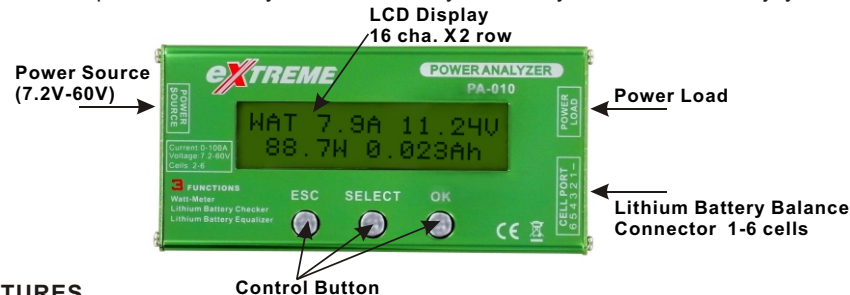


# **eXTREME** POWER ANALYZER PA-010

## **INSTRUCTION MANUAL**

### **INTRODUCTION**

Thank you for purchasing the Power Checker PA-010. We are confident you will find it to be an indispensable tool you use to make your hobby more fun and enjoyable.



### **FEATURES**

Power Checker is a very sophisticated electronic device. It has three functions:

#### **1. Watt Meter**

It measures current (Amps), voltage (Volts), power (Watts) and charge (Amp-hours)

#### **2. Voltage Checker**

Voltage Checker allows you to check the individual cell voltages of a 1 cell to 6 cells lithium battery. It can handle all types of lithium batteries (LiPo, Lilon, LiFe).

#### **3. Integrated Self Equalizer**

Power Checker has an integrated balanced circuit which is self-operative without connect to charger. Battery pack will be equalized to the lowest cell voltage of the pack.

### **SPECIFICATIONS**

Parameter	Range or Value	Resolution
Voltage	0-60V (*1)	0.01V
Current	0-100A peak (*2)	0.1A
Power	0-6000 W	0.1W
Cell Count	1-6 cells	
Battery Type	LiPo, Lilon, LiFe	
Dimensions	103x49.5x20mm	
Net Weight	105g	
Display	16 Cha. X 2 row LCD	

(\*1) 0V minimum with auxiliary power

(\*2) 50A continuous, 100A peak, assumes device's wires are in free air and attached to connections at or below temperature of 35°C with adequate airflow. 100A operation time depends on ambient temperature and wiring temperature.

**In watt-meter mode, you can calibrate all values to zero by pressing 'SELECT' button for more than 3 seconds.**

### **SAFETY PRECAUTIONS**

**CAUTIONS:** High power electrical systems pose dangers independent of devices like the Power Checker and it is the user's responsibility to be familiar with these dangers and take any necessary action to ensure safe use. Shorting a rechargeable battery or

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a Power Checker connected to a rechargeable battery or battery charger can supply huge currents and have serious consequences including explosions, causing fire, damage to equipment and personal injury.

There are risks associated with the potentially high currents measured by the Power Checker. These include, but are not limited to, fire, burns and personal injury. The user must be familiar with the relevant methods, procedures and connection components before using or making any connection. It is suggested that any connectors and wires chosen for use be appropriately sized and rated for the intended application and attached in the manner recommended by their respective manufacturers. Poor connections and reckless wire handling in electrical systems may have serious consequences. Intermittent and loose connections can cause component damage!

### **WATT METER**

This function measures current (Amps), voltage (Volts), power (Watts) and charge (Amp-Hours) values for you, in real-time, for the circuit in which you connect it.

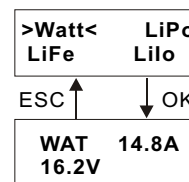
Now you can stop wondering what's going on with your electric model and get answers that allow you to apply science to your hobby. The precise measurements you collect will help you fine tune your model to get all the performance that you paid for.

With watt meter function, it is now easy to determine things like:

- Flight time
- Current through an ESC and motor
- ESC, BEC and motor efficiencies
- Charge put into and removed from a battery and the performance of battery chargers
- Battery health
- Why power is lost during acrobatics or extreme conditions
- Effect of gearing and propeller size and shape on power consumption and battery currents
- Effects of modifications, age and damage on many electrical system components

Clever hobbyists will discover new applications to further improve electric model performance.

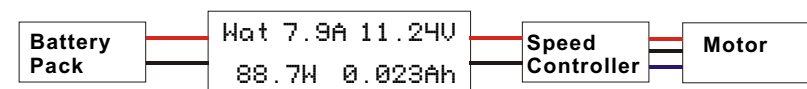
Power Checker is activated when the battery is connected to the unit. Select the "Watt" program by pressing 'SELECT' button, then press 'OK' to start watt meter program.



When you enter the watt meter mode, you can calibrate all values to zero by pressing 'SELECT' button for more than 3 seconds.

The following are some examples of meter connections. Many other arrangements and uses are possible

Testing Loads (e.g. motors)

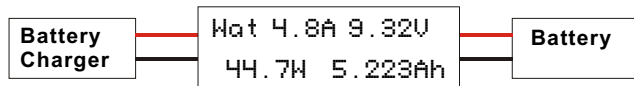


Battery on SOURCE side, Electronic Speed Controller (ESC) and motor on LOAD

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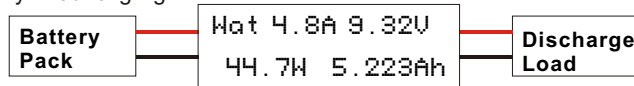
side, with ESC on, the meter shows the current into the motor, voltage and power at the battery and accumulates the charge (Ah) while the motor is running.

### Battery Charging



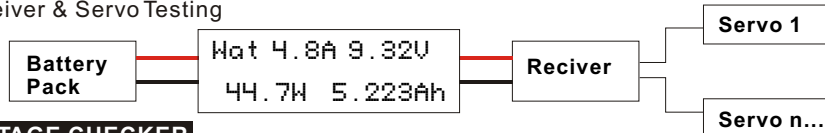
With a battery charger on the SOURCE side and battery pack on the LOAD side, the meter shows the charging current into the battery, the voltage and charging power at the battery and accumulates the charge (Ah) into the battery.

### Battery Discharging



When the battery is discharged, the meter indicates the total charge (Ah) the battery delivered to the load as well as current, voltage and discharging power.

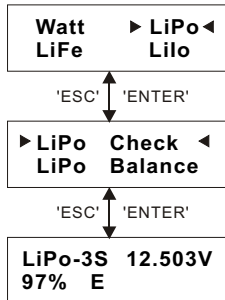
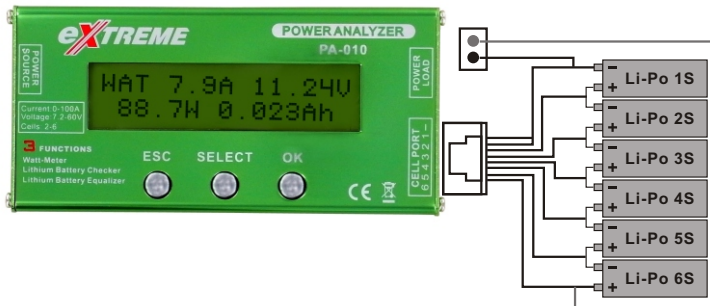
### Receiver & Servo Testing



## VOLTAGE CHECKER

This feature can be used to check the residual battery capacity and voltage of individual cells.

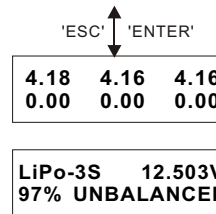
The power checker replaces all the tedious measurement and calculations required in the past to determine the overall voltage of lithium battery pack and the individual cell voltages that determine the balance of the lithium pack.



Press 'SELECT' button to choose Lithium Battery's type, then press 'OK' button to confirm.

There are two programs which are voltage checker and self-balancing. Select "LiPo Check" program and press 'OK' button to confirm.

It shows the type of battery and number of cell-count at upper left and total voltage at upper right. The second line displays the residual capacity in percentage and visual graphic.



The individual voltages are shown from the first cell at upper right.

If the voltages are out of balance, it warns and shows the voltage difference from the highest to lowest one. You need to let them be balanced.

### How to measure a single cell or the total voltage of battery pack is lower than 7.2V

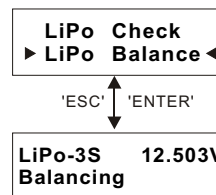
Since the minimum operation voltage of this unit is 7.2V, if you want to measure battery which total voltage is lower than 7.2V, you must use auxiliary power. By connecting battery pack (at least 7.2V) to 'POWER SOURCE' side, the voltage checker can measure down to 0V. This makes it possible to measure the characteristics of a single battery cell.

### Error messages of voltage checker program

- 'UNBALANCED' There are voltage differences more than 50mV between the highest and lowest voltages of individual cells.
- 'HIGH VOL' The voltage of any peculiar cell is higher than the safe value LiPo: 4.24V, LiFe: 3.65V and Lilo: 4.14V
- 'LOW VOL' The voltage of any peculiar cell is lower than the minimum safe value LiPo: 3.00V, LiFe: 2.50V, Lilo: 3.00V

## INTEGRATED SELF EQUALIZER

This program can equalize the individual voltages to their lowest one. A balanced battery provides a safer environment when flying. If you know that your cell balance is out, you can address the issue. The prevention of deteriorating cells over time, will improve the efficiency and stability of the lithium battery.



Select the matched type of lithium battery using 'SELECT' button and press 'OK' button to start the equalizing process.

As the equalizing job goes on, you can see the individual voltage by pressing 'OK' button. When the equalizing job is done, the beep sounds 20 times. (You can turn off beep sound by pressing 'SELECT' button for more than 3 seconds.)

### Error messages of voltage self equalizer program

- 'CELL LOW VOL' The voltage of cell is too low
- 'CELL HIGH VOL' The voltage of cell is too high.
- 'CELL CONNECT' There are bad connections on cable or connectors.

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.



Manufactured by  
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