

THUNDERSTRUCKMOTORS

BMS Quick-Start Guide

The Dilithium Battery Management System is designed to monitor lithium battery packs. The BMS has been implemented as two enclosures:

BMS Controller: a control board and a measurement board

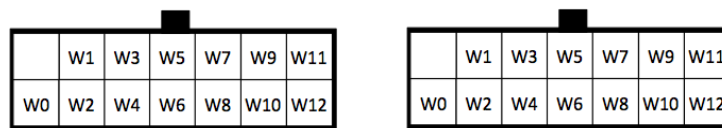
BMS Satellite: a measurement board

Each enclosure contains a measurement board supporting up to 24 cells. Each measurement board has two measurement chips (LTCs), each of which monitor at least 4 and up to 12 cells, called a cell group. A BMS Controller can operate alone, or up to 3 satellites can be added to support additional cells. A BMS Satellite requires a controller to operate.

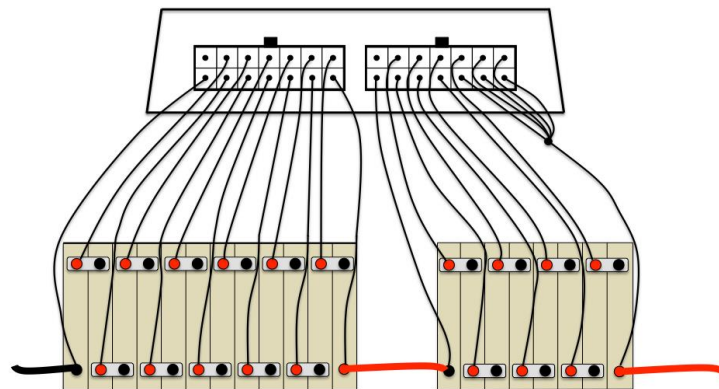
Cell Wiring

The first step in wiring the BMS is to determine the locations of the cell harness groups within the pack. All cells in a group must be wired consecutively with increasing voltage. Any unused cell wires must be connected to the last cell in the group, as shown below.

Wire 0 (pinout W0), is connected to the negative terminal of the first cell in each cell harness group. Notice that wire W12 of the left cell group and wire W0 of the right cell group essentially connect to the same pack location as shown below.



Pinout of cell connector



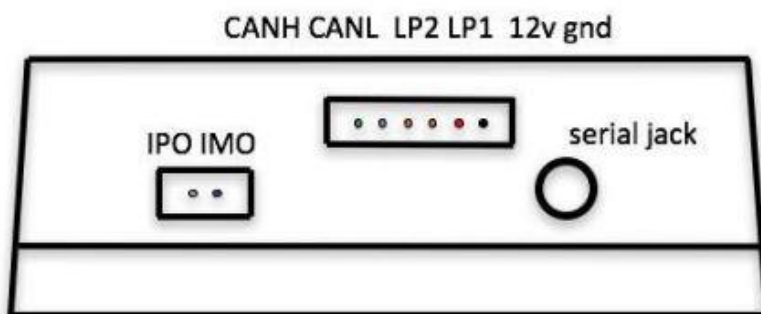
WARNING: INCORRECT WIRING MAY DAMAGE THE BMS. VERIFY PROPER WIRING BEFORE INSERTING THE HARNESS INTO THE BMS. REMOVE THE HARNESS FROM THE BMS BEFORE ALTERING ANY BATTERY CONNECTIONS. DAMAGE CAUSED BY WIRING ERRORS ARE NOT COVERED BY WARRANTY.

NOTE: A cell group must not span a fuse or other circuit protection device.

Wiring must be checked using the included harness test board before plugging each harness into the BMS. Verify that each wire number matches each assigned cell number. Verify that the cell voltages increase consecutively from contacts C1 to C12 relative to contact C0 on the test board. Please see the harness testing document, wiring video, and the complete manual at

www.thunderstruck-ev.com/bms-controller.html.

System Connections



12v power is connected to **+12V** and **GND**. The BMS should be powered when the vehicle is being driven or charged. For use with the Thunderstruck EVCC, the BMS may be powered by the “12V_OUT” connection.

Either CAN or cell loop can be used to disable the charger:

The **CANH** and **CANL** wires are connected to the EVCC, which will stop the charge if a BMS error is posted over canbus.

The cell loop wires **LP1** and **LP2** connect to an internal 200 ma solid-state relay which is closed if there are no alerts while the BMS is powered. The cell loop can trigger an external relay (coil <200 ma) to disable the charger or trigger an alarm.

The **IPO** and **IMO** pins are only used for packs with more than 24 cells. (See manual for details.)

Software Configuration

The BMS is configured by connecting to a computer with the serial cable available for purchase. Once connected to the interface, commands can be entered to change configuration.

```
bmsc> show config
  lvc      : 2.400v
  hvc      : 3.400v
  bvc      : n/a
  bvmin    : 3.000v
  thmax    : 50C
bmsc> set hvc 4
bmsc> set lvc 3.1
bmsc> set bvmin 3.5
bmsc> enable balance
bmsc> show config
  lvc      : 3.100v
  hvc      : 4.000v
  bvc      : n/a
  bvmin    : 3.500v
  thmax    : 50C
  options  : balance (cell balancing is enabled)
bmsc> show map
  ltc|pack|group|cells
-----
  1 | 1 | 1 | (c1 -c12) . . . . .
  2 | 2 | 2 | (c13-c24) . . . . .
bmsc> lock
configuration locked
bmsc>
```

- **lvc**: low voltage cutoff
- **hvc**: high voltage cutoff
- **bvmin**: minimum balancing voltage
- **thmax**: maximum cell temperature

The **lock** command is entered to save cell configuration. Once been entered, the BMS will generate an alert if there are any loose or open connections.

Balancing draws about 170ma from cells with the highest voltage, and runs after enabled any time the BMS is powered.

For technical support, call **707-578-7973** or send an email to:

connect@thunderstruck-ev.com