

Power Quality Response Mode Settings

New inverter settings

In December 2020, Standards Australia released a new version of AS/NZS 4777.2 Grid connection of energy systems via inverters Part 2: Inverter requirements (AS/NZS 4777.2:2020). The update saw a range of changes to improve the performance of inverters on the electricity supply network. These changes will support the continued increase of solar Photovoltaic (PV), batteries and electric vehicles. Inverter manufacturers have been working to update their products so they can undergo certification testing and listing with the Clean Energy Council (CEC) as 2020 compliant.

Amendments to the National Electricity Rules (NER), which commence on **18 December 2021** require all grid connected inverters to comply with **AS/NZS 4777.2:2020**.

The power quality 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 Providers (DNSP)
Australia A	Ausgrid, AusNet Services, Endeavour Energy, Essential Energy, Ergon Energy and Energex, EvoEnergy, Jemena, CitiPower, Powercor, United Energy and SA Power Networks
Australia B	Western Power and Power & Water
Australia C	Horizon Power and TasNetworks

You can apply for a connection with a AS/NZS 4777.2:2020 inverter already. However, **from 18 December 2021 it will be mandatory to install a AS/NZS 4777.2:2020 inverter**.

For more information, please see Frequently asked questions (FAQ) provided in the following link:

<https://www.energynetworks.com.au/projects/national-grid-connection-guidelines/power-quality-response-mode-settings/>

Current power quality settings

The current power quality settings tables (Table 1 to 9) **will be superseded** by the above table on **18 December 2021** to comply with the new AS/NZS 4777.2:2020.

Table 1 – Progress with DNSP grid connection rules re Volt-Watt and Volt-var capability

State	DNSP	Grid connection rules with respect to Volt-Watt and Volt-var	Comments
Victoria	Ausnet Services	V-W and V-var capability are mandatory for grid connection in Victoria	Refer to tables 2a, 2b and 2c for details of the required settings
	Jemena		
	Citipower		
	Powercor		
	United Energy		
Queensland	Energex	V-W and V-var capability are mandatory for grid connection in Queensland	Refer to tables 3a, 3b and 3c for details of the required settings
	Ergon Energy		
South Australia	SA Power Networks	V-W and V-var capability are mandatory for grid connection in SA	Refer to tables 3a, 3b and 3c for details of the required settings
New South Wales	Ausgrid	V-W and V-var capability are mandatory for grid connection on the Ausgrid, Endeavour Energy and Essential Energy networks	Refer to tables 4a, 4b and 4c for details of the required settings
	Endeavour Energy		Refer to tables 5a, 5b and 5c for details of the required settings
	Essential Energy		Refer to tables 3a, 3b and 3c for details of the required settings
Western Australia	Horizon Power	V-W and V-var capability are mandatory for grid connection in Western Australia	Refer to tables 6a, 6b and 6c for details of the required settings
	Western Power		Refer to tables 7a, 7b and 7c for details of the required settings
Australian Capital Territory	Evoenergy	V-W and V-var capability are mandatory for grid connection in the ACT.	Refer to tables 8a, 8b and 8c for details of the required settings Final draft of guidelines is being reviewed by local regulatory bodies.
Northern Territory	NT Power and Water	V-W and V-var capability are mandatory for grid connection in the Northern Territory.	Refer to tables 3a and 3b for details of the required settings.

State	DNSP	Grid connection rules with respect to Volt-Watt and Volt-var	Comments
Tasmania	TasNetworks	V-W and V-var capability are mandatory for grid connection in Tasmania.	Refer to tables 3a, 3b and 3c for details of the required settings

Tables 2a to 2c – Mandatory settings for Victorian DNSPs

Table 2a: Mandatory volt-var response mode settings

Reference	Voltage (V)	Var (% rated VA)
V1	208	44% leading (exporting vars)
V2	220 (default)	0%
V3	241	0%
V4	253	44% lagging (sinking vars)

Table 2b: Mandatory volt-watt response mode settings

Reference	Voltage (V)	Power (% rated Power)
V1	207 (default)	100% (default)
V2	220 (default)	100% (default)
V3	253	100% (default)
V4	259	20% (default)

Table 2c: Sustained operation for voltage variation

Reference	Voltage (V)
V nom-max	258

Tables 3a to 3c

Table 3a: Mandatory volt-var response mode settings for Queensland DNSPs, Essential Energy (NSW), TasNetworks (TAS), Power and Water Corporation (NT) and SA Power Networks

Reference	Voltage (V)	Var % rated VA
V1	207	44% supplying
V2	220	0%
V3	240	0%
V4	258	60% absorbing

Table 3b: Mandatory volt-watt response mode settings Queensland DNSPs, Essential Energy (NSW), TasNetworks (TAS), SA Power Networks and Power and Water Corporation (NT)

Reference	Voltage (V)	Max value (P/P_{rated}), %
V1	207	100%
V2	220	100%
V3	253	100%
V4	260	20%

Table 3c: Sustained operation for voltage variation Queensland DNSPs, Essential Energy (NSW), SA Power Networks and TasNetworks (TAS).

Reference	Voltage (V)
V nom-max	258

Tables 4a to 4c – Mandatory settings for the Ausgrid network

Table 4a: Mandatory volt-var response mode settings

Reference	Voltage (V)	Var % rated VA	Power factor
V1	207	60% leading	0.8 leading
V2	220	0%	1
V3	248	0%	1
V4	258	60% lagging	0.8 lagging

Table 4b: Mandatory volt-watt response mode settings

Reference	Voltage (V)	Max value (P/P _{rated}), %
V1	207	100%
V2	220	100%
V3	248	100%
V4	258	20%

Table 4c: Sustained operation for voltage variation

Reference	Voltage (V)
V nom-max	258

Tables 5a to 5c – Mandatory settings for the Endeavour Energy network

Table 5a: Mandatory volt-var response mode settings

Reference	Voltage (V)	Var % rated VA
V1	207	60% export ¹
V2	220	0%
V3	248	0%
V4	260	60% import ¹

Table 5b: Mandatory volt-watt response mode settings

Reference	Voltage (V)	Var % rated VA
V1	207	100%
V2	220	100%
V3	255	100%
V4	265	20%

Table 5c: Sustained operation for voltage variation

Reference	Voltage (V)
V nom-max	258

¹ If the inverter is not capable of 60% reactive power (0.8 power factor) adjustment then it shall be set to the limit of the inverter capability which shall be at least 30% or greater

Tables 6a to 6c – Mandatory settings for the Horizon Power network

Table 6a: Mandatory volt-var response mode settings

Reference	Voltage (V)	Var % rated VA
V1	207	60% leading
V2	230	0%
V3	240	0%
V4	265	60% lagging

Table 6b: Mandatory volt-watt response mode settings

Reference	Voltage (V)	Var % rated VA
V1	207	100%
V2	220	100%
V3	254	100%
V4	265	20%

Table 6c: Sustained operation for voltage variation

Reference	Voltage (V)
V nom-max	258

Tables 7a to 7c – Mandatory settings for the Western Power network

Table 7a: Mandatory volt-var response mode settings

Reference	Voltage (V)	Var % rated VA
V1	205	30% (vars source)
V2	220	0%
V3	235	0%
V4	250	30% (vars sink)

Table 7b: Mandatory volt-watt response mode settings

Reference	Voltage (V)	Var % rated VA
V1	207	100%
V2	220	100%
V3	250	100%
V4	265	20%

Table 7c: Sustained operation for voltage variation

Reference	Voltage (V)
V nom-max	258

Tables 8a to 8c – Mandatory settings for the Evoenergy network

Table 8a: Mandatory volt-var response mode settings

Reference	Voltage (V)	Var % rated VA
V1	207	30% leading
V2	220	0%
V3	250	0%
V4	258	30% lagging

Table 8b: Mandatory volt-watt response mode settings

Reference	Voltage (V)	Var % rated VA
V1	207	100%
V2	220	100%
V3	250	100%
V4	258	20%

Table 8c: Sustained operation for voltage variation

Reference	Voltage (V)
V nom-max	258