

User Manual

MasterPower[®]
Unlimited power



GAMMA **3KW/5KW PV Inverter** **(IP 20)**

Version: 1.0

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1. Introduction

1-1. Overview

This PV inverter is designed to convert solar electric (photovoltaic or PV) power into utility-grade electricity that can be sold to the local power company. This inverter is embedded with smart MPP tracker to allow the PV inverter to operate at optimum power output voltage.

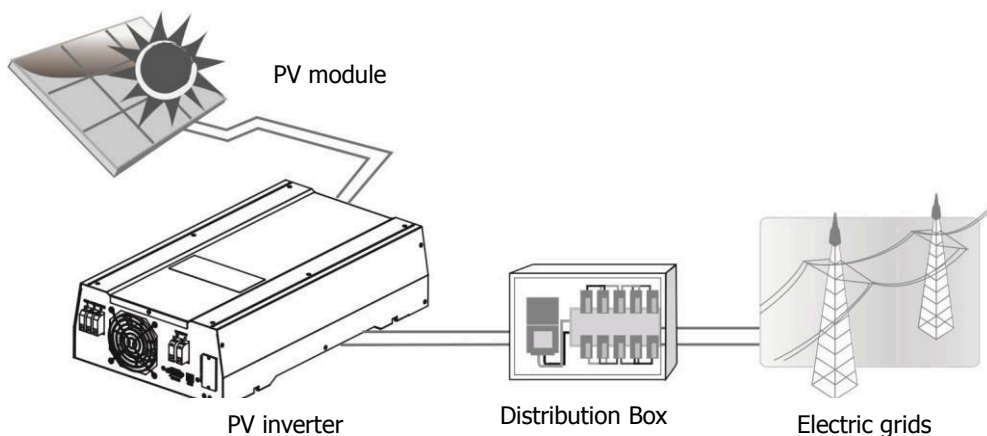


Figure 1 Basic PV System Overview

This inverter is only compatible with PV module types of single crystalline and poly crystalline. And, only Class A-rated PV modules are acceptable to use. Do not connect any sources of energy other than these two types of PV modules to the inverter. When designing the PV system, ensure that the values comply with the permitted operating range of all components at all times. See Figure 1 for a simple diagram of a typical PV system with the Inverter.

1-1. Affecting Factors for Performance of the Inverter

There are a lot of factors to influence the performance of this inverter.

Rating for PV Modules

PV modules are rated at ideal factory conditions, such as specified illumination (1000 W/m²), spectrum of the light and temperature (25 °C / 77 °F). This is called the STC (Standard Test Condition) rating and is the figure that appears on the spec label of PV module. Generally speaking, only around 60% to 70% of its peak STC-rated output will be produced from your PV modules due to unpredicted environmental factors.

Temperature and Power Reduction

Environment temperature affects the power output of PV modules. Higher the temperature, lower the power output of PV module. Comparing with pole-mounted PV module array, roof-mounted PV module array generates less power due to less air circulation and excess heat from roof top.

Important: The inverter will reduce its output generation to protect its electronic circuits from overheating and any damage under high temperature environment. For maximum power output in high temperature, it's recommended to mount the inverter in a shaded location with good ventilation.

Angle of the Sun

The angle of the sun in relation to the PV array surface—the array orientation can dramatically affect the PV array output. The array energy output will vary depending on the time of day and time of year as the sun's angle in relation to the array changes. Sunlight output decreases as the sun approaches the horizons (such as in winter in Europe) due to the greater atmospheric air mass it must penetrate, reducing both the light intensity that strikes the array's surface and spectrum of the light. In general, you can expect only four to six hours of direct sunlight per day depending on what part of Europe the inverter is installed.

Partial Shade

Shading on a single PV module of the array will reduce the output power of the entire system. Such shading can be caused by something as simple as the shadow of a utility wire or tree branch on part of the array's surface. This condition, in effect, acts like a weak battery in a flashlight, reducing the total output, even though the other batteries are good. However, the output loss is not proportionate to shading even a tiny bit of shading will reduce the PV power to the inverter. The inverter is designed to maximize its power production in all of the above situations using its proprietary MPPT algorithm.

Other Factors

Other factors to reduce power generation of a solar system are:

- Dust or dirt on the modules
- Fog or smog
- Mismatched PV array modules, with slight inconsistencies in performance from one module to another.
- Inverter efficiency
- Wire losses
- Utility grid voltage

2. Important Safety Warning

Before using the inverter, please read all instructions and cautionary markings on the unit and this manual. Store the manual where it can be accessed easily.

This manual is for qualified personnel. The tasks described in this manual may be performed by qualified personnel only.

General Precaution-

Conventions used:

WARNING! Warnings identify conditions or practices that could result in personal injury;

CAUTION! Caution identify conditions or practices that could result in damaged to the unit or other equipment connected.



WARNING! Before installing and using this inverter, read all instructions and cautionary markings on the inverter and all appropriate sections of this guide.



WARNING! Normally grounded conductors may be ungrounded and energized when a ground fault is indicated.



WARNING! This inverter is heavy. It should be lifted by at least two persons.



CAUTION! Authorized service personnel should reduce the risk of electrical shock by disconnecting both the AC and DC power from the inverter before attempting any maintenance or cleaning or working on any circuits connected to the inverter. Turning off controls will not reduce this risk. Internal capacitors can remain charged for 5 minutes after disconnecting all sources of power.



CAUTION! Do not disassemble this inverter yourself. It contains no user-serviceable parts. Attempt to service this inverter yourself may cause a risk of electrical shock or fire and will void the warranty from the manufacturer.



CAUTION! To avoid a risk of fire and electric shock, make sure that existing wiring is in good condition and that the wire is not undersized. Do not operate the Inverter with damaged or substandard wiring.



CAUTION! Under high temperature environment, heat sink of this inverter could be hot enough to cause skin burns if accidentally touched. Ensure that this inverter is away from normal traffic areas.



CAUTION! Use only recommended accessories from installer. Otherwise, not-qualified tools may cause a risk of fire, electric shock, or injury to persons.



CAUTION! To reduce risk of fire hazard, do not cover or obstruct the heat sink.



CAUTION! Do not operate the Inverter if it has received a sharp blow, been dropped, or otherwise damaged in any way. If the Inverter is damaged, called for an RMA (Return Material Authorization).

3. Unpacking & Overview

3-1. Packing List

Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. You should have received the following items inside of package:



Inverter unit



Software CD

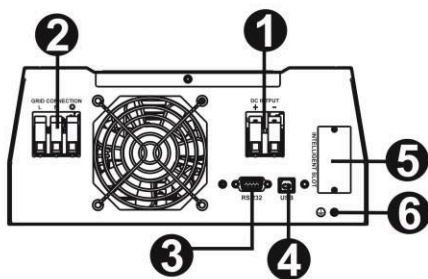
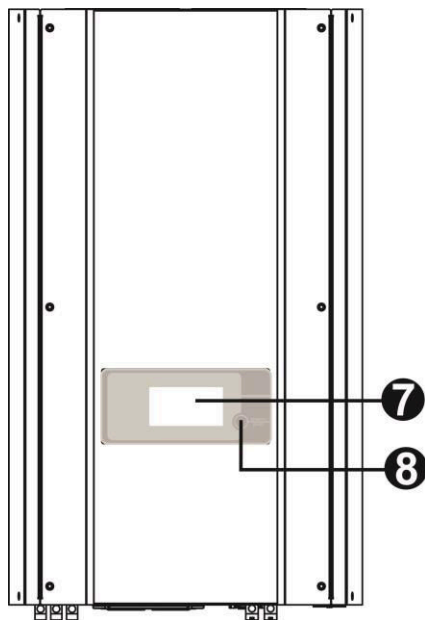


Manual



USB cable

3-2. Product Overview



- 1) PV connectors
- 2) Grid connectors
- 3) RS-232 communication port
- 4) USB communication port
- 5) Intelligent slot
- 6) Grounding
- 7) LCD display panel (Please check section 10 for detailed LCD operation)
- 8) Operation button



4. Installation

4-1. Selecting Mounting Location

Consider the following points before selecting where to install:

- Do not mount the inverter on flammable construction materials.
- Mount on a solid surface
- This inverter can make noises during operation which may be perceived as a nuisance in a living area.
- Install this inverter at eye level in order to allow the LCD display to be read at all times.
- For proper air circulation to dissipate heat, allow a clearance of approx. 20 cm to the side and approx. 50 cm above and below the unit.
- Dusty conditions on the unit may impair the performance of this inverter.
- The ambient temperature should be between 0°C and 40°C and relative humidity should be between 5% and 85% to ensure optimal operation.
- The recommended installation position is to be adhered to (vertical).
- For proper operation of this inverter, please use appropriate cables for grid connection.
- The pollution degree of the inverter is PD2. Select an appropriate mounting location. Install the solar inverter in a protected area that is dry, free of excessive dust and has adequate air flow. Do NOT operate it where the temperature and humidity is beyond the specific limits. (Please check the specs for the limitations.)
- Installation position shall not prevent access to the disconnection means.
- This inverter is designed with IP20 for indoor applications only.
- Regularly clean the fan vent.

4-2. Mounting Unit with Wall Mounting Bracket

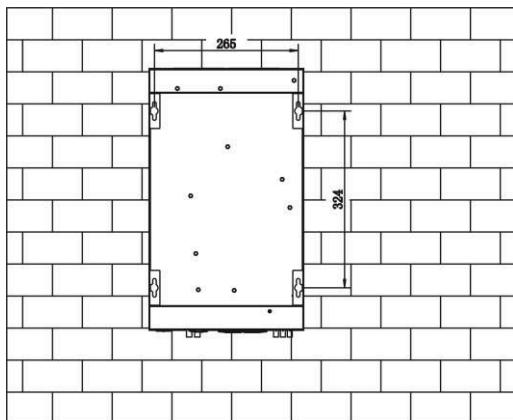
WARNING!! Remember that this inverter is heavy! Please be carefully when lifting out from the package.

Installation to the wall should be implemented with the proper screws. After that, the device should be bolted on securely.

The inverter only can be used in a CLOSED ELECTRICAL OPERATING AREA.

WARNING!! FIRE HAZARD.
SUITABLE FOR MOUNTING ON CONCRETE OR OTHER NON-COMBUSTIBLE SURFACE ONLY.

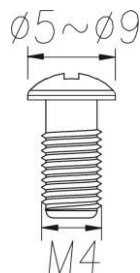
1. Drill four holes in the marked locations with four screws.
2. Place the unit on the surface and align the mounting holes with the four screws.



3. Check if the solar inverter is firmly secured.



Note: Recommended specs for screws.



5. Grid (AC) Connection

5-1. Preparation

Before connecting to AC utility, please install a **separate** AC circuit breaker between inverter and AC utility. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of AC input.

NOTE1: Although this inverter is equipped with 250VAC/30A fuse, it's still necessary to install a separate circuit breaker for safety consideration. Please use 250VAC/30A circuit breaker between inverter and AC utility.

NOTE2: The overvoltage category of the AC input is III. It should be connected to the power distribution.

WARNING! It's very important for system safety and efficient operation to use appropriate cable for grid (utility) connection. To reduce risk of injury, please use the proper recommended cable size as below.

Suggested cable requirement for AC wire

Model	3KW	5KW
Nominal Grid Voltage	208/220/230/240 VAC	
Conductor cross-section (mm ²)	4	6
AWG no.	12	10

5-2. Connecting to the AC Utility

Step 1: Check the grid voltage and frequency with an AC voltmeter. It should be the same to "VAC" value on the product label.

Step 2: Turn off the circuit breaker.

Step 3: Remove insulation sleeve 8 mm for three conductors. And shorten phase L and neutral conductor N 3 mm. Refer to chart 1.



Chart 1

Step 4: Connect wires according to polarities indicated on terminal block. Be sure to connect PE protective conductor (⊕) first.

L → LINE (brown or black)

N → Neutral (blue)

⊕ → Ground (yellow-green)

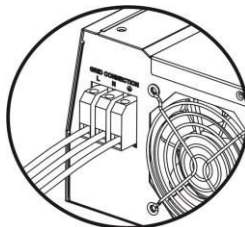


Chart 2

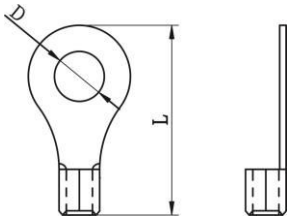
Step 5: Make sure the wires are securely connected. The reference tightening torque is 0.82 N.m.

Step 6: For safe operation, please use one more wire with ring terminal to connect grounding. Refer to Chart 3.



Chart 3

Ring terminal:



Recommended wire and terminal size:

Wire Size	Ring Terminal			Torque value
	Cable mm ²	Dimensions		
		D (mm)	L (mm)	
10 AWG	6	4.3	21.8	1.2~ 2 Nm

CAUTION: To prevent risk of electric shock, ensure the ground wire is properly earthed before operating the solar inverter.

6. PV Module (DC) Connection

CAUTION: Do **NOT** connect battery or DC source to PV connectors. Otherwise, it will cause inverter damage.

CAUTION: Before connecting to PV modules, please install **separately** a DC circuit breaker between inverter and PV modules.

NOTE1: Please use 600VDC/20A circuit breaker for 3KW, 600VDC/25A for 5KW

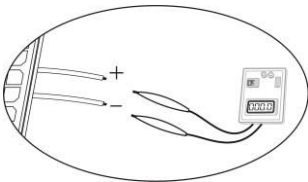
NOTE2: The overvoltage category of the PV input is II.

Please follow below steps to implement PV module connection:

WARNING: Because this inverter is non-isolated, only three types of PV modules are acceptable: single crystalline and poly crystalline only class A-rated and CIGS modules. To avoid any malfunction, do not connect any PV modules with possibility of leakage current to the inverter. For example, grounded PV modules will cause leakage current to the inverter. When using CIGS modules, please be sure do NOT grounding.

CAUTION: It's requested to have PV junction box with surge protection. Otherwise, it will cause inverter damage when lightning occurs on PV modules.

Step 1: Check the input voltage of PV array modules. The acceptable input voltage of the solar inverter is 250VDC - 450VDC. This system is only applied with one string of PV array. Please make sure that the maximum current load of PV input connector is 13A for 3KW, 18A for 5KW.



CAUTION: Exceeding the maximum input voltage can destroy the unit!! Check the system before wire connection.

Step 2: Disconnect the circuit breaker.

Step 3: Remove insulation sleeve 10 mm for positive and negative conductors. Refer to chart 4.

Step 4: Check correct polarity of connection cable from PV modules and PV input connectors. Then, connect positive pole (+) of connection cable to positive pole (+) of PV input connector. Connect negative pole (-) of connection cable to negative pole (-) of PV input connector. Refer to Chart 5.

Step 5: Make sure the wires are securely connected.
The reference tightening torque is 1.22 N.m.

WARNING! It's very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommended cable size as below.

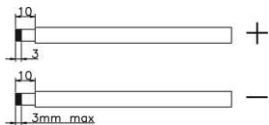


Chart 4

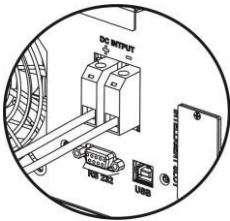


Chart 5

Model	Conductor cross-section (mm ²)	AWG no.
3KW	4	12
5KW	6	10

CAUTION: **Never** directly touch terminals of the inverter. It will cause lethal electric shock.

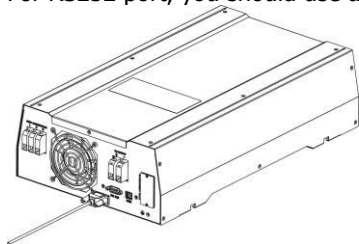
CAUTION: Do NOT touch the inverter to avoid electric shock. When PV modules are exposed to sunlight, it may generate DC voltage to the inverter.



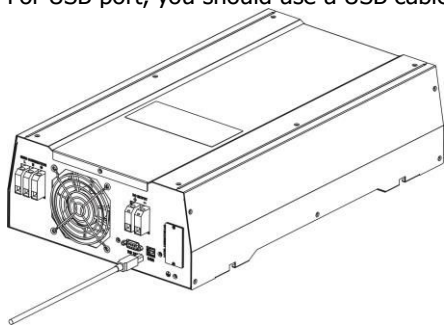
7. Communication

The inverter is equipped with RS232 and USB ports and it is also equipped with a slot for alternative communication interfaces in order to communicate with a PC with corresponding software. This intelligent slot is suitable to install with SNMP card and Modbus card. Follow below procedure to connect communication wiring and install the software.

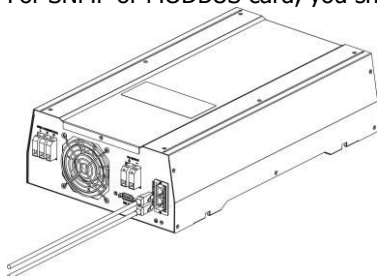
For RS232 port, you should use a DB9 cable as follows:



For USB port, you should use a USB cable as follows:



For SNMP or MODBUS card, you should use RJ45 cables as follows:



Please insert CD into your computer and install monitoring software in your PC. Follow below steps to install software.

1. Follow the on-screen instructions to install the software.
2. When your computer restarts, the monitoring software will appear as shortcut icon located in the system tray, near the clock.

After software is installed, you may initial the monitoring software and extract data through communication port.



8. Commissioning


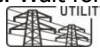
Step 1: Check the following requirements before commissioning:

- Ensure the inverter is firmly secured
- Check if the open circuit DC voltage of PV module meets requirement (Refer to Section 6)
- Check if the open circuit utility voltage of the utility is at approximately same to the nominal expected value from local utility company.
- Correct connection to grid
- Full connection to PV modules
- Unused DC input connectors are sealed with supplied sealing plugs.
- AC circuit breaker and DC circuit breaker are installed correctly.

Step 2: After switching on the DC circuit breakers, it will display "No Utility" in the LCD screen. Then, switch on the AC circuit breakers. After 60 seconds, the system will automatically connect to the grid. Then:

- If inverter icon is in the LCD display like below, commissioning has been successfully.



- Or, if  icon flashes, there is insufficient radiation and the inverter is in standby mode. Wait for sufficient radiation.
- Or, if  icon flashes, the grid voltage or frequency is beyond acceptable range and the inverter is in standby mode. Wait for grid voltage or frequency to return to acceptable range.
- Or if **ERROR** icon flashes, there has been an error. Please check chapter 11 for trouble shooting. If the problem still resists, please inform your installer.

Step 3: After the inverter is successfully on, please calibrate the time and date of the inverter via monitoring software. Please check software manual for the details.



9. Operation

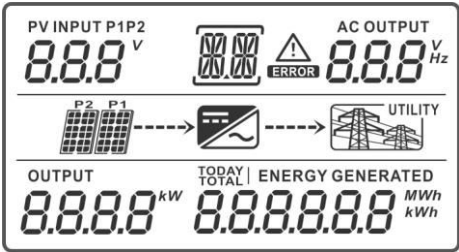
9-1. Interface









This LCD panel shows current status and value of your system. This display is operated by Information/SELECT button.

NOTICE: To accurately monitor and calculate the energy generation, please calibrate the timer of this unit via software every one month. For the detailed calibration, please check the user manual of bundled software.

9-2. LCD Information Define



Display	Function
PV INPUT P1P2 8.8.8 V	Indicates input voltage of PV module 1 or PV module 2. P1: PV module 1, P2: PV module 2, V: voltage
AC OUTPUT 8.8.8 V Hz	Indicates AC output voltage or frequency. V: voltage, Hz: frequency
OUTPUT 8.8.8.8 kW	Indicates current feeding power.
TODAY ENERGY GENERATED 8.8.8.8.8 MWh kWh	Indicates energy generated today.
TOTAL ENERGY GENERATED 8.8.8.8.8 MWh kWh	Indicates total energy generated so far.
⚠	Indicates that the warning occurs.
ERROR	Indicates that the fault occurs.
🔌	Indicates fault code in fault mode or WR for warning situation.

	Indicates PV module status. <ul style="list-style-type: none">Each  indicates 150VDC. When input voltage is below 100VDC,  icon will flash.When PV module is not connected,  icon will flash.
	Indicates the Inverter circuit is working.
	Indicates grid.

9-3. Operation Button

The INFORMATION/SELECT button controls LCD settings and has three functions.

Function	Operation	Description
Information changes	Press the button once	To jump to next selection or decrease value.
Query Menu	Press and hold the button for 2 seconds	To enter query menu
Selection confirmed	Press and hold the button for 2 seconds	To confirm selection or value entry in query menu.

NOTE: If backlight shuts off, you may activate it by pressing any button.

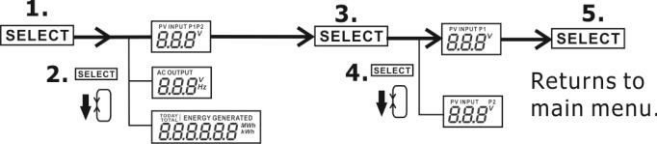
9-4 Query Menu Operation

This display shows current values of your system. These displayed values can be changed in query menu via button operation. Press “INFORMATION/SELECT” button to enter query menu. There are three query selections:

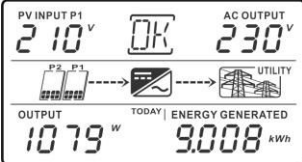
- Input voltage of PV module 1 or PV module 2
- Frequency or voltage of AC output
- Power generation today or total power generation since installation.

Input voltage of PV module
Input voltage of PV module 1

Procedure



LCD Display



Input voltage of PV module 2 (only available for 5KW)

Procedure	LCD Display
<p>1. SELECT → PV INPUT P1 P2 88.8^v → 3. SELECT → PV INPUT P1 88.8^v</p> <p>2. SELECT → AC OUTPUT 88.8^{Hz} → 4. SELECT → PV INPUT P2 88.8^v</p> <p>↓</p> <p>1000h ENERGY GENERATED 888888^{Wh}</p> <p>5. SELECT → Returns to main menu.</p>	

Frequency or voltage of AC output**Voltage of AC output**

Procedure	LCD Display
<p>1. SELECT → PV INPUT P1 P2 88.8^v → 3. SELECT → AC OUTPUT 88.8^v → 5. SELECT</p> <p>2. SELECT → AC OUTPUT 88.8^{Hz} → 4. SELECT → AC OUTPUT 88.8^{Hz} → Returns to main menu.</p> <p>↓</p> <p>1000h ENERGY GENERATED 888888^{Wh}</p>	

Frequency of AC output






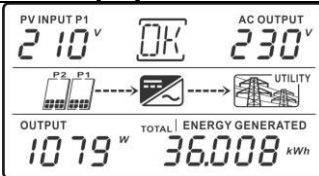
Procedure	LCD Display
<p>1. SELECT → PV INPUT P1 P2 88.8^v → 3. SELECT → AC OUTPUT 88.8^v → 5. SELECT</p> <p>2. SELECT → AC OUTPUT 88.8^{Hz} → 4. SELECT → AC OUTPUT 88.8^{Hz} → Returns to main menu.</p> <p>↓</p> <p>1000h ENERGY GENERATED 888888^{Wh}</p>	

Power generation**Power generation today**

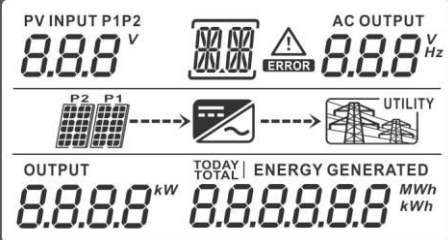
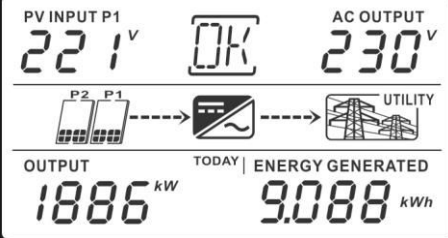
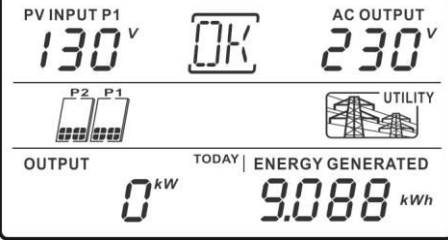
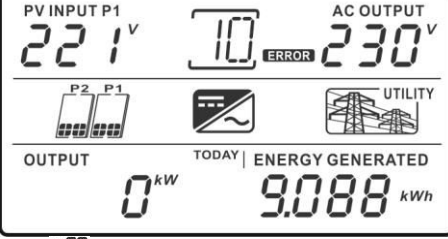


Procedure	LCD Display
<p>1. SELECT → PV INPUT P1 P2 88.8^v → 3. SELECT → 1000h ENERGY GENERATED 888888^{Wh} → 5. SELECT</p> <p>2. SELECT → AC OUTPUT 88.8^{Hz} → 4. SELECT → 1000h ENERGY GENERATED 888888^{Wh} → Returns to main menu.</p> <p>↓</p> <p>1000h ENERGY GENERATED 888888^{Wh}</p>	



Total power generation since installation

Procedure	LCD Display
1.  2. (SELECT)  3.  4. (SELECT)  5.  Returns to main menu.	

9-5. Operation Mode & Display

Mode	LCD Display	Description
Power on mode		The inverter is initializing.
Grid mode		The inverter is feeding power to the grid.
Standby mode		The inverter is waiting for the DC voltage to reach a certain level so that it can start feeding the grid.
Fault mode	  and  icons will flash.	An error occurs inside of the inverter. Please inform your installer.

10. Maintenance & Cleaning

Check the following points to ensure proper operation of whole solar system at regular intervals.

- Heat sink of the inverter should be cleaned from dust.
WARNING: Although the inverter is designed in sealed IP65 enclosure, it is not recommended to use a pressure washer to clean the inverter, or use other high pressure cleaning methods that could allow water or moisture to enter the unit.
- Clean the PV modules, during the cool time of the day, whenever it is visibly dirty.
- Periodically inspect the system to make sure that all wires and supports are securely fastened in place.


WARNING: There are no user-replaceable parts inside of the inverter. Do not attempt to service the unit yourself.










11. Trouble Shooting





When there is no information displayed in the LCD, please check if PV module connection is correctly connected.

NOTE: The warning and fault information can be recorded by remote monitoring software.


11-1. Warning List











When a warning situation occurs,  icon will flash and the fault code area will display “WR” wordings. You may check software for the detailed warning situations. Please contact your installer when below warning situations occur.

Warning	Icon (flashing)	Description
CPU is performing the auto-correction of AD signals.		Sampling adjustment is in process in DSP.
Data saving failure.		Flash memory fails.
Input PV is found lost.		The PV input voltage is out of range.
PV input voltage reads low.		The input PV voltage is too low to initiate the inverter.
Power island		Islanding condition is detected.
An Error occurred in the CPU initialization		Initialization failed in CPU when the inverter is turned on.
Power grid voltage exceeds the upper threshold		The grid voltage has exceeded the highest limit.
Power grid voltage falls below the lower threshold		The grid voltage is beyond the lowest limit.
Power grid frequency exceeds the upper threshold		The grid frequency has exceeded the highest limit.

Power grid frequency falls below the lower threshold		The grid frequency is beyond the lowest limit.
Power grid-connected average voltage exceeds the maximum threshold		Average feeding voltage has exceed the upper limit
Emergent grid disconnection		The utility is abnormal.
Over temperature alarm		Over temperature

11-2. Fault Reference Codes

When a fault occurs, the icon  will flash as a reminder. See below for fault codes for reference.

Situation			Solution
Fault Code	Fault Event	Icon (flashing)	
01	DC bus voltage exceeds the upper threshold		<ol style="list-style-type: none"> 1. Disconnect AC circuit breaker first. Then, disconnect DC circuit breaker. 2. Until LCD screen completely shuts down, turn on DC breaker first. It will show "No Utility" in LCD screen. Then, turn on AC breaker. After 300 seconds, the system will automatically connect to the grid. 3. If the error message still remains, please contact your installer.
02	DC bus voltage falls below the lower threshold		
05	An Inverter overcurrent event is detected		
07	An relay failure event is detected		
08	DC component in the output current exceeds the upper threshold		
11	Over-current on PV input is detected		
14	Inverter DC component exceeds the allowable range		
16	Leakage current CT failed		<ol style="list-style-type: none"> 1. The internal temperature is higher than specified temperature. 2. Leave inverter to be cooled to room temperature. 3. If the error message still remains, please contact your installer.
06	Over temperature fault		
09	PV input voltage exceeds the upper threshold		<ol style="list-style-type: none"> 1. Check if the open circuit voltage of PV modules is higher than 500VDC. 2. If PV open circuit voltage is less than 500VDC and



			the error message remains, please contact your installer.
10	Auxiliary power* failed *Auxiliary power means switch power supply.	ERROR	<ol style="list-style-type: none"> 1. Turn off the inverter. 2. Then, restart the inverter. 3. If the error message still remains, please contact your installer.
12	Leakage current exceeds the allowable range	ERROR	<ol style="list-style-type: none"> 1. The ground voltage is too high. 2. Please disconnect AC breaker first and then DC breaker. Check if grounding is connected properly after LCD screen completely shuts down. 3. If grounding is correctly connected, turn on DC breaker. After it displays "No Utility" in LCD screen, turn on AC breaker. After 300 seconds, the system will automatically connect to the grid. 4. If the error message still remains, please contact your installer.
13	PV insulation resistance is too low	ERROR	<ol style="list-style-type: none"> 1. Check if the impedance between positive and negative poles to the ground is greater than 1MΩ. 2. If the impedance is lower than 1MΩ, please contact your installer.
15	A difference occurred in the readings from the main and secondary controllers	ERROR	<ol style="list-style-type: none"> 1. Please disconnect AC breaker first and then disconnect DC breaker.
17	Communication with the main and secondary controllers is interrupted	ERROR	<ol style="list-style-type: none"> 2. After LCD screen is completely off, turn on DC breaker. Until it shows "No Utility" in LCD display, turn on AC breaker. After 300 seconds, the system will automatically connect to



			the grid. 3. If error message remains, please contact your installer.
27	Fan fault	ERROR	1. Please check if fans are running ok. 2. If fans are running ok, please shut down inverter first and then, restart it. 3. If fans are stop running or error message remains after restart the inverter, please contact your installer.
30	Version mismatch between controller board and power board	ERROR	1. Shut down the inverter completely. 2. Restart the inverter to see if it's ok. 3. If error message still remains, please contact your installer.



12. Specifications

MODEL	3KW	5KW
INPUT (DC)		
Max. DC Power	3150 W	5300W
Maximum DC Voltage	500 VDC	
Full load MPP Voltage Range	250 VDC ~ 450 VDC	300 VDC ~ 450 VDC
DC Nominal Voltage	360 VDC	
Start-up Voltage / Initial Feeding Voltage	115VDC / 150VDC	
Maximum Input Current (Isc)	13A	18A
Max. inverter back feed current to the array	0A	
OUTPUT (AC)		
AC Nominal Power	3000 W	5000 W
Maximum AC Apparent Power	3000 VA	5000 VA
Nominal AC Voltage / Range*	230 VAC / 184 VAC ~ 264 VAC	
AC Grid Frequency	50 Hz / 60 Hz	
AC Grid Frequency Range*	47.5~ 51.5 Hz	
Nominal Output Current	13A	21.7 A
Inrush Current/Duration	13A / 20ms	21.7A / 20ms
Maximum Output Fault Current/Duration	52A / 1ms	
Maximum output Overcurrent Protection	52A	
Power Factor range	0.9 lag ~ 0.9 lead	
EFFICIENCY		
Maximum Efficiency @ Nominal Voltage	96%	
European Efficiency @ Nominal Voltage	95%	
PROTECTION		
DC Reverse-Polarity Protection	Yes	
Ground Fault Monitoring	Yes	
Grid Monitoring	Yes	
AC Short Circuit Protection	Yes	
PHYSICAL		
Dimension, D X W X H (mm)	480 x 285 x 125	
Net Weight (kgs)	9.5	
INTERACE		
Standard	USB & RS-232	
Intelligent Slot	Optional SNMP, Modbus, GPRS, WIFI card	
ENVIRONMENT		
Protection Degree	IP20	
Humidity	0 ~ 100%	
Operating Temperature	0°C to 40°C	
Altitude	0 ~ 1000 m	

* The grid voltage and frequency range may vary depending on different country grid standard. And these can be changed through SolarPower software.

