

Pressure sensor advance

Having recently been tested in real-world driving scenarios, a new pressure sensor glow plug is promising to push the technology to the next engineering level

► Striving for sustainable mobility and being aware of the demanding limits set by emissions regulations around the world, Hidria, a Tier 1 supplier headquartered in Slovenia, continues to invest heavily in high-level R&D to further develop new-generation glow plug technology that promises to improve engine combustion control.

The glow plug, one of Hidria's most successfully marketed and technologically advanced products, has recently been upgraded and enhanced with complex high-tech mechanical and electronic systems to enable the component to sense accurately all phases of the combustion process.

As a result of such engineering inroads, Hidria is now set to launch an all-new generation of piezo-electric based cylinder pressure-sensor glow plug (PSG) for light- and heavy-duty vehicle applications, as illustrated in Figure 1.

The accuracy of Hidria's PSG has recently been tested on the road in real-world driving conditions. The assessment was performed using a test car that featured an engine modified to accommodate the PSG component as well as a high-end reference pressure sensor in the same cylinder. This setup enabled engineers to directly evaluate, in a wide variety of driving conditions from highways to steep mountain roads, the performance of the Hidria PSG technology compared with a reference sensor that's currently on the market.

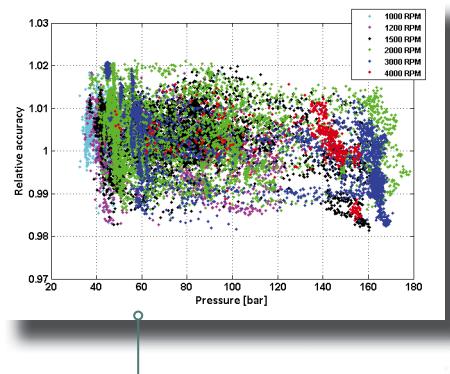


Figure 3: The results of the road test showing the relative accuracy of the PSG component compared with the reference sensor

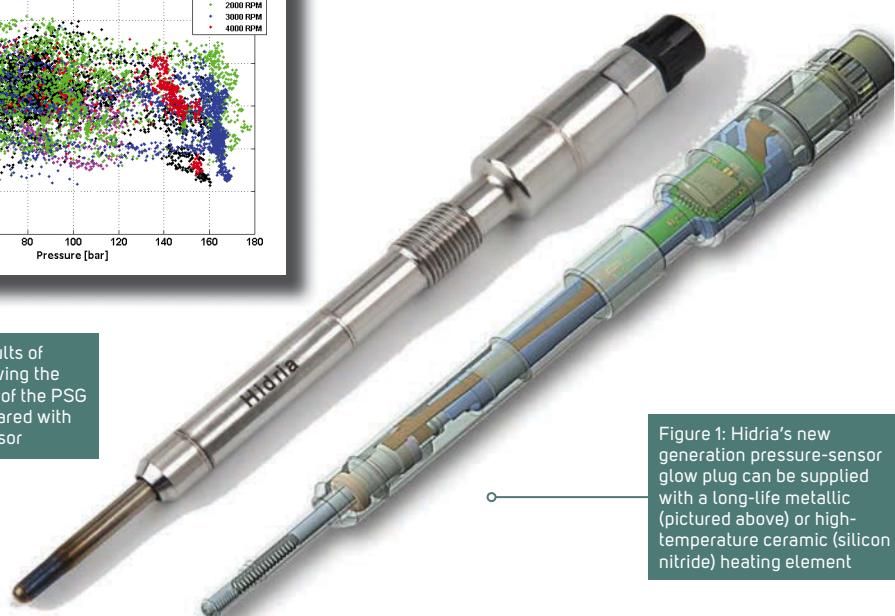


Figure 1: Hidria's new generation pressure-sensor glow plug can be supplied with a long-life metallic (pictured above) or high-temperature ceramic (silicon nitride) heating element

The road test covered the whole engine map from low loads and speeds right up to 180 bar and 4,000rpm. Pressure data from the Hidria PSG and the reference sensor was acquired continuously during the road test, which covered 400km in total. An important feature of the test was the realistic temperature conditions within which the PSG component is able to operate. The elevation profile is shown in Figure 2.

Furthermore – and as highlighted in Figure 3 – the PSG technology exhibited excellent performance across the entire engine map. All corresponding pressure cycles

measured (see the single dots in Figure 3) had a maximum error of $\pm 2\%$ when compared with the reference pressure sensor.

In addition to these key advantages that have been proved during testing, the PSG's high accuracy also enables efficient closed-loop control in diesel engines, which contributes to reduced emissions; compensation for different fuel qualities; cylinder balancing; load-pressure regulation; improved engine vibration and acoustics optimization; injector drift corrections; easier and more robust engine calibration; and vastly improved cold-start performance.



Figure 2: The road test elevation profile of the PSG

With investment in high-level research and development that pushes ahead key engineering and technical breakthroughs, Hidria has established itself as a leading supplier of high-technology solutions for powertrains and steering systems in the global automotive industry. The result of this is that Hidria technology today co-manages every tenth new car in Europe and ignites every sixth new car in the world equipped with a modern diesel powertrain. ◎

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