12 V 100 Ah GR24
USER MANUAL

Volthium Energy inc. | T. 514.989.9586 | info@volthium.com | www.volthium.com

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1. Safety

1.1 Statement

Please read this manual carefully before installation, operation, and maintenance, and pay attention to various warning signs and statements on the equipment. After reading this manual, please keep it properly for future reference.

1.2 Specification

These manual contents using the following symbols should be paid special attention to during operation.

Symbol	Statement
ATTENTION	Attention: Reminder of precautions during operation.
WARNING	Warning: Indicates that there is a hazardous situation during the operation process and special attention needs to be paid.

1.3 Critical safety info

Before installing, operating, or maintaining the battery, the following operating and maintenance instructions must be read.

Before installing :
- It is very important and necessary to carefully read the user manual before installing or using the battery. Failure to follow any instructions or warnings in this document may result in electric shock, serious injury, or damage to the battery and the entire system.
- Before connecting the battery pack to your device, check the voltage and ensure that they are within the limits of your device specifications. Failure to comply with these specifications will void your warranty.

During installation :
- Personnel familiar with the electrical specifications of their country or region are required to install battery packs. For optimal safety, please follow the steps described in this manual. The environmental conditions specified in the product specification must be followed.

ATTENTION

- Prohibit connecting batteries to different types of batteries;
- Do not use faulty or mismatched chargers to charge the battery;
- Long term float charging is prohibited for lithium-ion batteries;
- The environmental conditions given in the product documentation must be followed;
- If the battery is found to be deformed, abnormally hot, or emitting an odor, please immediately cut off the power and stop using it.

1.4 Battery maintaining

1. Professional personnel should take care of the charging operation, ensure good contact between the plug and socket during the charging process, ensure normal operation of the charging equipment, and ensure good contact at all connection points of the battery pack. If there is an abnormality, it needs to be repaired before charging;

2. If there is a large amount of dust, metal shavings, or other debris on the upper cover and pole of the battery pack, clean it with compressed air in a timely manner to avoid using water or objects soaked in water for cleaning;
3. Try to avoid splashing water or other conductive objects onto the battery cover and pole during charging and discharging, such as when exposed to heavy rain for use;
4. Estimate the charging and discharging time of the battery or battery pack based on its actual usage status. Pay attention to observing whether there are any abnormalities in the battery or battery pack at the end of charging and discharging, such as voltage difference issues;
5. Check whether the conductive strip, voltage collection terminal, and other nodes are loose, detached, rusted, or deformed, ensuring that the battery pack is used in series or parallel reliable fixation (once/3 months).

1.5 Waste treatment

ATTENTION

Please handle packaging and replace components in accordance with the laws and regulations of the country or region where the battery pack is located. Do not mix batteries with daily waste for disposal.

2. Installation

2.1 Tools and equipment

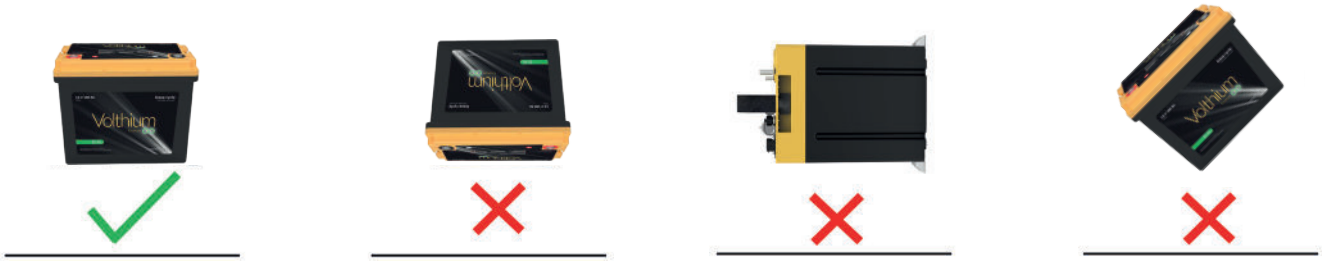
Insulating gloves

Safety shoes

Tools

2.2 Battery placement

Gently place the battery pack face up on the support surface, do not lay it on its side or upside down, and do not place any covers above the pack. The schematic diagram of battery pack placement is shown in figure.



2.3 Battery supporting materials

NO.	Material name	Chart	QTY (PcS)	SPEC
1	Battery		1	12 V 100 Ah GR24
2	Screw		2	M8 * 16 stainless steel screws

3. Introduction to Volthium series batteries

3.1 Main features

a. LiFePO4 composition - providing excellent safety and lifespan
b. High reliability
c. Maintain consistent performance over a wide temperature range
d. With higher heat dissipation effect, it can maintain high current charging and discharging of the battery for a longer time

3.2 Product appearance

Components description			
NO.	Component appearance	Name	Statement
1		Terminal Posts	Negative and positive M8 terminal posts
2		Label	Carefully read the label and use the battery correctly according to the label content

1. Terminal Posts

Each battery has a positive terminal and a negative terminal. During use, be sure to identify and avoid reversing the positive and negative poles. After connecting the power line to the pole terminal, cover it with a protective cover to avoid short circuits.

2. Label

The label displays the parameters. During use, it is important to match the corresponding charger and load according to the label parameters to avoid battery failure.

3.3 Battery performances

3.3.1 Parameters

Item	12 V 100 Ah GR24
Nominal voltage	12.8 V
Nominal energy	1280 Wh
Nominal capacity	100 Ah
Internal resistance@1khz AC	≤30 mΩ
Allowed MAX. charge current@25°C	100 A
Allowed MIN. discharge current@25°C	100 A
Recommend charge current	50 A
Recommend discharge current	50 A
Peal /Surge current limit	350 A@3 s
Short circuit current	800 A@500 μs

4. Series and parallel connection of batteries

4.1 Introduction

The GR24 12V100Ah battery allows multiple batteries to be connected in series or parallel up to 4S or 4P max.
This allows for the assembly of different voltage systems or the expansion of battery system capacity.

ATTENTION

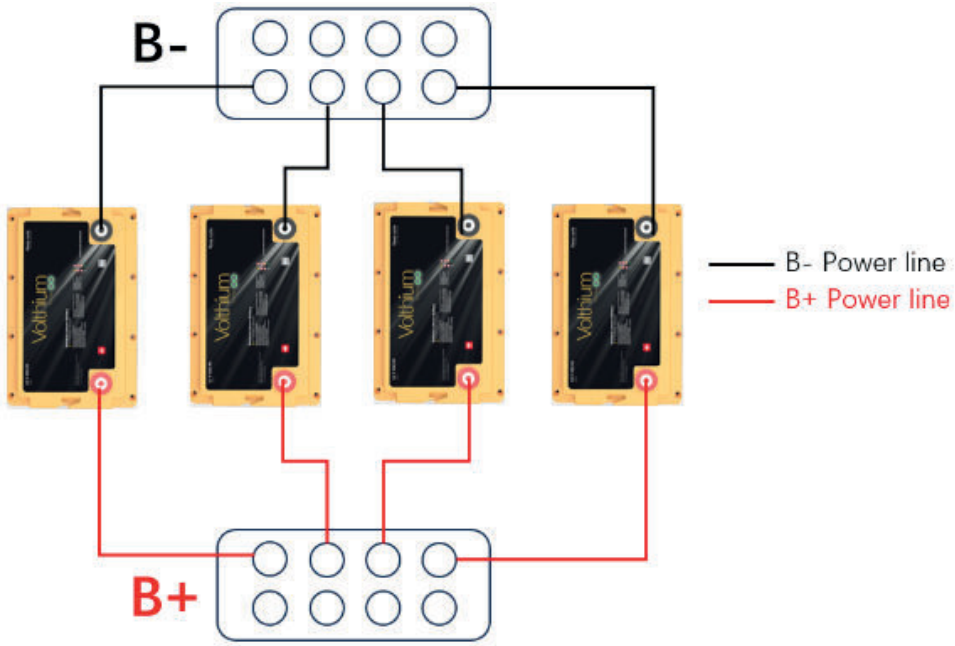
Before connecting batteries in series or parallel, it is necessary to pay attention to :

a. The batteries must be the same model ! Different models, different capacities and different voltage platforms ar not allowed to be connected in series and parallel;
b. Ensure that all parallel wires have the same length;
c. We recommend 0.5 C for charging, that is, charging current=Nameplate capacity of battery * 0.5 C
d. Before connecting the batteries in series, the voltage of each group of batteries must remain highly consistent. It is recommended that the voltage between batteries packs be:＜200mV (@ 96%~100% SOC). After the batteries pack are connected in series, it will be charged and discharged as a whole system.

4.2 Parallel usage

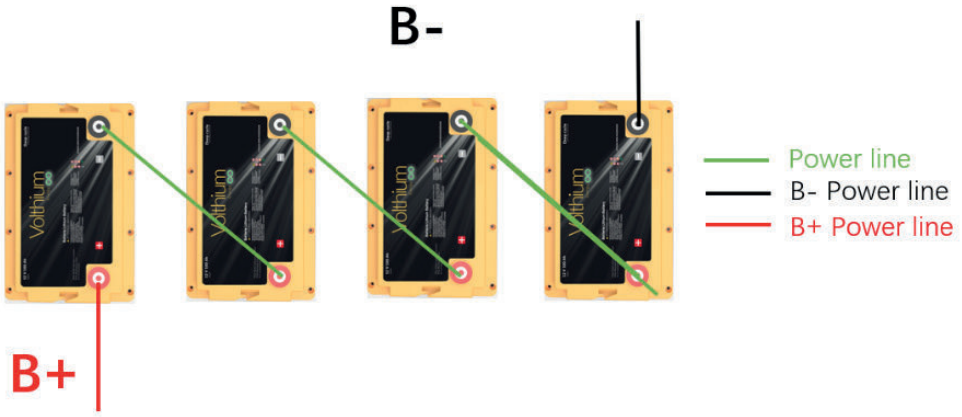
When batteries are in parallel, a maximum of 4 batteries can be used. Before parallel connection, The voltage between each battery's positive and negative terminals must be verified using either a multimeter or the Bluetooth app, ensuring the voltage difference between any batteries does not exceed 200mV. If the voltage difference exceeds 200mV, each battery must be fully charged individually, left to rest for one hour, and then rechecked for voltage compliance before being connected in parallel. Always confirm all batteries meet the 200mV maximum voltage difference requirement prior to parallel connection to ensure safe operation.

For example, four 12.8 V 100 Ah batteries connected in parallel
System voltage：12.8 V System capacity：100 Ah*4 = 400 Ah



4.3 Serial usage

A maximum of 4 batteries can be used in series. Before connecting the batteries in series, a multimeter needs to be used to test the voltage between the positive and negative terminals of the battery. The battery voltage can be also checked through the Bluetooth APP to ensure that the voltage between the batteries does not exceed 150mV. If the voltage between the batteries exceeds 150mV, each battery needs to be fully charged separately, left for 1 hour, and then used in series. Series connection method: Connect the positive pole of the battery to the negative pole of the next battery, and so on.
For example, four 12.8 V 100 Ah batteries connected in series
System voltage：12.8 V *4= 51.2 V System capacity：100 Ah



5. Charging requirements

We recommend using a charging source with specific lithium charging settings to meet the following charging requirements to achieve the optimal performance and lifespan of Volthium series batteries.

Model	Max charge voltage	Cut-off voltage	Maximum charge current	Recommended charge current	Operation temperature
12 V 100 Ah GR24	14.4 V	11.2 V	1 C	0.3 C	Charge : 0 - 60 °C Discharge : -20 ~ 60 °C
Note: Batteries with heating function need to be heated before switching to charging mode.					

5.1 AC-DC charger

Check if the AC-DC battery charger you plan to use has a dedicated lithium charging setting that meets the above charging requirements. Many battery chargers are only designed to charge Lead–acid battery and may not have appropriate lithium charging settings.

5.2 Photovoltaic charging

Check if the solar regulator you plan to use has a dedicated lithium charging setting that meets the above charging requirements. The Volthium series batteries can be charged using a solar regulator without lithium charging settings. However, it must be set to charge no more than 58.4V (4 batteries in series, with a maximum charging voltage of no more than 14.6V for a single battery). After the battery is fully charged, do not open the solar regulator without a suitable lithium charging setting.

5.3 Charging with an AC generator through a DC-DC charger

Check if the DC-DC charger you plan to use has a dedicated lithium charging setting that meets the above charging requirements. You can use a DC-DC charger without lithium charging settings to charge Volthium series batteries. However, it must be set to charge no more than 58.4V (4 batteries in series, with a maximum charging voltage of no more than 14.6V for a single battery), and then it must be turned off after the Volthium series battery is fully charged. After the battery is fully charged, do not turn on the DC-DC charger without a suitable lithium charging setting.

5.4 Recommended charging voltage

We strongly recommend a dedicated charger for lithium-ion batteries to better fully charge the battery. At the same time, according to the actual situation, AGM chargers can also be used to charge the battery, which can achieve varying degrees of effect.

6. Battery recycling

Volthium GR24 12 V 100 Ah batteries are recyclable and should not be treated as household waste or landfill waste. If you need assistance in recycling batteries, please contact your dealer or Volthium's technical support engineer (as mentioned earlier in this manual).

7. Transportation and storage

ATTENTION

- During transportation, there should be no severe vibration, impact, or compression, and it should be protected from sunlight and rain.
- Handle with care during loading and unloading, and strictly prevent falling, rolling, and heavy pressure.
- The battery should be stored in a dry, clean, dark and well ventilated indoor environment for a long time. The recommended storage temperature range is 15~35 °C.
- The storage area is free of harmful gases, flammable and explosive materials, and corrosive chemicals.
- Batteries should be stored and transported at temperatures close to 50% SOC.
- If not used for a long time, the battery needs to be charged every 6 months according to the specifications.
- It is strictly prohibited to collapse, and the stacking should not exceed 6 layers, with the surface facing upwards.

8. Warnings and Attentions

Please carefully read the battery specifications or instructions before use. Improper use may cause the battery to heat up, catch fire, rupture, damage, or decrease capacity. Energie Volthium Inc shall not be responsible for any accidents caused by not following our operating instructions.

WARNING

- The battery must be kept away from heat sources, high voltage, and directly exposed to sunlight.
- Do not throw the battery into water or fire.
- Do not invert the two terminals when using the battery.
- Do not connect the positive and negative poles of the battery to the conductors.
- Do not strike, throw, or step on the battery.
- Do not disassemble the battery without the manufacturer's permission and guidance.
- Do not mix batteries of different capacities and brands.

ATTENTION

- It is recommended to fully charge the battery every month to correct the battery SOC.
- When the battery is discharged, please charge the battery in a timely manner (≤ 2 days).
- Please use a dedicated lithium battery charger to charge the battery.
- Please stop using the battery when it emits odor, heat, deformation, or any abnormalities occur.
- Please place the battery away from children or pets.
- If the battery pack electrolyte leaks, please avoid contact with liquids or leaked gases. If the battery pack electrolyte leaks, please take the following steps immediately.
- Inhalation of gas: Evacuate personnel from the contaminated area and seek medical attention as soon as possible.
- Eye contact: Rinse eyes with water for 15 minutes and seek medical attention as soon as possible.
- Skin contact: Thoroughly rinse the exposed area with soap and water to ensure there are no chemicals or soap residues on it, and seek medical assistance as soon as possible.
- Swallowing: Try to induce vomiting and seek medical attention as soon as possible.
- Fire: Please use carbon dioxide fire extinguishers instead of liquid fire extinguishers to extinguish the fire.