

Smart Lithium Iron Battery
RV12200-B100

User Manual 2023 V1.0

Legal Information

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Disclaimer

The Manual contains instructions for the use of the product. All the pictures and charts hereinafter are for description and explanation only. The information in the manual is subject to change, without further notice.

Please read this manual carefully before using the product, and use this product with the guidance and assistance of professionalstrained in supporting the product.

Failure to do so may result in serious injury, property damage and may void warranty. Please keep this manual for further reference.

By using this product, you hereby signify that you have read this manual carefully and that you understand and agree to abide by all terms and conditions of this manual and all relevant documents of this product. You agree to use this product only for purposes that are proper. You agree that you are solely responsible for your own conduct while using this product and for any consequences there of Pylontech shall not be liable for any damages, injuries or any legal liability incurred directly or indirectly from the use of this product. In the event of any conflicts between this manual and the applicable law, the latter prevails.

Safety Instructions

Warning

General

- The device should be used in strict compliance with local laws, electrical safety regulations, and fire prevention regulations of the nation or the region.
- Do not place the device near open fire, heat sources and flammable materials, which may result in an explosion.
- Do not leave the device in a hot environment, which may cause an explosion or the leakage of flammable liquid or gas. For battery storage and working temperature, see the specification.
- Do not subject the device to extremely low air pressure, which may result in an explosion or the leakage of flammable liquid or gas.
- Do not mechanically crush or cut the device, which may result in an explosion.
- Do not disassemble/wrap the device, which may cause electric shock.
- Keep the device out of reach of children and pet.

Caution

General

- For safety purposes, please use only the accessory (cable, charger, and etc) supplied or recommended by Pylontech. Pylontech shall not liable for damage caused by third-party device.
- Use the device within the appropriate temperature range. Otherwise, battery self-protection maybe triggered. For battery storage and working temperature, see the specification.
- Please do not use/install this device in the places with direct sunshine.
- Do not expose the device to vapor, dripping or splashing water. For the battery storage humidity requirement, see the specification.
- Do not expose the device to high electromagnetic radiation.
- Do not shake the device.
- Do not drop the product or subject it to physical shock.
- Do not insert any foreign object into the device.

Installation

- Do not install the device in an unstable place. Personal injury or property damage maybe caused if the device falls.
- Do not install the device in a confined area.

Operation

- Do not operate the device in wet conditions.
- Do not operate the device near heat sources.

Safety Instructions

- Please ensure good ventilation while the device is in use.
- Do not move the unit while operating as vibrations and impacts may lead to component damage.
- Carefully check the batteries stored for more than one year, and use them only after making sure they are qualified.

Transportation

- Keep the device in original or similar packaging while transporting it.
- Do not bring the device on the plane.

Maintenance

- Charge the battery every three months and keep the SOC above 60% if you need to store the battery for a long time.
- Please turn off the battery and charge it to 60% capacity every time before storing it.
- Recharge the battery within 12 hours after it has been fully discharged. If not, the battery will be irreversibly damaged.
- If the device does not work properly, please contact your supplier or the nearest service center within 24 hours. DO NOT disassemble the battery for repair or maintenance by yourself. Pylontech shall not assume any responsibility for problems caused by unauthorized repair or maintenance.

Cleaning

- Please use a soft and dry cloth to clean the interior and exterior surfaces. Do not use cleaning solvent. Regular cleaning is required to keep the device in good condition.

Disposal

Disposal

- Dispose of used batteries according to the laws or the regulations of the nation or the region.

Recycle

Recycle

- Recycle the batteries according to the local recycling regulation (i.e. Regulation (EC) N° 1013/2006 among European Union), and use advanced technology to improve recycling efficiency.

Specifications

Electrical Specification

Nominal Voltage	12.8 VDC
Nominal Capacity	200 Ah
Resistance	<20 mΩ
Efficiency	99%
Self Discharge	≤3% per month
Maximum Modules in Parallel or Series	4S4P
Cycle Life(25° C)	>4500 (80%DOD, 0.5C, 25°C)

Discharge Specification

Maximum Continuous Discharge Current	100 A
Peak Discharge Current	200 A@5 s
Recommended Low Voltage Disconnect	10.8 V
BMS Discharge Voltage Cut-off	10.8 V
Reconnect Voltage	12 V

Charge Specification

Recommended Charge Current	50 A
Maximum Charge Current	100 A
Recommended Charge Voltage	14.2 V ~ 14.6 V
BMS Charge Voltage Cut-off	14.6 V
Reconnect Voltage	13.8 V

Temperature Specification

Discharge Temperature	-4 °F ~ 140 °F (-20 °C ~ 60 °C)
Charge Temperature	32 °F ~ 131 °F (0 °C ~ 55 °C)
Storage Temperature	-40 °F ~ 140 °F (-40 °C ~ 60 °C)
Working Temperature	-4 °F ~ 122 °F (-20 °C ~ 50 °C)
System Environment Temperature	104 °F ~ 140 °F (40 °C ~ 60 °C)

Mechanical Specification

Dimensions (L*W*H)	18.07 in × 7.48 in × 8.46 in (459 mm × 190 mm × 215 mm)
Weight (45.19 lbs)	20.5 kg

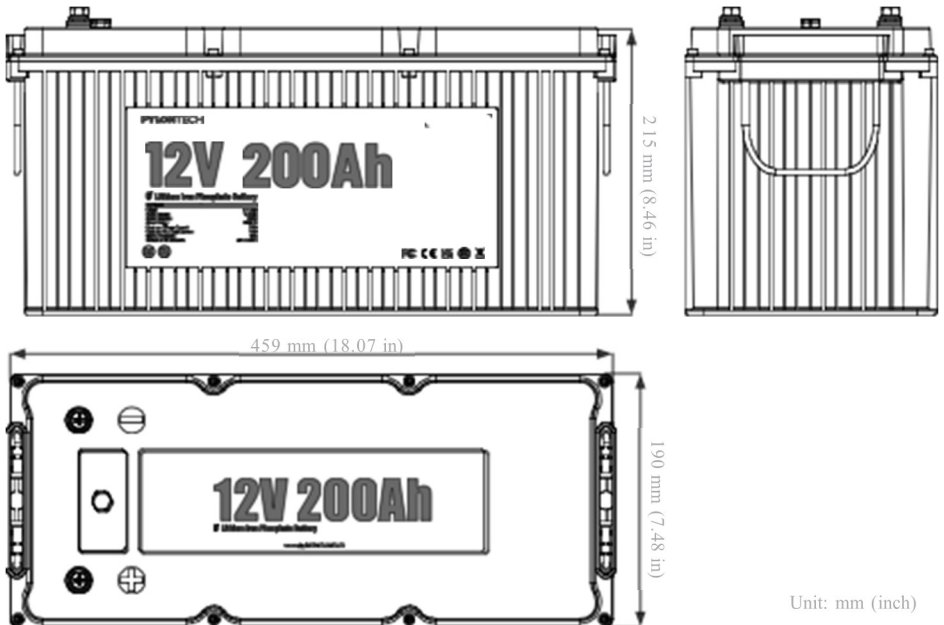
Specification

Terminal Type	M8
Terminal Torque	10 Nm ~ 12 Nm
Case Material	PC + ABS
Enclosure Protection	IP65
Cell Type-chemistry	LiFePO4

Other	
Certifications	UL1973, FCC, CE, UKCA, Bluetooth SIG
Communication	BLE 5.0
Heating Film	Support
APP	Support

*Product performance is based on testing in a controlled environment. Your results may vary due to several external and environmental factors.

Dimension



Unit: mm (inch)

Introduction

RV12200-B100 is a lithium iron phosphate battery module. With a standard BCI group size, it is designed to replace deep cycle lead-acid batteries. The battery is perfect for RV, marine (boats), electric vehicles (EV), robots, renewable energy and other off-grid applications.

The product has the following advantages.

- **Long Cycle Life**
More than 4,500 cycles at a depth of discharge of 80%.
- **High Security**
The built-in advanced BMS manages charging and discharging status, helps in balancing the individual cells, and ensures intelligent automatic protection against over voltage, over current, over discharge, over temperature.
- **Strong Environmental Adaptability**
With the built-in heating film, the battery can be heated under extreme low temperature environment automatically to ensure the normal use of the battery.
- **Low Self-discharge Loss**
The battery can be stored for more than 2 months when SoC is 0, and more than 6 months when SoC between 20%-100%.
- **High Discharge Efficiency**
Available for 0.5 C-rate continuous operation and up to 1 C-rate instantaneous discharge.
- **Flexible Connection in Parallel and Series**
Supports up to 4 in series and 4 in parallel (Max 4S4P) to build a 48V 400Ah battery system for 20.48kWh energy and max. 20.48kW load power.
- **Lightweight & Small Size**
Half the the weight of a 12V 200Ah lead acid battery, but equivalent in energy. It's easier to carry, faster to charge, and more convenient to use.
- **Remote Monitoring via APP**
The built-in Bluetooth module enables remote monitoring on mobile devices in real time.

Packing List



Battery



User Manual & Warranty Card

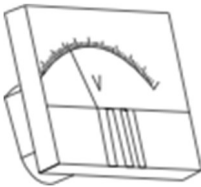
Interface

Negative Pole



Positive Pole

Tools



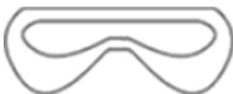
Volmeter



Wire Cutter



Screwdriver

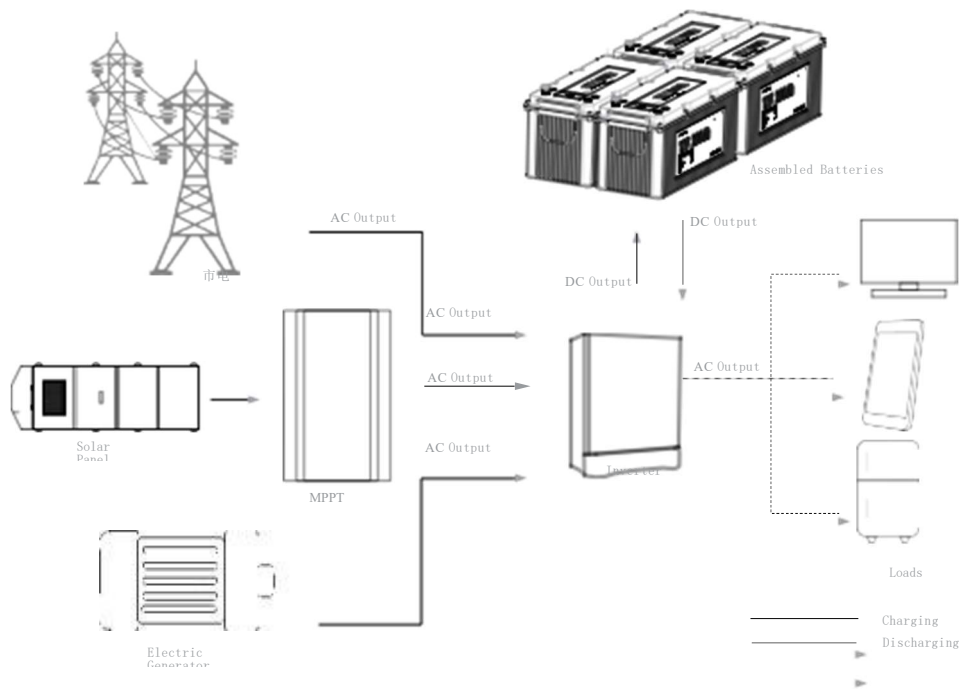


Safety Goggles



Insulating Gloves

Topological Graph



Charging

The battery supports solar panel charging, grid power charging, and generator charging.

Please charge the battery with a battery charger or charge controller that is compatible with the lithium iron phosphate battery.

Caution

- Add a pre-charge resistance to avoid mosfet damage if the inductance of the charging device is too large.
- When the Battery Management System (BMS) is in protection mode, charge the battery immediately with a LiFePO4 battery charger (voltage will be 14.6 V) to wake up the BMS. DO NOT use a lead acid charger in this case.

When to charge the battery?

Charge the battery after each use OR charge the battery when it has been discharged up to 80% DOD (20% SOC).

Caution

- Disconnect the battery from loads and charge it immediately when the BMS disconnects from the battery due to low voltage.
- Charge the battery within 12 hours after the battery is fully discharged. Otherwise, the battery will have irreversible damage.

Charging Temperature

-32°F to 131°F (0°C to 55°C)



Note

- Optimal charging temperature: 50°F to 104°F (10°C to 40°C) .
- If the ambient temperature is out of the charging temperature range, the battery stops operating to protect itself, and it cannot be charged. If the temperature falls below -32°F (0°C) , and you need to use the battery, please enable the self-heating function of the battery via Bluetooth, and charge it after its temperature returns to charging temperature range.

Charging Time

It takes 2 hours to fully charge a battery with a current of 50 A.

Discharging

The battery discharges at a constant current of 100A(MAX) until the battery voltage reaches 10.8V.

Caution

- Do not continuously discharge a battery with extremely low voltage.
- Charge the battery within 12 hours after the battery is fully discharged. Otherwise, the battery will have irreversible damage.
- Add a pre-charge resistance to avoid mosfet damage if the inductance of the charging device is too large.

Note

- It is recommended to use the battery with the device which has a low voltage disconnect function.
- The battery can be discharged to 100% of their capacity. However, in order to optimize battery performance and avoid BMS disconnecting the battery, it is recommended to limit the discharge to 80%.

Charging Temperature

-4 °F ~ 140 °F (-20 °C ~ 60 °C)

Pre-Installation Check

Caution

- Make sure all the battery terminals are disconnected before wiring, installing or removing the battery.
- To prevent electric shock, please remove watches, bracelets, rings and other conductive items (if any) and wear insulated gloves and protective goggles before installation.

Battery Installation

1. (Optional) Activate the battery.

Activate the battery with a charge current greater than 1A and measure the terminal voltage to validate before using the battery for the first time.

2. Place the battery in the designated area.

The area where the battery is installed needs to be kept dry and stable, away from water and fire sources, and the temperature and humidity of the area shall be suitable for battery use.

3. Fix the battery modules tight.

If the battery is placed on a moving object (eg. car), please fix the battery and the moving object with a pressure strip in the horizontal or vertical direction.

4. Connect the cables.

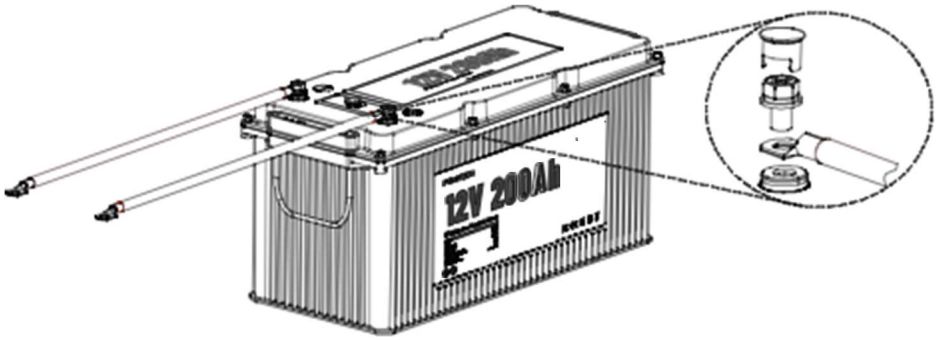


Note

When installing the battery, the tiny sparks generated during the connection will not harm humans or equipment.

Battery Installation

Single Battery



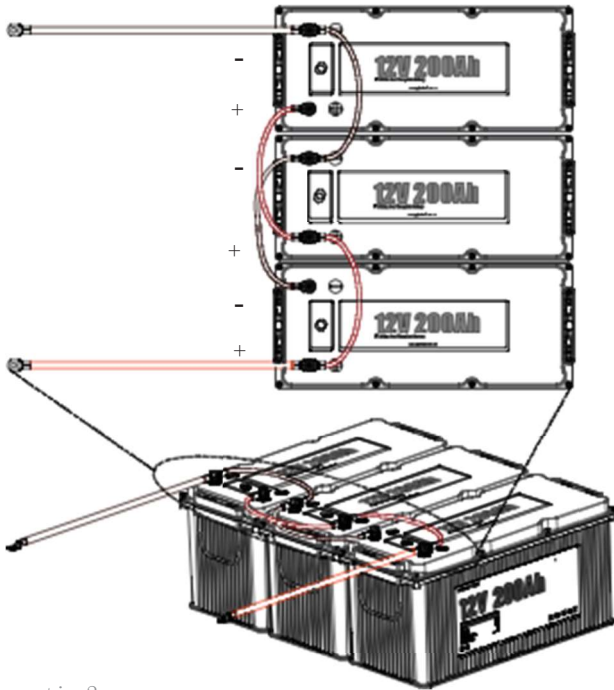
Multiple Batteries

 Note

- Check if the voltage difference between the batteries is less than 0.1 VDC. If not, fully charge the batteries individually to rebalance. Otherwise, overcurrent protection may be triggered.
- Do not mix batteries of different brands, types, models or life spans.
- In order to prolong the life span of the batteries, please make sure the length, diameter and internal resistance of the power cables are the same when using multiple batteries.

Battery Installation

① Connecting the Batteries in Parallel



Why Parallel Connection?

To increase the overall battery capacity while keeping the battery voltage the same.

Connection Steps:

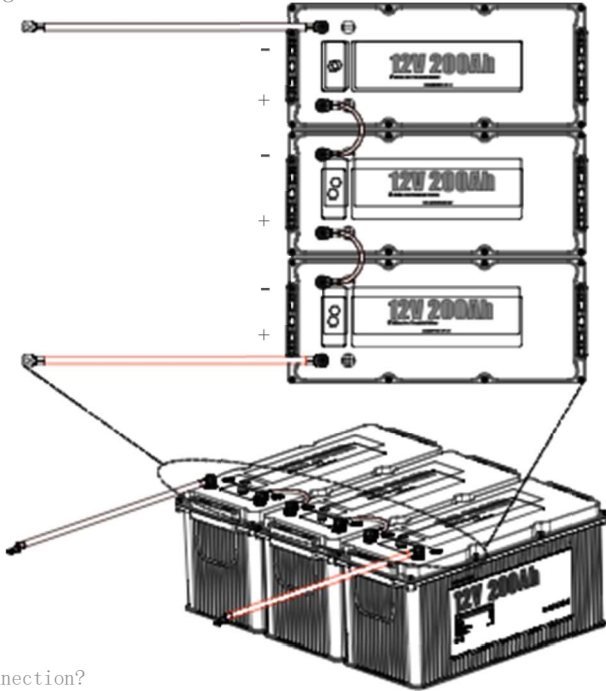
1. Connect the Positive Terminals of the batteries in sequence.
2. Connect the Negative Terminals of the batteries in sequence.
3. Finally, connect the Negative Terminal of the first battery and the Positive Terminal of the last battery to the system.

Parallel Configuration	Max. Charge/Discharge Value
1P ~ 8P	$100A \times N$ *N= module amount, 1~8
9P ~ 16P	$80A \times N$ *N= module amount, 9~16

*Up to 16 batteries can be connected in parallel.

Battery Installation

② Connecting the Batteries in Series



Why Series Connection?

To increase the overall battery voltage while keeping the capacity the same.

Connection Steps:

1. Connect the Positive Terminal of the first battery to the Negative Terminal of the second battery.
2. Connect the Positive Terminal of the second battery to the Negative Terminal of the third battery, and so on.
3. Finally, connect the Negative Terminal of the first battery and the Positive Terminal of the last battery to the system.

Series Configuration	Recommended Charge Voltage Value (VDC)	Recommended Discharge Voltage Value (VDC)
1S	14 ~ 14.6	10.8 ~ 14.6
2S	28 ~ 29.2	21.6 ~ 29.2
3S	42 ~ 43.8	32.4 ~ 43.8
4S	56 ~ 58.4	43.2 ~ 58.4

*Up to 4 batteries can be connected in series.

*Charging as a series can lead to imbalances and reduced runtime. It is recommended to charge the batteries (10 °C ~ 40 °C) individually once a month.

Battery Installation

③ Connecting Batteries in Parallel and Series

Why Parallel and Series Connection?

To increase the overall battery voltage and the capacity at the same time.

Connection Steps:

1. Connect the batteries in parallel.
2. Connect the paralleled batteries in series.
3. Finally, connect the Negative Terminal of the first battery and the Positive Terminal of the last battery to the system.

*Up to 4S4P connection is supported for the battery.

Post-Installation Check

- Please check if the positive and negative connections are correct.
- Make sure all wiring holes are sealed and do not expose the cables.

Battery Storage

Please follow the steps below to store the battery.

1. Charge the battery to 50%~70%.
2. Disconnect the battery from the system, and the battery will enter the shelf mode automatically after 24 hours.
3. Store the battery in an well ventilated, clean, dry area with temperatures between -40 °F ~ 140 °F (-40 °C ~ 60 °C).



Note

Charge the battery at least once every 3~6 months to prevent overdischarge.

Storage Temperature

Recommended storage temperature: -5°C ~ 35°C (23 °F~ 95 °F)

Storage up to 1 month: -20°C ~ 60°C (4 °F~ 140 °F)

Storage up to 3 months: -10°C ~ 35°C (14 °F~ 95 °F)

Extended storage time: 15°C ~ 35°C (59 °F~ 95 °F)

Battery Management System

Protection and Warnings	Charge/Discharge Cut-off
	Overvoltage
	Undervoltage
	Overcurrent
	High/Low Temperature
	Short Circuit
Management and Monitoring	Cell Balancing
	Smart Charging Mode
	Battery Power Indicator
	Heating Film

Battery Management System

Battery State		Condition	
Battery Overvoltage	Protection	Trigger	Battery Voltage > 14.6 V
		Recovery	Battery Voltage < 13.8 V/ Current > 1 A
Battery Cell Overvoltage	Protection	Trigger	Battery Cell Voltage > 3.65 V
		Recovery	Battery Cell Voltage < 3.45 V/ Discharge Current > 1 A
Battery Undervoltage	Warning	Trigger	Battery Voltage < 11.2 V
		Recovery	Battery Voltage > 12 V / Charge Current>1 A
	Protection	Trigger	Battery Voltage < 10.8 V
		Recovery	Battery Voltage > 12 V / Charge Current>1 A
Battery Cell Undervoltage	Warning	Trigger	Battery Cell Voltage < 2.8 V
		Recovery	Battery Cell Voltage > 3 V/ Charge Current > 1 A
	Protection	Trigger	Battery Cell Voltage < 2.7 V
		Recovery	Battery Voltage > 3 V/ Charge Current > 1 A
Charge High Temperature	Warning	Trigger	Battery Temperature > 122 °F (50 °C)
		Recovery	Battery Temperature < 113 °F (45 °C)
	Protection	Trigger	Battery Temperature > 131 °F (55 °C)
		Recovery	Battery Temperature < 122 °F (50 °C)
Discharge High Temperature	Warning	Trigger	Battery Temperature > 131 °F (55 °C)
		Recovery	Battery Temperature < 122 °F (50 °C)
	Protection	Trigger	Battery Temperature > 140 °F (60 °C)
		Recovery	Battery Temperature < 122 °F (50 °C)
Charge Low Temperature	Warning	Trigger	Battery Temperature < 41 °F (5 °C)
		Recovery	Battery Temperature > 50 °F (10 °C)
	Protection	Trigger	Battery Temperature < 32 °F (0 °C)
		Recovery	Battery Temperature > 41 °F (5 °C)

Battery Management System

Battery State		Condition	
Discharge Low Temperature	Warning	Trigger	Battery Temperature < 14 °F (-10 °C)
		Recovery	Battery Temperature < 23°F (-5 °C)
	Protection	Trigger	Battery Temperature < -4 °F (20 °C)
		Recovery	Battery Temperature < 1.4 °F (-17 °C)
Charge Overcurrent	Warning	Trigger	Charge Current > 110 A
		Recovery	Charge Current < 100 A
	Primary Protection	Trigger	Charge Current > 115 A (Delay 1 min)
		Recovery	Charge Current < 100 A / Discharge Current > 1 A
	Secondary Protection	Trigger	Charge Current > 120 A(Delay 1 s)
		Recovery	Charge Current < 100 A / Discharge Current > 1 A
Discharge Overcurrent	Warning	Trigger	Discharge Current > 110 A
		Recovery	Discharge Current < 105 A
	Primary Protection	Trigger	Discharge Current > 120 A (Delay 1 min)
		Recovery	Discharge Current < 105A / Charge Current > 1 A
	Secondary Protection	Trigger	Discharge Current > 160 A (Delay 5 s)
		Recovery	Discharge Current < 105A / Charge Current > 1 A
	Tertiary Protection	Trigger	Discharge Current > 220 A (Delay 10 ms)
		Recovery	Discharge Current < 105A / Charge Current > 1 A
Short Circuit	Protection	Trigger	Discharge Current > 500 A (Delay 100 ms)
		Recovery	Remove Short Circuit / Charge Current > 1A

FCC Regulations

Battery Management System

- This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
 - Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and receiver.
 - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 - Consult the dealer or an experienced radio/ TV technician for help.
- Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

FCC RF Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. To comply with FCC RF Exposure compliance requirements, this grant is applicable to only Mobile Configurations. The antennas used for the transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

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