

Press Release

FEV senses electrical partial discharge in high-voltage vehicle propulsion systems

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Aachen, March 2024 – FEV, a leading global engineering service provider and innovation leader for sustainable mobility and energy solutions, has developed PD-HVX (Partial Discharge – High Voltage X), the world's first solution for early detection and prevention of partial discharge (PD) in high-voltage electric drive units (EDUs). PD can cause damage to the insulation in modern EDUs, which in the worst-case scenario can result in a total failure of the vehicle. FEV's PD-HVX uses well established measuring systems with specialized sensors, which are used in EDUs for qualitative measurement. This enables customers to identify partial discharge during the development phase and take the necessary action.

PD is a local electrical sparkover that can occur at high voltages above 600 volts. It is caused by extremely small defects or inhomogeneities in the insulation material or soiled surfaces. If it remains unnoticed within an EDU and occurs repeatedly, PD leads to gradual damage of the insulation and to a premature stop of the vehicle.

PD-HVX uses electromagnetic frequency analysis, one of the most precise and reliable measurement methods for the application field of electrical propulsion systems, to measure the electromagnetic fields around the drive unit to be analyzed. The innovative software then uses the measurement results to determine whether partial discharge occurs within the EDU during operation.

“PD has been known for a long time in the field of electrical systems engineering and high-voltage transmission networks, where corresponding tests are common practice,” said Dr. Michael Stapelbroek, Vice President Electric Powertrain at FEV. “In the automotive sector, however, the phenomenon is just gaining focus with the increasing spread of 800-volt batteries. Thanks to our many years of expertise in the development of EDUs, with PD-HVX we can now offer our customers a dedicated solution for PD.”

This solution consists of a comprehensive service package for vehicle OEMs and suppliers. The test equipment, which is optimized for EDU operation, filters out drive-related interference signals and therefore enables significantly better measurement results for PD. The customer subsequently receives the data obtained in the tests for evaluation and further interpretation.

FEV has many years of experience in power, propulsion, and control electronics as well as various areas of sensor technology in vehicle construction. On request, the customer can also make use of this expertise in data analysis and system optimization.

“By detecting partial discharge in the EDU at an early stage, possible reasons for insulation damage in the electronics can be eliminated during the development process. This prevents delays due to premature vehicle failures and additional costs during development,” said Stapelbroek, summarizing the advantages of the solution.

For further information about PD-HVX please visit www.fev.com/partialdischarge

Footage:



Caption: FEV's PD-HVX detects partial discharge in the EDU at an early stage and thus prevents vehicle failures. Source: FEV

About FEV

FEV has always pushed the limits.

FEV is a globally leading engineering provider in the automotive industry and internationally recognized leader of innovation across different sectors and industries. Professor Franz Pischinger laid the foundations by combining his

background in academia and engineering with a great vision for continual progress. The company has supplied solutions and strategy consulting to the world's largest automotive OEMs and has supported customers through the entire transportation and mobility ecosystem.

As the world continues to evolve, so does FEV.

That's why FEV is unleashing its technological and strategic expertise into other areas. It applies its forward thinking to the energy sector. And its software and system know-how will enable the company to lead the way making intelligent solutions available to everyone. FEV brings together the brightest minds from different backgrounds and specialties to find new solutions for both current and future challenges.

But FEV won't stop there.

Looking ahead, FEV continues to push the limits of innovation. With its highly qualified over 7,500 employees at more than 40 locations globally, FEV imagines solutions that don't just meet today's needs but tomorrow's. Ultimately, FEV keeps evolving – to a better, cleaner future built on sustainable mobility, energy and software that drives everything. For the company's partners, its people and the world. [#FeelEVolution](#)