

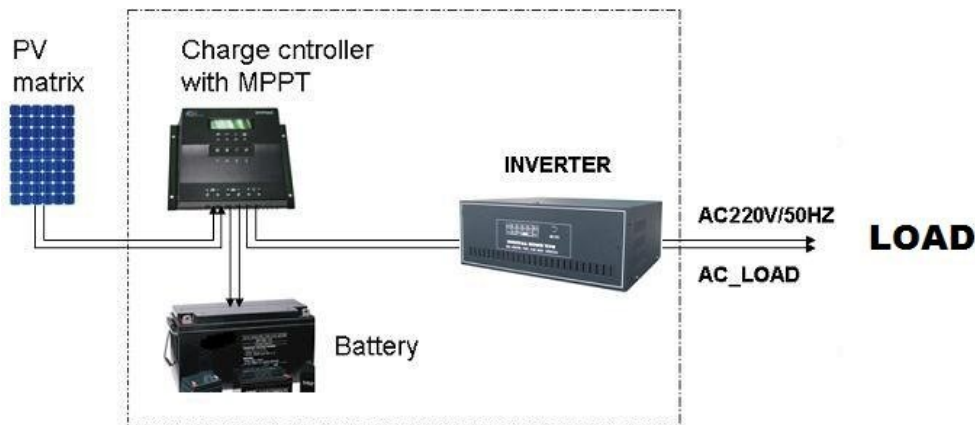
ASIACOST CO LTD has received many inquiries for a self-running (off-grid) solar system that would be very compact, not too heavy to carry by a single person and easy to transport in a Jeep. We have developed such system called “MSS”: Mobile Solar System.

The initial basic requirement of relatively light weight and small size leads to some limitations in this solar system’s capacities. However, many applications can be considered for remote areas, like a mobile battery charger for example. Moreover, this system allows the possibility to add solar panels and/or batteries to increase its capacity.

Summary of this document:

	<i>page</i>
1. SYSTEM DESIGN .....	1
2. SYSTEM FUNCTIONS .....	2
3. SPECIFICATIONS OF THE CENTRAL UNIT .....	3
4. SPECIFICATIONS OF THE SOLAR PANELS .....	5
5. SPECIFICATIONS OF THE BATTERIES .....	7
6. TRADE TERMS .....	8

## 1. System design



### 2. System functions

This is an Independent Solar Power System designed for easy transportation (in a 4 wheels car, truck, etc.) It provides stable voltage and frequency for the equipment while there is no AC current from the electric network. There are three working patterns of the Solar Power Kit:

*(1) Solar Power supply:*

*When the solar power reaches a certain fixed value, the solar modular group will provide the DC current through the charging controller for the inverter, and meanwhile, charges the batteries (MPPT can auto-regulate itself according to the load and charging state of the battery).*




*(2) Solar battery cooperate:*

*When the solar power cannot reach a certain fixed value, the solar battery will change into discharging state, and provide the DC current for the inverter along with the charging controller, and the inverter will supply power to the load.*

*(3) Battery supply:*



*When there is no sunshine (cloudy or at night), batteries supply power to the inverter until the end of the discharge, and the inverter will supply power to the load.*

As examples, when there is no sun, the fully charged two built-in batteries can support :

-  50 minutes backup time for 700 watt load, or
-  2 hours backup time for 350 watt load, or
-  4 hours backup time for 180 watt load

In this last example, it would mean approximately 60 pieces of 3 watt LEDs (almost a whole small village could have light for 4 hours, allowing children to study in the evening, etc.)

This system is compact and comprises of two boxes:

-  Central unit: 280x500x500mm ; 50 Kgs
-  Solar panels: 1300x650x300mm ; 28 Kgs

It has been designed so that it can enter a Jeep and one single person can carry it.

The connection of all components is done except the connection of the solar panels to the central unit. However, it is very simple to connect the furnished cables.

## 3. Specifications of the Central Unit

### SOLAR CHARGE CONTROLLER

**Functions:**

- ✚ CPU control,
- ✚ Automatic recognition of input voltage
- ✚ Applicable with various types of durable batteries
- ✚ Micro processing controller Pulse Modulation Wide-frequency ( PWM ) charge
- ✚ Temperature sensor for charging a battery in compensation
- ✚ Overload protection
- ✚ Overcharge protection
- ✚ Short circuit protection
- ✚ Reverse polarity connection protection
- ✚ Converse discharge protection
- ✚ TSInder protection
- ✚ Low voltage protection
- ✚ Working temperature:-25°C to +55°C

**Technical Data:**

Rated Voltage	12V / 24V Automatic voltage recognition
Max Load current	20A
Input voltage range	12V ~ 17V / 24V ~ 34V
Length≤1m, Charge loop drop	< 0.25V
Length≤1m, Discharge loop drop	< 0.15V
Over voltage protection	17V / 34V
Full charge cut	13.7V / 27.4V
Low voltage cut	10.5V~11V / 21V~22V
Temperature compensation	-3mv/°C/cell
No load loss	≤20mA
Max wire area	4mm <sup>2</sup>
Ambient temperature	-25°C ~ +55°C

## SOLAR INVERTER

### *Functions:*

This type of solar inverter is new, and it adopts the design of microcomputer control technology. It has many good points, including high reliability, complete protection function, small waveform distortion, low price, etc. It can convert the DC power supply into the purity sine wave AC power supply of voltage stabilizing, frequency stabilizing and low noise of 220V and 50Hz. This product has higher conversion efficiency (can reach up to above 85% under the full load) and very strong nonlinear load drive capacity. It can simultaneously implement the inspection and monitoring to input voltage and current, as well as output voltage and current; therefore, it realizes the maintenance function of unattended operation. The power inverter can start all kinds of electronic appliances, such as the computer, television, refrigerator, microwave oven, the lighting etc, and other places that have the 12V - 48VDC dynamic (DC screen).

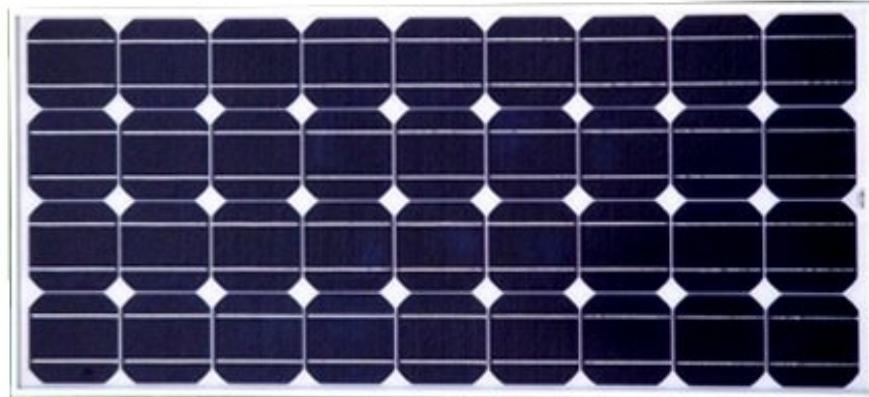
### *Features:*

- ✚ Pure Sine Wave;
- ✚ Long Backup Type;
- ✚ Microprocessor control;
- ✚ Short Circuit & Overload Protection;
- ✚ Cold start function;
- ✚ Output: AC 220+/-10%

### *Technical Data:*

Capacity	W	700W
Output	Phase	Single
	Voltage range(Vac)	220+/-10%
	Frequency	50/60+/-0.5Hz
	Waveform	Sine wave
Battery	DC Voltage	DC12V/24V
Protection	Full Protection	Discharge, overcharge, and overload protection etc...
Environment	Operating Temp.	0~40 °C, 0~90% relative SMidity (non-condensing)
	Noise Level	Less than 40dB

## 4. Specifications of the Solar Panels



### **SPECIFICATIONS**

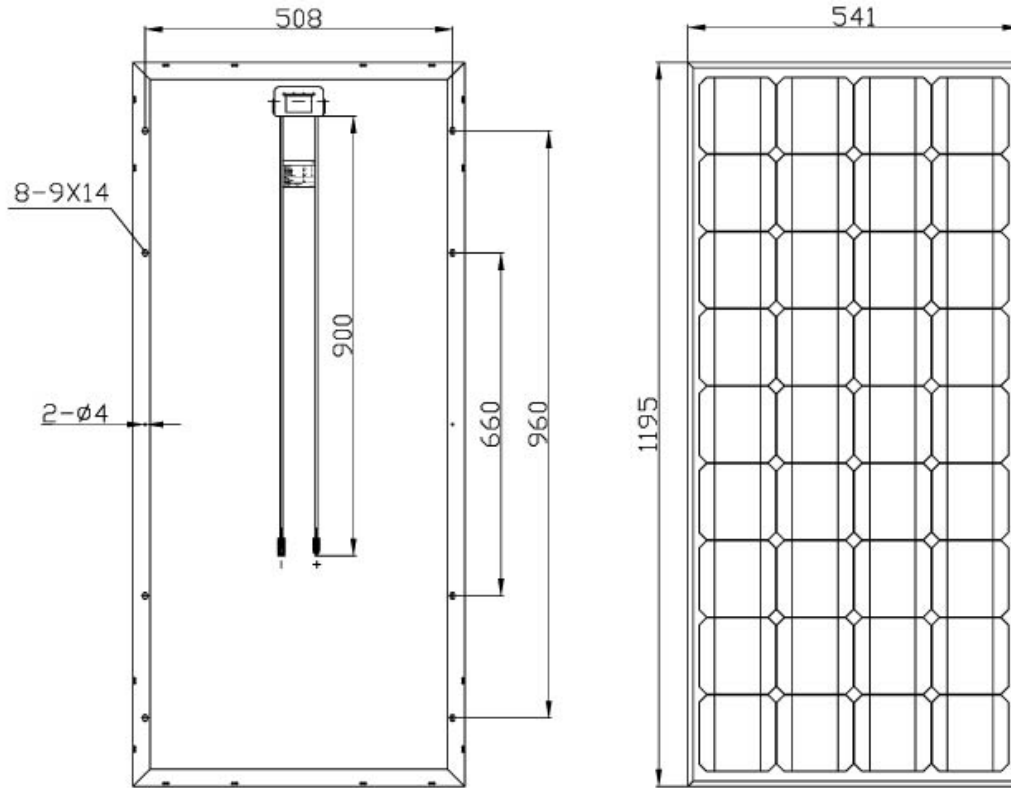
Type	Data
Cells	Mono crystal, 125x125mm
Number of cells	4x9 pieces in series
Typical application	12V DC
Max voltage	715V DC
Operating temperature	-40 / +85 °C
Hail diameter at 80km/h	up to 25 mm
Continuous wind pressure	up to 130 km/h
Wire type	0.90m (ø 4mm <sup>2</sup> )
Diode's amount	2 pieces
Size	1195(L) x 541(W) x 35(H) mm
Weight	8 Kg
Front glass	3.2mm tempered glass
NOCT (Nominal Operation Cell Temperature)	45°C ±2°C
Voltage temperature coefficient	-0.35%/°C
Current temperature coefficient	0.05%/°C
Power temperature coefficient	-0.48%/°C

### **ELECTRICAL DATA**

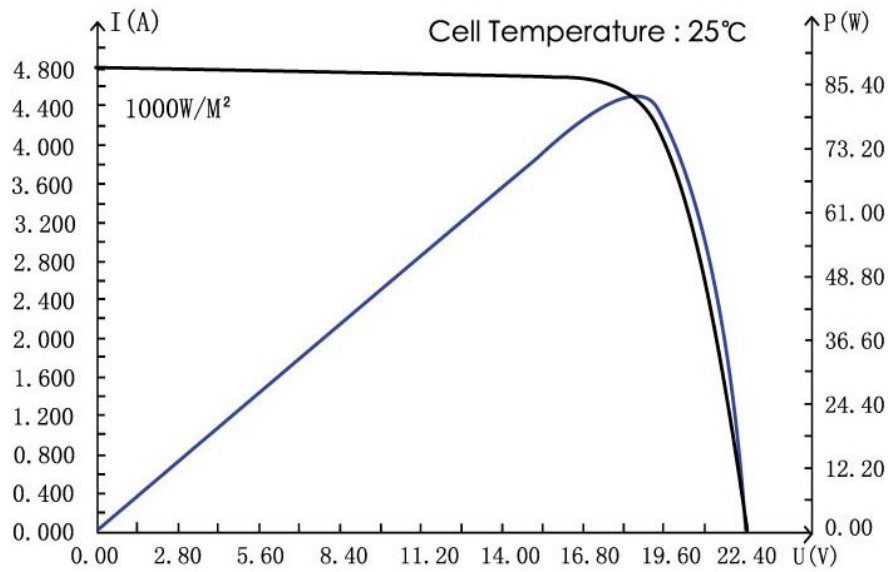
Model	Rated power (Pm)	Rated current (Im)	Rated voltage (Vm)	Short circuit current (Isc)	Open circuit voltage (Voc)
SP90M	90W ±3%	5.06A	17.8V	5.35A	22.2V

Above values may vary by ±5% according to measuring system

## DIMENSIONS



## CHARACTERISTIC CURVES



Measurement conditions: under irradiance level of 1000W/m<sup>2</sup>, air mass 1.5 spectrum, cell temperature of 25°C

## 5. Specifications of the Batteries



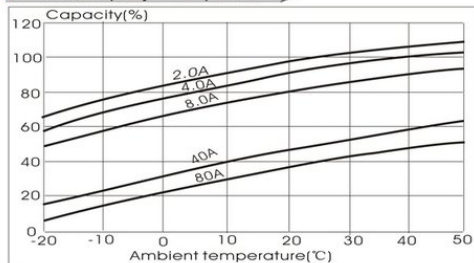
### Specifications

Nominal Voltage	12V	
Rated capacity (10hour rate)	40 Ah	
Dimensions	Total Height	171 mm (6.73 inches)
	Height	171 mm (6.73 inches)
	Length	197 mm (7.73 inches)
	Width	166mm (6.54 inches)
Weight Approx	13.5 Kg (29.74 lbs)	

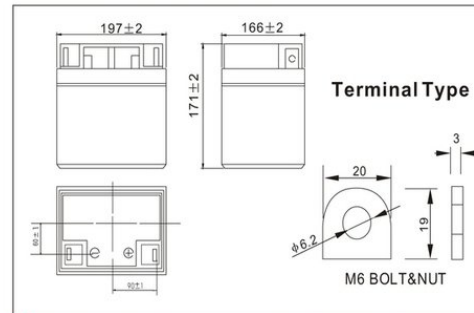
### Characteristics

Capacity 25°C(77°F)	10 hour rate(4.0 A)	40AH
	5 hour rate(6.4A)	32AH
	1 hour rate(24A)	24AH
	1.5 hour discharge to 10.5V	16A
Internal Resistance	Full charged Battery at 25°C(77°F)	8m Ω
Capacity affected by Temperature (10hour rate)	40°C(104°F)	102%
	25°C(77°F)	100%
	0°C(32°F)	85%
	-15°C(5°F)	65%
Self-Discharge at 25°C(77°F)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	82%
	Capacity after 12 month storage	64%

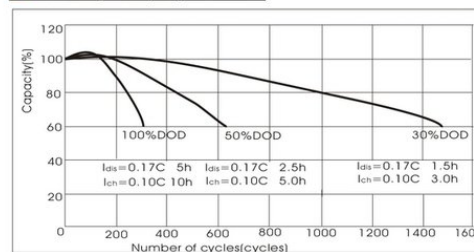
### Curves of capacity and temperature



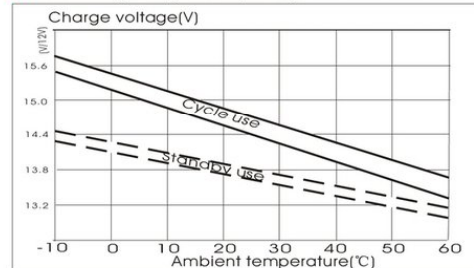
### Outer dimensions (mm)



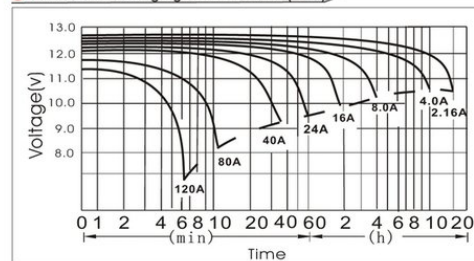
### Curves of cycle life(25°C)



### Curves of charge voltage and temperature



### Curves of discharging characteristic(25°C)



Constant Current(Amp) and Constant Power(Watt) Discharge Table at 25°C(77°F)

Time		5min	10min	15min	30min	1h	2h	3h	4h	5h	8h	10h	20h
9.60V	A	128	84	68	45.6	24.0	14.0	10.3	8.0	6.6	4.68	4.20	2.27
	W	1322	901	730	490	259	154	114	90	75	54	49	26.4
10.20V	A	124	76	64	43.6	22.6	13.4	10.0	7.8	6.5	4.56	4.12	2.20
	W	1325	850	717	489	255	154	116	91	76	53	48	25.8
10.50V	A	120	68	56	40.8	21.8	13.0	9.8	7.7	6.4	4.52	4.04	2.20
	W	1311	775	640	470	253	151	114	90	75	53	48	26.0
10.80V	A	116	64	52	37.6	21.1	12.7	9.5	7.6	6.2	4.40	4.00	2.16
	W	1298	740	600	436	246	149	112	89	74	52	48	25.7
11.10V	A	112	60	48	33.6	20.4	12.4	9.2	7.4	6.1	4.28	3.80	2.04
	W	1268	697	560	393	240	147	109	88	73	51	45.9	24.7

### **6. Trade terms**

**Price for the Mobile Solar System (MSS):** USD2100 per unit FOB SHENZHEN  
(price is based on full container load, approximately 80 units in a 20' container)

The MSS includes:

- 4 pcs 90W solar panels (total 360W)
- 1 pc 1KVA/24V solar inverter and charger controller (can accept additional solar panels and/or batteries)
- 2 pcs built-in 12V40AH batteries
- 1 lot of cables
- 2 strong boxes

**Payment terms:** 30% by T/T on order + 70% by T/T before shipment

**Production lead time:** approximately 45 days