

Press release

Optical analysis method for combustion processes

The HIS high-speed camera system from Kistler – for deep insights into the inner workings of engines

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Kistler, the Swiss measurement technology expert, is adding a new product to its portfolio: the innovative HIS high-speed camera system with optical probes to visualize the combustion process in engines. The system comprises a control unit, a high-speed camera and a borescope with integrated LED illumination. HIS helps developers to optimize combustion engines, with the focus on emissions and consumption.

Electrified propulsion is set to gain ground in the coming years. Nevertheless, a large percentage of vehicles delivered by manufacturers will still be equipped with combustion engines, so developers are continuing to focus on optimizing their emission and consumption values. Demand for increasingly accurate measuring instruments is therefore growing – and Kistler has responded by expanding its range of products for optical combustion analysis.

High-resolution images of combustion processes

The new HIS system comprises a control unit, a high-speed camera and a borescope with integrated LED illumination. This innovative system allows detailed investigations of processes in engine cylinders, so users can examine phenomena such as the injection process, soot formation and flame propagation. The high-speed camera captures up to 40,000 high-resolution images per second and is equipped with an LED system for illumination. Thanks to these features, users can carry out precise investigations of gasoline direct injection and flame propagation. The high-speed camera images are captured synchronously with the combustion analysis pressure values in one control unit. All data is matched to ensure precise fine-tuning of all the relevant combustion parameters – and this process results in optimal consumption values.

User-friendly integration of pressure sensor and light conductor

Another Kistler highlight: the cylinder pressure sensor and the optical waveguide are integrated in one spark plug. The plug is screwed directly into the engine with no need for an additional mounting bore. The system is both user-friendly and rugged, making it ideal for modern applications aimed at developing high-performance compact engines with complex cylinder head geometries.

These new products from Kistler play a key part in the cost-effective development of engines with optimized consumption values and emission levels.

Image material (please name the Kistler Group as picture source)



The high-speed camera captures up to 40,000 high-resolution images per second and is equipped with an LED system for illumination.



The optical probes in the spark plug can be selected for every aperture angle and viewing direction, in line with customers' requirements.

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About the Kistler Group

Kistler is the global market leader for dynamic pressure, force, torque and acceleration measurement technology. Cutting-edge technologies provide the basis for Kistler's modular solutions. Customers in industry and scientific research benefit from Kistler's experience as a development partner, enabling them to optimize their products and processes so as to secure sustainable competitive edge. Unique sensor technology from this owner-managed Swiss corporation helps to shape future innovations not only in automotive development and industrial automation but also in many newly emerging sectors. Drawing on our extensive application expertise, and always with an absolute commitment to quality, Kistler plays a key part in the ongoing development of the latest megatrends. The focus is on issues such as electrified drive technology, autonomous driving, emission reduction and Industry 4.0. Some 2,200 employees at more than 60 facilities across the globe are dedicated to the development of new solutions, and they offer application-specific services at the local level. Ever since it was founded in 1959, the Kistler Group has grown hand-in-hand with its customers and in 2018, it posted sales of CHF 475 million. About 8% of this figure is reinvested in research and technology – with the aim of delivering better results for every customer.