1700W 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.

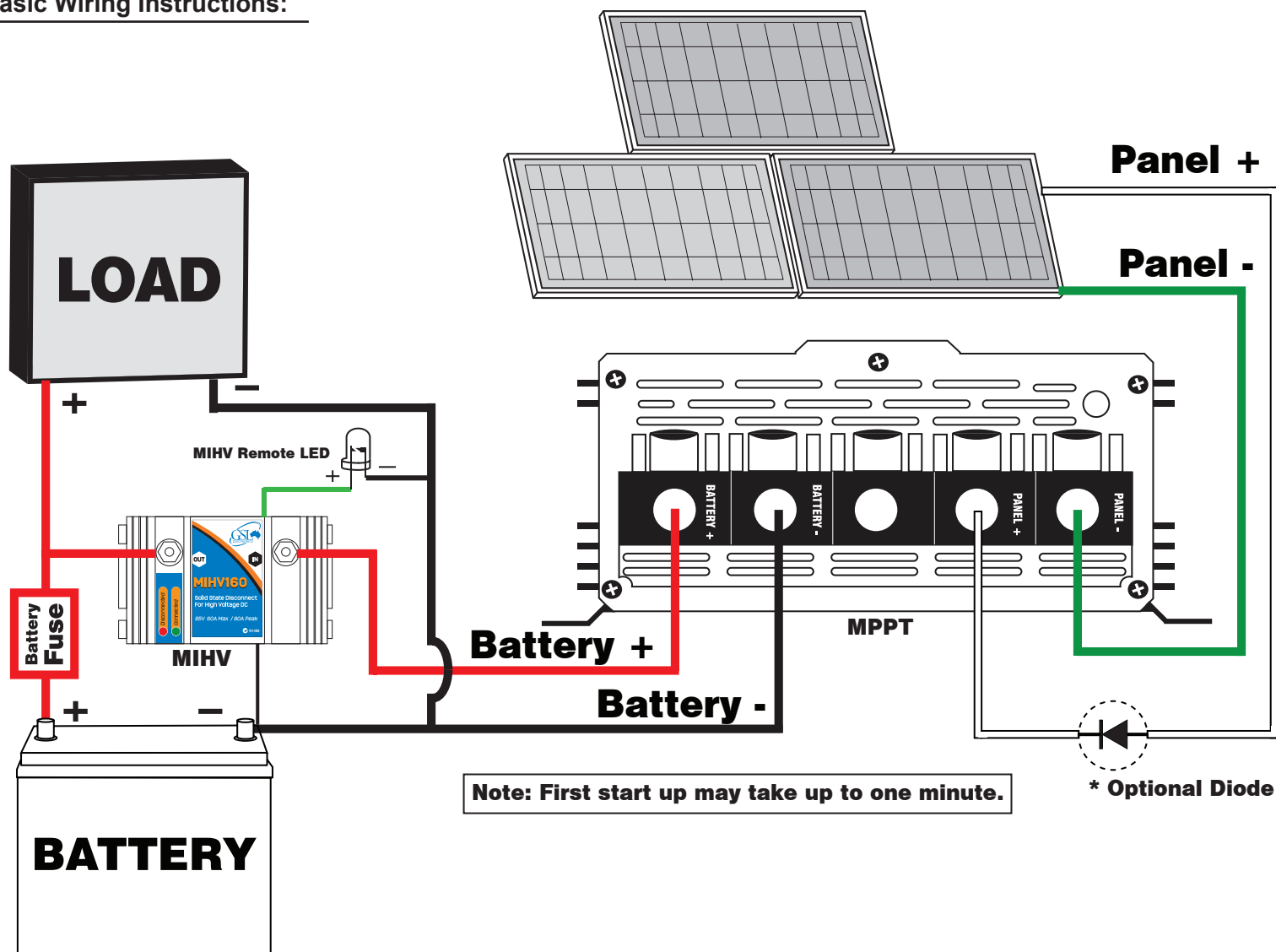*MPPT30-1 Unit*

PATENT APPLIED FOR - 2010901565

1700W Solar Battery Charger
Maximum Power Point Tracker

Operating Instructions
Please read these instructions before use

GSL ELECTRONICS

MPPT30-1 Specifications	
Efficiency typical	97%
Input voltage	16V to 95V
Output voltage Lead Acid Batteries	**Float** 13.5V / 27V / 54V **Absorption** – Vented LA batteries 14.5V / 29V / 58V – Sealed LA batteries 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	1700W / 30A MAX
Quiescent current	0.05A
Thermal protection	Multilevel Type

Basic Wiring Instructions:

Note: First start up may take up to one minute.

* Optional Diode

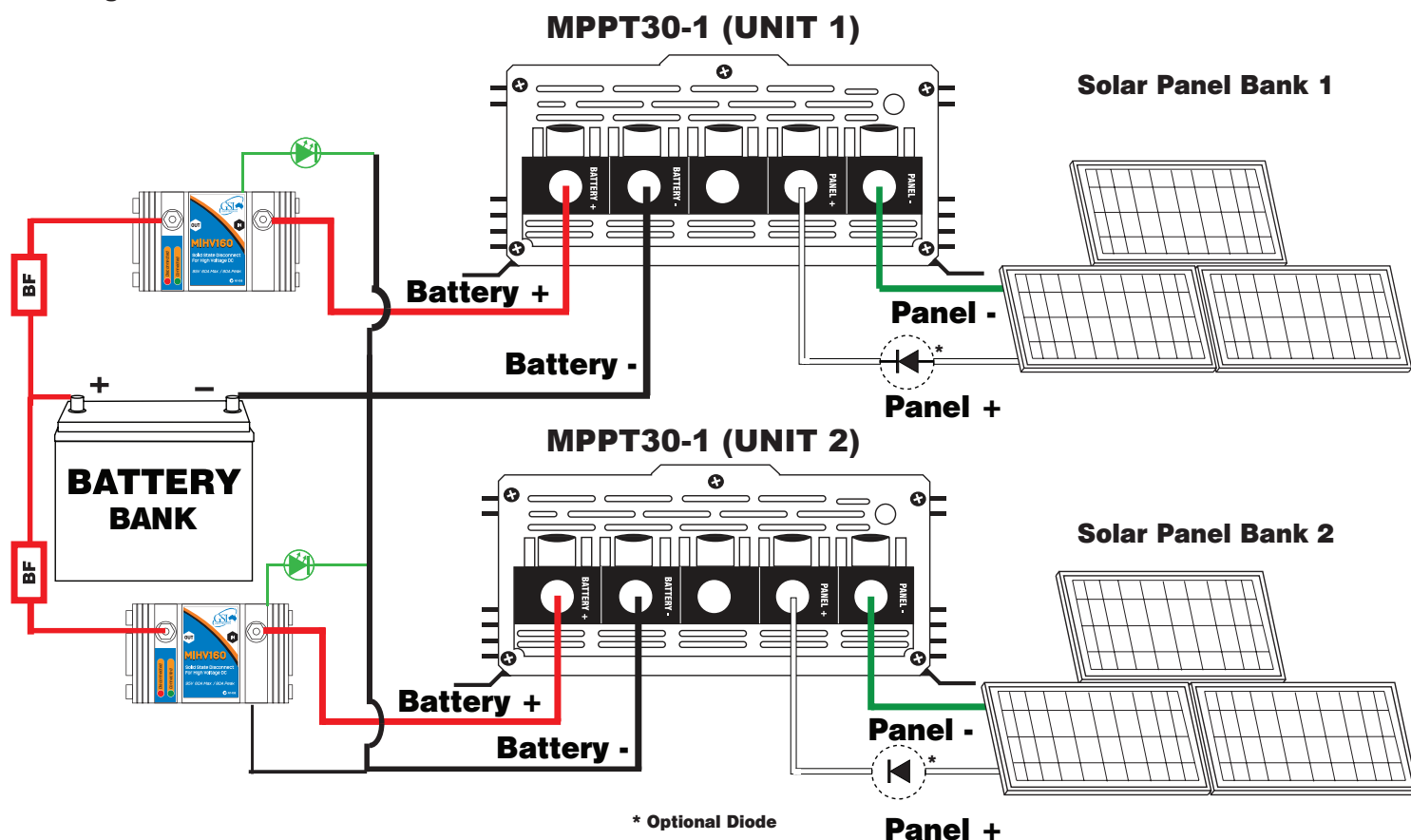**1700W Solar Battery Charger**
Maximum Power Point Tracker
Operating Instructions
Please read these instructions before use

GSL ELECTRONICS

Basic Wiring Instructions - Parallel Installation:

MPPT30-1 (UNIT 1)

Solar Panel Bank 1

Battery +

Battery -

Panel -

Panel +

MPPT30-1 (UNIT 2)

Solar Panel Bank 2

Battery +

Battery -

Panel -

* Optional Diode

Panel +

BATTERY BANK

BF

BF

The MPPT30-1 is designed to charge lead acid and lithium batteries from photovoltaic panels. Silicon based panels such as monocrystalline, polycrystalline and amorphous are suitable.

MPPT30-1 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 30-1 is shipped in a sealed battery setting which is the safest setting but if your batteries are vented or lithium iron phosphate 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 1700W in 48V systems, 850W in 24V systems and 425W in 12V systems. The output current is limited to 30A.

Model:
MPPT30-1
Page 4 of 8

1700W Solar Battery Charger
Maximum Power Point Tracker
Operating Instructions
Please read these instructions before use

GSL
ELECTRONICS

> ⚠️ **WARNING**
> • **DO NOT Disconnect battery and/or load whilst charger is operating. Disconnect charger from the PV first**
> • **IF the optional Diode is <u>not</u> installed then shorting the panels when the batteries are connected may damage the MPPT**
> • **Lithium batteries must have a battery management system with built in under votlage and over voltage protection.**

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.

• **Optional Diode** A suitably heatsinked schottky diode rated at or above 40A 60V (its anode connected to the + panel and cathode to the MPPT + input white wire) may be used, see wiring diagram. This diode will protect against panel short and block any voltage on the panel but will slightly decrease the battery charge current.

• 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.

1700W Solar Battery Charger
Maximum Power Point Tracker
Operating Instructions
Please read these instructions before use

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.

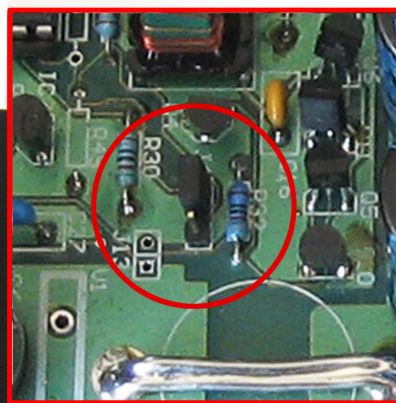• The above procedure can be repeated to revert a different battery chemistry setting – **see Figure 3**.
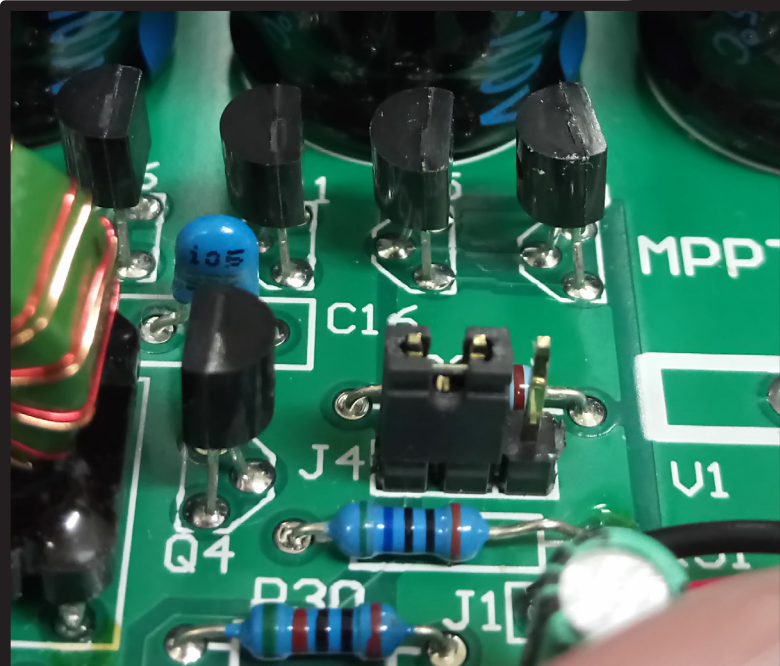

Figure 1.

1700W Solar Battery Charger
Maximum Power Point Tracker
Operating Instructions
Please read these instructions before use

Figure 2 (*Left*): Vented Battery Setting
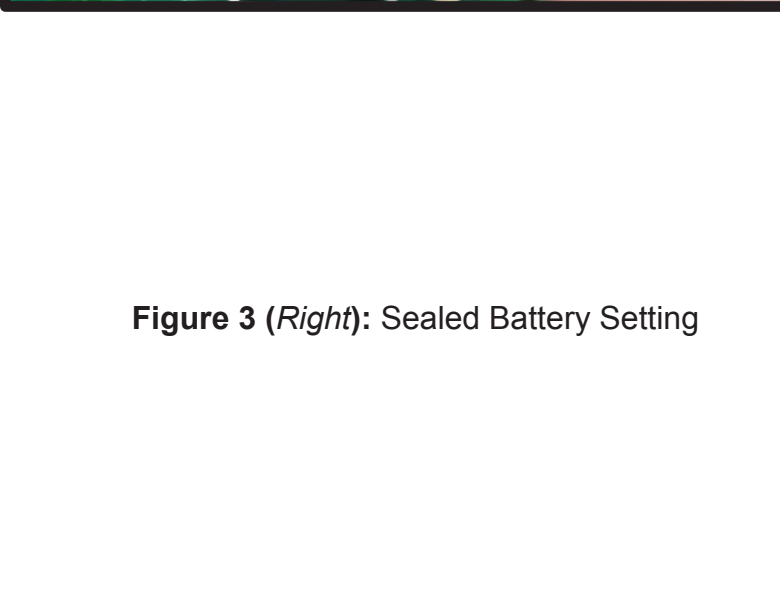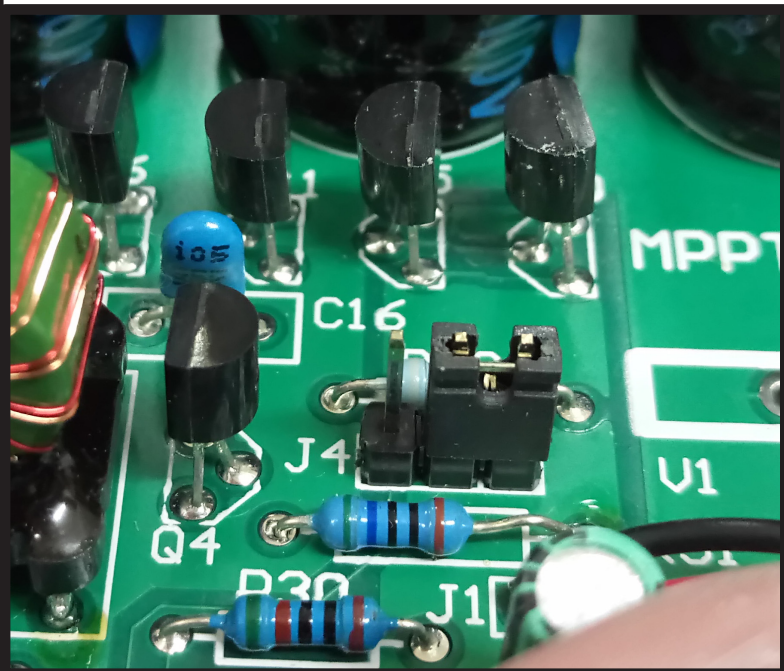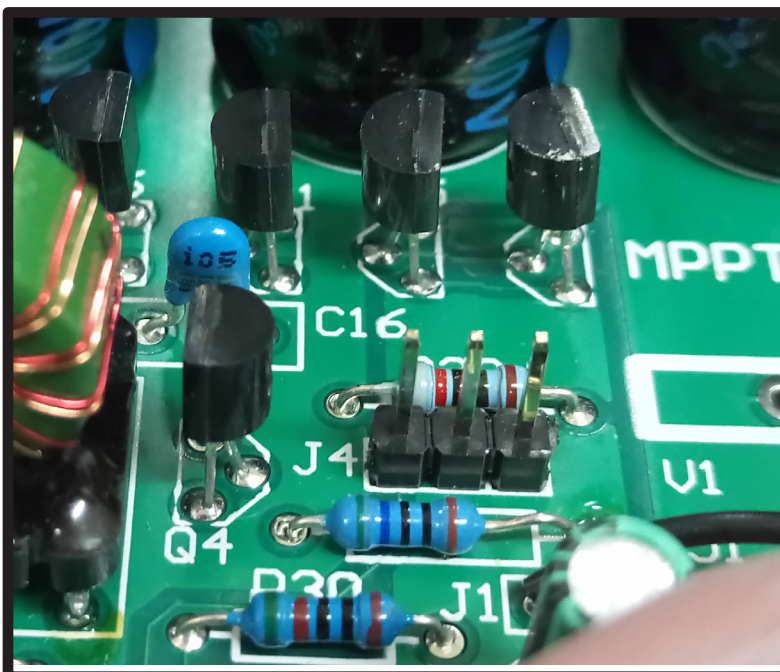
Figure 3 (*Right*): Sealed Battery Setting

Figure 4 (*Left*): Lithium Battery Setting

Model:
MPPT30-1
Page 7 of 8

1700W Solar Battery Charger
Maximum Power Point Tracker
Operating Instructions
Please read these instructions before use

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 GSL MPPT's advantages compared to standard solar regulators?
1. Suitable for lower cost non battery type PV since the MPPT can efficiently charge the batteries from relatively high voltage, say 12V batteries from 36Vmp panels.
2. Less interference and more accurate voltages during absorption and float.

Q: What sorts of loads can I power with the MPPT30-1?
1. The maximum bulk charge current with the MPPT30-1 on a 12V battery and 425W panel is approximately 30A, so you can expect about 100Ah per day which means a 100W load for about 10 hours daily.
2. Following the same reasoning with a 24V 850W panel the MPPT30-1 will supply a daily load of 200W for about 10 hours.
3. Following the same reasoning with a 48V 1700W panel the MPPT30-1 will supply a daily load of 400W for about 10 hours.

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 180Ah.
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 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: 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.

1700W Solar Battery Charger
Maximum Power Point Tracker
Operating Instructions
Please read these instructions before use

GSL ELECTRONICS

For optimal performance from panel and MPPT please use the following table to determine the best setup for your situation.

Panel Configuration	V_{OC}	V_{MP}	12V Charging	24V Charging	48V Charging
"Battery Panel"					
1x12V Battery Panel	21	16			
2x12V Battery Panel	42	32	✓		
3x12V Battery Panel	63	48	✓	✓	
4x12V Battery Panel	84	64	✓	✓	
1x24V Battery Panel	42	32	✓		
2x24V Battey Panel	84	64	✓	✓	
Grid Connect Panel (size = no. cells in grid)					
1x18 Cell Grid	10	8			
1x48 Cell Grid	28	23	✓		
2x48 Cell Grid	56	46	✓	✓	
3x48 Cell Grid	84	69	✓	✓	
1x52 Cell Grid	31	25	✓		
2x52 Cell Grid	62	50	✓	✓	
3x52 Cell Grid	93	75	✓	✓	✓
1x54 Cell Grid	32	26	✓		
2x54 Cell Grid	64	52	✓	✓	
3x54 Cell Grid	96	78	✓	✓	✓
1x60 Cell Grid	36	29	✓		
2x60 Cell Grid	72	58	✓	✓	
1x72 Cell Grid	44	36	✓	✓	
2x72 Cell Grid	88	72	✓	✓	
1x96cgsp	65	55	✓	✓	

GSL Electronics
www.gsl.com.au
ABN 30 053 250 472

Phone: (02) 9620 9988
Fax: (02) 9620 9899

MPPT30-1-R8

Unit 2, 110 Station Road, Seven Hills, NSW, 2147, Australia