

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

Due to product version upgrades or other reasons, the document content may be updated from time to time. Unless otherwise agreed, the document content cannot replace the safety precautions on the product label. All descriptions in the document are for guidance only.

Preface

Overview

This document mainly introduces product information, installation wiring, configuration and commissioning, troubleshooting, and maintenance for the energy storage system composed of a residential energy storage all-in-one machine, expansion batteries, and an Intelligent meter. Before installing and using the product, please read this manual carefully, understand the product safety information, and familiarize yourself with the product's functions and features. The document may be updated from time to time; please obtain the latest version of the materials and more product information from the official website.

Applicable Products

The energy storage system includes the following products:

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

Symbol Definitions

 DANGER
Indicates a high potential hazard that, if not avoided, will result in death or serious personal injury.
 WARNING
Indicates a moderate potential hazard that, if not avoided, could result in death or serious personal injury.
 CAUTION
Indicates a low potential hazard that, if not avoided, could result in moderate or minor personal injury.

NOTICE

Emphasis and supplement to the content; may also provide tips or tricks for optimized product use, which can help you solve a problem or save time.

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1 Safety Precautions

The safety precautions contained in this document must always be observed when operating the equipment.

WARNING

The equipment has been designed and tested in strict accordance with safety regulations. However, as electrical equipment, relevant safety instructions must be observed before any operation on the equipment. Improper operation may cause serious personal 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 cannot replace the safety precautions on the product label. All descriptions in the document are for guidance only.
- Before installing the equipment, carefully read this document to understand the product and precautions.
- When operating the equipment, use insulated tools and wear personal protective equipment to ensure personal safety. When touching electronic components, wear antistatic gloves, antistatic wrist straps, antistatic clothing, etc., for Protection of the equipment from electrostatic damage.
- Unauthorized disassembly or modification may cause equipment damage, and such damage is not covered by the warranty.
- 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 not within the scope of the equipment manufacturer's responsibility. For more product warranty information, please visit the official website: <https://en.goodwe.com/warranty>.

1.2 Personnel Requirements

NOTICE

- Personnel responsible for equipment maintenance must first undergo strict training, understand various safety precautions, and master correct operating methods.
- Maintenance or replacement of equipment or components is only permitted to be performed by qualified professionals or trained personnel.

1.3 System Safety

 DANGER

- Before performing electrical connections, ensure that the equipment is de-energized. Live operation is strictly prohibited; otherwise, hazards such as electric shock may occur.
- For devices that support connection to PV strings, the PV input terminals have weak surge current withstand capability. It is strictly prohibited to directly power on via the PV port using a DC voltage source. If power-on from the PV port is required, perform the following steps. If equipment damage is caused by non-compliant operation, it is considered human-induced damage and is not covered by product warranty.
 1. First, limit the output current of the DC voltage source to within the allowable Max. Current from Grid range of the PV port.
 2. Then close the inverter's DC Switch.
 3. Finally, slowly raise the DC source output voltage from zero to the target value at a rate of ≤ 50 V/s.
- Applicable laws, regulations, standards, and specifications shall be observed during all operations such as transportation, storage, installation, operation, use, and maintenance.
- The specifications of cables and components used for electrical connections shall comply with local laws, regulations, standards, and specifications.
- Please use the cable connectors supplied with the equipment to connect the equipment cables. If connectors of other models are used, any resulting equipment damage is not within the scope of the equipment manufacturer's responsibility.
- Ensure that all cable connections of the equipment are correct, tight, and free from looseness. Improper wiring may lead to poor contact or equipment damage.
- To ensure Protection of the equipment and its components from damage during transportation, please ensure that transportation personnel are professionally trained. Record the operating steps during transportation and keep the equipment balanced to avoid dropping the equipment.
- The equipment is heavy. Please assign corresponding personnel according to the equipment Weight to prevent the equipment from exceeding the Weight range that can be carried by the human body and causing injury to personnel.
- Ensure that the equipment is placed stably and not tilted. Equipment tipping may cause equipment damage and personal injury.

WARNING

- During equipment installation, do not allow the wiring terminals to bear weight; otherwise, terminal damage may occur.
- If the cable is subjected to excessive tension, it may cause poor wiring. When wiring, please reserve a certain length of cable before connecting it to the equipment wiring port.
- Cables of the same type should be tied together; cables of different types should be routed at least 30 mm apart; winding around each other or crossing is prohibited.
- Using cables in high-temperature environments may cause insulation aging and damage. The distance between cables and heat-generating components or the outer periphery of heat source areas shall be at least 30 mm.

1.3.1 PV String Safety

WARNING

- Ensure that the module frames and mounting bracket system are properly grounded.
- After the DC cable connection is completed, ensure that the cable connections are tight and free from looseness. Improper wiring may lead to poor contact or high impedance and damage the all-in-one unit.
- Ensure that the positive and negative poles of the cables are connected correctly and not reversed; the voltage should be lower than the maximum DC input voltage. Damage caused by reverse connection and Overvoltage is not within the scope of the equipment manufacturer's responsibility.
- The PV string output does not support grounding. Before connecting the PV string to the all-in-one unit, ensure that the minimum insulation resistance of the PV string to ground meets the minimum insulation impedance requirement ($R = \text{Max. Input Voltage (V)} / 30\text{mA}$).
- Do not connect the same PV string to multiple all-in-one units; otherwise, the all-in-one unit may be damaged.
- The photovoltaic modules used in conjunction must comply with IEC 61730 Class A standards.

1.3.2 Residential ESS All-in-One System Safety

WARNING

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

1.3.3 Battery Safety

DANGER

- Before operating equipment in the system, ensure that the equipment is de-energized to avoid electric shock hazards. During equipment operation, strictly observe all safety precautions in this manual and the safety markings on the equipment.
- Without official authorization from the equipment manufacturer, do not disassemble, modify, or repair the equipment; otherwise, electric shock hazards or equipment damage may occur, and losses caused thereby are not within the scope of the equipment manufacturer's responsibility.
- Do not strike, pull, drag, crush, or step on the equipment. Do not place the battery in fire; otherwise, there is a risk of battery explosion.
- Do not place the battery in a high-temperature environment. 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 abnormalities, do not use it. Battery damage may cause electrolyte leakage.
- Do not move the battery system while the battery is operating.
- 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, weather conditions, etc., which may cause battery current limiting and affect the load capacity.
- If the battery cannot be started, contact the after-sales service center as soon as possible. Otherwise, the battery may be permanently damaged.
- Perform regular inspection and maintenance on the battery according to the battery maintenance requirements.

Emergency Measures for Emergency Situations

- **Battery Electrolyte Leakage**
If the battery module leaks electrolyte, avoid contact with the leaked liquid or gas. The electrolyte is corrosive; contact may cause skin irritation and chemical burns. If you accidentally come into contact with leaked substances, perform the following operations accordingly:
 - Inhalation: Evacuate from the contaminated area and seek medical attention immediately.
 - Eye contact: Rinse with clean water for at least 15 minutes and seek medical attention immediately.
 - Skin contact: Wash the affected area thoroughly with soap and water and seek medical attention immediately.
 - Ingestion: Induce vomiting and seek medical attention immediately.
- **Fire**
 - When the battery temperature exceeds 150°C, there is a risk of battery fire. After the battery catches fire, it may release toxic and harmful gases.
 - To avoid fire, ensure that carbon dioxide, Novec1230, 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 Safety Symbols and Certification Mark

Description

DANGER

- After the equipment is installed, the labels and warning signs on the enclosure must be clearly visible. Obstructing, altering, or damaging them is prohibited.
- The following enclosure warning label descriptions are for reference only. Please refer to the labels actually used on the equipment.

No.	Symbol	Meaning
1		Potential hazards exist during equipment operation. When operating the equipment, take proper protective measures.
2		High voltage hazard. High voltage exists during equipment operation. Before operating the equipment, ensure that the equipment has been powered off.
3		The inverter surface is hot. Do not touch it during equipment operation; otherwise, burns may result.
4		Use the equipment properly. Using it under extreme conditions may pose an explosion risk.
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, please wait 5 minutes until the device is completely 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 device manufacturer.
14		Protection grounding conductor connection point.
15		CE Certification mark.
16		Double insulation or reinforced insulation

1.5 EU Declaration of Conformity

1.5.1 Devices with Wireless Communication Function

Devices with wireless communication function that can be sold in the European market meet 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 that can be sold in the European market meet 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.

More EU Declarations of Conformity can be obtained from [the official website](#).

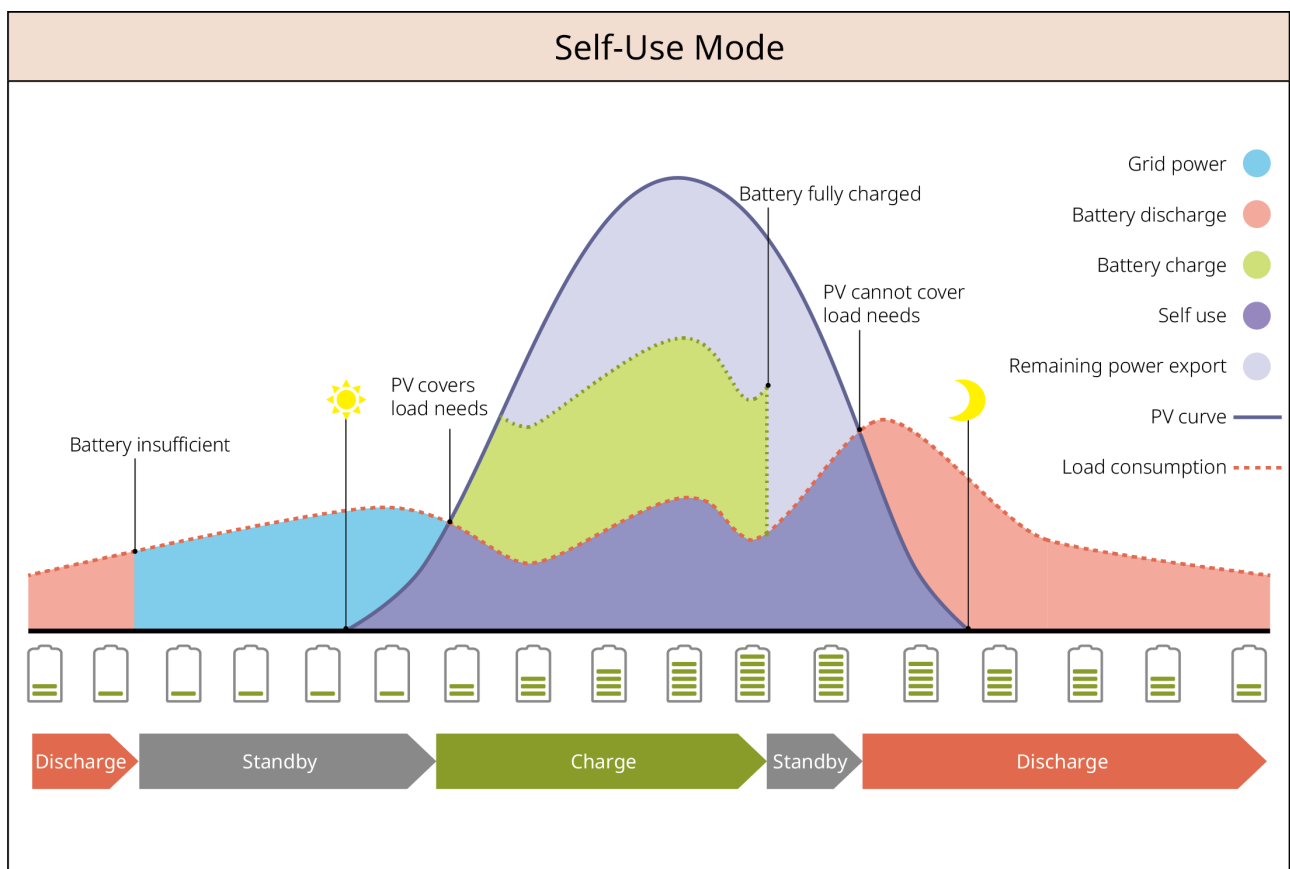
the App via WiFi, the straight-line distance between the device and the router is less than 10 meters.

- 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 60V.

2.2 System Mode

Self-consumption Mode

- Basic operating mode of the system.
- PV power generation supplies the load first, surplus power charges the battery, and any remaining power is exported to the grid. When PV power generation does not meet the load demand, the battery supplies power to the load; when the battery power also does not meet the load demand, the grid supplies power to the load.

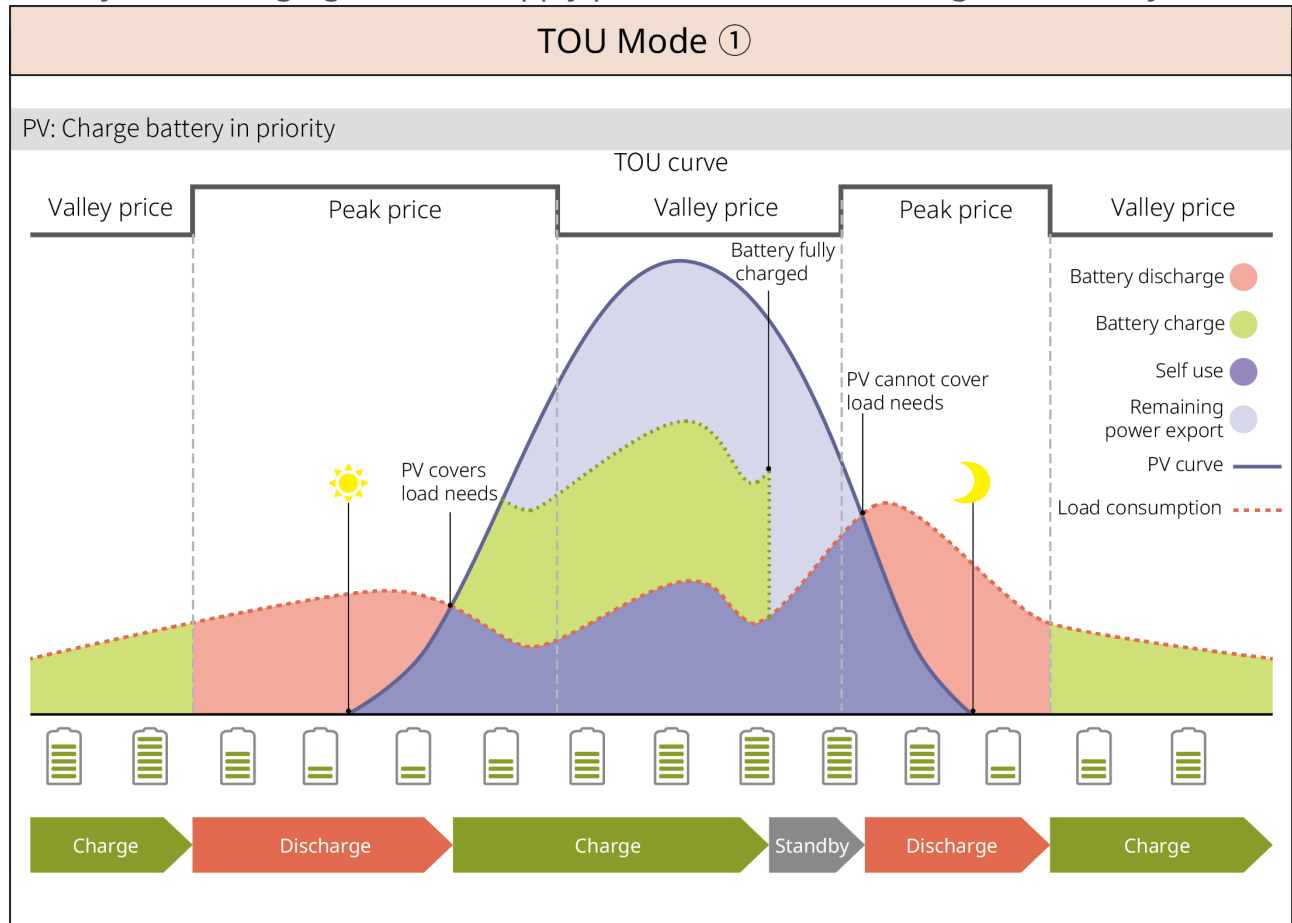


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TOU Mode

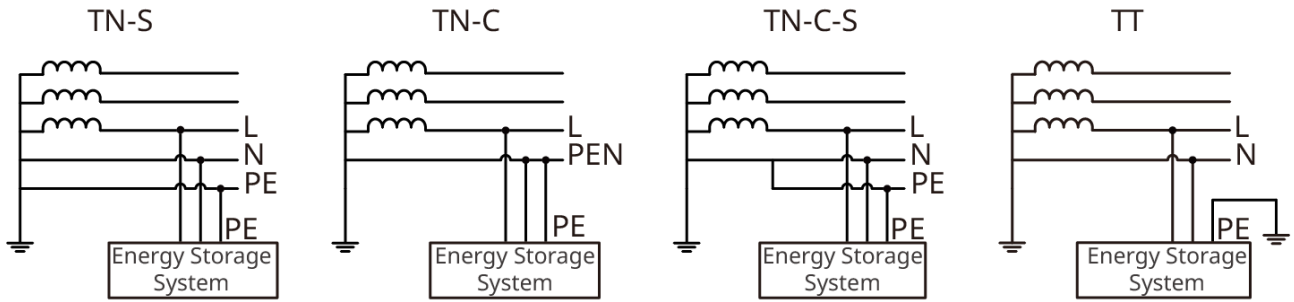
In compliance with local laws and regulations, set different time periods for energy

purchase and Export Energy according to the grid's peak-valley Tariff differentials. For example: During the valley Tariff period, set the battery to charging mode to purchase electricity from the grid for charging; during the peak Tariff period, set the battery to discharging mode to supply power to the load through the battery.



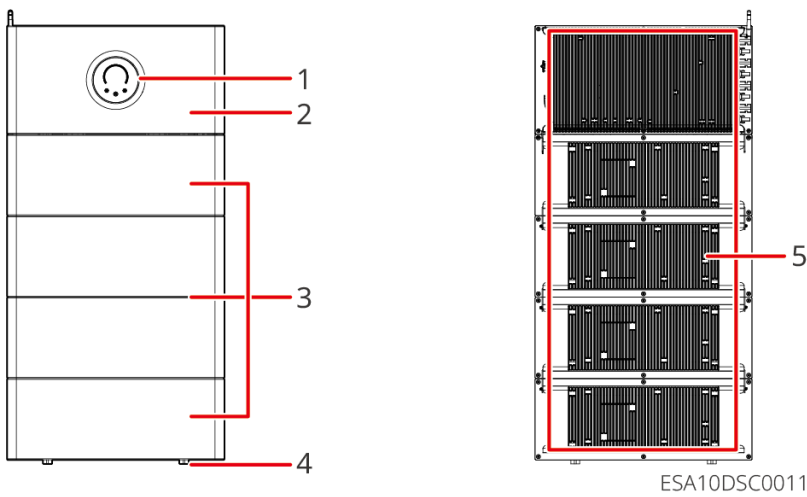
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2.3 Supported Grid Types



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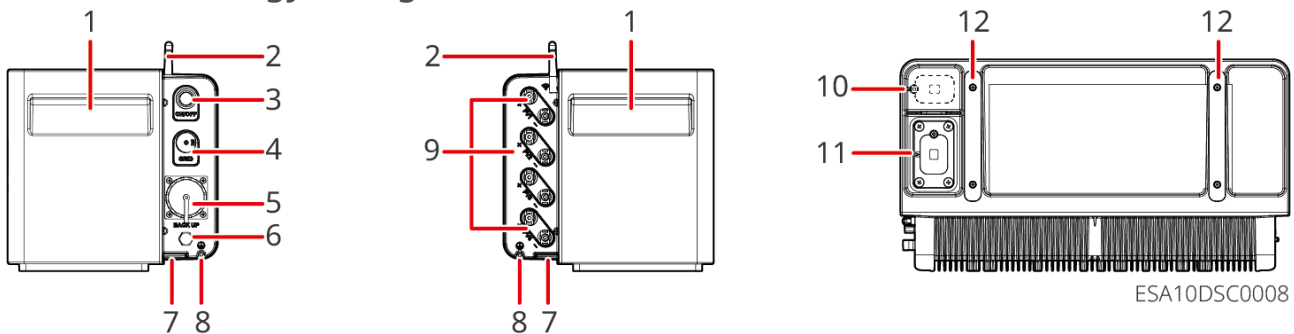
2.4 Appearance Description



ESA10DSC0011

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

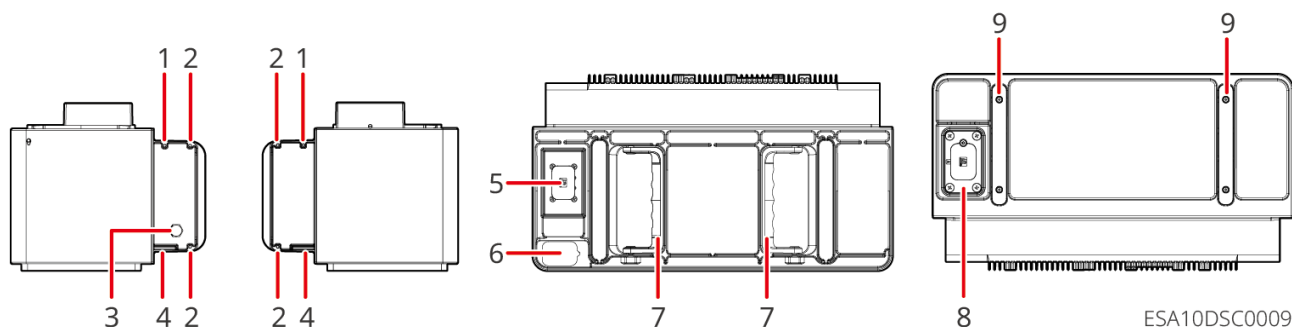
Residential Energy Storage All-in-One Machine



ESA10DSC0008

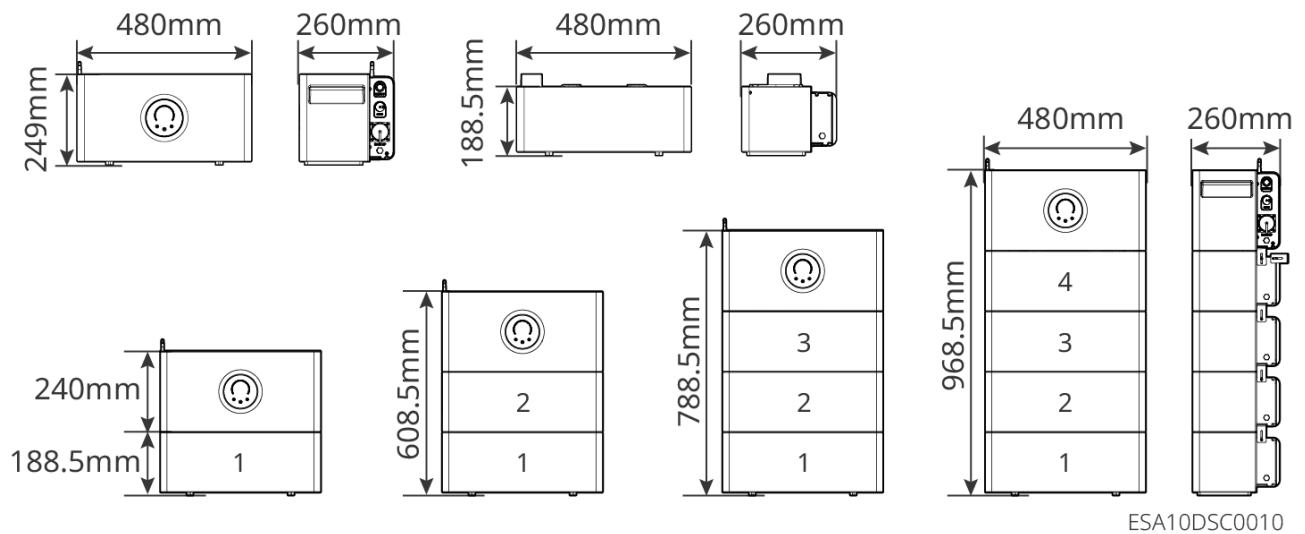
No.	Part/Silkscreen	Note
1	Carrying Handle	Used for carrying the device.
2	Antenna	Used for wireless communication; currently supports Wi-Fi and Bluetooth signals.
3	ON/OFF Switch	Control Device Start/Stop.
4	Grid Port	Connect the AC cable to connect the device to the grid.
5	BACK-UP Port	Connect the AC cable to supply power to critical loads.
6	Vent valve	-
7	Series bracket mounting hole	Install the series bracket to secure the all-in-one unit and the expansion battery.
8	Protection grounding terminal	Reserved port for connecting the Protection ground wire.
9	PVinput terminal	ConnectPVmodule DC input cables.
10	Battery connection port Protection cover mounting base	• Store the Protection cover of the battery connection port. • When the battery blind-mate port is in use, install the Protection cover on the mounting base; when the battery blind-mate port is not in use, install the Protection cover on the blind-mate port.
11	Battery connection blind-mate port	Connect the residential energy storage all-in-one unit and the expansion battery.
12	Foot Pad	-

Battery

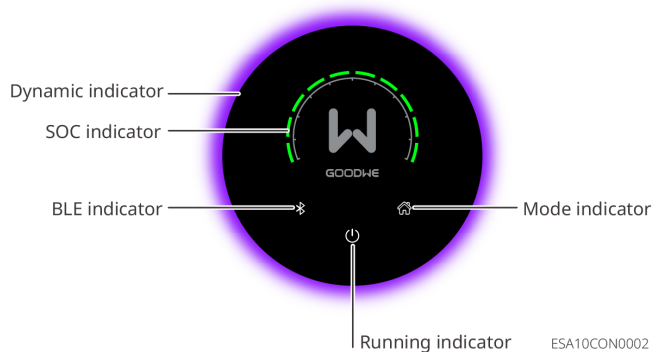


No.	Part/Silkscreen	Note
1	Series bracket fixing hole	Install the series bracket to secure the all-in-one unit and the expansion battery, or to secure batteries to each other.
2	Anti-tip bracket fixing hole	Used to secure the anti-tip bracket.
3	Vent valve	-
4	Series bracket mounting hole	Install the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

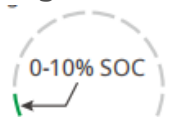
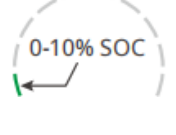
2.5 Dimensions



2.6 Indicator Light Description



Indicator Light	Indicator Light Status	Dynamic Indicator Light Status [1]	Note
	White light flashing	Blue-purple running light	System is preparing.
	White light steady on	Blue-purple Breathing Light	System is 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]	Note
	Off	Off	System is not powered on or is damaged.
 [2] [4]	White light steady on		The system Operating Mode is Balcony Mode.
	Off		The system Operating Mode is Outdoor Mode.
 [3] [4]	White light steady on		Bluetooth advertising is enabled.
	Off		Bluetooth advertising 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 the system is not powered on.

[1] The lighting duration of the dynamic indicator light can, according to actual needs, [be adjusted via SEMS+ App](#).

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

Mode.

[3] Press and hold for 1-2 seconds  indicator light to enable Bluetooth advertising; press and hold for 1-2 seconds, then release, and repeat this action three times within 10 seconds to restore Bluetooth, WiFi configuration, and other settings.

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

3 Equipment Inspection and Storage

3.1 Equipment Inspection

Before signing for the product, please carefully inspect the following:

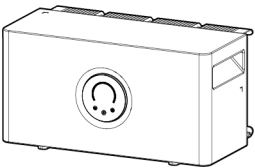
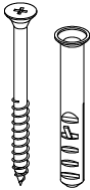
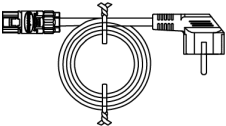
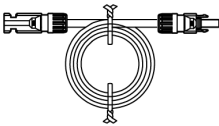
1. Check whether the outer packaging is damaged, such as deformation, punctures, cracks, or other signs that may cause damage to the equipment in the package. If there is any damage, do not open the package and contact your dealer.
2. Check whether the equipment model is correct. If it does not match, do not open the package and contact your dealer.

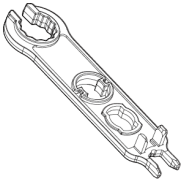
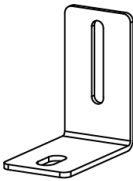
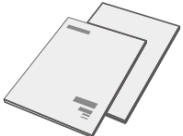
3.2 Delivered Items

WARNING

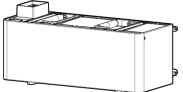
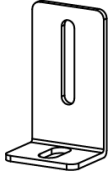
Check whether the type and quantity of the delivered items are correct and whether their appearance is damaged. If there is any damage, contact your dealer.

Delivered Items for the Residential Energy Storage All-in-One System

Component	Note	Component	Note
	Residential Energy Storage All-in-One System x1		Expansion screws x2
	AC connection cable x1 AC connection cable length: 5 m		PV extension cable x8 Extension cable length: 2.9 m

Component	Note	Component	Note
	PV connector removal tool x1		Anti-tip bracket x2
	M4*10 screws x2		PV anti-tamper cover x8
	Product documentation x1	-	-

Battery Delivered Items

Component	Note	Component	Note
	Battery x1		Series connection bracket x2
	M4*10 screws x2	-	-

3.3 Equipment Storage

- If the residential energy storage all-in-one system has been stored for more than two years, or has not been operated for more than 6 months after installation, it is recommended to have it inspected and tested by professionals before putting it into use.
- To ensure good electrical performance of the internal electronic components of the residential energy storage all-in-one system, 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 to have it inspected and tested by professionals before putting it into use.

- To ensure battery performance and service life, avoid long-term idle storage. Prolonged storage may cause deep discharge of the battery, resulting in irreversible chemical loss, capacity degradation, or even complete failure; prompt use is recommended. If the battery needs to be stored for a long time, perform maintenance according to the following requirements:

NOTICE

The storage time starts from the SN date on the battery outer packaging. After the storage period is exceeded, charge/discharge maintenance is required. (Battery maintenance time = SN date + charge/discharge maintenance period). To check the SN date, see: [10.3.Battery SN Code Meaning\(Page 73\)](#).

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°C	-20~35°C, 12months	Recharge the battery according to the battery SOC range requirements.
GW1.9-BAT-LVD-G10			35~45°C, 6months	

Packaging Requirements:

Ensure the outer packaging box is not removed and the desiccant inside the box is not lost.

Environmental Requirements:

1. Ensure the equipment is stored in a cool place and protected from direct sunlight.
2. Ensure the storage environment is clean, with suitable temperature and humidity ranges and no condensation. If condensation occurs at the equipment ports, do not install the equipment.
3. Ensure the equipment is stored away from flammable, explosive, corrosive, and other items.

Stacking Requirements:

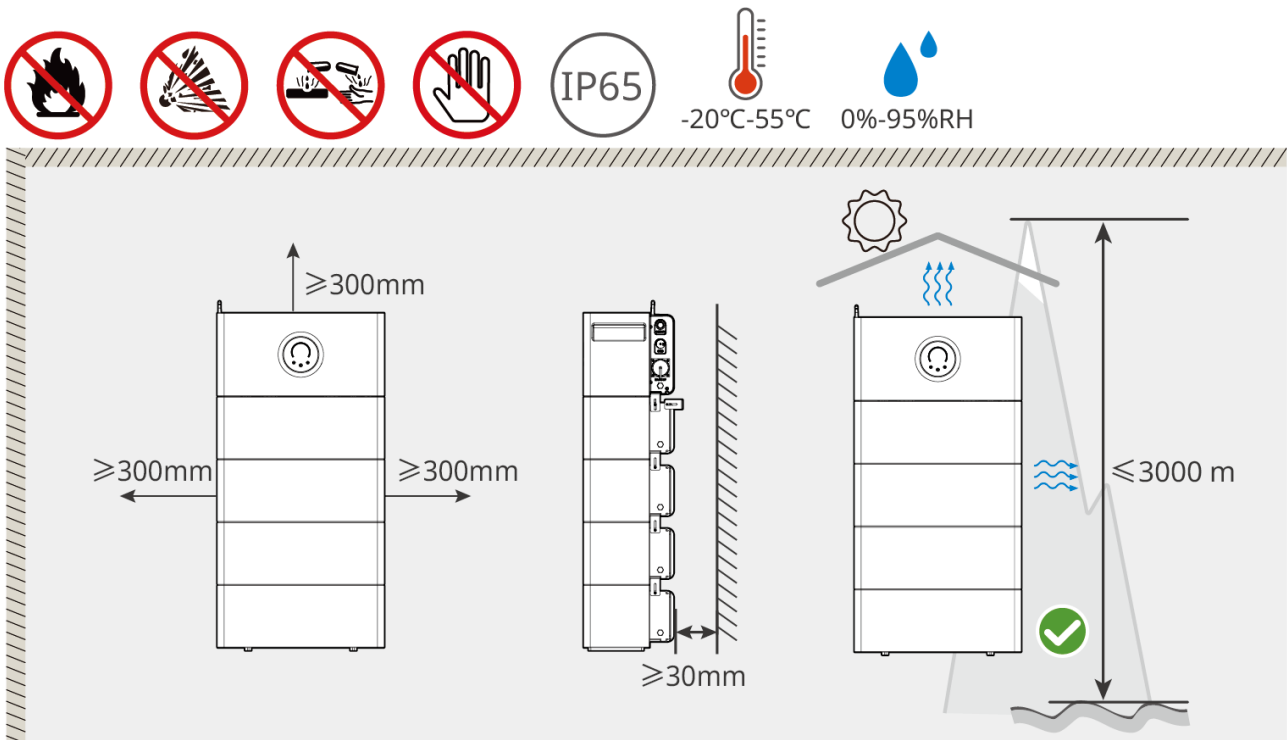
1. Ensure the stacking height and direction of the equipment are arranged according to the label instructions on the packaging box.
2. Ensure there is no risk of tipping after stacking the equipment.

4 Installation

DANGER

When installing the equipment and making electrical connections, use the delivered parts shipped with the box; otherwise, any resulting equipment damage will not be 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 other conditions. If full sheltering is

not possible due to site conditions, ensure that the ambient temperature, humidity, and other conditions always 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 temperatures may cause inverter output power derating. When selecting the installation site, fully consider heat dissipation conditions and avoid direct sunlight on the equipment body.
5. The equipment installation and storage site should avoid areas directly exposed to cold air from air conditioner outlets. Excessive local temperature differences may cause condensation inside the equipment, which may lead to equipment damage.
6. The installation position must be out of the reach of children and avoid locations where it can be easily touched.
7. During equipment operation, surfaces may be hot. Do not touch the enclosure before cooling to prevent burns.
8. The installation space must meet the equipment's ventilation and heat dissipation requirements and operating space requirements.
9. The equipment installation height must facilitate operation and maintenance, ensuring that equipment indicators and all labels are easy to view, and wiring terminals are easy to operate.
10. The equipment installation altitude must be lower than the Max. Operating Altitude.

NOTICE

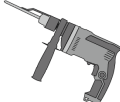
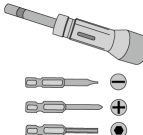
Charging temperature range: $-20^{\circ}\text{C} < T < 55^{\circ}\text{C}$; Discharging temperature range: $-20^{\circ}\text{C} < T < 55^{\circ}\text{C}$ 。

If installed at -20°C or below, the battery will be unable to continue charging to recover energy after being fully discharged, causing Battery Undervoltage.

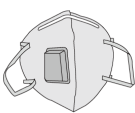
Tool Requirements

NOTICE

During installation, it is recommended to use the following installation tools. If necessary, other auxiliary tools may be used on site.

Tool Type	Note	Tool Type	Note
	Diagonal Pliers		Spirit Level
	Impact Drill (Drill Bit Φ8mm)		Torque Wrench M4、 M5、 M8
	Rubber Mallet		Marker
	Cable Tie		Vacuum Cleaner

Personal Protective Equipment

Tool Type	Note	Tool Type	Note
	Insulating Gloves, Protective Gloves		Dust Mask
	Safety Goggles		Safety Shoes

4.2 Equipment Handling

CAUTION

- During transportation, turnover, installation, and other operations, the laws, regulations, and relevant standards of the country and region must be complied with.
- Before installation, the equipment needs to be transported to the installation site. During transport, to avoid personal injury or equipment damage, pay attention to the following:
 - Please allocate corresponding personnel according to the equipment Weight to prevent the equipment from exceeding the human handling weight range and causing crushing injuries to personnel.
 - Please wear safety gloves to avoid injury.
 - Please ensure the equipment remains balanced during handling to avoid falling.

4.3 Install the Device

CAUTION

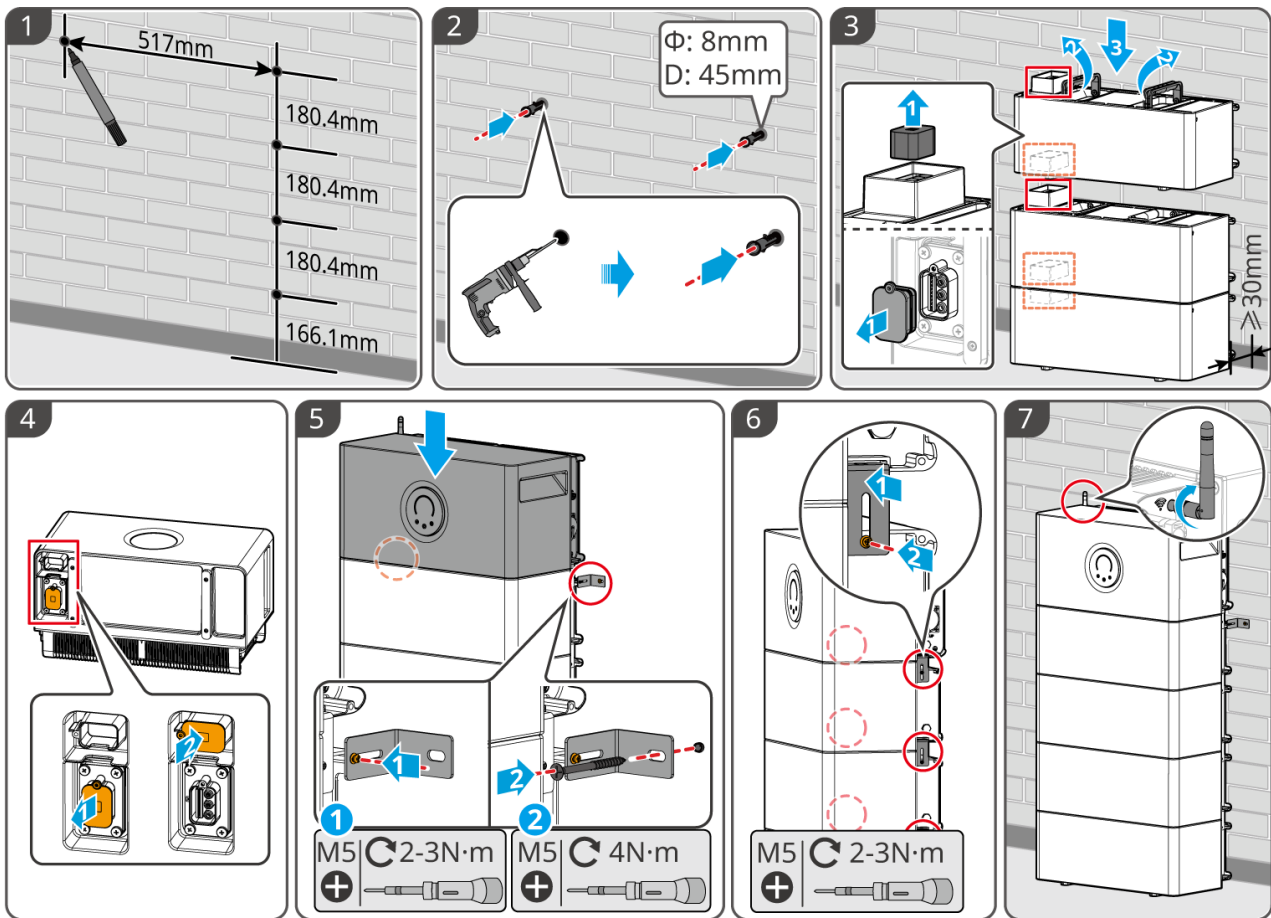
- When drilling, ensure the drilling positions avoid water pipes, cables, etc. inside the wall to prevent hazards.
- When drilling, wear goggles and a dust mask to prevent dust from being inhaled or entering the eyes.
- The All-in-One unit is installed above the expansion battery. Do not install the expansion battery above the All-in-One unit.
- During device installation, ensure the installation is level and secure. When placing the All-in-One unit and expansion battery, confirm that the upper and lower mounting holes are aligned; the anti-tip bracket must be vertical and flush against the wall or battery surface.
- When using an impact drill to drill holes, cover the device with cardboard or other shielding materials to prevent foreign objects from entering the device and causing damage.

The following steps apply to scenarios with expansion batteries. If no expansion battery is involved, place the All-in-One unit in a suitable installation position

according to actual needs.

Procedure

1. Use a marker to mark the drilling positions. The drilling positions vary depending on the number of expansion batteries installed; refer to the illustration for details.
2. Use an impact drill to drill holes, and pre-install the expansion bolt sleeves in the holes. Hole diameter: 8 mm, hole depth: 45 mm.
3. Except for the battery stacked at the very bottom, for which the lower blind-mate port protective cover must be retained, the blind-mate port protective covers of all other batteries must be removed. After removing the covers, stack and install the batteries, placing them 30 mm away from the wall and parallel to the wall.
4. Remove the blind-mate port protective cover from the All-in-One unit and install it on the adjacent protective cover holder to prevent loss.
5. Stack-install the All-in-One unit. During installation, align the battery blind-mate ports to ensure secure installation. Fix one side of the anti-tip bracket to the first battery below the All-in-One unit and tighten it with screws. Fix the other side to the wall and tighten it with the pre-installed expansion bolts.
6. Insert the series brackets into the bracket mounting holes of the All-in-One unit and batteries in sequence, and tighten them with screws to secure the All-in-One unit to the batteries and the batteries to each other.
7. Tighten the antenna on the upper side of the All-in-One unit.



ESA10INT0016

5 System Wiring

DANGER

- The erection, routing, and connection of cables must comply with local laws, regulations, and specification requirements.
- All operations during electrical connection and the specifications of cables and components used must comply with local laws and regulations.
- Before performing electrical connections, ensure that the equipment is de-energized. Live operation is strictly prohibited; otherwise, hazards such as electric shock may occur.
- Cables of the same type should be tied together and routed separately from cables of different types. Intertwining or crossing routing is prohibited.
- If the cable is subjected to excessive tension, it may lead to poor connection. During wiring, reserve a certain length of cable before connecting it to the inverter connection port.

NOTICE

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

Connect PV DC Cables

DANGER

Before connecting PV strings to the equipment, confirm the following information; otherwise, it may cause permanent equipment damage and, in severe cases, fire, resulting in personal injury and property loss.

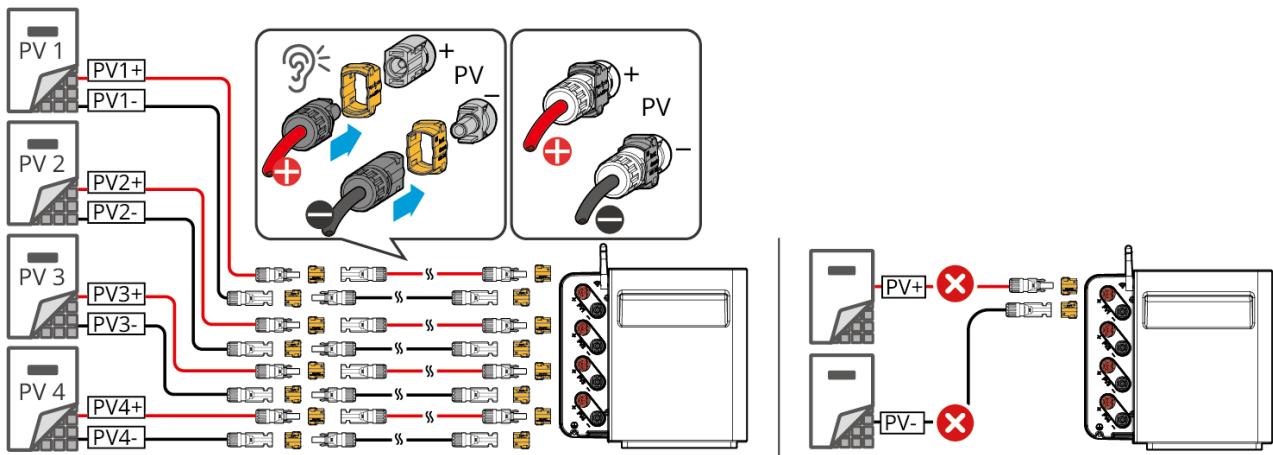
1. Ensure that the Max. MPPT Short Circuit Current and Max. Input Voltage of each MPPT are within the allowable range of the all-in-one machine.
2. Ensure that the positive pole of the PV string is connected to PV+ of the all-in-one machine, and the negative pole of the PV string is connected to PV-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

WARNING

- The PV string output does not support grounding. Before connecting the PV string to the all-in-one machine, 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 the DC cables are connected, ensure that the cable connections are tight and not loose.
- Ensure that the positive and negative poles of the DC cables are correct and not reversed, and the voltage is within the allowable range.
- To prevent the PV cable from detaching, install the anti-removal cover. The anti-removal cover is only applicable to MC4 PV connectors.
- Ensure that the PV cable connection length does not exceed 3 meters. It is recommended to use the PV extension cable shipped with the box.

Procedure

1. Take out the PV anti-removal cover shipped with the box, and install it to the PV connector on the all-in-one machine side and the PV connector on the module side.
2. Take out the PV extension cable shipped with the box, and connect it to the all-in-one machine and the module respectively.



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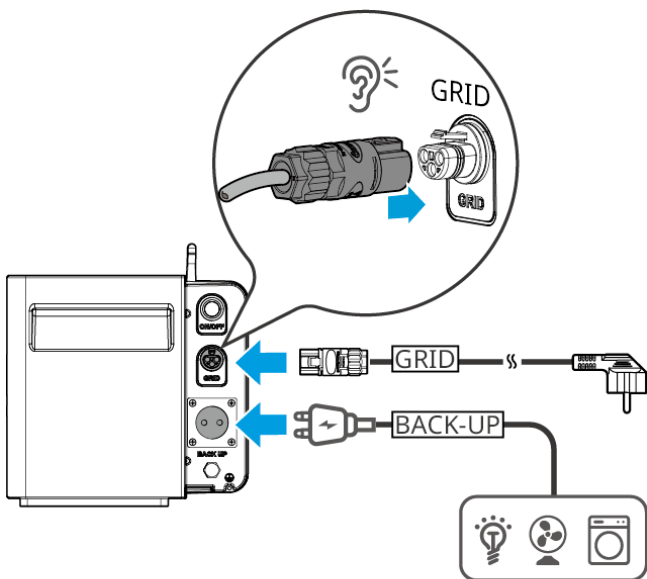
Connect AC Cables

⚠ DANGER

Ensure that the AC cable plug and socket specifications match.

Procedure

1. Take out the AC cable shipped with the box, and connect it to the GRID AC connection port on the all-in-one machine side.
2. If a BACK UP load needs to be connected, plug the load connector into the BACK UP port on the all-in-one machine side.
3. Insert the plug at the other end of the AC cable into the household socket.



ESA10ELC0015

6 System Trial Run

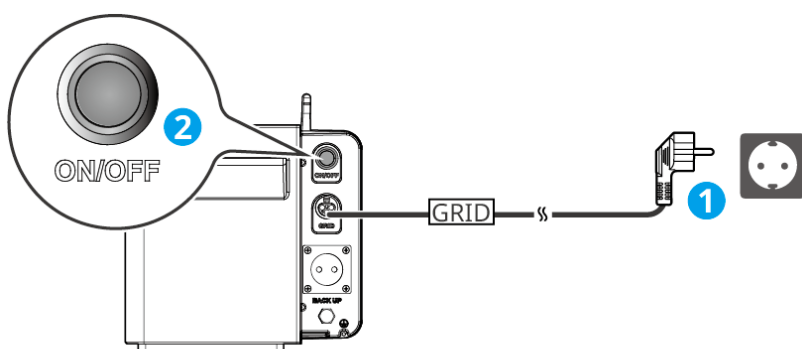
6.1 Pre-Power-on Check

No.	Check Items
1	The equipment is installed securely; the installation position facilitates operation and maintenance; the installation space facilitates ventilation and heat dissipation; and the installation environment is clean and tidy.
2	The DC cables and AC cables are connected correctly and securely.
3	The cables are bound in accordance with routing requirements, reasonably distributed, and free from damage.
4	The voltage and frequency at the inverter's grid-connection point meet the grid-connection requirements.

6.2 Power on the System

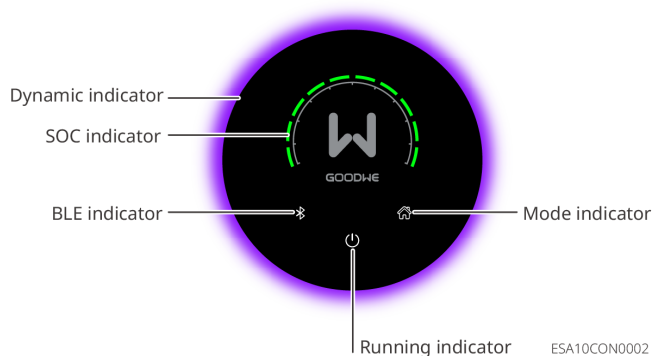
Procedure

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

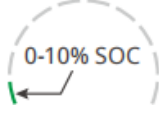
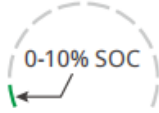


ESA10PWR0002

6.3 Indicator Light Description



Indicator Light	Indicator Light Status	Dynamic Indicator Light Status [1]	Note
	White light flashing	Blue-purple running light	System is preparing.
	White light steady on	Blue-purple Breathing Light	System is 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	/	The system Operating Mode is Balcony Mode.
	Off		The system Operating Mode is Outdoor Mode.
 4] [3] [	White light steady on		Bluetooth advertising is enabled.
	Off		Bluetooth advertising is disabled.

Indicator Light	Indicator Light Status	Dynamic Indicator Light Status [1]	Note
	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 the system is not powered on.

[1] The lighting duration of the dynamic indicator light can, according to actual needs, [be adjusted via SEMS+ App](#).

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

[3] Press and hold for 1-2 seconds  indicator light to enable Bluetooth advertising; press and hold for 1-2 seconds, then release, and repeat this action three times within 10 seconds to restore Bluetooth, WiFi configuration, and other settings.

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

7 System Commissioning and Plant Monitoring

7.1 Perform Device Commissioning and Plant Monitoring via the SEMS+ App

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

- Remotely monitoring plant operation and setting plant and device operating parameters.
- Connecting to devices locally to view device operating status and set device parameters.

Downloading and Installing the SEMS+ App

Mobile Phone Requirements:

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

Download Methods:

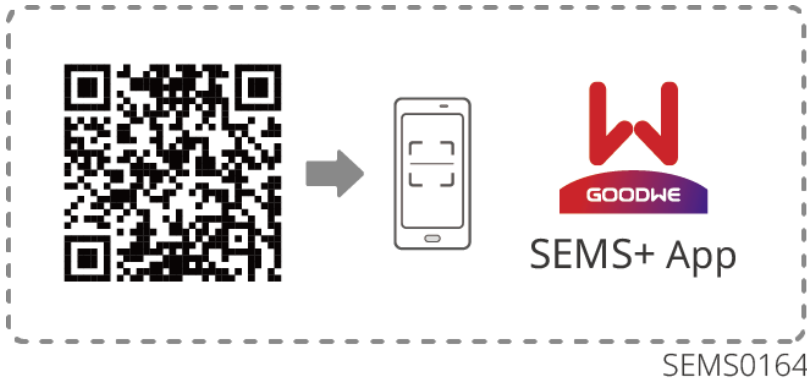
Method 1:

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



Method 2:

Scan the QR code below to download and install.



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



SEMS+ App User Manual

7.2 Perform Device Commissioning and Plant Monitoring via SEMS+ Web

SEMS+ Web is a monitoring platform that can communicate via WiFi or LAN. The following are the common functions of SEMS+ Web:

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

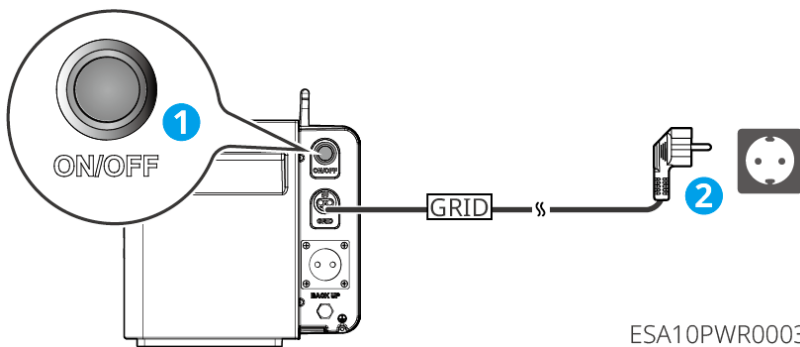
8.1 System Power-Off

DANGER

- When performing operation and maintenance on equipment in the system, power off the system. Operating equipment while energized may cause equipment damage or electric shock hazards.
- After the device is powered off, the internal components require a certain time to discharge. Wait according to the time requirement on the label until the device is fully discharged.

Procedure

1. Press the device ON/OFF switch to turn off the device.
2. Unplug the AC cable plug.



8.2 Equipment Removal

! DANGER

- Ensure that the device is powered off.
- When operating the device, wear personal protective equipment (PPE).
- Use proper removal tools when removing wiring terminals to avoid damaging the terminals or the device.
- Unless otherwise specified, the equipment removal procedure is the reverse of the installation procedure and is not repeated in this document.

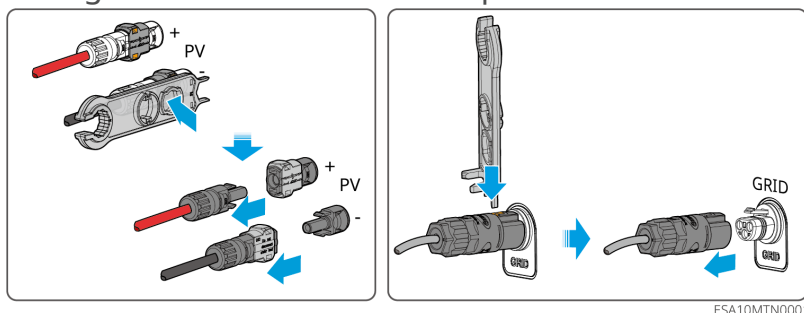
Step 1:Power off the system.

Step 2:Use labels to mark the cable types of cables connected in the system.

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 it will 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 laws and regulations of the country/region where the device is located. Do not dispose of the device as household waste.

8.4 Periodic Maintenance



DANGER

- Before equipment maintenance, ensure that you wear necessary personal protective equipment (PPE) to prevent electric shock.
- During maintenance, ensure that both the upstream and downstream switches of the device are disconnected.
- During maintenance, strictly follow correct operating procedures.



WARNING

- If any problem that may affect the battery or energy storage inverter system is found, contact after-sales personnel. Do not disassemble it without authorization.
- If exposed copper wire inside the conductive cable is found, do not touch it. High voltage hazard. Contact after-sales personnel. Do not disassemble it without authorization.
- If other emergencies occur, contact after-sales personnel immediately, operate under their guidance, or wait for after-sales personnel to perform on-site operations.

Maintenance Item	Maintenance Method	Maintenance Cycle	Maintenance Purpose
System Cleaning	Check whether the installation space meets the requirements and whether there is debris accumulated around the equipment.	Once every 6 months	Prevent heat dissipation faults.

Maintenance Item	Maintenance Method	Maintenance Cycle	Maintenance Purpose
System Installation	- Check whether the equipment is installed securely and whether the fastening screws are loose. - Check whether the equipment appearance is damaged or deformed.	Once every 6 months to once a year	Confirm the stability of equipment installation.
Electrical Connection	Check whether the electrical connections are loose, whether the cable appearance is damaged, and whether exposed copper occurs.	Once every 6 months to once a year	Confirm the reliability of electrical connections.
Battery Maintenance	If the battery has not been used or fully charged for a long time, periodic charging of the battery is recommended.	Once every 15 days	Protection of battery service life.

8.5 Troubleshooting

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

When contacting the after-sales service center, please collect the following information to facilitate quick problem resolution.

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 the modules are obstructed or shaded, etc. For the installation environment, it is recommended to provide photos, videos, and other files to assist in problem analysis.
3. Grid condition.

If a problem not listed occurs in the system, or if following the instructions still cannot stop the problem or abnormality, immediately stop system operation and

immediately contact your dealer.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
1	Grid Overvoltage Protection/Grid Overvoltage	Grid voltage is above the allowable range, or the high voltage Duration exceeds the high voltage ride-through setpoint.	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 allowed range. • If the grid voltage exceeds the allowed range, please contact your local power operator. • If the grid voltage is within the allowed range, after obtaining the consent of the local power operator, modify the inverter's Grid Overvoltage Protection setpoint, HVRT, or disable the Grid Overvoltage Protection function. 3. If it cannot recover for a long time, check whether the AC-side circuit breaker and output cables are properly connected.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
2	Grid Undervoltage Protection/Grid Undervoltage	Grid voltage is below the allowable range, or the Low Voltage Duration exceeds the Low Voltage Ride-Through setpoint.	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 allowed range. • If the grid voltage exceeds the allowed range, please contact your local power operator. • If the grid voltage is within the allowed range, after obtaining the consent of the local power operator, modify the inverter's Grid Undervoltage Protection setpoint, LVRT, or disable the Grid Undervoltage Protection function. 3. If it cannot recover for a long time, check whether the AC-side circuit breaker and output cables are properly connected.
3	Grid Rapid Overvoltage Protection/Grid Rapid Overvoltage	Abnormality occurs in grid voltage detection, or ultra-high voltage triggers a 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 allowed range. • If the grid voltage exceeds the allowed range, please contact your local power operator. • If the grid voltage is within the allowed range, after obtaining the consent of the local power operator, modify the inverter's Grid Overvoltage Protection setpoint, HVRT, or disable the Grid Overvoltage Protection function. 3. If it cannot recover for a long time, check whether the AC-side circuit breaker and output cables are properly connected.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
4	Grid 10min Overvoltage/ Grid 10min Overvoltage	The 10-minute sliding average of grid voltage 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 high voltage for a long time. If it occurs frequently, check whether the grid voltage is within the allowed range. • If the grid voltage exceeds the allowed range, please contact your local power operator. • If the grid voltage is within the allowed range, after obtaining the consent of the local power operator, modify the grid's Grid 10min Overvoltage setpoint.
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 allowed range. • If the grid frequency exceeds the allowed range, please contact your local power operator. • If the grid frequency is within the allowed range, after obtaining the consent of the local power operator, modify the Grid Overfrequency setpoint.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
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 allowed range. • If the grid frequency exceeds the allowed range, please contact your local power operator. • If the grid frequency is within the allowed range, after obtaining the consent of the local power operator, modify the Grid Underfrequency setpoint.
7	Grid Frequency Instability	Grid Abnormality: The actual grid frequency change rate does not comply with the local grid standard.	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 exceeds the allowed range, please contact your local power operator. • If the grid frequency is within the allowable range, contact your dealer or after-sales service center.
8	LVRT Undervoltage	Grid Abnormality: The duration of Grid Voltage Abnormal exceeds the time specified for HVRT/LVRT.	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 your local power utility; if yes, contact your dealer or after-sales service center.
9	HVRT Overvoltage	Grid Abnormality: The duration of Grid Voltage Abnormal exceeds the time specified for HVRT/LVRT.	

No.	Fault Name	Fault Cause	Fault Handling Suggestions
10	DCI Protection Level1	The DC component of the inverter output current exceeds the safety standard or the default allowable range of the equipment.	1. If the abnormality is caused by an external fault, the inverter will automatically resume normal operation after the fault is cleared, without manual intervention. 2. If this alarm occurs frequently and affects the normal power generation of the PV plant, contact your dealer or after-sales service center.
11	DCI Protection Level2	The DC component of the inverter output current exceeds the safety standard or the default allowable range of the equipment.	
12	Low Insulation Resistance	1. The PV string is short-circuited to Protection ground. 2. The installation environment of the PV strings is humid for a long period, and the line-to-ground insulation is poor.	1. Check the impedance of the PV string to Protection ground. If a short circuit occurs, rectify the short-circuit point. 2. Check whether the inverter's Protection ground wire is correctly connected. 3. If it is confirmed that the impedance is indeed lower than the default value in rainy weather, reset the "Insulation Impedance Protection Point".
13	Grounding Abnormal	The inverter's Protection ground wire is Not Connected.	Please confirm whether the inverter's Protection ground wire is Not Connected properly.
14	Internal Comm Loss	Refer to the specific sub-code cause.	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, connect the PV strings, and set the equipment switch to ON. If the fault persists, contact your dealer or after-sales service center.
15	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	Prevent load damage caused by inverter output overvoltage.	1. If it occurs occasionally, it may be caused by load switching and does not require manual intervention. 2. If it occurs frequently, please contact your dealer or after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
17	AC HCT check Abnormal	The AC sensor has a 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, connect the PV strings, and set the equipment switch to ON. If the fault persists, contact your dealer or after-sales service center.
18	Relay Check Abnormal	Relay abnormality, cause: 1. Relay abnormality (relay short circuit) 2. Relay sampling circuit abnormality. 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, connect the PV strings, and set the equipment switch to ON. If the fault persists, 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. Internal fan abnormality.	1. Check whether the ventilation at the inverter installation location is good and whether the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If there is no ventilation or Ambient Overtemperature occurs, please improve the ventilation and heat dissipation conditions. 3. If ventilation and ambient temperature are normal, please contact your dealer or after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
20	INV Module Overtemperature	INV module overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. Internal fan abnormality.	
21	Boost Module Overtemperature	Boost Module Overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. Internal fan abnormality.	
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, connect the PV strings, and set the equipment switch to ON. If the fault persists, contact your dealer or after-sales service center.
23	Model Type Error	Fault related to Model Recognition Error	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, connect the PV strings, and set the equipment switch to ON. If the fault persists, contact your dealer or after-sales service center.
24	Bus Overvoltage		

No.	Fault Name	Fault Cause	Fault Handling Suggestions
25	N-Bus Overvoltage	BUS overvoltage, possible causes: 1. PV overvoltage; 2. Inverter BUS voltage 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, connect the PV strings, and set the equipment switch to ON. If the fault persists, contact your dealer or after-sales service center.
26	PV Input Overvoltage	PV input voltage is too high. Possible causes: Incorrect PV array configuration: too many PV modules connected in series in the string, causing the string open-circuit voltage to exceed 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 correctly configured, the inverter alarm will automatically clear.
27	PV 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, connect the PV strings, and set the equipment switch to ON. If the fault persists, contact your dealer or after-sales service center.
28	FlyCap Software Overvoltage	FlyCap overvoltage. Possible causes: 1. PV voltage too high; 2. Inverter BUS voltage sampling abnormal;	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, connect the PV strings, and set the equipment switch to ON. If the fault persists, contact your dealer or after-sales service center.
29	PV String Reversed(String1~16)	PV string reversed	Check whether the string is reversely connected.
30	Internal Fan Abnormal	Internal Fan Abnormal 1. Fan power supply abnormal; 2. Mechanical fault (locked rotor); 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, connect the PV strings, and set the equipment switch to ON. If the fault persists, contact your dealer or after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
31	Flash R/W Error Flash R/W Error	Flash content changed; Flash lifespan exhausted;	1. Upgrade to the latest firmware. 2. Contact your dealer or after-sales service center.
32	PV IGBT short-circuit fault	1. PVBoost circuit MOS short circuit 2. Inverter sampling circuit abnormal	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, connect the PV strings, and set the equipment switch to ON. If the fault persists, contact your dealer or after-sales service center.
33	PV String Mismatch	1. String power exceeds 600 W 2. Inverter sampling circuit abnormal	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, connect the PV strings, and set the equipment switch to ON. If the fault persists, contact your dealer or after-sales service center.

Battery fault

No.	Fault Name	Fault Cause	Fault Handling Suggestions
1	BMS1 Parallel Rack n Total voltage is too high fault/ BMS1 RACK n Total voltage is too high fault	1. Battery system voltage too high 2. Voltage sampling line abnormal	1. Discharge the battery to see if the fault persists; 2. If the fault does not recover, please contact the after-sales service center.
2	BMS1 Parallel Rack n Total voltage is too low fault/ BMS1 RACK n Total voltage is too low fault	1. Battery system voltage too low 2. Voltage sampling line abnormal	1. Charge the battery, let it stand, and see if the fault persists; 2. Determine the inverter working condition, whether it is not charging the battery due to working mode and other issues, try to charge the battery through the inverter, and observe whether the fault recovers. 3. If the fault does not recover, please contact the after-sales service center.
3	BMS1 Parallel Rack n Cell voltage is too high fault/ BMS1 RACK n Cell voltage is too high fault	1. Single cell voltage too high 2. Voltage sampling line abnormal	1. Discharge the battery, let it stand, and see if the fault persists; 2. If the fault does not recover, please contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
4	BMS1 Parallel Rack n Cell voltage is too low fault/ BMS1 RACK n Cell voltage is too low fault	1. Single cell voltage too low 2. Voltage sampling line abnormal	1. Charge the battery, let it stand, and see if the fault persists; 2. Determine the inverter working condition, whether it is not charging the battery due to working mode and other issues, try to charge the battery through the inverter, and observe whether the fault recovers. 3. If the fault does not recover, please contact the after-sales service center.
5	BMS1 Parallel Rack n Charging temperature is too high fault/ BMS1 RACK n Charging temperature is too high fault	1. Ambient Overtemperature 2. Temperature sensor abnormal	1. Place the battery in a cool place, shut down and let it stand for 30 minutes, and after restarting, check whether the fault persists; 2. If the fault persists, please contact the after-sales service center.
6	BMS1 Parallel Rack n Discharging temperature is too high fault/ BMS1 RACK n Discharging temperature is too high fault	1. Ambient Overtemperature 2. Temperature sensor abnormal	1. Place the battery in a cool place, shut down and let it stand for 30 minutes, and after restarting, check whether the fault persists; 2. If the fault persists, please contact the after-sales service center.
7	BMS1 Parallel Rack n Charging temperature is too low fault/ BMS1 RACK n Charging temperature is too low fault	1. Ambient temperature too low 2. Temperature sensor abnormal	1. Check the cell temperature from the background. If the lowest temperature is higher than -20°C, set the battery to discharge to raise the cell temperature. 2. If the temperature is lower than -20°C, shut down the battery and place it in a warm environment, and use it after the cell temperature rises. 3. If all the above are ineffective, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
8	BMS1 Parallel Rack n Discharging temperature is too low fault BMS1 RACK n Discharging temperature is too low fault	1. Ambient temperature too low 2. Temperature sensor abnormal	1. Check the cell temperature from the background. If the lowest temperature is higher than -20°C, set the battery to discharge to raise the cell temperature. 2. If the temperature is lower than -20°C, shut down the battery and place it in a warm environment, and use it after the cell temperature rises. 3. If all the above are ineffective, contact the after-sales service center.
9	BMS1 Parallel Rack n Charge overcurrent fault/ BMS1 RACK n Charge overcurrent fault	1. Charging Current too large, battery current limiting abnormal: sudden changes in temperature and voltage values 2. Inverter response abnormal	1. Shut down and let it stand for 5 minutes, and after restarting, check whether the fault persists; 2. Check whether the inverter is set with excessive power, causing it to exceed the battery's rated operating current; 3. If overcurrent persists, contact the after-sales service center.
10	BMS1 Parallel Rack n Discharge overcurrent fault/ BMS1 RACK n Discharge overcurrent fault	1. Discharge current too large, battery current limiting abnormal: sudden changes in temperature and voltage values 2. Inverter response abnormal	1. Shut down and let it stand for 5 minutes, and after restarting, check whether the fault persists; 2. Check whether the inverter is set with excessive power, causing it to exceed the battery's rated operating current; 3. If overcurrent persists, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
11	BMS1 Parallel Rack n Cell excessive temperature differentials fault/ BMS1 RACK n Cell excessive temperature differentials fault	1. At different stages of excessive temperature difference, the battery will limit the battery power, i.e., limit the charge and discharge current. So it is generally difficult for this problem to occur. 2. Cell capacity degradation leads to excessive internal resistance; when Overcurrent occurs, the temperature rise is large, so the temperature difference becomes large. 3. Poor welding of the cell tabs causes the cell to heat up too quickly under Overcurrent. 4. Temperature sampling problem; 5. Power line connection loose	Shut down and restart the battery, wait for 2 hours. If the problem is not solved, contact the after-sales service center.
12	BMS1 Parallel Rack n Post temperature is too high fault/ BMS1 RACK n Post temperature is too high fault	Post temperature too high	1. Shut down and let it stand for 30 minutes, and after restarting, check whether the fault persists; 2. If the fault persists, please contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
13	BMS1 RACK n Cell excessive voltage differentials fault/ BMS1 RACK n Cell excessive voltage differentials fault	1. Inconsistent degree of cell aging 2. A chip issue on the slave board can also cause excessive cell voltage differentials; 3. A balancing issue on the slave board can also cause excessive cell voltage differentials 4. Caused by a wiring harness issue	Shut down and restart the battery, wait for 2 hours. If the problem is not solved, 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, shut down and leave it standing 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, shut down and leave it standing 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-charging circuit is abnormal	1. Upgrade the software, shut down and leave it standing 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	Poor contact or disconnection of the battery acquisition line	Shut down, check the wiring, restack the batteries, and if the problem still exists after restarting, contact the after-sales service center.
18	BMS1 RACK n Relay or MOS temperature is too high fault/ BMS1 RACK n Relay or MOS temperature is too high fault	Relay or MOS overtemperature	1. Upgrade the software, shut down and leave it standing 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	Fault Handling Suggestions
19	BMS1 RACK n Shunt temperature is too high fault/ BMS1 RACK n Diverter temperature is too high fault	Shunt overtemperature	1. Upgrade the software, shut down and leave it standing 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	BMS internal acquisition communication abnormal	1. Restart the battery, 2. Upgrade the battery; if the problem still exists after restarting, contact the after-sales service center.
21	BMS1 RACK n Micro-electronics fault/ BMS1 RACK n Micro-electronics fault	MCU internal fault	Upgrade the software, restart the battery; if the problem still exists 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. A large number of inverters are connected in parallel, causing excessive inrush to the battery during pre-charging	1. Upgrade the software and observe whether the fault persists. 2. If it is a parallel system, perform a black start of the battery first, then start the inverter.
23	BMS1 RACK n Application Software Failure/ BMS1 RACK n Application software fault	MCU self-test failed	Upgrade the software, restart the battery; if the problem still exists 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 slave RACK, or cell inconsistency between RACKs	1. Check the slave's battery information and software version, and whether the communication cable connection with the host is normal. 2. Upgrade software.
25	BMS1 RACK n DCDC fault/ BMS1 RACK n DCDC fault	DCDC Overload or high radiator temperature, etc.	Upgrade the software, restart the battery; if the problem still exists after restarting, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
26	BMS1 RACK n Inconsistent cell fault BMS1 RACK n Inconsistent cell fault	1. Abnormal cell identification 2. Stacking of different cell types	Check the cell type.
27	BMS1 RACK n The output port over temperature fault/ BMS1 RACK n The output port over temperature fault	Output port screws loose or poor contact	1. Turn off the battery, 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 used for too long or severe cell damage	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. Shut down and let it stand for 5 minutes, and 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. Shut down and let it stand for 5 minutes, and 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 fault	Overcurrent, overvoltage, or short circuit fault occurred	1. Shut down and let it stand for 5 minutes, and 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 All-in-One Machine Technical Parameters

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

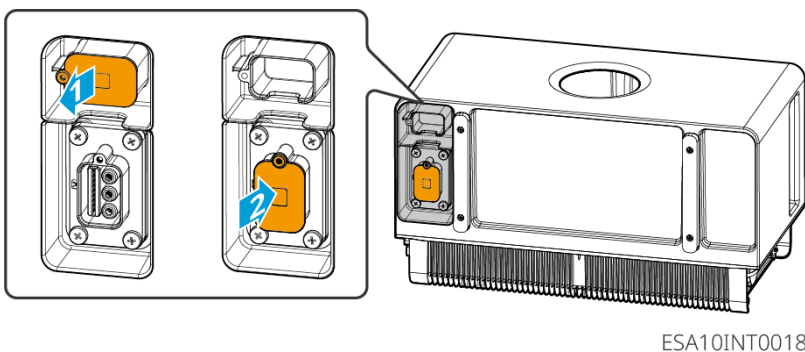
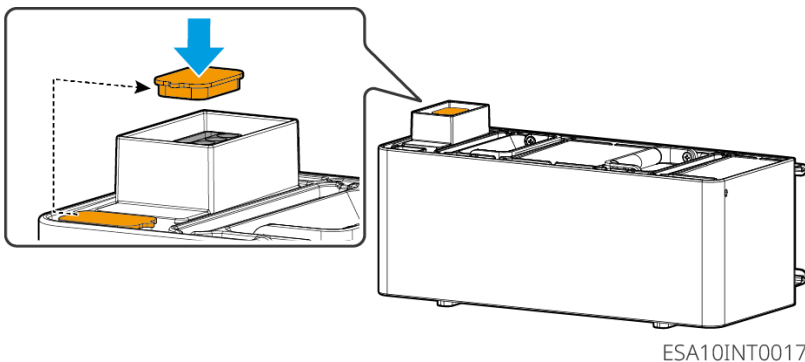
10 Appendix

10.1 FAQs

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

Procedure

1. Press the ON/OFF button to turn off the device.
2. Disconnect the device wiring, including BACKUP cable, GRID cable, and PV cable.
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 to the battery connection blind-mate port of the all-in-one machine, and install the battery port Protection cover to the blind-mate port on the battery. As shown in the figure below.
5. After arriving outdoors, press the ON/OFF button to turn on the device, and click the scene switch button to switch to the outdoor scene. At this time, the scene light turns off.

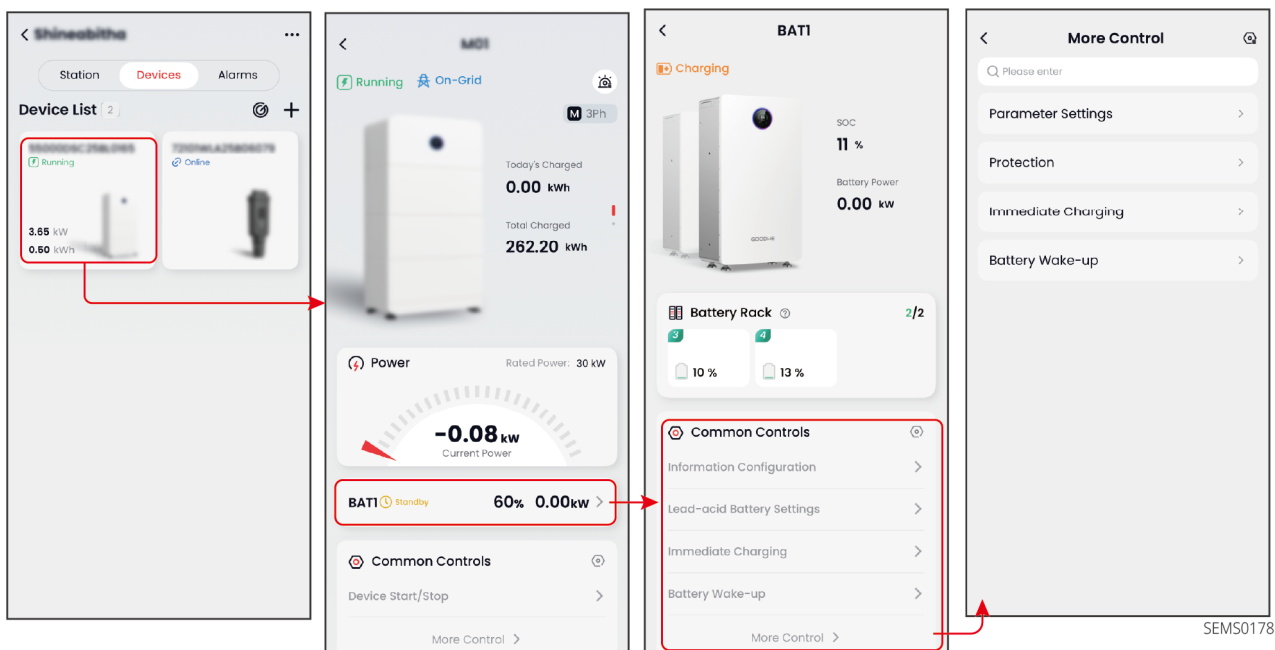


10.1.2 How to Set Energy-Saving Mode

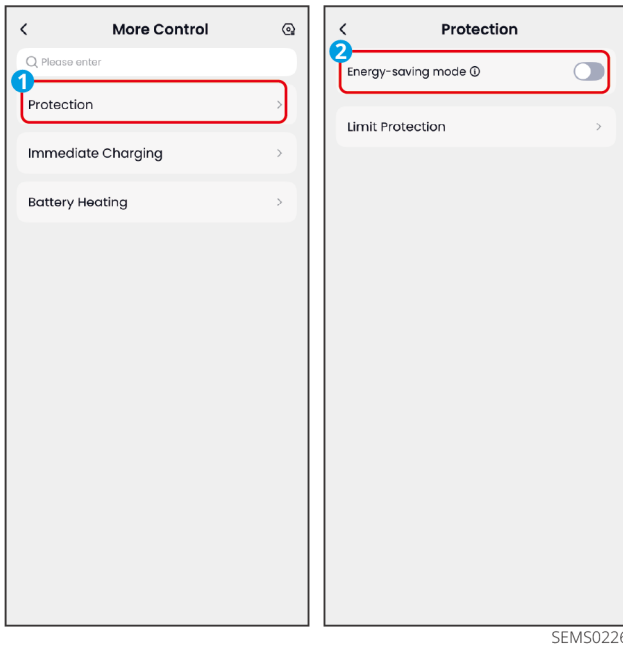
When Energy-saving mode is enabled, to save power, the device automatically enters standby mode after the battery level reaches the lower SOC limit for 5 minutes in grid-connected state, or when there is no load for 2 consecutive hours in off-grid state. After entering standby, the screen turns off, and the App cannot monitor temporarily. The device can be woken up when the PV voltage is higher than its Start-up Voltage or by toggling the device button once.

Procedure

1. Log in to SEMS+ App. On the plant device list screen, select All-in-One > target battery to enter the battery details screen.
2. On the battery details screen, tap More Control to enter the settings screen.



3. Tap Protection > Energy-saving mode. Enable or disable Energy-saving mode as required.



10.2 Terminology Explanation

- **Explanation of Overvoltage Categories**

- **Overvoltage Category I:** Equipment connected to circuits with measures limiting transient overvoltages to a relatively low level.
- **Overvoltage Category II:** Energy-consuming equipment supplied by a fixed distribution installation. Such equipment includes appliances, portable tools, and other household and similar loads. If special requirements are placed on the reliability and suitability of such equipment, Overvoltage Category III shall be used.
- **Overvoltage Category III:** Equipment in fixed distribution installations, where the reliability and suitability of the equipment must meet special requirements. This includes switchgear and controlgear in fixed distribution installations and industrial equipment permanently connected to fixed distribution installations.
- **Overvoltage Category IV:** Equipment used upstream in the power supply of the distribution installation, including measuring instruments and upstream overcurrent Protection equipment, etc.

- **Explanation of Damp Location Categories**

Environmental Parameters	Level		
	3K3	4K2	4K4H

Environmental Parameters	Level		
	Level 1	Level 2	Level 3
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:** the ambient air temperature range is -25 to +60°C, suitable for environments with Pollution Degree 3;
 - **Indoor Type II inverter:** the ambient air temperature range is -25 to +40°C, suitable for environments with Pollution Degree 3;
 - **Indoor Type I inverter:** the ambient air temperature range is 0 to +40°C, suitable for environments with Pollution Degree 2;
- **Explanation of Pollution Degree Categories**
 - **Pollution Degree 1:** no pollution or only dry, non-conductive pollution;
 - **Pollution Degree 2:** generally, only non-conductive pollution occurs, but temporary conductive pollution occasionally 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 Battery SN Code Meaning

*****2388****



 11-14位

ProductSNcode digits11-14are the production time code.
The production date in the above figure is2023-08-08

- The11、12th digits are the last two digits of the production year, e.g.,2023is represented by23;

- The 13th digit is the production month, e.g., the 8th month is represented by 8;
The details are as follows:

Production Month	January to September	October	November	December
Month Code	1~9	A	B	C

- The 14th digit is the production date, e.g., the 8th day is represented by 8;
Numbers are used preferentially, e.g., 1~9 represents the 1~9 days, A represents the 10 day, and so on. Among them, the letters I and O are not used to avoid confusion. The details are as follows:

Production Day	1st	2st	3st	4st	5st	6st	7st	8st	9st
Code	1	2	3	4	5	6	7	8	9

Production Day	10st	11st	12st	13st	14st	15st	16st	17st	18st	19st	20st
Code	A	B	C	D	E	F	G	H	J	K	L

Production Day	21st	22st	23st	24st	25st	26st	27st	28st	29st	30st	31st
Code	M	N	P	Q	R	S	T	U	V	W	X

11 Contact Information

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