

Grid-Tied PV Inverter

SW010KTL-T1-G2

SW012KTL-T1-G2

SW015KTL-T1-G2

SW020KTL-T1-G2

SW030KTL-T1-G2

SW040KTL-T1-G2

SW050KTL-T1-G2

SW012KTL-T1-L-G2

SW017KTL-T1-L-G2

SW030KTL-T1-L-G2

User Manual

About This Manual

This document mainly introduces the product information, installation and wiring, configuration and commissioning, fault troubleshooting, and maintenance of the inverter. Before installing and using this product, please read this manual carefully to understand the product safety information and become familiar with the functions and features of the product. The document may be updated from time to time. Please obtain the latest version and more product information from the official website.

Applicable Model

This document applies to the following inverter models:

model	Nominal power	Nominal output voltage
SW010KTL-T1-G2	10kW	220/380, 230/400, 240/415, 3L/N/PE or 3L/PE
SW012KTL-T1-G2	12kW	
SW015KTL-T1-G2	15kW	
SW020KTL-T1-G2	20kW	
SW030KTL-T1-G2	30kW	
SW040KTL-T1-G2	40kW	
SW050KTL-T1-G2	50kW	
SW012KTL-T1-L-G2	12kW	127/220, 3L/N/PE or 3L/PE
SW017KTL-T1-L-G2	17kW	
SW030KTL-T1-L-G2	30kW	

Applicable Personnel

Only applicable to professionals who are familiar with local regulations and electrical systems, have received professional training, and are knowledgeable about this product.

Symbol Definition

To better use this manual, the following symbols are used to highlight important information. Please read the symbols and their descriptions carefully.

 DANGER
Indicates a highly potential danger that, if not avoided, will result in death or serious injury.
 WARNING
Indicates a moderate potential danger that, if not avoided, may result in death or serious injury.
 CAUTION
Indicates a low potential danger that, if not avoided, may result in moderate or minor injury.
NOTICE
Emphasis and supplement to the content, may also provide tips or tricks for optimizing product use, helping you solve a problem or save time.

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1 Safety Precautions

WARNING

The inverter has been designed and tested in strict compliance with safety regulations. However, as an electrical device, relevant safety instructions must be followed before any operation on the equipment. Improper operation may result in serious injury or property damage.

1.1 General Safety

NOTICE

- Due to product version upgrades or other reasons, the document content may be updated periodically. Unless otherwise agreed, the document content does not replace the safety precautions on the product label. All descriptions in this document are for guidance only.
- Please read this document carefully before installing the device to understand the product and precautions.
- All operations on the device must be performed by professional, qualified electrical technicians who are familiar with the relevant standards and safety regulations of the project location.
- When operating the device, use insulated tools and wear personal protective equipment to ensure personal safety. When handling electronic components, wear anti-static gloves, anti-static wrist straps, anti-static clothing, etc., to protect the device from electrostatic damage.
- Unauthorized disassembly or modification may cause device damage. Such damage is not covered by the warranty.
- Device damage or personal injury caused by failure to install, use, or configure the device in accordance with this document or the corresponding user manual is beyond the manufacturer's liability.

1.2 DC side

DANGER

Please use the DC connector provided with the shipment to connect the inverter DC cable. Using other types of DC connectors may lead to serious consequences. Any equipment damage caused thereby is beyond the manufacturer's liability.

WARNING

- Ensure that the module frame and mounting system are properly grounded.
- After connecting the DC cables, ensure that the connections are tight and secure.
- Use a multimeter to measure the PV string. Damage caused by reverse polarity, overvoltage, or overcurrent is beyond the manufacturer's liability.
- Photovoltaic modules connected to the same MPPT must be of the same model. The voltage difference between different MPPTs must be <160V.
- When the input voltage is between 1000V and 1100V, the inverter will enter standby mode. When the voltage returns to the MPPT operating voltage range (140V~1000V), the inverter will resume normal operation.
- It is recommended that the sum of the peak power currents of the strings connected to each MPPT does not exceed the maximum input current per MPPT of the inverter.
- When the inverter is connected to multiple PV strings, it is recommended that each MPPT has at least one string connected, and no MPPT is left unused.
- The photovoltaic modules used with the inverter must comply with IEC 61730 Class A standards.

1.3 AC Side

WARNING

- Ensure that the voltage and frequency at the grid connection point comply with the inverter grid connection specifications.
- It is recommended to add protective devices such as circuit breakers or fuses on the AC side of the inverter. The specifications of the protective devices must be greater than 1.25 times the inverter's maximum output current.
- The protective ground wire of the inverter must be securely connected.
- It is recommended to use copper core cables for the AC output lines. If aluminum wires are required, please use copper-aluminum transition terminals for wiring.

1.4 Inverter

DANGER

- During inverter installation, avoid placing load on the bottom wiring terminals, otherwise it may cause damage to the terminals.
- After inverter installation, the labels and warning signs on the enclosure must be clearly visible. Do not cover, alter, or damage them.
- The warning labels on the inverter enclosure are as follows:

No.	Symbol	Meaning
1		Potential danger exists when the equipment is running. Please take protective measures when operating the equipment.
2		High voltage danger. High voltage exists when the equipment is running. When operating the equipment, ensure it is powered off.
3		The inverter surface is hot. Do not touch when the equipment is running, otherwise burns may occur.
4		Delayed discharge. After powering off the equipment, wait 5 minutes for the equipment to fully discharge.
5		Before operating the equipment, please read the product manual carefully.
6		The equipment cannot be treated as household waste. Please dispose of the equipment according to local laws and regulations, or return it to the manufacturer.
7		Grounding point.
8		CE certification mark.

1.5 EU Declaration of Conformity

1.5.1 Equipment with Wireless Communication Modules

Equipment with Wireless Communication Modules sold on the European market meets the following directive requirements:

- Radio Equipment Directive 2014/53/EU (RED)
- Restrictions of Hazardous Substances Directive 2011/65/EU and (EU) 2015/863 (RoHS)
- Waste Electrical and Electronic Equipment 2012/19/EU
- Registration, Evaluation, Authorization and Restriction of Chemicals (EC) No 1907/2006 (REACH)

1.5.2 Equipment without wireless communication function

Equipment without wireless communication function that can be sold in the European market must comply with the following directive requirements:

- Electromagnetic compatibility Directive 2014/30/EU (EMC)
- Electrical Apparatus Low Voltage Directive 2014/35/EU (LVD)
- Restrictions of Hazardous Substances Directive 2011/65/EU and (EU) 2015/863 (RoHS)
- Waste Electrical and Electronic Equipment 2012/19/EU
- Registration, Evaluation, Authorization and Restriction of Chemicals (EC) No 1907/2006 (REACH)

1.6 personnel requirements

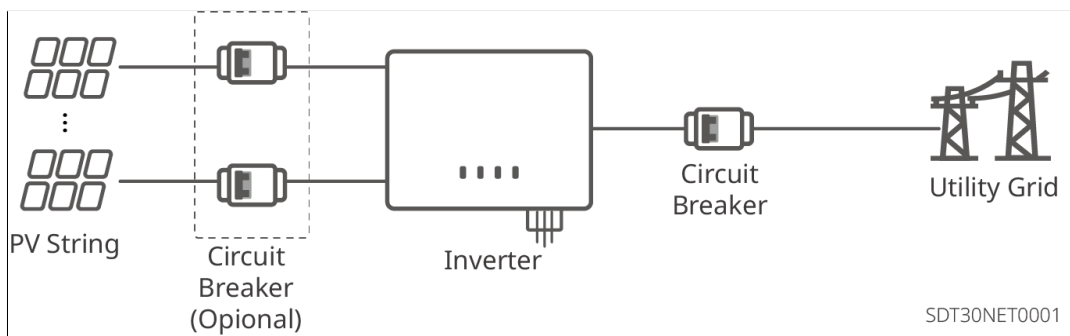
NOTICE

- Personnel responsible for installing and maintaining equipment must undergo strict training, understand all product safety precautions, and master the correct operating methods.
- Installation, operation, maintenance, and replacement of equipment or components are only permitted by qualified professionals or trained personnel.

2 Product Introduction

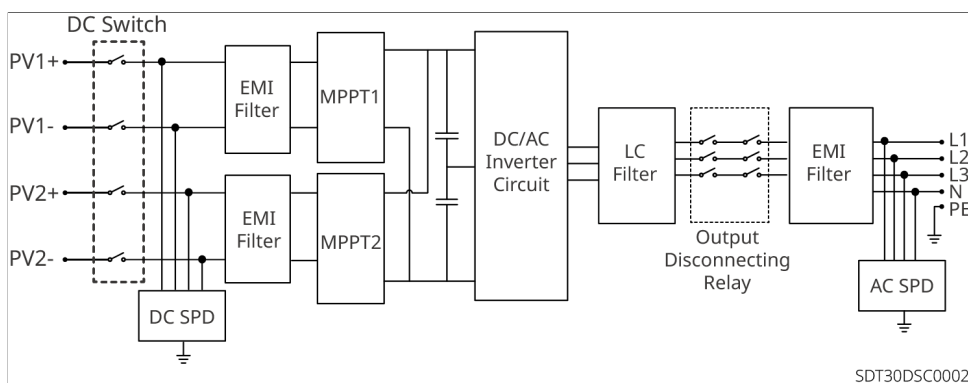
2.1 Introduction

This series of inverters is a three-phase string grid-connected photovoltaic inverter, which can convert the direct current generated by photovoltaic solar panels into alternating current that meets grid requirements and feed it into the grid. The main application scenarios of the inverter are as follows:

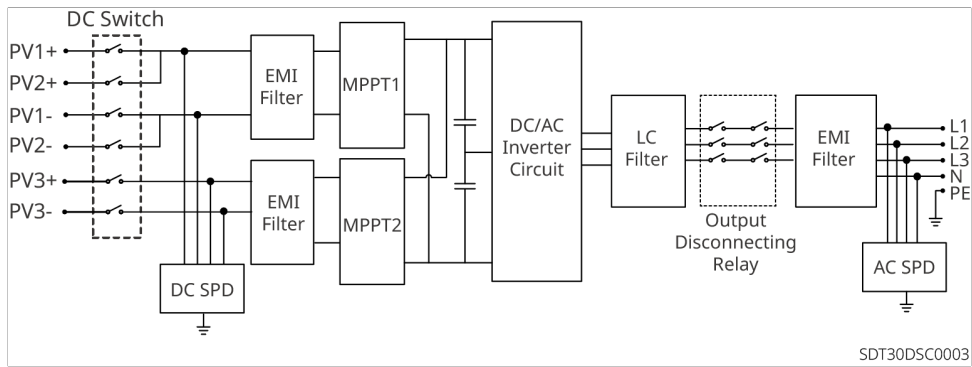


2.2 Circuit Block Diagram

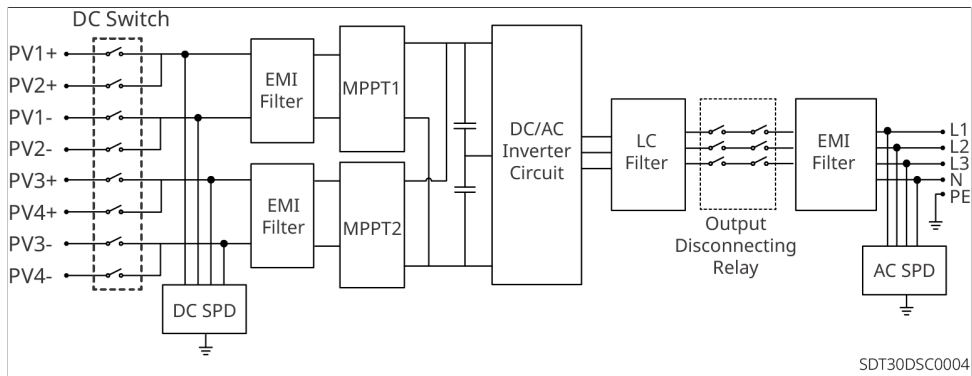
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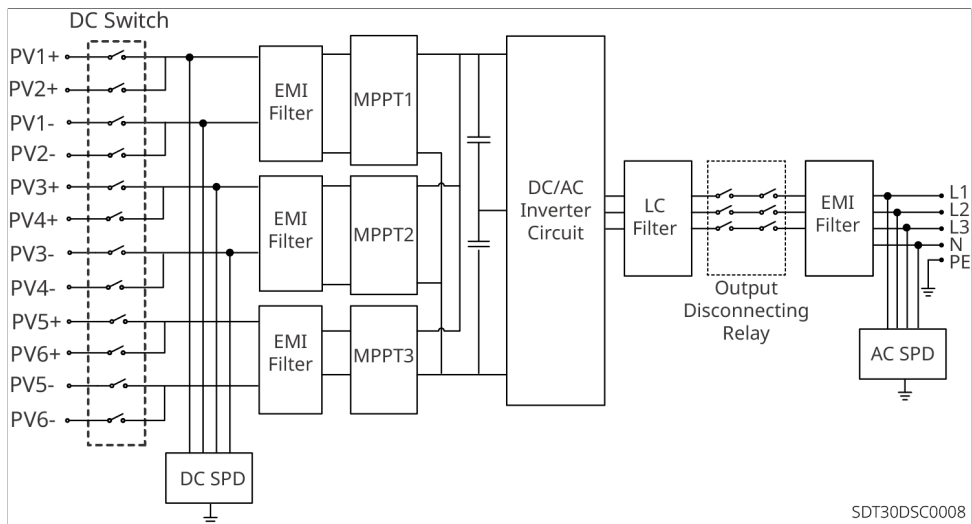
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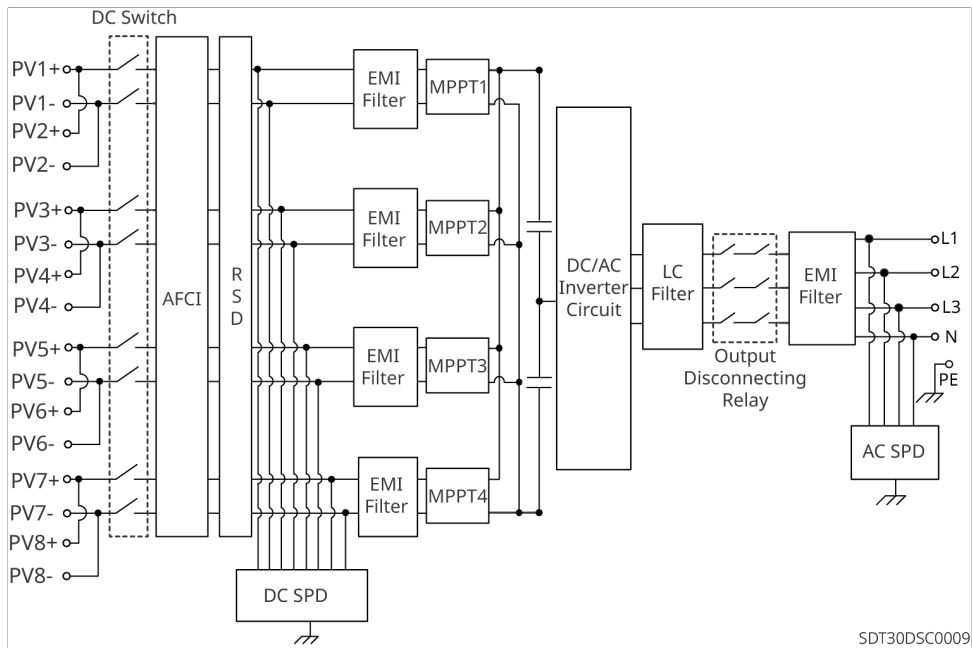
SW017KTL-T1-L-G2, SW030KTL-T1-G2:



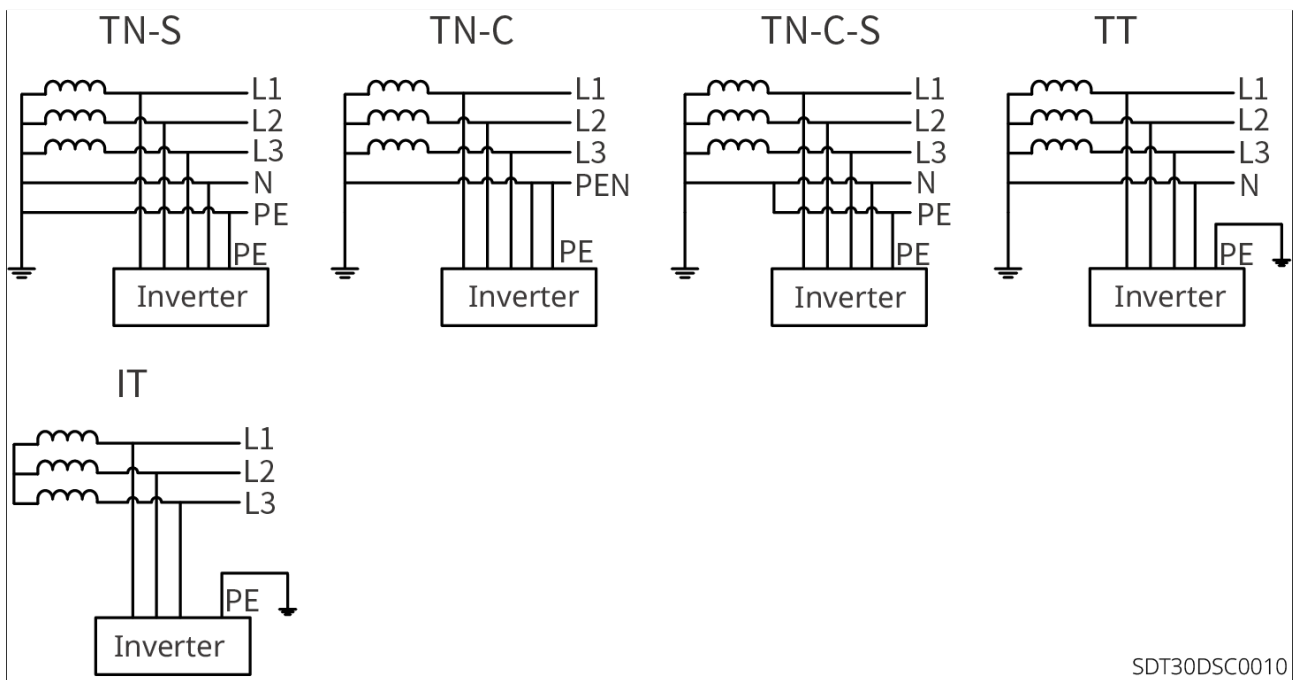
SW040KTL-T1-G2:



SW030KTL-T1-L-G2, SW050KTL-T1-G2:



2.3 Supported Grid Types



2.4 Features

AFCI

The AFCI function is used to detect arc faults on the DC side of the inverter. When an arc fault occurs, the inverter will automatically protect itself.

Causes of arc:

- Damage or improper connection of DC connectors in the photovoltaic system.
- Incorrect or damaged cable connections.
- Aging of connectors and cables.

Arc detection method:

When the inverter detects an arc, the fault type can be viewed via the App.

When arcing is detected, the inverter alarms and shuts down for protection. After waiting 60 seconds, the machine will automatically resume grid connection. If multiple shutdown protections occur, the inverter wiring must be checked to eliminate the arcing phenomenon.

RSD

In the rapid shutdown system, the rapid shutdown transmitter works with the receiver to achieve rapid system shutdown. The receiver maintains module output by receiving signals from the transmitter. The transmitter can be external or built into the inverter. In an emergency, an external trigger device can be enabled to stop the transmitter, thereby shutting down the modules.

External transmitter:

Transmitter model: GTP-F2L-20, GTP-F2M-20

Receiver model: GR-B1F-20, GR-B2F-220

Built-in transmitter:

External trigger device: AC side circuit breaker;

Receiver model: GR-B1F-20, GR-B2F-20

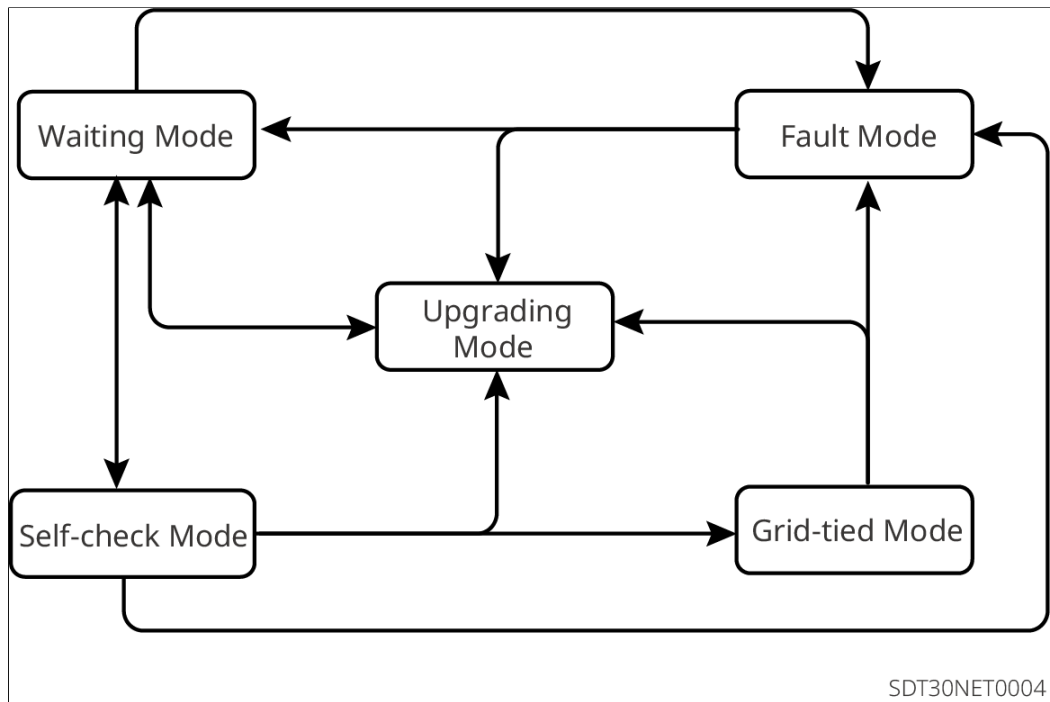
Communication

The inverter supports parameter setting via Bluetooth locally; supports connecting to the monitoring platform via 4G to monitor inverter operation status, plant operation, etc.

- Bluetooth: Complies with Bluetooth 5.1 standard.
- 4G: Supports connection to third-party monitoring platforms via MQTT

communication protocol.

2.5 Inverter Operation Mode



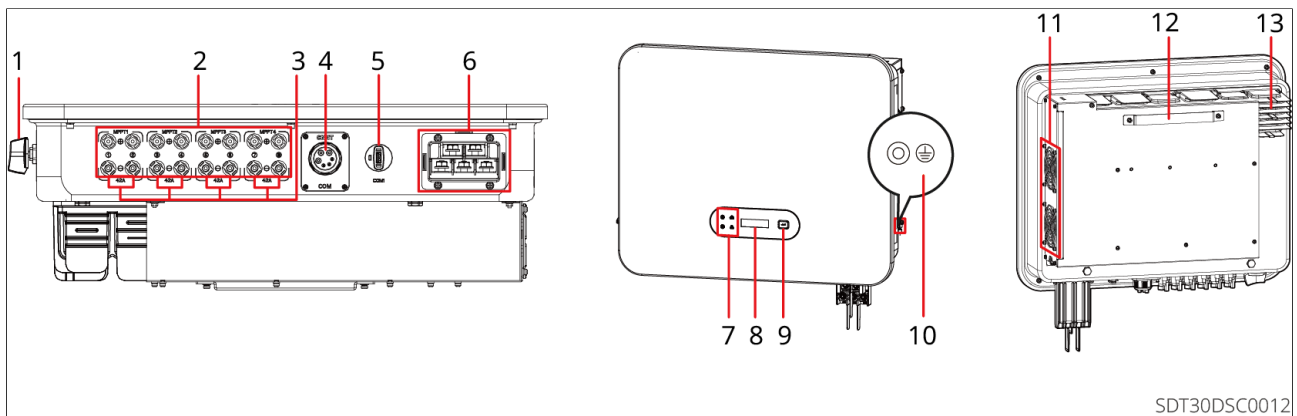
No.	Component	Description
1	Waiting mode	Waiting phase after power-on. • When conditions are met, enter self-test mode. • If a fault occurs, the inverter enters fault mode. • If an upgrade request is received, enter upgrade mode.
2	Self-test mode	Before the inverter starts, it continuously performs self-test, initialization, etc. • If conditions are met, enter on-grid mode, and the inverter starts grid-connected operation. • If an upgrade request is received, enter upgrade mode. • If self-test fails, enter fault mode.

3	On-grid mode	The inverter operates normally in grid-connected mode. • If a fault is detected, enter fault mode. • If an upgrade request is received, enter upgrade mode.
4	Fault mode	If a fault is detected, the inverter enters fault mode. After the fault is cleared, it enters waiting mode. After the waiting mode ends, the inverter checks the operating status and then enters the next operating mode.
5	Upgrade mode	The inverter switches to this state when updating the program. When the program update is complete, it enters waiting mode. After the waiting mode ends, the inverter checks the operating status and then enters the next operating mode.

2.6 Appearance Description

Different models of inverters have differences in color and appearance. The actual product shall prevail.

2.6.1 Component Introduction



No.	Component/Silkscreen	Description
1	DC Switch	Controls the connection or disconnection of DC input.
2	PV Input Terminal	Can connect the DC input cable from PV modules.

3	Max input current per MPPT silkscreen value	The maximum current value that can be connected to each MPPT channel of the inverter. The value varies by inverter model. Please refer to the inverter technical parameters for specific values.
4	Communication Port	Can connect to RS485 and electricity meter.
5	Communication Module Port	Can connect a communication module. Please select the module type according to actual needs.
6	AC Output Port	Can connect the AC output cable to connect the inverter to the grid.
7	indicator	Indicates the operating status of the inverter.
8	Display (optional)	View inverter-related data.
9	Button (optional)	Used in conjunction with the display to operate the inverter.
10	Grounding terminal	Connecting the PE cable.
11	Fan	The inverter is equipped with an external fan. When the temperature is too high, it can cool the inverter. • SW010KTL-T1-G2, SW012KTL-T1-G2, SW015KTL-T1-G2: No external fan. • SW012KTL-T1-L-G2, SW020KTL-T1-G2: External fan x 1. • SW017KTL-T1-L-G2, SW030KTL-T1-G2, SW040KTL-T1-G2: External fan x 2. • SW030KTL-T1-L-G2, SW050KTL-T1-G2: External fan x 3.
12	Mounting bracket	Can be used to mount the inverter.
13	heat sink	For heat dissipation of the inverter.

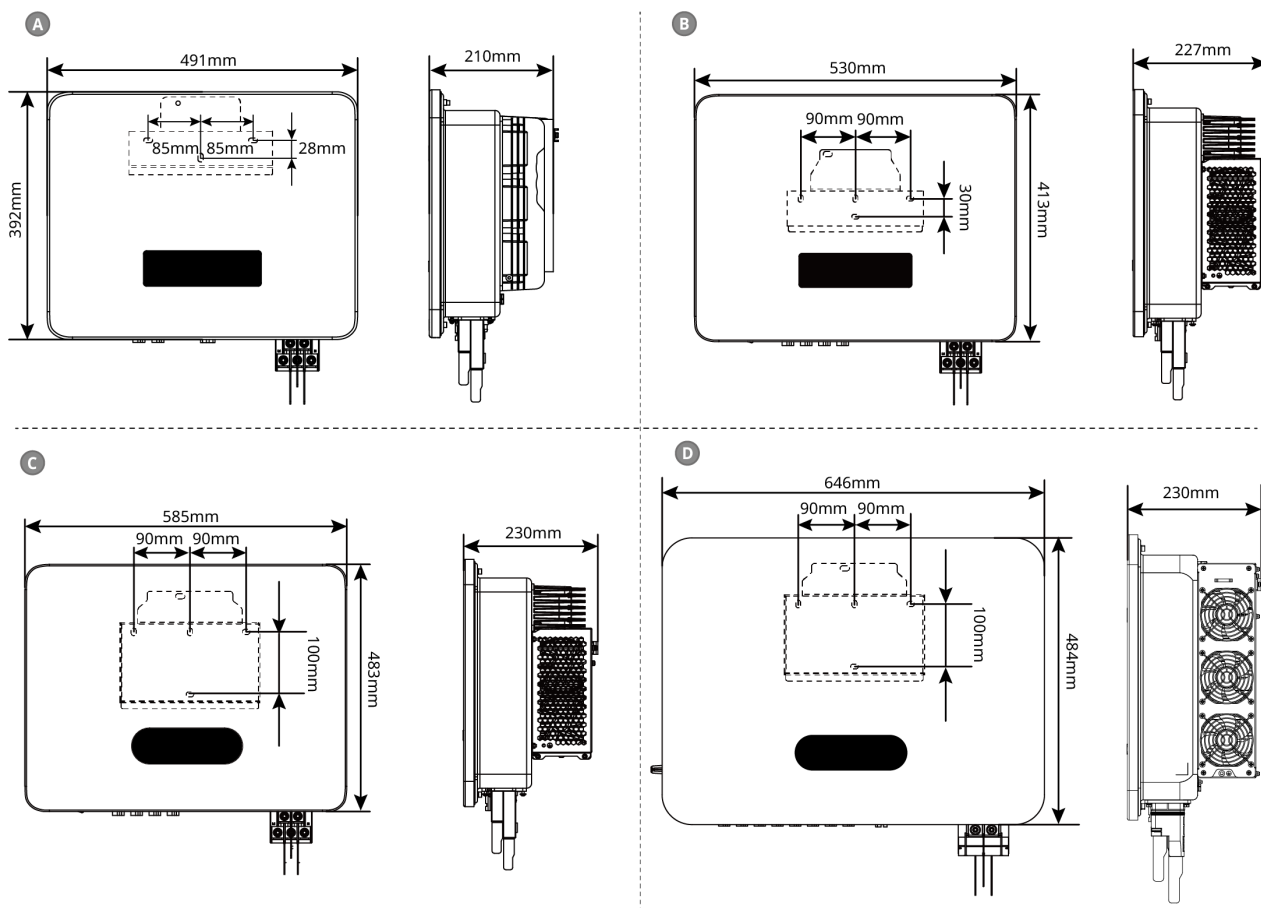
2.6.2 Product Dimensions

A: SW010KTL-T1-G2, SW012KTL-T1-L-G2, SW012KTL-T1-G2, SW015KTL-T1-G2

B: SW020KTL-T1-G2, SW030KTL-T1-G2, SW017KTL-T1-L-G2

C: SW040KTL-T1-G2

D: SW050KTL-T1-G2, SW030KTL-T1-L-G2



CWSDT30DSC0013

2.6.3 Indicator Light Description

Three Lights

indicator	Status	Description
 Power		Steady on: Wireless monitoring normal
		Single flash: Wireless module reset or restart
		Two flashes: Not connected to router/base station
		Four flashes: Not connected to monitoring server

		Flashing: RS485 communication normal
		Off: Wireless module resetting to factory defaults
 Operation		Steady on: Grid normal, grid-connected successfully
		Off: Not grid-connected
 Communication		Steady on: System fault
		Off: No fault

Four Lights

Indicator	Status	Description
Power		Steady on: Device powered on
		Off: Device not powered on
Operation		Steady on: Grid normal, grid connection successful
		Off: Not grid-connected
		Single slow flash: Self-check before grid connection
		Single fast flash: About to connect to grid
Communication		Steady on: Wireless monitoring normal
		Single flash: Wireless module reset or restored

No.	Meaning
1	Trademark and product type and model
2	Product technical parameters
3	Product safety symbols and certification symbols
4	Contact information and serial number information

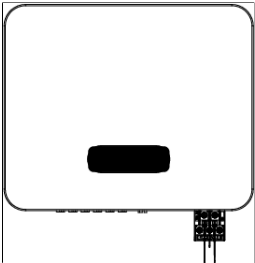
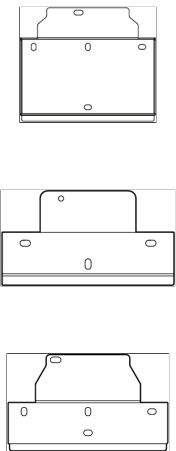
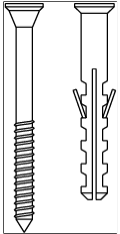
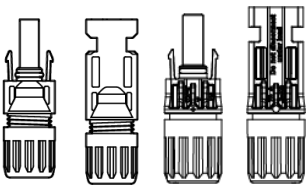
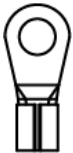
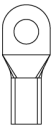
2.7 Check Before Receiving

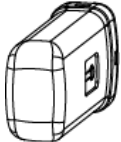
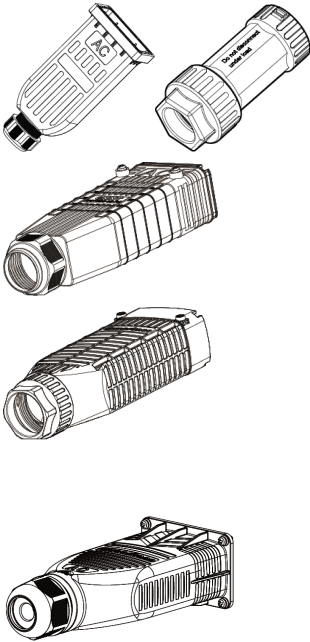
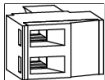
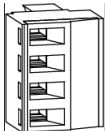
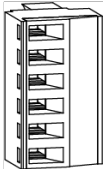
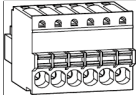
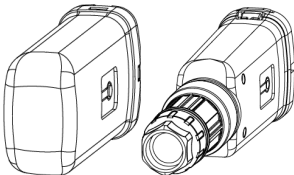
Before signing for the product, please carefully check the following:

1. Check whether the outer packaging is damaged, such as deformation, holes, cracks, or any other signs that may indicate damage to the equipment inside the box. If damaged, do not open the packaging and contact your dealer.
2. Check whether the inverter model is correct. If not, do not open the packaging and contact your dealer.
3. Check whether the type and quantity of delivered items are correct and whether the appearance is damaged. If damaged, contact your dealer.

2.8 deliverables

NOTICE
[1] The type of backplate depends on the inverter model. [2] The number of DC connectors matches the number of inverter DC terminals. Please confirm based on the number of inverter DC terminals. [3] The number of expansion screws matches the holes on the backplate. [4] The number of communication terminals and tubular terminals matches the selected communication method. Please confirm based on the communication configuration. Depending on the inverter configuration, the quantity of 2-pin, 3-pin, 4-pin communication terminals or DRED/RCR communication terminals supplied with the box may vary. Please refer to the actual product. [5] Communication module types include 4G, WiFi/LAN modules. The actual shipping type depends on the selected inverter communication method.

Component	Description	Component	Description
	Inverter x1		mounting plate x1 ^[1]
	Expansion screw x N ^[3]		DC Connector x N ^[2]
	Grounding OT terminal x 1		Product documentation x 1
	AC OT terminal x N		Tube terminal x N ^[4]

Component	Description	Component	Description
	smart dongle x 1		AC terminal protective cover x 1
	2PIN communicatio n terminal x N ^[4]		3PIN communication terminal x N ^[4]
	4PIN communicatio n terminal x N ^[4]		6PIN communication terminal x 1
	DRED/RCR communicatio n terminal x N ^[4]		smart dongle x 1 ^[5]

2.9 Storage

If the device is not put into use immediately, store it according to the following requirements:

1. Ensure the outer packaging box is not removed and the desiccant inside is not lost.
2. Ensure the storage environment is clean, with appropriate temperature and humidity range, and no condensation.
3. Ensure the stacking height and direction of the inverter comply with the label instructions on the packaging box.
4. Ensure there is no risk of tipping after stacking the inverters.
5. If the storage time of the inverter exceeds two years or the time after installation without operation exceeds 6 months, it is recommended to have it inspected and tested by professionals before putting it into use.
6. To ensure good electrical performance of the internal electronic components of the inverter, it is recommended to power it on every 6 months during storage. If it has not been powered on for more than 6 months, it is recommended to have it inspected and tested by professionals before putting it into use.

3 Installation

3.1 Installation Requirements

Installation Environment Requirements

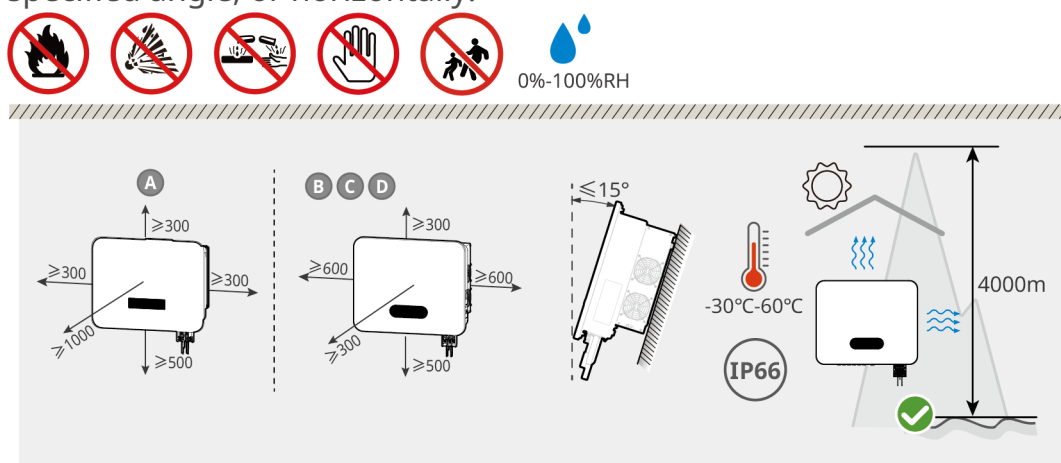
1. Do not install the equipment in flammable, explosive, or corrosive environments.
2. The installation surface must be sturdy and reliable to support the weight of the inverter.
3. The installation space must meet the requirements for equipment ventilation and heat dissipation, as well as operational space.
4. The equipment protection level is suitable for indoor and outdoor installation. The ambient temperature and humidity must be within the appropriate range.
5. The inverter must be installed away from direct sunlight, rain, and snow accumulation. It is recommended to install it in a sheltered location, such as under a canopy if necessary.
6. The installation location must be out of reach of children and avoid areas where accidental contact is likely. The surface of the equipment may become hot during operation to prevent burns.
7. The installation height of the equipment should facilitate operation and maintenance, ensuring that indicator lights, labels, and terminal connections are easily visible and accessible.
8. The installation altitude must be below 4000 meters.
9. Inverters installed in salt-damaged areas are subject to corrosion. Salt-damaged areas refer to regions within 1000m of the coast or areas affected by sea winds. The extent of sea wind influence varies depending on weather conditions (e.g., typhoons, seasonal winds) and terrain (e.g., embankments, hills).
10. Keep away from strong magnetic fields to avoid electromagnetic interference. If the installation location is near a radio station or wireless communication equipment below 30 MHz, install the equipment according to the following requirements:
 - Add a multi-turn ferrite core or a low-pass EMI filter to the DC input line or AC output line of the inverter.
 - The distance between the inverter and the wireless electromagnetic interference source must exceed 30m.

Installation Carrier Requirements

- The installation carrier must not be made of flammable materials and must be fire-resistant.
- Ensure the installation surface is sturdy and that the carrier meets the weight-bearing requirements of the equipment.
- The equipment may vibrate during operation. Do not install it on a carrier with poor sound insulation to avoid noise disturbance to residents in living areas.

Installation Angle Requirements

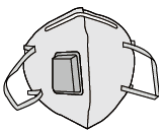
- Recommended inverter installation angle: vertical or tilted backward $\leq 15^\circ$.
- Do not install the inverter upside down, tilted forward, tilted backward beyond the specified angle, or horizontally.

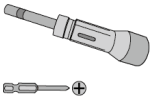
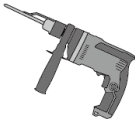
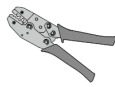
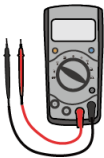
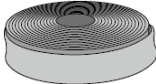
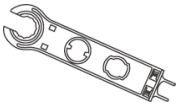


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Installation Tool Requirements

The following installation tools are recommended for installation. Additional auxiliary tools may be used on site if necessary.

Tool Type	Description	Tool Type	Description
	Safety gloves		Dust mask
	Goggle		Safety shoes

Tool Type	Description	Tool Type	Description
	Torque wrench M4, M5, M6		Hammer drill
	Diagonal plier		Heat gun
	Wire stripper		Terminal crimping pliers
	Rubber hammer		Marker pen
	Multimeter		Heat shrink tubing
	Vacuum cleaner		Level bar
	MC4 DC unlocking tool		Jinko DC unlocking tool

3.2 Installing the Inverter

3.2.1 Portable Inverter

⚠ CAUTION

Before installation, the inverter must be transported to the installation site. During transportation, to avoid personal injury or equipment damage, please note the following:

1. Please assign personnel according to the equipment weight to avoid the equipment exceeding the weight range that can be carried by a person, causing injury.
2. Please wear safety gloves to avoid injury.
3. Please ensure the equipment remains balanced during transportation to avoid falling.

3.2.2 Installing the Inverter

NOTICE

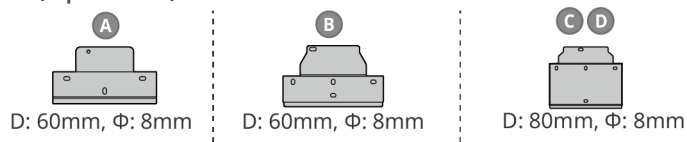
- When drilling, ensure that the drilling position avoids water pipes, cables, etc. inside the wall to prevent danger.
- When drilling, please wear goggles and a dust mask to avoid inhaling dust or getting it into your eyes.
- The anti-theft lock is provided by the user. Please select an anti-theft lock of appropriate size, otherwise installation may not be possible.
- The graphics in this document are for reference only. The appearance varies by model or version; please refer to the actual product.

1: Place the backplate flat against the wall and mark the drilling positions with a marker.

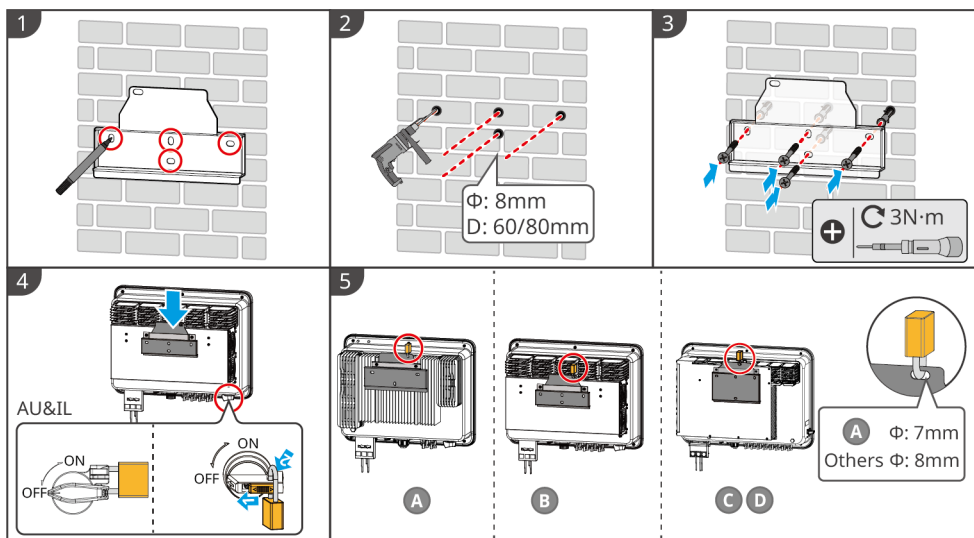
2: Drill holes using a hammer drill.

3: Secure the backplate to the wall using expansion screws.

4 (optional): Install an anti-theft lock.



CWSDT30INT0005



CWSDT301INT0006

4 Electrical Connection

4.1 Safety Precautions

DANGER

- Before making electrical connections, disconnect the inverter's DC switch and AC output switch to ensure the equipment is de-energized. Do not operate with power on, otherwise electric shock or other DANGER may occur.
- All operations, cables, and component specifications used during electrical connection must comply with local laws and regulations.
- If the cable is subjected to excessive tension, it may lead to poor connection. When wiring, reserve a certain length of cable before connecting it to the inverter's wiring terminal.

NOTICE

- When making electrical connections, wear personal protective equipment such as safety shoes, protective gloves, and insulating gloves as required.
- Only professionals are allowed to perform electrical connection operations.
- The cable colors in the graphics in this document are for reference only; specific cable specifications must comply with local regulatory requirements.
- The appearance of the graphics in this document is for reference only. The appearance may vary by model or version; refer to the actual product.

Cable Specification Requirements

Cable	Type	Cable Specification	
		Cable outer diameter (mm)	Conductor cross-sectional area (mm ²)
DC cable	Photovoltaic cable compliant with 1100V standard	4.8~6.3	Recommend: 4~6
		5.9-8.8	Recommend: 4~6

Cable	Type	Cable Specification		
		Cable outer diameter (mm)	Conductor cross-sectional area (mm ²)	
AC cable	Outdoor single four-core/five-core copper/aluminum wire[1]	SW030KTL-T1-L-G2, SW050KTL-T1-G2: 22~38 Others: 12 ~ 30	Copper core (single or multi-strand wire): SW010KTL-T1-G2, SW012KTL-T1-G2, SW015KTL-T1-G2: 6-10 SW020KTL-T1-G2, SW030KTL-T1-G2: 16~25 SW012KTL-T1-L-G2, SW017KTL-T1-L-G2: 25 Copper core (multi-strand wire only): SW030KTL-T1-L-G2, SW040KTL-T1-G2, SW050KTL-T1-G2: 25~70	Aluminum core (single or multi-strand wire): SW010KTL-T1-G2, SW012KTL-T1-G2, SW015KTL-T1-G2: 10~16 SW020KTL-T1-G2, SW030KTL-T1-G2: 16~25 Copper core (multi-strand wire only): SW040KTL-T1-G2: 25~35 SW030KTL-T1-L-G2, SW050KTL-T1-G2: 35~70
PE cable	Outdoor cable	-	Copper core: SW012KTL-T1-L-G2, SW010KTL-T1-G2, SW012KTL-T1-G2, SW015KTL-T1-G2: 4 SW017KTL-T1-L-G2, SW030KTL-T1-L-G2, SW030KTL-T1-G2, SW040KTL-T1-G2, SW050KTL-T1-G2: 10~16	Aluminum core: SW030KTL-T1-L-G2, SW040KTL-T1-G2, SW050KTL-T1-G2: 16~25 Not supported for other models

Cable	Type	Cable Specification		
		Cable outer diameter (mm)	Conductor cross-sectional area (mm ²)	
Communication cable	Outdoor shielded twisted pair compliant with local standards[2]	3~7	0.2~0.5	
Note: [1] When using aluminum wire, please connect copper-aluminum transition terminals. [2] The total length of communication cable must not exceed 1000m. The values in this table are valid only when the external protective grounding conductor uses the same metal as the phase conductor. Otherwise, the cross-sectional area of the external protective grounding conductor shall be such that its conductivity is equivalent to that specified in this table.				

4.2 Connecting the PE cable

⚠ WARNING

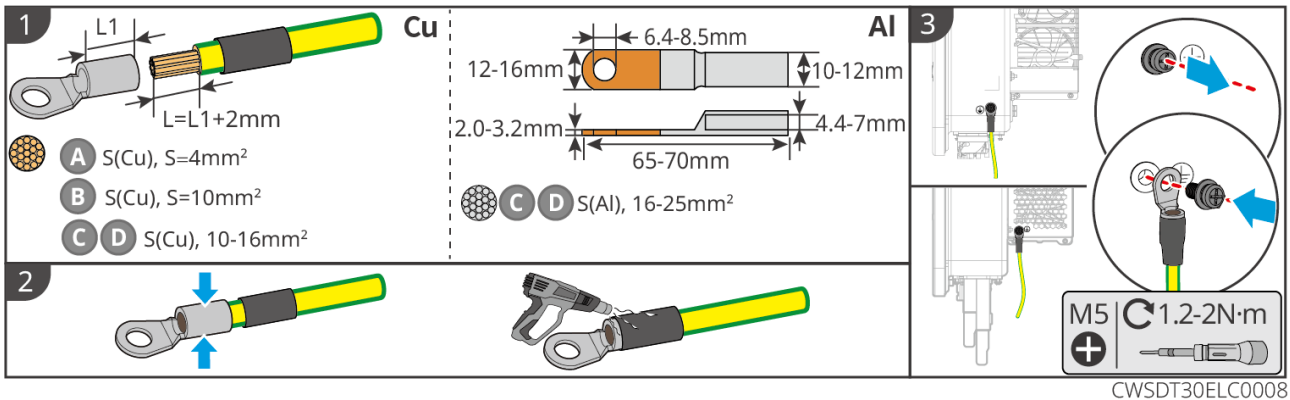
- The protective grounding of the chassis cannot replace the protective ground wire of the AC output port. When wiring, ensure reliable connection of both protective ground wires.
- If there are multiple inverters, ensure equipotential connection of the protective grounding points of all inverter chassis.
- To improve the corrosion resistance of the terminals, it is recommended to apply silicone or paint on the outside of the grounding terminal after the protective ground wire connection is installed.
- Prepare the protective ground wire yourself. It is recommended to use copper core cable for the grounding wire. If aluminum wire is used, please use copper-aluminum transition terminals for wiring. Copper-aluminum transition terminals are to be prepared by yourself.

A: SW010KTL-T1-G2, SW012KTL-T1-L-G2, SW012KTL-T1-G2, SW015KTL-T1-G2

B: SW020KTL-T1-G2, SW030KTL-T1-G2, SW017KTL-T1-L-G2

C: SW040KTL-T1-G2

D: SW050KTL-T1-G2, SW030KTL-T1-L-G2



4.3 Connect AC Output Lines

WARNING

- Do not connect any load between the inverter and the AC switch directly connected to the inverter.
- The inverter has an integrated Residual Current Monitoring Unit (RCMU). When the inverter detects a leakage current exceeding the allowable value, it will quickly disconnect from the grid.

Decide whether to install an RCD (Residual Current Monitoring Device) according to local laws and regulations. The inverter can be connected to an external Type A RCD to provide protection when the DC component of the leakage current exceeds the limit. The following RCD specifications are for reference: 300mA.

NOTICE

Each inverter must be equipped with an AC output switch. Multiple inverters cannot be connected to a single AC switch at the same time.

To ensure that the inverter can be safely disconnected from the grid in the event of an abnormality, connect an AC switch on the AC side of the inverter. Choose an appropriate AC switch according to local regulations. The following switch specifications are for reference:

Inverter Model	AC Switch Specification
SW010KTL-T1-G2	20A
SW012KTL-T1-G2, SW015KTL-T1-G2	32A
SW012KTL-T1-L-G2, SW020KTL-T1-G2	40A
SW017KTL-T1-L-G2, SW030KTL-T1-G2	63A
SW040KTL-T1-G2	80A
SW030KTL-T1-L-G2, SW050KTL-T1-G2	100A

WARNING

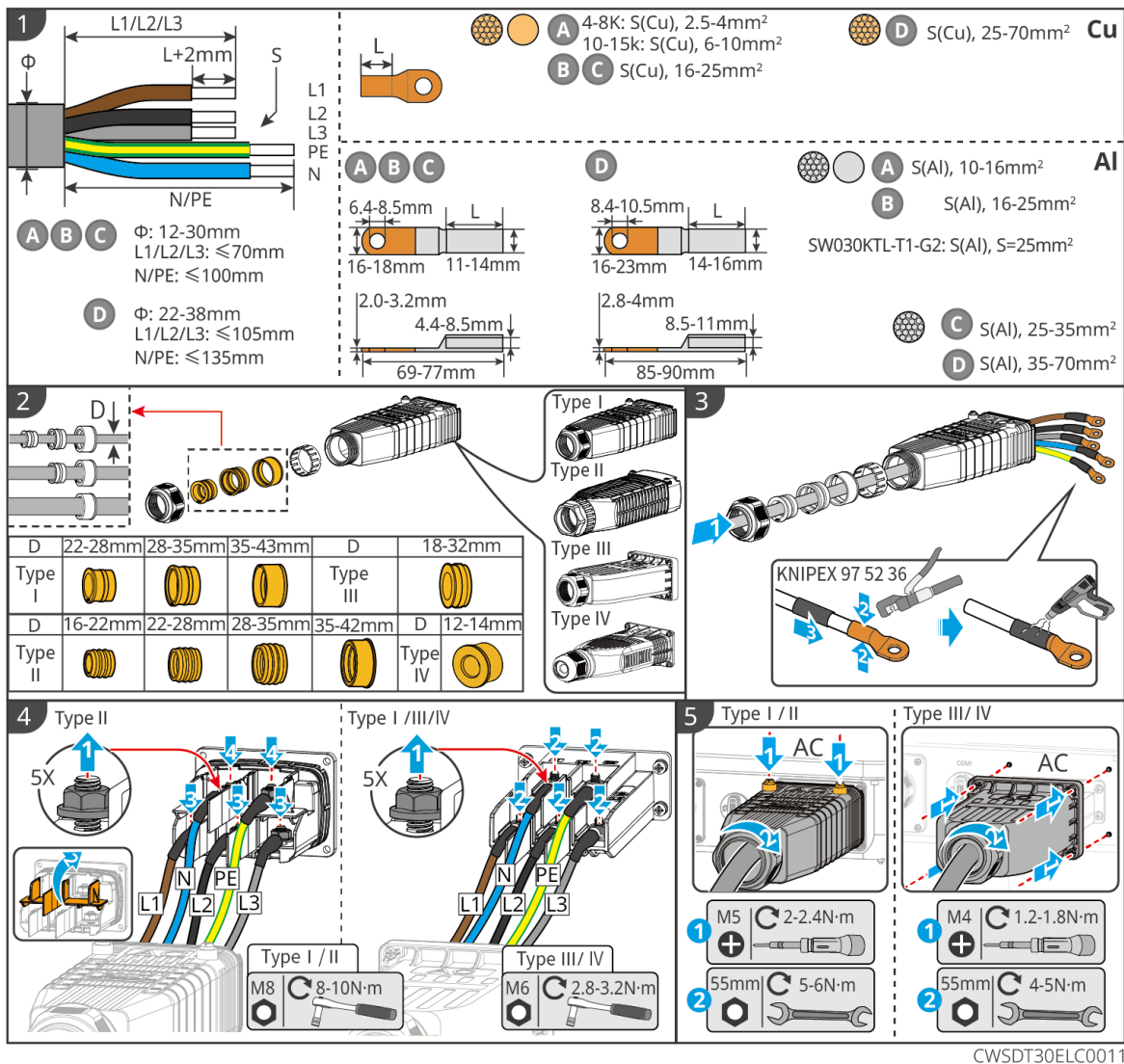
- When wiring, the AC output lines must match the "L1", "L2", "L3", "N", and "PE" terminals of the AC terminal block. Incorrect cable connections will damage the inverter.
- Ensure that the wire cores are fully inserted into the AC terminal wiring holes with no exposed conductor.
- Ensure the cable connections are tight; otherwise, overheating of the terminal block may cause inverter damage during operation.
- The AC output terminal has three-phase four-wire and three-phase five-wire connection types. The actual wiring scenario shall prevail. This document uses the three-phase five-wire system as an example.
- The length of the protective earth conductor should have sufficient margin so that when the AC output cable is subjected to tensile force due to force majeure, the protective earth conductor bears the stress last.
- When using aluminum wire, connect copper-aluminum adapter terminals. Prepare AC wiring OT terminals yourself. When selecting terminals, refer to T/CEEIA 281-2017 or equivalent standards.

A: SW010KTL-T1-G2, SW012KTL-T1-L-G2, SW012KTL-T1-G2, SW015KTL-T1-G2

B: SW020KTL-T1-G2, SW030KTL-T1-G2, SW017KTL-T1-L-G2

C: SW040KTL-T1-G2

D: SW050KTL-T1-G2, SW030KTL-T1-L-G2



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4.4 Connect DC Input Wires



DANGER

Before connecting the PV string to the inverter, please confirm the following information, otherwise it may cause permanent damage to the inverter, and in severe cases, may lead to fire causing personal injury and property loss.

1. Ensure that the maximum input voltage is within the inverter's allowable range.
2. Ensure that the positive pole of the PV string is connected to PV+ of the inverter, and the negative pole of the PV string is connected to PV- of the inverter.

WARNING

- Mixing PV modules of different brands or models in the same MPPT, or connecting PV modules with different orientation angles or tilt angles in the same PV string, may not damage the inverter but will cause system performance degradation.
- It is recommended that the voltage difference between different MPPTs does not exceed 160V.
- It is recommended that the sum of the peak power currents of the strings connected to each MPPT does not exceed the maximum input current per MPPT of the inverter.
- When the maximum DC input voltage of the inverter is 1100V, ensure that the open-circuit voltage of the PV strings connected to each MPPT does not exceed 1100V. When the input voltage is between 1000V and 1100V, the inverter will enter standby mode. When the voltage returns to the MPPT operating voltage range (140V~1000V), the inverter will resume normal operation.
- When the maximum DC input voltage of the inverter is 850V, ensure that the open-circuit voltage of the PV strings connected to each MPPT does not exceed 850V. When the input voltage is between 700V and 850V, the inverter will enter standby mode. When the voltage returns to the MPPT operating voltage range (140V~700V), the inverter will resume normal operation.
- When the inverter is connected to multiple PV strings, it is recommended to maximize the number of MPPTs used.
- Please use the DC connectors shipped with the product. Equipment damage caused by using incompatible connectors is not covered by the warranty.
- The PV string output does not support grounding. Before connecting the PV strings to the inverter, ensure that the minimum insulation resistance of the PV strings to ground meets the minimum insulation impedance requirements.
- Please prepare the DC input cables yourself.
- Type of DC input cables: outdoor photovoltaic cables that meet the inverter's maximum input voltage.

PV String Connection Method

NOTICE

To achieve optimal power generation, it is recommended to connect the PV strings in the following manner.

Select the number of MPPT channels and strings based on the actual machine.

•: Connect one PV string ••: Connect two PV strings

Number of PV strings	MPPT1	MPPT2	MPPT3	MPPT4
4	•	•	•	•
5	••	•	•	•
6	••	••	•	•
7	••	••	••	•
8	••	••	••	••

PV Connection Mode

When installing the inverter for the first time, set the corresponding MPPT connection mode via the Solar Go App based on the actual wiring method (contact after-sales service for specific settings). After setting, disconnect PV and AC power supply and restart the inverter. The configuration is successful if the inverter does not report a PV connection mode abnormal fault.

PV connection modes are divided into the following three types:

1. Independent connection (default mode): MPPT1, 2, 3, 4 are connected independently;
2. Partial parallel connection: MPPT1 and MPPT2 are connected in parallel, MPPT3 and MPPT4 are connected independently;
3. Parallel connection: MPPT1 - MPPT4 are connected in parallel to the same PV module.

For the selection method of the connection mode, refer to Chapter 8 of this manual or the SolarGo user manual.

Connect DC Input Wires

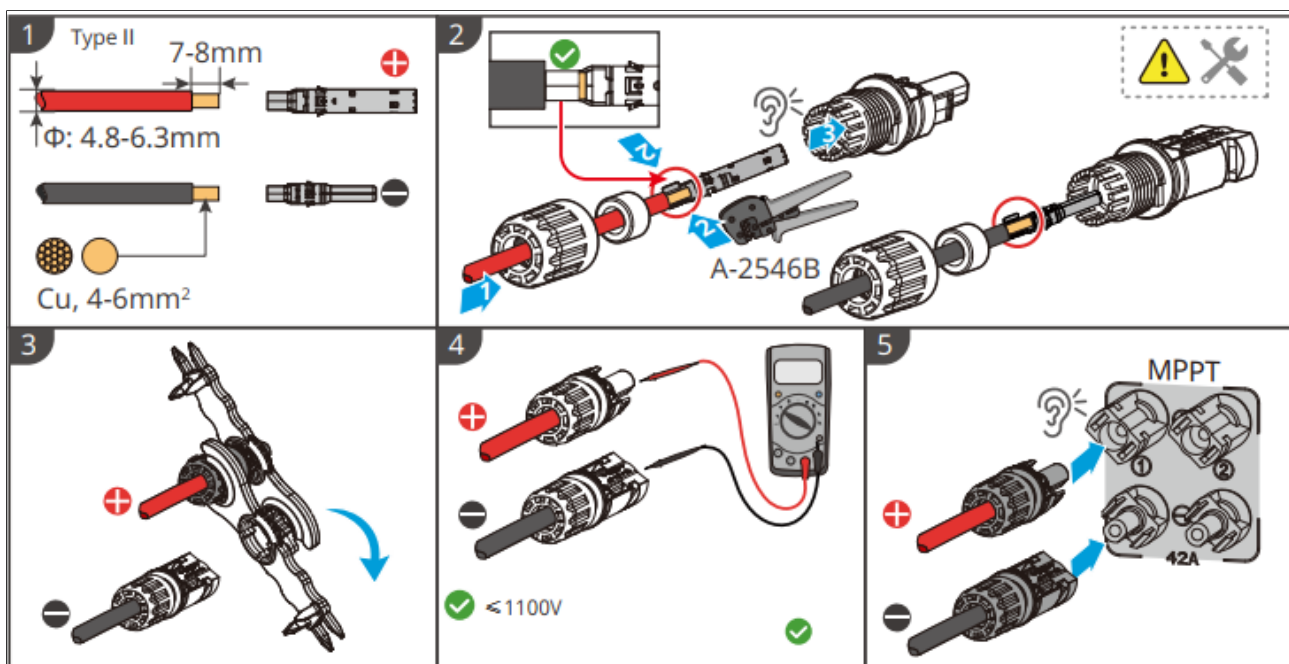
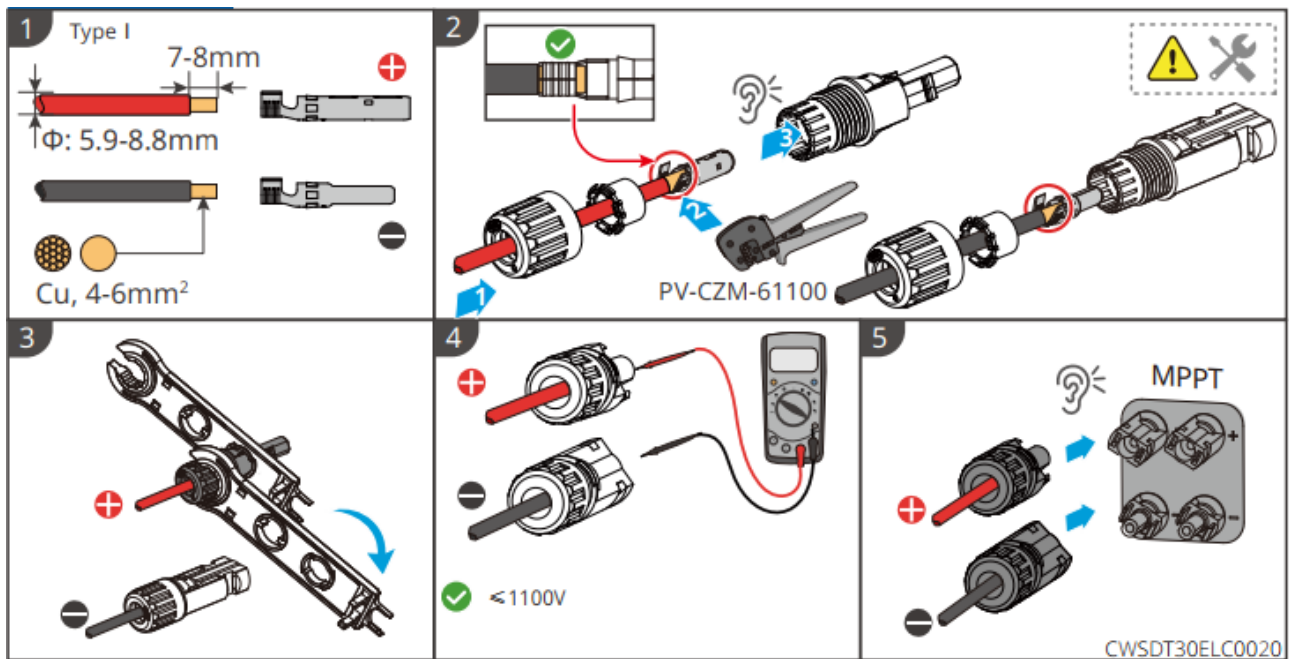
Step 1: Prepare the DC cables.

Step 2: Disassemble the DC connector. Crimp the DC terminal and assemble the DC connector.

Step 3: Tighten the DC connector.

Step 4: Check the DC input voltage.

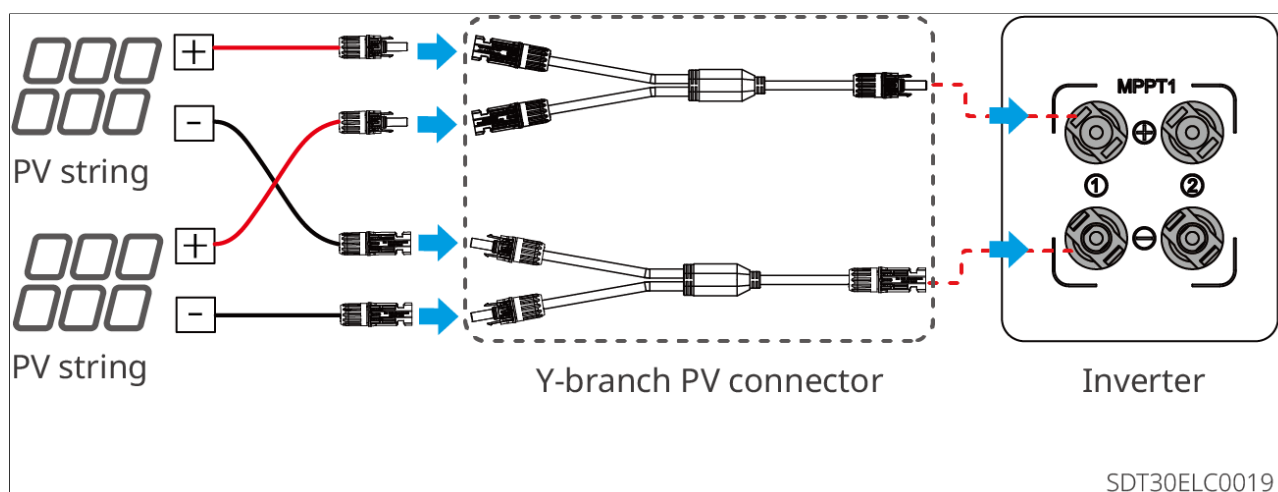
Step 5: Connect the DC connector to the DC terminal of the inverter.



Connect Y-Type PV Connector (Optional)

NOTICE

1. If you need to use a Y terminal, ensure that the DC connector model of the Y terminal is the same as the model and specification of the inverter PV input terminal. Equipment damage caused by using incompatible Y terminals is not covered by the equipment manufacturer's warranty.
2. It is necessary to ensure that all photovoltaic strings connected to one MPPT via Y terminals have the same structure, including model, quantity, tilt angle, and azimuth angle, etc.
3. The total current of strings connected via Y terminals must be less than the maximum current per PV channel.
4. For photovoltaic strings connected via Y terminals, if the total number of strings connected to a single MPPT is ≥ 3 , each string of modules must be equipped with a corresponding fuse.



4.5 Communication Connection

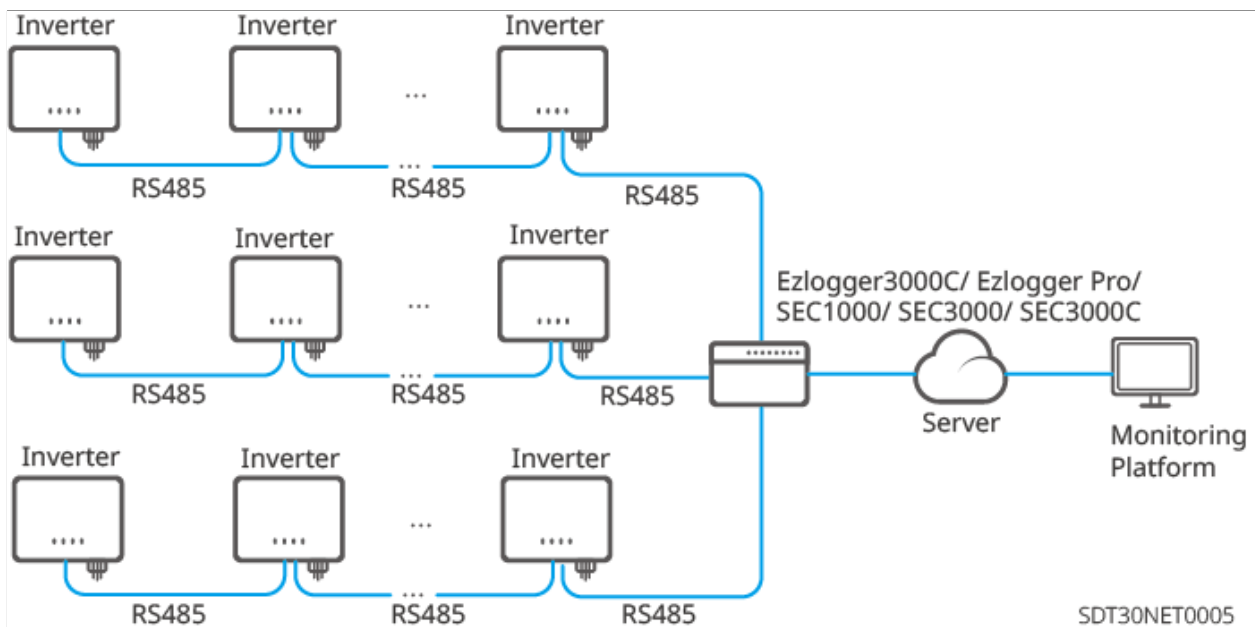
NOTICE

- For specific product function configurations, please refer to the actual inverter model in your region.

4.5.1 RS485 Communication Networking Solution

NOTICE

- When using a data collector to set up an RS485 network with multiple inverters, multiple inverters can be connected to each COM port of the data collector. When using EzLogger Pro or SEC1000, up to 20 inverters can be connected to each COM port; when using EzLogger 3000C, SEC3000, or SEC3000C, up to 25 inverters can be connected to each COM port. The total length of the RS485 cable for each COM port must not exceed 1000m.
- When using EzLogger 3000C, SEC3000, or SEC3000C for parallel operation of multiple inverters, to ensure normal communication, please confirm that only the terminal resistor DIP switch of the last inverter is set to ON (factory default), and the rest are set to OFF.
- Only SW050KTL-T1-G2 supports SEC3000C.



4.5.2 Power Limit and Load Monitoring

Power Limit

When the photovoltaic power station generates electricity for self-consumption and the electrical equipment cannot consume all the power, and the excess power needs to be fed into the grid, the power generation can be monitored through a smart meter, data logger, or Smart Energy Controller SEC1000 to control the amount of power fed into the grid.

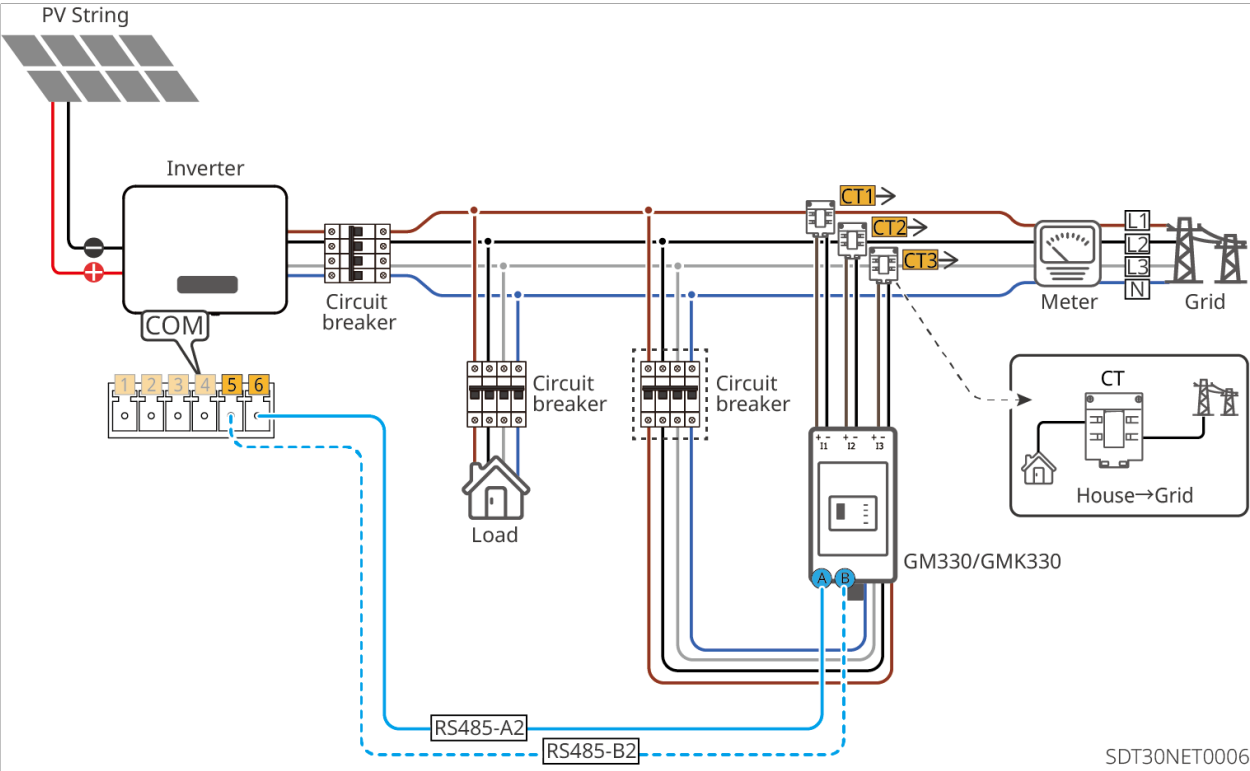
WARNING

1. The CT installation position should be close to the grid connection point, with the correct installation direction. The "-->" in the CT indicates the direction of the inverter current flowing toward the grid. If reversed, the inverter will trigger an alarm and cannot achieve the anti-reverse flow function.
2. The aperture of the CT must be larger than the outer diameter of the AC power cable to ensure the AC power cable can pass through the CT.
3. For the specific wiring method of the CT, please refer to the corresponding manufacturer's documentation to ensure the wiring direction is correct and the function is normal.
4. The CT must be clamped onto the L1, L2, and L3 cables. Do not clamp it onto the N cable.
5. CT specification requirements:
 - Select nA/5A for the CT current transformation ratio specification. (nA: primary side input current of the CT, with n ranging from 200 to 5000, to be selected by the user based on actual needs. 5A: secondary side output current of the CT.)
 - The recommended accuracy class for the CT is 0.5, 0.5s, 0.2, or 0.2s, ensuring the CT current sampling error is $\leq 1\%$.
6. To ensure the current detection accuracy of the CT, it is recommended that the CT cable length does not exceed 30m.
7. The inverter supports setting parameters locally via WiFi or Bluetooth signals, connecting to a mobile phone or WEB interface to configure device-related parameters, view device operation information and error information, and stay informed of the system status in a timely manner.
 - When there is only one inverter in the system, a 4G Kit-CN-G20, 4G Kit-CN-G21, Wi-Fi Kit, Wi-Fi/LAN Kit, WiFi Kit-20, or WiFi/LAN Kit-20 smart communication stick can be used.
 - When the system includes multiple inverters in a parallel network, the main inverter needs to install the Ezlink3000 smart communication stick for networking.

NOTICE

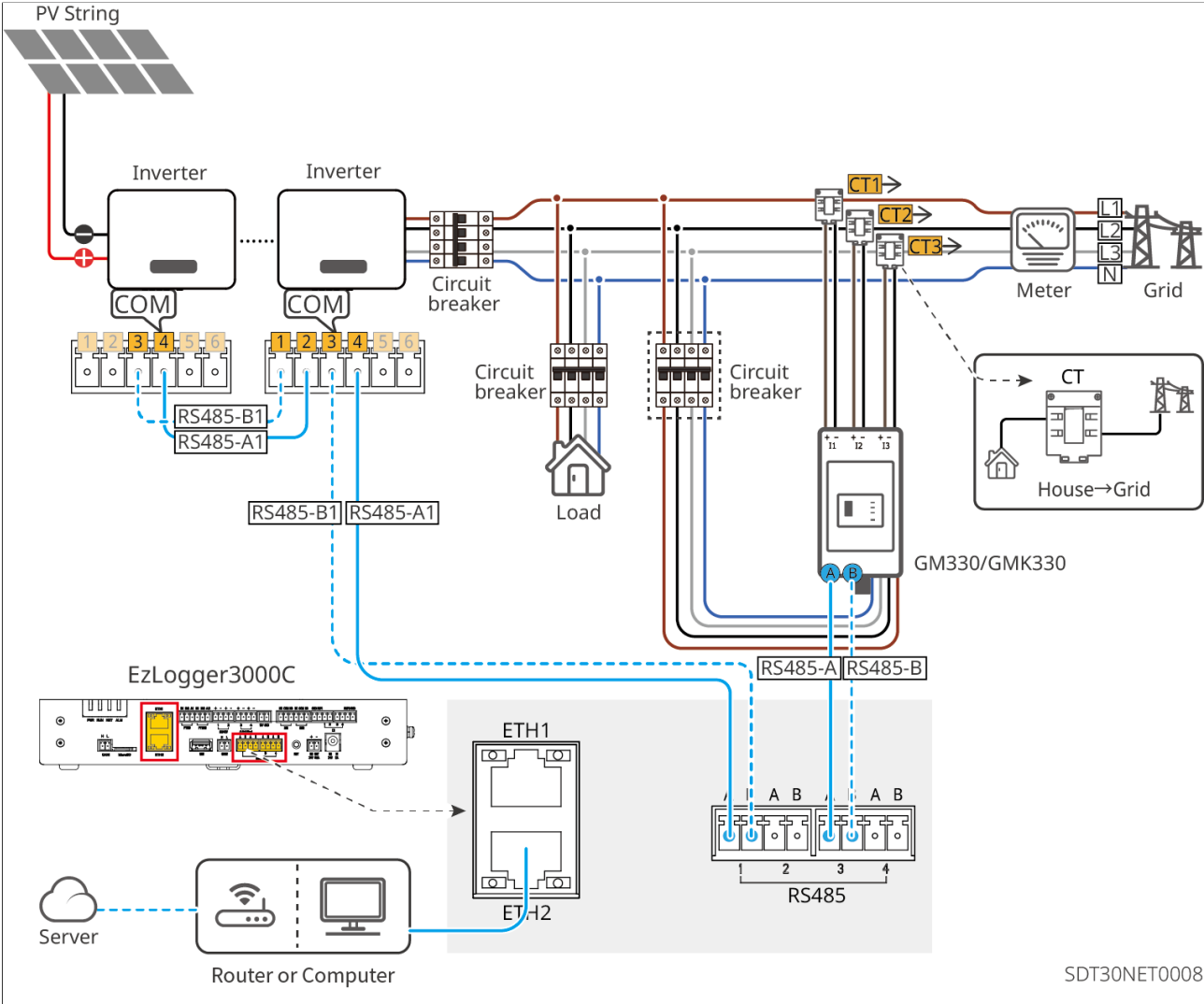
- Please ensure that the meter wiring and phase sequence are correct. Recommended input voltage cable cross-sectional area: 1mm^2 (18AWG).
- The external CT ratio can be set via the Solar Portal+ App. For example: if using a 200A/5A CT, the CT ratio needs to be set to 40.

Single-Unit Power Limit Networking Solution (GMK330/GM330)



The diagram illustrates a PV system configuration for monitoring. It features two PV strings connected to two inverters. The inverters are connected to a main bus with circuit breakers, which then branches out to a load and a meter. The meter is connected to the grid. A GM330/GMK330 device is connected to the meter's CTs (CT1, CT2, CT3) and the main bus. The GM330/GMK330 device has RS485-A and RS485-B ports. The EzLogger Pro is connected to the RS485-A and RS485-B ports of the GM330/GMK330 device. The EzLogger Pro is also connected to a Server/Router/Computer via a NET port. The Server/Router/Computer is connected to a Server via a wireless connection.

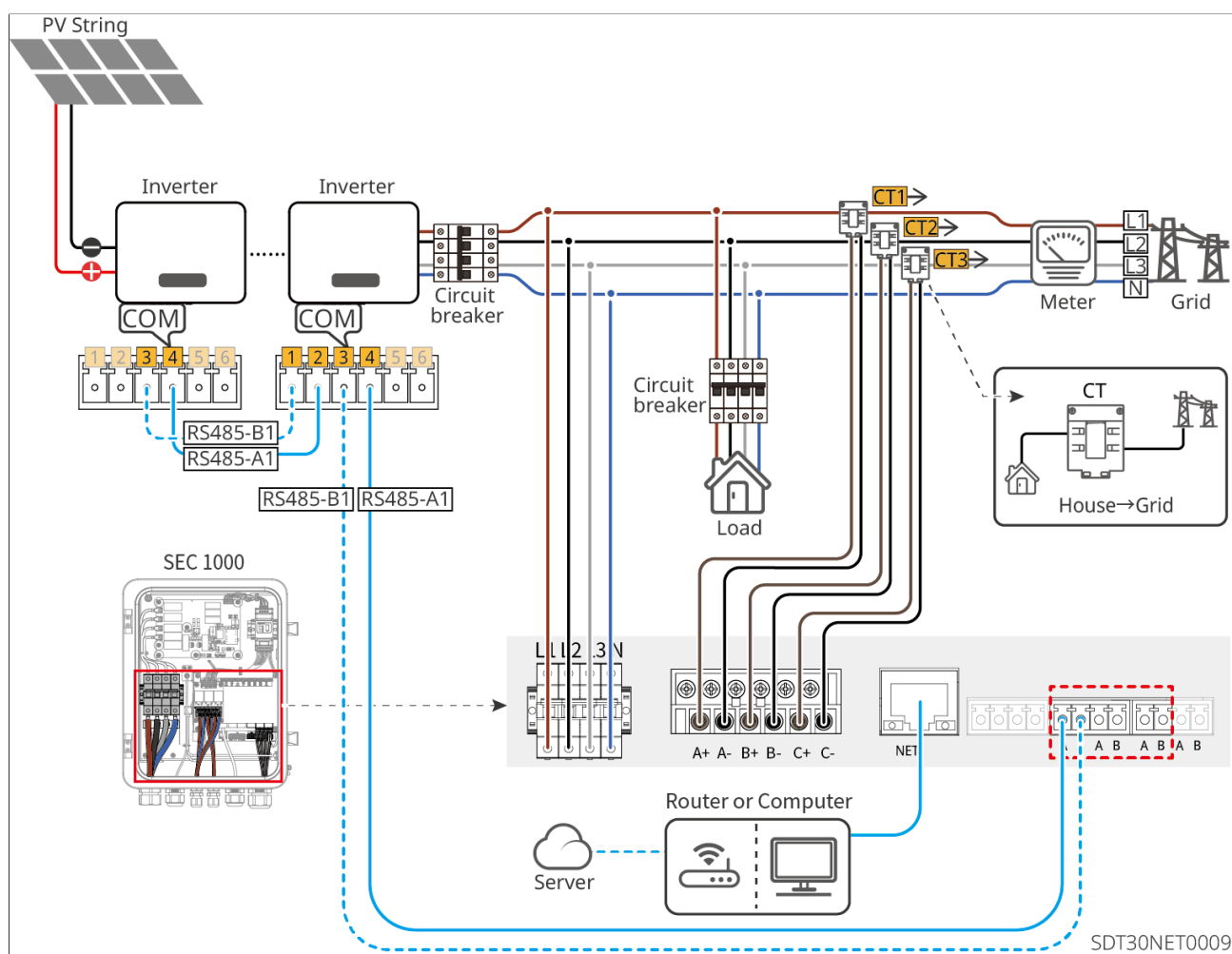
Multi-Unit Power Limit Networking Solution (EzLogger3000C+GM330)



Multi-Unit Power Limit Networking Solution (SEC1000)

WARNING

1. When the SEC1000 AC line is connected to the grid, 3L/N/PE must be connected, and the grid voltage must be within the voltage sampling range allowed by the SEC1000.
2. The CT installation position should be close to the grid connection point. When installing the CT, ensure the CT direction is correct. If reversed, the anti-backflow function cannot be achieved.
3. When using the SEC1000, an external CT must be prepared by the user.
4. The CT aperture must be larger than the outer diameter of the AC power line to ensure the AC power line can pass through the CT.
5. For the specific wiring method of the CT, please refer to the corresponding manufacturer's documentation to ensure correct wiring direction and normal function.
6. The CT must be clamped on the L1, L2, L3 cables. Do not clamp it on the N cable.
7. SW050KTL-T1-G2 does not support SEC1000.



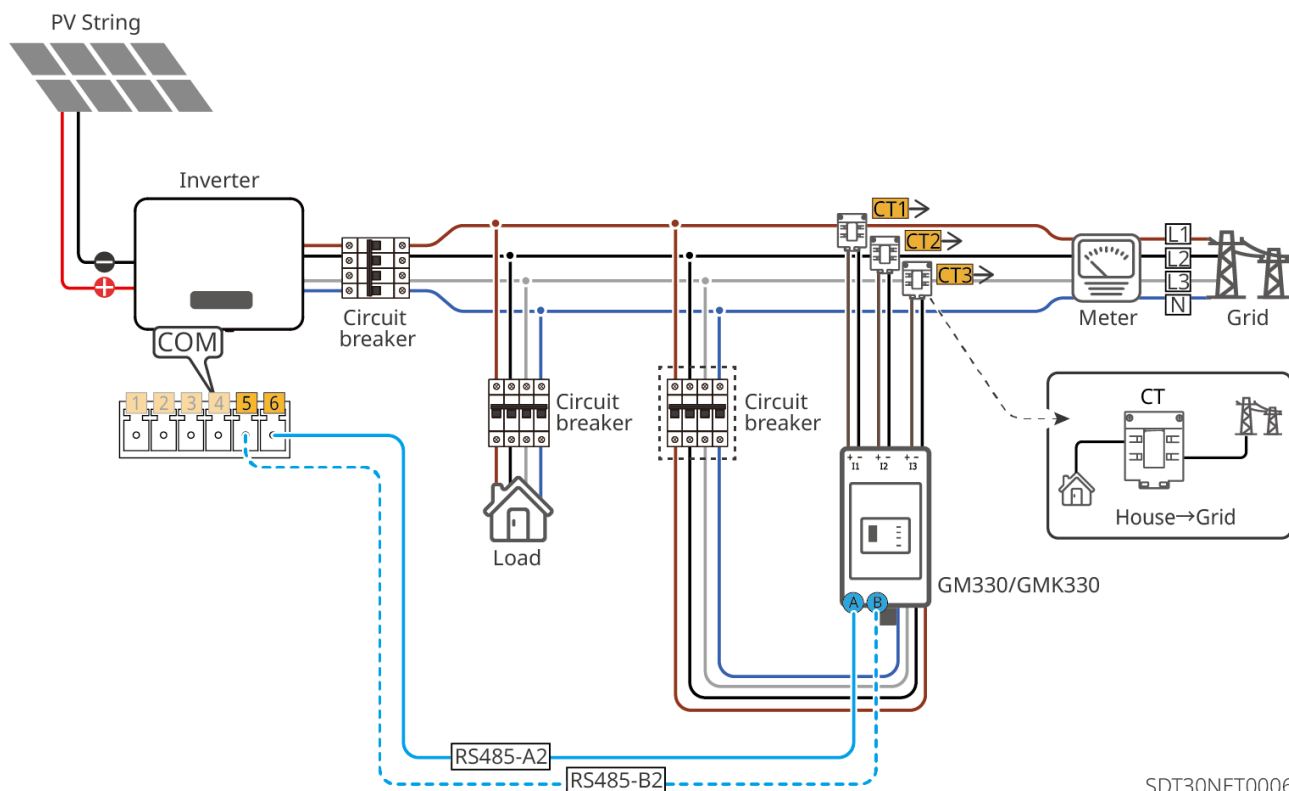
Recommended external CT specifications:

No.	Current Range	Specification Description	Remarks
1	Imax < 250A	CT 200A Acrel/AKH-0.66(200A/5A)	Anti-backflow CT, closed type (Aperture size 31mm*11mm, Φ22mm)
		CT 250A/5A Acrel/AKH-0.66-K-30x20-250/5	Anti-backflow CT, open type (Opening size 32mm*22mm), accuracy 0.5%
		CT 250A/5A Acrel/AKH-0.66-K-60x40-250/5	Anti-backflow CT, open type (Opening size 62mm*42mm), accuracy 1.0%

No.	Current Range	Specification Description	Remarks
2	$250A \leq I_{max} < 1000A$	CT 1000A/5A Acrel/AKH-0.66-K-60x40-1000/5	Anti-backflow CT, open type (Opening size 62mm*42mm), accuracy 0.5%
		CT 1000A/5A Acrel/AKH-0.66-K-80x40-1000/5	Anti-backflow CT, open type (Opening size 82mm*42mm), accuracy 0.5%
3	$1000A \leq I_{max} < 5000A$	CT 5000A/5A Acrel/AKH-0.66-K-140x60-5000/5	Anti-backflow CT, open type (Opening size 142mm*62mm), accuracy 0.2%
		CT 5000A/5A Acrel/AKH-0.66-K-160x80-5000/5	Anti-backflow CT, open type (Opening size 162mm*82mm), accuracy 0.2%

24-Hour Load Monitoring

The inverter with optional night power supply features 24-hour load monitoring. The GMK330 and GM330 smart meters measure grid-tied data and transmit it to the inverter. The inverter sends generation information and grid-tied data to the cloud monitoring platform via the communication module. The monitoring platform calculates the load power consumption data, thereby enabling real-time 24-hour monitoring of load power consumption.

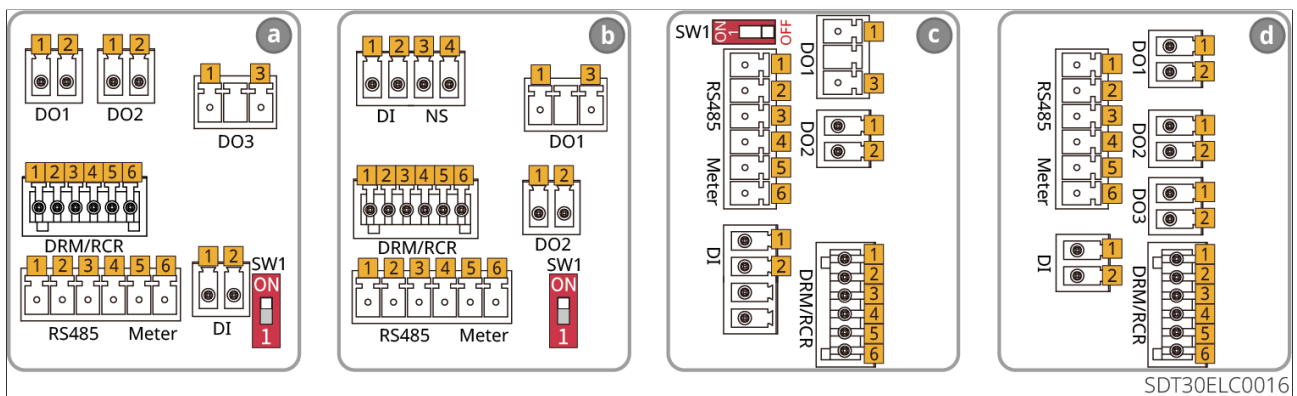


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4.5.3 Connecting the Communication Cable

NOTICE

- When connecting communication cables, ensure that the wiring port definitions match the device exactly, and the cable routing path should avoid interference sources, power lines, etc., to prevent affecting signal reception.
- Remote shutdown and DRED/RCR functions are disabled by default. To use them, enable them via the Solar Portal+ App.
- For detailed introduction of the communication module, please refer to the documentation provided with the corresponding module. For more detailed information, please obtain it from the official website.



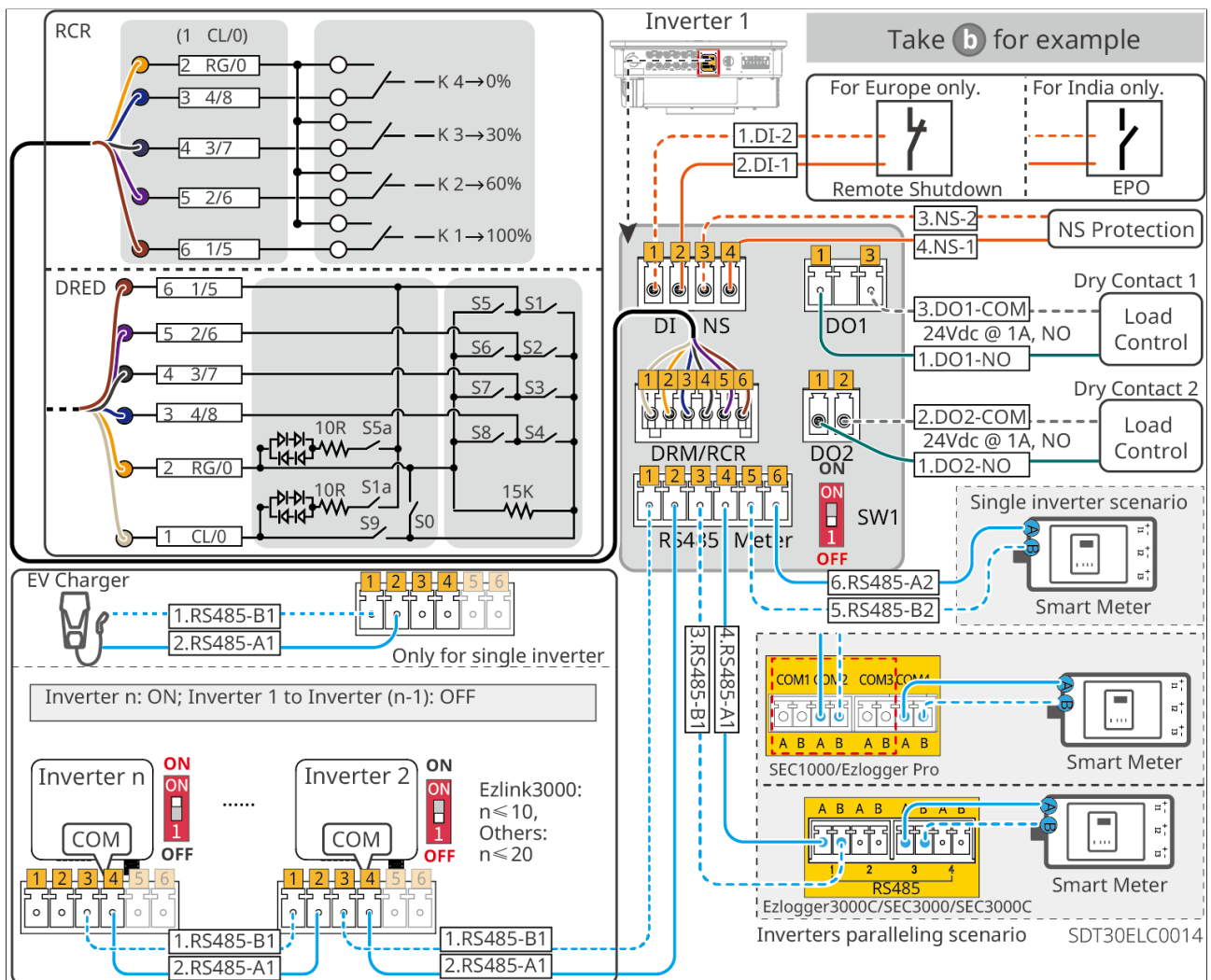
Function	Port Definition (Model a)	Port Definition (Model b)	Port Definition (Model c)	Port Definition (Model d)	Function Description
Meter	5: RS485-B2 6: RS485-A2	5: RS485-B2 6: RS485-A2	5: RS485-B2 6: RS485-A2	5: RS485-B2 6: RS485-A2	Using the meter and CT to achieve anti-backflow function. If supporting equipment is needed, please contact the inverter manufacturer for purchase.
RS485	1: RS485-B1 2: RS485-A1 3: RS485-B1 4: RS485-A1	1: RS485-B1 2: RS485-A1 3: RS485-B1 4: RS485-A1	1: RS485-B1 2: RS485-A1 3: RS485-B1 4: RS485-A1	1: RS485-B1 2: RS485-A1 3: RS485-B1 4: RS485-A1	RS485 port for connecting multiple inverters or data loggers.

Function	Port Definition (Model a)	Port Definition (Model b)	Port Definition (Model c)	Port Definition (Model d)	Function Description
DRM/ RCR	1: CL/0 2: RG/0 3: 4/8 4: 3/7 5: 2/6 6: 1/5	1: CL/0 2: RG/0 3: 4/8 4: 3/7 5: 2/6 6: 1/5	1: CL/0 2: RG/0 3: 4/8 4: 3/7 5: 2/6 6: 1/5	1: CL/0 2: RG/0 3: 4/8 4: 3/7 5: 2/6 6: 1/5	DRM (Demand Response Modes): Meets Australian DRM functionality and provides DRED signal control port. RCR (Ripple Control Receiver): Provides RCR signal control port to meet grid dispatch requirements in Germany and other regions. The inverter has reserved wiring ports; related equipment must be provided by the user.

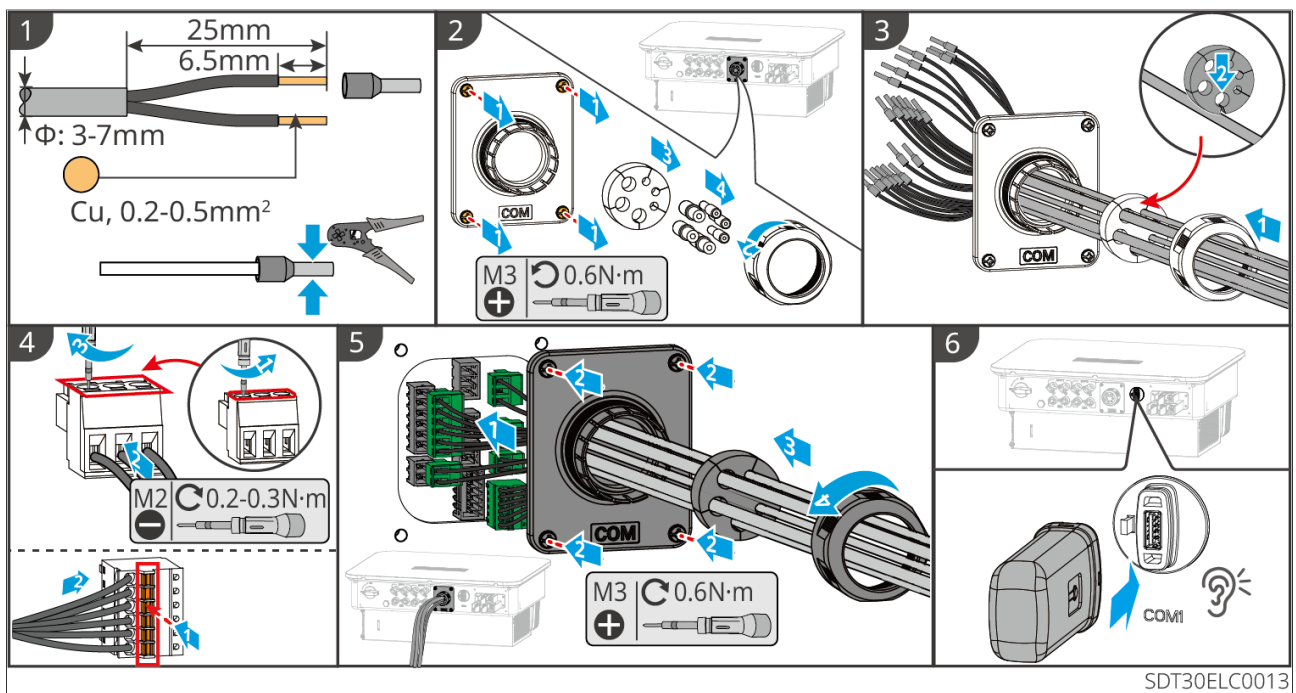
Function	Port Definition (Model a)	Port Definition (Model b)	Port Definition (Model c)	Port Definition (Model d)	Function Description
DI	1: DI-2 2: DI-1	1: DI-2 2: DI-1	1: DI-2 2: DI-1	1: DI-2 2: DI-1	After the emergency switch sends a shutdown signal, the inverter's AC side automatically disconnects and stops grid connection. An external emergency shutdown switch is required, controlled via the DI port: • Remote Shutdown: If the DI port is closed, the inverter starts; if the DI port is open, the inverter stops. • Emergency Poweroff: If the DI port is closed, the inverter stops; if the DI port is open, the inverter starts.
DO1	1: DO1-NO 2: DO1-COM	1: DO1-NO 3: DO1-COM	1: DO1-NO 3: DO1-COM	1: DO1-NO 2: DO1-COM	load control

Function	Port Definition (Model a)	Port Definition (Model b)	Port Definition (Model c)	Port Definition (Model d)	Function Description
DO2	1: DO2-NO 2: DO2-COM	21: DO2-NO 2: DO2-COM	1: DO2-NO 2: DO2-COM	21: DO2-NO 2: DO2-COM	load control
DO3	1: DO3-NO 3: DO3-COM	Reserved	Reserved	1: DO3-NO 2: DO3-COM	load control
NS	Reserved	3: NS-2 4: NS-1	Reserved	Reserved	Connect NS protection (Germany only)

Taking model b as an example:

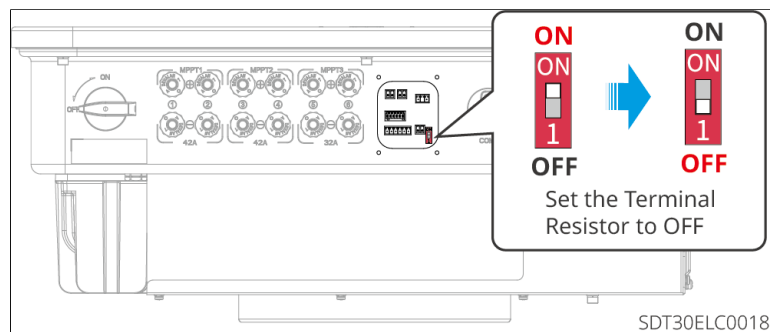


- Step 1: Prepare the communication cable.
- Step 2: Open the communication connector.
- Step 3-4: Connect the communication cable to the terminal and tighten it.
- Step 5: Connect the communication terminal to the device.
- Step 6: Install the smart communication stick.



Turn off the terminal resistor DIP switch

Some inverter models are equipped with an RS485 terminal resistor. The DIP switch for this terminal resistor is enabled by default. "ON" means enabled, "1" means disabled. Operation method: Open the outer cover of the communication port (see 6.5.4), use an insulated lever to flip the terminal resistor DIP switch to "1" (OFF).



5 Equipment Trial Run

5.1 Pre-Power-On Check

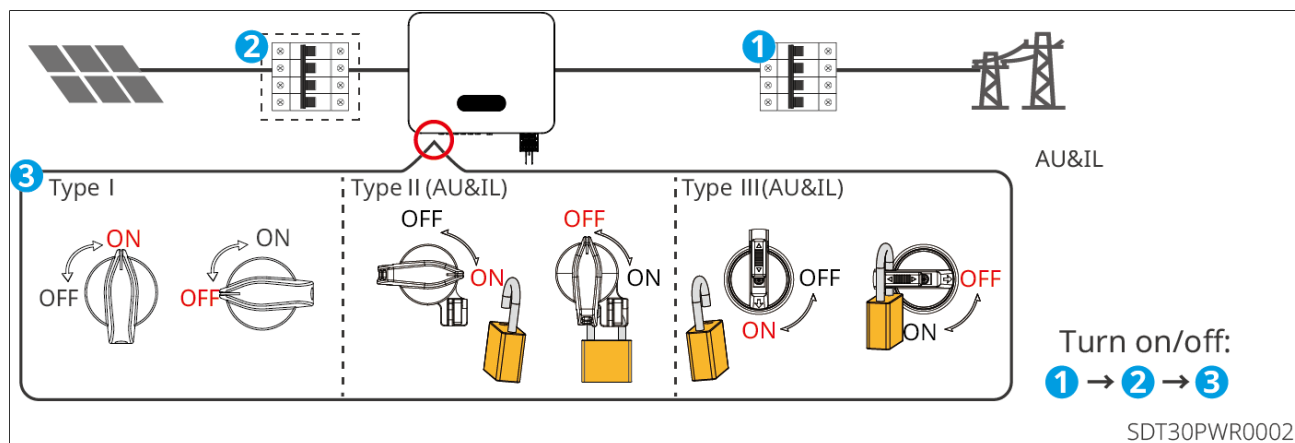
No.	Check Item
1	The inverter is installed securely, in a location that facilitates operation and maintenance, with sufficient space for ventilation and heat dissipation, and the installation environment is clean and tidy.
2	The PE cable, DC input cables, AC output cables, and communication cables are correctly and securely connected.
3	Cable routing meets the wiring requirements, with proper distribution and no damage.
4	Unused ports are sealed.
5	The voltage and frequency at the inverter grid connection point meet the grid connection requirements.

5.2 Power On the Device

Step 1: Close the AC switch between the inverter and the grid.

Step 2: (Optional) Close the DC switch between the inverter and the PV modules.

Step 3: Close the DC switch of the inverter.



6 System Commissioning and Power Station Monitoring

6.1 Download and Install SolarPortal+ App

Phone Requirements:

- Mobile operating system requirements: Android 7.0 and above, iOS 15.1 and above.
- Phone supports a web browser and Internet connection.
- Phone supports WLAN/Bluetooth.

Download Methods:

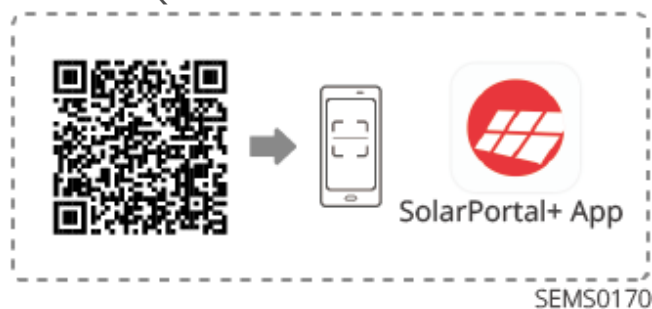
Method 1:

Search for SolarPortal+ in Google Play, App Store, Huawei, Honor, Xiaomi, OPPO, and vivo app stores to download and install.



Method 2:

Scan the QR code below to download and install.



6.2 Power Plant Creation

Supports Power Plant Creation based on actual needs.

6.2.1 Fill in Power Plant Information

Power Plant Creation (Installer/Dealer) Steps

1. After logging in to the App, if there is no power plant under the account, click "Create Power Plant"; if there is, click "+" on the power plant list screen to enter the new power plant information filling screen.
2. Follow the on-screen prompts and fill in the basic information such as the power plant address, name, capacity, and power according to the actual situation.
3. To add power plant visitors, enter the organization code and visitor information. Click "Finish" to create the new power plant.
4. Choose whether to add power plant equipment based on the actual situation. If necessary, refer to the [Add Device](#) section.

Figure 1 shows the steps to create a new power plant station in the app. The process involves filling in basic information (Address, Name, Capacity, Power) and optional information (Organization Code, Visitor Information) before completing the creation.

Figure1 Fill in Power Plant Information (Installer/Dealer)

Parameter	Function Description
Station Type	Set according to the actual station type. Supported: Residential PV Station, Residential Storage Station, Commercial & Industrial Storage Station, Commercial & Industrial PV Station.
Station Name	Set the station name according to actual needs.
Rated Power	Set the total installed power of the station.
PV Capacity	Set the total PV installed capacity of the station.
Battery Capacity	Set the total battery capacity of the station.

Parameter	Function Description
PV Installation Angle	Set the installation angle of the PV panels.
Commercial Operation Date	Set the grid connection date of the station.

Power Plant Creation (Owner) Steps

1. After logging in to the App, click "Create Power Plant" as prompted; if there is a power plant under the account, click "+" on the power plant list screen to enter the new power plant information filling screen.
2. Follow the on-screen prompts and fill in the basic information such as the power plant name, address, and type according to the actual situation.

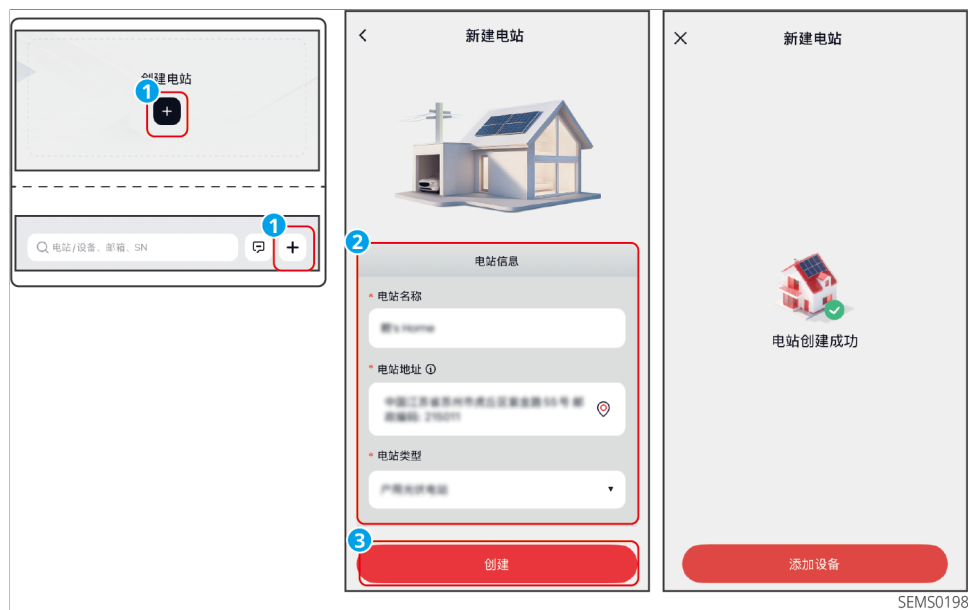


Figure2 Fill in Power Plant Information (Owner)

6.2.2 Add Power Station Device

After the power station is created, you can add devices to the power station based on actual needs.

- When a Home Energy Management System (HEMS) has been added to the power station:

- You can add devices associated with the HEMS; or add devices not associated with the HEMS, only monitoring all devices in the same power station.
- Please use a Bluetooth local connection to connect devices such as energy storage inverters, charging piles, and smart switches in the network to the same Router as the HEMS; otherwise, the HEMS will not be able to recognize these devices.

Manual Device Addition Steps

1. On the device list screen, tap **+**.
2. Add a device based on actual needs. Select the device type, and scan the device SN or enter the device SN manually.
3. After scanning, confirm that the device serial number and verification code are correct. Modify the device name as needed. Tap "Add Device" to complete the addition.
4. (Optional) To continue adding devices to the current power station, tap **+** and repeat the step of entering the device SN.
5. (Optional) Tap "Quick Configuration" to modify settings such as safety regulations and operating modes. For details, refer to [6.2.3.Quick Configuration\(Page 60\)](#).
6. Tap "Finish" to complete the device addition.

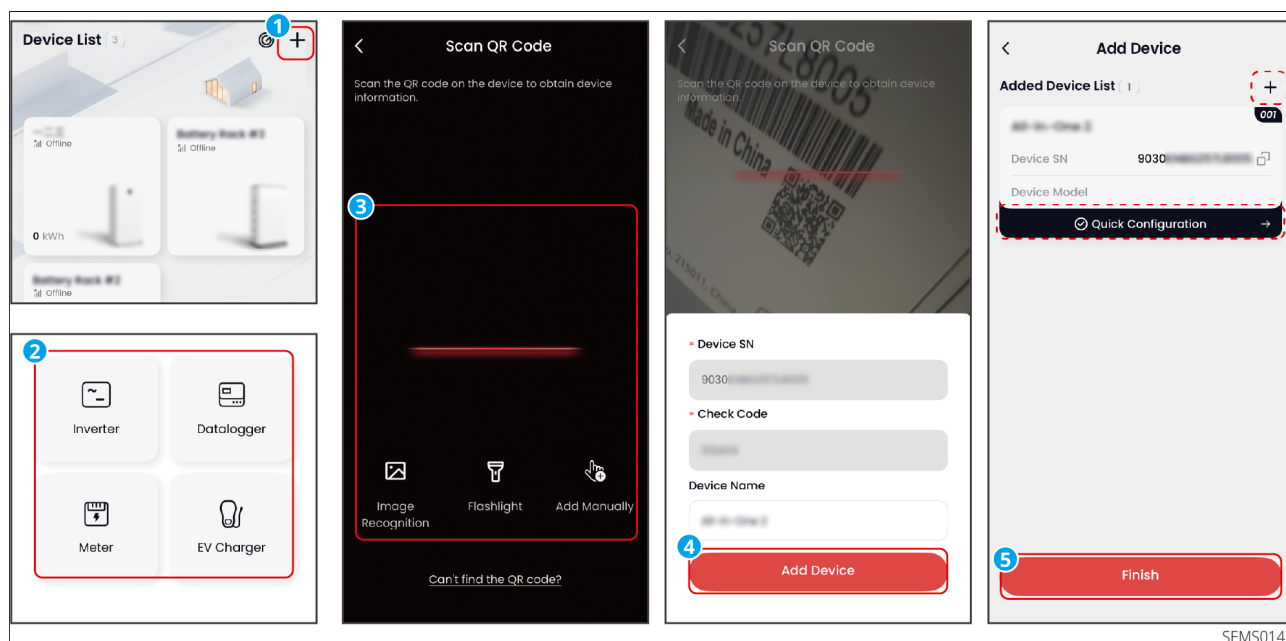


Figure3 Manual Device Addition

Device Addition via Scanning Steps

After manually adding the inverter to the power station, you can scan to add

associated devices of the inverter, such as batteries.

1. On the device list screen, tap .
2. In the scanned devices, select the devices to add and tap "Add".
3. To continue adding other devices that were not scanned, tap "Continue Adding"; otherwise, tap "Finish".

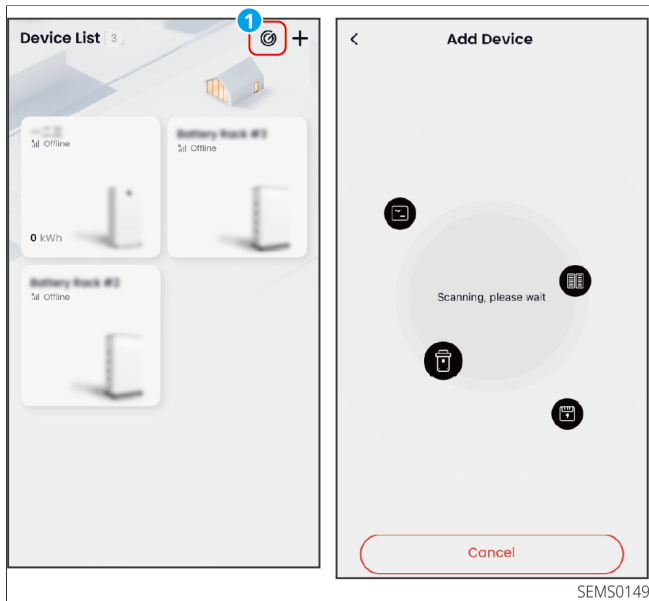


Figure4 Add Device via Scanning

6.2.3 Quick Configuration Device

NOTICE

- After the device is first added to the power station, quick configuration can ensure basic operation.
- Before performing quick configuration, please confirm that all devices are powered on and running normally.
- Quick configuration content varies by device type. Please refer to the actual interface.

Operation Steps

1. After adding the device, follow the on-screen prompts to click "Quick Configuration", or go to the device list interface via "Services" > "Local Access".

2. On the device list interface, select the "Bluetooth" or "WiFi" tab according to the Smart Communication Dongle signal type.
3. Pull down or click "Search Device", confirm the inverter signal name based on the inverter serial number, and click to enter the Quick Configuration interface. If you entered the settings interface via "Local Access", please click "Quick Configuration" on the home page.
4. Complete network configuration, safety code, working mode, etc. according to the on-screen prompts. For details on working modes, refer to the [System Working Mode](#) section.
5. Click "Finish" to complete the Quick Configuration.

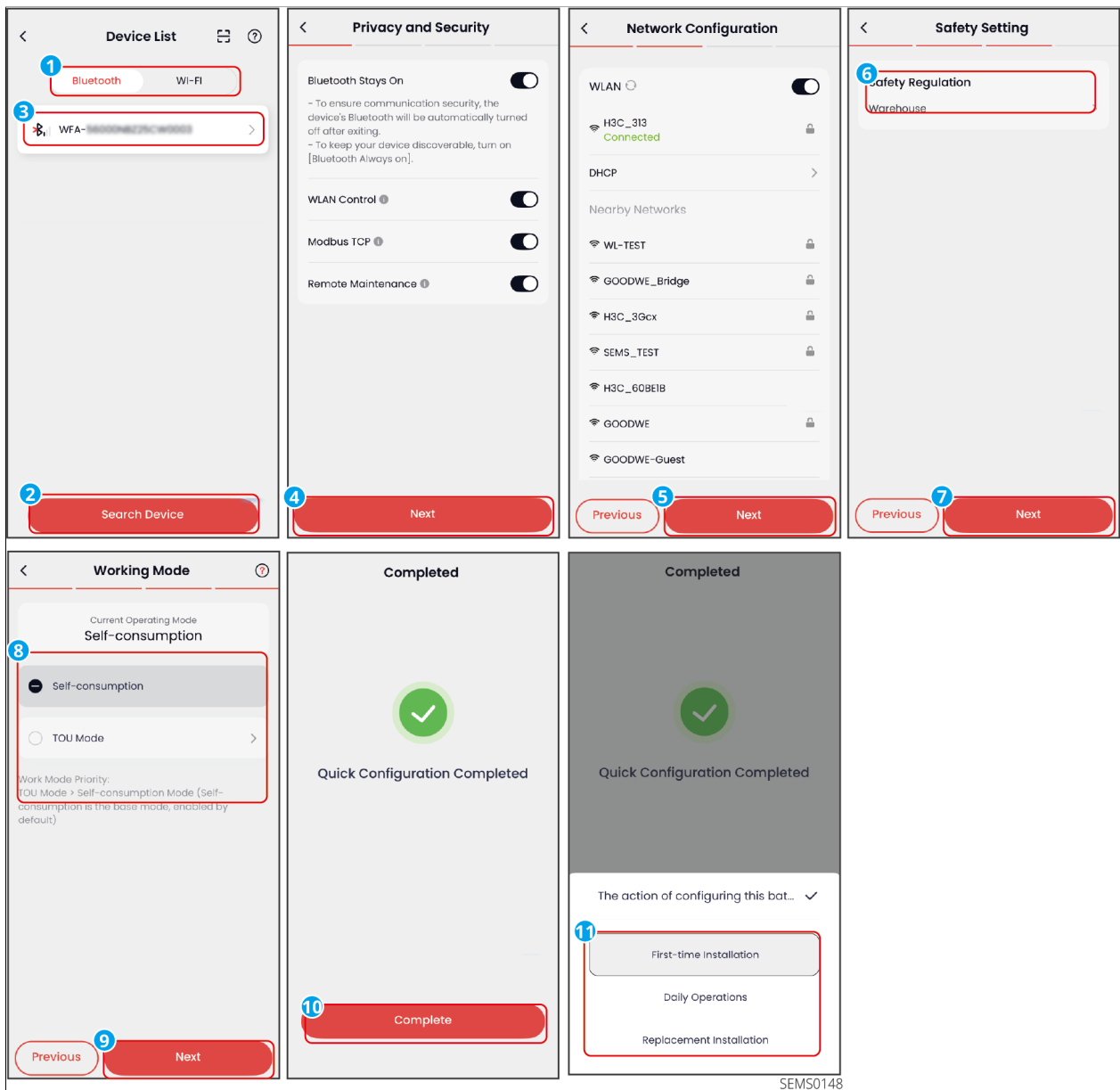


Figure5 Quick Configuration Device

6.3 SKYWORTH Solar

6.4 Setting inverter parameters via the display

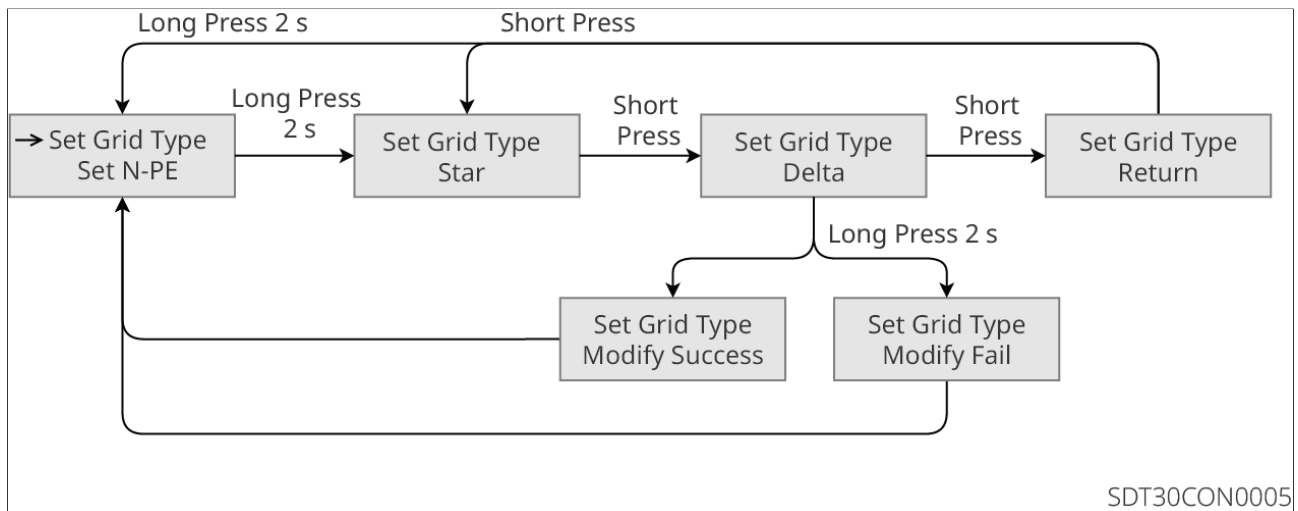
NOTICE

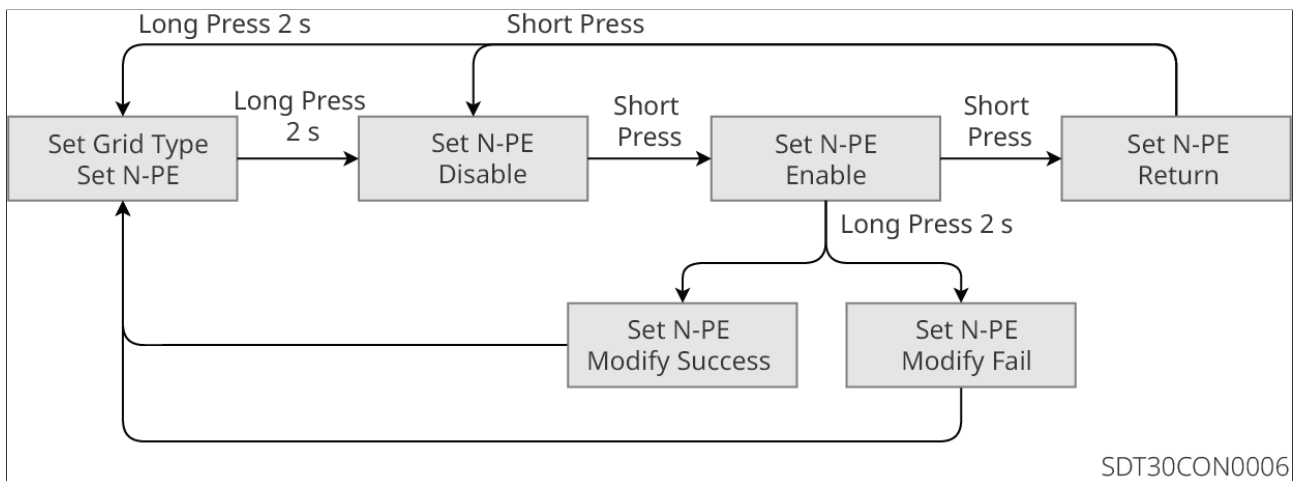
- The interface images in this article correspond to inverter software version V1.00.00. The interface is for reference only; the actual interface shall prevail.
- Parameter names, ranges, and default values may be changed or adjusted in the future; the actual display shall prevail.
- The inverter power parameters must be set and monitored by professionals to avoid incorrect settings affecting the inverter's power generation.

Display button instructions

- In all menu levels, if no button is pressed for a certain period, the LCD display will dim and the interface will automatically return to the initial screen.
- Short press the display button: to switch menu screens or adjust parameter values.
- Long press the display button: after adjusting parameter values, long press to confirm the setting; then enter the next submenu.

Button operation example:



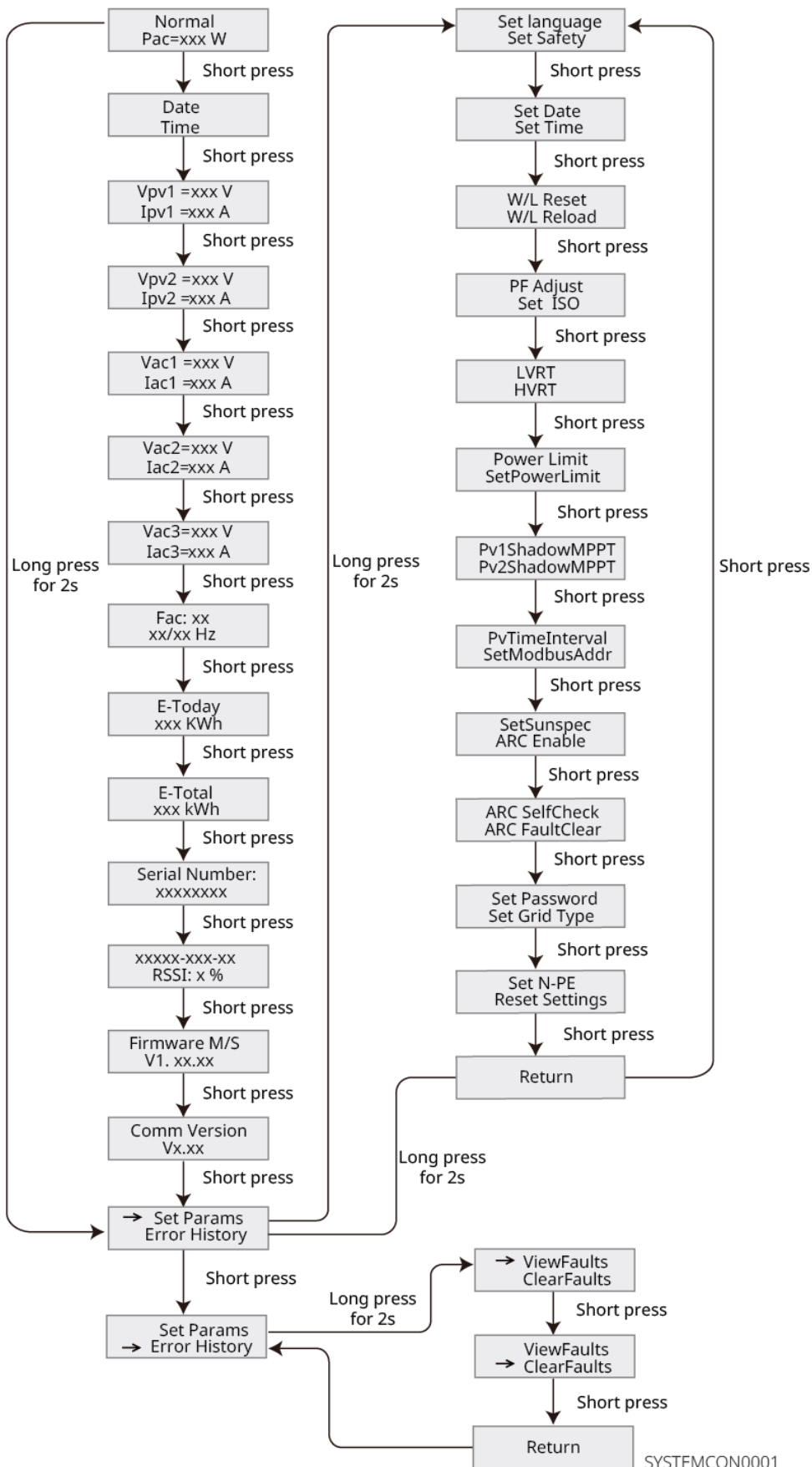


6.4.1 Display Menu Introduction

Introduces the display menu structure, allowing you to access various menus, view inverter information, and set related inverter parameters.

First level menu

Second level menu



6.4.2 Inverter Parameter Introduction

Parameter Name	Description
Date and Time	View the time of the country/region where the inverter is located.
Input Voltage	View the DC input voltage of the inverter.
Input Current	View the DC input current of the inverter.
Mains Voltage	View the grid voltage.
Output Current	View the AC output current of the inverter.
Mains Frequency	View the grid frequency.
Daily Generation	View the daily energy generation of the inverter.
Total Generation	View the total energy generation of the inverter.
serial number	View the serial number of the inverter.
XXXXX-XXX-XX Signal strength: xx%	View the signal strength of the communication module.
Firmware Version	View the firmware version of the inverter.
Communication Version	View the communication version of the inverter.
Language Setting	Set according to actual needs.
Safety Standard Setting	Set according to the grid standard of the country/region where the inverter is located and the application scenario of the inverter.
Date Setting	Set according to the actual time of the country/region where the inverter is located.
Time Setting	
W/L Restart	Power cycle the communication module.
W/L Reload	Restore the communication module to factory settings. After restoration, the network parameters of the communication module need to be reconfigured.

Parameter Name	Description
Power Factor Adjustment	Set the power factor of the inverter according to actual needs.
Set ISO	Set the insulation impedance threshold of PV-PE. When the detected actual value is less than the set value, an ISO fault will be reported.
Low Voltage Ride Through	After enabling this function, when the grid experiences a short-term low voltage anomaly, the inverter will not immediately disconnect from the grid and can sustain operation for a period of time.
High Voltage Ride Through	After enabling this function, when the grid experiences a short-term high voltage anomaly, the inverter will not immediately disconnect from the grid and can sustain operation for a period of time.
Power Limit Enable	Set according to the actual power that can be fed into the grid.
Set Power Limit	
PV1 Shadow Mode	If the PV panels are heavily shaded, the shadow scanning function can be enabled.
PV2 Shadow Mode	
Shadow Scan Interval	Set the shadow scan time according to actual needs.
Set Modbus Address	Set according to the actual Modbus address of the inverter.
Set Sunspec	Set the Sunspec protocol according to actual communication needs.
Arc Fault Enable	The arc fault function is optional and disabled by default. Please enable or disable it according to actual needs.
Arc Fault Self-Test	Check whether the arc fault function of the inverter is normal.

Parameter Name	Description
Arc Fault Clear	Clear the arc fault alarm records.
Password Setting	The password of the inverter can be modified. After modifying the password, please remember it. If you forget the password, contact the after-sales service center for assistance.
Type of Electrical Supply System	Set according to the actual grid the inverter is connected to. Currently supports star and delta type of electrical supply system.
N-PE Detection	N line to ground detection switch.
Restore Factory Settings	Restore some settings of the inverter to factory defaults.
View fault	View the historical fault records of the inverter.
Clear fault	Clear the historical fault records of the inverter.

7 Maintenance

7.1 Inverter Power-Down

DANGER

- When performing operation and maintenance on the inverter, please power off the inverter. Operating the device with power on may cause inverter damage or electric shock hazard.
- After the inverter is powered off, it takes some time for the internal components to discharge. Please wait until the device is fully discharged according to the time requirements on the label.

Step 1: (Optional) Send a stop grid-tied command to the inverter.

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

Step 3: Disconnect the DC switch of the inverter.

Step 4: (Optional) Disconnect the switch between the inverter and the PV modules.

7.2 Remove the inverter

WARNING

- Ensure the inverter is powered off.
- When operating the inverter, wear personal protective equipment.

Step 1: Disconnect all electrical connections of the inverter, including: DC cable, AC cable, Communication cable, smart dongle, PE cable.

Step 2: Remove the inverter from the backplate.

Step 3: Remove the backplate.

Step 4: Properly store the inverter. If the inverter is to be used again in the future, ensure that the storage conditions meet the requirements.

7.3 Scrap inverter

When the inverter can no longer be used and needs to be scrapped, please dispose

of the inverter in accordance with the electrical waste disposal requirements of the country/region where the inverter is located. Do not dispose of the inverter as household waste.

7.4 Inverter Fault

7.4.1 Troubleshooting (Fault Codes F01-F40)

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F01	Grid Power Outage	1. Grid power outage. 2. AC line or AC switch disconnected.	1. The alarm will automatically disappear after grid power is restored. 2. Check if the AC line or AC switch is disconnected.
F02	Grid Overvoltage Protection	Grid voltage is higher than the allowable range, or the high voltage duration exceeds the HVRT setting value.	1. If it occurs occasionally, it may be a temporary grid abnormality. The inverter will resume normal operation after detecting the grid is normal. No manual intervention is required. 2. If it occurs frequently, check if the grid voltage is within the allowable range. If not, contact the local power operator. If it is, you also need to modify the grid overvoltage protection point after obtaining the consent of the local power operator. 3. If it cannot be restored for a long time, check if the AC side circuit breaker and output cable are connected properly.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F03	Grid Undervoltage Protection	Grid voltage is lower than the allowable range, or the low voltage duration exceeds the LVRT setting value.	1. If it occurs occasionally, it may be a temporary grid abnormality. The inverter will resume normal operation after detecting the grid is normal. No manual intervention is required. 2. If it occurs frequently, check if the grid voltage is within the allowable range. If not, contact the local power operator. If it is, you also need to modify the grid undervoltage protection point after obtaining the consent of the local power operator. 3. If it cannot be restored for a long time, check if the AC side circuit breaker and output cable are connected properly.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F04	Grid Rapid Overvoltage Protection	Abnormal grid voltage detection or ultra-high voltage triggers the fault.	1. If it occurs occasionally, it may be a temporary grid abnormality. The inverter will resume normal operation after detecting the grid is normal. No manual intervention is required. 2. If it occurs frequently, check if the grid voltage is within the allowable range. If not, contact the local power operator. If it is, you also need to modify the grid undervoltage protection point after obtaining the consent of the local power operator. 3. If it cannot be restored for a long time, check if the AC side circuit breaker and output cable are connected properly.
F05	10min Overvoltage Protection	The sliding average of grid voltage within 10min exceeds the safety regulation range.	Check if the grid voltage is operating at a high voltage for a long time. If it occurs frequently, check if the grid frequency is within the allowable range. If not, contact the local power operator. If it is, you also need to modify the grid 10min overvoltage protection point after obtaining the consent of the local power operator.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F06	Grid Overfrequency	Grid abnormality: The actual grid frequency is higher than the local grid standard requirement.	1. If it occurs occasionally, it may be a temporary grid abnormality. The inverter will resume normal operation after detecting the grid is normal. No manual intervention is required. 2. If it occurs frequently, check if the grid frequency is within the allowable range. If not, contact the local power operator. If it is, you also need to modify the grid overfrequency protection point after obtaining the consent of the local power operator.
F07	Grid Underfrequency	Grid abnormality: The actual grid frequency is lower than the local grid standard requirement.	1. If it occurs occasionally, it may be a temporary grid abnormality. The inverter will resume normal operation after detecting the grid is normal. No manual intervention is required. 2. If it occurs frequently, check if the grid frequency is within the allowable range. If not, contact the local power operator. If it is, you also need to modify the grid underfrequency protection point after obtaining the consent of the local power operator.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F08	Grid Frequency Instability	Grid abnormality: The rate of change of actual grid frequency does not meet the local grid standard.	1. If it occurs occasionally, it may be a temporary grid abnormality. The inverter will resume normal operation after detecting the grid is normal. No manual intervention is required. 2. If it occurs frequently, check if the grid frequency is within the allowable range. If not, contact the local power operator.
F09	Anti-islanding Protection	The grid is disconnected, but grid voltage is maintained due to the presence of load. Grid connection is stopped according to safety regulation requirements.	1. If it occurs occasionally, it may be a temporary grid abnormality. The inverter will resume normal operation after detecting the grid is normal. No manual intervention is required. 2. If it occurs frequently, check if the grid frequency is within the allowable range. If not, contact the local power operator.
F10	HVRT Undervoltage	Grid abnormality: The duration of abnormal grid voltage exceeds the specified time for high/low voltage ride-through.	1. If it occurs occasionally, it may be a temporary grid abnormality. The inverter will resume normal operation after detecting the grid is normal. No manual intervention is required. 2. If it occurs frequently, check if the grid voltage and frequency are within the allowable range and stable. If not, contact the local power operator.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F11	HVRT Overvoltage	Grid abnormality: The duration of abnormal grid voltage exceeds the specified time for high/low voltage ride-through.	1. If it occurs occasionally, it may be a temporary grid abnormality. The inverter will resume normal operation after detecting the grid is normal. No manual intervention is required. 2. If it occurs frequently, check if the grid voltage and frequency are within the allowable range and stable. If not, contact the local power operator.
F12	30mA GFCI Protection	The insulation resistance of the input to ground becomes low during inverter operation.	1. If it occurs occasionally, it may be caused by an occasional external line abnormality. The inverter will resume normal operation after the fault is cleared. No manual intervention is required. 2. If it occurs frequently or cannot be restored for a long time, check if the impedance of the PV string to ground is too low.
F13	60mA GFCI Protection	The insulation resistance of the input to ground becomes low during inverter operation.	1. If it occurs occasionally, it may be caused by an occasional external line abnormality. The inverter will resume normal operation after the fault is cleared. No manual intervention is required. 2. If it occurs frequently or cannot be restored for a long time, check if the impedance of the PV string to ground is too low.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F14	150mA GFCI Protection	The insulation resistance of the input to ground becomes low during inverter operation.	1. If it occurs occasionally, it may be caused by an occasional external line abnormality. The inverter will resume normal operation after the fault is cleared. No manual intervention is required. 2. If it occurs frequently or cannot be restored for a long time, check if the impedance of the PV string to ground is too low.
F15	GFCI Gradual Change Protection	The insulation resistance of the input to ground becomes low during inverter operation.	1. If it occurs occasionally, it may be caused by an occasional external line abnormality. The inverter will resume normal operation after the fault is cleared. No manual intervention is required. 2. If it occurs frequently or cannot be restored for a long time, check if the impedance of the PV string to ground is too low.
F16	DCI Level 1 Protection	The DC component of the inverter output current is higher than the safety regulation or the machine's default allowable range.	1. If it is an abnormality introduced by an external fault, the inverter will automatically resume normal operation after the fault disappears. No manual intervention is required. 2. If this alarm occurs frequently and affects the normal power generation of the plant, contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F17	DCI Level 2 Protection	The DC component of the inverter output current is higher than the safety regulation or the machine's default allowable range.	1. If it is an abnormality introduced by an external fault, the inverter will automatically resume normal operation after the fault disappears. No manual intervention is required. 2. If this alarm occurs frequently and affects the normal power generation of the plant, contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F18	Low Insulation Resistance	1. PV string short circuit to protective earth. 2. The environment where the PV string is installed is humid for a long time, and the insulation of the line to ground is poor. 3. Low insulation resistance of battery port line to ground.	1. Check the impedance of the PV string/battery port to protective earth. If there is a short circuit, find the short circuit point and rectify it. 2. Check if the protective earth wire of the inverter is properly connected. 3. If it is confirmed that the impedance is indeed lower than the default value in rainy weather, reset the inverter's "Insulation Resistance Protection Point" through the App. For inverters in the Australian and New Zealand markets, when an insulation resistance fault occurs, the alarm can also be issued in the following ways: 1. The inverter is equipped with a buzzer. When a fault occurs, the buzzer sounds continuously for 1 minute. If the fault is not resolved, the buzzer sounds again every 30 minutes. 2. If the inverter is added to the monitoring platform and the alarm notification method is set, the alarm information can be sent to the customer via email.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F19	Grounding Abnormal	1. The protective earth wire of the inverter is not connected. 2. When the output of the PV string is grounded, the output side of the inverter is not connected to an isolation transformer.	1. Please confirm if the protective earth wire of the inverter is not connected properly. 2. If the output of the PV string is grounded, confirm if the inverter output side is connected to an isolation transformer.
F20	Hard Anti-backflow Protection	Abnormal load fluctuation	1. If it is an abnormality introduced by an external fault, the inverter will automatically resume normal operation after the fault disappears. No manual intervention is required. 2. If this alarm occurs frequently and affects the normal power generation of the plant, contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F21	Internal Comm Loss	Slave DSP1 communication timeout - Master DSP, Slave DSP2 communication timeout - Master DSP, Slave DSP2 communication timeout - Slave DSP1, Master DSP communication timeout - Slave DSP1, Master DSP communication timeout - Slave DSP2, or Slave DSP1 communication timeout - Slave DSP2: 1. Chip not powered on 2. Chip program version error	Disconnect the AC output side switch and DC input side switch, then close the AC output side switch and DC input side switch after 5 minutes. If the fault still exists, contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
		Master DSP CAN module error, Slave DSP1 CAN module error, or Slave DSP2 CAN module error: 1. Frame format error 2. Parity check error 3. CAN bus offline 4. Hardware CRC check error 5. Control bit is receive (transmit) when transmitting (receiving) 6. Transmission to unauthorized unit	
F22	Generator Waveform Detection Fault	1. This fault will be displayed continuously when the generator is not connected; 2. Under generator operation, if the generator does not meet safety regulations, this fault will be triggered.	1. Ignore this fault when the generator is not connected; 2. When the generator has a fault, this fault is normal. After the generator recovers, wait for a period of time and the fault will automatically clear; 3. This fault does not affect the normal operation of off-grid mode; 4. If both generator and grid are connected and meet safety regulations, the grid will be prioritized for grid connection and the system will work in grid-connected state.
F23	Generator Abnormal Connection		
F24	Generator Low Voltage		
F25	Generator High Voltage		
F26	Generator Low Frequency		

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F27	Generator High Frequency		
F28	Paralleling I/O Self-check Abnormal	Paralleling communication cable not securely connected or paralleling IO chip damaged	Check if the paralleling communication cable is securely connected, then check if the IO chip is damaged. If so, replace the IO chip.
F29	Paralell Grid Line Reversed	Some machines have grid lines reversed with others	Reconnect the grid lines
F30	AC HCT check Abnormal	AC HCT has sampling abnormality	Disconnect the AC output side switch and DC input side switch, then close the AC output side switch and DC input side switch after 5 minutes. If the fault still exists, contact the dealer or after-sales service center.
F31	GFCI HCT Check Abnormal	GFCI HCT has sampling abnormality	Disconnect the AC output side switch and DC input side switch, then close the AC output side switch and DC input side switch after 5 minutes. If the fault still exists, contact the dealer or after-sales service center.
F32	Inverter Internal Failure	Inverter has a fault	Disconnect the AC output side switch and DC input side switch, then close the AC output side switch and DC input side switch after 5 minutes. If the fault still exists, contact the dealer or after-sales service center.
F33	Flash Read/Write Error	Possible reasons: Flash content changed; Flash lifespan exhausted;	1. Upgrade to the latest program version 2. Contact the dealer or after-sales service center

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F34	AFCI Check Failure	During the arc fault self-check, the arc fault module did not detect the arc fault	Disconnect the AC output side switch and DC input side switch, then close the AC output side switch and DC input side switch after 5 minutes. If the fault still exists, contact the dealer or after-sales service center.
F35	Cabinet Overtemperature	Cabinet overtemperature. Possible causes: 1. The inverter installation location is not ventilated. 2. Ambient temperature is too high. 3. Internal fan is abnormal.	1. Check if the ventilation at the inverter installation location is good and if the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If ventilation is poor or ambient temperature is too high, improve ventilation and heat dissipation. 3. If ventilation and ambient temperature are normal, contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F36	Bus Overvoltage	BUS overvoltage. Possible causes: 1. PV voltage too high; 2. Inverter BUS voltage sampling abnormal; 3. Poor isolation effect of the dual-split transformer at the inverter rear, causing mutual interference when two inverters are connected to grid, and one inverter reports DC overvoltage when grid-connected;	Disconnect the AC output side switch and DC input side switch, then close the AC output side switch and DC input side switch after 5 minutes. If the fault still exists, contact the dealer or after-sales service center.
F37	PV Input Overvoltage	PV input voltage too high. Possible causes: Incorrect PV array configuration, too many PV panels in series in the string, causing the open circuit voltage of the string to be higher than the inverter's maximum operating voltage.	Check the series configuration of the corresponding PV array string to ensure the open circuit voltage of the string is not higher than the inverter's maximum operating voltage. After the PV array configuration is correct, the inverter alarm will automatically disappear.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F38	PV Continuous Hardware Overcurrent	1. Module configuration unreasonable 2. Hardware damage	Disconnect the AC output side switch and DC input side switch, then close the AC output side switch and DC input side switch after 5 minutes. If the fault still exists, contact the dealer or after-sales service center.
F39	PV Continuous Software Overcurrent	1. Module configuration unreasonable 2. Hardware damage	Disconnect the AC output side switch and DC input side switch, then close the AC output side switch and DC input side switch after 5 minutes. If the fault still exists, contact the dealer or after-sales service center.
F40, F98	String Reverse Connection (String 1-n) n: Determined by the actual number of strings of the inverter	PV string reverse connection	Check if the string is reverse connected.

7.4.2 Troubleshooting (Fault Codes F41-F80)

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F41	Generator Port Overload	1. Off-grid side output exceeds the specified requirements in the datasheet 2. Off-grid side short circuit 3. Off-grid side voltage too low 4. When used as a large load port, the large load exceeds the specified requirements in the datasheet	Check the off-grid side output voltage, current, power, etc. through data to confirm the cause of the issue.
F42, F164, F165	DC Arcing Failure (String 1-n) n: Determined by the actual number of strings of the inverter	1. DC side connection terminal loose; 2. DC side connection terminal poor contact; 3. DC cable core damaged and poorly connected	1. After the machine reconnects to the grid, check if the voltage and current of each string are abnormally reduced or become zero; 2. Check if the DC side terminals are firmly connected.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F43	Grid Waveform Abnormal	Grid abnormal: Abnormal grid voltage detection triggers the fault.	1. If it occurs occasionally, it may be a short-term grid anomaly. The inverter will resume normal operation after detecting the grid is normal. No manual intervention is required. 2. If it occurs frequently, check whether the grid voltage and frequency are within the allowable range and stable. If not, contact the local power operator.
F44	Grid Phase Loss	Grid abnormal: Single-phase voltage sag in the grid.	1. If it occurs occasionally, it may be a short-term grid anomaly. The inverter will resume normal operation after detecting the grid is normal. No manual intervention is required. 2. If it occurs frequently, check whether the grid voltage and frequency are within the allowable range and stable. If not, contact the local power operator.
F45	Grid Voltage Imbalance	Excessive difference between grid phase voltages.	1. If it occurs occasionally, it may be a short-term grid anomaly. The inverter will resume normal operation after detecting the grid is normal. No manual intervention is required. 2. If it occurs frequently, check whether the grid voltage and frequency are within the allowable range and stable. If not, contact the local power operator.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F46	Grid Phase Sequence Failure	Abnormal wiring between inverter and grid: Wiring is not in positive sequence	1. Check if the wiring between the inverter and the grid is in positive sequence. The fault will clear automatically after wiring is corrected (e.g., swapping any two live wires). 2. If the fault still exists after correct wiring, contact the dealer or after-sales service center.
F47	Grid Rapid Shutdown Protection	Quickly shut down output after detecting grid power failure condition	The fault will clear automatically when grid power is restored.
F48	Grid Neutral Wire Loss (Split Grid)	Split-phase grid neutral wire loss	1. The alarm will clear automatically when grid power is restored. 2. Check if the AC wiring or AC switch is disconnected.
F49	L-PE Short Circuit	Low impedance or short circuit between output phase line and PE	Measure the impedance between the output phase line and PE, find the location with low impedance and repair it.
F50	DCV Level 1 Protection	Abnormal load fluctuation	1. If the anomaly is caused by an external fault, the inverter will resume normal operation automatically after the fault disappears. No manual intervention is required. 2. If this alarm occurs frequently and affects normal power generation of the plant, contact the dealer or after-sales service center.
F51	DCV Level 2 Protection	Abnormal load fluctuation	

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F52	GFCI Multiple Fault Shutdown	North American safety regulations require that after multiple faults, automatic recovery is not allowed; manual recovery or waiting 24h is required	Please check if the PV string impedance to ground is too low.
F53	DC Arcing (AFCI) Multiple Fault Shutdown	North American safety regulations require that after multiple faults, automatic recovery is not allowed; manual recovery or waiting 24h is required	1. After the machine reconnects to the grid, check if the voltage and current of each string are abnormally reduced or become zero; 2. Check if the DC side terminals are firmly connected.
F54	External Communication Disconnection	Communication loss with external device of the inverter. Possible causes: peripheral power supply issue, communication protocol mismatch, or no corresponding peripheral configured.	Determine based on the actual model and detection enable bit. Some models do not detect peripherals that are not supported.
F55	Back-up Port Overload Fault	Prevent the inverter from continuous overload output.	Turn off some off-grid loads to reduce the inverter's off-grid output power.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F56	Back-up Port Overvoltage Fault	Prevent inverter output overvoltage from causing load damage.	1. If it occurs occasionally, it may be caused by load switching. No manual intervention is required. 2. If it occurs frequently, contact the dealer or after-sales service center.
F57	External Box Fault	Waiting time for Box relay switching during grid-to-off-grid transition is too long	1. Check if the Box is working properly; 2. Check if the Box communication wiring is correct.
F58	CT Loss Fault	CT connection wire disconnected (Japanese safety regulation requirement)	Check if the CT wiring is correct.
F59	Parallel CAN Communication Abnormal	Parallel communication cable not securely connected or some machines offline	Check if each machine is powered on and if the parallel communication cable is securely connected.
F60	Parallel Back-up Reversed	Some machines have backup wires reversed with others	Reconnect the backup wires.
F61	Inverter Soft Start Failure	Inverter soft start failed during off-grid cold start	Check if the inverter module is damaged.
F62	AC HCT Failure	HCT sensor abnormality	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F63	GFCI HCT Failure	Leakage current sensor abnormality	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.
F64	Inverter Internal Failure	Inverter has a fault	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.
F65	AC Terminal Overtemperature	AC terminal temperature too high. Possible causes: 1. Poor ventilation at the inverter installation location. 2. Ambient temperature too high. 3. Internal fan malfunction.	1. Check if the ventilation at the inverter installation location is good and if the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If ventilation is poor or ambient temperature is too high, improve ventilation and heat dissipation. 3. If ventilation and ambient temperature are normal, contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F66	INV Module Overtemperature	Inverter module temperature too high. Possible causes: 1. Poor ventilation at the inverter installation location. 2. Ambient temperature too high. 3. Internal fan malfunction.	1. Check if the ventilation at the inverter installation location is good and if the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If ventilation is poor or ambient temperature is too high, improve ventilation and heat dissipation. 3. If ventilation and ambient temperature are normal, contact the dealer or after-sales service center.
F67	Boost Module Overtemperature	Boost module temperature too high. Possible causes: 1. Poor ventilation at the inverter installation location. 2. Ambient temperature too high. 3. Internal fan malfunction.	1. Check if the ventilation at the inverter installation location is good and if the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If ventilation is poor or ambient temperature is too high, improve ventilation and heat dissipation. 3. If ventilation and ambient temperature are normal, contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F68	AC Capacitor Overtemperature	Output filter capacitor temperature too high. Possible causes: 1. Poor ventilation at the inverter installation location. 2. Ambient temperature too high. 3. Internal fan malfunction.	1. Check if the ventilation at the inverter installation location is good and if the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If ventilation is poor or ambient temperature is too high, improve ventilation and heat dissipation. 3. If ventilation and ambient temperature are normal, contact the dealer or after-sales service center.
F69	PV IGBT Short Circuit Fault	Possible causes: 1. IGBT short circuit 2. Inverter sampling circuit abnormality	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.
F70	PV IGBT Open Circuit Fault	1. Software issue causing no PWM output: 2. Driver circuit abnormality: 3. IGBT open circuit	
F71	NTC Abnormal	NTC temperature sensor abnormality	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.
F72	PWM Abnormal	Abnormal PWM waveform	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F73	CPU Interrupt Abnormal	CPU interrupt abnormality	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.
F74	Microelectronic Fault	Functional safety detected an abnormality	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.
F75	PV HCT Failure	Boost current sensor abnormality	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.
F76	1.5V Reference Abnormal	Reference circuit fault	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.
F77	0.3V Reference Abnormal	Reference circuit fault	
F78	CPLD Version Identification Error	CPLD version identification error	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.
F79	CPLD Communication Fault	Communication content error or timeout between CPLD and DSP	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F80	Model Identification Fault	Fault related to incorrect model identification	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.

7.4.3 Troubleshooting (Trouble Codes F81-F121)

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F81	P-Bus Overvoltage	BUS overvoltage, possible causes: 1. PV voltage too high; 2. Inverter BUS voltage sampling abnormal; 3. Poor isolation of the dual-split transformer at the inverter output, causing interference between two inverters when grid-connected, and one inverter reports DC overvoltage when grid-connected;	Disconnect the AC output side switch and DC input side switch, close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.
F82	N-Bus Overvoltage		

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F83	Bus Overvoltage (Secondary CPU1)	BUS overvoltage, possible causes: 1. PV voltage too high; 2. Inverter BUS voltage sampling abnormal; 3. Poor isolation of the dual-split transformer at the inverter output, causing interference between two inverters when grid-connected, and one inverter reports DC overvoltage when grid-connected;	Disconnect the AC output side switch and DC input side switch, close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.
F84	P-Bus Overvoltage (Secondary CPU1)		
F85	N-Bus Overvoltage (Secondary CPU1)		
F86	Bus Overvoltage (Secondary CPU2)		Disconnect the AC output side switch and DC input side switch, close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.
F87	P-Bus Overvoltage (Secondary CPU2)		

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F88	N-Bus Overvoltage (Secondary CPU2)	BUS overvoltage, possible causes: 1. PV voltage too high; 2. Inverter BUS voltage sampling abnormal; 3. Poor isolation of the dual-split transformer at the inverter output, causing interference between two inverters when grid-connected, and one inverter reports DC overvoltage when grid-connected;	
F89	P-Bus Overvoltage (CPLD)		Disconnect the AC output side switch and DC input side switch, close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F90	N-Bus Overvoltage (CPLD)	BUS overvoltage, possible causes: 1. PV voltage too high; 2. Inverter BUS voltage sampling abnormal; 3. Poor isolation of the dual-split transformer at the inverter output, causing interference between two inverters when grid-connected, and one inverter reports DC overvoltage when grid-connected;	
F91	FlyCap Software Overvoltage	FlyCap overvoltage, possible causes: 1. PV voltage too high; 2. Inverter FlyCap voltage sampling abnormal;	Disconnect the AC output side switch and DC input side switch, close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.
F92	FlyCap Hardware Overvoltage		

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F93	FlyCap Undervoltage	FlyCap undervoltage, possible causes: 1. PV insufficient energy; 2. Inverter FlyCap voltage sampling abnormal;	Disconnect the AC output side switch and DC input side switch, close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.
F94	FlyCap Precharge Failure	FlyCap precharge failure, possible causes: 1. PV insufficient energy; 2. Inverter FlyCap voltage sampling abnormal;	Disconnect the AC output side switch and DC input side switch, close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.
F95	FlyCap Precharge Abnormal	1. Unreasonable control loop parameters 2. Hardware damage	Disconnect the AC output side switch and DC input side switch, close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.
F96, F97	String Overcurrent (String 1-n) n: Determined by the actual number of strings of the inverter	Possible causes: 1. String overcurrent; 2. String current sensor abnormal	Disconnect the AC output side switch and DC input side switch, close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F99, F100	String Loss (String 1-n) n: Determined by the actual number of strings of the inverter	String fuse blown (if present)	Check if the fuse is blown.
F101	Battery 1 Precharge Fault	Battery 1 precharge circuit fault (precharge resistor burned out, etc.)	Check if the precharge circuit is good. After battery power-on, check if the battery voltage and bus voltage are consistent. If not, contact the dealer or after-sales service center.
F102	Battery 1 Relay Fault	Battery 1 relay cannot operate normally	After battery power-on, check if the battery relay works and if a closing sound is heard. If not, contact the dealer or after-sales service center.
F103	Battery 1 Input Overvoltage	Battery 1 input voltage exceeds the rated range of the machine	Confirm if the battery voltage is within the rated range of the machine.
F104	Battery 2 Precharge Fault	Battery 2 precharge circuit fault (precharge resistor burned out, etc.)	Check if the precharge circuit is good. After battery power-on, check if the battery voltage and bus voltage are consistent. If not, contact the dealer or after-sales service center.
F105	Battery 2 Relay Fault	Battery 2 relay cannot operate normally	After battery power-on, check if the battery relay works and if a closing sound is heard. If not, contact the dealer or after-sales service center.
F106	Battery 2 Input Overvoltage	Battery 2 input voltage exceeds the rated range of the machine	Confirm if the battery voltage is within the rated range of the machine.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F107	On-grid PWM Sync Failure	Abnormality during carrier synchronization grid connection	1. Check if the sync cable connection is normal 2. Check if the master/slave setting is correct; 3. Disconnect the AC output side switch and DC input side switch, close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.
F108	DSP Communication Fault	-	-
F109	External STS Fault	Abnormal connection cable between inverter and STS	Check if the wiring harness connections between the inverter and STS correspond one-to-one in sequence.
F110	Export Limit Protection	1. Inverter error and disconnection from grid 2. Unstable meter communication 3. Reverse power flow condition occurs	1. Check if the inverter has other error messages. If so, handle them accordingly; 2. Check if the meter connection is reliable; 3. If the alarm occurs frequently and affects normal power generation, contact the dealer or after-sales service center.
F111	Bypass Overload	-	-
F112	Black Start Failure	-	-
F113	Offgrid AC Ins Volt High	-	-

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F114	Relay Failure 2	Relay abnormal, reasons: 1. Relay abnormal (relay short circuit) 2. Relay sampling circuit abnormal. 3. Abnormal AC side wiring (possible loose connection or short circuit)	Disconnect the AC output side switch and DC input side switch, close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.
F115	SVG Precharge Disabled	SVG precharge hardware failure	Contact the dealer or after-sales service center.
F116	Night SVG PID Prevention Fault	PID prevention hardware abnormal	
F117	DSP Version Identification Error	DSP software version identification error	Disconnect the AC output side switch and DC input side switch, close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F118	MOS Continuous Overvoltage	1. Software issue causes inverter drive to turn off before flyback drive turns off; 2. Inverter drive circuit abnormal, unable to turn on; 3. PV voltage too high; 4. Mos voltage sampling abnormal;	Disconnect the AC output side switch and DC input side switch, close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.
F119	Bus Short Circuit Fault	Hardware damage	If a BUS short circuit fault occurs and the inverter remains disconnected from grid, contact the dealer or after-sales service center.
F120	Bus Sampling Abnormal	1. BUS voltage sampling hardware fault	Disconnect the AC output side switch and DC input side switch, close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.
F121	DC Side Sampling Abnormal	1. BUS voltage sampling hardware fault 2. Battery voltage sampling hardware fault 3. Dcrly relay fault	Disconnect the AC output side switch and DC input side switch, close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.

7.4.4 Troubleshooting (Fault Codes F122-F171)

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F122	PV Access Mode Setting Error	PV Access Mode has three modes, taking four MPPT as an example: 1. Parallel mode: i.e., AAAA mode (same source mode), PV1-PV4 same source, 4 PV inputs connected to the same photovoltaic panel 2. Partial parallel mode: i.e., AACC mode, PV1 and PV2 same source, PV3 and PV4 same source 3. Independent mode: i.e., ABCD mode (different source), PV1, PV2, PV3, PV4 independently connected, 4 PV inputs each connected to one photovoltaic panel If the actual PV access mode does not match the PV access mode set in the device, this fault	Check whether the PV access mode is correctly set (ABCD, AACC, AAAA), and reset the PV access mode correctly 1. Confirm that each PV input is correctly connected; 2. If PV is correctly connected, check through the APP or screen whether the currently set "PV Access Mode" corresponds to the actual access mode; 3. If the currently set "PV Access Mode" does not match the actual access mode, set the "PV Access Mode" to the actual mode via the APP or screen. After setting, disconnect the PV and AC power supply and restart; 4. If after setting, the current "PV Access Mode" matches the actual mode but the fault still persists, contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
		will be reported	
F123	Multi-channel PV Phase Error	PV input mode setting error	Check whether the PV access mode is correctly set (ABCD, AACC, AAAA), and reset the PV access mode correctly 1. Confirm that each PV input is correctly connected; 2. If PV is correctly connected, check through the APP or screen whether the currently set "PV Access Mode" corresponds to the actual access mode; 3. If the currently set "PV Access Mode" does not match the actual access mode, set the "PV Access Mode" to the actual mode via the APP or screen. After setting, disconnect the PV and AC power supply and restart; 4. If after setting, the current "PV Access Mode" matches the actual mode but the fault still persists, contact the dealer or after-sales service center.
F124	Battery 1 Reverse Polarity Fault	Battery 1 positive and negative poles reversed	Check whether the polarity of the battery and the machine wiring terminals are consistent.
F125	Battery 2 Reverse Polarity Fault	Battery 2 positive and negative poles reversed	Check whether the polarity of the battery and the machine wiring terminals are consistent.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F126	Abnormal Battery Connection	Abnormal battery connection	Check whether the battery works normally.
F127	BAT Overtemperature	Battery overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient overtemperature. 3. Internal fan malfunction.	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault still exists, contact the dealer or after-sales service center.
F128	Ref Voltage Abnormal	Reference circuit fault	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault still exists, contact the dealer or after-sales service center.
F129	Cabinet Under Temperature	Cabinet under temperature, possible cause: Ambient temperature too low.	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault still exists, contact the dealer or after-sales service center.
F130	AC Side SPD Fault	AC side surge protective device failure	Replace the AC side surge protective device.
F131	DC Side SPD Fault	DC side surge protective device failure	Replace the DC side surge protective device.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F132	Internal Fan Abnormal	Internal fan abnormal, possible causes: 1. Fan power supply abnormal; 2. Mechanical fault (blocked rotation); 3. Fan aging or damage.	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault still exists, contact the dealer or after-sales service center.
F133	External Fan Abnormal	External fan abnormal, possible causes: 1. Fan power supply abnormal; 2. Mechanical fault (blocked rotation); 3. Fan aging or damage.	
F134	PID Diagnosis Abnormal	PID hardware fault or PV voltage too high, PID paused	PV voltage too high causing PID pause warning does not need treatment. For PID hardware fault, turn off the PID switch and then turn it on again to clear the PID fault, or replace the PID device.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F135	Trip-Switch Trip Warning	Possible causes: Overcurrent or PV reverse connection causing the trip switch to open;	Contact the dealer or after-sales service center; The cause of tripping may be a PV short circuit or reverse connection. Check if there is a historical PV short circuit warning or historical PV reverse connection warning. If so, a maintenance technician needs to check the corresponding PV condition. After inspection and no fault, manually close the trip switch and clear the warning by clearing historical faults through the APP interface.
F136	Historical PV IGBT Short Circuit Warning	Possible causes: Overcurrent causing the trip switch to open;	Contact the dealer or after-sales service center; Maintenance personnel should check the corresponding Boost hardware and external string for faults based on the historical PV short circuit warning subcode. After inspection and no fault, clear the warning by clearing historical faults through the APP interface.
F137 , F138	Historical PV Reverse Connection Warning (String 1-n) (n: determined by the actual number of inverter strings)	Possible causes: PV reverse connection causing the trip switch to open;	Contact the dealer or after-sales service center; Maintenance personnel should check whether the corresponding string is reverse-connected based on the historical PV reverse connection warning subcode, and check if there is a voltage difference in the PV panel configuration. After inspection and no fault, clear the warning by clearing historical faults through the APP interface.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F139	Flash Read/Write Error Warning	Possible causes: 1. Flash content changed; 2. Flash lifespan exhausted;	1. Upgrade to the latest firmware; 2. Contact the dealer or after-sales service center.
F140	Meter Comm Loss	This warning may only be reported when the anti-reverse function is enabled. Possible causes: 1. Meter not connected; 2. Communication wiring between the meter and the inverter is incorrect.	Check the meter wiring, connect the meter correctly. If the fault still exists after inspection, contact the dealer or after-sales service center.
F141	PV Panel Type Identification Failed	PV panel identification hardware abnormality	Contact the dealer or after-sales service center.
F142	PV String Mismatch	PV string mismatch, two strings under the same MPPT have different open-circuit voltage configurations	Check the open-circuit voltage of the two strings, and configure the strings with the same open-circuit voltage under the same MPPT. Prolonged string mismatch poses a safety hazard.
F143	CT Not Connected	CT not connected	Check the CT wiring.
F144	CT Reverse Polarity	CT reverse polarity	Check the CT wiring.
F145	PE Loss	Ground wire not connected	Check the ground wire.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F146	String Terminal Overtemperature (String 1~8)	37176 register PV terminal temperature alarm subcode 1 set	-
F147	String Terminal Overtemperature (String 9~16)	37177 register PV terminal temperature alarm subcode 2 set	-
F148	String Terminal Overtemperature (String 17~20)	37178 register PV terminal temperature alarm subcode 3 set	-
F149	Historical PV Reverse Connection Warning (String 33~48)	Possible causes: PV reverse connection causing the trip switch to open;	Contact the dealer or after-sales service center; Maintenance personnel should check whether the corresponding string is reverse-connected based on the historical PV reverse connection warning subcode, and check if there is a voltage difference in the PV panel configuration. After inspection and no fault, clear the warning by clearing historical faults through the APP interface.
F150	Battery 1 Low Voltage	Battery voltage below set value	-
F151	Battery 2 Low Voltage	Battery voltage below set value	-
F152	Low Voltage of Battery Power	Battery not in charging mode, voltage below shutdown voltage	-

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F153	Battery 1 High Voltage	-	-
F154	Battery 2 High Voltage	-	-
F155	Online Low Insulation Resistance	1. PV string short circuit to protective earth. 2. The PV string installation environment is persistently humid and the line insulation to ground is poor.	1. Check the impedance of the PV string to protective earth. If there is a short circuit, correct the short circuit point. 2. Check whether the protective earth wire of the inverter is correctly connected. 3. If it is confirmed that the impedance is indeed lower than the default value in rainy weather, reset the "Insulation Resistance Protection Point".
F156	Micro-grid Overload Warning	Backup port input current too high	Occasional occurrence does not require treatment; if the alarm occurs frequently, contact the dealer or after-sales service center.
F157	Manual Reset	-	-
F158	Generator Phase Sequence Abnormal	-	-
F159	Multiplexed Port Configuration Abnormal	Multiplexed (Generator) port configured as microgrid or large load, but a generator is actually connected	Use the APP to change the multiplexed (Generator) port configuration.

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F160	EMS Forced Off-Grid	EMS issues forced off-grid command, but the off-grid function is not enabled	Enable the off-grid function.
F161	Passive Anti-islanding Protection	-	-
F162	Grid Type Fault	Actual grid type (two-phase or split-phase) does not match the set safety standard	Switch to the corresponding safety standard according to the actual grid type.
F163	Grid Phase Instability	Grid abnormality: The grid voltage phase change rate does not comply with local grid standards.	1. If it occurs occasionally, it may be a temporary grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, no manual intervention is required. 2. If it occurs frequently, check whether the grid frequency is within the allowable range. If not, contact the local power operator.
F166	PV Terminal Overtemperature	PV terminal overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient overtemperature. 3. Internal fan malfunction.	

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F167	AC Terminal Overtemperature Warning	AC terminal overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient overtemperature. 3. Internal fan malfunction.	1. Check whether the inverter installation location is well ventilated and whether the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If not ventilated or the ambient temperature is too high, improve the ventilation and heat dissipation. 3. If ventilation and ambient temperature are normal, contact the dealer or after-sales service center.
F168	BAT Terminal Overtemperature	BAT terminal overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient overtemperature.	
F169	BAT Terminal Overtemperature Warning	BAT terminal overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient overtemperature.	

Fault Code	Fault Name	Fault Cause	Fault Handling Suggestion
F170	STS Overtemperature	STS overtemperature, possible causes: 1. STS installation location is not ventilated. 2. Ambient overtemperature.	
F171	Abnormal Inverter-Battery Connection	Abnormal power line connection between battery and inverter	Check whether the power line connection between the battery and the inverter is normal.

7.4.5 Fault Symptom Handling

Fault Name	Fault Cause	Troubleshooting Suggestion
Generator Failure	1. This fault will be displayed continuously if the generator is not connected. 2. When the generator is running, this fault will be triggered if the generator does not meet safety regulations.	1. Ignore this fault if the generator is not connected. 2. This fault is normal when the generator fails. After the generator recovers, wait a while and the fault will clear automatically. 3. This fault does not affect normal operation in off-grid mode. 4. If both the generator and the grid are connected and meet safety regulations, the grid takes priority for on-grid operation, and the system will work in grid-connected mode.

Fault Name	Fault Cause	Troubleshooting Suggestion
BMS Status Bit Error	BMS module fault	Disconnect the AC output switch and DC input switch. After 5 minutes, reconnect the AC output switch and DC input switch. If the fault persists, contact the dealer or after-sales service center.
Ambient Overtemperature	- Poor ventilation of the unit. - Hot air recirculation to the ambient temperature sampling point.	Disconnect the AC output switch and DC input switch. After 5 minutes, reconnect the AC output switch and DC input switch. If the fault persists, contact the dealer or after-sales service center.
PV Terminal Overtemperature	PV Terminal Overtemperature. Possible causes: - Inverter installation location lacks ventilation. - Ambient temperature is too high. - Internal fan malfunction.	- Check whether the inverter installation location has good ventilation and whether the ambient temperature exceeds the maximum allowable ambient temperature range. - If ventilation is poor or ambient temperature is too high, improve the ventilation and heat dissipation. - If ventilation and ambient temperature are normal, contact the dealer or after-sales service center.
BAT Terminal Overtemperature	BAT Terminal Overtemperature. Possible causes: - Inverter installation location lacks ventilation. - Ambient temperature is too high.	- Check whether the inverter installation location has good ventilation and whether the ambient temperature exceeds the maximum allowable ambient temperature range. - If ventilation is poor or ambient temperature is too high, improve the ventilation and heat dissipation. - If ventilation and ambient temperature are normal, contact the dealer or after-sales service center.

Fault Name	Fault Cause	Troubleshooting Suggestion
AC Terminal Overtemperature Warning	AC Terminal Overtemperature. Possible causes: 1. Inverter installation location lacks ventilation. 2. Ambient temperature is too high. 3. Internal fan malfunction.	
BAT Terminal Overtemperature Warning	BAT Terminal Overtemperature. Possible causes: 1. Inverter installation location lacks ventilation. 2. Ambient temperature is too high.	1. Check whether the inverter installation location has good ventilation and whether the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If ventilation is poor or ambient temperature is too high, improve the ventilation and heat dissipation. 3. If ventilation and ambient temperature are normal, contact the dealer or after-sales service center.
Three-phase on-grid fault	Three-phase external wiring error	Rewire.
External STS Failure	Abnormal connection cable between inverter and STS	Check whether the wiring harness connection sequence between the inverter and STS corresponds one-to-one in order.

Fault Name	Fault Cause	Troubleshooting Suggestions
Parallel Comm Timeout Shutdown	In parallel mode, if the slave does not communicate with the master for more than 400 seconds	Check whether the parallel communication cable is connected reliably, and check whether the slave address is duplicated.
Three-phase off-grid phase loss fault	Three-phase off-grid system phase loss	1. Check whether all inverters are powered on; 2. Check whether each phase of the three-phase system has an inverter connected;
EPO	External hardware EPO button triggered or remote EPO command triggered	1. If it is an active remote shutdown, it can be ignored; 2. If not actively triggered, contact the dealer or after-sales service center.
Combustible Gas Concentration High	When the combustible gas detection device detects 20% LEL or higher concentration, it will automatically trigger	1. After the fault occurs, the machine will automatically open the air damper to exhaust and reduce the concentration. When the concentration drops below 5% LEL for 15 minutes continuously, it will automatically clear. 2. After the fault occurs, if a cluster-level fire alarm is triggered, the air damper will automatically close. Confirm the air damper status within 30s to ensure the cluster-level fire protection is executed in a closed space. 3. Contact the dealer or after-sales service center.

Fault Name	Fault Cause	Troubleshooting Suggestions
Combustible Gas Device Open Air Damper & Feedback Signal Mismatch	The control signal to open the air damper does not match the feedback signal	1. Check that the cable signal connection is normal. 2. Contact the dealer or after-sales service center.
One-Key Shutdown	Check via the App whether the one-key shutdown function is enabled	Disable the one-key shutdown.
Offline Shutdown	-	-
Remote Shutdown	-	-
On-Grid SPD Fault	-	1. Try restarting the machine and observe whether the fault clears; 2. If the fault persists after restarting, contact the dealer or after-sales service center.
Off-Grid SPD Fault	-	1. Try restarting the machine and observe whether the fault clears; 2. If the fault persists after restarting, contact the dealer or after-sales service center.

Fault Name	Fault Cause	Troubleshooting Suggestions
Child Node Communication Failure	Internal Comm Abnormal	1. Try restarting the machine and observe whether the fault clears; 2. If the fault persists after restarting, contact the dealer or after-sales service center.
Dehumidifier Communication Failure	Communication link between dehumidifier and LC control box is abnormal	1. Check the communication cable and observe whether the fault clears; 2. Try restarting the machine and observe whether the fault clears; 3. If the fault persists after restarting, contact the dealer or after-sales service center.
Combustible Gas Detection Device Communication Failure	1. The combustible gas device was not properly configured with 485 address 2 at the factory. 2. Communication link between the combustible gas device and the LC control box is abnormal	1. Check the communication cable and observe whether the fault clears; 2. Try restarting the machine and observe whether the fault clears; 3. Use the method provided by the combustible gas manufacturer to check whether the address of the combustible gas device is 2; if not, modify it; 4. If the fault persists after restarting, contact the dealer or after-sales service center.

Fault Name	Fault Cause	Troubleshooting Suggestions
DG Communication Failure	Communication link between control board and DG is abnormal	1. Check the communication cable and observe whether the fault clears; 2. Try restarting the machine and observe whether the fault clears; 3. If the fault persists after restarting, contact the dealer or after-sales service center.
Battery Over Voltage	1. Single cell voltage too high 2. Voltage sampling cable abnormal	Record the fault phenomenon, restart the battery, wait a few minutes, and confirm whether the fault disappears. If the problem persists after restarting, contact the after-sales service center.
	1. Battery total voltage too high 2. Voltage sampling cable abnormal	
Battery Undervoltage	1. Single cell voltage too low 2. Voltage sampling cable abnormal	
	1. Battery total voltage too low 2. Voltage sampling cable abnormal	
Battery Overcurrent	1. Charging current too high, battery current limit abnormal: temperature and voltage values change abruptly 2. Inverter response abnormal	

Fault Name	Fault Cause	Troubleshooting Suggestions
	Battery discharge current too high	
Battery Overtemperature	1. Ambient Overtemperature 2. Temperature sensor abnormal	
Battery Undertemperature	1. Ambient temperature too low 2. Temperature sensor abnormal	
Battery Terminal Overtemperature	Terminal temperature too high	

Fault Name	Fault Cause	Troubleshooting Suggestions
Battery Imbalance	1. Temperature difference too large: at different stages, the battery will limit battery power, i.e., limit charge/discharge current. So this problem is generally rare. 2. Cell capacity degradation leads to high internal resistance, causing large temperature rise during overcurrent, thus large temperature difference. 3. Poor welding of cell tabs, causing rapid temperature rise of the cell during overcurrent. 4. Temperature sampling issue; 5. Power cable connection loose	

Fault Name	Fault Cause	Troubleshooting Suggestions
	1. Inconsistent aging degree of cells 2. Slave board chip issues can also cause excessive cell voltage difference; 3. Slave board balancing issues can also cause excessive cell voltage difference; 4. Cable issues causing the problem	
Insulation Resistance	Insulation resistance damaged	Check whether the ground wire is properly connected, restart the battery. If the problem persists after restarting, contact the after-sales service center.
Pre-charging Failure	Pre-charging failure	Indicates that during the pre-charge process, the voltage across the pre-charge MOS always exceeds the specified threshold. Shut down and restart, observe whether the fault persists, check whether the wiring is correct and whether the pre-charge MOS is damaged.
Sampling Cable Fault	Battery sampling cable poor contact or disconnected	Check the wiring, restart the battery. If the problem persists after restarting, contact the after-sales service center.
	Single cell voltage sampling cable poor contact or disconnected	Check the wiring, restart the battery. If the problem persists after restarting, contact the after-sales service center.

Fault Name	Fault Cause	Troubleshooting Suggestions
	Single cell temperature sampling cable poor contact or disconnected	
	Dual-channel current comparison error too large, or current sampling cable loop abnormal	
	Dual-channel voltage comparison error too large, or MCU and AFE voltage comparison error too large, or voltage sampling cable loop abnormal	
	Temperature sampling cable loop abnormal or poor contact, disconnected	
	Overvoltage level 5 or overtemperature level 5, three-terminal fuse blown	Three-terminal fuse blown, contact the after-sales service center to replace the main control board.
Relay or MOS Overtemperature	Relay or MOS overtemperature	This fault indicates that the MOS temperature exceeds the specified threshold. Shut down and let it rest for 2 hours to allow the temperature to recover.

Fault Name	Fault Cause	Troubleshooting Suggestions
Shunt Overtemperature	Shunt overtemperature	This fault indicates that the shunt temperature exceeds the specified threshold. Shut down and let it rest for 2 hours to allow the temperature to recover.
BMS1 Other Fault 1 (Residential Storage)	Relay or MOS open circuit	1. Upgrade the software, let it rest for 5 minutes, then restart and check if the fault persists; 2. If it persists, replace the battery pack.
	Relay or MOS short circuit	1. Upgrade the software, let it rest for 5 minutes, then restart and check if the fault persists; 2. If it persists, replace the battery pack.
	Communication abnormality between master cluster and slave cluster, or inconsistency between cells of clusters	1. Check the battery information and software version of the slave, and whether the communication cable connection with the master is normal 2. Upgrade the software
	Battery system return cable abnormal, causing interlock signal not to form a loop	Check whether the terminating resistor is installed correctly
	BMS and PCS communication abnormal	1. Confirm that the communication cable interface definition between the inverter and the battery is correct; 2. Contact the after-sales service center to check the background data and observe whether the inverter and battery software match correctly.

Fault Name	Fault Cause	Troubleshooting Suggestions
	BMS master and slave communication cable abnormal	1. Check the wiring, restart the battery; 2. Upgrade the battery software. If the problem persists after restarting, contact the after-sales service center.
	Main negative chip communication lost	
	MCB, shunt trip abnormal	1. Let it rest for 5 minutes, then restart and check if the fault persists; 2. Check the blind-mate connector between PACK and PCU bottom; see if the communication pins are loose or bent;
	MCU self-test failed	Upgrade the software, restart the battery. If the problem persists after restarting, contact the after-sales service center.
	1. Software version too low or BMS board damaged 2. Large number of parallel inverters, excessive impact on battery during pre-charge	1. Upgrade the software and observe whether the fault persists 2. If it is a parallel configuration, first black-start the battery then start the inverter
	MCU internal fault	Upgrade the software, restart the battery. Generally, it is detected that the MCU or external device is damaged. If the problem persists after restarting, contact the after-sales service center.

Fault Name	Fault Cause	Troubleshooting Suggestions
	Master current exceeds specified threshold	1. Let it rest for 5 minutes, then restart and check if the fault persists; 2. Check whether the inverter power setting is too high, causing the bus load to be exceeded;
	Parallel cluster battery cells inconsistent	Confirm whether the cells of the parallel cluster batteries are consistent
	Parallel cluster battery positive and negative reversed	Check whether the positive and negative terminals of the parallel cluster battery are reversed
	Severe overtemperature, overvoltage, etc. triggering fire protection system	Contact the after-sales service center.
Air Conditioner Failure	Air conditioner abnormal failure	Try restarting the system. If the fault persists, contact the after-sales service center.
	Cabinet door not closed	Check whether the cabinet door is properly closed
	Supply voltage too high	Confirm whether the supply voltage meets the air conditioner input voltage requirements. If it does, power on again.
	Supply voltage too low	
	No voltage input	
	Supply voltage unstable	

Fault Name	Fault Cause	Troubleshooting Suggestions
	Compressor voltage unstable	Try restarting the system. If the fault persists, contact the after-sales service center.
	Sensor contact poor or damaged	
	Air conditioner fan abnormal	
BMS1 Other Fault 2 (Residential Storage)	DCDC internal voltage or current abnormal	Refer to the specific DC fault details.
	DCDC overload or heatsink temperature too high, etc.	
	Cell sampling abnormal or inconsistent aging degree	Contact the after-sales service center.
	Fan operation not executed normally	Contact the after-sales service center.
	Output port screw loose or poor contact	1. Shut down the battery, check the wiring and output port screws 2. After confirming, restart the battery and observe whether the fault persists. If it persists, contact the after-sales service center.
	Battery usage time too long or cell severely damaged	Contact the after-sales service center to replace the pack.

Fault Name	Fault Cause	Troubleshooting Suggestions
	1. Software version too low or BMS board damaged 2. Large number of parallel inverters, excessive impact on battery during pre-charge	1. Upgrade the software and observe whether the fault persists. 2. If it is a parallel configuration, first black-start the battery then start the inverter.
	Heating film damaged	Contact the after-sales service center.
	Heating film three-terminal fuse blown, heating function unavailable	Contact the after-sales service center.
	Software model, Cell Type, hardware model mismatch	Check whether the software model, SN, cell type, and hardware model are consistent. If not, contact the after-sales service center.
	Thermal management board communication disconnected	1. Let it rest for 5 minutes, then restart and check if the fault persists; 2. If the fault does not clear, contact after-sales to replace the pack.
	Pack fan fault signal triggered	
DCDC Fault	Output port voltage too high	Check the output port voltage. If the output port voltage is normal and the fault does not clear after restarting the battery, contact the after-sales service center.
	DCDC module detects battery voltage exceeds maximum charging voltage	Stop charging, discharge to SOC below 90% or let it rest for 2 hours. If ineffective and the fault persists after restarting, contact the after-sales service center.

Fault Name	Fault Cause	Troubleshooting Suggestions
	Heatsink temperature too high	Let the battery rest for 1 hour to allow the heatsink temperature to drop. If ineffective and the fault persists after restarting, contact the after-sales service center.
	Battery discharge current too high	Check whether the load exceeds the battery's discharge capability. Turn off the load or stop the PCS for 60 seconds. If ineffective and the fault persists after restarting, contact the after-sales service center.
	Output port power cable positive and negative reversed with parallel cluster battery or PCS	Turn off the battery manual switch, check whether the output port wiring is correct, and restart the battery.
	Output power relay cannot close	Check whether the output port wiring is correct and whether there is a short circuit. If ineffective and the fault persists after restarting, contact the after-sales service center.
	Power device temperature too high	Let the battery rest for 1 hour to allow the internal power device temperature to drop. If ineffective and the fault persists after restarting, contact the after-sales service center.
	Relay stuck	If the fault persists after restarting, contact the after-sales service center.
Battery Rack Circulating Current Failure	1. Cell imbalance 2. First power-on without full charge calibration	Record the fault phenomenon, restart the battery, wait a few minutes, and confirm whether the fault disappears. If the problem persists after restarting, contact the after-sales service center.

Fault Name	Fault Cause	Troubleshooting Suggestions
BMS1 Other Fault 3 (Large Storage)	Communication abnormal with Linux module	1. Check whether the communication cable connection is normal 2. Upgrade the software, restart the battery and observe whether the fault persists. If it persists, contact the after-sales service center.
	Cell temperature rise too fast	Cell abnormal, contact after-sales to replace the pack.
	SOC below 10%	Charge the battery.
	SN writing does not comply with rules	Check whether the SN digit length is normal. If abnormal, contact the after-sales service center.
	1. Battery cluster daisy chain communication abnormal 2. Inconsistent aging degree of cells between battery clusters	1. Check the contact of individual cluster battery packs 2. Confirm the usage status of each cluster battery, such as cumulative charge/discharge capacity, cycle count, etc. 3. Contact the after-sales service center.
	Pack internal humidity too high	-
	Fuse blown	Contact after-sales to replace the pack.
	Battery low charge	Charge the battery.
BMS1 Other Fault 4 (Large Storage)	MCB abnormal	Contact after-sales to replace the pack.
	External device abnormal	Contact after-sales to replace the pack.
Contactor Failure 1	-	-

Fault Name	Fault Cause	Troubleshooting Suggestions
Contactor Failure 2	-	-
Overload Protection (Ksic)	Continuous overload (exceeding 690KVA) for 10s	Contact the after-sales service center.
Overload Protection (Smart Port)	Continuous overload (exceeding 690KVA) for 10s	Contact the after-sales service center.
Overcurrent Protection (Ksic)	-	-
Overcurrent Protection (Smart Port)	-	-
Master AC On Meter Comm Error	1. The meter may not be connected to the master 2. The meter communication cable may be loose	1. Check whether the meter is connected to the master 2. Check whether the meter communication cable is loose
Parallel Slave Meter Error	Meter connected to the slave	Set the machine connected to the meter as the master
Slave AC On Timeout with Master	1. Slave address setting error 2. Slave communication cable loose	1. Check whether the slave addresses are duplicated 2. Check whether the parallel communication cable is loose

7.5 Routine Maintenance



When performing operation and maintenance on the inverter, please power off the inverter. Operating the device while energized may cause damage to the inverter or electric shock DANGER.

Maintenance Item	Maintenance Method	Maintenance Cycle
System Cleaning	Check whether there are foreign objects or dust on the heat sink and air inlet/outlet.	Once every 6 months - Once every year
Fan	Check whether the fan operates normally, whether there is abnormal noise, and whether the appearance is normal.	Once every year
DC Switch	Turn the DC switch on and off 10 times consecutively to ensure the DC switch functions properly.	Once every year
Electrical Connection	Check whether the electrical connections are loose, and whether the cable appearance is damaged or exposing copper.	Once every 6 months - Once every year
Sealing	Check whether the sealing of the equipment cable entry hole meets requirements. If the gap is too large or not sealed, reseal it.	Once every year

8 technical parameter

Technical Data	SW010KTL-T1-G2	SW012KTL-T1-G2
Input		
Max. Input Power (kW)	15	18
Max. Input Voltage (V)* ¹	1100	1100
MPPT Operating Voltage Range (V)* ^{2*3}	140 ~ 1000	140 ~ 1000
MPPT Voltage Range at Nominal Power (V)	310~850	380~850
Start-up Voltage (V)	160	160
Nominal Input Voltage (V)	600	600
Max. Input Current per MPPT (A)	22	22
Max. Short Circuit Current per MPPT (A)	27.5	27.5
Max. Backfeed Current to The Array (A)	0	0
Number of MPP Trackers	2	2
Number of Strings per MPPT	1	1
Output		
Nominal Output Power (kW)	10	12

Technical Data	SW010KTL-T1-G2	SW012KTL-T1-G2
Nominal Output Apparent Power (kVA)	10	12
Max. AC Active Power (kW)	11	13.2
Max. AC Apparent Power (kVA)	11	13.2
Nominal Power at 40°C (kW)	10	12
Max. Power at 40°C (Including AC Overload) (kW)	10	12
Nominal Output Voltage (V)	220/380,230/400,240/415, 3L/N/PE or 3L/PE	220/380,230/400,240/415, 3L/N/PE or 3L/PE
Output Voltage Range (V)	180~280 (according to local standard)	180~280 (according to local standard)
Nominal AC Grid Frequency (Hz)	50/60	50/60
AC Grid Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65
Max. Output Current (A)	16.7	20
Max. Output Fault Current (Peak and Duration) (A/μs)	42 ,6.5μs	67 ,6.5μs
Inrush Current (Peak and Duration) (A/μs)	23.7 ,50μs	23.7 ,50μs

Technical Data	SW010KTL-T1-G2	SW012KTL-T1-G2
Nominal Output Current (A)	14.5	17.4
Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)	~1 (Adjustable from 0.8 leading to 0.8 lagging)
Max. Total Harmonic Distortion	<3%	<3%
Maximum Output Overcurrent Protection (A)	42	67
Efficiency		
Max. Efficiency	98.5%	98.5%
European Efficiency	98.0%	98.2%
Protection		
PV String Current Monitoring	Integrated	Integrated
PV Insulation Resistance Detection	Integrated	Integrated
Residual Current Monitoring	Integrated	Integrated
PV Reverse Polarity Protection	Integrated	Integrated
Anti-islanding Protection	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated

Technical Data	SW010KTL-T1-G2	SW012KTL-T1-G2
AC Short Circuit Protection	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated
DC Switch	Integrated	Integrated
DC Surge Protection	Type III (Type II Optional)	Type III (Type II Optional)
AC Surge Protection	Type III (Type II Optional)	Type III (Type II Optional)
AFCI	Optional	Optional
Rapid Shutdown	Optional	Optional
Remote Shutdown	Integrated	Integrated
PID Recovery	Optional	Optional
Power Supply at Night	Optional	Optional
General Data		
Operating Temperature Range (°C)	-30~+60	-30~+60
Derating temperature (°C)	45	45
Storage Temperature (°C)	-40~+70	-40~+70
Relative Humidity	0~100%	0~100%
Max. Operating Altitude (m)	4000	4000
Cooling Method	Natural Convection	Natural Convection

Technical Data	SW010KTL-T1-G2	SW012KTL-T1-G2
User Interface	LED, LCD(Optional), WLAN+APP	LED, LCD(Optional), WLAN+APP
Communication	RS485, WiFi+LAN+Bluetooth , 4G+Bluetooth (Optional)	RS485, WiFi+LAN+Bluetooth , 4G+Bluetooth (Optional)
Communication Protocols	Modbus-RTU (SunSpec Compliant), Modbus-TCP	Modbus-RTU (SunSpec Compliant), Modbus-TCP
Weight (kg)	15.1	16.6
Dimension (W×H×D mm)	491*392*210	491*392*210
Noise Emission (dB)	< 30	< 30
Topology	Non-isolated	Non-isolated
Self-consumption at Night (W)	<1	<1
Ingress Protection Rating	IP66	IP66
Anti-corrosion Class	C4	C4
DC Connector	MC4 (4~6 mm ²)	MC4 (4~6 mm ²)
AC Connector	OT/DT terminal (Max.10mm ²)	OT/DT terminal (Max. 16 mm ²)
Environmental Category	4K4H	4K4H
Pollution Degree	III	III
Overvoltage Category	DC II / AC III	DC II / AC III

Technical Data	SW010KTL-T1-G2	SW012KTL-T1-G2
Protective Class	I	I
The Decisive Voltage Class (DVC)	PV: C AC: C Com: A	PV: C AC: C Com: A
Active Anti-islanding Method	AFDPF + AQDPF *4	AFDPF + AQDPF *4
Country of Manufacture	China	China

*1: When the input voltage is 1000V-1100V, the inverter will enter standby mode. The inverter will return to normal operation state when the voltage returns to the MPPT working voltage range.

*2: PV modules connected to the same MPPT need to be of the same type of PV panel. The voltage difference between the different MPPTs must be <160 V.

*3: Please refer to the user manual for the MPPT Voltage Range at Nominal Power.

*4: AFDPF: Active Frequency Drift with Positive Feedback, AQDPF: Active Q Drift with Positive Feedback.

Technical Data	SW015KTL-T1-G2	SW020KTL-T1-G2
Input		
Max. Input Power (kW)	22.5	30
Max. Input Voltage (V)*1	1100	1100
MPPT Operating Voltage Range (V)*2*3	140 ~ 1000	140 ~ 1000
MPPT Voltage Range at Nominal Power (V)	480~850	520~850
Start-up Voltage (V)	160	160

Technical Data	SW015KTL-T1-G2	SW020KTL-T1-G2
Nominal Input Voltage (V)	600	600
Max. Input Current per MPPT (A)	22	32/22
Max. Short Circuit Current per MPPT (A)	27.5	40/27.5
Max. Backfeed Current to The Array (A)	0	0
Number of MPP Trackers	2	2
Number of Strings per MPPT	1	2/1
Output		
Nominal Output Power (kW)	15	20
Nominal Output Apparent Power (kVA)	15	20
Max. AC Active Power (kW)	16.5	22
Max. AC Apparent Power (kVA)	16.5	22
Nominal Power at 40°C (kW)	15	20
Max. Power at 40°C (Including AC Overload) (kW)	15	20
Nominal Output Voltage (V)	220/380,230/400,240/415, 3L/N/PE or 3L/PE	220/380,230/400,240/415, 3L/N/PE or 3L/PE

Technical Data	SW015KTL-T1-G2	SW020KTL-T1-G2
Output Voltage Range (V)	180~280 (according to local standard)	180~280 (according to local standard)
Nominal AC Grid Frequency (Hz)	50/60	50/60
AC Grid Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65
Max. Output Current (A)	25	33.3
Max. Output Fault Current (Peak and Duration) (A/μs)	67 ,6.5μs	73 ,6.5μs
Inrush Current (Peak and Duration) (A/μs)	23.7,50μs	30.2 ,50μs
Nominal Output Current (A)	21.8	29
Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)	~1 (Adjustable from 0.8 leading to 0.8 lagging)
Max. Total Harmonic Distortion	<3%	<3%
Maximum Output Overcurrent Protection (A)	67	73
Efficiency		
Max. Efficiency	98.5%	98.5%
European Efficiency	98.2%	98.2%
Protection		
PV String Current Monitoring	Integrated	Integrated

Technical Data	SW015KTL-T1-G2	SW020KTL-T1-G2
PV Insulation Resistance Detection	Integrated	Integrated
Residual Current Monitoring	Integrated	Integrated
PV Reverse Polarity Protection	Integrated	Integrated
Anti-islanding Protection	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated
DC Switch	Integrated	Integrated
DC Surge Protection	Type III (Type II Optional)	Type III (Type II Optional)
AC Surge Protection	Type III (Type II Optional)	Type III (Type II Optional)
AFCI	Optional	Optional
Rapid Shutdown	Optional	Optional
Remote Shutdown	Integrated	Integrated
PID Recovery	Optional	Optional
Power Supply at Night	Optional	Optional
General Data		
Operating Temperature Range (°C)	-30~+60	-30~+60

Technical Data	SW015KTL-T1-G2	SW020KTL-T1-G2
Derating temperature (°C)	45	45
Storage Temperature (°C)	-40~+70	-40~+70
Relative Humidity	0~100%	0~100%
Max. Operating Altitude (m)	4000	4000
Cooling Method	Natural Convection	Smart Fan Cooling
User Interface	LED, LCD(Optional), WLAN+APP	LED, LCD(Optional), WLAN+APP
Communication	RS485, WiFi+LAN+Bluetooth , 4G+Bluetooth (Optional)	RS485, WiFi+LAN+Bluetooth , 4G+Bluetooth (Optional)
Communication Protocols	Modbus-RTU (SunSpec Compliant), Modbus- TCP	Modbus-RTU (SunSpec Compliant), Modbus-TCP
Weight (kg)	16.6	18.8
Dimension (W×H×D mm)	491*392*210	530*413*227
Noise Emission (dB)	< 30	< 45
Topology	Non-isolated	Non-isolated
Self-consumption at Night (W)	<1	<1
Ingress Protection Rating	IP66	IP66
Anti-corrosion Class	C4	C4
DC Connector	MC4 (4~6 mm ²)	MC4 (4~6 mm ²)

Technical Data	SW015KTL-T1-G2	SW020KTL-T1-G2
AC Connector	OT/DT terminal (Max. 16 mm ²)	OT/DT terminal (Max. 16mm ²)
Environmental Category	4K4H	4K4H
Pollution Degree	III	III
Overvoltage Category	DC II / AC III	DC II / AC III
Protective Class	I	I
The Decisive Voltage Class (DVC)	PV: C AC: C Com: A	PV: C AC: C Com: A
Active Anti-islanding Method	AFDPF + AQDPF *4	AFDPF + AQDPF *4
Country of Manufacture	China	China

*1: When the input voltage is 1000V-1100V, the inverter will enter standby mode. The inverter will return to normal operation state when the voltage returns to the MPPT working voltage range.

*2: PV modules connected to the same MPPT need to be of the same type of PV panel. The voltage difference between the different MPPTs must be <160 V.

*3: Please refer to the user manual for the MPPT Voltage Range at Nominal Power.

*4: AFDPF: Active Frequency Drift with Positive Feedback, AQDPF: Active Q Drift with Positive Feedback.

Technical Data	SW030KTL-T1-G2
Input	
Max. Input Power (kW)	45

Technical Data	SW030KTL-T1-G2
Max. Input Voltage (V)* ¹	1100
MPPT Operating Voltage Range (V)* ^{2*3}	140~1000
MPPT Voltage Range at Nominal Power (V)	550~850
Start-up Voltage (V)	160
Nominal Input Voltage (V)	600
Max. Input Current per MPPT (A)	42/32
Max. Short Circuit Current per MPPT (A)	52.5/40
Max. Backfeed Current to The Array (A)	0
Number of MPP Trackers	2
Number of Strings per MPPT	2
Output	
Nominal Output Power (kW)	30
Nominal Output Apparent Power (kVA)	30
Max. AC Active Power (kW)	33
Max. AC Apparent Power (kVA)	33
Nominal Power at 40°C (kW)	30

Technical Data	SW030KTL-T1-G2
Max. Power at 40°C (Including AC Overload) (kW)	30
Nominal Output Voltage (V)	220/380,230/400,240/415, 3L/N/PE or 3L/PE
Output Voltage Range (V)	180~280 (according to local standard)
Nominal AC Grid Frequency (Hz)	50/60
AC Grid Frequency Range (Hz)	45~55 / 55~65
Max. Output Current (A)	50
Max. Output Fault Current (Peak and Duration) (A/μs)	115 ,6.5μs
Inrush Current (Peak and Duration) (A/μs)	29.4 ,50μs
Nominal Output Current (A)	45.5 @380V 43.5 @400V 41.7 @415V
Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)
Max. Total Harmonic Distortion	<3%

Technical Data	SW030KTL-T1-G2
Maximum Output Overcurrent Protection (A)	115
Efficiency	
Max. Efficiency	98.6%
European Efficiency	98.3%
Protection	
PV String Current Monitoring	Integrated
PV Insulation Resistance Detection	Integrated
Residual Current Monitoring	Integrated
PV Reverse Polarity Protection	Integrated
Anti-islanding Protection	Integrated
AC Overcurrent Protection	Integrated
AC Short Circuit Protection	Integrated
AC Overvoltage Protection	Integrated
DC Switch	Integrated
DC Surge Protection	Type III (Type II Optional)
AC Surge Protection	Type III (Type II Optional)
AFCI	Optional

Technical Data	SW030KTL-T1-G2
Rapid Shutdown	Optional
Remote Shutdown	Integrated
PID Recovery	Optional
Power Supply at Night	Optional
General Data	
Operating Temperature Range (°C)	-30~+60
Derating temperature (°C)	45
Storage Temperature (°C)	-40~+70
Relative Humidity	0~100%
Max. Operating Altitude (m)	4000
Cooling Method	Smart Fan Cooling
User Interface	LED, LCD (Optional), WLAN+APP
Communication	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)
Communication Protocols	Modbus-RTU (SunSpec Compliant), Modbus-TCP
Weight (kg)	21.1
Dimension (W×H×D mm)	530*413*227

Technical Data	SW030KTL-T1-G2
Noise Emission (dB)	45
Topology	Non-isolated
Self-consumption at Night (W)	< 1
Ingress Protection Rating	IP66
Anti-corrosion Class	C4
DC Connector	MC4 (4~6 mm ²)
AC Connector	OT/DT terminal (Max. 25 mm ²)
Environmental Category	4K4H
Pollution Degree	III
Overvoltage Category	DC II / AC III
Protective Class	I
The Decisive Voltage Class (DVC)	PV: C AC: C Com: A
Active Anti-islanding Method	AFDPF + AQDPF ^{*4}
Country of Manufacture	China

*1: When the input voltage is 1000V-1100V, the inverter will enter standby mode. The inverter will return to normal operation state when the voltage returns to the MPPT working voltage range.

*2: PV modules connected to the same MPPT need to be of the same type of PV

panel. The voltage difference between the different MPPTs must be <160 V.

*3: Please refer to the user manual for the MPPT Voltage Range at Nominal Power.

*4: AFDPF: Active Frequency Drift with Positive Feedback, AQDPF: Active Q Drift with Positive Feedback.

Technical Data	SW040KTL-T1-G2	SW050KTL-T1-G2
Input		
Max. Input Power (kW)	60	75
Max. Input Voltage (V)*1	1100	1100
MPPT Operating Voltage Range (V)*2*3	140~1000	140 ~ 1000
MPPT Voltage Range at Nominal Power (V)	480~850	450~850
Start-up Voltage (V)	160	160
Nominal Input Voltage (V)	600	600
Max. Input Current per MPPT (A)	42/42/32	40
Max. Short Circuit Current per MPPT (A)	52.5/52.5/40	52
Max. Backfeed Current to The Array (A)	0	0
Number of MPP Trackers	3	4
Number of Strings per MPPT	2	2
Output		

Technical Data	SW040KTL-T1-G2	SW050KTL-T1-G2
Nominal Output Power (kW)	40	50
Nominal Output Apparent Power (kVA)	40	50
Max. AC Active Power (kW)	40	50
Max. AC Apparent Power (kVA)	40	50
Nominal Power at 40°C (kW)	40	50
Max. Power at 40°C (Including AC Overload) (kW)	40	50
Nominal Output Voltage (V)	220/380, 230/400, 240/415, 3L/N/PE or 3L/PE	220/380,230/400,240/415, 3L/N/PE or 3L/PE
Output Voltage Range (V)	180~280 (according to local standard)	180~280 (according to local standard)
Nominal AC Grid Frequency (Hz)	50	50/60
AC Grid Frequency Range (Hz)	45~55	45~55 / 55~65
Max. Output Current (A)	60.7	75.7
Max. Output Fault Current (Peak and Duration) (A/μs)	157 ,6.5μs	230 ,4.36μs

Technical Data	SW040KTL-T1-G2	SW050KTL-T1-G2
Inrush Current (Peak and Duration) (A/μs)	60 ,500μs	26.4 ,8.5ms)
Nominal Output Current (A)	60.7 @380V 58.0 @400V 55.6 @415V	75.7 @380V 72.4 @400V 69.4 @415V
Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)	~1 (Adjustable from 0.8 leading to 0.8 lagging)
Max. Total Harmonic Distortion	<3%	<3%
Maximum Output Overcurrent Protection (A)	157	196.6
Efficiency		
Max. Efficiency	98.6%	98.7%
European Efficiency	97.8%	98.0%
Protection		
PV String Current Monitoring	Integrated	Integrated
PV Insulation Resistance Detection	Integrated	Integrated
Residual Current Monitoring	Integrated	Integrated
PV Reverse Polarity Protection	Integrated	Integrated

Technical Data	SW040KTL-T1-G2	SW050KTL-T1-G2
Anti-islanding Protection	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated
DC Switch	Integrated	Integrated
DC Surge Protection	Type III (Type II Optional)	Type II
AC Surge Protection	Type III (Type II Optional)	Type II
AFCI	Optional	Optional
Rapid Shutdown	Optional	Optional
Remote Shutdown	Integrated	Integrated
PID Recovery	Optional	Optional
Power Supply at Night	Optional	Optional
General Data		
Operating Temperature Range (°C)	-30~+60	-30~+60
Derating temperature (°C)	45	45
Storage Temperature (°C)	-40~+70	-40~+70

Technical Data	SW040KTL-T1-G2	SW050KTL-T1-G2
Relative Humidity	0~100%	0~100%
Max. Operating Altitude (m)	4000	4000
Cooling Method	Smart Fan Cooling	Smart Fan Cooling
User Interface	LED, LCD(Optional), WLAN+APP	LED, LCD(Optional), WiFi+APP
Communication	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)
Communication Protocols	Modbus RTU, Modbus TCP	Modbus-RTU (SunSpec Compliant), Modbus-TCP
Weight (kg)	28.0	33.0
Dimension (W×H×D mm)	585*483*230	646*484*230
Noise Emission (dB)	45	50
Topology	Non-isolated	Non-isolated
Self-consumption at Night (W)	< 1	<1
Ingress Protection Rating	IP66	IP66
Anti-corrosion Class	C4	C4
DC Connector	MC4 (Max. 4 ~ 6 mm ²)	MC4 (4 ~ 6mm ²)

Technical Data	SW040KTL-T1-G2	SW050KTL-T1-G2
AC Connector	OT/DT terminal (Max. 35mm ²)	OT/DT terminal (Max. 70 mm ²)
Environmental Category	4K4H	4K4H
Pollution Degree	III	III
Overvoltage Category	DC II / AC III	DC II / AC III
Protective Class	I	I
The Decisive Voltage Class (DVC)	PV: C AC: C Com: A	PV: C AC: C Com: A
Active Anti-islanding Method	AFDPF + AQDPF*4	AFDPF + AQDPF*4
Country of Manufacture	China	China

*1: When the input voltage is 1000V-1100V, the inverter will enter standby mode. The inverter will return to normal operation state when the voltage returns to the MPPT working voltage range.

*2: PV modules connected to the same MPPT need to be of the same type of PV panel. The voltage difference between the different MPPTs must be <160 V.

*3: Please refer to the user manual for the MPPT Voltage Range at Nominal Power.

*4: AFDPF: Active Frequency Drift with Positive Feedback, AQDPF: Active Q Drift with Positive Feedback.

Technical Data	SW012KTL-T1-L-G2	SW017KTL-T1-L-G2
Input		
Max. Input Power (kW)	18	25.5

Technical Data	SW012KTL-T1-L-G2	SW017KTL-T1-L-G2
Max. Input Voltage (V)* ¹	850	850
MPPT Operating Voltage Range (V)* ^{2*3}	140 ~ 700	140 ~ 700
MPPT Voltage Range at Nominal Power (V)	260~600	260~500
Start-up Voltage (V)	160	160
Nominal Input Voltage (V)	420	420
Max. Input Current per MPPT (A)	32/22	42/32
Max. Short Circuit Current per MPPT (A)	40/27.5	52.5/40
Number of MPP Trackers	2	2
Number of Strings per MPPT	1	2
Output		
Nominal Output Power (kW)	12	17
Max. AC Active Power (kW)	13.2	18.7
Max. AC Apparent Power (kVA)	13.2	18.7
Nominal Power at 40°C (kW)	12	17
Max. Power at 40°C (Including AC Overload) (kW)	12	17

Technical Data	SW012KTL-T1-L-G2	SW017KTL-T1-L-G2
Nominal Output Voltage (V)	127/220, 3L/N/PE or 3L/PE	127/220, 3L/N/PE or 3L/PE
Output Voltage Range (V)	114~139(according to local standard)	114~139(according to local standard)
Nominal AC Grid Frequency (Hz)	60	60
AC Grid Frequency Range (Hz)	59.5~60.2	59.5~60.2
Max. Output Current (A)	33.3	50
Nominal Output Current (A)	33.3	50
Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)	~1 (Adjustable from 0.8 leading to 0.8 lagging)
Max. Total Harmonic Distortion	<3%	<3%
Efficiency		
Max. Efficiency	98.2%	97.5%
European Efficiency	97.2%	96.9%
Protection		
PV String Current Monitoring	Integrated	Integrated

Technical Data	SW012KTL-T1-L-G2	SW017KTL-T1-L-G2
PV Insulation Resistance Detection	Integrated	Integrated
Residual Current Monitoring	Integrated	Integrated
Anti-islanding Protection	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated
DC Switch	Integrated	Integrated
DC Surge Protection	Type II	Type II
AC Surge Protection	Type III (Type II Optional)	Type III (Type II Optional)
AFCI	Optional	Optional
Rapid Shutdown	Optional	Optional
Remote Shutdown	Integrated	Integrated
PID Recovery	Optional	Optional
Power Supply at Night	Optional	Optional
General Data		
Operating Temperature Range (°C)	-30~+60	-30~+60
Relative Humidity	0~100%	0~100%

Technical Data	SW012KTL-T1-L-G2	SW017KTL-T1-L-G2
Cooling Method	Smart Fan Cooling	Smart Fan Cooling
User Interface	LED, LCD(Optional), WLAN+APP	LED, LCD(Optional), WLAN+APP
Communication	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional al)
Communication Protocols	Modbus RTU, Modbus TCP	Modbus RTU, Modbus TCP
Weight (kg)	18.8	21.1
Dimension (W×H×D mm)	530×413×227	530×413×227
Noise Emission (dB)	< 45	< 45
Topology	Non-isolated	Non-isolated
Self-consumption at Night (W)	<1	<1
Ingress Protection Rating	IP66	IP66
Anti-corrosion Class	C4	C4
DC Connector	MC4 (4~6 mm ²)	MC4 (4~6 mm ²)
AC Connector	OT/DT terminal (Max. 16mm ²)	OT/DT terminal (Max. 16 mm ²)
Environmental Category	4K4H	4K4H
Pollution Degree	III	III

Technical Data	SW012KTL-T1-L-G2	SW017KTL-T1-L-G2
Overvoltage Category	DC II / AC III	DC II / AC III
Protective Class	I	I
The Decisive Voltage Class (DVC)	PV: C AC: C Com: A	PV: C AC: C Com: A
Active Anti-islanding Method	AFDPF + AQDPF*4	AFDPF + AQDPF*4
Country of Manufacture	China	China

Technical Data	SW030KTL-T1-L-G2
Input	
Max. Input Power (kW)	45
Max. Input Voltage (V)*1	850
MPPT Operating Voltage Range (V)*2*3	140 ~ 700
MPPT Voltage Range at Nominal Power (V)	350~600
Start-up Voltage (V)	160
Nominal Input Voltage (V)	420
Max. Input Current per MPPT (A)	40/40/40/40

Technical Data	SW030KTL-T1-L-G2
Max. Short Circuit Current per MPPT (A)	52/52/52/52
Number of MPP Trackers	4
Number of Strings per MPPT	2
Output	
Nominal Output Power (kW)	30
Max. AC Active Power (kW)	33
Max. AC Apparent Power (kVA)	33
Nominal Power at 40°C (kW)	30
Max. Power at 40°C (Including AC Overload) (kW)	30
Nominal Output Voltage (V)	127/220, 3L/N/PE or 3L/PE
Output Voltage Range (V)	114~139 (according to local standard)
Nominal AC Grid Frequency (Hz)	60
AC Grid Frequency Range (Hz)	59.5~60.2
Max. Output Current (A)	78.8

Technical Data	SW030KTL-T1-L-G2
Nominal Output Current (A)	78.8
Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)
Max. Total Harmonic Distortion	<3%
Efficiency	
Max. Efficiency	98.0%
European Efficiency	97.1%
Protection	
PV String Current Monitoring	Integrated
PV Insulation Resistance Detection	Integrated
Residual Current Monitoring	Integrated
Anti-islanding Protection	Integrated
AC Overcurrent Protection	Integrated
AC Short Circuit Protection	Integrated
AC Overvoltage Protection	Integrated
DC Switch	Integrated

Technical Data	SW030KTL-T1-L-G2
DC Surge Protection	Type II
AC Surge Protection	Type II
AFCI	Optional
Rapid Shutdown	Optional
Remote Shutdown	Integrated
PID Recovery	Optional
Power Supply at Night	Optional
General Data	
Operating Temperature Range (°C)	-30 ~ 60
Relative Humidity	0 ~ 100%
Cooling Method	Smart Fan Cooling
User Interface	LED, LCD (Optional), WLAN+APP
Communication	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth (Optional)
Communication Protocols	Modbus RTU, Modbus TCP
Weight (kg)	33.0
Dimension (W×H×D mm)	646×484×230

Technical Data	SW030KTL-T1-L-G2
Noise Emission (dB)	< 50
Topology	Non-isolated
Self-consumption at Night (W)	<1
Ingress Protection Rating	IP66
Anti-corrosion Class	C4
DC Connector	MC4 (4~6 mm ²)
AC Connector	OT/DT terminal (Max. 70 mm ²)
Environmental Category	4K4H
Pollution Degree	III
Overvoltage Category	DC II / AC III
Protective Class	I
The Decisive Voltage Class (DVC)	PV: C AC: C Com: A
Active Anti-islanding Method	AFDPF + AQDPF ^{*4}
Country of Manufacture	China

*1: When the input voltage is 700V-850V, the inverter will enter standby mode. The inverter will return to normal operation state when the voltage returns to the MPPT working voltage range.

*2: PV modules connected to the same MPPT need to be of the same type of PV

panel. The voltage difference between the different MPPTs must be <160 V.

*3: Please refer to the user manual for the MPPT Voltage Range at Nominal Power.

*4: AFDPF: Active Frequency Drift with Positive Feedback, AQDPF: Active Q Drift with Positive Feedback.

9 Explanation of Terms

Explanation of Overvoltage Categories

- **Overvoltage Category I:** Equipment connected to circuits with measures to limit transient overvoltages to a relatively low level.
- **Overvoltage Category II:** Energy-consuming equipment supplied by fixed electrical installations. This equipment includes appliances, portable tools, and other household and similar loads. If special requirements for reliability and suitability apply to such equipment, Overvoltage Category III is used.
- **Overvoltage Category III:** Equipment in fixed electrical installations where special requirements for reliability and suitability must be met. Includes switching devices in fixed installations and industrial equipment permanently connected to fixed installations.
- **Overvoltage Category IV:** Equipment used at the origin of the electrical installation, including meters and primary overcurrent protection devices, etc.
- **Explanation of Wet Location Categories**

Environmental Parameters	Level		
	3K3	4K2	4K4H
Temperature Range	0~+40°C	-33~+40°C	-33~+40°C
Humidity Range	5% to 85%	15% to 100%	4% to 100%

- **Explanation of Environmental Categories:**
 - **Outdoor inverter:** Ambient air temperature range -25~+60°C, suitable for Pollution Degree 3 environment;
 - **Indoor Type II inverter:** Ambient air temperature range -25~+40°C, suitable for Pollution Degree 3 environment;
 - **Indoor Type I inverter:** Ambient air temperature range 0~+40°C, suitable for Pollution Degree 2 environment;
- **Explanation of Pollution Degree Categories**
 - **Pollution Degree 1:** No pollution or only dry, non-conductive pollution;
 - **Pollution Degree 2:** Normally only non-conductive pollution, but temporary conductivity caused by condensation must be considered;
 - **Pollution Degree 3:** Conductive pollution, or dry non-conductive pollution that

becomes conductive due to condensation;

- **Pollution Degree 4:** Persistent conductive pollution, e.g., due to conductive dust, rain, or snow.

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