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GEP 12-60KW THREE PHASE USER MANUAL



Ver.1.1

SOLAR INVERTER

www.gesolarinverter.com

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1 Symbols



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



Danger of high voltage & electric shock



Don't touch, hot surface!



This side up - The package must always have the arrows point up



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



Fragile



Recyclable materials



Special disposal instructions



Keep Dry



Refer to operation instructions



Wait at least 5 minutes after disconnecting the inverter before handling internal parts



CE mark.

2 Safety Measures & Warning

This manual contains important instructions for GEP series inverter that shall be followed during installation of the inverter.

The GEP series for Three or Six MPPT, Three-Phase solar inverter without transformer, which consists of GEP12-L-10, GEP15-L-10, GEP20-L-10, GEP25-10, GEP30-10, GEP36-10, GEP29.9-10, GEP30-L-10, GEP35-L-10, GEP50-10 and GEP60-10 model type.

GEP Series have been designed and tested strictly according to the international safety regulation. As electrical and electronic equipment, safety instructions related to them must be complied with during installation, commissioning, operation. Incorrect or improper work may result in damage to:

1. The life and well-being of the operator or a third party.
2. The inverter and other properties that belong to the operator or a third party. Therefore the following safety instructions must be read and always kept in mind prior to any work. All detailed work-related safety warnings and notes will be specified at the critical points in corresponding chapter.

All installation and electrical work must only be performed by qualified personnel. They have:

- Been trained specially.
- Already completely read through and understood the manual and related documents.
- Be familiar with safety requirements for electrical systems.

The inverter must be installed and maintained by professionals in compliance with local electrical standards regulations and the requirements of local power authorities or companies.

- Improper handling of this device will pose a risk of injury.
- Always follow the instructions contained in the manual when moving or positioning the inverter.
- The weight of the equipment can cause injuries, serious wounds or bruise if improperly handled.
- Please install it in a place beyond children's reach.
- Prior to installing and maintaining the inverter, it is crucial to make certain that the inverter is not electrically connected.
- Before maintaining the inverter, disconnect the connection between the AC grid and the inverter first, and then disconnect the connection between the DC input and the inverter, you should wait at least 5mins after these disconnection in case of electric shock.
- All cables must be firmly attached, undamaged, properly insulated, and adequately dimensioned.
- The temperature of some parts of the inverter may exceed 60°C during operation. To avoid being burnt, do not touch the inverter during operation. Let it cool before touching it.
- Without permission, opening the front cover of the inverter is not allowed. Users should not touch/replace any components of the inverter except the DC/AC connectors. Manufacturer will not bear any consequences caused by unauthorized actions which will lead to potential injury to people and damage to inverters.

- Static electricity may damage electronic components. Appropriate method must be adopted to prevent such damage to the inverter; otherwise the inverter may be damaged and the warranty will be annulled.
- Ensure that the output voltage of the proposed PV array is lower than the maximum rated input voltage of the inverter; otherwise the inverter may be damaged and the warranty will be annulled.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- When exposed to sunlight, the PV array will generate very high voltage which can cause electrical shock hazard. Please strictly follow the instruction we provided.
- PV modules should have an IEC61730 class A rating.
- Prohibit inserting or pulling the AC or DC terminals when the inverter is operational. Or the inverter will be destroyed.

Only DC connectors provided by Manufacturer are permitted for use, otherwise the inverter may be damaged and the warranty will be annulled.

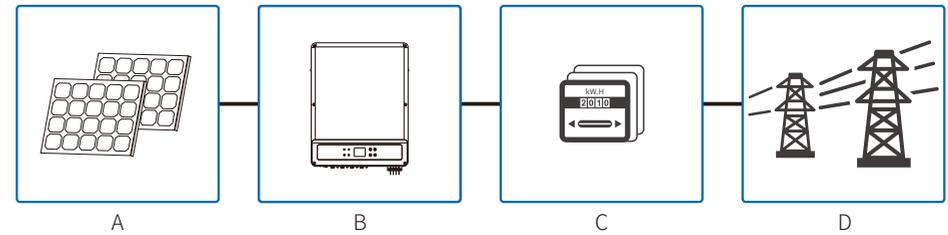
- The inverter can exclude the possibility of DC residual currents to 6mA in the system, Where an external RCD is required in addition to the built-in RCMU, type A RCD must be used to avoid tripping.
- The default photovoltaic module is not grounded.
- It is recommended to add a fuse when there is more than two PV string inputs into one MPPT.

The IP65 premise is that the machine is completely sealed. Please install it within one day after unpacking, otherwise please block the unconnected port and do not open it to ensure that the machine is not exposed to water and dust.

3 Product Introduction

3.1 Intended Usage

The GEP series which is a Three or Six MPPT, three phase transformer-less grid-connected inverter which is a crucial unit between the PV string and the utility grid in the PV power system. Inverter is dedicated to converting directing current generated by the PV module into alternating current, and feeding it into the utility grid, this conforms to parameters of the local utility grid. The intended usage of inverter is illustrated in the below figure.

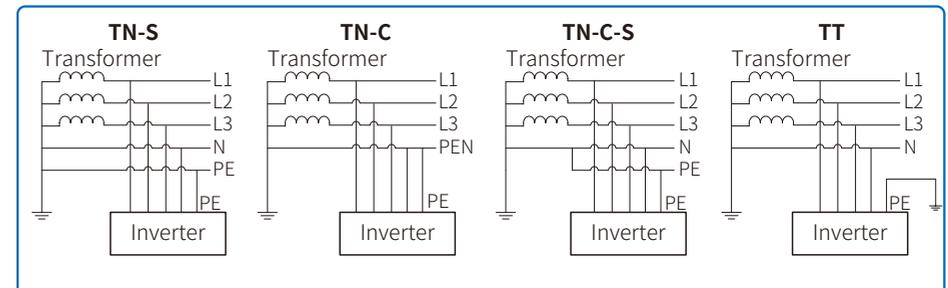


⚠ The reason why the inverter can't be connected to the PV module is that the positive or negative terminal should be grounded, except when a transformer has been used between the inverter and grid.

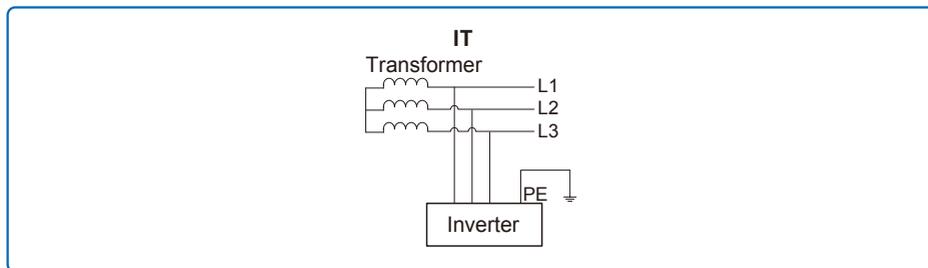
| Item | Description | Note |
|------|--------------|---|
| A | PV string | Monocrystalline silicon, polycrystalline silicon and others. |
| B | Inverter | GEP Series |
| C | Meter device | Meter cupboard with distributed generation system |
| D | Utility grid | TN-S, TN-C, TN-C-S, TT, IT (different Model types with different types of utility grid as below) |

GEP series

GEP12-L-10, GEP15-L-10, GEP20-L-10, GEP25-10, GEP30-10, GEP36-10, GEP29.9-10, GEP30-L-10, GEP35-L-10, GEP50-10, GEP60-10 support four different types (TN-S, TN-C, TN-C-S, TT) of grid. please refer to the below figure.



When neutral wire of inverter is not connected to grid, "Delta Grid" should be selected in grid type(IT) setting page.



3.2 Inverter Overview

3.2.1 GEP series inverter illustration

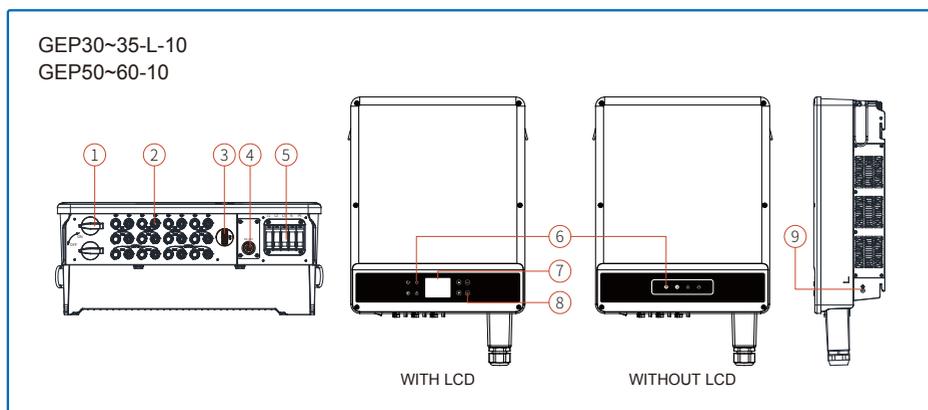
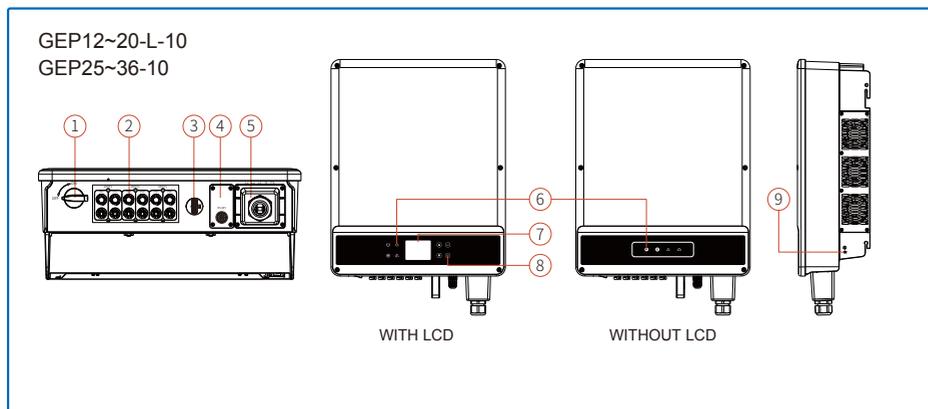


Image shown here is for reference only, actual product you receive may differ.

| Item | Name | Description |
|------|-----------------------------------|--|
| 1 | DC Switch (optional) | During normal operation it is in "on" state, it can shut down the inverter after it is disconnected from the grid by the AC breaker. |
| 2 | PV Input Port | For PV string connection |
| 3 | WiFi | WiFi For connection |
| 4 | RS485&DRED&USB Communication Port | For RS485 And DRED And USB Communication |
| 5 | AC output port | For AC cable connection |
| 6 | LED indicator light | Display the state of the inverter |
| 7 | LCD display screen | Inverter operation data viewing and parameter configuration. |
| 8 | Buttons | For configuration and viewing parameters. |
| 9 | Air Outlet | Exit of hot air during the inverter operation. |

3.2.2 DC Switch

The DC switch is designed such that the DC input can be disconnected safely.

The inverter works automatically when the input and output meet the requirements. Rotating the DC switch to "OFF" position will immediately cut off the flow of DC current. Rotate the DC switch to "ON" position before starting the inverter.

3.3 Technical Description

3.3.1 Principle Description

PV string voltage is transmitted to DC BUS via BOOST circuit.

The GEP series is equipped with Three or Six MPPTs for Six, Twelve DC inputs to ensure that the maximum power is utilized even in different PV installation condition.

DC/AC converter circuit convert DC power into AC power, which can be fed into the utility.

Protective circuit are designed to protect the inverter safety and human safety.

DC switch is integrated to allow for a safe disconnection from the DC input. The inverter provides standard interface RS485, WIFI for communication. Inverters also provide running recode data display, parameter configuration via LCD panel. For the main block diagram please refer to chapter 7.2.

3.3.2 Function Description

Inverter functions can be grouped as following.

1. Conversion function

Inverter converts direct current power into alternating current power, which conforms to the grid requirement of its installation country.

2. Data storage and display

Inverter stores the running information and fault records and display them on the LCD screen.

3. Parameter configuration

Inverter provides various parameter configurations for optional operation.

4. Communication interface

Inverter provides standard RS485 communication interface.

5. Protection functions

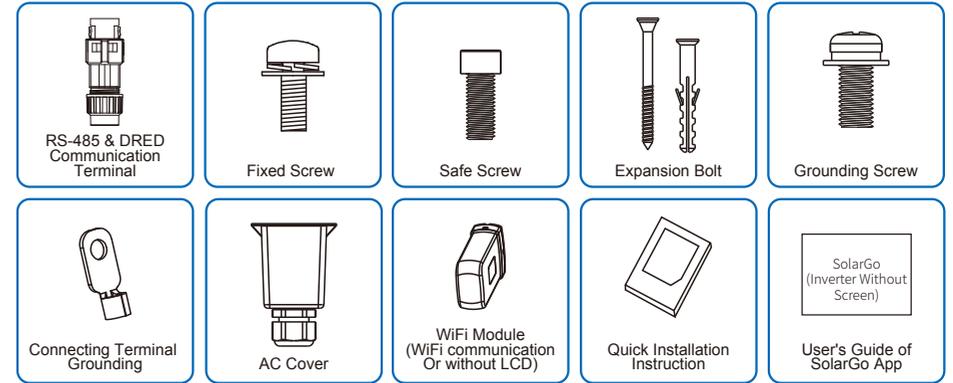
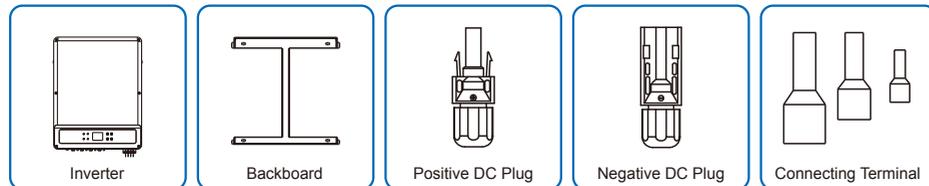
- > Insulation resistance to ground surveillance.
- > Input voltage monitor
- > Residual current monitoring unit
- > Anti-islanding protection
- > PV array string fault monitoring
- > DC switch
- > DC SPD
- > AC SPD
- > SPD fault monitoring
- > AC over current protection
- > Insulation monitoring

3.4 Package

3.4.1 Unpacking And Inspection

The unit is thoroughly tested and strictly inspected before delivery. Damage may still occur during shipping.

1. Check the package for any visible damage upon receiving.
2. Check the inner contents for damage after unpacking.
3. Check the Package list and it is shown as below:



3.4.2 Identify The Inverter

A nameplate is attached on the one side of the inverter. It provides the information about the type of the inverter along with the most important specifications, marks of certifications, website and serial number, which are all identified by manufacturer.

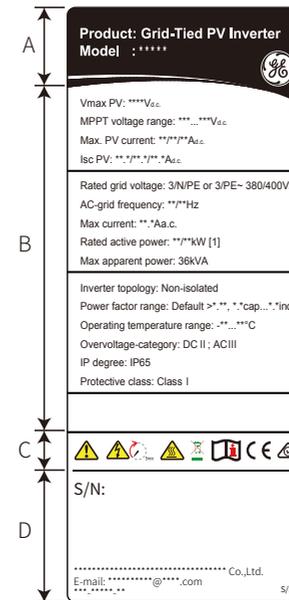


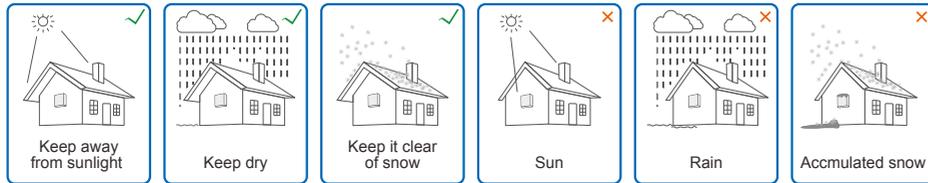
Image shown here is for reference only, the received products may be different.

| Item | Description |
|------|--|
| A | Logo and inverter's type |
| B | Technical data of the inverter |
| C | Marks of certification institution of inverter |
| D | S/N No. and company's name, website and origin |

4 Installation

4.1 Mounting Instructions

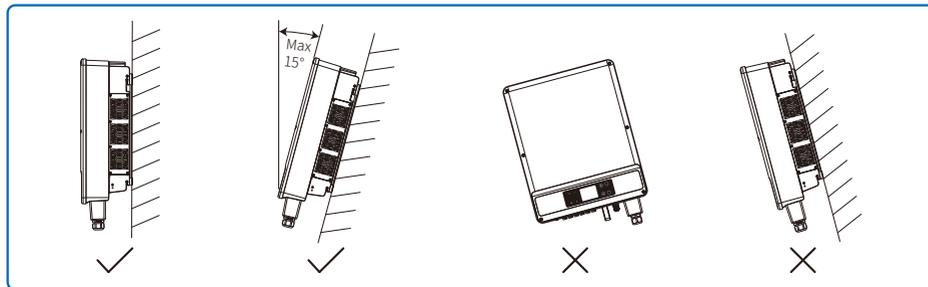
1. In order to achieve optimal performance, the ambient temperature should be lower than 45°C.
2. For easy maintenance, we suggest to install the inverter at eye level.
3. Inverters should not be installed near flammable and explosive items. Strong electro-magnetic charges should be kept away from installation site.
4. Product label and warning symbols should be placed at a location that is easy to read by the users.
5. Make sure to install the inverter at a place where it is protected from direct sunlight, rain and snow.



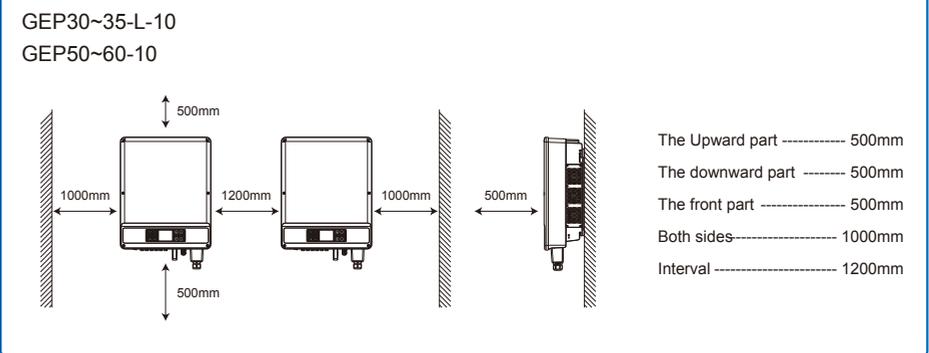
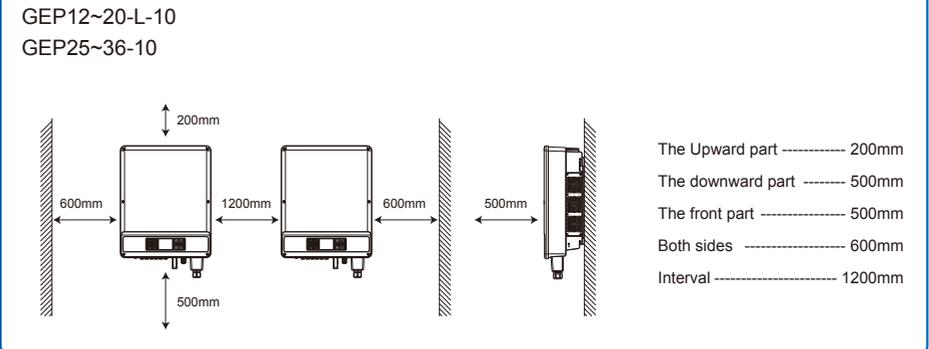
4.2 Equipment Installation

4.2.1 Select The Installation Location

1. Take the bearing capacity of the wall into account. The wall (such as concrete walls and metal structures) should be strong enough to hold the weight of the inverter over a long period of time.
2. Install the unit where it is accessible to service or do the electrical connection.
3. Do not install the unit on the wall of flammable material.
4. Make sure the installation location is well ventilated.
5. Inverters should not be installed near flammable or explosive items. Any strong electro-magnetic equipment should be kept away from installation site.
6. Install the unit at eye level to for convenient operation and maintenance.
7. Install the unit vertically or tilted backwards of no more than 15 degrees, and wiring area should be facing downwards. Horizontal installation requires more than 250mm off the ground.

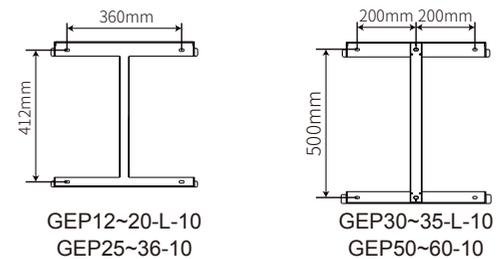


To ensure heat dissipation and convenient disassembly, the minimum clearance around the inverter should not be less than the following values.

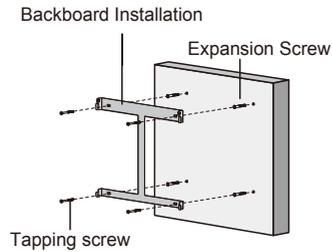


4.2.2 Mounting Procedure

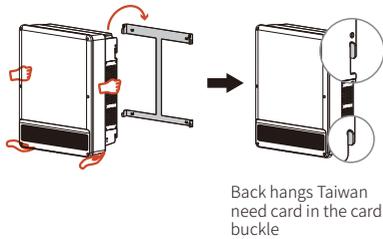
Step 1: Use back hangs Taiwan locates, hole on the wall, 10 mm in diameter, depth of 80 mm, the size of the hole as shown in the figure below.



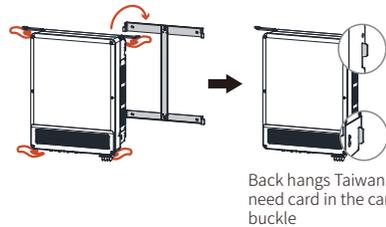
Step 2: with the expansion of the accessory package the screw back on the wall.



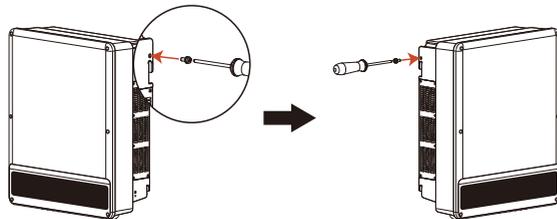
Step 3: two people holding will on both sides of the inverter in the back flip chart.



If equipped with a hand, please install the handle to the inverter, then as shown in the figure below Inverter to hang in the back flip chart.



Step 4: the accessory bag on both sides of the security screw locking to inverter, make its fixed on the flip chart.



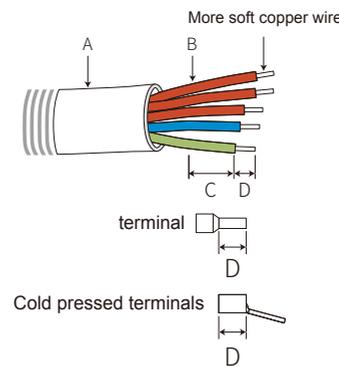
! Two mounting holes in the middle of the wall-mounted bracket are only used for single column installation, other environments may not be used.

4.3 Electrical Installation

4.3.1 AC side lines connection

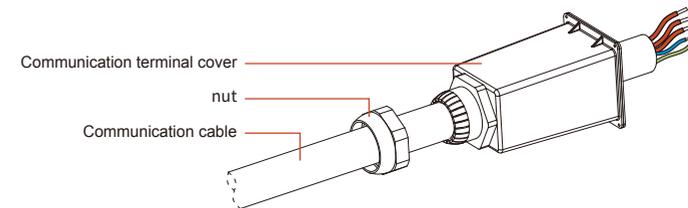
1. Measure the voltage and frequency of the grid access point, determine the grid specifications conform to the inverter.
2. Suggest increase the ac circuit breaker or fuse, the specification of ac output more than 1.25 times the rated current.
3. The inverter of PE line (ground) must be reliable grounding, ensure that the impedance between the zero line and ground wire is less than 10 ohms.
4. Disconnect the inverter and grid access point of the circuit breaker or fuse.
5. It is recommended to use copper wire, if you need to use aluminum wire, please consult the inverter manufacturers.
6. Follow these steps to connect the utility and inverter.

Step 1: Choose the appropriate communication cable and wire stripping out, specifications, please refer to the table below.



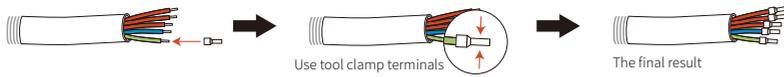
| Grade | Description | Value |
|-------|----------------------------------|---|
| A | Wire diameter | GEP12~20-L-10/GEP25~36-10: 22~30mm GEP30~35-L-10/GEP50~60-10: 30~40mm |
| B | Cross-sectional area of the wire | GEP12~20-L-10/GEP25~36-10: 10 ~ 25 was 16 was recommended to use copper wire GEP30~35-L-10/GEP50~60-10: 35 ~ 50 was 50 was recommended to use copper wire, aluminum wire suggested was 70 As cable diameter and distribution terminals, or cable for aluminium wire, please contact our service personnel |
| C | Wire length | About 40 mm |
| D | Bare wire length | About 20 mm |

Step 2: Remove the ac wiring cover from the accessory bag and wiggled nut, and then communication cable through the parts as shown.

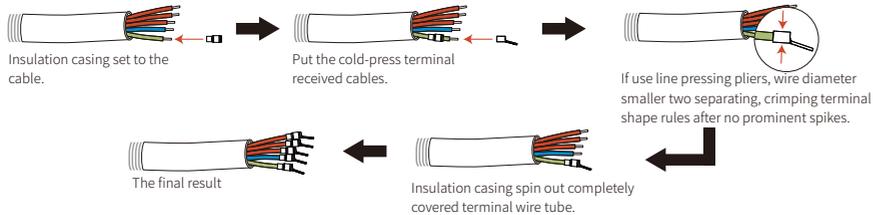


Step 3: From the accessory bag terminal, set on the wire and tool clamping.

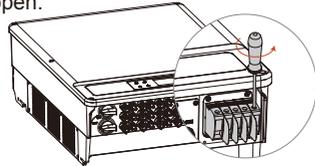
GEP12~20-L-10/GEP25~36-10 models use terminals



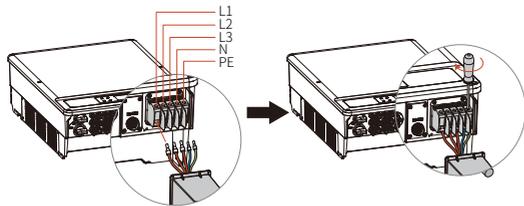
GEP30~35-L-10/GEP50~60-10 models using cold pressed terminals



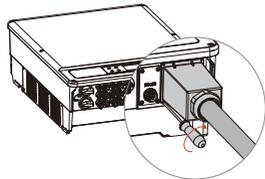
Step 4: Use flat head screw driver side screw counterclockwise communication terminals, make five interface is open.



Step 5: The communication cable line according to the sequence access communication terminal station, then twisting the screw clockwise (2.3 N.m fastening torque).



Step 6: The communication terminal cover closed, using communication connection cap screw clockwise twist will exchange cover tighten.(2.3 N.m fastening torque).



4.3.2 AC Circuit Breaker And Residual Current Device

An independent three or four pole circuit breaker for each inverter must be installed at the output side to ensure that the inverter can be securely disconnected from the grid.

| Inverter Model | Output Current | Recommended Nominal Current Of AC Breaker |
|----------------|----------------|---|
| GEP12-L-10 | 31.5A | >40A |
| GEP15-L-10 | 40A | >50A |
| GEP20-L-10 | 54.5A | >68A |
| GEP25-10 | 40A | >50A |
| GEP29.9-10 | 43.3A | >55A |
| GEP30-10 | 48A | >60A |
| GEP36-10 | 53.3A | >66A |
| GEP30-L-10 | 80A | >100A |
| GEP35-L-10 | 96A | >120A |
| GEP50-10 | 80A | >100A |
| GEP60-10 | 96A | >120A |

Warning: It's not allowed for several inverter to use the same circuit breaker. It's not allowed to connect loads between inverter and circuit breaker.

The internal integrated residual current detection device (RCD) of inverter can detect external leakage current in real time, when detecting the leakage current value exceeds the limit value, the inverter will be disconnected from the grid as soon as possible. If an external RCD is installed, the action current should be 500mA or higher.

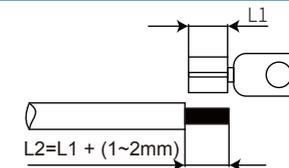
4.3.3 Earth Terminal Connection

The inverter is equipped with earth terminal according to the requirement of EN 50178.

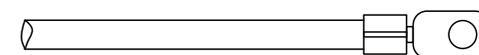
All non-current carrying exposed metal parts of the equipment and other enclosures in the PV power system should be grounded.

Please connect 'PE' cable to ground.

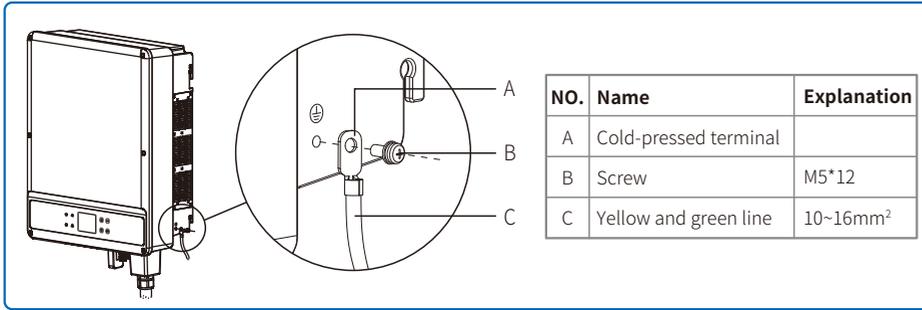
1. Strip the wire insulation sheet of a suitable length with a wire stripper.



2. Insert the stripped wire into the terminal and compress it tightly by crimping pliers.



3. Fix the earth wire shall on the machine, illustrated as the below figure.



4. In order to improve the corrosion resistance of the terminal, it is recommended to apply silica gel on the earth terminal for the corrosion protection after the grounding cable assembly is completed.

4.3.4 Connecting Inverter To PV Panel



Caution

Make sure the DC switch is turned off before connecting PV string to the inverter.

Make sure PV string polarity confirms with DC connector, otherwise, it will damage the inverter.

Make sure the maximum open circuit voltage (Voc) of each PV string does not exceed the maximum input voltage of the inverter under any condition(1100V).

Make sure that the maximum short circuit current of each DC input is less than the inverter allowable limit.

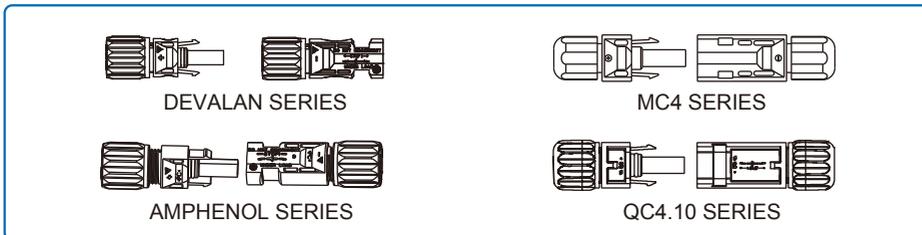
Do not connect positive or negative pole of PV string to earth (PE terminal). Otherwise, it will permanently destroy the inverter.

Positive wire shall be red, negative wire shall be black.

The minimum insulation resistance to ground of the PV panels must exceed 33.7kΩ, there is a risk of shock hazard if the requirement of minimum resistance is not met.

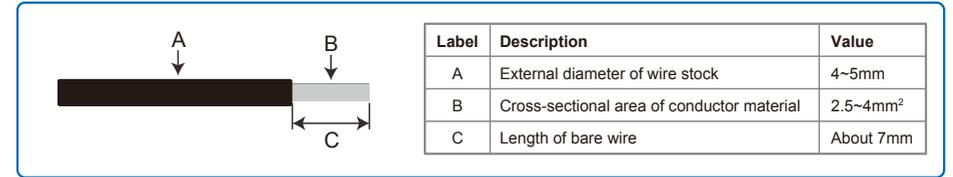
The GEP series has three PV input area PV1 input, PV2 input, PV3 input, each with MPPT tracker, therefore the three PV input can be different with each other, including different type of modules, different numbers of connecting PV strings, different orientation angel of PV modules.

There are four types of DC connectors, DEVALAN, MC4, AMPHENDL H4 and QC4.10 series.

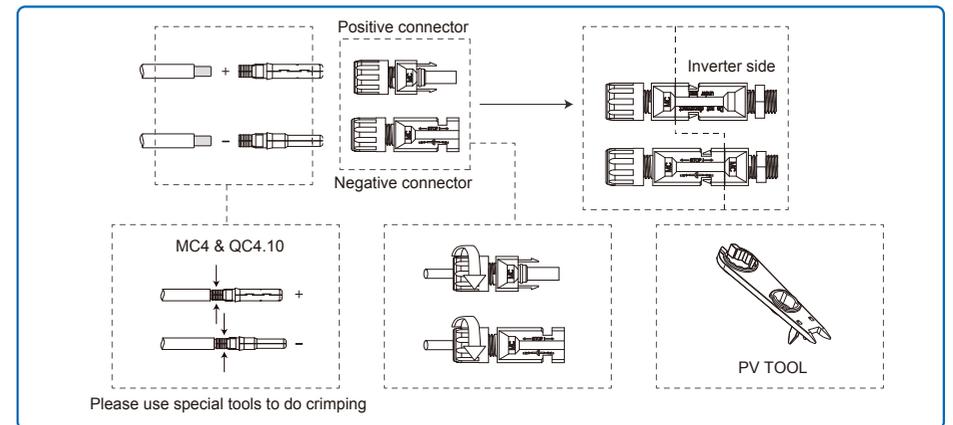
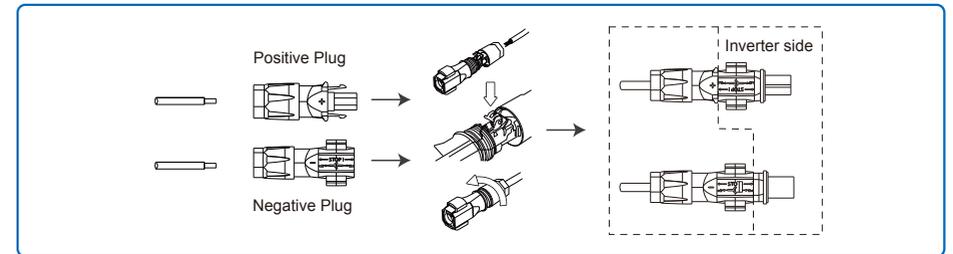


Note: The actual DC connector used is as shown in the accessory box.

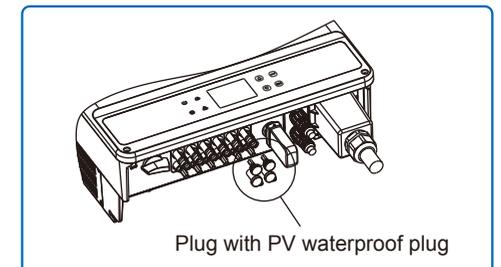
DC cable specification:

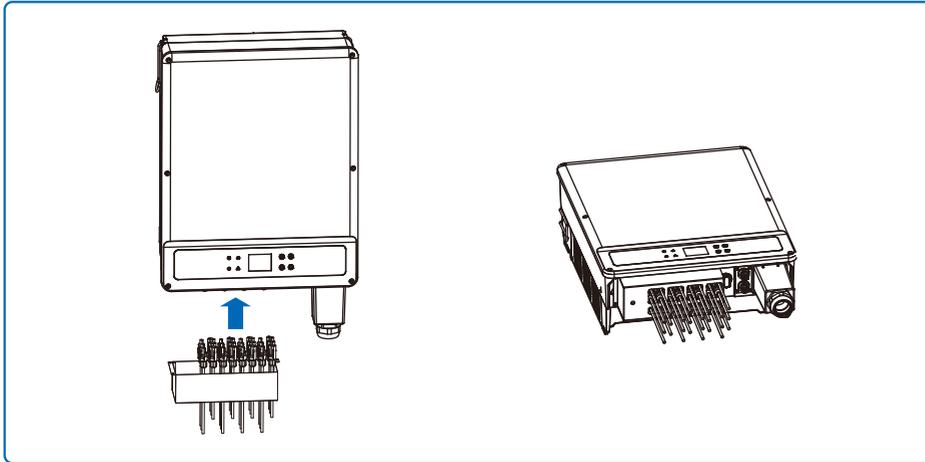


The installation method of DC connector is shown in the two figures below.



In order to better dustproof and waterproof the internal inverter, all the DC connectors provided by accessory bag should be connected to the inverter. If only some of the DC connectors are used, the DC connectors without connection should be blocked with non-conductive insulator.





4.4 Communication Connection

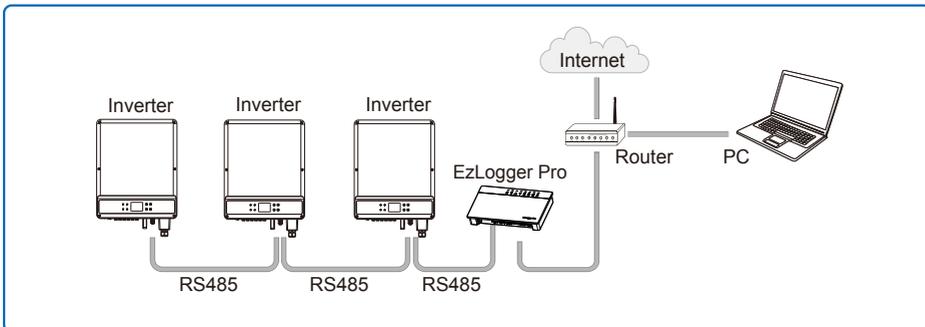
Inverter operation data can be transferred by RS485, or WIFI Modular to a PC with monitoring software or to data logger device such as Ezlogger Pro. RS485 is the standard communication choice for inverter, and WIFI modular can be used optionally for communication.

4.4.1 RS485 / DRED / Remote Shutdown Communication

The RS485 port of inverter is used to connect the EzLogger Pro, and the total length of connecting cable should not exceed 1000m.

DRED(Demand response enabling device) is only for Australian and New Zealand installations, in compliance with Australian and New Zealand safety requirements. DRED is not provided by manufacturer. DRM function is achieved by Ezlogger Pro or DRED COM port , and please connect the Ezlogger Pro through RS485 port. Detailed DRED connection refer to Ezlogger Pro manual.

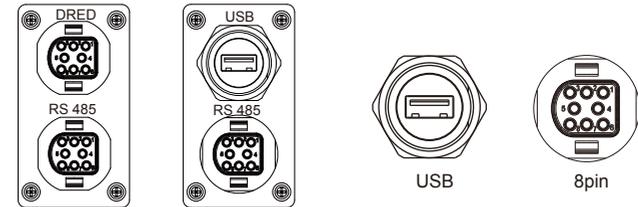
Communication cable must be separated from other power cable to prevent the communication from being interfered. RS485 connection please refer to the figure below.



Step 1:

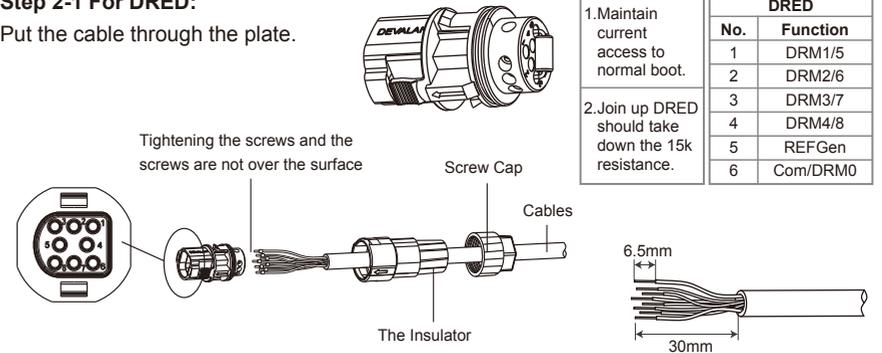
Plug out the terminal and dismantle the resistor / short wire, if you want use the DRED and Remote shutdown function.

Note: DRED should be connected through "COM port".



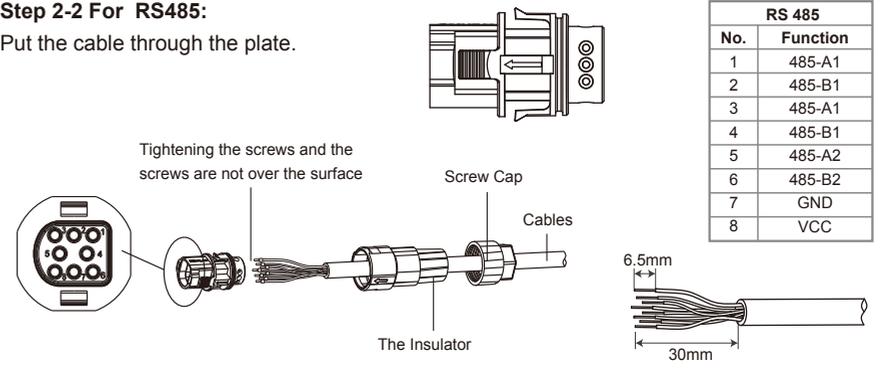
Step 2-1 For DRED:

Put the cable through the plate.



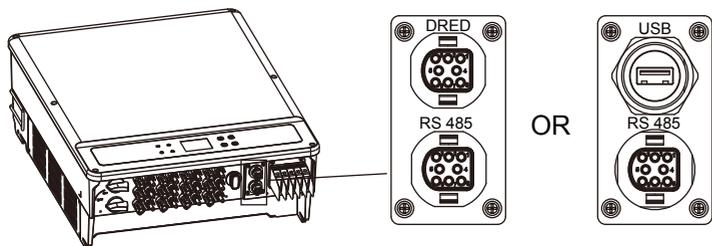
Step 2-2 For RS485:

Put the cable through the plate.



Step 3:

Connect the terminal to the right position onto the inverter.



Cable requirements of RS485 communication: Shielded twisted-pair cable or shielded twisted-pair.

Ethernet cable 120ohm termination resistor is controlled by dip switch. "ON" means connected, and "OFF" means disconnected, illustrated as the above figure.

Selection mode of terminal resistance dial switch with 120ohm.

- When single inverter is in communication, dial the terminal resistance dial switch to ON state (The default is OFF) which is next to the RS485 communication port of inverter, so that the RS485 terminal is with 120ohm. and make the shielding layer of munication line single-point grounding, as shown in the last figure.
- If multiple inverters are in communication, connect all the inverters in a daisy chain through the RS485 communication cable For device at the end of daisy chain, dial the terminal resistance dial switch to ON state (The default is OFF), and make the shielding layerof communication line single-point grounding.

4.4.2 Earth Fault Alarm

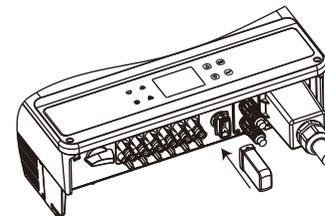
The inverter complies with IEC62109-2 13.9. When earth fault occurs, Buzzer in EzLogger Pro will ring for 1 minute, and RUN LED will be lighting for 1 minute. The alarm will ring again in half an hour unless the fault is resolved.

4.4.3 WiFi Communication

This function is only applicable for WiFi model, for specific configurations, please refer to "WiFi/LAN Configuration Instruction" in the attachment, and you can also refer to the description of "Demo Videos Of Monitoring Installation" on the <http://www.goodwe.com/DownLoad.aspx> website. After the configurations are completed, please register on the website www.gesolarinverter.com. The WiFi module installation of series is shown in the below figure.



The name and password of Wi-Fi cannot use symbols, only Arabic numerals or upper-case /lowercase letters.



4.4.4 Monitoring Portal

Portal is an on-wire monitoring system. After completing the installation of communication connection, you can access portal.gesolarinverter.com or download the 'Power Sight' App by scanning the QR code to monitor your PV plant and device. Please contact after-sales for further details.



Power Sight

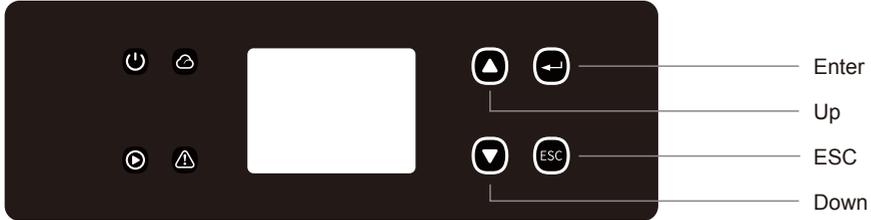
5 System Operation

5.1 LCD Panel And LED

As a human-computer interaction interface, LCD display panel comprise LED indicators, buttons and LCD display on the front panel of the inverter.

LED indicates the working status of the inverter.

Buttons and LCD are used for configuration and viewing parameters.



LED panel is shown as below.



Green / green /green / red light respectively corresponds to: / / /

| Indicator | Status | Explanation |
|-----------|--------|---|
| | | ON = Equipment Powered-on |
| | | OFF = Equipment Powered-off |
| | | ON = Inverter is feeding power |
| | | OFF = Inverter is not feeding power |
| | | Single slow flash = Self check before grid connects |
| | | Single flash = Connecting / active |
| | | On = Wireless connected / active |
| | | Blink 1 = Wireless system resetting |
| | | Blink 2 = Wireless router problem |
| | | Blink 4 = Wireless server problem |
| | | Blink = RS485 Connected |
| | | OFF = Wireless not active |
| | | On = Fault occurred |
| | | OFF = No fault |

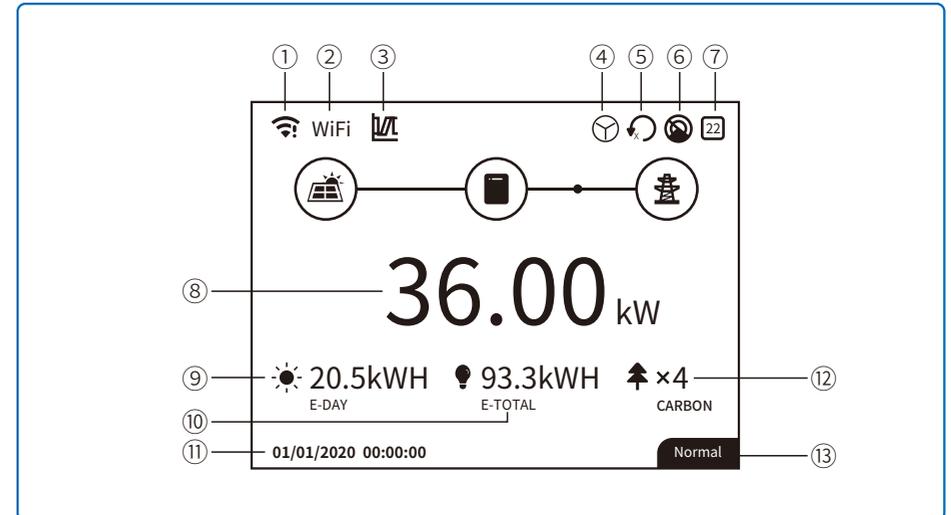


SolarGo APP

NOTE:

Download SolarGo App from Google Play Store or Apple App Store to complete the system operation if the inverter has no screen. You can also scan the QR code to download it.

5.2 User Interface Introduction



- ①: Communication information icon:GPRS and WiFi show the signal strength, RS485 shows the communication address.
- ②: Communication icon:The way of communication,There are GPRS, WiFi LAN and RS485
- ③: LVRT/HVRT icon:The icon indicates that the system LVRT/HVRT function is on
- ④: Grid Type icon:The icon indicates that the system select Delta Grid/Star Grid
- ⑤: Power limit icon:The Power limit icon indicates that the Power limit function is on
- ⑥: Shadow scan:The icon indicates that the Shadow scan function is on
- ⑦: Safety icon:The number represents the safety country number
- ⑧: Real-time power
- ⑨: E-day: daily generation
- ⑩: E-Total:Total generation
- ⑪: System date and time
- ⑫: System status information
- ⑬: Carbon:Energy conservation and emission reduction

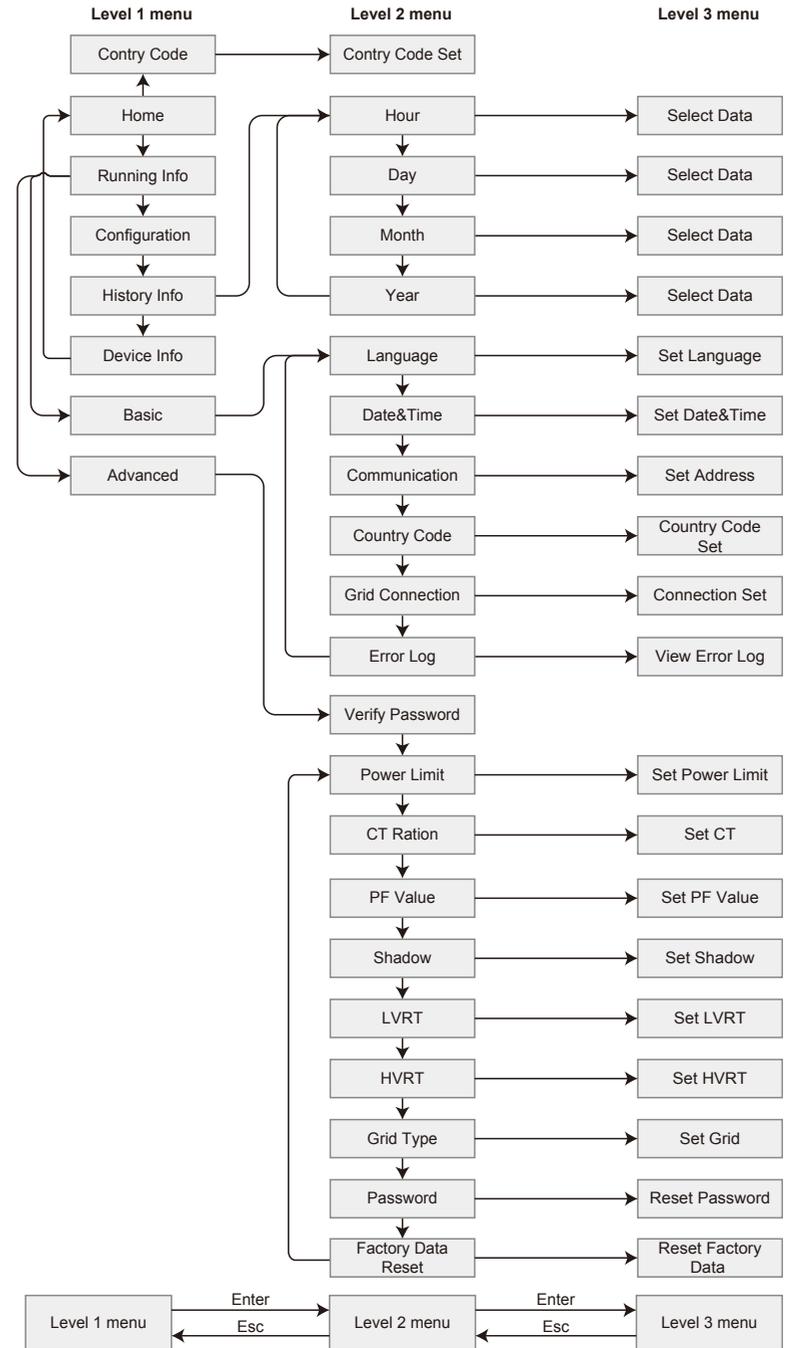
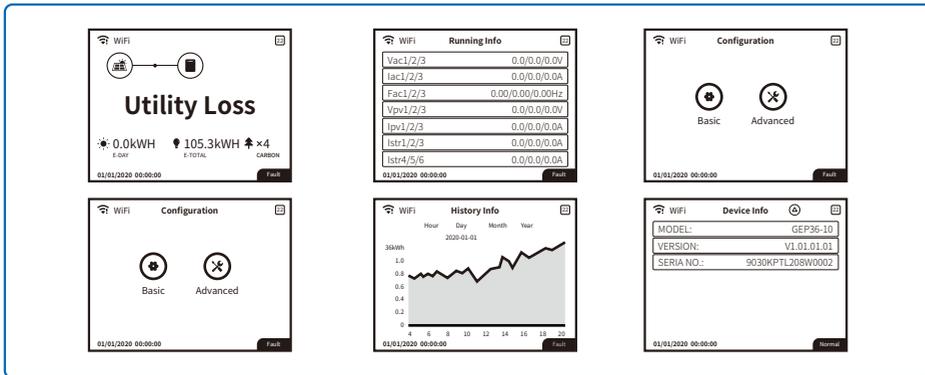
5.2.1 Overview Of Menu Architecture

The display menu through the Up, Down, Enter, Esc key to operate the menu, which Enter key is divided into long press (greater than 3s) and short press, so a total of five key operation. Press the Enter Esc key to toggle the 123 menu, use the up and down keys to select the item and change the parameters, and long press the Enter (short press is also ok for some item) to set the parameters. The display and keys of series is shown in the below figure.



5.2.2 Level 1 Menu

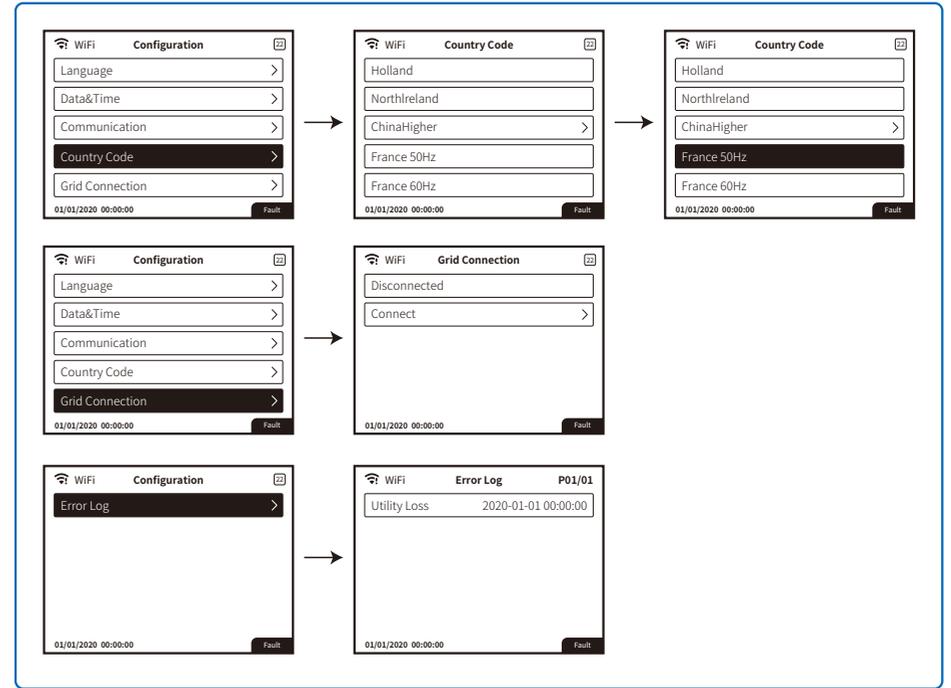
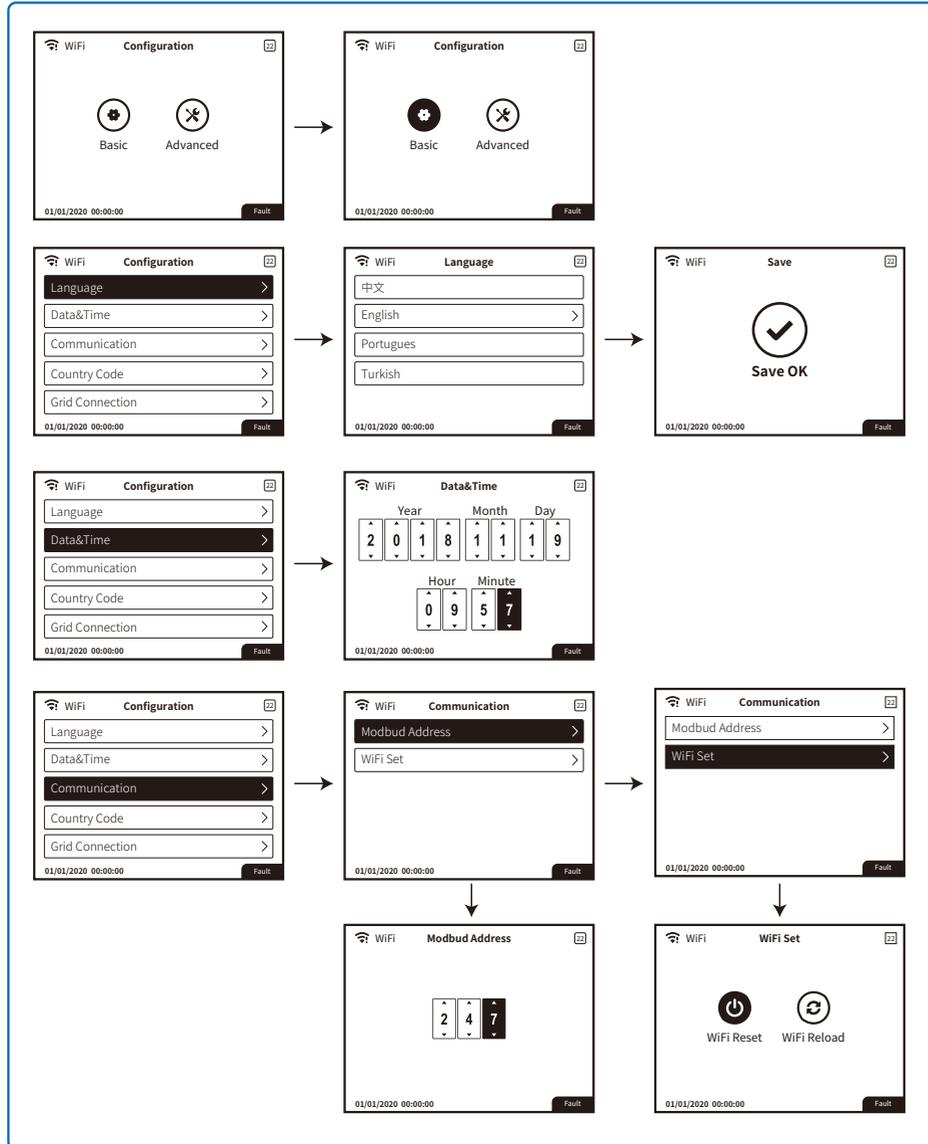
Level 1 menu interface through the up and down key cycle, in the historical information, configuration, advanced settings interface, pressing the Enter key will enter the Level 2 menu. To enter the Level 2 menu, select the item from the up and down keys. Press Enter to enter the project setup menu, go to the Level 3 menu, change the setting contents by pressing the up and down keys, and press the Enter key to set the contents. If country safety setting is not selected (shows 'Configure Safety' on display at home page), press any key will enter country safety setting page.



5.3 System Configuration

5.3.1 Basic Settings

Basic Settings is mainly used to set the commonly used parameters, including language settings, time settings, communication settings and safety settings for projects. And these parameters could be set by App.

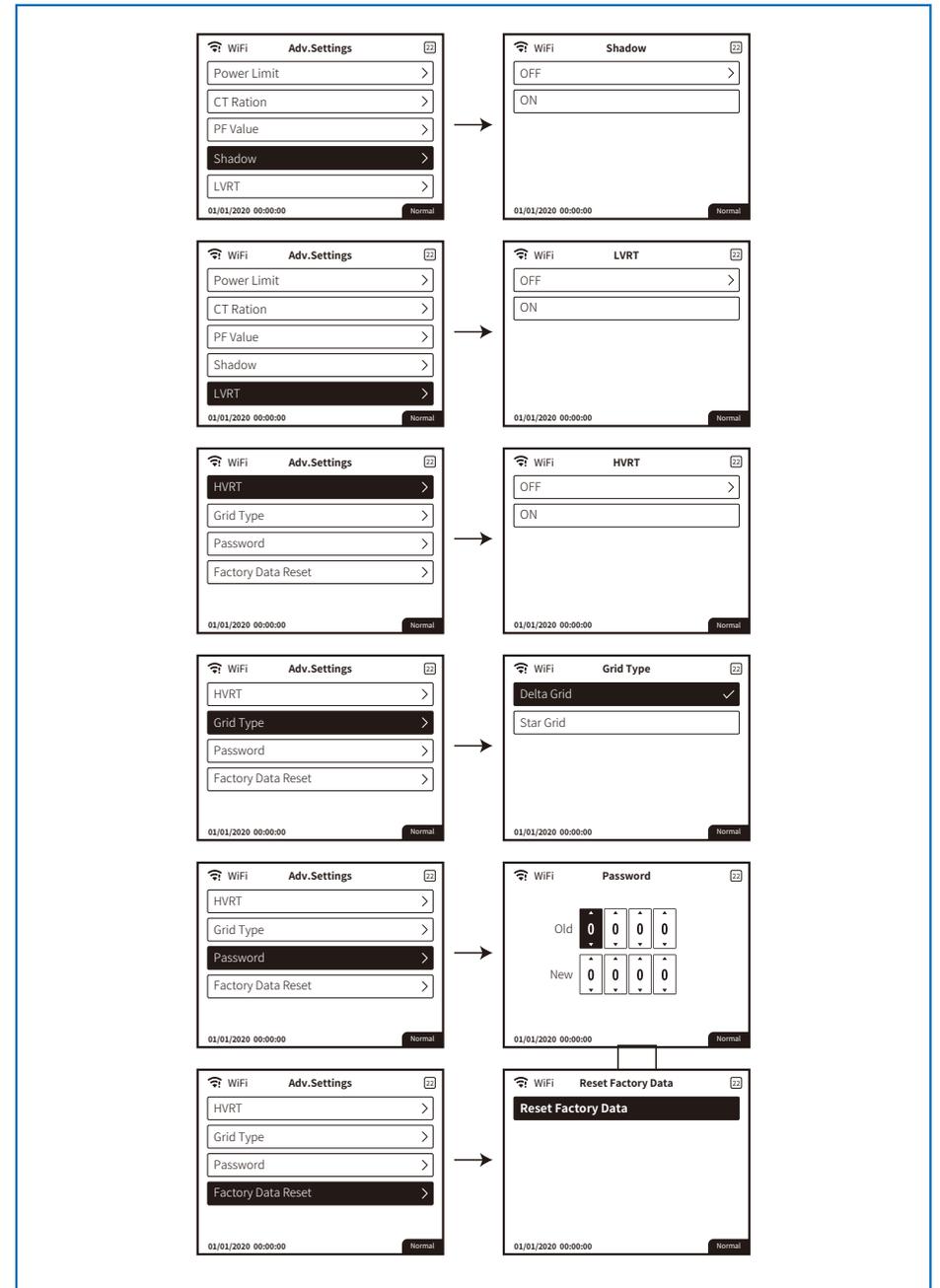
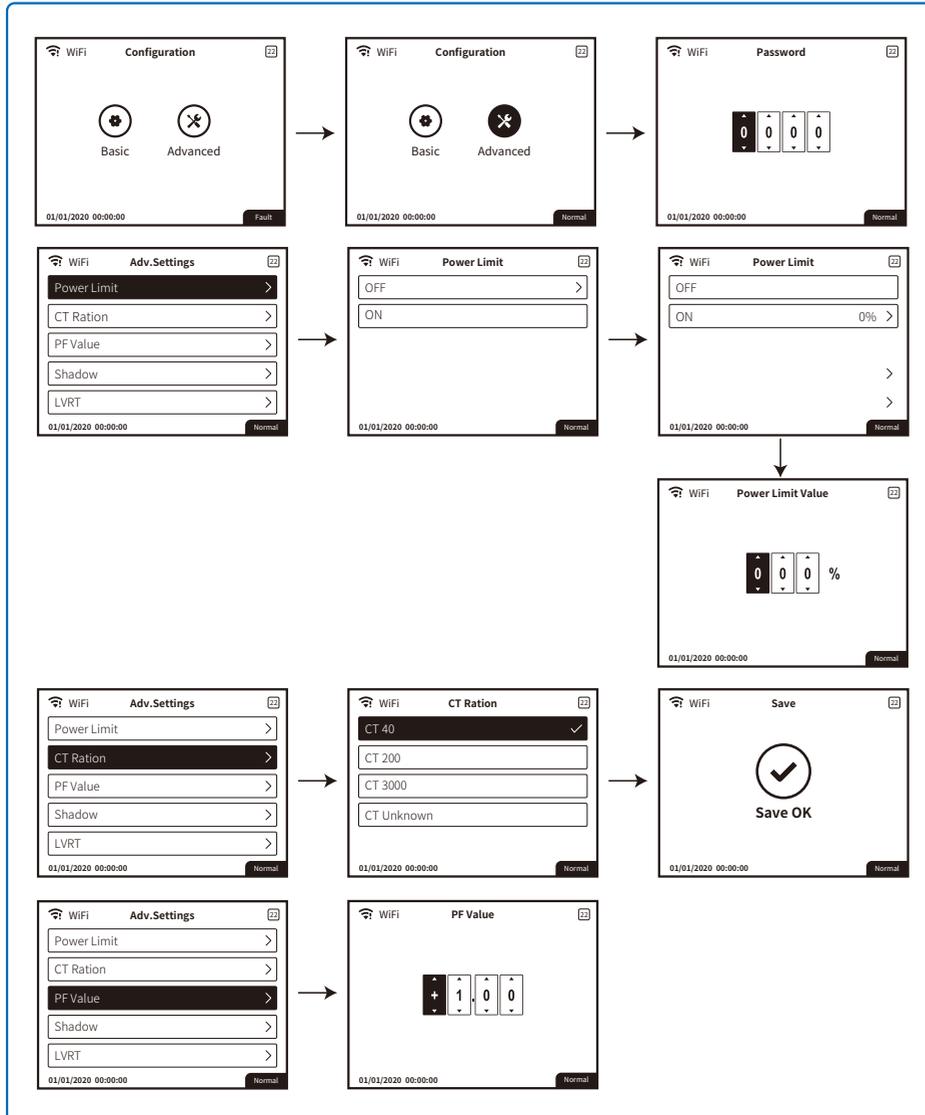


5.3.2 Advanced Settings

User must enter password to operate advanced settings because permission is required.

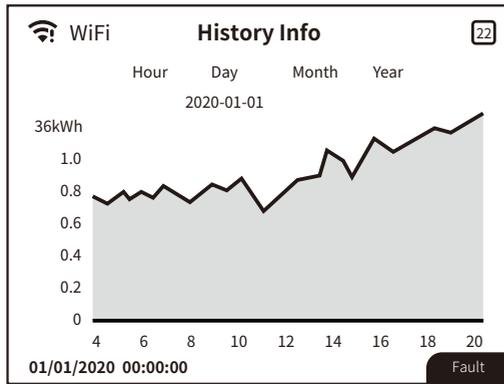
Note: Initial password: "1111".

Advanced Settings include nine Settings: 1. Power limit; 2. CT ratio; 3. Power factor; 4. Shadow scanning; 5. Low pressure crossing; 6. High pressure crossing; 7. Type of power grid; 8. Reset the password; 9. Recovery parameters;

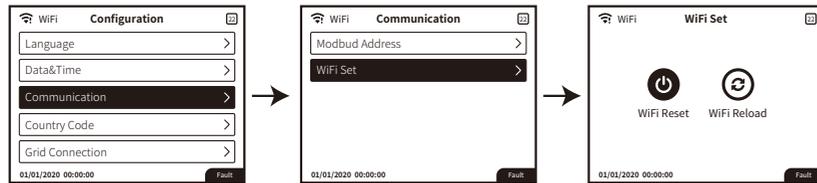


5.3.3 History Information

The history information mainly includes the information of the generating capacity of the equipment, the power generation information mainly includes the amount of electricity generation, daily power generation, monthly power generation and annual power generation information.



5.3.4 Wi-Fi Reset & Wi-Fi Reload



Please press the "Enter" over 3 seconds to save the setting.

5.4 Precaution For Initial Startup

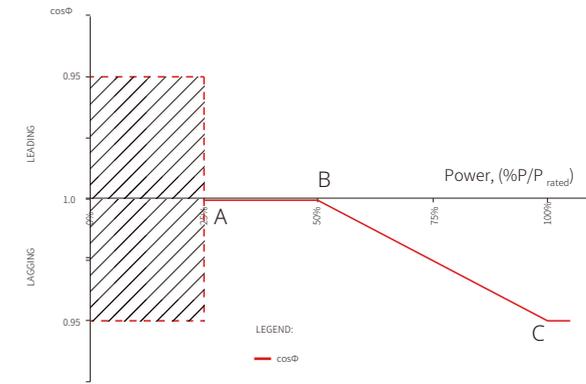
1. Make sure the AC circuit is connected and AC breaker is turned off.
2. Make sure the DC cable between inverter and PV string is connected, and the PV voltage is normal.
3. Turn on the DC switch, and set safety according to the local regulation.
4. Turn on the AC breaker, and check the inverter work normal.

5.5 Special Adjustable Setpoints

The inverter has a field in which the user can set functions, such as trip points, trip times, reconnect times, active and inactive QU curves and PU curves. It is adjustable through special software. If needed, please contact after-sales. To obtain software manuals, you can download them from the official website or contact after-sales.

5.5.1 PF Power Curve Mode

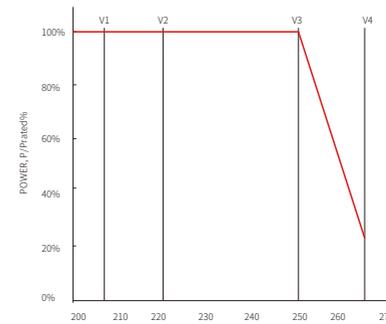
PF power curve mode can be modified by Modbus communication method, specifically according to the machine Modbus address and Modbus register value, according to the set range to set the corresponding value.



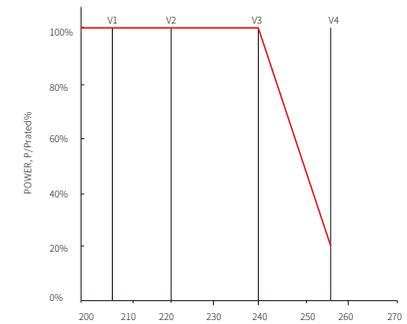
| PF Power Curve Mode | | | | |
|---------------------------------|---------------------------|-----------------------------|---------------|----------|
| Function | Default value (Australia) | Default value (New Zealand) | Setting range | Register |
| PF curve mode enable or disable | 0 | 0 | "0" or "1" | 40600 |
| B power factor | 50 (50%) | 50 (50%) | 30-80 | 40603 |
| C power factor | 90 (90%) | 90 (90%) | 90-100 | 40606 |

5.5.2 PU Curve Mode

The PU curve mode can be modified by Modbus communication method, specifically according to the machine Modbus address and Modbus register value, according to the set range to set the corresponding value.



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



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

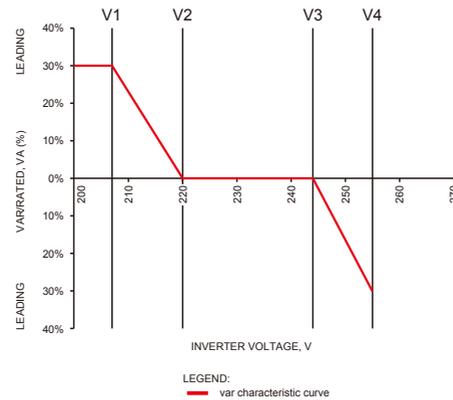
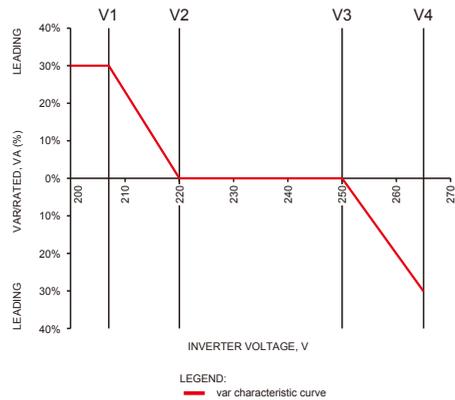
| PU curve Mode | | | | |
|---------------------------------|---------------------------|-----------------------------|---------------|----------|
| Function | Default value (Australia) | Default value (New Zealand) | Setting range | Register |
| PU curve mode enable or disable | 1 | 1 | "0"or"1" | 40680 |
| V1 voltage ratio | 900 (207V) | 900 (207V) | 0~2000 | 40683 |
| P1 power ratio | 1000 (100%*Pn) | 1000 (100%*Pn) | 0~1500 | 40684 |
| V2 voltage ratio | 956 (220V) | 956 (220V) | 0~2000 | 40685 |
| P2 power ratio | 1000 (100%*Pn) | 1000 (100%*Pn) | 0~1500 | 40686 |
| V3 voltage ratio | 1087 (250V) | 1061 (244V) | 0~2000 | 40688 |
| P3 power ratio | 1000 (100%*Pn) | 1000 (100%*Pn) | 0~1500 | 40689 |
| V4 voltage ratio | 1152 (265V) | 1109 (255V) | 0~2000 | 40690 |
| P4 power ratio | 200 (20%*Pn) | 200 (20%*Pn) | 0~1500 | 40691 |

Example: set the ratio of V1 voltage to 1100, corresponding to the rated voltage of 230 v, $V1 = 230 * 110\% = 253V$.

Example: set P1 power ratio to 900 and the corresponding power to $0.9 * \text{rated power}$.

5.5.3 QU Curve Mode

QU curve mode can be modified by Modbus communication, specifically according to the machine Modbus address and Modbus register value, according to the set range to set the corresponding value.



| QU curve Mode | | | | |
|---------------------------------|---------------------------|-----------------------------|---------------|----------|
| Function | Default value (Australia) | Default value (New Zealand) | Setting range | Register |
| QU curve mode enable or disable | 0 | 0 | "0"or"1" | 40650 |
| V1 voltage ratio | 900 (207V) | 900 (207V) | 0~2000 | 40653 |
| Q1 reactive power ratio | 300 (30%*Pn) | 300 (30%*Pn) | 0~600 | 40654 |
| V2 voltage ratio | 957 (220V) | 957 (220V) | 0~2000 | 40655 |
| Q2 reactive power ratio | 300 (30%*Pn) | 300 (30%*Pn) | 0~1500 | 40656 |
| V3 voltage ratio | 1087 (250V) | 1061 (244V) | 0~2000 | 40657 |
| Q3 reactive power ratio | 300 (30%*Pn) | 300 (30%*Pn) | 0~1500 | 40658 |
| V4 voltage ratio | 1152 (265V) | 1109 (255V) | 0~2000 | 40659 |
| Q4 reactive power ratio | 300 (30%*Pn) | 300 (30%*Pn) | 0~600 | 40660 |

Example: set the ratio of V1 voltage to 1100, corresponding to the rated voltage of 230 v, $V1 = 230 * 110\% = 253V$.

Example: set Q1 reactive power ratio to 300, corresponding reactive power $Q1 = 30\% * \text{rated power}$.

5.5.4 Power Recovery Rate

The power recovery rate can be modified by Modbus communication, specifically according to the machine Modbus address and Modbus register value, according to the set range to set the corresponding value.

| Function | The default value (Australia & New Zealand) | Setting range | Register |
|------------------------------|---|---------------|----------|
| Power recovery rate Settings | 16 (16%Pn/min) | 5~100 | 40536 |

If you need to change the above Settings, please contact our after-sales service.

6 Troubleshooting

In most situations, the inverter requires very little maintenance. However, if the inverter is not working properly, please try the following solutions:

| Type of fault | | Troubleshooting |
|----------------|-------------------|---|
| System Failure | Isolation Failure | <ol style="list-style-type: none"> 1. Disconnect DC switch, take off DC connector, check the impedance between PV (+) & PV (-) to earth. 2. If impedance is less than 100 kΩ, please check the insulation of PV string wiring to the earth. 3. If impedance is larger than 100 kΩ, please contact local service office. 4. Take off AC connector, measure the impedance between neutral and PE. If it is larger than 10 kΩ, please check AC wiring. |
| | Ground I Failure | <ol style="list-style-type: none"> 1. Disconnect DC switch, check the insulation of PV string wiring to earth. 2. Reconnect the DC switch again. 3. If the problem still exists, please call the local service office. |
| | Vac Failure | <ol style="list-style-type: none"> 1. Disconnect DC switch, take off AC connector, measure the voltage between line and neutral in connector, make sure it conforms to the grid-connected specification of inverter. 2. If it does not, please check grid wiring. 3. If it does, please connect AC connector, reconnect DC switch, inverter will connect to automatically. If the problem still exists, please call the local service office. |
| | Fac Failure | <ol style="list-style-type: none"> 1. The PV inverter will automatically restart if the Fac returns to normal. 2. If the problem still exists, please call the local service office. |
| | Utility Loss | <ol style="list-style-type: none"> 1. Disconnect the DC switch, take off AC connector, measure the voltage between line and neutral in connector, make sure it conforms to the grid-connected specification of inverter. 2. If it does not, please check if the distribution switch is connected and the grid is normal. 3. If it does, reconnect AC connector and DC connector; If the problem still exists, please call the local service office. |
| | PV Over Voltage | <ol style="list-style-type: none"> 1. Disconnect the DC switch, take off DC connector, check PV string voltage, check if it exceeds the input voltage in inverter specification. 2. If it does, please reconfigure PV panel string. 3. If the problem still exists, please call the local service office. |
| | Over Temperature | <ol style="list-style-type: none"> 1. Disconnect the DC switch, take off DC connector, check PV string voltage, check if it exceeds the input voltage in inverter specification. 2. If it does, please reconfigure PV panel string. 3. If the problem still exists, please call the local service office. |

| Type of fault | | Troubleshooting |
|------------------|---------------------|---|
| Inverter Failure | Relay-check Failure | <ol style="list-style-type: none"> 1. Disconnect the DC connector. 2. Reconnect the DC connector. 3. If the problem still exists, please call the local service office. |
| | DCI High | |
| | EEPROM R/W Failure | |
| | SPI Failure | |
| | DC Bus High | |
| | GFCI Failure | |
| Others | No display | <ol style="list-style-type: none"> 1. Disconnect the DC switch, take off DC connector, measure the voltage of PV string. 2. Plug in DC connector, and reconnect DC switch. 3. If the voltage is less than 70 V, please check the PV string configuration. 4. If the voltage is higher than 180V and still no display please contact local service office. |



When sunlight is insufficient, the PV inverter may continuously start and shut down due to insufficient power generation by the PV panel, this will not damage the inverter. If the problem still exists, please call the local service office.

7 Technical Parameters & Block Diagram

7.1 Technical Parameters

| Technical Data | GEP12-L-10 | GEP15-L-10 | GEP20-L-10 |
|---|---|-----------------------|-----------------------|
| PV String Input Data | | | |
| Max. DC Input Power (W) | 15600 | 19500 | 26000 |
| Max. DC Input Voltage (V) | 800 | 800 | 800 |
| MPPT Range (V) | 200~650 | 200~650 | 200~650 |
| Start-up Voltage (V) | 180 | 180 | 180 |
| Nominal DC Input Voltage (V) | 370 | 370 | 370 |
| PV Input Operating Voltage range (V) | 180~800 | 180~800 | 180~800 |
| Max. Inverter Backfeed Current To The array (A) | 0 | 0 | 0 |
| Max. Input Current (A) | 26/26/26 | 26/26/26 | 26/26/26 |
| Max. Short Current (A) | 33/33/33 | 33/33/33 | 33/33/33 |
| No. of MPP Trackers | 3 | 3 | 3 |
| No. of Input Strings per Tracker | 2/2/2 | 2/2/2 | 2/2/2 |
| AC Output Data | | | |
| Nominal Output Power (W) | 12000 | 15000 | 20700 |
| Max. Output Power (W) | 12000 | 15000 | 20700 |
| Max. Output Apparent Power (VA) [1] | 12000 | 15000 | 20700 |
| Nominal Output Voltage (V) | 220, 3L/N/PE or 3L/PE | 220, 3L/N/PE or 3L/PE | 220, 3L/N/PE or 3L/PE |
| Nominal Output Frequency (Hz) | 50/60 | 50/60 | 50/60 |
| Max. Output Current (A) | 31.5 | 40 | 54.5 |
| Output Power Factor | ~1 (Adjustable from 0.8 leading to 0.8 lagging) | | |
| Output THDi (@Nominal Output) | <3% | <3% | <3% |
| Current (inrush) | 60 | 60 | 60 |
| Maximum Output Fault Current | 160 | 160 | 160 |
| Maximum Output Over Current Protection (A) | 109 | 109 | 109 |
| Efficiency | | | |
| Max. Efficiency | 98% | 98% | 98% |
| European Efficiency | 97.7% | 97.7% | 97.7% |
| Protection | | | |
| Anti-islanding Protection | Integrated | | |
| Input Reverse Polarity Protection | Integrated | | |
| PV String Current Monitoring | Integrated | | |
| Anti-PID Function for Module | Optional | | |
| DC Surge Protection | Type II | | |
| AC Surge Protection | Type II | | |
| Residual Current Monitoring Unit | Integrated | | |
| Output Over Current Protection | Integrated | | |
| Output Short Protection | Integrated | | |
| Output Over Voltage Protection | Integrated | | |
| Protective Class | Class I | | |
| Decisive Voltage Classification (DVC) | C | | |
| General Data | | | |
| Operating Temperature Range (°C) | -30~60 | | |
| Relative Humidity | 0~100% | | |
| Operating Altitude (m) | ≤3000 | | |
| Cooling | Fan Cooling | | |
| User Interface | LCD & LED or APP & LED | | |
| Communication | RS485, WiFi, USB, PLC (Optional) | | |
| Weight (kg) | 40 | | |
| Size (Width*Height*Depth mm) | 480*590*200 | | |
| Protection Degree | IP65 | | |
| Night Self Consumption (W) | <1 | | |
| Topology | Transformerless | | |
| Certifications & Standards | | | |
| Grid Regulation | VDE0126-1-1/VDE-AR-N 4105 | | |
| Safety Regulation | IEC62109-1&2 | | |
| EMC | EN61000-6-1,EN61000-6-2,EN61000-6-3,EN61000-6-4 | | |

| Technical Data | GEP25-10 | GEP36-10 | GEP29.9-10 | |
|---|---|-------------------------------------|-----------------------|----------|
| PV String Input Data | | | | |
| Max. DC Input Power (W) | 32500 | 46800 | 45000 | |
| Max. DC Input Voltage (V) | 1100 | 1100 | 1100 | |
| MPPT Range (V) | 200~950 | 200~950 | 200~950 | |
| Start-up Voltage (V) | 180 | 180 | 180 | |
| Nominal DC Input Voltage (V) | 600 | 600 | 600 | |
| PV Input Operating Voltage range (V) | 180~1100 | 180~1100 | 180~1100 | |
| Max. Inverter Backfeed Current To The array (A) | 0 | 0 | 0 | |
| Max. Input Current (A) | 26/26/26 | 26/26/26 | 26/26/26 | |
| Max. Short Current (A) | 33/33/33 | 33/33/33 | 33/33/33 | |
| No. of MPP Trackers | 3 | 3 | 3 | |
| No. of Input Strings per Tracker | 2/2/2 | 2/2/2 | 2/2/2 | |
| AC Output Data | | | | |
| Nominal Output Power (W) | 25000 | 36000 | 29900 | |
| Max. Output Power (W) | 27500 ¹ | 36000 | 29900 | |
| Max. Output Apparent Power (VA) [1] | 27500 ² | 36000 | 29900 | |
| Nominal Output Voltage (V) | 400 ³ , 3L/N/PE or 3L/PE | 400 ³ , 3L/N/PE or 3L/PE | 400, 3L/N/PE or 3L/PE | |
| Nominal Output Frequency (Hz) | 50/60 | 50/60 | 50/60 | |
| Max. Output Current (A) | 40 | 53.3 | 43.3 | |
| Output Power Factor | ~1 (Adjustable from 0.8 leading to 0.8 lagging) | | | |
| Output THDi (@Nominal Output) | <3% | <3% | <3% | |
| Current (inrush) | 60 | 60 | 60 | |
| Maximum Output Fault Current | 160 | 160 | 160 | |
| Maximum Output Over Current Protection (A) | 109 | 109 | 109 | |
| Efficiency | | | | |
| Max. Efficiency | 98.3% | 98.3% | 98.3% | |
| European Efficiency | 98% | 98% | 98% | |
| Protection | | | | |
| Anti-islanding Protection | Integrated | | | |
| Input Reverse Polarity Protection | Integrated | | | |
| PV String Current Monitoring | Integrated | | | |
| Anti-PID Function for Module | Optional | | | |
| DC Surge Protection | Type II | | | |
| AC Surge Protection | Type II | | | |
| Residual Current Monitoring Unit | Integrated | | | |
| Output Over Current Protection | Integrated | | | |
| Output Short Protection | Integrated | | | |
| Output Over Voltage Protection | Integrated | | | |
| Protective Class | Class I | | | |
| Decisive Voltage Classification (DVC) | C | | | |
| General Data | | | | |
| Operating Temperature Range (°C) | -30~60 | | | |
| Relative Humidity | 0~100% | | | |
| Operating Altitude (m) | ≤3000 | | | |
| Cooling | Fan Cooling | | | |
| User Interface | RS485, WiFi, USB, PLC (Optional)*4 | | | |
| Communication | LCD & LED or APP & LED | | | |
| Weight (kg) | 40 | | | |
| Size (Width*Height*Depth mm) | 480*590*200 | | | |
| Protection Degree | IP65 | | | |
| Night Self Consumption (W) | <1 | | | |
| Topology | Transformerless | | | |
| Certifications & Standards | | | | |
| Grid Regulation | IEC61727, IEC62116 | IEC61727, IEC62116 | IEC61727, IEC62116 | AS4777.2 |
| Safety Regulation | IEC62109-1&2 | | | |
| EMC | EN61000-6-1,EN61000-6-2,EN61000-6-3,EN61000-6-4 | | | |

*1: For Brazil Max. Output Power GEP25-10 is 25000W.

*2: For Brazil Max. Output Apparent Power GEP25-10 is 25000W.

*3: For Brazil Nominal Output Voltage GEP25-10 is 380V, GEP36-10 is 380V.

*4: For Brazil Communication GEP25-10 is RS485, WiFi, USB, PLC (Optional); GEP36-10 is RS485, WiFi, USB, PLC (Optional).

| Technical Data | GEP30-L-10 | GEP35-L-10 | GEP50-10 | GEP60-10 |
|---|--|-----------------------|---|-------------------------------------|
| PV String Input Data | | | | |
| Max. DC Input Power (W) | 39000 | 45500 | 75000 | 90000 |
| Max. DC Input Voltage (V) | 800 | 800 | 1100 | 1100 |
| MPPT Range (V) | 200~650 | 200~650 | 200~950 | 200~950 |
| Start-up Voltage (V) | 180 | 180 | 180 | 180 |
| Nominal DC Input Voltage (V) | 370 | 370 | 600 | 600 |
| PV Input Operating Voltage range (V) | 180~800 | 180~800 | 180~1100 | 180~1100 |
| Max. Inverter Backfeed Current To The array (A) | 0 | 0 | 0 | 0 |
| Max. Input Current (A) | 26/26/26/26/26 | 26/26/26/26/26 | 26/26/26/26/26 | 26/26/26/26/26 |
| Max. Short Current (A) | 33/33/33/33/33 | 33/33/33/33/33 | 33/33/33/33/33 | 33/33/33/33/33 |
| No. of MPP Trackers | 5 | 6 | 5 | 6 |
| No. of Input Strings per Tracker | 2/2/2/2/2 | 2/2/2/2/2 | 2/2/2/2/2 | 2/2/2/2/2 |
| AC Output Data | | | | |
| Nominal Output Power (W) | 30000 | 35000 | 50000 | 60000 |
| Max. Output Power (W) | 30000 | 35000 | 55000 ¹ | 66000 ¹ |
| Max. Output Apparent Power (VA) [1] | 30000 | 35000 | 55000 ² | 66000 ² |
| Nominal Output Voltage (V) | 220, 3L/N/PE or 3L/PE | 220, 3L/N/PE or 3L/PE | 400 ³ , 3L/N/PE or 3L/PE | 400 ³ , 3L/N/PE or 3L/PE |
| Nominal Output Frequency (Hz) | 50/60 | 50/60 | 50/60 | 50/60 |
| Max. Output Current (A) | 80 | 96 | 80 | 96 |
| Output Power Factor | ~1 (Adjustable from 0.8 leading to 0.8 lagging) | | | |
| Output THDi (@Nominal Output) | <3% | <3% | <3% | <3% |
| Current (inrush) | 50 | 50 | 50 | 50 |
| Maximum Output Fault Current | 300 | 300 | 300 | 300 |
| Maximum Output Over Current Protection (A) | 195 | 195 | 195 | 195 |
| Efficiency | | | | |
| Max. Efficiency | 98% | 98% | 98.3% | 98.3% |
| European Efficiency | 97.7% | 97.7% | 98% | 98% |
| Protection | | | | |
| Anti-islanding Protection | Integrated | | | |
| Input Reverse Polarity Protection | Integrated | | | |
| PV String Current Monitoring | Integrated | | | |
| Anti-PID Function for Module | Optional | | | |
| DC Surge Protection | Type II (Type I optional) | | | |
| AC Surge Protection | Type II | | | |
| Residual Current Monitoring Unit | Integrated | | | |
| Output Over Current Protection | Integrated | | | |
| Output Short Protection | Integrated | | | |
| Output Over Voltage Protection | Integrated | | | |
| Protective Class | Class I | | | |
| Decisive Voltage Classification (DVC) | C | | | |
| General Data | | | | |
| Operating Temperature Range (°C) | -30~60 | | | |
| Relative Humidity | 0~100% | | | |
| Operating Altitude (m) | ≤3000 | | | |
| Cooling | Fan Cooling | | | |
| User Interface | LCD & LED or APP & LED | | | |
| Communication | RS485, WiFi, USB, PLC (Optional) | | RS485, WiFi ⁴ , PLC (Optional) | |
| Weight (kg) | 55 | | | |
| Size (Width*Height*Depth mm) | 520*660*220 | | | |
| Protection Degree | IP65 | | | |
| Night Self Consumption (W) | <1 | | | |
| Topology | Transformerless | | | |
| Certifications & Standards | | | | |
| Grid Regulation | IEC61727, IEC62116 | | IEC61727, IEC62116, AS4777.2 | |
| Safety Regulation | IEC62109-1&2 | | | |
| EMC | EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4 | | | |

*1: For Brazil Max. Output Power GEP50-10 is 50000W, GEP60-10 is 60000W.

*2: For Brazil Max. Output Apparent Power GEP50-10 is 50000W, GEP60-10 is 60000W.

*3: For Brazil Nominal Output Voltage GEP50-10 is 380V, GEP60-10 is 380V.

*4: For Brazil Communication GEP50-10 is RS485, WiFi, USB, PLC (Optional); GEP60-10 is RS485, WiFi, USB, PLC (Optional).

Note:

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. For example, appliances, portable tools and other plug-connected equipment;

Category III: applies to fixed downstream equipment, including the main distribution board. For example, switchgear and other equipment in an industrial installation;

Category IV: applies to equipment permanently connected at the origin of an installation (upstream of the main distribution board). For example, electricity meters, primary overcurrent protection equipment and other equipment connected directly to outdoor open lines.

Moisture Location Category Definition

| Moisture parameters | Level | | |
|---------------------|---------|-----------|-----------|
| | 3K3 | 4K2 | 4K4H |
| Temperature Range | 0~+40°C | -33~+40°C | -20~+55°C |
| Humidity Range | 5%~85% | 15%~100% | 4%~100% |

Environment Category Definition

Outdoor: the ambient air temperature is -20~50°C. Relative humidity range is from 4% to 100%, applied to PD3.

Indoor unconditioned: the ambient air temperature is -20~50 °C. Relative humidity range is from 5% to 95%, applied to PD3.

Indoor conditioned: the ambient air temperature is 0~40 °C. Relative humidity range is from 5% to 85%, applied to PD2.

Pollution Degree Definition

Pollution degree 1: No pollution or only dry, non-conductive pollution occurs. The pollution has no influence.

Pollution degree 2: Normally only non-conductive pollution occurs. However, a temporary conductivity occasionally caused by condensation must be expected.

Pollution degree 3: Conductive pollution occurs. Or dry, non-conductive pollution becomes conductive due to condensation, which is expected.

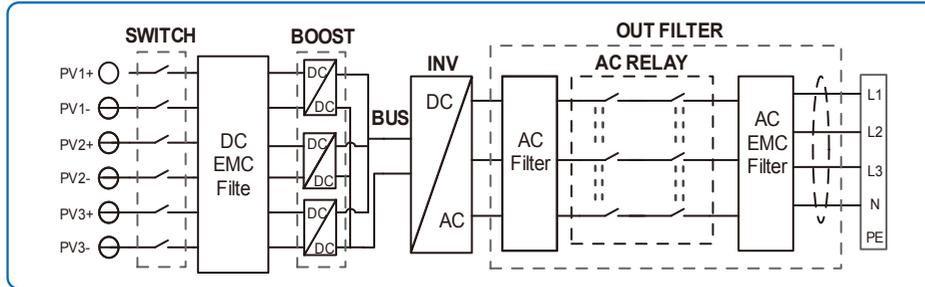
Pollution degree 4: Persistent conductive pollution occurs. For example, the pollution cause by conductive dust, rain and snow.

7.2 Block Diagram

GEP series main circuit is shown in the below figure:

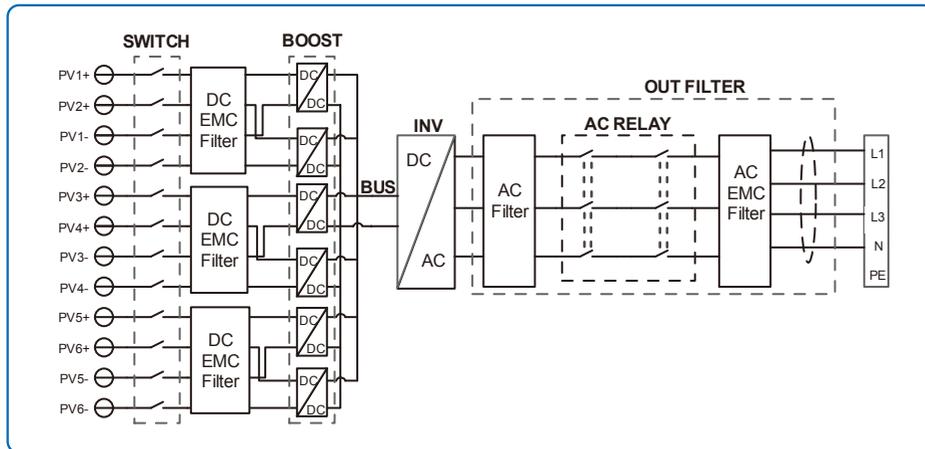
GEP12~20-L-10

GEP25~36-10



GEP30~35-L-10

GEP50~60-10



8 Maintenance

Regular maintenance ensures a long operating life and optimal efficiency of the entire PV plant.

Caution: Before maintenance please disconnect the AC breaker first and then disconnect DC breaker. Wait 5 minutes until the residual voltage has been released.

8.1 Clearing The Fan

Series inverter is equipped with three fans on its left side. The fan intakes and handle covers should be cleaned yearly with a vacuum cleaner. For more thorough cleaning, completely remove the fans.

Disconnect the AC breaker first and then disconnect DC breaker.

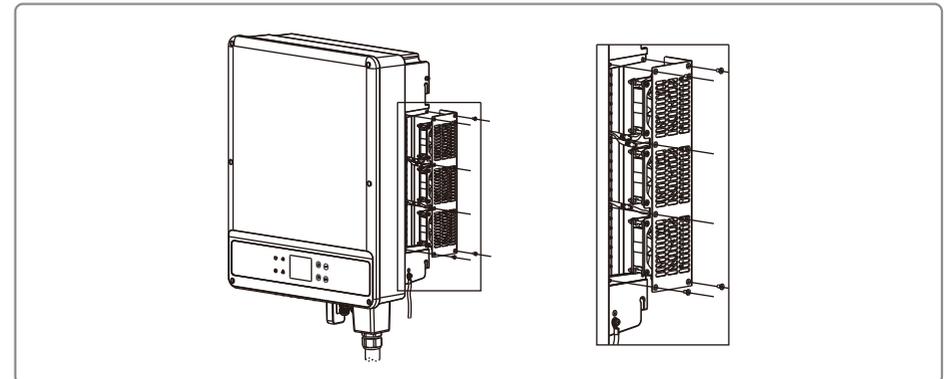
Wait 5 minutes until the residual voltage has been released and the fans are no longer turning.

Disassemble the fans (refer to the below figure).

1. Loosen the five screws with a crosshead screwdriver, then remove the fans out the cabinet about 50mm slowly.

3. Open the lockers of the three fans connectors and remove them from housing, then take the fans away.

- Clean the ventilation grid and the fan with a soft brush, a paint brush, a cloth, or compressed air.
- Reassemble the fans into the cabinet
- Please use towel to clean the heatsink once a year.



8.2 Checking The DC Switch

DC switch does not require any maintenance.

It is recommended, though not compulsory, to:

- Check the DC switch regularly.
- Activate the DC switch 10 times in a row once a year.

Operating the switch will clean the contacts and will extend the life of the DC switch.

Boot order:

1. Turn on the breaker on AC side.
2. Turn on the DC switch.
3. Turn on the breaker on DC side.

Caution: if there is no switch, step 2 is not required.

Shutdown order:

1. Turn off the breaker on AC side.
2. Turn off the DC switch.
3. Turn off the breaker on DC side.

Caution: if there is no switch, step 2 is not required.

8.3 Checking The Electrical Connection

1. Check if the AC or DC wire is loose.
2. Check if the earth wire is reliably grounded .
3. Check if the waterproof covers of RS485 /WiFi port are fasten.

Caution: Maintenance cycle is once every half a year.

4. please use torque wrench to tighten the AC terminal wiring connection once a year;

Caution: Maintenance cycle is once every half a year.

