

SOFAR

USER MANUAL

SOFAR 80-125KTLX-G4-ESS



Shenzhen SOFARSOLAR Co.,Ltd.

Shenzhen SOFARSOLAR Co., Ltd.

11/F, Gaoxingqi Technology Building,
District 67, XingDong Community, XinAn Street,
Bao'An District, Shenzhen, China

Email: service@SOFAR.com

Web: www.sofarsolar.com

EU Representative Information: SofarSolar GmbH

Add.: Kraemerstrasse 20, 72764 Reutlingen, Germany

Tel: [+49 \(0\)7121 31767-0](tel:+49(0)712131767-0)

Email: europe@sofarsolar.com

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1 About This Manual

This Installation and user manual (hereinafter referred to as the manual) describes the installation, electrical connection, commissioning, maintenance and fault elimination procedures of the following products:

SOFAR 80KTLX-G4-ESS;

SOFAR 99KTLX-G4-ESS;

SOFAR 100KTLX-G4-ESS;

SOFAR 110KTLX-G4-ESS;

SOFAR 125KTLX-G4-ESS.

- ▶ Carefully read this manual before use and retain it for future reference!
- ▶ Treat this manual as an integral component of the device.
- ▶ Please retain this manual in a readily accessible location for future reference.

This manual contains important safety information on the installation, operation and maintenance of the device.

- ▶ Read and observe all given safety information.

The products, services or features you purchased shall be subject to the company's commercial contracts and terms. All or part of the products and services described in this document may not be within the scope of your purchase. Unless additional terms and conditions in your contract, the company does not make any statement or guarantee on the contents of this document.

1.1 Copyright declaration

The copyright of this manual is owned by SOFARSOLAR. It may not be copied – neither partially nor completely – by companies or individuals (including software, etc.) and must not be reproduced or distributed in any form, or with the appropriate means.

SOFARSOLAR reserves the right to final interpretation. This manual may be amended following feedback from users or customers.

Consult our website at: www.sofarsolar.com for the latest version.

1.2 Presentation of warnings

This manual contains information on safe operation and uses symbols to ensure the safety of persons and property as well as the efficient operation of the inverter.

- Read through the following symbol explanations carefully in order to prevent injury or property damage.

Warning symbol

	The general danger symbol warns of risk of serious injury when used with the signal words CAUTION, WARNING, and DANGER.
---	--

Signal word

DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a danger that results in damage to or destruction of the inverter.

Sectional warnings

Sectional warnings refer to a complete section and are structured as follows:

 WARNING
Type and source of danger Consequences for non-observance ► Avoiding the danger

Embedded warnings

Embedded warnings are part of an action sequence and are placed right before the dangerous step.

WARNING Combination of type/source of danger, consequences for non-observance and avoiding the danger.

1.3 Presentation of action instructions

This table shows the sequence of Action steps:

Symbol	Function
✓	This describes an action requirement
1. 2. 3.	This is the sequence of action steps that must be followed step by step
▶	This is a single-action step
↪	This describes the result of the action

1.4 Note

Notes are presented in a grey bar.

Provides tips essential to the optimal operation of the product.

2 Basic Safety Information



This chapter details the safety information pertaining to the installation and operation of the device.

If you have any questions or problems after reading the following information, please contact SOFARSOLAR.

Read and understand the instructions within this manual and familiarise yourself with the relevant safety symbols in this chapter before beginning with the installation of the device and eliminating any faults.

Before connecting to the power grid, you must obtain official authorisation from the local power grid operator in accordance with the corresponding national and state requirements. Furthermore, the operation may only be carried out by qualified electricians.

Please contact the nearest authorised service centre if any maintenance or repairs are required.

- ▶ Please contact your dealer to obtain information about your nearest authorised service centre.
- ▶ Do NOT carry out repairs on the device yourself, this may lead to injury or property damage.
- ▶ Before installing the device or carrying out maintenance on it, you must turn off the DC switch in order to interrupt the DC voltage of the PV generator. You can also switch off the DC voltage by turning off the DC switch in the array junction box. Not doing this may result in serious injury.

2.1 Target group

This manual is intended for qualified electricians who are responsible for the installation and commissioning of the inverter in the PV system, as well as the PV system operators.

2.2 Qualified personnel

Personnel tasked with the operation and maintenance of the device must have the qualifications, competence and experience required to perform the described tasks, while also being capable of fully understanding all instructions contained within the manual. For safety reasons, this inverter may only be installed by a qualified electrician.

Requirements for qualified electricians:

- Personnel have received training on occupational safety, as well as the installation and commissioning of electrical systems.
- Personnel are familiar with the local laws, standards and regulations of the grid operator.

SOFARSOLAR assumes no responsibility for the destruction of property or any injuries to personnel caused by improper usage.

2.3 Installation requirements

Install the inverter according to the information contained in the following section.

- ▶ Choose a suitable place for the installation of electrical devices.
- ▶ Ensure that there is sufficient space for an emergency exit which is suitable for maintenance.
- ▶ Installation of the inverter must conform with laws, regulations, codes and standards applicable in the jurisdiction.
- ▶ Before connecting the product to the electrical utility grid, contact the local utility company for approval.

2.4 Transport requirements

The factory packaging is specifically designed to prevent transport damage, i.e. violent shocks, moisture and vibrations. However, the device must not be installed if it is visibly damaged. In this case, notify the responsible transport company immediately. If necessary, you can seek help from your photovoltaic system installer or SOFARSOLAR.

The stacking height of multiple inverters should not exceed the stacking limit indicated on the outer box.

If the inverter is stored for more than half a year, the inverter needs to be fully examined and tested by qualified service or technical personnel before use. For storage conditions see Technical Data.

2.5 Labelling on the device

The labels must NOT be concealed by items and foreign objects (rags, boxes, devices, etc.). They must be regularly cleaned and kept clearly visible at all times. See the chapter about the 3.4 Labelling on the inverter.

2.6 Electrical connection

Observe all applicable electrical regulations when working with the Solar inverter.

DANGER

Dangerous DC voltage

- Before establishing the electrical connection, cover the PV modules using opaque material or disconnect the PV generator from the inverter. Solar radiation will cause dangerous voltage to be generated by the PV generator!

DANGER

Danger through electric shock!

- All installations and electrical connections may only be carried out by trained electricians!

NOTICE

Authorisation for grid feed-in

- Obtain authorisation from the local power grid operator before connecting the inverter to the public power grid.

Do not open the inverter or remove any of the labels. Otherwise, SOFARSOLAR shall assume no guarantee.

2.7 Operation

DANGER

Electric shock

- ▶ Contact with the electrical grid or the device's terminals may result in an electric shock or fire!
- ▶ Do not touch the terminal or the conductor which is connected to the electrical grid.
- ▶ Follow all instructions and observe all safety documents that refer to the grid connection.

CAUTION

Burning due to hot housing

- ▶ While the inverter is being operated, several internal components will become very hot. Please wear protective gloves!
- ▶ Keep children away from the device!

2.8 Repair and maintenance

DANGER

Dangerous voltage!

- ▶ Before carrying out any repair work, first switch off the AC circuit breaker between the inverter and power grid, and then the DC switch.
- ▶ After switching off the AC circuit breaker and the DC switch, wait a minimum of 5 minutes before starting any maintenance or repair work.

NOTICE**Unauthorised repairs!**

- ▶ Following the elimination of any faults, the inverter should be fully functional once more. Should any repairs be required, please contact a local authorised service centre.
- ▶ The internal components of the inverter must NOT be opened without the relevant authorisation. SOFARSOLAR assumes no responsibility for any resulting losses or defects.

2.9 EMC / noise level of inverter

Electromagnetic compatibility (EMC) refers to the fact that electrical equipment functions in a given electromagnetic environment without any trouble or error, and imposes no unacceptable effect upon the environment. Therefore, EMC represents the quality characteristics of electrical equipment.

- The inherent noise-immune character: immunity to internal electrical noise.
- External noise immunity: immunity to electromagnetic noise of the external system.
- Noise emission level: influence of electromagnetic emission upon the environment.

**DANGER****Electromagnetic radiation from the inverter may be harmful to health!**

- ▶ Please do not continue to stay around the inverter for less than 20 cm when the inverter is working.

2.10 Symbols and signs

**DANGER****Dangerous DC voltage**

- ▶ High voltage circuits of inverters can endanger life.
- ▶ All installations and electrical connections may only be carried out by trained electricians.

- ▶ Minors, individuals with disabilities, and those with mental health conditions are prohibited from using this product.
- ▶ This product should be installed out of the reach of children.

WARNING

Damage due to overvoltage

- ▶ Ensure that the input voltage does not exceed the maximum permissible voltage. Overvoltage may cause long-term damage to the inverter, as well as other damage that is not covered by the warranty.

CAUTION

Beware of burning hazards due to the hot housing!

- ▶ While the inverter is in operation, only touch the display and the buttons, as the housing can become hot.

NOTICE

Implement earthing!

- ▶ The PV generator must be earthed in accordance with the requirements of the local power grid operator!
- ▶ For reasons of personal safety, we recommend that all PV module frames and inverters of the PV system are reliably earthed.

Symbols on the inverter

Several symbols pertaining to safety can be found on the inverter. Please read and understand the content of these symbols before starting the installation.

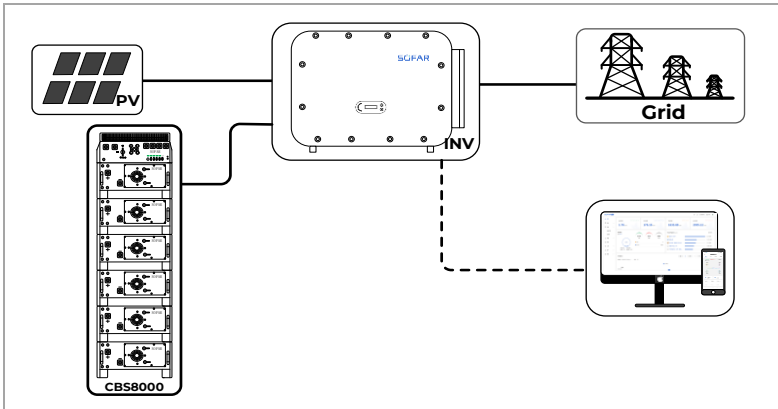
Symbol	Description
 	Residual voltage is present in the inverter! Before opening the inverter, you should wait five minutes to ensure that the capacitor has been fully discharged.

Symbol	Description
	Caution! Danger through electric shock
	Caution! Hot surface
	The product is compliant with EU guidelines
	Earthing point
	Please read the manual before installing the inverter
	Device degree of protection according to EN 60529
	Positive and negative poles of the DC input voltage
	The inverter must always be transported and stored with the arrows pointing upward
	Allowable operating temperature range.
	RCM (Regulatory Compliance Mark) The product meets the requirements of the applicable Australian standards.
	When the equipment is scrapped, it is disposed of following local laws and regulations or sent to the manufacturer.

3 Product Features

3.1 System description

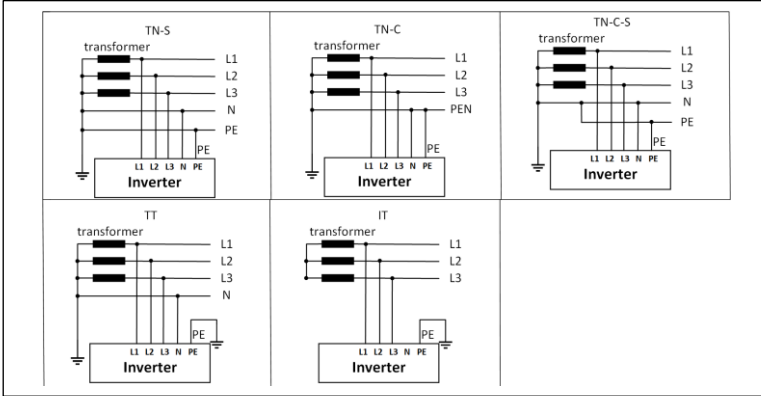
SOFAR 80-125KTLX-G4-ESS can not only convert the direct current generated by the solar photovoltaic (PV) array into alternating current and feed it into the power grid, but also has an external DCBUS interface. Combined with the battery cluster controller and the battery pack, it can form a PV-storage DC coupling system.



SOFAR 80-125KTLX-G4-ESS can only be used for grid-connected power generation in PV power stations. This inverter must not be used for any other or additional purposes. The manufacturer/supplier shall not be held responsible for any losses resulting from purposes other than those mentioned above. Any risk of loss arising from uses other than the above-mentioned purposes shall be borne by the user themselves. For the above-mentioned purposeful uses, the relevant instructions in this manual must also be strictly followed. The DC input of the inverter must be PV modules. SOFARSOLAR refuses to bear all responsibilities for equipment damage, product damage and personal injury caused by users using DC sources or batteries instead of PV panels for testing purposes.

3.2 Intended grid types

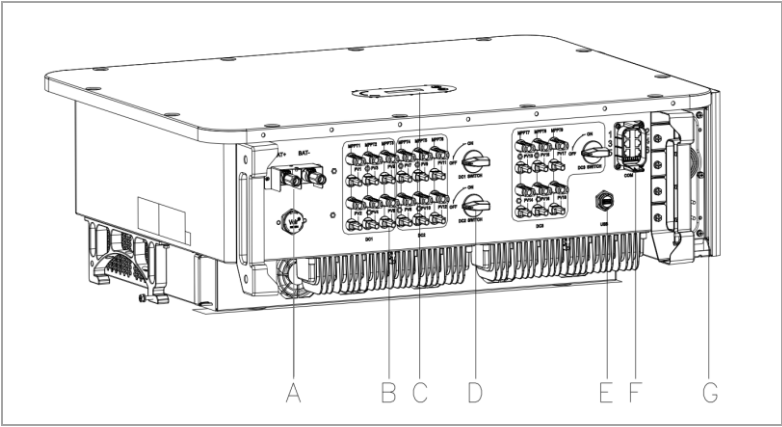
SOFAR 80-125KTLX-G4-ESS configurations for the TT type of electricity grid, the voltage between neutral and earth should be less than 30V. Inverters are compatible with TN-S, TN-C, TN-C-S, TT, IT grid.



The IT system does not have unbalanced output and off-network functions.

3.3 Product overview

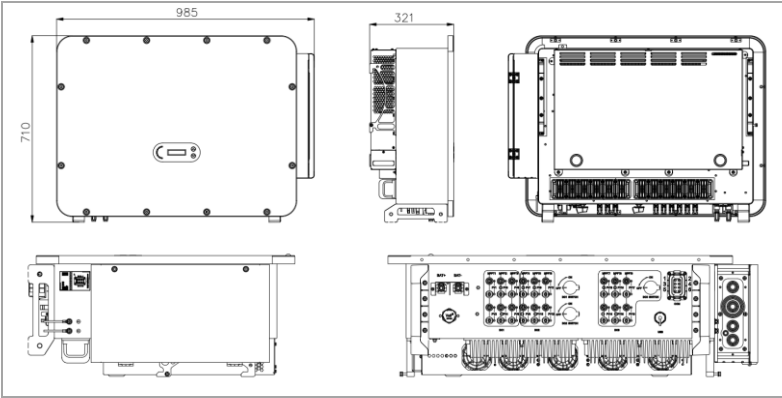
For the appearance and descriptions of each part of SOFAR 80-125KTLX-G4-ESS, please refer to:



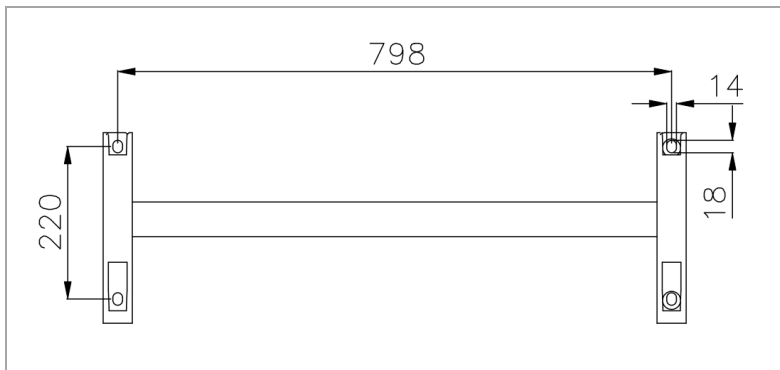
A	Battery port	E	USB/Wi-Fi
B	PV input terminals	F	COM port
C	LCD display	G	AC output terminals
D	DC switch		

All SOFAR 80-125KTLX-G4-ESS have the following dimensions:

W×H×D=985×710×321mm



Rear panel dimensions of inverter:



3.4 Labelling on the inverter

SGFAR *Hybrid Inverter*

Model: SOFAR 125KTLX-G4-ESS

PV Input

Max. Input Voltage: 1100 Vd.c.

MPPT Voltage Range: 160-1000 Vd.c.

Max. Input Current: 9*40A

Max. Isc: 9*50A

Battery

Voltage Range: 600-1000 Vd.c.

Max. Charging Current: 200 A

Max. Discharging Current: 200 A

Battery Type: Lithium-ion

AC Input

Rated Input Voltage: 3(N)~@380/400/415 V.a.c.

Rated Input Frequency: 50/60 Hz

Max. Input Current: 189.9/180.4/173.9 A

AC Output (Off-Grid)

Rated Output Voltage: 3N~@380/400/415 V.a.c.

Rated Output Frequency: 50/60 Hz

Rated Output Power: 62.5 kW

Max. Apparent Power: 62.5 kVA

Max. Output Current: 94.9/90.2/86.9 A

AC Output (On-Grid)

Rated Output Voltage: 3(N)~@380/400/415 V.a.c.

Rated Output Frequency: 50/60 Hz

Rated Output Power: 125 kW

Max. Apparent Power: 125 kVA

Max. Output Current: 189.9/180.4/173.9 A

Power Factor Range: 0.8lagging-0.8leading

Inverter Topology: Non-Isolated

Protective Class: Class I

IP Rating: IP66

Overvoltage Category: AC III, DC II

Manufacturer: Shenzhen SGFARSOLAR Co., Ltd.

Address: 11/F., Gaoxing Technology Building, No.67 Area, Xingdong Community, Xin'an Sub-district, Bao'an District, Shenzhen City, China

Made in China

Note: Take 125KTLX-G4-ESS as an example

The machine nameplate must not be obscured or broken by other objects (rags, cardboard boxes or other tools); the surface of the machine nameplate must be kept clean and clear to ensure that the contents are clearly visible.

3.5 Functional features

The DC power generated by the PV array is filtered by the input circuit before entering the power board, where insulation impedance detection and input DC voltage/current detection are performed. The power board converts the DC power into AC power, which is then passed through an EMI filter before being fed into the grid or used to charge the battery.

The power board also provides auxiliary power supply, grid voltage/output current detection, GFCI (Ground Fault Circuit Interrupter), and output isolation relay functions.

The control board manages the inverter's operating state and communicates the operating status via the display board. It can also trigger relays to protect internal components of the inverter from damage.

The display board shows inverter fault codes and abnormal operating conditions.

Functions

A Remote power on/off

This control can be used to switch the inverter on/off through an external (remote) control.

B Reactive power control

The inverter is able to produce reactive power and can therefore feed it into the grid through the setting of the phase shift factor. Feed-in management can be controlled directly by the grid company through a dedicated RS485 serial interface.

C Active power limiting

The inverter or a group of inverters may be monitored remotely through an advanced communication system based on RS-485 serial interface, or remotely via the WIFI/GPRS.

D Self-power reduction when the grid is over frequency

The inverter or a group of inverters may be monitored remotely through an advanced communication system based on RS-485 serial interface, or remotely via the WIFI/GPRS.

E Data transmission

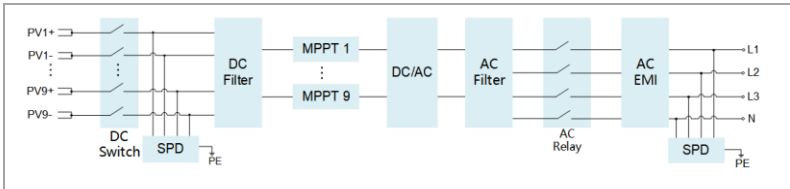
The inverter or a group of inverters may be monitored remotely through an advanced communication system based on RS-485 serial interface, or remotely via the WIFI/GPRS.

F Software update

Support USB flash drive local upgrade software and Wi-Fi/GPRS remote upgrade software.

3.6 Electrical block diagram

SOFAR 80-125KTLX-G4-ESS has 18 DC input strings. 9 MPPT trackers that convert the direct current of PV array to grid-compliant, three phase current and feeds in into the utility grid. Both DC and AC side has Surge Protection Device (SPD).

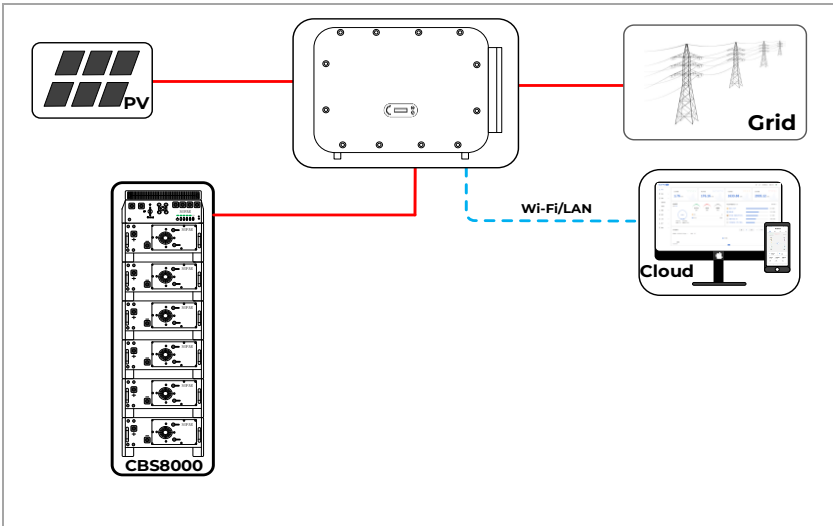


4 Application Scenarios and Mode

4.1 Single inverter grid-tied system

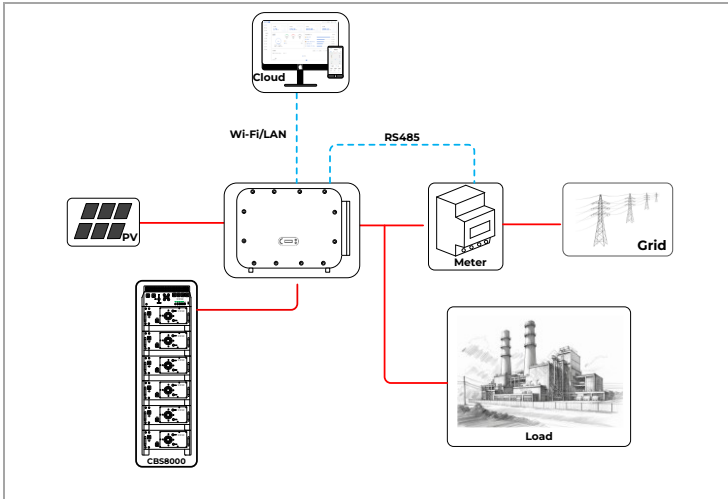
Full export mode

In this scenario, the inverter allows users to enable the TOU (Time-of-Use) strategy to optimize PV–battery coordination and achieve more refined energy management



Single-inverter export limitation grid-tied mode

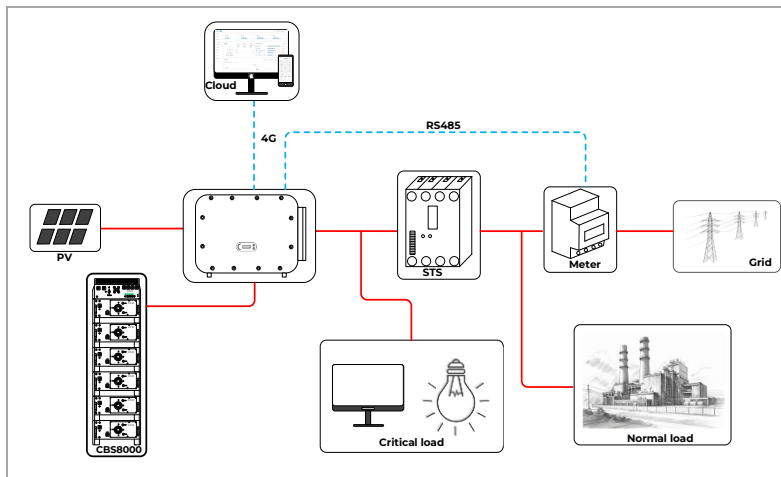
In this scenario, users may select from multiple operating modes—Self-use, Peak Shaving, TOU and Feed-in Priority—to enable flexible PV–battery scheduling and achieve optimized energy management.



4.2 Single-inverter system with emergency power supply

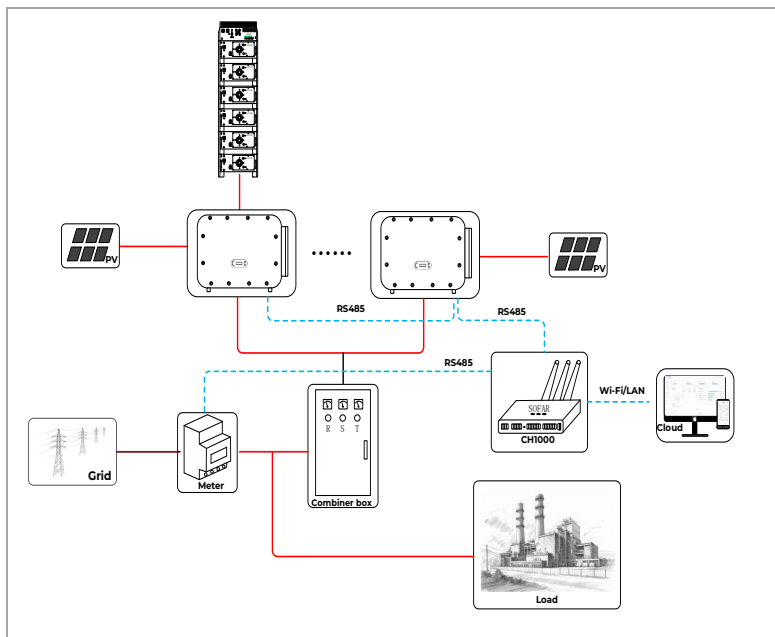
Single-inverter export limitation in grid-tied and off-grid mode

In addition to supporting all operating conditions in grid-connected scenarios, the system can provide an emergency power supply by configuring an external on-grid/off-grid transfer switch (STS). In the event of a grid outage, the system automatically and rapidly switches to off-grid operation to supply power to the loads.

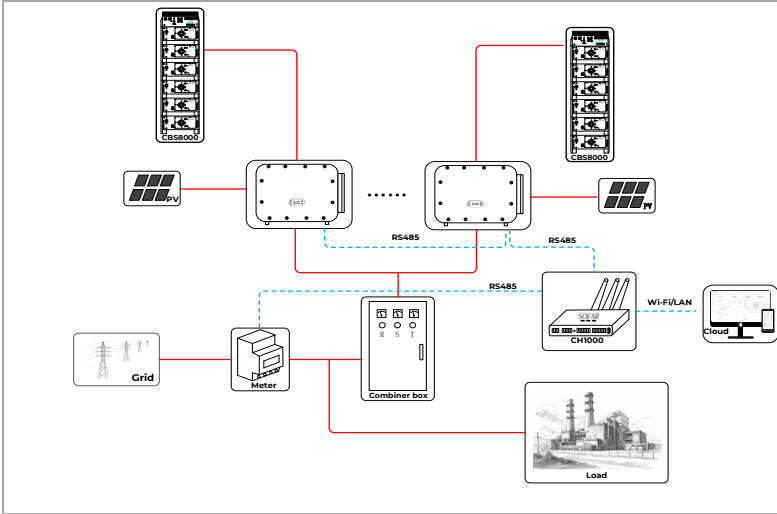


4.3 Multi-Inverter Grid-Tied System

PV and battery inverters grid-tied mode



Parallel battery inverters grid-tied mode



4.4 EMS Mode Description

Work Mode Description:

Parameter	Setting Description	Range
System		
Energy Storage Operating Mode	Refer to the detailed description of operating modes below	Self-consumption Time of use Passive Peak Shaving Feed-in Priority
Date	Mode Effective Date	[1.1~12.31]
Time	Mode Effective Time	[00:00~23:59]
Effective Days	Mode Effective Days	[Monday~Sunday]
Grid Charging for Battery	When enabled, the battery is allowed to be charged using power purchased from the grid; when disabled, charging the battery from the grid is prohibited.	Enable Disable

Battery Forced Charging Power (kW)	Set the maximum battery charging power.	Charging: [0,Maximum charging power]
Battery Forced Discharging Power (kW)	Set the maximum battery discharging power.	Discharging: [0,Maximum discharging power]
Peak Shaving Power (kW)	When the grid import power exceeds the peak shaving power, the battery discharges to shave the peak.	[0~4294967]
PCC Feeder Priority Power	Power fed into the grid.	[0~4294967]
Charging Cut-off SOC (%)	Set the charging cut-off capacity; once reached, the battery stops charging.	[10~100]
Discharging Cut-off SOC (%)	Set the discharging cut-off capacity; once reached, the battery stops discharging.	[10~100]
Backup SOC (%)	When the battery SOC is less than or equal to this value, the system allows battery discharge only if the grid import power is greater than the peak shaving power. When the battery SOC is higher than this value, the battery participates in discharging.	Setting range: [10~100]; this value must be greater than the Discharging Cut-off SOC and less than or equal to the Charging Cut-off SOC
Standalone		
Grid-connected Discharging Cut-off SOC	Set the grid-connected discharging cut-off capacity for a single unit; once reached, the battery will no longer discharge to the grid.	[10~100]
Off-grid Maximum Discharge Capacity (%)	Set the off-grid discharging cut-off capacity; once reached, the battery will no longer discharge for off-grid use.	[10~100]
Maximum Charging	Set the maximum battery charging current for a single unit.	[0~200]

Current Limit (A)		
Maximum Discharging Current Limit (A)	Set the maximum battery discharging current for a single unit.	[0~200]
Charging Cut-off SOC (%)	Set the charging cut-off capacity for a single unit; once reached, the battery is no longer allowed to charge.	[10~100]

Self-consumption

Store the excess PV generation in the battery, and discharge the battery to supply the load when PV generation is insufficient or during nighttime, improving the self-consumption rate of the PV system and the household energy self-sufficiency, thereby saving electricity costs.

The setup method for this mode is as follows:

Energy Storage Operating Mode

Time share tariff

Time share tariff rules 1

paradigm: Self-generation and self-consumption

Date: 01-01

Time: 00:00

Week the rule came into effect: Mon, Tue, Wed, Thu, Fri, Sat, Sun

Grid buys power to charge batteries: ☐

Battery Forced Charge Power: 140 kW

Charge cut-off SOC: 100 %

Grid buys power to the batteries: Whether charging the battery from the grid is allowed.

Date: Set the effective day and month.

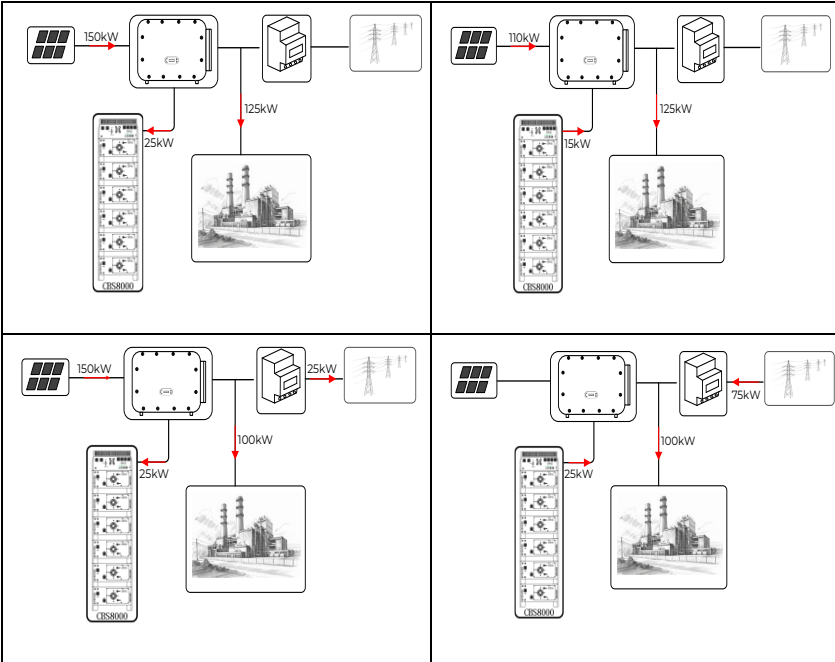
Rule Effective Days: Set working days or the entire week.

Battery Forced Charging Power: The power allowed for charging the battery from the grid.

Charging cut-off SOC: When the battery SOC reaches the charging cut-off SOC, the battery will no longer be charged from the grid; if the battery SOC has not reached the cut-off SOC, charging from the grid is allowed.

PV Supply Priority: Load > Battery > Grid.

Load Consumption Priority: PV > Battery > Grid.



Feed-in Priority

Within the specified Feed-in Priority time period, the system will prioritize controlling the inverter to feed power into the grid.

The screenshot shows the 'Energy Storage Operating Mode' configuration window. It includes a 'Time share tariff' dropdown, a 'Time share tariff rules 1' toggle, and a 'paradigm' dropdown set to 'Feeder Priority'. The 'Date' field shows '01-01' and '12-31', and the 'Time' field shows '00:00' and '06:00'. Below these, the 'Week the rule came into effect' section shows 'Mon', 'Tue', 'Wed', 'Thu', 'Fri', 'Sat', and 'Sun' buttons. The 'PCC Feeder Priority Power' field is set to '140' kW.

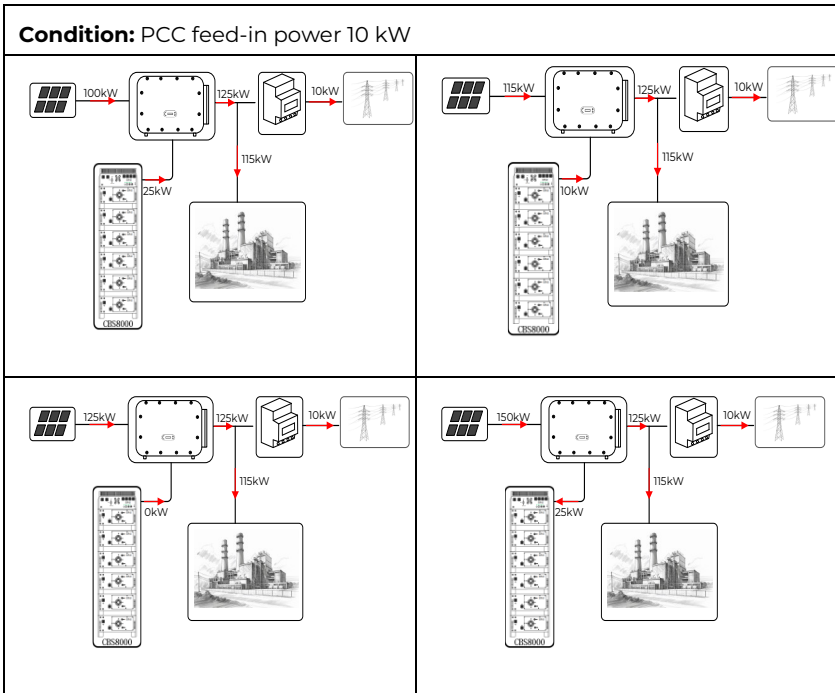
When set to Feed-in Priority mode, the system will prioritize meeting the configured PCC Feed-in Priority power (i.e., the power fed back to the grid).

PV energy is first used to supply the load, and any excess is fed into the grid. Once the power fed into the grid reaches the configured feed-in power, any remaining energy charges the battery.

When PV energy is insufficient to supply the load, the battery discharges to the load (note that battery energy is not fed into the grid).

PV Energy Output Priority: Load > Configured Feed-in Power > Battery Charging > Grid Supply

Load Energy Supply Priority: PV Generation > Battery Discharge > Grid Supply



Peak Shaving Mode

Applicable to scenarios where electricity is billed based on consumption and to weak-grid conditions. In weak-grid scenarios, the battery only activates when

the load power exceeds a certain threshold, in order to limit the maximum power at the grid connection point and extend battery lifespan; it can also be used to restrict the maximum power drawn from the grid.

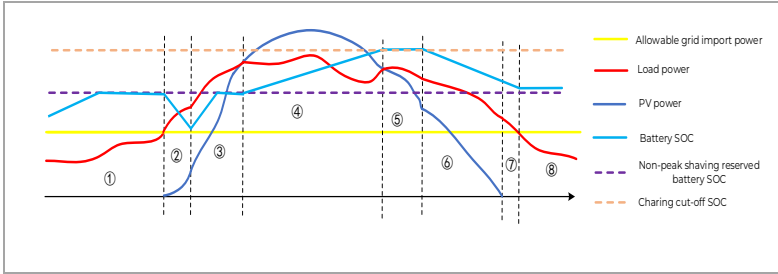
The screenshot displays the 'Energy Storage Operating Mode' configuration window. It features a 'Time share tariff' dropdown and a 'Time share tariff rules 1' toggle which is turned on. Below this, the 'paradigm' is set to 'Peak Shaving Mode'. The 'Date' range is configured from '01-01' to '12-31', and the 'Time' range is from '00:00' to '06:00'. The 'Week the rule came into effect' section shows a calendar with 'Sun' selected. The 'Grid buys power to charge batteries' toggle is currently off. The 'PCC Peak Shaving Power' is set to '140 kW'. Finally, the 'Stop peak shaving SOC' is set to '100 %'.

In this mode, the Peak Shaving Power (maximum power drawn from the grid) needs to be set. When the power drawn from the grid exceeds the configured peak shaving power, the battery starts discharging to keep the grid import power below the set peak shaving value.

The Backup SOC also needs to be set. When the system SOC is greater than the Backup SOC, the battery is allowed to discharge to supply the load (i.e., Self-consumption mode).

- If the system SOC is below the Backup SOC and Grid Charging for Battery is not enabled, the battery will not be charged from the grid unless the system has not reached the configured maximum grid import power.
- If the system SOC is below the Backup SOC and Grid Charging for Battery is enabled, the battery will be charged from the grid until the SOC reaches the Backup SOC, as long as the system has not reached the configured maximum grid import power.
- If the system SOC is below the Backup SOC and the grid import power reaches the configured maximum, the system controls the battery to discharge for peak shaving.

The following diagram illustrates the peak shaving process:



①: Load power is less than the allowable grid import power; the grid charges the battery up to the Backup SOC.

②: Load power exceeds the sum of peak shaving power and PV power; the battery discharges to shave the peak.

③: Load power is less than the sum of peak shaving power and PV power; the grid charges the battery up to the Backup SOC.

④: PV power exceeds the load power; the excess PV energy charges the battery.

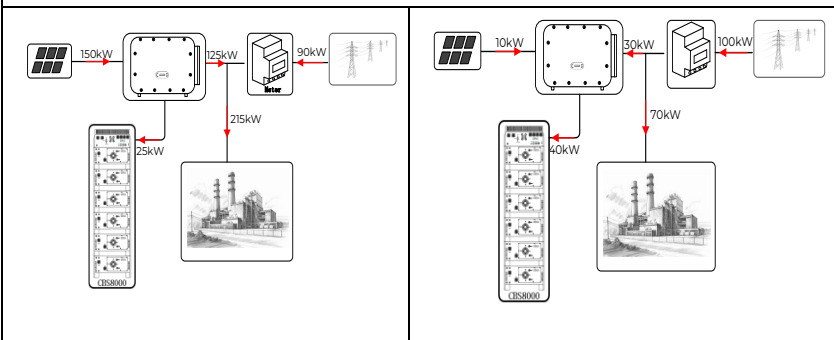
⑤: Load power is less than the sum of peak shaving power and PV power, and the battery is fully charged; the battery does not charge.

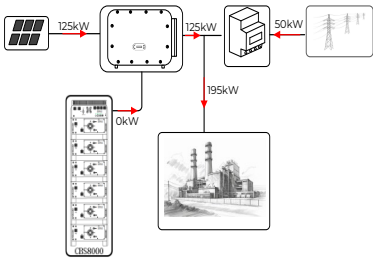
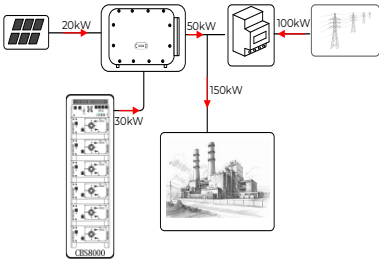
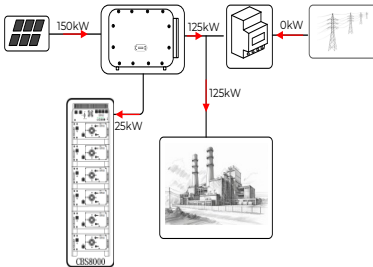
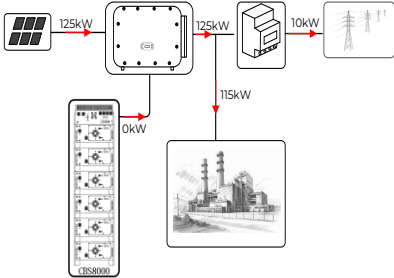
⑥: Load power exceeds PV power, and battery SOC is above the Backup SOC; the battery discharges to supply the load.

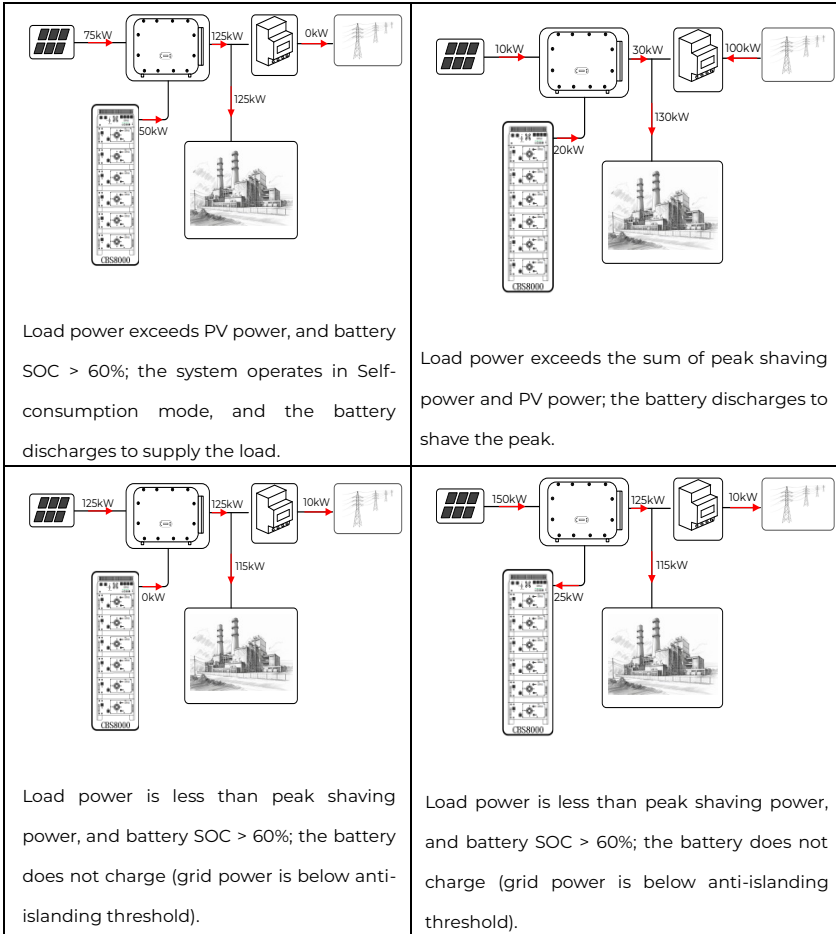
⑦: Load power exceeds the sum of peak shaving power and PV power; the battery discharges to shave the peak.

⑧: Load power is less than the peak shaving power, and battery SOC is above the Backup SOC; the battery does not charge.

Condition: Peak shaving power = 100 kW, Backup SOC = 60%



Battery SOC $\leq$ 60%, grid charging not allowed; load power is less than peak shaving power, PV energy charges the battery up to the Backup SOC.	Battery SOC $\leq$ 60%, grid charging allowed; load power is less than peak shaving power, the system charges the battery from the grid up to the Backup SOC.
	
Battery SOC $\leq$ 60%, load power is less than peak shaving power; the battery does not discharge.	Load power exceeds the sum of peak shaving power and PV power; the battery discharges to shave the peak (regardless of battery SOC).
	
PV power exceeds load power; the excess PV energy charges the battery.	Load power is less than the sum of peak shaving power and PV power, and the battery is fully charged; the battery does not charge.



Time of use

This mode is suitable for scenarios with significant peak and off-peak electricity price differences.

When this mode is selected, set the operating mode to Time-of-Use (TOU). Under different TOU rules (up to 5), various operating modes—including Forced Charging, Forced Discharging, Peak Shaving Mode, Feed-in Priority,

and Self-consumption Mode—can be configured manually along with specific time periods to achieve different operational strategies.

Peak Shaving Power: Maximum allowable power drawn from the grid.

Backup SOC: SOC used for peak shaving.

Forced Charge

During the specified Forced Charging time period, the system will charge the battery forcibly.

Energy Storage Operating Mode

Time share tariff

Time share tariff rules 1 ☒

paradigm: Forced Charge

Date: 01-01 to 12-31

Time: 00:00 to 06:00

Week the rule came into effect: Mon, Tue, Wed, Thu, Fri, Sat

Battery Forced Charge Power: 140 kW

Charge cut-off SOC: 100 %

PV energy is prioritized for battery charging. When PV power is sufficient, any excess power is supplied to the load or fed into the grid. When PV power is insufficient, the system draws power from the grid to charge the battery, ensuring that the battery charging power reaches the configured Forced Charging Power.

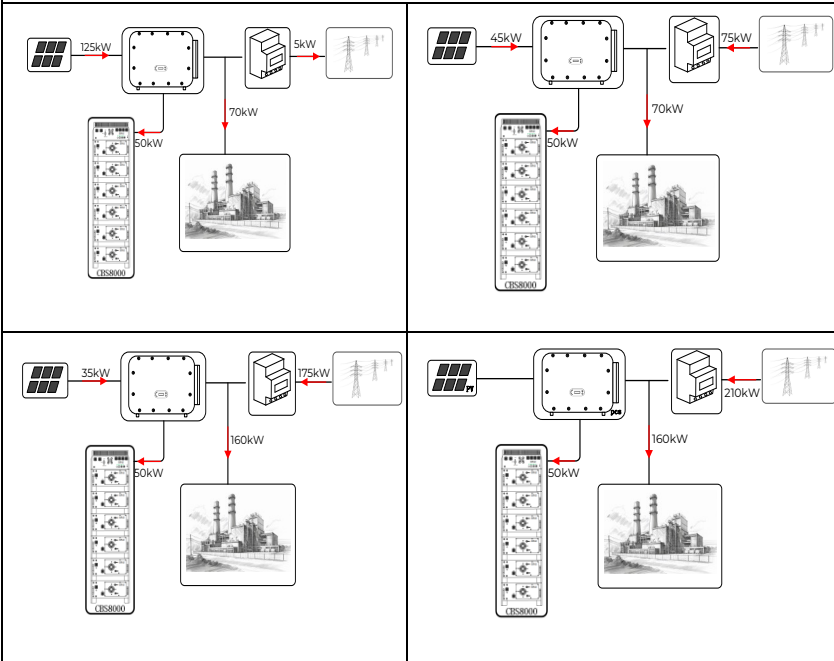
Forced Charging mode is active when the battery SOC $\leq$ Charging Cut-off SOC.

PV Energy Output Priority: Battery Charging > Load > Grid Feed-in.

Load Energy Supply Priority: PV Generation > Battery Discharge > Grid Supply.

When the battery SOC > Charging Cut-off SOC, the system switches to Self-consumption Mode.

Condition: Battery forced charging power = 50 kW



Forced Discharge

During the specified Forced Discharging time period, the system will force the battery to discharge (priority is lower than feed-in limitation).

Energy Storage Operating Mode Read Settings

Time share tariff ▼

Time share tariff rules 1 ☑

paradigm ▼ Date 01-01 Time 12:31

Forced Discharge 00:00 06:00

Week the rule came into effect

Mon Tue Wed Thu Fri Sat Sun

Battery Forced Discharge Power 140 kW

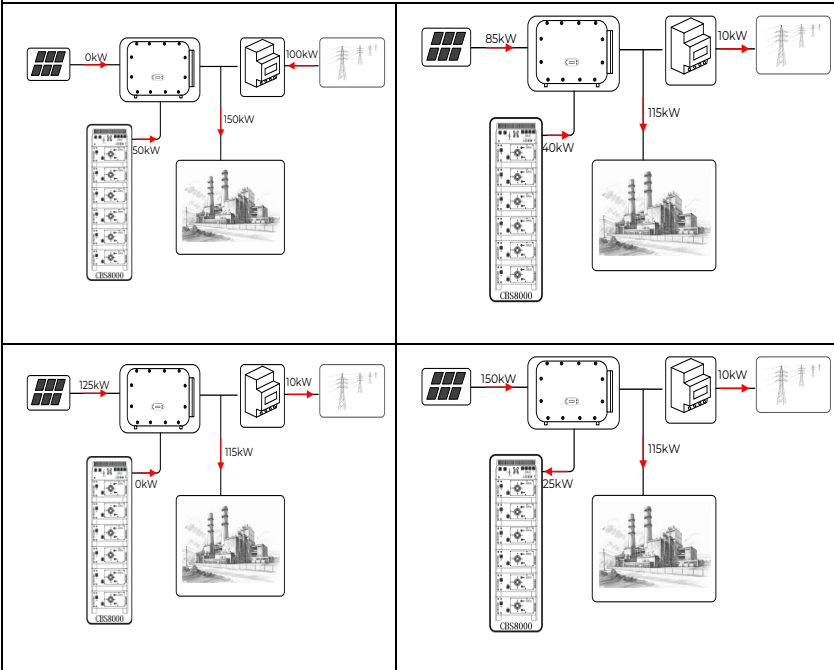
Discharge cut-off SOC 10 %

The system prioritizes battery discharging. When the system backfeed reaches the configured backfeed limit, the battery discharging power is reduced. If the anti-islanding function is not enabled, the system controls the battery to discharge according to the configured Forced Discharging Power.

PV Energy Output Priority: Load > Grid Feed-in > Battery Charging.

Load Energy Supply Priority: PV Generation > Battery Discharge > Grid Supply.

Condition: Battery forced discharging power = 50 kW, Feed-in Limit = 10 kW

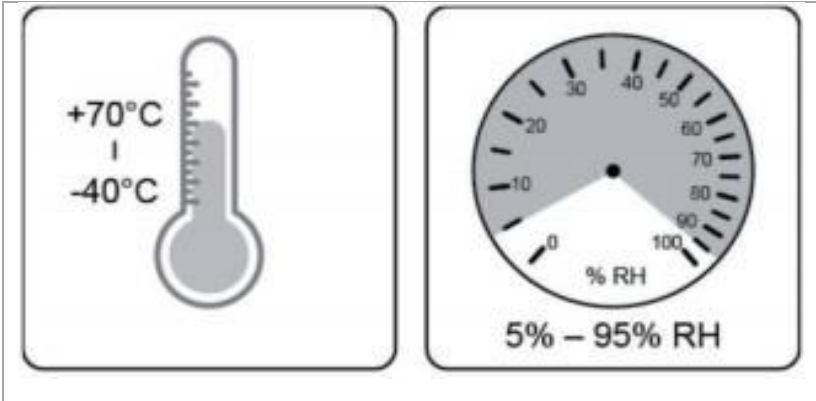


5 Inverter Storage

If the inverter is not installed immediately, storage conditions need to meet the following requirements:

Place the inverter in the original packing case with the desiccant inside.

Keep the storage temperature around -30°C to $+70^{\circ}\text{C}$, Relative humidity 5 to 95%, non-condensing.



In case of stacking storage, the number of stacking layers should never exceed the limit marked on the outer side of the packing case.

The packing case should be upright.

If the inverter needs to be transported again, pack it strictly before loading and transporting it.

Do not store the inverter in places susceptible to direct sunlight, rain, and strong electric field.

The inverter needs to be stored in a clean and dry place and protected from dust and moisture.

Inverters stored for half a year or above need to be inspected and tested by a professional before being put into use.

Please store the product in accordance with the storage requirements. Damage to the product caused by storage conditions that do not meet the requirements will not be covered by the warranty.

6 Installation

DANGER

Fire hazard

- ▶ Do NOT install the inverter on flammable material.
- ▶ Do NOT install the inverter in an area in which flammable or explosive material is stored.

CAUTION

Burning hazard

- ▶ Do NOT install the inverter in places where it can be accidentally touched. The housing and heat sink may become very hot while the inverter is being operated.

NOTICE

Handling Safety

- ▶ Consider the weight of the inverter when transporting and moving it.
- ▶ Choose a suitable installation location and surface.
- ▶ Commission a minimum of two persons for the installation of the inverter.
- ▶ Do not turn the inverter upside down.

6.1 Installation procedure

Mechanical installation is performed as follows:

1. Examine the inverter before installation
2. Prepare the installation
3. Select an installation location
4. Transport the inverter
5. Mount the rear panel
6. Install the inverter

6.2 Examination before installation

Before unpacking the inverter, check the external packaging material for damage, e.g. holes and cracks. If you discover any cases of damage, do not unpack the inverter and contact the transport company and/or dealer immediately.

Do not install the inverter if the packaging is damaged.

It is recommended that the packaging material be removed within 24 hours before installing the inverter.

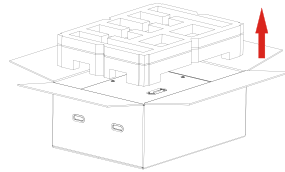
Keep the original packaging and use it whenever the inverter needs to be shipped or transported.

6.3 Unpacking the inverter

► Open the packaging and have at least two people grip underneath the inverter at both sides.

- Do not put the inverter with wiring terminals contacting the floor because the power ports and signal ports are not designed to support the weight of the inverter.

- When placing the inverter on the floor, put it above foam or paper to avoid the damage of the shell of the inverter.



CAUTION

Please handle the inverter carefully. Keep your balance when lifting the inverter.

► Lift the inverter out of the packaging and move it to its installation position horizontally.

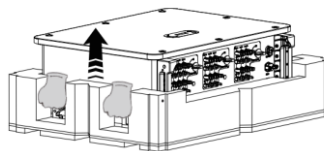
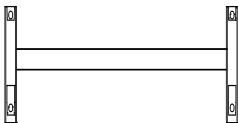
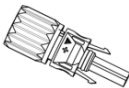
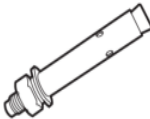
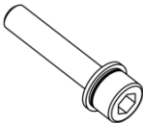


Figure 5-1 Move inverter from package

6.4 Checking the delivery scope

► Check that the delivery is intact and complete.

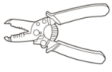
In the event of any damage or missing components, contact the wholesaler.

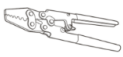
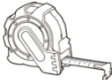
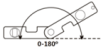
No.	Image	Description	Quantity
1		SOFAR 80-125KTLX-G4-ESS	1
2		Rear Panel	1
3		PV+ input terminal	18
4		PV- input terminal	18
5		Metal terminals secured to PV+ input power cables	18
6		Metal terminals secured to PV- input power cables	18
7		M10*90 Hexagon screws	4
8		M6*30 Hexagon screws	2
9		COM communication terminal	1

No.	Image	Description	Quantity
10		Wi-Fi stick logger	1
11		Documents	1
12		120Ω resistor	2

6.5 Tools

Prepare tools required for installation and electrical connections.

No.	Tool	Model	Function
1		Hammer drill Recommend drill dia. 6mm	Used to drill holes on the wall.
2		Screwdriver	Wiring
3		With an open end of larger than or greater than 32 mm	Used to tighten expansion bolts
4		Rubber Mallet	Used to hammer expansion bolts into holes
5		Removal tool	Remove PV terminal
6		Wire stripper	Strip wire

No.	Tool	Model	Function
7		M6	M6 use to uninstall and install the front top cover and down cover
8		Torque wrench	Connect AC connector
9		Crimping tool	Used to crimp power cables
10		Multi-meter	Used to check grounding
11		Marker	Used to mark signs
12		Measuring tape	Used to measure distances
13		Level	Used to ensure that the rear panel is properly installed
14		ESD gloves	Operators wear
15		Safety goggles	Operators wear
16		Anti-dust respirator	Operators wear

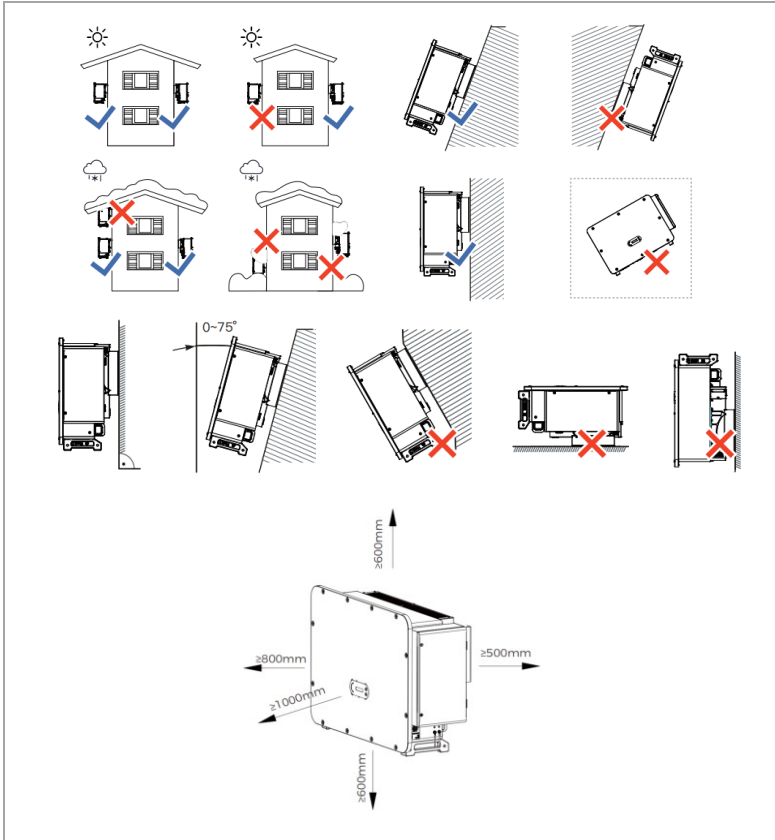
6.6 Selecting an installation location

Requirements for the installation position:

- ▶ Install position must not obstruct the disconnect of power.
- ▶ Place the inverter on an appropriate bearing capacity object.
- ▶ Location should be avoided touch by children.

- Install vertical or backward tilt within 0-75°, Do not install forward or upside down!

Choose a suitable position for the installation of the inverter. Ensure that the following requirements have been fulfilled:

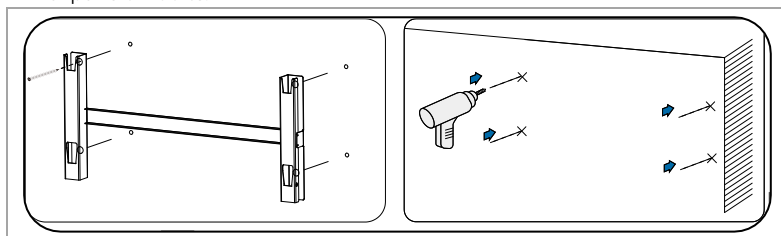


6.7 Installing the inverter

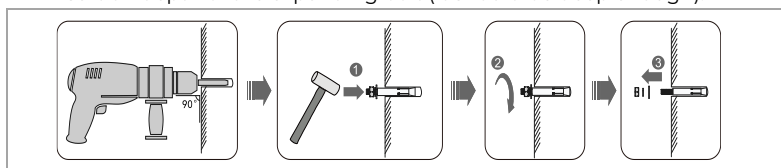
Installed on wall

1. Placed the rear panel on the mounting wall, determine the mounting height of the bracket and mark the mounting poles accordingly. Drilling holes by using Hammer Drill, keep the hammer drill perpendicular to the

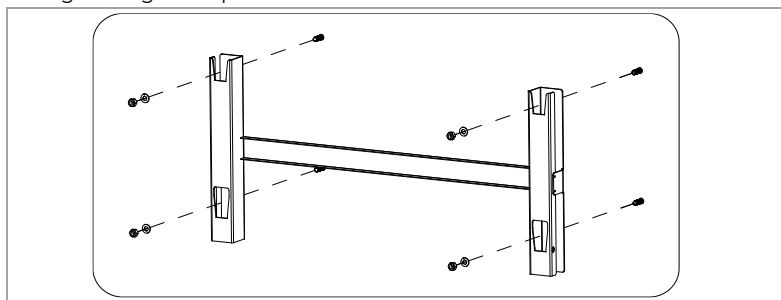
wall and make sure the position of the holes should be suitable for the expansion bolts.



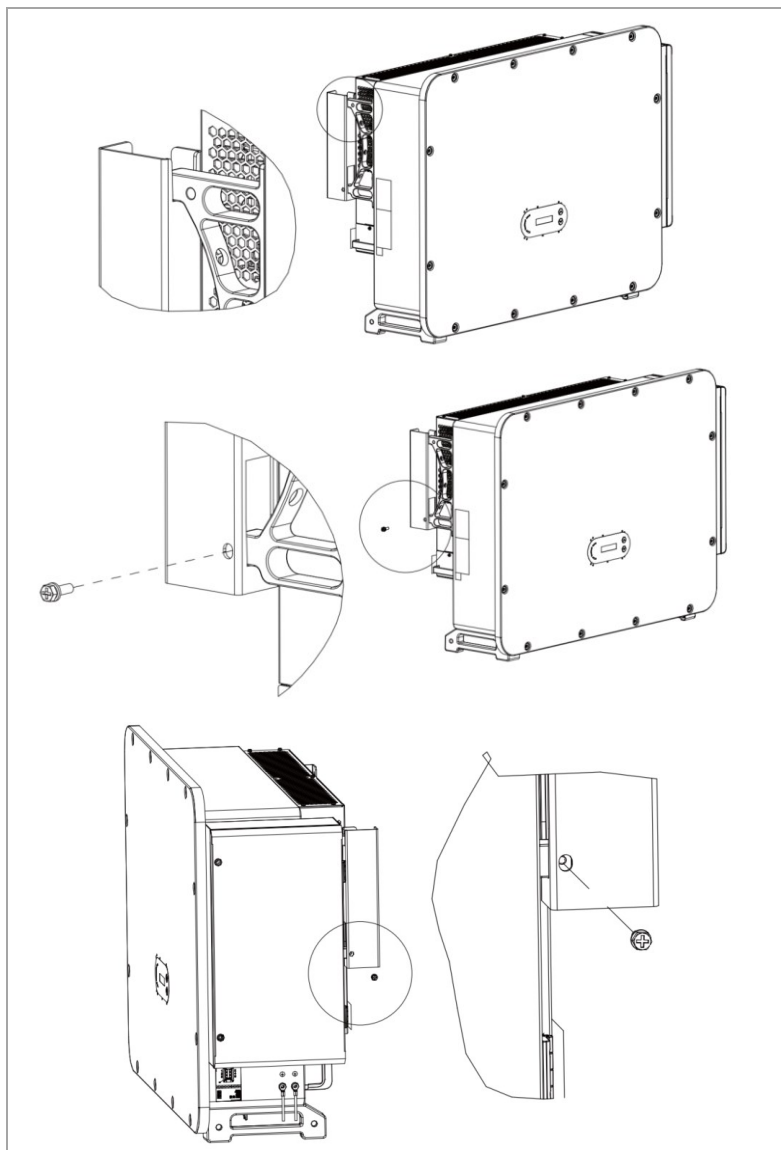
2. Insert the expansion bolt vertically into the hole, pay attention to the insertion depth of the expanding bolt (it should be deep enough).



3. Align the rear panel with hole positions, fix the rear panel on the wall by tightening the expansion bolt with the nuts.

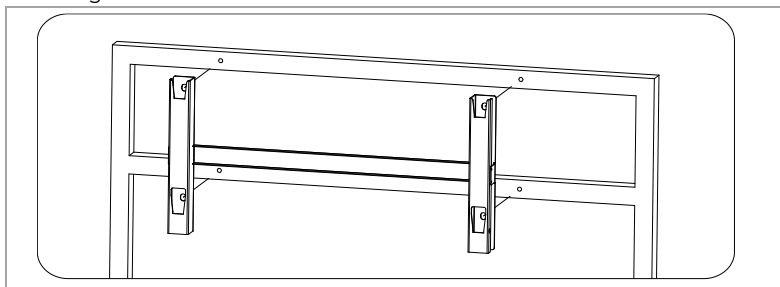


4. Lift the inverter and hang it on the rear panel, and fixing both side of inverter with M6 screw (accessories).

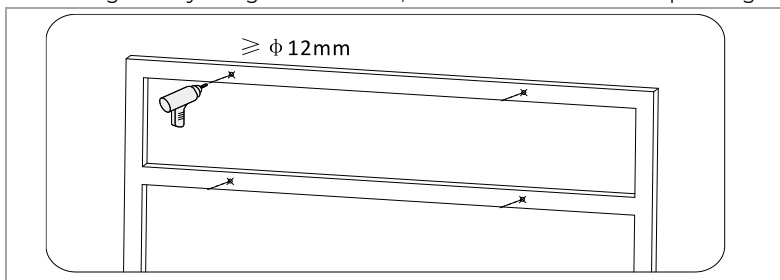


Bracket Installation

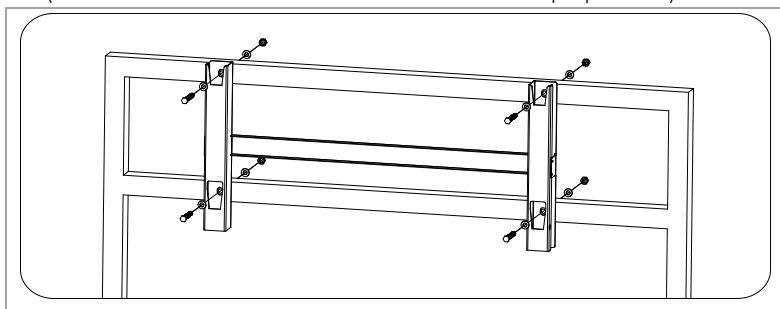
1. Use wall mount bracket, ensure the pole position are in same level by using level rule and take a mark with maker.



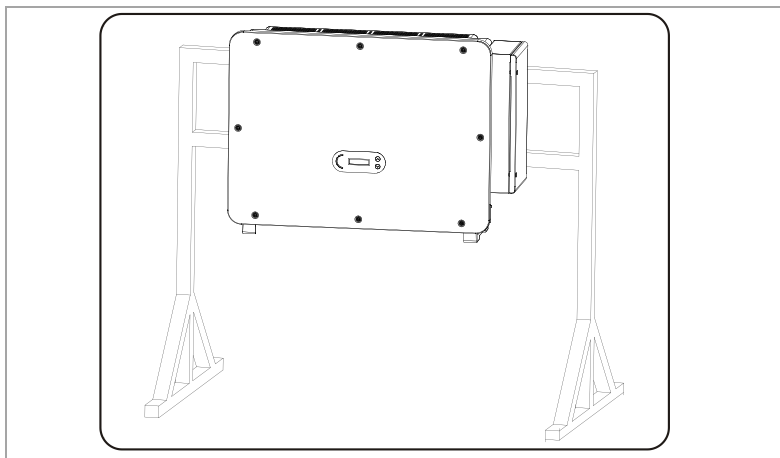
2. Drilling hole by using Hammer Drill, recommend to do a stain proofing.



3. Use M10 screw and M10 flat washer to secure the wall bracket
(Note:M10*90 screw and M10 flat washer need self-preparation).



4. Lift the inverter and hang it on the wall bracket, and fix both sides of inverter with M6 screw. Repeat 6.7.1 step 4.



The stand must be firmly anchored to the ground to avoid shaking and tipping.

7 Electrical Connections

7.1 Precautions

This section introduces the electrical connection for the product. Please read the information carefully, it may be helpful to understand the grounding wiring, DC input connection, AC output connection and communication connection.

DANGER

Dangerous DC voltage

- ▶ Before establishing the electrical connection, cover the PV modules using opaque material or disconnect the PV generator from the inverter. Solar radiation will cause dangerous voltage to be generated by the PV generator.
- ▶ Before performing electrical connections, ensure that the DC switch is OFF.
- ▶ Reason is that the electrical charge remains in the capacitor after the DC switch has been switched off. Therefore, at least 5 minutes must lapse before the capacitor has been electrically discharged.

NOTICE

- ▶ Installation and maintenance of the inverter must be performed by a professional electrical engineer.
- ▶ For SOFAR 80-125KTLX-G4-ESS, open-circuit voltage(Voc) of module arrays connected in series must be $\leq 1100V$.
- ▶ The connected PV modules must have an IEC 61730 Class A rating.

Model	Isc PV	Max. current
SOFAR 80KTLX-G4-ESS	9×50 A	127.0A@400V
SOFAR 99KTLX-G4-ESS		144.3A@400V
SOFAR 100KTLX-G4-ESS		158.7A@400V
SOFAR 110KTLX-G4-ESS		174.6A@400V
SOFAR 125KTLX-G4-ESS		181.2A@400V

7.2 Connection sequence

Electrical installation is performed as follows:

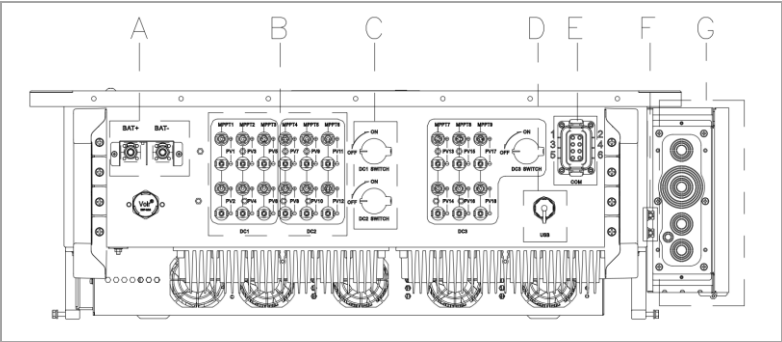
- 1. Connect PE cable
- 2. Connect AC output power cable
- 3. Connect DC input cable
- 4. Connect communication cable (optional)

7.3 Terminal connector

 **CAUTION**

Pay attention to damage during transport

- Please carefully check that the product packaging and each connection terminal are intact before installation.



No.	Label	Description
A	BAT+/-	BAT inputs connection
B	PVI-18(+/-)	PV inputs connection
C	DC SWITCH	Control the access and shutdown of DC inputs
D	USB	USB firmware update or Stick logger connection
E	COM	RS485/DRMS/Ethernet/Wi-Fi/STS/Battery Communication port

F		Connecting terminal of the ground, choose at least one for grounding connection
G	AC	AC output connection

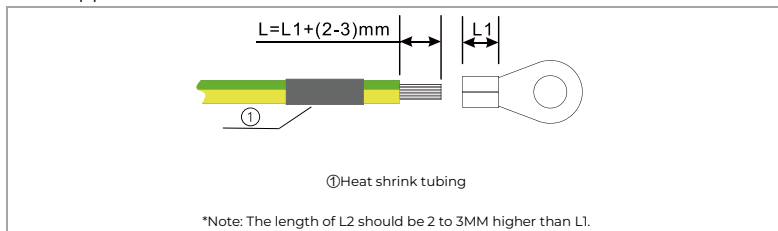
7.4 Connect grounding PE cable

Connect the inverter to the grounding electrode using protection ground (PGND) cables for grounding purpose.

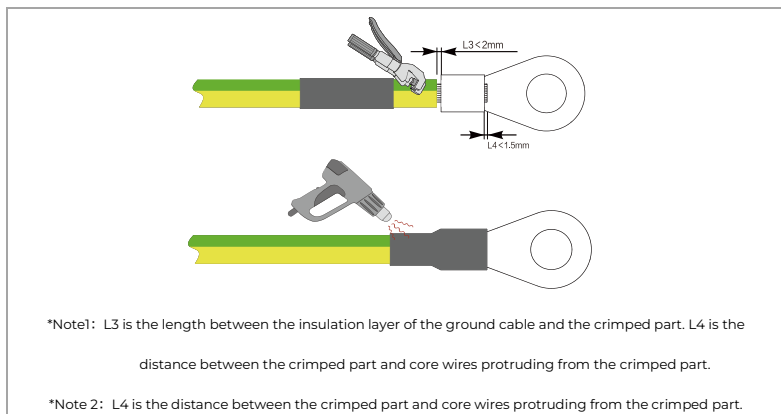
The inverter is transformer-less, requires the positive pole and negative pole of the PV array to be NOT grounded. Otherwise, it will cause inverter failure. In the PV power system, all non-current carrying metal parts (such as PV module frame, PV rack, combiner box enclosure, and inverter enclosure) should be connected to the earth.

Prerequisites: The PGND cables are prepared (recommend 16mm² yellow-green outdoor cable and M6 OT Terminal)

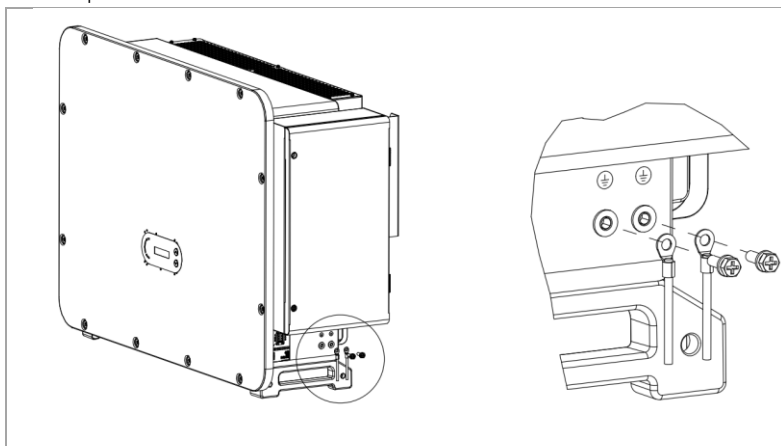
1. Remove the insulation layer with an appropriate length using a wire stripper.



2. Insert the exposed core wires into the OT terminal and crimp them by using a crimping tool.



3. Remove the screw from the bottom side of inverter, connect the grounding cable to the grounding point and tighten the grouping screw. Torque is 5-7N.m.



For improving anti-corrosion performance, after ground cable installed, apply silicone or paint is preferred to protect.

7.5 Connect grid side of inverter (AC-Output)

Connect the inverter to the AC power distribution frame or power grid using AC output power cables.

⚠ CAUTION

- ▶ Each inverter must have its own circuit breaker.
- ▶ Do not connect any consumers between the inverter and circuit breaker!
- ▶ The AC disconnecting device must be easily accessible.

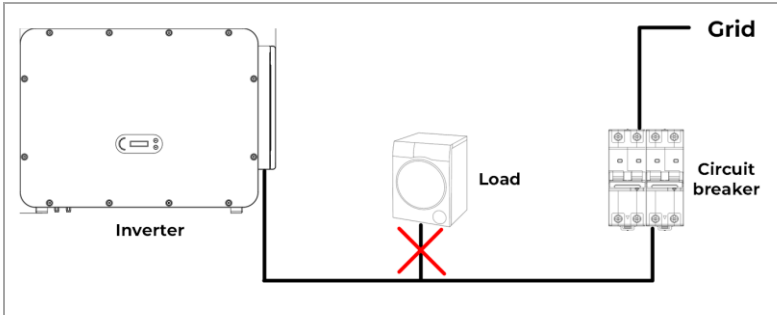
NOTICE**Obtaining permission to connect to the grid**

- ▶ The AC cable needs to meet the requirement of the local grid operator.

All the AC output cables used for the inverters are outdoor five-core cables. To facilitate the installation, use flexible cables.

Specification		L/N Cross-sectional area (mm ²)		PE Cross-sectional area cable (mm ²)		Cable insulation voltage (V)
		Cu	Al	Cu	Al	
SOFAR	80KTLX-G4-ESS	≥95	≥120	≥16	≥35	600
SOFAR	99KTLX-G4-ESS	≥95	≥120	≥16	≥35	600
SOFAR	100KTLX-G4-ESS	≥95	≥120	≥16	≥35	600
SOFAR	110KTLX-G4-ESS	≥95	≥120	≥16	≥35	600
SOFAR	125KTLX-G4-ESS	≥95	≥120	≥16	≥35	600

NOT allowed: connect loads between inverter and circuit breaker:



The grid impedance at the inverter's point of common coupling (PCC) must be less than 200 m Ω .

To ensure reliable anti-islanding performance, high-quality PV-dedicated cables with sufficient current-carrying capacity shall be used, so that the line losses are kept below 5% of the rated power. In addition, the distance between the inverter AC side and the grid connection point shall not exceed 100 m.

The AC output terminal of this product is equipped with a high-current terminal block and a customized waterproof AC output cover. When installed according to the requirements, it can meet the IP66 protection rating. The AC output cable shall be provided and connected by the customer.

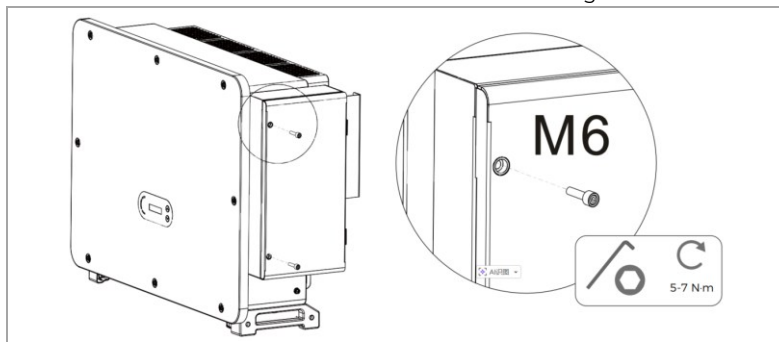
The AC output of this product is equipped with terminal block connector. The inverter is equipped with IP66 AC connector, and the AC output cable needs to be wired by the customer.

Open the wiring box

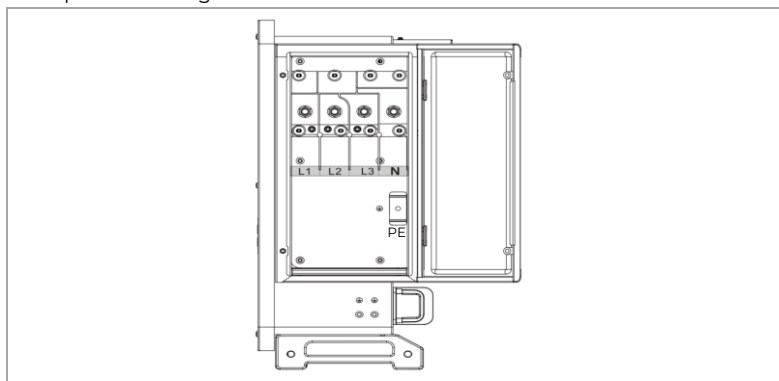
NOTICE

- ▶ Forbid to open then main board cover of inverter.
- ▶ Before open the wiring box, please ensure there is not DC and AC connection.
- ▶ If open the wiring box on snowing or raining day, please take protective measures to avoid the snow and rain enter wiring box. Otherwise, should not open the wiring box.
- ▶ Please do not unused screw in the wiring box

1. Use M6 driver to unscrew the two screws on the wiring box.



2. Open the wiring box cover.



Wiring Terminal and Precautions

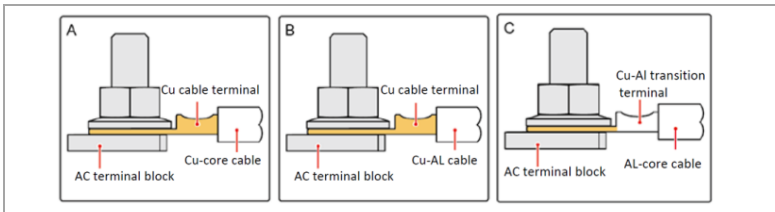
NOTICE

- Before connecting to grid, please ensure the grid voltage and frequency of the local grid meet the requirements of inverter. For any questions, please contact your local grid company for assistance.
- Inverter can only connect to grid after get the permission from local grid company.
- Should not connect any loads between inverter and AC circuit breaker.
- Please do not unused screw in the wiring box

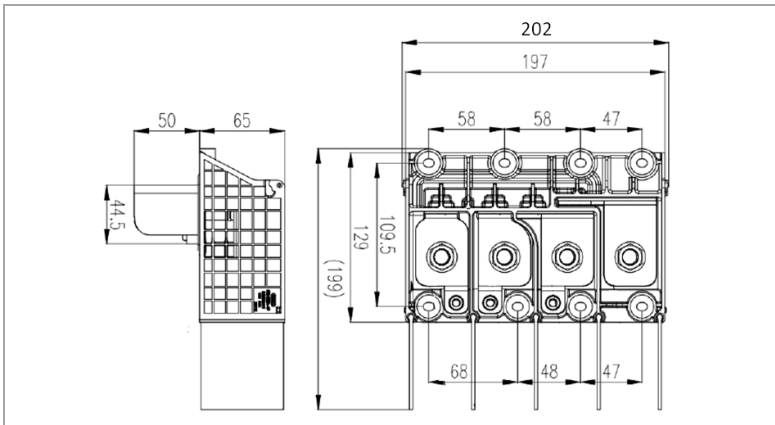
OT/DT Requirement:

- When using copper core cable, please use a copper terminal connector.
- When using copper-clad aluminium cable, please use a copper terminal connector.
- When using aluminium core cable, please use a copper and aluminium transition terminal connector.

Requirement for terminal connection:



AC Terminal size:



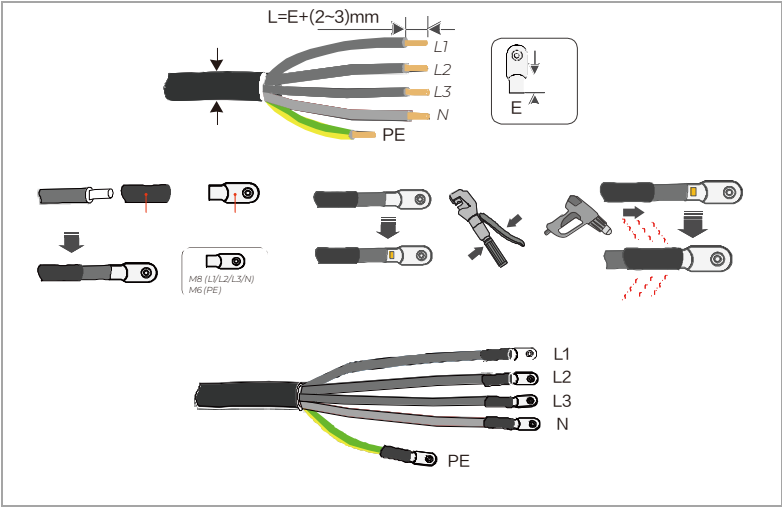
Wring Procedure

The section will use a five-core wire as a sample, single-core wire has the same connection process

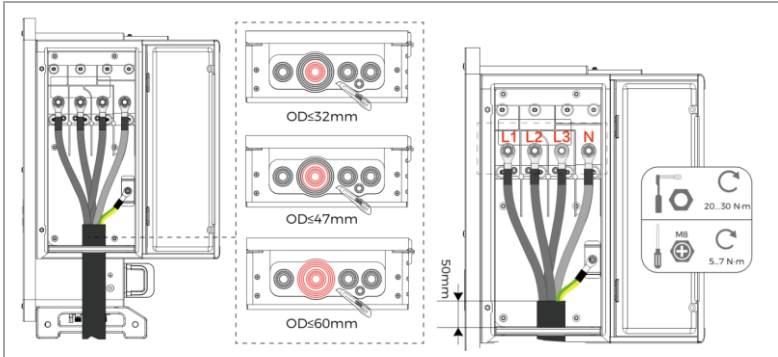
Type Model	Cable cross-sectional area of L/N(mm ²)	Cable cross-sectional area of P/E(mm ²)	Multi-core cable O.D. range(m m)	Single-core cable O.D. range(mm)
SOFAR 80-125KTLX-G4-ESS	Copper Wire:95~185 Aluminium Wire:120~240	16~35	≤60	≤32

Wiring Procedure:

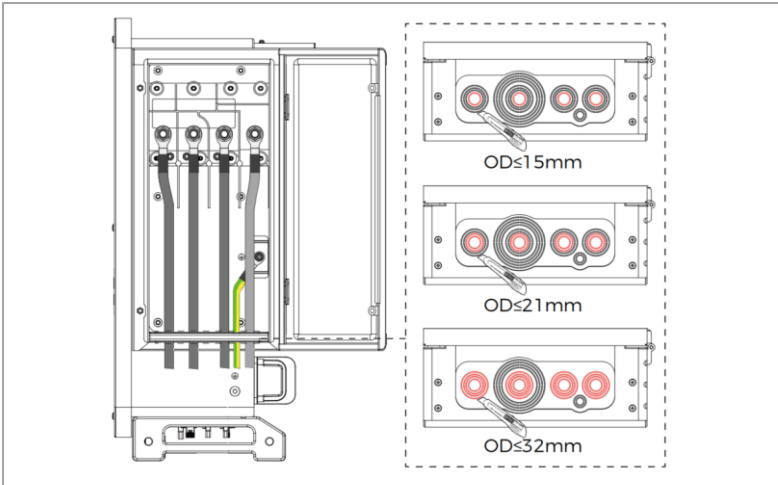
1. Open the cover, refers to section 7.4.1.
2. Turn OFF the AC circuit breaker and secure against reconnection.
3. Unscrew the nut of the AC terminal block and select the sealing ring according to the outer diameter of the cable. Insert the nut, sealing ring into the cable in sequence
4. Remove the insulation layer of an appropriate length according to figure below.
5. Crimp the Terminal.



6. Depending on the grid configuration, connect L1, L2, L3 and N to the terminals according to the label and tighten the screw on the terminal using a screwdriver.



single core cable is wired as follows:



Phase lines use M12 terminal connector, PE line use M8 terminal connector. The position of "PE" Line and "N" Line should not be opposite. Opposite position may cause the inverter to be permanently faulty.

7. Close the wiring box cover, and tighten the screw.

7.6 Connect PV side of inverter (DC-Input)

Connecting PV strings to inverter must follow the procedure below. Any faulty cause by inappropriate operation will not be included in the warranty.

WARNING

- ▶ Before connecting the PV array to the inverter, make sure that the PV array is well insulated to ground.
- ▶ Make sure that the voltage and the maximum short-circuit current of each PV string are within the permissible range of the inverter, see 'Technical Data' for details.
- ▶ Ensure that the 'DC switch' is in the OFF position.
- ▶ Before connecting the DC connector to the inverter, please check the positive and negative polarity of the PV string and make sure it is correct before plugging the DC connector into the corresponding DC terminal.
- ▶ Do not connect the same PV string to more than one inverter. Otherwise, it may cause damage to the inverter.
- ▶ Please use the connectors in the accessories bag. The damage caused by incorrect use is not included in the warranty.
- ▶ The PV terminal that comes standard with the inverter can only be used for copper wire cables. If the customer needs to use aluminium wire cables, please consult the after-sales service of SOFARSOLAR.

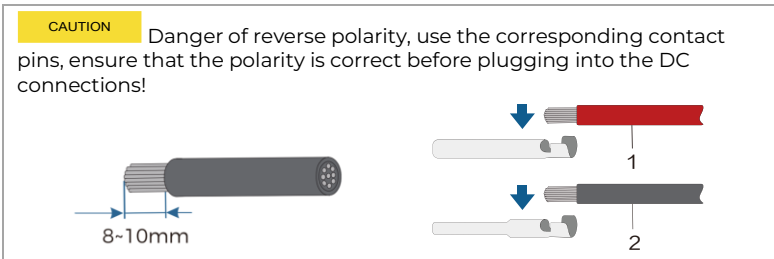
NOTICE

- ▶ Ensure PV positive connector connects to the inverter positive pole, negative connector connects to the inverter negative pole. Use the connectors in the accessories bag. The damage caused by incorrect is not included in the warranty.
- ▶ Ensure same PV string must have the same structure, including: same model, same number of panels, same direction, same azimuth.

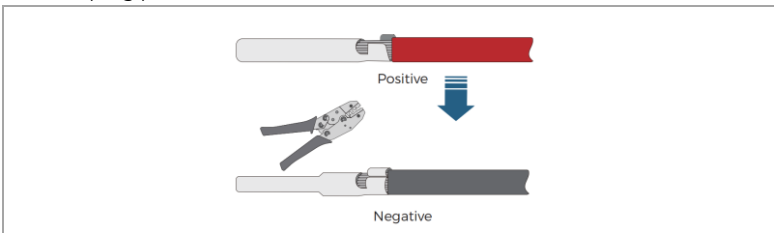
Recommended DC input cable size

Cross-Sectional Area (mm ²)		Cable OD (mm)
Range	Recommend	
4.0~6.0	4.0	4.5~7.8

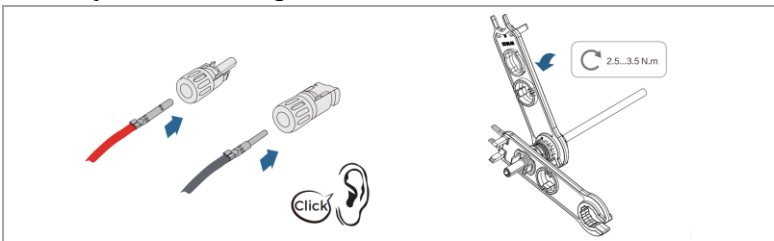
1. Use the metal contact pins from the accessories bag. Connect the cable according to the diagram (1. Positive cable, 2. Negative cable).
2. Insert the positive and negative DC cables into the corresponding contact pins.



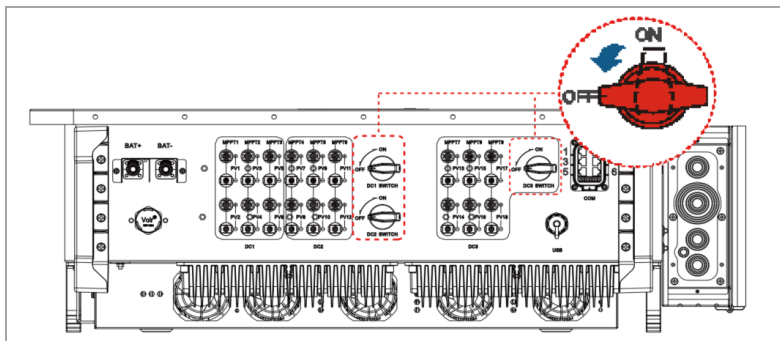
3. Crimp the PV metal contact pin to the striped cable using proper crimping pliers.



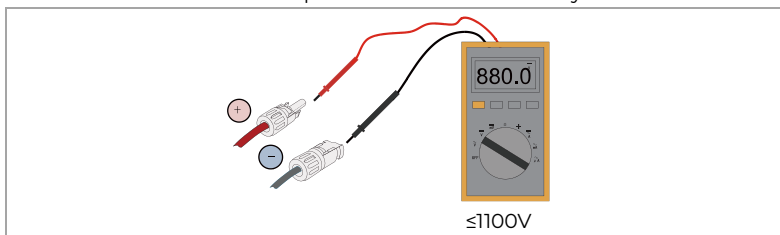
4. Insert the crimped DC cables into the corresponding connector housing until you hear a **clicking** sound.



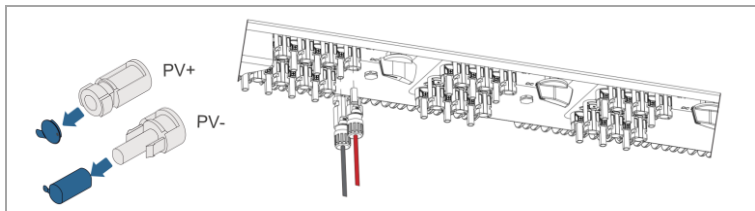
5. Ensure the DC switch is in the 'OFF' position.



6. Check the polarity of the DC input cable by measuring the PV voltage at the DC input with a multimeter. Ensure that the open circuit voltage does not exceed the inverter input limit of 1100V under any circumstances.



7. Connect the DC connector to the inverter.



For unconnected PV ports, do not remove the connector plug to prevent water.

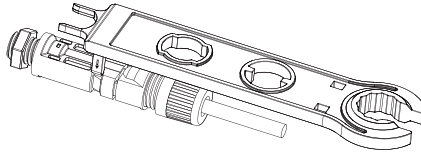
Removing the DC connector:

If you need to remove the PV connector from the inverter side, use the Removal Tool as shown figure below, move the connector gently.

- ▶ Insert a removal key into the locking and press on the key with adequate force.

CAUTION

Danger of DC arcing. Set the DC switch to OFF before removing the plus and minus connector.



7.7 Wiring method recommended

The inverter has a total of 18 DC input terminals, of which the branch route of MPPT1~MPPT3 is controlled by DC SWITCH 1, the branch route of MPPT4~MPPT6 is controlled by DC SWITCH 2, and the branch route of MPPT7~MPPT9 is controlled by DC SWITCH 3.

It is recommended that the working voltage of photovoltaic modules be configured within the range of 600V to 800V. When the working voltage is configured to the rated voltage of 625V, the conversion efficiency is the highest. If the operating voltage of the inverter MPPT exceeds the range of 500V to 850V, even if the components are over-configured, it may not be able to operate at maximum power for a long time.

Each MPPT channel has a maximum operating current of 40A. The recommended configuration of the number of strings in each group should not vary too much. If the working voltage of individual components is lower than that of other circuits, it is recommended to connect a separate MPPT circuit. The maximum operating current of the single-channel component is 26A.

When the maximum current of each MPPT branch is 20A, in order to give full play to the power generation capacity of the PV string and extend the service life of the inverter, when the number of input strings is 11~18 strings, the recommended connection method of DC input terminals is as follows:

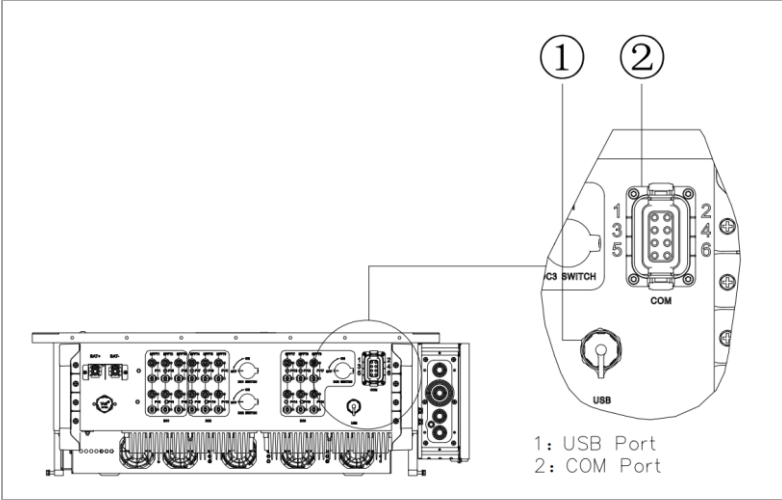
Enter the number of strings	Terminal selection
11	PV1/PV2/PV3/PV4/PV5/PV7/PV9/PV11/PV13/PV15/PV17
12	PV1/PV2/PV3/PV4/PV5/PV6/PV7/PV9/PV11/PV13/PV15/PV17
13	PV1/PV2/PV3/PV4/PV5/PV6/PV7/PV8/PV9/PV11/PV13/PV15/PV17
14	PV1/PV2/PV3/PV4/PV5/PV6/PV7/PV8/PV9/PV10/PV11/PV13/PV15/PV17
15	PV1/PV2/PV3/PV4/PV5/PV6/PV7/PV8/PV9/PV10/PV11/PV12/PV13/PV15/PV17
16	PV1/PV2/PV3/PV4/PV5/PV6/PV7/PV8/PV9/PV10/PV11/PV12/PV13/PV14/PV15/PV17
17	PV1/PV2/PV3/PV4/PV5/PV6/PV7/PV8/PV9/PV10/PV11/PV12/PV13/PV14/PV15/PV16/PV17
18	PV1/PV2/PV3/PV4/PV5/PV6/PV7/PV8/PV9/PV10/PV11/PV12/PV13/PV14/PV15/PV17/PV18

PV1/PV2 two string voltages should be as consistent as possible, PV3/PV4, PV5/PV6, PV7/PV8, PV9/PV10, PV11/PV12, PV13/PV14, PV15/PV16, PV17/PV18 is the same.

7.8 Communication connection (optional)

When laying out the cable routing, separate the communication wiring and power wiring because the signal can be affected.

The SOFAR 80-125KTLX-G4-ESS has one UBS port and one COM port.



If the COM port is connected to the smart control box CH1000, the USB port does not need to be connected to the stick logger.

USB port

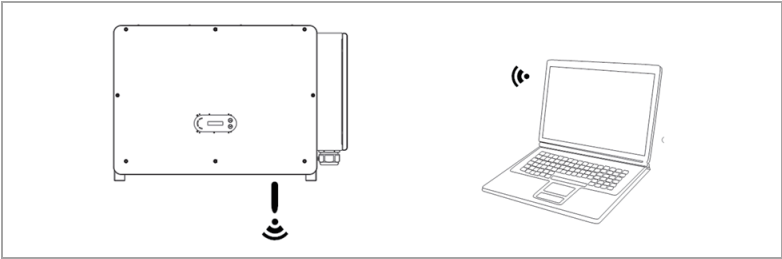
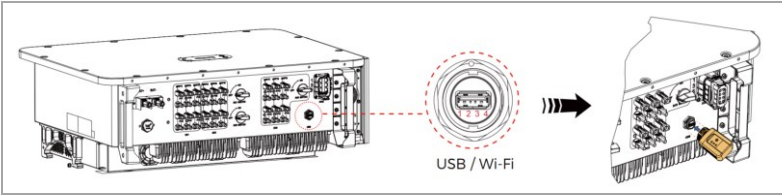
The power output data, alarm information, and operating status of the inverter can be transmitted to a PC or local data acquisition device via a USB stick logger and subsequently uploaded to the server. To enable remote monitoring, register the SOFAR 80-125KTLX-G4-ESS on the relevant website or app using the monitoring device's SN.

Port Description:

USB Port	USB flash drive connection	Use for updating the software
	WiFi dongle connection	Use for remote data acquisition and upgrading of inverters

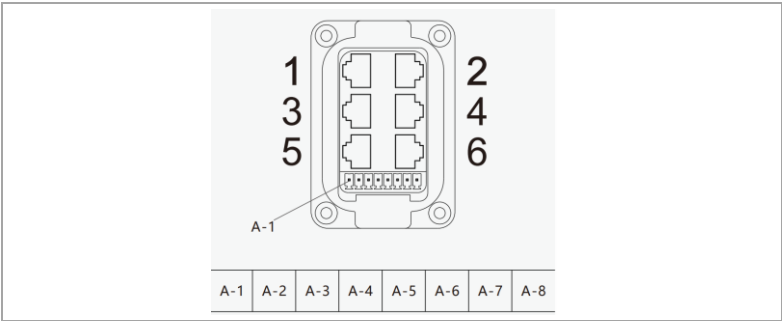
Procedure:

Install the stick logger in the USB port at the bottom of the inverter.



COM port

The communication terminal of the inverter is located at the bottom of the inverter. Please refer to the following figure:



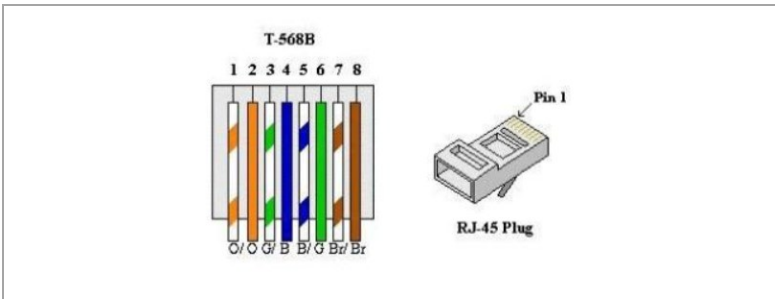
Definition of communication terminal:

PIN			Definit ion	Function	Descripti on
RJ4 5_1	1	orange/white	DRM1/5	DRM1/5	DRM interface
	2	orange	DRM2/6	DRM2/6	
	3	green/white	DRM3/7	DRM3/7	

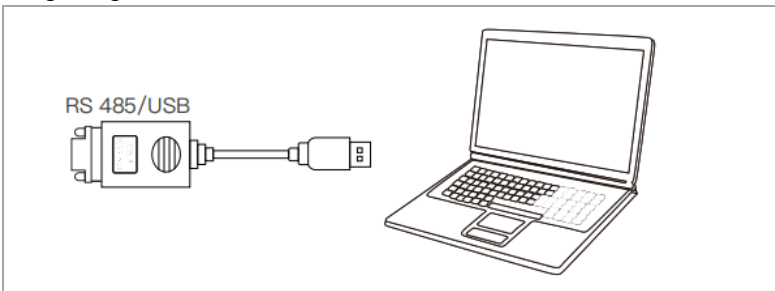
	4	blue	DRM4/8	DRM4/8	
	5	blue/white	RefGen	RefGen	
	6	green	COM/DRM0	COM/DRM0	
	7	brown/white	N/A	N/A	
	8	brown	N/A	N/A	
RJ45_2	1	orange/white	RX+	Ethernet_RX+	Ethernet interface
	2	orange	RX-	Ethernet_RX-	
	3	green/white	TX+	Ethernet_TX+	
	4	blue	N/A	N/A	
	5	blue/white	N/A	N/A	
	6	green	TX-	Ethernet_TX-	
	7	brown/white	N/A	N/A	
	8	brown	N/A	N/A	
RJ45_3	1	orange/white	RS485_2A	STS_RS485_2A	STS interface
	2	orange	RS485_2B	STS_RS485_2B	
	3	green/white	N/A	N/A	
	4	blue	STS-DO_B	STS-DO_B	
	5	blue/white	STS-DO_A	STS-DO_A	
	6	green	N/A	N/A	
	7	brown/white	STS-DI_A	STS-DI_A	
	8	brown	STS-DI_B	STS-DI_B	
RJ45_4	1	orange/white	N/A	N/A	Battery interface
	2	orange	N/A	N/A	
	3	green/white	CAN2_H	Battery_CAN2_H	
	4	blue	CAN1_H	Battery_CAN1_H	

	5	blue/white	CAN1_L	Battery_C AN1_L	
	6	green	CAN2_L	Battery_C AN2_L	
	7	brown/white	DIO1	Battery_DI O1	
	8	brown	GND_S1	Battery_G ND_S1	
RJ45_5	1	orange/white	RS485_1 A	Monitor_R S485_1A	RS485 and parallel interface
	2	orange	RS485_1 B	Monitor_R S485_1B	
	3	green/white	N/A	N/A	
	4	blue	RS485_3 A	Meter_RS4 85_3A	
	5	blue/white	RS485_3 B	Meter_RS4 85_3B	
	6	green	N/A	N/A	
	7	brown/white	CAN3_H	Parallel_C AN3_H	
	8	brown	CAN3_L	Parallel_C AN3_L	
RJ45_6	1	orange/white	RS485_1 A	Monitor_R S485_1A	RS485 and parallel interface
	2	orange	RS485_1 B	Monitor_R S485_1B	
	3	green/white	N/A	N/A	
	4	blue	RS485_3 A	Meter_RS4 85_3A	
	5	blue/white	RS485_3 B	Meter_RS4 85_3B	
	6	green	N/A	N/A	
	7	brown/white	CAN3_H	Parallel_C AN3_H	
	8	brown	CAN3_L	Parallel_C AN3_L	
Straight - type con	A-1		STS- DO_B	Reserve_S TS_DIO	Reserved interface
	A-2		STS- DO_A	Reserve_S TS_DIO	
	A-3		STS- DI_A	Reserve_S TS_DIO	

nec tor	A-4	STS- DI_B	Reserve_S TS_DIO	
	A-5	VCC_ST S	Reserve_S TS_DIO	
	A-6	SGND1	Reserve_S TS_DIO	
	A-7	RS485_1 A	Reserve_T erminatio n resistor	
	A-8	RS485_1 B	Reserve_T erminatio n resistor	

RJ45 Serial Port Definition:**RS485****Single Inverter Communication System**

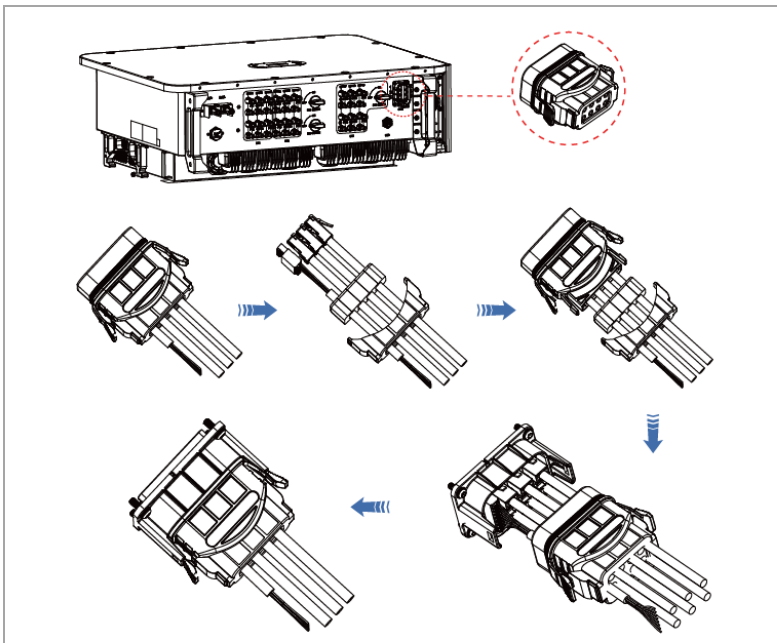
For applications with a single inverter, communication can be established using a single RS485 communication cable.

**Multiple Inverter Communication System**

For applications with multiple inverters, all inverters can be connected in a series connection using RS485 communication cables.

The length of the RS485 communication cable should be less than 1000 m. The length of the WiFi communication cable should be less than 100m.

Wiring steps

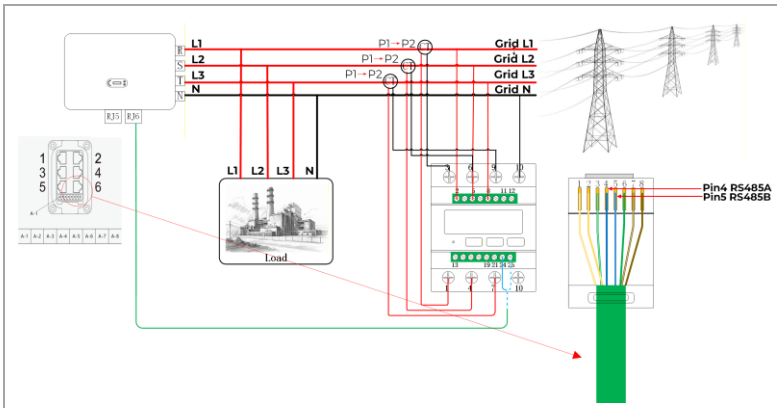


Meter connection (Optional)

NOTICE

- ▶ When connecting the electricity meter, it is required that the phase sequence of the electricity meter correspond one-to-one with that of the inverter; otherwise, the three-phase unbalance function cannot be achieved.
- ▶ When using the EMS mode, an electricity meter must be connected.

- The communication ports of the electricity meter on the inverter are either RJ45 or RJ45 6, both of which are network ports. When making communication cables, standard network cables can be used as communication cables. Among them, the blue part of the network cable is RS485-A, which is connected to pin 24 of the electricity meter. The blue one is RS485-B, which connects to pin 25 of the electricity meter.

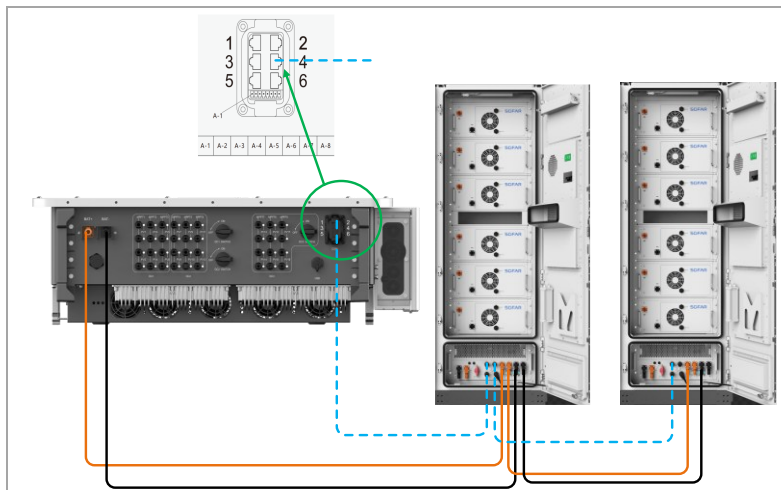


Description of the RS485 interface for electricity meters:

COM port of inverter		Electricity meter port	
Pin	Definition	Pin	Definition
RJ5/6	RS485 -3A	24	RS485 A
	RS485-3 B	25	RS485 B

7.9 Battery Connection (Optional)

SOFAR 80-125KTLX-G4-ESS series inverter provides a reserved battery interface. When energy storage is required, it supports connection to SOFAR CBS 8000 series batteries. The wiring diagram is shown below.



7.10STS Connection (Optional)

After the SOFAR 80-125KTLX-G4-ESS series inverter is connected to the CBS 8000 series battery and the STS, it supports off-grid emergency power supply. The wiring diagram is shown below.



8 Commissioning

8.1 Cable Connection Inspection

NOTICE

Pre-commissioning checks

- ▶ Before starting up the device for the first time, all operations performed on the device should be thoroughly checked.
- ▶ Ensure that DC and AC voltages are within the acceptable range of the inverter.

Before turning on the inverter for the first time, perform the following checks:

- ▶ Check and make sure that all equipment is installed safely and properly.
- ▶ Check that the DC breaker and the AC breaker are in the “OFF” position.
- ▶ Check that the grounding cables, AC cables, and DC cables are correctly and securely connected.
- ▶ Check that the insulation of the PV modules and DC cables is in good condition; otherwise, the inverter may be damaged.
- ▶ Check that the communication cables are correctly and securely connected.
- ▶ Check that all unused terminals are properly sealed.
- ▶ Make sure no installation tools are left on the equipment or inside the connection box (if the equipment has one).
- ▶ Check that the selection of the AC breaker complies with this manual and local regulations.
- ▶ Check that all safety and warning labels are firmly attached and clearly visible.

8.2 Starting the inverter

1. Switch on the DC switch.
2. Switch on the AC circuit breaker.

3. Setting the PV input mode, when a parallel connection exists in the MPPT, or when a PV busbar is used, the parallel connection mode needs to be set via the LCD.
↳ When the DC output generated by the solar system is at a sufficient level, the inverter starts automatically. A correct operation is indicated by the screen displaying **Normal**.

- ▶ Different distribution network operators in different countries have different requirements regarding grid connections of PV grid connected inverters.
- ▶ Choose the correct country code. If in doubt, consult a qualified electrical engineer or an electrical safety officer.
- ▶ SOFARSOLAR is not responsible for any consequences arising out of incorrect country code selection.
- ▶ The inverter can monitor the power grid in real time. The protection can be realized when the power grid is abnormal, so that the inverter is separated from the power grid.

If the inverter displays an error message, refer to Chapter 10, Troubleshooting.

9 SofarCloud APP

SofarCloud is a platform for the full lifecycle management of renewable energy plants. It is designed for distributors/installers and end users of residential PV and storage systems as well as commercial and industrial PV and storage systems. Customers can monitor their systems both locally and remotely via the web interface or mobile app, effectively helping them to stay informed about the real-time operation of their plants, enabling refined management, efficient maintenance, transparent operation, and maximised benefits.

Web portal: <https://eu.sofarcloud.com>

9.1 Download and Install the App

1. Android device users can download the APP through major Android application markets such as Google Play.
2. IOS device users can search for “SofarCloud” in the App Store and download the app.
3. You can also download the “SofarCloud” by scanning the QR code below.



9.2 Register and Log In on APP

As the APP is updated periodically, the operation methods shown in this manual are for reference only. Please refer to the actual app interface for the most up-to-date instructions.

If you have any questions, please consult the SofarCloud Web and App User Manual or contact SOFARSOLAR for assistance.

Before logging into the app, please ensure the following conditions are met:

- The inverter's AC and DC sides are powered on.
- The distance between your mobile phone and the inverter is within 5 meters with no obstacles in between.

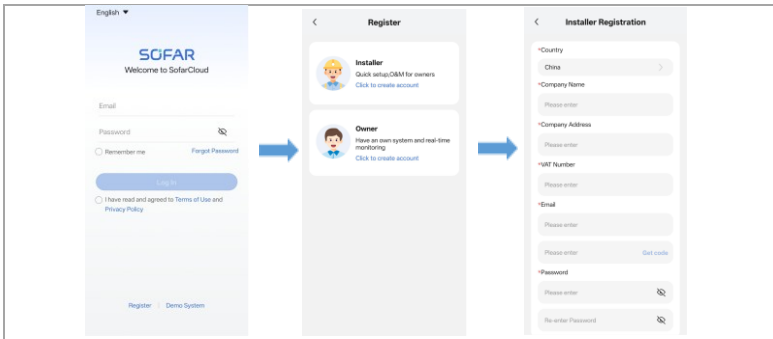
- The Bluetooth function on your mobile phone is enabled.

Register

If you do not have a SofarCloud account, please click [Register] at the bottom of the login page.

On the registration page, select either [Installer] or [Owner], then follow the on-screen instructions to complete the account registration.

Once your account is successfully registered, you can log in to SofarCloud using your registered username and password.



Currently, account registration supports either a mobile phone number or an email address.

Please follow the on-screen instructions to correctly enter your mobile phone number or email address, set a login password, and complete the verification process.

After successful verification, please tick the checkbox to indicate that you agree to the **Terms of Use** and **Privacy Policy**.

If you already have a SofarCloud account, you can log in directly.

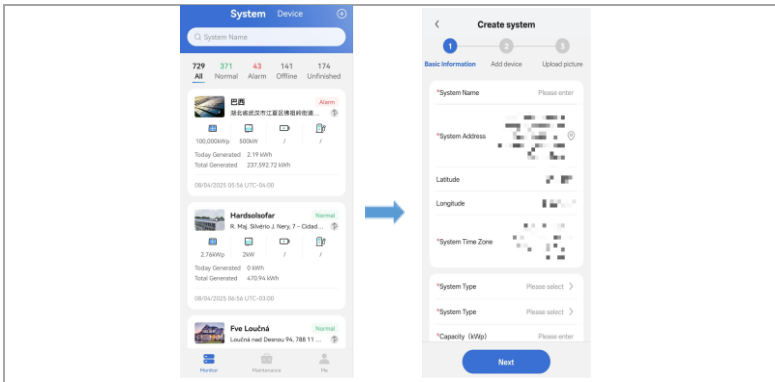
For account security purposes, the password must be a combination of numbers and letters, 6 to 32 characters in length, and must not contain spaces.

After correctly entering all required information, click the [Register] button to automatically log in to your account.

9.3 Add a device

Method 1: Add a device via "Create system"

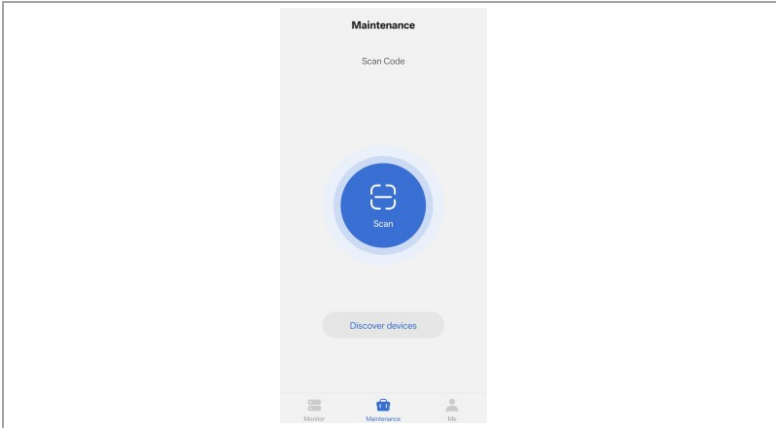
1. On the Home > Monitor tab, click the button at the top right corner to enter the "Create system" interface.
2. After completing the basic information as prompted, click the [Add] button under the "Add Device" section.



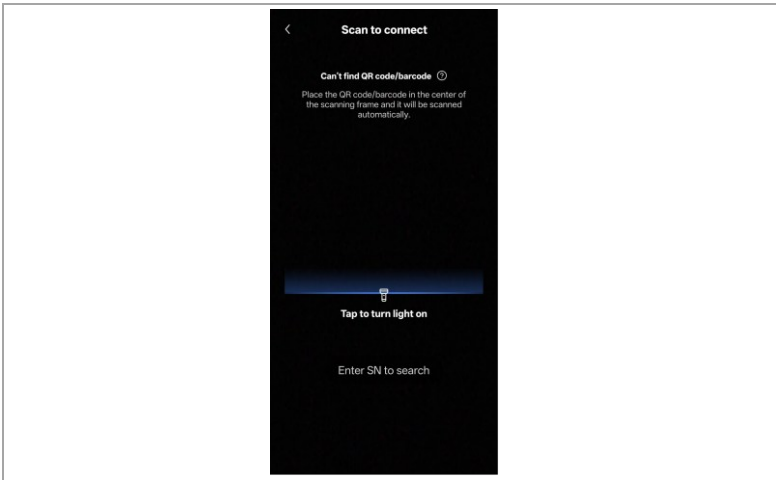
3. Scan the QR code or barcode of the device to obtain the SN number. Alternatively, you can manually enter the SN number and optionally enter a device name.
4. After clicking the [Confirm] button to complete the device addition, click [Next > Submit] to proceed.

Method 2: Add a device directly

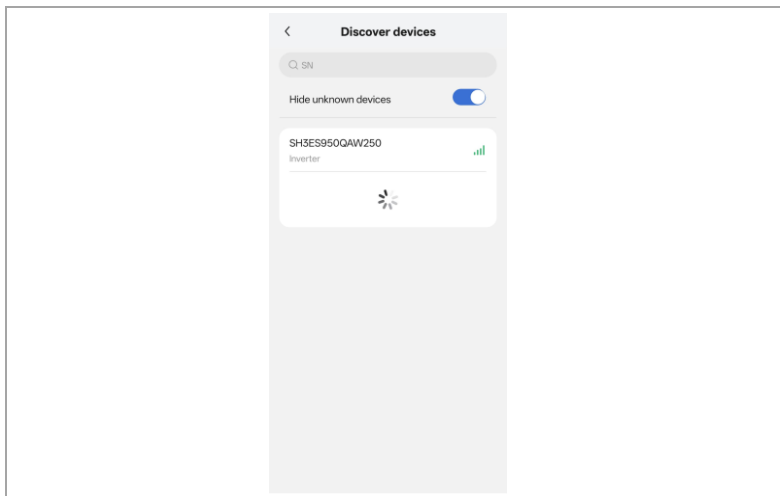
1. After logging into the app, go to the Home > Maintenance tab.
2. Tap [Scan] to quickly recognise and connect by scanning the device's barcode, or tap [Discover Devices] to select and connect to the target device from the list of Bluetooth-discovered devices.



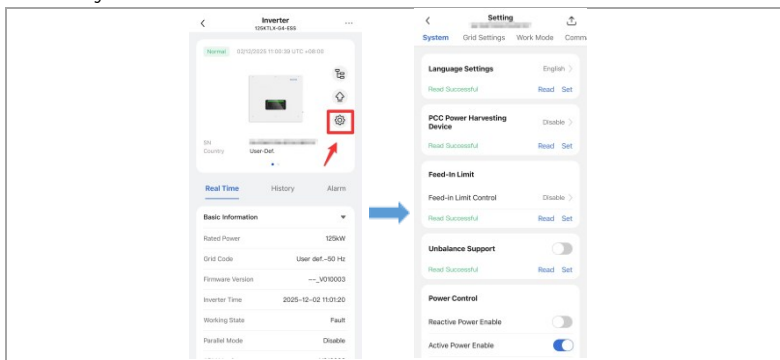
- **Scan:** Tap [Scan] to prompt the phone's camera to open. Scan the barcode of the inverter's SN number to start searching for the device's Bluetooth. Once the Bluetooth is found, it will automatically connect and return to the home page.



- **Discover Devices:** After tapping [Discover devices], the app will navigate to the Bluetooth device list and start searching for nearby available Bluetooth devices. Select the device to connect to based on the inverter's serial number.



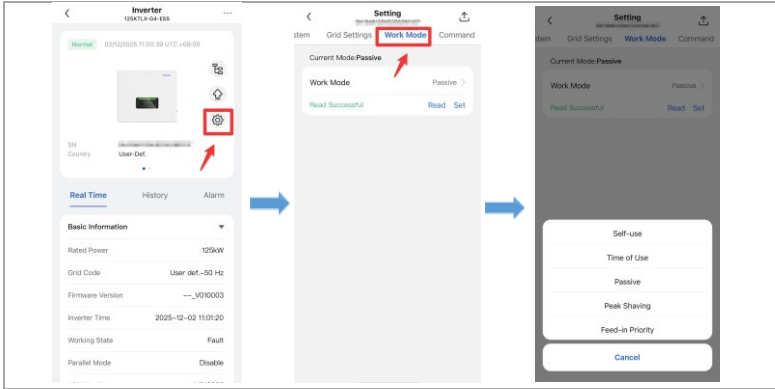
- After successfully connecting the device, go to the device page. Through the [Quick Setup] section, you can configure the language, time, and safety code.



The available safety codes may vary depending on the device and software version. Please refer to the actual interface for details.

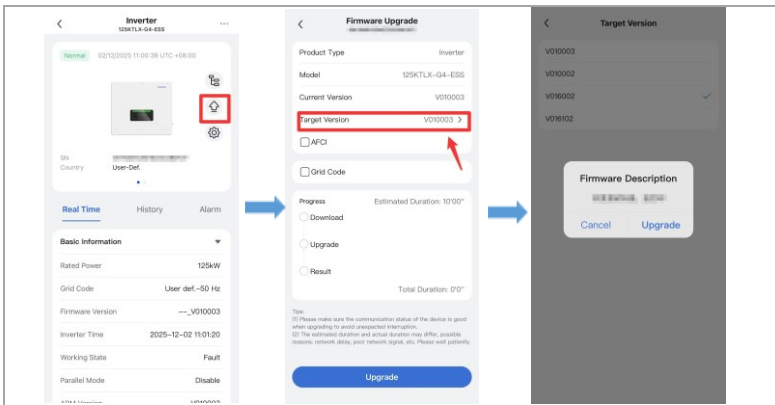
9.4 EMS set up

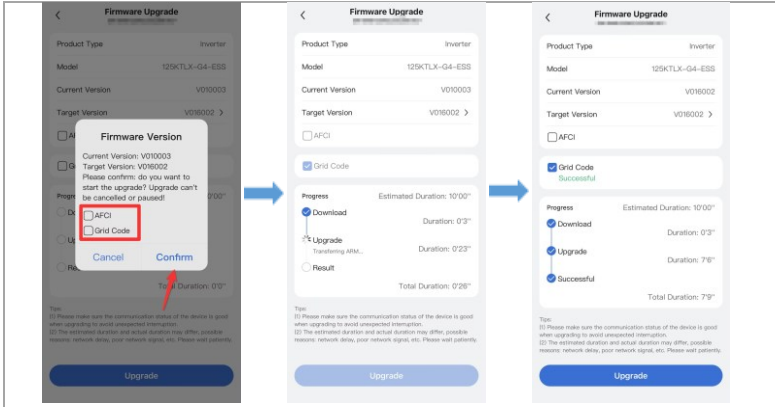
Tap [Quick Setup] button, access the advanced settings screen, and then choose [Work Mode]. Under this setting, you can configure a total of 5 modes.



9.5 Device upgrade

1. Tap the [Upgrade] button, and follow the on-screen instructions to download the firmware package in advance.
2. Tap [Current Version], then select the firmware package you need and proceed with the upgrade.





1. During the upgrade process, the system will sequentially send commands, download the firmware, verify the firmware, and upgrade the device based on the selected firmware, until the upgrade reaches 100% completion.
2. If the upgrade fails, the failure reason will be displayed at the point of failure. You can either tap [Cancel] in the lower-left corner to exit the upgrade, or tap [Retry] in the lower-right corner to attempt the upgrade again.

10 Operation

This section introduces the display, operation, buttons and LED indicator lights of SOFAR 80-125KTLX-G4-ESS inverter.

This chapter is based on a specific firmware version. Please update the program if there are discrepancies.

10.1 Control panel and display

Buttons and display lights



Button

Button	Description
	UP key Short press: Select previous menu item Long press: Exit menu or interface
	DOWN key Short press: Select next menu item Long press: Enter function or interface

LED

LED			Description
Normal	Green	Light up	Normal state
		Flashes	Wait or Check state
GFI	Red	Light up	GFCI ground leakage fault or low insulation resistance alarm

LED			Description
Alarm	Red	Light up	Recoverable fault or permanent fault state

10.2 Standard display

LCD interface indicated inverter status, alarm information, communication connection, PV input current and voltage, grid voltage, current and frequency, today's generation and total generation.

This shows a rolling status display:

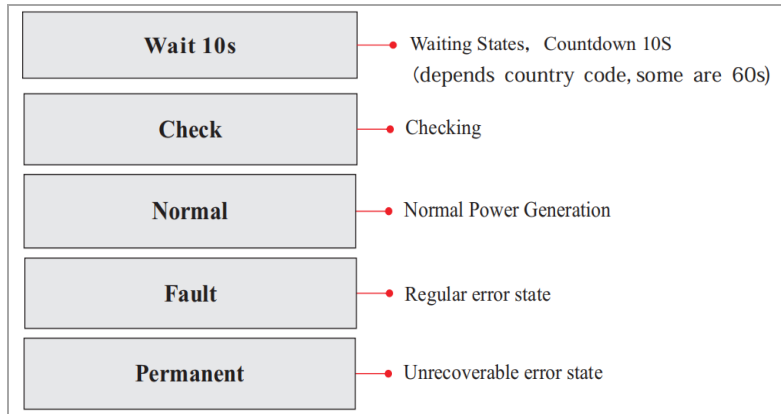
1. PV 1 - PV10 input voltage and current;
2. PV generated power;
3. Today generated electricity;
4. Total generated electricity;
5. Grid voltage and current;
6. Grid voltage and frequency;
7. Wi-Fi/ RS485 status;
8. Inverter faulty alarm.

Normal PV1:193V- 0.3A	Normal Grid:227V- 0.6A
Normal Power: 0.13kW	Normal Grid:227V-50.0Hz
Normal Today: 0.06kWh	Normal  Power: 0.14kW
Normal Tot: 74kWh	GridUVP Total: 0KWh

When power turn on, LCD interface displays INITIALIZING, refer below picture.

Initializing...

When control board successfully connected with communication board, the LCD display the current state of the inverter, display as shown in the figure below.



The following table displays the various statuses and their meanings:

Status	Description
Wait	The inverter is waiting to Check State when reconnecting the system. In this state, the grid voltage value is between the max and min limits and so on; If not, Inverter will go to Fault State or Permanent State.
Check	The inverter is checking isolation resistors, relays, and other safety requirements. It also does self-test to ensure inverter software and hardware are well-functional. The inverter will go to Fault State or Permanent State if any error or fault occurs.
Normal	The inverter enters to Normal State, feeding power to the grid; the inverter will go to a Fault State or Permanent state if any error or fault occurs.
Fault	The inverter has encountered a recoverable error. It should recover if the errors disappear. If the Fault State continues; please check the inverter according to the error code.
Permanent	The Inverter has encountered an unrecoverable error, we need a maintainer to debug this kind of error according to the error code.

Status	Description
	When the control board and communication board connections fail, the LCD display interface is shown in the figure below. DSP communicate fail

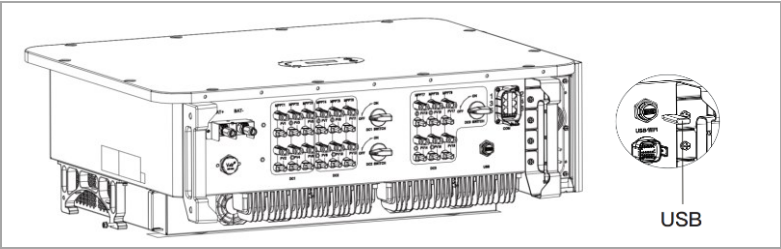
For more information about LCD display and Settings, you can click the link below to view:

https://sofarsolar.jianguoyun.com/p/DfPalhUQ4c_MChjXkpgGIAA

10.3 Updating inverter software

SOFAR 80-125KTLX-G4-ESS inverter offers software upgrade via USB flash drive to maximise inverter performance and avoid inverter operation errors caused by software bugs.

- 1. Turn off AC circuit breaker and DC switch, remove the communication board cover as below figure. If the RS485 line has been connected, please release the waterproof nut first and make sure the communication line is no longer the force. Then remove the waterproof cover.
- 2. Insert the USB stick into the computer.
- 3. SOFARSOLAR service team will send the firmware update to the user. Unzip the file and copy the original file to a USB stick. Attention: The firmware update file must be in the “firmware” subfolder.
- 4. Insert the USB flash drive into the USB interface of the inverter.



5. Then turn on the DC switch and enter the online upgrade to the main menu "5. Software Update" in the LCD program [6.3(E)]. The method to enter the menu can refer to operation interface of LCD.
6. Input the password. If password is correct, and then begin the update process. The original password is 0715.
7. System update main DSP, slave DSP and ARM in turns. If main DSP update success, the LCD will display "Update DSP1 Success", otherwise display "Update DSP1 Fail"; If slave DSP update success, the LCD will display "Update DSP2 Success", otherwise display "Update DSP2 Fail"; AFCI programme upgrade successfully prompts "AFCI upgrade successful", otherwise display "Update AFCI Fail"; ARM programme upgrade successfully prompts "ARM upgrade successful", otherwise display "Update ARM Fail"; DCDC program upgrade successfully prompted "DCDC upgrade success", otherwise display "Update DCDC Fail"; After the BCU programme has been successfully upgraded, it prompts the initialisation to start immediately "The system is starting up...". The system is starting up... When initialisation is complete, the screen will display "Recoverable Fault" (Recoverable Fault is displayed because the AC circuit breaker is still disconnected and the machine is not detecting the grid)
8. If Fail, please turn off the DC switch, wait for the LCD screen turn off, then turn on the DC switch again, and then continue to update from step 5.
9. After the update is completed, turn off the DC breaker, wait for the LCD screen to extinguish, then recover the communication waterproof and then turn on the DC breaker and AC breaker again, the inverter will enter the running state. User can check the current software version in SystemInfo>>3.SoftVersion.

11 Troubleshooting and Maintenance

11.1 Troubleshooting

This section contains information and procedures pertaining to the remedying of potential problems with the inverter.

As the content of this chapter involves software version updates, the differences may exist among different versions of the software. If you have any questions, please contact the SOFARSOLAR technical team.

To carry out troubleshooting, proceed as follows:

1. Check the warnings, error messages or error codes displayed on the screen of the inverter.
2. If no error information is displayed on the screen, check whether the following requirements have been fulfilled:
 - ✓ Has the inverter been set up in a clean, dry, well-ventilated area?
 - ✓ Is the DC switch set to ON?
 - ✓ Are the cables sufficiently dimensioned and short enough?
 - ✓ Are the input connections, output connections and wiring all in good condition?
 - ✓ Are the configuration settings for the relevant installation correct?

Please proceed as follows to display the recorded problems: Hold the button down to bring up the main menu of the standard interface. Select “2. Event list” and hold the button down to bring up the event list.

Earth fault alarm

This inverter is compliant with IEC 62109-2 Clause 13.9 for earth fault protection. If an earth fault alarm occurs, the error is displayed on the LCD screen, the red light illuminates and the error can be found in the error history log.

In the case of devices equipped with a stick logger, the alarm information can be viewed on the monitoring portal and retrieved via the smartphone app.

Event list

The error codes and troubleshooting methods of the inverter are detailed in the following table. The models you purchased may only contain some of the fault information listed therein. When the inverter malfunctions, you can query the fault information through the LCD display of the device or the mobile App.

Code	Name	Description	Solution
ID001	GridOVP	The grid voltage is too high	If the alarm occurs occasionally, the possible cause is that the electric grid is abnormal occasionally. Inverter will automatically return to normal operating status when the electric grid's back to normal.
ID002	GridUVP	The grid voltage is too low	
ID003	GridOFP	The grid frequency is too high	
ID004	GridUFP	The grid frequency is too low	If the alarm occurs frequently, check whether the grid voltage/frequency is within the acceptable range. If yes, please check the AC circuit breaker and AC wiring of the inverter. If the grid voltage/frequency is NOT within the acceptable range and AC wiring is correct, but the alarm occurs repeatedly, contact technical support to change the grid over-voltage, under-voltage, over-frequency, under-frequency protection points after obtaining approval from the local electrical grid operator.
ID005	GFCI	Charge Leakage Fault	1. If the fault occurs accidentally, it may be caused by an accidental exception of the external line. After the fault is rectified, it

			will return to normal operation without manual intervention. 2. If it occurs frequently or cannot be recovered for a long time, check whether the ground impedance of the photovoltaic string is too low, and whether the insulation of the photovoltaic cable is damaged. 3. Confirm that it is not the above reasons and the fault still exists, please contact technical support.
ID006	OVRT	OVRT function is faulty	1. If it happens by chance, it may be a short time anomaly of the power grid, and the inverter will resume work after detecting that the power grid is normal, without manual intervention.
ID007	LVRT	LVRT function is faulty	2. If it occurs frequently, please check whether the grid frequency is within the allowable range, if not, please contact the local power operator, if yes, please contact technical support.
ID008	IslandFault	Island protection error	Wait for the grid to return to normal after the grid will be reconnected.
ID009	GridOVPIinstant1	Transient overvoltage of grid voltage 1	1. If it happens by chance, it may be a short time anomaly of the power grid, and the inverter will return to normal work after the detection of the power grid is normal, without manual intervention.
ID010	GridOVPIinstant2	Transient overvoltage of grid voltage 2	2. If it occurs frequently, check whether the grid voltage is within the allowable range. 3. If the fault persists for a long time, check whether the AC circuit breaker is properly

			connected to the output cable.
ID011	VGridLineFault	Power grid line voltage error	1. If it occurs occasionally, the power grid may be abnormal for a short time, and the device will return to normal work after detecting that the power grid is normal, without manual intervention. 2. If it occurs frequently, check whether the power grid voltage is within the normal range. If no, contact the local power operator. If the fault persists for a long time, check whether the AC cable is properly connected. If the AC connection is normal and the alarm occurs frequently, the normal operation of the power station is affected. Contact the local power operator.
ID013	RefluxFault	Anti-countercurrent overload	Please check whether the meter communication is normal, if yes, please contact SOFARSOLAR customer service.
ID014	VGridUnbalance	grid voltage imbalance	1. If it occurs occasionally, the power grid may be abnormal for a short time, and the device will return to normal work after detecting that the power grid is normal, without manual intervention. 2. If it occurs frequently, check whether the power grid voltage is within the normal range. If no, contact the local power operator. If the fault persists for a long time, check whether the AC cable is properly connected. If the AC connection is normal

			and the alarm occurs frequently, the normal operation of the power station is affected. Contact the local power operator.
ID016	GridPhaseMutation	Abrupt change of grid phase	No need to deal with the occasional occurrence, if frequent, please contact technical support.
ID017	HwADErrIGrid	Power grid current sampling error	If the inverter is faulty, turn off the DC switch of the inverter, wait for 5 minutes, and then turn on the DC switch. Observe whether the fault has been eliminated after the inverter restarts. If it is still not eliminated, please contact technical support.
ID018	HwADErrDCI(AC)	Wrong sampling of dc component of grid current	
ID020	HwADErrVGrid(AC)	Power grid voltage sampling error (AC)	
ID021	HwGFCIFault(DC)	Leakage current sampling error(DC)	
ID022	HwGFCIFault(AC)	Leakage current sampling error(AC)	
ID024	HwADErrIdc	Dc input current sampling error	
ID025	HwADErrDCI(DC)	DCI sampling error (DC)	
ID026	HwADErrIdcBranch	The branch current is incorrectly sampled	
ID027	NLine_Fault	Zero error	1. Turn off the AC switch and DC switch, delay for a period of time, and then close the DC switch and AC switch. 2. Check the impedance of the DC side to the protection ground. Rectify the fault if there is a short circuit or insufficient insulation. 3. If the fault still
ID028	PIDAbnormalOutput	PID abnormal output	

			exists, please contact technical support.
ID029	ConsistentGFCI	Leakage current consistency error	If the inverter is faulty, turn off the DC switch of the inverter, wait for 5 minutes, and then turn on the DC switch. Observe whether the fault has been eliminated after the inverter restarts. If it is still not eliminated, please contact technical support.
ID030	ConsistentVgrid	Grid voltage consistency error	
ID031	ConsistentDCI	DCI consistency error	
ID032	N-PE fault	Neutral ground fault	1. After powering off the device, check the grounding cable to ensure that it is reliably connected. 2. If still not ruled out, please contact technical support.
ID033	SpiCommFault(DC)	SPI communication error (DC)	1. Check the cable connection to the communication board after shutdown. 2. If still not ruled out, please contact technical support.
ID034	SpiCommFault(AC)	SPI communication error (AC)	
ID035	SChip_Fault	Chip error (DC)	
ID036	MChip_Fault	Chip error (AC)	
ID038	InvSoftStartFail	Inverter soft startup failed	Please turn off the DC switch of the inverter, wait for 5 minutes, and then turn on the DC switch. Observe whether the fault has been eliminated after the restart of the inverter. If it is still not eliminated, please contact technical support.
ID039	ArcShutdownAlarm	Arc shutdown protection	Check whether the ground impedance of the photovoltaic string is too low and whether the insulation of the photovoltaic cable is damaged. If the use method

			is not excluded, please contact technical support.
ID040	LowLightChkFail	Low light detection failed	When the external lighting conditions are insufficient, the fault will be reported. If the lighting conditions are obviously sufficient, the fault will still be reported. please contact technical support.
ID041	RelayFail	Relay detection failure	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If no, please contact technical support.
ID042	IsoFault	Low insulation impedance	Check the insulation resistance between the photovoltaic array and ground (ground), if there is a short circuit, the fault should be repaired in time.
ID043	PEConnectFault	Ground fault	Check ac output PE wire for grounding.
ID044	InputConfigError	The input mode is incorrectly set	Check the input mode (parallel/ independent mode) Settings for the inverter. If not, change the input mode
ID046	ReversalConnection	PV input polarity reverse connection error	Perform the following operations after powering off the device: Check whether the DC side has short-circuit or reverse circuit connections. If yes, adjust the DC bus cables.
ID048	SNTypeFault	Serial number error	The internal failure of the transformer, please contact technical support.

ID050	TempErrHeatSink1	Radiator 1 temperature protection	Please check whether the inverter air duct is blocked or whether the fan is working normally. If the inverter still reports a fault, please contact technical support.
ID051	TempErrHeatSink2	Radiator 2 temperature protection	
ID057	TempErrEnv1	Ambient temperature 1 protection	
ID059	TempErrInv1	Module 1 temperature protection	
ID060	TempErrInv2	Module 2 temperature protection	
ID061	TempErrInv3	Module 3 temperature protection	
ID065	BusRmsUnbalance	Unbalanced bus voltage RMS	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If no, please contact technical support.
ID066	BusInstUnbalance	The transient value of bus voltage is unbalanced	
ID067	BusUVP	Busbar undervoltage during grid- connection	If the photovoltaic string is correctly configured, it is due to low solar irradiation, and after the solar irradiation returns to the normal level, the inverter will return to normal operation without manual intervention.
ID068	BusZVP	Bus low	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON

			inverter. Check whether the problem is solved. If no, please contact technical support.
ID072	SwBusRmsOVP	Inverter bus voltage RMS software overvoltage	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If no, please contact technical support.
ID073	SwBusIOVP	Inverter bus voltage instantaneous value software overvoltage	
ID082	DciOCP	Dci overcurrent protection	
ID083	SwIOCP	Output instantaneous current protection	No need to deal with the occasional occurrence, please contact technical support.
ID085	SwAcRmsOCP	Output effective value current protection	
ID086	SwPvOCPInstant	PV overcurrent software protection	
ID088	IacUnbalance	Unbalanced output current	
ID089	SwPvOCP	PV overcurrent software protection	
ID090	IbalanceOCP	Balanced current protection	
ID091	ResOver	Resonance protection	
ID092	SwAcCBCFault	Software AC Over Current Protection	
ID093	SwPvBranchOCP	PV branch software overcurrent (enabled by default)	

ID098	HwBusOVP	Inverter bus hardware overvoltage	
ID102	HwPVOCP	PV hardware overflows	
ID103	HwACOCP	Ac output hardware overflows	
ID104	HwDiffOCP	Hardware differential overcurrent	
ID105	MeterCommFault	Meters communication fault	
ID107	HwVerError	The hardware version does not match	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If no, please contact technical support.
ID113	OverTempDerating	Internal temperature is too high	Make sure the inverter is installed where there is no direct sunlight. Please ensure that the inverter is installed in a cool/well ventilated place. Ensure the inverter is installed vertically and the ambient temperature is below the inverter temperature limit.
ID114	FreqDerating	AC frequency is too high	Please make sure the grid frequency and voltage is within the acceptable range.
ID115	FreqLoading	AC frequency is too low	

ID116	VoltDerating	AC voltage is too high	
ID117	VoltLoading	AC voltage is too low	
ID129	PermHwAcOCP	Output hardware overcurrent permanent failure	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If no, please contact technical support.
ID130	PermBusOVP	Permanent Bus overvoltage failure	
ID131	PermHwBusOVP	Permanent Bus hardware overvoltage failure	
ID132	PermIpvUnbalance	PV uneven flow permanent failure	
ID134	PermAcOCPInstant	Output transient overcurrent permanent failure	
ID135	PermlacUnbalance	Permanent failure of unbalanced output current	
ID139	PermHwDCOCP	Input hardware overcurrent permanent failure	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If no, please contact technical support.
ID140	PermRelayFail	Permanent relay failure	
ID141	PermBusUnbalance	Bus voltage unbalanced permanent failure	
ID142	PermSpdFail(DC)	PV surge protection	
ID143	PermSpdFail(AC)	Grid surge protection	
ID144	PermGridRlyFail	Grid relay fault	

ID145	USBFault	USB fault	Check the USB port of the inverter
ID152	SafetyVerFault	The software version is inconsistent with the safety version	No need to deal with the occasional occurrence, if frequent, please contact technical support.
ID153	SCILose(DC)	SCI communication error (DC)	
ID154	SCILose (AC)	SCI communication error (AC)	
ID155	SCILose (Fuse)	SCI communication error (Fuse)	
ID156	SoftVerError	Inconsistent software versions	
ID161	ForceShutdown	Force shutdown	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved.
ID162	RemoteShutdown	Remote shutdown	
ID163	Drms0Shutdown	Drms0 shutdown	If no, please contact technical support.
ID169	FanFault1	Fan 1 fault	Check whether the inverter accumulates dust and dust, and whether the fan is blocked by foreign matter in the air inlet. If yes, improve the ventilation and heat dissipation of the environment. It is recommended that the inverter be cleaned once every six months or once a year.
ID170	FanFault2	Fan 2 fault	
ID171	FanFault3	Fan 3 fault	
ID172	FanFault4	Fan 4 fault	
ID173	FanFault5	Fan 5 fault	
ID174	FanFault6	Fan 6 fault	
ID175	FanFault7	Fan 7 fault	

ID189	AFCICommLose	AFCI module communication is lost	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved.
ID191	PID_Output_Fail	PID function is failed	
ID192	PLC_Com_Fail	PLC communication is lost	If no, please contact technical support.

When the ID042 IsoFault, during troubleshooting, the AC must be switched off or the inverter must be switched off. It is not possible to operate the DC switch directly in the grid-connected state of the inverter.

If the handling methods recommended in the "Solution" column fail to help you, please contact the dealer or SOFARSOLAR.

11.2 Maintenance

Inverters do not generally require daily or routine maintenance. Before carrying out cleaning, ensure that the DC switch and AC circuit breaker between the inverter and power grid have been switched off. Wait at least 5 minutes before carrying out cleaning.

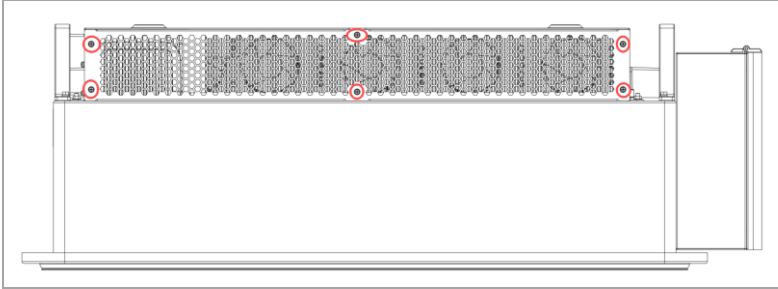
Cleaning the inverter

Clean the inverter using an air blower and a dry, soft cloth or a soft bristle brush. Do NOT clean the inverter with water, corrosive chemicals, cleaning agents etc.

Cleaning the heat sink

In order to help guarantee the correct long-term operation of the inverter, make sure that there is sufficient space for ventilation around the heat sink. Check the heat sink for blockages (dust, snow etc.) and remove them if present. Please clean the heat sink using an air blower and a dry, soft cloth or a soft bristle brush. Do NOT clean the heat sink with water, corrosive chemicals, cleaning agents etc.

After removing the screws of the inverter top cover and the fan, the heat sink can be cleaned.



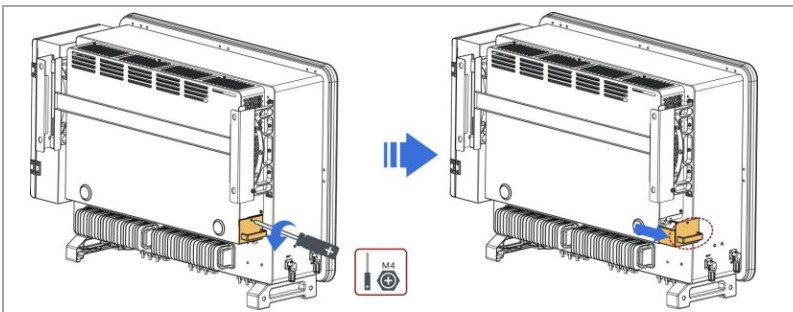
Fan maintenance

For SOFAR 80-125KTLX-G4-ESS series inverter with fans, if the fan is broken or not working properly may cause an inverter heat dissipation issue and affect the working efficiency of the inverter. Thus, fans need to have regular cleaning and maintenance, details operating as below.

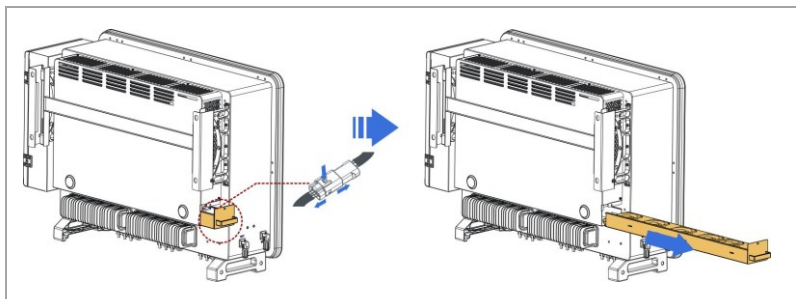
NOTICE

- ▶ Before replacing a fan, power off the inverter.
- ▶ When replacing a fan, use insulation tools and wear personal protective devices.

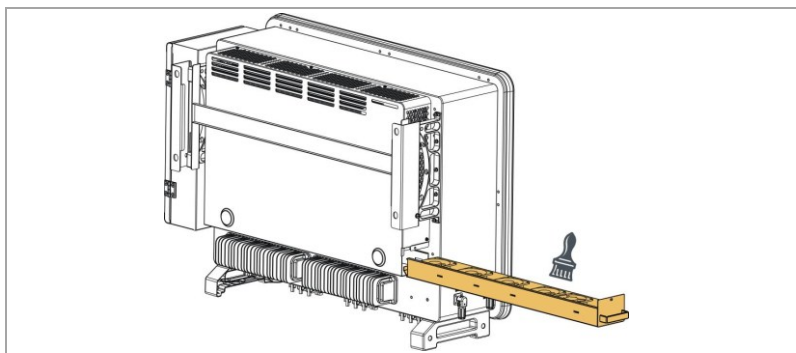
1. Remove the screw on the fan tray and save it. Extract the fan bracket about 5-10cm.



2. Cut the ties holding the fan cable, unplug the connection terminals, and pull out the fan bracket.



3. Use a soft-bristled brush or vacuum cleaner to clean dust and debris from the surface of the fan.



4. Follow step 2 to align the fan bracket with the mounting position, push in the fan bracket and connect the connection terminals. Then tighten the screws on the fan bracket according to step 1.

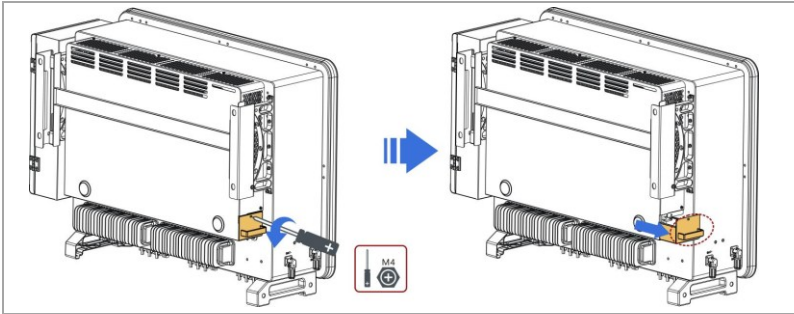
Replacing a Fan

Follow the steps below for maintenance:

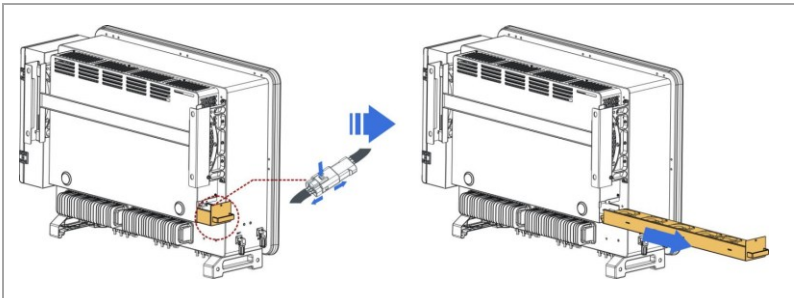
NOTICE

- ▶ Before replacing a fan, power off the inverter.
- ▶ When replacing a fan, use insulation tools and wear personal protective devices.

1. Remove the screw on the fan tray and save it. Extract the fan bracket about 5-10cm.

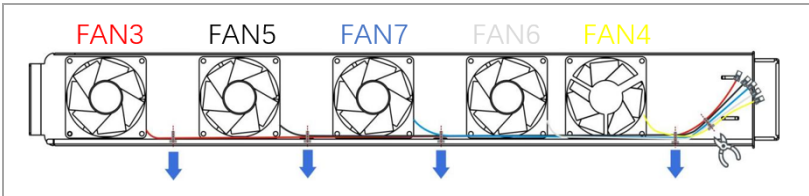


2. Cut the ties holding the fan cable, unplug the connection terminals, and pull out the fan bracket.

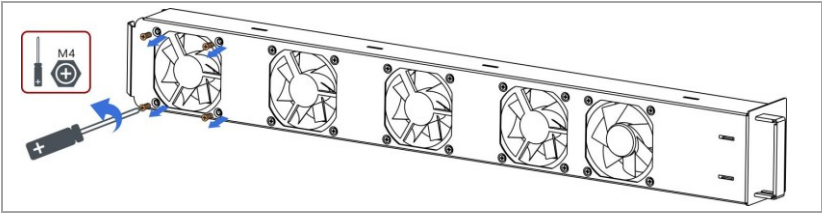


Avoid using brute force to pull out the terminal. Press down the movable buckle with a fingernail (tweezers or a small screwdriver are recommended), then pull out or insert the terminal.

3. Cut the cable ties of the faulty fan (fan 3 is used as an example below; other fans work in the same way).



4. Remove the faulty fan



- 5. Install the new fan, following the order of steps 4,3.
- 6. Clean the fan bracket to make sure there are no foreign objects left behind.
- 7. Follow step 2 to align the fan bracket with the mounting position, push in the fan bracket and connect the connection terminals. Then tighten the screws on the fan bracket according to step 1.

Comparison table of fan failure messages

Name of the fan	FAN 3	FAN 5	FAN 7	FAN 6	FAN 4
Color	 Red	 black	 Blue	 White	 Yellow
Corresponding PCBA port	CN7	CN9	CN16	CN4	CN8
Code	FanFault3	FanFault5	FanFault7	FanFault6	FanFault4

12 Technical Data

Technical Data	SOFAR 80KTLX-G4-ESS	SOFAR 99KTLX-G4-ESS	SOFAR 100KTLX-G4-ESS
Input (DC)			
Recommended Max. PV Power	12000Wp	148500Wp	150000Wp
Max. input voltage	1100V		
Rated input voltage	625V		
Start-up voltage	200V		
MPPT operating voltage range	160-1000V		
Number of MPP trackers	9		
Number for DC inputs	18		
Max. input MPPT current	9 × 40A		
Max. input short circuit current	9 × 50A		
Output (AC)			
Rated output power	80kW	99.99kW	100kW
Max. output apparent power	88kVA	99.99kVA	110kVA
Nominal output current	121.6A@380V/ 115.5A@400V/ 111.3A@415V	151.9A@380V/ 144.3A@400V/ 139.1A@415V	151.9A@380V/ 144.3A@400V/ 139.1A@415V
Max. Output current	133.7A@380V / 127.0A@400V / 122.4A@415V	151.9A@380V / 144.3A@400V / 139.1A@415V	167.1A@380V / 158.7A@400V / 153.0A@415V
Rated output voltage	3N~+PE, 380V / 400V / 415V		
Output voltage range	310Vac-480Vac		
Rated output frequency	50Hz/60Hz		
Output frequency range	45-55Hz/55-65Hz		
Active power adjustable range	0-100%		
THDi	<1%(@100%P)		
Power factor	0.8 leading – 0.8 lagging		
Output (Off-grid)			
Rated Output Voltage	3N~+PE,380/400/415 V.a.c.		
Rated Output Frequency	50/60Hz		
Rated Output Power	62.5kW		

Rated Output Current	94.9A		
Peak Output Apparent Power[3]	200%, 2s		
THDv(@ linear load)	3%		
Switching Time	<10ms, with STS		
Asymmetric load	100%		
Input (BAT)			
Battery type	Lithium-ion		
Numbers of battery	1~4		
Numers of packs per batttery	4~15		
DC voltage range	600-1000V		
Max. Charge	125kW		
Max. Discharge Power	80kW	99.99kW	100kW
Max. Charge Current	200A		
Max. Discharge Current	140.8A	160A	176A
BMS communication	RJ45, CAN*2 + DO*1		
Efficiency			
Max. efficiency	98.6%		
European efficiency	98.3%		
Protection			
DC reverse polarity protection	Yes		
Anti-islanding protection	Yes		
Leakage current protection	Yes		
Ground fault monitoring	Yes		
PV-array string fault monitoring	Yes		
DC switch	Yes		
PID recovery	Yes		
AFCI	Yes		
SPD	PV: Type I+II, AC: Type II		
General Data			
Ambient temperature range	-30℃ to +60℃		
Topology	Transformerless		
Degree of protection	IP66		

Allowable relative humidity range	0-100%
Max. operating altitude	4000m (>3000m derating)
Cooling	Smart air cooling
Dimension (W × H × D)	985×710×321mm
Weight	80kg
Display	LCD & Bluetooth +APP
Communication	Ethernet/ RS485 / WiFi
Battery communication	RJ45, CAN*2 + DO*1
STS communication	RS485, DIO *2
Standard	EN/IEC 62109-1/2, EN/IEC 61000-6-2/-4, IEC 61000-3-11/-12, EN 50530, EN 50549, VDE-AR-N 4105/4110, C10/11

Technical Data	SOFAR 110KTLX-G4-ESS	SOFAR 125KTLX-G4-ESS
Input (DC)		
Recommended Max. PV Power	165000Wp	187500Wp
Max. input voltage	1100V	
Rated input voltage	625V	
Start-up voltage	200V	
MPPT operating voltage range	160-1000V	
Number of MPP trackers	9	
Number for DC inputs	18	
Max. input MPPT current	9 × 40A	
Max. input short circuit current	9 × 50A	
Output (AC)		
Rated output power	110kW	125kW
Max. output apparent power	121kVA	125kVA
Nominal output current	167.1A@380V/ 158.8A@400V/ 153.0A@415V	189.9A@380V/ 180.4A@400V/ 173.9A@415V
Max. Output current	183.8A@380V / 174.6A@400V / 168.3A@415V	190A@380V / 180.4A@400V / 173.9A@415V
Rated output voltage	3N~+PE, 380V / 400V / 415V	
Output voltage range	310Vac-480Vac	

Rated output frequency	50Hz/60Hz	
Output frequency range	45~55Hz/55~65Hz	
Active power adjustable range	0~100%	
THDi	<1%(@100%P)	
Power factor	0.8 leading – 0.8 lagging	
Output (Off-grid)		
Rated Output Voltage	3N~+PE,380/400/415 Va.c.	
Rated Output Frequency	50/60Hz	
Rated Output Power	62.5kW	
Rated Output Current	94.9A	
Peak Output Apparent Power[3]	200%, 2s	
THDv(@ linear load)	3%	
Switching Time	<10ms, with STS	
Asymmetric load	100%	
Input (BAT)		
Battery type	Lithium-ion	
Numbers of battery	1~4	
Numers of packs per batttery	4~15	
DC voltage range	600-1000V	
Max. Charge	125kW	
Max. Discharge Power	121kW	125kW
Max. Charge Current	200A	
Max. Discharge Current	193.6A	200A
BMS communication	RJ45, CAN*2 + DO*1	
Efficiency		
Max. efficiency	98.6%	
European efficiency	98.3%	
Protection		
DC reverse polarity protection	Yes	
Anti-islanding protection	Yes	
Leakage current protection	Yes	
Ground fault monitoring	Yes	

PV-array string fault monitoring	Yes
DC switch	Yes
PID recovery	Yes
AFCI	Yes
SPD	PV: Type I+II, AC: Type II
General Data	
Ambient temperature range	-30°C to +60°C
Topology	Transformerless
Degree of protection	IP66
Allowable relative humidity range	0-100%
Max. operating altitude	4000m (>3000m derating)
Cooling	Smart air cooling
Dimension (W × H × D)	985×710×321mm
Weight	80kg
Display	LCD & Bluetooth +APP
Communication	Ethernet/ RS485 / WiFi
Battery communication	RJ45, CAN*2 + DO*1
STS communication	RS485, DIO *2
Standard	EN/IEC 62109-1/2, EN/IEC 61000-6-2/-4, IEC 61000-3-11/-12, EN 50530, EN 50549, VDE-AR-N 4105/4110, C10/11

Note: the product may be upgraded in the future. The above parameters are for reference only. Please refer to the real product

13 Quality Assurance

If a product fault occurs during the warranty period, SOFARSOLAR will provide free repair service or replace the product with a new one, subject to the warranty terms and conditions.

Required Proof for Service

During the warranty period, customers must provide a valid purchase invoice and proof of the purchase date. Additionally, the product's trademark must remain intact and legible. Otherwise, SOFARSOLAR reserves the right to decline warranty service.

Conditions

- If a replacement is provided, the faulty product will be handled by SOFARSOLAR.
- Customers must allow SOFARSOLAR a reasonable period to repair the faulty device.

Limitations and Exclusions

SOFARSOLAR reserves the right to refuse warranty service in the following cases:

- The product's warranty period has expired.
- Damage occurred during transportation.
- The device was improperly installed, modified, or used.
- The device was operated in conditions beyond those specified in this manual.
- The fault or damage was caused by unauthorised installation, repair, modification, or disassembly by personnel not authorised by SOFARSOLAR.

- The fault or damage resulted from the use of non-standard or non-SOFARSOLAR components or software.
- The installation and operating conditions do not comply with relevant international standards.
- The device was damaged due to unforeseen natural disasters or force majeure.

For faulty products under the above conditions, customers may request repair services, which may be subject to additional costs based on SOFARSOLAR's assessment.

Contact Us

If the purchased product encounters a fault, customers can quickly contact us through the following methods, and we will respond as soon as possible. Customers may also reach out to our authorised local service providers or distributors for assistance.

We need the following information to provide you the best assistance:

- Model of the device
- Serial number of the device
- Error code/name
- Purchase invoice and warranty card
- The device was damaged due to unforeseen natural disasters or force

For more detailed information, please email service@sofarsolar.com or visit WWW.SOFARSOLAR.COM.

Version 1.0



ENERGY TO POWER YOUR LIFE

ADDRESS

11th Floor, Gaoxingqi Technology Building,
District 67, Xingdong Community, Xin'an Street,
Bao'an District, Shenzhen, China

EMAIL

info@sofarsolar.com

WEBSITE

www.sofarsolar.com

SOFARSOLAR | Q

