



L12100 Lithium-ion Battery for Off-Grid Application

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FOREWORD

Overview

This manual describes the installation, parameter settings battery maintenance etc. Please keep the manual in safety for more information.





Readers

This document provides technical details regarding the tools and infrastructure used by the following users:

- Sales engineer
- Technical support engineer
- Installation engineer
- Application engineer
- Maintenance engineer

Symbol convention

The following symbols may appear in this article, and they are represented as follows:

Symbol	Indication
 Dangerous	Used as warning in an emergency, if not avoided, it will result in death or serious personal injury.
 Warning	Used as a warning of a middle or low potential hazards, if not avoided, it may cause minor or normal injury.
 Caution	Used as a warning of potential dangers, if ignore this information, it may result in equipment broken, data lost, equipment performance decrease and other unpredictable result.
 INTRO	Represents the supplement information of main text to emphasize or replenish.

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1 OVERVIEW

1.1 Product model

The lithium-ion battery (hereinafter referred to as battery or PACK) model is shown in Figure 1-1.

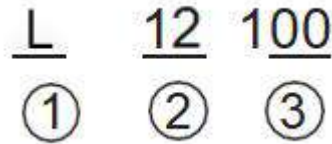


Figure1-1 The explanation of the product model

- ① L represent the product series of Lithium-ion Battery for Off-Grid Application
- ② The nominal voltage is 12.8V
- ③ The rated capacity is 100Ah

1.2 Product profiles

The L12100 Lithium-ion Battery is one of the new energy storage products developed and manufactured for off-grid application. It can be used to support reliable power for various types of devices and solar systems. L12100 is especially suitable for off grid solar system.

L12100 has a built-in BMS battery management system that supports overcharge protection, over-discharge protection, over-current protection, short-circuit protection, over-temperature protection and other functions. **It can support up to 4 series battery packs or 4 parallel battery packs (cannot be connected in series and parallel at the same time) for extended voltage and power.**

1.3 Product structure

The appearance of the L12100 is shown in Figure 1-2.



Figure 1-2 Product picture

2 INSTALLATION GUIDE

2.1 Installation precaution notes

Comply with local laws and regulations

When operating the equipment, make sure to certain to comply with local laws and regulations.

Personnel requirements

Technicians responsible for installation and maintenance must first undergo rigorous training. Only when they have mastered the correct methods of operation and safety can installation, operation and maintenance be carried out.

In order to maximize the efficiency of the equipment, achieve the best possible operating results and ensure maximum service life, please pay careful attention to the correct installation and use requirements.

Personal safety

- Insulated tools and gloves should be used and worn at all times - watches, bracelets, rings and other metal items should be removed during installation.
- Avoid falls or collisions during installation.
- Do not remove any battery components. Battery maintenance should be carried out by a qualified technician
- All operations should be carried out and supervised by an experienced engineer who can take preventive measures against potential battery hazards.

Field and environment

- **Site requirements**

1) Cleanness

Lithium-ion battery packs cannot be placed in or near garbage disposals, or accidentally dropped or placed in smaller disposal units, as their interaction with metals is likely to cause short circuits and endanger the system and personal safety.

2) Fire protection

It is prohibited to store flammable, explosive and other dangerous goods in the place where the battery pack is installed, and it should be equipped with effective fire-fighting equipment (e.g. CO₂ fire extinguishers).

3) Ventilation and heat dissipation

To facilitate the operation and maintenance of the battery, a minimum of 30-50cm should be left around the battery, with approximately 50cm left for the upper space. The installation space is better to be fitted with an exhaust fan to ensure good ventilation.

4) Installation requirements

Installation should be carried out as shown in Figure 2-1 to avoid possible hazards. Place the Lithium-ion battery on the ground and avoid tilting or uneven surfaces. Avoid exposure to sunlight, rain or wet surfaces. Avoid exposure to sunlight, rain or wet surfaces.

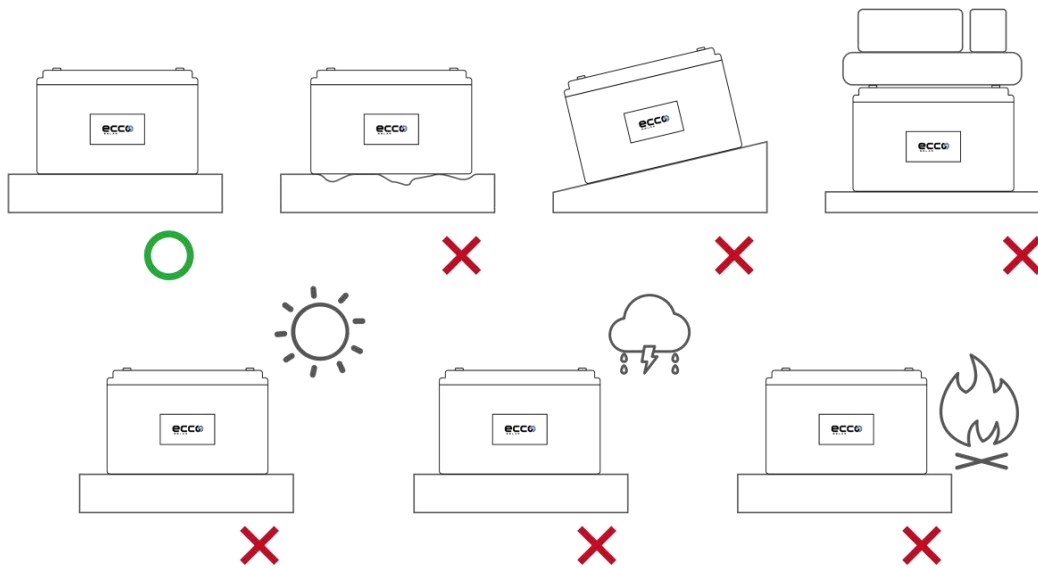


Figure2-1 Requirements for installation scenarios

● Environmental requirements

Ambient temperature: -10~40°C.

Relative humidity level: 0~95%RH, no condensation. Cooling method: air cooler.

Verticality: no vibration and the vertical tilt does not exceed 5°.

Pollution level: Level 2.

Recommended operating temperature: 20~25°C, humidity level control within 50%.

⚠ Caution

- Do not install in an environment with metallic conductive dust.
- Do not install anything containing corrosive gases.
- Do not place anything in the areas where dust is concentrated.
- Do not place anything on top of the lithium-ion battery.
- Do not allow people to sit on the battery.

Power check

Before installation, make sure that the load capacity of the supply wire meets the requirements of the new equipment. Check that the voltage and frequency of the power supply matches the nameplate on the equipment and that the current carrying capacity has not decreased due to ageing of the wire.

If in doubt, please consult your local power supply Consultation Department.

Caution

When installing the Lithium-ion Battery Pack, the user should check the Lithium-ion Battery Pack in advance to ensure that the contacts and connectors are securely in place to avoid an open circuit or short circuit fault.

When installing the Lithium-ion Battery Pack, do not reverse the polarity or connect it incorrectly to avoid short circuit.

Do not connect the terminals without safety or insulation protection to avoid the risk of electric shock.

2.2 Installation preparation

2.2.1 Unpacking and inspection





Lithium battery and accessories are packed in cardboard or wooden boxes. Take care when unpacking. Check the battery and accessories against the packing list to ensure that they are complete and that nothing has been damaged in transit.

If the equipment or accessories have been damaged in transit or are incomplete or incompatible, the equipment, accessories and purchase orders should be recorded and the local branch or office contacted immediately.

2.2.2 Installation tools

For possible commonly used tools, as shown in Table 2-1~2-4, the field technician will increase or decrease the amount according to the construction.

Table2-1 General purpose tools

The appearance of the tools, parameters, and names			
Adjustable wrench	Phillips screwdriver	Slotted screwdriver	Socket wrench
			
Torque wrench	Open-end wrench	Double offset ring spanner	Diagonal cutting pliers




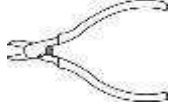
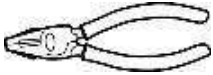
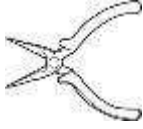



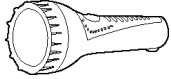


			
Wire cutters	Needle-nosed pliers	Marking pen	Working gloves
			
Ladder (2m)	Flashlight	Tape measure	Impact drill
			

Table2-2 Tools for delivery and unpacking

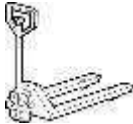

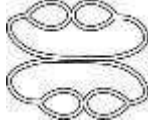

The appearance of the tools, parameters, and names			
Manual forklifts	Electric forklift	Sling (weight≥400kg)	Leverage (weight≥400kg)
			

Table2-3 Electrical installation tools

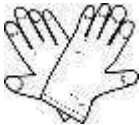
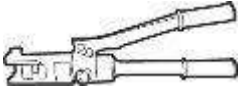
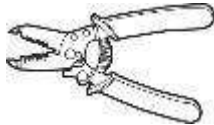
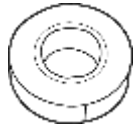

The appearance of the tools, parameters, and names			
Insulated gloves	Power cable crimping pliers	Wire stripping pliers	Electrical tape
			

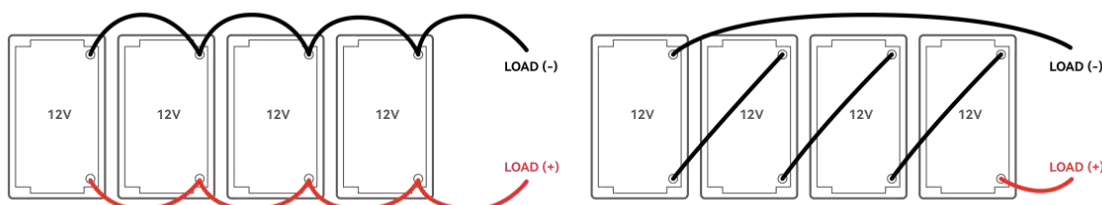
Table2-4 Measuring tools

The appearance of the tools, parameters, and names			
Clamp ammeters			-
			-

2.3 Installation method

Connection (Red: Positive terminal of battery Black: Negative terminal of battery)

It can support up to 4 series battery packs or 4 parallel battery packs (cannot be connected in series and parallel at the same time) for extended voltage and power.



Suggestions

- 1) Charge: The battery must be charged within the ambient temperature range of 0~45°C and the charging current must not exceed the maximum charging current specified in this manual. The charging voltage must not exceed the maximum voltage specified in this manual, which is limited to **14.6V**. The design of the charger should meet this condition.
- 2) Discharge: The battery must be discharged within the ambient temperature range of -10~55°C and the discharge current must not exceed the maximum discharge current specified in this standard. Please note that batteries may be in some state of discharge due to other self-discharge characteristics when not used for a long period of time. To prevent the battery from over-discharging, it should be charged regularly to keep its voltage above **12V**.
- 3) The positive terminal and power cable of standard Lithium-ion battery packs are red, and the negative terminal and power cable are black.
- 4) Series connection diagram: Only battery banks with the same rated capacity and voltage can be used in series. **No more than 4 battery packs may be used in series.**
- 5) Parallel connection diagram: Only battery packs with the same actual capacity and voltage can be used in parallel. After parallel connection, the voltage remains unchanged and the total capacity is equal to the sum of the capacities of each battery pack. **No more than 4 battery packs may be used in parallel.**
- 6) The battery pack must be fully charged before connecting in series or parallel. It is not permitted to connect battery packs in series and then in parallel, or in parallel and then in series. It is forbidden to mix new and old batteries.

3 MAINTENANCE

To ensure that the lithium-ion battery pack achieves the longest possible service life, the service technician should carry out regular inspections and maintenance.

Maintenance records should be complete and routine so that subsequent verification of the battery pack's management parameters can be tracked.

3.1 Electrical maintenance

For maintenance of the electrical parts, refer to Table3-1.

Table 3-1 Table of contents for maintenance

Items	The checking Points	Methods	Repair conditions	Repair solution
Electrical	Check if the Output of the voltage is normal	Multimeter	Battery voltage out of range set	See the following problem-solving solution.
Cable	Insulating outer layer, terminal	Visual inspection	<ul style="list-style-type: none"> ● Cracking and aging of the insulation layer ● Terminal insulation peeling off, terminal corrosion 	<ul style="list-style-type: none"> ● Replace the cable ● Replace the terminal block

3.2 Battery maintenance

Maintenance of the battery may refer to Table3-2.

Table 3-2 Contents of battery maintenance

Frequency	Items	Solutions
Monthly	Operating environment	Keep away from heat sources and avoid direct sunlight.
	Visual inspection	If there is any breakage, leakage or deformation, isolate the problematic battery pack, take a photograph and replace the battery.
Quarterly	Visual inspection	Use a cotton cloth to clean the appearance. Be careful when cleaning as the voltage is high.
	Connection status	<ul style="list-style-type: none"> ● Check each terminal, check the screw if it's loose and tighten it again. ● If the cable is soft or hot, check the cause.
Every 6 months	Measure and record the voltage	<ul style="list-style-type: none"> ● During the final stages of charging, record the voltage; make sure the positive and negative voltages of the battery are greater than 12.8V. Otherwise, check and report for repair.

		<ul style="list-style-type: none">● Check the charging and discharging data at least once every six months .
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3.3 Problem-solving solutions

1) Identify the problem:

Whether the battery can be charged/discharged;

Preliminary solution:

The battery cannot be charged or discharged, please check the battery parameters:

a) Temperature: If the temperature is higher than 50 °C or lower than -10 °C , the battery will not work. Solution: Move the battery to a normal environment of -10°C to 50°C for use.

b) Current: If the current is higher than 150A, the battery protection will be turned on. Solution: Check if the current is too high. If it is too high, check that the electrical equipment and cables are intact.

c) Voltage is too high: If the charge voltage exceeds 14.6V, the battery protection will be turned on. Solution: You are using the wrong charger and should replace it.

d) Voltage too low: The battery protection will be turned on when the battery is discharged to 9.2V or less. Solution: Charge the battery with a current not exceeding 50A.

If other than the four points above, the fault still cannot be located, turn off the battery and repair it.

2) The battery cannot be charged or discharged

① Cannot be charged: Disconnect the power cables, and measure the voltage at the power terminal. If the voltage is 13~13.5V, reconnect the power cord and battery and try again. If it still doesn't work, disconnect the battery and contact us.

② Cannot be discharged: Disconnect the power cables, and measure the voltage across the battery. If the voltage is lower than 10.8V, please charge the battery. If the voltage is higher than 12V and the battery still does not discharge, please turn off the battery and contact us.

4 SPECIFICATION

4.1 Technical specifications

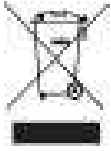
Technical data for a single battery is shown in table 4-1.

Table 4-1 technical data

Item	Specification
Model	L12100
Rated Capacity	100 Ah
Nominal Voltage	12.8 V
Discharge Ending Voltage	10 ± 0.5 V
Charging Limited Voltage	14.6 ± 0.5 V
Float Charge Voltage	13.8 ± 0.5 V
Maximum Charging Current	100 A
Maximum Continue Discharging Current	100 A
Peak Current	150 A less than 60s
Weight	Around 13 kg
Dimensions (W*D*H) mm	330 mm*172 mm*220 mm
Cycle Life	More than 5000 cycles at 80% DOD
IP Class	IP 65
Operating Temperature	Charging: 0~45°C; Discharging: -10~55°C; Storage: -40~60°C

5 ENVIRONMENT PROTECTION

5.1 Recycle



This symbol indicates that the product cannot be classified with other wastes. To prevent potentially hazardous substances from being disposed of in a way that endangers the environment and human health, please refer to the classification of waste recycling to promote the sustainable use of material resources..



To recycle used equipment, please use the recycling system or contact the manufacturer or seller of the product, or the local authority responsible for managing the product.