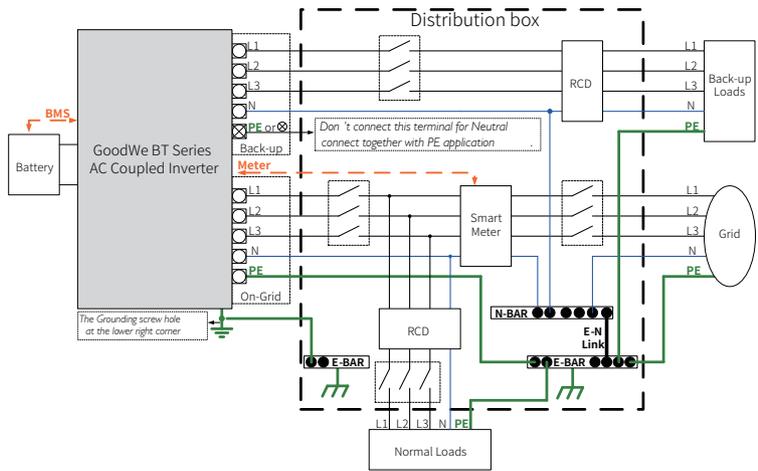




## • SYSTEM CONNECTION DIAGRAMS

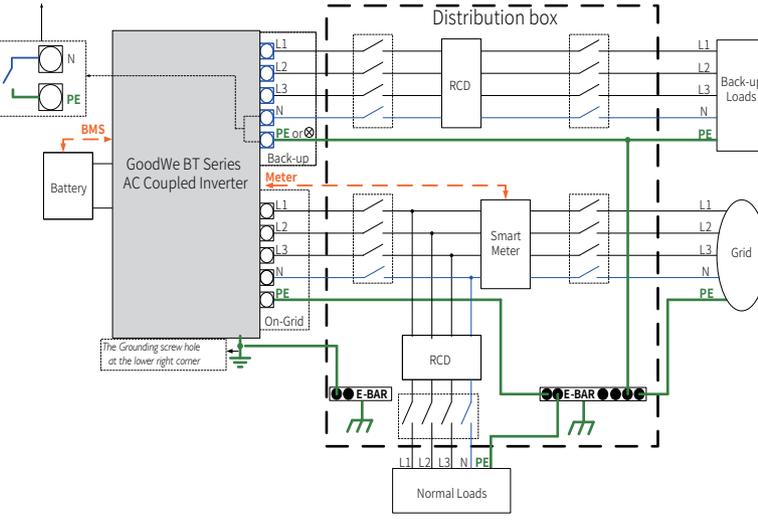
Note: For Australia safety country, the neutral cable of On-Grid side and Back-Up side must be connected together, otherwise Back-Up function will not work.

This diagram is an example for application that Neutral connect together with PE in distribution box. Such as: Australia, NewZealand, South Africa, etc. (Please follow local wiring regulations!)



This diagram is an example for application that Neutral separate with PE in distribution box. Such as: China, Germany, Czech Republic, Italy, etc. (Please follow local wiring regulations!)

the Back-Up side neutral and the PE are connected together via the internal relay when inverter work in Back-up mode, and this internal relay will be open when inverter work in Grid-tied mode.

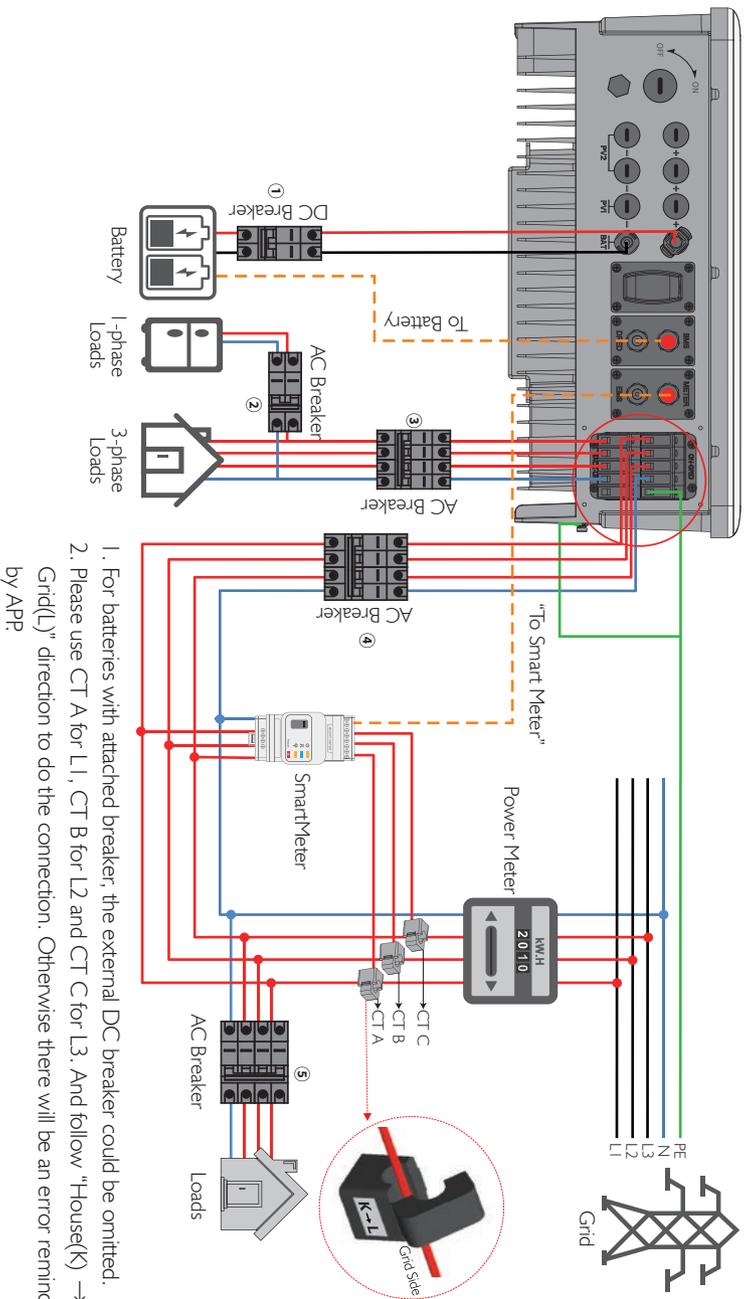


## • WIRING SYSTEM FOR BT SERIES HYBRID INVERTER

Note: This diagram indicated wiring structure of BT series AC coupled inverter, not the electric wiring standard.

Please select Breaker according to the specification below

GW5K-BT	①	25A/400V AC breaker	②	③	④	⑤
GW6K-BT		40A/600V DC breaker				Depends on household loads
GW8K-BT		25A/400V AC breaker				
GW10K-BT		32A/400V AC breaker				



1. For batteries with attached breaker, the external DC breaker could be omitted.
2. Please use CT A for L1, CT B for L2 and CT C for L3. And follow "House(K)" → Grid(L)" direction to do the connection. Otherwise there will be an error reminded by APP.

### 3.1 WIFI CONFIGURATION

- This part shows configuration on web page.
- Wi-Fi configuration is absolutely necessary for online monitoring and after-sales maintenance.

#### PREPARATION:

1. Inverter must be powered up with Battery or grid power.
2. Need a router with available internet access to GoodWe portal <https://www.semsportal.com>

#### Step 1

1. Connect Solar-WiFi\* to your PC or smart phone>(\* means the last 8 characters of the inverter serial No.)
2. Open browser and login 10.10.100.253  
Admin (U): admin; Password: admin
3. Then click "OK"

#### Step 2

1. Click "Start Setup" to choose your router
2. Then click "Next"

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

**Start Setup**

#### 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.

**Back**

**Next**

#### Step 3

1. Fill in the password of the router, then click "Next"
2. Click "Complete"

#### Add wireless network manually

Network name (SSID)	WiFi Test
Encryption method	WPA/WPA2-PSK
Encryption algorithm	AES
<b>Please enter the wireless network password:</b>	
Password (8-63 bytes)	hellogoodwe
	show psk

**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**

### •Wi-Fi Reset & Reload

Wi-Fi Reset means restarting Wi-Fi module, Wi-Fi settings will be reprocessed and saved automatically. Wi-Fi Reload means setting Wi-Fi module back to default factory setting.

#### Wi-Fi Reset Button



#### Wi-Fi Reset

short press Reset button  
Wi-Fi Led will blink for a few seconds

#### Wi-Fi Reload

long press Reset button (longer than 3s)  
Wi-Fi Led will double blink until doing Wi-Fi configuration again.

*Note: Wi-Fi Reset & Reload function is only used when:*

1. Wi-Fi lost connection to internet or cannot connect to PV Master APP successfully.
2. Cannot find "Solar-WiFi signal" or have other Wi-Fi configuration problem.
3. Please do not use this button if Wi-Fi monitoring works well.

### 3.2 PV MASTER APP OPERATION

PV Master is an external monitoring/ configuration application for GoodWe hybrid inverters, used on smart phones or pad for both Android and iOS system, main functions as below:

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

Please download PV Master OPERATION INSTRUCTIONS from <https://en.goodwe.com/>



### 3.3 CEI AUTO-TEST FUNCTION

PV Auto-Test function of CEI is integrated in PV Master APP for Italy safety country requirement. For detailed instruction of this function please refer to PV Master Operation Instructions.

Note:

1. Please make sure the password, Encryption Method/Algorithm is right the same with the router's.
2. If everything is right well, the Wi-Fi LED on inverter will change from double blink to quartic blink then to solid status, which means Wi-Fi is connected to GoodWe server successfully.
3. Wi-Fi configuration could also be done on PV Master, details please check on PV Master APP.

## 4.1 ERROR MESSAGE AND TROUBLESHOOTINGS

### • ERROR MESSAGE

The error message below will be displayed on PV Master APP or reported by Email if the error really happens.

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	Not available of public grid power (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 right well.</li> <li>3. If all is well, please try to turn off AC breaker and turn on again after 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 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 AC voltage is high, then make sure AC cable complies with that required on user manual and AC cable is not too long</li> <li>b. if voltage is low, make sure AC cable is connected well and the jacket of AC cable is not compressed into 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 Efficiency is not within permissible range	Inverter detects that Grid frequency 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. If safety country is right, then please check on inverter display if AC frequency (Fac) is within a normal range.</li> <li>3. If FAC failure only appear a few times and 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	Inverter 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 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 multi reasons like Battery are not 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 make the connection between earth &amp; inverter frame well.</li> <li>2. If the humidity is very high, there maybe Isolation Failure 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 happens, if not, means it is just an occasional situation, or contact GoodWe.</li> </ol>
Ground Failure	Ground leakage current is over-high	Ground I failure could be caused by multi reasons like neutral cable on AC side is not connected well or surrounding humidity is comparative 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 cable are not connected well on AC side. If it happened only at early morning, dawn or on rainy days with higher air humidity, and recover soon, it should be normal.
Relay Check Failure	Self checking of relay fails	Neutral & ground cable are not connected well on AC side or just occasional failure	Check (use multi-meter) if there is high voltage (normally should be lower than 10V) between N & PE cable on AC side. If the voltage 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 inverter,check if it still happens.If not,it is just an occasional situation.Otherwise, contact GoodWe immediately.
EEPROM R/W Failure	/	Caused by a strong external magnetic field etc.	Try to restart inverter,check if it still happens.If not,it is just an occasional situation.Otherwise, contact GoodWe immediately.
SPI Failure	Internal communication fails	Caused by a strong external magnetic field etc.	Try to restart inverter,check if it still happens.If not,it is just an occasional situation.Otherwise, contact GoodWe immediately.
DC Bus High	BUS voltage is over-high	/	Try to restart inverter,check if it still happens.If not,it is just an occasional situation.Otherwise, contact GoodWe immediately.
Back-Up Over Load	Back-up side is over loaded	Total Back-Up load power is higher than the nominal backup 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).

## • TROUBLE SHOOTINGS

### Checking Before Turning On AC power

- **Battery Connection:** Confirm the connection between BT and battery : polarities ( +/-) not reversed, refer to Figure 4.1-1
- **On-Grid & Back-Up Connection:** Confirm ON-GRID connected to power grid and Back-Up to loads: polarity (L1/L2/L3/N) not reversed, refer to Figure 4.1-2.
- **Smart Meter & CT Connection:** Make sure Smart Meter & CT are connected between house loads and grid, follow the Smart Meter direction sign on CT, refer to Figure 4.1-3.

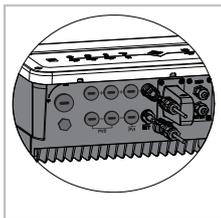


Figure 4.1-1

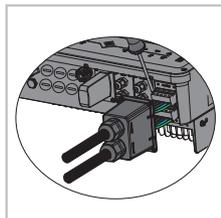


Figure 4.1-2

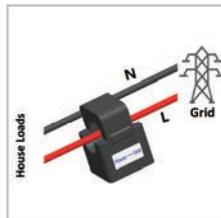
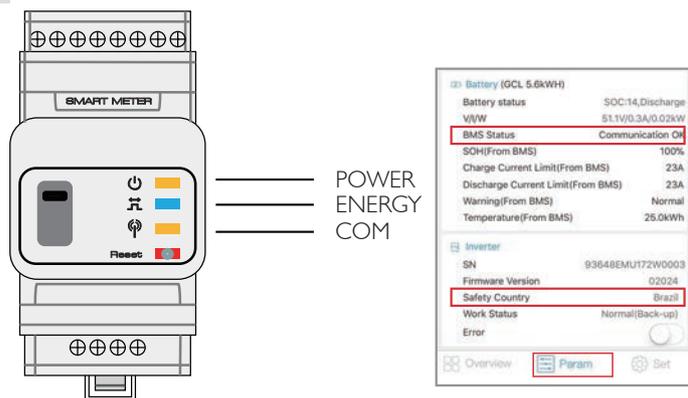


Figure 4.1-3

### Checking as Start BT up and Turn On AC power

- **Battery Settings, BMS Communication and Safety Country:** After connecting Solar-WiFi\* (\* means the last 8 characters of the inverter serial No.), check on PV Master APP Param to make sure battery type is right what you have installed, and Safety Country is right. If not, please set it right in "Set" .(Figure 4.1-4)

Figure 4.1-4



Note:

For compatible lithium batteries, BMS status is "communication OK" after selecting the right battery company.

## Problems During Operation

### BT not Start Up With Only Battery

#### Solution:

Make sure the voltage of battery is higher than 180V, otherwise battery cannot start BT 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 PV Master.
2. Check if CT connected in the right position and to right direction as on the user manual page 12
3. Check if the total load power is much higher than PV power.

## Operation & Answers (Q & A)

### About Wi-Fi Configuration

#### Q: Why cannot see Solar-WiFi\* signal on mobile devices

A: Normally Solar-WiFi\* signal could be searched right after inverter powered up. But Solar-WiFi signal will disappear when BT connected to internet. If need to change settings, can connect to the router to change. If cannot see Wi-Fi signal even not connect to router, then please try to reload Wi-Fi (please refer to BT user manual page 17).

#### Q: Why cannot connect Solar-WiFi\* signal on my phone?

A: It is the character of the Wi-Fi module that it can connect to only one device at a time. If the signal is connected to another device at the time for some reason, then you cannot connect to the signal.

### About Battery Operation

#### Q: Why battery does not discharge when grid is not available, while it discharges normally when grid is available?

A: On APP, Off-Grid output and Back-Up function should be turned on to make battery discharge under Off-Grid mode.

#### Q: Why there is no output on Back-Up side?

A: For Back-Up supply, the "Back-Up Supply" on PV Master App must be turned on. Under Off-Grid mode or grid power is disconnected, "Off-Grid Output Switch" function must be turned on as well.

Note: As turn "Off-Grid Output Switch" on, don't restart inverter or battery, otherwise the function will switch off automatically.

#### Q: On Portal, why battery SOC has a sudden jump up to 95%?

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

**Q: Why battery cannot be fully charged to 100%?**

A: Battery will stop charge when battery voltage reaches charge voltage set on PV Master APP.

**Q: Why battery switch always trip when starts it 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 GoodWe for details.

**Q: Which battery should I use for BT?**

A: For BT series inverter, it could connect lithium batteries which have compatibility with BT series inverter with nominal voltage from 180V to 600V. Compatible lithium batteries can see on battery list in PV Master APP .

### **About PV Master Operation and Monitoring**

**Q: Why Cannot save settings on PV Master App**

A: This could be caused by losing connection to Solar-WiFi\* .

1. Make sure you connected Solar-WiFi\* (make sure no other devices connected) or router (if connected Solar-WiFi\* to router) and on APP home page shows connection well.
2. Make sure restart inverter 10mins later after you do some settings because inverter will save settings every 10 mins under normal mode. We recommend you change setting parameters when inverter under waiting mode.

**Q: On the App, why the data on the homepage and Param page is different, like charge/dis-charge, PV value, load value or grid value?**

A: As the data on APP is from inverter and on home page and Param page, the data refresh frequency is different, so there will be a data inconformity between different pages on APP as well as between that on portal and APP .

**Q: On App, some columns show NA, like battery SOH, etc. why is that?**

A: NA means App does not receive data from inverter or server, normally it is because communication problem, such as battery communication, and communication between inverter and the APP.

### **About Smart Meter and Power Limit Function**

**Q: How to Act Output Power Limit function?**

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

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

*Note: If out-put power limit set as 0W, then there might still have deviation max 100W exporting to grid.*

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

A: Export limit could theoretically to minimum 0W, but there will have a deviation of around 50-100W for BT system.

**Q: Can I use other brand Meter to take over Smart Meter in BT 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.

**Q: What is the max current allowed going through CT on Smart Meter?**

A: The max current for CT is 120A.

### **Other Questions**

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

A: The shortest way, please refer to BT QUICK INSTALLATION INSTRUCTIONS and PV MASTER APP INSTRUCTION.

**Q: What kind of load can I connect on Back-Up side?**

A: Please refer to user manual on page 12.

**Q: Whether the warranty of the inverter still valid if the installation or operation does not follow the user manual instructions, for some special conditions when we cannot 100% follow them?**

A: Normally if any problem caused by disobeys the instructions on user manual, we can provide technical support to help to solve the problem, but cannot guarantee a replacement or returns. So if there is any special conditions when you cannot 100% follow the instructions, please contact GoodWe for suggestions.

## 4.2 DISCLAIMER

The BT series inverters are transported, used and operated under environmental and electrical conditions. GoodWe has the right not providing after-sales services or assistance under following conditions:

- Inverter is damaged during transferring.
- Inverter is out of warranty year and extended warranty is not bought.
- Inverter is installed, refitted or operated in improper ways without authority from GoodWe.
- Inverter is installed or used under improper environment or technical condition mentioned in this user manual, without authority from GoodWe.
- 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 authority from GoodWe.
- 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 BT system.

*Note: GoodWe will keep right to explain all the contents in this user manual. To insure IP65, inverter must be sealed well, please install the inverters in one day after unpacking, otherwise please seal all unused terminals/holes, not allowed to keep any terminals/holes open, confirm there is no risk to have water & dust in.*

## Maintenance

The inverter requires periodically maintenance, details as below:

- Make sure inverter is totally isolated from all DC and AC power for at least 5 mins before maintenance.
- Heat sink: Please use clean towel to clean up heat sink once a year.
- Torque: Please use torque wrench to tighten AC and DC wiring connection once a year.
- DC breaker: Check DC breaker regularly, active the DC breaker 10 times in a row once a year.
- Operating DC breaker will clean contacts and extend lifespan of DC breaker.
- Water-proof covers: Check if water-proof covers of RS485 and other part are replaced once a year.

## 4.3 TECHNICAL PARAMETERS AND CERTIFICATES

### • TECHNICAL PARAMETERS OF BT INVERTERS

Technical Data	GW5K-BT	GW6K-BT	GW8K-BT	GW10K-BT
<b>Battery Input Data</b>				
Battery Type	Li-Ion			
Battery Voltage Range (V)	180~600			
Max. Charging Current (A)	25			
Max. Discharging Current (A)	25			
Charging Strategy for Li-Ion Battery	Self-adaption to BMS			
<b>AC Output Data (On-grid)</b>				
Nominal Apparent Power Output to Utility Grid (VA)	5000	6000	8000	10000
Max. Apparent Power Output to Utility Grid (VA) *	5500	6600	8800	11000
Max. Apparent Power from Utility Grid (VA)	10000	12000	15000	15000
Nominal Output Voltage (V)	400/380, 3L/N/PE			
Nominal Output frequency (Hz)	50/60			
Max. AC Current Output to Utility Grid (A)	8.5	10.5	13.5	16.5
Max. AC Current From Utility Grid (A)	15.2	18.2	22.7	22.7
Output Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)			
Output THDi (@Nominal Output)	<3%			
<b>AC Output Data (Back-up)</b>				
Max. Output Apparent Power (VA)	5000	6000	8000	10000
Peak Output Apparent Power (VA) **	10000, 60sec	12000, 60sec	15000, 60sec	15000, 60sec
Max. Output Current (A)	8.5	10.5	13.5	16.5
Nominal Output Voltage (V)	400/380			
Nominal Output Frequency (Hz)	50/60			
Output THDv (@Linear Load)	<3%			
<b>Efficiency</b>				
Max. Battery to Load Efficiency	97.6%			
Max. Charge Efficiency	97.6%			
<b>Protection</b>				
Anti-islanding Protection	Integrated			
Insulation Resistor Detection	Integrated			
Residual Current Monitoring Unit	Integrated			
Output Over Current Protection	Integrated			
Output Short Protection	Integrated			
Battery Input Reverse Polarity Protection	Integrated			
Output Over Voltage Protection	Integrated			
<b>General Data</b>				
Operating Temperature Range (°C)	-35~60			
Relative Humidity	0~95%			
Operating Altitude (m)	≤4000			
Cooling	Nature Convection			
Noise (dB)	<30			
User Interface	LED & APP			
Communication with BMS	RS485; CAN(***)			
Communication with Meter	RS485			
Communication with EMS	RS485 (Insulated)			
Communication with Portal	Wi-Fi; LAN			
Weight (kg)	21			
Size (Width*Height*Depth mm)	516*415*180			
Mounting	Wall Bracket			
Protection Degree	IP65			
Standby Self Consumption (W) ****	<15			
Topology	Transformerless			
<b>Certifications &amp; Standards</b>				
Grid Regulation	CEI 0-21; VDE-AR-N 4105; G98/1; G100; EN 50438			
Safety Regulation	IEC/EN 62477			
EMC	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN61000-4-16, EN61000-4-18, EN61000-4-29			

\* According to the local grid regulation

\*\* Can be reached only if battery capacity is enough, otherwise will shut down.

\*\*\* CAN communication is configured by default. If 485 communication is used, please replace the corresponding communication line.

\*\*\*\* No Back-up Output

• **CERTIFICATES OF BT SERIES**



G100 CEI 0-21 VDE 0126-1-1 VDE-AR-N 4105 EN 50438

• **OTHER TEST**

For Austria requirements, in the THDi test, there should add Zref 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

**4.4 WARNING QUICK CHECK LIST**

[1] Inverter cannot be installed near flammable, explosive or strong electro-magnetic equipment, page 06

[2] Remember that this inverter is heavy! Please be careful when lifting out from the package, page 07

[3] Make sure battery breaker is off and battery nominal voltage meet BH specification before connecting battery to inverter and make sure inverter is totally isolated from PV and AC power, page 09

[4] Make sure inverter is totally isolated from any DC or AC power before connecting AC cable, page 11

[5] Make sure AC cable is totally isolated from AC power before connecting Smart Meter & CT, page 13

**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 and 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 and snow.