

## Technical guidance sheet 2.3

# Protection of wiring and wiring systems



Solar  
Victoria



This guidance provides further information to support installers' understanding of applicable requirements in AS/NZS 5139:2019 *Electrical installations – Safety of battery systems for use with power conversion equipment* in relation to the protection of wiring and wiring systems

To help installers maintain standards, this document includes installation advice and examples of installations that may not be meeting the requirements relating to the protection of wiring and wiring systems.

### Standards referenced:

- » AS/NZS 3000:2018 *Electrical installations "Wiring Rules"*.
- » AS/NZS 4777.1:2016 *Grid connection of energy systems via inverters Part 1: Installation requirements*.
- » AS/NZS 5033:2021 *Installation and safety requirements for photovoltaic (PV) arrays*.
- » AS/NZS 5139:2019 *Electrical installation – Safety of battery systems for use with power conversation equipment (PCE)*.

This guidance is part of a series we commissioned TechSafe Australia (sheets 2.1 and 2.2) and Grey Sky Solar Consulting (sheets 2.3 – 2.5) to develop. Energy Safe Victoria has also reviewed this guidance.

### In series 2:

- 2.1 Physical protection of battery systems
- 2.2 Battery system protection against the spread of fire and battery system protected locations
- 2.3 Protection of wiring and wiring systems (this sheet)**
- 2.4 Labelling
- 2.5 Earthing

# Protection of wiring and wiring systems:

## For Grid Connected Battery Energy Storage Systems (GC BESS)

The requirements for the correct protection of wiring and wiring systems relating to a GC BESS are derived from AS/NZS 5139:2019 *Electrical installations – Safety of battery systems for use with power conversion equipment*. However, in most cases there will also be a Grid Connected PV system on site so other Standards will also need to be considered.

In this document we will be focusing on the requirements from AS/NZS 5139:2019

For all cables that exit a pre-assembled Battery system that does not have internal overcurrent protection, the cables shall be mechanically protected by at least medium duty conduit or equivalent protection up to the over current device.

**Standards referenced:**

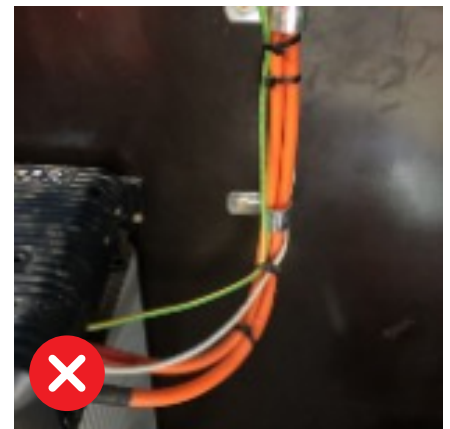
- » AS/NZS 5139:2019 Clause 5.3.1.4.3

For all battery systems that operate at DVC-B or DVC-C, the cable between the overcurrent protection device and the PCE shall have mechanical protection.

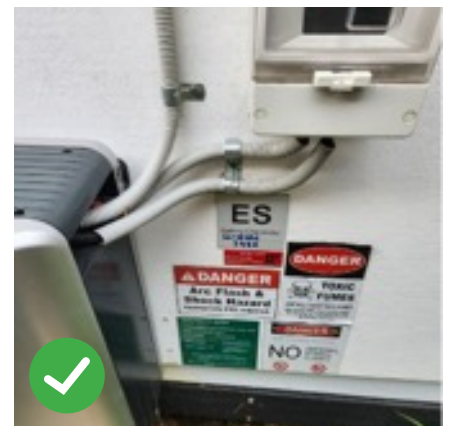
**Standards referenced:**

- » AS/NZS 5139:2019 Clause 5.3.1.4.3

Note: The level of mechanical protection required for the wiring system will be determined by the location and risk or damage, refer to AS/NZS 3000:2019 H4 to determine the minimum protection requirements of cables.

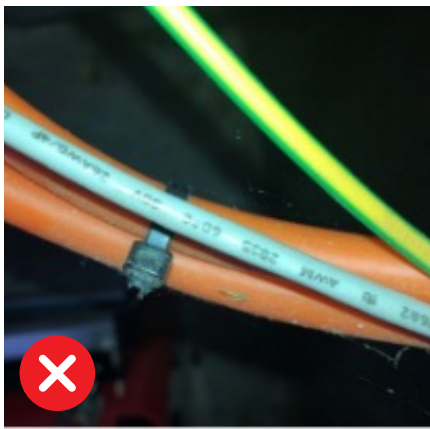


**Figure 1.1:**  
Note: The above battery has no inbuilt over current protection and therefore the cables are not suitably protected.



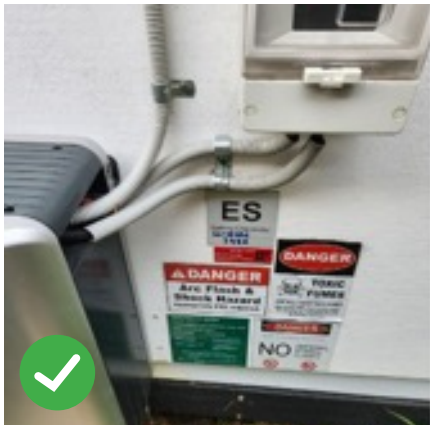
# Protection of wiring and wiring systems:

## For Grid Connected Battery Energy Storage Systems (GC BESS)



**Figure 1.2:**

*Note: The light blue comms cable does not have the same level of insulation protection as the battery cables and therefore needs to be installed in conduit or suitably segregated.*



For installations that require cables of different voltages to be run in the same proximity or in the same enclosure then the installation must meet the requirements for segregation dependant on the type and location of wiring.

As a minimum, this requires at least double insulation for the highest voltage level present and compatible with the installation environment.

**Standards referenced:**

- » AS/NZS 3000:2018 Section 3
- » AS/NZS 4777.1:2016 Clause 5.2
- » AS/NZS 5139:2019 Clause 5.3.1.5

Wiring systems installed in positions where they may reasonably be expected to be subject to mechanical damage shall be adequately protected.

Refer Clause 3.9.4.1 AS/NZS 3000:2018.

Wiring systems that are fixed or held in position by thermal insulation, where they are concealed and within 50mm from the surface of a building surface, shall be provided with additional protection.

For example: installed in steel conduit with a wall thickness of at least 2.0 mm (WSX3 rating).

Refer Clause 3.9.4.4 AS/NZS 3000:2018.

## More information

For more information about Solar Victoria's commitment to safety and quality, including our audit program, checklists, and training and workforce development visit:

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