Three-phase AC coupled Battery Inverter (PCS)

Quick Installation Guide

ELT-12

Important Safety Information

IMPORTANT SAFETY INSTRUCTIONS. SAVE THESE INSTRUCTIONS. This guide contains important instructions that you must follow during installation and maintenance of the PCS. Failing to follow any of these instructions may void the warranty. Follow all of the instructions in this manual. These instructions are key to the installation and maintenance of the APstorage PCS. These instructions are not meant to be a complete explanation of how to design and install APstorage PCSs. All installations must comply with national and local electrical codes and standards.

⚠️ DANGER: Risk of electricshock. Risk of fire.

    1. Only qualified professionals should install and/or replace the APstorage PCS.

    2. Perform all electrical installations in accordance with local codes.

    3. To reduce risk of burns, do not touch the body of the PCS.

⚠️ WARNING:

    1. Do NOT attempt to repair the APstorage PCS. If it shows abnormal performance, Contact APsystems Customer Support to obtain adequate support. Damaging or opening the APstorage PCS will void the warranty.

    2. These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that specified in the operating instructions".

📋 NOTE:

    Before installing or using the APstorage PCS, please read all instructions and cautionary markings in the technical documents and on the APstorage PCS.

When installing the PCS cables and accessories, adhere to the following:

▶ If the PCS is installed outside, it should be protected under shelter from direct sunlight or bad Weather conditions (like snow, rain, lightning, etc). Fully shielded installation locations are preferred.

▶ Do not install PCS in a confined space with no ventilation.

▶ Do not drill holes in the casing at any location, otherwise we will not provide warranty.

▶ Please ensure each DC cable's length within 3 meters.

▶ Do not loosen the screw to the end when removing wires, otherwise the terminal may be damaged.

▶ Make sure to connect the live wire to L1/L2/L3, connect the neutral wire to N, otherwise the precision of the CT will be affected.

Product labels

⚡	Caution, risk of electric shock.
⚠️	NOTICE, danger! This device directly connected with electricity generators and public grid.
♨️	Caution, hot surface.
⚡ ⏱5min	After the inverter is turned off, wait for at least 5 minutes before opening the inverter or touching live parts.
📖	Refer to the operating instructions.
♻️	Products shall not be disposed as household waste.
CE	Declaration of Conformity.

1 Declaration

1. The contents of this quick installation guide may change due to product updates and other reasons.
2. Unless otherwise stated, this guide does not replace the safety precautions in the data sheet or user manual; the contents are for reference only.
3. Please read this guide and the user manual carefully before installation to understand the relevant information and precautions regarding the product.
4. Please check that the model of the delivered product is correct, that all accessories are complete, and that there is no damage to the appearance. If any damage or missing accessories are found, please contact the manufacturer.
5. Only qualified professionals should install or replace the APstorage PCS, and all electrical installations must comply with local regulations. When performing installations and other operations, please wear personal protective equipment, use insulated tools, and wear anti-static equipment to prevent static damage to the PCS. The manufacturer is not responsible for any damage to the PCS caused by improper handling resulting in static electricity.
6. All operations must strictly follow the instructions in the user manual and this guide. The manufacturer is not responsible for any damage caused by improper usage.
7. All wiring must use copper cables.

2 Pack List

Inspect the equipment before installation. Please ensure that the packaging is not damaged. The package should contain the items shown in the image below:

PCS x1	Wall mounted Bracket x1	Expansion screw (M8x70) x4	Fixing screw (M6x22) x1	Magnetic ring x1
CT x6	Quick Installation Guide x1	AP Dongle x1	DC terminals x2	
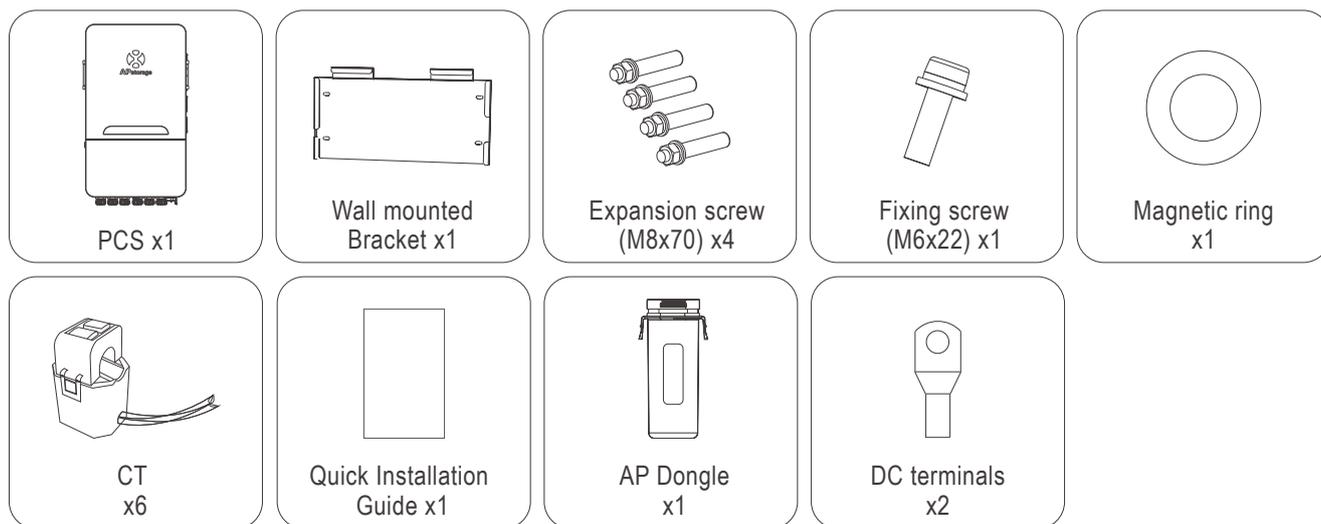
NOTE:
You will need to purchase a junction box for connecting batteries in parallel. Junction box requirement: rated current for each connection $\geqq$ 240A.

NOTE:
If you need to connect a generator, you will need to purchase an additional generator-related function CT ring.

3 Product Introduction

474mm 275mm 818mm

A: LED   B: On/Off Button

① BAT+ /BAT- Terminals
② Communication Terminals
③ CT Terminals
④ GRID Terminals
⑤ Off-Grid Input/Gen Terminals
⑥ LOAD Terminals
⑦ ATS Terminals
⑧ Ground Terminals
⑨ DO1/DO2/DO3 Terminals/
   RSD Terminals
⑩ AP Dongle
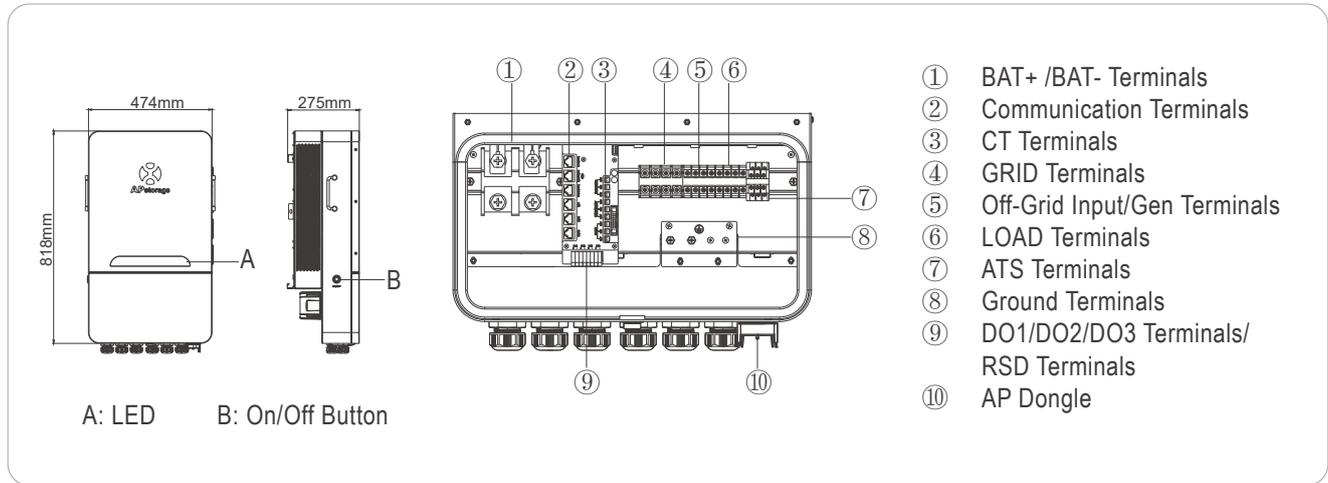
COM/DO/ATS Introduction

ATS Connection

N1 (Reserved, no wiring needed), N2 is the ATS external contactor interface (for use with generators), and NO3 is the ATS external contactor interface (for use with off-grid PV). All interfaces must be connected to external contactors to enable functionality.

If you need to connect the generator side contactor, you can refer to the corresponding user manual.
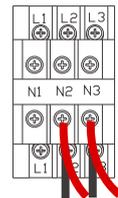
DO Connection

The energy storage inverter PCS integrates multifunctional dry contacts (DO1, DO2, and DO3). The dry contacts can be set to one of the following functions: generator control and load control. The APstorage system supports third-party generators. In the event of a grid disconnection or other conditions, APstorage can automatically control the generator to start, serving as a backup power source for the battery and load.
RSD (Rapid Shutdown System): It can connect to an external switch for quickly shutting down the energy storage system, protecting the PCS.
For more information on the above two functions, please refer to the relevant user manual or contact the APstorage technical support team.
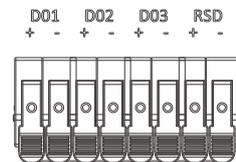
NOTE: Load control function reserved.

COM Connection

The configuration of each network port is as follows:

BMS RS485/CAN	LAN	RS485
8: 485_B	8: GND	8: RS485
7: 485_A	7: NC	7: RS485
6: NC	6: RD-	6: NC
5: CAN_L	5: CT	5: NC
4: CAN_H	4: CT	4: NC
3: NC	3: RD+	3: NC
2: NC	2: TD-	2: NC
1: NC	1: TD+	1: NC
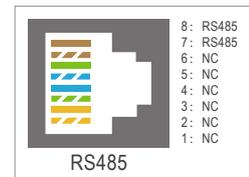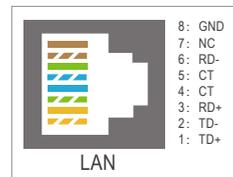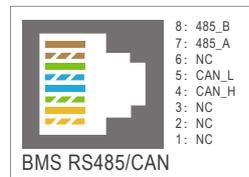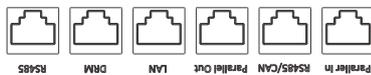
NOTE: The Parallel In/Parallel Out/DRM feature is temporarily unavailable.

4 Wiring Diagram

Diagram for Australia, New Zealand, South Africa, etc.
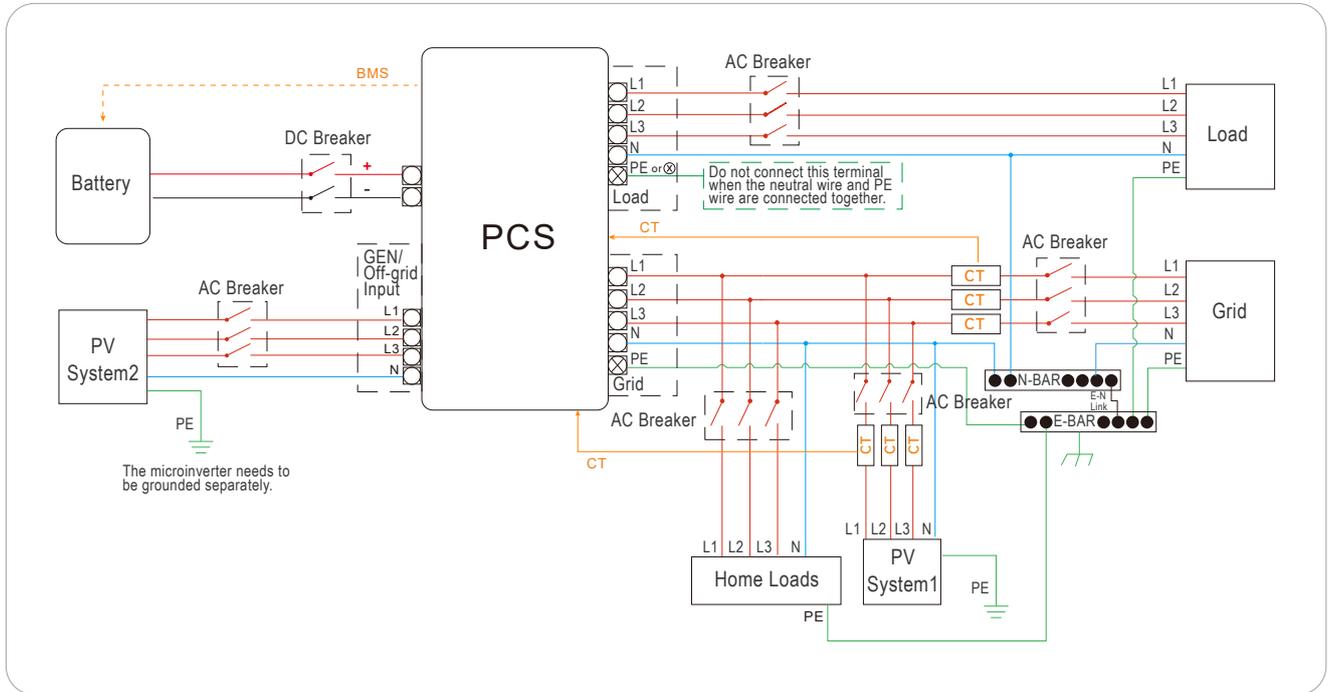
Diagram for Other Countries.

When the PCS is working in backup mode, neutral and PE on the backup side are connected via the internal relay. Also,this internal relay will be open when the PCS is working in grid tied mode.
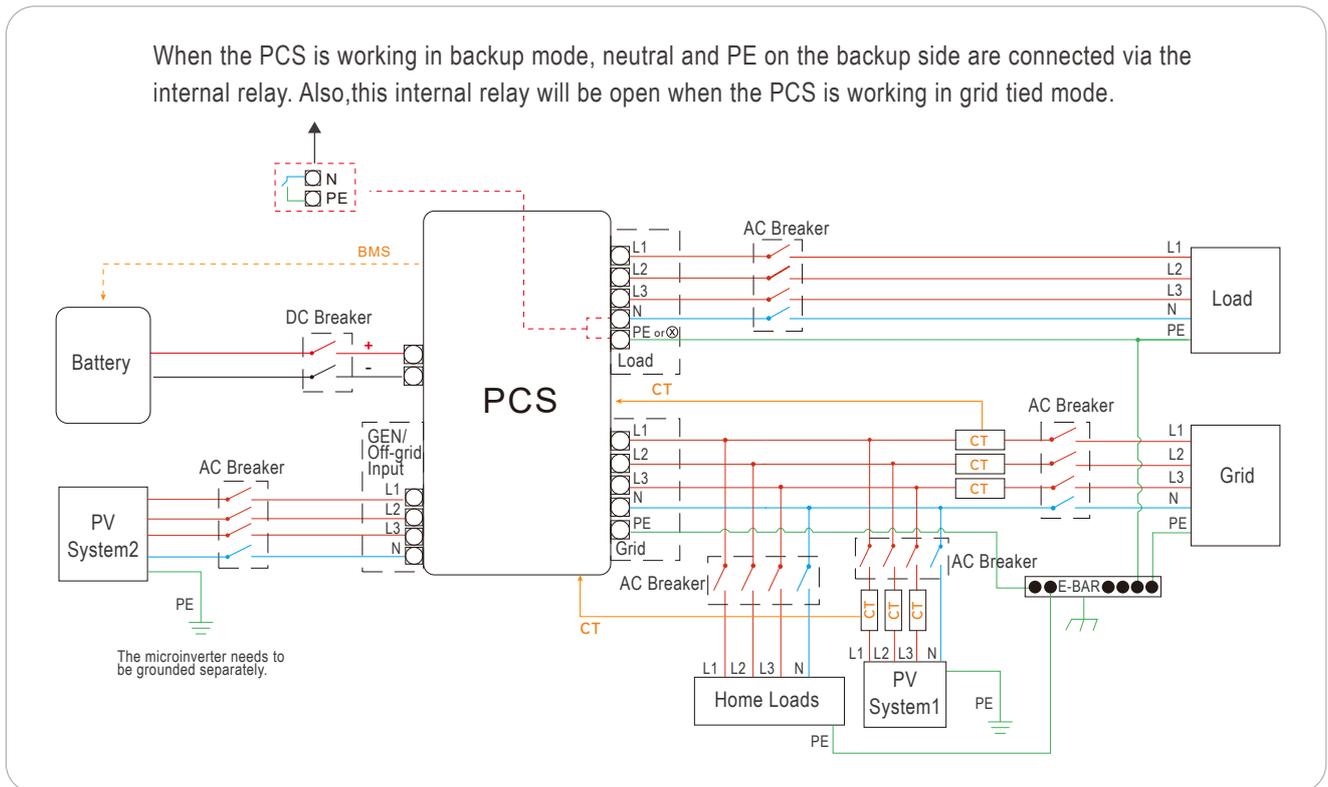
4 Wiring Diagram
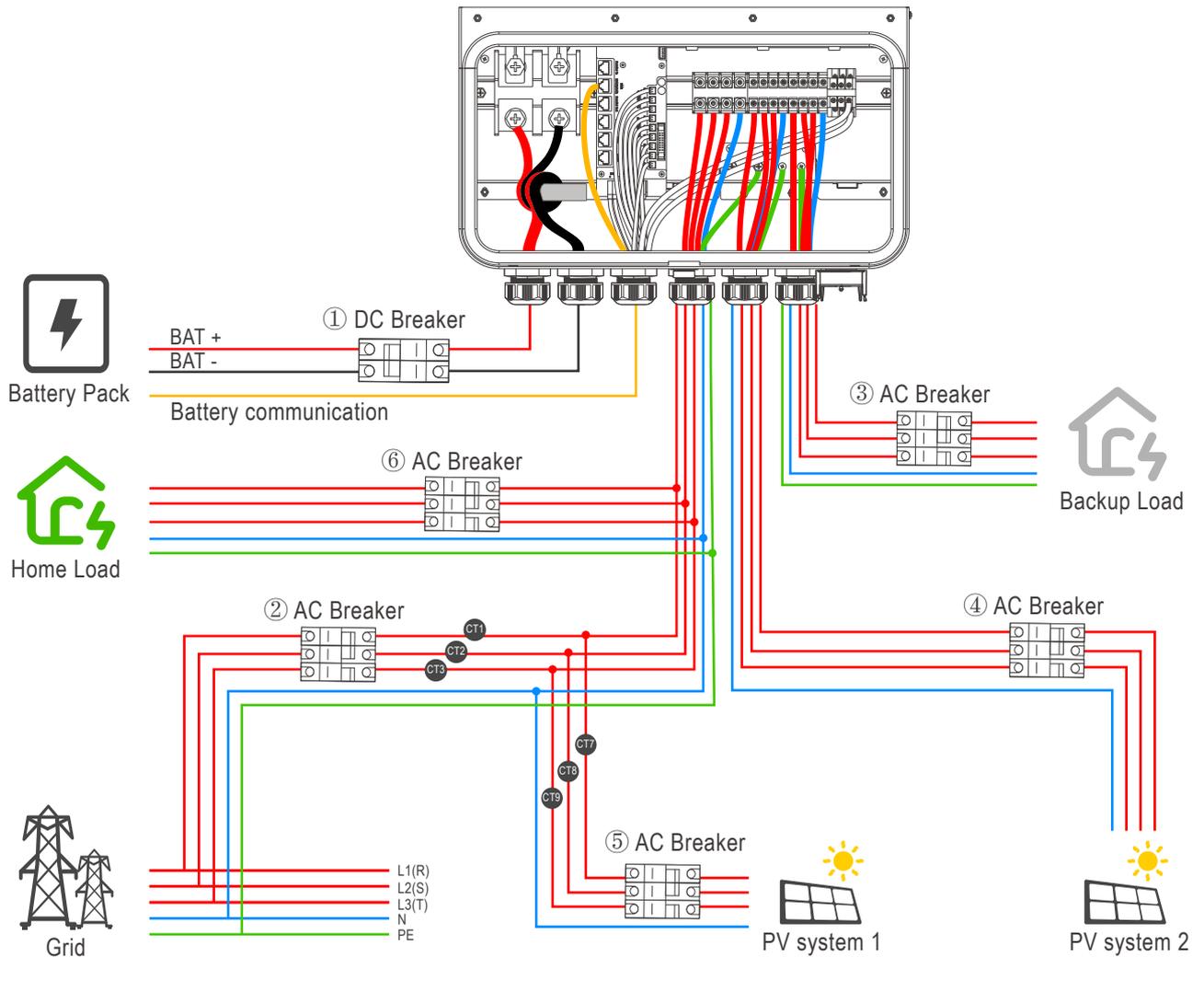
━━━ DC +	① Battery Breaker: 300A DC Breaker
━━━ DC -	② Main Breaker : 63A AC Breaker
━━━ wire L	③ Backup Breaker: 32A AC Breaker
━━━ wire N	④ PV Breaker 2: Depends on PV system 2
━━━ wire PE	⑤ PV Breaker 1: Depends on PV system 1
	⑥ Grid Load Breaker: Depends on Grid Load

5 Installation instructions

Wiring Terminals and Cables Requirements Description

When wiring, please use the following specifications for wiring terminals and cables (the DC side wiring terminals are included in the accessories).
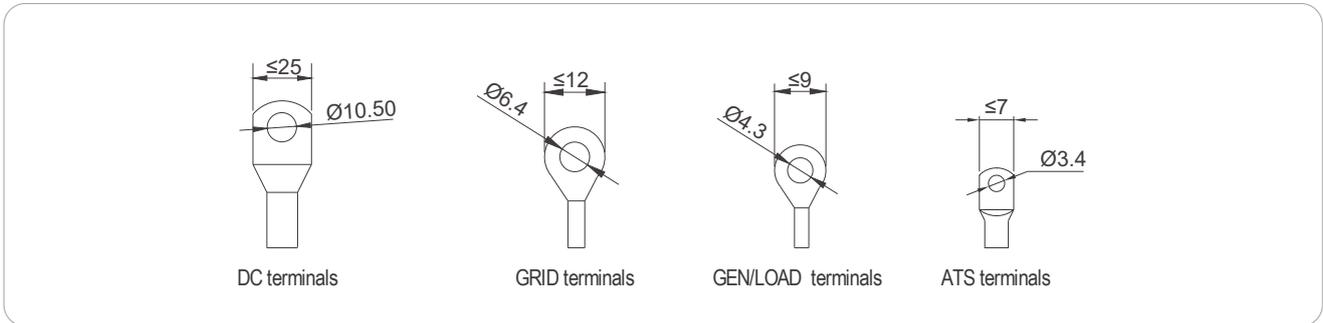
	Model	Cable(mm²)	Torque value
DC Cable	ELT-12	70	10Nm
Grid Cable	ELT-12	6	2.5Nm
GEN/LOAD Cable	ELT-12	4	1.2Nm
ATS Cable	ELT-12	0.5	1.2Nm

Battery Inputs: "Use No. 90°C Copper Wire only";
AC Outputs: "Use No. 90°C Copper Wire only";
DC Ground: "Use No. 90°C Copper Wire only";
AC Ground: "Use No. 90°C Copper Wire only".

5.1 PCS installed on the wall
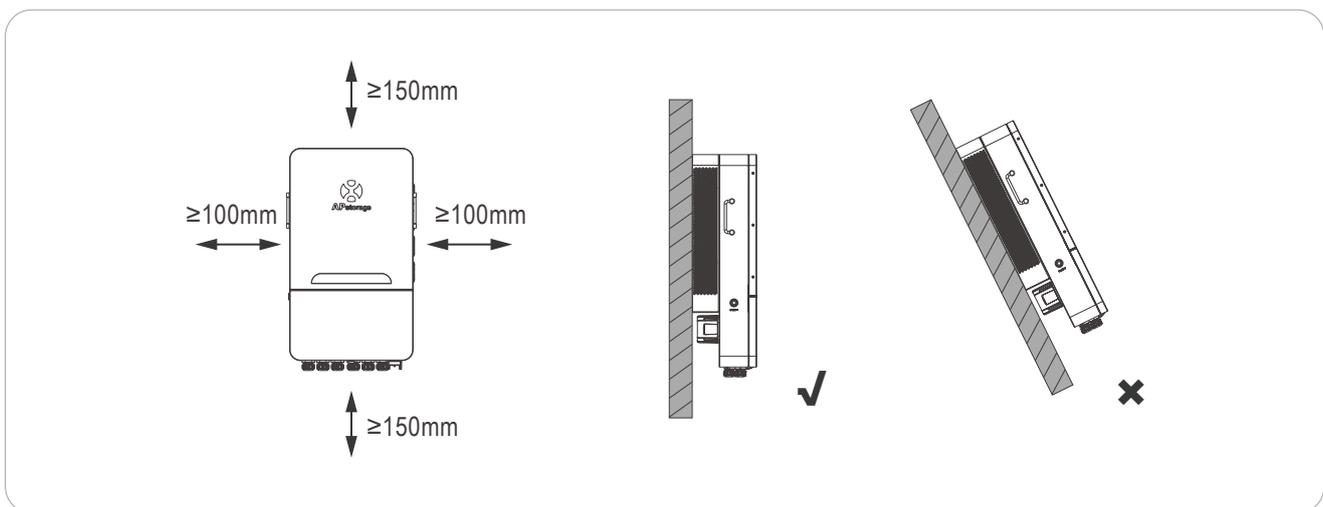
5 Installation instructions

STEP 1

Mark the holes position on the wall and drill holes according to wall type and expansion screws type. The Configured expansion screw is drilled with a diameter of 12mm(0.5") and a depth of 50-55mm(1.9-2.2").

STEP 2

Put the expansion screws into the holes on the wall. Use a wrench to tighten the hex nuts, so that the expansion screws sleeve are fully expanded. Then remove the hex nuts. Hang the wall mounting bracket into the expansion screws, and use the hex nuts to fix it firmly. Make sure that the wall mounting bracket is horizontal after installation.

STEP 3

Lift the PCS to hang it into the wall mounting bracket, and fix the PCS on wall mounting bracket with the M6×22mm screw.
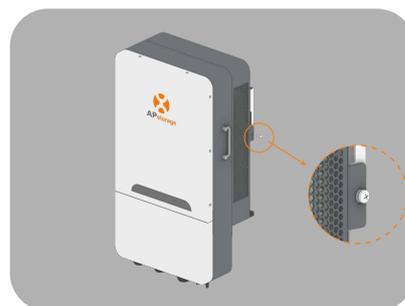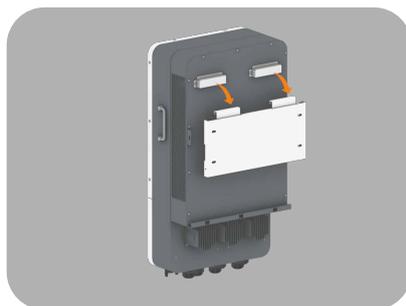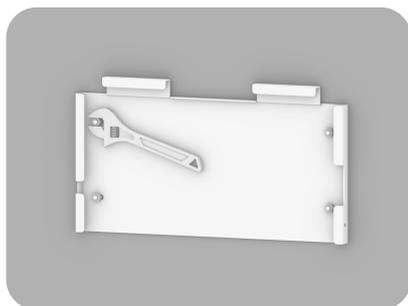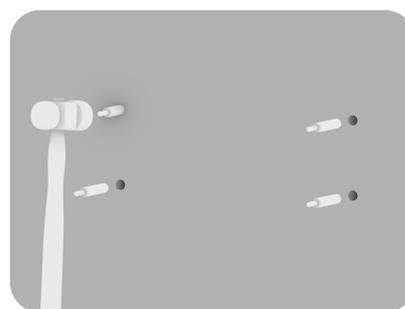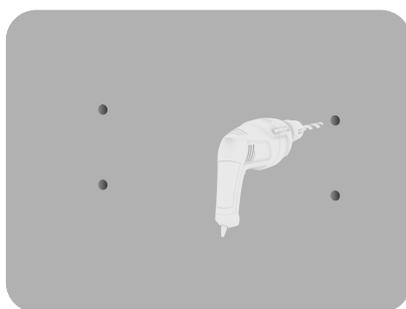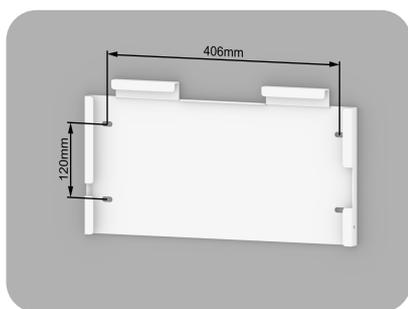
WARNING:

Do not drill holes in the casing at any location, otherwise we will not provide warranty.

5 Installation instructions

5.2 Electrical Wiring

STEP 1 Remove the bottom cover

Before connecting the wires, please unscrew the screws on the bottom cover, then open the buckle on the bottom cover, and remove the bottom cover.
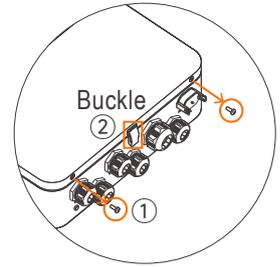
STEP 2 Battery Wiring

For battery wiring BAT+, please use red or orange cables, and for BAT -, please use black cables. As shown in the diagram, wrap them once on the magnetic ring and thread them out from the corresponding cable connector below the casing.

Please use a Phillips screwdriver with a suitable torque of 10Nm.

Please insert the appropriate network cable into the battery communication port and BMS RS485/CAN interface on the PCS according to the battery configuration, and thread the network cable out of the COM cable connector below.

Pass the battery power cable through the magnetic ring and wrap it around the magnetic ring one times.

BAT+ BAT- Battery communication
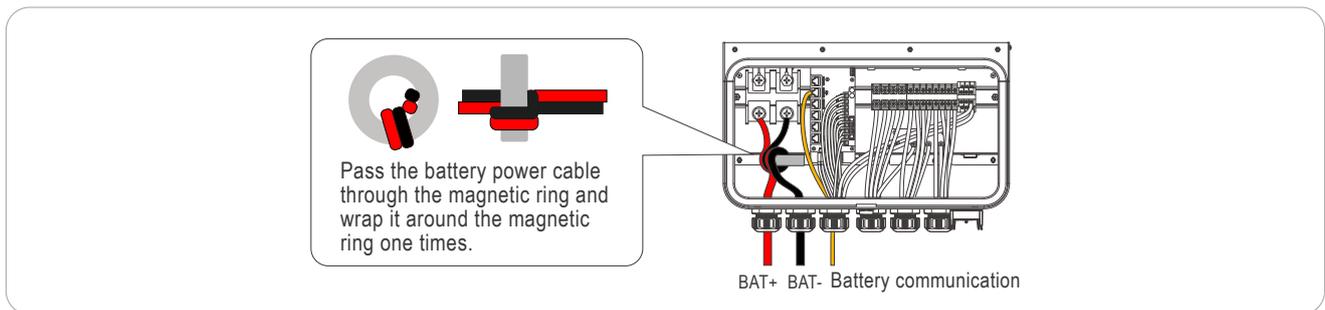
NOTE: Ensure that the polarity of the battery and PCS are correctly connected, otherwise PCS may be damaged.

NOTE: APstorage ELS/ELT series PCS are DC/AC isolated, so the battery ground should not be connected to AC ground. Leave battery ground point floating could ensure the system working safely and stably.

STEP 3 AC Wiring

The LOAD/GEN terminal uses a cross screwdriver with a suitable torque of 1.2Nm; The GRID terminal uses a cross screwdriver with a suitable torque of 2.5Nm.

Please thread the cables of LOAD/GEN/GRID separately through the cable connectors marked with LOAD/GEN/GRID below.
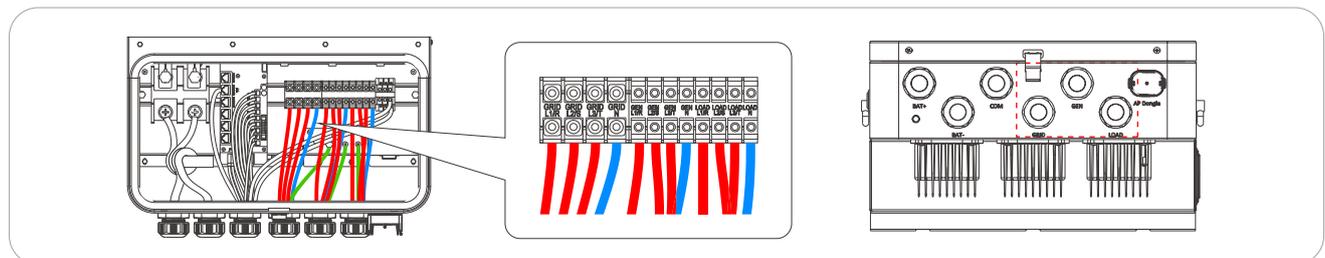
NOTE: Please ensure that the N and L wires are connected accurately.

STEP 4 Grounding Wiring

A: For GRID AC connection
B: For GEN AC connection
C: For LOAD AC connection

A B C
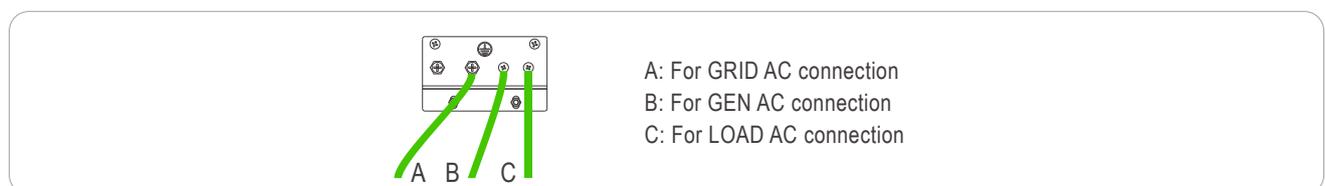
NOTE: A Torque value is 2.5Nm; B/C Torque value is 1.2Nm.

5 Installation instructions

STEP 5 CT Wiring

The CT ring wiring is shown in the following figure,
where CT1/2/3 corresponds to grid L1/2/3 and CT7/8/9 corresponds to L1/2/3 of GRID-PV.

CT4/CT5/CT6: Reserve

The arrows on the CT ring (as shown in the figure) should all point towards PCS.
Please thread the wire of the CT ring through the COM cable connector below.
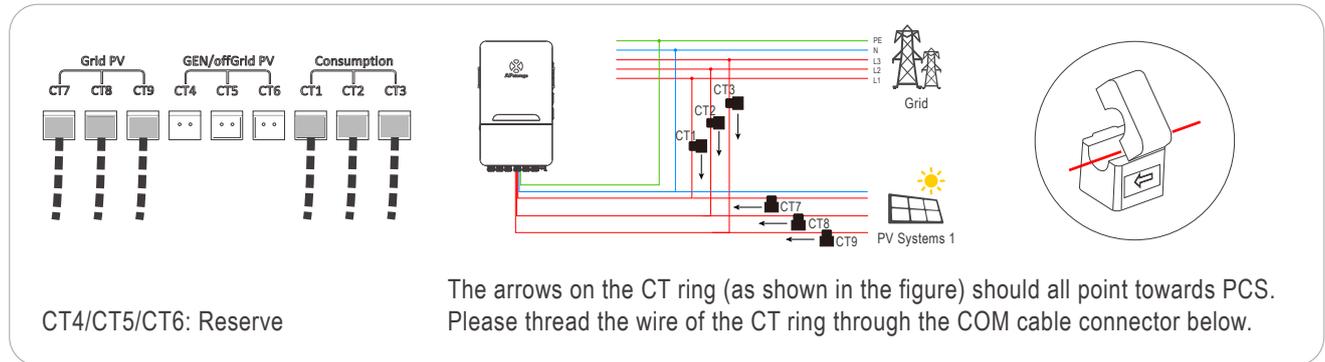
STEP 6 AP Dongle Installation

① Pull out the USB interface protective cover;
② Insert the AP Dongle into the USB interface, and the buckle will make a sound when tightened;
③ After PCS power supply, the operating status can be observed through LED display.

NOTE: When the AP Dongle is powered on normally, the green light remains on. When connected to WIFI, both the green and blue lights will remain on.

NOTE: If Bluetooth is not connected for 5 consecutive minutes, it will automatically turn off. To reactivate the Bluetooth function, please press the corresponding button or plug and unplug to restart.

Restart

STEP 7 Network port wiring

Please use the appropriate network cables for the COM Connection based on your needs, as referenced in Chapter 3. All network cables should be routed out from the COM cable connector at the bottom.

STEP 8 Lower cover installation

After completing all cable connections, please tighten the nuts of all cable connectors.
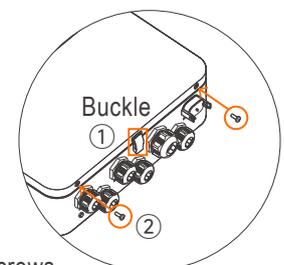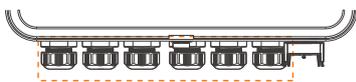
Buckle

After completing all the above steps, please fasten the lower cover buckle first, and then tighten the screws.

After PCS installation is completed, enter the PCS initialization.

6 PCS Initialization

6.1 Start the PCS

6.1.1 Pre-check

Check all Below Steps Before Starting PCS：

① Make sure the PCS is properly mounted to the wall.

② Make sure all the DC wirings and AC wirings are completed.

③ Make sure the CT is connected properly.

④ Make sure the battery is connected properly.

⑤ Make sure all grounded busbar are connected property.

⑥ Make sure the PV system is connected properly.

⑦ Make sure the loads and critical loads are connected property, and the critical loads rating is within nominal rating range.

6.1.2 First Power-On

When the PCS is properly installed and the battery is firmly connected,

① Turn on the DC circuit breaker;

② Press the on/off button;

③ Turn the battery switch to ON to provide power supply to the system；

④ Wait for the On/Off Button on the side of PCS to light up, and then the indicator lights will illuminate.

After the PCS is powered on, the SYSTEM indicator lights become steady ON, the BATTERY, WI-FI and COM indicator light flashes every 5 seconds, and the AP Dongle indicator light turns green.

6.2 Initialize the PCS

QR code for downloading the app：

6.2.1 Scan the QR code to download and install the EMA Manager app.

6.2.2 Log in to the app and tap Local access. Select APstorage to start the initialization process.
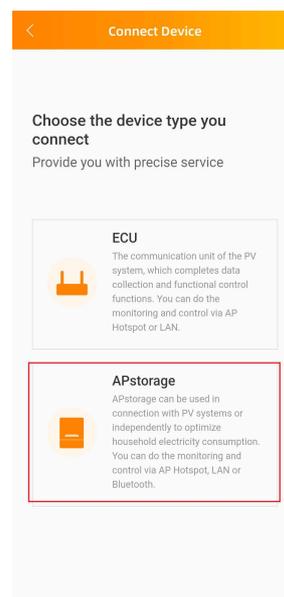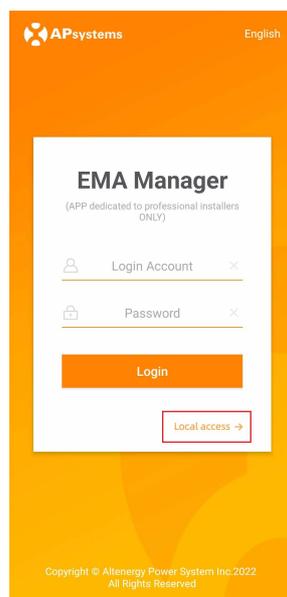
6.2.3 Connect the PCS

Tap Connect next to Bluetooth connection supported based on the device model. On the page that appears, select the UID of the PCS. After the PCS is successfully connected, the message "Succeed to connect with the device via bluetooth" is displayed. After that, the SYSTEM indicator light turns OFF and the FAULT indicator light becomes steady red.
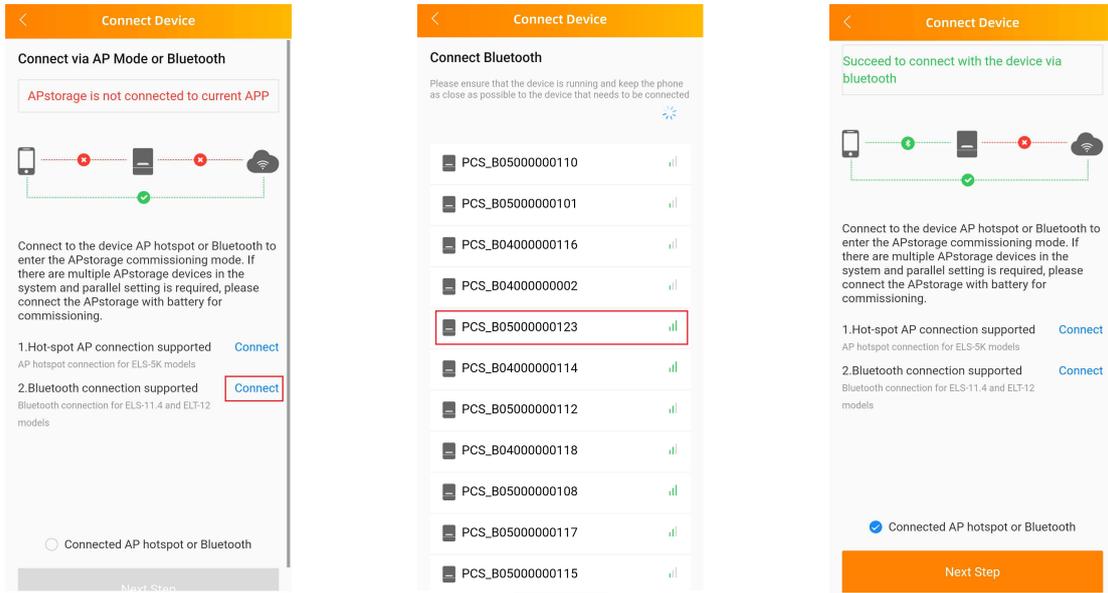
Tap Next Step.

6.2.4 Basic Configurations

Tap **Basic Configuration**. On the page that appears, perform the network configuration. In the **Network Connection** field, select the Wi-Fi that you want to connect to, enter the password, and tap **Connect to Network**. After successful connection, the icon between the PCS and the cloud changes from ✖ in red to ✔ in green. The AP Dongle indicator light turns blue.
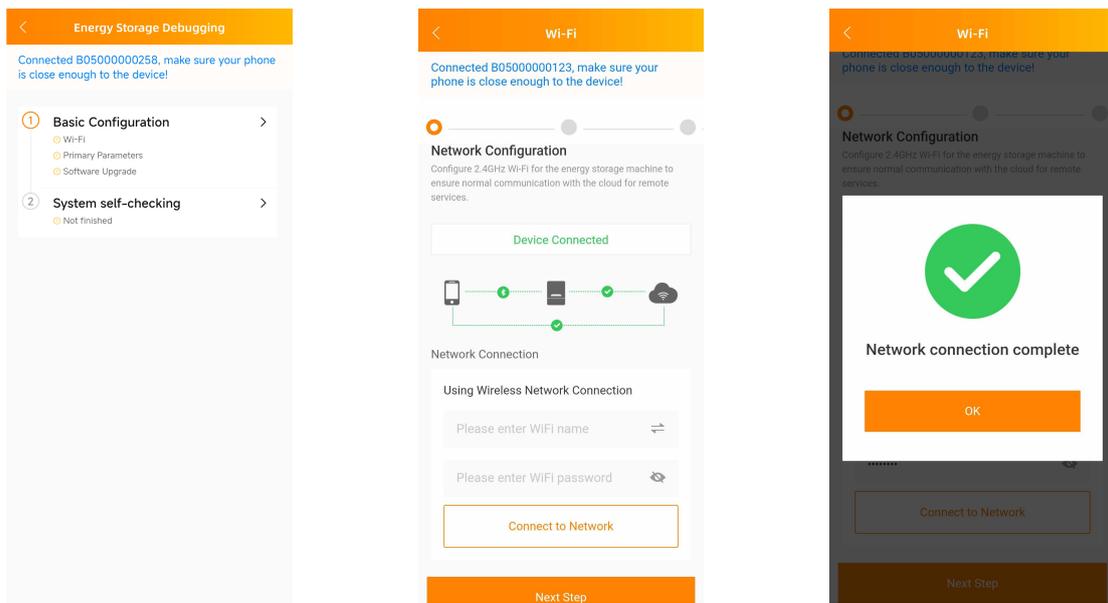
Tap **Next Step** to perform the PV, grid, battery and third-party generator configurations.

Select the parameters to be configured. The **PV System** and **Genertor** parameter is optional, and the **Grid Profile** and **Battery Company** parameters are required. For the configuration of third-party generators, please refer to the relevant user manual or contact the APstorage technical support team.
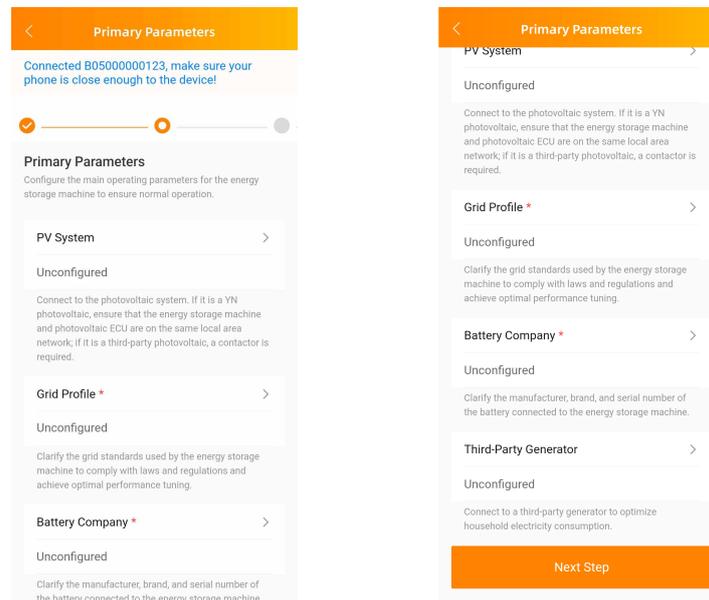
(Optional) Perform the PV configuration.

Tap **PV System**.

Confirm that the wires are properly connected and tap **OK**. Turn on the **PV Syste**m switch and configure the parameters based on the PV system that you use.
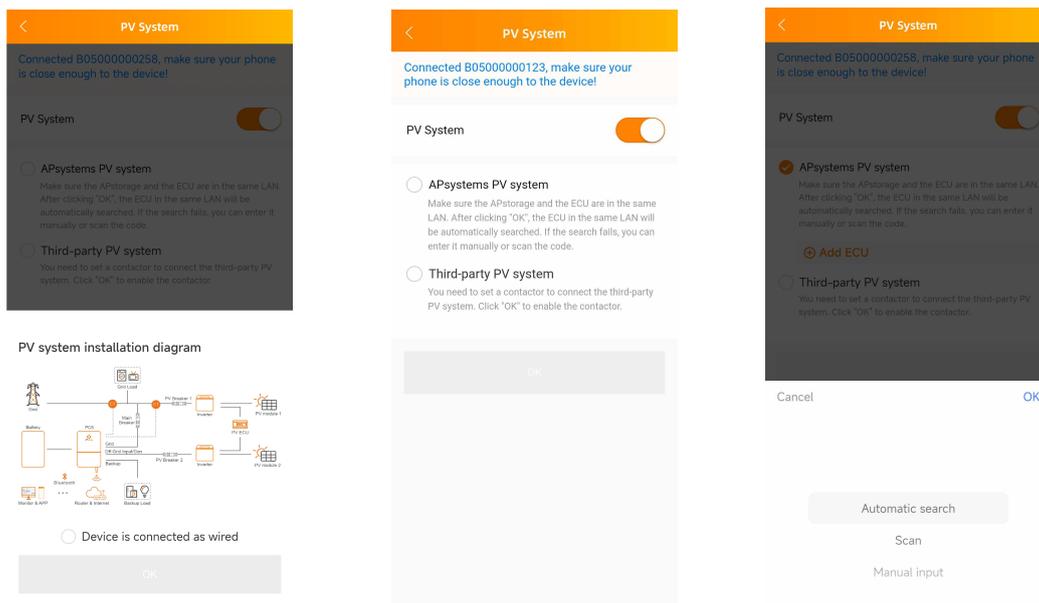
Select **APsystems PV system**. The app automatically searches for nearby ECUs. If an ECU is found, tap the ECU to record its information directly. If no ECU is found, manually record the device information or scan the ECU ID.

Select **Third-party PV system** and tap **OK**. The contactor is turned on. After the PV configuration is complete, you are go back to to the **Primary Parameters** page.

Perform the grid configuration.

Tap **Grid Profile**. Configure the **Country/Region** and **Set Standard** parameters based on your country or region and the grid standard. Parameters are displayed based on your settings. Retain the default values or change the values based on actual needs. After the grid configuration is complete, tap **OK** and go back to the **Primary Parameters** page.

<	Grid Profile

Connected B05000000123, make sure your phone is close enough to the device!

Grid Profile

Clarify the grid standards used by the energy storage machine to comply with laws and regulations and achieve optimal performance tuning.

Country/Region *
Please Select

Set Standard *
Please Select

OK

<	Grid Profile

Reconnection AC frequency low *
47.5-49.5Hz
47.5

Reconnection AC frequency high *
50.1-51.5Hz
50.1

Soft-start ramp-up rate *
600-1200s
600

Fixed power factor mode *
-1-1
1

cos φ (P) mode *
0-1
0

Q(U) mode *
0-1
0

OK

Perform the battery configuration.

Tap **Battery Company**. Select the battery company and battery model for the **Battery Company** and **Battery Model** parameters. The battery company is automatically displayed for some connected batteries. Then, scan or manually enter the battery serial number. After the battery configuration is complete, tap **OK** and go back to the **Primary Parameters** page.

<	Battery Company

Connected B05000000258, make sure your phone is close enough to the device!

Battery Company *
Soluna

Battery Model *
Please Select Battery Model

Battery Serial Number *   ⊕

OK
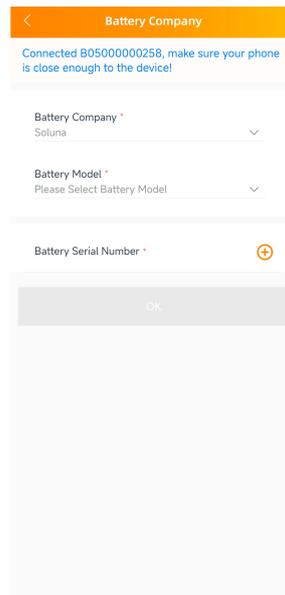
Tap Next Step.

6.2.5 System Upgrade

After you tap **OK**, you proceed to the **Software Upgrade** step. In this step, the app detects the software version of the PCS. If the software version is already the latest, tap **Next Step**. If the latest version is available, tap **Upgrade**. The upgrade progress is displayed during the upgrade process. After the upgrade is complete, refresh the page. The button at the bottom of the page changes to **Next Step**. Tap **Next Step**.

On the page that appears, tap **System self-checking**.
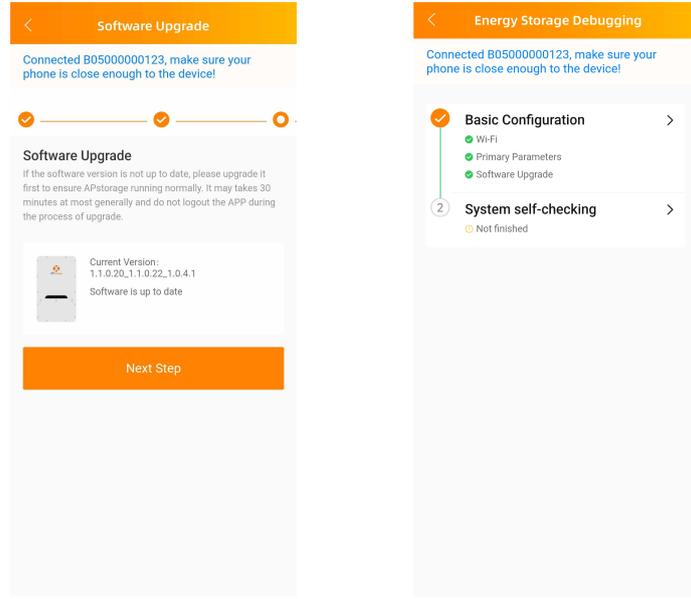
6.2.6 System Self-Check

The app enters system self-check, the following dialog box is displayed. Check the connection status of the breakers on the grid, grid-PV, off-grid-PV, and load sides.

Tap Start Check.

You can find that the SYSTEM indicator light flashes and the FAULT indicator light changes from red to OFF. After the grid-side breaker is turned off, the GRID indicator light flashes.
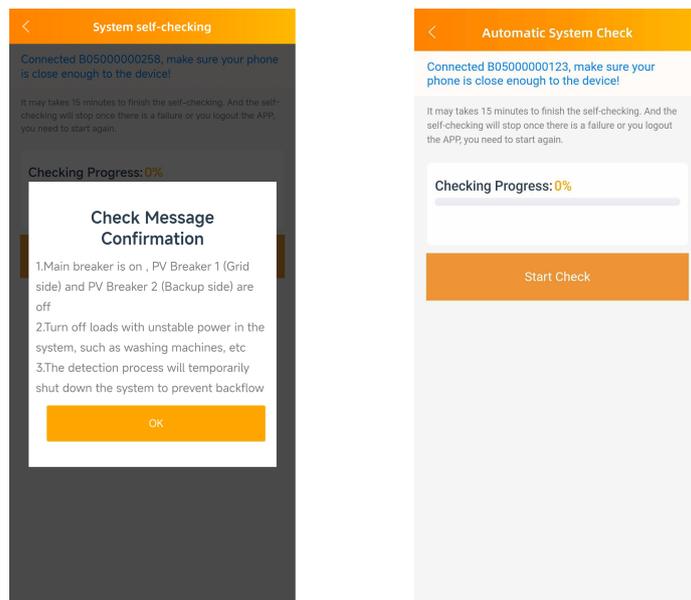
The app can perform system self-check on the following three systems: pure energy storage system, APsystems PV system, and third-party PV system. The app performs system self-check based on the preceding settings in this section.

6.2.6.1 Pure Energy Storage System

If no PV device is configured in the previous stage, the following pages are displayed. Wait for about 15 minutes until initialization is automatically complete.
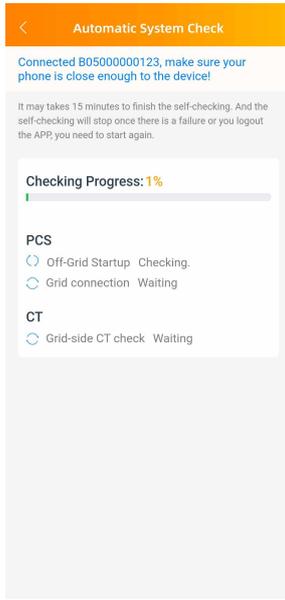
During the self-check process, the front LED indicator light of PCS is as follows:

	Off-grid startup		Grid-connected startup/Grid-side CT check	
SYSTEM	▬▬▬	SYSTEM	▬▬▬
WI-FI	▬▬▬	WI-FI	▬▬▬
COM	▬▬▬	COM	▬▬▬
GRID	▪ ▪ ▪ ▪	GRID	▬▬▬
BATTERY	▪ ▪ ▪ ▪	BATTERY	▬▬▬
ENERGY	—————	ENERGY	▬▬▬

After self-check is complete, tap **Go to the home page** in the dialog box displayed to complete the initialization process.

6.2.6.2 APsystems PV Systemm

If the APsystems PV system is configured in the previous stage, the following pages are displayed. After check on off-grid startup, grid-connected startup, and grid-side CT is complete, the **Whether to check off-grid PV?** and **Whether to check Grid-side PV?** dialog boxes are displayed. Turn off the breaker based on the requirements and tap Yes.

During the self-check process, the front LED indicator light of PCS is as follows:

Off-grid startup		Grid-connected startup/Grid-side CT check		PV-side CT check	
SYSTEM	▬▬▬ (on)	SYSTEM	▬▬▬ (on)	SYSTEM	▬▬▬ (on)
WI-FI	▬▬▬ (on)	WI-FI	▬▬▬ (on)	WI-FI	▬▬▬ (on)
COM	▬▬▬ (on)	COM	▬▬▬ (on)	COM	▬▬▬ (on)
GRID	▪ ▪ ▪ ▪ (blinking)	GRID	▬▬▬ (on)	GRID	▬▬▬ (on)
BATTERY	▪ ▪ ▪ ▪ (blinking)	BATTERY	▬▬▬ (on)	BATTERY	▬▬▬ (on)
ENERGY	——— (off)	ENERGY	▬▬▬ (on)	ENERGY	——— (off)

After self-check is complete, tap **Go to the home page** in the dialog box displayed to complete the initialization process.

6.2.6.3 Third-Party PV System

If the third-party PV system is configured in the previous stage, the following pages are displayed. After check on off-grid startup, grid-connected startup, and grid-side CT is complete, the **Whether to check off-grid PV?** and **Whether to check Grid-side PV?** dialog boxes are displayed. Turn off the breaker based on the requirements and tap **Yes**.

During the self-check process, the front LED indicator light of PCS is as follows:

Off-grid startup		Grid-connected startup/Grid-side CT check		PV-side CT check	
SYSTEM	▬▬▬ (on)	SYSTEM	▬▬▬ (on)	SYSTEM	▬▬▬ (on)
WI-FI	▬▬▬ (on)	WI-FI	▬▬▬ (on)	WI-FI	▬▬▬ (on)
COM	▬▬▬ (on)	COM	▬▬▬ (on)	COM	▬▬▬ (on)
GRID	▪ ▪ ▪ ▪ (blinking)	GRID	▬▬▬ (on)	GRID	▬▬▬ (on)
BATTERY	▪ ▪ ▪ ▪ (blinking)	BATTERY	▬▬▬ (on)	BATTERY	▬▬▬ (on)
ENERGY	——— (off)	ENERGY	▬▬▬ (on)	ENERGY	——— (off)

After self-check is complete, tap **Go to the home page** in the dialog box displayed to complete the initialization process.

6.2.7 Initialization Completed

After self-check is complete, tap **Go to the home page** in the dialog box displayed to complete the initialization process.
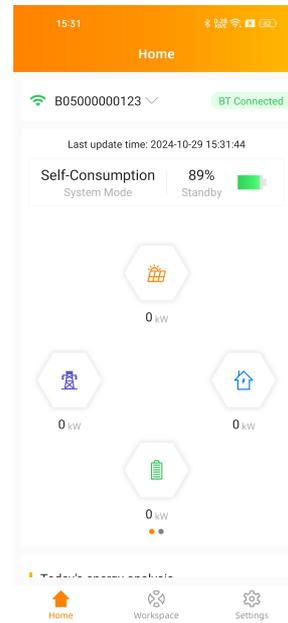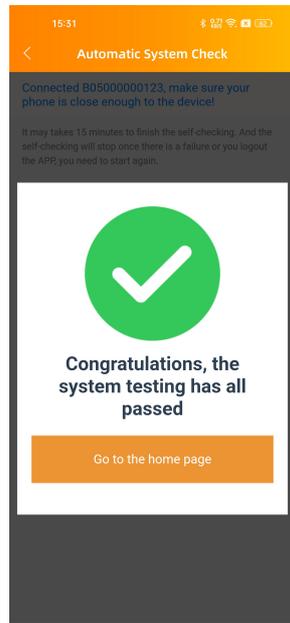
EU Declaration Of Conformity

（No.20240522）

We, ALTENERGY POWER SYSTEM INC.

Of

Building 2, No. 522, Yatai Road, Nanhu District, Jiaxing City, Zhejiang 314050, China declare under our sole responsibility that the product,

Product Description: Power Conversion System

Model No.: ELT-12, ELT-10, ELT-8, ELT-6

to which this declaration relates, is conformity with the following standards and/or other

normative documents.

Safety	EN 62477-1:2012; EN 62477-1:2012/A11:2014 EN 62477-1:2012/A1:2017; EN 62477-1:2012/A12:2021
Health	EN IEC 62311:2020; EN 50665:2017
EMC	EN 55011:2016/A2:2021; EN 62920:2017/A1:2021; EN IEC 61000-6-1:2019; EN IEC 61000-6-2:2019; EN IEC 61000-6-3:2021; EN IEC 61000-6-4:2019; EN IEC 61000-3-2:2019+A1:2021; EN 61000-3-3:2013/A2:2021; EN 61000-3-12:2011; EN 301 489-1 V2.2.3(2019-11); EN 301 489-17 V3.2.4(2020-09)
Radio	EN 300 328 V2.2.2(2019-07)

We hereby declare that all essential radio test suites have been carried out and that the above named product is conformity to all the essential requirements of directive 2014/53/EU (RED).

Title: Director

Address: Jiaxing, China

Date: 2024/05/24

Wi-Fi Frequency Range: 2412MHz - 2472MHz

Wi-Fi Maximum Power (EIRP): 17.67dBm

Bluetooth Frequency Range: 2402MHz - 2480MHz

Bluetooth Maximum Power (EIRP): 8.57dBm

Importer: Altenergy Power System Europe B.V

Address: Karspeldreef 8, 1101 CJ, Amsterdam, The Netherlands

Email: support.emea@Apsystems.com

Manufacturer: Altenergy Power System Inc.

Address: Building 2, No.522, Yatai Road, Nanhu District, Jiaxing City, Zhejiang 314050, China

Please scan the code to install the APP,
get the EU Declaration of Conformity
and Instructions

PAP 22
Raccolta Carta