# SK12V314PH

# Rechargeable Lithium Battery

## Operation and Maintenance manual


Version: V-1.1

If you have any Suggestion or need help, please send us an email: sales@sokbattery.com .Please note, if no reply in 24 hours, it maybe want to your spam folder or please resend again. Or give us a call at: 725 765 2879 Monday-Friday 9AM - 4PM (PST).

# About This Document

## Purpose

This document describes the SK12V314PH Rechargeable Lithium battery in terms of its features, performance, working principles, appearance as well as instructions for installation.

## Intended Audience

This document is intended for:

- Sales engineers
- Technical support engineers
- System engineers
- Hardware installation engineers
- Commissioning engineers
- Maintenance engineers
- Knowledge of how an energy storage system (including PV/ lithium iron phosphate batteries /hybrid inverter, MPPT, Meter etc.) works and is operated.

## Symbol Conventions

The symbols that may be found in this document are defined as follows.

| Symbol | Description |
|---|---|
| DANGER | Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury. |
| WARNING | Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury. |
| CAUTION | Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury. |
| NOTICE | Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results.<br>NOTICE is used to address practices not related to personal injury. |
| NOTE | Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration. |

# REVISION LOG

| Version Num. | Date | Purpose of Revision |
|---|---|---|
| V-1.0 | 2024/10/13 | This issue is the first official release. |
| V-1.1 | 2024/12/27 | Added Bluetooth APP description |
| | | |
| | | |
| | | |

# Contents

# 1 Information

## 1.1 Validity

This document is valid for: SK12V314PH Rechargeable Lithium battery. When transporting, storing, installing, operating and maintaining the equipment, please read this manual first and strictly follow all safety precautions marked on the equipment and in the manual.

## 1.2 Safety

### Statement

Before installing, operating, and maintaining the equipment, read this document and observe all the safety instructions on the equipment and in this document.

The "NOTICE", "WARNING", and "DANGER" statements in this document do not cover all the safety instructions. They are only supplements to the safety instructions. SOK will not be liable for any consequence caused by the violation of general safety requirements or design, production, and usage safety standards.

Ensure that the equipment is used in environments that meet its design specifications. Otherwise, the equipment may become faulty, and the resulting equipment malfunction, component damage, personal injuries, or property damage are not covered under the warranty.

Follow local laws and regulations when installing, operating, or maintaining the equipment. The safety instructions in this document are only supplements to local laws and regulations.

SOK will not be liable for any consequences of the following circumstances:

- Damage caused during shipping or mishandling of the Product
- Damage due to improper installation: loose terminal connections, under-sized cabling, incorrect series (cannot be used in series) or parallel connections, reverse polarity connections.
- Environmental damage such as inappropriate storage conditions as defined by the Manufacturer, exposure to extreme hot or cold temperatures, fire or freezing, or water damage,

impact, or collision

- Damage due to improper operation or maintenance such as under- or over-charging the Product, cold temperature charging, lack of cleaning resulting in corroded terminal connections or build-up of dirt, debris, organic matter, fossil fuels, or chemicals on the Product casing
- Product that has been opened, modified, or tampered with Tampering or removal of manufacture date codes.
- Product that was used for applications other than which it was designed and intended for by the Manufacturer

## Emergency treatment measure

If a battery leaks, protect the skin or eyes from the leaking liquid. If the skin or eyes come in contact with the leaking liquid, wash it immediately with clean water and go to the hospital for medical treatment.

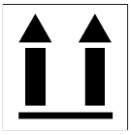
- **Gas Inhalation**: Evacuate the people in the contaminated area and go to the hospital for medical treatment.
- **Eye Contact**: Flush your eye with clean and flowing water for 15 min, and go to the hospital for medical treatment.
- **Skin Contact**: Thoroughly rinse the exposed area with soap and water to be sure no chemical or soap is left on them, and go to the hospital for medical treatment.
- **Ingestion**: Induce vomiting, and go to the hospital for medical treatment.

## Support

If you have technical questions about the Product, please contact the place of purchase or SOK Battery directly at techsupport sales@sokbattery.com

# 1.3 Symbol Description

**Symbols on products label**

| Label | Definition |
|---|---|
|  | Do not expose the battery to direct sunlight, rain and snow |
|  | Maintain upward storage/transportation |
|  | Handle with care |
|  | A maximum of 5 layers are stacked |
|  | Pay attention to the positive and negative battery terminals |
|  | Grounding point |
| UN38.3 | The certificate label for UN38.3 |
|  | Beware of electrical shock |

## 1.4 Abbreviation Description

| Abbreviation | Definition |
|---|---|
| Battery | Single SK12V314PH rechargeable lithium iron phosphate battery pack including cells, BMS and enclosure etc. |
| BMS | Full name: Battery management system<br>Unit to ensure lithium cells' safety and display information or control the battery work mode. |
| SOC | Full name: State of Charge<br>SOC is defined as the ratio of the remaining capacity to the battery capacity. |
| SOH | Full name: State of health<br>The ratio of the current battery capacity to the new battery capacity reflects the remaining life and performance of the battery. |

# 2 Product introduction

## 2.1 Features Description

The SK12V314PH battery is designed for PV/Marine systems. It has a stable and reliable BMS management system and user-friendly Bluetooth function. Has the following features:

- Gas Aerosol Fireproof: Equipped with a gas aerosol fire suppression system for enhanced safety, quickly containing potential fire hazards.
- CAN Communication with Victron Inverter: Supports CAN protocol, ensuring seamless communication and integration with Victron inverters.
- Self-Heating: Buil in self-heating functionality allows for reliable operation in low-temperatu re environments, perfect for installations in colder climates.

- IP67 Waterproof & Dustproof: Designed with IP67 protection, offering excellent water and dust resistance for extended durability in outdoor and harsh environments.
- 8000+ Cycle Life: Delivers a long lifespan with over 8000 charge cycles, ensuring sustained performance over time.
- Bluetooth for iOS and Android Apps: Allows real-me monitoring and control via Bluetooth on both iOS and Android devices .
- ON/OFF Switch: Features an easy-to-use switch for quick power control
- 800A/10s Peak Discharge Current: Supports a peak discharge of 800A for 10 seconds.

## 2.2 Parameters

| Items | SK12V314PH |
|---|---|
| Nominal voltage | 12.8V |
| Nominal capacity | 314Ah |
| Nominal energy | 15.6kWh |
| Max. voltage range | 10~15V |
| Recommended charging voltage | 14V |
| Standard charge current | ≤200A |
| Max. charge current | 250A@3S |
| Standard discharge current | ≤200A |
| Max. discharge current | 260A@60S/500A@15s |
| Standard charge Temperature | 4 ~ 122 ° F (-20 ~ 50° C) |
| Max. charge Temperature | 23~149°F/-5~65°C |
| Standard discharge Temperature | -4 ~ 140 ° F (-20 ~ 60° C) |
| Max. discharge Temperature | -4~158°F/-20~70°C |
| Storage Temperature | 23 ~ 95 ° F (-5 ~ 35 ° C） |
| Communication | RS485 /CAN |
| Max series/parallel number | 10P or 4S |
| Dimension | 17.1*9.4*10.9 inch |

| | |
|---|---|
| Weight | About 30 KG |

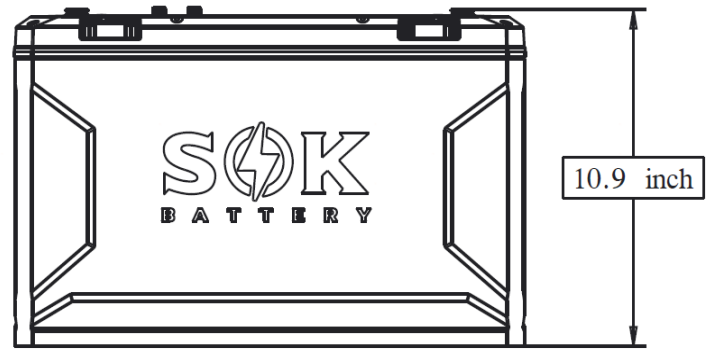
**⚠ WARNING**

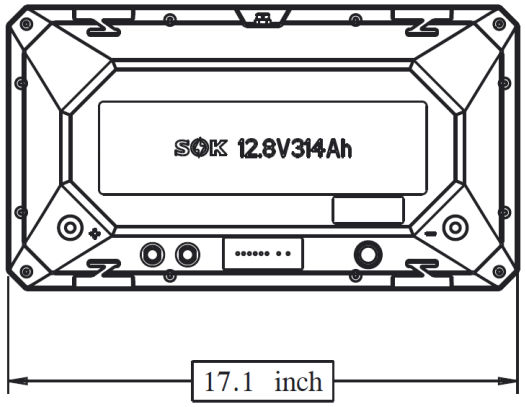
There is a risk of safe if use outside the Max current, Max voltage, Max temperature range.

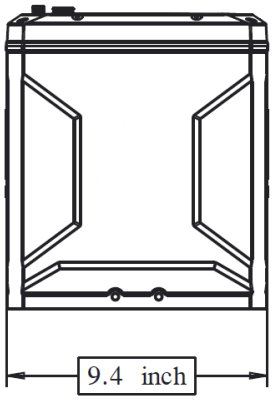
**⚠ CAUTION**

The device supports a maximum of four batteries in series or four batteries in parallel. Batteries cannot be connected in series or parallel at the same time.

## 2.3 Dimension

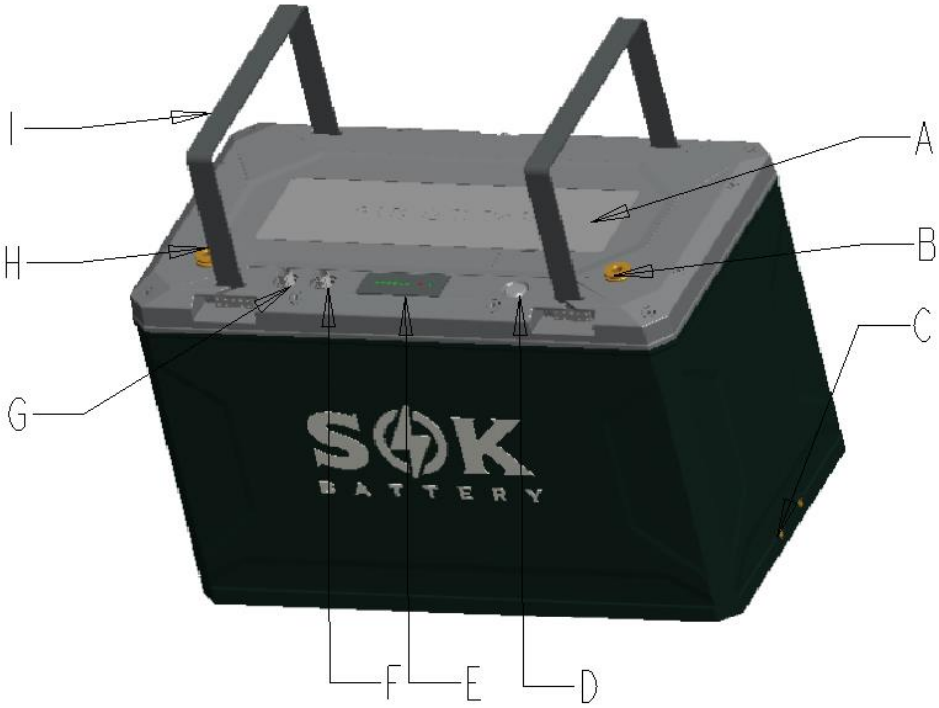


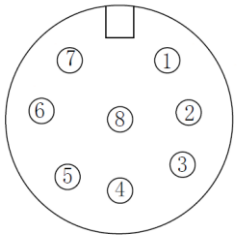

Dimension (L x W x H):
17.1*9.4*10.9 inch
435*240*276 mm

# 2.4 Component description




| No. | Items | Usage description |
|---|---|---|
| A | Cooling aluminum sheet | For BMS heat dissipation |
| B | Negative terminal | Used to connect the inverter/charger |
| C | Mounting hole | For holding batteries |
| D | Power switch | Used to Power on/off battery |
| E | SOC light | Used to show battery real-time SOC |
| F | Link OUT | For internal and external communication |
| G | Link IN | For internal and external communication |
| H | Positive terminal | Used to connect the inverter/charger |
| I | Lifting rope | For handling batteries |

## 2.4.1 Link IN / Link OUT




| Port | Pin No. | Definition | Remarks |
|---|---|---|---|
| Link IN | 1 | CAN-H | Connected inverter |
| | 2 | CAN-L | |
| | 3 | RS485-A | For internal communication |
| | 4 | RS485-B | |
| | 5 | RS485-A1 | For internal communication |
| | 6 | RS485-B1 | |
| | 7 | GND | / |
| | 8 | DI-IN | For BMS identification address |
| Link OUT | 1 | CAN-H | Connected inverter（Use the CAN interface of LINK IN. This interface is reserved） |
| | 2 | CAN-L | |
| | 3 | RS485-A | For internal communication |
| | 4 | RS485-B | |
| | 5 | RS485-A1 | For internal communication |
| | 6 | RS485-B1 | |
| | 7 | GND | / |
| | 8 | DI-OUT | For BMS identification address |

**⚠ CAUTION**

When multiple batteries are used, the Link-OUT of the first battery must be connected to the Link-INT of the next battery.

## 2.4.2 RUN/ALM/SOC

| Mode | Normal/Alarm/Protection | RUN | ALM | LED indicator | | | | | | description |
|---|---|---|---|---|---|---|---|---|---|---|
| | |  |  |  |  |  |  |  |  | |
| Shut down | Dormancy | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | ALL OFF |
| Standby | Normal | FLASH1 | OFF | According to battery state of charge | | | | | | Standby |
| | Warning | FLASH1 | FLASH3 | | | | | | | Low voltage |
| Charge | Normal | ON | OFF | According to battery state of charge (highest SOC LED: FLASH2) | | | | | | All alarm except the over charge |
| | Warning | ON | FLASH3 | | | | | | | |
| | over charge | ON | OFF | ON | ON | ON | ON | ON | ON | |
| | Other protection | OFF | ON | OFF | OFF | OFF | OFF | OFF | OFF | Stop charging |
| Discharge | Normal | FLASH3 | OFF | According to battery state of discharge | | | | | | |
| | Warning | FLASH3 | FLASH3 | | | | | | | |
| | over discharge | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | Stop discharging |
| | Other protection | OFF | ON | OFF | OFF | OFF | OFF | OFF | OFF | Stop discharging |
| Lose effectiveness | | OFF | ON | OFF | OFF | OFF | OFF | OFF | OFF | Stop charging/discharging |

| FLASH Type | ON | OFF |
|---|---|---|
| FLASH1 | 0.25S | 3.75S |
| FLASH2 | 0.5S | 0.5S |
| FLASH3 | 0.5S | 1.5S |

# 3 Installation introduction

Please strictly follow the local safety regulations and related operating procedures.

## 3.1 Installation environment

The operating environment shall meet the following requirements:

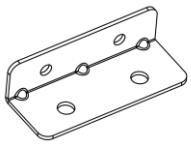
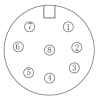
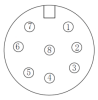
| Category | Description |
|---|---|
| Temperature | -20℃-60℃(maximum operating range) |
| Humidity | 5%RH～90%RH |
| Altitude | 0～4000m（In the 3000m to 4000m environment, the derating is required） |
| Safety requirement | • Do not expose the battery to direct sunlight, rain and snow.<br>• Do not place the battery within children/pet touchable area.<br>• Do not place the battery near heat source and flammable material.<br>• Do not place the battery in a closed place where the ventilation is not available.<br>• Do not drop, deform, impact, cut or spearing with a sharp object.<br>• Do not put heavy things on battery.<br>• Do not disassemble the battery without Manufacturer's permission.<br>• If the product fails, contact the supplier in time. |

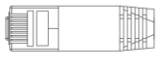
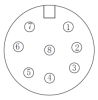
# 3.2 Installation Inspection

## 3.2.1 Unpack precautions

- Step 1. Check if the packing boxes are intact. If the packing case is seriously damaged or wet, please find out the reason and give us feedback.
- Step 2. Open the box.
- Step 3. Check the number of parts on the packing list. If the quantity is different from that on the packing list, please confirm the reason and give us feedback.

## 3.2.2 Checking components

<table>
<tr><th>Type</th><th>Description</th><th>quantity</th></tr>
<tr><td>Battery</td><td>  </td><td>1PCS</td></tr>
<tr><td>Mounting fittings</td><td>Used to secure the left and right sides of the battery<br>  </td><td>2PCS</td></tr>
<tr><td>Screw</td><td>M6 Screw（Use with mounting fittings）</td><td>8PCS</td></tr>
<tr><td>Line of Parallel</td><td>Battery to battery communication cable(500mm)<br> 
<table>
<tr><td>  </td><td colspan="2"></td><td>  </td></tr>
<tr><td>Pin 1</td><td>GND</td><td>GND</td><td>Pin 1</td></tr>
<tr><td>Pin 2</td><td>RS485 B</td><td>RS485 B</td><td>Pin 2</td></tr>
<tr><td>Pin 3</td><td>RS485 A</td><td>RS485 A</td><td>Pin 3</td></tr>
</table></td><td>1PCS</td></tr>
</table>

<table>
<tr><td></td><td><table>
<tr><td>Pin 4</td><td>RS485 B1</td><td>RS485 B1</td><td>Pin 4</td></tr>
<tr><td>Pin 5</td><td>RS485 A1</td><td>RS485 A1</td><td>Pin 5</td></tr>
<tr><td>Pin 6</td><td>/</td><td>/</td><td>Pin 6</td></tr>
<tr><td>Pin 7</td><td>/</td><td>/</td><td>Pin 7</td></tr>
<tr><td>Pin 8</td><td>OUT/IN</td><td>OUT/IN</td><td>Pin 8</td></tr>
</table></td><td></td></tr>
<tr><td>Line of Communication</td><td>Battery to inverter(Victron) communication cable(2000mm)<br>  <table>
<tr><td>  </td><td></td><td>  </td><td></td></tr>
<tr><td>Pin 1</td><td>/</td><td>/</td><td>Pin 1</td></tr>
<tr><td>Pin 2</td><td>/</td><td>/</td><td>Pin 2</td></tr>
<tr><td>Pin 3</td><td>/</td><td>/</td><td>Pin 3</td></tr>
<tr><td>Pin 4</td><td>/</td><td>/</td><td>Pin 4</td></tr>
<tr><td>Pin 5</td><td>/</td><td>/</td><td>Pin 5</td></tr>
<tr><td>Pin 6</td><td>/</td><td>CANOL</td><td>Pin 6</td></tr>
<tr><td>Pin 7</td><td>CANOH</td><td>CANOH</td><td>Pin 7</td></tr>
<tr><td>Pin 8</td><td>CANOL</td><td>/</td><td>Pin 8</td></tr>
</table></td><td>1PCS</td></tr>
<tr><td>Warranty Card</td><td></td><td>1PCS</td></tr>
<tr><td>Specification</td><td></td><td>1PCS</td></tr>
<tr><td>PACK OQC Report</td><td></td><td>1PCS</td></tr>
</table>

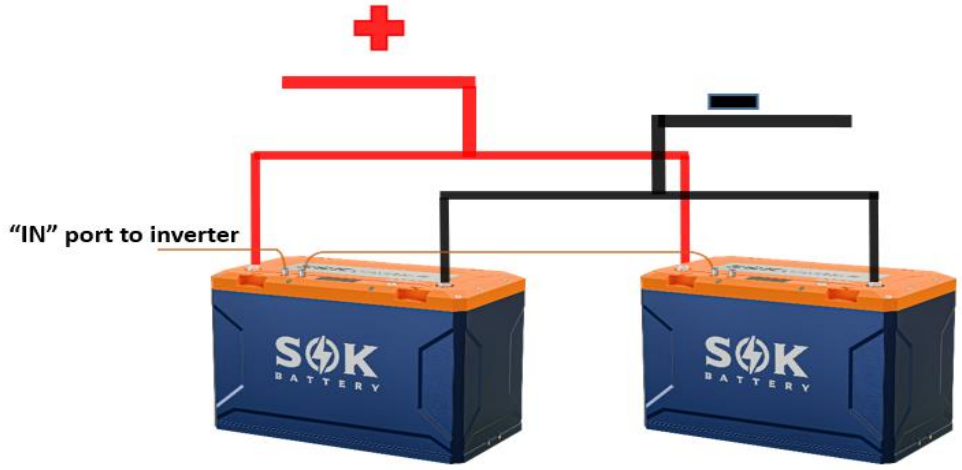
**⚠ CAUTION**

Please check whether the accessories are complete, if there is any problem, please contact the dealer in time

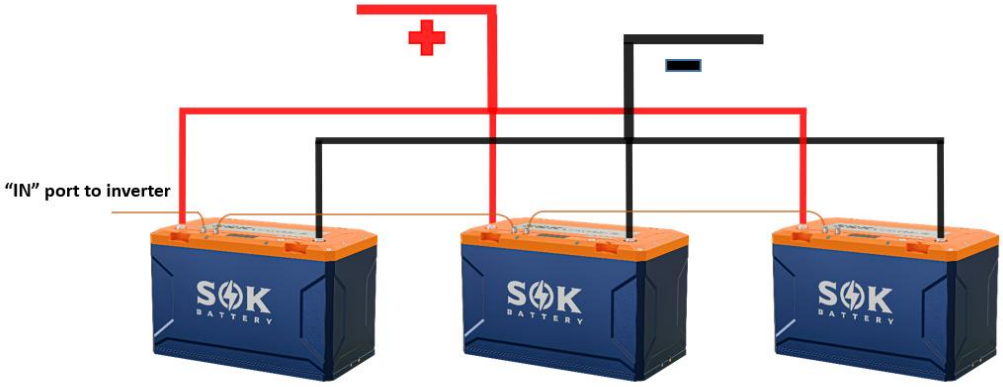
# 3.3 Start Installation

## 3.3.1 Parallel installation（Support communication）

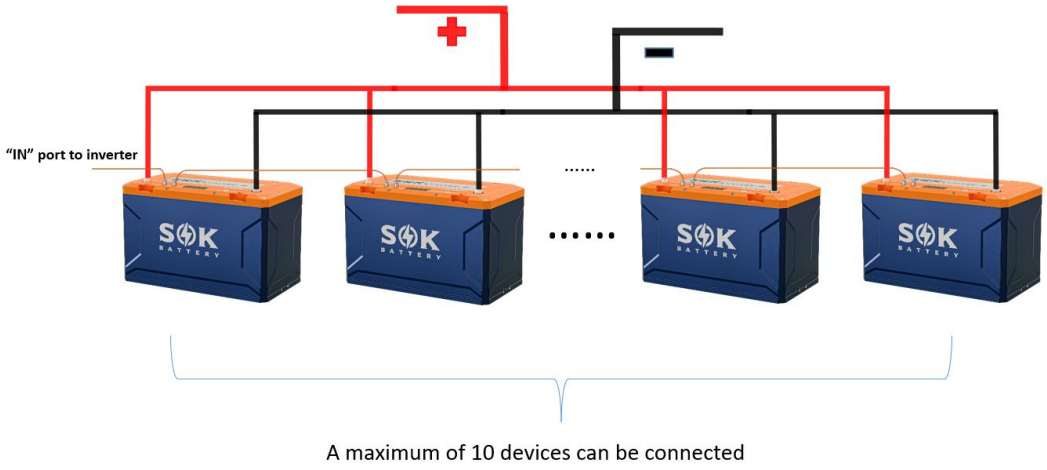
A: Connect 2 batteries (12V 628AH)




B: Connect 3 batteries (12V 942AH)



C: Connect 4 batteries ((12V 314 * N (N≤10)))




## 3.3.2 Series installation （Not Support communication）

A: Connect 2 batteries (24V 314AH)

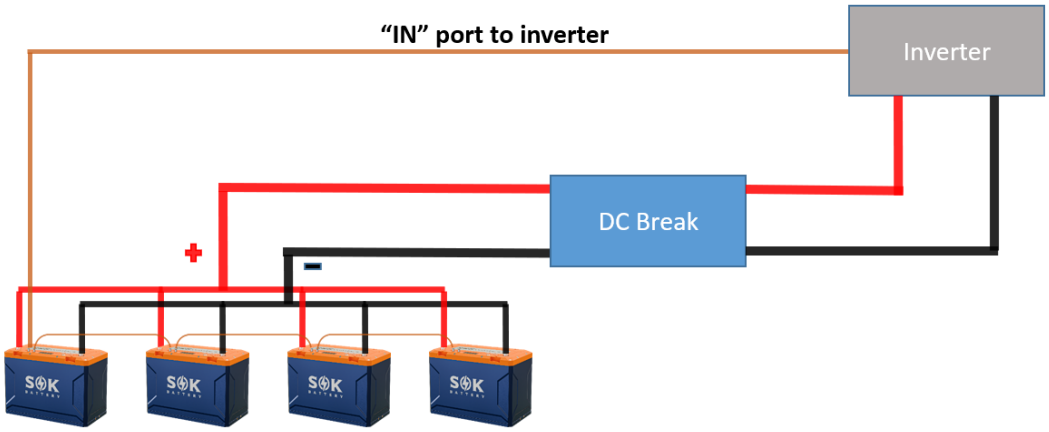
B: Connect 3 batteries (36V 314AH)

C: Connect 4 batteries (48V 314AH) Max 4

**⚠ WARNING**

Only the above three series mode are supported (The number of batteries in series cannot exceed 4). All other operations are illegal and have serious risks (It cannot be used in series and parallel).

## 3.4 Connecting with inverter




**⚠ WARNING**

This connection in this diagram is only for illustration, please follow the Manual suggestions of related devices and operate in accordance with locally applicable connection requirements, standards, and directives.

- The maximum communication cable length is required to be less than 15m between inverter/charge and battery.
- The maximum power cable length is suggested to be less than 10m between inverter/charge and battery (Screw fixing torque value range 9-11 N.M).
- When the battery is used in parallel, use a bus bar to connect the battery to the inverter.
- Connecting Master battery Link IN port with inverter CAN communication port communication cable.
- Connecting battery OUTPUT (+) with inverter battery INPUT (+), battery OUTPUT (-) with inverter battery INPUT (-), choose the corresponding power cable pair and wiring them correctly.
- Confirm inverter AC input and PV input is disconnected before wiring connection, and the DC/ signal switch of inverter/charger is in off status.
- The maximum permissible current of each power cable and terminal is 200A.
- Please use corresponding number of power cable pairs according to the field configuration and local connection requirements, standards, and directives.

# 3.5 Commissioning

## 3.5.1 Power on

**Step 1：** Make sure the harness is connected correctly.

**Step 2：** Hold down the switch button of the battery for 3s to start the battery.

**Step 3：** Then turn on the inverter/charger isolator.

**Step 4：** Finish the setting on inverter/charger or any other control devices, if everything is correct, you are ready to use.

## 3.5.2 Switch off battery

**Step 1：** Turn off the inverter.

**Step 2：** Hold down the switch button on the battery for 3s to turn off the battery.

# 3.6 APP Inspection

SK12V314PH can read the relevant data through the dedicated Bluetooth APP. The APP can be downloaded in the following two ways.

Method 1: Download directly by scanning the QR code.

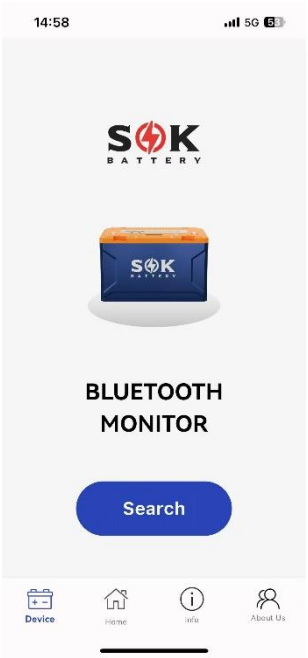
iOS system

Android system

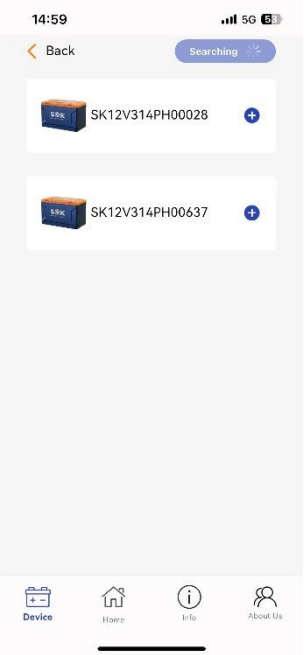
Method 2: Apple users can search for "**SOK Battery**" directly in the App Store. Android users search for "**SOK Battery**" directly in the Google Play (If the search is incorrect, you can search for "**APP: SOK Battery**").

## 3.6.1 Connecting battery

**Step 1**：Open the installed APP, and the page is displayed as follows:



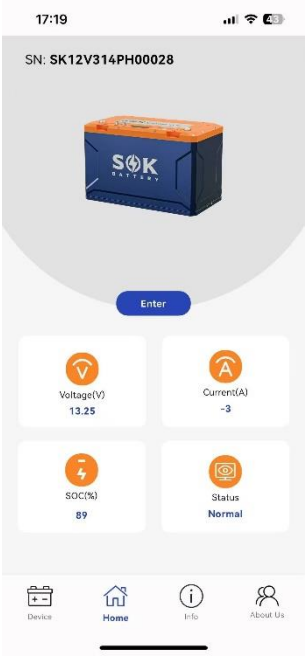
**Step 2：** Click the "Search" button on the main page. If the device is not detected, please check whether the Bluetooth of the mobile phone is turned on or whether the battery is power-on state, and it is within the Bluetooth search range. After the battery is found, the following page is displayed:




**Step 3：** Click the "+" button to the right of the battery information. The battery is connected successfully.

## 3.6.2 Battery information display

After the battery is successfully connected, the home page is displayed. The home page displays the following information: Battery voltage information, Battery current information (the negative number is discharge current and the positive number is charge current), Battery SOC information, Battery status information (including normal, heating and fault status). The page is displayed as follows:



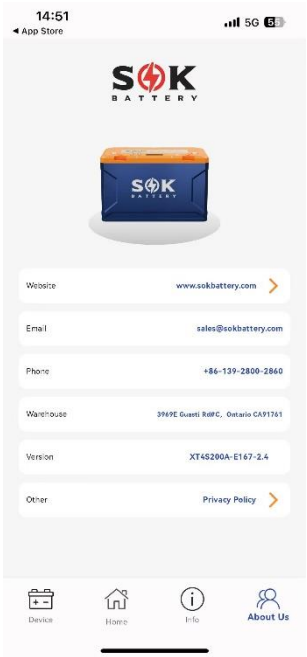

After clicking the "Enter" button in the home page, you can view more detailed battery data, including detailed cell voltage and temperature information. The page is displayed as follows:


The "info" page displays battery alarm information and parameter information.

| **Abbreviation** | **Full name** | | **Abbreviation** | **Full name** |
|---|---|---|---|---|
| OCV | Over cell voltage | | DOT | Discharging over temperature |
| UCV | Under cell voltage | | CUT | Charging under temperature |
| OTV | Over total voltage | | DUT | Discharging under temperature |

| | | | | |
|---|---|---|---|---|
| UTV | Under total voltage | | EOT | Environment over temperature |
| OC | Over Charge current | | EUT | Environment under temperature |
| OD | Over Charge current | | MOT | MOS over temperature |
| COT | Charging over temperature | | SC | short-circuit |


The "About Us" page contains the contact information of the manufacturer and the version information of the product, you can contact us if you have any questions.



# 4 Troubleshooting

| Items | Solution |
|---|---|
| Unable to start | 1：Press and hold the Start button and release it after 5 seconds.<br>2：Use a charger or inverter to provide 12~12.4V voltage. |
| Unable to charge | 1: Check whether the battery has a charging fault, which can be observed through the Bluetooth APP. After the charging fault is eliminated, try charging again.<br>2：Check that the power lines and communication lines of the battery and the inverter/charger are correctly connected.<br>3：Check whether the inverter or charger is faulty. |
| Unable to discharge | 1: Check whether the battery has a discharging fault, which can be observed through the Bluetooth APP. After the discharging fault is eliminated, try discharging again.<br>2：Check that the power lines and communication lines of the battery and the inverter/charger are correctly connected.<br>3：Check whether the inverter or charger is faulty. |
| High/Low temperature | 1. Let the battery stand for a period of time and observe whether the temperature returns to normal.<br>2. Avoid continuous full charging and discharging.<br>3. Reduce battery power. |
| High current | 1: Use more batteries for parallel use.<br>2: Set the correct inverter parameters. |

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| Communication fail | 1. Check the communication cable type is correct and is contacted well.<br>2. Check the inverter protocol related setting is correct.<br>3. Check both battery and inverter are working properly. |
| Long time charge | After the SOC is 100%, the battery can be charged for a long time (> 30min). This is normal because the product itself may have a capacity of > 314AH. |
| The inverter displays an incorrect number of batteries | Check whether the communication cable of the battery is connected properly, and the OUT of the previous battery is connected to the IN of the next battery. |
| After the above actions, the battery still cannot be used. Please contact the supplier | |