Improving Electric Motors in Hybrid Cars

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– Marcus Warrelman, VP Sales, Europe

Innovating for the Future of Fuel Efficiency

Emissions regulations are forcing automobile designers to focus on fuel efficiency across the globe. In Europe, new requirements take effect in 2021, while China, battling its own pollution issues, will follow suit. In the U.S., emission controls are ongoing and expected to peak in 2025. These mounting fuel economy requirements have left auto makers searching for answers, and is creating a growing interest in hybrid vehicle designs that are more fuel efficient.

However, not all hybrid designs are created equal. A manufacturer who came to Flex recently was looking to produce a Full Hybrid solution, in which the engine and the braking system both charge the battery, but the cost of that design was prohibitively expensive for its target market. It needed an alternative that would bring greater fuel efficiency at lower cost.

Making 'Mild Hybrid' Designs Cost-Effective

Flex helped the automobile manufacturer adopt a Mild Hybrid design in which a high-voltage electric motor assists a combustion engine to move the vehicle by shouldering part of the load. Flex made this possible by enabling the automaker to rethink the electrical system underpinning its powertrain design.

Today, most Mild Hybrid Vehicles use a high voltage 120V motor, but these are expensive and can carry safety issues. Flex's 10 years of experience in automotive power conversion and recuperation enabled it to identify an opportunity that would create a step change in automobile efficiency for the client: a 48V electrical system.

A 48V Mild Hybrid powertrain enables an automobile to charge a 48V lithium-ion battery when the driver brakes. However, the client would still use a 12V DC system to power the rest of the accessories in the vehicle.

Higher Fuel Efficiency, Lower Cost

Flex used its Sketch-to-Scale™ solution to integrate its power conversion technology into the client's specific vehicle design. It used its second-generation 48V DC-DC Converter to not only transfer power from the client's 48V powertrain system to its 12V system, but to route it back again with more than 96% efficiency.

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48V hybrid solutions have been shown to generate up to 70% of the energy savings of high-voltage mild hybrids at just 30% of the cost. The cost efficiencies that Flex has brought its automotive clients have helped them to bring fuel efficiency to new target markets while also satisfying government regulations and improving their corporate social responsibility.

Flex Capabilities

Experience

Flex has over a decade of experience working closely with customers in automotive design.

Electrical Subsystems

Flex excels in DC-DC Converters that can transfer power efficiently between one part of the system and another. It also offers a recuperation module that can store energy generated while braking and convert it into kinetic power where necessary.

Clean Technology

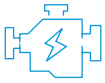
Flex has a rich history in developing and deploying aluminum wiring and solenoid technologies.

No Electrification

A vehicle with a standard combustion engine, and no electric motor.

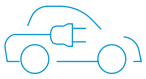
Mild Hybrid

A high-voltage electric motor supports a combustion engine to move the vehicle. The combustion engine is still the primary means of moving the vehicle.



Full Hybrid

Can function as fully electrical, fully combustion, or a combination. Electric system is charged by the engine, and/or other recuperation methods.



Plug-In Hybrid

A system similar to a Full Hybrid with a larger battery that is charged by physically plugging it in, not by a combustion engine.

Electric Vehicle

No combustion engine, electric motor moves vehicle. Vehicle is charged in the same manner as a Plug-In Hybrid.

For more information, please visit www.flex.com or follow us on Twitter @flexltd

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