

CHARGING STAGE

The unit has a 6-stage charging algorithm.

- 1 Diagnose*** Only for Lithium battery types, once the Lithium battery initial voltage is understood it will then determine the next stage of charge, switching to soft start or bulk charge. If the Lithium battery is protected by a BMS, the controller will automatically send the signal periodically to the battery terminal to activate the BMS against protection and 'wake up' the battery.
- 2 Soft starts** When batteries suffer an over-discharge, the controller will softly ramp the battery voltage up to 10V.
- 3 Bulk Charge** Maximum current charging until batteries rise to absorption level.
- 4 Absorption** Constant voltage charging, and battery is over 85% for lead acid battery; the LiFePO4 battery will close fully charging after absorption stage, the absorption voltage level will reach 14.4V for LiFePO4 battery.
- 5 Equalisation*** Only for WET and Calcium battery type, when the battery is deeply drained below 10V or every 28 days cycle, it will automatically run this stage to bring the internal cells as an equal state and fully complement the loss of capacity. (LTO, LiFePO4, Gel and AGM battery do not run Equalisation charge).
- 6 Float Charge** The regulator will apply a float charge to maintain a fully charged battery at full capacity (excluding lithium batteries).

SAFETY PROTECTION

- Spark-free protection
- Reverse polarity for solar and battery connection protection
- Reverse current protection from solar panel to battery at night time or very low light levels
- Over temperature protection with charging current de-rate
- Transient Voltage Suppressor (TVS), installed at solar input and battery output, protects against surge voltage
- Safety and EMC compliance
 - IEC/EN 60335, EN61000-3-3, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5 FCC Class-B, EN61000-4-6, EN61000-4-11, CISPR14-1

MAINTENANCE

Occasionally, clean the case using a damp cloth and mild cleaning agent. Check the terminals are not loose or rusty. If connecting cable is damaged contact a qualified person for a replacement.



User Manual

In-Line 15A PWM Solar Charge Controller



Part Number
SG2-PWM-15A

Input
DC12V Solar Panel (Max.25V)
Output
DC12V, 15A



SCAN ME



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Important: Please read before first use.

Congratulations on choosing the SolarGo2's PWM solar regulator, it is as tough as you need it for the outside lifestyle, and it's designed to work perfectly with our range of 12v leisure solar panels.

This rugged solar regulator will optimally charge a large range of battery types, including AGM, Gel, Calcium, Wet and all common lithium variants including LiFePO4, Li-ion and Li+. It contains a host of smart electronics including reverse polarity protection, short circuit protection, reverse current protection, overcharge protection and much more.

Please follow the below instructions to get the very best from this product. If you have any questions not answered in this user manual, please visit the product page on our website www.solargo2.com for more FAQs and help.

FEATURES

- This in-line solar charger controller is designed with PWM (pulse width modulated) technology.
- Anderson ports are provided for solar panel and battery connection.
- Suitable for 12V systems only.
- Suitable for all kinds of 12V solar panels, in a 12V solar system.
- Suitable for most rechargeable batteries: Lithium battery (LiFePO4, Li-ion and Li+), Lead Acid battery (AGM, Wet, Gel and Calcium).
- Built-in high efficiency smart regulation to prevent your battery from being over or undercharged, optimises the battery performance to keep your battery permanently fully charged.
- Coloured LEDs to easily indicate the charging status and battery conditions.
- Big digital LCD screen displaying battery voltage, charging current, charging capacity (Amp/hour), battery types, charging percentage, battery temperature and fault codes.
- Waterproof design, suitable for indoor and outdoor use.
- Designed according to CE and UKCA standards, EMC, FCC compliance.

WARNING

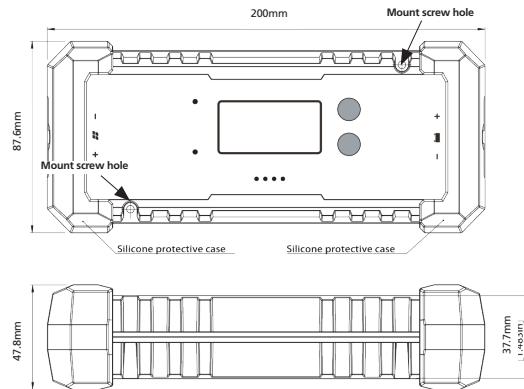
Explosive gases develop during normal battery operation.

To reduce risk of battery explosion, follow these instructions and those published by the battery manufacturer.

- Ensure no sparks or flames are present when working near batteries
- Never attempt to charge a damaged, frozen or non-rechargeable battery
- Never smoke, use an open flame or create sparks near batteries or solar controller during charging operation as batteries may give out explosive gases
- Someone should be close enough to come to your aid when you work near a lead-acid battery or Lithium battery
- Eye protection should always be worn
- If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters the eye, immediately flush the eye with running cold water for at least 10 minutes and get medical attention immediately
- Avoid dropping a metal tool onto the battery

INSTALLATION

The Solar Controller is mounted as shown below. The easiest way to mount the unit is to use two small but long self-tapping screws and mount the unit to a flat surface.



WIRING CONNECTIONS

To protect the battery, we strongly recommend that you place an in-line fuse on the positive wire on the 'battery' circuits as per the wiring diagram (Fig1). We recommend a 20A or 30A fuse for the 15A controller (as close to the battery as possible).

Connect the input and output cables by Anderson connectors (supplied) to the output from the solar panel and the input to the battery, please note the correct polarity ie **positive +** and **negative -** for connections to the solar panel and the battery.

Wiring diagram

Refer to the below drawing. Please cover the solar panel before connecting the cables.



- Given sufficient light solar panels always generate energy even when they are disconnected. Cover the panel(s) with a soft cloth to block all incoming light during the installation. This will ensure that no damage is caused to the solar panel or battery if the wires are accidentally short circuited
- Never short circuit the battery. Accidental 'shorting' of the terminals or wiring can result in sparks causing personal injury or a fire hazard
- Do not reverse connect the wires to the solar panel or battery
- Always install a battery fuse on each circuit including the solar controller
- Do not disassemble the charger, take it to a qualified person if repair is required

Fitting Anderson connectors (supplied)

An important note is to make sure you use the correct wire size for the Anderson connections. We have a simple grid below to help you with this. The Anderson connections supplied can be soldered or crimped onto the wire. Please go to our website to see a short video on how to do this. Or have a look on YouTube as there are lots of good examples on how to fit this connection to your cables.

Correct Wire Size

Please refer to the wire size chart below, to determine the minimum size wire needed for each connection. This will also ensure you get the best performance out of your solar controller. The solar controller should be installed as close to the battery as possible. When the connections are completed, the solar controller will start working automatically.

Unit: Metre

Rated current	The cable total length One-way distance	Solar panel -> Controller -> Battery			
		< 3M	3-6M	6-9M	9-12M
15Amp	The cable size (AWG)	14AWG	12AWG	10AWG	8AWG

Unit: Feet

Rated current	The cable total length One-way distance	Solar panel -> Controller -> Battery			
		< 10ft	10-20ft	20-30ft	30-40ft
15Amp	The cable size (AWG)	14AWG	12AWG	10AWG	8AWG

OPERATION - LCD DISPLAY

Please check your battery manufacturer's specifications to select correct battery type. The unit provides 6 battery types for selection: LTO, LiFePO4, Gel, AGM, WET (conventional lead acid), Calcium battery.



Press 'battery type' button and hold for 3 seconds to go into your battery type selection mode. The battery type you select will be shown on the LCD meter - the default setting is AGM battery. The controller will automatically memorize your battery type setting.

Please note - LFP battery shown in LCD indicates Lithium Iron Phosphate battery, LiFePO4 battery. LTO battery shown in LCD indicates Lithium Titanium Oxide battery.

Caution - Incorrect battery type setting may damage your battery. When the controller powers on, the unit will run self-qualify mode and automatically show below items on LCD before going into charging process.

888 Self-test starts, digital meter segments test

888 Software version test

888 880 Rated voltage and current test

888 Indicates the solar panel connected.

After going into charging process, the LCD displays the charging status as below:

Press VOLT / AMP button in sequence, the LCD will display in turn with battery voltage, charging current, charged capacity (Amp-hour) and battery.

888 880 880 AB 888

The VOLT / AMP button can be changed at any time during charging process. The LCD can also be treated as an independent voltage meter.

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