



EN

User Manual

Grid-connected Inverter

STT 100-150KTL

sunways

SUNWAYS INVERTER CONVERTER

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» 1 Preface

※ 1.1 Overview

This manual is an integral part of Sunways STT 100-150kW series three-phase inverters (hereinafter referred to as the inverter). It mainly introduces the assembly, installation, electrical connection, maintenance and troubleshooting of the products. Before installing and using the inverter, please read this manual carefully, understand the safety information and be familiar with the functions and characteristics of the inverter.

※ 1.2 How To Use This Manual

Before installing or operating the inverter, carefully read this manual to understand the safety precautions and familiarize yourself with the inverter's functions and features. Note that the manual for future versions of the inverter may be updated. The latest version can be accessed at www.sunways-tech.com.

※ 1.3 Target Groups

This manual is applicable to the electrical installers with professional qualifications and end-users. If there are any problems in the installation process, please call Sunways service telephone at +86 400-9922-958 or email Sunways at service@sunways-tech.com for consultation.

» 2 Safety Instructions

※ 2.1 Safety Notes

- ① Before installation, please read this manual carefully and follow the instructions in this manual strictly.
- ② Installers need to undergo professional training or obtain electrical related professional qualification certificates.
- ③ When installing, do not open the front cover of the inverter. Apart from performing work at the wiring terminal (as instructed in this manual), touching or changing components without authorization may cause injury to people, damage to inverters and annulment of the warranty.
- ④ All electrical installations must conform to local electrical safety standards.
- ⑤ If the inverter needs maintenance, please contact the local designated personnel for system installation and maintenance.
- ⑥ To use this grid-connected inverter for power generation needs the permission of the local power supply authority.
- ⑦ The temperature of some parts of the inverter may exceed 60° C during operation. To avoid being burnt do not touch the inverter during operation. Let it cool before touching it.
- ⑧ When exposed to sunlight, the PV array generates dangerous high DC voltage. Please operate according to our instructions, or it will result in danger to life.
- ⑨ The safety instructions in this manual are only supplements and cannot cover all the precautions that should be followed. Perform operations considering actual onsite conditions.
- ⑩ This device is heavy. Do not attempt to lift or move it alone. Doing so may result in foot injury or other accidents. Always use proper lifting equipment or seek assistance.

※ 2.2 Statement

Sunways Technologies Co.,Ltd. has the right not to undertake quality assurance in any of

the following circumstances:

- ① Damages caused by improper transportation.
- ② Damages caused by incorrect storage, installation or use.
- ③ Damages caused by installation and use of equipment by non-professionals or untrained personnel.
- ④ Damages caused by failure to comply with the instructions and safety warnings in this document.
- ⑤ Damages of running in an environment that does not meet the requirements stated in this document.
- ⑥ Damages caused by operation beyond the parameters specified in applicable technical specifications.
- ⑦ Damages caused by unauthorized disassembly, alteration of products or modification of software codes.
- ⑧ Damages caused by abnormal natural environment (force majeure, such as lightning, earthquake, fire, storm, etc.).
- ⑨ Any damages caused by the process of installation and operation which don't follow the local standards and regulations.
- ⑩ Products beyond the warranty period.

※ 2.3 Important Safety Matters

Table below shows the symbols that may appear in this document and their definition:

 Danger	Dangerous situation, if not avoided, it could result in death or serious personal injury.
 Warning	Potentially dangerous situation, if not avoided, may result in death or serious personal injury.

 Caution	Potentially dangerous situation, if not avoided, may result in moderate or minor personal injury.
 Attention	The safety warning information about equipment or environment, to prevent equipment damage, data loss, equipment performance degradation or other unpredictable results.
 Note	Symbol highlights important information, best practices and tips, etc.

※ 2.4 Symbols Explanation

This chapter mainly elaborates the symbols displayed on the inverter, nameplate and packing box.

▼ 2.4.1 Symbols on the Inverter

	Inverter status indicator.
	Inverter running indicator.
	Grounding symbol, the inverter casing needs to be properly grounded.

▼ 2.4.2 Symbol on the Inverter nameplate

	The inverter cannot be disposed of with household waste.
	Please read the instructions carefully before installation.
	Do not touch any internal parts of the inverter until 5 min after being disconnected from the mains and PV input.
	CE mark, the inverter complies with the requirements of the applicable CE guidelines.
	TUV certification.
	Danger. Risk of electric shock!
	The surface is hot during operation and no touch is allowed.



Electric shock hazard, live parts, risk of electric shock, do not touch.

▼ 2.4.3 Symbol on the Packing box



Handle with care.



This side up.



Keep dry.



Stacked layers.

» 3 Product Description

※ 3.1 Basic Features

▼ 3.1.1 Function

The Sunways STT 100-150kW series inverter is a three-phase grid-connected PV inverter which used to efficiently convert the DC power generated by the PV string into AC power and feed it into the grid.

▼ 3.1.2 Models

The STT 100-150kW series inverter includes 5 models which are listed below: STT-100KTL-SE, STT-110KTL-SE, STT-125KTL-SE, STT-136KTL-SE, STT-150KTL-SE, STT-55KTL-SE-LV, STT-60KTL-SE-LV, STT-70KTL-SE-LV, STT-75KTL-SE-LV, STT-80KTL-SE-LV, STT-130KTL-SE-HV, STT-145KTL-SE-HV, STT-165KTL-SE-HV, STT-170KTL-SE-HV

▼ 3.1.3 Applicable grid type

The applicable grid types for the Sunways STT 100-150kW series are TN-S, TN-C, TN-C-S, IT and TT. When applied to the TT grid, the voltage of N to PE should be less than 30V.

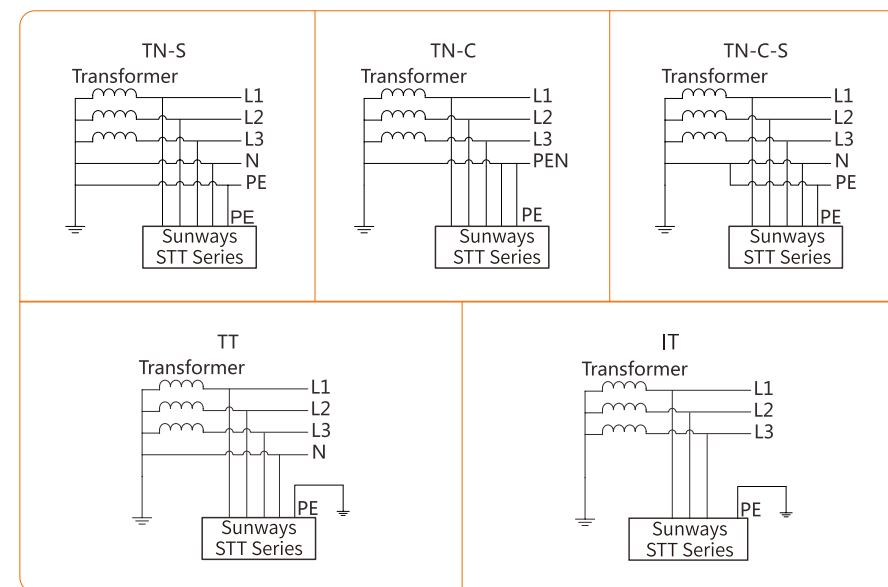


Figure 3-1 400V Applicable grid types

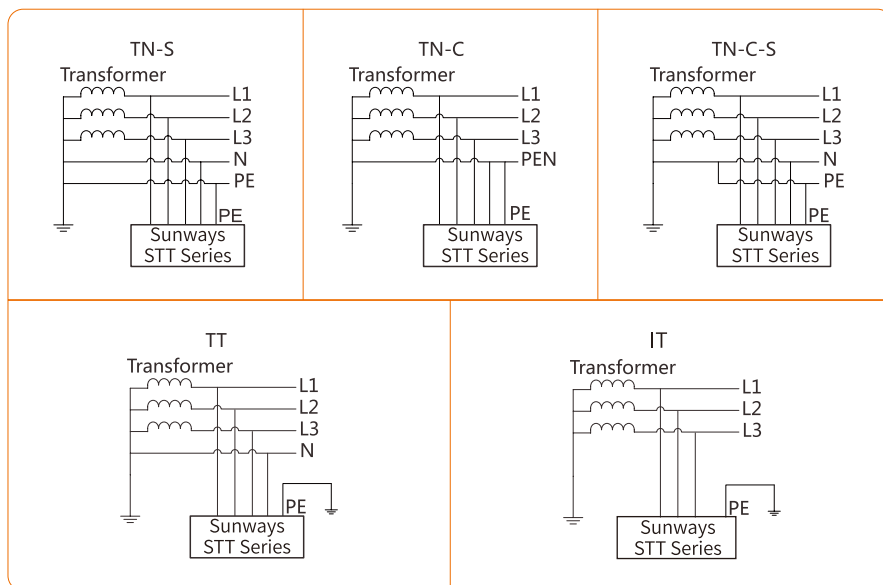


Figure 3-2 230V output inverter applicable grid type

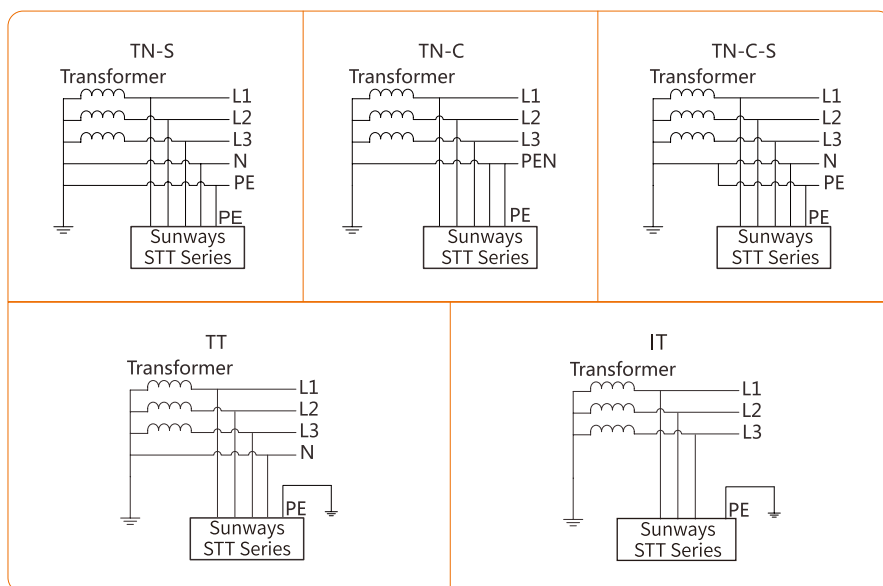


Figure 3-1 500V output inverter applicable grid type

3.1.4 Storage conditions

- ① Inverter must be stored in its original packaging.
- ② The storage temperature and humidity should be in the range of -30°C and $+60^{\circ}\text{C}$, and less than 90%, respectively.
- ③ If a batch of inverters needs to be stored, the height of each pile should be no more than 2 levels.

3.2 Physical Layout

3.2.1 Inverter front view

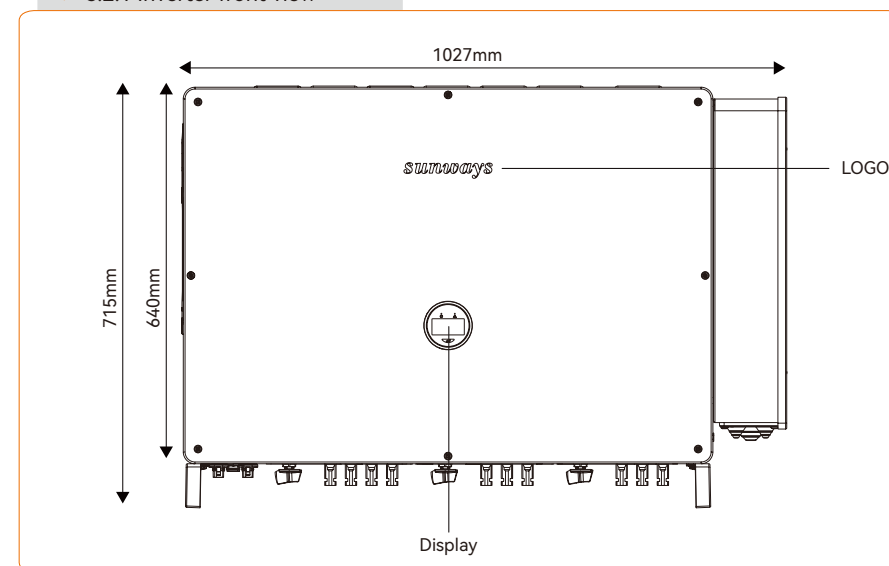


Figure 3-3 Front view

3.2.2 Inverter side view

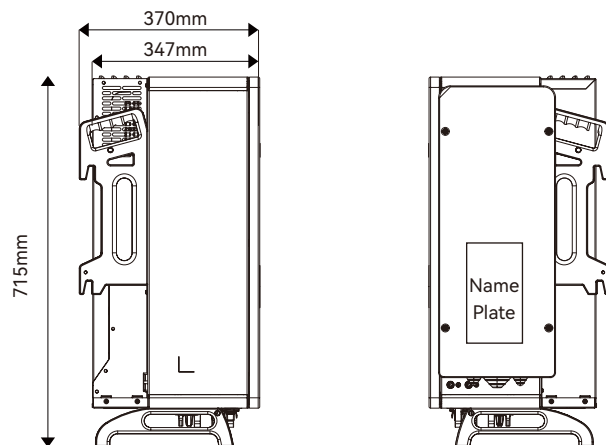


Figure 3-4 Side view

3.2.3 Inverter Bottom View

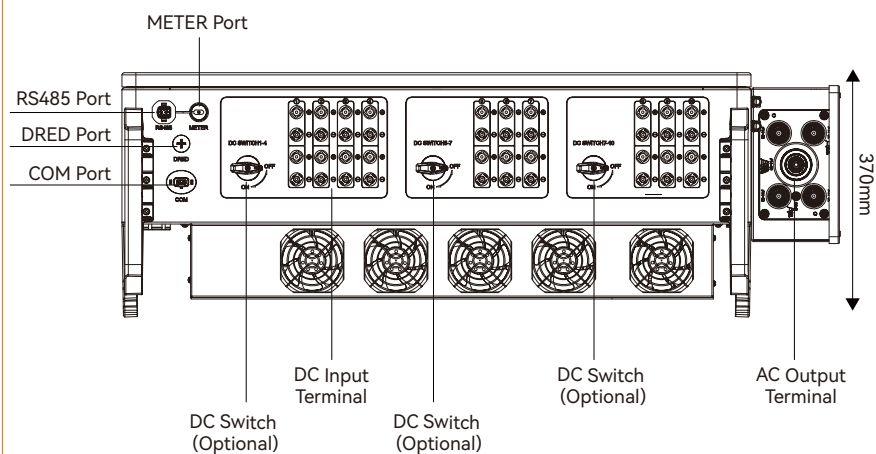


Figure 3-5 Bottom view

Wiring terminals are at the bottom of the inverter, as shown in the table below.

Item	Terminal	Note
1	DC Input terminal	PV connector
2	COM 1 Port	WiFi/LAN/GPRS/4G device connector
3	COM 2 Port	RS485/DRED connector
4	AC Output Terminal	Used for AC output cable connection

3.2.4 Inverter back view

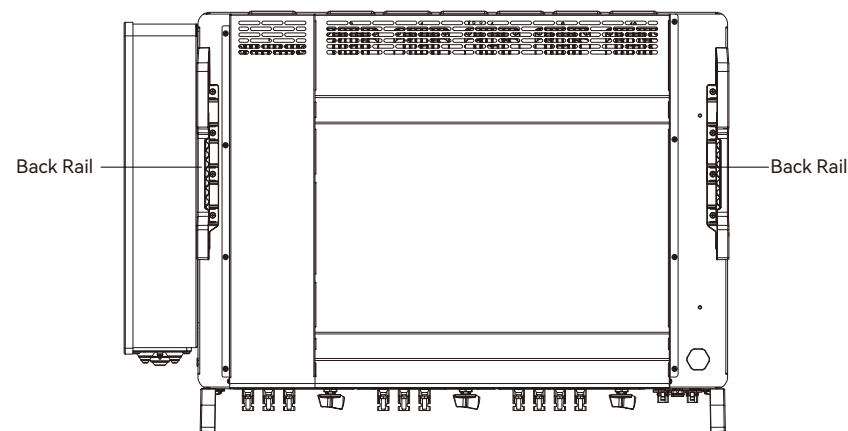


Figure 3-6 Inverter back view

※ 3.3 Display Interface



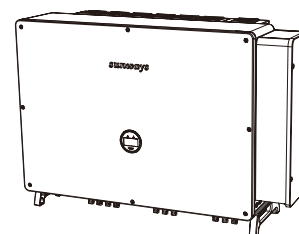
Figure 3-7 Display interface

Item	Indicator	Status	Description
1	Power Indicator	Off	No input voltage detected or input voltage is too low.
		Slow flashing	Inverter powered on, waiting for the grid connection.
		Quick flashing	Inverter detected grid power and entered self-test status.
		On	Normal, grid-connected and power generated.
2	Alarm Indicator	On	An alarm or faults detected, specific fault information can be viewed from the display.
		Off	The inverter is running normally.
		Slow flashing	The monitoring device is not connected to the router or is not connected to internet.
		Quick flashing	The monitoring device is connected to the router or connected to internet but not connected to the server.
3	OLED Display	On	Display the inverter operating information.
		Off	If the button pressed without any response, the screen is faulty or not well connected.
4	Button	Physical button	Switch OLED display information and set parameters by short press and long press.

※ 3.4 Packing List

The package of the inverter includes the following accessories. Please check whether the accessories in the packing box are complete when receiving the goods. See Figure 3-7 for the packing list.

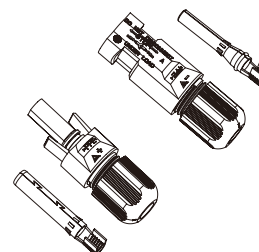
▼ Inverter×1



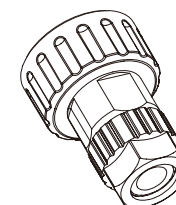
▼ Wall Bracket×1



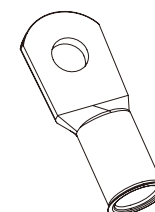
▼ PV Terminal×20^①



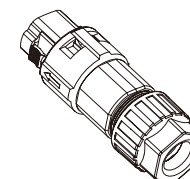
▼ Meter-Lead Connector×1



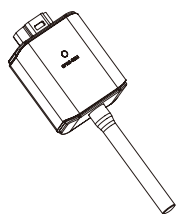
▼ RND38-8S Enclosure Grounding Terminal x2



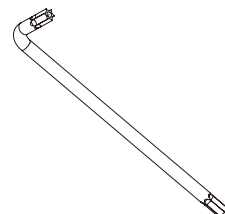
▼ RS485 Cable-End Connector



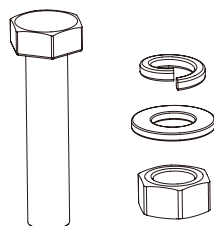
▼ Monitoring Device × 1(Optional)



▼ Ring Spanner ×1



▼ M10 Bracket Screw×4



▼ User Guide

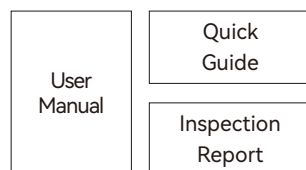


Figure 3-8 Packing list

» 4 Installation

※ 4.1 Location

The Sunways STT 100-150kW series inverters designed with IP66 protection enclosure for indoor and outdoor installations. When selecting an inverter installation location, the following factors should be considered:

- ① The wall on which the inverters mounted must be able to withstand the weight of the inverter.
- ② The inverter needs to be installed in a well-ventilated environment.
- ③ Do not expose the inverter directly to strong sunlight to prevent excessive temperature operation. The inverter should be installed in a place with shelter to prevent direct exposure to sunlight and rain.
- ④ Install the inverter at eye level for easy inspection of screen data and further maintenance.
- ⑤ The ambient temperature of the inverter installation location should be between -30°C and 60°C .
- ⑥ The surface temperature of the inverter may reach up to 75°C . To avoid risk of burns, do not touch the inverter while it's operating and inverter must be installed out of reaching of children.

▼ 4.1.1 Installation location

Recommended installation location of the inverter, as shown in Figure 4-1:



Figure 4-1 Recommended installation location



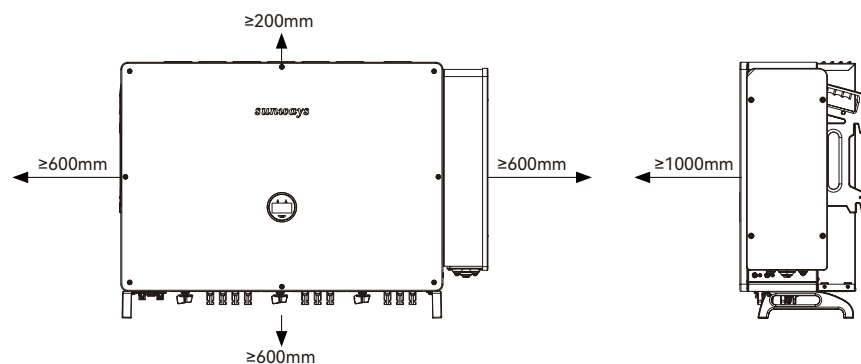
Warning

Do not put flammable and explosive articles around the inverter.

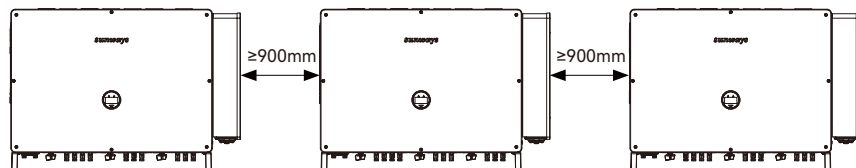
▼ 4.1.2 Installation Spacing

Reserve sufficient clearance around the inverter for installation and heat dissipation.

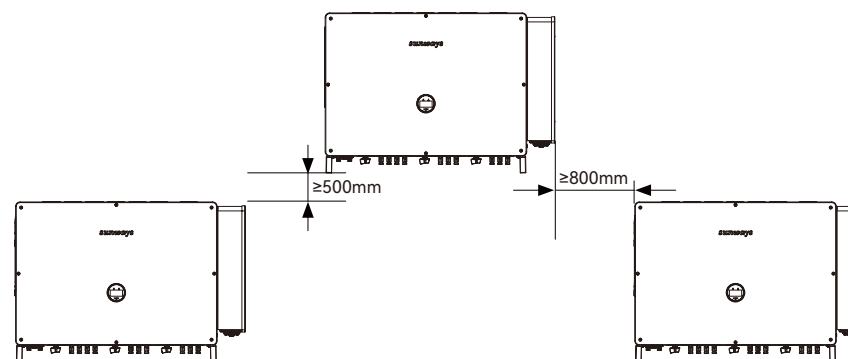
▼ Single-unit installation scenario



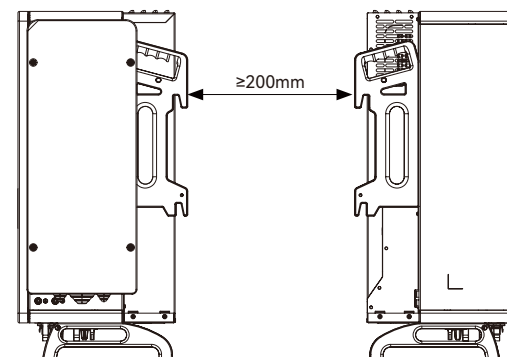
▼ Horizontal installation mode (recommended)



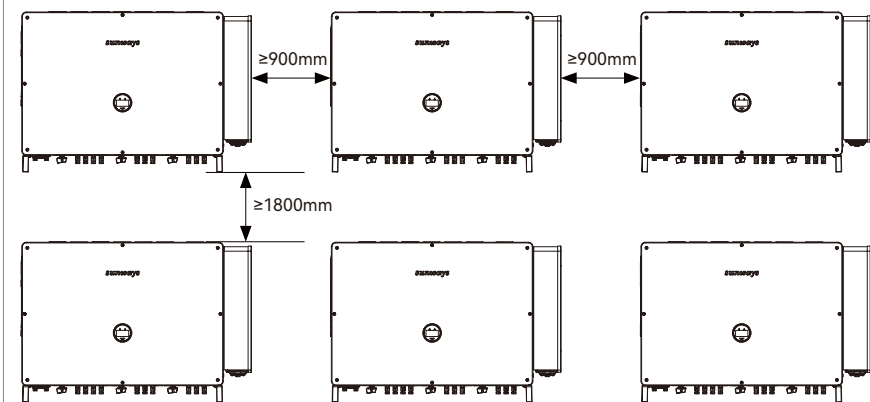
▼ Triangle installation mode (recommended)



▼ Back-to-back installation mode (recommended)



▼ Stacked installation mode (not recommended)



▼ 4.1.3 Installation Angle

The installation angle of the inverter is recommended as shown in Figure 4-3:

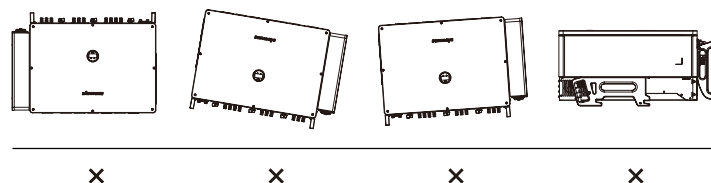


Figure 4-3 Recommended installation angle

※ 4.2 Mounting

▼ 4.2.1 Wall bracket installation

Dimensions of wall bracket, see Figure 4-4:

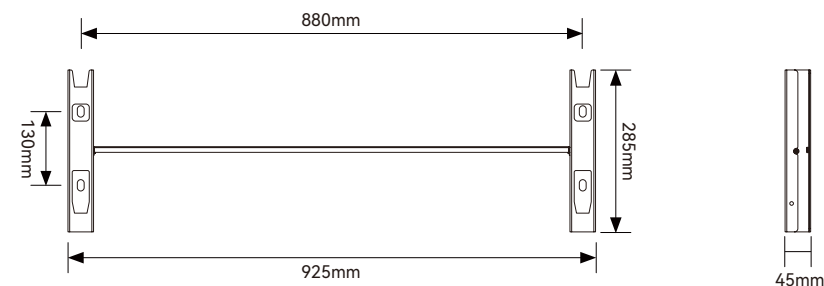


Figure 4-4 Dimensions of wall bracket

Use the inverter back bracket as the template to mark the position of 4 holes on installation bracket.

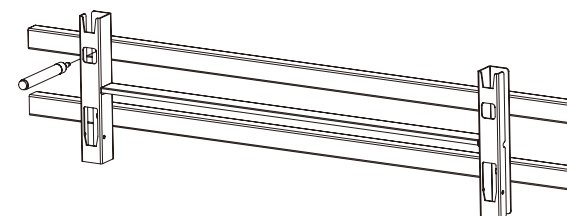


Figure 4-5 Mark the hole position

③ Use an electrical driller with 12mm diameter bit to drill 4 holes on the installation bracket. See Figure 4-6 for details:

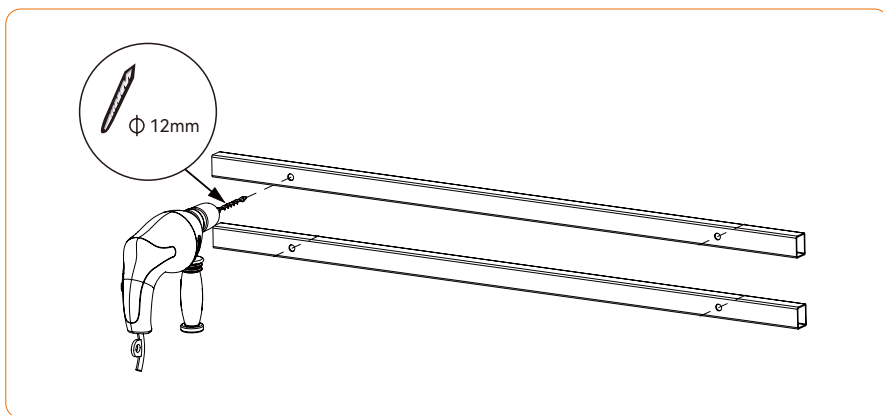


Figure 4-6 Drill the holes

③ Follow the instructions in the picture below to install the M10 assembling bolts (bolt, spring washer, flat washer) and tighten the bolts with torque wrench in the torque of 35N.m, see Figure 4-7 for details:

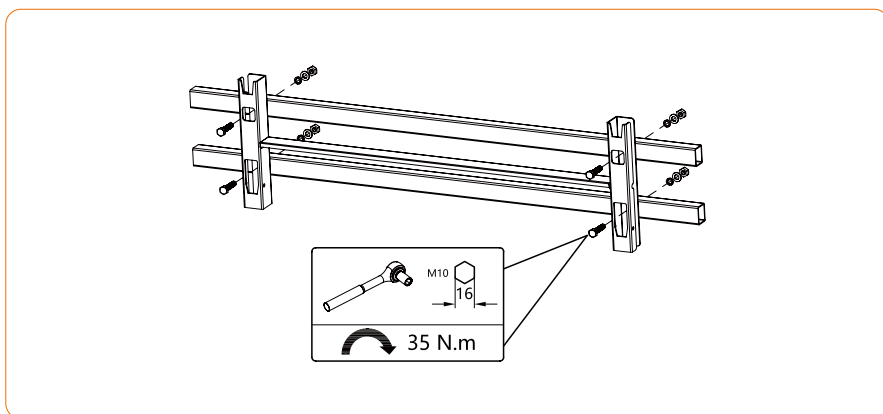


Figure 4-7 Fixing the bracket

▼ 4.2.2 Mounting the inverter

Lift the inverter, hang the back rail on the fixed back bracket carefully. See Figure 4-8 for details:

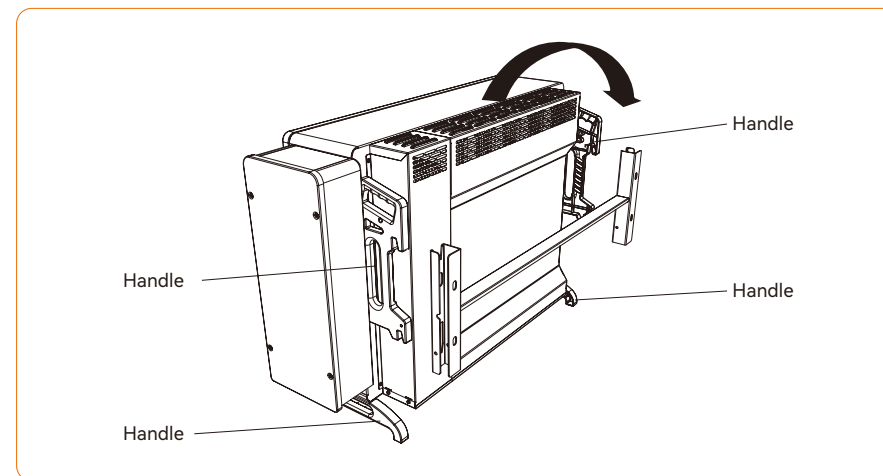


Figure 4-8 Mounting the inverter

※ 4.3 External ground connection



Danger

Do not connect the N-wire as a protective ground wire to the inverter casing. Otherwise, it may cause electric shock.



Attention

Good grounding is good for resisting surge voltage shock and improving EMI performance. Inverters must be well-grounded. For a system with only one inverter, the PE cable needs to be grounded. For a multi-inverter system, all inverters PE wires need to be connected to the same grounding copper bar to ensure equipotential bonding.

Ground terminal connection steps:

- ① The external grounding terminal is located in the lower right side of the inverter.
- ② Fix the grounding terminal to the PE wire with a proper tool and lock the grounding terminal to the grounding hole in the lower right side of the inverter, as shown in Figure 4-9.

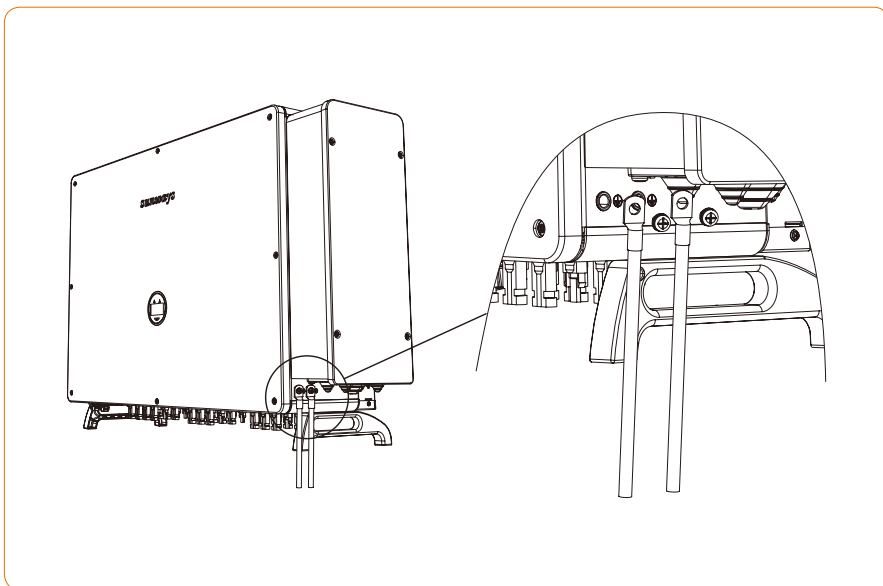


Figure 4-9 Grounding terminal connection

※ 4.4 Electrical Connection

 Danger	A high voltage in the conductive part of the inverter may cause an electric shock. When installing the inverter, make sure that the AC and DC sides of the inverter are completely de-energized.
 Warning	Do not ground the positive or negative pole of the PV string, otherwise it will cause serious damage to the inverter.
 Warning	Static may cause damage to the electronic components of the inverter. Anti-static measures should be taken during installation and maintenance.



Attention

Do not use other brands or other types of terminals other than the terminals in the accessory package. Sunways has the right to refuse all damages caused by the mixed-use of terminals.



Attention

Moisture and dust can damage the inverter, ensure the cable gland is securely tightened during installation. The warranty claim will be invalidated if the inverter is damaged as a result of a poorly connected cable connector.

▼ 4.4.1 Inverter PV string connection

1. The following must be considered when making electrical connections to the inverter:

- ① Disconnect the AC breaker switch on the grid side.
- ② The DC switch of the inverter must be turned to the "OFF" position.
- ③ For best practice, ensure PV modules of the same model and specifications are connected in each string.
- ④ Make sure the maximum output voltage of each PV string does not exceed 1100V.

2. DC connector assembly procedure

① Select the appropriate photovoltaic cable:

Cable type	Traverse area (mm ²)	
	Range (mm ²)	Recommended value (mm ²)
General photovoltaic cable	4-6	4.7-6.4

② Peel off the DC cable insulation sleeve for 7 mm, as shown in Figure 4-10:

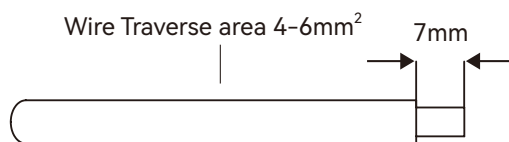


Figure 4-10

③ Disassemble the connector in the accessory bag, as shown in Figure 4-11:

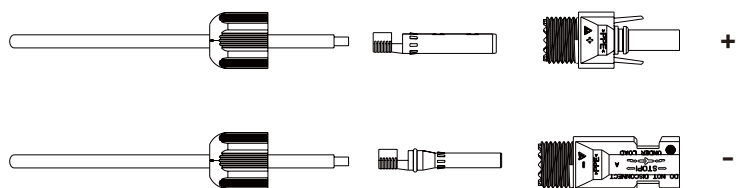


Figure 4-11

④ Insert the DC cable through the DC connector nut into the metal terminal and press the terminal with a professional crimping plier (pull back the cable with some power to check if the terminal is well connected to the cable), as shown in Figure 4-12:

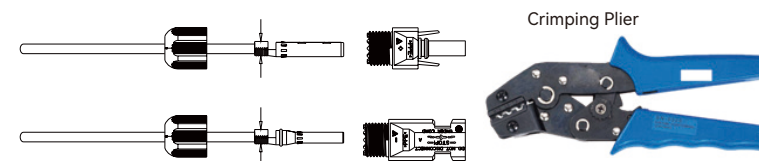


Figure 4-12

⑤ Insert the positive and negative cables into the corresponding positive and negative connectors, pull back the DC cable to ensure that the terminal is tightly attached in the connector.

⑥ Use an open-end wrench to screw the nut to the end to ensure that the terminal is well sealed, as shown in Figure 4-13:

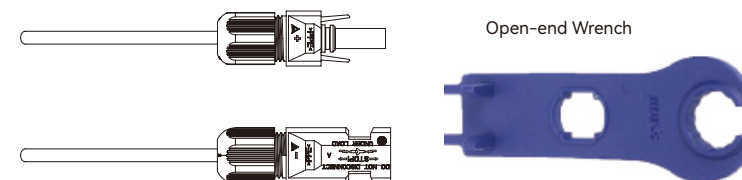


Figure 4-13



Warning

① Before assembling the DC connector, make sure that the cable polarity is correct.

② Use a multimeter to measure the voltage of the DC input string, verify the polarity of the DC input cable, and ensure that each string voltage is within 1000V.

3.Insert the positive and negative connectors into the inverter DC input terminals respectively, a click sound should be heard if the terminals are well connected, as shown in Figure 4-14:

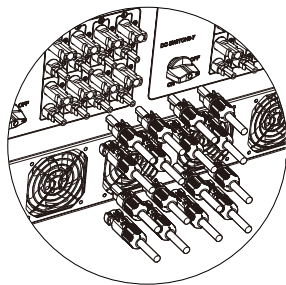


Figure 4-14

4. Seal the unused PV terminals with the terminal caps.

5. System Layout of Units without Integrated DC Switch

Local standards or codes may require that PV systems are fitted with an external DC switch on the DC side. The DC switch must be able to safely disconnect the open-circuit voltage of the PV array plus a safety reserve of 20%. Install a DC switch to each PV string to isolate the DC side of the inverter. We recommend the following electrical connection, as shown in Figure 4-15:

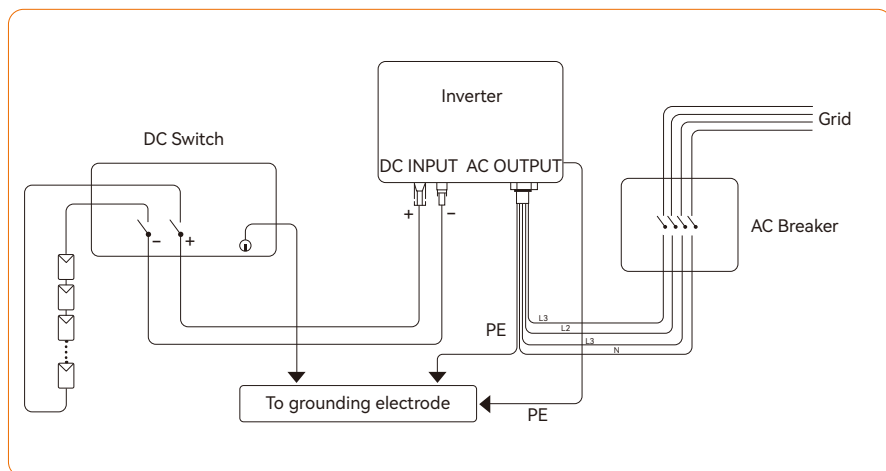


Figure 4-15

▼ 4.4.2 Connection of AC output

1. AC side requirements

Before connecting to the power grid, make sure that the power grid voltage and frequency meet the requirements of the inverter. See technical parameters for details.

① AC Circuit Breaker

The rated output voltage and recommended AC breaker specifications of Sunways STT series 100~150kW three-phase inverter as shown in the table below:

Model	Inverter Rated Output Voltage	AC Breaker Rated Voltage	AC Breaker Rated Current
STT-100KTL-SE	400V	400V	200A
STT-110KTL-SE	400V	400V	200A
STT-125KTL-SE	400V	400V	250A
STT-136KTL-SE	400V	400V	250A
STT-150KTL-SE	400V	400V	250A
STT-55KTL-SE-LV	230V	240V	200A
STT-60KTL-SE-LV	230V	240V	250A
STT-70KTL-SE-LV	230V	240V	250A
STT-75KTL-SE-LV	230V	240V	250A

Model	Inverter Rated Output Voltage	AC Breaker Rated Voltage	AC Breaker Rated Current
STT-80KTL-SE-LV	230V	240V	250A
STT-130KTL-SE-HV	500V	690V	200A
STT-145KTL-SE-HV	500V	690V	250A
STT-165KTL-SE-HV	500V	690V	250A
STT-170KTL-SE-HV	500V	690V	250A



Warning

An AC breaker must be connected on the AC side of the inverter.
Any loads cannot be connected to the inverter without the AC breaker.

② Requirements for OT/DT terminal

OT/DT terminals (not included in the delivery scope) are required for fixing Ac cables to the terminal block. Purchase the OT/DT terminals according to the following requirements.

/	OT / DT terminals of phase wire	OT / DT terminals of PE wire
Specification	M10	M6
Dimensions	$a \leq 36\text{mm} / 11\text{mm} \leq b \leq 15\text{mm} / c \leq 20\text{mm}$	/

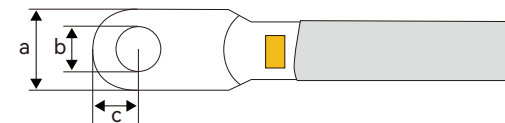


Figure 4-16 OT / DT terminals of phase wire

③ Aluminium cable requirements

If an aluminium cable is selected, use a copper to aluminium adapter terminal to avoid direct contact between the copper bar and the aluminium cable.

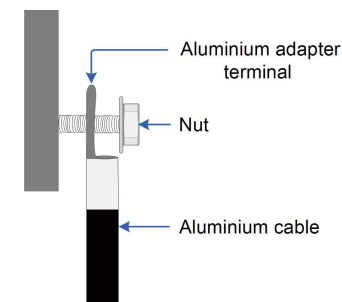


Figure 4-17



Caution

Direct contact between the copper bar and aluminium wire may arise electrochemical corrosion, thus affect the reliability of the electrical connection.
If an aluminium wire is used, please use a copper-aluminium wire terminal to avoid direct contact between the copper bar and aluminium wire.

④ Wire requirements

Cable Type	Connection Type	Conductor Cross-sectional Area	Outer Diameter
AC Output Cable (Multicore)	When selecting the grounding point connection at the chassis enclosure for applications without a neutral (N) line, a three-core (R, S, T) outdoor cable is recommended.	Copper Wire S: 95mm ² ~ 240mm ² Aluminum Wire S: 150mm ² ~ 240mm ² Sp ≥ S/2	24mm~62mm
	When selecting the grounding point connection inside the maintenance cavity for applications without a neutral (N) line, a four-core (R, S, T, PE) outdoor cable is recommended.		
	When selecting the grounding point connection at the chassis enclosure for applications with a neutral (N) line, a four-core (R, S, T, N) outdoor cable is recommended.		
	When selecting the grounding point connection at the inverter junction box for applications with a neutral (N) line, a five-core (R, S, T, N, PE) outdoor cable is recommended.		
AC Output Cable (Single-Core)	The use of single-core outdoor cables is recommended.	Copper Wire S: 95mm ² ~ 400mm ² Aluminum Wire S: 150mm ² ~ 400mm ² Sp ≥ S/2	14mm~34mm

Cable Type	Connection Type	Conductor Cross-sectional Area	Outer Diameter
RS485 Communication Cable	Outdoor shielded twisted pair cable compliant with local standards, 2-core or 4-core.	0.75~1.8mm ²	/

S represents the cross-sectional area of the AC line conductor, and Sp represents the cross-sectional area of the protective grounding conductor.

2. AC connector connection steps

① Take out the ring spanner from the accessory box and remove the cover after unscrewing the screws on it, as shown in Figure 4-18 & Figure 4-19:

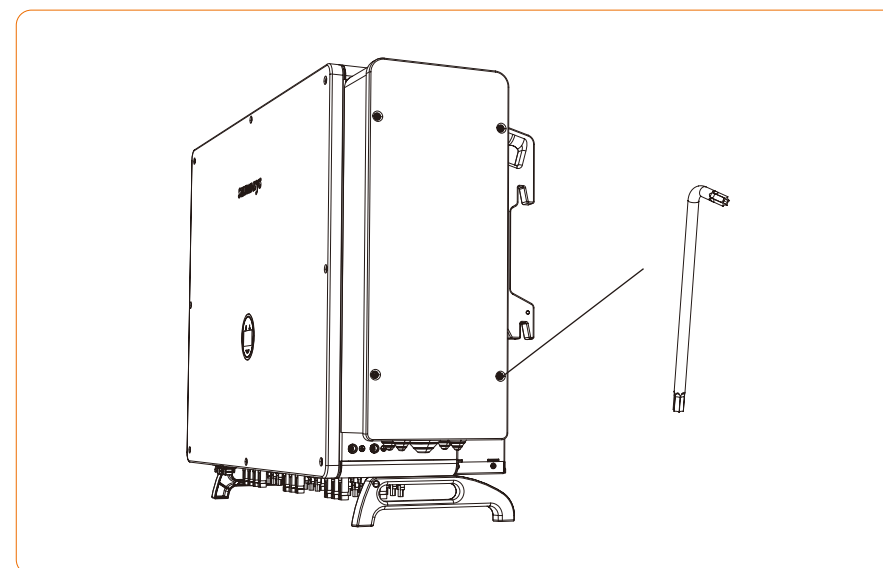


Figure 4-18

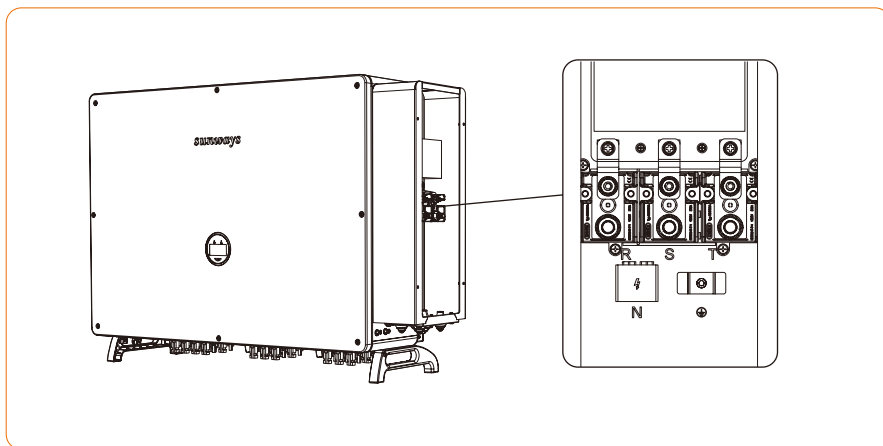


Figure 4-19

② Put the cable through the cable gland, and strip off the outer insulation sheath < 190mm, according to the size of OT/DT terminals to peel off a proper length of the 3L /PE N wires, then insert the conductor core into the OT/DT terminals and press with a hydraulic clamp. As shown in Figure 4-20:

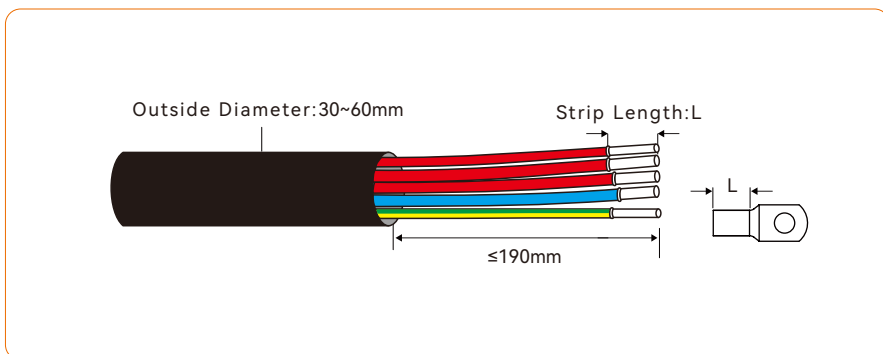


Figure 4-20

③ Select the appropriate threading hole on the wiring board based on the wire type. Align and cut the opening with scissors according to the corresponding wire diameter indicated beside each hole. Then thread the cable through the wiring board and connect it sequentially to terminals R, S, T, and N, as illustrated in Figure 4-20 and Figure 4-21.

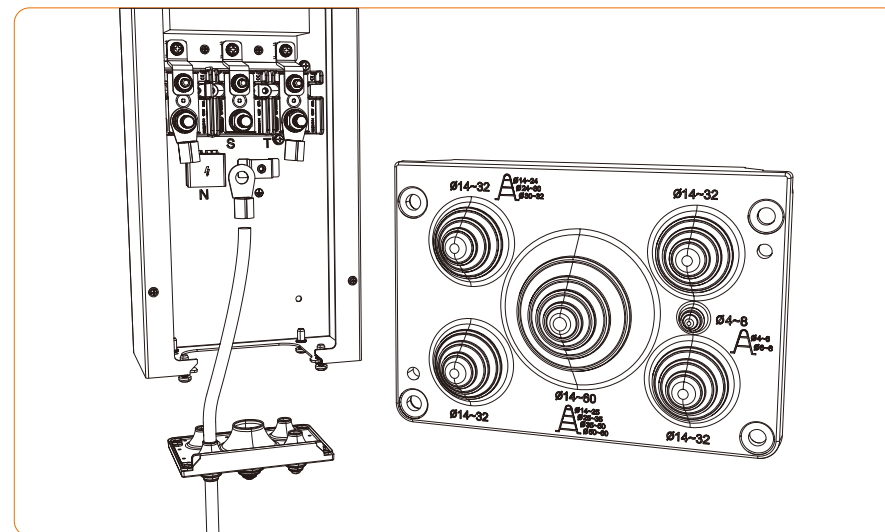


Figure 4-21



Failure to follow the specified instructions for tearing the wiring board may result in an enlarged opening. Water ingress through this enlarged opening causing damage to the device is not covered under the product warranty.

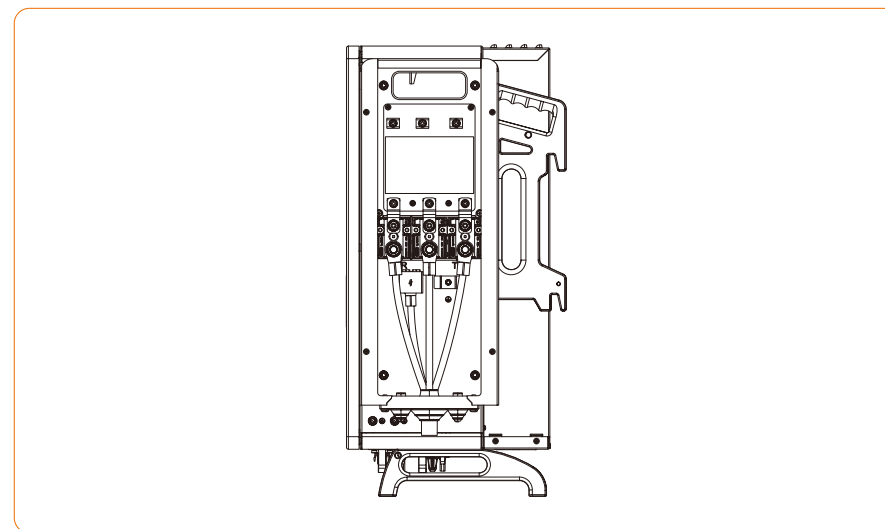


Figure 4-22

④ Put back the right side cover and lock with its original screws. As shown in Figure 4-23:

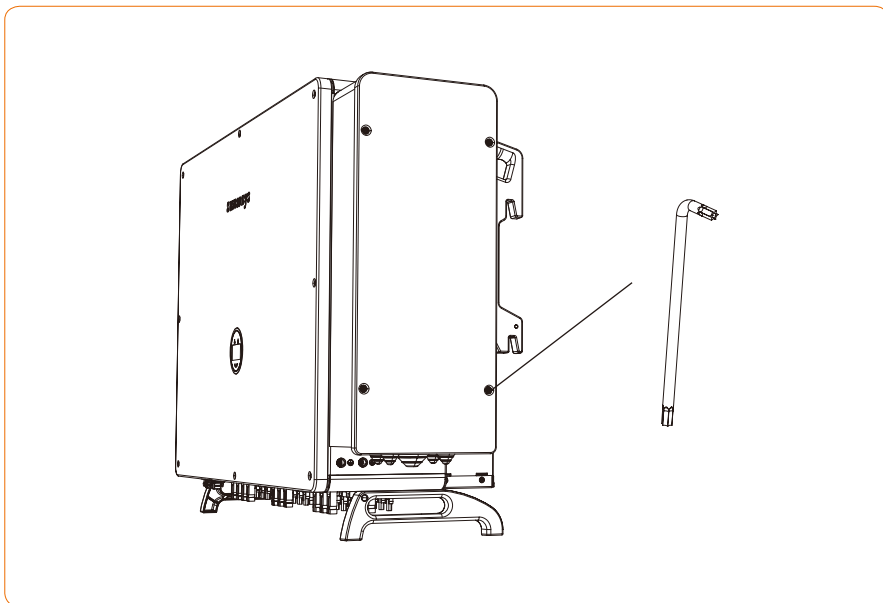


Figure 4-23



Attention

If there're more than one inverter in a project, do not open all inverters roof cover at the same time if you cannot finish the AC connection immediately.
Any damages caused by the moisture and dust that came into the inverter on account of exposed to the air for a long time are out of Sunways warranty.

※ 4.5 Monitoring Device Installation

Sunways STT 100-150kW series three phase inverter supports WIFI, GPRS, LAN, 4G and RS485 communication.

Plug the WIFI, LAN, 4G or GPRS module into the COM port in the bottom of inverter (as shown in Figure 4-24). A slight "click" sound during the installation represents that the assembly is in place.

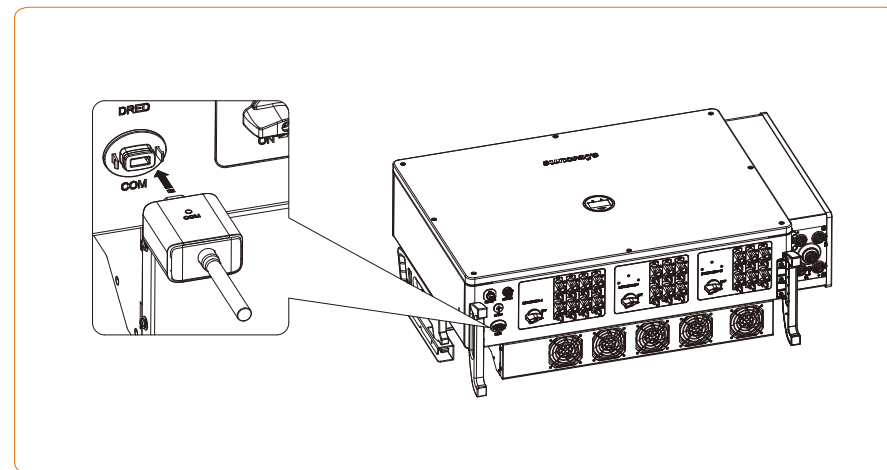


Figure 4-24 Monitoring device installation



Note

1. The 4G and GPRS version module does not need to be configured.
2. The WiFi version module needs to be configured to the router for the first installation. If the router name or password are changed, the WiFi dongle will need to be reconfigured. For details, please refer to the [QUICK INSTALLATION GUIDE] which is attached to the accessory bag.
3. If DHCP is enabled on the router, the LAN version module does not need to be configured. Otherwise, please refer to the [QUICK INSTALLATION GUIDE] which is attached to the accessory bag.



Attention

Do not touch the waterproof plug in the card slot except for replacing the SIM card. In that case, please make sure the card slot is completely sealed by the weatherproof plug after replacing the SIM card. Any damages caused by improper waterproof plug placement, will void warranty.

※ 4.6 Meter/RS485/DRED Connection

▼ 4.6.1 Terminals definition

Inverter communication ports are located at the ARM board inside of the inverter and include RS485 port (used for Meter or Datalogger connection), DRED port, and display port. as shown in Figure 4-24:

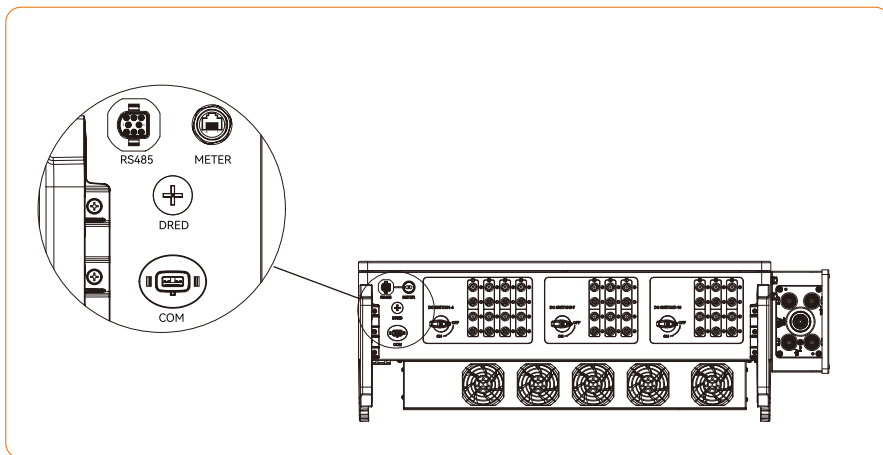


Figure 4-25

Port	Function	NO.	Definition
RS485	In case of multiple inverters, all the inverters can be dai-sy-chained via RS485 cables.	1	RS485 A1
		2	RS485 B1
		3	PE
		4	RS485 A1
		5	RS485 B1
		6	PE
		7	R2
		8	R1

Port	Function	NO.	Definition
METER	Communication interface between inverter and meter	1	RS485 A2
		2	RS485 B2
		3	PE
		4	RS485 A2
		5	RS485 B2
		6	PE
		7	/
		8	/
DRED	Only DRED version with this port.DRED means demand re-sponse enable device. The AS/NZS4777.2:2015 requires in-verters to support demand response mode (DRM).This function is for inverters that comply with AS/NZS4777.2:2015 standard. Sunways inverter is fully compliant with all DRM. The 8pin connector is used for DRM connection.	1	/
		2	
		3	
		4	
		5	
		6	
		7	
		8	

▼ 4.6.2 RS485 Communication

STT series three-phase inverter supports multiple inverters daisy-chain connection to a data logger via RS485 communication.

Multiple inverters connection diagram as shown in Figure 4-26:

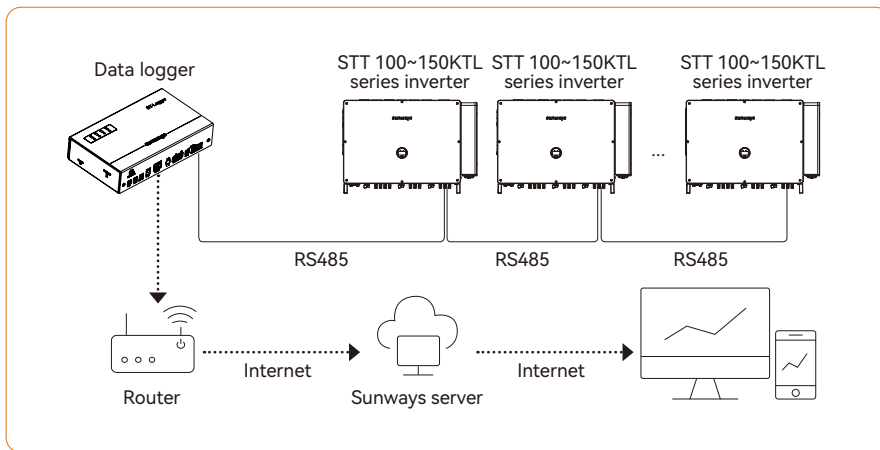


Figure 4-26

When multiple inverters are connected in parallel, link them via RS485 communication in a daisy chain configuration. For the inverter at the end of the daisy chain, short-circuit pins 7 and 8 on its RS485-1 interface, as shown in Figure 4-26:

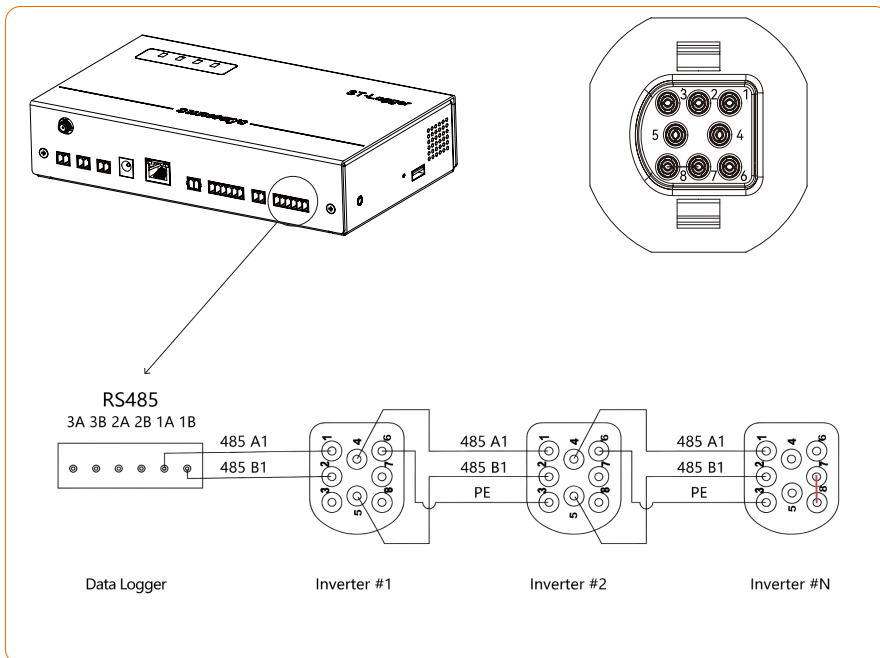


Figure 4-27 Multi-Inverter Connection

The maximum distance between the inverter at the end of the daisy chain and the Data logger should be within 1000m.



Attention

It is recommended to use the RS485 communication cable with a cross sectional area of 0.75~1.5mm² and an outer diameter of 5mm~10mm.

RS485 cable requirements: Shielded twisted-pair cable or shielded twisted Ethernet cable.

▼ 4.6.3 Export limitation & control or power limit solution

Refer to the figure below for the export limitation system wiring diagram.

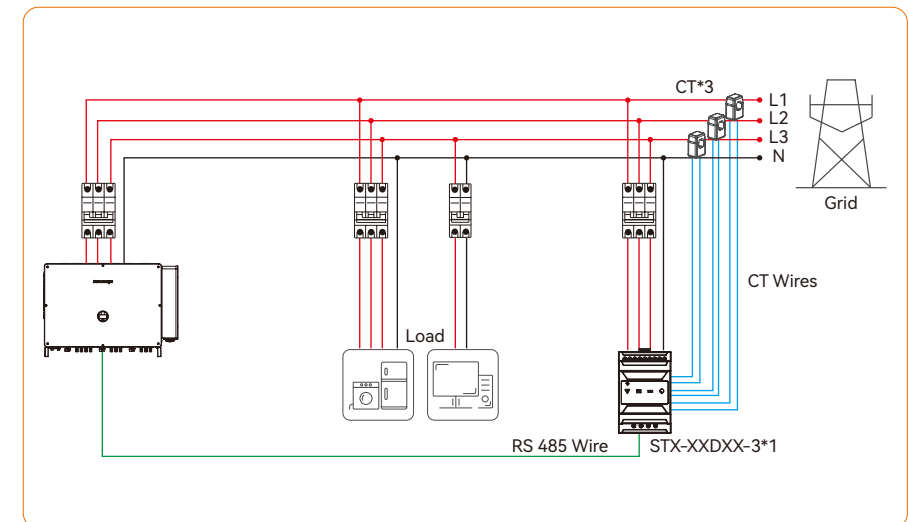


Figure 4-28

▼ 4.6.4 Meter Connection

- ① Remove the Meter port cover on the left side of the inverter base. Refer to Figure 4-29.
- ② Connect the opposite end of the Ethernet cable from meter RS485-2 to the inverter's Meter port. Refer to Figure 4-30.

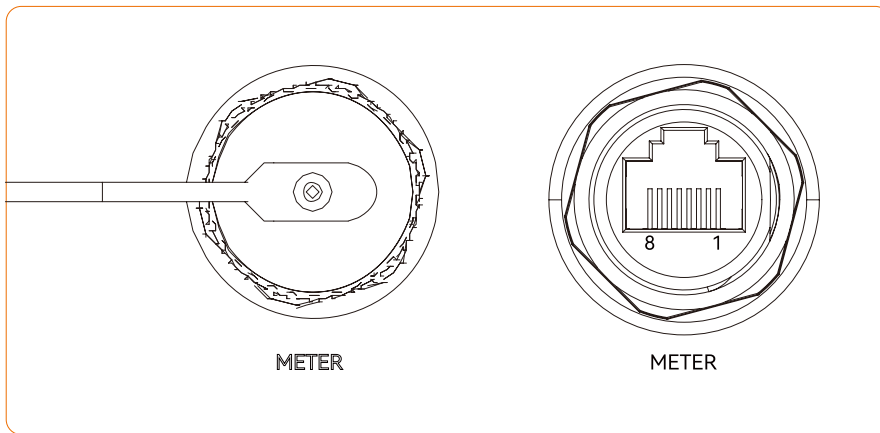


Figure 4-29

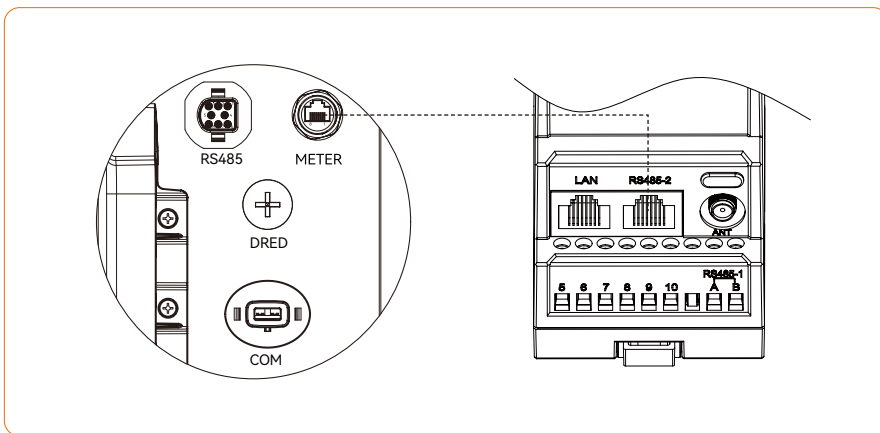


Figure 4-30

» 5 Start and Stop

※ 5.1 Start the Inverter

When starting the inverter, follow these steps:

- ① Turn on the AC breaker first (close the AC circuit breaker).
- ② Turn on the DC switch in the bottom. If the PV string voltage higher than the inverter start-up voltage, the inverter will start.
- ③ When both AC and DC power supply are normal, the inverter is ready to start. The inverter will initiate checking its internal parameters and grid parameters, if it is within the range, the green light on the left side of the screen begins to flash, and the “Waiting” message will be displayed on the OLED display.
- ④ After self-checking completed, the inverter will start generating electricity, the green light will remain on, and the OLED display will display real-time power information.

※ 5.2 Stop the Inverter

When turning off the inverter, please follow the steps below:

- ① Turn off the AC breaker first.
- ② Wait 30 seconds and then turn the DC switch to the “OFF” position. At this time, there is remaining power in the inverter capacitor. Wait for 5 minutes until the inverter is completely de-energized before conducting any work on the inverter.
- ③ Disconnect the AC and DC cables.

- ③ Insert the cable to the port in the 6pin connector and fasten with a screwdriver.
- ④ Insert the 6pin connector into the 6pin connector inside the inverter, and screw the roof cover back with a cross screwdriver.

» 6 General Operation

※ 6.1 Display Operation

When the inverter is turned on, the following interfaces will be displayed on the OLED display, and the OLED display allows the user to check various operation information and to modify the settings of the inverter. Please refer to the following display operation flow for details:

▼ 6.1.1 Main Window and General Setting

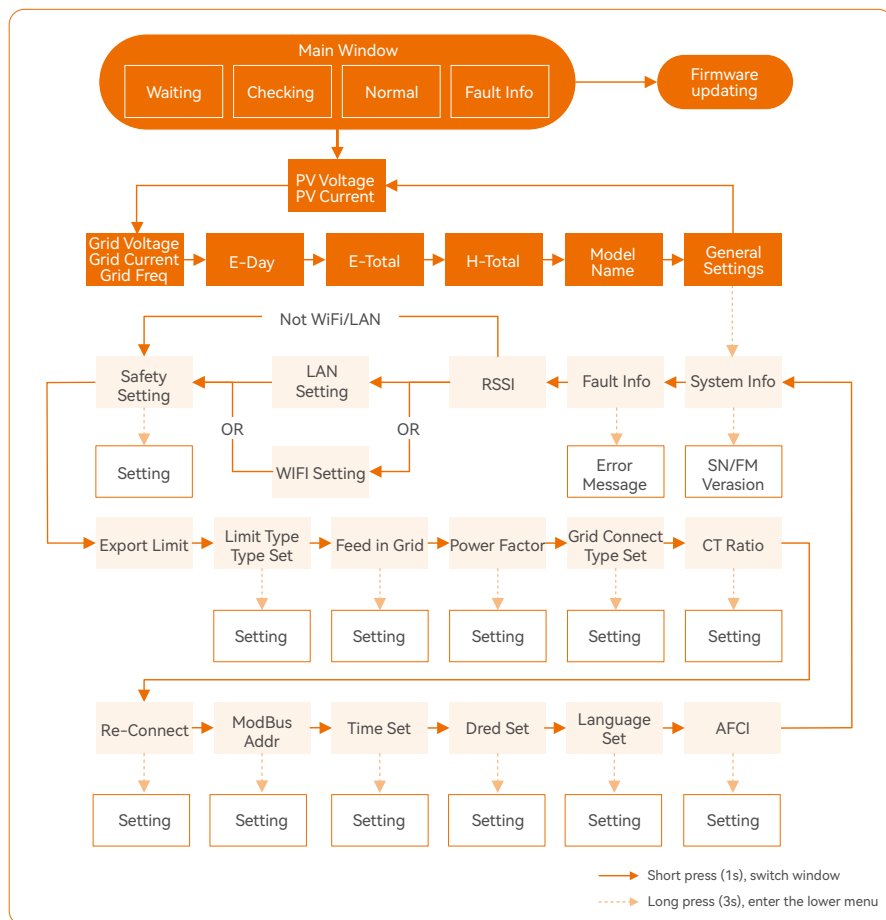


Figure 6-1



Note

Please wait for 10 seconds and the inverter will automatically save your settings or modifications.

▼ 6.1.2 LAN/WIFI Setting

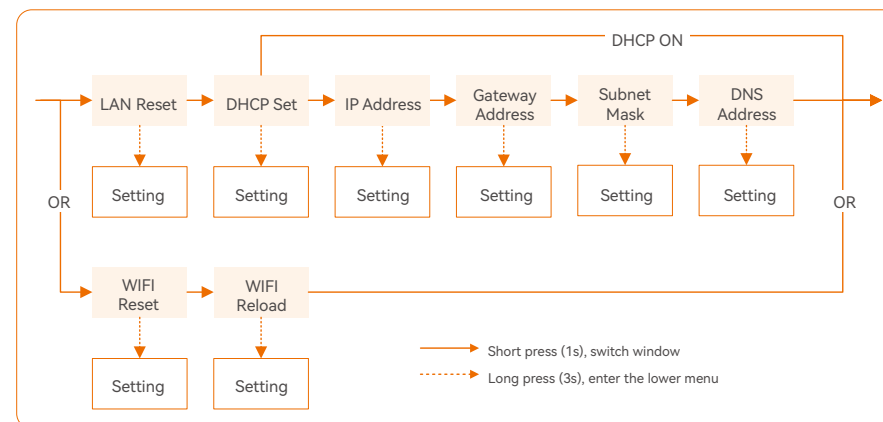


Figure 6-2

※ 6.2 Country Code (Safety Code) Setting

Please set "Country code (Safety code)" under the menu "Safety Set" in "General Settings".

Please follow this flow chart to set "Country code (Safety code)":

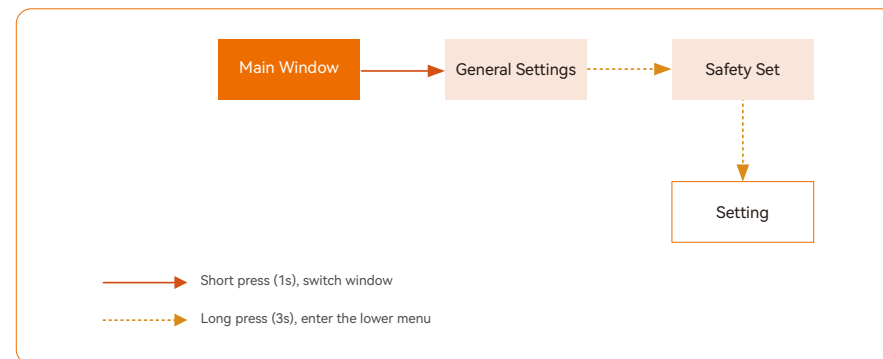


Figure 6-3

※ 6.3 Auto-Test

▼ 6.3.1 On-site Operation

This function is disabled by default, and only will be functional in the safety code of Italy. Short press the button several times until “Auto Test CEI 0-21” displays on the screen, press and hold the button 3 seconds to activate “Auto Test”. After the auto test finished, short press the button several times until the screen displays “Auto Test Record”, and hold the button 3 seconds to check the test result.

Connect the AC cable, auto test will start after the inverter connected to the grid, see the operation steps below:

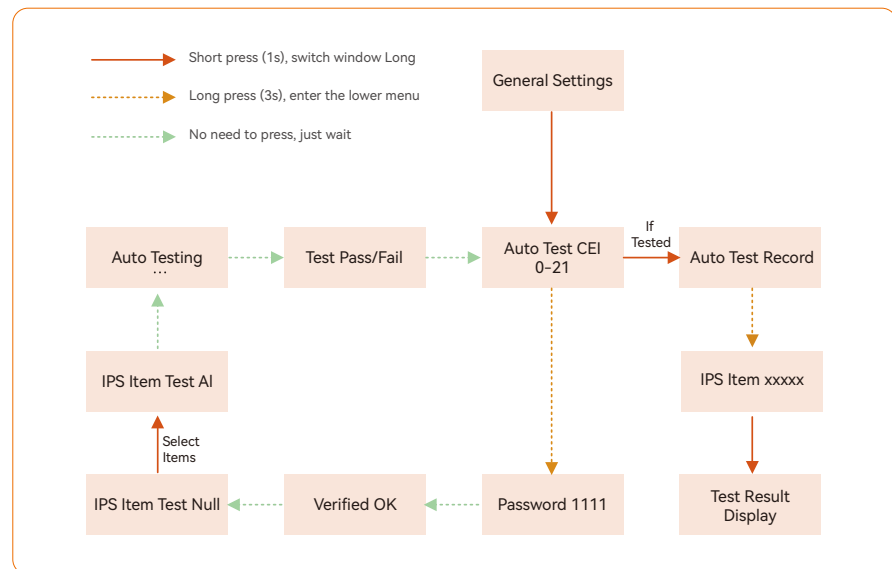


Figure 6-4



Note

IPS Items including : Test Null , 59.S1 Test , 59.S2 Test , 27.S1 Test , 27.S2 Test , 81 > .S1 Test , 81 < .S1 Test , 81 > .S2 Test , 81 < .S2 Test , Test ALL.

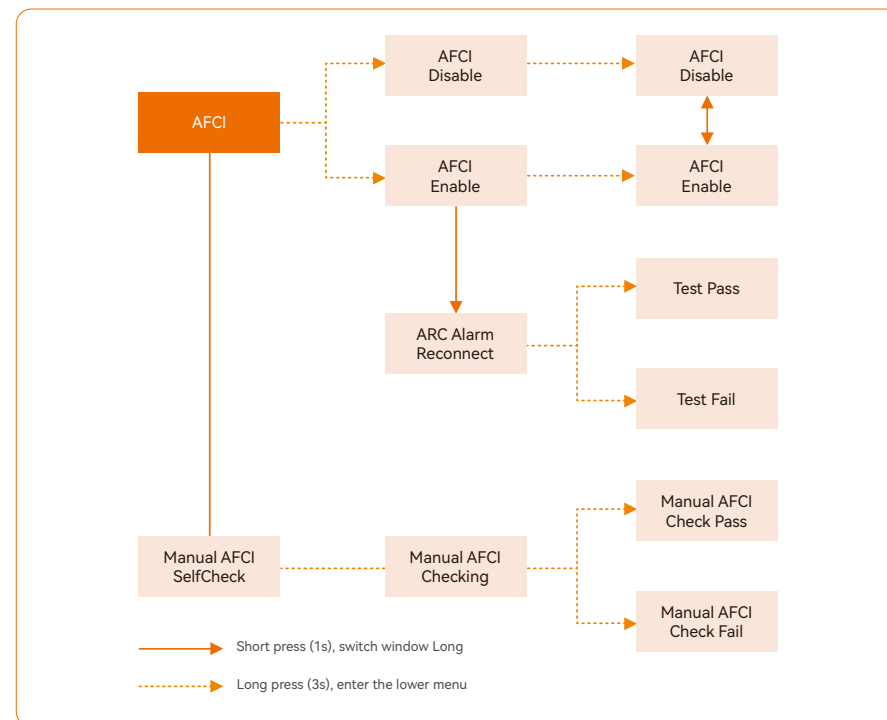
The auto test will start when the correct test item is selected, and the test result will be displayed on the screen when it finished. If the test was successful, it will display "Test Pass", otherwise will display "Test Fail". After each item tested, the inverter will reconnect to the grid and automatically start the next test according to the requirements of CEI 0-21.

▼ 6.3.2 Remote Operation

With a Sunways Portal account, you can remotely perform Auto-test in the Device Management section of Sunways Portal and generate Auto-test reports online. For details, refer to the Sunways Portal User Manual.

※ 6.4 AFCI Test

In the AFCI menu, select "Manual AFCI SelfCheck" and long press to perform the test. If the AFCI module is functioning properly, the screen will display "Manual AFCI Check Pass".



※ 6.5 Power Quality Response Modes

▼ 6.4.1 Power derating for voltage variation (Volt-Watt mode)

This mode can be enabled via the configuration software. Please contact Sunways Technical Support at service@sunways-tech.com for more information.

▼ 6.4.2 Reactive power regulation for voltage variation (Volt-VAr mode)

This mode can be enabled via the configuration software. Please contact Sunways Technical Support at service@sunways-tech.com for more information.

※ 6.6 Online Monitoring APP

Sunways inverter provides a monitoring port that can collect and transmit data from the inverter to Sunways monitoring platform via an external monitoring device. Please refer to the product nameplate on side of enclosure to get the monitoring application. If download issues exist, contact your dealer or Sunways technical support.

» 7 Troubleshooting

※ 7.1 Error Message

Sunways STT 100-150kW series three phase inverter is designed in accordance with grid operation standards, and conform to the requirements of safety and EMC. The inverter had passed a series of rigorous tests to ensure it runs sustainably and reliably before shipment.

When a fault occurs, the corresponding error message will be shown on the OLED display, and in this case, the inverter might stop feeding into grid. The fault messages and their corresponding troubleshooting methods are listed below:

Error Message	Description	Solution
Mains Lost	Grid power outage, AC switch or circuit is disconnected.	① Check whether the mains supply is lost ② Check whether the AC breaker and terminals are well connected.
Grid Voltage Fault	Grid overvoltage or undervoltage, the grid voltage is higher or lower than the set protection value.	① Check whether the impedance of the AC cable is too high to cause the grid voltage to increase. Change a thicker AC cable if it is. ② Extend the voltage protection range if it is allowed by the electricity company.
Grid Frequency Fault	Grid over frequency or under-frequency, the grid frequency is higher or lower than the set protection value.	① Check whether the AC cable is correct and well connected. ② Switch to safety code with wider frequency tolerance if it's allowed by the local electricity company.
DCI Fault	DC injection High. Inverter detects a higher DC component in AC output.	① Restart the inverter. ② Contact the installer or manufacture.
ISO Over Limitation	Low system insulation resistance, which is generally caused by poor insulation to ground of the module/cable or by rainy and damp environment.	① Restart the inverter. ② Check if the insulation of the wires in PV, battery, and AC is damaged. ③ Contact the installer or manufacture.

Error Message	Description	Solution
GFCI Fault	Excessive leakage current.	① Restart the inverter. ② Check if the insulation of the wires in PV, battery, and AC is damaged. ③ Contact the installer or manufacture.
Bus Voltage Fault	BUS voltage is over-high	① Check whether the input voltage is over the limitation. ② Contact the installer or manufacture.
INV Hardware Over current	Inverter hardware over current	① Check whether the grid voltage has large continuous fluctuation impact. ② Contact the installer or manufacture.
Relay1 Short Fault	Relay 1 short circuit	① Contact the installer or manufacture.
Relay2 Short Fault	Relay 2 short circuit	① Contact the installer or manufacture.
Grid Phase Lost Fault	Grid Phase Lost Fault	① Please check whether there is phase loss. ② Contact the installer or manufacture.
Half Bus Over Voltage	Half Bus Over Voltage	① Please Power off for a about ten mins.and check whether the fault persists after powering on the power again. ② Contact the installer or manufacture.
Bus Short Fault	Bus Short Fault	① Restart the inverter. ② Contact the installer or manufacture.

Error Message	Description	Solution
InV Curr UnBalance	InV Curr UnBalance	① Restart the inverter. ② Contact the installer or manufacture.
Grid Volt UnBalance	Grid Volt UnBalance	① Please Check whether the grid voltage is unbalanced. ② Contact the installer or manufacture.
DC Volt Check Fault	DC Voltage detection Fault	① Restart the inverter. ② Contact the installer or manufacture.
Out Power Fault	Output Power Fault	① Restart the inverter. ② Contact the installer or manufacture.
Equip Fire Fault	Equip Fire Fault	① Please Check whether the inverter is burning. ② Contact the installer or manufacture.
INV NTC Device Fault	INV NTC Device Fault	① Restart the inverter. ② Check whether the ambient temperature is below -20°C ③ Contact the installer or manufacture.
Boost NTC Device Fault	Boost NTC Device Fault	① Restart the inverter. ② Check whether the ambient temperature is below -20°C ③ Contact the installer or manufacture.
DCACSoftStart Fault	DCAC SoftStart Fault	① Restart the inverter. ② Contact the installer or manufacture.

Error Message	Description	Solution
AC Transducer Fault	AC Transducer Fault	① Restart the inverter. ② Contact the installer or manufacture.
Relay Check Fail	Relay Check Fail	① Check whether the power grid voltage connection and voltage value are normal ② Contact the installer or manufacture.
DC Transducer Fault	DC Transducer Fault	① Restart the inverter. ② Contact the installer or manufacture.
Bus Voltage Lower	Bus Voltage Lower	① Check whether the input voltage is powered off. ② Contact the installer or manufacture.
Bus Volt Unbalance	Bus Voltage Unbalance	① Please Power off for a about ten mins.and check whether the fault persists after powering on the power again. ② Contact the installer or manufacture.
BusOvHw Fault	Bus Over Voltage Hardware Fault	① Check whether the input voltage is over the limitation. ② Contact the installer or manufacture.
CabinNTC Device Fault	CabinNTC Device Fault	① Restart the inverter. ② Check whether the ambient temperature is below -20°C ③ Contact the installer or manufacture.
InvVoltFns Fault	INV Voltage Fault	① Restart the inverter. ② Contact the installer or manufacture.

Error Message	Description	Solution
PIIPhase Err	Gird Phase Err	① Check the power grid quality for voltage drop and harmonic pollution. ② Contact the installer or manufacture.
FPGAComms Fault	Control Board FPGA communication Fault	① Restart the inverter. ② Contact the installer or manufacture.
UPS12V Fault	UPS12V Voltage Low Fault	① Restart the inverter. ② Contact the installer or manufacture.
DRV12V Fault	Drive12V Voltage Low Fault	① Restart the inverter. ② Contact the installer or manufacture.
PVStringRev	PV String Reverse Connection	① Check whether the connection of PV String is reversed. ② Contact the installer or manufacture.
InvPwm Fault	INV PWM Output Fault	① Restart the inverter. ② Contact the installer or manufacture.
InvPwm Locked	INV PWM Output Locked	① Restart the inverter. ② Contact the installer or manufacture.
DSP Crash	DSP Crash	① Restart the inverter. ② Contact the installer or manufacture.

※ 7.2 Maintenance

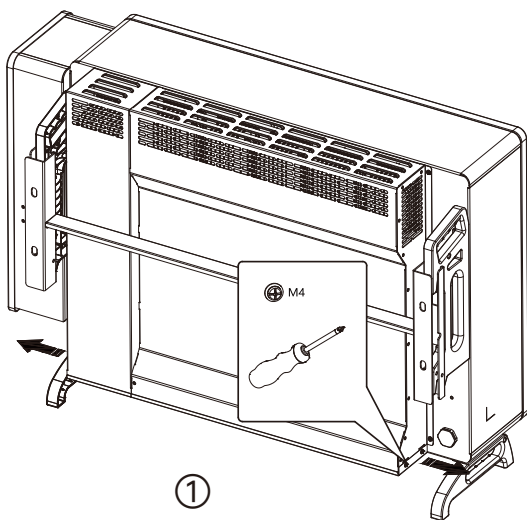
▼ 7.2.1 External Fan Maintenance

For maintenance of the external fans on the STT 100-150kW series, the following steps should be performed:

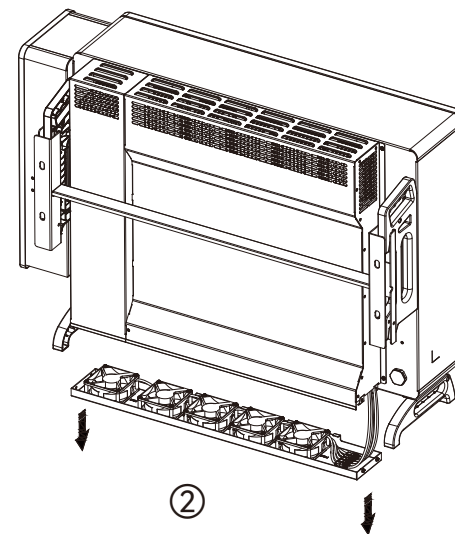
1. Check for any fan fault alarms.
2. Inspect for abnormal noises during fan operation.
3. Clean the fans or replace them according to the instructions below if necessary.

Fan Replacement Procedure:

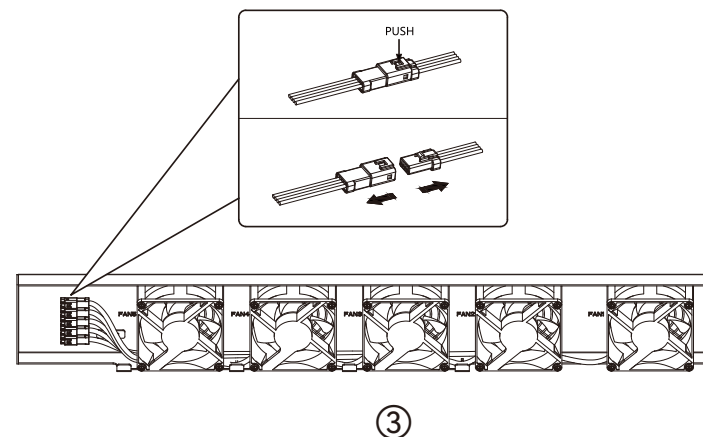
- ① Remove the four M4 screws securing the fan assembly on both bottom sides using a compatible screwdriver.



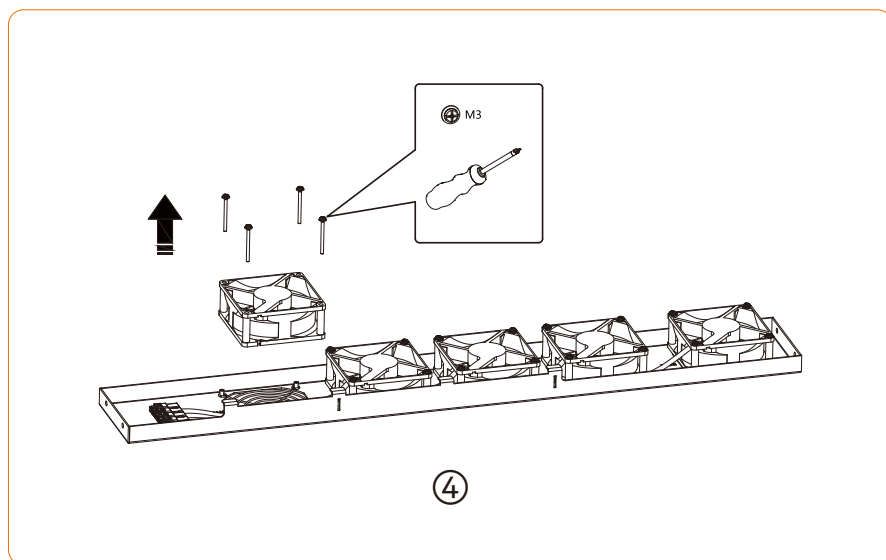
- ② Carefully pull down the entire fan row.



- ③ Locate the connector of the fan requiring replacement. Push the raised tab on the connector to release it.



④ Remove the four M3 screws securing the individual fan using a compatible screwdriver, then install the new fan unit.



Attention

Restart the inverter only after removing the fault that impairs safety performance.
Never arbitrarily replace any internal components.
For any maintenance support, please contact Sunways. Otherwise, Sunways shall not be held liable for any damage caused.



Note

Servicing of the device in accordance with the manual should never be undertaken in the absence of proper tools, test equipment or the latest revision of the manual which has been clearly and thoroughly understood.

Items	Methods	Period
System clean	Check the temperature and dust of the inverter. Clean the inverter enclosure if necessary. Check if the air inlet and outlet are normal. Clean the air inlet and outlet if necessary.	Six months to a year (it depends on the dust contents in air.)

▼ 7.2.2 Maintenance



Danger

Risk of inverter damage or personal injury due to incorrect service!
Always keep in mind that the inverter is powered by dual sources: PV strings and utility grid.
Before any service work, observe the following procedure.
① Disconnect the AC circuit breaker and then set the DC load-break switch of the inverter to OFF;
② Wait at least 5 minutes for inner capacitors to discharge completely;
③ Verify that there is no voltage or current before pulling any connector.



Caution

Keep non-qualified persons away!
A temporary warning sign or barrier must be posted to keep non-qualified persons away while performing electrical connection and service work.

» 8 Technical Parameters

Model	STT-100KTL-SE	STT-110KTL-SE	STT-125KTL-SE
Input			
Max. Input Power (W)	160000	176000	200000
Start-up Voltage (V)	180	180	180
Max. DC Input Voltage (V)	1100	1100	1100
Rated DC Input Voltage (V)	620	620	620
MPPT Voltage Range (V)	200-1000	200-1000	200-1000
Number of MPP Trackers	10	10	10
Number of DC Inputs per MPPT	2	2	2
Max. Input Current (A)	10*40	10*40	10*40
Max. Short-circuit Current (A)	10*50	10*50	10*50
Output			
Rated Output Power (W)**	100,000	110,000	125,000
Max. Output Power (W)	110,000	121,000	137,500
AC output rated apparent power (VA)	100,000	110,000	125,000
Max. Apparent Power (VA)	110,000	121,000	137,500
Grid Type**	3L/N/PE, 220/380V, 230/400V		
Rated AC Frequency (Hz)	50/60	50/60	50/60
AC output rated current (A)	144.3	158.8	180.4
Max. Output Current (A)	159	175	199
Power Factor	0.8 leading ...0.8 lagging		
THDi @ Rated Power	<3%		
DCI	<0.5%In		
Efficiency			
Max. Efficiency	98.8%	98.8%	98.8%
European Efficiency	98.3%	98.3%	98.3%
MPPT Efficiency	99.9%	99.9%	99.9%

Model	STT-100KTL-SE	STT-110KTL-SE	STT-125KTL-SE
Protection			
DC Reverse Polarity Protection	Integrated		
Insulation Resistance Protection	Integrated		
DC Switch	Optional		
Surge Protection	Integrated (Type II)		
Over-temperature Protection	Integrated		
Residual Current Protection	Integrated		
Islanding protection	Frequency shift, Integrated		
AC Short-circuit Protection	Integrated		
AC Over-voltage Protection	Integrated		
Intelligent string shutdown	Optional		
AFCI	Optional		
General Data			
Dimensions [W*H*D] (mm)	1025 * 640 * 320		
Weight (kg)	92		
Protection Degree	IP66		
Self-consumption at Night (W)	<1		
Topology	Transformerless		
Operating Temperature Range (° C)	-30~60		
Relative Humidity (%)	0~100		
Operating Altitude (m)	4000 (derating >3000)		
Cooling	Smart Fan Cooling		
Display	OLED & LED		
Communication	RS485/WiFi/GPRS/LAN (Optional)		

Model	STT-136KTL-SE	STT-150KTL-SE
Input		
Max. Input Power (W)	217600	240000
Start-up Voltage (V)	180	180
Max. DC Input Voltage (V)	1100	1100
Rated DC Input Voltage (V)	620	620
MPPT Voltage Range (V)	200-1000	200-1000
Number of MPP Trackers	10	10
Number of DC Inputs per MPPT	2	2
Max. Input Current (A)	10*40	10*40
Max. Short-circuit Current (A)	10*50	10*50
Output		
Rated Output Power (W)**	136,000	150,000
Max. Output Power (W)	149,600	165,000
AC output rated apparent power (VA)	136,000	150,000
Max. Apparent Power (VA)	149,600	165,000
Grid Type**	3L/N/PE, 220/380V, 230/400V	
Rated AC Frequency (Hz)	50/60	50/60
AC output rated current (A)	196.3	216.5
Max. Output Current (A)	216.8	239
Power Factor	0.8 leading ...0.8 lagging	
THDi @ Rated Power	<3%	
DCI	<0.5%In	
Efficiency		
Max. Efficiency	98.8%	98.8%
European Efficiency	98.3%	98.3%
MPPT Efficiency	99.9%	99.9%

Model	STT-136KTL-SE	STT-150KTL-SE
Protection		
DC Reverse Polarity Protection	Integrated	
Insulation Resistance Protection	Integrated	
DC Switch	Optional	
Surge Protection	Integrated (Type II)	
Over-temperature Protection	Integrated	
Residual Current Protection	Integrated	
Islanding protection	Frequency shift, Integrated	
AC Short-circuit Protection	Integrated	
AC Over-voltage Protection	Integrated	
Intelligent string shutdown	Optional	
AFCI	Optional	
General Data		
Dimensions [W*H*D] (mm)	1025 * 640 * 320	
Weight (kg)	92	
Protection Degree	IP66	
Self-consumption at Night (W)	<1	
Topology	Transformerless	
Operating Temperature Range (° C)	-30~60	
Relative Humidity (%)	0~100	
Operating Altitude (m)	4000 (derating >3000)	
Cooling	Smart Fan Cooling	
Display	OLED & LED	
Communication	RS485/WiFi/GPRS/LAN (Optional)	

Model	STT-55KTL-SE-LV	STT-60KTL-SE-LV	STT-70KTL-SE-LV
Input			
Start-up Voltage (V)	180	180	180
Max. DC Input Voltage (V)	1100	1100	1100
Rated DC Input Voltage (V)	360	360	360
MPPT Voltage Range (V)	200-1000	200-1000	200-1000
Number of MPP Trackers	10	10	10
Number of DC Inputs per MPPT	2	2	2
Max. Input Current (A)	10*40		
Max. Short-circuit Current (A)	10*50		
Output			
Rated Output Power (W)**	55,000	60,000	70,000
Max. Output Power (W)	60,500	66,000	77,000
AC output rated apparent power(-VA)	55,000	60,000	70,000
Max. Apparent Power (VA)	60,500	66,000	77,000
Grid Type (V)**	3L/N/PE, 127/220V,133/230V		
Rated AC Frequency (Hz)	50/60		
AC output rated current (A)	138.1	150.6	175.7
Max. Output Current (A)	158.8	173.2	202.1
Power Factor	0.8 leading...0.8 lagging		
THDi @ Rated Power	<3%		
DCI	< 0.5% In		
Efficiency			
Max. Efficiency	98.8%	98.8%	98.8%
Euro Efficiency	98.3%	98.3%	98.3%
MPPT Efficiency	99.9%	99.9%	99.9%
Protection			
DC Reverse Polarity Protection	Integrated		

Model	STT-55KTL-SE-LV	STT-60KTL-SE-LV	STT-70KTL-SE-LV
Insulation Resistance Detection	Integrated		
DC Switch	Optional		
Surge Protection	Integrated (Type II)		
Over-temperature Protection	Integrated		
Residual Current Protection	Integrated		
Islanding Protection	Frequency shift, Integrated		
AC Short-circuit Protection	Integrated		
AC Over-voltage Protection	Integrated		
AFCI	Optional		
General Data			
Dimensions [W*H*D] (mm)	1025*640*320		
Weight (kg)	92		
Protection Degree	IP66		
Self-consumption at Night (W)	< 1		
Topology	Transformerless		
Operating Temperature Range (° C)	-30~60		
Relative Humidity (%)	0~100		
Operating Altitude (m)	4000 (derating > 3000)		
Cooling	Smart Fan Cooling		
Display	OLED & LED		
Communication	RS485, WiFi/GPRS/LAN (Optional)		

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Model	STT-75KTL-SE-LV	STT-80KTL-SE-LV
Input		
Start-up Voltage (V)	180	180
Max. DC Input Voltage (V)	1100	1100
Rated DC Input Voltage (V)	360	360
MPPT Voltage Range (V)	200-1000	200-1000
Number of MPP Trackers	10	10
Number of DC Inputs per MPPT	2	2
Max. Input Current (A)	10*40	
Max. Short-circuit Current (A)	10*50	
Output		
Rated Output Power (W)**	75,000	80,000
Max. Output Power (W)	82,500	88,000
AC output rated apparent power(VA)	75,000	80,000
Max. Apparent Power (VA)	82,500	88,000
Grid Type (V)**	3L/N/PE, 127/220V,133/230V	
Rated AC Frequency (Hz)		
AC output rated current (A)	188.3	200.8
Max. Output Current (A)	216.5	230.9
Power Factor	0.8 leading...0.8 lagging	
THDi @ Rated Power	<3%	
DCI	< 0.5% In	
Efficiency		
Max. Efficiency	98.8%	98.8%
Euro Efficiency	98.3%	98.3%
MPPT Efficiency	99.9%	99.9%
Protection		
DC Reverse Polarity Protection	Integrated	

Model	STT-75KTL-SE-LV	STT-80KTL-SE-LV
Insulation Resistance Detection	Integrated	
DC Switch	Optional	
Surge Protection	Integrated (Type II)	
Over-temperature Protection	Integrated	
Residual Current Protection	Integrated	
Islanding Protection	Frequency shift, Integrated	
AC Short-circuit Protection	Integrated	
AC Over-voltage Protection	Integrated	
AFCI	Optional	
General Data		
Dimensions [W*H*D] (mm)	1025*640*320	
Weight (kg)	92	
Protection Degree	IP66	
Self-consumption at Night (W)	< 1	
Topology	Transformerless	
Operating Temperature Range (° C)	-30~60	
Relative Humidity (%)	0~100	
Operating Altitude (m)	4000 (derating > 3000)	
Cooling	Smart Fan Cooling	
Display	OLED & LED	
Communication	RS485, WiFi/GPRS/LAN (Optional)	

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Model	STT-130KTL-SE-HV	STT-145KTL-SE-HV	STT-165KTL-SE-HV
Input			
Start-up Voltage (V)	180	180	180
Max. DC Input Voltage (V)	1100	1100	1100
Rated DC Input Voltage (V)	750	750	750
MPPT Voltage Range (V)	200-1000	200-1000	200-1000
Number of MPP Trackers	10	10	10
Number of DC Inputs per MPPT	2	2	2
Max. Input Current (A)	10*40	10*40	10*40
Max. Short-circuit Current (A)	10*50	10*50	10*50
Output			
Rated Output Power (W)**	130,000	145,000	165,000
Max. Output Power (W)	143,000	159,500	181,500
AC output rated apparent power (VA)	130,000	145,000	165,000
Max. Apparent Power (VA)	143,000	159,500	181,500
Grid Type**	3L/PE, 288/500V		
Rated AC Frequency (Hz)	50/60	50/60	50/60
AC output rated current (A)	150.1	167.4	190.5
Max. Output Current (A)	165.1	184.2	209.6
Power Factor	0.8 leading ..0.8 lagging		
THDi @ Rated Power	<3%		
DCI	<0.5%In		
Efficiency			
Max. Efficiency	98.8%	98.8%	98.8%
European Efficiency	98.3%	98.3%	98.3%
MPPT Efficiency	99.9%	99.9%	99.9%
Protection			
DC Reverse Polarity Protection	Integrated		

Model	STT-130KTL-SE-HV	STT-145KTL-SE-HV	STT-165KTL-SE-HV
Insulation Resistance Protection	Integrated		
DC Switch	Optional		
Surge Protection	Integrated (Type II)		
Over-temperature Protection	Integrated		
Residual Current Protection	Integrated		
Islanding protection	Frequency shift, Integrated		
AC Short-circuit Protection	Integrated		
AC Over-voltage Protection	Integrated		
Intelligent string shutdown	Optional		
AFCI	Optional		
General Data			
Dimensions [W*H*D] (mm)	1025*640*320		
Weight (KG)	92		
Protection Degree	IP66		
Self-consumption at Night (W)	<1		
Topology	Transformerless		
Operating Temperature Range (° C)	-30~60		
Relative Humidity (%)	0~100		
Operating Altitude (m)	4000(derating>3000)		
Cooling	Smart Fan Cooling		
Display	OLED & LED		
Communication	RS485/WiFi/GPRS/LAN (Optional)		

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Model	STT-170KTL-SE-HV
Input	
Start-up Voltage (V)	180
Max. DC Input Voltage (V)	1100
Rated DC Input Voltage (V)	750
MPPT Voltage Range (V)	200-1000
Number of MPP Trackers	10
Number of DC Inputs per MPPT	2
Max. Input Current (A)	10*40
Max. Short-circuit Current (A)	10*50
Output	
Rated Output Power (W)**	170,000
Max. Output Power (W)	187,000
AC output rated apparent power (VA)	170,000
Max. Apparent Power (VA)	187,000
Grid Type**	3L/PE, 288/500V
Rated AC Frequency (Hz)	50/60
AC output rated current (A)	196.3
Max. Output Current (A)	215.9
Power Factor	0.8 leading ..0.8 lagging
THDi @ Rated Power	<3%
DCI	<0.5%In
Efficiency	
Max. Efficiency	98.8%
European Efficiency	98.3%
MPPT Efficiency	99.9%
Protection	
DC Reverse Polarity Protection	Integrated

Model	STT-170KTL-SE-HV
Insulation Resistance Protection	Integrated
DC Switch	Optional
Surge Protection	Integrated (Type II)
Over-temperature Protection	Integrated
Residual Current Protection	Integrated
Islanding protection	Frequency shift, Integrated
AC Short-circuit Protection	Integrated
AC Over-voltage Protection	Integrated
Intelligent string shutdown	Optional
AFCI	Optional
General Data	
Dimensions [W*H*D] (mm)	1025*640*320
Weight (KG)	92
Protection Degree	IP66
Self-consumption at Night (W)	<1
Topology	Transformerless
Operating Temperature Range (° C)	-30~60
Relative Humidity (%)	0~100
Operating Altitude (m)	4000(derating>3000)
Cooling	Smart Fan Cooling
Display	OLED & LED
Communication	RS485/WiFi/GPRS/LAN (Optional)

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sunways

📍 No. 1, Second Road, Green Industrial Zone, Chongshou Town,
Cixi City, ZheJiang Province, PRC

🌐 www.sunways-tech.com

✉ service@sunways-tech.com

