

**OWNERS MANUAL**

**EC-90 BATTERY SYSTEM**



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Thank you for purchasing the Eco-Charge EC-90 battery system. It is designed and built to be extremely reliable and simple to use. With proper use and care, the EC-90 will provide years of reliable service. Please spend a few minutes to familiarize yourself with these instructions and the product prior to use. Make sure to save these instructions for future reference.

Eco-Charge has been designing and manufacturing high performance battery systems for over a decade. With the advent of hundreds of portable electronic devices, each with different and demanding power requirements, battery power can be confusing to say the least. The EC-90 offers the user new features to make life in the field easier and more convenient.

## **EC-90 FEATURES**

- Dual XLR output connectors
- LED battery level meter
- Internal dual rate charger with temperature compensation
- LED charge status indicator
- Automatic shut off
- Automatic short circuit protection
- Global charging with 110V and 230V power supplies
- Available in 3 different voltage combinations:
  - (1) 12V
  - (2) 12V & 7.5V
  - (3) 12V & 6V
- High efficiency switch mode regulator circuitry
- Reliable Sealed Lead Acid technology
- No memory effects
- Cordura™ nylon soft case with belt loop and removable shoulder strap
- Can be recycled and rebuilt at the end of service life

## SPECIFICATIONS

BATTERY VOLTAGE	12V
BATTERY CAPACITY	7.2A/h
CHARGE TIME	8 hours maximum
MAX. CURRENT 12V	2A
MAX. CURRENT REGULATED	2A
MAX. TOTAL BATTERY CURRENT	2.25A
DIMENSIONS	L6" x W2.75" x H5"
WEIGHT	5.5 lbs.

## TECHNICAL FEATURES

### AUTO SHUT OFF

This feature is designed to protect the battery from deep discharge and maximize battery life. The circuit monitors battery voltage and is preset to shut off output at 10.5V. The battery level meter will be on "E" at this stage.

### BATTERY LEVEL METER

The 4 position LED meter indicates remaining power and is designed to work like a empty-full fuel gauge. To check power status, simply press the battery level button. The following image describes how the meter indicates remaining battery capacity.

- F ○ 100% - 95%
- ○ 95% - 60%
- ○ 60% - 20%
- E ○ Recharge



BATTERY LEVEL

**Figure 1. Battery Level Meter**

## CHARGER

The EC-90 has a built in dual rate charger with temperature compensation. The circuit is activated by connecting the Eco-Charge PS-151 power supply to the “CHARGER IN” XLR connector on the battery. Charge status is monitored by a LED indicator located next to the “CHARGER IN” connector.

## REGULATED OUTPUT

The dual voltage EC-90 uses a high efficiency switch mode regulator to provide 6V or 7.5V output from the 12 volt battery. This regulator has a maximum output current of 2 Amperes. The switch mode regulator is activated when the proper power cable is connected to the XLR output. To avoid draining the battery, it is advised to remove this power cable when not in use.

## SHORT CIRCUIT PROTECTION

The EC-90 is protected from short circuit by an automatic resettable fuse. The fuse is designed to interrupt the flow of dangerously high current during fault conditions. It will automatically reset after the fault is cleared and power to the circuit is removed.

## **OPERATION**

### CHARGING

Fully engage and lock the male XLR connector on the PS-151/PSE-151 power supply to the “CHARGER IN” female XLR connector on the battery. This connector is located on the right side of the battery and is surrounded by a red box on the top battery label. The LED charge status indicator is located to the right of the charger connector. Plug the power supply into the proper voltage receptacle. The charger circuit should now be on and charging the battery. The LED charge status indicator is RED during the charge cycle and will turn OFF when complete. At this point, the battery may be used. Charge times vary with the amount of use. The first charge will take longer than normal as the battery chemicals form. Do not interrupt the charge process for optimum battery performance.

### WARNING

The EC-90 battery requires a 15V / 1A unregulated power supply to activate the internal charger circuit. The power supply is available from Eco-Charge. The PS-151 is for 110V outlets, the PSE-151 is for 220-240 outlets. **Use of any other power supply may damage the battery. Do not use a sealed lead acid battery charger with the EC-90, severe damage may occur.**

CONNECTION

Make sure to use the correct power cable for your application. First, engage and lock the male XLR connector on the power cable to the correct output connector on the EC-90. Second, connect the mating end of the power cable to the intended device. You are now ready to turn on the device and begin using the EC-90.

COMPATABILITY

To avoid compatibility problems, the XLR output connectors are configured differently for each voltage. The 12 volt output is configured as industry standard pin 1 ground, pin 4 positive. All existing Eco-Charge 12 volt cables are compatible with the EC-90. The regulated output connector is configured differently to prevent voltage mismatching. This new wiring configuration requires a jumper in the power cable XLR connector to activate the regulator circuit. The following diagrams indicate the pin configurations of all EC-90 batteries.

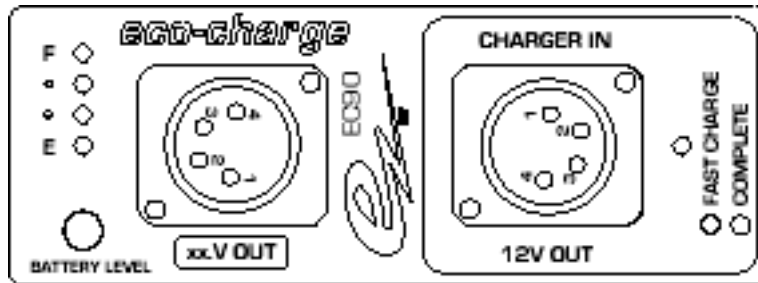


Figure 2. EC-90 Overlay

6V or 7.5V OUT		CHARGER IN / 12V OUT	
PIN 1	GND	PIN 1	GND
PIN 2	REG. ON/OFF IN**	PIN 2	NC
PIN 3	6 OR 7.5 VDC OUT*	PIN 3	CHARGER IN
PIN 4	12 VDC OUT	PIN 4	12 VDC OUT

\* 6VDC FOR MODEL B-906V

\* 7VDC FOR MODEL B-907V

\*\* JUMPER TO PIN 4 TO ENABLE REGULATED OUTPUT

Table 1. XLR Pin Assignments

## OPERATING TIME

The operating time for the EC-90 is determined by the total battery current. The total battery current is the sum of the current being drawn from the 12V unregulated output and the regulated output. Since the EC-90 has two outputs, there are many possible output load configurations. Establishing a run time for each possible device combination would be difficult so we have provided the following formulas that you can use to estimate operating time for your particular equipment combination.

To calculate the approximate operating time use the following formula:

$$T = (7.2Ah * 0.6) / I_{total}$$

Where T is time in hours

$I_{total}$  is the total battery current (12V current plus current from regulator. See below)

Since the regulated output uses a high efficiency switch mode regulator, the actual current being drawn from battery will be a fraction of the current being drawn from the regulator output.

This can be approximated with the following formula:

$$I_{battery} = I_{reg} * (\text{Current Factor})$$

Where  $I_b$  is the battery current

$I_r$  is the regulator output current (power to your device)

Current Factor is the value from the table below.

Regulator Voltage	Current Factor
6V	0.55
7.5V	0.68

**Table 2. Current Factors**

## **MAINTENANCE AND STORAGE**

During storage, it is advised to charge the battery once at least every six months. If the battery has been stored for a long period in a discharged state, it may not be able to regain its capacity even if it is recharged. If the battery is stored for a year or longer without being charged, its service life may be shortened. Store the battery only after fully charging it.

## CAUTION

- Store the battery in a stable, upright position.
- Protect from moisture.
- Store at reasonable room temperatures.
- Do not store the battery in direct sunlight or high temperatures (140°F (60°C) or in a highly humid atmosphere, because rusting, deterioration of performance and life of the battery may occur.

## **TROUBLESHOOTING**

### NO OUTPUT VOLTAGE

- Verify you are using the correct power cable for the application. A pin configuration diagram is located on page 8 of this manual.
- There could be a short in the power cable. Unplug the cable from the battery and inspect to see if there is any visible damage to the wire. Replace or repair defective cables immediately.
- If all else appears normal then the battery, cable or power supply could be defective.

## **REPLACEMENT PROGRAM**

No battery last forever, but Eco-Charge has implemented a battery replacement program that's as kind to the environment as it is to your wallet. EC-90 batteries can be returned at the end of service life and rebuilt at an affordable price. The top assembly is reused to build a new battery while the spent battery is recycled with the SAV-LEAD program.

## **TRAVEL**

Since many people travel with Eco-Charge batteries, we have added safe shipping information on the main battery label. Although this will not guarantee a hassle free airport security check, it should be noted that this information is provided by the Department of Transportation and is sufficient for safe shipping of all sealed lead acid batteries. The material data safety statement is located on the right side of the silver battery label, below the caution box. It reads:

### MATERIAL SAFETY DATA

ECO-CHARGE SEALED BATTERIES ARE UNREGULATED BY THE DOT FOR TRANSPORTATION BY TRUCK, RAIL, OCEAN AND AIR TRANSPORT BECAUSE THEY MEET THE REQUIREMENTS OF 49 CFR 173.159.

## **TRANSPORTATION**

All Eco-Charge batteries are unregulated for air transportation because they meet the requirements of Special Provision--"A67" as promulgated by the International Civil Aviation Association (IATA) and the International Civil Aviation Association (ICAO). They also meet the Vibration and Pressure Differential Tests of the International Maritime Dangerous Goods (IMDG) regulations.

## **WARRANTY**

For twelve (12) months from the date of sale, Eco-Charge LLC warrants to the original purchaser only, that products sold and manufactured by Eco-Charge are free from defects in workmanship, that standard products meet or exceed the applicable published ratings and specifications at the time of shipment. The original purchaser's warranty rights are limited to the repair or replacement of any defective products or the issuing of credit, at Eco-Charge's exclusive option. No warranty claim will be permitted which, in the opinion of Eco-Charge resulted from the product being altered or repaired by anyone other than Eco-Charge. No warranty claim will be allowed which, in the opinion of Eco-Charge, resulted from misuse, negligence, improper storage, or modification. The original purchaser shall have no right to return or seek credit for any product that is not defective. Before returning any defective product, the original purchaser must call and receive a return authorization number from Eco-Charge.

## **NOTES:**