

SHURAIKEN[®]
LITHIUM SERIES

LiFePO₄ = Lithium Iron Phosphate

Out of the three types of batteries LFP is the safest battery type in the market. It is rated to last longer than both LTO and Lithium Ion. Has a better shelf life than LTO. Lighter weight than LTO, and easier to manufacture.

- LiFePO₄ has a far longer lifespan of 4000 times cycle life due to its superior lithium iron phosphate chemistry.
- Lithium iron phosphate has a 350-day shelf life. Lithium titanium lasts 300 days.
- When we compare the price of LTO vs LiFePO₄ batteries, the LiFePO₄ is superior.
- LTO is difficult to manufacture, the energy density is low and the cost is too high, the battery production process is easy to produce gas, the consistency is relatively poor, and the market share is still small. In terms of LTO vs LiFePO₄ battery performance and user experience, lithium iron phosphate battery has always been the mainstream battery because of its high energy density, no memory effect, excellent high temperature performance and high cost performance.

Lithium Ion Li-ion

Lithium Ion can deliver high levels of power. Lithium-ion is normally the go-to source for power hungry electronics that drain batteries at a high rate. Example: cranking and vehicle but has a shorter lifespan.

Lithium-ion, the higher energy density makes it more unstable, especially when working in a hot environment. It has a life cycle of 500-1,000 cycles as it can be negatively impacted based on the operating temperature of the electronics or working components.

Both lithium iron phosphate and lithium ion have good long-term storage benefits. Lithium-ion has a shelf life of roughly around 300 days.

Lithium Battery Management System

All Shuriken Lithium batteries incorporate a Battery Management Systems (BMS) into each battery.

The BMS comprises different protection components:

- Integrated Circuit (IC)
- MOSFET - compact transistor
- Fuse - protects against excessive current
- Thermistor - temperature sensor
- Protection Circuit Module (PCM)

The inclusion of a BMS helps to:

- Maintain safety for users.
- Prevent damage to equipment and property.
- Eliminate concerns about use of the wrong charger for this chemistry type.
- Minimize the risk of over discharge causing damage.
- Provide short circuit and overcharge protection.

The BMS ensures optimal operating conditions for your battery to last longer and perform at its best in your devices and equipment.



What's inside a Lithium Battery

Cylindrical Cells Inside

Shuriken models constructed with cylindrical cells inside are the most versatile design. Internal cell safety in addition to the integrated BMS in every battery module, plus multi-layer internal structure safety measures results in a battery that is more tolerant to vibration and thermal cycling.

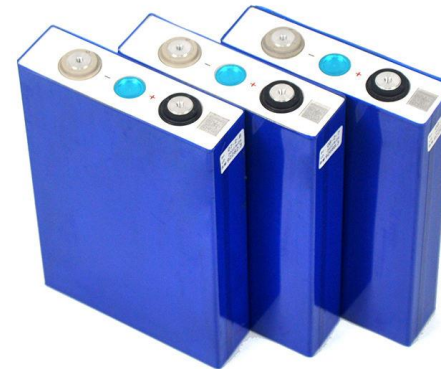
Most importantly, if one cell fails, the whole pack does not fail. This provides peace of mind for use in critical applications, and safety in mobility.



Prismatic Cells Inside

Shuriken models constructed with LiFePO₄ prismatic cells inside are designed for users who require a rechargeable lithium solution that provides more optimal use of space. The size and shape of prismatic cells lends itself to being an easier format for assembly, requiring less cells overall and lower manufacturing costs.

The larger format of a prismatic cell compared to a cylindrical cell does mean there is a larger thermal runaway potential. However, with the combination of built-in BMS this is limited, still giving the prismatic cells great storage ability.



Lithium Batteries Terms

3.2V 18AH 4S 3P : 3.2V = Voltage per cell 18AH = Amp Hours 4S = 4 Cells in Series 3P = 3 Cells in Parallel

Resting Voltage : Voltage of the battery when nothing is connected or no current is being drawn.

Voltage Range: Range of voltage the battery can safely operate in.

Discharge Cut-off Voltage: Set voltage that the battery stops pushing current, needs to be recharged.

BCI : Battery Group Size, this is typically used for under hood batteries.

Pulse Discharge Current: Maximum number of amps the battery can deliver over a period of time.
Ours is measured in 10 milli-second.

Max Continuous Current: Maximum number of amps the battery can continuously and safely deliver.

Watt Energy or Watt Hours : Calculated by : Battery voltage x AH = Watt Energy. WH is a measurement of how much energy (in watts) the battery will expend over one hour.

CA : Cranking Amps, the amount of amps that can be delivered and sustained for 30 seconds.
Shuriken Lithium Ion battery have CA listed as they are starting batteries for utility vehicles.

Ah Pb Eq : This number is the Lead Acid equivalent to our lithium batteries in amp hours.
AH = Amp Hours **Pb Eq = Lead Acid Equivalent**

AH: Amp Hour rating of our Lithium Batteries. Example: a 100 Ah battery can output 1 amp for 100 hours or 100 amp for 1 hour.

Maximum # of Batteries that can be wired together.

CONNECTING BATTERIES IN SERIES



Voltage Increases (48V) Current Stays the same

CONNECTING BATTERIES IN PARALLEL



12.8 V Voltage Stays the same Current Increases

Parallel wiring of these batteries is not recommended.

It is not considered 100% safe. If connection is unavoidable, take precaution with switches and fuses.

Warranty and Return Information

Warranty

- 1 year limited warranty on all Shuriken Lithium batteries.
- Warranty only covers manufactures defects

Warranty does not cover

- Misuse or abuse
- Improper installation or charging
- Physical damage that can include but not limited to damage to the case caused by impacts, drops, or improper use of battery mounting hardware.

Returns

All Returns must be approved by Metra and RA# will be issues for the return to be issued. Please contact your sales person for the complete RA process. Must be shipped through UPS with DOT and FAA approved shipping protocols that include static-free wrapping and a specially marked, secure box. All of these supplies can be found at your local UPS store. Cost of shipping is the responsibility of the customer. Metra Electronics will not be responsible for cost of shipping.

Warnings

- Do not short circuit the terminals.
- Do not crush, puncture, submerge or dispose of in water or fire. The battery is not waterproof.
- Do not attempt to open, disassemble or service the battery pack.
- Disconnect the battery before welding or soldering anywhere on the vehicle.
- Lithium batteries contain flammable gases. Have a plan in place to respond to possible fires or personal injury, including burns.
- Parallel wiring of these batteries is not recommended. It is not considered 100% safe. If connection is unavoidable, take precaution with switches and fuses.