

# Smart Lithium Ion Phosphate Battery RT2450-G31 User Manual

## Legal Information

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### Disclaimer

The Manual contains instructions for the use of the product. All the pictures and charts in this manual are for description and explanation only. Pylon Technologies Co., Ltd. reserves the right to change the information in the manual which is subject to change without further notice.

Please read this manual carefully before using the product and keep this manual for further reference. Failure to use the product in accordance with the manual may result in serious injuries, property damages and may void the warranty, for which Pylon Technologies Co., Ltd. shall not be liable.

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The final interpretation of this manual belongs to Pylon Technologies Co., Ltd.

# Safety Instructions

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## Warning

- The device should be used in strict compliance with local laws, electrical safety regulations, and fire prevention regulations of the nation or the region.
- Do not place the device near open fire, heat sources and flammable materials.
- Do not leave the device in an extremely hot environment.
- Do not place the device in damp locations.
- Do not expose the device to high electromagnetic radiation.
- Do not strike, mechanically crush or cut the device.
- Do not puncture the device with sharp objects.
- Do not stack heavy objects on the device.
- Do not place metal objects or wires on the device.



## Caution

### General

- For safety purposes, please use only the accessory (cable, charger, and etc) supplied or recommended by Pylontech. Pylontech shall not be liable for damage caused by third-party devices.
- Before first use, please check if the device is in good condition. If the device is deformed or has an odor, do not use the device and return it to the distributor.
- Keep the device out of reach of children and pets.
- If the device falls into water during use, please take it out immediately.
- If the battery leaks, avoid contact with the leaking liquid or gas. In case of contact with skin or eyes, flush immediately with plenty of clean water and seek medical advice.

### Installation

- Do not install the device in an unstable place. Personal injury or property damage may be caused if the device falls.
- Do not place the device in dusty locations.

### Operation

- Please ensure good ventilation while the device is in use.
- If the device has been stored for more than one year, please check it carefully to make sure there is no problem before using it.

### Transportation

- Keep the device upright when moving it.
- Handle the device gently.

# Safety Instructions

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## Maintenance

- Charge the device regularly. If you need to store the device for a long time, please charge it to at least 60% every time before storing it.
- Recharge the device as soon as possible after it has been fully discharged.
- If the device does not work properly, please contact your distributor or the nearest service center within 24 hours. DO NOT disassemble the device for repair or maintenance by yourself. Pylontech shall not assume any responsibility for problems caused by unauthorized repair or maintenance.
- Do not charge the device which is hot, deformed, or leaking.
- It is recommended to check the connection between power cords and screws regularly to ensure that there is no loosening, breakage or corrosion at the connection points.
- It is recommended to regularly check if the device storage environment is normal.

## Cleaning

- Please use a soft and dry cloth to clean the exterior surfaces.

## Disposal

- Dispose of used batteries according to the laws or the regulations of the nation or the region.

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# 1 Introduction

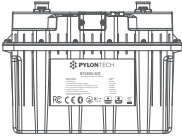
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RT2450-G31 is a lithium iron phosphate battery module. With a standard BCI G31 size, it is perfect for recreational vehicles (RV), marine (boats), trucks, cabins, and other off-grid deep-cycle applications. Moreover, it can replace deep-cycle lead-acid batteries.

The product has the following advantages.

- **High Reliability**  
The built-in advanced BMS manages charging and discharging status, helps in balancing the individual cells, and ensures intelligent automatic protection against over-voltage, under-voltage, over-current, over-temperature, under-temperature and short circuit.
- **High Energy Density**  
With the high energy density lithium cells, our battery is half the weight of the lead acid battery of equivalent energy, and 70% the size of the regular lithium battery of equivalent energy. It's easier to carry, faster to charge, and more convenient to use.
- **Real-time Monitoring via App**  
The built-in Bluetooth module allows real-time monitoring via mobile devices.
- **Low Self-discharge Loss**  
The battery can be stored for over 6 months if it is turned off after being fully discharged, and can be stored for over 12 months if it is turned off when its level is between 40% and 70%.
- **Flexible Connection in Parallel and Series**  
The battery supports up to 16 identical batteries in 2S8P or 1S16P connection, building a battery system with a max. energy output of 20.48 kWh.
- **Communication Expansion**  
With a KIT-C1 communication box, you can form a battery network to extend external communication and control functions of these batteries, such as CAN communication, RS485 communication, and dry contacts.

## 2 Packing List



Battery

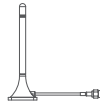


User Manual

## 3 Optional Accessories



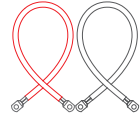
KIT-C1



Extended Antenna  
(3 m, 2.4 G, 3 dBi)



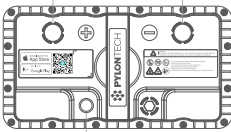
Rubber Duck Antenna  
(2.4 G, 3 dBi)



Battery Adapter Cables  
(Orange/Black, 0.4/1/3/5 m,  
4 AWG, GT25-8 Terminal)

## 4 Interface

Positive Pole Negative Pole



Power Button  
(with Dust-proof Cap)

Status

Meaning

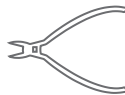
Light up for 0.5 s every other 1.5 s	Working Mode
Light up for 1 s every other 1 s	Networking Mode
Light up for 1.5 s every other 0.5 s	Protected Mode
Light Off	Sleep Mode/Power Off/System Error

## 5 Battery Installation

### 5.1 Tools and Accessories Preparation



Voltmeter



Wire Cutter

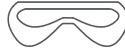


Screwdriver

# 5 Battery Installation



Insulating Gloves

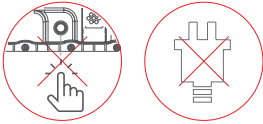


Safety Goggles

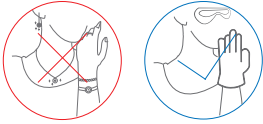


Bus Bar

## 5.2 Pre-installation Check



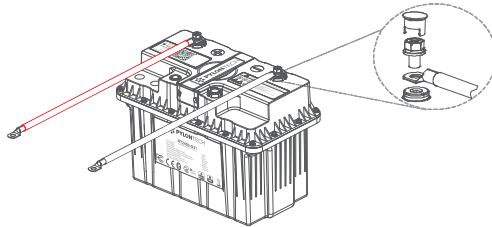
- Cut off the power before wiring, installing or removing the battery.



- To prevent electric shock, please remove watches, bracelets, rings and other conductive items (if any) and wear insulating gloves and safety goggles before installation.

## 5.3 Battery Connection

### Single Battery



### Multiple Batteries

#### ! Caution

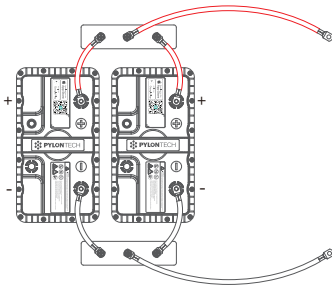
- Before use, check if the voltage difference between the batteries is less than 0.1 VDC before using them in series connection, or 0.5 VDC in parallel connection. If not, connect the batteries in parallel, and float charge them for 24 hours after a full charge. Otherwise, over-current protection may be triggered due to the large voltage difference.
- Do not mix batteries of different brands, types, models or life spans.
- In order to prolong the life span of the batteries, please make sure the length, diameter and internal resistance of the power cables are the same when using multiple batteries.



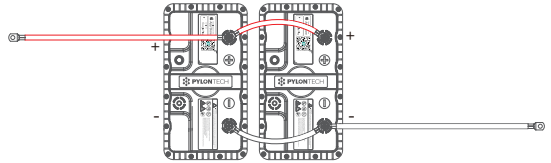
# 5 Battery Installation

## ① Connecting the Batteries in Parallel

Method 1 (Optimal)



Method 2



### Steps:

1. Connect the Positive Terminals of the batteries to a bus bar.
2. Connect the Negative Terminals of the batteries to another bus bar.
3. Finally, connect the two bus bars to the external devices via two cables.



### Note

Up to 16 batteries can be connected in parallel.

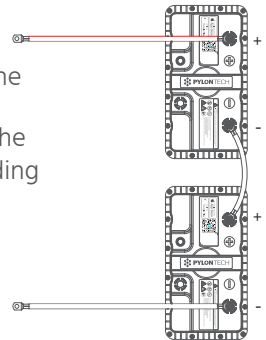
### Steps:

1. Connect the Positive Terminals of the batteries in sequence.
2. Connect the Negative Terminals of the batteries in sequence.
3. Finally, connect the Positive Terminal of the first battery and the Negative Terminal of the last battery to the corresponding terminals of external devices.

## ② Connecting the Batteries in Series

### Steps:

1. Connect the Negative Terminal of the first battery to the Positive Terminal of the second battery.
2. Connect the Positive Terminal of the first battery and the Negative Terminal of the second battery to corresponding terminals of the external devices.



### Note

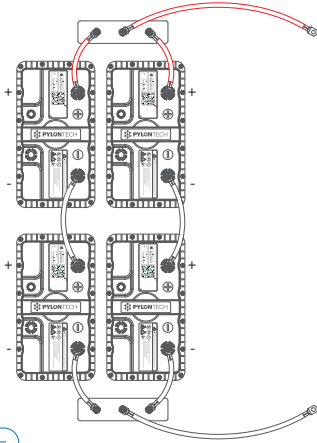
- Up to 2 batteries can be connected in series.
- Using batteries in a series connection for a long time may lead to imbalances. It is recommended to regularly connect the batteries in parallel, and float charge them for 24 hours after a full charge.

Series Configuration	Recommended Charge Voltage Value (VDC)
1S	28 ~ 28.8
2S	56 ~ 57.6

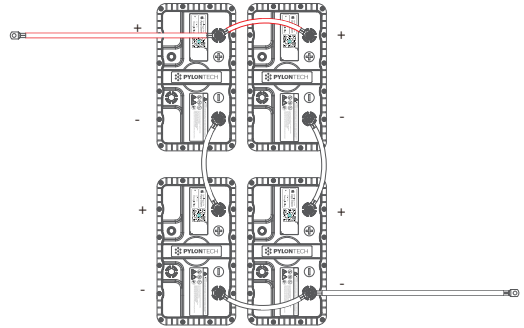
# 5 Battery Installation

## ③ Connecting the Batteries in Series & Parallel

Method 1 (Optional)



Method 2



### Note

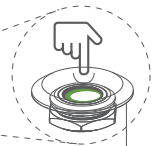
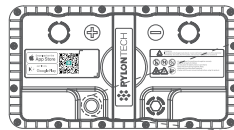
- To avoid triggering battery protection due to the large voltage difference, it is recommended to connect the batteries in parallel, float charge them for 24 hours after a full charge, and then use them in series and parallel connection.
- When connecting the batteries in series and parallel, please connect them in series first and then in parallel.
- Up to 16 identical batteries are supported in series and parallel connection (Max 1S16P or 2S8P).

## 5.4 Post-Installation Check

Please check if the positive and negative connections are correct.

## 6 Turn On/Off Battery

- Press the power button, the button indicator is solid green and the battery is on.
- Press the power button again, the button indicator goes out and the battery is turned off.



Dust-proof Cap



### Note

- Do not remove the dust-proof cap, or the dust ingress may affect battery usage.

# 7 Battery Networking

You can check battery information by organizing them in one network. For ways of battery networking, please scan the QR codes below to download Pylontech Auto App, and view the App Quick Guide.



Pylontech Auto App



Pylontech Auto App Quick Guide

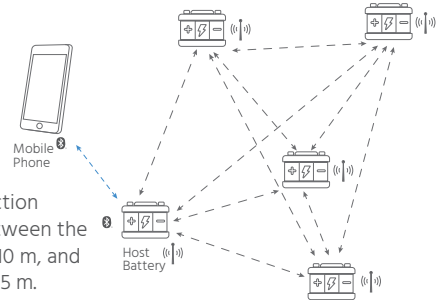
## 7.1 Basic Mode

Search for batteries via Pylontech Auto App, and connect them for networking.



### Note

In this mode, make sure that there is no obstruction between the devices, and that the distance between the mobile phone and the host battery is less than 10 m, and the distance between the batteries is less than 5 m.



## 7.2 Extension Mode

With a KIT-C1 communication box, you can form a battery network to extend external communication and control functions of these batteries, such as CAN communication, RS485 communication, and dry contacts.



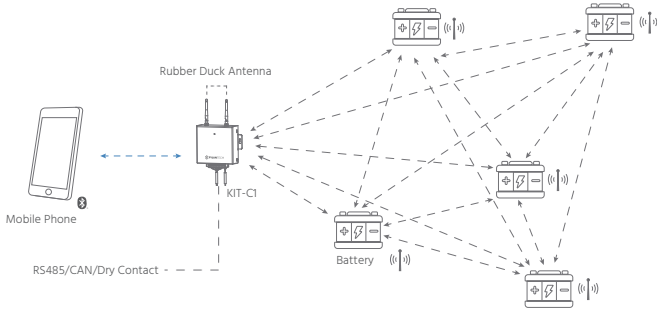
### Note

- KIT-C1 power supply: DC10 V ~ 60 V.
- When KIT-C1 is far away from the mobile phone or battery, or when there is an obstruction between KIT-C1 and the mobile phone or battery, you are recommended to use an extended antenna for smooth signal transmission.
- For more information about KIT-C1, refer to KIT-C1 User Manual.

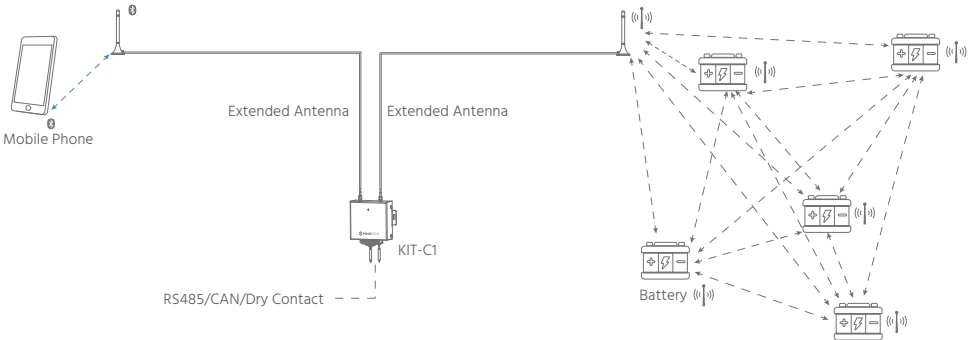
# 7 Battery Networking

## KIT-C1 Connection Scenarios

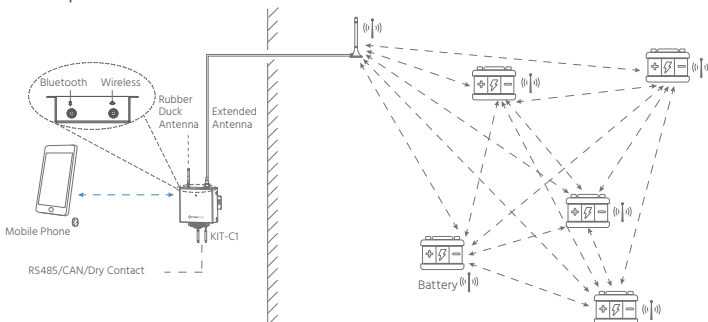
① When KIT-C1 is close to both the mobile phone and the batteries, and there is no obstruction between the devices, rubber duck antennas are recommended for both ports.



② When KIT-C1 is far from both the mobile phone and the batteries, extended antennas are recommended for both ports.

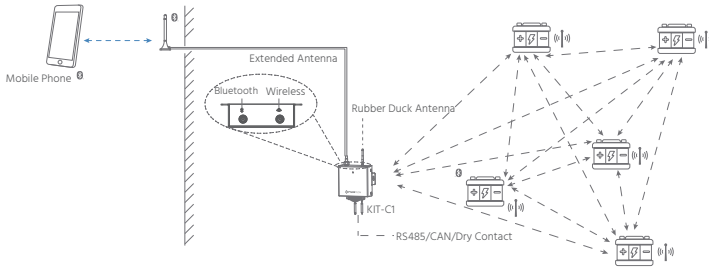


③ When KIT-C1 is close to the mobile phone and there is no obstruction between them, while there is an obstruction between KIT-C1 and the batteries, a rubber duck antenna is recommended for the Bluetooth port and an extended antenna for the wireless port.



# 7 Battery Networking

④ When there is an obstruction between KIT-C1 and the mobile phone, and KIT-C1 is close to the batteries and there is no obstruction between them, an extended antenna is recommended for the Bluetooth port and a rubber duck antenna for the wireless port.



# 8 Battery Storage

Please follow the steps below to store the battery.

1. Make sure the battery level is between 40% and 70%.
2. Disconnect the battery from all loads and the charging device (if present).
3. Turn off the battery.
4. Store the battery in a well-ventilated, clean, dry area with temperatures between 50 °F (10 °C) and 95 °F (35 °C).



Note

- Charge the battery at least once every 6 months to prevent over-discharge.
- In extreme conditions, the battery can be stored for up to 1 month at temperatures as low as -4 °F (-20 °C) or as high as 140 °F (60 °C).

# 9 Battery Management System

## Protection and Warnings

Under-voltage

Over-voltage

Over-current

Over-temperature/Under-temperature

Short Circuit

System Error

## Management and Monitoring

Cell Balancing

SoC Calculation

Wireless Internal Networking

Wired Extended Communication

Bluetooth Communication

Operation Log

# 10 Specifications

## Electrical Specification

Nominal Voltage	25.6 VDC
Nominal Capacity	50 Ah
Resistance	< 10 mΩ
Self Discharge	≤ 3% per month
Max. Batteries in Parallel or Series	2S8P or 1S16P
Cycle Life (25°C)	> 4000 (80% DOD, 0.5 C, 25 °C)
Design Life	≥ 10 years
Short Circuit Current Duration	< 1 kA/100 us
Discharge of Depth (DoD)	100%

## Discharge Specification

Max. Continuous Discharging Current	50 A
Peak Discharging Current	100 A @30 s

## Charge Specification

Recommended Charging Current	25 A
Max. Continuous Charging Current	50 A
Recommended Charging Voltage	28 V ~ 28.8 V

## Environment Specification

Storage Temperature	-4 °F ~ 140 °F (-20 °C ~ 60 °C)
Operating Temperature	-4 °F ~ 122 °F (-20 °C ~ 50 °C) *The battery does not support charging when the temperature is below 32 °F (0 °C).
Max. Altitude	13123 ft (4000 m)
Relative Humidity	5% ~ 95% (non-condensing)

## Mechanical Specification

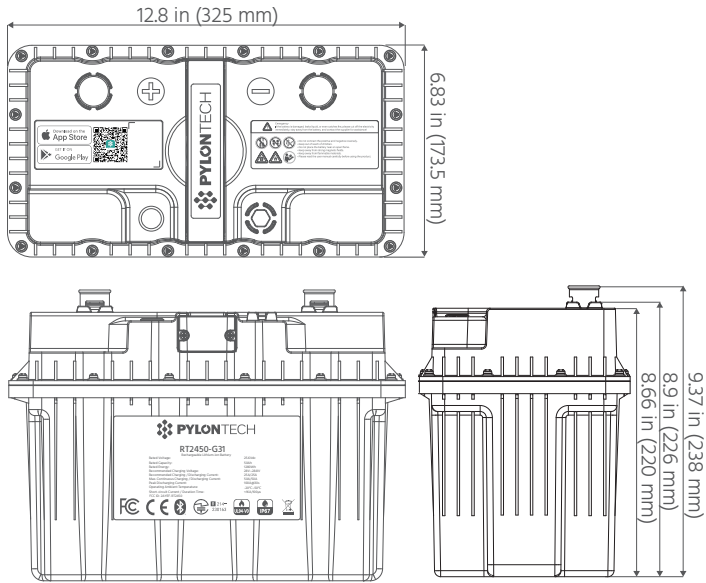
Dimensions (L × W × H)	12.8 in × 6.83 in × 9.37 in (325 mm × 173.5 mm × 238 mm)
Weight	Approx. 23.37 lbs (10.6 kg)
Terminal Type	M8 × 1.25 × 14 mm

# 10 Specifications

Terminal Torque	9 ± 1 Nm
Case Material	PC
IP Rating	IP67
Cell Type-chemistry	LiFePO <sub>4</sub>
<b>Other</b>	
Certifications	UN38.3, TELEC, FCC, IEC 62619, Bluetooth SIG
Communication	BLE 5.0
App	Pylontech Auto App

\*Product performance is based on testing in a controlled environment. Your results may vary due to several external and environmental factors.

## Dimension



Unit: inch (mm)

# 11 Troubleshooting

## My battery won't turn on?

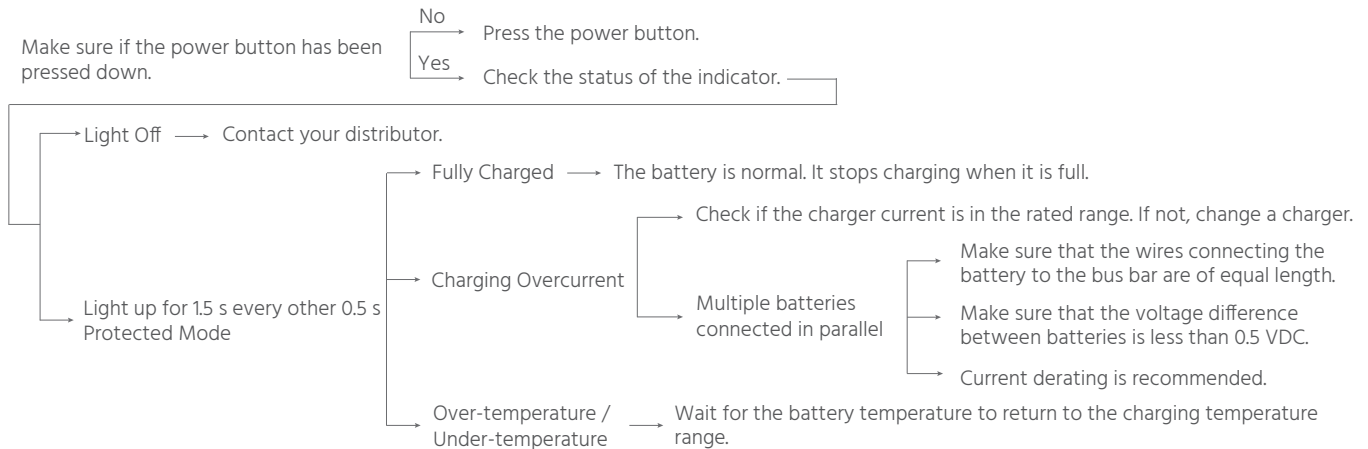
- The power button cannot be pressed down. → Contact your distributor.
- With the button pressed down, the button indicator doesn't light up. → Check if the battery is running down. 

Yes	→ Charge the battery in time.
No	→ Contact your distributor.

## My battery won't turn off?

- Disconnect all external devices, and press the power button to confirm whether it can be turned off.
- |     |                             |
|-----|-----------------------------|
| Yes | → The battery is normal.    |
| No  | → Contact your distributor. |

## My battery won't charge?





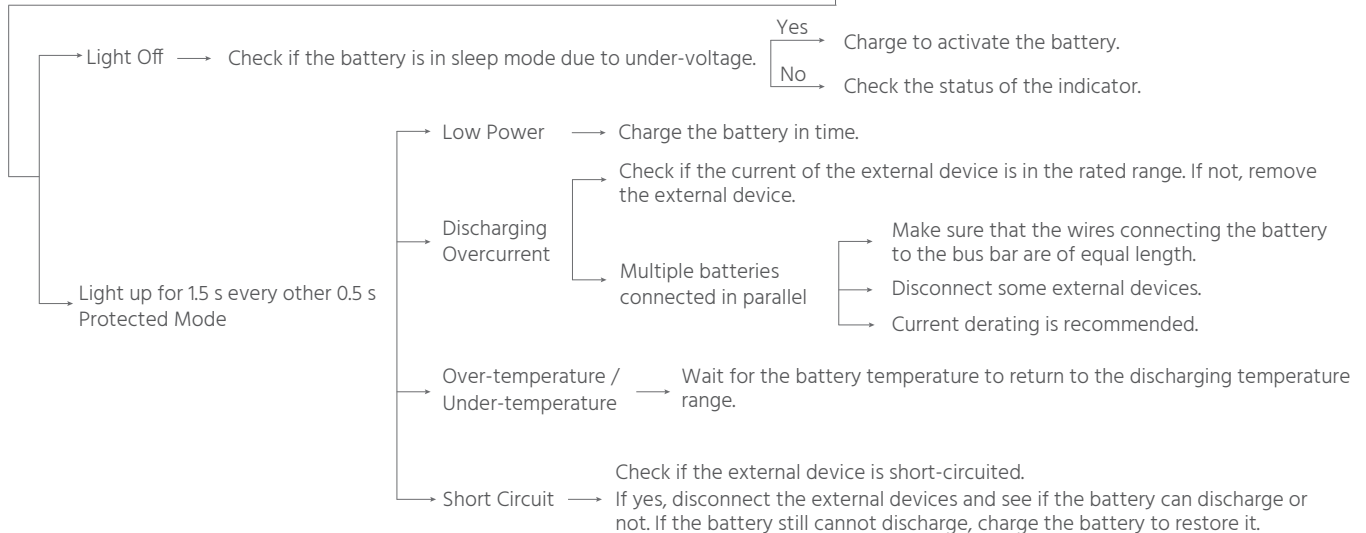
# 11 Troubleshooting

## My battery won't discharge?

Make sure if the power button has been pressed down.

No → Press the power button.

Yes → Check the status of the indicator.



## Why won't my battery turn on sometimes when it is just turned off?

When the battery is turned off, it enters lock state for 5 s. Please wait for 5 s before turning on the battery.

## Why can a voltage be measured by a multimeter at the power terminals of a battery when it is turned off?

It is a normal phenomenon. After the battery is turned off/enters the sleep mode, there is a floating voltage (18.7 V~26 V/0 V~3 V) on both terminals of the battery, which is not sufficient for device operation.

## Why won't my batteries connected in parallel charge/discharge sometimes?

When multiple batteries are connected in parallel, the internal resistance from the bus bar to each battery may differ, and there may be a voltage difference between the batteries. Therefore, the current may be unevenly distributed. In this case, derating is strongly recommended to avoid triggering protection.

## Can my battery communicate with wired RS485 or CAN devices?

With a KIT-C1 communication box, the battery can be extended with RS485 communication, CAN communication and dry contact function. For more information, see KIT-C1 User Manual.

## Why does my battery sometimes over-discharge?

When the battery is discharged, please disconnect the load and charge the battery in time. If the bus bar is connected, the battery may be activated repeatedly by float currents or external devices, which may result in over-discharge.

## Why won't my cascaded battery system turn off with one-click?

- In basic mode, only the first battery (whose address is 1) supports the one-click shutdown function.
- If the batteries are used in cascade, please remove the charger before turning off the battery. Otherwise, you may fail to do so.


## Why does networking fail sometimes?




- The channel you selected is duplicated with the surrounding network, please change the channel.
- Long distance between devices results in unstable signals.
- The environment interference is serious.

You can re-organize the batteries in one network after solving the above problems.

## Why does the network drop sometimes?

- The network is interfered.
- The distance between the antenna and the device is long, resulting in an unstable network.
- The battery is turned off abnormally, resulting in a loss of signal source.

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