

# GOODWE



## **User Manual**

**Hybrid Inverter**

ET Series / ET Plus Series

5.0-10.0kW

**AC-Coupled Inverter**

BT Series

5.0-10.0kW

V1.1-2022-12-20

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**NOTICE**

The information in this user manual is subject to change due to product updates or other reasons. This guide cannot replace the product labels or the safety precautions in the user manual unless otherwise specified. All descriptions in the manual are for guidance only.

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# 1 About This Manual

This manual describes the product information, installation, electrical connection, commissioning, troubleshooting and maintenance. Read through this manual before installing and operating the product. All the installers and users have to be familiar with the product features, functions, and safety precautions. This manual is subject to update without notice. For more product details and latest documents, visit <https://en.goodwe.com>.

## 1.1 Applicable Model

This manual applies to the listed inverters below:

### ET Series (Hybrid Inverter)

- GW5KL-ET
- GW6KL-ET
- GW8KL-ET
- GW10KL-ET
- GW5K-ET
- GW6.5K-ET
- GW8K-ET
- GW10K-ET
- GW5KN-ET
- GW6.5KN-ET
- GW8KN-ET
- GW10KN-ET

### BT Series (AC-Coupled Inverter)





- GW5K-BT
- GW6K-BT
- GW8K-BT
- GW10K-BT

## 1.2 Target Audience

This manual applies to trained and knowledgeable technical professionals only. The technical personnel has to be familiar with the product, local standards, and electric systems.

## 1.3 Symbol Definition

Different levels of warning messages in this manual are defined as follows:

 <b>DANGER</b>
Indicates a high-level hazard that, if not avoided, will result in death or serious injury.
 <b>WARNING</b>
Indicates a medium-level hazard that, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>
Indicates a low-level hazard that, if not avoided, could result in minor or moderate injury.
 <b>NOTICE</b>
Highlights key information and supplements other text. It may include skills and methods to solve product-related problems.

## 1.4 Updates

The latest document contains all the updates made in earlier issues.

### V1.1 2022-12-20

- Updated information about ET Plus series inverters.

### V1.0 2020-05-20

- First Issue

## 2 Safety Precaution

Please strictly follow these safety instructions in the user manual during the operation.

### NOTICE

The inverters are designed and tested strictly in compliance with related safety rules. Read and follow all the safety instructions and cautions before any operations. Improper operation might cause personal injury or property damage as the inverters are electrical equipment.

### 2.1 General Safety

#### NOTICE

- The information in this user manual is subject to change due to product updates or other reasons. This guide cannot replace the product labels otherwise specified. All descriptions in the manual are for guidance only.
- Before installations, read through the user manual to learn about the product and the precautions.
- All operations should be performed by trained and knowledgeable technicians who are familiar with local standards and safety regulations.
- Use insulating tools and wear personal protective equipment when operating the equipment to ensure personal safety. Wear anti-static gloves, clothes, and wrist strips when touching electronic devices to protect the inverter from damage.
- Strictly follow the installation, operation, and configuration instructions in this guide and user manual. The manufacturer shall not be liable for equipment damage or personal injury if you do not follow the instructions. For more warranty details, please visit <https://en.goodwe.com/warranty>.

### 2.2 PV String Safety


#### DANGER


Connect the DC cables using the delivered DC connectors and terminals. The manufacturer shall not be liable for the equipment damage if other connectors or terminals are used.









#### WARNING

- Ensure the component frames and the bracket system are securely grounded.
- Ensure the DC cables are connected tightly, securely and correctly.
- Measure the DC cables with a multimeter to avoid reverse polarity connection. Also, the voltage should be under the permissible range.
- Do not connect one PV string to more than one inverter at the same time. Otherwise, it may cause damage to the inverter.

### 2.3 Inverter Safety

 <b>WARNING</b>	
<ul style="list-style-type: none"> <li>• The voltage and frequency at the connection point should meet the inverter grid connection requirements.</li> <li>• Additional protective devices like circuit breakers or fuses are recommended on the AC side. Specification of the protective device should be at least 1.25 times the maximum AC current.</li> <li>• PE cable of the inverter must be connected firmly. The resistance between the neutral wire and the earth cable is less than 10Ω.</li> <li>• You are recommended to use copper cables as AC output cables. Contact the manufacturer if you want to use other cables.</li> <li>• When single overload protection occurs, the inverter can restart automatically; however, the restarting time will be extended if it happens several times. For a faster restarting, try it via app.</li> <li>• Do not enable the BACK-UP function if the PV system is not configured with batteries. Otherwise, the manufacturer shall not be liable for related risks.</li> </ul>	

 <b>DANGER</b>	
<ul style="list-style-type: none"> <li>• Do not apply mechanical load to the terminals, otherwise the terminals can be damaged.</li> <li>• All labels and warning marks should be visible after the installation. Do not cover, scrawl, or damage any label on the equipment.</li> <li>• Warning labels on the inverter are as follows:</li> </ul>	

	HIGH VOLTAGE HAZARD Disconnect all incoming power and turn off the product before working on it.		Delayed discharge. Wait 5 minutes after power off until the components are completely discharged.
	Read through the user manual before any operations.		Potential risks exist. Wear proper Personnel Protective Equipment before any operations.
	High-temperature hazard. Do not touch the product under operation to avoid being burnt.		Grounding point.
	CE Mark		Do not dispose of the inverter as household waste. Discard the product in compliance with local laws and regulations, or send it back to the manufacturer.

## 2.4 Battery Safety

### WARNING

- The battery used with the inverter shall be approved by the inverter manufacturer. The approved battery list can be obtained through the official website.
- Before installations, read through the corresponding battery's User Manual to learn about the product and the precautions. Strictly follow its requirements.
- If the battery discharged completely, please charge it in strict accordance with the corresponding user manual.
- Factors such as: temperature, humidity, weather conditions, etc. may limit the battery's current and affect its load.
- Contact after-sale service immediately if the battery is not able to be started. Otherwise, the battery might be damaged permanently.
- Measure the DC cable using the multimeter to avoid reverse polarity connection. Also, the voltage should be under the permissible range.
- Do not connect one battery group to several inverters at the same time. Otherwise, it may damage the inverter.

## 2.5 Personnel Requirements

### NOTICE

- Personnel who install or maintain the equipment must be strictly trained, learn about safety precautions and correct operations.
- Only qualified professionals or trained personnel are allowed to install, operate, maintain, and replace the equipment or parts.

## 2.6 EU Declaration of Conformity

GoodWe Technologies Co., Ltd. hereby declares that the inverter with wireless communication modules sold in the European market meets the requirements of the following directives:

- 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)

You can download the EU Declaration of Conformity on <https://en.goodwe.com>.

GoodWe Technologies Co., Ltd. hereby declares that the inverter without wireless communication modules sold in the European market meets the requirements of the following directives:

- Electromagnetic compatibility Directive 2014/30/EU (EMC)
- Electrical Apparatus Low Voltage Directive 2014/35/EU (LVD)
- 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)

You can download the EU Declaration of Conformity on <https://en.goodwe.com>.

## 3 Product Introduction

### 3.1 Product Overview

#### Intended usage

Inverters control and optimize the power in the PV system through an integrated energy management system. The power generated in the PV system can power the loads, stored in the battery, output to the utility grid, etc.

#### Model

This manual applies to the listed inverters below:

#### ET Series (Hybrid Inverter)

- GW5KL-ET
- GW6KL-ET
- GW8KL-ET
- GW10KL-ET
- GW5K-ET
- GW6.5K-ET
- GW8K-ET
- GW10K-ET
- GW5KN-ET
- GW6.5KN-ET
- GW8KN-ET
- GW10KN-ET

#### BT Series (AC-Coupled Inverter)

- GW5K-BT
- GW6K-BT
- GW8K-BT
- GW10K-BT

#### Model

**GW10KL-ET**

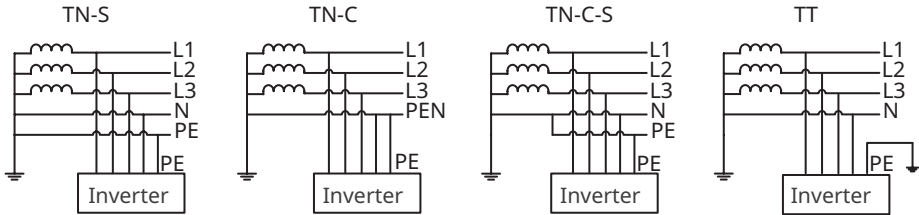


1      2      3      4

No.	Referring to	
1	Brand Code	GW: GoodWe
2	Rated Power	<ul style="list-style-type: none"> <li>• 5K: the rated power is 5kW.</li> <li>• 6K: the rated power is 6kW.</li> <li>• 6.5K: the rated power is 6.5kW.</li> <li>• 8K: the rated power is 8kW.</li> <li>• 10K: the rated power is 10kW.</li> </ul>
3	Product Feature	<ul style="list-style-type: none"> <li>• L: lower voltage</li> <li>• N: higher PV input current</li> </ul>
4	Series Code	<ul style="list-style-type: none"> <li>• ET: ET series hybrid inverter</li> <li>• BT: BT series AC-Coupled inverter</li> </ul>

## Supported Grid Types

For the grid type with neutral wire, the voltage between the neutral wire and the ground must be less than 10V.



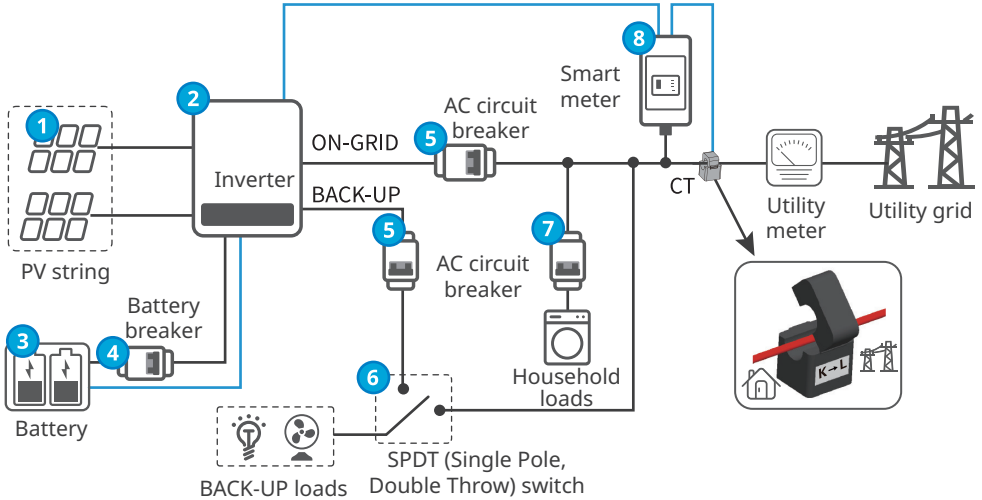
## 3.2 Application Scenarios

### ! WARNING

- The PV system is not suitable to connect equipment that relies on a stable power supply, such as medical equipment to sustain life. Ensure that no personal injury is occurred when the system is disconnected.
- Avoid loads with high starting current like high-power water pumps in the PV system. Otherwise, the off-grid output may fail due to excessive instantaneous power.
- Do not start the BACK-UP function if the PV system is not configured with batteries. Otherwise, the manufacturer shall not be liable for related system risks.
- Factors such as: temperature, humidity, weather, etc. may limit the battery's current and affect its loading capacity.
- The inverter supports UPS, and the switching time of UPS is less than 10ms. The UPS function may fail to start if the BACK-UP load capacity exceeds the rated power of the inverter.
- When single overload protection occurs, the inverter can restart automatically; however, the restarting time will be extended if it happens several times. For a faster restarting, try it via app.
- Normal household loads can be supported when the inverter is in back-up mode. Accepted loads as below:
  - Inductive loads: 1.5P non-inverter air conditioner
  - Capacitive loads: total power  $\leq 0.6$  times of the inverter's rated output power.



### Self Consumption System (Hybrid Scenarios)

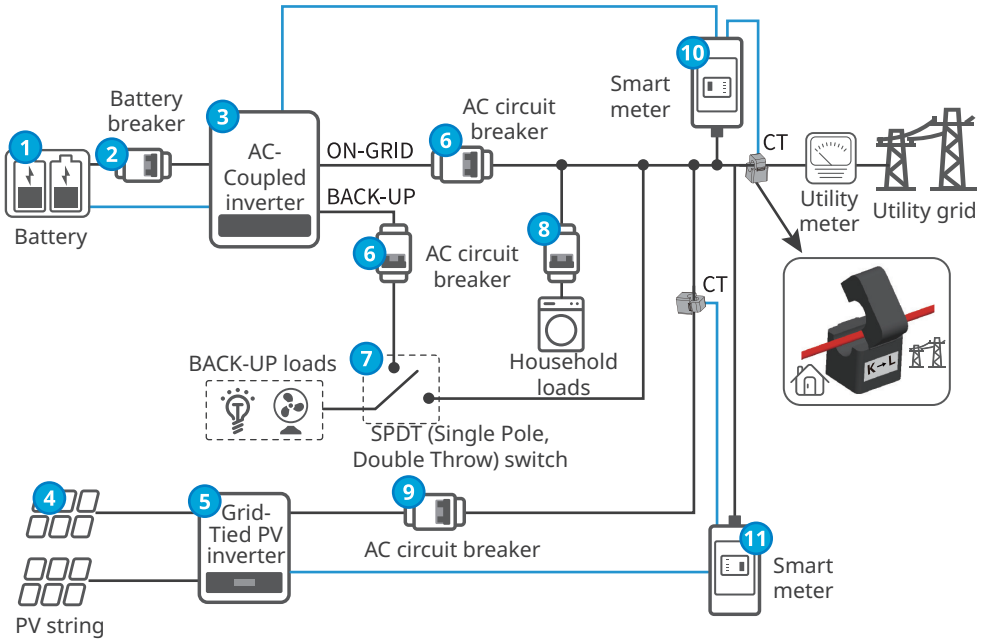


No.	Parts	Description
1	PV string	PV string is composed of series connected PV panels. Only for hybrid inverters.
2	Inverter	Supports ET, ET Plus, and BT series inverters.
3	Battery	Select the battery model according to the inverter model and the approved battery list.
4	Battery breaker	Recommended specifications: nominal current $\geq$ 40A, nominal voltage $\geq$ 600V.
5	AC circuit breaker	<ul style="list-style-type: none"> <li>For one inverter model, specifications of the BACK-UP load breakers and ON-GRID load breakers shall be the same. AC circuit breakers should be prepared by the customers.</li> </ul>
6	SPDT (Single Pole, Double Throw) switch	<ul style="list-style-type: none"> <li>An SPDT switch is recommended to ensure that the BACK-UP loads do not stop working when the inverter is off or in maintenance.</li> <li>Recommended specifications of AC Circuit Breaker and SPDT Switch:                             <ul style="list-style-type: none"> <li>For GW5KL-ET, GW5K-BT, GW5K-ET, GW5KN-ET, GW6KL-ET, GW6K-BT, GW6.5K-ET, GW6.5KN-ET: the nominal current<math>\geq</math>25A and the nominal voltage<math>\geq</math>400V.</li> <li>For GW8KL-ET, GW8K-ET, GW8K-BT, GW8KN-ET, GW10KL-ET, GW10K-BT, GW10K-ET, and GW10KN-ET: the nominal current<math>\geq</math>32A and the nominal voltage<math>\geq</math>400V.</li> </ul> </li> </ul>
7	AC circuit breaker	Depend on the actual using load.
8	Smart meter	Included in the deliverables of the inverter. Recommended model: GM3000.

**Self Consumption System (AC-Coupled Scenario)**

**NOTICE**

- Before enabling the power limit function, ensure that the AC-Coupled inverter or hybrid inverter supports power limit.
- **Enable** the power limit function if GoodWe AC-Coupled inverter or grid-tied PV inverter is applied in the PV system. Complete the power limit settings as required if a grid-tied PV inverter from other manufacturers is applied.
- When power limit function is enabled, the PV system will purchase 100W power from the utility grid.



No.	Parts	Description
1	Battery	Select the battery model according to the inverter model and the approved battery list.
2	Battery breaker	Recommended specifications: nominal current $\geq$ 40A, nominal voltage $\geq$ 600V.
3	AC-Coupled Inverter	Supports BT series inverters.
4	PV String	PV string is composed of series connected PV panels.
5	Grid-Tied PV Inverter	Supports grid-tied PV inverters from a third-party.

No.	Parts	Description
6	AC circuit breaker	<ul style="list-style-type: none"> <li>For one inverter model, specifications of the BACK-UP load breakers and ON-GRID load breakers shall be the same. AC circuit breakers should be prepared by the customers.</li> <li>An SPDT switch is recommended to ensure that the BACK-UP loads do not stop working when the inverter is off or in maintenance.</li> <li>Recommended specifications of AC circuit breaker and SPDT:                             <ul style="list-style-type: none"> <li>For GW5K-BT and GW6K-BT: the nominal current is <math>\geq 25A</math> and the nominal voltage is <math>\geq 400V</math></li> <li>For GW8K-BT and GW10K-BT: the nominal current is <math>\geq 32A</math> and the nominal voltage is <math>\geq 400V</math></li> </ul> </li> </ul>
7	SPDT (Single Pole, Double Throw) switch	
8	AC circuit breaker	Specifications of the AC breaker depend on the rated output current of the Grid-Tied PV inverter.
9	AC circuit breaker	Depend on the actual using load.
10	Smart meter (for AC-Coupled Inverter)	Included in the deliverables of the inverter. Recommended model: GM3000.
11	Smart meter (for Grid-Tied PV Inverter)	<ul style="list-style-type: none"> <li>When a GoodWe inverter is applied, GM3000 is recommended.</li> <li>When the inverter is from other manufacturer, model of the smart meter depends on the inverter.</li> </ul>

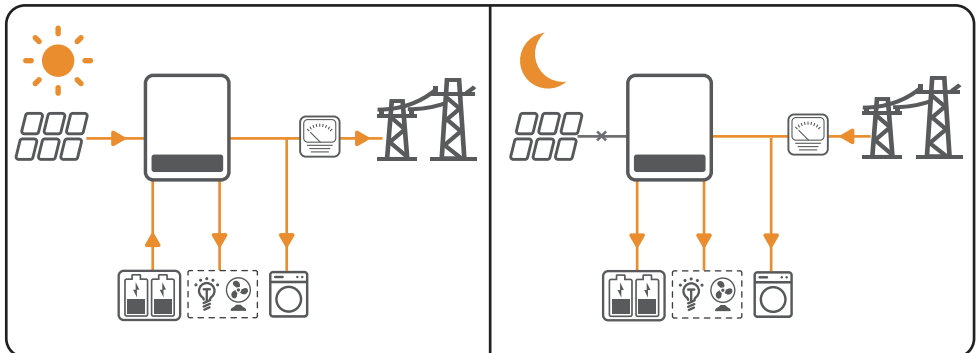
### 3.3 Working Mode

#### 3.3.1 System working mode

##### Economic mode

#### NOTICE

- Select Economic mode only when it meets the local laws and regulations, e.g., whether the grid is allowed to charge the battery. If not, do not use this mode.
- It is recommended to use economic mode in scenarios when the peak-valley electricity price varies a lot.
- Daytime: when the electricity price is at its peak, the battery will power the load first, and the remaining power can be sold to the grid.
- Night: when the electricity price is at its valley, set the time for the grid to charge the battery.



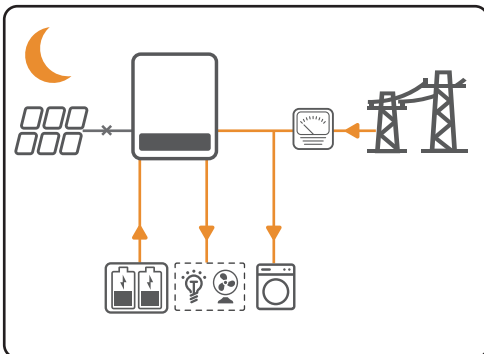
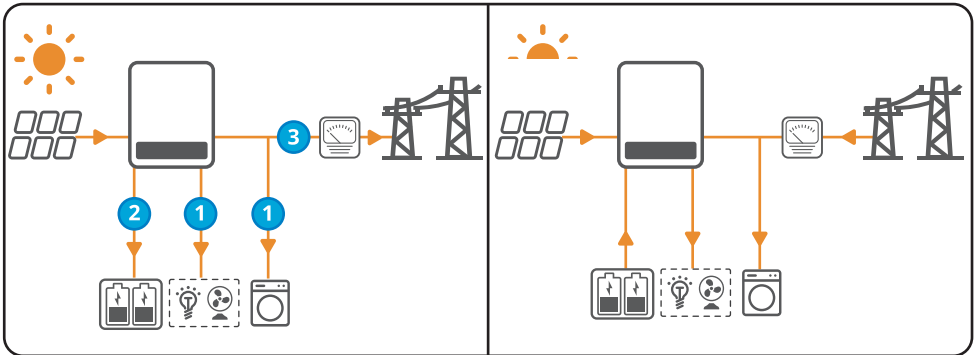
### Self consumption mode

#### NOTICE

- For solar power, consider self consumption mode in priority: the excess power charges the battery in day time; the battery supplies power to the load when there is no solar power generated at night. This will improve the self consumption rate and saves electricity costs.
- It is suitable for areas with high electricity prices and little or no solar power generation subsidies.

- Day time:
  - When the power generated in the PV system is sufficient, it will supply the loads in priority. And the excess power will charge the batteries first. The remaining power will be sold to the grid.
  - When the power generated in the PV system is insufficient or no power is generated, the battery will supply the loads in priority. If the battery power is insufficient, then the load will be powered by the grid.
- Night:
 

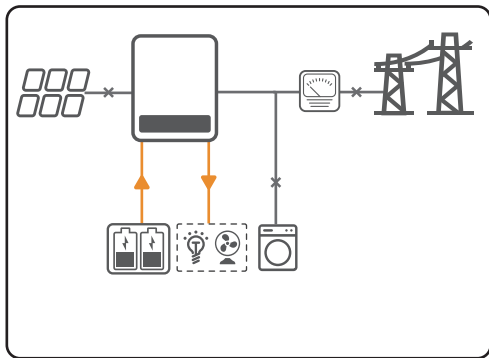
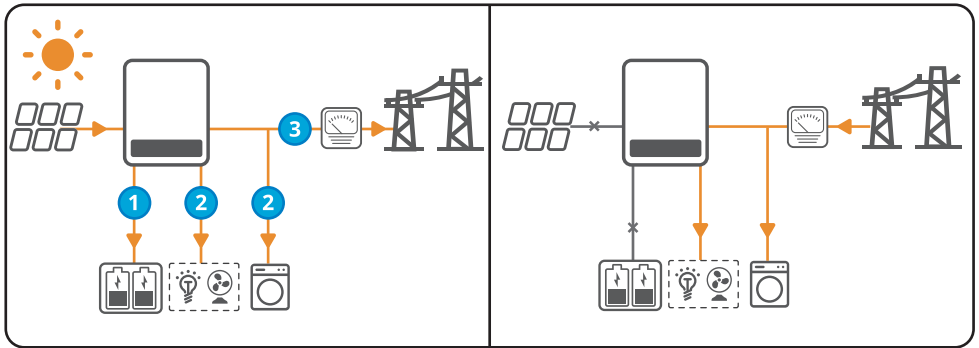
If the battery power is sufficient, the load will be powered by the battery. If the battery power is not enough, the load will be powered by the grid.



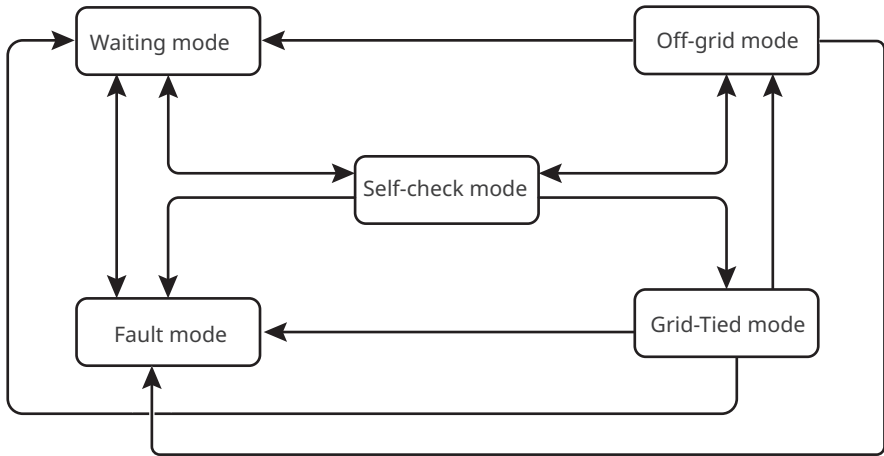
## Back-up mode

### NOTICE

- The back-up mode is mainly applied to the scenario where the grid is unstable and there is an important load. When the grid is disconnected, the inverter turns to off-grid mode to supply power to the load; when the grid is restored, the inverter switches to on-grid mode.
  - The battery stops discharging when it reaches SOC. When there is sunlight the next day, the battery starts to supply power to the load after it is charged to a certain power level.
- When the power generated in the PV system is sufficient, it charges the battery as priority. And the excess power charges the load. The remaining power will be sold to the grid.
  - When there is no power generated in the PV system:
    - The grid will supply the load when it is normal.
    - The inverter will enter off-grid mode and the battery will supply power to the load when the grid is abnormal.



### 3.3.2 Inverter operation mode



No.	Parts	Description
1	Waiting mode	Waiting stage after the inverter is powered on. <ul style="list-style-type: none"> <li>When the conditions are met, it enters the self-check mode.</li> <li>If there is a fault, the inverter enters the fault mode.</li> </ul>
2	Self-check mode	Before the inverter starts up, it continuously performs self-check, initialization, etc. <ul style="list-style-type: none"> <li>When the conditions are met, it enters the grid-tied mode, and the inverter starts on grid connection.</li> <li>If the grid is not detected, it enters the off-grid mode and the inverter runs off-grid; if the inverter has no off-grid function, it enters the wait mode.</li> <li>If the self-check is not passed, it enters the fault mode.</li> </ul>
3	Grid-Tied mode	The inverter is grid-tied successfully. <ul style="list-style-type: none"> <li>If the grid is not detected, it enters the off-grid mode.</li> <li>If a fault is detected, it enters the fault mode.</li> <li>If the conditions do not meet grid-tied requirements and the off-grid output function is not turned on, it enters the wait mode.</li> </ul>
4	Off-grid mode	When the grid is powered off, the inverter switches to the off-grid mode and continues to supply power to the load via BACK-UP port. <ul style="list-style-type: none"> <li>If a fault is detected, it enters the fault mode.</li> <li>If the conditions do not meet grid-tied requirements and the off-grid output function is not turned on, it enters the wait mode.</li> <li>If the conditions meet grid-tied requirements and the off-grid output function is turned on, it enters the self-check mode.</li> </ul>
5	Fault mode	If a fault is detected, the inverter enters the fault mode. When the fault is cleared, it enters the wait mode.

### 3.4 Features

#### Power derating

For a safe operation, the inverter will automatically reduce the output power when the operating environment is not ideal.

The following are the factors that may occur power derating. Please try to avoid them when the inverter is working.

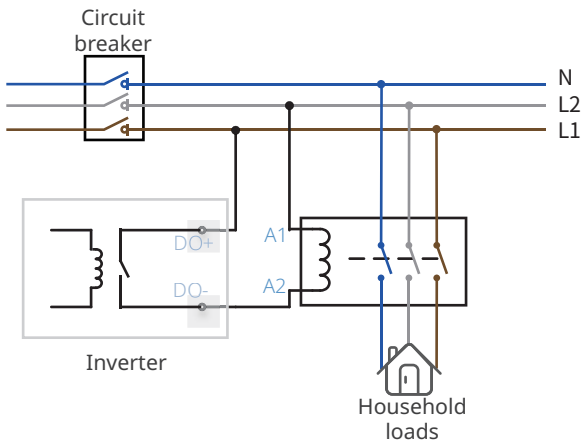
- Unfavorable environmental conditions, e.g., direct sunlight, high temperature, etc.
- Inverter's output power percentage has been set.
- The voltage of the grid varies with the frequency.
- Higher input voltage value.
- Higher input current value.

#### Load Control

The inverter reserves a dry contact controlling port, which supports connecting additional contactors to enable/disable the load.

The load control methods are as follows:

- Time control: set the time to enable/disable the loads, and the loads will be turned on or off automatically within the setting time period.
- Switch control: when the control mode is ON, the loads will be enabled; when it is OFF, the loads will be disabled.
- BACK-UP load control: the inverter has integrated DO dry contact controlling port, which can control the loads on or off. In off-grid mode, the loads connected to the DO port can be turned off if the overload at the BACK-UP is detected or the battery SOC value is lower than the battery off-grid protection setting.



## Communication

Communication module like Bluetooth, 4G, WiFi, and LAN is supported.

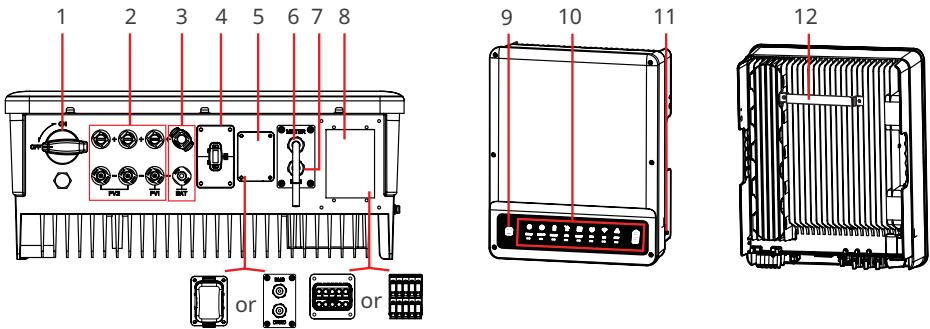
The inverter supports parameter setting in a short distance. Connecting to the server via 4G, WiFi, or LAN to monitor the working status of the inverter and the running situations of the power plant, etc.

- Bluetooth: meets Bluetooth 5.1 standard
- 4G (optional): supports mainstream telecommunication operators like AT&T and T-Mobile.
- WiFi: supports 2.4GHz frequency band. Set the router to 2.4GHz or 2.4GHz/5GHz coexistence mode. The maximum length of a WiFi network name is 40 bytes.
- LAN (optional): connects the inverter to the router via LAN communication and then to the server.



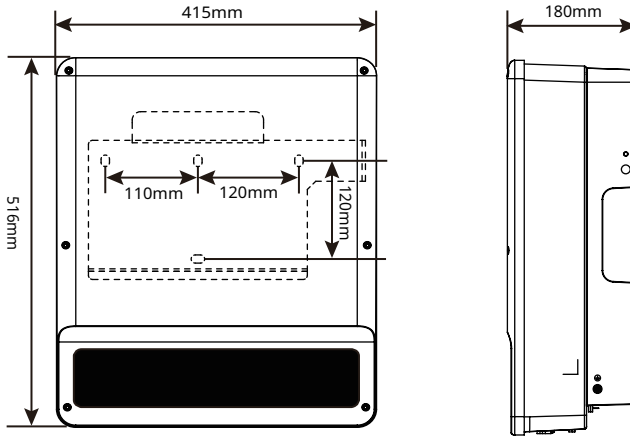
### 3.5 Appearance

#### 3.5.1 Parts















No.	Parts	Description
1	DC Switch	Starts or stops DC input. Only for hybrid inverters. GW5KL-ET, GW6KL-ET, GW8KL-ET,GW10KL-ET: optional.
2	PV input terminal	Connects the PV module DC input cables. Only for ET series and ET Plus series.
3	Battery input terminal	Connects the battery input cables.
4	Communication module port	Connects communication modules like Bluetooth, WiFi, LAN, 4G, etc. Only for ET series and ET Plus series.
5	Communication port	Supports RS485, DRED, RCR, DO, EMS etc.
6	Meter communication port	Connects the smart meter communication cable.
7	BMS communication port	Connects the battery BMS communication cable.
8	AC output terminal	Connects the AC output cable.
9	Wi-Fi reset	<ul style="list-style-type: none"> <li>Short press the button to restart the WiFi module.</li> <li>Long press for at least 3 seconds to factory reset the WiFi module.</li> </ul>
10	Indicators	Indicates working status of the inverter.
11	PE terminal	Connects the grounding cable.
12	Mounting Plate	Used to install the inverter.

### 3.5.2 Dimension



### 3.5.3 Indicator Description

Indicator	Status	Description
SYSTEM		ON = The system is ready.
		BLINK = The system is starting.
		OFF =The system is not working.
BACK-UP		ON = Back-up is ready / power available.
		OFF = Back-up is off / power not available.
BATTERY		ON = The battery is charging.
		BLINK 1 = The battery is discharging.
		BLINK 2 = The battery is low / soc is low.
		OFF = The battery is disconnected / not active.
GRID		ON = The grid is active and connected.
		BLINK = The grid is active but not connected.
		OFF = The grid is not active.
ENERGY		ON = Consuming energy from grid / buying.
		BLINK 1 = Supplying energy to grid / zeroing.
		BLINK 2 = Supplying energy to grid / selling.
		OFF = The grid is not connected or the system is not working.

Indicator	Status	Description
COM		ON = Both BMS communication and meter communication are ok.
		BLINK 1 = BMS communication fails; meter communication is ok.
		BLINK 2 = BMS communication is ok; meter communication fails.
		OFF = BMS communication and meter communication fail.
WiFi		ON = WiFi connected / active.
		BLINK 1 = WiFi is resetting.
		BLINK 2 = WiFi is not connected to the router.
		BLINK 4 = WiFi server problem.
		OFF = WiFi is not active.
FAULT		ON = A fault has occurred.
		BLINK 1 = Back-up output overload / reduce load.
		OFF = No fault.

### 3.5.4 Nameplate





The nameplate is for reference only.





GOODWE

**Product: Hybrid Inverter**  
**Model : GWSKN-ET**

PV Input	UDCmax: 1000Vd.c. UMPP: 200...850Vd.c. IDc,max: 1616Ad.c.
Battery	ISC,PV: 21.221.2Ad.c. Ubatt1: 80...600Vd.c., Li-Ion Ibatt,max (C/D): 25/25Ad.c.
On-grid	UAC,r: 3L/NP E~ 400/380V a.c. fAC, r: 50/60Hz PAC, r: 5kW IAC,max (to grid): 8.5Aa.c. Sr (to grid): 5kVA Smax (to grid): 5.5kVA IAC,max (from grid): 15.2Aa.c. Sr (from grid): 10kVA Smax (from grid): 10kVA
Back-up	UAC,r: 400/380V a.c. fAC, r: 50/60Hz IAC,max: 8.5Aa.c. Sr: 5kVA Smax: 5kVA

PF: ~1.0, cap., 0.8ind, Toperating: -35~60°C  
 Non-isolated, IP66, protective Class I, OVC(DCI)ACIII

S/N: \_\_\_\_\_

Good We Technologie s Co., Ltd.  
 E-mail: service@goodwe.co m  
 No.90 Zijin Rd., New District, Suzhou, 215011, China S/N

GW trademark, product type, and product model

Technical parameters

Safety symbols and certification marks

Contact information and serial number

## 4 Check and Storage

### 4.1 Check Before Receiving

Check the following items before receiving the product.

1. Check the outer packing box for damage, such as holes, cracks, deformation, and other signs of equipment damage. Do not unpack the contents from the box and contact the supplier as soon as possible if any damage is found.
2. Check the inverter model. If the inverter model is not what you requested, do not unpack the product and contact the supplier.
3. Check the deliverables for correct model, complete contents, and intact appearance. Contact the supplier as soon as possible if any damage is found.

### 4.2 Deliverables

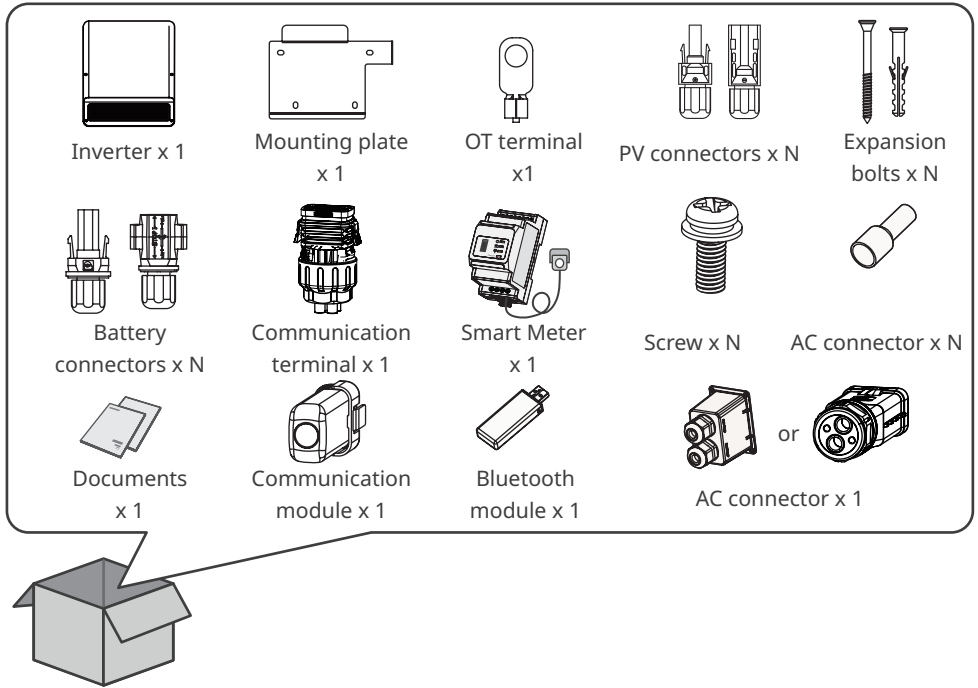
#### NOTICE

- The number of PV connectors corresponds to the number of PV input terminals. No PV input terminal will be delivered for the AC-coupled inverter.
- Bluetooth module: only for hybrid inverter.
- The number of expansion bolts, screws, and AC cable terminals are various depending on different inverters. The actual accessories may differ.



#### WARNING

Connect the DC cables with the delivered terminals. The manufacturer shall not be liable for the damage if other terminals are used.



### 4.3 Storage

If the equipment is not to be installed or used immediately, please ensure that the storage environment meets the following requirements:

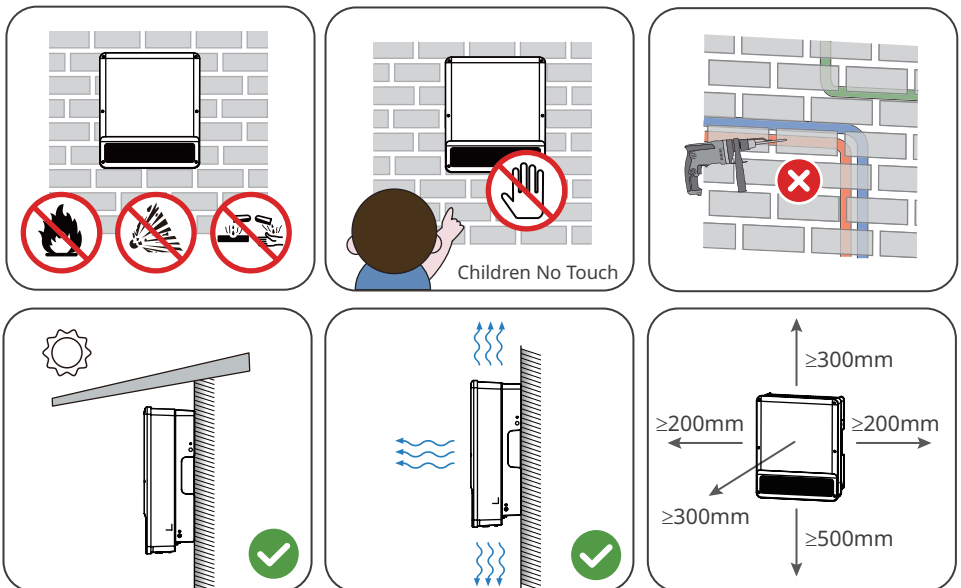
1. Do not unpack the outer package or throw the desiccant away.
2. Store the equipment in a clean place. Make sure the temperature and humidity are appropriate and no condensation.
3. The height and direction of the stacking inverters should follow the instructions on the packing box.
4. The inverters must be stacked with caution to prevent them from falling.
5. If the inverter has been long term stored, it should be checked by professionals before being put into use.

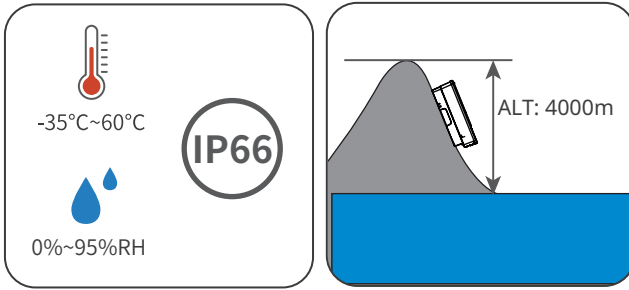
## 5 Installation

### 5.1 Installation Requirements

#### Installation Environment Requirements

1. Do not install the equipment in a place near flammable, explosive, or corrosive materials.
2. Do not install the equipment in a place that is easy to touch, especially within children's reach. High temperature exists when the equipment is working. Do not touch the surface to avoid burning.
3. Avoid the water pipes and cables buried in the wall when drilling holes.
4. Install the equipment in a sheltered place to avoid direct sunlight, rain, and snow. Build a sunshade if it is needed.
5. The place to install the equipment shall be well-ventilated for heat dissipation and large enough for operations.
6. The equipment with a high ingress protection rating can be installed indoors or outdoors. The temperature and humidity at the installation site should be within the appropriate range.
7. Install the equipment at a height that is convenient for operation and maintenance, electrical connections, and checking indicators and labels.
8. The inverter shall be installed below the maximum operating elevation of 4000m.
9. Install the equipment away from electromagnetic interference. If there is any radio or wireless communication equipment below 30MHz near the equipment, you have to:
  - Add a multi-turn winding ferrite core at the DC input line or AC output line of the inverter, or add a low-pass EMI filter.
  - Install the inverter at least 30m far away from the wireless equipment.



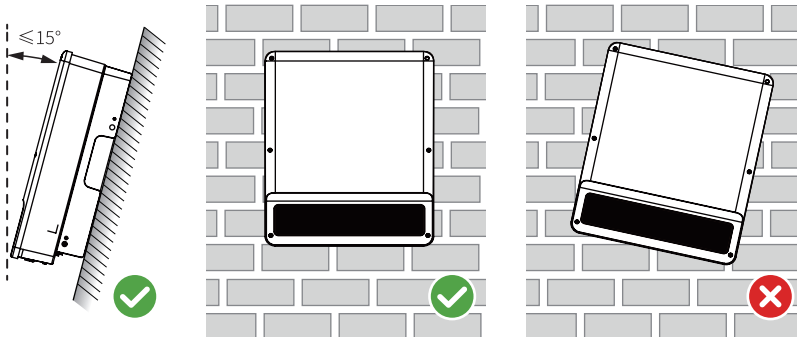


### Mounting Support Requirements

- The mounting support shall be nonflammable and fireproof.
- Install the equipment on a surface that is solid enough to bear the inverter weight.
- Do not install the product on the support with poor sound insulation to avoid the noise bothering people nearby.

### Installation Angle Requirements

- Install the inverter vertically or at a maximum back tilt of 15 degrees.
- Do not install the inverter upside down, forward tilt, back forward tilt, or horizontally.



### Installation Tool Requirements

The following tools are recommended when installing the equipment. Use other auxiliary tools on site if necessary.





## 5.2 Inverter Installation

### 5.2.1 Moving the Inverter

#### CAUTION

- Operations such as transportation, shipment, installation and so on shall in compliance with laws and regulations of the country or region where the inverter is located.
- Move the inverter to the site before installation. Follow the instructions below to avoid personal injury or equipment damage.
  1. Consider the weight of the equipment before moving it. Assign enough personnel to move the equipment to avoid personal injury.
  2. Wear safety gloves to avoid personal injury.
  3. Keep balance to avoid falling down when moving the equipment.

### 5.2.2 Installing the Inverter

#### NOTICE

- Avoid the water pipes and cables buried in the wall when drilling holes.
- Wear goggles and a dust mask to prevent the dust from being inhaled or contacting eyes when drilling holes.
- The DC switch lock of appropriate size should be prepared by customers. Diameter of the lock hole is  $\varnothing 8\text{mm}$ . Choose the appropriate size. Otherwise, it might not be able to install. Only for hybrid inverters.
- The anti-theft lock of appropriate size should be prepared by customers. Diameter of the lock hole is 10mm.
- Make sure the inverter is firmly installed in case of falling down.

**Step 1** Put the plate on the wall horizontally and mark positions for drilling holes.

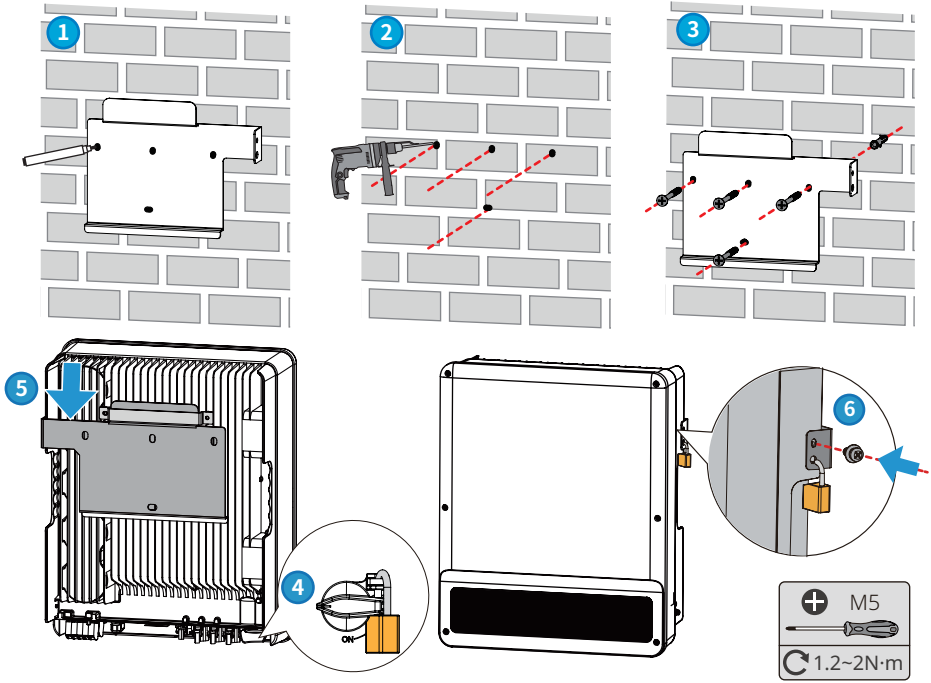
**Step 2** Drill holes to a depth of 80mm using the hammer drill. The diameter of the drill bit should be 10mm.

**Step 3** Secure the mounting plate using the expansion bolts.

**Step 4 (Optional)** Secure the DC switch with the DC switch lock, ensuring that the DC switch is "OFF" during installation.

**Step 5** Install the inverter on the mounting plate.

**Step 6** Tighten the nuts to secure the mounting plate and the inverter.



## 6 Electrical Connection

### DANGER

- Perform electrical connections in compliance with local laws and regulations. Including operations, cables, and component specifications.
- Disconnect the DC switch and the AC output switch of the inverter to power off the inverter before any electrical connections. Do not work with power on. Otherwise, an electric shock may occur.
- Tie the cables of the same type together, and place cables of different types apart. Do not place the cables entangled or crossed.
- If the tension is too large, the cable may be poorly connected. Reserve a certain length of the cable before connecting it to the inverter cable port.
- Make sure that the cable conductor is in full contact with the terminal and the cable insulation part is not crimped with the terminal when crimping the terminal. Otherwise, the inverter may not be able to work properly, or the connection may be unreliable during working, which may cause terminal block damage, etc.

### NOTICE

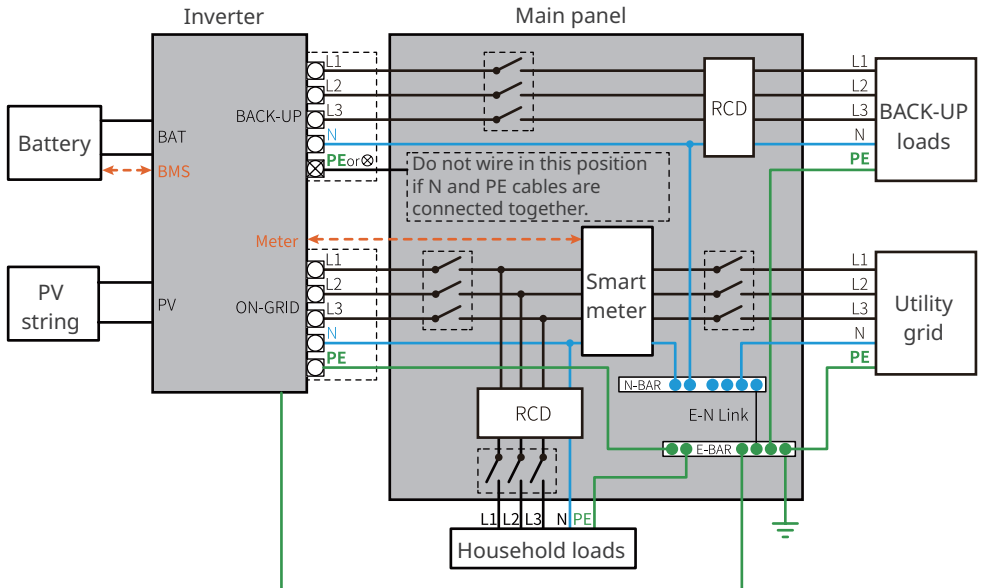
- Wear personal protective equipment like safety shoes, safety gloves, and insulating gloves during electrical connections.
- All electrical connections should be performed by qualified professionals.
- Cable colors in this document are for reference only. The cable specifications shall meet local laws and regulations.

## 6.2 System Wiring Diagram

### NOTICE

N and PE wiring via ON-GRID and BACK-UP ports of the inverter are different based on the regulation requirements of different regions. Refer to the specific requirements of local regulations.

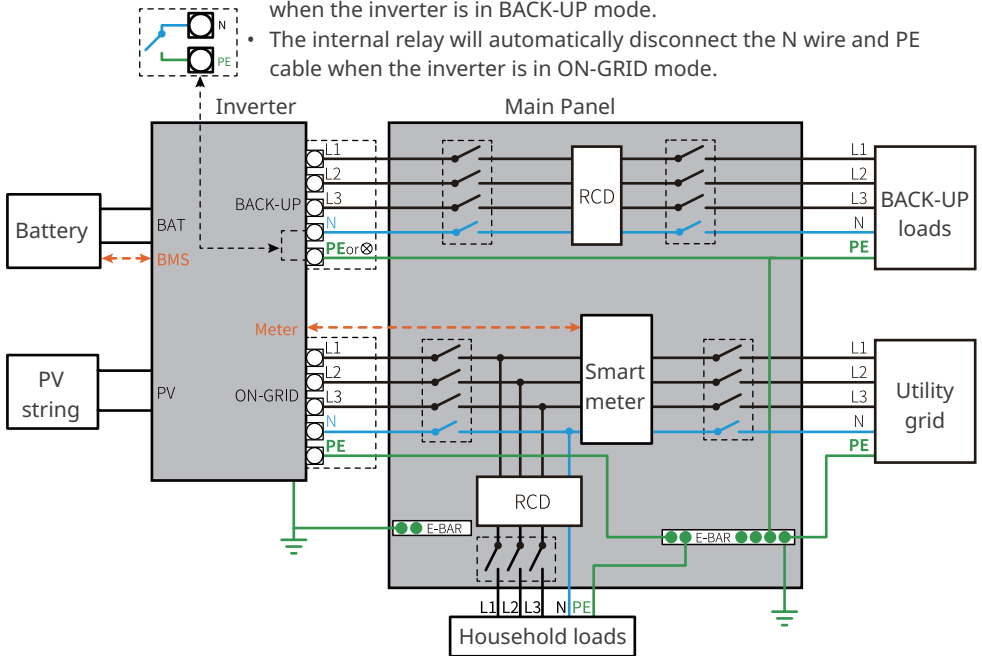
**N and PE cables are connected together in the Main Panel for wiring.**  
**The following diagram is applicable to areas in Australia, New Zealand, South Africa, etc.**



**N and PE cables shall be wired separately in the Main Panel.**

The following diagram is applicable to areas except Australia, New Zealand, South Africa.

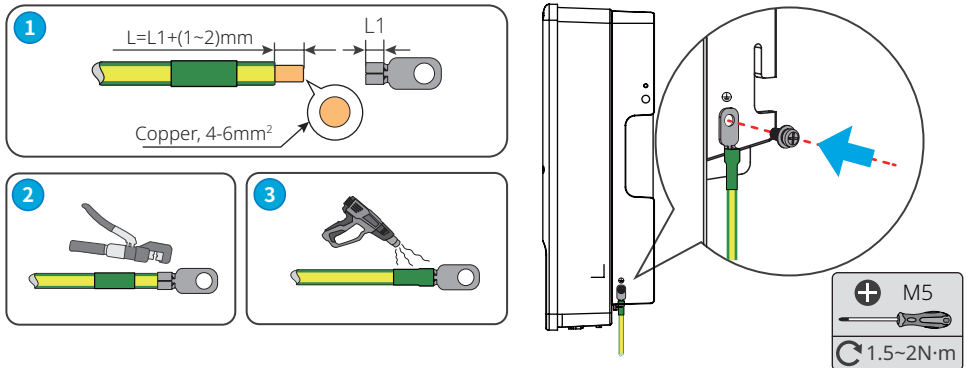
- The internal relay will automatically connect the N wire and PE cable when the inverter is in BACK-UP mode.
- The internal relay will automatically disconnect the N wire and PE cable when the inverter is in ON-GRID mode.



### 6.3 Connecting the PE Cable

#### WARNING

- The PE cable connected to the enclosure of the inverter cannot replace the PE cable connected to the AC output port. Make sure that both of the two PE cables are securely connected.
- Make sure that all the grounding points on the enclosures are equipotential connected when there are multiple inverters.
- To improve the corrosion resistance of the terminal, it is recommended to apply silica gel or paint on the ground terminal after installing the PE cable.
- Prepare PE cables with the recommended specification:  
Type: single-core outdoor copper cable  
Conductor cross-sectional area: 4-6mm<sup>2</sup>



## 6.4 Connecting the DC Input Cable (PV)

### NOTICE

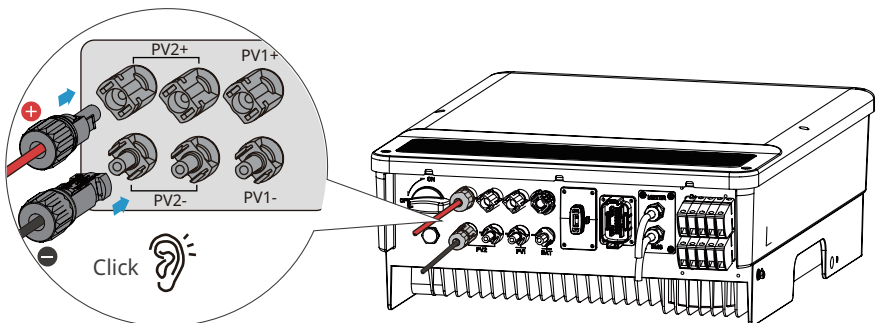
Only for hybrid inverters.

### DANGER

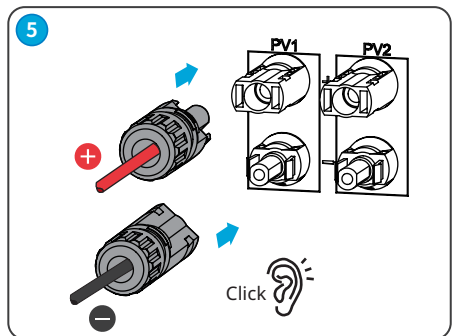
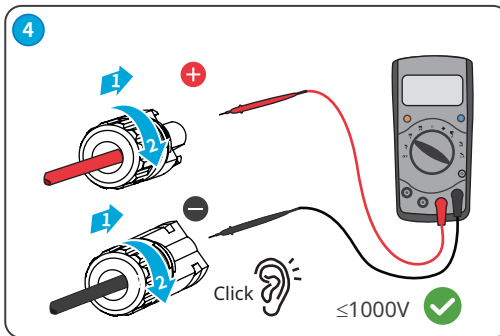
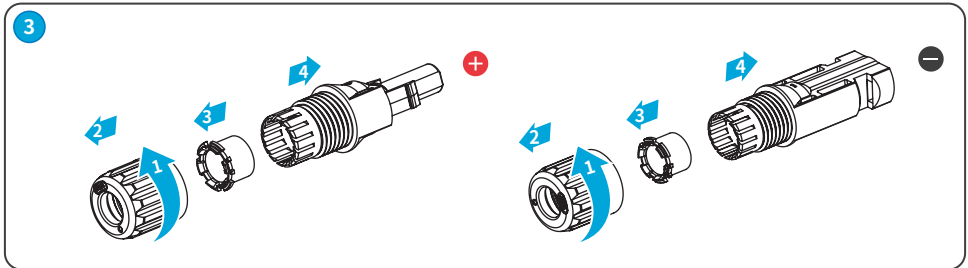
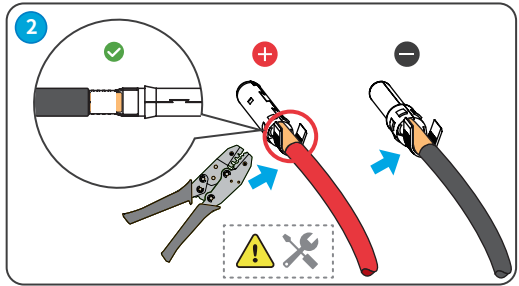
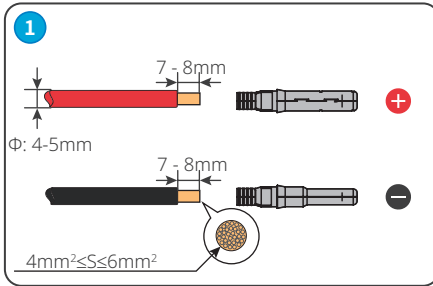
- Do not connect one PV string to more than one inverter at the same time. Otherwise, it may cause damage to the inverter.
- Confirm the following information before connecting the PV string to the inverter. Otherwise, the inverter may be damaged permanently or even cause fire and cause personal and property losses.
  1. Make sure that the max short circuit current and the max input voltage per MPPT are within the permissible range.
  2. Make sure that the positive pole of the PV string connects to PV+ of the inverter. And the negative pole of the PV string connects to PV- of the inverter.

### WARNING

- The PV strings cannot be grounded. Ensure the minimum insulation resistance of the PV string to the ground meets the minimum insulation resistance requirements before connecting the PV string to the inverter ( $R = \text{maximum input voltage} / 30\text{mA}$ ).
- Ensure the DC cables are connected tightly, securely and correctly.
- Measure the DC cables using a multimeter to avoid reverse polarity connection. Also, the voltage should be under the permissible range.

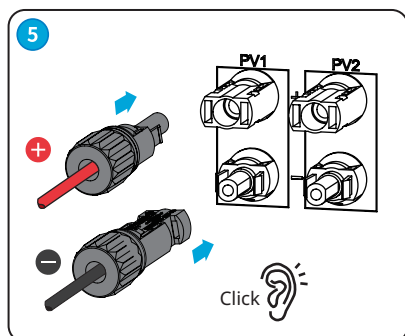
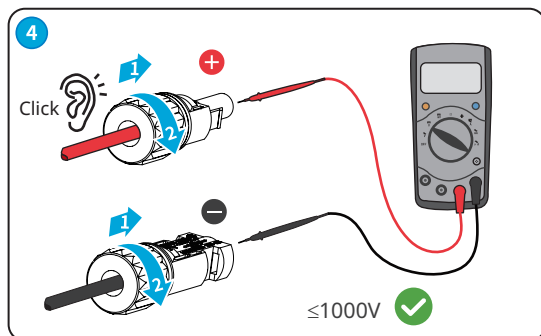
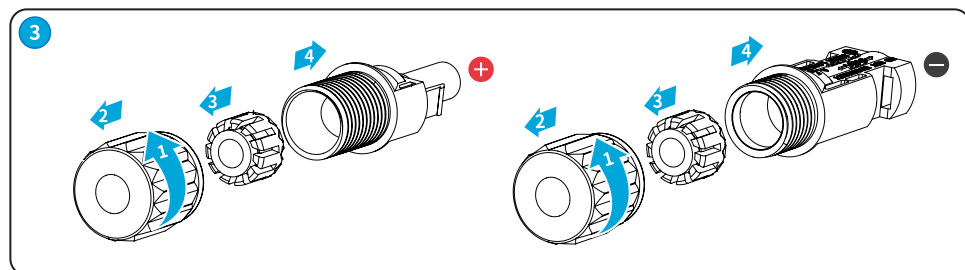
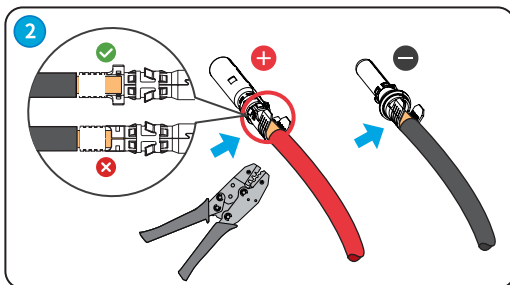
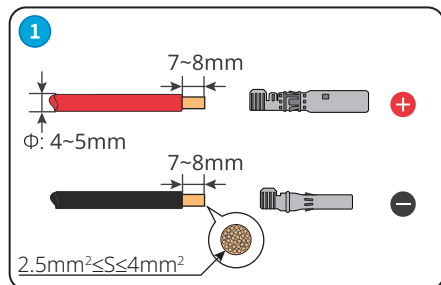


### Stäubli MC4 PV connector





### Vaconn PV connector



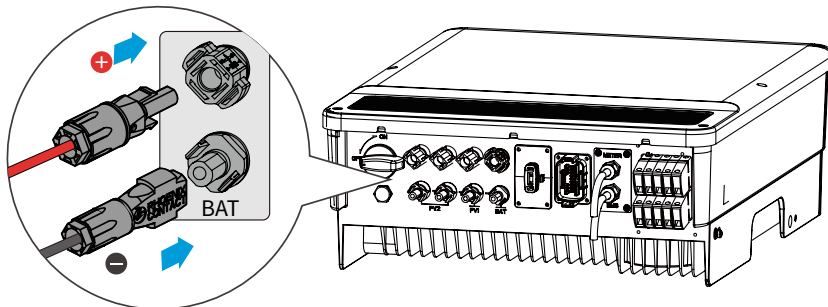
## 6.5 Connecting the Battery Cable

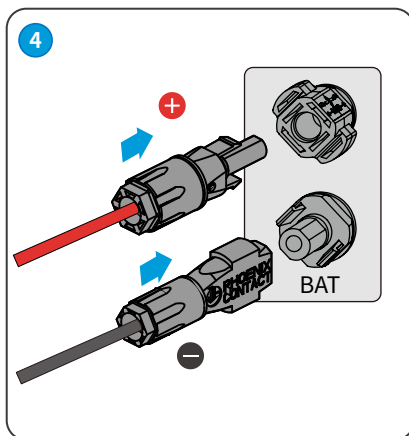
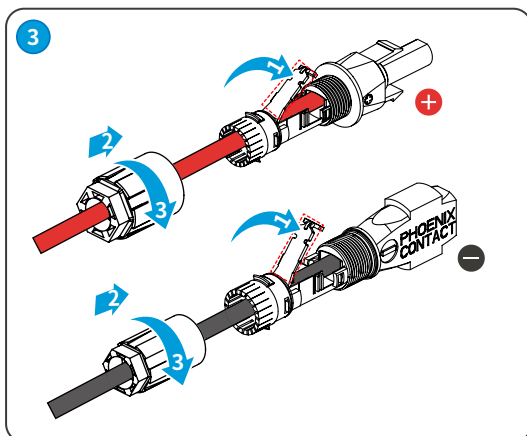
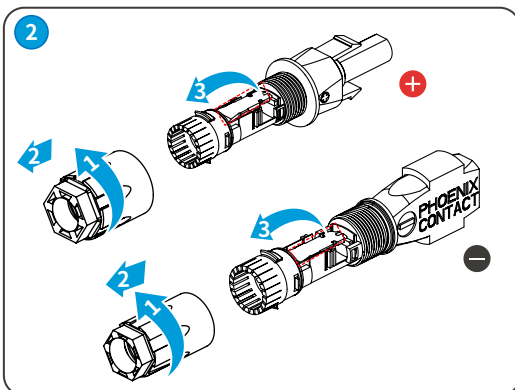
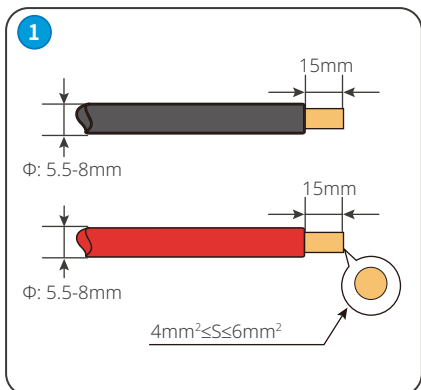
### DANGER

- The battery used with the inverter shall be approved by the inverter manufacturer. The approved battery list can be obtained through the official website.
- A short circuit in the battery 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.
- Before connecting the battery cable, ensure the inverter and the battery, and downstream & upstream switches, are all disconnected.
- It is forbidden to connect and disconnect the battery cables when the inverter is running. Otherwise it may cause electric shock.
- Do not connect one battery group to more than one inverter at the same time. Otherwise, it may damage the inverter.
- It is forbidden to connect loads between the inverter and batteries.
- When connecting battery cables, use insulated tools to prevent accidental electric shock or short circuit to the batteries.
- Ensure that the open circuit voltage of the battery is within the permissible range of the inverter.
- Install a DC breaker between the inverter and the battery.

### WARNING

- Connect the battery cables to the corresponding terminals such BAT+, BAT- and grounding ports correctly. Otherwise it will damage the inverter.
- Ensure the DC cables are connected tightly, securely and correctly.
- Measure the DC cables using a multimeter to avoid reverse polarity connection. Also, the voltage should be under the permissible range.





## 6.6 Connecting the AC Cable

### WARNING

- Do not connect loads between the inverter and the AC switch directly connected to the inverter.
- An AC circuit breaker should be installed on the AC side to make sure that the inverter can safely disconnect the grid when an exception happens. Install one AC circuit breaker for each inverter. Multiple inverters cannot share one AC circuit breaker. Select an appropriate AC circuit breaker in compliance with local laws and regulations.
- The residual current monitoring unit (RCMU) is integrated into the inverter. When the leakage current exceeds the allowable limit, the inverter will disconnect from the grid quickly.
- When the inverter is powered on, the BACK-UP AC port is live. Power off the inverter first if maintenance is required for the loads connected with BACK-UP ports. Otherwise, it may cause electric shock.

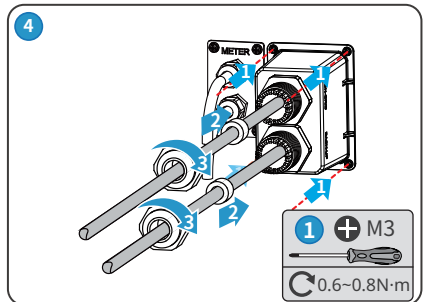
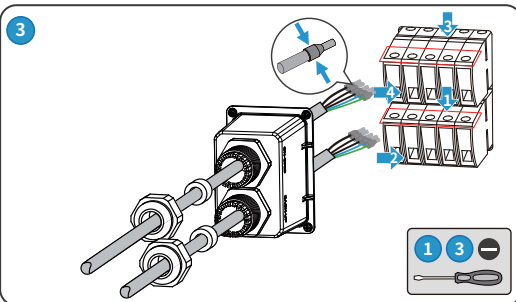
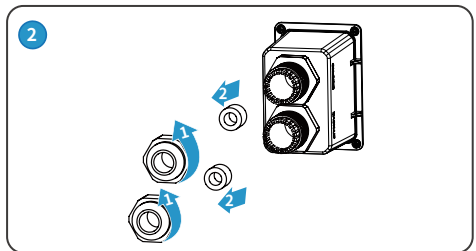
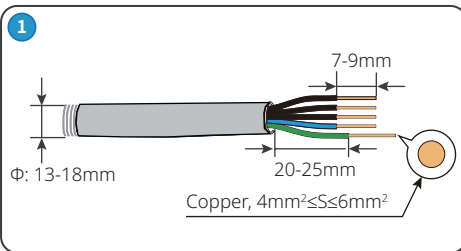
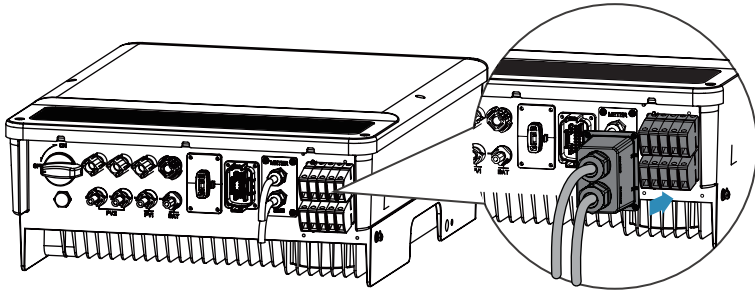
Connect a Residual Current Device (RCD for short) based on local laws and regulations. Type A RCDs can be connected to the outside of the inverter for protection when the DC component of the leakage current exceeds the limit value. The following RCDs are for reference:

No.	Inverter Model	RCD Type (ON-GRID)	RCD Type (BACK-UP)
1	GW5KL-ET	100A	30mA
2	GW6KL-ET		
3	GW8KL-ET		
4	GW10KL-ET		
5	GW5K-ET		
6	GW6.5K-ET		
7	GW8K-ET		
8	GW10K-ET		
9	GW5KN-ET		
10	GW6.5KN-ET		
11	GW8KN-ET		
12	GW10KN-ET		
13	GW5K-BT		
14	GW6K-BT		
15	GW8K-BT		
16	GW10K-BT		

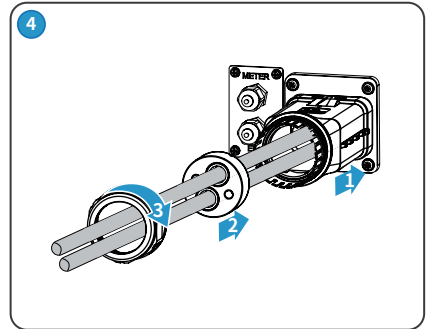
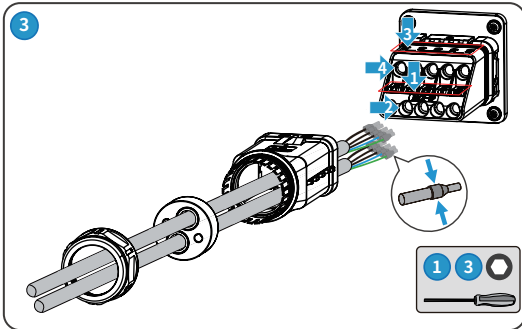
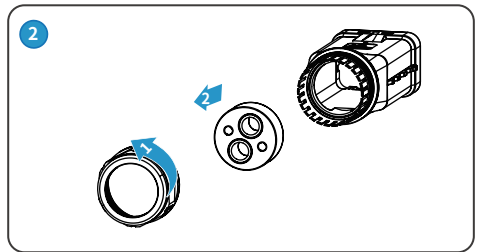
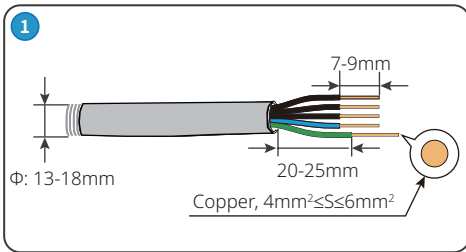
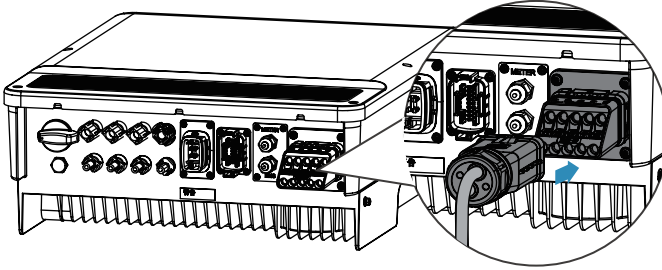
 **WARNING**

- Pay attention to the L1, L2, L3, N and PE terminals. Connect the AC cables to the corresponding terminals. The inverter may be damaged if the cables are connected to the wrong terminal.
- Ensure that the whole cable cores are inserted into the terminal holes. No part of the cable core can be exposed.
- Ensure that the cables are connected securely. Otherwise it will cause damage to the inverter due to overheat during its operation.
- Connect the ON-GRID cable before BACK-UP cable when connecting the AC cables.

**Type I**



## Type II



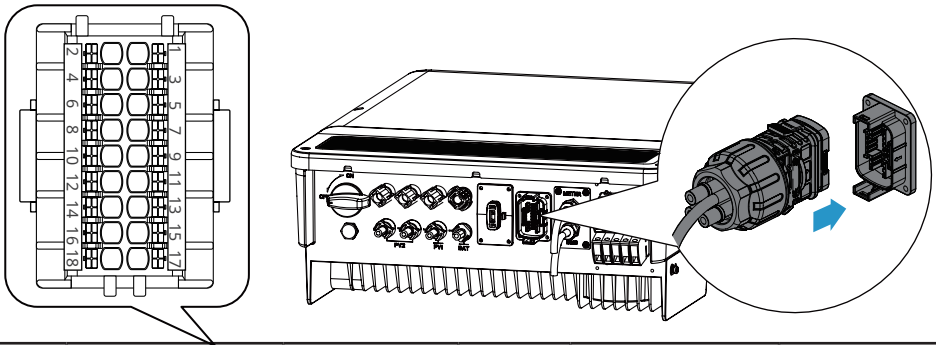
## 6.7 Communication

### NOTICE

Make sure that the communication device is connected to the right COM port. Route the communication cable far away from any interference source or power cable to prevent the signal from being influenced.

### 6.7.1 Connecting the Communication Cable

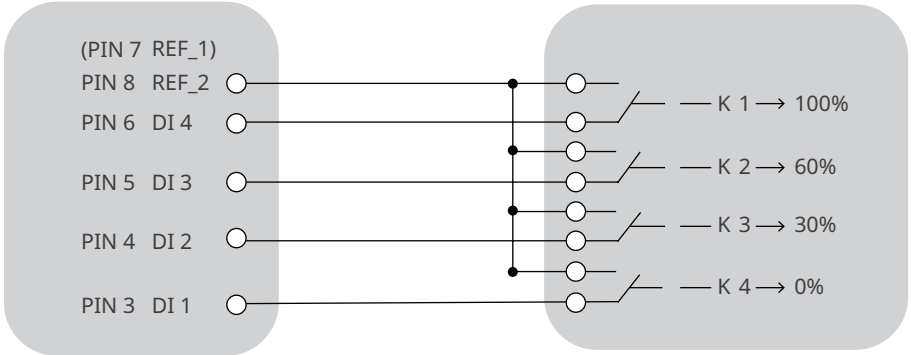
#### Type I (18PIN Terminal Block)



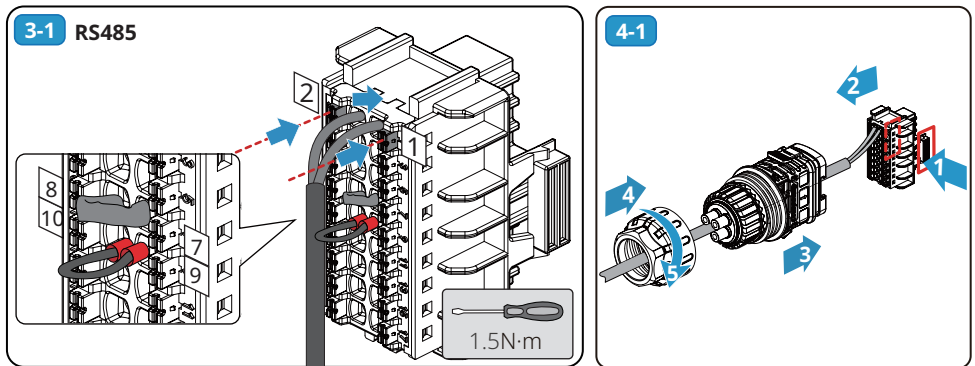
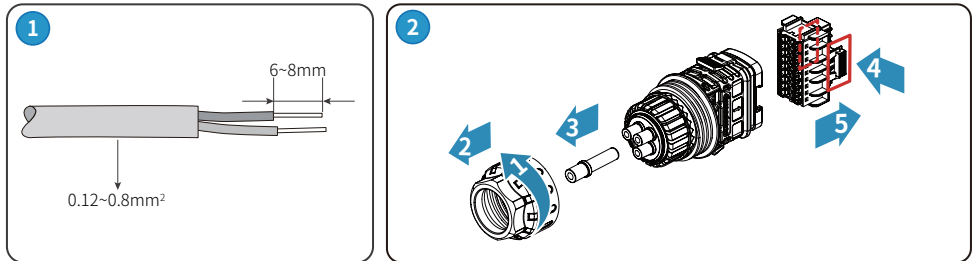
PIN	Definition	Function	PIN	Definition	Function
1	485_A1	RS485 or EMS	9	Remote Shutdown	Remote Shutdown*
2	485_B1		10	GND-S	
3	DRM 1/5 or DI_1	DRED* or RCR	11	LG_EN+	LG battery enable signal
4	DRM 2/6 or DI_2		12	LG_EN-	
5	DRM 3/7 or DI_3		13/14	N/A	N/A
6	DRM 4/8 or DI_4		15/16	N/A	
7	COM/DRM0 or REF_1		17	DO-	Load control dry contact
8	REFGEN or REF_2		18	DO+	

**NOTICE**

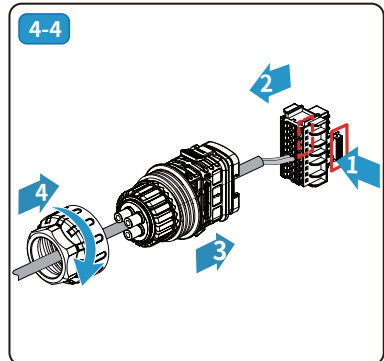
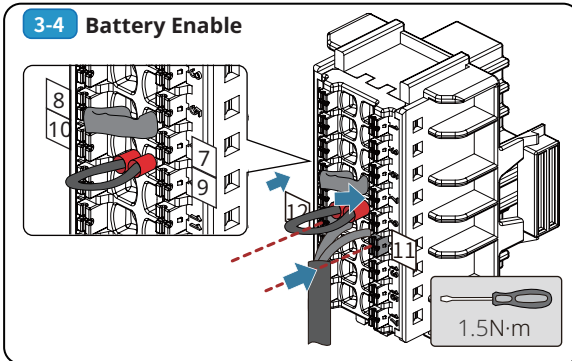
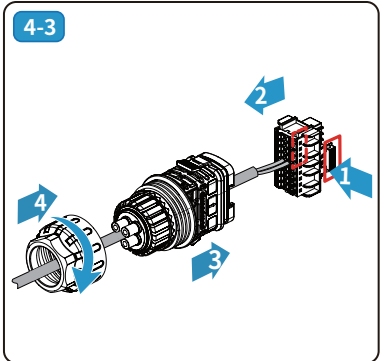
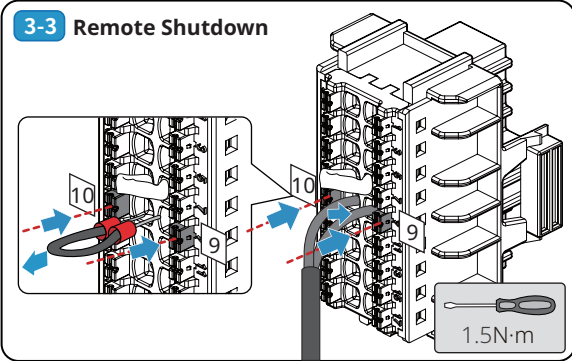
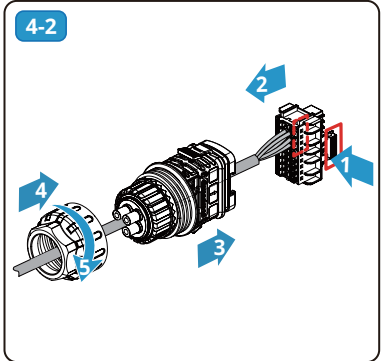
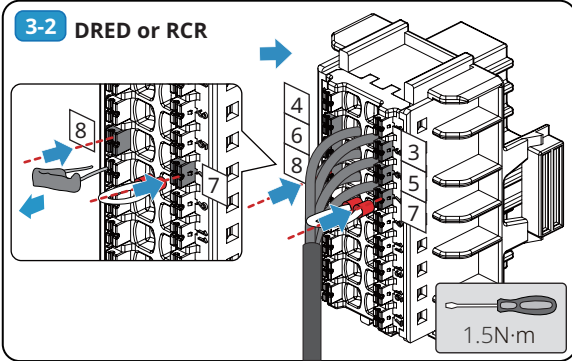
- Do not remove the resistor or short circuit wire unless you are going to use DRED or RCR.
- Enable the DRED function or remote shutdown function via SolarGo app after cable connections.

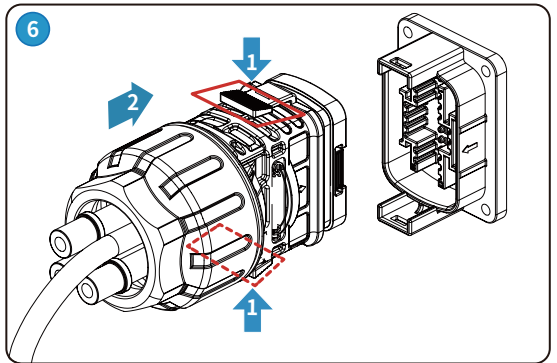
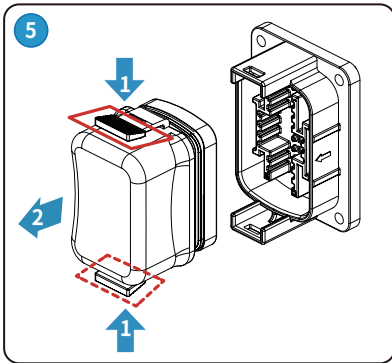
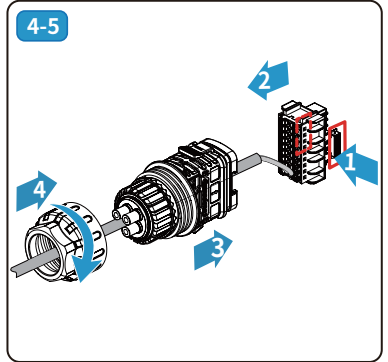
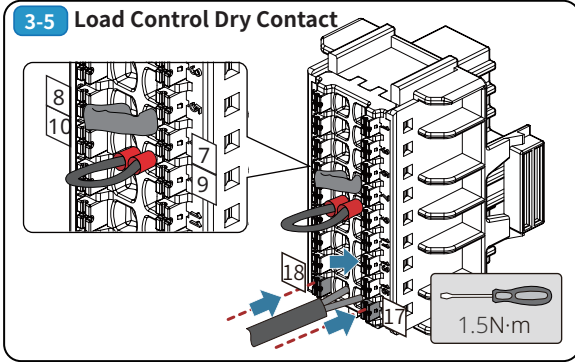


**Example:**

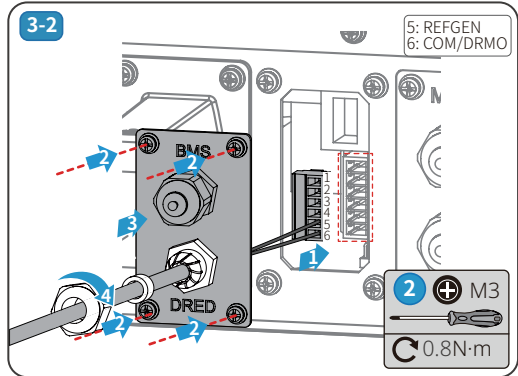
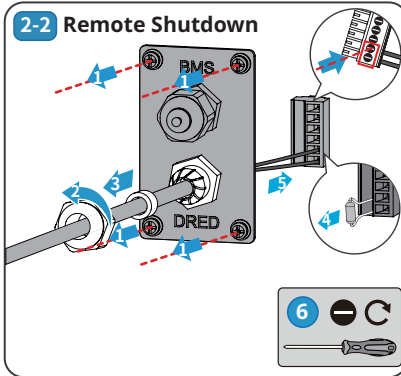
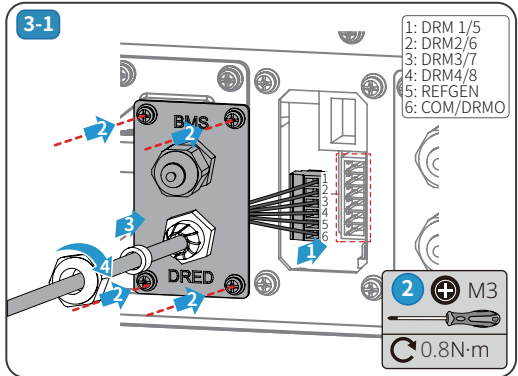
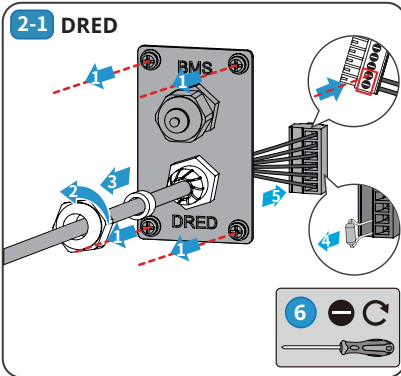
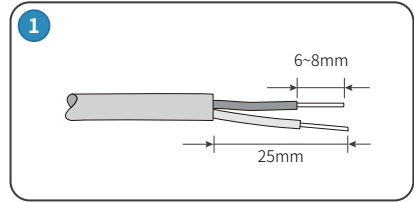
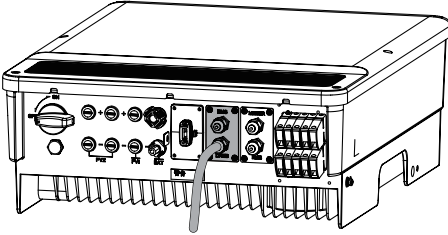








## Type II (6PIN Terminal Block)



Enable the DRED function or remote shutdown function via SolarGo app after cable connections.

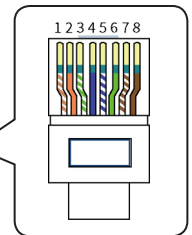
### 6.7.2 Connecting the Meter Communication Cable

#### NOTICE

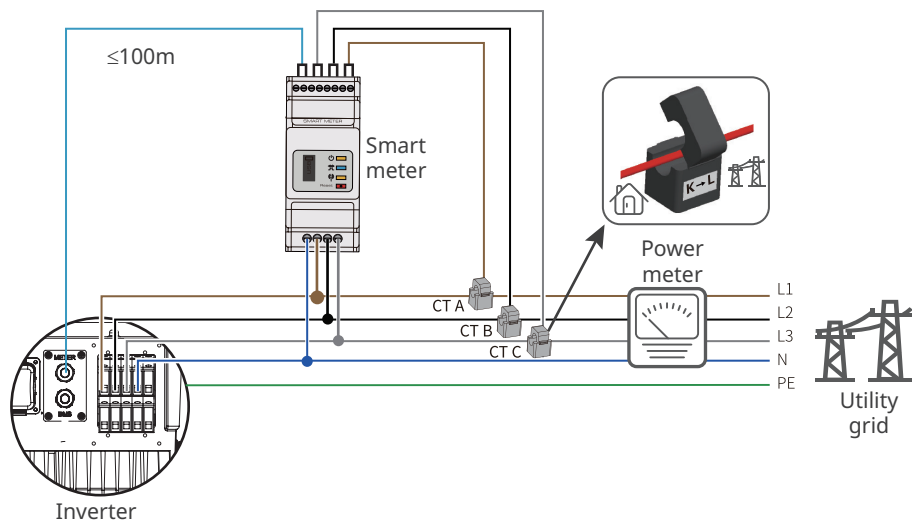
- The smart meter and CT have been preset parameters before delivered with the inverter. Do not modify the relevant parameters.
- Each smart meter needs to be connected to one inverter independently. Do not connect one smart meter to multiple inverters.
- Confirm the following items for a proper use of the smart meter and CT:
  1. Ensure that CT connects with the corresponding phase line: CT1 is connected to L1; CT2 is connected to L2; and CT3 is connected to L3.
  2. Connect CT according to the pointing direction of the smart meter. It will display CT reverse fault on the inverter if it is the opposite direction.
- The CT cable is 3m or 5m long as a default.
- The communication cable connecting the inverter and the smart meter cannot be longer than 100m. RJ45 connector with the following definition can be connected for BMS communication:



No.	Color	Smart meter
1	Orange and White	NC
2	Orange	NC
3	Green and White	485_B1
4	Blue	NC
5	Blue and White	NC
6	Green	485_A1
7	Brown and White	485_B1
8	Brown	485_A1



## Smart Meter Network

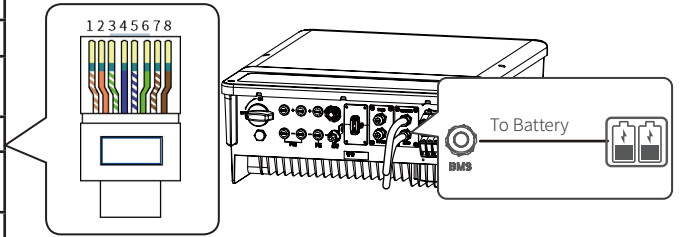


### 6.7.3 Connecting the BMS Communication Cable

#### NOTICE

- CAN communication is the default communication method between the inverter and the battery. Contact the after-sales service for RS485 communication cable if you prefer RS485 communication.
- The BMS communication cable is 3m long as a default and can be extended to a maximum of 5m. The communication cable connecting the inverter and the battery cannot be longer than 5m. RJ45 connector with the following definition can be connected for BMS communication:

No.	Color	BMS
1	Orange and White	485_A2
2	Orange	NC
3	Green and White	485_B2
4	Blue	CAN_H
5	Blue and White	CAN_L
6	Green	NC
7	Brown and White	NC
8	Brown	NC

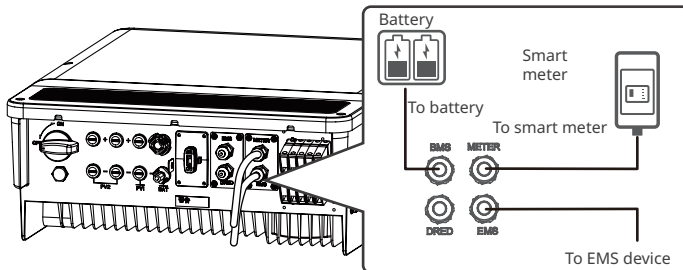
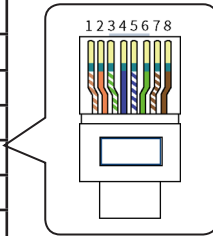


### 6.7.4 Connecting the EMS Communication Cable

**NOTICE**

Connect the EMS communication cable to the 18PIN communication terminal block when a 18PIN terminal block is applied. Connect the EMS communication cable as following when the 18PIN terminal block is not applied.

No.	Color	EMS
1	Orange and White	485_A
2	Orange	485_B
3	Green and White	485_A
4	Blue	NC
5	Blue and White	NC
6	Green	485_B
7	Brown and White	NC
8	Brown	NC

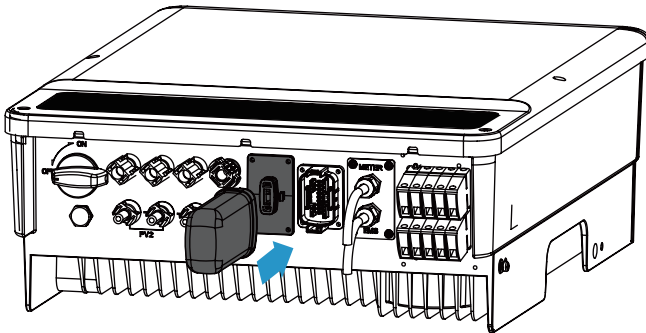


### 6.7.5 Installing the Communication Module (Optional)

Plug a communication module into the inverter to establish a connection between the inverter and the smartphone or web pages. The communication module can be a WiFi kit, WiFi/LAN kit, or 4G module. Set inverter parameters, check running information and fault information, and observe system status in time via the smartphone or web pages.

#### NOTICE

Refer to the delivered communication module user manual to get more introduction to the module. For more detailed information, visit [www.goodwe.com](http://www.goodwe.com).



## 7 Equipment Commissioning

No.	Check Item
1	The product is firmly installed at a clean place that is well-ventilated and easy-to operate.
2	The PE cable, DC input cable, AC output cable, and communication cable are connected correctly and securely.
3	Cable ties are intact, routed properly and evenly.
4	(Optional) The SIM card is properly installed.
5	Unused cable holes are fitted using the waterproof nuts.
6	The electrical conduit holes are sealed.
7	The voltage and frequency at the connection point meet the inverter grid connection requirements.





























### 7.2 Power On

- Step 1** Turn on the AC switch between the inverter and the utility grid.
- Step 2** Turn on the DC switch between the inverter and the battery.
- Step 3** (optional) Turn on the DC switch between the inverter and the PV string.
- Step 4** Turn on the DC switch of the inverter.



## 8 System Commissioning

### 8.1 Indicators and Buttons

Indicator	Status	Description
SYSTEM		ON = The system is ready.
		BLINK = The system is starting.
		OFF =The system is not working.
BACK-UP		ON = Back-up is ready / power available.
		OFF = Back-up is off / power not available.
BATTERY		ON = The battery is charging.
		BLINK 1 = The battery is discharging.
		BLINK 2 = The battery is low / soc is low.
		OFF = The battery is disconnected / not active.
GRID		ON = The grid is active and connected.
		BLINK = The grid is active but not connected.
		OFF = The grid is not active.
ENERGY		ON = Consuming energy from grid / buying.
		BLINK 1 = Supplying energy to grid / zeroing.
		BLINK 2 = Supplying energy to grid / selling.
		OFF = The grid is not connected or the system is not working.
COM		ON = Both BMS communication and meter communication are ok.
		BLINK 1 = BMS communication fails; meter communication is ok.
		BLINK 2 = BMS communication is ok; meter communication fails.
		OFF = BMS communicationand meter communication fail.
WiFi		ON = WiFi connected / active.
		BLINK 1 = WiFi is resetting.
		BLINK 2 = WiFi is not connected to the router.
		BLINK 4 = WiFi server problem.
		OFF = WiFi is not active.
FAULT		ON = A fault has occurred.
		BLINK 1 = Back-up output overload / reduce load.
		OFF = No fault.

## 8.2 Setting Inverter Parameters via SolarGo App

### NOTICE

Please set the inverter parameters first via SolarGo app to ensure its operation.

SolarGo app is a smart phone application used to communicate with the inverter via bluetooth, WiFi, 4G or GPRS modules. Commonly used functions are as follows:

1. Check the operating data, software version, alarms, etc.
2. Set grid parameters, communication parameters, etc.
3. Equipment maintenance.
4. Upgrade software version.

For more details, refer to SolarGo User Manual. Scan the QR code or visit [https://en.goodwe.com/Ftp/EN/Downloads/User%20Manual/GW\\_SolarGo\\_User%20Manual-EN.pdf](https://en.goodwe.com/Ftp/EN/Downloads/User%20Manual/GW_SolarGo_User%20Manual-EN.pdf) to get the user manual.



SolarGo App



SolarGo App User Manual

## 8.3 Monitoring via SEMS Portal

SEMS Portal is an monitoring platform used to communicate with the inverter via WiFi, LAN, 4G or GPRS. Commonly used functions:

1. Manage the organization or User information;
2. Add and monitor the power plant information;
3. Equipment maintenance.



SEMS Portal App



SEMS Portal app  
User Manual

## 9 Maintenance

### 9.1 Power OFF the Inverter



#### DANGER

INSTRUCTIONS PERTAINING TO A RISK OF FIRE OR ELECTRIC SHOCK.

- Power off the inverter before operations and maintenance. Otherwise, the inverter may be damaged or electric shocks may occur.
- Delayed discharge. Wait until the components are discharged after power off.

**Step 1** Turn off the AC switch between the inverter and the utility grid.

**Step 2** Turn off the DC switch between the inverter and the battery.

**Step 3** (optional) Turn off the PV DC switch of the inverter.

**Step 4** (optional) Turn off the DC switch between the inverter and the PV string.

### 9.2 Removing the Inverter



#### WARNING

- Make sure that the inverter is powered off.
- Wear proper PPE before any operations.

**Step 1** Disconnect all the cables, including DC cables, AC cables, communication cables, PE cables, and the communication module.

**Step 2** Remove the inverter from the mounting plate.

**Step 3** Remove the mounting plate.

**Step 4** Store the inverter properly. Ensure that the storage conditions meet the requirements for future use.

### 9.3 Disposing of the Inverter

If the inverter cannot work anymore, dispose of it according to the local disposal requirements for electrical equipment waste. The inverter cannot be disposed of together with household waste.

## 9.4 Troubleshooting

Perform troubleshooting according to the following methods. Contact the after-sales service if these methods do not work.

Collect the information below before contacting the after-sales service, so that the problems can be solved quickly.

1. Inverter information like serial number, software version, installation date, fault time, fault frequency, etc.
2. Installation environment, including weather conditions, whether the PV modules are sheltered or shadowed, etc. It is recommended to provide some photos and videos to assist in analyzing the problem.
3. Utility grid situation.

No.	Fault	Cause	Solutions
1	Utility Loss	<ol style="list-style-type: none"> <li>1. Utility grid power fails.</li> <li>2. The AC cable is disconnected, or the AC circuit breaker is off.</li> </ol>	<ol style="list-style-type: none"> <li>1. The alarm is automatically cleared after the grid power supply is restored.</li> <li>2. Check whether the AC cable is connected and the AC circuit breaker is on.</li> </ol>
2	Grid Overvoltage	<p>The grid voltage exceeds the permissible range, or the duration of high voltage exceeds the requirement of HVRT.</p>	<ol style="list-style-type: none"> <li>1. If the problem occurs occasionally, the utility grid may be abnormal temporarily. The inverter will recover automatically after detecting that the utility grid is normal.</li> <li>2. If the problem occurs frequently, check whether the grid voltage is within the permissible range.                             <ul style="list-style-type: none"> <li>• Contact the local power company if the grid voltage exceeds the permissible range.</li> <li>• Modify the overvoltage protection threshold, HVRT or disable the overvoltage protection function after obtaining the consent of the local power company if the grid frequency is within the permissible range.</li> </ul> </li> <li>3. Check whether the AC circuit breaker and the output cables are connected securely and correctly if the problem persists.</li> </ol>

No.	Fault	Cause	Solutions
3	Grid Rapid Overvoltage	The grid voltage is abnormal or ultra-high.	<ol style="list-style-type: none"> <li>1. If the problem occurs occasionally, the utility grid may be abnormal temporarily. The inverter will recover automatically after detecting that the utility grid is normal.</li> <li>2. Check whether the high grid voltage continues for a long time. If the problem occurs frequently, check whether the grid voltage is within the allowed range. <ul style="list-style-type: none"> <li>• Contact the local power company if the grid voltage exceeds the permissible range.</li> <li>• Modify the grid overvoltage rapid protection threshold after obtaining the consent of the local power company if the grid voltage is within the permissible range.</li> </ul> </li> </ol>
4	Grid Undervoltage	The grid voltage is lower than the permissible range, or the duration of low voltage exceeds the requirement of LVRT.	<ol style="list-style-type: none"> <li>1. If the problem occurs occasionally, the utility grid may be abnormal temporarily. The inverter will recover automatically after detecting that the utility grid is normal.</li> <li>2. If the problem occurs frequently, check whether the grid voltage is within the permissible range. <ul style="list-style-type: none"> <li>• Contact the local power company if the grid voltage exceeds the permissible range.</li> <li>• Modify the undervoltage protection threshold, LVRT or disable the undervoltage protection function after obtaining the consent of the local power company if the grid frequency is within the permissible range.</li> </ul> </li> <li>3. Check whether the AC circuit breaker and the output cables are connected securely and correctly if the problem persists.</li> </ol>

No.	Fault	Cause	Solutions
5	Grid 10min Overvoltage	The moving average of grid voltage in 10min exceeds the range of safety requirements.	<ol style="list-style-type: none"> <li>1. If the problem occurs occasionally, the utility grid may be abnormal temporarily. The inverter will recover automatically after detecting that the utility grid is normal.</li> <li>2. If the problem occurs frequently, check whether the grid voltage is within the permissible range.                             <ul style="list-style-type: none"> <li>• Contact the local power company if the grid voltage exceeds the permissible range.</li> <li>• Modify the grid overvoltage rapid protection threshold after obtaining the consent of the local power company if the grid voltage is within the permissible range.</li> </ul> </li> </ol>
6	Grid Overfrequency	Utility grid exception. The actual grid frequency exceeds the requirement of the local grid standard.	<ol style="list-style-type: none"> <li>1. If the problem occurs occasionally, the utility grid may be abnormal temporarily. The inverter will recover automatically after detecting that the utility grid is normal.</li> <li>2. If the problem occurs frequently, check whether the grid frequency is within the permissible range.                             <ul style="list-style-type: none"> <li>• Contact the local power company if the grid frequency exceeds the permissible range.</li> <li>• Modify the overfrequency protection threshold or disable the overfrequency protection function after obtaining the consent of the local power company if the grid frequency is within the permissible range.</li> </ul> </li> </ol>

No.	Fault	Cause	Solutions
7	Grid Underfrequency	Utility grid exception. The actual grid frequency is lower than the requirement of the local grid standard.	<ol style="list-style-type: none"> <li>1. If the problem occurs occasionally, the utility grid may be abnormal temporarily. The inverter will recover automatically after detecting that the utility grid is normal.</li> <li>2. If the problem occurs frequently, check whether the grid frequency is within the permissible range. <ul style="list-style-type: none"> <li>• Contact the local power company if the grid frequency exceeds the permissible range.</li> <li>• Modify the underfrequency protection threshold or disable the underfrequency protection function after obtaining the consent of the local power company if the grid frequency is within the permissible range. Or close “Grid Underfrequency” function.</li> </ul> </li> </ol>
8	Grid Frequency Instability	Utility grid exception. The actual grid frequency change rate does not meet the requirement of the local grid standard.	<ol style="list-style-type: none"> <li>1. If the problem occurs occasionally, the utility grid may be abnormal temporarily. The inverter will recover automatically after detecting that the utility grid is normal.</li> <li>2. If the problem occurs frequently, check whether the grid frequency is within the permissible range. <ul style="list-style-type: none"> <li>• Contact the local power company if the grid frequency exceeds the permissible range.</li> <li>• Contact the dealer or the after-sales service if the grid frequency is within the permissible range.</li> </ul> </li> </ol>

No.	Fault	Cause	Solutions
9	Anti-islanding	The utility grid is disconnected. The utility grid is disconnected according to the safety regulations, but the grid voltage is maintained due to the loads.	<ol style="list-style-type: none"> <li>1. Check whether the utility grid is disconnected.</li> <li>2. Contact the dealer or the after-sales service.</li> </ol>
10	LVRT Undervoltage	Utility grid exception. The duration of the utility grid exception exceeds the set time of LVRT.	<ol style="list-style-type: none"> <li>1. If the problem occurs occasionally, the utility grid may be abnormal temporarily. The inverter will recover automatically after detecting that the utility grid is normal.</li> <li>2. If the problem occurs frequently, check whether the grid frequency is within the permissible range. If not, contact the local power company. If yes, contact the dealer or the after-sales service.</li> </ol>
11	HVRT Overvoltage	Utility grid exception. The duration of utility grid exception exceeds the set time of HVRT.	
12	Abnormal GFCI 30mA	The input insulation impedance becomes low when the inverter is working.	<ol style="list-style-type: none"> <li>1. If the problem occurs occasionally, it may be caused by a cable exception. The inverter will recover automatically after the problem is solved.</li> <li>2. Check whether the impedance between the PV string and PE is too low if the problem occurs frequently or persists.</li> </ol>
13	Abnormal GFCI 60mA		
14	Abnormal GFCI 150mA		
15	Abnormal GFCI		
16	Large DC of AC current L1	The DC component of the output current exceeds the safety range or default range.	<ol style="list-style-type: none"> <li>1. If the problem is caused by an external fault like a utility grid exception or frequency exception, the inverter will recover automatically after solving the problem.</li> <li>2. If the problem occurs frequently and the PV station cannot work properly, contact the dealer or the after-sales service.</li> </ol>
17	Large DC of AC current L2		



No.	Fault	Cause	Solutions
18	Low Insulation Res.	<ol style="list-style-type: none"> <li>1. The PV string is short-circuited to PE.</li> <li>2. The PV system is in a moist environment and the cable is not well insulated to the ground.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the resistance of the PV string to PE exceeds 50kΩ. If no, check the short circuit point.</li> <li>2. Check whether the PE cable is connected correctly.</li> <li>3. If the resistance is lower than default on rainy days, please reset the ISO via SolarGo app.</li> </ol> <p>Inverters for the Australian and New Zealand markets can also be alerted in the following ways in the event of insulation impedance failure:</p> <ol style="list-style-type: none"> <li>1. The inverter is equipped with the buzzer: the buzzer sounds continuously for 1 minute in case of failure; If the fault is not resolved, the buzzer sounds every 30 minutes.</li> <li>2. Add the inverter to the monitoring platform, and set the alarm reminder, the alarm information can be sent to the customer by emails.</li> </ol>
19	Abnormal Ground	<ol style="list-style-type: none"> <li>1. The PE cable of the inverter is not connected well.</li> <li>2. The L cable and N cable are connected reversely when output of the PV string is grounded.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the PE cable of the inverter is connected properly.</li> <li>2. Check whether the L cable and N cable are connected reversely if output of the PV string is grounded.</li> </ol>
20	Anti Reverse power Failure	Abnormal fluctuation of load	<ol style="list-style-type: none"> <li>1. If the exception is caused by an external fault, the inverter will recover automatically after solving the problem.</li> <li>2. If the problem occurs frequently and the PV station cannot work properly, contact the dealer or the after-sales service.</li> </ol>

No.	Fault	Cause	Solutions
21	Internal Comm Loss	<ol style="list-style-type: none"> <li>1. Frame format error</li> <li>2. Parity checking error</li> <li>3. Can bus offline</li> <li>4. Hardware CRC error</li> <li>5. Send (receive) control bit is receive (send).</li> <li>6. Transmit to the unit that is not allowed.</li> </ol>	<p>Disconnect the AC output switch and DC input switch, then connect them 5 minutes later. Contact the dealer or the after-sales service if the problem persists.</p>
22	AC HCT Check abnormal	<p>The sampling of the AC HCT is abnormal.</p>	<p>Disconnect the AC output switch and DC input switch, then connect them 5 minutes later. Contact the dealer or the after-sales service if the problem persists.</p>
23	GFCI HCT Check abnormal	<p>The sampling of the GFCI HCT is abnormal.</p>	<p>Disconnect the AC output switch and DC input switch, then connect them 5 minutes later. Contact the dealer or the after-sales service if the problem persists.</p>
24	Relay Check abnormal	<ol style="list-style-type: none"> <li>1. The relay is abnormal or short-circuited.</li> <li>2. The control circuit is abnormal.</li> <li>3. The AC cable connection is abnormal, like a virtual connection or short circuit.</li> </ol>	<p>Disconnect the AC output switch and DC input switch, then connect them 5 minutes later. Contact the dealer or the after-sales service if the problem persists.</p>
26	Flash Fault	<p>The internal Flash storage is abnormal.</p>	<p>Disconnect the AC output switch and DC input switch, then connect them 5 minutes later. Contact the dealer or the after-sales service if the problem persists.</p>

No.	Fault	Cause	Solutions
27	DC Arc Fault	<ol style="list-style-type: none"> <li>1. The DC terminal is not firmly connected.</li> <li>2. The DC cable is broken.</li> </ol>	Read the Quick Installation Guide and check whether the cables are connected properly.
28	AFCI Self-test Fault	AFCI detection is abnormal.	Disconnect the AC output switch and DC input switch, then connect them 5 minutes later. Contact the dealer or the after-sales service if the problem persists.
29	Cavity Overtemperature	<ol style="list-style-type: none"> <li>1. The inverter is installed in a place with poor ventilation.</li> <li>2. The ambient temperature exceeds 60°C.</li> <li>3. A fault occurs in the internal fan of the inverter.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the ventilation and the ambient temperature at the installation point.</li> <li>2. If the ventilation is poor or the ambient temperature is too high, improve the ventilation and heat dissipation.</li> <li>3. Contact the dealer or after-sales service if both the ventilation and the ambient temperature are normal.</li> </ol>
30	BUS Overvoltage	<ol style="list-style-type: none"> <li>1. The PV voltage is too high.</li> <li>2. The sampling of the inverter BUS voltage is abnormal.</li> </ol>	Disconnect the AC output switch and DC input switch, then connect them 5 minutes later. Contact the dealer or the after-sales service if the problem persists.
31	PV Input Overvoltage	The PV array configuration is not correct. Too many PV panels are connected in series in the PV string.	Check the serial connection of the PV array. Make sure that the open circuit voltage of the PV string is not higher than the maximum operating voltage of the inverter.
32	PV Continuous Hardware Overcurrent	<ol style="list-style-type: none"> <li>1. The PV configuration is not proper.</li> <li>2. The hardware is damaged.</li> </ol>	Disconnect the AC output switch and DC input switch, then connect them 5 minutes later. Contact the dealer or the after-sales service if the problem persists.

No.	Fault	Cause	Solutions
33	PV Continuous Software Overcurrent	1. The PV configuration is not proper. 2. The hardware is damaged.	Disconnect the AC output switch and DC input switch, then connect them 5 minutes later. Contact the dealer or the after-sales service if the problem persists.
34	String1 PV String Reversed	The PV string is connected reversely.	Check whether the PV1 and PV2 strings are connected reversely.
35	String2 PV String Reversed		

## 9.5 Routine Maintenance

Maintaining Item	Maintaining Method	Maintaining Period
System Clean	Check the heat sink, air intake, and air outlet for foreign matter or dust.	Once 6-12 months
DC Switch	Turn the DC switch on and off ten consecutive times to make sure that it is working properly.	Once a year
Electrical Connection	Check whether the cables are securely connected. Check whether the cables are broken or whether there is any exposed copper core.	Once 6-12 months
Sealing	Check whether all the terminals and ports are properly sealed. Reseal the cable hole if it is not sealed or too big.	Once a year

## 10 Technical Parameters

### 10.1 Technical Parameters - ET/ET Plus Series

Technical Parameters	GW5KL-ET	GW6KL-ET	GW8KL-ET	GW10KL-ET
<b>Battery Input Data</b>				
Battery Type	Li-Ion	Li-Ion	Li-Ion	Li-Ion
Nominal Battery Voltage (V)	500	500	500	500
Battery Voltage Range (V)	180~600	180~600	180~600	180~600
Start-up Voltage (V)	180	180	180	180
Number of Battery Input	1	1	1	1
Max. Continuous Charging Current (A)	25	25	25	25
Max. Continuous Discharging Current (A)	25	25	25	25
Max. Charge Power (W)	7,500	7,800	9,600	10,000
Max. Discharge Power (W)	7,500	7,800	9,600	10,000
<b>PV String Input Data</b>				
Max. Input Power (W)	6,650	7,980	10,640	13,300
Max. Input Voltage (V) <sup>*1</sup>	1000	1000	1000	1000
MPPT Operating Voltage Range (V) <sup>*2</sup>	200~850	200~850	200~850	200~850
MPPT Voltage Range at Nominal Power (V) <sup>*3</sup>	240~850	285~850	260~850	320~850
Start-up Voltage (V)	180	180	180	180
Nominal Input Voltage (V)	620	620	620	620
Max. Input Current per MPPT (A)	12.5	12.5	12.5/22	12.5/22
Max. Short Circuit Current per MPPT (A)	15.2	15.2	15.2/27.6	15.2/27.6
Max. Backfeed Current to The Array (A)	0	0	0	0
Number of MPP Trackers	2	2	2	2
Number of Strings per MPPT	1	1	1/2	1/2
<b>AC Output Data (On-grid)</b>				
Nominal Output Power (W)	5,000	6,000	8,000	10,000
Max. Output Power (W) <sup>*4</sup>	5,500	6,600	8,800	11,000
Nominal Apparent Power Output to Utility Grid (VA)	5,000	6,000	8,000	10,000
Max. Apparent Power Output to Utility Grid (VA) <sup>*2*4</sup>	5,500	6,600	8,800	11,000

Technical Parameters	GW5KL-ET	GW6KL-ET	GW8KL-ET	GW10KL-ET
Nominal Apparent Power from Utility Grid (VA)	10,000	12,000	15,000	15,000
Max. Apparent Power from Utility Grid (VA)	10,000	12,000	15,000	15,000
Nominal Output Voltage (V)	400/380, 3L/N/PE	400/380, 3L/N/PE	400/380, 3L/N/PE	400/380, 3L/N/PE
Output Voltage Range (V)	0~300	0~300	0~300	0~300
Nominal AC Grid Frequency (Hz)	50/60	50/60	50/60	50/60
AC Grid Frequency Range (Hz)	45~65	45~65	45~65	45~65
Max. AC Current Output to Utility Grid (A)	8.5	10.5	13.5	16.5
Max. AC Current From Utility Grid (A)	15.2	18.2	22.7	22.7
Max. Output Fault Current (Peak and Duration) (A)	45@2 $\mu$ s	45@2 $\mu$ s	45@2 $\mu$ s	45@2 $\mu$ s
Inrush Current (Peak and Duration) (A)	45@2 $\mu$ s	45@2 $\mu$ s	45@2 $\mu$ s	45@2 $\mu$ s
Nominal Output Current (A)	7.5	9.0	12	14.5
Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)			
Max. Total Harmonic Distortion	<3%	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	45	45	45	45
<b>AC Output Data (Back-up)</b>				
Back-up Nominal Apparent Power (VA)	5,000	6,000	8,000	10,000
Max. Output Apparent Power without Grid (VA) <sup>*3</sup>	5,000 (10,000 @60sec)	6,000 (12,000 @60sec)	8,000 (16,000 @60sec)	10,000 (16,500 @60sec)
Max. Output Apparent Power with Grid (VA) <sup>*3</sup>	5,000	6,000	8,000	10,000
Nominal Output Current (A)	7.5	9	12	14.5
Max. Output Current (A)	8.5	10.5	13.5	16.5
Max. Output Fault Current (Peak and Duration) (A)	45@2 $\mu$ s	45@2 $\mu$ s	45@2 $\mu$ s	45@2 $\mu$ s
Inrush Current (Peak and Duration) (A)	45@2 $\mu$ s	45@2 $\mu$ s	45@2 $\mu$ s	45@2 $\mu$ s
Maximum Output Overcurrent Protection (A)	45	45	45	45

Technical Parameters	GW5KL-ET	GW6KL-ET	GW8KL-ET	GW10KL-ET
Nominal Output Voltage (V)	400/380	400/380	400/380	400/380
Nominal Output Frequency (Hz)	50/60	50/60	50/60	50/60
Output THDv (@Linear Load)	<3%	<3%	<3%	<3%
Switching from Grid Connected Mode to Standalone Mode	<10ms	<10ms	<10ms	<10ms
Switching from standalone mode to network connected mode	<10ms	<10ms	<10ms	<10ms
<b>Efficiency</b>				
Max. Efficiency	97.6%	97.6%	97.6%	97.6%
European Efficiency	96.8%	96.8%	96.8%	96.8%
Max. Battery to AC Efficiency	97.5%	97.5%	97.5%	97.5%
MPPT Efficiency	99.9%	99.9%	99.9%	99.9%
<b>Protection</b>				
PV Insulation Resistance Detection	Integrated	Integrated	Integrated	Integrated
Residual Current Monitoring	Integrated	Integrated	Integrated	Integrated
PV Reverse Polarity Protection	Integrated	Integrated	Integrated	Integrated
Anti-islanding Protection	Integrated	Integrated	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated	Integrated	Integrated
DC Switch	Optional	Optional	Optional	Optional
DC Surge Protection	Type III	Type III	Type III	Type III
AC Surge Protection	Type III	Type III	Type III	Type III
Remote Shutdown	Integrated	Integrated	Integrated	Integrated
<b>General Data</b>				
Operating Temperature Range (°C)	-35~+60	-35~+60	-35~+60	-35~+60
Derating temperature (°C)	40	40	40	40
Relative Humidity	0~95%	0~95%	0~95%	0~95%
Max. Operating Altitude (m)	4000	4000	4000	4000
Cooling Method	Natural Convection	Natural Convection	Natural Convection	Natural Convection



Technical Parameters	GW5KL-ET	GW6KL-ET	GW8KL-ET	GW10KL-ET
User Interface	LED, APP	LED, APP	LED, APP	LED, APP
Communication with BMS* <sup>6</sup>	RS485, CAN	RS485, CAN	RS485, CAN	RS485, CAN
Communication with Meter	RS485	RS485	RS485	RS485
Communication with Portal	WiFi / WiFi+LAN (Optional) / 4G (Optional)			
Weight (kg)	24	24	25	25
Dimension (W×H×D mm)	415×516×180			
Noise Emission (dB)	<30	<30	<30	<30
Topology	Non-isolated	Non-isolated	Non-isolated	Non-isolated
Self-consumption at Night (W)* <sup>7</sup>	<15	<15	<15	<15
Ingress Protection Rating	IP66	IP66	IP66	IP66
DC Connector	MC4 (4~6mm <sup>2</sup> )	MC4 (4~6mm <sup>2</sup> )	MC4 (4~6mm <sup>2</sup> )	MC4 (4~6mm <sup>2</sup> )
AC Connector	Feed-Through Terminal Blocks UW10			
Environmental Category	4K4H	4K4H	4K4H	4K4H
Pollution Degree	III	III	III	III
Overtoltage Category	DC II / AC III	DC II / AC III	DC II / AC III	DC II / AC III
Storage Temperature (°C)	-40~+85	-40~+85	-40~+85	-40~+85
The Decisive Voltage Class (DVC)	Battery: C PV: C AC: C Com: A			
Mounting Method	Wall Mounted			
Active Anti-islanding Method	AFDPF + AQDPF * <sup>5</sup>			
Type of Electrical Supply System	Three phase Grid	Three phase Grid	Three phase Grid	Three phase Grid
Country of Manufacture	China	China	China	China
Certification* <sup>8</sup>				
Grid Standards	AS/NZS 4777.2:2015			
Safety Regulation	IEC62109-1&2			
EMC	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN61000-4-16, EN61000-4-18, EN61000-4-29			

Technical Parameters	GW5KL-ET	GW6KL-ET	GW8KL-ET	GW10KL-ET
<p>*1: For 1000V system, Maximum operating voltage is 950V.</p> <p>*2: According to the local grid regulation.</p> <p>*3: Can be reached only if PV and battery power is enough.</p> <p>*4: For Chile Max. Apparent Power Output to Utility Grid (VA) and Max. Output Power (W): GW5KL(N)-ET is 5000; GW6KL(N)-ET is 6000; GW8KL(N)-ET is 8000;GW10KL(N)-ET is 10000.</p> <p>*5: AFDPF: Active Frequency Drift with Positive Feedback, AQDPF: Active Q Drift with Positive Feedback.</p> <p>*6: CAN communication is configured default. If RS485 communication is used, please replace the corresponding communication line.</p> <p>*7: No Back-up Output.</p> <p>*8: Not all certifications &amp; standards listed, check the official website for details.</p>				

Technical Parameters	GW5K-ET	GW6.5K-ET	GW8K-ET	GW10K-ET
<b>Battery Input Data</b>				
Battery Type	Li-Ion	Li-Ion	Li-Ion	Li-Ion
Nominal Battery Voltage (V)	500	500	500	500
Battery Voltage Range (V)	180~600	180~600	180~600	180~600
Start-up Voltage (V)	180	180	180	180
Number of Battery Input	1	1	1	1
Max. Continuous Charging Current (A)	25	25	25	25
Max. Continuous Discharging Current (A)	25	25	25	25
Max. Charge Power (W)	7,500	8,450	9,600	10,000
Max. Discharge Power (W)	7,500	8,450	9,600	10,000
<b>PV String Input Data</b>				
Max. Input Power (W)	7,500	9,700	12,000	15,000
Max. Input Voltage (V) <sup>*1</sup>	1000	1000	1000	1000
MPPT Operating Voltage Range (V) <sup>*2</sup>	200~850	200~850	200~850	200~850
MPPT Voltage Range at Nominal Power (V) <sup>*3</sup>	240~850	310~850	380~850	460~850
Start-up Voltage (V)	180	180	180	180
Nominal Input Voltage (V)	620	620	620	620
Max. Input Current per MPPT (A)	12.5	12.5	12.5	12.5
Max. Short Circuit Current per MPPT (A)	15.2	15.2	15.2	15.2
Max. Backfeed Current to The Array (A)	0	0	0	0
Number of MPP Trackers	2	2	2	2
Number of Strings per MPPT	1	1	1	1
<b>AC Output Data (On-grid)</b>				
Nominal Output Power (W)	5,000	6,500	8,000	10,000
Max. Output Power (W) <sup>*4</sup>	5,500	7,150	8,800	11,000
Nominal Apparent Power Output to Utility Grid (VA)	5,000	6,500	8,000	10,000
Max. Apparent Power Output to Utility Grid (VA) <sup>*2*4</sup>	5,500	7,150	8,800	11,000
Nominal Apparent Power from Utility Grid (VA)	10,000	13,000	15,000	15,000

Technical Parameters	GW5K-ET	GW6.5K-ET	GW8K-ET	GW10K-ET
Max. Apparent Power from Utility Grid (VA)	10,000	13,000	15,000	15,000
Nominal Output Voltage (V)	400/380, 3L/N/PE	400/380, 3L/N/PE	400/380, 3L/N/PE	400/380, 3L/N/PE
Output Voltage Range (V)	0~300	0~300	0~300	0~300
Nominal AC Grid Frequency (Hz)	50/60	50/60	50/60	50/60
AC Grid Frequency Range (Hz)	45~65	45~65	45~65	45~65
Max. AC Current Output to Utility Grid (A)	8.5	10.8	13.5	16.5
Max. AC Current From Utility Grid (A)	15.2	19.7	22.7	22.7
Max. Output Fault Current (Peak and Duration) (A)	45@2μs	45@2μs	45@2μs	45@2μs
Inrush Current (Peak and Duration) (A)	45@2μs	45@2μs	45@2μs	45@2μs
Nominal Output Current (A)	7.5	9.5	12.0	14.5
Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)			
Max. Total Harmonic Distortion	<3%	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	45	45	45	45
<b>AC Output Data (Back-up)</b>				
Back-up Nominal Apparent Power (VA)	5,000	6,500	8,000	10,000
Max. Output Apparent Power without Grid (VA) <sup>*3</sup>	5,000 (10,000 @60sec)	6,500 (13,000 @60sec)	8,000 (16,000 @60sec)	10,000 (16,500 @60sec)
Max. Output Apparent Power with Grid (VA) <sup>*3</sup>	5,000	6,500	8,000	10,000
Nominal Output Current (A)	7.5	9.5	12	14.5
Max. Output Current (A)	8.5	10.8	13.5	16.5
Max. Output Fault Current (Peak and Duration) (A)	45@2μs	45@2μs	45@2μs	45@2μs
Inrush Current (Peak and Duration) (A)	45@2μs	45@2μs	45@2μs	45@2μs
Maximum Output Overcurrent Protection (A)	45	45	45	45
Nominal Output Voltage (V)	400/380	400/380	400/380	400/380
Nominal Output Frequency (Hz)	50/60	50/60	50/60	50/60

Technical Parameters	GW5K-ET	GW6.5K-ET	GW8K-ET	GW10K-ET
Output THDv (@Linear Load)	<3%	<3%	<3%	<3%
Switching from Grid Connected Mode to Standalone Mode	<10ms	<10ms	<10ms	<10ms
Switching from standalone mode to network connected mode	<10ms	<10ms	<10ms	<10ms
Efficiency				
Max. Efficiency	98.0%	98.0%	98.2%	98.2%
European Efficiency	97.2%	97.2%	97.5%	97.5%
Max. Battery to AC Efficiency	97.5%	97.5%	97.5%	97.5%
MPPT Efficiency	99.9%	99.9%	99.9%	99.9%
Protection				
PV Insulation Resistance Detection	Integrated	Integrated	Integrated	Integrated
Residual Current Monitoring	Integrated	Integrated	Integrated	Integrated
PV Reverse Polarity Protection	Integrated	Integrated	Integrated	Integrated
Anti-islanding Protection	Integrated	Integrated	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated	Integrated	Integrated
DC Switch	Integrated	Integrated	Integrated	Integrated
DC Surge Protection	Type II	Type II	Type II	Type II
AC Surge Protection	Type III	Type III	Type III	Type III
Remote Shutdown	Integrated	Integrated	Integrated	Integrated
General Data				
Operating Temperature Range (°C)	-35~+60	-35~+60	-35~+60	-35~+60
Derating temperature (°C)	40	40	40	40
Relative Humidity	0~95%	0~95%	0~95%	0~95%
Max. Operating Altitude (m)	4000	4000	4000	4000
Cooling Method	Natural Convection	Natural Convection	Natural Convection	Natural Convection
User Interface	LED, APP	LED, APP	LED, APP	LED, APP
Communication with BMS <sup>*6</sup>	RS485, CAN	RS485, CAN	RS485, CAN	RS485, CAN

Technical Parameters	GW5K-ET	GW6.5K-ET	GW8K-ET	GW10K-ET
Communication with Meter	RS485	RS485	RS485	RS485
Communication with Portal	WiFi	WiFi	WiFi	WiFi
Weight (kg)	24	24	24	24
Dimension (W×H×D mm)	415×516×180			
Noise Emission (dB)	<30	<30	<30	<30
Topology	Non-isolated	Non-isolated	Non-isolated	Non-isolated
Self-consumption at Night (W)*7	<15	<15	<15	<15
Ingress Protection Rating	IP66	IP66	IP66	IP66
DC Connector	MC4 (4~6mm <sup>2</sup> )	MC4 (4~6mm <sup>2</sup> )	MC4 (4~6mm <sup>2</sup> )	MC4 (4~6mm <sup>2</sup> )
AC Connector	Feed-Through Terminal Blocks UW10			
Environmental Category	4K4H	4K4H	4K4H	4K4H
Pollution Degree	III	III	III	III
Overtoltage Category	DC II / AC III	DC II / AC III	DC II / AC III	DC II / AC III
Storage Temperature (°C)	-40~+85	-40~+85	-40~+85	-40~+85
The Decisive Voltage Class (DVC)	Battery: C PV: C AC: C Com: A			
Mounting Method	Wall Mounted			
Active Anti-islanding Method	AFDPF + AQDPF *5			
Type of Electrical Supply System	Three phase Grid	Three phase Grid	Three phase Grid	Three phase Grid
Country of Manufacture	China	China	China	China
Certification*8				
Grid Standards	VDE-AR-N 4105, VDE 0126-1-1, EN 50549-1, G98, G99, G100, CEI 0-21			
Safety Regulation	IEC62109-1&2			
EMC	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN61000-4-16, EN61000-4-18, EN61000-4-29			

Technical Parameters	GW5K-ET	GW6.5K-ET	GW8K-ET	GW10K-ET
<p>*1: For 1000V system, Maximum operating voltage is 950V.</p> <p>*2: According to the local grid regulation.</p> <p>*3: Can be reached only if PV and battery power is enough.</p> <p>*4: *4: For Chile Max. Apparent Power Output to Utility Grid (VA) and Max. Output Power (W) : GW5K(L)-ET is 5000; GW6K(L)-ET is 6000; GW8K(L)-ET is 8000; GW10K(L)-ET is 10000.</p> <p>*5: AFDPF: Active Frequency Drift with Positive Feedback, AQDPF: Active Q Drift with Positive Feedback.</p> <p>*6: CAN communication is configured default. If RS485 communication is used, please replace the corresponding communication line.</p> <p>*7: No Back-up Output.</p> <p>*8: Not all certifications &amp; standards listed, check the official website for details.</p>				

Technical Parameters	GW5KN-ET	GW6.5KN-ET	GW8KN-ET	GW10KN-ET
<b>Battery Input Data</b>				
Battery Type	Li-Ion	Li-Ion	Li-Ion	Li-Ion
Nominal Battery Voltage (V)	500	500	500	500
Battery Voltage Range (V)	180~600	180~600	180~600	180~600
Start-up Voltage (V)	180	180	180	180
Number of Battery Input	1	1	1	1
Max. Continuous Charging Current (A)	25	25	25	25
Max. Continuous Discharging Current (A)	25	25	25	25
Max. Charge Power (W)	7,500	8,450	9,600	10,000
Max. Discharge Power (W)	7,500	8,450	9,600	10,000
<b>PV String Input Data</b>				
Max. Input Power (W)	7,500	9,700	12,000	15,000
Max. Input Voltage (V)*1	1000	1000	1000	1000
MPPT Operating Voltage Range (V)*2	200~850	200~850	200~850	200~850
MPPT Voltage Range at Nominal Power (V)*3	240~850	310~850	380~850	460~850
Start-up Voltage (V)	180	180	180	180
Nominal Input Voltage (V)	620	620	620	620
Max. Input Current per MPPT (A)	16	16	16	16
Max. Short Circuit Current per MPPT (A)	21.2	21.2	21.2	21.2
Max. Backfeed Current to The Array (A)	0	0	0	0
Number of MPP Trackers	2	2	2	2
Number of Strings per MPPT	1	1	1	1
<b>AC Output Data (On-grid)</b>				
Nominal Output Power (W)	5,000	6,500	8,000	10,000
Max. Output Power (W) *4	5,500	7,150	8,800	11,000
Nominal Apparent Power Output to Utility Grid (VA)	5,000	6,500	8,000	10,000
Max. Apparent Power Output to Utility Grid (VA)*2*4	5,500	7,150	8,800	11,000
Nominal Apparent Power from Utility Grid (VA)	10,000	13,000	15,000	15,000



Technical Parameters	GW5KN-ET	GW6.5KN-ET	GW8KN-ET	GW10KN-ET
Max. Apparent Power from Utility Grid (VA)	10,000	13,000	15,000	15,000
Nominal Output Voltage (V)	400/380, 3L/N/PE	400/380, 3L/N/PE	400/380, 3L/N/PE	400/380, 3L/N/PE
Output Voltage Range (V)	0~300	0~300	0~300	0~300
Nominal AC Grid Frequency (Hz)	50/60	50/60	50/60	50/60
AC Grid Frequency Range (Hz)	45~65	45~65	45~65	45~65
Max. AC Current Output to Utility Grid (A)	8.5	10.8	13.5	16.5
Max. AC Current From Utility Grid (A)	15.2	19.7	22.7	22.7
Max. Output Fault Current (Peak and Duration) (A)	45@2μs	45@2μs	45@2μs	45@2μs
Inrush Current (Peak and Duration) (A)	45@2μs	45@2μs	45@2μs	45@2μs
Nominal Output Current (A)	7.5	9.5	12.0	14.5
Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)			
Max. Total Harmonic Distortion	<3%	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	45	45	45	45
<b>AC Output Data (Back-up)</b>				
Back-up Nominal Apparent Power (VA)	5,000	6,500	8,000	10,000
Max. Output Apparent Power without Grid (VA) <sup>*3</sup>	5,000 (10,000 @60sec)	6,000 (13,000 @60sec)	8,000 (16,000 @60sec)	10,000 (16,500 @60sec)
Max. Output Apparent Power with Grid (VA) <sup>*3</sup>	5,000	6,500	8,000	10,000
Nominal Output Current (A)	7.5	9.5	12	14.5
Max. Output Current (A)	8.5	10.8	13.5	16.5
Max. Output Fault Current (Peak and Duration) (A)	45@2μs	45@2μs	45@2μs	45@2μs
Inrush Current (Peak and Duration) (A)	45@2μs	45@2μs	45@2μs	45@2μs
Maximum Output Overcurrent Protection (A)	45	45	45	45
Nominal Output Voltage (V)	400/380	400/380	400/380	400/380
Nominal Output Frequency (Hz)	50/60	50/60	50/60	50/60

Technical Parameters	GW5KN-ET	GW6.5KN-ET	GW8KN-ET	GW10KN-ET
Output THDv (@Linear Load)	<3%	<3%	<3%	<3%
Switching from Grid Connected Mode to Standalone Mode	<10ms	<10ms	<10ms	<10ms
Switching from standalone mode to network connected mode	<10ms	<10ms	<10ms	<10ms
Efficiency				
Max. Efficiency	98.0%	98.0%	98.2%	98.2%
European Efficiency	97.2%	97.2%	97.5%	97.5%
Max. Battery to AC Efficiency	97.5%	97.5%	97.5%	97.5%
MPPT Efficiency	99.9%	99.9%	99.9%	99.9%
Protection				
PV Insulation Resistance Detection	Integrated	Integrated	Integrated	Integrated
Residual Current Monitoring	Integrated	Integrated	Integrated	Integrated
PV Reverse Polarity Protection	Integrated	Integrated	Integrated	Integrated
Anti-islanding Protection	Integrated	Integrated	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated	Integrated	Integrated
DC Switch	Integrated	Integrated	Integrated	Integrated
DC Surge Protection	Type II	Type II	Type II	Type II
AC Surge Protection	Type III	Type III	Type III	Type III
Remote Shutdown	Integrated	Integrated	Integrated	Integrated
General Data				
Operating Temperature Range (°C)	-35~+60	-35~+60	-35~+60	-35~+60
Derating temperature (°C)	40	40	40	40
Relative Humidity	0~95%	0~95%	0~95%	0~95%
Max. Operating Altitude (m)	4000	4000	4000	4000
Cooling Method	Natural Convection	Natural Convection	Natural Convection	Natural Convection
User Interface	LED, APP	LED, APP	LED, APP	LED, APP
Communication with BMS <sup>46</sup>	RS485, CAN	RS485, CAN	RS485, CAN	RS485, CAN

Technical Parameters	GW5KN-ET	GW6.5KN-ET	GW8KN-ET	GW10KN-ET
Communication with Meter	RS485	RS485	RS485	RS485
Communication with Portal	WiFi / WiFi+LAN (Optional) / 4G (Optional)			
Weight (kg)	24	24	24	24
Dimension (W×H×D mm)	415×516×180			
Noise Emission (dB)	<30	<30	<30	<30
Topology	Non-isolated	Non-isolated	Non-isolated	Non-isolated
Self-consumption at Night (W) <sup>*7</sup>	<15	<15	<15	<15
Ingress Protection Rating	IP66	IP66	IP66	IP66
DC Connector	MC4 (4~6mm <sup>2</sup> )	MC4 (4~6mm <sup>2</sup> )	MC4 (4~6mm <sup>2</sup> )	MC4 (4~6mm <sup>2</sup> )
AC Connector	Feed-Through Terminal Blocks UW10			
Environmental Category	4K4H	4K4H	4K4H	4K4H
Pollution Degree	III	III	III	III
Overvoltage Category	DC II / AC III	DC II / AC III	DC II / AC III	DC II / AC III
Storage Temperature (°C)	-40~+85	-40~+85	-40~+85	-40~+85
The Decisive Voltage Class (DVC)	Battery: C PV: C AC: C Com: A			
Mounting Method	Wall Mounted			
Active Anti-islanding Method	AFDPF + AQDPF <sup>*5</sup>			
Type of Electrical Supply System	Three phase Grid	Three phase Grid	Three phase Grid	Three phase Grid
Country of Manufacture	China	China	China	China
Certification <sup>*8</sup>				
Grid Standards	VDE-AR-N 4105, VDE 0126-1-1, EN 50549-1, G98, G99, G100, CEI 0-21			
Safety Regulation	IEC62109-1&2			
EMC	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN61000-4-16, EN61000-4-18, EN61000-4-29			

Technical Parameters	GW5KN-ET	GW6.5KN-ET	GW8KN-ET	GW10KN-ET
<p>*1: For 1000V system, Maximum operating voltage is 950V.</p> <p>*2: According to the local grid regulation.</p> <p>*3: Can be reached only if PV and battery power is enough.</p> <p>*4: For Chile Max. Apparent Power Output to Utility Grid (VA) and Max. Output Power (W): GW5KL(N)-ET is 5000; GW6KL(N)-ET is 6000; GW8KL(N)-ET is 8000; GW10KL(N)-ET is 10000.</p> <p>*5: AFDPF: Active Frequency Drift with Positive Feedback, AQDPF: Active Q Drift with Positive Feedback.</p> <p>*6: CAN communication is configured default. If RS485 communication is used, please replace the corresponding communication line.</p> <p>*7: No Back-up Output.</p> <p>*8: Not all certifications &amp; standards listed, check the official website for details.</p>				

## 10.2 Technical Parameter - BT Series

Technical Parameters	GW5K-BT	GW6K-BT	GW8K-BT	GW10K-BT
<b>Battery Input Data</b>				
Battery Type	Li-Ion	Li-Ion	Li-Ion	Li-Ion
Nominal Battery Voltage (V)	500	500	500	500
Battery Voltage Range (V)	180~600	180~600	180~600	180~600
Start-up Voltage (V)	180	180	180	180
Number of Battery Input	1	1	1	1
Max. Continuous Charging Current (A)	25	25	25	25
Max. Continuous Discharging Current (A)	25	25	25	25
Max. Charge Power (W)	5,000	6,000	8,000	10,000
Max. Discharge Power (W)	5,000	6,000	8,000	10,000
<b>AC Output Data (On-grid)</b>				
Nominal Output Power (W)	5,000	6,000	8,000	10,000
Max. Output Power (W) *6	5,500	6,600	8,800	11,000
Nominal Apparent Power Output to Utility Grid (VA)	5,000	6,000	8,000	10,000
Max. Apparent Power Output to Utility Grid (VA)*1 *6	5,500	6,600	8,800	11,000
Nominal Apparent Power from Utility Grid (VA)	10,000	12,000	15,000	15,000
Max. Apparent Power from Utility Grid (VA)	10,000	12,000	15,000	15,000
Nominal Output Voltage (V)	400/380, 3L/N/PE	400/380, 3L/N/PE	400/380, 3L/N/PE	400/380, 3L/N/PE
Output Voltage Range (V)	0~300	0~300	0~300	0~300
Nominal AC Grid Frequency (Hz)	50/60	50/60	50/60	50/60
AC Grid Frequency Range (Hz)	45~55	45~55	45~55	45~55
Max. AC Current Output to Utility Grid (A)	8.5	10.5	13.5	16.5
Max. AC Current From Utility Grid (A)	15.2	18.2	22.7	22.7
Max. Output Fault Current (Peak and Duration) (A)	45@2μs	45@2μs	45@2μs	45@2μs
Inrush Current (Peak and Duration) (A)	45@2μs	45@2μs	45@2μs	45@2μs
Nominal Output Current (A)	7.2	8.7	11.6	14.5

Technical Parameters	GW5K-BT	GW6K-BT	GW8K-BT	GW10K-BT
Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)			
Max. Total Harmonic Distortion	<3%	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	45	45	45	45
AC Output Data (Back-up)				
Back-up Nominal Apparent Power (VA)	5,000	6,000	8,000	10,000
Max. Output Apparent Power without Grid (VA) *2	5,000 (10,000 @60sec)	6,000 (12,000 @60sec)	8,000 (15,000 @60sec)	10,000 (15,000 @60sec)
Max. Output Apparent Power with Grid (VA)	5000	6000	8000	10000
Nominal Output Current (A)	7.2	8.7	11.6	14.5
Max. Output Current (A)	8.5	10.5	13.5	16.5
Max. Output Fault Current (Peak and Duration) (A)	45@2μs	45@2μs	45@2μs	45@2μs
Inrush Current (Peak and Duration) (A)	45@2μs	45@2μs	45@2μs	45@2μs
Maximum Output Overcurrent Protection (A)	45	45	45	45
Nominal Output Voltage (V)	400/380	400/380	400/380	400/380
Nominal Output Frequency (Hz)	50/60	50/60	50/60	50/60
Output THDv (@Linear Load)	<3%	<3%	<3%	<3%
Switching from Grid Connected Mode to Standalone Mode	<10ms	<10ms	<10ms	<10ms
Switching from Grid Connected Mode to Standalone Mode	<10ms	<10ms	<10ms	<10ms
Efficiency				
Max. Efficiency	97.6%	97.6%	97.6%	97.6%
European Efficiency	97.2%	97.2%	97.5%	97.5%
Max. Battery to AC Efficiency	97.6%	97.6%	97.6%	97.6%
Protection				
PV Insulation Resistance Detection	Integrated	Integrated	Integrated	Integrated
Residual Current Monitoring	Integrated	Integrated	Integrated	Integrated

Technical Parameters	GW5K-BT	GW6K-BT	GW8K-BT	GW10K-BT
Battery Reverse Polarity Protection	Integrated	Integrated	Integrated	Integrated
Anti-islanding Protection	Integrated	Integrated	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated	Integrated	Integrated
General Data				
Operating Temperature Range (°C)	-35~+60	-35~+60	-35~+60	-35~+60
Derating temperature (°C)	40	40	40	40
Relative Humidity	0~95%	0~95%	0~95%	0~95%
Max. Operating Altitude (m)	4000	4000	4000	4000
Cooling Method	Natural Convection	Natural Convection	Natural Convection	Natural Convection
User Interface	LED, APP	LED, APP	LED, APP	LED, APP
Communication with BMS <sup>*3</sup>	RS485, CAN	RS485, CAN	RS485, CAN	RS485, CAN
Communication with Meter	RS485	RS485	RS485	RS485
Communication with Portal	WiFi, LAN	WiFi, LAN	WiFi, LAN	WiFi, LAN
Weight (kg)	21.0	21.0	21.0	21.0
Dimension (W×H×D mm)	415×516×180			
Noise Emission (dB)	<30	<30	<30	<30
Topology	Non-Isolation	Non-isolated	Non-isolated	Non-isolated
Self-consumption at Night (W)*4	<15	<15	<15	<15
Ingress Protection Rating	IP66	IP66	IP66	IP66
DC Connector	MC4 (4~6 mm <sup>2</sup> )	MC4 (4~6 mm <sup>2</sup> )	MC4 (4~6 mm <sup>2</sup> )	MC4 (4~6 mm <sup>2</sup> )
AC Connector	Feed-Through Terminal Blocks UW10			
Environmental Category	4K4H	4K4H	4K4H	4K4H
Pollution Degree	III	III	III	III
Overvoltage Category	DC II / AC III	DC II / AC III	DC II / AC III	DC II / AC III
Protective Class	I	I	I	I
Storage Temperature (°C)	-40~+85	-40~+85	-40~+85	-40~+85

Technical Parameters	GW5K-BT	GW6K-BT	GW8K-BT	GW10K-BT
The Decisive Voltage Class (DVC)	Battery: C AC: C Com: A			
Mounting Method	Wall Mounted			
Active Anti-islanding Method	AFDPF + AQDPF *7			
Type of Electrical Supply System	Three phase TN/TT system	Three phase TN/TT system	Three phase TN/TT system	Three phase TN/TT system
Country of Manufacture	China	China	China	China
Certification*5				
Grid Standards	VDE-AR-N4105, EN 50549-1 G98, G99 G100, CEI 0-21			
Safety Regulation	IEC/EN 62477			
EMC	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN61000-4-16, EN61000-4-18, EN61000-4-29			
<p>*1: According to the local grid regulation.</p> <p>*2: Can be reached only if battery capacity is enough, otherwise will shut down.</p> <p>*3: CAN communication is configured by default. If 485 communication is used, please replace the corresponding communication line.</p> <p>*4: No Back-up Output.</p> <p>*5: Not all certifications &amp; standards listed, check the official website for details.</p> <p>*6: For Chile Max. Apparent Power Output to Utility Grid (VA) and Max. Output Power (W): GW5K-BT is 5000; GW6K-BT is 6000; GW8K-BT is 8000; GW10K-BT is 10000.</p> <p>*7: AFDPF: Active Frequency Drift with Positive Feedback, AQDPF: Active Q Drift with Positive Feedback.</p>				






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