



MEDALPOWER

INVERTER

1KVA

Off-Grid Solar Inverter

MPI1KV#12VPVCR



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1. Introduction

This is a DC-to-AC inverter with integrated solar battery charger, an energy-saving solution or an automotive inverter (hereinafter referred to as “**inverter**”)

The inverter accepts input power source from AC mains (utility), battery, and PV (solar) string and switches between various operation modes automatically depending on the operational conditions.

The PV (solar) string can be set as priority to supply the loads without consuming the power from AC mains, as long as sufficient sunlight is present.

The battery can be charged by both AC mains and PV (solar) string with intelligent charging control.

Key features:

Built-in enhanced AC charger & solar charger controller up to 50A

Selectable input voltage ranges, charging priority setting, AC or solar power priority setting

Auto restart when AC recovery

User-friendly LCD and LED indications with setting function

With the environmental temperature control charge management

Rack design & wall-mounted design for flexible installation

Intelligent 3-stage charger control for efficient charging and preventing overcharge

Multiple protection: low battery alarm, low battery shutdown, over charge protection, overload protection, over temperature protection, short circuit protection

Fan speed automatic adjust, Low noise

Battery Cut off point setting, Buzzer alarm ON/OFF setting

2. Important Safety Warning(Save These Instructions)

Before using the inverter, please read all instructions and cautionary markings on the unit, this manual and the batteries.

Conventions used:

WARNING! Warnings identify conditions or practices that could result in personal injury.

CAUTION! Caution identify conditions or practices that could result in damaged to the unit or other equipment connected.

General Precaution-

WARNING! The unit is designed for indoor use. Do not expose this unit to rain, snow or liquids of any type.

WARNING! To reduce risk of injury, only use qualified batteries from qualified distributors or manufactures. Any unqualified batteries may cause damage and injury. Do not use old or overdue batteries. Please check the battery type and date code before installation to avoid damage and injury.

WARNING! It's very important for system safety and efficient operation to use appropriate external battery cable. To reduce risk of injury, external battery cables should be UL certified and rated for 75°C or higher. And do not use copper cables less than 10AWG.

WARNING! Do not disassemble the inverter. Contact with the qualified service center when service or repair is required.

WARNING! Provide ventilation to outdoors from the battery compartment. The battery enclosure should be designed to prevent accumulation and concentration of hydrogen gas at the top of the compartment.

WARNING! Use insulated tools to reduce the chance of short-circuit when installing or working with the inverter, the batteries, or other equipments attached to this unit.

WARNING! For battery installation and maintenance, read the battery manufacture's installation and maintenance instructions prior to operating.

Personnel Precaution-

WARNING! Careful to reduce the risk or dropping a metal tool on the batteries. It could spark or short circuit the batteries and could cause an explosion.

WARNING! Remove personal metal items such as rings, bracelets, necklaces, and watches when working with batteries. Batteries can produce a short circuit current high enough to make metal melt, and could cause severe burns.

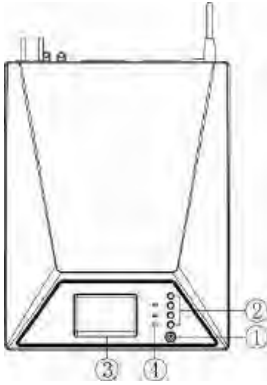
WARNING! Avoid touching eyes while working near batteries.

WARNING! Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.

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

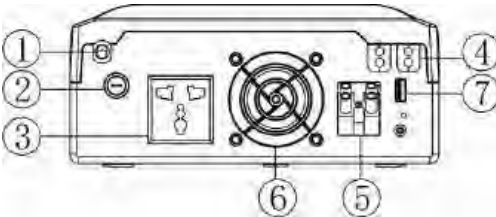
3. Product Overview

3.1 Top Panel



- ① Power ON/OFF button
- ② Setting function button
- ③ LCD
- ④ LED indicator

3.2 Rear Panel



- ① AC input
- ② Input circuit fuse
- ③ AC output receptacle
- ④ Battery input wires
- ⑤ PV input terminal
- ⑥ Cooling fan
- ⑦ USB charger for option

4. Installation

NOTE: Before installation, please inspect the unit. Be sure that nothing inside the package is damaged.

4.1 Mounting the unit

The unit **ONLY** can be mounted vertically to a wall surface.

Please follow below steps:

1. Turn off the unit before mounting,
2. Select an appropriate mounting location. Use a horizontal line and the length of the line must be 172 mm and mark the two ends on the wall.(See Fig. 1)
3. Drill two marks by screws.
4. Mount the unit by positioning the key-hole slots over the mounting screws.

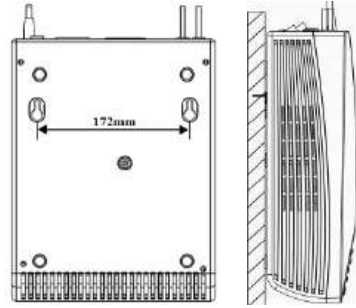


Fig. 1

4.2 Connect to Utility and Charge

Plug in the AC input cord to the wall outlet. The unit will automatically charge the connected external battery even though the unit is off.

Connect External Battery

Step 1- Take away the cover of external battery terminal.

Step 2- Following battery polarity guide printed near the battery terminal!

Place the external battery cable ring terminal over the battery terminal,

RED cable to the positive terminal (+);

BLACK cable to the negative terminal (-).

Step 3- Connect battery cables to the external batteries.

Note: For the user operation safety, we strongly recommend that you should use tapes to isolate the battery terminals before you start to operate the unit.

1) Single battery connection (Refer to Fig. 2): When using a single battery, its voltage must be equal to the Nominal DC Voltage of the unit (see below Table 1)

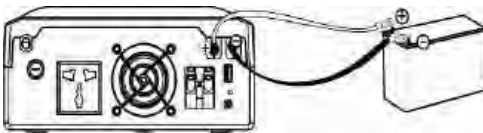


Fig. 2

Capacity	Nominal Battery Voltage
1000VA	12Vdc
2000VA	24Vdc

2) **Multiple batteries in parallel connection(Refer to Fig. 3):** Each battery's voltage must be equal to the Nominal DC Voltage of the unit.

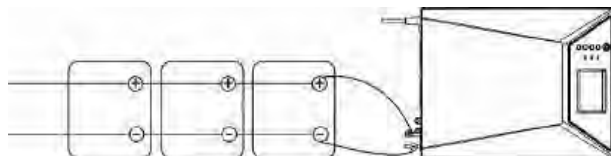


Fig. 3

12V

3) **Multiple batteries in series connection(Refer to Fig. 4):** All batteries must be equal in voltage and amp hour capacity. The sum of their voltages must be equal to the nominal DC Voltage of the unit.

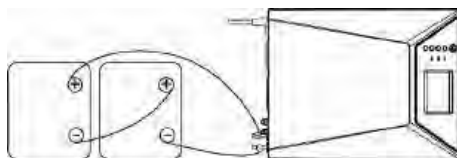


Fig. 4

24V

Step 4- Make sure to connect the polarity of battery side and the unit correctly.

Positive pole (Red) of battery to the positive terminal (+) of the unit.

Negative pole (Black) of battery to the negative terminal (-) of the unit.

4.3 Connect to Solar Panel

CAUTION: Before connecting to PV modules, please install **separately** a DC circuit breaker between inverter and PV modules.

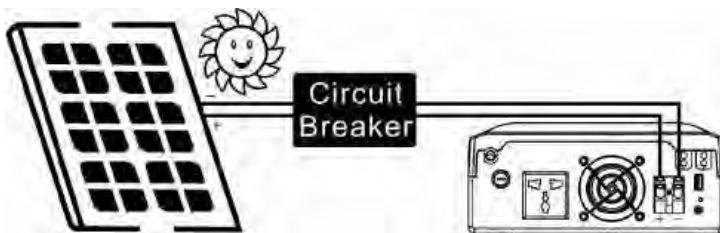
WARNING! All wiring must be performed by a qualified personnel.

WARNING! It's very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommended cable size as below.

Typical Amperage	Gauge	Torque Value
50A	8 AWG	1.4~1.6 Nm

Step 1- Connect one cable to the positive (+) pole of solar panel and solar charger positive (+) terminal.

Step 2- Connect the other cable to the negative (-) pole of solar panel and solar charger negative (-) terminal.



Solar Panel Connection

4.4 PV Module Selection

The following parameters can be found in each PV panel's specification, when selecting proper PV modules, please be sure to consider below requirements first:

- Voc: Open Circuit Voltage (V)
- Pmax: Maximum Power (W)
- Vmpp: Max. Power Voltage (V)
- Impp: Max. Power Current (A)
- Isc: Short Circuit Current (A)

1. Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter:

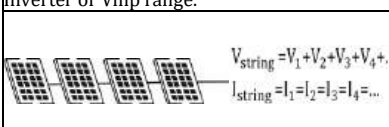
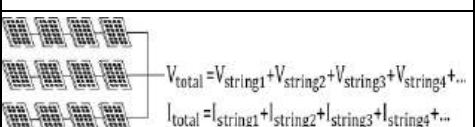
Capacity	1000VA	2000VA
MAX. INPUT POWER	900W	1600W
CHARGING CURRENT (PWM)	50Amp	
System DC Voltage	12Vdc	24Vdc
OPTIMAL WORK VOLTAGE RANGE	15V~18V	30V~32V
MAX. PV INPUT VOLTAGE	40V	60V

2. Max. Power Voltage (Vmpp) of PV modules should be close to Best Vmp of inverter or within Vmp range to get best performance. If one PV module can't meet this requirement, it's necessary to have several PV modules series connection. Refer to below table.

Capacity	Best Vmp	Vmp range
1000VA	15Vdc	15V~18V
2000VA	30Vdc	30V~32V

Note: Best Vmp: panel max power point voltage.

The PV charging efficiency if maximized while PV system voltage is close to Best Vmp.

Maximum PV module numbers in Series	PV module numbers in parallel
Vmpp of PV module * X pcs ≈ Best Vmp of Inverter or Vmp range.	Max. charging current of inverter / Impp
	

Total PV module numbers = maximum PV module number in series * PV module number in parallel

Example 1: SCC SKY INVERTER 1000

After considering Voc PV module not exceeds 40Vdc and max. Vmpp of PV module close to 15Vdc or within 15Vdc~18Vdc, we can choose PV module with below specification.

Maximum Power (Pmax)	84W	Max. PV module number in series 17.22 × 1 ≈ 15~18 → 1
Max. Power Voltage Vmpp(V)	17.22V	
Max. Power Current Impp(A)	4.85A	PV module number in parallel : 50A/4.85A=10.31 ≈ 10 Total PV module numbers : 1 × 10 = 10
Open Circuit Voltage Voc(V)	21.97V	
Short Circuit Current Isc(A)	5.23A	

Maximum PV module numbers in Series: 1

PV module numbers in parallel: 10

Total PV module numbers: 1 × 10 = 10

Example 2: SCC SKY INVERTER 2000

After considering Voc PV module not exceeds 60Vdc and max. Vmpp of PV module close to 30Vdc or within 30Vdc~32Vdc, we can choose PV module with below specification.

Maximum Power (Pmax)	255W	Max. PV module number in series 30.65 × 1 ≈ 30~32 → 1
Max. Power Voltage Vmpp(V)	30.65V	
Max. Power Current Impp(A)	8.31A	PV module number in parallel : 50A/8.31A=6.02 ≈ 6 Total PV module numbers : 1 × 6 = 6
Open Circuit Voltage Voc(V)	37.93V	
Short Circuit Current Isc(A)	8.62A	

Maximum PV module numbers in Series: 1

PV module numbers in parallel: 6

Total PV module numbers: 1 × 6 = 6

5. Operation

5.1 Power ON/OFF







Once the inverter has been properly installed, press the power switch to turn on the unit. The unit will work automatically in line mode or inverter mode according to input utility power's status. When press the power switch again, the unit will be turned off.

5.2 LED Indicators & Audible Alarms












There are three indicators (Green/ Yellow / Red) in the front panel of the unit.

	Indicator	Status	Alarm
Green LED	lighting	Line mode and battery fully charged	Off
	flashing every 2 sec	Battery charging at power on	Off
	flashing every 5 sec	Battery charging at power off	Off
	flashing every 10 sec	Battery fully charged at power off	Off
Yellow LED	lighting	Battery mode	Off
	flashing every 5 sec	Shutdown mode	Off
	flashing every 1 sec	Battery weak at battery mode	Beep every sec
Red LED	lighting	Fault mode	Continuous beep
	flashing every sec	The unit is overload	Beep every 0.5 sec
	flashing every 5 sec	The unit is over charged	Continuous beep

5.3 LCD Display

Display	Function
Input source information	
	Indicates the AC input
	Indicates the PV input
	Indicate input voltage, input frequency, PV voltage, Battery voltage , Charging current
Configuration Program and Fault Information	
	Indicates the setting programs.
Output Information	
	Indicate the output voltage, output frequency, Load percent, Load in VA, Load in W
Battery Information	
	Indicate the Battery level by 0~10%, 10%~30%, 30%~55%, 55%~80%, 80%~100% in battery mode, charging status in line mode

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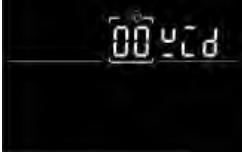




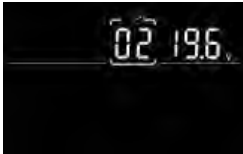



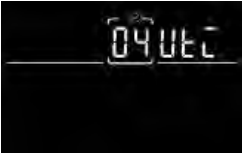

	Indicates the Battery voltage low.
<p>Battery mode:</p> <p>4 step: battery voltage $\geq 11.7V/23.4V$ the four bars are lighting.</p> <p>3 step: battery voltage $\geq 11.1V/22.2V$ the first three bars are lighting.</p> <p>2 step: battery voltage $\geq 10.6V/21.2V$ the first two bars are lighting.</p> <p>1 step: battery voltage $< 10.6V/21.2V$ the first bar is lighting.</p> <p>Line mode:</p> <p>4 step: CV mode, battery voltage $\geq 13.0V/26.0V$ the four bars are lighting.</p> <p>3 step: CC mode, battery voltage $\geq 14.0V/28.0V$ the first three bars are lighting, the fourth is flashing.</p> <p>2 step: CC mode, battery voltage $\geq 13.5V/27.0V$ the first two bars are lighting, the others are flashing.</p> <p>1 step: CC mode, battery voltage $\geq 13.0V/26.0V$ the first bar is lighting, the others are flashing.</p> <p>0 step: CC mode, battery voltage $< 13.0V/26.0V$ all led bars flashing</p>	
Load Information	
	Indicates overload
	<p>4 step: $\geq 80\%$ load level.</p> <p>3 step: $\geq 55\%$ load level.</p> <p>2 step: $\geq 30\%$ load level.</p> <p>1 step: $\geq 10\%$ load level.</p>
Mode operation information	
	Line Mode
	Backup Mode
	Fault Mode
	Indicates unit connect to the mains
	Indicates unit connect to the PV panel
	Indicates the utility charger circuit is working
	Indicates the DC/AC inverter circuit is working
Mute operation	
	Indicates unit buzzer is disabled

5.4 LCD Setting




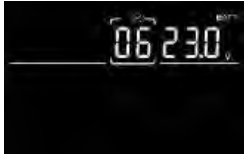
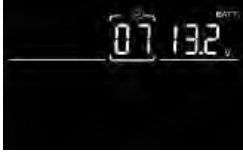
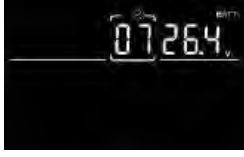
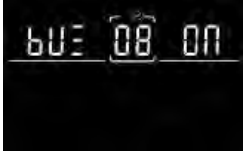
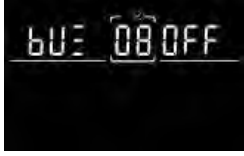


After pressing and holding "ENTER" button for 3 seconds, the unit will enter setting mode. Press "UP/DOWN" button to select setting programs. And then, press "ENTER" button to confirm the selection or "ESC" button to exit.

If there is no button action during 60 seconds, setting mode will exit to normal display mode.

During shutdown process, the setting information can be stored in MCU, and it will be read out during next start up.









Program	Description	Selectable option		
00	AC input voltage range selection	 <p style="text-align: center;">Wide(<i>default</i>) If selected, acceptable AC input voltage range will be within 90~280Vac.</p>	 <p style="text-align: center;">Narrow If selected, acceptable AC input voltage range will be within 170~280Vac.</p>	
01	AC charging current selection	 <p style="text-align: center;">20A (<i>default</i>)</p>	 <p style="text-align: center;">10A</p>	
02	Low DC cut-off voltage setting	 <p style="text-align: center;">9.8V (<i>default</i>) 1000VA model: setting range 8.7~12.0Vdc, 0.1V /time.</p>	 <p style="text-align: center;">19.6V(<i>default</i>) 2000VA model: setting range 17.5~24.0Vdc, 0.1V /time.</p>	
03	AC output rating voltage selection	 <p style="text-align: center;">230V (<i>default</i>)</p>	 <p style="text-align: center;">220V</p>	 <p style="text-align: center;">240V</p>
04	Output source priority (utility or solar first)	 <p style="text-align: center;">utility first(<i>default</i>) Utility will provide power to the loads as first priority. Solar and battery energy will</p>	 <p style="text-align: center;">Solar first Solar energy provide power to the loads as first priority. If solar energy is not sufficient to</p>	

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		provide power to the loads only when utility power is not available.	power all connected loads, battery energy will supply power the loads at the same time. Utility provides power to the loads only when any one conditions happens: -Solar energy is not available. -Battery voltage drops to low- level warning voltage or the setting point in program 06.
05	Solar charging current selection	 50A (default)	 30A
06	Setting battery voltage point back to utility source when selecting "solar first"	 11.5V (default) 1000VA Model: 10.8~12.5Vdc, 0.2~0.3V/time.	 23.0V (default) 2000VA Model: 21.8~25.1Vdc, 0.4~0.5V /time.
		 13.2V (default) 1000VA Model: 11.9~13.7Vdc, 0.2~0.3V/time.	 26.4V (default) 2000VA Model: 23.8~27.5Vdc, 0.4~0.5V /time.
08	Buzzer mute control	 ON (default)	 OFF
09	Background LED control (for option)	 ON (default)	 OFF

5.5 Display Setting



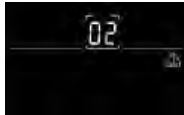
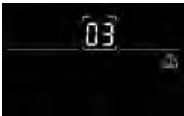
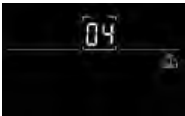
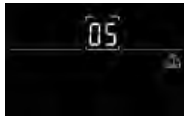
The LCD display information will be switched in turns by pressing "UP/DOWN" key. The selectable information is switched as below order: input voltage, output voltage, battery voltage, PV voltage, PV charging current, load percentage, load in VA, load in Watt, CPU Version, rated capacity.

Selectable information	LCD display	Selectable information	LCD display
AC input voltage / AC output voltage (Default Display Screen)		Load percentage	
Battery voltage		Load in VA	
PV voltage		Load in W	
PV charging current		CPU version / Rated capacity	

5.6 Operating Mode Description

Operation Mode	LCD Display		
Standby Mode			
	Charging by utility	Charging by PV energy	Charging by utility and PV energy
Description: Utility input bypass to output, charger available Note:*Standby Mode: The inverter is not turned on yet but at this time, the inverter can charge battery with AC bypass output.			
Line Mode			
	Charging by utility	Charging by PV energy	Charging by utility and PV energy
Description: The unit will provide output power from the mains. It will also charge the battery at line mode.			
Battery Mode			
	Power from battery only	Power from battery and PV energy	
Description: The unit will provide output power from battery and PV power.			

5.7 Fault Reference Code

Fault Code	Fault Event	Fault Code	Fault Event	Fault Code	Fault Event
00	 Output voltage too high	01	 Battery overcharge	02	 Output short
03	 Over load after alarm	04	 Battery voltage too low	05	 Fan failure

6. SPECIFICATION

CAPACITY (VA/W)		1000VA/900W	2000VA/1600W
NOMINAL BATTERY VOLTAGE (lead-acid battery)		12Vdc	24Vdc
LINE MODE			
INPUT	Nominal Voltage	230Vac	
	Voltage Range	170~280Vac (Narrow Range)	
		90~280Vac (Wide Range)	
Normal Frequency	50Hz or 60Hz		
OUTPUT	Voltage	220/230/240Vac	
	Frequency / Waveform	Following the Utility	
TRANSFER TIME		20ms Typical	
BACKUP MODE			
OUTPUT	Voltage	220/230/240Vac (+10% / -18%)	
	Frequency	50Hz or 60Hz (Auto detection)	
	Waveform	Simulated Sine Wave	
PROTECTION		Discharge, over-charged, over-loading, over-temperature, short-circuit protection	
BATTERY CHARGER (POWERED BY AC)			
CHARGING ALGORITHM		3-step charging	
AC CHARGING MODE		10A / 20A	10A / 20A
FLOATING CHARGING VOLTAGE		13.75±0.25V	27.50±0.50V
OVERCHARGING VOLTAGE		15.30V	30.60V
SOLAR BATTERY CHARGER			
MAX. INPUT POWER		600W	1200W
CHARGING CURRENT (PWM)		50Amp	
System DC Voltage		12Vdc	24Vdc
OPTIMAL WORK VOLTAGE RANGE		15V~18V	30V~32V
MAX. PV INPUT VOLTAGE		40V	60V
MAX. PV INPUT CURRENT		50Amp	
GENERAL			
PHYSICAL	Dimension (D*W*H)	316mm(D)*227mm(W)*92mm(H)	
	Net Weight (kg)	3.1	3.3
ENVIRONMENT	Operating Environment	0~50℃, 0%~90% relative humidity (non-condensing)	
	Storage Environment	-15℃ to 55℃, 0% to 90% humidity (non-condensing)	
	Noise Level	Less than 50dB	

7. TROUBLESHOOTING

Problem	LED/LCD/Buzzer	Possible Cause	Solution
Utility power is normal but the unit is in battery mode.	Yellow LED is lighting or flashing, Input voltage displayed as 0 on the LCD.	AC input Power cord is not connected well or Input protector is tripped	Check if AC wiring is connected well an AC protector is tripped.
	Green LED is lighting or flashing, Input voltage displayed normal on the LCD.	Set "Solar first" as the priority of output source.	Change output source priority to Utility first
Backup time is short.	Battery low alarm issue quickly.	Battery voltage is too low.	Charge the unit at least 8 hours.
		Battery capacity is not full even after charge the unit for at least 8 hours.	Check the date code of the battery. If the batteries are too old, replace the batteries.
No display on the front panel when the utility power is normal	No LED/LCD display.	Battery is not connected well.	Check if the external battery cable and terminal are all correct.
		Battery defect.	Replace the batteries.
Solar ok but Solar charger doesn't work.	PV voltage displayed as 0 on the LCD.	PV reverse polarity protection.	Re-connect the PV terminals.
Buzzer beeps continuously and red LED is on.	Fault code 00	Output voltage too high	Return to repair center.
	Fault code 01	Battery overcharge	Return to repair center.
	Fault code 02	Output short / Over temperature	Check if wiring is connected well and remove abnormal load, and make sure the unit has adequate air flow.
	Fault code 03	Over load after alarm	Disconnect non-critical loads.
	Fault code 04	Battery voltage too low	Return to repair center.
	Fault code 05	Fan failure	Replace the fan.

If there is any abnormal situations occur, which doesn't list above, please call the service people immediately for professional examine.

DISPOSAL

In the event the product reaches the end of its service life, please contact the local dealer for disposal instructions.



The product must not be disposed of with the household waste.

Disposal of the product at the end of its service life shall be done accordance with applicable disposal regulations for electronic waste.



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