

SUNNY TECH SOLAR

Product Manual

51.2V LiFePO₄ Battery



Model: 48V100Ah

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About Our Batteries

The Sunnytech Solar 51.2V LiFePO₄ Battery Series is engineered to deliver reliable performance, long cycle life, and consistent energy output across a wide range of residential, commercial, and mobile applications. Designed and assembled in New Zealand, each module integrates an intelligent Battery Management System (BMS) that ensures accurate monitoring, advanced protection, and stable operation under demanding conditions. Built with high-grade components and precision manufacturing, Sunnytech Solar batteries provide a durable and efficient energy storage solution for modern power systems.

Product Specifications

Model	48V100Ah
Nominal Voltage	51.2V
Nominal Capacity	100Ah
Energy	5.12kWh
Cell Type	Prismatic LiFePO ₄
Self Discharge	<3% per month
Connection Type	Not allowed in series; can be connected in parallel
Normal Charge Voltage CV/CC	58.4V
Standby (Float) Voltage	53.6V
Max Charge Current	100A
Recommended Charge Current	50A
BMS Charge Cut-off Voltage	58.4V
Continuous Discharge Current	100A
Pulse Discharge Current	200A
BMS Discharge Cut-off Voltage	40V
Continuous Discharge Power	4.8kW@25°C
Pulse Discharge Power	9.7kW@25°C for 60 Seconds
Recommended Max Depth of Discharge	80%
Dimensions(LxWxH)	542mm x 380mm x 215mm
Weight	42kg
Terminal Type	M8 Screw
Casing Material	ABS
Discharge Temperature	-20°C to 60°C
Charge Temperature	0°C to 45°C
Storage Temperature	-20°C to 40°C
Built-in BMS Protection	Cell balancing, overcharge, over-discharge, short-circuit protection
BMS Balancing	Active Balancing
Bluetooth Monitoring	Yes

Installation Guide

Environment

Ensure the installation area is dry, clean, moisture-proof, and pest-free, with a flat and stable surface.

If the floor surface is slightly uneven, place a rubber or anti-vibration mat (Gym Matting) underneath the battery to ensure stability.

Humidity

The recommended operating environment should maintain a relative humidity between 5% and 75% RH, avoiding damp or condensing conditions to prevent internal moisture buildup.

If the installation area has high humidity or large temperature variations, ensure good ventilation and consider using a dehumidifier to prevent condensation forming on or inside the battery casing, which could affect internal electronic components.

Avoid the following conditions:

- Battery modules exposed to direct sunlight or rain.
- Installation areas close to heat sources or prone to water accumulation.

Temperature Requirements

Temperature has a significant impact on the performance and lifespan of the battery.

Please strictly follow the operating temperature range specified in the technical specifications.

Discharge Temperature -20°C to 60°C

Charge Temperature 0°C to 45°C

Installation Guide

- High temperatures accelerate cell aging, while high charge/discharge currents further raise internal temperature, shortening lifespan.
- Low temperatures may temporarily reduce capacity and output — this is normal, and performance will recover when temperature returns to normal levels.

Each battery module includes a Battery Management System (BMS) that continuously monitors cell and component temperatures.

If the temperature goes beyond the safe range, charging and discharging will automatically stop and resume once conditions stabilize.

Location

- Follow applicable low- and high-voltage wiring standards and local installation codes.
- Choose an appropriate battery capacity to match the system's power demand.
- Ensure the area is well-ventilated, and keep the battery away from heat sources, open flames, or flammable materials.

Installation Protection

- Avoid installing the battery in high-humidity or flood-prone areas to prevent corrosion, leakage, or short circuits.
- Do not expose the battery to direct sunlight for extended periods, as this may cause overheating or performance degradation.
- For outdoor installations, use a waterproof, sunproof, and dustproof enclosure to shield the battery from extreme weather conditions and ensure safe operation.

If the battery is physically damaged or impacted, stop using it immediately to prevent short circuits or other safety risks.

Battery Charging & Discharging

LiFePO₄ battery modules operate differently from traditional lead-acid systems. To ensure stable performance and long service life, please follow the guidelines below.

State of Charge (SOC) Monitoring

LiFePO₄ batteries maintain a very flat voltage curve, which means voltage alone cannot accurately indicate SOC during normal use.

For precise monitoring, a shunt-based battery monitor is recommended.

Approximate Voltage-Based SOC Reference (Resting / No Load)

Voltage can provide only a rough SOC estimate when the battery is fully at rest:

- $\approx 57.6\text{--}58.4\text{V}$ (charging): The battery is approaching 100% SOC, especially when charge current naturally tapers.
- $\approx 53.2\text{--}54.4\text{V}$ (rest): Battery is in a high SOC range (around 80–100%), depending on temperature.
- $\approx 51.2\text{--}52.8\text{V}$: Indicates a mid-range SOC (roughly 30–70%) under normal light-load conditions.
- $\approx 48.0\text{V}$ or below (rest): Battery is near 0% SOC and should be recharged promptly.

During typical operation, working voltage usually sits around 51.2–53.2V, influenced by load and ambient temperature.

⚠ Note: Voltage-based SOC estimates are approximate and should not replace proper current-based monitoring.

Multiple Charging Sources

If using more than one charging source (solar, AC charger, alternator, etc.):

- Set consistent charge profiles (bulk/absorption/float) across all devices.
- Avoid mismatched settings that may cause one charger to force others into float mode or create rapid cycling.
- Synchronized charge behaviour improves overall system efficiency and battery health.

Battery Charging & Discharging

Charging Frequency & Cell Balancing

To maintain proper cell balance and optimal performance:

Allow the battery to reach 100% SOC at least once per week.

Regular full charging ensures the BMS has enough time to equalize cell voltages.

If full charges are infrequent, cell imbalance may increase — leading to early over-voltage cutoffs during charging.

Low Voltage Protection

Avoid keeping the battery in a deeply discharged state.

- Under-voltage protection typically activates around 40.0–42.0V.
- ⚠ If triggered, recharge within 24 hours to prevent irreversible capacity loss.



Battery Connections

Terminals & Connections

This Sunnytech Solar battery module is equipped with one M8 positive and one M8 negative terminal. Use compatible copper cable lugs and tighten them with a torque of 10–12 N·m. Avoid stacking multiple lugs on the same terminal to prevent poor contact or overheating.

Connection Configuration

- **Series connection is not allowed:** Battery modules must not be connected in series to increase system voltage.
- **Parallel connection is supported:** Modules can be connected in parallel to expand capacity.

When connected in parallel, ensure all cables have equal length and cross-sectional area to maintain balanced charge and discharge currents, improving overall system stability and lifespan.

Cable Specifications

When selecting cables, consider:

- Maximum system load.
- Cable length and a maximum voltage drop of 3%.
- The rated power and terminal capacity of the inverter or bus bar.

Installation Notes

- All electrical connections must comply with local low-voltage DC wiring standards.
- Use certified cables, terminals, and protection components.
- After installation, perform tightness and insulation tests to ensure secure and reliable connections.

Battery Operation & Monitoring

Power Button Operation

Each battery module is equipped with a small silver button used to turn the internal BMS (Battery Management System) on or off.

Operation is as follows:

- To Turn On the Battery:

When the battery is off (button not illuminated), press the button once. You may hear several short beeps, and the button will light up red, indicating the battery is now on and the terminals are live.

- To Turn Off the Battery:

Press and hold the button for at least 5 seconds, then release it. The button light will turn off, and the terminals will no longer output current (a small amount of residual voltage may remain).

⚠ Note

The red illumination of the button does not indicate a fault; it simply represents the normal LED operating color.

Bluetooth Monitoring

To monitor the battery's State of Charge (SOC) and operating status via the JK BMS Bluetooth App, ensure the battery is turned on.

If you experience any issues during operation, please contact the Sunnytech Solar Support Team for technical assistance.

Battery Operation & Monitoring

BMS Bluetooth App Installation

The JK BMS Bluetooth App is available for free download from the Google Play Store and Apple App Store (search for “JK BMS”).

Download Links



Apple App Store:

<https://apps.apple.com/us/app/jk-jbms/id1425725691>

Google Play Store:

<https://play.google.com/store/apps/details?id=com.jktech.bms&hl=en&gl=US>

The app is not compatible with the following devices:

- Android devices running below Android 6.0
- Apple devices running below iOS 13.0 or earlier than iPhone 6s

Usage Notes

- Please allow all permissions requested by the app. Failing to do so may cause limited functionality.
- The default password is 1234, which can be changed as desired.
- The parameter settings in this BMS are locked to prevent accidental changes.

The app provides an approximate State of Charge (SOC) reading, generally accurate within $\pm 5\text{--}10\%$. Accuracy will improve after several charge/discharge cycles.

If you are using an external battery monitor, please refer to that device's SOC reading for higher precision.

⚠ Note

The cell voltage delta displayed in the JK BMS Bluetooth app may vary depending on the charge/discharge current, SOC level, and temperature — this is normal behavior.

Storage & Maintenance

Long-Term Storage Requirements

For extended storage periods, follow the guidelines below to maintain battery health and prevent irreversible capacity degradation:

1. Power Down the Module

Switch off the battery module using the power button to fully deactivate the BMS and eliminate any parasitic current draw.

2. Set the Battery to Storage SOC

Charge or discharge the module to a 50–80% State of Charge (SOC) before storage. This range provides optimal long-term stability.

3. Perform Periodic Maintenance Charging

Recharge the battery every 3–6 months to maintain cell balance and prevent deep discharge.

4. Avoid Full-State Storage

Do not store the battery fully charged or keep it permanently connected to external power. Long-term 100% SOC accelerates capacity fade.

5. Maintain Suitable Environmental Conditions

Store the module in a dry, ventilated environment between -10°C and $+35^{\circ}\text{C}$ with 5–75% RH.

6. Protect from Heat, Sunlight, and Freezing

Avoid exposure to direct sunlight, heat sources, or sub-zero conditions during storage.

Safety & Handling Instructions

Safety Information

Before installation or operation, please read this manual carefully and follow all instructions provided by Sunnytech Solar. All work must comply with applicable electrical and safety standards. Failure to comply may void the warranty and result in personal injury or property damage.

Do not short-circuit, disassemble, crush, puncture, or expose the battery to fire, water, or high temperatures.

Always ensure correct polarity, proper ventilation, and secure electrical connections.

Keep the battery away from heat sources, direct sunlight, and flammable materials.

Never attempt to open or modify the battery module — internal components are not user-serviceable.

Designers and installers must read and fully understand this manual before performing any installation work. Battery modules must be installed, charged, discharged, and stored in accordance with this manual.

Do not use batteries that are damaged, deformed, or modified. Avoid installation in direct sunlight or environments with humidity exceeding 80%. Batteries must always be kept dry, clean, and well ventilated.

Installation or transportation in orientations other than specified is prohibited without written approval from Sunnytech Solar.

Disclaimer

Information in this manual is subject to change without notice.


Sunnytech Solar assumes no responsibility for damage or injury caused by improper installation, misuse, modification, or failure to follow safety instructions.

All warranty terms shall be governed by Sunnytech Solar's official Warranty Policy.


Customer Support

 11 Old Wairoa Road, Papakura, Auckland 2110, New Zealand

 www.sunnytech.co.nz

 service@sunnytech.co.nz (For After-sales Service)

sales@sunnytech.co.nz (For Business Inquiries)

 Monday – Friday 9:30 AM – 4:30 PM (NZT)

Recycling Notice

- Do not dispose of batteries in household waste.
- Return used batteries to an authorized recycling facility in accordance with local regulations.

Locally Designed, Assembled, and Tested in New Zealand.

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Powering a Sustainable Future.