

SKF Waviness Analyzer

Measuring device for small bearing rings and rollers

MWA 100D



General description

The MWA 100D computer based analyzer covers all demands of modern quality control for roundness and waviness.

The MWA 100D is a low-cost version of the SKF roundness and waviness testing systems, which are the world-wide SKF standard for roundness and waviness evaluation. Possible measuring objects are rollers and rings.

Measuring capabilities

The MWA 100D provides macro geometry measurements and analysis of:

- Roundness
- Harmonics
- Waviness
- Flatness

Rapid cycle times and flexibility

Simple and fast set-up and operation are ensured by the modular and powerful, but user-friendly design of the hard- and software:

- A large number of specialized tools for performing serial measurements are available.
- Individual measuring sequences with an infinite number of evaluation criteria, each with its own tolerance values, are pre-programmable and can be stored for each part of the sample.
- This enables machine operators to perform detailed measurements and get immediate machine-setting and accept/reject decisions from the system without any programming on their part.



- Repeat measurements can be summarized statistically on request, giving the mean (\bar{x}), standard deviation (s), range and histogram of each criterion used.

Close to the manufacturing

The design of the MWA 100D allows the equipment to be used right on the production floor – and that’s where modern quality assurance mainly takes place.

Powerful and user-friendly

Roundness and waviness measurements are the two principles traditionally used worldwide to qualify round parts. Each principle has advantages and disadvantages, depending on the requirements.

The MWA 100D software allows both principles to be utilized and provides an analysis of roundness as well as of waviness.

Additionally Fast Fourier Transformation (FFT) provides detailed harmonics analysis.

Waviness analysis

- Waviness analysis The MWA 100D provides waviness evaluation as outlined below:
 - Displacement-proportional readout (μm) corresponding to Bendix
 - Waveometer machines (Low Band and High Band)
 - Vibration-velocity-proportional read-out ($\mu\text{m}/\text{sec}$), corresponding to SKF standard
 - User-programmable waviness evaluation, by selecting any combination of
 - frequency band
 - velocity or displacement proportional read-out
 - r/min in the case of velocity proportional read-out.

Machine description

For different test pieces and applications there are various measuring stands, sensors and chucks available. In the figure below you see one application.

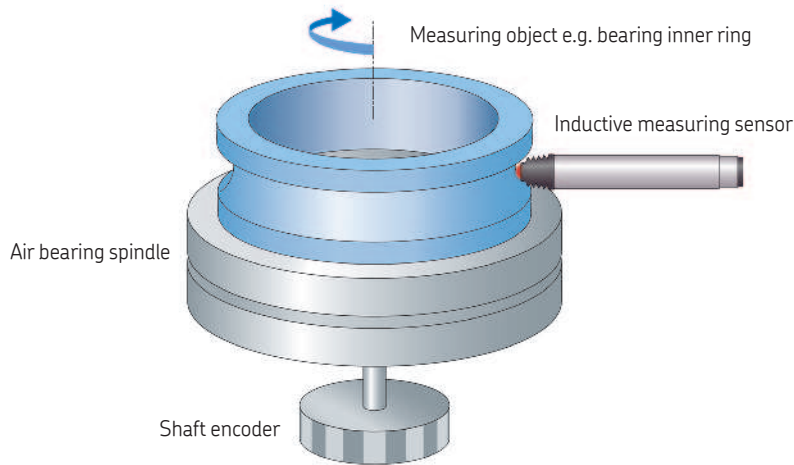
- 1 Measuring stand with sensor holder and mini slides for measuring sensor adjustment
- 2 Measuring sensors (up to two sensors possible)
- 3 Switch for sensor removable
- 4 Air bearing spindle with flywheel mass
- 5 Pneumatic shock absorbers
- 6 Panel PC with WinMWA software
- 7 Keyboard with touch pad
- 8 Electrical/electronic cabinet
- 9 MWA Measuring box



Functional principle

The measuring object is placed into the chuck of the spindle which is then rotated manually. The probe is applied manually or pneumatically to the part. After performing the measurement, the

results are automatically checked for plausibility, presented on the monitor and then documented on an attached printer.



Technical specifications

- Mechanics
 - Working range, dependent on clamping tool:
 - Rollers: OD 1,5 to 99 mm (0.2 to 3.90 in.)
 - Rings: depends on bearing type, max. OD 100 mm (3.94 in.)
 - Workpiece weight: max. 10 kg (22 lbs)
 - Spindle: Vertical air bearing spindle
 - Spindle Drive: Manual
 - Maximum spindle load: Axial 300 N (67 lbs) centricly
 - Paint: Silver-grey RAL 7001
- Electronics: MWA Measuring box
 - Processor: ARM 9 32-Bit
 - Memory: 64 MB SDRAM
 - Operating System: Linux
 - Measuring range: $\pm 100 \mu\text{m}$, $\pm 500 \mu\text{m}$
 - Sensors: Various inductive measuring sensors
- Electronics: Evaluation PC – Panel PC
 - Processor: 2,4 GHz Intel Core i5 M520
 - Memory: 4 GB DDR RAM
 - Operating System: Windows 7 Ultimate 64 bit
 - Harddisk: 120 GB SSD
 - Interface: 2 serial interfaces, 4 USB (2.0)
 - Network: 2 LAN/1 Wi-Fi
 - Housing: Workshop compatible
 - Monitor: 17 in. LCD colour monitor
 - Keyboard: USB PC keyboard with touch pad
 - Printer: All Windows supported printers
- System accuracy
 - Δr –Repeatability measured at 5 r/min spindle speed, optimum conditions and optimum work piece: $< 0,1 \mu\text{m}$ (4 $\mu\text{in.}$)
 - Waviness repeatability: Up to 25 waves, $\leq 3 \mu\text{m/s}$, above 25 waves, $\leq 25 \mu\text{m/s}$
- Dimensions and weights
 - Dimensions H \times W \times D:
 - MWA 100D mechanics: 550 \times 475 \times 450 mm (21.7 \times 18.7 \times 17.7 in.)
 - Panel PC: 580 to 690 adjustable \times 430 \times 500 mm (22.8 to 27.2 \times 16.9 \times 19.7 in.)
 - Maintenance unit: 320 \times 270 \times 150 mm (12.6 \times 10.6 \times 5.9 in.)
 - Weights:
 - Mechanics: 40 kg (88 lbs)
 - Panel PC: 19 kg (41.9 lbs)
- Requirements
 - Electrical System:
 - MWA Measuring box: 18 to 30 V DC/10 W (24 V)
 - Panel PC: 110 to 240 V/50 – 60 Hz/0,5 kVA
 - Pneumatic system
 - Air pressure 5 bar (72,5 psi) at least
 - Air consumption 4,2 Nm³/h
 - Air quality, instrument air = dry, filtered and oil free oil $< 0,01 \text{ mg/m}^3$, water pressure dew point = 2 °C
 - Temperature: Normal temperatures, Temperature gradient less than 1 degree/hour, no fan blowing on the equipment, no open doors near by which can increase the temperature gradient
 - 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.

Technical specifications subject to change without notice.

For more information on your specific application, please contact our engineers at QT.

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