

# fullwat®

PDA300S / PDA600S / PDA1200S  
PDA1800S / PDA2500S / PDA3000S  
PDA1000 / PDA1800 / PDA3000

DC to AC power inverters

User's manual



## Smart Start function

1. Maximizing startup performance
2. Dynamic DC Bus voltage regulation
3. Soft-start technology improves reliability

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## 1. Important safety instructions



### WARNING

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

### General safety precautions

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

To avoid a risk of fire and electric shock make sure that existing wiring is in good electrical conditions and the wire size isn't undersized. Do not operate the inverter with damage or substandard wiring.

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.

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

Not installing a fuse can result in fire that may cause injuries and/or damages.

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.

Shock Hazard. Before proceeding further, carefully check the inverter is **not** connected to any batteries, and that all wiring is disconnect 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:**

**Dry:** keep the inverter away from any water or moisture.

**Cool:** Ambient air temperature should be between -15°C y 45°C (5°F and 113°F)

**Ventilated:** Ensure that the unit is located in a well ventilated compartment. At least 15cm (6 inches) 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.

### **Making DC cable connections:**

Your cables should be as short as possible (ideally, less than 3m / 10 feet) 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 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 the cables, the greater the voltage drop.

### 3. 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:

PDA300S	PDA600S / PDA1200S / PDA1800S / PDA2500S / PDA3000S PDA1000 / PDA1800 / PDA3000
9.5V to 16.0V for 12V models; 19.0V to 32.0V for 24V models; 38.0V to 61.0V for 48V models.	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 voltage at “suitable” range while operation, the range is as below:

- 11.5 ~ 14.0V for 12V;
- 23.0 ~ 28.0V for 24V;
- 46.0 ~ 56.0V for 48V.

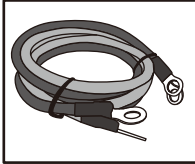
Higher input voltage would cause high operation temperature inside the inverter, then overtemperature protection can be activated soon.

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

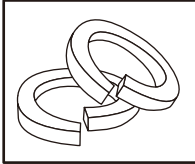
## 4. Terminal installation diagram.

### Parts:

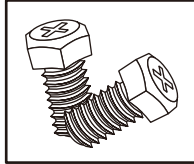
Cable terminals



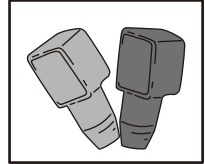
Spring washer



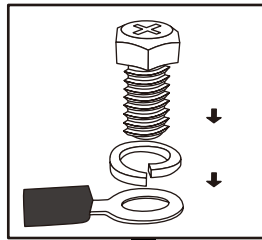
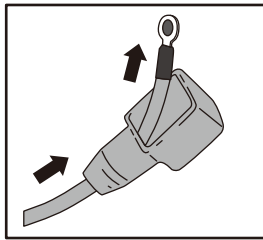
Screw



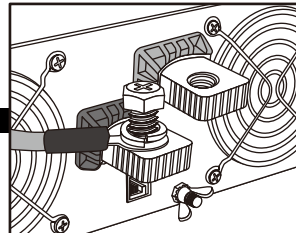
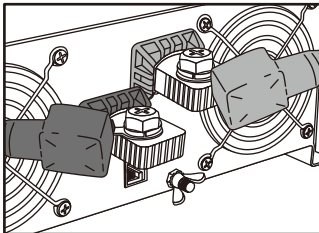
Insulator



### Step:



Screw the terminals tightly



To cover the terminals by the insulator.

Pure sine wave & PDA1000



Modified sine wave models



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

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

## 5. Modified sine wave models

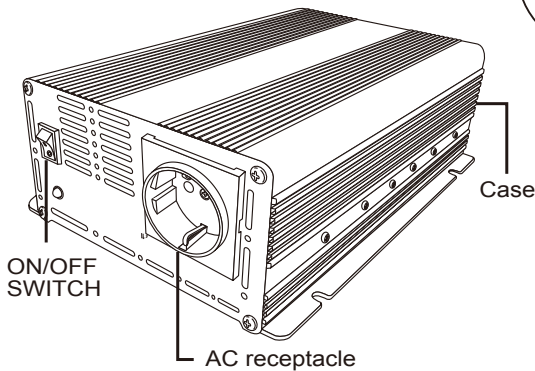
Model: **PDA1000**

Compact design

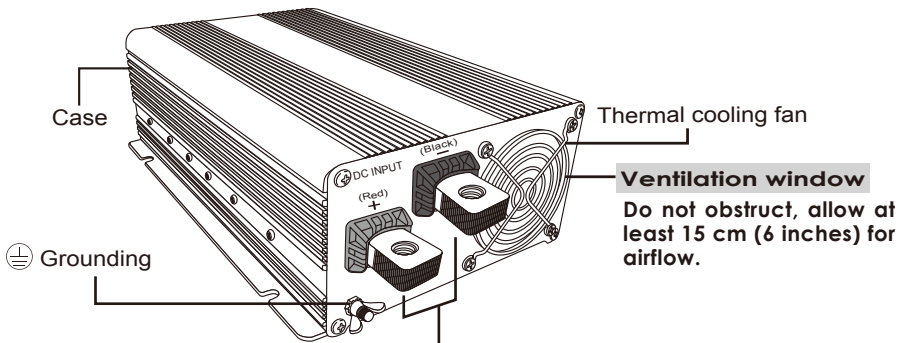
External hetasink

Re-start when input volt is returned to normal range.

### Front view



### 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.

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Models: **PDA1800 / PDA3000**

Internal heatsink.

2-stage thermal control fan(s) – 8cm fan.

Remote control function (detachable).

Front LCD screen shows you the input volt, output watts, battery capacity, etc... and any failure situation.

High peak power.

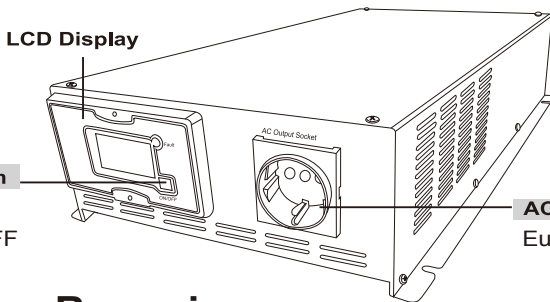
Re-start function.

Complete protection design

Available for various appliances, including resistant load, traditional lighting load, computer load, etc.

**PDA-1800  
PDA-3000**

## Front view



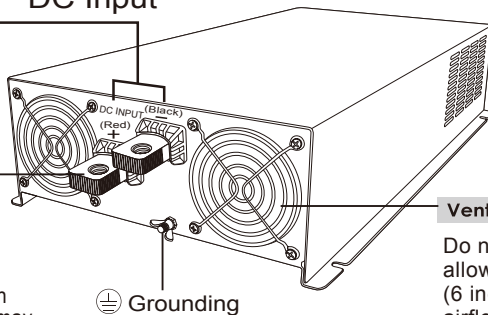
**ON/OFF switch**  
Please keep switch in the OFF position during installation

**AC Outlet socket**  
European type

## Rear view



### DC Input



**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.

**Grounding**

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

## 6. Pure sine wave models

Models **PDA300S / PDA600S / PDA1200S / PDA1800S / PDA2500S / PDA3000S**

Pure sine wave output (<2% THD)

Input and output fully isolation design.

High efficiency >87%

Internal and external heatsink.

Multi-stage thermal control fan.

Frequency 50/60Hz selectable.

Auto re-start function.

Complete protection design.

Detachable front LCD display panel (for PDA1800S/PDA2500S/PDA3000S models)

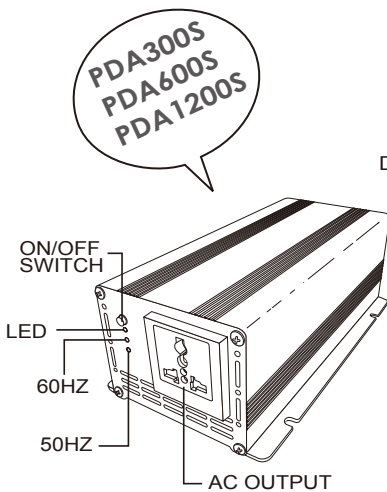
Power saving function (for PDA1800S/PDA2500S/PDA3000S models)

By-pass function optional (for PDA1800S/PDA2500S/PDA3000S models)

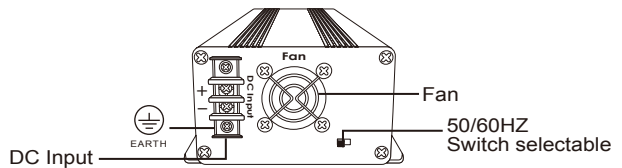
Applications:

- Office equipment: computer, printers, monitors, facsimile machines, scanner, etc.
- Small kitchen appliances: coffe makers, toasters, etc.
- Lighting products: fluorescent and incandescent lights, high-pressure sodium lamps, etc.
- Home entertainment electronics: TV, VCR, video games, etc.

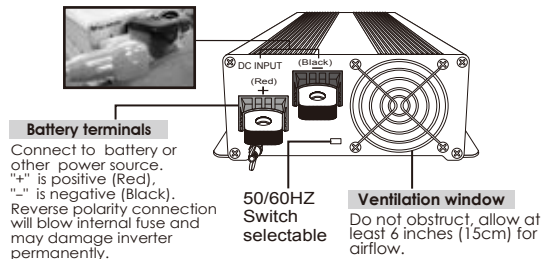
### Model PDA300S, PDA600S & PDA1200S



### Rear view (PDA300S)



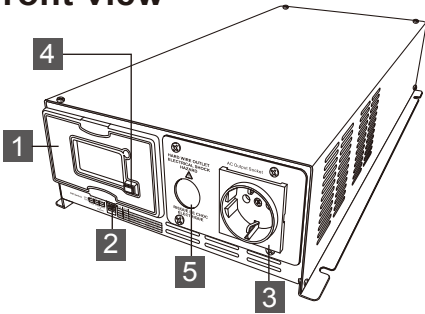
### Rear view (PDA600S & 1200S)



**PLEASE re-return on the inverter when you change the frequency.**

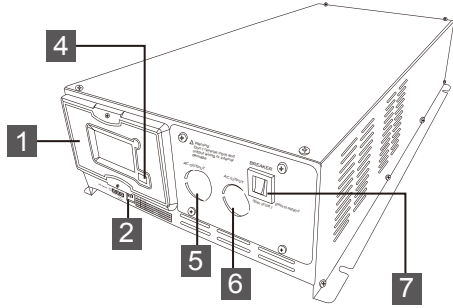
Model PDA1800S, PDA2500S & PDA3000S

## Front view



No bypass function model

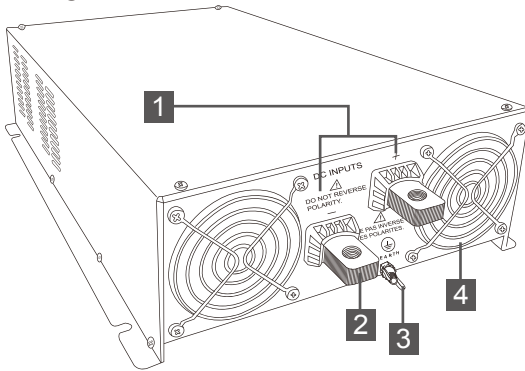
1. Detachable Remote Control LCD
2. DIP Switch Function ( Note 1 )
3. AC Output Socket ( for no bypass model only )
4. ON / OFF Switch



With bypass function model

5. AC Output hard wiring
6. AC Input hard wiring ( for bypass model only )
7. Breaker ( for bypass model only )

## Rear view



### 1. DC Input



### 2. Battery terminals

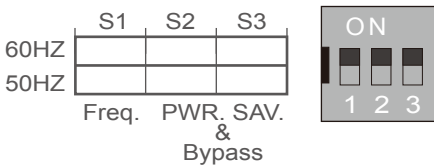
Connect to battery or other power source.  
 "+" is positive (Red) "-" is negative (Black).  
 Reverse polarity connection will blow internal fuse and may damage inverter permanently.

### 3. ⚡ Grounding

### 4. Ventilation window

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

## Note 1: DIP Switch Function ( OFF: )

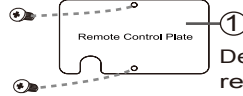
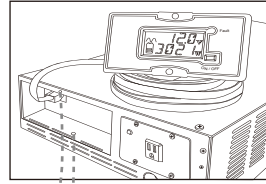
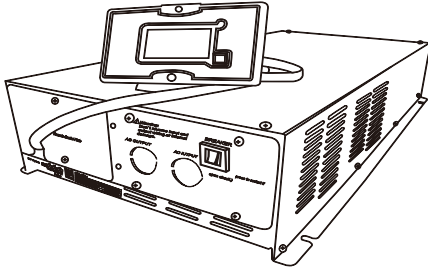


		S2	S3	
ON	ON	ON	ON	Power sav. count down time 30sec.
ON	ON	OFF	OFF	Power sav. count down time 10sec.
OFF	ON	ON	ON	Bypass OFF Power sav. OFF
OFF	ON	OFF	OFF	Bypass ON Power sav. OFF

**PLEASE re-turn on the inverter when you change the frequency.**

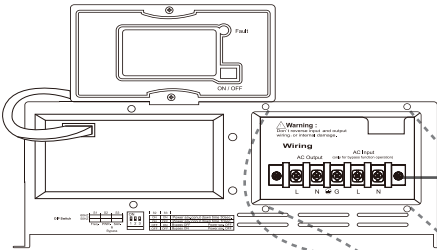


## Accessories



① Detachable LCD remote control plate.

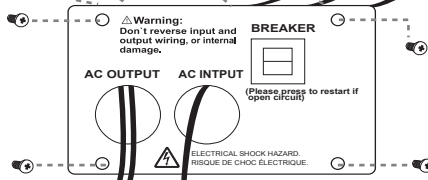
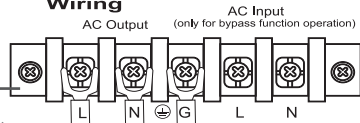
### FRONT VIEW



### ② Hard Wiring (Only by-pass models)

**Warning :**  
Don't reverse input and output wiring, or internal damage.

#### Wiring



### Mounting Bracket – optional accessory

Bracket has two parts: rear and frame.

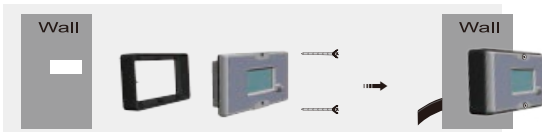


FRONT VIEW



Rear Frame

1. With the frame only, it must be a hole in the wall.

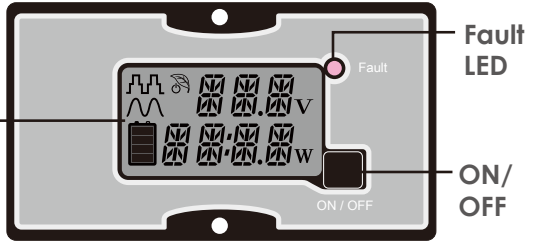
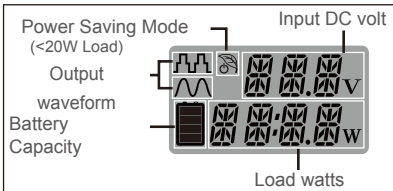


2. With both frame and rear, user just can screw the bracket on the wall. It is not necessary a hole in the wall.

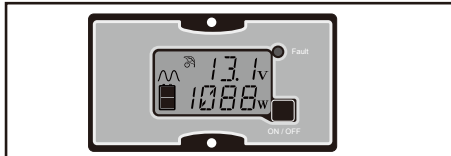


## 7. Remote control - Liquid crystal display

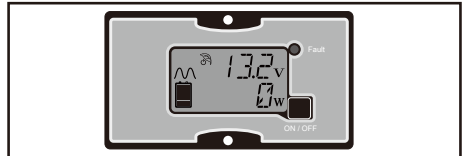
### Graph



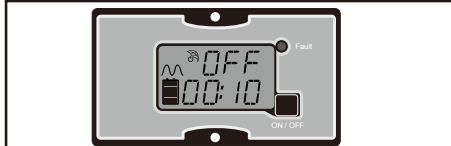
### Display Content :



1. Inverter Mode: Standby Display.



2. Power Saving Mode Signal Display.



3. Power Saving Count Down Time 10sec. Display.



4. Power Saving Count Down Time 30sec.



5. Battery low volt protection.



6. Battery high volt protection.



7. Overtemp. Protection.



8. Overload or short circuit protection.




9. AC input & Bypass Mode Display.




10. When the load is less than 50W (↓50W).

## 8. Modified sine wave specifications


Model No.	PDA1000-12N	PDA1800-12N	PDA3000-12N
	PDA1000-24N	PDA1800-24N	PDA3000-24N
Max. surge power	2000W	3600W	6000W
Continuous power	1000W	1800W	3000W
AC output voltage	230VAC		
Regulation	±8%	±5%	
DC input voltage	10 ~ 16V (12V)		
	20 ~ 32V (24V)		
Output wave form	 Modified sine wave		
Frequency	50Hz ± 3%		
Efficiency	> 85%		
No load current draw	≤ 0.6A (12V)	≤ 0.5A (12V)	≤ 0.6A (12V)
	≤ 0.3A (24V)	≤ 0.3A (24V)	≤ 0.3A (24V)
Temperature protection	55 ± 5°C (131 ± 9 °F)		
Input low voltage alarm	YES		
Input low voltage shut down	YES		
Input high voltage protection	YES		
Output short circuit protection	YES		
DC and AC isolated	YES		
Remote control optional	NO	YES	
Dimensions (L *W * H) in mm	295*179*82.5	530*274*105	570*274*105
Net weight (kg)	2.4	7.3	8.3
Gross weight (kg) with cable	2.7	8.0	9.4

Note: Specifications subject to change without notice

## 9. Pure sine wave specifications

Model No.	PDA300S-12N	PDA600S-12N	PDA1200S-12N
	PDA300S-24N	PDA600S-24N	PDA1200S-24N
	PDA300S-48N	PDA600S-48N	PDA1200S-48N
Max. surge power	600W	1200W	2400W
Continuous power	300W	600W	1200W
AC output voltage	230VAC		
Regulation	±5%		
DC input voltage	9.5 ~ 16V (12V)	10 ~ 16V (12V)	
	19 ~ 32V (24V)	20 ~ 32V (24V)	
	38 ~ 64V (48V)	40 ~ 64V (48V)	
Output wave form			Pure sine wave
Frequency	50Hz / 60Hz ± 3%		
Efficiency	> 87%		
No load current draw	< 0.6A (12V)	< 0.9A (12V)	< 1.1A (12V)
	< 0.3A (24V)	< 0.5A (24V)	< 0.6A (24V)
	< 0.2A (48V)	< 0.3A (48V)	< 0.3A (48V)
Temperature protection	55 ± 5°C (131 ± 9 °F)		
Input low voltage alarm	YES		
Input low voltage shut down	YES		
Input high voltage protection	YES		
Output short circuit protection	YES		
DC and AC isolated	YES		
THD (Distortion)	< 2%		
Dimensions (L *W * H) in 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

Model No.	PDA1800S-12N	PDA2500S-12N	PDA3000S-12N
	PDA1800S-24N	PDA2500S-24N	PDA3000S-24N
	PDA1800S-48N	PDA2500S-48N	PDA3000S-48N
Max. surge power	3600W	5000W	6000W
Continuous power	1800W	2500W	3000W
AC output voltage	230VAC		
Regulation	±5%		
Frequency	50Hz / 60Hz ± 3%		
Output wave form			Pure sine wave
DC input voltage	10 ~ 16V (12V) // 20 ~ 32V (24V) // 40 ~ 61V (48V)		
DC current at full load	180A (12V)	240A (12V)	300A (12V)
	90A (24V)	120A (24V)	150A (24V)
	45A (48V)	60A (48V)	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)		
<b>Inverter would re-start automatically from power saving mode when load is higher than 10W</b>			
Efficiency	> 85%		
Battery low alarm	10.5±0.5V (12V) // 21±1V (24V) // 42±2V (48V)		
Battery low shut down	10±0.5V (12V) // 20±1V (24V) // 40±2V (48V)		
Overvoltage protection	16±0.5V (12V) // 32±1V (24V) // 61±2V (48V)		
Overtemperature protection	55 ± 5°C (131 ± 9 °F)		
Short circuit protection	Shut-off		
Battery polarity reverse protection	Fuse burn-out		
Fuse	9 pcs	12 pcs	15 pcs
Overload protection	Restart 1 time, shut-down if failed		
Working temperature	-15 ~ +45 °C (5 ~ 113 °F)		
Working humidity	20 ~ 90 % RH non-condensing		
Storage temperature & humidity	-30 ~ +70°C (-22 ~ +158 °F) // 10 ~ 95% RH		
Temperature coefficient	± 0.05 %/°C (0 ~ 55°C / 32 ~ 131 °F)		

Model No.	PDA1800S-12N	PDA2500S-12N	PDA3000S-12N
	PDA1800S-24N	PDA2500S-24N	PDA3000S-24N
	PDA1800S-48N	PDA2500S-48N	PDA3000S-48N
EMI conduction & radiation	Compliance to EN55022 class B, 72/245/CEE, 95/45/CE		
EMS immunity	Compliance to EN61000-4-2, EN61000-4-3		
LVD	Compliance to EN60950		
Dimensions (L *W * H) in mm	570*274*105	570*274*105	570*274*105
Net weight (kg)	8.3	9.8	9.8
Gross weight (kg) with cable	9.0	10.8	10.8

Note: Specifications subject to change without notice

## Specifications for by-pass model (optional)

Model No.	PDA1800S-12N	PDA2500S-12N	PDA3000S-12N
	PDA1800S-24N	PDA2500S-24N	PDA3000S-24N
	PDA1800S-48N	PDA2500S-48N	PDA3000S-48N
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 voltage transfer to inverter mode	180VAC ± 5%		
Low AC input voltage recovery to AC mode	190VAC ± 5%		
High AC input voltage transfer to inverter mode	265VAC ± 5%		
High AC input voltage recovery to AC mode	250VAC ± 5%		
Input AC terminal	Hard wiring with terminal block		
Output AC terminal	Hard wiring with terminal block		
AC outlet socket	No		

Note: Specifications subject to change without notice

## 10. 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 and watts indicator in the red zone	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 volt indicator in lower red zone	Low input voltage	Recharge the battery, check the connections and cables.
No output voltage and no voltage indication	Inverter off	Turn the inverter on
	No DC power to the inverter	Check the wiring
	Reverse DC polarity	Check battery fuse and the installation Replace the inverter. <b>Damage caused by reversed polarity is not covered by the warranty</b>
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
		Allow inverter to cool off
		Improve ventilation
	Improper installation	Install properly
No output voltage and overload indicator	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



## **11. Warranty**

We offer 12 months warranty from the date of purchase, as stated in invoice or purchasing proof, and will repair or replace any defective power invertir.

This limited warranty is void if the unit is abused, modified, installed improperly, if the housing has been removed, if the serial number is missing, or if the original identification markings have been defaced, altered, or removed

The supplier is not liable for any incidental, consequential or other damages arising from the use, cost of removal, installation, or troubleshooting of the customer's electrical systems. Repair or replacement are your sole remedies and shall not be liable for damages, whether direct, incidental, special or consequential, even though cause by negligence or other fault.

This is only warranty and the company makes no other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose.

**V3 09/2014**