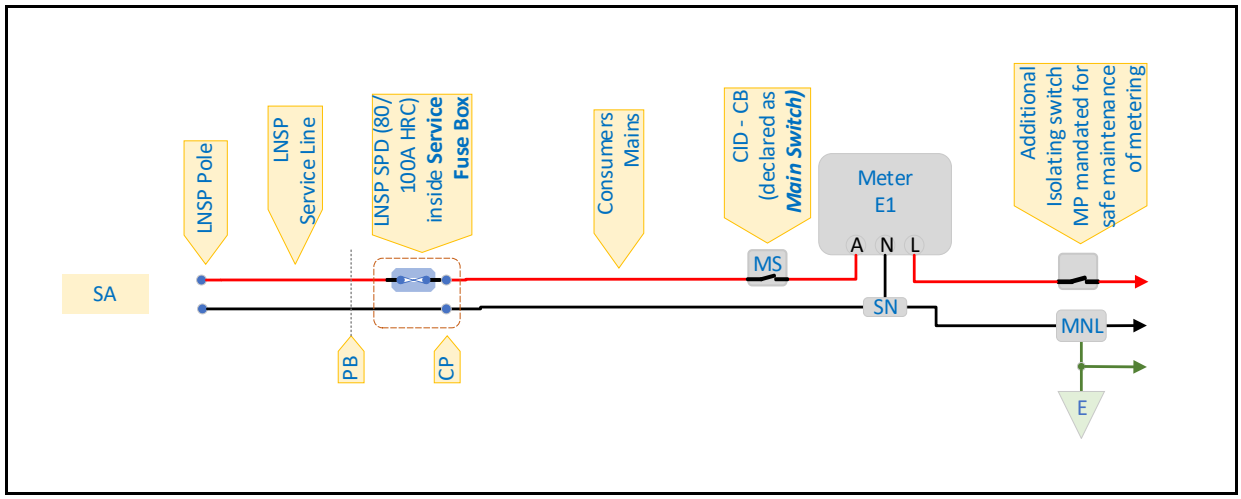
Australian Capital Territory (ACT)



Tasmania (TAS)

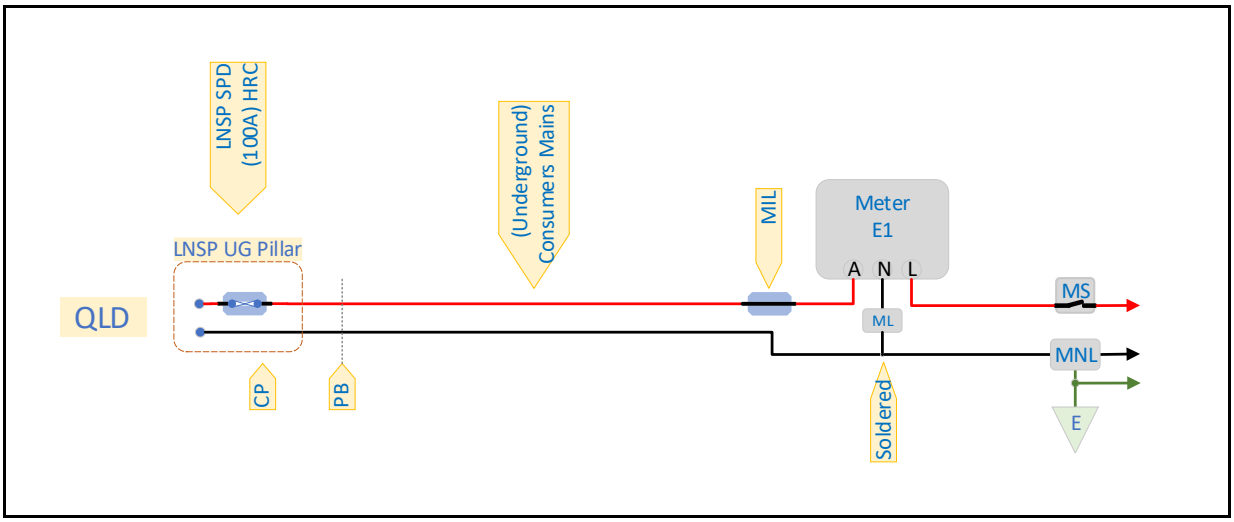


South Australia (SA)

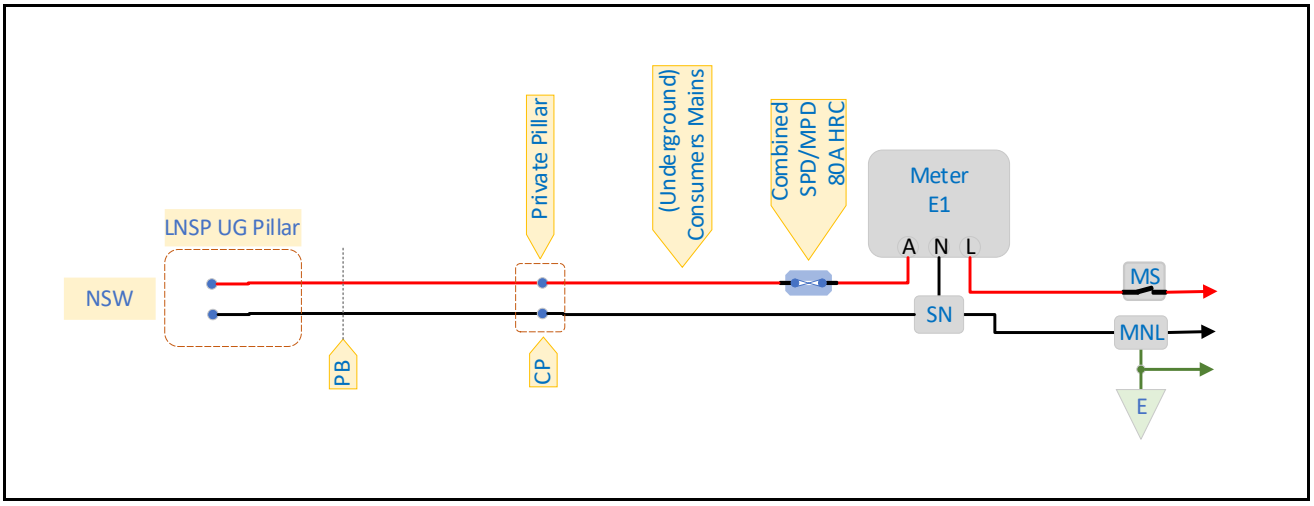


SINGLE PHASE SINGLE ELEMENT WHOLE CURRENT UNDERGROUND SERVICE

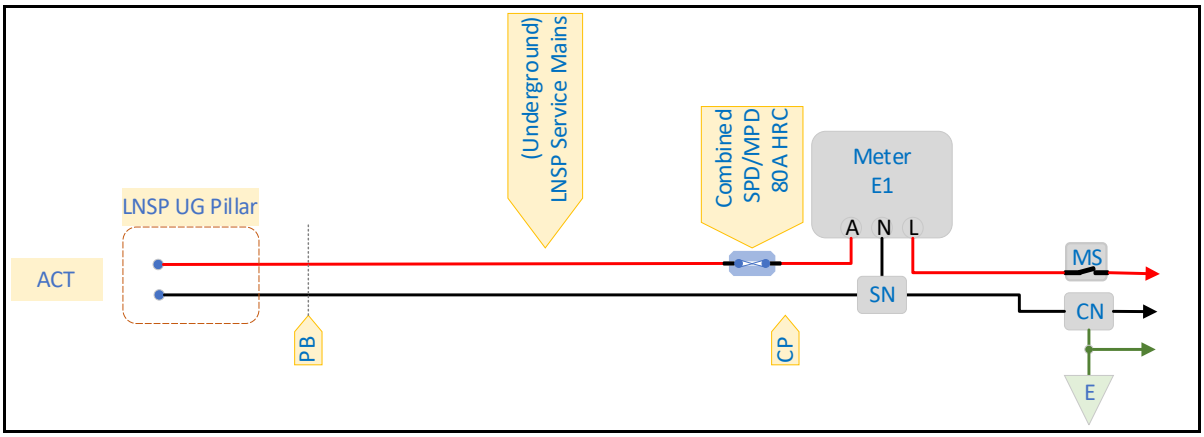
Queensland (QLD)



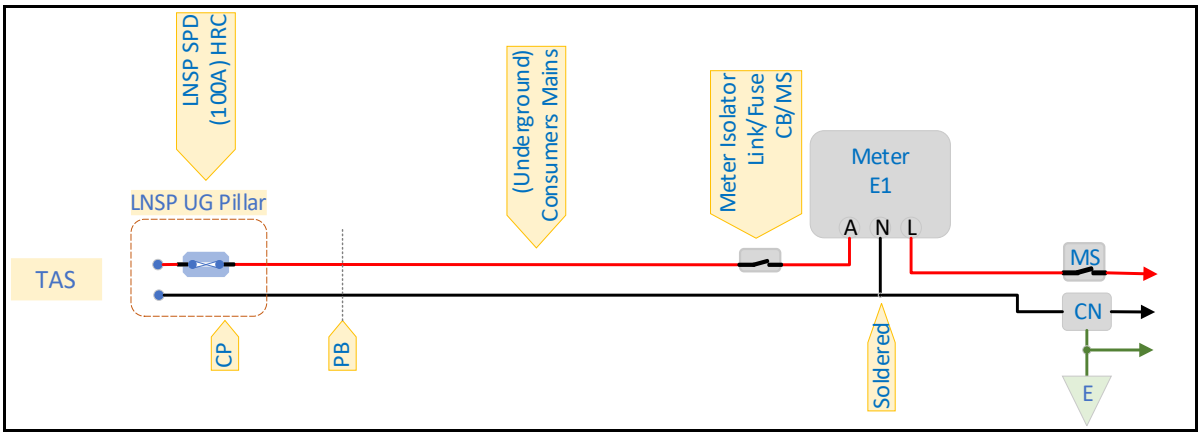
New South Wales (NSW)



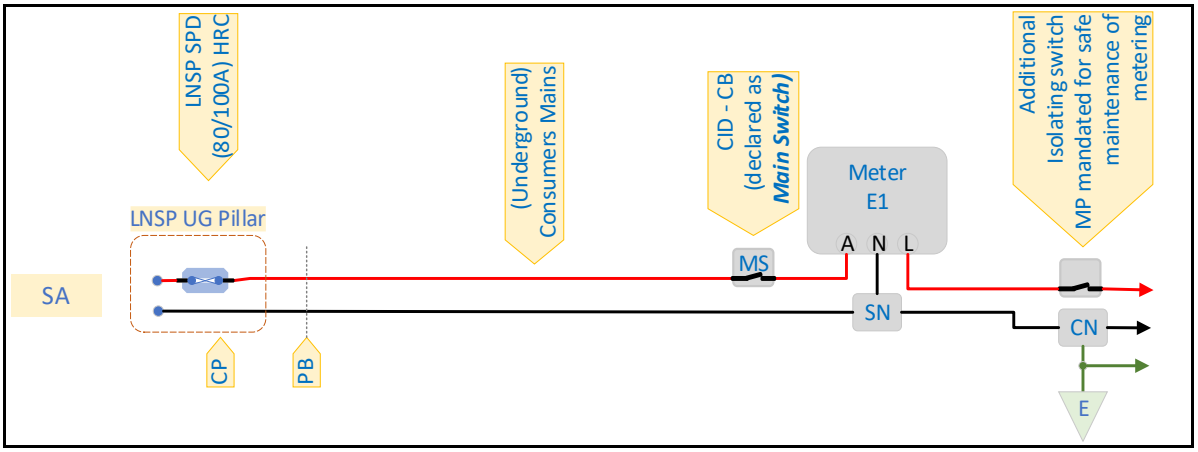
Australian Capital Territory (ACT)



Tasmania (TAS)



South Australia (SA)



APPENDIX D – LOW VOLTAGE CT LAYOUTS

1. GENERAL ARRANGEMENTS FOR METERING FUSE SEALING BLOCKS

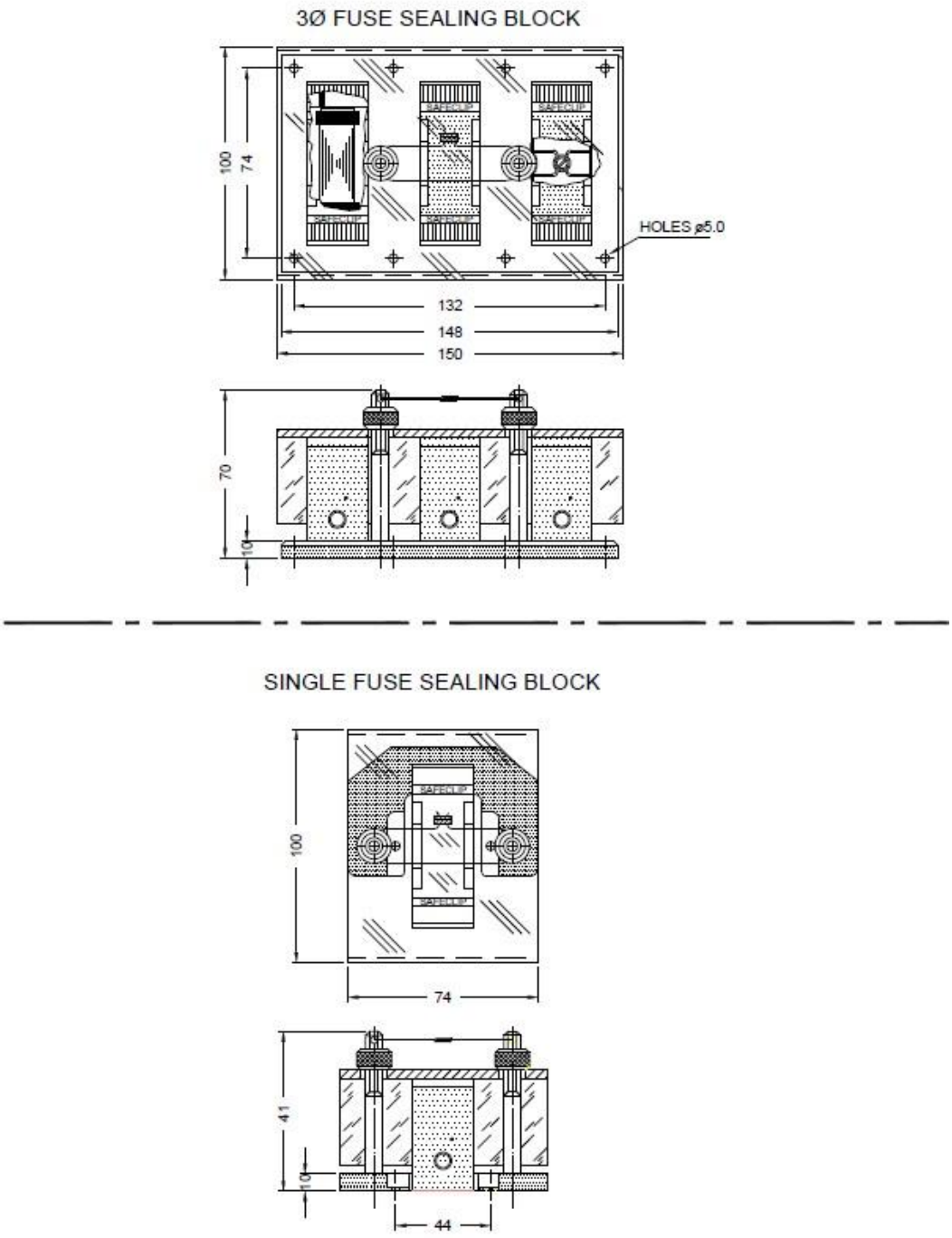
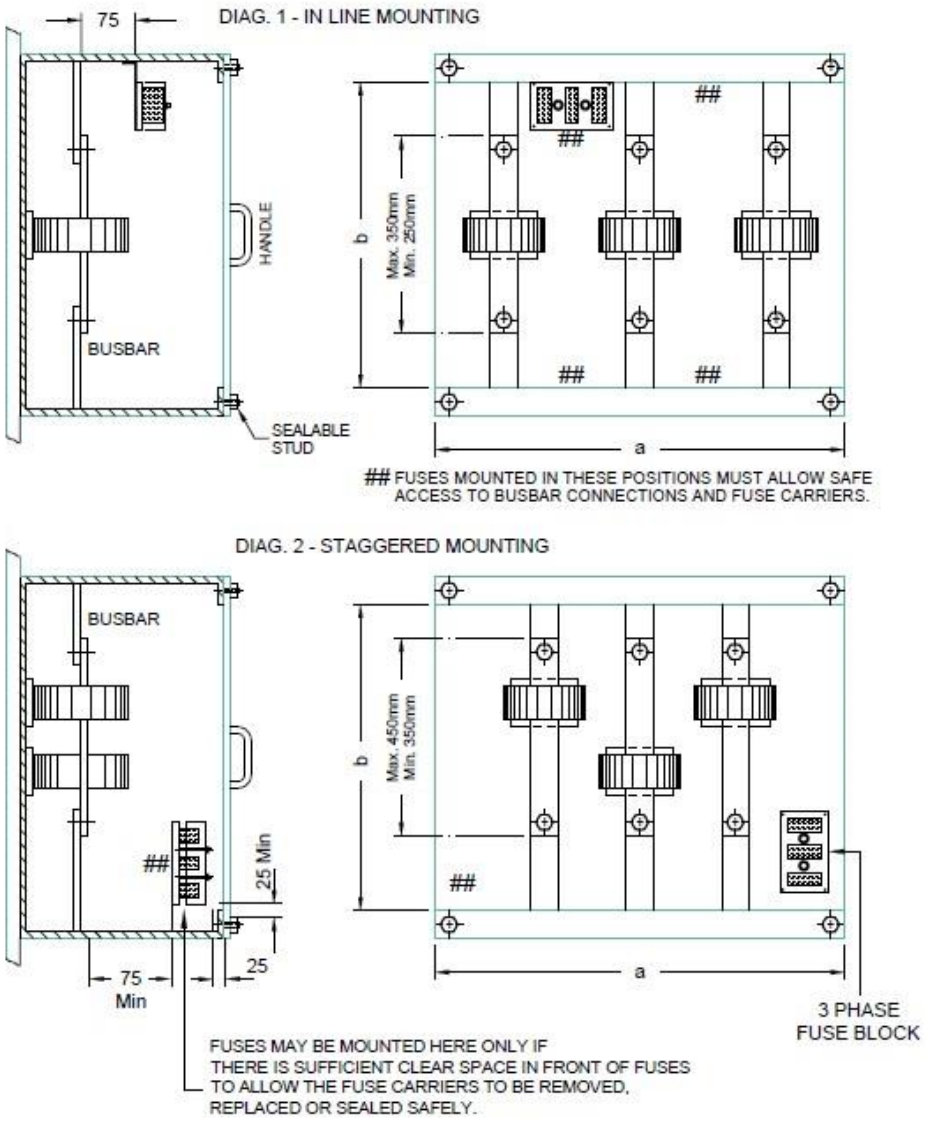


Figure 30 - General arrangement for metering fuse sealing blocks

2. CHAMBER ARRANGEMENTS – SINGLE OCCUPANCY



NOTES:
1. VOLTAGE FUSE BLOCKS MAY BE MOUNTED ON EITHER FRONT OR SIDE OF ENCLOSURE FOR EACH CT. ARRANGEMENT.
2. ALL LIVE CONDUCTORS TO BE INSULATED - BUSBAR AND CABLE BOLTED CONNECTIONS TO BE COVERED WITH NON-ADHESIVE INSULATION, ADEQUATELY SECURED IN PLACE BY CABLE TIES.

Figure 31 - Typical CT chamber arrangements

3. Wiring Diagram – LV CT Metering Connections

REFER TO SECTION **12 Specific Jurisdictional Requirements and Transitional Arrangements** FOR ADDITIONAL OR VARIATION TO THE REQUIREMENTS DESCRIBED WITHIN THIS SECTION

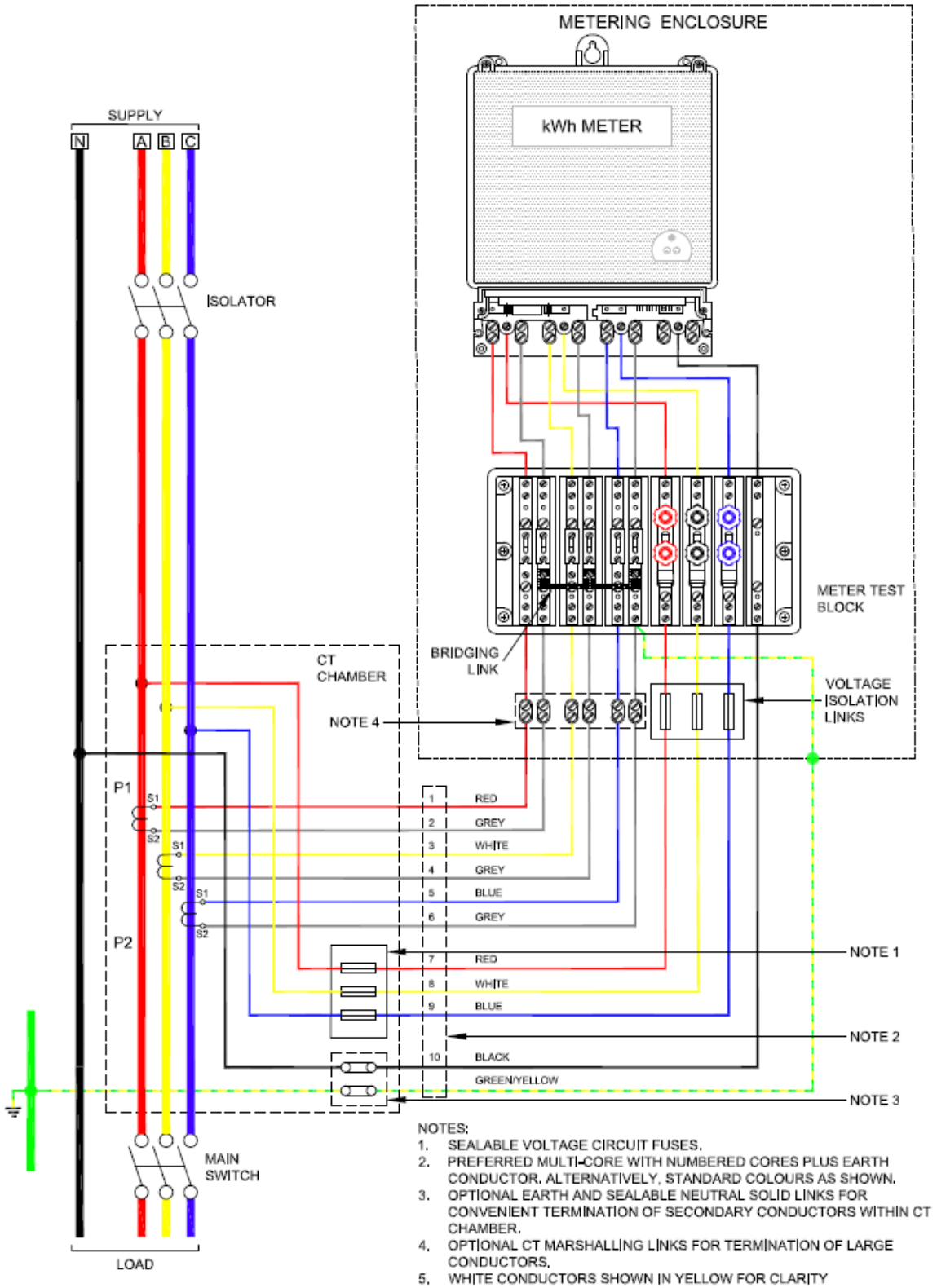


Figure 32 - Wiring Diagram for CT Metering

APPENDIX E – SPECIFICATION FOR TEST BLOCKS FOR TRANSFORMER-OPERATED METERS

(This appendix has been derived from the ESAA Standard No. S(b)7.-1976 as prepared by No.27 Committee, Metering of Section No.2 Transmission and Distribution, of the ESAA, as was adopted by the ESAA on 22nd October 1975.) **Note: Figure references in this text refer to the original standard – not figures in this document.**

1. SCOPE

(1) This specification applies to transformer-operated meter test blocks which may be installed on customers' premises to facilitate removal and site-testing of the metering installation.

2. TYPE

(1) The test blocks must be front-connected and provide for the connection of three-phase, three and four-wire meters with a current rating of 20A, and a voltage rating of 660V.

(2) Each block must provide for three current circuits, three voltage circuits and one neutral circuit.

(3) Each voltage circuit must be fitted with a slide link and two insulated nuts. The slide link must be so insulated as to enable its manipulation while energised.

(4) The neutral circuit must be a solid bar without slide links.

(5) Provision must be made for the insertion of auxiliary instruments in the current, voltage and neutral circuits with the aid of 4 mm diameter test plugs.

(6) Four mounting holes of not less than 6 mm diameter must be provided in the base of the test blocks.

(7) The construction of the test blocks must comply with AS/NZS 61439.

(8) The test blocks must conform to the constructional and layout features shown in this appendix. Two hardware arrangements differ in the following way:

a) Mk I having isolation facility on both polarity and non-polarity leg of the current circuit; and

b) Mk II having isolation facility on the polarity leg and the non-polarity as a solid bar.

(9) The hardware can be equipped with additional components:

a) Bridging link to star-connect the non-polarity legs of the current circuits – locatable either on the meter side or the current transformer side of the current transformer isolation links.

b) Current transformer shorting swing links, located on the current transformer side of the isolation links. These links can be left open for normal operation, or closed, when access to the meter is required for tested.

(10) The preferred arrangement is the Mk1 test block without current transformer shorting swing links, with bridging link star-connecting the non-polarity legs of the current circuits, located on the current transformer side of the isolation links. (See Figure 27). The reasoning for this preference is as follows:

a) The Mk1 test block, together with dedicated polarity and non-polarity wiring for each CT ensures independent operation of each current transformer, plus full access for testing and measurements;

b) Excluding the shorting swing links eliminates the potential to leave the current transformers shorted after leaving the site. Instead, by requiring the use of external shorting links, the cover is only able to be reinstated if the links are removed, thus discouraging the circumstances of leaving the current transformers shorted after leaving the site;

c) Star connecting the non-polarity on the current transformers, on the current transformer side, allows provision for referencing the secondary current transformers to earth potential for safety, at all times, irrespective of the position of isolation links

(11) Alternative arrangements are and have been commonly used in different jurisdictions, including:

a) Queensland (Figure 7)

b) New South Wales, Australian Capital Territory (Figure 8**Error! Reference source not found.**)

c) Victoria, South Australia, Tasmania (Figure 9)

3. General Construction

(1) The test block base and cover and insulated portions of the voltage slide links and insulated nuts must be of moulded insulating material or materials complying with AS/NZS61439. Insulating materials must not be adversely affected by normal (operational) heat and abnormal heat. Glow-wire test principles of AS/NZS 61439.1 must be used to verify the suitability of insulating materials.

(2) All moulded material for the base must be black except that the phases of the voltage links must be identified by red, white and blue coloured insulated nuts.

(3) Unless otherwise specified all current carrying metal parts must be made of electro tin-plated brass suitable for electrical purposes. Any steel holding down screws must be suitably protected against corrosion. Reference is drawn to AS/NZS 5112; Tunnel type terminal neutral bars for low voltage switchboards - Requirements for termination of copper conductors up to 50 mm^2 for verification of corrosion standards and testing.

(4) ISO metric coarse pitch machine screw threads must be used, except where otherwise specified.

4. Terminals

(1) Cable terminals must comply with AS/NZS 5112 and have tunnel entries, each having a diameter not less than 5 mm and length 14 mm. Each entry must be countersunk.

(2) Each terminal must be provided with two brass cheese head 4 mm screws for effectively clamping the external conductor.

(3) Access to the terminals must be obtained by 9 mm diameter holes suitably placed in the faces of the moulded base.

5. Cover

(1) The moulded cover must effectively enclose all current carrying parts and must extend beyond the top and bottom edges of the test block base. It must provide clearances of not less than 18 mm between the external edges of the base and the internal edges of the cover. With the cover in position, no conductor, its insulation or any mounting screws must be visible.

6. Sealing

(1) Nonferrous nickel-plated knurled nuts suitable for sealing must be provided for fixing the cover in position. Sealing holes in nuts and studs must be not less than 1.6 mm diameter.

7. General Arrangements for Metering Test Blocks

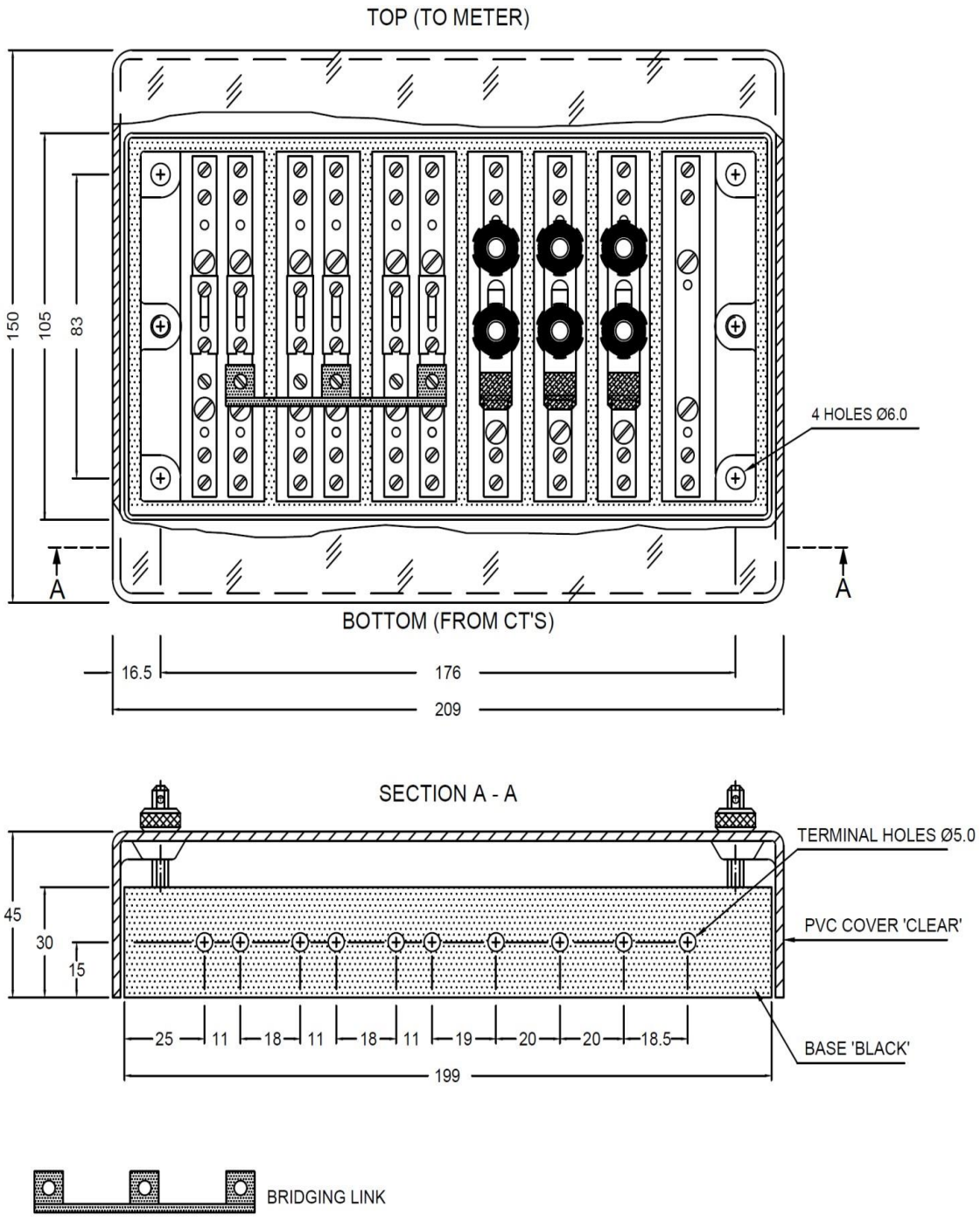


Figure 33 – Test Block Arrangement

APPENDIX F – DEFECT FORM

Dear Customer,
While attending the below address to replace/inspect the electricity meter, the metering technician noted that the electrical installation (or part of) does not comply with the safety regulations, wiring rules or metering requirements. As such, we are unable to proceed with the metering work until these issues are resolved.

Level 1 (L1) defects result in disconnection of supply and must be rectified before supply is restored.
Level 2 (L2) defects prevent a meter being installed.
Level 3 (L3) defects should be rectified to make the installation compliant / safe. ,

Site Address:		
Suburb:		Post code:

Date	NMI	WO Number	Retailer

Type of Supply:	Overhead		Underground		No. of Phases	1		2		3

Mark as appropriate, choose whether the defect can be fixed by the local Network (LNSP), a Registered Electrical Contractor (REC) **engaged by the customer**, or customer.

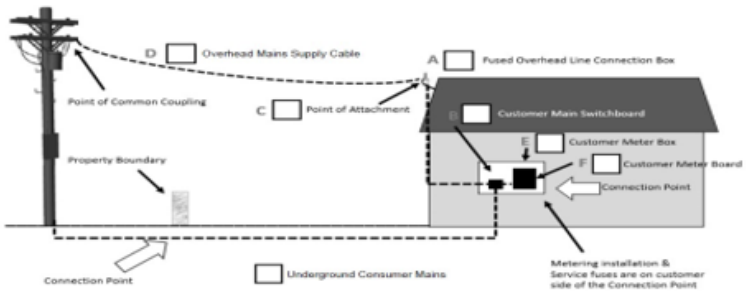
Provide notes in plain English to ensure the customer / retailer understands what steps are required to resolve the defect to enable work to be completed.

LNSP Informed?

Defect	L1	L2	L3	Notes	To be fixed by	
No MEN at customers' installation, no direct earthing					LNSP	REC
Neutral Integrity Failure					LNSP	
Exposed conductive parts						REC
Illegal Wiring – Tampering					LNSP	REC
Damaged or Faulty wiring -VIR (Network to Main Switch)					LNSP	REC
Non-Compliant Wiring -Network to Main Switch (Not including main switch)					LNSP	REC
Defective Equipment -Network to Main Switch (Not including main switch)					LNSP	REC
Meter is not protected from the weather					LNSP	REC
Access to Metering Equipment Impeded (Bushes, Tree, location and height from a stable platform etc.)					CUSTOMER	
No MEN at customers' installation but direct earth installed					LNSP	REC
Earthing System issue, or equipment not bonded						REC
Non-Compliant Wiring (Main Switch/Customer Switchboard)					LNSP	REC
Damaged/ Faulty wiring -VIR (Main Switch wiring, Switchboard wiring)					LNSP	REC
Defective Equipment (Main Switch/Customer Switchboard)					LNSP	REC

Indicate on the picture where the defect is and **provide notes** for REC/LNSP so the problem can be resolved. More detail can be provided on the back page

Notes:



THIS NOTICE REFERS ONLY TO THE 'DEFECT' IN THIS ADVICE AND DOES NOT EXCLUDE THE POSSIBILITY OF OTHER INSTANCES OF NON-COMPLIANCE

Technician name		License No.	
Metering Provider Contact Details (Must be provided)			

Customer Switchboard, Consumer Mains Cable & Equipment

If the defect/s on this form prevented your meter installation you will need to:

A. arrange rectification as described, and

B. contact your Retailer when the defect has been fixed.

The specific area where the defect exists at the customer's switchboard is noted below and notes provided so the defect can be fixed.

General Switch board faults

	Enclosure is damaged		Asbestos clean-up required
	Equipment is exposed to the weather.		Asbestos removal required
	Meter panel is broken or not secured.		Requires safety switches (Queensland).
7	FIR (Load Control Relay) Needs to be installed, Contact an ASP.	**5**	Main switch(s) needs replacement or installation.

Customer Equipment Issues. The following items are numbered as

1	Consumer Mains Cable	**2**	Conduit containing consumer's mains
3	Supply fuses/Supply Isolation	**4**	Existing Meter Tampered or Broken
5	Customer Switch gear / enclosure ○ Main Switch/s ○ Circuit breaker ○ Fuse base/cartridge ○ No barrier to live parts	**6**	Customer sub-circuits
7	Network Relay or Timeclock	**8**	Earth Electrode/Main earth connection
9	Service Neutral Link Required	**10**	MEN required on customer neutral link
11	Customer equipment needs moving to provide space to fit a Vector Meter. Height x width x depth (inc. 10mm air gap): 1ph meter is =220 x 140 x 110 3ph meter =270 x 180 x 105.