GOODWE
YOUR SOLAR ENGINE

User Manual
Grid-Tied PV Inverter
MS Series

V1.8-2022-04-25

1 Symbols

⚠	Risk of injury due to improper handling of the device
♻	Recyclable naterials
⚡	Danger of high voltage & electric shock
↑↑	Keep upwards
♨	Don't touch, hot surface!
4	Stack no more than 4
🗑	Special disposal instructions
🍷	Fragile
☂	Keep Dry
📖	Refer to operation instructions
⚡⏱ 5min	Wait at least 5 minutes after disconnecting the inverter before touching internal parts
CE	CE mark.

⚠ 2 Safety measures & warning

The MS series inverter of Jiangsu GoodWe Power Technolgy Co., Ltd. (hereinafter referred to as GoodWe) strictly conforms to related safety rules in design and test.

Safety regulation relevant to the location shall be followed during installation, commissioning, operation and maintenance. Improper operation may have a risk of electric shock or damage to equipment and property. (MS: Three MPPT, Single-Phase)
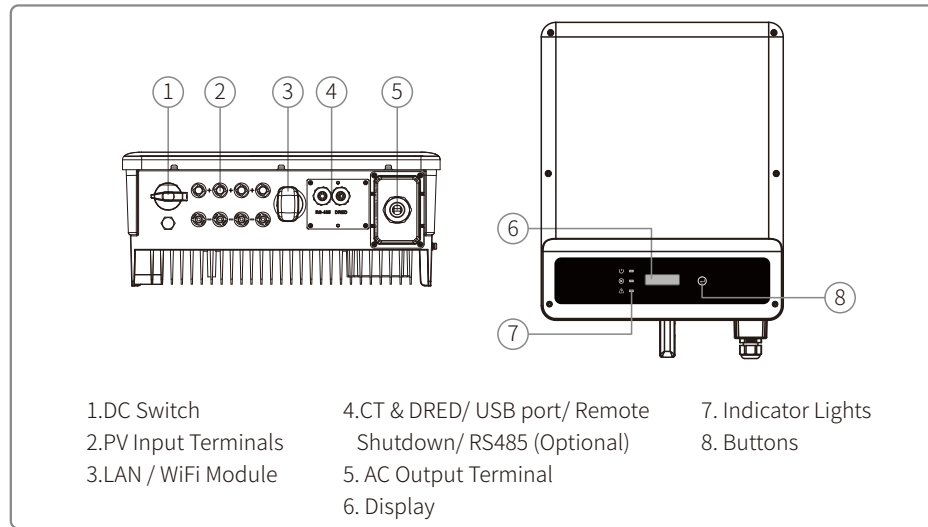
• Installation, maintenance and connection of inverters must be performed by qualified personnel, in compliance with local electrical standards,regulations and the requirements of local power authorites and/or companies.

• To avoid electric shock, DC input and AC output of the inverter must be disconnected and wait at least 5 minutes before performing any installation or maintenance.

• 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.

• Keep children away from inverters.

• Do not open the front cover of the inverter. Apart from performing work at the wiring terminal (as instructed in this manual), touching or changing components without authorization may cause injury to people, damage to inverters and annulment of the warranty.

• 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 annulled.

• Ensure 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 annulled.

• When exposed to sunlight, the PV array generate dangerous high DC voltage, Please operate according to our instructions, or it will result in danger to life.

• PV modules should have an IEC61730 class A rating.

• If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

• Completely isolate the equipment should: switch off the DC switch, disconnect the DC terminal, and disconnect the AC terminal or AC breaker.

• Prohibit inserting or pulling the AC or DC terminals when the inverter is electrified.

• An earthing photovoltaic system needs to connect an Arc fault detector on DC side.

• 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 PV is not grounded as default configuration.

• Inverters should not be installed in multiple phase combinations.

⚠ To ensure IP65, inverters must be sealed well, please install the inverters in one day after unpacking, otherwise please seal all unused terminals/holes, not allowed to keep any terminals/holes open, confirm there is no risk to have water&dust in.
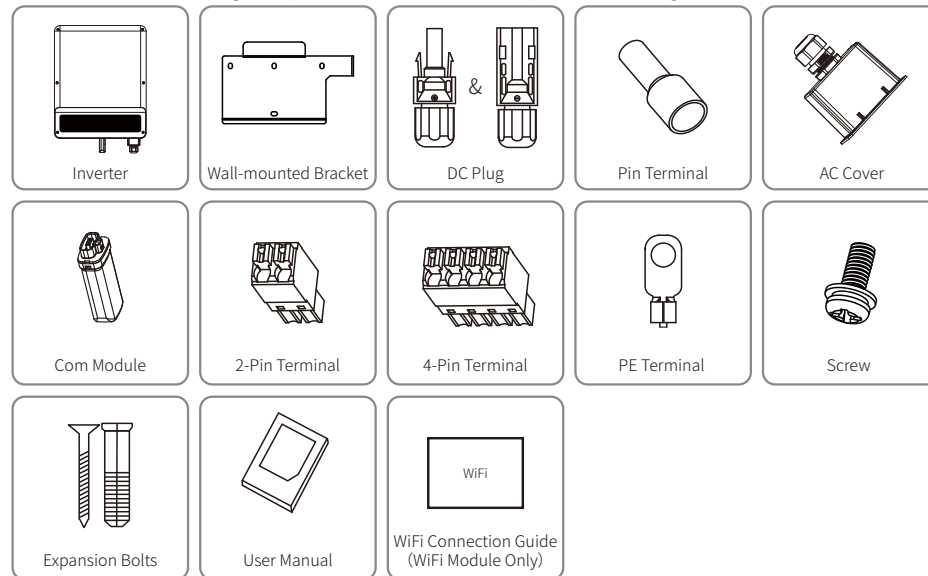
3 Product introduction

3.1 Inverter Overview
Please refer as below.

1. DC Switch
2. PV Input Terminals
3. LAN / WiFi Module
4. CT & DRED/ USB port/ Remote Shutdown/ RS485 (Optional)
5. AC Output Terminal
6. Display
7. Indicator Lights
8. Buttons

3.2 Package
Check if there is missing components and if there is any visible damage.

|				
Inverter	Wall-mounted Bracket	DC Plug	Pin Terminal	AC Cover
Com Module	2-Pin Terminal	4-Pin Terminal	PE Terminal	Screw
Expansion Bolts	User Manual	WiFi Connection Guide (WiFi Module Only)		

2-Pin terminal is used for CT; 4-Pin terminal is used for RS485.

4 Installation

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

| Keep away from sunlight | Keep dry | Keep it clear of snow | Sun | Rain | Accmulated snow |
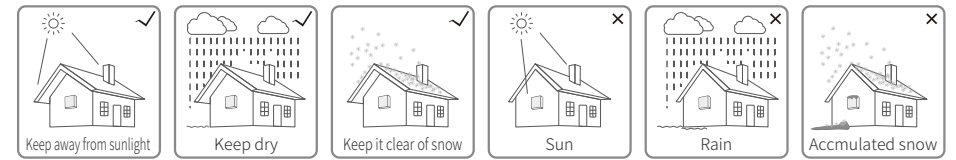
4.2 Inverter Installation

4.2.1 Selecting the installation location
The following must be considered when selecting the best location for an inverter:
• The mounting and installation method must be appropriate for the inverter's weight and dimensions.
• The location must be well ventilated and sheltered from direct sunlight.
• The inverter must be installed vertically or with a backward tilt of no more than 15 degrees.No sideways tilt is allowed. The connection area must face downwards.

Maximum 15°
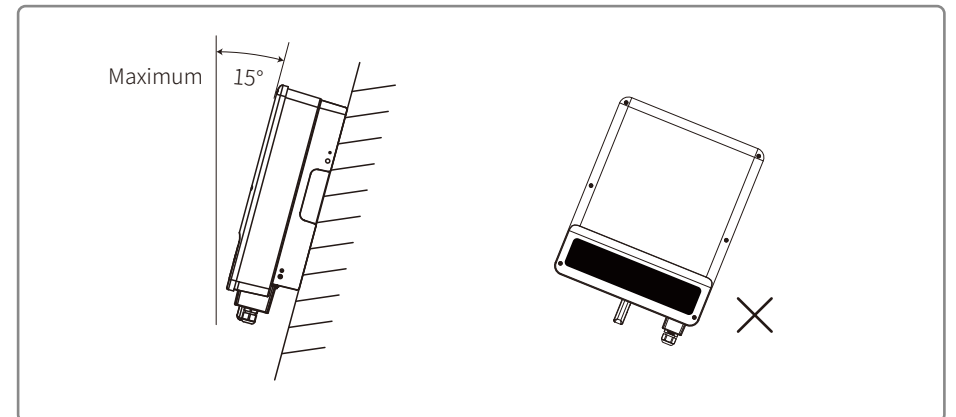
For dissipation of heat and convenience of dismantling, clearnaces around the inverter must meet the standard as shown below :

The installation position should not prevent access to the disconnection means.

300mm

200mm   200mm   300mm

Upward ------------300mm
Downward ---------500mm
Front ----------------300mm
Both sides ----------200mm

500mm
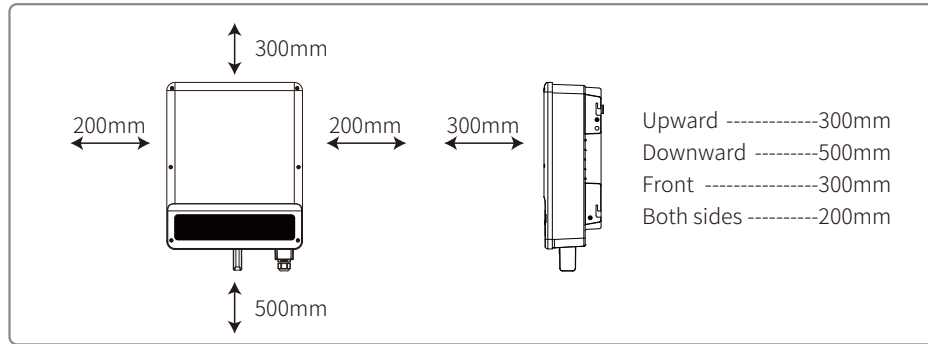
4.2.2 Mounting Procedure

1. Use the wall-mounted bracket as a template and drill holes in the wall, 10 mm in diameter and 80mm deep.

2. Fix the wall-mounted bracket on the wall by using the expansion bolts in the accessory bag.

3. Hold the inverter by the side groove.

4. Install the inverter on the wall-mounted bracket.

329mm

120mm

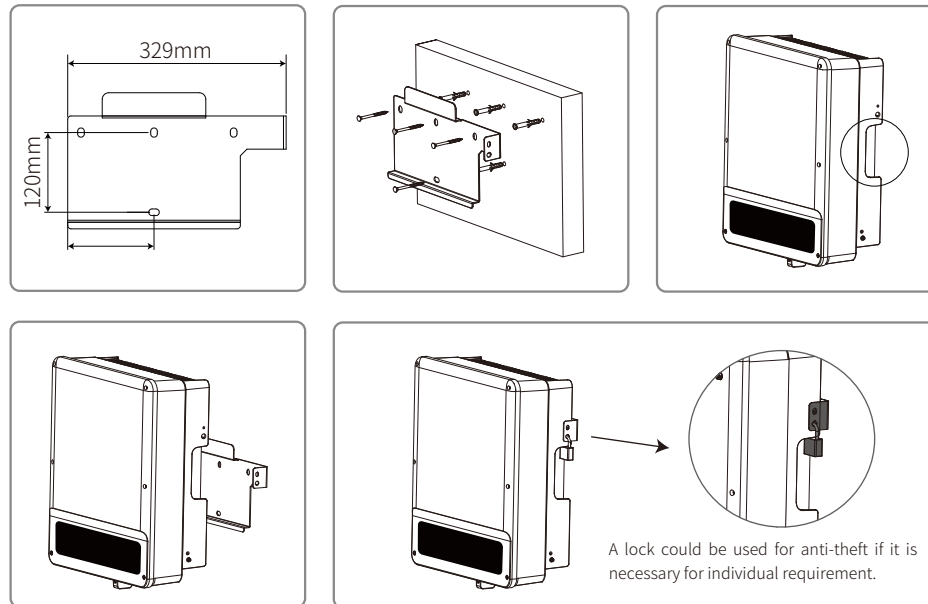A lock could be used for anti-theft if it is necessary for individual requirement.

4.3 Electrical Connection

4.3.1 Connection to grid (AC side Connection)

1. Check the grid voltage and frequency to see if it can comply with the required voltage and frequency of the inverter connection.

2. Add a breaker or fuse to AC side, the specification should be more than 1.25 times of rated AC output current.

3. The PE line of inverter should be connected to the earth, make sure the impedance of neutral wire and earth wire is less than 10ohm.

4. Disconnect the breaker or fuse between the inverter and the utility.

5. Connect the inverter to the gird as follows.

Cable specification of AC side .

A   B   C   D

Annealed copper wire

Grade	Description	Value
A	Outside diameter	13~18mm
B	Separated wire length	20~25mm
C	Conductor wire length	7~9mm
D	Conductor core section	2.5~10mm^2

Inverter	Conductor core section
GW5000-MS/GW6000MS	2.5mm^2
GW7000-MS	4mm^2
GW8500-MS/GW10K-MS	10mm^2

Step 1: Put AC cable through terminal cover follow the sequence.

Screw cap

Cables

Single hole
seal ring

AC sheet cover

The insulator
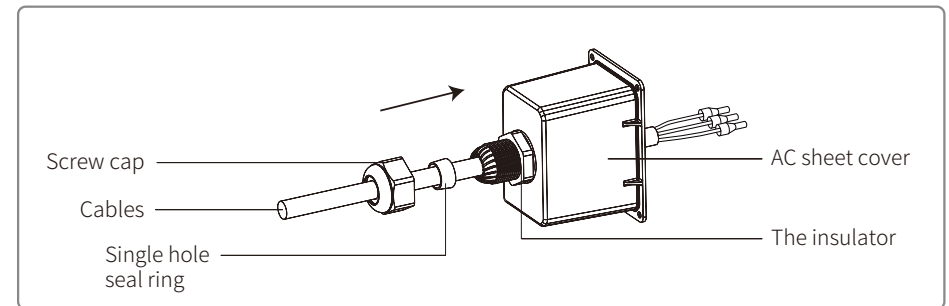
Step 2: Press the 3 connectors on cable conductor core tightly.
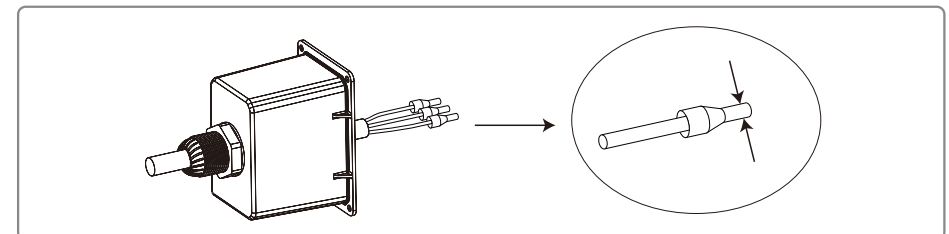
Step 3: Lock the cover and screw the cap.1. Connect the assembled AC cables into AC terminals with fastening torque about 2.0-2.5N.m. Then lock the cover and screw the cap.

Screwing torque 2.0-2.5N.m
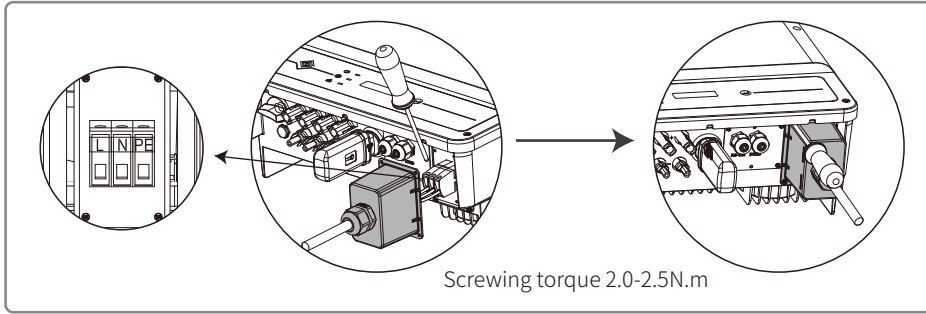
4.3.2 AC circuit breaker and leakage current protection device

In order to ensure that the inverter can be safely and reliably disconnected from the power grid, please install an independent two pole circuit breaker to protect the inverter.

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.

Inverter model	AC breaker specification
GW5000-MS	32A
GW6000-MS	40A
GW7000-MS / GW8500-MS	50A
GW10K-MS	63A

Note: Multiple inverters are not allowed to share a circuit breaker.

The integrated leakage current detection device of the inverter can detect external leakage current in real time. When the detected leakage current exceeds the limit value, inverter will quickly disconnect from the grid, If the leakage current protection device is installed externally, the action current should be 300mA or higher.

4.3.3 DC Side Connection

1. Before connecting the PV strings, please ensure that the plug connectors have the correct polarity. Incorrect polarity could permanently damage the unit.
2. The open circuit voltage of the PV strings cannot exceed the maximum input voltage of the inverter.
3. Only DC connectors provided by manufacturer are permitted for use.
4. The positive and negative pole are not allowed to connect to the PE wire（Ground wire).Otherwise, it will damage the unit.
5. Do not connect positive or negative pole of PV string to PE wire. Otherwise , it will cause damage to inverter.
6. Positive cable shall be red, negative cable shall be black.
7. The minimum insulation resistance to ground of the PV panels for MS series must exceed 33.4K Ω(R=1000/30mA).There is a risk of shock hazard if the requirements of minimum resistance are not met.

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

DEVALAN SERIES　　　MC4 SERIES　　　AMPHENOL SERIES　　　QC4.10 SERIES
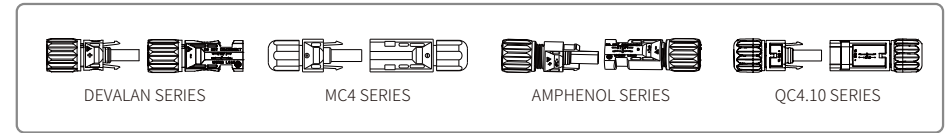
DC Cable specification:

Grade	Description	Value
A	Outside diameter	4~5mm
B	Conductor Material Sectional Area	2.5~4mm^2
C	Bare Wire Length	7mm around

DC Cable should use dedicated PV cable (Suggest using 4mm PV1-F wire).

Installation instruction of DC connector:

Positive connector

Inverter side

Negative connector

MC4 & QC4.10

DEVALAN & AMPHENOL

Do not crimp wire into the limit buckle.

Please use special tools to do crimping
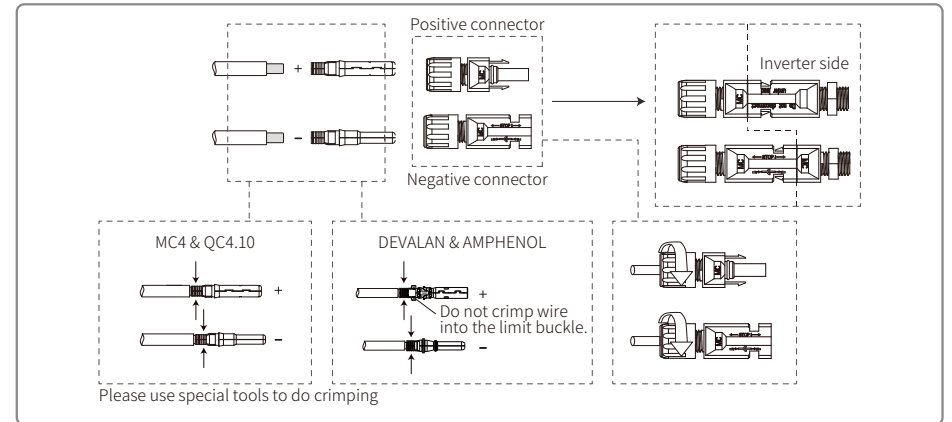
4.3.4 Earth Terminal Connection

The earth terminal should be added according to the requirement of IEC62109-1:2010. It is necessary that installation person must connect the terminal to earthing wire.

The earth connecting terminal is on the side of inverter, illustrated as right. The customer should select the right place to grounding based on site condition.
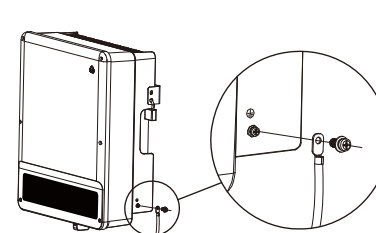
NO.	Name	Explanation
A	Cold-pressed terminal	
B	Screw	M5*14 (1~1.5Nm)
C	Yellow and green line	

Inverter	Conductor core section
GW5000-MS/GW6000MS/GW7000-MS/GW8500MS	6mm^2
GW9000-MS/GW10K-MS	10mm^2

4.4 Communication connection

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

4.4.1 USB connection

USB cable must be connected according to the following steps as below:

1.Remove the communication cover

2.Insert the USB data cable
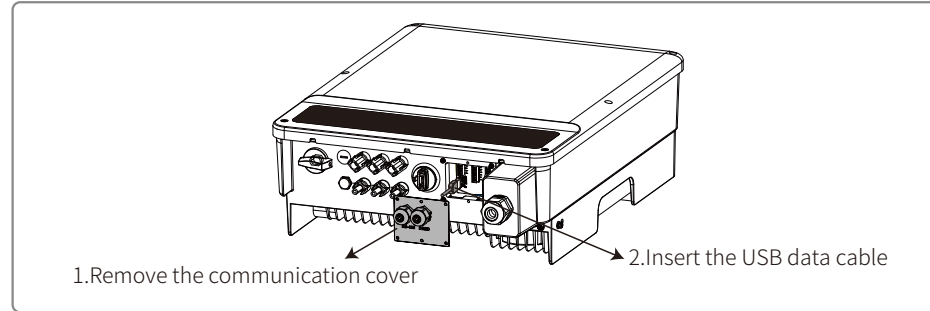
USB communication is only used for the inverter configuration by operation and maintenance personel.Please do not use for other purpose.

4.4.2 RS485 Communication

This function only applies to the inverter with RS485 ports.

The RS485 port of inverter is used to connect the EzLogger Pro, and the total length of connecting cable should not exceed 800m.

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

Internet

Inverter   Inverter   Inverter

Router

PC

Ezlogger Pro

RS485   RS485   RS485
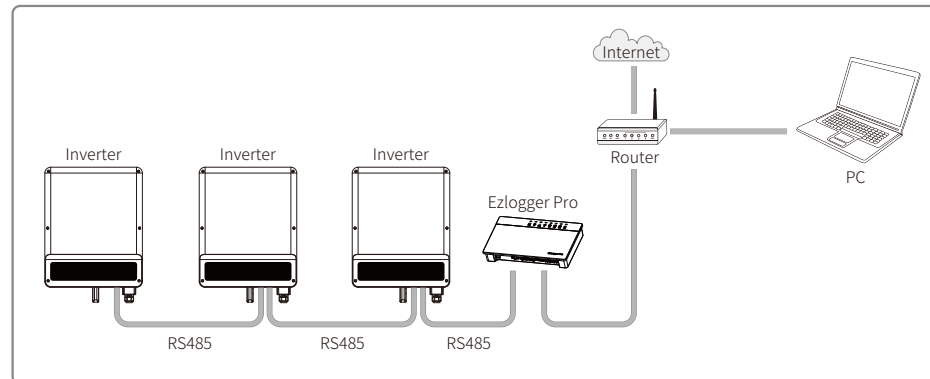
The connection steps of RS485 communication of MS series are as follows:

Step 1: Screw this plate off from inverter.
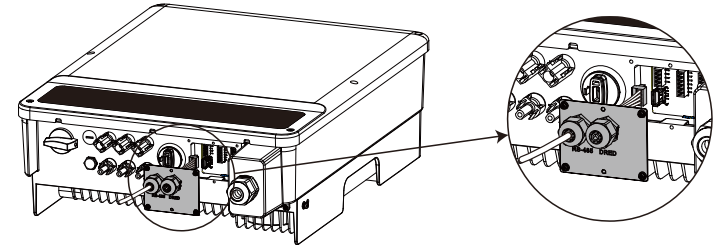
Step 2:

Put the cable through the plate.

Connect RS485 cable on the 4-pin terminal.

Advise to use cable 16AWG-26AWG.

No.	Function
1	RS485+
2	RS485-
3	RS485+
4	RS485-

RS485 communication board   Single hole seal ring   Cable
Lock   Nut   The Insulator   Screw   Cap
1 2 3 4
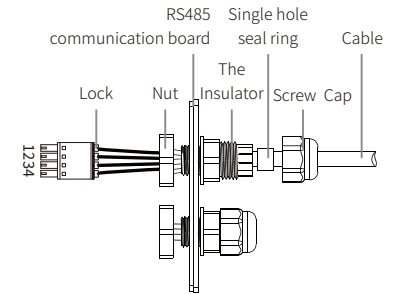
Step 3: Connect the terminal to the right position onto the inverter and screw the plate.
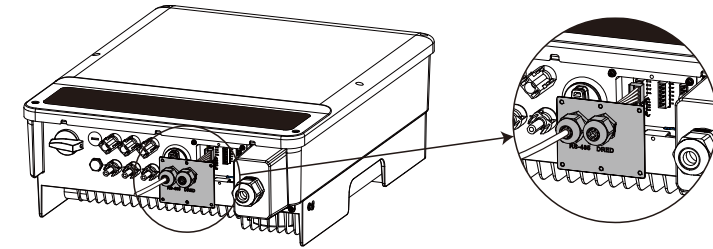
Connect the inverter to Ezlogger Pro through communication cables of RS485.Connect the Ezlogger Pro to the interchanger or the router through UTP (Unshielded Twisted Pair).

4.4.3 Wi-Fi/LAN Communication

The Wi-Fi/LAN communication function is only applicable if the inverter has a WiFi module.The detailed configuration instruction please refer to Wi-Fi Configuration/LAN Module Quick Installation Guide in the accessory box.After configuration, please browse http://www.goodwe-power.com to create PV station.
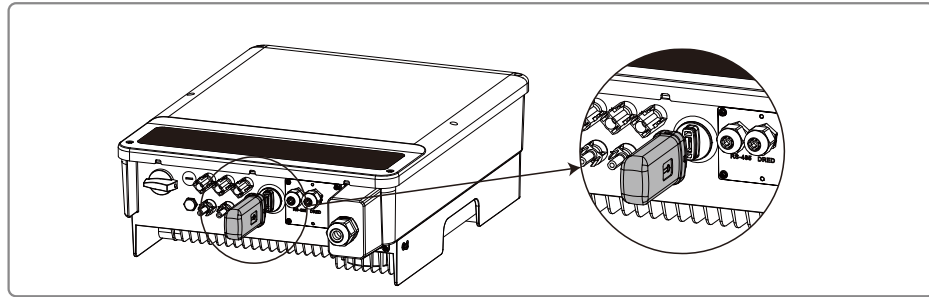
⚠ This port is used for connection of Wi-Fi or LAN module only. No connection to USB is allowed. Do not connect PC or other device to this port.

4.4.4 Export power limit connection diagram

The methods of connecting the Power Limiting device CT is shown below.
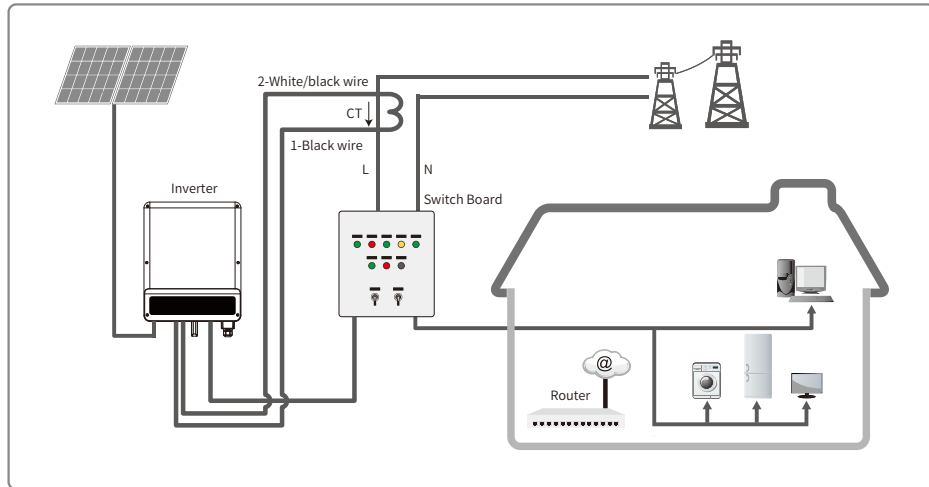
4.4.5 DRED /Remote Shutdown /CT connection

DRED (Demand response enabling device) is only for Australian and New Zealand installations, in compliance with Australian and New Zealand safety requirements.

Contat the after-sales service to get the DRED terminal if you need to use DRED function.

DRED function is off by default. Start this function via SolarGo App if it's needed.

Remote shutdown is only for Europe installations, in compliance with European safety requirements. And Remote shutdown device is not provided by manufacturer.

Detailed operation is shown as below:

The connection steps of DRED /Remote Shutdown& CTcommunication of MS series as follows:

Step 1: Screw this plate off from inverter.

This terminal is only used for DRED.

This terminal is only used for Remote Shutdown.
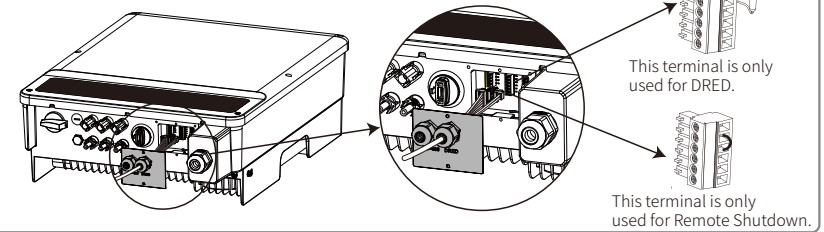
Step 2-1 For DRED& CT:

Put the cable through the plate.

Connect RS485 cable on the terminal.

Advise to use cable 16AWG-26AWG.

No.	Function	No.	Function
1	CT-	3	COM/DRMO
2	CT+	4	REFGEN
		5	DRM4/8
		6	DRM3/7
		7	DRM2/6
		8	DRM1/5
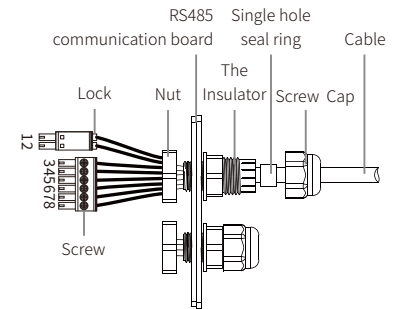
Step 2-2 For Remote Shutdown& CT:

Put the cable through the plate.

Connect RS485 cable on the terminal.

Advise to use cable 16AWG-26AWG.

No.	Function	No.	Function
1	CT-	3	NC
2	CT+	4	REFGEN
		5	DRM4/8
		6	NC
		7	NC
		8	NC
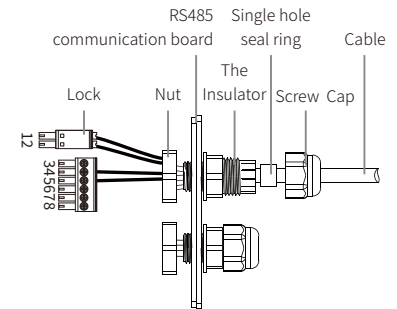
Notes:

2-pin terminal is used to make connection to CT device. You can find it in the accessory bag.

6-pin terminal is used to make connection to DRED / remote shutdown device. If DRED / remote shutdown device is not available, please keep it unconnected.

Step 3: Connect the terminal to the right position onto the inverter and screw the plate.
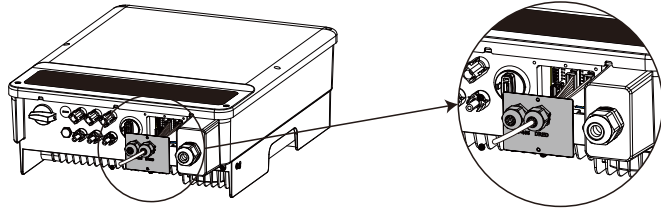
1. Supported DRM command: DRM0, DRM5, DRM6, DRM7, DRM8.

2. After finishing the installation, please set up power limiting function referring to section 4.2(6).

3. Pay attention to the direction of CT when wiring. CT clip should be locked tightly. White / Black cable should be connected to Line 2, black cable should be connected to Line 1. Tighten them with screwdriver. Make sure that CT cables are connected to the right output phase lines of inverter when in use.

4. If not connected to CT, the inverter will show "CT Disconnect". If CT is connected reversely, the inverter will show "CT Reverse" when it enters into on-grid status.

4.4.7 Earth Fault Alarm

The inverter complies with IEC62109-2 chapter 13.9. When earth fault occurs, the fault indicator LED on the front cover will light up. For non-wifi inverter, , the buzzer in the inverter will keep ringing for 1 minute every half an hour unless the fault is resolved (This function is only available for Australia/New Zealand).

5 System Operation

5.1 Indicator Lights
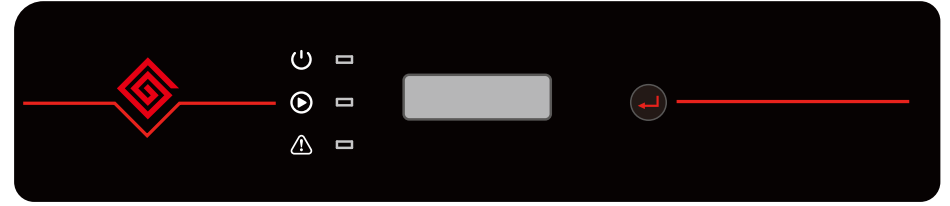
Inverter with LCD, indicator lights in Yellow/Green/Red correspondently refer to ⏻ / ▶ / ⚠

Indicator	Status	Explanation
⏻	▬▬▬	ON = WiFi/ LAN connected / active
	▮▮▮▮▮▮▮	BLINK 1 = WiFi/ LAN system resetting
	▬▬ ▬▬	BLINK 2 = WiFi/ LAN router problem
	▮▮▮ ▮▮▮	BLINK 4 = WiFi/ LAN server problem
	▬▬▬	OFF = WiFi/ LAN not active
▶	▬▬▬	ON = Inverter is feeding power
	▬▬▬	OFF = Inverter is not feeding poweratthe moment
⚠	▬▬▬	ON = Fault occurred
	▬▬▬	OFF = No fault

5.2 User Interface and Use of The Display

Set Country /Region's Safety Setting :

After powering on for the first time, the inverter prompts **Select Country/Region**, please short press until "GW5000-MS Pac=****.0W" is displayed, and then set the safety region. The inverter cannot be connected to the grid before the safety-related area is set.

If display shows "GW5000-MS Pac=****.0W", then long press the button to enter the second level menu. Short press to browse the countries available. Please wait after choosing the suitable country's safety setting, the display will show "setting..." and skip to "Set OK" or "Set Fail".

NOTE: For the Australian market, to comply with AS/NZS 4777.2:2020, please select from Australia Region A/B/C, please contact your local electricity grid operator on which Region to select. After the safety area setting is completed, some parameters in the inverter system will take effect according to the corresponding safety regulations, such as PU curve, QU curve, trip protection, etc. If you need to change the configuration parameters, please refer to the SolarGo APP user manual.

1. A schematic of the display screen is shown as below:

```
    Normal
  Pac=6000.0W
```

Display area is divided as follows:

```
    Line 1
    Line 2
```

First Level Menu / Second Level Menu

First Level Menu

- Normal
  Pac=6000W
- E-Today=15.2KWh
  Pac=6000W
- E-Total=533.17KWh
  Pac=6000W
- Vpv1=360V
  Ipv1=5.5A
- Vpv2=360V
  Ipv2=5.5A
- Vpv3=360V
  Ipv3=5.5A
- Iac=11.3A
  Pac=6000W
- Fac=50.02Hz
  Pac=6000W
- Error History
  Pac=6000W
- GW7000-MS
  Pac=6000W
- Ver:V1.XX.XX
  Pac=6000W
- Set Language
  Pac=6000W
- Set Time
  Pac=6000W
- RSSI : 0%
  Pac=6000W
- W/L Reset
  Pac=6000W
- W/L Reload
  Pac=6000W
- PF Adjust
  Pac=6000W
- Shadow MPPT OFF / Shadow MPPT ON
  Pac=6000W
- Power Limit OFF / Power Limit ON
  Pac=6000W
- Set Power Limit
  XXX%
- Set Modbus Addr
  Pac=6000W
- Shadow MPPT OFF / Shadow MPPT ON
  Pac=6000W

Second Level Menu

- 50Hz Grid Default
- Lock
- No Error
- E01 110822 01:01
- 50Hz GridDefault — Short press for safety country select
- English / Angielski — Short Press
- Short Press to select number 0 ~ 9: 2000-00-00 00:00 (Long Press)
- WiFi Resetting — Wait → WiFi Reset OK / WiFi Reset Fail
- W/L Reloading — Wait → W/L Reload OK / W/L Reload Fail
- Disable / Lagging 0.95 — Short press short press to select "Leading" or "Lagging"; Short Press to select number 8 or 9; Short Press to select number 0 ~ 9
- Set Power Limit XXX% — Short press to select number 0 ~1; Short press to select number 0 ~9; Short press to select number 0 ~9
- Set Addr: XXX — Short press to select number 0 ~ 2; Short press to select number 0 ~ 9; Short press to select number 0 ~ 9

(Long Press / Short Press transitions as indicated)

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2. Display area

Line 1---Working status information

Line 2---Diaplays of the real-time power generated by the inverter.

This area displays the status information. "**Waiting Pac=0.0W**" indicates the inverter is standing by for power generation; "**Checking**S Pac=0.0W**" (checking time is based on safety, and varies from country/region to country/region) indicates the inverter is self-checking, counting down and preparing for power generation. "**Normal Pac=6000.0W**" indicates the inverter is generating power. If any condition of the system is abnormal, the screen will display an error message. Refer to the chapter Troubleshooting.

Through button operation, the screen can display different information such as operation parameters and power generation status in this area.

3. Operation of the display

There are 2 modes of button operation: short press and long press.

The display allows access to the configuration of the basic parameters. All the languages, time and country/region safety setting can be configured by pressing the buttons. The menu shown in the LCD display area has two levels. Short pressing or long pressing will take you to different menus. Normally, in all levels of the menu, if no action is taken over 20 seconds, the backlight of the LCD display will be switched off, and the display will automatically revert to the first item of the first level menu, and then any modifications made to the data will be stored into internal memory.

Items in the first level menu will be locked if the second level menu doesn't show. For these items, when the button is pressed for two second, the LCD will display the word "**Lock**",the display will stay in the lastest locked menu. The locked menu can only be unlocked through system mode switching, fault occurrence or button operation.

4. Menu introduction

- When the PV panel is feeding power to the inverter, the screen will show the first-level menu.

- The initial display is the first item of the first level menu, and the interface displays the current status of the system, it shows "**Waiting Pac=0.0W**" in the initial state; it shows "**Normal Pac=6000.0W**" during power generation mode; if there is something wrong with the system, an error message is shown. Please refer to the chapter Troubleshooting.

  The way to view all the data in the menu:

- Short press the button to enter the E-Today menu which displays the total power generation for today.

- Short press the button to enter the E-Total menu which displays the total power generation up to today.

- Short press the button to enter the menu which displays the PV1 voltage in "V" and current in "A".

- Short press the button to enter the menu which displays the PV2 voltage in "V" and current in "A".

• Short press the button to enter the menu which displays the PV3 voltage in "V" and current in "A".

• Short press the button to enter the Vac which displays the grid voltage in "V".

• Short press the button to enter the Fac which displays the grid frequency in "Hz".

• Ways to view Error message:

Short press the button to enter the Error Message History menu.

Long press (2s) the button to enter the second level menu of error detection. The last five inverter error message will be shown by short pressing the button in this second level menu. The records include error message and error times (190520 15:30). Error message can be found in "5.3 Erroe message".

• The way to view model name and reconfigure safety country/region:

From the error message history item in the first level menu, short press the button once to see model name.

If you want to change the country/region's safety setting , please long press the button for 2 seconds, then the LCD screen will access to the second level menu.

In the second level menu, short pressing the button can change the safety country/region. If you change nothing in second level menu and without pressing button over 20 seconds, then the backlight of LCD will power off and return to the first level menu.

• View software version

Short press the button from the model name item to check the software version in the first level menu.

5. Basic setting:

• Set language:

Short press the button to enter the Set Language menu. Long press（2s）the button to enter the second level menu. Short press to browse the available languages. If you change nothing in second level menu and without pressing button over 20 seconds , then the backlight of LCD will power off and screen return to the first level menu.

• Set time:

From Set language menu in the first level, short press the button to enter the Set Time menu.

Long press（2s）the button to enter the second level menu. The initial display is "**2019-00-00 00:00**", in which the first four numbers represent the year (e.g 2000-2099); the fifth and sixth numbers represent the month (e.g 01-12); the seventh and the eighth numbers represent the date(e.g 01-31). The remaining numbers represent the time.

Short press to change the number in current location, and long press (2s) to move the cursor to next position. The inverter will store the time if there is no input over 20 seconds, and the LCD will automatically return to the main menu and the backlight will switch off.

• MPPT (Maximum Power Point Track) function for Shadow:

The default setting for shadow optimizer is disabled.

Please do not enable the function when there is no shadow on panel. Otherwise it could lead to generating less power.

Short press the button to enter Shadow Optimize menu. When it shows "**Shadow MPPT OFF**", it means the shadow optimizer is off. Long press the button for 2s to turn on the function.

• Power limiting function setting

The Operations of the ON/OFF power limiting function (the default is OFF) and the power limiting settings (the default is 2% rated) are shown below:
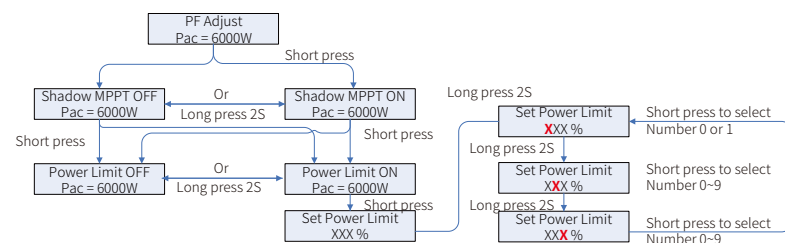
Note:

If the power limiting function is ON, the maximum output power of the inverter will be limited to the value of the power limiting settings while the inverter is without a power limmiting device or the device is not working.

You need to enter a password before being able to set the power limit. The default password is "1111".(This function is only available for Australia/New Zealand)

• Explanation to some Messages

Message	Explanation
F/W Updating	DSP firmware is upgrading
70% Rated Enable	Only for German safety code. The output power limit of inverter is set as 70% of nominal power of inverter.
100% Rated Enable	Only for German safety code. The output power limit of inverter is set as 100% of nominal power of inverter.
Shadow MPPT OFF	Turn off shadown scan function
Shadow MPPT ON	Turn on shadown scan function
RSSI: %	Signal intensity of GPRS in percentage.
% Prated	Export power limit setting. The export power to the grid is **% of nominal power.

6. Operation of display under grid-connected mode.

When the input voltage reaches the inverter's turn-on voltage, the LCD starts to work, the yellow light will be turned on and the LCD will display "**Waiting**". More information will be displayed within a few second. If the inverter is connected to the grid, "**Checking XXs**" will be displayed and a countdown will commence from XX seconds (Different countries or regions have different regulation of time for countdown). When it shows "**Checking 0S**", you will hear the relay be triggered some times. Then the LCD will display "**Normal**". The instant power output will be shown at the bottom of the LCD.

5.3 Error Message

An error message will be displayed on the LCD if a fault occurs.

Error code	Description
03	Grid frequency out of pemissible range.
14	Ground insulation impedance is too low.
15	Grid voltage out of permissible range.
17	Overvoltage at DC input.
19	Over temperature on the case.
23	Utility is unavailable.

5.4 W/L Reset & W/L Reload

The two functions are only available for Wi-Fi/ LAN model inverters.

W/L reload function is used to change the W/L configuration to default value.

Please configure the Wi-Fi/LAN as 4.4.3 after using the function.

Press the button until the LCD displays "**W/L Reset**", then long press (2S) until the LCD displays "**W/L Resetting...**". Stop press and wait for the screen to show "**W/L Reset OK**" or "**W/L Reset Failed**".

Press the button until the LCD displays "**W/L Reload**", then long press (2S) until the LCD displays "**W/L Reloading...**". Stop pressing and wait for the screen to show "**W/L Reloading OK**" or "**W/L Reloading Failed**".

5.5 Precaution For Initial Startup

1. Make sure the AC circuit is connected and the AC breaker is off.

2. Make sure the DC cable between the inverter and the PV string is connected, and the PV voltage is normal.

3. Turn on the DC switch, and set safety country according to the local regulation.

4. Turn on the AC breaker. Check whether the inverter can work normally.

5.6 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 SolarGo app.

5.6.1 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.
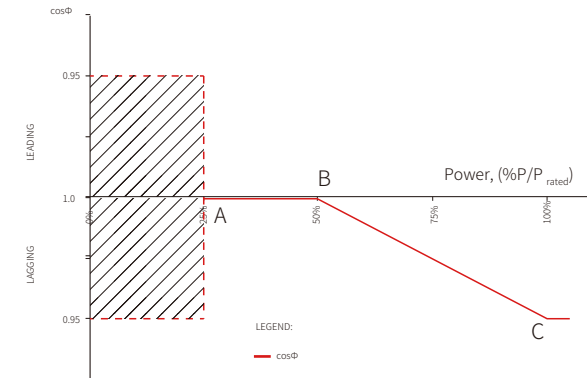
5.6.2 PU Curve Mode

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)

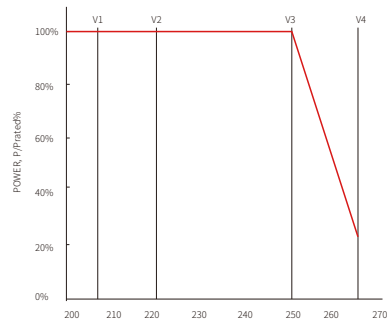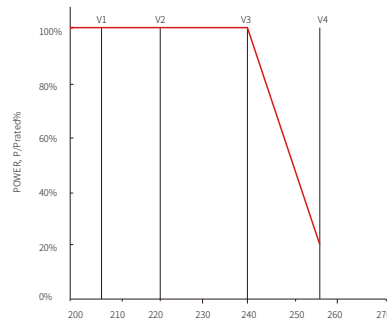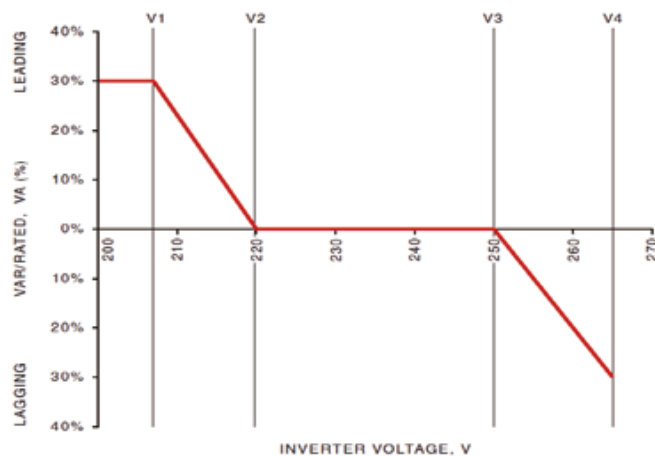### 5.6.3 QU Curve Mode

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.

6 Troubleshooting

If the Inverter is not able to work properly, please refer to the following instructions before contacting your local service. If any problems arise, the red (FAULT) LED indicator on the front panel will light up and the LCD screen will display relevant information. Please refer to the following table for a list of error message and associated solutions.

Type of fault		Troubleshooting
System failure	Isolation Failure	1. Turn off DC switch first, then take off DC connector and AC connector. Check the impedance between PV (+) & PV (-) to earth. 2. If impedance is less than 100KΩ, please check the insulation of PV string wiring to the earth. 3. If impedance is larger than 100KΩ, please contact local service office. 4. Take off AC connector, measure the impedance between neutral wire and PE line. If it is larger than 10KΩ, please check AC wiring.
	Ground I Failure	1. Turn off DC switch first, then take off DC connector and AC connector, check the insulation of PV string wiring to earth. 2. Restart the DC switch. 3. If the problem still exists, please call the local service office.
	Vac Failure	1. Turn off DC switch first, then take off the AC connector and DC connector, measure the voltage between live line and neutral wire in connector. Check if it conforms to the grid-connected specification of inverter. 2. If not, please check grid wiring. 3. If conforming to the specification, please connect AC connector, restart DC switch.The inverter will connect grid automatically. If the probiem still exists, please call the local service office.
	Fac Failure	1.Turn off DC switch first, then take off the AC connector and DC connector, check if the AC line and PE line are right. 2.If the problem still exists, please call the local service office.
	Utility Loss	1. Turn off DC switch first, then take off the AC connector and DC connector, measure the voltage between live line and neutral wire in connector. Check if it conforms to the grid-connected specification of inverter. 2. If not, please check if the distribution switch is connected and the grid is normal. 3. If conforming to the specification, reconnect AC connector and DC connector. If the problem still exists, please call the local service office.
	PV Overvoltage	1. Turn off DC switch first, then take off the AC connector and 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	1. Turn off DC switch first, then take off the AC connector and DC connector 2. Reduce ambient temperature. 3. Move the inverter to a cool place. 4. If the problem still exists, contact local service office for help.

Type of fault		Troubleshooting
Inverter failure	Relay-Check Failure	1. Disconnect the DC connector and AC. 2. Reconnect the DC connector. 3. If the problem still exists, please call the local service office.
	DCI Injection High	
	EEPROM R/W Failure	
	SPI Failure	
	DC BUS High	
	GFCI Failure	
Others	No display	1. Turn off DC switch, take off DC connector, measure the voltage of PV array. 2. Plug in DC connector, and turn on DC switch. 3. If PV array voltage is lower than 150V, please check configuration of invert module. 4. If voltage is higher than 150V and the problem still exists, please contact local office.

Note:

When sunlight is insufficient, the PV Inverter may continuously start up and shut down automatically due to insufficient power generated by the PV panel.

Explanation of some faults:

Fault	Explanation
Consistent Fail	Consistence failure between two DSP chips in inverter which check simultaneously grid voltage and frequency and other variables. Consistence error occurs when there is much difference in the results detected by both chips.
DCI High	The DC current injection exceeds the threshold and triggers protection.
EEprom R/W Fail	Error in reading/writing from/into the memory card data storage such as SN, generation.
SPI Fail	Error of abnormal data transmission between two DSP chips.
Ref 2.5v Fail	The reference voltage limitation is exceeded, which leads to detection deviation of voltage and current.
AC HCT fail	Error in AC current sensor.
E:	Error message.

7 Technical Parameters

Technical Data	GW5000-MS	GW6000-MS	GW7000-MS	GW8500-MS	GW10K-MS
Input					
Max. Input Power (W)	10000	12000	13500	13500	13500
Max. Input Voltage (V)	600	600	600	600	600
MPPT Operating Voltage Range (V)	80~550	80~550	80~550	80~550	80~550
MPPT Voltage Range at Nominal Power (V)	150~500	200~500	240~500	250~500	280~500
Start-up Voltage (V)	80	80	80	80	80
Nominal Input Voltage (V)	360	360	360	360	360
Max. Input Current per MPPT (A)	16	16	16	16	16
Max. Short Circuit Current per MPPT (A)	20	20	20	20	20
Max. Backfeed Current to The Array (A)	0	0	0	0	0
Number of MPP Trackers	3	3	3	3	3
Number of Strings per MPPT	1	1	1	1	1
Output					
Nominal Output Power (W)	5000	6000	7000	8500	10000
Nominal Output Apparent Power (VA)	5000	6000	7000	8500	10000
Max. AC Active Power (W)[*1]	5500	6600	7700	9350	10000
Max. AC Apparent Power (VA)[*2]	5500	6600	7700	9350	10000
Nominal Power at 40°C (W) (Only for Brazil)	5000	6000	7000	8500	10000
Max Power at 40°C (Including AC Overload) (W) (Only for Brazil)	5500	6600	7700	9350	10000
Nominal Output Voltage (V)	220/230/240	220/230/240	220/230/240	220/230/240	220/230/240
Output Voltage Range (V)	180~265	180~265	180~265 (Australia) 176~242 (Brazil)	180~265 (Australia) 176~242 (Brazil)	180~265 (Australia) 176~242 (Brazil)
Nominal AC Grid Frequency (Hz)	50/60	50/60	50/60	50/60	50/60
AC Grid Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65
Max. Output Current (A)	25.0	30.0	35.0	42.5	45.5
Max. Output Fault Current (Peak and Duration) (A)	74A@5ms	74A@5ms	74A@5ms	90A@5ms	90A@5ms
Inrush Current (Peak and Duration) (A)	150A@50us	150A@50us	150A@50us	150A@50us	150A@50us
Nominal Output Current (A)	22.7/21.7	27.3/26.1	31.8/30.4	38.6/37	45.5/43.5
Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)				
Max. Total Harmonic Distortion	<3%				
Maximum Output Overcurrent Protection (A)	68	68	68	78	78
Efficiency					
Max. Efficiency	97.7%	97.7%	97.7%	97.7%	97.7%

European Efficiency	97.3%	97.3%	97.3%	97.3%	97.3%
Protection					
PV Insulation Resistance Detection	Integrated				
Residual Current Monitoring	Integrated				
PV Reverse Polarity Protection	Integrated				
Anti-islanding Protection	Integrated				
AC Overcurrent Protection	Integrated				
AC Short Circuit Protection	Integrated				
AC Overvoltage Protection	Integrated				
DC Switch	Integrated				
DC Surge Protection	Type II				
AC Surge Protection	Type III (Type II Optional)				
AFCI	Optional				
Emergency Power Off	Optional				
Remote Shutdown	Optional				
General Data					
Operating Temperature Range (°C)	-25~+60				
Relative Humidity	0~100%				
Max. Operating Altitude (m)[*3]	4000				
Cooling Method	Natural Convection				
User Interface	LED, LCD				
Communication	WiFi, RS485 or LAN (Optional)				
Communication Protocols	Modbus-RTU (SunSpec Compliant)				
Weight (kg)	22.5				
Dimension (W×H×D mm)	511×415×175				
Noise Emission (dB)	<30				
Topology	Non-isolated				
Self-consumption at Night (W)	<1				
Ingress Protection Rating	IP65				
Anti-corrosion Class	C4				
DC Connector	MC4 (4~6 mm²)				
AC Connector	AC Connector				
Environmental Category	4K4H				
Pollution Degree	III				
Overvoltage Category	DC II / AC III				
Protective Class	I				
The Decisive Voltage Class (DVC)	PV：C AC：C Com：A				
Active Anti-islanding Method	AFDPF + AQDPF [*4]				
Country of Manufacture (Only for Australia)	China				

Only for Brazil

Technical Data	GW7000-MS
Input	
Max. Input Power (W)	13500
Max. Input Voltage (V)	600
MPPT Operating Voltage Range (V)	80~550
MPPT Voltage Range at Nominal Power (V)	200~500
Start-up Voltage (V)	80
Nominal Input Voltage (V)	360
Max. Input Current per MPPT (A)	16
Max. Short Circuit Current per MPPT (A)	20
Max. Backfeed Current to The Array (A)	0
Number of MPP Trackers	3
Number of Strings per MPPT	1
Output	
Nominal Output Power (W)	7000
Nominal Output Apparent Power (VA)	7000
Max. AC Active Power (W)[*1]	7700
Max. AC Apparent Power (VA)[*2]	7700
Nominal Power at 40°C (W) (Only for Brazil)	7000
Max Power at 40°C (Including AC Overload) (W) (Only for Brazil)	7700
Nominal Output Voltage (V)	220
Output Voltage Range (V)	176~242
Nominal AC Grid Frequency (Hz)	60
AC Grid Frequency Range (Hz)	55~65
Max. Output Current (A)	35.0
Max. Output Fault Current (Peak and Duration) (A)	74A@5ms
Inrush Current (Peak and Duration) (A)	150A@50us
Nominal Output Current (A)	31.8
Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)
Max. Total Harmonic Distortion	<3%
Maximum Output Overcurrent Protection (A)	NA
Efficiency	
Max. Efficiency	97.7%
European Efficiency	97.3%
Protection	
PV Insulation Resistance Detection	Integrated
Residual Current Monitoring	Integrated
PV Reverse Polarity Protection	Integrated

Anti-islanding Protection	Integrated
AC Overcurrent Protection	Integrated
AC Short Circuit Protection	Integrated
AC Overvoltage Protection	Integrated
DC Switch	Integrated
DC Surge Protection	Type III
AC Surge Protection	Type III
AFCI	Optional
Emergency Power Off	NA
Remote Shutdown	Optional
General Data	
Operating Temperature Range (°C)	-25~+60
Relative Humidity	0~100%
Max. Operating Altitude (m)*3	4000
Cooling Method	Natural Convection
User Interface	LED, LCD
Communication	WiFi, RS485 or LAN (Optional)
Communication Protocols	Modbus-RTU (SunSpec Compliant)
Weight (kg)	22.5
Dimension (W×H×D mm)	511×415×175
Noise Emission (dB)	<30
Topology	Non-isolated
Self-consumption at Night (W)	<1
Ingress Protection Rating	IP65
Anti-corrosion Class	C4
DC Connector	MC4 (4~6 mm²)
AC Connector	AC Connector
Environmental Category	4K4H
Pollution Degree	III
Overvoltage Category	DC II / AC III
Protective Class	I
The Decisive Voltage Class (DVC)	PV:C AC:C Com:A
Active Anti-islanding Method	AFDPF + AQDPF *4
Country of Manufacture (Only for Australia)	China

*1: For Belgium Max. AC Active Power (W): GW5000-MS is 5000, GW6000-MS is 6000,GW7000-MS is 7000, GW8500-MS is 8500,GW10K-MS is 10000;
*2: For Belgium Max. Output Apparent Power (VA): GW5000-MS is 5000, GW6000-MS is 6000,GW7000-MS is 7000, GW8500-MS is 8500,GW10K-MS is 10000;
*3: For Australia Max. Operating Altitude (m) is 3000;
*4: AFDPF: Active Frequency Drift with Positive Feedback, AQDPF: Active Q Drift with Positive Feedback.

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.

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, and disconnect DC breaker then. Wait for 5 minutes until the residual voltage totally released.

9 Power off the inverter

When operating and maintaining the inverter, please power off the inverter. Operating the equipment with power on may cause damage to the inverter or risk of electric shock.

After the inverter is powered off, there is a delay in the discharge of internal components. Please wait until the equipment is completely discharged according to the required label time.

Step 1: (Optional) Issue a shutdown command to the inverter.

Step 2: Disconnect the AC switch between the inverter and the grid.

Step 3: Disconnect the DC switch of the inverter.

Step 4: (Optional) Disconnect the DC switch of the inverter and PV string paper.