# GEH
# 5-10kW Single Phase
# User Manual



V1.0

HYBRID INVERTER

www.gesolarinverter.com

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# 01 Safety and Warning

## 1.1 Symbol Conventions

| | |
|---|---|
| DANGER! | DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury. |
| WARNING! | WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury. |
| CAUTION! | CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. |
| NOTE | NOTE does not indicate any hazardous situation. It supplements description and explanation only. |

**General safety cautions:**

- The documentation may be updated from time to time due to product upgrades or other reasons. Unless otherwise specified, information in the documentation do not replace safety cautions in the labels. All descriptions in the documentation are used for guidance only.
- Please read the user manual carefully to acquire knowledge about product features and safety precautions before installing the equipment. GEP will not be liable for any equipment damages or personnel injuries caused by failure to install, operate or configure the inverter in accordance with this document or corresponding user manual.
- Please follow local laws and regulations, and safety cautions in this manual during the installation, operation, and maintenance. Improper operation or misuse may result in personal injuries or property losses.
- All installation, operation, and maintenance must be carried out by trained professionals who meet the following requirements:
  - read through this manual
  - be familiar with various safety precautions
  - operate properly
  - acquaint with local laws, regulations, and standards.
- To ensure safety, please use insulated tools and wear personal protective equipment when operating the equipment.
- Always comply with electrostatic protection rules. To protect the inverter from being damaged, please wear anti-static gloves, wrist strap and clothes when touching printed circuit board or other electrostatic sensitive components during operation.

**Operation Safety Precautions:**

- The equipment can get hot during operation. Touching the hot surface can result in burn injuries.
- Do not plug or pull DC/AC terminals when the equipment is running.
- PV negative (PV-) and battery negative (BAT-) on inverter side is not grounded by default. Connecting PV- or BAT- to EARTH is strictly forbidden.
- PV modules used on the inverter must have an IEC61730 class A rating, and the total open-circuit voltage of PV string/array is lower than the maximum rated DC input voltage of the inverter. Any damage caused by PV over-voltage is beyond warranty.
- When the inverter leakage current to ground is ≥ 6mA, it can be detected by the built-in RCMU function. Type A (≥ 30mA) residual current device is recommended.

- In Australia, the inverter internal switching does not maintain neutral integrity, which must be addressed by external connection arrangements like in the system connection diagram for Australia.
- 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”.
- Power off the equipment before any cable connection or electrical operation.
- Residual high voltage exists after the equipment is powered off. To avoid electric shock, please wait for 5minutes for the equipment to discharge to safe voltage.
- Destroying the labels without authorization will void the guarantee of corresponding modules.
- If the equipment is not to be installed immediately, put it inside the original package with the desiccant. If the equipment is unpacked but not put into use immediately, seal all unused terminal ports to prevent dust and water vapor corrosion.

**Warranty Declaration:**
- The equipment damage caused by following reasons are not covered by warranty:
- Exceed the guarantee period.
- Improper installation, alteration, transportation or operation.
- The installation or operation environment is beyond the requirements of this manual or local laws and regulations.
- Force majeure (lightening, earthquake, fire disaster, storm or volcanic eruption etc.)
- Unauthorized replacement, dismantle, maintenance or modification of software code.
- Failure to comply with local laws and regulations, and safety precautions in this manual.
- For more warranty conditions, please visit www.gesolarinverter.com.

## 1.2 Symbols Explanation

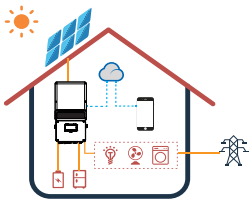
The hybrid or bidirecational solar inverter strictly comply with related safety rules for product design and testing. Please read and follow all the instructions and cautions on the hybrid inverter or user manual during installation, operation or maintenance, as any improper operation might cause personal injury or damage.

| | |
|---|---|
|  | Caution!<br>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 |

# 02 Product Introduction

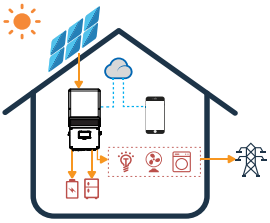
## 2.1 Operation Modes Introduction

The hybrid or bidirecational solar inverter applys to solar system with participation of PV, battery, loads and grid system for energy management. The energy produced by PV system shall be used to optimize self-consumption, excess power charge battery and the rest power could be exported to the grids. Battery shall discharge to support loads when PV power is insufficient to meet self-consumption. If both PV power and battery power is insufficient, the system will take power form grid to support loads.



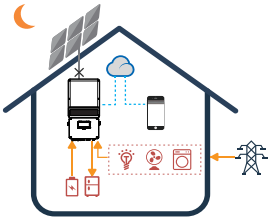
Note: The introduction describes a general behavior of the hybrid or bidirecational solar inverter system. The operation mode can be adjusted on StorageMate APP based on the system layout. Below are the general operation based on the system layout. Below are the general operation modes for the hybrid or bidirecational solar inverter system.

The solar inverter system normally has the following operation modes based on your configuration and layout conditions.



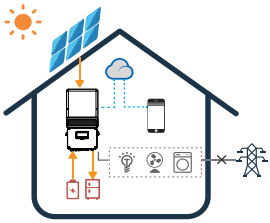
### Mode I

The energy produced by the PV system is used to optimize self-consumption. The excess energy is used to charge the batteries, then exported to gird.



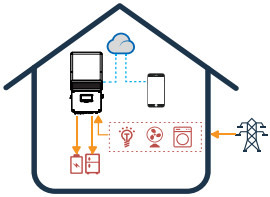
### Mode II

When there is no PV, and the battery is sufficient , It can supply the load with the grid together.



### Mode III

When grid fails , the system automatically switches to Back-Up mode, the Back-Up load could be supported by PV and battery.



### Mode IV

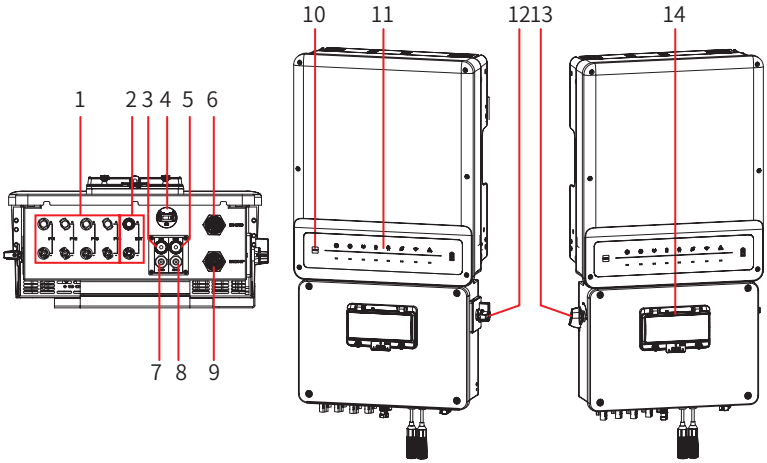
Battery could be charged by grid, and charge time/power could be set flexibly on StorageMate APP.

## 2.2 Model

GEH series inverter models:

- GEH5.0-1U-10
- GEH8.6-1U-10
- GEH10-1U-10

## 2.3 Appearance

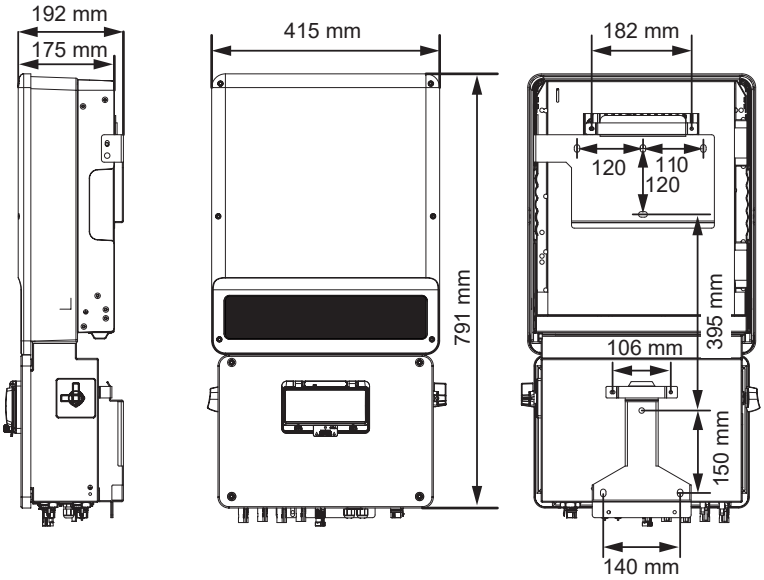



| No. | Part | Description |
|---|---|---|
| 1 | PV input port | To connect PV strings. |
| 2 | Battery input port | To connect the battery. |
| 3 | BMS port | To connect the BMS communication part of the battery. |
| 4 | WiFi/Bluetooth port | To install the WiFi/Bluetooth communication module. |
| 5 | METER port | To connect the meter. |
| 6 | ON-GRID port | To connect to the power grid. |
| 7 | DRED communication port | To connect to DRED for communication. |
| 8 | RS485 port | To connect data monitor devices. When the LG RESU 10H-Type R battery is applied, it's used to connect the enable signal port of the battery. |
| 9 | BACK-UP port | To connect the BACK-UP load. The BACK-UP port of the inverter is designed with uninterruptible power supply function. The inverter will supply power to the load to keep them working when the power grid is disconnected. |
| 10 | WiFi Reset Button | For WiFi Reset and WiFi Reload. |
| 11 | Indicator | To indicate the status of the inverter. |
| 12 | Bypass switch | Turn the switch to "bypass" when the inverter fails to work. The power grid will supply the BACK-UP load. |
| 13 | DC switch | Shutdown the PV system in an emergency. Or switch it off for quick disconnection. |
| 14 | Breaker | • Disconnect the inverter from the grid by ON-GRID breaker.<br>• Disconnect the inverter from the BACK-UP load by BACK-UP breaker |

## 2.4 LED Indicators Explanation

| INDICATOR | COLOR | STATUS | EXPLANATION |
|---|---|---|---|
| SYSTEM | | | ON = System is ready |
| | | | BLINK = System is starting up |
| | | | OFF = System is not operating |
| BACK-UP | | | ON = Back-up is ready / power available |
| | | | OFF = Back-up is off / on power available |
| BATTERY | | | ON = Battery is charging |
| | | | BLINK 1 = Battery is discharging |
| | | | BLINK 2 = Battery is low / soc is low |
| | | | OFF = Battery is disconnected / not active |
| GRID | | | ON = Grid is active and connected |
| | | | BLINK = Grid is active but not connected |
| | | | OFF = Grid is not active |
| ENERGY | | | ON = Consuming energy from grid / buying |
| | | | BLINK 1 = Supplying energy to grid / zeroing |
| | | | BLINK 2 = Supplying energy to grid / selling |
| | | | OFF = Grid not connected or system not operating |
| COM | | | ON = BMS and meter communication ok |
| | | | BLINK 1 = Meter communication ok, BMS communication fail |
| | | | BLINK 2 = BMS communication ok, meter communication fail |
| | | | OFF = BMS and meter communication fail |
| WiFi | | | ON = WiFi connected / active |
| | | | BLINK 1 = WiFi system resetting |
| | | | BLINK 2 = WiFi not connect to router |
| | | | BLINK 4 = WiFi server problem |
| | | | OFF = WiFi not active |
| FAULT | | | ON = Fault has occurred |
| | | | BLINK1 = Overload of back-up / Output / reduce load |
| | | | BLINK4 = CT wiring fault |
| | | | OFF = No fault |

## 2.5 Product Dimension



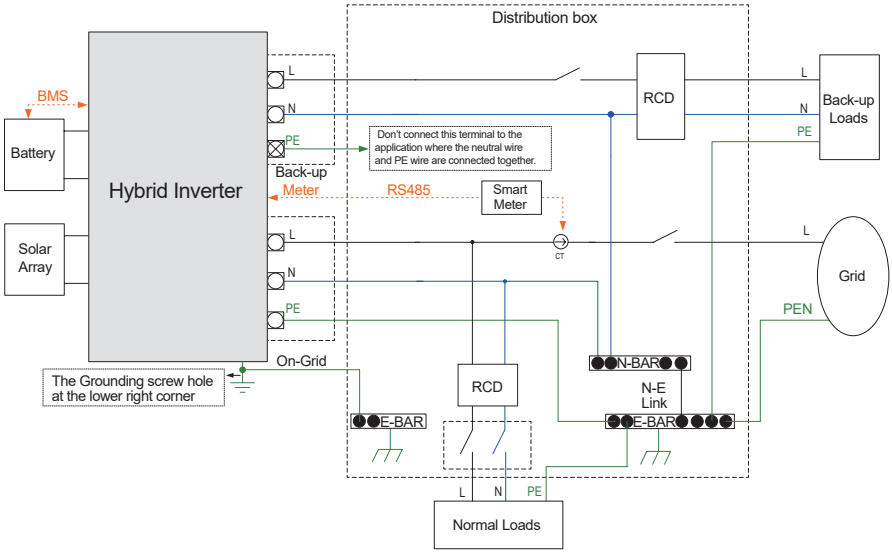
## 2.6 System Connection Diagrams

**WARNING!**

- 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.
- When the inverter is working tied to the grid with its backup function enabled, it will automatically switch to the backup mode if the grid suddenly disconnected. Please confirm that the backup mode is normal.

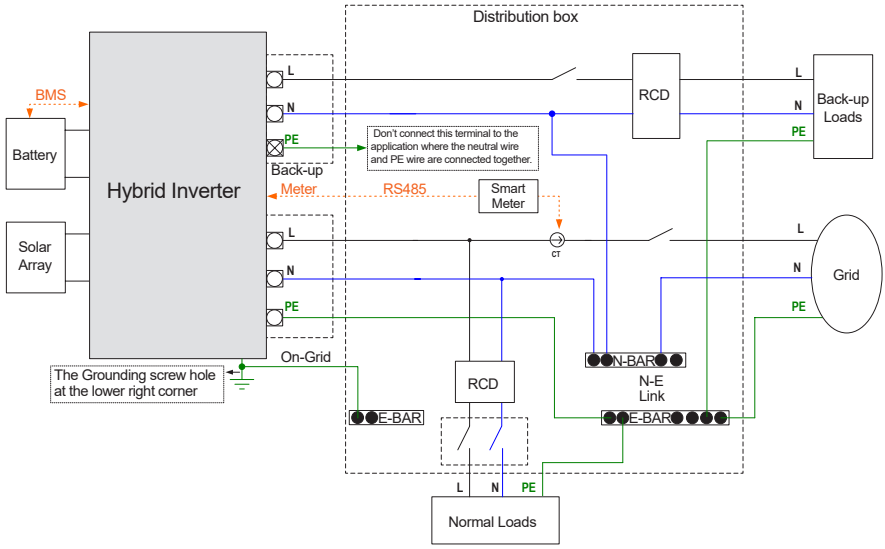
The diagram is an example for application that Neutral connects together with PE in distribution box.

Such as: Australia, New Zealand, etc(Please follow local wiring regulations)



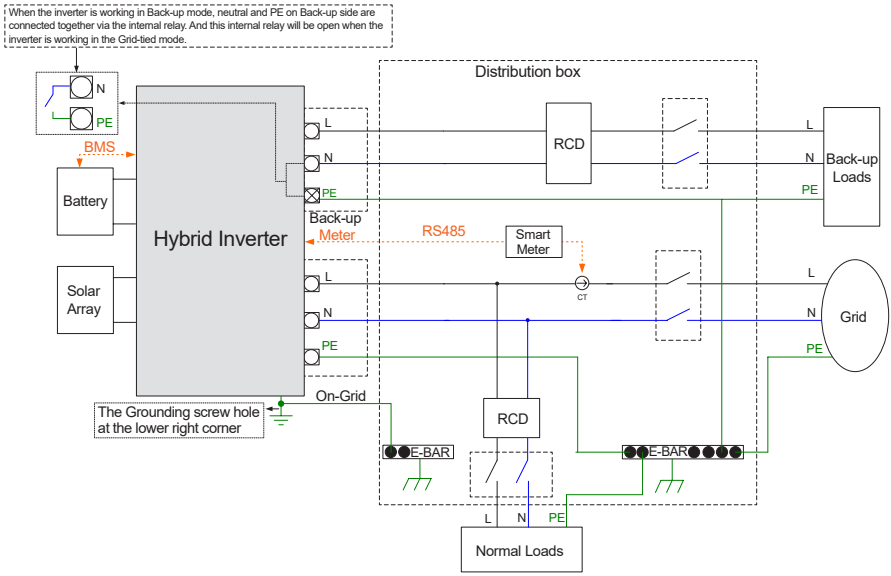
The diagram is an example for application that Neutral separates with PE in distribution box.

Such as: Australia, New Zealand, etc(Please follow local wiring regulations)




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

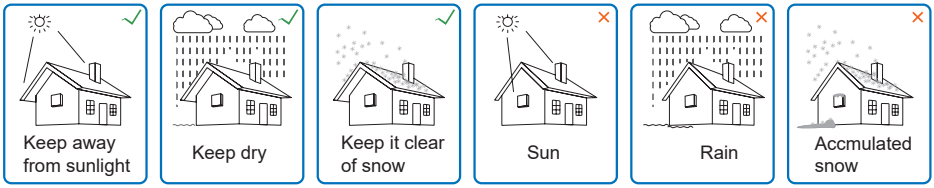
Such as: China,Germany,South Africa, Czech Republic,Italy,Brazil,etc.
(Please follow local wiring regulations)



# 03 Installation Requirements

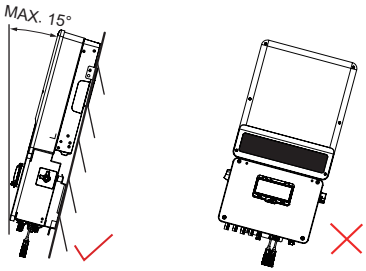
## 3.1 Environment Requirements

- Any part of this system shouldn't block the switch and breaker from disconnecting the inverter from DC and AC power.
- Inverter should be installed at eye level for convenient maintenance.
- Inverter should be installed on a solid surface, where it is suitable for inverter's dimensions and weight.
- Ambient temperature should be lower than 45°C. The temperature and humidity at the installation site should be within the appropriate range (60 °C for outdoor unconditioned with solar effects).
- It is recommanded that the installation of the inverter should be prevented from direct sunlight, snow, rain and other negative influences which may effect product function or lifetime.
- Product label on inverter should be clearly visible after installation. Do not damage the lable.

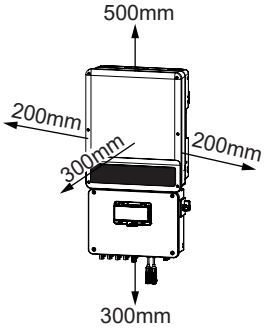



## 3.2 Installation Angle Space Requirements

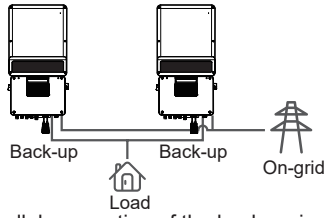
Inverter should be installed vertically or lie on a slope by a max of 15°.



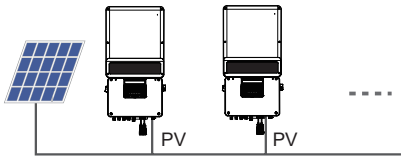

Leave enough space around the inverter according to the below figure for natural heat dissipation.



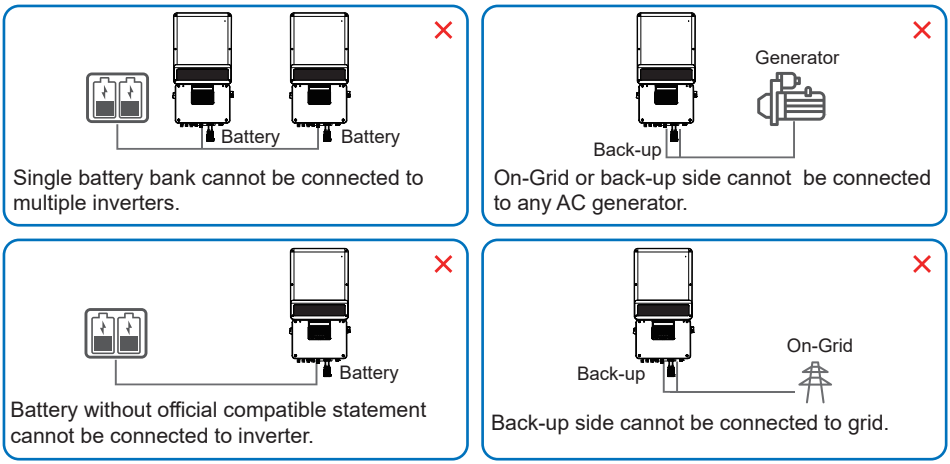

## 3.3 Improper Installation Mode




No parallel connection of the back-up is allowed in general application. Please contact the Service Center first for advanced application.




Single PV string cannot be connected to multiple inverters.




The inverter shall not be used in multiple inverter combinations.

# 04 Installing the Inverter

## 4.1 Packing List




**NOTE**

[1], [2]: Supplied according to PV port numbers.
[3]: Including Quick Installation Guide, User Manual, etc.

## 4.2 Installing the Inverter

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

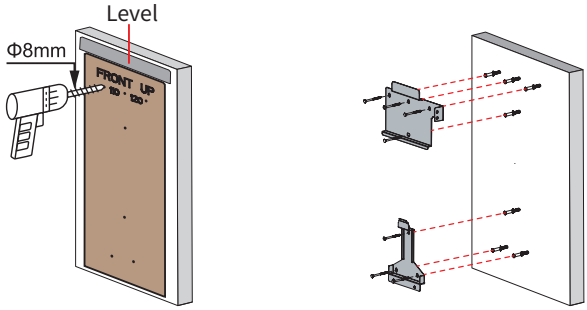
1. Consider the weight of the equipment before moving it. Assign enough personnel to move the

equipment to avoid personal injury.
2. Wear safety gloves to avoid personal injury.
3. Keep balance when moving the equipment.

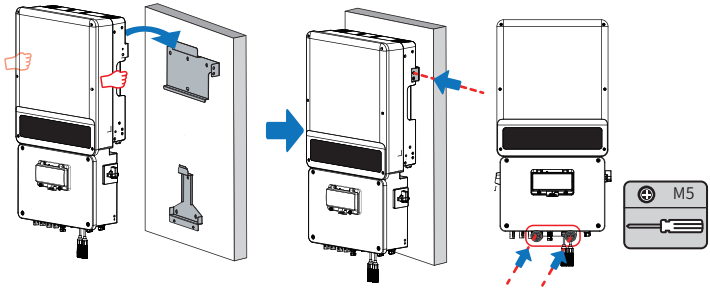
**CAUTION!**

- Do not install the inverter when it is snowing or raining. If you have to, pay attention to the waterproof and moisture-proof of the inverter and distribution box.
- Avoid drilling holes in walls which with cables inside or on the back.

1. Drill holes with the help of installation locating plate.
2. Install the wall-mounted bracket.



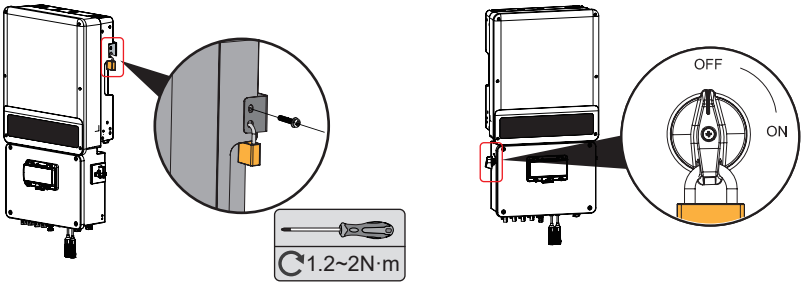

3. Install the inverter.




**WARNING!**

- Do not use force beyond the heatsink sides to avoid damage to the inverter.
- The connection unit cannot lift holding.
- Avoid holding and lifting the connection unit, keep balance of the inverter during moving.

4. Secure the inverter with a lock.
5. Ensure that the switch is on "OFF" position and locked during installation and maintenance. (Applicable in Australia and New Zealand)

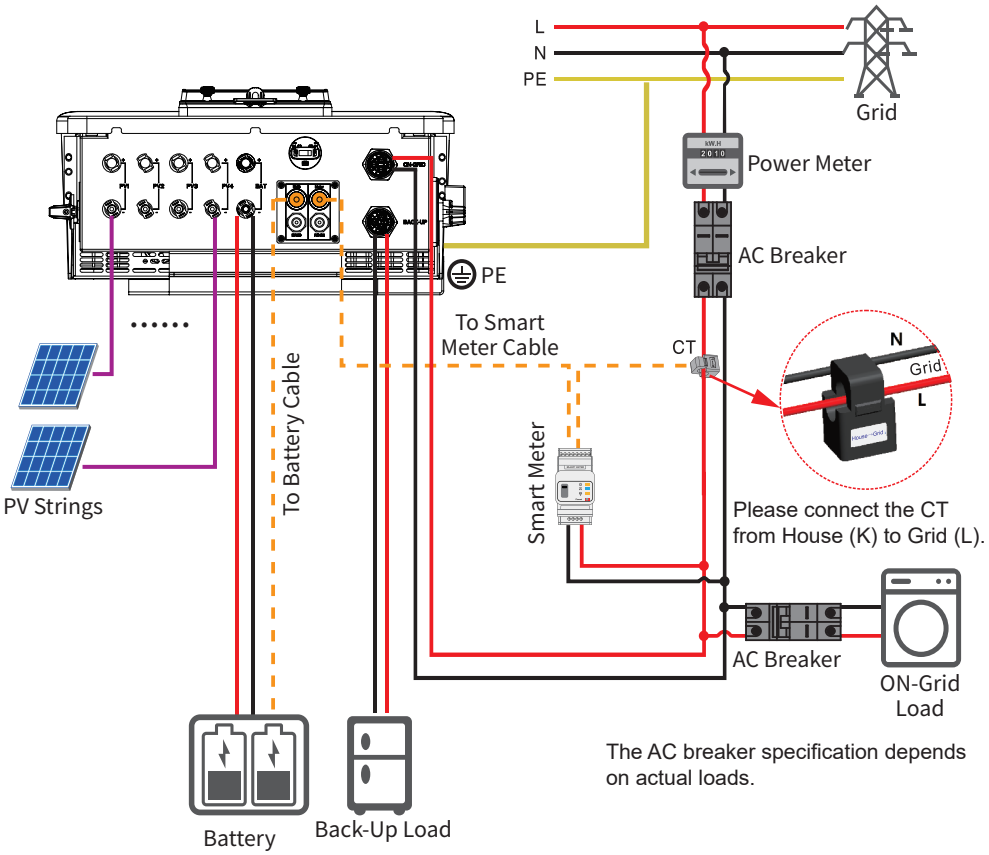


# 05 Electrical Connections

**CAUTION!**

- During wiring connection, the operator should always wear proper PPE.
- The wiring installation must strictly observe correct specification. Otherwise, it may bring waterproof and electrical problems.
- Direction of the CT cannot be connected in reverse, please follow House(K)→Grid (L) direction to do the connection.

## 5.1 Overview of Cable Connections

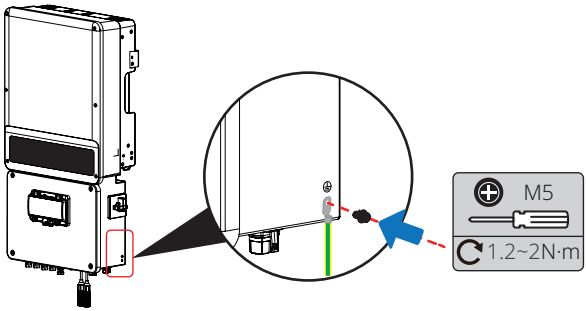



Cable Specifications

| Model | PV Cable | BAT Cable | AC Cable | PE Cable |
|---|---|---|---|---|
| GEH5.0-1U-10 | 3-4mm² | 12-13mm² | 5-6mm² | 5-6mm² |
| GEH8.6-1U-10 | 3-4mm² | 12-13mm² | 10-12mm² | 10-12mm² |
| GEH10-1U-10 | 3-4mm² | 12-13mm² | 10-12mm² | 10-12mm² |

## 5.2 Connecting the PE cable

Ground cable shall be connected to ground plate on grid side.

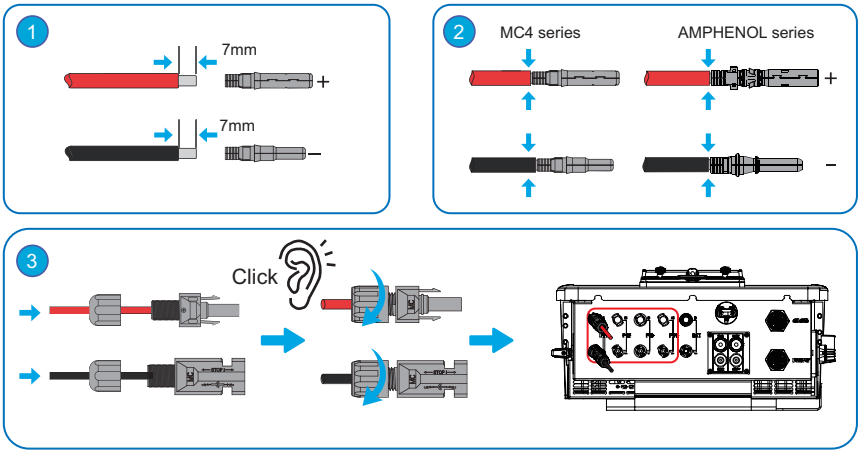



## 5.3 Connecting PV Cables

**CAUTION!**

- The total short-circuit current of PV string must not exceed inverter's max DC current.
- The minmum isolation resistance to ground of the PV string must exceed 19.33kΩ in case of any shock hazard.
- The polarity of PV strings or on the inverter cannot be connected by reversely, otherwise inverter could be damaged.
- PV strings could not connect to earth/grounding conductor.
- Use the right PV plugs in the accessory box. (BAT plugs are similar with PV plugs, please confirm before use it.)
- There will be MC4 or Amphenol plugs in accessory box.

1. Prepare PV cables and PV plugs.
2. Connect PV cable to PV connectors.
3. Screw the cap on and plug onto inverter side.



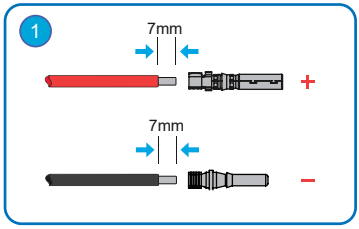

**NOTE**

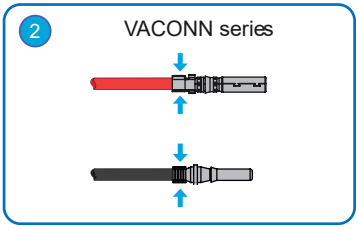
- PV cable must be tightly crimped in to the connectors.
- For Amphenol connector, the limit buckle cannot be pressed.
- There will be a click sound if connectors are inset correctly into PV plugs.

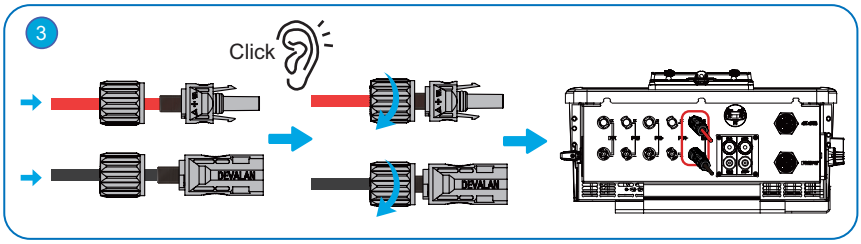
## 5.4 Connecting Battery DC Cables

**CAUTION!**

- Make sure battery breaker is off and battery nominal voltage meet the Hybrid Inverter specification before connecting battery to inverter and make sure inverter is totally isolated from PV and AC power.
- Please be careful against any electric shock or chemical hazard.
- Please following Cments and steps 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 12 to 13 mm² because the maximum battery current is 50A.

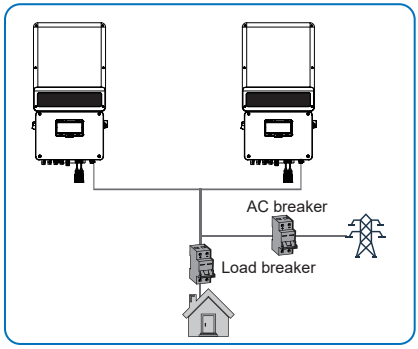


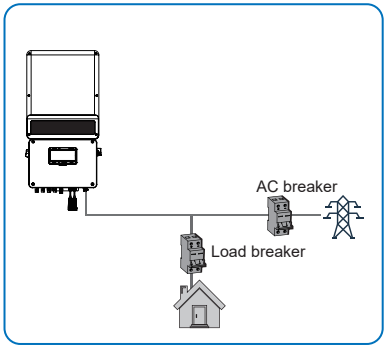




## 5.5 Connecting AC Cables

AC circuit breakers shall be installed on the grid side and the load side. Select the AC breaker according to the actual load.



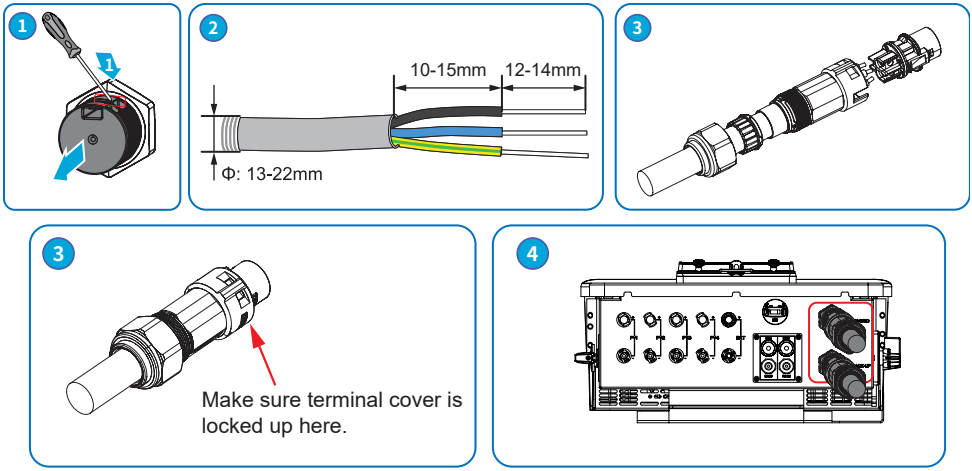



Requirements of AC cable connected to On-Grid and Back-Up side

**WARNING!**

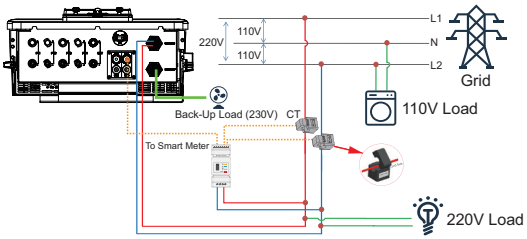
1. Make sure inverter is totally isolated from any DC or AC power before connecting AC cable.
2. The choice of AC cable needs to meet both the outside diameter and conduct core section requirements. Please refer to the table for selecting the AC cable.
3. Neutral cable shall be blue, line cable is black or brown (preferred) and protective earth cable yellow-green.
4. 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.

1. Remove the protective cover.
2. Prepare the terminals and AC cables.
3. Put AC cable through terminal cover and screw the three cables tightly on the connectors.
4. Lock terminal cover and screw up the terminal cap.
5. Connect the assambled AC terminals onto inverter.




**Connection For SPLIT Grid System**

In SPLIT grid system, there is a solution allowing inverter to work under On-Grid condition. But the export power and load power might be detected inaccurately as the nominal output power of inverter is 230V and there could be loads of 110V or 220V.




**Declaration For Back-Up Function**

The below statement lays out the general policies governing the hybrid inverter.

1. For hybrid inverters, 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. GEP 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:

- 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 battery itself, battery current might be limited by some factors including but not limited to the temperature, weather etc.

**Declaration For Back-Up Loads**

The hybrid inverters are able to supply over load output at its' Back-Up. For details please refer to the technical parameters of the hybrid inverter. And the inverter has self-protection derating at high ambient temperature.

**Accepted loads as below:**

- Inductive Load:
  1. For GEH5.0-1U-10, a 1.5P non-frequency conversion air-conditioner can be connect to back-up side.
  2. For GEH8.6-1U-10 and GEH10-1U-10, a 2P non-frequency conversion air-conditioner can be connect to back-up side.
  3. The uninterrupted power supply of the inverter will become unstable if the air conditioner is connected beyond required.
- 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 the Service Center.

**Declaration For Back-Up Overload Protection**

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

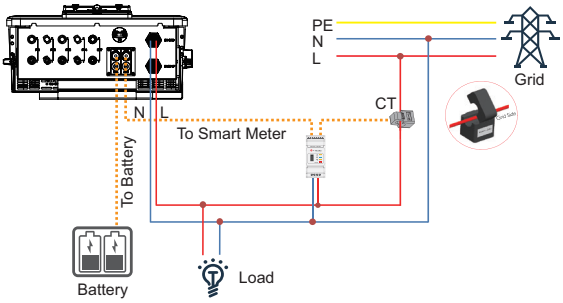
- Decrease Back-Up load power within max limitation.
- On StorageMate APP, choose "Advanced Setting "→ "Reset Back-Up Overload History".

## 5.6 Connecting Communication Cables and Installing CT

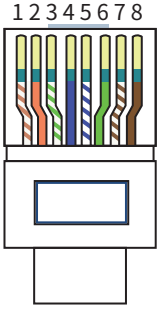
- The Smart Meter with CT in product box is compulsory for the hybrid inverter system installation, used to detect grid voltage and current direction and magnitude, further to instruct the operation condition of the hybrid inverter via RS485 communication.
- Choose standard network cables and RJ45 terminals only for communication.

**CAUTION!**

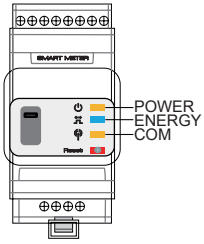
1. Make sure AC cable is totally isolated from AC power before connecting Smart Meter & CT.
2. The Smart Meter and CT is well configured, please do not change any setting on Smart Meter.
3. One Smart Meter can only be used for one hybrid inverter.
4. CT must be connected on the same direction as the CT indicated.




- CT cable is 3m as default, could be extended to max 5m.
- Choose standard network cables and RJ45 terminals only for communication.
- Communication cables of Smart Meter can expand to 100m to ensure normal communication. Normally, BMS communication cables are 3~5M.




| NO. | Color | BMS Function | Smart Meter Function |
|---|---|---|---|
| 1 | Orange&White | 485_A2 | N/A |
| 2 | Orange | N/A | N/A |
| 3 | Green&White | 485_B2 | 485_B1 |
| 4 | Blue | CAN_H | N/A |
| 5 | Blue&White | CAN_L | N/A |
| 6 | Green | N/A | 485_A1 |
| 7 | Brown&White | N/A | 485_B1 |
| 8 | Brown | N/A | 485_A1 |




Smart Meter LED Indications

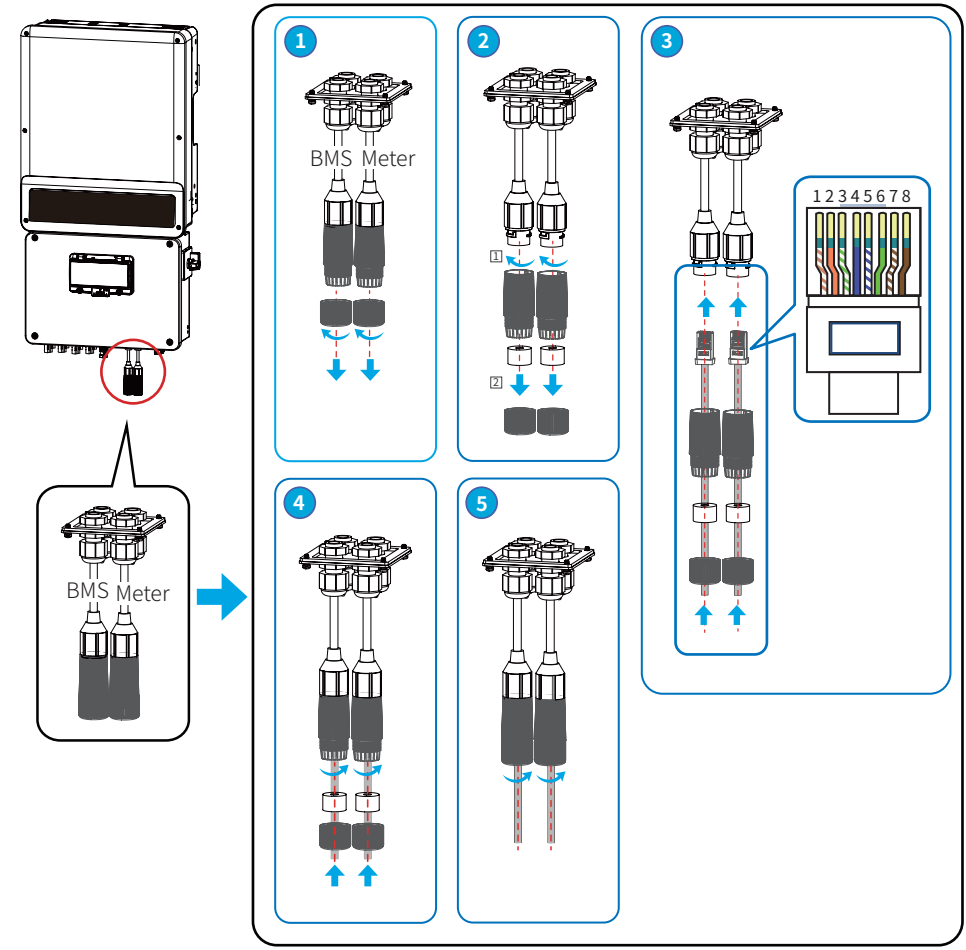
| | OFF | ON | Blinking |
|---|---|---|---|
| POWER | Not working | Working | N/A |
| ENERGY | N/A | Importing | Exporting |
| COM | Blink one time when it transfer data to inverter. | | |

## BMS Connection

BMS is used to communicate with the connected compatible lithium battery. There is a communication cable marked "To Battery" on the inverter.

**Connection steps:**

1. Confirm that the battery and inverter power cables are connected (refer to 5.4 Connecting Battery DC Cables).
2. Connect the BMS communication cable of the inverter to the communication interface of the lithium battery.
3. Select the corresponding battery via the APP (please refer to the user manual of the Storage Mate app).



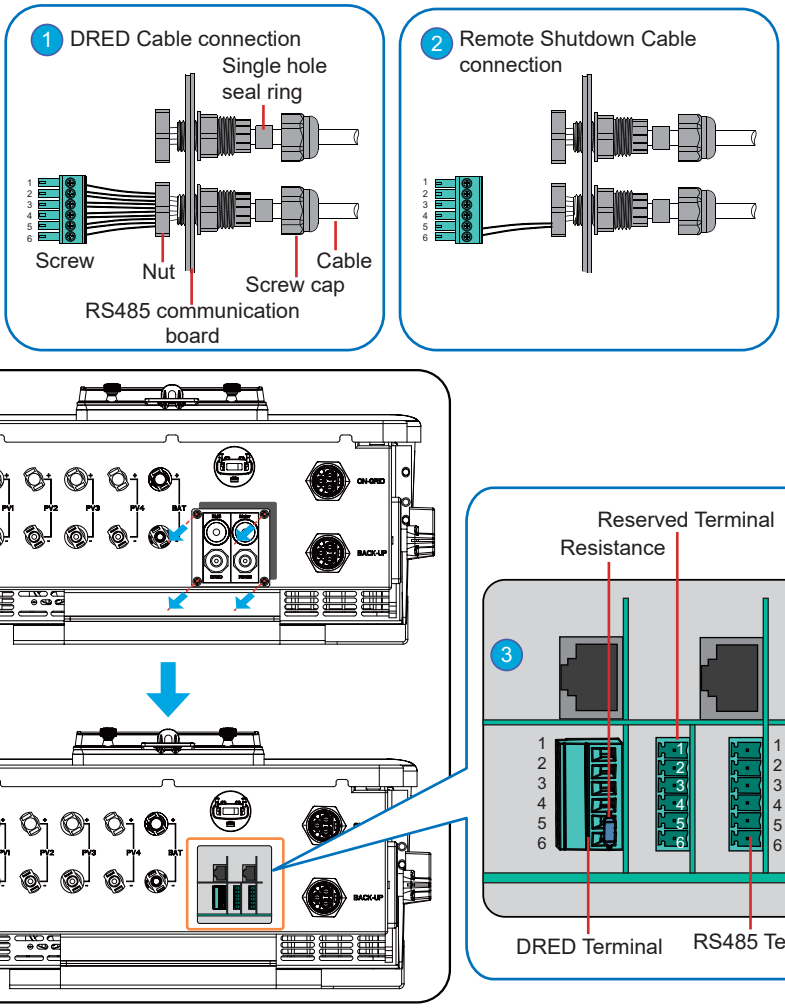

## 5.7 DRED and Remote Shutdown Connection

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 prepared by the customer.

| NO. | DRED port definition | Reserved port definition | RS485 port definition |
|---|---|---|---|
| 1 | DRM1/5 | CANL2 | RS485_B2 [2] |
| 2 | DRM2/6 | CANH2 | RS485_A2 [2] |
| 3 | DRM3/7 | GND-S | LG_EN- [3] |
| 4 | DRM4/8 | 12V-S | LG_EN+ [3] |
| 5 | REFGEN/Remote Shutdown[1] | NODE- | RS485_B1[4] |
| 6 | COM/DRM0/Remote Shutdown[1] | NODE+ | RS485_A1[4] |

**CAUTION!**

- [1]: Please connect to 5/6PIN of DRED port if Remote Shutdown is applied.
- [2]: Connect BMS to this port if a battery with RS485 port is selected.
- [3]: For LG RESH10-TypeR battery, connect the BMS cable to RS485_A2/B2 port and connect the enable cable to LG_EN+ and LG_EN-.
- [4]: Used to connect the data monitoring device.
- The RS485 port shall be connected in the same way as the DRED port.
- If the DRED and Remote Shutdown functions are not used, make sure that the Resistance is inserted into the DRED Terminal.




## 5.8 Earth Fault Alarm Connection

The 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.

Inverter should be installed at eye level for convenient maintenance.

## 5.9 Startup/shutdown Procedure

DC switch is used to cut off PV input power while the breaker equipped on the battery is used to cut off battery power.
When you want to shut down the inverter during an event, you shall turn off the inverter DC switch and the battery DC breaker.
When you want to start-up the inverter after rectification, you shall turn on the inverter DC switch and the battery DC breaker.

# 06 Parameter Configuration

## 6.1 Checking Before Turning On AC Power

1. Battery Connection: Confirm the connection between inverter and battery, polarity (+/-) are not reversed.
2. PV Input Connection: Confirm the connection between inverter and PV, polarity (+/-) are not reversed.
3. On-Grid & Back-Up Connection: Confirm ON-GRID connection to power grid and Back-Up to loads, polarity (L/N are in sequence) not reversed.
4. Smart Meter & CT Connection: Make sure Meter & CT are connected house loads and grid, and follow the Smart Meter direction sign on CT.

## 6.2 StorageMate App Operation

### 6.2.1 Basic Settings

StorageMate is an external monitoring and configuration application for hybrid inverters and is used on smart phones or tablets for both Andriod 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 StorageMate 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 opertaion instructions, please refer to StorageMate user manual in www.gesolarinverter.com.

StorageMate app

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 StorageMate user manual.

**WiFi Reset & Reload**

WiFi Reset & Reload function is only used when:
1. WiFi lost connection to internet or cannot connect to StorageMate App successfully.
2. Cannot find “Solar-WiFi signal” or have other WiFi configuration problem.
3. Please do not use this button if WiFi monitoring works well.

- WiFi Reset means restarting WiFi module, WiFi settings will be reprocessed and saved automatically. Short press RESET button, WiFi LED on inverter will blink for a few seconds.
- WiFi Reload means setting WiFi module back to default factory setting. Long press RESET button (longer than 3s), WiFi LED on inverter will blink until doing WiFi configuration again.

### 6.2.2 CEI Auto-Test Function

PV Auto-Test function of CEI is integrated in StorageMate App for Italy safety country requirement. For detailed instruction of this function, please visit https://www.gesolarinverter.com for "StorageMate App User Manual".

### 6.2.3 RSD Function

The inverter supports the RSD function, which is optional and requires a quick shutdown device. Once the DC switch is turned off, the PV module can be quickly turned off.

### 6.2.4 Inverter Arc Detection (Optional)

An electric arc is a gas discharge phenomenon. An instantaneous spark caused by an electric current passing through some insulating medium (such as air).

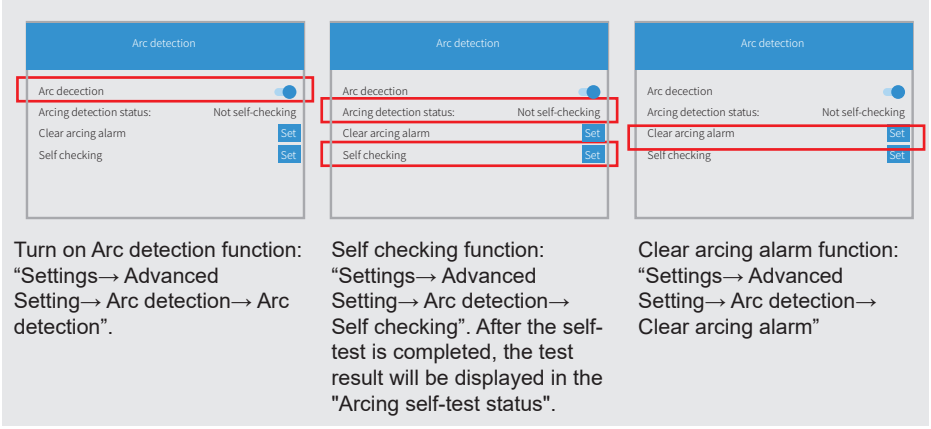
**The cause of the electric arc:**

• Connector is not connected well in photovoltaic system
• Incorrect or broken cable connection
• Deterioration of connectors and cables due to aging of photovoltaic systems

Arcs generate heat which can cause fires and they also pose an electrocution risk to those working near them.

**Use of the arc detection function**

The Arc decetion function is integrated in the hybrid inverter. Once an arc is detected, the corresponding error and time will be reported in the App. The first 4 faults of the inverter within 24 hours can be resolved by automatic recovery or manual recovery. After the 5th arc fault the inverter must be stopped. Only after the site troubleshooting or the problem components are replaced, and the fault error is manually cleared, can the machine work normally. AFCI function needs to be operated in StorageMate App:




Turn on Arc detection function: “Settings→ Advanced Setting→ Arc detection→ Arc detection”.

Self checking function: “Settings→ Advanced Setting→ Arc detection→ Self checking”. After the self-test is completed, the test result will be displayed in the "Arcing self-test status".

Clear arcing alarm function: “Settings→ Advanced Setting→ Arc detection→ Clear arcing alarm”

**NOTE**

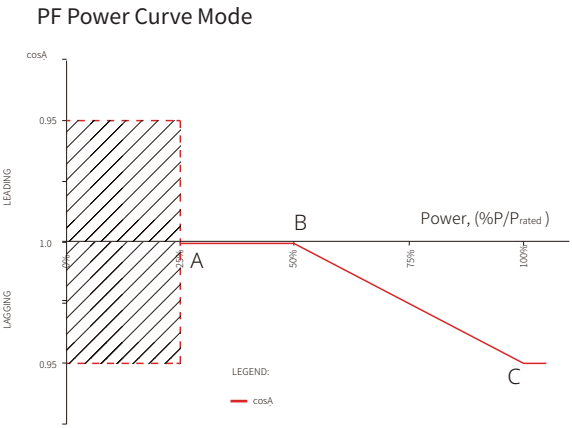
Since the arc detection fuction is optional, StorageMate will remind you it's Unactivated if the function is not activated in the inverter you purchased. Please contact service center to activate the arc detection funtion if you need.

### 6.2.5 Safety Parameter Settings

Set the QU curve, PU curve, and PF power curve in StorageMate. Please contact the service center if you need to set them. (For Australia and New Zealand only)

Steps to set the curves: "**Settings→Advanced Setting→Custom safety parameters→Curve setting**"



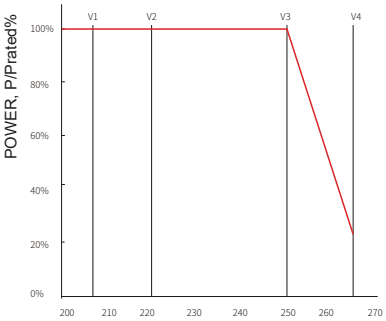




| PF Power Curve Mode | | | |
|---|---|---|---|
| Function | Default value (Australia) | Default value (New Zealand) | Setting range |
| B %P/Prated | 50% | 50% | 30%~80% |
| C Power factor | 0.9 | 0.9 | 0.8-1 |

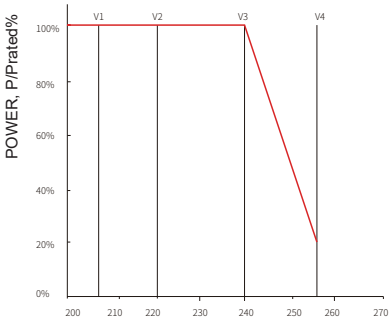
Power Recovery Slope

| Power Recovery Slope | | |
|---|---|---|
| Function | The default value (Australia & New Zealand) | Setting range |
| Rising slope | 16.67%Pn/min | 5-100%Pn/min |
| Falling slope | 16.67%Pn/min | 5-100%Pn/min |

PU curve Mode




Example curve for a volt-watt response mode (Australia)

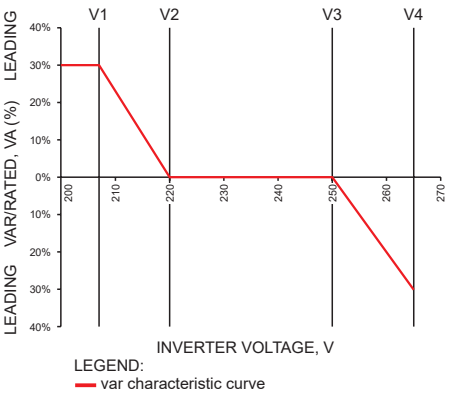


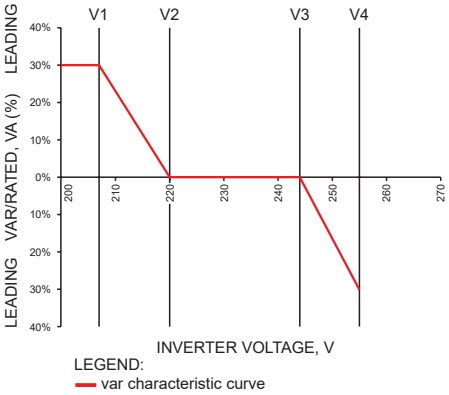

Example curve for a volt-watt response mode (New Zealand)

| PU curve Mode (Discharge) | | | |
|---|---|---|---|
| Function | Default value (Australia) | Default value (New Zealand) | Setting range |
| V1 voltage ratio | 207V | 207V | Not applicable |
| P1 power ratio | 100%*Pn | 100%*Pn | 0-100%*Pn |
| V2 voltage ratio | 220V | 220V | 216 to 230 |
| P2 power ratio | 100%*Pn | 100%*Pn | 0-100%*Pn |
| V3 voltage ratio | 250V | 244V | 235 to 255 |
| P3 power ratio | 100%*Pn | 100%*Pn | 0-100%*Pn |
| V4 voltage ratio | 265V | 255V | 244 to 265 |
| P4 power ratio | 20%*Pn | 20%*Pn | 0-20%*Pn |

| PU curve Mode (Charge) | | | |
|---|---|---|---|
| Function | Default value (Australia) | Default value (New Zealand) | Setting range |
| V1 voltage ratio | 207V | 207V | Not applicable |
| P1 power ratio | 0%*Pn | 0%*Pn | Not applicable |
| V2 voltage ratio | 220V | 220V | 216 to 230V |
| P2 power ratio | 100%*Pn | 100%*Pn | 0-100%*Pn |
| V3 voltage ratio | 250V | 244V | 235 to 255 |
| P3 power ratio | 100%*Pn | 100%*Pn | 0-100%*Pn |
| V4 voltage ratio | 265V | 255V | 244 to 265 |
| P4 power ratio | 100%*Pn | 100%*Pn | 0-100%*Pn |

QU curve Mode




| QU curve Mode | | | |
|---|---|---|---|
| Function | Default value (Australia) | Default value (New Zealand) | Setting range |
| V1 voltage ratio | 207V | 207V | Not applicable |
| Q1 reactive power ratio | 30% leading | 30% leading | 0 to 60% leading |
| V2 voltage ratio | 220V | 220V | 216 to 230 |
| Q2 reactive power ratio | 0% | 0% | 0% |
| V3 voltage ratio | 250V | 244V | 235 to 255 |
| Q3 reactive power ratio | 0% | 0% | 0% |
| V4 voltage ratio | 265V | 255V | 244 to 265 |
| Q4 reactive power ratio | 30% lagging | 30% lagging | 0 to 60% lagging |

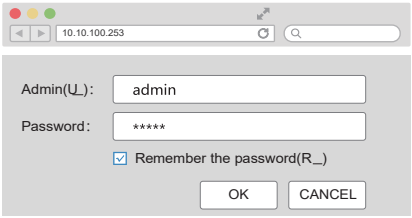
## 6.3 WiFi Configuration

This part shows the configuration using a web page.
Wi-Fi configuration is absolutely necessary for online monitoring and maintenance.

Preparation:
1. The inverter must be powered up with battery or grid power.
2. A router with internet access to the website https://portal.gesolarinverter.com is required.

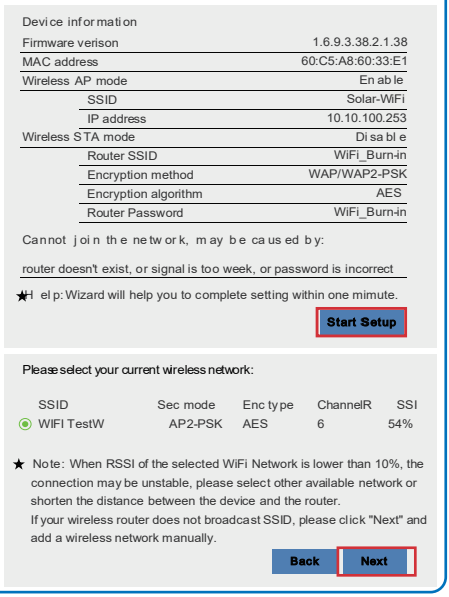
### Step 1

1. Connect Solar-WiFi* to your PC or smart phone (* means the last 8 characters of the inverter serial No.) Password:12345678.
2. Open browser and login 10.10.100.253; Admin (U): admin; Password: admin
3. Then click “OK”



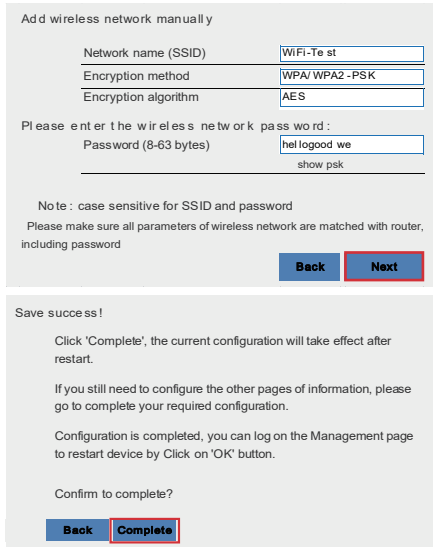

### Step 2

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




### Step 3

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




**NOTE**

Please make sure the password, Encryption Method/Algorithm is right the same with the router’s.
If everything is right well, the WiFi LED on inverter will change from double blink to quartic blink then to solid status, which means WiFi is connected to GE Solar Inverte Portal successfully.
WiFi configuration could also be done on Power Sight app, details please check on Power Sight app.

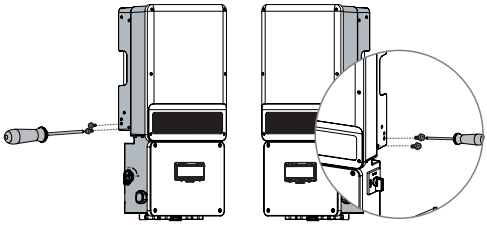
# 07 Maintenance

| Maintaining Item | Maintaining Method | Maintaining Period |
|---|---|---|
| System Clean | Check the heat sink, air intake, and air outlet for foreign matter or dust. | Once 6-12 months |
| DC Switch | Turn the DC switch on and off ten consecutive times to make sure that it is working properly. | Once a year |
| Electrical Connection | Check whether the cables are securely connected. Check whether the cables are broken, or whether there is any exposed copper core. | Once 6-12 months |
| Sealing | Check whether all the terminals and ports are properly sealed. Reseal the cable hole if it is not sealed or too big. | Once a year |
| THDi Test | For Australia requirements, in the THDi test, there should add Zref between inverter and mains.<br>L:0.24 Ω + j0.15 Ω; N:0.16 Ω +j0.10 Ω<br>L:0.15 Ω + j0.15 Ω ; N:0.1 Ω + j0.1 Ω | As needed |
| Fan | Check the fan for proper working status, low noise, and intact appearance. | Once a year |

The fans should be cleared yearly. Before clearing or replacing the fans, turn off all switches including battery switch and AC breaker switch.

Step 1

Rotate DC switch in “OFF” position.
Remove 4 screws by cross screwdriver.



Step 2

Separate the plug terminal by pressing the buckle.

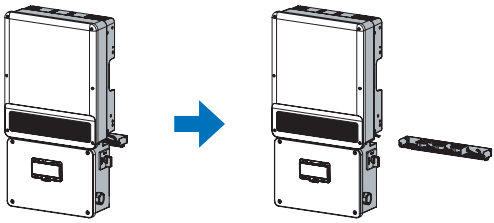


Step 3

Clean the ventilation grid and the fan with soft brush, paint brush, or compressed air.

Reassemble the fans into the cabinet.

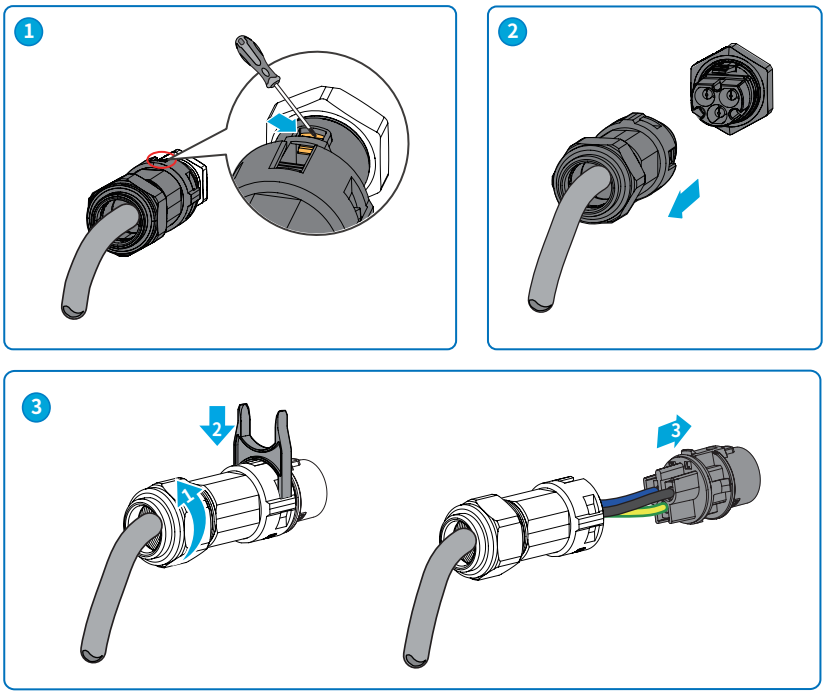
If there is something wrong with the fan and need to be repaired or replaced, disassemble the fans following the above steps.



**Remove AC and ON-GRID terminals**

CAUTION!

1. Disconnect all electrical connections of the inverter.
2. Ensure that the inverter is powered off.
3. When operating the inverter, please wear personal protective equipment.



# 08 Troubleshootings

## 8.1 Error Message

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

| Error Message | Explanation | Reason | Solutions |
|---|---|---|---|
| Utility Loss | Public grid power is not available (power lost or on-grid connection fails) | Inverter does not detect the connection of grid | 1. Check (use multi-meter) if AC side has voltage . Make sure grid power is available.<br>2. Make sure AC cables are connected tightly and well.<br>3. If all is well, please try to turn off AC breaker and turn on again in 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.<br>2. Check (use multi-meter) if the AC voltage (Between L & N) is within a normal range (also on AC breaker side)<br>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.<br>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.<br>3. Make sure the grid voltage of your area is stable and within normal range. |
| 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 | 1. Make sure the safety country of the inverter is set right.<br>2. If safety country is right, then please check on the inverter display if AC frequency (Fac) is within a normal range.<br>3. If FAC failure only appears a few times and is resolved soon, it should be caused by occasional grid frequency unstability. |
| PV Over Voltage | PV voltage is too high | The total voltage (open-circuit voltage) of each PV string is higher than the max DC input voltage of the inverter. | Check if PV string Voc is lower than Max PV input voltage of the inverter.If Voc of PV string is high, please decrease panels to make sure Voc is within the max DC input voltage of the inverter. |
| Over Temperature | Temperature inside of the inverter is too high | The inverter's working environment leads to a high temperature condition | 1. Try to decrease surrounding temperature.<br>2. Make sure the installation complies with the instruction on inverter user manual.<br>3. Try to close the inverter for 15 mins, then start up again. |

| Error Message | Explanation | Reason | Solutions |
|---|---|---|---|
| EEPROM R/W Failure | N/A | 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 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. |
| DC Bus High | BUS voltage is over-high | N/A | 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 24). |
| AC HCT Check Failure | The inverter's AC HCT check failure. | Inverter hardware current sensor failure. | Try to restart the inverter, check if it still occurs. If not, it is an occasional situation. Otherwise , contact after-sales immediately. |
| AFCI Fault | AFCI module detected a failure. | AFCI self-test is abnormal or an arc occurs on the PV terminal of the inverter. | 1. If it is the first time this problem has occurred, clear arc fault by App and restart the inverter. If not, it means it is caused by an occasional situation.<br>2. If the problem persists, check whether connectors or cables in a PV system are improperly connected or are damaged. Unplug all the wires and reconnect or replace the damage cable, Then restart the inverter. If the fault still occurs, contact after-sales. |
| GFCI Device Check Failure | GFCI Device Check Failure | GFCI device failure | Try to restart the inverter. Check if the fault still occurs. If not, it means it is caused by an occasional situation, or contact after-sales. |

| Error Message | Explanation | Reason | Solutions |
|---|---|---|---|
| Isolation Failure | Ground insulation impedance of PV string is too low | Isolation failure could be caused by multiple reasons like that the PV panels are not grounded well, DC cable is broken, PV panels are aged or surrounding humidity is comparatively heavy, etc. | 1. Use multi-meter to check if the resistance between earth & inverter frame is close to zero. If it's not, please ensure that the connection is well.<br>2. If the humidity is too high, isolation failure may occur.<br>3.Check the resistance between PV1+/ PV2+/PV3+/PV4/+BAT+/PV- to earth. If the resistance is lower than the minimum isolation resistance shown in the table( chapter 2.4.2 ) , check the system wiring connection.<br>4. Try to restart the inverter.Check if the fault still occurs. If not, it means it is caused by an occasional situation, or contact after-sales. |
| Ground I 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 | N/A | The 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. |

## 8.2 FAQ

| NO. | Problems | Solutions |
|---|---|---|
| 1 | The inverter does not start up with battery only. | Make sure the voltage of battery is higher than 100V, otherwise battery cannot start inverter up. |
| 2 | The inverter not started up with PV only. | 1. Make sure the voltage of PV is highter than 100V (need 200V to enter on-grid mode).<br>2. Make sure the connection between Inverter and PV panels: polarities are (+/-) not reversed. |
| 3 | The inverter doesn't discharge or output without PV or when PV is lower than load power. | 1. To check whether the CT is installed correctly, Meter test can be performed in StorageMate.<br>2. Make sure load power is higher than 100W.<br>• Battery will not discharge continuously unless load power is higher than 100W.<br>• If battery does not discharge when Meter power is higher than 100W, please check CT connection and direction.<br>3. Make sure SOC (State of charge) is higher than 1-DOD (Depth of discharge). Or if battery discharges to below 1-DOD, battery will only discharge again when SOC charged to (20%+1-DOD)/2 (if the battery discharge is needed immediately, the user should restart battery).<br>4. Check on App whether the charge time has already been set, as during charge time, battery will not discharge (battery will charge in priority during coincident time of charge/discharge). |
| 4 | Battery does not charge when PV power higher than load power. | 1. Check the discharge time setting on App.<br>2. Check if battery is fully charged or not, or if battery voltage reaches "charge voltage" or not. |
| 5 | High power fluctuation on battery charge or discharge. | 1. Check if there is a fluctuation on load power.<br>2. Check if there is a fluctuation on PV power. |
| 6 | Battery does not charge. | 1. Make sure BMS communication is OK on StorageMate App.<br>2. Check if CT is connected in the right position and connected to right direction . |
| 7 | Why cannot search Solar-WiFi signal on smart phone? | Normally Solar-WiFi signal could be searched right after inverter powered up. But Solar-WiFi signal will disappear when the inverter connected to internet. If need to change settings, can connect to the router to change. If cannot see WiFi signal even not connect to router, then please try to reload WiFi. |
| 8 | Why cannot connect Solar-WiFi signal on my phone? | It is the character of the WiFi 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. |
| 9 | Why battery does not discharge when grid is not available, while it discharges normally when grid is available? | On APP, Off-Grid output and Back-Up function should be turned on to make battery discharge under Off-Grid mode. |

| NO. | Problems | Solutions |
|---|---|---|
| 10 | Why there is no output on Back-Up side? | For Back-Up supply, the “Back-Up Supply” on StorageMate 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.<br>Note: As turn “Off-Grid Output Switch” on, don’t restart inverter or battery, otherwise the function will switch off automatically. |
| 11 | On Portal, why battery SOC has a sudden jump up to 95%? | This normally happens on when BMS communication fail on lithium. If battery enter float charge, SOC will be reset to 95% compulsively. |
| 12 | Why battery cannot be fully charged to 100%? | Battery will stop charge when battery voltage reaches charge voltage set on StorageMate APP. |
| 13 | Why battery switch always trip when starts it up (Lithium battery)? | The switch of lithium battery normally trips for following reasons:<br>1. BMS communication fails.<br>2. Battery SOC is too low, battery trips to protect itself.<br>3. An electrical short-cut happened on battery connection side. Or other reasons please contact the Service Center for details. |
| 14 | Which battery should I use for the hybrid inverter? | For the inverter, it could connect lithium batteries which have compatibility with the inverter with nominal voltage from 80V to 495V. Compatible lithium batteries can see on battery list in StorageMate App. |
| 15 | Why Cannot save settings on StorageMate App. | This could be caused by losing connection to Solar-WiFi .<br>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.<br>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. |
| 16 | On the App, why the data on the homepage and Param page is different, like charge/discharge, PV value, load value or grid value? | 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. |
| 17 | On App, some columns show NA, like battery SOH, etc. why is that? | 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. |
| 18 | How to Act Output Power Limit function? | For the hybrid inverter system, the function could be realized by:<br>1. Make sure Smart Meter connection and communication well.<br>2. Turn on Export Power Limit function and set the max output power to grid on APP.<br>Note: If out-put power limit set as 0W,then there might still have deviation max 100W exporting to grid. |

| NO. | Problems | Solutions |
|---|---|---|
| 19 | Why there is still power exporting to grid after I set power limit as 0W? | Export limit could theoretically to minimum 0W, but there will have a deviation of around 100W for the hybrid inverter system. |
| 20 | Can I use other brand Meter to take over Smart Meter in the hybrid inverter system or change some settings on Smart Meter? | 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. |
| 21 | What is the max current allowed going through CT on Smart Meter? | The max current for CT is 120A. |
| 22 | Is there a quick way to make the system work? | The shortest way, please refer to GEH 5-10KW SINGLE PHASE QUICK INSTALLATION INSTRUCTIONS. |
| 23 | 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? | 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 the Service Center for suggestions. |

If there's any problem cannot be solved by the above solutions, contact the Service Center for help.

# 09 Technical Parameters and Certificates

| Technical Data | GEH5.0-1U-10 | GEH8.6-1U-10 | GEH10-1U-10*6 |
|---|---|---|---|
| **Battery Input Data** | | | |
| Battery Type | Li-Ion (BYD HVM&HVS, LG RESU 10H-Type R, GOODWE LX S-H) | | |
| Nominal battery voltage (V) | 350 | 350 | 350 |
| Battery Voltage Range (V) *1 | 80~495 | | |
| Max. Charging Current (A) | 50 | | |
| Max. Discharging Current (A) | 50 | | |
| Max charge power (W) | 5000 | 8600 | 9600 |
| Max discharge power (W) | 5250 | 9030 | 10080 |
| Charging Strategy for Li-Ion Battery | Self-adaption to BMS | | |
| **PV String Input Data** | | | |
| Max. DC Input Power (W) | 7500 | 12900 | 15000 |
| Max. DC Input Voltage (V)*2 | 600 | | |
| MPPT Range (V)*3 | 80~550 | | |
| Start-up Voltage (V) | 95 | | |
| MPPT Range for Full Load (V) | 200~500 | 255~500 | 300~500 |
| Nominal DC Input Voltage (V) | 380 | | |
| Max. Input Current (A) | 13/13/13 | 13/13/13/13 | |
| Max. Short Current (A) | 16.3/16.3/16.3 | 16.3/16.3/16.3/16.3 | |
| Max. Backfeed Current to The Array (A) | 0 | 0 | |
| No. of MPP Trackers | 3 | 4 | |
| No. of Strings per MPP Tracker | 1/1/1 | 1/1/1/1 | |
| **AC Output Data (On-grid)** | | | |
| Nominal Output Voltage (Vac) | 230 Australia/220 Brazil | | |
| Output Voltage Range (V) | 0~300 | | |
| Nominal Output Frequency (Hz) | 50 Australia/60 Brazil | | |
| AC Grid Frequency Range (Hz) | 45~55 | | |
| Nominal Apparent Power Output to Utility Grid (VA) | 5000 | 8600 | 9500(@220Vac)<br>10000(@230Vac) |
| Max. Apparent Power Output to Grid (VA)*4 | 5000 | 8600 | 9500(@220Vac)<br>10000(@230Vac) |
| Max. Apparent Power from Grid (VA) | 6000 | 10000 | 10000 |
| Max. AC Current Output to Grid (A) | 23 | 39 | 43.5 |
| Max. AC Current From Grid (A) | 27 | 45.5 | 45.5 |
| Nominal Output Current (A) | 23 | 39 | 43.5 |

| Technical Data | GEH5.0-1U-10 | GEH8.6-1U-10 | GEH10-1U-10*6 |
|---|---|---|---|
| Max. Output Fault Current(peak and duration) (A) | 60(10us) | 105(10us) | 105(10us) |
| Inrush Current(peak and duration) (A) | 60(10us) | 105(10us) | 105(10us) |
| Maximum output overcurrent protection (A) | 56.5 | 95 | 95 |
| Output Power Factor | ~1 (Adjustable from 0.8 leading to 0.8 lagging) | | |
| Output THDi (@Nominal Output) | <3% | | |
| **AC Output Data (Back-up)** | | | |
| Nominal Output Voltage (V) (Vac) | 230 (±2%) | | |
| Nominal Output Frequency (Hz) | 50 Australia/60 Brazil (±0.2%) | | |
| Automatic Switch Time (ms) | <10 | | |
| Output THDv (@Linear Load) | <3% | | |
| Back-up Nominal apparent power (VA) | 5000 | 8600 | 9500(@220Vac)<br>10000(@230Vac) |
| Max. Continuous Output Apparent Power(VA) | 5000 | 8600 | 9500(@220Vac)<br>10000(@230Vac) |
| Peak Output Apparent Power (VA) *4 | 6000, 60sec | 10320, 60sec | 12000, 60sec |
| Nominal Output Current (A) | 21.7 | 37.4 | 43.5 |
| Max. Continuous Output Current (A) | 23 | 39 | 43.5 |
| Max. Output Fault Current(peak and duration) (A) | 60(10us) | 105(10us) | 105(10us) |
| Inrush Current(peak and duration) (A) | 60(10us) | 105(10us) | 105(10us) |
| Maximum output overcurrent protection (A) | 56.5 | 95 | 95 |
| **Efficiency** | | | |
| PV Max. Efficiency | 97.6% | | |
| PV CEC Efficiency | 97.0% | | |
| European Efficiency | 97.0% | | |
| Max. Battery to Load Efficiency | 96.5% | | |
| Battery Charged By PV Max. Efficiency | 98.2% | | |
| Battery Charge/discharge to AC Max. Efficiency | 96.5% | | |
| **Protection** | | | |
| PV Arc Fault Detection | Optional | | |
| Rapid Shutdown System (RSS) Transmitter | Optional | | |
| DC&AC Breaker, AC Bypass Switch | Integrated | | |
| AC&DC SPD Type II | Integrated | | |

| Technical Data | GEH5.0-1U-10 | GEH8.6-1U-10 | GEH10-1U-10[*6] |
|---|---|---|---|
| Anti-islanding Protection | Integrated | | |
| PV String Input Reverse Polarity Protection | Integrated | | |
| Insulation Resistor Detection | Integrated | | |
| Residual Current Monitoring Unit | Integrated | | |
| Output Over Current Protection | Integrated | | |
| Back-up Output Short Protection | Integrated | | |
| Output Over Voltage Protection | Integrated | | |
| Battery Input Reverse Polarity Protection | Integrated | | |
| **General Data** | | | |
| Operating Temperature Range(°C) | -35~60 | | |
| Relative Humidity | 0~95% | | |
| Operating Altitude (m) | ≤4000 | | |
| Cooling | Intelligent Fan | | |
| Noise (dB) | <50 | | |
| User Interface | LED & APP(WiFi&Bluetooth) | | |
| DC&AC Power Connect Port | MC4 & ADAPTER WIELAND | | |
| Communication with BMS | RS485; CAN | | |
| Communication with Meter | RS485 | | |
| Communication with EMS | RS485 (Insulated) | | |
| Communication with Portal | Wi-Fi | | |
| Communication with RSD | SUNSPEC | | |
| Weight | 28.8kg | 32.3kg | |
| Size (Width*Height*Depth mm) | 415 * 791 * 175 | | |
| Mounting | Wall Bracket | | |
| Protection Degree | IP65 | | |
| Standby Self Consumption (W)[*5] | <20 | | |
| Topology | Non-isolated | | |
| DC Connector | MC4 | | |
| AC Connector | MC4 | | |
| Protective class | I | | |
| Environmental Category | 4K4H | | |
| Storage environments(°C) | -40~85°C | | |
| Pollution Degree | III | | |
| Overvoltage Category | PV II / AC III | | |

| Technical Data | GEH5.0-1U-10 | GEH8.6-1U-10 | GEH10-1U-10*6 |
|---|---|---|---|
| The Decisive Voltage Class (DVC) | Battery: C<br>PV: C<br>AC: C<br>Com: A | | |
| Active anti-islanding method | AFDPF+ AQDPF*7 | | |
| Type of electrical supply system | Single phase TN/TT system | | |
| Certifications & Standards | | | |
| Grid Regulation | Australia: AS/NZS 4777.2; Brazil: ABNT NBR 16149:2013 ABNT NBR 16150:2013 ABNT NBR IEC 62116:2012 | | |
| Safety Regulation | IEC62109-1&-2 | | |
| EMC | EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, EN 61000-3-11, EN 61000-3-12 | | |

*1: Battery discharge/charge power limited by voltage.
*2: Inverter will not work when PV input voltage ≥585V.
*3: When there is no battery connected, inverter starts feeding in only if string voltage is higher than 200V.
*4: Can be reached only if PV and battery power is enough.
*5: No Back-up Output.
*6: The model name does not represent the rated power, please refer to the marked parameters for details.
*7: AFDPF: Active Frequency Drift with Positive Feedback, AQDPF: Active Q Drift with Positive Feedback.

# 10 Appendix

**Other Tests**
For Australian requirements, in the THDi test, Zref should be added between the inverter and mains.
RA, XA for the line conductor
RN, XN for the neutral conductor
Zref:
RA = 0, 24, XA = j0,15 at 50Hz
RN = 0, 16, XN = j0,10 at 50Hz

Protection category definition

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 |

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 euiquipment 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. |

Pollution degree definition

| | |
|---|---|
| **Pollution Degree I** | No pollution or only dry, non-conductive polllution 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. |

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## Global Sales & Service Network

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