

# **SERVICE AND INSTALLATION RULES of NSW** **JANUARY 2009 AMENDMENT SUMMARY**

Note: Amendments are underlined

## **Section 1**

### **1.5.3.2 Number of Services**

Only one connection point will be provided to each electrical installation. A strata title development will normally be considered as one installation. The electricity distributor may vary these arrangements.

An electricity distributor may allow more than one electricity network connection per installation if the distributor considers that to do so would be sound engineering practice after taking into account any or all of the following:

- (a) The magnitude of the customer's load;
- (b) The distance between 'sub installations' within an installation;
- (c) The nature of the customer's activities
- (d) The site conditions; and
- (e) The ongoing segregation of the separate parts of the installation.

The customer may be required to pay the cost involved in providing an additional supply. Before starting work, the electricity distributor must be consulted.

## **Section 2**

### **2.7.1 Enclosure**

An appropriately manufactured (with appropriate waterproofing and method of connections) electrical termination enclosure (pit or pillar) is required where the point of supply is not established at the main switchboard.

***Figure 2.6: Typical sketch of the underground service route off the premises - to be submitted to the electricity distributor by way of a Notification of Service Work form. This figure does not necessarily show the specific design requirements for a service installation.***

### **2.10.2 Installation on the Electricity Distributor's Pole for an Underground Service with conductors up to a maximum 70mm<sup>2</sup>**

The method of installation on the electricity distributor's pole for an underground service with conductors up to a maximum of 70mm<sup>2</sup>, must meet the following requirements (refer to Figure 2.9 for details).

### **Underground Service with conductors larger than 70mm<sup>2</sup>**

Where an underground service cable comprises conductors larger than 70mm<sup>2</sup> the cables must be installed in accordance with the distributor's construction/approved materials inventory and installation method. Refer to Figure 2.10.

### **2.10.3 Installation on the Electricity Distributor's Pole for an**

**Table 2.3: Maximum Number of Underground to Overhead (UGOH) Service Cables allowed on an Electricity Distributor's Pole**

Total Number of All Types of Existing UGOH's on the Distributor's Pole (Refer to Clause 2.10.4)	Additional Number of Customer UGOHs that can be placed on a Electricity Distributor's Pole			
	Conductors up to a maximum of 70mm <sup>2</sup>			Conductors greater than 70mm <sup>2</sup>
	Line pole	Transformer pole	Air Break switch pole	All situations
0	3	1	1	1
1	2	#	#	#
2	1	*	*	
3	*			

\* The customer must apply to have a UGOH installed to a pillar in the footway.

# One additional UGOH may be installed provided one is not connected to the LV mains, eg HV or telecommunications.

**Figure 2.9: Typical Underground Service with conductors up to a maximum of 70mm<sup>2</sup> installed on an Electricity Distributor's Pole. (Refer to Table 2.2)**

**Figure 2.10: Typical Underground Service with conductors larger than 70mm<sup>2</sup> installed on an Electricity Distributor's Pole. (Refer to Table 2.3)**

## Section 3

### 3.6 ACCESS TO SERVICE AND POINT OF ATTACHMENT

The overhead service and point of attachment must be erected with readily available access. The area below the point of attachment should provide a firm, level base with sufficient space to safely erect a standard 4m/7m extension ladder. A space for the ladder 1m square with the centre of the space 1.5m from the base of the point of attachment is satisfactory.

Unacceptable access to a point of attachment examples are:

- Access using a second ladder, except where the point of attachment is above a shop or commercial building's awning.
- Resting a ladder against the balustrade of a balcony to get access to a point of attachment.
- Access to the point of attachment by walking upon a building or verandah roofs.
- Access through a building. Exterior stairs may be used to gain access to a balcony.

- Access from adjacent private property.

The point of attachment must not be accessible without the use of a ladder or other device to assist climbing. If necessary, install a protective guard to prevent unauthorised access. When access is from an awning or balcony, its construction should allow safe working practices to be followed in attaching an overhead service to the building.

#### 3.7.2 Private Post/Pole

##### 3.7.2.2 Labelling of Private Post/Pole

A customer's pole must be clearly labelled to indicate it is a 'PRIVATE POLE' to differentiate it from the electricity distributor and other utility poles. The height of the lettering must be a minimum of 20mm.

## **Section 4**

### **4.7.3 Enclosures for Service Protective Device Greater than 100 Amps**

Service protective devices exceeding 100 Amp rating must be designed and installed in accordance with the requirements Appendix ZC of AS 3439.1 – Type Tested and Partially Type Tested Switchboard Assemblies for arc fault minimisation.

## **4.10 SERVICE AND METERING NEUTRAL LINKS**

The links must:

- (a) Be the all insulated type.
- (b) Be fitted with a cover suitable for sealing.
- (c) Have a separate tunnel terminal for each conductor which is clamped by not less than two screws.
- (d) Have a current rating not less than the current carrying capacity of the associated incoming conductor.
- (e) Be located so that they are not higher than 2.0m and not lower than 0.5m above the ground floor or platform. For special situations check with the electricity distributor.
- (f) Be identified to indicate that they are either a 'Service Neutral Link' or 'Meter Neutral Link'. Labelling must be legible and durable in accordance with AS/NZS 3000.
- (g) Hinged panel construction enables the service or meter neutral link to be located on the rear of the panel.

### **4.10.1 Service Neutral Link**

The service neutral link must accommodate the following:

#### **4.13.1 Whole Current Metering**

In installations where whole current metering is used, a control device must be provided on the load side of the meter and load control equipment at the meter/switchgear enclosure to enable each individual tariff to be isolated and sealed.

The means of isolation:

- (a) Must be on the load side of the meters to prevent unwanted removal of supply to the meters, in particular electronic meters.
- (b) The switch toggle must be sealable in the open position, with nylon/plastic sealing wire, not less than 1.4 mm in diameter, refer to Figure 4.7.

- i) The incoming main neutral conductor.
- ii) The neutral connection to the customer's neutral link.
- iii) A separate neutral conductor for each meter or load control device being installed.
- iv) The operating coil of the controlled load contactor if provided.

An auxiliary sealable metering link must be provided if the service neutral link cannot terminate all of the meter neutral conductors. The auxiliary link to the service neutral link must be connected using a minimum 4mm<sup>2</sup> sized copper conductor.

### **4.10.2 Meter Neutral Link**

The service neutral link must accommodate the following:

- iv) The incoming main neutral conductor.
- v) A separate neutral conductor for each meter or load control device being installed.

### **4.17.10 CT Security Locking or Sealing**

## **Section 7**

### **7.5.11 Power Factor Correction**

The customer must maintain the power factor at all metering points at a value not less than 0.9 lagging (Customers supplied at a voltage in excess of 50 kV refer to the National Electricity Rules). You should allow for power factor correction equipment in the initial design, refer to clause 1.10.11.

## **Section 8**

### **8.3.1 Conditions of Use**

Stand-by generating equipment must only be used under the conditions agreed to by the electricity distributor.

In general, stand-by generating equipment must not be used to operate in parallel with the electricity distributor's distribution system unless it complies with the requirements of Clauses 8.4 or 8.5.

Applications to connect generating systems intended to operate in parallel with the distribution system will be individually assessed. Connection of these systems must be approved by the electricity distributor and meet the requirements of Clauses 8.4, 8.5 and 8.6.

Inquiries or proposals for generation and sale of electricity into the network shall be directed to the electricity distributor.

## 8.4 REQUIREMENTS FOR STAND-BY GENERATOR SYNCHRONISE CLOSE TRANSFER TRIP

Generator Synchronise Close Transfer Trip (SCTT) allows transfer to generator supply without complete disconnection of the load.

Customers who wish to use SCTT operation with their stand-by generation must also provide a letter stating the operating conditions of the generator. The operating conditions must specify that the generator will be used as a stand-by supply and will only run in parallel with the electricity distributor's supply system for extended periods if the conditions of Clause 8.5 are met.

The customer must provide the electricity distributor with the following details of the equipment:

- i) Site electrical drawings.
- ii) The protection settings of circuit breaker transfer switches and interlocking arrangements.
- iii) Earthing provisions.
- iv) The proposed installation date.
- v) The size of the generator.

### 8.4.1 SCTT Operating Procedure

The time period for operating in parallel with the distribution system during the disconnection or reconnection function of the SCTT for any occurrence should not be longer than 1 second for each operation. The short transfer period eliminates the need for protection against reverse power flow and vector shift. This time period includes:

- (a) Closing the generator isolating device to the distribution system once generator and mains supply are synchronised.

- (b) Isolation from the distribution system and transfer of the load to the generator.

- (c) Transferring the load from the generator to the distribution system once generator and mains supply are synchronised.

- (d) Disconnecting the generator.

### 8.4.2 Additional Protection

Apart from the protection requirements in AS/NZS 3010, the only additional protection required is a check synchronisation relay.

An indicator on the main switchboard must clearly show the generator and electricity distributor's supply system status.

The electricity distributor will approve and inspect the installation before the generator is commissioned. A test operation may be necessary.

When it is necessary for the electricity distributor's System Operator to be informed of a stand-by generator run period, a minimum of one hours notice is desirable advising of the starting time and duration before commencing each run period. The customer representative must provide a contact number and be available for the duration of the run period.

The customer must provide details of the maintenance schedule of the generator protection devices if requested. The customer must keep records; they must be available upon request.

Manual synchronisation is prohibited, unless monitored by a check synchronisation relay.

### 8.5.2 Additional Protection

The minimum interconnection protection requirements to allow parallel operation are:

- (a) Over and under voltage protection relays with appropriate time delays (under voltage protection to prevent generator load being transferred to the electricity distributor's distribution system in the event of low or no supply system voltage).
- (b) Manually initiated, fully automatic synchronising equipment.
- (c) Overcurrent and earth fault protection. The protection setting must be suitable for the rating of the machine, the method of earthing and the current capability of the affected circuits.
- (d) A supervised battery supply for relays and tripping.

**Note: Settings on these devices should be approved by the electricity distributor prior to the generator being used in parallel mode.**

You must also provide devices to protect the generator from abnormal operating conditions. Devices shall include (as a minimum) protection against:

- i) Reverse Power (Failure of Prime Mover).
- ii) Loss of Excitation (Pole Slipping).
- iii) Loss of Mains (Anti-Islanding)

Further protection may be installed as required by the generator manufacturer or consultant. Typical examples are listed as follows:

- i) Negative phase sequence.
- ii) Rotor earth fault.
- iii) Differential protection.
- iv) Thermal overload.

Switchboards must be labelled as in clause 8.7. An indicator on the main switchboard must clearly show the generator and electricity distributor's supply system status.

The electricity distributor will approve and inspect the installation before the generator is commissioned. A test operation may be necessary.

When it is necessary for the electricity distributor's System Operator to be informed of a stand-by generator run period, a minimum of one hours notice is desirable advising of the starting time and duration before commencing each run period. The customer representative must provide a contact number and be available for the duration of the run period.

If the paralleling adversely affects the quality of supply to other customers, correct the operation of the generator before any further parallel operation.

The customer must provide details of the maintenance schedule of the generator protection devices if requested. The customer must keep records; they must be available upon request.

Manual synchronisation is prohibited, unless monitored by a check synchronisation relay.

### 8.6.1 Introduction

This clause outlines requirements for the installation of small scale generation facilities on a customer's premises that are connected to the electricity distributor's distribution system (grid) via an inverter. The generation source is most commonly solar photovoltaic (PV) arrays, but other sources are applicable.

These Rules apply to single and three phase generators rated at 10 kVA per phase maximum, larger generators will require special negotiation and approval by the electricity distributor, refer to clauses 8.6.11 and 1.10.13.

These installations allow customers to offset part or all of their electricity needs and to export (sell) any excess energy to an electricity retailer, by agreement.

### 8.6.2 Responsibilities

The customer is responsible for the design, installation and maintenance of private generation facilities. The installation must comply with all relevant Australian Standards, including:

- (a) AS 4777.1 'Grid connection of energy systems via inverters - Installation requirements'.
- (b) AS 4777.2 'Grid connection of energy systems via inverters - Inverter requirements'.
- (c) AS 4777.3 'Grid connection of energy systems via inverters - Grid protection requirements'.
- (d) AS/NZS 3000.
- (e) AS/NZS5033, Installation of Photovoltaic Arrays.
- (f) These Rules.
- (g) Any requirements of the electricity distributor.

Customers must not connect generation facilities until the electricity distributor gives approval in writing. The electricity distributor will advise its requirements upon receipt of application for connection and all supporting documentation.

The associated Application for Connection and relevant notice of electrical work form must include full details of the inverter rating and its Certificate of Suitability certification number.

### **8.6.3 Buy Back Tariffs**

Availability of buy back tariffs should be discussed with the electricity retailer.

### **8.6.4 Metering Requirements**

The electricity distributor will outline its metering requirements for the installation.

Possible metering options include:

#### **8.6.4.1 Time of Use (TOU)**

The customer must arrange to install bi-directional electronic metering capable of separately registering imported energy and TOU exported energy.

#### **8.6.4.2 Standard**

The customer must arrange to install either:

- (a) Separate back to back, non electronic, detented metering, or
- (b) Bi-directional electronic metering capable of separately registering imported energy and flat rate exported energy.

#### **8.6.4.3 Customers not recording energy exported to the network**

The customer must arrange to install detented metering (appropriate for the tariff) for imported energy only.