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Sensor system for the internal inspection of bore holes

A development project for a bore hole sensor envisaged by Micro-Epsilon last year has now resulted in a marketable product. The miniature confocal sensor with a diameter of just 3.4mm can now be used to measure the internal walls of bore holes with a diameter of at least 4.0mm. The sensor, which is rotated by an electric stepper motor, can measure the diameter, roundness, concentricity, tapers and the straightness of bore holes. A complex integrated precision ball bearing system provides the required rotational stability. The system comprises a stainless steel measuring head with integrated mechanics, a sensor probe, a confocal sensor and two controllers. Similar to linear standard systems, confocal technology is suitable for different types of surface. The system does not require any reference points during measurements as it can also recognise edges and steps. At full power, tapered bore holes can only be partially measured, as the light spot is reflected past the optical system. However, in the case of a suitable surface, it is possible to measure the diffuse reflection if the power is reduced. Due to the installation length of the sensor, bore holes up to 45mm in depth can be measured. In doing so, the sensor probe is guided into the bore hole using a linear unit provided by the customer. Depending on the setting, individual planes can be measured or a spiral profile of the bore hole can be produced. If the sensor becomes damaged, the sensor probe can be replaced quickly. The system is used in industrial applications for the quality inspection of bore holes in production lines or in test environments.

approx. 1600

Figure 1: Bore hole sensor
(PR183_Bohrlochsensor.jpg)

Micro-Epsilon Messtechnik

presse@micro-epsilon.com
Tel.: +49/8542/168-
0 · www.micro-epsilon.com

Dipl.-Wirt. Ing. (FH) Florian Hofmann
Marketing
Tel.:+49 8542 168-225
Florian.hofmann@micro-epsilon.de