WATT METER

1 FEATURES AND SPECIFICATIONS

1.1 Features

- Measures energy (Wh), charge (Ah), power (W), current (A) and voltage (V)
- Connector to use an optional receiver battery for measurement down to 0 V
- Accurate & precise ?0.01 A current and 0.01 V voltage resolutions
- Measures peak Amps, peak Watts (except for Doc Wattson) and voltage minimum (sag)
- Rugged -handles 50 A continuous and 100 A peak at 60 V
- 14 ga., super fine stranded, high temperature, silicone rubber insulated wire
- Small & light with a tough plastic case available in several colors
- Acts like a wire so doesn't affect model's performance. Precision Alu-Chrom current sensing resistor, with only 0.001 Ohms resistance and circuitry that draws only 7 mA
- Uses DSP to increase ADC resolution and differential measurement amplifiers to increase noise immunity
- Factory calibration stores constants in EEPROM to compensate for component tolerances
- Powerful, 8 MIPS micro-controller
- Made in USA to ISO 9001:2000 quality standards
- One-year warranty and complete user manual

1.2 Specifications Tables

Table 1 Electrical Measurement Ranges

Parameter	Range	Resolution	Notes
Voltage	0* - 60 V	0.01 V	*0 V min. w/ auxiliary power. E.g. a receiver battery. Else 4.0V.
Current	0 -100 A peak	0.01 A	50 A continuous
Power	0 - 6554 W	0.1 W	
Charge	0 - 65 Ah	0.001 Ah	0-6554 Ah for Doc Wattson. 0.1Ah resolution
Energy	0 - 6554 Wh	0.1 Wh	0 -655 Kwh for Doc Wattson. 0.01KWh resolution

Table 2 Miscellaneous Specifications

Parameter	Value	Notes
Measurement Update Period	400 mS	650 mS for Doc Wattson
Signal Sampling Rate	???? samples/s	
Data Queue Sequence time	2 seconds	
In Circuit Resistance	0.001 Ohms	
Operation Current	7 mA	
Auxiliary Power Voltage	4.0 V - 60 V	e.g. from a receiver battery
Dimensions（LxWxD）	84mmx50mmx20 mm	
Weight	132g	100g without case
Display Screen	16 character x 2 row STN LCD	
Nominal Operating Conditions	0℃- 50℃ ambient temperature, non condensing humidity	Maximum temperature must be reduced at maximum current rating

2 SAFETY PRECAUTIONS

CAUTION: High power electrical systems pose dangers independent of devices like the Watt Meter 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 a Watt Meter 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.
Please carefully read the entire SAFTY PRECAUTIONS section to ensure safe product use.

2.1 Safe Operation Limitations
The Watt Meter is designed to be safe to use when operated within the parameter limits it was designed for. Typical applications are well within these limits, but it is the user's responsibility to be familiar with the Watt Meter specifications and ensure the unit is operated within its limits.

Table 3 Safe Operating Limits (Do Not Exceed)

Parameter	Operating Range	Notes
Voltage	0 V - 60 V	
Current	0 - 100 A intermittent 50 A continuous	Assumes device's wires are in free air and attached to connections at or below temperature of 35℃ (95℉) with adequate air flow. 100 A operation time depends on ambient temperature and wiring temperature.
Nominal Operating Conditions	0℃- 50℃ ambient air temperature, non condensing humidity	Maximum temperature must be reduced at maximum current rating

CAUTION: Exceeding these limits may permanently damage the Watt Meter and may cause personal injury and may cause fire.

2.2 Electrical Connections and Wiring
There are risks associated with the potentially high currents measured by the Watt Meter. 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 to the. 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.

CAUTION: Poor connections and reckless wire handling in electrical systems may have serious consequences including personal injury, fire and property damage.
Intermittent and loose connections can cause component damage!

2.3 Powering Up
Verify there are no exposed wires or connectors at risk for a short circuit before connecting a battery or power source to the Watt Meter. The Red “SOURCE”and “LOAD”leads of the Watt Meter are connected to each other and the Black leads are essentially so. This means the "other" side is electrically "hot" when a battery or other power source is connected to either side.

CAUTION: Shorting a rechargeable battery or a Watt Meter 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.

2.4 Limits of Connected Equipment
The Watt Meter may have measurement capabilities, operating ratings and electrical signal handling abilities that exceed those of equipment to which it is connected. This means the Watt Meter may be able to make measurements on a connected component despite that component being operated outside of its safe operating ratings.

CAUTION: It is the user's responsibility to consider the limitations of any equipment connected to the Watt Meter and not to exceed them since the Watt Meter provides no protection for those components. Examples of possible hazards include, without limitation: charging or discharging batteries outside their voltage and current ratings, application of excessive voltage or currents to electronic speed controls (ESC) and motors, application of currents that cause dangerous heating or voltages that present a shock hazard. Other hazards may exist.