Powerhouse BATTERIES

LiFePO4

Next Generation Lithium Batteries.

FACT SHEET

This is a basic technical overview on our range of LiFePO4 lithium batteries.

• A LiFePO4 battery is made by combining multiple cells in series and parallel to provide the required voltage and charge capability. For a standard 12V battery this requires 4 cells in series (often expressed as 4S) with a nominal voltage of 12.8V.

• Within each battery housing exists a battery management system (BMS). This is used to oversee the well being of the overall battery pack and manages issues such as Over-voltage cut off, Low battery cut off and Over temperature shut down. It also balances the multiple single cells within the battery ensuring they are all correctly charged.

• Due to the BMS design, not all LiFePO4 batteries can be wired in series, and if they can be, there are limitations as to how many can be wired in a series string. Maximum for our range is 4 pieces. Generally there are no problems wiring the batteries in parallel. In theory, you could use unlimited batteries in parallel.

• It is important to note that prior to first use, all LiFePO4 batteries should be fully charged. Altronics LiFePO4 batteries are supplied 30% charged from the factory.

• If a LiFePO4 battery's BMS "low battery cut off" activates, it will disconnect the battery from the battery terminals. This will present a very low voltage across the battery terminals (potentially 0V) which may look like the battery is dead, but simply indicates that it is protecting itself. Chargers designed for LiFePO4 batteries will recognise this and bring the battery out of protect mode via various methods. For example our M8536A charger will pulse charging voltage into the BMS until it has charged the battery enough for the BMS to reconnect the battery (this can take up to 20 minutes). Once the battery has been reconnected, charging will proceed as normal.

• At a pinch a LiFePO4 can be charged with an SLA charger, however this will make poor use of the battery's capacity and we strongly recommend a LiFeP04 compatible charger such as M8536A.

Lithium's offer several advantages over traditional SLA batteries.

✔ Weight - up to half the weight of equivalent SLA models

✔ Low self discharge

✔ Longer service life up to 10 years

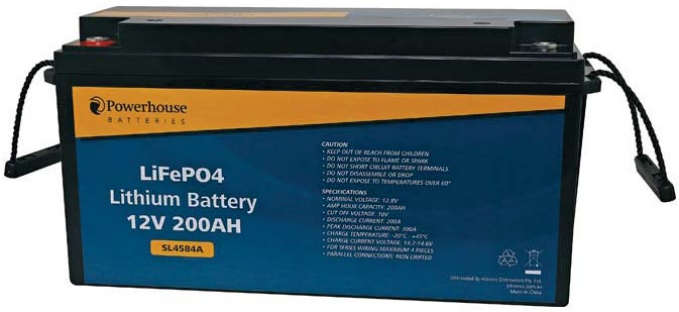
✔ Can't be damaged by over discharging

✔ Built in battery management system BMS to protect the battery

Revision Date: 11/06/2021

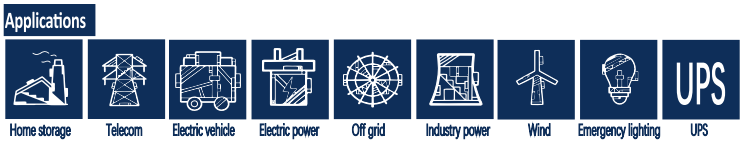
LiFePO4 Lithium Iron Phosphate Batteries
12V200AH
Model:SL4584A

Powerhouse BATTERIES



The latest generation in maintenance free batteries is here! LiFePO4 batteries offer longer service life than traditional lead acid batteries, plus weigh less than HALF as much as SLA batteries. LiFePO4 also provide more usable life per cycle, allowing for longer run times by holding a higher voltage until capacity is almost exhausted. These batteries will also maintain 80-90% charge when in storage - far higher than their lead acid counterparts.

Each battery is fitted with an internal battery management system to provide safe charging and discharging at all times. This system provides internal short circuit, over temperature and under/over voltage cut off. Can be wired in series and/or parallel.



BATTERY SPECIFICATIONS

Battery Type - Chemistry	$LiFePO_4$
Nominal Voltage	12.8 V
Amp Hour Capacity	200 AH
Energy Density	2560 Wh
Dimensions (L*W*H)	482*170*240 mm
Weight	22.0 KG
Terminal Type	M8
Terminal Torque	12.4 NM
Case Material	ABS
BMS build-in	Yes
Recommend Charge Voltage	14.2±0.20V
Max Charge Voltage	14.8±0.20V
Recommend Charge current	40 A
Max Charge Current	200 A
Charge Current (0 to -10℃)	<0.1C
Charge Current (-20 to -10℃)	<0.05C
Recommend Discharging voltage	10.8±0.20V
Max Discharging Voltage	8.8±0.20V
Max Discharge Current	200 A
Pulse Discharge Current	600A/3S

Internal Resistance - Milliohms	< 4mΩ
Efficiency - round trip	> 99.5%
Self Discharge per Month	< 3%
Max 4 - series connections	12-48V
Parallel connections	No Limited
Case IP Rating	IP65
Design Life	20 Years
Cycle Life(1C, 25℃@80%DOD)	>4000 cycles
Cycle Life(0.2C, 25℃@80%DOD)	>6000 cycles
Discharge Temperature	(-23 to 65)℃
Charge Temperature	(-3 to 65)℃
Storage Temperature	(-20 to 45)℃
Bluetooth(APP)	Optional
LCD Screen	Optional
Heating functions -20°C	Optional By Charger
Batteryself heating function	Optional By Cell
Shipping Classification	UN3480, CLASS9
Other Certifications	CB /CE

LiFePO4 Lithium Iron Phosphate Batteries
12V200AH
Model:SL4584A

Powerhouse BATTERIES

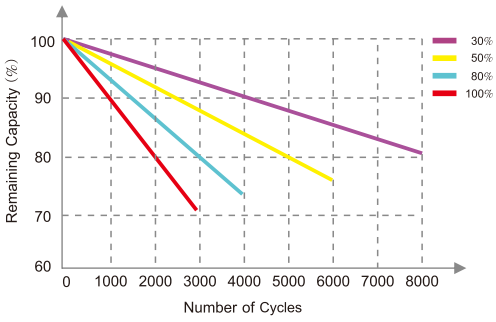
BMS SPECIFICATIONS

BMS Version: JBD

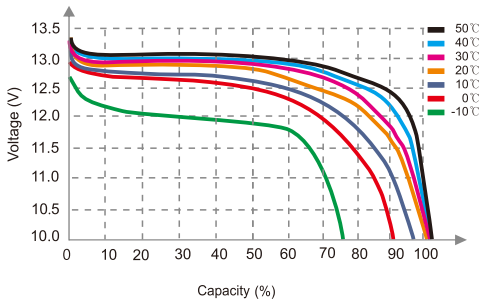
BMS Protections Range: Over (Voltage, Current, Temperature management) and cell balance

Over Charging Cell protection	>3.75±0.03V	Delay 500ms-1500ms
Over Charging Pack protection	>15.0±0.12V	Delay 500ms-1500ms
Over Charging Current 1	320±80A	Delay 500ms-1500ms
Over Charging Current 2	--	Delay 500ms-1500ms
Over Charging Temp Protection 1	-15±5℃ or 54±5℃	Release -8±5℃ or 49±5℃
Over Discharging Cell protection	<2.2±0.08V	Delay 500ms-1500ms
Over Discharging Pack protection	<8.8±0.32V	Delay 500ms-1500ms
Over Discharging current 1	1600±350A	Delay 5ms-15ms
Over Discharging current 2	3200±700A	Delay 500us-1500us
Over Discharging Temp Protection 1	75±5℃	Release 58±5℃
PCB Temp protection	90±8℃	Release 65±15℃
Cell Balance Start	3.50±0.05V	
Cell Balance Current	200±50mA	
Short circuit	6400±1200A	Delay 200-800us

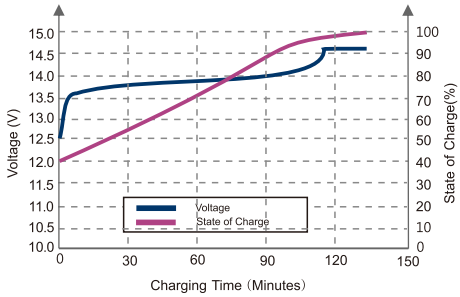
Different DOD Discharge Cycle Life Curve 1C 25C



Different Temperature Discharge Curve(0.2C)



State of Charge Curve(0.5C, 25℃)



Issued November 1st 2022.

Powerhouse BATTERIES

LiFePO4 Models

Important Information Regarding Your Lithium Battery.

The Powerhouse range of Lithium batteries have undergone two charge/discharge cycles at the factory during manufacture, and are only shipped with approximately 30% charge.

It is important to completely charge a new battery prior to first use. To obtain best performance and prolong battery life, you should use a battery charger suitable for Lithium batteries.

In an emergency you can use a traditional SLA charger, but you will not get optimum performance from the battery as it will never get to 100% charged.

Battery Management System (BMS) Overview

Every model Powerhouse Lithium battery has an inbuilt Battery Management System known as a BMS which is an elaborate electronic protection circuit. The purpose of the BMS is to protect the internal battery cells from numerous adverse conditions, including over temperature, over voltage, under voltage, over discharge as well as ensuring the internal cells making up the battery are properly charged and discharged and are overall well balanced.

SAFE/SLEEP mode.

During use, if the battery does encounter over temperature, over voltage, under voltage or over discharge situations, the BMS will place the battery into “SAFE/SLEEP” mode. When in this “SAFE/SLEEP” mode, there is no voltage present at the terminals. If you measured the battery with a DC volt meter the reading will be 0V. This could lead you to believe the battery is dead or faulty, but it is not. It is in protection “SAFE/SLEEP” mode and to continue using it, it has to be brought out of this state.

Reactivating Battery From “SAFE/SLEEP” mode.

With the battery completely disconnected, you will need to use a mains lithium battery charger with a “wake” circuit (suitable Powetran chargers include M8534A and M8536A). This will pulse the battery, eventually getting it to start charging. The time it takes varies depending on the charger used and the capacity of the battery. This can take from several minutes to more than an hour.

Do not use the battery until it has been 100% recharged.

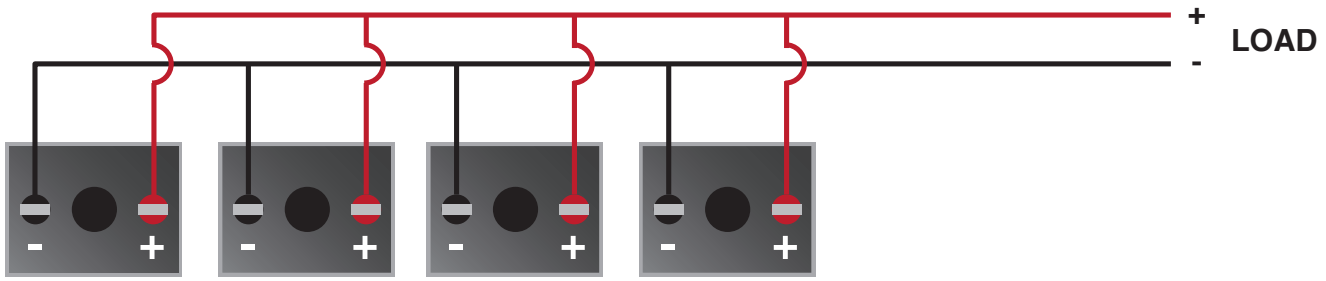
Powerhouse BATTERIES

LiFePO4 Models

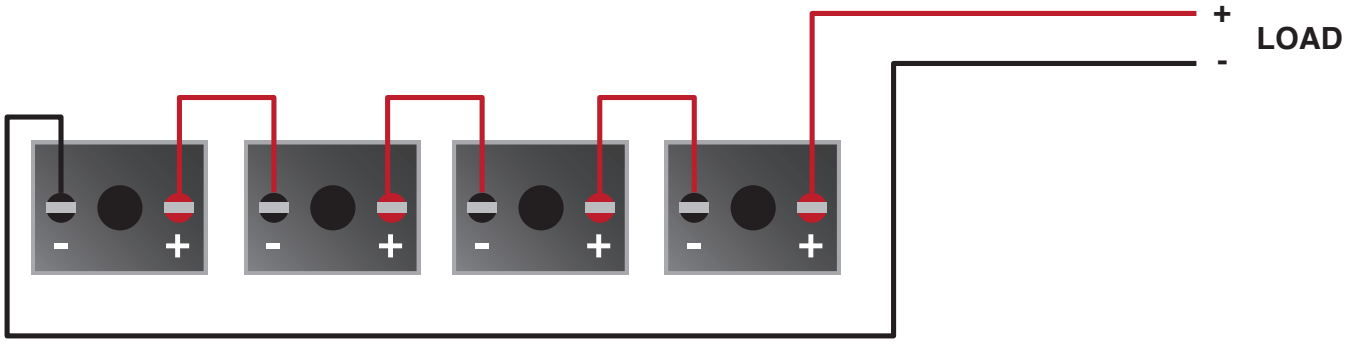
Battery Wiring Configurations

Regardless of your wiring configuration it is technically best to individually charge each battery to 100% capacity using the same charger before connecting them. This ensures all batteries are at the same terminal voltage and will charge/discharge evenly.

Parallel Batteries (no limit on number connected - always check battery datasheets to confirm).



Series Batteries (maximum 4 units - always check battery datasheets to confirm).



Note: When using LiFePO4 batteries in circuits, NEVER mix brands, capacities or voltages. Always use identical batteries in your circuit (ie: same brand/model, same amp hour (Ah) rating, same voltage).

Disclaimer

Information provided as a guide only. Please seek professional advice when installing battery circuits in your vehicle or trailer. Battery wiring can carry very high currents and if not fused correctly, could cause circuit failures and fires.

Warranty Statement

Altronic Distributors warrants Powerhouse LiFePO4 batteries for 5 years from date of purchase from Altronics or its resellers to the consumer. If this item is part of an installation or another product, please contact the installer or supplier for your warranty. During the warranty period, we undertake to repair or replace your product at no charge if found to be defective due to a manufacturing fault. The warranty excludes damage by misuse or incorrect installation (i.e. failure to install and operate device according to specifications in the supplied instruction manual), neglect, shipping accident, or no fault found, nor by use in a way or manner not intended by the supplier.

For repair or service please contact your PLACE OF PURCHASE.

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure. NOT FIELD SERVICEABLE.

Distributed by Altronic Distributors Pty. Ltd. Ph: 08 9428 2199 Internet: altronics.com.au

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Powerhouse BATTERIES

LiFePO4

Installation Guide for Powerhouse LiFePO4 batteries.

IMPORTANT NOTICE: **As of November 2023 Australian Law states batteries installed in RVs, Caravans etc., CANNOT be installed in a habitable area unless placed in a sealed enclosure. The following outlines the specific requirements for installation.**

Overview

This guide is designed to provide information on installation of Powerhouse LiFePO4 batteries in accordance with AS/NZS 3001.2:2022. This guide is suitable for installation of batteries in recreational vehicles and covers the following battery series:

- Powerhouse Standard LiFePo4
- Powerhouse Slimline LiFePo4
- Powerhouse Bluetooth LiFePo4

Before commencing we advise that you read AS/NZS 3001.2:2022 to make sure that your installation complies to the requirements of this standard. The standard is available from Standards Australia.

All Powerhouse LiFePO4 batteries are fitted with an integral Battery Management System (BMS) that protects the following conditions as set out in clause 5.4.12.3.3:

A. Over and under voltage (at cell level).

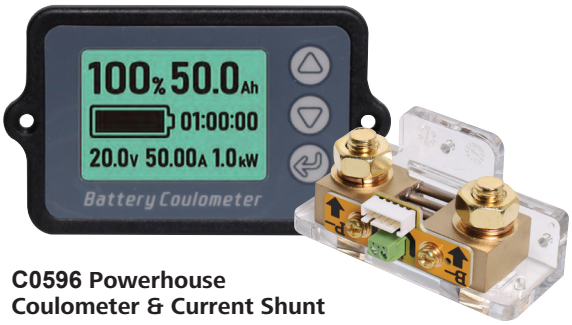
B. Over and under temperature.

C. Over current.

The lithium cells (batteries) inside the Powerhouse LiFePO4 batteries comply with AS IEC 62619 as required by clause 5.4.12.3.1 of the standard.

Battery State Of Charge (SOC)

The Powerhouse Bluetooth range of batteries are fitted with a Bluetooth module which allows monitoring of the state of charge (SOC) percentage as required by clause 5.4.12.3.4 along with current, temperature and voltage of the cells. If using multiple batteries in parallel we recommend a standalone battery monitor to be connected to the battery circuit such as the C0594 & C0596 coulometers.



C0596 Powerhouse Coulometer & Current Shunt

The Powerhouse Standard and Slimline ranges of batteries require external SOC monitoring. Using the C0594 & C0596 coulometers, essential battery parameters can be monitored including capacity as set out in clause 5.4.12.3.4.

Powerhouse
BATTERIES

Installing your batteries.

To protect the battery from impact and moisture ingress the battery should be installed in a designated battery enclosure/compartment.

If the battery compartment is within a vehicle (car or caravan etc), the battery must be installed to share an outer wall or floor of the vehicle. The compartment must be sealed and made from material which prevents gases/vapour from entering the habitable space of the vehicle, directly or indirectly.

To meet clause 5.4.11.3.2 access to the battery compartment must be easy. It should be accessible by a door/hatch directly from the outside of the vehicle. As this cannot always be achieved in every installation type, an internal access panel is acceptable as long as it is securely fastened and fully sealed to prevent gas/vapour from entering the habitable space within the vehicle. If you choose this method of installation we recommend attaching a label to the hatch that warns of the dangers and legalities of leaving it unsecured.

Ventilation requirements.

Venting of the compartment is a requirement of the standard and must consist of a 20mm minimum hole size to the exterior of the vehicle either through the wall or floor of the structure. This venitilation allows the compartment to equalise pressure and temperature between the compartment and the outside environment. It also allows for venting of gas/vapour in the unlikely event of a battery/cell failure. The vent design should not compromise the battery compartment or force gas/vapour into the habitable space of the vehicle.

Mounting requirements.

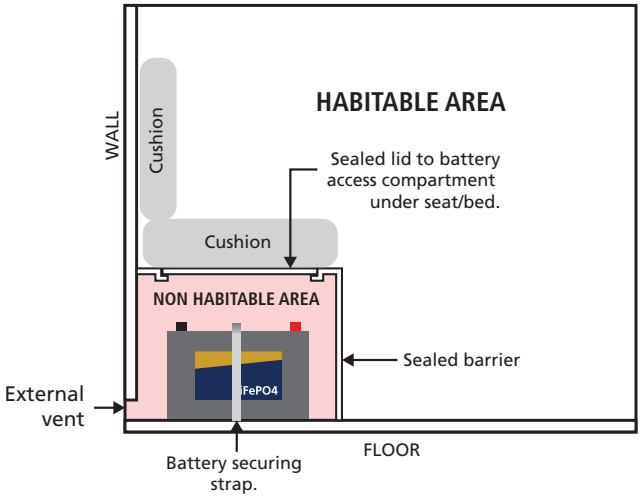
The Powerhouse Slimline batteries are provided with integral mounting points to comply with Clause 5.4.5.

For other Powerhouse LiFePO4 batteries, we recommend the use of a secure battery tray or straps to restrict the batteries movement as per the requirements of the standard.

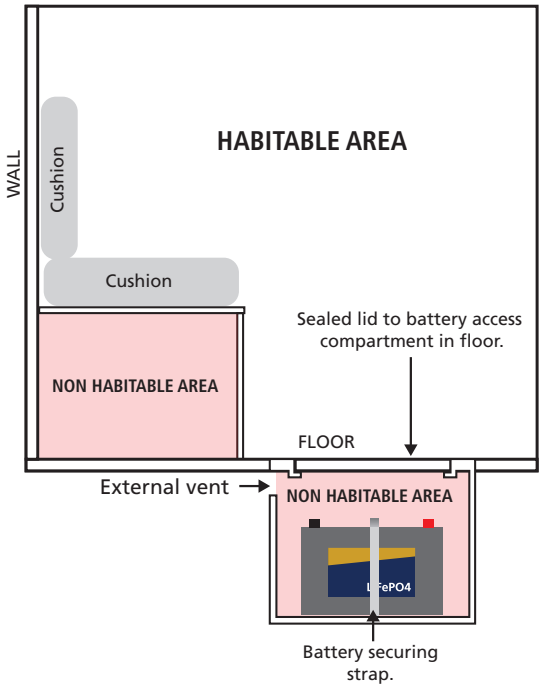
Spill trays are not required as part of the standard when using LiFePO4 batteries.

Example installations:

Caravan Seat / Bed Installation (Sealed Internal)



Under Floor Installation (External)



Powerhouse
BATTERIES

Steps before use:

Before commencing use of your vehicle power system you should ensure the following steps have been checked off.

1. All connections are secure and there is no interference from non-conductive materials.
2. Check that all batteries in the system are secure as per clause 5.4.5 (ie: no movement in any direction >25mm).
3. System has been charged to 100% capacity to allow all battery monitors to sync to 100% SOC.
4. Perform a discharge test with all intended loads, including any power inverters at their intended output. Check for hot connections which may indicate a poor quality connection or cable over its specified current carrying capacity.
5. Make any rectifications required.
6. Recharge the system to 100% SOC again.

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