



FAQ's

WA Electrical Distribution and Connection Requirements

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Q: Do you require installing a Service Protection Device (SPD) in all consumer installations?

- Yes. Except for sole-use substations, where the transformer circuit breaker may not be duplicated, the SPD does not replace the main switch. An SPD and a main switch must be provided on direct connected metering installations.
- SPD to be installed in the line side of meters or metering transformers (CT's).

Where safety services are installed the SPD to be labelled with additional labelling:

CAUTION
SAFETY (EMERGENCY) SYSTEMS ON SITE
MAY BE DISABLED BY OPERATING THIS DEVICE

Q: Can you use service fuses as SPD for direct metering installations with maximum not exceeding 100A?

- Yes. HRC fuses capable of carrying a continuous current of 100A (fuse holder and cartridge; 22mm barrel) to be used as SPD.

Q: What can you use as SPD for direct metering installation with maximum demand exceeding 100A and CT metered installations?

- A circuit breaker or combined fuse switch (CFS) unit acceptable by the distributor can be used as SPD.
- This device shall:
 - have a continuous current rating to accommodate the maximum demand;
 - unless otherwise approved by the network operator, have a rated short circuit breaking capacity of 25kA minimum;
 - be capable of discrimination with both upstream and downstream protective devices; and
 - be able to be locked and tagged in the "off" position.
 - Should be a current limiting device (cannot use a ACB as SPD)
 - SPD must grade with the Network Operator's upstream protective device

Q: What are the additional measures to be taken for switchboards rated above 800A?

- As per the requirements of AS/NZS 3000 Section 2.5.5 the customer's switchboard protection equipment must be able to detect and clear arcing fault currents for switchboards with a load capacity of 800 A or more.
- Switchboards with a capacity of 800 A or more are typically supplied from either a 630 or 1000 kVA network transformer. The minimum fault levels that should be used to ensure appropriate operation of protection equipment is 25% of 25 kA for 3 phase faults within 30 km's of a zone substation.

Q: How to achieve authorised access only for metering equipment?

- Meter enclosures and access areas to be locked, provided that a standard approved master key locking system is fitted to the door of the meter enclosure, cupboard or switchroom.
- The following range of locks may be used for enclosures:
- Yale locks
 - Type 490 – 25 Camlock (25 mm body length)
 - Type 490 – 30 Camlock (30 mm body length)
- Lockwood locks
 - Type 691 Cupboard Lock
 - Type 201 Cylinder (to suit night latch)
 - Type 570/2 Cylinder (to suit appropriate lock)
 - Type 847/4 Locking “T” handle

Q: Is it mandatory to have the meter panels hinged?

No. Meter panels can be fixed or hinged. The conductors connected to the equipment in the panel shall be:

- Of sufficient free length to allow the panel to be moved into an inspection or workable position
- Suitably fixed or otherwise retained in position to avoid undue movement or stress on electrical equipment at equipment terminals
- Arranged to prevent undue pressure on electrical equipment mounted behind the panel
- Appropriately secured and protected when installed on hinged panels
- Wiring not intended to be connected to metering equipment shall not enter the area directly behind the meter panel(s) unless contained within
- In all cases unsealed panel holes must satisfy a minimum protection rating of IP2X

Q: Why do we need to use magnetic screening around meters?

- To avoid adverse effect on meters from magnetic fields, adequate spacing is required between the meters and large current carrying conductors as per below table:

MAXIMUM CURRENT IN CONDUCTOR NEAREST TO METER	MINIMUM SPACING BETWEEN CONDUCTOR AND METER
150	NIL
200	100
400	500
600	700
1000	900
1500	1200
2000	1400
3000	1700
4000	2000

Where spacing cannot be achieved magnetic screening must be installed around the meter. Screening shall be of a ferrous material, not less than 0.76 mm thick. The meter box must be totally enclosed around the meter, e.g. enclosed top, bottom, sides and back.

Q: What are the design and construction criteria for outdoor meter boxes?

The enclosure must be constructed of material of sufficient strength to achieve protection against vandalism, weather and other external factors.

The meter box shall be constructed from:

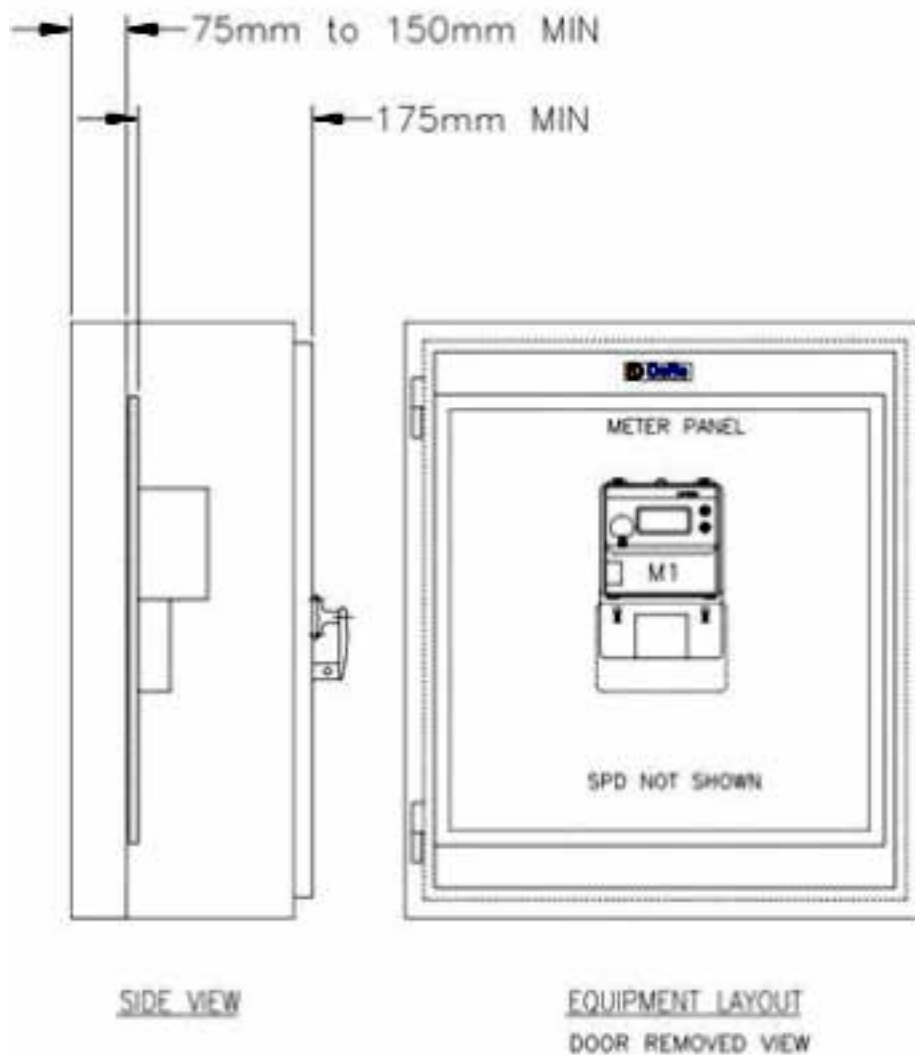
- Sheet steel with a minimum thickness of 1.0 mm, galvanised
- Sheet aluminium with a minimum thickness of 2.0 mm
- minimum degree of protection to a rating of IP 24

Where required ventilation and draining shall be provided to:

- Minimise fluctuations in temperature and humidity
- Provide an exit point for moisture that may collect within a box
- Restrict the entry of insects and vermin

Q: What are the minimum clearance requirements for meter enclosures?

- The internal width and height (excluding panel supports) shall be no smaller than the required panel size
- Clearance from the front of the meter panel to the inside of the door in the closed position shall be a minimum of 175 mm
- Clearance from the back of the meter panel to the rear of the surround, box or assembly shall be a minimum of 75 mm minimum.
- The rear clearance from the back of the meter panel to the rear of the enclosure shall be at least 150 mm for conductors greater than 16 mm² up to 35 mm² **(Horizon Power only)**



- All enclosures shall be fitted with a hinged door, catch and retainer. A minimum of two (2) hinges shall be fitted, consisting of a robust lift type, constructed from a non-corroding material
- Meter enclosure need to be earthed

Q: What is the minimum distance from ground to the meter panel that needs to be followed?

This distance depends on a couple of things:

- 1200 mm for a single direct connected meter
- 600 mm for multiple and remote reading meter(s)
- 900 mm in all other cases.

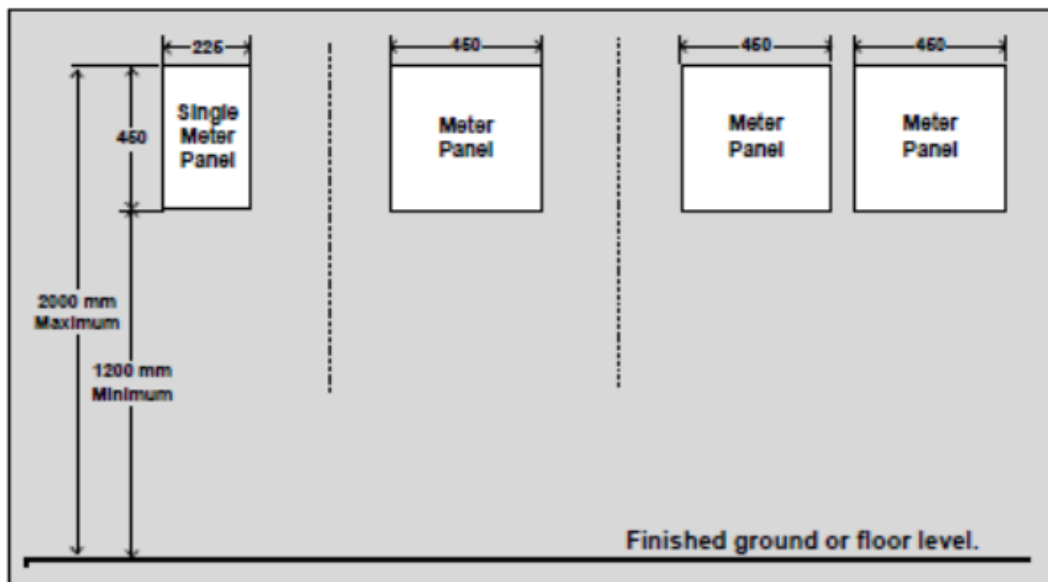


Figure 28: Typical meter panel mounting heights

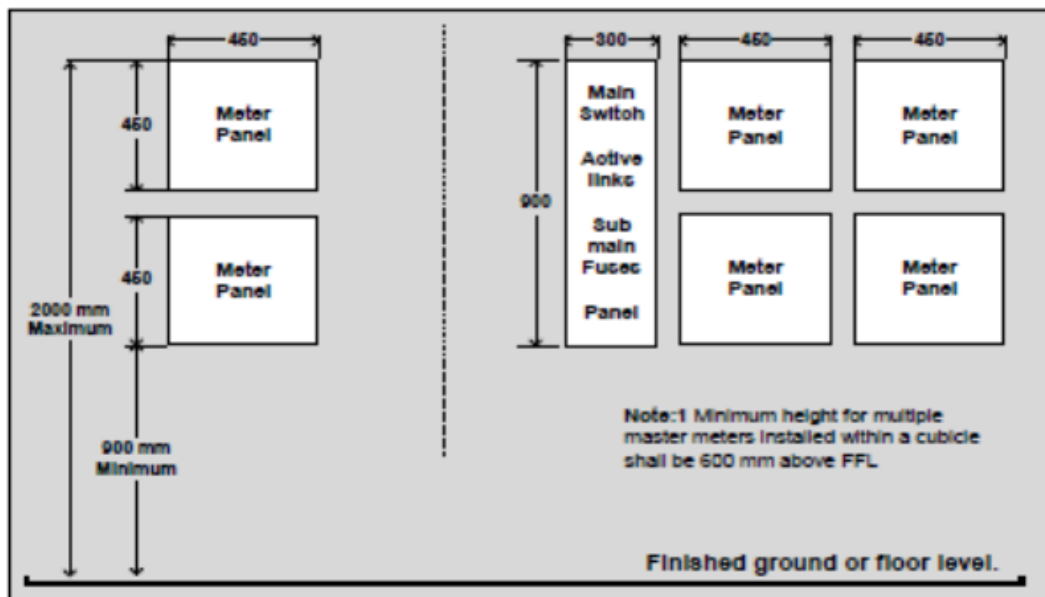


Figure 29: Typical multiple meter panel mounting heights

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Q: What are the acceptable panel sizes for direct wired meters for electrical loads less than or equal to 100A?

- 450 mm high by 225 mm wide with a minimum thickness of 6 mm; or
- 450 mm high by 450 mm wide with a minimum thickness of 6 mm

Number of Meters	Number and size of Meter Panels	Meter Phase Link	Meter Neutral link	Meter Protection	Service Protection (SPD)
1 x 100 A	1 x (450 x 225 x 6)	Not required	Not required	Not required	Required
2 x 100 A	1 x (450 x 450 x 6) 2 x (450 x 225 x 6)	Not required	1 x 165 A	Required	Required
3 x 100 A	1 x (450 x 450 x 6) 2 x (450 x 225 x 6)	3 x 165A	1 x 165 A	Required	Required
4 x 100 A	2 x (450 x 450 x 6)	3 x 165 A	2 x 165 A	Required	Required
5 x 100 A	2 x (450 x 450 x 6) 1 x (450 x 225 x 6)	3 x 165 A	2 x 165 A	Required	Required
< 5 x 100 A	Multiples of previous sizes				Required
Note	Maximum conductor size is 35 mm Refer to Clause 11.3.6 for specific Network Operator requirements				

Table 10: Direct wired meter panel arrangements

- Above table illustrates the maximum number of single phase or three phase meters that can be fitted in these meter panels.

Q: Can you use flexible conductors for panel wiring?

No. Cables shall be stranded copper conductors (building wire) and be:

- Not less than 16 mm² (7/1.70) for meters with a maximum current limited by an SPD or Meter Protection Device with a rating of up to 80 A or
- Not less than 25 mm² (19/1.35) for meters with a maximum current limited by an SPD or Meter Protection Device with a rating of up to 100A.
- For multiple master metering arrangements and distributed master metering house services meters, a neutral reference meter cable system shall be installed. The neutral reference cable shall be not less than 2.5 mm² (7/0.67) stranded cable.

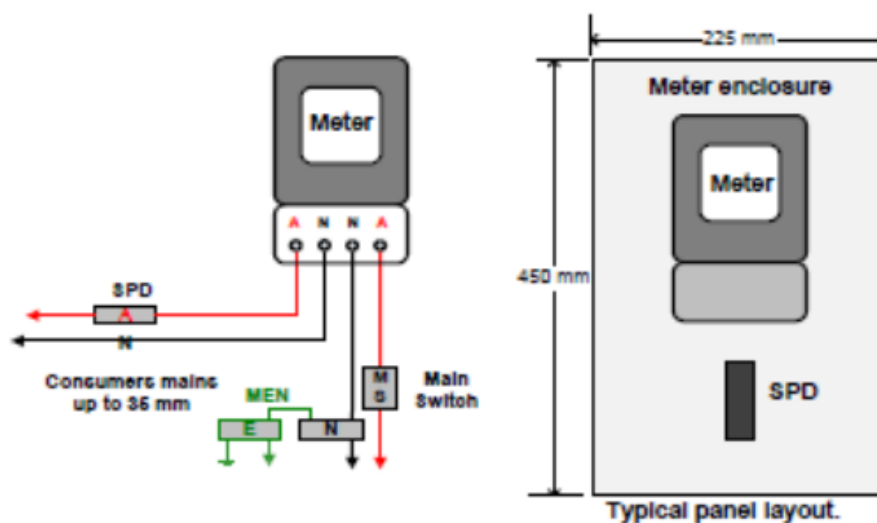


Figure 36: Typical single phase direct connected meter configuration.

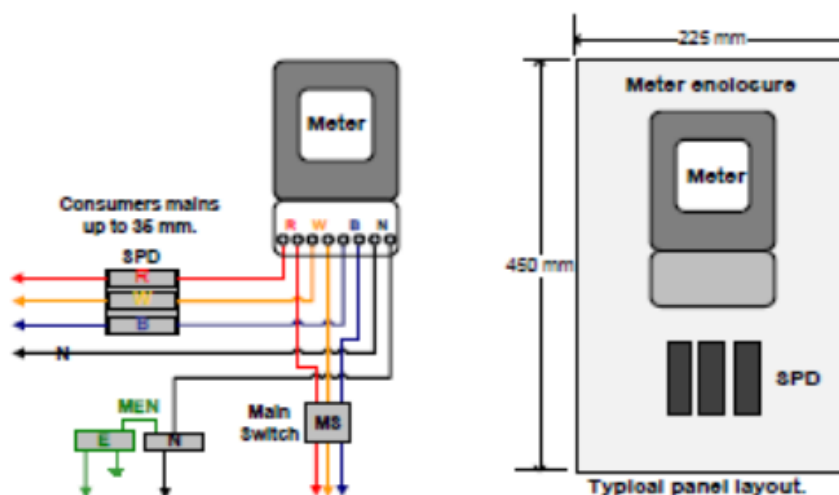


Figure 37: Typical three phase direct connected meter configuration.

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Q: Where do we use multiple master metering?

- Where there is a requirement to measure and record multiple loads such as residential units on a single lot. Meters are usually grouped and can be either multiple direct connected loads or CT metered systems.
- The site main switchboard and multiple master metering enclosures shall be installed in the common area, not be more than 30 metres from the point of supply
- The site main switchboard and each individual metering point must be accessible to Network Operator personnel without the necessity to traverse property occupied by others.

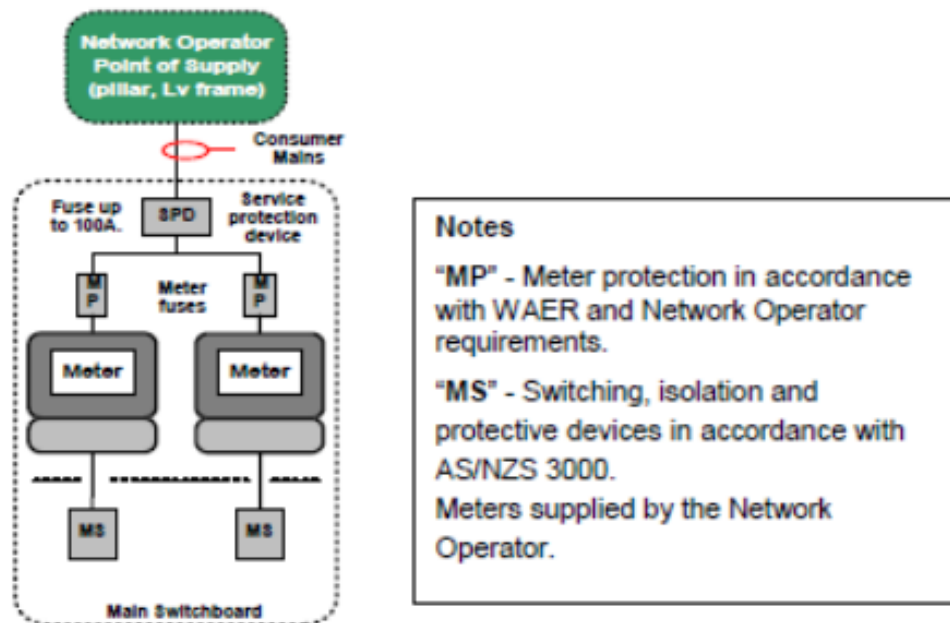


Figure 40: Typical multiple master meter layout under 100 A

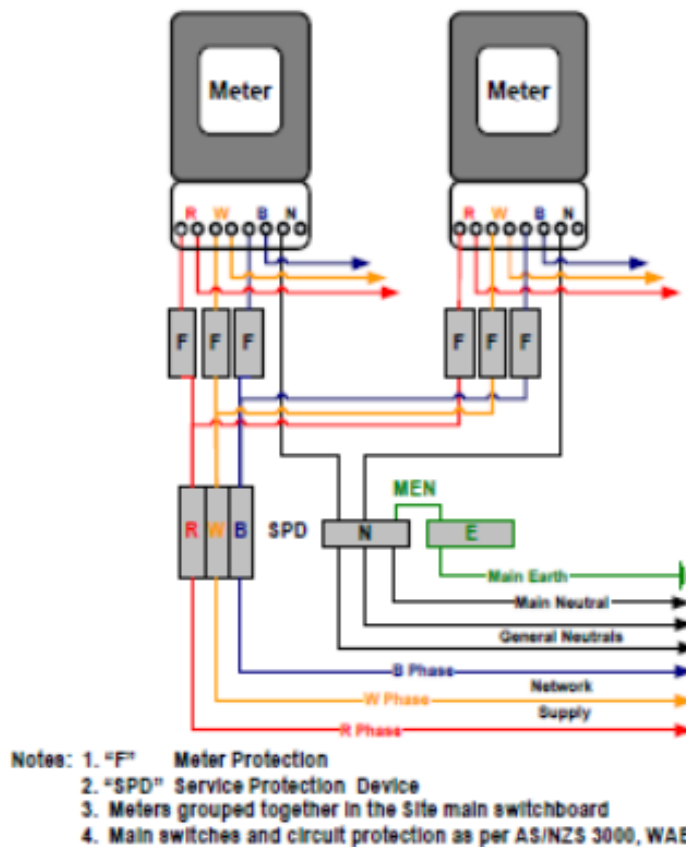


Figure 41: Generic multiple master metering wiring diagram under 100 A

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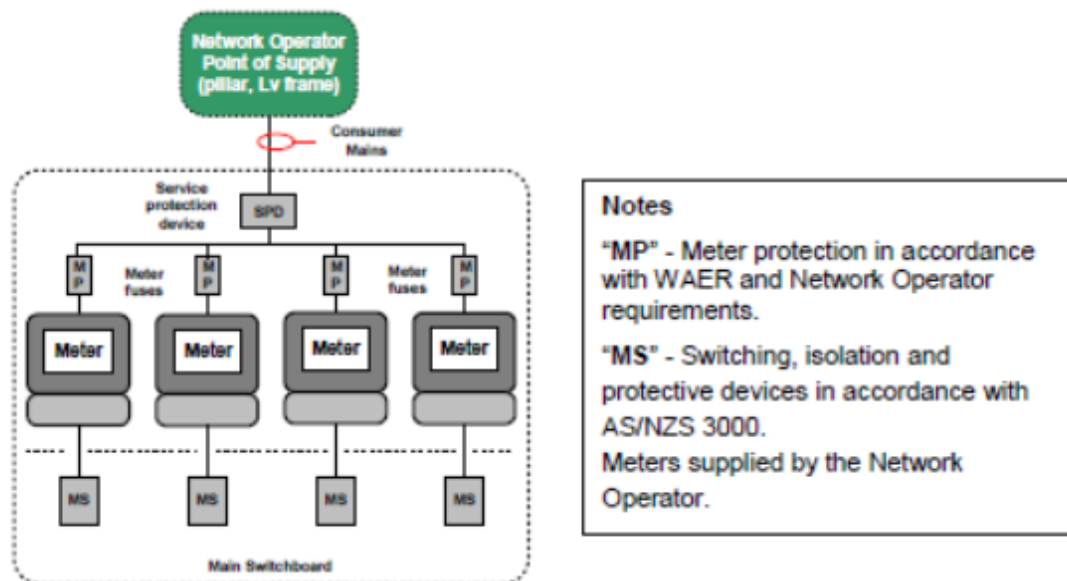


Figure 42: Typical multiple master metering layout over 100A

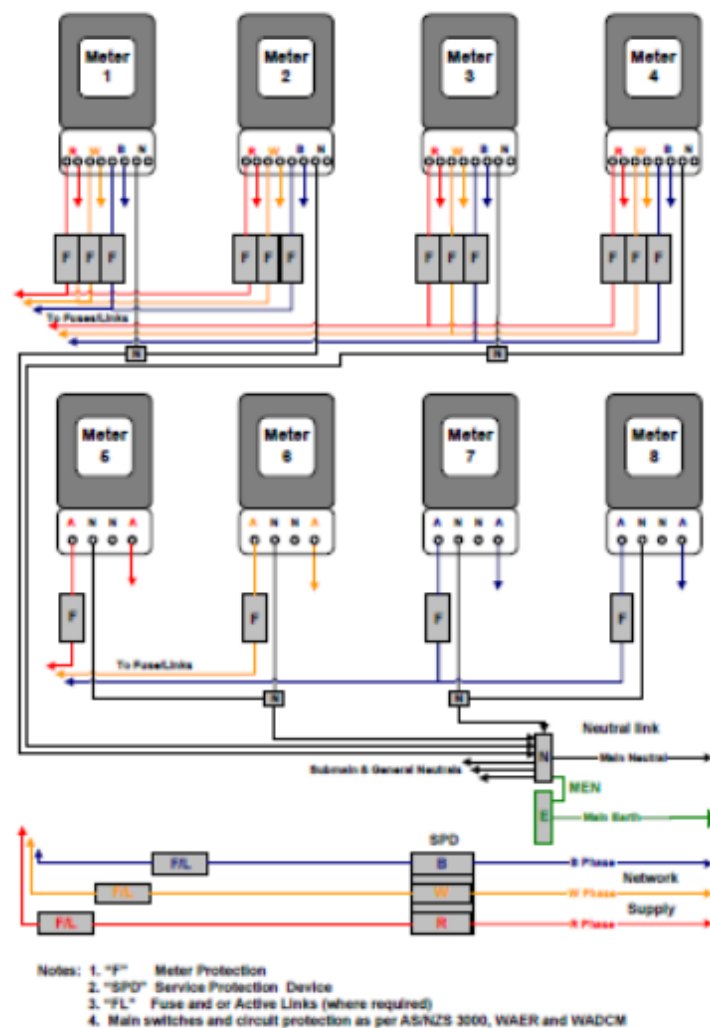
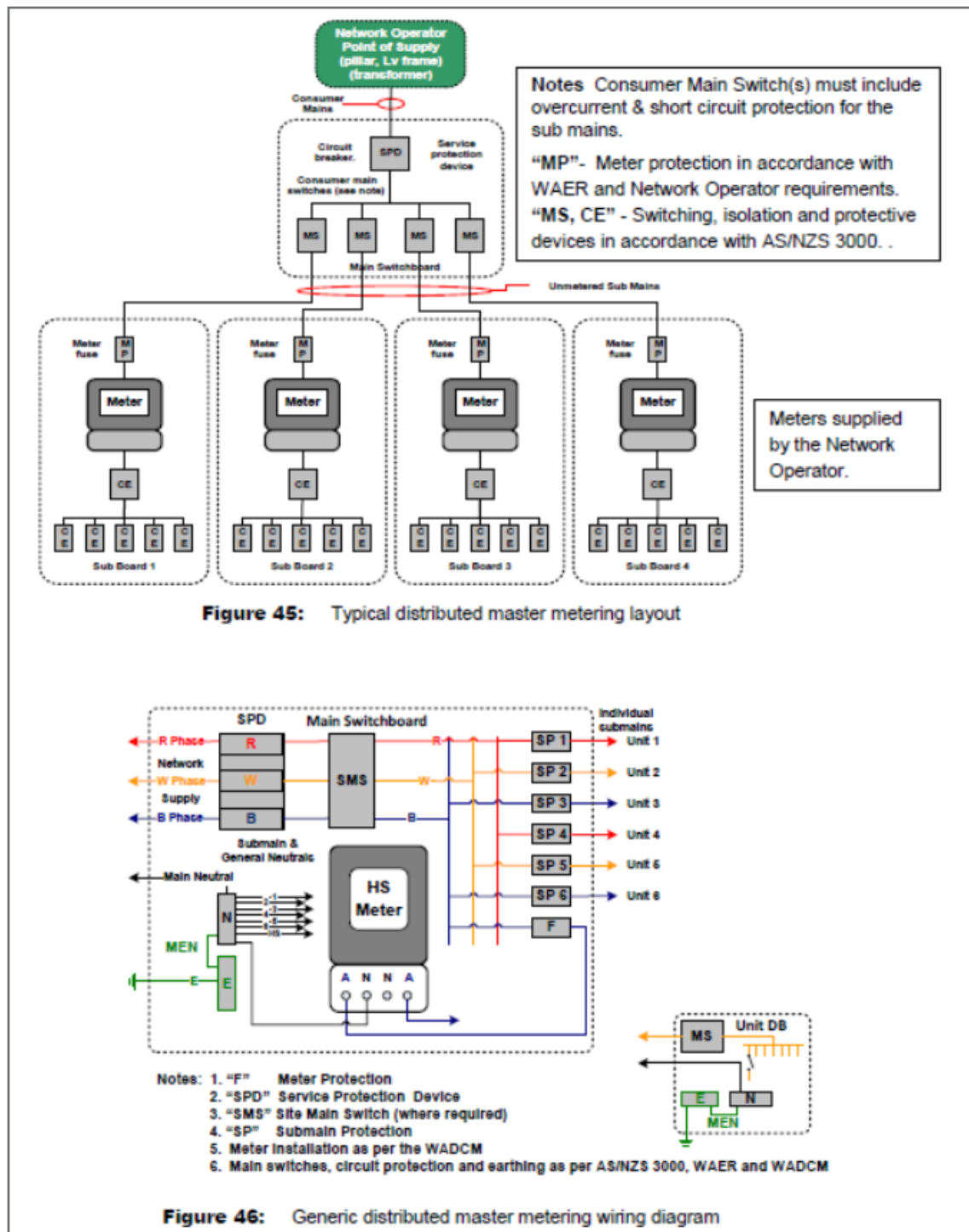


Figure 43: Generic multiple master metering wiring diagram over 100 A

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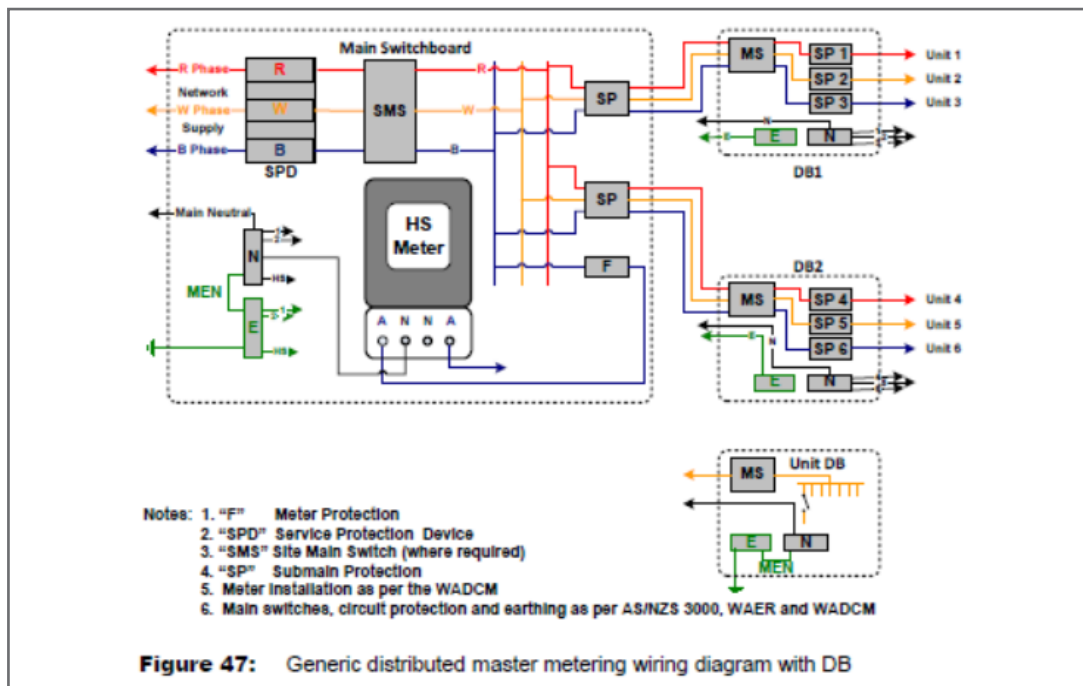


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Q: Where do we use distributed master metering?

Applies to direct connected master meters and CT connected meters, distributed throughout an installation. The meters shall not be grouped.

- A distributed master metered installation shall have only one point of supply. The supply to every installation shall be controlled by a main switch or switches at the site main switchboard, which shall be located not more than 30 metres from the point of supply
- The site main switchboard and each individual metering point must be accessible to Network Operator personnel without the necessity to traverse property occupied by others
- Grouping of individual distributed master meters and their enclosures in either a single or multiple locations is not permitted unless approved by the Network Operator
- If a common service is required (e.g. water reticulation pumps, lighting circuits) it must originate from and be metered at the site main switchboard



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Q: Where do we use current transformer (CT) connected metering?

Commonly used in most commercial and industrial installations. Used whenever the installation is connected at low voltage for loads exceeding 100 A and up to 3750 A per phase

- In the design of the customer's installation, it is necessary to ensure that switchboards, switch-rooms, metering arrangements and electrical layouts meet the customer's present and foreseeable future requirements
- Current Transformers (CT's) and Meter Panels (MP's) are to be an integral part of the customer's electrical switchboard and shall be purchased and installed by the customer's electrical contractor

The metering installation will be on two panels consisting of a:

- Foot panel, 600 mm wide by 200 mm high, containing the terminations for the current transformers and the potential wires;
- Meter panel, 600 mm wide by 400 mm high to mount one meter.
- The design shall be such that the SPD grades and discriminates against the Network Operator's protection equipment. The main switch protection may be set to values similar to SPD if discrimination with Sub Boards cannot be obtained.
- Three types of current transformer, 'S', 'T' and 'W' are used as per below table:

CT Type	Ratios	Primary Current Range	Primary kVA Range	Accuracy Class	Secondary Current Rating
S	200 extended to 400	5 – 400 A	3.5 - 287	0.5 ME 2	5
T	800 extended to 1600	16 – 1600 A	14.5 - 1150	0.5 ME 2	5
W	1500 extended to 3750	37.5 – 3750 A	27 - 2695	0.5 ME 2.5	5

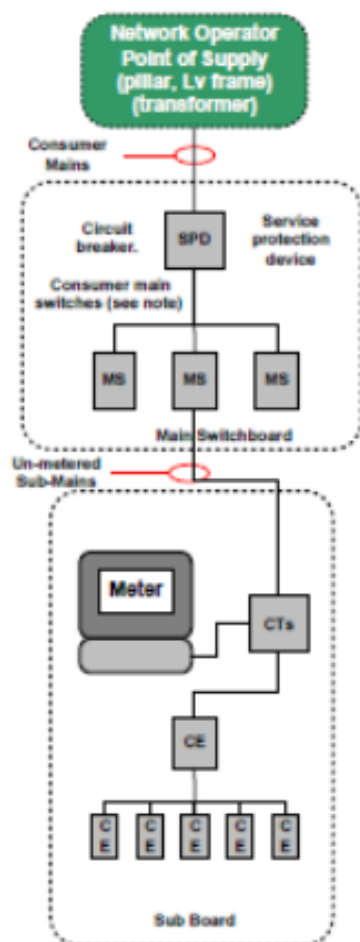
Table 11: Operating range and accuracy of current transformers

- The size and maximum number of busbars that will fit through the 'S', 'T' and 'W' type transformers as follows

Current Transformer Type	Busbars Maximum Size of Removable Busbar Links
S	2 x 25 mm x 6 mm
T	2 x 64 mm x 6 mm
W	4 x 100 mm x 6 mm

Table 12: Size and maximum number of busbars

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Notes

Consumer Main Switch(s) must include overcurrent & short circuit protection for the sub mains.

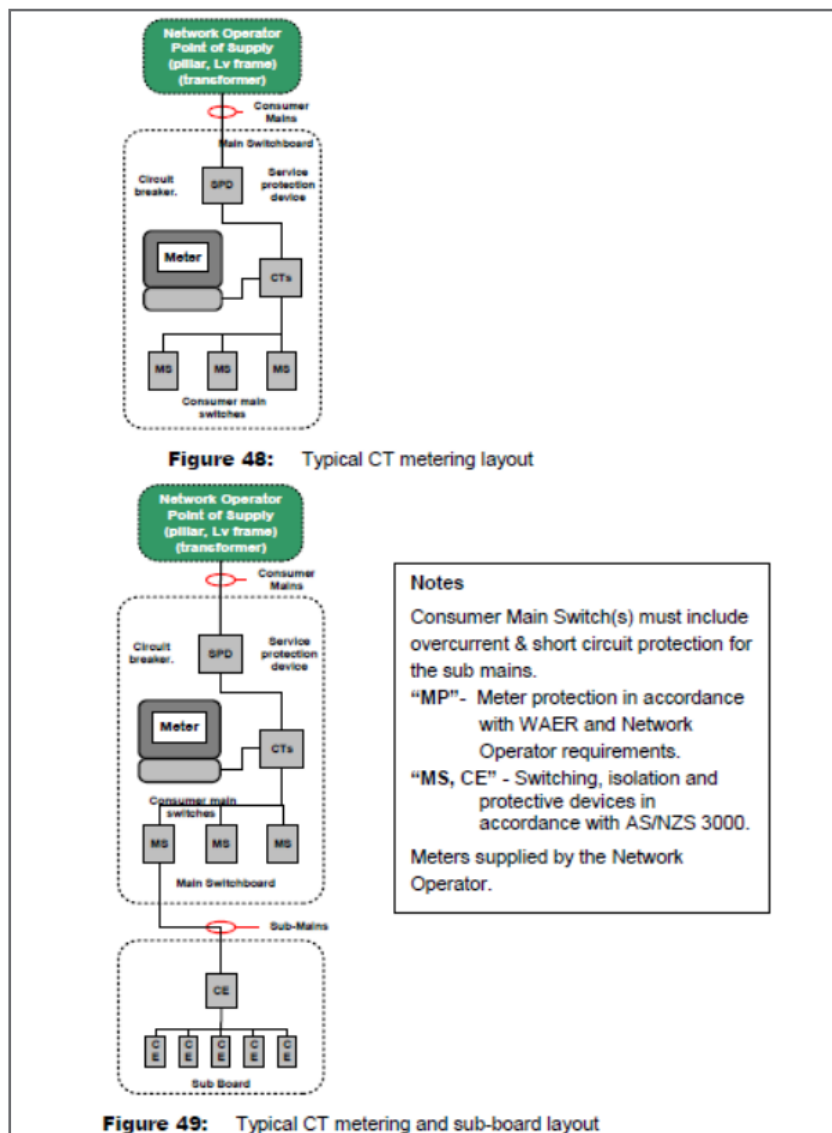
"MP"- Meter protection in accordance with WAER and Network Operator requirements.

"MS, CE" - Switching, isolation and protective devices in accordance with AS/NZS 3000.

Meters supplied by the Network Operator.

Figure 50: Typical MSB with CT metering on the sub-board layout

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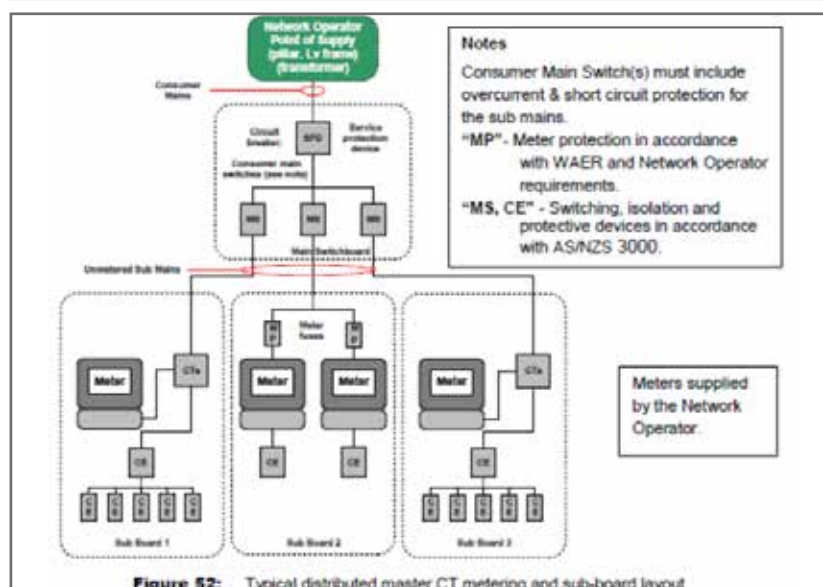
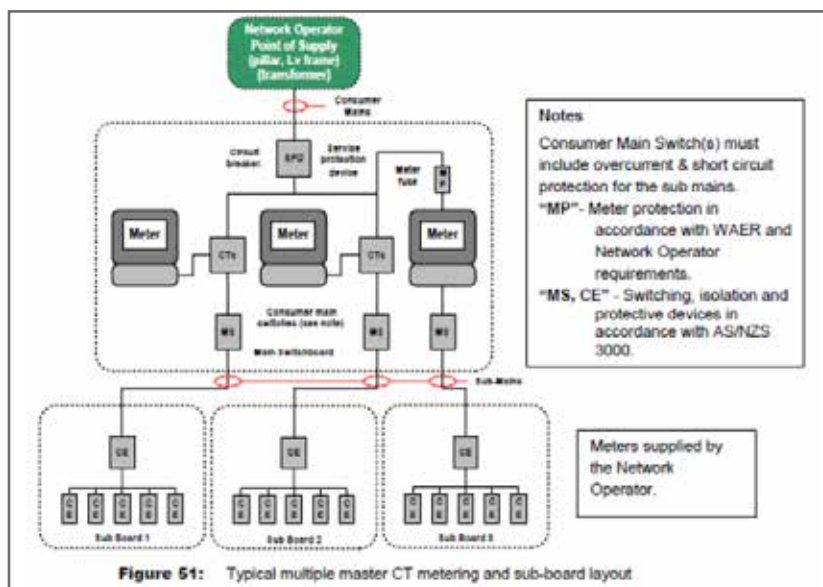
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Refer Appendix K of WA distribution connection manual 2015 for CT wiring schematics, wire numbers, minimum space requirements for CT and busbar links

Q: Where do we use multiple master CT metering?

This type of arrangement is used where there are more than one CT metered tenancies. May also include direct metering for house services etc.

- The main switch or switches must be capable of being locked and sealed in the open (off) position by the Network Operator.
- A separate meter panel is required for each current transformer operated meter. This may also necessitate separate applications for magnetic screening between the kWh meter and active conductors with current carrying capacity of 150A or greater.



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Reference: : WA electrical requirements http://www.commerce.wa.gov.au/sites/default/files/atoms/files/waer_2014_0.pdf

Western Australian Distribution and Connection Manual 2015
http://www.westernpower.com.au/documents/WA_Distribution_Connections_Manual.pdf

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