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Press release

Highly accurate and robust pressure measurement in hydrogen environments

Hydrogen combustion: Kistler launches a new absolute pressure sensor to measure hydrogen pressure

Winterthur, April 2025

The new 4012A absolute pressure sensor from Kistler delivers the reliable measurements that are essential for optimizing hydrogen fueled combustion engines, and for pressure monitoring in fuel cells. With a design developed for use in H_2 environments, this sensor features a high resilience to hydrogen – proven by testing.

The emergence of a large-scale hydrogen economy presents challenges in terms of the measurement technology to be deployed. Diffusion and accumulation of hydrogen leads to increased embrittlement of materials; furthermore, diffusion of hydrogen into sensor measuring elements can lead to distortion of measurement results.

Combustion engines operated with hydrogen or alternative H_2-based fuels are practically emission-free, and they pave the way for decarbonized mobility. Engine developers need hydrogen-resistant sensors in order to optimize hydrogen combustion. Kistler has responded by developing the 4012A hydrogen pressure sensor, which can be used for gas exchange analysis, as well as pressure measurement in the low-pressure fuel supply rail of hydrogen engines.

Ongoing fuel cell development opens up an additional approach to achieving a sustainable energy supply. The new 4012A sensor can be used to monitor hydrogen pressure in the low-pressure range of a fuel cell. To do this, the piezoresistive absolute pressure sensor features two measuring ranges: up to 20 bar and 50 bar.

New hydrogen pressure sensor was tested intensively

Kistler's new 4012A absolute pressure sensor has been designed to withstand hydrogen environments, for extended periods. All parts of the sensor that are exposed to H_2 are manufactured from hydrogen-resistant materials. Moreover, the sensor body is coated with gold to prevent hydrogen from penetrating into the oil-filled measuring cell. The sensor has undergone intensive testing to warrant the required levels of hydrogen compatibility and resistance.

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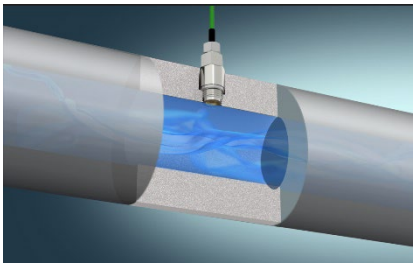
Piezoresistive absolute pressure sensor with temperature compensation

The new 4012A has a compact design and measures with high accuracy (≤1% FSO) in a digitally compensated temperature range from –20 to 50°C (operating temperature: up to 80°C). The new hydrogen absolute pressure sensor can be operated separately by selecting a suitable piezoresistive amplifier, or it can be used with Kistler's KiBox2 indicating system. A choice of two adapter variants is offered to ensure flexible installation: M12x1 and M14x1.25.

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

The new 4012A absolute pressure sensor from Kistler measures with high precision in hydrogen environments, and features a special design to ensure high resistance to hydrogen.

Ideal for measuring H_2 pressure in hydrogen combustion and fuel cells: the new 4012A hydrogen pressure sensor from Kistler.



The front of Kistler's new 4012A absolute pressure sensor is coated with gold to prevent penetration of hydrogen into the measuring cell.

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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 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 2,000 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

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has grown hand-in-hand with its customers and in 2024, it posted sales of mCHF 448. About 9 percent of this figure is reinvested in research and technology – with the aim of delivering innovative solutions for every customer.

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