

Bogart Engineering TriMetric: TM-2030 Warranty and Specifications

Warranty: 4 years provided there are no obvious signs of abuse: We will repair or replace (at our option) to operate at a level specified or implied by our instructions.

Main battery (B1): Measures Volts, Amps, Watts, Battery % Full, Amp-hours from full, Days since charged, Timer for days since Equalized. Also data logging (history data) described below.

Secondary Battery (B2) sharing common negative with main battery: Measures volts only

Battery Volts: From 10.0 – 65.0 volts for main battery. From 0.0 to 100 volts on secondary battery. Resolution 0.1 volt. Accuracy $\pm 0.3\%$

Amps charging or discharging: With 500A/50mV shunt: 00.0 to ± 999 Amps, resolution 0.1A. With 100A/100mV shunt 0.00-300 Amps, resolution 0.01 Amp. $\pm 1\%$ \pm least significant digit.

Note: Maximum amps is often limited by the shunt capability: maximum current for a typical 500A/50mV shunt is about ± 400 A. For a 100A/100mV shunt about ± 70 Amps. (Depending on shunt design and ambient temperature)

Watts: $\pm 20,000$ Watts. (With 500A shunt: when “Amps” read greater than 10.0, Watts accuracy $\pm 1.5\%$ \pm least significant digit.) When “Amps” value is lower, watts accuracy depends on “amps” resolution accuracy.

Amp-hours: Measurement accuracy: 0.00 to $\pm 80,000$ Amp-hours to same accuracy as amps.

Battery % Full: Measurement accuracy $\pm 1\%$. Also measures overcharge. Typical system accuracy, if batteries are charged full at least every 5 days : typical $\pm 4\%$. With “efficiency” set to suggested 94% the **Battery%Full** Display will be conservative (i.e. display a little lower than actual).

Shows “replaced amp hours”: Compared with most recent discharge period—while charging shows what percent of previous amp hours have been replaced.: 0-199%

Meter Power requirement: About 30 mA when display is on and about 16mA when display turned off.

Efficiency factor adjustable: 60-100%

Battery capacity settable 10 to 10,000 Amp-hrs.

Serial Data: 5V output stream with all TriMetric real time data ASCII coded.

Charge criteria defined by: Filtered voltage above Vset. Filtered amps less than Iset. Both adjustable. (Filtered time constant: 140 seconds). See Section 6.2 of **TM-2030 User’s Instructions** for detailed description.

Power Requirement: Power from main battery B1: 9-65V, 32mA with display lighted. 16 mA with display off.

Size: TM-2030-RV: Box is 4-1/4 high x 3 x 1-3/8 inch depth with 1/2 in. mounting tabs top and bottom. (10.8 x 7.6 x 3.5 cm.)

TM-2030-A: 4-1/2 x 4-3/4 panel with circuit board 1-1/8 (max) in. deep. (11.4 x 12.1 x 2.85 cm.)

History data: retained in memory when power turned off

● **Cumulative amps discharged during battery lifetime** (0-999,000 amp hours) measures only discharge amp-hours, to measure battery wear

Records the following for last 5 charge/discharge cycles:

- **Hours ago since end of cycle**
- **Length of cycle (hours)**
- **Amp hour efficiency factor for each complete cycle** (amp hours total discharging divided by amp total charge into show charge efficiency of battery system)
- **Minimum voltage** for each cycle.
- **Minimum battery %Full** for each cycle

For the last 5 days:

- **Maximum charging voltage each day**
- **Amps value: intended** to show how close to “charged” the battery system got
 - When maximum voltage greater than charged setpoint volts: shows minimum amps.
 - When maximum voltage less than charged setpoint volts: shows amps at maximum voltage
- **Maximum value percent charge returned compared to most recent discharge**