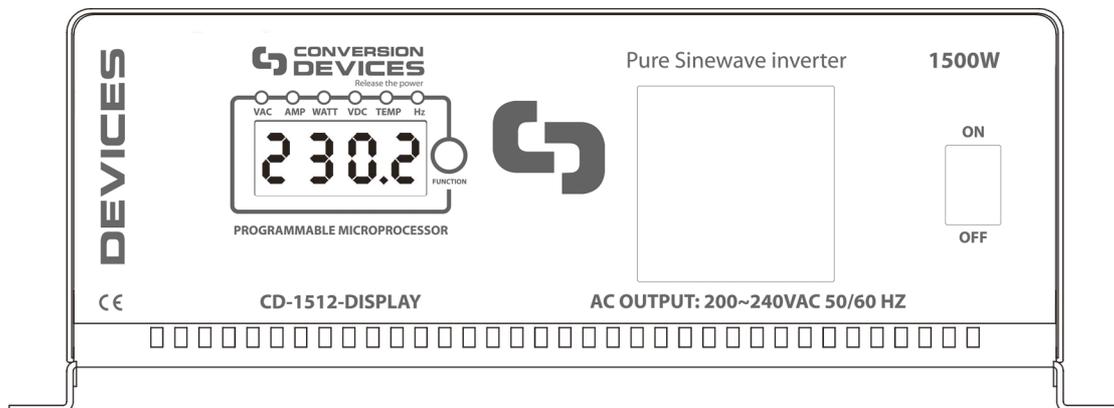




CD1512 - Display

CD1524 - Display

CD1548 – Display



Conversion Devices Series

Pure Sine Wave Inverter

User Manual

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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 controls port / Wire connection to PC
- Wired Remote control
- Thermostatically controlled cooling fan
- Advanced microprocessor
- Protection :
 - Input low voltage
 - Overload
 - Short circuit
 - Low battery alarm
 - Input over voltage
 - Over temperature

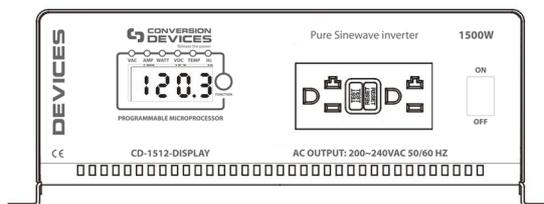
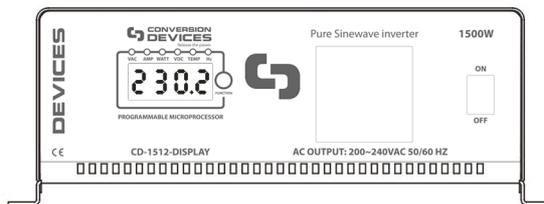
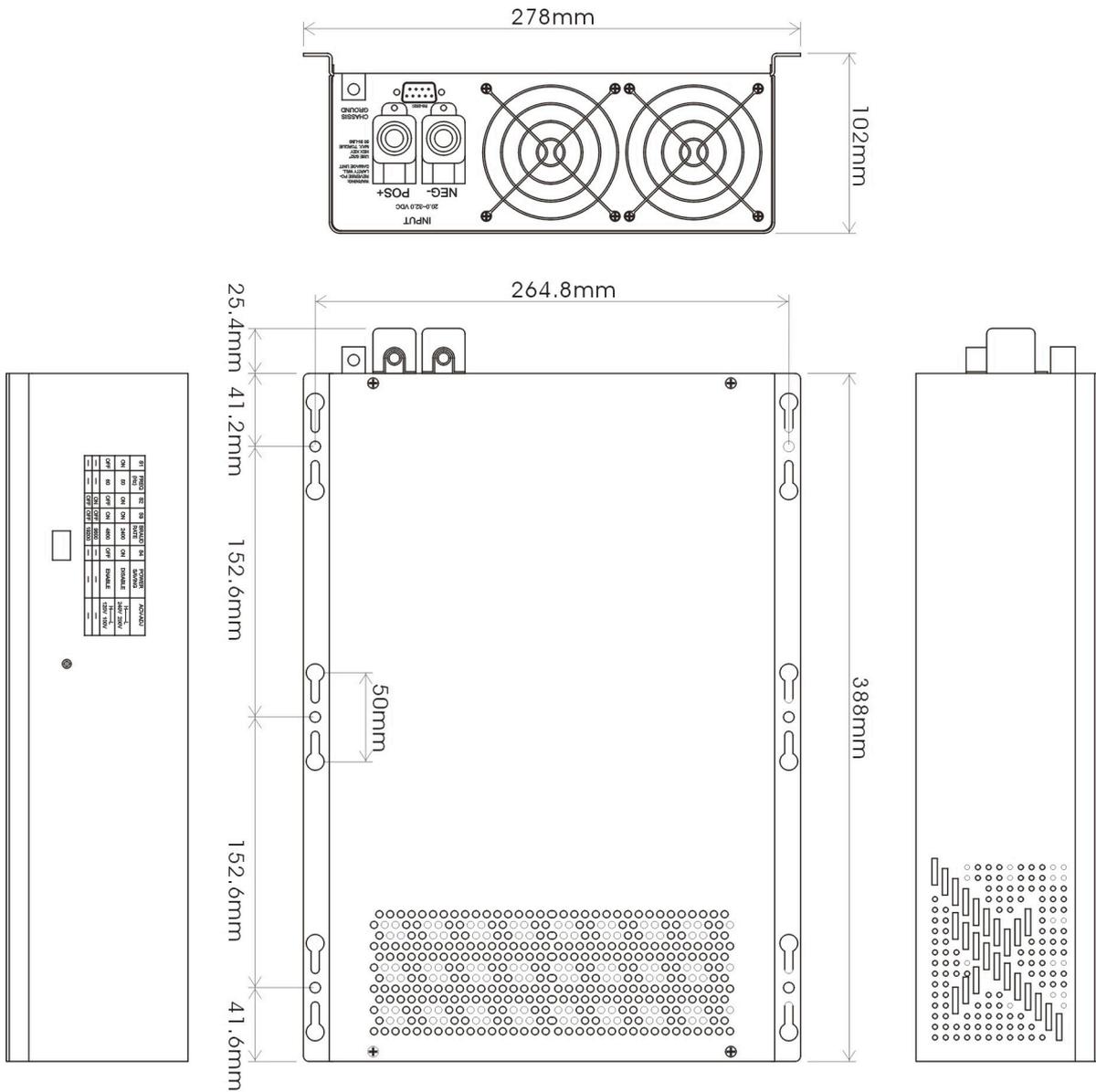
1-1 Utilities Application

- 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	Conversion Devices CD1512 - Display	Conversion Devices CD1524 - Display	Conversion Devices CD1548 - Display
Continuous Output Power	1500W		
Maximum Output Power (3mins)	1650W		
Surge Rating	3000W		
Input Voltage	12V	24V	48V
Input Voltage Range	10-16 VDC	20-32 VDC	42-62 VDC
Dc Input over voltage alarm	15.5VDC	31VDC	61VDC
Dc Input over voltage shut-down	16.0VDC	32.0VDC	62.0VDC
Dc Input under voltage alarm	10.5VDC	21.0VDC	43.0VDC
Dc Input under voltage shut-down	10.0VDC	20.0VDC	42.0VDC
Frequency	50/60Hz \pm 0.05% (Switch Selectable)		
Peak Output Current	11A		
Efficiency (full load)	87%	90%	92%
No Load Current Draw	1.6A	0.7A	0.36A
Stand by Current Draw	\leq 1.5W Power Saving Mode		
Output Waveform	Pure Sine Wave <3% THD (R Load)		
Output Voltage Regulation	200 ~ 240VAC (Tune VR)		
Protection	Overload, Short Circuit, Reverse Polarity (Fuse), Over/Under Input Voltage, Over Temper.		
Digital Display	OVP 、 UVP 、 OTP 、 OLP 、 VAC 、 AMP 、 WATT 、 VDC 、 TEMP 、 Hz		
Safety	Meet 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-026033
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	-30 $^{\circ}$ C to 60 $^{\circ}$ C		
Storage Temperature Range	-30 $^{\circ}$ C to 70 $^{\circ}$ C		
Dimensions	413(L) x278(W) x102(H) mm		
Cooling	Thermostatically controlled cooling fan		
Weight	7.2kgs		

1-3 Mechanical Drawings (1500W)



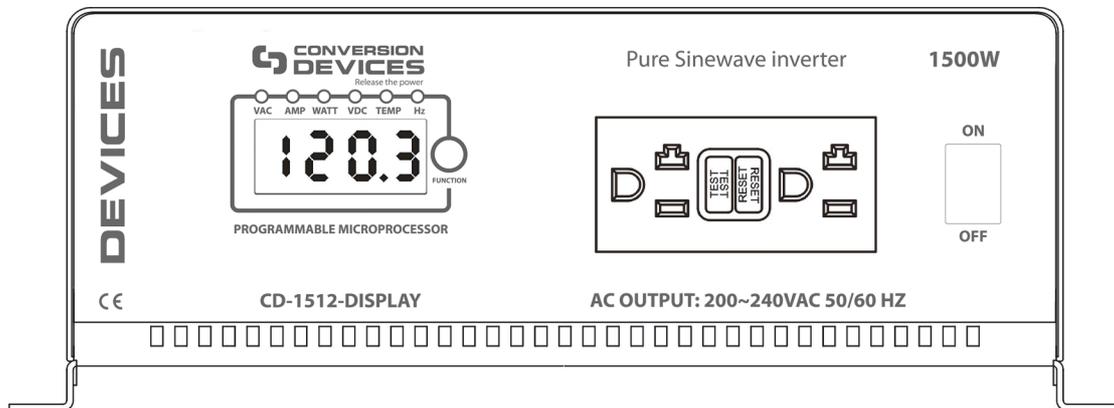
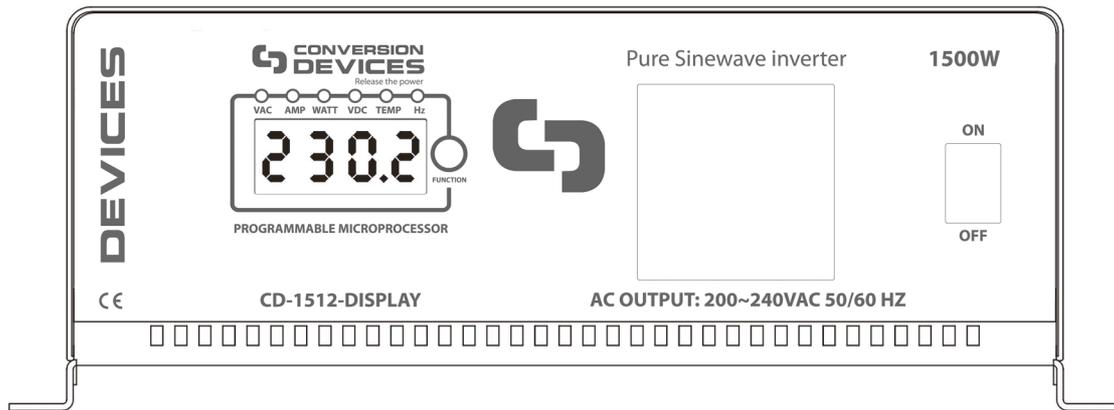
2. Introduction:

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:

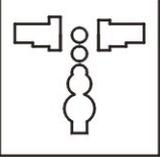
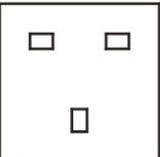
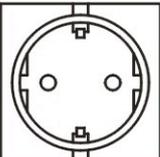
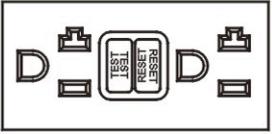
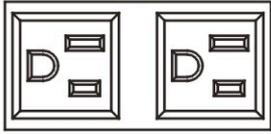
Power ON / OFF switch, leave in the OFF position during installation.

2-1-3 Function Key

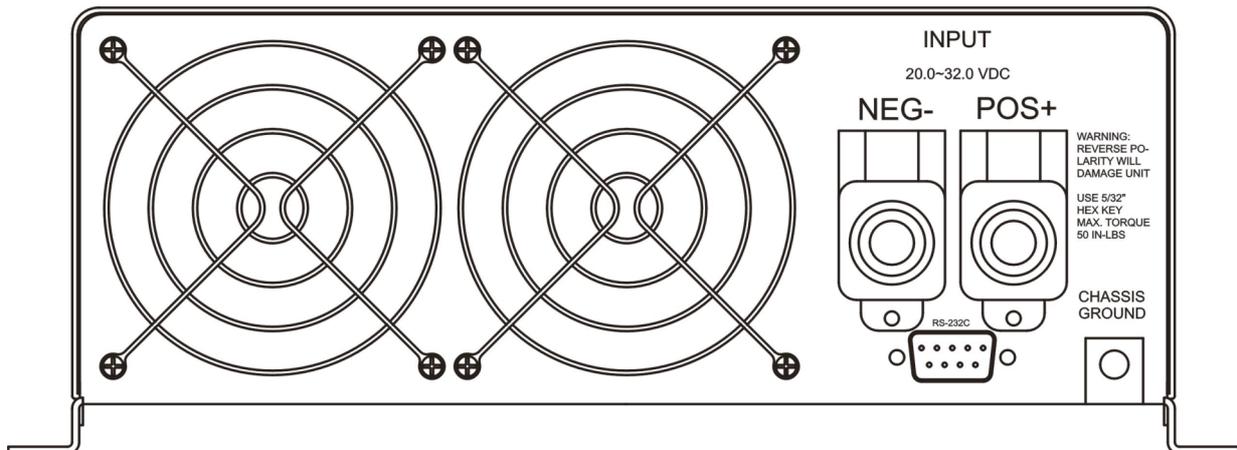
When sequentially push "Function Key", it will display various status on the function screen, Such as VAC, Amp, watts... and so on.

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

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

Universal	Australia / New Zealand
	
United Kingdom	Continental European(SCHUKO)
	
North America(GFCI)	North America
	

2-2 Rear Panel Operation:



2-2-1 Ventilation openings:

Do not obstruct, allow at least 3 inch for air flow.

2-2-2 Battery terminals:

Connect to 12V / 24V / 48V battery or other 12V / 24V / 48V power Source.

Red is positive, black is negative. Reverse polarity connection will blow internal fuse and may damage inverter permanently.



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

2-2-3 RS-232C:

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

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 0° and 40°, 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 three inch of clearance around the inverter for air flow. 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 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 reverse 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 is showed 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 shut 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 PSW2000W/E 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. Marking 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!

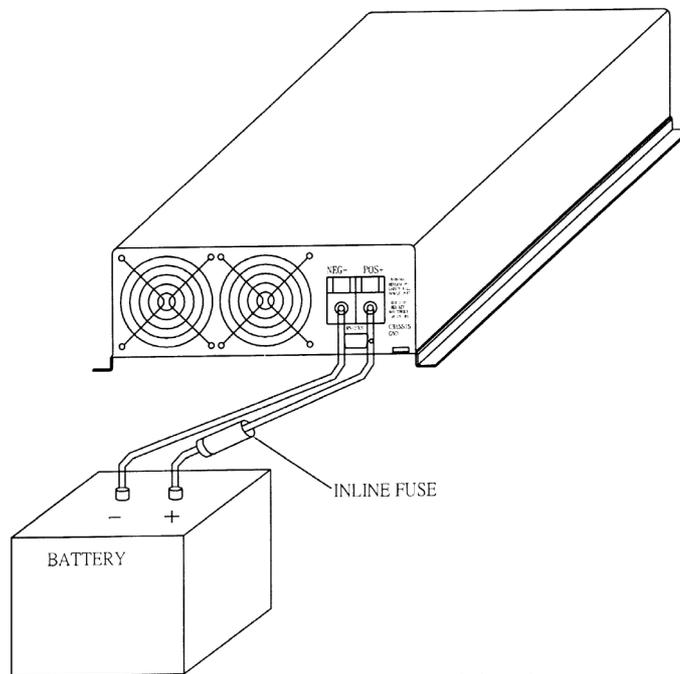
The installation of a fuse must be on positive cable.
Failure to place a fuse on “+ “cables running between the inverter and battery may cause damage to the inverter and will void warranty.

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)

Model No	Wire AWG	Inline Fuse
CD1512 - Display	#2	200A
CD1524 - Display	#4	100A
CD1548 - Display	#6	50A

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



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 ranging from:

10.5 to 15.0 VDC for 12V models

21.0 to 30.0 VDC for 24V models

42.0 to 60.0 VDC for 48V 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
CD1512 - Display	16.0VDC	15.5VDC	10.5VDC	10.0VDC
CD1524 - Display	32.0VDC	31VDC	21.0VDC	20.0VDC
CD1548 - Display	62.0VDC	61VDC	43.0VDC	42.0VDC

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

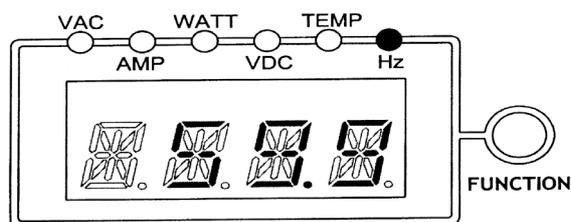
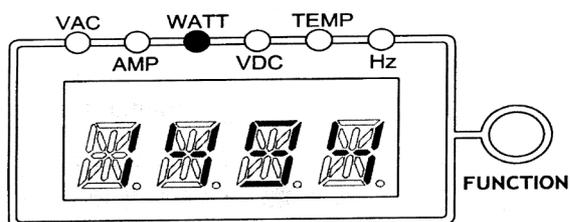
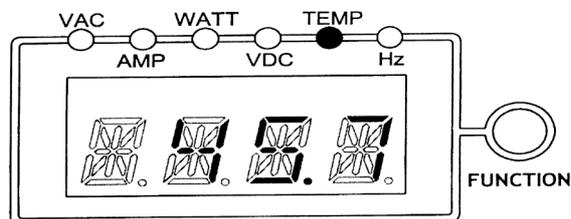
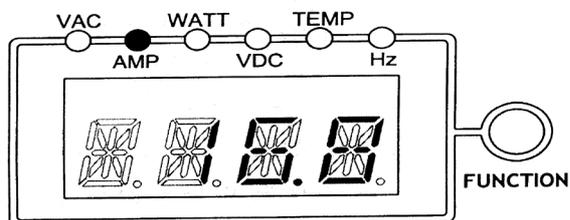
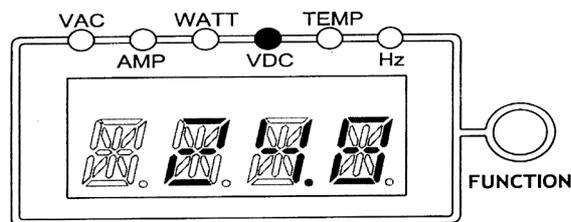
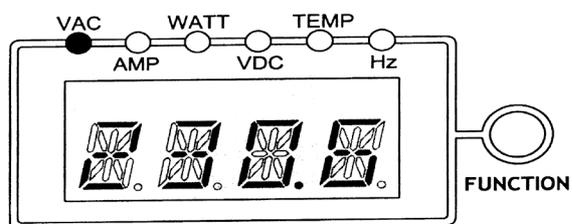
LED displays light on VDC as show as input DC voltage value

2-7-6 Temperature Indicator

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

2-7-7 Output Frequency DC 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	0-120□	50Hz	60Hz
Accuracy	± 1%	± 1%	± 1%	± 3%	± 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 12/24V / 48VDC version. (See page 13)

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

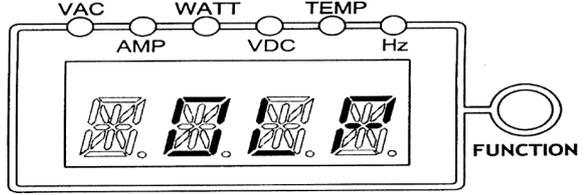
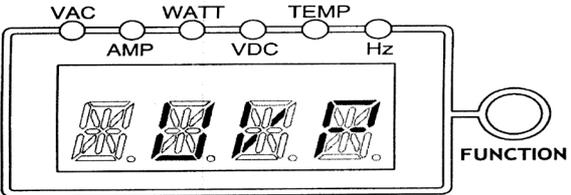
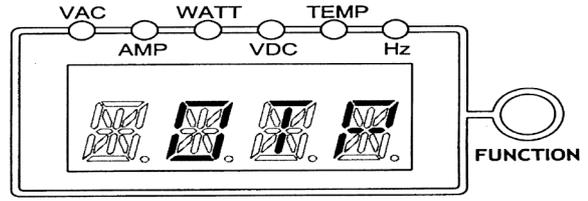
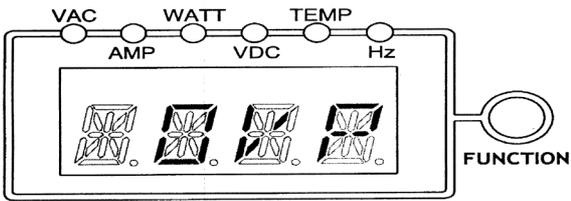
The under voltage indicator indicates that the power inverter has shut itself down because its input voltage fell below 12 / 24V / 48VDC. (See page13)

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

The over temp indicator indicates that the power inverter has shut itself down because its temp 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 it's 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 Symptoms	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 11)
No output voltage Over Temp indicator	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 :

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 least 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 spark 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)

S2/S3: Baud Rate

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.