AS/NZS 5033:2012
(Incorporating Amendment Nos 1 and 2)

Australian/New Zealand Standard™

Installation and safety requirements for photovoltaic (PV) arrays

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee EL-042, Renewable Energy Power Supply Systems and Equipment. It was approved on behalf of the Council of Standards Australia on 24 May 2012 and on behalf of the Council of Standards New Zealand on 26 June 2012.
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The following are represented on Committee EL-042:

Australian Industry Group
Australian Solar Energy Society
Clean Energy Council
Consumer Electronics Suppliers Association
CSIRO Energy Technology
Electrical Regulatory Authorities Council
Electrical Safety Organisation, New Zealand
Electricity Engineers Association, New Zealand
ElectroComms and Energy Utilities Industries Skills Council
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This Standard was issued in draft form for comment as DR 11001.

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Installation and safety requirements for photovoltaic (PV) arrays

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-042, Renewable Energy Power Supply Systems and Equipment, to supersede AS/NZS 5033:2005, *Installation of photovoltaic (PV) arrays*.

This Standard incorporates Amendment No. 1 (June 2013) and Amendment No. 2 (July 2013). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

At the time of publication there was very limited technology for arc detection and prevention in PV arrays and there were no standards for arc signatures. When this technology is available there will be a revision of this Standard, which will require the use of this technology for PV arrays.

Many new protection features for arrays when used in grid connected applications will be implemented in inverter systems and are required by the International Standard for inverters—IEC 62109-2, Ed. 1.0 (2011), *Safety of power converters for use in photovoltaic power systems*—Part 2: *Particular requirements for inverters*. Both this Standard and AS 4777, *Grid connection of energy systems via inverters* (series) require inverters that comply with IEC 62109-2 for grid connected PV systems.

There are many changes in requirements in this revision. They include but are not limited to—

(a) changes in voltage and power limits; requirements for earthing of frames of LV systems;

(b) earth fault protection requirements;

(c) requirements for multiple input power conditioners;

(d) changes to load breaking switch requirements;

(e) changes in calculations of maximum voltage ratings and overcurrent protection requirements;

(f) requirements for PV cables, cable protection and conduit; connector requirements; and

(g) new signs and commissioning requirements.

This Standard necessarily deals with existing types of systems, but is not intended to discourage innovation or to exclude materials equipment and methods that may be developed in the future. Revisions will be made from time to time in view of such developments, and amendments to this edition will be made when necessary.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

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1.1 SCOPE AND APPLICATION

1.1.1 Scope

This Standard sets out general installation and safety requirements for photovoltaic (PV) arrays, including d.c. array wiring, electrical protection devices, switching and earthing up to but not including energy storage devices, power conversion equipment or loads.

The safety requirements of this Standard are critically dependent on the inverters associated with PV arrays complying with the requirements of IEC 62109-1 and IEC 62109-2 and all power conditioning equipment complying with IEC 62109 series standards.

PV arrays of less than 240 W and less than 50 V open circuit voltage at Standard Test Condition (STC) are not covered by this Standard.

1.1.2 Application

This Standard shall apply three months from the date of publication with the exception of the issues identified in Appendix H.

1.2 OBJECTIVE

The object of this Standard is to address the safety requirements arising from the particular characteristics of photovoltaic systems. Direct current systems, and photovoltaic arrays in particular, pose hazards in addition to those derived from conventional a.c. power systems, including the ability to produce and sustain electrical arcs with currents that are not greater than normal operating currents.

NOTE: This Standard does not include installation requirements for batteries in systems but it does cover the extra protection requirements of PV arrays that result from the use of batteries in PV systems.

1.3 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard.

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

AS
4777 Grid connection of energy systems via inverters
4777.1 Part 1: Installation requirements

60529 Degrees of protection provided by enclosures (IP Code)

AS/NZS
1170 Structural design actions
1170.2 Part 2: Wind actions
1170.3 Part 3: Snow and ice actions

2053 Conduits and fittings for electrical installations
2053.1 Part 1: General requirements