1. SAFETY PRECAUTIONS

Item No. 01446

CAUTION: Shorting a rechargeable battery or Watt Meter connected to a rechargeable battery can supply huge currents, causing fire, explosions, personal injury, and damage to equipment. Ensure that all wiring and connections are rated to handle the input or output current, and are properly assembled for each application.

1.1 Input Voltage & Current Handing Limitations

The Watt Meter is designed to be safe in systems using less than 60V and carrying currents up to130A. CAUTION: Exceeding these limits will damage the Watt Meter and may cause personal injury.

2. WIRING, CONNECTIONS &APPLYING POWER

Warning: Loose connections can cause component damage! Only switch power between meter & LOAD. The Red SOURCE wire goes to positive (+)battery or other device terminals and black to Negative (-). User is responsible for attaching connectors rated to handle the voltage and current expected in user's application. Qualified individuals should make sure any high current connections. Verify there are no exposed wires or connectors that may short circuit before connecting a battery or power source to the Watt Meter. Only use female connectors on batteries. By connecting an auxiliary battery (e.g. a receiver battery) of 6-60V to the SOURCE 3-pin connector, the Watt Meter can measure down to 0V.

3. DISPLAY SCREEN

3.1 Startup Screen

Each time power is applied across the Watt Meter's leads (or auxiliary power connector), a startup screen will be displayed before changing to the measurement screen. All measured values are also reset to 0.
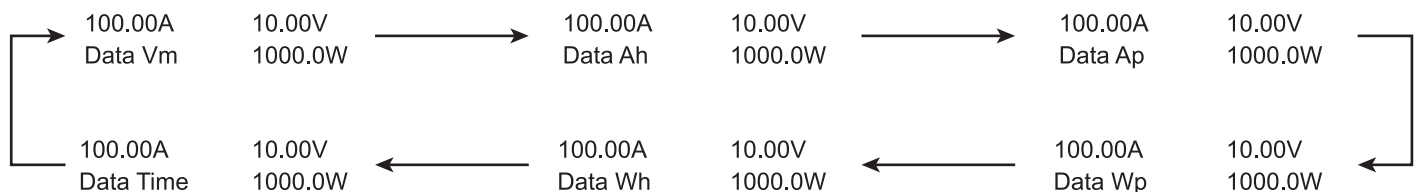
3.2 Measurement Screen

The measurement screen continuously displays Amps, Volts and Watts. All other measured values are presented sequentially, every two seconds, in the "Data-Queue" position of the display. Data values are identified by their units (Ah, Wh. Ap,Vm, Wp). All measurement screen values are updated every 0.4 seconds.

The Measurement Screen layout: Amps,Volts,watts & "Data Queue"

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100.00A      10.00V
Data Queue   1000.0W
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The "Data Queue" shows Vm, Ah, Ap, Wp, Wh and Time in sequence.

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100.00A    10.00V            100.00A    10.00V            100.00A    10.00V
Data Vm    1000.0W           Data Ah    1000.0W           Data Ap    1000.0W


100.00A    10.00V            100.00A    10.00V            100.00A    10.00V
Data Time  1000.0W           Data Wh    1000.0W           Data Wp    1000.0W
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3.2.1 (Voltage)Volts & Minimum Volts V, Vm

The displayed Volts value is the average voltage over the last screen update interval. The displayed Minimum. Volts value (Vm) is the minimum voltage (or "sag") measured on the SOURCE side, since the startup screen ended. The Volts value is measured on the SOURCE side.

3.2.2 (Charge)Amp-hours Ah

The displayed value is the total charge in Amp- hours (x1000=mAh) delivered since the startup screen ended. It is measured on the LOAD side. For accurate results, be careful not to interrupt the SOURCE connection to the Watt's Up during a charge measurement.

3.2.3 (Current)Amps & Peak Amps A, Ap

Only current from SOURCE to LOAD is measured. Amps value displayed is the average current over the last screen update interval. Peak Amps value (AP) displayed is the maximum current drawn from the LOAD side since the meter's startup. Peaks lasting only a fraction of a second can be captured. Supplying the auxiliary power with a voltage greater than the meter is measuring removes the meter's operation current from measurements. To reduce meter heating, only measure currents over 65 Amps for short periods of time, and pay attention to the Watt Meter's surface temperature. Also consider using connectors that can handle large current.

3.2.4 (Power) Watts & Peak Watts W,Wp

The displayed value is the average power delivered in watts (=Volts XAmps) over the last screen update interval. The displayed Peak Watts value (Wp) is the maximum power drawn on the LOAD side, since the startup screen ended. Watts values are measured on the LOAD side.

3.2.5 (Energy) Watt- hours Wh

The displayed value is the total energy delivered in Watt-hours since the startup screen ended. It is measured on the LOAD side .For accurate results, be careful not to interrupt the SOURCE connecting to the Watt Meter during an energy measurement.

3.2.6 Timing Function:
When detected current is above 0.01A, the timer will begin counting.
When detected current drops below 0.01A, the timer will pause.
When detected current rises above 0.01A again, the timer will resume counting.
This function can be used to test the run-time of the motor of an RC quadcopter/helicopter during flight.

4. Using the Watt Meter / Power Analyzer

You can think of the Watt Meter as a set of jumper wires. Connect it in the same way and you can measure what the jumper wires are connected to. Like jumper wires, the Watt Meter is essentially a direct connection between same colored SOURCE and LOAD wires, i.e. both the SOURCE and LOAD leads are electrically "hot" when a battery is connected to either side. Current flows from SOURCE to LOAD. Make sure connections are secure to prevent component damage!

Example use #1: Battery on SOURCE side, Motor Speed Controller(ESC) and motor on LOAD side. With the ESC on, the Watt Meter shows the current into the motor, voltage and power at the battery and accumulates the Ah and Wh while the motor is running. Example use #2: with a battery charger on the SOURCE side and battery pack on the LOAD side, the Watt Meter shows the charging current into the battery, the voltage and charging power at the battery and accumulates the charge (Ah) and energy (Wh) into the battery.

Application Examples

Tenergy Watt Meter / Power Analyzer can measure EIGHT parameters that are key to electric power safety and performance. Use it to: prevent peak currents damaging battery, motor control, motors, wiring and connectors; verify sufficient operating voltage under load; set cutoff voltages; check battery capacity and health; balance battery cells; confirm proper battery charger operation; detect receivers and actual operating current so as to make sure whether an UBEC is needed.
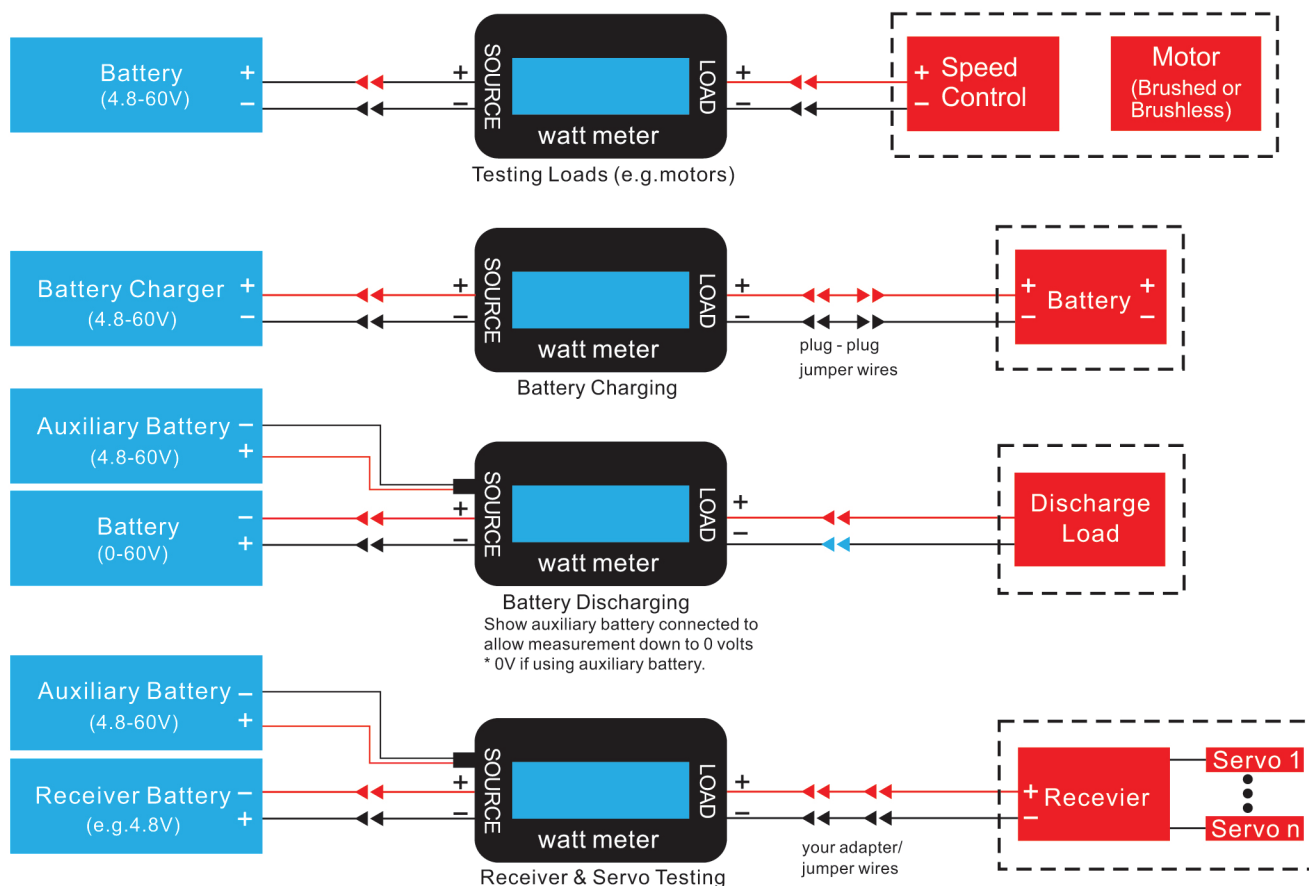
SPECIFICATIONS
- Operates from 0-60V
  0V with optional auxiliary battery.
- Measures 0-1 50A, resolution 0.01 A;
  0-60V, resolution 0.01 V;
  0-6554W, resolution 0.1 W;
  0-65Ah, resolution 0.001 Ah;
  0-6554Wh, resolution 0.1 Wh.
- 16x2, backlit LCD display.
- Dimensions: 85mm x 42mm x 25mm
- Weight: 82g.

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