Grid connected multiple mode inverters

An important message from Building and Energy

Building and Energy wishes to share this document with you regarding Battery Energy Storage Systems (BESS) that incorporate hybrid inverters. It contains important information on the testing required to ensure the safe operation of these installations.

Since July 2025, inspections have identified critical defects – mainly due to installers not following manufacturer instructions and inadequate testing in alternative supply mode. It's essential to confirm that no parallel multiple earthed neutral (MEN) connections exist and that there is neutral continuity between the alternative supply port and the installation MEN. Thorough testing helps prevent these issues and ensures installations remain safe and compliant.

Additional safety tests – such as Residual Current Device (RCD) trip tests—are also vital. Please remember to:

- Group and clearly label alternative supply circuits.
- Upgrade RCDs to Type A, or as specified by the manufacturer, to maintain compliance.
- Consider attaching test results and manufacturer instructions to completion notices.

If you have any questions, please contact Building and Energy at be.info@lgirs.wa.gov.au.

There are two supply types related to grid connected multiple mode inverters (also known as hybrid inverters) used with photovoltaic (PV) and BESS described in AS/NZS 4777.1 that operate as:

a) supplementary supply – reliant on a grid connection to function; and

b) alternative supply (i.e. back-up) – operates when the grid is isolated to power backup loads within an installation from a BESS.

Installers must familiarise themselves with these supply modes and the configuration type of the inverter being installed, which can be either:

i) a combined supplementary and alternative supply port inverter – requires an external AS/NZS 4777.2 tested grid disconnection device to operate in alternative supply mode that is supplied and tested by the inverter manufacturer; or

ii) separate supplementary and alternative supply ports inverter – internal inverter changeover switching from grid supply to alternative supply operation.

AS/NZS 4777.1 provides details for the installation and testing requirements for these types of inverter energy systems.

Since 1 July 2025, there have been many grid connected inverters with Battery Energy Storage Systems (BESS) installed under the WA Residential Battery Scheme and Federal Cheaper Home Batteries Program by accredited installers.

Network operator inspectors have been conducting inspections and have since found two types of critical defects relating to lack of following manufacturer's instructions and testing in alternative supply (back-up) mode to prove:

- No parallel MEN connections are made by the inverter or installed incorrectly by installer.

- Neutral continuity from the alternative supply port to the installation MEN.

Installers are reminded that for safety and compliance, testing to AS/NZS 3000 and importantly AS/NZS 4777.1 Section 8.3.3 must be carried out with test results clearly recorded to comply with electricity regulations. For testing in alternative supply (back-up) mode, it may be necessary for installers to return to the installation when the batteries are within a state of charge to permit alternative supply operation and testing.

Testing in accordance with AS/NZS 4777.1 Sections 8.3.3.2 and 8.3.3.3 (current measurements) must prove there are no parallel MEN or neutral-earth (N-E) connections made by the inverter or inadvertently connected by the installer. Test currents measured must be checked for compliance, recorded and made available for inspection.

Critically, the inverter energy system must be tested in alternative supply (back-up) mode in accordance with AS/NZS 4777.1 Clause 8.3.3.4 to prove that the neutral conductor between the main neutral bar (with the MEN connection) and the alternative supply neutral are connected to allow earth fault detection and protection operation. Voltage measurements must be captured on test records and made available for inspection.

Additionally, in alternative supply (back-up) mode the following tests must be performed:

- Testing of final and subcircuits shall be done in accordance with all mandatory tests required by AS/NZS3000 Section 8. Trip testing of RCDs using an RCD testing instrument or meter from within the installation. Push button testing is insufficient for this purpose.

Installers should attach test results and manufacturers installation/operating instructions to the Notice of Completion to facilitate inspections.

It is important to read and understand manufacturer's installation and operation instructions including Australian specific wiring layouts. If in doubt, consult the manufacturer or refer to the relevant Australian Standard to determine safety compliance requirements.

Installers are also reminded of AS/NZS 4777.1 requirements to re-arrange, group and label all alternative supply (back-up) circuits or install an alternative supply switchboard. In addition, it is a requirement that RCDs for these alternative supply final sub-circuits are upgraded to Type A or to the type specified by the inverter manufacturer.

Testing of grid connected multiple mode inverters as described in this document and AS/NZS4777.1 may involve work on or near live energised parts. Any such work must be carried out in accordance with Building and Energy's Code of Practice for Persons Working on or Near Energised Electrical Installations, which can be found at www.lgirs.wa.gov.au.

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