

Lithium Iron Phosphate Battery UPS Systems for Military Applications

AJ's Power Source has been at the forefront of utilizing Lithium Iron Phosphate (LiFePO₄) batteries in Backup Power Systems for our military customers. For ten plus years we have been using this chemistry with our own added technology that allows us to provide the smallest/lightest Tactical UPS available in our **PowergridM™ UPS**. <https://www.ajpowersupply.com/military-uninterruptible-power-supply/>

A UPS (Uninterruptible Power Supply) provides power to equipment, typically from batteries, when the power source is not available. In critical military applications, an Online UPS system not only provides this backup power but also filters the input to provide continuous regulated and conditioned power that is critical for effective and efficient operation of the end equipment.

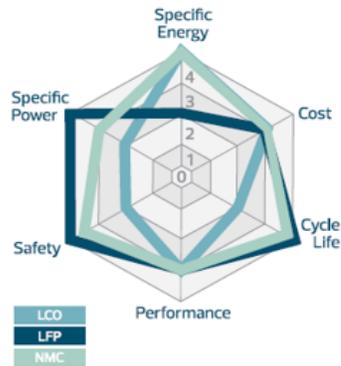
A UPS system can utilize many different types of battery chemistries. Lithium Iron Phosphate (LiFePO₄) and other lithium-ion batteries are in the same category as they all use lithium ions as the main charge carrier within the cell. A key difference in lithium-ion chemistries is in the cathode material. LiFePO₄ batteries are ideal for use in UPS systems as they provide an outstanding combination of attributes including:

- ✓ High energy with long runtime and consistent discharge voltage
- ✓ Stable chemistry - safe and non-toxic
- ✓ Long life (10+ years) with no maintenance
- ✓ Lightweight for mobile and airborne applications
- ✓ Wide operating temperature range
- ✓ Low long-term cost

Recently, we have even seen that **Tesla** is changing over to LiFePO₄ batteries! In October 2020 Tesla started to produce their Model 3 out of their Gigafactory Shanghai facility with LiFePO₄ batteries. <https://electrek.co/2020/10/01/tesla-reduces-model-3-prices-china-range-lfp-batteries/>

The advantages of LiFePO₄ batteries over other lithium chemistries is seen in the following chart.

Advantages of Lithium Iron Phosphate (LiFePO4) batteries



LCO
Lithium Cobalt Oxide (LiCoO₂ or LCO)
Li-cobalt excels on high specific energy but offers only moderate performance specific power, safety and life span.

LFP
Lithium Iron Phosphate (LiFePO₄ or LFP)
Li-phosphate has excellent safety and long life span but moderate specific energy and a lower voltage than other lithium-based batteries. LFP also has higher self-discharge compared to other lithium-ion systems.

NMC
Lithium Nickel Manganese Cobalt Oxide (LiNiMnCoO₂ or NMC)
NMC has good overall performance and excels on specific energy. This battery is the preferred candidate for the electric vehicle and has the lowest self-heating rate.



Battery	LiFePO4	LiCoO2	LiMn2O4	Li(NiCo)O2
Safety	Safest	Not Stable	Acceptable	Not Stable
Environmental Concern	Most Enviro-friendly	Very Dangerous	Acceptable	Very Dangerous
Cycle Life	Best/ Excellent	Acceptable	Acceptable	Acceptable
Power/Weight Density	Acceptable	Good	Acceptable	Best
Long Term Cost	Most Economic/ Excellent	High	Acceptable	High
Temperature Range	Excellent (-20C to 70C)	Decay Beyond (-20C to 55C)	Decay Extremely Fast over 50 C	-20C to 55C

AJ's Power Source was the first company to utilize LiFePO4 batteries in a Military UPS system with our **Powergrid™ UPS**. The **Powergrid™** design utilizes the latest advancements in power management technologies to dramatically enhance operational flexibility and performance by using advanced computer-controlled inverters, auto switching AC/DC input power controls, advanced Lithium Iron Phosphate battery technology, Ethernet-based SNMP status monitoring, and global AC/DC power input capabilities. **Powergrid™** is the first power management system based on a common set of modular power components that can be configured and re-configured to meet a wide variety of dynamic mobile and deployed power support requirements.

Powergrid™ is designed as a High Reliability power management solution capable of providing resilient to fully redundant non-stop power capabilities for critical systems. Our "plug & play" UPS Backplane Module is the first of its kind and provides outstanding flexibility and functionality to the end user in a truly **Integrated Power Management System** that can provide up to 12kW of reliable, on-demand power. <https://www.ajpowersupply.com/10u-shipboard-backplane-system/>

Powergrid™ has been qualified to all applicable Military Standards for environmental, EMI, and power quality requirements and is the only LiFePO4 based UPS to have received **US Navy Safety Certification** In accordance with the requirements of Navy Technical Manual S9310-AQ-SAF-010.

For any information you contact our official distributor:

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