FAQ: Changes to Inverter Standards

New AS/NZS 4777.1:2024 effective from 23 February 2025. Information about AS/NZS 4777.1:2024 is for guidance only, refer to the standard and DNSP requirements for detailed information.

1. General

1.1. Why do we need to change to a new version of AS/NZS 4777.1?

In August 2024, Standards Australia released a new version of AS/NZS 4777.1 Grid connection of energy systems via inverters Part 1: Installation requirements (AS/NZS 4777.1:2024). The update saw a range of changes to improve the safety of electrical installations and support the security of the electricity supply network taking into account standardised improvements to inverter technology since the last installation standard was released. These changes will support the continued increase of solar Photovoltaic (PV), batteries and electric vehicles.

1.2. When do I need to start installing systems compliant to the new AS/NZS 4777.1 standard?

From 23 February 2025 it will be **mandatory** for all inverters connected at low voltage to the distribution network to be compliant to AS/NZS 4777.2:2020 and installed in compliance with AS/NZS 4777.1:2024.

1.3. What DNSP standards do I need to meet?

In addition to AS/NZS 4777.1:2024 you will also need to meet any relevant DNSP network standards. Please liaise with your relevant DNSP to confirm their additional requirements before you undertake your installation.

2. Applying and Connecting to a local DNSP

2.1. If I have a valid contract in place before the 23 February 2025, can I install to AS/NZS 4777.1:2016 after the 23 February 2025?

2.1.1. If your connection to the DNSP network is low voltage

No, it is mandatory from 23 February to install all inverters to AS/NZS 4777.1:2024 for a customer connected to the low voltage network.

The date the contract for the inverter was established has no impact on the requirement to start installing inverters in compliance with AS/NZS 4777.1:2024 from 23 February 2025.

2.1.2. If your connection to the DNSP network is high voltage

This requirement will be different for each State or Territory. Please liaise with your relevant DNSP to confirm their specific requirements before you undertake your installation.

3. Technical Changes

3.1. Changes to protection requirements?

3.1.1. New terminology interface protection

There is a new term replacing 'central protection' from AS/NZS 4777.1:2016. In AS/NZS 4777.1:2024 the term interface protection is used to describe protection located downstream of the site main switch and upstream of the inverters.

3.1.2. Interface protection limits

Under AS/NZS 4777.1:2024, interface protection shall apply to Inverter Energy System (IES) or aggregate IES on electrical installation > 200 kVA for all DNSPs in Australia.

However, some variations may apply for interface protection limits for:

- inverter power sharing devices (IPSD) as per FAQ 4.4.
- for electrical installations that are part of multiple electrical installations with a single grid supply (e.g. embedded networks).
- Alterations or additions to legacy systems.

The variations may be different for each DNSP. Please liaise with your relevant DNSP to confirm their additional requirements before you undertake your installation.

3.2. What region settings do I need to meet?

The interface protection settings in the new version are defined by region of installation: Australia A, B and C. The table below provides a list of the regions and the corresponding Distribution Network Service Provider (DNSP):

Region	Distribution Network Service Provider (DNSP)
Australia A	Ausgrid, AusNet Services, Endeavour Energy, Essential Energy, Ergon Energy and Energex, Evoenergy, Jemena, CitiPower, Powercor, United Energy, SA Power Networks and Power & Water
Australia B	Western Power
Australia C	Horizon Power, TasNetworks and Power & Water

3.3. What is the maximum inverter capacity and export limit allowed for single-phase supply?

The maximum inverter capacity and fixed export limit allowed for single-phase supply can vary between DNSPs due to differences in local network designs and available hosting capacities. Limits may also vary for non-standard or constrained networks.

Some DNSPs offer a new type of connection known as dynamic or flexible, which may provide an option for increased maximum inverter capacities and for dynamic/flexible export limits with an increased maximum export.

Please liaise with your relevant DNSP to confirm their specific requirements and options before you undertake your installation.

3.4. Phase balance for multi-phase supply

For all multi-phase grid connections, the requirements in Appendix C in AS/NZS 4777.1:2024 apply including:

- Customers may have a combination of single-phase and/or three-phase inverters in compliance with AS/NZS 4777.2
- All multi-phase phase IES shall have a balanced a.c. output.
- Where single-phase inverters are installed for both ESS and PV they shall be installed on the same phase
- For IES with an aggregate rating ≤50 kVA the additional phase balance requirements in 3.5 below apply.
- For IES with an aggregate rating of >50 kVA the additional phase balance requirements in 3.6 below apply.
- For DNSP specific requirements refer to the FAQ 1.3.

3.5. Phase balance for connections with IES 50 kVA and under

3.5.1. General

- As per Table C.1 in AS/NZS 4777.1:2024 the limits for single-phase and balanced three-phase inverters on an IES with an aggregate ≤50 kVA are:

Multi-phase DNSP connections with IES ≤50 kVA	Single-phase inverter aggregate rating limit	Balance three-phase inverter aggregate rating limit
Inverters with PV port	5 kVA per phase	50 kVA
ESS only inverters	5 kVA per phase	50 kVA
V2G only inverters		
Aggregate of combined IES	10 kVA per phase	50 kVA

- As per 3.4 of this FAQ where single-phase inverters are installed for both ESS and PV they shall be installed on the same phase.
- Where there is a combination of single-phase inverters, the maximum rated apparent power imbalance of all IES shall not exceed 5 kVA between phases.
- Phase balance protection is not required for IES connections with an aggregate rating ≤50 kVA.

3.5.2. Generation Limit Control for Phase Balance

Generation limit control may be supported by some DNSPs for single-phase inverters in 50 kVA and under multi-phase installations as a method to meet the phase balance requirements of Table C.1 of AS/NZS 4777.1:2024. DNSPs may support generation limit control to facilitate grandfathering of existing systems to support the introduction of newer functionality or for a limited time for specific technology as greater product standardisation is developed in these industries such as V2G. Please liaise with your relevant DNSP to confirm their specific requirements before you undertake your installation.

3.6. Phase balance for connections of IES greater than 50 kVA

- For multi-phase IES with an aggregate rating greater than 50 kVA each phase must meet the following phase balance limit requirement:

$$\frac{The\ difference\ between\ aggregate\ single-phase\ rating\ of\ inverters\ on\ a\ phase\ (kVA)}{Aggregate\ rating\ of\ all\ inverters\ in\ multi-phase\ IES\ (kVA)} \leq 10\%$$

- Phase balance protection may be required for multi-phase connections with a total inverter rating over 50 kVA, refer to your DNSP for specific requirements.

3.7. What are the requirements for high voltage connections?

AS/NZS 4777.1:2024 may be applied to high voltage connections particularly for low voltage installation of systems that may be connected to the DNSP networks at high voltage.

This requirement will be different for each State or Territory. Please liaise with your relevant DNSP to confirm their specific requirements before you undertake your installation.

4. Special Cases

4.1. Vehicle to grid (V2G)

Vehicles capable of reverse power transfer are typically referred to as vehicle to grid (V2G) and require compliance as an IES with AS/NZS 4777.2:2020. A V2G is an approved inverter registered with CEC as a supplementary supply inverter, alternative supply inverter or independent supply inverter with an energy source of EV.

The release of AS/NZS 4777.2:2020 Amd 2:2024 has clarified that Electric Vehicle Supply Equipment (EVSE) capable of reverse power transfer are not categorised as a battery energy storage system that need to conform with AS/NZS 5139:2019.

Please liaise with your relevant DNSP to confirm their specific requirements to apply for and connect a V2G IES before you undertake your installation.

4.2. Supplementary supply, substitute supply, alternative supply, independent supply

4.2.1. General

AS/NZS 4777.1 has introduced new terminology for the types of supplies associated with inverters to support safe installation and operation of inverters particularly when inverters are supplying circuits which are isolated from grid supply. These supply types also assist in identifying when inverters are considered grid connected and are required to meet DNSP technical requirements, inverter compliance requirements and need approval from the DNSPs prior to connection.

There are four supply types described in AS/NZS 4777.1:2024:

- **Supplementary supply** – normally grid-connected and capable of supplying to the electrical installation in parallel with supply from the grid.

- **Alternative supply** – Capable of supplying to the electrical installation when isolated from the grid. There are two types of alternative supply a) one that is connected to the grid and will supply through an alternate supply port only when isolated from the grid b) one that is always isolated from the grid behind a manual change over switch.

- **Substitute supply** – a dedicated socket outlet supplied from the inverter which is an electrically separated supply system to the electrical installation and has a max rating of 15A.

- **Independent supply** – an inverter that is normally grid-connected that specifically conforms with Clause 3.4.4 and Appendix M of AS/NZS 4777.2:2020. These inverters do not meet standard AS/NZS 4777.2:2020 functions required for network or system support such as power quality and protection. Due to the different protection capability, the device is not able to supply electricity into electrical installation through the grid port connection of the device which means it will also prevent any export.

The table below shows the basic compliance and approval requirements for each supply types. Compliance and approval requirements may vary between DNSPs for the various supply types, please contact your relevant DNSP for specific requirements.

Type of inverter supply being installed		AS/NZS 4777.1 references	Inverter compliance requirements	DNSP approval required
Supplementary supply		Section 2, Section 3, Section 5, Figures 2.1, 2.2, 5.1 or 5.2	AS/NZS 4777.2:2020	Yes
Alternative supply	**Normally grid-connected and able to be isolated from grid**	Section 2, Section 3, Clause 5.3 and Figure 5.1 or 5.2	AS/NZS 4777.2:2020	Yes
	Not connected to the grid	Section 2, Clause 5.3 and Figure 5.3 and 5.5		No
Substitute supply*		Section 2, Section 3, Clause 5.2	AS/NZS 4777.2:2020	Yes
Independent supply		Section 2, Section 3, Clause 5.4 and Figure 5.4	Clause 3.4.4 and Appendix M of AS/NZS 4777.2:2020	Yes

*Any inverter capable of substitute supply will be either a supplementary supply or an alternative supply which is normally grid-connection. Approval is required for connection of the inverter as either supplementary supply or alternative supply.

4.3. Inverter power sharing device (IPSD)?

4.3.1. What is an IPSD

An inverter power sharing device (IPSD) is a device used to share the supplementary supply from an inverter or multiple inverters to provide supplementary supplies to a number of electrical installations that are part of a multiple electrical installation.

4.3.2. What are the requirements for installing an IPSD?

Any installation will need to meet the mandatory requirements of AS/NZS 4777.1. Included in the mandatory requirements is the following requirement:
Interface protection for IPSDs with a connected aggregated inverter rated apparent power greater than 30 kVA. Additionally, as indicated in the definition of IPSD, an IPSD cannot be used with alternate supply, substitute supply or independent supply types.

Other standard technical and contractual requirements for connection may be different for each State or Territory. Please liaise with your relevant DNSP to confirm if they have any approved IPSD devices and their specific requirements before you undertake your installation.

4.4. Low voltage bulk-metered connections (e.g. embedded networks or retirement villages)

There is an option for DNSPs to provide an exception for aspects of the interface protection requirements within parameters for low-voltage bulk metered connections.

This requirement will be different for each State or Territory. Please liaise with your relevant DNSP to confirm their specific requirements before you undertake your installation.

4.5. Additional Interface Protection Requirements

There is an option for DNSPs to specify additional interface protection requirements to AS/NZS 4777.1:2024. Please liaise with your relevant DNSP to confirm their specific requirements before you undertake your installation.

5. Why are there differences across Australia?

This could be due to a range of reasons such as different local regulatory requirements or decisions by local regulatory authorities.

For more information, please contact your relevant DNSP via the following email or portal:

State/Territory	DNSP	Contact Information
ACT	Evoenergy	embeddedgeneration@evoenergy.com.au
NSW	Ausgrid	eg@ausgrid.com.au
	Endeavour Energy	dsp.endeavourenergy.com.au/prweb/PRAuth/ECP
	Essential Energy	Essential Connections Portal
QLD	Energex	energexgeneration@energyq.com.au

	Ergon Energy	ergongeneration@energyq.com.au
VIC	Ausnet Services	customersupport@ausnetservices.com.au
	CitiPower/Powercor	newenergyservices@powercor.com.au
	Jemena	Generation_Enquiries@jemena.com.au
	United Energy	embeddedgeneration@ue.com.au
SA	SA Power Networks	customerservice@sapowernetworks.com.au
TAS	TasNetworks	newsupply.applications@tasnetworks.com.au
WA	Horizon Power	Renewables@horizonpower.com.au
	Western Power	Embedded.generation@westernpower.com.au
NT	Power and Water	EGApplications.PWC@powerwater.com.au