



# Solar Controller

## Model 510

Practical Battery Charger/DC Load Manager

Seamless Integration of PV Panel, Battery and Load

### FEATURES

- Easy to use
- Intelligent control of battery charge
  - Prolongs battery life
  - Prevents overcharge
  - Prevents deep discharge
- Blocks reverse current to prevent loss of charge
- Display of battery status
- Display of photovoltaic output
- Display of charging & load current
- Built-in microprocessor for PV charge control maximizes charging efficiency and load operation
- Steel case suitable for outdoor use
- Two year warranty

### TYPICAL APPLICATIONS

- Remote / rural power
- Emergency communication
- Auxiliary power source
- Garden lighting
- Pond aerator or fountain
- Electric fence controller
- Off-grid lighting
- Remote Christmas lights
- Emergency power supply
- Marine lighting, communication and accessories

### DESCRIPTION

- Solar controller provides effective, straightforward means to utilize solar energy
- Designed for efficient battery charging and control of DC output
- Standard model is equipped with a tri-color LED to indicate battery status
- Optional display monitors battery voltage, photovoltaic voltage and charging current
- Units are individually configured to any of four battery and PV factory-settings for optimum flexibility and efficiency
  - 12, 24, 36 and 48 Volt systems are available

### ORDERING INFORMATION

**Model 510** is available with several different factory configurations for optimal efficiency.

- **Model 510** 12 Volts (standard)
- **Model 510-24** - 24 Volts
- **Model 510-36** - 36 Volts
- **Model 510-48** - 48 Volts

Note: Higher voltage models may also require multiple PV panels.

### Electronic Control Concepts

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## SPECIFICATIONS

### BATTERIES

- Wet or sealed lead acid, lead calcium, lead antimony battery, 12V nominal or multiples (i.e. bank of 4 batteries for 48V system)

### PROTECTION

- **Reverse Polarity Protection** – protects against reverse connection of PV panel or battery
- **Diode Protection** – prevents battery discharge when battery is higher than PV panel
- **Overcharging Protection**
- **Over-discharging Protection**

### CHARGING CURRENT

- 10 Amps maximum

### LOAD CURRENT

- 10 Amps maximum

### LOW VOLTAGE DISCONNECT

- 11.5 Volts

### LOW VOLTAGE RECONNECT

- 11.8 Volts

### DISPLAY (Optional)

- Liquid Crystal
- 2 Line x 16 Character Alphanumeric

### ACCURACY (Display and Working)

- Battery Voltage
  - 8 to 15 Volts, 2% +/- 0.1V
- Photovoltaic Voltage
  - 0 to 27 Volts, 2% +/- 0.1V

### BATTERY STATE INDICATOR

- Tri-Color LED
  - Green – Above 13.2 Volts
  - Orange – 11.8 to 13.2 Volts
  - Red – Below 11.8 Volts

### CONTROLS/INDICATORS

- ON/OFF Switch
- Battery State LED
- Green Power-On LED
- Red DC Output On
- Optional 2 Line x 16 Character LCD

### PHYSICAL CHARACTERISTICS

- Durable 14 gage steel enclosure
- Weather resistant
- 172 x 110 x 84 mm
- 6.75 x 4.3 x 3.3 inches

### WEIGHT

- 1.8 kg (4.0 lb)

## MODES OF OPERATION FOR DC LOAD

### DUTY CYCLE ON-OFF CONTROL

- Model 510 determines on and off times based on battery, charge current, and load. The load will be switched off for an instant to test the battery with no load.

### DEEP CYCLE CONTROL WITH TEST

- The battery charges to the Bulk Voltage. The load turns on until the battery reaches the Low Battery Cutoff Point. The load will be switched off for a short interval to test the battery with no load.

### DEEP CYCLE CONTROL WITHOUT SHUT-OFF

- The battery charges to the Bulk Voltage. The motor or DC load turns on until the battery reaches the Low Battery Cutoff Point. The load remains on while testing the battery voltage.
- Testing a battery under load is less accurate than no-load testing. This mode is for applications where any disruption of the load would be a problem such as operation of a radio.

### NIGHT

- The battery charges all day and the load activates at dusk. The load remains on until the battery voltage drops to the low voltage cutoff level.
- Ideal for indoor or outdoor lighting, garden lighting, DC Christmas lights, etc.

### ALWAYS ON

- Load on immediately, only shuts off load when battery is dangerously low.
- Used for applications where load is light and controlled by external switches.

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