

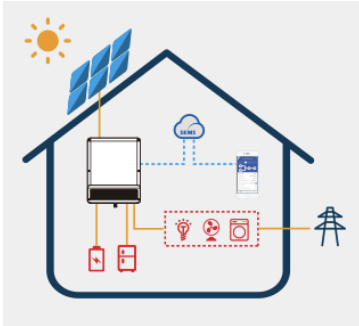


ET SERIES USER MANUAL

Hybrid inverter

1. INTRODUCTION

The GoodWe ET inverter series, also known as hybrid or bidirectional solar inverters, are designed to manage energy in solar systems that use PV, batteries, loads, and grid systems. With the help of these inverters, the energy generated by PV systems can be optimized for household loads. Any excess energy is stored in the battery, and once the battery is fully charged, the excess energy is exported to the grid if it is allowed. If the PV panels are not producing and the battery is charged, the energy for consumption in the house is supplied from the battery. After the battery is discharged, the energy is supplied from the distribution network to meet the household energy requirements.

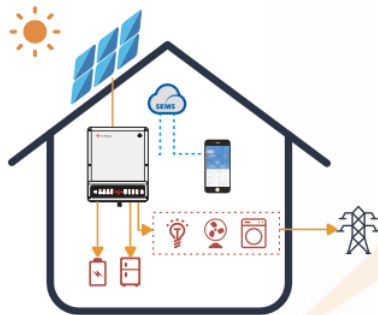


Note:

The introduction describes the general operation conditions of an ET system. The operating mode can be adjusted in the PV Master App including the system layout. The general operating modes for the ET system are shown below:

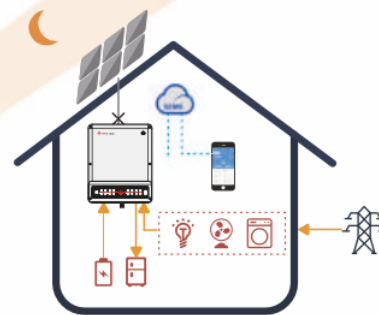
1.1 Introduction to operating modes

The operating mode of the ET series inverter can be set according to the required conditions. Below are examples of the inverter's basic operating modes.



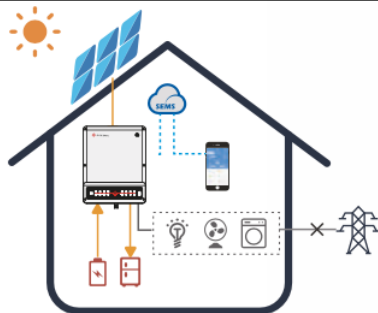
Mode 1

When PV is produced, consumption in the house is supported first. Excess energy is stored in the battery, after the battery is charged the excess energy goes to the grid. (If the inverter is enabled for surplus to the grid)



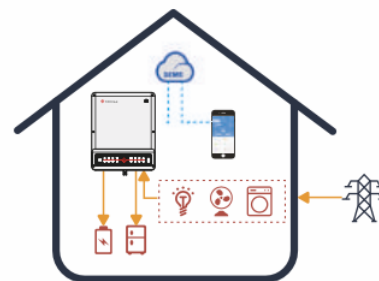
Mode 2

When the PV is not produced, the energy for consumption in the house is supplied from the battery, and in case of higher consumption, from the grid



Mode 3

In the event of a distribution network failure, only the „Back-Up“ output (backed-up appliances) will remain active. This output is powered by PV and battery.















Mode 4

Battery charging and discharging can be set using a schedule. These time schedules are set up using the PV Master app.

1.2 SAFETY AND WARNINGS

The ET inverter series from Jiangsu GoodWe Power Supply Technology Co., Ltd. (also called GoodWe) strictly complies with related safety rules for product design and testing. Please read and follow all of the instructions and cautions appearing on the inverter or in the User Manual during installation, operation, and maintenance, as any improper operation might cause personal injury or property damage.

Symbol explanation

	Caution! Failure to observe any warnings contained in this manual may result in injury.
	The danger of an electric shock!
	Danger - hot surface!
	The components of the product can be recycled.
	This side up! This package must always be transported, handled and stored in such a way that the arrows always point upwards.
	No more than six identical packages are to be stacked on top of each other.
	The product shall not be disposed of as household waste.
	The package/product must be handled carefully and should never be tipped over or slung.
	Refer to the operating instructions.
	Keep dry! The package must be protected from excessive humidity and must be stored under cover.
	This symbol indicates that you should wait at least 5 minutes after disconnecting the inverter from the utility grid and from the PV panel before touching any inner parts.
	CE mark

Safety warnings

Any installation or operations on the inverter must be performed by qualified electricians in compliance with standards, wiring rules, and the requirements of local grid authorities or companies (such as AS 4777 and AS/NZS 3000 in Australia).

Never insert or remove the AC or DC connections when the inverter is running.

Before any manipulation in the inverter connection area, it is necessary to turn off all power from the DC and AC sides. After that, you must wait 5 minutes before starting work with the inverter.

The temperature of the inverter surface can exceed 60°C during operation. Make sure it has cooled down before touching it and make sure the inverter is out of reach of children.

Do not open the inverter cover or change any components without the manufacturer's authorization. Otherwise, the warranty for the inverter will be invalid.

The usage and operation of the inverter must follow the instructions in this User Manual. Otherwise, the protection design might be impaired and the warranty for the inverter will be invalid.

Appropriate methods must be adopted to protect the inverter from static electricity damage. Any damage caused by static electricity is not warranted by the manufacturer.

The negative (PV-) input of the inverter is not grounded. **It is prohibited to connect the PV- or BAT- inputs to the ground.**

PV panels shall comply with class A according to IEC61730. The total idle voltage of the string, must not exceed the permitted maximum DC input voltage of the inverter. Exceeding the maximum permitted DC voltage will cause the changer to be destroyed and the warranty to be lost.

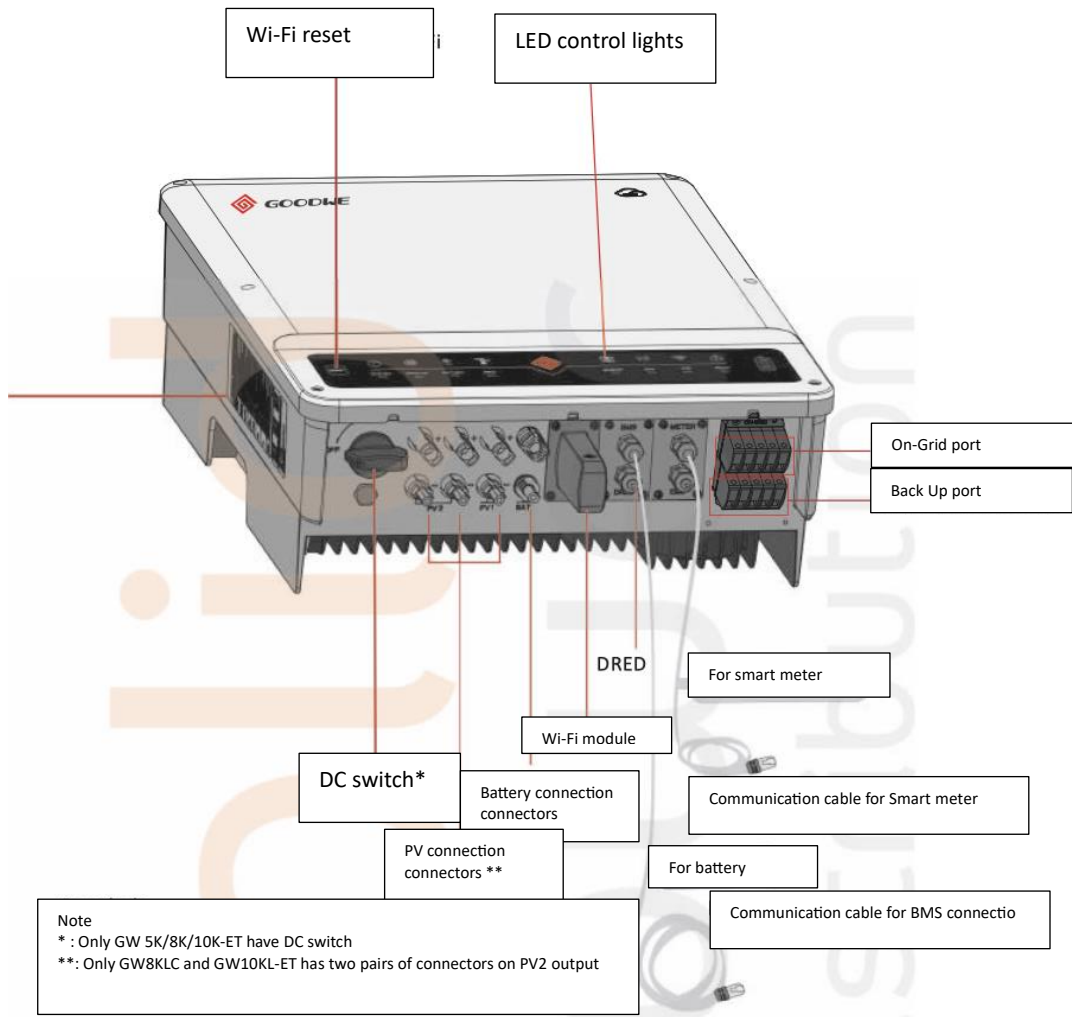
When exposed to sunlight, the PV array generates dangerous high DC voltages. Please operate the inverter according to these instructions, or danger to life may result.

The inverter has a built-in RCMU protector that monitors leakage currents on the DC side up to 6mA, when using an external protector, use an RCD/A type protector

In Australia, the output of the backup side in the switch box should be labeled "Main Switch UPS Supply". The output on the normal load side in the switch box should be labeled "Main Switch Inverter Supply".

1.3 Inverter Overview

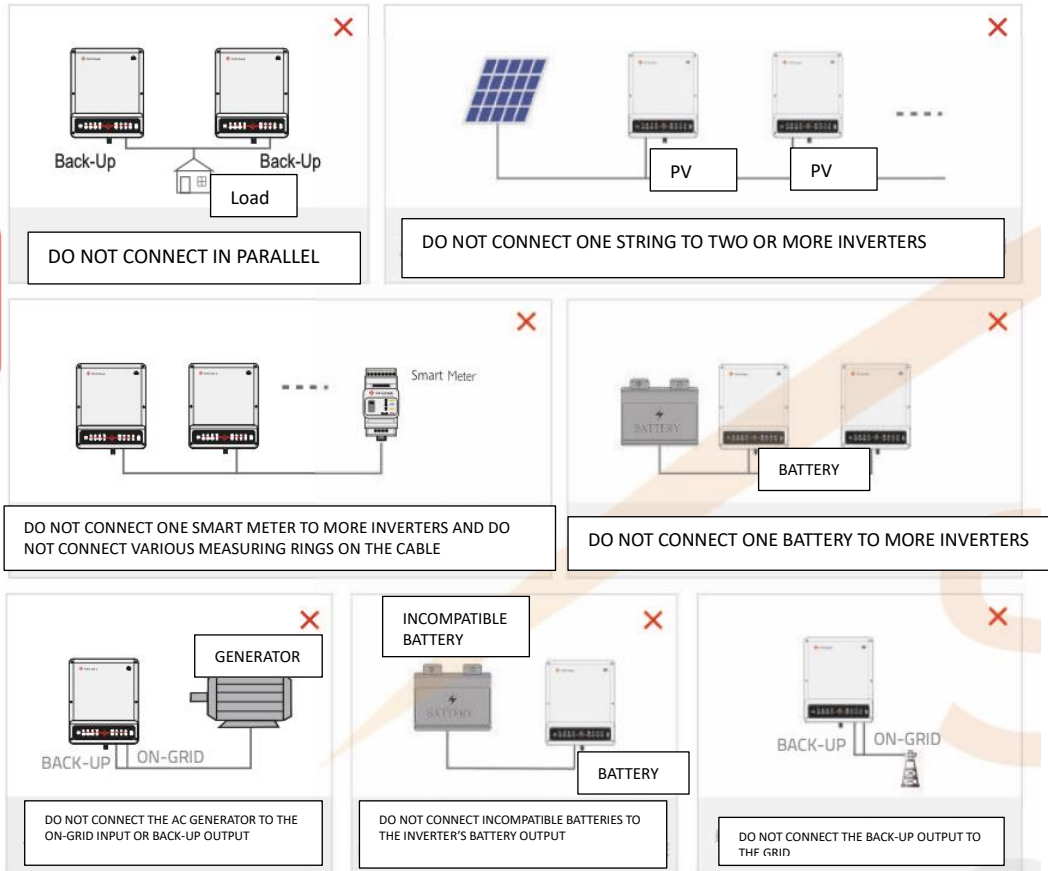
LED INDICATORS								
SYSTEM	BACKUP	BATTERY	GRID	ENERGY	COM	WI-FI	FAULT	
INDICATOR	STATUS		EXPLANATION					
SYSTEM			ON = system is ready					
			BLINK = system is starting up					
			OFF = system is not operating					
BACKUP			ON = backup is ready/power available					
			OFF = backup is off/on power available					
BATTERY			ON = battery is charging					
			BLINK 1 = battery discharging					
			BLINK 2 = battery is low/soc is low					
			OFF = battery is disconnected/not active					
GRID			ON = the grid is active					
			BLINK= the grid is active but is not connected					
			OFF = the grid is not active					
ENERGY			ON = consuming energy from the grid/purchasing					
			BLINK 1 = supplying energy from the grid/zeroing					
			BLINK 2 = supplying energy to the grid/selling					
			OFF = the grid is not connected or the system is not operating					
COM			ON = BMS and meter communications are OK					
			BLINK 1 = meter communications are OK, BMS communications have failed					
			BLINK 2 = BMS communications are OK, meter communications have failed					
			OFF = BMS and meter communications have both failed					
WI-FI			ON = WiFi is 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 = overload of backup output/reduce load					
			BLINK 4 = CT wiring fault					
			OFF = no fault					



2. INSTALLATION

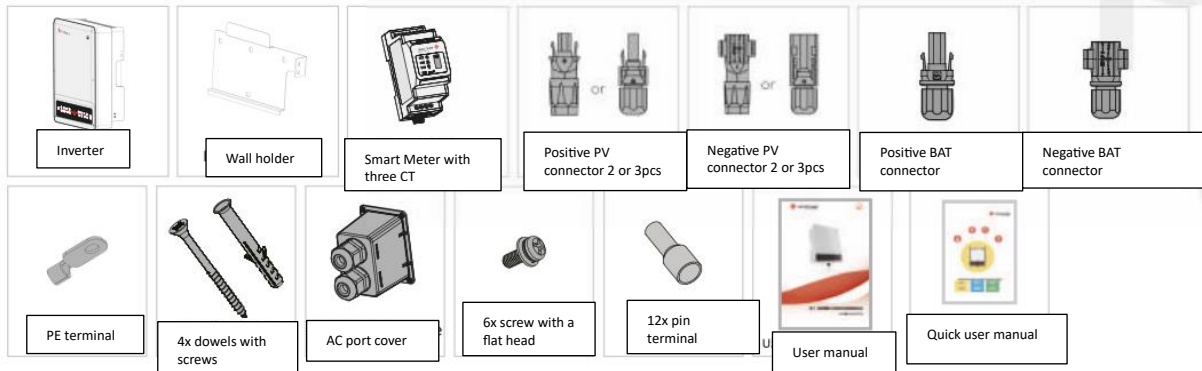
2.1 Installations that are not allowed

Please avoid the following installation types, which will damage the system or the inverter.



2.2 PACKAGE CONTENTS

When receiving the inverter, check that the components shown below are not missing or damaged.



2.3 MOUNTING

2.3.1 Select mounting location

For inverter protection and convenient maintenance, the mounting location for the inverter should be selected carefully based on the following rules:

No part of the system should not block the switch or breaker from disconnecting the inverter from DC and AC power.

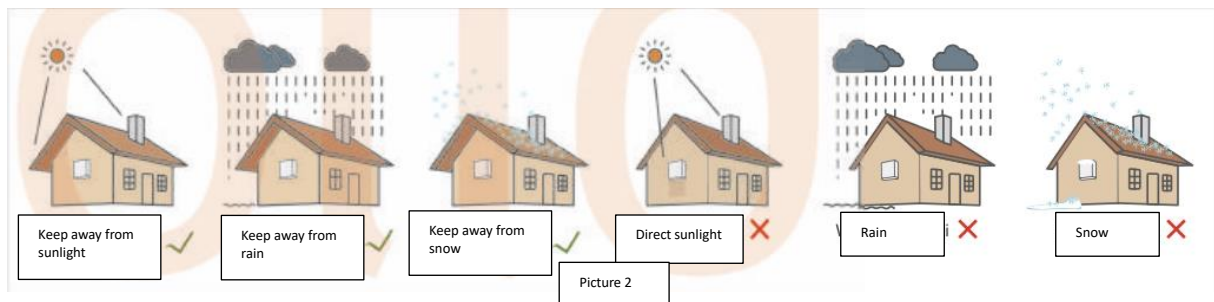
Rule 1. The inverter should be installed on a solid surface that is suitable for the inverter's dimensions and weight.

Rule 2. The inverter should be installed vertically or on a slope with a maximum value of 15°.



Rule 3. The ambient temperature should be lower than 45°C.

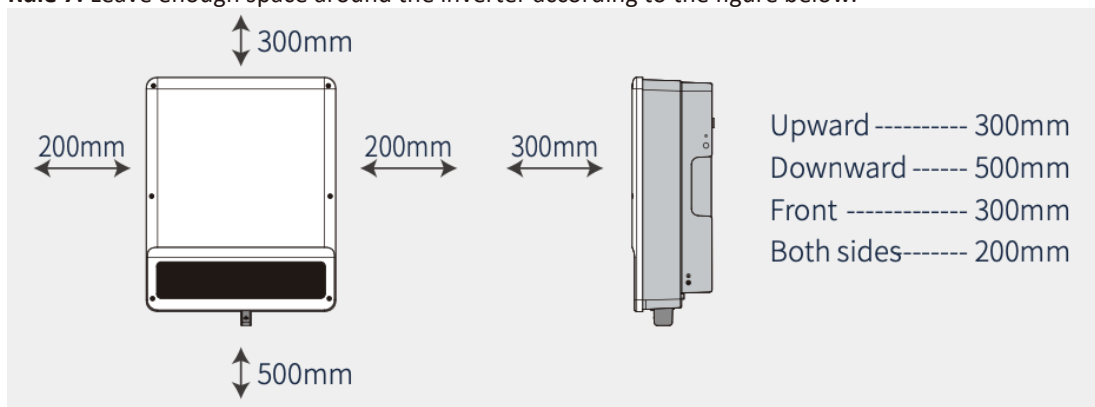
Rule 4. The inverter installation should be protected by shelter from direct sunlight or bad weather such as snow, rain, lightning, etc.



Rule 5. The inverter should be installed at eye level.

Rule 6. The product label on the inverter should be visible after installation.

Rule 7. Leave enough space around the inverter according to the figure below.



Do not install the inverter near flammable or explosive substances or near equipment with a strong electric magnetic field. [1]

2.3.2 MOUNTING

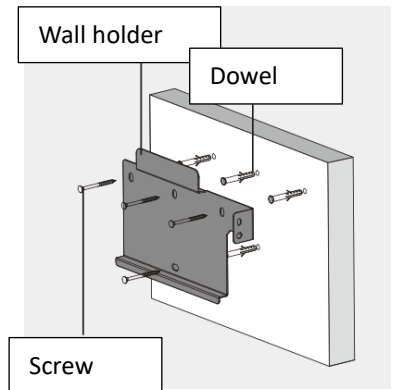


REMEMBER THE INVERTER IS HEAVY! BE CAREFUL WHEN REMOVING IT FROM THE BOX.[2]

The inverter is suitable for mounting on concrete or other non-combustible surfaces only.

Step 1

- Please use the mounting bracket as a template to drill 6 holes in the correct positions (10mm in diameter and 80mm in depth). (picture 4)
- Use the expansion bolts in the accessory box and tightly attach the mounting bracket to the wall.

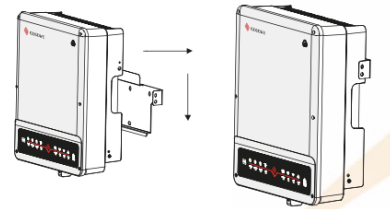


Note: The load capacity of the wall must be greater than 25kg. Otherwise, the wall may not be able to prevent the inverter from dropping.

Step 2

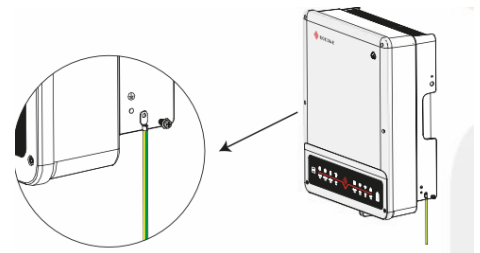
Grasp the inverter on both sides of the cooler and place the inverter on the wall bracket. (picture 5).

NOTE: Make sure the inverter is properly seated on the wall bracket.



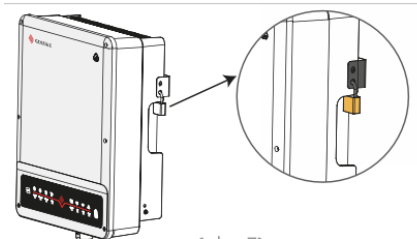
Step 3

Attach the grounding wire to the grounding point of the inverter.



Step 4

The inverter can be locked. (the lock is not part of the package).



2.4 WIRING

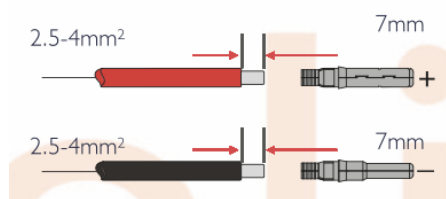
2.4.1 PV CONNECTION

Before connecting the PV panels/strings to the changer, check the following points:

- The total shortcircuit current of the panels is no higher than the max input DC of the inverter. (for GW8KL-ET and GW10KL-ET, the PV2 has two pairs of connectors, allowing two strings to be connected with a total short circuit current not exceeding 22A).
- The insulation resistance of the PV panels against the ground must be more than 33.33k, otherwise, there is a risk of electric shock.
- The PV string should not be attached to the ground.
- **Use the attached connectors to connect the PV strings. (THE BAT connector is similar to the PV connector, check the connectors thoroughly before connecting)**

NOTE: Accessories include either MC4 or QC4.10 connectors or Amphenol, the detailed connection is shown below.

Step 1

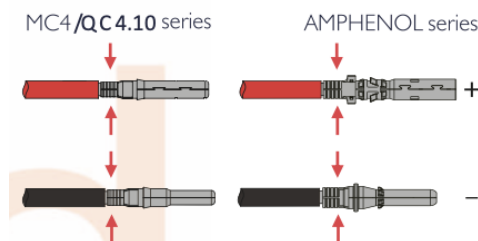


Note:

- Use the PV connectors included in the package
- Use a PV cable with a cross-section of 2.5-4 mm²

Step 2

Connect the PV cable with the PV connector



Note:

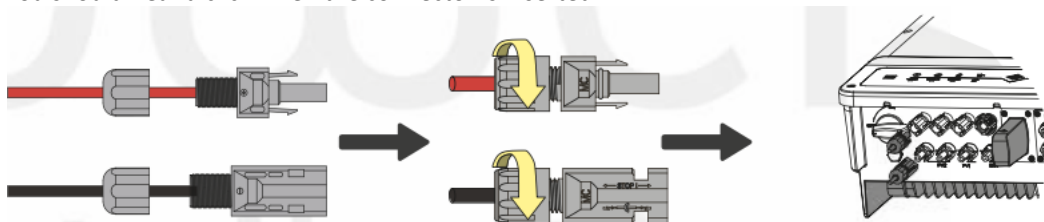
- The PV cable must be tightly pressed with the connector
- For the Amphenol connector, use a limiting clip, it must not be pressed. There must be a click when the connector is assembled

Step 3

Pull the cap onto the connector

Note:

- You should hear a click when the connector is inserted



The polarity of the PV input must not be reversed, otherwise, there is a risk of destroying the inverter [3] For GW8KL-ET and GW10KL-ET, if the PV array you connect to the PV2 input has a short-circuit current higher than 15A, divide the PV array into two strings and connect two pairs of connectors to the PV2 input.

2.4.2 BATTERY CONNECTION

- Take care not to cause electric shock or chemical hazards
- Plug in the DC circuit breaker ($\geq 40A$) between the battery and the inverter.

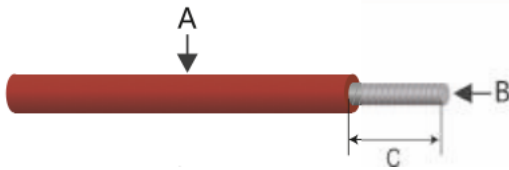
Make sure your batteries are switched off before connecting and the ET series is disconnected from the FV and AC sides[4].



Follow strictly the instructions below.

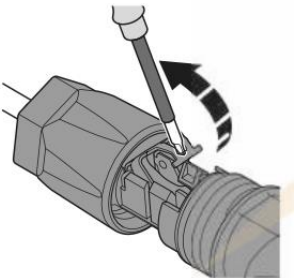
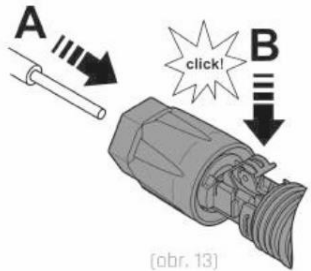
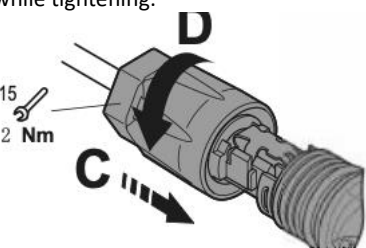
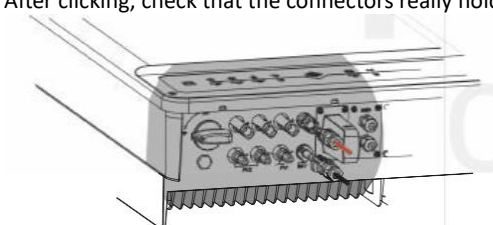
Using the wrong conductor can result in poor contact and high impedance, which is dangerous for the system.

- Use the correct BAT connector from the accessories.
- Use tinned cables with a 4 to 6 mm² (AWG 10) cross-section, as the maximum battery current is 25A. Adjust the cable to connect the battery according to the picture below



Marking	Description	Value
A	Outer diameter	5.5-8.0 mm
B	Conductor cross-section	4-6 mm ²
C	Stripped wire length	15 mm

Connect the battery according to the following steps:

<p>Step 1 Using a screwdriver, open the clip</p> 	<p>Step 2 Carefully insert the stripped and twisted wire into the connector (A). The end of the wire must be visible under the clip. Snap the clip. Make sure the clip holds the cable (B).</p>  <p>(obr. 13)</p>
<p>Step 3 Insert the insert into the connector (C). Tighten the cap with 2 Nm (D). Use a suitable and calibrated size 15 torque wrench and hold the connector open with a size 16 wrench while tightening.</p> 	<p>Step 4 A click should be heard when the connector is inserted. After clicking, check that the connectors really hold.</p> 

* To install compatible lithium batteries (Pylon/BYD), read the ET QUICK INSTALLATION MANUAL.

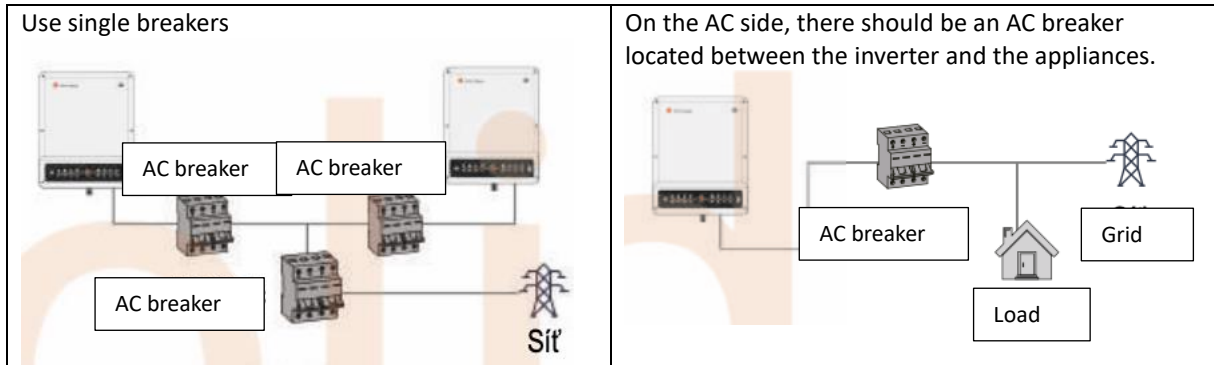
2.4.3 ON-GRID AND BACK-UP CONNECTION

Install a separate AC breaker ($\geq 32A$) for the inverter, which is required to protect the On-Grid input of the inverter. Recommended circuit breakers are shown below:

Inverter model	AC breaker specification
GW5KL/6KL-ET	24A/400V (e.g. DZ47-60 C25)
GW8KL/10KL-ET	32A/400V (e.g. DZ47-60 C32)
GW5K-ET	25A/400V (e.g. DZ47-60 C25)
GW8K/10K-ET	32A/400V (e.g. DZ47-60 C32)

Note:

The absence of an AC breaker on the Back-Up output can cause the inverter to be destroyed in the event of a short circuit.

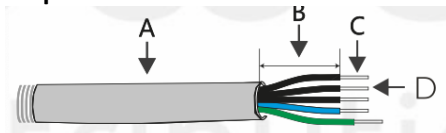


Before connecting, make sure that the inverter and cables are disconnected from the DC and AC side [5].

NOTE:

1. The neutral wire must be blue, the phase black or brown, and the protective wire green-yellow.
2. For AC cable, PE wire must be longer than L and N wire. This is to maintain protection in the event of a cable being pulled out.

Step 1



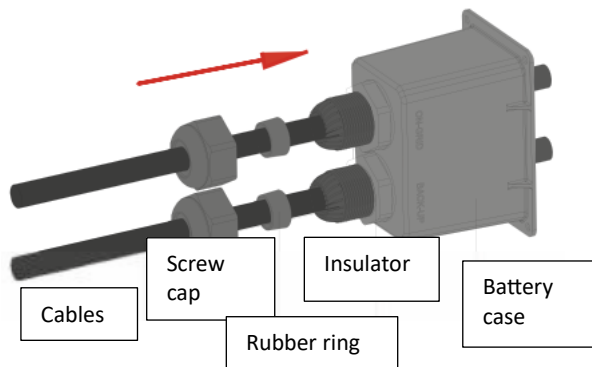
Prepare the cable according to the picture

Marking	Description	Value
A	Outer diameter	13-18 mm
B	Length of the insulated wire	20-25 mm
C	Length of the stripped wire	7-9 mm
D	Conductor cross-section	4-6 mm ²

Step 2

Pass the AC cable through the terminal block cover in the order shown in the picture

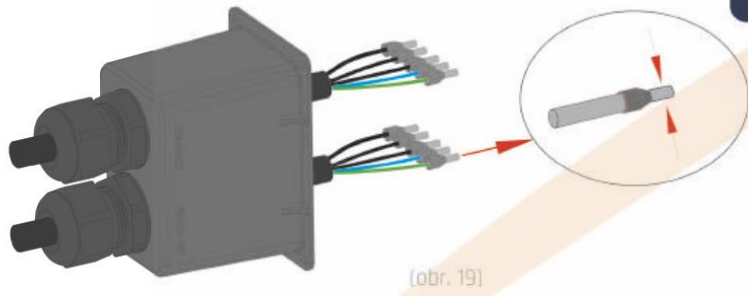
Note: Use only the original cover from the GoodWe brand



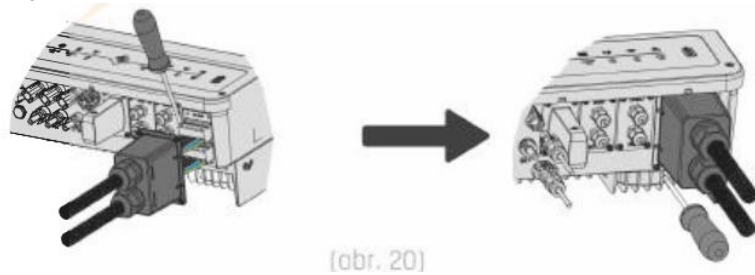
Step 3

Firmly crimp the 10 pin terminals on the ends of the cables

Note: Make sure there is no crimped insulation in the pin terminals



Step 4



Tightening torque 2.0-2.5N .m

Connecting the AC cable to the terminal block with a tightening torque of 2.0-2.5N.m

Note: Connect the Backup terminal block first

Make sure you have everything wired up correctly

Screw the cover (see the picture above)

Special settings

The inverter has adjustable functions such as shutdown point, shutdown time, reconnection time, active and invalid QU/PU curves, etc. These features can be set up using special software. Contact the GoodWe retailer if you want to set up these functions.

Back-up output

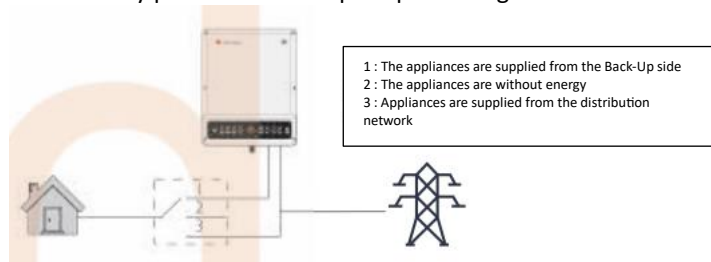
The hybrid ET series inverter can handle backup output congestion for a certain amount of time. For more details, see the technical parameters of the inverter (Chapter 4.3) The inverter also has protection against exceeding its maximum temperature

Allowed appliances connected to the Back-Up output:

- Inductive appliances: 1.5P climate control without frequency changer. Connecting two or more of these air-conditioning units can cause back-up output instability.
- Capacitive appliances: Total power $\leq 0.6 \times$ rated power of the model.
- Note: Do not connect a 3-phase inductive load (engine) without zero conductor (no appliances allowed that have a high shock current at startup)
- To plug in complex devices, consult GoodWe technical support.

Note:

For convenient maintenance, install a 3-phase switch on the Backup outlet and mains. By switching, you can conveniently power the BackUp output during inverter maintenance (see the picture below)



Back-Up output overload protection:

The inverter restarts during overload and during repeated overloads the restart time after restart is extended and during repeated overloads, the inverter restart time can be extended up to one hour. To reset the overload follow these steps:

- Reduce the connected power that is on the Back-Up output
- In the PV Master app, in "Advanced Setting" click on "Reset Back-Up Overload History"



2.4.4 SMART METER AND CT

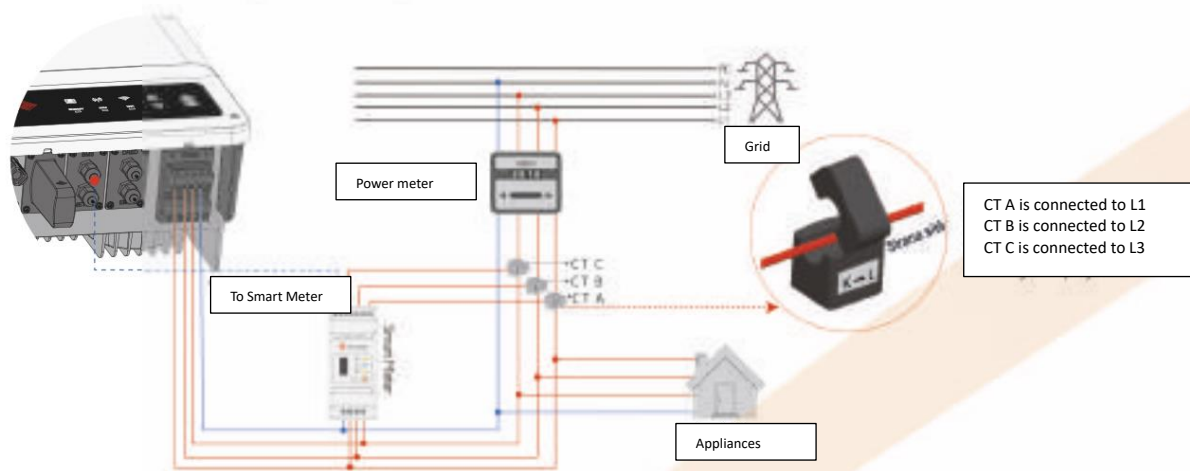
Make sure you have everything voltage-free before connecting the smart meter and CT [6]

The measuring module Smart Meter with CT is included in the package and must be connected to the ET inverter. The measuring module detects the direction and magnitude of power and current and controls the operation of the inverter via RS485 communication.

NOTE:

1. Smart Meter and CT are pre-set, do not change any settings on Smart Meter;
2. One Smart Meter and CT can only be used for one ET inverter;
3. Three CTs must be connected to one Smart Meter and must be connected to the same phase to which the Smart Meter is connected.

Smart Meter and CT connection



NOTE:

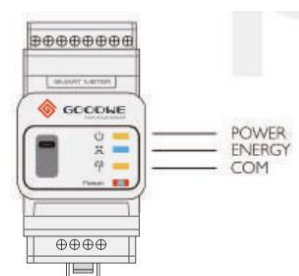
1. Use the Smart Meter and 3x CT that comes with the inverter;
2. CT cable is 3m long, and can be extended to max. 5m;
3. The communication cable for the Smart Meter (RJ45) is connected to the inverter ("To Smart Meter" cable), this cable can be extended to a maximum of 100m, and the data cable and RJ45 plug must be used as shown below:



PIN	Color	BMS function	Smart Meter function	RS485
1	Orange-white	485_A2	NC	485_A
2	Orange	NC	NC	485_B
3	Green-white	485_B2	485_B1	485_A
4	Blue	CAN_H	NC	NC
5	Blue-white	CAN_L	NC	NC
6	Green	NC	485_A1	485_B
7	Brown-white	NC	485_B1	NC
8	Brown	NC	485_A1	NC

LED indication of the Smart Meter

	Does not shine	Shines	Flickers
Power	Turned off	Turned on	/
Energy	/	Takes	Gives
COM	Flickers when there's communication going on		



2.5 DRED AND FAULT IN THE GROUND CONNECTION

2.5.1 DRED CONNECTION

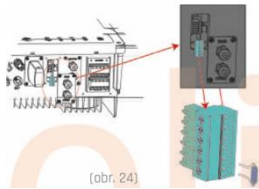
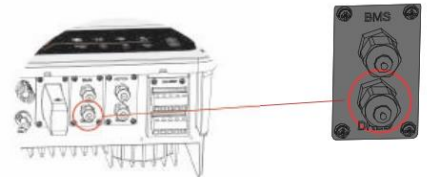
The DRED connection is only used in Australia and New Zealand. DRED equipment is not provided by GoodWe. GoodWe series ET changers comply with IEC 62109-213.9. The fault indicator ("FAULT") is located on the changer's taskbar and lights up in red in the event of a malfunction. The changer then sends the customer information about the malfunction.

The wiring diagram for the DRED device is shown below:

Step 1

Unscrew the cover from the inverter (see the picture).

Note: The DRED device should be connected via the "DRED port" as shown in the picture.



Step 2

1. Disconnect the 6-pin connector and disconnect the resistor from it (Fig. 24). CT C is connected to L3
2. Pull out the resistor and proceed according to the next step. Note: The 6-pin resistor connector has its function in the inverter if you do not have any DRED devices connected. Please leave this connector plugged into the inverter.

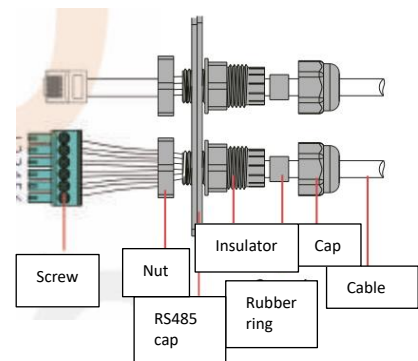
Step 3

1. Push the DRED cable through the cap, see the picture.

2. Connect the DRED cable to the 6-pin connector.

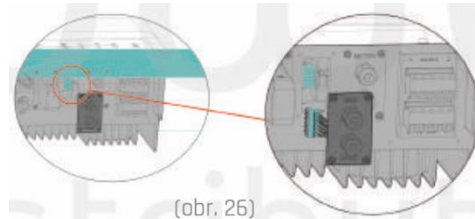
The function of each pin is shown below:

PIN	1	2	3	4	5	6
Function	DRM1/5	DRM2/6	DRM3/7	DRM4/8	REFGEN	COM/DRMO



Step 4

Connect the connector to the inverter



2.5.2 GROUND CONNECTION INDICATION

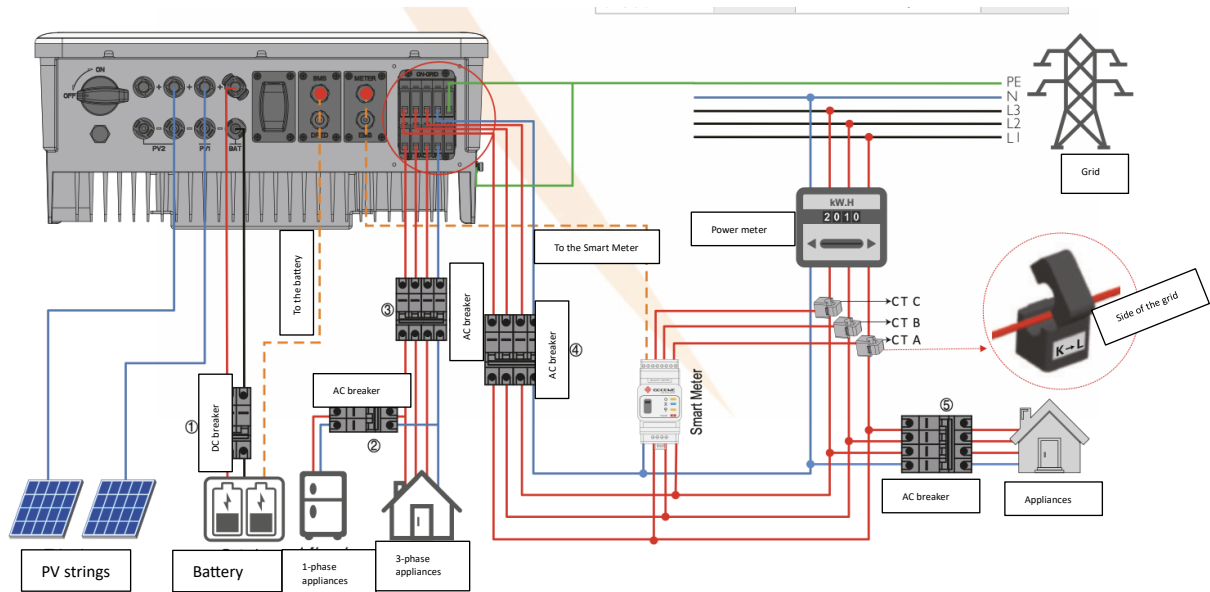
The GoodWe ET series inverters comply with the IEC 62109-213.9 standard. The fault indicator ("FAULT") is located on the main panel of the inverter and lights up red in the event of a fault. After that, the inverter sends information about the fault to the customer.

Connection diagram of the hybrid ET series inverter

Note: The scheme does not portray a general connection to the ET series inverter according to the standards.

Choose a circuit breaker according to the specifications

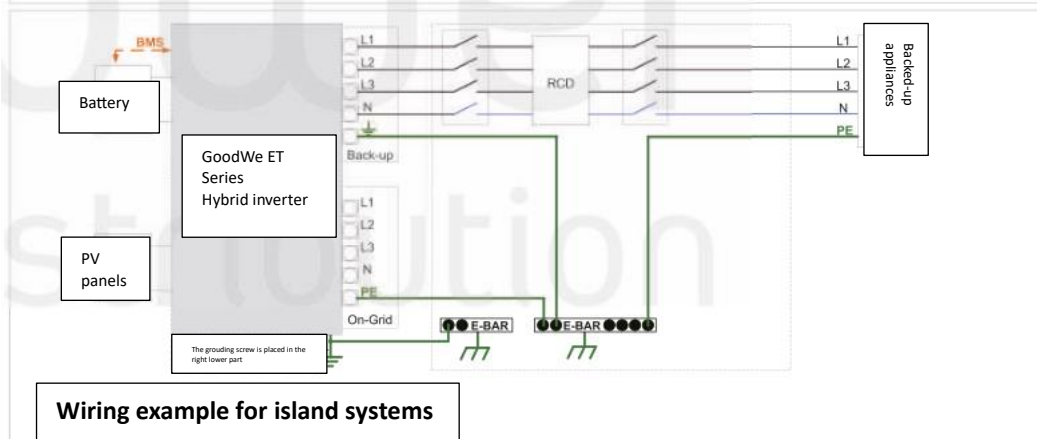
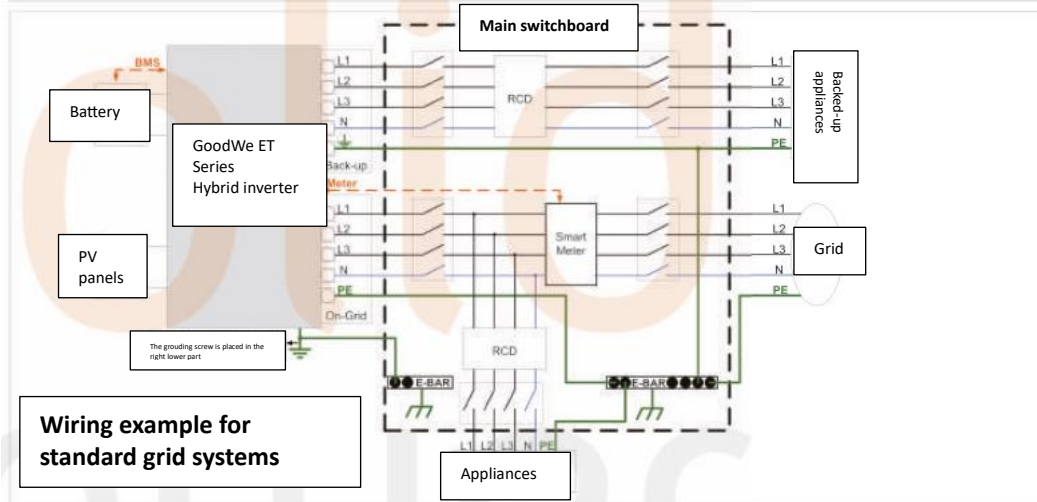
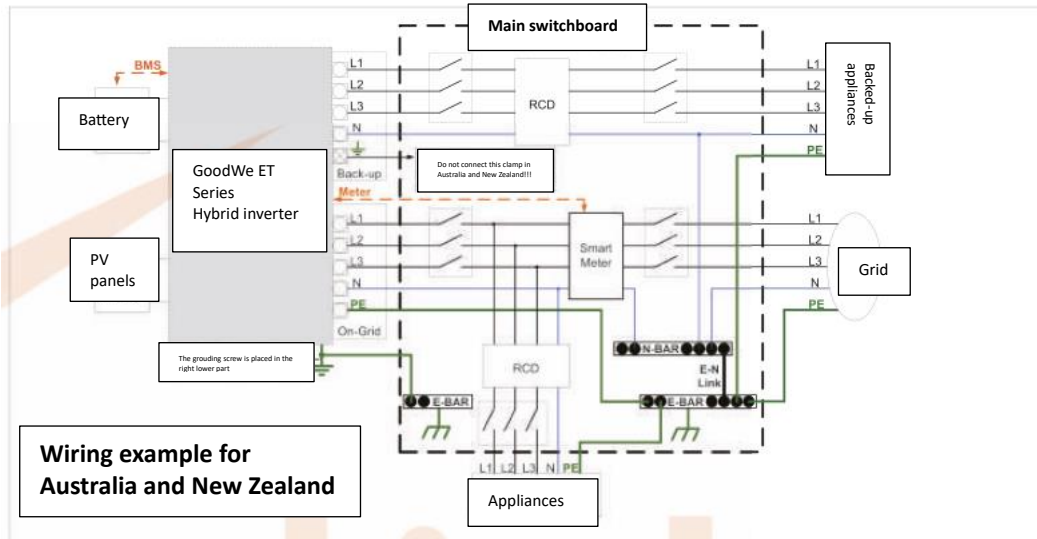
	1	2	3	4	5
GW5KL/6KL-ET	40A/600V DC breaker	25A/400V AC breaker		Depending on the household consumption	
GW8KL/10KL-ET		32A/400V AC breaker			
GW5K-ET		25A/400V AC breaker			
GW8K/10K-ET		32A/400V AC breaker			



1. For batteries with their circuit breaker, there is no need to install an external circuit breaker.
2. Connect CT A to L1, CT B to L2, CT C to L3. and observe the directions CT „House (K)- Grid (L)". Otherwise, the device will not work properly.

Wiring scheme

NOTE: According to the Australian Safety Standard, the neutral wire from the mains side and the backup side must be connected, otherwise the Backup function will not work



3. CONNECTION

3.1 WI-FI CONFIGURATION

This part shows the configuration using a web page.

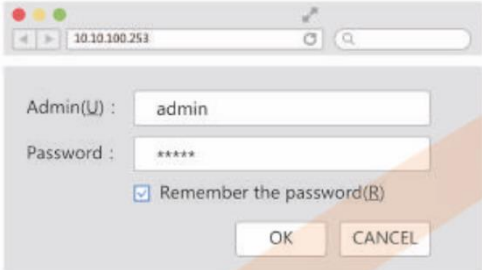
Wi-Fi configuration is necessary for online monitoring and maintenance.

Preparation:

1. We switch the inverter on only to PV.
2. A router with internet access to the website www.semsportal.com is required.

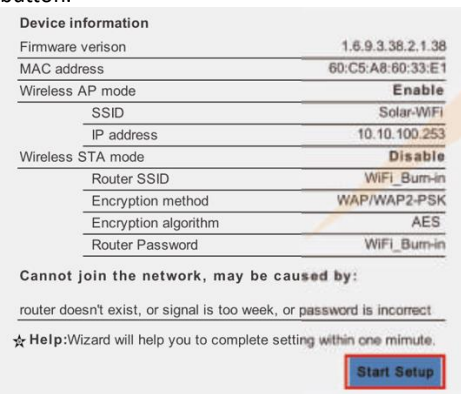
Step 1

1. Connect to Solar-Wi-Fi* via your PC or smart phone (* its name is the last 8 characters of the inverter's serial number);
2. Open your browser and login to 10.10.100.253 or 10.10.100.254"
Admin (U): admin | Password: admin
3. Then click on the "OK" button.



Step 2

1. Click on the "Start Setup" button to select the router (home WiFi). Then click the "Next" button.



Device information				
Firmware version	1.6.9.3.38.2.1.38			
MAC address	60:C5:A8:60:33:E1			
Wireless AP mode	Enable			
SSID	Solar-WiFi			
IP address	10.10.100.253			
Wireless STA mode	Disable			
Router SSID	WiFi_Bum-in			
Encryption method	WAP/WAP2-PSK			
Encryption algorithm	AES			
Router Password	WiFi_Bum-in			

Cannot join the network, may be caused by:
router doesn't exist, or signal is too weak, or password is incorrect

☆ Help: Wizard will help you to complete setting within one minute.

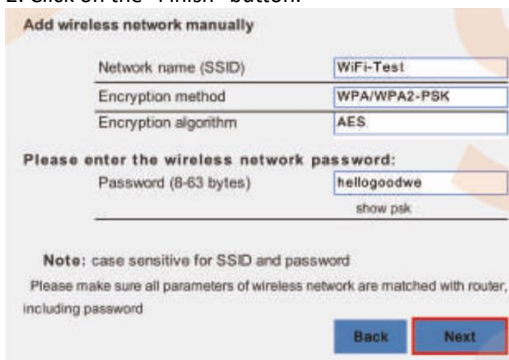
Please select your current wireless network:

SSID	Sec mode	Enc type	Channel	RSSI
WIFI Test	WAP2-PSK	AES	6	54%

★ Note: When RSSI of the selected WiFi Network is lower than 10%, the connection may be unstable, please select other available network or shorten the distance between the device and the router.
If your wireless router does not broadcast SSID, please click "Next" and add a wireless network manually.

Step 3

1. Fill in the router password and click "Next".
2. Click on the "Finish" button.



Add wireless network manually

Network name (SSID): WiFi-Test

Encryption method: WPA/WPA2-PSK

Encryption algorithm: AES

Please enter the wireless network password:
Password (8-63 bytes): helloworldwe

Note: case sensitive for SSID and password
Please make sure all parameters of wireless network are matched with router, including password

Back Next

Save success!

Click 'Complete', the current configuration will take effect after restart.

If you still need to configure the other pages of information, please go to complete your required configuration.

Configuration is completed, you can log on the Management page to restart device by Click on 'OK' button.

Confirm to complete?

Back Complete

NOTE:

1. Please make sure the password and encryption method/algorithm are the same as those of the router.
2. If everything goes well, the Wi-Fi LED on the inverter will change from a double blink to 4 blinks and then to a solid status, which means that the Wi-Fi has successfully connected to the server.
3. Wi-Fi configuration can also be done on the PV Master App. For details, please check the PV Master App.

Wi-Fi Reset and Reload

A Wi-Fi reset means restarting the Wi-Fi module without losing the saved settings.

A Wi-Fi Reload means setting the Wi-Fi module to the default factory settings.



Wi-Fi Reset

Quickly press the reset button. The Wi-Fi LED will blink for a few seconds.

Wi-Fi Reload

Perform a long press of the reset button (longer than 3 seconds). The Wi-Fi LED will double-flicker until the Wi-Fi is configured again.

Note: The Wi-Fi reset and reload functions are used only when:

1. Wi-Fi loses connection to the internet or cannot connect successfully to the PV Master app.
2. Cannot find the "Solar-Wi-Fi signal" or there are other Wi-Fi configuration problems.
3. Please do not use these buttons if Wi-Fi monitoring is working correctly.

3.2 PV MASTER APP

PV Master is an external monitoring/configuration app for hybrid inverters and is used on smartphones or tablets for both Android and iOS operating systems. The main functions are described below:

1. Edit the system configuration to make the system function as the customer requires.
2. Monitor and check the performance of the hybrid system.
3. Wi-Fi configuration.

Please download the PV Master OPERATION INSTRUCTIONS from www.goodwe.com



3.3 CEI FUNCTION AND AUTO-TEST

The PV auto-test function of CEI is integrated into the PV Master App to satisfy Italian safety requirements. For detailed instructions regarding this function, please refer to "PV Master Operation Instructions".

4. OTHER

4.1 Error messages and troubleshooting

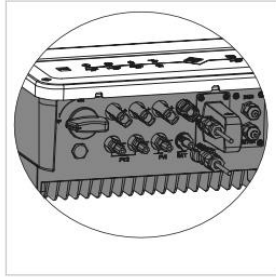
The error messages shown below will be displayed on the PV Master app or reported by e-mail if an error occurs.

ERROR MESSAGE	EXPLANATION	REASON	SOLUTIONS
Utility Phase Failure	On-Grid Phase Shift Error	The inverter has detected that the phase angles of L2 and L3 are reversed	The L2 and L3 cables are connected in reverse order.
Utility lose	The distribution network is not available (loss of power or network connection failed).	The inverter cannot detect a connection to the grid	1. Check (use a multimeter) to see if the AC side has any voltage present. Make sure that grid power is available. 2. Make sure that the AC cables are connected tightly. 3. If all appears to be working well, please turn off the AC breaker and turn it on again in 5 mins.
VAC Failure	The mains voltage is not within the permissible range.	The inverter has detected that the AC voltage is beyond the normal range required for safety in the country of use.	1. Make sure the safety country of the inverter is set correctly. Check (use a multimeter) if the AC voltage (between L and N) is within the normal range (also on the AC breaker side) a. If the AC voltage is high, make sure that the AC cable complies with the requirements stated in the User Manual and that the AC cable is not too long. b. If the voltage is low, make sure the AC cable is connected well and that the jacket of the AC cable is not compressed into the AC terminal. 3. Make sure that the grid voltage in your area is stable and is within the normal range.
FAC Failure	The network frequency is not within the permissible range.	The inverter has detected that the grid frequency is beyond the normal range required for safety in the country	1. Make sure the safety country of the inverter is set correctly. 2. If the safety country setting is correct, please check the inverter display to see if the AC frequency (Fac) is within the normal range. 3. If an FAC failure only occurs a few times and is resolved quickly, this condition could be caused by occasional grid-frequency instability.
PV/BAT Over Voltage	The total voltage of the PV string or battery is too high.	The total voltage (open-circuit voltage) of each PV string is higher than the maximum DC input voltage of the inverter or the battery voltage is higher than the maximum BAT input voltage of the inverter	Check the voltage of the VOC FV string to see if it is lower than the maximum input voltage of the inverter. If the VOC FV string is high, connect the panels so that the VOC voltage is the same, or less than the maximum DC input voltage of the inverter.
Over Temperature	The inverter temperature is too high.	The inverter's working environment has led to a high-temperature condition	1. Attempt to decrease the ambient temperature. 2. Make sure that the installation complies with the instructions in the inverter User Manual. 3. Attempt to shut down the inverter for 15 mins and then start it up again.
Isolation Failure	The insulation resistance of the PV string is too low.	An insulation fault can be caused by many reasons such as: The PV panels are not well grounded, the DC cable is broken, the PV panels are aging, the environment is too humid, etc.	Use a multimeter to check that the resistance between ground and the inverter case is zero. If not, connect the inverter to ground. High humidity can cause problems with insulation resistance. Check the insulation resistance between PV1+/PV2+/BAT +/BAT -/ PV- and ground, if the resistance is less than 33.33 kohm, check the connections in the system Restart the inverter and check if the fault still occurs, if not, it is single error.
Ground Failure	The leakage current is too high.	A ground failure can be due to multiple causes such as the neutral cable on the AC side is not connected well or the ambient humidity is relatively high, etc.	Check (use a multimeter) if there is a measurable voltage (it should normally be close to 0 V) between the earth and the inverter frame. If there is a measurable voltage, this means the neutral and ground cables are not connected well on the AC side. If this happens only in the early morning, at dawn, or on rainy days with higher humidity and recovers quickly, this may be a normal situation.
Relay Check Failure	Relay auto check failed	The neutral and ground cables are not connected well on the AC side or this may be an occasional failure	Check (use a multimeter) if there is high voltage (which should normally be less than 10 V) between the N and PE cables on the AC side. If the voltage is greater than 10 V, this means the neutral and ground cables are not connected well on the AC side or it may be necessary to restart the inverter.
DC Injection High	/	The inverter has detected a high DC component in the AC output	Try restarting the inverter, check if the error is still indicated, if not, it means it is only an occasional situation.
EEPROM R/W Failure	/	This is caused by a strong external magnetic field, etc.	Try restarting the inverter, check if the error is still indicated, if not, it means it is only an occasional situation.
SPI Failure	Internal communication error	This is caused by a strong external magnetic field, etc.	Try restarting the inverter, check if the error is still indicated, if not, it means it is only an occasional situation.
DC BusHigh	The bus voltage is too high	/	Try restarting the inverter, check if the error is still indicated, if not, it means it is only an occasional situation.
Back-Up Over Load	The back-up output is overloaded	The total backup load power is greater than the nominal backup output power	Decrease the backup loads to make sure the total load power is lower than nominal backup output power

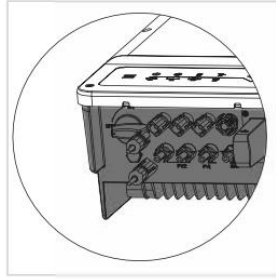
Troubleshooting

Check Before Turning On AC Power

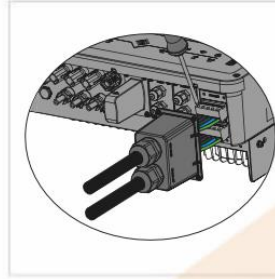
- Battery connection: Check the connection between the ET inverter and the battery: the polarity (+ / -) must not be reversed, see picture 28.
- PV input connection: Check the connection between the ET inverter and the photovoltaic panels: the polarity (+ / -) must not be reversed, see picture 29.
- On-Grid and Back-Up Connection: Check the "On-Grid" connection to the distribution network and the Back-Up connection of the outlet: check (L1/L2/L3 / N) that they are not overlapped, see picture 30
- Connecting the Smart Meter and the CT: Make sure the CT is connected in the correct direction between the house and the grid (House-Grid) (picture 31).



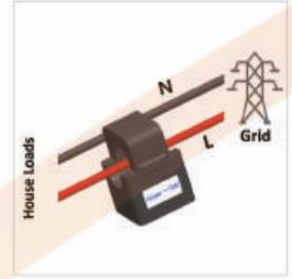
Picture 28



Picture 29



Picture 30



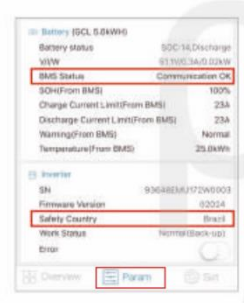
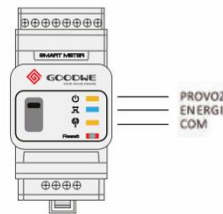
Picture 31

Check after starting the inverter and connecting to the distribution network

Battery settings, BMS communication, and country settings: After connecting to Solar-WiFi * (*last 8 characters of the inverter serial number), check that the correct battery type and country settings are set in the PV Master - Param application (Fig. 33). If it is not correct, please set it in "Basic Setting".

NOTE:

For lithium batteries, check the BMS status "Communication OK" if the BMS Status is "NG" or "NA", check that the batteries are correctly connected and set according to the quick installation guide.



Problems during operation

The inverter does not start up with a battery only

Solution:

1. Make sure that the battery voltage is greater than 180V, otherwise, the inverter cannot be turned on.

The inverter did not start up with PV only

Solution:

1. Make sure the PV voltage is greater than 180 (230 V is needed to enter on-grid mode).
2. Make sure that, for the connection between the inverter and PV panels, the polarities are (+/-) not reversed.

At night or during the day, with low PV power, there is no battery discharge

Solution:

1. Communication between the inverter and the Smart Meter shall be OK;
2. Make sure the power consumption is higher than 150W.
 - (a) the battery is not running smoothly, even if the power consumption is more than 150W;
 - (b) if the battery is still running low, even if the power consumption is more than 150W, please check that the Smart Meter and CT are properly connected;
3. Make sure the SOC is higher than the 1-DOD. Or if the battery is dead below 1-DOD, then the battery will start to run out again if the SOC is at $20\% + (1-DOD) / 2$ or SOC $105\% - DOD$ (if you need to drain the battery immediately, you need to restart it).
4. Check the app to see if the charging time is set, as the battery will not drain during the set charging time (the set charging will be taken as a priority during the same charging/discharging time).

The battery does not charge even if there is enough PV power

Solution:

1. Make sure the discharge time is not set.
2. Check that the battery is not fully charged or that the battery voltage has not reached the 'charge voltage'.

High variation in battery charging and discharging current

Solution:

1. Check that the performance in the house does not fluctuate.
2. Check that the PV performance does not fluctuate.

The battery is not charging

Solution:

1. Make sure the BMS communication is in order in the PV Master application;
2. Check that the CT is connected in the correct position and direction as indicated in the user manual;
3. Check that the total consumption is not much higher than the PV output.

Q&A

Wi-Fi setting

Q: Why can't I find the Solar-Wi-Fi signal on mobile devices?

A: Normally the Solar-Wi-Fi signal can be seen immediately after the inverter has powered up. However, the Solar-Wi-Fi signal will disappear when the ET connects to the internet. If changes to the settings are required to connect to the router for changes. If you cannot find the Wi-Fi signal or connect to the router, please try to reload the Wi-Fi.

Q: Why can't I connect to the Solar-Wi-Fi signal on my phone?

A: The Wi-Fi module can only connect to one device at a time. If the signal is already connected to another device at the same time, you will not be able to connect to the signal.

Battery

Q: Why does the battery not discharge when the grid is not available but it discharges normally when the grid is available?

A: On the APP, the off-grid output and backup function should be turned on to force the battery to discharge under off-grid mode.

Q: Why is there no output on the backup output?

A: For backup supply, "Backup Supply" on the PV Master App must be turned on. In off-grid mode or when the grid power is disconnected, the "Off-Grid Output Switch" function must be turned on as well.

Note: When turning the "Off-Grid Output Switch" on, do not restart the inverter or battery. Otherwise, the function will be switched off automatically.

Q: Why does the battery SOC suddenly jump to 95% on the Portal?

A: This normally happens when BMS communications fail when using lithium batteries. If the batteries enter float charge mode, the SOC is automatically reset to 95%.

Q: The battery cannot be fully charged to 100%?

A: The battery will stop charging when the battery voltage reaches the charge voltage set in the PV Master App.

Q: Why does the battery switch always trip when it starts up (lithium battery)?

A: The switch of the lithium battery trips because of the following reasons:

1. BMS communication fails.
2. The battery SOC is too low and the battery trips to protect itself.
3. An electrical short-circuit has occurred on the battery connection side.

Q: Which battery should I use for the ET?

A: For the ET series inverter, you can connect to lithium batteries that have compatibility with ET-series inverters with nominal voltages from 180 V to 600 V. For compatible lithium batteries, please refer to the battery list in the PV Master App.

Setting and monitoring in the PV Master app

Q: Why can't I save settings on the PV Master App?

A: This could be caused by losing the connection to Solar-Wi-Fi.

1. Make sure you have already connected to Solar-Wi-Fi (make sure that no other devices are connected) or to the router (if Solar-Wi-Fi is connected to the router). The APP homepage shows the connections.
2. Make sure you restart the inverter 10 minutes after you have changed any settings because the inverter will save the settings every 10 mins while operating in normal mode. We recommend 26 that parameter settings be changed when the inverter is in wait mode.

Q: Why are the data displayed on the homepage different from the param page, like charge/discharge, PV value, load value, or grid value?

A: Since the data on the home page and the Param page are refreshed with a different time delay, there may be a difference between the data. This also applies to the data in the app and on the GoodWe portal.

Q: In the app, some columns show NA, like battery SOH, etc. Why does that happen?

A: NA means that the App has not received data from the inverter or server because of communication problems, such as battery communications and the communications between the inverter and the app.

Smart Meter and Power Limit function

Q: How to activate the output power limit function?

A: For the ET system, this function can be activated by following these steps:

1. Make sure the Smart Meter connections and communications are functioning correctly.
2. Turn on the export power limit function and set the maximum output power to the grid on the APP.

Note: Even if the output power limit is set to 0W, there might still be a deviation of a maximum of 100 W when exporting to the grid.

Q: Why is there still power exporting to the grid after I have set the power limit to 0 W?

A: The export limit could theoretically be 0W but there will be a deviation of around 50–100 W.

Q: Can I use other meter brands to take over from the Smart Meter in the ET system or to change settings in Smart Meter?

A: No, because the communication protocol is integrated into the inverter and Smart Meter, other meter brands cannot communicate. Also, any change to the manual settings could cause a meter communication failure.

Q: What is the maximum current allowed to pass through the CT on the Smart Meter?

A: The maximum current for the CT is 120A.

Other questions

Q: Is there a quick way to make the system work?

A: For the shortest resolution, please refer to "ET Quick Installation Instructions" and to the "PV

Q: What kind of load can I use to connect to the backup side?

A: Please refer to the User Manual on page 12.

Q: Will the warranty of the inverter still be valid if, for some special conditions, we cannot follow 100% of the User Manual instructions for installation or operation?

A: Normally we still provide technical support for problems caused by not following the instructions in the User Manual. However, we cannot guarantee any replacements or returns. So, if there are any special conditions for which you cannot follow the instructions 100%, please contact the after-sales department for suggestions.

4.1 WARRANTY REFUSAL

Hybrid ET series inverters are transported, used, and operated following standards. The GoodWe company has the right not to provide warranty or technical support in the following cases:

- The inverter was damaged during transport.
- The inverter is out of warranty and the extended warranty is not purchased.
- The inverter is installed, repaired, or operated improperly without GoodWe's approval.
- The inverter is improperly installed or used in an inappropriate environment that is not following this document and has not been approved by GoodWe for operation in these conditions.
- Installation or setup of the inverter does not meet the requirements stated in this document.
- The inverter is installed or operated in non-compliance with the requirements or warnings in this document. The inverter is damaged by force majeure such as lightning, earthquake, fire, volcanic eruption, etc.
- The inverter has been opened, modified, or software and hardware updated without GoodWe's authorization.
- The inverter is installed, used, or operated in non-compliance with international or local regulations.
- An incompatible battery, solar panel, appliance, or other incompatible device connected to the inverter has been connected

[Note: GoodWe reserves the right to change any content in this user manual.](#)

Maintenance

The inverter requires periodic maintenance; the details are shown below:

WARNING: Make sure the inverter is completely disconnected from DC and AC power and wait at least 5 minutes before servicing.

Cooler: Clean the cooler once a year with a clean cloth.

Torque: Once a year, check the tightening of the AC side and battery connection screw using a torque wrench.

DC switch (optional): Regularly check the DC switch, turn on and off the DC switch 10 times in a row once a year, the contacts will be cleaned and the service life of the switch will be extended.

Waterproof covers: Once a year, check that the RS485 waterproof covers and other parts are well-fixed.

4.2 TECHNICAL PARAMETERS AND CERTIFICATES

Technical data	GW5KL-ET	GW6KL-ET	GW8KL-ET	GW10KL-ET	GW5K-ET	GW8K-ET	GW10K-ET
Battery							
Supported battery types	Li-Ion				Li-Ion		
Rated battery voltage (V)	180 ~ 600				180 ~ 600		
Max. charging current (A)	25				25		
Max. discharge current (A)	25				25		
Lithium Battery BMS Battery Charge Management System	Auto-adaptive with BMS				Auto-adaptive with BMS		
PV Input							
Max. DC input power (W)	6500	7800	9600	12000	6500	9600	13000
Max. DC input voltage (V)*	600				1000		
MPPT voltage range (V)	200 ~ 550				200 ~ 850		
Starting voltage (V)	180				180		
MPPT - Full Load Voltage Range (V)	240~550	285~550	260~550	320~550	240~850	380~850	460~
Rated DC input voltage (V)	480				620		
Max. input current (A)	12.5/12.5		12.5/22		12.5/12.5	12.5/12.5	12.5/12.5
Max. short circuit current (A)	15.2/15.2		15.2/27.6		15.2/15.2		
PV overcurrent protection (A)	29.2/29.2		29.2/46.7		29.2/29.2		
PV reverse current (A)	0				0		
Number of MPPTs	2				2		
Number of strings per MPPT	1/1		1/2		1/1		
AC output (On-Grid)							
Rated Output Apparent Power (VA)	5000	6000	8000	10000	5000	8000	10000
Max. output apparent power (VA)	5500	6600	8800	11000	5500	8800	11000
Max. apparent power from the grid (VA)	10000	12000	15000		10000	15000	
Rated output voltage (V)	400/380, 3L/N/PE				400/380, 3L/N/PE		
Rated output frequency (Hz)	50/60				50/60		
Max. output current (A)	8.5	10.5	13.5	16.5	8.5	13.5	16.5
Max. input current (A)	15.2	18.2	22.77	22.7	15.2	22.7	22.7
Output inrush current (peak/time)	220A/5us				220A/5us		
Max. output RMS overcurrent protection (A)	8.5	10.5	13.5	16.5	8.5	13.5	16.5
AC Reverse Current (Standby) (A)	0				0		
Output power factor	~ 1 (Adjustable from 0.8 inductive to 0.8 capacitive)						
Output THDi (Rated Output)	<3%				<3%		
AC output (Back-up)							
Max. output apparent power (VA)	5000	6000	8000	10000	5000	8000	1000
Max. Peak Apparent Output Power (VA)**	10000, 60 s	12000, 60 s	16000, 60 s	16500, 60 s	10000, 60 s	16000, 60 s	16500, 60 s
Max. output current (A)	8.5	10.5	13.5	16.5	8.5	13.5	16.5
Rated output voltage (V)	400/380				400/380		
Rated output frequency (Hz)	50/60				50/60		
Output inrush current (peak/time)	50A/2us				50A/2us		
Max. output RMS overcurrent protection (A)	15.2	18.2	24.2	25.0	15.2	18.2	25.0
Output THDv (ohmic load)	<3%				<3%		
Protection							
Island protection	Integrated (AFD)						
PV input reverse polarity protection	Integrated						
Insulation resistance detection	Integrated						
Leakage current protection	Integrated						
Output overcurrent protection	Integrated						
Output short circuit protection	Integrated						
Battery reverse polarity protection	Integrated						
Protection against output overvoltage	Integrated						
General data							
Operating temperature range (°C)	-35 ~ 60						
Relative humidity	0~95%						
Category of external influences	Outdoor and indoor						
External degree of pollution	Class 1, 2, 3						
Protection class	Class I						
Overvoltage category	DC II: ACIII						

Max. altitude for operation (m)	≤ 4000		
Cooling	Passive cooling		
Noise level (dB)	<30		
Control	LED and app		
Communication with the BMS	RS485; CAN		
Communication with the Smart Meter	RS485		
Communication with EMS	VRS485 (Isolated)		
Communication with the Portal	Wi-Fi		
Weight (kg)	24	25	24
Dimensions (Width*Height*Depth mm)	516*415*180		
Mounting	Wall holder		
Degree of protection	IP65		
Consumption in Stand-by mode (W) ****	<15		
Topology	Without a transformer		
Certificates and standards			
Grid regulation	AS/NZS 4777.2:2015	CEI 0-21; VDE4105-AR-N; VDE0126-1-1; EN50438; G83/2; G100	
Safety regulation	IEC62109-1&2, IEC62040-1	IEC62109-1&2, IEC62040-1	
EMC	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN61000A-4-16A, EN61000-4-18, EN61000-4-29		

* For 1000V system, max rated voltage is 950V

** According to local regulations

*** It will only reach if there is enough energy from PV and from the battery

**** without Back-Up output

ET SERIES INVERTER CERTIFICATES



G100 IEC62109-1 CEI 0-21
RD1699 VDE0126-1-1 VDE-AR-N 4105 NRS 097-2-1

MORE TESTS

For Australian requirements, in the THDi test, Zref must be added between the inverter and the mains.

RA, XA for phase conductor.

RN, XN for a neutral wire

Ref:

RA=0.24;XA=j0;15 at 50Hz;

RN=0.16;XN=j0.10 at 50Hz;

4.4 SUMMARY OF WARNINGS

- [1] The inverter cannot be installed near flammable and explosive substances or strong electromagnetic fields
- [2] Remember this inverter is heavy! Be careful when removing from packaging
- [3] You must not reverse the polarity of the PV string, otherwise, the inverter could be damaged
- [4] Before connecting the inverter, make sure the battery switch is off and the battery voltage rating meets the ET specification, before connecting the battery to the inverter, make sure the inverter is completely disconnected from the PV and AC power
- [5] Make sure the inverter is completely disconnected from DC or AC power before connecting the AC cable
- [6] Make sure the AC cable is completely disconnected from the AC power supply before connecting the Smart Meter and CT

DEFINITION OF PROTECTION CATEGORY

Definition of overvoltage category

CATEGORY I	For specially protected devices, which are low-current appliances
CATEGORY II	On outlets from sub-distributors, which is a device intended for connection to a fixed installation
CATEGORY III	Behind the main switchboard, which is a fixed installation device
CATEGORY IV	At the entrance to the building, when it is the beginning of the installation

Environment category definition

Humidity parameters	Degree		
	3K3	4K2	4K4H
Temperature range	0~+40°C	-33~+40°C	-20~+55°C
Humidity range	5%-85%	15%-100%	4%-100%

	Ambient temperature	Relative humidity	Applied to
Outdoor	-20~50°C	4%~100%	PD3
Indoor - non-air conditioned	-20~50°C	5%~95%	PD3
Indoor - air conditioned	0~40°C	5%~85%	PD2

Definition of degree of pollution

Degree of pollution I	No or only dry, non-conductive pollution. Pollution has no effect
Degree of pollution II	Usually only non-conductive contamination occurs. The occasional occurrence of temporary conductivity caused by condensation must also be taken into account
Degree of pollution III	There is the occurrence of conductive pollution or dry non-conductive pollution that turns conductive due to condensation
Degree of pollution IV	Permanent conductive pollution arising, for example, from the effect of conductive dust, rain and snow