

time. NEVER short the positive and negative jacks together when a battery is connected, as a dead-short could cause severe damage to the ESV and the battery pack.

## CONNECTORS

It is necessary to use the proper test lead when connecting the ESV to your battery pack. Hobbico offers a full range of charge leads to include one for transmitters, one for receiver batteries, as follows:

HCAP0101–Futaba® J TX & RX charge plugs  
 HCAP0102–Futaba J TX & RX charge plugs 9VAP only  
 HCAP0104–Airtronics TX & RX charge plugs  
 HCAP0105–JR TX & RX charge plugs  
 HCAP0106–Hitec TX & RX charge plugs  
 HCAP0108–Charge lead with alligator clips (2)  
 HCAP0110–Charge leads with 9V clips & Fut J

**Note:** Some radios have a diode inside the TX to protect the battery pack from reverse polarity. This diode could prevent the ESV from taking proper readings through the transmitter's charge jack. In this case, the battery must be removed from the TX and

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## INTRODUCTION

Failure to identify a weak nickel-cadmium (NiCd) or nickel-metal hydride (NiMH) rechargeable battery is a leading cause for failure of R/C models. Simply by charging a battery as directed in the instructions that are included with a radio system or an after-market charger, one may believe the pack has taken a full charge. However, if one cell within the pack has a defect, which would result in lower than normal pack voltage and capacity, it could go undetected and cause a crash of the model. The Expanded Scale Voltmeter MKII can detect an under-charged battery, or bad cells in a pack before it is too late.

## OPERATION

The ESV MKII is designed to measure the voltage of transmitter or receiver batteries while subjecting them to a realistic R/C hobby load. Loading provides the most useful indication of a battery's charge status. Loads of between 225-275mA are supplied to the batteries under test, which are the most realistic TX and RX loads found on any ESV. For all applications, to achieve the most accurate readings view the meter at an angle so that the reflection of the needle in the mirror backplate is in perfect alignment with the actual needle.

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connected directly to the ESV in order to obtain the proper reading. Contact your radio manufacturer for information on how to address this situation with your particular radio.

### 1 YEAR LIMITED WARRANTY

Thank you for purchasing this TOWER HOBBIES Quality Product. This TOWER HOBBIES product has been carefully designed and manufactured to provide long-term, trouble free operation. We are so confident of these high quality standards, that we protect your purchase with a 1 year limited warranty.

TOWER HOBBIES warrants this product to be free from defects in materials and workmanship for a period of one (1) year from the date of purchase. During that period, we will repair or replace, at our option, any product that does not meet these standards. You will be required to provide proof of purchase date (receipt or invoice).

If, during the 1 year warranty period, your TOWER HOBBIES product shows defects caused by abuse, misuse, or accident, it will be repaired or replaced at our option, at a service charge not greater than 50% of the current retail list price. The item will be returned to you C.O.D.

*Under no circumstances will the purchaser be entitled to consequential or incidental damages.*

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

**If you attempt to disassemble or repair this unit yourself it may void the warranty.**

For service to your TOWER HOBBIES product, either in or out of warranty, send it post paid and insured to:

#### Hobby Services

1610 Interstate Drive  
 Champaign, IL 61822  
 (217) 398-0007

Internet: <http://www.towerhobbies.com>  
 e-mail: [productsupport@towerhobbies.com](mailto:productsupport@towerhobbies.com)

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**Testing receiver / flight packs:** The ESV MKII is designed to measure voltages for both 4.8V and 6.0V receiver batteries.

○ 1. Slide the switch on the front of the ESV to the proper selection to match your battery pack. Move to the left for testing 4-cell, 4.8V packs, or to the right for 5-cell, 6.0V packs.

○ 2. Connect the battery to the ESV using the proper connector (not included, a full list of connector leads shown on page 5). Make sure the positive (+), red plug is connected to the red jack on the left side of the meter. The negative (-), black plug is connected to the black jack in the center.

○ 3. For a fully charged battery, the needle should deflect into the green area of the meter. A reading into the red area indicates poor charge on the battery, and re-charging or re-evaluation of the battery is necessary.

A. ONLY the bottom scale of the meter, marked as "4C," should be read for 4.8V packs. If the voltage reading is 4.8V or less, operating the model will be risky and should be avoided.

B. ONLY the middle scale, marked as "5C," should be read for 6.0V packs. Flying with a voltage reading of less than

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**Tower Hobbies® LCD Digital Tachometer**  
 Monitor engine performance—evaluate different props and fuels. Tachometer measures RPM of 2-, 3- and 4-bladed propellers in a 0-32,000 range, and shows the results on a large, 1/2" LCD display. Features one-touch operation and auto-off after 5 minutes (unused). Uses two common AAA batteries (included).  
 TOWP1221



## TOWER HOBBIES®

### EXPANDED SCALE VOLTMETER MKII



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TOWZ1181 for TOWP1181

5.8V is risky. At this point, the capacity and voltage of the pack will proceed to drop very rapidly, so operation below this point should be avoided.

**Testing transmitter batteries:** The ESV MKII is also designed to measure voltages of 9.6V transmitter battery packs.

○ 1. Connect the battery to the ESV using the proper connector (not included, a full list of connector leads shown on page 5). Make sure the positive (+), red plug is connected to the red jack on the right side of the meter. The negative (-), black plug is connected to the black jack in the center.

○ 2. For a fully charged battery, the needle should deflect into the green area of the top scale. A reading into the red area indicates an undercharged battery, and re-charging or re-evaluation of the battery is necessary. ONLY the top scale of the meter, marked as "8C," should be read for 9.6V packs. If the voltage reading is 9.5V or less, operating the model will be risky and should be avoided.

**CAUTION:** DO NOT connect a TX battery to the RX jacks. This could result in damage to the ESV. Do NOT connect a TX battery and RX battery to the ESV at the same time. Only connect one battery to the ESV at a

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