

# 150W Solar Charger Booster 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, low cost and highly efficient way to charge sealed or vented 24V batteries from low voltage or parallel panels with built in Low Voltage Disconnect, Load Remote Control or Dusk to Dawn mode.



**BMPPT - 150 Unit**

PATENT APPLIED FOR - 2010901565

<b>BMPPT-150 Specifications</b>	
Efficiency Typical	95%
Input Voltage	14V to 54V
Output Voltage (Float)	27V / 54V (See NOTE on Pg.2)
Output Voltage (Bulk)	Flooded 29V, Sealed 28.4V
Output Power	150W @ $V_{out} / V_{in} \approx 2$ , 100W @ $V_{out} / V_{in} \approx 4$
Quiescent Current	0.04A
Thermal Protection	Multilevel type
Dimensions (mm)	35 X 75 X 100mm
Indications	Dual LED display – battery OK / LOW



**BMPPT-150 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 charge 24V/48V\* battery systems and select a suitable 3 stage charge regime. (**\*NOTE: on 48V batteries only a fixed float charge at 54V is available**)
- 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 BMPPT has a built in multilevel over temperature protection to improve product reliability while maximising output power availability.
- The BMPPT will efficiently charge 24V batteries from 12V panels.
- The BMPPT will efficiently float charge 48V batteries from 12V panels or 24V panels.
- The panel voltage limits for the BMPPT-150 are: Maximum open circuit voltage below 54V.
- The lowest maximum power point required for operation is 14V
- If used, this fuse is optional, locate the output fuse (OF) as close to the BMPPT as possible (15A 24VDC rating).

**Important Notes:**

- **The panel open circuit voltage MUST be below 27V on 24V battery systems or below 54V on 48V battery Systems.**
- 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.
- If used with panels over 150W the BMPPT-150 MUST be fitted with the PVF fuse. Locate this fuse as close as possible to the BMPPT. A 10A 32V fuse is recommended.

### Settings And Configurations:

The BMPPT-150 factory default setting is for sealed lead acid batteries (Maximum charge voltage 28.4V and float voltage 27V) 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

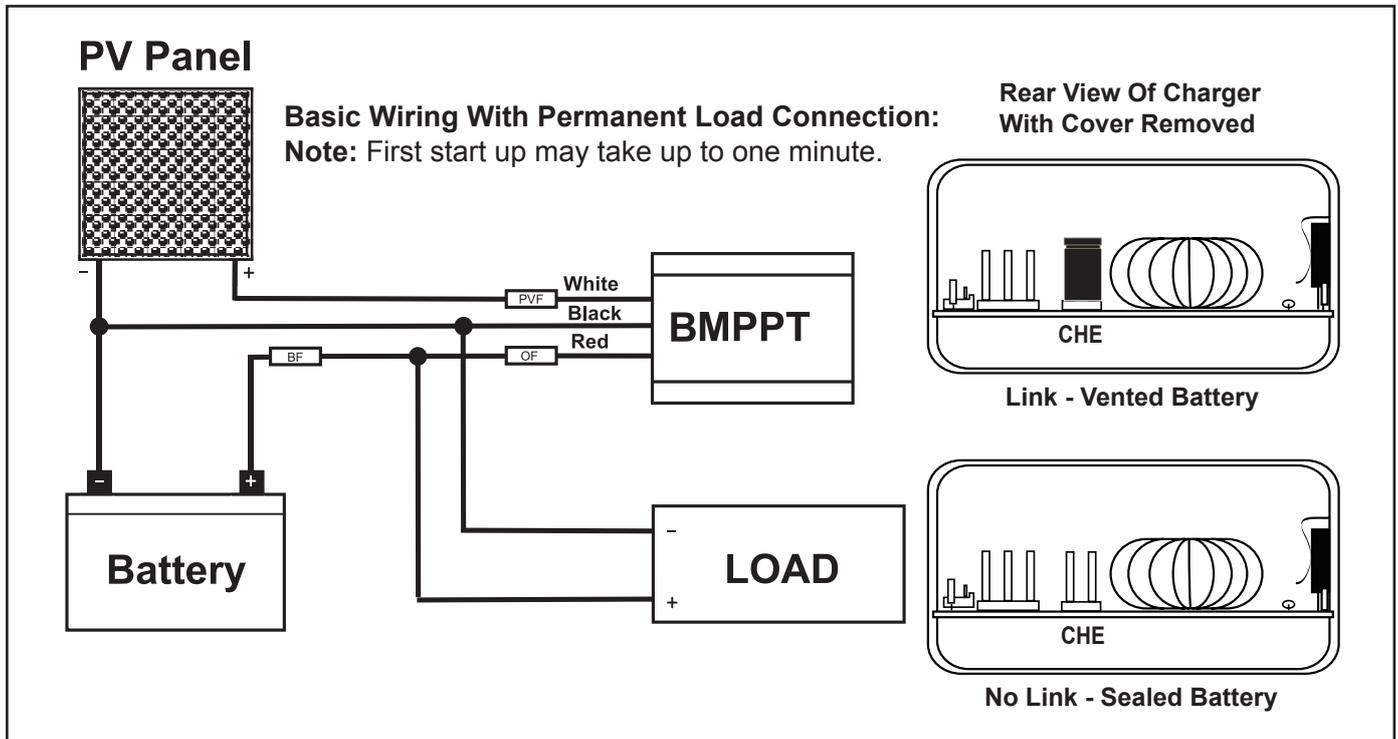
**REN:** Right Link - 6 Hour DDS, Left Link - All Night DDS, No Link - LVD

**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.



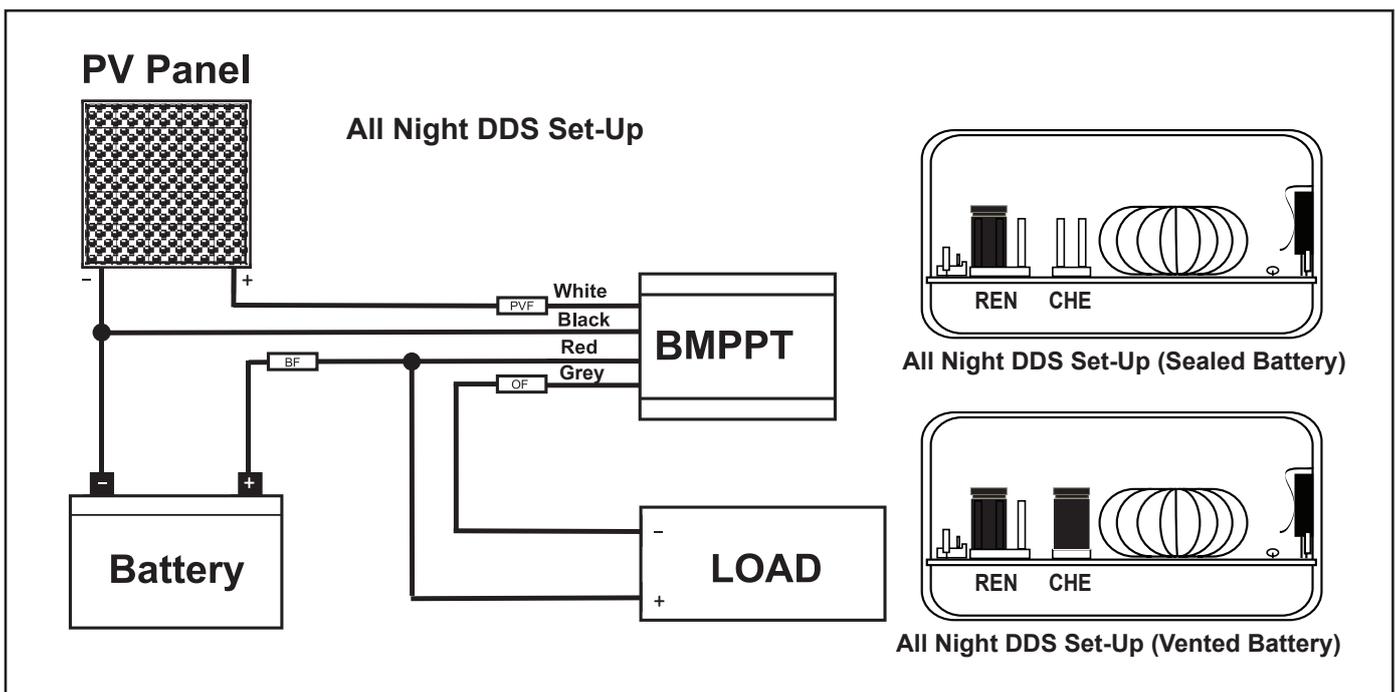
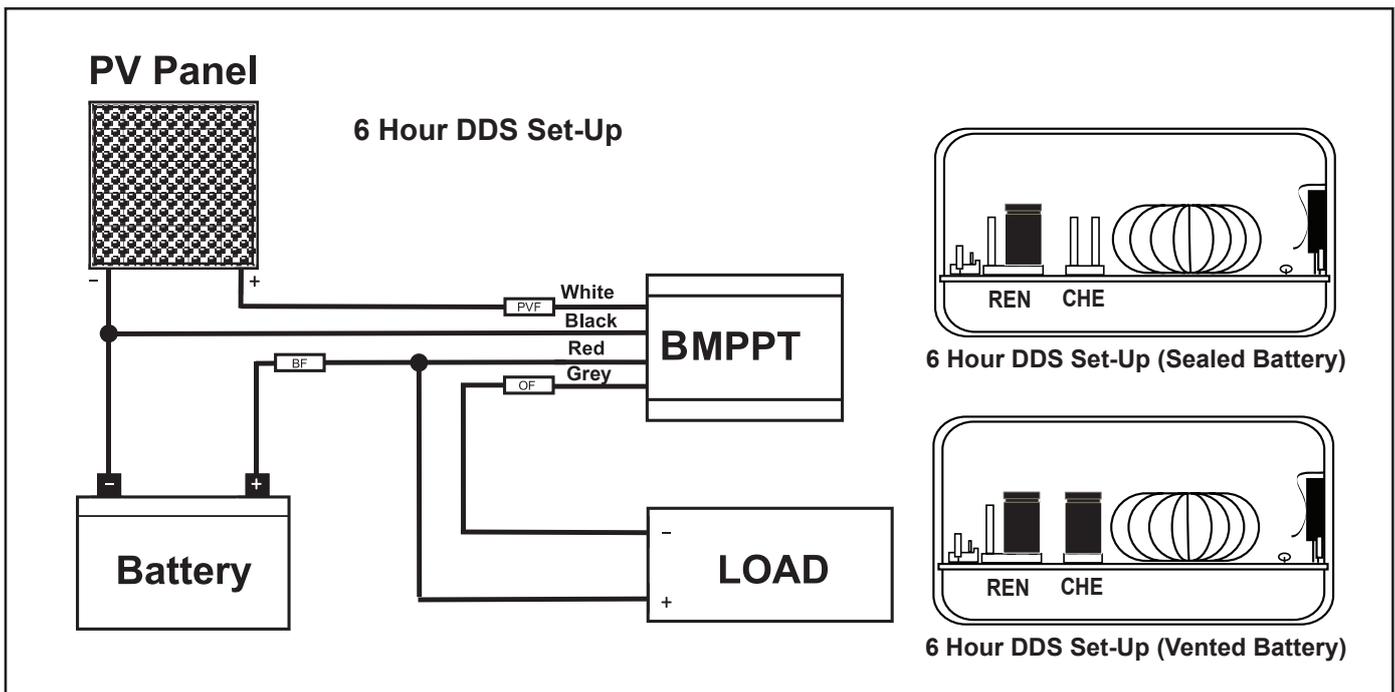
**Wiring With Dawn To Dusk Switch:**

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.

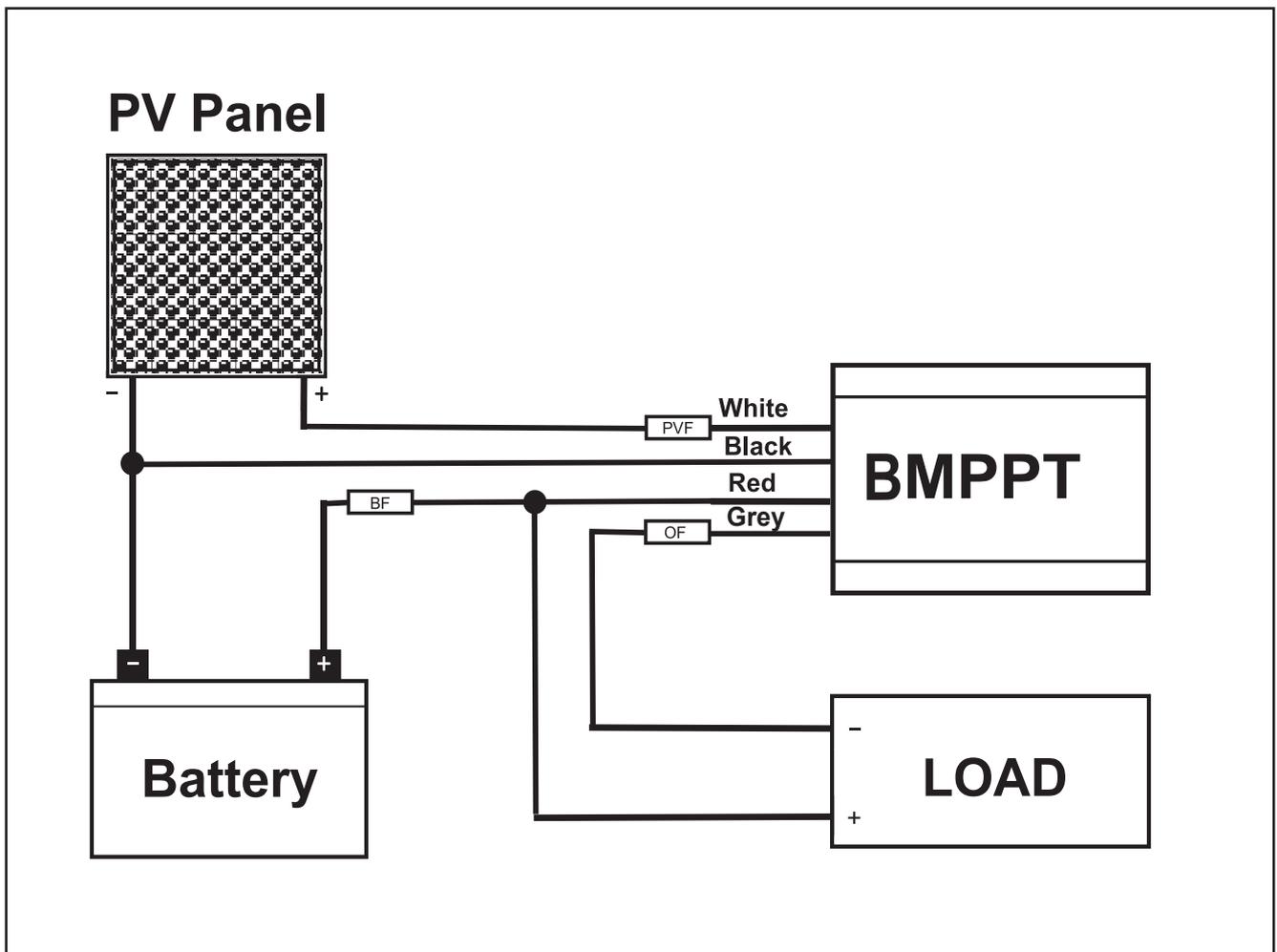
The maximum DDS load current is 10A continuous or 20A transients.

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



**Wiring With Low Voltage Disconnect :**

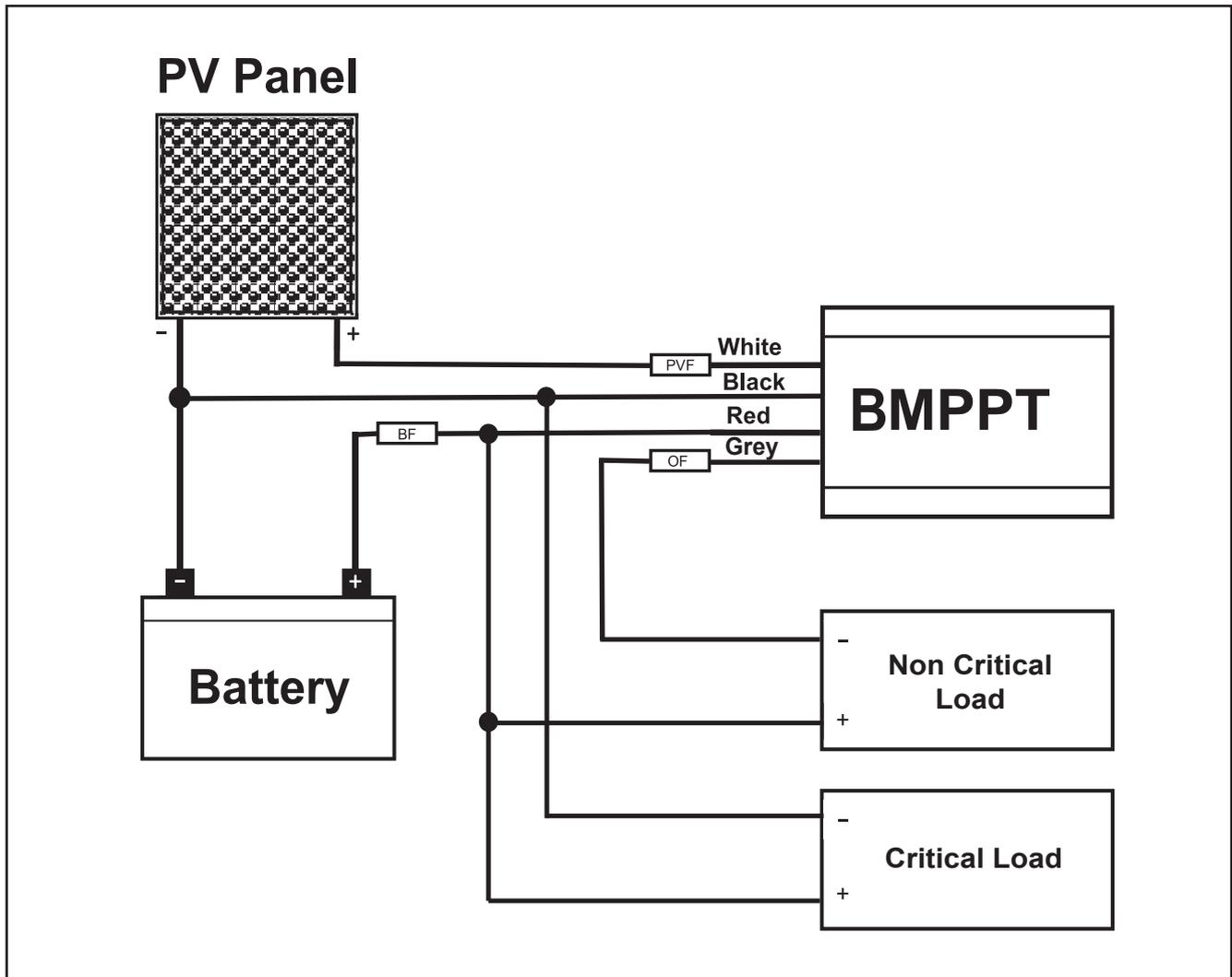
The LVD option disconnects the load when the battery voltage drops below 0.85 of nominal voltage to protect the battery from damage. The load reconnects when the battery voltage exceeds 0.9 of nominal voltage. This feature will not trigger during short transients. LVD load is 10A continuous or 20A transient.



Please ensure that your BMPPT 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:**

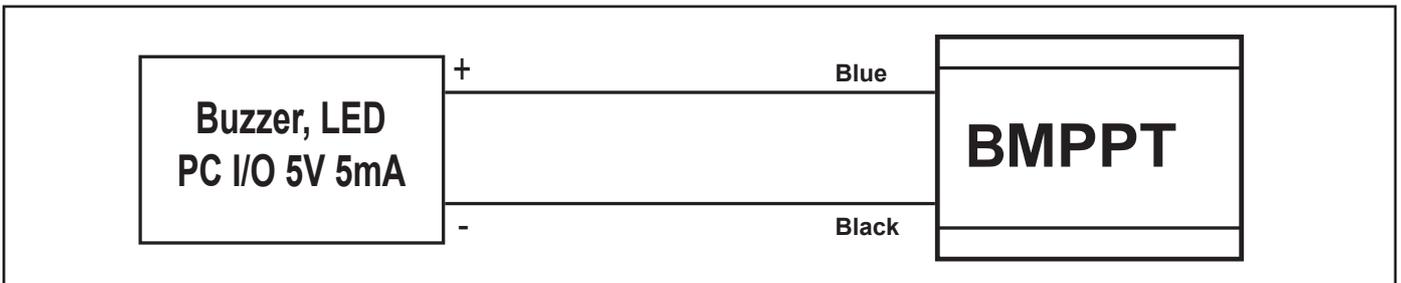
Critical loads are generally light loads which are powered under any condition. Non critical loads are loads which can be disconnected to ensure maximum on time for critical loads as well as to extend the life expectancy and reliability of the system. The non critical load can be set up as LVD, DD 6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



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

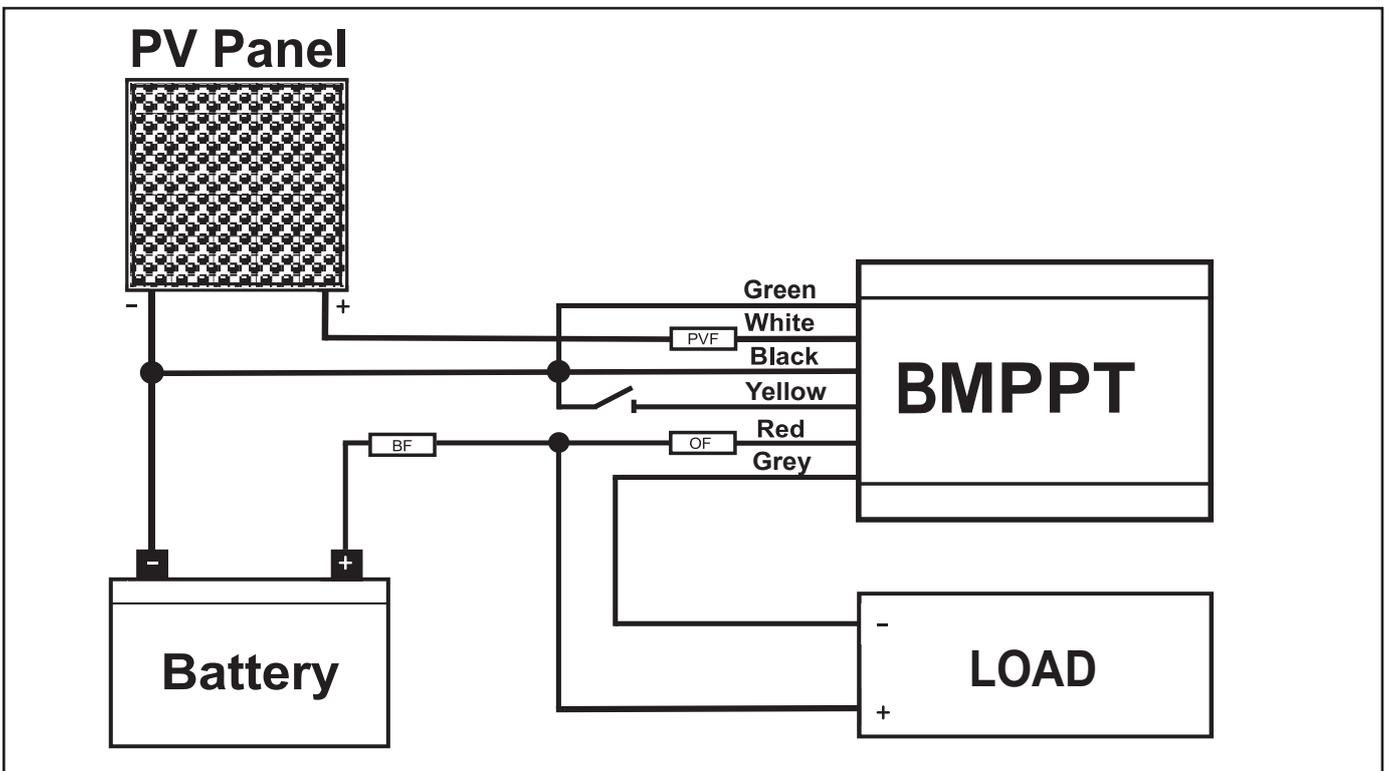
### Wiring The Remote Alarm:

The remote alarm is a normally low, 5V digital signal that goes high when the battery voltage drops below 0.9 of nominal voltage, the LVD disconnects or over temperature trips. It has a 5mA source capability and can be used to remotely monitor system 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 BMPPT has been correctly configured (REN & CHE settings) for your application. Refer to the Settings and Configurations section for more information.



#### MPPT FAQs

**Q: What is a BMPPT?**

BMPPT stands for **Booster 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 while at the same time boosting the output voltage above the input. The nominal panel output power can only be ensured with the use of an BMPPT.

**Q: When is the BMPPT required?**

The BMPPT is required when the panel voltage is below the battery voltage such as when a 12V panel needs to charge a 24V battery.

The BMPPT enables the parallel connection of panels which can make the system more tolerant to partial shading when compared to series panel connection.

**Q: What output can I expect from a 150 BMPPT?**

The maximum bulk charge current with a 24V battery and 150W panel is approximately 6A, so you can expect about 24AH per day which is a close to 60W load for about 10 hours.

**Q: Why are BMPPT used mainly in high power systems?**

Until now and despite their overwhelming advantages BMPPTs have been excluded from low power systems because of cost. The new GSL BMPPT 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 100AH.
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 resulting in lower panel output.

**Q: What is the smallest panel size for the BMPPT-150?**

The smallest panel size recommended for the BMPPT-150 is 10W, below that level the BMPPT will not function effectively.

**Q: Is interference possible? and If so what do I do?**

GSL's BMPPTs 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 BMPPT wires. Ensure the BMPPT chassis is grounded. Grounding a battery terminal may also help and finally you can try adding ferrite clamps.

*Warranty Conditions:* The product is warranted to be free from defects in materials and workmanship under normal use and service for a period of 24 months from the date of sale. This warranty covers defective parts and workmanship provided that the product is shipped prepaid to the seller within 24 months of purchase of goods. This warranty is limited to the repair or replacement (at the manufacturers' discretion) of parts and shipping prepaid to the original despatch destination. We regret that no liability can be accepted for consequential or special damages of any kind howsoever arising in connection with products supplied by the seller. This warranty is in lieu of all other warranties expressed or implied. No representative is authorised to assume for the seller any other liability in connection with the seller's products.