marvel® Tech

Lead Acid Replacement Battery

ML-S09

User Manual

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IMPORTANT SAFETY INSTRUCTIONS

This manual contains important installation, operation, and maintenance instructions for the Smart LiFePO4 Battery. Please observe these instructions and keep them located near the battery for further reference.

Handling Precautions:

- DO NOT puncture, drop, crush, burn, penetrate, shake, or strike the battery.
- Avoid opening, dismantling, or modifying the battery.
- Refrain from touching any terminals or connectors.
- Avoid contact with exposed electrolyte or powder if the battery casing is damaged.
- Keep the battery away from water, heat sources, sparks, and hazardous chemicals.

Charging Safety:

- Ensure any battery charger or charge controller is disconnected before working on the battery.
- DO NOT connect or disconnect terminals from the battery without first disconnecting loads.
- Please use the matched charger that contains a Lithium charge profile for this battery.

Workplace Safety:

- Avoid placing tools on top of the battery.
- Keep the battery out of the reach of young children.
- Wear proper protective equipment and use insulated tools when working on the battery.
- Do not wear jewelry or other metal objects when working on or around the battery.

Transportation:

- Use suitable handling equipment for safe transportation of the battery.
- Avoid shipping or storing the battery together with metal.

Installation Environment:

- Ensure adequate and secure mounting of the battery.
- Install the battery away from heat sources, high voltage, and avoid exposed sunlight for long periods.

- The battery should be installed in a clean, cool, and dry place, away from water, oil, and dirt. Accumulation of these materials on the battery can lead to current leakage, self-discharge, and potential short-circuits.
- Ensure sufficient air flow around the battery to prevent excessive heat build-up and minimize temperature variation between batteries. This helps maintain optimal performance and prolongs battery life.

Usage Instructions:

- Do not use the battery for cranking/starting applications.
- Do not connect the positive and negative terminals of the battery together.
- DO NOT connect batteries with different chemistries, brands, models, rated capacities, or nominal voltages in series or parallel configurations.
- In parallel connections, ensure that the cables between each battery are of equal length to promote uniformity in the system's operation.

Disposal and Recycling:

- DO NOT dispose of the battery as household waste. Please use recycling channels in accordance with local, state, and federal regulations.

Emergency Procedures:

- If the battery emits a peculiar smell, heats up, distorts, or exhibits any abnormality during operation or storage, stop using the battery immediately. Contact San Hima for further details.
- In case of battery leakage getting into eyes or on skin, do not wipe. Rinse with clean water and seek medical attention immediately.

BATTERY INSTALLATION

Before installing and operating the battery, it is advisable to have the following equipment or tools readily available:

- Proper Protective Equipment
- Insulated Tool(s)
- Multimeter
- Battery Cable
- Battery Charger / Charge Controller

TECHNICAL SPECIFICATIONS

Rated Voltage	12.8V			
Rated Capacity	100Ah	200Ah	300Ah	314Ah
Rated Energy	1280WH	2560Wh	3840Wh	4019Wh
Output Voltage Range	12V~14.4±0.2V			
Charging Voltage	14.4±0.2V			
Cut-off Voltage	12V			
Max. Charging Current	<100A	<200A	<200A	<200A
Recommended Charging Current	<50A	<100A	<140A	<150A
Max.Discharging Current	<100A	<200A	<200A	<200A
Efficiency	>98%			
Dimension L*W*H(mm)	310*175*210	330*257*210	380*235.4*240	370*257*230
Weight (kg)	13.5	24.5	31.5	31.5
Humidity	5%~95% Relative humidity			
Charging Temperature	0℃~60℃			
Discharging Temperature	-20℃~60℃			
Storage Temperature	-10℃~30℃			
Cycle Life	>6000 times (0.5C，@25℃，80%DOD)		>8000 times (0.5C,@25C,80%DOD)	>6000 times (0.5C,@25C,80%DOD)
Design Life	>10 years			
Rated Voltage	25.6V			
Rated Capacity		100Ah	200Ah	314Ah
Rated Energy		250Wh	5120Wh	8038Wh
Output Voltage Range			24V~28.6±0.2V	
Charging Voltage	28.6±0.2V			
Cut-off Voltage	24V			
Max. Charging Current		<100A	<200A	<200A
Recommended Charging Current		<50A	<100A	<150A
Max.Discharging Current		<100A	<200A	<200A
Efficiency	>98%			
Dimension L*W*H(mm)		490*175*210	550*257*210	450*257*330
Weight (kg)		24.5	44	62
Humidity	5%~95% Relative humidity			
Charging Temperature	0℃~60℃			
Discharging Temperature	-20℃~60℃			
Storage Temperature	-10℃~30℃			
Cycle Life	>6000 times (0.5C，@25℃，80%DOD)			
Design Life	>10 years			

BATTERY MAINTENANCE

Regular Inspections:

- Examine the external appearance of the battery.
- Ensure the top of the battery and terminals are clean, dry, and free of corrosion.
- Check battery cables and connections; replace damaged cables and tighten loose connections.

Cleaning Procedure:

- Disconnect the battery from the charging source or electric load.
- Clean the top of the battery and terminals with a damp cloth or non-metallic brush.
- Dry the battery with a clean cloth and maintain cleanliness and dryness around the battery.

Periodic Voltage Checks:

- Periodically check the battery voltage to assess battery health.
- If the battery resting voltage is under 10V in active mode at room temperature, it may indicate over-discharge due to self-discharge or parasitic loads.
- Stop using the battery until the fault is corrected and the battery can be charged.

BATTERY STORAGE

- To prevent potential parasitic loads from discharging the battery, disconnect it from the discharge equipment.
- Store the battery in an open, well-ventilated, dry, and clean area to maintain its condition and prevent damage.
- Charge the battery at least once every 3 months to prevent over-discharge and ensure its longevity.
- When taking the battery out of storage, ensure it is given a full charge before use to optimize its performance and reliability.