



## **Lead Acid Replacement Battery**

12.8V/150Ah/200Ah

25.6V/150Ah/200Ah

# **MTUL-A02 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

## SERIES / PARALLEL CONNECTION

### Series Connection:

Please connect the batteries in series as shown with cables of the same type and specification.

(see Figure 1.)

Note: When the batteries need charging, disconnect the series connection and charge your batteries separately before connecting them in series again.

A battery connected in series will have lower volume than its standard capacity.

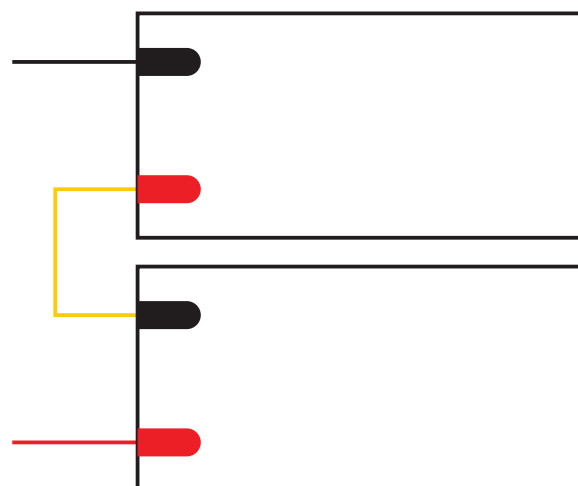


Figure 1.

### NOTE:

Series Connection Limitations :

For 12V system Up to 4 batteries (reduces warranty to 12 months)

For 24V system Up to 2 batteries (reduces warranty to 12 months)

### Parallel Connection:

Please configure the LiFePO4 batteries in parallel as indicated in the diagram on the right.

### NOTE:

Parallel Connection Limitations: Up to 4 batteries

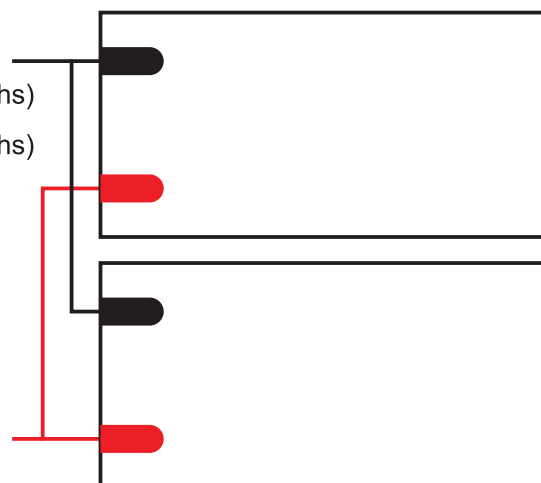


Figure 2

### Series-parallel Connection:

Please configure the LiFePO4 batteries in a series-parallel configuration as depicted in the diagram below.

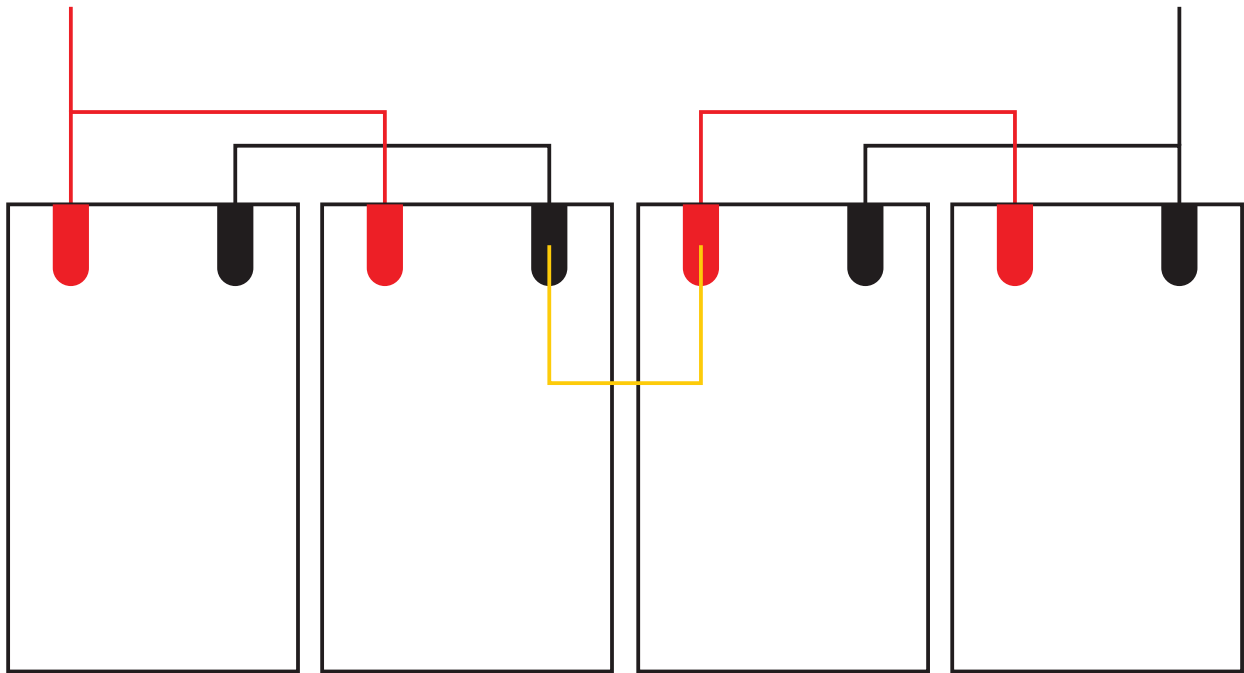


Figure 3.

# TECHNICAL SPECIFICATIONS

|                              |                                     |             |  |
|------------------------------|-------------------------------------|-------------|--|
| Rated Voltage                | 12.8V                               |             |  |
| Rated Capacity               | 150Ah                               | 200Ah       |  |
| Rated Energy                 | 1920Wh                              | 2560Wh      |  |
| Output Voltage Range         | 12V~14.4±0.2V                       |             |  |
| Charging Voltage             | 14.4±0.2V                           |             |  |
| Cut-off Voltage              | 12V                                 |             |  |
| Max. Charging Current        | <100A                               | <100A       |  |
| Recommended Charging Current | <50A                                | <75A        |  |
| Max.Discharging Current      | <100A                               | <100A       |  |
| Efficiency                   | >98%                                |             |  |
| Dimension L*W*H( mm )        | 330*171*215                         | 501*185*242 |  |
| Weight ( kg )                | 14                                  | 18          |  |
| Humidity                     | 5%~95% Relative humidity            |             |  |
| Charging Temperature         | 0°C~60°C                            |             |  |
| Discharging Temperature      | -20°C~60°C                          |             |  |
| Storage Temperature          | -10°C~30°C                          |             |  |
| Cycle Life                   | >6000 times ( 0.2C, @25°C, 80%DOD ) |             |  |
| Design Life                  | >10 years                           |             |  |

|                              |                                     |             |  |
|------------------------------|-------------------------------------|-------------|--|
| Rated Voltage                | 25.6V                               |             |  |
| Rated Capacity               | 150Ah                               | 200Ah       |  |
| Rated Energy                 | 3840Wh                              | 5120Wh      |  |
| Output Voltage Range         | 24V~28.6±0.2V                       |             |  |
| Charging Voltage             | 28.6±0.2V                           |             |  |
| Cut-off Voltage              | 24V                                 |             |  |
| Max. Charging Current        | <100A                               | <100A       |  |
| Recommended Charging Current | <50A                                | <75A        |  |
| Max.Discharging Current      | <100A                               | <100A       |  |
| Efficiency                   | >98%                                |             |  |
| Dimension L*W*H( mm )        | 523*269*218                         | 523*269*218 |  |
| Weight ( kg )                | 25                                  | 39.5        |  |
| Humidity                     | 5%~95% Relative humidity            |             |  |
| Charging Temperature         | 0°C~60°C                            |             |  |
| Discharging Temperature      | -20°C~60°C                          |             |  |
| Storage Temperature          | -10°C~30°C                          |             |  |
| Cycle Life                   | >6000 times ( 0.2C, @25°C, 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.