

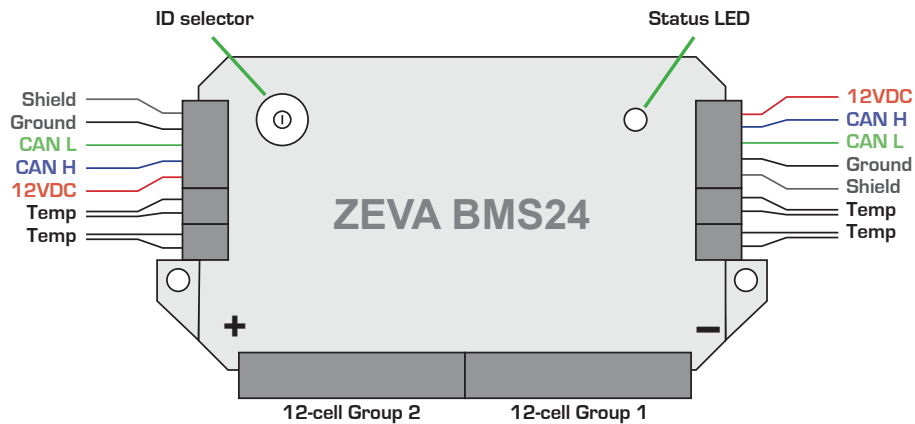


24-Cell Lithium BMS Module

Supplement to EVMS3 Manual

Introduction

This document is intended to provide some additional information specific to the 24-cell BMS modules used with the EVMS3. Please refer to the EVMS3 manual for most of the information needed for installation, setup and diagnostics of your complete BMS.



The 24-cell BMS modules can be considered just like two 12-cell BMS modules in one box, with identical connectors and wiring to cells. The two 13-pin cell connectors are electrically isolated from each other, so can be used for either a single string of between 8-24 cells, two parallel strings of 4-12 cells or even two completely independent strings.

Specifications

- Cells managed: 8–24 lithium cells per module
- Maximum total voltage: 120VDC
- Compatible with all lithium battery chemistries (LiFePO4, LiCo, LTO, NMC, etc)
- Cell measurement range: 0–5000mV
- Accuracy: Typically $\pm 1\text{mV}$
- Operating temperature range: -40°C to 85°C
- Pack balancing: 47Ω shunts, adjustable balance threshold
- Temperature sensing: 4x $100\text{K}\Omega$ NTC thermistors (optional)
- Cell quiescent current draw: 1.5mA (idle) 2.2mA (when sampling)

- CAN power supply: 12V nominal (8-16V range), 20mA
- CAN bus specification: 250kbps 29-bit IDs (CAN 2.0B)
- Dimensions: 135 x 67 x 12mm (excluding connectors)
- Weight: 70g

Installation

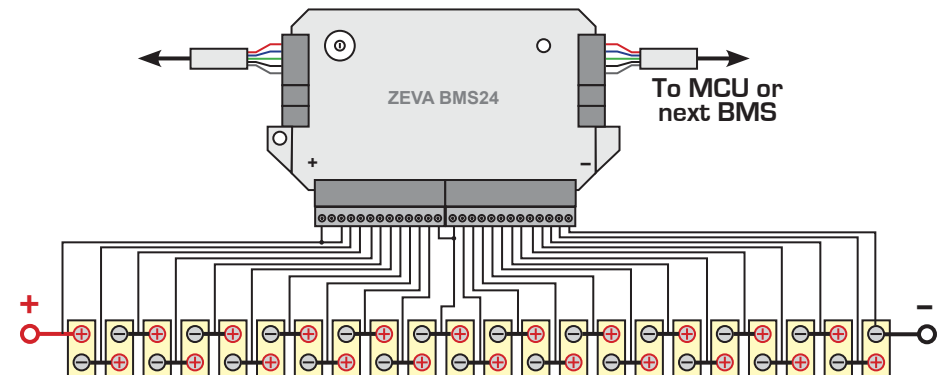
The module has two 4mm mounting holes 126mm apart which should be used to mount the module securely. Although the plastic housing provides some weather resistance, *they are not waterproof!* Modules should be installed in a location protected from water and debris. Inside sealed battery enclosures is ideal.

It is best to mount the module close to the cells it is monitoring, with flylead lengths under 1m recommended. Longer wiring can act as an antenna for EMI noise which in extreme cases can damage the module. If cells are distributed in physically separate groups, it is best to keep cell modules near the cells and run longer CAN bus to the master controller, rather than have cell modules close together with longer wires to the cells.

Note: Be careful not to have cell inputs span any mid-pack contactors or emergency stop buttons, as this can subject the module to damaging high voltages when opened, since the BMS module becomes a conduction path across the break! For similar reasons, be sure to unplug all BMS modules before doing any battery pack maintenance.

It is best to leave plugs disconnected from the module while wiring up, and verify all voltages / cell orders before connecting to the module, to avoid wiring mistakes which could damage the BMS module.

If fewer than 12 cells are to be connected to one of the cell groups, some cell inputs at the positive end will be unused. The voltage sampling chips power themselves from the most positive screw terminal, so the most positive cell wire connected must be bridged to the most positive screw terminal on the BMS module, as shown in the diagram below. Note the wire jumper on the left side of the cell connectors in the following 22-cell example.



Also since the two input groups are isolated from each other, for a single series string a wire jumper is required from the most positive terminal of the more negative connector to the most negative terminal of the more positive connector, i.e usually between the middle two terminals as shown in the diagram above.

Each BMS module needs to be assigned a unique ID on the CAN bus. This is done by adjusting the 16-position rotary switch near the top left of the board. Switch markings are in hexadecimal, so “A” means ID 10, “B” means ID 11, etc. Your MCU / EVMS will need to be programmed accordingly with information about module IDs and numbers of cells to expect. Since the BMS24 has two cell groups, the EVMS will expect to find group 1 at the ID on the selector, and group 2 will be ID+1.

Powering up

The BMS modules run most of their circuitry from CAN bus power. When the module powers up, the onboard LED should light up green. The LED may display a variety of codes as follows:

Green	BMS active, no errors
Blinking green	No CAN bus communications detected
Blinking red	No cells detected
Flashing green/orange	One or more shunt balancers active

The BMS modules themselves are unable to take action if a monitored cell is out of safe voltage range (in fact the BMS module stores no information about acceptable voltage ranges, only reports information and balances when instructed), so must communicate with an appropriate BMS master control unit which is able to respond to any reported error conditions, such as our EVMS. Please refer to the user manual for your BMS master control unit for advice on integration with BMS modules.

Tech support and warranty information

All products are covered by a 12 month warranty against manufacturing faults or failures under normal operating conditions. The warranty does not cover misuse of the product, including but not limited to physical damage or modification to the module, and reverse or excessive voltages to inputs.

We have taken great care to design a safe and reliable product, but faults can happen. If you believe your BMS module has a fault, please contact us via our website for RMA information. Or if you have any questions not covered by this manual, please contact us via our website:

<http://www.zeva.com.au/Contact>