

DC To AC POWER INVERTER

User Manual



Smart Start Function:

- Maximizing startup performance.
- Dynamic DC Bus Voltage regulation.
- Soft-start technology improves reliability.



M series

M-1000-12, 24

M-1500-12, 24

M-2000-12, 24

M-2500-12, 24

M-3000-12, 24



S series

S-300-12, 24, 48

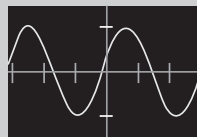
S-600-12, 24, 48

S-1200-12, 24, 48

S-1800-12, 24, 48

S-2500-12, 24, 48

S-3000-12, 24, 48



List of contents

Important Safety Instructions	3
Where to install	3
Making DC cable connections	3
Inverter Operation	4
Terminal installation diagram	4
Modified Sine Wave graph	
(M Series: M-1000, M-1500, M-2000)	5
(M Series: M-2500, M-3000)	6
Pure sine wave graph	
(S Series: S-300, S-600, S-1200)	8
(S Series: S-1800, S-2500, S-3000)	9
Bracket Introduction	11
Remote Control — LCD	12
Modified sine wave specification	
(M Series: M-1000, M-1500, M-2000, M-2500, M-3000)	13
Pure sine wave specification	
(S Series: S-300, S-600, S-1200)	14
(S Series: S-1800, S-2500, S-3000)	15
Inverter Troubleshooting guide	16

1. Important Safety Instructions



Warning!

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

General Safety Precaution:

- A. 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.
- B. To avoid a risk of fire and electronic shock. Make sure that existing wiring is in good electrical condition, and the wire size isn't undersized.
Do not operate the inverter with damaged or substandard wiring.
- C. This equipment contains components that tend to produce arcs or sparks.
To reduce the risk of fire or explosion, do not install in a compartment containing batteries or flammable materials, or in a location that requires ignition protected equipment.
- D. Never smoke or allow a spark or flame in vicinity of battery or engine.
- E. Not installing a fuse can result in fire that may cause injuries and / or damages.
- F. You may observe a spark when making the cable connections since current may flow and charge capacitors in the inverter. This is normal.
Do not make cable connections in the presence of flammable fumes; it may result in explosion and / or fire.
- G. 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. Where to install

Your inverter should be installed in a location that meets the following requirements:

- A. Dry: Keep the inverter away from any water or moisture.
- B. Cool: Ambient air temperature should be between 5°F and 113°F (-15°C and 45°C).
- C. Ventilated: Ensure that the unit is located in a well-ventilated compartment.
At least 6 inches (15cm) of clearance are required around the inverter for air flow.
Verify that all ventilation openings on the unit (front and rear panels) are not obstructed.

3. Making DC cable connections:

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 guage (too narrow or 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. To longer and narrower these cables, the greater the voltage drop.

4. 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.

The ON/OFF switch turns the control circuit in the power inverter on and off. The inverter input voltage ranges are shown as below:

S-300 ---

9.5V to 16.0V for 12V models;
19.0V to 32.0V for 24V models;
38.0V to 61.0V for 48V models.

M-1000, M-1500, M-2000, M-2500, M-3000, S-600, S-1200, S-1800, S-2500, S-3000 ---

10.0V to 16.0V for 12V models;
20.0V to 32.0V for 24V models;
40.0V to 61.0V for 48V models.

Attention:

Please set input volt at "suitable" range while operation, the range is as below:

11.5~14.0 VDC for 12V models
23.0~28.0 VDC for 24V models
46.0~56.0 VDC for 48V models

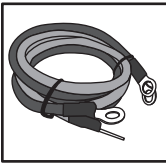
Higher input volt would cause high operation temperature inside the inverter, then overtemp protection soon.

Lower input volt would make inverter shut down easily because of low voltage protection, and shorter the battery life.

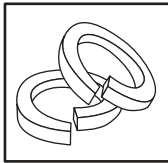
5. Terminal installation diagram:

Parts:

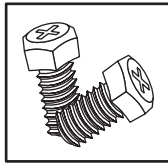
Cable terminals



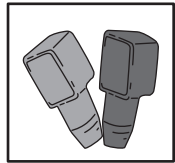
Spring washer



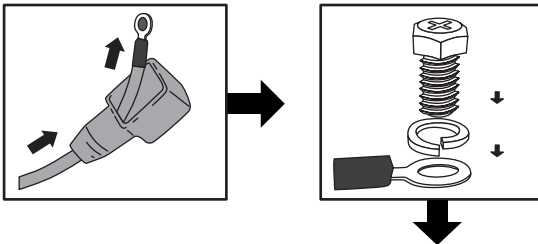
Screw



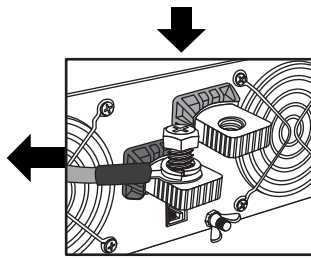
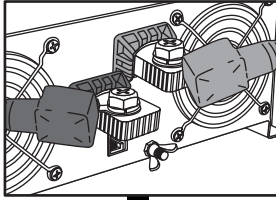
Insulator



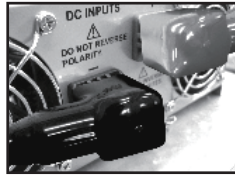
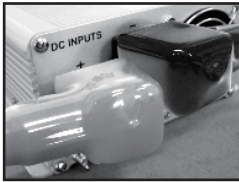
Step:



Screw the terminals tightly



To cover the terminals by the insulator.



Connect to battery or other power source. "+" is positive (Red), "-" is negative (Black). Reverse polarity connection will blow internal fuse and may damage inverter permanently.

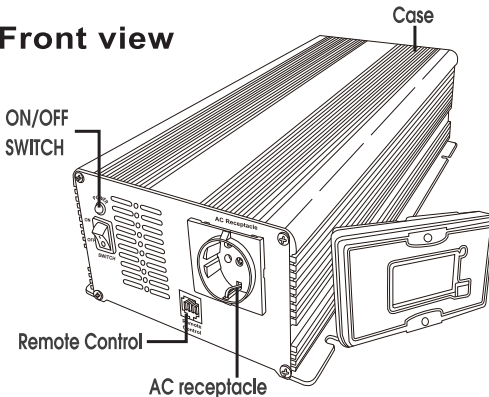
Damage caused by reversed polarity is not covered by the warranty.

6. Modified sine wave graph -- M (modified sine wave) series

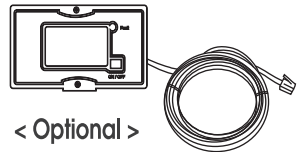
6-1. M-1000; M-1500; M-2000

- a. Compact and dexterous dimension design.
- b. External heat sink.
- c. Re-start function.
- d. Complete protection design.
- e. Cost-saving design.
- f. High peak power.
- g. With remote control function. (for M-1500, M-2000 only)

Front view

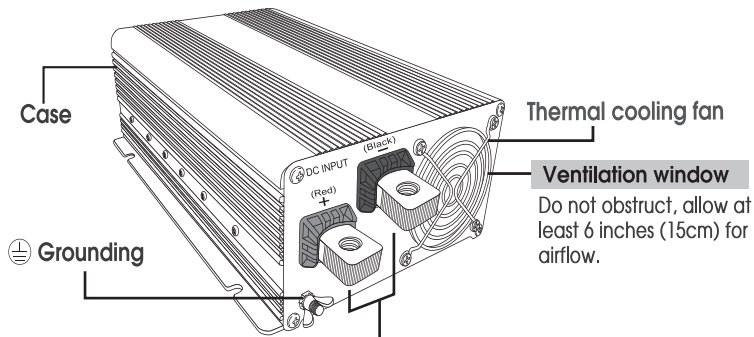


M-1000
M-1500
M-2000



< Optional >
Accessory --
Remote Control
(for M-1500, M-2000 only)

Rear view

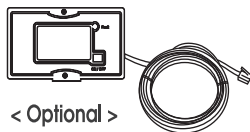


Battery terminals

Connect to battery or other power source. "+" is positive (Red), "-" is negative (Black). Reverse polarity connection will blow internal fuse and may damage inverter permanently.

6-2. M-2500; M-3000

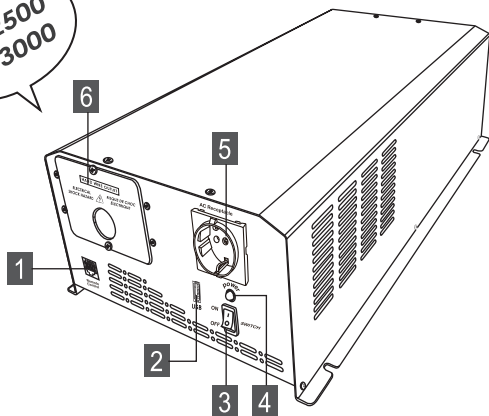
- Internal heat sink.
- With USB power port (5V/3A max.) function.
- 9cm thermal control fan to lower operation temperature.
- With LCD remote control function -- option.
- Hard wiring design.
- Re-start function.
- Complete protection design.
- Compact size design.
- High peak power.



< Optional >
Accessory --
Remote Control

Front view

M-2500
M-3000

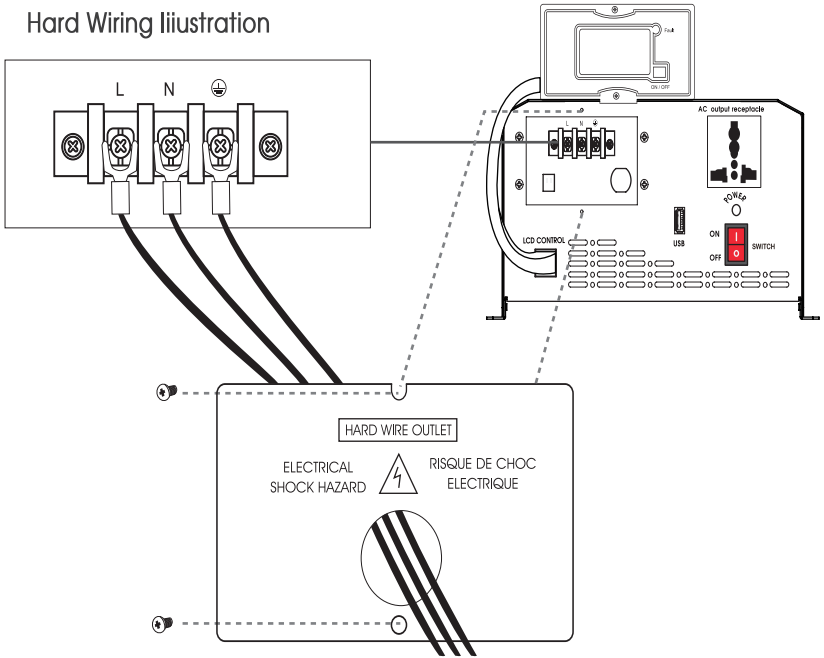


- LCD Remote Control jack
- USB port
- ON/OFF switch**
Please keep switch in the OFF position during installation.
- Power indicator
- AC Output Receptacle
- AC output hard wiring

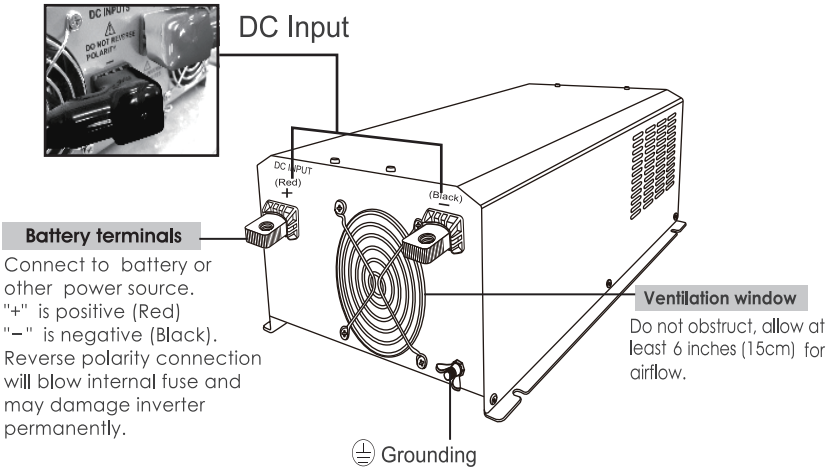
HARD WIRE OUTLET

ELECTRICAL SHOCK HAZARD ⚡ RISQUE DE CHOC ÉLECTRIQUE

Hard Wiring Illustration



Rear view



7. Pure sine wave graph -- S (pure sine wave) series

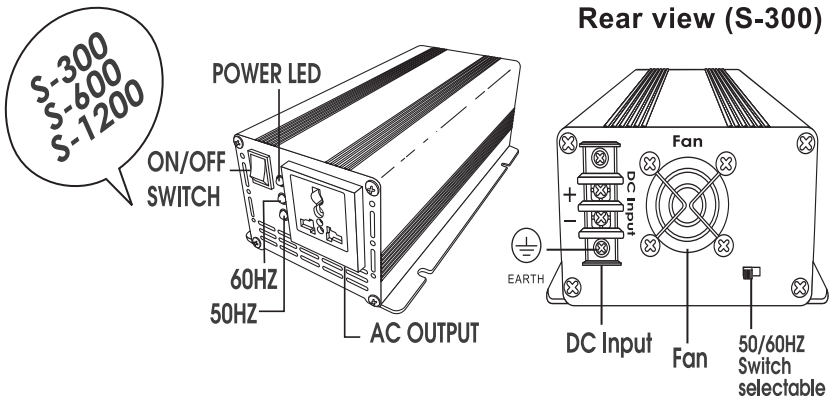
7-1. S-300, S-600, S-1200

A. Features:

- Pure sine wave output (<2% THD).
- Input & Output fully isolation design.
- High efficiency (>87%).
- Internal and external heat sinks.
- Multi-stage thermal control fan(s).
- Frequency 50/ 60Hz selective switch.
- Re-start function.
- Complete protection design.
- Detachable front LCD display panel. (for 1800W~3000W only)
- Bypass function. – optional (for 1800W~3000W only)
- Hard wiring design. (for 1800W~3000W only)

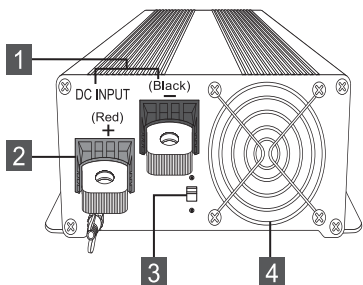
B. Suitable Appliances:

- Power tools - circular saws, drills, grinders, sanders, buffers, weed and hedge trimmers, air compressors.
- Office equipment - computer, printers, monitors, facsimile machines, scanner.
- Kitchen appliances - microwave ovens, refrigerators and freezers, coffee makers, blenders, ice maker, toasters.
- Industrial equipment - metal halide lamp, high-pressure sodium lamp.
- Household items - vacuum cleaners, fans, fluorescent and incandescent lights, sewing machines.
- Home entertainment electronics - TV, VCR, video games, stereos, musical instruments, satellite equipment.



(Please re-turn on the inverter when you change the frequency.)

Rear view (S-600,1200)



1. DC Input



2. Battery terminals

Connect to battery or other power source. "+" is positive (Red). "-" is negative (Black). Reverse polarity connection will blow internal fuse and may damage inverter permanently.

3. 50/60HZ Switch selectable

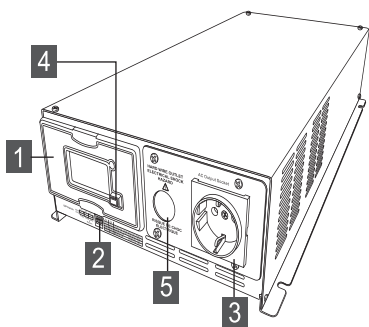
4. Ventilation window

Do not obstruct, allow at least 6 inches (15cm) for airflow.

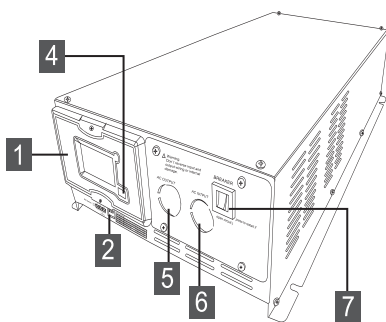
7-2. S-1800, S-2500, S-3000

Front view

No bypass function model



With bypass function model



1. Detachable Remote Control LCD.

2. DIP Switch Function. (Note 1)

3. AC Output Socket. (for no bypass model only)

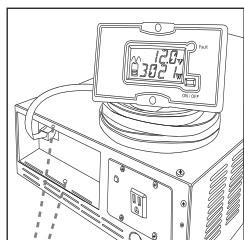
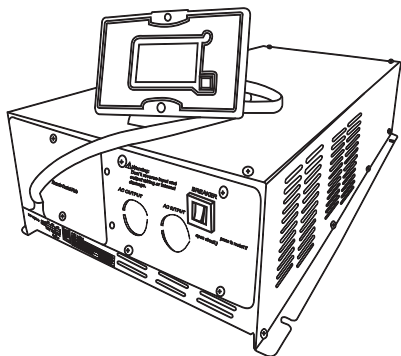
4. ON / OFF Switch.

5. AC Output hard wiring.

6. AC Input hard wiring. (for bypass model only)

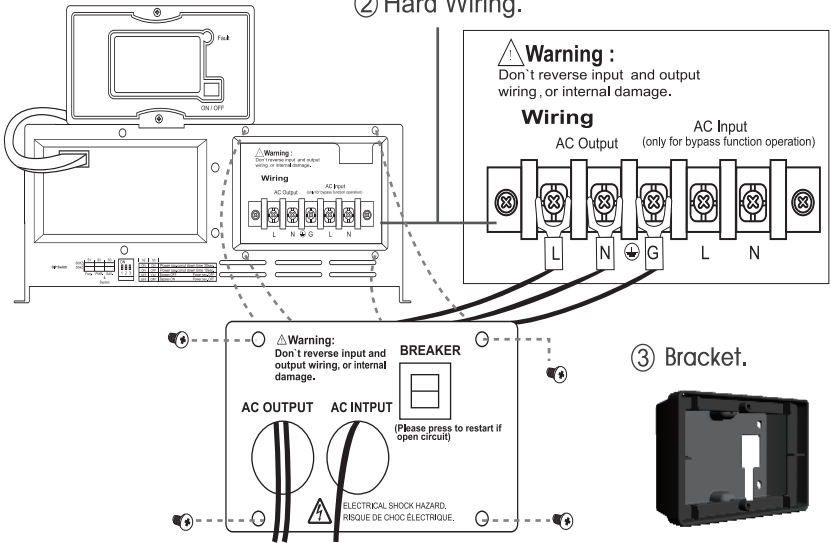
7. Breaker. (for bypass model only)

Accessories

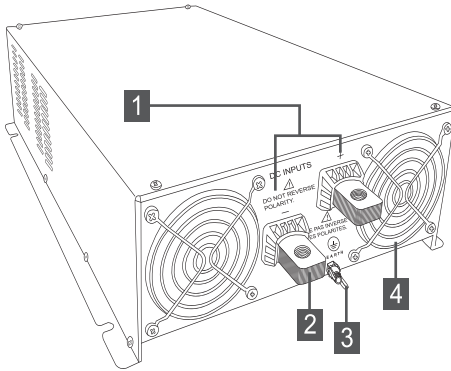


① Detachable LCD remote control plate.

② Hard Wiring.



Rear view



1.DC Input



2.Battery terminals

Connect to battery or other power source. "+" is positive (Red) "-" is negative (Black). Reverse polarity connection will blow internal fuse and may damage inverter permanently.

3. ⚡ Grounding

4.Ventilation window

Do not obstruct, allow at least 6 inches (15cm) for airflow.

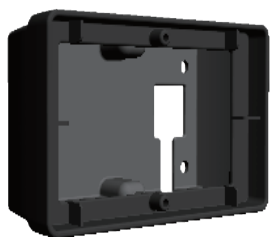
Note 1: DIP Switch Function (OFF:)

	S1	S2	S3		S2	S3	
60HZ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	Power sav. count down time 30sec.
50HZ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	Power sav. count down time 10sec.
Freq. PWR. SAV. & Bypass					<input type="checkbox"/>	<input type="checkbox"/>	Bypass OFF Power sav. OFF
					<input type="checkbox"/>	<input type="checkbox"/>	Bypass ON Power sav. OFF

(Please re-return on the inverter when you change the frequency.)

8. Bracket Introduction

bracket - 2 parts : rear and frame.



FRONT VIEW



Rear



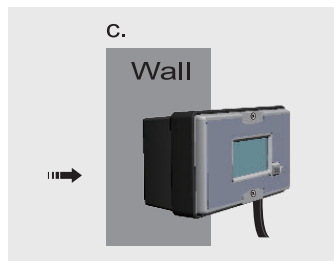
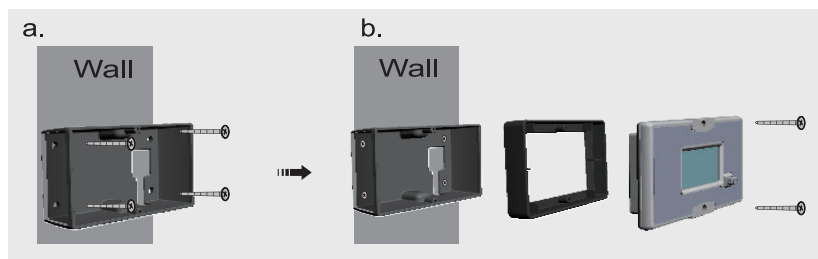
Frame

How to instal?

- ① With the frame only, if there's the hole on the wall for phone jack.

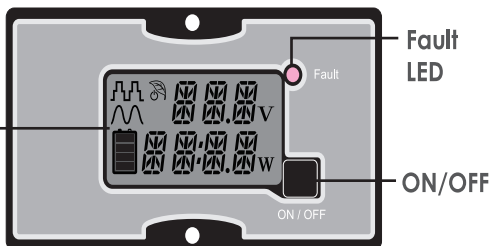
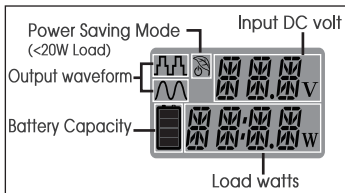


- or ② With the frame and rear both, if the user just can screw the bracket on the wall, no hole for phone jack.

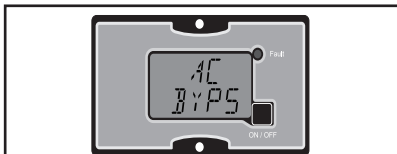
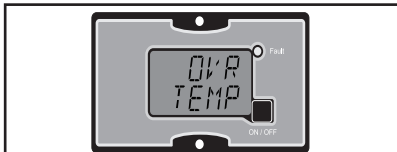
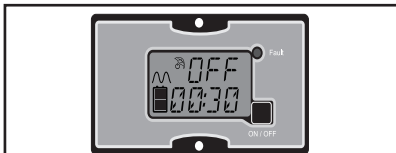
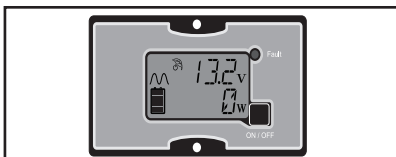


9. Remote Control - LCD


Graph



Display Content :

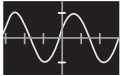


Modified Sine Wave spec.

SPECIFICATIONS					
Model No.	M-1000-12 M-1000-24	M-1500-12 M-1500-24	M-2000-12 M-2000-24	M-2500-12 M-2500-24	M-3000-12 M-3000-24
Max surge power	2000W	3000W	4000W	5000W	6000W
Continuous power	1000W	1500W	2000W	2500W	3000W
AC Output Voltage	100VAC / 120VAC / 230VAC				
Regulation	$\pm 8\%$ (100V: $\pm 10\%$)				
USB port	NO			5V/3A max.	
DC input Voltage	10 ~16V(12V) 20 ~32V(24V)				
Output wave form	 ~~ Modified Sine Wave ~~				
Frequency	50/60Hz $\pm 3\%$				
Efficiency	$>85\%$				
No load current draw	$\leq 0.6A$ (12V) $\leq 0.3A$ (24V)	$\leq 0.4A$ (12V) $\leq 0.2A$ (24V)	$\leq 0.4A$ (12V) $\leq 0.2A$ (24V)	$\leq 0.4A$ (12V) $\leq 0.2A$ (24V)	$\leq 0.4A$ (12V) $\leq 0.2A$ (24V)
Temperature protection	55°C ± 5 °C				
Input low volt alarm	YES				
Input low volt shut-down	YES				
Input high volt protection	YES				
Output short circuit protection	YES				
Output overload protection	YES				
DC & AC isolated	YES				
Remote control	NO	YES			
Dimensions (L*W*H)/mm	295*179*88.5	405*179*88.5	435*179*88.5	517*265*132	517*265*132
Net weight (kg)	2.4	3.4	3.7	8.2	8.5
Gross weight (kg) -- with cable	2.7	3.8	4.3	8.9	9.2


Note: Specifications subject to change without notice.

Pure Sine Wave spec.

SPECIFICATIONS			
Model No.	S-300-12 S-300-24 S-300-48	S-600-12 S-600-24 S-600-48	S-1200-12 S-1200-24 S-1200-48
Max surge power	600W	1200W	2400W
Continuous power	300W	600W	1200W
AC Output Voltage	100VAC / 120VAC / 230VAC		
Regulation	± 5%(100V:±10%)		
DC input Voltage	9.5 ~16V(12V) 19 ~32V(24V) 38 ~61V(48V)	10 ~16V(12V) 20~32V(24V) 40~61V(48V)	
Output wave form	 ~~ Pure Sine Wave ~~		
Frequency	50/60Hz ± 3%		
Efficiency	> 87%		
No load current draw	$\leq 0.6A(12V)$ $\leq 0.3A(24V)$ $\leq 0.2A(48V)$	$\leq 0.9A(12V)$ $\leq 0.5A(24V)$ $\leq 0.3A(48V)$	$\leq 1.2A(12V)$ $\leq 0.6A(24V)$ $\leq 0.3A(48V)$
Temperature protection	55°C ± 5°C		
Input low volt alarm	YES		
Input low volt shut-down	YES		
Input high volt protection	YES		
Output short circuit protection	YES		
DC & AC isolated	YES		
THD (Distortion)	< 2%		
Dimensions (L*W*H)/mm	260*129*82.5	285*179*82.5	435*179*82.5
Net weight (kg)	2.0	2.8	4.4
Gross weight (kg) -- with cable	2.2	3.0	5.0

Note: Specifications subject to change without notice.

Pure Sine Wave spec.

	Model No.	S-1800	S-2500	S-3000
OUTPUT	AC Voltage	100VAC/120VAC/230VAC		
	Continuous Power	1800W	2500W	3000W
	Surge Power	3600W	5000W	6000W
	Waveform	PURE SINE WAVE 		
	Frequency	50/60HZ±3%		
	AC Regulation	±5% (100V:±10%)		
	Receptacles	YES, 1pc		
	The inverter would re-start automatically from power saving mode when load is >20W.			
INPUT	DC Current	180A(12V) / 90A(24V) / 45A(48V) 250A(12V) / 125A(24V) / 62.5A(48V) 300A(12V) / 150A(24V) / 75A(48V)		
	DC no-load current under normal mode.	1.0A(12V) / 0.5A(24V) / 0.25A(48V)		
	DC no-load current under power saving mode.	0.12A(12V) / 0.06A(24V) / 0.03A(48V)		
	DC Voltage	12V/24V/48V		
	Voltage Range	10-16VDC(12V) / 20-32VDC(24V) / 40-61V(48V)		
	Efficiency (Typ.)	85%		
	DC Connector	Cable*1		
PROTECTION	Input low volt alarm	YES		
	Input low volt shut-down	YES		
	Input high volt protection	YES		
	Output short circuit protection	YES		
	Temperature protection	55°C±5°C		
	Battery polarity reverse	Fuse Burn out		
	Over Load	Shut down if re-try is still failed		
ENVIRONMENT	WORKING TEMP.	-15°C~+45°C		
	WORKING HUMIDITY	20%~90% RH non-condensing		
	STORAGE TEMP., HUMIDITY	-30°C~+70°C/-22°F~+158°F, 10~95% RH		
	TEMP. COEFFICIENT	±0.05%/°C(0~55°C)		
SAFETY & EMC	EMI Conduction & Radiation	Compliance to EN55022 class B, 72/245/CEE, 95/54/CE		
	EMS Immunity	Compliance to EN61000-4-2, 3		
	LVD	Compliance to EN60950		
OTHERS	Dimension (L*W*H)	570*274*105mm	570*274*105mm	570*274*105mm
	NET. Weight	8.3kgs	9.8kgs	9.8kgs
	Gross Weight (With Cable)	9.0kgs	10.8kgs	10.8kgs
Optional				
EXTRA FUNCTION	Byass function	Yes		
INPUT	DC no-load current under normal mode.	1.0A(12V) / 0.5A(24V) / 0.25A(48V)		
	DC no-load current under power saving mode.	0.4A(12V) / 0.2A(24V) / 0.1A(48V)		
	Low AC input volt transfer to inverter mode.	90Vac+/-5% or 180Vac+/-5%		
	Low AC input volt recovery to AC mode.	95Vac+/-5% or 190Vac+/-5%		
	High AC input volt transfer to inverter mode.	132Vac+/-5% or 265Vac+/-5%		
	High AC input volt recovery to AC mode.	125Vac+/-5% or 250Vac+/-5%		
Connector	Input AC terminal	Yes, hard wiring.		
	Output AC Terminal	Yes, hard wiring.		
	Receptacles	No		

Note: Specifications subject to change without notice.

11. Inverter Troubleshooting guide

Problem	Possible cause	Solution
Low output voltage	Using a voltmeter which can't properly read the RMS voltage well	Use a true RMS reading meter
Low input voltage	Poor battery condition	Check the batteries and the vehicle alternator condition
	Overload	Reduce load
	Improper Installation	Check each inverter's installation steps
No output voltage and display shows " LVP " or " ERR LOW " (low volt protection)	Low input voltage	Recharge the battery, check the connections and cables.
No output voltage ,and no power LED	Inverter off	Turn the inverter on
	No DC power to the inverter	Check the wiring
	Reverse DC polarity	Check fuse and the installation
		Replace the inverter. Damage caused by reversed polarity is not covered by the warranty
Low battery alarm on all the time	Poor battery condition	Charge or change battery
	Poor DC wiring	Use proper cables and check connection
	Poor DC terminal connections	Use proper tool
No output voltage and overtemp indicator on	Thermal shutdown	Reduce load
	Improper installation	Allow inverter to cool off Improve ventilation Install properly
No output voltage and display shows " OLP " or " OVR LOAD " (over load protection)	Short circuit or wiring error	Check AC wiring
	Inverter overload	Remove or reduce load, switch the inverter OFF at least 5 seconds and restart the inverter
	Improper installation	Check the AC wires and improper polarity.