Roundness, waviness and wall thickness analyzer

for large bearing rings

MIMA 600, MIMA 1200

MIMA 1200

MIMA 600 mechanics

General description

The MIMA measuring gauge models have been developed for analysing waviness, roundness and wall thickness for large bearing rings.

Low noise and vibration of bearings is becoming more and more important in many applications. Reasons for high vibration levels in bearings are waviness or scatter, local dents on components or wall thickness variations on rings. Customer demands for quick measurements directly on the shop floor next to the production machines have led to the development of this sophisticated MIMA gauge.

The MIMA equipment is designed to be robust, operator friendly and can be used in harsh shop floor environments. The MIMA can measure the waviness of the components, wall thickness variations, all out of roundness variations and also give an indication of the centre of gravity.

Functional Principle

Traditionally, rings and rolling bodies have been measured on a precision rotating table and in V-blocks to measure different orders of waviness. The V-blocks usually have 60 or 90 degrees angles To simplify the explanation for the MIMA principle: Gauges are arranged in a certain pattern to simulate V-block measurements and by using mathematical calculations it is also possible to measure wall thickness variations. This MIMA-principle allows the ring to be slightly off centre in the chuck and the software will compensate for small variations in ring positioning during the measuring cycle.

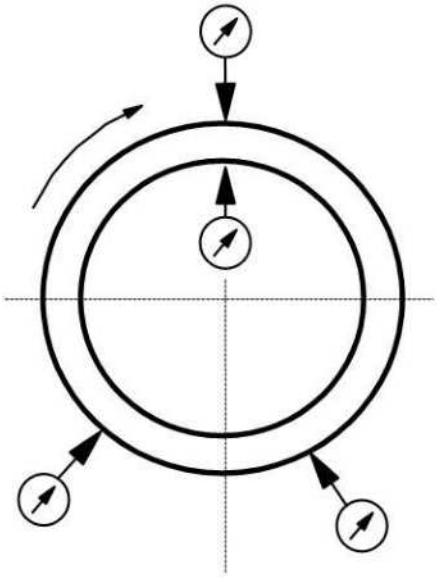
Evaluation parameters on inner/ outer geometry

- Two point diameter variation, in µm
- Three point diameter variation, support angle 60°, in µm
- Three point diameter variation, support angle 90°, in µm
- LSC Δr (ISO roundness deviation) in µm
- Dominating wave number, wpc (waves per circumference)
- Amplitude for dominating wave in µrad
- Waviness band L in µrad. Band L= 2 to 30 wpc.
- Waviness band M in µrad. Band M = 31 to 200 wpc.
- Roundness polar diagram, deviations in µm
- Roundness spectrum 1 to 150 wpc in µm and µrad.

Evaluation parameters wall thickness

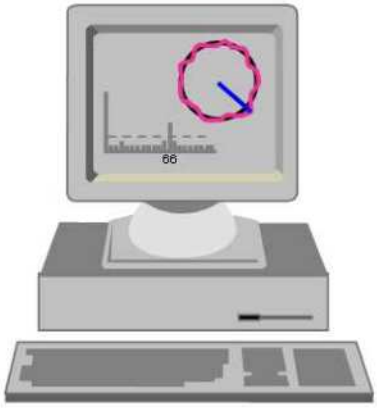
- Wall thickness variation in µm
- Maximum local tangent slope in µrad
- Waviness band L in µrad. Band L= 1 to 30 wpc
- Waviness band M in µrad. Band M = 31 to 200 wpc
- Dominating wave number, wpc
- Amplitude for dominating wave in µrad
- Polar diagram for wall thickness, deviations in µm
- Wall thickness spectrum 1 to 150 wpc, deviations in µm and µrad.

Functional principle



Result:
- roundness and wall thickness variation polar and spectrum plots
- race waviness 2 to 200 WPC
- wall thickness 1 to 30 WPC
- gravity point
- D11 std: VD, V3D60, V3D90,

PC evaluation



Measuring sequence

1

2

3

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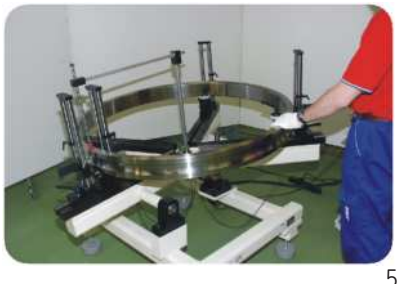
1 Place ring on the support rollers.
2 Adjust the measuring gauges to contact the ring.
3 Place the magnetic encoder arm on to the outer ring.
4 Press measuring start button.
5 Start turning ring slowly by hand.



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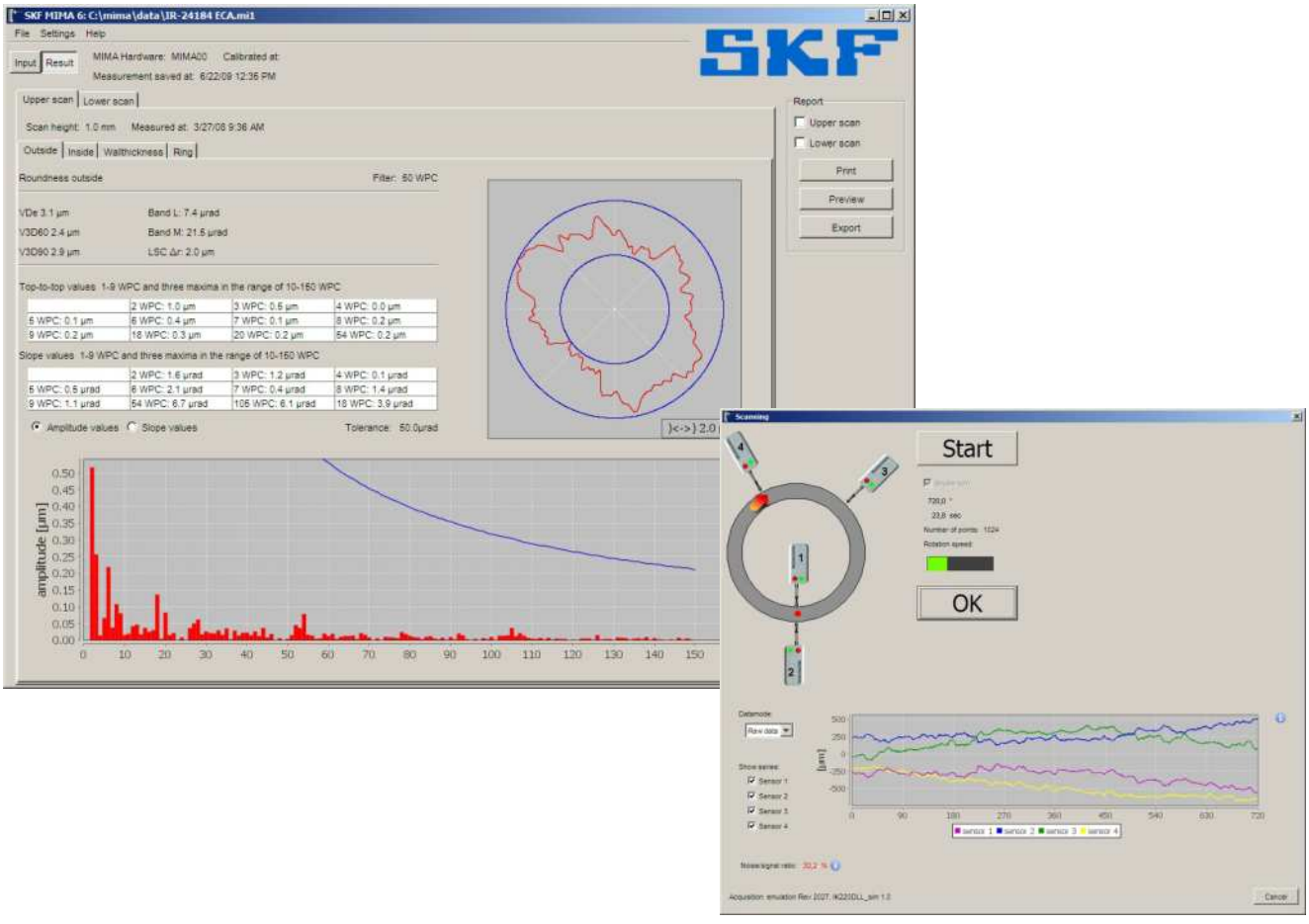
Example evaluation screens



Technical specifications

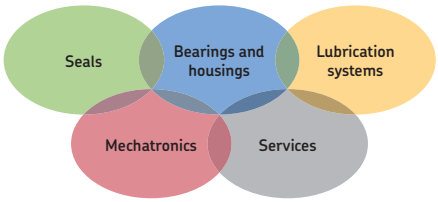
- Mechanics
  - Working range outer diameter:
    - MIMA 600: 200 to 600 mm *(7.87 to 23.62 in.)*
    - MIMA 1200: 600 to 1 300 mm *(23.62 to 51.18 in.)*
  - Resetting time: < 5 min.
  - Measuring time: < 2 min.

- Electronics
  - Measuring electronics: PC with MIMA software
    Each measurement can be saved (human-readable format, ini-style).Results can be transferred to the machine-mapping tool and for external analysis.
    Different kinds of reports (e.g. VQ424)
  - Filters: Default 1 to 50, upper limit configurable
  - Software: MIMA, operating system Windows 7
  - Measuring system: 4 pieces of Heidenhahn gauges, type MT1281

- Accuracy
  - Accuracy of measuring sensors: +/- 0,1 µm
  - Encoders: 8 192 points per revolution

- Dimensions and weights
  - Dimensions (H × W × D)
    - MIMA 600 mechanics: 1 044 × 773 × 750 mm *(41.10 × 30.43 × 29.53 in.)*
    - MIMA 1200 mechanics: 1 690 × 1 589 × 1 421 mm *(66.54 × 62.56 × 55.95 in.)*
    - Electronics with table: 1 671 × 600 × 500 *(68.79 × 23.62 × 19.69 in.)*
  - Weight:
    - MIMA 600: Approx. 215 kg (*474 lbs*)
    - MIMA 1200: Approx. 540 kg *(1 190 lbs)*

- Requirements
  - Electrical system: See rating plate, 115-230 V 50/60 Hz, max. 220 W
  - Air humidity: Must not exceed 60% in summer and 70% in winter.
    If the relative humidity is higher, we recommend air-conditioning.
  - Location: Install the machine on flat, firm ground. Install the machine where it is not exposed to shocks (e.g. near forging machines, presses and the like). It should not be located on floors where you can easily feel vibrations with your legs.



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