

# KICKASS<sup>®</sup>

## 12V 100A LITHIUM BATTERY WITH COMMUNICATION USER MANUAL



**KA12100-LION**

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# INTRODUCTION

**Thank you for purchasing a KickAss Lithium Battery. The battery allows you to power all your 12V camping equipment with the following features:**

- Lithium Iron Phosphate (LiFePO<sub>4</sub>) Battery.
- Internal Battery Management System (BMS).
- BMS supervised lithium battery protection and alarms, via LED indicators in battery display and Mobile Application.
- High discharge current of 150A, suitable for high power applications.
- Supports series and parallel connection. 4 x batteries in series connection (48V Max) and 4 x batteries in parallel connection (400Ah Max).
- Sturdy battery construction, making it suitable for demanding environments.
- Bluetooth connectivity allows monitoring of battery performance via a mobile application.
- Built-in communication ports for connection to compatible monitoring devices.
- Low power mode is available to reduce residual power consumption in storage.
- Multifunction button on battery.

## BMS Protection Features

- Battery over and under voltage protection.
- Battery over and under temperature protection.
- Battery over charge and discharge protection.
- Battery short circuit protection.

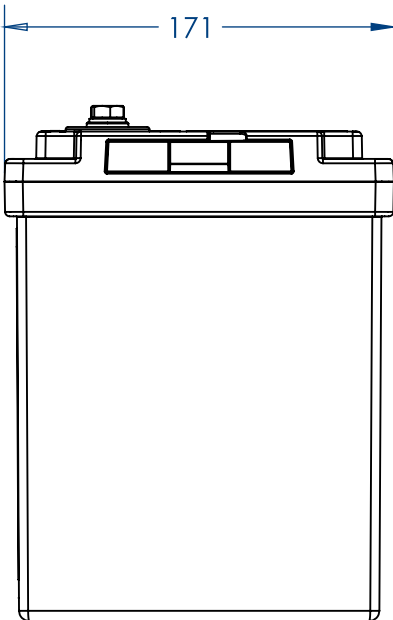
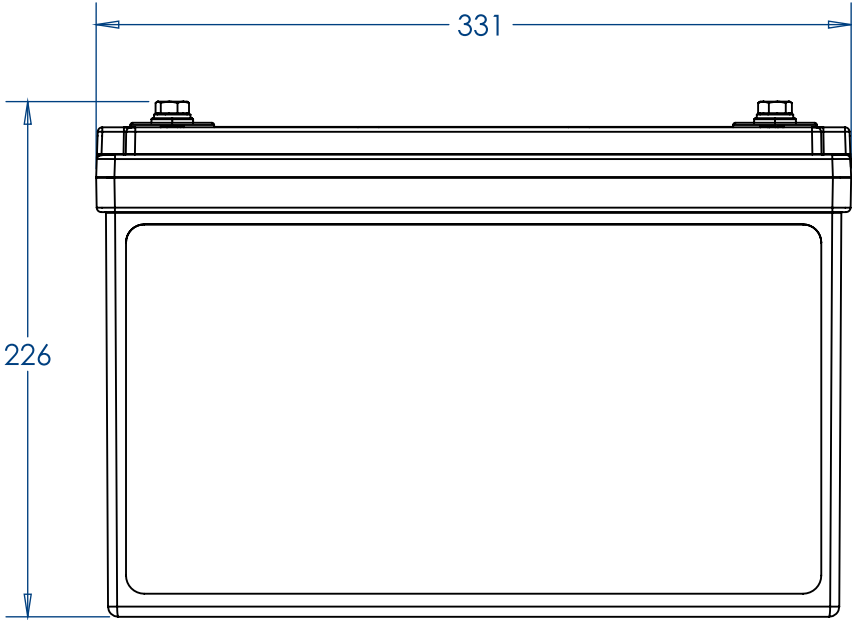
## Applications

- Renewable energy systems (Solar).
- Backup power systems for homes or businesses.
- Telecommunications.
- 4WD Dual Battery Systems.
- Caravan and Motorhome System.
- Emergency Power System.

## Safety Precautions

- The total current draw from the battery must not exceed BMS rated capacity.
- Ensure a lithium compatible charger is used with lithium batteries.
- Do NOT use the battery for cranking/starting applications.
- Do NOT allow the battery to sit in a discharged state  $\leq 10.0$  V.
- If connecting batteries in series, carefully read the instructions within this manual.
- If connecting batteries in parallel, carefully read the instructions within this manual.
- Do NOT use a charger with automatic desulfation mode (not for Lithium).
- Do NOT continuously charge the battery for longer than 24 hours.
- Do NOT install batteries near major heat sources or high voltage sources.
- Do NOT install batteries near high voltage sources.
- Do NOT install the battery where it will be exposed to direct sunlight for long periods of time.
- Do NOT deliberately short-circuit (reverse polarity) the battery terminals.
- Do NOT disassemble, altering the shape of, or making changes to the battery, as doing so may create safety hazards and invalidate the warranty.

# DIMENSIONS



# BATTERY SPECIFICATIONS



## 100AH LiFePO4 Battery Specifications

Nominal Voltage	12.8V
Nominal Capacity	100Ah
Nominal Energy	1280Wh
Cycle Life (DoD - 80% Under Controlled Conditions)	≥ 2000 Cycles
Bluetooth Battery Monitoring App	Yes

## Dimensions and Weight

Length	331mm
Width	171mm
Height	226mm
Weight	14kg ± 0.5

## Charging Specifications

Battery Charging Temperature	*0 ~ 45°C
Normal Charge Voltage CC/CV	14.4-14.6V
Standby Float Voltage	13.5-13.8V
Standard Charge Current	20A (0.2C)
Maximum Continuous Charge Current	100A (1C)

**\*Note:** It's important to note that exceeding the recommended maximum charge temperature for a lithium battery can lead to reduced battery life, capacity, and performance. If possible avoid charging battery at high currents when ambient temperature is close to the higher limit.

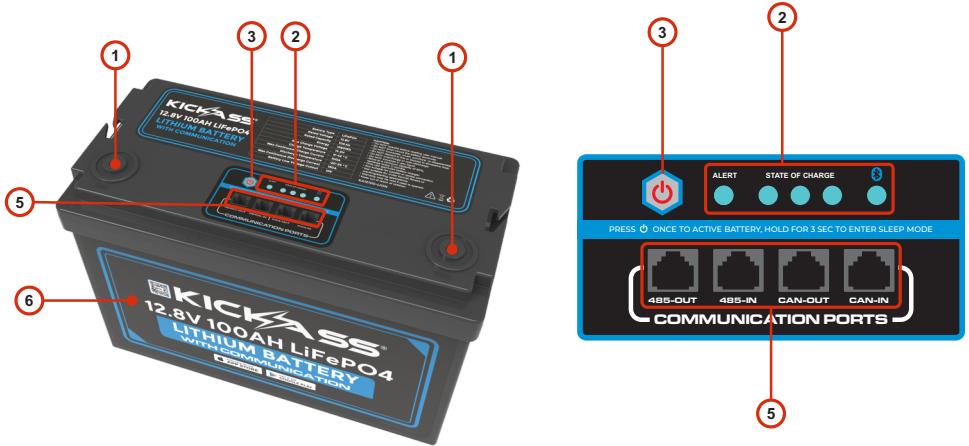
## Discharging Specifications

Battery Discharge Temperature	-20 ~ 55°C
Battery Operating Voltage	10-14.6V
Standard Discharge Current	20A (0.2C)
Maximum Continuous Discharge Current	150A (1.5C@25°C)
Pulse Discharge Current	350A (3s)
Discharge Cutoff Voltage	10V

## Storage and Transportation Information

Temperature and Humidity Range	≤ 30 days -10°C ~ 45°C, 5 ~ 75% RH ≤ 90 days -10°C ~ 35°C, 5 ~ 75% RH ≥ 90 days 0°C ~ 30°C, 5 ~ 75% RH
Storage SOC	40%~60%

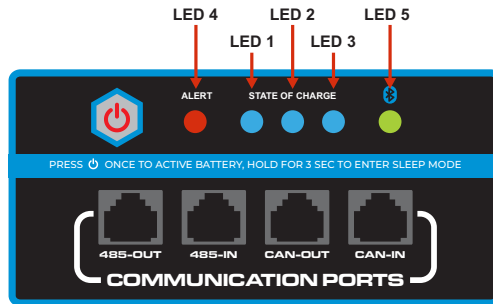
# PRODUCT INFORMATION



## DESCRIPTION

No.	Item	Description
1	Terminal Power Port	Battery connection terminals. M8 x 2 threaded holes.
2	LED Indicators	Check LED State Indicator Table at page 7
3	Function Key	Tap (1s) to activate battery display; Long press (2s) to sleep, the light is off; Long press (5s) to release the protection, the red light is off; In the active state, long press (10s) address allocation
4	Rubber Caps	Communication port protective caps, water and dust resistant.
5	RS485 Comms Ports	Communication ports to support connection to compatible monitoring devices. Supports parallel connection.
6	Battery Casing	Heavy Duty ABS casing.

# LED INDICATOR TABLE



## State indicator during charging and discharging

Power	LED 1 (Blue)	LED 2 (Blue)	LED 3 (Blue)	LED 4 (Red)	LED 5 (Green)
100%~60%	On ●	On ●	On ●	Off ●	/
60%~20%	On ●	On ●	Off ●	Off ●	/
20%~0%	Flash1 ⚡	Off ●	Off ●	Off ●	/
Fault	/	/	/	Flash1 🔴	/
App	/	/	/	/	App Access Flash 2 🟢
					App Disconnect Off



# BMS PROTECTION FEATURES AND ACTIVATION

The KickAss Lithium Batteries are built with a Battery Management System (BMS) inside to protect the battery from overcharging, over discharging, short circuiting and extreme temperature.

## Over-charge Protection

Over-charge Protection Per Cell / Battery	3.85 ± 0.2V (Cell) / 14.8 ±0.8V (Battery)
Over-charge Release Per Cell / Battery	3.45 ± 0.2V (Cell) / 13.8 ±0.8V (Battery)
Over-charge Release Method	Discharge below release voltage

## Over-discharge Protection

Over-discharge Protection Per Cell / Battery	2.5 ± 0.2V (Cell) / 10 ±0.8V (Battery)
Over-discharge Release Per Cell / Battery	2.8 ± 0.2V (Cell) / 11.2 ±0.8V (Battery)
Over-discharge Release Method	Charge above release voltage

## Over-current Protection

Charge Over-current Protection	≥105A	≥284A		
Charge Over-current Protection Delay	3s	17ms		
Charge Over-current Release Method	Automatic <sup>1</sup>	Manual <sup>2</sup>		
Discharge Over-current Protection	≥160A	≥350A	≥600A	≥1200A
Discharge Over-current Protection Delay	10s	3s	8ms	400us
Discharge Over-current Release Method	Automatic <sup>1</sup>	Automatic <sup>1</sup>	Manual <sup>2</sup>	Manual <sup>2</sup>

Note 1: Protection mode will be automatically released after 3 seconds.

Note 2: Protection can be manually released via the following methods:

- Remove the load connected to the battery (>13s).
- Remove the charging source from the battery (>13s).
- Long press the function key for 5s.

## Cell Temperature Protection

Battery Discharge High Temperature	65°C±2	Release 55°C±2
Battery Charge High Temperature	50°C±2	Release 45°C±2
Battery Discharge Low Temperature	-20°C±2	Release -15°C±2
Battery Charge Low Temperature	0°C±2	Release 5°C±2

## SLEEP MODE AND ACTIVATION

Sleep Modes	Timing Sleep	<p>Sleep mode can be triggered by two conditions:</p> <ol style="list-style-type: none"> <li>1. If there is no charge or discharge for 15 days.</li> <li>2. If the battery continuously powers a load with current below 0.5A for 15 days, it will enter sleep mode if the single cell voltage is lower than 3.0V. If the voltage is higher than 3.0V, it will not enter sleep mode.</li> </ol> <p>During overvoltage protection, the battery can be activated from sleep mode to standing mode through charging, discharging, or by pressing a key.</p>
	Low Voltage	<p>If the voltage of any cell falls below the battery's low-voltage protection value for 3 minutes, the battery will automatically enter sleep mode to prevent deep over-discharge and reduce power consumption. During low-voltage protection, the battery can be activated through charging, discharging, or by pressing a key.</p>
	Key Activated Sleep	<p>To enter sleep mode, press the key for 2 seconds. During over/low-voltage protection, the battery can be activated by charging, discharging, or by pressing a key.</p>
	Fault Sleep	<p>If there is a temperature, short circuit or temperature brake fault, the battery will enter sleep mode</p>
Activation modes	Charge activation	<p>To activate the BMS when the battery is in sleep mode, connect a charger with a voltage greater than 1.2V above the battery voltage and recharge the battery.</p>
	Discharge activation	<p>If the load (with a resistance less than 5 kΩ) is connected, it can activate the BMS even when the battery is in sleep mode.</p>
	Key activation	<p>Pressing the key briefly will activate either a single battery or the entire series/parallel battery group.</p>

## INSTALLATION INSTRUCTIONS

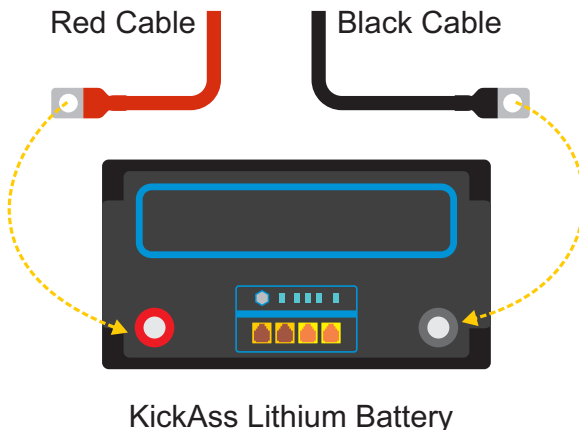
To ensure proper battery replacement, follow the instructions provided by the vehicle/equipment manufacturer. Here are some tips to consider before installation:

- Make sure the battery capacity is equal to or greater than the original lead-acid battery for deep cycle applications.
- Check the battery status beforehand:
  - Test the battery voltage using a multimeter. If it's below 13V, recharge it according to the charging instructions.
  - Ensure that the capacity and voltage between each battery are consistent if connecting them in series or parallel. See the instructions for connecting in series and parallel.
  - Check the battery terminals for cleanliness and rust, and ensure the screws are free of foreign objects.
  - Verify that the cable connecting the battery terminals is long enough.
  - Tighten the screws on the terminals to their maximum to prevent them from loosening during operation.
  - Make sure the maximum output voltage of the charging device connected to the battery does not exceed 14.6V before connecting.

## CONNECTING THE BATTERY

Install the battery cables onto the terminal posts of the battery. Ensure the red cable is connected to the positive (+) terminal and black cable is connected to the negative (-) terminal.

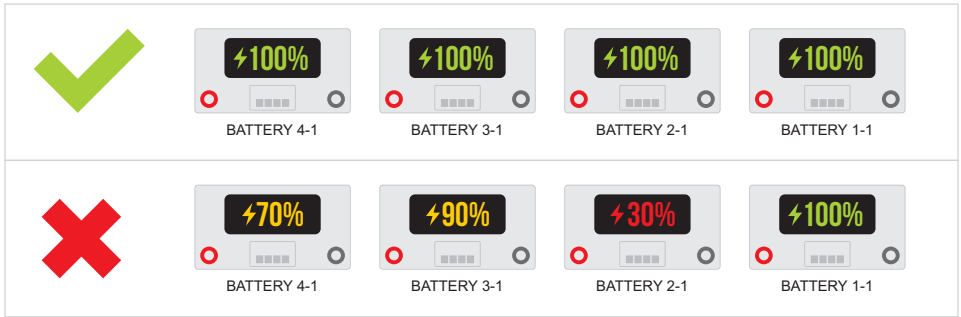
If connecting the Remote Display Unit to your KickAss Lithium Battery, connect the black data dongle on the RDU to the black data connector on the battery.



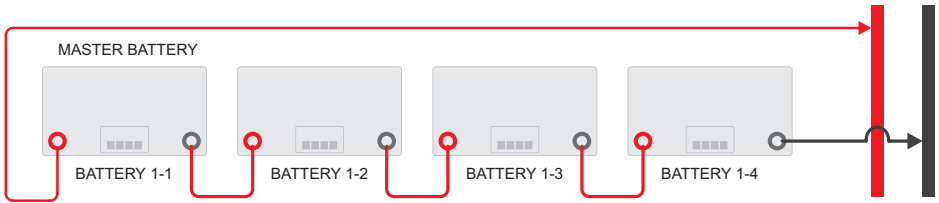
# CONNECTING THE BATTERY (SERIES)

Up to four batteries can be connected in series to increase the voltage (V) of the battery bank.

**WARNING:** Ensure all batteries are fully charged before connecting in series.



Install the battery cables between each battery to make the series connection.

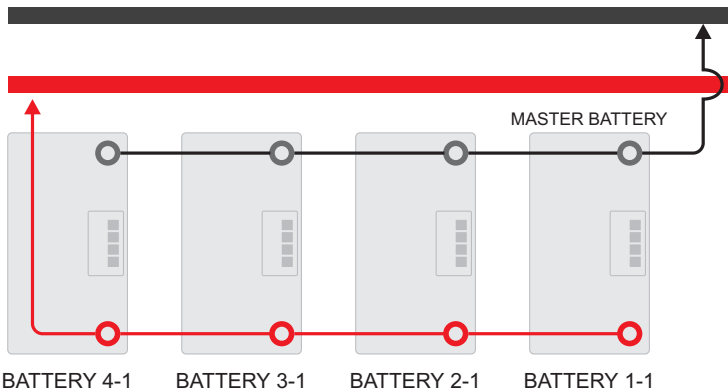


# CONNECTING THE BATTERY (PARALLEL)

Up to four batteries can be connected in parallel to increase the capacity (Ah) of the battery bank.

**WARNING:** Ensure all batteries are fully charged before connecting in parallel.

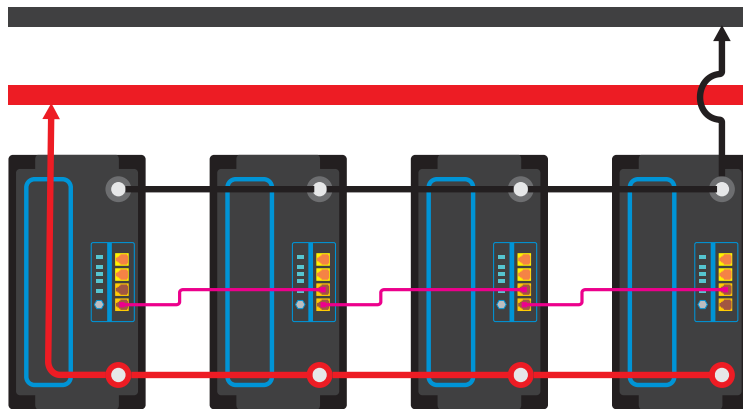
Install the battery cables from positive to positive and negative to negative between all batteries to make the parallel connection.



# CONNECTING THE BATTERY (PARALLEL COMMUNICATIONS)

Note: Parallel communications is only required when the KA12100-LION is used in conjunction with compatible Inverter/Charger devices. Please refer to the Inverter/Charger device to confirm if communications with the KA12100-LION is supported.

1. If using more than one KA12100-LION battery in parallel, connect the communications cable between each battery.



Master Battery

2. Connect the master battery to compatible inverter/charger device. Refer to the inverter/charge manual for correct connection port. Ensure the communications cable is connected to the port marked RS-485 OUT on the master battery.



Compatible Charger

Master Battery

3. Assign the master battery ID once all communications cables are connected. Hold down the function key on the master battery for 30 seconds to assign the battery IDs.

Note: Master battery address must be assigned when all batteries are connected to ensure correct communications between the KA12100-LION batteries and the compatible inverter/charger.

## CHARGING INSTRUCTION

Please adhere to the following guidelines while charging your batteries:

- Ensure that the charging voltage does not exceed 14.6V for a nominal 12V battery system.
- The charging current should not exceed the maximum charging current specified in the User Manual's specification sheet.
- Charge the batteries at an ambient temperature of 0°C to 45°C to prevent irreversible damage or safety risks.
- Do not use a battery charger that has the Equalization Mode, Desulfation Mode, or Pulse Function. Also, do not leave the lead-acid battery charger connected to maintain or store the battery because it will damage the battery's proper voltage charge algorithm for lithium batteries.
- Ensure you use a Lithium Battery Charger if replacing a AGM , FLOODED, GEL or SLA battery with a Lithium Battery.



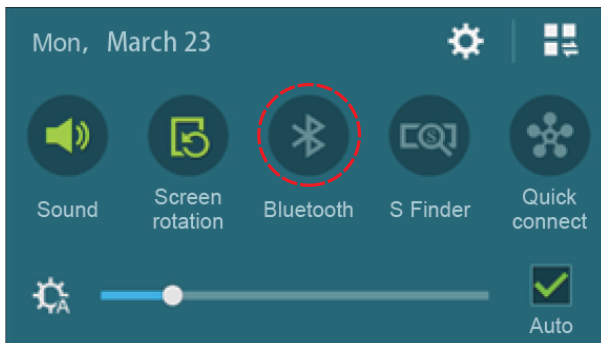
**CAUTION:** Exceeding the recommended charge temperature limits for a lithium battery can lead to reduced battery life, capacity, and performance. If possible avoid charging battery at high currents when ambient temperature is close to the higher limit.

## CONNECTING TO BLUETOOTH

1. The Bluetooth App is available on Google Play Store and Apple's App Store for download. Install the App and allow notification on your phone screen.



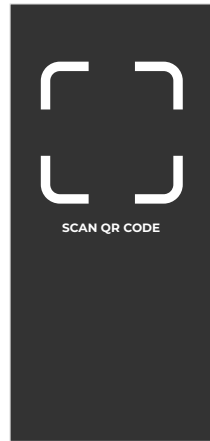
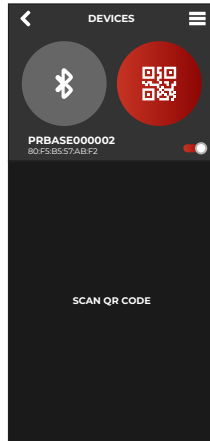
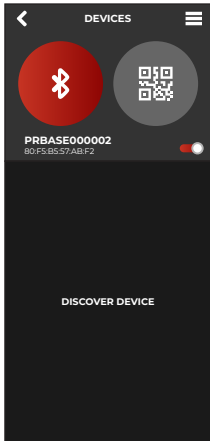
2. Activate Bluetooth mode on your phone before connecting battery and phone.



3. Connect the battery to your phone. You can rename the battery after connecting. There are two ways for connecting:

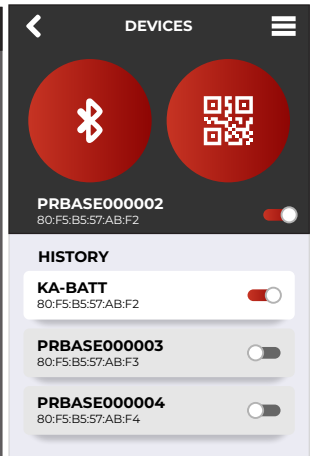
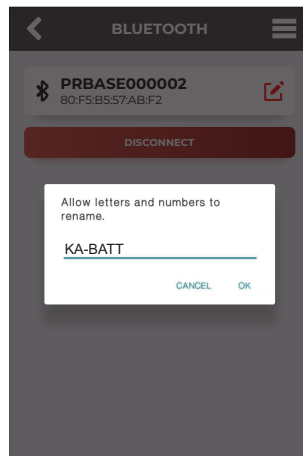
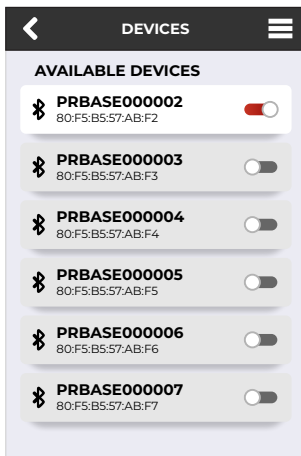
- a) Search the battery from the device list that your phone can discover.
- b) Scan QR code on the battery, and the battery name will appear.

*Note: One smartphone can only connect to one battery at the same time. You need to check the batteries one by one in turns if you configure them in series or parallel.*

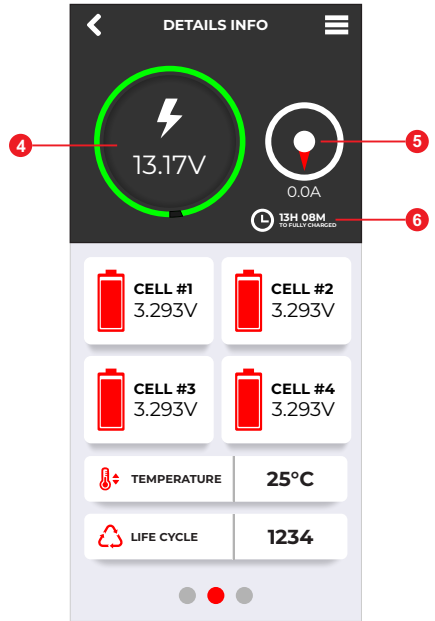
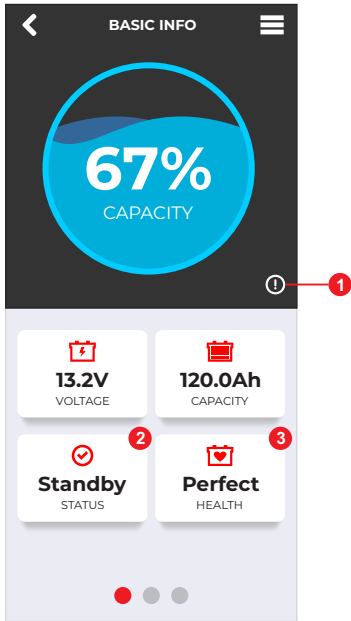


4. Choose the device on the list and connect to it:

5. You can rename the battery after being connected. The connected device will appear in the history when accessing the App again.



6. After connecting, you can see the SOC (States of Charge) from the Basic Info. There are 4 battery cells in total. If the voltage differences between any two of them reaches or even is higher than 400mV, these two cells will be displayed in red:



1 Click to check the Alarm details.

2 Battery state: Standby/Charging/Discharging

3 Perfect: > 90% Initial Capacity  
 Good: 80%~90% Initial Capacity  
 Service: ≤80% Initial Capacity

4 Battery Voltage (4 Cells in series)

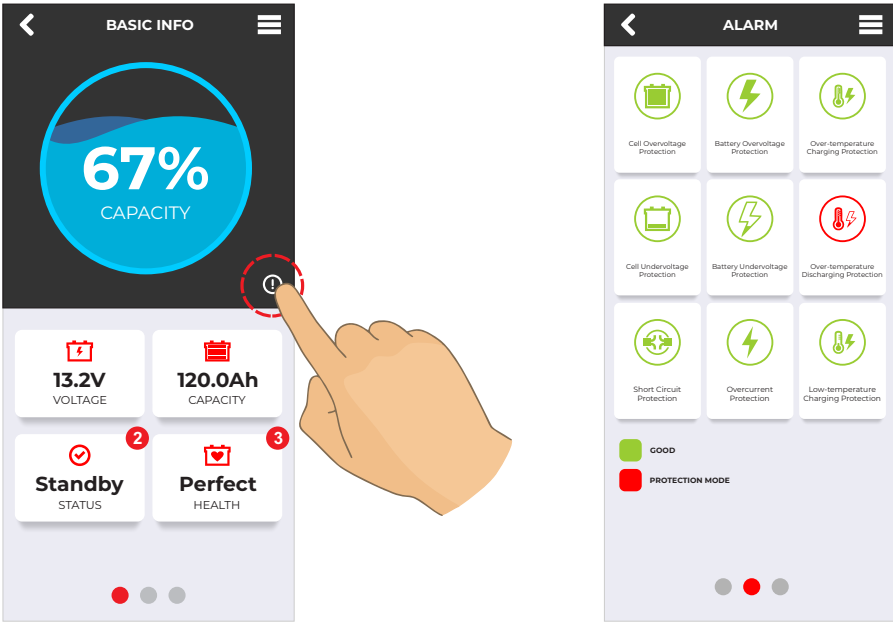
5 The discharge status is indicated by a counterclockwise flowing circle in orange, which is displayed as a negative value; the charge status is indicated by a clockwise flowing circle in blue, which is displayed as a positive value.

6 Time to fully charge

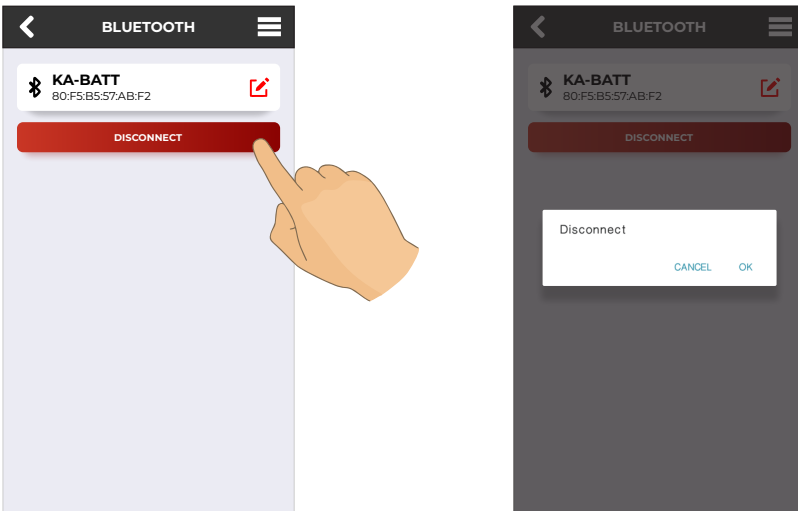




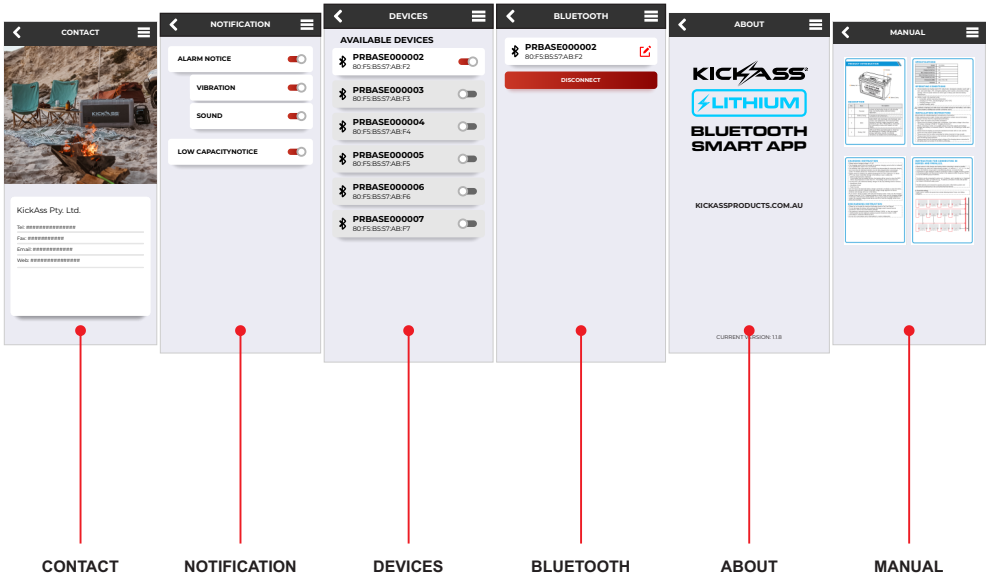
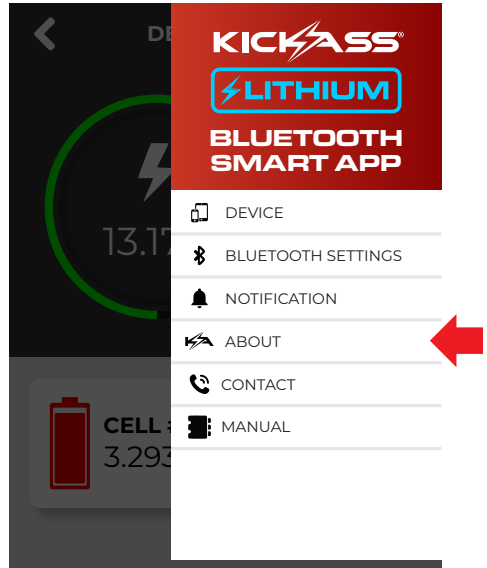
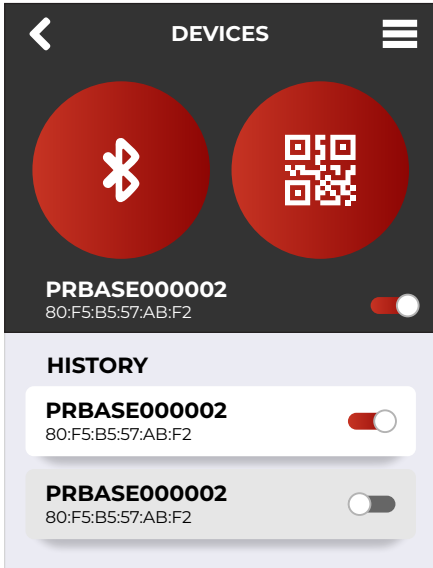
7. You can also check the individual cell voltage from the Details Info.



8. You can disconnect the battery from the connecting device list.



Note: You can check the Manual and other information from the menu.



## WARNING AND ATTENTION

- Do not reverse the positive and negative of the battery.
- Do not touch or store the electrodes of the battery with unnecessary wires or other metal materials to avoid short circuit
- Do not puncture, impact, drop, or step on the battery.
- Do not disassemble the battery or modify the outer casing.
- Do not expose the battery under the sun, since this may cause overheating, fire, or failure to the battery.
- Do not put the battery in a fire or heat the battery.
- Do not store the battery in a high temperature environment.
- Do not put the battery into the water, or in the rain for a long time.
- Battery should be stored in a cool and dry environment.
- If you detect any abnormal smell or noise while charging or discharging, remove the battery immediately and contact your dealer.
- When the battery is operated beyond the temperature range of 0°C ~ 50°C, the capacity may decrease, this does not mean that the battery is damaged.

# STORAGE AND TRANSPORTATION

Item		Criteria
Storage Temperature	Less than 1 month	-10°C ~ +45°C
	Less than 3 months	-10°C ~ +35°C
	More than 3 months	0°C ~ 30°C
Relative Humidity		≤75% RH
SOC		40% ~ 60%

- To ensure a longer lifespan of the battery, please recharge it every 3-6 months.
- Please ensure the battery terminals and screw holes are clean and securely connected.
- If the load is in an unused situation for a long time, disconnect the battery from the load to prevent the battery/load from leakage and causing the battery to be over-discharged.
- Insulation and shockproof materials should be used for the other packaging to avoid sudden collisions and squeezing during transportation.