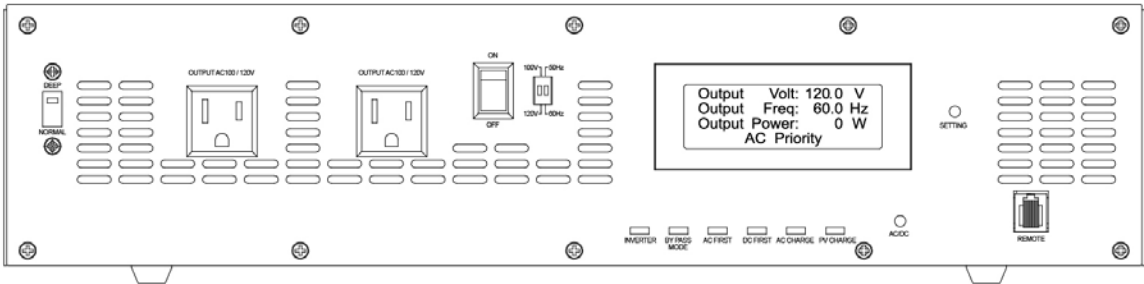


# 1500 WATT HYBRID INVERTER (SOLAR / INVERTER / AC MAINS)



## Users' Manual

## 1. Introduction

Thank you for purchasing the 1500 Watt Hybrid Inverter. Connected to the 12 volt battery, the 1500W Hybrid Inverter turns out to be AC pure sine wave power through isolation. This advanced product uses the MCU chip control technique, applying the most secure and stable control algorithm design, to improve the output parameters of the inverter to a new level. Also, this product and electrical appliances are well protected by the multiple protection features. The applicability of this inverter can be broadly used at households, schools, camping, flood preventions, communications, first aids, islands and other places without power supply. Please read the instructions carefully to ensure proper operation and save it for future reference.

## 2. Safety Precautions

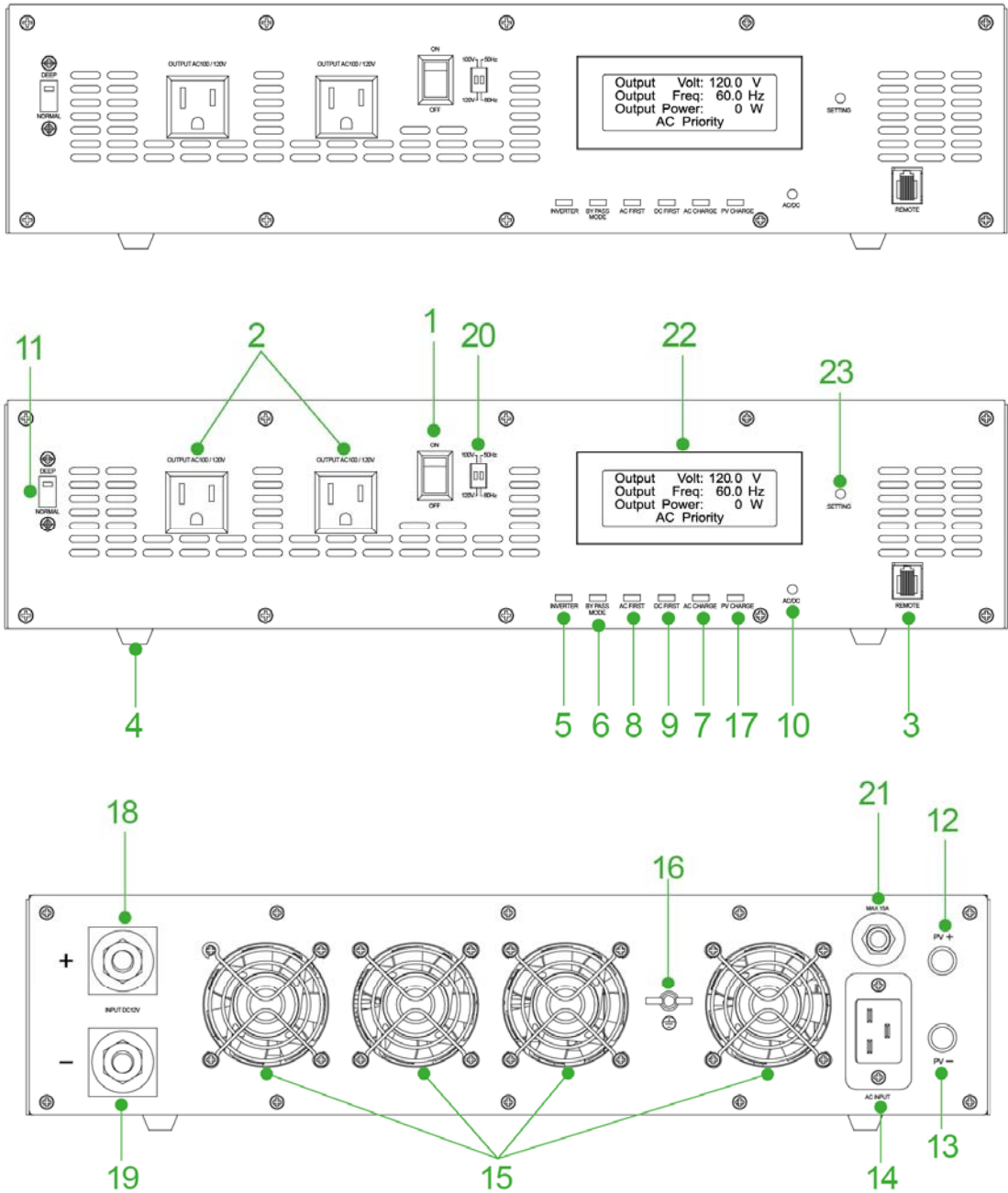
- The inverter can connect only to 12 volt battery and 12 volt DC power supply. Otherwise, it may cause product damage with inappropriate power supply.
- The inverter can convert 12 volt DC into 230 volt AC. The 230 volt AC can NOT be converted to 12 volt DC to only charge the battery bank that is connected.
- Do NOT place the inverter near flammable materials or any location which accumulate flammable fumes or gases. It has excellent thermal tolerance but might overheat after working for a long time. Please keep the inverter 15 cm (6 inch) away from other objects and place it in a clean and well-ventilated location.
- Do NOT operate the inverter with wet hands and do NOT expose it to rain or moisture.
- To prevent the risk of electric shock or sparkle, the plug must be securely connected to the outlet.
- Any unauthorized repair or disassembly may result in electric shock and void of warranty.

## 3. Product Features

- ☆ The power supply is controlled by the intelligent chip (MCU).
- ☆ 12 volt DC being converted to high-voltage DC power ends up as AC power.
- ☆ It can charge from either solar power or AC mains. The solar power is given priority by the MCU, considering energy saving.
- ☆ The cooling fan in the inverter is thermally activated and turns on when the inverter becomes warm.
- ☆ Press the AC / DC priority switch to input either AC or DC power.
- ☆ The AC mains have priority over the inverter and solar mode. (Factory default setting)

4. Names and Functions

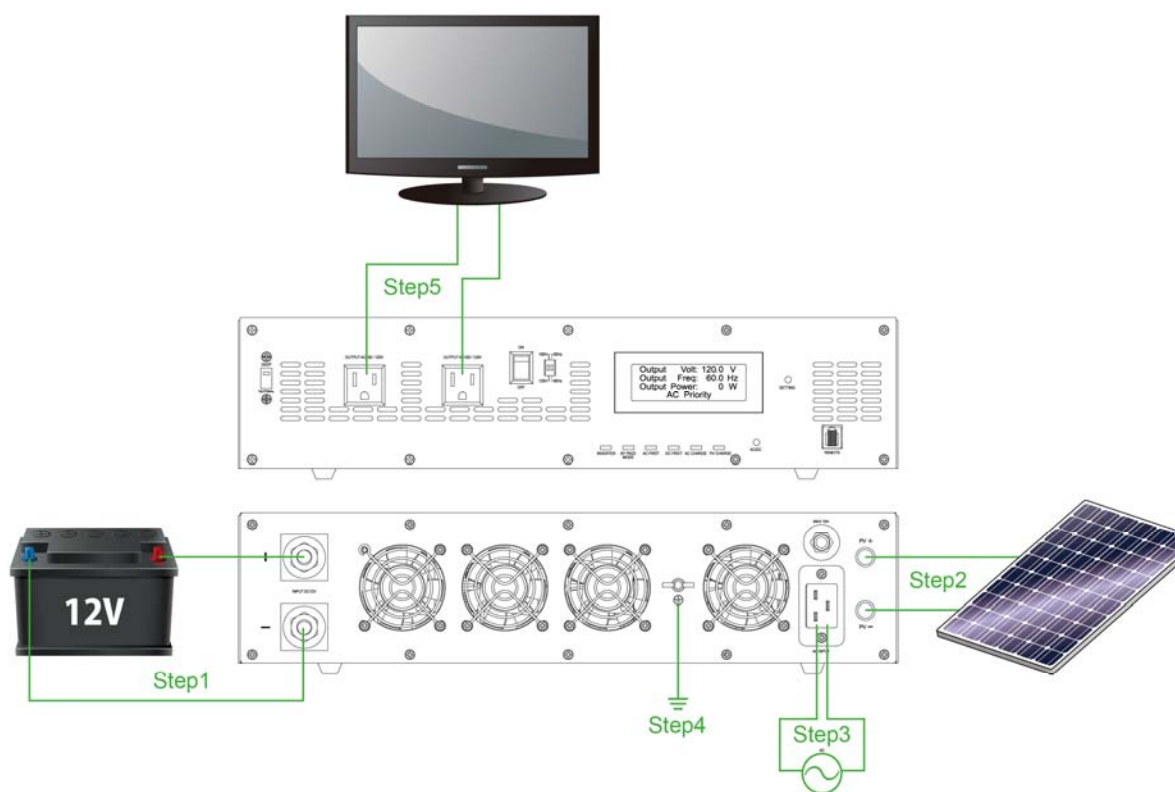
◎Front Panel (Power Output) and Back Panel (Power Input)



- |                                       |                                     |
|---------------------------------------|-------------------------------------|
| (1) Power switch                      | (2) AC outlet                       |
| (3) Remote control socket             | (4) Rubber Stand                    |
| (5) Inverter mode (RED)               | (6) Bypass mode (RED)               |
| (7) AC Charge (RED)                   | (8) AC Mains first (RED)            |
| (9) DC First mode( RED)               | (10) A/C Priority switch            |
| (11) Battery switch (Deep and Normal) | (12) Pos. terminal of solar charger |
| (13) Neg. terminal of solar charger   | (14) AC input socket                |
| (15) Cooling fan                      | (16) Ground terminal                |
| (17) PV Charger                       | (18) Pos. terminal of battery       |
| (19) Neg. terminal of battery         | (20) 50/60Hz switch                 |
| (21) Over load fuse                   | (22) LCD Display                    |
| (23) LCD Display switch               |                                     |

### **5. How to Connect the Hybrid Inverter in Your Facilities**

1. Connect the battery terminals with the battery as shown in Step 1. Please ensure the polarity is correct.
2. Connect the solar charge terminals with the solar panel as shown in Step 2. Please ensure the polarity is correct.
3. Connect the AC input socket with the AC mains as shown in Step 3.
4. Connect the ground terminal with the ground wire as shown in Step 4.
5. Connect the AC outlet with appliances as shown in Step 5.
6. After switching the inverter on, the power indicator light (red) constantly lit shows that power is operating normally. If the power indicator light (red) is blinking, please turn it off and check the wiring.

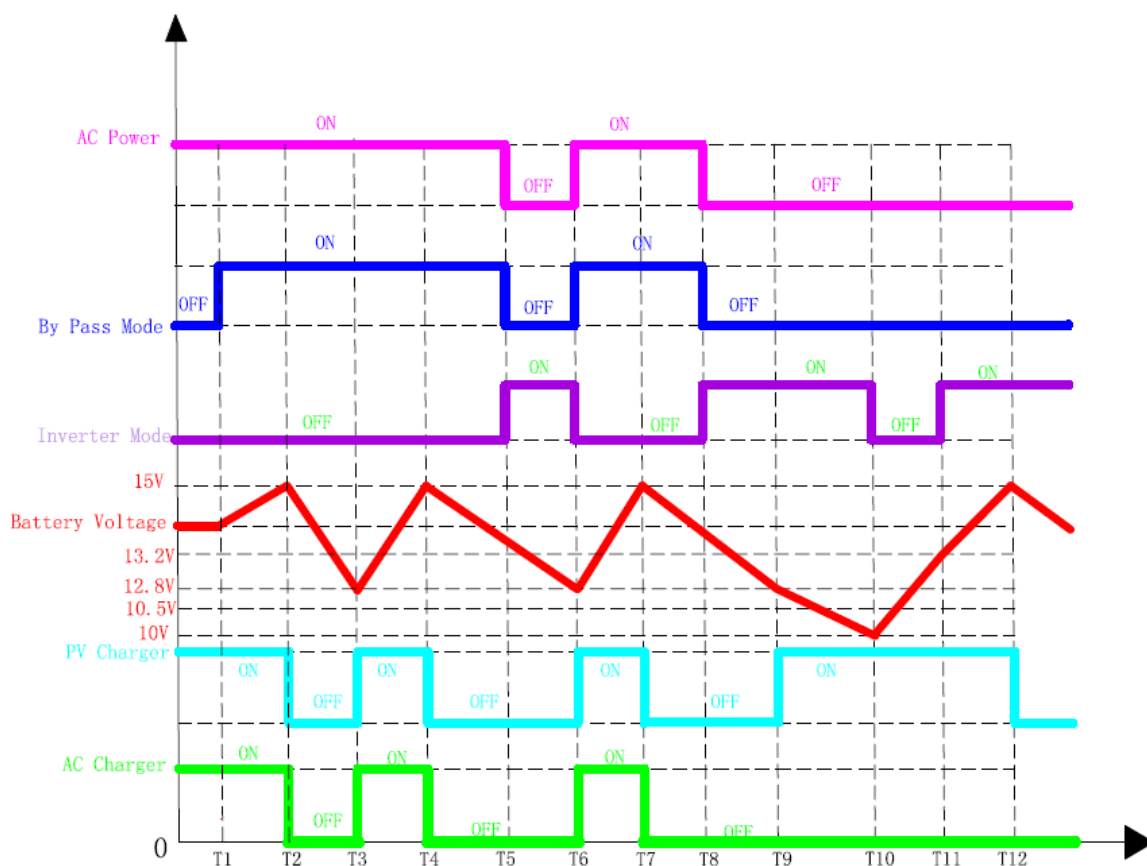


## 6. FAQ and Troubleshooting Guide

Problem	Possible Cause	Suggested Action
Hybrid inverter is not working	The battery is not being charged properly.	Have a qualified technician check the battery. Recharge or replace the battery.
	Incorrect connections between the inverter and the power source	Check the connections with exposed conductive parts.
	Blown fuse in the inverter	Replace the fuse.
No AC output voltage	Over temperature protection	Check for adequate ventilation. Reduce the load on the inverter to rated power.
	The load is rated at more than 1500 watts; an overload protection has occurred.	Ensure the load with a power rating less than 1500 watts. Once the load exceeds the surge capability, please use a load with a starting surge power within its capability.

	Short circuit protection	Check if the load exceeds the rating or short circuit occurs.
TV or radio interference	The electronic equipment is not shielded to minimize its interference with TV signals.	Put the inverter far away from the equipment and adjust the orientation of the inverter.
Battery discharge time is too short	The battery is old or defective.	Replace the battery.
	The battery capacity is too small.	Use a higher capacity battery.
	Charger failure (no charge voltage)	The battery voltage is too low to be charged. Change the battery.

### 7. AC Mains First



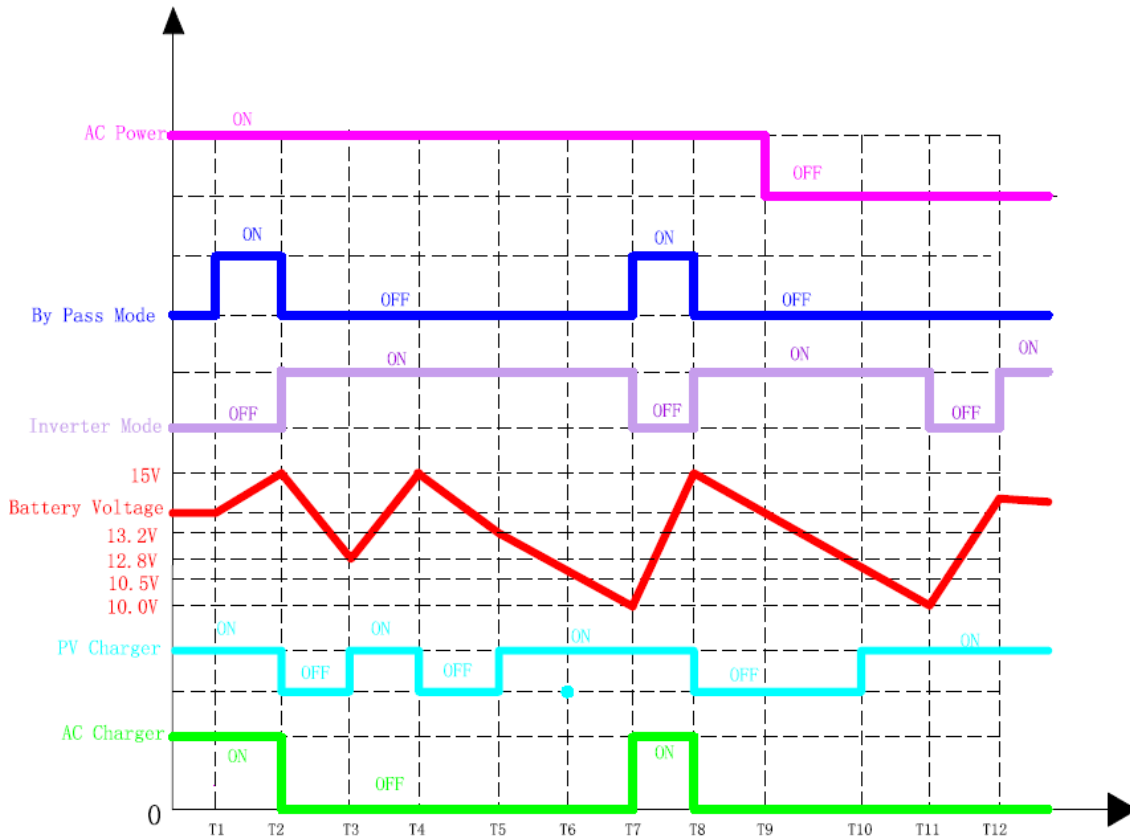
t1: When you turn on the 1500 Watt Hybrid Inverter, in order to ensure full battery capacity, the MCU will automatically enter the bypass mode, supplying electricity to the load. In the meantime the AC charger and solar charger will continue to charge the battery.

t2: When the battery is fully charged to 15 volt, the MCU will turn OFF both the AC and

solar charger. Otherwise the battery life span will be shortened by overcharging. Meanwhile, it is still in the bypass mode supplying electricity to the load.

- t3: Even if it is in the bypass mode, the battery voltage will gradually drop due to the standby loss from the 1500 Watt Hybrid Inverter. Once the battery drops below 12.8 volt, it will be charged by the AC charger upon the charger current below 8A (e.g. night time or cloudy days). Likewise, it will be charged by the solar charger above 8A.
- t4: When the load requirement is less than the energy provided by the chargers, the battery voltage will climb slowly. Once it reaches 15 volt, the MCU will shut off the chargers and supply the electricity to the load.
- t5: As the charger is OFF, the battery voltage will slowly fall between 13.2 volt and 15 volt (float charging). Once a power cut occurs, the MCU will automatically turn ON the inverter mode (<15ms) to keep loads running.
- t6: When the power returns, the MCU will switch to the bypass mode supply electricity to the load. If the battery voltage drops to 12.8 volt, the MCU will once again start charging.
- t7: When the load requirement is less than the energy provided by the chargers, the battery voltage will climb slowly. Once it reaches 15 volt, the MCU will shut off the chargers and supply electricity to the load.
- t8: When a power cut occurs, the MCU will automatically turn on the inverter mode (<15ms) to keep loads running.
- t9: Since the inverter mode is ON, the battery will be discharging rather quickly. As the battery drops below 12.8 volt, the solar charger will be turned on again.
- t10: As the battery voltage falls as low as 10 volt and the utility remains unavailable, the battery will be charged by only the solar charger. Then the battery will discharge very fast since the inverter continues supplying power through it. The inverter mode eventually shut down to prevent over discharging.
- t11: When the battery voltage rises to 13.2 volt, the MCU will restart the inverter supplying power to the load.
- t12: If the solar charger current is more than 8A and the utility is not available at the same time, the power to the battery is provided by the solar charger. As soon as the battery reaches 15 volt again, the solar charger will be turned OFF simultaneously.

### **8. DC Power First**



t1: When you turn on the 1500 Watt Hybrid Inverter, in order to ensure full battery capacity, the MCU will automatically enter the bypass mode supplying, electricity to the load. In the meantime the AC charger and solar charger will continue to charge the battery.

t2: When the battery is fully charged to 15 volt, the MCU will turn OFF both the AC and solar charger. Otherwise the battery life span will be shortened by overcharging. The MCU will also switch to the inverter mode supply electricity to the load through the battery. (Users can also press the AC/DC priority switch to set the DC first mode as the battery discharges below 15 volt)

t3: When the battery drops below 12.8 volt, the MCU will once again start up the solar charger instead of the AC charger in order to save energy.

t4: When the load requirement is less than the energy provided by solar panels, the battery voltage will climb slowly. When it reaches 15 volt, the solar charger will turn OFF to avoid overcharging.

t5: When the battery drops below 12.8 volt, the solar charger will start charging again.

t6: If the load requirement is greater than the energy provided by the solar panels, the battery voltage will gradually decline. As soon as it is down to 11 volt, the built-in



alarm will go off to inform users of the low voltage.

t7: As the battery voltage falls as low as 10 volt and the utility works normally, the MCU will detect this and enter the bypass mode supplying electricity to the load. In the meantime the AC charger and solar charger keep charging the battery to prevent the unit from switching off. Also, the solar charger will be turned ON if the solar current is higher than 8A to achieve the goal of energy saving.

t8: When the battery is fully charged by the AC charger and solar charger (battery voltage around 15 volt), both chargers will be turned OFF to prevent overcharging.

t9: Once a power cut occurs, the MCU will switch to the inverter mode (<15ms) to keep loads running.

t10: When the battery drops below 12.8 volt, the MCU will once again start up the solar charger instead of the AC charger in order to save energy.

t11: As the battery voltage falls as low as 10 volt and the utility remains unavailable, the battery will be charged by only the solar charger. Then the battery will discharge very fast since the inverter continues supplying power through it. The inverter mode eventually shut down to prevent over discharging.

t12: If the solar charger current is more than 8A and the utility is not available at the same time, the power to the battery is provided by the solar charger. As soon as the battery reaches 15 volt again, the solar charger will be turned OFF simultaneously.

## 9. Product Specifications

Item No. :	Hybrid inverter (Solar/DC/AC)
DC Input voltage	13.0VDC
DC Input voltage range	11-16VDC
DC Input low voltage alarm	10.5±0.5VDC
DC Input low voltage protection	10.0±0.5VDC

DC Input low voltage soft start	11.7V±0.5VDC	
DC Input high voltage protection	16.5±0.5VDC	
DC Input high voltage soft start	15.5V±0.5VDC	
Quiescent Input current	≤2A	
AC Output voltage	230VAC±5V (GS)	120VAC±5V (UL)
Continuous Power	1500W	
Overload Protection	1650-1900W , Alarm 30S	
Surge Power	3000W	
Frequency	60/50±0.5Hz (Switch)	
Wave Form	Pure Sine Wave	
THD	Line load≤3%	
Efficiency	≥80%	
Over Temperature Protection	≤65℃	
DC Input Fuse	40A×6	
Remote Controller	Bluetooth	
<b>AC</b>	GS	UL
AC Input Range	90VAC~ 264VAC	90VAC~132V AC
AC Input voltage	AC 230V	AC120V
Frequency	50/ 60±5Hz	60±5Hz
AC Input Quiescent current	≤0.08A	
AC Output watt (by pass)	1500W	

AC Output Over load (by pass)	1700-3000W	
AC Output Surge Powe ( by pass)	3000W	
AC Charger current	1.1A@230VAC	1.2A@120VAC
Charger output voltage ragne	10~15VDC	
Charger output current	10A@12VDC±10%	
Max charge voltage	15VDC±0.3V	
Efficiency	≥80%	
Output short circit protection	OK	
Reverse battery protection	OK	
Battery high voltage protection	15VDC±1V	
<b>PV</b>		
Max charge current	16A±2A	
Solar panle input voltage	20-50VDC	
Max charge voltage	15VDC±1V	
Soft Start	12.8VDC±1V	
MPPT Efficiency	≥92%	
LCD Display	Yes	
AC to /DC/ DC to AC	15ms	