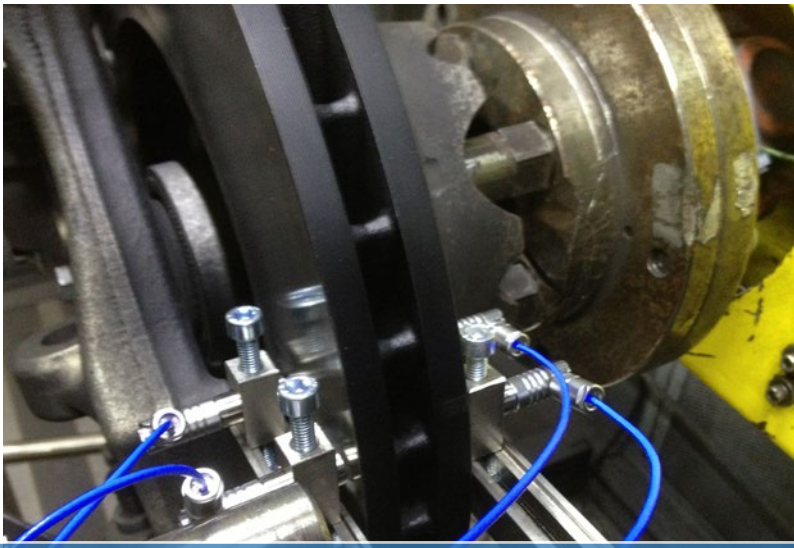
A074

Capacitive sensors
capaNCDT



Deformation of a brake disc under stress

To obtain accurate data on the deformation of brake disc friction rings under stress, they must be measured under extreme conditions.

- Nominal speed: 2000 1/min
- Surface temperature: approx. 600 °C

This measurement can be reliably made using the non-contact capacitive displacement measuring system capaNCDT.

Advantages

- High bandwidth for frequency analyses up to the 10th harmonic
- High accuracy minimum zero shift with change in temperature, no change in measuring signal due to temperature-related changes in magnetic and conductive properties
- High resolution because deformation takes place in the range <100 µm.

Requirements for the measurement system

- Measuring range: 2 mm resp. 4 mm with linearization
- Linearity: ±4 µm (at 20°C)
- Resolution: (dyn) 0.4 µm
- Bandwidth: 5 kHz (-3dB)
- Thermal zero drift: < ±0.17 µm/K

System design

- Modular multi-channel system DT6220 with demodulator DL6220 or controller DT6230 with demodulator DL6230
- Cable CCM2,8B
- Sensors CS1HP or CS2

The capacitive measuring principle

The carrier frequency (20 kHz) supplied by a constant current source generates a voltage drop over the sensor which is proportional to the distance between the sensor surface and the friction ring surface. This voltage change is fed through preamplifier/demodulator electronics which supply an analog signal at the output of the measuring amplifier. Very good linearity of the output signal is achieved by the guard ring capacitor principle.