

Overview of incoming PCE requirements in AS/NZS 5033:2014

AS/NZS 5033:2014 states that the transition period for Power Conversion Equipment (PCE) will end on July 11th, 2015. After this date, all requirements for PCEs as described in AS/NZS 5033:2014 will be applicable.

Although the changes are significant, they should come as no surprise to manufacturers of PCEs or the solar PV industry, as these new requirements were first introduced in AS/NZS 5033:2012 and have seen little modification since the release of that standard.

Power Conversion Equipment (PCE)

The Australian Standards defines PCE as “An electrical device converting one kind of electrical power from a voltage or current source into another kind of electrical power with respect to voltage, current and frequency”. Inverters, micro-inverters, DC to DC converters and charge controllers all fall under this category. D.C. conditioning units are not considered to be PCEs (see Clause 2.1.5) for the purposes of AS/NZS 5033:2014.

It should be noted that charge controllers used on LV PV arrays shall also provide fault detection and alarm functions.

Adherence to IEC 62109

All LV PV arrays connected to PCE will need to comply with IEC 62109-1. For grid-connected PV systems, the grid-interactive inverters will also need to comply with IEC 62109-2, as stipulated by AS/NZS 5033:2014 4.3.11.

IEC 62109-2 Clause 5.3.2 Information related to installation stipulates additional requirements for inverter documentation. Manufacturers will be required to include instructions for installation of different types of inverters dependent on the inverter’s internal protection and system configuration.

Compliance to AS/NZS 5033:2014 will only be achieved where inverters have been installed following manufacturer’s instructions.

Additional PCE requirement for functionally earthed arrays

PCEs are required to measure the PV array’s resistance to earth prior to the start-up of PV systems with functional earthing and compare it to a resistance threshold (Riso) set by AS/NZS 5033:2014. The system will be allowed to start if the resistance is higher than the threshold. The PCE shall shut the system down and initiate an earth fault alarm if the resistance is equal to or lower than Riso.

The PCE requirement for functionally earthed arrays have not changed since AS/NZS 5033:2012 except for the calculation of the resistance threshold. Riso now references the inverter kVA rating, rather than a factor of PV array max voltage.

Earth Fault Alarm

Earth fault alarm systems will be mandatory for all LV PV systems. The earth fault alarm shall have 2 parts: Firstly, a visible or audible indication that is integral to the inverter but externally detectable; and secondly an electrical or electronic indication that can be remotely accessed and used. This alarm system shall cause an action to be initiated to correct the earth fault and shall repeat its operation at least at hourly intervals until the earth fault is corrected. See AS/NSZ 5033:2014 3.4.3

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To ensure an action will be taken in response to the alarm, care will need to be taken in selecting the location of the inverter and the alarms, so that the alarm will be noticed by operational staff or system owners. When inverters are installed in an area where their integrated indicator, such as a flashing light, will not be easily noticed, appropriate utilisation of the remotely accessible indication will be vital in alerting people of the fault. This could be achieved by connecting the inverter to a buzzer or strobe light located in an area it will be noticed in accordance with the inverter manufacturer’s installation manual. An alternative would be connecting the inverter to an online gateway which sends recurring notifications via text or email. Inverter manufacturers may integrate this function into inverter communications or monitoring devices. Extra equipment may need to be purchased to meet the requirements for the remote indication.

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PV systems installed using a non-compliant inverter will not be able to claim STCs. At the time of writing, the Clean Energy Council (CEC) list of approved inverters and PCEs currently shows whether an approved inverter is compliant with IEC62109.

PV system Installers and designers should check with the inverter manufacturer and the CEC to ensure that the product they currently use will be compliant with AS/NSZ 5033:2014 once the transition period ends on July 11th, 2015.

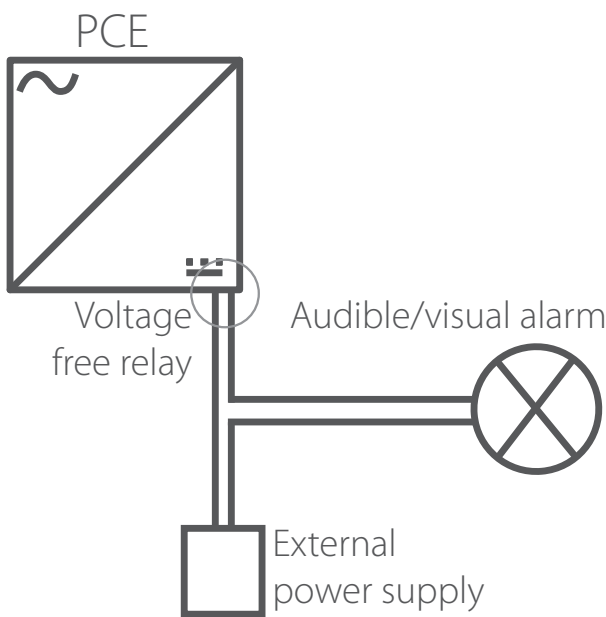


Figure 1: The following image represents one possible solution for installing the earth fault alarm. The earth fault alarm must be remote to the PCE but also in close proximity to operational staff or system owners so that they can respond to the alarm accordingly.

As part of the system documentation, clear instructions for actions to be taken in the case of an earth fault shall be provided to the system owner.

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