Eco-friendly glow plug

An innovative pressure sensor glow plug offers improved diesel engine closed-loop control

Striving for green mobility and being aware of the demanding limits set by emissions guidelines in all key markets, Hidria has invested in high-level research to develop a new generation of glow plugs that improve engine combustion control.

The result of this endeavor by the Slovenia-based supplier is a high-tech product that's been realized by both domestic and international cooperation and is protected by several patents.

The glow plug, one of Hidria's most successfully marketed and technologically advanced products, was upgraded with high-tech mechanical and electronic systems to accurately sense all phases of the combustion process: air intake, compression, combustion of pilot and main injections, and the exhaust.

Improvement of closed-loop control in diesel powertrains plays a key role in the overall reduction of emissions. The injection and the efficiency of the combustion of the diesel powertrain can be optimized with data relating to cylinder pressure, thus helping to reduce NOx and CO emissions in compliance with requirements.

Hidria is proposing a new generation of piezoelectric-based cylinder pressure sensors for light- and heavy-duty vehicles.

The pressure sensor glow plug (PSG) from Hidria helps to accurately sense all phases of the combustion process

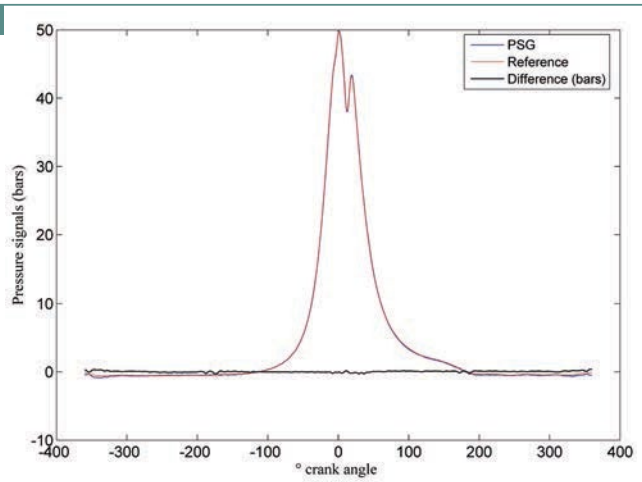
This new sensor has an accuracy of ±2% in a range of 0-220 bar. The performances of the sensor have been tested on a range of engine points with a lifetime of 600 million cycles. The maximum error of the pressure sensor glow plug signal compared with the Kistler product is 0.25 bar, as shown in Figure 1.

The sensor exhibits a very high signal-to-noise ratio, which makes the signal free of any resonance in a bandwidth of 0-5kHz, as outlined in Figure 2. This enables the rate of heat release to be computed with high precision, as shown in Figure 3, and to determine precisely the time of injection on a cycle in each cylinder. Many additional functions are also brought by this technology, such as cylinder balancing, load pressure regulation, compensation for different fuel qualities, injector drifts corrections, easier and more robust engine calibration, and the improvement of cold start and acoustics optimization.

The new-generation pressure sensor glow plug can be supplied with a long-life metallic or high-temperature (silicon nitride) ceramic heating element. The technology is also suitable for stop/start systems.

Hidria is a leading supplier of high-tech solutions for powertrains and steering systems in the global automotive industry. The company co-manages every tenth new car in Europe and ignites every sixth new car in the world that's equipped with a modern diesel engine.

1



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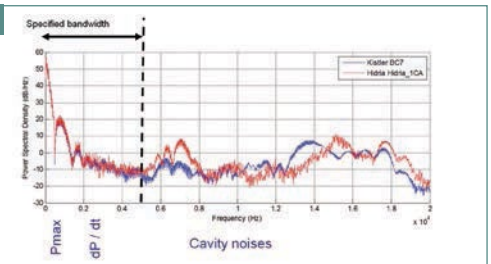

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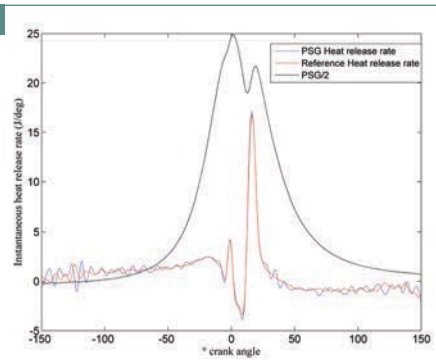

Figure 1: A comparison of pressure signals
Figure 2: A comparison of spectrum with reference
Figure 3: The rate of heat release on a cycle

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