48V Quick Start Guide

What's in the Box

1. 48V Dual Purpose Battery
2. Installation Guide
3.Long Terminal Bolt (2)

Safety

While Solid State batteries are inherently safe, as with all batteries, energy storage devices, and electrical equipment, safety and electrical hazards do exist. Failure to follow these safety instructions may result in electrical shock, injury, or death, or may damage the battery or other equipment or property.

Installation

- The battery should be installed as per national and local codes
- The battery should only be installed in locations approved by local codes.
- Electrical and shock hazards can be minimized by using insulated tools.
- Do not short the battery terminals.
- Do not install the battery if there are any signs of physical damage.

Operation

- Use only approved chargers for charging
- Do not disassemble the battery

Emergency

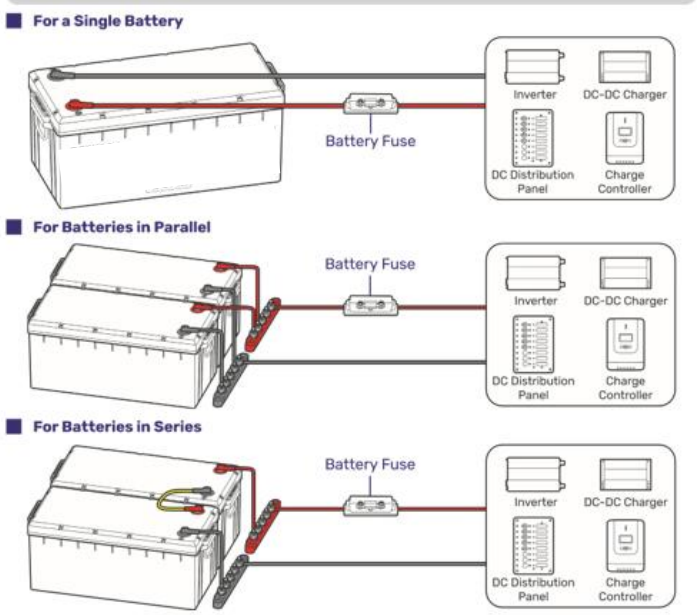
- Disconnect the battery from the system
- Wear a respirator, eye protection, and rubber gloves where appropriate.
- Use an ABC type dry chemical fire extinguisher
- Dispose of battery as per local regulations

Select the Right Cables

Use appropriately sized Battery Adapter Cables (sold separately) based on expected load.

Cable Gauge Size	Ampacity
14 AWG (2.08 mm^2)	35A
12 AWG (3.31 mm^2)	40A
10 AWG (5.25 mm^2)	55A
8 AWG (8.36 mm^2)	80A
6 AWG (13.3 mm^2)	105A

Incorporate Fuses



Connecting Load Cables

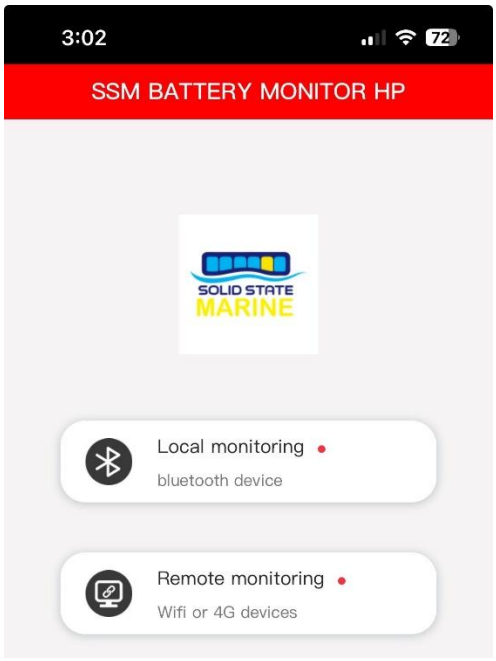
Identify the positive and negative terminals. These are labeled and color-coded **red for positive (+)**, **black for negative (–)**. Verify that your bolt can fully seat into the battery terminal. If multiple lugs are used, longer bolts may be required

Download Bluetooth Apps

Search “SSM Battery Monitor HP” and install application.

Apple IOS

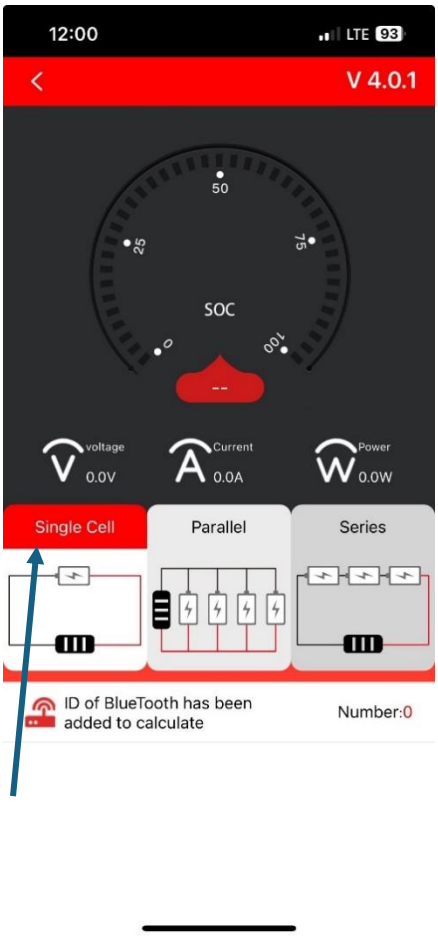
Android



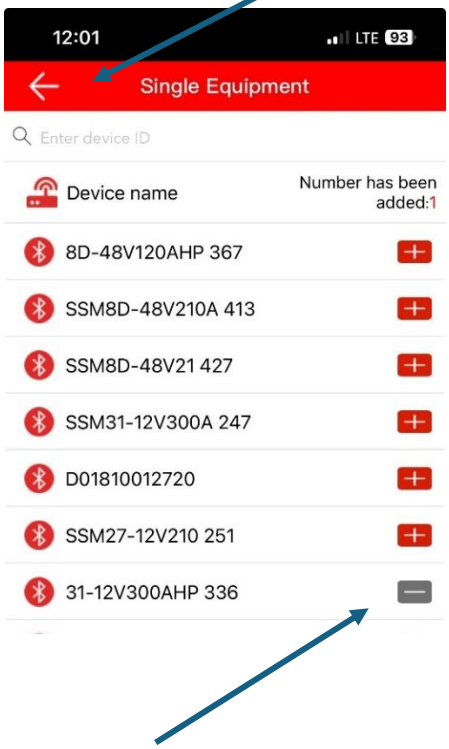
Bluetooth App

1. Open the app and connect to your battery, you must **TURN THE BATTERY ON** by connecting to a load or turning the charger on. Your battery starts automatically when connected to a load.

2. Select > Single or Parallel or Series depending on if your batteries are connected together

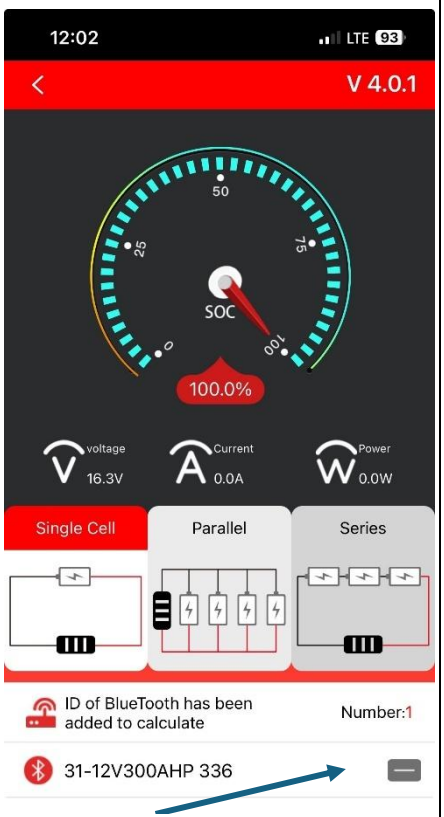


4. Return to the previous screen



3. Select the battery you wish to monitor

5. You are now able to see state of charge



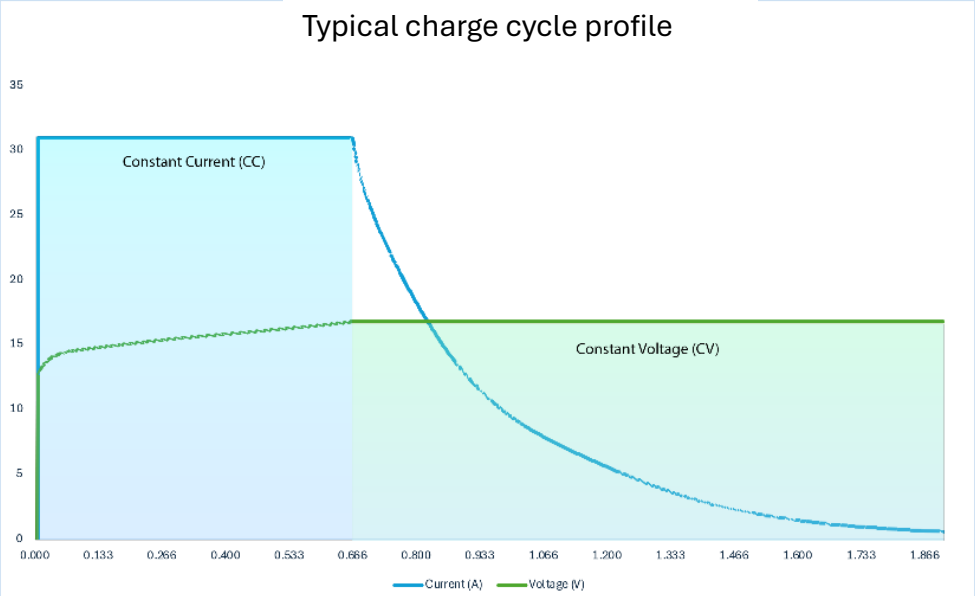
6. Select the battery again to see additional parameters

How to charge your battery

The battery will be received at a partial state of charge (SOC) depending on the time between manufacturing and shipping. It is crucial to fully charge the battery before its initial use. In case the battery shuts off due to low SOC, promptly disconnect it from loads and charge it to prevent irreversible damage.

Charging Logic

The standard charging process for the battery involves charging at a constant current until the battery voltage reaches 58.1 V for the 48 V battery, followed by charging at a constant voltage of 58.1 V while tapering the charge current to the tail current. A standard charger with a lithium battery charge cycle may be used.



	48V 60 Ah	48V 120 Ah	48V 210 Ah
Peak Charge Voltage (+/- 5%)	58.1 V	58.1 V	58.1 V
Fast Charge Current: Charge to 16.6V at a constant current (CC) of 1C and then charge to the degree to which the charging current is less than the tail current.	60A (1C)	120A (1C)	210A (1C)
Standard Charge Current: Charge to 16.5V at a constant current (CC) and then charge to the degree to which the charging current is less than the tail current.	20A	20A	20A
Tail Current	1 A	2 A	3.55 A

How does the BMS protect the batteries?

The battery is equipped with a Battery Management System (BMS) that provides warnings and protections against overvoltage, undervoltage, overcurrent, short circuit, high temperature, and low temperature conditions. Refer to the table below for the triggering and recovery conditions of each warning and protection.

High Voltage Disconnect > 58.8V	If an individual cell voltage exceeds a prescribed threshold during charging, the BMS will prevent a charge current from continuing. Discharge is always allowed under this condition. If the batteries have not been balanced for a long time, high voltage disconnect could occur at a lower voltage. The batteries will be rebalanced after several full charges.
Low-Voltage Disconnect < 35.28V	If an individual cell falls below a prescribed threshold during discharge, the BMS will prevent further discharge. Although the battery is in "low voltage disconnect" mode, it will still allow a charging current.
High Temperature Charging and Discharging	The BMS will not allow a charging current if the internal temperature of the battery has reached 150°F (65°C). The BMS will not allow a discharging charging current if the internal temperature of the battery has reached 150°F (65°C). Charging or discharging will resume when the temperature is below 150°F (65°C).
Low Temperature Operation	The BMS will not allow charging under -4°F (-20°C). Charging will resume at > -4°F (-20°C). Discharging is allowed down to -4°F (-20°C). The current will resume when the temperature is above -4°F (-20°C).
High Current Discharge Surges	The BMS will not allow a current that exceeds 2C or up to 500 Amps for more than 60 sec (120A for the 60Ah battery). After a high current disconnection, the battery will automatically reconnect after 60 seconds.
Short Current Discharge Surges	Our BMS has built-in short circuit protection of 1000A for 3 msec. If the short circuit protection is tripped, the BMS will shut the battery down and will remain disconnected until you remove the battery cables.
Balancing of Cells	A passive balancing process is activated by the BMS at the top of each charge cycle when the battery voltage exceeds >36V. This ensures that all the cells remain at the same state of charge, which helps pack longevity and performance.

How to Properly Store Batteries

Please follow the tips below to ensure that the battery emerges from storage in a good condition:

Charge the battery to 30% to 80% SOC.

- Disconnect the battery from the system.
- Store the battery in a well-ventilated, dry, clean area with temperatures between 32°F (0°C) and 113°F (45°C).
- Do not expose the battery to direct sunlight, moisture, or precipitation.
- Handle the battery carefully to avoid sharp impacts or extreme pressure on the battery housing.
- Charge the battery at least once every 3 to 6 months to prevent it from over-discharge.
- Fully charge the battery when it is taken out of storage.

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