

# 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 LiFePO4 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

## LiFePO4 Lithium Iron Phosphate Batteries

# 12V 12AH

Model: SL4547A



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 Module Specification

	Item	Specification	Conditions
Nominal	Voltage	12.8V	25°C, 0.2C
	Capacity	12Ah	
	Module weight	1.8kg	±0.1kg
	Dimensions(W*D*H), mm	151X98X95X101	±2mm
Operating parameters	Charging Voltage	14.8V	
	Discharging Voltage	11.8V Recommended	8.4~15V
	Charging current	Max constant charge: 10A	Recommended 5A
	Discharging current	Max constant discharge: 10A Pulse discharge: 28A for 30S	
Temperature	Charge range	0°C~45°C	
	Discharge range	-20°C~60°C	
	Storage range	-20°C~45°C	
BMS	Built-in BMS	Voltage, current, temperature management & cell balance	
Service life	Design life	>10years	0.2C, 25°C
	Cycle life (100%DOD to 80% end)	>2000 times	
	Cycle life (100%DOD to 50% end)	>4000 cycles	@0.5C, 25°C

**Battery Management System Specification**

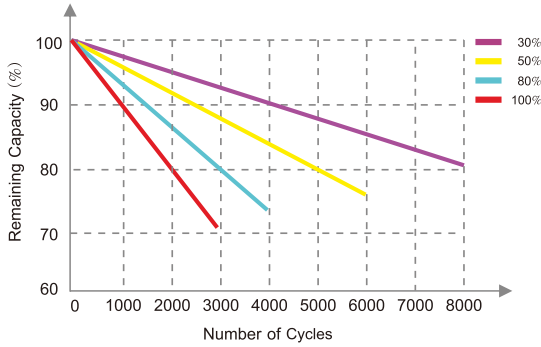
Item		Parameters		Condition
Charge	Cell voltage protection	3.7V	Delay 1~2S	Recover when discharge current >1A or Cell voltage<3.38V or module voltage<13.52V
	Module voltage protection	14.8V	Delay 1~2S	
	Over charging current 1	10A	Delay 20~30S	Turn to pre-charge mode and try to recover in every 3min
	Over charging current 2	--	--	
	Temperature protection	<-10C° or >70C°	Delay 1~2S	Recover when >0C°or <60C°
Discharge	Cell voltage protection	2.65V	Delay 500mS	Recover when charge current >1A or Cell voltage>2.3V or module voltage>9.2V
	Module voltage protection	8.4V	Delay 1~2S	
	Over discharging current 1	28~38A	Delay 500~1500mS	Recover when charging current>1A, or recover in every 60S
	Over discharging current 2	-	-	
	Short circuit	-	200~700 us	
	Temperature protection	<-20C° or >75C°	Delay 1~2S	Recover when >-10C°or <65C°
BMS	PCB Temp protection	>115C°	Delay 1~2S	Recover when <80C°
	Cell balance	26~46mA	Passive balance	Cell voltage difference > 46mV
	Temperature accuracy	±2C°	Cycle measurement	Measuring range -40~100C°
	Voltage accuracy	±20mV	Cycle measurement	For cells and module
	Current accuracy	FSC±5%	Cycle measurement	Measuring range -200~+200
	SOC	5%		Integral calculation
	Power consumption with different condition	<300uA	Switch-off mode	Storage & transportation
		<100uA	Sleep mode	Protection & stand-by
		<15mA	Operating mode	Operating
		NA	Pre-charge mode	Low voltage to start Pre-charge
Communication ports	NA		Can be customized to match the device	

**LiFePO4 Lithium Iron Phosphate Batteries**  
**12V 12AH**  
**Model: SL4547A**

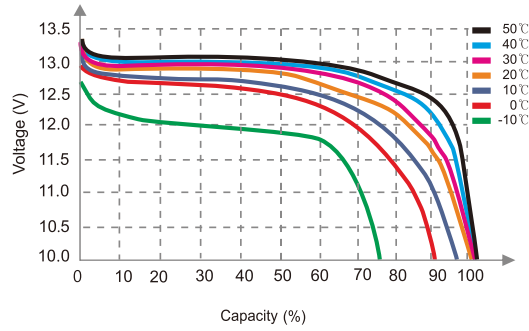


**Performance**

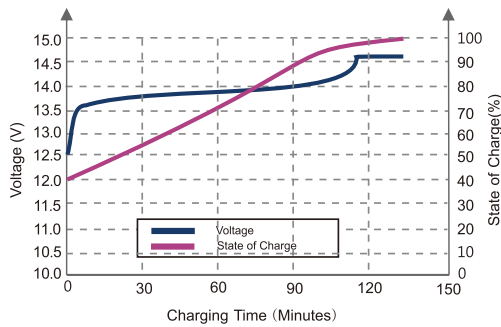
**Different DOD Discharge Cycle Life Curve 1C 25C**



**Different Temperature Discharge Curve(0.2C)**



**State of Charge Curve(0.5C, 25°C)**



**Battery & Connection Specifications**

Item	Specification
Dimensions:	151 x 98 x 101mm
Overall Weight:	1.3kg
Terminal Type:	F2
Connection:	12-48V max 4 in series, no limit in parallel.
Case Material:	ABS
Case IP Rating:	IP56
Cell Type:	Cylinder
Certification:	CB/CE, UN38.3, UL1642 @ cell.
Shipping Class	UN3480, Class 9

## 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.**

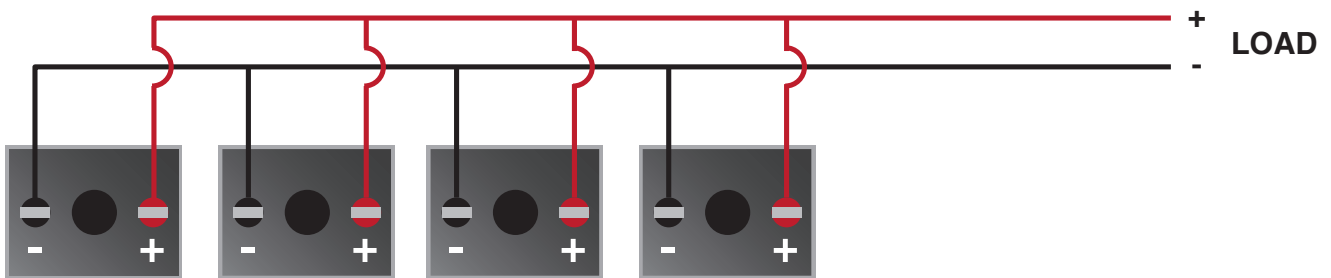
With the battery completely disconnected, you will need to use a mains lithium battery charger with a "wake" circuit (suitable Powetran chargers include M8534A and M8536A). This will pulse the battery, eventually getting it to start charging. The time it takes varies depending on the charger used and 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.**

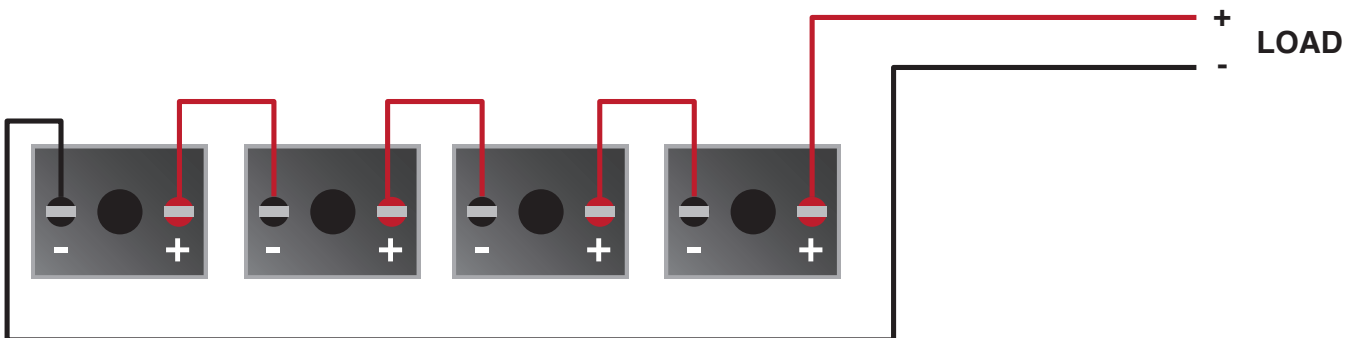
## Battery Wiring Configurations

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 Altronic 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.

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