200W Solar Charger
Maximum Power Point Tracker

Operating Instructions
Please read these instructions before use

This revolutionary maximum power point tracker solar charger was designed using the technology that won GSL Electronics the prestigious "2008 EDN Innovation award". A simple, compact and low cost alternative. Ideal for charging batteries with the new low cost high efficiency grid type panels.

MPPT12-2 Unit

PATENT APPLIED FOR - 2010901565

MPPT12-2 Specifications	
Efficiency Typical	96%
Input Voltage	16V to 55V
Output Voltage (Float)	13.5V / 27V
Output Voltage (Bulk)	Flooded 14.5V / 29V, Sealed 14.2V / 28.4V
Output Power	Peak 250W, constant 200W @29V / 150W @ 14.4V
Quiescent Current	0.04A
Thermal Protection	Multilevel type
Dimensions (mm)	35 X 75 X 100mm
Indications	Dual LED display – battery OK / LOW

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

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

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

200W Solar Charger
Maximum Power Point Tracker

Operating Instructions
Please read these instructions before use

MPPT12-2 General Information:

- Green LED flashing – battery charging and all normal.
- Red LED flashing – battery voltage low, below 0.9 of nominal voltage.
- This MPPT is designed to auto detect 12V and 24V battery systems and select a suitable charge regime.
- The absorption phase is entered following a low battery condition and is maintained for approx. 1.5 hours.
- Custom float and absorption voltages and times 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 MPPT12-2 will efficiently charge 12V batteries from 24V panels.
- The panel voltage limits for the MPPT12-2 are: Maximum open circuit voltage below 55V.
- Minimum Maximum Power Point (at the maximum operating temperature) must be above 17V for 12V batteries and 34V for 24V batteries to ensure full power.
- If used, this fuse is optional, locate the output fuse (OF) as close to the MPPT as possible (15A 24VDC rating).

Important:

- Use only PV systems with open circuit voltage below 55v & a minimum V_{MP} of 17V for 12V and 34V for 24V Charging.
- Use wires suitable for at least 15A, 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 15A 24V fuse would do.
- Before connecting battery always check battery and PV panel polarity.
- When used with panels over 150W @ 12V or 200W @ 24V the MPPT12-2 MUST be fitted with the PVF fuse. Locate this fuse as close as possible to the MPPT. A 10A 60V fuse is recommended.

For optimal power output the following panel combinations are recomended:-

12V Charging

- 2 x 12V Battery Panels connected in series (Total V_{OC} =42V & V_{MP} =32V)
- 1 x 24V Battery Panel (Total V_{OC} =42V & V_{MP} =32V)
- 1 x 48 Cell Grid Panel (Total V_{OC} =28V & V_{MP} =23V)
- 1 x 54 Cell Grid Panel (Total V_{OC} =32V & V_{MP} =26V)
- 1 x 52 Cell Grid Panel (Total V_{OC} =31V & V_{MP} =25V)
- 1 x 60 Cell Grid Panel (Total V_{OC} =36V & V_{MP} =29V)
- 1 x 72 Cell Grid Panel (Total V_{OC} =44V & V_{MP} =36V)

24V Charging

- 1 x 72 Cell Grid Panel (Total V_{OC} =44V & V_{MP} =36V)

GSL Electronics
www.gsl.com.au
ABN 30 053 250 472
Phone: (02) 9620 9988
Fax: (02) 9620 9899
Unit 2, 110 Station Road, Seven Hills ,NSW, 2147, Australia

200W Solar Charger
Maximum Power Point Tracker

Operating Instructions
Please read these instructions before use

Settings And Configurations:

The MPPT12-2 factory default setting is for sealed lead acid batteries (Maximum charge voltage 14.2V and float voltage 13.4V) and auxiliary switch (grey wire) configured in Low Voltage Disconnect mode. The various operating modes can be configured with a combination of the green and yellow wires and the internal links CHE and REN.

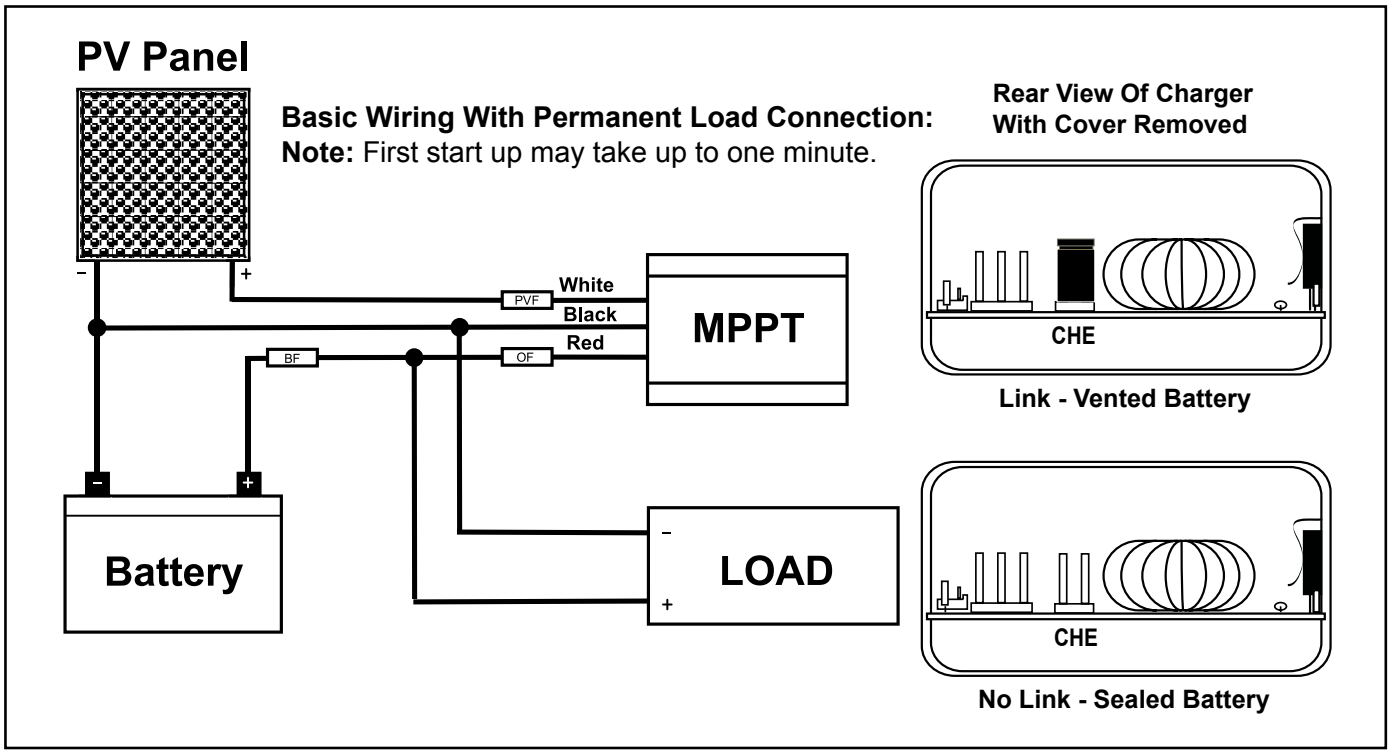
Always ensure that the CHE link is set for the Correct Battery Type:

The yellow and green wires are either left unconnected (Ensure they are insulated from any other point), or grounded (shorted to the black wire).

To access the CHE (2 pin) and REN (3pin) links carefully remove the rear plastic cover.

CHE: Linked - Vented Batteries, Unlinked - Sealed Batteries
REN: Right Link - 6 Hour DDS, Left Link - All Night DDS, No Link - LVD
Green Wire: Grounded - Enable Remote Load Control & Disable DDS & LVD,
: Floating - Disable RLC & Enable DDS & LVD.
Yellow Wire: Grounded (Green Wire Grounded) - Load Disconnected, Floating - Load Connected.
Note: If the Green wire is floating, the yellow wire has no effect.

For simplicity in the following drawings unconnected wires are not depicted.



GSL Electronics
www.gsl.com.au
ABN 30 053 250 472
Phone: (02) 9620 9988
Fax: (02) 9620 9899
Unit 2, 110 Station Road, Seven Hills ,NSW, 2147, Australia

200W Solar Charger
Maximum Power Point Tracker

Operating Instructions
Please read these instructions before use

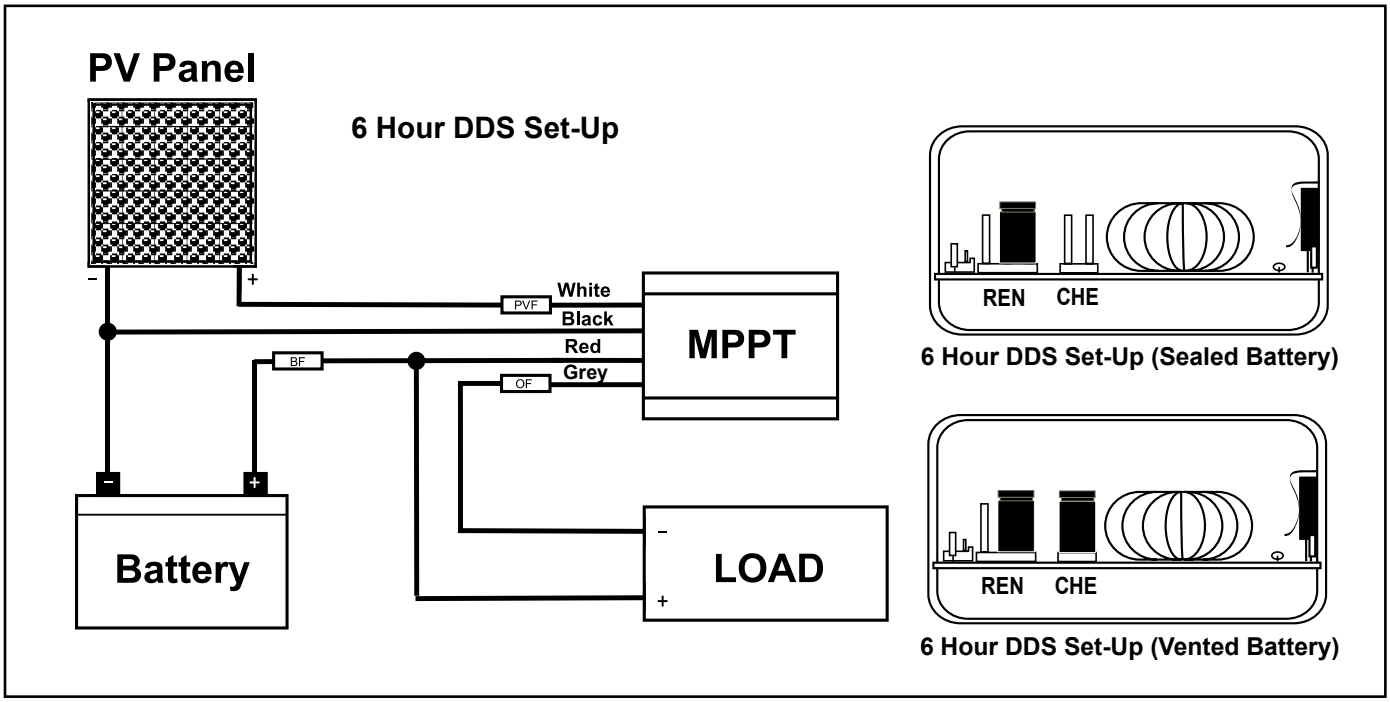
Wiring With Dawn To Dusk Switch:

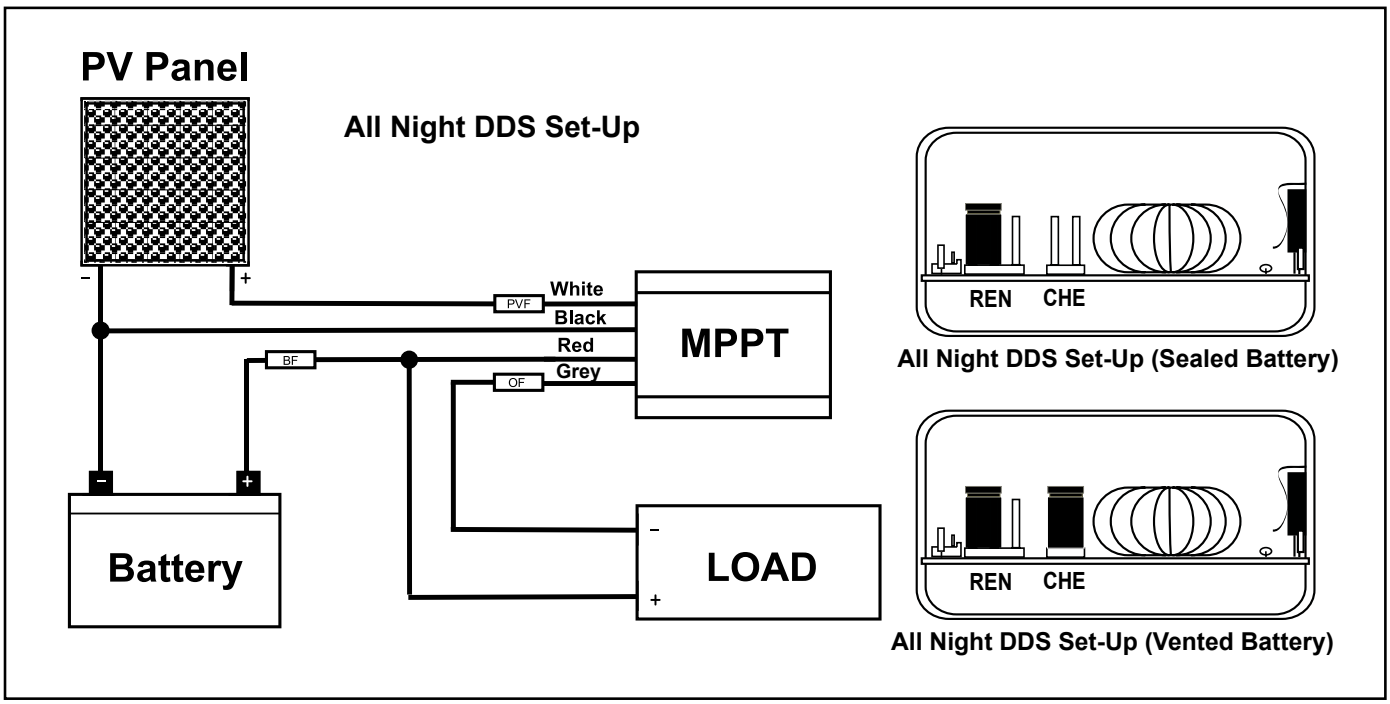
The DDS option is intended to power up loads during night-time only.

This feature will not trigger during short periods of low light, it is an approximation only to actual ambient light levels and if precise ambient light levels are required then light sensors must be used.

The maximum DDS load current is 10A continuous or 20A transients.

The DDS can be set to approx. 6 hours or “All Night” (actual night duration and up to 15 hours max.)





GSL Electronics
www.gsl.com.au
ABN 30 053 250 472
Phone: (02) 9620 9988
Fax: (02) 9620 9899
Unit 2, 110 Station Road, Seven Hills ,NSW, 2147, Australia

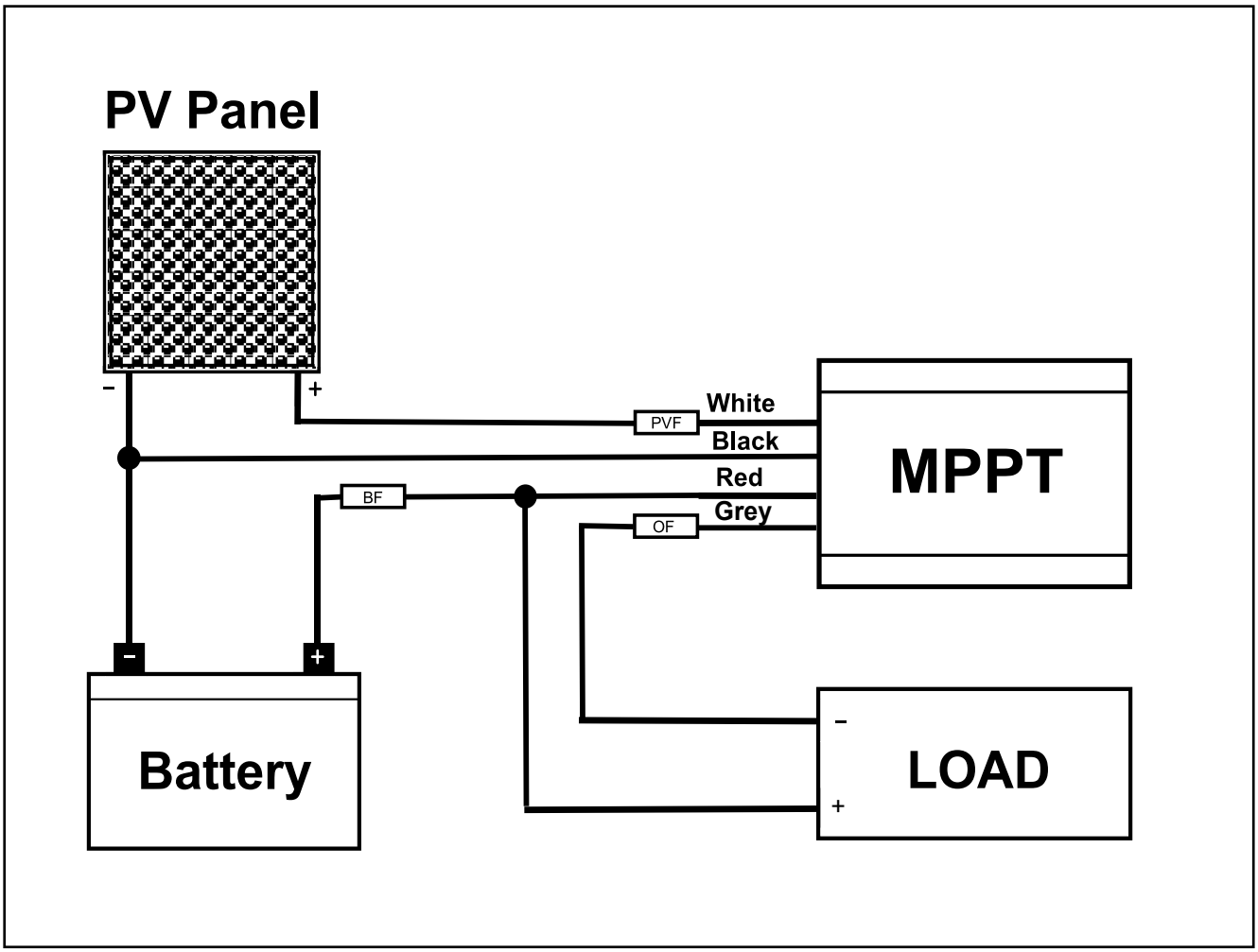
200W Solar Charger
Maximum Power Point Tracker

Operating Instructions
Please read these instructions before use

Wiring With Low Voltage Disconnect :

The LVD option disconnects the load when the battery voltage drops below 10.5V on 12V mode and 21V when operating in 24V mode. This helps to protect the Load from over discharge of your batteries. This feature will not trigger during short transients.

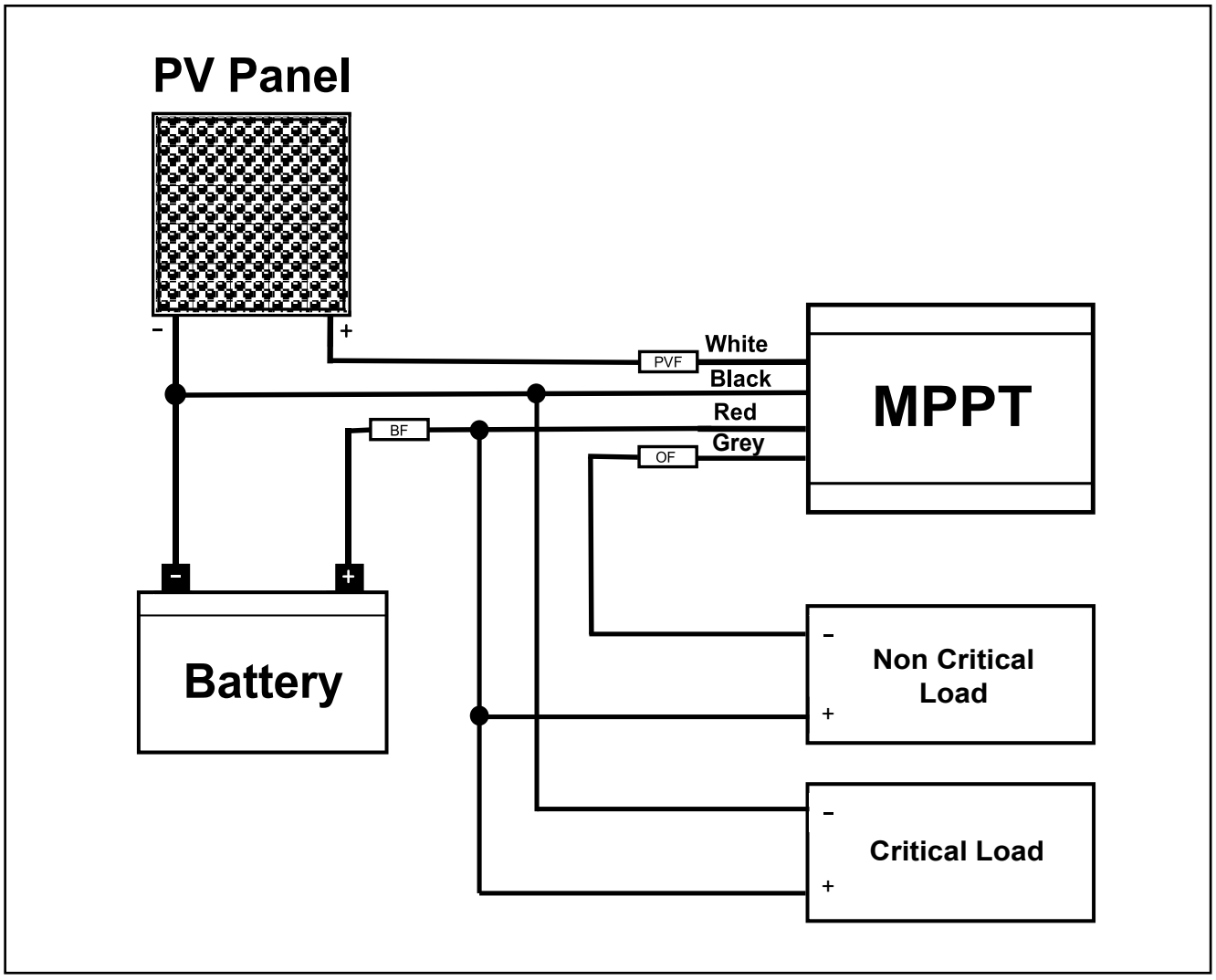
The LVD maximum load is 10A continuous and 20A for short transients below a few seconds.



Please ensure that your MPPT has been correctly configured (REN & CHE settings) for your application. Refer to the Settings and Configurations section for more information.

Wiring With Critical And Non Critical Loads:

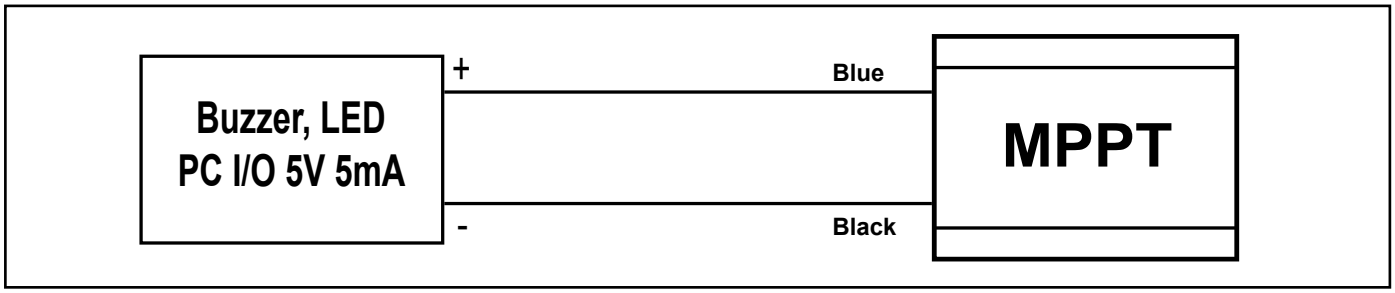
Critical loads are generally light loads which are powered under any condition. Non critical loads are loads which can be disconnected to ensure maximum on time for critical loads as well as to extend the life expectancy and reliability of the system. The non critical load can be set up as LVD, DD 6 hours or DD all night with the same REN configuration detailed earlier.



Please ensure that your MPPT has been correctly configured (REN & CHE settings) for your application. Refer to the Settings and Configurations section for more information.

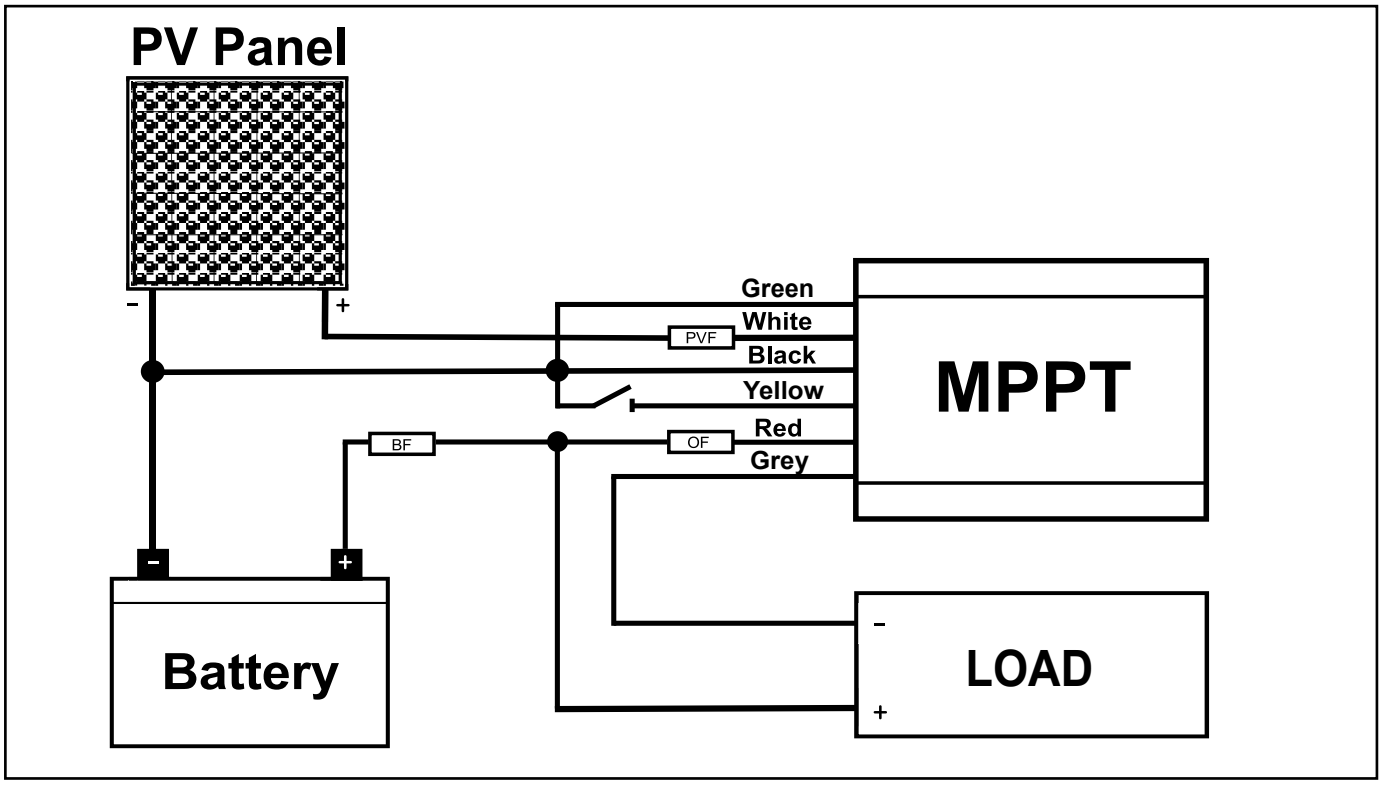
Wiring The Remote Alarm:

The remote alarm is a normally low 5V digital signal that goes high when the LVD disconnects. It has a 5mA source/sink capability and can be used to remotely monitor the LVD status.



Wiring With Load Remote Control:

This option enables the remote load connection and disconnection via the load remote control, yellow wire. When the yellow wire is grounded the load is disconnected otherwise the load is connected. To configure this mode the green wire must be grounded. This option overrides the LVD or DDS function but has the same load limitations of 10A continuous or 20A transient.



Please ensure that your MPPT has been correctly configured (REN & CHE settings) for your application. Refer to the Settings and Configurations section for more information.

200W Solar 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 specialised converter designed to maintain the PV voltage at the level in which it delivers maximum power to the load or battery. The nominal panel output power can only be ensured with the use of an MPPT.

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

1. Suitable for new lower cost high efficiency grid type panels since the GSL MPPT can efficiently charge the batteries from relatively high voltage, say 12V batteries from 36V MPP panels.
2. Less interference and more accurate voltages during absorption and float.

Q: What output can I expect from a 150W or 200W MPPT?

1. The maximum bulk charge current with a 12V battery and 150W panel is approximately 12A, so you can expect about 40AH per day which is a 40W load for about 10 hours.

2. The maximum bulk charge current with a 24V battery and a 200W panel is about 8A so you can expect about 30AH which is a 40W load for about 15 hours.

Q: Why are MPPT used mainly in high power systems?

Until now and despite their overwhelming advantages MPPTs have been excluded from low power systems because of cost. The new GSL MPPT specifically designed for low power makes economic sense even in small systems.

Q: What sort of batteries should I use?

1. A deep cycle battery is a must due to the cyclical nature of solar systems with a recommended battery capacity of at least 60AH.

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 does 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 4% of nominal panel power. Below 4%, 6W in a 150W 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 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.