

# GOODWE



## User Manual

AC-Coupled Inverter  
BTC Series

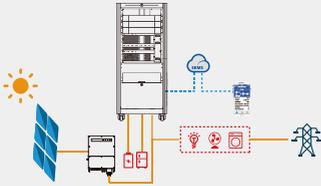
V1.0-2022-06-10

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GoodWe BTC series bidirectional inverter is designed for indoor use, which could be used with or without existing grid-tied inverter systems to store energy using batteries.

Energy produced from the grid-tied inverters will be used to optimize self-consumption, excess will be used to charge the battery, anymore could be exported to the grid. Loads will be supported in priority by grid-tied system, then battery power, if more power is needed, energy will be imported from the grid.

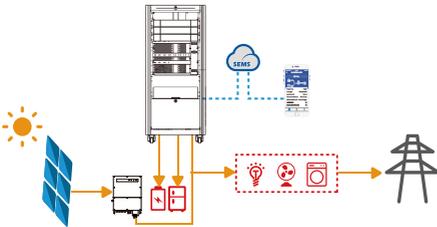


Note:

The introduction describes a general behavior of BTC system. The operation mode can be adjusted on depending on the system layout. Below are the general operation modes for BTC system:

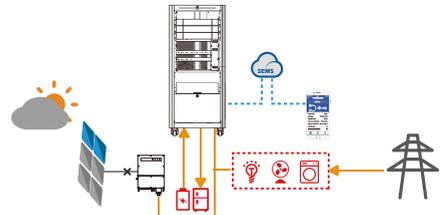
## 1.1 Operation Modes Introduction

BTC system normally has the following operation modes based on your configuration and layout conditions.



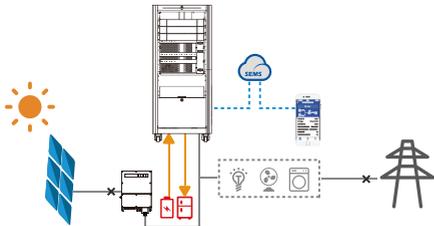
### Mode I

Energy from grid-tied inverters optimize loads, excess will be used to charge the battery, anymore will be exported to the grid.



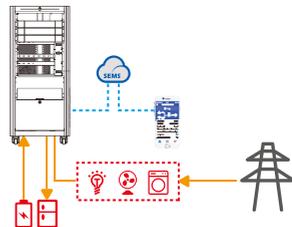
### Mode II

When energy from grid-tied inverters is weak, battery will discharge to support the load in priority together with the grid.



### Mode III

When grid power fails, battery will discharge to support back-up Loads.



### Mode IV

Battery could be charged by grid, and charge time/power could be set flexibly on PV Master APP.

## 1.2 Safety & Warning

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

### Symbols explanation



Caution!  
Failure to observe a warning indicated in this manual may result in injury.

---



Danger of high voltage and electric shock!

---



Danger of hot surface!

---



Components of the product can be recycled.

---



This side up! The package must always be transported, handled and stored in such a way as the arrows always point upwards.

---



Products should not be disposed as household waste.

---



Fragile - The package/product should be handled carefully and never be tipped over or slung.

---



Refer to the operating instructions.

---



Keep dry! The package/product must be protected from excessive humidity and must be stored under cover.

---



Signals danger due to electric shock and indicates the time to wait (5 minutes) before it is safe to touch the internal parts of the inverter after it has been disconnected from its power source.

---



CE Mark

---



Tick mark in Australia

---

## Safety warning

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

Prohibit inserting and pulling the AC and DC terminals when the inverter is running.

Before any wiring connection or electrical operation on inverter, all DC and AC power must be disconnected from inverter for at least 5 minutes to make sure inverter is totally isolated to avoid electric shock.

The temperature of inverter surface might exceed 60°C during operation, so please 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's cover or change any components without manufacturer's authorization, otherwise the warranty commitment for the inverter will be invalid.

Usage and operation of the inverter must follow instructions in this user manual, otherwise the protection design might be impaired and warranty commitment for the inverter will be invalid.

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

Battery negative(BAT-) on inveter side is not grounded as default design. Connecting BAT- to EARTH are strictly forbidden.

The inverter, with built-in RCMU, will exclude possibility of DC residual current to 6mA, thus in the system an external RCD (type A) can be used( $\geq 30\text{mA}$ ).

In Australia, the inverter internal switching does not maintain neutral integrity, which must be addressed by external connection arrangements like in the Off-Grid System Connection Diagram in page 7.

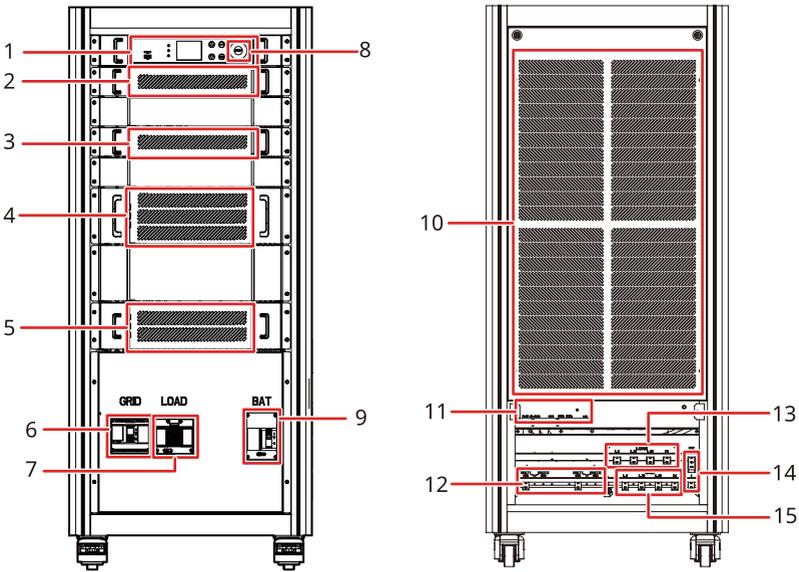
In Australia, output of back-up side in switchbox should be labeled "Main Switch UPS Supply", the output of normal load side in switch box should be labeled "Main Switch Inverter Supply".

The product is not suitable for household use.

### 1.3 Product Overview

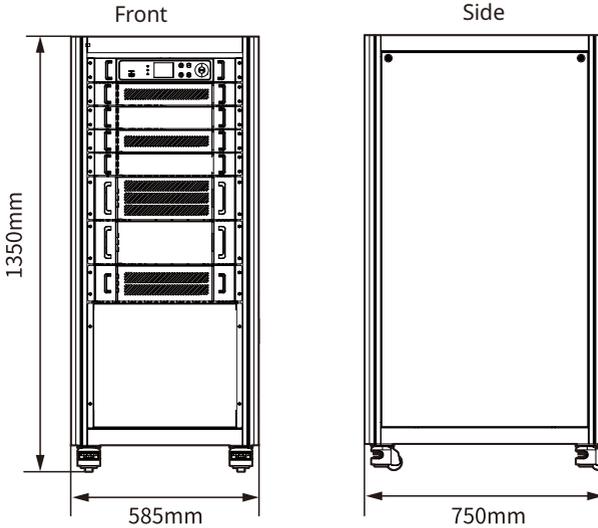
The BTC series inverter is a battery energy storage inverter that can be used for grid-connected, emergency power supply, hybrid power supply and other distributed power generation systems. This document focuses on the product model: GW50K-BTC

<b>GW50K-BTC</b>	Model
<b>GW</b>	Brand name
<b>50K</b>	Power rating
<b>BT</b>	Three-phase AC Coupled Energy Storage Unit
<b>C</b>	Cabinet Style Product



- |  |   |
|--|---|
| 1. Monitoring Unit (EMS1000)                 | 2. MPPT Module (GW50K-PVM)                    |
| 3. DC Conversion Module (GW50K-DCM)          | 4. Power Conversion System Module (GW50K-BTM) |
| 5. ON/OFF Grid Switching Module (GW100K-ST5) | 6. AC Output Circuit Breaker (GRID)           |
| 7. Load Circuit Breaker (LOAD)               | 8. Emergency Stop Button                      |
| 9. Battery Circuit Breaker (BAT)             | 10. Heat Dissipation Hole                     |
| 11. Communication Cable Port                 | 12. Battery DC Terminal (BAT)                 |
| 13. Load Terminal (LOAD)                     | 14. PE Terminal                               |
| 15. AC Output Terminal (GRID)                |   |

## Dimension Requirements



## 02

## INSTALLATION INSTRUCTIONS

### 2.1 Select Mounting Location

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

Any part of this system shouldn't block the switch and breaker from disconnecting the inverter from DC and AC power.

**Rule 1.** Inverter should be installed on a solid surface, where is suitable for inverter's dimensions and weight.

**Rule 2.** Inverter should be installed on flat floor.

**Rule 3.** Ambient temperature should be lower than 45°C. (High ambient temperature will cause power derating of inverter.)

**Rule 4.** The inverter should be installed indoors.

**Rule 5.** Bearing capacity of the floor must be higher than 125kg

**Rule 6.** Inverter should be installed at eye level for convenient maintenance.

**Rule 7.** Product label on inverter should be clearly visible after installation.

**Rule 8.** Leave enough space around the inverter according to the below figure.

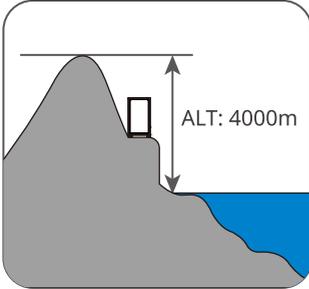
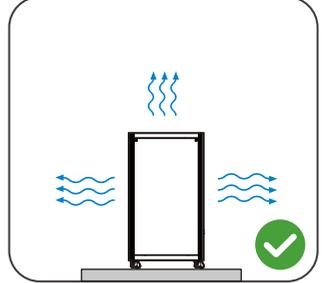
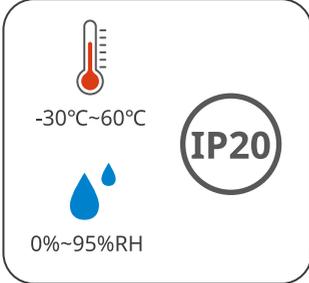
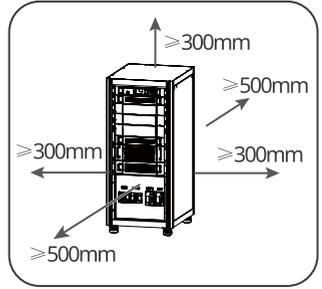
**Rule 9.** Suitable for mounting on concrete or other non-combustible surfaces only



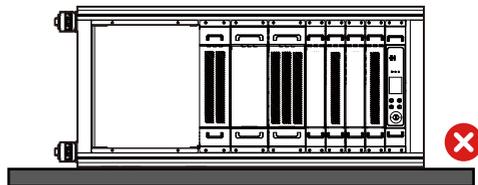
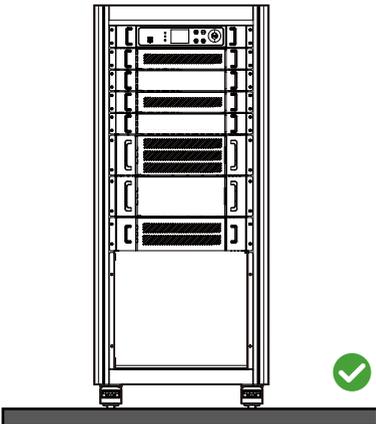
Move the inverter to the site before installation. Follow the instructions below to avoid personal injury or equipment damage.

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 when moving the equipment.

## Space Requirements



## Angle Requirements



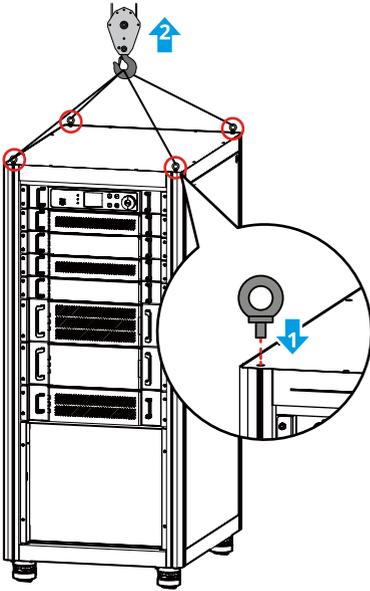
## 2.2 Mounting



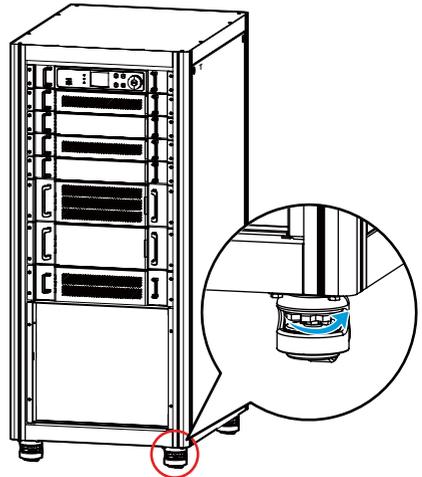
Inverter cannot be installed near flammable, explosive or strong electro-magnetic equipment.

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

**Cabinet Lifting**



**Fixed Cabinet**



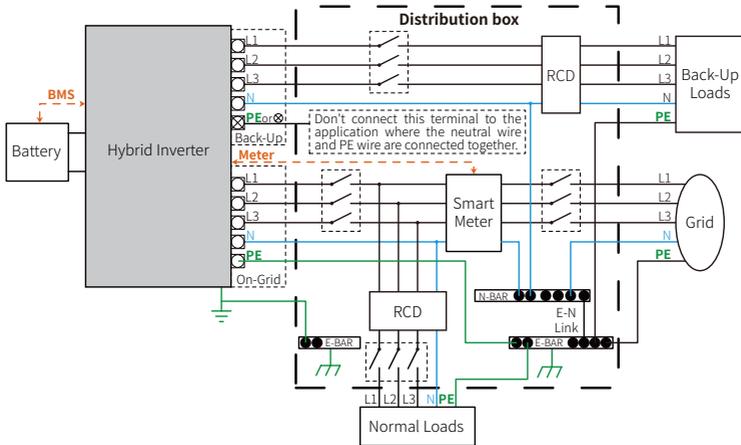
## 2.3 Electrical Wiring Connection

### 2.3.1 System connection diagrams

Note: According to Australian safety regulation, the neutral cable of on-grid side and back-up side must be connected together, otherwise back-up function will not work.

**This diagram is an example for application that Neutral connects together with PE in distribution box.**

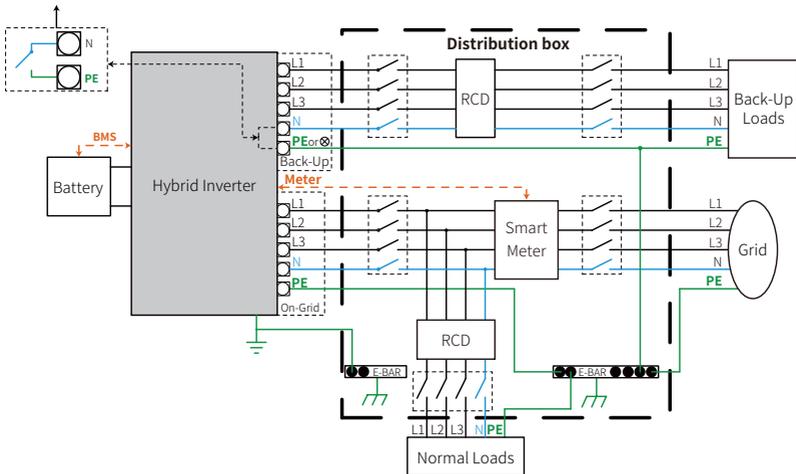
Such as: Australia, New Zealand, South Africa, etc. (Please follow local wiring regulations!)



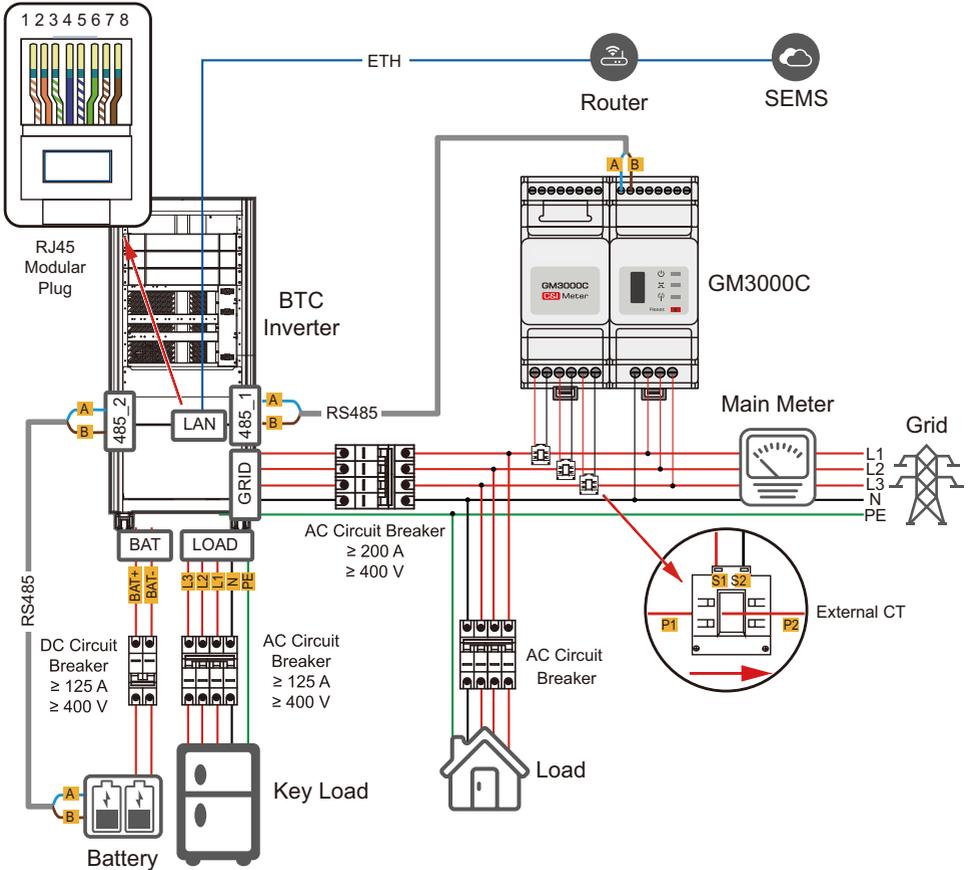
**This diagram is an example for application that Neutral separates with PE in distribution box.**

Such as: China, Germany, Czech Republic, Italy, etc. (Please follow local wiring regulations!)

When the inverter is working in back-up mode, neutral and PE on back-up side are connected together via the internal relay. And this internal relay will be open when the inverter is working in the grid-tied mode.



### 2.3.2 System Application

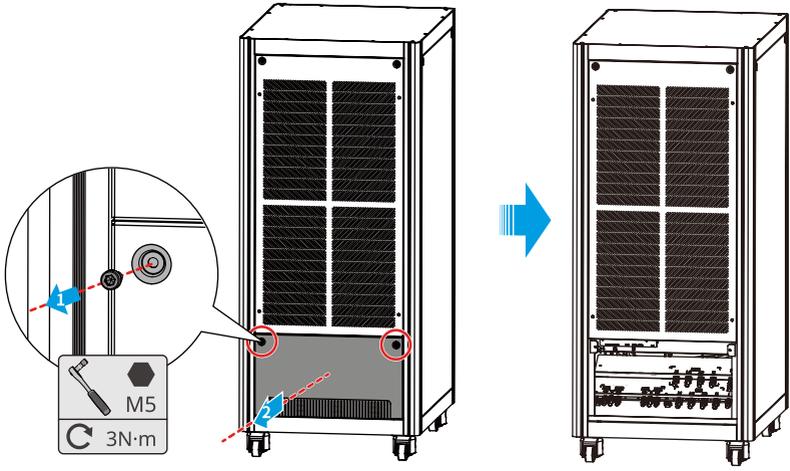


#### Cables

No.	Type	Specification
1	Protective Earth (PE)	Single-conductor outdoor copper wire (PE: M8 OT terminal) Cross-sectional area of conductor: 16 mm <sup>2</sup> - 25 mm <sup>2</sup>
2	AC output line (GRID)	Single or multiple-conductor outdoor copper wire (L1/L2/L3/N/PE: M8 OT terminal) Cross-sectional area of conductor (S): 35 mm <sup>2</sup> - 50 mm <sup>2</sup>
3	Load output line (LOAD)	Single or multiple-conductor outdoor copper wire (L1/L2/L3/N/PE: M8 OT terminal) Cross-sectional area of conductor: 25 mm <sup>2</sup> - 50 mm <sup>2</sup>
4	DC power line (BATTERY)	2 Single-conductor outdoor copper wires (BAT+/BAT-: M8 OT terminal) Cross-sectional area of conductor: 25 mm <sup>2</sup> - 50 mm <sup>2</sup>
5	RS485 communication line (RS485)	Outdoor shielded twisted pair Cross-sectional area of conductor: 0.25 mm <sup>2</sup> - 1 mm <sup>2</sup>

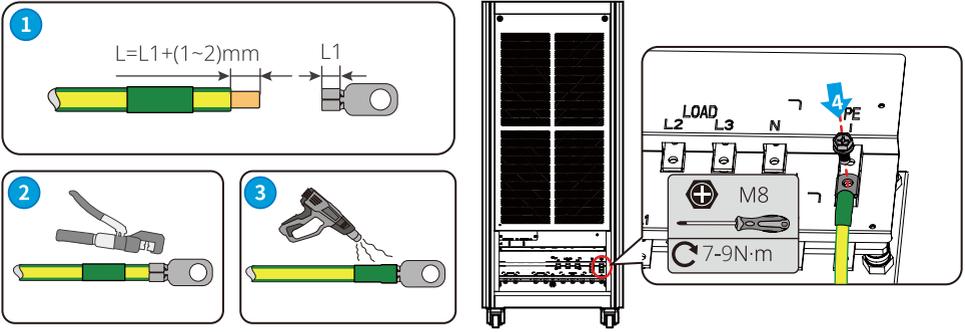
### 2.3.3 Electrical Wiring Connection

#### Opening the Wiring Chamber Door



- Before connecting AC, DC and communication cables, connect the ground terminals to the protective ground point to ensure reliable grounding of the inverter.
- Please be careful about any electric shock or chemical hazard.
- Before connecting AC, DC and communication cables, connect the ground terminals to the protective ground point to ensure reliable grounding of the inverter.
- For battery without build-in DC breaker, make sure there is an external DC breaker connected.
- Neutral cable shall be blue, line cable shall be black or brown (preferred) and protective earth cable shall be yellow-green.
- For AC cables, PE cable shall be longer than N&L cables, so in case that the AC cable slips or is taken out, the protecting earth conductor will be the last to take the strain.
- Make sure that the battery switch is off and battery nominal voltage meets the inverter's specification before connecting battery to inverter. Make sure inverter is totally isolated from AC power.
- Please follow the requirements and steps below strictly. Using improper wire may cause bad contact and high impedance, which is dangerous to the system.

## Protective Earth Wiring



## Connecting the AC Output Line, Load Output Line and DC Power Line

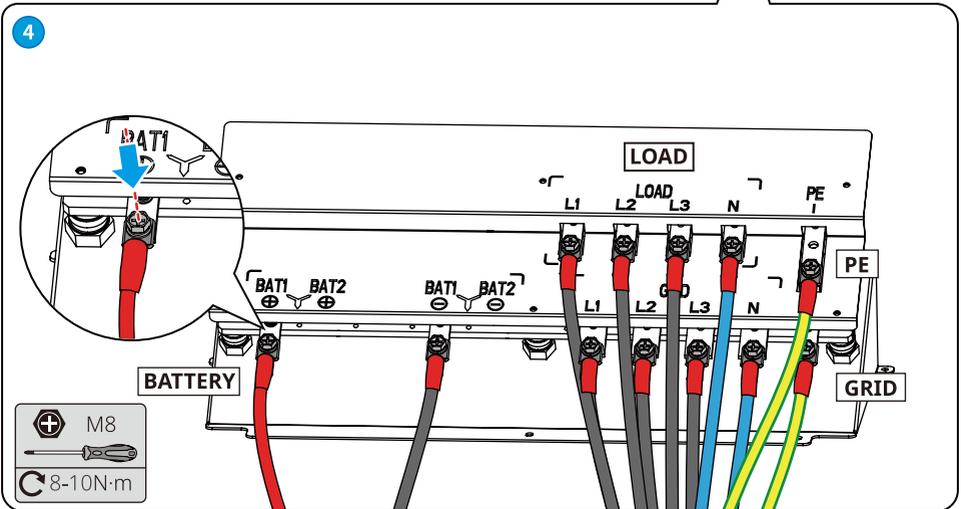
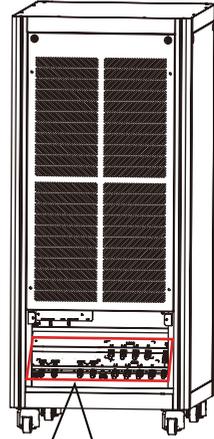
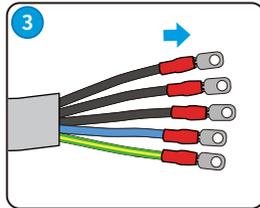
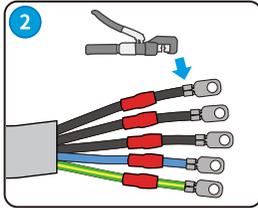
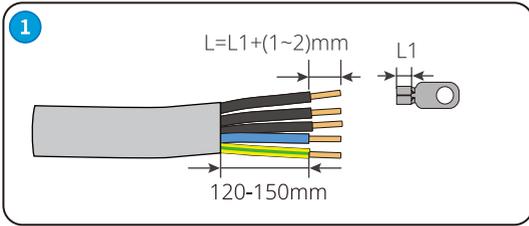
No.	Port	Description	Notes
1	GRID	Connects to the AC output line	L1/L2/L3/N/PE: M8 screws, Tightening torque: 7 - 9 N·M
2	LOAD	Connects to the load output line	
3	BATTERY	Connects to the DC power line	BAT+/BAT-: M8 screws, Tightening torque: 7 - 9 N·M



- Before starting an electrical connection, disconnect the circuit breaker between the DC and AC circuits and prevent them from reconnecting unexpectedly.
- Before connecting any cables, make sure that all cables are voltage-free.
- Before the battery and inverter are connected, make sure that the terminal impedance of both the positive and negative poles of the battery and the earth is greater than 1 MΩ.



- The wiring methods for the AC output line, load output line and DC power line are the same, and this document uses the AC output line connection as an example for illustration.
- Make sure that all the cable ports are connected correctly.

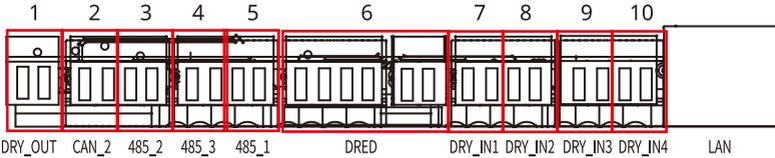


## Communication Line Connections



### NOTE

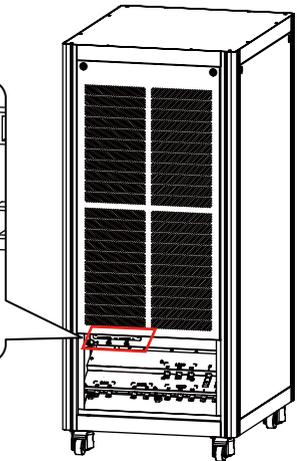
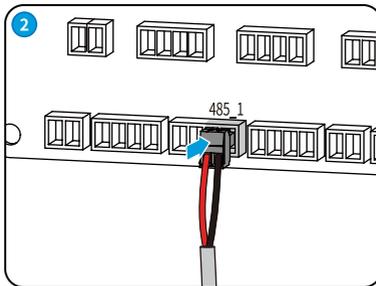
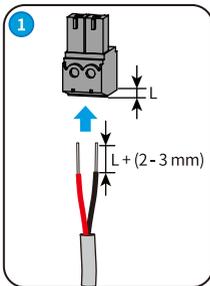
- The wiring methods for connecting communication lines through the terminal block are the same, and this document uses the RS485\_1 port connection as an example to illustrate the procedures.
- The DRY\_OUT, CAN\_2, RS485\_3, DRY\_IN1, DRY\_IN2, DRY\_IN3 and DRY\_IN4 ports are reserved.



No.	1	2	3	4	5
Definition	DRY_OUT	CAN_2	485_2	485_3	485_1
Function	Reserved	Reserved	BMS	Reserved	Meter

No.	6	7	8	9	10
Definition	DRED	DRY_IN1	DRY_IN2	DRY_IN3	DRY_IN4
Function	DRED	Reserved	Remote Shutdown	Reserved	Reserved

## Wiring method for the terminal block



## Demand response enabling device (DRED)

DRED is used for installations in Australia and New Zealand (also used as remote shutdown function in European countries), in compliance with Australia and New Zealand safety requirements (Or European countries). The inverter integrates the DRED control logic and provides the DRED interface. DRED is not provided by the manufacturer.

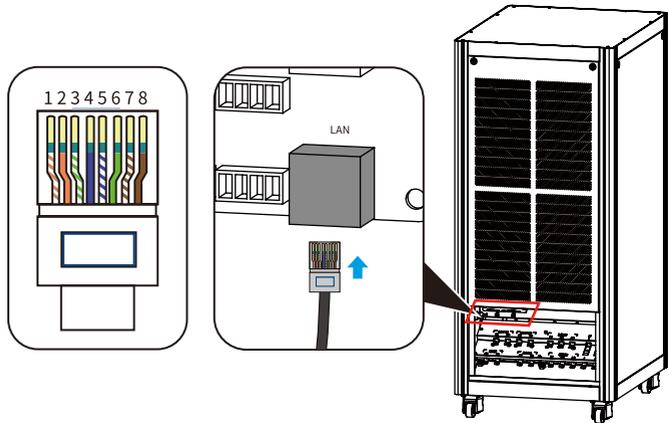
Detailed connection of DRED / Remote shutdown is shown below:

1. Put DRED cable through the plate.
2. Connect DRED cable on the 6-pin terminal. The function of each connection position is shown as below.

No.	1	2	3	4	5	6
Function	DRM1/5	DRM2/6	DRM3/7	DRM4/8	REFGEN	COM / DRMO

## LAN Communication Cable

PIN	Colour
1	Orange and White
2	Orange
3	Green and White
4	Blue
5	Blue and White
6	Green
7	Brown and White
8	Brown



### Special adjustable setting

The inverter has a field where the user could set functions, such as trip points, trip time, time of reconnection, active and invalid of QU curve and PU curve. Functions can be adjusted through special software. If interested, please contact with our department of server.

### Declaration for back-up function

The back-up output of BTC hybrid inverters have over load ability.

And the inverter has self-protection derating at high ambient temperature.

Under normal circumstances, the back-up switching time is less than 10 ms (the minimal condition to be considered as the UPS level). However, some external factors may cause the system to fail on Back-Up mode. As such, we recommend the users to be aware of conditions and follow the instructions as below:

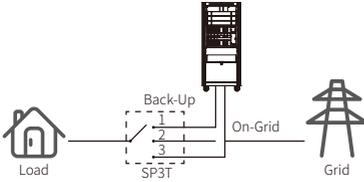
- Do not connect loads if they are dependent on a stable energy supply for a reliable operation
- Do not connect the loads which may in total exceed the maximum back-up capacity
- Try to avoid those loads which may create very high start-up current surges such as inverter air-conditioner, high-power pump etc.
- Due to the condition of the battery itself, battery current might be limited by some factors including but not limited to the temperature, weather etc.

### Accepted loads as below:

- Inductive load: The maximum starting power of the load should be less than the inverter power.
- Capacitive load: Total power  $\leq 0.6 \times$  nominal power of model. (Any load with high startup current at start-up is not accepted.)
- For complicated application, please contact after-sales.

### Note:

For convenient maintenance, please install a "4Pole3Throw" on back-up and on-grid side. Then it is adjustable to support load by back-up or by grid or default settings.



1. Back-up load is supplied from back-up side.
2. Back-up load is isolated.
3. Back-up load is supplied from grid side.

### Declaration for back-up overload protection

Inverter will restart itself if overload protection triggers. The preparation time for restarting will be longer and longer (max one hour) if overload protection repeats. Take following steps to restart inverter immediately.

- Decrease back-up load power within max limitation

### Smart Meter & CT Connection



#### NOTE

- Make sure AC cable is totally isolated from AC power before connecting Smart Meter & CT.
- For the detailed operation steps of connecting CT, please refer to "GM3000C Electric Meter Quick Installation Instructions".

## Anti-reverse function connection

If BTC system (connected with grid-tied inverters) requires anti-reverse function, it is operable but please note:

1. This diagram is only for installation where there is exporting power limit function requirement.
2. For anti-reverse function, it can be set on Screen→Settings→Operation Param→Power limit.
3. This diagram will only applies if grid-tied inverter has anti-reverse function build-in. And the power limitation value can be set on grid-tied inverter.
4. When using anti-reverse function, it would buy about 500W from the grid.

## 2.4 Earth Fault Alarm Connection

ETC series inverter complies with IEC 62109-2 13.9. Fault indicator LED on the inverter cover will light up and the system will email the fault information to customer. It must be installed in a high traffic area where the LED would be noticed.

## 03

## Checks Before System Power-up

No.	Checklist
1	Verify that the inverter is securely installed.
2	Verify that the protective ground wires, power lines and communication lines are connected in the correct and secure order.
3	Verify that the cable straps meet the wiring requirements and are well distributed, and ensure the straps are fastened without any sharp corners after cutting.
4	Verify that switches upstream and downstream of the inverter are open.
5	Verify that the inverter installation space is reasonable, the environment is clean and tidy and that there are no construction items left at the site.
6	Verify that the wiring chamber door is locked.
7	Verify that the cable inlet hole is sealed.

## 04

## System Power-on

## Checking Before Turning On AC Power

- **Battery connection:** Confirm the connection between BTC and battery : polarities (+/-) are not reversed.
- **On-grid & back-up connection:** Confirm on-grid connected to power grid and back-up connected to loads: polarities (L1/L2/L3/N are in sequence) are not reversed.
- **Smart Meter & CT connection:** Make sure Smart Meter & CT are connected between house loads and grid, and follow the Smart Meter direction sign on CT.

1. Verify that the AC switch matches the AC voltage on the grid side.
2. Turn on the AC switch between the inverter and the grid.
3. Verify that the battery's DC voltage is compliant.
4. Turn on the DC switch between the inverter and the battery.
5. Turn on the AC switch between the inverter and the load.
6. Observe the indicator status to determine the operating status of the inverter.

Indicator Status		Description
 Power Supply		ON=INVERTER POWER-ON
		OFF=INVERTER POWER-OFF
 Operation		ON=SYSTEM IS READY
		BLINK=SYSTEM IS STARTING UP
		OFF=SYSTEM IS NOT OPEATING
 Warning		FAULT HAS OCCUREED
		BLINK=OVERLOAD OF BACK-UP OUTPUT/REDUCE LOAD
		OFF=NO FAULT

## 5.1 Commissioning via LCD Screen



## NOTE

- After the inverter is powered on, the LCD screen of the monitoring unit automatically turns on and enters the home page.
- Access to the settings page requires a password, please contact GOODWE Service Center to obtain the password.



Up and Down Arrows



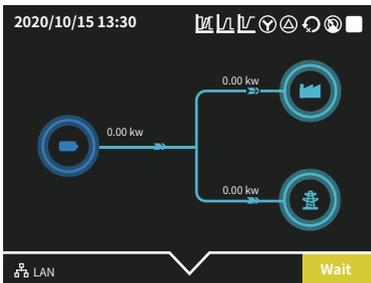
Enter Key



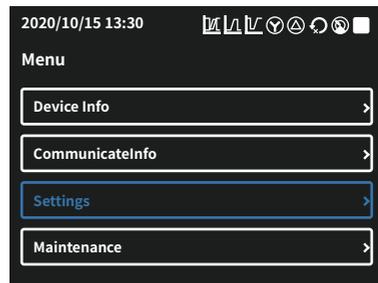
Esc Key

1. Press Enter on the homepage to access the main menu page.
2. Select "Settings" and press Enter to enter the password, then press and hold Enter to access the settings page.
3. Select "Safety Code" and press and hold Enter to complete the parameter settings according to the local safety code settings.
4. Select "Battery" and press and hold Enter to complete the parameter settings according to the battery type connected to the inverter.
5. Select "Operation Param" and press Enter to access the operating parameters page, then select "CT Ratio", set the CT ratio according to the actual connected CT specifications, and press and hold Enter to complete the parameter settings.
6. Exit to the main menu page and select "CommunicateInfo" to check if the electric meter, BMS and network communication status are normal.

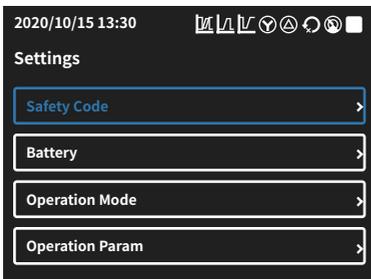
Homepage



Main Menu



Settings Page



Display operation logic: Refer to appendix for details.

## 5.2 PV Master

PV Master is an external monitoring and configuration application for hybrid inverters and is used on smart phones or tablets for both Android and iOS systems. The main functions are listed as below:

1. Configure the system to customize functions by the user.
2. Monitor and check the performance of the hybrid system.
3. Access and change the regional settings.
4. Check the inverter firmware version.
5. Set export power limit.

Search PV Master in Google Play or Apple App Store, or scan the QR code to download the app. Operation steps are the same for Android system and iOS system although the two interfaces are slightly different.

For more detailed operation instructions, please refer to PV Master user manual in [https://en.goodwe.com/Ftp/EN/Downloads/User%20Manual/GW\\_PV%20Master\\_User%20Manual-EN.pdf](https://en.goodwe.com/Ftp/EN/Downloads/User%20Manual/GW_PV%20Master_User%20Manual-EN.pdf).



PV Master App



PV Master  
User Manual

*Note:*

*For Australian customers please select from Australia Region A/B/C to comply with AS/NZS 4777.2:2020. Contact local grid operator to see which Region to select. After setting the safety region, some parameters in the inverter system will take effect according to the corresponding safety regulations, such as PU curve, QU curve, trip protection, etc. For Australian and European users, if you need to change the configuration parameters, please refer to the PV Master user manual.*

## 5.3 SEMS Portal

SEMS Portal is an monitoring platform used to manage organizations/users, add plants, and monitor plant status.

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



SEMS Portal



SEMS Portal  
User Manual

## 06 System Power-off

To power off the inverter, follow the steps below:

1. Turn off the AC switch between the inverter and the grid.
2. Turn off the AC switch between the inverter and the load.
3. Turn off the DC switch between the inverter and the battery.

## 7.1 Error Messages

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

ERROR MESSAGE	EXPLANATION	REASON	SOLUTIONS
Utility Phase Failure	The sequence of on-grid wire is wrong	Inverter detects that phase angle of L2 and L3 are reversed	Reverse connection order of L2 and L3 cable.
Utility Loss	Public grid power is not available (Power lost or on-grid connection fails)	Inverter does not detect the connection of grid	<ol style="list-style-type: none"> <li>1. Check (use multi-meter) if AC side has voltage . Make sure grid power is available.</li> <li>2. Make sure AC cables are connected tightly and well.</li> <li>3. If all is well, please try to turn off AC breaker and turn on again in 5 mins.</li> </ol>
VAC Failure	Grid voltage is not within permissible range	Inverter detects that AC voltage is beyond the normal range required by the safety country	<ol style="list-style-type: none"> <li>1. Make sure safety country of the inverter is set right.</li> <li>2. Check (use multi-meter) if the AC voltage (Between L &amp; N) is within a normal range (also on AC breaker side) <ol style="list-style-type: none"> <li>a. If the AC voltage is high, then make sure the AC cable complies with that required on user manual and the AC cable is not too long.</li> <li>b. If the voltage is low, make sure the AC cable is connected well and the jacket of the AC cable is not compressed into the AC terminal.</li> </ol> </li> <li>3. Make sure the grid voltage of your area is stable and within normal range.</li> </ol>
FAC Failure	Grid frequency is not within permissible range	Inverter detects that the grid frequency is beyond the normal range required by the safety country	<ol style="list-style-type: none"> <li>1. Make sure the safety country of the inverter is set right.</li> <li>2. If safety country is right, then please check on the inverter display if AC frequency (Fac) is within a normal range.</li> <li>3. If FAC failure only appears a few times and is resolved soon, it should be caused by occasional grid frequency instability.</li> </ol>
BAT Over Voltage	BAT voltage is too high	The battery voltage is higher than the max BAT input voltage of the inverter.	Check battery voltage is lower than Max Battery Input Voltage of the inverter. If voltage of Battery is high, please reduce battery module.
Over Temperature	Temperature inside of the inverter is too high	The inverter's working environment leads to a high temperature condition	<ol style="list-style-type: none"> <li>1. Try to decrease surrounding temperature.</li> <li>2. Make sure the installation complies with the instruction on inverter user manual.</li> <li>3. Try to close the inverter for 15 mins, then start up again.</li> </ol>

Isolation Failure	Ground insulation impedance of Battery is to low	Isolation failure could be caused by multiple reasons like battery not being grounded well, DC cable is broken, battery are aged or surrounding humidity is comparatively heavy, etc.	<ol style="list-style-type: none"> <li>1. Use multi meter to check if the resistance between earth &amp; inverter frame is about zero. If it's not, please ensure that the connection is well.</li> <li>2. If the humidity is too high, isolation failure may occur.</li> <li>3. Check the resistance between BAT to earth, if the resistance is lower than 33.3k, check the system wiring connection.</li> <li>4. Try to restart the inverter, check if the fault is still occurs, if not, means it is just an occasional situation, or contact after-sales.</li> </ol>
Ground Failure	Ground leakage current is too high	Ground failure could be caused by multiple reasons like that the neutral cable on the AC side is not connected well or the surrounding humidity is comparatively heavy, etc.	Check (use multi-meter) if there is voltage (normally should be close to 0V) between earth & inverter frame. If there is a voltage, it means the neutral & ground cables are not connected well on the AC side. If it happens only in the early morning/dawn /rainy days with higher air humidity and is recovered soon, it should be normal.
Relay Check Failure	Self checking of relay failure	Neutral & ground cables are not connected well on AC side or just an occasional failure	Check (use multi-meter) if there is high voltage (normally should be lower than 10V) between N & PE cable on the AC side. If the voltage is higher than 10V, it means the neutral & ground cable are not connected well on AC side or restart inverter.
DC Injection High	/	Inverter detects a higher DC component in AC output	Try to restart the inverter, check if it still occurs. If not, it is just an occasional situation. Otherwise, contact after-sales immediately.
EEPROM R/W Failure	/	Caused by a strong external magnetic field etc.	Try to restart the inverter, check if it still occurs. If not, it is just an occasional situation. Otherwise, contact after-sales immediately.
SPI Failure	Internal communication fails	Caused by a strong external magnetic field etc.	Try to restart the inverter, check if it still occurs. If not, it is just an occasional situation. Otherwise, contact after-sales immediately.
DC Bus High	BUS voltage is too high	/	Try to restart the inverter, check if it still occurs. If not, it is just an occasional situation. Otherwise, contact after-sales immediately.
Back-Up Over Load	Back-up side is over loaded	Total back-up load power is higher than the back-up nominal output power	Decrease back-up loads to make sure the total load power is lower than back-up nominal output power (please refer to page 12).

## Problems During Operation

### BTC does not start up with only battery

#### Solution:

Make sure the voltage of battery is higher than 250V, otherwise battery cannot start BTC up.

### High power fluctuation on battery charge or discharge:

#### Solution:

Check if there is a fluctuation on load power.

### Battery does not charge:

#### Solution:

1. Make sure BMS communication is OK on the LCD screen.
2. Make sure the CT is connected in the right position and to right direction as on the user manual page 12.
3. Make sure the total load power is much higher than PV power.

## Questions & Answers (Q & A)

### About Battery Operation

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

A: This normally happens on when BMS communication fail on lithium. If battery enter float charge, SOC will be reset to 95% automatically.

#### Q: Why battery switch always trip when it starts up (Lithium battery)?

A: The switch of lithium battery normally trips for following reasons:

1. BMS communication fails.
2. Battery SOC is too low, battery trips to protect itself.
3. An electrical short-cut happened on battery connection side. Or other reasons please contact with our department of server for details.

### About Smart Meter and Power Limit Function

#### Q: How to activate Output Power Limit function?

A: For BTC system, the function could be realized by:

1. Make sure Smart Meter connection and communication are well.
2. Turn on Export Power Limit function and set the max output power to grid on App.

**Note:** Even if output power limit is set to 0W, there might still be a deviation of a max of 500W exporting to grid.

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

A: Export limit could theoretically be 0W, but there will be a deviation of around 0-500W for BTC system.

**Q: Can I use other brand Meter to take over Smart Meter in BTC system or change some settings on Smart Meter?**

A: No, because the communication protocol is inset between inverter and Smart Meter, other brand Meter cannot communicate. Also any manual setting change could cause Meter communication failure.

**Other Questions**

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

A: The shortest way, please refer to "BT Quick Installation Instructions".

**Q: What kind of load can i connect on back-up side?**

A: Please refer to user manual on page 12.

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

A: Normally we can still provide technical support to problems caused b disobeying the instruction on the user manual, but we cannot guarantee a replacement or returns. So if there is any special conditions where you cannot 100% follow the instructions, please contact after-sales.

**Disclaimer**

The BTC series inverters are transported, used and operated under environmental and electrical conditions. Manufacturer has the right not to provide after-sales services or assistance under following conditions:

- Inverter is damaged during transfer.
- Inverter's warranty has expired and extended warranty is not bought.
- Inverter is installed, refitted or operated in improper ways without authorisation from manufacturer.
- Inverter is installed or used under improper environment or technical condition mentioned in this user manual, without authorisation from manufacturer.
- Installation or configuration of the inverter does not follow requirements mentioned in this user manual.
- The inverter is installed or operated against the requirements or warnings that are mentioned in this user manual.
- Inverter is broken or damaged by any force majeure like lightning, earthquake, fire hazard, storm and volcanic eruption etc.
- Inverter is disassembled, changed or updated on software or hardware without authorisation from manufacturer.
- Inverter is installed, used or operated against any related items in international or local policies or regulations.
- Any non-compatible batteries, loads or other devices connected to BTC system.

**Note: Manufacturer will keep the right to explain all the contents in this user manual.**

**Maintenance**

The inverter requires periodical maintenance, details as shown below:

- Make sure inverter is totally isolated from all DC and AC power for at least 5 mins before maintenance.
- Torque: Please use torque wrench to tighten AC and DC wiring connection once a year.
- Clean: Clean the dust of the fan inlet once a year
- DC breaker: Check DC breaker regularly, active the DC breaker 10 times in a row once a year.

## 7.2 Technical Parameters

Technical Data	GW50K-BTC
<b>Battery Input Data</b>	
Battery Voltage Range (V)	200~865
Start-up Voltage (V)	250
No. of Battery Input	1
Max Discharge/Charge Current (A)	100
Charging Mode for Battery	Self-adaption to BMS
DC breaker	Integrated
<b>AC Output Data (Ongrid mode)</b>	
Nominal Output Power (VA)	50k
Max. Output Power (VA)	52.5k
Max. apparent power from Grid(VA)	100k
Max Current from Grid(A)	145
Nominal Output Current (A)	72.5
Max Output Current (A)	76
Nominal Output Voltage (V)	400,3L/N/PE
Nominal Output Frequency (Hz)	50/60
Output Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)
Output THDi (@Nominal Output)	<3%
AC breaker	Integrated
<b>AC Output Data (Backup mode)</b>	
Nominal Output Power (VA)	50k
Overload Capability	1.1 times overload continuous , 1.2 times overload is not less than 1 minute
Nominal Output Voltage (V)	400,3L/N/PE
Nominal Output Frequency (Hz)	50/60
Nominal Output Current (A)	72.5
Output THDv (@Liner Load)	<3%
Load Unbalance	100% unbalanced load
AC breaker	Integrated
<b>Efficiency</b>	
Max. DisCharge Efficiency	97.0%
Max. Charge Efficiency	97.0%

Protection	
Reverse Protection	Integrated
Anti-islanding Protection	Integrated
Insulation Resistor Detection	Integrated
Residual Current Monitoring Unit	Integrated
AC SPD Protection	Integrated
Output Over Current Protection	Integrated
Output Short Protection	Integrated
Output Over Voltage Protection	Integrated
General Data	
Operating Temperature Range (°C)	-30~60
Relative Humidity	0~95%
Operating Altitude (m)	4000
Cooling	Fan Cooling
Noise (dB)	<68
User Interface	LCD&LED
Communication	RS485,LAN
BMS Communication	CAN,RS485
Weight (kg)	125
Size (Width*Depth*Height mm)	585*750*1350
Protection Degree	IP20
Isolation method	Transformerless

### 7.3 Other Test

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

RA, XA for Line conductor

RN, XN for Neutral conductor

Zref:

RA=0, 24; XA=j0,15 at 50Hz;

RN=0, 16; XN=j0,10 at 50Hz

### 7.4 Quick Check List To Avoid Danger

1. Inverter cannot be installed near flammable, explosive or strong electro-magnetic equipment, please refer to page 06
2. Remember that this inverter is heavy! Please be careful when lifting out from the package, please refer to page 07
3. Make sure battery breaker is off and battery nominal voltage meets BTC specification before connecting battery to inverter and make sure inverter is totally isolated from AC power, please refer to page 10
4. Make sure inverter is totally isolated from any DC or AC power before connecting AC cable, please refer to page 11
5. Make sure AC cable is totally isolated from AC power before connecting Smart Meter & CT, please refer to page 14

### Appendix protection category definition

Overvoltage category definition

Category I	Applies to equipment connected to a circuit where measures have been taken to reduce transient overvoltage to a low level.
Category II	Applies to equipment not permanently connected to the installation. Examples are appliances, portables tools and other plug-connected equipment.
Category III	Applies to a fixed equipment downstream, including the main distribution board. Examples are switchgear and other equipment in an industrial installation.
Category IV	Applies to equipment permanently connected at the origin of an installation (upstream of the main distribution board). Examples are electricity meters, primary over-current protection equipment and other equipment connected directly to outdoor open lines.

Moisture location category definition

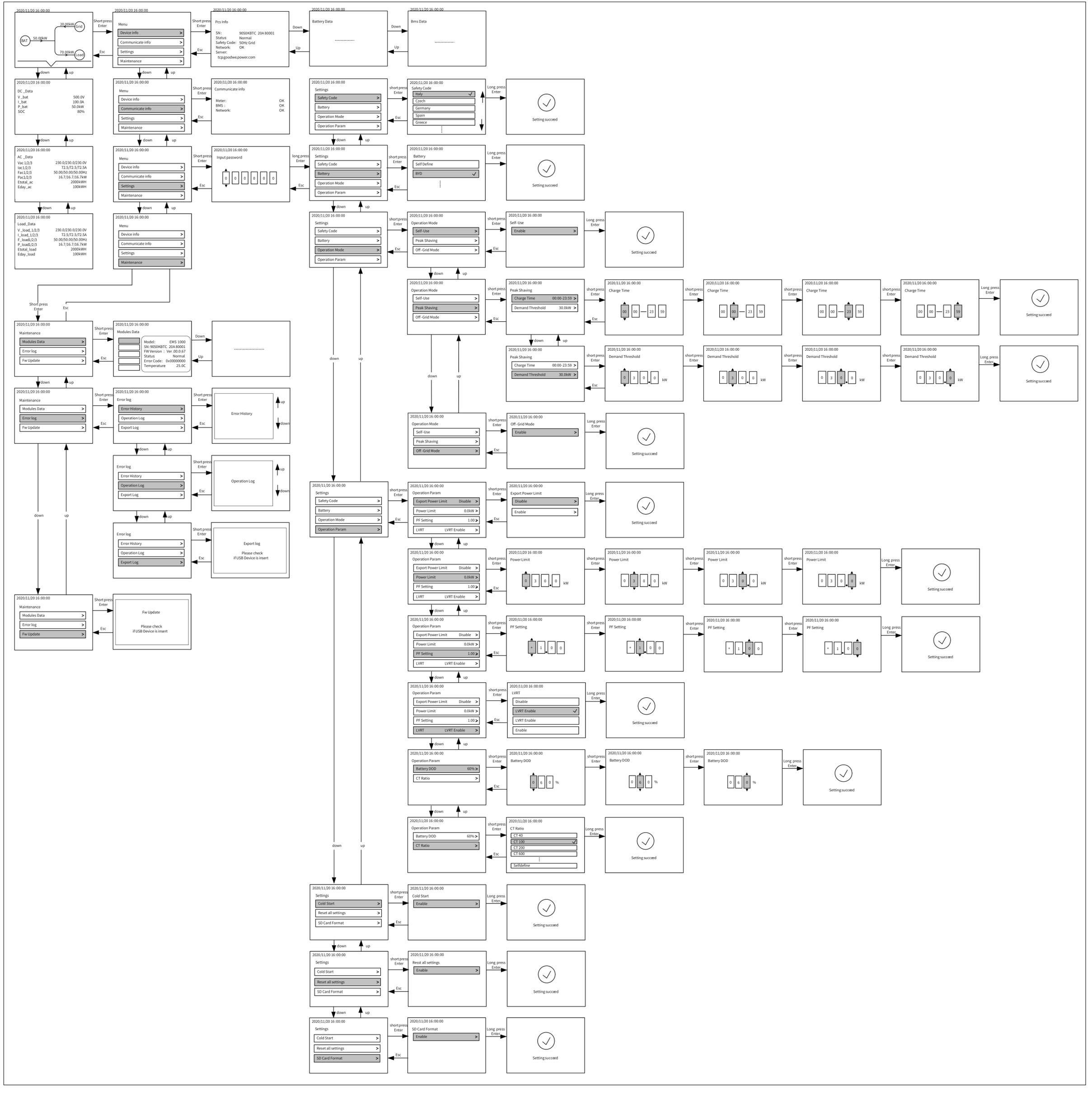
Moisture Parameters	Level		
	3K3	4K3	4K4H
Temperature Range	0~+40°C	-33~+40°C	~20~+55°C
Moisture Parameters	5%~85%	15%~100%	4%~100%

Environment category definition

Environment Condition	Ambient Temperature	Relative Humidity	Applied to
Outdoor	-20~50°C	4%~100%	PD3
Indoor Unconditioned	-20~50°C	5%~95%	PD3
Indoor conditioned	0~40°C	5%~85%	PD2

Pollution degree definition

Pollution Degree I	No pollution or only dry, non-conductive pollution occurs. The pollution has no influence.
Pollution Degree II	Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.
Pollution Degree III	Conductive pollution occurs, or dry, non-conductive pollution occurs, which becomes conductive due to condensation, which is expected.
Pollution Degree IV	Persistent conductive pollution occurs, for example, the pollution caused by conductive dust, rain or snow.





GoodWe Website

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