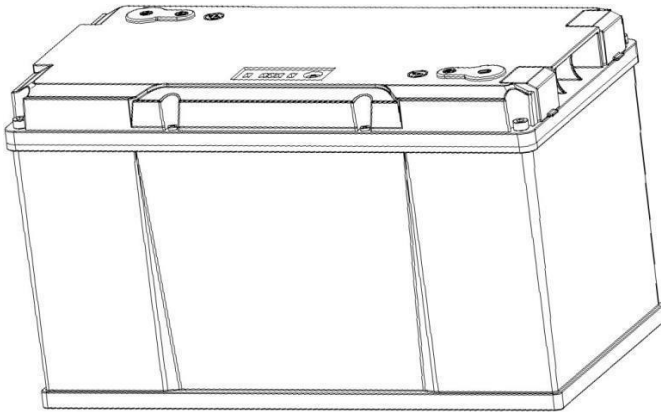




User Manual

Lithium Iron Phosphate (LiFePO₄) Rechargeable Battery

Li100-BHCAN





VOLTS LITHIUM BATTERY USER MANUAL

This user manual was created by Volts Energies Inc. and contains important information relating to the proper care and maintenance of your lithium battery. This manual only applies to Volts lithium battery products. It does not apply to other lithium batteries or chemistries. Please read through the guide in detail before installing and using your new lithium battery. Reading this guide in its entirety will help you achieve high performance and longer life from your lithium batteries. Should you have any questions concerning safety precautions, installation, or the use of your Volts lithium battery, please contact us:

Email: ventes@volts.ca

Phone: +1 450-973-4770

Online chat is available 24/7 on our website www.volts.ca



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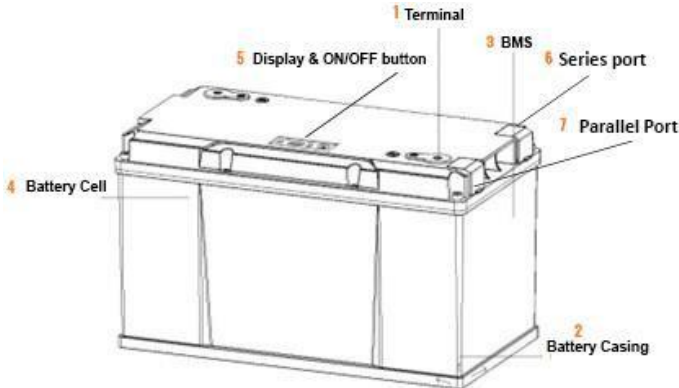
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1. Safety

Lithium Iron Phosphate (LiFePO₄) batteries are safe to use indoors and outdoors. However, as with any electronics, safety measures must always be taken. Please follow the instructions within this user manual for safe handling and operation of your Volts lithium batteries.

- Always wear protective gear when handling batteries
- Use a wrench with a rubber coated handle
- Do not place any objects on top of batteries
- Do not place batteries on a metallic surface
- Check that all cables are in good condition
- Make sure all cable connections are properly tightened
- Install and remove batteries using the lifting handles provided
- Keep sparks, flames and metal objects away from batteries
- The only person allowed to repair Volts Lithium Batteries are certified technicians from Volts Energies
- Have a fire extinguisher of the following type: a foam extinguisher, CO₂, ABC dry chemical, powdered graphite, copper powder or soda (sodium carbonate) on the premises



2. Description

No.	Item	Description
1	Terminal	Connection port, M8 threaded whole.
2	Battery Casing	Compliant to BCI Dimensions. Night Blue plastic
3	BMS	Built-in BMS, with overcharge, over-discharge, over current, over temperature short circuit, heating function, and other protection functions; support operation in series and in parallel.
4	Battery Cell	With prismatic lithium-ion cells built in, which have the advantages of high specific energy, high safety, long life, low internal resistance, low weight, and low self-discharge.
5	Display & ON/OFF	From left to right: one LED for the Bluetooth activity, 3 for the State of charge (SOC), and one for the alerts; Button to activate and deactivate the sleep mode
6	Series port	Connection for communication wires in case of series connection (maximum 48V). Allows each battery to communicate with the other(s). Please refer to "Instruction for Connecting in Series and Parallel" for more details.
7	Parallel port	Connection for communication wires in case of parallel connection (maximum 4). Allows each battery to communicate with the other(s). Please refer to "Instruction for Connecting in Series and Parallel" for more details.



3. Specifications

MODEL	CAPACTTY (Ah)	CHARGE CURRENT (A)	MAX CHARGE CURRENT (A)	MAX DISCHARGE CURRENT (A)	PULSE CURRENT (A) (<3S)	DIMENSIONS MM (inch)	TERMINAL
12V100Ah	100	20	100	150	350	330*175*195 (13*6.9*7.7)	M8

4. Operating Conditions

- These batteries can be used in RV, utility trucks, emergency vehicles, yacht, golf cart, solar street light, UPS, emergency lighting, alarm system, photovoltaic energy storage, 48V low speed vehicle and other types of deep cycle lead-acid battery replacement.
- Battery needs to be operated under:
 - * Acceptable ambient operating temperature for heated model (Li100) charging at -20°C~45°C, and discharging at -20°C~55°C

△ Cautions: Improper use will cause irreversible damage to the battery and could cause battery swelling and smoke in extreme cases.



State indicator during charging and discharging						
	LED1	LED2	LED3	LED4	LED5 (Green)	
Power	(Blue)	(Blue)	(Blue)	(Red)		
100%~60%	On	On	On	Off	/	
60%~20%	On	On	Off	Off	/	
20%~0%	Flash1	Off	Off	Off	/	
Fault	/	/	/	Flash1	/	
Host	/	/	/	/	App access	Flash2
					App disconnect	On
Non host	/	/	/	/	App access	Flash1
					App disconnect	Off
State indicator during standby but not sleep						
100%~60%	Press the button and light up	Press the button and light up	Press the button and light up	Off	/	
60%~20%	Press the button and light up	Press the button and light up	Off	Off	/	
20%~0%	Flash1	Off	Off	Off	/	
Fault	/	/	/	Flash1	/	
Host	/	/	/	/	App access	Flash 2
					App disconnect	On
Non Host	/	/	/	/	App access	Flash 1
					App disconnect	Off



5. Installation Instructions

Please follow the vehicle/equipment manufacturer's instructions:

- When replacing various types of deep cycle applications, please ensure the battery capacity is not less than the original lead-acid battery.
- Please check the battery status before installation:
 - * Please check the battery voltage with a multimeter. If the battery voltage is less than 13V, please recharge it (Refer to "Charging Instruction").
 - * When connecting in series or in parallel, please ensure the capacity and voltage between each battery is consistent (Refer to "Instruction for Connecting in Series and Parallel").
 - * Please check the battery to ensure the terminals are clean with no rust, and the screws are clean without foreign objects.
- Please ensure that the cable connecting the battery terminals does not impose stress on the terminals.
- Please ensure that the screws on the terminals are fixed/tightened to the proper torque value (18 Nm or 13.3 ft-lb for M8 bolts) to avoid loosening during operation.
- Please ensure that the maximum output voltage of the charging device connected to the battery does not exceed 14.6V before connecting.

6. Charging Instructions

- Please ensure the charging voltage is 14.4V (multiplied by the number of batteries in series in case of series connection)
- The charging current must not exceed the maximum charging current (see section 2). This current can be multiplied by the number of batteries in parallel in case of a parallel connection.
- Please ensure to charge at recommended charging temperature (see section 3)
 - * Battery Heating Function (Optional)
If your battery has a heating function, the heating will be turned on when the BMS detects the temperature is lower than 5 °C when the battery is charged. The heating will be turned off when the BMS detects the temperature reaching 10 °C. The heating current is less than 9.3A.
- If you use a lead-acid battery charger, the following mode or function should be deactivated:
 - * "Equalization mode"
 - * "Desulphation mode"
 - * "Pulse function"

- DO NOT leave the lead-acid battery charger connected to maintain or store the battery, because most will NOT maintain the proper charge algorithm for lithium batteries and damage will occur to the battery.

7. Discharging Instructions

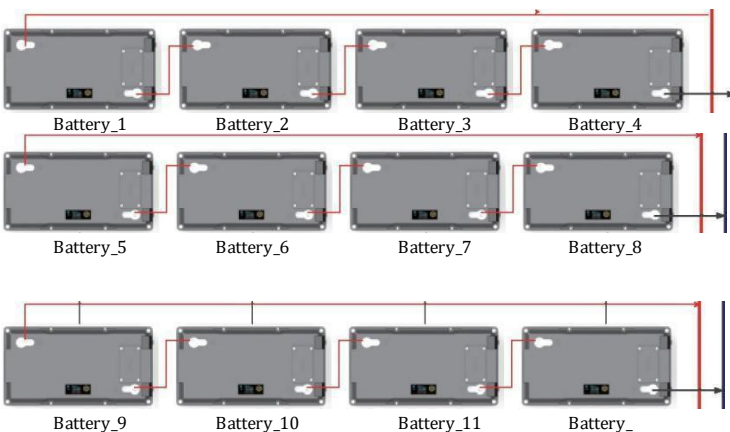
- Please do not exceed the maximum discharge current in this User Manual .(see section 2)
- Do not discharge the battery with maximum discharge current several times in succession, since it may cause battery damage.

8. Instruction for Connecting in Series and Parallel

- Please ensure to fully charge each battery before connecting in series or parallel.
- Do not mix a new battery and a used battery in the same configuration.
- If the battery top cover has a label showing number 1-N, such as 1-1, 1-2,1-3, 1-4, that means the batteries are grouped in the manufacturing factory; to ensure the high consistency in case batteries would be connected in series or parallel. The first number is the group number, and the second number is the sequence within the group. Please do not mix different groups of batteries.
- The battery can be connected in series up to 4 batteries, and in parallel up to 4 batteries simultaneously. That means you can connect up to 16 batteries in a series/parallel configuration to create a 48V/400Ah battery bank.
- Parallel batteries can increase the capacity and power of the battery system and increase the working time of the connected electrical devices.

8.1 First step: Power line wiring:

Make sure to connect the power lines strictly following the below Power Line Wiring Diagram.



8.2 Second step: Communication cable wiring for serial connection

- The master battery will be the one that has the positive output of the battery pack. Make sure to connect the CAN communication cables strictly following the diagram below.



- The address allocation method of the battery pack is necessary only for serial connections.
- For the address to be allocated, press the master battery ON/OFF button (See section 1_5) for 10 seconds. It will also start the battery system.

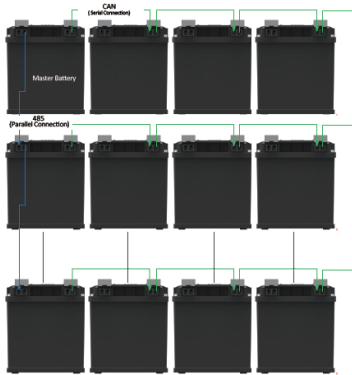
The functions of the master battery in the battery system are as follows:

- Interface for external CAN and RS485 communication.
- Active the system from sleep mode. (Other batteries cannot activate the system)
- Let the system enter sleep mode.

8.3 Communication cable wiring when serial and parallel connection:

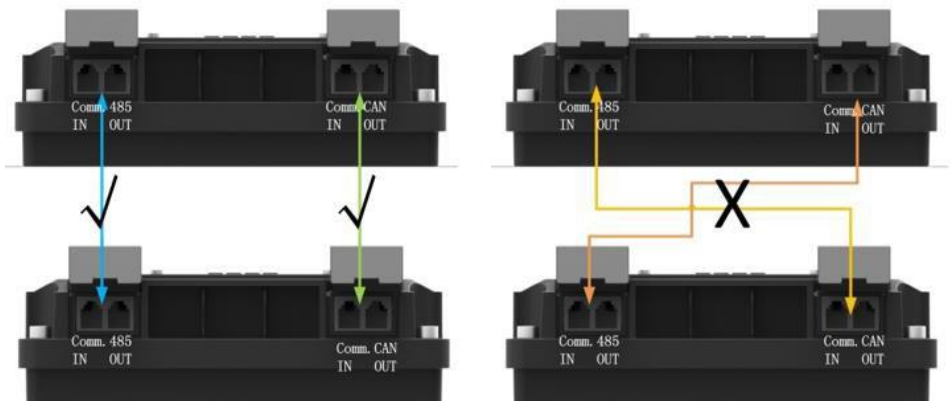
- 1) Connect the power lines strictly following Power Line Wiring Diagram. The parallel connections should be installed before the serial connection.
- 2) Each string will have a master (corresponding to the positive output of the string). The CAN communication cables (serial connection communication) should be connected first following the instructions in section 8.2.
- 3) Connect the RS485 communication cables (parallel connection communication of the master batteries in sequence (see diagram below)
- 4) The initial battery of RS485 communication is the master battery of the whole serial and parallel

battery system.

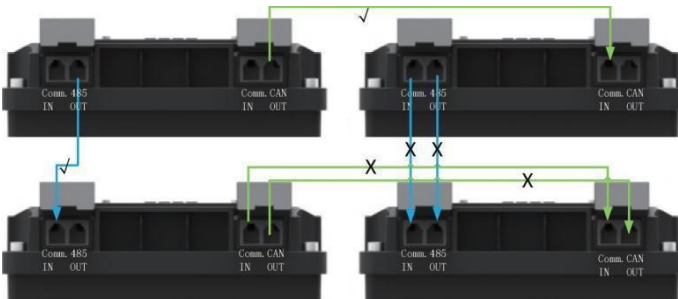


The functions of the master battery in the battery system are as follows:

- Initial battery for the address allocation.
- Interface for external CAN and RS485 communication.
- Active the system from sleep mode. (Other batteries cannot active the system.)
- Control the system to enter sleep mode.
- Note: RS485 can only be connected to RS485, and CAN can only be connected to CAN.
- If misconnected, the communication will not work and the serial and parallel battery system also cannot work.



Note: The OUT port of the previous battery should be connected to the IN port of the next battery.



9. Storage and Transportation

Item		Criteria
Storage Temperature	Less than 1 month	-10°C~+45°C
	Less than 3 months	-10°C~+35°C
	More than 3 months	0°C~+30°C
Relative Humidity		<75% RH
SOC - Storage		40%~60%

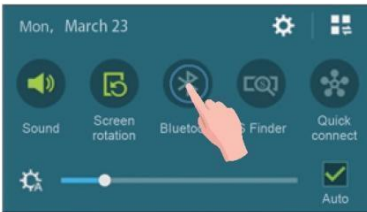
- To ensure a longer lifespan of the battery, please recharge it every 3-6 months.
- Please ensure the battery terminals and screw holes are clean and securely connected.
- If the loads are unused for a long time, disconnect them from the battery to prevent leakage, which could lead the battery to over-discharge.
- Insulation and shockproof materials should be used for the outer packaging to avoid sudden collisions and squeezing during transportation.

10. Bluetooth App

1. The Bluetooth App is available on Google Play Store and Apple's App Store for download. Install the VoltsConnect App and allow notifications.

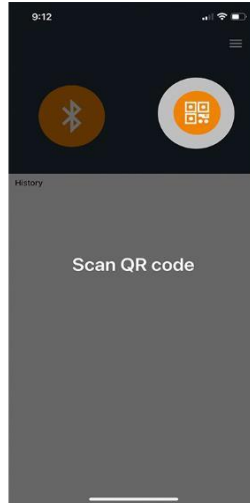
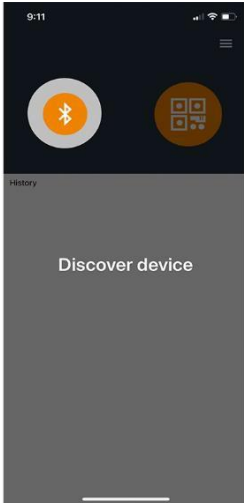


2. Activate Bluetooth on your phone before connecting the battery with your smartphone.

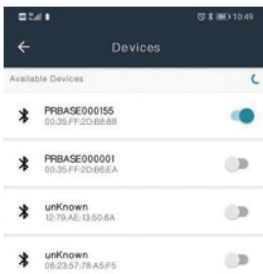


3. Connect the battery to your smartphone. There are two ways for connecting:
 - 1) Search the battery from the device list that your smartphone can discover.
 - 2) Scan QR code on the battery, and the battery name will appear.

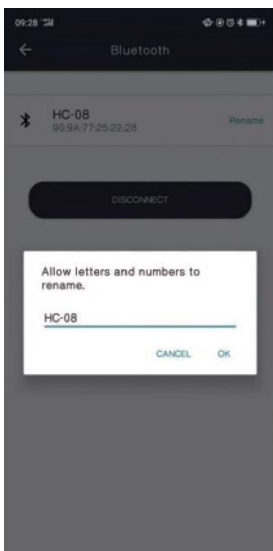
Note: One smartphone can only connect to one battery at the same time. You need to check the batteries one by one in turns if you configure them in series or parallel.



4. Choose the device and connect it:



5. You can rename the battery after being connected. The connected device will appear in the history when accessing the App again.



6. After connecting, you can see the SOC (States of Charge) from the Basic info.

A battery has 4 cells that should be balanced between each other. If the difference becomes too high, the BMS will enter into protection mode and the cells will be displayed in red:



1 Click ① to check the Alarm details.

2 Battery State: Standby/Charging/Discharging

3 Perfect: >90% Initial Capacity

Good: 80%~90% Initial Capacity

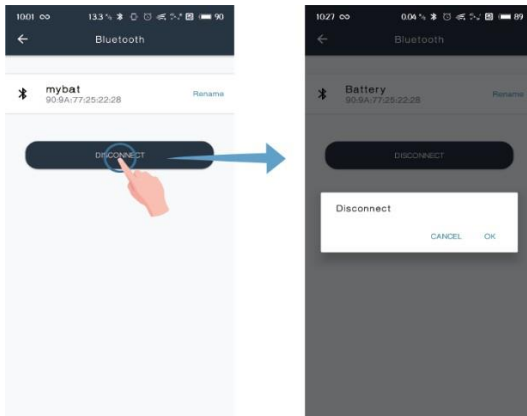
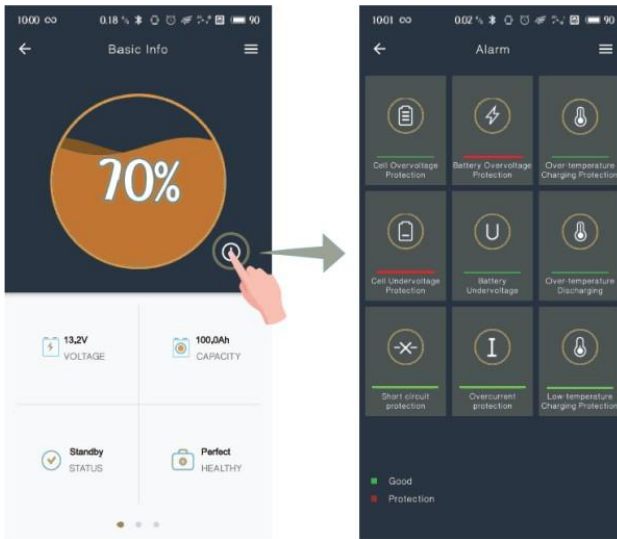
Service: <80% Initial Capacity

4 Battery Voltage (4 cells in series)

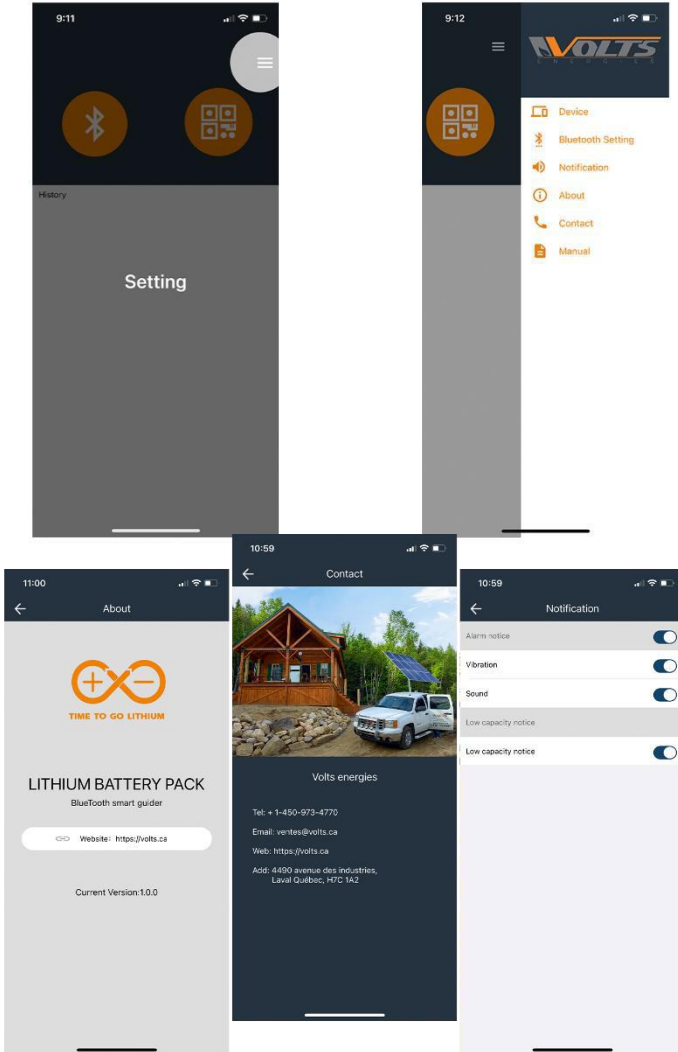
5 The discharge status is indicated by a counterclockwise flowing circle in orange, it also displays a negative value of amperage; the charge status is indicated by a clockwise flowing circle in blue, it also displays a positive value of amperage.

6 Time to full charge

7. You can also check the individual cell voltage from the Details Info.



8. You can disconnect the battery from the connecting device list. Note:
You can check the Manual and other information from the menu



10. Troubleshooting

	Symptom	Possible Causes	Corrective Actions
1	Battery heats up	Over current	Reduce load power.
		Over-temperature use	Work within the operating temperature.
2	Spark occurs on cable terminals	Initial connection to capacitive load or inductive load	No action required.
		Power supply short circuit	Check the cause of the short circuit and disconnect it.
3	No DC output	Battery being protected by BMS	Check the circuits/working environment and confirm the load power to ensure the battery is being charged/discharged within the Max. charging/discharging current stated in the specification.
		BMS failed	Replace the battery.
		Communication error	Check communication wires.
4	Battery working time is too short	The charging voltage is too low and the battery cannot be fully charged	Adjust the charging voltage at 14.4V.
		The load voltage is too high and the battery cannot be discharged	Reduce the load voltage or replace the battery with a larger capacity one.
		Over Temperature	Lower down the ambient temperature.
		Battery capacity is reducing	Replace the battery.



5	Cannot activate charging	The battery voltage is too high without releasing the overvoltage protection state	Measure battery voltage
6	Cannot activate discharging	The load is continuously connected to the battery without change	Check load status
7	No communication	BMs is broken	Replace battery
		Communication wiring problem	Check communication wiring

11. Battery recycling

Terminals must be covered with a protective cap or non-conductive tape prior to battery disposal to a lithium recycler. Dispose of LiFePO4 batteries at an authorized lithium recycling facility

12. Warranty

MANUFACTURER'S LIMITED WARRANTY

Volts Energies ("the Manufacturer") warrants each Volts Energies branded battery ("the Product"), as listed below, sold by Volts Energies or any of its authorized distributors or dealers, to be free of defects for the period as listed in the table below ("the Warranty Period"), from the date of sale as determined by either the customer's sale receipt, the shipping invoice and/or the battery serial number, with proof of purchase. Within the Warranty Period, subject to the exclusions listed below, the Manufacturer will credit, replace or repair, if serviceable, the Product and/or parts of the Product, if the components in question are determined to be defective in material or workmanship.

WARRANTY DETAILS

Li-100 / Li-48 Series - Should the manufacturer deem a valid warranty claim exist and battery(s) are unable to be repaired in year one through three the manufacturer will replace the defective battery free of charge with a similar product. Should the manufacturer deem a valid warranty claim exist and battery(s) are unable to be repaired in years four and five a similar product will be offered at 20% off the price listed at the time of the offer. Should the manufacturer deem a valid warranty claim exist and battery(s) are unable to be repaired in years six through 10 a similar product will be offered at 10% off the price listed at the time of the offer.

NON-TRANSFERABLE

This Limited Warranty is to the original purchaser of the Product and is not transferable to any other person or entity. Please contact the place of purchase regarding any warranty claim.



WARRANTY EXCLUSIONS

The Manufacturer has no obligation under this Limited Warranty for Product subjected to the following conditions (including but not limited to):

- Damage caused during shipping or mishandling of the Product
 - Damage due to improper installation; loose terminal connections, under-sized cabling, incorrect series (cannot be used in series) or parallel connections, reverse polarity connections, or insufficient space for airflow
 - Environmental damage such as inappropriate storage conditions as defined by the manufacturer, exposure to extreme hot or cold temperatures, fire or freezing, or water damage, impact, or collision
 - Damage due to improper operation or maintenance such as under- or over-charging the product, cold temperature charging, lack of cleaning resulting in corroded terminal connections or build-up of dirt, debris, organic matter, fossil fuels, or chemicals on the product casing
 - Improper use of CAN cables or RS485 cables such as improper connections or not connecting them
 - Installing CAN communication devices that do not follow the appropriate CANbus guidelines as defined by the Manufacturer
 - Installing RS485 communication devices that do not follow the appropriate RS485 guidelines as defined by the Manufacturer
 - Product that has been opened, modified, or tampered with
- tampering or removal of manufacture date codes
- Product that was used for applications other than which it was designed and intended for by the Manufacturer
 - Product that was under-sized for the application

This Limited Warranty does not cover a Product that has reached its normal end of life due to usage which may occur prior to the Warranty Period. A battery can deliver only a fixed amount of Energy over its life which will occur over different periods of time depending on the application. The Manufacturer reserves the right to deny a warranty claim if the Product is determined, upon inspection, to be at its normal end of life even if within the Warranty Period.

WARRANTY DISCLAIMER

This limited warranty is in lieu of, and manufacturer disclaims and excludes, all other express warranties. Manufacturer further limits the duration of all, whether statutory, express, or implied warranties, including, without limitation, any warranty of merchantability or fitness for a particular purpose, to the warranty period. Manufacturer's exclusive liability for breach of any warranty on the Battery shall be to replace the Battery within the warranty period in accordance with the terms of this limited warranty. In no event shall Manufacturer be liable for any loss or damages of any other kind, whether direct, incidental, consequential including lost profits, exemplary, special or otherwise, including any lost profits or removal, shipping, or installation expenses.

EXCEPT FOR THE WARRANTY SET FORTH ABOVE, SELLER MAKES NO WARRANTY WHATSOEVER WITH RESPECT TO THE GOODS, INCLUDING ANY (A) WARRANTY OF MERCHANTABILITY; OR (B) WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE; WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE.

LEGAL RIGHTS

Some countries and/or provinces do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to you. This warranty gives you specific legal rights, which may vary from country to country and/or province to province. This warranty shall be governed by and interpreted in accordance with the laws of QUEBEC. This warranty is understood to be the exclusive agreement between the parties relating to the subject matter hereof. No employee or representative of the Manufacturer is authorized to make any warranty in addition to those made in this agreement.



NON-Volts Energies WARRANTIES

This Limited Warranty does not cover Products sold by the Manufacturer or any authorized distributor or dealer to an Original Equipment Manufacturer ("OEM"). Please contact the OEM directly for warranty claims regarding such a Product.

SUBMITTING A WARRANTY CLAIM

To submit a warranty claim, please contact the original place of purchase. The Product may be required to be shipped back to the Manufacturer for further inspection. The Product must be shipped in compliance with UN38.3. Please note that D.O.T. requires all persons shipping batteries to be Hazmat certified.

TECHNICAL SUPPORT

If you have technical questions about the Product, please contact the place of purchase or Volts Energies directly at 450-973-4770.

Contact us

490 Avenue des Industries,
H7C 1A2 - Laval (QC)

Phone: 450 973 4770

Email: ventes@volts.ca

www.volts.ca

