

## 20W 12V solar charging kit Instruction manual

Dear Customer,

Thank you for selecting this Photonic Universe solar charging kit. This manual explains the installation of your solar kit and answers some frequently asked questions. Please read this manual carefully before setting up your system.

*Remember, all work should be carried out by an appropriately qualified person. Precautions and safety measures should be taken in all cases.*

### Contents of the package:

| No | Item   | Quantity |
|----|--|----------|
| 1  | 20W 12V polycrystalline solar panel with 3m cable                                    | 1        |
| 2  | 5A solar charge controller   | 1        |
| 3  | 2m battery cable with crocodile clips (used between the controller and your battery) | 1        |
| 4  | 5A fuse in a holder (installed on the battery cable)                                 | 1        |
| 5  | Instruction manual for the solar controller  | 1        |
| 6  | Instruction manual for the kit   | 1        |

### Installation of the solar kit:

- Before installing the solar kit, please ensure that your 12V battery is not fully discharged. The battery should produce at least 8V - this is the minimum voltage required to start the solar charge controller. If your battery is fully discharged, please charge it beforehand by other means for a short period of time.
- Connect your 12V battery to the solar charge controller using the 2m cable with crocodile clips **in the following order:**
  - On the solar controller end, attach the bare ends of the cable using the screw terminals
  - On the battery end, use the crocodile clips attached to the cable

The “+” battery terminal should be connected to the “+” battery terminal of the controller, and the “-” battery terminal should be connected to the “-” battery terminal of the controller.

Please note: crocodile clips are provided for temporary use only. For permanent connection, we recommend using special battery terminals or your existing battery connectors.

- Connect the solar panel to the solar charge controller: The “+” lead should be connected to the “+” solar terminal of the controller, and the “-” lead should be connected to the “-” solar terminal of the controller. Your solar kit should now start charging the battery. For maximum output, ensure that the solar panel is situated outdoors and is exposed to as much sunlight as possible, without any shading. Even a small shaded area can significantly reduce the output (e.g. leaves, trees etc.). *Note: positioning the solar panel indoors behind a window is not recommended as it will reduce the output considerably.*
- If required, you can connect any 12V load or appliances to the load terminals of the solar controller (“+” to “+”, “-” to “-”), for example 12V light bulbs. Ensure that **the total current drawn by the load does not exceed 5A.**  
Your 12V load or appliances can also be connected directly to your battery, however in this case the discharge protection feature of the solar controller will not function (the controller will not be able to automatically cut off the load when the battery is becoming over discharged).
- The solar panel and its connection box on the back are waterproof and can be used outdoors in all weather conditions. The solar controller is not waterproof and should always be used indoors.
- Please refer to the solar controller manual for information regarding operation of the controller.

### Load

Please note that the maximum current allowed for the solar charge controller is 5A. If you are using the load terminals of the solar controller, please ensure that your load does not draw more than 5A from your battery. If you are planning on using the load terminals of the solar charge controller, it is recommended that you install a fuse into the load circuit.

**Do not connect an inverter or a similarly powerful appliance to the load terminals of the solar charge controller. Such appliances should be connected to your battery terminals directly.**

### Common positive / negative ground of vehicles and boats

Most vehicles (including motorhomes and caravans) and boats typically have a common ground connection, where the vehicle body (or boat hull) is used as a shared connection point by the engine, generator, battery, lights and other system components. When installing the solar kit on such vehicles / boats, please pay attention to the following recommendations:

- To avoid any short circuits or conflicts between your vehicle / boat system and the solar kit system, you should never ground the solar panel (i.e. never connect it to your vehicle body / boat hull). The solar panel cable should be fully electrically isolated from your vehicle body / boat hull and should be connected directly to the solar controller.
- Similarly, if you are using the load terminals of the solar controller, your load should be fully isolated from the vehicle body / boat hull and should be connected directly to the solar controller.

If required, your battery can remain connected to the vehicle / boat system when the solar charging kit is connected to it (in parallel). It should not cause any interference with the solar controller unless the battery is being charged by the engine. Engine charging may cause the following to occur:

- The voltage of the battery circuit will increase due to the alternator charging your battery
- The solar controller will treat this as if the battery were fully charged and will cut the solar panel off temporarily to prevent overcharging of your battery.
- When engine charging ceases, the solar kit will resume charging automatically.

### **Frequently asked questions**

*Q. What type of batteries can be used with this kit?*

A. Any sealed, gel or flooded 12V lead acid battery with a capacity greater than 8Ah.

*Q. Can this kit charge a 24V battery?*

A. No, this kit is designed for charging a 12V battery.

*Q. Can the kit charge two 12V batteries connected in parallel?*

A. It's possible but only for batteries always wired together as a single 12V battery bank (batteries should be the same type and capacity).

*Q. Is there any risk that the solar kit will overcharge my battery?*

A. The solar charge controller has a built-in overcharge protection – it will ensure that your battery is not overcharged.

*Q. Can I leave the solar kit connected to the battery overnight? I heard that power might flow back into the solar panel and discharge the battery.*

A. The solar charge controller will prevent any reverse current flow, so your battery will not get discharged during the night.

*Q. If I want to disconnect the system, how do I do this?*

A. Disconnection should follow the reverse order to connection. The solar panel should be disconnected from the charge controller first, and then the charge controller should be disconnected from the battery.

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Q. If I disconnect the solar panel from the charge controller, can I leave the controller connected to the battery?

A. Yes, the solar charge controller can remain connected to the battery without the solar panel.

Q. I need to shorten / extend the solar panel cable. Is this possible?

A. Yes, it's possible. If you are extending the solar panel cable please make sure you use cable with the same cross section and your connections are secure (soldering is recommended) and well insulated.

Q. Can the solar kit be used for positive / negative ground vehicles / boats?

A. Yes, the solar kit can be used in both positive and negative ground vehicles and boats. As per the above note, please make sure that the solar panel (and load if you are using the load terminals of the solar controller) are fully electrically isolated from the body of your vehicle / boat hull.

Q. What is the difference between polycrystalline and monocrystalline solar panels?

A. The difference relates to the process of the solar cell manufacturing rather than product characteristics. Monocrystalline solar panels can use the space slightly more efficiently, but polycrystalline solar panels perform slightly better in hot climates. The difference is not significant.

Q. I want to have more solar power and charge my battery faster – can I upgrade the solar kit?

A. You can easily upgrade this kit from 20W to 40W by adding a similar 20W solar panel to the same charge controller. The output will double and the charging time will halve. See Appendix for more details.

Q. Do I need to clean my solar panel?

A. Yes. Regular cleaning increases energy yield. Always remember that any shading will reduce the output of the solar panel.

## Troubleshooting

Typically, a problem occurs when the controller loses connection to your battery (due to a blown fuse, poor connections, a discharged battery etc). In such circumstances, you may notice **fast flashing of all the lights** on the controller (if the solar panel is still connected) or no lights at all. To rectify the problem, firstly disconnect the solar panel from the controller, then disconnect the battery and repair the connections / re-charge the battery. Secondly, reconnect the battery only and ensure that you see the battery light on the controller. Thirdly, reconnect the solar panel as per the instructions above.

Other potential troubleshooting solutions are provided below:

- Ensure your battery generates at least 8V. Disconnect any load which may be drawing power from your battery (also disconnect your battery from the system of your vehicle / boat).
- Check all connections to ensure they are secure and clean.
- Check the polarity of the battery connections and solar panel connections.
- Ensure the solar panel is exposed to sufficient light – ideally positioned to face the sun directly.
- For more information, refer to the Troubleshooting section of the solar controller manual.

## Warranty

This product is covered by a 1 year warranty provided by Photonic Universe Ltd. We will repair or replace any products with defects at our discretion.

## Disclaimer



*Working with electricity and batteries can be dangerous. The information provided in this manual is for general guidance only. All work should follow the safety standards and should be carried out by an appropriately qualified person.*

*Photonic Universe Ltd is not responsible for any damage or injury caused by inappropriate installation or use of the product.*

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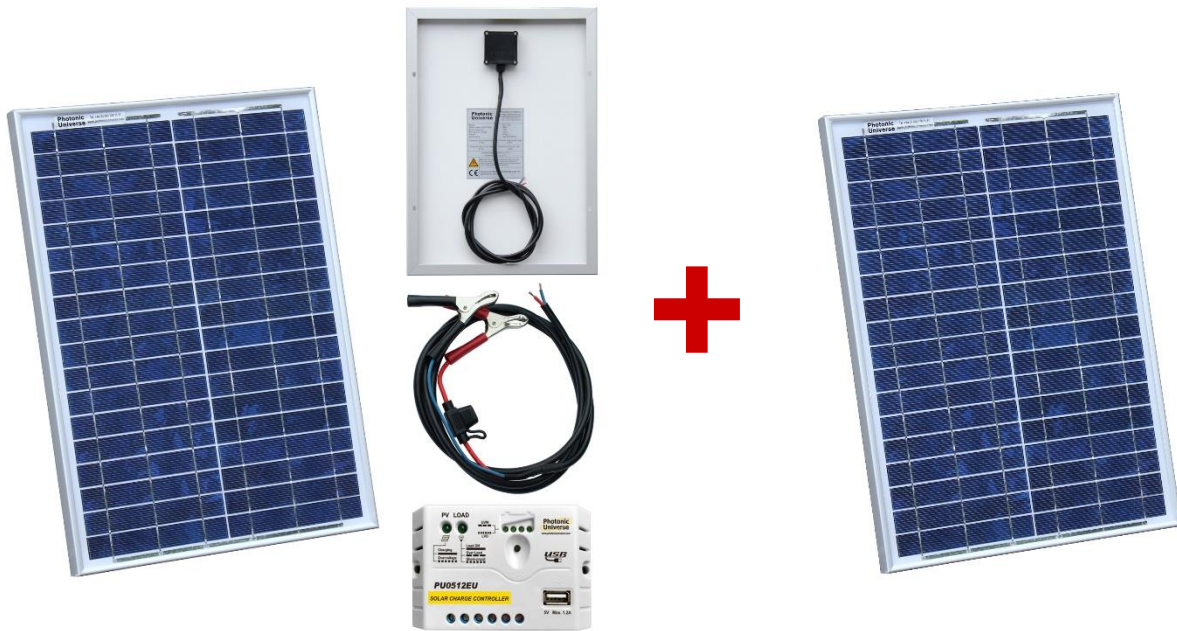
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# YOU CAN UPGRADE YOUR SOLAR KIT FROM 20W TO 40W AT ANY TIME

Did you know that you can easily double the power of your solar kit from **20W** to **40W** and **charge your battery twice as fast**? Just add a similar 20W solar panel to your solar kit:



Connect the second 20W solar panel to the same solar terminals of the controller, in parallel with your existing 20W solar panel (connecting “+” to “+”, “-” to “-”) – it’s that simple. **The output of your solar kit will double and the charging time will halve.**

20W solar panels are available in our online shop:

**[www.PhotonicUniverse.com](http://www.PhotonicUniverse.com)**

You can also order over the phone on: **020 3150 1111** (int. +44 203 150 1111)

If you want to upgrade your kit by more than 20W, or have any other questions, please do not hesitate to email us at [info@photonicuniverse.com](mailto:info@photonicuniverse.com) or call us on 020 3150 1111 (international +44 203 150 1111).

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