## Expandable Solar Power Kit

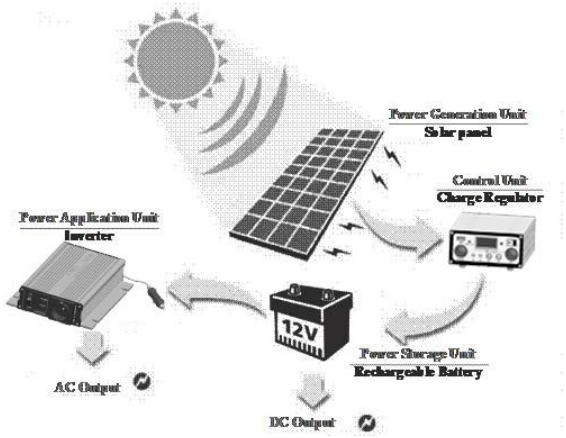
# Solar Starter kit

This Solar starter kit is an easy to use solar power supply system in complete solution. It is a "solar generator" that converters natural sun light into electricity, and can be functioned as a power source to run your household appliances, such as energy saving lamp, laptop computer, radio, DVD, TV, electric fan, satellite receiver…. (Total power output of the appliances should be less than 300 watt) This solar power supply system is grid independent, and is useful for places that either has problem with electricity supply, or utility grid is difficult to access.

This product is so designed that you are able to expand it to a bigger solar system should you has intention to power more household appliances with solar. Simply connect TPS-220-AA30 solar add on kit to this product through a TPS-221 Solar combiner.

## How does a solar power kit work?

Solar panel(s) converts sunlight into DC electricity, and electricity then sent to the battery. Battery acts as a storage device, so that power is available even there is no sunlight. And it also act as a power stabilizer, since electricity from solar panel varies according to the strength of the sunlight. Inverter draws power from the battery, and converts the electricity from 12VDC to 220VAC, so that use with AC household appliances is possible. Charge regulator is connected between solar panel(s) and battery, to control the charge and/or discharge process, so that the battery always works within a proper range.




The solar system generates electricity in proportion to the amount of sunlight exposed to the solar panel(s). The peak generation of power is on a clear day when the sun in at a normal angle to the solar panel(s).Clouds, seasonal variation of solar angle, dust/dirt on solar panel, off-azimuth orientation, and any incidental shading could decrease the performance of solar panel. Power loss during transmission through lead wire and connector, efficiency of charge controller and inverter will also decrease the amount of electricity.

## Caution!

- Before using, carefully read and understand the instruction user's manual.
- Charge regulator + inverter + LED light tube is not water proof. Please use them in a sheltered, dry and well ventilated place
- This product does not include a battery. Please use 12V batter only, battery capacity of 40Ah minimum is recommended.
- Total power output of the household appliances that connect to this product should not exceed 300Watt. For continuous operation, please do not exceed 200Watt.
- Clean the surface of solar panel periodically with a soft cloth for its best performance.
- Do not reverse the polarity of the load, the solar panel, & the battery.
- Please do not touch any bare stripped lead wire to prevent electric shock.
- Please turn off your application before connecting to this product.
- This appliance is not intended for use by young children or infirm person unless they are being adequately supervised by a responsible person to ensure that they can use the application safely.

# Part List:

| Serial | Description of parts | Quantity |
|---|---|---|
| 1 | Amorphous silicon solar panel<br>Peak Power Output: 30Wp@17.5V (±5%)<br>Anodized aluminum alloy frame with<br>4M connect wire.  | 1 PC |
| 2 | Mounting assembly  | 2 PCs |
| 3 | Mounting screws with nuts<br>For securing solar panel and assembley  | 6 PCs |
| 4 | Extension wire  | 1 PC |
| 5 | Tinned wire  | 1 PC |
| 6 | Battery connecting wire  | 2 PCs |
| 7 | 2-in-1 output lead wire on charge regulator  | 1 Set |
| 8 | LED Light tube<br>5 meter lead wire. 24 Super bright LEDs On/Off switch  | 2 PCs |
| 9 | Solar Charge regulator<br>12V / 30A Max  | 1 PC |
| 10 | Inverter<br>12VDC to 220VAC, 300W Max  | 1 PC |

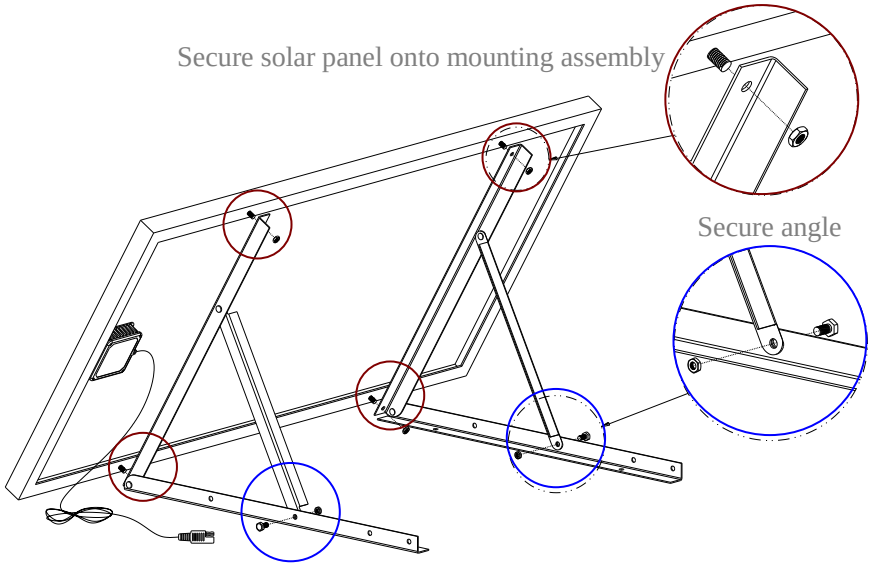
# Operation

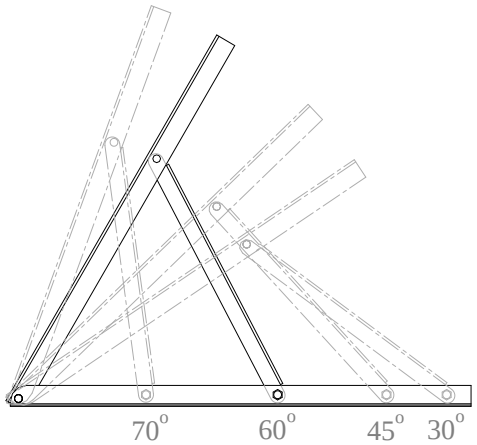
## Solar panel

- The solar panel should be mounted at a position that can have direct contact with sunlight, face the solar cell to the sun. Make sure that no shadow is cast onto the solar cell to ensure better power output.
- Solar panel comes with 4 meter lead wire, which allow the solar panel to be connected to the charge regulator.

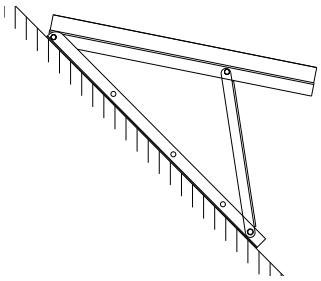
## Mounting assembly

- Mounting assembly consist of two triangle mounts. Open the triangle mount, and adjust it to the desire angle. Recommend angle that close to your local latitude (Please refer to below chart for reference). Then secure the angle with nut and screw. Please refer to "Secure angle"
- Secure the two triangle mounts onto the solar panel. There are two install holes on each long frame of the solar panel, please secure the triangle mounts onto the solar panel to all four holes with screws and nuts. Please refer to "Secure solar panel onto mounting assembly".
- The mounting assembly can be secured to the ground or other surface through the two ground mount holes on each of the triangle mount (long side)

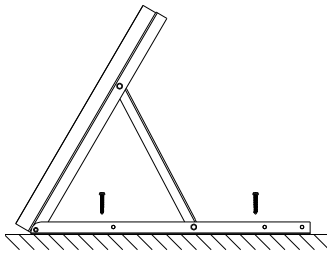


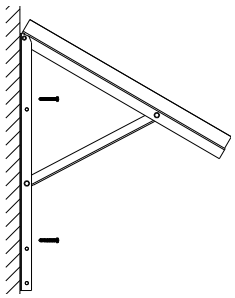

| Angle | Applicable Area |
|---|---|
| 30° | Southern USA (California)<br>Australia,<br>Southern Europe (Italy, Greece)<br>Chile (Santiago) |
| 45° | Northern USA (New York),<br>Canada.<br>Europe (France, Germany, Spain) |
| 60-70° | Northern Europe:(Sweden)<br>Russia (Moscow) |



On the Roof

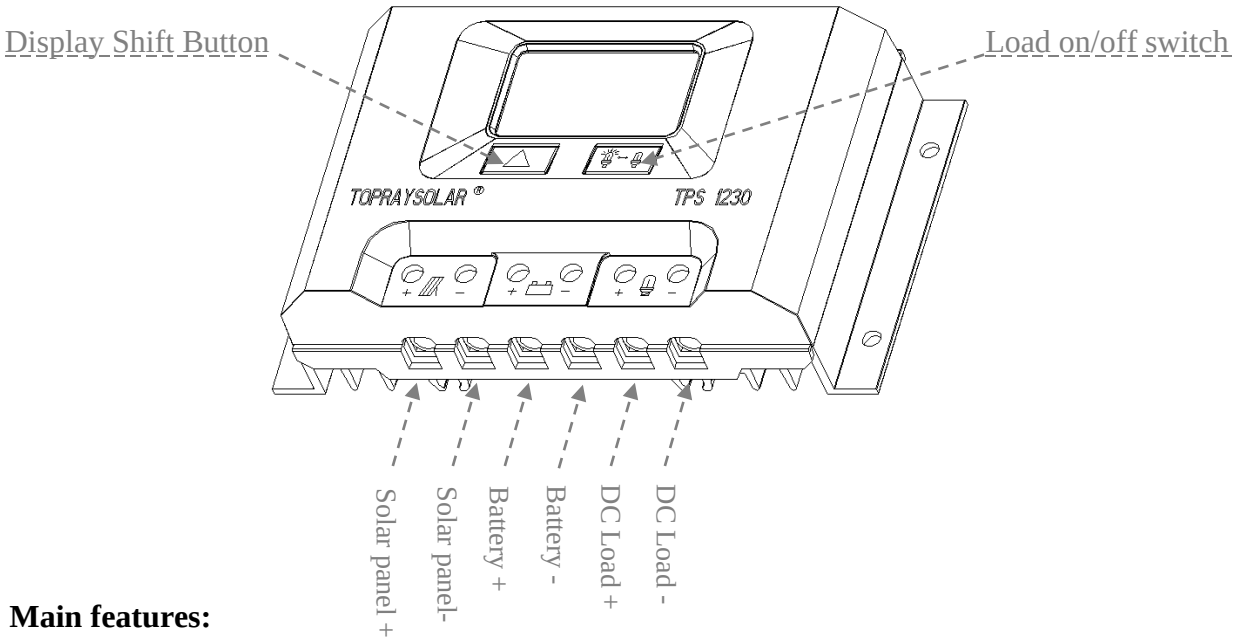


On the Ground



On the wall

# Charge regulator




- **Main features:**

  * Solar Charge Regulator is able to handle charge and discharge from 12V battery
  * It provides over-charging, over-discharging, and over-load protection. Therefore keep the whole solar system at proper working condition.
  * This solar charge regulator uses the latest Microcomputer-chip to realize intelligence control.
  * PWM (pulse width modulation) charging circuit is used for higher efficiency.
  * Big LCD display available for easy monitoring.

- **Caution:**

  * This solar charge regulator handle 12V battery only.
  * This solar charge regulator handle maximum solar input of 30A, please do not exceed this limit.
  * Charge regulator not water proof. Please use them in a sheltered, dry and well ventilated place.

- **How to connect**

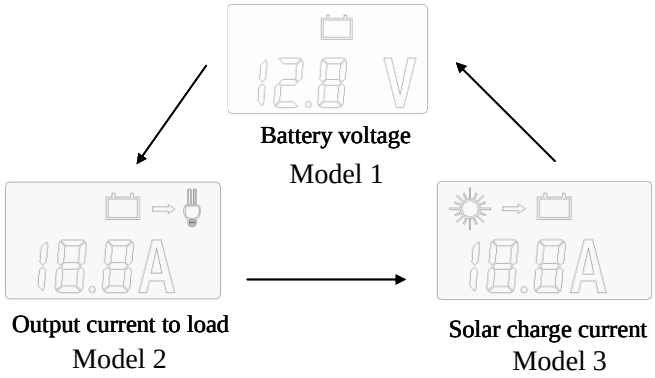
  * Battery should be connected to the port where shows + − . Please note that "+" stand for positive pole, and "－" stands for negative pole. Make sure you connect with polarity
  * DC load should be connected to the port where shows + − In the case of this product, you can also choose to connect lead wire #7 as stated in the part list to these two ports . Please note that "+" stand for positive pole, and "－" stands for negative pole. Make sure you connect with polarity.
  * Solar panel should be connected to the port where shows + − Please note that "+" stand for positive pole, and "－" stands for negative pole. Make sure you connect with polarity
  * Please make sure that all the connection is secure and correct
  * Do not short circuit when connecting the battery, fail to do so may cause sparking or explosion
  * When connecting and disconnect from the solar charge regulator, please always follow the sequence as stated below

    Connecting: Battery → Solar Panel → Load

    Disconnecting: Solar panel → Turn off your appliance and the "load on/off" switch on solar charge regulator → load → battery

- **How to monitor**

* The big LCD display helps you to monitor the working status of this solar power kit. The Display Shift Button works in a cycle pattern. By pressing the bottom, LCD will switch in between the three different models as below




| Model | Display Shift Button ▲ | Load on/off switch |
|---|---|---|
| 1 | when press ▲, LCD screen shows the working voltage of the battery | When press bottom at this model, it will not change what is being display on the LCD |
| 2 | when you press ▲ for the second time, the LCD Screen shows the output current from battery to load. | When press bottom at this model<br>1. When the load output is under ON status, LCD will show output current from battery to load.<br>2. When the load output is under OFF status, LCD will show 00.0A.<br>3. If over-discharge protection is activated, the load output will be cut off. If you press bottom under such status, it is invalid and with buzzer alarm.<br>4. If system recover from over-discharge or over load protection, please press bottom twice to reactivate the load output function |
| 3 | when you press ▲ for the third time, the LCD Screen shows the charging current from the solar panel to the battery | When press bottom at this model, it will not change what is being display on the LCD |

## Inverter

Please connect the alligator battery clamps coming from the inverter to battery. Please note that "+" and red color stand for positive pole, and "—" and black color stands for negative pole. Make sure you connect with correct polarity. For more detail, please refer to inverter user' manual.

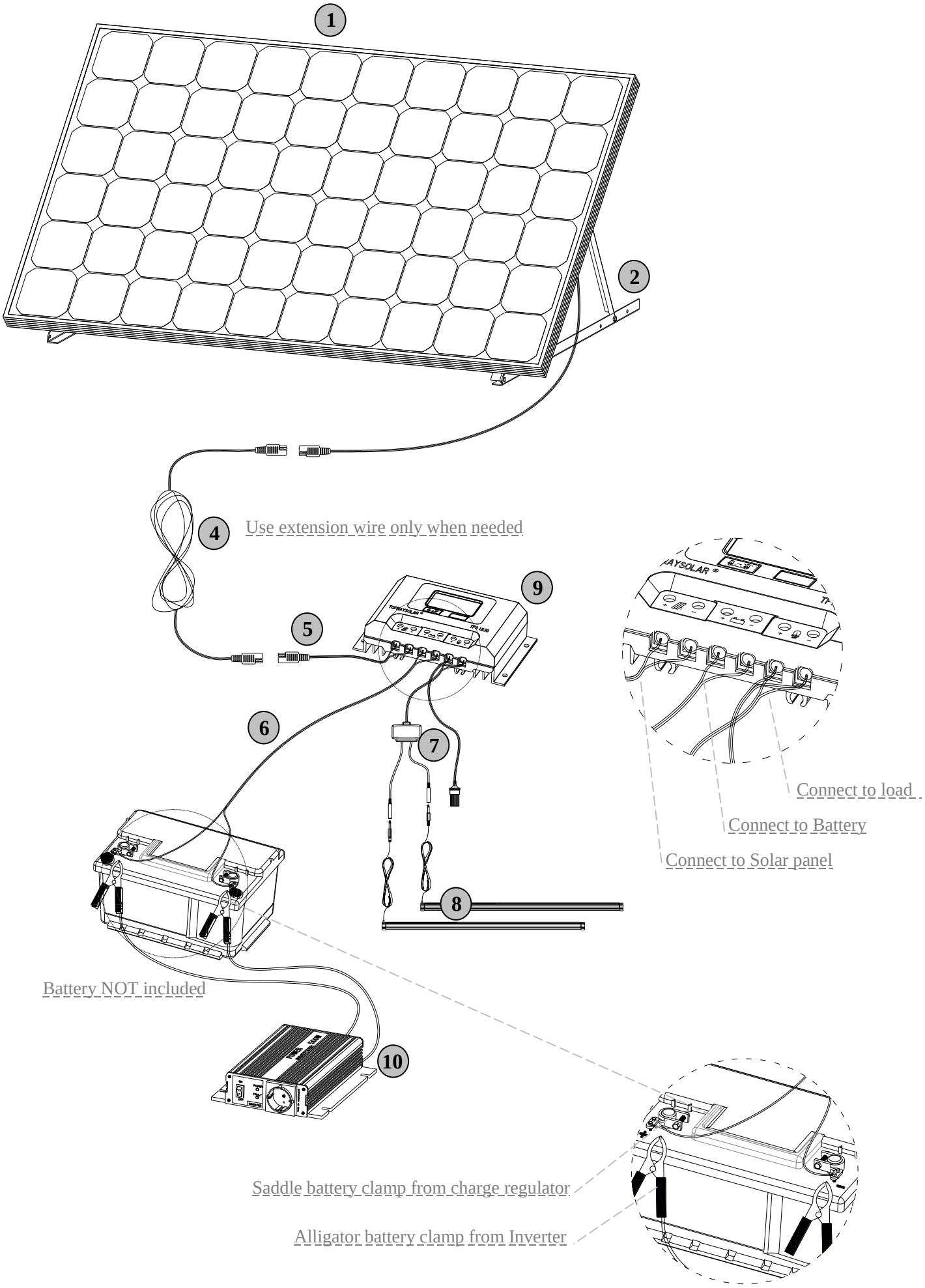
- **Caution**

* Do not short circuit when connecting the battery, fail to do so may cause sparking or explosion

* Total power output of the household appliances that connect to this product should not exceed 300 Watt. For continuous operation, please do not exceed 200Watt

# Solar Starter Kit connection diagram

Please refer to corresponding serial number in the part list



## How to expand your solar kit?

- A solar combiner TPS-221 is needed to expand your solar kit.
- Combine the solar starter kit and the solar add on kit(s), by plug the lead wire coming from the solar panel (or the extension wire, if it is used) to one of the inputs of the solar combiner.
- Plug one end of the tinned wire to the output port of the solar combiner, and the other end to the charge regulator.
- You can add multiple units of Solar Add On Kit TPS-220-AA30 onto the solar combiner. But make sure that total power output of solar panels from all the Add on kits + starter kit do not exceeds 510Watt. Fail to do so will result in damage to the product.
- If multiple units of solar kits are combined, bigger battery capacity will be required to hold the increase amount of solar power. For minimum battery capacity requirement. You can either change to a bigger capacity 12V battery, or connect additional battery with the same capacity to the original one. There are two pieces of battery connecting wire included in the solar start kit, use the additional wire to joint the two batteries.

## Connection diagram