

Soliton1 Motor Controller Specifications

Performance:

- **1000 Amps:** The Soliton1 can deliver 1000A continuously if liquid cooling is used, or for 15-20 seconds out of every 90-120 on air cooling alone. This limit can be unlocked for racing to deliver up to 1400A (for short periods only!) upon EVnetics approval of your application (a special racing warranty must be agreed to in writing).
- **300 Volts:** The Soliton1 can operate on 10V minimum to 342V maximum

Superior Construction:

- **600 Volt IGBT modules:** Rugged design based on industrial IGBT modules, not lots of little IGBTs or MOSFETs in parallel.
- **Cutting edge capacitor:** State of the art ultra low loss 600V film capacitor. No electrolytics to dry out and fail!
- **High Efficiency:** 1.5V max. drop at 1000A (0.8V typical).
- **Superior electrical layout:** Internal laminated bus structure minimizes noise emissions.
- **CAD/CAM/CNC:** Computer designed and CNC machined out of aluminum.
- **Rugged enclosure:** Anodized, laser-engraved markings and weather-resistant terminals for great weatherability.
- **Built in cooling capability:** Finned enclosure has good intrinsic heat dissipation capability; liquid cooling loops add more.
- **Dedicated high power connection:** Separate terminals (1/2") for the battery and motor connections. Makes for a clean and safe installation.

Features:

- **Battery pack protection:** both maximum current and minimum voltage for the battery side are programmable - protect your expensive investment from abuse *while* extracting the maximum performance and range from your pack.
- **Motor protection:** both motor voltage and current output in the forward *and* reverse directions can be independently limited (the Soliton1 is very capable of destroying motors if sensible limits are not set).
- **Adjustable switching frequency:** Losses in any controller go up with switching frequency; the Soliton1 lets you choose between higher performance and efficiency (8kHz) or guaranteed silence at all current levels (14kHz).
- **Smooth starts:** Dithering is used at low motor currents to maintain precise control and eliminate jerky starts without resorting to a huge drop in switching frequency.
- **Adjustable acceleration rate:** The rate at which motor current is allowed to rise is adjustable from a tortoise-like 100A per second to a tire-boiling 25,000A/s (functions essentially like traction control).
- **Built in Precharge/Contactor:** Precharge management and components are built inside the controller. There is no need for a external contactor and resistor.

- **Protected against wiring errors:** All input terminals protected against reverse and over-voltage. All output terminals protected against short-circuit and inductive kickback (diodes recommended across all coils anyway).
- **3-wire throttle input:** Throttle input accepts a 0-5V signal from a pot (1k to 5k ideal), Hall effect pedal, etc.
- **Two dedicated inputs:** Tachometer (1, 2, 4, 6 pulses per revolution) for protecting against motor over-speed and Brake, for inhibiting the motor output even if the throttle is "stuck on".
- **Three programmable inputs:** Reverse and motor temp so far, with additional functionality to be added later.
- **Three programmable outputs:** Meter drivers for amps, power and serial/parallel motor switching (coming soon).
- **Error light output:** for reporting errors to the driver via the existing "Check Engine" light or other 12V indicator.

Connectivity:

- **Web browser interface:** Fully programmable with an ordinary web browser - no special software needed to change settings or update the firmware!
- **Data acquisition:** Performance data is continuously streamed to the Ethernet port in plain text format at 0.1s intervals. A basic logging program is available but the text format makes it easy to write your own.
- **Firmware upgrades:** new features can be added to the Soliton1 without removing it from the vehicle - just upload the encrypted firmware through the web interface and reboot!