1. Adequate protection is to be incorporated under no load conditions, e.g. when the lamps are removed and the system is switched ON.
2. battery over charge - cut off limits should be specified
3. deep discharge conditions - cut off limits should be specified
4. Proper protection should be provided against short circuit conditions
5. A blocking diode should be provided as part of the electronics, to prevent reverse flow of current through the PV module (s).
6. In case such a diode is not provided with the PV module, Full protection against open circuit, accidental short circuit and reverse polarity should be provided.

<http://www.deityfuel.com/mnre_lantern.html>

LED driver consideration points

<http://www.ti.com/lit/an/slyt084/slyt084.pdf>

No Load Protection

Adequate protection is to be incorporated under no load conditions, e.g. when the lamps are removed and the system is switched ON.

Sample implementation

<http://radio-hobby.org/uploads/datasheets/der/der304.pdf>

Short Circuit Protection

From JREDA

A fuse should be provided to protect against short circuit conditions

Sort circuit protection for boost regulator

<http://cds.linear.com/docs/Design%20Note/dn154f.pdf>

Battery Protection

The system should have protection against battery over charge and deep discharge conditions. The numerical values of the cut off limits must be specified, while submitting the samples for the testing purposes.

Low voltage cut-off – Numerical values

Over Charge cut-off – Numerical values

Load Reconnect voltage – Numerical values

**From JREDA**

Battery cut offs & reconnects should be provided to protect it against overcharge and

deep discharge condition.

Temperature Compensation

Electronics should operate at 6.0V and should have temperature compensation for

Proper charging of the battery through out the year

Accidental Protection

* Reverse connection of battery
* Accidental short circuit at battery

Docs

Multiple soln’s

* With diode: Series diode from battery to circuit, diode will open in case of battery is reverse connected, power loss across diode/schotky
* With mosfet: far less power loss as compared to diode

<http://www.youtube.com/watch?v=IrB-FPcv1Dc>

* Using relay

<http://www.edn.com/design/analog/4368527/Simple-reverse-polarity-protection-circuit-has-no-voltage-drop>

* Using reverse voltage protection ic
  + ST Soln

<http://johndayautomotivelectronics.com/?p=8193>

* Using ti soln
  + No dedicated soln

Battery short circuit protection

<http://www.ti.com.cn/cn/lit/an/slua436/slua436.pdf>

Link below mentions why short circuit protection is required, methods, why conventional fuse is not proper way

<http://www.mpoweruk.com/protection.htm>

from maxim, also mentions diode parallel to battery as one of the solution

<http://pdfserv.maxim-ic.com/en/an/AN636.pdf>

Light Output

The light output should remain constant with variation of the battery voltage.

No load current

Numerical values

Output current

Should be constant, its measured

Docs

**LED-Driver Considerations**

<http://www.ti.com/lit/an/slyt084/slyt084.pdf>