

THE SOLLATEK GLOWSTAR

Low-cost lighting brilliance – a revolution in solar energy

USER'S MANUAL



Sollatek[™]
Solar Systems

1. Unpacking and inspection

Thank you for purchasing your new Glowstar lantern. On receiving your new Glowstar, make sure the outer packaging is not damaged. Then carefully unpack the unit and inspect the Glowstar casing and lamp. If there is any problem, immediately contact your supplier.

Before using Glowstar, leave the light off and fully charge the unit for at least one day (see 'How to use your Glowstar').

2. Important information

To charge your Glowstar you will need at least one of the following items:

- AC mains charger, or
- Vehicle charge cable, or
- Solar panel

Glowstar (GS5) and Glowstar (GS7): what's the difference?

	Glowstar (GS5)	Glowstar (GS7)
Lamp	5W	7W
Battery	4.4Ahr	7.2Ahr
Running time from full charge	5.2 hours	8 hours
Auxiliary output*	-	12V, 0.5A
Auto function**	-	Yes
Max charge current	1.2A (20W)	1.8A (30W)
Weight	2.4kg	3.3kg

* 12V DC output for running radio, etc – other voltages available.
 ** Used with mains charger, auto function detects mains power failure and acts as emergency light; used with solar module, detects nightfall and acts as security light.

You can use a 5W, 7W or 9W compact fluorescent lamp with both Glowstar models, but running times vary:

Lamp & equivalent output	Glowstar (GS5)	Glowstar (GS7)
5W (25W GLS)	5.2 hours*	8.5 hours
7W (40W GLS)	3.7 hours	6.2 hours*
9W (60W GLS)	2.9 hours	4.8 hours

NB. Times are approximate.
 * Fitted as standard.

The following Glowstar accessories are available:

Accessory	Use with		Stock No.
	Glowstar (GS5)	Glowstar (GS7)	
5W solar module	Yes	Not recommended	68005207
10W solar module	Yes	Yes	68013913
20W solar module	Yes	Yes	contact us
AC mains charger	Yes	Yes	96251000 (UK) 96251050 (euro) 96251100 (us)
Vehicle charge cable	Yes	Yes	64523211
Cigar lighter socket	No	Yes	64524211

AC mains charger

The AC mains charger connects to a normal wall socket (US, UK & European). It charges a Glowstar (GS5) in about 4 hours and a Glowstar (GS7) in about 6 hours, and can work from 85 to 300V AC (or 120V to 350V DC). The charger can be permanently connected.

Vehicle charge cable

This connects between the charge input socket on the Glowstar and a 12V vehicle cigar lighter socket. If the engine is off, the lantern will charge slowly and will not reach full charge. If the engine is running, the Glowstar battery will receive more charge. The Glowstar can remain connected to the vehicle socket for long periods.

Solar module

If your Glowstar package does not include a solar module, you can install your own, provided it meets the following specification:

- Nominally 12V type
- Max open-circuit voltage 24V
- Max short-circuit current:
 - Glowstar (GS5) 1.3A
 - Glowstar (GS7) 2.1A
- Max peak power:
 - Glowstar (GS5) 20W
 - Glowstar (GS7) 30W
- Optimum voltage (Vspec.) 14V – 17V
- Optimum current (I @ Vspec.):
 - Glowstar (GS5) 1.2A
 - Glowstar (GS7) 1.8A
- Type: amorphous, poly- or mono-crystalline
- Must be robust enough to cope with intended use (eg portable applications)
- Must have suitable cable or facility for connection
- Module cable will need a standard-type 2.1mm DC plug (available from Sollatek).
Polarity: centre contact: positive
- Must be of good make and quality, for good service, and reliable operation

Charging time when using a solar panel is variable and depends on geographical location, availability of sunlight and cloud cover.

DC output adapter

The DC output adapter cable plugs into the 'Aux' output socket on the Glowstar (GS7) and converts it to a socket like a vehicle cigarette lighter socket. This can then be used to run a mobile phone charger and other small appliances.

3. Safety advice

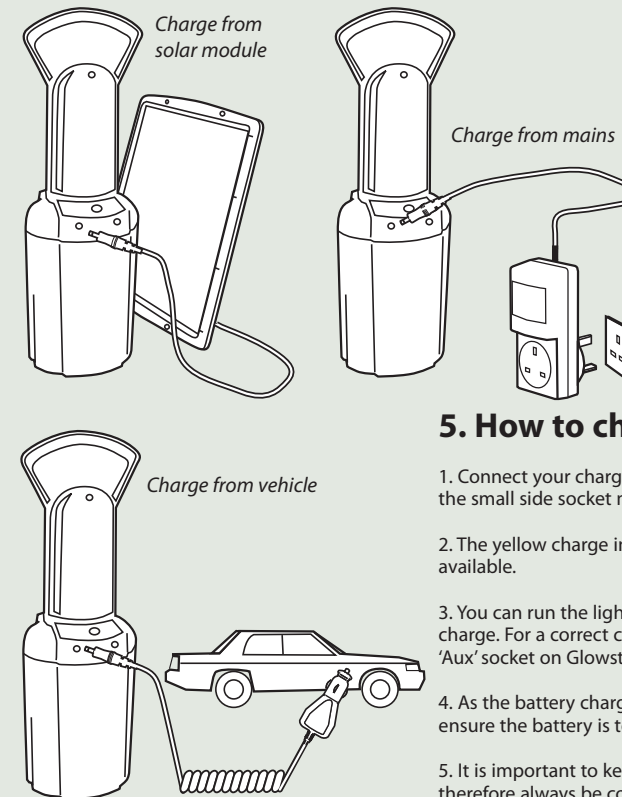
Used with care, Glowstar will give you many years of trouble-free service. To make the most of your lantern, please follow these hints:

Always:

- Keep your Glowstar lantern on charge (when possible). (See section 9: proper care of batteries).
This will extend battery life and keep it ready to use.
- Keep Glowstar dry; store in moderate to low temperatures.
- If charging Glowstar outdoors, keep it in the shade.

Remember:

- **Never** immerse Glowstar in water deeper than 160mm.
- **Never** store in extreme conditions or expose to direct sunlight.
- **Never** attempt to open Glowstar yourself (except to change the lamp or battery).
- **Do not** confuse the two DC sockets (on GS7)



4. How to use your Glowstar

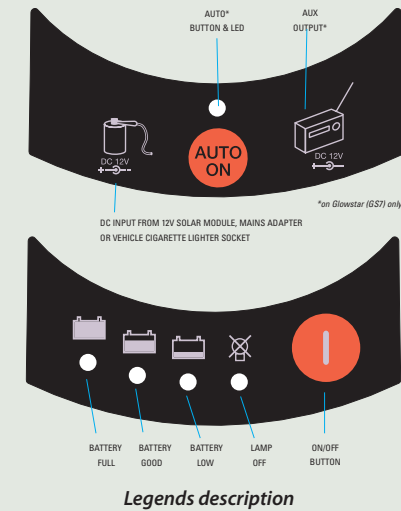
Turning the lamp on:

Press on/off button (marked 'I') once. LEDs will show the battery's charge status. The left-hand green LED will light when the battery is full. Other LEDs indicate 'battery good', 'battery low' and 'lamp off'.

To avoid battery damage the lamp automatically turns off when the battery is very low. With about 10 minutes running time left, the lamp will switch off for 1 second and back on as a warning. When the lamp finally turns off, the LEDs will continue to indicate the lamp status for a few minutes. The unit then shuts down to save power.

Turning the lamp off:

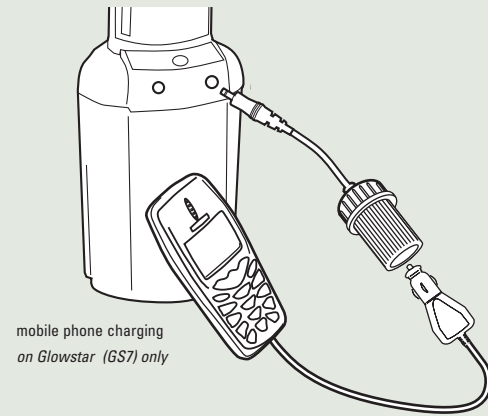
Press the on/off button again. The LEDs will continue to show Glowstar's status. It will shut down completely after a few minutes. Alternatively, hold the button down again for seven seconds and release; it will then shut down.



5. How to charge your Glowstar's battery

1. Connect your charging source (solar module, mains charger or vehicle lighter socket) to the small side socket marked with a battery symbol. The battery will charge automatically.
2. The yellow charge indicator (above the socket) will light when there is charging power available.
3. You can run the light while you are charging. However, the battery will receive little or no charge. For a correct charge it is best to have the light off (and nothing plugged into the 'Aux' socket on Glowstar (GS7)).
4. As the battery charges, indicators will change until the green 'battery full' LED lights. To ensure the battery is totally charged, leave power connected for an hour or two longer.
5. It is important to keep the battery fully charged and ready for use. Glowstar should therefore always be connected to the charge source when not in use. If you use the light in the same place as it is charged, there is no need to disconnect the charge cable.

6. Special features of Glowstar (GS7)



mobile phone charging
on Glowstar (GS7) only

Auxiliary output

The side socket (marked with a 'radio' symbol) is for running small appliances such as radios, extra lights, mobile phone chargers, and any other appliance or device. It can be used with the lamp on or off. It also can be used during charging (but note that current to the battery will be reduced).

Output current is limited to 0.5Amps @12V. The auxiliary output automatically turns off if the battery gets too low.

Pressing the on/off button turns on the lamp and auxiliary output. To use the auxiliary output only, press the button once more. The lamp will turn off whilst the auxiliary output remains on for 1 hour, after which it will automatically turn off. To turn it off earlier, hold down the on/off button for 7 seconds and release. Glowstar will switch off.

'Auto' function

This allows you to use Glowstar (GS7) as an emergency or security light.

If the mains charger is connected and switched on, press the 'auto' button. A red LED will light to show automatic mode. If mains power fails, Glowstar (GS7) will automatically turn the lamp on. When mains power returns, the lamp will be automatically turned off and the battery will start to recharge.

With a solar module, the auto function turns Glowstar (GS7) into a security light. Place the module outside in sunlight. Run the cable indoors to the Glowstar charging socket. Press the on/off button to turn the light on, then press the auto button. The lamp will turn off in daytime and on after dark.

The lamp will light until the battery gets low, automatically turning off at night. At sunrise, the battery will start to recharge ready for automatic operation the following evening.

To cancel auto mode, press the auto button once. If necessary,

turn off the light with the on/off button.

NB: if Glowstar (GS7) is in auto mode and the solar module faces the lantern, the light may flash on and off. This is because the module detects light from Glowstar at night and 'thinks' it is day again. This can be used to attract attention or warn of an emergency.

7. How to change the lamp



After 10,000 hours, you may need to replace your Glowstar lamp. Ensure you use a Philips, Osram or other Sollatek approved lamps.

1. Remove connectors from charge input (and auxiliary output on Glowstar GS7) ensuring lantern is turned off. No LEDs should be lit.
2. Use a Pozi screwdriver to remove the screw at the top of the clear lamp cover. Lift off the two halves of the cover and put them aside. The screw should be held by a fibre washer.
3. Carefully lift lamp from its socket (it is a push fit with a retaining spring-clip; it may be quite firm). Fit the new lamp, ensuring it is pushed fully into the socket and is straight.
4. Clean lamp covers if necessary with clean water and a little mild soap. Do not use abrasive cleaners. Dry thoroughly.
5. Refit lamp covers by inserting them into the base and closing them at the top. Secure them in place with the screw. Do not overtighten.
6. Press the on/off switch to ensure the new lamp works.

8. How to change the battery/fuse

After a few years of use, the battery may need replacing. This will be evident when the 'battery low' LED comes on and then the lamp turns off due to low voltage after only a short time, despite having been fully charged to the green 'full' level. It is important to replace the battery with the correct size and type; if unsure contact your Sollatek distributor.



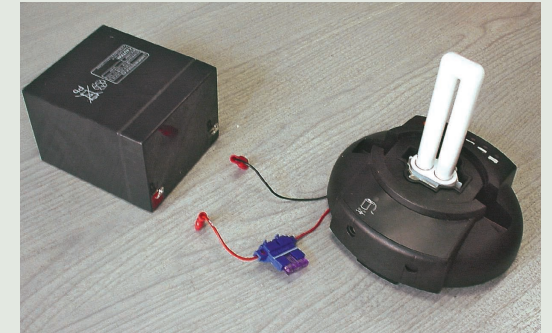
1. Unscrew the 2 hex bolts with an M5 hex key, they will not come right out as the are retained.



2. Lift off handle/diffuser assembly.

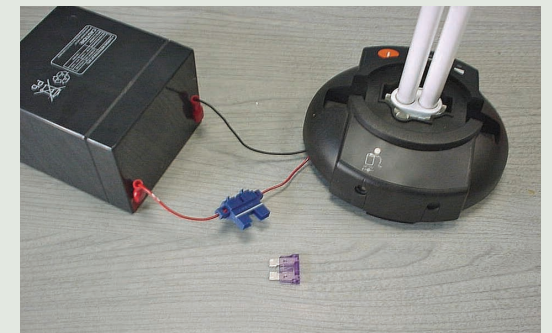


3. Carefully remove the black section and battery from the orange casing and place on a table or workbench.



Step 4: To change a battery.

Please ensure the battery is replaced with a replacement of the correct type. Contact your Sollatek distributor for details. Simply remove the battery terminal connectors and replace the battery, ensuring the polarity of the battery terminals are reversed on reconnection i.e. make sure the red lead is connected to the red terminal on the battery and that the black lead is connected to the black terminal of the battery.



It may be necessary to change the fuse in your Glowstar. Please ensure the fuse is replaced with a spare of the correct type and rating. If unsure, contact your Sollatek distributor.

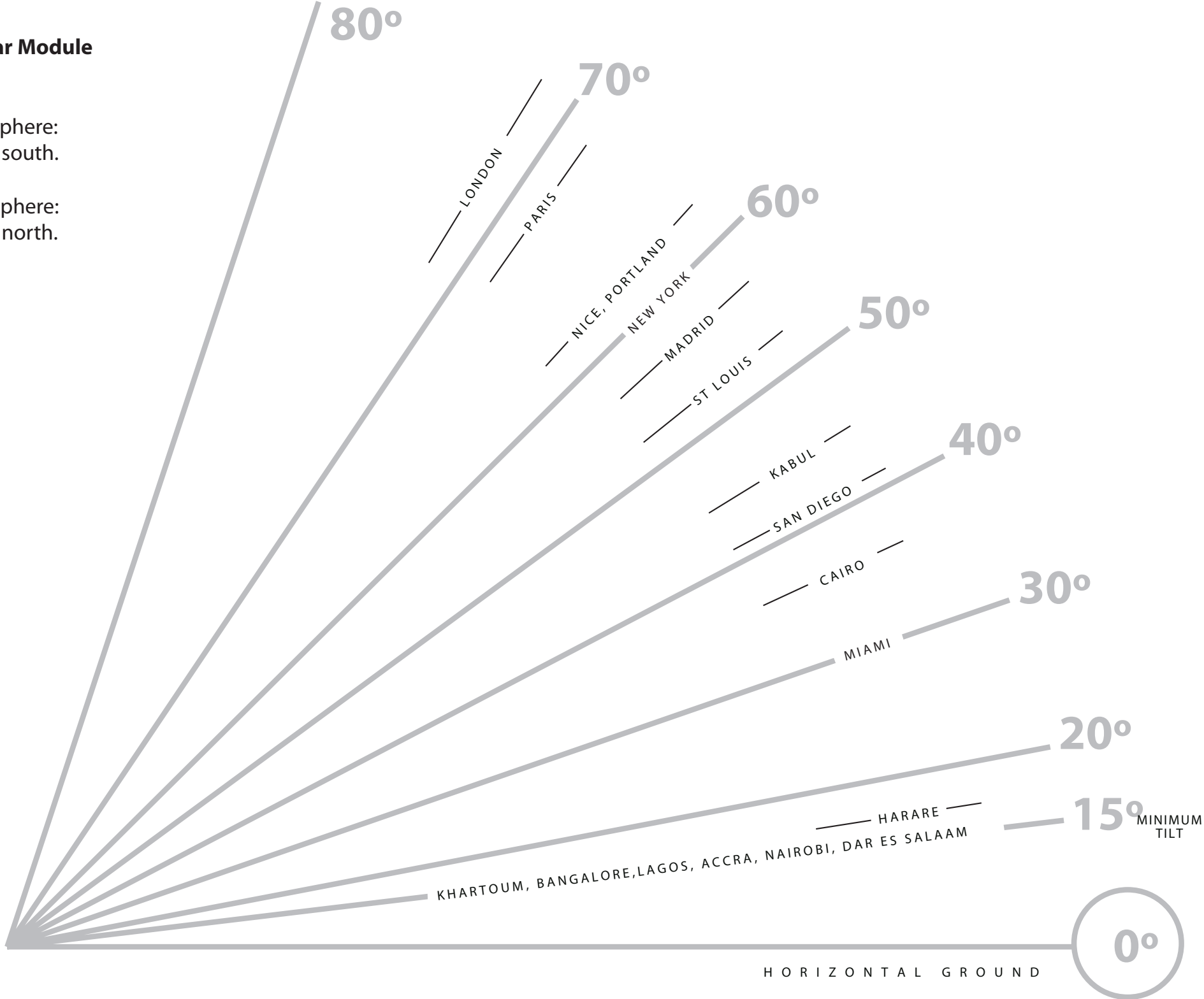
Step 5: How to change the fuse.

Simply remove the fuse from the inline fuse holder and replace with an identically rated spare. See above diagram.

Angle of Glowstar Solar Module from the ground

If in the northern hemisphere:
face your panel directly south.

If in the southern hemisphere:
face your panel directly north.



HORIZONTAL GROUND



9. Proper care of batteries

- Do not subject the battery to heavy vibration or mechanical shock.
- When you receive a new battery, charge fully before use.
- Full capacity will be reached after 2 or 3 full discharge / charge cycles.
- To obtain maximum life, always store batteries in a charged state.
- When storing batteries, re-charge every 6 months to prevent damage through self discharge. This should be done more often if storage temperature exceeds 25°C.
- Try to store / use in a cool, dry place. Do not expose to excessive hot or cold (i.e. outside the range 10-35°C ambient temp).
- To prolong battery life, try to avoid the complete discharge of your battery before recovery charge.
- Do not discharge a battery deeper than you have to.
- Do not attempt to dismantle a battery. They do not require topping up.
- Do not incinerate batteries. Always recycle old batteries.
- To avoid the risk of shock, do not touch the terminals.
- Keep terminals free from dirt and corrosion.
- Do not short the connections.
- Always charge in a ventilated area.
- Always use a suitable charging device. If unsure, contact your distributor.
- Replace only with Sollatek recommended replacement batteries. If unsure, contact your distributor.

10. Troubleshooting guide

Problem	Cause	Solution
1 LEDs come on but the lamp does not	Lamp may be loose	Push lamp into holder. See lamp change instructions
2 Charge LED doesn't come on when solar module is plugged-in	Solar module is not correctly installed Solar module is damaged Glowstar internal charge fuse is blown. May be because too large a solar module has been used	Check module is in sunlight, the correct way round Check for cracks in module, breaks in cable and damage to plug Check max size of module allowed in specification of Glowstar. Take Glowstar to approved dealer for repair
3 Two LEDs flash when solar module is plugged in	Solar module polarity is wrong	Swap wire connections on solar module cable so that centre connection of plug is positive
4 When you turn on, LEDs flash and go off	Battery is fully discharged	Charge battery as soon as possible
5 Light goes off for about 1 second and back on	Battery is low and will turn off in about 10 minutes switch off soon	Connect to charge source if available, or prepare for unit to
6 The unit is off and will not respond to the on/off switch	Battery is totally flat Internal battery fuse is blown	Charge battery as soon as possible Refer to dealer. Check fuse See section7.
7 Lamp goes off after only a short time	Battery was not fully charged	Charge battery fully each day. Check that battery full LED is reached
8 Battery charges but full LED is not reached	Solar module is too small Solar module is damaged Solar module is not correctly positioned Mains or vehicle charge unit or cable is damaged Mains power is not available for long enough each day	Check sizing chart or refer to dealer for advice Inspect for damage to module, cable and connector. Repair or replace See information in this manual on module use and positioning Inspect for damage to charger, cable and connector. Repair or replace Consider alternative charge method (eg solar module)
9 Lamp goes off after a short time, despite having reached full charge LED	Battery has reached end of useful life	Charge and discharge Glowstar a couple of times to 'wake up' battery if it has been out of use. If problem continues, change battery (see section7), refer to approved Sollatek dealer for further details
10 Glowstar yellow 'Charge' LED doesn't come on when mains charger is plugged in	No mains power Glowstar internal charger fuse has blown Charger is damaged	Check charger is plugged into wall socket and socket is switched on. Check no circuit breakers have tripped. Wait for mains power to return to your area Try charging from another source, (eg solar module or vehicle). If still not working, take Glowstar to approved dealer to replace fuse/repair Check charger, cable and plug for damage. Take to approved dealer to repair/replace
11 The lamp was turned off but LEDs are still on.	On Glowstar (GS7), aux. output is still working	To turn Glowstar off completely, hold 'I' button down again for 7 seconds and release it
12 The running time of Glowstar is shorter than the quoted time when charged from a solar module	Solar module may not be charging sufficiently	See information on module use. Charging time when using a solar panel is variable and depends on geographical location, availability of sunlight and cloud cover

11. Notes on Solar Module Use

Note that the black surface of the amorphous solar modules is the active one and should face the sun. The silver surface should face down. Carefully clean the surface of the module once every 6 months or when dust builds up. Use a soft brush. The module can also be wiped with a soft, damp cloth at a cool time of day. Don't use rough or abrasive cleaners.

For portable applications, avoid frequently holding the solar module by one edge and tilting it, as this will in time cause a break along the top of the module. Position the solar module where it gets no shade or shadow over it all day. Make sure vehicles will not run into it or animals knock it over. Charging through window glass will reduce the charging efficiency. Position the solar module to face the sun and adjust the angle so as to make the largest shadow on the ground behind it.

For fixed use, the module is best mounted on the roof or some other permanent position where it will not be damaged, moved or stolen. Mount it on a small metal or wooden frame to keep it away from the surface of the roof to allow air to circulate under it. This will improve efficiency by preventing the module from getting too hot. Don't mount it direct on a metal roof or metal surface as this will get too hot. Instead put a wooden board or similar on the metal roof.

For fixed use, it should be tilted at an angle from the ground according to the table below and towards the equator. This way it will get the best total sun throughout the year, taking into account the worst month. Don't mount it at less than 15° from flat, otherwise it won't benefit from the natural washing effect of rain.

Get into the habit of leaving the Glowstar plugged in to the charge all the time and only remove it when you need to use the lantern in an other room or location. Plug it back in as soon as you have finished. This way it will stay topped up and ready for use all the time. It will also help to give longer battery life. There is no problem leaving the solar module or charger plugged into the Glowstar over night because the Glowstar has reverse discharge protection.



Actual solar module appearance may differ

Tilt Angle of Solar Module.

It is best to face it to the equator, i.e. directly north (if you are in the southern hemisphere) or directly south if you live in the northern hemisphere). This way it will get the best total sun through out the day. Alternatively you can move the module round as the day goes on – if you remember! As a rough guide, tilt it at an angle from the ground as shown in the table below. This will generally give you the best solar charge through out the year, taking into account the worse month. If it is not going to be cleaned regularly, don't mount it at less than 15° otherwise it won't benefit from the natural washing effect of rain.

Location latitude	Suggested Tilt Angle from Horizontal
0-15°	15°
15-25°	Same as latitude
25-30°	add 5° to local latitude
30-35°	add 10° to local latitude
35-40°	add 15° to local latitude
40° +	add 20° to local latitude

The table below give some examples.

Location	Latitude	Tilted Angle	Direction to face
London, England	51	71	South
Paris, N France	48	68	South
Nice, S France	43	63	South
Madrid, Spain	40	57	South
Kabul, Afghanistan	34	44	South
Cairo, Egypt	30	37	South
Khartoum, Sudan	15	15	South
Bangalore, India	13	15	South
Lagos, Nigeria	6	15	South
Accra, Ghana	5	15	South
Nairobi, Kenya	-1	15	North or South
Dar Es Salaam, Tanzania	-7	15	North
Harare, Zimbabwe	-17	17	North
Seattle	47	67	South
Melbourne	-37	52	North
Perth	-32	42	North
Darwin	-12	15	North
Wellington, NZ	-41	61	North
Rio de Janerio	-23	23	North
Buenos Aires	-34	44	North
Lima	-12	15	North
Belem, Brazil	-1	15	North or South
Guatemala	14	15	South
NYC, USA	40	60	South
Miami, FL, USA	25	25 or 30	South
San Diego, CA, USA	32	42	South
Portland, Oregon, USA	45	65	South
St. Louis, MO, USA	38	53	South

Which Size of Solar Module?

This depends on the Glowstar model you have and on your location on the globe. The table below gives a guide. If you have a module that is too small, then the battery will not be charged fully each day and so the lamp will turn off sooner each evening. This will also mean the battery is permanently in a low state of charge, which over a long period, will have a detrimental effect on battery life.

You can not have too large a solar panel, as long as you don't exceed the 20W max limit for the GS5 and 30W max for the GS7.

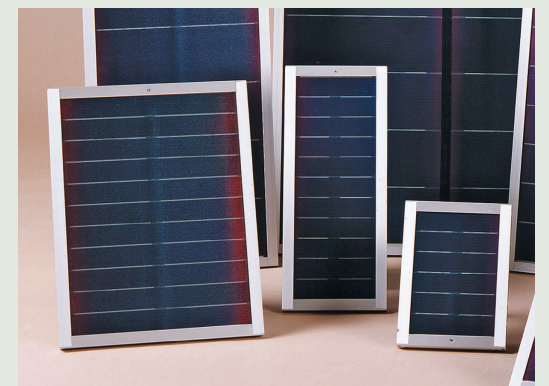
The table below shows the recommended peak power of the module. This takes into account the worst month of the year for solar in that location, working on average solar data over the past 10 years. It also assumes using 4 hours of a 5W lamp with a GS5, or 7 hours of a 7W lamp with the GS7. The figures in brackets are the calculated minimum module size. Some generalisations have been made because of variations across a region and there will also be variations due to localised climate conditions. The table is therefore only an approximate guide. Contact Sollatek for information that's specific to your location and intended use.

Location	Tilted Average Insolation (sun hours per day)	Module Wp GS5	Module Wp GS7
Nairobi, Kenya	4.0	5 (5)	10 or 15 (12.25)
Cairo, Egypt	5.0	5 (4)	10 (9.8)
Khartoum, Sudan	6.0	5 (3.3)	10 (8.2)
Accra, Ghana	3.5	5 (5.7)	20 (14)
Lagos, Nigeria	3.5	5 (5.7)	20 (14)
Tripoli, Libya	5.0	5 (4)	10 (9.8)
Dar es Salaam, Tanzania	4.0	5 (5)	10 or 15 (12.25)
Harare, Zimbabwe	5.5	5 (3.6)	10 (8.9)
Most of India	4.5	5 (4.5)	10 (10.8)
Kabul, Afghanistan	5.0	5 (4)	10 (9.8)
Northern France	1.5	20 (13.4)	30 (32.7)
Southern France	2.0	10 (10)	30 (24.5)
Spain	3.0	10 (6.7)	20 (16.4)
England	1.0	20 (20)	50 (49)*

* Using the GS7 with a 7W tube for 7 hours a day in winter will require a solar module which exceeds the input rating of the Glowstar. A 30W module should be used and ether a 5W tube used or less that 7 hours running time per day in winter be expected.



Other modules available now feature flexible solar modules for the most unforgiving of environments. Ask your sollatek distributor for further details.



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Specifications are subject to change without prior notice.

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The logo for Sollatek Solar Systems features the word "Sollatek" in a large, blue, cursive script font with a white outline. Below it, the words "Solar Systems" are written in a smaller, black, sans-serif font.

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