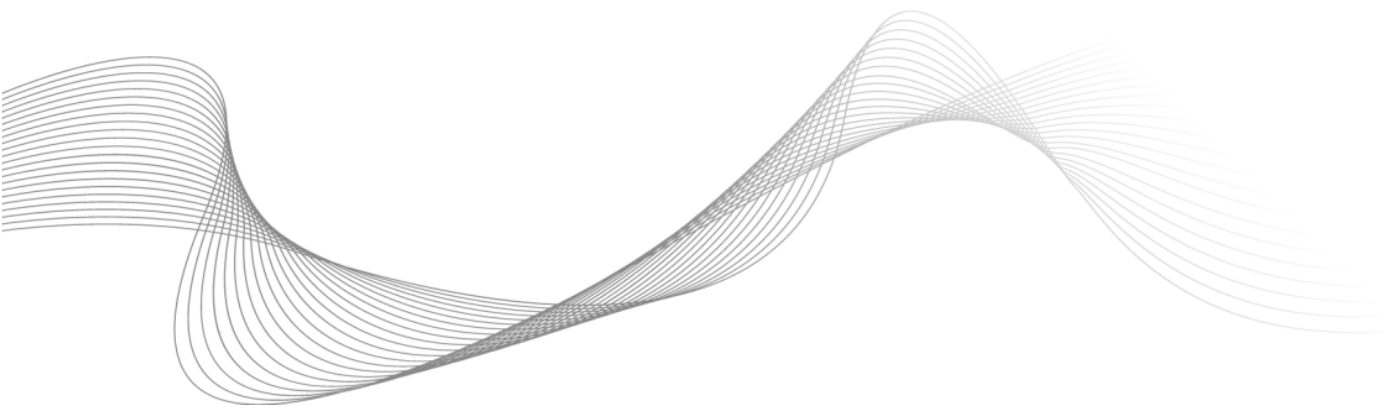


COTEK



SE200 User's Manual

PURE SINE WAVE INVERTER

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1. Important Safety Information



Warning! Before installing and using the inverter, you need to read the following safety information carefully.

1-1. General Safety Precautions

- 1-1-1. 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. Over heating may result.
- 1-1-2. To avoid 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.
- 1-1-3. This equipment contains components which can produce arcs or sparks. To prevent fire or explosion, do not install in compartment containing batteries or Flammable materials or in locations which require ignition protected equipment. This includes any space containing gasoline-powered machinery, fuel tanks, or joints, fittings, or other connection between components of the fuel system.
- 1-1-4. Installation
The power inverter should be installed in a location that meets the following requirements :
 - Dry – Do not allow water to drip or splash on the inverter.
 - Cool – Ambient air temperature should be between -20°C and 60°C, cooler the better.
 - Safe – Do not install in a battery compartment or other areas where flammable fumes may exist, such as fuel storage areas or engine compartments.
 - Ventilated – Allow at least one inch of clearance around the inverter for air flow. Ensure the ventilation openings on the rear and front of the unit are not obstructed.

-
- Dust – Do not install the inverter in a dusty environments where are dust, wood particles or other filings / shavings are present. The dust can be pulled into the unit when the cooling fan is operating.
 - Close to batteries – Avoid excessive cable length and make sure not to install the inverter in the same compartment as batteries. Use the recommended wire length and size (refer to 3-4). 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 may damage the inverter.



Warning! Shock Hazard. Before proceeding further, carefully check that 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.



Warning! Do not open or disassemble the Inverter. Attempting to do so may cause risk of electrical shock or fire.

1-2. Precautions When Working with Batteries

- 1-2-1. If battery acid contacts skin or clothing, immediately wash with soap and water. If acid enters eye, immediately flood eye with running cold water for 20 minutes at least and get medical attention immediately.
- 1-2-2. Never smoke or allow a spark or flame in vicinity of battery or engine.
- 1-2-3. 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.

1-2-4. 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.

2. Features

- Pure sine wave output
- Power ON / OFF remote control (Green terminal)
- Wide input range : 10~16VDC(112/212), 20~32VDC(124/224)
- Wide operating temperature : -20°C ~ +60°C
- Input & output fully isolation
- Output frequency 50 / 60Hz selectable by DIP switch
- Output voltage / power saving mode selectable
- Input Protection: Reverse Polarity (Fuse) / Under Voltage / Over Voltage Protection
- Output Protection: Short Circuit / Overload / Over Temperature Protection
- Power saving function
- FCC class B approved

2-1. Electrical Specification

MODEL		SE200-112	SE200-124	SE200-212	SE200-224
Output	AC Voltage	100 / 110 / 115 / 120VAC ±5%		200 / 220 / 230 / 240VAC ±5%	
	Rated Power	200VA			
	Over Rated Power (3 Min.)	230VA			
	Peak Power (3 Sec.)	250VA			
	Waveform (@rated VDC, linear load)	THD < 3.0%			
	Frequency	50 / 60Hz ±0.5% (selectable via Dip switch)			
Input	DC Voltage	12VDC	24VDC	12VDC	24VDC
	Voltage Range	10.0~16.0VDC	20.0~32.0VDC	10.0~16.0VDC	20.0~32.0VDC
	Efficiency (Typ.)	89%	91%	91%	93%
	No load power consumption	@12VDC	@24VDC	@12VDC	@24VDC

MODEL		SE200-112	SE200-124	SE200-212	SE200-224
Input	On mode @ save mode	< 0.12A	< 0.06A	< 0.12A	< 0.06A
	On mode @ no load mode	< 0.5A	< 0.4A	< 0.5A	< 0.4A
Protection	BAT. Low Shutdown	10.0VDC ± 3%	20.0VDC ± 3%	10.0VDC ± 3%	20.0VDC ± 3%
	BAT. Low Alarm	10.5VDC ± 3%	21.0VDC ± 3%	10.5VDC ± 3%	21.0VDC ± 3%
	BAT. Low Restart	12.5VDC ± 3%	25.0VDC ± 3%	12.5VDC ± 3%	25.0VDC ± 3%
	BAT. High Alarm	15.5VDC ± 3%	31.0VDC ± 3%	15.5VDC ± 3%	31.0VDC ± 3%
	BAT. High Shutdown	16.0VDC ± 3%	32.0VDC ± 3%	16.0VDC ± 3%	32.0VDC ± 3%
	BAT. High Restart	14.5VDC ± 3%	29.0VDC ± 3%	14.5VDC ± 3%	29.0VDC ± 3%
	Protection	Overload , Short circuit , DC over / under voltage , Over temperature			
	DC Input Reverse Polarity	By Fuse			
Environment	Working Temp.	-20℃ ~ +60℃			
	Storage Temp.	-30℃ ~ +70℃			
	Working Humidity	Max. 90% , RH non-condensing			
Safety & EMC	Safety Standards	---		Certified EN 60950-1	
	EMC Standards	Certified FCC Part15 Class B		Certified EN55022 Certified EN61204-3 Certified EN61000-6-3 Certified EN61000-3-2 Certified EN61000-3-3 Certified EN55024 Certified EN61000-6-1 Certified EN61000-4-2, 3, 4, 5, 6, 8, 11	
	E-mark	---		Certified CISPR 25; ISO 7637-2	
Others	Dimension (WxHxD)	150x68x187 mm (5.91x2.68x7.36 inch)			
	Packing	1.6kg; 6pcs / 10.6kg / 1.45CUFT			
	Cooling	Load and temperature control fan			
	Application	Home and Office applications, Portable Power Equipment, Vehicle, Yacht and Off-Grid Solar power systems ...etc.			

Table 1. Electrical Performance



Note:

1. The specifications are subject to change without notice.
2. This test condition is normal DC input and temperature 25°C.

2-2. Mechanical Drawing

Unit : mm [inch]

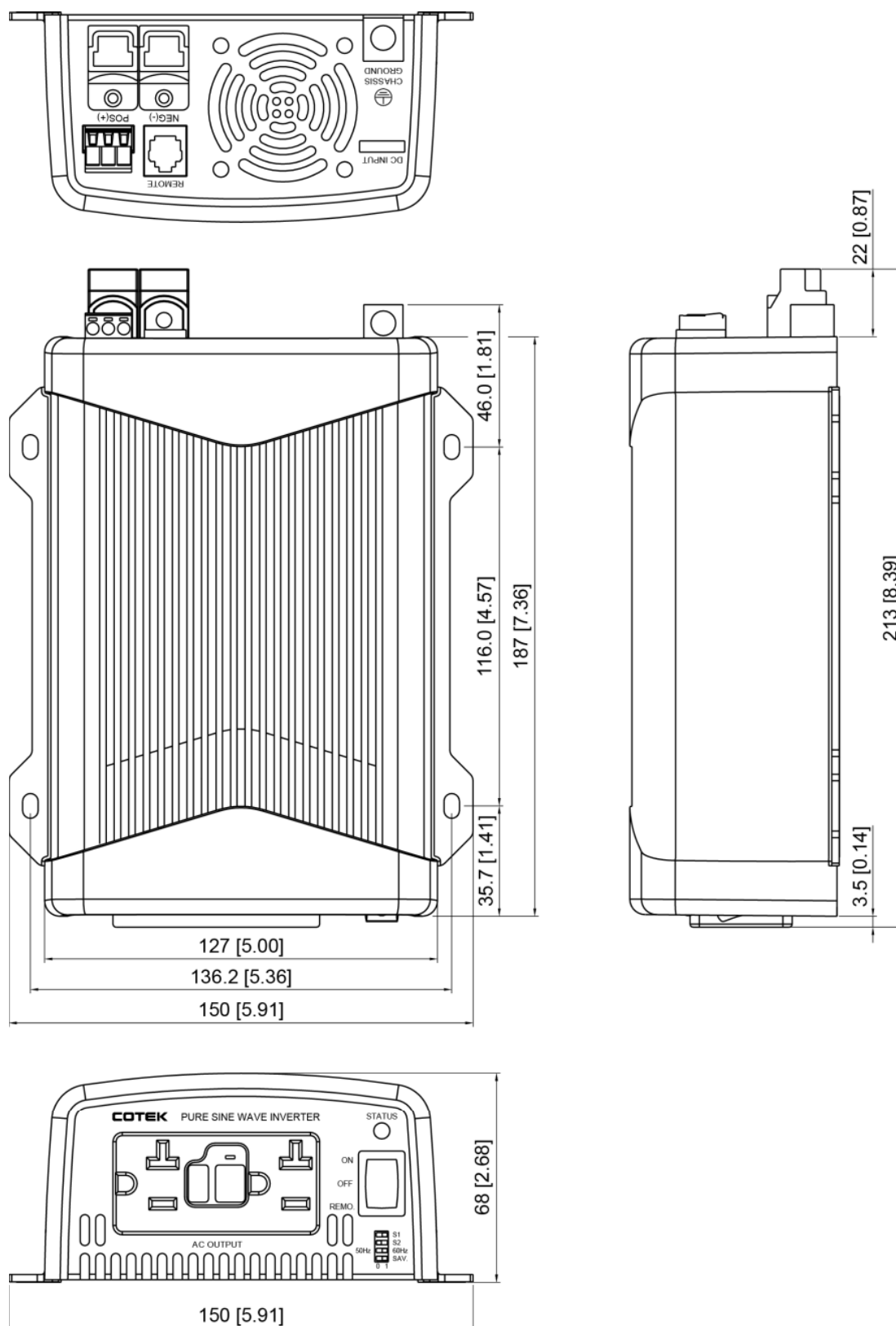


Fig. 1. Mechanical drawing

3. Introduction

This power inverter series is a 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 operating this model.

3-1. Front Panel

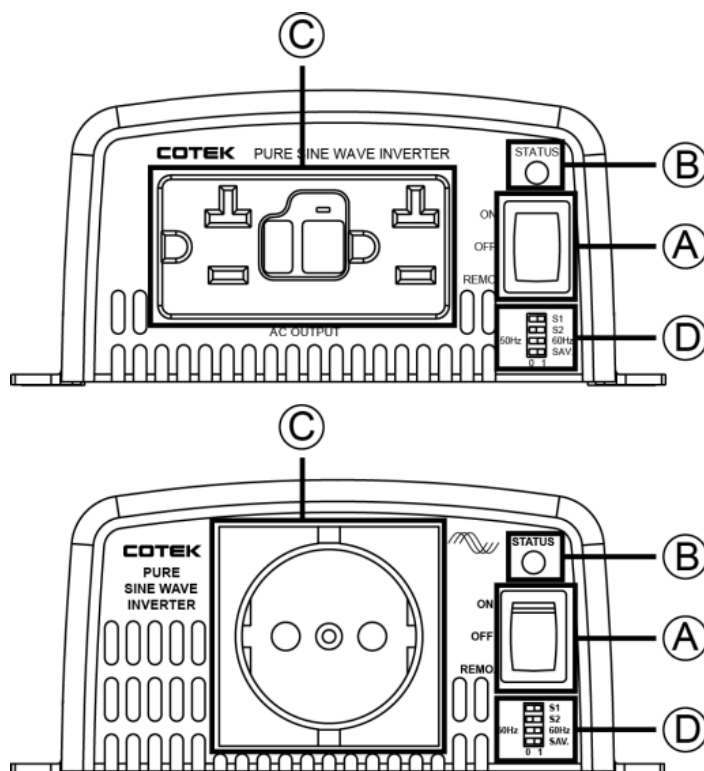


Fig. 2. SE200 front panel

(A)	Main switch	(C)	AC output socket
(B)	Status LED	(D)	Function switch

Table 2. SE200 front panel

3-1-1. Main switch (A) : ON / OFF / REMOTE main switch.

3-1-2. Status LED (B) : display power & fault status

Status	LED Signal	Description
Power on	R O G G	Beep twice, LED shows red → orange → green → green
Normal	G	LED lights in solid green

Status	LED Signal	Description
Saving mode		LED flashes green condition in intermediate condition once every 2 seconds
O/P over load		LED lights red; following two short beeps. Inverter shuts down after 3 minutes and restart 3 times.
O/P short circuit		LED lights red; following two short beeps. Inverter shuts down after two seconds and restart 3 times.
Over temperature		LED flashes red light quickly twice every 1.6 seconds
Under voltage alarm		LED flashes orange light slowly with 5 short beeps every 15 seconds
Shut down under voltage		LED flashes red light every 0.4 seconds, then inverter shuts down.
Over voltage		LED flashes orange light every 0.1 seconds
Shut down over voltage		LED flashes red light every 0.1 seconds, then inverter shut down.
Fan alarm		LED flashes red light slowly once and quickly twice every 1.6 seconds

Troubleshooting Guide : refer to section 4.

Table 3. LED Status



Note : LED Status G=Green R=Red O=Orange

3-1-3. AC output socket (available options) ③

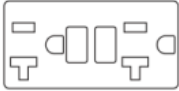
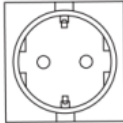
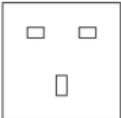
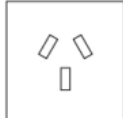
North America (GFCI)	NEMA 5-15R	Continental European
		
United Kingdom	Universal	Australia / New Zealand
		

Table 4. AC output socket

3-1-4. Function switch ④ : to set power saving on / off, AC output frequency & AC output voltage :

Power Saving	Dip Switch
ON	1
OFF	0

Table 5. Dip switch setting-power saving

Frequency	Dip Switch
50 HZ	0
60 HZ	1

Table 6. Dip switch setting-frequency



Fig. 3. Function switch

Output Voltage	S1	S2
100VAC (200VAC)	0	0
110VAC (220VAC)	0	1
115VAC (230VAC)	1	0
120VAC (240VAC)	1	1

Table 7. Dip switch setting-output voltage

3-2. Rear Panel

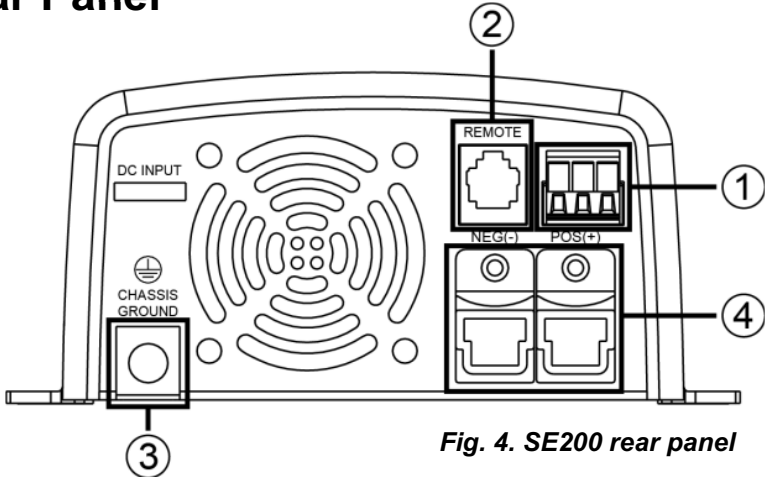


Fig. 4. SE200 rear panel

①	Green terminal	③	Chassis ground
②	Remote port (RJ-11)	④	DC input connector

Table 8. SE200 rear panel

3-2-1. Green terminal ① : using green terminal to ON / OFF the inverter. When user connect green terminal, the unit will set green terminal is first priority.

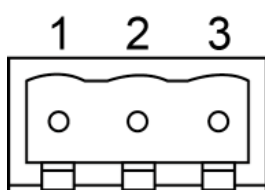


Fig. 5. SE200 green terminal

PIN Num.	Signal Description
1	GND
2	$\overline{\text{ENB}}$
3	ENB

Table 9. Green terminal setting

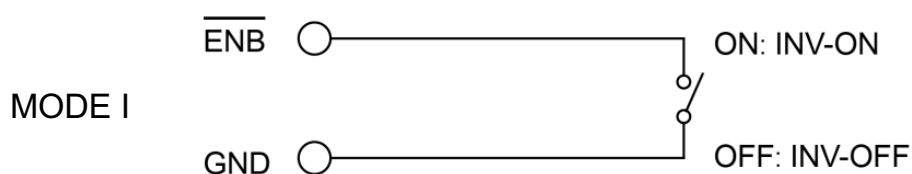


Fig. 6. Green terminal-mode 1

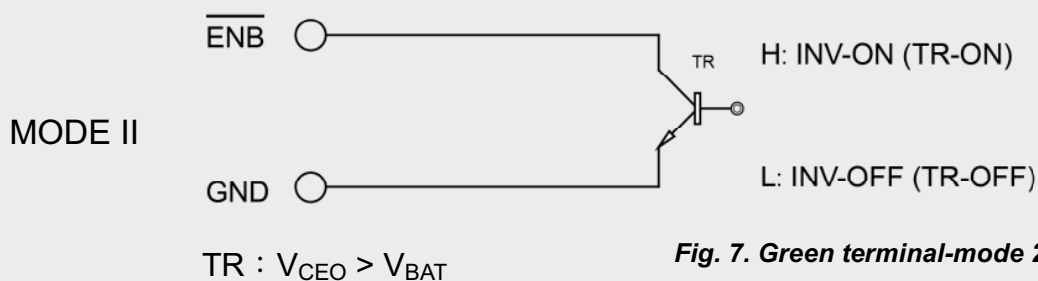


Fig. 7. Green terminal-mode 2

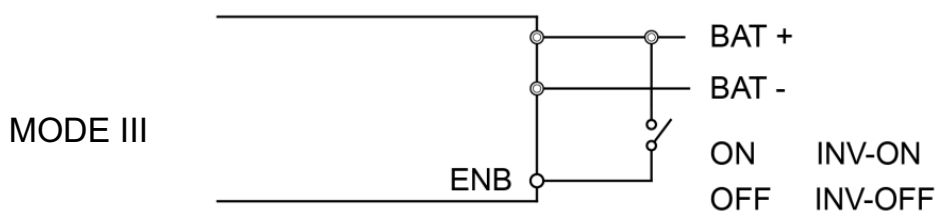


Fig. 8. Green terminal-mode 3

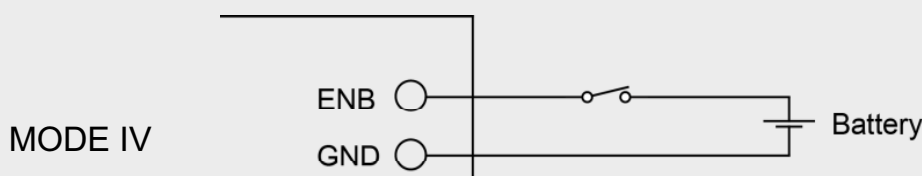


Fig. 9. Green terminal-mode 4

Battery voltage please follows inverter input voltage.

3-2-2. Remote port (RJ-11) ② :

1. Use 0.75mm² cable to connect the remote port and CR-8.
2. Use CR-8(optional remote control panel) to ON / OFF the inverter.



Fig. 10. Remote port

SE200		CR-8 (optional)	
PIN Num.	Signal Description	Signal Description	PIN Num.
1	Not used	Not used	1
2	GND	GND	2
3	Not used	Not used	3
4	Not used	Not used	4
5	$\overline{\text{ENB}}$	$\overline{\text{ENB}}$	5
6	Not used	Not used	6

Table 10. Remote port

3-2-3. Chassis ground ③ : use # 8 AWG wire to connect vehicle chassis.



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

3-2-4. DC input connector ④ :

Connect to 12V / 24V battery or the other power sources.

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

Model	DC Input Voltage	
	Minimum	Maximum
12V	10.0	16.0
24V	20.0	32.0

Table 11. DC input voltage

3-3. Protections Features

Model	DC Input (VDC)					Over Temperature Protection	
	Over Voltage		Under Voltage Alarm	Under Voltage		INTERIOR	
	Shut-down	Restart		Shut-down	Restart	Shut-down	Restart
12V	16V $\pm$ 3%	14.5V $\pm$ 3%	10.5V $\pm$ 3%	10.0V $\pm$ 3%	12.5 $\pm$ 3%	90 $\pm$ 3°C	50 $\pm$ 3°C
24V	32V $\pm$ 3%	29V $\pm$ 3%	21.0V $\pm$ 3%	20.0V $\pm$ 3%	25.0 $\pm$ 3%	90 $\pm$ 3°C	50 $\pm$ 3°C

Table 12. Protections Features



Note : The specifications are subject to change without notice.

3-4. DC Wiring Connections

Follow this procedure to connect the battery cables to the DC input terminals of the inverter. Your cables should be as short as possible (Ideally, less than 6 feet / 1.8 meters, apply both 120V and 230V versions) enough to handle the required current in accordance with the electrical codes or regulations application. Cables are not an adequate gauge (too narrow) or too long will decrease the inverter performances such as poor surge capability or causing frequent low input voltage warnings and shutdowns. UVP warning presents due to DC voltage drop across the cables from the inverter to the batteries. The longer or narrower the cables, the greater the voltage drop. Increasing your DC cable size will help improve the situation.



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.

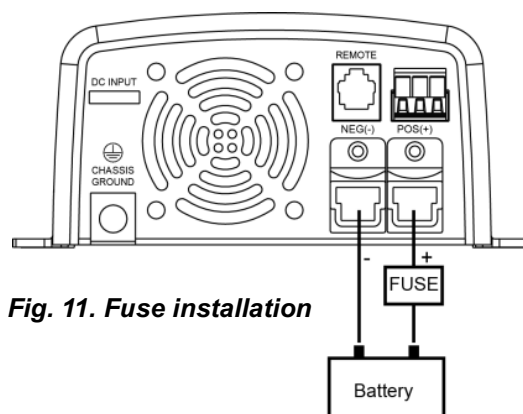


Fig. 11. Fuse installation

3-5. AC Safety Grounding

The AC output ground wire should go to the grounding point for your loads (for example, a distribution panel ground bus).

Ground Fault Circuit Interrupters (GFCI) :

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. COTEK has tested the following GFCI – protected 20A receptacles and found that they functioned properly when connected to the output of the inverter.



Warning! Risk of electronic shock.

Recommend GFCI connector :

- HUBBELL INC WIRING DEVICE DIV, Type GF20. Rated 125V, 20A
- COOPER WIRING DEVICES, Type VGF20. Rated 125V, 20A
- LEVITON MFG CO INC, Type 7899-W. Rated 125V, 20A

Others may fail in operating the inverter when connecting to the inverter's equipment.

3-6. Inverter Installation and Operation

Before installing the inverter, make sure the main switch must be "OFF".

STEP 1.

Connect the DC cable, then connect the DC cable to battery.

(Make sure the polarity)



Fig. 12. Installation step 1

STEP 2.

Dip switch setting for AC output voltage, frequency, and saving mode. (Refer to 3-1-4.)



Fig. 13. Installation step 2

STEP 3.

Connect the AC cable.

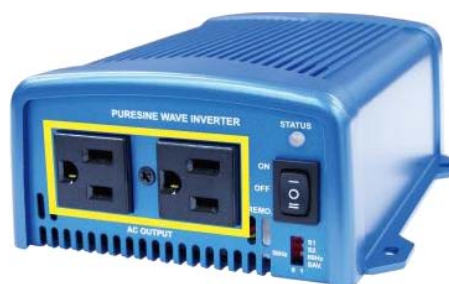


Fig. 14. Installation step 3

STEP 4.

Power ON.

The buzzer will send out “Beep” sounds at the moment the inverter will do self-diagnosis, then the power status LED indicators will also

appear in various colors. Finally the buzzer will sound another “Beep” and the power status LED indicators will turn to solid “Green” color (normal state), means the inverter is now ready to work.



Fig. 15. Installation step 4

**Note:**

1. If there is several loads used, turn them on separately after the inverter has been “ON” in order to prevent the OVP present caused by the surge power.
2. Set power inverter switch to the ON position and turn the test load on. The inverter should supply power to the load. If you

plan to accurately measure the true output r.m.s. voltage of inverter, a meter such as FLUKE 45 BECKMAN 4410 or TRIPLETT 4200 must be used.

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.

Status	LED Signal	Solutions
O/P over load R 	LED lights red; following two short beeps. Inverter shuts down after 3 minutes and restart 3 times.	Reduce load. In case of restart failed, please turn on the unit manually.
O/P short circuit R 	LED lights red; following two short beeps. Inverter shuts down after two seconds and restart 3 times.	Check AC wiring, make sure no circuit. In case of restart failed, please turn on the unit manually.
Over temperature R R R 	LED flashes red light quickly twice every 1.6 seconds	Improve ventilation. Make sure ventilation openings in inverter are not obstructed. Reduce ambient temperature.
Under voltage alarm O O O O O 	LED flashes orange light slowly with 5 short beeps every 15 seconds	1. Check connections and cable. 2. Recharge battery.
Shut down under voltage R R R R R 	LED flashes red light every 0.4 seconds, then inverter shuts down.	Recharge battery. Check connections and cable. Please turn on the unit manually.
Over voltage O 	LED flashes orange light every 0.1 seconds	Check input voltage. Reduce input voltage to meet SE200.
Shut down over voltage R 	LED flashes red light every 0.1 seconds, then inverter shut down.	Check input voltage. Reduce input voltage. Please turn on the unit manually.
Fan alarm R R R R R 	LED flashes red light slowly once and quickly twice every 1.6 seconds	1. Check fan connection wire 2. Clean the dust on the fan

Table 13. Troubleshooting Guide

5. Maintenance

Very little maintenance is required to keep your inverter operating properly. You should clean the exterior of the unit periodically with a damp cloth to prevent accumulation of dust and dirt. At the same time, tighten the screws on the DC input terminals.

6. Information

We guarantee this product against defects in materials and workmanship for a period of 24 months from the date of purchase. In case you need to repair or replace any defective power inverters, please contact COTEK local distributor.

This warranty will be considered void if the unit has been misused, altered, accidentally damaged, or disassembled. COTEK is not liable for anything that occurs as a result of the user's fault.

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