



GOODWE
YOUR SOLAR ENGINE



User Manual

Grid-Tied PV Inverter
HT 73-136kW Series

V1.0-2022-02-08

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Notice

The information in this user manual is subject to change due to product updates or other reasons. This manual cannot replace the product labels or the safety precautions unless otherwise specified. All descriptions in the manual are for guidance only.

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1 About This Manual

This manual describes the product information, installation, electrical connection, commissioning, troubleshooting, and maintenance. Read through this manual before installing and operating the product. All the installers and users have to be familiar with the product features, functions, and safety precautions. This manual is subject to update without notice. For more product details and latest documents, visit www.goodwe.com.

1.1 Applicable Model

This manual applies to the listed inverters below (HT for short):




| Model | Nominal Output Power | Nominal Output Voltage |
|------------|----------------------|-----------------------------|
| GW73KLV-HT | 73kW | 220V, 3L/N/PE or 3L/PE |
| GW75K-HT | 75kW | 380V/400V, 3L/N/PE or 3L/PE |
| GW80K-HT | 80kW | |
| GW100K-HT | 100kW | 400V, 3L/N/PE or 3L/PE |
| GW110K-HT | 110kW | |
| GW120K-HT | 120kW | |
| GW136K-HTH | 136kW | 500V , 3L/PE |

1.2 Target Audience

This manual applies to trained and knowledgeable technical professionals. The technical personnel has to be familiar with the product, local standards, and electric systems.

1.3 Symbol Definition

Different levels of warning messages in this manual are defined as follows:

| |
|--|
|  DANGER |
| Indicates a high-level hazard that, if not avoided, will result in death or serious injury. |
|  WARNING |
| Indicates a medium-level hazard that, if not avoided, could result in death or serious injury. |
|  CAUTION |
| Indicates a low-level hazard that, if not avoided, could result in minor or moderate injury. |
| NOTICE |
| Highlight and supplement the texts. Or some skills and methods to solve product-related problems to save time. |

1.4 Updates

The latest document contains all the updates made in earlier issues.

V1.0 2022-02-08

- First Issue

2 Safety Precaution

Notice

The inverters are designed and tested strictly complies with related safety rules. Read and follow all the safety instructions and cautions before any operations. Improper operation might cause personal injury or property damage as the inverters are electrical equipment.

2.1 General Safety

Notice

- The information in this document is subject to change due to product updates or other reasons. This manual cannot replace the product labels or the safety precaution unless otherwise specified. All descriptions here are for guidance only.
- Before installations, read through the user manual to learn about the product and the precautions.
- All installations should be performed by trained and knowledgeable technicians who are familiar with local standards and safety regulations.
- Use insulating tools and wear personal protective equipment when operating the equipment to ensure personal safety. Wear anti-static gloves, cloths, and wrist strips when touching electron devices to protect the inverter from damage.
- Strictly follow the installation, operation, and configuration instructions in this manual. The manufacturer shall not be liable for equipment damage or personal injury if you do not follow the instructions. For more warranty details, visit <https://en.goodwe.com/warranty.asp>.

2.2 DC Side:


DANGER

Connect the DC cables using the delivered DC connectors and terminals. The manufacturer shall not be liable for the equipment damage if other connectors or terminals are used.


WARNING







- Ensure the component frames and the bracket system are securely grounded.
- Ensure the DC cables are connected tightly and securely.
- Measure the DC cable using the multimeter to avoid reverse polarity connection. Also, the voltage should be under the permissible range.
- The PV modules used with the inverter must have an IEC61730 class A rating.
- If there are more than 3 PV strings on input side, an additional fuse installation will be suggested.
- 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.

2.3 AC Side

|  WARNING | |
|---|--|
| <ul style="list-style-type: none"> • The voltage and frequency at the connecting point should meet the on-grid requirements. • An additional protective device like the circuit breaker or fuse is recommended on the AC side. Specification of the protective device should be at least 1.25 times the AC output rated current. • You are recommended to use copper cables as AC output cables. Contact the manufacturer if you want to use other cables. | |

2.4 Inverter Installation

|  DANGER | |
|---|--|
| <ul style="list-style-type: none"> • Terminals at the bottom of the inverter cannot bear much load. Otherwise, the terminals will be damaged. • All labels and warning marks must be clear and distinct after the installation. Do not block, alter, or damage any label. • Warning labels on the inverter are as follows. | |

| | | | |
|---|--|---|---|
|  | High voltage hazard. Power off the inverter before any operations. |  | Potential risks exist. Wear proper PPE before any operations. |
|  | Read through the user manual before any operations. |  | Delayed discharge. Wait until the components are completely discharged after power off |
|  | High-temperature hazard. Do not touch the equipment to avoid being hurt. |  | Do not dispose of the product as household waste. Discard the product in compliance with local laws and regulations, or send it back to the manufacturer. |

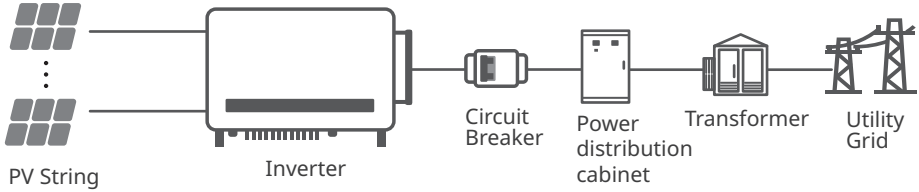
2.5 Personal Requirements

| NOTICE | |
|--|--|
| <ul style="list-style-type: none"> • Personnel who install or maintain the equipment must be strictly trained, learn about safety precautions and correct operations. • Only qualified professionals or trained personnel are allowed to install, operate, maintain, and replace the equipment or parts. | |

3 Product Introduction

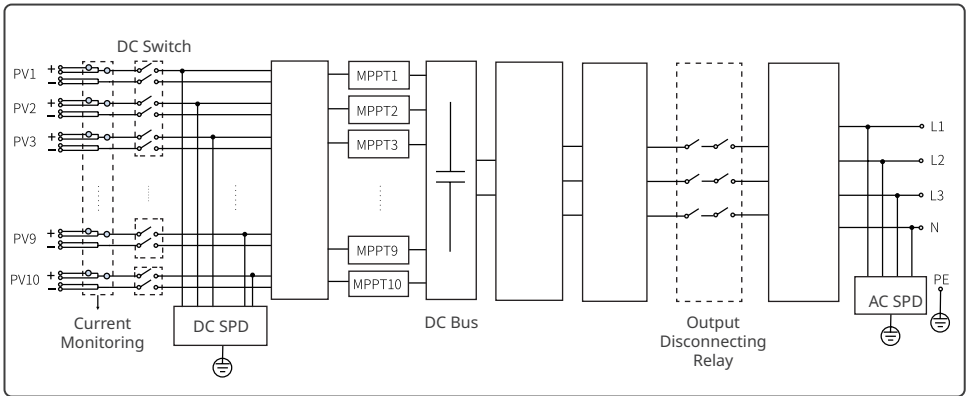
3.1 Application Scenarios

The HT inverter is a three-phase PV string grid-tied inverter. The inverter converts the DC power generated by the PV module into AC power and feeds it into the utility grid. The intended use of the inverter is as follows:

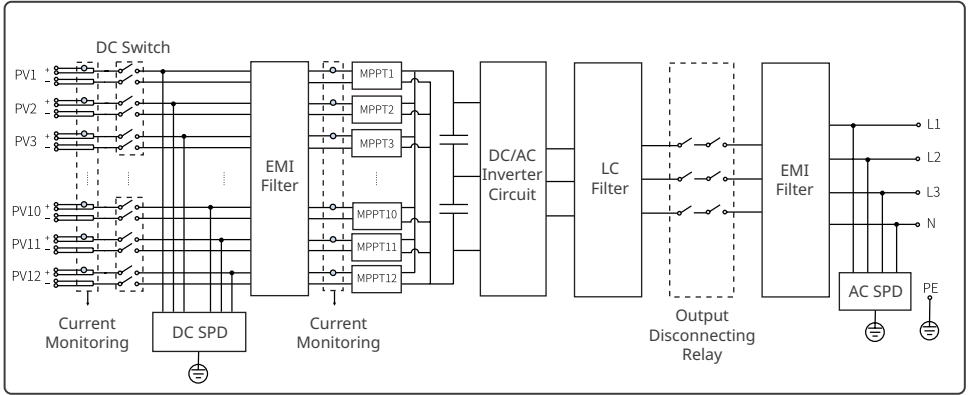


3.2 Circuit Diagram

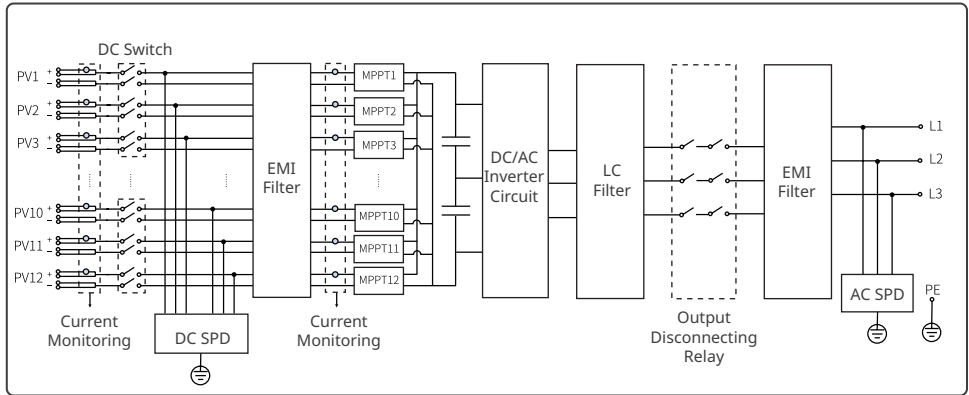
The circuit diagram of GW75K-HT/GW80K-HT/GW100K-HT is as follows.



The circuit diagram of GW73KLV-HT/GW110K-HT/GW120K-HT is as follows.



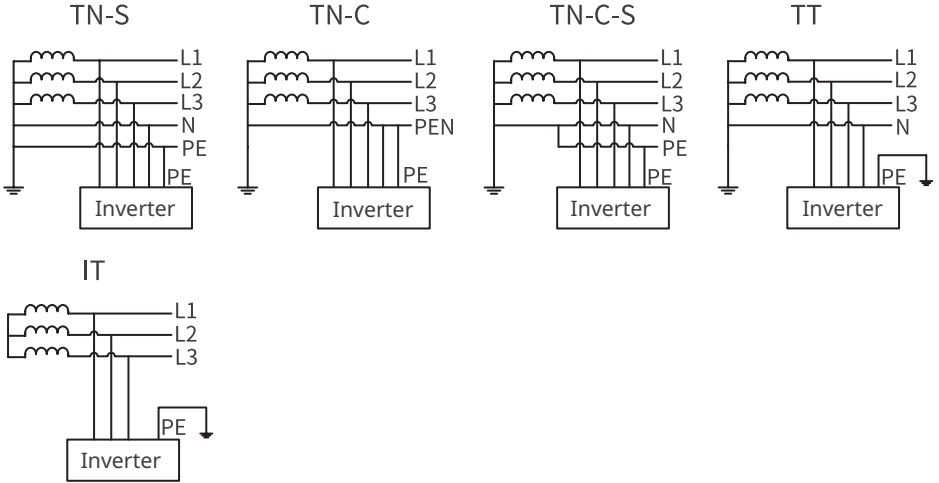
The circuit diagram of GW136K-HTH is as follows.



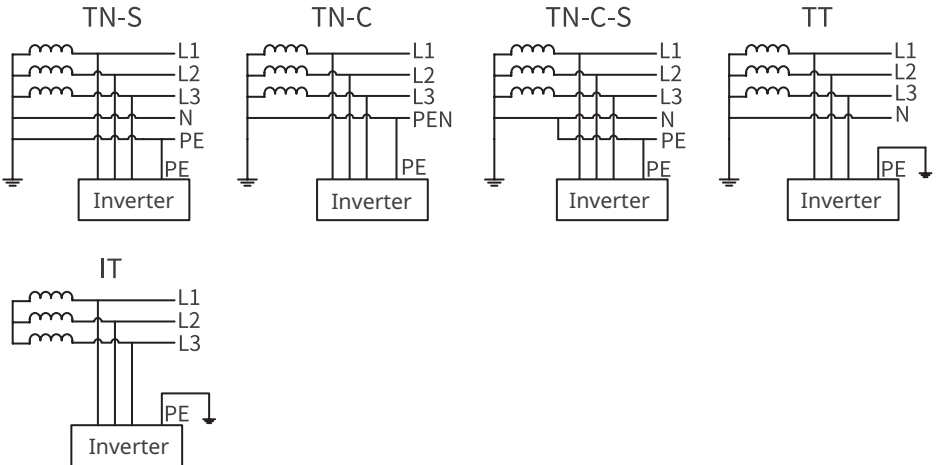
3.3 Supported Grid Types

For the grid type with neutral wire, the N to ground voltage must be less than 10V.

The grid structures supported by HT series 73K/75K/80K/100K/110K/120K are TN-S, TN-C, TN-C-S, TT, IT, as shown in the figure below:



The grid structures supported by HT series 136K are TN-S, TN-C, TN-C-S, TT, IT, as shown in the diagram below:

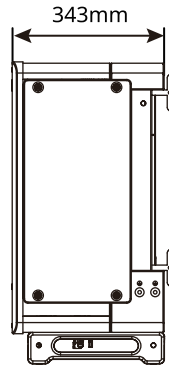
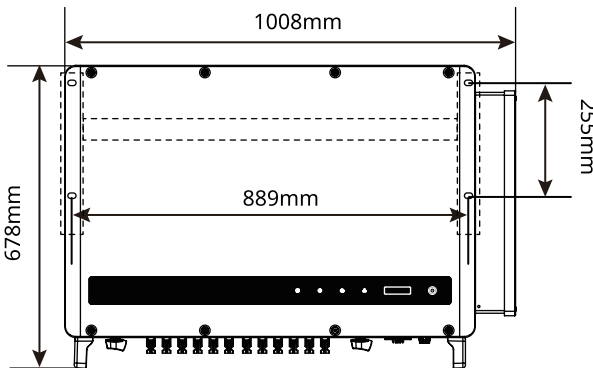
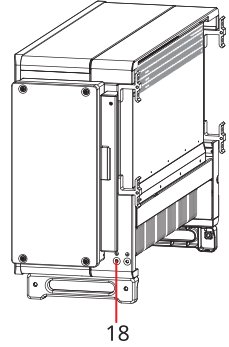
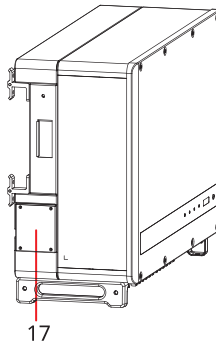
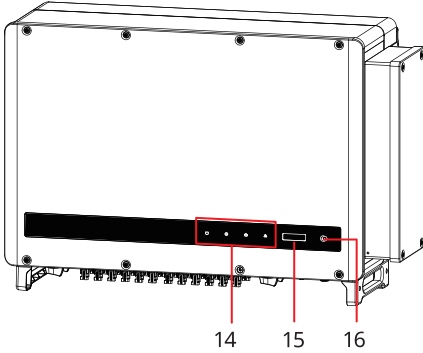
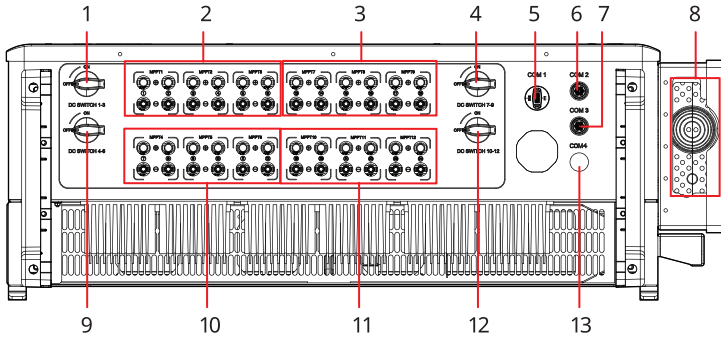


NOTICE

For the TT grid structure, the effective value of the voltage between the neutral wire and the ground wire must be less than 20V.

3.4 Appearance



















3.4.1 Parts



| No. | Parts | Description |
|-------------------|--|--|
| 1 | DC Switch 1-3 | Start or stop 1-3 DC input. |
| 2 | PV Input Terminal 1-3 (Controlled by DC Switch 1-3) | Used to connect the PV module DC input cables. |
| 3 | PV Input Terminal 7-9 (Controlled by DC Switch 7-9) | Used to connect the PV module DC input cables. |
| 4 | DC Switch 7-9 | Start or stop 7-9 DC input. |
| 5 | Communication Port | Used to connect communication modules like Bluetooth, WiFi, GPRS, 4G, etc. |
| 6 | Communication Port (RS485) | Used to connect the RS485 communication cable. |
| 7 | Communication Port (Remote Shutdown) | Used to connect the Remote Shutdown communication cable. |
| 8 | AC Cable Outlet Hole | - |
| 9 | DC Switch 4-6 | Start or stop 4-6 DC input. |
| 10 | PV Input Terminal 4-6 (Controlled by DC Switch 4-6) | Used to connect the PV module DC input cables. |
| 11 ^[a] | PV Input Terminal 10-12 (Controlled by DC Switch 10-12) | Used to connect the PV module DC input cables. |
| 12 | DC Switch 10-12 | Start or stop 10-12 DC input. |
| 13 | Reserved Port | Reserved. |
| 14 | Indicator | Indicates working state of the inverter. |
| 15 | LCD (optional) | Optional. Used to check the parameters of the inverter. |
| 16 | Button(optional) | Optional. Used to control contents displayed on the screen. |
| 17 | Fan | Used to cool the inverter. |
| 18 | Grounding Point | Used to connect the PE cable. |



[a]. The number of PV terminals varies depending on the different inverters. The actual accessories may differ.

3.4.2 Indicators

| Indicator | Status | Description |
|---|---|--|
|  |  | ON = EQUIPMENT POWER ON |
| |  | OFF = EQUIPMENT POWER OFF |
|  |  | ON = THE INVERTER IS FEEDING POWER |
| |  | OFF = THE INVERTER IS NOT FEEDING POWER |
| |  | SINGLE SLOW FLASH = SELF CHECK BEFORE CONNECTING TO THE GRID |
| |  | SINGLE FLASH = CONNECTING TO THE GRID |
|  |  | ON = WIRELESS IS CONNECTED/ACTIVE |
| |  | BLINK 1 = WIRELESS SYSTEM IS RESETTING |
| |  | BLINK 2 = WIRELESS ROUTER PROBLEM |
| |  | BLINK 4 = WIRELESS SERVER PROBLEM |
| |  | BLINK = RS485 IS CONNECTED |
| |  | OFF = WIRELESS IS NOT ACTIVE |
|  |  | ON = A FAULT HAS OCCURRED |
| |  | OFF = NO FAULT |

3.4.3 Nameplate

The nameplate is for reference only.

| | |
|--|--|
|  GOODWE <small>YOUR SOLAR ENGINE</small> | <p>Goodwe trademark, product type, and product model</p> |
| Product: Grid-Tied PV Inverter Model : ***** | |
| Vmax PV: *****Vd.c. MPPT voltage range: ***...***Vd.c. Max. PV current: **/**Ad.c. Isc PV: **/**Ad.c. | |
| Rated grid voltage: **/**Va.c. AC-grid frequency: **/**Hz Max current: **,**Aa.c. Rated active power: **/**kW [1] Rated/Max apparent power: **kVA | <p>Technical parameters</p> |
| Inverter topology: Non-isolated Power factor range: Default >*,**, *,*cap...*,*ind Operating temperature range: -*...**°C Overvoltage-category: DC II ; ACIII IP degree: IP65 Protective class: Class I | |
|  | <p>Safety symbols and certification marks</p> |
| S/N: Co.,Ltd. E-mail: *****@***.com S/N | <p>Contact information and serial number</p> |



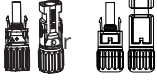

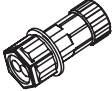





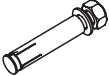



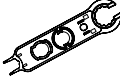


4 Check and Storage

4.1 Check Before Receiving

Check the following items before receiving the product.

1. Check the outer packing box for damage, such as holes, cracks, deformation, and others signs of equipment damage. Do not unpack the package and contact the supplier as soon as possible if any damage is found.
2. Check the inverter model. If the inverter model is not what you requested, do not unpack the product and contact the supplier.
3. Check the deliverables for correct model, complete contents, and intact appearance. Contact the supplier as soon as possible if any damage is found.

4.2 Deliverables

| | | | | |
|---|--|--|--|--|
|  Inverter x1 |  Mounting plate x1 |  PV connector xN |  PIN terminal xN |  Communication Connector xN |
|  Screwdriver x1 |  Fireproofing Mud x1 |  COM module xN |  Screws xN |  Bluetooth xN |
|  Expansion bolts x4 |  Unlock Tool x1 |  Unlock Tool x1 |  Unlock Tool x1 |  Unlock Tool x1 |
|  RS485-USB Cable x1 |  Documents x1 | | | |

NOTICE

- The number of PV connectors and the PV terminals in the inverter is the same.
- The type and number of the communication connector are decided by the selected communication method.
- Communication module types: WiFi, GPES, 4G, Bluetooth, etc. The actual module delivered depends on the communication method of the selected inverter.
- The number of expansion bolts, screws, pin terminals are various depending on different inverters. The actual accessories may differ.
- The tool will only be delivered in Korea.
- The RS485-USB cable will only be delivered in Brazil.

4.3 Storage

If the equipment is not to be installed or used immediately, please ensure that the storage environment meets the following requirements:

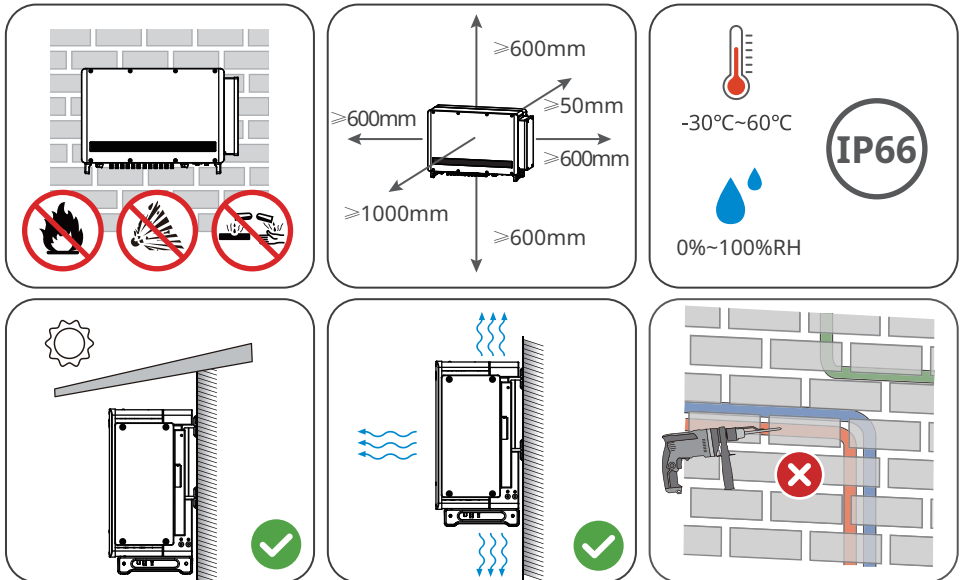
1. Do not unpack the outer package or throw the desiccant away.
2. Store the equipment in a clean place. Make sure the temperature and humidity are appropriate and no condensation.
3. The height and direction of the stacking inverters should follow the instructions on the packing box.
4. The inverters must be stacked with caution to prevent them from falling.
5. If the inverter has been long term stored, it should be checked by professionals before being put into use.

5 Installation

5.1 Installation Requirements

Installation Environment Requirements

1. Do not install the equipment in a place near flammable, explosive, or corrosive materials.
2. Install the equipment on a surface that is solid enough to bear the inverter weight.
3. Install the equipment in a well-ventilated place to ensure good dissipation. Also, the installation space should be large enough for operations.
4. The equipment with a high ingress protection rating can be installed indoors or outdoors. The temperature and humidity at the installation site should be within the appropriate range.
5. Install the equipment in a sheltered place to avoid direct sunlight, rain, and snow. Build a sunshade if it is needed.
6. Do not install the equipment in a place that is easy to touch, especially within children's reach. High temperature exists when the equipment is working. Do not touch the surface to avoid burning.
7. Install the equipment at a height that is convenient for operation and maintenance, electrical connections, and checking indicators and labels.
8. Install the equipment away from electromagnetic interference.

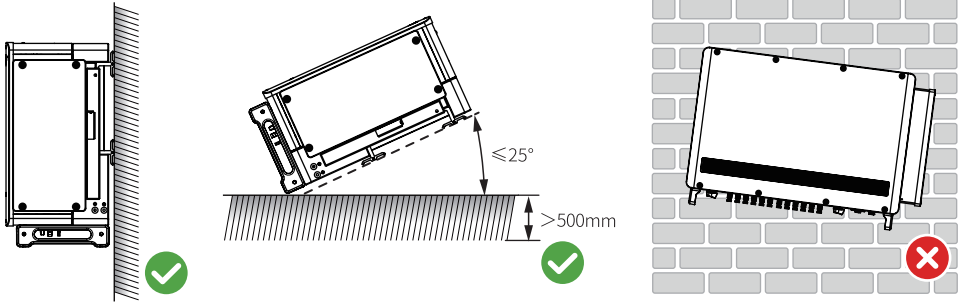


Mounting Support Requirements

1. The mounting support shall be nonflammable and fireproof.
2. Make sure that the support surface is solid enough to bear the product weight load.
3. Do not install the product on the support with poor sound insulation to avoid the noise generated by the working product, which may annoy the residents nearby.

Installation Angle Requirements

- Install the inverter vertically or at a maximum back tilt of 25 degrees.
- Do not install the inverter upside down, forward tilt, back forward tilt, or horizontally.



Installation Tool Requirements

The following tools are recommended when installing the equipment. Use other auxiliary tools on site if necessary.

| | | | | |
|---|---|---|---|--|
|  Goggles |  Safety shoes |  Safety gloves |  Dust mask |  RJ45 crimping tool |
|  Diagonal pliers |  Wire stripper |  Hammer drill |  Heat gun |  DC terminal crimping tool |
|  Marker |  Level |  Heat shrink tube |  Rubber hammer |  DC wiring wrench |
|  Multimeter |  Cable tie |  Torque wrench M6/M5 |  Vacuum cleaner M8/M12 | |

5.2 Inverter Installation

5.2.1 Moving the Inverter

CAUTION

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

1. Consider the weight of the equipment before moving it. Assign enough personnel to move the equipment to avoid personal injury.
2. Wear safety gloves to avoid personal injury.
3. Keep balance when moving the equipment.

5.2.2 Installing the Inverter

NOTICE

- Avoid the water pipes and cables buried in the wall when drilling holes.
- Wear goggles and a dust mask to prevent the dust from being inhaled or contacting eyes when drilling holes.

Step 1 Put the mounting plate on the wall horizontally and mark positions for drilling holes.

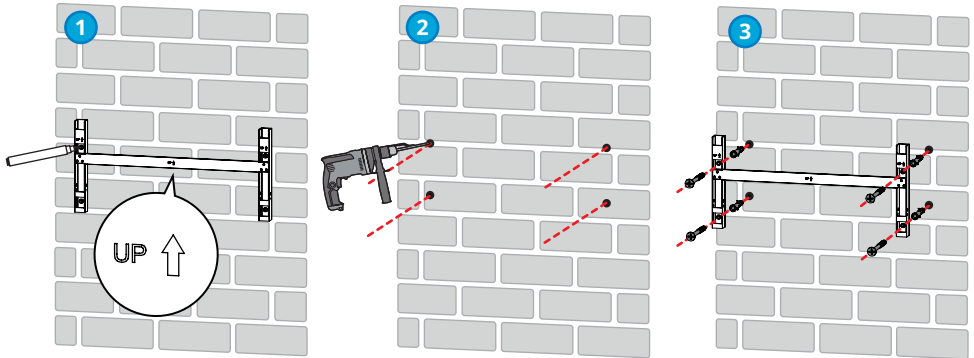
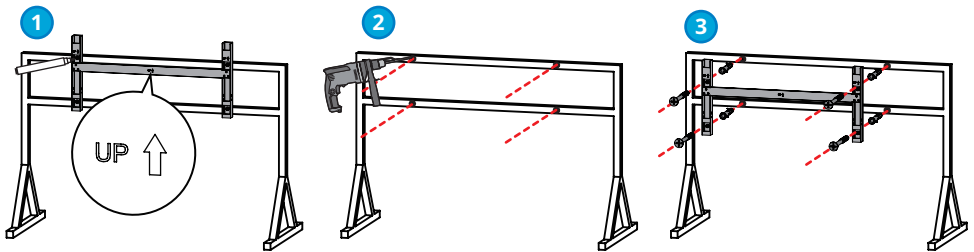
Step 2 Drill holes to a depth of 65mm using the hammer drill. The diameter of the drill bit should be 13mm.

Step 3 Fix the mounting plate on the wall or the bracket.

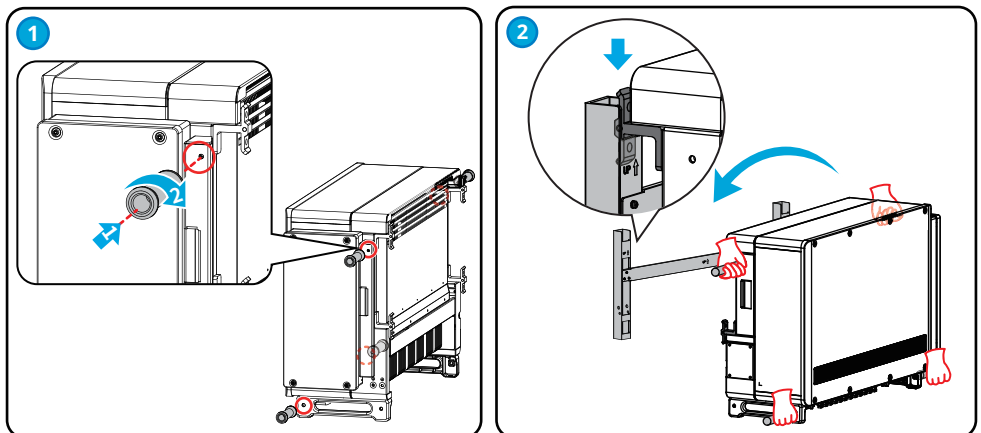
Step 4 Install the handles or the hoisting rings.

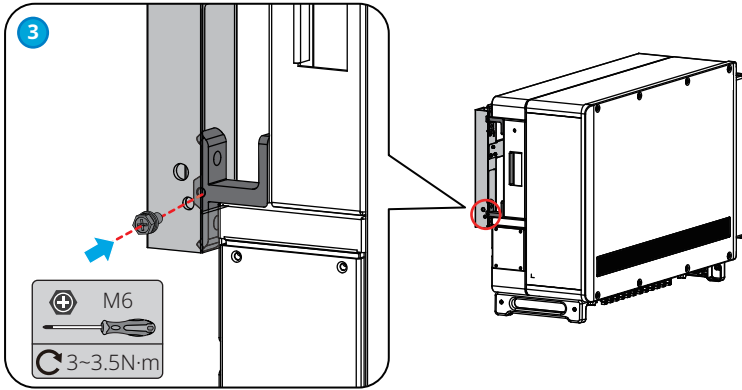
Step 5 Grab the handles to lift the inverter or hoist the inverter to place it on the mounting plate.

Step 6 Tighten the nuts to secure the mounting plate and the inverter.

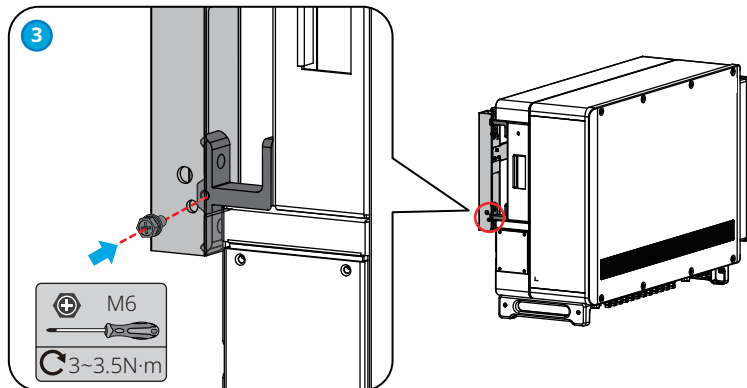
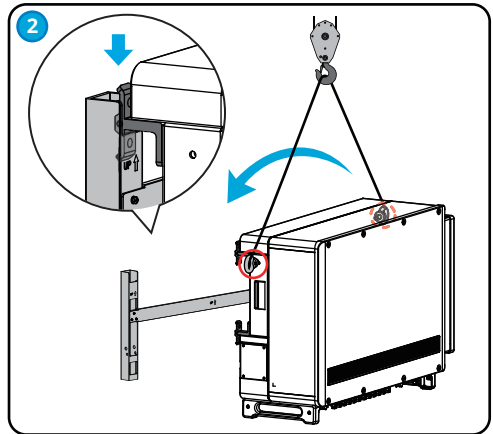
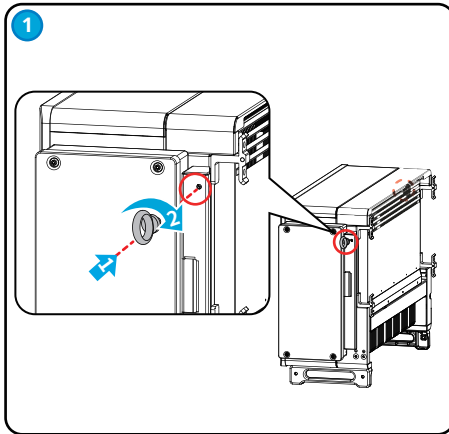
Mounting on the wall**Mounting on the plate****NOTICE**

- Contact the dealer or the after sales center to purchase the handle if it is needed.
- The hoist ring should be prepared by customers.

Lifting the Inverter



Hoisting the Inverter



6 Electrical Connection

6.1 Safety Precautions

DANGER

- Disconnect the DC switch and the AC output switch of the inverter to power off the equipment before any electrical connections. Do not work with power on. Otherwise, an electric shock may occur.
- Perform electrical connections in compliance with local laws and regulations. Including operations, cables, and component specifications.
- If the tension is too large, the cable may be poorly connected. Reserve a certain length of the cable before connecting it to the inverter cable port.

NOTICE

- Wear personal protective equipment like safety shoes, safety gloves, and insulating gloves during electrical connections.
- All electrical connections should be performed by qualified professionals.
- Cable colors in this document are for reference only. The cable specifications should meet local laws and regulations.

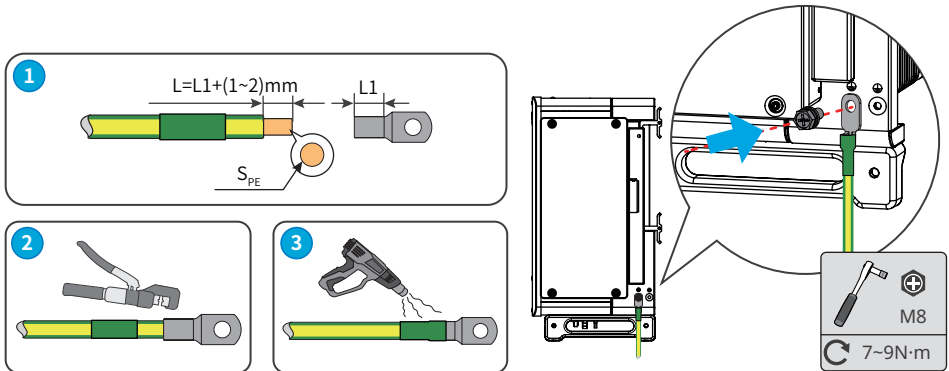
| No. | Cable | Type | Cable Specification |
|-----|-------------------------------|--|---|
| 1 | PE cable | Outdoors cable | Conductor cross sectional area $S_{PE} \geq S/2$ |
| 2 | DC input cable | PV cable that meets 1100V standard. | <ul style="list-style-type: none"> Conductor cross sectional area: 4~6mm² Cable outer diameter: 5.5mm~9mm |
| 3 | AC output cable (multi-core) | Multi-core outdoor cable | <ul style="list-style-type: none"> Cable outer diameter: 22mm~67mm Copper core cable conductor cross sectional area: $70 \leq S \leq 300\text{mm}^2$ Aluminum alloy cable or copper-clad aluminum cable conductor cross sectional area: $95 \leq S \leq 300\text{mm}^2$ Conductor cross sectional area $S_{PE} \geq S/2$ |
| 4 | AC output cable (single core) | Single-core outdoor cable | <ul style="list-style-type: none"> Cable outer diameter: 11mm~35mm Copper core cable conductor cross sectional area: $70 \leq S \leq 300\text{mm}^2$ Aluminum alloy cable or copper-clad aluminum cable conductor cross sectional area: $95 \leq S \leq 300\text{mm}^2$ Conductor cross sectional area $S_{PE} \geq S/2$ |
| 5 | RS485 communication cable | Outdoor shielded twisted pair. The cable should meet local requirements. | Cable Length: 1000m |
| 6 | Remote Shutdown Cable | Outdoor shielded twisted pair. The cable should meet local requirements. | N/A |

Note: The values in this table are valid only if the external protective earthing conductor is made of the same metal as the phase conductors. Otherwise, the cross-sectional area of the external protective earthing conductor is to be determined in a manner which produces a conductance equivalent to that which results from the application of this table.

6.2 Connecting the PE Cable

WARNING

- The PE cable connected to the enclosure of the inverter cannot replace the PE cable connected to the AC output port. Both of the two PE cables must be securely connected.
- Make sure that all the grounding points on the enclosures are equipotential connected when there are multiple inverters.
- To improve the corrosion resistance of the terminal, it is recommended to apply silica gel or paint on the ground terminal after installing the PE cable.
- The PE cable should be prepared by customers.



6.3 Connecting the PV Input Cable

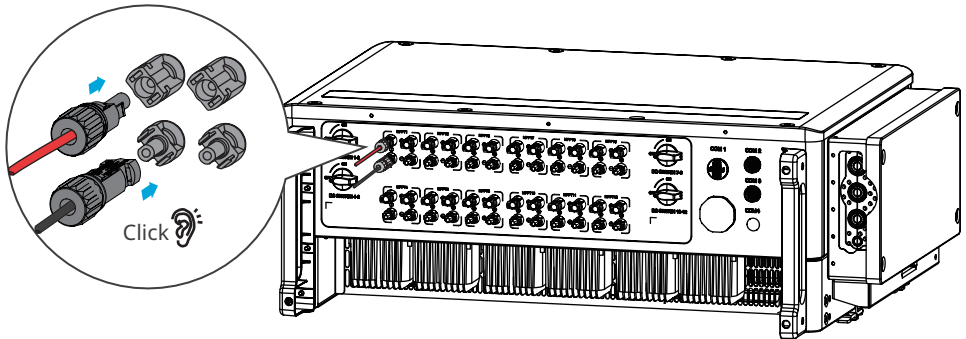
DANGER

Confirm the following information before connecting the PV string to the inverter. Otherwise, the inverter may be damaged permanently or even cause fire and cause personal and property losses.

1. Make sure that the max short circuit current and the max input voltage per MPPT are within the permissible range.
2. Make sure that the positive pole of the PV string connects to the PV+ of the inverter. And the negative pole of the PV string connects to the PV- of the inverter.

WARNING

- Connect the DC cables using the delivered PV connectors. The manufacturer shall not be liable for the damage if other connectors are used.
- The PV strings cannot be grounded. Ensure the minimum isolation resistance of the PV string to the ground meets the minimum isolation resistance requirements before connecting the PV string to the inverter.
- The DC input cable should be prepared by customers.



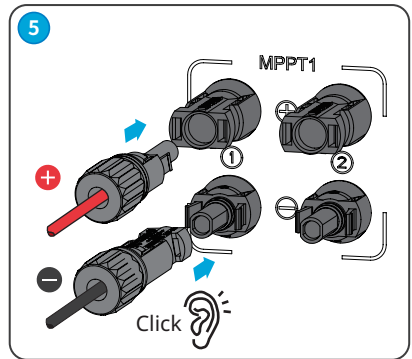
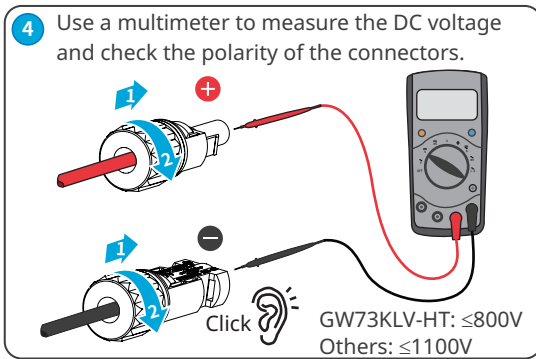
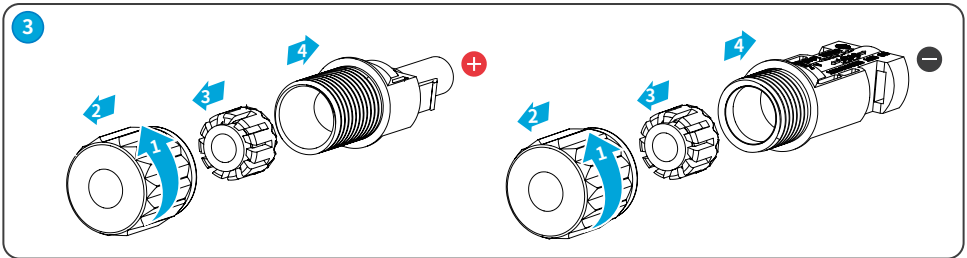
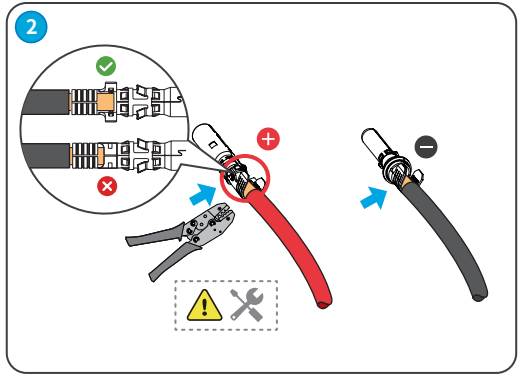
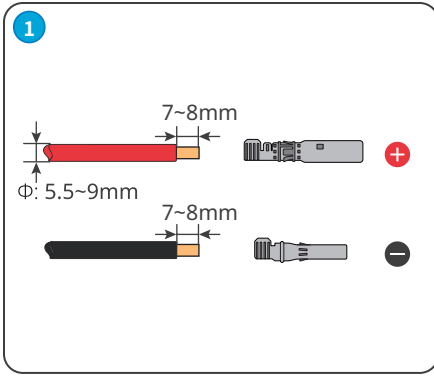
NOTICE

Seal the PV input terminals using waterproof covers when they are not to be used. Otherwise, the ingress protection rating will be influenced.

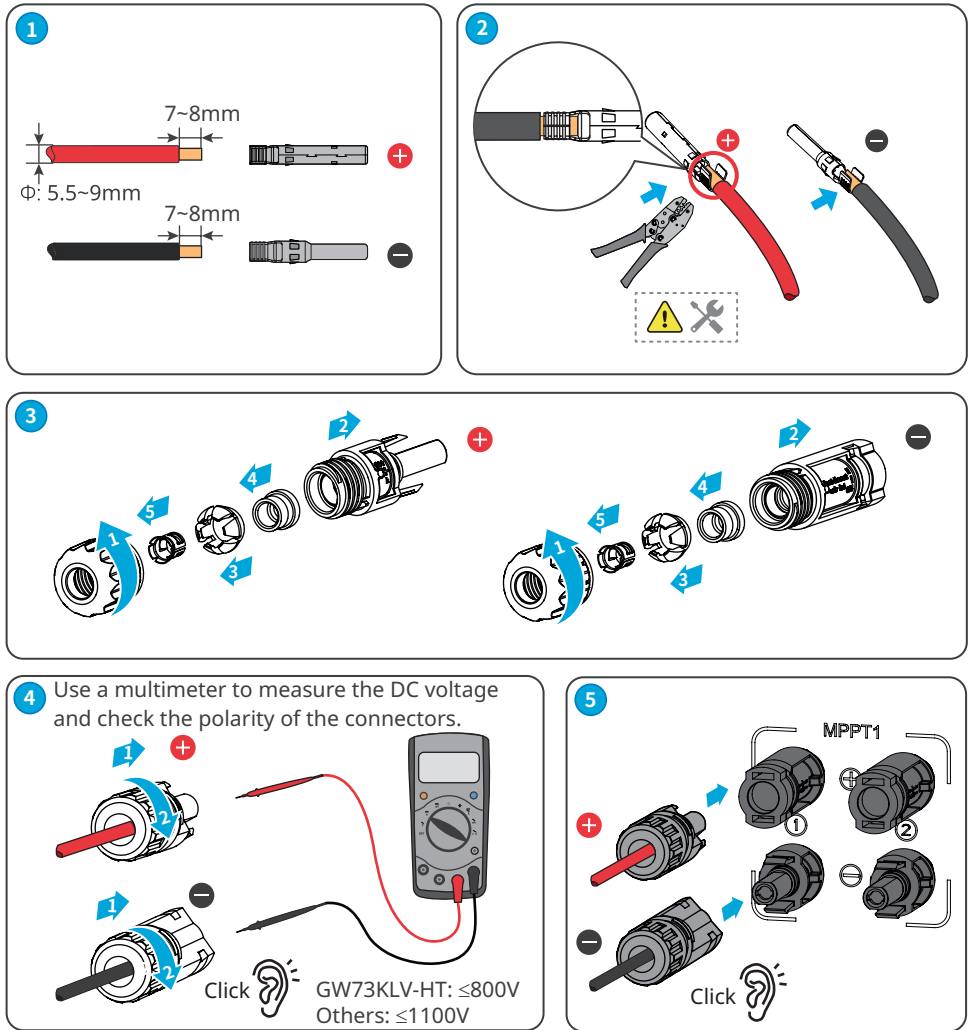
Connecting the DC Input Cable

- Step 1** Prepare DC cables.
- Step 2** Crimp the crimp contacts.
- Step 3** Disassemble the PV connectors.
- Step 4** Make the DC cable and detect the DC input voltage.
- Step 5** Plug the PV connectors into the PV terminals.

Devalan DC Connector



QC4.10 DC Connector



6.4 Connecting the AC Output Cable

WARNING

Do not connect loads between the inverter and the AC switch directly connected to it.

Where an external RCD (Residual Current Device) is required in addition to the built-in RCMU (Residual Current Monitoring Unit), and a type A RCD must be used to avoid tripping.

| Inverter model | Recommended RCD specifications |
|----------------|--------------------------------|
| GW73KLV-HT | 730mA or higher |
| GW75K-HT | 750mA or higher |
| GW80K-HT | 800mA or higher |
| GW100K-HT | 1000mA or higher |
| GW110K-HT | 1100mA or higher |
| GW120K-HT | 1200mA or higher |
| GW125K-HTH | 1250mA or higher |
| GW136K-HTH | 1360mA or higher |

An AC circuit breaker should be installed on the AC side to make sure that the inverter can safety disconnect the grid when an exception happens. Select the appropriate AC circuit breaker in compliance with local laws and regulations. Recommended AC circuit breakers:

| Inverter model | AC circuit breaker |
|-----------------------------|--------------------|
| GW75K-HT/GW80K-HT/GW100K-HT | 200A |
| GW110K-HT | 250A |
| GW73KLV-HT/GW120K-HT | 250A |
| GW125K-HTH/GW136K-HTH | 225A |

NOTICE

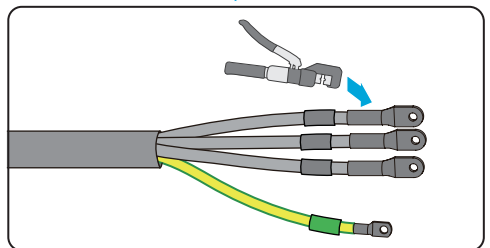
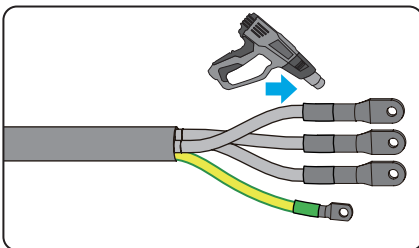
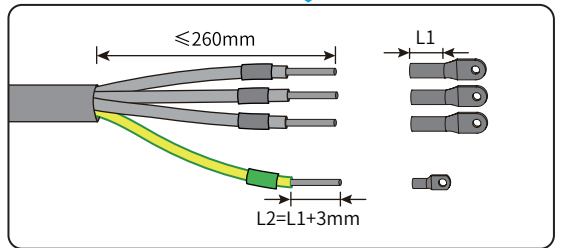
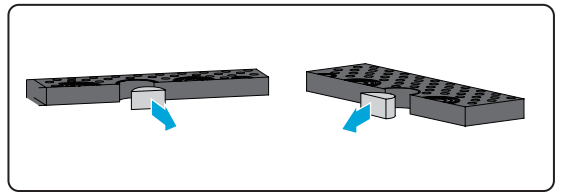
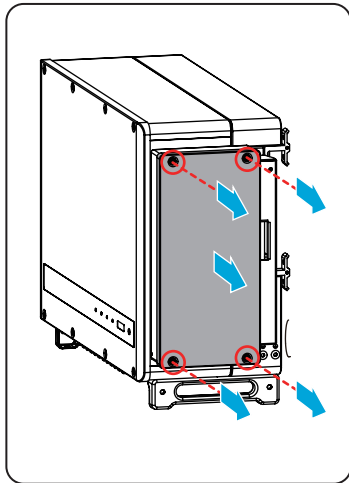
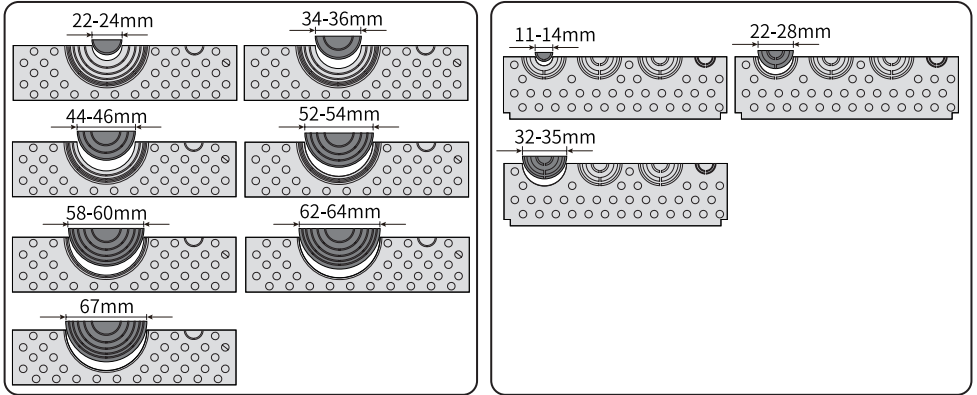
Install one AC circuit breaker for each inverter. Multiple inverters cannot share one AC circuit breaker.

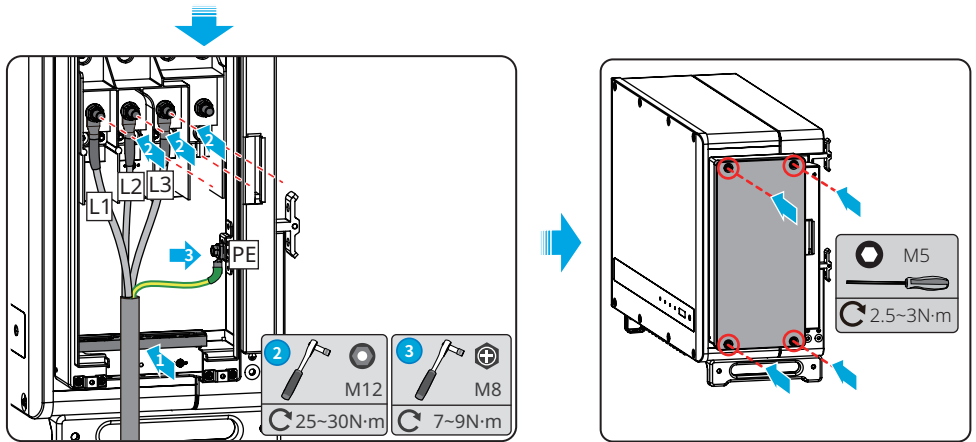


WARNING

- Pay attention to the silkscreens L1, L2, L3, N, PE on the AC terminal. Connect the AC cables to the corresponding terminals. The inverter may be damaged if the cables are connected inappropriately.
- Make sure that the whole cable cores are inserted into the AC terminal holes. No part of the cable core can be exposed.
- Make sure that the cables are connected securely. Otherwise, the terminal may be too hot to damage the inverter when the inverter is working.
- The AC terminals can be connected in three-phase four-wire or three-phase five-wire. The actual wiring method may be different. The figure below takes the three-phase five-wire as an example.
- Reserve certain length of PE cable. Make ensure that the PE cable is the last one to bear the stress when the AC output cable is under tension.

- Step 1** Make the AC output cable.
- Step 2** Dismantle the AC cover and take out the rubber ring.
- Step 3** Cut the rubber ring to right size.
- Step 4** Crimp the AC cable OT terminal
- Step 5** Connect the AC output cables and install the cover.





NOTICE

- Make sure that the cables are connected correctly and firmly after connections. Clean all the debris in the maintenance compartment.
- Seal the AC output terminal to ensure the Ingress Protection Rating.

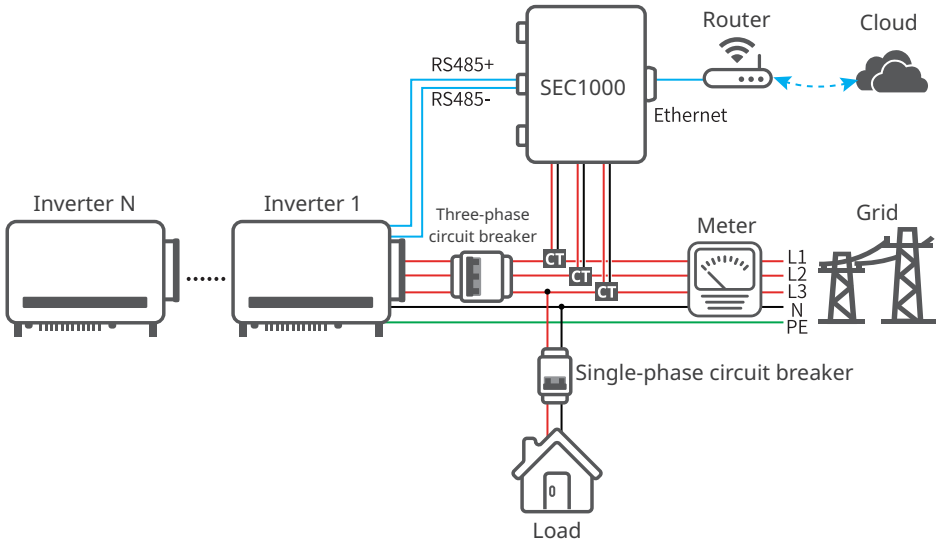
6.5 Communication

6.5.1 Connecting the Communication Cable

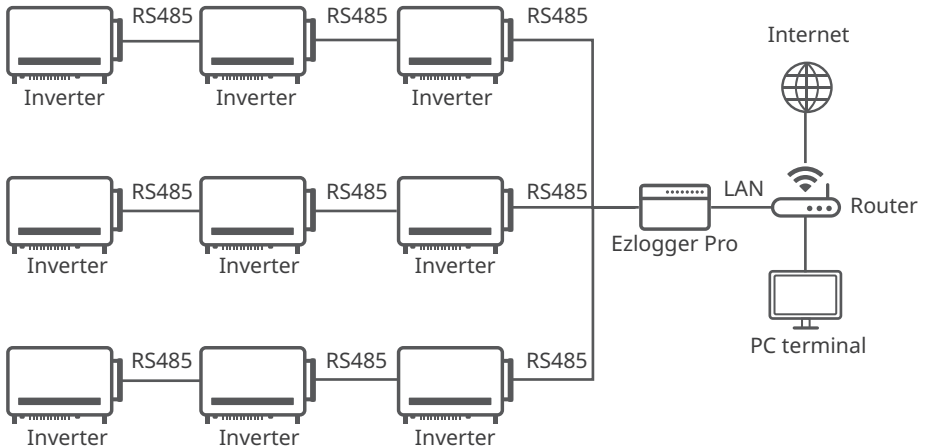
NOTICE

Make sure that the communication device is connected to the right COM port. Route the communication cable far away from any interference source or power cable to prevent the signal from being influenced.

Power limit networking scenario



RS485 networking scenario

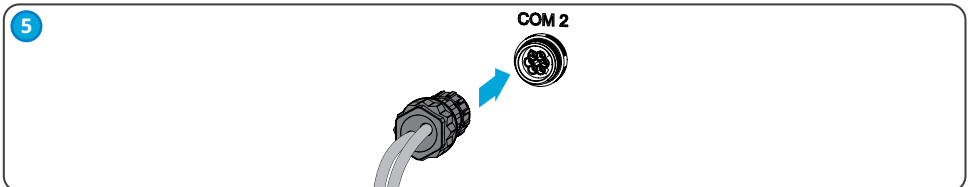
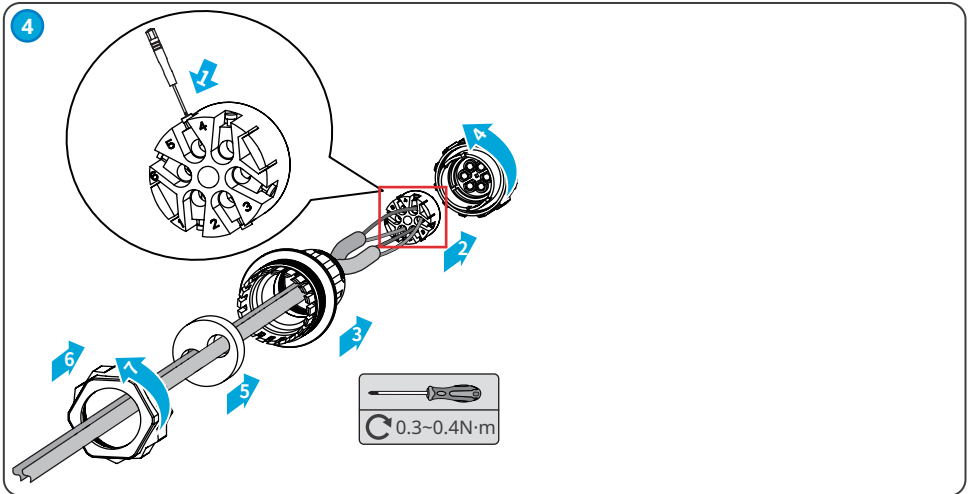
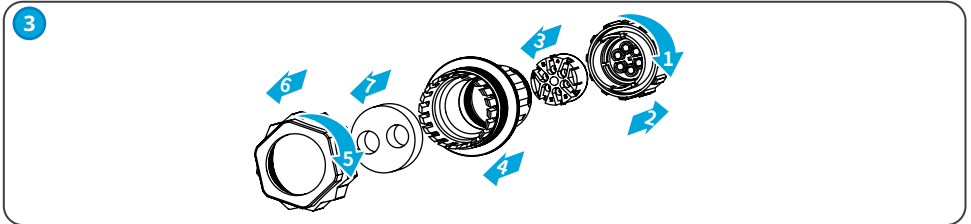
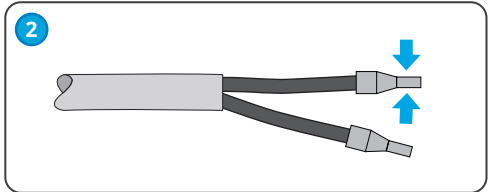
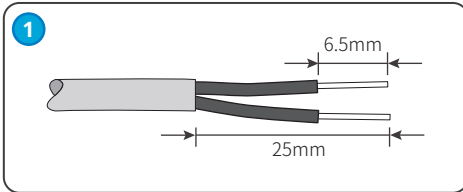
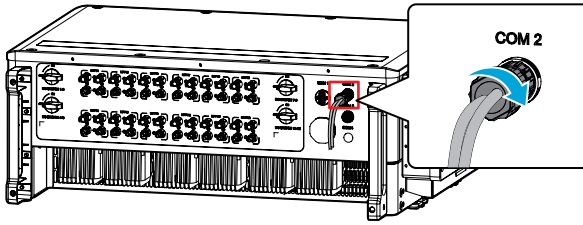


Connecting the RS485 Communication Cable

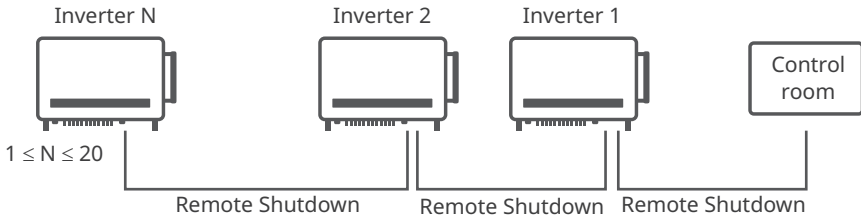
| Communication Type | COM Port | Port Definition | Function Description |
|--------------------|----------|--|--|
| RS485 | COM2 | 1: RS485 B 2: RS485 B 3: RS485 A 4: RS485 A 5: Grounding 6: Grounding | Used to connect the inverter to other inverters or the RS485 port on the data logger. DRED function should be set in EzLogger Pro. You can refer to EzLogger Pro SERIES USER MANUAL. Visit https://en.goodwe.com/Public/Uploads/sersups/GW_EzLogger%20Pro_User%20Manual-EN.pdf to get the user manual. |

NOTICE

Connect the RS485 cable using a 6PIN communication terminal as follows.



Remote Shutdown networking scenario

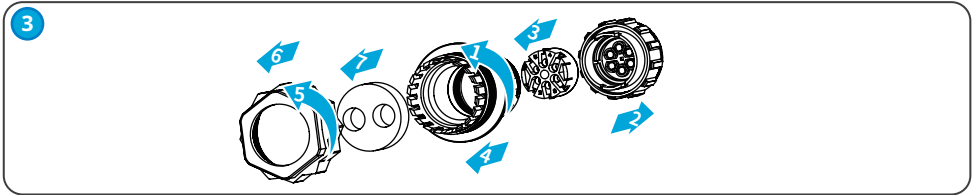
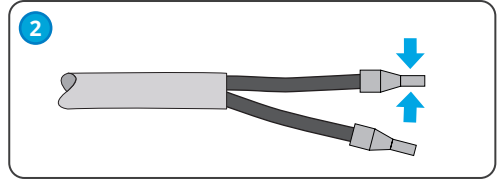
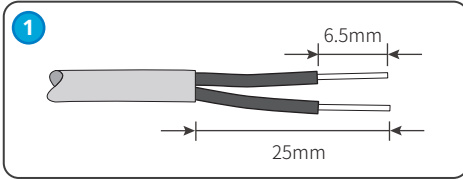
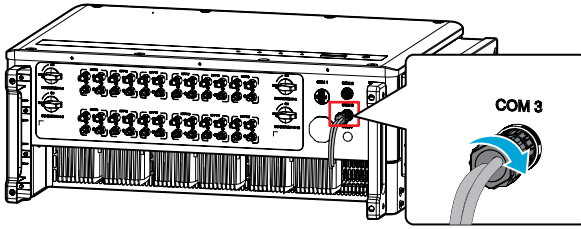


Connecting the Remote Shutdown Communication Cable

| Communication Type | COM Port | Port Definition | Function Description |
|--------------------|----------|--|--|
| Remote Shutdown | COM3 | 1: +24V 2: SHUTOFF1 3: Reserved 4: Reserved 5: +24V 6: SHUTOFF2 | The remote shutdown port is reserved to meet the safety regulations in Europe. Related devices have to be prepared by customers. |

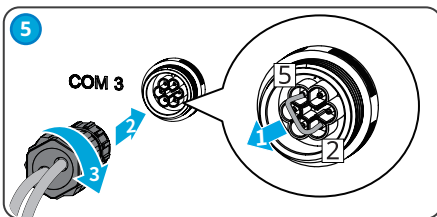
NOTICE

Connect the RS485 cable using a 6PIN communication terminal as follows.



4

| No. | Function |
|-----|----------|
| 1 | +24V |
| 2 | SHUTOFF1 |
| 3 | Reserved |
| 4 | Reserved |
| 5 | +24V |
| 6 | SHUTOFF2 |

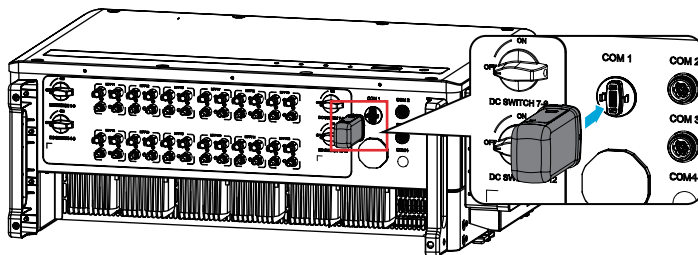


NOTICE

The Remote Shutdown communication port is installed with a short circuit wire. Remove the short circuit wire and keep it properly when enabling the Remote Shutdown function. Install the short circuit wire in PIN2 and PIN5 of the COM3 port when disabling the Remote Shutdown function.

6.5.2 Installing the Communication Module (optional)

Plug a communication module into the inverter to establish a connection between the inverter and the smartphone or web pages. The communication module can be a Bluetooth module, WiFi module, LAN module, or 4G module. Set inverter parameters, check running information and fault information, and observe system status in time via the smartphone or web pages.



NOTICE

- Refer to the delivered communication module user manual to get more introduction to the module. For more detailed information, visit <https://en.goodwe.com/>.
- Remove the communication module using the unlock tool. The manufacturer shall not be liable for the port damage if the module is removed without the unlock tool.

7 Equipment Commissioning

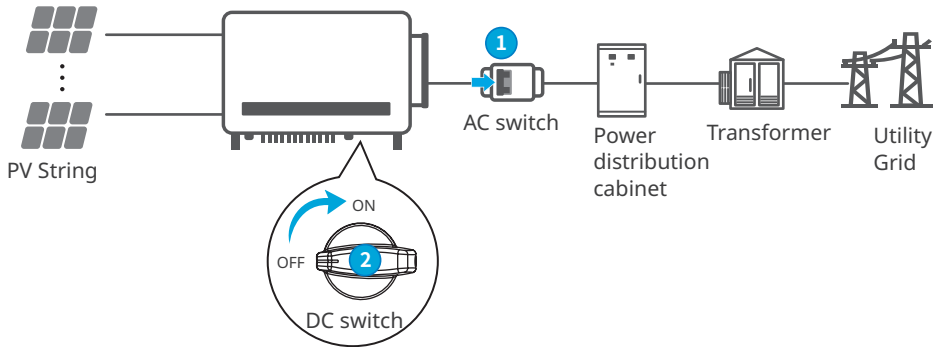
7.1 Check Items Before Switching Power ON

| No. | Check Item |
|-----|--|
| 1 | The inverter is firmly installed in a clean place where is well-ventilated and easy to operate. |
| 2 | The PE cable, DC input cable, AC output cable, and communication cable are connected correctly and securely. |
| 3 | Cable ties are routed properly and evenly, and no burrs. |
| 4 | Unused ports and terminals are sealed. |
| 5 | The voltage and frequency at the connection point meet the on-grid requirements. |

7.2 Power On

Step 1 Turn on the AC switch between the inverter and the utility grid.



















Step 2 Turn on the DC switch of the inverter.



8 System Commissioning

8.1 Indicators and Button



| Type | Status | Description |
|---|---|--|
|  Power |  | Steady green Power On |
| |  | Off Power Off |
|  Operating |  | Steady green The inverter is connected to the grid successfully. |
| |  | Off The inverter is not connected to the grid. |
| |  | Single slow green blinking Self check before connecting to the grid successfully. |
| |  | Single fast green blinking The inverter will connect to the grid. |
|  SEMS |  | Steady green The wireless monitoring is normal. |
| |  | Single green blinking The wireless module is resetting. |
| |  | Double green blinking The inverter is not connected to the router. |
| |  | Quadruple green blinking The inverter is not connected to the server. |
| |  | Green blinking RS485 communication is normal. |
| |  | Off The wireless module is restoring factory settings. |
|  Alarming |  | Steady red System fault. |
| |  | Off No fault. |

LCD Button Description

Stop pressing the button for a period in any page, the LCD will get dark and go back to the initial page, which means the parameter in that page has been saved successfully.

8.2 Setting Inverter Parameters via LCD

NOTICE

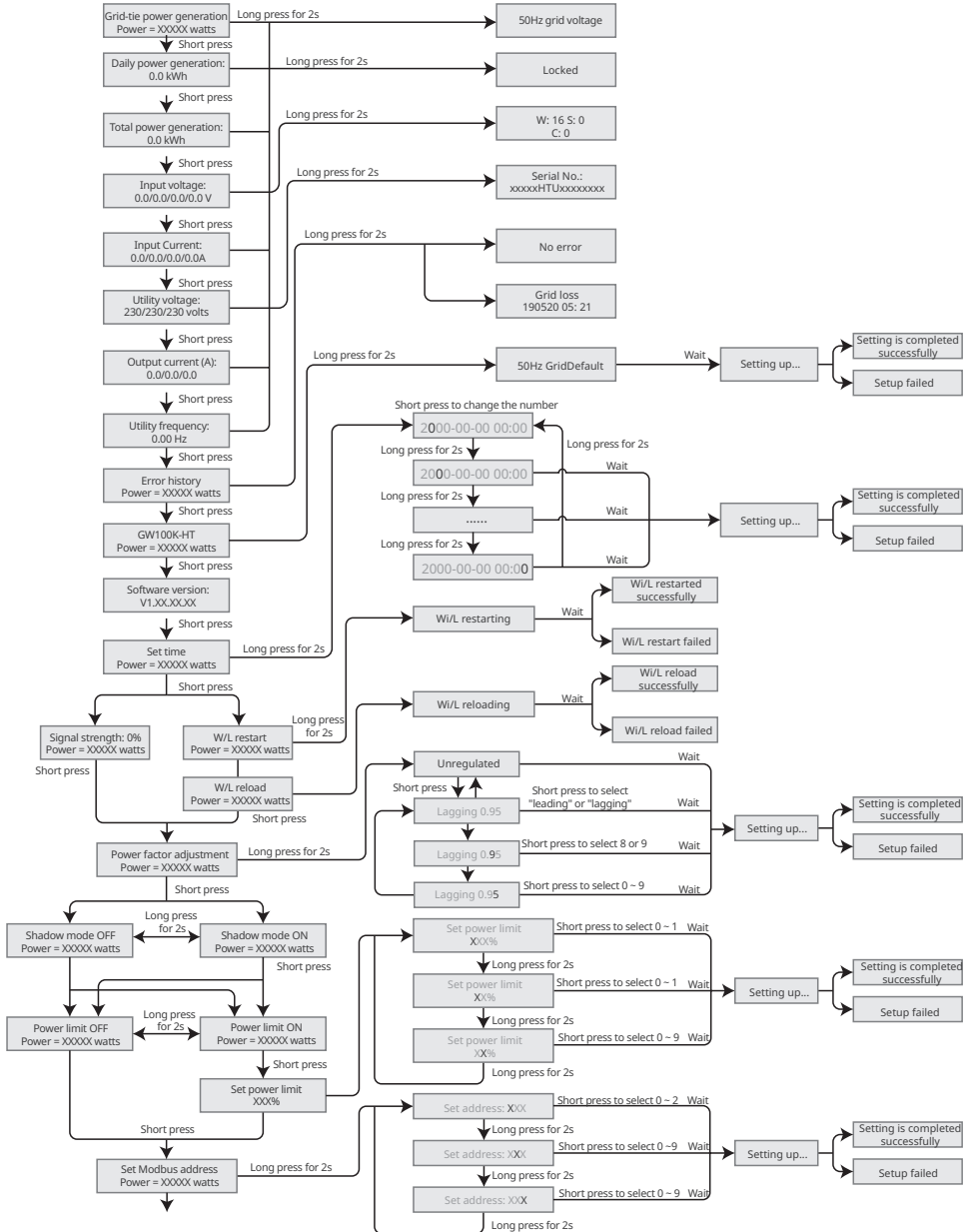
- Inverter software version shown in this document is V1.00.00.13. The screen shots are for reference only. The actual display may differ.
- The name, range, and default value of the parameters is subject to change or adjust. The actual display prevails.
- the power parameters should be set by professionals to prevent the generating capacity from being influenced by wrong parameters.

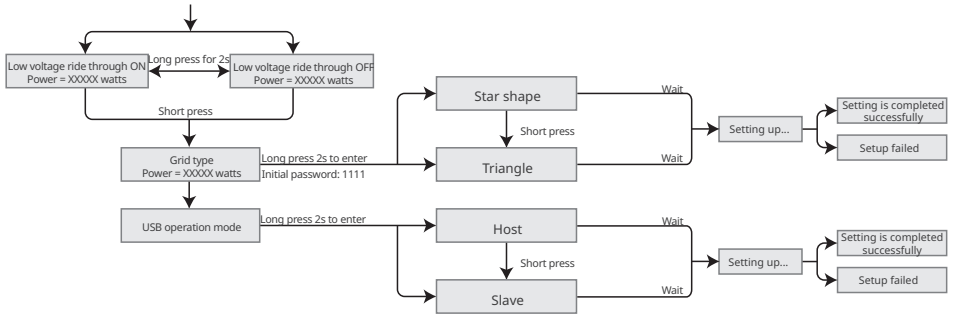
8.2.1 LCD Menu Introduction

This part describes the menu structure, allowing you view inverter information and set parameters more conveniently.

First level menu

Second level menu





8.2.2 Inverter Parameter Introduction

| Parameters | Description |
|---------------|---|
| Normal | Home page. Indicates the real-time power of the inverter. Long press for 2s to check the current safety code. |
| E-Today | Check the generated power of the system for that day. |
| E-Total | Check the total generated power of the system. |
| Vpv | Check the DC input voltage of the inverter. |
| Ipv | Check the DC input current of the inverter. |
| Vac | Check the voltage of the utility grid. |
| Iac | Check the AC output current of the inverter. |
| Fac | Check the frequency of the utility grid. |
| Error History | Check historical error message records of the inverter. |
| Model | Indicates the specific inverter model. Long press for 2s to set the safety code. Set the safety country in compliance with the local grid standards and application scenario of the inverter. |
| Ver | Check the software version. |
| Set Language | Set language accordingly. Languages: English, Portuguese, Spanish |
| Set Time | Set time according to the actual time in the country/region where the inverter is located. |
| RSSI | Indicates the received signal strength of the GPRS module and 4G module. |
| W/L Reset | Power off and restart the WiFi module. |
| W/L Reload | Restore the factory settings of the WiFi module. Reconfigure the WiFi module network parameters after restoring the factory settings, |
| PF Adjust | Set the power factor of the inverter according to actual situation. |
| Time Interval | Set Time Interval according to actual needs. |

| Parameters | Description |
|-----------------|---|
| Shadow MPPT | Enable the shadow scan function if the PV panels are shadowed. |
| Power Limit | Soft limit: Set the power feed into the utility grid according to local requirements and standards. Hard limit: The inverter and the utility grid will automatically disconnect when the power feeds into the grid exceeds the required limit. |
| Set Power Limit | Set the power feed back into the utility grid according to the actual situation. |
| Set Modbus Addr | Set the actual Modbus address. |
| LVRT | With LVRT on, the inverter will stay connected with the utility grid when a short-term utility grid low voltage exception occurs. |
| HVRT | With HVRT on, the inverter will stay connected with the utility grid when a short-term utility grid high voltage exception occurs. |
| Grid Type | Set the grid type according to the actual grid type. Supported grid type: star grid and delta grid. |
| Set ARC | ARC is optional and off by default. Enable or disable ARC accordingly. |
| Fault Clear | Clear ARC alarm records. |
| Self Check | Check whether ARC can work normally. |
| USB Mode Select | Reserved for troubleshooting by after-sales service staff. |

8.3 Setting Inverter Parameters via App

SolarGo is an application used to communicate with the inverter via Bluetooth module, WiFi module, Wi-Fi/LAN module, 4G module, or GPRS module. Commonly used functions:

1. Check the operating data, software version, alarms of the inverter, etc.
2. Set grid parameters and communication parameters of the inverter.
3. Maintain the equipment.

For more details, refer to the SolarGo APP User Manual. Scan the QR code or visit <https://en.goodwe.com> to get the user manual.



SolarGo App



SolarGo App
User Manual

8.4 Monitoring via SEMS Portal

SEMS Portal is an monitoring platform used to manage organizations/users, add plants, and monitor plant status.

For more details, refer to the SEMS Portal User Manual. Scan the QR code or visit <https://www.goodwe.com/> to get the user manual.



SEMS Portal



SEMS Portal
User Manual

9 Maintenance

9.1 Power Off the Inverter



DANGER

- Power off the inverter before operations and maintenance. Otherwise, the inverter may be damaged or electric shocks may occur.
- Delayed discharge. Wait until the components are discharged after power off.

Step 1 (optional) Send shutdown command to the inverter,

Step 2 Turn off the AC switch between the inverter and the utility grid.

Step 3 Turn off the DC switch of the inverter.

9.2 Removing the Inverter

WARNING

- Make sure that the inverter is powered off.
- Wear proper PPE before any operations.

Step 1 Disconnect all the cables, including DC cables, AC cables, communication cables, the communication module, and PE cables.

Step 2 Handle or hoist the inverter to take it down from the wall or the bracket.

Step 3 Store the inverter properly. If the inverter needs to be used later, ensure that the storage conditions meet the requirements.

9.3 Disposing of the Inverter

If the inverter cannot work any more, dispose of it according to the local disposal requirements for electrical equipment waste. Do not dispose of it as household waste.

9.4 Troubleshooting

Perform troubleshooting according to the following methods. Contact the after-sales service if these methods do not work.

Collect the information below before contacting the after-sales service, so that the problems can be solved quickly.

1. Inverter information like serial number, software version, installation date, fault time, fault frequency, etc.
2. Installation environment, including weather conditions, whether the PV modules are sheltered or shadowed, etc. It is recommended to provide some photos and videos to assist in analyzing the problem.
3. Utility grid situation.

| No. | Fault | Cause | Solutions |
|-----|--------------|--|--|
| 1 | Ver. Error | Wrong software version. | Contact after-sales service to upgrade the software. |
| 2 | Utility Loss | <ol style="list-style-type: none"> 1. Utility grid power failure. 2. The AC circuit or the AC breaker is disconnected. | <ol style="list-style-type: none"> 1. Check whether other electrical devices under the same grid connection point is working normally and whether the main supply is normal. 2. Make sure that the upstream switches of the inverter are connected. 3. Make sure that the phase sequence of the AC cables are connected correctly, and the neutral wire and PE cable are connected properly and firmly. |
| 3 | Vac Fail | The utility grid voltage is out of the allowed range. | <ol style="list-style-type: none"> 1. Make sure that the grid voltage is within the allowed range. 2. Make sure that the phase sequence of the AC cables are connected correctly, and the neutral wire and PE cable are connected properly and firmly. |

| No. | Fault | Cause | Solutions |
|-----|-----------------|---|--|
| 4 | Fac Fail | The utility grid frequency is out of the allowed range. | <ol style="list-style-type: none"> 1. Check whether other electrical devices under the same grid connection point is working normally, and whether the main supply is normal. 2. Make sure that the grid frequency is within the allowed range. 3. Make sure that the phase sequence of the AC cables are connected correctly, and the neutral wire and PE cable are connected properly and firmly. 4. Pay attention to the frequency of the fault. If it happens occasionally, the fault may be caused by the instantaneous utility grid frequency change and does not need to be handled. |
| 5 | Isolation Fail | <ol style="list-style-type: none"> 1. The PV system is short-circuited to the ground. 2. The PV system is in a moist environment and the circuit is not well insulated to the ground. | <ol style="list-style-type: none"> 1. Check whether the PV input cables are broken. 2. Check whether the module frames and the metal bracket are securely grounded. 3. Check whether the AC side is properly grounded <p>Inverters sold in Australia and New Zealand will also alarm as following when Isolation Fail occurs.</p> <ol style="list-style-type: none"> 1. Inverters support WiFi communication: An email about the fault will be sent to the user automatically. 2. Inverters do not support WiFi communication: The buzzer in the inverter will sound for 1 minute. If the problem persists, the buzzer will sound every 30 min. |
| 6 | DC inject High | DC injection exceeds the allowed range. | <ol style="list-style-type: none"> 1. Check whether the software version is the latest one. 2. Restart the inverter and check whether the inverter can work properly. |
| 7 | Ground I Fail | The input insulation impedance to the ground decreases when the inverter is operating. | <ol style="list-style-type: none"> 1. Check whether the working environment of the inverter meets the requirements. For example, the fault may occur due to high humidity on rainy days 2. Make sure that the components are properly grounded and the AC side is properly grounded. |
| 8 | PV Over Voltage | Excess PV modules are connected in the series, and the open-circuit voltage is higher than the operating voltage. | <ol style="list-style-type: none"> 1. Check whether the PV string input voltage consistent with the value displayed on the LCD. 2. Check whether the PV string voltage meets the maximum input voltage requirements. |

| No. | Fault | Cause | Solutions |
|-----|------------------|--|---|
| 9 | Over Temperature | <ol style="list-style-type: none"> The inverter is installed in a place with poor ventilation. The ambient temperature is too high. The inverter is working improperly. | <ol style="list-style-type: none"> Check the installation environment and space of the inverter. Make sure that the ventilation meets heat dissipation requirements. Make sure that the fans are working properly and not covered or blocked. Check whether the operating ambient temperature is too high. |
| 10 | AFan Fail | A fault occurs in all fans of the inverter. | <ol style="list-style-type: none"> Restart the inverter and check whether the inverter can work normally. Make sure that the fans are working properly and not covered or blocked. |
| 11 | EFan Fail | A fault occurs on the external fan of the inverter. | |
| 12 | IFan Fail | A fault occurs in the internal fan of the inverter. | <ol style="list-style-type: none"> Restart the inverter and check whether the inverter can work normally. A fault occurs in the internal fan, contact after-sales service. |
| 13 | ARC Fault | The PV string cables arc or are in poor contact. | <ol style="list-style-type: none"> Check whether the PV terminals and cables are connected properly. Clear the error messages. Contact after-sales service if the fault occurs frequently. |
| 14 | DC Bus High | Inverter internal fault. | <ol style="list-style-type: none"> Make sure that the software version is the latest one. Restart the inverter to check whether the inverter can work properly. |
| 15 | SPI Fail | | |
| 16 | Ref 1.5V Fail | | |
| 17 | AC HCT Fail | | |
| 18 | GFCI Fail | | |
| 19 | Relay Check Fail | | |
| 20 | EEPROM R/W Fail | | |

9.5 Routine Maintenance

| Maintaining Item | Maintaining Method | Maintaining Period |
|-----------------------|---|--------------------|
| System Clean | Check the heat sink, air intake, and air outlet for foreign matter or dust. | Once 6-12 months |
| Fan | Check the fan for proper working status, low noise, and intact appearance. | Once a year |
| DC Switch | Turn the DC switch on and off ten consecutive times to make sure that it is working properly. | Once a year |
| Electrical Connection | Check whether the cables are securely connected. Check whether the cables are broken, or whether there is any exposed copper core. | Once 6-12 months |
| Sealing | Check whether all the terminals and ports are properly sealed. Reseal the cable hole if it is not sealed or too big. | Once a year |
| THDi Test | For Australia requirements, in the THDi test, there should add Zref between inverter and mains. Zref: Zmax or Zref (phase current>16A) Zref: L: $0.24 \Omega + j0.15 \Omega$; N: $0.16 \Omega + j0.10 \Omega$ (phase current>16A, <21.7A) Zref: L: $0.15 \Omega + j0.15 \Omega$; N: $0.1 \Omega + j0.1 \Omega$ (phase current>21.7A, <75A) Zref: $\geq 5\% U_n / I_{rated} + j5\% U_n / I_{rated}$ (phase current>75A) | As needed |

10 Technical Parameters

| Technical Data | GW100K-HT | GW110K-HT | GW120K-HT | GW136K-HTH |
|---|---|---------------|---------------|---------------|
| Input | | | | |
| Max.Input Power (W) | 150 | 165 | 180 | 205 |
| Max.Input Voltage (V) | 1100 | 1100 | 1100 | 1100 |
| MPPT Operating Voltage Range (V) | 180~1000 | 180~1000 | 180~1000 | 180~1000 |
| MPPT Range for Full Load(V) | 500~850 | 500~850 | 500~850 | 500~850 |
| Start-up Voltage (V) | 200 | 200 | 200 | 200 |
| Nominal Input Voltage (V) | 600 | 600 | 600 | 750 |
| Max. Input Current per MPPT (A) | 30 | 30 | 30 | 30 |
| Max. Backfeed Current to The Array (A) | 0 | 0 | 0 | 0 |
| Max. Short Circuit Current per MPPT (A) | 45 | 45 | 45 | 45 |
| Number of MPPT | 10 | 12 | 12 | 12 |
| Number of Strings per MPPT | 2 | 2 | 2 | 2 |
| Output | | | | |
| Nominal Output Power (kW) | 100* | 110 | 120 | 136 |
| Nominal Output Apparent Power (kVA) | 100* | 110 | 120 | 136 |
| Max. AC Active Power (kW) | 110* | 121 | 132 | 150 |
| Max. AC Apparent Power (kVA) | 110* | 121 | 132 | 150 |
| Nominal Output Voltage (V) | 400, 3L/N/PE or 3L/PE | | | 500, 3L/PE |
| Nominal AC Grid Frequency (Hz) | 50 / 60 | 50 / 60 | 50 / 60 | 50 / 60 |
| Max. Output Current (A) | 167 | 175.5 | 191.3 | 173.2 |
| Nominal Output Current (A) | 144.3 | 158.8 | 173.2 | 157.0 |
| Max. Output Fault Current (peak and duration) (A) | 364@5 μ s | 364@5 μ s | 364@5 μ s | 364@5 μ s |
| Maximum output overcurrent protection (A) | 364@5 μ s | 364@5 μ s | 364@5 μ s | 364@5 μ s |
| Inrush Current (peak and duration) (A) | 120@1 μ s | 120@1 μ s | 120@1 μ s | 120@1 μ s |
| Output Power Factor | ~1 (Adjustable from 0.8 leading to 0.8 lagging) | | | |

| Technical Data | GW100K-HT | GW110K-HT | GW120K-HT | GW136K-HTH |
|------------------------------------|--|-----------|-----------|------------|
| Max. Total Harmonic Distortion | <3% | <3% | <3% | <3% |
| Efficiency | | | | |
| Max. Efficiency | 98.6% | 98.6% | 98.6% | 99.0% |
| European Efficiency | 98.3% | 98.3% | 98.3% | 98.5% |
| Protection | | | | |
| PV String Current Monitoring | Integrated | | | |
| Internal Humidity Detection | Integrated | | | |
| DC Insulation Resistance Detection | Integrated | | | |
| Residual Current Monitoring Unit | Integrated | | | |
| Anti-islanding Protection | Integrated | | | |
| DC Reverse Polarity Protection | Integrated | | | |
| DC Surge Arrester | Type II (Type I Optional) | | | |
| AC Surge Arrester | Type II (Type I Optional) | | | |
| AC Overcurrent Protection | Integrated | | | |
| AC Short Circuit Protection | Integrated | | | |
| AC Overvoltage Protection | Integrated | | | |
| DC Arc Fault Circuit Interrupter | Optional | | | |
| PID Recovery | Optional | | | |
| Active anti-islanding method | AFD | | | |
| General Data | | | | |
| Operating Temperature Range (°C) | -30 ~ 60 (60 °C for outdoor unconditioned with solar effects.) | | | |
| Relative Humidity | 0~100% | 0~100% | 0~100% | 0~100% |
| Max. Operating Altitude (m) | 5000 (>4000 derating) | | | |
| Cooling Method | Smart Fan Cooling | | | |
| Display | LED (Standard), LCD (Optional) , Bluetooth+APP | | | |
| Communication protocols | modbus-RTU (SunSpec compliant) | | | |
| Communication | RS485 or PLC or WiFi | | | |
| Weight (Kg) | 93.5 | 98.5 | 98.5 | 98.5 |
| Dimension (W×H×Dmm) | 1008× 678× 343 | | | |

| Technical Data | GW100K-HT | GW110K-HT | GW120K-HT | GW136K-HTH |
|----------------------------------|--|-----------|-----------|------------|
| DC Connector | MC4 (Max. 6 mm ²) | | | |
| AC Connector | OT / DT terminal (Max. 300 mm ²) | | | |
| Ingress Protection Rating | IP66 | | | |
| Night Power Consumption (W) | <2 | | | |
| Oversvoltage Category | PVII/AC III | | | |
| Protective class | I | | | |
| Noise Emission (dB) | <70 | | | |
| Topology | Transformerless (non-isolated) | | | |
| The Decisive Voltage Class (DVC) | C | | | |
| Pollution Degree | III | | | |
| Environmental Category | 4K4H | | | |
| Country of Manufacture | China | | | |

NOTE:

* For Australia and New Zealand: 99.99kW/99.99kVA.

| Technical Data | GW73KLV-HT | GW75K-HT | GW80K-HT |
|---|---------------------------------|---------------------------|---------------------------|
| Input | | | |
| Max.Input Power (W) | 112.5 | 112.5 | 120 |
| Max.Input Voltage (V) | 800 | 1100 | 1100 |
| MPPT Operating Voltage Range (V) | 180~650 | 180~1000 | 180~1000 |
| MPPT Range for Full Load(V) | 250~650 | 500~850 | 500~850 |
| Start-up Voltage (V) | 200 | 200 | 200 |
| Nominal Input Voltage (V) | 370 | 600 | 600 |
| Max. Backfeed Current to The Array (A) | 0 | 0 | 0 |
| Max. Input Current per MPPT (A) | 30 | 30 | 30 |
| Max. Short Circuit Current per MPPT (A) | 45 | 45 | 45 |
| Number of MPPT | 12 | 10 | 10 |
| Number of Strings per MPPT | 2 | 2 | 2 |
| Output | | | |
| Nominal Output Power (kW) | 73 | 75 | 80 |
| Max. AC Active Power (kW) | 73@220V; 69@208V; 75@230V | 75 | 88 |
| Max. AC Apparent Power (kVA) | 75 | 75 | 88 |
| Nominal Output Apparent Power (kVA) | 73 | 75 | 80 |
| Nominal Output Voltage (V) | 220, 3L/N/PE or 3L/PE | 380/400, 3L/N/PE or 3L/PE | 380/400, 3L/N/PE or 3L/PE |
| Nominal AC Grid Frequency (Hz) | 50/60 | 50/60 | 50/60 |
| Max. Output Current (A) | 192 | 125.3 | 134 |
| Nominal Output Current (A) | 191.6 | 114.0/108.3 | 121.6/115.5 |
| Max. Output Fault Current (peak and duration) (A) | 364@5μs | 364@5μs | 364@5μs |
| Maximum output overcurrent protection (A) | 364 | 364 | 364 |
| Inrush Current (peak and duration) (A) | 120@1μs | 120@1μs | 120@1μs |

| Technical Data | GW73KLV-HT | GW75K-HT | GW80K-HT |
|------------------------------------|--|----------|----------|
| Output Power Factor | ~1 (Adjustable from 0.8 leading to 0.8 lagging) | | |
| Max. Total Harmonic Distortion | <3% | <3% | <3% |
| Efficiency | | | |
| Max. Efficiency | 98.4% | 98.6% | 98.6% |
| European Efficiency | 98.1% | 98.3% | 98.3% |
| Protection | | | |
| PV String Current Monitoring | Integrated | | |
| Internal Humidity Detection | Integrated | | |
| DC Insulation Resistance Detection | Integrated | | |
| Residual Current Monitoring Unit | Integrated | | |
| Anti-islanding Protection | Integrated | | |
| DC Reverse Polarity Protection | Integrated | | |
| DC Surge Arrester | Type II (Type I Optional) | | |
| AC Surge Arrester | Type II (Type I Optional) | | |
| AC Overcurrent Protection | Integrated | | |
| AC Short Circuit Protection | Integrated | | |
| AC Overvoltage Protection | Integrated | | |
| DC Arc Fault Circuit Interrupter | Optional | | |
| PID Recovery | Optional | | |
| Active anti-islanding method | AFD | | |
| General Data | | | |
| Operating Temperature Range (°C) | -30 ~ 60 (60 °C for outdoor unconditioned with solar effects.) | | |
| Relative Humidity | 0~100% | | |
| Max. Operating Altitude (m) | 5000 (>4000 derating) | | |
| Cooling Method | Smart Fan Cooling | | |
| Display | LED(Standard), LCD(Optional) , Bluetooth+APP | | |
| Communication | RS485 or PLC or WiFi | | |
| Communication protocols | modbus-RTU (SunSpec compliant) | | |
| Weight (Kg) | 98.5 | 93.5 | 93.5 |

| Technical Data | GW73KLV-HT | GW75K-HT | GW80K-HT |
|----------------------------------|--|----------|----------|
| Dimension (W×H×Dmm) | 1008× 678× 343 | | |
| DC Connector | MC4 (Max. 6 mm ²) | | |
| AC Connector | OT / DT terminal (Max. 300 mm ²) | | |
| Ingress Protection Rating | IP66 | | |
| Night Power Consumption (W) | <2 | | |
| Overvoltage Category | PVII/AC III | | |
| Protective class | I | | |
| Noise Emission (dB) | <70 | | |
| Topology | Transformerless (non-isolated) | | |
| The Decisive Voltage Class (DVC) | C | | |
| Pollution Degree | III | | |
| Environmental Category | 4K4H | | |
| Country of Manufacture | China | | |

Overvoltage levels:

Overvoltage I: Devices connected to the circuit which can limit instantaneous overvoltage to a relatively low level.

Overvoltage II: Energy-consuming devices powered by fixed power distribution equipment, including appliances, portable tools, and other household and similar equipment. Overvoltage III is also applicable if there are special requirements for the reliability and applicability of the equipment.

Overvoltage III: Devices apply to fixed distribution equipment, including switches in the fixed power distribution equipment and industrial equipment permanently connected to fixed power distribution equipment. The reliability and applicability of the equipment have to meet special requirements.

Overvoltage IV: Devices apply to the power distribution equipment, such as measuring instruments and prepositioned overcurrent protection devices, etc.

Humidity Levels:

| Environmental Parameters | Level | | |
|--------------------------|-------------|---------------|---------------|
| | 3K3 | 4K2 | 4K4H |
| Temperature range | 0°C - +40°C | -33°C - +40°C | -20°C - +55°C |
| Humidity range | 5% to 85% | 15% to 100% | 4% to 100% |

Environmental levels:

Outdoor inverter: The ambient temperature range is -25°C - +60°C, suitable for an environment with pollution of level 3;

Indoor type II inverter: The ambient temperature range is -25°C - +40°C, suitable for an environment with pollution of level 3;

Indoor type I inverter: The ambient temperature range is 0°C - +40°C, suitable for an environment with pollution of level 2;

Pollution levels:

Pollution level 1: No pollution or dry and non-conductive pollution only;

Pollution level 2: Usually non-conductive pollution only, but there may be temporary conductive pollution caused by condensation;


Pollution level 3: Conductive pollution or non-conductive pollution turns to conductive pollution due to condensation;


Pollution level 4: Persistent conductive pollution, such as pollution caused by conductive dust or rain and snow.




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