

Power Management

The Intelligent Battery Sensor (IBS)

Intelligent Battery Sensor Technology



The intelligent Battery Sensor (IBS) is a key element for the regulation of energy generation, energy distribution and storage in vehicles. Hella develops this key component for power management in cooperation with the OEMs and partners AutoKabel and Moll, in order to bundle all necessary competencies.

Motivation

- Ensuring power supply with increased electronic equipment rate; balancing of the generated, stored and energy necessary to ensure starting capability
- Intelligent energy distribution enables optimal layout of the vehicle electric system and increases the reliability of vehicle electric systems
- Further emission and fuel consumption reduction enables fulfillment of more stringent legal requirements
- Increase of the battery life through controlled charging and discharging

Battery Monitoring

- Determination of the real physical battery data as an optimal and reliable basis for the regulation of the battery condition
- Monitoring of the charge condition (SOC) and aging (SOH) of the battery
- Sensor concept is independent of the electronic equipment rate and vehicle battery
- Battery-terminal-clamp-integrated battery sensor technology for realization of modular and platform-independent energy management

Advantages

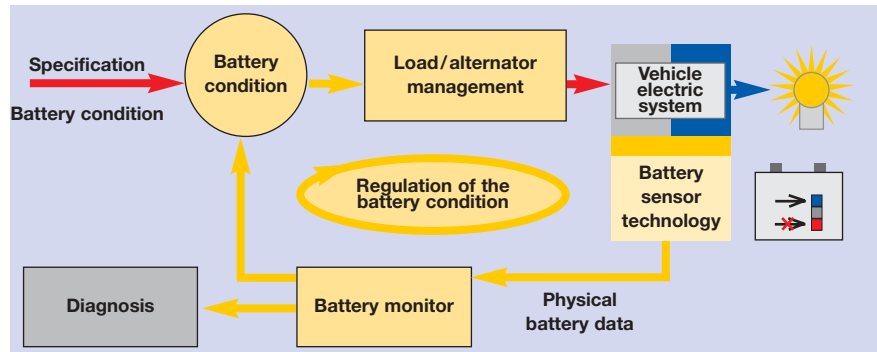
- **Availability:** Maintenance of starting capability in the case of longer standstill periods and in the case of the operation of electrical loads during standstill
- **Battery Diagnosis:** Continuing and exact determination of the essential battery parameters over an extended area with very high accuracy
- **Preservation of Resources:** Optimization of vehicle fuel consumption values as well as further weight reduction through dynamic adaptable alternator performance
- **Cost Savings:** Through substitution of today's costly voltage and current measurements in production
- **Quality Testing:** Quiescent current monitoring through battery sensor technology enables immediate recognition of defective devices during production
- **Charge State:** Ensuring an optimal charge state during delivery
- **Quiescent current monitoring:** Permanent monitoring of the quiescent current enables detection of defective control units in the vehicle
- **Battery Diagnosis:** Detailed information about the charge and aging state of the vehicle electric system battery



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Innovative and trend-setting design concept



Essential Performance Features

Acquisition of Measuring Values

- Highly precise measurement of current, voltage and battery temperature
- Isochronous scanning of voltage and current over two parallel functioning AD converters
- Bi-directional current measurement via a very wide measuring area without range change (mA to kA)
- Variable scanning rates into the KHz range with very good signal/noise ratio

Component Features

- Programmable current-threshold monitoring with minimal quiescent current consumption
- Wake-up-capability for the monitoring all vehicle conditions
- Programmable timer in the range of seconds to several hours
- Bus-capability for LIN/BSL

Design Concept

- Direct attachment of the measuring electronics on shunt enables maximum measuring precision
- Minimal inherent loss through inter-metallic connection of all energized components, incl. shunt
- Mechanical protection of the electronics module through integration in the battery-terminal clamp and glue coating

Package Space

- Highly integrated mechatronic component for placing of the battery sensor technology in a standardized DIN clip space enables installation in every vehicle.
- Very good thermal connection to the battery through direct attachment to the negative terminal guarantees exact temperature determination of the battery.

Measured Variable	Range	Resolution	Linearity	Offset	Noise*
Voltage U	6 to 18 V	0.5 mV	±0.2 %	±5.0 mV	2.0 mVpp
Current I10	±10 A	1.0 mA	±1.0 %	±5.0 mA	5.0 mApp
Current I300	±300 A	10 mA	±1.0 %	±50 mA	75 mApp
Current I1.000	0 to 1500A	50 mA	±1.0 %	±0.5 A	0.15 App
Temperature T	-20 °C to +60 °C	0.5 K	±2 K		
	-40 °C to +105 °C	0.5 K	±4 K		

* The noise comprises 99 % of all measuring values