AS/NZS 4777.1:2016

Australian/New Zealand Standard™

Grid connection of energy systems via inverters

Part 1: Installation requirements

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 22 August 2016 and by the New Zealand Standards Approval Board on 17 August 2016.
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The following are represented on Committee EL-042:

Australasian Fire and Emergency Service Authorities Council
Australian Energy Market Operator
Australian Industry Group
Australian PV Association
Australian Solar Council
Clean Energy Council
Clean Energy Regulator
Construction, Environment and Workplace Protection, ACT Government
Consumer Electronics Suppliers Association
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For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of Standards Australia or the New Zealand Standards Executive at the address shown on the back cover.

This Standard was issued in draft form for comment as DR AS/NZS 4777.1:2016.

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Part 1: Installation requirements

Originated in Australia as AS 4777.1—2002.

Previous edition 2005.
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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, and is based on requirements developed by a group of utility, photovoltaic, renewable energy, battery, inverter and industry experts. This Standard supersedes AS 4777.1—2005 six months after publication. During this period, either this edition or AS 4777.1—2005 may be utilized. After this period, it is anticipated that the 2005 edition will be withdrawn.

In addition, the provisions of Clause 3.4.8.3 for the soft limit of an export control function of an IES will apply 18 months after publication. These transitional periods are expected to be adopted by the relevant regulators.

Where a clause in this Standard refers to an inverter requirement of AS/NZS 4777.2, then either an inverter complying with AS/NZS 4777.2:2015 or an inverter complying with both AS 4777.2—2005 and AS 4777.3—2005 may be used during the transitional period for the application of AS/NZS 4777.2.

The objective of the Standard is to specify safety and installation requirements for inverter energy systems (IES) intended for the injection of electric power through an electrical installation to the grid. IES are distributed energy resources when connecting to the grid and need to ensure overall safe operation of the installation and interaction with the broader grid.

This Standard is part of a series, which consists of the following:

(a) AS/NZS 4777.1, *Grid connection of energy systems via inverters*, Part 1: *Installation requirements* (this Standard).

(b) AS/NZS 4777.2, *Grid connection of energy systems via inverters*, Part 2: *Inverter requirements.*

This Standard needs to be read in conjunction with the regulations, service and installation rules of the electricity distributor approving the connection.

This Standard is required to be read in accordance with the following:

(i) AS/NZS 3000 *Electrical installations (known as the Australian/New Zealand Wiring Rules).*

(ii) AS/NZS 5033 *Installation and safety requirements for photovoltaic (PV) arrays*, where applicable.

There has been extensive revision of this Standard to cater for changes in the industry. Both this Standard and AS/NZS 5033 now require inverters that comply with IEC 62109-2, *Safety of power converters for use in photovoltaic power systems*, Part 2: *Particular requirements for inverters*, for grid-connected PV systems.

There has also been significant innovation in the areas of multiple mode IES, voltage management and commencement of enabling a smart grid, which this revision accommodates.

This Standard has also been revised to accommodate some consideration of other energy sources where relevant standards may not be available. Until installation, wiring and safety concepts have been developed to cover these other energy source technologies, this Standard provides a limited range of provisions.

Statements expressed in mandatory terms in notes to figures are deemed to be requirements of this Standard.

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

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1.1 SCOPE AND APPLICATION

1.1.1 Scope

This Standard specifies the electrical and general safety installation requirements for inverter energy systems (IES) up to or equal to 200 kVA for the injection of electric power to an electrical installation connected to the grid at low voltage.

NOTES:

1 Larger systems connected to a low voltage grid with local load may follow the same general guidelines.

2 This Standard may be used for low voltage installation of systems which may be connected to the grid at high voltage.

3 This Standard does not contain detailed installation requirements for the energy source(s) and its associated wiring.

1.1.2 Application

This Standard shall be used in conjunction with AS/NZS 3000.

This Standard needs to be used in conjunction with the connection and technical requirements of the appropriate electricity distributor and local electricity legislation.

NOTES:

1 Refer to Appendix F for further information on electricity distributor requirements.

2 In some locations there may be further limitations due to the characteristics of the electricity distributor’s grid at the point of connection.

1.2 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard:

AS

3011 Electrical installations—Secondary batteries installed in buildings (series)
3011.1 Part 1: Vented cells
3011.2 Part 2: Sealed cells

4086 Secondary batteries for use with stand-alone systems
4086.2 Part 2: Installation and maintenance

60038 Standard voltages

62040 Uninterruptible power systems (UPS)
62040.1.1 Part: 1.1 General and safety requirements for UPS used in operator access areas