



PVES Series User Manual

User Manual

Shenzhen Pvenergy Technologies Co., Ltd



PVES Series

Solar Residential System

Overview

Thank you for choosing PVES series solar residential system from Shenzhen Pvenergy Technologies Co., Ltd. With the innovative design and impeccable quality control, PVES series solar residential system has extremely high stability and reliability, which are widely applied for high-demanding solar off-grid system.





This manual describes the installation, operation and troubleshooting of PVES series. Please read this manual carefully before installations and operations. If any problem is encountered during installation or operation, please refer to the manual before contacting the local distributor or sales representative. This manual could be helpful to solve most difficulties of installation and operation. If necessary, please contact installers.

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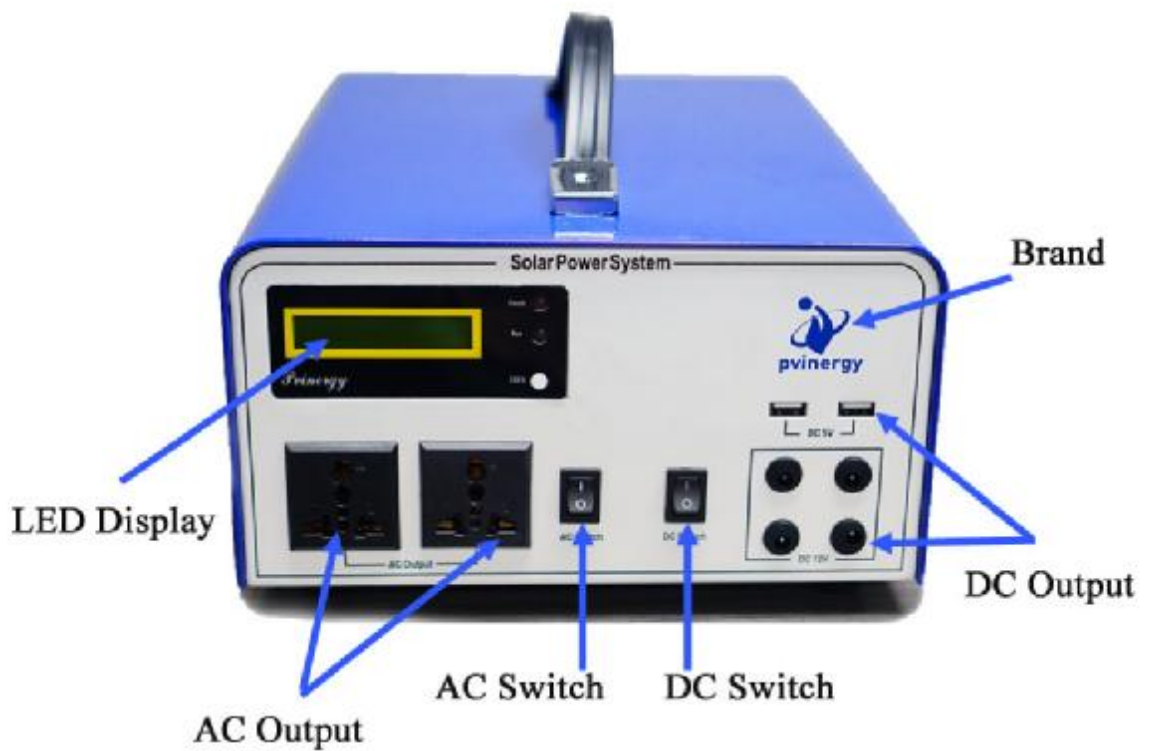
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1. Symbol Explanation

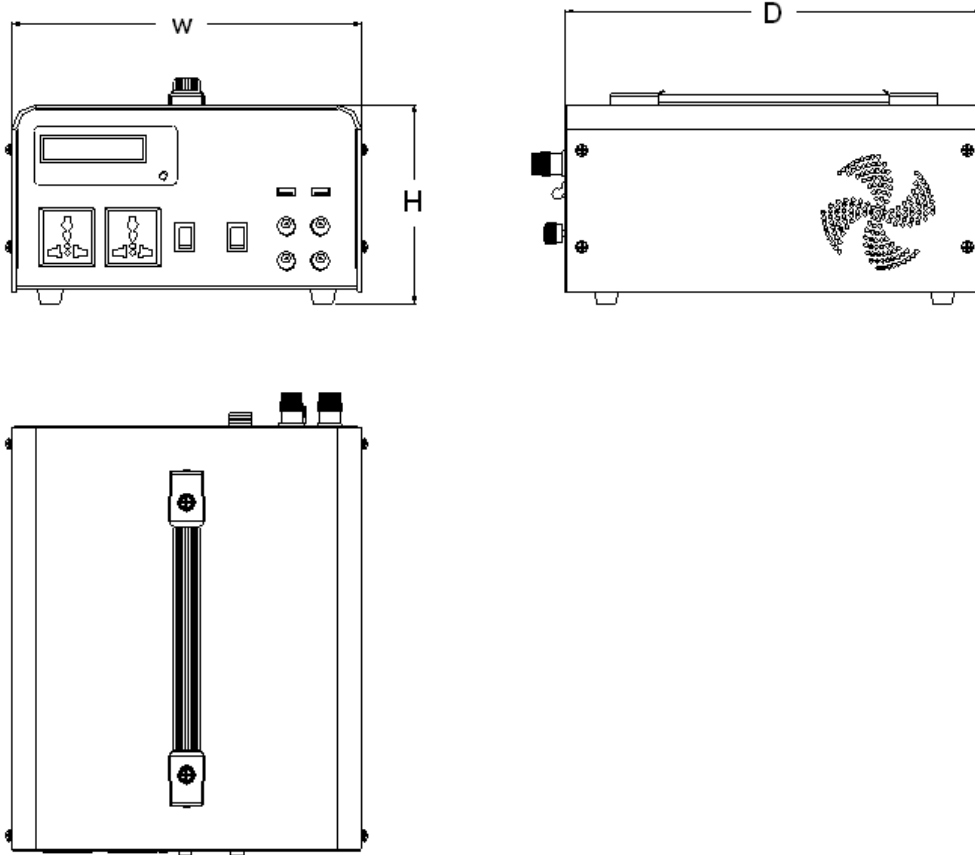
	<p style="text-align: center;">Danger</p> <p>High - voltage risk; Inhibit touching; if not avoided, there will result in casualties.</p>
	<p style="text-align: center;">Warning</p> <p>Potential risk; if not avoided, there will result in casualties.</p>
	<p style="text-align: center;">Warning</p> <p>High temperature; inhibit touching; incaution touching may result in scald.</p>
	<p style="text-align: center;">Attention</p> <p>Attention to existing potential risk; if not avoided, could cause the device not operating properly or property loss.</p>
	<p style="text-align: center;">Attention</p> <p>It is compliance with WEEE directive.</p>

2. Product Introduction

2.1 PVES Appearance Overview



2.2 Dimensions and Weights



Model	Width (mm)	Depth (mm)	Length (mm)	Weight (Kg)
PVES300	255	305	143	5.5
PVES600	255	305	143	5.7
PVES800	255	305	143	5.7
PVES1000	285	335	143	6.0

2.3 System Diagram



- A. Solar Panel: Provide DC power to inverter
- B. PVES Inverter: Charging battery via DC power from solar panel(s); Converting DC power from battery to 110/220V AC power for loads; Providing 12V/24V and 5V DC input
- C. Battery: Charging through controller, storing solar energy and discharging to loads
- D. Loads: Divided into AC loads and DC loads, such as fan, TV, computer, light, mobile phone, etc

3. Installation



3.1 Notes before Installation

This user manual describes inverter installation and safety operation. Please follow below instructions carefully before installation:

- To check the ambient temperature for installation, it is recommended from 0°C to 45°C
- AC output voltage range: 110/220Vac \pm 5%, 50/60Hz
- Adequate convection space surrounds the inverter
- The inverter is installed far away from explosive vapor
- No flammables are near the inverter
- Do not expose the PV inverter to direct sunlight

3.2 Checklist of Package

Please go over the items carefully in the box after open the package. The items should contain as below:

No.	Items	Quantity
-----	-------	----------

1	PVES300/PVES600/PVES800/PVES1000 inverter	1
2	12/24V incandescent light with wires	1
3	Length: 1m 6 mm ² cable and battery clamp	1
4	User Manual	1
5	Quality Assurance Card	1
6	10 in one USB cable	1



Verify that the above items are complete when open the package



3.3 Safety Precautions

- A. Do not disassemble the enclosure. This inverter does not contain user serviceable parts. Refer all servicing to qualified service personnel. All wiring and electrical installation should be conducted by the qualified service personnel and must meet CE requirements.
- B. AC loads, PV voltage and Bat voltage are terminated inside the PV Inverter. Please disconnect these circuits before servicing.
- C. Energy stored in this equipment's DC link capacitors presents a risk of electric shock. Even if the equipment is disconnected from the grid and photovoltaic panels, high voltages may still exist inside the PV inverter. Do not disassemble the enclosure until at least 5 minutes after disconnecting all power sources.
- D. This inverter is mainly designed for 110/220V AC loads, 12V/24V and 5V DC loads. Please do not connect the inverter to grid, otherwise serious damage will be resulted in to the equipment.
- E. Attentively take the inverter out from its packaging and inspect for external damage. If any flaw is found, please contact the local dealers.

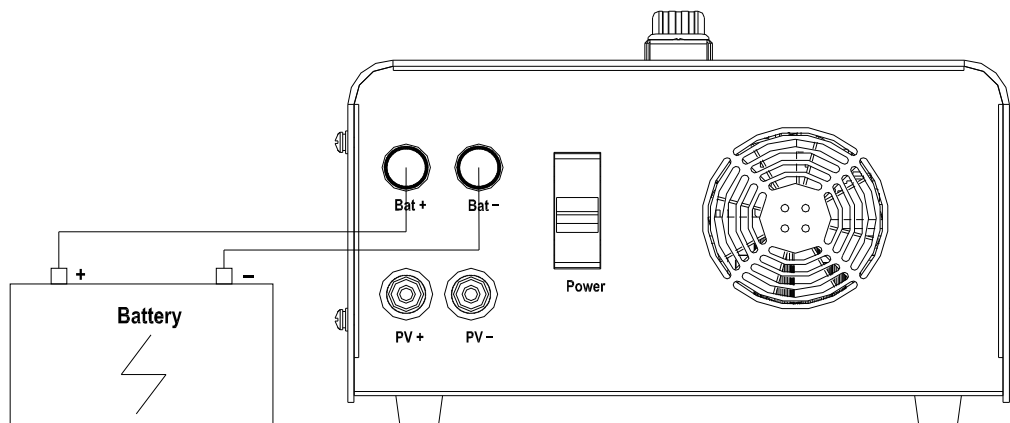
4. Circuit Connection

4.1 Input and Output Terminals

Terminal symbols	Function instruction	Quantity
Bat+	Battery anode terminal	1
Bat-	Battery cathode terminal	1
PV+	PV panel anode terminal	1
PV-	PV panel cathode terminal	1

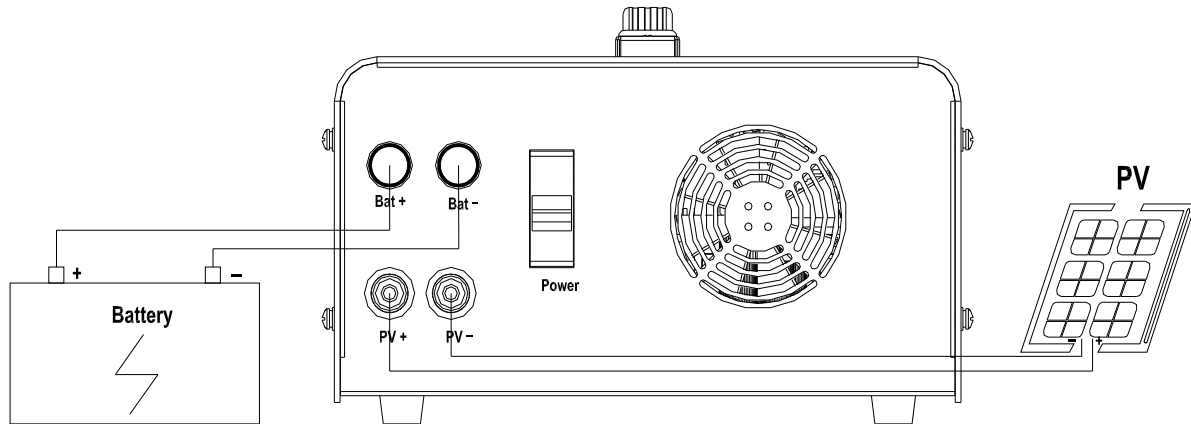
Terminal symbols	Function instruction	Quantity
Power	Electric switch for inverter	1
AC Switch	Output switch for 110/220V AC inverter	1
DC Switch	12V/24V and 5V DC output switch	1
DC 5V	5V DC output terminal, USB connection	2
DC 12V/24V	12V/24V DC output terminal	4

4.2 Wiring Diagram under Inverter Mode



- A. Please avoid short-circuit for battery and make sure the polarity is correct before battery connects to the unit. Incorrect polarity connection could cause permanently damage of the unit.
- B. The cathode and anode terminal of battery are connected respectively to the Bat+ and Bat-terminal of off-grid inverter. Each DC terminal on the inverter can tolerate $100A_{DC}$. The suggested connect wire for positive (+) is red wire, and for negative (-) is black wire.

4.3 Wiring Diagram under Charging Inverter Mode



- A. Before connecting PV panels to PV terminals, please make sure the polarity is correct. Please avoid short-circuit for battery and make sure the polarity is correct before battery connects to the unit. Incorrect polarity connection could cause permanently damage of the unit.
- B. The cathode and anode terminal of PV panels are connected respectively to the PV+ and PV- terminal of off-grid inverter. Each DC terminal on the inverter can tolerate 50A_{DC}. The suggested connect wire for positive (+) is red wire, and for negative (-) is black wire.
- C. The cathode and anode terminal of battery are connected respectively to the Bat+ and Bat- terminal of off-grid inverter. Each DC terminal on the inverter can tolerate 100A_{DC}. The suggested connect wire for positive (+) is red wire, and for negative (-) is black wire.

5. PVES Operation Instruction

PVES series solar residential system can not only under charging inverter mode, but also inverter mode.

5.1 Inverter Mode

- A. Connect battery wires pursuant to figure 4.2, the wiring diagram
- B. Power switch: Turn the switch on the back of power into on
- C. AC output switch: connect to AC switch, providing 110/220V and 50/60Hz AC power to loads
- D. DC output switch: connect to DC output switch, providing DC output with 12V/24V and 5V

5.2 Charging Inverter Mode

- A. Connect the PV and BAT cables pursuant to figure 4.2, the wiring diagram
- B. Power switch: Turn the switch on the back of power into on, providing power for battery by controller
- C. AC output switch: connect to AC switch, providing 110/220V and 50/60Hz AC power to loads
- D. DC output switch: connect to DC output switch, providing DC output with 12V/24V and 5V



Notes:

It is extremely easy to operate the PVES solar residential system. The machine

works automatically when it is at normal charging. If it needs to support loads, AC Switch and DC Switch should be operated manually. Besides, in order to achieve maximum conversion efficiency for inverter, please read below information carefully:

- A. Charging mode: inverter is going on three phase charging automatically when it is at normal charging
- B. Adjustment for LCD backlight: for power saving, the LCD backlight will be closed automatically after 20 seconds
- C. Standby mode: in order to save power for battery, it is recommended to turn off AC switch and DC switch

6. HMI Instruction

6.1 LCD Display

There are 2 LED indicating lights and 1 button in HMI as below:



Contents		Function instruction
Red light (Fault)		ü Fault when red light is on
Green light (Run)		ü Run when green light is on
Button (Info)		ü Press the button and LCD backlight is on
What LCD displays when system runs	ü Pv Volt	ü PV panels voltage
	ü Bat Volt	ü Battery voltage
	ü Chg Cur	ü Battery charging current
	ü Out Volt	ü AC output voltage
	ü Out Cur	ü AC output current
	ü Out Power	ü Output power

Contents		Function instruction
What LCD displays when system fails	Refer to figure 7.1 for system failure	Refer to figure 7.1 for system failure

7. Alarm Information and Troubleshooting

PVES series solar residential system has a perfectly complete alarm and protection function. When system fails, controller can clearly indicate the fault and alarm. Red light is on and alarmed, and LCD displays what the fault is. Pursuant to the LCD, fault can be rapidly recognized so that relevant strategy is made to solve it.

7.1 System Failure

System Failure	Reasons	Strategies
ü AC Fault Over current	1. Short-circuit for output load 2. Over-load	1. Check the connection for loads 2. Check whether the power of load exceeds rated output power 3. Please call local service
ü AC Fault high temp	1. Fan is failed to work 2. There are too much dust or block in air inlet or outlet	1. Replace a new fan 2. Dredge the air inlet and outlet 3. Please call local service
ü AC Fault low temp	1. Environment temperature is low 2.No connection for temperature sensor	1.Put the system on high temperature 2.Please call local service
ü DC Fault bat low volt	1.The power of battery is low	1.Charge the battery 2.Please call local service
ü DC Fault bat high volt	1.Over-charge for battery 2.False series number for battery	1. Turn off the DC switch and reboot 2. Check series number for battery
ü AC Fault out high volt	1. High-voltage for AC output	1.Please call local service

System Failure	Reasons	Strategies
ü AC Fault out low volt	1. Low-voltage for AC output	1.Please call local service
ü AC Fault bus high	1. Booster circuit fault	1.Please call local service
ü AC Fault bus low	1.Booster circuit fault 2.The voltage for battery discharges 10.5/20V	1.Please call local service 2.Check whether the power of battery is enough
ü AC Fault out over load	1. Over-load	1. Lower the power of load to rated output power or less 2. Please call local service
ü DC Fault pv high volt	1. High-voltage for PV panels	1. Open circuit for PV panels exceeds its specification 2. Please call local service
ü DC Fault load oc	1. The power of DC 12V/24V and 5V loads is higher than their rated power	1. Reduce DC loads 2. Please call local service
ü DC Fault Charge over current	1. Charging circuit fault	1. Please call local service
ü DC Fault Communication off line	1.Communcation fault 2.No connection for communication cable	1. Please call local service
ü AC Fault Short oc	1.short-circuit for out laod 2.Over laod	1.Check the connection for laods 2.Check whether the power of laod exceeds Rated output power 3. Please call local service

8. Technical Data

Model		PVES300	PVES600	PVES800	PVES1000
Technical data					
Output data					
Output voltage		110/220V ± 5%	110/220V ± 5%	110/220V ± 5%	110/220V ± 5%
Output power		300W	600W	800W	1000W
Surge capacity		600W	1200W	1600W	2000W
Efficiency		>85%	>85%	>85%	>85%
Over-load protection		Yes	Yes	Yes	Yes
Short-circuit protection		Yes	Yes	Yes	Yes
Waveform		Pure Sine Wave	Pure Sine Wave	Pure Sine Wave	Pure Sine Wave
DC output	USB output	5V /2A	5V /2A	5V /2A	5V /2A
	DC output	12V/8A	24V/8A	24V/8A	24V/8A
Input data					
PV panel		18V 120W	32V 250W	32V 250W	32V 250W*2
Battery	Battery voltage	12V	24V	24V	24V
	Floating charge voltage	13.6V	27.2V	27.2V	27.2V
	Over-charged protection voltage	14.4V	28.8V	28.8V	28.8V
PV controller	Max. Voc	25V	60V	60V	60V
	Max. charging current	10A	10A/20A	20A	20A/30A
	Standby power consumption	0.9W	0.9W	0.9W	0.9W
Environment					
Working temperature range		0°C ~ +45°C			
Storage temperature range		-15°C ~ +65°C			
Altitude		≤2000m 79.5kPa~ 106kPa			
Relative humidity		Non-solidification, relative humidity<90%			
Mechanical					
Width/ Depth/ Height (mm)		255/305/143	255/305/143	285/335/143	285/335/143
Weight		5.5KG	5.7KG	6.0KG	6.2KG
Standard		CE			