

White Paper: NCM Battery Safety

Introduction

Omnicharge designs intelligent, portable power solutions for professionals, businesses, and critical environments. A core part of our engineering strategy is selecting the right battery technology to balance energy density, safety, longevity, and form factor. Most Omnicharge products are built with NCM (Nickel Cobalt Manganese) lithium-ion cells—a choice that is often compared to LiFePO₄ (Lithium Iron Phosphate) batteries.

This white paper explains:

- Why Omnicharge chooses NCM cells
- Design Safety in Omnicharge NCM Systems
- Engineered for Safety: Factory-Level QA, Global Certifications, and Proven Reliability

Why Omnicharge Chooses NCM Battery

- **The Power of NCM: Low Resistance, Low Heat, High Safety:** NCM cells offer naturally low internal resistance, which means they generate less heat during charging and discharging—even under heavy workloads. The result? Cooler operating temperatures, slower thermal buildup, and enhanced safety during rapid power delivery.

Compared to LiFePO batteries, which tend to rise in temperature more quickly under high loads, Omnicharge NCM batteries stay cooler and safer—a critical advantage in professional environments where reliability and safety are non-negotiable.

- **High Energy Density in a Compact Form:** NCM cells offer superior energy density—delivering more power in a smaller, lighter package. This allows Omnicharge to design sleek, portable solutions that are both space-efficient and high-performance, especially in office, healthcare, and mobile enterprise environments.
- **Superior Power Output for Demanding Applications:** NCM chemistry enables high discharge rates, essential for powering devices such as laptops, monitors, routers, and medical equipment. This performance level is difficult to match with LiFePO₄ in the same compact footprint.
- **Balanced Lifecycle and Versatility:** Modern NCM technology offers an ideal balance of durability and performance — sufficient for most commercial and

enterprise-grade applications. Combined with Omnicharge's power management system, our products maintain longevity without compromising size or weight.

Debunking the Myth: "LFP is Safer than NCM" (Design Safety in Omnicharge NCM Systems)

It is true that LFP chemistry is inherently stable, but safety is not defined by chemistry alone. Cell quality, BMS (Battery Management System) design, enclosure engineering, and thermal management all play pivotal roles in real-world safety.

- **Tier One Battery Cell Selection:**

Omnicharge exclusively sources **Tier One Battery Cells**—the same grade used by leading EV manufacturers. These cells come from top global suppliers with traceable quality control, ensuring:

- Consistent chemical stability
- Tight cell matching for thermal uniformity
- Low internal resistance for safer operation

Using premium-grade cells significantly narrows the risk gap between NCM and LFP.

- **Enterprise-Grade Battery Management System (BMS)**

Our NCM systems are **protected by a proprietary enterprise-grade BMS**, designed to monitor, regulate, and respond in real time. Combined with **real-time thermal sensors and intelligent algorithms**, our systems don't just prevent problems—they **anticipate and avoid them**.

Advanced safety features include:

- Intelligent cell balancing
- Overvoltage and undervoltage protection
- Thermal shutdown at critical thresholds
- Short-circuit and surge protection
- Predictive health monitoring that alerts before issues arise

In contrast, LFP systems often rely on passive thermal stability and basic protections. At Omnicharge, we take a smarter, more proactive approach to safety.

- **Multi-Layer Thermal Defense**

All Omnicharge devices are built with multi-layers thermal protection which includes:

- Efficient heat dissipation design
- Real-time temperature sensors across cells and PCBs
- Intelligent load management to reduce power draw during high-temperature conditions

While LFP systems often rely on the chemistry's inherent thermal stability, their BMS platforms are generally simpler—focusing on basic voltage, current, and temperature thresholds. NCM systems from Omnicharge provide deeper insight and greater protection under complex or extreme operating conditions.

Engineered for Safety: Factory-Level QA, Global Certifications, and Proven Reliability

Omnicharge doesn't just design for safety—we validate it through rigorous quality assurance processes, adherence to international standards, and real-world performance data. Our commitment ensures that every product shipped delivers the same level of reliability, protection, and peace of mind.

- **Strict Quality Assurance Process**

Every Omnicharge product undergoes a comprehensive, multi-stage testing process during production:

- Full battery testing (voltage, resistance, leakage)
- Charging and Output Performance
- Environmental Adaptability
- BMS failure-mode simulation
- Final system audit with serialization and traceability

This strict QA ensures every unit meets our safety and performance standards—often exceeding the controls applied in typical LFP-based systems.

- **Global Safety Certification Compliance**

Omnicharge products meet the world's most recognized safety standards:

- **ETL, CE, FCC** for electrical and consumer safety.
- **IEC 62133** for battery integrity

- **UN38.3** for safe global transport
- **RoHS** for environmental compliance

But we don't stop at compliance. We run **additional stress tests and simulations** to ensure performance well beyond regulatory standards—because reliability should never be average.

- **Proven Performance in the Real World**

Omnicharge power solutions are trusted by Fortune 500 companies, government agencies, and leading educational institutions. Powered by advanced NCM battery systems, our technology is recognized for its exceptional safety record. From offices and classrooms to medical carts and off-grid deployments, Omnicarge delivers reliable, high-performance power—safely and consistently, even in the most demanding environments.