

Solar PV Single Phase Inverter

(MACSI1000 | MACSI1500 | MACSI2000 | MACSI2500 | MACSI3000)



NOTICE

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

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1 About This Manual

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

1.1 Applicable Model

This manual applies to the listed inverters below:

Model	Nominal Output Power	Nominal Output Voltage
MACSI1000	1000W	230V
MACSI1500	1500W	
MACSI2000	2000W	
MACSI2500	2500W	220/230V
MACSI3000	3000W	

1.2 Target Audience

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

1.3 Symbol Definition

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

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

1.4 Updates

- First Issue

2 IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

Please strictly follow these safety instructions in the user manual during the operation.

NOTICE

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

2.1 General Safety

NOTICE

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

2.2 DC Side

DANGER

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

WARNING

- Ensure the component frames and the bracket system are securely grounded.
- Ensure the DC cables are connected tightly, securely and correctly.
- Measure the DC cable using the multimeter to avoid reverse polarity connection. Also, the voltage should be under the permissible range.
- Do not connect the same PV to multiple inverters. Otherwise, the inverters may be damaged.
- The PV modules used with the inverter must have an IEC61730 class A rating.

2.3 AC Side

WARNING

- The voltage and frequency at the connection point meet the inverter grid connection requirements
- Additional protective devices like circuit breakers or fuses are recommended on the AC side. Specification of the protective device should be at least 1.25 times the rated AC output rated current.
- Make sure that all the groundings are tightly connected.
- You are recommended to use copper cables as AC output cables. Contact the manufacturer if you want to use other cables.

2.4 Inverter Installation

DANGER

- Do not apply mechanical load to the terminals, otherwise the terminals can be damaged.
- All labels and warning marks should be visible after the installation. Do not scrawl, damage, or cover any label on the device.
- Testing to AS/NZS 4777.2:2020 for multiple inverter combinations has not been conducted.
- Warning labels on the inverter are as follows.

	DANGER High voltage hazard. Disconnect all incoming power and turn off the product before working on it.		Delayed discharge. Wait 5 minutes after power off until the components are completely discharged.
	Read through the user manual before working on this device.		Potential risks exist. Wear proper PPE before any operations.
	High-temperature hazard. Do not touch the product under operation to avoid being burnt.		Grounding point.
	CE Mark		Do not dispose of the inverter as household waste. Discard the product in compliance with local laws and regulations, or send it back to the manufacturer.

2.5 Personal Requirements

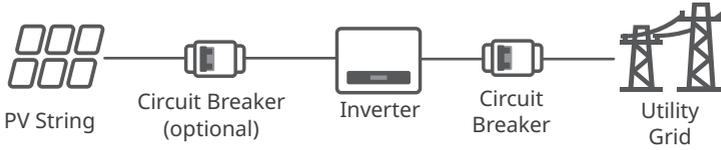
NOTICE

- Personnel who install or maintain the equipment must be strictly trained, learn about safety precautions and correct operations.
- Only qualified professionals or trained personnel are allowed to install, operate, maintain, and replace the equipment or parts.

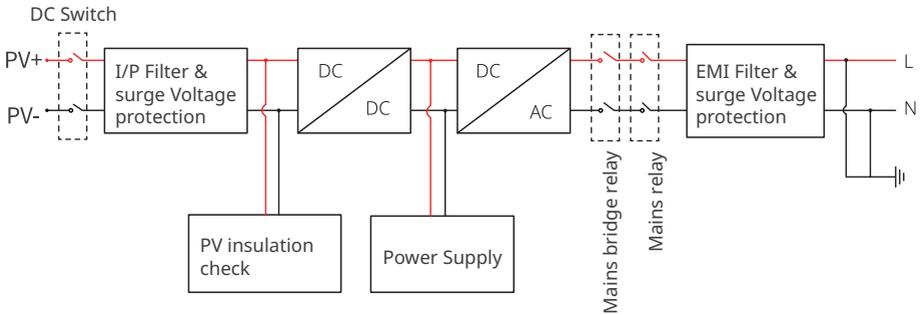
3 Product Introduction

3.1 Application Scenarios

The inverter is a single-phase PV string grid-tied inverter, which converts the DC power generated by the PV module into AC power for loads or the grid. The intended use of the inverter is as follows:

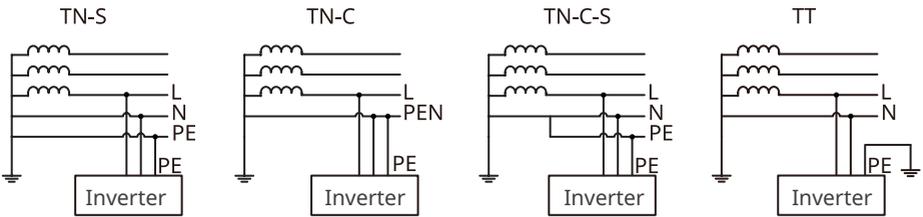


3.2 Circuit Diagram



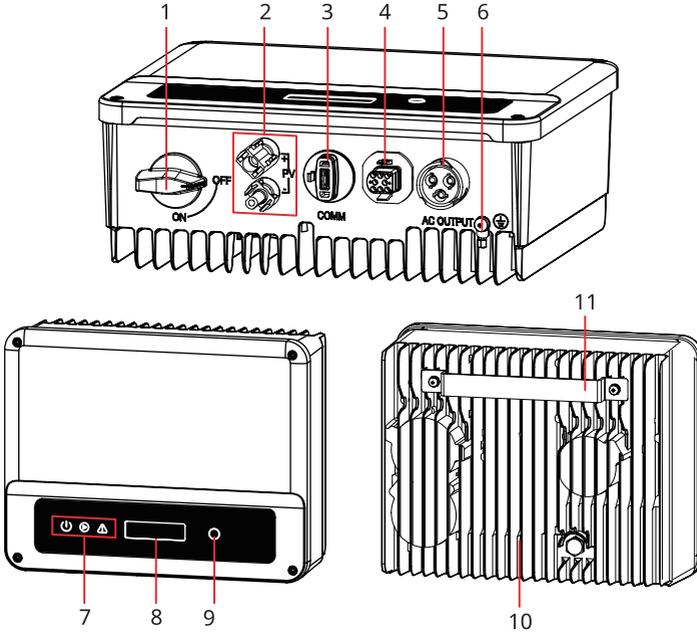
3.3 Supported Grid Types

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



3.4 Appearance

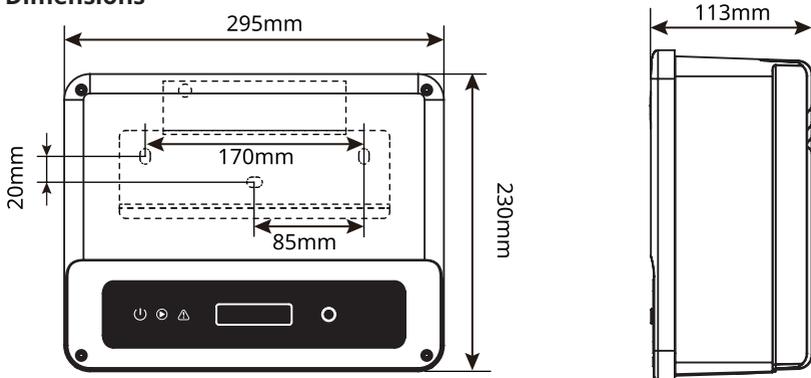
3.4.1 Parts



No.	Parts	Description
1	DC Switch(optional)	Optional. During normal operation it is in "on" state, it can shut down the inverter after it is disconnected from the grid by the AC breaker. For Australia and New Zealand: With DC Switch.
2	PV Input Terminal	Used to connect the PV module DC input cables.
3	WiFi/LAN/4G Communication Module Port	<ul style="list-style-type: none"> Connect a communication module like Bluetooth, WiFi, LAN, 4G, etc. The module type may differ depending on actual needs. Connect the USB-RS485 cable in Brazil. Update the software version of the inverter using a USB flash driver.
4	RS485/DRED/CT/Remote Shutdown Communication Cable Port(optional)	Optional. Used to connect the RS485, DRED, CT, or Remote Shutdown communication cable.
5	AC Output Terminal	Used to connect the AC output cable, which connects the inverter and the utility grid.
6	PE Terminal	Used to connect the PE cable.
7	Indicator	Indicates working state of the inverter.

No.	Parts	Description
8	LCD	Used to check the parameters of the inverter.
9	Button	Used to select menus displayed on the screen.
10	Heat Sink	Used to cool the inverter.
11	Mounting Plate	Used to install the inverter.

3.4.2 Dimensions



3.4.3 Indicators

Indicator	Status	Description
 Power		ON = WiFi is connected/active.
		BLINK 1 = WiFi system is resetting.
		BLINK 2 = WiFi not connect to the router.
		BLINK 4 = WiFi server problem.
		BLINK = RS485 is connected.
		OFF = WiFi is not active.
 Operating		ON = The inverter is feeding power.
		OFF = The inverter is not feeding power at the moment.
 Faulty		ON = A fault has occurred.
		OFF = No fault.

3.4.4 Nameplate

The nameplate is for reference only.

Clearline INVERTER	
Product: Grid-Tied PV Inverter Model : *****	
PV Input	UDCmax: ***Vd.c.
	UMPP: **...***Vd.c.
	IDC,max: **Ad.c.
	ISC PV: **Ad.c.
Output	UAC,r: ***Va.c.
	fAC,r: **Hz
	PAC,r: ****W
	IAC,max: **Aa.c.
	Sr: ***VA
	Smax: ****VA
P.F.: ~1,0,8cap...0,8ind T operating: -**~***C Non-isolated, IP**, Protective Class I, OVC DCII/ACIII	
S/N:	
Viridian Solar Ltd E-mail: info@viridiansolar.co.uk www.viridiansolar.co.uk	
S/N	

— Trademark, product type, and product model

— Technical parameters

— Safety symbols and certification marks

— Contact information and serial number

4 Check and Storage

4.1 Check Before Receiving

Check the following items before receiving the product.

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

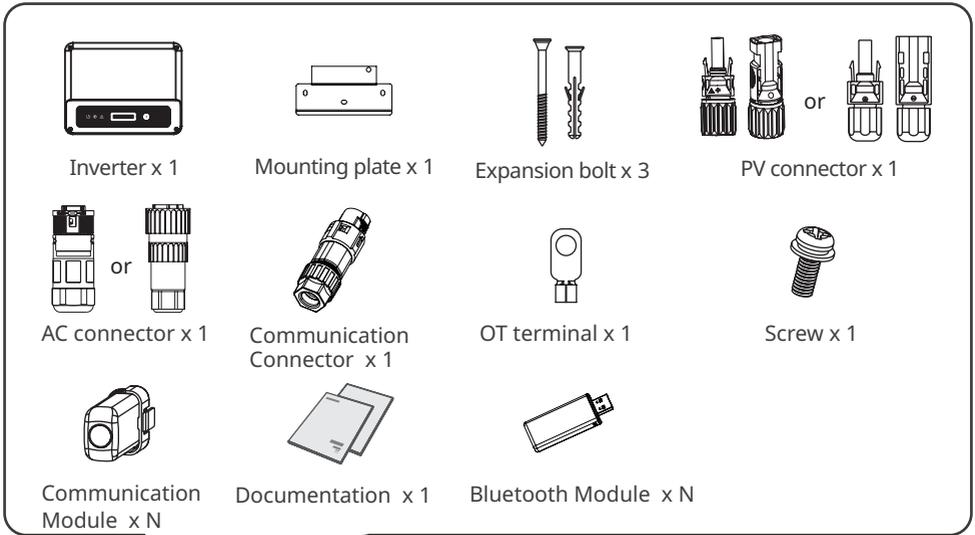
4.2 Deliverables

 **WARNING**

Connect the DC cables with the delivered terminals. The manufacturer shall not be liable for the damage if other terminals are used.

NOTICE

- Communication module types: WiFi, LAN, Bluetooth, 4G, etc. The actual module delivered depends on the communication method of the selected inverter.



4.3 Storage

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

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

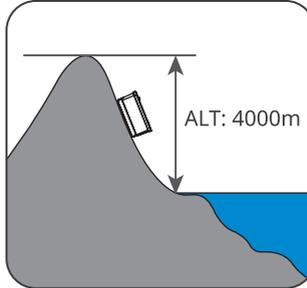
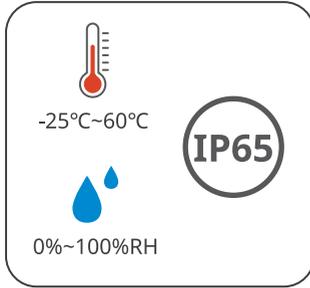
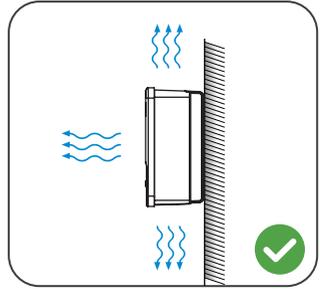
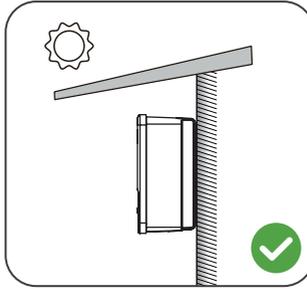
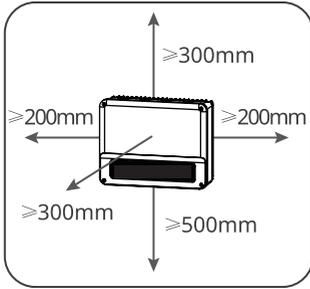
5 Installation

5.1 Installation Requirements

Installation Environment Requirements

1. Do not install the equipment in a place near flammable, explosive, or corrosive materials.
2. Install the equipment on a surface that is solid enough to bear the inverter weight.
3. Install the equipment in a well-ventilated place to ensure good dissipation. Also, the installation space should be large enough for operations.
4. The equipment with a high ingress protection rating can be installed indoors or outdoors. The temperature and humidity at the installation site should be within the appropriate range.
5. Install the equipment in a sheltered place to avoid direct sunlight, rain, and snow. Build a sunshade if it is needed.
6. Install the equipment in a well-ventilated place to ensure good dissipation. Also, the installation space should be large enough for operations.
7. Do not install the equipment in a place that is easy to touch, especially within children's reach. High temperature exists when the equipment is working. Do not touch the surface to avoid burning.
8. Install the equipment at a height that is convenient for operation and maintenance, electrical connections, and checking indicators and labels.
9. The altitude to install the inverter shall be lower than the maximum working altitude 4000m.
10. The inverter is easy to be corroded when installed in salt areas. Please consult the inverter manufacturer before installing it outdoors in salt areas. A salt area refers to the region within 1000m offshore or affected by the sea breeze. The area prone to the sea breeze varies depending on weather conditions (e.g. typhoon, monsoon) or terrain (such as dams and hills).
11. Install the inverter away from high magnetic field to avoid electromagnetic interference. If there is any radio or wireless communication equipment below 30MHz near the inverter, you have to:
 - Install the inverter at least 30m far away from the wireless equipment.
 - Add a low pass EMI filter or a multi winding ferrite core to the DC input cable or AC output cable of the inverter.



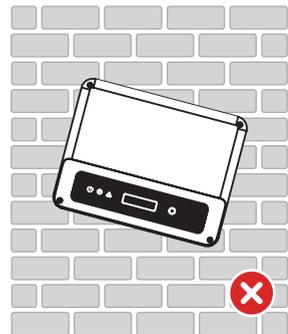
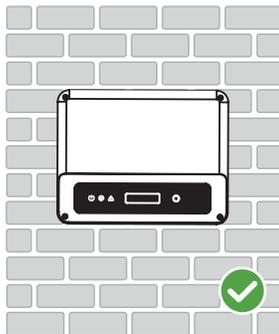
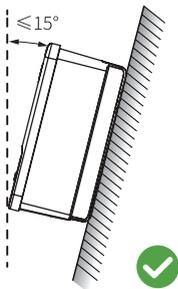


Mounting Support Requirements

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

Installation Angle Requirements

- Install the inverter vertically or at a maximum back tilt of 15 degrees.
- Do not install the inverter upside down, forward tilt, back forward tilt, or horizontally.



Installation Tool Requirements

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



5.2 Inverter Installation

5.2.1 Moving the Inverter

CAUTION

- Operations such as transportation, turnover, installation and so on must meet the requirements of the laws and regulations of the country or region where it is located.
- Move the inverter to the site before installation. Follow the instructions below to avoid personal injury or equipment damage.
 1. Consider the weight of the equipment before moving it. Assign enough personnel to move the equipment to avoid personal injury.
 2. Wear safety gloves to avoid personal injury.
 3. Keep balance to avoid falling down when moving the equipment.

NOTICE

- Avoid the water pipes and cables buried in the wall when drilling holes.
- Wear goggles and a dust mask to prevent the dust from being inhaled or contacting eyes when drilling holes.
- The DC switch lock is prepared by the customer.
- Make sure the inverter is firmly installed in case of falling down.

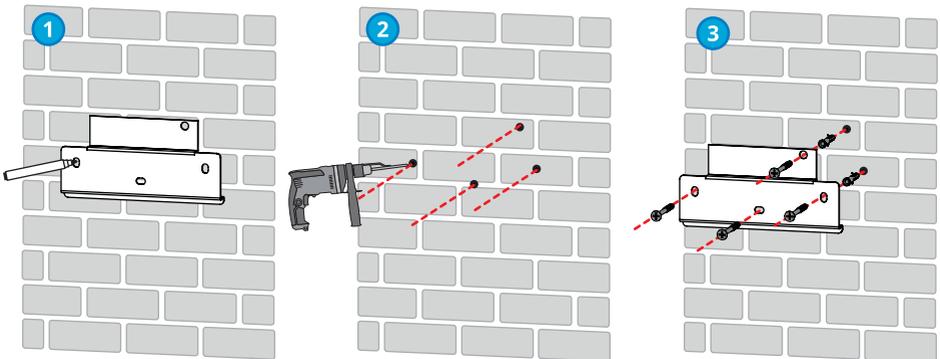
Step 1 Put the mounting plate on the wall or the support horizontally and mark positions for drilling holes.

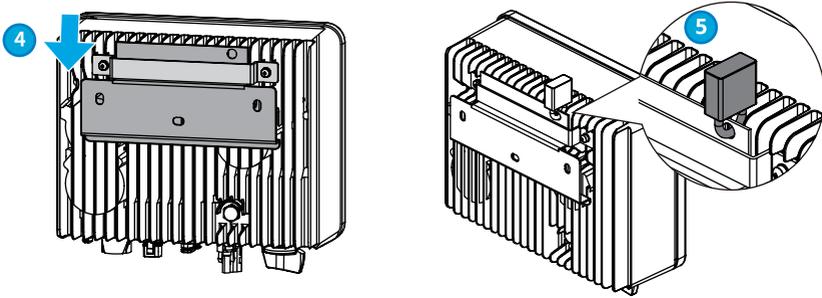
Step 2 Drill holes to a depth of 80mm using the hammer drill. The diameter of the drill bit should be 10mm.

Step 3 Secure the mounting plate using the expansion bolts.

Step 4 Install the inverter on the mounting plate.

Step 5 Install the anti-theft lock.





6 Electrical Connection

6.1 Safety Precaution

DANGER

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

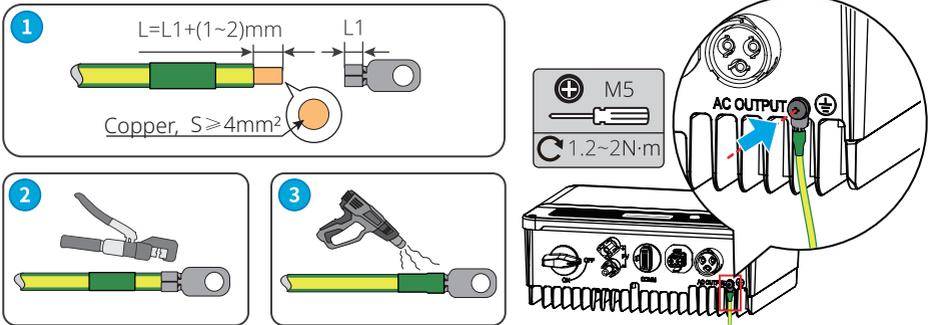
NOTICE

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

6.2 Connecting the PE Cable

⚠ WARNING

- The PE cable connected to the enclosure of the inverter cannot replace the PE cable connected to the AC output port. Make sure that both of the two PE cables are securely connected.
- Make sure that all the grounding points on the enclosures are equipotential connected when there are multiple inverters.
- To improve the corrosion resistance of the terminal, you are recommended to apply silica gel or paint on the ground terminal after installing the PE cable.
- The PE cable is prepared by the customer. Recommended specifications:
 - Type: single-core outdoor copper cable
 - Conductor cross-sectional area: 4mm^2



6.3 Connecting the PV Input Cable

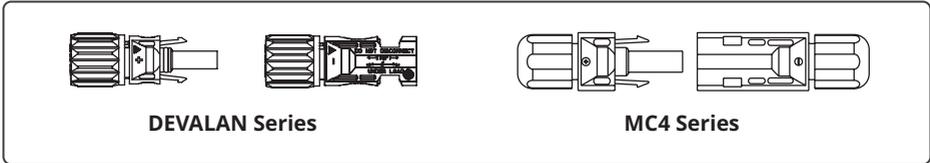
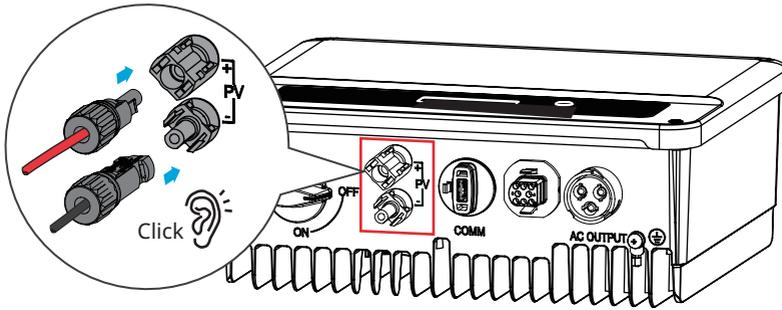
⚠ DANGER

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

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

⚠ WARNING

- Connect the DC cables using the delivered PV connectors. The manufacturer shall not be liable for the damage if other connectors are used.
- The PV strings cannot be grounded. Ensure the minimum isolation resistance of the PV string to the ground meets the minimum isolation resistance requirements before connecting the PV string to the inverter.
- The DC input cable is prepared by the customer. Recommended specifications:
 - Type: the outdoor photovoltaic cable that meets the maximum input voltage of the inverter.
 - Conductor cross-sectional area: $2.5\sim 4\text{mm}^2$ (Devalan) or $4\sim 6\text{mm}^2$ (MC4).



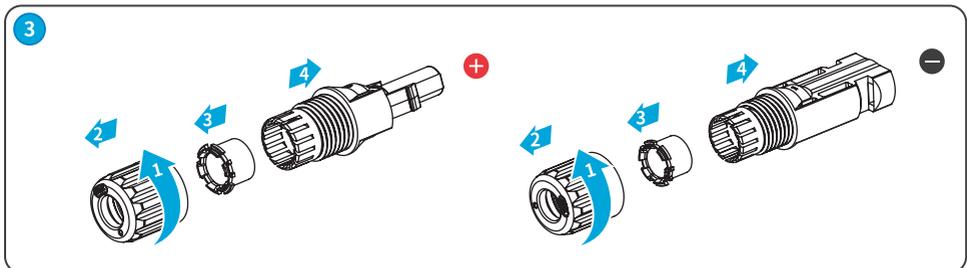
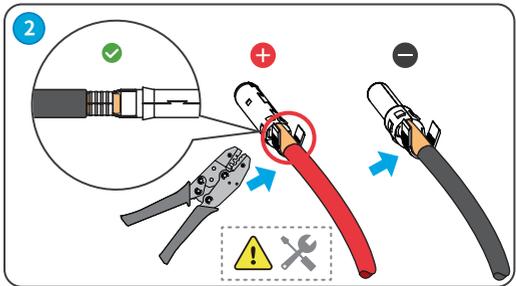
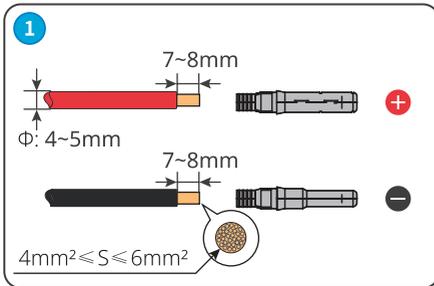
NOTICE

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

Connecting the DC Input Cable

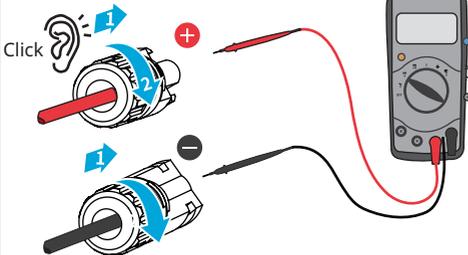
- Step 1** Prepare DC cables.
- Step 2** Crimp the crimp contacts.
- Step 3** Disassemble the PV connectors.
- Step 4** Make the DC cable and detect the DC input voltage.
- Step 5** Plug the PV connectors into the PV terminals.

MC4 PV connector

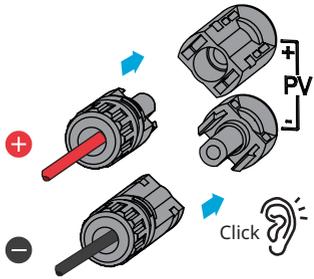


4

CSI2500, CSI3000: ≤ 600V
Others: ≤ 500V

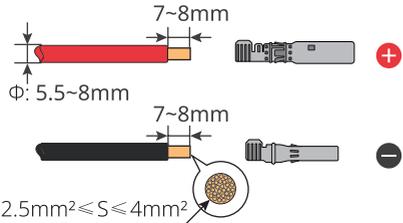


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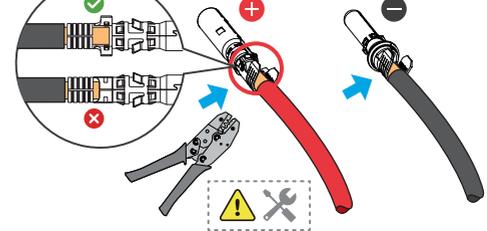


Devalan PV connector

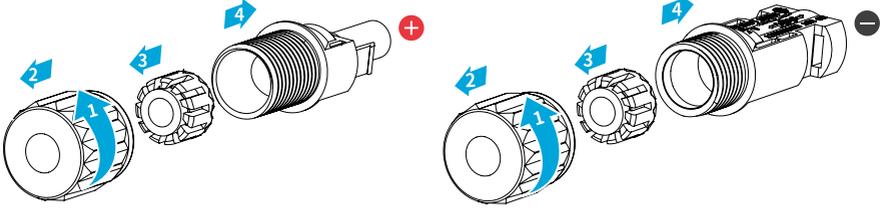
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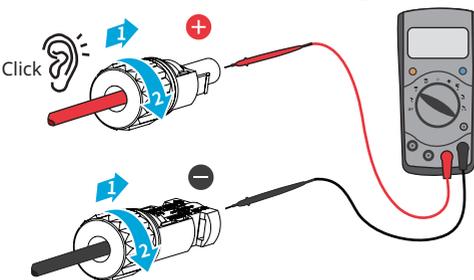


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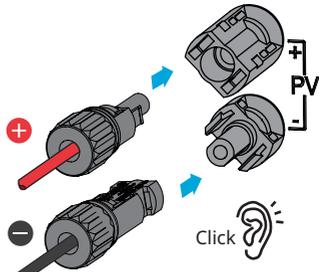


4

CSI2500, CSI3000: ≤ 600V
Others: ≤ 500V



5



6.4 Connecting the AC Output Cable

WARNING

- Do not connect loads between the inverter and the AC switch directly connected to the inverter.
- The Residual Current Monitoring Unit (RCMU) is integrated into the inverter. The inverter will disconnect the utility grid rapidly once it detects any leak current over the permissible range.

NOTICE

- Install one AC circuit breaker for each inverter. Multiple inverters cannot share one AC circuit breaker.
- An AC circuit breaker shall be installed on the AC side to make sure that the inverter can safely disconnect the grid when an exception happens. Select the appropriate AC circuit breaker in compliance with local laws and regulations. Recommended AC circuit breakers:

Inverter model	AC circuit breaker
MACSI1000	16A
MACSI1500	
MACSI2000	25A
MACSI2500	
MACSI3000	

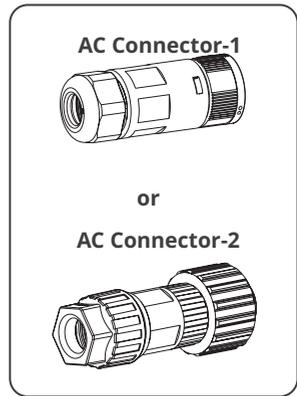
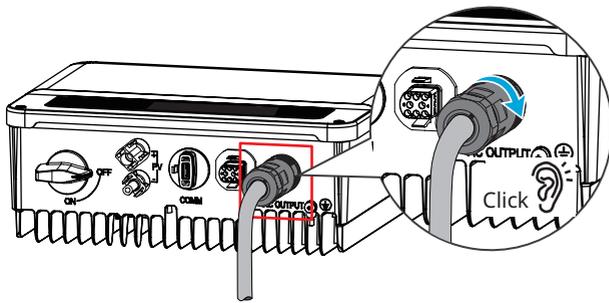
Select and Install RCD depending on local laws and regulations. Type A RCDs (Residual Current Monitoring Device) can be connected to the outside of the inverter for protection when the DC component of the leakage current exceeds the limit value. The following RCDs are for reference:

Inverter model	AC circuit breaker
MACSI1000	300mA
MACSI1500	
MACSI2000	
MACSI2500	
MACSI3000	

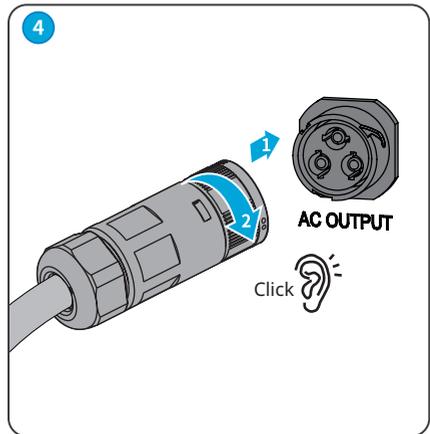
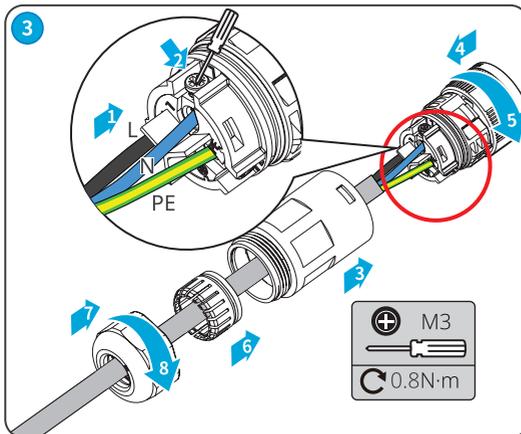
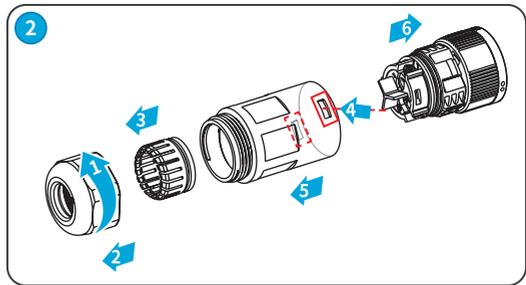
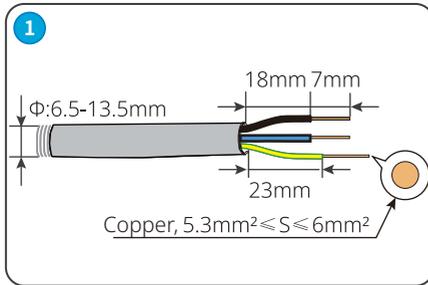
 **WARNING**

- Pay attention to the silkscreens L, N, PE on the AC terminal. Connect the AC cables to the corresponding terminals. The inverter may be damaged if the cables are connected inappropriately.
- Make sure that the whole cable cores are inserted into the AC terminal holes. No part of the cable core can be exposed.
- Make sure that the cables are connected securely. Otherwise, the terminal may be too hot to damage the inverter when the inverter is working.

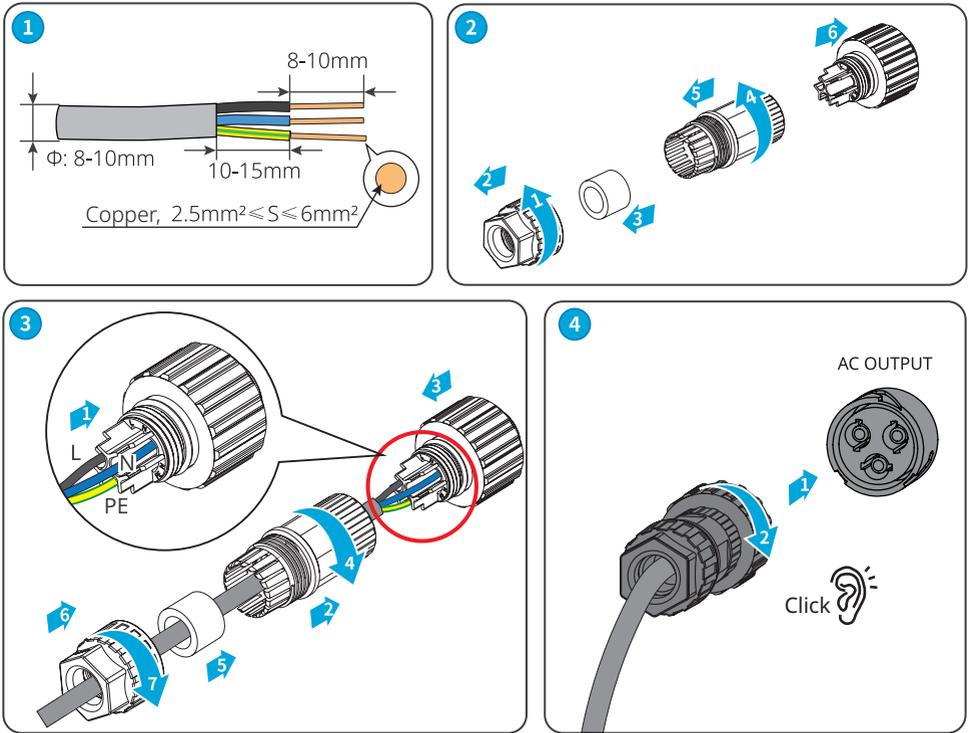
- Step 1** Make the AC output cable.
- Step 2** Disassemble the DC routing hole's end cap.
- Step 3** Use the cable gland for routing wires.
- Step 4** Plug the AC connector into the inverter.



AC Connector-1



AC Connector-2



NOTICE

- Make sure that the cable is connected correctly and securely. Clear the debris after completing the connection.
- Seal the AC output terminal to ensure the ingress protection rating.

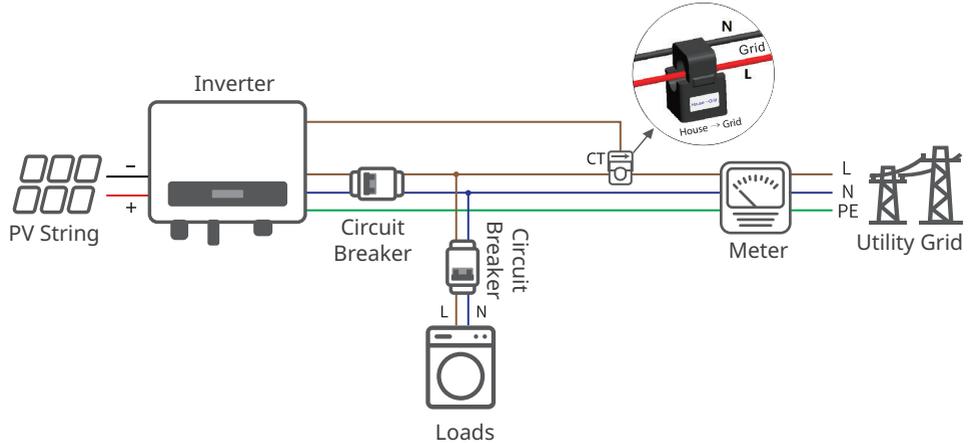
6.5 Communication

6.5.1 Communication Network Introduction

Power Limit Network

The PV station generates power for self-consumption, but the electric equipment cannot consume all the generated power. The inverter can monitor the on-grid electric data in real-time and adjust the output power to avoid the residual current feeding back to the utility grid.

CT90



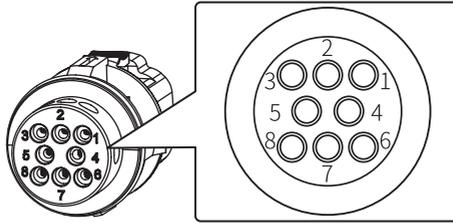
Notice

After completing cable connections, set related parameters via LCD or WE Mate app to enable export power limit control or output power limit control.

6.5.2 Connecting the Communication Cable (optional)

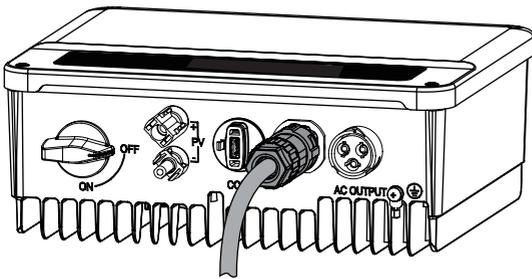
NOTICE

- DRED (Demand response enabling device) is only for Australian and New Zealand installations, in compliance with Australian and New Zealand safety requirements.
- Contact the after-sales service to get the DRED terminal if you need to use DRED function.
- DRED function is off by default. Start this function via WE Mate App if it's needed.
- Remote shutdown is only for Europe installations, in compliance with European safety requirements. And Remote shutdown device is not provided by Viridian.
- Remote shutdown function is off by default. Start this function via WE Mate App if it's needed.

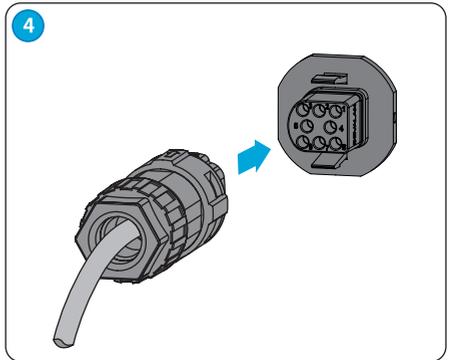
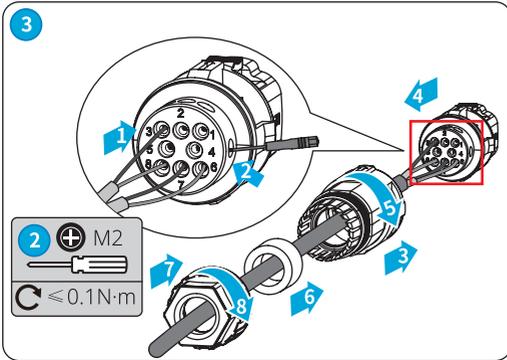
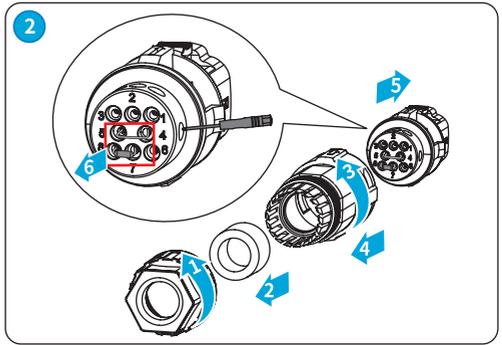
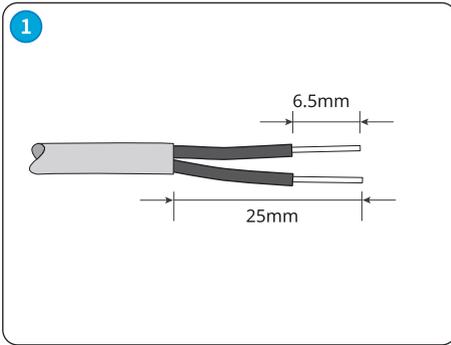


Communication Type	Definition	Function
RS485	3: RS485- 6: RS485+ 7: RS485- 8: RS485+	Used to connect multi inverters or the RS485 port on the data logger.
Remote shutdown	3: Content + 4: Content -	The port is reserved in compliance with grid regulations in Europe. Related devices should be prepared by customers.
CT	1: CT- 2: CT+	Realize the anti-backfeed function by connecting the meter and the CT. Contact the manufacturer to purchase the devices if you need them.
DRED	3: DRM1/5 4: DRM2/6 5: DRM3/7 6: DRM4/8 7: REFGEN 8: COM/DRM0	The port is reserved in compliance to grid regulations in Australia and New Zealand. Related devices should be prepared by customers.

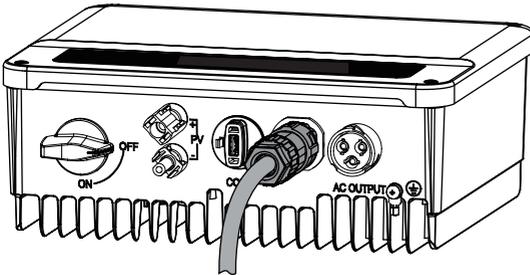
6.5.3 Connecting the RS485 Cable



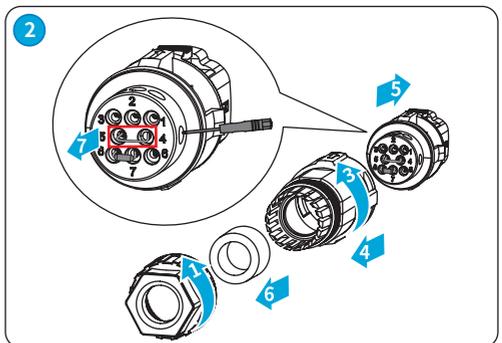
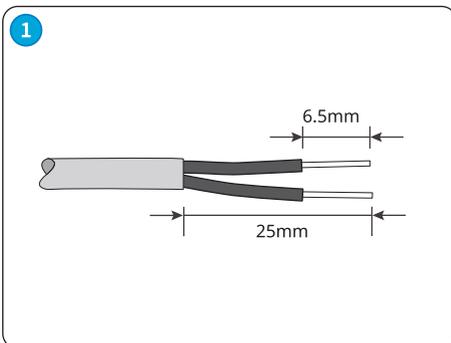
No.	Function
3	RS485-
6	RS485+
7	RS485-
8	RS485+

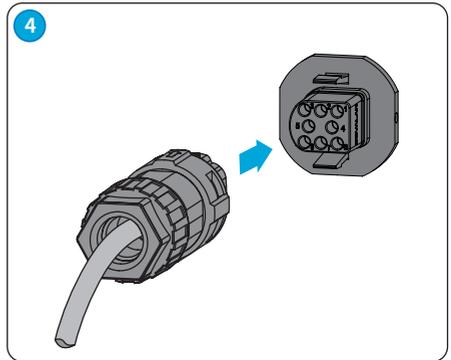
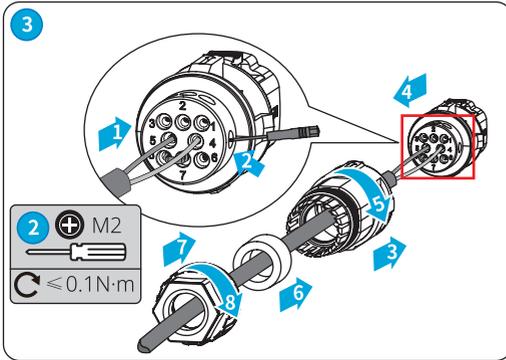


6.5.4 Connecting the Remote Shutdown Cable

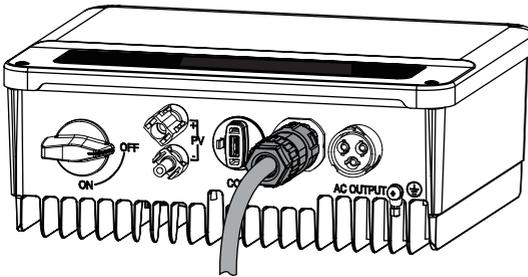


No.	Function
4	Content +
5	Content -

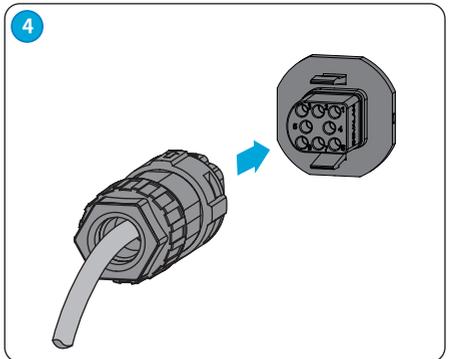
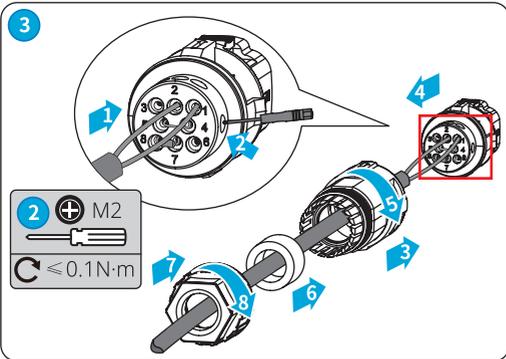
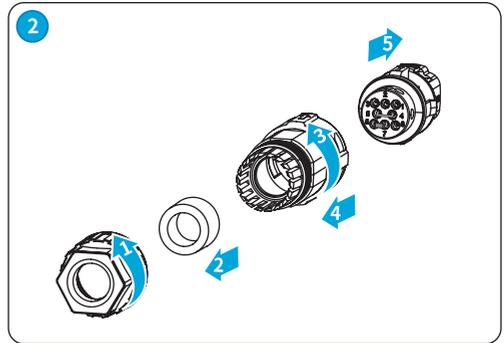
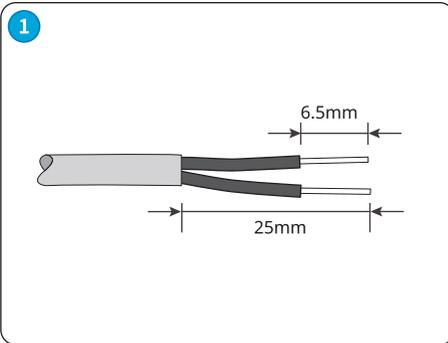




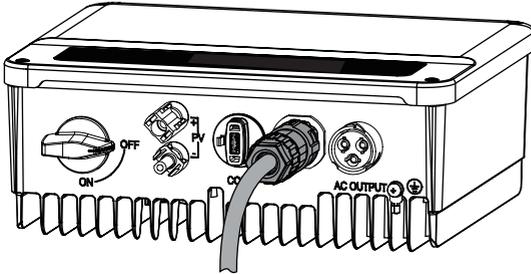
6.5.5 Connecting the CT Cable



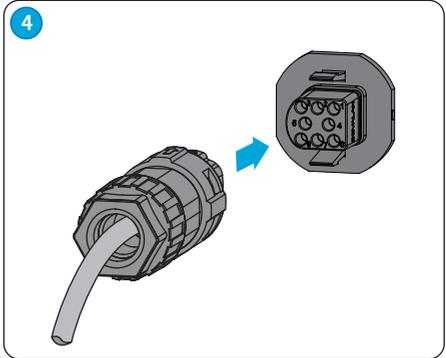
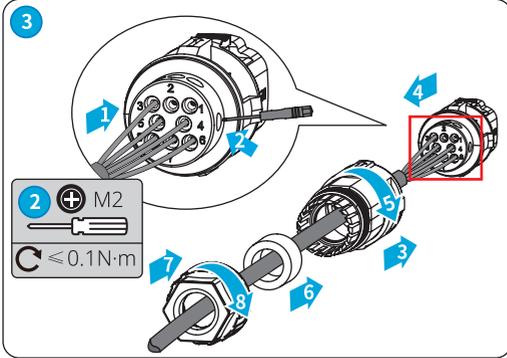
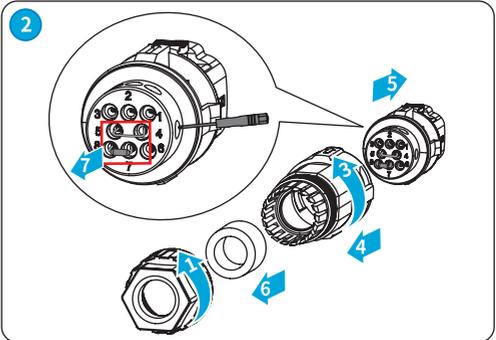
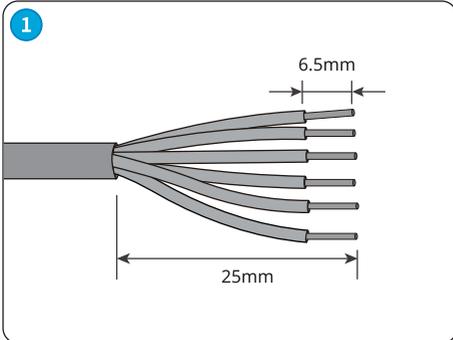
No.	Function
1	CT-
2	CT+



6.5.6 Connecting the DRED Cable



No.	Function
3	DRM1/5
4	DRM2/6
5	DRM3/7
6	DRM4/8
7	REFGEN
8	COM/DRM0



7 Equipment Commissioning

7.1 Check Before Power ON

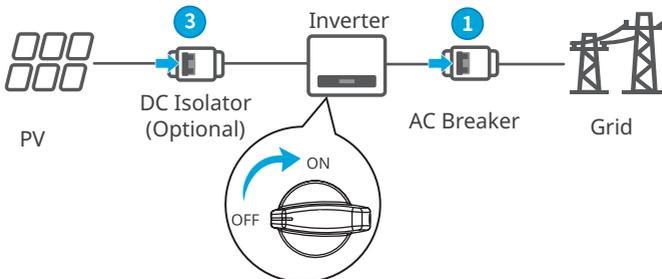
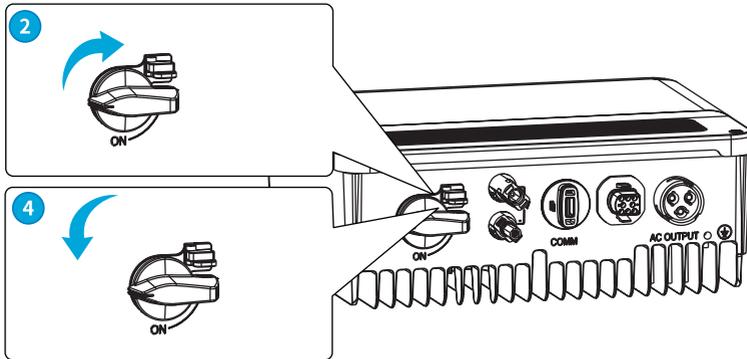
No.	Check Item
1	The product is firmly installed at a clean place that is well-ventilated and easy to operate.
2	The PE, DC input, AC output, and communication cables are connected correctly and securely.
3	Cable ties are intact, routed properly and evenly.
4	Unused ports and terminals are sealed.
5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

7.2 Power On

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

Step 2 (optional) Turn on the DC switch between the inverter and the PV string.

Step 3 Turn on the DC switch of the inverter.



Turn on **1** → **3** → **2**

8 System Commissioning

8.1 Indicators and Buttons

Indicator	Status	Description
 Power		ON = WiFi is connected/active.
		BLINK 1 = WiFi system is resetting.
		BLINK 2 = WiFi not connect to the router.
		BLINK 4 = WiFi server problem.
		BLINK = RS485 is connected.
		OFF = WiFi is not active.
 Operating		ON = The inverter is feeding power.
		OFF = The inverter is not feeding power at the moment.
 Faulty		ON = A fault has occurred.
		OFF = No fault.

8.2 Setting Inverter Parameters via LCD

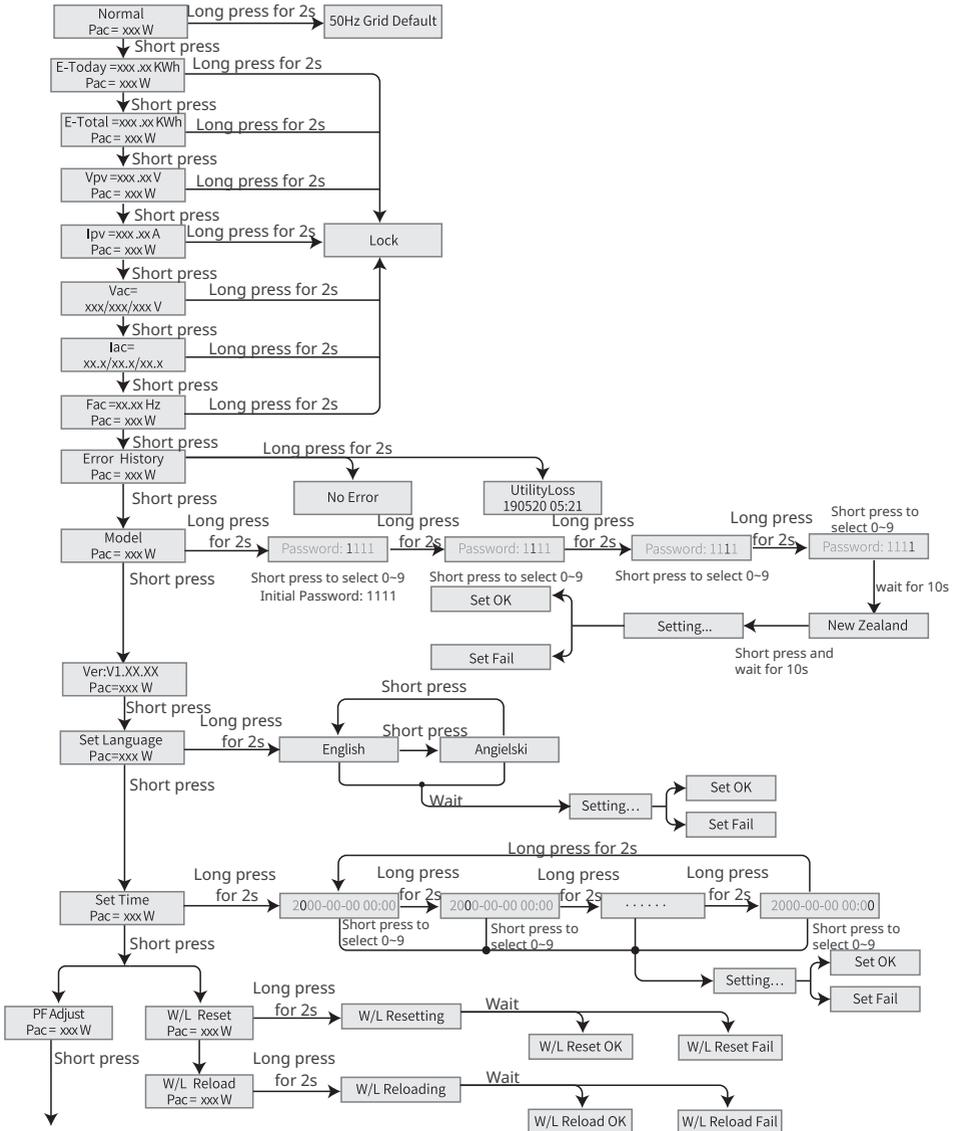
NOTICE

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

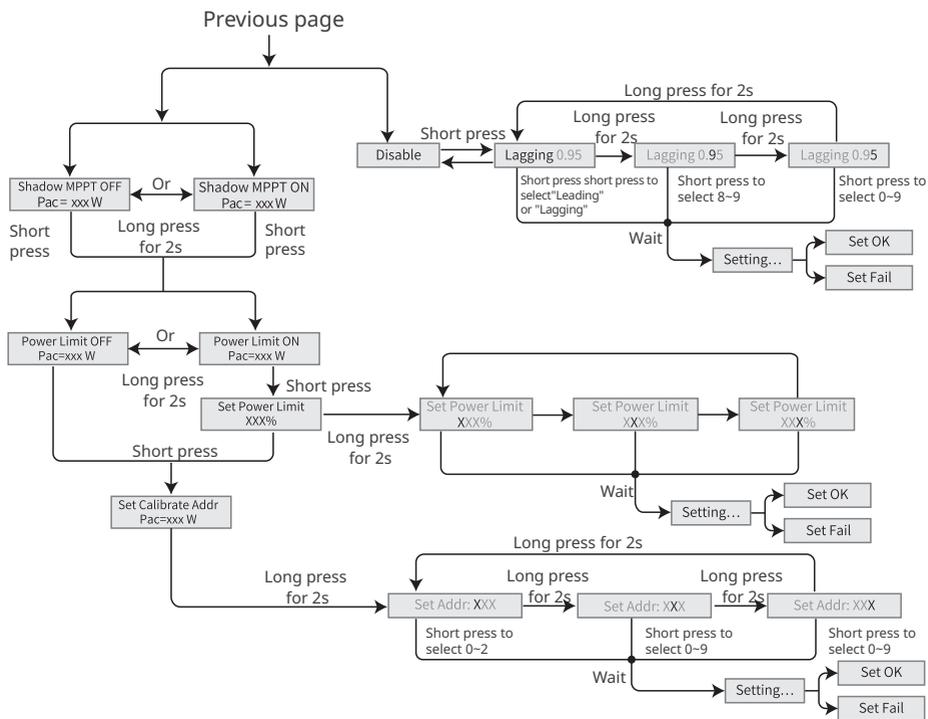
LCD Button Description

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

Main menu



Next page



8.2.1 Inverter Parameter Introduction

Parameters	Description
Normal	Home page. Indicates the real-time power of the inverter. Long press for 2s to check the current safety code.
E-Today	Check the generated power of the system for that day.
E-Total	Check the total generated power of the system.
Vpv	Check the DC input voltage of the inverter.
Ipv	Check the DC input current of the inverter.
Vac	Check the voltage of the utility grid.
Iac	Check the AC output current of the inverter.
Fac	Check the frequency of the utility grid.
Error History	Check historical error message records of the inverter.
Model	Indicates the specific inverter model. Long press for 2s to set the safety code. Set the safety country in compliance with the local grid standards and application scenario of the inverter.

Parameters	Description
Ver	Check the software version.
Set Language	Set language accordingly. Languages: English, Portuguese, Spanish.
Set Time	Set time according to the actual time in the country/region where the inverter is located.
W/L Reset	Power off and restart the WiFi module.
W/L Reload	Restore the factory settings of the WiFi module. Reconfigure the WiFi module network parameters after restoring the factory settings,
PF Adjust	Set the power factor of the inverter according to actual situation.
Time Interval	Set Time Interval according to actual needs.
Shadow MPPT	Enable the shadow scan function if the PV panels are shadowed.
Power Limit	<p>Soft limit: Set the power feed into the utility grid according to local requirements and standards.</p> <p>Hard limit: The inverter and the utility grid will automatically disconnect when the power feeds into the grid exceeds the required limit.</p>
Set Power Limit	Set the power feed back into the utility grid according to the actual situation.
Set Calibrate Addr	Set the actual Modbus address.

8.3 Upgrading the Firmware Via USB Flash Disk

Step 1 Contact the after-sales service to obtain the upgrade package.

Step 2 Save the upgrade package in the USB flash drive.

Step 3 Insert the USB flash drive into the USB port, and upgrade the software version of the inverter following the prompts.

8.4 Setting Inverter Parameters via WE Mate App

WE Mate app is a mobile application that communicates with the inverter via Bluetooth module, WIFI module or GPRS module. Commonly used functions are as follows:

1. Check the operating data, software version, alarms, etc.
2. Set grid parameters, communication parameters, etc.
3. Equipment maintenance.



WE Mate App

8.5 Monitoring via Solar Portal

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



Solar Portal

9 Maintenance

9.1 Power Off the Inverter

DANGER

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

Step 1 (Optional) Send shutdown command to the inverter.

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

Step 3 Turn off the DC switch of the inverter.

9.2 Removing the Inverter

WARNING

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

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

Step 2 Grab the handles or hoist the inverter to remove the inverter from the mounting plate.

Step 3 Remove the mounting plate.

Step 4 Store the inverter properly. If the inverter needs to be used later, ensure that the storage conditions meet the requirements.

9.3 Disposing of the Inverter

If the inverter cannot work anymore, dispose of it according to the local disposal requirements for electrical equipment waste. The inverter cannot be disposed of together with household waste.

9.4 Troubleshooting

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

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

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

Type of fault		Troubleshooting
Inverter Failure	Isolation Failure	<ol style="list-style-type: none"> 1. Disconnect DC switch, take off DC connector, check the impedance between PV (+) & PV(-) to earth. 2. If impedance is less than 100 kΩ, please check the insulation of PV string wiring to earth. 3. If impedance is large than 100 kΩ, please contact local service office. 4. Take off AC connector, measure the impedance between neutral. <p>Inverters for the Australian and New Zealand markets can also be alerted in the following ways in the event of insulation impedance failure:</p> <ol style="list-style-type: none"> 1. The inverter is equipped with the buzzer: the buzzer sounds continuously for 1 minute in case of failure; If the fault is not resolved, the buzzer sounds every 30 minutes. 2. Add the inverter to the monitoring platform, and set the alarm reminder, the alarm information can be sent to the customer by emails.
	Ground I Failure	<ol style="list-style-type: none"> 1. The ground current is too high. 2. Unplug the inputs from the PV generator and check the peripheral AC system. 3. When the problem is cleared, reconnect the PV panel and check the Inverter status. 4. Contact local service office for help if the problem still persist.
	Vac Failure	<ol style="list-style-type: none"> 1. The PV Inverter will automatically restart within 5 minutes if the grid returns to normal. 2. Make sure grid voltage conforms with the specification. 3. Make sure neutral (N) wire and PE wire are connected well. 4. Contact local service office for help if the problem still persist.
	Fac Failure	<ol style="list-style-type: none"> 1. Grid is not connected. 2. Check grid connection cables. 3. Check availability of grid.
	Utility Loss	<ol style="list-style-type: none"> 1. Not connect to the grid. 2. Check if the power grid is connected to cable. 3. Check the availability of power grid.
	PV Over Voltage	<ol style="list-style-type: none"> 1. Check if the PV open circuit voltage is higher or too close to the maximum input voltage or not. 2. If the problem still persist when PV voltage is less than the maximum input voltage, contact local service office for help.
	Over Temperature	<ol style="list-style-type: none"> 1. The internal temperature is higher than normal value specified. 2. Reduce ambient temperature. 3. Move the inverter to a cool place. 4. If the problem still exists, contact local service office for help.

Inverter Failure	Relay-Check Failure	<ol style="list-style-type: none"> 1. Turn off DC switch of the inverter. 2. Wait till the inverter's LCD light is off. 3. Turn on DC switch and make sure it is connected. 4. If the problem still exists, contact local service office for help.
	DCI Injection High	
	EEPROM R/W Failure	
	SCI Failure	
	SPI Failure	
	DC BUS High	
	BUS Unbalance	
	GFCI Failure	
	Ifan Fault	
	Efan Fault	
	Afan Fault	
	AFCI Fail	
	No display	<ol style="list-style-type: none"> 1. Turn off DC switch, take off DC connector, measure the voltage of PV array. 2. Plug in DC connector, and turn on DC switch. 3. If PV array voltage is lower than 250V , please check configuration of inverter module. 4. If voltage is higher than 250V , please contact local office.
Others	Wi-Fi module fail to connect to network	<ol style="list-style-type: none"> 1. If the Wi-Fi module fail to connect to network after choosing the right router hotspot and entering the right passwords, it's possible that there are special characters not supported by module in the hotspot passwords. Please modify the password to consist of only Arabic numerals or uppercase / lowercase letters. 2. If the problem still exists, contact local service office for help.

NOTICE

When sunlight is insufficient, the PV inverter may continuously start up and shut down automatically due to insufficient power generation from the PV panels, which would not lead to inverter damage.

9.5 Recommended Maintenance

 **WARNING**

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

Maintaining Item	Maintaining Method	Maintaining Period
System Clean	Check the heat sink, air intake, and air outlet for foreign matter or dust.	Once 6-12 months
DC Switch	Turn the DC switch on and off ten consecutive times to make sure that it is working properly.	Once a year
Electrical Connection	Check whether the cables are securely connected. Check whether the cables are broken or whether there is any exposed copper core.	Once 6-12 months
Sealing	Check whether all the terminals and ports are properly sealed. Reseal the cable hole if it is not sealed or too big.	Once a year

10 Technical Parameters

Technical Data	MACSI1000	MACSI1500	MACSI2000
Input			
Max. Input Power (W)	1500	2250	3000
Max. Input Voltage (V)	500	500	500
MPPT Operating Voltage Range (V)	40~450	50~450	50~450
MPPT Voltage Range at Nominal Power (V)	85~450	125~450	165~450
Start-up Voltage (V)	40	50	50
Nominal Input Voltage (V)	360	360	360
Max. Input Current per MPPT (A)	15	15	15
Max. Short Circuit Current per MPPT (A)	18.75	18.75	18.75
Max. Backfeed Current to The Array (A)	0	0	0
Number of MPP Trackers	1	1	1
Number of Strings per MPPT	1	1	1
Output			
Nominal Output Power (W)	1000	1500	2000
Nominal Output Apparent Power (VA)	1000	1500	2000
Max. AC Active Power (W)	1100	1650	2200
Max. AC Apparent Power (VA)	1100	1650	2200
Nominal Power at 40°C (W) (Only for Brazil)	1000	1500	2000
Max Power at 40°C (Including AC Overload) (W) (Only for Brazil)	1000	1500	2000
Nominal Output Voltage (V)	230	230	230
Output Voltage Range (V)	154~288	154~288	154~288
Nominal AC Grid Frequency (Hz)	50/60	50/60	50/60
AC Grid Frequency Range (Hz)	45~55/57~63	45~55/57~63	45~55/57~63
Max. Output Current (A)	4.8	7.2	9.6
Max. Output Fault Current (Peak and Duration) (A/ms)	25@5ms	25@5ms	25@5ms

Inrush Current (Peak and Duration) (A/us)	50@2us	50@2us	50@2us
Nominal Output Current (A)	4.3	6.5	8.7
Power Factor			
Max. Total Harmonic Distortion			
Maximum Output Overcurrent Protection (A)	22.3	22.3	22.3
Efficiency			
Max. Efficiency	97.2%	97.3%	97.5%
European Efficiency	96.4%	96.6%	97.0%
Protection			
PV Insulation Resistance Detection	Integrated		
Residual Current Monitoring	Integrated		
Anti-islanding Protection	Integrated		
AC Overcurrent Protection	Integrated		
AC Short Circuit Protection	Integrated		
AC Overvoltage Protection	Integrated		
DC Switch	Integrated		
DC Surge Protection	Type III (Type II Optional)		
AC Surge Protection	Type III		
AFCI	Optional		
Emergency Power Off	Optional		
Remote Shutdown	Optional		
Remote Shutdown	Optional		
General Data			
Operating Temperature Range (°C)	-25~+60		
Relative Humidity	0~100%		
Max. Operating Altitude (m) ^{*5}	3000		
Cooling Method	Natural Convection		
User Interface	LED, LCD , WLAN+APP		
Communication	RS485		
Weight (kg)	5.8		
Dimension (W×H×D mm)	295×230×113		
Noise Emission (dB)	<25		
Topology	Non-isolated		

Self-consumption at Night (W)	<1
Ingress Protection Rating	IP65
DC Connector	MC4 (2.5-4mm ²)
AC Connector	plug and play connector
Environmental Category	4K4H
Pollution Degree	III
Overvoltage Category	DC II / AC III
Protective Class	I
The Decisive Voltage Class (DVC)	PV: C AC: C Com: A
Active Anti-islanding Method	AFDPF + AQDPF *1
Country of Manufacture (Only for Australia)	China

Technical Data	MACSI2500	MACSI3000
Input		
Max. Input Power (W)	3750	4500
Max. Input Voltage (V)	600	600
MPPT Operating Voltage Range (V)	50-550	50-550
MPPT Voltage Range at Nominal Power (V)	200-450	240-450
Start-up Voltage (V)	50	50
Nominal Input Voltage (V)	360	360
Max. Input Current per MPPT (A)	15	15
Max. Short Circuit Current per MPPT (A)	18.75	18.75
Max. Backfeed Current to The Array (A)	0	0
Number of MPP Trackers	1	1
Number of Strings per MPPT	1	1
Output		
Nominal Output Power (W)	2500	3000
Nominal Output Apparent Power (VA)	2500	3000
Max. AC Active Power (W)	2750	3300
Max. AC Apparent Power (VA)	2750	3300
Nominal Power at 40°C (W)(Only for Brazil)	2500	3000

Max Power at 40°C (Including AC Overload) (W)(Only for Brazil)	2500	3000
Nominal Output Voltage (V)	220/230	220/230
Output Voltage Range (V)	154~288	154~288
Nominal AC Grid Frequency (Hz)	50/60	50/60
AC Grid Frequency Range (Hz)	45~55/57~63	45~55/57~63
Max. Output Current (A)	12	14.3
Max. Output Fault Current (Peak and Duration) (A)(at 5ms)	25	30
Inrush Current (Peak and Duration) (A)(at 2μs)	50	50
Nominal Output Current (A)	11.4/10.9	13.6/13.0
Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)	
Max. Total Harmonic Distortion	<3%	
Maximum Output Overcurrent Protection (A)	31.5	31.5
Efficiency		
Max. Efficiency	97.6%	97.6%
European Efficiency	97.2%	97.2%
Protection		
PV Insulation Resistance Detection	Integrated	
Residual Current Monitoring	Integrated	
Anti-islanding Protection	Integrated	
AC Overcurrent Protection	Integrated	
AC Short Circuit Protection	Integrated	
AC Overvoltage Protection	Integrated	
DC Switch	Integrated	
DC Surge Protection	Type III (Type II Optional)	
AC Surge Protection	Type III	
AFCI	Optional	
Emergency Power Off	Optional	
Remote Shutdown	Optional	
General Data		
Operating Temperature Range (°C)	-25~+60	
Relative Humidity	0~100%	
Max. Operating Altitude (m)	3000	
Cooling Method	Natural Convection	
User Interface	LED, LCD , WLAN+APP	

Communication	WiFi or LAN or RS485(Optional)
Weight (kg)	5.8
Dimension (W×H×D mm)	295×230×113
Noise Emission (dB)	<25
Topology	Non-isolated
Self-consumption at Night (W)	<1
Ingress Protection Rating	IP65
DC Connector	MC4 (2.5-4mm ²)
AC Connector	plug and play connector
Environmental Category	4K4H
Pollution Degree	III
Overvoltage Category	DC II / AC III
Protective Class	I
The Decisive Voltage Class (DVC)	PV: C AC: C Com: A
Active Anti-islanding Method	AFDPF + AQDPF *1
Country of Manufacture (Only for Australia)	China

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



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