12V 150AH BATTERY USER MANUAL



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12V 150Ah battery

Our 12V 150Ah battery are designed for use with off-grid caravans, RVs, solar, boats (service) or any application requiring the use of a deep cycle battery. These batteries can be connected in series to provide a battery bank with a maximum voltage of 51.2 volts (for example, a maximum of four 12.8 volt batteries or two 24 volt batteries).

They are equipped with a Texas Instrument "Battery Management System" BMS that monitors, optimizes and protects the batteries to ensure safe and accurate battery operation. Note that the 51.2V 100AH battery is equipped with a Microchip Technology BMS.

General characteristic of BMS

The Battery Management System (BMS) is designed to monitor the battery's charge, current, and temperature. When the BMS detects that the battery or battery cells exceed programmed thresholds, the battery will enter a "protection" state. In this state, the external battery terminals are disconnected from the internal battery cells. The BMS will bring the battery out of the protection state once the reconnection parameters are met. Please refer to your battery's technical specifications for the specific disconnect (protection) and reconnection parameters for that battery.

High voltage protection:

If the voltage of an individual cell exceeds a prescribed threshold during charging, the BMS will prevent the charging current from continuing. Discharge is still allowed in this case.

Low voltage protection:

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, charging is still allowed in this state.

A battery disconnected at low voltage will have zero volts on the external positive terminal. Many chargers must detect a voltage greater than 10V in order to send a charge to the battery.

Note: Some battery chargers will first check to see if a battery is connected before starting the charge process. Although a battery in low voltage protection will accept a charge current, some "smart" battery chargers may not start the charge process because a battery in "low voltage disconnect" protection has 1 volt or less on the battery terminals. In order to recharge the battery, your battery charger may need to be "tricked" to start the charge process. Please contact Volthium Technical Support if you suspect this is the case. If possible, it is best to program your inverter's LBCO (Low Battery Cut Out) setting to shut down before the battery BMS detects a low voltage condition.

Example: For a 12V inverter system, set the LBCO setting to 12V. The inverter should shut down when the battery BMS detects a low voltage condition. The inverter should shut down when the battery(ies) still have approximately 10% state of charge. For a 24V inverter system, the LBCO setting can be set to 24 volts. Since the inverter shuts down before the batteries go into low voltage protection, charging issues with smart chargers can be avoided.

High temperature protection: *(60°C in discharge | 45°C in charge)

When discharging, the battery BMS will enter protection mode if the battery temperature exceeds 60°C.
It will not allow a discharge current.
When charging, the battery BMS will enter protection mode if the battery temperature exceeds 45°C.
It will not allow a charge current.

* Refer to the data sheet for more details.

Low Temperature Protection: (-30°C in discharge | 0°C in charge)

During discharge, the battery BMS will enter protection mode if the battery temperature is below -30°C.
It will not allow a discharge current.
When charging, the battery BMS will enter protection mode if the battery temperature is below 0°C.
It will not allow a charge current.

In low temperature conditions, Volthium batteries with the self-heating option will use the charge current to activate the battery's internal heating pads. Once the cell temperature has reached the prescribed level, the BMS uses the charge current to recharge the battery cells.

Please refer to your battery's data sheet for more details.

High charge and discharge current protection

The BMS will not allow a charge or discharge current that exceeds the thresholds prescribed by Volthium.

Please refer to the battery datasheet for specific details regarding current thresholds.

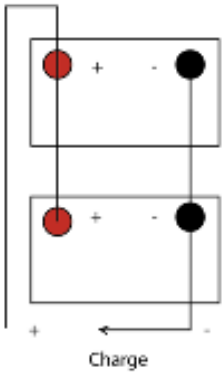
Installation

Care should be taken when connecting to the battery terminals. The positive and negative terminals are labeled and color-coded (red for +, black for -). Do not reverse the battery polarities, as this will damage the battery and the connected device.

Parallel

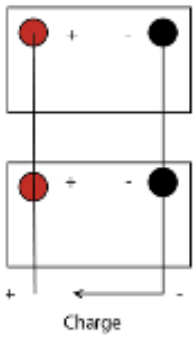
Batteries can be connected in parallel to increase the amp-hour capacity of the system (please note that if you have more than 2 batteries in parallel, we recommend using a busbar to interconnect the batteries and the rest of the system. The busbar must be able to accept the DC capacity of all the batteries added together). When batteries are connected in parallel, the system voltage does not change, but the DC and amp-hour values are added together. Therefore, all cables and connections must be capable of handling the high currents that can be delivered by the batteries. Appropriate fuses and circuit breakers are also required to protect all components from current spikes and short circuits. Batteries to be connected in parallel must be in the same state of charge before being connected.
To avoid excessive discharge currents from one battery to another, please charge each battery using a suitable LiFePo4 battery charger to ensure they are all at the same state of charge or voltage.

To distribute the current equally between the batteries, use the diagram below:



GOOD INSTALLATION

Battery current distributed evenly. All batteries contribute equally to the charging current.



BAD INSTALLATION

Unevenly distributed current. The batteries closest to the load contribute the most to the charging current while those furthest away contribute the least. Wear is higher for batteries close to the load.

Series

Up to four 12.8V batteries (same series) or two 24V batteries (same series) can be connected in series to increase the system voltage to a maximum of 51.2V. When the batteries are connected in series, the current capabilities remain the same, but the system voltage is increased.
The batteries to be connected in series must be at the same state of charge before connection. To avoid over-discharge from one battery to the next, please charge each battery with a suitable LiFePo4 battery charger to ensure that they are all at the same state of charge or voltage before connecting them in series.

Battery disconnection

Disconnect the negative cable from the (-) battery terminal first, then the positive cable from the (+) battery terminal.

Inverters / Chargers

Do not connect batteries to an inverter/charger over 1500 Watt without a surge protector as this may damage the BMS and pose a potential fire hazard.



Here is an example of wiring a Bluesea Battery Transfer Switch with an inverter capacitor pre-charge resistor. When connecting the battery(ies) to the inverter, the user first selects position 1 of the switch for about 10 seconds. The battery current will flow through the 25W resistor to "slowly" charge the inverter input capacitors. After 10 seconds, the switch can be moved to position 2 to directly connect the battery(ies) to the inverter input. Volthium recommends using a 25 ohm / 25 watt resistor to avoid excessive instantaneous discharge when first connected to the inverter.

Battery chargers / solar controller

Battery chargers without a specific charging algorithm for lithium (LiFePo4) are compatible. However, if a charger has an automatic equalization mode, it must be disabled.

Communication

The battery has an RJ45 port that allows communication to Volthium compatible accessories.



Waterproofing

This battery is IP66. It is equipped with a black rubber cap that helps maintain the battery's waterproofness. It is necessary to install it correctly to avoid infiltration. Note that there is still a sealant on the inside (epoxy / silicone) of the connectors to provide a safety barrier, but external protection remains essential and mandatory for maintaining the warranty.

If the battery is installed in a humid environment where condensation may form, or in a location where rain may reach the battery, it is best to protect the battery from overexposure to water for an extended period of time.

Charging the battery

You can recharge your Volthium batteries after each use or when they have been discharged to 20% (state of charge).
If the BMS disconnects the battery due to low voltage (0% state of charge), recharge it immediately.

Battery charger / solar controller

Battery chargers with a specific charging algorithm for lithium (LiFePo4) are compatible with Volthium batteries. If a charger does not have a LiFePo charging parameter, check if it offers the possibility to define a custom or user battery. You can then define and adjust the charging parameters for Bulk/Boost, Absorb, Float values provided in the battery datasheet. Note that the automatic equalization mode must be disabled and temperature compensation during charging is not necessary.

Charging with lead-acid battery chargers

Most lead acid battery chargers (AGM, Gel, FLA) can be used with Volthium batteries as long as they meet the proper voltage guidelines. AGM and FLA algorithms generally match the voltage requirements of our batteries, but will not charge them beyond 90-95%. To charge them to 100%, we recommend replacing your charger with a lithium-based charger. Since the BMS protects the battery, using lead acid chargers will generally not damage the battery. However, the charger must be disconnected once the battery is fully charged.
Unlike lead acid batteries, Volthium LiFePo batteries do not require a "trickle charger" to maintain their SOC at 100% when the battery is stored for one or more months.

Battery charging settings

Please refer to your battery's datasheet for charging instructions.

Here are the general charging parameters for 12.8V and 25.6V Volthium batteries:

Charging parameter 12.8V	Voltage Parameter 12.8V
Bulk Voltage : 14.2V-14.6V	Low Voltage Cutoff 11V-11.5V
Absorption Voltage : 14.2V-14.6V	High Voltage Cutoff 14.6V
Absorption Time : 0-30min	
Float Voltage : 13.3 -13.6V	

Volthium batteries do not require equalization.

Charging parameter 25.6V	Voltage parameter 25.6V
Bulk Voltage : 28.8 – 29.2V	Low Voltage Cutoff 20V
Absorption Voltage : 28.8 – 29.2V	High Voltage Cutoff 30.8V
Absorption Time : 0-30min	
Float Voltage : 27.2 V	

Charging with the vehicle alternator

To protect your battery and alternator, adding a DC to DC voltage regulator between the alternator and the battery(ies) is highly recommended.

Storage

Before storing your batteries, refer to the technical data sheet of your battery (available on volthium.com).
It is not necessary or recommended to connect the battery to a trickle charger.

Caution

- When connecting batteries in series, never exceed 60V (four 12.8V batteries in series).

- Do not connect a Volthium battery to batteries of different chemistry or to Volthium batteries of different voltage or capacity.

- Do not use deep cycle batteries to start engines.

- Always use a protection device (DC-to-DC) when an alternator is used to recharge the battery(ies).

- Never store the battery when its state of charge is less than or equal to 10%.

- Be sure to pre-charge the inverter DC input capacitors before connecting the lithium battery (unless the battery includes the Soft-Start function, available on some Volthium products).

- Completely cycle the batteries (from 5% SOC to 100% SOC) at least twice a year to keep the cells balanced and healthy.

- Do not immerse the battery in any liquid

- Do not short-circuit the battery

- Do not connect the battery with the polarity reversed

- Do not expose the battery to temperatures above 60 degrees Celsius.

- Do not drop the battery or apply excessive force to it.

- Do not disassemble, puncture or modify the battery case.

Bluetooth function and self-heating function

Added Bluetooth function

PLEASE NOTE : To get the Bluetooth function, you need to add a Volthium Bluetooth module to your battery (not included with the battery). Available for sale on our website: volthium.com

You will find valuable additional information on the Bluetooth functionality in the User Manual of the module

Limited ten (10) year warranty of Volthium Energy Inc.

Applicable only to Volthium brand batteries

IMPORTANT NOTICE :

BY USING YOUR VOLTHIUM BRAND BATTERY, YOU AGREE TO BE BOUND BY THE TERMS OF VOLTHIUM'S LIMITED TEN (10) YEAR WARRANTY (THE "WARRANTY") SET FORTH BELOW.

DO NOT USE YOUR BATTERY UNTIL YOU HAVE READ THE TERMS OF THIS WARRANTY. IF YOU DO NOT ACCEPT THE TERMS OF THIS WARRANTY, DO NOT USE THE BATTERY AND RETURN IT WITHIN THE RETURN PERIOD SPECIFIED IN VOLTHIUM ENERGY INC.'S RETURN POLICY (AVAILABLE AT WWW.VOLTHIUM.COM NOTE: INSERT LINK TO RETURN POLICY PAGE) TO VOLTHIUM ENERGY INC.'S HEADQUARTERS OR TO THE AUTHORIZED DISTRIBUTOR FROM WHICH YOU PURCHASED THE PRODUCT FOR A REFUND.

APPLICATION OF CONSUMER PROTECTION LAWS TO THIS WARRANTY

THIS WARRANTY GRANTS YOU SPECIFIC LEGAL RIGHTS. YOU MAY ALSO HAVE OTHER RIGHTS DEPENDING ON YOUR PROVINCE OF RESIDENCE. EXCEPT AS PERMITTED BY APPLICABLE LAWS, VOLTHIUM ENERGY INC. DOES NOT EXCLUDE, LIMIT, OR SUSPEND OTHER RIGHTS YOU MAY HAVE, INCLUDING RIGHTS ARISING FROM THE NON-CONFORMITY OF A SALES CONTRACT. IT IS YOUR RESPONSIBILITY TO REVIEW YOUR PROVINCE'S LAWS TO FULLY UNDERSTAND YOUR RIGHTS.

Residents of Quebec are subject to the consumer protection legislation of that province.

WARRANTY LIMITATIONS SUBJECT TO CONSUMER PROTECTION LAWS

APPLICABLE THROUGHOUT CANADA, EXCEPT IN QUEBEC: TO THE EXTENT PERMITTED BY APPLICABLE LAWS, THIS WARRANTY AND THE REMEDIES DESCRIBED HEREIN REPLACE ALL OTHER WARRANTIES, REMEDIES, AND CONDITIONS OF ANY KIND, WHETHER ORAL OR WRITTEN, STATUTORY, EXPRESS, OR IMPLIED. VOLTHIUM ENERGY INC. DISCLAIMS, TO THE EXTENT PERMITTED BY LAW, ALL STATUTORY OR IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND WARRANTIES AGAINST HIDDEN DEFECTS. TO THE EXTENT THAT SUCH WARRANTIES CANNOT BE DISCLAIMED, VOLTHIUM ENERGY INC. LIMITS THE DURATION AND REMEDIES OF SUCH WARRANTIES TO THE DURATION OF THIS EXPRESS WARRANTY AND, AT VOLTHIUM ENERGY INC.'S SOLE DISCRETION, TO THE REPAIR OR REPLACEMENT SERVICES DESCRIBED BELOW. SOME PROVINCES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY (OR CONDITION) LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

COVERAGE OF THIS WARRANTY

Volthium Energy Inc., located at 100-2600 Ford Blvd., Châteauguay, Quebec, J6J 4Z2, Canada, warrants Volthium brand batteries ("Volthium batteries") against defects in manufacturing and operation, provided they have been used normally and according to the guidelines published by Volthium Energy Inc., for a period of TEN (10) YEARS from the date of retail purchase (as determined by the customer's sales receipt) by the end user ("warranty period"). The guidelines published by Volthium Energy Inc. include, but are not limited to, information contained in technical specifications, user guides, and service communications.

Volthium Energy Inc. warrants that each Volthium brand battery sold by Volthium Energy Inc. or one of its authorized distributors or resellers is free from operational defects for a period of 10 years from the date of sale as determined by the customer's sales receipt and/or invoice.

Subject to the exclusions listed below, the manufacturer will repair the Volthium brand battery if it is repairable, or replace or credit the Volthium brand battery and/or its parts if the components in question are deemed defective.

During the first four (4) years of your Volthium brand battery's life, if applicable under this limited warranty, the covered amount for a new replacement battery will be 100%. Starting from the first day of the 5th year of your Volthium brand battery's life, if applicable under the warranty, the covered amount for a new replacement Volthium brand battery will be determined according to the table below:

Number of Years of Life of the Defective Volthium Brand Battery Covered by the Warranty	% of the Covered Amount for the Equivalent Replacement Volthium Brand Battery Included in the Warranty
5 years	60%
6 years	50%
7 years	40%
8 years	30%
9 years	20%
10 years	15%

The amounts granted above are always conditional upon the return of the defective Volthium brand battery to Volthium Energy Inc. with an invoice.

Warranty Statement

This warranty is the only legitimate warranty supported by Volthium Energy Inc. Under no circumstances shall Volthium Energy Inc. be liable for any loss or damage of any other kind, whether direct or indirect, in connection with Volthium brand batteries. The warranty is understood to be the exclusive agreement between the parties regarding the subject matter herein. No employee of Volthium Energy Inc. is authorized to offer any warranty beyond this one.

Non-Transferable Warranty

The warranty is to the original purchaser of Volthium brand batteries and is not transferable to any other individual or entity.

WHAT IS NOT COVERED BY THIS WARRANTY

This warranty does not apply to products that are not Volthium branded, even if they are included in the packaging or sold with Volthium batteries. This does not affect your rights under the Consumer Protection Act. Manufacturers and/or suppliers other than Volthium Energy Inc. may provide their own warranties. Contact them for further information. Volthium Energy Inc. is not responsible for damages resulting from the failure to follow instructions for using Volthium batteries.

This warranty does not apply to:

a) Damages attributable to the use of Volthium batteries not in accordance with the guidelines of Volthium Energy Inc.;

b) Damages attributable to improper installation, including but not limited to, loose terminal connections, undersized wiring, incorrect connections (series and parallel) for desired voltage and amp-hour requirements, or reverse polarity connections;

c) Damages attributable to improper maintenance, including but not limited to, inappropriate storage conditions as defined by the manufacturer, exposure to extremely hot or cold temperatures, fire, freezing, sunlight, water, or seawater.

d) Damages attributable to an accident, including but not limited to, misuse, fire, liquid contact, earthquake, or any other external cause;

e) Cosmetic damages, including scratches, dents, and breakage of plastic parts of the ports, unless the defect occurred due to a material or manufacturing flaw;

f) Damages attributable to use for applications other than those for which the Volthium battery was designed and intended;

g) Damages attributable to use with a third-party component or product that does not meet the technical specifications of Volthium batteries (accessible in the technical specifications of each battery as well as in-store) and approved by Volthium Energy Inc., including but not limited to, chargers or inverters;

h) Damages attributable to maintenance (including charging, upgrading, and extending) performed by anyone who is not an employee of Volthium Energy Inc. or one of its authorized distributors or resellers;

i) Damages attributable to a Volthium brand battery that has been modified to substantially or completely change functionality or capacity without the written authorization of Volthium Energy Inc.;

j) Damages attributable to normal wear and tear or normal aging of Volthium batteries;

k) Damages attributable to excessive use of Volthium brand batteries. Volthium Energy Inc. reserves the right to deny a warranty claim if it is determined during inspection that the product has reached its normal end of life even if it remains within its warranty period;

l) When the serial number of Volthium brand batteries has been removed or degraded;

m) Damages attributable to collision;

n) When the Volthium brand battery has been opened, pierced, modified, or altered;

o) Non-essential components to the operation of the battery (LCD screen warranty limited to one (1) year and integrated Bluetooth device warranty limited to one (1) year);

p) When Volthium Energy Inc. receives information from a competent public authority indicating that the product has been stolen or you are unable to prove that you are the authorized user of the product (by presenting your proof of purchase).

YOUR RESPONSIBILITIES

Before providing warranty service, Volthium Energy Inc. or one of its authorized distributors or resellers will require you to provide details of your proof of purchase, answer questions designed to facilitate the diagnosis of potential issues, and follow the procedures established by Volthium Energy Inc. to benefit from warranty service.

YOUR RESPONSIBILITIES

Before providing warranty service, Volthium Energy Inc. or one of its authorized distributors or resellers will require you to provide details of your proof of purchase, answer questions designed to facilitate the diagnosis of potential issues, and follow the procedures established by Volthium Energy Inc. to benefit from warranty service.

WHAT ENERGY VOLTHTIUM INC. WILL DO IN CASE OF BREACH OF THIS WARRANTY

If, during the warranty period, you submit a valid claim to Volthium Energy Inc., Volthium Energy Inc. may, at its discretion :

(i) repair your Volthium brand battery using new authentic parts from Volthium Energy Inc.;

(ii) replace the Volthium brand battery with a Volthium brand battery of the same model or a newer model.

Upon replacement of a part or a Volthium brand battery, the replacement Volthium brand battery becomes your property and the replaced Volthium brand battery becomes the property of Volthium Energy Inc.

PROCEDURE TO AVAIL WARRANTY SERVICE

If your Volthium brand battery is not functioning properly, please contact Volthium Energy Inc.'s technical support. Our team will assist you in determining whether your Volthium brand battery needs repair or replacement services, and if so, will provide you with information on how Volthium Energy Inc. plans to provide the service. Additional charges may apply when contacting Volthium Energy Inc. by phone depending on your location.

WARRANTY SERVICE OPTIONS

To submit a warranty request, please contact Volthium Energy Inc. by email at support@volthium.com or by phone at 514-989-9586 before proceeding with either of the following options.

Volthium Energy Inc. will provide warranty service through one of the following options :

(i) You may bring your Volthium brand battery to our headquarters located at 100-2600 Ford Blvd., Châteauguay, Quebec, J6J 4Z2, Canada. Repairs to your Volthium brand battery will be carried out on-site in our repair workshop. Once notified that the repairs have been completed, you can promptly retrieve your Volthium brand battery.

(ii) Mail-in repair service. If Volthium Energy Inc. determines that your Volthium brand battery is eligible for mail-in repair service, Volthium Energy Inc. will provide you with prepaid shipping labels and, if applicable, necessary packaging materials and instructions for proper packaging and shipping of your Volthium brand battery to our headquarters. Once repairs are completed, Volthium Energy Inc. will return your Volthium brand battery to you. Volthium Energy Inc. will cover shipping costs from your location and back provided that the packaging and shipping instructions for your Volthium brand battery are followed.

Volthium Energy Inc. reserves the right to modify the method or option it chooses to provide you with warranty service, as well as the eligibility conditions of your Volthium brand battery for a particular service method.

LIMITATION OF LIABILITY

SUBJECT TO THE PROVISIONS OF THIS WARRANTY AND TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, VOLTHIUM ENERGY INC. SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, OR CONSEQUENTIAL DAMAGES ARISING FROM A BREACH OF WARRANTY OR CONDITION OR UNDER ANY OTHER LEGAL THEORY, INCLUDING, WITHOUT LIMITATION, LOSS OF USE, LOSS OF REVENUE, LOSS OF ACTUAL OR ANTICIPATED PROFITS (INCLUDING LOSS OF PROFITS REALIZED BY THE BUSINESS), LOSS OF USE OF FUNDS, LOSS OF ANTICIPATED SAVINGS, LOSS OF CUSTOMERS, LOSS OF BUSINESS OPPORTUNITIES, LOSS OF GOODWILL, AND LOSS OF DATA OR THEIR DAMAGE, COMPROMISE, OR CORRUPTION, NOR FOR ANY CONSEQUENTIAL LOSSES OR DAMAGES CAUSED IN ANY WAY.

SOME PROVINCES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU.

Residents of Quebec are subject to the consumer protection legislation of that province.

GENERAL PROVISIONS

No employee of Volthium Energy Inc. or authorized distributor or reseller is authorized to make any modification, extension, or addition to this warranty. If any provision herein is found to be illegal or unenforceable, the legality and enforceability of the remaining provisions shall not be affected or limited. This warranty shall be governed and interpreted in accordance with the laws of the country in which the Volthium brand battery was purchased. Volthium Energy Inc. or its successors are the guarantors under this warranty.

RETURN AND REFUND POLICY

If you are not entirely satisfied with your purchase, we're here to help.

Return

You have fourteen (14) calendar days to return your Volthium brand battery from the date of purchase identified on your invoice or the shipping date of your Volthium brand battery. To be eligible for a return, your Volthium brand battery must be new (sealed box) and never used. Keep the original packaging for 45 days. Your Volthium brand battery must be in its original packaging. Your Volthium brand battery must have the receipt (invoice) or proof of purchase. No returns will be accepted without your invoice and secure barcode label number.

Refund

nce we receive your Volthium brand battery, we will inspect it and notify you that we have received your returned Volthium brand battery.

We will immediately proceed with the refund after inspecting your Volthium brand battery and confirming its eligibility.

Delivery

You will be responsible for paying for your own shipping costs for returning your Volthium brand battery. Shipping costs are non-refundable. If you receive a refund, the cost of return shipping will be deducted from your refund, if applicable.

If you have any questions on how to return your Volthium brand battery to us, please contact us via email at support@volthium.com or at 514-989-9586.