MICRO-EPSILON

Deformation of a brake disc under stress

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

Nominal speed: 2000 1/min.

Surface temperature: approx. 600 °C

The following demands are therefore made on the measuring system:

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

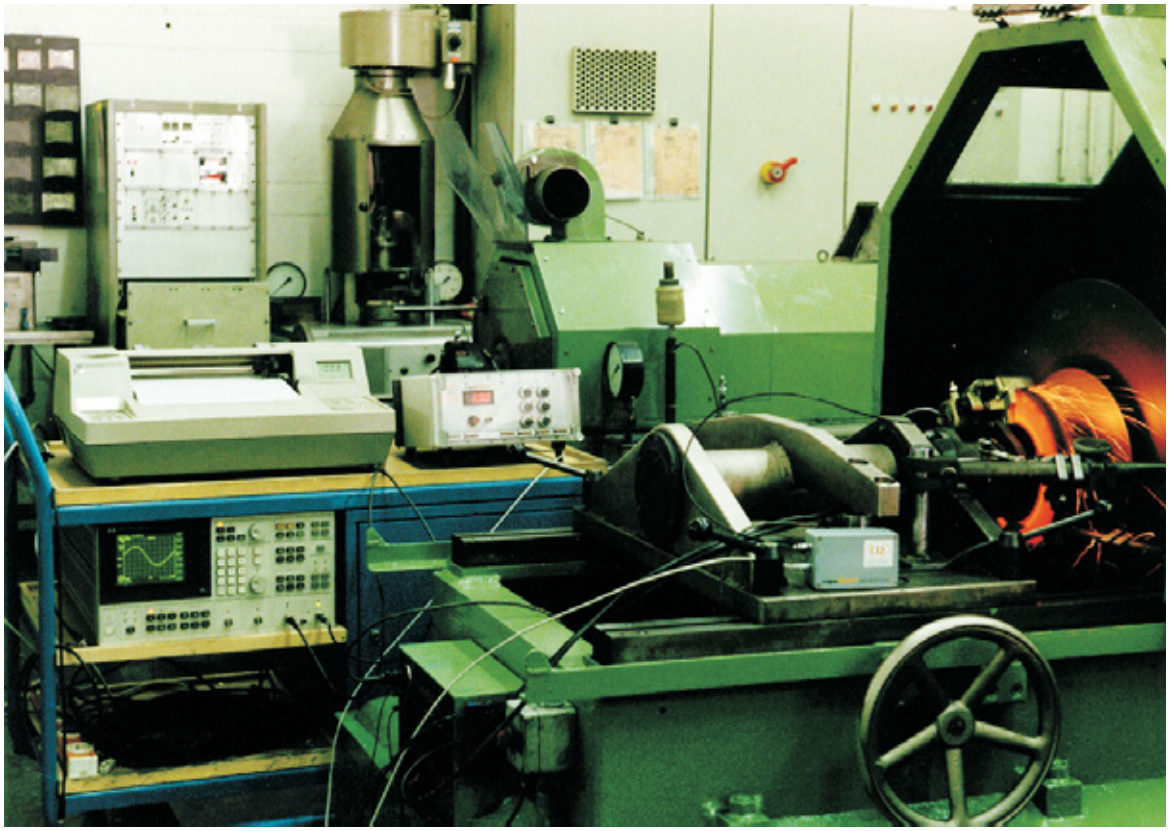
This measurement can be reliably made using the non-contact capacitive displacement measuring system capaNCDT.

Technical data

- Measuring range:	2 mm resp. 4 mm with linearization
- Sensibility:	5 V/mm
- Linearity:	$\pm$ 4 μm (at 20 °C)
- Resolution:	(dyn) 0,4 μm
- Bandwidth:	4 kHz (-0.1 dB), 6 kHz (-3 dB)
- Thermal zero drift:	$\leq \pm$ 0.17 μm/K

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 gurad ring capacitor principle.



Application

System configuration

1 x RS 649 3-channel bench top cabinet with power supply

1 x DD 600 Digital display plug-in, 3 1/2 digit, channel selection switch and BNC-socket for test purpose

1 x S 602 Oscillator plug-in 20 kHz to supply both channels

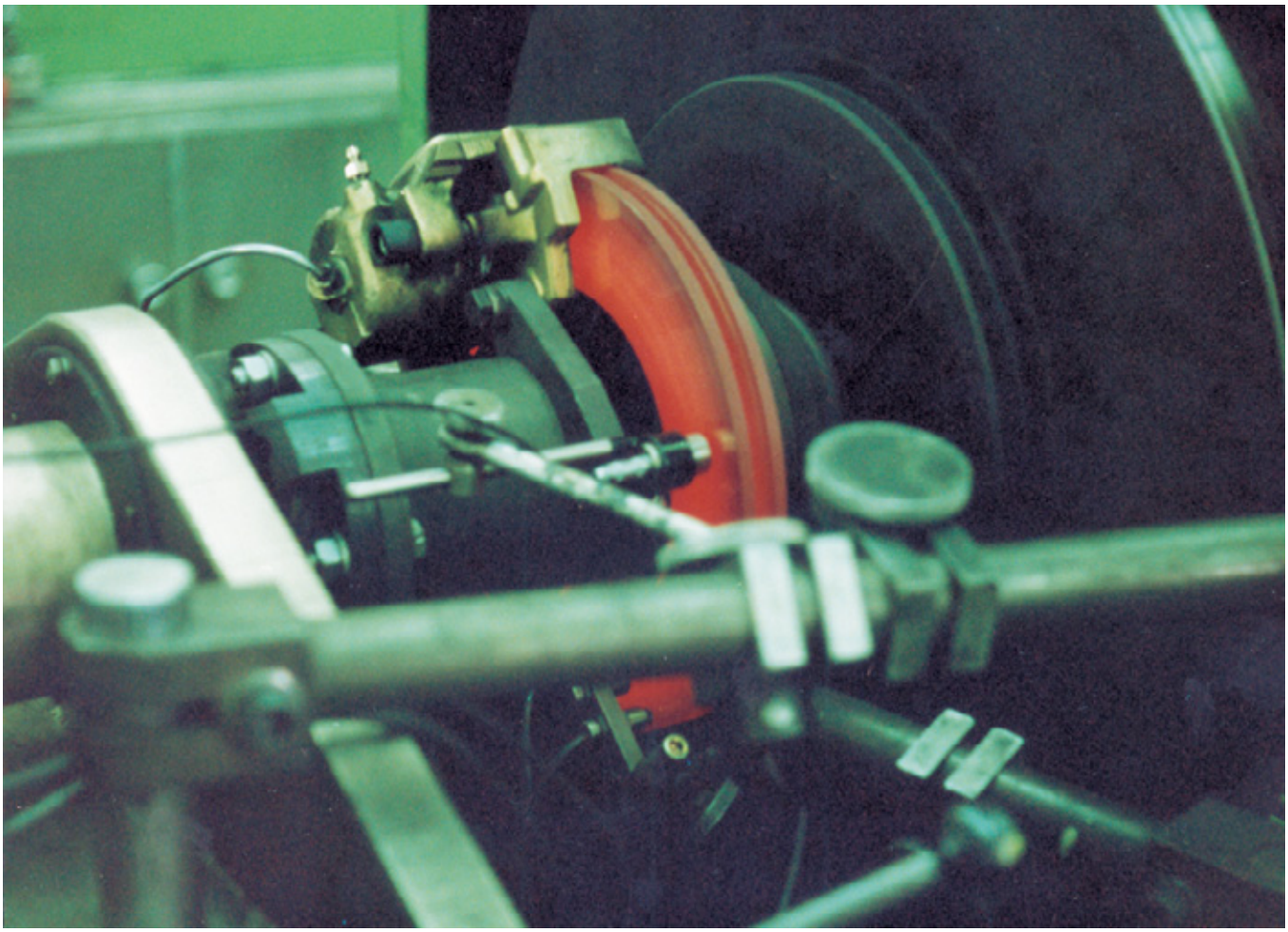
2 x PA 601 Preamplifier

2 x DL 604 Demodulator plug- in; output 0 - 10 V, adjustment by means of 10 turn connecting dial potentiometers

2 x C 600-2 Capacitive sensors, guard ring condensator principle, measuring range 2 mm

2 x C 602-1 1 m sensor interconnecting cable

2 x C 604-5 5 m preamplifier interconnecting cable



MICRO-EPSILON

A member of micro-epsilon group.

Koenigbacher Str. 15
94496 Ortenburg / Germany

Tel.: 0 85 42/1 68-0
Fax: 0 85 42/1 68 90

info@micro-epsilon.com
www.micro-epsilon.com