ACOUSTIC EMISSION SENSORS FOR GRINDING MACHINES

MARPOSS supplies a wide range of acoustic sensors for grinding machines, able to satisfy various requirements including continuous monitoring and air gap check, dressing, grinding wheel and part collision.

These sensors are based on ultrasonic (acoustic emission) technology which can check the noise emitted when the part or the dresser touches the grinding wheel.

This noise typically relates to acoustic emission signals which are high frequency waves, generated by the energy stored and released in the machine structure. Monitoring of these waves and their comparison with a basic reference allows checks of possible changes in condition, for which corrective action may be applied on the machine.

For example, this may be used to identify contact between the grinding wheel and the part, or contact between the grinding wheel and the dressing tool.

Variations in the acoustic emission may indicate changes in the cutting force which can consequently be corrected with adaptive cycles. For grinding machines the acoustic sensor can be supplied in the most suitable version for positioning as close as possible to the machining where the signal/noise ratio is at its best.

Advantages

- Shorter process time
- Better protected machine
- Longer wheel life
- Reduced maintenance costs
**Fixed AE sensor**
Sensor for ultrasonic acoustic emissions with surface propagation and signal transmission via cable.

**Contactless AE sensor**
Sensor for ultrasonic acoustic emissions with surface propagation and contactless signal transmission between a rotary part (rotor) and a fixed part (stator).

**Typical checks:**
- Gap & Crash between grinding wheel and part
- Grinding wheel positioning relative to dresser (Gap)

**Dressing Electrospindle**
Rotary AE sensor mounted on front of dresser disk.

**Typical checks:**
- Gap & Crash between grinding wheel and dresser
- Dressing profile check

**External Grinding**
Rotary AE sensor mounted on front of grinding wheel flange.

**Typical checks:**
- Gap & Crash between grinding wheel and part
- Grinding wheel positioning relative to dresser (Gap)
**Split AE Sensor**
Sensor for ultrasonic acoustic emissions with surface propagation and contactless signal transmission between a rotary part (rotor) and a fixed part (stator). The rotary part is split and consists of the piezoelectric microphone and the electronic signal transmission part. The sensor dimensions can be adapted to specific application requirements.

**Ring-shaped AE Sensor**
Sensor for ultrasonic acoustic emissions with surface propagation and contactless signal transmission between a toroidal rotary part (rotor) and a fixed part (stator). The sensor is “customised” according to the machine layout, which determines its external diameter (Ø ext.), internal diameter (Ø int.) and thickness (Ws and Wr).

**INTERNAL GRINDING**
Rotary AE sensor mounted inside grinding wheel spindle.
Typical checks:
- Gap & Crash between grinding wheel and part
- Grinding wheel positioning relative to dresser (Gap)

**DRESSING ELECTRO-SPINDLE**
Rotary AE sensor mounted inside dressing electro-spindle.
Typical checks:
- Gap & Crash between grinding wheel and dresser
- Dressing profile check

**INTERNAL GRINDING PART SPINDLE**
External ring-shaped AE sensor mounted behind the part spindle.
Typical checks:
- Gap & Crash between grinding wheel and part

**TAILSTOCK**
Ring-shaped AE sensor mounted on part support tailstock.
Typical checks:
- Gap & Crash between grinding wheel and part
- Grinding wheel positioning relative to dresser (Gap)
**Fixed AE Sensor**

- Frequency response: from 50 kHz to 400 kHz
- Degree of Protection (in accordance with IEC 529): IP67
- Complies with: ASTM E976
- Compatible: EMC

**Split AE Sensor**

- Frequency response: from 50 kHz to 500 kHz
- Degree of Protection (in accordance with IEC 529) with rotor mounted inside spindle: IP67
- Distance between rotor and stator: 0.5 ÷ 1.5 mm
- Speed of rotation: Max. 20,000 rpm
- Complies with: ASTM E976
- Compatible: EMC

**Contactless AE Sensor**

- Frequency response: from 50 kHz to 350 kHz
- Degree of Protection (in accordance with IEC 529): IP67
- Distance between rotor and stator: 0.5 ÷ 2 mm
- Speed of rotation: Max. 20,000 rpm
- Complies with: ASTM E976
- Compatible: EMC

**Ring-shaped AE Sensor**

- Frequency response: from 50 kHz to 250 kHz
- Degree of Protection (in accordance with IEC 529): IP67
- Distance between rotor and stator: 0.5 ÷ 1.5 mm
- Speed of rotation: Max. 10,000 rpm
- Complies with: ASTM E976
- Compatible: EMC