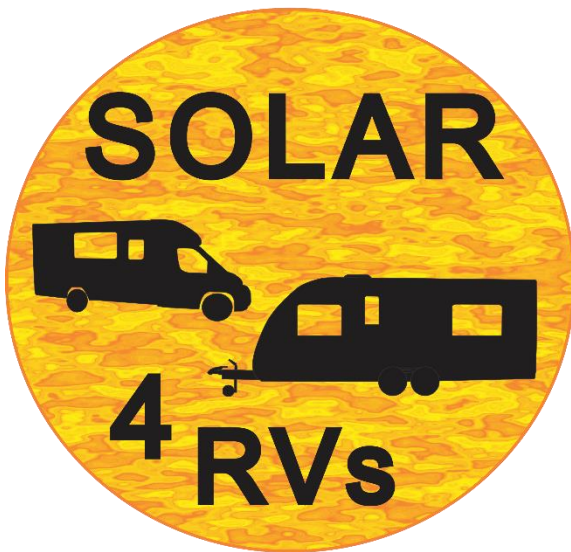


# SOLAR 4 RVs

CALB LiFePO4 CELLS AND DALY BMS



**Please read this document in full before use.**

This document is common for the pre-assembled lithium packs and to those who are self-assembling. To maximise the longevity and safety of your new lithium battery, please ensure you follow the instructions in this guide carefully.

Failure to do so could result in shortened lifespan and void your warranty.

If you need clarification on any of the instructions, please contact **Solar 4 RVs** on **(03) 9763 3363**.

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## Safety

- LiFePO4, while one of the safest lithium types, is classed as dangerous good for shipping purposes under UN3480;
- Use insulated tools;
- **Use a torque wrench** when tightening onto the positive terminal (6Nm maximum torque) – Terminal will be damaged beyond this torque and will require repair;
- Avoid or cover exposed metal parts;
- Use gloves and other PPE where appropriate;
- Seek help where needed.

## Connection and Preservation of the LiFePO4 Cells

- All lithium cells contain liquid electrolyte. While the battery will work on its side, the lifespan will be greatly decreased so the cell warranty is only valid with the battery pack upright.
- The P- cable lug as circled in Figure 1 is the battery negative. Connect your load negative/s to this point.
- The terminal with a male thread, washer, spring washer and nut next to the "+" marking on the battery case (out of view), circled in Figure 2 is the battery positive.
  - Important: 6Nm is the maximum torque allowable for this terminal. The spring washer, and optionally thread locker may be used to avoid loosening of this terminal. **4Nm torque is recommended.**
  - We recommend that a cable be wired from this positive terminal to a main fuse or terminal block so that all other connections do not require this terminal to be frequently operated.
- The cells are rated to 3,000 cycles at 100% DoD, this equates to approximately a full cycle every day for 10 years. To maximise the life of the cells, the battery should be charged by lithium compatible chargers rated at 0.3C (0.3 multiplied by the total capacity of the battery) and optionally used between 10 and 90% state of charge.
- The battery pack requires minimum 25mm clearance on all sides for ventilation.



Figure 1- Battery Negative Terminal



Figure 2 - Battery Positive Terminal

## Connection and Preservation of the Daly BMS

- If the unit has just been installed or disables the load output for one of the following reasons: short circuit, overload, low cell voltage. You will need to connect it to a charger such as a mains, DC-DC or certain MPPT chargers, and **the charger must be set to 0.6V above the overall battery voltage or higher in order to wake up the BMS. New Daly BMS' can be woken by pressing the button on the Bluetooth dongle.**
  - This can be difficult when the battery is at or very close to 100% state of charge and the battery trips on overload or short circuit. In this circumstance, the charger voltage may need to be increased temporarily to achieve the 0.6V difference.
- Download the "SMART BMS" app by Daly BMS on the iOS or Android store to connect, see Figure 3 for the app logo. The app is for status only (state of charge, voltage, current etc.), you cannot see or adjust settings on this unit if using a 3-4S BMS. If using the 5-32S, some settings can be adjusted but it is not recommended as only the trip points are visible, the reset points are not. Please adjust using the PC software if special changes are required for your application.
  - If you are connected to the Daly by Bluetooth, no other Bluetooth user will be able to see or connect to it. **If your device is connected to the Daly and the device has the screen turned off, the connection will still be active.** Ensure you close the app to disconnect and allow other users to connect.
- The main purpose of the BMS is to protect the cells from high and low voltage, overload, short circuit, high and low temperature etc. The secondary purpose is for monitoring. The unit uses a Hall-effect sensor for current measurement which is not as accurate as a precision shunt battery monitor. **A limitation is if the current is less than approximately 1.8A, it will not read any current.** This is possible if you have one LED that draws 1A, the unit will not measure the current, therefore the state of charge will appear to stay at 100%. If high accuracy is required, please use on a shunt battery monitor such as a Victron BMV-7XX Battery Monitor and ignore the current and state of charge measurement on the Daly.
- The battery is normally charged and ready to operate once you receive it, if not, please follow the usual steps to wake up your BMS by connecting to a charger that is 0.6V above the battery voltage.
- The continuous current rating of the BMS must not be exceeded in normal operation. The system should be designed so that if a 12V 100A BMS is used, then no more than 1200VA (12V x 100A) load is drawn from the battery. Short time high currents are acceptable, i.e. starting an air conditioner.
- If any fault condition occurs, a Fault alarm will display an error description, see Figure 4. It may also disconnect the charge MOSFET (Chg MOS) or discharge MOSFET (Dischg MOST). If this occurs, you will not be able to charge or discharge the battery respectively. If you cannot connect at all to the BMS, then follow the usual steps to wake up the BMS.

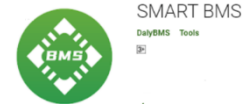


Figure 3 - SMART BMS App

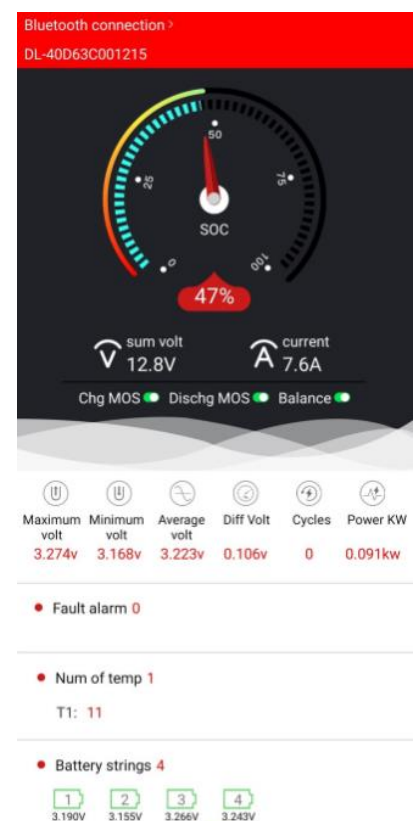


Figure 4 - Daly BMS Status Display

## Recommended Charger Settings

Battery Voltage (V)	Recommended Charger Absorption Set Point (V)	Recommended Charger Float Set Point (V)	Absorption Period (Hour)
12	14.2	13.5	1
24	28.4	27	1
36	42.6	40.5	1
48	56.8	54	1

You may use standard LiFePO4 settings on your chargers. Victron lithium settings are recommended as a default.

## Maintenance

To ensure your battery is performing optimally, be sure to keep on top of this simple maintenance checklist:

- Ensure the battery does not have accumulated dust on the BMS or cell covers;
- If in a marine environment, ensure the battery is housed in a waterproof enclosure;
- Periodically inspect the mechanical and electrical connections;
- Using the Daly BMS app:
  - Check the Diff volt is 0.1V or less to ensure the cells are balanced
  - Check the temperature reading is correct and approximately ambient temperature
- Do NOT allow the battery voltage to drop below 10.8V for extended periods.
- Do NOT charge above 14.6V
- Charge at least once every 3 months
- Chargers MUST be multi-stage with Float function – power supplies can only be used if set to Float voltage.

## Warranty

The warranty covers cells and BMS independently. If the BMS has failed within the warranty period, a new BMS will be programmed for your battery will be provided to you under warranty. The original BMS must be returned to Solar 4 RVs.

If a cell fails within the warranty period, a replacement cell will be provided under warranty. Note that a single cell failure is incredibly rare, particularly with Electric Vehicle rated A grade cells as used in these packs.

Optionally you may return the battery pack to Solar 4 RVs where we will conduct a free repair if a part has failed in the warranty period, or a repair with charge if a part has failed out of warranty or due to a voided warranty.

In most cases, Solar 4 RVs will cover the cost of shipping components to you, in cases of some rural destinations a shipping charge may apply.

Please refer to individual warranty statements for the BMS and cells.

## Ongoing Support

Solar 4 RVs are proud to offer a support service beyond the purchase of your battery. If you require further technical support, please feel free to contact us. We are happy to help!