AS/NZS 4777.2:2020

Australian/New Zealand Standard™

Grid connection of energy systems via inverters

Part 2: Inverter requirements

AS/NZS 4777.2:2020

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 27 November 2020 and by the New Zealand Standards Approval Board on 10 December 2020.

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The following are represented on Committee EL-042:

Australasian Fire and Emergency Service Authorities Council
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Australian PV Institute
Better Regulation Division — NSW Fair Trading
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Jointly revised, amalgamated and redesignated as AS/NZS 4777.2:2015.
Fourth edition AS/NZS 4777.2:2020.

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 4777.2:2015, *Grid connection of energy systems via inverters, Part 2: Inverter requirements*. AS/NZS 4777.2:2015 will also remain current for 12 months after the date of publication of this Standard and after this time they will be superseded by AS/NZS 4777.2:202X. Regulatory authorities that reference this Standard in regulation may apply these requirements at a different time. Users of this Standard should consult with these authorities to confirm their requirements.

The objective of this Standard is to specify minimum performance and safety requirements for the design, construction and operation of inverters intended for grid connection of energy systems.

This Standard is part of a series on the grid connection of energy systems via inverters. The series is as follows:

AS/NZS 4777.1, *Grid connection of energy systems via inverters, Part 1: Installation requirements*

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

The differences between this and the previous edition include but are not limited to the following:

(a) Revision of sustained frequency response.

(b) Revised set-points and limits to match electricity distributor and grid operator requirements.

(c) Revision of provisions for demand response and power quality response modes.

(d) Inclusion of requirements for electrical safety of non-PV energy sources in accordance with IEC 62477-1.

(e) Inclusion of requirements for improved withstand capabilities including multiple voltage disturbances, rate of change of frequency and voltage phase shift.

(f) Inclusion of requirements for measurement system accuracy and functional prioritization.

(g) Inclusion of requirements for standalone inverters.

(h) Inclusion of requirements for generation limit and export limit control function.

(i) Revised and expanded testing procedures.

The following documents were used for information and guidance in the preparation of this Standard to ensure that features and requirements were aligned with international developments.

IEEE 1547-2018, *IEEE Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces*

VDE-AR-N 4105:2018-11, *Generators connected to the low-voltage distribution network — Technical requirements for the connection to and parallel operation with low-voltage distribution networks*

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The terms “normative” and “informative” are used in Standards to define the application of the appendices 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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Section 1 Scope and general

1.1 Scope

This Standard specifies device specifications, functionality, testing and compliance requirements for electrical safety and performance for inverters designed to facilitate connectivity between energy sources and/or energy storage systems and the grid, connected at low voltage. This includes electric vehicles that can operate as an energy source and energy storage system that can supply an electrical installation connected to the grid.

This Standard also applies to stand-alone inverters within an electrical installation that may be connected to the grid at low voltage via an a.c. input port.

General requirements relating to the test methods set out in Appendices B to L are specified in Appendix A. Appendix M specifies requirements for stand-alone inverters.

NOTE This Standard does not include the regulatory requirements mandated in Australia by the Australian Communications Media Authority (ACMA) and in New Zealand by Radio Spectrum Management. Refer to ACMA, *Electromagnetic Compatibility—Information for suppliers of electrical and electronic products in Australia and New Zealand,* for guidance.

1.2 Application

This Standard enables the inverters to be installed as part of an inverter energy system (IES) in accordance with the requirements of AS/NZS 4777.1. This Standard applies in conjunction with the requirements of the electricity distributor approving the connection. Relevant legislation and regulations also apply.

1.3 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

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

AS 60038, *Standard voltages*

AS 60947.3, *Low voltage switch gear and control gear, Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units (IEC 60947-3:2015 (ED. 3.2) MOD)*

AS IEC 62040.3, *Uninterruptible power systems (UPS), Part 3: Method of specifying the performance and test requirements*

AS IEC 62196.2, *Plugs, socket-outlets, vehicle connectors and vehicle inlets — Conductive charging of electric vehicles, Part 2: Dimensional compatibility and interchangeability requirements for a.c. pin and contact-tube accessories*

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

AS/NZS 3112, *Approval and test specification—Plugs and socket-outlets*

AS/NZS 4777.1, *Grid connection of energy systems via inverters, Part 1: Installation requirements*

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