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*The purpose of this document is to provide a consistent approach across Australia and New Zealand when applying the requirements within the particular Standard.*

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## **Solar Energy Systems**

### **Inverters and isolation - a summary of requirements**

There are a number of requirements for the isolation of power conversion equipment (inverters) which are spread across various Australian Standards including AS/NZS 3000, AS/NZS 4777 and AS/NZS 5033.

This advice is intended to summarise these requirements which would assist the electrical industry in providing a safe and compliant installation.

#### **A. Isolation of the inverter inputs when PV is the energy source**

##### **1. The requirement (AS/NZS 5033)**

- a. Clause 4.4.1.1 requires a means to isolate PV arrays from the inverter.
- b. Clause 4.4.1.2 then provides three options that an installer may choose which would meet the requirement of the previous clause. These options are either
  - i. An adjacent and physically separate dc isolator, or
  - ii. a dc isolator that is mechanically interlocked with a replaceable module of the inverter which allows for the removal of the module without risk of electric shock, or
  - iii. a dc isolator located in the same external enclosure as the other components of the inverter and when in the open position, there shall be no risk of electrical hazards when any inverter external cover is removed

##### **2. The switch disconnectors (isolators)**

Clause 4.3.5 of AS/NZS 5033 (including amendment 1 and 2), requires each disconnector to comply with the requirements of AS 60947.3

The requirements of this standard are extensive. It is advised that installers check the manufacturer's data to ensure your device has been tested and approved to meet these requirements.

The following short list summary may be beneficial;

The isolator must,

- not be polarity sensitive; and
- have at least one pole per polarity; and
- be rated for d.c. use; and
- interrupt all live conductors simultaneously (all poles of the circuit); and
- have an IP rating of at least IP56NW (depending on the installation location); and
- have Australian Certification as a Level 3 equipment on the "[EESS National Certification Database](#)"; and
- Be capable of being secured in the open position.

*“Capable of being secured in the open position” requires the handle, lever or toggle to accommodate a padlock, sealing wire, cable tie or similar that would prevent the inadvertent operation of the switch without first removing the securing method.*

*This requirement prevents the accidental or careless operation that may cause the energising of the downstream equipment.*

*Where the device does not have the facility to accommodate the use of padlock, sealing wire or cable tie and requires a third party device, that device must be permanently fixed onto the isolator (or enclosure) that allows another person to secure the isolator simply and easily without having to first locate and install a special or custom made mechanism to facilitate the securing.*

*A modification to the isolator or enclosure requires approval from the manufacturer.*

The selected isolator must be rated sufficiently to interrupt the full load current and the prospective fault current from the solar PV array and any other power source (batteries, fuel powered generators etc.) Clause 4.3.5.2 (j) details these ratings.

### **3. Integrated DC isolators**

Isolators that are integrated in the inverter must have Australian Certification as Level 3 equipment on the [EESS National Certification Database](#).

Please request a 'Letter of Certification' from your supplier certifying compliance of the specific model of inverter with the additional requirements of AS/NZS 5033.

### **4. Labelling requirements**

Clause 5.5 sets various requirements to ensure the purpose and function of the isolator is apparent to the home owner or occupier and persons engaged to work on the installation.

These requirements include,

- i. Each disconnection device must indicate whether the device is in the open or closed position.
- ii. For multiple inputs and therefore more than one device is installed which do not operate simultaneously i.e. “are not ganged”, the label must warn of the need to operate multiple devices in order to isolate the inverter. This label must have black lettering on a yellow background.

## **B. Isolation of the AC output (AS/NZS 4777.1)**

### **I. The requirement**

If the inverter is not adjacent to the switchboard to which it is connected, Clause 3.4.3 requires an isolation switch to be installed adjacent to the inverter.

*Note: adjacent is defined in AS/NZS 4777.1 as no more than 3M, with each item fully visible from both locations*

The isolation switch

Clause 3.4.3 requires this switch to be

- i. Readily available, and
- ii. Capable of being secured in the open position (see explanation above)
- iii. May not be located within the operational portion of the inverter unless;
  - o The serviceable section is interlocked with the isolating device, or
  - o All live parts are either behind barriers or isolated automatically.

### **2. The labelling requirements**

Clause 6.8 requires this isolator to be labelled as “INVERTER AC ISOLATOR”

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