

SKF Waviness Analyzer

Measuring device for balls, rollers and rings

MWA 160D



General description

The MWA 160D computer based analyzer covers all demands of modern quality control for roundness and waviness. To enable the analysis of small-tolerance fields in mechanical production, the MWA 160D provides highest accuracy and resolution, not normally available on basic roundness measuring instruments. Possible measuring objects are balls, rollers and rings.

Measuring capabilities

The MWA 160D 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 hard- and software:

- A large number of specialized tools for serial measurements are available.
- Upgrading to a fully automatic in-line measuring system is possible, including the required handling and interfacing with other production machines.
- No need of centring of samples, within the measuring range. Any eccentricity is filtered out by the software.
- Individual measuring sequences with infinite numbers of evaluation criteria, each with its own tolerance and plausibility limit values, are pre-programmable and can be stored for each part of the sample.



- This enables machine operators to perform detailed measurement and obtain immediate machine-settings and accept/ reject decisions from the system without any programming on their part.

Typical repeat measurements of similar parts may be performed in well under 10 seconds.

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 160D has the measuring mechanics placed on a dampened granite plate. This allows the equipment to be used not only in the standard measuring rooms or laboratories, but also right on the production floor - and that's where modern quality assurance mainly take 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 160D allows both principles to be utilized and provides an analysis of roundness as well of waviness.

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

Waviness analysis

The MWA 160D 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

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

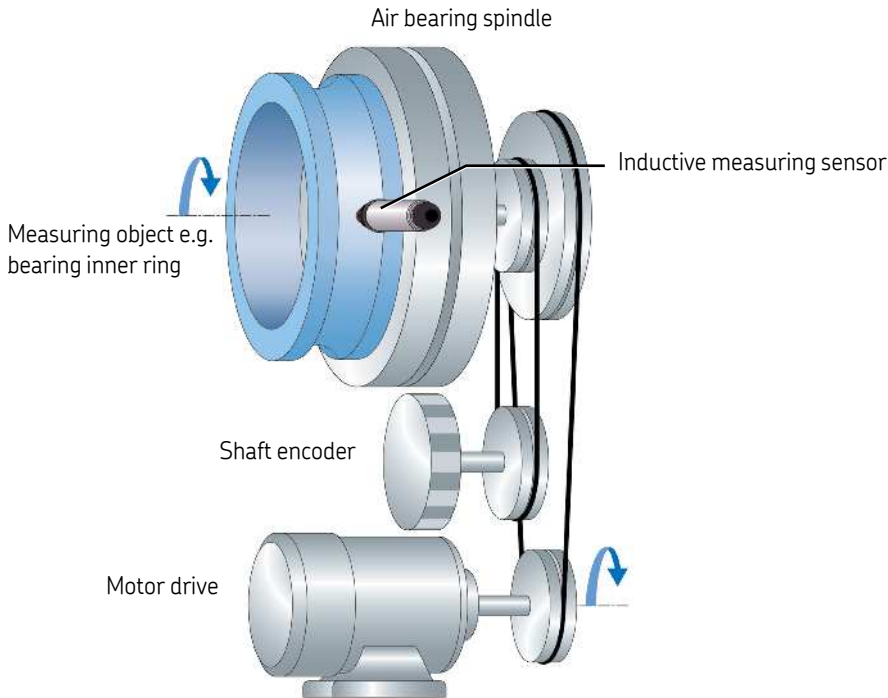
- 1 Air bearing spindle
- 2 Measuring stand with sensor holder and measuring sensor
- 3 Adjusting x-y-z slide
- 4 Base plate (stone)
- 5 Vibration damped base frame with pneumatics inside
- 6 Monitor
- 7 Keyboard
- 8 Mouse
- 9 Measuring electronics MEC 7001 A
- 10 Control panel
- 11 Electric



Functional principle

The measuring object is placed into the spindle chuck, which is then set in rotation. 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:
Outer diameter max. 160 mm (6.3 in.), length max. 180 mm (7.1 in.)
 - Workpiece weight: Max. 20 kg (44 lbs)
 - Spindle: Horizontal air bearing spindle
 - Spindle speed adjustable: 1 to 30 r/min
 - Maximal spindle load: Radial 300 N (67 lbs), axial 800 N (180 lbs), torque 3 Nm (2.22 lb.ft)
 - Paint: Silver-grey RAL 7001
- Electronics
 - Measuring electronics: MEC 7001 A; for details see data sheet MEC 7001 A
 - Sensor: Various inductive measuring sensors
 - Software: WinMWA, operating system Windows 10; for details see data sheet MEC 7001 A
- System accuracy
 - Δr - Repeatability measured at 5 r/min spindle speed, optimum conditions and optimum work piece: < 0,02 μm (0.8 $\mu\text{in.}$)
- Dimensions and weights
 - Dimensions (H x W x D): 1 140 x 1 130 x 660 mm (44.9 x 44.5 x 26.0 in.)
 - Weight: Approx. 510 kg (1 124 lbs)
- Requirements
 - Electrical system: See rating plate 230 V/ 50 Hz/480 VA, 115 V/60 Hz/480 VA, 230 V/60 Hz/480 VA \pm 10%
 - Pneumatic system
 - Air pressure 5,5 bar (79.8 psi) at least
 - Air consumption 3 Nm³/h
 - Air quality, instrument air = dry, filtered and oil free oil <0,01 mg/m³, 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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