

Residential All-In-One Energy Storage System

GW0.8/1.9-ESA-PS-G10

GW1.9-BAT-LVD-G10(Expansion Battery)

User Manual

GOODWE

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NOTICE

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Preface

Overview

This document mainly describes the product information, installation and wiring, configuration and commissioning, troubleshooting, and maintenance of an energy storage system consisting of a residential storage all-in-one, expansion battery, and smart meter. Before installing or using the product, read this manual carefully to understand the product safety information and familiarize yourself with the product functions and features. The document may be updated from time to time. Please obtain the latest version and more product information from the official website.

Applicable Products

The energy storage system includes the following products:

Product Type	Product Information	Description
Residential Storage All-in-One	GW0.8/1.9-ESA-PS-G10	- Rated capacity: 100 Ah - Rated energy: 1.92 kWh
Expansion Battery	GW1.9-BAT-LVD-G10	Rated energy: 1.92 kWh

Symbol Definitions

 DANGER
Indicates a highly potential hazard that, if not avoided, will result in death or serious injury.
 WARNING
Indicates a moderately potential hazard that, if not avoided, may result in death or serious injury.
 CAUTION
Indicates a low potential hazard that, if not avoided, may result in moderate or minor injury.
NOTICE
Emphasizes and supplements the content, and may also provide tips or tricks for optimal product use to help you solve a problem or save time.

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1 Safety Precautions

Always comply with the safety precautions contained in this document when operating the equipment.

WARNING

The equipment has been strictly designed and tested in accordance with safety regulations. However, as electrical equipment, relevant safety instructions must be observed before performing any operation on the equipment. Improper operation may result in serious injury or property damage.

1.1 General Safety

NOTICE

- Due to product version upgrades or other reasons, the document content may be updated from time to time. Unless otherwise agreed, the document content does not supersede the safety precautions on the product label. All descriptions in the document are for guidance only.
- Before installing the equipment, read this document carefully to understand the product and precautions.
- When operating the equipment, use insulated tools and wear personal protective equipment to ensure personal safety. When contacting electronic components, wear antistatic gloves, antistatic wrist straps, antistatic clothing, etc., to ensure Protection of the equipment from electrostatic damage.
- Unauthorized disassembly or modification may cause equipment damage, and such damage is not covered by the warranty.
- Any equipment damage or personal injury caused by failure to install, use, or configure the equipment in accordance with this document or the corresponding user manual is outside the scope of responsibility of the equipment manufacturer. For more product warranty information, please visit the official website: <https://en.goodwe.com/warranty>.

1.2 Personnel Requirements

NOTICE

- Personnel responsible for repairing the equipment must first undergo rigorous training, understand all safety precautions, and master the correct operating methods.
- Repair and replacement of equipment or components may only be performed by qualified professionals or trained personnel.

1.3 System Safety

 DANGER

- Before making electrical connections, ensure that the equipment is powered off. Live working is strictly prohibited; otherwise, hazards such as electric shock may occur.
- For equipment supporting PV string access, the PV input has weak surge current withstand capability. Strictly prohibit using a DC voltage source to power on directly through the PV port. If power-on via the PV port is required, follow the steps below. Damage caused by improper operation is considered human-induced damage and is not covered by the product warranty.
 1. First, limit the output current of the DC voltage source to within the Max. Current from Grid allowed at the PV port.
 2. Then close the DC Switch of the inverter.
 3. Finally, slowly increase the DC source output voltage from zero to the target value at a rate of $\leq 50\text{V/s}$.
- All operations such as transportation, storage, installation, operation, use, and maintenance shall comply with applicable laws, regulations, standards, and code requirements.
- The specifications of cables and components used for electrical connections shall comply with local laws, regulations, standards, and code requirements.
- Please use the cable connectors supplied with the package to connect the equipment cables. If connectors of other models are used, any resulting equipment damage is outside the scope of responsibility of the equipment manufacturer.
- Ensure that all cables of the equipment are connected correctly, firmly, and without looseness. Improper wiring may cause poor contact or damage to the equipment.
- For the Protection of the equipment and its components from damage during transportation, ensure that transport personnel have received professional training. During transportation, record the operation steps and keep the equipment balanced to avoid dropping the equipment.
- The equipment is heavy. Please deploy personnel according to the equipment Weight to prevent the equipment from exceeding the weight range that can be handled by personnel and injuring them.
- Ensure that the equipment is placed stably and does not tilt. Overturning of the equipment may cause equipment damage and personal injury.

WARNING

- During equipment installation, avoid subjecting the wiring terminals to load-bearing, otherwise the terminals may be damaged.
- If the cable is subjected to excessive tensile force, poor connection may result. When wiring, leave a certain length of cable as a reserve before connecting it to the equipment wiring port.
- Cables of the same type should be bundled together. Cables of different types should be laid out at least 30 mm apart. Twisting or crossing them with each other is prohibited.
- Using cables in a high-temperature environment may cause aging or damage to the insulation layer. The distance between cables and heat-generating components or the periphery of heat source areas should be at least 30 mm.

1.3.1 PV String Safety

WARNING

- Ensure that the module frame and mounting system are properly grounded.
- After completing the DC cable connection, ensure that the cable connections are firm and secure. Improper wiring may cause poor contact or high impedance and damage the all-in-one machine.
- Ensure that the positive and negative polarities of the cables are connected correctly and there is no reverse connection; the voltage should be lower than the maximum DC input voltage. Damage caused by reverse connection and Overvoltage is outside the scope of responsibility of the equipment manufacturer.
- PV string output does not support grounding. Before connecting the PV string to the all-in-one machine, ensure that the minimum insulation resistance of the PV string to ground meets the minimum insulation impedance requirement ($R = \frac{\text{Max. Input Voltage (V)}}{30\text{mA}}$).
- Do not connect the same PV string to multiple all-in-one machines, as this may damage the all-in-one machines.
- The PV modules used in conjunction must comply with IEC 61730 Class A standard.

1.3.2 Safety of the Residential Energy Storage All-in-One Machine

WARNING

Ensure that the voltage and frequency at the grid connection point comply with the inverter grid connection specifications.

1.3.3 Battery Safety

DANGER

- Before operating the equipment in the system, ensure that the equipment is powered off to avoid electric shock hazards. During operation of the equipment, all safety precautions in this manual and safety labels on the equipment must be strictly observed.
- Do not disassemble, modify, or repair without official authorization from the equipment manufacturer; otherwise, electric shock hazards or equipment damage may occur. Any losses caused thereby are outside the scope of responsibility of the equipment manufacturer.
- Do not strike, pull, drag, squeeze, or step on the equipment, and do not place the battery in fire, otherwise there is a risk of battery explosion.
- Do not place the battery in high-temperature environments. Ensure that there are no heat sources near the battery and that it is not exposed to direct sunlight. If the ambient temperature exceeds 60°C, a fire may occur.
- If the battery has obvious defects, cracks, damage, or other conditions, do not use it. Battery damage may result in electrolyte leakage.
- Do not move the battery system while the battery is in operation.
- Battery Short Circuit may cause personal injury. The instantaneous high current caused by a short circuit can release a large amount of energy and may cause a fire.

WARNING

- Battery Current may be affected by factors such as temperature, humidity, and weather conditions, which may cause the battery to limit current and affect its load capacity.
- If the battery cannot start, contact the after-sales service center as soon as possible. Otherwise, the battery may be permanently damaged.
- Perform regular inspection and maintenance of the battery in accordance with the battery maintenance requirements.

Emergency Response Measures

- **Battery Electrolyte Leakage**
If the battery module leaks electrolyte, avoid contact with the leaked liquid or gas. Electrolyte is corrosive; contact may cause skin irritation and chemical burns. If you accidentally come into contact with the leaked substance, take the following actions accordingly:
 - Inhalation: Evacuate from the contaminated area and seek medical help immediately.
 - Eye contact: Rinse with clean water for at least 15 minutes and seek medical help immediately.
 - Skin contact: Thoroughly wash the affected area with soap and water, and seek medical help immediately.
 - Ingestion: Induce vomiting and seek medical assistance immediately.
- **Fire**
 - When the battery temperature exceeds 150°C, there is a risk of fire. If the battery catches fire, it may release toxic and hazardous gases.
 - To avoid fire, ensure that carbon dioxide (CO₂), Novec 1230, or FM-200 fire extinguishers are available near the equipment.
 - When extinguishing a fire, do not use ABC dry powder fire extinguishers. Firefighters must wear protective clothing and self-contained breathing apparatus.

1.4 Explanation of Safety Symbols and Certification

Marks

DANGER

- After equipment installation, the labels and warning signs on the enclosure must be clearly visible. Covering, altering, or damaging them is prohibited.
- The following descriptions of the enclosure warning labels are for reference only. Refer to the actual labels on the equipment.

No.	Symbol	Meaning
1		There is a potential danger when the equipment is running. Take protective measures when operating the equipment.
2		High voltage danger. High voltage is present when the equipment is running. Before performing operations on the equipment, ensure that the equipment is de-energized.
3		The inverter surface is at high temperature. Do not touch it while the equipment is running; otherwise, burns may occur.
4		Use the equipment properly. Under extreme conditions, the equipment has a risk of explosion.
5		The battery contains flammable materials. Beware of fire.
6		The equipment contains corrosive electrolyte. Avoid contact with leaked electrolyte or volatile gases.
7		Delayed discharge. After the device is powered off, wait 5 minutes until the device is fully discharged.
8		The device should be kept away from open flames or ignition sources.
9		The device should be kept away from areas accessible to children.
10		Do not extinguish with water.
11		Before operating the device, please read the product manual carefully.

No.	Symbol	Meaning
12		Personal protective equipment must be worn during installation, operation, and maintenance.
13		The device must not be disposed of as household waste. Please dispose of the device in accordance with local laws and regulations, or return it to the manufacturer.
14		Protection grounding wire connection point.
15		CE Certification mark.
16		Double insulation or reinforced insulation

1.5 European Declaration of Conformity

1.5.1 Equipment with Wireless Communication Function

Equipment with wireless communication function sold in the European market complies with the following directive requirements:

- Radio Equipment Directive 2014/53/EU (RED)
- Restrictions of Hazardous Substances Directive 2011/65/EU and (EU) 2015/863 (RoHS)
- Waste Electrical and Electronic Equipment 2012/19/EU
- Registration, Evaluation, Authorization and Restriction of Chemicals (EC) No 1907/2006 (REACH)

1.5.2 Battery

Batteries sold in the European market comply with the following directive requirements:

- Electromagnetic compatibility Directive 2014/30/EU (EMC)
- Battery Directive 2006/66/EC and Amending Directive 2013/56/EU
- Restrictions of Hazardous Substances Directive 2011/65/EU and (EU) 2015/863 (RoHS)*1

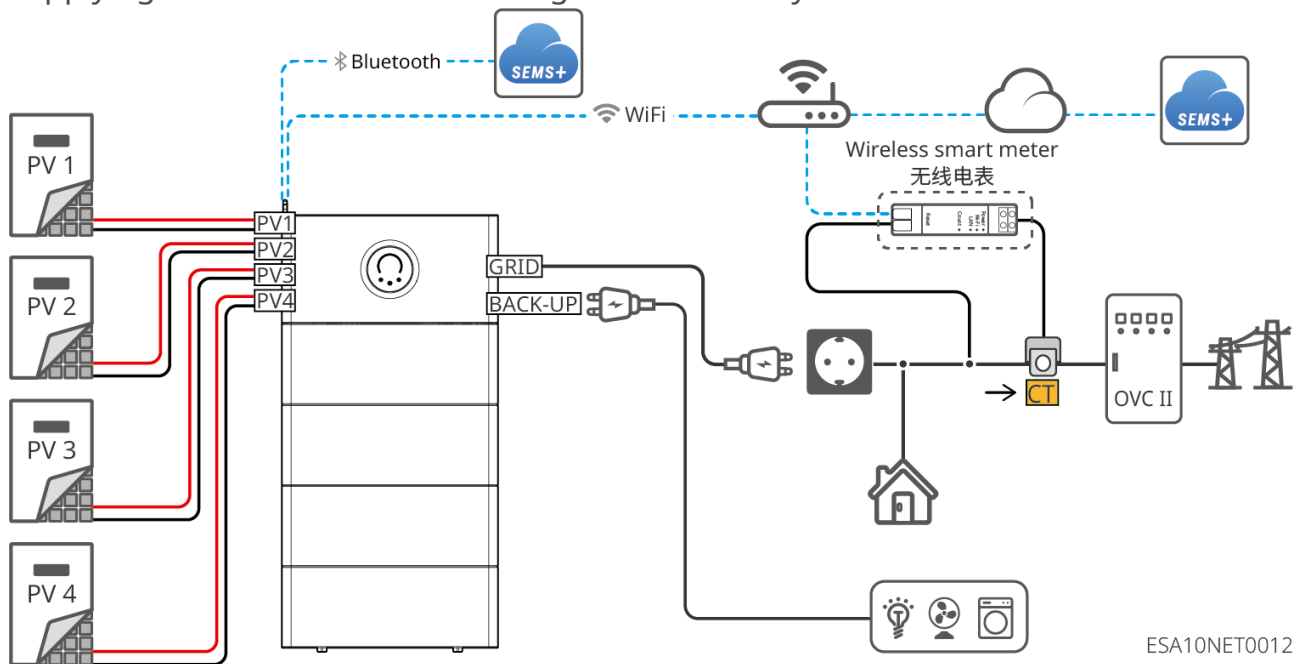
- Regulation (EU) 2023/1542 Article 12 - Safety of stationary battery energy storage systems
- Regulation (EU) 2023/1542 Article 10 - Performance and durability requirements for rechargeable industrial batteries, LMT batteries and electric vehicle batteries
- Regulation (EU) 2023/1542 Article 14 - Information on the state of health and expected lifetime of batteries
- Waste Electrical and Electronic Equipment 2012/19/EU
- Registration, Evaluation, Authorization and Restriction of Chemicals (EC) No 1907/2006 (REACH)
*1: Our company's battery products meet the hazardous substance limit requirements specified in this regulation.

For more EU declarations of conformity, please visit the [official website](#) to obtain them.

2 System Introduction

2.1 System Overview

The ESA series residential energy storage all-in-one machine integrates an inverter and battery, converting solar energy into electrical energy in PV systems, directly supplying household loads or storing it in the battery.



- The residential energy storage all-in-one machine supports use in household balcony or outdoor scenarios.
- When used in balcony scenarios, expansion batteries can be installed as needed, with up to 4 expansion batteries supported.
- Please provide your own wireless smart meter. Connect the wireless meter via WiFi to enable functions such as Self-consumption and power limiting. For the Mounting Method and precautions of the wireless meter, please refer to the corresponding meter manual. Currently supported meter models: Shelly Pro 3EM and Donghong SEM3-WL-2.
- The all-in-one machine supports connecting to the SEMS+ App via Bluetooth for local configuration of router information, and then connecting to the SEMS+ App via WiFi for remote monitoring of the system equipment.
- Please ensure that when connecting to the App via Bluetooth, the straight-line distance between the device and the App is less than 5 meters; when connecting to

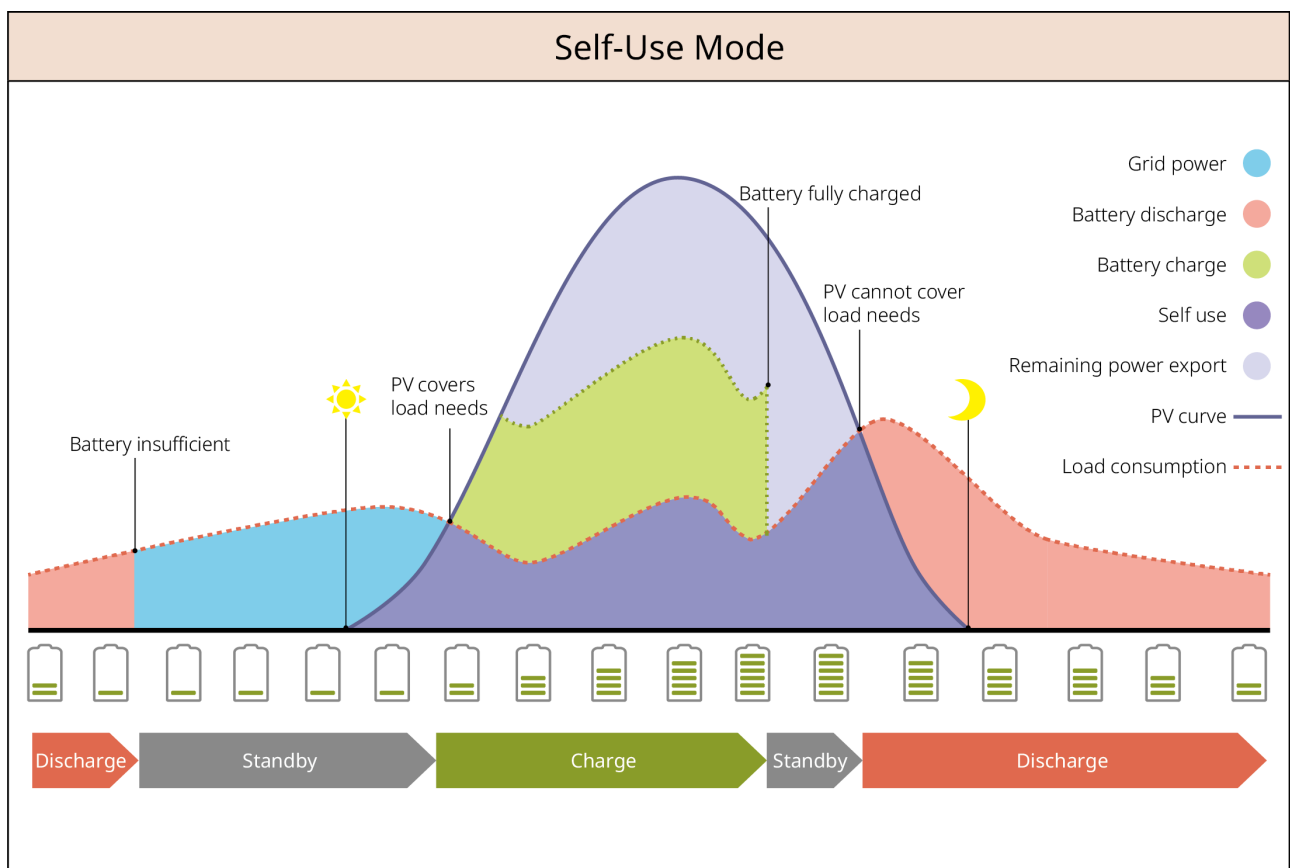
the App via WiFi, the straight-line distance between the device and the router is less than 10 meters.

- Before grid connection, please confirm that local grid permission has been obtained.
- Please ensure that the PV DC input open-circuit voltage does not exceed 60 V.

2.2 System Modes

Self-consumption Mode

- Basic mode of system operation.
- PV generation powers the load first. Excess energy charges the battery, and any remaining energy is sold to the grid. When PV generation cannot meet the load demand, the battery supplies the load. When the battery cannot meet the load demand, the grid supplies the load.

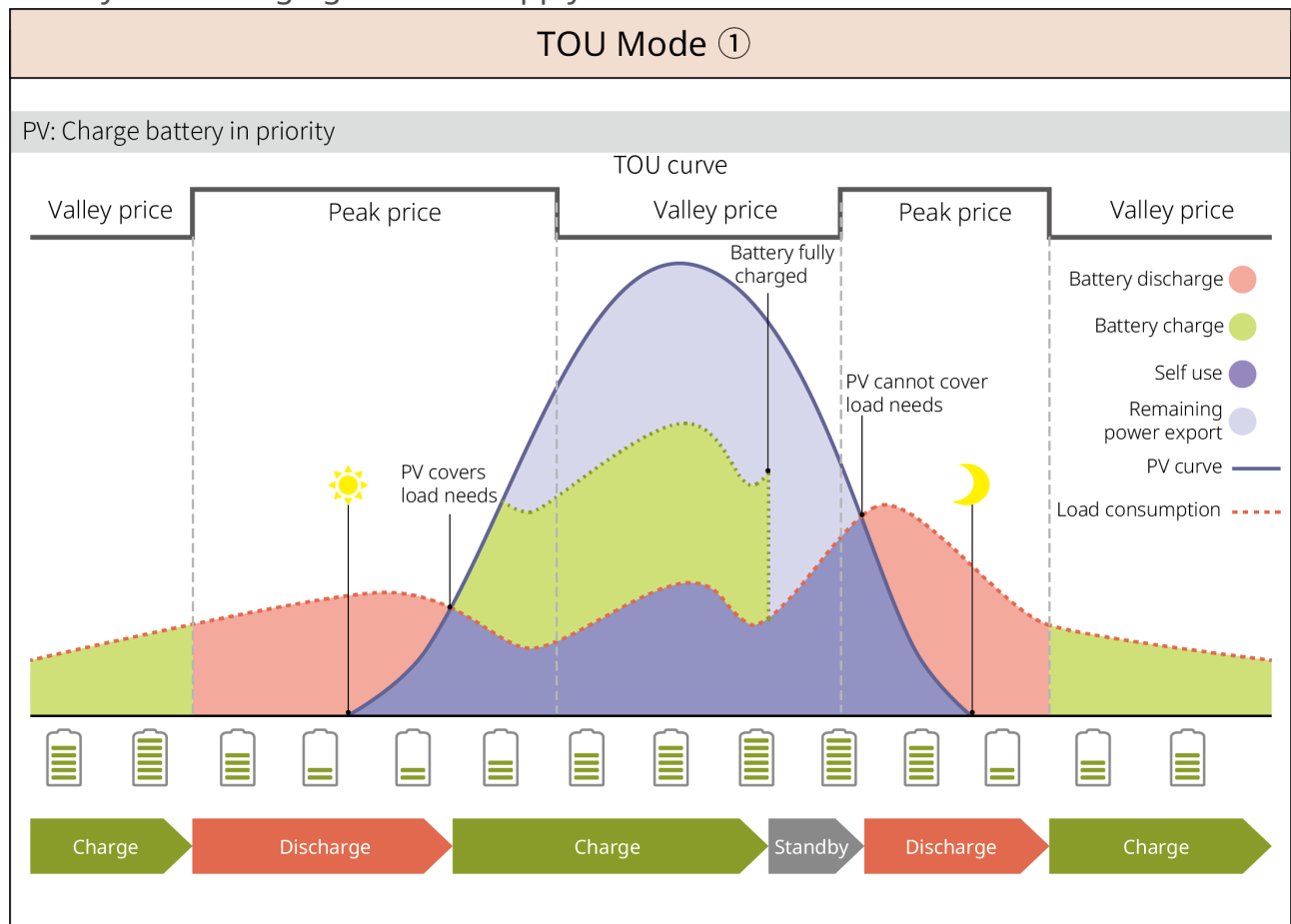


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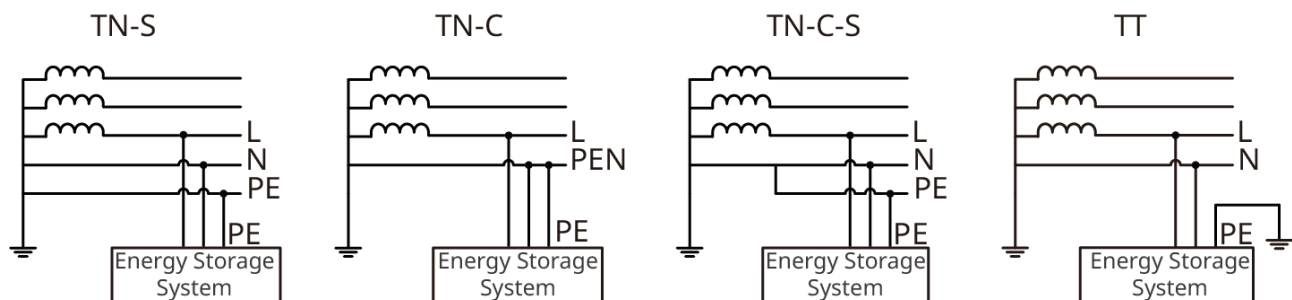
TOU mode

In compliance with local laws and regulations, set different time periods for buying electricity and exporting energy based on grid peak-valley Tariff differences.

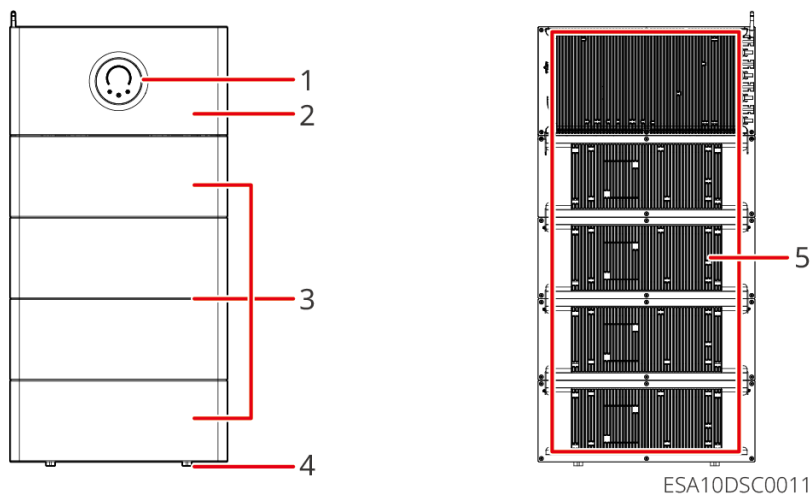
For example, during off-peak Tariff periods, set the battery to charging mode and purchase electricity from the grid to charge it; during peak Tariff periods, set the battery to discharging mode to supply the load.



2.3 Supported Grid Types

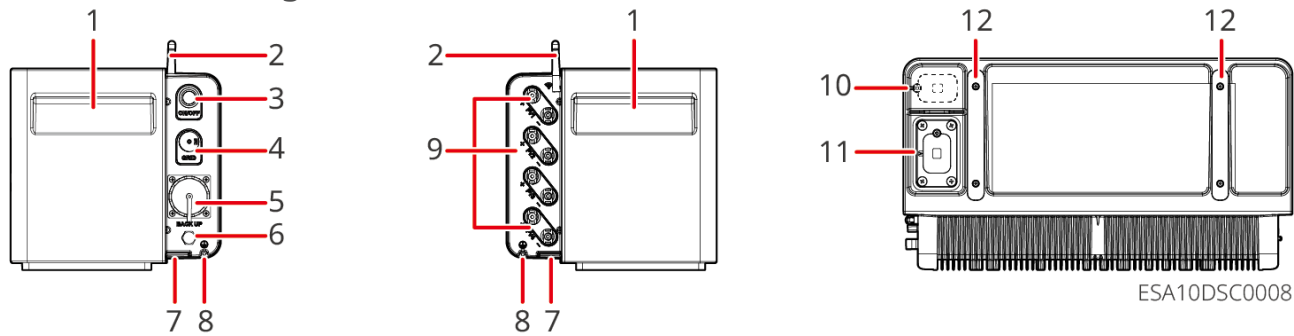


2.4 Appearance Description



No.	Components	No.	Components
1	System Indicator	2	Residential Storage All-in-One
3	Battery	4	Foot Pad
5	Heat Sink	-	-

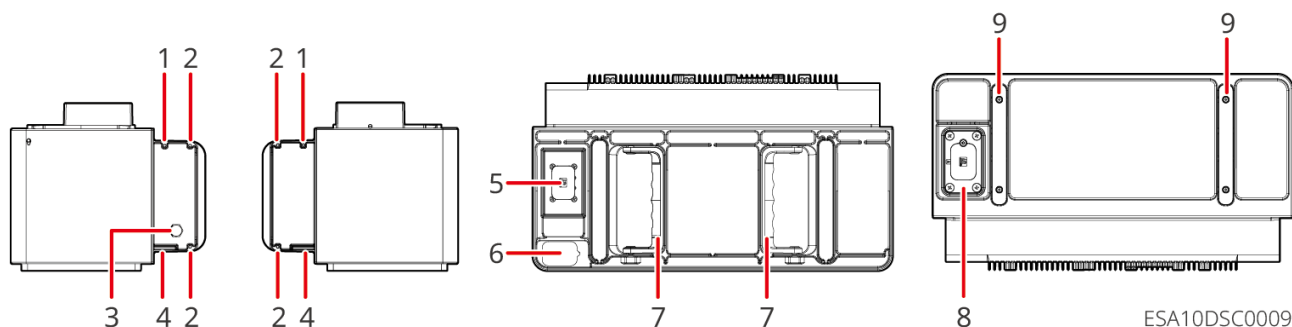
Residential Storage All-in-One



No.	Component / Silkscreen	Description
1	Carrying Handle	Used for carrying the equipment.
2	Antenna	Used for wireless communication. Currently supports Wi-Fi and Bluetooth signals.

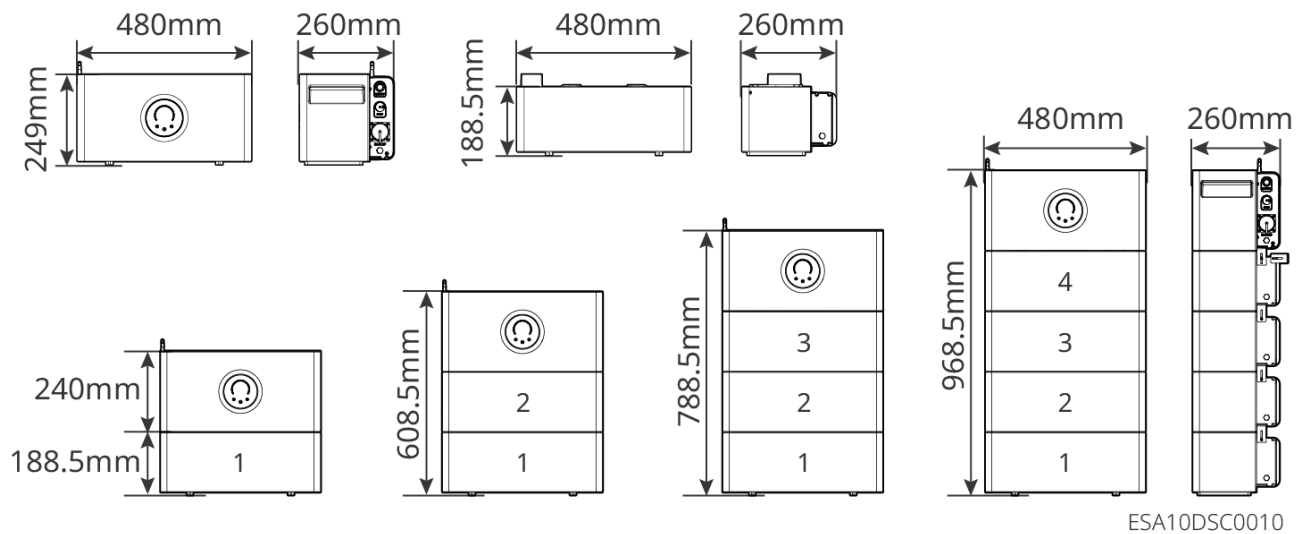
No.	Component / Silkscreen	Description
3	ON/OFF Switch	Controls Device Start/Stop.
4	Grid Port	Connect the AC cable to connect the device to the grid.
5	BACK-UP Port	Connect the AC cables to supply power to critical loads.
6	Vent valve	-
7	Series bracket mounting holes	Install the series bracket to secure the all-in-one machine and the expansion battery.
8	Protection grounding terminal	Reserved port for connecting the Protection ground wire.
9	PVinput terminals	ConnectPVmodule DC input cables.
10	Battery connection port Protection cover mounting base	• Stores the Protection cover of the battery connection port. • When the battery blind-mating port is in use, install the Protection cover on the mounting base; when the battery blind-mating port is not in use, install the Protection cover on the blind-mating port.
11	Battery connection blind-mating port	Connects the home energy storage all-in-one machine and the expansion battery.
12	Foot Pad	-

Battery

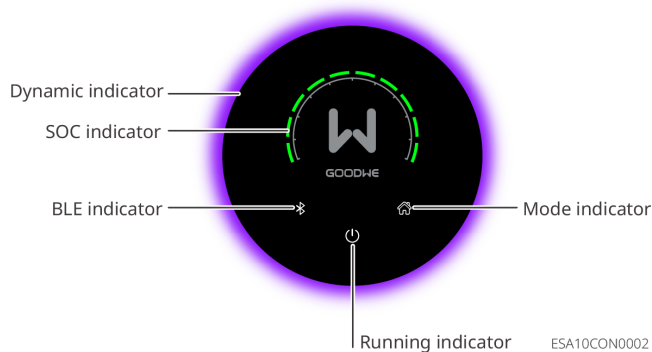


No.	Component / Silkscreen	Description
1	Series bracket fixing holes	Install the series bracket to secure the all-in-one machine and the expansion battery, or to secure the batteries to each other.
2	Anti-tip bracket fixing holes	Used to secure the anti-tip bracket.
3	Vent valve	-
4	Series bracket mounting holes	Install the series bracket to secure the all-in-one machine and the expansion battery, or to secure the batteries to each other.
5	Battery connection upper blind-mating port	Connection ports between the all-in-one machine and the battery, and between batteries.
6	Battery connection port Protection cover	Used to install on the battery connection upper blind-mating port when the battery is not in use.
7	Carrying Handle	Used for carrying the equipment.
8	Battery connection lower blind-mating port	• Connection port between batteries. • When batteries are stacked, a termination resistor must be installed in the lower blind-mating port of the bottom battery.
9	Foot Pad	-

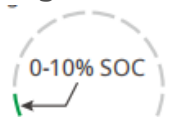
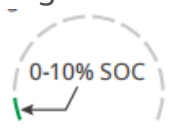
2.5 Dimension Description



2.6 Indicator Light Description



Indicator light	Indicator light status	Dynamic indicator light status [1]	Description
	White light flashing	Blue-purple running light	System initializing.
	White light steady on	Blue-purple Breathing Light	System operating normally.
	Off	Red light flashing	System fault.
	Off	Yellow light flashing	Off-grid Overload.

Indicator light	Indicator light status	Dynamic indicator light status [1]	Description
	Off	Off	System is not powered on or is damaged.
 [2] [4]	White light steady on	/	System Operating Mode is Balcony Mode.
	Off		System Operating Mode is Outdoor Mode.
 [3] [4]	White light steady on		Bluetooth broadcast is enabled.
	Off		Bluetooth broadcast is disabled.
	Green light steady on		- Battery charging. - Segmented lighting, each segment = 10% SOC: 
	Green light flashing		- Battery discharging. - Segmented lighting, each segment = 10% SOC: 
	Off		Battery has no charge or system is not powered.

[1] The dynamic indicator light duration can be adjusted based on actual needs via the SEMS+ App.

[2] Press and hold for 1-2 seconds  the indicator light to switch the system

Operating Mode.

[3] Press and hold for 1-2 seconds  the indicator light to enable Bluetooth broadcast; after pressing and holding for 1-2 seconds and releasing, repeat this action three times within 10 seconds to restore Bluetooth, WiFi configuration and other settings.

[4] Simultaneously press and hold  and  the indicator lights for 3s to unlock the touch function; the touch function locks again 30 seconds after unlocking.

3 Equipment Inspection and Storage

3.1 Equipment Inspection

Before accepting the product, please carefully check the following:

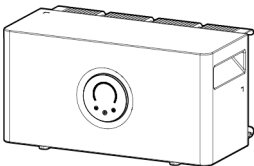
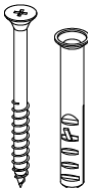
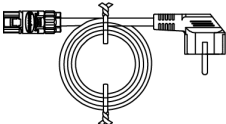
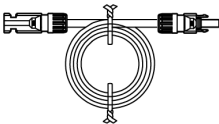
1. Check whether the outer packaging is damaged, such as deformation, openings, cracks, or other signs that may cause damage to the equipment inside the box. If damaged, do not open the packaging and contact your dealer.
2. Check whether the equipment model is correct. If there is any discrepancy, do not open the packaging and contact your dealer.

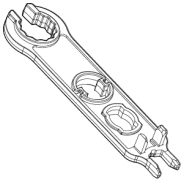
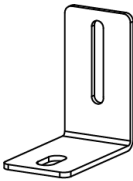
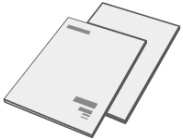
3.2 Deliverables

WARNING

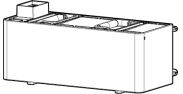
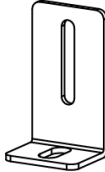
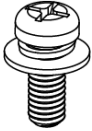
Check whether the type and quantity of deliverables are correct and whether the appearance is damaged. If damaged, contact your dealer.

Residential Storage All-in-One Machine Deliverables

Components	Description	Components	Description
	Residential Storage All-in-One Machine x1		Expansion bolts x2
	AC connection cable x1 AC connection cable length: 5 m		PV extension cable x8 Extension cable length: 2.9 m

Components	Description	Components	Description
	PV connector removal tool x1		Anti-tip brackets x2
	M4*10 screws x2		PV anti-tamper covers x8
	Product documentation x1	-	-

Battery deliverables

Components	Description	Components	Description
	Battery x1		Series brackets x2
	M4*10 screws x2	-	-

3.3 Equipment Storage

- If the residential storage all-in-one machine has been stored for more than two years, or has not been in operation for more than 6 months after installation, it is recommended to have it inspected and tested by professionals before commissioning.
- To ensure good electrical performance of the electronic components inside the residential energy storage all-in-one machine, it is recommended to power it on once every 6 months during storage; if it has not been powered on for more than 6 months, it is recommended that it be inspected and tested by professionals before being put into use.

- To ensure battery performance and service life, it is recommended to avoid long-term idle storage. Long-term storage may cause deep discharge of the battery, resulting in irreversible chemical loss, leading to capacity degradation or even complete failure. It is recommended to use the battery promptly. If the battery requires long-term storage, please perform maintenance according to the following requirements:

NOTICE

The storage time is calculated from the SN date on the battery outer packaging as the starting point. After the storage period is exceeded, charge/discharge maintenance is required. (Battery maintenance time = SN date + charge/discharge maintenance period). For the method of checking the SN date, see: [10.3.Meaning of the Battery SN Code\(Page 80\)](#).

Product Model	Battery Storage Initial SOC Range	Recommended Storage Temperature	Charge/discharge maintenance period[1]	Battery Maintenance Method
GW0.8/1.9-ESA-PS-G10	35~45%	0~35℃	-20~35℃, 12months	Refer to the battery SOC range requirements to charge and top up the battery.
GW1.9-BAT-LVD-G10			35~45℃, 6months	

Packaging requirements:

Ensure that the outer packaging box has not been removed and the desiccant inside the box has not been lost.

Environmental requirements:

1. Ensure that the equipment is stored in a cool place away from direct sunlight.
2. Ensure that the storage environment is clean, with appropriate temperature and humidity ranges, and free of condensation. If condensation appears on equipment ports, do not install the equipment.
3. Ensure that the equipment is stored away from flammable, explosive, corrosive, and other similar items.

Stacking requirements:

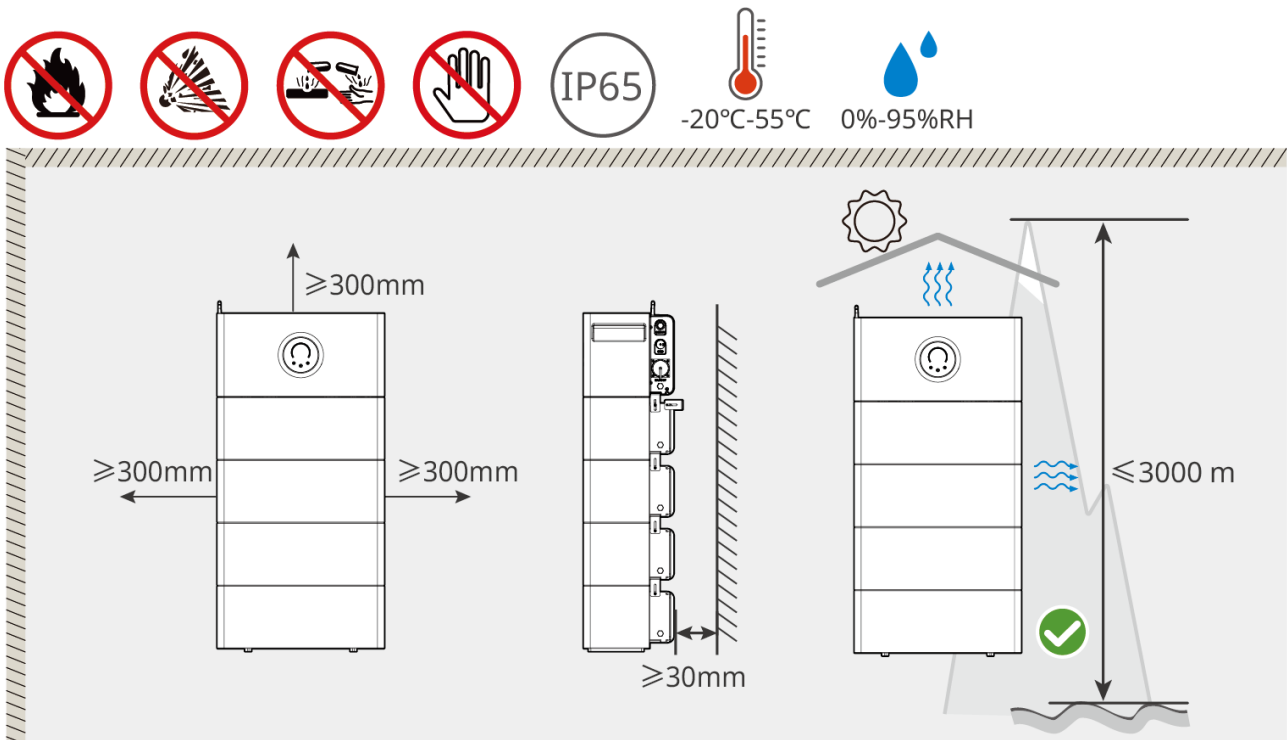
1. Ensure that the equipment is stacked at the height and in the direction indicated by the labels on the packaging box.
2. Ensure that there is no risk of tipping after the equipment is stacked.

4 Installation

DANGER

When installing the equipment and making electrical connections, use the delivery parts shipped with the unit; otherwise, equipment damage caused thereby is not covered by the warranty.

4.1 Installation Requirements



ESA10INT0013

Installation Environment Requirements

1. The equipment must not be installed in flammable, explosive, corrosive, or similar environments.
2. Select an installation environment with good ventilation and uniform temperature and humidity distribution, and ensure that the ambient temperature and humidity always meet the operating range specified in the manufacturer's specifications.
3. It is recommended to install the equipment in a sheltered location away from direct sunlight, rain, snow accumulation, and similar conditions. If full shelter is not

possible due to site restrictions, ensure that ambient temperature, humidity, and other conditions remain within the allowable range specified in the equipment specifications and take necessary protective measures.

4. Adverse environmental conditions such as direct sunlight and high temperature may cause derating of inverter output power. When selecting the installation site, fully consider heat dissipation conditions and avoid direct sunlight on the equipment body.
5. The installation and storage location of the equipment should avoid areas with direct cold air blowing, such as air conditioner outlets. Excessive local temperature differences may cause condensation inside the equipment, which may further lead to equipment damage.
6. The installation location must be out of the reach of children and should avoid positions where the equipment can be easily touched.
7. The surface of the equipment may be at high temperature during operation. Do not touch the enclosure before it cools down to prevent burns.
8. The installation space must meet the equipment's ventilation and heat dissipation requirements as well as operating space requirements.
9. The installation height of the equipment must facilitate operation and maintenance, ensuring that indicator lights and all labels are easy to view, and wiring terminals are easy to operate.
10. The installation altitude of the equipment is lower than the Max. Operating Altitude.

NOTICE

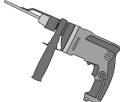
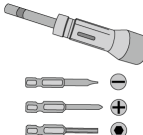
Charging temperature range: $-20^{\circ}\text{C} < T < 55^{\circ}\text{C}$; Discharge temperature range: $-20^{\circ}\text{C} < T < 55^{\circ}\text{C}$.

If installed in an environment below -20°C , the battery will be unable to continue charging and recover energy after being fully discharged, resulting in Battery Undervoltage.

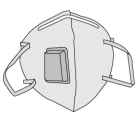
Tool Requirements

NOTICE

During installation, the following installation tools are recommended. If necessary, other auxiliary tools may be used on site.

Tool type	Description	Tool type	Description
	Diagonal cutting pliers		Spirit level
	Impact drill (drill bit $\Phi 8\text{mm}$)		Torque wrench M4、M5、M8
	Rubber mallet		Marker pen
	Cable ties		Vacuum cleaner

Personal protective equipment

Tool type	Description	Tool type	Description
	Insulated gloves, protective gloves		Dust mask
	Safety goggles		Safety shoes

4.2 Equipment Handling

CAUTION

- During transportation, transfer, installation, and other operations, the laws, regulations, and relevant standards of the country or region must be complied with.
- Before installation, the equipment must be transported to the installation site. To avoid personal injury or equipment damage during handling, note the following:
 - Please assign appropriate personnel according to the equipment Weight to prevent the equipment from exceeding the manual handling weight range and injuring personnel.
 - Please wear safety gloves to avoid injury.
 - Please ensure the equipment remains balanced during handling to avoid falling.

4.3 Installing the Device

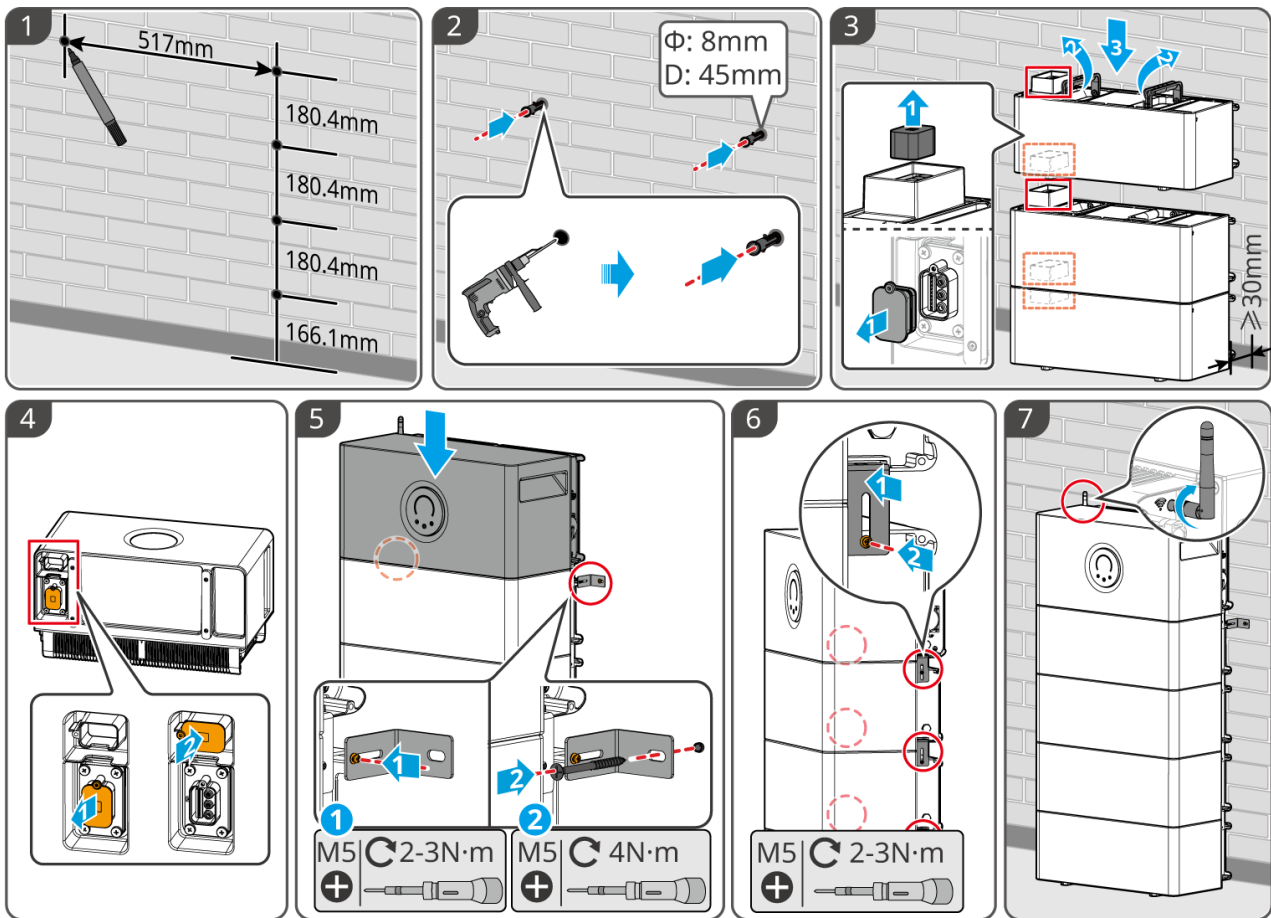
CAUTION

- When drilling, ensure that the drilling positions avoid water pipes, cables, and other fixtures inside the wall to prevent danger.
- When drilling, wear safety goggles and a dust mask to avoid inhaling dust or getting it into your eyes.
- Install the all-in-one unit above the expansion battery. Do not install the expansion battery above the all-in-one unit.
- When installing the equipment, ensure that it is installed level and securely. When placing the all-in-one unit and the expansion battery, confirm that the hole positions of the upper and lower layers are aligned; the anti-tip bracket should be vertically flush against the wall or battery surface.
- When drilling with a hammer drill, use a shield such as cardboard to cover the equipment to prevent foreign objects from entering the interior and causing damage.

The following steps apply to scenarios where an expansion battery is used. If no expansion battery is involved, simply place the all-in-one unit in a suitable installation position according to actual requirements.

Operation steps

1. Use a marker pen to mark the drilling positions. The drilling positions vary depending on the number of expansion batteries installed. Refer to the diagrams for details.
2. Use a hammer drill to drill holes, and pre-install the expansion bolt sleeves in the holes. Hole diameter: 8mm, hole depth: 45mm.
3. Except for the battery at the bottom of the stack, which must keep the blind-mating port protective cover, the covers on all other batteries' blind-mating ports must be removed. After removing the covers, stack the batteries and place them 30mm away from the wall, parallel to the wall.
4. Remove the blind-mating port protective cover from the all-in-one unit and install it on the adjacent cover fixing base to prevent loss.
5. Stack the all-in-one unit, aligning the battery blind-mating ports during installation to ensure secure installation. Fix one side of the anti-tip bracket to the first battery below the all-in-one unit with screws. Fix the other side to the wall using the pre-installed expansion screws.
6. Insert the series brackets into the bracket mounting holes of the all-in-one unit and the batteries in sequence, and tighten with screws to complete the fixation between the all-in-one unit and the batteries, and between batteries.
7. Tighten the antenna on the upper side of the all-in-one unit.



ESA10INT0016

5 System Wiring

DANGER

- Cable installation, routing, and connection must comply with local laws, regulations, and code requirements.
- All operations during electrical connection, as well as the specifications of cables and components used, must comply with local laws and regulations.
- Before making electrical connections, ensure that the equipment is powered off. Live working is strictly prohibited; otherwise, hazards such as electric shock may occur.
- Cables of the same type should be bundled together and routed separately from cables of different types. Intertwining or crossing is prohibited.
- If the cable is subjected to excessive tension, poor connection may result. When wiring, leave some slack in the cable before connecting it to the inverter wiring terminals.

NOTICE

- When making electrical connections, wear personal protective equipment such as safety shoes, protective gloves, and insulating gloves as required.
- The cable colors shown in the figures in this document are for reference only. The specific cable specification must comply with local regulatory requirements.

Connect the PV DC cables

DANGER

Before connecting PV strings to the device, confirm the following information. Otherwise, the device may be permanently damaged, and in severe cases, fire may occur, causing personal injury and property damage.

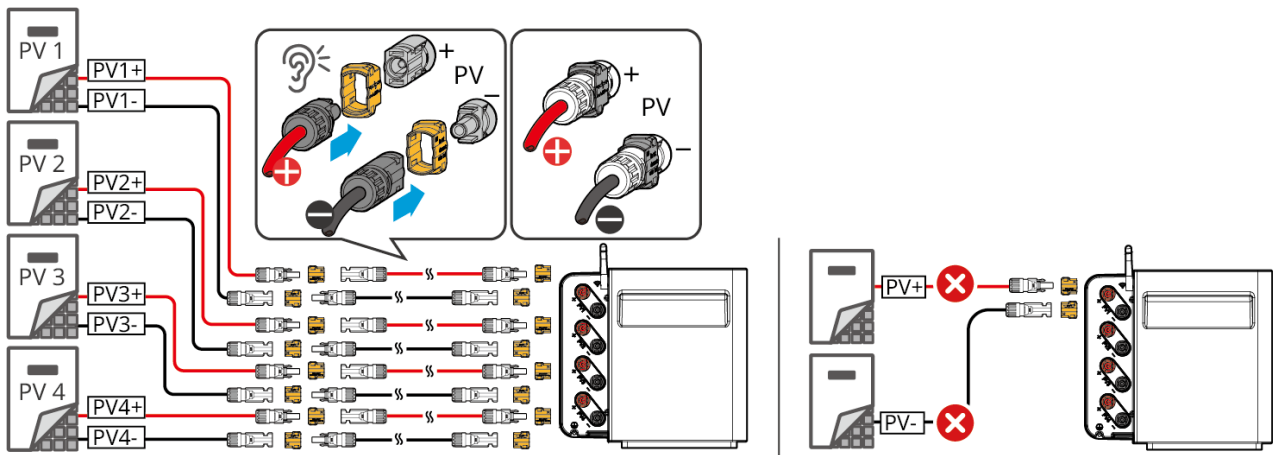
1. Ensure that the Max. MPPT Short Circuit Current and Max. Input Voltage of each MPPT are within the allowable range of the all-in-one inverter.
2. Ensure that the positive terminal of the PV string is connected to PV+ on the all-in-one inverter, and the negative terminal of the PV string is connected to PV- on the all-in-one inverter.

WARNING

- The PV string output does not support grounding. Before connecting the PV string to the all-in-one inverter, ensure that the minimum insulation resistance to ground of the PV string meets the minimum insulation impedance requirement ($R = \text{Max. Input Voltage} / 30\text{mA}$).
- After completing the DC cable connections, ensure that the cable connections are tight and not loose.
- Ensure that the positive and negative terminals of the DC cables are correctly connected without reverse polarity, and that the voltage is within the allowable range.
- To prevent the PV cables from falling off, install the anti-tamper covers. The anti-tamper covers are only applicable to MC4 PV connectors.
- Ensure that the PV cable connection length does not exceed 3 m. It is recommended to use the PV extension cable shipped with the unit.

Operation steps

1. Take out the PV anti-tamper covers shipped with the unit and install them on the PV connectors on the all-in-one inverter side and the PV connectors on the module side.
2. Take out the PV extension cable shipped with the unit and connect it to the all-in-one inverter and the PV module respectively.



ESA10ELC0014

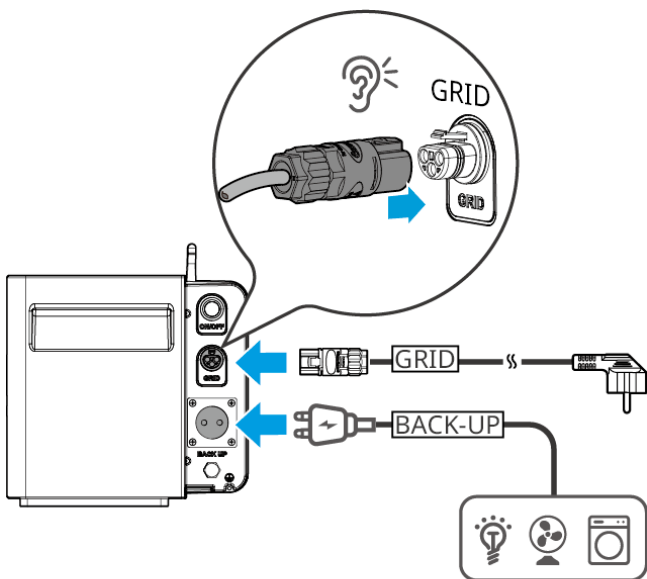
Connect the AC cables

⚠ DANGER

Confirm that the AC cable plug and socket specifications match.

Operation steps

1. Take out the AC cable shipped with the unit and connect it to the GRID AC connection port on the all-in-one inverter side.
2. If you need to connect BACK UP loads, plug the load into the BACK UP port on the all-in-one inverter side.
3. Insert the plug at the other end of the AC cable into a household socket.



ESA10ELC0015

6 System Trial Operation

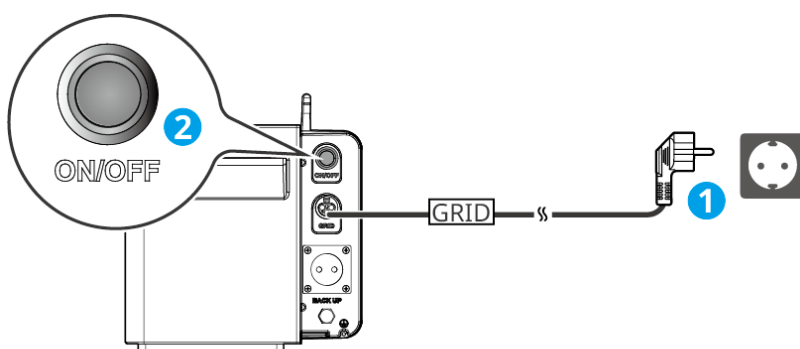
6.1 Pre-Power-on Checks

No.	Check items
1	The equipment is firmly installed. The installation position is convenient for operation and maintenance. The installation space is conducive to ventilation and heat dissipation. The installation environment is clean and tidy.
2	The DC cables and AC cables are connected correctly and securely.
3	Cable bundling complies with cable routing requirements, is reasonably distributed, and is free of damage.
4	The voltage and frequency at the grid connection point of the inverter meet the grid connection requirements.

6.2 System Power-On

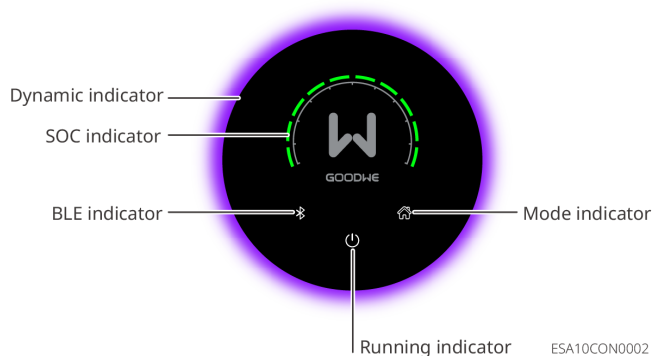
Operation steps

1. Insert the AC cable plug into the socket.
2. Press the device ON/OFF switch to start the device.

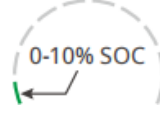
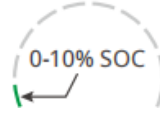


ESA10PWR0002

6.3 Indicator Light Description



Indicator light	Indicator light status	Dynamic indicator light status [1]	Description
	White light flashing	Blue-purple running light	System initializing.
	White light steady on	Blue-purple Breathing Light	System operating normally.
	Off	Red light flashing	System fault.
	Off	Yellow light flashing	Off-grid Overload.
	Off	Off	System is not powered on or is damaged.
 2] [4]	White light steady on	/	System Operating Mode is Balcony Mode.
	Off		System Operating Mode is Outdoor Mode.
 4] [3] [	White light steady on		Bluetooth broadcast is enabled.
	Off		Bluetooth broadcast is disabled.

Indicator light	Indicator light status	Dynamic indicator light status [1]	Description
	Green light steady on		- Battery charging. - Segmented lighting, each segment = 10% SOC: 
	Green light flashing		- Battery discharging. - Segmented lighting, each segment = 10% SOC: 
	Off		Battery has no charge or system is not powered.

[1] The dynamic indicator light duration can be adjusted based on actual needs via the SEMS+ App.

[2] Press and hold for 1-2 seconds  the indicator light to switch the system Operating Mode.

[3] Press and hold for 1-2 seconds  the indicator light to enable Bluetooth broadcast; after pressing and holding for 1-2 seconds and releasing, repeat this action three times within 10 seconds to restore Bluetooth, WiFi configuration and other settings.

[4] Simultaneously press and hold  and  the indicator lights for 3s to unlock the touch function; the touch function locks again 30 seconds after unlocking.

7 System Commissioning and Power Plant Monitoring

7.1 Perform Device Commissioning and Power Plant Monitoring Through the SEMS+ App

SEMS+ App is software for remote power plant monitoring or local device commissioning. It supports installers or plant owners:

- Remotely monitor plant operation and set operating parameters for the plant and devices.
- Connect to devices locally to view device operating status and set device parameters.

Download and Install the SEMS+ App

Phone requirements:

- Phone operating system requirements: Android 7.0 or later, iOS 15.1 or later.
- The phone supports a web browser and Internet connection.
- The phone supports WLAN/Bluetooth functions.

Download methods:

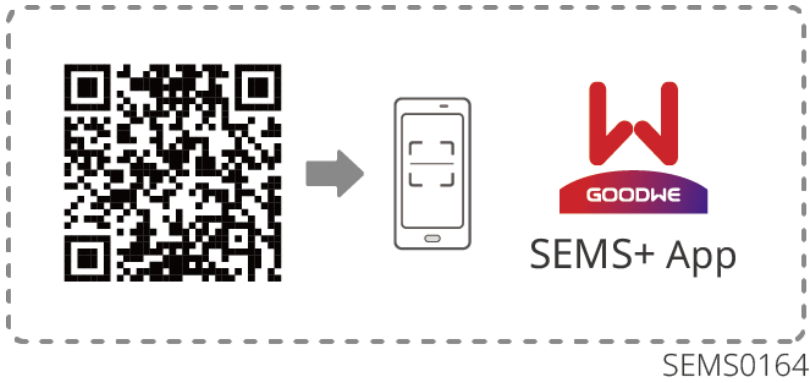
Method 1:

Search for SEMS+ in the Google Play, App Store, Huawei, Honor, Xiaomi, OPPO, and vivo app stores, then download and install.



Method 2:

Scan the following QR code to download and install.



For detailed functions, refer to "[SEMS+ App User Manual](#)". The user manual can be obtained from the official website or by scanning the following QR code.



SEMS+ App User Manual

7.1.1 Download and Install the SEMS+ App

Phone Requirements

- Phone operating system requirements: Android 7.0 or later, iOS 15.1 or later.
- The phone supports a web browser and Internet connection.
- The phone supports WLAN/Bluetooth functions.

Download Method

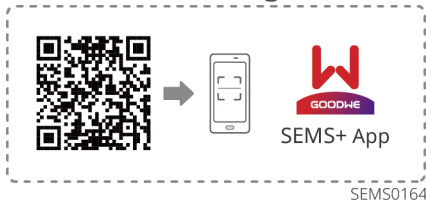
Method 1:

Search for SEMS+ in the Google Play, App Store, Huawei, Honor, Xiaomi, OPPO, and vivo app stores, then download and install.



Method 2:

Scan the following QR code to download and install.



Add Desktop Widget

- When the App version is V2.5.2 or above, you can add the SEMSt+ App to the phone desktop.
- Different operating systems have different steps for adding desktop widgets; please follow the actual steps.
- After adding the desktop widget, you can quickly view the station operation status without opening the App.

7.1.2 Register Account

Operation steps

1. On the App home page, tap "Register" to enter the account registration screen.
2. Select the server and account type according to your actual needs, then tap "Next".
3. Enter account information as appropriate, then tap "Confirm" to complete registration.

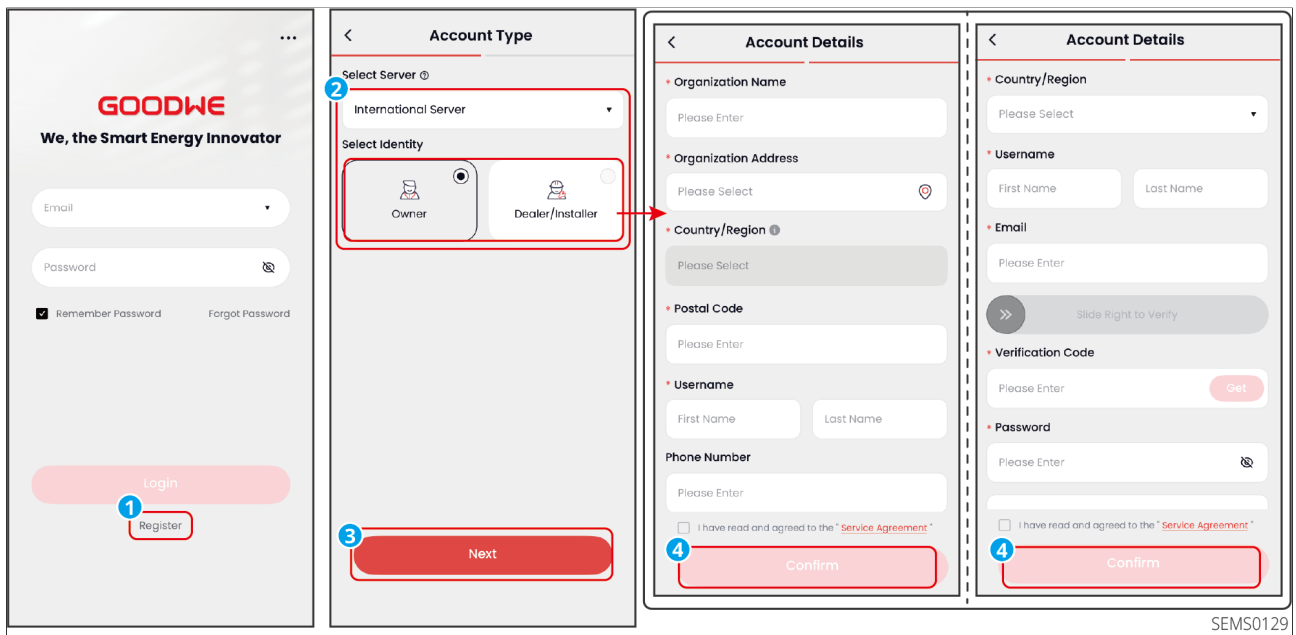


Figure1 Register Account

7.1.3 Login Account

NOTICE

- Before logging in to the App, please register an account or obtain the account and password from your dealer.
- After logging in, you can view or manage plant information. The actual interface shall prevail. The displayed plant information may vary depending on account type, region, and plant type.

Operation steps

1. Enter your account and password, then tap "Log In".

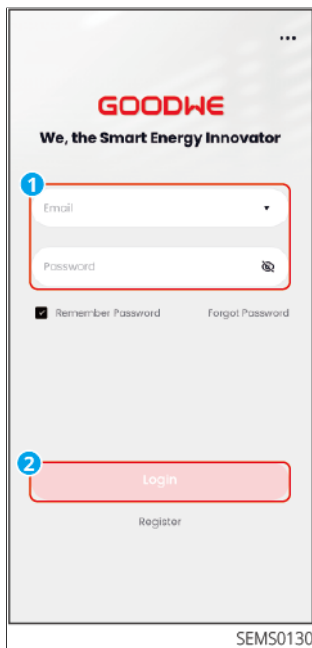


Figure2 Login Account

7.1.4 Create Plant

You can create a plant according to your actual needs.

7.1.4.1 Fill in Power Station Information

Create Plant (Installer/Dealer)

Operation steps

1. After logging in to the App, tap "Create Plant" if there are no plants under the account; if there are plants, tap "+" on the plant list screen to enter the new plant information page.
2. Follow the on-screen prompts to fill in basic information such as plant address, name, capacity, and power based on actual conditions.
3. To add plant visitors, enter the organization code and plant visitor information. Tap "Done" to create the new plant.
4. Choose whether to add plant devices based on actual conditions.

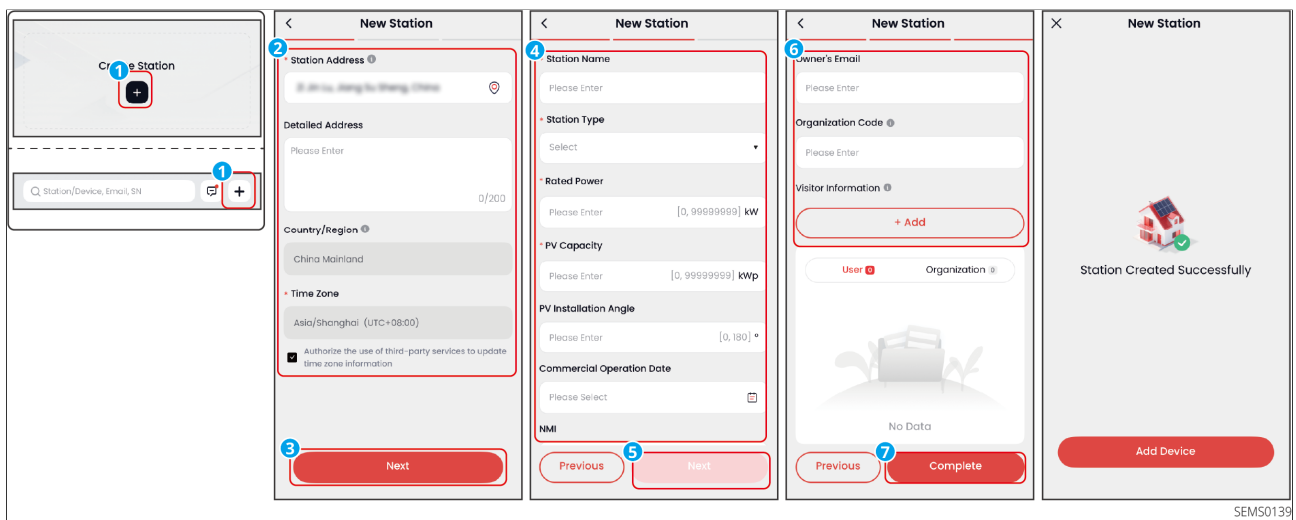


Figure3 Fill in Plant Information (Installer/Dealer)

Parameters	Functional Description
Station Type	Set according to the actual station type. Supports: Residential PV Station, Residential Storage Station, Commercial & Industrial Storage Station, Commercial & Industrial PV Station.
Station Name	Set the station name according to actual requirements.
Rated Power	Set the total installed power of the station.
PV Capacity	Set the total installed PV capacity in the station.
Battery Capacity	Set the total battery capacity in the station.
PV Installation Angle	SetPVPanel Installation Angle.
Commercial Operation Date	Set the grid connection date of the station.

Create Station (Owner)

Operation steps

1. After logging in to the App, click "Create Station" following the on-screen prompts; if there are stations under the account, click "+" on the station list page to enter the new station information page.
2. Follow the on-screen prompts and fill in basic information such as station name, address, and type according to actual conditions.

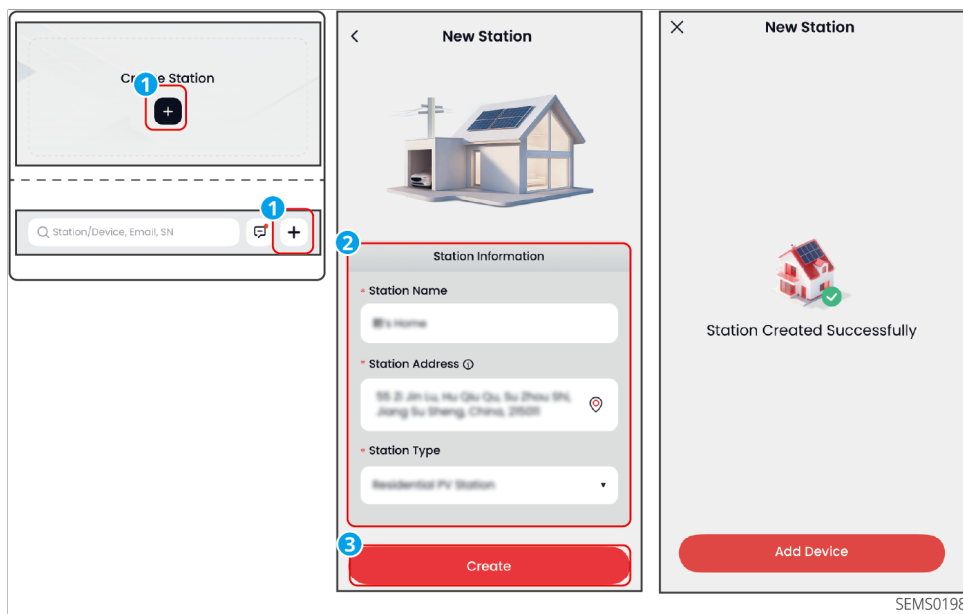


Figure4 Fill in Station Information (Owner)

7.1.4.2 Add Plant Device

After the plant is created, you can add plant devices as needed.

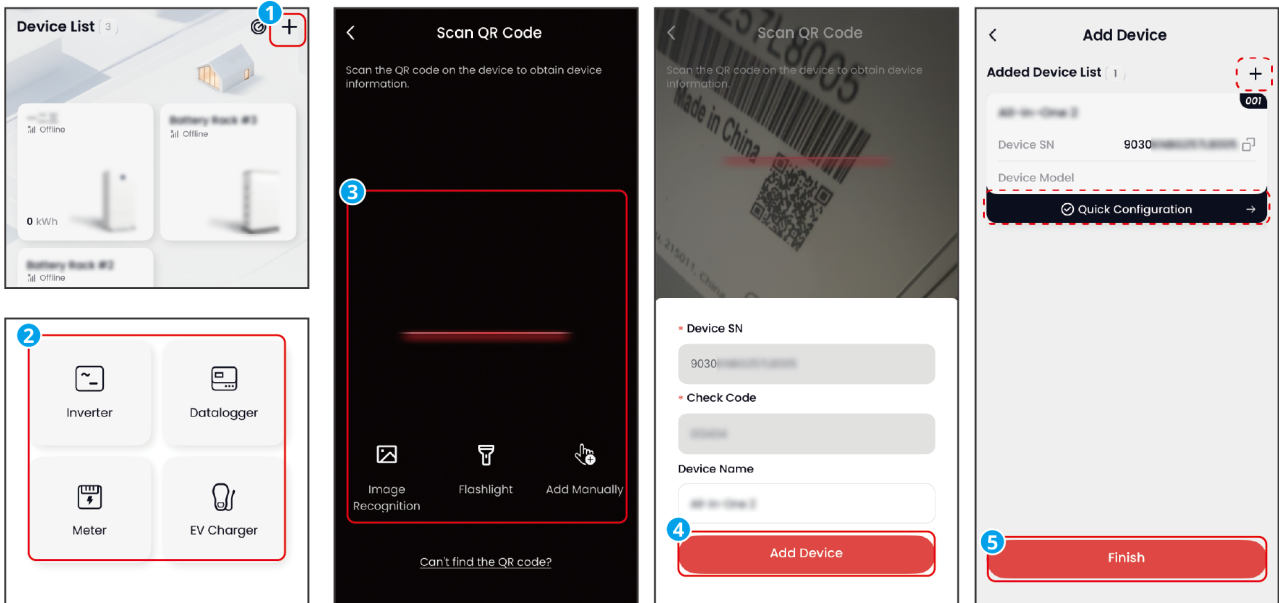
- When a home energy management system (HEMS) device has been added to the power station:
 - Supports adding devices associated with HEMS synchronously; or adding devices not associated with HEMS, and monitoring all devices in the same plant.
 - Please use Bluetooth Local Access to connect the devices in the network (such as energy storage inverters, charging piles, and smart switches) and the HEMS to the same router; otherwise, the HEMS cannot recognize the above devices. For GoodWe products, please refer to [Local Device Connection](#) section; for third-party products, please refer to the device user manual.

Steps for Manually Adding Devices

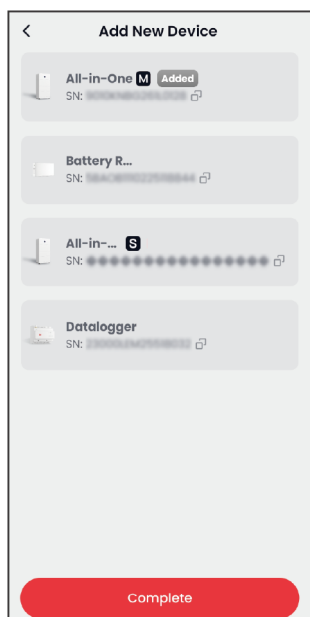
1. On the device list screen, tap **+**.
2. Add devices according to actual requirements. Select the device type, and scan the device SN or manually enter the device SN.
3. After scanning, confirm that the device serial number and check code are correct. Modify the device name according to actual requirements. Tap "Add Device" to complete the addition.
4. (Optional) To continue adding devices to the current plant, tap **+**, and repeat the

step of entering the device SN.

5. (Optional) Tap "Quick Configuration" to modify device settings such as safety code settings and network configuration. For details, refer to [7.1.4.3.Quick Configuration\(Page 48\)](#).



6. After completing Quick Configuration, devices in the same system will be recognized, such as meters and batteries, without the need to manually add them again. Tap "Done" to complete the device addition. After the device addition is completed, any new devices in the system will be automatically scanned and prompted.

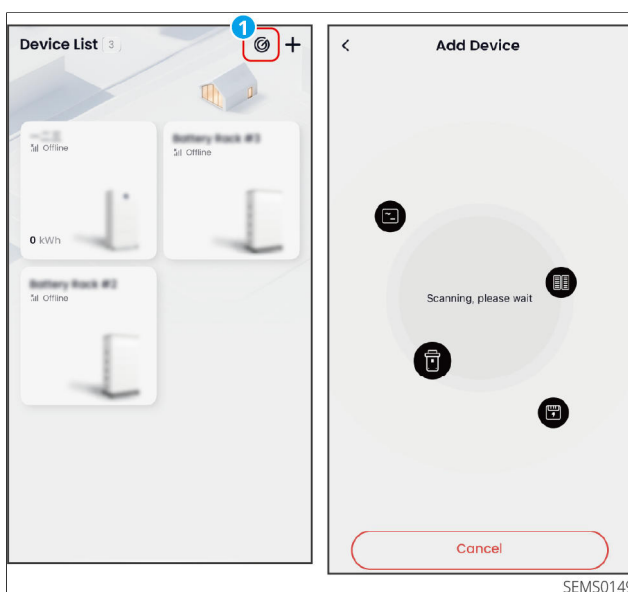


SEMS0196

Procedure for Adding Devices via Scanning

After manually adding the inverter to the plant, you can add associated devices of the inverter, such as batteries, by scanning.

1. On the device list screen, tap .
2. In the scanned devices, select the devices to be added and tap "Add".
3. To continue adding other unscanned devices, tap "Continue Adding"; otherwise, tap "Done".



SEMS0149

7.1.4.3 Quick Configuration of Devices

NOTICE

- After a device is added to the plant for the first time, Quick Configuration can ensure basic operation.
- Before performing Quick Configuration, confirm that all devices are powered on and operating normally.
- The Quick Configuration content varies by device type. Refer to the actual interface.

Operation steps

1. After adding the device, tap "Quick Configuration" as prompted on the screen, or enter the device list screen via "Service" > "Local Access".
2. On the device list screen, select the "Bluetooth" or "WiFi" tab according to the signal type of the smart communication stick.
3. Pull down or tap "Search Devices", confirm the inverter signal name according to the inverter serial number, and tap to enter the Quick Configuration screen. If you entered the settings screen via "Local Access", tap "Quick Configuration" on the home page.
4. Complete network configuration, safety code, working mode, etc. as prompted on the interface. For details on working modes, refer to System Working Modes chapter in SEMS+ App User Manual.
5. Tap "Done" to complete Quick Configuration.

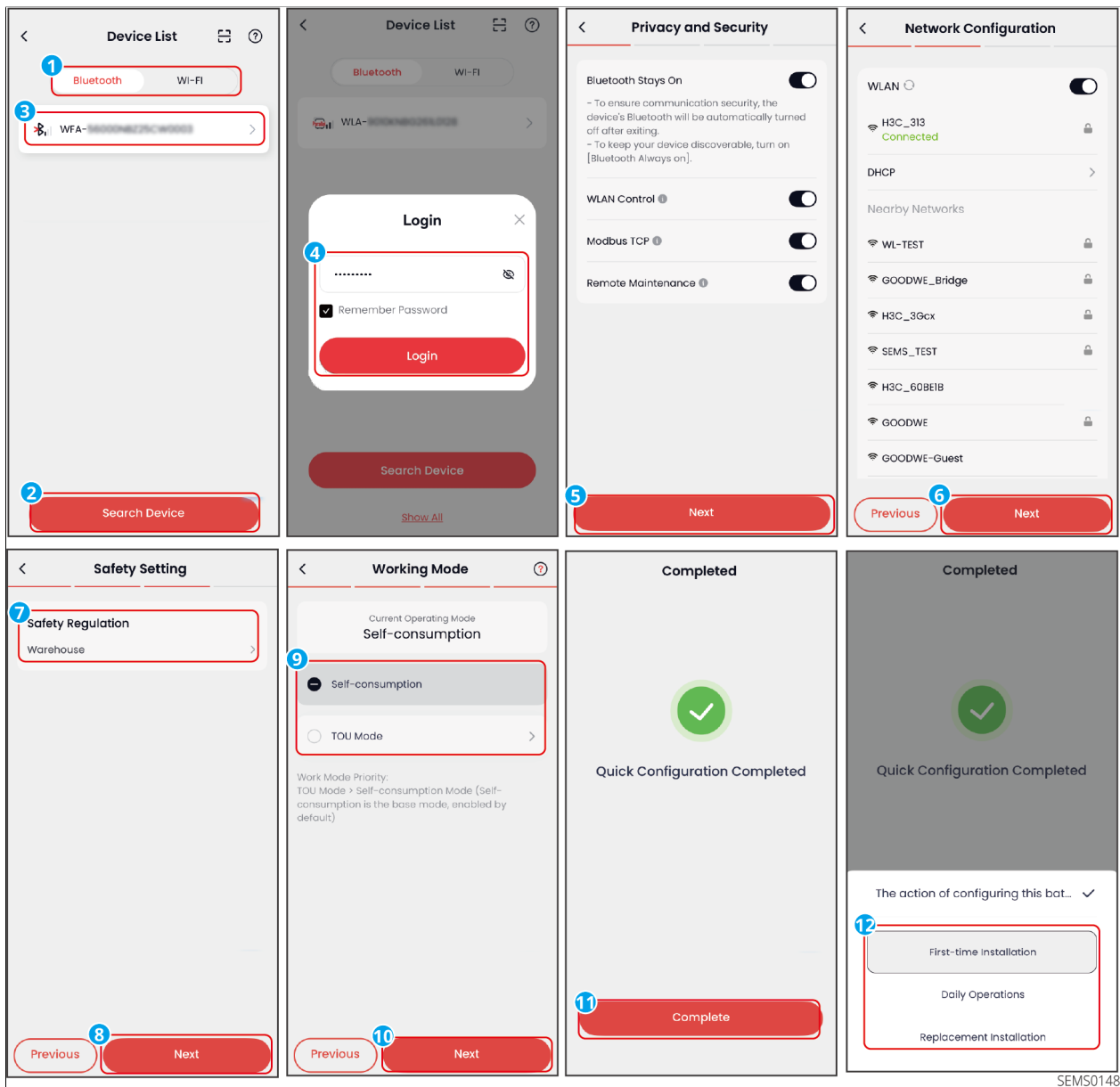


Figure5 Quick Configuration of Devices

7.2 Perform Device Commissioning and Power Plant Monitoring via SEMS+ WEB.

SEMS+ WEB is a monitoring platform that can communicate via WiFi or LAN. The common functions of SEMS+ WEB are as follows:

1. Manage organization or user information, etc.
2. Add and monitor plant information, etc.

3. Maintain devices.

For detailed functions, refer to [SEMS+ WEB User Manual](#).



SEMS+ WEB User Manual

8 System Maintenance

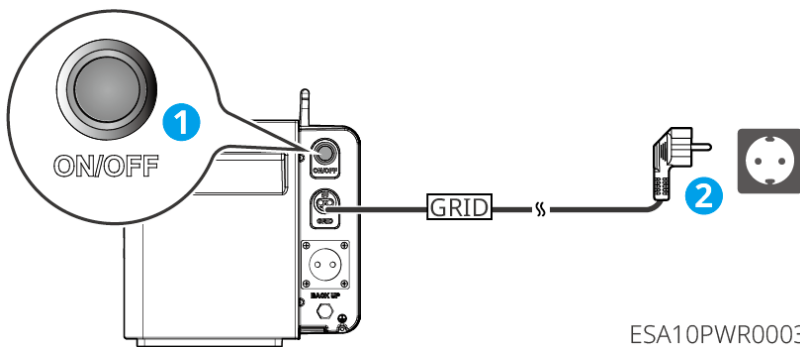
8.1 System Power-Off

DANGER

- When performing operation and maintenance on equipment in the system, power off the system first. Operating equipment while energized may cause equipment damage or risk of electric shock.
- After the device is powered off, it takes time for internal components to discharge. Wait until the device is fully discharged according to the time requirements on the label.

Operation steps

1. Press the device ON/OFF switch to power off the device.
2. Unplug the AC cable connector.



8.2 Device Removal

⚠ DANGER

- Ensure that the device is powered off.
- Wear personal protective equipment when operating the device.
- When removing wiring terminals, use standard removal tools to avoid damaging the terminals or the device.
- Unless otherwise specified, the device removal procedure is the reverse of the installation procedure and will not be described again in this document.

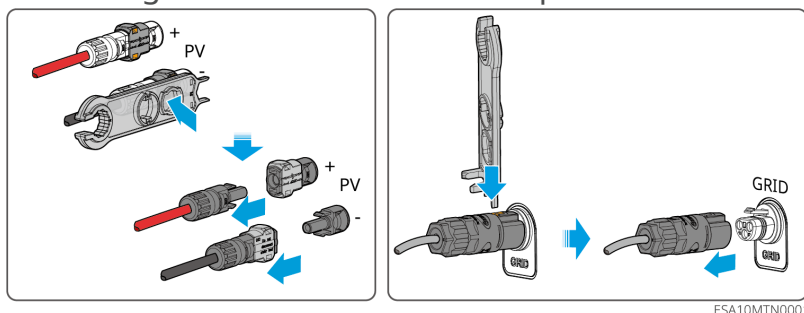
Step 1:Power off the system.

Step 2:Label the cables connected in the system to identify the cable type.

Step 3:Disconnect all electrical connections of the device, including PV cables and AC cables, as shown in the figure below.

Step 4:Remove the all-in-one unit and battery.

Step 5:Store the device properly. If the device is to be put into use later, ensure that the storage conditions meet the requirements.



8.3 Equipment Disposal

When the device can no longer be used and needs to be scrapped, dispose of it in accordance with the electrical waste disposal requirements of the country/region where the device is located. Do not dispose of the device as household waste.

8.4 Routine Maintenance



DANGER

- Before equipment maintenance, ensure that necessary safety protection equipment is worn to prevent electric shock.
- During maintenance, ensure that the upstream and downstream switches of the device are all disconnected.
- During maintenance, strictly follow the correct operating procedures.



WARNING

- If any issue that may affect the battery or the energy storage inverter system is found, contact after-sales personnel. Do not disassemble the device without authorization.
- If the copper wires inside the conductive cable are exposed, do not touch them. High voltage danger. Contact after-sales personnel. Do not disassemble the device without authorization.
- If any other emergency occurs, contact after-sales personnel immediately. Operate under the guidance of after-sales personnel, or wait for after-sales personnel to operate on site.

Maintenance Content	Maintenance Method	Maintenance Cycle	Maintenance Purpose
System Cleaning	Check that the installation space meets the requirements, and check whether debris has accumulated around the equipment.	Once every six months	Prevent heat dissipation failure.
System Installation	• Check whether the equipment is installed securely and whether the fastening screws are loose. • Check the equipment exterior for damage or deformation.	Once every six months to once every year	Confirm the stability of the equipment installation.

Maintenance Content	Maintenance Method	Maintenance Cycle	Maintenance Purpose
Electrical Connection	Check whether the electrical connections are loose, and whether the cable exterior is damaged or has exposed copper.	Once every six months to once every year	Confirm the reliability of the electrical connections.
Battery Maintenance	If the battery has not been used or fully charged for a long time, it is recommended to charge the battery periodically.	Once every 15 days	Protection of battery service life.

8.5 Troubleshooting

Please perform troubleshooting according to the following methods. If these methods cannot help you, please contact the after-sales service center.

When contacting the after-sales service center, please gather the following information to help resolve the issue quickly.

1. Product information, such as serial number, software version, device installation time, fault occurrence time, fault occurrence frequency, etc.
2. Device installation environment, such as weather conditions, whether modules are shaded or blocked, etc. For the installation environment, it is recommended that you provide photos, videos and other files to assist in problem analysis.
3. Grid conditions.

If any unlisted problem occurs in the system, or if following the instructions still cannot prevent the problem or abnormality, stop system operation immediately and contact your dealer immediately.

No.	Fault name	Fault cause	Troubleshooting suggestions
1	Grid Overvoltage Protection/Grid Overvoltage	Grid voltage is higher than the allowable range, or the Duration of high voltage exceeds the high voltage ride-through setting value.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid voltage is within the allowable range. • If the grid voltage is outside the allowable range, contact the local power operator. • If the grid voltage is within the allowable range, after obtaining consent from the local power operator, modify the inverter grid overvoltage protection point, HVRT, or disable the grid overvoltage protection function. 3. If normal operation cannot be restored for a long time, check whether the AC-side circuit breaker and output cables are connected properly.
2	Grid Undervoltage Protection/Grid Undervoltage	Grid voltage is lower than the allowable range, or the Duration of low voltage exceeds the Low Voltage ride-through setting value.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid voltage is within the allowable range. • If the grid voltage is outside the allowable range, contact the local power operator. • If the grid voltage is within the allowable range, after obtaining consent from the local power operator, modify the inverter grid undervoltage protection point, LVRT, or disable the grid undervoltage protection function. 3. If normal operation cannot be restored for a long time, check whether the AC-side circuit breaker and output cables are connected properly.

No.	Fault name	Fault cause	Troubleshooting suggestions
3	Grid Rapid Overvoltage Protection/Grid Rapid Overvoltage	Grid voltage detection is abnormal, or an ultra-high voltage triggers the fault.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid voltage is within the allowable range. • If the grid voltage is outside the allowable range, contact the local power operator. • If the grid voltage is within the allowable range, after obtaining consent from the local power operator, modify the inverter grid overvoltage protection point, HVRT, or disable the grid overvoltage protection function. 3. If normal operation cannot be restored for a long time, check whether the AC-side circuit breaker and output cables are connected properly.
4	Grid 10min Overvoltage/ Grid 10min Overvoltage	The sliding average of the grid voltage within 10 minutes exceeds the range specified by safety regulations.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. Check whether the grid voltage has been operating at a relatively high level for a long time. If it occurs frequently, check whether the grid voltage is within the allowable range. • If the grid voltage is outside the allowable range, contact the local power operator. • If the grid voltage is within the allowable range, after obtaining consent from the local power operator, modify the Grid 10min Overvoltage protection point.

No.	Fault name	Fault cause	Troubleshooting suggestions
5	Grid Overfrequency/Grid Overfrequency	Grid abnormality: The actual grid frequency is higher than the local grid standard requirement.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid frequency is within the allowable range. • If the grid frequency is outside the allowable range, contact the local power operator. • If the grid frequency is within the allowable range, after obtaining consent from the local power operator, modify the Grid Overfrequency protection point.
6	Grid Underfrequency/Grid Underfrequency	Grid abnormality: The actual grid frequency is lower than the local grid standard requirement.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid frequency is within the allowable range. • If the grid frequency is outside the allowable range, contact the local power operator. • If the grid frequency is within the allowable range, after obtaining consent from the local power operator, modify the Grid Underfrequency protection point.

No.	Fault name	Fault cause	Troubleshooting suggestions
7	Grid Frequency Instability/Grid Frequency Unstable	Grid abnormal: The actual grid frequency change rate does not comply with local grid standards.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid frequency is within the allowable range. • If the grid frequency is outside the allowable range, contact the local power operator. • If the grid frequency is within the allowable range, contact your dealer or after-sales service center.
8	Undervoltage Ride-Through Fault/LVRT Undervoltage	Grid abnormal: The duration of Grid Voltage Abnormal exceeds the time specified for high/low voltage ride-through.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid voltage and frequency are within the allowable range and stable. If not, contact the local power operator; if yes, contact your dealer or after-sales service center.
9	HVRT Overvoltage/HVRT Overvoltage	Grid abnormal: The duration of Grid Voltage Abnormal exceeds the time specified for high/low voltage ride-through.	
10	DCI Protection Level1/DCI Protection Level 1	The DC component of the inverter output current exceeds the allowable range specified by safety regulations or the inverter default settings.	1. If the abnormality is caused by an external fault, the inverter will automatically resume normal operation after the fault disappears, without manual intervention. 2. If this alarm occurs frequently and affects the normal power generation of the power station, contact the dealer or after-sales service center.
11	DCI Protection Level2/DCI Protection Level 2	The DC component of the inverter output current exceeds the allowable range specified by safety regulations or the inverter default settings.	

No.	Fault name	Fault cause	Troubleshooting suggestions
12	Low Insulation Resistance/Low Insulation Resistance	1. PV strings are short-circuited to the protection ground. 2. The environment where the PV strings are installed is humid for a long time, and the insulation of the cables to ground is poor.	1. Check the impedance of the PV strings to the protection ground. If a short circuit occurs, rectify the short-circuit point. 2. Check whether the protection ground wire of the inverter is correctly connected. 3. If it is confirmed that the impedance is indeed lower than the default value in rainy or overcast environments, reset the "Insulation Impedance Protection Point".
13	Grounding Abnormal/Grounding Abnormal	The protection ground wire of the inverter is Not Connected.	Please confirm whether the protection ground wire of the inverter is Not Connected normally.
14	Internal Comm Loss/Internal Comm Loss	Refer to the cause indicated by the specific subcode.	Disconnect the AC output side switch, disconnect the PV strings, and set the equipment switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the equipment switch to ON. If the fault still exists, contact your dealer or after-sales service center.
15	Back-up Output Overload/Back-up Output Overload	Prevent the inverter from continuous overload output.	Turn off some off-grid loads to reduce the inverter's off-grid output power.
16	Back-up Output Overvoltage/Back-up Output Overvoltage	Prevent load damage caused by inverter output overvoltage.	1. If it occurs occasionally, it may be caused by load switching, and no manual intervention is required. 2. If it occurs frequently, contact your dealer or after-sales service center.
17	AC HCT check Abnormal	AC sensor sampling abnormality	Disconnect the AC output side switch, disconnect the PV strings, and set the equipment switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the equipment switch to ON. If the fault still exists, contact your dealer or after-sales service center.

No.	Fault name	Fault cause	Troubleshooting suggestions
18	Relay Check Abnormal	Relay abnormal, cause: 1. Relay fault (relay short circuit) 2. Relay sampling circuit abnormal. 3. Abnormal AC-side wiring (possible loose connection or short circuit).	Disconnect the AC output side switch, disconnect the PV strings, and set the equipment switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the equipment switch to ON. If the fault still exists, contact your dealer or after-sales service center.
19	Cabinet Overtemperature	Cabinet Overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. The internal fan operates abnormally.	1. Check whether the inverter installation location is well ventilated and whether the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If it is not ventilated or Ambient Overtemperature occurs, please improve its ventilation and heat dissipation. 3. If ventilation and ambient temperature are both normal, contact your dealer or after-sales service center.
20	INV Module Overtemperature	Inverter module overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. The internal fan operates abnormally.	

No.	Fault name	Fault cause	Troubleshooting suggestions
21	Boost Module Overtemperature	Boost Module Overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. The internal fan operates abnormally.	
22	1.5V Ref Abnormal	Reference circuit fault	Disconnect the AC output side switch, disconnect the PV strings, and set the equipment switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the equipment switch to ON. If the fault still exists, contact your dealer or after-sales service center.
23	Model Type Error	About the Model Recognition Error fault	Disconnect the AC output side switch, disconnect the PV strings, and set the equipment switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the equipment switch to ON. If the fault still exists, contact your dealer or after-sales service center.
24	Bus Overvoltage	Bus overvoltage, possible causes: 1. PV voltage is too high; 2. Abnormal inverter BUS voltage sampling;	Disconnect the AC output side switch, disconnect the PV strings, and set the equipment switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the equipment switch to ON. If the fault still exists, contact your dealer or after-sales service center.
25	N-Bus Overvoltage		

No.	Fault name	Fault cause	Troubleshooting suggestions
26	PV Input Overvoltage/P V Input Overvoltage	PV input voltage is too high. Possible causes: Incorrect PV array configuration. Too many PV panels are connected in series in the string, causing the string open-circuit voltage to be higher than the inverter's maximum operating voltage.	Check the series configuration of the corresponding PV array string to ensure that the string open-circuit voltage does not exceed the inverter's maximum operating voltage. After the PV array is configured correctly, the inverter alarm will disappear automatically.
27	PV Continuous Hardware Overcurrent/P V Continuous Hardware Overcurrent	1. Improper module configuration 2. Hardware damage	Disconnect the AC output side switch, disconnect the PV strings, and set the equipment switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the equipment switch to ON. If the fault still exists, contact your dealer or after-sales service center.
28	FlyCap Software Overvoltage/F lyCap Software Overvoltage	Flying capacitor overvoltage. Possible causes: 1. PV voltage too high; 2. Abnormal BUS voltage sampling of the inverter;	Disconnect the AC output side switch, disconnect the PV strings, and set the equipment switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the equipment switch to ON. If the fault still exists, contact your dealer or after-sales service center.
29	PV String Reversed(Stri ng1~16)/PV String Reversed(Stri ng 1~16)	PV string reversed	Check whether the string is reversed.

No.	Fault name	Fault cause	Troubleshooting suggestions
30	Internal Fan Abnormal/Internal Fan Abnormal	Internal Fan Abnormal 1. Abnormal fan power supply; 2. Mechanical fault (stall); 3. Fan aging/damage.	Disconnect the AC output side switch, disconnect the PV strings, and set the equipment switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the equipment switch to ON. If the fault still exists, contact your dealer or after-sales service center.
31	Flash R/W Error Flash R/W Error	The flash content has changed; the flash lifetime is exhausted;	1. Upgrade to the latest program version. 2. Contact the dealer or after-sales service center.
32	PV IGBT short-circuit fault	1. MOS short circuit in the PV Boost circuit 2. Abnormal inverter sampling circuit	Disconnect the AC output side switch, disconnect the PV strings, and set the equipment switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the equipment switch to ON. If the fault still exists, contact your dealer or after-sales service center.
33	PV String Mismatch	1. String power exceeds 600W 2. Abnormal inverter sampling circuit	Disconnect the AC output side switch, disconnect the PV strings, and set the equipment switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the equipment switch to ON. If the fault still exists, contact your dealer or after-sales service center.

Battery fault

No.	Fault name	Fault cause	Troubleshooting suggestions
1	BMS1 RACK n* Total voltage is too high fault/ BMS1 RACK n Total voltage is too high fault	1. Battery system voltage too high 2. Abnormal voltage sampling line	1. Discharge the battery and check whether the fault persists; 2. If the fault is not cleared, please contact the after-sales service center.

No.	Fault name	Fault cause	Troubleshooting suggestions
2	BMS1 RACK n Total voltage is too low fault/ BMS1 RACK n Total voltage is too low fault	1. Battery system voltage too low 2. Abnormal voltage sampling line	1. Charge the battery and let it rest to see if the fault persists; 2. Check the inverter operation status. If the battery is not being charged due to issues such as the operating mode, try charging the battery through the inverter and observe whether the fault clears. 3. If the fault does not clear, please contact the after-sales service center.
3	BMS1 RACK n Cell voltage is too high fault/ BMS1 RACK n Cell voltage is too high fault	1. Single cell voltage too high 2. Abnormal voltage sampling line	1. Discharge the battery and let it rest to see if the fault persists; 2. If the fault is not cleared, please contact the after-sales service center.
4	BMS1 RACK n Cell voltage is too low fault/ BMS1 RACK n Cell voltage is too low fault	1. Single cell voltage too low 2. Abnormal voltage sampling line	1. Charge the battery and let it rest to see if the fault persists; 2. Check the inverter operation status. If the battery is not being charged due to issues such as the operating mode, try charging the battery through the inverter and observe whether the fault clears. 3. If the fault does not clear, please contact the after-sales service center.
5	BMS1 RACK n Charging temperature is too high fault/ BMS1 RACK n Charging temperature is too high fault	1. Ambient Overtemperature 2. Abnormal temperature sensor	1. Place the battery in a cool place, power off and let it rest for 30 minutes. After restarting, check whether the fault persists; 2. If the fault persists, please contact the after-sales service center.
6	BMS1 RACK n Discharging temperature is too high fault/ BMS1 RACK n Discharging temperature is too high fault	1. Ambient Overtemperature 2. Abnormal temperature sensor	1. Place the battery in a cool place, power off and let it rest for 30 minutes. After restarting, check whether the fault persists; 2. If the fault persists, please contact the after-sales service center.

No.	Fault name	Fault cause	Troubleshooting suggestions
7	BMS1 RACK n Charging temperature is too low fault/ BMS1 RACK n Charging temperature is too low fault	1. Ambient temperature too low 2. Abnormal temperature sensor	1. Check the cell temperature in the background. If the minimum temperature is above -20°C, set the battery to discharge to raise the cell temperature. 2. If the temperature is below -20°C, power off the battery and place it in a warm environment. Use it after the cell temperature rises. 3. If none of the above works, contact the after-sales service center.
8	BMS1 RACK n Discharging temperature is too low fault BMS1 RACK n Discharging temperature is too low fault	1. Ambient temperature too low 2. Abnormal temperature sensor	1. Check the cell temperature in the background. If the minimum temperature is above -20°C, set the battery to discharge to raise the cell temperature. 2. If the temperature is below -20°C, power off the battery and place it in a warm environment. Use it after the cell temperature rises. 3. If none of the above works, contact the after-sales service center.
9	BMS1 RACK n Charge overcurrent fault/ BMS1 RACK n Charge overcurrent fault	1. Charging Current too high, battery current limiting abnormal: temperature and voltage values change suddenly 2. Abnormal inverter response	1. Power off and let it rest for 5 minutes. After restarting, check whether the fault persists; 2. Check whether the inverter power setting is too high, causing the battery rated operating current to be exceeded; 3. If overcurrent persists, contact the after-sales service center.
10	BMS1 RACK n Discharge overcurrent fault/ BMS1 RACK n Discharge overcurrent fault	1. Discharge current too high, battery current limiting abnormal: temperature and voltage values change suddenly 2. Abnormal inverter response	1. Power off and let it rest for 5 minutes. After restarting, check whether the fault persists; 2. Check whether the inverter power setting is too high, causing the battery rated operating current to be exceeded; 3. If overcurrent persists, contact the after-sales service center.

No.	Fault name	Fault cause	Troubleshooting suggestions
11	BMS1 RACK n Cell excessive temperature differentials fault/ BMS1 RACK n Cell excessive temperature differentials fault	1. When the temperature difference is too large at different stages, the battery limits its power, i.e., limits the charging and discharging current. Therefore, this problem is generally unlikely to occur. 2. Cell capacity degradation leads to excessive internal resistance, causing a large temperature rise during Overcurrent and thus a large temperature difference. 3. Poor welding of cell tabs causes the cell to heat up too quickly during Overcurrent. 4. Temperature sampling issue; 5. Loose power cable connection	Power off, restart the battery, and wait for 2 hours. If the problem is not resolved, contact the after-sales service center.
12	BMS1 RACK n Post temperature is too high fault/ BMS1 RACK n Post temperature is too high fault	Post temperature too high	1. Power off and let it rest for 30 minutes. After restarting, check whether the fault persists; 2. If the fault persists, please contact the after-sales service center.

No.	Fault name	Fault cause	Troubleshooting suggestions
13	BMS1 RACK n excessive cell voltage differential fault/ BMS1 RACK n Cell excessive voltage differentials fault	1. Inconsistent cell aging levels 2. Slave board chip issues can also cause excessive cell voltage differentials; 3. Slave board balancing issues can also cause excessive cell voltage differentials 4. Caused by wiring harness issues	Power off, restart the battery, and wait for 2 hours. If the problem is not resolved, contact the after-sales service center.
14	BMS1 RACK n relay or MOS short-circuit fault/ BMS1 RACK n Relay or MOS short-circuit fault	MOS short circuit	1. Upgrade the software, power off and let it sit for 5 minutes, then restart and check whether the fault persists; 2. If it persists, contact the after-sales service center.
15	BMS1 RACK n relay or MOS open-circuit fault/ BMS1 RACK n Relay or MOS open-circuit fault	MOS open circuit	1. Upgrade the software, power off and let it sit for 5 minutes, then restart and check whether the fault persists; 2. If it persists, contact the after-sales service center.
16	BMS1 RACK n Pre-charging Failure fault/ BMS1 RACK n The precharge failed fault	Pre-charging was unsuccessful; the pre-charge circuit is abnormal	1. Upgrade the software, power off and let it sit for 5 minutes, then restart and check whether the fault persists; 2. If it persists, contact the after-sales service center.
17	BMS1 RACK n acquisition line fault/ BMS1 RACK n Acquisition line fault	The battery acquisition line has poor contact or is disconnected	Power off, check the wiring, and re-stack the batteries. If the problem persists after restarting, contact the after-sales service center.
18	BMS1 RACK n relay or MOS over-temperature fault/ BMS1 RACK n Relay or MOS temperature is too high fault	Relay or MOS over-temperature	1. Upgrade the software, power off and let it sit for 30 minutes, then restart and check whether the fault persists; 2. If it persists, contact the after-sales service center.

No.	Fault name	Fault cause	Troubleshooting suggestions
19	BMS1 RACK n shunt over-temperature fault/ BMS1 RACK n Diverter temperature is too high fault	Shunt over-temperature	1. Upgrade the software, power off and let it sit for 30 minutes, then restart and check whether the fault persists; 2. If it persists, contact the after-sales service center.
20	BMS1 RACK n BMU communication fault/ BMS1 RACK n BMU communication fault	Abnormal internal BMS acquisition communication	1. Restart the battery, 2. Upgrade the battery. If the problem persists after restarting, contact the after-sales service center.
21	BMS1 RACK n microelectronics fault/ BMS1 RACK n Micro-electronics fault	MCU internal fault	Upgrade the software and restart the battery. If the problem persists after restarting, contact the after-sales service center.
22	BMS1 RACK n Hardware Overcurrent fault/ BMS1 RACK n Hardware overcurrent fault	1. The software version is too low or the BMS board is damaged 2. The large number of parallel-connected inverters causes excessive inrush to the battery during pre-charging	1. Upgrade the software and observe whether the fault persists. 2. If it is a parallel configuration, first black-start the battery and then start the inverter.
23	BMS1 RACK n application Software Failure fault/ BMS1 RACK n Application software fault	MCU self-test failure	Upgrade the software and restart the battery. If the problem persists after restarting, contact the after-sales service center.
24	BMS1 RACK n parallel RACK fault/ BMS1 RACK n Parallel RACK fault	Abnormal communication between the master RACK and the slave RACK, or inconsistent cells between RACKs	1. Check the battery information and software version of the slave unit, and whether the communication cable connection with the master unit is normal 2. Upgrade the software
25	BMS1 RACK n DCDC Failure/ BMS1 RACK n DCDC fault	DCDC Overload or heat sink temperature too high, etc.	Upgrade the software and restart the battery. If the problem persists after restarting, contact the after-sales service center.

No.	Fault name	Fault cause	Troubleshooting suggestions
26	BMS1 RACK n Inconsistent cell fault BMS1 RACK n Inconsistent cell fault	1. Abnormal cell recognition 2. Different types of cells are stacked	Check the cell type.
27	BMS1 RACK n output port over-temperature fault/ BMS1 RACK n The output port over temperature fault	Loose screws or poor contact at the output port	1. Turn off the battery and check the wiring and output port screws 2. After confirmation, restart the battery and observe whether the fault persists. If it persists, contact the after-sales service center.
28	BMS1 RACK n SOH too low fault/ BMS1 RACK n SOH too low fault	Battery has been used for too long or the cells are severely damaged	Replace the battery.
29	BMS1 RACK n heating film three-terminal fault	Heating film MOS damaged	Please contact the after-sales service center.
30	BMS1 RACK n heating film MOS open circuit	Heating MOS abnormal	1. Power off and let it rest for 5 minutes. After restarting, check whether the fault persists; 2. After confirmation, restart the battery and observe whether the fault persists. If it persists, contact the after-sales service center.
31	BMS1 RACK n heating film MOS stuck	Heating MOS abnormal	1. Power off and let it rest for 5 minutes. After restarting, check whether the fault persists; 2. After confirmation, restart the battery and observe whether the fault persists. If it persists, contact the after-sales service center.
32	BMS1 RACK n DCDC Failure	An overcurrent, overvoltage, or short-circuit fault has occurred	1. Power off and let it rest for 5 minutes. After restarting, check whether the fault persists; 2. After confirmation, restart the battery and observe whether the fault persists. If it persists, contact the after-sales service center.

9 Technical Parameters

9.1 Technical Parameters of the All-in-One Machine

Technical Data	GW0.8/1.9-ESA-PS-G10
Battery Data	
Battery Type	LFP (LiFePO4)
Rated Capacity (Ah)	100
Rated Energy (kWh)	1.92
Nominal Voltage (V)	19.2
Operating Voltage Range (V)	52...56
Max. Input/ Output Current (A)-Basic Unit	30/30
Max. Input/ Output Power (kW)-Basic Unit	1.6/1.6
Max. Input/ Output Current (A)-With Expandable Battery	45/30
Max. Input/ Output Power (kW)-With Expandable Battery	2.4/1.6
Cycle Life	> 6000 (25±2°C 0.5P 100%DOD 70%EOL)
Depth of Discharge	100%
PV String Input Data	
Max.MPPT Input Power (kW)	2.4
Max.Input Voltage (V)	60
Operating Voltage Range(V)	13...60

Technical Data	GW0.8/1.9-ESA-PS-G10
MPPT Voltage Range (V)	13...48
MPPT Voltage Range at Nominal Power (V)	33.3...48
Start-up Voltage (V)	15
Nominal Input Voltage (V)	40
Max.MPPT Current(A)	18/18/18/18
Max.MPPT Short Circuit Current(A)	20/20/20/20
Number of MPPT Trackers	4
Number of Strings per MPPT	1
Max.Inverter Backfeed Current(A)	0
AC Output Data (On-grid)	
Nominal Power (kW)	0.8
Max. Output Power (kW)	0.8
Nominal Apparent Power to Grid(kVA)	0.8
Max. Current to Grid(A)	3.6@220V 3.5@230V 3.3A@240V
Nominal Apparent Power from Grid (kVA)	1.5
Max.Apparent Power from Grid(kVA)	1.5
Max.Current from Grid(A)	8.8
Nominal Voltage (V)	220/230/240, L/N/PE
Output Voltage Range (V)	170-280

Technical Data	GW0.8/1.9-ESA-PS-G10
Nominal Frequency (Hz)	50/60
AC Grid Frequency Range (Hz)	45~55 / 55~65
Power Factor	~1 (0.8lagging...0.8leading)
THDi	3%
Inrush Current(A)	20
Max. Output Fault Current(A)	20
Maximum Output Overcurrent Protection(A)	15
AC Output Data (Back-up)	
Nominal Output Apparent Power(kVA)	1.5
Max.Output Apparent Power(kVA)	1.5
Max. Output Current (A)	6.8
Nominal Output Voltage (V)	220/230/240, L/N/PE
Nominal Output Frequency (Hz)	50/60
THDu	<3%
Switching from Grid Connected Mode to Standalone Mode(ms)	<10
Efficiency	
Max. Efficiency	92%
MPPT Efficiency	99.80%
Protection	
PV Insulation Resistance Detection	Integrated

Technical Data	GW0.8/1.9-ESA-PS-G10
Anti-islanding Protection	Integrated
AC Overcurrent Protection	Integrated
AC Short Circuit Protection	Integrated
AC Overvoltage Protection	Integrated
AC Surge Protection	Type III
Fast AC Discharge	Integrated
Fire Safety Equipment	Optional(Aerosol)
General Data	
Operating Temperature Range (°C)	-20°C-+55°C (With Heating)
Storage Temperature (°C)	-20°C-35°C (1 year) 35°C-45°C (6 month)
Relative Humidity	0-95%
Max.Operating Altitude (m)	3000
Cooling Method	Natural Convection
User Interface	LED、APP
Communication Interface	Bluetooth、Wi-Fi
Weight (kg)	26
Dimension (W×H×D mm)	480×249×260
Noise Emission (dB)	23
Topology	Isolated
Ingress Protection	IP65

Technical Data	GW0.8/1.9-ESA-PS-G10
Pollution Degree	PD3 (External) PD2 (Internal)
Overvoltage Category	OVCII (DC) OVCII (AC)
Anti-Corrosion Class	C4
Protection Class	Class II
Mounting Method	Floor stacked
Warranty (year)	10 Years
Certification	
Grid Standards	VDE 4105:2018; EN50549-1/-10; C10/11 CEI 0-21
Safety Regulation	IEC62109-1/-2; EN18031; IEC 62619; IEC 63056; IEC60730; UN38.3
EMC	IEC/EN 61000-1/-2/-3/-4; IEC/EN 62920; CISPR 11; EN 55011; EN 301489-1/- 17

9.2 Battery Technical Parameters

Technical Data	GW1.9-BAT-LVD-G10
Battery Data	
Battery Type	LFP (LiFePO4)
Rated Capacity (Ah)	100
Rated Energy (kWh)	1.92
Nominal Voltage (V)	19.2

Technical Data	GW1.9-BAT-LVD-G10
Operating Voltage Range (V)	52...56
Max. Input/Output Current (A)	30/30
Max. Charge/ Discharge power (kW)	1.6/1.6
Cycle Life	> 6000 (25±2°C 0.5P 100%DOD 70%EOL)
Depth of Discharge	100%
General Data	
Operating Temperature Range (°C)	-20°C~+55°C (With Heating)
Storage Temperature (°C)	-20°C~35°C (1 year) 35°C~45°C (6 month)
Relative Humidity	0 ~ 95%
Max.Operating Altitude (m)	3000
Cooling Method	Natural Convection
Weight (kg)	21
Dimension (W×H×D mm)	480×180×260
Ingress Protection	IP65
Pollution Degree	PD3 (External) PD2 (Internal)
Overvoltage Category	OVCII (DC)
Anti-Corrosion Class	C4
Protection Class	Class II
Mounting Method	Floor stacked

Technical Data	GW1.9-BAT-LVD-G10
Fire Safety Equipment	Aerosol(Optional)
Warranty (year)	10 Years
Certification	
Grid Standards	/
Safety Regulation	IEC 62619; IEC 63056; IEC60730; UN38.3

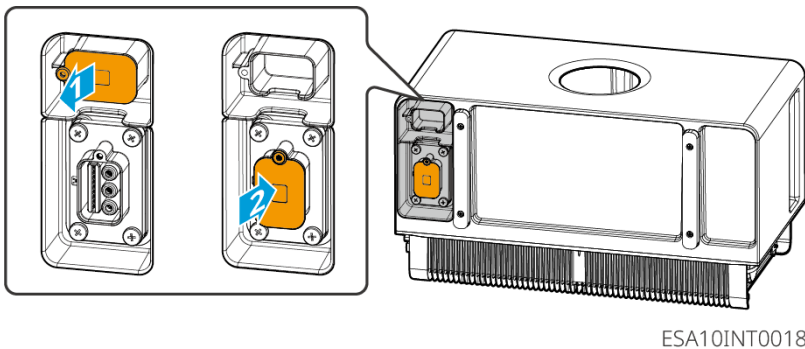
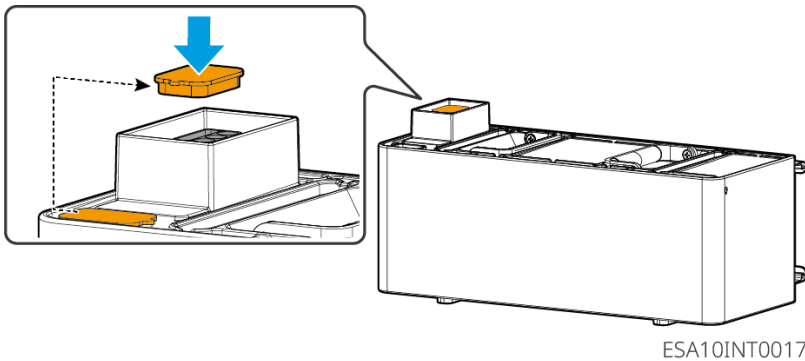
10 Appendix

10.1 FAQs

10.1.1 How to Take the All-in-One Machine Outdoors for Use

Operation steps

1. Press the ON/OFF button to power off the device.
2. Disconnect the device wiring, including the BACKUP, GRID, and PV cables.
3. If there is a battery, remove the series bracket between the all-in-one machine and the battery.
4. Install the battery connection port Protection cover onto the battery connection blind-mating port of the all-in-one machine, and install the battery port Protection cover onto the blind-mating port on the battery. As shown in the figure below.
5. After arriving outdoors, press the ON/OFF button to power on, and click the scene switch button to switch to the outdoor scene. At this time, the scene light goes off.



10.2 Definition of Terms

- **Overvoltage Category Explanation**

- **Overvoltage category I:** Equipment connected to circuits with measures that limit transient overvoltages to a relatively low level.
- **Overvoltage category II:** Energy-consuming equipment supplied from a fixed installation. Such equipment includes appliances, portable tools and other household and similar loads. If special requirements for reliability and suitability apply to such equipment, voltage category III is adopted.
- **Overvoltage category III:** Equipment in a fixed installation, for which the reliability and suitability of the equipment must meet special requirements. Includes switching devices in the fixed installation and industrial equipment permanently connected to the fixed installation.
- **Overvoltage category IV:** Equipment used at the source of the power distribution installation, including measuring instruments and primary overcurrent Protection devices, etc.

- **Definition of Damp-location Categories**

Environmental Parameters	Level		
	3K3	4K2	4K4H
Temperature Range	0~+40°C	-33~+40°C	-33~+40°C
Humidity Range	5% to 85%	15% to 100%	4% to 100%

- **Environmental Category Explanation:**

- **Outdoor inverter:** ambient air temperature range -25°C to +60°C, suitable for Pollution Degree 3 environments;
- **Indoor Type II inverter:** ambient air temperature range -25°C to +40°C, suitable for Pollution Degree 3 environments;
- **Indoor Type I inverter:** ambient air temperature range 0°C to +40°C, suitable for Pollution Degree 2 environments;

- **Pollution Degree Category Explanation**

- **Pollution Degree 1:** no pollution or only dry, non-conductive pollution;
- **Pollution Degree 2:** Generally, only non-conductive pollution occurs, but occasional temporary conductivity caused by condensation must be considered;
- **Pollution Degree 3:** Conductive pollution occurs, or non-conductive pollution becomes conductive due to condensation;

- **Pollution Degree 4:** Persistent conductive pollution, such as pollution caused by conductive dust or rain and snow.

10.3 Meaning of the Battery SN Code

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 11-14位

The SN code's 11-14 digits are the production time code.

The production date in the above figure is 2023-08-08

- The 11th and 12th digits are the last two digits of the production year. For example, 2023 is represented as 23;
 - The 13th digit is the production month, e.g., month 8 is represented as 8;
- The details are as follows:

Production Month	Months 1~9	October	November	December
Month Code	1~9	A	B	C

- The 14th digit is the production day, e.g., the 8th day is represented as 8;
- Numbers are preferred. For example, 1~9 represent days 1~9, A represent days 10, and so on. The letters I and O are not used to avoid confusion. The details are as follows:

Production Day	1day	2day	3day	4day	5day	6day	7day	8day	9day
code	1	2	3	4	5	6	7	8	9

Production Day	10da y	11da y	12da y	13da y	14da y	15da y	16d ay	17d ay	18d ay	19d ay	20d ay
code	A	B	C	D	E	F	G	H	J	K	L

Production Day	21da y	22da y	23da y	24da y	25da y	26d ay	27d ay	28d ay	29d ay	30d ay	31d ay
code	M	N	P	Q	R	S	T	U	V	W	X

11 Contact Information

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