

## Technical guidance sheet 2.3

# Battery system 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*
- » AS/NZS 3000:2018 – *Electrical installations (known as the Australian/New Zealand Wiring Rules)*

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

This guidance is part of a series Solar Victoria commissioned TechSafe Australia 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 restricted locations
- 2.3 Battery system wiring systems**  
*(this sheet)*

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This publication may be of assistance to you, but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

The information provided within has been put together to highlight specific aspects of several Australian installation standards that include, but not limited to AS/NZS 3000:2018, AS/NZS 5033:2021, AS/NZS 4777.1:2016. While care has been taken to provide examples that highlight specific defects or compliance it should not be assumed that additional defects are not present in the supplied examples. It is a requirement that all aspects of the relevant Australian installation standards are followed, and compliance of any installation remains the responsibility of the installer.

This document is designed around providing best practice solutions for specific scenarios. Any advice given is general in nature and if possible, solutions to compliance issues are highlighted, it should not be assumed these are the only methods to achieving compliance.

Content provided in this guidance document has been extracted from multiple sources that are referenced on the same page. This content has been collated to help provide an overview and in no way should be referenced on its own. It is intended that all referenced material is also read in conjunction with the rest of its relative material to ensure full understanding of the context, relationship with other parts and anything not mentioned in this overview.

## Mechanical protection of cables:

# Between battery system and overcurrent protection device/s

In these examples, the battery manufacturer does not allow their internal overcurrent protection to protect outgoing conductors.

As such, the installer is required to install external overcurrent protection and enclose the cables between the battery system and the external overcurrent protection device in at least medium-duty conduit.

### Standards referenced:

AS/NZS 5139:2019

Clauses 5.3.1.2.1, 5.3.1.2.4 & 5.3.1.4.3

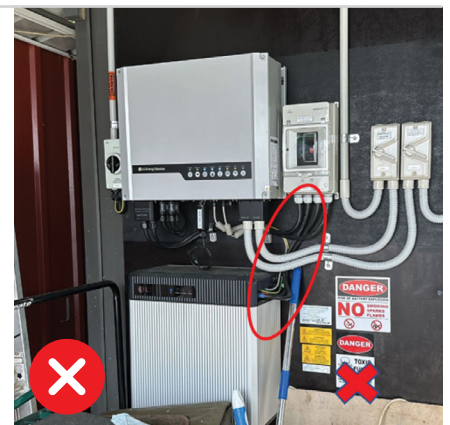
**Figure 1.1:**

*In this example the battery manufacturer does not allow the pictured internal overcurrent protection device to be used as cable protection. As such, external overcurrent protection is required to be installed on outgoing cables.*



**Figure 1.2:**

*As the manufacturer does not allow their battery internal overcurrent protection to protect the outgoing cables, in this example, the installer is required to install external overcurrent protection and enclose the outgoing cables in M/D conduit up to their installed overcurrent protection device.*



**Figure 1.3:**

*In this example the installer has enclosed the outgoing cables in M/D conduit between the battery system and required external overcurrent protection device.*



## Mechanical protection of cables:

# Between battery system and overcurrent protection device

In this example, the battery manufacturer has stated there is internal overcurrent protection in the battery system, however the internal fuse protection is rated higher than the current carrying capacity of the outgoing cables.

As such, the installer is required to install additional overcurrent protection and enclose the cables between the battery system and the external overcurrent protection device in at least medium-duty conduit.

As can be seen, external overcurrent protection has been installed, however the cables between it and the battery system have not been enclosed in M/D conduit as required.

### Standards referenced:

AS/NZS 5139:2019

Clauses 5.3.1.2.1, 5.3.1.2.4 & 5.3.1.4.3

**Figure 2.1:**

*This system has internal overcurrent protection, however, it is rated higher than the connected outgoing cables. Therefore, the cabling connecting to the external overcurrent protection device must be enclosed in at least M/D conduit.*



**Figure 2.2:**

*As the internal overcurrent protection is not adequate to protect outgoing conductors, external overcurrent protection is required and the cables between battery system and external overcurrent protection are required to be enclosed in at least M/D conduit.*



## Mechanical protection of cables:

# Between battery systems and PCE for pre-assembled battery systems above DVC-A

For pre-assembled battery systems above DVC-A (>60Vdc), the battery cables must be mechanically protected all the way from the battery system to the inverter/PCE (Power Conversion Equipment), regardless of overcurrent protection as per AS/NZS 5139:2019 Clause 5.3.1.4.3.

In most situations this will be achieved by enclosing the cables in at least medium-duty conduit, however some circumstances may require additional protection as per Appendix H of AS/NZS 3000:2018.

### Standards referenced:

AS/NZS 5139:2019  
Clauses 5.3.1.4.3

**Figure 3.1:**

*As this installation is categorised as DVC-C, additional mechanical protection is required on cabling between the battery system and PCE (Power Conversion Equipment).*



**Figure 3.2:**

*In this image, the installed battery is categorised as DVC-C and cabling between the battery system and PCE has been adequately protected in M/D conduit.*



**Figure 3.3:**

*In this image, the installed battery is categorised as DVC-C and cabling between the battery system and PCE has been adequately protected in M/D conduit.*



## 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:  
[solar.vic.gov.au/industry](https://solar.vic.gov.au/industry)

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