POWER SOLID

400VA
INVERTER

PSi400VAO#12VPVT

SMART SOLAR SYSTEM

USER MANUAL

Content

I Operating Instruction

1-1.Open-package inspection

1).After opening the package,please check the attached parts and components,including operation manual and checking whether the inverter is in good condition? If found any inverter broken or components missing,do not turn on the machine,feedback to the carrier or supplier.

Note:
Please keep the box and packing materials in case the use in future.

1-2.Installation notice:

1).The products should be well-ventilated, away from water and the corrosive and combustible gases.
2).Do not set it in a corner, ensure the bottom of the front panel, the rear panel fan outlet and the side of the machine are well-ventilated.
3).The environment temperature should remain 0-40℃.
4).If the machine operates under low temperature environment, it would cause water condense,only in a absolute dry condition can the machine would work normal, otherwise there will be a electric shock.
5).Install the inverter near the mains input socket or nearby the switch, to draw out plugs then cut off mains supply once there is an emergency.

Attention:
1).Load should be turned off before connecting to inverter and turned on one by one after connecting completed.
2).The inverter should be connected to a socket with a corresponding current protection.
3).All power sockets should link with ground protection.
4).No matter input power cable inserts to mains socket or not,the inverter will also continue outputing possibly, turning off the inverter can not guarantee there is no current inside the machine. In order to make sure to cut off the output of inverter, you should turn off all the switches then turn off the main supply.
5).To load inductive appliances such as electromotor, displayer and laser printer, inverter capacity should be twice as loading machine's rated power at least.

Ⅱ.Description Of Front Board
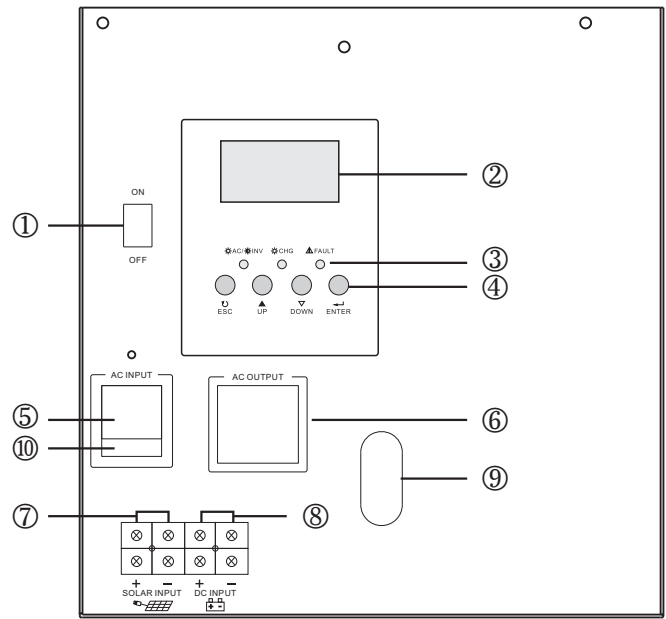
1. Power ON/OFF switch
2. LCD display
3. LED indicators
4. Function keys
5. Input seat

6. Output seat
7. Solar panel connect terminals
8. Battery connect terminals
9. Wire holes
10. Input seat fuse
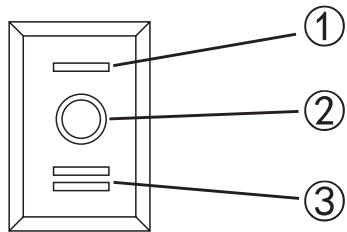
1 .... Saver Mode

2 .... Off Mode

3 .... On Mode

LED INDICATOR

LED Indicator			Messages
☀AC/☀INV	Green	Solid On	Output is powered by utility in Line mode
		Flashing	Output is powered by battery or PV in battery mode
☀ CHG	Yellow	Solid On	Battery is fully charged
		Flashing	Battery is charging
⚠ FAULT	Red	Solid On	The inverter is in the fault warning status

Function Keys

Function Key	Description
ESC	To exit setting mode
UP	To go to previous selection
DOWN	To go to next selection
ENTER	To confirm the selection in setting mode or enter setting mode

Ⅲ. Function setting

Enter setting mode, Press "ENTER" button for 10 seconds.

Exit setting mode, Press "ESC" button repeatedly.

1. Press up or down button to choose the parameter and then press "ENTER" button.

2. When parameter is flashing, press up or down to change it and then press "ENTER" button to confirm.

When setting: Setting icon is flashing

Setting succeed: Left-sided frame of the parameter will flash Setting failed: ERROR light on

Settings	Display (Left)	Display (Mid)	Display (Right)	Setting range
Mains input voltage range	AIr	00	UPS	Narrow range
			APL	Wide range
Mains frequency voltage range	AFr	01	LO	Narrow range
			HI	Wide range
Working mode	None	02	UTI	Mains priority
			SOL	Solar priority
			SBU	Battery priority
Charging mode	None	03	CUT	Mains priority
			CSO	Solar priority
			OSO	Solar charging only
Mains charging current ratio	ACP	04	100%	10~100%
Solar charging current ratio	SCP	05	100%	20~100%

Settings	Display (Left)	Display (Mid)	Display (Right)	Setting range
Boost charging voltage	CU	06	14.2V	13.5~15.0V
Float charging voltage	FLU	07	13.6V	12.5~14.0V
Battery lockdown voltage	COU	08	10.2V	9.5V~11.5V
Charging voltage of mains recovery	DTA	09	12.0V	11.5~12.5V
Charging voltage of mains off	ATD	10	13.5V	13.0V~14.0V
Inv. output voltage	OU	11	220V	200~240V
Mains detection speed	CST	12	HI	High speed
			IDE	Mid. speed
			LO	Low speed
Inv. output frequency	OF	13	50Hz	
			60Hz	
Fault restart switch	RA	14	TE	On
			TD	Off
Backlight control	BLC	15	LON	Always on
			LOF	Always off
			LOD	Delay off
Buzzer control switch	BEC	16	AON	On
			AOF	Off
Low battery alarm switch	BOL	17	OFF	Off
			ON	On
Load limit	LL	18	OFF	Off
			ON	On
Load alarm limit	LEL	19	OFF	Off
			ON	On
Baud rate	BAU	20	0	2400
			1	4800
			2	9600
Factory	RS		OFF	Off
			ON	On

Error codes for reference

Display (Left)	Display (Right)	Details
ALA	021	Inverter communication connection failure alarm
ALA	233	Abnormal mains output alarm
ALA	236	Abnormal machine load alarm
ALA	237	Inverter overload alarm
ALA	231	Abnormal output alarm
ALA	234	High battery voltage alarm
ALA	235	Low battery voltage alarm
ALA	241	Memory chip read and write error alarm
ALA	232	Memory chip connection failure alarm
ALA	238	Inverter over temperature alarm
ALA	239	Load-causing over temperature alarm
ALA	242	Host computer software planned shutdown alarm
FAL	102	Inverter overload shutdown fault
FAL	104	Abnormal output fault
FAL	105	Abnormal load fault
FAL	106	Inverter over temperature fault
FAL	135	High battery voltage fault
FAL	134	Low battery voltage fault
FAL	123	Load-causing over temperature fault
FAL	169	Current detection signal failure
FAL	161	Abnormal mains output fault
FAL	152	Temperature sensor connection failure
FAL	162	Host computer software planned shutdown failure

Ⅳ. Care and maintenance

1). This inverter is low in repair rate. Battery of standard model is valve adjusting, low maintenance, ensuring better life only by charging often. When connecting to mains supply, no matter inverter on or off , it still keeps charging for battery , and provide over charge, over discharge protection.

2). If there has been long time no using, please discharging then charging the inverter each 4-6 months.

3). Usually, the life span of battery is 3-5 years. If any wrong

with it, please ask professionals for changing . And do not change it by yourself.

4). Don't change the single battery , changing the battery should according to the suppliers instructions.

5). Normally, the battery should discharge then recharge every four or six months, charging for it more than 12 hours after discharging.

6). At high temperature area, the battery should be discharging and charging every 2 months and the standard charging time is 12 hours at least each time.

Note:

1). Before changing battery, must turn off inverter and disconnect the mains supply.

2). Remove metal object like ring, watch etc.

3). Please don't put the metal objects on the battery.

4). This is the normal phenomenon, when connecting the battery wire, the wiring will appear at a small spark.

5). Be attention to connecting between anode and cathode.

V. Rapid troubleshooting and maintenance

Fault	Cause	Solution
No city power input	Recoverable fuse broken	Change the fuse
Terminal heating	Fault or loose connection	Fasten again
No Output	Battery no energy or overload	Charge battery or reduce loads
Switch on failure	Fault connection with city power or battery	Check connection with battery or connect again
Alarm when switch on	Battery no energy or overload	Charge battery or reduce loads
Buzzer scream every second	Over temperature alarm or low battery alarm	Check if fan heat dissipation hole jammed
Fan sometimes twirls or sometimes stop	Fan twirls when inside temperature reaches 45℃, stop when 37℃	Normal phenomenon, fan is under intelligent control

VI. Technical Datasheet

| MODEL	PSi400VA#12VPVT
Input	
Capacity(VA)	400VA/250W
Voltage(DC)	12V
Nominal Voltage	220VAC
Voltage Range	154-265VAC
Frequency	50-60Hz Auto sensing
Output	
Watt	250W
Voltage	220VAC
Frequency	50/60Hz
Waveform	Pure sinewave
Transfer time(ACto DC)	<8ms
Transfer time(DC to AC)	<8ms
Output voltage regulation	10% rms
Bypass Mode	Yes
Saver Mode	Yes
Efficiency	>98%
Battery	
Battery Type	AGM-Deep Cycle, GEL
	Up to 500Ah
Charging current	9A
Low Level disconnect (Selectable)	10V or 10.5V
	Input AC, Output AC
	Battery DC, Output Load
LCD Indicator status	Alarm, Fault
	Battery Charge Level
	Output Frequency
	AC Line In: Green
LED Indicator status	Inverter: Green
	Charging: Yellow
	Alarm: Red
Battery low alarm	battery light discharge 11.5V*N: battery load discharge 11.5V*N@load<20% ; 11V*N@load>50%/10.5V*N@load>50%;
Battery low recovery	battery light discharge 12V*N; battery load discharge 12V*N@load<20%; 11.5V*N@load>50%/11V*N@load>50%;
DC low voltage shutdown	battery light discharge 11V*N: battery load discharge 11V*N@load<20% 10.5V*N@load>50%/10V*N@load>50%
DC high voltage alarm and fault	16V*N
DC high voltage recovery	15V*N
Optional	
Maximum PV array power	800W
MPPT input voltage range	15-150VDC
Maximum PV array open circuit voltage	150VDC
Maximum solar charging current	60A
Alarm	
Low battery alarm	The buzzer beeps once a second and stops after one minute
Overload alarm	The buzzer keeps beeping and stops after one minute
Fault	The buzzer keeps beeping and stops after one minute
Environment	
Temperature	0-40
Humidity	C0-95%, Non condensing
Accoustic Noise(db)	>55dB

Appendix

How to choose and configure PV panels

The following parameters can be found in the specifications of each PV panel:
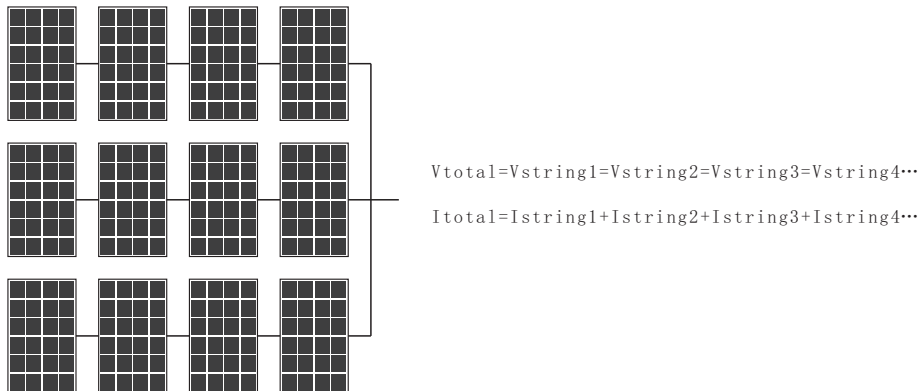
● Pmax: Maximum output power (W)

● Voc: Open circuit voltage (V)

● Isc: Short circuit current (A)

● Vpm: Rated voltage (V)

● lpm: Rated current (A)

PV panels can be connected in series or in parallel to obtain the required output voltage and current to meet the allowable range of the solar controller.

When connecting PV panels in series, the total maximum voltage and current are:

$$Vstring = V1 + V2 + V3 + V4 \cdots$$
$$Istring = I1 = I2 = I3 = I4 \cdots$$
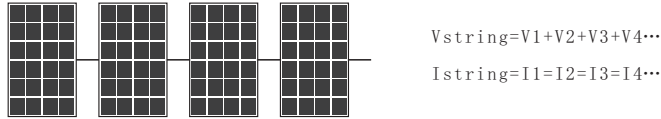
When the PV panels that have been connected in series are connected in parallel, the total maximum voltage and current are:

$$Vtotal = Vstring1 = Vstring2 = Vstring3 = Vstring4 \cdots$$
$$Itotal = Istring1 + Istring2 + Istring3 + Istring4 \cdots$$

● In either case, the total output power is the power of a single PV panel × the total number of PV panels. The criteria for configuring PV panels is that the total power should be equal to or slightly greater than the maximum allowable PV power of the solar controller (please refer to the technical parameter table) . The excess capacity of PV panels does not contribute to the capacity of solar chargers and will only lead to higher installation costs.

● The total Ipm of the PV panels should be less than the maximum charging current of the inverter (60A) .

● The total Voc of the PV panel should be less than the maximum PV input voltage of the inverter(please refer to the technical parameter table).

Example 1: Take a 12V inverter as an example to select suitable PV modules. Considering that the total Voc of the PV panel cannotexceed the maximum 150VDC. The total power should be equal to or slightly greater than 800W, we can choose the following specifications of PV panels.
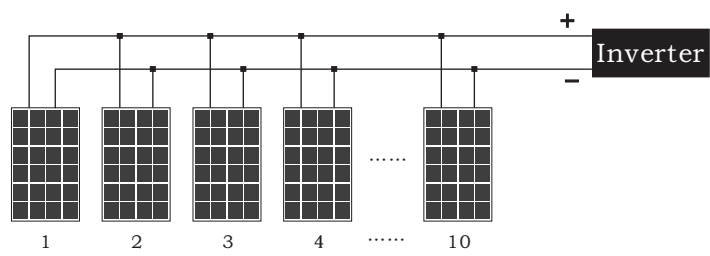
Maximum power (Pmax)	80W	The number of PV panels connected in series for each group: MPPT→2 PCS (2*21.6V<60V)
Rated voltage Vpm(V)	18V	
Rated current Ipm(A)	4.46A	Total number of PV panels: 10PCS→800W/80W=10 (PCS)
Open circuit voltage Voc(V)	21.6V	Number of groups that can be connected in parallel:
Short circuit current Isc(A)	4.8A	MPPT →5 groups (10/2 = 5 groups)

The configuration scheme of the 12 V inverter is:
Every 2 PV panels are connected in series to form a group, and connected to 5 groups of PV panels。
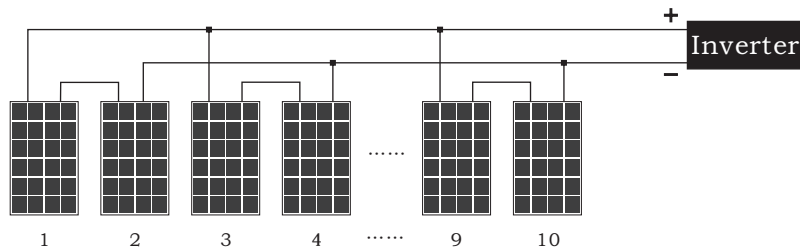
10 PV panels are connected in parallel to the inverter.

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