Astro Super Whattmeter, model 101

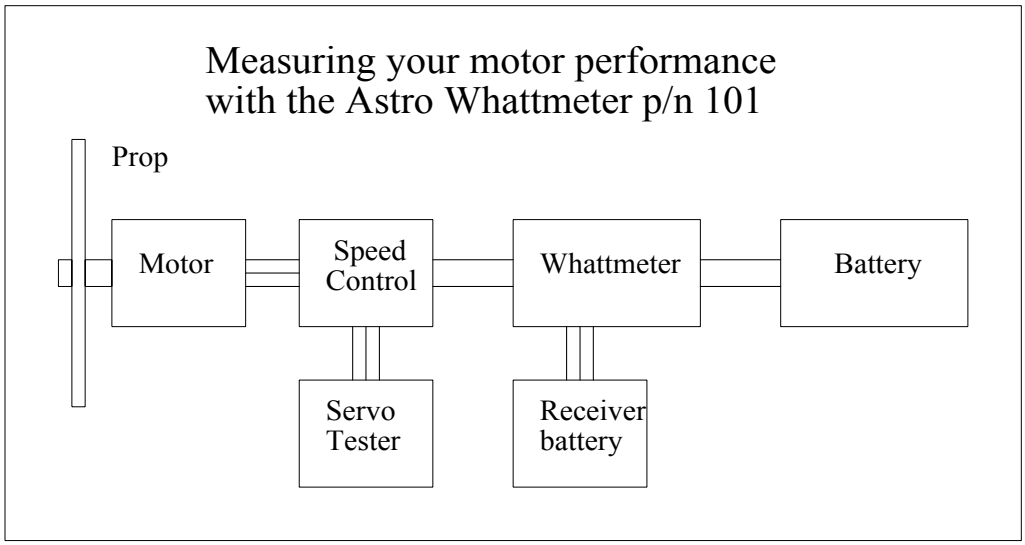
- **Our new Super Whattmeter takes the guesswork out of electric power.**
- **Just look at what this precision measuring instrument can do for you.**
- **Now you can measure your battery discharge current draw up to 70 Amps.**
- **Now you can measure your battery charging current up to 10 Amps**
- **Now you can measure your battery voltage up to 60 Volts.**
- **Now you can measure your motor input power up to 4,000 Watts.**
- **Now you can measure your battery capacity up to 96 amp hours.**
- **Now you can measure your battery energy up to 5000 watt hours.**
- **By using a separate receiver battery you can measure a single 1 cell.**
- **By using a separate receiver battery you can measure motor resistance.**
- **Use it to adjust your motor timing for optimum power and efficiency.**
- **Use it to choose the right prop to load your motor for best Amps.**
- **Use it to select your cells for maximum Volts, Watts or Amp hours.**

The New Astro Model 101 Whattmeter is a very sophisticated piece of electronic equipment. It contains three digital micro-processors, a 4.096 volt precision reference, five volt power supply and a precision amplifier. The meter contains no battery. It is powered from the voltage source and absorbs about 3 milliamps. A separate receiver battery connector is supplied to allow the meter to be externally powered by any four cell radio receiver battery. The meter will turn on at **4.5 volts** and will measure any DC voltage up to **60 volts**. To measure voltages between zero and 4.5 volts, power the meter with a separate receiver battery. Connect the receiver battery to the Futaba battery connector. . The Whattmeter micro-processor goes through a self calibration routine every time voltage is applied. This routine takes about 1 second. Wait for the voltage display before connecting the load. This way you will have a very accurate current measurement. If the load is connected before the source of power is connected the current measurement may have up to a 1 amp error.

To measure motor current and power, first connect the Whattmeter *SOURCE LEADS* to the battery or power supply. The meter display should light up and indicate the Source voltage. Then connect the motor to be tested to the *LOAD LEADS*. If the motor is of higher power it would be best to place a speed control between the motor and the Whatt Meter so that power can be applied smoothly. This set up can also be used to measure battery capacity. The arrow on the display indicates direction of current flow.

We are very excited about this new Super "Whattmeter". I would like to thank Doug Ingraham and Garry Powers for their help in designing this revolutionary new product.
I know you will love it!
All my best
Bob Boucher

Testing your new motor



First test the motor with no prop to make sure it is OK and does not have a shorted winding or a bad bearing. Select a battery with the proper voltage for your motor. Run the motor with no prop at wide open throttle for about 30 seconds. The Whattmeter will show amps being delivered from the battery to the speed control .The display will Look like this

0.95A ← 12.45 V
12 W 0.000 AH

If your motor current is between 5 and 10 percent of the maximum operating current recommended for the motor, then you have a good motor. If the current is more than 25 percent your motor is probably junk. Send it back to the Dealer.

Next install a propeller that is about 1 inch smaller then the recommended prop for the motor and throttle up slowly using the servo tester to command the speed control. Observe the current and do not exceed the manufacturer's recommendation. If the amps are too high, pick a smaller prop and try again. The display should look like this.

6.50A ← 11.20V
66W 0.000AH

If you do not have a prop recommendation, start with a small prop and work you way up until you find a prop that loads the motor properly with the recommended battery. Remember larger props will draw more amps and smaller props will draw fewer amps. Higher battery voltage will draw more amps, lower voltage fewer amps. The Whattmeter will display the amps drawn, the battery voltage and the power delivered by the battery. If the Amps, Volts and Watts are close to the manufacturers data sheets and the RPM is ok then your motor is OK.

Check your battery both with the motor off and at wide open throttle to make sure it is suitable for the motor. For Nicads and NIMH a fully charged battery with motor should have between 1.25 and 1.30 volts per cell. For Lithium packs between 4.15 and 4.20 volts per cell. At wide open throttle the Nicads and NIMH packs may drop to between

1.0 and 1.1 volts per cell and for Lithium between 3.50 and 3.70 volts per cell. If your battery voltage drops lower than this your may not be fully charged or is too small for the motor. Next you can test your battery for capacity. First fully charge your battery and then run the motor until the battery voltage drops to 0.9 volts per cell for Nicads and NIMH and 3.2 volts for Lithium. During the run the display will look like this

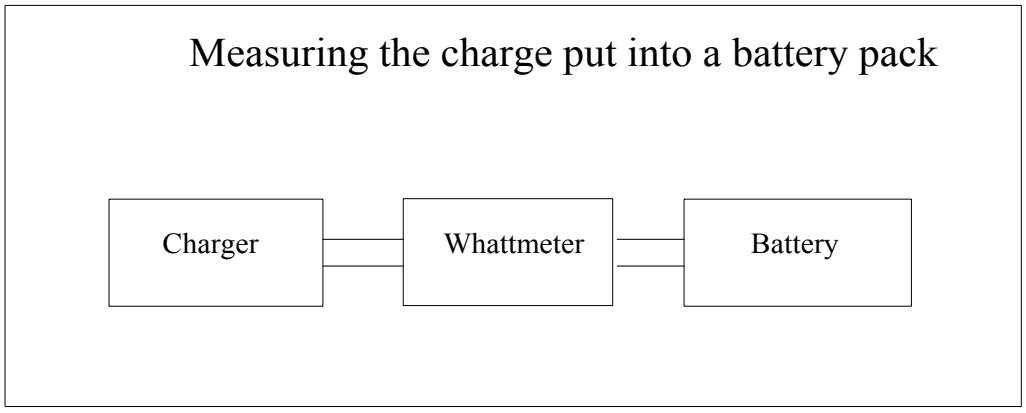
6.01 A ← 9.85V
59W 0.650Ah 6.70WH

The amp hour and watt hour display alternates every few seconds. So far we have used up 650 mahr from the battery. The watt hour display indicates that the battery has delivered 6.4 watt hours so the average voltage so far has been **6.70/.065 =10.3V** Keep running until the battery voltage drops to 9.6 volts then turn off the motor using the servo tester to command the speed control. Do not disconnect the battery. Your display should look like this.

0.00A ← 10.2V
0.00W 1.320 AH 13.0 WH

The amps and watts are now zero and the battery voltage has recovered to 10.2 volts.
The battery has delivered 1.320 Amp hours = 1320 milliamp hours and the power delivered by the battery was 12.8 watt hours. The average battery voltage can be calculated **13.0/1.32 = 9.8 Volts**.

Charging your battery



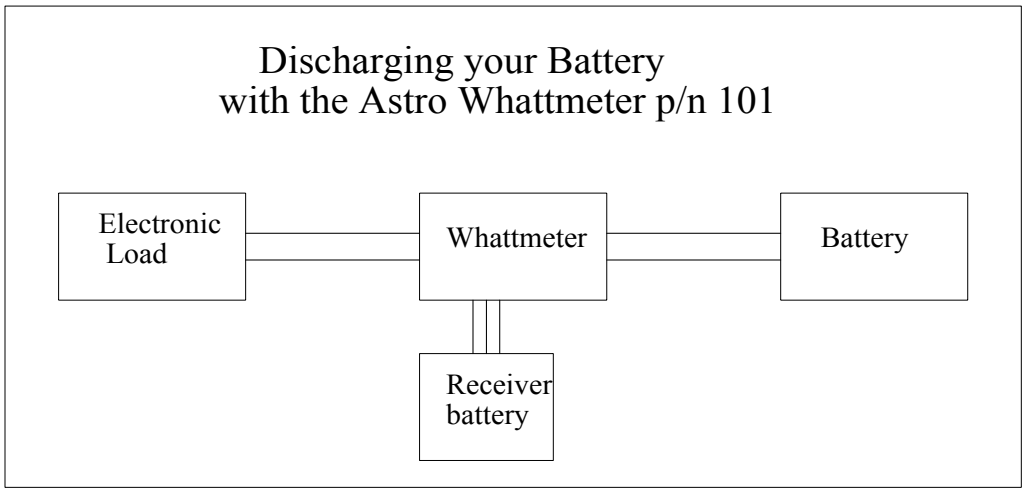
If you have a charger that does not have a digital display, you can use your Whattmeter to tell you the battery voltage, and the number of milliamp hours of charge you have put into the battery pack. Connect the meter in line between the charger and the battery
If the battery has less than 6 volts, the meter may not work and you will need to connect a receiver battery to the female radio connector on the Whattmeter. During the charge the Display will look like this.

1.50A → 11.50V
16W 0.350AH

When the charge is complete and the charger has stopped charging the display will look like this.

0.00A → 12.60V
0W 1.320Ah

Discharging your battery



You can use the Whattmeter to measure both the milliamp hour and the watt hour capacity of your batteries. Connect the Whattmeter between the battery to be tested and the electronic load. If you do not have an electronic load you can use a set of resistors, or a bank of light bulbs. I the battery is less than 6 volts or will be discharged to less than 6 volts, you will need to connect a separate receiver battery to the female radio connector on the meter. Start with a fully charged battery then discharge to about 2/3 of the initial fully charged voltage. Disconnect the Load but leave the meter connected to the battery. The number of milliamp hours delivered to the load will be shown for 5 seconds followed by the number of watt hours. The display will alternate between milliamp hours and watt hours every five seconds. If you want to know the average voltage of your battery divide the watt hours by the amps hours.