



## Battery Monitoring System

### Electrical System Sensing

Battery Monitoring/Management Systems (BMS) monitor the physical variables of a battery, such as current, voltage and temperature and prevents the battery from operating outside its safe operation parameters. Monitored variables are used to check the battery state, to calculate secondary data, report that data, control its environment or for authentication.



#### Redundant Multi-Sensor System

The system consists of a heterogeneous, galvanically isolated Hall current sensor and a shunt resistor-based current sensor, creating a redundant current sensing mechanism. Additionally, the standard module includes a battery voltage sensor and dual NTC temperature sensors. Together, these components monitor internal system parameters to ensure safe and reliable operation.



#### Programmable and Customizable

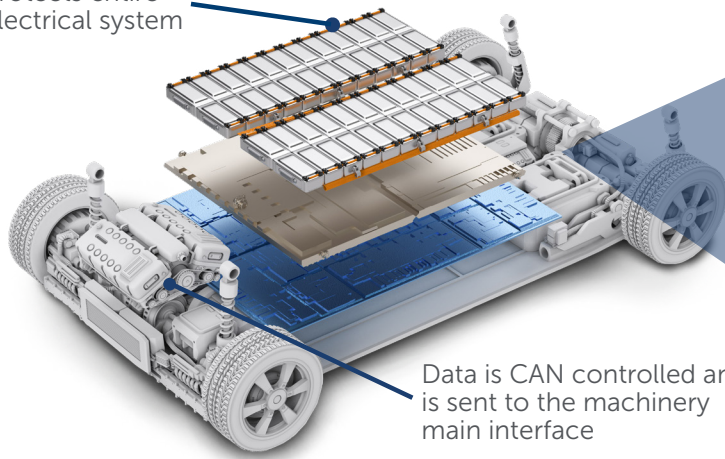
The design of the BMS is highly modifiable and can easily integrate changes upon request. Configuration options include customizable current and voltage ranges, power supply. All signals are provided at the output via the CAN interface, making the module compatible with numerous digital systems.



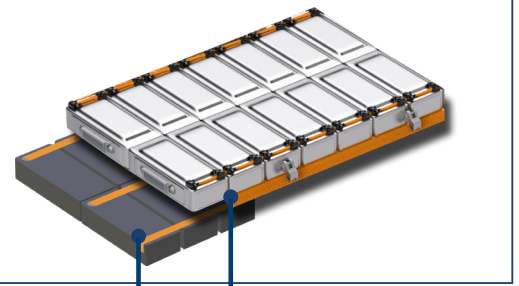
#### Special Features

A particular feature of the product is its independent power supply and galvanically isolated design. The device operates directly with 5 V<sub>DC</sub>, but can be configured to 12 V<sub>DC</sub> upon request. It is also attachable on both high-side and low-side of the high-voltage (HV) battery system.

Protects entire electrical system



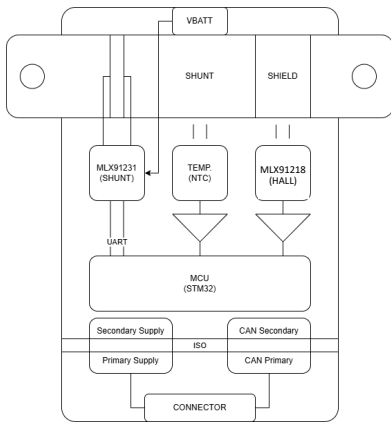
Data is CAN controlled and is sent to the machinery main interface



Easily attaches electrical system in almost any configuration

## Technical Specifications and Layout:

Parameter	Value
Current Range	$\pm 1500 A_{PK}$
Voltage Range	$\pm 1000 V_{DC}$
Accuracy	$\pm 0.5\% FS$
Operation Temperature Range	$-40$ to $+85^{\circ}C$
Supply Voltage	$5 V_{DC}$
Redundant Measurement Hall	12 Bits
Redundant Measurement Shunt	18 Bits



## Secondary Calculated Data:

Monitored variables are used to calculate secondary data

- **Voltage Monitor:** Tracks individual cell voltages, identifies minimum and maximum values and monitors voltage at key tap points across the battery pack.
- **Temperature:** Detect average temperature, coolant, intake temperature, coolant output temperature, or temperatures of individual cells.
- **Current Monitor:** Current in or out of the battery.
- **State-of-Health (SOH):** Measurement of the remaining capacity of the battery as a percent of the original capacity.
- **State-of-Safety (SOS):** Overall indication of safe operation based on programmed parameters.
- **State-of-Charge (SOC):** Indicate the charge level of the battery.
- **State-of-Power (SOP):** Detect amount of power available for a defined time interval given the current power usage, temperature, and other conditions.
- **Coolant Flow:** Monitor air or fluid-cooled batteries.

## Years Of Automotive Experience

CTS Corporation began expanding into the automotive market in the early 1970's, when the U.S. government first issued requirements for controlling automotive emissions.

Today, we are a leading provider of sensing solutions, smart actuators, and pedals. As a former leader in providing soft ferromagnetic cores, shields, and shunts, we have grown into providing full current sensing solutions for high power and industrial applications.

## Contact Information

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