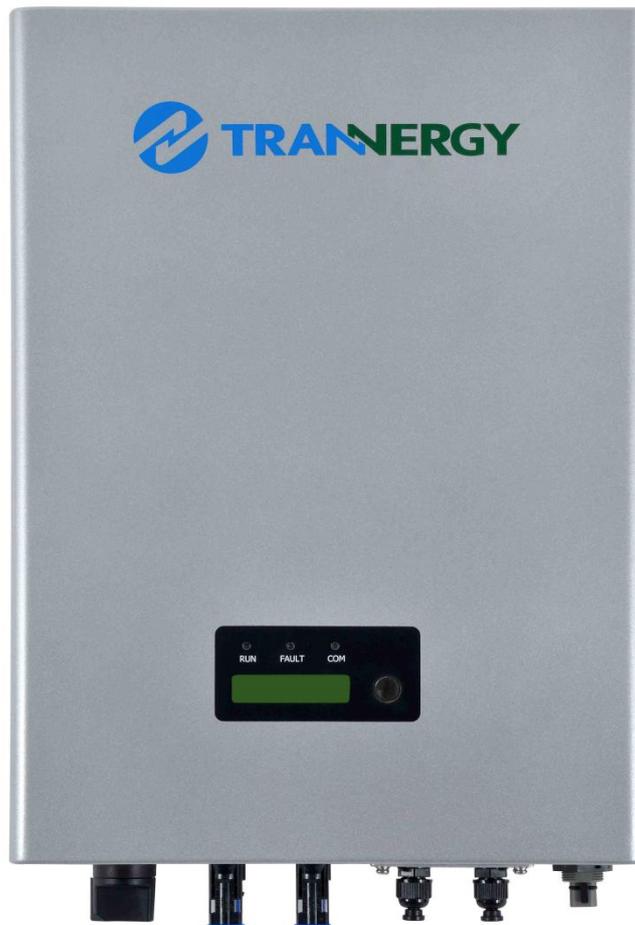


User Manual



SGN1300/1800/2300/2700/3000/3400/4000/4600/5400/6600TL

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1. Introduction

1.1. Introduction

This manual describes Tranergy solar inverters SGN1300TL, SGN1800TL , SGN2300TL,SGN2700TL,SGN3000TL,SGN3400TL, SGN4000TL, SGN4600TL , SGN5400TL and SGN6600TL. These products are among the most technologically advanced and efficient inverters on the market and are designed to ensure a stable power supply for many years.

The SGN inverter is a transformerless based inverter.

1.2. How to Use this manual

Please read the safety instructions in this manual first. Throughout the manual it is assumed that the reader is familiar with AC and DC installations and knows the rules and regulations for electrical equipment and for connecting it to the utility AC grid. It is especially important to be familiar with the general safety rules for working with electrical equipment.

1.3. Applied Designations (Warning, Caution, Note)

Throughout the manual important information is shown at different levels depending on the character of the information, as shown here:

	<p>Safety information important for human safety. Violation of warnings may result in injury to persons or death.</p>
	<p>Information important for the protection of property. Violation of this type of information may cause damage and loss of property.</p>
	<p>Useful additional information or "Tips and Tricks" on specific subjects.</p>
	<p>Caution,risk of electric shock. Operation after 10 minutes.</p>
	<p>Caution,risk of burns.</p>
	<p>Refer to the manual.</p>
	<p>The inverter must not be disposed of with the household waste.</p>

1.4. Important Safety Information

Read this before installing, operating or maintaining the inverter.



when the photovoltaic array is exposed to light, it supplies a d.c. voltage to the PCE



Before installation:

Check for damage to inverter and packaging. If you are in doubt, please contact your supplier before installing the inverter. Check the voltages of the solar modules and make sure they are within the limits of the Trannergy inverter specifications before connecting them to the inverter.

Installation:

Only trained and authorized personnel familiar with local electrical codes may install the inverter. For optimum safety, please follow the steps described in this manual. Keep in mind that the inverter has two voltage carrying sides, the PV input and the AC grid.

Disconnecting the inverter:

Always disconnect the AC line first! Afterwards disconnect the PV lines. Note that the inverter can still be charged with very high voltages at hazardous levels even when it is disconnected from grid/mains and solar modules. Wait at least 15 min. before proceeding, after having disconnected from grid and PV panels.

operating the inverter:

Before connecting the AC grid to the inverter, make sure that the installation cover is mounted again. The inverter must not be open during operation.

Maintenance and modification:

Only authorized personnel are allowed to repair or modify the inverter. To ensure optimum safety for user and environment, only the original spare parts available from your supplier should be used.

Functional safety parameters:

Unauthorized changes of functional safety parameters may cause injury or accidents to people or inverter. Additionally it will lead to the cancelling of all inverter operating approval certificates. The Trannergy inverters in the SGN range are all designed according to international safety requirements.

If non-original spare parts are used, the compliance with CE guidelines in respect of electrical safety, EMC and machine safety is not guaranteed.



In Australia:

Electrical Installation & Maintenance shall be conducted by licensed electrician and shall comply with Australia National Wiring Rules



Anti island method:Active frequency shift method

1.5. General Safety Rules for Working on Electrical Equipment

All persons installing, maintaining or servicing inverters should be trained in and have experience with the general safety rules to be observed when working on electrical equipment.

Installation and service personnel should also be familiar with local requirements, rules and regulations as well as safety requirements.

To provide a general guideline for safety precautions, five well-known and widely accepted rules are repeated below. The list should by no means be considered as exhaustive.



The person performing work on electrical equipment is responsible for the safety of persons and property!

Disconnecting

Disconnect all cables supplying voltage to the working place before starting any work. Please note that a lack of voltage is no guarantee that disconnection has been performed.

Protecting against reconnection

Prevent the system from reconnecting by marking, closing or locking off the work area. Unintentional reconnection may result in severe accidents.

Checking that system is voltage free

Ascertain conclusively by means of a voltage tester that the system is voltage free. Check all terminals to ensure that the system is voltage free (on each individual conductor).

Covering adjacent voltage-carrying components and preventing persons from gaining access to them

Cover up all voltage-carrying system components that can harm you while working. Make sure that danger areas are clearly marked.

1.6. System Sizing



When dimensioning a photovoltaic system, it must be ensured that the open circuit voltage of the PV string never exceeds the maximum permissible input voltage of 500(580)V DC. The PV string open circuit voltage during parallel string operation is 500V DC (SGN1300TL/SGN1800TL/SGN2300TL /SGN2700TL /SGN3000TL) and 580V DC(SGN3400TL /SGN4000TL /SGN4600TL /SGN5400TL/SGN6600TL) respectively. Higher voltages may result in permanent damage to the inverter.

In Europe, the PV string open circuit voltage is normally calculated at a module temperature of M10NC or M20NC depending on the location.

The selection of PV string output should be based on the optimum utilization of the invested capital compared to the expected annual energy yield from the system. This optimization depends on local weather conditions and should be considered in each individual case.

The inverter incorporates an input power limiting device, which automatically keeps the power at levels that are safe for the inverter. The limitation depends mainly on internal and ambient temperatures. The limitation is calculated continuously and always allows the maximum possible amount of energy to be produced.

Please use the tool supplied by Tranergy when dimensioning a photovoltaic system.

1.7. DC-switch



Only trained and authorized personnel familiar with local electrical codes may perform service or maintenance on the inverter. Before opening the inverter:

- 1) Disconnect AC grid.
- 2) Disconnect DC power.
- 3) Remove both AC and DC lines.

- 1) To switch OFF all power supply from the PV panels turn the DC-switch to OFF (O).
- 2) To switch ON power supply from the PV panel turn the DC-switch to ON (I).

To ensure the functionality of the DC-switch, all switches should be switched on and off (by turning the switch to on and off positions ten times) once a year, to clean the contacts.

2. Technical Description of Inverters

2.1. Mechanical design

Figure 2-1 shows the outline dimensions of SGN1300/1800/2300/2700/3000TL:

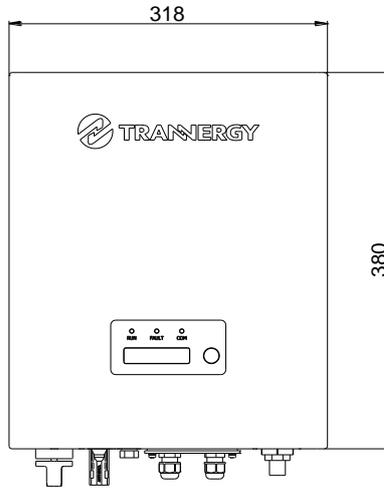


Figure 2-1

Figure 2-2 shows the outline dimensions of SGN3400/4000/4600/5400TL/6600TL:

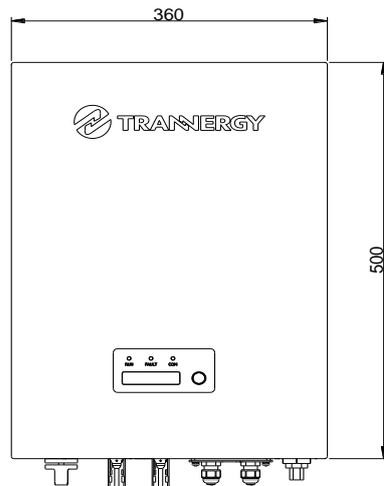


Figure 2-2



Note: The AC output terminal is most length part at the bottom of inverter, so take care of the AC output terminals, do not make it stand on the ground or other materials while moving or lifting the inverters otherwise will make terminal damaged.

2.2. Electrical system design

Figure 2-3 shows the wiring diagram of the whole SGN systems.

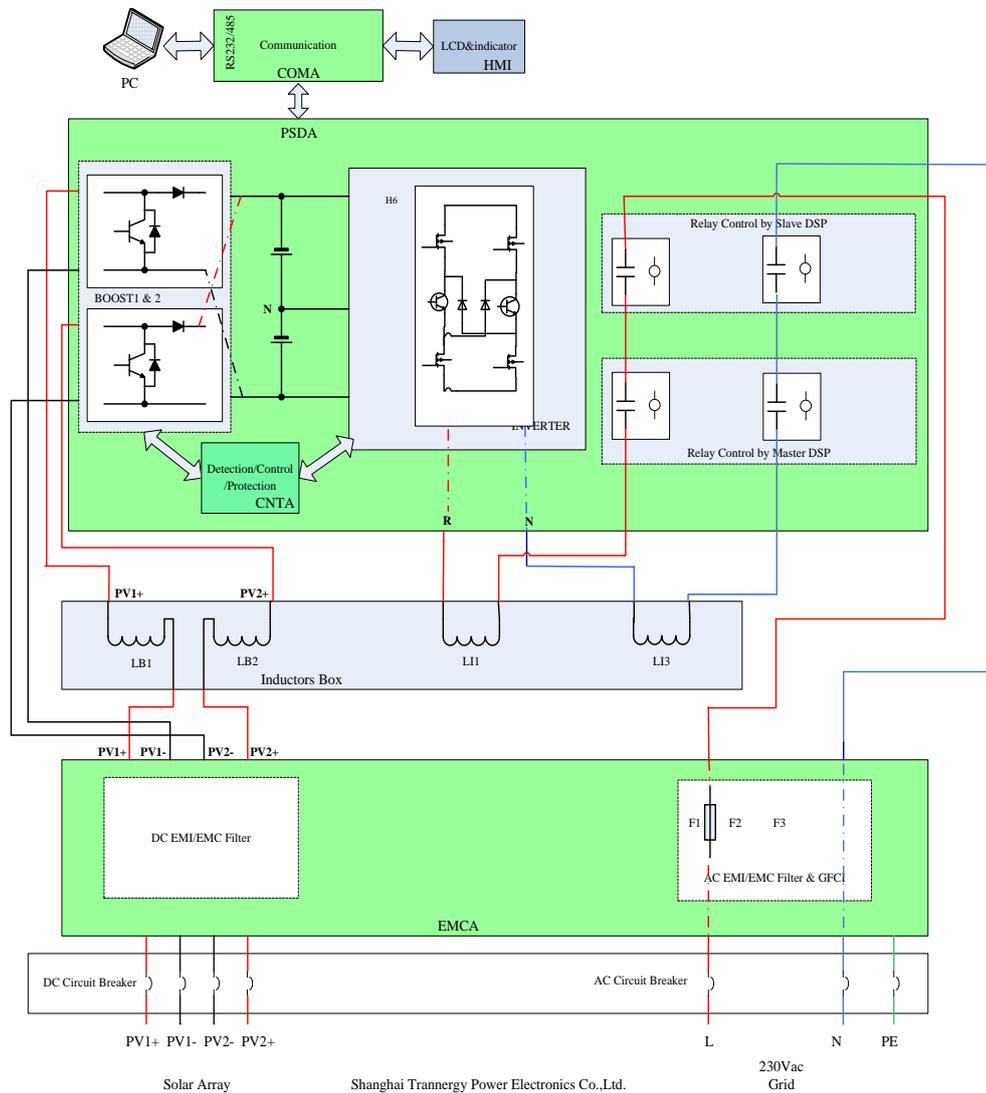


Figure 2-3 wiring diagram of the whole SGN system

We recommend a 32A DC Breaker located at the input of the DC input, and a 32A AC Breaker located at the output of the AC part.

Notes:

When choose the breaker, please call your installer for technique support

For the input and output wire selection, we recommend UL1015 wire, please see the following table.

MODEL	SGN1300TL/SGN1800TL/SGN2300TL/ SGN2700TL/SGN3000TL/SGN3400TL	SGN4000TL/SGN4600TL/ SGN5400TL/SGN6600TL
DC input	12AWG or 4~6 mm ²	12AWG or 4~6 mm ²
AC output	12AWG or >2.5 mm ²	10AWG or 4 mm ²



Please make sure the resistance of cable is lower than 1.5ohm.If the wire is longer than 20m,it is recommended to use 4mm² cable.



Notes:

Before install the inverter, please firstly check the polarity of the PV side, and a wrong polarity to the inverter may lead to a permanent damage

The above recommended wire already consider the maximum work current and degrading

3. Operation Mode Definition

The inverter has four standard operation modes.

3.1. Waiting mode

In waiting mode, the inverter is ready to switch into connecting mode. As decision variable the input voltage of the PV generator is used. Inverter is waiting to checking when output DC voltage from PV panels is greater than the lowest start-up voltage but less than the lowest operating voltage. If the input voltage exceeds the lowest operating voltage, the inverter shifts from "standby" to "connecting", or continues into the operation model OFF" if the PV voltage drops.

3.2. Connecting mode

After performing the system tests, which check whether all connection conditions are met, the inverter goes from waiting mode to connecting mode. During the specified cut-in time, the inverter continues testing the system values and connects the inverter to the grid if the system tests are okay. The minimum cut-in time is specified by the supplier and authorities and can vary from region to region.

3.3. Normal mode

In this mode, the inverter is connected to the grid and supplies power to the grid. Inverter begins to operate normally with green light on. Meanwhile, feedback energy to grid, LCD displays present output power, and inverter will stop feedbacks power to grid when PV power is not enough. The inverter is only disconnected from the grid in case of abnormal grid conditions or when PV power is not available.

3.4. Fault mode

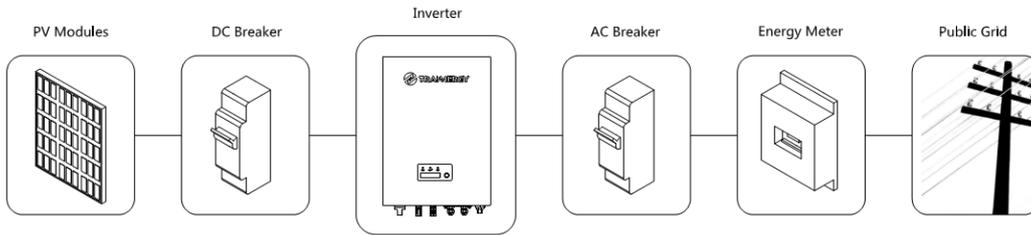
If the red LED on the front panel light up, the inverter enters the fault mode. The following solutions for trouble shooting are recommended:

	LCD display	Possible actions
Resumable Fault	Isolation Fault	<ol style="list-style-type: none"> 1. Check the impedance between PV (+)&PV(-) and the inverter is earthed. The impedance must be greater than 2MΩ 2. Check whether the AC end has contacted with earth
	Ground Fault	<ol style="list-style-type: none"> 1. The ground current is too high 2. After cutting off the AC end connection, unplug the inputs from the PV generator and check the peripheral AC system. 3. After the cause is cleared, re-plug the PV generator and AC connection, and check PV-Inverter status.
	Grid Fault FacOver Range Vac Over Range	<ol style="list-style-type: none"> 1. Wait for a moment, if the grid returns to normal, PV-Inverter automatically restarts. 2. Make sure grid voltage and frequency meet the specifications.
	Utility Loss	<ol style="list-style-type: none"> 1. Grid is not connected. 2. Check grid connection cables. 3. Check grid usability. 4. If grid is ok, the problem persists, maybe the fuse in the inverter is open, please call the service.
	Over Temperature	<ol style="list-style-type: none"> 1. The internal temperature is higher than specified normal value. 2. Find a way to reduce the ambient temperature or move the inverter to cooler environment.
	PV over voltage	<ol style="list-style-type: none"> 1. Check the open circuit voltage of the PV generator, see if it is greater than or too close to 500VDC (for SGN1300TL/SGN1800TL/ SGN2300TL /SGN2700TL /SGN3000TL) or 580VDC (forSGN3400TL/SGN4000TL/ SGN4600TL /SGN5400TL/SGN6600TL) 2. If PV voltage is less than 500VDC or 580VDC, and the problem still occurs, please call the service.
Permanent Fault	Consistent Fault	Disconnect PV (+) or PV(-) from the input, restart the inverter.
	Relay-Check Fail	<ol style="list-style-type: none"> 1. Disconnect all PV (+) or PV (-) 2. Wait for a few seconds. 3. After the LCD switches off, reconnect and check again. 4. If the problems remain, please call the service.
	DC INJ High	
	EEPROM R/W Fail	
	SCI Failure	
	AC HCT Fault	
GFCI Failure		

4. Installation and startup

4.1. Installation precaution

PV System block diagram



Caution!

Electrical Installation & Maintenance shall be conducted by licensed electrician !
All electrical installations shall be done in accordance with the local and national electrical code.



Danger!

Danger of lethal injury due to fire or explosion!
The Tranergy inverter may become hot in normal operation.
Do not install the Tranergy inverter on easily flammable materials and where flammable materials are stored.
Do not install the Tranergy inverter where there is a risk of explosion.



Caution!

Danger of burns from hot housing components!
Install the Tranergy inverter at a proper place where it cannot be touched unintentional.

Dimensions for SGN1300TL/1800TL/SGN2300TL/SGN2700TL/SGN3000TL:

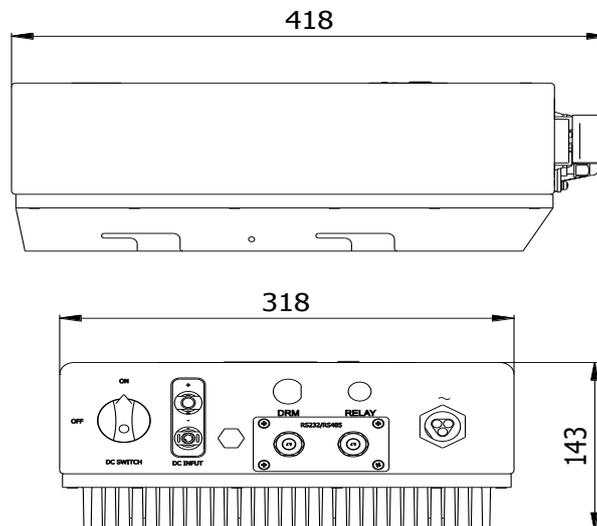


Figure 4-1

Dimensions for SGN3400TL/ SGN4000TL/SGN4600TL/SGN5400TL/SGN6600TL:

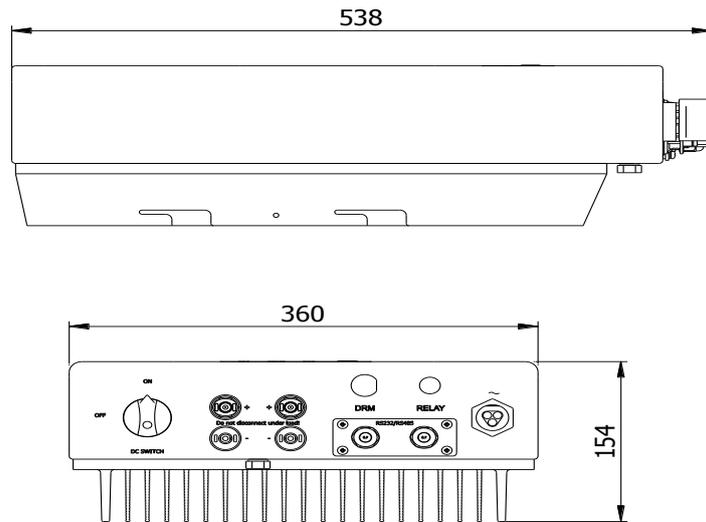


Figure 4-2

Ambient conditions

- The area where the Trannergy inverter installed is as dry as possible in order to extend their service life.
- Ensure good access to the unit for installation or any service work that may later be required.
- Ensure that equipment out of the children's reach.
- Maintain the following minimum clearances around the unit:

Direction	Minimum clearance
Above	30cm
Below	30cm
Sides	20cm

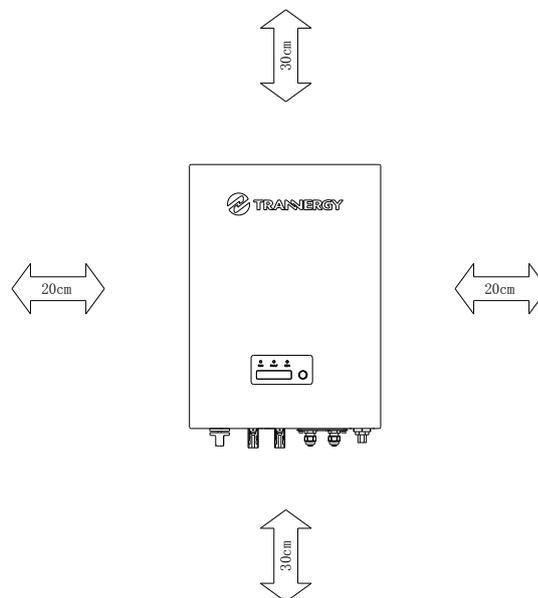


Figure 4-3

- Do not expose the Tranergy inverter to direct sunlight, in order to avoid power reduction by excessive heating. That the ambient temperature keeps below 45°C will guarantee optimal operation.
- Provide better ventilation for the inverter to ensure that heat is dissipated adequately.
- Install the inverter on a solid surface. Because of the noises made by the inverter when in operating, do not install the unit on plasterboard walls in order to avoid audible vibrations.
- If the inverter is installed in the residential area, it should be fixed onto the concrete wall. Wooden wall or plastic board is not recommended.
- If the wall is wooden, please insert the heat isolated material between the inverter and the wall.

Ambient conditions

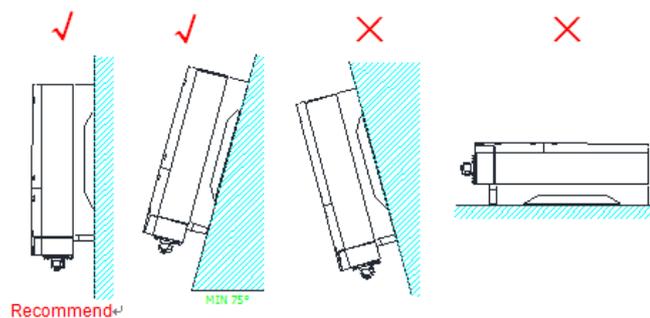


Figure 4-4

- The unit has been designed for vertical or tilted backwards by max. 15° installation.
- Do not install the Tranergy inverter forwards.
- Never install it horizontally.
- Install at eye level makes it easier to operate and read the display.

4.2. Installing the inverter

Installing procedure:

a) Drilling holes

Drill four screw holes according to the holes on the installing board. Keep drilling vertical to the wall, and don't shake the drill to avoid holes tilting. The depth of the holes must be the same and 38 mm~45 mm. After removing the dust in the four holes, measure the net depth of the holes. If the depth is deeper than 45 mm or less than 38 mm, the expansion tubes wouldn't be installed and tightened.

b) Install the Installation board

After drilling holes in the wall, fix the installation board (object 2) on the wall with the expansion bolts (object 1).

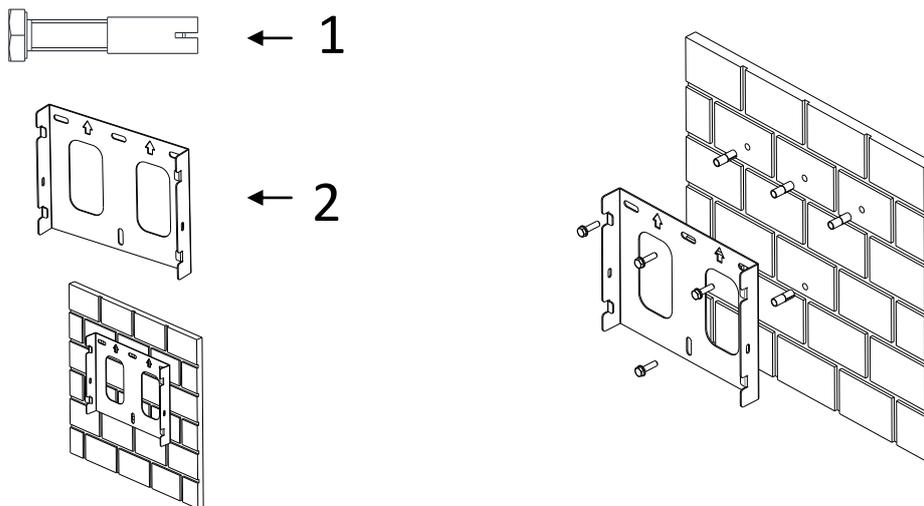


Figure 4-5



Attention!

Before inserting expansion bolts, measure the depth of every hole and measure the distance between every two holes. If the measures values do not meet installing requirements, re-drill holes in the wall.

c) Hung the inverter on the installation board,Fit washers and bolts(double)

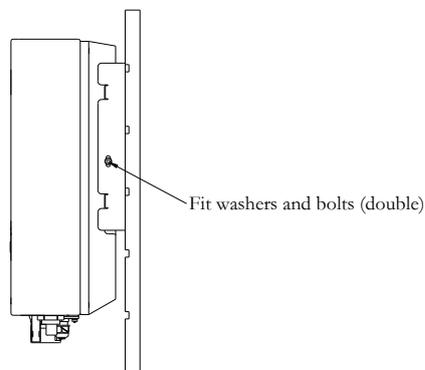
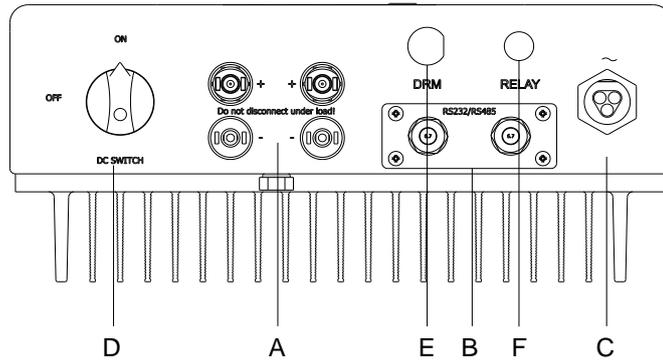


Figure 4-6

d) Check both sides for correct positioning.

4.3. Electrical connection

Product A:



Product B:

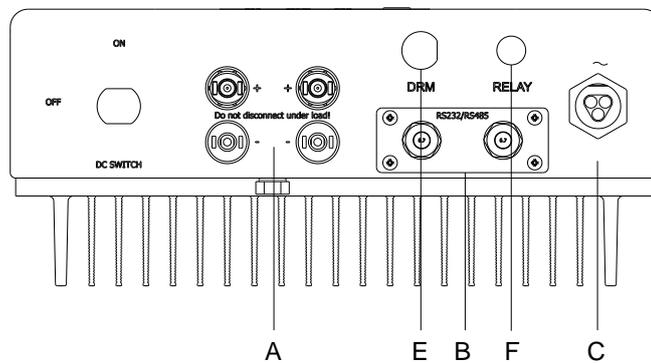


Figure 4-7

Object	Description
A	Plug connectors for DC input. Their polarity is signed lost to the Corresponding connectors
B	Communication terminal: RS-485/422 or RS232 interface
C	Terminal for grid connection (AC output)
D	DC Switch (optional)
E	DRM port
F	Earth fault relay



Note!

- 1) After the inverter has been installed in its fixed position, the electrical connection to the unit can be established.
- 2) Make sure Max. Open Voltage and short-circuit current of the PV string accord with the Spec.
- 3) Choose the appropriate cable width for AC/DC wire.
- 4) To connect the inverter, the AC and DC side must be disconnected from all power.
- 5) Sources and secured against being inadvertently switched back on.
- 6) Before connecting inverter to PV modules and public grid, please make sure the Polarity is correct.

4.3.1 Connection to the grid (AC)



Attention !

You must safeguard each inverter with an individual AC breaker in order that the inverter can be safely disconnected under load.

Please connect AC wires with the inverter via the AC female connector (see Figure 4-8) obey the procedures below:



Figure 4-8

- Assemble the cover and cable gland, see Figure 4-9.



Figure 4-9

- Strip the jacket of cable (40 ± 1 mm) and strip the insulation (7.5 ± 0.5 mm), see Figure 4-10.

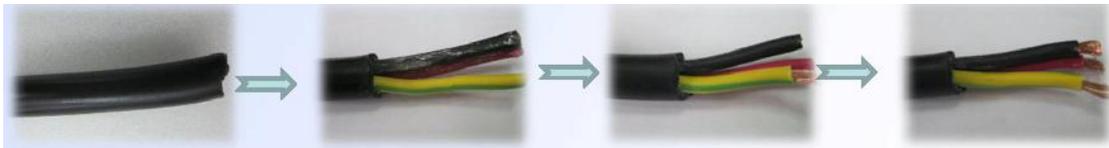


Figure 4-10

- Amphenol specified strip tool can be used in this step. Adjust the stripper stopper and put the cable in the corresponding notch to strip the length of 7.5mm as male side.
- Insert the conductors into the corresponding terminal and the screw is tightened with the torque 0,8Nm, see Figure 4-11.



Figure 4-11

- Assemble the cover & insert and cable gland using wrench tool (Torque of tightening rear enclosure: 5 Nm, torque of tightening cable: 3,3Nm), see Figure 4-12.



Figure 4-12

- Mate and separate connector
- After wrest the cable gland, align male and female side and mate them together by hand until a “Click” is heard or felt, see Figure4-13.

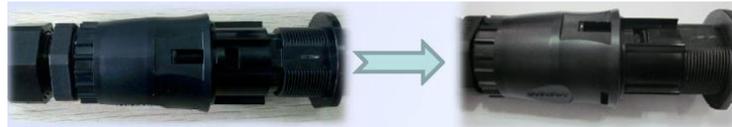


Figure 4-13

- When the separation of connector is necessary, use common tool to separate (A word screwdriver) .
- Lay the tooling in the location of snap and press the tool down. Then the male side can be pushed from the female insert by hand, see Figure4-14.



Figure 4-14

- Lay the tooling in the location of snap in cover and press the tool down. When there is space, then the female side can be pushed from the cover by hand, see Figure4-15.



Figure 4-15

- When it is the necessary the male contact is taken out from insert. Use the Amphenol specified tool TS30-001 as Figure 4-16.



Figure 4-16



DANGER!

DANGER to life due to potential fire or electricity shock.

NEVER connect or disconnect the AC connections under load.

4.3.2 Connection to the PV generator (DC) for Product A&B



Attention!

In order to safeguard the installation and startup of the device, a manual DC breaker must be fit at the input end of the inverter. The breaker should have certain capacity of over current and over voltage.

In addition, before cutting off the DC end connection please cut off the AC end connection at first.



Attention!

Please do not connect PV array positive or negative pole to the ground, it could cause serious damages to the inverter.

Type	Maximum input voltage[V]	Maximum input current[A]
SGN1300~3000TL	500	12
SGN3400~6600TL	580	12/12

For the inverter SGN1300TL/1800TL/SGN2300TL/SGN2700TL/SGN3000TL, there is a pair of DC connection and one MPPT tracker.

For the inverter SGN3400TL, SGN4000TL, SGN4600TL, SGN5400TL and SGN6600TL, there are two pair of DC connection and two MPPT trackers.



Attention!

The open circuit voltage of the PV generator must be measured, which must not exceed the maximum input voltage of the unit. Connecting to a higher voltage will destroy the unit.

The total short circuit current of the PV modules should be less than the inverter's maximum DC input current.

Before connecting PV generator to the unit, please make sure the polarity of the strings is correct.

Please use professional tools to mate and separate H4 connectors.

Connection procedure by H4:

Connect the PV generator and the inverter using H4 connectors as below. The positive and negative terminals of the PV generator are corresponding to positive (+) terminals and negative (-) terminals on the inverter, see Figure4-17&4-18.

Helios H4 components come pre-assembled and the caps are loose.
And the whole connector will include the male side and female side.



Figure4-17 Female side connector (+) Figure4-18 Male side connector (-)

- Switch off the DC breaker and secure against being switched back on inadvertently.
- Strip the cable 7 mm, see Figure4-19.

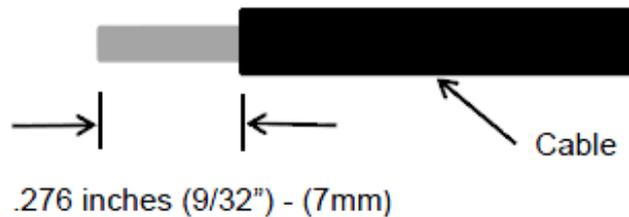


Figure 4-19

- Insert striped cable into contact barrel, and insure all conductor strands are captured in the contact barrel.
-
- Crimp contact barrel by using a hex crimping die. A specified crimping tool can be used in this step. Put the contact barrel with striped cable in the corresponding crimping notch and crimp the contact, see Figure4-20&4-21.



Figure 4-20

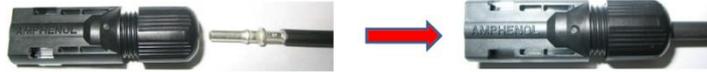


Figure 4-21

- Insert contact cable assembly into back of male and female side connector. A “click” should be heard or felt when the contact cable assembly is seated correctly, see Figure 4-22.



PV-090508-F – Female side Connector



PV-090508-M – Male side Connector

Figure 4-22



DANGER!

DANGER to life due to potential fire or electricity shock.

NEVER connect or disconnect the connectors under load.

4.4. Run the inverter

Start inverter after checking all below steps

- Make sure all the DC breaker and AC breaker are disconnected.
- AC cable is connected to grid correctly.
- All PV panels are connected to inverter correctly, DC connectors which are not used should be sealed by cover.

Start inverter

- Turn on DC and AC side switches.
- Inverter will start up automatically when PV panels generate enough energy. Below is three different states when operating (Waiting, Connecting, and Normal), which means inverter starting up successfully. See Chapter 3 for details.

5. Human Machine Interface

5.1. Control Panel

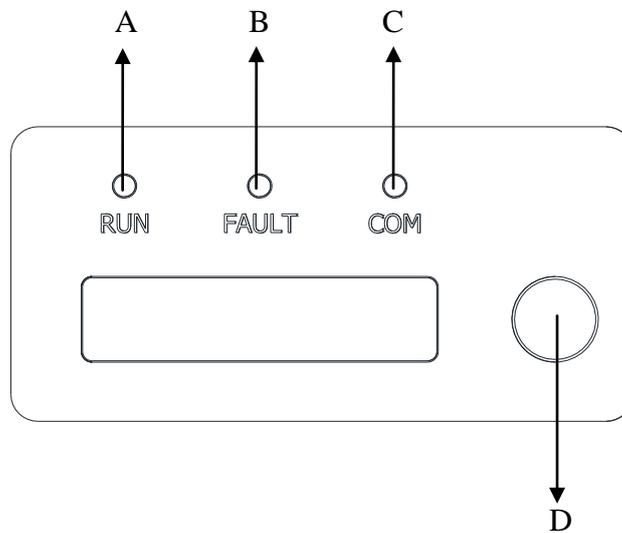
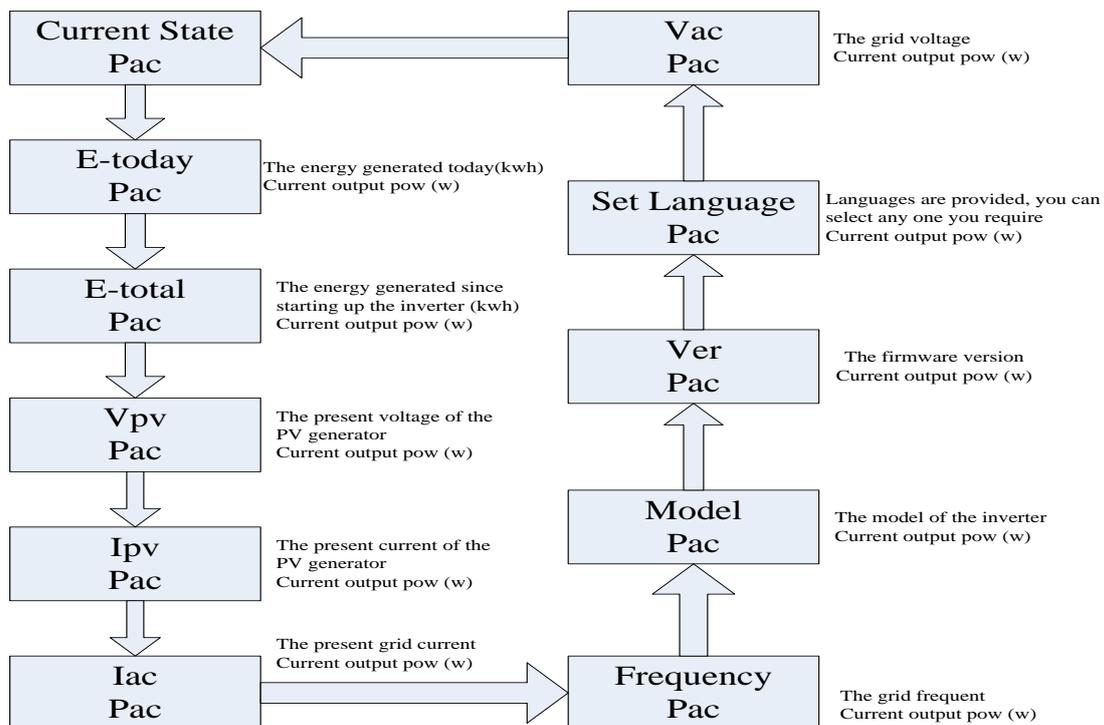


Figure 5-1

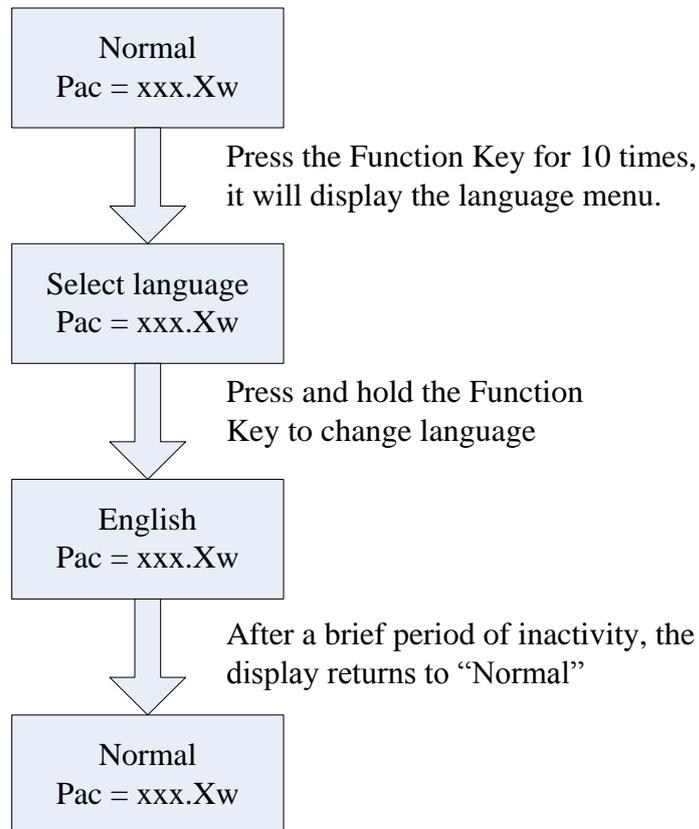
- A—Green LED: Working Normally
- B—Red LED: Fault detected.
- C—Yellow LED: Communication or updating firmware
- D—Function key: For settings. It can alternate among different parameters and different languages.

5.2. LCD Functions



5.3. Language Settings

Language setting function is as below:

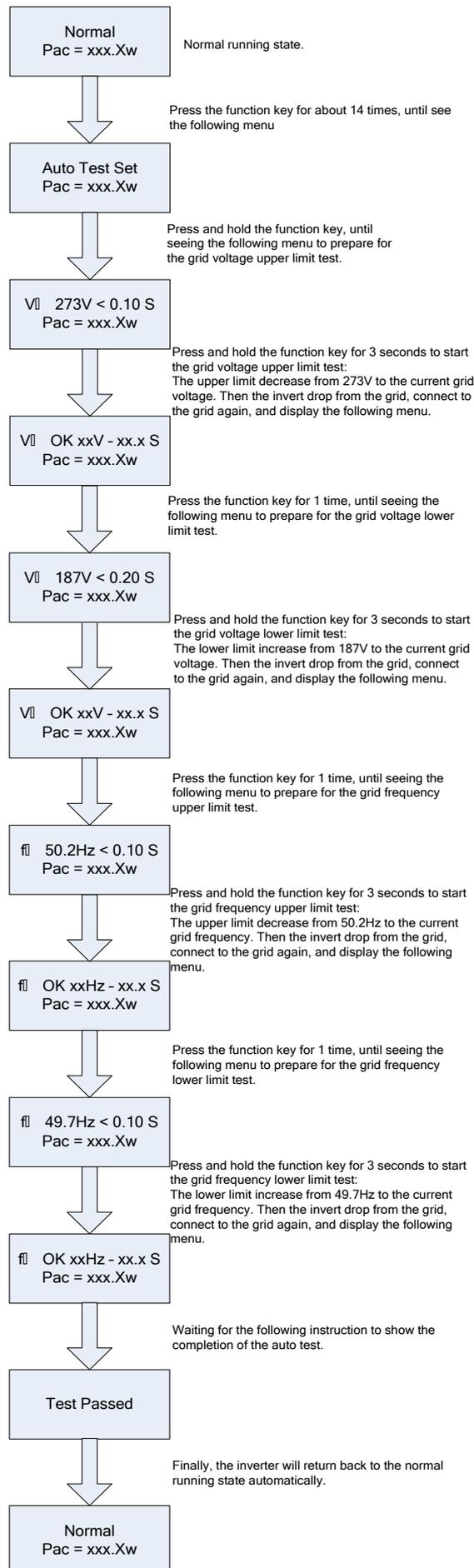


5.4. Auto Test Settings

For the customers in Italy, who need to perform the auto test function, please set according to the following instructions.

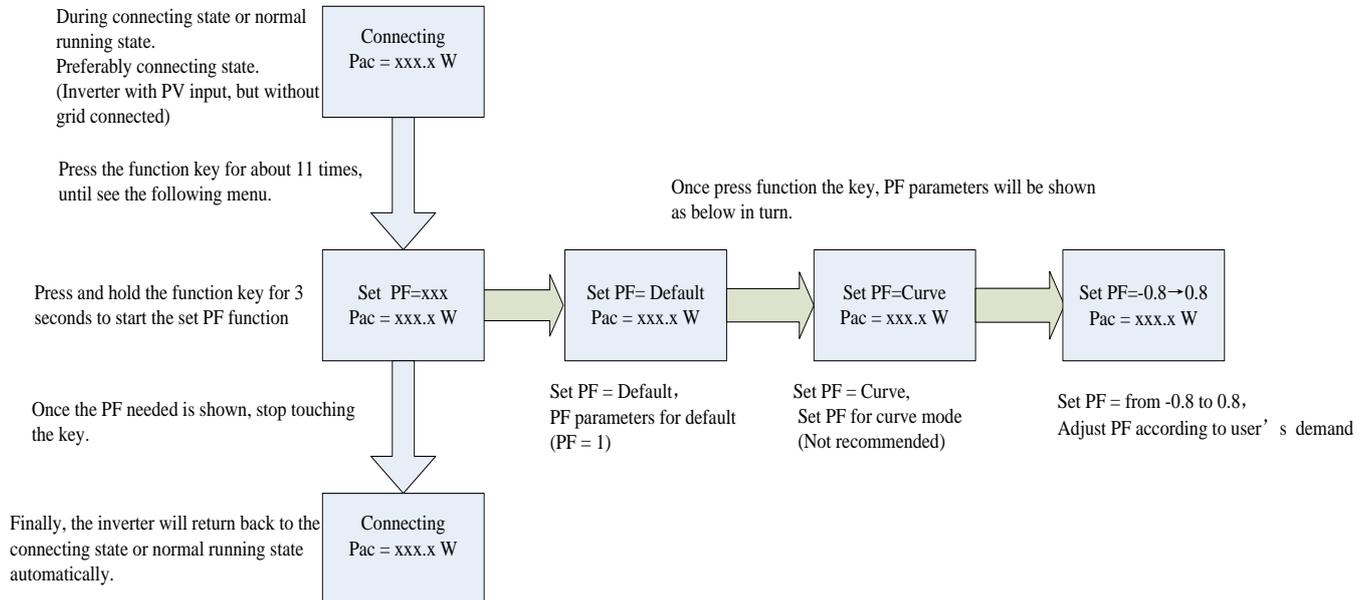
Please make sure the PV inverter is made for Italian Standard. (You will see machine type and ENEL if you press the switch for several times when the PV is running.)

During the auto test procedure, if anything abnormal happens, please wait until the inverter run normally, then make the auto test settings from the beginning.



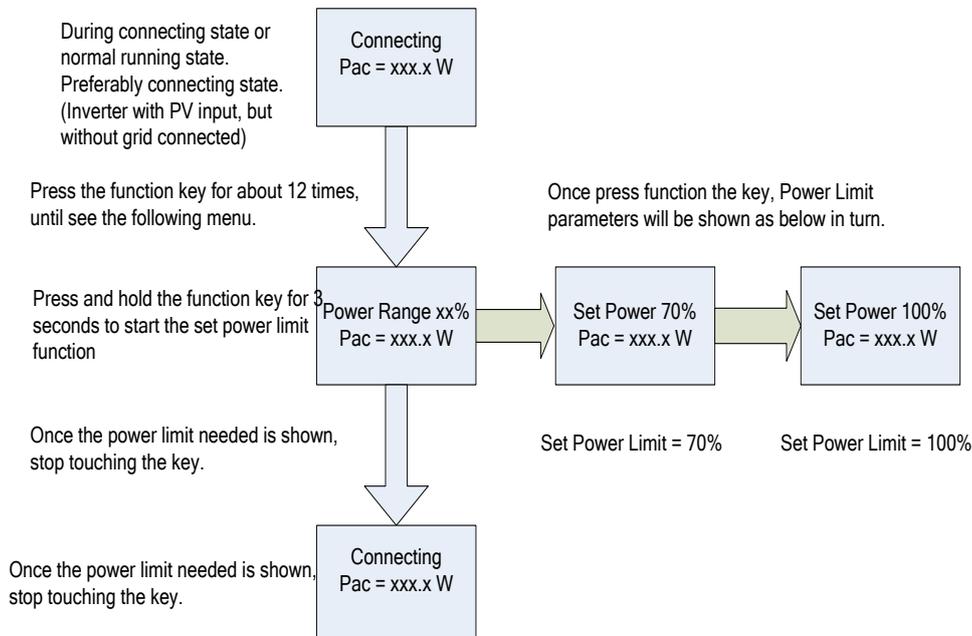
5.5. Power Factor Settings

IF customers need to adjust PF, do the following:



5.6. Power Limit Settings

IF customers need to adjust Power Limit, do the following:



5.7. DRM port

For the customers in Australia, who need to perform the DRM function, please use according to the following instructions.

DRM 0, DRM5, DRM6, DRM7, DRM8 are active for use.

RJ45 socket pin assignment for DRM							
1	2	3	4	5	6	7	8
DRM5	DRM6	DRM7	DRM8	RefGen	DRM 0		

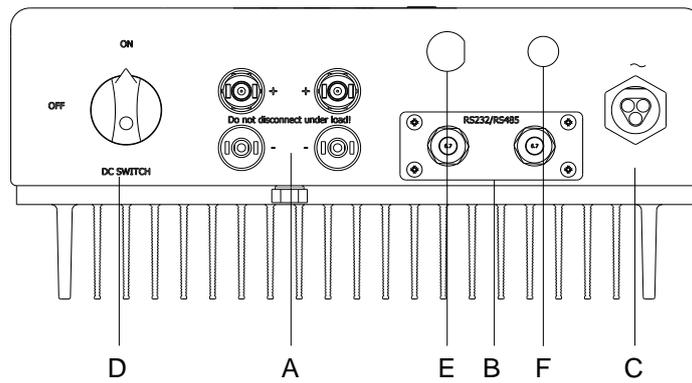


Figure 5-2: location “E” is RJ45 for DRM

6. Communication and Monitoring

6.1. Communication Interfaces

This product has a communication interface RS-232, RS-485/422 and WiFi/GPRS/Ethernet /USB(optional). Operating information like output voltage, current, frequency, fault information, etc., can be delivered to PC or hardware storage devices or other monitoring equipment via communication interface

6.2. Communication

When user want to know the information of the power station and manage the entire power system. We offer below 4 type communications.

6.2.1. RS-232 Communication for single inverter type

RS-232 is one communication interface. It transmits the data between PC and one single SGN series inverters (Figure 6-1). For communication cable, one end is male connector; the other end is female connector. The maximum length of the cable for RS-232 is 10 m.

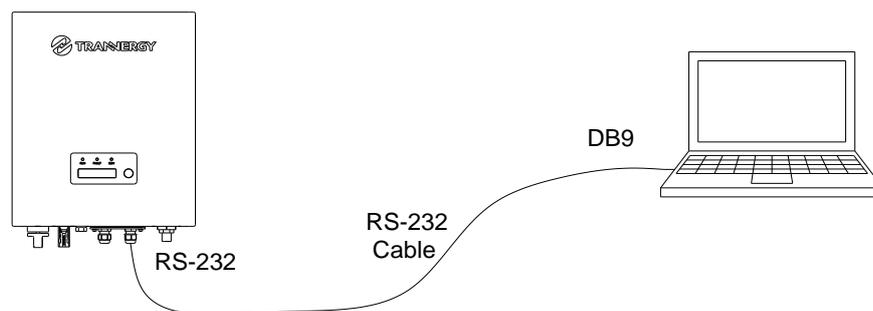
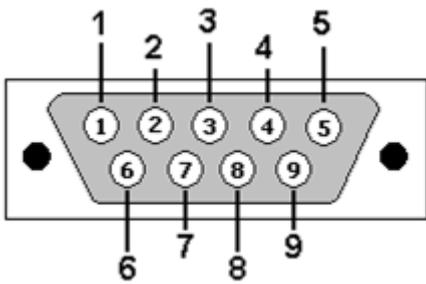


Figure 6-1 RS-232 Communication Diagram

PIN1	NC	
PIN2	TXD	
PIN3	RXD	
PIN4	NC	
PIN5	GND	
PIN6	NC	
PIN7	NC	
PIN8	NC	
PIN9	NC	
 <p>Notes: If your computer doesn't have the DB9 communication interface, you can use RS232-USB cable to achieve this function.</p>		

One inverter can only be communicated with one PC at the same time through RS-232 port. Thus this method is generally used for single inverter's communication, for examples, software updating and serviceman's testing.

6.2.2. RS-485/422 Communication

RS-485/422 is generally for multi inverters' communication. It can communicate with and up to 32 inverters could communicate at the same time, but wire length should be ≤ 1200 m. Connect the system as blow (Figure 6-2), user can easily monitoring the PV power station.

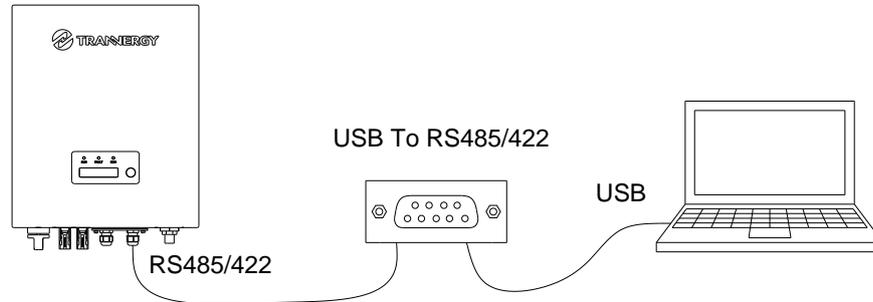
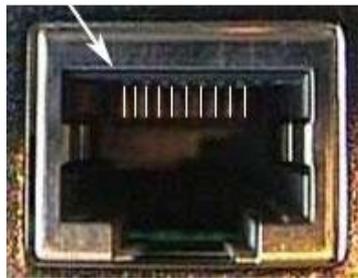


Figure 6-2 RS-485/422 Communication Diagram

PIN1	TXD+_RS-485/422	
PIN2	TXD-_RS-485/422	
PIN3	RXD+_RS-485/422	
PIN4	GND	
PIN5		
PIN6	RXD-_RS-485/422	
PIN7	+7V/DC	
PIN8		



The wires connection sequence of two ends of a RS-485/422 cable is the same.

2 If customer communicate with inverter via RS-485/422 ,you can buy USB to RS-485/422 converters and install pvc software.

3 TX termination of inverter connect with RX termination of USB to RS-485/422 converters, RX termination of inverter connect with TX termination of USB to RS-485/422 converters.

6.2.3. WiFi/GPRS/Ethernet Communication

SGN can be communicated with WiFi/GPRS/Ethernet. Trannergy can customize the required special device from customers to realize wireless communication.

6.2.4. USB Communication

USB interface is specially designed for maintenance engineer to realize burning and updating of PCU firmware.

6.3. Monitoring

Monitoring system is divided into local monitoring and remote monitoring

1. Local monitoring system

System monitor PVCS should be configured to realize one PC communicates with multi inverters at the same time. Through PC PVCS could get real time PV plants operating data. Please see Installation Guide of PVCS for more information.

The connected graph of the monitoring system, in which the multipoint communication of the inverters can be realized through RS-485/422 interface, is shown below (Figure 6-3). The software “PVCS” in the PC can handle real-time monitoring of max 32 inverters at the same time.

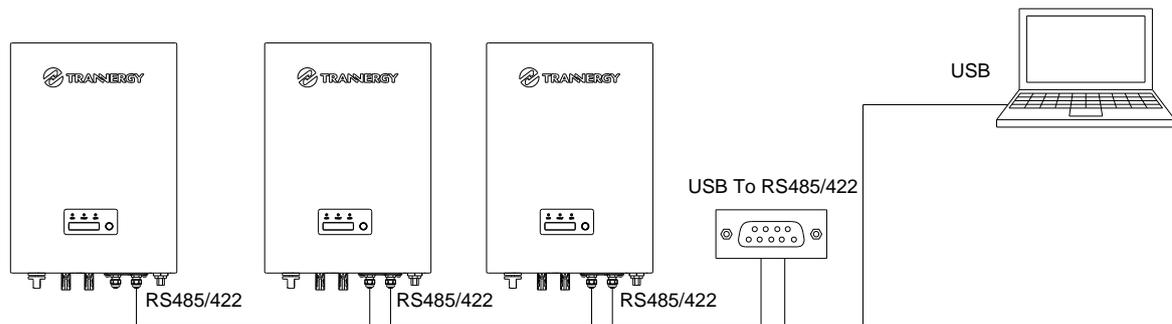


Figure 6-3 Monitoring Topology Diagram

2. Remote monitoring system

When user choose WiFi/GPRS/Ethernet communication, User can open a web browser and visit the portal website: <http://log.trannergy.com/> , after register and log in , you can monitor information of inverter.

At Apple’s and Android’s app store, you can input the key words: Trannergy-log, then you can download and install the Trannergy-log to your Mobile equipment. After the download and installed, input your user name and password, then visit your station, (we supply a free demo, for the users who do not register) choose the power station and enter the main interface, then you the daily energy etc. will be displayed. Meanwhile, you can view the relevant date to view the curve.

7. Service and repair

7.1. Safety during service and repair

In this chapter the term ‘event’ describes all conditions preventing the inverter from operating properly.

An event can occur in any part of the system (grid, PV modules, cables and connectors, inverter), and does not automatically indicate an inverter failure.



Notes:

- Please note the following:
- The inverter exerts a self-protecting function.
- Events are registered in an event log.
- The inverter will attempt to reconnect when all conditions are OK.
- The inverter can pass into a locked position if an error related to functional safety is registered. This locked position will be revoked at PV shutdown/every night.



Disconnect the AC grid first!

Before the PV modules are disconnected from DC side of the inverter, the AC grid must be disconnected. The inverter must never be disconnected from the PV modules when it is feeding energy to the grid!



The inverter must only be opened by qualified personnel for repair. The inverter can still be charged with hazardous voltages even when it is disconnected from the PV modules and the grid. Measure the DC bus voltage, which must be lower than 48V, before starting work on the electronic system inside the cabinet.

Before servicing the inverters, please read Important Safety Information in Chapter 1.

7.2. Troubleshooting

If your solar system is not working properly, please follow the steps in the troubleshooting guide below before calling for assistance. The troubleshooting guide is designed to check for the most common problems, which in many cases can be solved by the owner.

Use this check list first if you experience problems with your PV system:

- 1) Check the event at the LCD, An event is indicated at the LCD
- 2) Check that AC grid voltage is within the normal range(see LCD information)

- 3) If not, check whether the AC isolation switch is connected, and whether the AC grid is available. If there is no AC grid in your house, the inverter automatically switches off for safety reasons. When the AC grid is once again accessible, the inverter automatically connects to the grid when there is sufficient solar radiation .Check that the grid is connected properly to the inverter and that the grid is ready for operation.
- 4) Check PV voltages in the display. PV voltages must be higher than initial feeding voltage in order for the inverter to start. If the PV voltage is too low;
- 5) Check that there is sufficient solar radiation to generate power
- 6) Check for shading and loose cables and connections in the PV system.
- 7) Check the polarity of the PV side.
- 8) If the AC current value of the grid is not within the threshold values, please contact your utility for technical assistance.
- 9) If the PV system still does not supply any power to the grid, please check the voltage, current and power of the PV module as well as voltage, current and power of the grid at the LCD.

If the PV voltage is still too low or unstable, call for service support.

7.3. Cleaning the Inverter

If the inverter is dirty, clean the enclosure lid,the display using only clean water and a cloth. Do not use any cleaning agents(e.g.solvents or abrasives).



Notes:

Remember that only trained and authorized personnel familiar with electrical systems and safety issues are allowed to work on inverters and electrical installations.

8. Technique specification

This specification is regarding to a series of Transformerless Photovoltaic Inverters (PV Inverter) developed by Trannergy for customers. The inverter is used to convert DC power from solar array to AC power fed to grid in distributed power applications.

8.1. Electrical Specification

8.1.1. Input Specification

Model	SGN1300TL	SGN1800TL	SGN2300TL	SGN2700TL	SGN3000TL	SGN3400TL	SGN4000TL	SGN4600TL	SGN5400TL	SGN6600TL
Nominal DC voltage	360V									
Maximum PV open voltage	500 V _{DC}					580 V _{DC}				
MPPT voltage range	50 to 450V	70 to 450V				90 to 530V				
Working voltage range	50~500 V _{DC}	70~500 V _{DC}				90~580 V _{DC}				
Max. Total power in input	1300w	1800w	2300w	2700w	3200w	3400w	4000w	4600w	5400w	6600W
Initial feeding voltage	60V ±5V	90V ±5V				110V ±5V				
Rated. Input current for each connection	10 A _{DC}	10 A _{DC}	10 A _{DC}	10 A _{DC}	10 A _{DC}	10/10 A _{DC}	10/10 A _{DC}	10/10 A _{DC}	10/10 A _{DC}	10/10 A _{DC}
Max. Input current for each connection	12A _{DC}	12A _{DC}	12A _{DC}	12 A _{DC}	12 A _{DC}	12/12 A _{DC}	12/12 A _{DC}	12/12 A _{DC}	12/12 A _{DC}	12/12 A _{DC}
Isc PV	15A _{DC}	15A _{DC}	15A _{DC}	15A _{DC}	15A _{DC}	15/15 A _{DC}	15/15 A _{DC}	15/15 A _{DC}	15/15 A _{DC}	15/15 A _{DC}
Max. inverter backfeed current to the array	500uA	500uA	500uA	500uA	500uA	1mA	1mA	1mA	1mA	1mA
Shutdown voltage	40V	50V typical				70V typical				
Number of DC connection	1					2				
Number of MPP trackers	1					2				
Static MPPT efficiency	>99.9% in MPPT range									

8.1.2. Output Specification

Model	SGN1300TL	SGN1800TL	SGN2300TL	SGN2700TL	SGN3000TL	SGN3400TL	SGN4000TL	SGN4600TL	SGN5400TL	SGN6600TL
Nominal output power	1000W	1500W	2000 W	2500W	2800W	3000W	3680 W	4000 W	4600 W	6000W
Maximum output power	1100 VA	1650 VA	2200 VA	2500 VA	3080 VA	3300 VA	3680 VA	4400 VA	5000 VA	6000VA
Nominal voltage	220/230/240Vac									
Operational voltage	180 - 270 Vac									
Voltage range at	200 - 260 Vac									
Operational frequency	50 Hz, 60Hz / -5 Hz ... +5 Hz									
Nominal output current	5 A _{AC}	7.7 A _{AC}	10.2 A _{AC}	12.8 A _{AC}	14.2 A _{AC}	15.2 A _{AC}	16A _{AC}	20.4 A _{AC}	23.6 A _{AC}	27.3 A _{AC}
Maximum output current	6 A _{AC}	8.4 A _{AC}	11.3 A _{AC}	12.8 A _{AC}	15.7 A _{AC}	16 A _{AC}	16A _{AC}	22.5 A _{AC}	26 A _{AC}	27.3 AAC
Maximum output overcurrent protection	10A _{dc}	14 A _{dc}	19A _{dc}	22A _{dc}	26A _{dc}	27A _{dc}	27A _{dc}	38A _{dc}	44A _{dc}	46A _{dc}
Maximum output fault current	19A _{dc}	26A _{dc}	26A _{dc}	30 A _{dc}	30 A _{dc}	32 A _{dc}	45 A _{dc}	45A _{dc}	52 A _{dc}	54 A _{dc}
ac inrush current	<100 A _{dc}	<100 A _{dc}	<100 A _{dc}	<100 A _{dc}	<100 A _{dc}	<100 A _{dc}	<100 A _{dc}	<100 A _{dc}	<100 A _{dc}	<100 A _{dc}
THDi	<1%	<1%								
Power Factor	>0.99 , -0,8 - 0,8 controllable									

8.1.3. General Data

Model	SGN1300TL	SGN1800TL	SGN2300TL	SGN2700TL	SGN3000TL	SGN3400TL	SGN4000TL	SGN4600TL	SGN5400TL	SGN6600TL
Internal power consumption	<5W	<5W		<6W	<6W	<6W	<6W	<6W	<6W	<6W
Standby power (at night)	<0.2W									
Maximum Conversion Efficiency (DC/AC)	>97.1%	>97.3%		>97.5%	>97.5%	>97.8%	>97.8%	>97.8%	>97.8%	>97.8%
European Efficiency	>96.5%	>96.7%		>96.9%	>96.9%	>97.3%	>97.3%	>97.3%	>97.3%	>97.3%
Pollution degree	II									
Overvoltage category	PV: II, Main: III									
Protection degree	IP65									
environment category	Outdoor use									
Operation temperature	-25 to +60 °C (up 45 °C derating)									
Humidity	0 to 100%									
Heat Dissipation	Air convection									
Acoustic noise level	<30dB									
Altitude	Up to 3000m (>2000m derating)									
Manufacturing process	Unleaded, meet RoHS									
DC switch	Optional									
Weight [kg]	12	13				21				
Size [mm]	380x320x140					500x360x150				

9. Qualification

We grant a warranty of 60 months as standard, starting from the date of the purchase invoice marked. We will only perform warranty services when the faulty unit is returned to us together with a copy of the invoice and warranty card which are issued by the dealer to the user. The unit should be returned in its original or equivalent packaging, please preserve the original packing. The costs for new packing and shipment are absorbed by the customer. In addition, the type label on the unit must be fully legible. If these requirements are not fulfilled, we reserve the right to deny warranty services.

Warranty claims are excluded for direct or indirect damages due to:

- 1) Beyond warranty date;
- 2) Without warranty card and serial number;
- 3) Transport damage;
- 4) Improper use, operation and refitting;
- 5) Non-observance to the relevant safety instructions and work in the severe environment out of the recommended ones in this manual;
- 6) Beyond installation and use areas of the relevant international standards;
- 7) Influence of foreign objects and force majeure (lightning strike, overvoltage, severe weather, fire etc).

10. Contact Information

If you have any further technical questions about our products, please contact us:

Tranergy Co., Ltd

Address: No.188 Weiwu Rd, Shanghai China 201802

Email: service@tranergy.com

Hotline: +86 400-012-9979

Tranergy UK Ltd

Address: Mezzanine Floor 19, 19-21 Crawford Street, London, W1H 1PJ

Email: service@tranergy.com

Hotline: 0845 056 4118

Tranergy Benelux Service Center

Email: service@tranergy.com

Hotline: +31 (0)613841982

Tranergy Australia Service Center

Email: service@tranergy.com

Hotline: +61 (0)9 2188 2117

For further information of Tranergy warranty regulation and reliability, please visit www.tranergy.com

Appendix A: FAQ (Frequently asked questions)

Sometimes, the PV system does not work normally; we recommend the following solutions for average troubleshooting. This can help the technician to understand the problem and take a proper action.

	LCD display	Possible actions
Resumable Fault	Isolation Fault	<ol style="list-style-type: none"> 1. Check the impedance between PV (+)&PV(-) and the inverter is earthed. The impedance must be greater than 2MΩ 2. Check whether the AC end has contacted with earth
	Ground Fault	<ol style="list-style-type: none"> 1. The ground current is too high 2. After cutting off the AC end connection, unplug the inputs from the PV generator and check the peripheral AC system. 3. After the cause is cleared, re-plug the PV generator and AC connection, and check PV-Inverter status.
	Grid Fault Fac Over Range Vac Over Range	<ol style="list-style-type: none"> 1. Wait for a moment, if the grid returns to normal, PV-Inverter automatically restarts. 2. Make sure grid voltage and frequency meet the specifications.
	Utility Loss	<ol style="list-style-type: none"> 1. Grid is not connected. 2. Check grid connection cables. 3. Check grid usability. 4. If grid is ok, the problem persists, maybe the fuse in the inverter is open, please call the service.
	Over Temperature	<ol style="list-style-type: none"> 1. The internal temperature is higher than specified normal value. 2. Find a way to reduce the ambient temperature or move the inverter to cooler environment.

Appendix B: Abbreviation

AC	Alternating Current
DC	Direct Current
DLU	Data Logger Unit
DSP	Digital Signal Processing
EEPROM	Electrically Erasable Programmable Read-Only Memory
EMC	Electro Magnetic Compatibility
EMI	Electro Magnetic Interference
GFCI	Ground Fault Circuit Interrupter
HCT	Hall Current Transformer
HMI	Human Machine Interface
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MPPT	Maximum Power Point Track
PC	Personal Computer
PV	Photovoltaic
PVCS	Photovoltaic Control System
SCI	Serial Communication Interface

