SHORAI® Battery Management System (BMS) & Care Guide

LiFePO4 powersports batteries — LFM models and mid-2022+ LFX (red-dot)

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1. About the Shorai Sentry BMS

Since May 2022, every Shorai powersports battery ships with an internal Battery Management System (Shorai Sentry BMS). The BMS protects against over-discharge by electronically disconnecting the main terminals if pack voltage falls too low — key left on, parasitic draw, or extended storage. The battery may then read 0 V at the terminals. This is a protective lock, not a failed battery, and most "smart" chargers see zero volts and refuse to start, which is why the unlock procedure below is required. Beginning August 2026, the Sentry BMS also includes over-current protection (OCP), which briefly locks the terminals when it detects an abnormal current spike and releases automatically (See 3B).

2. Identifying a BMS-Equipped Battery

- **LFM model number** → has BMS.
- **LFM with no visible dot** → has BMS.
- **Red dot** on the bottom-right corner of the front label → has BMS.
- **Green, black dot** → no BMS (pre-2022).
- **LFX with no visible dot** → email Shorai the model number and a photo of the two white labels on the bottom of the battery.

LFM and LFX share the same case and LiFePO4 cells; the LFM designation was introduced in October 2024 to simplify identification.

3. BMS Protective Lockouts

The Sentry BMS uses two distinct protections. Each has a different recovery — do not confuse them.

A. Over-Discharge Lockout (manual recovery)

The main terminals read 0 V and stay locked until manually recovered. Use one of the methods below. After any successful unlock, fully charge on a LiFePO4-compatible charger and, when possible, rest 24 hours before returning to service. If the BMS locks again within 24 hours, file an RMA at shoraipower.com/rma.

- **Shorai BMS01 charger (preferred, if owned):** Set to CHARGE MODE — never use STORE MODE on a BMS equipped battery. LEDs alternate yellow/green while unlocking/low level charging, then rapid green during charge.
- **Jump from a fully charged, similar-capacity 12 V powersports battery:** Connect for **15 seconds**, disconnect, and measure. Repeat as needed until the battery unlocks and terminal voltage stabilizes around **12.5 V**. Then move to a LiFePO4 compatible charger and fully recharge.
- **Low-current 12–15 V DC power supply:** Apply a less than 1A current to the main terminals for up to 5 minutes. Disconnect; if steady above ~12.5 V, switch to a LiFePO4 compatible charger and fully recharge.
- **BMS-recovery chargers with unlock function:** Optimate Lithium 4s 0.8 A (TM-471) for batteries up to the 14 series; Optimate Lithium 6 A for the 18 series and above.

⚠ **Never use lithium jump packs or boost packs.** They deliver extremely high current in a very short period of time and can damage the BMS or cause catastrophic cell failure. **Use of these devices voids the Shorai warranty.**

B. Over-Current Protection — OCP (self-recovering, August 2026 and later)

- **Trigger:** an abnormal current spike at the terminals — prolonged or repeated cranking, or excessive inrush current from an engine that the battery is not sized for (e.g., high-compression custom builds).
- **Recovery:** Wait **1–5 minutes** for the OCP to release automatically, then attempt to start again. No charger, no jump, no manual unlock required.
- **Recurring triggers serve as a diagnostic indicator.** If OCP trips more than once in normal use, the battery is likely undersized for the engine, or a starter or wiring fault is drawing abnormal current. Contact Shorai for sizing guidance before continuing — repeatedly forcing OCP events stresses the BMS and shortens battery life.

⚠ **Do not engage in prolonged or continuous cranking.** Sustained starter engagement and back-to-back crank attempts draw extended high current — this will trigger OCP on August 2026 and later batteries (see Section 3B) and can permanently damage the BMS on any battery under severe or repeated abuse. If the engine will not start after a few attempts, stop and investigate the underlying cause (fuel, ignition, charging system) rather than cranking harder.

4. Initial Charging (Before First Installation)

Shorai batteries do not arrive fully charged. Before installing, fully charge the battery on a LiFePO4-compatible charger. A full initial charge conditions the cells and maximizes cranking performance. Charge times may vary depending on the battery and charger.

5. Installation & Physical Care

- **Any mounting orientation is safe.** LiFePO4 cells contain no free liquid electrolyte and may be installed upright, on their side, or inverted. Ensure that the battery terminals are protected from shorting and exposure to water.
- **Secure the battery.** Shorai batteries are lighter and smaller than the OEM lead-acid they replace. Use the included foam padding to fill gaps in the battery tray — a battery that shifts or vibrates will suffer internal damage.
- **Verify polarity with a multimeter** before connecting cables. Reverse polarity will damage the battery and the vehicle's electronics.
- **Use only the supplied terminal bolts.** A longer bolt will bottom out inside the terminal and crack it. **Do not overtighten**.

- **Standard order of connection:** Connect positive first, negative last. Disconnect negative first. Cover the positive terminal any time the battery is out of the vehicle.
- **Never bridge the terminals** with metal, and never short the 5-pin BMS port. Remove rings, watches, and metal jewelry; use insulated tools.

6. Voltage Behavior & Everyday Maintenance

- **Right off the charger** a Shorai battery will read ~14.4 V, then settles to a **resting ~13.4 V** within minutes. This is normal — the battery is fully charged.
- **Recharge threshold:** recharge when resting voltage approaches **~13.1 V (~40% SOC)** or sooner.
- **Older vehicles and off road bikes:** which normally do not have a key off draw usually need no additional maintenance charging. Charge every few months.
- **Modern street vehicles** have key-off parasitic draw (clock, ECU, alarm, navigation, etc.) that slowly discharges the battery even when parked. During periods of infrequent riding or storage, recharge the battery monthly. Vehicles with higher parasitic draw may require more frequent charging.
- **Do not run accessories** (lights, radios, phone chargers, heated gear, etc) with the engine off. Draining battery reserve can void the warranty.
- **Frequent normal riding** generally keeps the battery charged. However, infrequent use, short trips, or extended storage may not replace the energy used during starting. Check battery voltage periodically and recharge as needed.

7. Vehicle Charging System Requirements

A healthy charging system is the single biggest factor in prolonging battery life. Before installing a new battery — and whenever the BMS locks unexpectedly — verify charging system output with a multimeter.

- **At ~2000 RPM:** output must read **around** 13.8 V minimum for reliable charging.
- **Maximum output:** must NEVER exceed **14.8 V** at any RPM. Higher voltage damages the battery and voids the warranty.
- **Check with accessories on** to confirm the system holds voltage under load. Older or unregulated systems may need a regulator upgrade before installing a lithium battery.

8. Compatible & Forbidden Chargers

- **Use:** any charger designed for or confirmed compatible with LiFePO4. BMS-recovery / unlock function preferred.
- **Lead-acid chargers or tenders:** acceptable for a single full charge only. Do not leave it connected for storage or maintenance unattended.
- **Never use:** LiPo or standard Li-ion chargers (wrong voltage profile), or any lead-acid charger with automatic desulfation, repair, recondition, or recovery modes that cannot be disabled — this includes essentially all Schumacher lead-acid chargers.

9. Storage & Cold-Weather Starting

- Fully charge before storing. Preferred: remove from vehicle, tape both terminals, store in a cool, dry place (~34 °F / 1 °C is ideal — a refrigerator works well).
- Avoid prolonged storage below **0 °F / –18 °C** or above **90 °F / 32 °C**. Check voltage every 3–6 weeks; charge above freezing only.
- Cold-weather starting: down to ~20 °F / −7 °C most bikes start normally. Below that, run headlights/accessories **~30 sec at 40 °F, 4–5 min at 0 °F** before cranking to warm the pack.
- If the first crank fails, wait at least 30 seconds before the next attempt — the first crank warms the battery and the second will be stronger.

10. Safety, Handling & Disposal

- **Do not disassemble, drop, puncture, or crush.** After any crash, fall, or hard impact, inspect for cracks, dents, or swelling — if in doubt, retire the battery.
- **Do not connect** Shorai batteries in series or parallel with any other battery (including other Shorai batteries) without factory guidance.
- **Avoid Short Circuits**: Do not allow metal objects to bridge the terminals.
- **Intended use:** powersports applications only (motorcycle, ATV, UTV, PWC, snowmobile). Contact Shorai before using in any other application.
- **Keep dry.** For wet environments, pack the 5-pin port with dielectric grease and coat terminals with heavy grease. Avoid high-pressure washing near the battery case; if submerged, disconnect and inspect before returning to service.
- **Do not expose** to open flames, prolonged direct sunlight, or extreme heat (>500 °C can cause cell decomposition).
- **Fire (rare):** use a Class D extinguisher or dry sand. LiFePO4 has very low thermal-runaway risk relative to other lithium chemistries.
- **Cell venting (very rare, abuse condition):** ventilate the area, avoid inhaling vapors, seek fresh air, and do not attempt to reuse the battery.
- **Transport:** insulate both terminals before shipping. Never ship a damaged, or swollen battery — DOT Class 9 lithium regulations apply.
- **Disposal:** recycle at a designated LiFePO4 facility. Never place in household trash and never incinerate.
- **Warranty & support:** submit claims at **shoraipower.com/rma**. When in doubt, contact Shorai before attempting further recovery.

Disclaimer: Shorai Service LLC is not liable for damage caused by misuse, improper installation, incompatible chargers, jump packs, or failure to follow this guide. Always prioritize safety.