

Residential All-In-One Energy Storage System

GW3K-EMA-G10

GW3K-EMA-UK-G10

GW3.0-BAT-LVD-G10

User Manual

GOODWE

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NOTE

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

Foreword

Overview

This document mainly describes the product information, installation and wiring, configuration and commissioning, troubleshooting, and maintenance of the energy storage system composed of an inverter, expansion battery, and Intelligent meter. Before installing and using the product, carefully read this manual to understand product safety information and become familiar with product functions and features. The document may be updated periodically; 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
Inverter*	GW3K-EMA-G10 GW3K-EMA-UK-G10	Rated Power: 3kW
Battery System	GW3.0-BAT-LVD-G10	Rated Energy: 3kWh

*This product is an inverter only and can be used as part of a plug-in solar equipment system. Whether it complies with the system requirements of the VDE 0126-95 standard must be ensured by the end user or system integrator.

Symbol Definitions

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

NOTE

Emphasis and supplement to the content; may also provide tips or tricks for optimized product use, helping 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 injury or property damage.

1.1 General Safety

NOTE

- Due to product version upgrades or other reasons, the document content may be updated periodically. Unless otherwise specified, the document content cannot replace the safety precautions on the product labels. 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.
- Damage to the equipment 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

NOTE

- Personnel responsible for equipment maintenance must first undergo rigorous training, understand all safety precautions, and master correct operating methods.
- Only qualified professionals or trained personnel are permitted to perform maintenance or replacement of equipment or components.

1.3 System Safety

 DANGER

- Before making electrical connections, ensure that the equipment is powered off. Live-line operation is strictly prohibited; otherwise, hazards such as electric shock may occur.
- For devices that support connection to PV strings, the PV input terminal has weak surge current withstand capability. It is strictly prohibited to use a DC voltage source to directly power on through the PV port. If power-on from the PV port is required, follow the steps below. If the equipment is damaged due to violation of operations, 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 Max. Current from Grid allowed by the PV port.
 2. Then close the inverter's DC Switch.
 3. Finally, slowly increase the DC source output voltage from zero to the target value at a rate of $\leq 50\text{V/s}$.
- 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 equipment cables. If connectors of other models are used, any equipment damage caused thereby is not within the scope of the equipment manufacturer's responsibility.
- Ensure that all equipment cables are correctly connected, tightened, and not loose. Improper wiring may cause poor contact or damage the equipment.
- To ensure Protection of the equipment and its components from damage during transportation, ensure that transportation personnel have received professional training. Record the operation steps during transportation and keep the equipment balanced to avoid dropping the equipment.
- The equipment is heavy. Please assign appropriate personnel according to the equipment Weight to prevent the equipment from exceeding the Weight range that a person can carry and causing personal injury.
- Ensure that the equipment is placed securely and not tilted. Equipment tipping may cause equipment damage and personal injury.

WARNING

- During equipment installation, do not allow wiring terminals to bear weight; otherwise, terminal damage may result.
- If cables are subjected to excessive tension, poor connections may result. When wiring, leave 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 shall be routed at least 30 mm apart; they must not be twisted together or routed crossing each other.
- Using cables in high-temperature environments may cause insulation aging or damage. The distance between cables and heat-generating devices or the 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 cables are connected, ensure that the cable connections are tight and not loose. Improper wiring may cause poor contact or high impedance, and damage the hybrid inverter.
- Ensure that the positive and negative poles of the cables are correctly connected 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 hybrid inverter, 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 hybrid inverters; otherwise, the hybrid inverter may be damaged.
- The PV modules used in conjunction must comply with IEC 61730 Class A standards.

1.3.2 Inverter Safety

WARNING

- Ensure that the voltage and frequency at the grid connection point comply with the inverter's grid-connection specifications.
- On the AC side of the inverter, it is recommended to add Protection devices such as circuit breakers or fuses. The specifications of the Protection devices must be greater than 1.25 times the inverter AC output Max. Current.
-

1.3.3 Battery Safety

DANGER

- Before operating equipment in the system, ensure that the equipment is powered off to avoid electric shock hazards. During equipment operation, strictly comply with all safety precautions in this manual and safety labels on the equipment.
- Without official authorization from the equipment manufacturer, do not disassemble, modify, or repair the equipment; otherwise, electric shock hazards may occur or equipment damage may result, and any losses caused thereby are not within the scope of the equipment manufacturer's responsibility.
- Do not impact, 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 a high-temperature environment. Ensure there is no heat source near the battery and that it is not exposed to direct sunlight. A fire may occur if the ambient temperature exceeds 60°C.
- If the battery has obvious defects, cracks, damage, or other conditions, 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 load-carrying capability.
- 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. Electrolyte is corrosive, and 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: Flush with clean water for at least 15 minutes and seek medical attention immediately.
 - Skin contact: Wash the contacted area thoroughly with soap and water, and seek medical attention immediately.
 - Ingestion: Induce vomiting and seek medical assistance immediately.
- **Fire**
 - When the battery temperature exceeds 150°C, there is a risk of battery fire, and after the battery catches fire, it may release toxic and harmful gases.
 - To avoid fire, ensure that a carbon dioxide or water fire extinguisher is available near the equipment.
 - When extinguishing a fire, do not use an ABC dry powder fire extinguisher. Firefighters must wear protective clothing and self-contained breathing apparatus.

1.4 Explanation of Safety Symbols and Certification

Markings

DANGER

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

No.	Symbol	Meaning
1		Potential hazards exist during equipment operation. Take protective measures when operating the equipment.
2		High voltage hazard. High voltage exists during equipment operation. Before operating the equipment, ensure that the equipment is 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 present 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, wait 5 minutes until the device is fully discharged.
8		Keep the device away from open flames or ignition sources.
9		Keep the device away from areas accessible to children.
10		Do not extinguish with water.
11		Before operating the device, read the product manual carefully.

No.	Symbol	Meaning
12		Wear personal protective equipment during installation, operation, and maintenance.
13		The device must not be disposed of as household waste. 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 functions 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

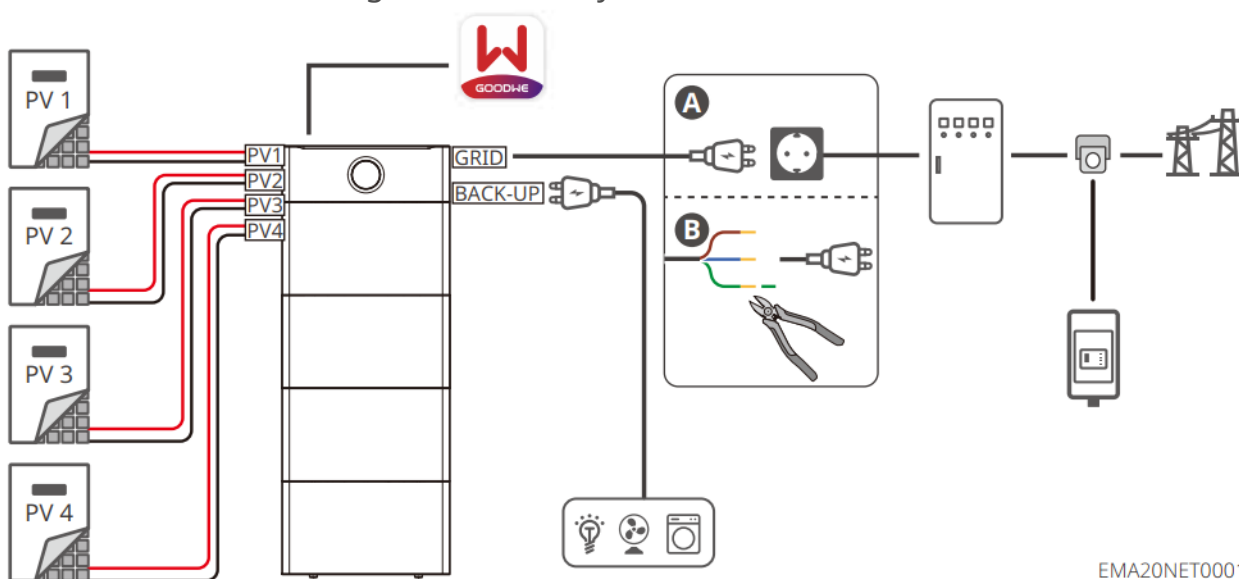
- Regulation (EU) 2023/1542 Article 12 - Safety of stationary battery energy storage systems
- Regulation (EU) 2023/1542 Article 10 - Performance and durability requirements for rechargeable industrial batteries, LMT batteries and electric vehicle batteries
- Regulation (EU) 2023/1542 Article 14 - Information 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 battery products meet the hazardous substance limit requirements specified in this regulation.

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

2 System Introduction

2.1 System Overview

The residential energy storage all-in-one solution integrates an inverter and battery. In a PV system, it converts solar energy into electrical energy for direct use by household loads or storage in the battery.



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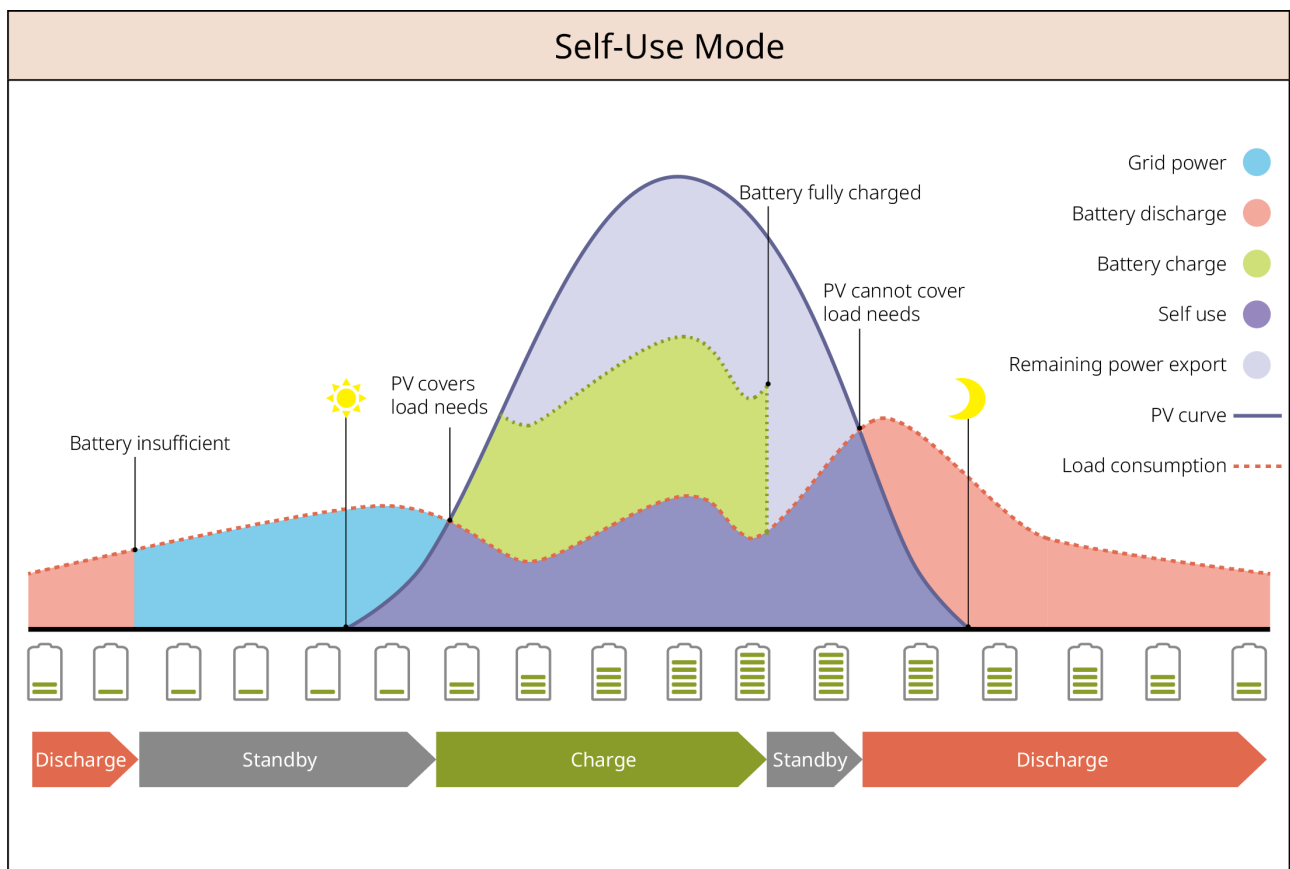
- Supports Plug in solar device wiring or Permanent connection wiring.
 - Plug in solar device wiring: The default grid-connected power is 800 W, plug and play.
 - Permanent connection wiring: The maximum grid-connected power is 3000 W. Wiring must be completed by professionals and commissioned via the App. For wiring steps, refer to [5.2. Professional Mode System Wiring \(Page 37\)](#) chapter.
 - If you need to switch to 3000 W or another power range, confirm that you have obtained the relevant grid authorization. When switching to another power range or back to the default power, complete steps such as wiring updates and App commissioning.
- Supports installing batteries according to actual needs, and supports connecting up to 5 batteries.
- Please provide your own Intelligent meter. Connect a wireless meter via WiFi or a wired meter via the RS485 port to implement functions such as Self-consumption and power limitation. For the meter's Mounting Method and precautions, refer to the corresponding meter manual.

- Supports connecting to the SEMS+ App for local device configuration or remote monitoring of plant information.
- Ensure that when connecting to the App via Bluetooth, the straight-line distance between the device and the App is less than 5 m; when connecting to the App via WiFi, the straight-line distance between the device and the router is less than 10 m.
- Before grid connection, confirm that local grid permission has been obtained.
- Ensure that the DC input current of each PV channel does not exceed 36 A, and the open-circuit voltage does not exceed 60 V.

2.2 System Mode

Self-Consumption Mode

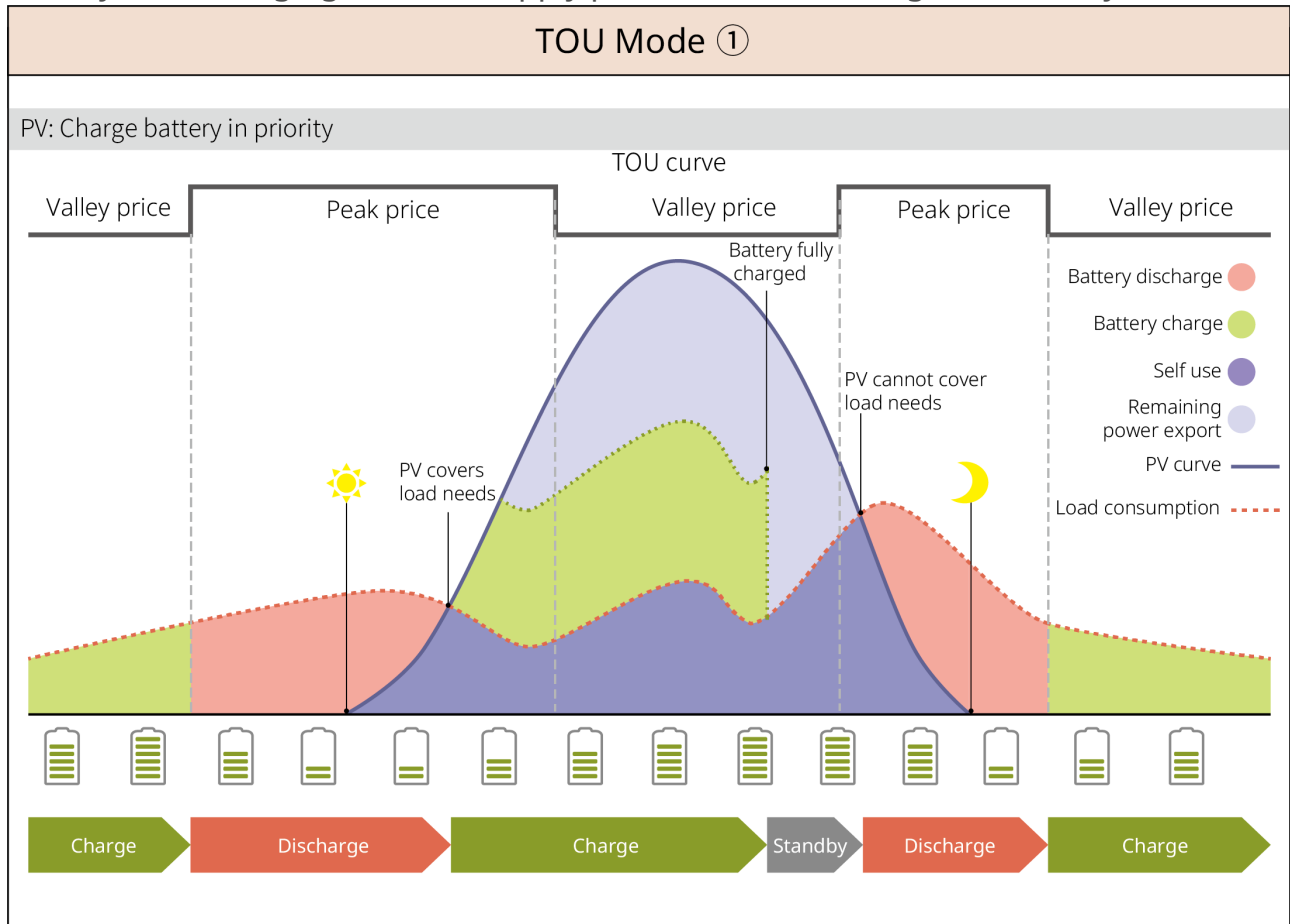
- The basic mode for system operation.
- PV generation preferentially supplies power to loads, surplus power charges the battery, and any remaining power is exported to the grid. When PV generation does not meet load demand, the battery supplies power to loads; when the battery capacity also does not meet load demand, the grid supplies power to loads.



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TOU Mode

Where local laws and regulations permit, set different time periods for power purchase and Export Energy according to grid peak-valley Tariff differences. For example, during valley Tariff periods, set the battery to charging mode to purchase electricity from the grid for charging; during peak Tariff periods, set the battery to discharging mode to supply power to loads through the battery.



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AI Mode

AI Mode can be enabled when a home energy management system (HEMS) is used in the system.

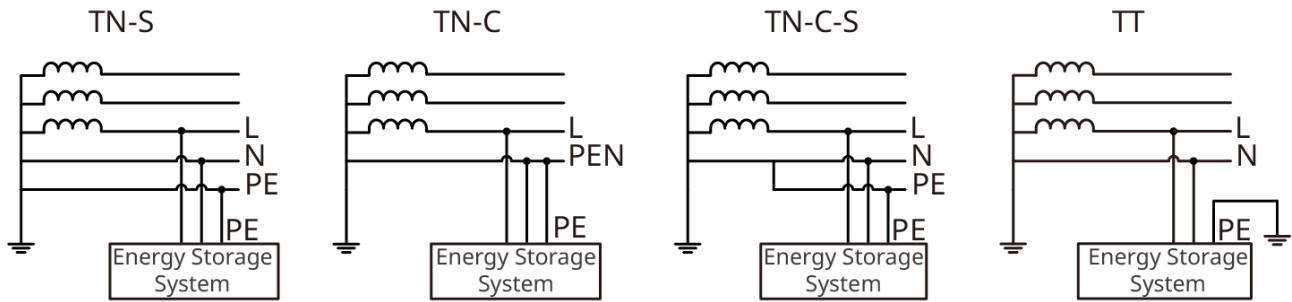
Set the Tariff according to user needs, and combine AI computation to optimize scheduling to maximize energy and economic Efficiency. When using AI Mode, during the initial plant information collection stage, there may be deviations between the predicted curve and actual conditions. Before enabling AI Mode, set a Tariff plan first. When the Tariff plan is a fixed Tariff, AI Mode is not supported. Selecting Time-of-Use Tariff or Dynamic Pricing is supported:

- Dynamic Pricing: Obtain Dynamic Pricing from the utility company, and combine it

with the Tariff surcharge set by the user to dynamically adjust the actual Tariff for power purchase and Export Energy.

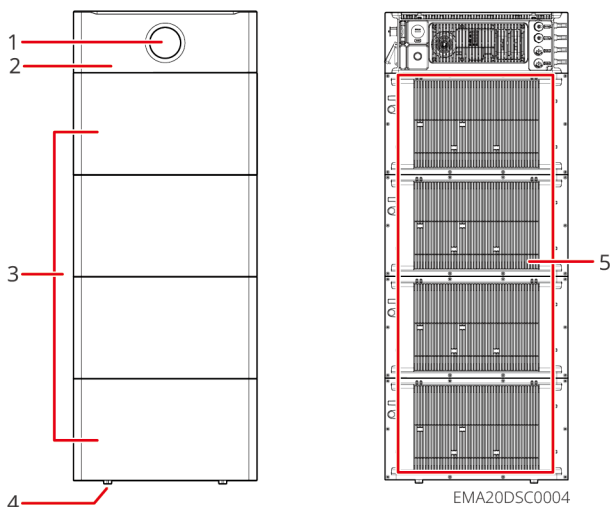
- Time-of-Use Tariff: Users can set Tariff information for different time periods according to the actual Tariff. Multiple Tariff groups can be set.

2.3 Supported Grid Types



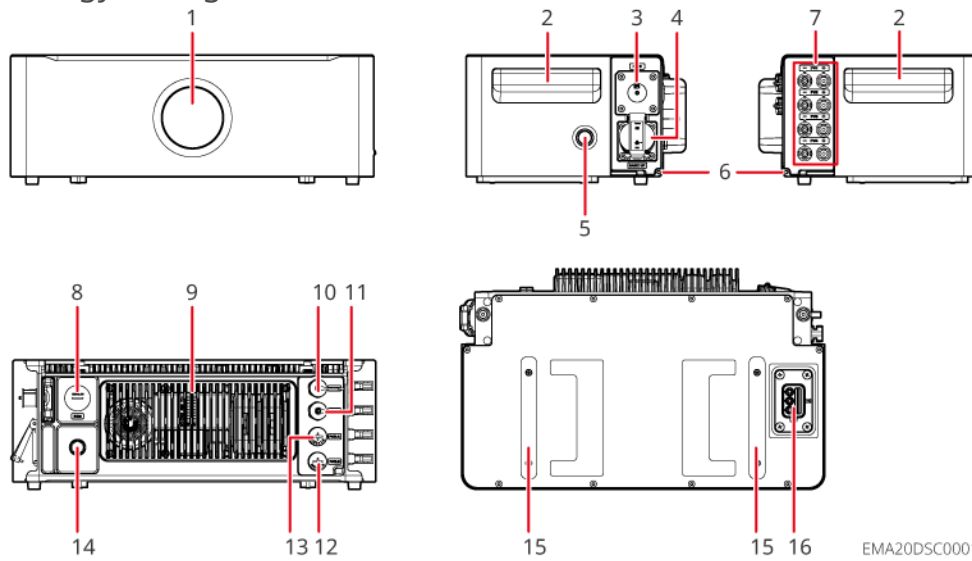
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2.4 Appearance Description



No.	Components	No.	Components
1	System Indicator Light	2	Energy Storage Inverter
3	Battery	4	Foot Pads
5	Heat Sink	-	-

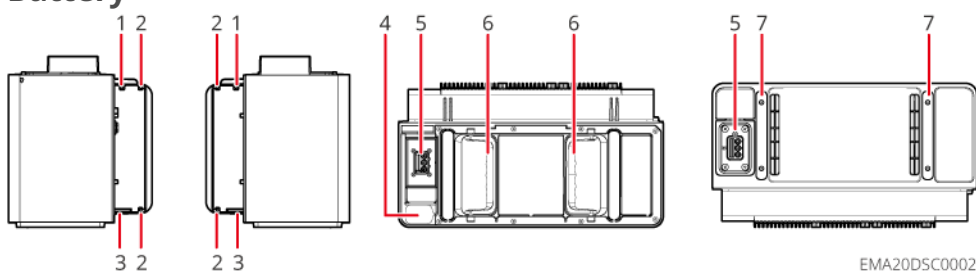
Energy Storage Inverter



No.	Component/Silkscreen	Description
1	System Indicator Light	Indicates the operating status of the system.
2	Transport Handle	Used for transporting the device.
3	Grid Port	Connect the AC cable to connect the device to the grid.
4	BACK-UP Port	Connect the AC cable to supply power to critical loads.
5	ON/OFF Switch	Controls Device Start/Stop.
6	Grounding Point	Connect the grounding cable.
7	PV Input Terminals	Connect the PV module DC input cables.
8	Communication Port	Reserved Port.
9	Heat Sink	-
10	RS485 Communication Port	Connect the communication cable to connect the device to energy meters, EnWG 14A devices, etc.

No.	Component/Silkscreen	Description
11	LAN Communication Port	Connect to the HEMS device.
12	Parallel communication port	Reserved Port.
13		
14	Vent valve	-
15	Foot Pads	-
16	Battery connection blind-mate port	Connect the inverter and the expansion battery.

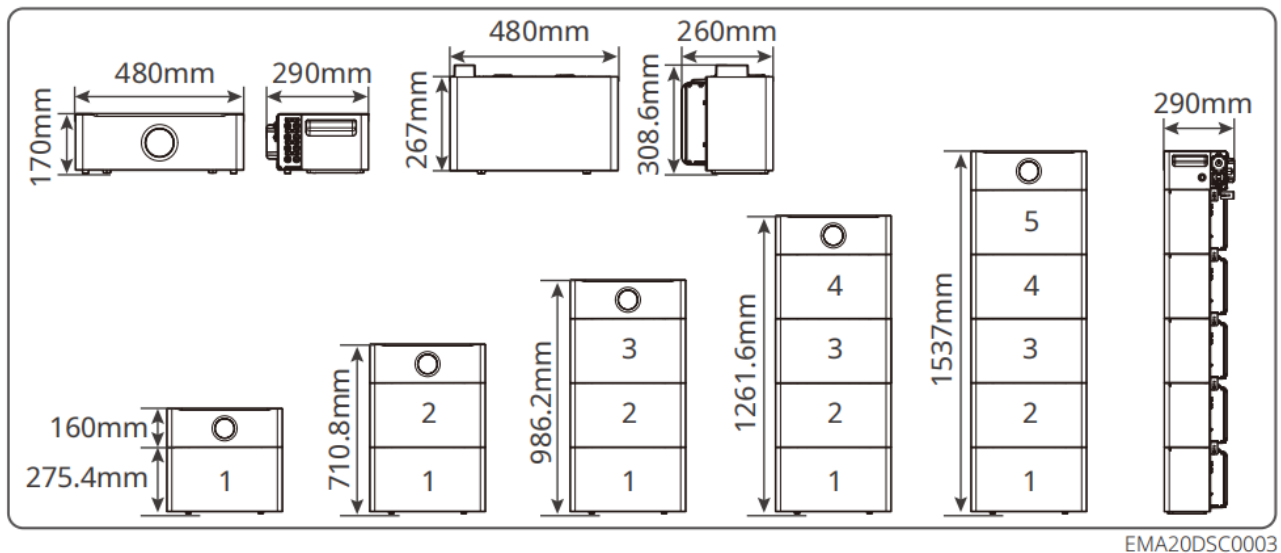
Battery



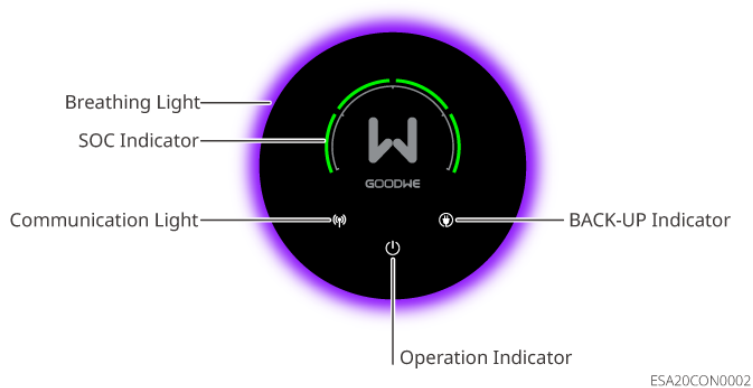
No.	Component/Silkscreen	Description
1	Series bracket mounting hole	Install the series bracket to secure the inverter to the battery or secure batteries to each other.
2	Anti-tip bracket mounting hole	Used to secure the anti-tip bracket.
3	Series bracket installation hole	Install the series bracket to secure the inverter to the battery or secure batteries to each other.
4	Protection cover for the battery connection port	When the battery is not in use, it is installed on the battery connection blind-mate port.

No.	Component/Silkscreen	Description
5	Battery connection blind-mate port	Connection port between the inverter and battery, and between batteries.
6	Transport Handle	Used for transporting the device.
7	Foot Pads	-

2.5 Dimensions

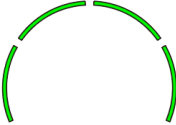


2.6 Indicator Light Description



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Indicator Light	Indicator Light Status	Dynamic Indicator Light Status	Description
	Yellow steady on	Blue-purple marquee light	The inverter is powered on and in standby mode.
	Green flashing	Blue-purple marquee light	The inverter is starting up and in self-check mode.
	Green steady on	Blue-purple Breathing Light	The inverter is operating normally in grid-connected power generation or off-grid mode.
	Off	Red flashing	System operation fault.
	Off	Off	The inverter is powered off.
	Yellow LED flashing	/	The inverter monitoring module is resetting.
	Yellow steady on		No connection has been established between the inverter and the communication terminal.
	Green LED flashing		Communication failure between the communication terminal and the cloud server.
	Green LED steady on		Inverter monitoring is normal.
	Off		The inverter monitoring module is not started.
	Yellow steady on		Grid abnormal; the inverter BACK-UP port is supplying power normally.
	Green LED steady on		Grid normal; the inverter BACK-UP port is supplying power normally.

Indicator Light	Indicator Light Status	Dynamic Indicator Light Status	Description
	Off		No power supply at the BACK-UP port.
	Green LED steady on		• Battery charging. • Segmented LED indication, each segment = 25% SOC:
	Green LED flashing		• Battery discharging. • Segmented LED indication, each segment = 25% SOC:
	Off		Battery depleted or system not powered on.

3 Device Inspection and Storage

3.1 Device Inspection

Before signing for the product, carefully inspect the following:

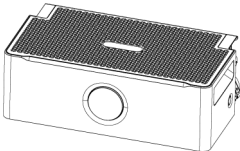
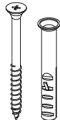
- 1. Check whether the outer packaging is damaged, such as deformation, punctures, cracks, or other signs that may cause damage to the equipment inside the packaging box. If there is damage, do not open the packaging and contact your dealer or after-sales service center.
- 2. Check whether the equipment model is correct. If it does not match, do not open the packaging and contact your dealer or after-sales service center.
- 3. Check whether the types and quantities of delivered items are correct and whether their appearance is damaged. If there is damage, contact your dealer or after-sales service center.

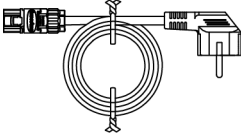
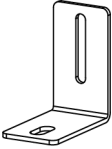
3.2 Delivered Items

 **WARNING**

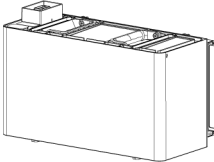
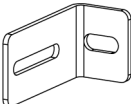
Check whether the types and quantities of delivered items are correct and whether their appearance is damaged. If there is damage, contact your dealer.

Energy Storage Inverter Delivered Items

Components	Description	Components	Description
	Energy Storage Inverter x1		Expansion Bolts x2

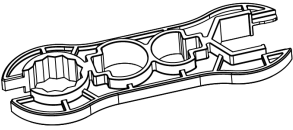
Components	Description	Components	Description
	AC Connection Cable x1 AC plug styles vary by region; the actual product shall prevail.		Anti-Tip Bracket x2
	M4*10 Screw x2		PV Anti-Tamper Cover x8 Only applicable to MC4 PV connectors in certain regions.
	Product Documentation x1	-	-

Battery Delivery Items

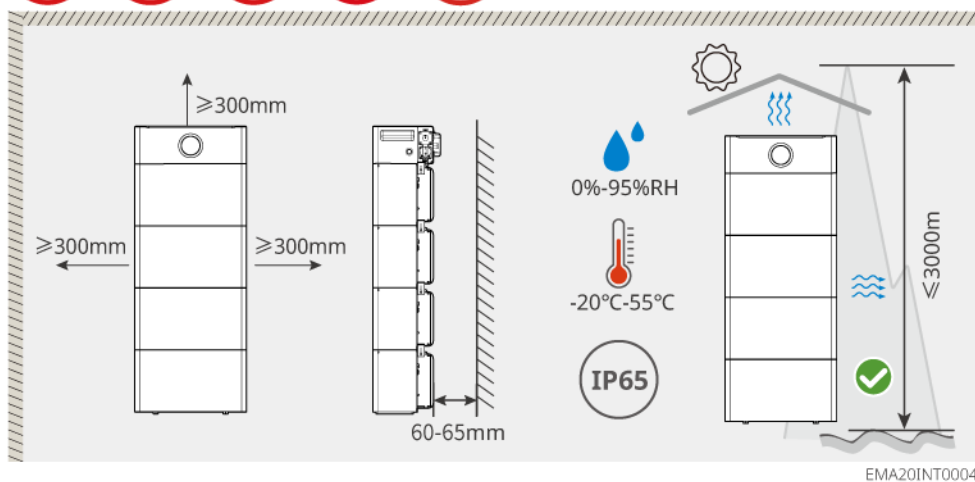
Components	Description	Components	Description
	Battery x1		Series Bracket x2
	M4*10 Screw x2	-	-

Optional Delivery Items

Components	Description
	PV Connector Unlocking Tool

Components	Description
	AC Connector Unlocking Tool

3.3 Equipment Storage



- If the inverter 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 electronic components inside the inverter, 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, it is recommended to avoid long-term idle storage. Prolonged storage may cause deep discharge of the battery, resulting in irreversible chemical losses, leading to capacity degradation or even complete failure. It is recommended to use it promptly. If the battery needs to be stored for a long time, please refer to the following conditions for maintenance:

NOTE

[1] The storage time is calculated from the first maintenance time on the battery outer packaging label, and charge/discharge maintenance shall be performed according to the charge/discharge maintenance cycle. After the charge/discharge maintenance passes, update the maintenance information on the outer box maintenance label to facilitate maintenance record keeping.

Product Model	Battery Storage Initial SOC Range	Recommended Storage Temperature	Charge/Discharge Maintenance Cycle [1]	Battery Maintenance Method
GW3.0-BAT-LVD-G10	35~45%	0~35°C	-20~35°C, 12 months 35~45°C, 6 months	Charge the battery according to the battery SOC range requirements.

Packaging Requirements:

Ensure that 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 away from direct sunlight.
2. Ensure the storage environment is clean, with appropriate temperature and humidity ranges and no condensation. If there is condensation at the equipment ports, do not install the equipment.
3. Ensure the equipment is kept away from flammable, explosive, corrosive, and other such items during storage.

Stacking Requirements:

1. Ensure the equipment stacking height and orientation 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



When performing equipment installation and electrical connections, use the delivered components shipped with the package; otherwise, any resulting equipment damage is not covered by the warranty.

4.1 Installation Requirements

Installation Environment Requirements

1. The equipment must not be installed in flammable, explosive, corrosive, or similar environments.
2. Please 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 site conditions prevent complete sheltering, ensure that 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 itself.
5. The equipment installation and storage site should avoid areas with direct cold air such as air conditioner outlets. Excessive local temperature differences may cause condensation inside the equipment, which may lead to equipment damage.
6. The installation location must be out of reach of children and avoid locations where it can be easily touched.
7. The surface of the equipment may be hot 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 and operation space requirements.

9. The equipment installation height must facilitate operation and maintenance, ensuring that the equipment indicator lights and all labels are easy to view, and wiring terminals are easy to operate.
10. The equipment installation altitude is lower than the Max. Operating Altitude.

NOTE

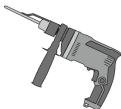
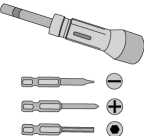
Charging temperature range: $-20 < T < 55^{\circ}\text{C}$; discharging temperature range: $-20 < T < 55^{\circ}\text{C}$.

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

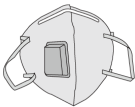
Tool Requirements

NOTE

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 pliers		Spirit level
	Impact drill ($\Phi 8$ mm drill bit)		Torque wrench M5
	Rubber mallet		Marking pen
	Cable ties		Vacuum cleaner

Personal protective equipment (PPE)

Tool Type	Description	Tool Type	Description
	Insulating gloves, protective gloves		Dust mask
	Goggles		Safety shoes

4.2 Equipment Handling



- During transport, transfer, installation, and other operations, the laws, regulations, and relevant standards of the country or region must be met.
- Before installation, the equipment must be transported to the installation site. During handling, to avoid personal injury or equipment damage, pay attention to the following:
 - Please assign corresponding personnel according to the device Weight to prevent the device from exceeding the Weight range that can be handled by the human body and causing injury to personnel.
 - Please wear safety gloves to prevent injury.
 - Please ensure that the device remains balanced during handling to avoid falling.

4.3 Install the Equipment



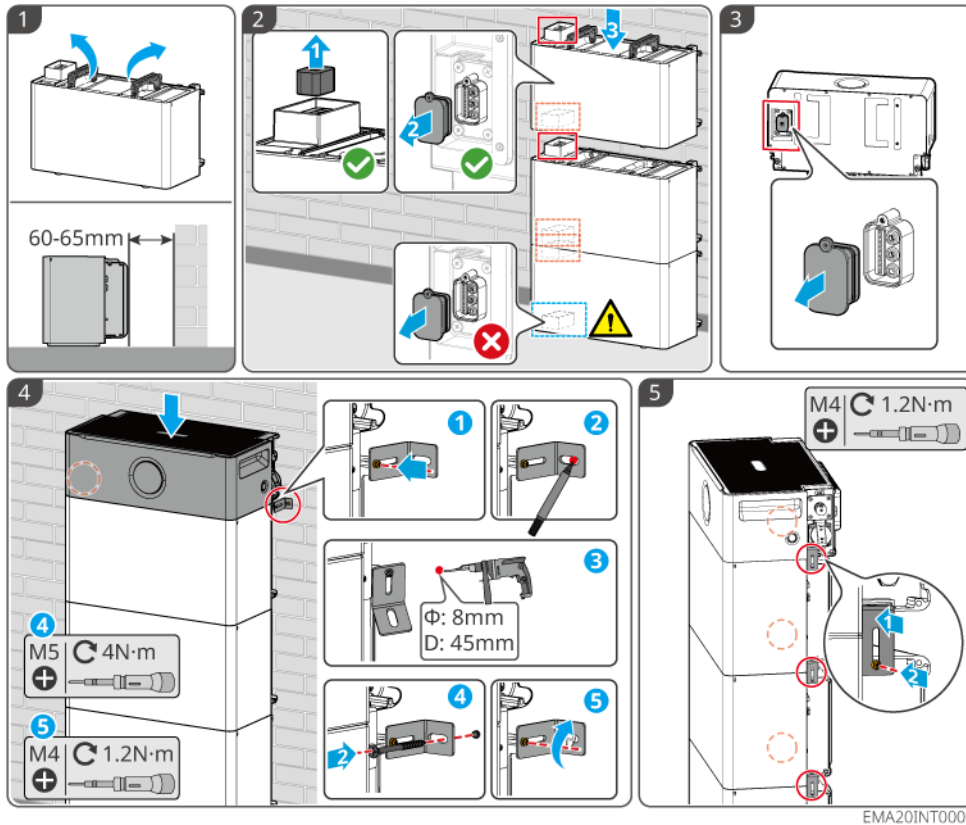
CAUTION

- When drilling holes, ensure that the drilling positions avoid water pipes, cables, etc. inside the wall to prevent danger.
- When drilling holes, wear goggles and a dust mask to prevent dust from being inhaled into the respiratory tract or getting into your eyes.
- Install the inverter above the battery. Do not install the battery above the inverter.
- During equipment installation, ensure the installation is level and secure. When placing the inverter and 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 equipment with cardboard or other shielding materials to prevent foreign objects from entering the equipment and causing damage.
- Ensure the system installation location is within WiFi signal coverage.
- When stacking batteries, do not remove the protective cover of the blind-mate port on the bottommost battery; otherwise, the system will not operate normally.

Installation steps:

1. Place the bottommost battery at a distance of 60 mm to 65 mm from the wall, parallel to the wall.
2. Except for the bottommost battery in the stack, for which the lower blind-mate port protective cover must be retained, remove the blind-mate port protective covers from all other batteries. After removing the protective covers, stack and install the batteries.
3. Remove the blind-mate port protective cover from the inverter.
4. Stack-install the inverter. During installation, align the battery blind-mate ports to ensure secure installation.
 - a. Install one side of the anti-tip bracket on the first battery below the inverter, and pre-tighten the screws.
 - b. Confirm the positions on the wall where holes need to be drilled to secure the anti-tip bracket, and mark them.
 - c. Use an impact drill to drill holes with a diameter of 8 mm and a depth of 45 mm.
 - d. Secure the anti-tip bracket to the wall using expansion bolts.
 - e. Tighten the Battery Side screws.

5. Insert the series connection brackets into the bracket mounting holes of the inverter and batteries in sequence, and fasten them with screws to secure the inverter to the battery and the batteries to each other.



5 System Wiring



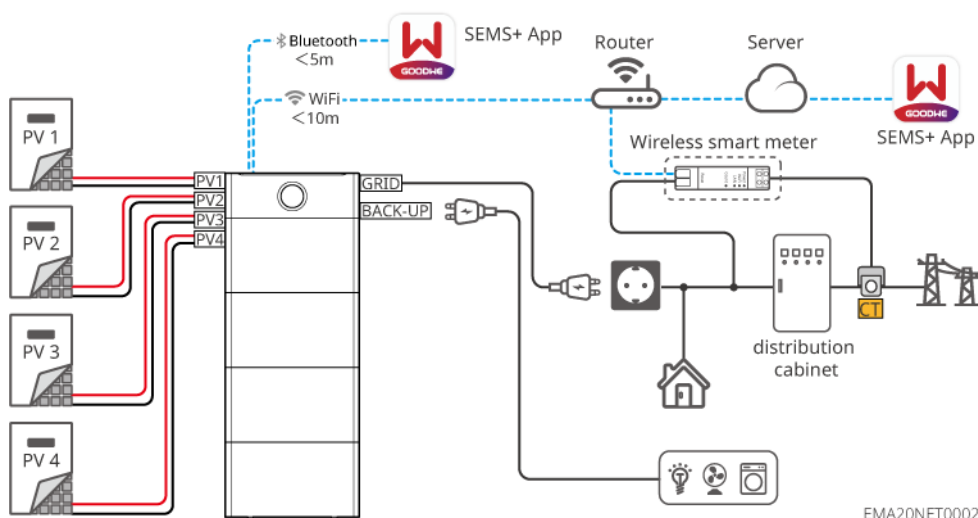
- The erection, routing, and connection of cables must comply with local laws, regulations, and specifications.
- All operations during electrical connection and the specifications of cables and components used must comply with local legal and regulatory requirements.
- Before making electrical connections, ensure that the equipment is powered off. Live-line operation is strictly prohibited; otherwise, hazards such as electric shock may occur.
- Cables of the same type should be bound together and routed separately from cables of different types. They must not be intertwined or crossed.
- If a cable bears excessive tensile force, it may lead to a poor connection. When wiring, reserve a certain length of cable before connecting it to the inverter wiring port.

NOTE

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

5.1 Plug in solar device wiring

System Networking Diagram



- Please provide your own Intelligent meter and connect the wireless meter via WiFi to enable functions such as Self-consumption and power limitation. For the Mounting Method and precautions of the meter, refer to the corresponding meter manual.
- Supported wireless meter models: Shelly PRO 3EM, Easton meter SEM3-WL-2, Easton P1 meter reading head, everhome infrared meter reading head, everhome P1 meter reading head.

Connect PV DC Cables



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

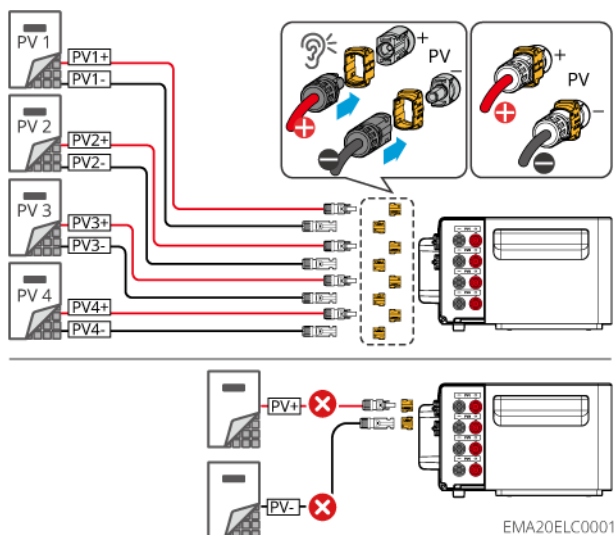
1. Please ensure that the Max. MPPT Short Circuit Current and Max. Input Voltage are within the allowable range of the inverter for each MPPT.
2. Please ensure that the positive pole of the PV string is connected to the PV+ of the inverter, and the negative pole of the PV string is connected to the PV- of the inverter.

WARNING

- The PV string output does not support grounding. Before connecting the PV string to the 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 the DC cables are connected, ensure that the cables are securely connected and not loose.
- Ensure that the positive and negative poles of the DC cables are correct and not reversed; and that the voltage is within the allowable range.
- Do not connect two or more PV strings in series; otherwise, the input voltage may exceed 60 V, causing equipment damage.
- To prevent the PV cables from becoming detached, install the anti-removal cover. The anti-removal cover is only applicable to MC4 PV connectors in some regions.

Procedure:

1. (Optional) If a PV anti-removal cover is shipped with the package, install it on the PV connector on the inverter side.
2. Connect the module-side PV cable to the inverter-side PV connector.



Connect the AC cable

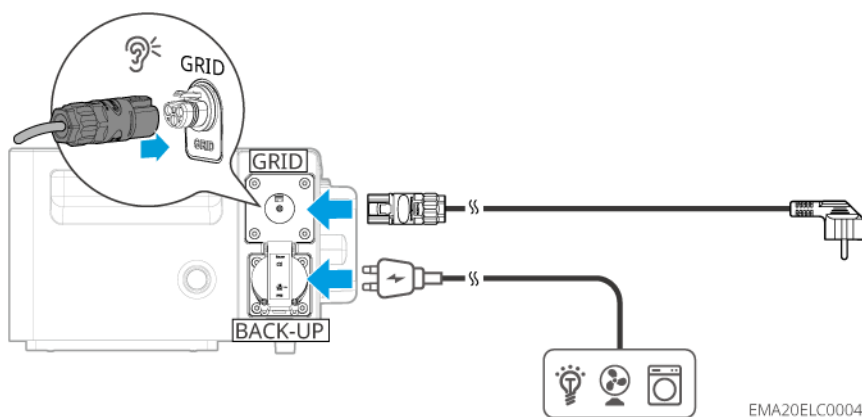


DANGER

Please confirm that the AC cable plug and socket specifications match.

Procedure:

1. Take out the AC cable shipped with the package and connect it to the GRID AC connection port on the all-in-one inverter side.
2. If a BACK UP load needs to be connected, plug the load plug 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 the household socket.

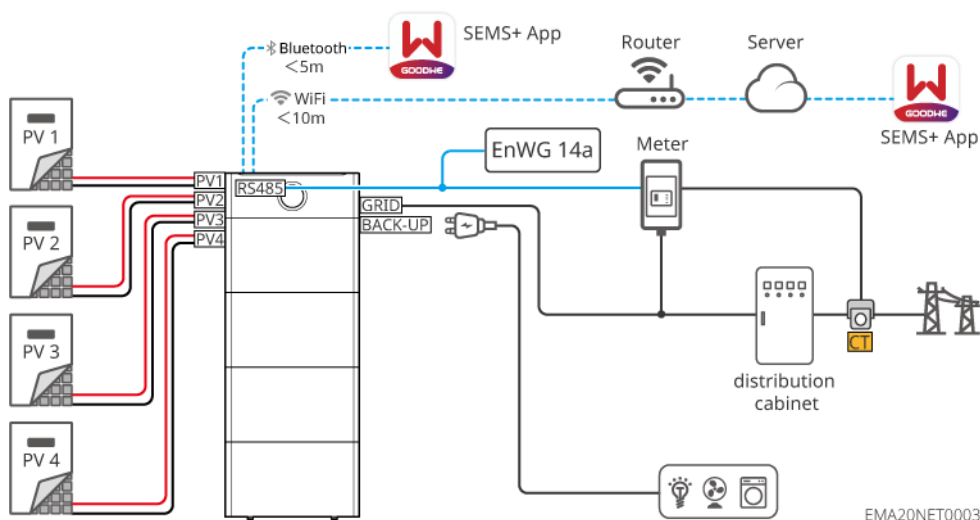


5.2 Permanent connection wiring



DANGER

- Professional mode system installation and wiring must only be performed by professional technicians.
- After the system installation and wiring are completed, the grid-connected power can be modified via the SEMS+ App.

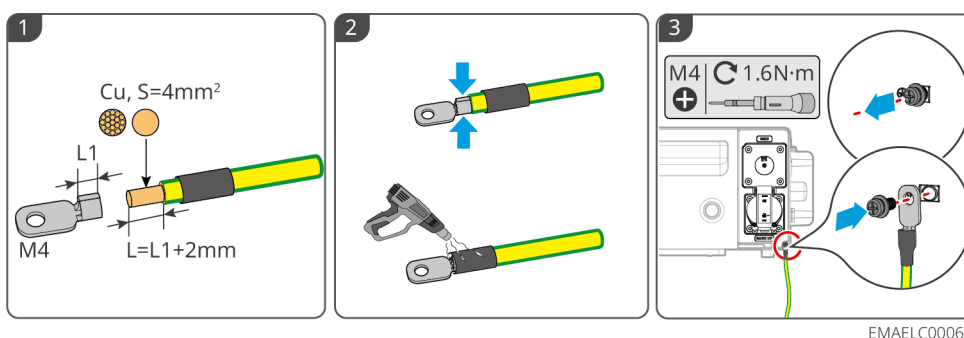


- Supports connection to a Home Energy Management System (HEMS), and the system is managed under unified scheduling by HEMS. For the Mounting Method and precautions of HEMS, please refer to [HEMS User Manual](#).
- Please provide your own Intelligent meter. Connect a wireless meter via WiFi or a wired meter via the RS485 port to implement functions such as Self-consumption and power limitation. For the meter's Mounting Method and precautions, refer to the corresponding meter manual.
 - Supported wireless meter models: Shelly PRO 3EM; Eastron meter SEM3-WL-2; Eastron P1 meter reading head; everhome infrared meter reading head; everhome P1 meter reading head.
 - Supported wired meter models: GoodWe GMK110; GoodWe GMK330; Eastron meter SEM3-WL-2.

Connect the Protection grounding cable

WARNING

- When connecting multiple inverters, ensure that the Protection grounding points on the enclosure shells of all inverters are equipotentially bonded.
- To improve the corrosion resistance of the terminal, after the Protection grounding cable is connected and installed, it is recommended to apply silicone or paint to the outside of the grounding terminal for protection.
- Please provide your own Protection grounding cable. Recommended specification: 4mm².
- Please provide an M4 grounding OT terminal yourself.



Connect PV DC Cables

DANGER

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

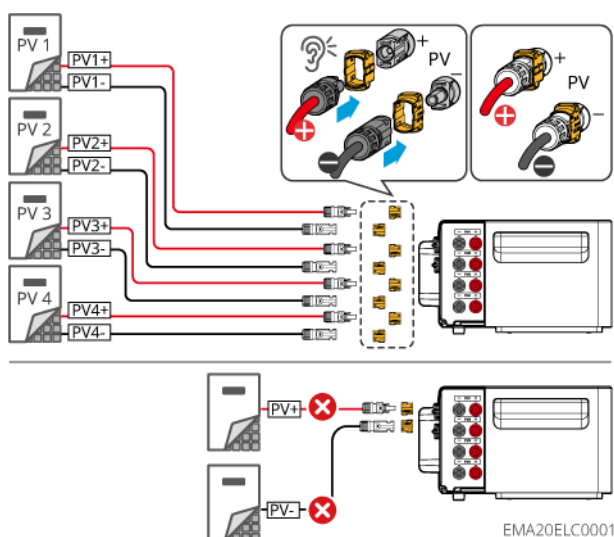
1. Please ensure that the Max. MPPT Short Circuit Current and Max. Input Voltage are within the allowable range of the all-in-one inverter for each MPPT.
2. Please ensure that the positive pole of the PV string is connected to the PV+ of the all-in-one inverter, and the negative pole of the PV string is connected to the PV- of 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 the DC cables are connected, ensure that the cables are securely connected and not loose.
- Ensure that the positive and negative poles of the DC cables are correct and not reversed; and that the voltage is within the allowable range.
- Do not connect two or more PV strings in series; otherwise, the input voltage may exceed 60 V, causing equipment damage.
- To prevent the PV cables from detaching, install the anti-removal cover. The anti-removal cover is only applicable to MC4 PV connectors.

Procedure:

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



Connect the AC cable

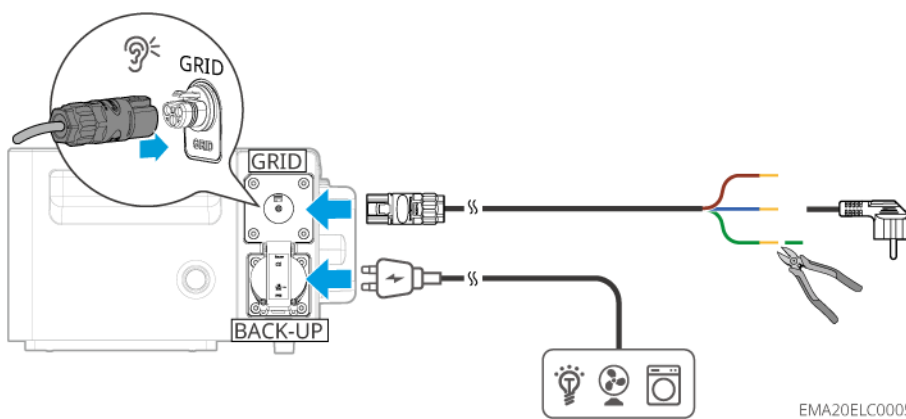
- According to local laws and regulations, choose whether to install an RCD device. The inverter can be externally connected to a compliant RCD (Residual Current

Monitoring device). When the leakage current exceeds the limit, Protection is performed.

- If you need to extend the AC cable, please prepare it yourself. Recommended specification: 2.5 mm² outdoor copper-core cable.

Procedure:

1. Prepare the AC cable and connect it to the household distribution cabinet.
2. If you need to connect a BACK UP load, plug the load plug into the BACK UP port on the inverter side.



Connect the communication cable

- When wiring using the RS485 communication port, please prepare a standard network cable of CAT5 or above and an RJ45 plug. According to the following port definitions and actual requirements, crimp an RJ45 plug onto a network cable yourself, or contact the manufacturer to purchase a plug and a 2PIN/8PIN terminal adapter cable.

PIN	Port Definition	Description
1	RS485_A2	Reserved Port.
2	RS485_B2	
3	NC	
4	RefGen	

6 System Trial Operation

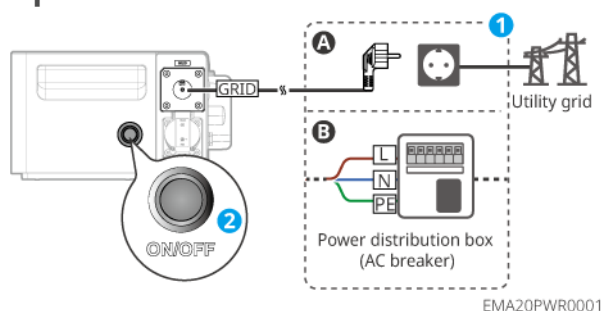
6.1 Pre-Power-on Check of the System

No.	Check Item
1	The device is installed securely, the installation position is convenient for operation and maintenance, the installation space is convenient for ventilation and heat dissipation, and the installation environment is clean and tidy.
2	DC cables and AC cables are connected correctly and securely.
3	Cable binding meets routing requirements, is reasonably distributed, and is free from damage.
4	The voltage and frequency at the inverter grid connection point meet the grid connection requirements.

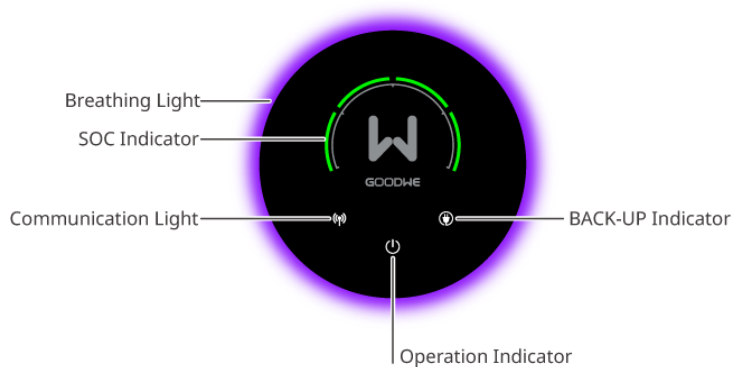
6.2 System Power-On

Step 1: Connect the AC cable.

Step 2: Press the device ON/OFF switch to start the device.

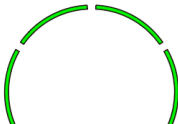


6.3 Indicator Light Description



ESA20CON0002

Indicator Light	Indicator Light Status	Dynamic Indicator Light Status	Description
⏻	Yellow steady on	Blue-purple marquee light	The inverter is powered on and in standby mode.
	Green flashing	Blue-purple marquee light	The inverter is starting up and in self-check mode.
	Green steady on	Blue-purple Breathing Light	The inverter is operating normally in grid-connected power generation or off-grid mode.
	Off	Red flashing	System operation fault.
	Off	Off	The inverter is powered off.
((P))	Yellow LED flashing	/	The inverter monitoring module is resetting.
	Yellow steady on		No connection has been established between the inverter and the communication terminal.
	Green LED flashing		Communication failure between the communication terminal and the cloud server.
	Green LED steady on		Inverter monitoring is normal.

Indicator Light	Indicator Light Status	Dynamic Indicator Light Status	Description
	Off		The inverter monitoring module is not started.
	Yellow steady on		Grid abnormal; the inverter BACK-UP port is supplying power normally.
	Green LED steady on		Grid normal; the inverter BACK-UP port is supplying power normally.
	Off		No power supply at the BACK-UP port.
	Green LED steady on		- Battery charging. - Segmented LED indication, each segment = 25% SOC:
	Green LED flashing		- Battery discharging. - Segmented LED indication, each segment = 25% SOC:
	Off		Battery depleted or system not powered on.

7 System Commissioning and Plant Monitoring

7.1 Use the SEMS+ App for Device Commissioning and Plant Monitoring

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

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

Download and install the SEMS+ App

Mobile Phone Requirements:

- Mobile phone operating system requirements: Android 7.0 and above, iOS 15.1 and above.
- The mobile phone supports a web browser and can connect to the Internet.
- The mobile phone supports WLAN/Bluetooth functions.

Download Methods:

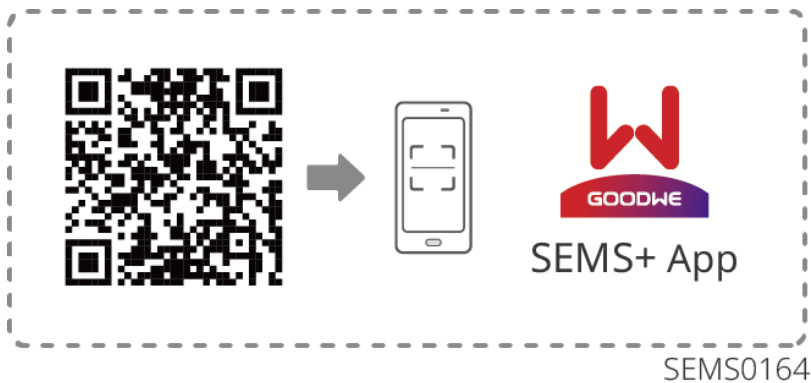
Method 1:

Search for SEMS+ in 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 it.



For detailed functions, please 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 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, see [SEMS+ WEB User Manual](#).



SEMS+ WEB User Manual

8 System Maintenance

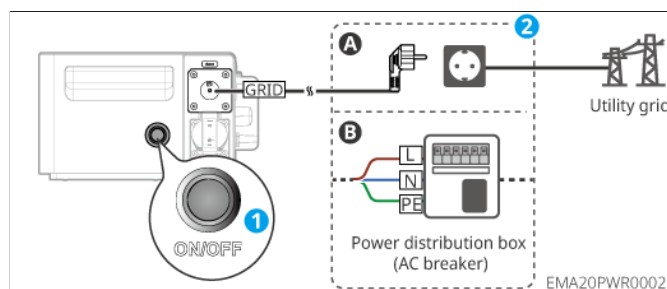
8.1 System Power-Off

DANGER

- When performing operations and maintenance on equipment in the system, please power off the system. Operating equipment with power on may cause equipment damage or electric shock hazards.
- After the device is powered off, the internal components take a certain time to discharge. Please wait until the device is fully discharged according to the time requirements on the label.

Step 1: Press the device ON/OFF switch to turn off the device.

Step 2: Disconnect the AC cable.



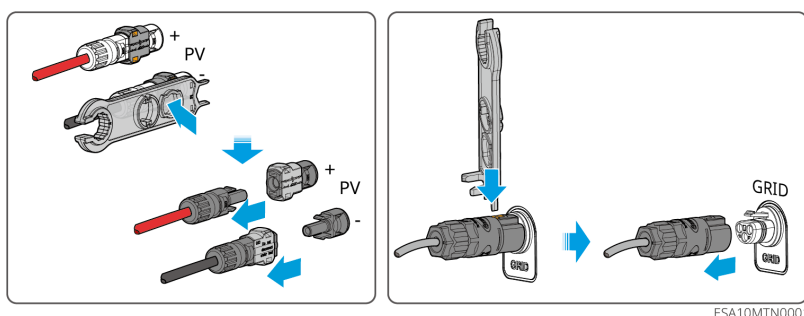
8.2 Equipment Removal

DANGER

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

Procedure:

1. Power off the system.
2. Use labels to mark the cable types of the cables connected in the system.
3. Disconnect all electrical connections of the equipment. Remove the PV anti-tamper cover and AC Connector with tools, as shown in the figure below.
4. Remove the inverter and battery.
5. Store the equipment properly. If it will be put into use later, ensure that the storage conditions meet the requirements.



8.3 Equipment Disposal

When the equipment 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 equipment is located. Do not dispose of the equipment as household waste.

8.4 Periodic Maintenance



DANGER

- Before equipment maintenance, ensure that necessary safety protection equipment is worn to prevent electric shock.
- During maintenance, ensure that both the upstream and downstream switches of the equipment 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. Unauthorized disassembly is prohibited.
- If exposed copper strands inside the conductive wire are found, do not touch. High voltage hazard. Contact after-sales personnel. Unauthorized disassembly is prohibited.
- In case of other emergencies, contact after-sales personnel immediately, operate under their guidance, or wait for them to operate on site.

Maintenance Item	Maintenance Method	Maintenance Cycle	Maintenance Purpose
System Cleaning	Check whether the installation space meets the requirements and whether debris has accumulated around the equipment.	Once every six months	Prevent heat dissipation failures.
System Installation	• Check whether the equipment is securely installed and whether the fastening screws are loose. • Check whether the equipment has any external damage or deformation.	Once every 6 months to once a year	Confirm equipment installation stability.

Maintenance Item	Maintenance Method	Maintenance Cycle	Maintenance Purpose
Electrical Connection	Check whether the electrical connections are loose, whether the cables are damaged, and whether there is exposed copper.	Once every 6 months to once a year	Confirm electrical connection reliability.
Battery Maintenance	If the battery has been unused or not fully charged for an extended period, periodic charging of the battery is recommended.	Once every 15 days	Protection of battery service life.

8.5 Troubleshooting

Please troubleshoot 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, equipment installation time, fault occurrence time, fault occurrence frequency, etc.
2. Equipment installation environment, such as weather conditions, whether 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 conditions.

If a problem not listed occurs in the system, or if following the instructions still cannot stop the problem or abnormality, please immediately stop operating the system and immediately contact your dealer.

No.	Fault Name	Fault Cause	Troubleshooting Suggestions
1	Grid Overvoltage Protection	The grid voltage is higher than 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, please check whether the grid voltage is within the allowable range • If the grid voltage exceeds the allowable range, please contact your local power operator. • If the grid voltage is within the allowable range, it is necessary to modify the inverter's Grid Overvoltage Protection setpoint, HVRT, or disable the Grid Overvoltage Protection function after obtaining consent from the local power operator. 3. If it cannot recover for a long time, check whether the AC-side circuit breaker and output cable are connected properly.
2	Grid Undervoltage Protection	The grid voltage is below the allowable range, or the Duration of Low Voltage 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, please check whether the grid voltage is within the allowable range • If the grid voltage exceeds the allowable range, please contact your local power operator. • If the grid voltage is within the allowable range, it is necessary to modify the inverter's Grid Undervoltage Protection setpoint, LVRT, or disable the Grid Undervoltage Protection function after obtaining consent from the local power operator. 3. If it cannot recover for a long time, check whether the AC-side circuit breaker and output cable are connected properly.

No.	Fault Name	Fault Cause	Troubleshooting Suggestions
3	Grid Rapid Overvoltage Protection	An abnormality occurs in grid voltage detection, or an 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, please check whether the grid voltage is within the allowable range • If the grid voltage exceeds the allowable range, please contact your local power operator. • If the grid voltage is within the allowable range, it is necessary to modify the inverter's Grid Overvoltage Protection setpoint, HVRT, or disable the Grid Overvoltage Protection function after obtaining consent from the local power operator. 3. If it cannot recover for a long time, check whether the AC-side circuit breaker and output cable are connected properly.
4	Grid 10min Overvoltage	The moving average of the grid voltage within 10 min exceeds the range specified by the safety code.	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 voltage for a long period. If it occurs frequently, check whether the grid voltage is within the allowable range. • If the grid voltage exceeds the allowable range, please contact your local power operator. • If the grid voltage is within the allowable range, it is necessary to modify the Grid 10min Overvoltage setpoint after obtaining consent from the local power operator.

No.	Fault Name	Fault Cause	Troubleshooting Suggestions
5	Grid Overfrequency	Grid abnormality: The actual grid frequency is higher than the requirements of 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 allowable range, please contact your local power operator. • If the grid frequency is within the allowable range, it is necessary to modify the Grid Overfrequency setpoint after obtaining consent from the local power operator.
6	Grid Underfrequency	Grid abnormality: The actual grid frequency is lower than the requirements of 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 allowable range, please contact your local power operator. • If the grid frequency is within the allowable range, it is necessary to modify the Grid Underfrequency setpoint after obtaining consent from the local power operator.

No.	Fault Name	Fault Cause	Troubleshooting Suggestions
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 allowable range, please contact your local power operator. • If the grid frequency is within the allowable range, please contact your distributor or after-sales service center.
8	LVRT Undervoltage Fault	Grid abnormality: 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 your local power operator; if yes, contact your distributor or after-sales service center.
9	HVRT Overvoltage	Grid abnormality: The duration of Grid Voltage Abnormal exceeds the time specified for high/low voltage ride-through.	
10	DCI Protection Level1	The inverter output current has a High DC Component, exceeding the safety regulation or the machine's default allowable range.	1. If the abnormality is caused by an external fault, the inverter will automatically resume normal operation after the fault disappears, and no manual intervention is required. 2. If this alarm occurs frequently and affects the normal power generation of the plant, please contact your dealer or GoodWe after-sales service center.
11	DCI Protection Level2	The inverter output current has a High DC Component, exceeding the safety regulation or the machine's default allowable range.	

No.	Fault Name	Fault Cause	Troubleshooting Suggestions
12	Low Insulation Resistance	1. The PV string is short-circuited to Protection ground. 2. The environment where the PV strings are installed has been humid for a long time, and the line-to-ground insulation is poor.	1. Check the impedance from 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 this impedance is indeed lower than the default value in rainy weather, reset the "Insulation Resistance 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 device switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the device switch to ON. If the fault persists, please contact your dealer or GoodWe after-sales service center.
15	Back-up Output Overload	Prevent the inverter from continuous Overload output.	Switch off part of the 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 no manual intervention is required. 2. If it occurs frequently, please contact your dealer or GoodWe after-sales service center.
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 device switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the device switch to ON. If the fault persists, please contact your dealer or GoodWe after-sales service center.

No.	Fault Name	Fault Cause	Troubleshooting Suggestions
18	Relay Check Abnormal	Relay abnormality, cause: 1. Relay abnormality (relay short circuit) 2. Relay sampling circuit abnormality. 3. AC side wiring abnormality (possible loose connection or short circuit).	Disconnect the AC output side switch, disconnect the PV strings, and set the device switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the device switch to ON. If the fault persists, please contact your dealer or GoodWe after-sales service center.
19	Cabinet Overtemperature	Cabinet Overtemperature, possible causes: 1. The inverter is installed in an unventilated location. 2. Ambient Overtemperature. 3. Internal fan is operating 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 there is no ventilation or Ambient Overtemperature occurs, improve its ventilation and heat dissipation. 3. If ventilation and ambient temperature are normal, contact your distributor or GoodWe after-sales service center.
20	INV Module Overtemperature	Inverter module overtemperature, possible causes: 1. The inverter is installed in an unventilated location. 2. Ambient Overtemperature. 3. Internal fan is operating abnormally.	

No.	Fault Name	Fault Cause	Troubleshooting Suggestions
21	Boost Module Overtemperature	Boost Module Overtemperature, possible causes: 1. The inverter is installed in an unventilated location. 2. Ambient Overtemperature. 3. Internal fan is operating abnormally.	
22	1.5V Ref Abnormal	Reference circuit fault	Disconnect the AC output side switch, disconnect the PV strings, and set the device switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the device switch to ON. If the fault persists, please contact your dealer or GoodWe after-sales service center.
23	Model recognition fault	Fault related to Model Recognition Error	Disconnect the AC output side switch, disconnect the PV strings, and set the device switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the device switch to ON. If the fault persists, please contact your dealer or GoodWe after-sales service center.
24	Bus Overvoltage	BUS overvoltage, possible causes: 1. PV overvoltage; 2. Abnormal inverter BUS voltage sampling;	Disconnect the AC output side switch, disconnect the PV strings, and set the device switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the device switch to ON. If the fault persists, please contact your dealer or GoodWe after-sales service center.
25	N-Bus Overvoltage		

No.	Fault Name	Fault Cause	Troubleshooting Suggestions
26	PV Input Overvoltage	PV input voltage too high, possible causes: Incorrect PV array configuration: too many PV modules are 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 device switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the device switch to ON. If the fault persists, please contact your dealer or GoodWe after-sales service center.
28	FlyCap Software Overvoltage	Flying capacitor overvoltage, possible causes: 1. PV overvoltage; 2. Inverter BUS voltage sampling abnormal;	Disconnect the AC output side switch, disconnect the PV strings, and set the device switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the device switch to ON. If the fault persists, please contact your dealer or GoodWe after-sales service center.
29	PV String Reversed (String1~16)	PV String Reversed	Check whether the PV strings are 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 device switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the device switch to ON. If the fault persists, please contact your dealer or GoodWe after-sales service center.

No.	Fault Name	Fault Cause	Troubleshooting Suggestions
31	Flash R/W Error	Flash content changed; Flash life exhausted;	1. Upgrade to the latest firmware. 2. Contact your dealer or GoodWe 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 device switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the device switch to ON. If the fault persists, please contact your dealer or GoodWe after-sales service center.
33	PV String Mismatch	1. String power exceeds 600W 2. Inverter sampling circuit abnormal	Disconnect the AC output side switch, disconnect the PV strings, and set the device switch to OFF. After 5 minutes, close the AC output side switch, reconnect the PV strings, and set the device switch to ON. If the fault persists, please contact your dealer or GoodWe after-sales service center.

9 Technical Parameters

9.1 Inverter Technical Parameters

Technical Parameters	GW3K-EMA-G10	GW3K-EMA-UK-G10
Battery Side		
Battery Type	Li-ion	Li-ion
Nominal Voltage (V)	54	54
Voltage Range (V)	52-56	52-56
Start-up Voltage (V)	9	9
Number of Battery Inputs	1	1
Max. Continuous Charging Current (A)	63	63
Max. Continuous Discharging Current (A)	64	64
Max. Charging Power (kW)	3.4	3.4
Max. Discharging Power (kW)	3.2	3.2
PV Side		
Max. Input Power (kW)	4.8	4.8

Technical Parameters	GW3K-EMA-G10	GW3K-EMA-UK-G10
Max. Input Voltage (V)	60	60
MPPT Operating Voltage Range (V)*1	13-48	13-48
MPPT Operating Voltage Range at Nominal Power (V)	33.3-48	33.3-48
Start-up Voltage (V)	15	15
Nominal Input Voltage (V)	40	40
Max. MPPT Current (A)	36/36/36/36	36/36/36/36
Max. MPPT Short Circuit Current (A)	40/40/40/40	40/40/40/40
Max. Backfeed Current to the Array (A)	0	0
Number of MPPTs	4	4
Number of Strings per MPPT	1	1
AC Side (Grid Port)		
Rated Power (kW)	0.8 (default) /3 *2	0.8 (default) /3 *2
Maximum Power (kW)	0.8 (default) /3 *2	0.8 (default) /3 *2

Technical Parameters	GW3K-EMA-G10	GW3K-EMA-UK-G10
Rated Apparent Power from Grid (kVA)	3.6	3.6
Rated Apparent Power to Grid (kVA)	0.8 (default) /3 *2	0.8 (default) /3 *2
Max. Apparent Power to Grid (kVA)	0.8 (default) /3 *2	0.8 (default) /3 *2
Max. Apparent Power from Grid (kVA)	3.6	3.6
Nominal Voltage (V)	220/230/240, L/N/PE	220/230/240, L/N/PE
Voltage Range (V)	170-280	170-280
Nominal Frequency (Hz)	50/60	50/60
Frequency Range (Hz)	45-55 / 55-65	45-55 / 55-65
Rated Current from Grid (A)	16@220V 15.7@230V 15@240V	16@220V 15.7@230V 15@240V
Rated Current to Grid (A)	3.5@220V/3.5@230V/3.3@240 V (default) 13.7@220V/13@230V/12.5@240V*2	3.5@220V/3.5@230V/3.3@240 V (default) 13.7@220V/13@230V/12.5@240V*2
Max. Current from Grid (A)	16	16

Technical Parameters	GW3K-EMA-G10	GW3K-EMA-UK-G10
Max. Current to Grid (A)	3.5 (default)/15.2*2	3.5 (default)/15.2*2
THDi	3%	3%
Type of Voltage	a.c.	a.c.
AC Side (Back-up Port)		
Rated Apparent Power (kVA)	3	3
Max. Apparent Power (kVA)	Off-grid: 3 On-grid: 3.6	Off-grid: 3 On-grid: 3.6
Nominal Voltage (V)	220/230/240, L/N/PE	220/230/240, L/N/PE
Nominal Frequency (Hz)	50/60	50/60
Frequency Range (Hz)	45-55 / 55-65	45-55 / 55-65
Rated Current (A)	13.7@220V 13.1@230V 12.5@240V	13
Max. Current (A)	Off-grid: 13.7 On-grid: 16	Off-grid: 13 On-grid: 13
Total Voltage Waveform Distortion Rate (@ Linear Load)	<3%	<3%
On/Off-grid Switching Time (ms)	10	10
Efficiency		

Technical Parameters	GW3K-EMA-G10	GW3K-EMA-UK-G10
Max. Efficiency	92.0%	92.0%
Max. Battery to AC Efficiency	92.0%	92.0%
MPPT Efficiency	99.80%	99.80%
Protection		
PV String Current Monitoring	Standard	Standard
PV Insulation Resistance Detection	Standard	Standard
Anti-islanding Protection	Standard	Standard
AC Overcurrent Protection	Standard	Standard
AC Short Circuit Protection	Standard	Standard
AC Overvoltage Protection	Standard	Standard
DC Surge Protection	Type III	Type III
AC Surge Protection	Type II	Type II
General Data		
Operating Temperature Range (°C)	-20-55	-20-55

Technical Parameters	GW3K-EMA-G10	GW3K-EMA-UK-G10
Operating Environment	Indoor/Outdoor	Indoor/Outdoor
Storage Temperature (°C)	-20~+35°C ≤ 12 months +35~+45°C < 6 months	-20~+35°C ≤ 12 months +35~+45°C < 6 months
Relative Humidity	0-100%	0-100%
Max. Operating Altitude (m)	3000	3000
Cooling Method	Natural Cooling	Natural Cooling
User Interface	LED, APP	LED, APP
Communication (BMS)	CAN	CAN
Communication	RS485, LAN, WiFi, Bluetooth	RS485, LAN, WiFi, Bluetooth
Communication Protocols	Modbus-RTU	Modbus-RTU
Weight (kg)	≤ 15	≤ 15
Dimensions (W×H×D mm)	480x170x290	480x170x290
Noise Emission (dB)	≤20	≤20
Topology	Isolated	Isolated
Power Self-consumption at Night (W)	<10	<10
Ingress Protection Rating	IP65	IP65

Technical Parameters	GW3K-EMA-G10	GW3K-EMA-UK-G10
Anti-corrosion Class	C4M	C4M
DC Connector	Jinko (6mm ²)	Stäubli MC4 (6mm ²)
AC Connector	Plug-and-play terminal	Plug-and-play terminal
Environmental Category	3K5	3K5
Pollution Degree	PD3 (External) PD2 (Internal)	PD3 (External) PD2 (Internal)
Overvoltage Category	DC II / AC III	DC II / AC III
Protective Class	I	I
Decisive Voltage Classification (DVC)	battery: B PV: B AC: C Com: A	battery: B PV: B AC: C Com: A
Mounting Method	Ground stacking	Ground stacking
Type of Electrical Supply System	TT, TN	TT, TN
Power Factor	Adjustable from 0.8 leading to 0.8 lagging	Adjustable from 0.8 leading to 0.8 lagging
Safe service life (years)	≤15	≤15
Country of Manufacture	China	China
Certification		
Grid Standard		

Technical Parameters	GW3K-EMA-G10	GW3K-EMA-UK-G10
Safety Regulation	Refer to the official website.	
EMC		

*1: Please refer to the user manual for the MPPT Voltage Range at nominal power.

*2: Default 0.8 kW; it can be adjusted from 0.8 kW to 3 kW by a professional electrician.

9.2 Battery Technical Parameters

Technical Parameters	GW3.0-BAT-LVD-G10
Battery Type	LFP (LiFePO ₄)
Rated Capacity (Ah)	314
Rated Energy (kWh)	3
Usable Energy (kWh)*1	2.75
Nominal Voltage (V) (Battery)	9.6
Voltage Range (V) (Battery)	8.61-10.83
Operating Voltage Range (V) (Single-phase System)	52-56
Max. Current from Grid (System) (A)	32
Max. Current to Grid (System) (A)	33
Max. Input Power (System) (kW) *2	1.7
Max. Output Power (System) (kW) *2	1.7

Technical Parameters	GW3.0-BAT-LVD-G10
Charging Temperature Range (°C)	-20~+55 (Heating Film)
Discharging Temperature Range (°C)	-20~+55
Relative Humidity	4-100%
Max. Operating Altitude (m)	3000
Noise Emission Level (dB)	≤20
Communication	CAN
Weight (kg)	≤29
Available Fire Extinguishing Agents	CO ₂ , H ₂ O
Key Materials	LiFePO ₄ , C, Cu, LiPF ₆ , Al, (C ₃ H ₆) _n
Ingress Protection Rating	IP65
Protective Class	II
Dimensions (W×H×D mm)	480×308.6×260
Storage Temperature (°C)	-20~+45
Max. Storage Time	-20~+35°C ≤12 months +35~+45°C ≤6 months
Scalability	≤5P
Mounting Method	Ground stacking
Cycle Life ^{*3}	≥10000
Country of Manufacture	China
Standards and Certification	

Technical Parameters	GW3.0-BAT-LVD-G10
Safety	IEC 60673, IEC62619/IEC63056 REGULATION (EU) 2023/1542 article 12 REGULATION (EU) 2023/1542 article 10
EMC	IEC 61000-6-1/-2/-3/-4(EN IEC 61000-6-1/-2/-3/-4), CISPR11
Transportation	UN38.3

*1: Test conditions are 100% DOD (battery Voltage Range 2.87–3.61 V), and the battery system is charged/discharged at 850 W at 25±2°C at the beginning of life. Usable energy is defined by its initial design value. Actual usable energy may vary depending on charge/discharge rate, environmental conditions (such as temperature), transportation, and storage factors.

*2: Max. Input Power / Max. Output Power / Peak Output Power are related to temperature and SOC.

*3: Based on test data under specific laboratory conditions.

10 Appendix

10.1 Terminology Explanation

- **Overvoltage Category Explanation**

- **Overvoltage Category I:** Equipment connected to circuits in which measures are taken to limit transient overvoltage to a sufficiently low level.
- **Overvoltage Category II:** Energy-consuming equipment supplied by a fixed installation. Such equipment includes appliances, portable tools, and other household and similar loads. If special requirements are imposed on the reliability and suitability of such equipment, Voltage Category III is used.
- **Overvoltage Category III:** Equipment in fixed installations whose reliability and suitability must meet special requirements. This includes switchgear in fixed installations and industrial equipment permanently connected to fixed installations.
- **Overvoltage Category IV:** Equipment used at the supply source of the installation, including measuring instruments and upstream overcurrent Protection devices, etc.

- **Explanation of Wet 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:** The ambient air temperature range is -25 to +60°C, suitable for an environment with Pollution Degree 3;
- **Indoor Type II Inverter:** The ambient air temperature range is -25 to +40°C, suitable for an environment with Pollution Degree 3;
- **Indoor Type I Inverter:** The ambient air temperature range is 0 to +40°C, suitable for an environment with Pollution Degree 2;

- **Pollution Degree Category Explanation**

- **Pollution Degree 1:** No pollution or only dry, non-conductive pollution;
- **Pollution Degree 2:** Normally, only non-conductive pollution occurs; however,

temporary conductive pollution caused by condensation must be considered;

- **Pollution Degree 3:** Conductive pollution, or non-conductive pollution that becomes conductive due to condensation;
- **Pollution Degree 4:** Persistent conductive pollution, such as pollution caused by conductive dust or rain and snow.

10.2 Meaning of Battery SN Code

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11-14位

The productSNcode's11-14digits are 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;
- The13th digit is the production month, e.g.,8is represented by8;

The details are as follows:

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

- The14th digit is the production date, e.g., the8th day is represented by8;
Prefer to use numerals, e.g., 1~9 represents the 1~9 day, A represents the 10 day, and so on. Note: do not use the letters I and O to avoid confusion. The details are as follows:

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

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

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

11 Contact Information

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