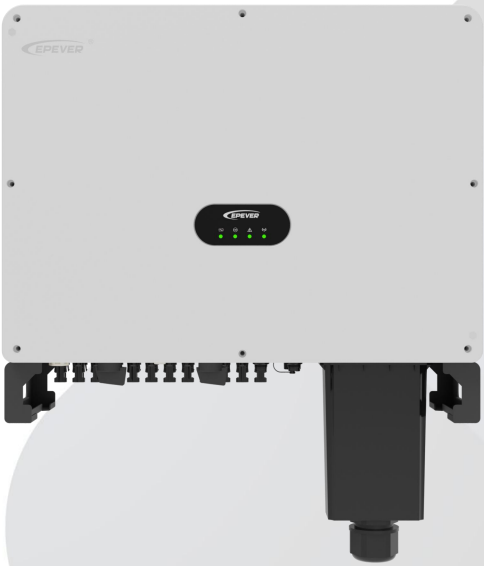
# USER MANUAL



# On-Grid PV Inverter

SPT50KTL, SPT50KTL-H, SPT60KTL, SPT60KTL-H

SPT70KTL, SPT70KTL-H

EN

## Table of Contents

## Important Safety Instructions

**Please keep this manual for future reference.**

This manual contains instructions on safety, installation, and operation for SPT50-70KTL On-grid PV Inverter (hereinafter referred to as "inverter").

### 1. Explanation of symbols

To ensure the user's personal and property safety while using this product, relevant information is provided in the manual and highlighted with the following symbols. Please read the relevant texts carefully when you encounter the following symbols in the manual.

**DANGER**

Indicates a high-level hazard that, if not avoided, will result in serious injury or death.

**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**

Indicates an important reminder during the operation which, if ignored, may result in an equipment error alarm.

| | |
|---|---|
| **Tip** | Indicates recommendation for reference. |
|  | Read through the user manual before any operations. |

## 2. Requirements for professional and technical personnel

- Professionally trained.
- Familiar with related safety regulations of the electrical system.
- Read this manual carefully and master the related safety precautions.

## 3. Operations for professional and technical personnel

- Install the inverter to a specified position.
- Conduct trial operations for the inverter.
- Operate and maintain the inverter.

## 4. Safety precautions before installation

**⚠ DANGER**

- Keep the inverter out of the reach of children.
- When installing the inverter, please evaluate whether there is a risk of electric arc in the operation area.

**NOTICE**

- After receiving the inverter, please check if there is any damage during transportation. If you find any problem, please contact the transportation company, our local distributor or our company in time.
- When installing or moving the inverter, follow the instructions in the manual.

## 5. Safety precautions for mechanical installation

**⚠ DANGER**

Before installation, ensure the inverter has no electrical connection.

**NOTICE**

- Ensure enough heat dissipation space for installing the inverter. Do not place flammable or explosive objects around the inverter, or install the inverter on the heat-intolerant buildings, avoid direct sunlight.
- The inverter must be placed horizontally on the level floor.

## 6. Safety precautions for electrical connection

**DANGER**

Electric shock hazard! High voltage at Utility input and AC output terminals. Do not touch wire connections.

**WARNING**

Check whether wiring is tight to avoid the danger of heat accumulation caused by loose connection.

**NOTICE**

The inverter shell should be connected to the ground, and the cross-sectional area of the wire connecting the ground terminal to the earth should not be less than 4mm$^2$.

## 7. Safety precautions for inverter operation

**WARNING**

- The inverter generates much heat during operation with a high cabinet temperature. Do not touch the unit and keep it far away from the materials and devices that are sensitive to high temperature.
- When the inverter is working, do not open its shell for any operation.
- When troubleshooting faults that affect the safety performance of the inverter or disconnecting DC input, turn off the power switch of the inverter and wait until the LCD screen is completely off.

## 8. Dangerous operations causing an electric arc, fire, or explosion

- Touch the uninsulated ends of potentially live cables.
- Touch the wiring copper busbars, terminals or internal components of the inverter/charger that might be electriferous.
- Loose connection of power cables.
- Accidental dropping of screws or other components into the inverter.
- Improper operations by untrained non-professional or technical personnel.

**DANGER**

Once an accident occurs, it must be handled by professionals. Improper operation would cause a more serious accident.

## 9. Safety precautions for stopping the inverter

- Firstly, disconnect the circuit breakers of PV input and AC output, and then turn off the DC switch on the inverter.
- After the input and output wires are disconnected for ten minutes, the internal conductive modules could be touched.
- The inverter does not contain repair parts internally. If any maintenance service is required, please get in touch with our after-sales service personnel.

**DANGER**

Do not touch or open the shell after the inverter is powered off within ten minutes.

## 10. Safety precautions for inverter maintenance

- It is recommended to test the inverter with testing equipment to ensure there is no voltage or current.
- When conducting the electrical connection and maintenance, post a temporary warning sign or put up barriers to prevent unrelated personnel from entering the electrical connection or maintenance area.
- Improper maintenance of the inverter may cause injury to personnel or damage to the equipment.
- It is recommended to wear an antistatic wrist strap or avoid unnecessary contact with the circuit board.

**CAUTION**

The safety mark, warning label and rating plate on the inverter should be clearly visible, not removed or covered.

## Disclaimers

**The warranty does not apply to the following conditions:**

- Damage caused by improper use or inappropriate environments (Do not place flammable or explosive objects around the inverter, or install the inverter on the heat-intolerant buildings or under the direct sunlight).
- The actual current/voltage/power exceeds the limit value of the inverter.
- Damage caused by working temperature exceeding the rated temperature range.
- Electric arc, fire, explosion and other accidents caused by failure to follow the inverter labels or manual instructions.
- Unauthorized disassembly and maintenance of the inverter.
- Damage caused by force majeure.
- Damage occurred during transportation or loading/unloading the inverter.

# 1 General Information

## 1.1 Overview

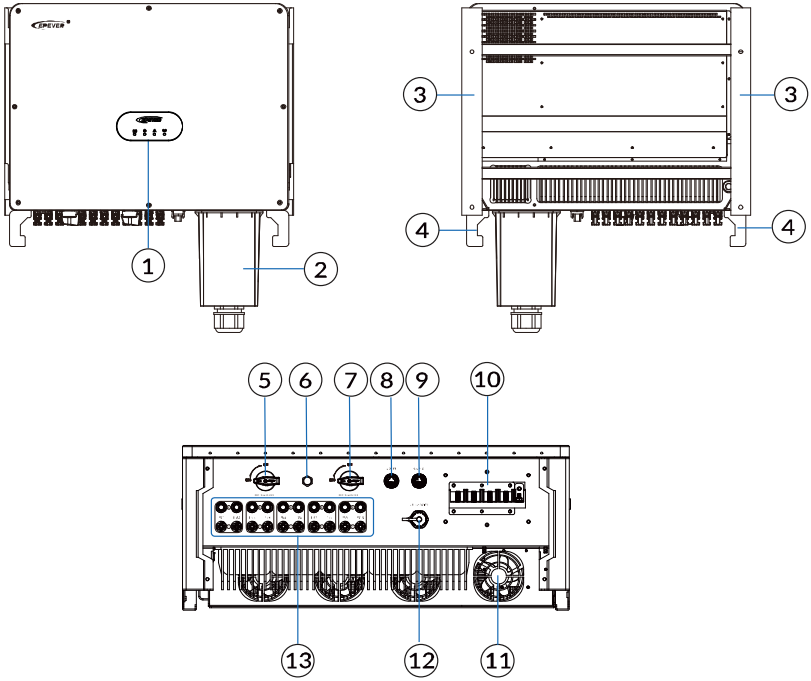
SPT50-70KTL series is a on-grid PV inverter that can directly convert DC generated by PV panel into AC and feed power back to grid. The PV input adopts an advanced maximum power point tracking (MPPT) control algorithm, which can track the maximum power point of the PV array in real time. The product is configured with an output relay for disconnecting the inverter safely from the grid during inverter faults or grid abnormalities. The inverter output can meet the grid requirements in different regions and directly realizes the on-grid PV power feeding.

The series selects key components of high power density and long service life, providing continuous, full and stable power output; with multiple human-machine interaction solutions available, it is convenient to control the real-time parameters. At the same time, its EMC characteristics make it suitable for applications with high power quality requirements.

### Features

- Fully digital voltage and current dual-loop control with fast response speed and high stability.
- Excellent EMC characteristics, suitable for applications with high power quality requirements.
- Selecting components of high power density and long service life to ensure the stability.
- Supporting multiple PV inputs to improve PV utilization.
- Equipped with circuit breakers at the PV input terminal to ensure the safe running of the equipment.
- Maximum DC input voltage of 1,100VDC, string maximum input current of 15A, and each MPPT supports 2 strings.
- 110% long term overload.
- Equipped with circuit breakers at the AC output terminal to disconnect from the grid when in failure.
- USB communication port with optional GPRS and WiFi modules to realize remote monitoring.
- Full failure detection and protection functions to ensure the reliable and stable operation .
- High protection level of IP65, suitable for harsh outdoor environments such as salt spray and humidity.
- Operating temperature ranging from -30℃ to 60℃ to offer a wider scope of application.
- Intelligent air cooling.

## 1.2 Appearance




| No. | Description | No. | Description |
|---|---|---|---|
| 1 | Indicator | 8 | COM1 (Optional for receiving anti-reverse current CT signal, see Section 3.2 Communication connection) |
| 2 | AC terminal cover | 9 | COM2 (Receive local 485 and power-off signal, see Section 3.2 Communication connection) |
| 3 | Wall mounting bracket | 10 | AC output terminal |
| 4 | Handle | 11 | Cooling fan |

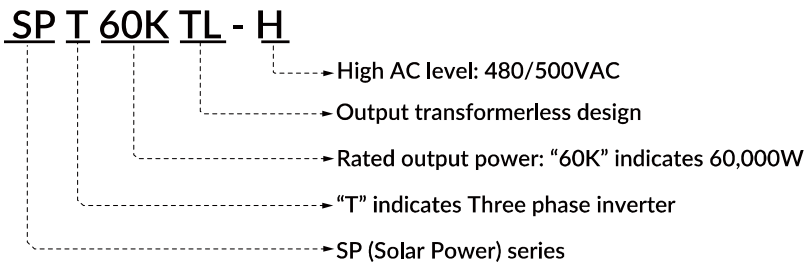
| | | | |
|---|---|---|---|
| 5 | DC switch 1(1) | 12 | WiFi/GPRS module port (see Section 3.2 Communication connection) |
| 6 | Air valve | 13 | PV input terminal(3) |
| 7 | DC switch 2(2) | | |

(1) Controls PV1-PV4 for SPT50KTL and SPT50KTL-H models; controls PV1-PV6 for other models.

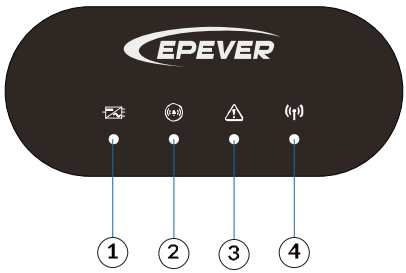
(2) Controls PV5-PV8 for SPT50KTL and SPT50KTL-H models; controls PV7-PV10 for SPT60KTL, SPT60KTL-H; controls PV7-PV12 for SPT70KTL and SPT70KTL-H models.

(3) Each MPPT input consists of two parallel PV strings. PV1-PV8 is for SPT50KTL and SPT50KTL-H models; PV1-PV10 is for SPT60KTL and SPT60KTL-H models; PV1-PV12 is for SPT70KTL and SPT70KTL-H models.

## 1.3 Naming rules



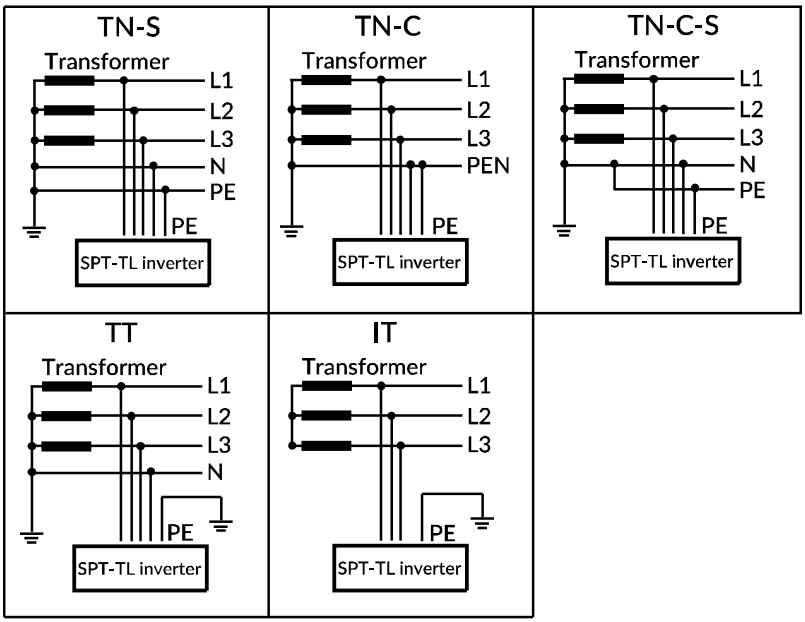

## 1.4 Indicator




| No. | Indicator | Status | Description |
|---|---|---|---|
| 1 | Power/Operating | Solid green | Grid-connected power generation |

| | | | |
|---|---|---|---|
| | | Flashing green for 0.5s | Grid-connected power generation is stopped, indicating the system should be powered on. |
| 2 | Alarm | Flashing yellow for 0.5s | System alarm |
| | | OFF | Alarm is cleared. |
| 3 | Fault | Solid red | System fault |
| | | OFF | Fault is cleared. |
| 4 | Communication | Solid green | Normal external communication |
| | | OFF | Interrupted external communication |
| | | Flashing green for 0.5s | Program upgrade |

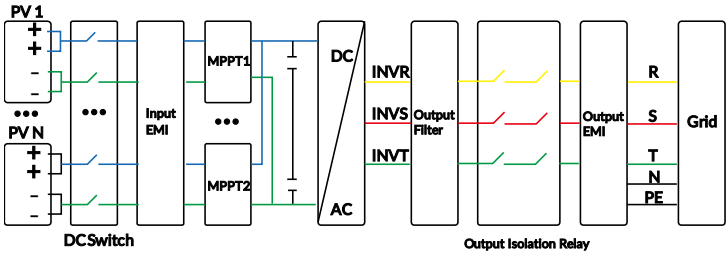
## 1.5 Supported grids



**NOTICE**

The DC input for this inverter series must be PV panel. It is strictly prohibited to use DC source or battery for replacement, and the company shall not be held liable for any equipment damage, product failure, or personal injury resulting from this.

## 1.6 Electrical block diagram

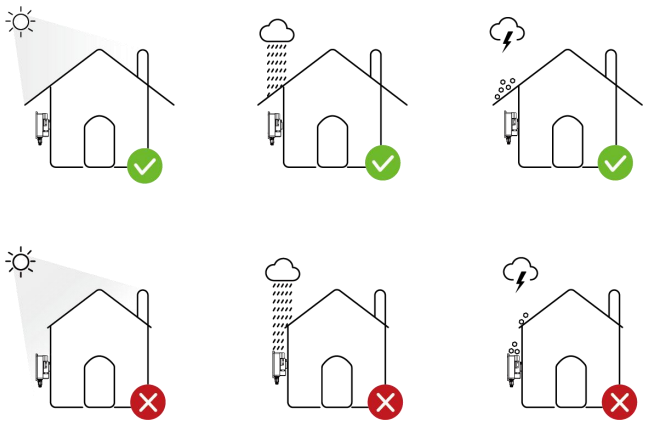


# 2 Installation

## 2.1 Preparations

**Prohibited installation environments**

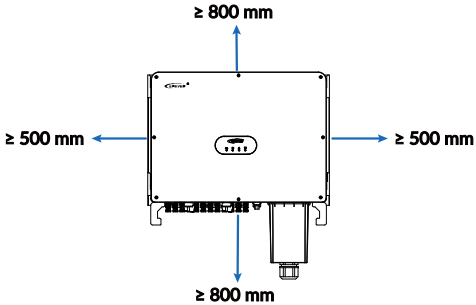
- Do not install the inverter in the flammable, explosive, dust accumulative or other harsh environments.
- Do not install the inverter and the lead-acid liquid battery in the same cabinet to avoid corrosion from acidic gases generated during battery operation.
- Do not install the inverter on a hollow brick wall.
- Do not install the inverter near strong electromagnetic signals.
- Keep the inverter out of reach of children.
- Do not place the inverter close to flammable materials or gases.
- Although the inverter is rated IP65, please avoid exposing it to direct sunlight, rain or snow cover, as a suitable installation environment can extend the service life.



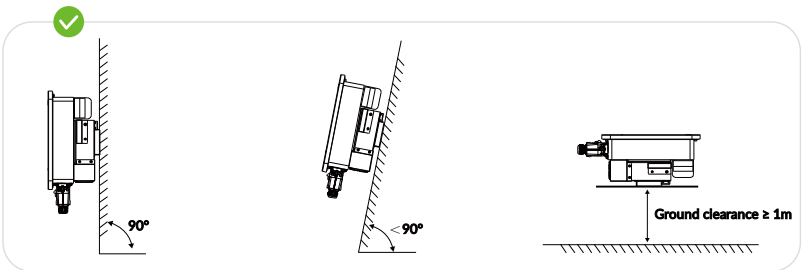
**Recommended installation environments**

- For wall mounting, it is recommended that the inverter be fixed to concrete and solid brick walls.

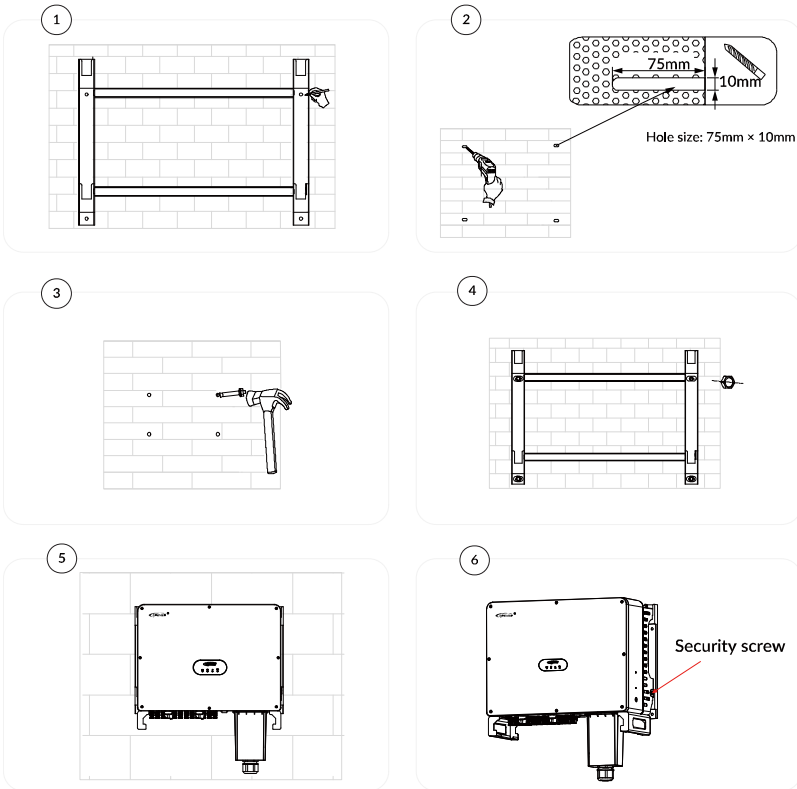
- The inverter is rated IP65 and can be installed both indoors and outdoors.
- The installation site must accommodate the dimensions of the inverter.
- When installing the inverter, please leave enough space around it for heat dissipation, the left and right clearance is not less than 500mm and the upper and lower clearance is not less than 800mm.




- The inclination angle between the inverter and the horizontal ground is less than or equal to 90 degrees.
- Install the inverter at eye level for checking indicators and maintenance.
- The humidity of the installation environment should be 0–95%, and the ambient temperature around the inverter should be between -30℃ and +60℃.
- When drilling holes in the wall, avoid plumbing pipelines and electrical wiring.
- The inverter can be installed on a vertical or backward inclined plane or placed flat on a bracket at least 1 meter above the ground, please refer to the picture below:



## 2.2 Installation steps




**Step 1:** Mark the installation position with the wall mounting bracket.

**Step 2:** Drill the holes in the marked positions with an electric drill.

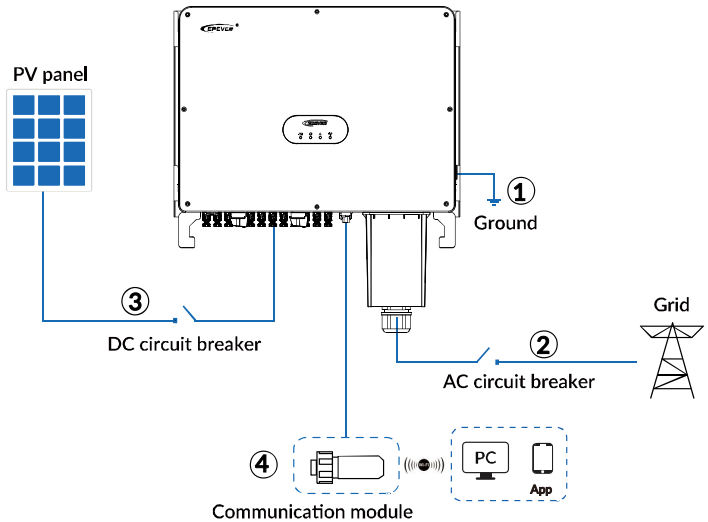
**Step 3:** Insert the expansion bolts into the holes.

**Step 4:** Fix the wall mounting bracket with screws.

**Step 5:** Place the inverter on the wall mounting bracket.

**Step 6:** Tighten the inverter with the included security screws.

# 3 Electrical Connection




1. Disconnect all the AC and DC switches before wiring.
2. Follow the wiring sequence of "1. Grounding > 2. Grid > 3. PV panel > 4. Communication modules".

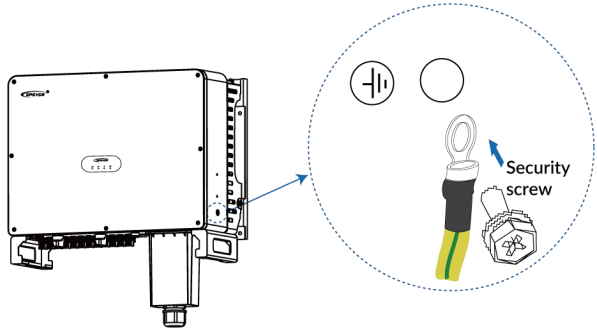
## 3.1 Cables connection

### 3.1.1 Connect the ground protection cable

**NOTICE**

- The inverter is designed without a transformer. In this case, both the positive and negative terminals of the PV array on the inverter cannot be grounded; otherwise, the inverter failure will occur.
- The ground terminal on the side of the inverter must be grounded correctly.

In the PV power generation system, all non-current-carrying metal components (e.g. brackets, shells of combiner box/distribution cabinet/inverter etc.) should be connected to the ground. It is recommended to use a yellow-green grounding cable with a cross-sectional area of not less than 16 $mm^2$ to ensure the reliable and safe grounding connection.




### 3.1.2 Connect the AC output cable

Connect the inverter with AC distribution cabinet or grid by AC output cable; the AC output cable connection must comply with the requirements of the local grid service provider. Recommended specifications for AC output cable and Earth-Leakage Circuit Breaker(ELCB) are as follows:

| Model | Cross-sectional area ($mm^2$) | ELCB |
|---|---|---|
| SPT50KTL | 16–25 | 100A/230V/3P, leakage protection, 0.3A |
| SPT60KTL | 25–35 | 125A/230V/3P, leakage protection, 0.3A |
| SPT70KTL | 25–35 | 150A/230V/3P, leakage protection, 0.3A |
| SPT50KTL-H | 16–25 | 100A/280V/3P, leakage protection, 0.3A |
| SPT60KTL-H | 25–35 | 125A/280V/3P, leakage protection, 0.3A |
| SPT70KTL-H | 25–35 | 150A/280V/3P, leakage protection, 0.3A |

**Note:** When using the smallest recommended cable specifications for each model, ensure that the transmission distance is less than 5 meters. If the transmission distance is greater than or equal to 5 meters, the cable specifications need to be appropriately increased to reduce the cable voltage drop and improve system performance.

**NOTICE**

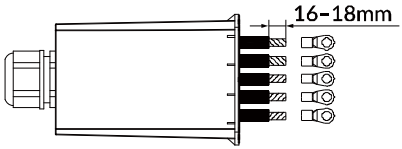
- It is prohibited for multiple inverters to share the same circuit breaker.
- It is prohibited to connect the load between the inverter and the circuit breaker.

**Step 1:** Take the AC terminal cover off the inverter.

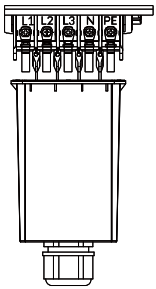
**Step 2:** Thread the AC output cable (recommended specifications: 3*16–3*35mm$^2$, preferably armored)through the AC terminal cover. The cable length is subject to actual situation.

**Step 3:** Remove the insulation layer of 16–18mm at one end of the AC output cable.

**Step 4:** Insert the bare cable end to the ring terminal and crimp them tightly with crimping pliers.

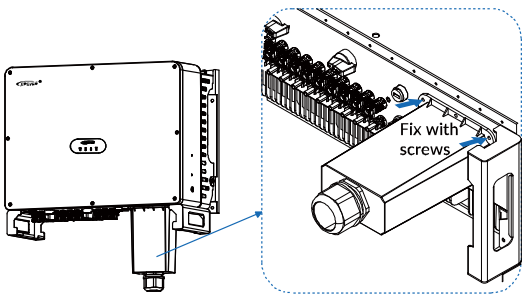



**Step 5:** Connect the ring terminal to the inverter terminal.




| L1 | L2 | L3 | N | PE |
|---|---|---|---|---|
| Yellow | Green | Red | Blue | Yellow-green |

**Step 6:** Fasten the AC terminal cover and tighten the screws.

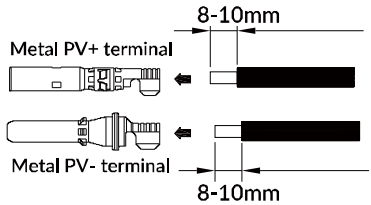


### 3.1.3 Connect the PV input cable

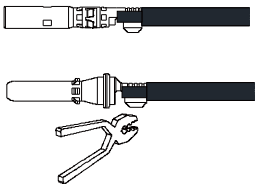
**Step 1:** Prepare PV input cable, the cable length and quantity are subject to actual situation.

**Step 2:** Remove the insulation layer of 8–10mm at one end of the PV input cable.

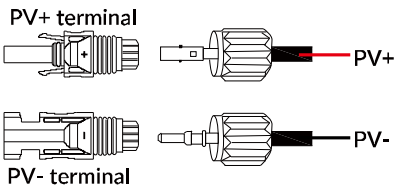
**Step 3:** Install the bare cable end to the metal PV positive/negative terminals respectively as illustrated below.



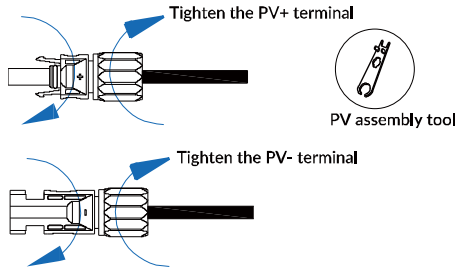

**Step 4:** Crimp the PV input cable with the metal terminals tightly with crimping pliers.



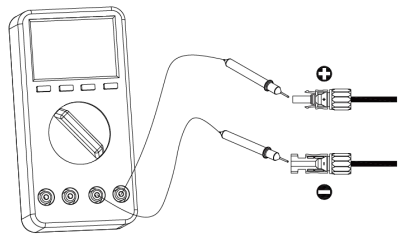
**Step 5:** Thread the crimped PV positive and negative cables through the locking nut and insert them into the corresponding plastic housings until you hear a "click" sound, which indicates that the metal cores have been snapped into place. Please pay attention to the positive and negative terminals.



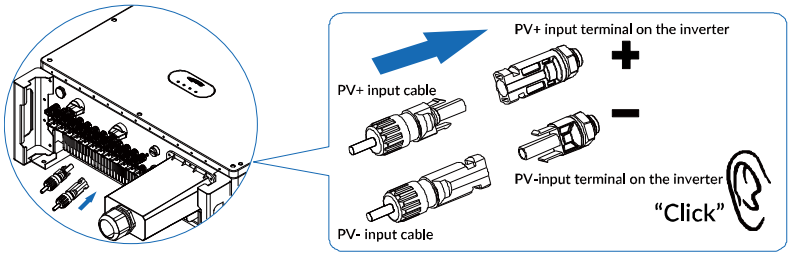

**Step 6:** Use the PV assembly/disassembly tool (optional accessory) to lock the nut tightly, pull the PV cables gently to ensure the terminal is not wobbly or disconnected.




**Step 7:** Please use multimeter to check the open-circuit voltage between the PV+ and PV- terminals to ensure the PV cable polarities are correct and the open-circuit voltage is less than or equal to 1,100VDC.



**Step 8:** Connect the PV input cable to the inverter terminal.




The recommended specifications of DC input cable: copper core cross-sectional area: 2.5–6mm$^2$, maximum withstand voltage: 1,100VDC.

**Note:** When using the smallest recommended cable specifications for each model, ensure that the transmission distance is less than 5 meters. If the transmission distance is greater than or equal to 5 meters, the cable specifications need to be appropriately increased to reduce the cable voltage drop and improve system performance.

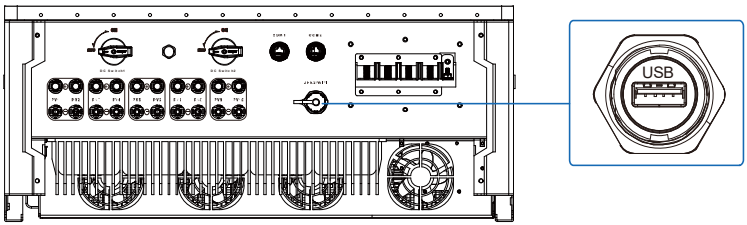
**NOTICE**

- Before installing the PV input terminals, ensure that the PV input voltage and current do not exceed the inverter limits.
- When installing the PV input terminals, pay attention to the positive and negative terminals.
- When the terminals are connected, you can hear the "click" sound, After terminals connection is completed, pull the PV cables gently to ensure the terminal is not wobbly or disconnected.

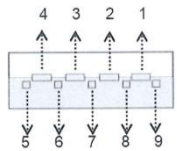
## 3.2 Communication connection

### 3.2.1 WiFi/GPRS port

Remote monitoring can be realized on the APP by connecting the WiFi modules with the WiFi/GPRS communication port, or the remote data collection can be realized by connecting the GPRS modules, which can also be used for inverter upgrades and data monitoring.




The pin definition of the port is as follows:

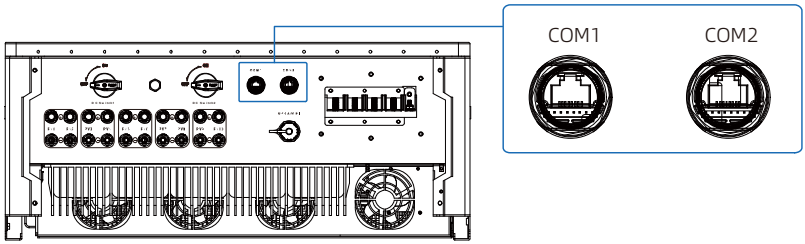




| Pin | Definition | Color | Description |
|---|---|---|---|
| 1 | VBUS | Red | Power (5VDC/1.2A) |
| 2/3/7/8/9 | Reserved | Reserved | Reserved |
| 4 | GND | Black | GND |

| | | | |
|---|---|---|---|
| 5 | RS485-A1 | Blue | RS485-A1 (to transfer data with cloud platform, APP, PC software, screen, etc.) |
| 6 | RS485-B1 | Yellow | RS485-B1 (to transfer data with cloud platform, APP, PC software, screen, etc.) |

### 3.2.2 COM1/COM2 port




- The description of port COM1:

This reserved interface serves as an external anti-reverse power flow CT signal input port. By connecting an optional anti-reverse current transformer to the COM1 interface, the system can sample grid-side current and adjust inverter output power to prevent reverse power flow to the grid. For specific usage, please consult our technical personnel or refer to the manual "Anti-Reverse Power Flow Function Instructions for SPT Series On-Grid PV Inverter".

- The pin definition of port COM2 is as follows:

| Pin | Definition | Function |
|---|---|---|
| 1 | +5VDC | Power supply for external communication supply 5V, 1A |
| 2 | +5VDC | |
| 3 | RS485-B | Local communication 485B |
| 4 | RS485-A | Local communication 485A |
| 5 | DRM 0 | DRM0 function (If the impedance between pin 2 and pin 3 is greater than 20kΩ or short-circuited, the inverter stops running) |
| 6 | GNDS | Communication GND |
| 7 | GNDS | |
| 8 | INV-OFF | Emergency shutdown signal (effective when short circuit GNDS) |

COM2 (for receiving local 485 and power-off signal): Supporting RS485 communication protocol, users can customize the monitoring software to realize the remote monitoring function of the inverter. Short circuit Pin 8 and Pin 6/Pin 7 (GNDS) of this port for emergency shutdown.

**Note:** The local communication ports 485B/485A in COM2 can also be configured for reverse-power prevention by connecting an external electric meter. For specific usage, please consult our technical personnel or refer to the manual "Anti-Reverse Power Flow Function Instructions for SPT Series On-Grid PV Inverter".

# 4 Commissioning

## 4.1 Check before powering on

- Whether the inverter is installed correctly and securely;
- Whether L1/L2/L3 (live wire), N (neutral wire) and PE (ground wire) of the AC grid are connected correctly;
- Whether PV input polarities are correct;
- Whether the communication or WiFi module is connected correctly and securely;
- Whether the "DC SWITCH 1", "DC SWITCH 2" and all circuit breakers or all switches connected to the inverter are "OFF".

## 4.2 Inverter operating

**NOTICE**

Before powering on the inverter, please check whether the DC terminal voltage and AC terminal voltage are within the specified range of the inverter.

**Operation steps:**

**Step 1:** Connect the DC switch between the PV module and the inverter.

**Step 2:** Connect the switch between the AC grid and the inverter.

**Step 3:** Turn the "DC SWITCH 1", "DC SWITCH 2" of the inverter to "ON".

**Step 4:** Check the running status of the inverter by its LED indicators.

**Note:** Please refer to Section 1.4 Indicator in the manual for LED indicator status.

## 4.3 APP remote monitoring

After adding the SPT50–70KTL series to the cloud platform through App or Web, users can remotely monitor and set parameters for the onsite equipment by App. It is convenient for users to keep track of the working status of the equipment at anytime and anywhere to improve work efficiency. The following is an example of connecting SPT50-70KTL series to WiFi module and remote monitoring by APP.

### 4.3.1 Download APP

**iOS:** Scan the QR code or search for "Solar Guardian" in the App Store to download the APP.

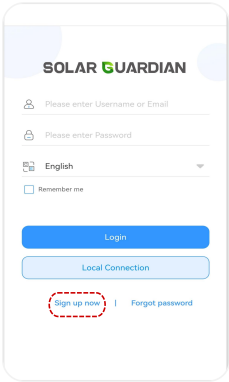
Apple App Store

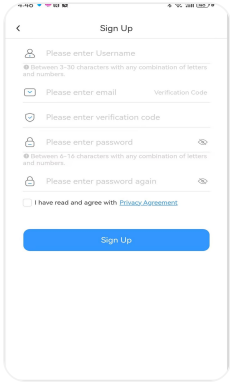
**Android**: Scan the QR code to download the App.

应用宝

### 4.3.2 Sign up & Log in

**Sign up:** End users can register a new account for free on the cell phone.

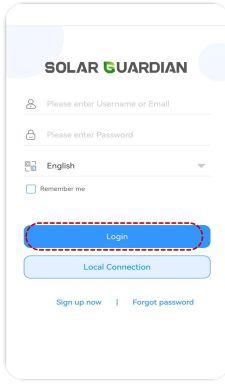


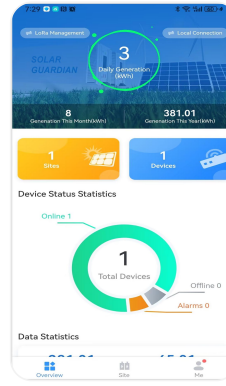

**Step 1:** Click "Sign up now" on the initial interface of the APP.

**Step 2:** Enter your username, email address or mobile phone number, verification code, password and reconfirm password; check and agree to the privacy policy; click "Register" to complete the registration of the new account.

**Log in:**



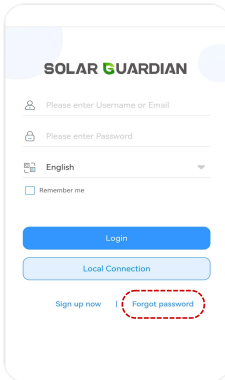

**Step 1:** Open the APP, enter your account name and password; select the language, check "Remember username and password" (so that you can log in quickly next time), and click "Login" to enter the APP main interface.

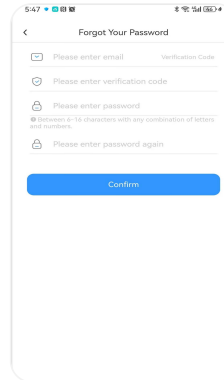



**Step 2:** The main interface of the APP includes "Overview, Site, Me".

**Note:** The App data and the WEB data are synchronized in real time, and the operations performed through the APP will also be synchronized to the WEB.

**Reset password:** If you forget your login password for your account, you can reset your password by the following steps.



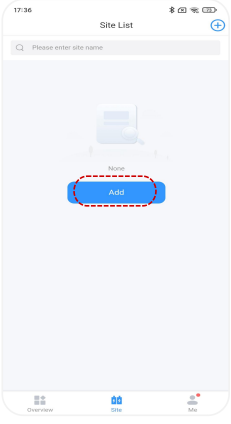



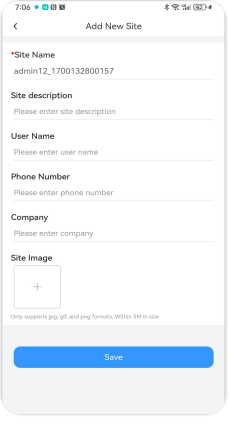
**Step 1:** Click “Forgot password” on the initial login interface.

**Step 2:** Enter the new password, mobile phone number or email address, click "Verification Code", then enter the verification code received in your phone or email , click "Confirm ", and the new password is set successfully.

### 4.3.3 One Click Add gateways and devices

The gateways and devices should be correctly connected and powered on before adding them by the “One Click Add” on the App (The following is an example of adding WiFi module).

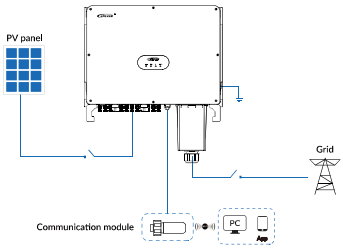


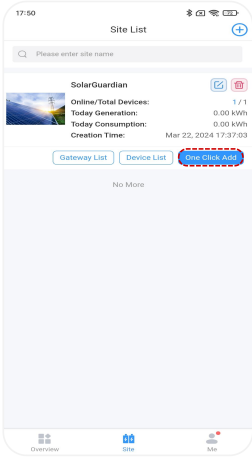




**Step 1:** After logging in, enter “Site” interface, click “Add” or ⊕ icon to enter “Add New Site” interface.

**Step 2:** Fill in the “Site Name” (or use the default site name of the App) and click "Save" to complete the creation of the site after filling in the remaining site information (optional).

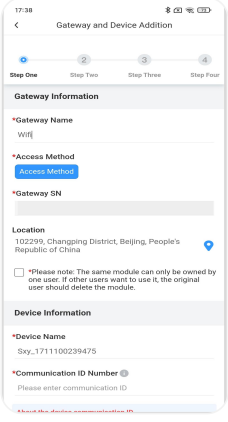
**Note:** Items marked with ★ must be filled in. Items not marked with ★ are optional. If you do not upload the site picture, it will be displayed as the default picture. Otherwise, it will be displayed as your uploaded picture.




**Step 3:** Connect the WiFi module to the USB communication port on the inverter (the USB-A 3.0 WiFi module can connect with the inverter directly, for other communication modules, please purchase the appropriate communication cables according to the communication port type).

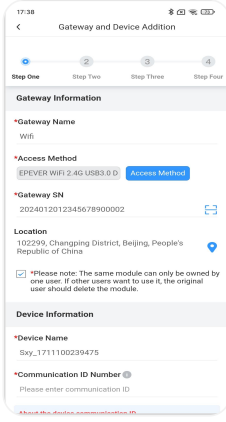
**Step 4:** Click "One Click Add" in the site interface to add gateways and devices under this site.

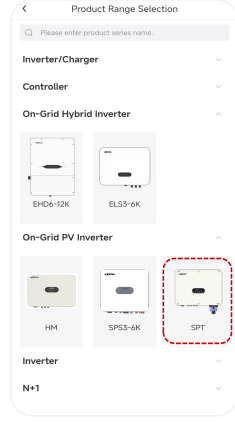



**Step 5:** Enter “Gateway and Device Addition” interface, fill in the “Gateway Name” (or use default name of the App), click “Access Method” to enter “Internet Gateway Select” interface.

**Step 6:** Select “EPEVER WiFi 2.4G USB3.0 D”, it will automatically return to the “Gateway and Device Addition” interface in Step 5. Scan the QR code(1) on the gateway label or manually enter the 22-digit gateway SN; Select the “Location” (optional), check the information prompt.

(1) If you enter the “Gateway SN” by scanning the QR code, please allow the App to access camera on your phone to scan the QR code on the gateway. The system will verify the gateway SN automatically and only the gateway that have been added to the production management system can be added to the cloud platform successfully. If you are prompted with "Gateway already exists", please contact technical support for assistance.

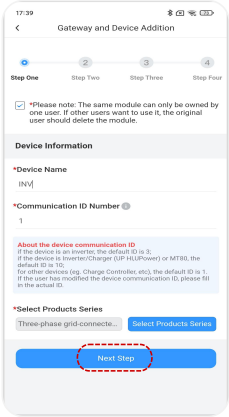


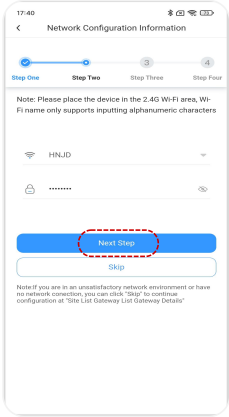

**Step 7:** On the “Gateway and Device Addition” interface, fill in the “Device Name” (or use default name of the App) and “Communication ID Number”(2), click “Select Products Series” to enter the device selection interface.

**Step 8:** Select the current connected device, it will automatically return to the “Gateway and Device Addition” interface in Step 7. If the "Next" button is grayed out and cannot be clicked. Please check whether the information filled in is correct or whether the required fields are completed.

(2) For device communication ID, the default ID is 3 for inverter, 10 for UP-HI or UPower, 1 for other devices. Please fill in the actual ID value if you have modified the device communication ID.



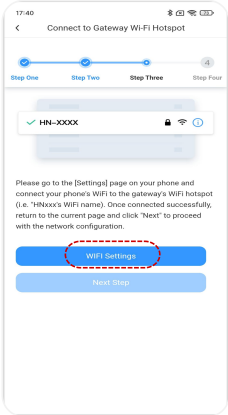

**Step 9:** When you have filled all the information, click “Next” to finish adding the gateway and devices, and enter the “Network Configuration Information” interface.



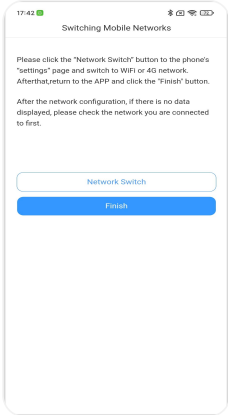

**Step 10:** Enter your local WiFi account and password and click "Next".

**Note:**

- If you are using an Android phone, click the WiFi icon to display the WiFi searched by the phone. If you are using an iPhone, you need to enter the WiFi name manually.
- If you need to check or verify if the WiFi password is correct, click to enter the password in plain text.
- If the WiFi signal in the environment is weak or there is no network, you can click "Skip" to complete the network configuration in the gateway details later. Please refer to Subsection 4.3.4 Gateway details for more details. If the network configuration of the WiFi module has not completed and cannot establish a connection with the cloud platform, the WiFi module will not be able to go online.



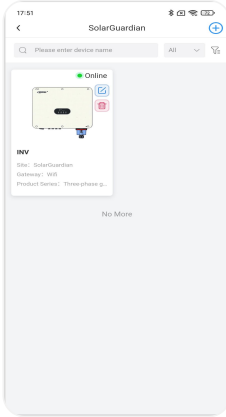

**Step 11:** Click “WiFi Settings” to connect your phone to the gateway WiFi (Name: HN_EPxxx, password: 12345678), return to the App when connection is successful. Click “Next Step” for network connection.



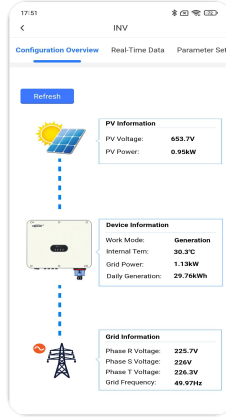

**Step 12:** Click “Network Switch” to return to the “Settings” interface of your phone, switch the phone to a WiFi network or 4G network that can access the Internet, and then click "Finish" to enter the device list.

**Note:**

- Ensure the GPS is turned on and the APP is allowed to access the location in the phone, otherwise the phone cannot search for the hotspot of the WiFi module.
- The WiFi hotspot network does not have access to the Internet. When the phone asks whether to allow or trust the network, please allow or trust it. Otherwise, the connection to the WiFi hotspot will fail and you will be unable to proceed to the next step.

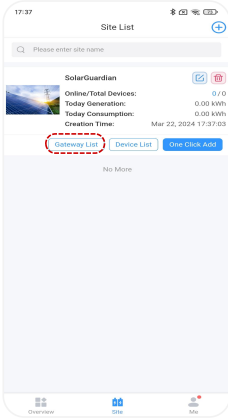



**Step 13:** When it is added, it will automatically switch to the “Device List”, click the device to view its real-time data.

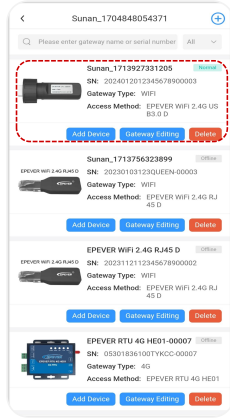



**Step 14:** Enter the device interface to view the real-time device data. The default interface is “ Configuration Overview”.

### 4.3.4 Gateway details




**Step 1:** Enter the "Site List" interface and click on the "Gateway List" of a certain power station.

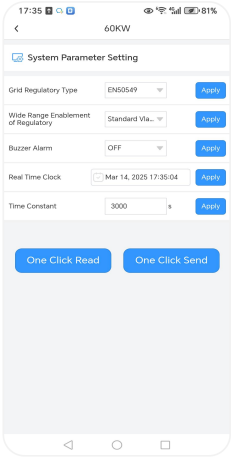



**Step 2:** Enter the “Gateway List” interface, click the gateway that you want to view.


**Step 3:** Enter the “Gateway Details” interface to view the related gateway information. After the network configuration of the WiFi module is completed, the WiFi name and password of the router are displayed. Click the icon to switch to displaying the password in plain text to verify the correctness. Click "Configure Gateway WiFi" to enter the network configuration process, the network configuration of the WiFi module is completed or corrected.

### 4.3.5 Grid Regulatory Type

To comply with local grid interconnection requirements, select the applicable regulatory code from the “Grid Regulatory Type” drop-down box in Parameter Settings > System Parameters Setting and click Apply to complete the configuration.



# 5 Troubleshooting and Maintenance

## 5.1 Faults

| No. | Faults | Causes and Measures |
|---|---|---|
| 1 | Inverter Over Temperature | Check whether there is any foreign object blocking the inverter fan inlet; check whether the ambient temperature of the inverter installation position exceeds the maximum ambient temperature. If the ambient temperature of the inverter installation position exceeds the maximum ambient temperature, please improve the ventilation and heat dissipation. |
| 2 | Boost Over Temperature | |
| 3 | Radiator Over Temperature | |
| 4 | Chassis Over Temperature | |
| 5 | DC Bus Voltage Imbalance | It is the internal fault of the inverter. Please disconnect the "DC Switch" of the inverter, wait for 5 minutes, then connect the "DC Switch" again, and check whether the fault has been cleared after restarting the inverter; if it is still not cleared, please contact the manufacturer. |
| 6 | DC Bus Overvoltage | |
| 7 | DC Component Fault | |
| 8 | DC Bus Undervoltage | |
| 9 | Relays Fault | |
| 10 | Hardware DC Bus Overvoltage | |
| 11 | Inverter Hardware Overcurrent | |
| 12 | COM Error (DSP with ARM) | |
| 13 | Output Current Imbalance | |
| 14 | PV Hardware Overcurrent | |
| 15 | Grid Overvoltage Fault | If it occurs occasionally, it might be a temporary grid failure, the fault will be automatically cleared after the grid resumes normal without manual intervention. If it occurs frequently, please check the grid voltage |
| 16 | Grid Undervoltage Fault | |
| 17 | Grid Overfrequency Fault | |

| | | |
|---|---|---|
| 18 | Grid Under Frequency Fault | and frequency are within the specified range of the inverter. If not, please contact the manufacturer; if yes, please check if the connection between the AC circuit breaker and output cable is normal.<br>If the grid voltage and frequency are within the specified range of the inverter, and the AC wiring is correct, the alarms still occurs frequently, please contact the manufacturer to modify the grid undervoltage and overvoltage protection value of the inverter after getting the approval from the local grid service provider |
| 19 | Inverter Software Overcurrent | It is the internal fault of the inverter. Please disconnect the "DC Switch" of the inverter, wait for 5 minutes, then connect the "DC Switch" again, and check whether the fault has been cleared after restarting the inverter; if it is still not cleared, please contact the manufacturer. |
| 20 | Inverter SelfCheck Error | |
| 21 | Boost SelfCheck Error | |
| 22 | Param Config Failure | |
| 23 | Islanding Fault | |
| 24 | Inverter Overvoltage Fault | |
| 25 | Leakage Current Fault | 1. If it occurs occasionally, it may be caused by an accidental error of the external circuit, the inverter will automatically resume normal operation after the fault is cleared, without manual intervention.<br>2. If it occurs frequently or the inverter cannot resume normal operation for a long time, please check whether the ground impedance of the PV string is too low and whether the insulation of the PV cable is damaged. |
| 26 | Leakage Current Sensor Fault | It is the internal fault of the inverter. Please disconnect the "DC Switch" of the inverter, wait for 5 minutes, then connect the "DC Switch" again, and check whether the fault has been cleared after restarting the inverter; if it is still not cleared, please contact the manufacturer. |
| 27 | Leakage Current Consistency Error | |
| 28 | Voltage Consistency Error | |
| 29 | Insulation Resistance Low | Please check whether the ground impedance of the PV string is too low and whether the insulation of the PV cable is damaged. If it is still not cleared, please contact the manufacturer. |
| 30 | Grounding Warning | |

| | | |
|---|---|---|
| 31 | PV1 Overvoltage | The PV array is misconfigured, with too many strings connected in series, and the open-circuit voltage is higher than the maximum operating voltage of the equipment. |
| 32 | PV2 Overvoltage | |
| 33 | PV3 Overvoltage | |
| 34 | PV4 Overvoltage | |
| 35 | PV5 Overvoltage | |
| 36 | PV6 Overvoltage | |
| 37 | PV7 Overvoltage | |
| 38 | PV8 Overvoltage | |
| 39 | PV9 Overvoltage | |
| 40 | PV10 Overvoltage | |
| 41 | COM Error (DSP with DSP) | It is the internal fault of the inverter. Please disconnect the "DC Switch" of the inverter, wait for 5 minutes, then connect the "DC Switch" again, and check whether the fault has been cleared after restarting the inverter; if it is still not cleared, please contact the manufacturer. |
| 42 | I2C EPROM (DSP) | |
| 43 | AFCI Error | Please check whether there is arcing or poor contact in the PV string wiring. |
| 44 | PV1 Reverse Connected | Please power off the equipment completely first before conducting the following operations: Check whether the PV polarities are connected in reverse, if yes, correct the PV polarities connection. |
| 45 | PV2 Reverse Connected | |
| 46 | PV3 Reverse Connected | |
| 47 | PV4 Reverse Connected | |
| 48 | PV5 Reverse Connected | |
| 49 | PV6 Reverse Connected | |
| 50 | PV7 Reverse Connected | |
| 51 | PV8 Reverse Connected | |
| 52 | PV9 Reverse Connected | |
| 53 | PV10 Reverse Connected | |

| | | |
|---|---|---|
| 54 | PV1 Overcurrent | It is the internal fault of the inverter. Please disconnect the DC switch of the inverter, wait for 5 minutes, then connect the DC switch again, and check whether the fault has been cleared after restarting the inverter; if it is still not cleared, please contact the manufacturer. |
| 55 | PV2 Overcurrent | |
| 56 | PV3 Overcurrent | |
| 57 | PV4 Overcurrent | |
| 58 | PV5 Overcurrent | |
| 59 | PV6 Overcurrent | |
| 60 | PV7 Overcurrent | It is the internal fault of the inverter. Please disconnect the DC switch of the inverter, wait for 5 minutes, then connect the DC switch again, and check whether the fault has been cleared after restarting the inverter; if it is still not cleared, please contact the manufacturer. |
| 61 | PV8 Overcurrent | |
| 62 | PV9 Overcurrent | |
| 63 | PV10 Overcurrent | |

## 5.2 Alarms

| No. | Alarms | Causes and Measures |
|---|---|---|
| 1 | PV1 Short Circuit | Please power off the equipment completely first before conducting the following operations: Check whether the PV polarities are short circuited or connected in reverse, if yes, correct the PV polarities connection. |
| 2 | PV2 Short Circuit | |
| 3 | PV3 Short Circuit | |
| 4 | PV4 Short Circuit | |
| 5 | PV5 Short Circuit | |
| 6 | PV6 Short Circuit | |
| 7 | PV7 Short Circuit | |
| 8 | PV8 Short Circuit | |
| 9 | PV9 Short Circuit | |
| 10 | PV10 Short Circuit | |
| 11 | Lighting Protection:LP<br>DC LP Warning | -- |
| 12 | Ligthting Protection:LP<br>AC LP Warning | |

| | | |
|---|---|---|
| 13 | User Shutdown | |
| 14 | Device Locking | |
| 15 | Out Fan 1 Stopped | Check whether there accumulated dust or dust on the inverter, and whether there are foreign objects blocking the fan at the fan inlet, if so, please improve the ambient ventilation and heat dissipation. |
| 16 | Out Fan 2 Stopped | |
| 17 | Out Fan 3 Stopped | |
| 18 | Out Fan 4 Stopped | |
| 19 | Out Fan 5 Stopped | |
| 20 | Inner Fan Stopped | |

## 5.3 Routine maintenance

To maintain long-term working performance, it is recommended to have the following items inspected twice a year.

- Make sure the airflow around the inverter is not blocked, and remove dirt or debris from the fan.
- Check whether the exposed cables have been damaged by sunlight, friction with other surrounding objects, dryness, insects or rodents, etc., repair or replace the cables if necessary.
- Verify whether the indicator and display are consistent with the actual operation of the equipment, and note that corrective action should be taken in case of inconsistency or error.
- Check terminals for signs of corrosion, insulation damage, high temperature or burning/discoloration, tighten terminal screws.
- Check for signs of dirt, insect nesting and corrosion and clean up as required.
- This inverter is not equipped with a lightning arrester, if it is equipped with a failed lightning arrester, replace the failed lightning arrester in time to avoid lightning strikes' damage to the inverter or even other equipment.

**⚠ DANGER**

Risk of electric shock! Make sure that the power supply of the inverter is disconnected when performing the above operations, and wait for 10 minutes for the power in the capacitor to be discharged before performing the corresponding checks or operations.

# 6 Technical Specifications

## 6.1 Parameters

| Product Model | SPT50KTL | SPT60KTL | SPT70KTL | SPT50KTL-H | SPT60KTL-H | SPT70KTL-H |
|---|---|---|---|---|---|---|
| **DC Input** | | | | | | |
| Maximum DC Input Voltage | 1,100VDC | | | | | |
| Maximum Single MPPT Input Power | 15,000W | | | | | |
| Minimum Start-up Voltage | 250VDC | | | | | |
| Rated Input Voltage | 620VDC | | 720VDC | | | |
| MPPT Operating Voltage Range | 180–1,000VDC | | | | | |
| Maximum Input Current per MPPT | 30A | | | | | |
| Number of MPPTs | 4 | 5 | 6 | 4 | 5 | 6 |
| Maximum Number of PV Strings per MPPT | 2 | | | | | |
| **AC Output** | | | | | | |
| Rated Output Power | 50,000W | 60,000W | 70,000W | 50,000W | 60,000W | 70,000W |
| Maximum Output Apparent Power | 55,000VA | 66,000VA | 77,000VA | 55,000VA | 66,000VA | 77,000VA |
| Rated Output Voltage | 380VAC/400VAC | | | 480VAC/500VAC | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Rated Output Frequency | 50Hz/60Hz | | | | | |
| Rated Output Current | 76A | 91.2A | 106.3A | 60.2A | 72.2A | 84.2A |
| Maximum Output Current | 83.6A | 100.3A | 117A | 67A | 80A | 92.6A |
| Power Factor | 1 (± 0.8) | | | | | |
| THDi (Total Harmonic Current Distortion) | < 3% | | | | | |
| Grid Wring Method | 3W + N + PE | | | | | |
| **Efficiency** | | | | | | |
| Maximum Efficiency | 98.50% | 98.50% | 98.60% | 98.50% | 98.60% | 98.60% |
| European Efficiency | 98.2% | | | | | |
| MPPT Efficiency | 99.90% | | | | | |
| **Environment Parameters** | | | | | | |
| Relative Humidity | 0–100% (N.C.) | | | | | |
| Enclosure | IP65 | | | | | |
| Working Temperature Range | -30℃ to +60℃ | | | | | |
| Altitude | ≤ 4,000m | | | | | |
| **Mechanical Parameters** | | | | | | |
| Dimension (L × W × H) | 700mm × 610mm × 298mm | | | | | |

| | |
|---|---|
| **Others** | |
| DC Input Connector | H4/MC4 (Optional) |
| AC Output Connector | Connector |
| Cooling Method | Intelligent cooling |
| Display | LCD (Optional) + LED/WIFI + APP |
| Nighttime Self-consumption | < 3W |
| Communication Port | USB/RS485 (included), WIFI/GPRS (optional) |
| **Protections** | |
| String Current Monitoring | Integrated |
| Residual Current Monitoring | Integrated |
| Insulation Impedance Detection | Integrated |
| Anti-Islanding Protection | Integrated |
| Reverse Polarity Protection | Integrated |
| DC Surge Protection | Type II |
| AC Surge Protection | Type II |
| AC Overcurrent Protection | Integrated |
| AC Short-Circuit Protection | Integrated |
| Overtemperature Protection | Integrated |

| | |
|---|---|
| AC Overvoltage Protection | Integrated |
| DC Arc-Fault Protection | Optional |
| PID Recovery Function | Optional |

## 6.2 Declaration

This inverter is classified as a Class B inverter. The grid voltage and frequency ranges are specified in the tables below.

**Grid Voltage Range Specifications (U = Operating voltage; UN = Rated voltage)**

| Grid Voltage | Requirement |
|---|---|
| U < 50%UN | Shut down within 0.2 seconds |
| 50%UN ≤ U < 85%UN | Shut down within 2 seconds |
| 85%UN ≤ U < 110%UN | Normal operation |
| 110%UN ≤ U < 135%UN | Shut down within 2 seconds |
| U ≥ 135%UN | Shut down within 0.2 seconds |

**Grid Frequency Range Specifications**

| Grid Frequency | Requirement |
|---|---|
| F ≤ 47.5Hz | Stop operation within 0.2 seconds |
| 47.5Hz < F ≤ 49.5Hz | Stop operation within 2 seconds |
| 49.5Hz <F ≤ 50.5Hz | Normal operation |
| F > 50.5Hz | Stop operation within 0.2 seconds; the inverter must not reconnect to the grid while in shutdown state |

**Any changes without prior notice! Version number: V1.0**

**HUIZHOU EPEVER TECHNOLOGY CO., LTD.**

**+86 - 752-3889706**

**info@epever.com**

**www.epever.com**