# LiBAL s-BMS 9 - 16 cells™







## ROBUST INTEGRATION SYSTEM OPTIMIZED FOR 9 - 16 CELLS BATTERY PACK APPLICATIONS:

- Electric vehicles
- Hybrid vehicles
- Marine vessels
- Energy storage

## INTRODUCTION

The LiBAL s-BMS 9-16 cells™ is a dedicated and cost effective Battery Management System for industrial, motive, and stationary battery packs with 9-16 cells in series. It manages rechargeable lithium batteries of any chemistry and from any battery supplier allowing you maximum battery sourcing freedom. The product is an stand alone housed solution which is easy to integrate and install on any give battery pack.

The PC Diagnostic Software provides displays for monitoring battery and BMS performance. It also allows you to configure all battery parameters such as limit voltages and temperatures, allowable charge and discharge rates or improve SoC estimation with your own battery model.

CAN frames can be constructed at "Bit level" to broad-cast the parameters measured and calculated. A post processing module allows you to scale and manipulate values and broadcast them on the CAN bus with no custom development needed. This allows the s-BMS to work as a drop in replacement for many existing systems.

#### **FLEXIBILITY**

9 to 16 cells in series

All battery parameters easily configured

User-definable event responses and warnings

User configurable I/Os and CAN messages

Battery model for intelligent rate control

Embedded post processing of CAN values

## SAFETY

Detection of 27 error modes and 17 warning conditions

Noise and vibration robust

-40° to +85°C operational range

## **FUNCTIONALITY**

Cell voltages 0-5V, ±2mV accuracy

SOC and SOH estimation

LEAK detection

Cell balancing up to 840mA/cell

Cell and Pack resistance estimation

Thermal management

Advanced charger control

Data logging via PC diagnostic tool

## TESTED TO HELL SO YOU CAN USE IT ON EARTH WITH CONFIDENCE!

- Electromagnetic interference >200 volts/m
- Fast transients 4kV on all inputs
- HALT tested on all 3 vibration axes
- Tested from -90°C up to 120°C

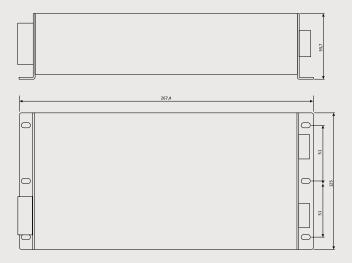




# **LiBAL s-BMS 9 - 16 Cells**Housed Battery Management system

# LITHIUM BALANCE BATTERY MANAGEMENT SYSTEMS





**LiBAL s-BMS 9-16 Cells™ Housed Battery Management System** 

Capacity         Up to 840mA @ 4.2VDC           Balancing Current         Up to 840mA @ 4.2VDC           Input Voltage         Control Unit only: 12 VDC (9VDC - 14VDC)           Current Consumption:         Control Unit only – from 12V supply: <150mA operating           Temperature Sensor         1 to 4 per Unit. Type NTC , 10KΩ @ 25 DegC , β Value : 3900           Measurement Specifications         Cell Voltage: Range 0-5V, Accuracy ±2mV typical, ±210mV max, Sampling 1Hz           Temperature accuracy ±1.5°C (dependent on sensor)         Pack voltage 0-1000W, accuracy ±1M, Sampling 5 Hz           Dimensions         Current Measurement by Shunt (100 – 1000 μΩ), 400mV max, Sampling 5 Hz           Dimensions         268 x 125 x 56mm, 988g, Length with cables 500mm           Control IOs         HV Contactors, Charge Contactor, Precharge Contactor           User Defined IOs (max. 3)         Fan Control, Heater Control, HV Interlock, Low SOC Warning, Mild Pack Relays,           Communication         CAN bus 2.0 A&B for system integration           Charger Control Options         Analogue voltage control, PwM 1-5 KHz, CAN 2.0 A&B           Protection Modes         Capable to monitor and handle 27 safety critical error modes           Capable to report 17 unique warnings conditions         Capable to report 17 unique warnings conditions           Diagnostic Tool         Licencing via USB Dongle (allowing multiple device usage)           Supporte	Cells per System	9-16 Cells in Series
Input Voltage         Control Unit only: 12 VDC (9VDC - 14VDC)           Current Consumption:         Control Unit only − from 12V supply: <150mA operating           Temperature Sensor         1 to 4 per Unit. Type NTC, IOKΩ @ 25 DegC, β Value: 3900           Measurement Specifications         Cell Voltage: Range 0-5V, Accuracy ±2mV typical, <±10mV max., Sampling 1Hz           Temperature accuracy ±1.5°C (dependent on sensor)         Pack voltage 0-1000V, accuracy ±1V, Sampling 5 Hz           Dimensions         268 x 125 x 56mm, 988g, Length with cables 500mm           Control IOS         HV Contactors, Charge Contactor, Precharge Contactor           User Defined IOs (max. 3)         Fan Control, Heater Control, HV Interlock, Low SOC Warning, Mid Pack Relays, Error LED, Off Board Leak Detection, Low Power Charger Mode (e.g. dual chargers)           Communication         CAN bus 2.0 A&B for system integration RS232 PC diagnostics interface           Charger Control Options         Analogue voltage control, PWM 1-5 KHz, CAN 2.0 A&B           Protection Modes         Capable to monitor and handle 27 safety critical error modes           Capablity to broadcast system status, errors and warnings over CAN           Diagnostic Tool         Licencing via USB bongle (allowing multiple device usage)           Supported Operating Systems: Windows Professional, XP, Vista, 7, 8           Pro Version - Calibration Development capability           Service Version - Field Service & troubleshooting	Capacity	Up to 5000 Ahr
Current Consumption:       Control Unit only − from 12V supply: <150mA operating         Temperature Sensor       1 to 4 per Unit. Type NTC, 10KΩ @ 25 DegC, β Value: 3900         Measurement Specifications       Cell Voltage: Range 0-SV, Accuracy ±2mV typical, <±10mV max, Sampling 1Hz         Temperature accuracy ±1.5°C (dependent on sensor)       Pack voltage 0-1000V, accuracy ±1V, Sampling 5 Hz         Current Measurement by Shunt (100 − 1000 μΩ), 400mV max, Sampling 5 Hz       Current Measurement by Shunt (100 − 1000 μΩ), 400mV max, Sampling 5 Hz         Dimensions       268 x 125 x 56mm, 988g, Length with cables 500mm         Control IOs       HV Contactors, Charge Contactor, Precharge Contactor         User Defined IOs (max. 3)       Fan Control, Hv Interlock, Low SoC Warning, Mid Pack Relays, Error LED, Off Board Leak Detection, Low Power Charger Mode (e.g. dual chargers)         Communication       CAN bus 2.0 A&B for system integration         R5232 PC diagnostics interface       Analogue voltage control, PWM 1-5 KHz, CAN 2.0 A&B         Charger Control Options       Analogue voltage control, PWM 1-5 KHz, CAN 2.0 A&B         Protection Modes       Capable to monitor and handle 27 safety critical error modes         Capable to report 17 unique warnings conditions       Capablity to broadcast system status, errors and warnings over CAN         Diagnostic Tool       Licencing via USB Dongle (allowing multiple device usage)         Supported Operating Systems: Windows Professional, XP, Vista, 7	Balancing Current	Up to 840mA @ 4.2VDC
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PatentsU.S. Patent No. 8,350,529. China Patent No. ZL 2007 8 0048774. Patents pending	Certifications	CE marking
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