



### How does the latest revision of AS5033 affect AC Solar installations?

A new version of AS/NZS 5033, Installation and safety requirements for PV arrays was published in November 2014 and there are a few changes that specifically affect microinverter and AC solar module installations. We recommend that all solar installers obtain a copy of the revised standard and read it thoroughly. As AC Solar Warehouse and our customers of course have a particular interest in AC solar installations, we've put together a quick summary of the changes that we suggest AC solar system installers should be aware of.

While it was open to some interpretation as to whether microinverter installations were covered by the previous version of AS5033, the new standard specifically includes these systems (up to 240kW) in its scope.

The definition of a microinverter has been simplified and there are also new definitions for AC modules and AC module inverters. Essentially a microinverter is now defined as any inverter designed to be mounted on or next to a solar module. An AC module is a PV module with an inverter attached to it, and an AC module is an inverter that is integrated into a PV module such that there are no external DC connections. (Refer sections 1.4.3, 1.4.4, 1.4.39)

One of the most significant changes is that there is now a new section in the standard (4.3.12) which effectively defines a "small microinverter installation".

A small microinverter installation is a system where:

- The total length of the DC cables between the module junction box and the microinverter input is less than 1.5m (including any DC adaptor leads that may be used)
- Each input of the microinverter has a separate MPPT, is rated at 350W or less, and has an input voltage no greater than ELV

This new section is important because small microinverter installations are exempt from the requirement to install a DC switch-disconnector in-between the solar module and the input of the inverter (4.4.1.2). Note however that this exemption only applies if there is a warning attached to the DC connectors prohibiting the disconnection of the PV module and inverter under load. Some DC connectors (e.g. genuine MC4) have this warning printed on them but will be important for installers to check this because it may be necessary to attach a separate warning label to some brands of connectors if the warning isn't already printed on them.

It is important to note that if a microinverter is used in a way that does not conform to the definition of a small microinverter installation (e.g. with a long extension in the DC leads) then a DC switch-disconnector is required to be installed between the module and the inverter. In practice this would be difficult and expensive to achieve, so the standard is effectively limiting the use of microinverters to small microinverter installations. This doesn't really restrict the use of microinverters any more than previous versions of the standard did so this section is unlikely to cause any new problems for installers.

The previous version of the standard limited microinverters to a maximum of 2 inputs. This restriction is no longer in place so in effect a microinverter may now have an unlimited number of inputs so long as each input is rated at less than 350W, has it's own MPPT, and the DC cables are no longer than 1.5m in length.

The earthing requirements for AC solar installations have been clarified in the new standard. All AC solar installations must now include equipotential bonding of the rails and modules frames (4.4.2.1). However, under section 4.4.2.2 the earth wire included in the AC cable that runs from the switchboard to the AC isolators and through to the inverters will in most cases now be able to be used for this purpose. Where the metal case of most microinverters is internally bonded to the earth in the main AC cable (as is the case with most commonly available micros in Australia) the standard now allows installers to earth the rail by using an earthing washer (e.g. WEEB) between the microinverter attachment point and the rail. The module frames may also be bonded to the rails through the use of earthing washers, thus eliminating the need to run a separate earth wire to the rails as has previously been common in DC installations. Note that to meet the requirements of the standard we recommend installing an earthing washer on every microinverter.

We would caution installers from relying on the internal earth connection of the microinverter to bond the rail and modules to earth unless the microinverter manufacturer has specifically approved this connection arrangement. Contact us for further details of which manufacturers have approved this configuration.

The previous version for AS5033 did not specify the wording to be used on switchboard labels for AC solar system installations. AC Solar Warehouse developed a specific set of labels for this in 2011 and it has been a great compliment to see the wording of these labels copied by other suppliers across Australia (and China) and essentially become a de-facto standard. AS5033 does now provide specific guidance for the red emergency sign to be used with AC Solar installations, but at least until the next version of AS4777 is released later in 2015 the wording of the full label kit is still open to some interpretation. Label kits sold by AC Solar Warehouse comply with the requirements of this latest version of AS5033 as well as the requirements set out in the draft versions of AS4777.

The revised standard includes significant discussion around the implementation of inverter earth fault alarms and we often get asked about the implications of this for AC solar installations. Section 3.4.1 clarifies that audible/visual earth fault alarms are only required on systems where the array is operating at LV, so these requirements don't apply to microinverter and AC module installations.

The requirements of the revised standard come into effect 3 months from the publication date, which means that all installations will need to comply with the new requirements by **6 February 2015**.

If you are an AC Solar Warehouse customer (or would like to be!) and have any questions regarding the implications of the revised standard on your installations please don't hesitate to call us on **1300 55 44 67**.