

3400W Solar Battery Charger Maximum Power Point Tracker

Operating Instructions
Please read these instructions before use



A simple, compact low cost MPPT to efficiently charge lead acid and lithium iron batteries from a wide range of photovoltaic panels.

The MPPT 60-2 is designed to charge lead acid and lithium batteries from photovoltaic panels. Silicon based panels such as monocrystalline, polycrystalline and amorphous are suitable. It has a built in Load Low Voltage Disconnect configurable as a Dawn to Dusk switch. It can be connected to the MCM for remote control and full system parameter logging and display.

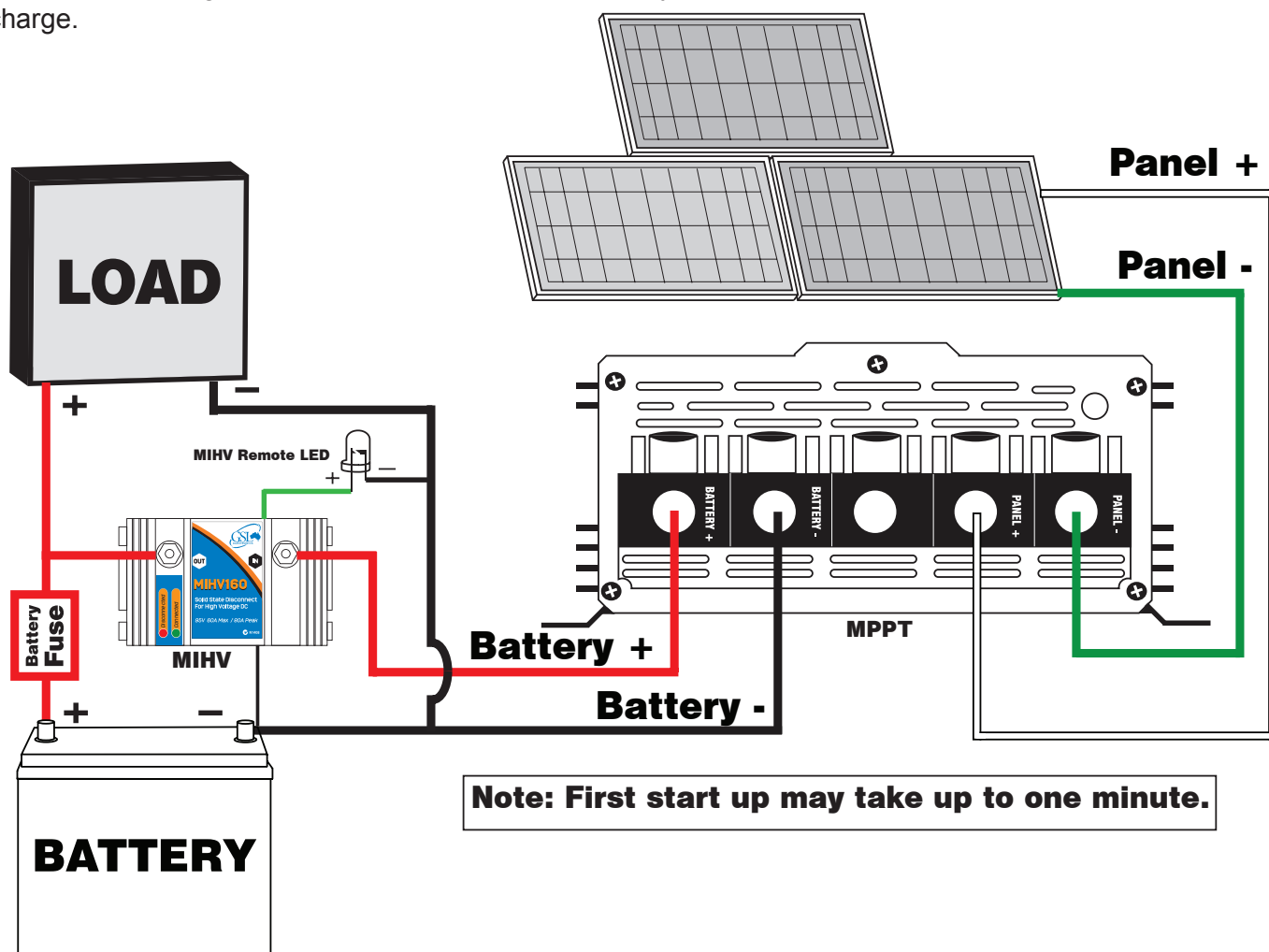


PATENT APPLIED FOR - 2010901565

MPPT60-2 Specifications	
Efficiency typical	97%
Input voltage	16V to 95V
Output voltage Lead Acid Batteries	Float - 13.5V / 27V / 54V Absorption – Vented 14.5V / 29V / 58V – Sealed 14.2V / 28.4V / 56.8V
Output Voltage Lithium Iron Phosphate Batteries	Maintenance - 14.1V / 28.2V / 56.4V Saturation - 14.8V / 29.6V / 59.2V
Output power	3400W / 60A MAX
Quiescent current	0.05A
Thermal protection	Multilevel Type
Dimensions (mm)	313 X 145 X 67mm
Indications	LED display – OUTPUT STATUS

BASIC WIRING OPTIONS: Permanent Load Connection

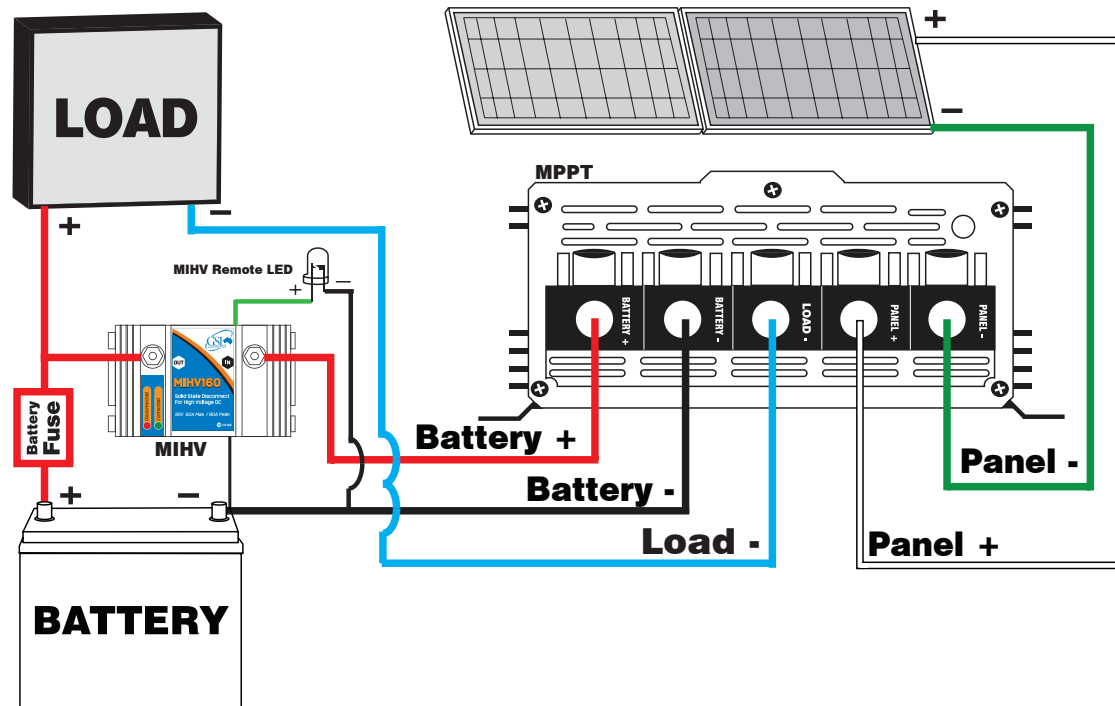
(Figure 1): Simplest wiring option where the load is permanently connected and the batteries are **not** protected from over discharge.



Wiring With Low Voltage

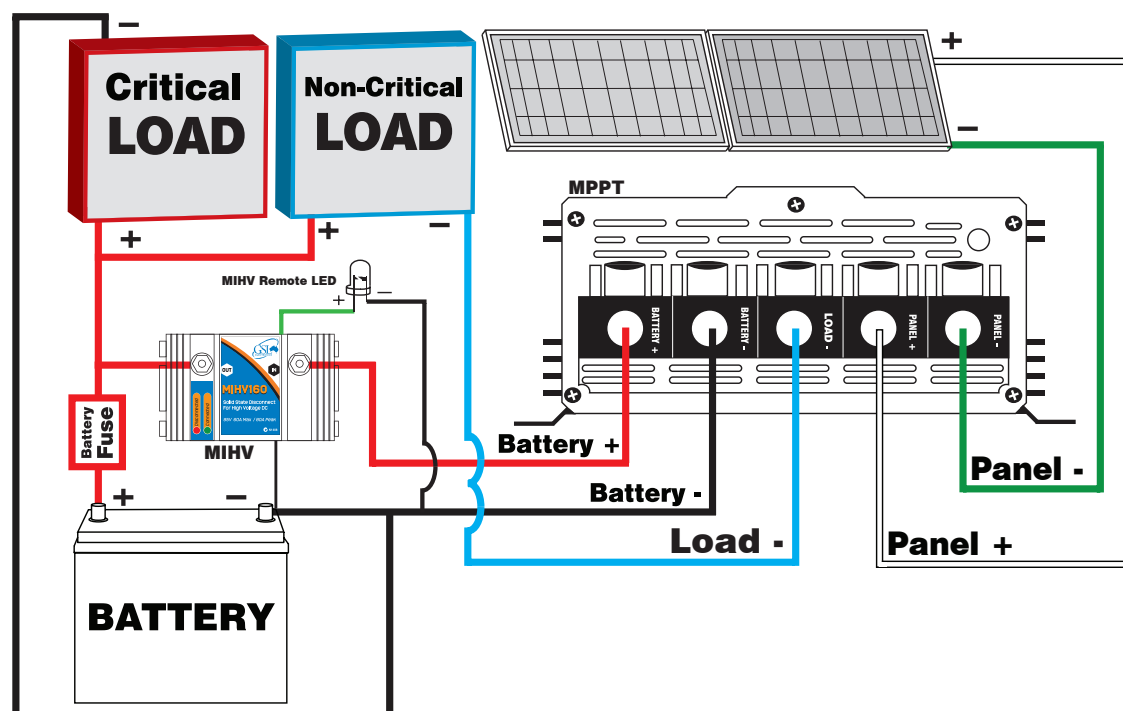
Disconnect (Figure 2) :

This option protects the battery from overdischarge by disconnecting the load. The LVD option disconnects the load when the battery voltage drops below 85% of nominal voltage to protect the battery from damage. The load reconnects when the battery voltage exceeds 95% of nominal voltage. This feature will not trigger during short transients. LVD load is 60A continuous or 100A transient.



Wiring With Critical And Non Critical Loads (Figure 3):

Critical loads are generally light loads which are powered under any condition. Non critical loads are loads which can be disconnected to ensure maximum on time for critical loads as well as to extend the life expectancy and reliability of the system. The non critical load can be set up as LVD or Dawn to Dusk loads.



Wiring with MCM option:

Connecting the optional MCM to the MPPT will allow various system parameter display, output voltage and alarm settings and enable the programmable dawn to dusk or remote load control options. **For more details please refer to the MCM Manual.**

The MPPT60-2 is designed to charge lead acid and lithium batteries from photovoltaic panels.

Silicon based panels such as monocrystalline, polycrystalline and amorphous are suitable.

MPPT60-2 General Information:

- Green LED On – Battery Ok.
- Green LED Flashing – Battery Low.
- This MPPT is designed to auto detect 12V, 24V or 48V battery systems and select a suitable charge regime.
- The MPPT 60-2 is shipped in a sealed battery setting which is the safest setting but if your batteries are vented or lithium then, **BEFORE** wiring the MPPT, follow the **CHANGING BATTERY TYPE SETTING PROCEDURE**.
- The maximum absorption voltage is 14.5V, 29V or 58V and the float voltage is 13.5V, 27V or 54V for 12V, 24V or 48V batteries respectively.
- The Absorption Mode is entered following a “low battery condition” at dawn and that mode is maintained for the remainder of the day. If the battery is not in a “low condition” at dawn then the Maintenance (Float) Mode is entered and that mode is maintained for the remainder of the day.
- Custom float and absorption voltages and thresholds are possible but minimum orders apply.
- This MPPT has a built in multilevel over temperature protection to improve product reliability while maximising output power availability.
- The maximum continuous output power is 3400W in 48V systems, 1700W in 24V systems and 850W in 12V systems. The output current is limited to 60A.



WARNING

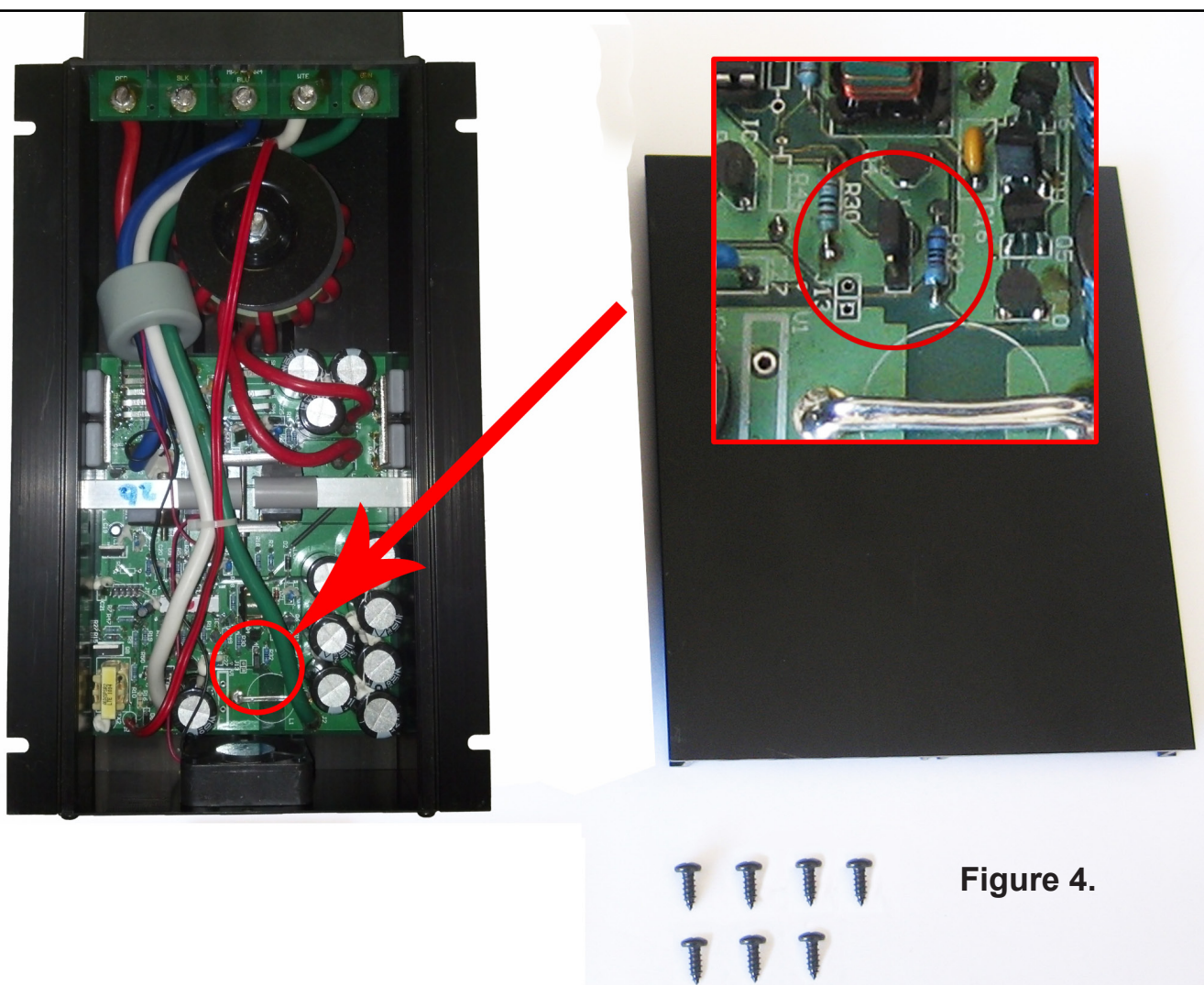
- **DO NOT** Disconnect battery and/or load whilst charger is operating. Disconnect charger from the PV first
- IF the optional Diode is not installed then shorting the panels when the batteries are connected may damage the MPPT

Important notes:

- This MPPT should only be operated with a suitable battery connected.
- To enhance Battery and load protection the use of the MIHV or equivalent is recommended
- Before any maintenance ensure that the panels are disconnected or de-energised.
- Use only PV Systems with open circuit voltage below 95V
- This equipment must be installed by qualified personnel only and incorrect wiring can cause fire, injury or death – GSL will accept no responsibility for MPPT misconnection or misuse.
- Use only 12V, 24V or 48V Lead Acid or Lithium batteries and confirm the MPPT settings, charge voltages and currents are correct for your battery system – if in any doubt seek qualified advice!
- Use wires suitable for at least 40A, but if wire runs are over 3m then larger wires are recommended to limit voltage drop and losses.
- Install the unit in a dry place out of direct sunlight and away from flammable liquids or gases.
- Battery fuse (BF) is always required and must be located as close to the battery as possible, its sizing depends on the wire size and load ratings. Typically a 40A fuse would do.
- Before connecting the battery always check the battery and PV panel polarity.
- The lowest Maximum Power Point system voltages are 18V for 12V batteries, 36V for 24V batteries and 72V for 48V batteries to ensure full output power.

Changing Battery Type Setting Procedure

- 1.Ensure all the MPPT wires are disconnected. Disconnecting PV first.
 - 2.Remove the 5 front panel screws and the move the front panel ajar. Then remove 1 middle rear screw on the back panel (bottom middle below fan) then slide out bottom cover – **see Figure 1.**
 - 3.Locate connector J4 – **see zoom window in Figure 1.**
 - 4.Move link on J4 to vented position or Remove link for Lithium batteries – **see Figures 2 ,3 ,4.**
 - 5.Slide in the cover and fit front panel carefully, secure the front panel again with the 5 screws and the 1 rear screw.
- The above procedure can be repeated to revert a different battery chemistry setting – **see Figure 3.**



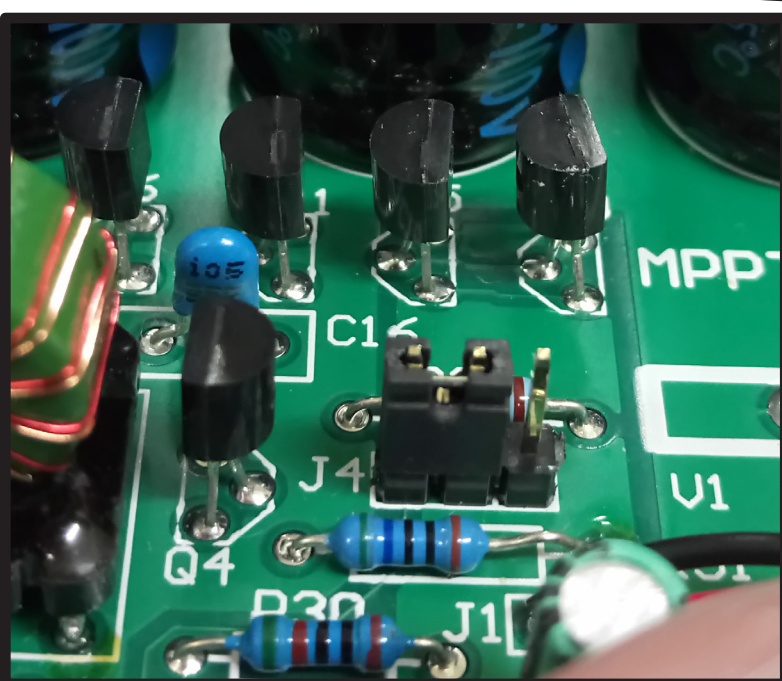


Figure 2 (Left): Vented Battery Setting

Figure 3 (Right): Sealed Battery Setting

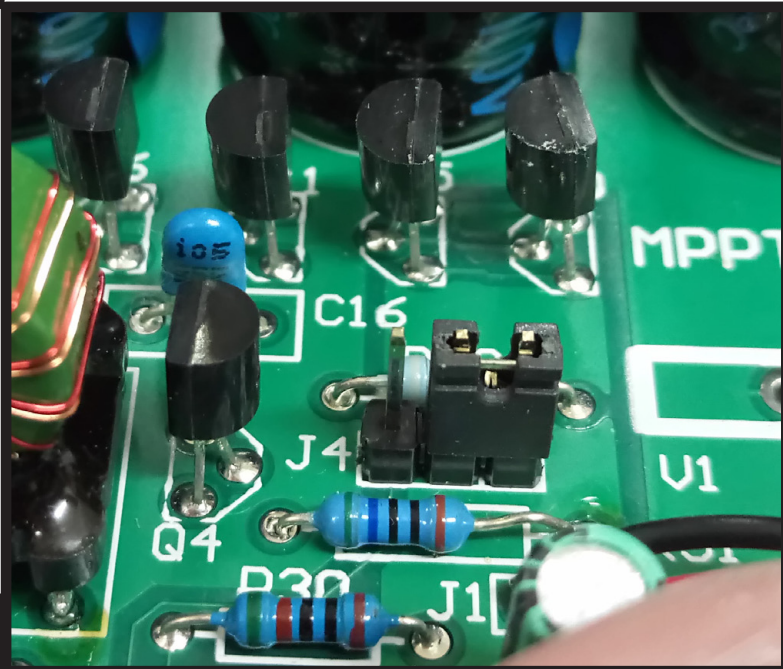
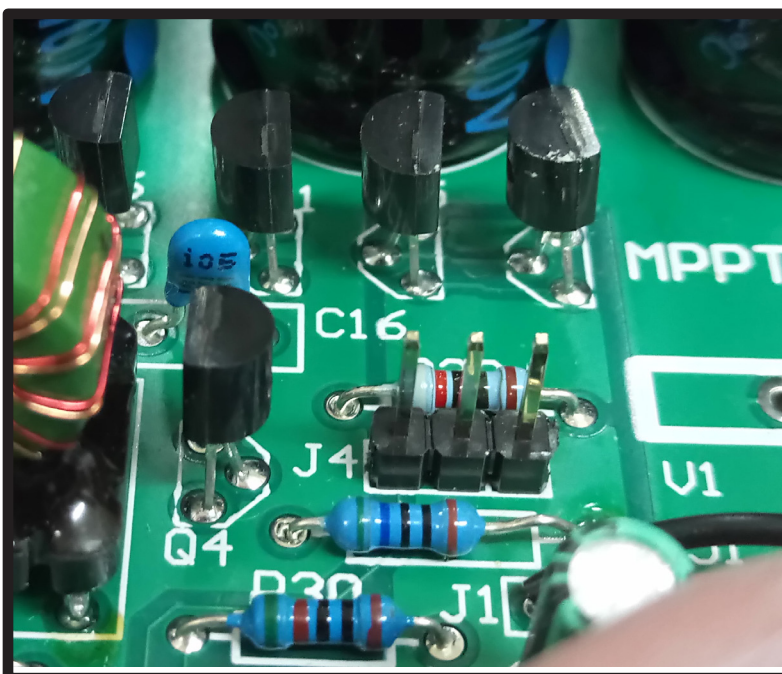


Figure 4 (Left): Lithium Battery Setting





MPPT FAQs

Q: What is an MPPT?

MPPT stands for Maximum Power Point Tracker and is a specialized converter designed to maintain the PV voltage at the level in which it delivers maximum power to the load or battery. The panel's nominal output power can only be obtained with the use of an MPPT.

Q: What are the MPPTs advantages compared to standard solar regulators?

1. About 20% higher current in a typical application which can be used for higher loads or longer run times or cutting PV system cost.
2. Suitable for lower cost non battery type PV since the MPPT can efficiently charge the batteries from relatively high voltage, say 12V batteries from 40V MPP panels.
3. Less interference and more accurate voltages during absorption and float.

Q: What happens at low PV currents?

The MPPT will outperform the conventional regulator above 3% of nominal panel power. Below 3%, about 10W in a 400W panel, the MPPT will have a slightly lower output current than a non MPPT.

Q: Why are MPPT not more common in standalone solar systems?

Until now and despite their overwhelming advantages MPPTs have not been commonly used in standalone solar systems because of cost. The new GSL MPPT specifically addresses this issue making economic sense in a wide range of solar systems.

Q: What sort of batteries should I use?

1. A deep cycle battery is a must due to the cyclical nature of the solar system with a recommended battery capacity of at least 360AH.
2. A larger battery will not only give longer run time during low light but also will be able to avoid available PV power being unstored such as when the battery reaches the float stage.

Q: How do PV temperatures affects charge current?

Temperature increase brings down the PVs maximum power point voltage reducing the MPPTs current gain available. In principle at 25C it is possible to achieve 30% gain but at 40C, a more realistic average temperature, about 20% is still available.

Q: What sorts of loads can I power with the MPPT60?

1. The maximum bulk charge current with the MPPT60 on a 12V battery and 800W panel is approximately 60A, so you can expect about 200AH per day which means a 200W load for about 10 hours daily.
2. Following the same reasoning with a 24V 1600W panel the MPPT60 will supply a daily load of 400W for about 10 hours.
3. Following the same reasoning with a 48V 3200W panel the MPPT60 will supply a daily load of 800W for about 10 hours.

Q: Is interference possible? and if so what do I do?

GSL's MPPTs produce far less interference than a conventional solar regulator during the absorption and float stages, that is during most of its operating time, and its designed to comply with local and international EMI standards however some interference is still possible. If interference occurs first try and reorient the aerial or move the sensitive equipment away from the MPPT wires. Ensure the MPPT chassis is grounded. Grounding a battery terminal may also help and finally you can try adding ferrite clamps.

Warranty Conditions: Our products come with guarantees that cannot be excluded under the Australian Consumer Law.

The customer is entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. The customer is also entitled to have the products repaired or replaced if the products fail to be of acceptable quality and the failure does not amount to a major failure.

GSL Electronics (GSL) warrants that its products will, under normal use and service, be free of defects in material and workmanship for a period of two (2) years from the date of the original purchase by the customer as marked on the customer's original invoice. Please refer to our website for full warranty and return information which can be found at <http://www.gsl.com.au/faq.html>

