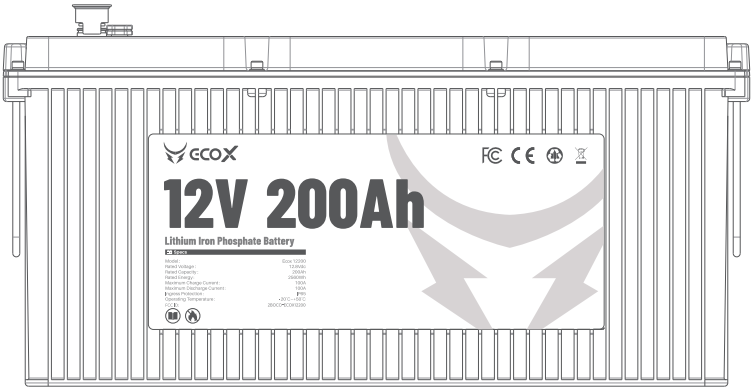



# Smart Lithium Iron Phosphate Battery
# Ecox 12200

## User Manual

Information Version: 1.0

# Legal Information



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. Information in the manual may 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, with which the user acknowledges and accepts full responsibility for any risks associated.

No representations or warranties, either express or implied, are made with respect to the information contained in this manual.

In the event of any conflicts between this manual and the applicable law, the latter prevails.

The final interpretation of this manual rests with the issuing party.

## Safety Instructions

### 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. Damage to the product that caused by using third-party accessories is not covered by warranty.
- 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

## Maintenance

- Charge the device regularly. If you need to store the device for a long time, please charge it to 40% ~ 70% 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. DO NOT disassemble the device for repair or maintenance by yourself. The user acknowledges and accepts full responsibility for any risks associated.
- 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.

# Contents

# 1 Introduction

Ecox 12200 is a smart lithium iron phosphate battery module. It is designed to replace deep cycle lead-acid batteries. With a standard BCI 4D size, it is perfect for recreational vehicles (RV), marine (boats), trucks, cabins, and other off-grid deep-cycle applications.

The product has the following advantages.

- High Reliability

Adopting advanced BMS, the battery has comprehensive protection functions.

- Long Cycle Life

With Energy Storage Grade $LiFePO_4$ Cells, the battery extends its cycle life to more than 8 times that of lead-acid batteries.

- High Energy Density

With the high energy density lithium cells, the battery is 50% 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.

- Flexible Connection in Parallel and Series

Available in 12 V, 24 V, 36 V and 48 V, multiple batteries can build a battery system with a max. energy output of 40.96 kWh through flexible connection in parallel and series.

- Strong Environmental Adaptability

With low-temperature smart heating function, the battery can be charged safely in sub-zero temperatures.

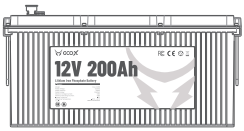
- Real-time Monitoring via App

You can monitor the battery status via App.

- Low Self-discharge Loss

The battery can be stored for over 2 months if it is turned off after being fully discharged, and can be stored for over 6 months if it is turned off when its level is between 40% and 70%.

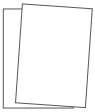
# 2 Packing List




Insulating Cap × 2

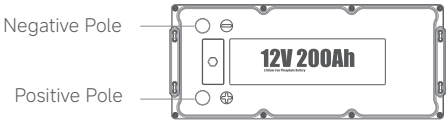
Terminal Bolt × 2
(M8 × 1.25 × 14 mm)

Battery



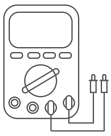
User Manual

# 3 Interface



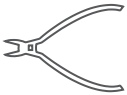

# 4 Battery Installation

## 4.1 Tools and Accessories Preparation



Voltmeter

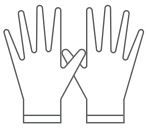
Torque Wrench



Wire Cutter

Screwdriver

# 4 Battery Installation



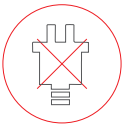
Insulating Gloves

Safety Goggles

Bus Bar

## 4.2 Pre-installation Check

- Ensure that the battery is away from open flames, heat sources and flammable materials.

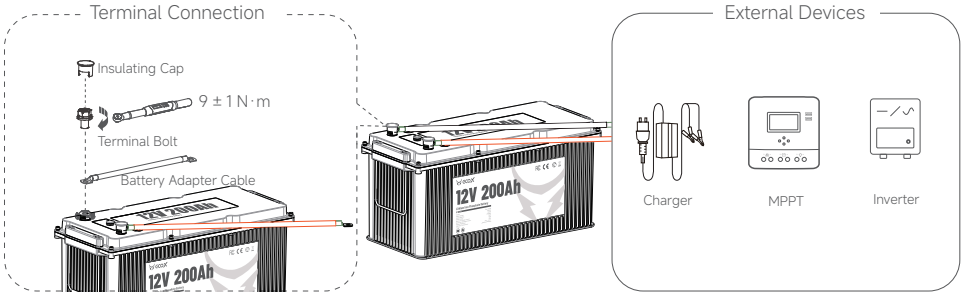


- Cut off the power before wiring, installing or removing the battery.

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

## 4.3 Battery Connection

### 4.3.1 Single Battery



## 4.3.2 Multiple Batteries

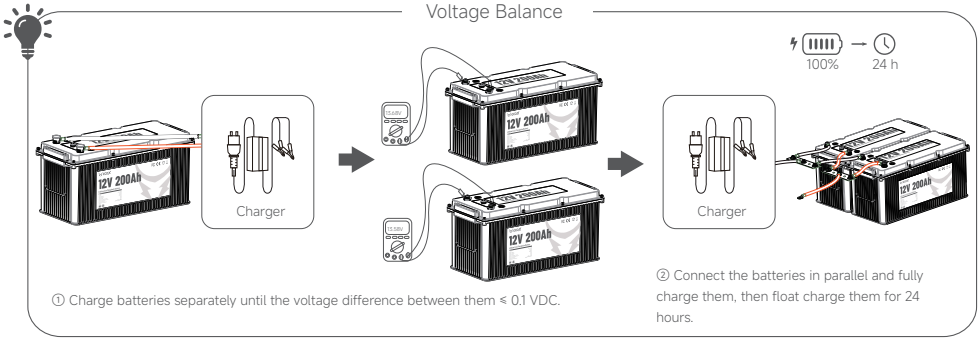
Connect batteries in series and parallel via power adapter cables to increases voltage and capacity.

**Caution**

- 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, please balance the voltage first. 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.

**Note**

- Please refer to Section 5.3.1 for terminal connection and external devices connection.
- When batteries are used in series and parallel connection, it is recommended to use with a busbar to distribute power effectively.
- The power cable connection methods provided in the manual are for reference only. The actual optimal connection method varies depending on the cable size, equipment devices connected and environmental conditions.

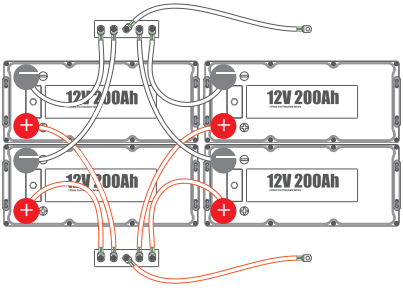


# 4 Battery Installation

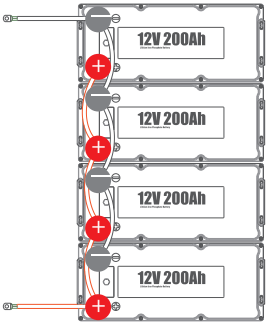
## ① Connecting the Batteries in Parallel

⊕ to ⊕

⊖ to ⊖




Method 1 (Optimal)




Method 2

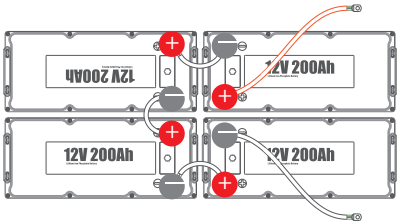
| Voltage of Battery Pack (VDC) | Current of Battery Pack (A) |
|---|---|
| 12.8 | Total Current of All Batteries |

Note

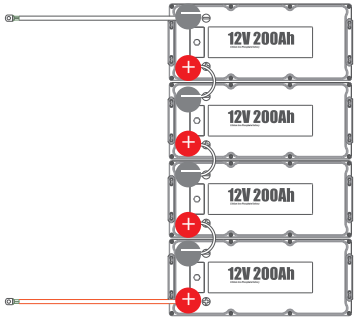
Up to 8 batteries can be connected in parallel. The pictures above shows 4 batteries in parallel as an example.

## ② Connecting the Batteries in Series

⊕ to ⊖




Method 1




Method 2

# 4 Battery Installation

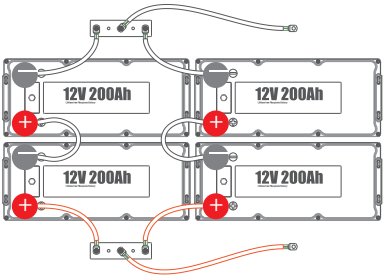
| Series Configuration | Recommended Charging Voltage Value (VDC) |
|---|---|
| 1S | 14 ~ 14.6 |
| 2S | 28 ~ 29.2 |
| 3S | 42 ~ 43.8 |
| 4S | 56 ~ 58.4 |

| Voltage of Battery Pack (VDC) | Current of Battery Pack (A) |
|---|---|
| 12.8 ~ 51.2 | Current of Single Battery |

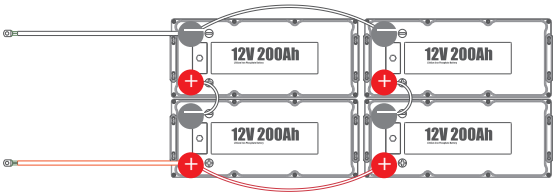
Note

- Up to 4 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.

③ Connecting the Batteries in Series & Parallel




Method 1 (Optimal)




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 4S4P). The pictures above shows 4 batteries in 2S2P connection as an example.

## 4.4 Post-Installation Check

Please check if the positive and negative connections are correct.

# 5 Battery Activation

Before first use, use a charger with a current greater than 1 A to activate the battery, and verify if the battery is activated successfully by measuring its voltage.

# 6 Battery Monitoring

## 6.1 App

You can finish battery networking, check battery information, complete remote upgrades and more through RE+ App.

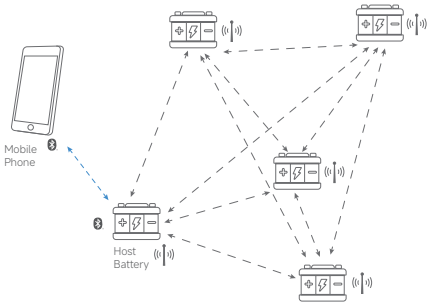
ios

Google play

## 6.2 Battery Networking

- Basic Mode

  Before first use, follow "Connect" section in the App Quick Guide to finish battery networking.



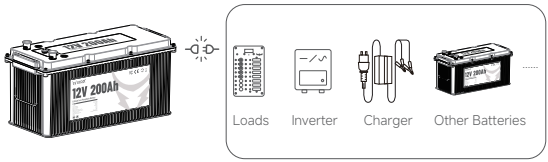

Note

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.

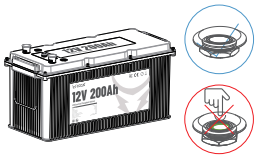
# 7 Battery Storage

1.Make sure the battery level is above 40% (Optimal 70%).

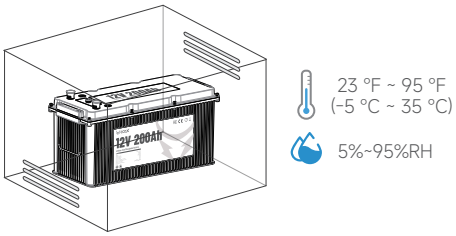

2.Disconnect the battery from all external devices (if present).




3.Turn off the battery.




4.Store the battery in a well-ventilated, clean, dry area.




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 -40 °F (-40 °C) or as high as 140 °F (60 °C).

# 8 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 |
| Smart Heating Mode |
| SoC Calculation |
| Wireless Internal Communication |
| Wired Extended Communication |
| Operation Log |

# 9 Specifications

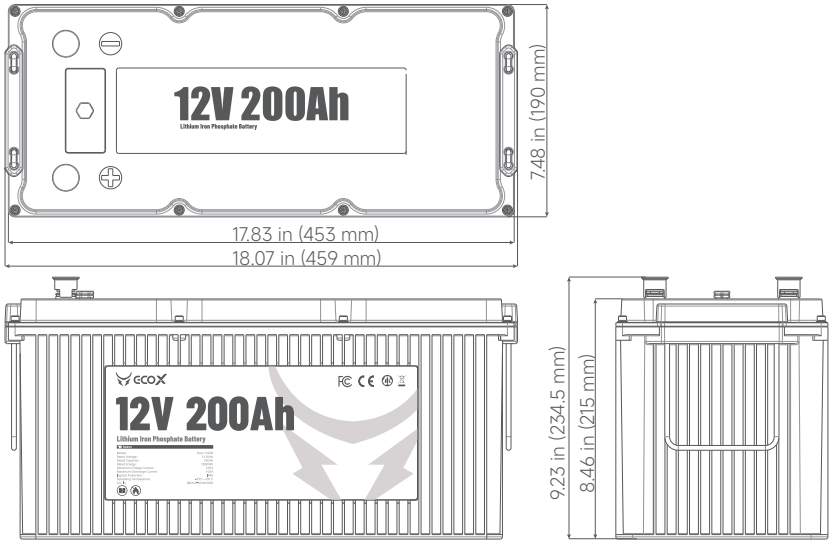
| Electrical Specification | |
|---|---|
| Nominal Voltage | 12.8 VDC |
| Nominal Capacity | 200 Ah |
| Resistance | < 10 mΩ |
| Efficiency | 99% |
| Self Discharge | ⩽ 3% per month |
| Max. Batteries in Parallel or Series | 4S4P |
| Cycle Life (25°C) | > 4000 (80% DOD, 0.5 C, 25 °C) |
| Design Life | ⩾ 10 years |
| **Discharge Specification** | |
| Max. Continuous Discharging Current | 100 A |
| Peak Discharging Current | 200 A @5 s |
| **Charge Specification** | |
| Recommended Charging Current | 50 A |
| Max. Continuous Charging Current | 100 A |
| Recommended Charging Voltage | 14 V ~ 14.6 V |
| **Environment Specification** | |
| Discharging Temperature | -4 °F ~ 140 °F (-20 °C ~ 60 °C) |
| Charging Temperature | 32 °F ~ 131 °F (0 °C ~ 55 °C) |
| Storage Temperature | -40 °F ~ 140 °F (-40 °C ~ 60 °C) |
| Operating Temperature | -4 °F ~ 122 °F (-20 °C ~ 50 °C)<br>*If charging is required when the temperature is below 32 °F (0 °C), please connect the charger to enable the heating film. The battery starts charging when the cell temperature is heated to a certain temperature. |
| Max. Altitude | 13123 ft (4000 m) |
| Relative Humidity | 5% ~ 95% (non-condensing) |

# 9 Specifications

| Mechanical Specification | |
|---|---|
| Dimensions (L × W × H) | 18.07 in × 7.48 in × 9.23 in (459 mm × 190 mm × 234.5 mm) |
| Weight | Approx. 46.08 lbs (20.9 kg) |
| Terminal Type | M8 |
| Terminal Torque | 9 ± 1 N·m |
| Case Material | PC |
| IP Rating | IP65 |
| **Other** | |
| Certifications | UN38.3, IEC 62619, FCC, CE |
| Communication | BLE 5.0 |

*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)

# 10 Troubleshooting

## My battery won't turn on?

Check if the charger is connected properly.

- Yes → Check if the charger output is normal.
- No → Contact your distributor.

## My battery won't turn off?

Disconnect all external devices, and the battery will turn off after 24 hours of inactivity.

## My battery won't charge?

- Over-voltage / Over-current → Check if the charger specification is in the rated range.
  - Yes → Restore the battery by discharging it.
  - No → Change a charger.
- Over-temperature / Under-temperature → Wait for the battery temperature to return to working temperature range.

## My battery won't discharge?

- Low Power → Disconnect all external devices, and charge the battery in time.
- Over-current → Check if the total current of all external devices is within the rated range.
  - Yes → Restore the battery by charging it.
  - No → Change a charger.
- Over-temperature / Under-temperature → Wait for the battery temperature to return to working temperature range.
- Short Circuit → Check if the external device is short-circuited. If yes, disconnect the external devices and see if the battery can discharge . If the battery still cannot discharge, restore it by charging it.

ess_support@pytesgroup.com