Volthium

Énergie
Energy

USER MANUAL
4D & 8D BATTERIES

Our 4D and 8D size batteries are ideal for off-grid caravans, recreational vehicles, solar power, boats (servitude) or any application requiring the use of a deep-cycle battery. These batteries can be connected in series to provide a battery bank up to a maximum voltage of 51.2 Volts (for example, a maximum of four 12.8V batteries, or two 24V batteries).

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

BMS - General characteristics:

The Battery Management System (BMS) is designed to monitor battery voltages, currents, and temperatures. When the BMS detects the battery or battery cells are exceeding programmed thresholds, the battery enters “protection” mode. In this state, the external battery terminals are disconnected from the internal battery cells. The BMS will take battery out of protection state once the reconnection parameters are reached. Please refer to the battery technical specifications for the disconnect (protection) and reconnect parameters specific to that battery.

High voltage protection:

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

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 permitted in this condition.

A battery disconnected at low voltage will have zero volts on the external positive terminal, multiple chargers need to detect a voltage above 10 V to send a charge to the battery.

Note: Some battery chargers will first check if there is a battery connected before starting the charging process. Even though a battery in Low Voltage protection will accept a charging current, some “intelligent” battery chargers might not initiate the charging process since a battery in “low voltage disconnect” protection state will present 1 volt or less on the battery terminals. In order to recharge the battery, your battery charger may need to be “tricked” into starting the charging process. Please contact Volthium technical services if you believe you have encountered this condition. Whenever possible, it is best to program your inverter’s Low Battery Cut Out (LBCO) parameter to turn off the inverter before the battery BMS detects a Low Voltage condition.

Example: for a 12 V inverter system, set the LBCO parameter to 12 volts. The inverter should turn off when the battery(s) still have approximately 10% State Of Charge. For a 24 V inverter system, the LBCO parameter can be set to 24 volts. Since the inverter turns off before the batteries enter low voltage protection, recharging issues with intelligent chargers can be avoided.

High temperature protection: *(+ 55-70° Celsius)

The BMS will not allow a charging or discharging current.

* *Depending on the model, please refer to the technical data sheet for more details.*

Low temperature protection: (- 20° Celsius discharge or 0° Celsius charging)

The BMS will prevent discharging of the battery cells when their temperature is below -20° Celsius or charging of the battery cells when their temperature is below 0° Celsius.

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

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

High charging and discharging current protection:

The BMS will not allow a charging current or discharging current that exceeds Volthium prescribed thresholds.

Please refer to the battery's technical data sheet for specific details regarding current thresholds.

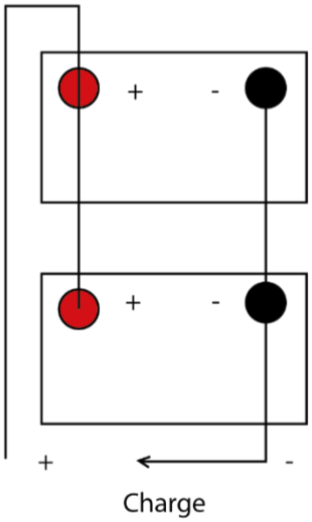
Installation:

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

Parallel

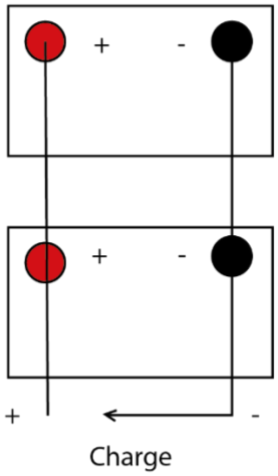
Batteries can be connected in parallel to increase system's Amp hour capacity (please note that if you have more than 2 batteries in parallel, we suggest using a "Busbar" to interconnect the batteries and the rest of the system. The busbar must be able to accept the continuous current capacity of all the batteries added together). When batteries are connected in parallel, the system voltage does not change, but the continuous current values and the Amp hour values will add up. Consequently, all cables and connections must be capable of withstanding the high currents that may 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 at the same State Of Charge before connection. To avoid excessive discharge currents from one battery to the other, please charge each battery using an appropriate LiFePo4 battery charger to ensure they are all at the same state of charge or voltage.

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



TO DO

Equally distributed battery current.
All batteries contribute equally to charging current.



DON'T

Unevenly distributed current.
Batteries closest to the load contribute the most to charging current, while those furthest from the load contribute the least. Wear and tear is higher for batteries close to the load.

Series

Up to four 12.8V batteries (from the same production series) can be connected in series to increase system voltage to a maximum of 51.2V. When batteries are connected in series, current capacities remain the same, but system voltage will be added. Batteries to be connected in series must have the same state of charge before connection. To avoid excessive discharge from one battery to the other, please charge each battery using an appropriate LiFePo4 battery charger to ensure they are all at the same state of charge or voltage before connecting them in series.

Battery disconnection

First, disconnect the negative cable from the (-) battery terminal, then disconnect the positive cable from the (-) battery terminal.

Inverter / Chargers

Do not connect batteries to an inverter/charger above 3500Watts without a current surge arrester, as this may damage the BMS and present a potential fire hazard.

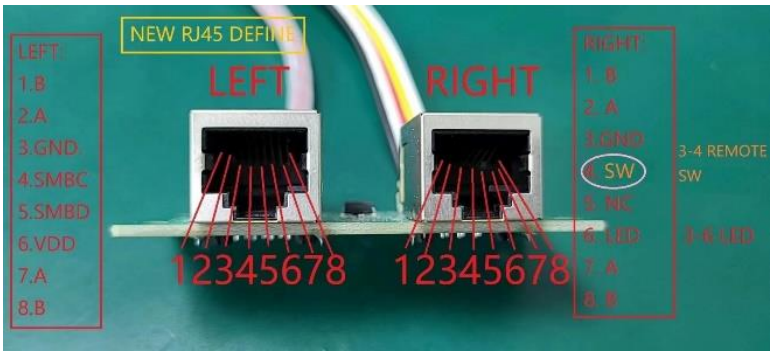
Here's an example of how to wire a Bluesea battery disconnect switch with an inverter capacitor pre-charge resistor. When connecting the battery(s) to the inverter, the user would first select position 1 on the switch for about 10 seconds. The current from the battery will pass through the 25 W resistor to “slowly” charge the inverter input capacitors. After 10 seconds, the switch can be set to position 2 to directly connect the battery(s) to the inverter input. Volthium recommends the use of a 25 ohms / 25 watts resistor to avoid excessive instantaneous discharge when connecting to the inverter for the first time.

Battery charger / solar controller

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

Communication:

The battery has two RJ45 ports for communication with Volthium-compatible accessories. Both ports offer RS485 communication, so it doesn't matter which port you choose to connect your Volthium accessory to.



Waterproofing:

The battery is fitted with black (or yellow) rubber caps which are essential to maintain the battery's watertight integrity. It's essential to install them correctly to avoid water infiltrations.

Note that there is a sealant on the inside (epoxy / Silicone) of the connectors to provide a safety barrier, but external protection remains essential and compulsory to maintain the warranty.

If the battery is installed in a damp, condensation-prone environment, or in a place where rain can reach the battery; **apply dielectric sealant around RJ45 ports.**
If you're connecting an RJ45 cable permanently, then fill the port completely with dielectric grease and then plug in the cable. Be generous, it has to overflow.

Dielectric grease is not harmful when injected into the RJ45 connector.

Volthium keeps Permatex dielectric grease in stock.
SKU: ACC-PMT81150

If the battery is to be used in a salty air environment, please also cover the stainless steel switch and apply an even more generous coat to seal the battery.

Switch:

The battery is fitted with a switch that disables discharging, while allowing charging current to enter. When the switch is depressed, the battery can be discharged and recharged for normal use. If the switch is in the non-depressed position, then the voltage on the terminals will be less than 6V, and the battery cannot be discharged, but can still be charged. The self-heating system will also be functional if the switch is in the OFF position.

Heating system and use of the H+ Connector:

Batteries incorporating a self-heating system will activate it during battery charging when the internal temperature of the cells is below 0 degrees Celsius. When the battery is connected to a charger, the BMS will first direct the charging current to the internal heating pads to heat the cells to 11° Celsius after which the charging current is directed to the battery cells. The power source must provide at least 8 Amps of current for the self-heating system to start. Your battery will be able to go from -20 to 11° Celsius in approximately 2 hours.

Our 4D and 8D self-heating batteries are also equipped with a manual activation system **reserved for professionals**. Access to this manual activation system is allowed through the connector, labeled: H+ on the battery cover, bypassing all the BMS's safety features. (see picture).

To use it, connect a cable between the positive terminal of the battery and the H+ connector. Once this connection is made, the heating pads will be activated. Note that it is imperative to install a timer switch that will automatically disconnect the power going to the H+ terminal after 80 minutes or less to avoid overheating the battery cells. To use this feature safely, **we invite you to contact one of our Volthium technicians at 514-989-9586**. We can discuss if your particular situation requires the use of the manual heating option. Normally, it is best to let the BMS automatically control the operation of the self-heating system.

WARNING! The self-heating pads will remain in operation as long as the connection is established. We recommend not exceeding more than 80 minutes of manual system activation, so it is essential to set a timer to avoid damaging the battery. Indeed, the heating pads could completely drain the battery since they bypass the low voltage protection offered by the BMS. Please keep in mind that improper use of this manual activation system will invalidate your battery warranty.

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 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 setting, then verify if it offers the possibility of defining a custom or User battery. You can then define and set the charging parameters for the Bulk/Boost, Absorb, Float values provided in the battery's technical data sheet. Note that the automatic equalization mode must be deactivated and temperature compensation during charging is not required.

Charging with lead-acid battery chargers

Most lead-acid battery chargers (AGM, Gel, FLA) can be used with Volthium batteries as long as they comply with the appropriate voltage guidelines. AGM and FLA algorithms generally match the voltage requirements of our batteries but will not recharge them beyond 90% to 95%. To recharge to 100%, we recommend replacing your charger with a lithium-function charger. As the BMS protects the battery, the use of 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 chemistry batteries do not require a “trickle charger” to keep their SOC at 100% when the battery is stored for one or more months.

Battery charging parameters

Please refer to your battery data sheet for charging instructions specific to your battery model.

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

Charge specs for the 12.8V batteries	Voltage specs for the 12.8V batteries
Bulk Voltage : 14.2V-14.6V	Low Voltage Cutoff 11V-11.5V
Absorption Voltage : 14.2V-14.6V	High Voltage Cutoff 15.4V
Absorption Time : 0-30min	
Float Voltage : 13.3 -13.6V	

Volthium batteries do not require equalization.

Charge specs for the 25.6V batteries	Voltage specs for the 25.6V batteries
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 a vehicle alternator

To protect your battery and alternator, we strongly recommend adding a DC-to-DC voltage regulator between the alternator and the battery(ies).

Storage

Before storing your batteries, charge them to between 70% and 80% SOC and then disconnect them from any charging or discharging circuit. It is not necessary or recommended to connect the battery to a trickle charger.

Warning:

- When connecting batteries in series, never exceed 60V (four 12.8 V batteries in series)
- Do not connect a Volthium battery with batteries of a different chemistry or Volthium batteries with a different voltage or capacity
- Do not use deep-cycle batteries to start engines
- Always use a protective device (DC-to-DC) when an alternator is used to recharge the battery(s)
- Never store the battery when it's SOC is 10% or less.
- Be sure to pre-charge the inverter's DC input capacitors before connecting the lithium battery (unless the battery includes the Soft-Start feature, available on certain Volthium products)
- Cycle batteries thoroughly (5% SOC to 100% SOC) at least twice a year to keep cells balanced and healthy
- Do not immerse the battery in any liquid
- Do not short circuit the battery
- Do not connect the battery in reverse polarity
- Do not expose the battery to a temperature above 60 degrees Celsius
- Do not drop or apply excessive force to the battery
- Do not disassemble, drill or modify the battery housing

Bluetooth and self-heating functionalities

Adding the Bluetooth function

PLEASE NOTE: To get the bluetooth function you need to add a Volthium Bluetooth dongle to your battery (not included).

**** You will find valuable additional information on Bluetooth functionality in the Bluetooth Dongle User Manual ****

10-year Limited warranty:

Volthium Energy warrants that each Aventura Series LiFePo4 battery sold by Volthium Energy or one of its authorized distributors or resellers is free from defects in performance for a period of 10 years from the date of sale as determined by the customer's sales receipt, shipping invoice and/or battery serial number, with proof of purchase.

Subject to the exclusions listed below, the manufacturer will repair if repairable, replace or credit, the product and/or parts of the product, if the components in question are found to be defective.

During the first 4 years of the life of your Volthium Battery, if applicable under this Limited Warranty, the amount covered for a new replacement battery will be 100%. From the first day of the 5th year of life of your Volthium battery, if applicable under this limited warranty, the amount covered for a new replacement battery will be determined according to the table below:

Number of years of defective Volthium battery life under this limited warranty	% of the amount covered for the equivalent Volthium replacement battery included in this limited warranty
5th year	60%
6th year	50%
7th year	40%
8th year	30%
9th year	20%
10th year	15%

*** The amounts granted above are always conditional on the return of the defective battery to Volthium with proof of purchase. ***

Declaration of warranty

This warranty is the only legitimate warranty carried by Volthium Energy. In no event shall the manufacturer be liable for any direct, indirect, or consequential loss or damage of any nature whatsoever in connection with Volthium brand batteries.

This warranty is understood to be the exclusive agreement between the parties concerning the subject matter hereof. No employee or representative of the manufacturer is authorized to make any warranty in addition to those set forth in this agreement.

Non-transferable warranty

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 for all warranty claims.

Warranty exclusions

The manufacturer has no obligation under this limited warranty for products subject to the following conditions (including, but not limited to):

- Damage due to incorrect installation; loose terminal connections, undersized wiring, incorrect connections (series and parallel) for desired voltage and AH requirements, or connections with reversed polarity;
- Environmental damage; inappropriate storage conditions as defined by the manufacturer; exposure to extremely hot or cold temperatures, fire or frost, or water damage;
- Collision damage;
- Damage due to improper maintenance; under or overloading the product, overloading when cold, use of an unsuitable charger, etc;
- Product that has been opened, pierced, modified or altered;
- Product used for applications other than those for which it was designed and intended, including repeated engine starting;
- Product used on an oversized inverter/charger without the use of a manufacturer-approved surge suppressor;
- Product not stored in accordance with manufacturer's storage instructions:
- Product that was undersized for use, including an air conditioner or similar appliance with locked rotor starting current that is not used in conjunction with a manufacturer-approved surge-limiting device;
- This limited warranty does not cover a product that has reached the end of its normal life due to excessive use. A battery can only deliver a fixed amount of energy over its lifetime, which will occur over different periods depending on usage. For example, repeated and frequent use of more than one battery cycle per day will result in normal end-of-life before the end of the warranty period. The manufacturer reserves the right to refuse a warranty claim if, upon inspection, it is determined that the product has reached the end of its normal life, even though it remains within its warranty period;
- This limited warranty does not apply to non-essential battery components. These are covered as follows:
  LCD SCREEN – 1 year;
  Bluetooth device – 4 year.

Repairs without warranty

For any damage outside the warranty period, or for damage not covered by the warranty, customers can always contact the manufacturer for battery repairs. Costs will be assessed and determined according to the current terms and conditions.

Submitting a warranty claim

To submit a warranty claim, please contact Volthium Energy by email at support@volthium.com or call us at 514 989-9586.

Return and refund policy

Return and refund policy

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

Return

You have 14 calendar days to return an item from the date of shipment. To be eligible for a return, your item must be brand new (sealed box) and unused. Keep the original packaging for 45 days. Your item must be in its original packaging. Your item must have the receipt or proof of purchase. No returns will be accepted without a secure barcode label number.

Refund

Once we have received your item, we will inspect it and inform you that we have received your returned item. We will proceed with the refund immediately after inspecting the item and confirming its eligibility.

Shipping

You will be responsible for paying your own shipping costs for the return of your item. Shipping charges are non-refundable. If you receive a refund, the return shipping costs will be deducted from your refund.

If you have any questions about how to return your item, please contact us.

Return request

To submit a return request, please contact Volthium Energy by email at support@volthium.com or call us at 514 989-9586.