POWER ANALYZER

Watt Meter, Battery Checker/Balancer and Servo Test Unit

Thank you for purchasing *POWER ANALYZER*. Please read this entire operating manual completely and attentively as it contains important information and safety notes, therefore you need to keep this manual in a safe place, and be sure to pass it on to the new owner if you ever dispose of *POWER ANALYZER*.

Special features

POWER ANALYZER is a very sophisticated electronic device that controlled by high performance microprocessor and precise resistors. It has three functions of 'watt-meter', 'battery checker' and self-balancer. Those functions are essential for electric flyers to ensure safe battery condition and to measure the electric consumptions of the power system. And also, the built-in self-balancer can equalize the individual voltages instantly.

POWER ANALYZER can handle all types of Lithium batteries(LiPo, LiIo, LiFe) consisting of series-wired cells, but the battery pack has to have a balancing plug for checking voltages.

- **Watt-meter program**

The Watt-meter circuit can measure the electric current up to 100A. You can verify the electric consumptions on your power system.

- **Battery checker**

POWER ANALYZER can show you the voltage and residual capacity of your Lithium battery pack with its individual voltage of each cells.

- **Integrated self-balancer**

POWER ANALYZER has an integrated self-balancing circuit which is self-operative without linking to charger. When you connect the battery pack to the individual port of the device the balancing job will be started instantly. In this case the individual cell voltages will be equalised to the lowest cell voltage of the battery pack.

- **Servo Test**

This program can drive any type of R/C servo to test without radio and receiver using integrated signal generator.

Specification

Input power:	Max. 60.0V (both on watt-meter and battery checker)
Max. current:	100A (watt-meter)
Min. operating voltage:	7.2V
Current consumption:	20mA at battery checker program
Dimension:	105x50x20 mm

Basic operation

POWER ANALYZER is activated when the battery is connected to the unit. For the battery checker function, connect the battery pack to the individual port via a suitable adaptor board, or connect the battery to the cable of 'Power source' for watt meter.

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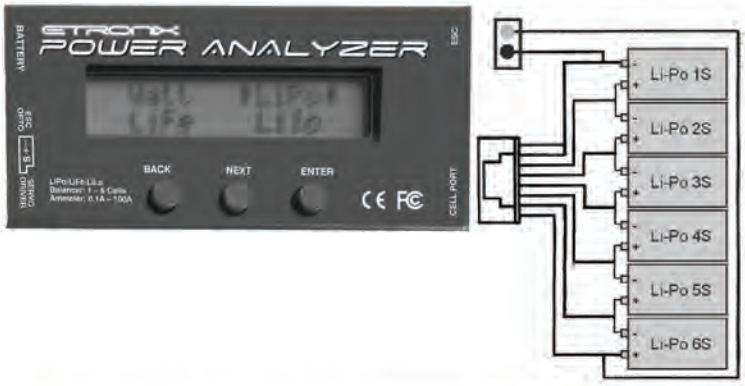
Battery checker program

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

-. Select the program by pressing 'SELECT' button to suit the type of battery being measured.

-. And press 'ENTER' to go to the next screen.

-. There are two programs which are voltage checker and self-balancing. Select 'LiPo Check' program using 'SELECT' button and press 'ENTER'.




```
Watt      ▶LiPo◀
LiFe      LiIo
```

'ESC' ↕ 'ENTER'

```
▶ LiPo Check  ◀
  LiPo Balance
```

'ESC' ↕ 'ENTER'

```
LiPo-3S     12.503V
97%  E▮▮▮▮▮▮▮▮▮▮▮▮
```

It shows the type of battery and number of cell-count at upper right, and output voltage. At lower line, it displays the residual capacity at percentage and visual graph.

'ESC' ↕ 'ENTER'

```
4.18  4.16  4.16
0.00  0.00  0.00
```

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

```
LiPo-3S     12.503V
97%   UNBALANCED
```

If the voltage are out of balance, it warns and shows the voltage difference from the highest to lowest one. You need to let them balanced, or check the cells and cables carefully.

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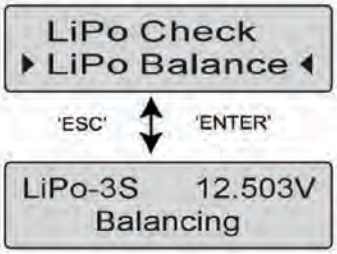
Self-balancing program

This program can equalize the individual voltages to their lowest one.
-. Select the matched type of Lithium battery using 'SELECT' button.
-. And press 'ENTER' to start to balance .

> ❗ To protect the battery from the over-discharge, there are minimum voltages to be balanced for each type of Lithium batteries. If the any individual voltage is lower than the limit, there shows an error message.
> LiPo/Lilo: 3.0V, LiFe: 2.0V
> *POWER ANALYZER.*

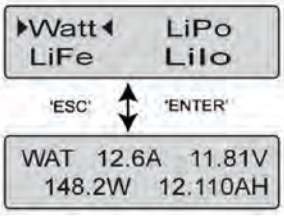


As the balancing job goes on, you can see the individual voltage by pressing 'ENTER' button.
When the balancing job is completed, the beep sounds 20 times.
(You can set the beep sound 'OFF' by pressing 'SELECT' button for more than three seconds. Or you can set it 'ON' by doing the job again. The default is 'ON'.)

Watt meter program

This program can measure the electric current on your power system.
-. Select the 'Watt' program by pressing 'SELECT' button.
-. And press 'ENTER' to start to measure.

> ❗ Beware of rotating propeller, when you check the motor with propeller. For maximum safety, hold the motor on a test bench tightly, and wear a safety eye protection and hand gloves.

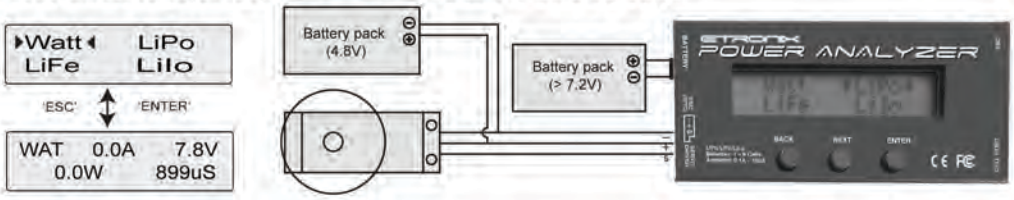


As you start to run the motor, it shows the power consumptions in real time. They are current, input voltage, wattage and current.
When you enter the watt-meter mode, you can calibrate all values to zero by pressing 'SELECT' button for more than 3 seconds.

Servo test program

This program can drive any type of R/C servo to test without radio and receiver using integrated signal generator.
A battery pack of 4.8V is necessary using Y-harness cord to drive the servo and a battery pack of above 7.2V is also necessary to power the TWO-METER itself.

-. Select the 'Watt' program by pressing 'SELECT' button.
-. And press 'ENTER' to start.
-. The signal value always starts at its lowest value(899us). Use ▼ and ▲ button, to drive the servo.



Error Messages

Battery check program

'UNBALANCED' - There are voltage difference more than 0.05V 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 and Lilo: 3.00V.

Self-balance mode

'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.

Lithium battery notation

	nominal voltage	max. charge voltage	min. discharge voltage
Lilo	3.6V/cell	4.1V/cell	2.9V/cell or higher
LiPo	3.7V/cell	4.2V/cell	3.0V/cell or higher
LiFe	3.3V/cell	3.6V/cell	2.0V/cell or higher

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