Solar Powerbank

W-Series

USER MANUAL
& PRODUCT SPECIFICATIONS

Models:
SPB-AW-55/300
SPB-AW-100/600
SPB-AW-200/1000

SOLARLAND®
Solar Technology and Solutions

Thank you for choosing the Solarland® Solar Powerbank. Please read this manual carefully before setting up and using the product. Pay close attention to all instructions and keep this user manual for future reference.

Content

1. Product Introduction

Since 2003 Solarland has been developing, designing and manufacturing off-grid solar systems, bringing power to structures and villages all over the world where no electrical power grid exists. The Solar Powerbank is the latest innovation in this series of power products: Simplified structure, reliable performance, easy operation. It can offer stable and reliable electricity to those regions that are short of power or even without power.

1.1 Features

- Compact, portable and convenient
- Quick and easy installation
- Simple design; …adapt the system to meet your requirements
- LCD display clearly shows system status at all times
- Reliable, maintenance free performance
- Power generation and storage for uninterrupted use in places without electricity
- Various applications ranging from everyday to emergency power supply

1.2 Technical data

Component		Parameters	SAP-W/300	SAP-W/600	SAP-W/1000
Solar Panel		Type NO./Qty	SLP100-12(1pc)	SLP100-12(1-2pcs)	SLP100-12(2-4pcs)
		Peak Power (Pm)	100W	100W	100W
		Open Circuit Voltage (Voc)	21.6V	21.6V	21.6V
		Max. Power Voltage (Vmp)	17.2V	17.2V	17.2V
		Short Circuit Current (Isc)	6.46A	6.46A	6.46A
		Max. Power Current (Imp)	5.81A	5.81A	5.81A
		Cable	2×1.5 mm² x 5m	2×1.5mm² x 5m	2×1.5mm² x 5m
Battery		Nominal Capacity	55Ah	100Ah	200Ah
		Nominal Voltage	12V	12V	12V
		Max. Outer Dimensions (LxWxH)	275x175x235mm	440x235x280mm	530x285x285mm
Powerbank	Model	Type NO.	SPB-AW-55/300	SPB-AW-100/600	SPB-AW-200/1000
	DC Controller	Rate Voltage	12V		
		Max. PV Charging Current	10A	30A	30A
		Max. PV Input Voltage	⩽25V		
		High-Voltage Disconnection	14±0.2V	13.7±0.2V	
		Low-Voltage Disconnection	10.5±0.2V	10.7±0.2V	
		Low-Voltage Reconnection	11.5+0.2V	12.6±0.2V	

Component		Parameters	SAP-W/300	SAP-W/600	SAP-W/1000
Powerbank	AC Charger	Max. AC Charging Current	N/A	8A	
		Charging Starting Voltage	N/A	11.5±0.2V	
		Charging Stopping Voltage	N/A	13.7±0.2V	
	DC Output	USB Max. Output Voltage/Current	5V/600mA		
		DC Outlet Max. Output Current/Voltage	1A/One Route/12V		
	Inverter	Max. AC Output Power	⩽300W	⩽600W	⩽1000W
		Output Wave Mode	Modified Wave	Pure Sine Wave	
		Output Voltage/Frequency	AC 120V±10% 60Hz±2Hz		
		Self-comsunption	⩽1.5%		
		Low-Voltage Disconnection	10.0±0.5V	10.0±0.5V	
		High Voltage Disconnection	15.5±0.5V		
		Low-Voltage Alarm	10.5±0.3V	10.5±0.3V	
	Other	Dimension(LxWxH)	300x180x550mm	460x240x550mm	560x290x480mm

1.3 Storage and Working environment

A. Storage

- Place in a well ventilated area free from dust and debris;
- Ideal Temperature Range for Safe Storage:
  Inverter & Battery: -10°C ~ 40°C;
  Solar panel: -40°C~ 90°C;
- Avoid humid conditions and moisture, such as condensation;
- Keep away from erosive gases and/or liquids;
- **When storing for long periods it is important to completely charge and discharge the system at least once every 6 months.**

B. Working environment

- Ideal Working Temperature Range:
  Inverter & Battery: -10°C ~ 40°C;
  Solar panel: -40°C~ 90°C;
- Moisture: 0 ~ 90%;
- Elevation: ⩽5000m;
- Avoid humid conditions and moisture, such as condensation.

1.4 Application

The Solarland Powerbank kits are scaled to meet many different power demands and can be used in many applications including households, schools, communications, marine, military, rural electricity, agriculture, street lamps, street stalls, special events, etc.

2. Installation Instructions

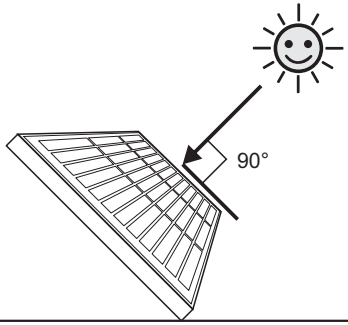
2.1 Kit Components (All sold Separately)

Component	SAP-W/300		SAP-W/600		SAP-W/1000	
	Type	Qty.	Type	Qty.	Type	Qty.
Powerbank Cabinet	SPB-AW-55/300	1pc	SPB-AW-100/600	1pc	SPB-AW-200/1000	1pc
Battery(*Recommend)	55Ah	1pc	100Ah	1pc	200Ah	1pc
Solar Panel	SLP100-12	1pc	SLP100-12	1-2pcs	SLP100-12	2-4pcs
Solar Bracket(*Optional)	SLB-0103	1set	SLB-0103	1-2sets	SLB-0103	2-4sets
Other	User's Manual					

2.2 Solar Panel Installation

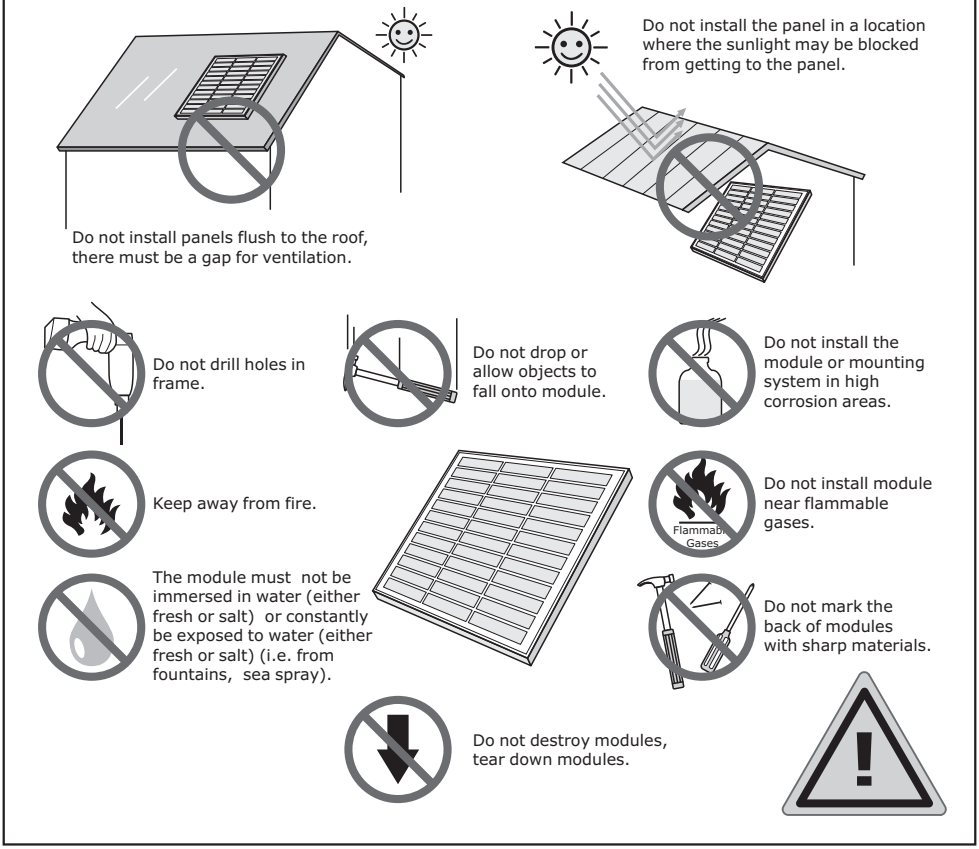
A. Orientation & Tilt

The solar panels perform best when set up at 90° to the direct sunlight.



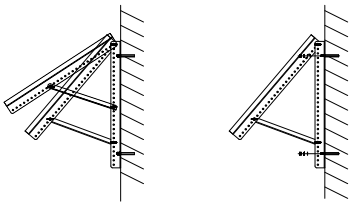
NOTICE

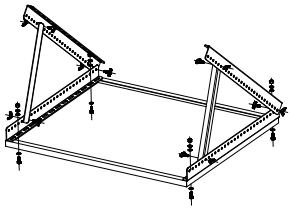
- Panels should be installed in a well ventilated location. High temperatures will reduce the performance of module, lowering power output.
- The solar panels are water resistant but not waterproof. **DO NOT** submerge in water or expose the panel to a continual flow of water.



B. Optional Solar Panel Mounts

- Wall mount
- Roof mount





Note: Panel mounts are not included in the kit and are optional add-ons. The kit shown above is the Solarland SLB-0103 Tilt Mount Kit.

2.3 Powerbank Installation

It is most important you follow these instructions properly otherwise damage and/or injury can occur.

NOTICE

- Place and operate the unit on a stable and level floor.
- Do not spray or splash water directly onto the unit.
- Keep the unit away from direct sunlight.
- Keep away from open flame and high temperatures (Keep well ventilated).
- Avoid placing near corrosive gases and/or liquids.
- Place in a well ventilated, cooler location.
- **Do not** insert objects and/or liquids into the unit.
- It is advised that only a qualified professional open the box and perform maintenance.

2.4 Connecting the System

DANGER

In order to avoid electrocution and fire hazards, pay attention to the following:

- Before commencing installation, make sure the switch on the Powerbank is OFF.
- It is advised that only a qualified professional install the system.
- Avoid contact with terminals and circuit boards.
- Be careful not to short-circuit the terminals.
- The AC inverter has a high-voltage output, avoid contact at all times.
- This kit has been specifically designed to work with just the provided components. The use of non-standard components, such as different panels can cause damage and void the warranty.

THE METAL HOUSING OF THE POWERBANK SHOULD BE PROPERLY GROUNDED AT ALL TIMES. PLEASE CONSULT WITH A QUALIFIED ELECTRICIAN FOR GROUNDING ADVICE.

WARNING:

FAILURE TO GROUND, OR IMPROPER GROUNDING, MAY RESULT IN SERIOUS INJURY AND/OR POSSIBLE DEATH.

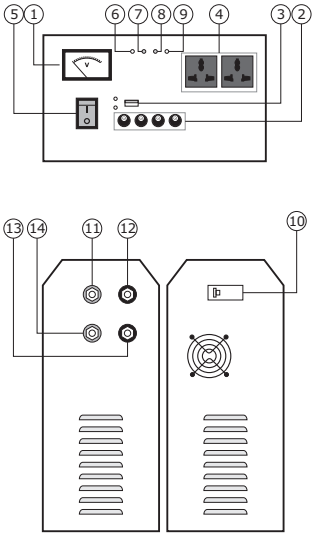
NOTICE

- Ensure all master power switch and breaker switch are in the off position before commencing with the connections.
- Connection Order:
  1. Powerbank to Battery
  2. Powerbank to Solar Panel/s
- Please DO NOT do withstanding voltage test to the Powerbank. Irrepairable damages to the Powerbank and components will occur.

3. Powerbank Control Panel & Connections

3.1 Schematic Drawings & Powerbank Layout Explanation

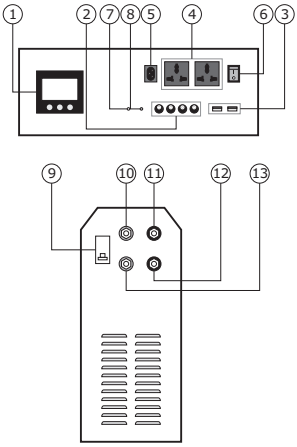
A. SAP-W/300



No.	Name	Function
1	Analog Voltmeter	Display the voltage of the battery
2	DC 12V output(L1,L2,L3,L4)	Connect with 12V DC load
3	USB 5V output	Connect with 5V DC load
4	120V AC output	Connect with 120V AC load
5	Switch	Inverter switch
6	Green LED	Inverter work indicator
7	Red LED	Inverter failure indicator
8	Red LED	Charging indicator
9	Green LED	DC load indicator
10	Breaker	General power switch
11	Solar panel +	Connect with PV +
12	Solar panel -	Connect with PV -
13	Battery +	Connect with the battery +
14	Battery -	Connect with the battery -

Note: Allowing for additional battery storage in parallel with battery inside cabinet.

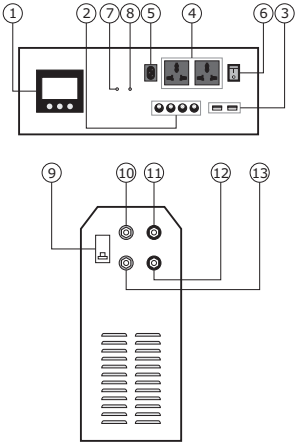
B. SAP-W/600



No.	Name	Function
1	LCD display	Display the status of system
2	DC 12V output(L1,L2,L3,L4)	Connect with 12V DC load
3	USB 5V output	Connect with 5V DC load
4	120V AC output	Connect with 120V AC load
5	Grid input	Connect with grid Power
6	Switch	Inverter switch
7	Green LED	Inverter work indicator
8	Red LED	Inverter failure indicator
9	Breaker	General power switch
10	Solar panel +	Connect with PV +
11	Solar panel -	Connect with PV -
12	Battery +	Connect with the battery +
13	Battery -	Connect with the battery -

Note: Allowing for additional battery storage in parallel with battery inside cabinet.

C. SAP-W/1000



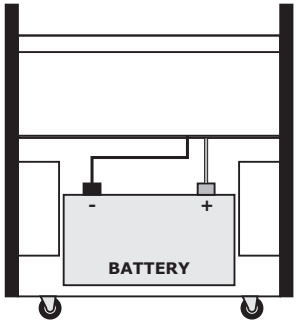
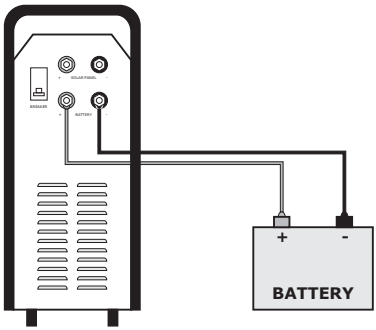
No.	Name	Function
1	LCD display	Display the status of system
2	DC 12V Output(L1,L2,L3,L4)	Connect with 12V DC load
3	USB 5V output	Connect with 5V DC load
4	120V AC output	Connect with 120V AC load
5	Grid input	Connect with grid Power
6	Switch	Inverter switch
7	Green LED	Inverter work indicator
8	Red LED	Inverter failure indicator
9	Breaker	General power switch
10	Solar panel +	Connect with PV +
11	Solar panel -	Connect with PV -
12	Battery +	Connect with the battery +
13	Battery -	Connect with the battery -

Note: Allowing for additional battery storage in parallel with battery inside cabinet.

Note:
The SAP-W/600 and SAP-W/1000 units feature both solar charging and AC grid charging capabilities. When the solar and AC inputs are connected they will both charge the battery when the battery voltage is below 11.5V. This combined charge will continue till the batteries are fully charged at 13.7V. If the battery voltage is above 11.5V only the solar panels will be charging the system except in initial use.

3.2 Connecting an External Battery to the AC bank

Additional battery storage capacity can be added to the Powerbank utilizing the parallel connections provided.

Built-in Battery	External Battery
	

Please note the charging performance of the system will be affected when adding additional battery capacity. It will take the system longer to fully charge the batteries.

The type and nominal voltage of the external battery has to be same as the battery inside the powerbank, but battery capacity can be different.

When adding a battery please follow the steps below:

- Turn off the BREAKER
- Securely connect the positive and negative battery terminals to the corresponding terminals on the Powerbank. (Incorrect connection can cause system damage.)
- Make sure all connections are secure and tight. (Loose connections will cause system performance issues and possible system damage.)
- The wires/cables to the external battery should not exceed 1m (40”) It is important to select the correct wire size to ensure the best possible system performance; …see chart below:

	CABLE
SAP-W/300	6mm²
SAP-W/600	12mm²
SAP-W/1000	20mm²

- Turn on the BREAKER and the system should function properly with the additional battery capacity.

3.3 Performance

- **Battery Charging Function:**
  The Solarland Powerbanks utilize a "state of the art" Smart controller to ensure the most efficient battery charging. The battery will not overcharge and the system has reverse polarity protection.
- **Low Voltage Disconnection Function (LVD):**
  The Solarland Powerbanks utilize a long life inverter that automatically recognizes a battery with low voltage and will disconnect the DC loads to avoid permanent battery damage. This disconnect occurs at 10.7±0.2V on models SPB-AW-100/600 and SPB-AW-200/1000. The disconnect occurs at 10.5±0.2V on model SPB-AW-55/300. All models will disconnect the AC loads when 10.0±0.5V.
- **High Voltage Disconnection Function (HVD):**
  The rated input voltage of the inverter is 12V. If the input voltage of inverter is more than 16V, the High Voltage Disconnection will occur automatically to protect the battery.
- **Electronic Overload Protection:**
  When the total power draw exceeds the rated power of the inverter, the overload protection will stop the inverter functioning within 10 seconds. The protection indicator light will indicate the system overload state.
  Power down the system by turning the power breaker switch to the OFF position and disconnect the loads. After 10~15 seconds switch the Powerbank back ON and start connecting the loads being careful not to overload the unit.
- **Short Circuit Protection:**
  When a short circuit occurs the inverter stops functioning immediately. The protection indicator light will indicate the short circuit has occured. You must identify the source of the short circuit and resolve the issue.
  Power down the system by turning the power breaker switch to the OFF position. After 10~15 seconds switch the Powerbank back ON.
- **High Temperature Protection:**
  When the inverter temperature reaches 75C it stops functioning immediately. The protection indicator light and alarm will indicate the temperature is a problem. Power down the system by turning the power breaker switch to the OFF position. Allow the system to cool down and we recommend you look for a better ventilated location to place the unit to avoid future overheating. After sufficient cooling switch the Powerbank back ON.

3.4 Setting Up the Powerbank

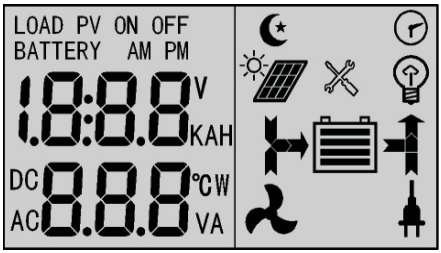
Please carefully read the following safety precautions and related operation instructions before commencing installation and set-up. :

- Ensure the intended location meets the requirements set out in section 2.3 of this document.
- Ensure the power breaker switch is set to the OFF position.
- Ensure the battery to be used meets the minimum battery voltage requirements.
- Connect the red cable to the positive battery terminal and the black cable to the negative battery terminal. Make sure all connections are tight and secure. Note that connecting the battery incorrectly can cause a short circuit and system damage.
- Switch the power breaker switch to the ON position. The LCD display will indicate the battery charge condition.
- Switch the inverter on and the indicator light should come on.
- Connect the solar panels to the assigned positive and negative connections on the Powerbank. If the panels are in sunlight the LCD will indicate the state of the solar charging.

DANGER

It is VERY IMPORTANT to follow the set-up instructions exactly.
The breaker switch will automatically disconnect the system in the event of a major failure.
Do NOT disconnect the breaker switch when the system is working normally.
If you have to disconnect using the breaker switch be sure to disconnect the solar panels first.
When re-setting the breaker switch make sure you reconnect the solar panels after the breaker switch has been reconnected.

3.5 LCD Display Explanation



A. LCD Displaying

LCD Displaying have left side of parameters and right side of parameters

: Indicates Solar Panels are connected.

: Indicates the load, appliance is connected.

: Indicates a system failure has occured.

: Indicates battery state of charge.

: Indicates the unit is connected to the grid AC power and is charging the batteries.

DANGER

Never connect grid input(Part No. 5 on Page 07) to AC output(Part No. 4 on Page 07), it will cause irreparable damage to the inverter.

B. Adjusting System Parameters

: Interface Button; ...use this to switch between the various charging parameters. (Figure 1)

: Use this button the adjust the parameter up.

: Use this button the adjust the parameter down.

To reset to factory default press and hold the + button for more than 5 seconds.

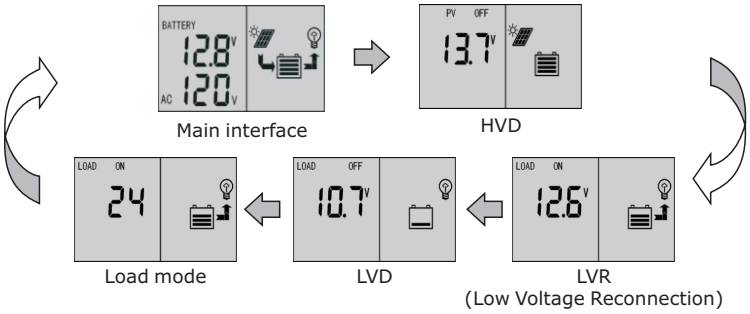


Figure 1

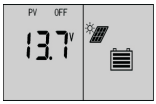
C. LCD Screen Explanations

- View & set system parameters

Display on left shows solar panels are connected, load is connected, battery status, battery voltage, and AC output voltage.

This function switches the load On/Off.

- View and set the High Voltage Disconnect



The value for the HVD - High Voltage Disconnect is shown. When this is achieved the controller will disconnect the charge to prevent over-charging battery.

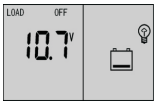
This parameter can be adjusted up or down. Press and the number will flash. Use the to adjust the parameter up or down, then press the for 5 seconds till the number stops flashing.

Press again to go to the next parameter.

- View and set the Low Voltage Reconnect

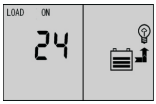
The value for the LVR - Low Voltage Reconnect is shown.
This parameter can be adjusted up or down. Press and the number will flash. Use the to adjust the parameter up or down, then press the for 5 seconds till the number stops flashing.
Press again to go to the next parameter.

- View and set the Low Voltage Disconnect



The value for the LVD - Low Voltage Disconnect is shown. When this is achieved the controller will disconnect the load to prevent over discharging battery.
This parameter can be adjusted up or down. Press and the number will flash. Use the to adjust the parameter up or down, then press the for 5 seconds till the number stops flashing.
Press again to go to the next parameter.

- View and set the Load Working Mode



24h - Indicates Normal Mode: The bank has continual DC power output.
1h-23h-means Light Control and Time Control Mode, the bank has DC power output after dark, and then cut off the DC power output according to the timer setting.
0h-Means Light Control Mode, the bank has DC power output after dark, and then cut off the DC power output after dawn.

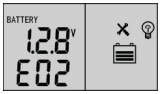
In this interface you can use the button , to adjust the parameter. The number will be flash. After long press the key (>5seconds), the number will be saved and stop flash. Short press to give up save the number and exit to next interface.

3.6 Common Faults & Fixes

- **Error Code E04** - Low Voltage Protection:

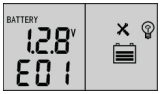
The LVD protection has been activated. and the load circuit has been disconnected by the controller. The batteries require to be charged and the system will resume normal operation when the LVR voltage has been attained.

- **Error Code E02** - Overload Protection:



The screen will display as shown. The system load has exceeded the controller has entered the system parameter. Turn the unit off, remove loads. Add loads carefully to not overload the system again and press the button to restore power to the load.

- **Error Code E01** - Short Circuit Protection:



The screen will display as shown. This indicates a short circuit on the load loop circuit. Check the load/s for damage after trouble shooting and clearing the problem, press the button to restart the system.

4. FAQ & Trouble Shooting Guide

Problem	Possible Reason	Corrective Action
LCD Display Not Working	Circuit Breaker Switch in OFF position.	Set Circuit Breaker to the ON position.
	Battery is connected in reverse.	Turn Powerbank OFF, disconnect and reconnect the battery correctly. (Note the reverse connection of the battery may have damaged the inverter.)
	Battery is deteriorated and voltage is below 9V.	Check battery condition and try recharge. If they do not hold the charge they should be replaced with new batteries.
	The LCD wire conncetions are loose or have come away from the meter during transportation.	Turn the Powerbank off and reconnect the wires to the LCD meter.
	The solar controller wire conncetions are loose or have come away from the meter during transportation.	Turn the Powerbank off and reconnect the wires to the solar controller.
LCD Displays, but no DC Output. No fault displayed on LCD	DC Output is not turned ON.	Press the button below the LCD screen to turn the DC Output ON.
	Poor connections on the solar controller, particularly check the load output connection.	Turn Powerbank OFF and reconnect all solar controller connections.
No AC Output	Inverter switch is not in the ON position.	Press Switch to the ON position.
	Inverter Switch is damaged.	Turn Powerbank OFF and replace Switch.
	Inverter is damaged.	Turn Powerbank OFF and replace Inverter.
	Poor connections on the solar controller, particularly check the load output connection.	Turn Powerbank OFF and reconnect all solar controller connections.
Solar Panels connected, but no Charging Status showing on the LCD	Solar panels are not correctly positioned.	Ensure the panels are placed in full sunlight with no shadows or other obstructions.
	Insufficient sunlight.	In cloudy and rainy condistions the solar panels will generate a small charging current. The Powerbank will not detect the current if it is below 0.1A.
	Solar Panel connections are loose.	Check all connections and tighten where required.
	Solar Panels connected in reverse.	Turn Powerbank OFF and reconnect the Solar Panels correctly.
5VDC & 12VDC Outputs only work at night	Load mode of the controller has been reset to 0~23.	Reset the load mode to 24.

Problem	Possible Reason	Corrective Action
LCD Displays E01 Fault	Short circuit has occurred.	Turn Powerbank OFF & check all components and cabling to clear any short circuit.
LCD Displays E02 Fault	DC Output overload has occurred.	Turn Powerbank OFF & remove all loads. Turn the Powerbank ON and reconnect the loads, careful not to overload again.
LCD Displays E04 Fault	Battery Voltage is LOW.	Turn Powerbank OFF & remove all loads. Turn the Powerbank ON and allow the battery to recharge before connecting any loads.
RED LED is ON, no AC output	AC Output Overload has occurred.	Turn Powerbank OFF & remove all loads. Turn the Powerbank ON and reconnect the loads, careful not to overload again. Check the power draw of the appliances does not exceed the system limit.
	AC Appliances peak power exceeds system limitations.	Check each appliance power specification and ensure they do not exceed the inverter output.
	Battery input voltage is too high.	Check battery voltage and ensure it does not exceed the maximum safety voltage of the inverter.
AC Load Power is low	AC Starting Load is too big.	This is a normal situation and occurs when too many loads are attached at start up. Disconnect the loads and add them in order from largest to smallest.
Alarm is sounding	Low Voltage.	Battery is discharged and has low voltage. Turn Powerbank OFF and recharge the batteries till a full charge is achieved.
	High Temperature, the Powerbank has overheated.	Turn Powerbank OFF. Remove loads and allow to cool. Check location of the Powerbank is well ventilated.
Battery discharges quickly	AC load is too big, resulting in rapid discharge.	Reduce the AC Load.
		Add external battery to handle the extra power requirements.
	Lifetime of battery is over.	To change a new battery.

5. Warranty

The Solarland AC Powerbank has a warranty of 1 year from date of invoice.

- Please read these instructions very carefully. The manufacturer shall not be liable for damages to the system, including the battery, caused by misuse and/or the user failing to follow the instructions as set out in this manual.
- The manufacturer shall not be liable for damages caused by service or repair by an unauthorized person, incorrect set-up & Installation or bad system design.
- The warranty is immediately void if batch numbers, serial numbers or identification-marks are manipulated or are unidentifiable.
- The warranty covers parts and components only.
- The warranty does neither cover the cost of transportation for the return of the system or components, nor for the additional shipment of replacement components.
- The warranty does not cover the cost for installation or reinstallation of the system.

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General Disclaimer

In no event shall the manufacturer liable for may damage or personal injury caused by non-compliance to the operating instructions and safety suggestions in this brochure.
The manufacturer will not bear any responsibility for misuse, damage, injury, incorrect installation and/or system design as such.