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GoodWe BT series bi-directional inverter is designed for both indoor and outdoor use, which could be used with or without existing grid-tied inverter systems to store energy with batteries. Energy produced from grid-tied inverters shall be used to optimize self-consumption, then charge battery, exceed power from grid-tied system could export to grid. Loads will be supported in priority by grid-tied system, then battery power, exceed consumption power will be drained from grid.

### 1.1 OPERATION MODES INTRODUCTION

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

**Mode I**  
Energy from grid-tied inverters optimize loads, then charge battery, exceed power export to grid.

**Mode II**  
When energy from grid-tied inverters is weak, battery discharge to support loads in priority, together with 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 BT series inverter of Jiangsu GoodWe Power Supply Technology Co., Ltd. (hereinafter called as GoodWe) strictly comply 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!**  
  Failing 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 that the arrows always point upwards.**

- **No more than six (6) identical packages being stacked on each other.**

- **Product should not be disposed as household waste.**

- **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.**

- **Inverter will be touchable or operable after minimum 5 minutes of being turned off or totally disconnected, in case of any electrical shock or injury.**

- **CE Mark**
**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 to insert or pull 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 working, so please make sure it is cooled down before touching it, and make sure the inverter is untouchable for children.

Do not open inverter cover or change any components without GoodWe’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 useless and warranty 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 GoodWe.

Battery negative(BAT-) on inverter 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(≥ 30mA).

In Australia, the inverter internal switching does not maintain neutral integrity, which must be addressed by external connection arrangements like in the s Off-Grid System Connection Diagram in page 16.

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’.
2.3 MOUNTING
2.3.1 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 to disconnected 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 installation should stand vertically or lie on a slope by max 15° (Figure 2.3.1-1)

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

**Rule 4.** The installation of inverter should be protected under shelter from direct sunlight or bad weather like snow, rain, lightning etc. (Figure 2.3.1-2)

**Rule 5.** Inverter should be installed at eye level for convenient maintenance.

**Rule 6.** Product label on inverter should be clearly visible after installation.

**Rule 7.** Leave enough space around inverter following the values in Figure 2.3.1-3.

---

**2.1 UNACCEPTABLE INSTALLATIONS**

Please avoid the following installations, which will damage the system or the Inverter.

**Rule 1.** Back-Up cannot connect in parallel.

**Rule 2.** One battery bank cannot be connect to multiple inverters.

**Rule 3.** Inverter battery input cannot connect to incompatible batteries.

**Rule 4.** One meter cannot connect to multiple inverters and different CT cannot connect to a same line cable.

**Rule 5.** Back-up side cannot connect to grid.

**Rule 6.** On-grid or back-up side cannot connect to any AC generator.

**Rule 7.** Inverter cannot be installed near flammable, explosive or strong electro-magnetic equipment.

---

**2.2 PACKING LIST**

On receiving the hybrid inverter, please check to make sure all the components as below are not missing or broken.

- Inverter × 1
- Wall-mounted Bracket × 1
- Positive BAT Plug × 1
- Negative BAT Plug × 1
- PE terminal × 1
- Expansion bolts × 4
- AC Cover × 1
- Pan head screw × 6
- Pin Terminal × 12
- User Manual × 1
- Quick Installation Guide × 1

---

*Notice:* Inverter cannot be installed near flammable, explosive or strong electro-magnetic equipment.
2.3.2 MOUNTING

Remember that this inverter is heavy! Please be careful when lifting out from the package.

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

**Step 1**

- Please use the mounting bracket as a template to drill 4 holes on right positions. (10mm in diameter, and 80mm in depth) (Figure 2.3.2-1)
- Use expansion bolts in accessory box and fix the mounting bracket onto the wall tightly.
  
  *Note: Bearing capacity of the wall must be higher than 25kG, otherwise may not be able to keep inverter from dropping.*

**Step 2**

Carry the inverter by holding the heating sink on two sides and place the inverter on the mounting bracket. (Figure 2.3.2-2)

*Note: Make sure the heat sink on inverter is right joint with mounting bracket.*

**Step 3**

Ground cable shall be connected to ground plate on grid side (Figure 2.3.2-3)

**Step 4**

A lock could be used for anti-theft if it is necessary for individual requirement. (Figure 2.3.2-4)

2.4 ELECTRICAL WIRING CONNECTION

2.4.1 BATTERY WIRING CONNECTION

- Please be careful against any electric shock or chemical hazard.
- Make sure there is an external DC breaker (≥40A) connected for battery without build-in DC breaker.
  
  *Make sure battery switch is off and battery nominal voltage meet BT series’ specification before connecting battery to inverter and make sure inverter is totally isolated from AC power.*

  *Please following requirements and step bellow strictly. Use improper wire may cause bad contact and high impedance, which is dangerous to the system.*

- Use the right BAT plugs in the accessory box.
- Use the tin-plated cables with a conductor cross section of 4 to 6 mm² (AWG 10) because the maximum battery current is 25A. Battery cable requirements are as (Figure 2.4.1-1).

**Grade** | **Description** | **Value**
---|---|---
A | Outside diameter insulation | 5.5-8.0 mm
B | Conductor core section | 4-6 mm²
C | Conductor core length | 7 mm

**Step 1**

Prepare BAT cables and BAT plugs (Figure 2.4.1-2)

*Note:*

- Use BAT plugs and connectors in GoodWe accessory box.
- BAT cable should be standard, 4-6mm² BAT cable

**Step 2**

Connect BAT cables to BAT connectors (Figure 2.4.1-3)

*Note:*

- BAT cable must be tightly crimped into the connectors
- There will be a click sound if connectors are inset correctly into BAT plugs

**Step 3**

Screw the cap on and plug onto inverter side (Figure 2.4.1-4)

*Note:*

- There will be a click sound if connectors are inset correctly into BAT plugs.

*Note: For the compatible lithium batteries (Pylon/BYD) connection, please refer to battery connection part in BT quick installation instructions.*
2.4.2 ON-GRID & BACK-UP CONNECTION

An external AC breaker is needed for On-Grid connection to be isolate from grid when necessary. Below are the requirements of On-Grid AC breaker.

<table>
<thead>
<tr>
<th>Inverter model</th>
<th>AC breaker specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>GW5K-BT</td>
<td>25A / 400V (e.g. DZ47-60 C25)</td>
</tr>
<tr>
<td>GW6K-BT</td>
<td>25A / 400V (e.g. DZ47-60 C25)</td>
</tr>
<tr>
<td>GW8K-BT</td>
<td>32A / 400V (e.g. DZ47-60 C32)</td>
</tr>
<tr>
<td>GW10K-BT</td>
<td>32A / 400V (e.g. DZ47-60 C32)</td>
</tr>
</tbody>
</table>

Note: The absence of AC breaker on Back-up side will lead to inverter damage if only electrical short circuit happen on back-up side.

1. Use separate AC breaker for individual inverter (Figure 2.4.2-1)

2. On AC side, the individual breaker should be connected before loads (between inverter and loads) (Figure 2.4.2-2)

- Requirement of AC cable connected to On-Grid and Back-Up side (Figure 2.4.2-3)

1. Neutral cable shall be blue, line cable is black or brown (preferred) and protective earth cable yellow-green.
2. For AC cables, PE cable shall be longer than N&L cables, so that if in any case AC cable slips or taken out, the protecting earth conductor will be the last to take the strain.

Step 1

Prepare the terminals and AC cables according to the right table.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Outside diameter</td>
<td>13-18 mm</td>
</tr>
<tr>
<td>B</td>
<td>Separated wire length</td>
<td>20-25 mm</td>
</tr>
<tr>
<td>C</td>
<td>Conductor wire length</td>
<td>7-9 mm</td>
</tr>
<tr>
<td>D</td>
<td>Conductor core section</td>
<td>4-6 mm²</td>
</tr>
</tbody>
</table>

Step 2

Put AC cable through terminal cover follow the sequence as on the right (Figure 2.4.2-4)

Note: Please use the terminals in GoodWe components box

Step 3

Press the 10 connectors on cable conductor core tightly (Figure 2.4.2-5)

Note: Make sure cable jacket is not locked within the connector

Step 4

Screwing torque 2.0-2.5N.m

1. Connect the assembled AC cables into AC terminals with fastening torque about 2.0-2.5N.m.
   Note: Connecting Back-up terminals before connect On-grid terminals.
   Make sure it is not connected to a wrong side.
2. Lock the cover and screw the cap on (Figure 2.4.2-6)

Special Adjustable Setting

The inverter has filed adjustable setting like tripping point, tripping time, reconnect time, active and invalid of QU/PU curves etc. by special firmware. Please contact GoodWe after sales for the special firmware and adjust methods.
Declaration For Back-Up Function

GoodWe BT series bi-directional inverters are able to supply over load output power at its' back-up. For details please refer to the technical parameters of GoodWe BT series inverter(4.3 se) And the inverter has self-protection derating at high ambient temperature.

The below statement lays out GoodWe general policies governing the energy storage inverters of the series ES, EM, SBP, ET, EH, BH and BT.

1. For Hybrid inverters (Series ES, EM, EH and ET), the standard PV installation typically consists of the connection of the inverter with both panels and batteries. In case of systems not connected to the batteries, the Back-Up function is strongly not advised to use. GoodWe shall not cover the standard warranty and be liable for any consequences arising from users not following this instruction.

2. 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:
   1) Do not connect loads if they are dependent on a stable energy supply for a reliable operation
   2) Do not connect the loads which may in total exceed the maximum Back-Up capacity
   3) Try to avoid those loads which may create very high start-up current surges such as Inverter Air-conditioner, high-power pump etc.
   4) Due to the condition of 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: 1.5P non-frequency conversion air-conditioner can be connect to back-up side. Two or more non-frequency conversion air-conditioner connect to back-up side may cause UPS mode unstable.
• Capacitive Load: Total power <= 0.6 x nominal power of model. (Any load with high inrush current at start-up is not accepted.)
• For complicated application, please contact GoodWe's after service.

Note:
1. Please use the Smart Meter with 3 CTs in GoodWe product box.
2. CT cable is 3m as default, could be extended to max 5m.
3. Smart Meter communication cable (RJ45) is attached on the inverter (“To Smart Meter” cable), could be extended to max 100m, and must use standard RJ45 cable and plug, as below:

2.4.3 SMART METER & CT CONNECTION

Make sure AC cable is totally isolated from AC power before connecting Smart Meter & CT.[8]

The Smart Meter with CT in GoodWe product box is compulsory for BT system installation, used to detect grid voltage and current direction and magnitude, further to instruct the operation condition of BT inverter via RS485 communication.

Note:
1. The Smart Meter with CT is well configured, please do not change any setting on Smart Meter.
2. One Smart Meter can only be used for one BT inverter.
3. Three CTs must be used for one Smart Meter, and must be connected on the same phase with Smart Meter power cable.

• Smart Meter & CT Connection Diagram (Figure 2.4.2-7)

• Detailed pin function of each port on BT

Note: For BMS cable, CAN communication is configured by default. If 485 communication is used, please contact GOODWE to replace with the corresponding communication line.

<table>
<thead>
<tr>
<th>Position</th>
<th>Color</th>
<th>BMS Function</th>
<th>Smart Meter Function</th>
<th>RS485</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Orange&amp;white</td>
<td>485_A2</td>
<td>NC</td>
<td>485_A</td>
</tr>
<tr>
<td>2</td>
<td>Orange</td>
<td>NC</td>
<td>NC</td>
<td>485_B</td>
</tr>
<tr>
<td>3</td>
<td>Green&amp;white</td>
<td>485_B2</td>
<td>485_B1</td>
<td>485_A</td>
</tr>
<tr>
<td>4</td>
<td>Blue</td>
<td>CAN_H</td>
<td>NC</td>
<td>NC</td>
</tr>
<tr>
<td>5</td>
<td>Blue&amp;white</td>
<td>CAN_L</td>
<td>NC</td>
<td>NC</td>
</tr>
<tr>
<td>6</td>
<td>Green</td>
<td>NC</td>
<td>485_A1</td>
<td>485_B</td>
</tr>
<tr>
<td>7</td>
<td>Brown&amp;white</td>
<td>NC</td>
<td>485_B1</td>
<td>NC</td>
</tr>
<tr>
<td>8</td>
<td>Brown</td>
<td>NC</td>
<td>485_A1</td>
<td>NC</td>
</tr>
</tbody>
</table>

• Smart Meter LED Indications

<table>
<thead>
<tr>
<th></th>
<th>OFF</th>
<th>ON</th>
<th>Blinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER</td>
<td>Not working</td>
<td>Working</td>
<td>/</td>
</tr>
<tr>
<td>ENERGY</td>
<td>/</td>
<td>Importing</td>
<td>Exporting</td>
</tr>
<tr>
<td>COM</td>
<td>Blink one time when it transfer data to inverter</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Anti-Reverse Function Connection**

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

1. This diagram is only for installation where has exporting power limit function requirement.
2. For anti-reverse function, will also need set on PV Master App→Advanced Setting→Power Limit.
3. This diagram only be reasonable if grid-tied inverter has anti-reverse function itself. And the power limitation value shall be set on grid-tied inverter.
4. When using anti-reverse function, it would buy about 150W from the grid.

- **Connection Diagram as below (Figure 2.4.2-8)**

[Diagram showing connection details]

1. This cable is a theoretical connection supporting anti-reverse function, which could be different for different grid-tied inverters.

**2.5 DRED & EARTH FAULT ALARM**

**2.5.1 DRED CONNECTION**

DRED is used for Australia and New Zealand installation (also used as remote shutdown function in European countries), in compliance with Australia and New Zealand safety requirements( or European countries). And DRED device is not provided by GoodWe.

Detailed connection of DRED device is shown below:

- **Step 1**
  
  Screw this plate off from inverter. (Figure 2.5.1-1)
  
  Note: DRED device should be connected through “DRED port” as the figure shows.

- **Step 2**

  1. Plug out the 6-pin terminal and dismantle the resistor on it (Figure 2.5.1-2).
  2. Plug the resistor out, leave the 6-pin terminal for next step.

  *Note: The 6-pin terminal in the inverter has the same function of DRED device. Please leave it in the inverter if no external device connected.*

- **Step 3-1 For DRED**

  1. Put DRED cable through the plate as shown in Figure 2.5.1-3.
  2. Connect DRED cable on the 6-pin terminal. The function of each connection position

<table>
<thead>
<tr>
<th>NO</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DRM1/5</td>
</tr>
<tr>
<td>2</td>
<td>DRM2/6</td>
</tr>
<tr>
<td>3</td>
<td>DRM3/7</td>
</tr>
<tr>
<td>4</td>
<td>DRM4/8</td>
</tr>
<tr>
<td>5</td>
<td>REFGEN</td>
</tr>
<tr>
<td>6</td>
<td>COM / DRMO</td>
</tr>
</tbody>
</table>

- **Step 3-2 For Remote Shutdown**

  1. Put the cable through the plate as shown in Figure 2.5.1-4.
  2. Wiring from the No. 5 and 6 holes respectively.

<table>
<thead>
<tr>
<th>NO</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>REFGEN</td>
</tr>
<tr>
<td>6</td>
<td>COM / DRMO</td>
</tr>
</tbody>
</table>

GoodWe BT series inverter complies with IEC 62109-2 13.9. Fault indicator LED on inverter cover will light up and the system will email the fault information to customer.
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 separate with PE in distribution box. Such as: China, Germany, Czech Republic, Italy, etc. (Please follow local wiring regulations!)

This diagram is an example for application that Neutral connect together with PE in distribution box. Such as: Australia, New Zealand, South Africa, 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.

Please select Breaker according to the specification below:

- 25A/400V AC breaker
- 32A/400V AC breaker
- 40A/600V DC 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](https://www.semsportal.com)
3. Connect Solar-WiFi* to your PC or smart phone(* means the last 8 characters of the inverter serial No.)
4. Open browser and login 10.10.100.253
5. Admin (U): admin; Password: admin
6. Then click “OK”

**Step 1**

1. Click “Start Setup” to choose your router
2. Then click “Next”
3. Fill in the password of the router, then click “Next”
4. Click “Complete”

**Step 2**

Device information

- Firmware version: 1.6.9.3.38.2.1.38
- MAC address: 60:C5:A8:60:33:E1
- SSID: Solar-WiFi
- IP address: 10.10.100.253
- Wireless STA mode: Enable
- Router SSID: WiFi_Burn-in
- Encryption method: WPA/WPA2-PSK
- Encryption algorithm: AES
- Router Password: hellogoodwe

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

HelpWizard will help you to complete setting within one minute.

**Step 3**

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

Please enter the wireless network password:

- Network name (SSID): WiFi Test
- Encryption method: WPA/WPA2-PSK
- Encryption algorithm: AES
- Password (8-63 bytes): hellogoodwe

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

Wi-Fi configuration: Save success!

Click ‘complete’, the current configuration will take effect after reboot.
If you still need to configure the other pages of information, please go to complete your required configuration.
If Configuration is completed, you can log on the Management page to restart device by click on ‘OK’ button.
Confirm to 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:
- 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/](https://en.goodwe.com/)

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.

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.
## 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.

<table>
<thead>
<tr>
<th>ERROR MESSAGE</th>
<th>EXPLANATION</th>
<th>REASON</th>
<th>SOLUTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility Phase Failure</td>
<td>The sequence of On-grid wire is wrong</td>
<td>Inverter detects that phase angle of L2 and L3 are reversed</td>
<td>Reverse connection order of L2 and L3 cable</td>
</tr>
</tbody>
</table>
| Utility Loss          | Not available of public grid power (power lost or on-grid connection fail) | Inverter does not detect the connection of grid   | 1. Check (use multi-meter) if AC side has voltage. Make sure grid power is available.  
2. Make sure AC cables are connected tightly and right well.  
3. If all is well, please try to turn off AC breaker and turn on again after 5 mins. |
| VAC Failure           | Grid voltage is not within permissible range      | Inverter detects that AC voltage is beyond the normal range required by the safety country | 1. Make sure safety country of the inverter is set right.  
2. Check (use multi-meter) if AC voltage (Between L & N) is within a normal range. (Also on AC breaker side)  
   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.  
   b. If voltage is low, make sure AC cable is connected well and the jacket of AC cable is not compressed into AC terminal  
   c. Make sure the grid voltage of your area is stable and within normal range.       |
| FAC Failure           | Grid Efficiency is not within permissible range   | Inverter detects that Grid frequency is beyond the normal range required by the safety country | 1. Make sure safety country of the inverter is set right.  
2. If safety country is right, then please check on inverter display if AC frequency (Fac) is within a normal range.  
3. If FAC failure only appear a few times and resolved soon, it should be caused by occasional grid frequency unstability. |
| 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 | 1. Try to decrease surrounding temperature.  
2. Make sure the installation complies with the instruction on inverter user manual.  
3. Try to close inverter for 15 mins, then start-up again.                              |
| Isolation Failure     | Ground insulation impedance of Battery is too low| Isolation failure could be caused by multi reasons like Battery are not grounded well/D C cable is broken, battery are aged or surrounding humidity is comparatively heavy etc. | 1. Use multi meter to check if the resistance between earth & inverter frame is about zero. If it’s not, Please make the connection between earth & inverter frame well.  
2. If the humidity is very high, there maybe Isolation Failure occur.  
3. Check the resistance between BAT to earth, if the resistance is lower than 33.3k, check the system wiring connection.  
4. Try to restart the inverter, check if the fault is still happens, if not, it means it is just an occasional situation, or contact GoodWe. |
| 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 comparatively heavy etc. | Check (use multi-meter) if there is voltage (normally should be close to 0V) between earth & inverter frame. If the inverter frame voltage is high, please reduce 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 Read 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.

**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)

---

### 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.

---

Note:
For compatible lithium batteries, BMS status is “communication OK” after selecting the right battery company.
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/discharge, 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 put-out 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.
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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 lightening, 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.
• Inverter is installed or operated under improper environment or technical condition mentioned in this user manual, without authority from GoodWe.
• Inverter is disassembled, changed or updated on software or hardware without authority from GoodWe.
• Inverter is out of warranty year and extended warranty is not bought.
• Inverter is broken or damaged by any force majeure like lightening, earthquake, fire hazard, storm and volcanic eruption etc.
• Inverter is disassembled, changed or updated on software or hardware without authority from GoodWe.
• Inverter is out of warranty year and extended warranty is not bought.

4.3 TECHNICAL PARAMETERS AND CERTIFICATES

** TECHNICAL PARAMETERS OF BT INVERTERS**

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>GW5K-BT</th>
<th>GW6K-BT</th>
<th>GW8K-BT</th>
<th>GW10K-BT</th>
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<tbody>
<tr>
<td>Battery Type</td>
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<td>Li-ion</td>
<td>Li-ion</td>
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<td>Battery Voltage Range (V)</td>
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<td>180 – 600</td>
<td>180 – 600</td>
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<tr>
<td>Max. Discharging Current (A)</td>
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<td>Charging Strategy for Li-ion Battery</td>
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<td>Self-adaption to BMS</td>
<td>Self-adaption to BMS</td>
<td>Self-adaption to BMS</td>
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<td>&lt;3%</td>
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<td>Operating Temperature Range (°C)</td>
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<td>0 – 95%</td>
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<td>Nature Convection</td>
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<td>RS485; CAN(***);</td>
<td>RS485; CAN(***);</td>
<td>RS485; CAN(***);</td>
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<td>Grid Regulation</td>
<td>CEI 0-21; VDE-AR-N 4105; C99/1; C100; EN 50438</td>
<td>CEI 0-21; VDE-AR-N 4105; C99/1; C100; EN 50438</td>
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</tr>
</tbody>
</table>

* 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
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

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category I</td>
<td>Applies to equipment connected to a circuit where measures have been taken to reduce transient overvoltage to a low level.</td>
</tr>
<tr>
<td>Category II</td>
<td>Applies to equipment not permanently connected to the installation. Examples are appliances, portables tools and other plug-connected equipment.</td>
</tr>
<tr>
<td>Category III</td>
<td>Applies to a fixed equipment downstream and including the main distribution board. Examples are switchgear and other equipment in an industrial installation.</td>
</tr>
<tr>
<td>Category IV</td>
<td>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.</td>
</tr>
</tbody>
</table>

Moisture Location Category Definition

<table>
<thead>
<tr>
<th>Moisture Parameters</th>
<th>Level</th>
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<tbody>
<tr>
<td></td>
<td>3K3</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>0°C - +40°C</td>
</tr>
<tr>
<td>Moisture Parameters</td>
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Environment Category Definition

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<th>Ambient Temperature</th>
<th>Relative Humidity</th>
<th>Applied to</th>
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<tbody>
<tr>
<td>Outdoor</td>
<td>-20°C - 50°C</td>
<td>4% - 100%</td>
<td>PD3</td>
</tr>
<tr>
<td>Indoor Unconditioned</td>
<td>-20°C - 50°C</td>
<td>5% - 95%</td>
<td>PD3</td>
</tr>
<tr>
<td>Indoor conditioned</td>
<td>0°C - 40°C</td>
<td>5% - 85%</td>
<td>PD2</td>
</tr>
</tbody>
</table>

Pollution Degree Definition

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