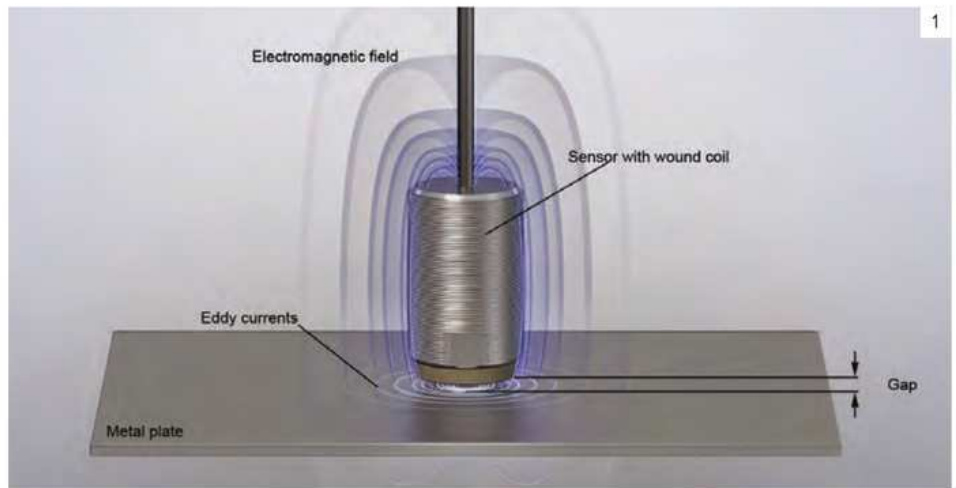
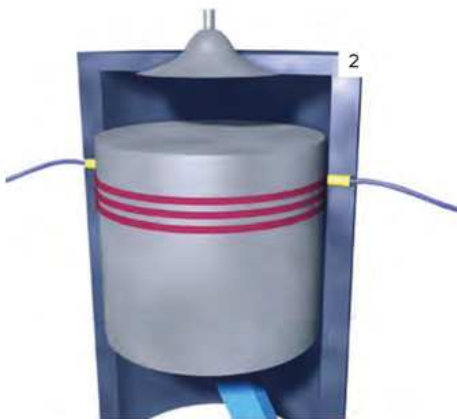


Precision sensors

EDDY CURRENT DISPLACEMENT SENSORS ARE A PILLAR OF NON-CONTACT INDUSTRIAL MEASUREMENT TECHNOLOGY, OFFERING MANY ADVANTAGES

Combustion engines must withstand maximum loads over a long service life. To deal with this requirement, eddy current sensors from Micro-Epsilon's eddyNCDT series are installed in engines for many different measurement tasks. Some of the smallest eddy current sensors in the world, these devices can be used in the harshest of conditions. Examples of measurements already being carried out are: valve lift, needle lift, cylinder head breathing, cylinder oil/lubrication gap, oil film thickness, crankshaft concentricity, crankshaft axial movement and piston secondary movement.

The turboSPEED DZ140 sensor system is a new generation of turbocharger speed sensor. Switchable target material, miniature size, wide speed range and high operating temperature are just some of the advantages of this latest design. The turboSPEED DZ140 speed sensor is the latest generation of revolution-counting sensors for turbochargers manufactured by Micro-Epsilon. This high-tech measurement system offers maximum EMC interference protection in harsh test cell conditions or in on-vehicle road tests. Built-in temperature measurement also offers the opportunity for a true ambient temperature measurement of the sensor, while a new electronic circuit boosts signal levels from the sensor and dramatically



improves circuit shielding to provide the sensor with levels of EMC immunity protection that are several factors higher than existing devices in the marketplace. The system is designed to replace the sensor mounted in the turbocharger housing without needing system electronics recalibration. The turboSPEED DZ140 system is immune to the effects of oil, dirt and carbon particles often found in the engine, which affect the measurement output quality of other measuring principles, particularly capacitive and optical measurement technologies.

The turboSPEED DZ140 speed sensor uses the eddy current measuring principle, which is used to measure electrically conductive materials that may have ferromagnetic or non-ferromagnetic properties. A coil is potted in a sensor housing and then energized by a high-frequency alternating current. The coil's electromagnetic field generates eddy currents in the turbocharger blade, while every blade generates a pulse. The controller identifies the speed (analog 0-5V) by considering the number of blades. The turboSPEED DZ140 operates with speed ranges from 200rpm through to 400,000rpm. The eddy current technique is highly suitable for miniaturization,

1. Measuring principle of the eddy current sensor
2. Embedded coil technology sensors are suitable for extremely harsh environments

so the miniature sensor design (3mm diameter) simplifies mounting to the turbo unit, where space is often restricted.

The turboSPEED DZ140 is used at target distances up to 2.2mm. The blade material (aluminum or titanium) can be set up in the sensor without requiring modifications to the compressor wheel. The sensor is equipped with a status LED and can be operated from outside without opening the controller housing, so sensor adjustment and setup is quick and easy. Setup and configuration are carried out at the front end of the controller, where the number of blades, sensitivity and speed range are all selected. While positioning the sensor, LEDs on the controller help to show the distance to the measurement object, which avoids any incorrect positioning of the sensor. The high operating temperature of the sensor (up to 285°C) enables a wide range of applications in motor R&D and testing, such as test bench operation and on-vehicle road tests. 