

User Manual

MPSG-500

MPSG-1000



**Smart Solar Power System
Built In Lithium Battery & MPPT Solar Controller**

Thank you for choosing our MPSG power system. Carefully read this user manual before installing or using the product, taking careful note of all safety advice. Please also keep this manual for future reference.

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MPSG Product Features

- Double CPU intelligent control technology
- Pure sine wave AC output for sensitive equipment
- Lithium battery pack built in
- Convenient 5VDC-USB and 12VDC output ports
- Digital LCD visual display
- Overcharge and over-discharge protection
- Replaceable lithium battery
- Quiet, intelligent fan
- High efficiency MPPT solar controller
- MC4 standard solar connectors
- 3 pin South African socket outlets
- Mains, Solar and Power Saving modes
- Portable with carry handle
- Independent DC outlets – charge or power USB/DC devices
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Safety

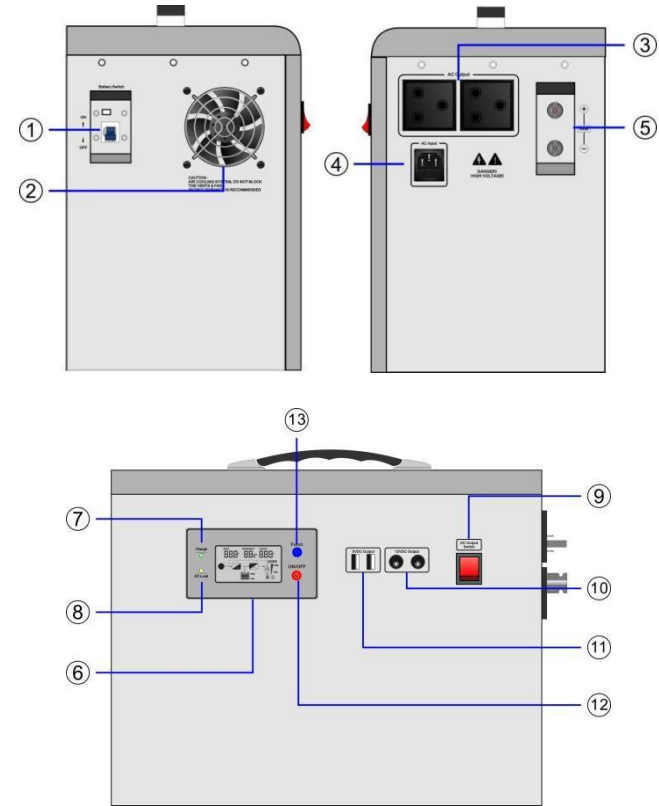
- Do not use in a damp, dusty, or corrosive environment
- Do not cover air vents to ensure proper cooling
- Do not attempt to service the machine. Battery replacement and fault diagnostics must be done by a qualified technician
- Be aware of the potential risk of high voltage inside the unit.
- Even if the system is disconnected from mains power it may still be live (230v).
- Never plug in appliances that exceed the MPSG power rating (eg. kettles, hair dryers, vacuum cleaners, etc.)
- Some inductive load equipment- (motors, laser printers, etc.) have start-up power requirements two to five times their normal capacity.
- Battery charging can be from AC mains or Solar power or a combination of both. If charging via a generator the generator needs to be started and running stable before connecting to the MPSG input (4).

Operating Instructions

- Move the BATTERY SWITCH ① on the side of the machine UP to the “ON” position. Use the supplied kettle cord to connect from an Eskom wall socket (230V) to the AC INPUT ④ on the side of the machine (see side panel diagram icon ④). The machine will come on and begin its set up.
- If AC power is not available from the Eskom socket, then the machine will not automatically start up. In this case move the BATTERY SWITCH ① on the side of the machine up to the “ON” position and press the red power button ⑫ until it beeps. The machine will start up and function on battery power. Once AC power returns the machine will stay on and recharge automatically.
- A multi plug and/or extension cable can be used to connect several devices to the outlets ③ at the side of the machine. **Ensure the total power requirement for your devices/appliances does not exceed the MPSG rating.** High powered items like hair dryers, kettles, irons, microwaves, vacuum cleaners, laser printers etc. will cause overload and could severely damage the CPU. **Damage caused by excessive overloading is not covered under the warranty.**
- Once connected to the MPSG, turn on your **devices/appliances** in sequence, starting with the biggest load first.
- The cooling fan ② RUNS CONTINUOUSLY in quiet mode and does not switch off. Fan speed will only increase if the internal temperature exceeds 45° C.
- The system will charge the battery automatically and power your appliances. When fully charged, the battery capacity display shows five bars and maintains a float charge. (NB. the use of solar panels ⑤ is optional.)
- If a power cut happens (or there is an AC voltage drop) the machine immediately switches to battery power. 4 beeps warn the unit has switched to battery power. The default setting is for the machine to then stay silent.
- An audible beeping warns when the battery is low. The machine will automatically shut down soon after this. When AC power is restored the MPSG will automatically start up and recharge. Draining the battery to the point of shutting down, however, is not recommended. Always aim to recharge before the battery is drained beyond 70% (and less if possible) for longer overall battery life.
- The MPSG is not designed for connection to a DB board.
- If the machine is not being used for a prolonged period disconnect AC ④ and move the DC breaker ① on the side of the machine down to the “OFF” position.
- Refrain from pressing the blue function button ⑬ unless you have read and understood the function settings. Changing from the default setting 1 may lead to unnecessary battery drain and decreased lifespan.

Icon Description

- ① -- Battery On/Off DC Switch
- ② -- Intelligent Cooling Fan
- ③ -- AC Output: SA Plug Outlets (Max. 10A) Pure Sine
- ④ -- AC Input WITH FUSE: Connect to mains AC with power Cord
- ⑤ -- Solar Input (MPPT): + / - MC4 Solar connectors

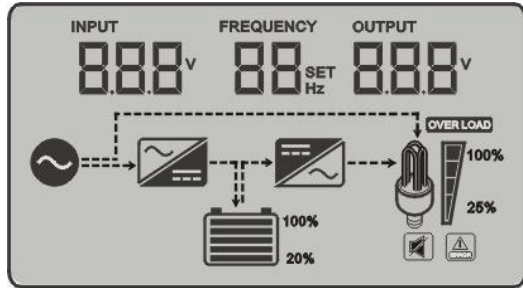


- ⑥ -- LCD display
- ⑦ -- Solar Charge indicator
- ⑧ -- DC Output Indicator
- ⑨ -- 5VDC & 12VDC ON/OFF switch
- ⑩ -- 12VDC output
- ⑪ -- 5VDC USB output
- ⑫ -- ON/OFF button
- ⑬ -- Function button

LCD Display

The display provides the following information:

Input/Output Voltage: Power Frequency (Hz): Operation/Function Mode (01,02 or 03):
 230V AC Supply On/Off: Inversion Mode: Battery Capacity: Load Capacity: Battery
 Mode Bleep (Speaker) On/Off: Fault Symbol



LCD Display Icons

	Mains Supply Icon – The MPSG is connected to a live 230V AC mains supply ④
	AC-DC icon – The MPSG is inverting from 230V AC to 12/24V DC to charge the battery
	DC-AC icon - The MPSG is inverting from 12/24V DC battery power to supply the 230V AC outlets ③
	Icon visible - 4 beeps sound when AC mains power cuts and the MPSG switches to battery power. It will then stay silent.
	Icon NOT visible - 4 beeps sound every 15 seconds when AC mains power is off and the MPSG is on battery power.
	Speaker Icon can be switched ON/OFF by pressing the function button for 1 second and then releasing
	Fault Icon

Battery Information

Lithium Battery		MPSG-500 12V	MPSG-1000 24V
	Blinking Bar	< 9.7V	< 19.4V
	Solid Bar	9.7~10.4V	19.4~20.8V
	Solid Bars	10.4~10.7V	20.8~21.4V
	Solid Bars	10.7~11.2V	21.4~22.4V
	Solid Bars	11.2~11.6V	22.4~23.2V
	Solid Bars	> 11.6V	> 23.2V

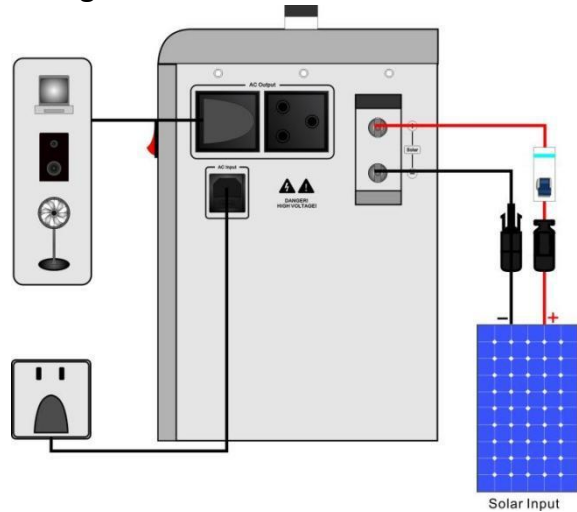
Load Information

	0%~25%	25%~50%	50%~75%	75%~100%
	Overload – AC Power requirement exceeds MPSG rating			

Audible alarm warnings

Equipment running on battery pack (mute speaker visible on lcd screen)	Default setting - beep warns only when MPSG first switches to battery power and then stays silent
Equipment running on battery pack (mute speaker NOT visible on lcd screen)	Beep warns when MPSG switches to battery power and then continues every 15 seconds
Battery high voltage alarm	Beep 4 times per second
Battery low voltage alarm	Beep 2 times per second
Over temperature alarm	Beep for 2 seconds; Pause for 1 second

System connection diagram



Function Button ⑬ and ON/OFF Button ⑫

⑬	Mute Beeping	Press Function Button ⑬ for 1 second and release. Single beep confirms selection. Speaker symbol appears on screen. Beep is permanently disabled.		
	Activate Beeping	Press Function Button ⑬ for 1 second and release. Double beep confirms selection. Speaker symbol disappears from screen. Beep warning is activated.		
	Function Button	Keep Function Button ⑬ pressed for at least 5 seconds and settings will scroll on the screen. When the desired setting appears, release the button to take effect.		
⑫	Mode Settings	Mains Priority Mode	Mains - Battery Saving Mode	Battery Priority Mode
		01 SET	02 SET	03 SET
⑫	ON/OFF Button	Starting Up	Press ON/OFF Power Button ⑫ and release when you hear the beep. The MPSG begins its startup cycle.	
		Power Off	Press ON/OFF Power Button ⑫ and release when you hear the internal relay close. The MPSG will shut down output.	

Function Settings

Keeping the function button pressed for more than 5 seconds will scroll through the 3 available settings. When the desired setting appears, release the button and the unit will change to that setting. However, we strongly advise not changing from mode 1 or 2 for the reasons listed in section 3 below.

01 SET	MAINS PRIORITY MODE. This is the preferred mode, and we advise using this setting in all circumstances. Under normal operation, power from the grid will supply the load and, at the same time, maintain the battery charge. When there is a power cut the MPSG will immediately switch to battery power providing high quality, pure sine wave electricity to the AC outlets ③ and your connected appliances. When power is restored, the battery will recharge. If a solar panel is connected the unit will automatically use any available solar to charge the battery and run appliances, even when AC power is available.
02 SET	MAINS MODE WITH BATTERY SAVING DURING POWER CUTS. Under normal operation, power from the grid will supply the load and, at the same time, maintain the battery charge. When there is a power cut the MPSG will immediately switch to battery power providing high quality, pure sine wave electricity to the AC outlets. If, during a power cut, no power is needed at the AC outlets ③ e.g., no appliances are plugged in or are switched off, then the MPSG will detect no power requirement and automatically switch the AC output to zero. This state requires no power inversion and cuts battery energy consumption to its lowest. Every 10 seconds the machine will pulse 230V to the AC outlet and if a power requirement is detected then AC will resume and stay on for as long as required. If, at any time, the load requirement drops to zero again, the AC will turn off and resume pulsing every 10 seconds.
03 SET	BATTERY PRIORITY MODE. This mode should only be set if the user wants to prioritize solar charging and not use any AC mains input. However, it is recommended to always use MODE 1 - MAINS PRIORITY MODE , even if you have solar connected because, in MODE 1 , the MPSG will still use solar charging but ensures the battery is not deeply drained in cloudy conditions or at night. It does this by using AC to keep the battery topped up. Repeated, unnecessary draining of the battery to very low levels in MODE 3 will reduce its overall lifespan. MODE 1 avoids this situation while still utilizing solar power to its maximum. The only situation where MODE 3 would be useful is where the load requirement is relatively small so that it only drains the battery by a small margin overnight and has enough solar power during the day to completely recharge the battery before the next overnight use.

DC Output Indicator

Yellow DC Load Indicator ⑧	Stable Light	DC output voltage normal
	Fast Flashing	DC current overload or short circuit
	Slow Flashing	DC output voltage low
	No Light	DC output power off

DC Connection

The USB 5VDC ⑪ and 12VDC ⑩ Output sockets can be switched on independently and used even when the main machine (AC output) and lcd screen are switched off.

- To use the 5VDC ⑪ and 12VDC ⑩ Output sockets when the main machine and lcd screen are switched off make sure the battery switch ① at the side is ON, illuminating the yellow DC Load light ⑧. The DC Output switch ⑨ on the front panel should also be switched ON.
- The DC Output switch ⑨ controls power to the DC outlets. Even when the main machine and lcd screen are running, the DC outlets can be isolated and switched ON and OFF using this switch ⑨.
- The two 5VDC ⑪ USB ports provide a maximum current of 1 amp each i.e., 2 amps in total combined.
- The two 12VDC ⑩ ports provide a maximum current of 1 amp each i.e., 2 amps in total combined.
- Before connecting any electronics, confirm your DC load current does not exceed the output rating of the DC port.
- Ensure the connecting plug type and polarity match the output port. Reversed polarity or any short circuit can damage the equipment.

Solar Charge Indicator

Green Charge Indicator ⑦	Stable Light	MPPT Average Charge Mode
	Fast Flashing	MPPT Charge Mode
	Slow Flashing	MPPT Float Charge Mode
	No Light	MPPT Standby

Solar Connection

The MPSG has a highly efficient MPPT solar controller. Connecting a solar panel charges the battery and provides longer run times during power outages.

- Before connecting a solar panel, the On/Off DC Switch ① on the side of the MPSG machine should be in the off position
- Ensure the correct panel voltage is used (determined by the voltage of your MPSG machine). The solar panel open circuit voltage should be 1.5 to 1.7 times the MPSG rated voltage.
- The MPSG 500 is a 12v machine meaning a solar panel open circuit voltage of 18 – 20V is needed. Do not exceed 300W total power.
- The MPSG 1000 is a 24v machine meaning a solar panel open circuit voltage of 36 – 40v is needed. Do not exceed 600W total power.
- Use the right diameter wire based on panel output and distance from the MPSG.
- Connect the panel to the Solar Input ⑤ + / - MC4 connectors. Make sure to double check the correct polarity (solar panel positive output to MPSG positive input and solar panel negative output to MPSG negative input). Incorrect or reversed polarity may damage the solar controller.
- An in-line circuit breaker/fuse should be used between the solar panel and MPSG to isolate incoming power from the panel to the machine. Once the solar panel is connected to the machine the in-line circuit breaker can be switched on. The On/Off DC Switch ① on the side panel of your MPSG can then also be switched on. Reverse this procedure when disconnecting a solar panel.

Troubleshooting

- If at any time you find the AC input showing zero on the screen ⑥ - even though there is incoming AC power - and the battery is not recharging or has gone flat then the input fuse may need replacing. The fuse is designed to offer some protection from small AC input anomalies.
- The fuse is situated in a slide out drawer just below the power cord input ④ as shown in the picture below. There is a spare fuse in the drawer.



- Please note the RED DC Output switch ⑨ on the front panel is solely for isolating and switching the USB and DC outlets on and off and does not control any other part of the machine.

IF YOU HAVE ANY ISSUES WITH THE MPSG PLEASE CONTACT US AND WE WILL TRY TO RESOLVE YOUR QUERY BY PHONE OR EMAIL. WE CAN DEAL WITH ANY WARRANTY QUESTIONS EVEN IF YOUR UNIT WAS PURCHASE THROUGH A THIRD PARTY. WE ARE ALSO ABLE TO ASSIST WITH TESTING AND, IF NECESSARY, REPAIRS.

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Technical Specifications

MODEL	MPSG-500	MPSG-1000
Rated Power	500W	1000W
Voltage	12V	24V
Lithium Battery	600Wh	1200Wh
INVERTER		
Output	Pure Sine Wave	
Input Voltage Range	140-275VAC	
Input Frequency	45 – 65 Hz	
Output Voltage	220VAC	
Output Frequency	50Hz	
MPPT SOLAR CONTROLLER		
Charging Voltage Range	10-25VDC	20-50VDC
Max PV Power	300W	600W
Floating Charge Voltage	13.7VDC	27.4VDC
Rated Charge Current	20A MPPT	
MPPT Efficiency	≥99%	
DC OUTPUT PORTS		
5VDC Output (USB)	2↑ MAX 2A	
12VDC Output	2↑ MAX 2A	
PHYSICAL		
Heat Dissipation	Quiet Intelligent Fan	
Display	Digital LCD	
External Size: W*D*H	42 x 22 x 27 cm	43 x 23 x 33
Package Size: W*D*H	51 x 30 x 36 cm	52 x 31 x 40
Weight	16 KG	23 KG