

BAT-SC350

Manual

Power Backup Module ***For*** ***HESC Series Power Supplies***

Manufactured by
TRI-M ENGINEERING
Engineered Solutions for Embedded Applications

Technical Manual

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This manual is for integrators of applications of embedded systems. It contains information on hardware requirements and interconnection to other embedded electronics.

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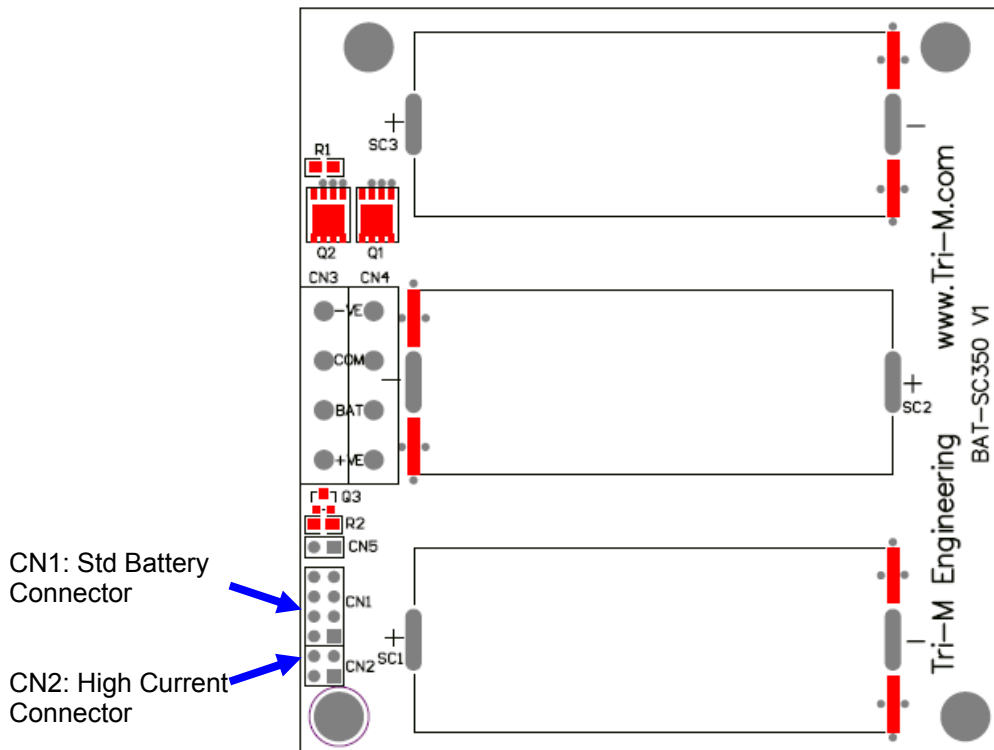
CHAPTER 1: GENERAL DESCRIPTION

The BAT-SC350 creates a complete UPS system when plugged directly into the bottom of an HESC Vehicle Power Supply. The BAT-SC350 includes six “D” size Super Capacitor (each capacitor is 350 farads to maximum of 2.5V) wired in series for a total of 58.3 farads up to 15 volts. Therefore a BAT-SC350 can supply backup power for over four minutes to a 20 watt load.

The BAT-SC350 includes Mosfet transistors for preventing deep discharge occurrences during extended power outages. The Mosfet transistors electrically isolate the BAT-SC350 from the HESC whenever the BE output of the HESC is de-asserted (pulled to 5V)

The BAT-SC350 has does not have a thermal fuse as the Super Capacitors do not generate internal heat when reaching a full charge state. A current fuse for protection against overcharging is also not included as the Super Capacitors can withstand very large levels of current safely.

Of the six “D” size Super Capacitor, three of them are mounted on one PCB, and the other three mounted on a second PCB. The two PCBs are separated with metal spaces, and interconnected with wiring. The spacers used between the two PCBs are 2.75 inches. The size of each of the PCBs is 3.55 x 3.775 inches, and each PCB is 0.062 inches in thickness.



CHAPTER 2: INSTALLATION

2.1 Installing the BAT-SC350

The BAT-SC350 mounts directly to the bottom of HESC products by plugging CN1 and CN2 into the mating connectors. Spacers of 0.6 inch size are used between the BAT-SC350 and the HESC power supply it is plugged into.

CHAPTER 3: Determining Power Hold-Up Time

Energy decrease in capacitor: $\Delta E = \frac{1}{2} C(V_{wv}^2 - V_{min}^2)$

Where:

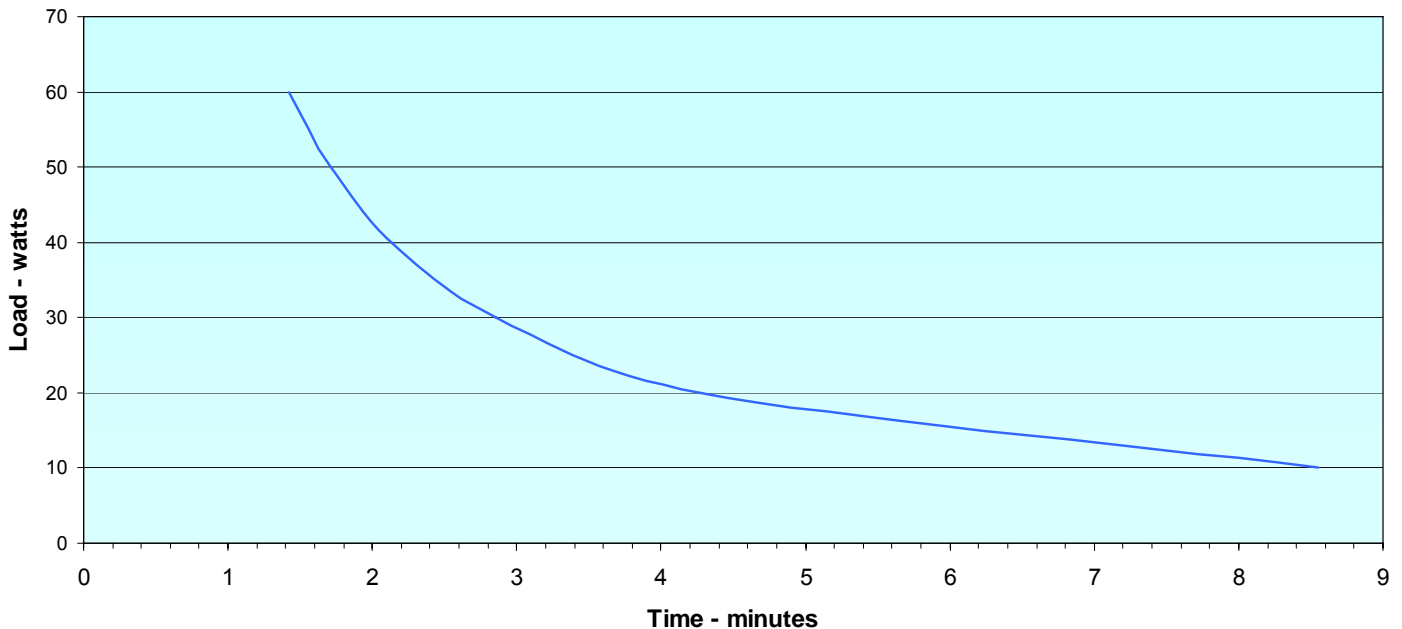
- C is the capacitance in farads.
- V_{wv} is the maximum voltage.
- V_{min} is the cutoff voltage.
- E is energy in joules (watt-seconds)

Therefore for the BAT-SC350, total energy available is $\Delta E = 0.5 * 58.3 (15^2 - 7^2) = 5130$ joules.

For a 20 watt load the hold-up time is $5130/20 = 256$ seconds or just over four minutes.

For a 50 watt load the hold-up time is $5130/50 = 102$ seconds or 1.7 minutes.

BAT-SC350 Hold-up Time



CHAPTER 4: High Current Applications

4.1 High Current Connector CN2

The standard battery connector, CN1, can handle loads up to 60 watts. For loads greater than 60 watts, the high current connector CN2 must be plugged into the mating connector. Power supplies HESC104+ and HPSC104-SER are available with a “high current” option. Please specify the “-HC” option when ordering these supplies for loads greater than 60 watts.