Asian Electron Co., Ltd.

PSW1500W / PSW2000W Series

Pure Sine Wave Inverter

Instruction Manual

List of Contents

1. Features

- Pure sine wave output (THD < 3%) R Load
- Output frequency : 50 / 60Hz switch
- Low power "Power Saving Mode" to conserve energy
- RS – 232C interface / remote control port / wire connection to PC
- Wired remote control
- Loading controlled cooling fan
- Advanced microprocessor
- Protection : Input low voltage
  Overload
  Short circuit
  Low battery alarm
  Input over voltage
  Over temperature

1-1 Utilities Application

1-1-1 Power tools – circular saws, drills, grinders, sanders, buffers, weed and hedge trimmers, air compressors.

1-1-2 Office equipment – computers, printers, monitors, facsimile machines, scanner.

1-1-3 Household items – vacuum cleaners, fans, fluorescent and incandescent lights, shavers, sewing machines.

1-1-4 Kitchen appliances – microwave ovens, refrigerators and freezers, coffee makers, blenders, ice markers, toasters.

1-1-5 Industrial equipment – metal halide lamp, high – pressure sodium lamp.

1-1-6 Home entertainment electronics – television, VCRs, video games, stereos, musical instruments, satellite equipment.

1-2 Electrical Performance：1500W

Specification	Model					
Item	YK-PSW12150	YK-PSW24150	YK-PSW48150	YK-PSW12150E	YK-PSW24150E	YK-PSW48150E
Continuous Output Power	1500W					
Maximum Output Power	1650W(3mins)					
Surge Rating	3000W					
Input Voltage	12V	24V	48V	12V	24V	48V
Input Voltage Range	10-16VDC	20-32VDC	42-62VDC	10-16VDC	20-32VDC	42-62VDC
Dc Input over voltage alarm	15.5VDC	31VDC	61VDC	15.5VDC	31VDC	61VDC
Dc Input over voltage shut-down	16.0VDC	32.0VDC	62.0VDC	16.0VDC	32.0VDC	62.0VDC
Dc Input under voltage alarm	10.5VDC	21.0VDC	43.0VDC	10.5VDC	21.0VDC	43.0VDC
Dc Input under voltage shut-down	10.0VDC	20.0VDC	42.0VDC	10.0VDC	20.0VDC	42.0VDC
Frequency	50/60Hz ± 0.05%(Switch Selectable)					
Peak Output Current	25A			11A		
Efficiency (full load)	**86%**	**88%**	**89%**	**87%**	**90%**	**92%**
No Load Current Draw	1.2A	0.55A	0.3A	1.6A	0.7A	0.36A
Stand by Current Draw	≦1.5W Power Saving Mode					
Output Waveform	**R Load Pure Sine Wave <3% THD**					
Output Voltage adjustment	100 ~120V (Tune VR)			200 ~ 240V (Tune VR)		
Protection	Overload, Short Circuit, Reverse Polarity (Fuse), Over/Under Input Voltage, Over Temperature					
Digital Display	OVP, UVP, OTP, OLP, VAC, AMP, WATT, VDC, TEMP, Hz					
Safety	UL 458 (File No.: E228561)			EN60950-1		
EMC	FCC Class B	EN55022: 1998/A1:2000/A2:2003(Class B) EN55024: 1998/A1:2001/A2;2003 EN61000-3-2: 2000 EN61000-3-3: 1995/A1:2001 IEC 61000-4-2:1995/A1: 1998/A2:2000 IEC61000-4-3:2002/A1:2002 IEC61000-4-4:2004 IEC61000-4-6:2003/A1:2004 IEC61000-4-8:1993/A1:2000		E-Mark E9-10R-02,6033		
Power Saving Recovery Time	8 Seconds					
Interface Control Port	RS-232C With Baud Rate 2400, 4800,9600,19200 (Switch Selectable)					
Operating Temperature Range	-20℃ to 50℃					
Storage Temperature Range	-30℃ to 70℃					
Dimensions	413(L) x278(W) x102(H) mm					
Cooling	Thermostatically controlled cooling fan					
Weight	7.2kgs					

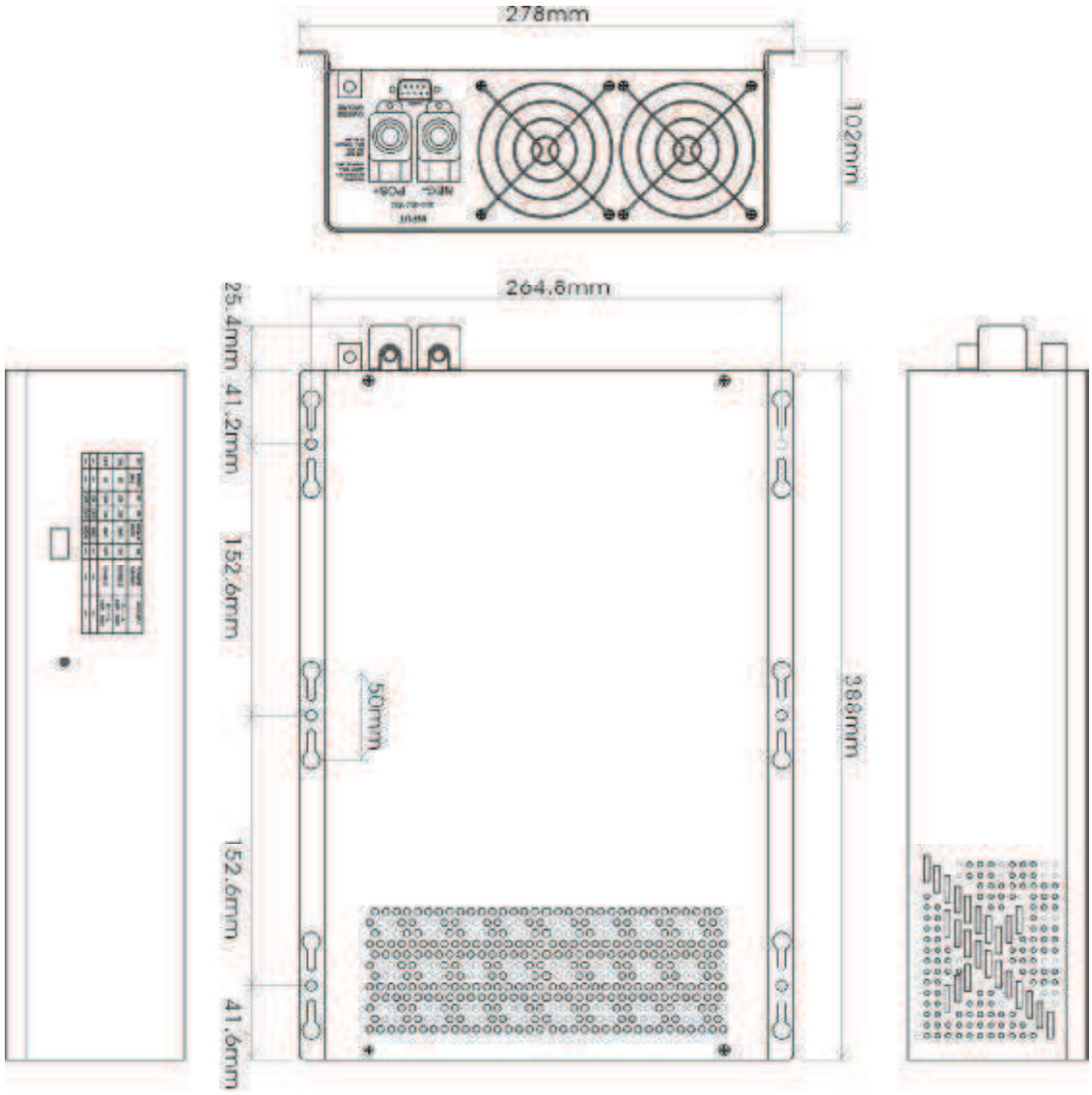
Electrical Performance：2000W

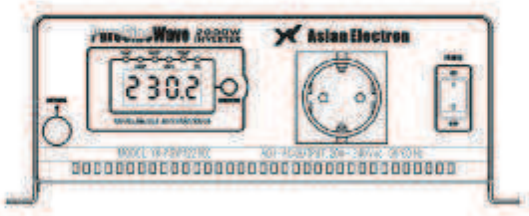
Specification	Model									
Item	YK- PSW 12200	YK- PSW 24200	YK- PSW 48200	YK-PSW 110200	YK-PSW 220200	YK-PSW 12200E	YK-PSW 24200E	YK-PSW 48200E	YK-PSW 110200E	YK-PSW 220200E
Continuous Output Power	2000W									
Maximum Output Power	2300W (3mins)									
Surge Rating	4000W									
Input Voltage	12V	24V	48V	110V	220V	12V	24V	48V	110V	220V
Input Voltage Range	10-16 VDC	20-32 VDC	42-62 VDC	90-140 VDC	180-275 VDC	10-16 VDC	20-32 VDC	42-62 VDC	90-140 VDC	180-275 VDC
DC Input over voltage alarm	15.5VDC	31VDC	61VDC	135VDC	270VDC	15.5VDC	31VDC	61VDC	135VDC	270VDC
C Input over voltage shut-down	16.0VDC	32.0VDC	62.0VDC	140VDC	275VDC	16.0VDC	32.0VDC	62.0VDC	140VDC	275VDC
C Input under voltage alarm	10.5VDC	21.0VDC	43.0VDC	95VDC	185VDC	10.5VDC	21.0VDC	43.0VDC	95VDC	185VDC
DC Input under voltage shut-down	10.0VDC	20.0VDC	42.0VDC	90VDC	180VDC	10.0VDC	20.0VDC	42.0VDC	90VDC	180VDC
Output Voltage adjustment	100 ~120V (Tune VR)					200 ~ 240V (Tune VR)				
Frequency	**50/60Hz ± 0.05% (Switch Selectable)**									
Peak Output Current	35A					16A				
Efficiency (full load)	**86%**	**88%**	**89%**	**94%**	**94%**	**87%**	**90%**	**92%**	**94%**	**94%**
No Load Current Draw	**1.25A**	**0.56A**	**0.32A**	**0.38A**	**0.18A**	**1.79A**	**0.87A**	**0.40A**	**0.4A**	**0.2A**
Stand by Current Draw	≦1.5W Power Saving Mode									
Output Waveform	**R Load Pure Sine Wave < 3% THD**									
Protection	Overload, Short Circuit, Reverse Polarity (Fuse), Over/Under Input Voltage, Over Temperature									
Digital Display	OVP, UVP, OTP, OLP, VAC, AMP, WATT, VDC, TEMP, Hz									
Safety	EN60950-1									
EMC	FCC Class B					EN 55022: 2006, Class A EN 55024:1998+A1: 2001+A2: 2003 EN 61000-3-2:2006 IEC 61000-4-2 Edition 1.2: 2001-04 EN 61000-3-3:1995+ A1:2001+A2: 2005 IEC 61000-4-3 Edition 3.0: 2006 IEC 61000-4-4: 2004 IEC 61000-4-5 Edition 2.0: 2005 IEC 61000-4-6 Edition 2.2: 2006 IEC 61000-4-8 Edition 1.1: 2001-03 IEC61000-4-11 Second Edition: 2004-03					
Power Saving Recovery Time	8 seconds									
Interface Control Port	RS-232C With Baud Rate 2400, 4800,9600,19200 (Switch Selectable)									
Remote Control Unit	Optional (RF Remote Control) or (wire Control)									
Operating Temperature Range	-20℃ to 50℃									
Storage Temperature Range	-30℃ to 70℃									
Dimensions	413(L) ×278(W) ×102(H) mm									
Cooling	Loading controlled cooling fan									
Weight	7.2kgs									

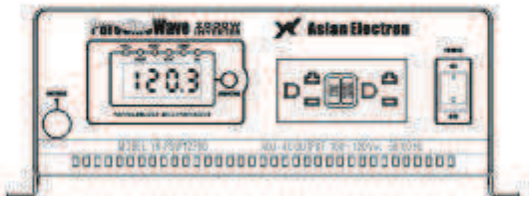
Note: The specifications are subject to change without notice.

1-3 Mechanical Drawings

1500W & 2000W







2. Introduction

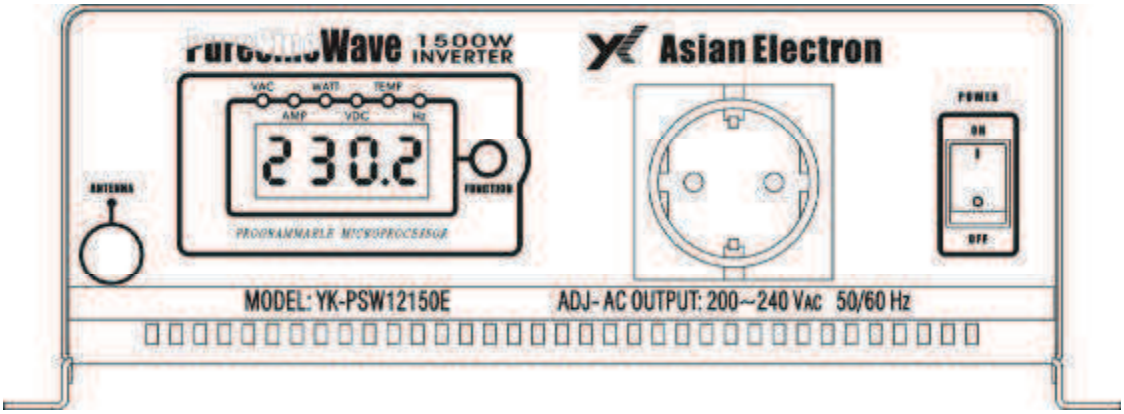
The power inverter series are the member of the most advanced line of mobile AC power systems available.

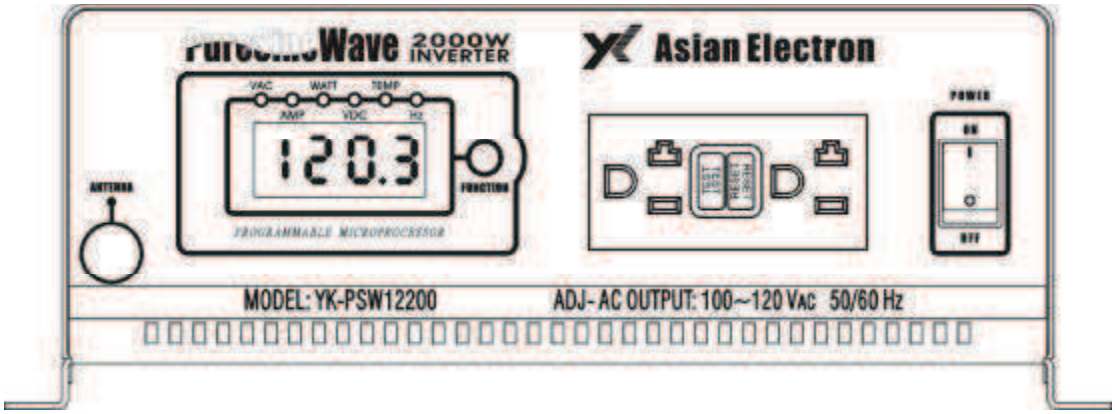
To get the most out of the power inverter, it must be installed and used properly.

Please read the instructions in this manual before installing and using this model.

2-1 Front Panel Operation

2-1-1 Front view:





2-1-2 ON / OFF switch:

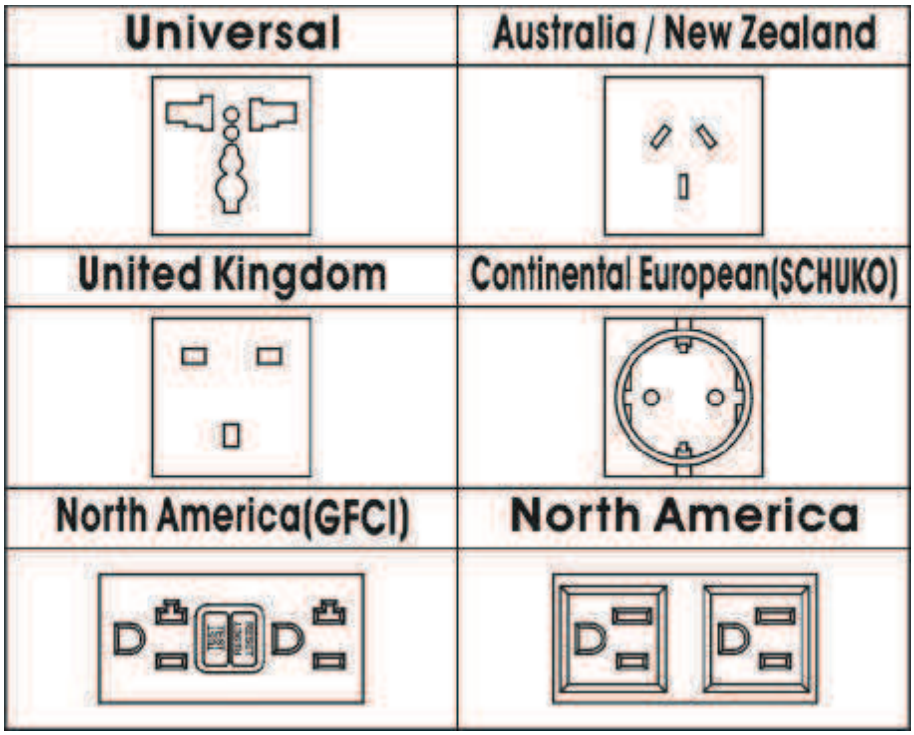
Power ON / OFF switch, leave in the OFF position during installation.

2-1-3 Function key

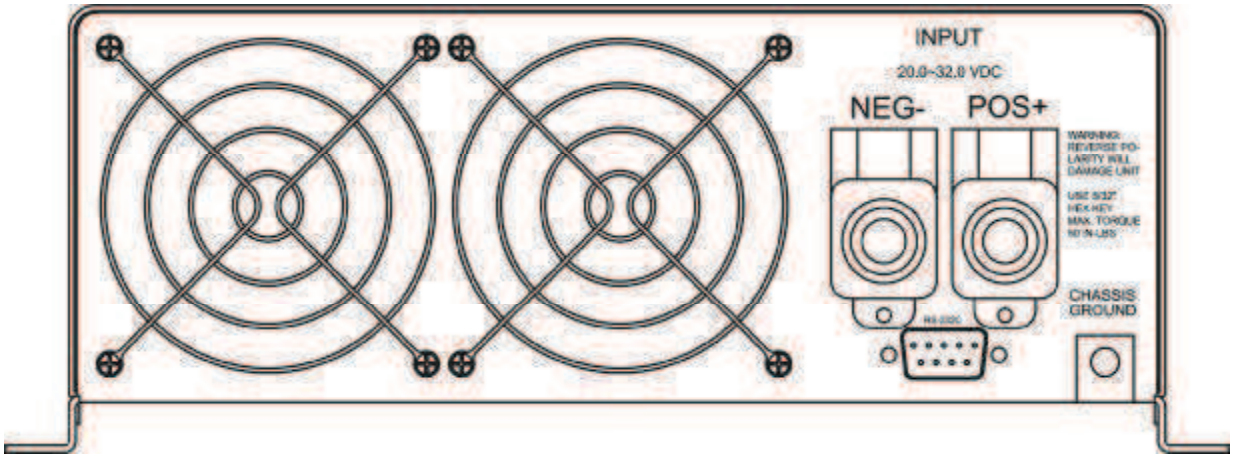
When sequentially push “Function Key”, it will display various status on the function screen, such as VAC, Amp, watts… and so on.

When malfunction is occurred, its display will be flashed on the screen.

2-1-4 AC outlet (Outlet sockets available):



2-2 Rear Panel Operation:



2-2-1 Ventilation openings:

Do not obstruct. Allow at least 3 inch for airflow.

2-2-2 Battery terminals:

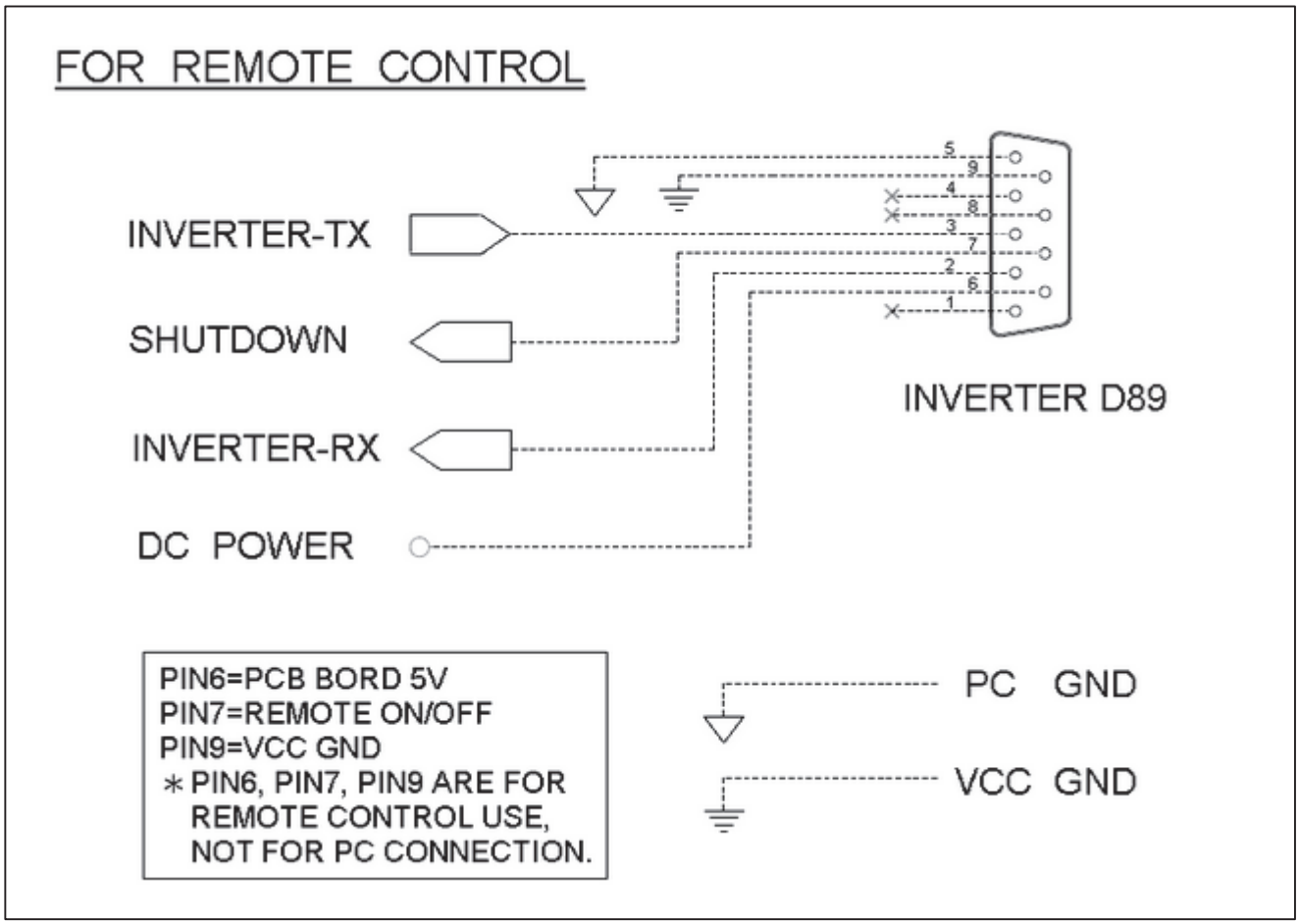
Connect to 12Vdc / 24Vdc / 48Vdc/110Vdc /220Vdc battery or other 12Vdc / 24Vdc / 48Vdc/ 110Vdc / 220Vdc power source.

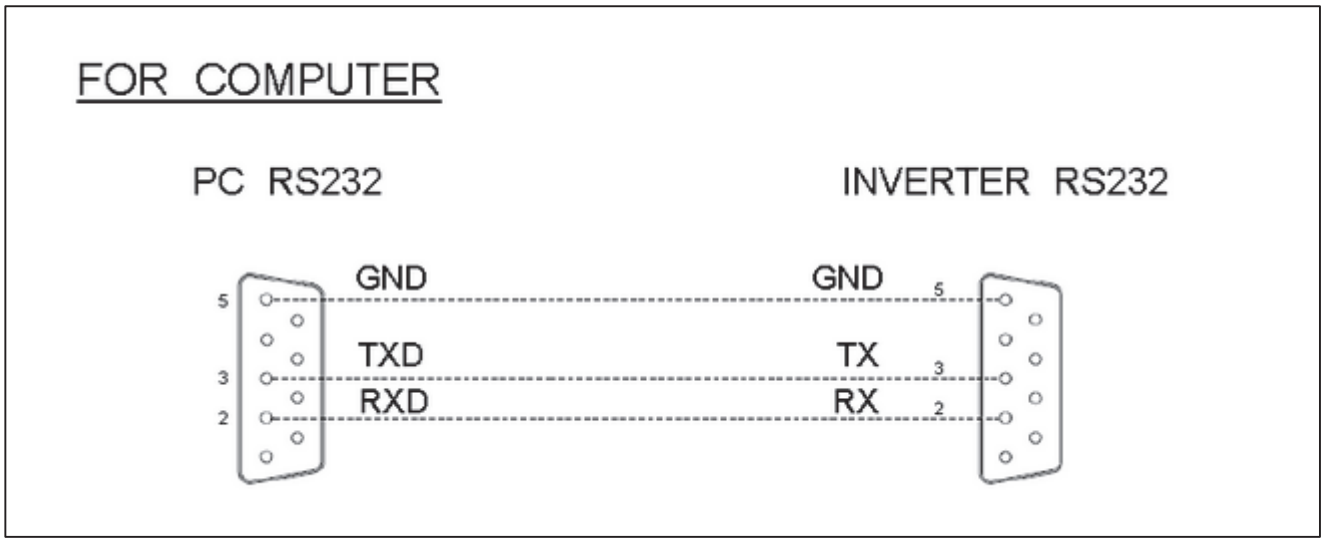
【＋】is positive;【－】is negative. Reversing polarity connection will blow internal fuse and may damage inverter permanently.

WARNING!
Do not connect the 12V model to a 24V or 48V battery. The unit will be destroyed immediately.

2-2-3 RS-232

Connect to remote control unit (option accessory) or connect to computer to remote control working status.





WARNING!
Any damages caused by using incorrect RS232 cable will be outside of our warranty scope. If you are not sure which one is correct RS232 cable, please purchase the correct RS232 cable from us directly.

2-2-4 Connect chassis ground terminal to earth or to vehicle chassis using # 8 AWG wire.

WARNING!
Operation of the inverter without a proper ground, connection may result in an electrical safety hazard.

WARNING!
Shock Hazard. Before proceeding further, carefully check the inverter is NOT connected to any batteries, and that all wiring is disconnected from any electrical sources. Do not connect the output terminals of the inverter to an incoming AC source.

2-3 Installation:

Where to install：

The power inverter should be installed in a location that meets the following requirements.

2-3-1 Dry – Do not allow water to drip or splash on the inverter.

2-3-2 Cool – Ambient air temperature should be between -20°C and 50°C, the cooler the better.

2-3-3 Safe – Do not install in a battery compartment or other areas where flammable fumes may exist, such as fuel storage areas or engine compartments.

2-3-4 Ventilated – Allow at least 3 inch of clearance around the inverter for airflow. Ensure the ventilation openings on the rear and bottom of the unit are not obstructed.

2-3-5 Dust-free – Do not install the inverter in a dusty environments where are dust, wood particles or other filings/shavings.
These dusts can be pulled into the unit when the cooling fan is operating.

2-3-6 Close to batteries – Avoid excessive cable lengths but do not install the inverter in the same compartment as batteries.
Use the recommended wire lengths and sizes (see section 2-6).
Also do not mount the inverter where it will be exposed to the gases produced by the battery. These gases are very corrosive and prolonged exposure that will damage the inverter.

2-4 Quick Hook – Up and Testing:

2-4-1 Unpack and inspect the power inverter, check to see that the power switch in the OFF position.

2-4-2 Connect the cables to the power input terminals on the rear panel of power inverter. The red terminal is positive (+) and black terminal is negative (-).
Insert the cables into the terminals and tighten relative nut to clamp the wires securely.

WARNING!
You may observe a spark when you make this connection since current may flow to charge capacitors in the power inverter.
Do not make this connection in the presence of flammable fumes. Explosion or fire may result.

WARNING!
Make sure all the DC connections are tight (torque to 9-10 ft-lbs, 11.7-13Nm). Loose connections will overheat and could result in a potential hazard.

2-4-3 Before proceeding further, carefully check that cable you have just connected negative terminal of inverter to the negative output power source.

CAUTION!
Reverse polarity connection will blow a fuse in inverter and may permanently damage the inverter.
Damage caused by reversing polarity connection is not covered by our warranty.

2-4-4 Connect the cable from the negative terminal of the inverter to the negative terminal of the power source. Make a secure connection.

WARNING!
You may observe a spark when you make this connection since current may flow to charge capacitors in the power inverter.
Do not make this connection in the presence of flammable fumes. Explosion or fire may result.

2-4-5 Set the power switch to the ON position; you will hear the “bi-bi-bi” sound. At the same time, the display shows the word “ASIAN” for two times. After that, you will hear the continuous sound from internal alarm. Then, the AC voltage shows on the display. It means the device has done the operation.

2-4-6 Set the power switch to the OFF position; the device shuts down completely.

2-4-7 Please use a power meter to accurately measure the true output R.M.S. voltage of inverter.
Our company uses a power meter such as IDRC CP-350 or ABM 2019 to measure our product.

2-5 AC Safety Grounding:

During the AC wiring installation, AC input and output ground wires are connected to the inverter. The AC input ground wire must connect to the incoming ground from your AC utility source.
The AC output ground wire should go to the grounding point for your loads (for example, a distribution panel of bus chassis).

2-5-1 Neutral grounding (GFCI’s):

2-5-1.1 **120V Models:**

The neutral conductor of the AC output circuit of the inverter is automatically connected to the safety ground during inverter operation. This conforms to national electrical code requirements that separately derived AC sources (such as inverter and generators) have their neutral conductors tied to ground in the same way that the neutral conductor from the utility is tied to ground at the GFCI breaker panel. For models configured with a transfer relay, while AC utility power is presenting and the inverter is in bypass mode, this connection (neutral of the inverter’s AC output to input safety ground) is not present so that the utility neutral is only connected to ground at your breaker panel, as required.

2-5-1.2 **230V Models:**

There is no connection made inside the inverter from either the line or neutral conductor to the safety ground.

Ground Fault Circuit Interrupters (GFCI'S):

Installations in Recreational Vehicles (for North American approvals) will require GFCI protection of all branch circuit connected to the AC output of the hardwire terminal equipped inverter. In addition, electrical codes require GFCI protection of certain receptacles in residential installations. While the pure sine wave output of the inverter is equivalent to the waveform provided by utilities, compliance with UL standards requires us to test and recommend specific GFCI. Our company has tested the following GFCI-protected 20A receptacles and found that they functioned properly when connected to the output of the inverter.

WARNING!
Do not operate the power inverter without connecting it to Ground.
Electrical shock hazard may result.

2-6 Making DC Wiring Connections:

Follow this procedure to connect the battery cables to the DC input terminals on the inverter. Your cables should be as short as possible (ideally, less than 10 feet / 3 meters) and large enough to handle the required current in accordance with the electrical codes or regulations applicable to your installation.

Cables that are not an adequate gauge (too narrow) or are too long will cause decreased inverter performance such as poor surge capability and frequent low input voltage warnings and shutdowns.

These low input voltage warnings are due to DC voltage drop across the cables from the inverter to the batteries.

The longer and narrower these cables, the greater the voltage drop.

WARNING!
The installation of a fuse must be on positive cable.
Failure to place a fuse on "+ "cables running between the inverter and battery may cause damage to the inverter and will void warranty.

Increasing your DC cable size will help improve the situation.

Our company recommends the following cables for optimum inverter performance (apply both 120V and 230V versions)

1500W

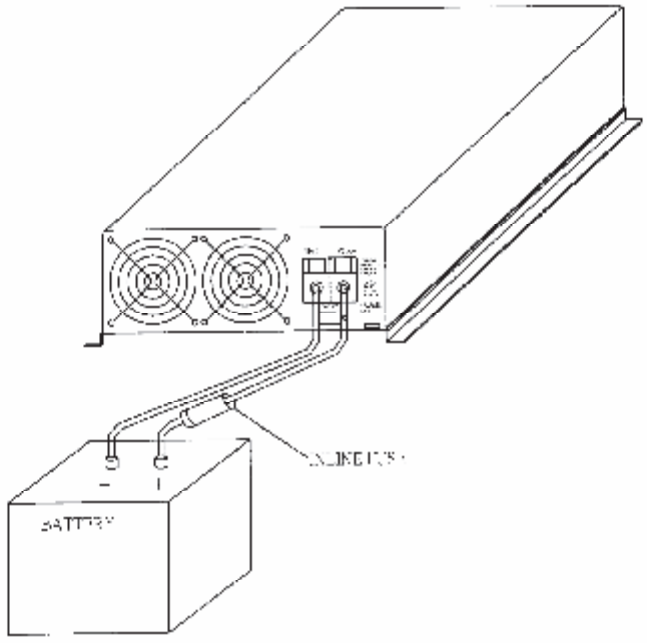
Model No	Wire AWG	Inline Fuse
YK-PSW12150	#2	200A
YK-PSW12150E	#2	200A
YK-PSW24150	#4	100A
YK-PSW24150E	#4	100A
YK-PSW48150	#6	50A
YK-PSW48150E	#6	50A

2000W

Model No	Wire AWG	Inline Fuse
YK-PSW12200	#2/0	250A
YK-PSW12200E	#2/0	250A
YK-PSW24200	#1/0	125A
YK-PSW24200E	#1/0	125A
YK-PSW48200	#2	70A
YK-PSW48200E	#2	70A
YK-PSW110200	#8	25A
YK-PSW110200E	#8	25A
YK-PSW220200	#16	15A
YK-PSW220200E	#16	15A

Also, use only high quality copper wiring and keep cable length short from 3-6 feet.

1500W & 2000W



2-7 Inverter Operation:

To operate the power inverter, turn it on using the ON/OFF switch on the front panel.
The power inverter is now ready to deliver AC power to your loads.
If you are operating several loads from the power inverter, turn them on separately after the inverter has been turned on.
This will ensure that the power inverter does not have to deliver the starting currents for all the loads at once.

2-7-1 Controls and indicators:

The ON / OFF switch turns the control circuit in the power inverter on and off.
The inverter operates from an input voltage range:
10.0 to 16.0 VDC for 12V models
20.0 to 32.0 VDC for 24V models
42.0 to 62.0 VDC for 48V models
90.0 to 140 VDC for 110V models
180 to 275 VDC for 220V models
The inverter will indicate high and low DC voltage conditions as follows:

Model		DC Input Over Voltage Shut-down	DC Input Over Voltage Alarm	DC Input Under Voltage Alarm	DC Input Under Voltage Shut-down
YK-PSW12150 YK-PSW12150E	YK-PSW12200 YK-PSW12200E	16.0VDC	15.5VDC	10.5VDC	10.0VDC
YK-PSW24150 YK-PSW24150E	YK-PSW24200 YK-PSW24200E	32.0VDC	31.0VDC	21.0VDC	20.0VDC
YK-PSW48150 YK-PSW48150E	YK-PSW48200 YK-PSW48200E	62.0VDC	61.0VDC	43.0VDC	42.0VDC
---------	YK-PSW110200 YK-PSW110200E	140VDC	135VDC	95VDC	90VDC
----------	YK-PSW220200 YK-PSW220200E	275VDC	270VDC	185VDC	180VDC

2-7-2 Output Voltage indicator:

LED displays light on VAC as show as output voltage value

2-7-3 Output Current indicator

LED displays light on AMP as show as output current value

2-7-4 Output Watts indicator

LED displays light on Watts as show as output watts value

2-7-5 Input DC Voltage indicator

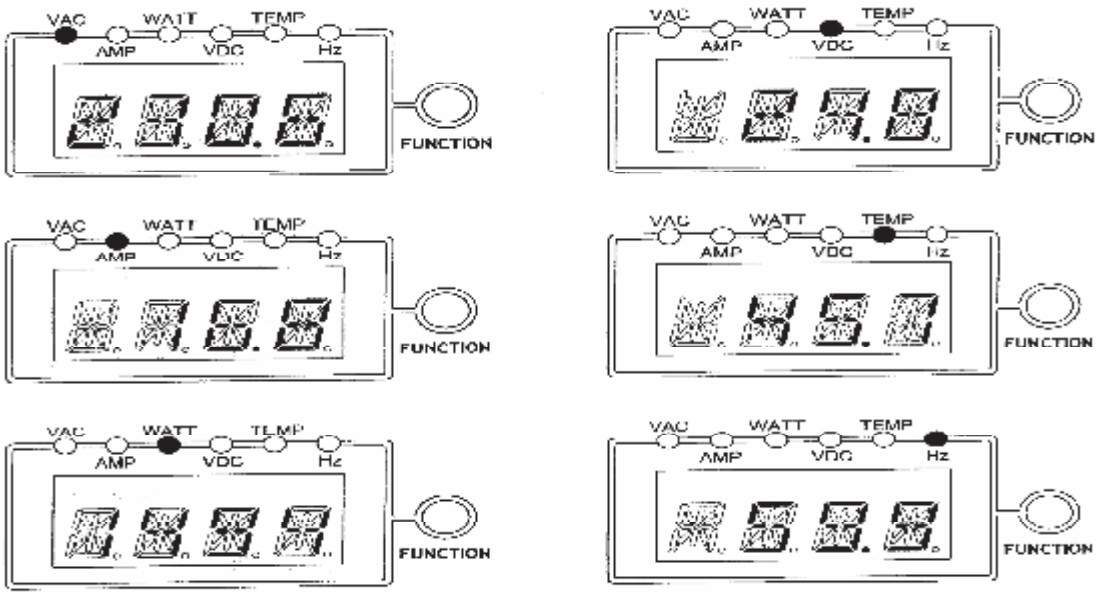
LED displays light on VDC as show as input DC voltage value

2-7-6 Temperature indicator

LED displays light on TEMP as show as internal operating temperature value

2-7-7 Output Frequency AC indicator

LED displays light on Hz as show as output frequency value



Please have the accuracy of 6 functions of display, as below:

Functions	VAC		AMP	WATT	VDC					TEMP	Frequency	
Ranges	100-120 VAC	200-240 VAC	0-20A	0-2KW	10-16 VDC	20-32 VDC	42-62 VDC	90-140 VDC	180-275 VDC	0-120°C	50Hz	60Hz
Accuracy	± 1%	± 1%	1% ± 0.5A	± 3%	± 2%	± 2%	± 2%	± 2%	± 2%	± 1%	± 0.01	± 0.01

2-7-8 Over Voltage Protection indicator: (OVP)

The over voltage indicator indicates that the power inverter has shut itself down because its input voltage exceeded 12V / 24V / 48VDC version. (See page 14)

2-7-9 Under Voltage Protection indicator: (UVP)

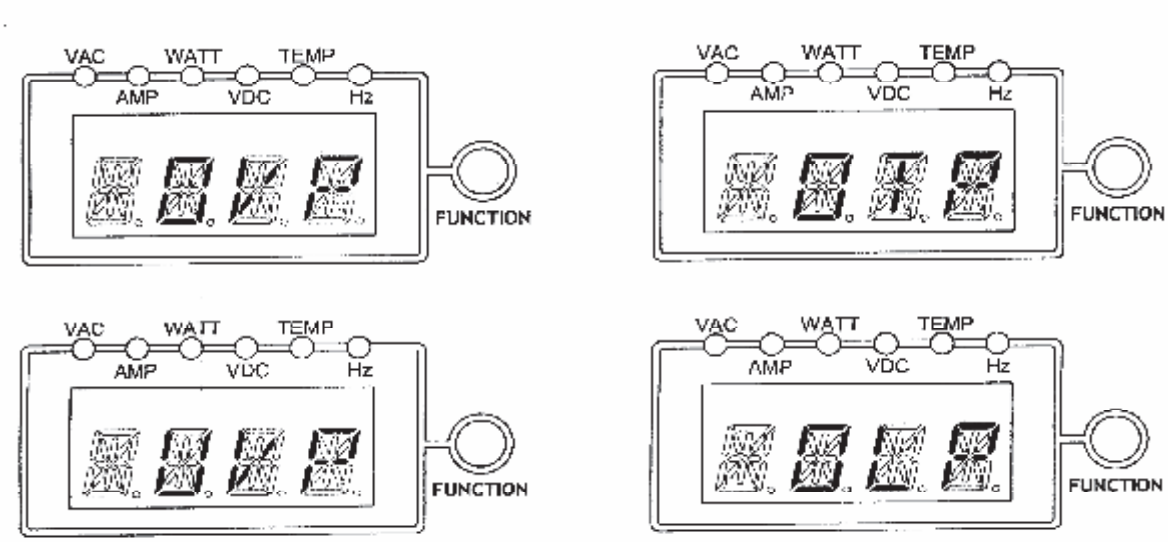
The under voltage indicator indicates that the power inverter has shut itself down because its input voltage fell below 12V / 24V / 48VDC. (See page14)

2-7-10 Over Temp Protection indicator: (OTP)

The over temp indicator indicates that the power inverter has shut itself down because its temperature has become overheated. The power inverter may overheat because it has been operated at power levels above its rating, or because it has been installed in a location which does not allow it to dissipate heat properly. The power inverter will automatically back up, once it has cooled off.

2-7-11 Over Load Protection indicator: (OLP)

The overload indicator indicates that the power inverter has shut itself down. When output voltage over its continuous voltage, then must return to operate manually.



2-8 Cooling Fan Working Code:

Cooling fan of inverter is through detecting output power and over temperature situation to work.

When start to turn on the inverter and output power under 300W, the cooling fan does not start running. It complies with saving energy sources requirement. Until, output power is up to 300W, the cooling fan will start to work in order to drop the inner temperature.

If the ventilation opening is obstructed, the inverter will enter Over Temperature Protection mode (OTP). The cooling fan will continue working to drop the inner temperature. When the temperature comes down to normal situation, the inverter will turn on automatically.

3. Maintenance:

Very little maintenance is required to keep your inverter operating properly.

You should clean the exterior of the unit periodically with a dry cloth to prevent accumulation of dust and dirt. At the same time, tighten the screws on the DC input terminals.

4. Troubleshooting Guide:

WARNING!
Do not open or disassemble the inverter. Attempting to service the unit yourself may result in a risk of electrical shock or fire.

Common problems – television interference:
Operation of the power inverter can interfere with television reception on some channels, if this situation occurs, the following steps may help to alleviate the problems.

- Make sure that the chassis ground lug on the back of the power inverter is solidly connected to the ground system of your vehicle, boat or home.
- Do not operate high power loads with the power inverter while watching television.
- Make sure that the antenna feeding your television provides an adequate (“snow free”) signal and that you are using good quality cable between the antenna and the television.
- Move the television as far away from the power inverter as possible.
- Keep the cables between the battery and the power inverter as short as possible and twist them together about 2 to 3 twists per foot. This mini radiated interference from the cables.

Problem and Symptom	Possible Cause	Solution
Low output voltage (110V: 95-105VAC 220V: 190-210VAC)	Using average reading voltmeter	Use true RMS reading meter and cable. (see page 10, Point 2-4-7 of manual)
Load display OLP flash	Over load	Reduce load
No output voltage Fault input voltage	Low/High input voltage	Recharge battery, check connections and cable. (see page 13)
No output voltage Over temp indicator Load less than 1300W (for 1500W models) Load less than 1700W (for 2000W models)	Thermal shutdown	Improve ventilation. Make sure ventilation openings in inverter are not obstructed. Reduce ambient temperature.
No output voltage Over load indicator	Short circuit or wiring error Very high power load	Check AC wiring for short circuit or improper polarity. (hot and neutral reversed) Remove load.

5. Warranty:

We warrant this product against defects in materials and workmanship during warranty period and will repair or replace any defective power inverter when directly returned (postage paid) to us.

This warranty will be considered void if the unit has suffered any obvious damage by natural and man-made factors or alteration either internal or external and does not cover damage arising from improper use such as plugging the unit into an unsuitable power sources attempts to operate products with excessive power consumption requirement, or use in unsuitable environments. This is the only warranty that the company makes.

No other warranties express or imply including warranties of merchantability and fitness for a particular purpose. Repair and replacement are your sole remedies and the company shall not be liable for damages, whether direct, incidental, special or consequential, even though caused by negligence or other fault.

6. Important Safety Instructions:

WARNING!
Before you install and use your inverter, be to read and save these safety instructions.

6-1 General Safety Precautions

6-1-1 Do not expose the inverter to rain, snow, spray, bilge or dust. To reduce risk of hazard, do not cover or obstruct the ventilation openings. Do not install the inverter in a zero-clearance compartment. Overheating may result.

6-1-2 To avoid a risk of fire and electronic shock. Make sure that existing wiring is in good electrical condition; and that wire size is not undersized. Do not operate the inverter with damaged or substandard wiring.

6-2 Precautions When Working with Batteries

6-2-1 If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at lease 20 minutes and get medical attention immediately.

6-2-2 Never smoke or allow a spark or flame in vicinity of battery or engine.

6-2-3 Do not drop a metal tool on the battery. The resulting sparks or short-circuit on the battery or other electrical part may cause an explosion.

6-2-4 Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery.
A lead-acid battery produces a short-circuit current high enough to weld a ring or the like to metal, causing a severe burn.

7. Appendices A

7-1 Dip Switch (at the left side of inverter)

S1	FREQ. (Hz)	S2	S3	BAUD RATE	S4	POWER SAVING	ACV-ADJ
ON	60	ON	ON	2400	ON	DISABLE	H--------L 240V 200V
OFF	50	OFF	ON	4800	OFF	ENABLE	H--------L 120V 100V
----	----	ON	OFF	9600	----	-----	----
----	----	OFF	OFF	19200	----	-----	----

S1 (FREQ. Hz) – 50Hz/60Hz

S2 S3 (BAUD RATE) – 2400 / 4800 / 9600 / 19200

S4 Power Saving Mode – Disable / Enable

When you set up S1~S4, please reset the inverter and let update data through CPU.

7-2 AC Output Voltage Tune (VR)

Tune VR (VAC) output voltage from 100 – 120 VAC or 200 – 240 VAC

The VAC value will gradually increase; tune VR from right to left.

8. Appendices B

8-1 Power Saving Mode

MICROPROCESSOR BASED SINE WAVE INVERTER SERIES ENABLING AND DILSABLING POWER SAVING MODE

8-1-1 When an inverter is powered on and is running in idle condition (there is no load or the load connected to the inverter has been switched off), it will still draw some power from the batteries for keeping the system alive.

8-1-2 This inverter features a power saving “sleep“mode for conserving the battery power during idle conditions. When this mode is enabled, the inverter senses the output power being drawn and if this is less than 2 to 15 watts, the inverter shuts down the output power. Only essential systems are kept alive to reduce power consumption from the batteries to a very low value of only about 1.5 watts. As soon as a load is switched on, the inverter wakes up from its “sleep” condition and restores the output power after a response time of about 8 seconds. Please note that on waking up from the power saving “sleep” mode, the inverter requires some time to prepare all the systems before it can start delivering power to the load. Hence, the output power will not be available immediately but after a time lag of approx. 15 to 18 sec.

If using a hand tool or other appliance with a trigger, keep the trigger pressed for some time till the power is available to drive the tool / appliance.

RE-MARK:

The user manual is subject to change without notice.