6. Operation

6.1 Power up

When connecting a battery, some or all (depending on the battery condition) of the "BATTERY CONDITION" LED's should light up.
The "LOAD DISCONNECT" LED might also light up, but will switch off after a few seconds if no abnormal condition is present (See section 6.3).

6.2 Battery Charge

When the solar panel is charging the battery by more than 200mA, the green "SOLAR CHARGE" LED will light up.

The "BATTERY CONDITION" LED's give an indication of the current battery voltage as follows:

LED's On	Battery Voltage
Green, Yellow and Red	Greater than 12V
Yellow, Red	Between 11.4V and 12V
Red	Below 11.4V

6.3 Load

The load output provides a connection to drive a load of up to 10A at the current battery voltage. The red "LOAD DISCONNECT" LED will light up and the load automatically disconnect in the following scenarios:

6.3.1 Undervoltage Protection
When the battery voltage drops below 11.2V the load is disconnected to prevent damage to the battery. As soon as the battery voltage recovers above 11.6V, the load will be automatically reconnected and the LED will go off.

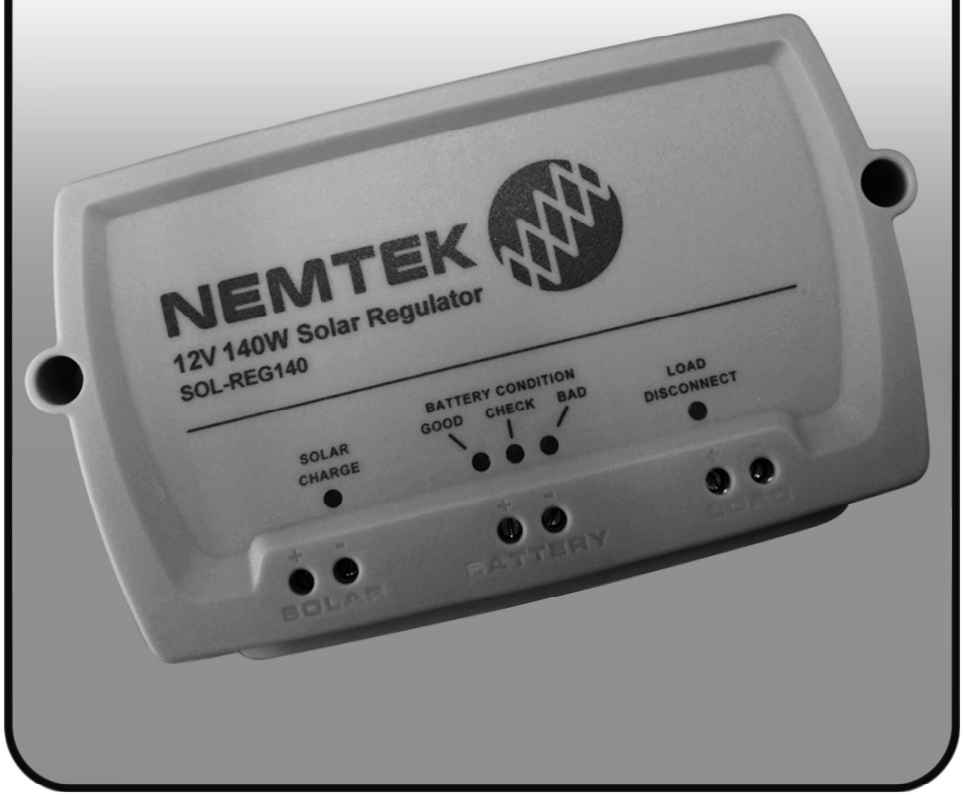
6.3.2 Overcurrent Protection
When the load terminals are short circuited or the connected load draws in excess of 10A, the load will be disconnected. The load will be reconnected and the LED will go off in a few seconds after the short circuit is removed or the load current falls below 10A.

If a higher load current is required, the load can be connected directly to the battery.
All protection will be bypassed in this case.

NEMTEK
www.nemtek.com

140W Solar Regulator

User Manual



Introduction, Disclaimer, Guarantee and Technical Specifications

1. Introduction

The NEMTEK 140W Solar Regulator is designed to efficiently convert the output from a solar panel to a level suitable for charging a 12V lead-acid battery, while Mean Power Point (MPP) technology ensures that the maximum available power is harvested from the solar panel. The regulator provides an output to drive a 12V load with a current consumption of up to 10A, as well as a load disconnect function to protect the system and battery against under-voltage and over-current. Five LED's indicate the charging state, battery condition and load state.

2. Disclaimer & Guarantee

The 140W Solar Regulator, manufactured by NEMTEK, is guaranteed for a period of two years from date of sale against defects due to faulty workmanship or material. NEMTEK will, at its discretion, either repair or replace a product that proves to be defective. NEMTEK guarantees that the product, when properly installed and used in line with the specification as determined by NEMTEK from time to time, will execute its function. NEMTEK does not guarantee that the operation of the product will be uninterrupted and totally error free. Faulty units must be returned to one of the NEMTEK Group outlets. The buyer shall pay all shipping and other charges for the return of the product to NEMTEK or NEMTEK Security Warehouse.

The guarantee does not apply to defects resulting from acts of God, modifications made by the buyer or any third party, misuse, neglect, abuse, accident or mishandling. Product specifications may be altered without prior notification.

3. Technical Specifications

Parameter	Value
Power Handling Capability	140W
Efficiency @ 140W	>90%
Maximum Solar Panel Input Voltage	24VDC
Solar Panel Input Range	20W – 200W
Battery Charge Voltage	14.3VDC
Suitable Lead Acid Battery Types	Flooded, AGM, Gel
Recommended Battery Capacity (Solar Panel < 90W)	>40Ah
Recommended Battery Capacity (Solar Panel > 90W)	>90Ah
Maximum Flat Battery (11 VDC) Charge Current	11A**
Maximum Load Supply Current	10A**
Load Disconnect Voltage	~11.2VDC
Quiescent Current	60mA
Operating Temperature	-20 – 55°C
Terminal Size	6mm^2 / 12AWG
Mounting Hole Size	5mm

*Where applicable, all specifications are quoted at a temperature of 25°C
**Over-current protected

4. Warnings

1. This system may pose a fire hazard if not properly installed.
2. Always take care not to create a short circuit between opposite polarities.
3. This solar regulator employs positive switching. **Never connect the positive outputs to a common point.**
4. It is highly recommended to install a 20A fuse in line with the positive polarity cable from the regulator to the battery.

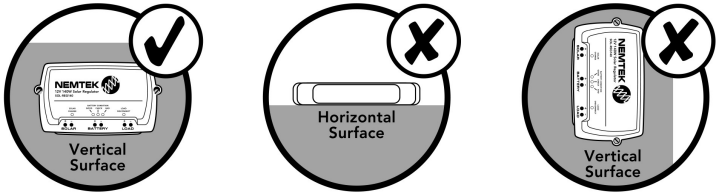
Warnings and Installation

5. Do not attempt to charge any battery other than a 12V lead-acid battery with a capacity that is matched to the solar panel and load.
6. Always ensure sufficient ventilation for the regulator and battery. The regulator should always be mounted on a vertical surface to ensure proper heat dissipation of the metal back plate.
7. Ensure all terminal screws are tightened firmly.
8. Keep the unit away from excessive moisture.

5. Installation

Refer to following steps in conjunction with the image when installing the solar regulator:

1. The unit should be mounted against a flat, vertical surface, by using the 5mm screw holes on the sides. The unit must be installed in an environment with sufficient ventilation to ensure operation within the temperature specifications as per section 2. **Do not** mount the unit on a horizontal surface as this might cause overheating under heavy loads.



2. Connect the battery cables **first to the regulator and then to the battery**, ensuring the correct polarity. It is strongly advised to install a 20A fuse, in-line with the positive cable from the regulator to the battery. Care must be taken to use cables that can handle the maximum regulator current. For maximum efficiency, 6mm^2 should be used. Only connect the regulator to a battery with a capacity suitable for the solar panel used.
3. Connect the solar panel cables, ensuring the correct polarity.
4. Make sure the load is switched off before connecting it to the regulator, ensuring correct polarity.
5. To disconnect the regulator, follow the installation steps in reverse order.
6. Ensure all cables are kept as short as possible to maximise efficiency.