POWERWIN®

BT5120

User Manual

51.2V 100Ah LiFePO4 Battery

1. Technical Specification

Model Name	BT5120
Battery Cell	3.2V/100Ah (LiFePO4)
Series-parallel	16S1P, 51.2V/ 100 Ah total.
Rated Power	5120Wh
Cycle Life	4000+ (to 80% DoD.)
Charging Current	20A-50A
Charging Voltage	56.8 - 58.4V
Charging Mode	Constant Current (CC) Constant Voltage (CV)
Discharge current	50A
Max. Discharge current	100A
Operating Temperature	Charge: 0-45°C Discharge:-20-60°C
Net Weight	86lbs / 39.05KG
Size	20.4”*10.6”*8.7” / 522*270*221 mm

2. Pleae Read Before Use

1. When using the battery for the first time, fully charge it before use.

2. Do not expose the battery to water or rain.

3. Do not charge the battery in the presence of fire or extreme heat.

4. Avoid using or storing the battery near a heat source such as a fire or heater. If the battery leaks or emits an odor, immediately remove it from the vicinity of an open flame.

5. Make sure the positive and negative terminals are not reversed.

6. Do not expose the battery to fire or heat.

7. Do not short-circuit the positive and negative electrodes of the battery with wires or other metal objects.

8. Do not puncture the battery casing with nails or other sharp objects, and avoid hammering or pedaling on the battery pack.

9. Disassembly of the battery and its components is strictly prohibited.

10. If you notice any unusual signs such as an odor, heat, deformation, discoloration, or any other abnormal behavior from the battery, stop using and disconnect immediately.

11. Avoid using the battery in a high temperature environment, as it may overheat and affect its performance and shorten its life.

12. If battery electrolyte comes into contact with your eyes due to a leak, do not rub your eyes. Immediately flush your eyes with water and seek medical attention. This is essential to prevent possible eye damage.

3. Charging Methods

A. Battery Characteristics & Charging Mode

The voltage measured during charging or discharging LiFePO4 batteries may not accurately represent their actual voltage.

After charging or discharging and disconnecting the battery, the voltage may gradually settle to its true voltage over time.

⚠ Note

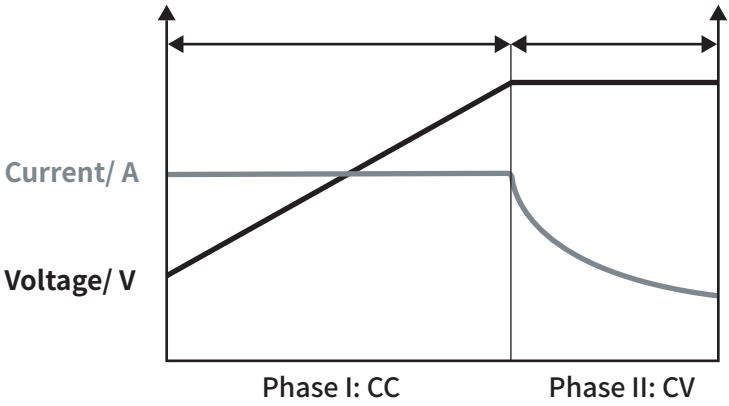
To accurately test the battery's true voltage, disconnect all connections and measure the battery after it has been resting for over 30 minutes. The expected true voltage should be approximately 53.6V.

Phase I: CC (Constant current)

Initially, a discharged battery is charged at a constant current, and the voltage steadily increases until it reaches a constant voltage point, which varies with different charging methods.

Phase II: CV (Constant Voltage)

Also known as constant current mode, in this phase the battery maintains a constant voltage while the rated current drops to 2A (0.02C).



B. Charging Mode

Method 1: Battery charger

Use a dedicated 58.4V LiFePO4 battery charger to maximize battery capacity.

Recommended charge voltage: **56.8V to 58.4V**

Recommended charging current:

The 20A (0.2C) battery is fully charged to 100% capacity in approximately 5 hours.
The 50A (0.5C) battery will charge to 97% in approximately 2 hours.

⚠ Note

a. Connect the charger to the battery before plugging it into the wall outlet to prevent sparks and potential fire hazard.
b. Disconnect the charger from the battery when the battery is fully charged.
c. Do not reverse the positive and negative terminals when making connections.

Method 2: Solar Panel and Controller

Solar Panel

Recommended power: **1200 W**

A 1200W solar panel, fully charged in one days (effective power: 4 hours/ day) It may take more than one day to fully charge because the duration and intensity of light are important factors in charging efficiency.

Solar Charge Controller

Recommended charging mode: **48V (58.4V**

Recommended charging current:

The 20A (0.2C) battery will take about 5 hours to charge to 100% capacity.
The 50A (0.5C) battery will charge to 97% in about 2 hours.

⚠ Notes

If you need to manually configure the controller, please use the following parameters. It's important to note that these settings are designed specifically for LiFePO4 batteries, as different battery models have different charging requirements.

Charging Specs

Charging Voltage	58.4V
Overvoltage Protection	58.4V
Overvoltage Recovery	56.8V
Equalizing Current	2A

Discharging Specs

Undervoltage Alarm	46.4V
Undervoltage Recovery	48V
Low-voltage Protection	35.2V
Low-voltage Recovery	43.2V

Method 3: Alternator / Inverter

The battery can be charged by an alternator or an inverter.

A. If your alternator or inverter provides DC output, consider adding a DC-DC charger between the battery and the alternator.

B. If your alternator or inverter supports AC output, follow the charger's recommendations for adding an appropriate battery charger between the battery and the generator.

Recommended charging voltage: **56.8V to 58.4V**

Recommended charging current:

The 20A (0.2C) battery will take about 5 hours to charge to 100% capacity.
The 50A (0.5C) battery will charge to 97% in about 2 hours.

4. How to Connect (series & parallel)

A. Definition

The battery is connected to the battery with an overall input and output cable, and two copper bars are added to multiple connection cables.

Step 1:

Connect batteries to batteries according to the wiring diagram.

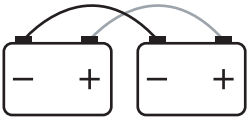
Step 2:

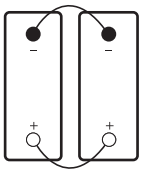
Connect the positive output leads of all batteries to a copper bar.
When connecting batteries in series (where the positive terminal of one battery is connected to the negative terminal of another), do not connect the positive electrode to the copper bar to ensure proper series connection of the battery system.

Step 3:

Connect the load to the copper bar. The wire chart used in this step should be able to support the total input and output current of the entire battery system.

Connect in 2 Parallel





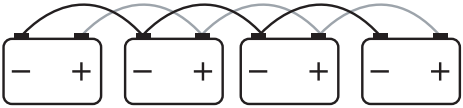
48V(51.2V) 200Ah battery system

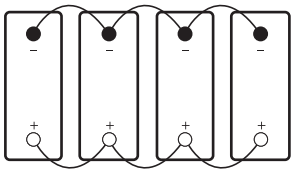
⚠ Note

When you connect batteries in series, the voltage increases while the amperage (amps) remains the same.

For example, if you connect two 51.2V 100Ah batteries in parallel, the voltage of the battery system will remain at 51.2V and the capacity will be 200Ah.

Connect in 4 Parallel





48V(51.2V) 400Ah battery system

⚠ Note

When you connect batteries in parallel, the amperage increases while the voltage remains the same.

For example, if you connect two 51.2V 100Ah batteries in parallel 4, the voltage of the battery system will remain at 51.2V and the capacity will be 400Ah.

⚠ Restrictions

Up to 8 identical batteries can be connected: 4 in series for 48V (51.2V) & 2 in parallel for a total of 400Ah battery systems.

4. Before Connection

A. Safety Precautions for Battery Connection:
1. Always wear insulating gloves before making connections.

2. Avoid reverse polarity or short circuits when connecting the positive and negative terminals.

B. Balancing Voltage in Parallel Battery Connections:
1. When connecting batteries in parallel, make sure the voltages are equal.

2. For systems with multiple batteries, consider voltage equalization every 6 months to eliminate potential voltage differences that may occur after 5 months of use.

This helps maintain consistent voltage levels between battery packs and ensures optimal performance in series and parallel configurations.

5. Equalization steps

1. Charge each battery individually to its full capacity.

2. Connect the batteries one at a time in parallel and let them sit together for 12-24 hours, but no more than 4 groups.

When using batteries in series and/or parallel mode, make sure the following conditions are met:

⚠ Restrictions

When using batteries in series and/or parallel modes, please ensure that the following conditions are met:

a. Use batteries of the same capacity (Ah) and BMS (A).

b. Select batteries of the same brand (different brands of lithium batteries may have unique BMS requirements).

c. Purchase batteries from nearby sources (within 1 month).

6. Other Connection Modes

	1S2P	1S4P
Battery voltage / capacity	51.2V / 200A	51.2V / 400A
Energy	10240Wh	20480Wh
Max. Discharge Current	200A	400A
Max. Load Power	10240Wh	20480W

7. For Extended Storage

1. If the battery pack is to be stored for an extended period of time, make sure that the storage temperature remains within the range specified in the product specifications.

2. Long-term storage, defined as exceeding three months, should be conducted at a temperature of 25±5°C and a relative humidity of 65±20%RH.

3. It is recommended that the battery pack be charged to approximately 50-70% of its capacity prior to storage.

4. Store the battery pack in a dry, well-ventilated place.

5. If the battery is to be stored for more than six months, it should be periodically maintained by charging and discharging.

6. Avoid exposure to corrosive substances, naked flames, and heat sources.

8. Transportation Precautions

1. During transportation, the battery pack must be adequately packaged to prevent severe vibration, shock, and compression.

2. Protect the battery from direct sunlight and rain.

3. Transportation can be carried out by various means, including cars, trains, ships, airplanes, and other appropriate methods.

9. Battery Maintenance

1. When servicing the battery pack, make sure that the battery power level is between 40% and 70%.

2. The recommended maintenance for batteries that are not used regularly is to recharge them every six months using the charger for 1 to 2 hours.

3. During maintenance, do not attempt to replace or remove individual batteries from the battery pack as this may adversely affect battery performance.

4. Unauthorized disassembly or dissection of the battery core is strongly discouraged and should not be attempted.

10. Trouble Shooting

Phenomenon	Cause	How to solve
Battery has no output.	The string of output cable is loose.	Connect the battery and output cable properly according to the specifications.
	The battery pack is dead.	Charge the battery.
The charger indicator is off.	The charger output voltage is incorrect or the AC input plug is incorrect.	Use the correct charger and connect the charger to the power outlet according to the instructions.
The battery cannot be charged.	The charger output plug is loose or the charger voltage is incorrect.	Check that the charger output connector and the battery set are firmly seated, or change to the correct charger.
	The battery is fully charged already.	The battery can be used normally.

If the problem persists because BMS triggered the protection system, you can try the following steps to reactivate it.

Method 1

1. Disconnect the battery from all devices.

2. Wait for 30 minutes, and the battery should return to normal voltage (above 40 volts).

Method 2

If the battery doesn't recover using method 1, you can try this:

1. Use a charger with "0V" function and charge the battery as usual.
2. Or charge the battery with a 18V-36V solar panel.

11. Packing List

1. POWERWIN BT5120 51.2V 100Ah Battery
2. M8 screw + plastic cover + screwdriver
3. User Manual

12. Warranty

Our company provides customers with a warranty of 12 months from the date of purchase.

13. Customer Service

service@iittechnology.com

RoHS

Made In China