itel Energy

User Manual

LiFePO4 Battery IPB-12100

About this manual

This manual is intended for the IPB-12100 LiFeP04 battery. These batteries can be installed in parallel and series configurations, particular attention must be paid to the power cable connections.

Statement

It is strongly advised that the installation and operation of the LiFeP04 battery be carried out by adequately qualified technicians; failure to do so will result in the warranty being voided.

Contents

1. Safety Introduction

1.1. Important Safety Instructions

This manual contains important instructions for the IPB-12100 LiFeP04 battery and must be followed when installing and operating the product.

This product is designed and tested in accordance with international safety requirements for CE compliance. However, as with all electrical and electronic equipment, users must observe specific precautions during installation or operation. To reduce personal injury risks and ensure safe installation and operation, carefully read and follow all instructions, cautions, and warnings in this manual.

1.2. Warnings in this Document

A warning describes a hazard to equipment or personnel. It highlights procedures or practices that, if not performed correctly could result in damage to or destruction of part or all of the equipment ,connected devices, or personal injury.

Symbol	Description
	Caution, risk of electric shock
	Lifting this heavy object may cause severe injure
	Keep the battery away from open flame or ignition sources
	Keep the battery away from children
	Dispose of waste batteries according to local laws and regulations
	Green and Recyclable Recycling
	Read this manual before installation and operation

For safety reasons, installers must familiarize themselves with this manual and all warnings prior to installation.

1.3. Battery Handling Guidance

- Use the battery pack only as directed.

- If the battery is defective, appears cracked, broken, or otherwise damaged, or fails to operate, contact the hotline immediately.

- Do not attempt to open, disassemble, repair, tamper, or modify the battery.

- Handle the battery with care during transportation to protect it and its components from damage.

- Do not subject the battery to mechanical stress.

- Do not insert foreign objects into any part of the battery pack.

- Do not clean the battery with solvents.

- Do not place tools on top of the battery.

Remark: The battery is not suitable for unprofessional technician's operation.

1.4. Response to Emergency Situations

The battery incorporates multiple safety strategies to prevent hazards from failures. However,the manufacturer cannot guarantee complete safety under all possible conditions.

1.4.1. Battery Leakage

If the battery pack leaks electrolyte, avoid contact with the leaking substance, The electrolyte is highly corrosive and may cause skin irritation or chemical burns upon contact. If exposure occurs, immediately perform the following actions:

Inhalation: Evacuate the contaminated area immediately and seek medical attention.

Eye Contact: Rinse eyes with running water for least 15 minutes and seek medical attention immediately.

Skin Contact: Wash the affected area thoroughly with soap and water and seek medical attention immediately.

Ingestion: Seek medical attention immediately. Do not induce vomiting unless instructed by medical personnel.

1.4.2. Fire

In case of a fire, make sure that an ABC or carbon dioxide extinguisher is nearby and does not use water to extinguish the fire.

WARNING
The battery may catch fire when heated above 150°

If a fire breaks out where the battery is installed, do these actions:

- Extinguish the fire before the battery catches fire.

- If the battery has caught fire, do not try to extinguish the fire. Evacuate people immediately.

WARNING
If the battery catches fire, it will produce poisonous gases. Do not approach.

1.4.3. Wet battery

If the battery is wet or submerged in water, do not try to access it. Contact Customer Service or your distributor for technical assistance.

1.4.4. Damaged Battery Handling

If the battery is damaged, immediately contact customer service or authorized distributor for assistance.

Damaged batteries pose significant risks including thermal runaway, electrolyte leakage, or fire and must be handled exclusively by trained personnel.

Do not use or attempt to repair damaged batteries as they may endanger personnel and property. If damage is suspected, safely package the battery following UN38.3 guidelines and return it to the manufacturer or the distributor.

CAUTION
Damaged battery might export electrolyte or flammable gas, so contact the manufacturer for advice and information immediately, the customer service will handle it.

1.5. Installers

The battery is suggested to be installed by skilled worker or electrician. A skilled worker is defined as a person who had been trained and qualified electrician.
Or had all of the following skills and experience:

- Knowledge of the functional principles and operation of on/off-grid Energy Storage systems.

- Knowledge of the dangers and risks associated with installing and using electrical devices and acceptable mitigation methods.

- Knowledge of the installation of electrical devices

- Knowledge of and adherence to this manual and all safety precautions and best practices.

1.6. Scrap Battery

Scrap batteries must be recycled or disposed of in strict compliance with local hazardous waste regulations. Contact licensed electronic waste treatment facilities for proper handling.

2. Guidance for Disconnection of Batteries During Shipment

- The IPB-12100 battery is not approved for air transport.

- Cartons that have been crushed, punctured, or torn in such a way that contents are revealed shall be set aside in an isolated area and inspected by a skilled person. If the package is deemed to be not shipped, the contents shall be promptly collected, segregated, and either the consignor or consignee contacted.

- The DC circuit of IPB-12100 battery has been disconnected before shipment.

- Comprehensive tests were conducted to ensure the equipment distribute around the world is safe for shipping. These products shall be handled with care and immediately inspected if visibly damaged. If the carton visibly damaged, please contact with customer service to confirm whether the battery could be used safely or not.

3. Product Introduction

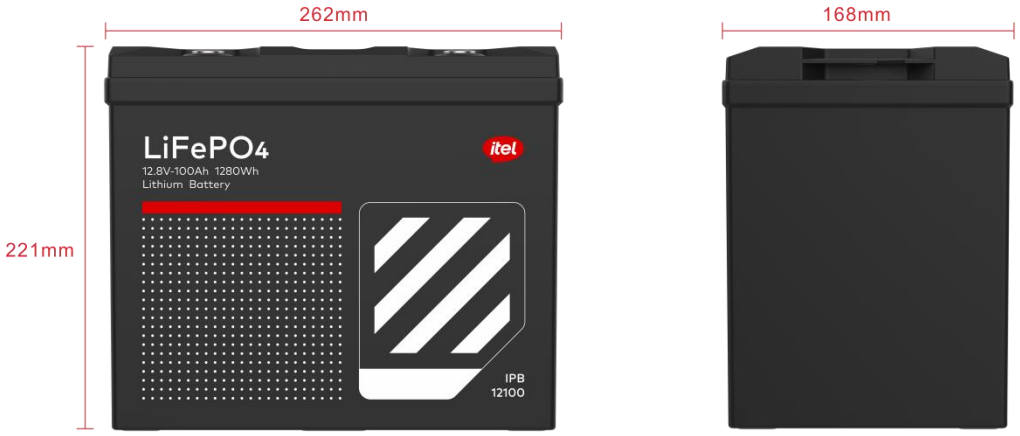
3.1. Technical Specifications

Model	IPB-12100
Battery Type	LiFePO4 Prismatic
Nominal Energy	1280Wh
Nominal Capacity	100Ah
Nominal Voltage	12.8V
Operating Voltage	11.6-14.4V
Recommended Charge/Discharge Current	20A/20A
Standard Charge/Discharge Current	50A/50A
Max.Charge & Discharge Current	90A@3s
Max.Peak Discharge Current	150A@500ms
Charging Temp. Range	0℃-55℃
Discharging Temp. Range	-20℃-55℃
Cycle Life	≥3000 cycles @25℃
Altitude Limit	Less than 2000m
Scalability	4Parallel/4Series
Communication	Bluetooth
Recommended Humidity	10%~95%(without condensation)
Cooling Type	Natural Cooling
Color	Black Plastic ABS
Installation	Ground Installation
Net Weight	≤9.8kg
Dimension	262*168*221mm
Protection	Over-current/Over-voltage/Short circuit/Under-voltage/Over temperature
Certification	UN38.3/CE/IEC62619
Testing conditions based on temperature 25℃ at the beginning of life. *Total Energy/Usable Energy measured under specific conditions from itel 0.2C CC-CV.	

3.2. Product Appearance

3.2.1. Design Overview

This product is designed to be simple, compact, and aesthetically pleasing. The switch, digital display screen, and AC input interface are located on the top of the slot cover.Small size, easy to transport and install.



3.2.2. Operating Interface Definition

There is an AC input interface, switch, and battery capacity display screen on the top cover of the battery .

Item	Definition
1	AC Input
2	Display Screen
3	Self-Locking Switch
4	Positive Terminal
5	Negative Terminal

3.2.3. Fault Code & Solutions

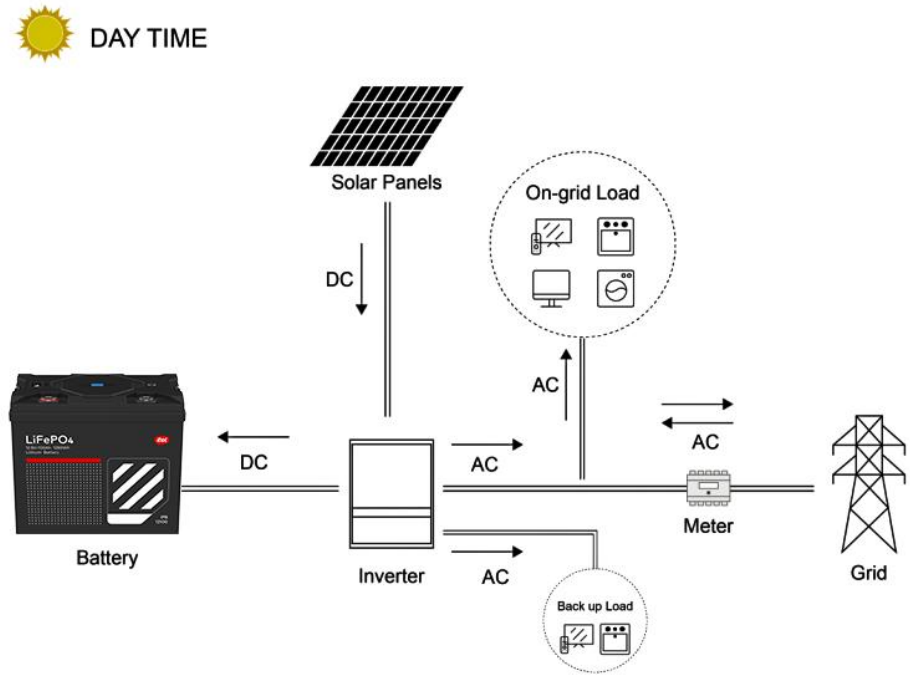
When the battery shows fault codes are listed as below,which stands for different protection status due to different conditions exceeding the operation limit.

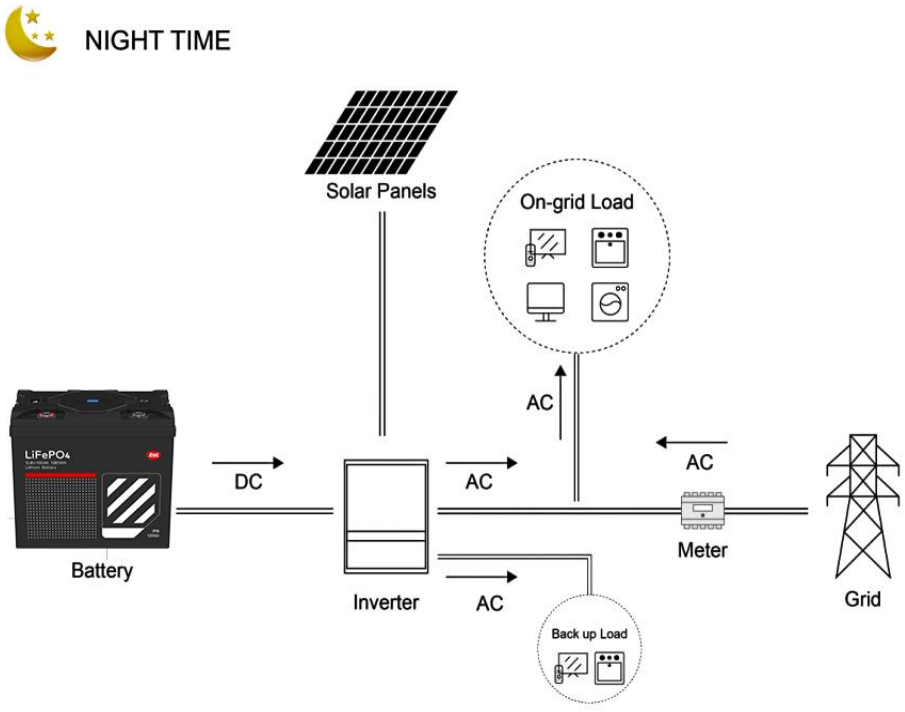
No.	Fault Protection Items	Code	Solutions
1	Protection Against Cell Over-Voltage	c0	Charging disable Discharging permitted
2	Protection Against Over-Voltage	c1	As above No.1
3	Protection Against Over-Current During Discharge	c2	Reduce the current to the recovery value before recharging
4	Protection Against Cell Over-Temperature During Charge	c3	Cell temperature must cool down before recharging
5	Protection Against Cell Low Temperature During Charge	c4	Cell temperature must rise before recharging is permitted
6	Protection Against Cell Under-Voltage	d0	Discharging disable Charging operational
7	Protection Against Pack Under-Voltage	d1	As above No.6
8	Protection Against Over-Current During Discharge	d2	Reduce the current to the recovery value before discharging
9	Protection Against Cell Low Temperature During Discharge	d3	It must reach the low-temperature recovery value before discharging is permitted
10	Protection Against Cell Over-Temperature During Discharge	d4	It must drop to the recovery value before discharging is permitted
11	Protection Against Short Circuit Protection	d5	Verify if there is a short circuit in the load
12	Protection Against MOS Over-Temperature	b0	Both charging & discharging are disable until the temperature returns to the normal range
13	Protection Against High Ambient Temperature	b1	As above No.12
14	Protection Against Low Ambient Temperature	b2	As above No.12
15	Protection Against Excessive Voltage Difference	b3	Charging & discharging blocked until voltage difference recovers
16	Protection Against Excessive Voltage Difference Latching	F0	Manual Reset Required
17	Cell Failure	F1	
18	AFE Failure Protection	F2	
19	MOSFET Failure Protection	F3	
20	NTC Failure Protection	F4	

21	Current Sensor Failure Protection	F5	
22	Protection Against AC-DC Module	F6	

3.3. Operation Diagram

The diagram as below shows how the system operates when daytime and night time.





3.4. Product Features

IPB-12100 LiFePO4 battery has following features:

- Energy Storage Unit: This battery is suitable for photovoltaic system compatibility.

- Battery Management System (BMS): Built-in BMS monitors its operation and prevents the battery from operating outside design limitations.

- Monitor: The battery is equipped with a built-in Bluetooth module, making it easy to check the battery status information at any time.

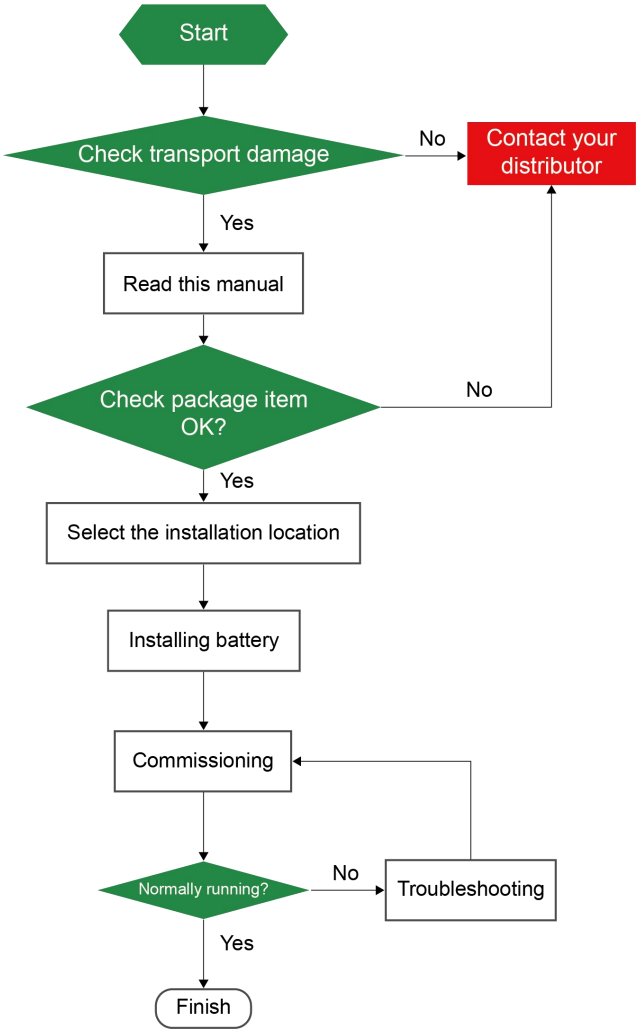
- Easy Firmware Update: The BMS firmware can be updated to the latest version.

- Expandability: The battery capacity can be increased by adding another battery.

4. Installation Prerequisites

4.1. Flow Chart of Installation

The battery should be installed according to the following flow chart.



4.2. Installation Location

Make sure that the installation location meets the following conditions:

- The building is designed to withstand earthquakes.

- Far away from the sea to avoid salt water and humidity.

- The floor is flat and level.

- No flammable or explosive materials nearby.

-Temperature and humidity stays at a constant level.

- Minimal dust and dirt in the area.

- No corrosive gases present, including ammonia and acid vapor.

- The battery is designed with IP65,it shall be suitable for indoor/outdoor but should avoid water .

If the ambient temperature is out of the operating range,the battery will protect itself by shutting down. Frequent exposure to severe operating condition would exacerbate the performance and lifetime of the battery.

4.3. Required Tools

To install the battery pack, those following tools are required:

			
Phillips Screwdriver	**Torque Wrench**	**Cable Crimper**	**Wire Clamp**
			
Voltmeter	**Tape Measure**	**Drill**	**Flat-Head Screwdriver**

In order to protect operator and installer's safety, please select and use suitable tools and measuring instruments that are certified for precision and accuracy.

4.4. Safety Instruments

When dealing with the battery, following safety gears should be equipped. Installers must meet the relevant requirements of IEC 62040 and IEC 62619 or the domestic legislation and other relevant international standards.

		
Insulated Glove	**Safety Goggles**	**Safety Shoes**

4.5. Storage

If the battery is not to be installed immediately, and needs to be stored for a long period, please choose an appropriate location to store it. Instructions for storage are:

- Do not stack more than four battery boxes.

- After the battery leaves the factory, the battery should be recharged with 0.2C current for each three months in storage.

- The temperature of battery stored recommended in the range of 0°C to 35°C.

- Do not expose to water.

- The carton should be placed at upright as shown in the following and not stacked upside down when storage.

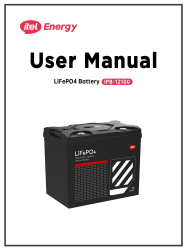
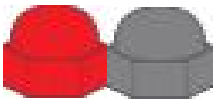
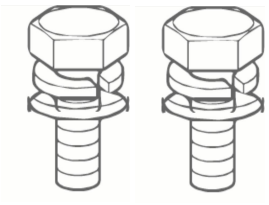
- If the battery had been stored over 3 months, the battery would discharge at a minimum rate and capacity degrades depended on storage time.

- If the battery had been stored over 3 months, it is suggested to recharge the battery as per charge standard.

5. Installation

5.1. Unpacking

When unpacking cartons,which shall include battery and other items are shown as follow:
(Product accessories are customized according to customer needs, the following is standard accessories list.)

		
Battery*1	**User Manual*1**	**Warranty Card *1**
		
Certificate of Quality*1	**Insulating Sleeve *2**	**Long Terminal Bolt * 2**

5.2. Pre-Installation Verification

There are some notices to check before installing the battery to ensure that it has no defects.

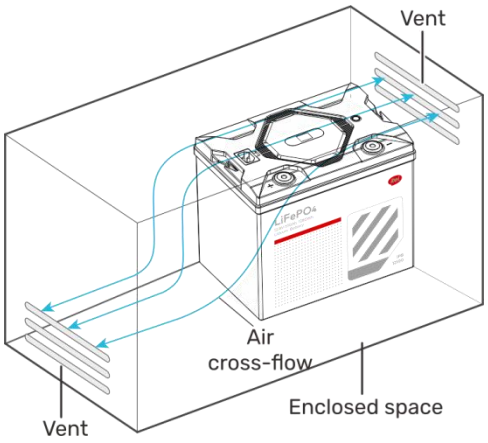
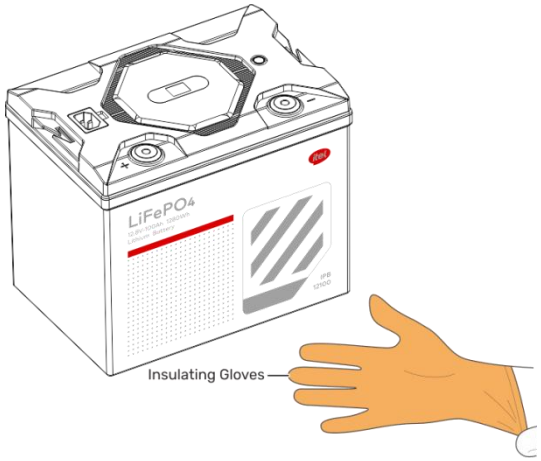
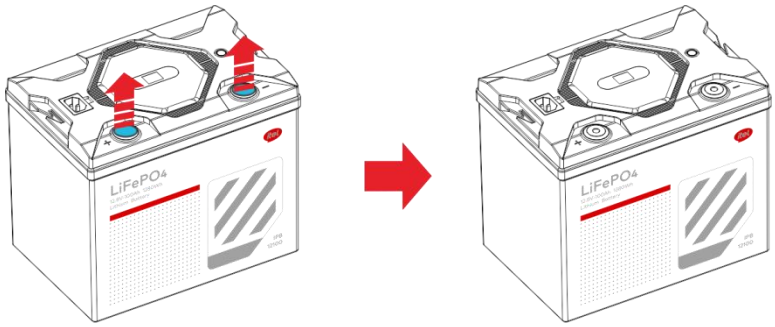
-Check the battery voltage upon following instructions.

- Press the switch on the top cover to lock it, and the display screen will light up at the same time, indicating power on.

- Measure the voltage at the terminal interface with a voltmeter. If the voltage is lower than 11.6V, do not use the battery and contact the customer service.

5.3. Installation Procedure

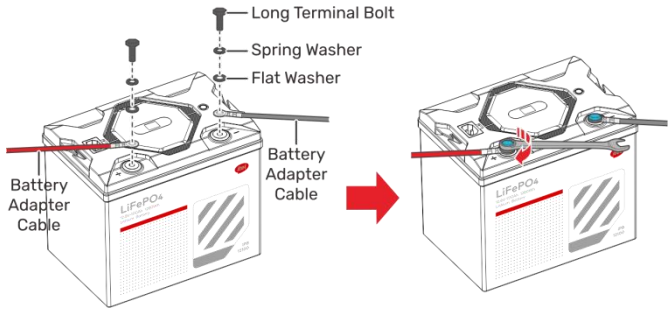
5.3.1. Vertical Installation

<table>
<tr><td>Step 1. Installation Site Selection</td><td>Step 2. Wear Insulating Gloves</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td colspan="2">Step 3. Remove the Protection Cover</td></tr>
<tr><td colspan="2"> 
</td></tr>
<tr><td colspan="2">Step 4. Check the Battery</td></tr>
<tr><td colspan="2">Inspect the battery for any visible damage including cracks, dents, deformation, and other visible abnormalities. All connector contacts shall be clean, free of dirt and corrosion, and dry

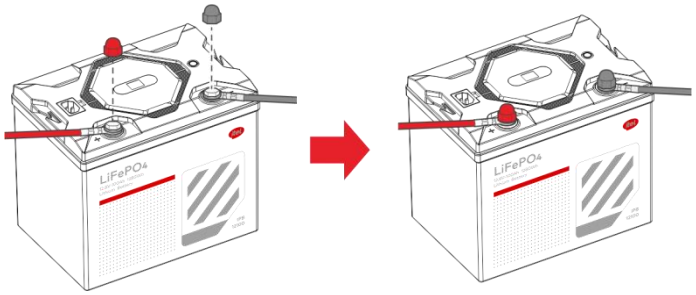
⚠ Do not touch the exposed electrolytes or powder if the battery is damaged.

⚠ If any uncovered electrolyte or powder comes into contact with your skin or eyes, flush the area immediately with plenty of clean water and seek medical</td></tr>
</table>

Step 5. Install Battery Terminals

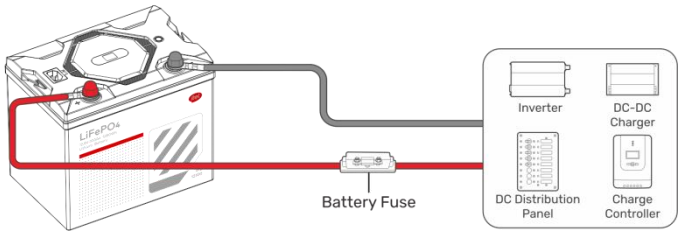


Step 6. Install the Insulating Sleeves

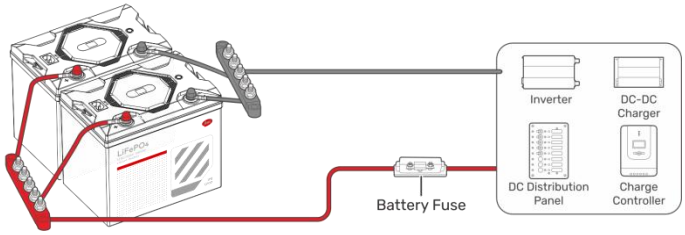


Step 7. Connect the Battery to Power Supply Devices

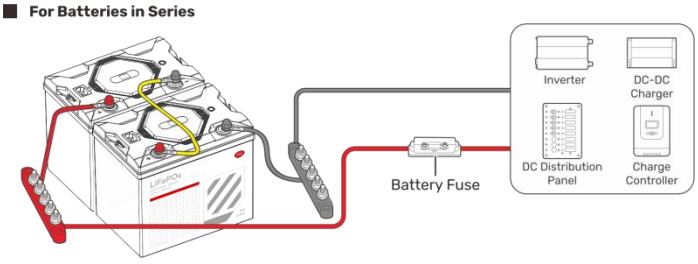
■ **For a Single Battery**



■ **For Batteries in Parallel**



■ **For Batteries in Series**



5.3.2. Cable Connections of the Battery

WARNING

Connect cables in accordance with local installation laws and regulations. Before connecting cables, ensure that the battery and relative devices are OFF. Otherwise, the high voltage of the battery may result in electric shocks.

Do not connect batteries with different chemistry, rated capacities, nominal voltages, brands, or models in parallel or in series. This can result in potential damage to the batteries and the connected devices,and can also pose safety risks.

Avoid connecting batteries that have been purchased for more than half a year.Over time, batteries can degrade and their performance may decrease,which can affect their ability to deliver reliable power and may lead to safety hazards.

Carefully consider the number of batteries connected in parallel or in series to avoid risks such as unbalanced charging or overcharging.

The cables between each connected battery should be of equal length to ensure that all batteries can work equally together.

The battery should meet the conditions as below when connecting them in series or in parallel:

1. The battery with the same model of capacity (Ah) and BMS (A);
2. The same brand battery(the battery with different brand has different BMS);
3. Purchased same batch at near time(within 1 month).

NOTICE

Before connecting batteries in series or in parallel, it is important to balance them to reduce voltage differences and optimize their performance. Follow these three steps:

Step 1: Charge each battery individually to its full capacity using a suitable charger.

Step 2: Use a voltmeter to measure the voltage of each battery. It is best to keep the voltage difference of each battery less than 0.2V.

Step 3: Connect all the batteries in parallel and allow them to rest together for 12 to 24 hours before use.

It is recommended to periodically re-balance the battery voltages every 3 months when connecting multiple batteries as a battery system. Slight voltage differences can occur among batteries over time due to factors like battery chemistry, capacity, temperature, and usage patterns.

It is not recommended to connect more than 4 batteries in Parallel or in Series to ensure the normal performance of the battery.

5.3.3. Series Connection

Connection Step
Please connect the battery in series as shown Figure 1 with cables of the same type and specification. The connection in series means that the negative terminal(**-**) of the first battery is connected to the positive terminal**(+**) of the second, and the negative terminal of the second is connected to the positive terminal of the third and in line until to meet the voltage requirement (**≤4 pieces**). The voltage in series connection is the total voltage of all cells connected together, and the current in series connection rating keeps as single one battery.

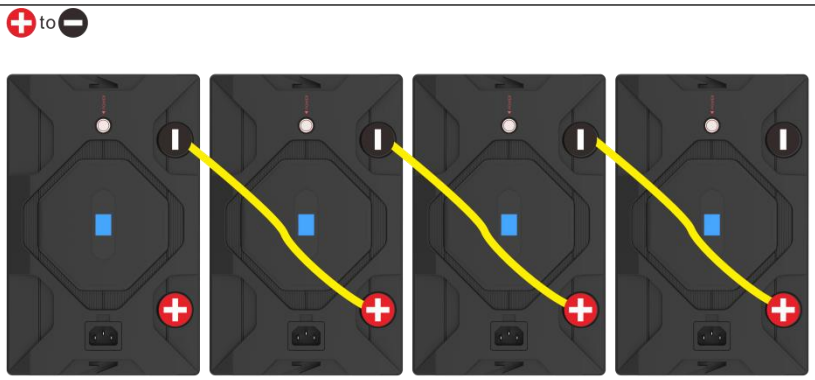


Figure 1

5.3.4. Parallel Connection

Connection Step
Please connect the battery in parallel as shown in Figure2 with cables of the same type and specification. Parallel connection means that the positive terminal(**+**) of the first battery is connected to the positive terminal(**+**) of the second, and the negative terminal(**-**)is connected to the negative terminal(**-**) and in line until to meet the power requirement(**≤4 pieces**). The voltage in parallel connection shall be as a single battery, and the total discharge current shall be as the sum of all battery's current.

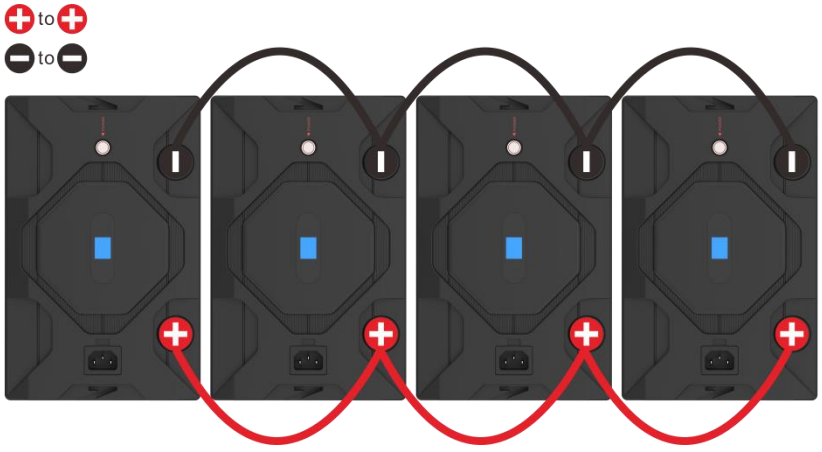
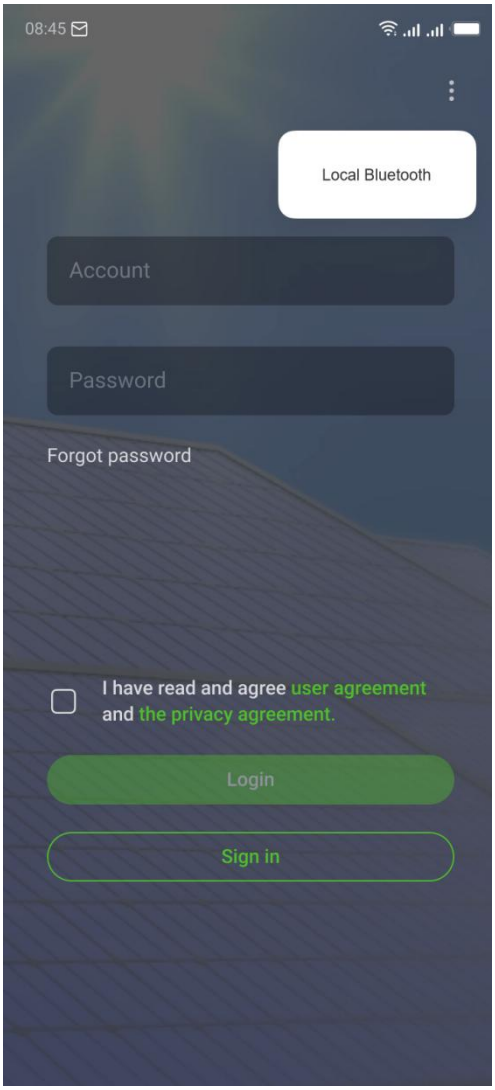


Figure 2

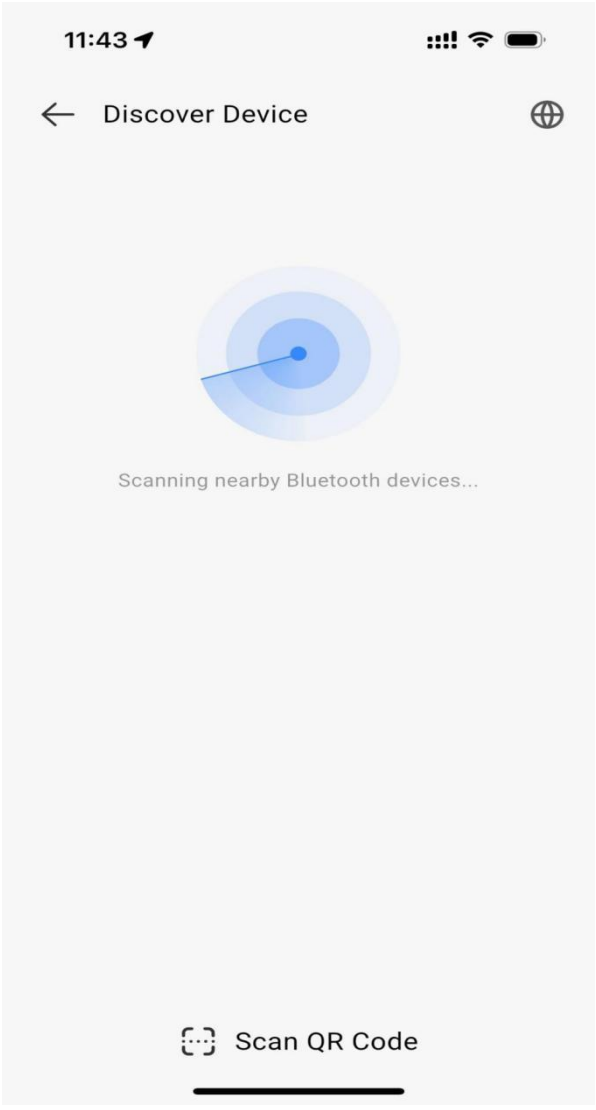
6. APP Operation Guidance

Step 1: Scan the QR code or search in the Play Store / App Store to download the itel Energy App.

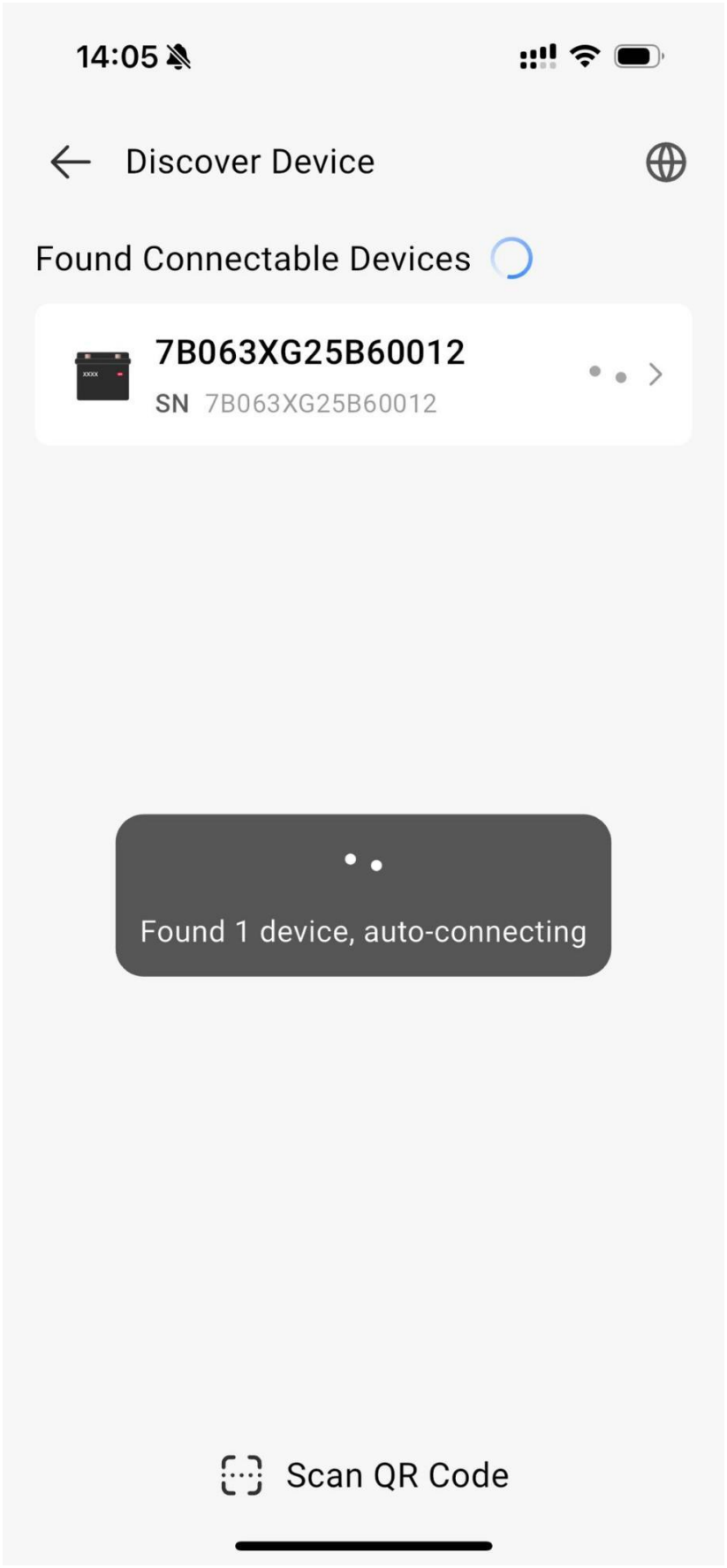
Step 2: At the login page, click the icon in the right up corner, there will be a Local Bluetooth button.



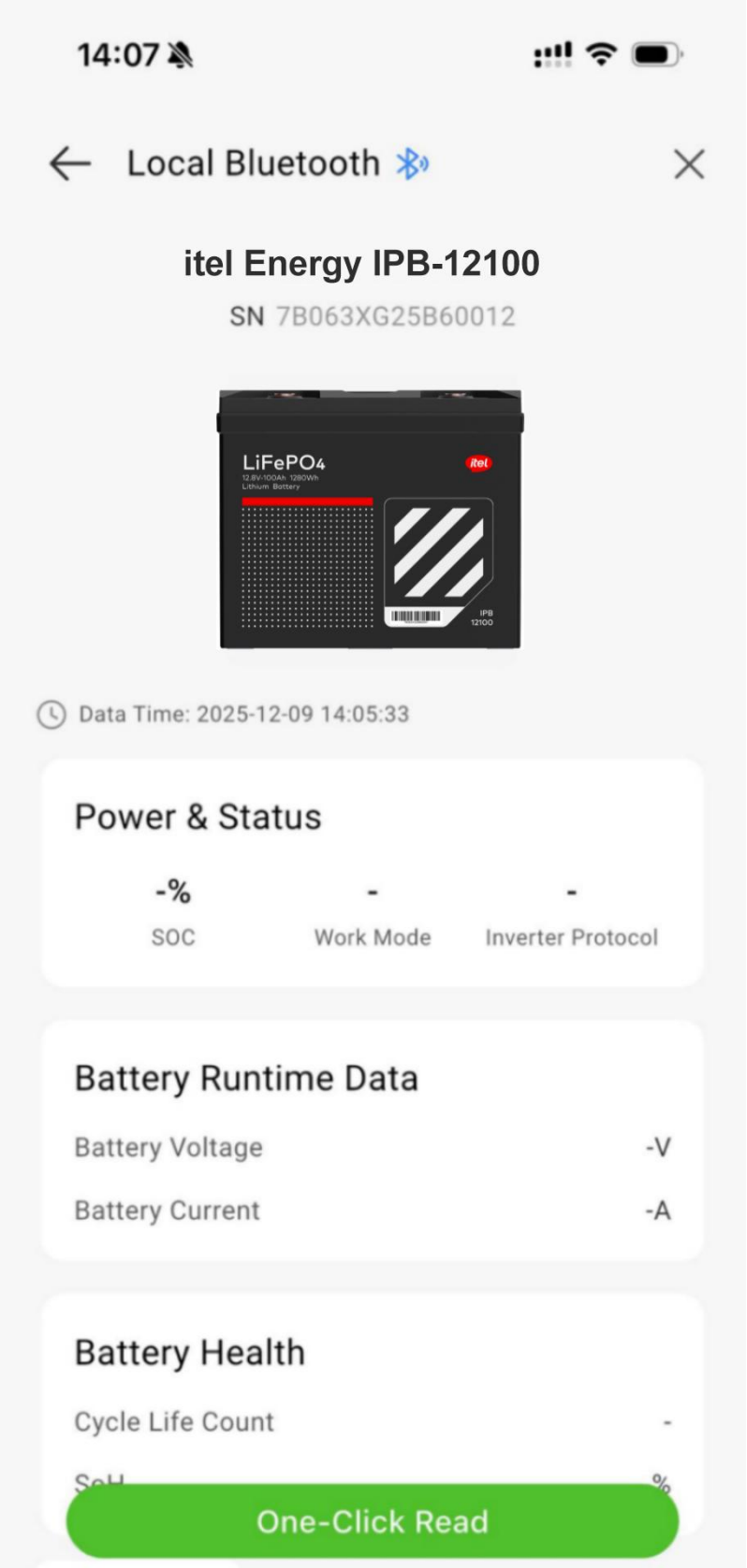
Step 3: Click the Local Bluetooth button, the App starts to search the battery Bluetooth, or click the “Scan Code” button at the bottom to scan the Bar Code on the back of the battery.



Step 4 : Once detect the battery,the App will connect its Bluetooth automatically.



Step 5 :After connecting the Bluetooth, the battery’s information shall be read.



7. Commissioning

7.1. Commissioning Battery

If only one battery is installed, use the following steps to put it in operation:

1) Press the switch button on the lower panel to ensure that it locks and does not pop up.

2) Ensure that the display screen is displaying normally, If it stays off, do not use the battery and contact customer service.

3) Turn on the inverter. Wait for the start-up sequence to complete fully.

If two or more batteries are connected in parallel, connect the power cables first. Follow the steps as below:

1) Check battery voltage,If it is lower than 11.6V, charge the battery first. If more assistance is needed, contact customer service.

2) Press the switch on the lower panel to ensure that it is locked and does not pop up.

3) Ensure that all batteries are turned on normally.

4) Make sure the maximum voltage difference between the batteries is less than 2V. If not, balance the battery voltage and connect batteries in parallel together.

5 Turn on the inverter,wait for the start-up sequence to complete fully.

7.2. Turn Off Battery

The battery shall be only be turned off when it is unable to charge or discharge. This can be viewed through the App on your mobile phone..

Press the switch on the top cover, it will automatically pop up and the display screen will be turn off.

8. Firmware Update

If BMS software version needs to be upgraded, please contact customer service.

NOTICE
When upgrading the software of the battery, please make sure that the master battery disconnected from inverter.

itel Energy

energy.itel-life.com