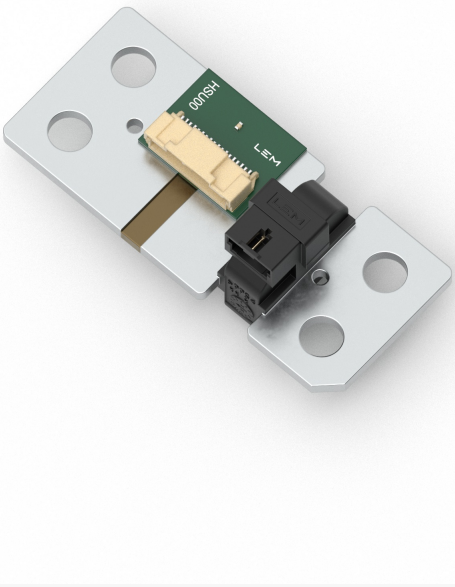
LEM releases a first of its kind high-voltage battery sensor that combines shunt and Hall effect technologies

Novel Hybrid Supervising Unit optimizes EV battery management systems at low cost



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GENEVA, SWITZERLAND, June 12, 2025 /EINPresswire.com/ -- LEM (SIX: LEHN) Electrical measurement technology specialist LEM has launched a new current sensing unit for battery management in electric vehicles (EVs). For the first time on the market, LEM has put together shunt and open-loop Hall effect technologies in a single part, called Hybrid Supervising Unit (HSU), to meet the challenges of small footprint, low cost and highest safety level in EV battery management systems.

“The HSU represents a significant innovation in sensor technology, being the first to combine shunt and Hall effect sensing into a single component. This integration simplifies system architecture, enhances safety, and allows for seamless upgrades without altering the mechanical layout. Additionally, it reduces the total bill of materials (BOM) and minimizes cycle time at the customer's end,” said Jérémie Piro, Product Manager Battery Management Systems and Battery Storage at LEM.

The EV’s high-voltage BMS plays three key roles: it manages the battery’s state of charge and state of health, keeps the system and end user safe, and performs cell balancing as part of the battery optimization process. For higher safety levels, system engineers typically use two separate devices, a shunt to measure 2000A and a current sensor fully isolated for measurements to 2000A.

Now LEM has combined the capabilities and performance of both technologies into a single unit,

integrating it into the BDU. The signals from each section – the shunt and the current sensor – are then collected by the BMS.

At BDU level, the HSU allows:
• Minimal footprint, weight and cost (BOM).
• Minimized integration effort for faster time to market; and
• Easy system upgrade, without impacting the mechanical layout while improving safety.

At the BMS level, the HSU enables system developers to easily reach the ASIL D safety level required for EVs.

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The shunt's resistance is very low at 25µΩ, and the Hall part is galvanically isolated, with accuracy of 2% at 500A and 5% at 2000A. Signal communication lines are separated (shunt signal and analogue or digital bus for the Hall part), and there's NTC (Negative Temperature Compensation) signal for shunt temperature compensation. The current measuring range is up to ±2000A at 10s for both parts, as is the wide operating temperature range of −40°C to +125°C.

> The HSU represents a significant innovation in sensor technology, being the first to combine shunt and Hall effect sensing into a single component"
>
> *Jérémie Piro, Product Manager Battery Mgmt Systems & Battery Storage*

The HSU is the only component on the market with two technologies fitted into a standard shunt footprint. It is a plug-and-play unit, allowing easy mounting. LEM initially offers the HSU00 part, with HSU01 to follow in June. The two are suitable for the two most common BDU busbar sizes: 84 x 36 x 3mm (HSU00) and 84 x 20 x 3mm (HSU01). Samples are available now.

LEM plans to expand its HSU lineup, by introducing new technologies, for example combining a shunt with a coreless Hall-effect part. The goal is to continue to shrink the devices' size and cost yet improve their performance.

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