

EP Series User's Manual



Caution!

This manual is important instruction that you should follow during installation and maintenance of the inverter. Please read all instructions before operating the equipment and save this manual for future reference.



**COMBINED INVERTER CHARGER
PURE SINE WAVEFORM**

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1. PRODUCTS SKETCH MAP

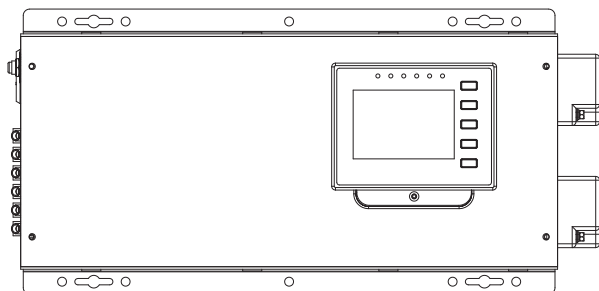


Figure 1 top view

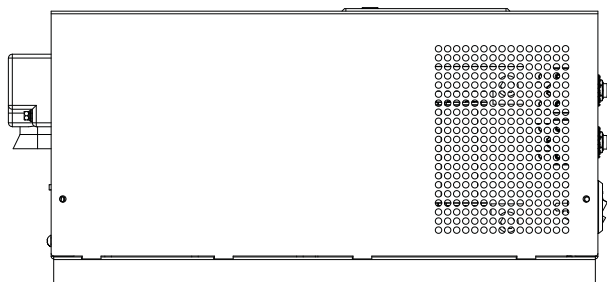


Figure 2 side view

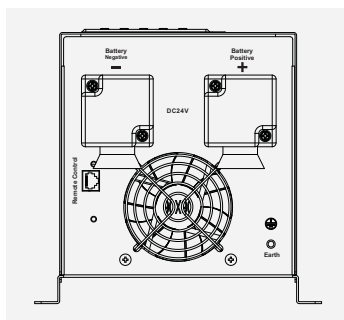


Figure 3 DC side

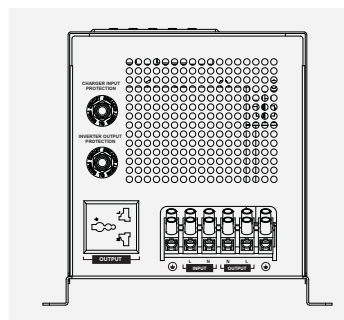
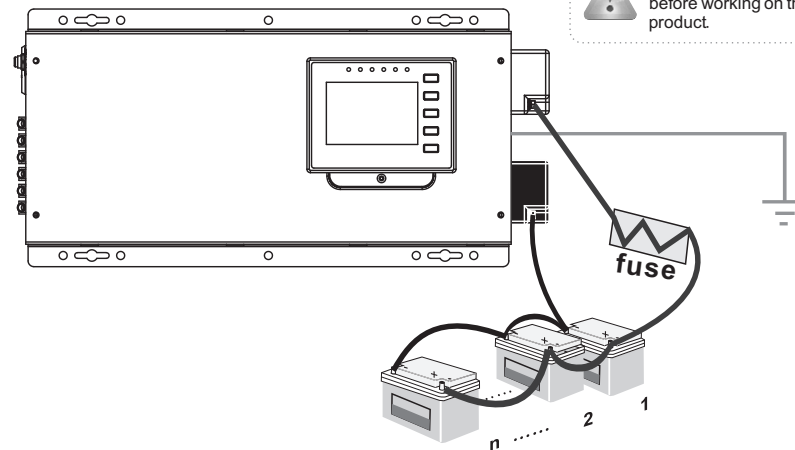


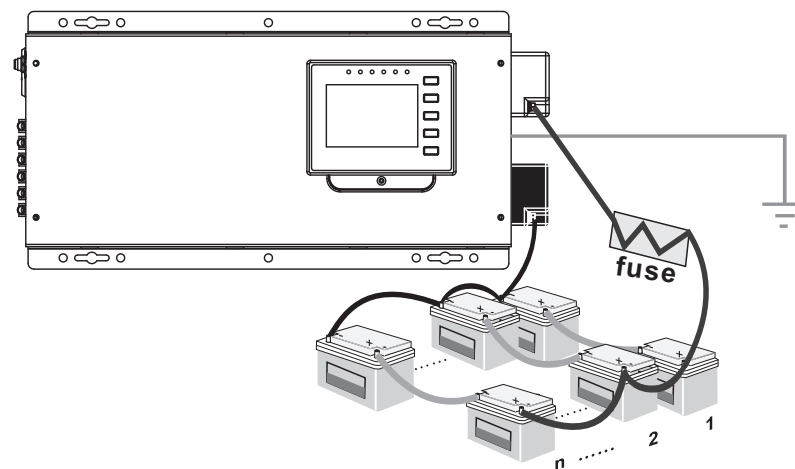
Figure 4 AC side

2. EP SERIES BASIC WIRING

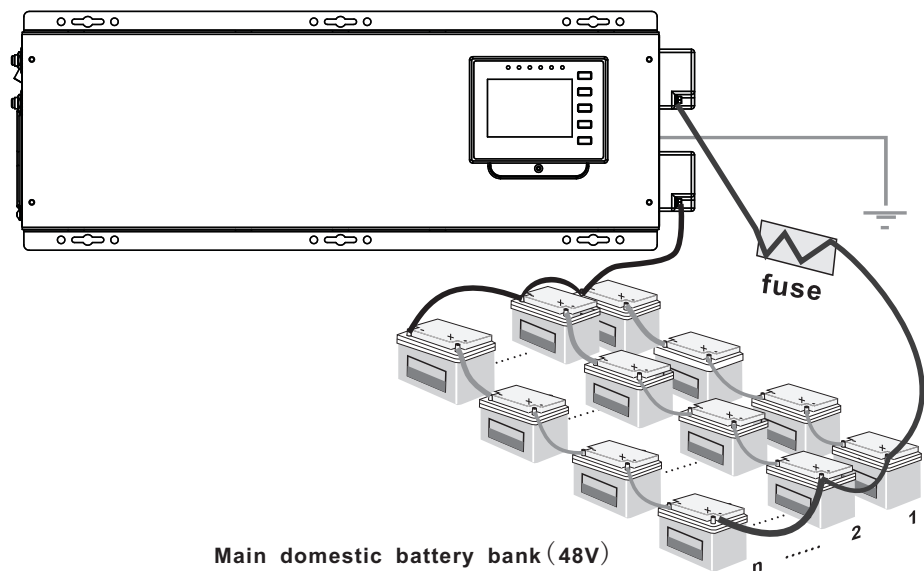
Warning: High voltage, do not open unless qualified to do so; Please read instructions before working on this product.



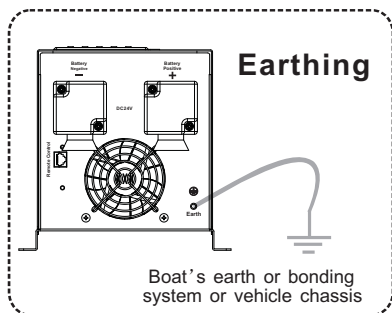
Main domestic battery bank (12V)



Main domestic battery bank (24V)



Main domestic battery bank (48V)

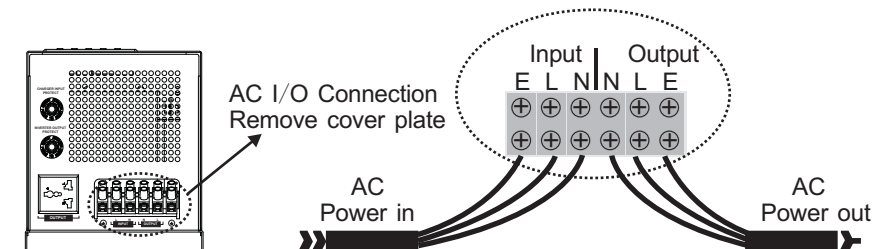


Boat's earth or bonding system or vehicle chassis

WHAT CABLE TO USE in mm²:

A charger or inverter	cable run distance 0-1.5m	cable run distance 1.5-4.0m
125-180A	50 mm ²	70 mm ²
180-330 A	70mm ²	90mm ²

Please note that if there is a problem obtaining for example 90 mm² cable, use 2*50mm², or 3*35mm², One cable is always best but, cables simply copper and all you require is the copper, so it does not matter if it is one cable or 10 cables as long as the square area adds up. Performance of any product can be improved by thicker cable and shorter runs, so please round up and keep the length as short as possible.



3. LINE MODE SPECIFICATION

MODEL	EP-1012	EP-2012	EP-2024	EP-3024	EP-4048	EP-6048
Input Voltage Waveform	Sinusoidal (utility or generator)					
Nominal Input Voltage	230Vac					
Low Line Disconnect	180Vac ± 4%					
Low Line Re-connect	190Vac ± 4%					
High Line Disconnect	265Vac ± 4%					
High Line Re-connect	255Vac ± 4%					
Nominal Input Frequency	50Hz/60Hz (Auto detection)					
Low Line Frequency Re-connect	58 ± 0.3Hz for 60Hz; 45 ± 0.3Hz for 50Hz;					
Low Line Frequency Disconnect	57 ± 0.3Hz for 60Hz; 45 ± 0.3Hz for 50Hz;					
High Line Frequency Re-connect	64 ± 0.3Hz for 60Hz; 54 ± 0.3Hz for 50Hz;					
High Line Frequency Disconnect	65 ± 0.3Hz for 60Hz; 55 ± 0.3Hz for 50Hz;					
Output Voltage Waveform	As same as Input Waveform					
Over-Load Protection (SMPS load)	Circuit breaker					
Output Short Circuit Protection	Circuit breaker					
Efficiency (Line Mode)	>95%					
Transfer Time (AC to DC)	≤ 10ms (typical)					
Transfer Time (DC to AC)	≤ 10ms (typical)					

4. INVERTER MODE SPECIFICATION

MODEL	HV MODEL					
	EP-1012	EP-2012	EP-2024	EP-3024	EP-4048	EP-6048
Output Voltage Waveform	Sine wave					
Rated Output Power (VA)	1000	2000	3000	4000	6000	
Rated Output Power (W)	1000	2000	3000	4000	6000	
Power Factor	0~1.0					
Nominal Output Voltage (V)	230Vac					
Nominal Output Frequency (Hz)	50Hz±0.3Hz					
Auto tracking Main Frequency (Hz)	Yes (Following Main first connection) 50Hz@45-54Hz 60Hz@55-64Hz					
Output Voltage Regulation	±10%rms					
Nominal Efficiency	>80%					
Over-Load Protection (SMPS load)	(100% <load <120%) ± 10%: Fault (shutdown output) after 2 minutes; (120% <load <140%) ± 10% : Fault (shutdown output) after 1 minutes, Load >140% ± 10%: Fault (shutdown output) after 20s					
Surge rating (10s)	3000VA	6000VA	9000VA	1200VA	18000VA	
Capable of starting electric motor	0.5 HP	1 HP	2 HP	2 HP	3 HP	
Output Short Circuit Protection	Current limit (Fault after 10s)					
Inverter Breaker Size	Input:10A Output:7A	Input:15A Output:10A	Input:30A Output:15A	Input:35A Output:20A	Input:40A Output:30A	
Nominal DC Input Voltage	12V	12V	24V	24V	48V	48V
Min DC Start Voltage	10V/20V/40V					
Low Battery Alarm	10.5Vdc±0.3Vdc for 12V battery 21.0Vdc±0.6Vdc for 24V battery 42.0Vdc±0.6Vdc for 48V battery					
Low DC Input Shut-down	10.0Vdc±0.3Vdc for 12V battery 20.0Vdc±0.6Vdc for 24V battery 40.0Vdc±0.6Vdc for 48V battery					
High DC Input Alarm & Fault	16Vdc±0.3Vdc for 12V battery 32Vdc±0.6Vdc for 24V battery 64Vdc±0.6Vdc for 48V battery					
High DC Input Recovery	15.5Vdc±0.3Vdc for 12V battery 31.0Vdc±0.6Vdc for 24V battery 62.0Vdc±0.6Vdc for 48V battery					
Power saver	Load ≤25W (Enabled on "P/S auto" setting of Remote control)					

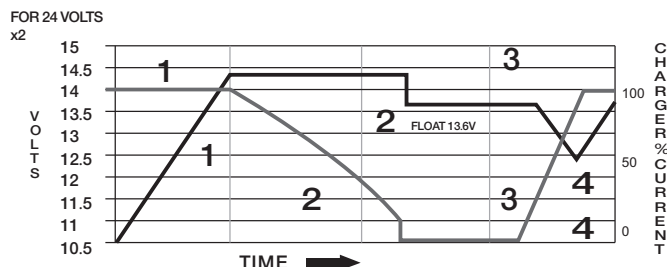
5. CHARGE MODE SPECIFICATION

MODEL	HV MODEL					
	EP-1012	EP-2012	EP-2024	EP-3024	EP-4048	EP-6048
Nominal Input Voltage	230Vac					
Input Voltage Range	180-250Vac					
Nominal Output Voltage	According to the battery type					
Nominal Charge Current	45A(Max.)					
Charge Current Regulation	±5A _{dc}					
Charger Short Circuit Protection	Circuit breaker					
Breaker Size	Input:10A Output:7A	Input:15A Output:10A	Input:30A Output:15A	Input:35A Output:20A	Input:40A Output:30A	
Over Charge Protection	Bat. V ≥ 15.7Vdc/31.4Vdc/62.8Vdc, beeps 0.5s every 1s & fault after 60s					
Charge Algorithm						
Algorithm	Three stage: Boost CC (Constant current stage) → Boost CV (constant voltage stage) → Float (constant voltage stage)					

6. CHARGE MODE SPECIFICATION

Charge Stage Transition Definitions

- ◆ **Boost CC Stage:** If A/C input is applied, the charger will run at full current in CC mode until the charger reaches the boost voltage.
- ◆ **Boost CV Stage:** In this stage, the charger will keep the boost voltage in Boost CV mode. The charging current will reduce, until less than 2A, then drop the voltage down to the float voltage.
- ◆ **Float Stage:** In float mode, the voltage will stay at the float voltage. If the A/C is reconnected or the battery voltage drops below 12Vdc/24Vdc/48Vdc, the charger will reset the cycle above.

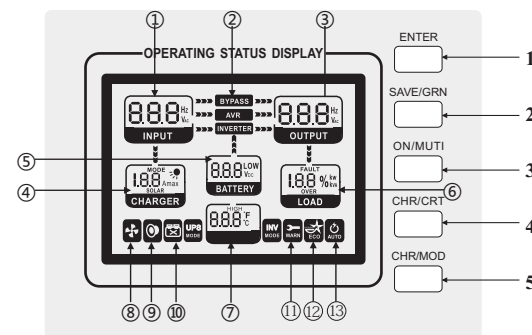


Battery Type Setting

⊙ BATTERY TYPE SELECTOR

Switch setting	Description	Boost			Float		
		12V	24V	48V	12V	24V	48V
0	To be used by factory for set up	-	-	-	-	-	-
1	Gel USA	14.0	28.0	56.0	13.7	27.4	54.84
2	AGM 1	14.1	28.2	56.4	13.4	26.8	53.6
3	AGM 2	14.6	29.2	58.4	13.7	27.4	54.8
4	Sealed lead acid	14.4	28.8	57.6	13.6	27.2	54.4
5	Gel EURO	14.4	28.8	57.6	13.8	27.6	55.2
6	Open lead acid	14.8	29.6	58.2	13.3	26.6	53.2
7	Calcium	15.1	30.2	60.4	13.6	27.2	54.4
8	De sulphation	15.5	31.0	62.0	4 hours then off		
9	Not used	-	-	-	-	-	-

7. DISPLAY & CONTROL



Instruction of the LCD display

Item	Indication	Description
①	Display of input voltage and input frequency	When the inverter is turned on, the LCD display shows input voltage, the input frequency of the display can be changed by switching the button.
②	Working Status of INVERTER	It shows the working status of the inverter. It shows "BYPASS" when the inverter is in AC mode. It shows "INVERTER" when it is in the battery mode. It shows "AVR" when it is in the "Boost Voltage" or "Buck Voltage" mode.
③	Display of output voltage	When the inverter is turned on, the display shows the real output voltage.
④	Display of the Max. charging current and charging mode	The inverter shows the Max. charging current when it is in the AC mode, it will show the charging mode by switching the button.
⑤	Display of the battery voltage	When the inverter is turned on, the display shows the real battery voltage. When the inverter is low battery, the buzzer beeps 0.5secs in every 5secs, the display flashes and shows "LOW" with the beep.
⑥	Display of load percentage	The display shows the load percentage. When the inverter is overload, the buzzer beeps 0.5secs in every 1 sec, the display flashes and shows "OVER" with the beep. When the load is 100%-120%, the inverter will shut down after 2 minutes' alarm. When the load is 120%-140%, the inverter will shut down after 1 minute's alarm. When the load is >140%, the inverter will shut down after 20 secs alarm.
⑦	Display of Temperature	The display shows the current temperature of the heat sink. When the temperature is $\geq 100^{\circ}\text{C}$, the buzzer will beep 0.5 secs in every 1 minute, the display will flash and show "HIGH" with the beep. When the temperature is $\geq 105^{\circ}\text{C}$, the inverter will shut down for self-protection.
⑧	The fan is running	The fan logo indicating inverter's fan is running.
⑨	Silence function	It shows the inverter is not in the silence mode. The silence function is inactive when it is low battery, over load and over temperature.
⑩	The battery is disabled	It shows the battery is disabled, it needs to replace the battery.
⑪	Warning	When the battery is over voltage, the buzzer beeps 0.5 secs every 1 second, the display flashes with the beep.
⑫	Power saver mode	It shows the "Power saver mode" is working. The inverter shut down the output automatically when in the battery mode and without any load, inverter automatically has output when load is more than 40w.
⑬	Auto re-start	It shows the inverter will start when AC is connected.

Function of the button

Item	Function of the button	Description
1	Enter button	"OK" button for confirming the Max. Charging current or the charging voltage mode .
2	Green mode button	When the inverter is working, the "Green mode button" can be opened or closed by short pressing on the button.
3	Start / silence function/ input frequency	The inverter can be turned on or turned off by pressing the button for 3 secs. In battery mode, the "silence function" can be ON/OFF by shortly pressing the button. In AC mode, The input frequency will be dispilyd by shortly pressing the button.
4	Choosing the Max. Charging current	When the AC is normal, shortly press the button, the display will keep flashing of "The maximum charging current value". Press "ENTER" button for confirming this setting. If you did not press "ENTER" button within 5 seconds, it will automatically return to the original setting of "maximum charging current value."
5	Choosing the charging voltage mode	When the AC is normal, shortly press the button, the display will keep flashing of "The charging voltage" for different tye of batteries. Press "ENTER" button for confirming this setting. If you did not press "ENTER" button within 5 seconds, it will automatically return to the original setting of "charging voltage".

Fault recovery	By restart the machine																																		
FAN Operation																																			
Fan Operation	<p>Variable speed fan operation is required in invert and charge mode. This is to be implemented in such a way as to ensure high reliability and safe unit and component operating temperatures in an operating ambient temperature up to 50°C.</p> <ul style="list-style-type: none"> • Speed to be controlled in a smooth manner as a function of internal temperature and/or current. • Fan should not start/stop suddenly. • Fan should run at minimum speed needed to cool unit. • Fan noise level target < 60db. <p>The fan logic as below:</p> <table border="1"> <thead> <tr> <th>Condition</th> <th>Entercondition</th> <th>Leavecondition</th> <th>Speed</th> </tr> </thead> <tbody> <tr> <td rowspan="3">HEAT SINK TEMPERATURE</td> <td>T≤60°C</td> <td>T>65°C</td> <td>OFF</td> </tr> <tr> <td>65°C≤T<85°C</td> <td>T≤60°C or T≥80°C</td> <td>50%</td> </tr> <tr> <td>T>85°C</td> <td>T≤80°C</td> <td>100%</td> </tr> <tr> <td rowspan="3">Charge Current</td> <td>T≤15%</td> <td>T≥20%</td> <td>OFF</td> </tr> <tr> <td>20%<T≤50%</td> <td>T≤15% or T≥50%</td> <td>50%</td> </tr> <tr> <td>T>50%</td> <td>T≤40%</td> <td>100%</td> </tr> <tr> <td rowspan="3">Load% (Invert mode)</td> <td>Load<30%</td> <td>Load≥30%</td> <td>OFF</td> </tr> <tr> <td>30%≤Load<50%</td> <td>Load≤20% or Load≥50%</td> <td>50%</td> </tr> <tr> <td>Load≥50%</td> <td>Load≤40%</td> <td>100%</td> </tr> </tbody> </table>	Condition	Entercondition	Leavecondition	Speed	HEAT SINK TEMPERATURE	T≤60°C	T>65°C	OFF	65°C≤T<85°C	T≤60°C or T≥80°C	50%	T>85°C	T≤80°C	100%	Charge Current	T≤15%	T≥20%	OFF	20%<T≤50%	T≤15% or T≥50%	50%	T>50%	T≤40%	100%	Load% (Invert mode)	Load<30%	Load≥30%	OFF	30%≤Load<50%	Load≤20% or Load≥50%	50%	Load≥50%	Load≤40%	100%
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8. GENERAL SPECIFICATION

Safety Certification	CE (EN62040-1)
EMC Classification	En62040 - 2, C2
Operating Temperature Range	0°C to 40°C
Storage temperature	-15°C ~ 60°C
Operatio humidity	5% to 95%
Audible Noise	60dB max
Cooling	Forced air, variable speed fan
Size	EP-1012,EP-2012,EP-2024, EP-3024 : 461mm*217mm*178mm EP-4048, EP-6048 : 636mm*217mm*179**mm

9. APPENDIX

1.Indicator and Buzzer setting.

Status	Item	Buzzer
Line Mode	CC	×
	CV	×
	Float	×
Invert Mode	Inverter on	×
	Power saver	×
Alarm Mode	Battery Low	beep 0.5s every 5s
	Battery High	beep 0.5s every 1s
	Overload on invert mode	Refer to "Instruction of the LCD display"
	OverTemp on invert mode	beep 0.5s every 1s
	OverTemp on line mode	beep 0.5s every 1s
	Over charge	beep 0.5s every 1s
Fault Mode	Fan lock	beep continuous
	Battery High	beep continuous
	Inverter mode overload	beep continuous
	OverTemp	beep continuous
	Over charge	beep continuous
	Back Feed Short	beep continuous