ROCKSOLAR Lithium Iron Phosphate Battery

User Manual

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1. Product Overview

This manual provides important information regarding the safe use, installation, and maintenance of ROCKSOLAR lithium iron phosphate ($LiFePO_4$) batteries. Please read this manual carefully before use to ensure optimal performance and safety.

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2. Key Features of $LiFePO_4$ Battery

- Long service life with high cycle stability
- Lightweight and compact design
- Built-in Battery Management System (BMS) for enhanced protection
- High energy efficiency with stable output voltage
- Environmentally friendly and maintenance-free
- Superior safety compared to traditional battery technologies

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3. Applications

This battery is suitable for a variety of applications, including but not limited to:

- Solar energy storage systems
- Recreational vehicles (RVs) and campers
- Marine and boating applications
- Off-grid and backup power systems
- Portable power solutions

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4. Safety Instructions

To ensure safe operation, please follow these guidelines:

- Do not disassemble, puncture, or crush the battery
- Avoid exposure to fire, high temperatures, or water
- Do not short-circuit the battery terminals
- Use only compatible chargers designed for $LiFePO_4$ batteries
- Keep out of reach of children
- If the battery emits unusual odor, heat, or deformation, discontinue use immediately

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5. Battery Management System (BMS)

The battery is equipped with an advanced BMS that provides protection against:

- Overcharge
- Over-discharge
- Overcurrent
- Short circuit
- High and low temperature

The BMS ensures safe and reliable battery operation under various conditions.

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6. Charging Instructions

- Use a charger specifically designed for $LiFePO_4$ batteries
- Follow recommended charging voltage and current specifications
- Do not overcharge the battery
- Charging should be performed in a well-ventilated environment
- Disconnect the charger once fully charged

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7. Discharging Guidelines

- Avoid deep discharge beyond recommended limits
- Do not exceed the maximum continuous discharge current
- If the battery is not in use for an extended period, recharge it periodically

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8. Connection Methods

Series Connection

- Batteries may be connected in series to increase voltage
- Ensure all batteries have the same capacity, model, and state of charge

Parallel Connection

- Batteries may be connected in parallel to increase capacity
- Use proper cabling and ensure balanced connections

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9. State of Charge (SOC)

The battery voltage corresponds to its approximate state of charge. Refer to the SOC chart for guidance when monitoring battery levels.

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10. Storage Instructions

- Store the battery in a cool, dry place
- Recommended storage temperature: 0°C to 25°C
- Maintain a charge level of approximately 50%–70% during storage
- Recharge the battery every 3–6 months

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11. Battery Activation

If the battery enters protection mode due to low voltage:

- Connect the battery to a compatible charger
- Charging will reactivate the battery automatically

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12. Troubleshooting

Issue	Possible Cause	Solution
Battery will not charge	Protection mode activated	Connect to charger to reset
Low capacity	Improper usage or aging	Check load conditions
No output	BMS protection triggered	Remove load and recharge

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13. Wiring and Installation Tips

- Ensure correct polarity before connecting
- Use appropriate cable size for current load
- Tighten all connections securely
- Avoid mixing different battery types or brands

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14. Maintenance

- No regular maintenance is required
- Keep terminals clean and dry
- Periodically inspect connections and cables

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15. Warranty

ROCKSOLAR provides a limited warranty covering manufacturing defects under normal operating conditions.

The warranty does not cover damage caused by:

- Improper installation or usage
- Unauthorized modifications
- Physical damage or environmental exposure
- Failure to follow instructions in this manual

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16. Contact Information

For technical support or warranty service, please contact ROCKSOLAR customer service.

17. Battery Specifications

Electrical Specifications

Parameter	Value
Nominal Voltage	12.8V
Nominal Capacity	100Ah
Energy	1280Wh
Cycle Life	≥ 6000 cycles (80% DOD)
Internal Resistance	≤ 30 mΩ
Efficiency	≥ 95%

Charging Specifications

Parameter	Value
Charge Voltage	14.4V – 14.6V
Float Voltage	13.6V – 13.8V
Standard Charge Current	20A
Max Charge Current	50A
Charge Temperature	0°C to 45°C

Discharging Specifications

Parameter	Value
Continuous Discharge Current	100A
Peak Discharge Current	300A (short duration)
Discharge Cut-off Voltage	10V
Discharge Temperature	-20°C to 60°C

Mechanical Specifications

Parameter	Value
Dimensions (L×W×H)	~308 × 168 × 2111 mm
Weight	~12 kg
Terminal Type	M8
Case Material	ABS

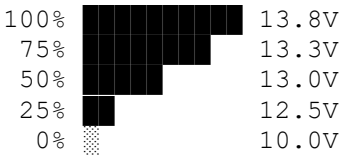
(Values aligned with typical data shown in spec table on page 3)

📊 18. State of Charge (SOC) vs Voltage

SOC Reference Table

SOC (%)	Voltage (V)
100%	13.6 – 13.8
90%	13.4
80%	13.3
70%	13.2
60%	13.1
50%	13.0
40%	12.9
30%	12.8
20%	12.5
10%	12.0
0%	10.0

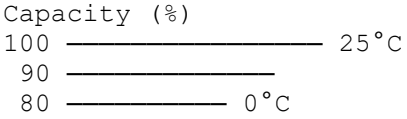
SOC Visualization

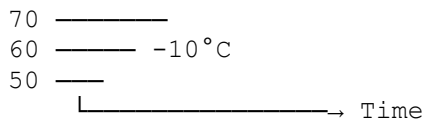


(Based on SOC chart from page 6)

🌡️ 19. Temperature Performance

Discharge Performance vs Temperature





✓ Higher temperatures → better performance
✓ Low temperatures → reduced capacity

(Derived from performance curves on page 9)

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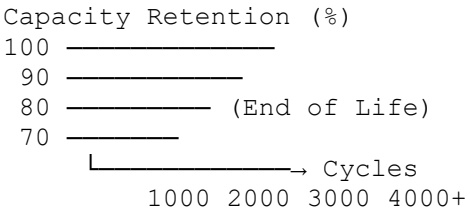
20. Cycle Life Performance



✓ Maintains ~80% capacity after ~4000 cycles
✓ Depends on depth of discharge (DOD)

(Based on cycle curve on page 11)

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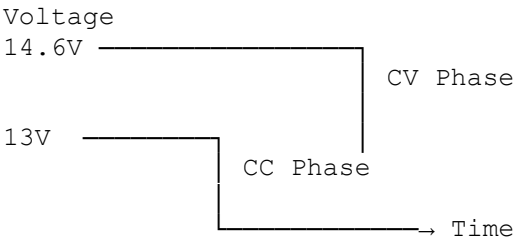
21. Charging Profile (CC-CV)



- **CC (Constant Current):** Battery charges at steady current
- **CV (Constant Voltage):** Voltage held constant, current tapers

(From charging characteristics charts on page 10)

🧠 22. BMS Protection Parameters

Protection Type	Threshold
Overcharge Protection	~14.6V
Over-discharge Protection	~10V
Overcurrent Protection	100A–300A
Short Circuit Protection	Instant
High Temp Cut-off	~60°C
Low Temp Cut-off	~0°C (charging)

(Aligned with BMS table on page 4)

🔗 23. Connection Limits

Configuration	Maximum
Series	Up to 4 batteries (48V system)
Parallel	Up to 4 batteries
