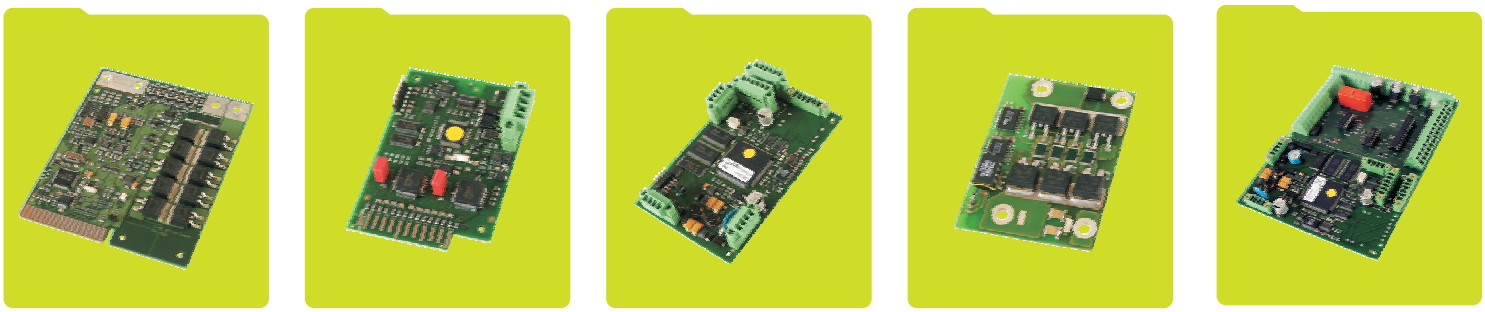


Intelligent

Battery Management System

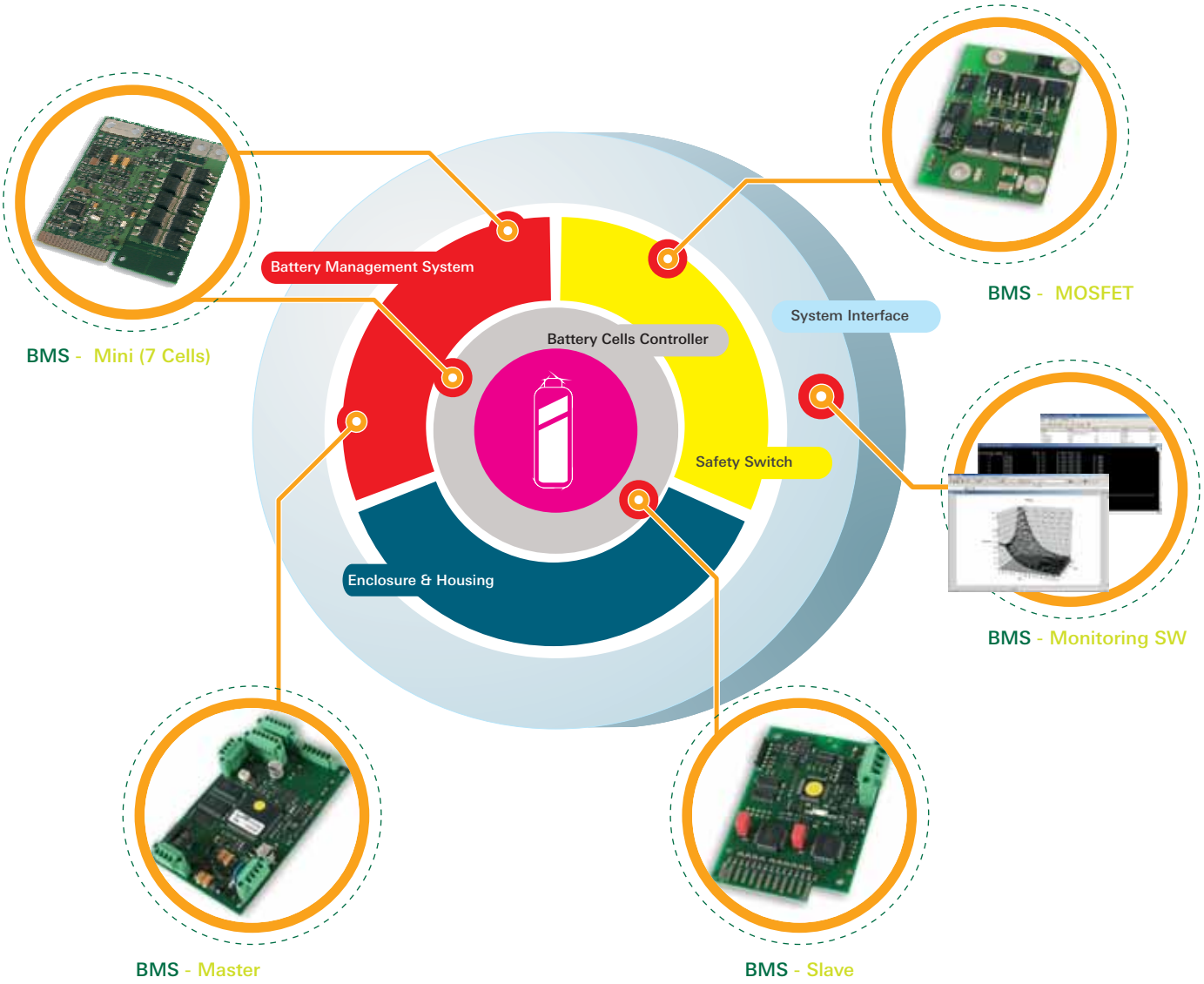
to control your power

A long- lived Experience

Our Know-How

I+ME ACTIA has been following since many years new battery technology based on Ni- Mh and Li- Polymer technology. Together with its long- lived know how in Electronics we have been working and developing consequently since 1995 new battery management systems enabling the use of NiMH or Li- Polymer batteries for mobile applications.

Together with development partners such as VARTA, GAIA, and ZSW, we build up innovative solutions, which have been already implemented in different applications:



Features

The implementation of our Battery Management Systems gives you competitive advantages:

- By enhancing the battery life
- By enabling the system integration of the battery
- By optimising the charging of batteries through automatic cell balancing
- By reaching high flexibility of use of various numbers of battery cells
- By getting information about the battery, single cells or cell groups
- By ensuring a high security of cells and users through control of the limit values
- By adapting the charging and discharging cycles to the customer and application needs
- By revealing statistics about the battery, such as State of Charge or State of Health, and with it enabling the use in commercial applications
- By offering minimal power consumption of the BMS thank our automotive electronic know how.

Battery Management Systems: Advantages

Uses

The advantages of the new battery cells can be enhanced through optimised Battery Management Systems, for example by avoiding the drifting of the cell voltages through an active balancing already during the charging.

Our systems are already implemented for NiMH and Li-polymer batteries.
These systems offer especially for mobile uses such as hybrid vehicles, bicycles, fork lifts, wheel chairs and robots the crucial advantage that they control the charging of the battery through the software application. This can be furthermore designed so that it supports also the reversal handling of onboard electric power train.
This functionality enables a secure function of the whole system and avoids a premature breakdown of the battery due to frequent overcharging or deep discharging of the battery cells.

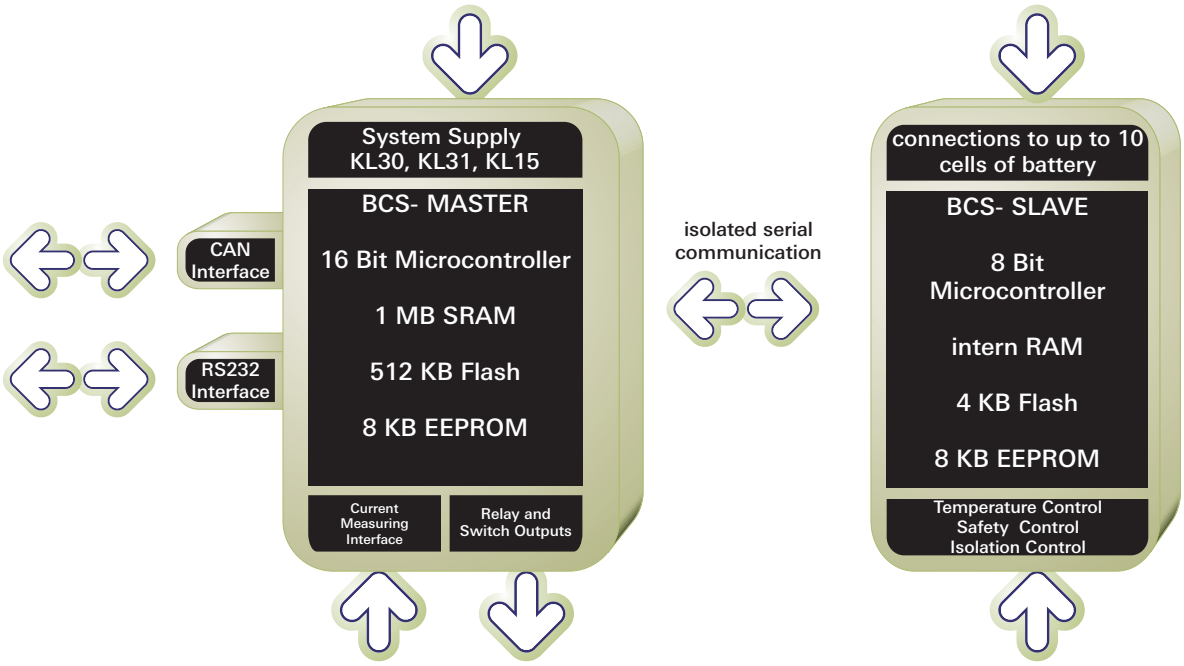
The communication of the BMS with complex car systems is a further crucial advantage in order to indicate for example the status of the battery to the car or to warn about critical operating use.

Techniques +++

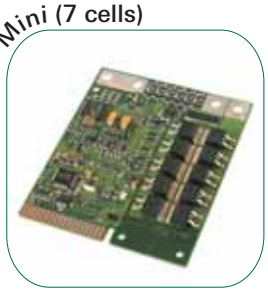
- The extremely low power consumption and the sleep mode are advantageous for the use in mobile application and vehicles because only few power is requested for the additional electronic.
- The electronics comply with the strict demands of the automobile industry.
- The CAN interfacing is a serial feature and the software has been already designed so that an optimised integration in onboard networks can be realised with complementary system communication.
- Management of power demand is supported by integrated dynamic power prediction.
- Through its modular concept (Master and Slaves modules), BMS can be easily adapted to different cell types and cell numbers.
- BMS enables short charging cycles. The cell balancing is executed automatically.
- State of Charge and State of Health are standard information.
- BMS can be enhanced with addidional components for security reasons.
- The system integration is flexible because of the low need of place and the modular system architecture.
- The best price/performance value of these products enables their integration in application with high quantities.
- Complementary outputs are available for the control of external components, such as fan or security switches

Technical Data

- BMS consist of one Master and up to 20 Slaves (correspond to approx. 15V - 840V)
- Applicable for a supply voltage of approx. 7- 42V
- Detailed Measurements of voltage with 16 Bit ADC and cell voltage with 12 Bit ADC
- Automatic balancing of the cell voltage up to +/- 5mV
- Identification of charging and discharging ends with an accuracy of 10mV
- Accurate determination of SOC und SOH based on voltage balancing and voltage measurement as well as other processes
- All limit values can be set up as parameters
- Communication with the vehicle computer per CAN with extensive messages of faults and warning
- PC Programm for displaying and analysing per CAN or RS232



BMS - Mini (7 cells)



BMS - Application Board

BMS - Master

BMS - Slave

BMS - MOSFET

BMS - Standalone Slave

Master Function

- Voltage measurement for the whole battery
- Data exchange with the slave modules
- System surveillance and triggering of the protective relay
- Triggering of fan or other components which are necessary for the operation of big batteries
- Administartion of system information auch as SOC, SOH, Date and time
- Communication to external peripherics through CAN

Slave Function

- Measurement of the cell voltage
- Balancing of different cell voltages
- Measurement of temperature
- Communication with the Master

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