

# 160W Folding Solar Panel

# **USER MANUAL**

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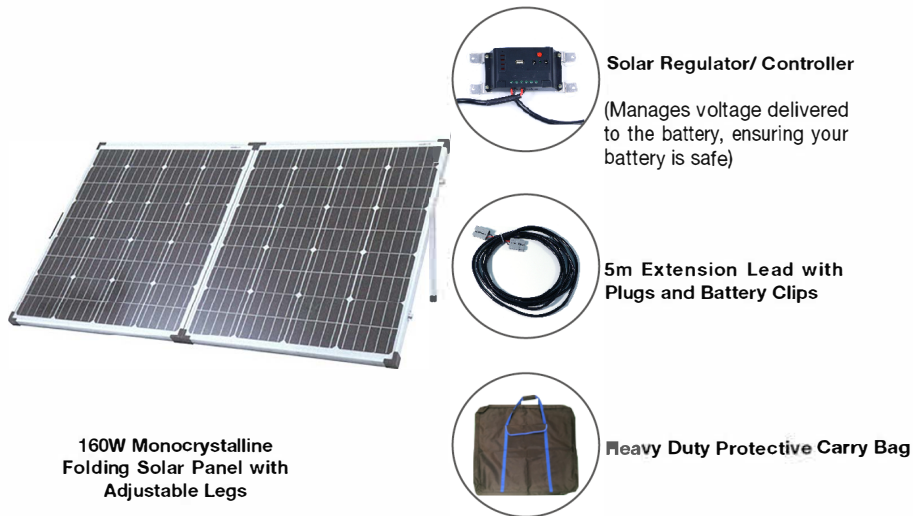
V1.0

***PLEASE READ AND UNDERSTAND THIS MANUAL  
COMPLETELY BEFORE USING THIS PRODUCT.***

## WARNINGS & SAFETY INFORMATION

- Keep the solar panel and controller away from liquids at all times.
- Keep the solar panel and controller clean and always check connectors for debris before connecting.
- This product is not intended to be used by children. In addition to this, adults with reduced physical or mental capabilities, or those who are under the influence of drugs or alcohol should not use the product.
- Only use the solar panel to charge 12v, rechargeable **Lead acid** batteries.
- Lead acid batteries produce harmful explosive gases. The battery should be mounted in a well-ventilated area, away from possible ignition sources.
- Take care when manoeuvring & setting-up the Solar Panel as to not damage the unit.
- Never connect the Solar Panel directly (without a controller) to a battery or other load.
- Tampering or modifying the solar panel, controller or wiring will void warranty.
- When transporting the solar panel, firmly secure the panel so that it will not move around or collide with other objects.
- Do not use the solar panel, controller or wiring if it is damaged or compromised in any way.

## INCLUDED IN THE KIT



## SOLAR BLANKET SPECIFICATIONS

Rated Max Power (PM)	160W ( 2X80W )
Open-Circuit Voltage (VOC)	21.6V
Short Circuit Current (ISC)	9.43A
Maximum Power Voltage(Vmp)	18V
Maximum Power Current (Imp)	8.9A
Max System Voltage	1000V
Series Fuse Rating	15A
Dimensions	770 x 670 x 62mm
Weight	13kg

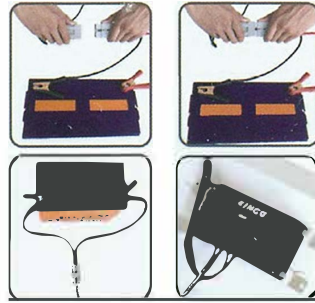
- Highly efficient monocrystalline modules in the solar panel guarantee efficient charging.
- When the 160W folding solar panel is folded, it's space-saving and portable; when the folding solar kit is open, it has a large solar cell area, providing a good consistent charge.
- The regulator is designed to protect the battery from overcharging, as well as short circuiting.
- Specially designed support legs enable the 160W folding solar panel to stand on rough surfaces, and on a desired angle for direct sun exposure.

## OPERATION INSTRUCTIONS

The 160W Folding Solar Panel will perform at its peak when the monocrystalline cells are angled directly towards the sun.

## CONNECTING YOUR SOLAR PANEL

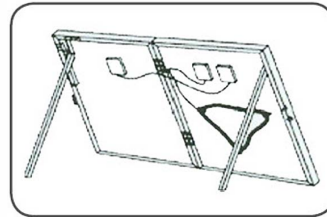
- With the panel setup facing directly towards the sun, connect the positive and negative clips to your battery.
- Always connect the battery clips to the battery first, before connecting to the solar panel. The **battery indicator on** solar controller will then illuminate.



## DISCONNECTING & STORING YOUR SOLAR PANEL

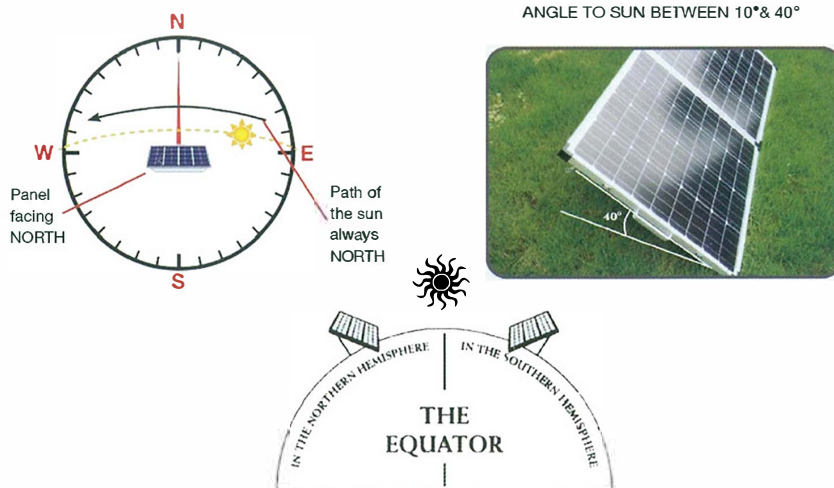
- Disconnect the solar panel from the alligator clips before removing the battery clips off the battery.
- Roll the wire neatly into the space behind the solar panel, make sure not to twist or kink the wiring in an unnatural way.

**Note: Never store your solar panel with the battery wire connected to the panel.**



## TIP

- For optimal performance through-out the day, set the panel to approximately 30° from the ground. The range between 10° and 40° will gain the best power absorption across the course of the day.

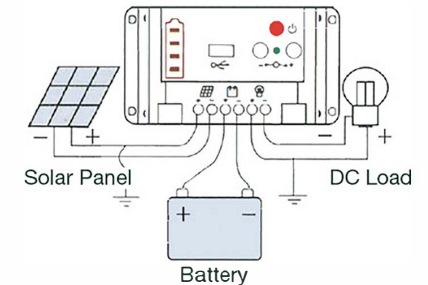
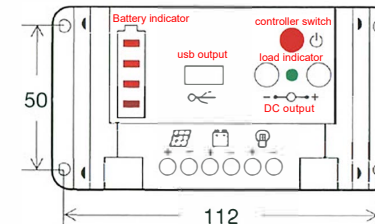


## SOLAR PANEL CONTROLLER

System voltage	12V (Auto)	Low voltage protection	10.7V
Rated current	10A	Low voltage reconnecting	12.6V
No load loss	≤12 mA (USB disconnect)	Overloading	≥1.2*rated current, 60s ≥1.5*rated current, 10s ≥1.8*rated current, 0.2s
Charging mode	PWM	USB output	5V, 1A
Float charging voltage	13.8V	Installing cables size	AWG24 ~ AWG12
Absorption voltage	14.4V/28.8V (lasting time: 2 hours)	Working temperature	-20°C~ 50°C
Charging/Discharging circuit voltage drop	<0.2V (<0.1V)	Dimensions (L x W x H)	119 x 64 x 26mm
		Net Weight	123g

## Features

- **Battery indicator** show system battery capacity, charging and discharging state of battery.
- Protection functions such as overcharging, over discharging, overload and reverse connection.
- PWM charging increases charging efficiency by 3% to 6%, compared with non-PWM charging.
- The parameters of charging and discharging are preset, so no need to adjust the parameters.
- USB output function.



## USAGE RECOMMENDATIONS

- As the controller generates heat during operation, install in an environment with good ventilation and ample clearance.
- The controller measures the ambient temperature and adjusts battery charging accordingly, for this reason, place the controller and battery close to each other.
- Always use cables that are rated to or higher than the current output of the controller (10A), overloading wires can result in fires and damage to equipment.
- The controller has a common positive pole inside. If grounding is required, ground the positive pole.

## INSTALLATION

- Make sure installation site accords with safety stipulation and is clear of flammable or explosive, or corrosive gases and dust etc.
- Prepare all the installing tools and cables. Suggest you to choose the appropriate multi-core cables to ensure the current density  $\leq 4A/mm^2$  so to reduce cable voltage drop.
- Put the controller in vertical surface, and a free space of 10cm on all sides must provided for better heat dissipation.
- Connect battery to controller first. After correct connection, check battery indicator on controller. If the indicator is **not turn on**, check whether the connection is right.
- Connect solar panels to controller. If there is sunlight illuminating solar panel, **battery indicators** flashes which means connection is right, otherwise is incorrect.
- Connect load to controller. Make sure there's no reverse polarity connection, **red for (+) polarity, black for (-) polarity**.

**Disassembly:** To avoid accident, please dismantle connection as the following order: solar panels, battery and load.

## OPERATION

- **Charging and display:** After controller is connected correctly, if the **battery indicators** are not illuminating, it means sunlight is weak or none. And if the **battery indicators** are illuminating **from 1-4 LED light**, it means battery is charged by controller. When the **4 LEDs light up and load indicator flashes**, it means battery is in float charging mode, which makes battery at full charging state to lengthen longevity of battery.
- **Battery capacity and display:** When battery indicator is red and flashing, to protect battery **the load function will switched off and the load indicator will on green and flash**.

Battery capacity state	Full charged	75%	50%	25%	Low battery disconnect
Indicator	4 leds	3 leds	2 leds	1 leds	Red & flashing

- **Load indicator:** When load indicator is green and flashing, **the load function is switched off**.

Load state	starting	shutting	overload protection
Indicator	green on	green off	green & flashing quickly

• Controller switch is to switch on/off the USB and DC output, if it turn on, load indicator will turn on green light, if it is turn off, the green light will turn off.

## WORKING MODE

Normal controlling mode: no light control and timing control function use as normal controller.

## FAULTS AND REMEDIES

- Only 1 red **battery indicator** flashes means capacity is low. When battery voltage recovers, controller switches on load automatically.
- Load indicator flashes slowly means controller output overloading. After removing redundant load, controller clears overload protection within 3 minutes.
- **Battery indicator** doesn't flash means solar panel isn't connected correctly. Make sure solar panel is correctly and firmly connected.
- If all indicators are off, check whether fuse of controller is burnt. If burnt, make sure connections among solar panel, battery and load are correct.

## QUALITY ASSURANCE

Please read the following instructions carefully. Free guarantee service will not be provided to the said equipment if

- It has been installed and operated otherwise than in accordance with the instructions
- Any unauthorized repair or modification has been carried out on the unit.
- It has been damaged through natural calamities.
- It has been damaged through transportation or storage.
- Batch numbers, serial numbers or identification-marks are manipulated or are unidentifiable.
- Load connected has been damaged due to incorrect, reversed connection as controller is equipped with solar panel and battery reverse connection protection.
- It has been used to control power generated from any other type of device such as a Gasoline Generator rather than a solar panel to charge a lead acid battery.

## TROUBLESHOOTING

SYMPTOMS	CAUSES AND SOLUTIONS
Battery Indicator does not light up when Solar Panel is in direct sunlight.	Check to make sure the connection between the battery and the controller is correct, the circuit is normal, and the battery / controller is healthy.
Battery Indicator LED flashing rapidly.	Overload. After removing the excess load, the controller will turn off the overload protection within 3 minutes.
Battery Indicator LED is off, battery voltage is sufficient, but there is no output.	Check to make sure the connection between the battery and the controller is correct, the circuit is normal, and the battery / controller is healthy.
The Battery Indicator LED is off.	Check to make sure the connection between the battery and the controller is correct, the circuit is normal, and the battery / controller is healthy.
Battery Indicator LED flashing rapidly and no battery output.	Overload. After removing the excess load, the controller will turn off the overload protection within 3 minutes.
The Load Indicator LED is flashing slowly and is not receiving power.	Short circuit of load. After solving the load short-circuit malfunction, the controller will turn off short circuit protection within 5 minutes.
The Load Indicator LED is flashing rapidly and the load is not being powered.	After solving the load short-circuit malfunction, the controller will turn off short circuit protection within 5 minutes.
The Load Indicator LED is on but, the load is not powered.	Check to make sure all connections are strong and reliable.
Other Issues.	Check to make sure all connections are strong and reliable. Ensure battery and/or load is 12V.

