



Operating Manual

Inverter Trienergia SunUno Plus Series



Introduction

Thank you for choosing a Trienergia inverter. We are pleased to provide you with first-class products and exceptional service.

This manual includes information for installation, operation, maintenance, trouble shooting and safety. Please follow the instructions of this manual so that we can ensure delivery of our professional guidance and wholehearted service.

Customer-orientation is forever our commitment. We hope this document proves to be of great assistance in your journey for a cleaner and greener world.

Please check for the latest version at www.coenergia.com

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Chapter 1 - Safety Precautions

1.1 Scope of Application

This Operating Manual describes instructions and detailed procedures for installing, operating, maintaining, and troubleshooting of the following TRIENERGIA grid-tied inverters:

SunUno Plus 1K (TR-1000M1), SunUno Plus 1.5K (TR-1500M1)
 SunUno Plus 2K (TR-2000M1), SunUno Plus 2.5K (TR-2500M1),
 SunUno Plus 3K (TR-3000M1), SunUno Plus 3K-M (TR-3000M2),
 SunUno Plus 4K-M (TR-4000M2), SunUno Plus 5K-M (TR-5000M2),
 SunUno Plus 6K-M (TR-6000M2).

Please keep this manual all time available in case of emergency.

1.2 Safety Instructions



DANGER

· DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

· WARNING indicates a hazardous situation which, if not avoided, can result in death or serious injury or moderate injury.



CAUTION

· CAUTION indicates a hazardous condition which, if not avoided, can result in minor or moderate injury.

**NOTICE**

· NOTICE indicates a situation that can result in potential damage, if not avoided.

1.3 Target Group

Only qualified electricians who have read and fully understood all safety regulations contained in this manual can install, maintain and troubleshoot the inverter. Operators must be aware of the live device.

Chapter 2 - Preparation

2.1 Safety Instructions



DANGER

- There is possibility of duing to electrical shock and high voltage.
- Do not touch the operating component of the inverter, or it might result in burning or death.
- To prevent risk of electric shock during installation and maintenance, please make sure that all AC and DC terminals are plugged out.
- Do not touch the surface of the inverter while the housing is wet, or it might lead to electrical shock.
- Do not stay close to the inverter while there are severe weather conditions including storm, lighting, etc.
- Before opening the housing, the TRIENERGIA inverter must be disconnected from the grid and PV generator; you must wait for at least five minutes to let the energy storage capacitors fully be discharged after disconnecting from power source.



WARNING

- The installation, service, recycling and disposal of the inverters must be performed by qualified personnel only in compliance with national and local standards and regulations.
- Any unauthorized actions including modification of product functionality of any form may cause lethal hazard to the operator, third parties, the units or their property. Coenergia S.r.l. are not responsible for the loss and these warranty claims.
- The TRIENERGIA inverter must only be operated with PV generator. Do not connect any other source of energy to the TRIENERGIA inverter.
- Be sure that the PV generator and inverter are well grounded in order to protect safety of people's life and property.



CAUTION











- The PV inverter will become hot during operation. Please do not touch the heat sink or peripheral surface during or shortly after operation.
- Risk of damage due to improper modifications.





NOTICE

- Public utility only.
- The PV inverter is designed to feed AC power directly to the public utility power grid; do not connect AC output of the inverter to any private AC equipment.

2.2 Explanations of Symbols

Symbol	Description
	Dangerous electrical voltage This device is directly connected to public grid, thus all work to the inverter shall only be carried out by qualified personnel.
	DANGER to life due to high electrical voltage! There might be residual currents in inverter because of large capacitors. Wait for 5 MINUTES before you remove the front lid.
	NOTICE, danger! This is directly connected with electricity generators and public grid.
	Danger of hot surface The components inside the inverter will release a lot of heat during operation. Do not touch metal plate housing during operating.
	An error has occurred Please go to Chapter 9 "Troubleshooting" to remedy the error.
	This device SHALL NOT be disposed of as residential waste Please go to Chapter 8 "Recycling and Disposal" for proper treatments.
	Without Transformer This inverter does not use transformer for the isolation function.
	Security Certificate The inverter complies with European product safety instructions.
	CE Mark Equipment with the CE mark fulfills the basic requirements of the Guideline Governing Low-Voltage and Electro-magnetic Compatibility.
	SAA Mark The inverter complies with the requirement of Equipment and Product Safety Act in Australia.

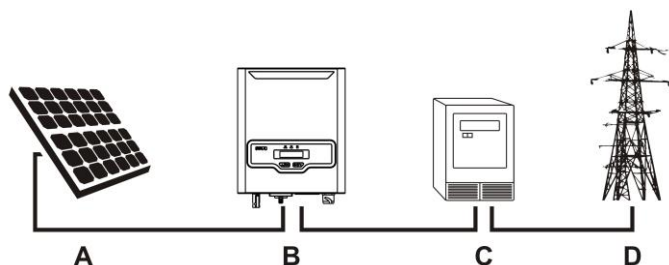
	<p>CQC Mark</p> <p>The inverter complies with the safety instructions from China's Quality Center.</p>
<p>ATTENTION </p> <p><small>Risk of electric shock! Only authorized operations are allowed to do disassembly, modification or maintenance. Any resulting defect or damage (device/person) is not covered by S&U warranty.</small></p>	<p>No unauthorized operations or modifications</p> <p>Any unauthorized operations or modifications are strictly forbidden, if any defect or damage (device/person) occurs, Coenergia S.r.l. shall not take any responsibility for it.</p>

Chapter 3 - Product Information

3.1 Application Scope of Products

Trienergia SunUno Plus series products are grid-tied single phase inverters without transformers, and the inverters are important components of grid-tied solar power systems.

The Trienergia SunUno Plus inverters convert the DC power generated by solar panels into AC power which is in accordance with the requirements of public grid and the AC power can feed the grid, Table 3.1 shows the structural diagram of the typical application system of SunUno Plus inverters.



Name	Description	Remarks
A	Solar panels	Monocrystalline or polycrystalline silicon, and thin-film PV modules with Class II protection and need no functional ground connection
B	Inverters	Inverter Trienergia SunUno Plus 1K/1.5K/2K/2.5K/3K/3K-M2/4K-M2/5K-M2/6K-M2
C	Metering equipment	Standard metering tool for measuring the output electric power of inverters
D	Power grid	TT, TN-C, TN-S, TN-C-S

Table 3.1 Systematic Configuration Diagram

3.2 Specification for Product Model

SunUno Plus (TR)

①

XK (xxxxM1)

②

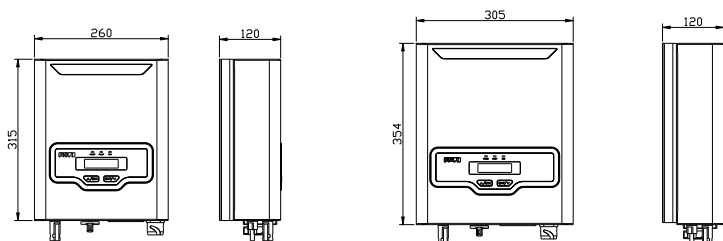
-M (xxxxM2)

③

- ① SunUno Plus (TR-) represents for product name.
- ② XK (xxxxM1) represents the inverter is equipped with one only MPPT.
- ③ -M (xxxxM2) represents the inverter is equipped with two MPPT.

3.3 Overview and Dimensions of products

The dimensions of Trienergia SunUno Plus series products is shown in Figure 3.2.

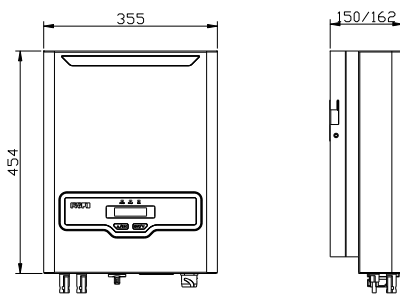


A

B

SunUno Plus 1K/1.5K (TR-xxxxM1)

SunUno Plus 2K/2.5K/3K (TR-xxxxM1)



C

SunUno Plus 3K-M/4K-M/5K-M/6K-M (TR-xxxxM2)

Figure 3.2 Dimensions of Trienergia SunUno Plus series Products

3.4 Datasheet

Trienergia SunUno Plus 1K/1.5K (TR-xxxM1)

Type	SunUno Plus 1K (TR-1000M1)	SunUno Plus 1.5K (TR-1500M1)
Input (DC)		
Max. DC Power [W]	1200	1800
Max. DC Voltage [V]	450	
MPPT Voltage range [V]	60-425	
Nominal DC Voltage [V]	360	
Start Voltage [V]	70	
Min. DC Voltage [V]	50	
Max. DC Input Current [A]	11	
Number of DC Connection Sets per MPPT	1	
Number of MPPT	1	
DC Switch	Integrated	
Output (AC)		
Rated AC Power [W]	1000	1500
Max. AC Power [W]	1100	1650
Rated AC Current [A]	4.3	6.5
Max. AC Current [A]	5.3	7.9
Nominal AC voltage/ range	220V, 230V, 240V/180V-280V	
Grid frequency/ range	50Hz, 60Hz/ ±5Hz	
Power factor [cos ϕ]	>0.99(full load)	
Total Harmonic Distortion [THDi]	< 3%	
Feed in	1L+N+PE	
Efficiency		
Max. Efficiency	97.1%	97.2%
Euro Efficiency [at 360Vdc]	96.6%	96.7%
MPPT Accuracy	>99.5%	

Protection	
Internal Over-voltage Protection	Integrated
DC Insulation Monitoring	Integrated
DCI Monitoring	Integrated
GFCI Monitoring	Integrated
Grid Monitoring	Integrated
AC Short Circuit Current Protection	Integrated
Thermal Protection	Integrated
Anti-island protection monitoring	AFD
Interface	
AC Connection	Plug-in connector
DC Connection	MC4/H4
LCD/LED Display	LCD (16x2 Characters, Backlight) & LED (3 Lights)
Display Language	English
Datalogger & Communication	RS232 (Standard)/WiFi (Optional)
General Data	
Topology	Transformerless
Consumption at Night [W]	<0.2
Consumption at Standby [W]	6
Operating Temperature Range	-25°C to +60°C (45°C to 60°C with derating)
Cooling Method	Natural Convection
Ambient Humidity	0% to 100% Non-condensing
Altitude	Up to 2000m (without derating)
Noise [dBA]	<15
Ingress Protection	IP65 (Indoor & Outdoor Installation)
Mounting	Rear Panel
Dimensions (H*W*D) [mm]	315*260*120
Net Weight [kg]	5.6
Standard Warranty [Year]	5 (Standard)/10/15/20/25 (Optional)
Certificates	IEC62109-1/2, IEC61000-6-2/3, IEC61683, IEC60068-2, IEC62116, IEC61727, PEA/MEA, NRS 097-2-1, UTE-C-15-712-1, VDE0126-1-1/A1, VDE-AR-N 4105, AS4777.2, AS4777.3, C-TICK, CQC NB/T 32004, G83-2, NBR 16149, NBR 16150, TF 3.2.1, C10/11, CEI 0-21

Trienergia SunUno Plus 2K/2.5K/3K (TR-xxxxM1)

Type	SunUno Plus 2K (TR-2000M1)	SunUno Plus 2.5K (TR-2500M1)	SunUno Plus 3K (TR-3000M1)
Input (DC)			
Max. DC Power [W]	2400	3000	3630
Max. DC Voltage [V]	500		550
MPPT Voltage range [V]	60-450		60-500
Nominal DC Voltage [V]	360		
Start Voltage [V]	70		
Min. DC Voltage [V]	50		
Max. DC Input Current [A]	11		
Number of DC Connection Sets per MPPT	1		
Number of MPPT	1		
DC Switch	Integrated		
Output (AC)			
Rated AC Power [W]	2000	2500	3000
Max. AC Power [W]	2200	2750	3300
Rated AC Current [A]	8.7	10.9	13.0
Max. AC Current [A]	10.6	13.3	15.9
Nominal AC voltage/ range	220V, 230V, 240V/180V-280V		
Grid frequency/ range	50Hz, 60Hz/ ±5Hz		
Power factor [cos ϕ]	>0.99(full load)		
Total Harmonic Distortion [THDi]	< 3%		
Feed in	1L+N+PE		
Efficiency			
Max. Efficiency	97.4%	97.5%	97.6%
Euro Efficiency [at 360Vdc]	96.9%	97.0%	97.1%
MPPT Accuracy	>99.5%		

Protection			
Internal Over-voltage Protection	Integrated		
DC Insulation Monitoring	Integrated		
DCI Monitoring	Integrated		
GFCI Monitoring	Integrated		
Grid Monitoring	Integrated		
AC Short Circuit Current Protection	Integrated		
Thermal Protection	Integrated		
Anti-island protection monitoring	AFD		
Interface			
AC Connection	Plug-in connector		
DC Connection	MC4/H4		
LCD/LED Display	LCD (16x2 Characters, Backlight) & LED (3 Lights)		
Display Language	English		
Datalogger & Communication	RS232 (Standard)/WiFi (Optional)		
General Data			
Topology	Transformerless		
Consumption at Night [W]	<0.2		
Consumption at Standby [W]	6		
Operating Temperature Range	-25°C to +60°C (45°C to 60°C with derating)		
Cooling Method	Natural Convection		
Ambient Humidity	0% to 100% Non-condensing		
Altitude	Up to 2000m (without derating)		
Noise [dBA]	<25		
Ingress Protection	IP65 (Indoor & Outdoor Installation)		
Mounting	Rear Panel		
Dimensions (H*W*D) [mm]	354*305*120		
Net Weight [kg]	7.8	8.3	8.4
Standard Warranty [Year]	5 (Standard)/10/15/20/25 (Optional)		
Certificates	IEC62109-1/2, IEC61000-6-2/3, IEC61683, IEC60068-2, IEC62116, IEC61727, PEA/MEA, NRS 097-2-1, UTE-C-15-712-1, VDE0126-1-1/A1, VDE-AR-N 4105, AS4777.2, AS4777.3, C-TICK, CQC NB/T 32004, G83-2, NBR 16149, NBR 16150, TF 3.2.1, C10/11, CEI 0-21		

Trienergia SunUno Plus 3K-M/4K-M/5K-M/6K-M (TR-xxxxM2)

Type	SunUno Plus 3K-M (TR-3000M2)	SunUno Plus 4K-M (TR-4000M2)	SunUno Plus 5K-M (TR-5000M2)	SunUno Plus 6K-M (TR-6000M2)
Input (DC)				
Max. DC Power [W]	3630	4840	6050	7200
Max. DC Voltage [V]	600			
MPPT Voltage range [V]	90-550			
Nominal DC Voltage [V]	360			
Start Voltage [V]	100			
Min. DC Voltage [V]	80			
Max. DC Input Current [A]	11/11			
Number of DC Connection Sets per MPPT	1/1			
Number of MPPT	2			
DC Switch	Integrated			
Output (AC)				
Rated AC Power [W]	3000	3680 ¹ /4000	4600 ² /5000	6000
Max. AC Power [VA]	3300	3680/4400	4600/5500	6000
Rated AC Current [A]	13.0	16.0/17.4	20.0/21.7	26.1
Max. AC Current [A]	15.9	16.0/21.0	22.2/26.7	28.7
Nominal AC voltage/ range	220V, 230V, 240V/180V-280V			
Grid frequency/ range	50Hz, 60Hz/±5Hz			
Power factor [cosφ]	0.8 leading~0.8 lagging			
Total Harmonic Distortion [THDi]	< 3%			
Feed in	1L+N+PE			
Efficiency				
Max. Efficiency	97.6%	97.8%	97.9%	97.9%
Euro Efficiency [at 360Vdc]	97.1%	97.4%	97.5%	97.5%
MPPT Accuracy	>99.5%			
Protection				
Internal Over-voltage Protection	Integrated			
DC Insulation Monitoring	Integrated			
DCI Monitoring	Integrated			
GFCI Monitoring	Integrated			
Grid Monitoring	Integrated			
AC Short Circuit Current Protection	Integrated			

Thermal Protection	Integrated	
Anti-island protection monitoring	AFD	
Interface		
AC Connection	Plug-in connector	
DC Connection	MC4/H4	
LCD/LED Display	LCD (16x2 Characters, Backlight) & LED (3 Lights)	
Display Language	English	
Datalogger & Communication	RS232 (Standard)/WiFi (Optional)	
General Data		
Topology	Transformerless	
Consumption at Night [W]	<0.2	
Consumption at Standby [W]	6	
Operating Temperature Range	-25°C to +60°C (45°C to 60°C with derating)	
Cooling Method	Natural Convection	
Ambient Humidity	0% to 98% Non-condensing	
Altitude	Up to 2000m (without derating)	
Noise [dBA]	<25	
Ingress Protection	IP65 (Indoor & Outdoor Installation)	
Mounting	Rear Panel	
Dimensions (H*W*D) [mm]	454*355*150	454*355*162
Net Weight [kg]	14.8	15.8
Standard Warranty [Year]	5 (Standard) /10/15/20/25 (Optional)	
Certificates	IEC62109-1/2, IEC61000-6-2/3, IEC61683, IEC60068-2, IEC62116, IEC61727, PEA/MEA, NRS 097-2-1, UTE-C-15-712-1, VDE0126-1-1/A1, VDE-AR-N 4105, AS4777.2, AS4777.3, C-TICK, CQC NB/T 32004, G83-2, G59-3, NBR 16149, NBR 16150, TF 3.2.1, C10/11, CEI 0-21	

Remark:

1. Meet the grid standard that AC current per phase not exceeding 16A.
2. Meet the VDE - ARN - N 4105 that biggest apparent power of single-phase is 4600 VA.

Chapter 4 - Instructions for installation

4.1 Safety Instructions



DANGER

- Dangerous to life due to potential fire or electricity shock.
- Do not install the inverter near any inflammable or explosive items.
- This inverter will be directly connected with HIGH VOLTAGE power generation device; the installation must be performed by qualified personnel only in compliance with national and local standards and regulations.



NOTICE

- This equipment is suitable for the pollution degree II.
- Inappropriate or unharmonized installation environment may jeopardize the life span of the inverter.
- Installation directly exposed under intensive sunlight is not recommended.
- The installation site must be well ventilated.

4.2 Pre-installation Check

4.2.1 Check the Package

Although TRIENERGIA's inverters have surpassed stringent testing and are checked before they leave the factory, it is uncertain that the inverters may suffer damages during transportation. Please check the package for any obvious signs of damage, and if such evidence is present, do not open the package and contact your dealer as soon as possible

4.2.2 Check the Assembly Parts

Please refer to the Packing List inside the package container.

4.3 Installation and Placement Method

4.3.1 Mounting Method

Please mount the inverter correctly as shown in Figure 4.1 below.

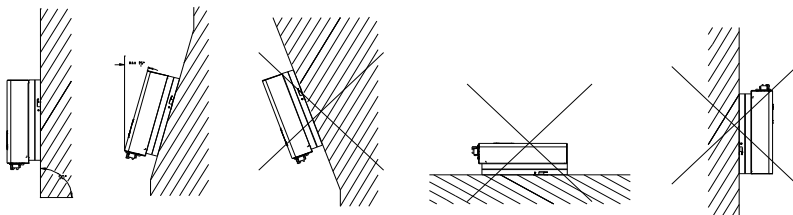


Figure 4.1 Mounting Method

(1)The equipment employs natural convection cooling, and it can be installed indoor or outdoor.

(2)Please install the equipment under the guidance of Figure4.1. Vertical installation on floor level is recommended. Mount vertically or tilted backwards by max. 15°. Never install the inverter tilted forwards, sideways, horizontally or upside down.

(3) Install the inverter at eye level for convenience when checking the LCD display and possible maintenance activities.

(4)When mounting the inverter, please consider that disassembly for service work may be required.

4.3.2 Installation Position

Do not expose the inverter to direct solar irradiation as this could cause power derating due to overheating. The ambient temperature should be between -25°C ~+60°C (-13° F ~140° F) to ensure optimum operation. Choose locations with sufficient air exchange. Ensure additional ventilation, if necessary.

To make sure the installation spot is suitably ventilated, if multiple TRIENERGIA grid-tied solar inverters are installed same area, the following safety clearance in Figure 4.2 Shall be followed for proper ventilation conditions.

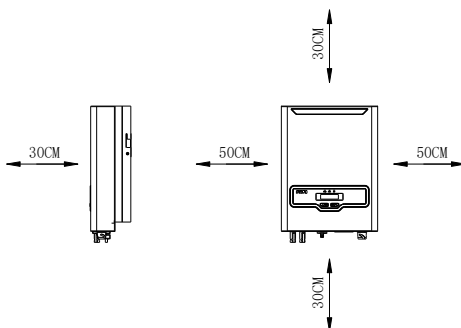


Figure 4.2 Minimum Clearance

4.4 Mounting Procedure

4.4.1 Mark the Positions of the Drill Holes of the Rear Panel

The mounting position should be marked as shown in Figure 4.3, Figure 4.4 & Figure 4.5.

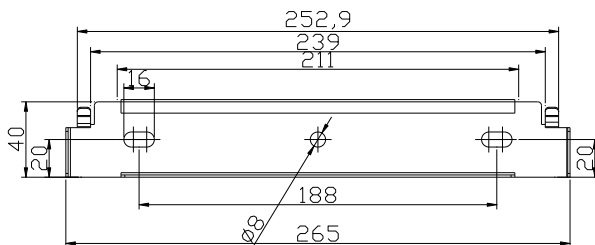


Figure 4.3 Dimensions of rear panel of SunUno Plus 1K/1.5K (TR-xxxxM1)

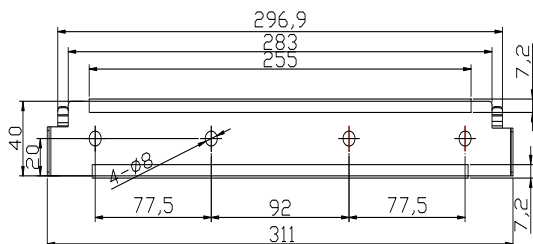


Figure 4.4 Dimensions of rear panel of SunUno Plus 2K/2.5K/3K (TR-xxxxM1)

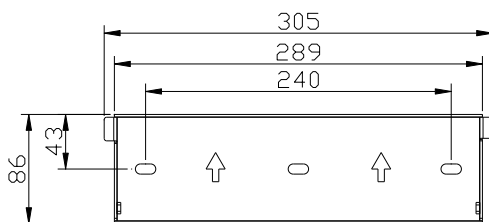


Figure 4.5 Dimensions of rear panel of SunUno Plus 3K-M/4K-M/5K-M/6K-M (TR-xxxxM2)

4.4.2 Drill Holes and Place the Expansion Tubes

According to the guides, drill 3 holes in the wall (in conformity with position marked in Figure 4.6, 4.7, 4.8), and then place expansion tubes in the holes using a rubber mallet.

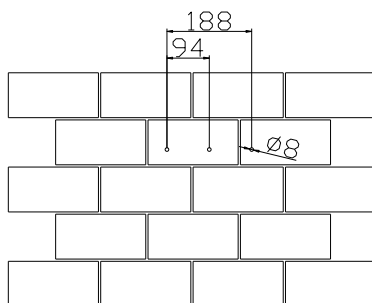


Figure 4.6 Drill holes' dimensions of SunUno Plus 1K/1.5K (TR-xxxxM1)

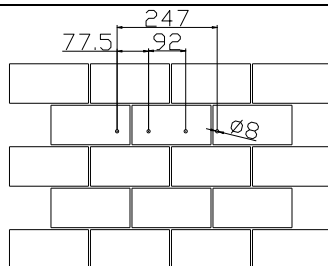


Figure 4.7 Drill holes' dimensions of SunUno Plus 2K/2.5K/3K (TR-xxxxM1)

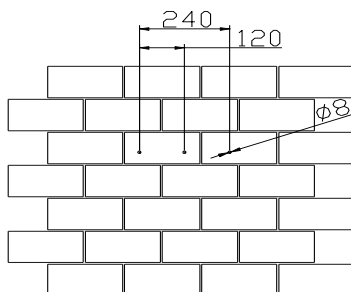


Figure 4.8 Drill holes' dimensions of SunUno Plus 3K-M/4K-M/5K-M/6K-M (TR-xxxxM2)

4.4.3 Mount the Screws and the Rear Panel

The panels should be mounted in the mounting position by screws as shown in Figure 4.9, Figure 4.10 and Figure 4.11.

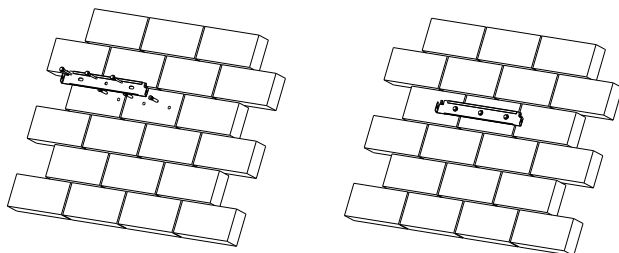


Figure 4.9 Mount the Rear Panel of SunUno Plus 1K/1.5K (TR-xxxxM1)

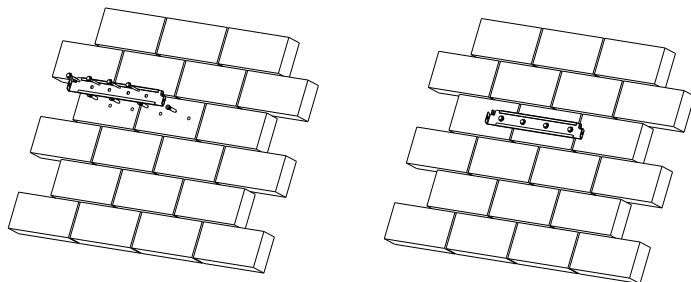


Figure 4.10 Mount the Rear Panel of SunUno Plus 2K/2.5K/3K (TR-xxxxM1)

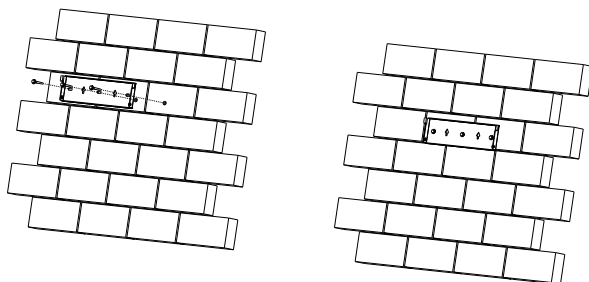


Figure 4.11 Mount the Rear Panel of SunUno Plus 3K-M/4K-M/5K-M/6K-M (TR-xxxxM2)

4.4.4 Mount the Inverter

Carefully mount the inverter to the rear panel as shown in Figure 4.12, Figure 4.13, Figure 4.14. Make sure that the rear part of the equipment is closely mounted to the rear panel.

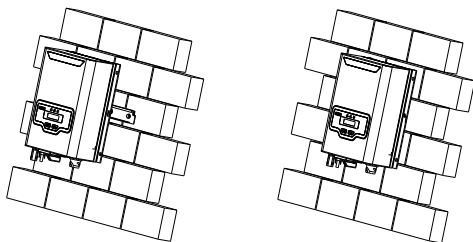


Figure 4.12 Mount SunUno Plus 1K/1.5K (TR-xxxxM1) inverter

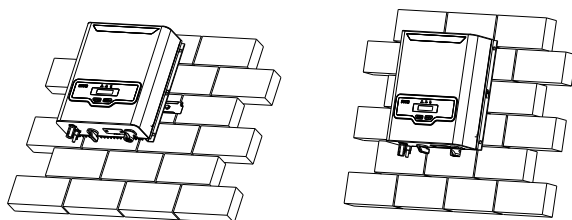


Figure 4.13 Mount SunUno Plus 2K/2.5K/3K (TR-xxxxM1) inverter

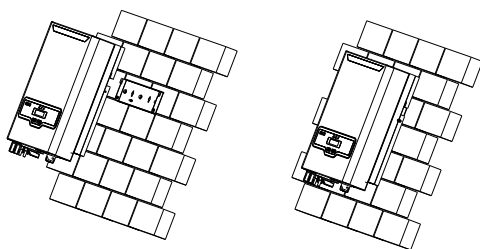


Figure 4.14 Mount SunUno Plus 3K-M/4K-M/5K-M/6K-M (TR-xxxxM2) inverter

Chapter 5 - Electrical Connection

5.1 Safety Instruction for live line

Electrical connection must only be operated on by professional technicians. Please keep in mind that the inverter is a bi-power supply equipment. Before connection, necessary protective equipment must be employed by technicians including insulating gloves, insulating shoes and safety helmet.



DANGER

- Dangerous to life due to potential fire or electricity shock.
- When power-on, the equipment should be in conformity with national rules and regulations.
- The direct connection between the converter and high voltage power systems must be operated by qualified technicians in accordance with local and national power grid standards and regulations.



WARNING

- When the photovoltaic array is exposed to light, it supplies a d.c voltage to the inverter.



NOTICE

- Electrical connection should be in conformity with proper precautions, such as precautions for cross-sectional area of conductors, fuse and ground protection.
- The overvoltage category on DC input port is II, and that on AC output port is III.

5.2 Specifications for Electrical Interface

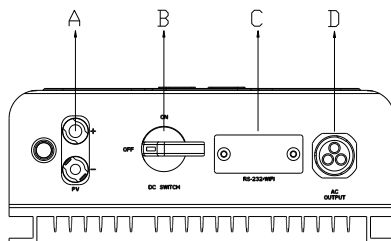


Figure 5.1 Electrical Interface of SunUno Plus 1K/1.5K/2K/2.5K/3K (TR-xxxxM1)

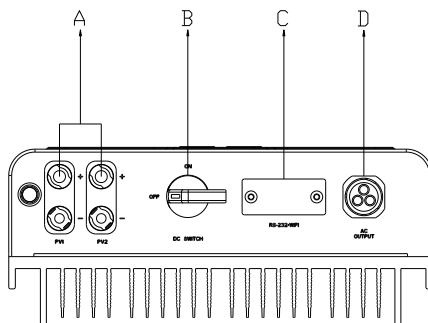


Figure5.2 Electrical Interface of SunUno Plus 3K-M/4K-M/5K-M/6K-M (TR-xxxxM2)

Code	Name
A	DC Input
B	DC Switch (optional)
C	RS232 /Wi-Fi Port
D	AC Plug Terminal

Table 5.1 Specifications for Interface

5.3 AC Side Connection

Cross-sectional Area of Cables (mm ²)		Outside Diameter of the Cables (mm)
Scope	Recommended Value	
4.0-6.0	4.0	4.2~5.3

Table 5.2 Recommended Specifications of AC Cables

5.3.1 Feed the AC cable through the AC waterproof hole.

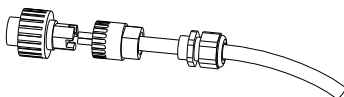


Figure 5.3 Thread the cables

5.3.2 Connect the cables according to connection marks of L, N and PE.

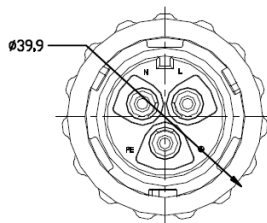


Figure 5.4 Connect the Cables

5.3.3 Secure all parts of the AC connector tightly.

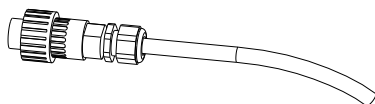


Figure 5.5 Screw the Connector

5.3.4 Connect the AC connector to the equipment securely, ensuring the pins are connected directly. Then the connection of AC cable is complete.

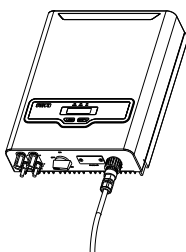


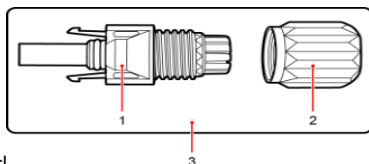
Figure 5.6 Connect the Inverter

5.4 DC Side Connection

Cross-sectional Area of Cables (mm ²)		Outside Diameter of the Cables (mm)
Scope	Recommended Value	
4.0-6.0	4.0	4.2~5.3

Table 5.3 Recommended Specifications of DC Cables

DC connector is made up of the positive connector and the negative connector

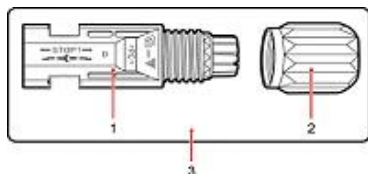


1. Insulated Encl

3

2 Positive Connector

Figure 5.7 Positive Connector



1. Insulated Enclosure

2. Lock Screw

3. Negative Connector

Figure 5.8 Negative Connector

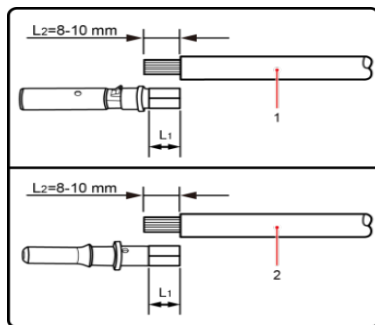


NOTICE

- Please place the connector separately after unpacking in order to avoid confusion for connection of cables.
- Please connect the positive connector to the positive side of the solar panels, and connect the negative connector to the negative side of the solar side. Be sure to connect them in right position.

Connecting Procedures:

- (1) Tighten the lock screws on positive and negative connector.
- (2) Use specified strip tool to strip the insulated enclosure of the positive and negative cables with appropriate length.

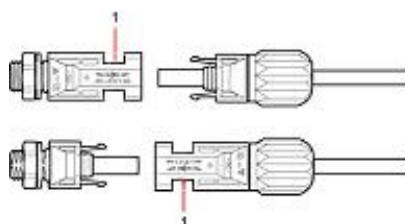


1. Positive Cable

2. Negative Cable

Figure 5.9 Connecting Cables

- (3) Feed the positive and negative cables into corresponding lock screws.
- (4) Put the metal positive and negative terminals into positive cable and negative cable whose insulated enclosure has been stripped, and crimp them tightly with a wire crimper. Make sure that the withdrawal force of the pressed cable is bigger than 400N.
- (5) Plug the pressed positive and negative cables into relevant insulated enclosure, a “click” should be heard or felt when the contact cable assembly is seated correctly.
- (6) Fasten the lock screws on positive and negative connectors into respondent insulated enclosure and make them tight.
- (7) Connect the positive and negative connectors into positive and negative DC input terminals of the inverter, a “click” should be heard or felt when the contact cable assembly is seated correctly.



1. Connection Port

Figure 5.10 Connect the Inverter


NOTICE

· Before inserting the connector into the DC input terminal of the inverter, please make sure that the DC switch of the inverter is open (OFF).

5.5 Communication Connection

Trienergia SunUno Plus 1K/1.5K/ (TR-xxxxM1), SunUno Plus 2K/2.5K/3K (TR-xxxxM1) and SunUno Plus 3K-M/4K-M/5K-M/6K-M (TR-xxxxM2) are equipped with a RS232 interface.

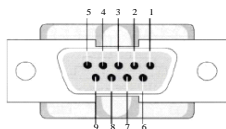


Figure 5.11 Pins of Nine Serial Port Cable

Pin No.	Name
1	DCD (Data Carrier Detec)
2	RxD (Received Data)
3	TxD (Transmitted Ready)
4	DTR (Data Terminal)
5	GND (Signal Ground)
6	DSR (Data Send Ready)
7	RTS (Request To Send)
8	CTS (Clear To Send)
9	RI (Ring Indicator)

Table 5.5 Instruction of Nine Serial Port Pins

(1) RS232 can externally connect with Wi-Fi module. For more details, please refer to the operating manual of Wi-Fi module.

(2) RS232 can externally connect with Wi-Fi module. For more details, please refer to the operating manual of Ethernet module.

(3) RS232 can externally connect with Wi-Fi module. For more details, please refer to the operating manual of GPRS module.

Chapter 6 - Debugging Instructions

6.1 Introduction of display Interface

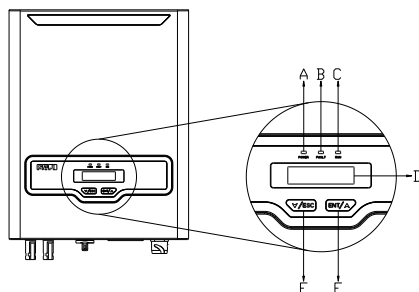


Figure 6.1 display Interface

Object	Description
A	Yellow LED light = Power - After the device is powered on, the yellow LED light will go on
B	Red LED light = Error - The red LED light will go on when an Error occurs, it will go off automatically after Errors are resolved
C	Green LED light = operation - The green LED light will go on when the equipment is in normal operation.
D	The LCD shows the operational data, recorded information and parameters
E	▼ Exit button
F	▲ Enter button

Table 6.1 Instructions of the Interface

The inverter provides two buttons for inquiry of operational information and parameters, these two buttons can be used with single or multiple pressures.

Name of the button	Operation	Description
▼ / ESC	Press time shorter than 1 second	Move down the cursor to enter into the sub-menu, or reduce the setting value.
	Press time longer than 1 second	Return to the previous menu or cancel the present order.
▲ / ENT	Press time shorter than 1 second	Move up the cursor to enter into the superior menu, or increase the setting value.
	Press time longer than 1 second	Enter into the sub-menu, or confirm order.

Table 6.2 Instructions for buttons

6.2 First Run Setup

6.2.1 Set the Country

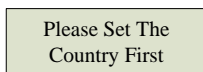


Figure 6.2 Set The Country

Please press the "ENT" button, LCD will show the countries for option. Users can press "▼ " or "▲" to move the cursor">"to select the correct country and press "ENT" button to confirm the selection.

Note: The configuration of the country of usage must be set before inverter starts to run for its first time, otherwise the inverter will not operate correctly. The User can enter the menu of "Inverter-Info->Grid Compliance" to check whether the setting is correct.

If users can not locate the corresponding country, please abort the setting and contact the after sales for confirmation.

6.2.2 State

If the country has been set the LCD shows the machine type when the inverter is started up, then it automatically displays the inverter operation status:

Normal, Wait, Fault, Update.

Data name	Explanation
Normal	The inverter in normal (function) operation
Wait	The inverter in stand-by state
Fault	A fault occurs during operation
Update	The state of updating firmware

Turn on the AC switch, the LCD begins to count seconds backward, after this, the inverter begins to connect the grid.

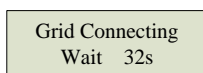
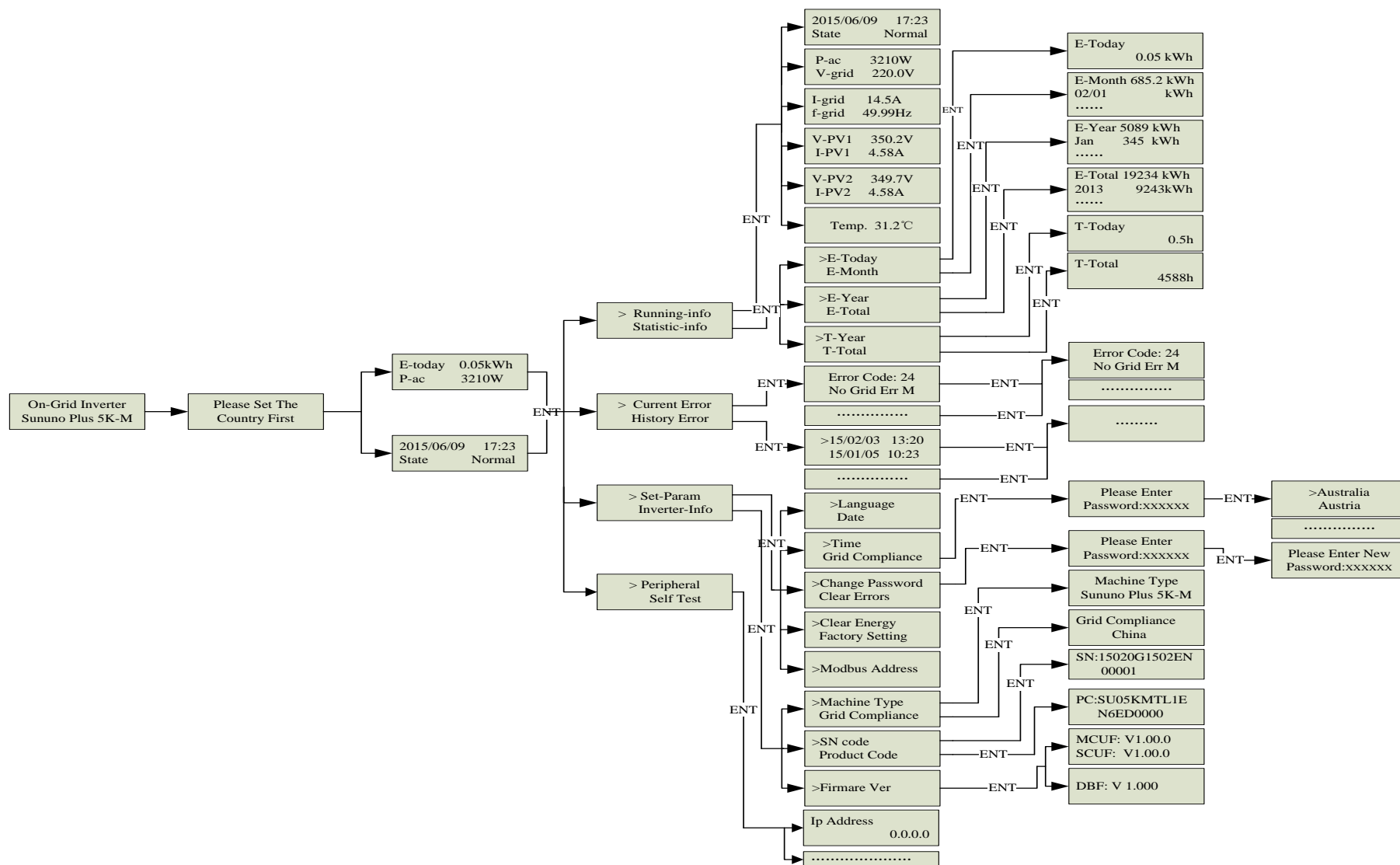
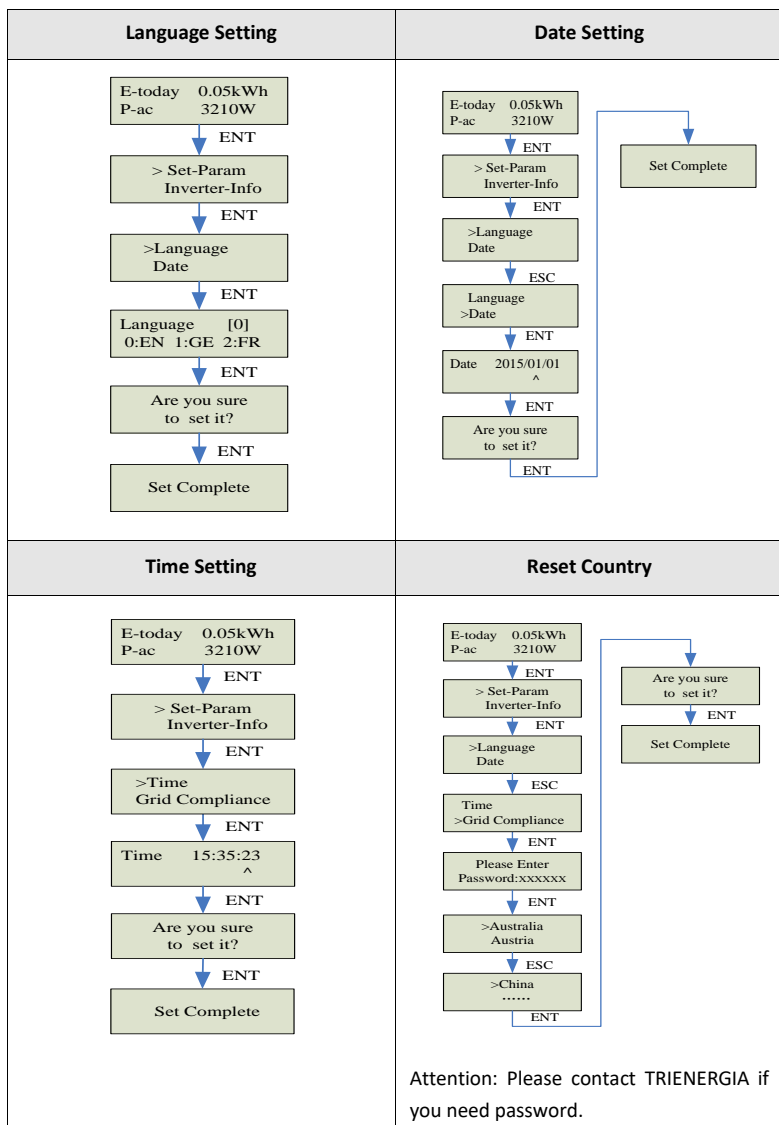


Figure 6.3 Count down Seconds

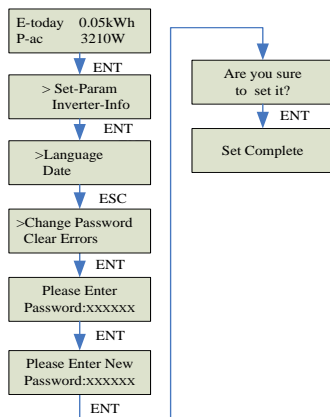
6.2.3 LCD menu is shown as below



6.2.4 Settings of General Parameters of the Inverter

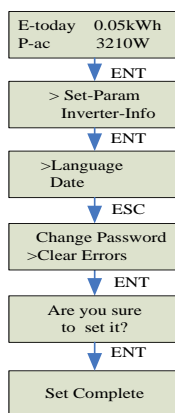


Reset Password

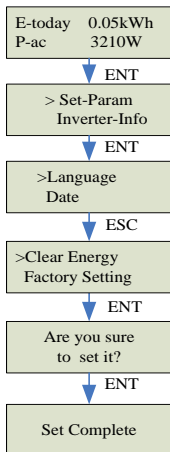


Attention: Please contact TRIENERGIA if you need password.

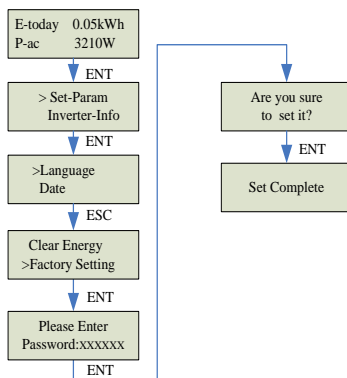
Clear Fault Records



Clear Energy

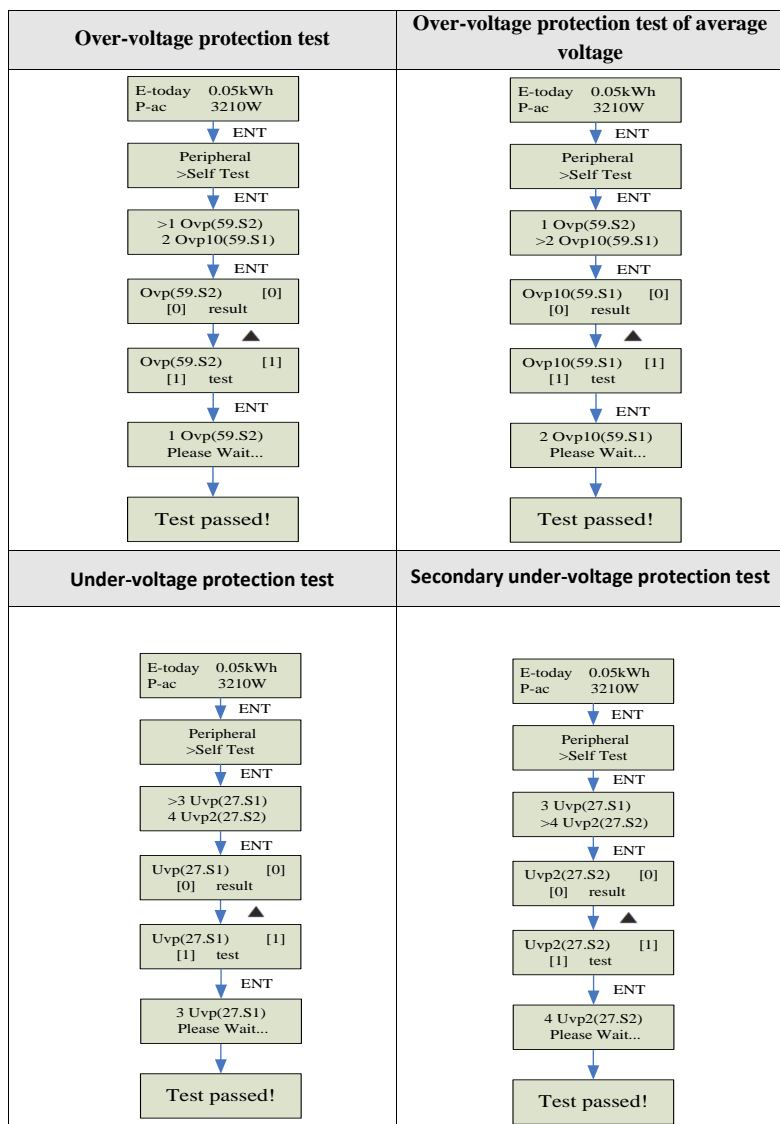


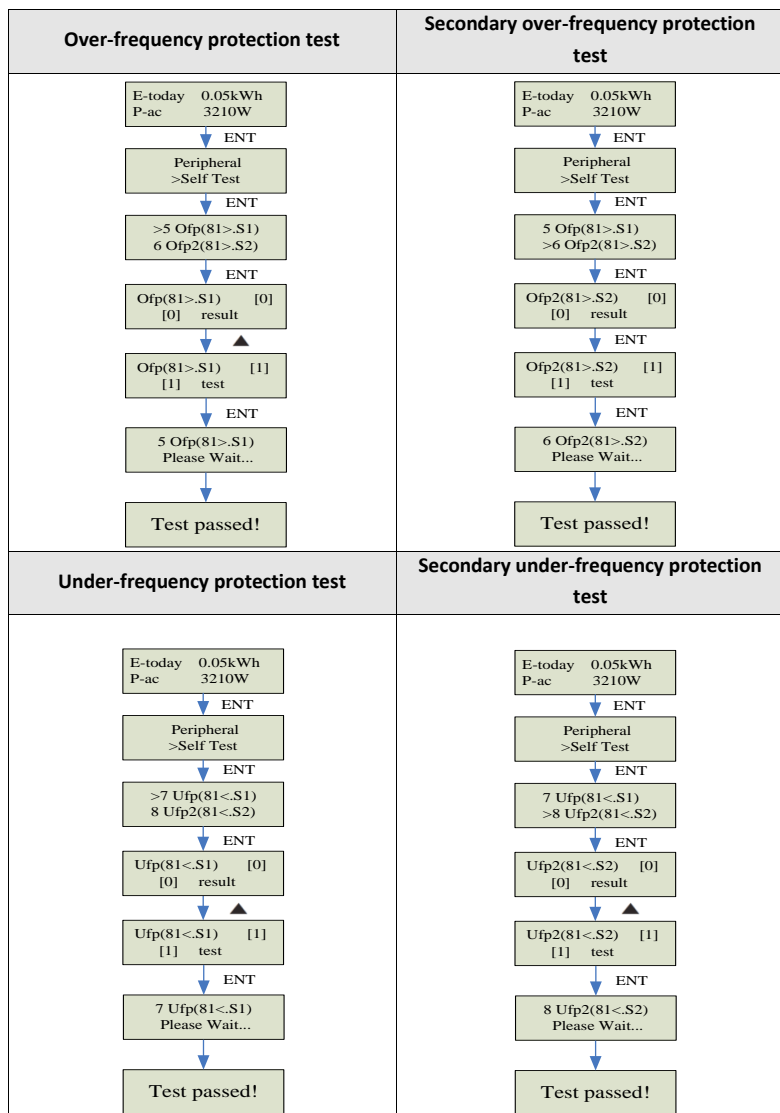
Factory Setting Reset

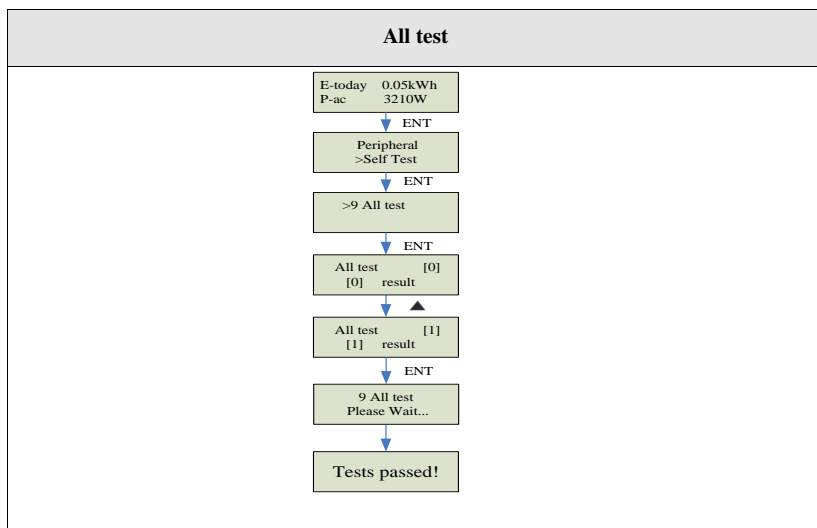


Attention: Please contact TRIENERGIA if you need password.

6.2.5 Self test of the Inverter



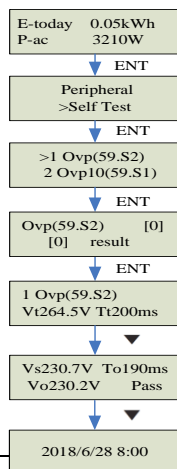




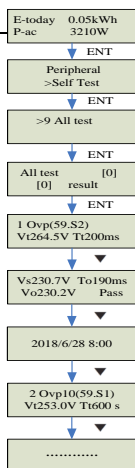
Note:

- 1.This setting only appears when the grid compliance selects Italy.
- 2.This setting shall be operated when the inverter is under normal grid-connected state.
- 3.“All test” is starting from the item 1 to item 8 of the autotest.
- 4.The self test information could be reviewed after successful setting.Self test from item 1 to item 8 could only show the test results of each item respectively. By “All test”, all test results from item 1 to item 8 could be checked all at once. as example:

over-voltage protection test



All test



6.3 Monitoring Operation

The equipment is equipped with a RS232 interface, and the RS232 interface can be connected to Wi-Fi module, Ethernet module, GPRS module which can be used in the monitoring of the operation status.

① The equipment can be connected to local internet via a Wi-Fi module and the Wi-Fi web server which is embedded in the machine; following this, the operational status of the inverter can be monitored.

② By connecting the Internet through Wi-Fi module and uploading the inverter data to the server, users can monitor the operational information of the inverter by web version web portal or mobile remotely.

③ The equipment can be connected to local internet via Ethernet module and the Wi-Fi web server which is embedded in the machine; following this, the operational status of the inverter can be monitored.

④ By connecting the Internet through Ethernet module and uploading the inverter data to the server, users can monitor the operational information of the inverter by web version web portal or mobile APP remotely.

⑤ By connecting the Internet through GPRS module and uploading inverter data to the server, users can monitor the operational information of the inverter by web version web portal or mobile APP remotely.

Chapter 7 - Fault Code and Troubleshooting

Error Code	Fault Information	Explanation
1	Relay Error M	Relay Error Master
2	Eeprom Error M	Storer Error Master
3	Temp. High Err M	High Temperature Master
4	Temp. Low Err M	Low Temperature Master
5	Lost Com. M<->S M	Lost Interior Communication Master
6	GFCI Dev Err M	GFCI Devices Error Master
7	DCI Dev Err M	DCI Devices Error Master
8	Cur Sensor Err M	Current Sensor Master
9	Grid Volt High M	Grid Voltage High Master
10	Grid Volt Low M	Grid Voltage Low Master
15	Volt 10m High M	Average voltage of 10 minutes High Master
18	Freq High M	Frequency High Master
19	Freq Low M	Frequency LowMaster
24	No Grid Err M	Grid Lost Error Master
27	GFCI Error M	GFCI Error Master
28	DCI Error M	DCI Error Master
31	ISO Error M	Insulation Error Master
33	Bus Volt High M	Bus Voltage High Master
35	Current High M	Current High Master
38	HW Bus Volt High M	Bus Voltage High Of Hardware Master
39	HW PV1 Curr High M	PV1 Current High of Hardware Master
40	HW PV2 Curr High M	PV2 Current High of Hardware Master
41	HW Curr High M	Current High of Hardware of Grid Master
50	Lost Com. M<->S S	Lost interior communication Slave
51	Volt Consis Err S	Data Consistency of Voltage Error Slave
54	Freq Consis Err S	Data Consistency of Frequency Error Slave

57	GFCI Consis Err S	Data Consistency of GFCI Slave
61	Voltage High S	Grid Voltage High Slave
62	Voltage Low S	Grid Voltage Low Slave
67	Freq High S	Frequency High Slave
68	Freq Low S	Frequency Low Slave
73	No Grid Err S	No Grid Error Slave
76	PV1 Volt High M	PV1 Voltage High Master
77	PV2 Volt High M	PV2 Voltage High Master
81	Lost Com.D<->C M	Lost Communication Between Display board & Control board Master
85	DRM0Error M	DRM0 Error Master

Table 7.1 Error Code

Fault Information	Troubleshooting
Relay Error	If this error occurs frequently, please contact your distributor or phone TRIENERGIA.
Storer Error	If this error occurs frequently, please contact your distributor or phone TRIENERGIA.
Temperature High Error	Check whether the radiator is blocked, whether the inverter is in too high or too low temperature, if the above mentioned are in normal, please contact your distributor or phone TRIENERGIA.
GFCI Device Error	If this error occurs frequently, please contact your distributor or phone TRIENERGIA.
DCI Device Error	If this error occurs frequently, please contact your distributor or phone TRIENERGIA.
Current Sensor Error	If this error occurs frequently, please contact your distributor or phone TRIENERGIA.
AC Voltage Error	<ul style="list-style-type: none"> -Check the volt of the grid -Check the connection between the inverter and the grid. -Check the settings of the on-grid standards of the inverter. -If the volt of the grid is higher than the volt regulated by local grid, please inquire the local grid workers whether they can adjust the volt at the feed point or change the value of the regulated volt. -If the volt of the grid is in regulated range as allowed and LCD

	still in this error, please contact your distributor or phone TRIENERGIA.
Frequency Error	Check the set of country and check the frequency of the local grid, if the above mentioned are in normal, please contact your distributor or phone TRIENERGIA.
No Grid Error	Check the connection status between the AC side of the inverter and the grid, if the above mentioned are in normal, please contact your distributor or phone TRIENERGIA.
GFCI Error	Check the insulation resistance of the positive side and negative side of the solar panel; check whether the inverter is in wet environment; check the grounding of the inverter. If the above mentioned are in normal, please contact your distributor or phone TRIENERGIA.
DCI Error	If this error exists always, please contact your distributor or phone TRIENERGIA.
ISO Error	Check the insulation resistance of the positive side and negative side of the solar panel; check whether the inverter is in wet environment; check whether the grounding of the inverter is loose or not. If the above mentioned are in normal, please contact your distributor or phone TRIENERGIA.
Current High	Check the connection status between the inverter and the grid and test whether the volt of the grid is stable or not, if the above mentioned are in normal, please contact your distributor or phone TRIENERGIA.
Bus Voltage High	Check the settings of the solar panel. TRIENERGIA designer can help you. If the above mentioned are in normal, please contact your distributor or phone TRIENERGIA.
PV Current High	If this error exists always, please contact your distributor or phone TRIENERGIA.
PV Voltage Fault	Check the settings of the solar panel. TRIENERGIA designer can help you. If the above mentioned are in normal, please contact your distributor or phone TRIENERGIA.
Lost Communication	Check the connection of communication cables between control board and display board. If the above mentioned are in normal, please contact your distributor or phone TRIENERGIA.

Table 7.2 Troubleshooting

Chapter 8 - Recycling and Disposal

This device should not be disposed as residential waste. For an Inverter that has reached the end of its life and is not required you must find an approved collection and recycling facility in your area.

Chapter 9 - Guarantee Service

Please refer to the warranty card.

Chapter 10 - Contact TRIENERGIA

Trienergia

Web: www.trienergia.it

Email: support@trienergia.it

Tel: +39 0376 598512

Coenergia S.r.l.

Strada Pavese, 13

46023 Bondeno di Gonzaga (MN)

Italy

Web: www.coenergia.com

Tel: +39 0376 598512

TRIENERGIA Inverter - Warranty Policy

Standard Warranty Period

Coenergia S.r.l. guarantees a standard warranty period of 60 months (5 years) for the Trienergia SunUno Plus Series inverters, starting from the date of purchased invoice marked.

Extension of Warranty

The purchaser of Trienergia inverters (SunUno Plus Series) should extend the warranty period within 18 months from the date of settlement or 30 months from the date of shipment from Coenergia by providing the serial number of the unit and purchased invoice (whichever is shorter). You can purchase the warranty extension for 10 years, 15 years, 20 years or 25 years but do not apply the extension beyond the specified date, or else your application will be unacceptable. Please refer to the Warranty Extension Order Form for more details.

Once the purchase of the warranty extension goes into effect, Coenergia S.r.l. will send the warranty extension certificate to the customer for confirming the extended warranty period.

Warranty Conditions

If your inverter gets fault and requires troubleshooting, please contact your distributor or dealer directly. Alternatively, feedback briefly to Coenergia S.r.l. service hotline for logging and send your warranty card to our service department by fax/email to process the warranty claim.

To claim the warranty under the warranty policy of Coenergia S.r.l., you need to supply us with the following information and documentation regarding the faulty inverter:

1. Product Model No.(e.g. SunUno Plus 3K [TR-3000M1]) and serial number (e.g.13020G1141EN00014).
2. Copy of the invoice and warranty certificate of the inverter.
3. Copy of the installation report and installation date.
4. Error message on LCD screen (if available) or any information which would be helpful to determine the defect
5. Detailed information about the entire system (modules, circuits, etc.).
6. Documentation of previous claims/exchanges (if applicable).

After receiving above information, Coenergia S.r.l. will decide how to proceed the service

- 1.Repaired by Coenergia S.r.l. factory, or Coenergia S.r.l. authorized service center overhaul.
- 2.Repaired on-site by Coenergia S.r.l. Service Center.
3. Offer a replacement device of equivalent value according to model and age.

In case of replacement of the inverter, Coenergia S.r.l. will immediately send a replacement unit. The faulty inverter must be duly prepared and stored in its original packaging and will be returned by Coenergia S.r.l.

In case the inverter needs to be replaced, the remaining warranty period will be assigned to the replacement inverter, otherwise the warranty of the original unit will continue normally. If, after replacement, the remaining warranty period is less than 1 year, it will automatically be extended to 1 year for the replacement unit.

The warranty only covers the inverter. The warranty excludes all costs such as installation and uninstallation costs, travels, board and lodging or any losses due to plant shutdown.

Service after warranty expiration

If the inverters for maintenance are out of warranty, Coenergia S.r.l. charges an on-site service fee, parts, labor cost and logistic fee to end-user. Detailed standard refers to the listed table.

Item	Return Factory Maintenance	On-site Maintenance
Without parts replacement	Labor + Logistic fee (to & from Coenergia)	Labor + On-site attendance fee
With parts replacement	Labor + Parts + logistic fee (to & from Coenergia)	Labor + On-site attendance fee + Parts

■ On-site attendance fee: Cost of travel and time for the technician in attending on-site.

■ Parts: Cost of replacement parts (including any shipping/admin fee that may apply).

■ Labor: Labor time fee charged for the technician, who is repairing, maintaining, installing (hardware or software) and debugging the faulty product.

■ Logistic fee: Cost of delivery, tariff and other derived expense when defective products are sent from user to Coenergia S.r.l. or/and repaired products are sent from Coenergia S.r.l. to user.

Exclusion of Liability

Any defect caused by the following circumstances will not be covered by the manufacturer's warranty (the Dealers or Distributors are responsible and authorized by Coenergia for the following investigation):

- ◆ "Warranty Card" not being sent back to Distributor/Dealer or Coenergia S.r.l.;
- ◆ Product modified, parts replaced or attempt to maintain;
- ◆ Changes, or attempted repairs and erasing of series number or seals by non Coenergia S.r.l. technician;
- ◆ Incorrect installation or commissioning;
- ◆ Failure to comply with the safety regulations (VDE standards, etc.);
- ◆ The inverter has been improperly stored and damaged while being stored by the Dealer or the end user;
- ◆ Transport damage (including scratch caused by movement inside packaging during shipping). A Claim should be made directly to shipping company/insurance Company as soon as the container/packaging is unloaded and such damage is identified;
- ◆ Failure to follow any / all of the user manual, the installation guide and the maintenance regulations;
- ◆ Improper use or misuse of the inverter;
- ◆ Insufficient ventilation of the inverter;
- ◆ Influence of foreign objects and force majeure (lightning, grid overvoltage, severe weather, fire, etc.)
- ◆ For further information on Coenergia S.r.l. warranty regulation and reliability, please visit our website: www.coenergia.com

Warranty Card

To request the guarantee, fill the forms below and send this page to Coenergia S.r.l.

End User informations

Name and Surname or Company name:
Address:
ZIP Code:
Location and City:
Tel e Fax:
E-mail:

Installer and PV System informations

Company Name:	
Address:	
ZIP Code:	
Location and City:	
Tel e Fax:	
E-mail:	
Type of device:	
Serial Number.(S/N):	
Invoice Number and Date:	
Commissioning Date:	
PV Panels Type:	
PV Panels for string:	Number of Strings:
Signature:_____ Date:_____	



Claim informations

Type of device:
Serial Number.(S/N):
Invoice Number and Date:
Commissioning Date:
Fault time:
Error message (Display reading):
Short description of fault & pictures:
<div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div>Signature: _____</div> <div>Date: _____</div> </div>



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