

LaBL

Lighting a Billion Lives



User's manual for solar lantern

LED solar lantern

The LED (Light Emitting Diode) solar lantern is a portable lighting system (called a lantern) (Figure 1). It comprises LEDs, maintenance-free storage battery, and electronics – all placed in a case made of plastic or fibreglass – and a solar module. During the day, the electricity generated through the solar module charges the storage battery. At night, the solar module is disconnected from the lantern, which can be used as an independent portable source of light. This lantern is suitable for both indoor and outdoor lighting applications.

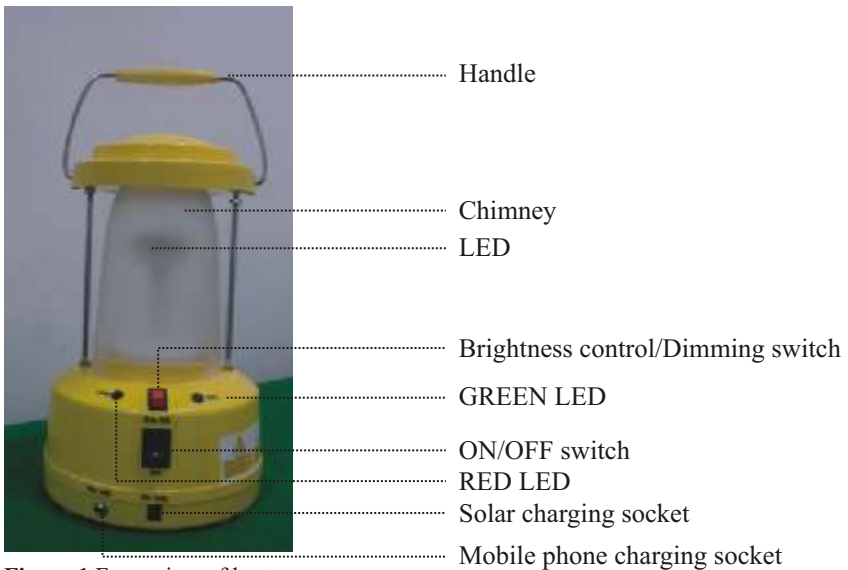


Figure 1 Front view of lantern

Major components of solar lantern

Solar module A solar module is a combination of solar cells. It collects sunlight and converts it into DC electricity. The generated



Figure 2 Solar module (3 Wp [watt peak])

DC electricity is then used to charge the battery. The solar module used in the lantern depends upon the total wattage of the LEDs and size of the battery used in the lantern. The module used is of 3 Wp (Watt Peak) at 6 V (volt). The charging cord from the module is connected to the charging socket of the lantern (Figure 2).

Battery The battery used with the lantern is an SMF (Sealed Maintenance Free) lead acid type battery. The capacity/rating of



Figure 3 SMF lead acid battery (6 V, 4.5 Ah)

the battery used in the given lantern is 6 V, 4.5 Ah (ampere-hour) at a discharge rate of C/20 at 20 °C ambient temperature. As the battery is sealed and contains very low volume of acid in the form of gel, it does not lose electrolyte, and hence, no maintenance is required for the battery. There is no need of pouring water in an SMF battery (Figure 3).

LED It is a special type of diode, which emits light when connected to DC power supply. The LED (Figure 4) used in the given lantern is a two pins, 0.25 W/LED. In total, nine LEDs are used, which give total lumen of 110–115.



Figure 4 Two pin LED (Light Emitting Diode)

Electronics/PCB card The electronics used with the lantern consist of a charge controller and driver circuit (Figure 5). All the protection required for effective operation of the lantern is incorporated in the PCB (Printed Circuit Board).



Figure 5 Electronic/printed circuit board card

Fuse A fuse is provided with the lantern in order to protect the circuit in case of excess current flowing into the lantern. The fuse used in this solar lantern is of 1A (ampere) (please note there are two more fuses which are attached with the MS stud and these fuses can be kept as spare and used whenever required).



Figure 6 Fuse of 1A used in solar lantern

Indications

- Red LED glowing: Battery low
- Green LED glowing: Battery getting charged
- Green LED blinking: Battery fully charged
- Lantern shines for four to five hours on complete charge

Instructions for use

Step 1 Switching ON/OFF the lantern

- The switch (black one) is a two-position switch.
- Pressing the switch downward will make the LED glow (Figure 7).
- Pressing the switch upward will turn the LED OFF.



Figure 7 Switching ON the lantern

Step 2 Controlling the brightness/dimming of the lantern

- A small two-position switch (red one) is available. Pressing the switch downward will make the lantern less bright (dimming) (Figure 8).
- Pressing the switch upward will make the lantern brighter.



Figure 8 Controlling the brightness/dimming of the lantern

Step 3 Charging the lantern



Figure 9 Backside of solar panel module



Figure 10 Inserting the charging cord

- Please ensure that the charging cord (supplied with the lantern) is connected to the solar module. (The red and black wires of the cord should be connected to the positive and negative terminals of the solar module respectively [Figure 9].)
- While charging the battery in the lantern, the ON/OFF switch should be kept in the OFF position. Insert the charging cord, attached to the solar module, to the socket provided in the lantern for solar charging (Figure 10).
- The solar module should be placed in a sunny place. The module should be tilted at an appropriate angle in order to get maximum solar radiation.
- The glowing of GREEN LED indicates that charging of battery is in progress. When the GREEN LED blinks, it indicates that the battery is fully charged.
- The solar lantern is provided with reverse polarity protection. There will be no reverse flow of current from the battery to the PV module even if you forget to disconnect the PV module from the lantern during the night.



Figure 11 Inserting the mobile charging cord in the mobile the 'mobile phone charging socket'.

Step 4 Charging the mobile

- A '**mobile phone charging socket**' (Figure 11) is provided in the lantern which can be used for charging the mobile phone. One end of the '**mobile phone charging cord**' should be inserted in to '**mobile phone charging socket**' and the other end should be inserted into the mobile phone.

Replacement of fuse

- 1 Unscrew the bottom plate of the lantern.
- 2 Remove the fuse from the two-joint terminals and replace the same (Figure 12).



Figure 12 Replacement of fuse

- 3 Put the fuse over the two-joint terminals. The fuse will get fixed when you press it lightly downwards.
- 4 For replacing other components of the lantern (in case of non-functioning), contact the nearest electrical shop or any electrician/solar technician.

Precautions

(Dos)

- In case the RED LED glows, charge the battery of the lantern till the GREEN LED indicator starts blinking.
- The battery of the lantern should be charged regularly on a daily basis, even if the lantern is not in use or is out of order.

(Don'ts)

- Do not keep the lantern outside in the sun. Only the solar module is to be placed under the sun at the appropriate angle.
- If the direction is not known, keep the PV module under the sun on a horizontal surface.
- Do not clean the lantern/solar module with acid, detergent or any other chemical.
- Do not connect the lantern to an AC main supply.
- Do not keep the lantern near fire.

Maintenance

- Wipe/clean the solar lantern and module with a cotton cloth.
- Occasionally, the module's surface and the lantern can be cleaned with moist cloth.

Troubleshooting

Lantern not glowing

- Ensure the ON/OFF switch is kept in the 'ON' position.
- Ensure that the red LED indicator is not glowing.
- Charge the battery with solar module if the RED LED indication is glowing.
- While charging, the GREEN LED should start glowing. Continue charging the lantern till the GREEN LED blinks.
- Check the fuse and replace it, if necessary.

Charging indicator (GREEN LED) not glowing

- Ensure that sunlight directly falls on the module.
- Ensure that the solar module is clean.
- Ensure that the charging cord is properly connected to the lantern and module.
- If the solar lantern is not working in spite of ensuring the above, please do not attempt to repair the PCB/solar lantern. Send it to the nearest electrical shop or any electrician/solar technician.

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Contact

Akanksha Chaurey
akanksha@teri.res.in
The Energy and Resources Institute
Darbari Seth Block, IHC Complex
Lodhi Road, New Delhi – 110 003
India

Tel. 2468 2100 or 4150 4900
Fax 2468 2144 or 2468 2145
India +91 ● Delhi (0)11
Web www.teriin.org