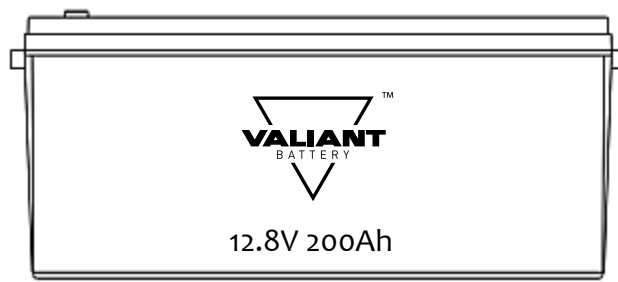
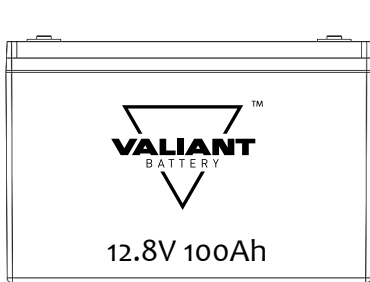




VTL Series LiFePO4 Lithium Battery

VTL12-100
VTL12-200
VTL12-300
VTL12-100CW
VTL12-200CW
VTL12-300CW



Heating Function Included on CW series

User Manual

2026.3.31V1.0

Table Of Contents

➤ 1. Safety	P 2
➤ 2. LiFePO ₄ Battery Basics	P 2
➤ 3. Battery Storage	P 5
➤ 4. Battery Installation	P 5
➤ 5. Battery Charge	P 7
➤ 6. Battery Discharging	P 8
➤ 7. BMS Operation	P 9
➤ 8. Display Screen	P 10
➤ 9. Heating Function	P 10
➤ 10. Battery Recycling	P 10

1. Safety

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

2.1 EQUIPMENT

The following equipment may be required to install your battery:

- Protective gear, gloves and eye protection
- Wrench with insulated/rubber coated handle
- Voltmeter

2.2 Basic Construction

LiFePO₄ battery packs include two main components:

1. Individual cells assembled inside an ABS plastic or a steel case.
2. An internal BMS (Battery Management System) to protect the battery from a variety of conditions.

2.3 Battery Pack Voltages

Lithium Iron Phosphate (LiFePO4) Nominal Voltage

Cell = 3.2V

12.8V – 4 cells in series

25.6V – 8 cells in series

38.4V – 12 cells in series

48.0V – 15 cells in series

51.2V – 16 cells in series

2.4 Products Performance Test

NO.	Test	Test Criteria	Result
1	Self-Discharge Performance	After charging, store at $20 \pm 5^\circ\text{C}$ for 30 days	The battery did not discharge below 85% of initial capacity.
2	Over Charge Test	Battery charged at 1.0C current with a voltage limit of 12.8V. Charging is continued for 3 hours.	No Issues
3	Discharge Test	Battery discharged continuously at the constant current of 0.5C to 12.8V, then discharged with a current of 0.2C to 10V.	No Issues
4	Vibration test	Subject the battery to simple harmonic motion with an amplitude of 0.8mm (1.6mm) total maximum excursion. The frequency is to be varied at a rate of 1 hertz per minute between 10 and 55 hertz. The battery is to be tested for 30 min in each direction.	No Issues
5	External Short-Circuit Test	Fully charge. Short circuit by connecting the positive and negative terminals with a circuit load having a maximum resistance load of $100\text{m}\Omega$, until its temperature has fallen by 10°C from the peak temperature.	No Issues
6	Humidity and heat test	A fully charged battery is placed in a box for 48 hours where the temperature is $40^\circ\text{C} \pm 2^\circ\text{C}$ and the relative humidity is 90%~95%	No Issues
7	Impact test	After the battery is fully charged, place the battery on a flat surface and place a steel rod with a diameter of 10mm in the center of the battery. A 5kg weight is dropped onto the battery from a height of 50mm.	No Issues

2.5 General Specification

Valiant LiFePO4 Battery Specifications			
Battery Style	VTL12-100	VTL12-200	VTL12-300
Nominal Voltage	12.8V		
Rated Capacity	100Ah	200Ah	314Ah
Charge End Voltage	14.6V		
Discharge End Voltage	10.0V		
Standard Charge Current	20A	40A	60A
Max. Charge Current	100A	200A	200A
Standard Discharge Current	50A	100A	100A
Max. Continuous Discharge Current	100A	200A	200A
Max. Peak Current	200A	300A	300A
Battery Terminal	M8 Terminal		
Shell Material/ Color	ABS Plastic/ Black		
Size(mm)	331*171*222	522*242*220	387*206*273
Work Temperature Range	Charge: 0°C - +50°C Discharge: -20°C - +60°C		

2.5 General Specification

Valiant LiFePO4 Battery Specifications			
Battery Style	VTL12-100CW	VTL12-200CW	VTL12-300CW
Nominal Voltage	12.8V		
Rated Capacity	100Ah	200Ah	314Ah
Charge End Voltage	14.6V		
Discharge End Voltage	10.0V		
Standard Charge Current	20A	40A	60A
Max. Charge Current	100A	200A	200A
Standard Discharge Current	50A	100A	100A
Max. Continuous Discharge Current	100A	200A	200A
Max. Peak Current	200A	300A	300A
Battery Terminal	M8 Terminal		
Shell Material/ Color	ABS Plastic/ Black		
Size(mm)	331*171*222	522*242*220	387*206*273
Work Temperature Range	Charge: -30°C - +50°C Discharge: -20°C- +60°C		

3. Battery Storage

3.1. Storage Temperature

- Recommended storage temperature: -5 to +35°C (23 to 95 °F)
- Storage up to 1 month: -20 to +60°C (4 to 140 °F)
- Storage up to 3 month: -10 to +35°C (14 to 95 °F)
- Extended storage time: +15 to +35°C (59 to 95 °F)

It is highly recommended to store lithium batteries indoors during the off season.

3.2. Storage SOC

It is recommended to store LiFePO4 batteries at about a 50% state of charge (SOC). If batteries are stored for long periods of time, cycle the batteries at least every 6 months. Do not store batteries that are fully discharged.

4. Battery Installation

4.1 Battery Connections

To maximize battery performance and ensure safe operation of your battery, use the appropriate cable size and tighten connections using the proper torque value. It is recommended to use a washer. Place the washer between the cable lug and nut, not between the cable lug and battery terminal surface. VTL Series lithium batteries come with bolts and washers included. Refer to the data sheet for your battery's torque value and the size of the included bolts.

4.2 Cable Size

Choose the appropriate cable size based on the expected load of your system. See the table to the right. Allowable Ampacities for copper cables rated at 167 °F (75°C) operating at an ambient temperature of 86°F (30°C).

4.3 Torque Values

Terminal connections should adhere to the appropriate torque values for the specified terminal type to provide optimum electrical conductivity. Refer to the data sheet for your battery's torque value. Over- or under- tightening the connections can result in terminal breakage, overheating and/or terminal melting. Use a rubber handled or insulated wrench when making terminal connections to avoid an external short circuit.

Wire Gauge (AWG) – Copper Conductors	Ampacity (Amps)
14	25
12	30
10	40
8	55
6	75
4	95
2	130
1	150
1/0	170
2/0	195
4/0	260

4.4 Terminal Protection

Battery terminals may be covered with a plastic cap to prevent an external short circuit. Terminals must be covered prior to disposal at a lithium recycler.

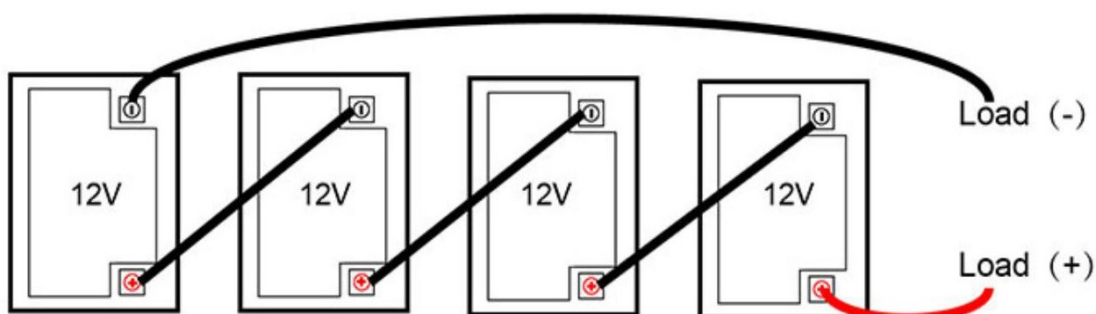
4.5 Battery Orientation

VTL Series LiFePO₄ batteries can be installed upright or on their sides. Please ensure the battery is properly fastened if installed in a moving vehicle, such as in an RV or a boat.

4.6 Series or Parallel Connections (For capacity over 50AH including 50AH)

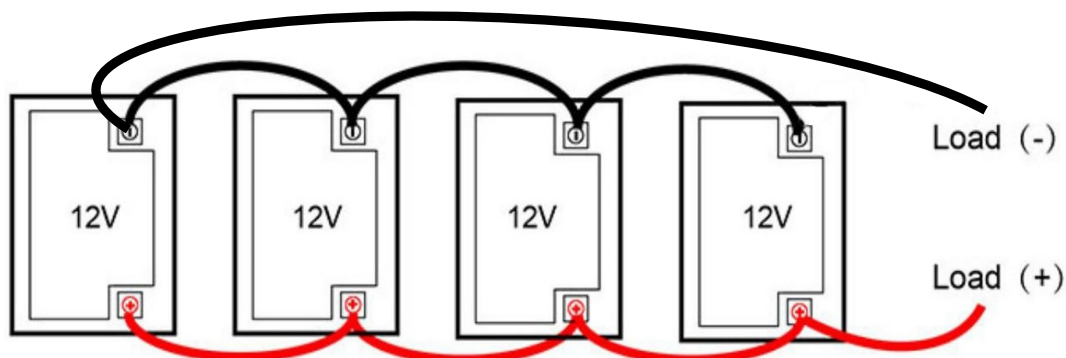
When connecting batteries in series or parallel, please follow these guidelines:

1. Make sure each battery is within 50mV (0.05V) of each other before putting them in service. This will minimize the chance of imbalance between batteries. If your batteries are out of balance (the voltage of any battery is >50mV (0.05V) from another battery in the system), you should fully charge each battery individually to rebalance. VTL Series 12V LiFePO₄ batteries support series connections up to 4 units.



Series Connection

2. All Batteries must be the same capacity and the same age. The capacity of batteries (rated in amp hours) when connected in parallel is increased by the multiple of the batteries connected (2x, 3x, 4x, etc). However, the current ratings (discharge and charge) for parallel batteries is only increased by 75% of the multiple of the batteries connected (1.5x, 2.25x, 3x, etc). VTL Series 12V LiFePO₄ batteries support parallel connections of up to 4 units (24V 2 units).



Parallel Connection

- Please reference VTL series LiFePO₄ Charging Instructions document for series and parallel charging.

Specifications for Batteries in Parallel				
Battery Quantity	1	2	3	4
Voltage	12/24/48	12/24/48	12/24/48	12/24/48
Capacity (Ah)	100	200	300	400
Max Continuous Discharge Current	100	150	225	300
Peak Discharge Current	200	300	450	600
Rec'd Charge Current	50	75	113	150
Max Charge Current	100	150	225	300

5. Battery Charge

5.1 When to Charge your LiFePO₄ Battery

If LiFePO₄ batteries are not fully discharged, they do not need to be charged after each use. LiFePO₄ batteries will not be damaged if left in a partial state of charge (PSOC). You can charge your LiFePO₄ batteries after each use or when they have been discharged up to 80% (20% SOC). If the BMS disconnects the battery due to low voltage, remove the load to reconnect the battery circuit and charge immediately. You must use a LiFePO₄ battery charger in order for the BMS to reconnect. If battery is over-discharged and will not respond to charging, contact your dealer for instructions.

5.2 Charging Temperature

Lithium Iron Phosphate batteries generate a fraction of the heat of other lithium chemistries when charging, making them very safe. VTL series batteries can safely charge between 0° C to 45° C (32° F to 113° F). VTL CW series (cold weather) can be charged between -30° C to 45° C (-4° F to 113° F). The CW series has a built-in heating system which activates when the temperature of the cells reaches freezing (0°C) and charging is attempted. It works by warming up the lithium cells to above freezing and then the BMS will allow charging. LiFePO₄ batteries do not require temperature compensation for voltage when charging at hot or cold temperatures. All VTL Series LiFePO₄ batteries come with a BMS that protects the battery from under-temperature and over-temperature. If the BMS disconnects due to low temperature while charging, the battery must warm up for the BMS to reconnect and continue charging. If the battery disconnects due to high temperature, the BMS won't allow the battery to recharge until the battery's temperature is reduced. Please refer to your battery's data sheet for BMS low temperature and high temperature cut-off values.

5.3. Charging with Lead-Acid Chargers

Most lead-acid battery chargers can be used with LiFePO₄ batteries as long as they are within the appropriate voltage parameters (14.6V). AGM and Gel algorithms typically fall within the LiFePO₄ voltage requirements, but you are still required to check the charging algorithm of your specific charger. The voltage for flooded battery charging algorithms are often higher than LiFePO₄ requirements, which will result in the BMS disconnecting the battery during the charge cycle and may result in the charger displaying an error code. If this happens, it is recommended to replace your charger with a lithium approved model. Since the BMS protects the battery, using lead-acid chargers will not damage the battery. Please refer to the VTL Series Lithium Charging Instruction section for complete charging instructions. Important: If your battery's BMS disconnects due to low voltage during discharge, the battery's voltage will read 0V. In this case, a lead-acid battery charger may not be able reconnect the BMS and recharge the battery. This is because a lead-acid battery charger requires a voltage reading to start charging. A LiFePO₄ battery charger is required to reconnect the BMS, as it is designed to 0V. This is one reason why it's recommended to use a charger designed for LiFePO₄ batteries.

6. Battery Discharging

6.1 Discharge Temperature

LiFePO₄ batteries generate a fraction of the heat of other lithium chemistries when discharging, making them very safe. LiFePO₄ batteries can safely be discharged between -20°C to 60°C (-4°F to 140°F). All VTL Series LiFePO₄ come with a BMS that protects the battery from low temperatures and high temperatures. If the BMS disconnects due to low temperature, the battery must warm up for the BMS to reconnect. If the battery disconnects due to high temperature, wait until the temperature reduces. Please refer to your particular battery's data sheet for BMS low temperature and high temperature cut-off values.

6.2 Discharging your LiFePO₄ Battery

LiFePO₄ batteries can be discharged up to 100% of their capacity. However, to optimize the performance of your LiFePO₄ battery and to avoid the BMS disconnecting the battery, we recommend limiting the discharge to 80%. Please refer to your battery data sheet for the maximum rate of discharge for your specific battery model.

7. BMS Operation

7.1 BMS protection system

All LFP Series LiFePO4 batteries come with a BMS, which protects against: Under and Over-Voltage/Current - during charging and discharging Temperature Extremes - low and high temperature cut-off Protection from Shorts - internal circuit. If the BMS disconnects the battery due to voltage or current limits, you must remove the load to reconnect the battery. If the BMS disconnects the battery due to temperature limits, you must wait for the temperature to adjust to reconnect the battery. While short-circuit protection protects the battery's cells, it still may produce a spark and damage your cable or bolt, so it is best to avoid short circuit conditions.

7.2 Bluetooth Monitoring System

Valiant One is the exclusive wireless Bluetooth monitoring and management app for VALIANT smart lithium batteries. No additional standalone battery monitoring hardware is required: the app connects directly to the battery's built-in BMS via Bluetooth, enabling full visual management of your VALIANT lithium batteries. It delivers convenient, reliable battery operation and maintenance for RV, marine, off-grid solar, and commercial energy storage applications.

Key Features

- Connects to your smartphone via Bluetooth, supports simultaneous monitoring of multiple batteries.
- Real-time monitoring of battery status, including voltage, current, temperature, state of charge (SOC) and battery health.
- Offline operation supported, no internet connection or account required, data stored locally on your device.
- Integrated user manuals and specification sheets for quick reference.

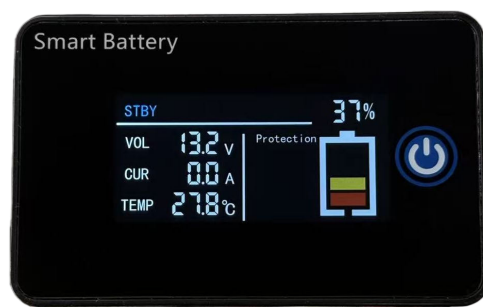
Download Channels:

The app is available for both iOS and Android devices. Search for "Valiant One" on the App Store or Google Play to download and install for free.



8. Display Screen (Optional)

The display screen is installed on the top of the battery. The left side of the screen displays real-time information of the battery voltage, current and temperature, while the right side intuitively shows the battery capacity. A power button is equipped at the bottom right corner; a short press lights up the screen to view the power and voltage data, and a long press turns off the display screen.



9. Heating Function (CW Series)

When the cell temperature is below 15 °C with the charger connected, the protection board will turn on heating while charging. If low temperature protection is triggered during charging (cells are below 0°C) only heating will occur until the cells are above 5°C. The heating will use the charger power to warm the cells, then return to proper recharging once that is achieved.

10. Battery Recycling

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

Warranty Card

User Information

Name:

Email:

City:

Dealer Name:

Product Information

Battery Serial No:

Invoice Number:

Date:

For product registration, please
take a picture of the completed
form and email to
info@valiantbattery.ca.