

Battery Management



ENERGY
MANAGEMENT
Battery Management

- Context
- Needs
- Solutions

Context

In a constant effort to increase driving comfort and safety while reducing fuel consumption and engine emissions, the number of electronic and electrically-operated functions in automobiles is continuously rising. This has created a need for smarter solutions to ensure sufficient battery power to supply these loads and start the engine reliably at any time.

Car batteries power many important features designed to:

- Reduce fuel consumption and emissions (stop & start, optimized gear shifting, etc.)
- increase automobile safety (electronic stability control, ABS, cruise control, etc.)
- improve comfort (air-conditioning, navigation systems, power steering, seat heating, etc.)

To balance battery power consumption and charging in an optimum manner, energy management systems rely on battery sensors for the information they need to implement closed-loop control strategies.

The ideal battery sensor should be non-intrusive and automatically adapt to any new battery. In addition to measuring battery current, voltage and temperature, smart battery sensors can calculate and deliver state-of-health, state-of-charge and state-of-function information. In this way, they open the way to extended battery life, reliable cranking power and reduced fuel consumption and CO2 emissions, without increasing the computing load on the energy management ECU.

Electricfil masters all leading sensor technologies to bring you the right sensing solution for your every need.

Function needs

To optimize energy management and extend battery life, the engine management systems need to know the state of health, charge and function of the battery in addition to the current, voltage and temperature.

All this information should be provided without increasing the calculation load on the energy management system and without intruding on the battery circuit.

In addition, the function should be easy to install on any battery, without requiring dealer servicing.

Sensors needs

The sensors that provide this information must offer:

- High accuracy
- Small size
- Fast response
- Intelligence (state-of-the-art algorithms)
- Programmability
- Easy integration
- High reliability
- Diagnostic capabilities

Depending on where they are installed, they must also withstand severe environmental conditions:

- High temperatures
- Rapid temperature fluctuations
- Electromagnetic disturbances
- Vibrations
- Corrosive liquids

Electricfil solutions

Electricfil Automotive masters **all leading sensor technologies** to produce optimum sensing solutions for every need. The solution path is based on more than 25 years of experience in the field.

- **Analysis of customer needs** to select the most suitable sensor type from our proven core technologies (LVDT, Hall, Eddy-Current, GMR, AMR, VR, etc.)
- **Determination of degree of integration** (single sensor, sensor cluster or mechatronic module)
- **Circuit design and ASIC development** if required
- **Selection of electronic components and assembly technology** (e.g. surface mounted devices, discrete components)
- **Package design**, including the selection of materials (PA, PPS, PBT, etc.), assembly process (laser, thermal or vibration welding), potting, overmolding and encapsulation techniques, sizing, etc.
- **Selection of interconnections** (leadframe, flex foil, cable harness, etc.)
- **Magnetic circuit design** (magnet materials, pole piece dimensions, etc.)
- **FMEA, reliability studies, computer simulations, prototyping, initial samples**, etc.

Electricfil sensing solutions for battery management

- > Smart Battery Sensor
- > Hall current sensor
- > Temperature sensor