



LITHIUM BATTERY GUIDELINES TO AS/NZ3001.2:2002

This is a guide to help understand the requirements of the new standard in relation to lithium battery installation in Australian and New Zealand RVs. It also details out the specific recommendations for the BM PRO Invicta range of lithium batteries to ensure you meet the requirements of the standard.

1. APPLICATION OF AS/NZS3001.2:2022

This released standard applies to new builds from November 2023.

The standard has requirements for the installation of Lithium Batteries around:

- ▣ Lithium battery minimum specifications
- ▣ Lithium battery safety approvals to IEC 62619
- ▣ Monitoring of batteries
- ▣ Exclusion zones
- ▣ Location, sealing and venting

2. MINIMUM BATTERY REQUIREMENTS FOR LITHIUM BATTERIES

Clause 5.4.12.3.1 Requirements

Each lithium ion battery shall be provided with a battery management safety system either integrated into a battery pack or as a separate component. All lithium ion batteries shall comply with AS IEC 62619.

The battery management safety system is designed to protect the lithium ion battery from potentially damaging situations.

This includes the battery management safety system and cells, the whole battery. The BM PRO Invicta batteries referenced in section 9 of this document have IEC certification which applies to the whole battery.

In some cases only the cells are certified to IEC62619. If only the cells are certified it means the key safety component of the BMS (Battery Management System of the battery) and how it interacts and manages the cells has not been considered and reviewed and therefore complies with IEC62619. This is especially important regarding battery cell propagation and thermal runaway.

CELL VS BATTERY

CELL: A cell is a single encased electrochemical unit.

BATTERY: Battery means two or more cells which are electrically connected together and fitted with devices necessary for use, for example, case, terminals, marking and protective devices.

A single cell battery is considered a "cell", regardless of whether the unit is termed a "battery" or a "single cell battery". ref. UN38.3

It's important to ensure that the battery manufacturer or supplier can provide the certificate of compliance to verify that the batteries are compliant to IEC 62619.

The whole certificate of compliance is available on the individual battery product pages on the BMPRO website.



3. MONITORING DEVICE

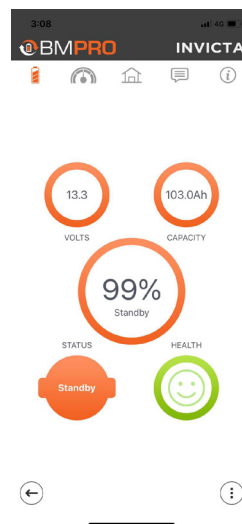
5.4.12.3.4 Monitoring device

Each battery (or bank of batteries) shall be monitored via a battery monitor designed for managing lithium ion batteries. The monitor shall display the state of charge (SoC) and may display voltage. Communications with the monitor may be by wired or wireless connection direct to the battery management safety systems.

The BMPRO Invicta Lithium Batteries listed below feature integrated Bluetooth compatibility which allows the in-built BMS connection to the BMPRO Invicta app for the purpose of monitoring each individual battery.

- SNL12V100BT: 100Ah Bluetooth Lithium Battery
- SNL12V200BT: 200Ah Bluetooth Lithium Battery

The parameters displayed in the BMPRO Invicta app include State of Charge (SoC), voltage, capacity, battery status and temperature.



For non-Bluetooth compatible batteries, BMPRO offers a range of battery monitoring devices and Power Management Systems which also monitor and maintain batteries and display battery data via a controller, wired display or smartphone app.

For more information on BMPRO monitoring products, **please refer to our website.**



Battery Monitoring Devices

- BatteryCheckPRO
- BatteryCheck300

Power Management Systems

- BatteryPlus35
- ASPERO
- J35

Power Management System Displays

- RVView2
- Trek3
- Odyssey Controller
- JHUB
- JControl
- ASDisplay

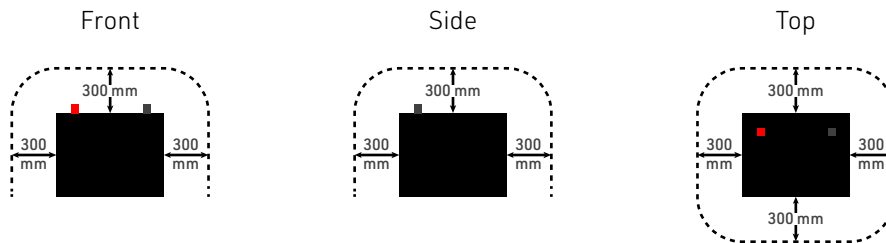
4. EXCLUSION ZONES FOR BATTERIES

5.4.10.2 Metallic services line

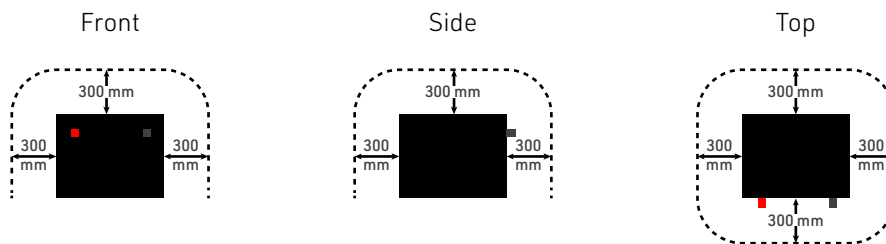
Metallic services lines that include: gas, diesel, water and/or other fuels that are installed within 300 mm of the horizontal or vertical plane of the battery surface containing the terminals, shall be shielded with dielectric material to protect against accidental short circuit, see Figure 5.2.

In compliance with clause 5.4.10.2, battery installations are required to be a minimum of 300mm away from gas, diesel, water and other fuel lines. The exclusion area is limited by the sides of the battery box or compartment. This applies to the horizontal and vertical plane of the battery surface containing terminals. If the exclusion area is not able to be achieved, dielectric material is to be used to protect against accidental short circuits.

Top Terminal Battery



Side Terminal Battery



5. PROTECTIVE DEVICES

Individual batteries or battery banks are required to be protected against overload and short circuit by fuses or circuit breakers to be installed on the positive pole. Ensure the location of the protective device complies with clauses 5.4.7.2 and 5.4.10.1.

5.4.7.2 Location of protection devices

Protection devices as detailed in Clause 5.4.7.1 shall be accessible, protected against accidental damage and installed in one of the following locations:

- (a) within 200 mm of the battery terminals; or
- (b) directly outside the battery compartment; or
- (c) 1.0 m from the battery terminals, provided each conductor is contained within a protective covering, such as a sheathing, conduit or cable trucking for its entire length from battery terminals to the circuit protective device, to reduce the risk of mechanical damage.

5.4.10.1 Protective devices

Overcurrent protective devices shall not be fitted in a fuel storage compartment or fuel storage housing intended for the storage of LP Gas cylinders.

6. BATTERY LOCATION REQUIREMENTS

5.4.12.2 Location

Lithium ion batteries shall:

- (a) be installed externally, i.e. behind a wall, compartment or barrier that prevents the egress of gases into the habitable structure; and
- (b) not enter the habitable area of the structure; and
- (c) be installed to operate within the manufacturer's defined operating temperatures, including IP rating; and
- (d) be installed in a suitable battery container where the battery manufacturer has not provided encapsulated cells.

Batteries are required to be installed so that any vented gases are unable to enter the habitable area of the recreational vehicle.

The areas they can be installed are.

- ☑ Externally to the recreational vehicle body
- ☑ Behind a wall or compartment
- ☑ Under the bed
- ☑ In a cupboard
- ☑ Under a seat
- ☑ Behind a barrier

For batteries installed in an enclosed area, such as behind a wall, under the bed, in a cupboard or under a seat, the battery installation is required to be in a sealed box or container which is vented to the outside of the RV. Cables into the battery box or container must be sealed by cable glands or similar. Refer to the Specifications Table in section 8 which details the ventilation area requirements per battery.

For installations external to the recreational vehicle body the battery should be protected from physical impact by a box or container which is vented to the outside of the RV.

In addition to the location of where lithium batteries can be installed, care should be taken to comply to other aspects of the standard.

This includes but is not limited to the below:

- ▣ Easy access to batteries via panel or hatch.
- ▣ Attaching warning label that warns of dangers if panel/hatch is not sealed.
- ▣ Ensuring ventilation of the battery compartment to the outside. Refer to the Specifications Table in section 8 which details the ventilation area requirements per battery.
- ▣ Mounting the battery securely in the battery compartment.
- ▣ Check all connections are done tight and there are no conductive materials are touching the lugs.

7. CONSTRUCTION MATERIALS

Materials used for construction of the battery compartment should protect the battery from accidental damage, meeting the criteria defined in this document and allowing the battery to operate within the BMPRO defined operating conditions, temperatures and IP rating.

If installed within these criteria it is deemed sufficient prevention for thermal runaway events.



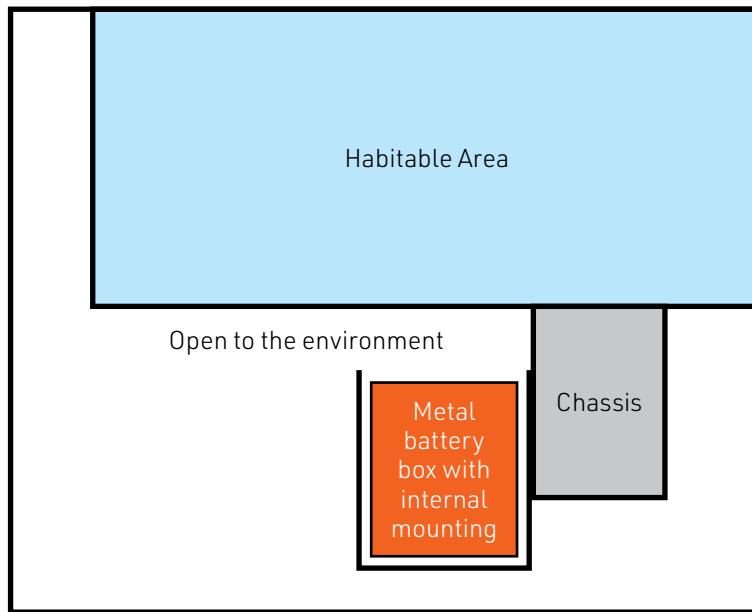
8. EXAMPLES OF BATTERY INSTALLATIONS

The following examples are guidelines on how the batteries could be installed.

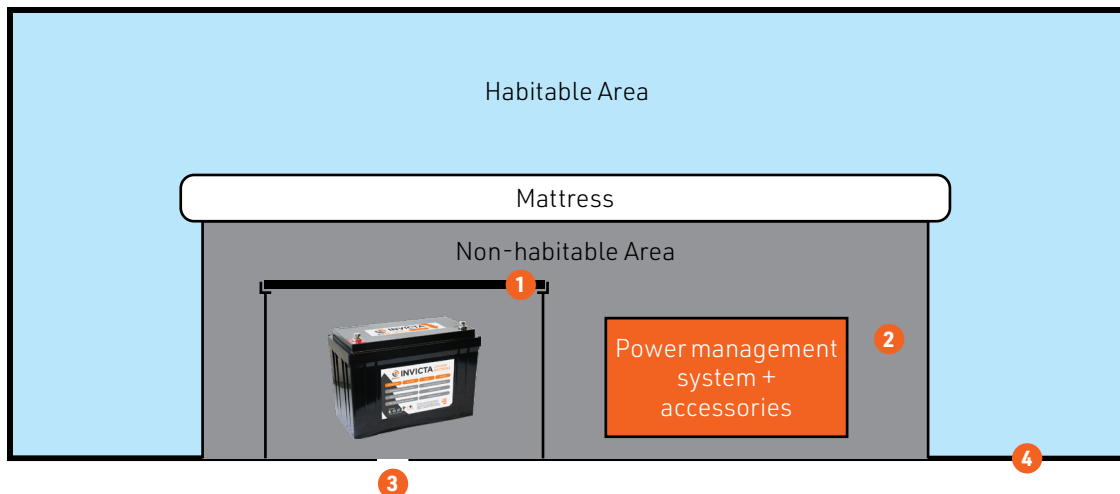
It is up to the manufacturer of the caravan to determine the most suitable to meet the Clause 5.4.12.2 detailed in the section above.

External to recreational vehicle

Refer to the Specification Table in section 8 for IP rating specifications which may determine if the battery can safely be installed externally to the RV for the intended use of the RV. For example, if the RV will be taken on river crossings where the battery is likely to be temporarily and less than 200mm of being submerged, the battery would need to be IP65 rated to be suitable for this application. This is similar to a motor vehicle which is rating IP65 on wiring harnesses and some components.



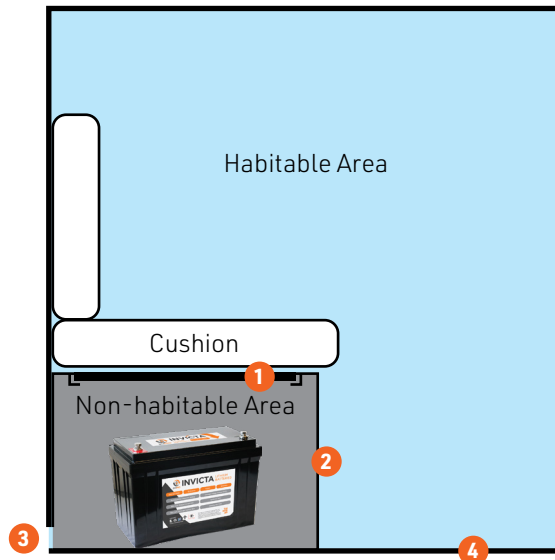
Under the bed



1. Sealed lid to access battery compartment
2. Sealed compartment/barrier
3. Externally vented (open to environment). Refer to section 8 for ventilation area requirements
4. Floor of RV

A separate sealed compartment is recommended, with venting and sealed lid, along with cable glands out of the box.

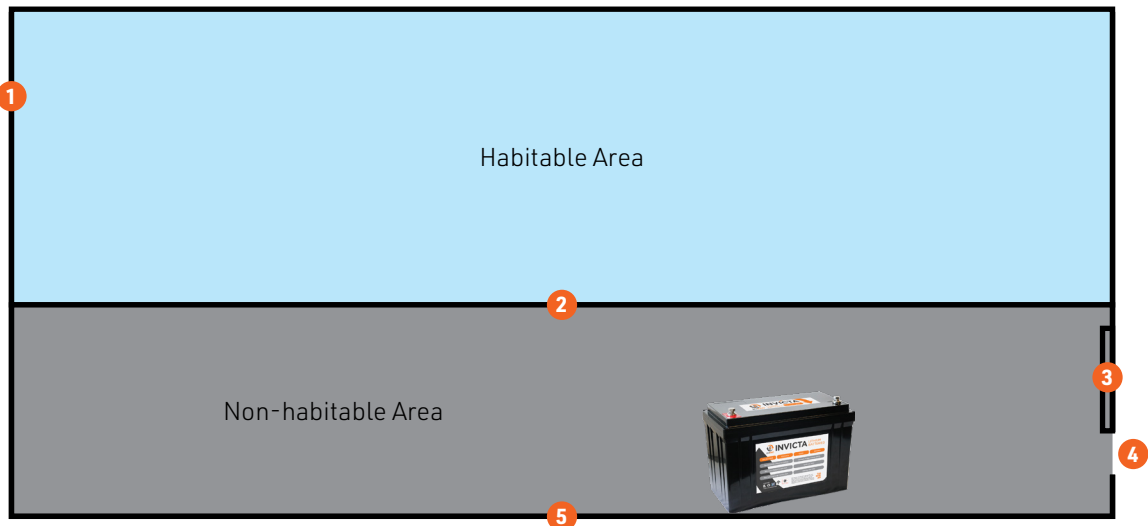
Under seat



1. Sealed lid to access battery compartment
2. Sealed compartment under seat cushion
3. Externally vented (open to environment). Refer to section 8 for ventilation area requirements
4. Floor of RV

In this drawing, the area under a seat is being used as the sealed compartment. If this is not achievable then an additional sealed compartment is necessary as per the Under Bed concept above.

Tunnel boot



1. Wall of RV
2. Sealed compartment/barrier
3. Tunnel boot door
4. Externally vented (open to environment). Refer to section 8 for ventilation area requirements
5. Floor of RV

Ensure overcurrent protective devices are not fitted in a fuel storage compartment or fuel storage housing intended for the storage of LP gas cylinders.

In this area the Tunnel Boot is a large area, which can be sealed, however it may be necessary to potentially section the area off if using this area for the battery. Ensure the battery is protected from potential impact and mechanical damage from any goods stored in the tunnel boot.

9. BMPRO INVICTA LITHIUM BATTERY SPECIFICATIONS RELEVANT TO AS/NZS3001.2:2022

ITEM	CLAUSE	SNL12V100S	SNL12V125S	SNL12V100BT	SNL12V200BT
Brand		Invicta	Invicta	Invicta	Invicta
Description		100Ah Standard	125Ah Standard	100Ah Bluetooth	200Ah Bluetooth
Type of battery	5.4.2	Rechargeable			
Nominal Voltage	5.4.1	12V			
Capacity (Ah) (25°C, 0.33C)	5.4.3	100	125	100	200
Capacity @20h (0.05C) discharge rate	5.4.3	104	128	104	208
Compliance to IEC62619	5.4.12.3.1	Y	Y	Y	Y*
Integrated BMS	5.4.12.3.2	Y	Y	Y	Y
Over Voltage Protection	5.4.12.3.3	Y	Y	Y	Y
Under Voltage Protection	5.4.12.3.3	Y	Y	Y	Y
Over Temp Protection	5.4.12.3.3	Y	Y	Y	Y
Under Temp Protection	5.4.12.3.3	Y	Y	Y	Y
Over Current Protection	5.4.12.3.3	Y	Y	Y	Y
Bluetooth Compatible	5.4.12.3.4	N	N	Y	Y
Ventilation area (cm ²)	5.4.12.2	1.8	2.25	1.8	3.6
Ventilation area (mm ²)	5.4.12.2	180	225	180	360
Square vent size (mm)	5.4.12.2	13.5 x 13.5	15 x 15	13.5 x 13.5	19 x 19
Round vent size (Ø mm)	5.4.12.2	15	17	15	21.5
Operating Temperature (charging)	5.4.12.2	0-50°C	0-50°C	0-50°C	0-50°C
IP rating	5.4.12.2	IP65	IP54	IP65	IP65

*Compliance due November 2023

10. ACCESSING THE STANDARDS

Any questions in relation to how BMPRO Invicta Lithium batteries comply to the standards can be directed to customerservice@teambmp.com.au.

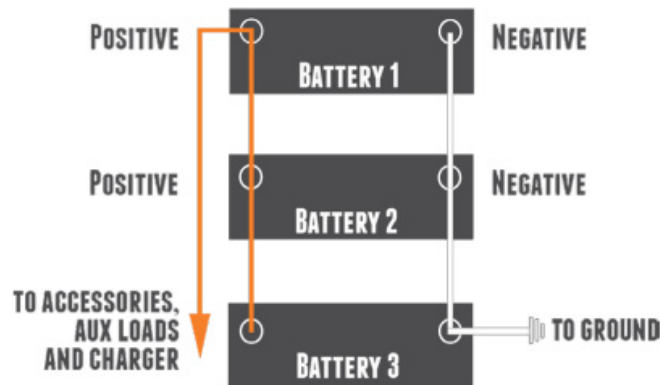
For members of Caravan Industry Association Australia access is available through Caravan Industry Association of Australia and the i2i Platform, AS/NZS 3001.2:2022 is now available to view and download. For other businesses to access the standards they are available for purchase.

It is important to note that this document does not provide an exhaustive list of changes to the standard. It is strongly recommended that industry businesses make their own investigations and explore the changes to AS/NZS 3001.2:2022 with regard to the recreational vehicles they are producing. It is also important to ensure that the relevant personnel (e.g. contract or staff electricians, vehicle designers etc.) within your business are up to date with these changes.

11. BATTERY COMMISSIONING

All BMPRO Invicta lithium batteries can be configured into a parallel configuration up to 4 units in parallel under the conditions outlined below:

1. Fully charge all batteries individually using matched chargers.
2. Ensure Open Circuit Voltage (OCV) of each battery is less than 0.2V of each other.
3. After charging, set aside and allow to rest for 8 hours.
4. Use a wire size large enough to carry required current (>100A), connect the batteries in the below configuration. Ensure all connecting cables lengths are of the same length.



5. Be careful not to reverse connect the Positive and Negative.
6. Ensure correct charge voltage and current is utilised for configuration.
7. Don't connect more than 4 items connected to a battery terminal in line with clause 5.4.7.3.
8. Ensure a full charge is completed a minimum of every 3 months.
9. The system must be charged and discharged as a system. If one battery needs to be replaced, the whole system will require replacing.
10. Ensure the battery capacity and profile is correctly configured in the battery monitoring device or Power Management System.

12. EXISTING INSTALLATIONS FOR REPAIRS AND REPLACEMENTS

Clause 1.5.2.1 allows for installations to be repaired and replaced without inacting the requirements of the new standard.

Note however, repairs or replacements need comply to the standards applicable at the time of installation or to AS/ANZ 3000 at a minimum, which does not require the sealed compartment with venting.



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