

# c-BMS24X™

## Compact Battery Management System for 24 cells

The c-BMS24X combines the compact hardware and all the functionality of a traditional c-BMS with the latest features, software capability, and advanced Sensata Technologies | Lithium Balance proprietary algorithms developed for low Voltage BMS.

The c-BMS24X supports connecting up to 10 battery packs in parallel, providing flexibility in battery design along with improved safety and serviceability. The battery packs connected in parallel are battery swappable, eliminating downtime and range concerns normally associated with EVs due to the need of charging.

Hybrid SOC, along with advanced SOH, SOP, and SOE algorithms ensure that the c-BMS can maintain high measurement accuracy even with cell chemistries such as LFP, without the need of a full charge-discharge cycle or long rest time, essentially increasing overall system uptime.

Using the c-BMS24X Creator™ software, an advanced version of the traditional c-BMS' configuration software, the battery designer can define unique, application-specific battery settings, safety strategy, optimized battery performance and battery life. The c-BMS24X is cell agnostic both in terms of form factor and chemistry.

### Highlights

#### Safety

- Safety rated key components
- Self-test and redundancy in safety critical measurement circuits
- Open circuit detection

#### Battery Life

- High frequency sampling of current at 100 mS allows optimal detection of pulses
- Powerful and intelligent dissipative balancing at 200 mA per cell
- Heater control

#### Usability

- RTC + logging of events, errors and warnings
- BMS Creator PC tool for easy configuration

#### Battery Life

- Individual cell voltage measurement accuracy to within  $\pm 1.6$  mV at 25 °C
- Optimized low power consumption mode
- $\pm 1$  °C accuracy in temperature measurement
- Hybrid SOC algorithm & OCV compensation
- Advanced SOH algorithm based on capacity fading and internal resistance estimation
- Advanced SOP and SOE algorithms
- Parallel pack support (up to 10 packs)
- Battery swap capability
- Advanced balancing algorithm allowing cells balancing at any time during the charge-discharge cycle

### Features

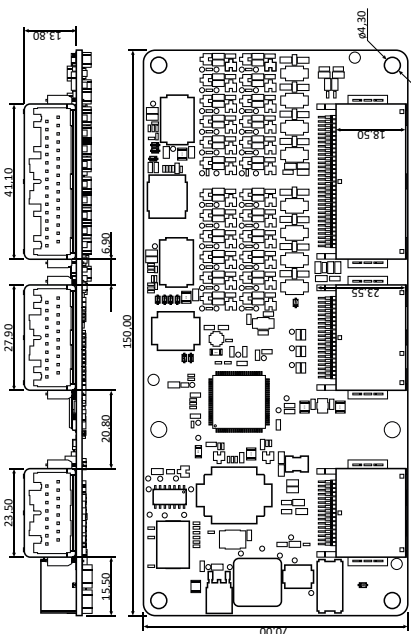
- Parallel pack capable up to 10 packs in parallel
- Battery swappable
- Heater control
- Hybrid SOC algorithm
- Advanced balancing, SOH, SOP, SOE algorithms

### Applications



# c-BMS24X Compact Battery Management System

## Technical Specifications



c-BMS Compact Battery Management System for 24 cells

Parameters	Specifications
Power supply	6-35 V
Range of high voltage measurement	0 - 120 VDC
Accuracy of high voltage measurement	±1 VDC
Range of current measurement input Shunt	±200 mV
Accuracy of current measurement input Shunt	±0.5 mV -40 – 85 °C
Range of current measurement input (Hall effect sensor)	0.0 – 5.0 V, 0.0 -2.5 V current in, 2.5 V – 5.0 V current out
Accuracy of current measurement input (Hall effect sensor)	±1.25 mV -40 – 85 °C
Standby consumption (sleep mode)	<2,5 mW
Active consumption	<2.7 W
Supported CAN communication type	CAN 2.0A/B 11 bit and 29 bit IDs
Supported CAN speeds	125, 250, 500, 1000 kbit/sec
CAN ports	1
External General Purpose I/O's	4 GP I/O (Active Low) and 4 inputs
Charger control interfaces	CAN
Number of cells	Up to 24 Cells. Minimum 11 V
Minimum detectable cell voltage	0 VDC
Maximum detectable cell voltage	5 VDC
Cell balancing topology	Dissipative
Cell balancing current	200 mA, at cell voltage 4.2 V
Cell voltage typical sampling time	100 ms
Accuracy of single cell voltage	±1,6 mV at 25 °C
Range of Temperature measurements	-40 to +85 °C
Accuracy of cell temperature (NTC)	±1 °C -40 – 85 °C
Patents	Granted: ZT 200780048774, EP 0781788.6, US 8.350.529
Temperature sensor channels	Up to 6
Dimension	170 mm x 70 mm x 15 mm, 94 g
Parallel pack support	Yes
Battery swap capability	Yes
Hybrid SOC algorithm	Yes

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Mailing Address: Sensata Technologies, Inc., 529 Pleasant Street, Attleboro, MA 02703, USA

**Sensata Technologies**  
Denmark A/S  
Greater Copenhagen  
Phone: +45 5851 5104  
Email: [lb\\_contact@sensata.com](mailto:lb_contact@sensata.com)

**Regional head offices:**  
United States of America  
Sensata Technologies  
Attleboro, MA  
Phone: 508-236-3800  
E-mail: [support@sensata.com](mailto:support@sensata.com)

Netherlands

Sensata Technologies Holland  
B.V.  
Hengelo  
Phone: +31 74 357 8000  
E-mail: [support@sensata.com](mailto:support@sensata.com)

China  
Sensata Technologies China  
Co., Ltd.  
Shanghai  
Phone: +8621 2306 1500  
E-mail: [support@sensata.com](mailto:support@sensata.com)