

# Measurement solutions

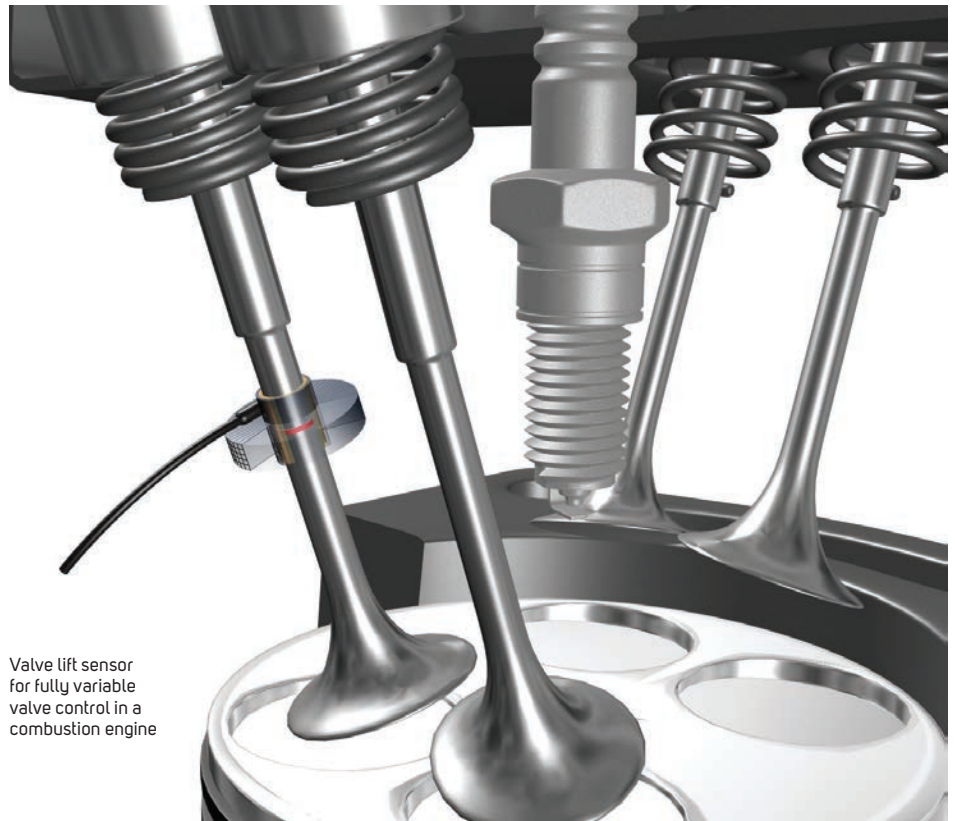
INNOVATIVE AND ACCURATE SENSOR TECHNOLOGY IS REDEFINING AUTOMOTIVE TESTING AND DEVELOPMENT

**Today, vehicles must prove** their suitability for later use in the first stages of development. At the same time, not only are aspects such as functionalities tested, but also factors including stability, expansion, vibrations and many other things are assessed. The extensive use of measurement technology in the development phase often provides new perceptions and helps to design safer and more comfortable vehicles. In this area, measurement technology expert Micro-Epsilon provides intelligent solutions for automotive applications.

## Engine manifold vibrations measurement

Optimizing the processes within an IC engine is becoming increasingly important. A whole series of measurements is vital for engine management purposes. The temperature of the exhaust gas is one important source and is recorded using a thermocouple within the manifold. To check the way it is attached, it is necessary to examine the propensity to vibrate, as well as the mechanical rigidity of the structure. This is an application where the blue laser distance sensor comes to the fore. The high temperatures in the flow of exhaust gas leads to the thermocouple self-fluorescence (becoming red hot). Due to the short wavelength of the blue-violet laser being employed, the light emitted from the thermocouple does not dazzle the sensor, as the long-wavelength intrinsic incandescence is a long way off the 405nm wavelength of the blue-violet laser, and it is therefore effectively blocked by the high-quality interference filters used.

The electromagnetic valve gear with its fully variable valve control is perhaps the most promising technology for increasing the efficiency, reducing exhaust emissions significantly and cutting fuel consumption on petrol-driven combustion engines. Experts calculate that a potential fuel saving of between 8% and 9% is possible using this technology. Engine valves with electromagnetic valve gear



Valve lift sensor for fully variable valve control in a combustion engine

are controlled by electric actuators instead of conventional aspirated engines that use a camshaft. This means that the camshaft can be completely dispensed with. Dynamic valve lift sensors from Micro-Epsilon are being used in combination with electric actuators for fast and reliable monitoring of valve positions in combustion engines. The valve lift sensor from Micro-Epsilon is based on a patented inductive VIP measuring principle, which offers high resolution and linearity, high-temperature stability and fast measuring rates. The VIP sensor provides a very robust mode of operation, while simultaneously doing away entirely with permanent magnets. In this way, the disadvantages normally associated

with permanent magnets can be avoided and therefore a longer sensor life is achieved. The valve lift sensor operates in a non-contact method and is therefore wear-free.

Minimization of pollutants and the reduction of oil consumption are the objectives of current engine development. Therefore knowledge of the behavior and the thickness of the oil film between the cylinder wall and piston or piston rings is important. To obtain reliable results, tests must be conducted on real engines and under realistic operation conditions. Therefore Micro-Epsilon offers the subminiature displacement eddy current sensor, with the sensor being built into the cylinder wall behind a protective layer. ◻