

# EWC-30

## 12 Volt 30 Amp Digital Solar Charge Controller Installation & Operation Manual

### IMPORTANT SAFETY INSTRUCTION: SAVE THESE INSTRUCTIONS

THIS MANUAL CONTAINS IMPORTANT SAFETY AND OPERATING INSTRUCTIONS FOR 12V SOLAR CHARGE CONTROLLER. KEEP IT WITH OR NEAR THE CONTROLLER AT ALL TIMES.

The charge controller is designed to protect your 12 Volt Lead-acid or Gel-cell battery from being overcharged by solar panels. It also prevents discharging of battery during nighttime. This controller reduces overall system maintenance and prolongs your batteries life. It will display the charging current or battery voltage from the LCD digital meter; it also indicates the batteries condition with LED bar-graph. This controller is designed to work with all kinds of 12 Volt solar panels for indoor installation.

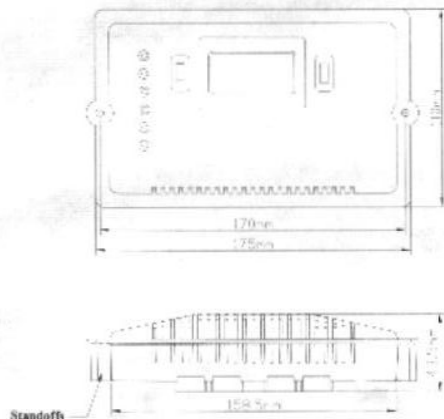
**WARNING: RISK OF EXPLOSIVE GAS-** Working in the vicinity of a lead acid battery is dangerous. Batteries generate explosive gases during normal battery operation. Always work in a well-ventilated area.

- **DO NOT** smoke, strike a match, or cause a spark in the vicinity of batteries during charging.
- **CAUTION: DO NOT EXCEED THE UNIT'S VOLTAGE AND CURRENT RATINGS:**
- **MAXIMUM** solar array voltage rating of 25 volts.
- **MAXIMUM** charging current 30 amps.
- **CAUTION: DO NOT DEVIATE FROM THE RECOMMENDED WIRING INSTRUCTIONS:**
- **DO NOT** reverse the Battery and Solar panel connections to the controller.
- **DISCONNECT** the controller from the solar panel and battery before attempting any maintenance or cleaning.
- **Do not** dismantle the controller. Take it to a qualified service center when service or repair is required. Incorrect reassembly may result in a risk of damage to the Solar system.
- **Installation** should be made by a qualified person.

#### PERSONAL PRECAUTION:

- If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flush eye with running cold water for at least 10 minutes and get medical attention immediately.
- In order to reduce the risk of sparks or short circuits that could result in an explosion be careful not to drop metal tools on any connections.

#### Controller Dimension



#### Features

- **Digital Meter** – Battery voltage or charging current are shown digitally.
- **Protects and Maintains battery** – Protects batteries from overcharging and maintains batteries in fully charged state.
- **Battery Type selector** – Selection of the Gel-cell or Lead-acid battery for better charging result.
- **Safety circuit protection** – Reverse polarity protection
- **Reverse leakage protection** – Protects batteries from being discharged by solar panel.
- **Temperature Protection** – Over temperature protection and auto-resume
- **Status Lights** – Easy read LED indicators.
- **Terminal Block** – Easy wire connections
- **Mounting Options** – Panel mount / wall mount.

## Installation and Operation

### 1. Mounting

- 1.1 **Mounting Consideration:** - The solar controller is designed to either be flush mounted or wall mounted.
- 1.2 **Flush mounting:** The flush mount unit requires a rectangular cutout in the mounting surface with sufficient space (2-3 inches) behind to accommodate the controller.
- 1.3 **Wall mounting:** The wall-mounted unit is installed onto a wall surface using two mounting screws. Electrical connections are made to the back of the controller. Wiring can be run down the wall or through a hole in the wall directly below the controller.
- 1.4 **Recommended Battery Capacity:** 12V 45AH minimum.

### 2. Connection Procedures (refer to Connection diagram)

- 2.1 Mount the solar controller panel.
- 2.2 Select Lead-Acid or Gel-cell Battery modes.
- 2.3 Connect the battery positive side to the solar controller BATTERY POSITIVE + with a suitable wire.
- 2.4 Connect the battery negative side to the solar controller BATTERY NEGATIVE - with a suitable wire.
- 2.5 Connect the solar panel positive side to the solar controller (ARRAY) PANEL POSITIVE + with a suitable wire. (Be careful DO NOT short circuit the solar array.)
- 2.6 Connect the solar panel negative side to the solar controller (ARRAY) PANEL NEGATIVE - with a suitable wire.

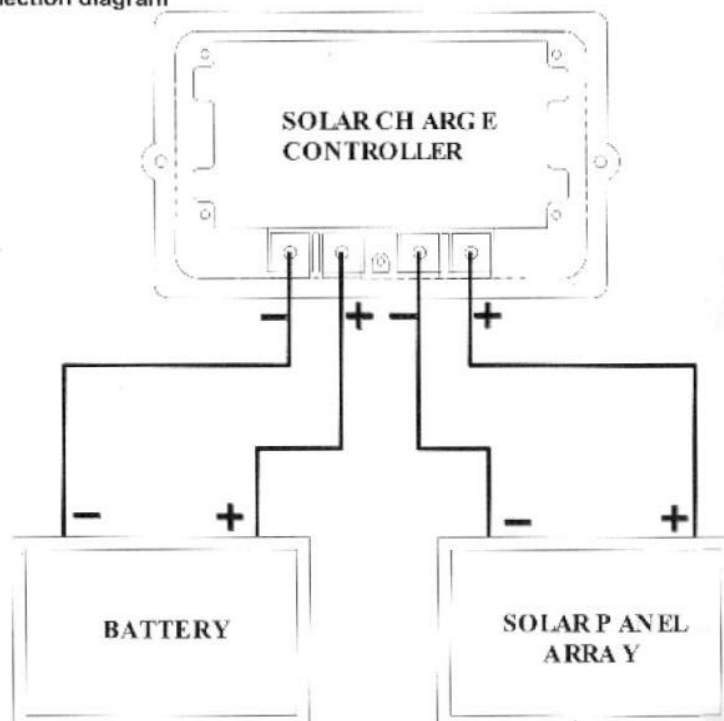
*Any wiring variation of size or length can affect the LCD meter performance*

3. **Wire size:** - Refer to the "WIRE SIZE" chart below to determine the minimum size wire needed for each connection. When using heavy stranded wire, you may need to divide the ends into two groups and straddle the screw on the terminal block.

	Battery Connection Distance round trip (meter)	Solar Array Connection Distance round trip (meter)		
Length of Wire	< 0.6m	6m	9m	12m
AWG	6 or 8	10	8	6

4. **Wire type:** - It is better using stranded wire instead of solid wire. Stranded wire does not wear out and cause loose connections over time as easily as solid wire. Use red wire for (+) and black wire for (-). One 6 AWG wire (stranded) or two 8 AWG wires are suitable. Connect the wires to the controller with crimped connectors.

### 5. Connection diagram



**CAUTION:** Do not attempt to change the battery type selector switch during charging, otherwise the LCD meter readings will be affected.

## 6. OPERATION

When connection is completed, the charge controller will start charging the battery automatically. The solar controller is based on a three stage charging algorithm, i.e. Bulk charge mode, Constant-voltage mode and Float mode. During the charging period, you can change the select switch to read the battery voltage or charging current from LCD meter.

- Battery condition detect by LED bar-graph. The controller will indicate the battery condition with three states: GOOD, FAIR, LOW.
- PWM constant-voltage regulation to prevent heating and excessive battery gassing. Pulse charging to restore full battery capacity.
- Float mode: When the battery is fully charged, the battery voltage will reduce to a lower regulated voltage, this **safety** maintains the battery at full charged state safely.

## 7. Specifications

Technical Specifications		
PARAMETERS	UNITS	DATA
<b>ELECTRICAL:</b>		
Normal input (solar cell array voltage)	Volt	17~22
Max input solar cell array voltage	Volt	25
Max charging current:	Amps	30
Charging start when Battery voltage not less than	Volt	5.0 +/-0.3
Current Consumption when connected 15V Array (Battery not present)	mA	35 Max.
Current Consumption when connected 12V battery (Array not present)	mA	25 Max.
PWM Constant-voltage for Gel-cell battery	Volt	14.1 +/-0.4
PWM Constant voltage for Lead-acid battery	Volt	14.5 +/-0.4
Float mode voltage	Volt	13.4 +/-0.4
<b>METER DISPLAY:</b>		
LED Bar graph indicated range (Battery Voltage status)		
LOW LED	Volt	<11.5 +/-0.4
FAIR LED	Volt	11.5 to 12.5 +/-0.4
GOOD LED	Volt	>12.5 +/-0.4
LCD Meter Accuracy- DC Voltage	Volt	1.25%
LCD Meter Accuracy- DC Current- at 5~30Amp	Amps	3%
<b>PROTECTION:</b>		
Over temperature protection starting at (Stop charging)	°C	>80
Over temperature protection reset at (Restart Charging)	°C	<65
<b>MECHANICAL</b>		
Controller Dimension	mm	185 (L) x 109(W)
Controller overall Height	mm	Approx. 45
Net weight	g	Approx. 350
<b>ENVIROMENTAL CHARACTERISTIC:</b>		
Operation temperature	°C	-5 to 50

Storage temperature	°C	-10 to70
Operation humidity range		0 to 80% RH

## MONITORING

### 1. LED Indicator

The 6 LEDs indicate charging status and battery conditions. These functions are described below.

#### Solar Power Indication (POWER LED - red)

**ON:** Indicates solar panel properly connected and solar power supplied normally.

**OFF:** No power available or insufficient voltage to active charge controller.

**Charging status** ("CHARGING" LED - blue; "CHARGE COMPLETE" LED - green)

Normal Status	Charging LED	Charge Complete LED	Conditions
Bulk Charge	ON	OFF	Indicates the battery is charging, virtually all the power from the solar panel pass through to the battery.
Solar power Weak	Flash	OFF	Indicates the solar panel voltage is too low when it is in Bulk charge mode. (insufficient daylight)
Float Charge	OFF	ON	Indicates full charge reached, a small "Float" charge continues to optimize battery when needed.

#### Battery conditions

**GOOD LED: ON** indicates the battery voltage is over 12.5V, usually indicates when the unit is charging.

**FAIR LED: ON** indicates the battery voltage is between 11.5 to 12.5V and needs charging.

**LOW LED: ON** indicates the battery voltage is under 11.5V and needs charging.

*The LOW LED will be blinking if battery is disconnected from the unit.*

*If the Solar Panel Power is weak, the charger will turn off the charging LED, that indicate the charging status has been turned off, in order to prevent the current return to the solar panel. (Return of current will cause serious damage the solar panel.)*

### 2. Digital LCD meter

A digital LCD meter is available on this controller; it will continuously display battery voltage or charging current. You can select the Current-Volt slide switch at any time on front panel. If the slide switch places at the middle position, the LCD meter will be OFF.

## MAINTENANCE

1. Ensure all wire connections are sound and free from corrosion. Tighten terminal block screws, the panel connections and battery terminals.
2. Visual Check of Solar panel and battery output cabling for signs of overheating, damage and cracking. If you find any wires damaged, please replace with new ones.
3. Verify each LED status to determine whether it meets the specifications or not.
4. The above maintenance should be done at least every 3 months

## TROUBLE SHOOTING

1. **The system of solar Panels-Controller-batteries is sized incorrectly**-The batteries will be under-charged if the solar panel is too small, or if the battery bank is too small, or if the usage is too high.
2. **Solar panel problems** - Solar panel can be seriously affected by the angle of the panel (as in winter months), minor shading, high level haze (barely visible) and dust on the panel.
3. **Battery problems** - If the battery is going bad, a little charging or discharging will cause a large change in the battery voltage. A battery short somewhere can also reduce the battery voltage.
4. **Incorrect connection of Controller** - Includes reversing the polarity from the panels or batteries, or switching the panel and battery connections.