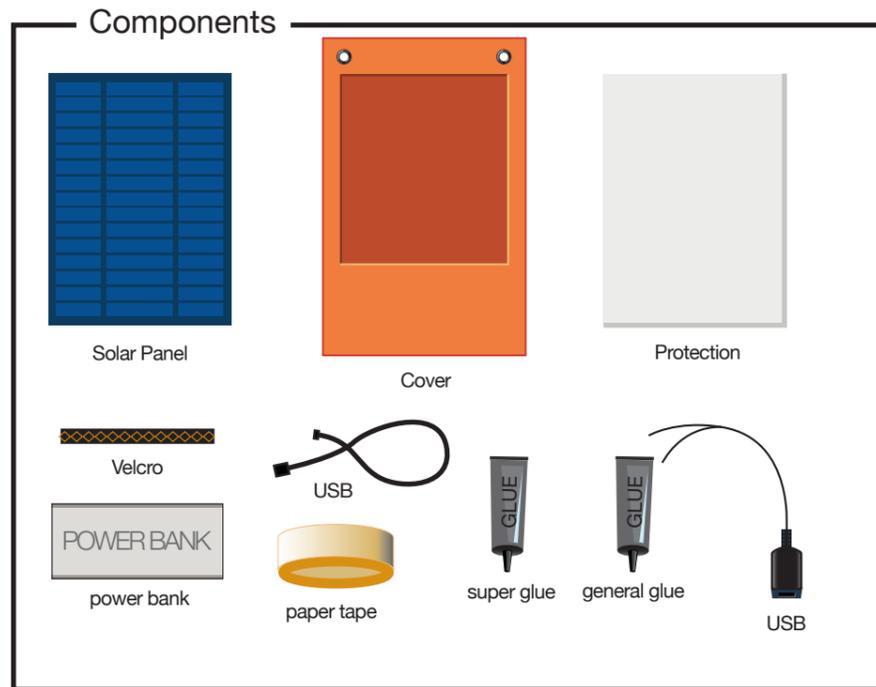


# SOLAR CHARGER

## AURINKOLATURI



1. Find a plus and minus of the solar panel.
2. Find a plus and minus of the charge controller.
3. Make sure the diode is placed on plus (red wire) and is positioned correctly.
4. Solder the diode to the plus pad on the solar panel and minus wire to the minus pad.
5. Put the paper tape on the top of the panel, 1cm inside, in order to protect the solar cells of the panel from super glue. Make sure you are placing the tape on the edge (red line in the above picture).

6. Put the Velcro as seen here; you can also sew it to the fabric.
7. Place the panel and the protection inside of the mark on the fabric and place the top cover on the panel to check the alignment and make sure that the panel cells are not covered by the front fabric.
8. Before putting the super glue make sure the panel cells are not covered by the front fabric.
9. Put a super glue on the edges of the panel, and place the top fabric on the panel. Remove the tape after the glue is dried.
10. Rotate the cover and open the cover. Put a general glue on the edge of back cover like shown above. Place the front cover on top of the back cover and apply a firm pressure, let it dry according to your glue guideline.
11. Connect the USB of solar panel to the battery; USB cable.
12. Place the battery inside of the fabric and connect it to the weather station.

# SOLAR CHARGER COMPONENTS.

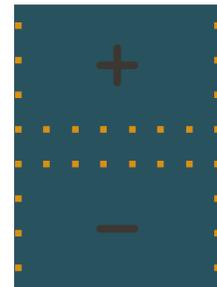
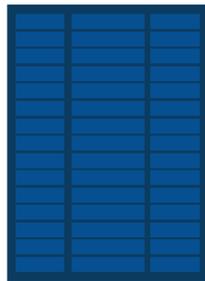
## Solar panel

In this package we are using monocrystallin solar cell, which are made from crystalline silicon. Monocrystallin cells has one of the highest efficiency rate in the solar panel market, and have a long lifespan of ~25years.

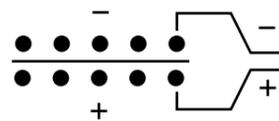
In simple terms Solar Panels or Photovoltaics (photo means light

and voltaic means electricity) is the product made out of Silicon (most of the time) that generates electricity from the sunlight.

Silicon atoms are put together with other atoms that have more electrons (to produce Negative charge) or with less electrons to make positively charged silicon.



When the sunlight hits the silicon solar cell it will knock the electron off and free electron from negative type rush towards the less electron part (i.e. positive type) silicon, hence creating the current.

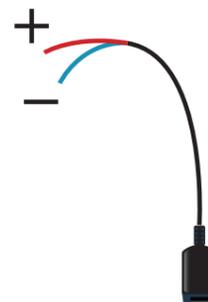


## Charge control / DC to DC regulator

DC to DC converter is a component designed to convert the input voltage (in this case 6V-18V) to a fixed output voltage (5v).

This component is also designed as a solar panel charge controller

i.e. it detects the device and resets the circuit after the shadow is lifted from the panel. This is done so that the maximum current and voltage is drawn from the panel at all times.



Note: \*When charging your phone with the given converter, please give few seconds to the device to detect and start running correctly.

\*\* If your phone is showing charging and not charging quite frequently it means the sun is too weak and there is not enough current; You should disconnect the device and try again with better sunlight condition.

## DIODE

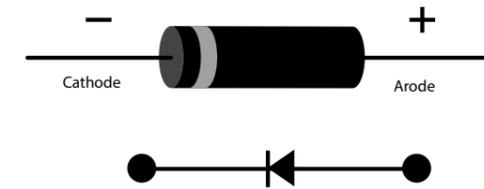
Diode is a semiconductor that allows the current to flow in one direction only. Think of it as a one way street that only allows the traffic (current in this case) to travel in a certain direction.

It has a cathode and anode side which lets the current to travel from anode to cathode.

In our case this component is used to prevent the charge from the battery or phone travels to panel/s.

We are using following diodes which allow 1A of maximum forward current to travel through.

1N4001-4007 and 1N5619

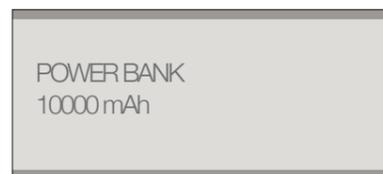


## Battery

For weather station and solar panel kit the following ADATA PV-150 with 10,000mAh power is used. It will run the weather station for ~45hrs without the solar panel connected. When the panel is connected to the battery, with a day of sunlight our panel will add around 15-20hrs of extra operating time.

List of other batteries which can be used are as follows: ADATA D16750, A10050QC, A10050, PT100, PV120, P10050, P16750 and P20100.

\*If you want to use other batteries beside the one provided here, make sure they support simultaneous charge and discharge.



## Weatherproof Cover

We are using a recycled heavy duty tarpaulin which is waterproof and is mostly used in boat and transport industries.



## Glue

To put together the tarpaulin fabric you will need a general/universal purposed glue, pay attention to the drying time since this may vary from 15m to 1 day.

To glue the panel to the cover you will need a super glue, since you are gluing the soft plastic and the general purpose glue will not work.



general/universal glue



super glue

# WHERE TO GET THE COMPONENTS.

## COMPONENTS LIST.

You may buy the pre-made package/kit which includes all the components or you may also follow this

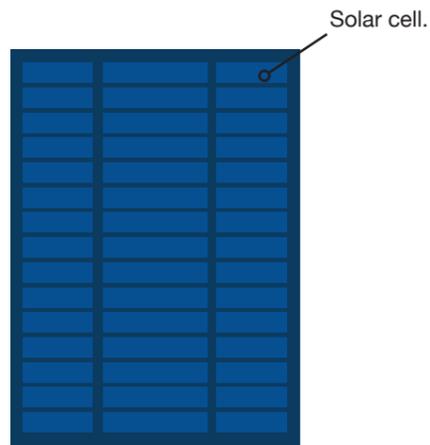
guide and order all the components separately from your local shop or Online.

### Solar panel

When purchasing the solar panels for a solar charger, pay attention to the power and voltage.  
Panel voltage: 5-7V (volt)  
Panel Power:  $\geq 4W$  (watt)

You may purchase the panels from, AliExpress, Wish or Finnish local shops.

Pro tip: count the cells and multiply them by 0.5 that will give you the voltage of the panel.



### Charge control / DC-DC regulator

DC to DC converter or Charge controller needs to have following specification:  
Input voltage:  $\geq 5V-18V$  (volt)  
Output voltage: 5V (volt)  
Output current: max. 2A (ampere)

You may purchase the charge controller from, AliExpress, Wish or Finland local electronic shop.



### Diode

General purpose diode, Rectifier and Shottky Diodes are all fine to be used for this application. Pay attention to forward voltage and maximum forward current rating of the diodes before purchasing:  
 $I_f$  current rating: 1A (ampere)

Diodes suitable for this kit are: 1N4001-4007 and 1N5619

This item is available in most electronic shops and you may find other diodes suitable for this task as long as they match the above description.



### Battery

If you are using the solar charger with the Arduino weather station, you can get the following power bank otherwise you can skip this part of the guide.

10,000mAh, ADATA PV-150 is originally used for this kit. However you may purchase other batteries from ADATA, which all work fine with our system too:

ADATA D16750, A10050QC, A10050, PT100, PV120, P10050,

P16750 and P20100. If you want to use other batteries make sure they support simultaneous charge and discharge. So that it is possible to charge the battery with solar panel while the power-bank is simultaneously running the weather station.



### Weatherproof Cover

This item may be the most challenging component of our kit to find in the market. You may purchase the brand new tarpaulin fabric or any other type of weatherproof fabric and either sew or glue it to the panel. Our guide includes Recycled heavy duty tarpaulin fabric collected from our local producer.

You may add Grommet/Eyelets to the fabric so that it is possible to hang the panels from your back pack, for example



### Glue

To put together the tarpaulin you will need a general purpose glue (Yleisliima), pay attention to the drying time since this may vary from 15m to 1 day.

To glue the panel to the cover you will need a superglue, since you are gluing the soft plastic the general purpose glue will not work.

Some local shops that you can buy them in Finland are: Biltema and Bauhaus.



## WHERE TO FIND US.

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