

MarForm



MarForm MFU 100

Reference Form Measuring Machine for the Inspection Laboratory and the Production Environment in a New Dimension, Optionally with Optical and Tactile Sensor(WP)

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MarForm MFU 100 Reference Form Measuring Machine for the Inspection Laboratory and the Production

Mahr has been a competent partner for precision metrology for many years. Now another step into a new dimension of accuracy has been reached: **MarForm MFU 100**.

The **MarForm MFU 100** was developed by Mahr in order to realize a cost-efficient shop-floor inspection of form and position parameters on industrial products within a measuring volume of 1 liter. For decades already have MarForm measuring machines been famous for their accuracy and stability. **MarForm MFU 100** offers this knowhow in a new dimension.

Accuracy

The **MarForm MFU 100** is the # 1, i.e. first class, in form metrology. You can become a member of this class and belong to the best!

Would you like to reduce your production costs?

MarForm MFU 100 is a high-precision measuring instrument with an extremely low measuring uncertainty that increases the tolerance ranges for your production and, thus, reduces your production costs.

Productivity

Would you like to reduce your inspection costs?

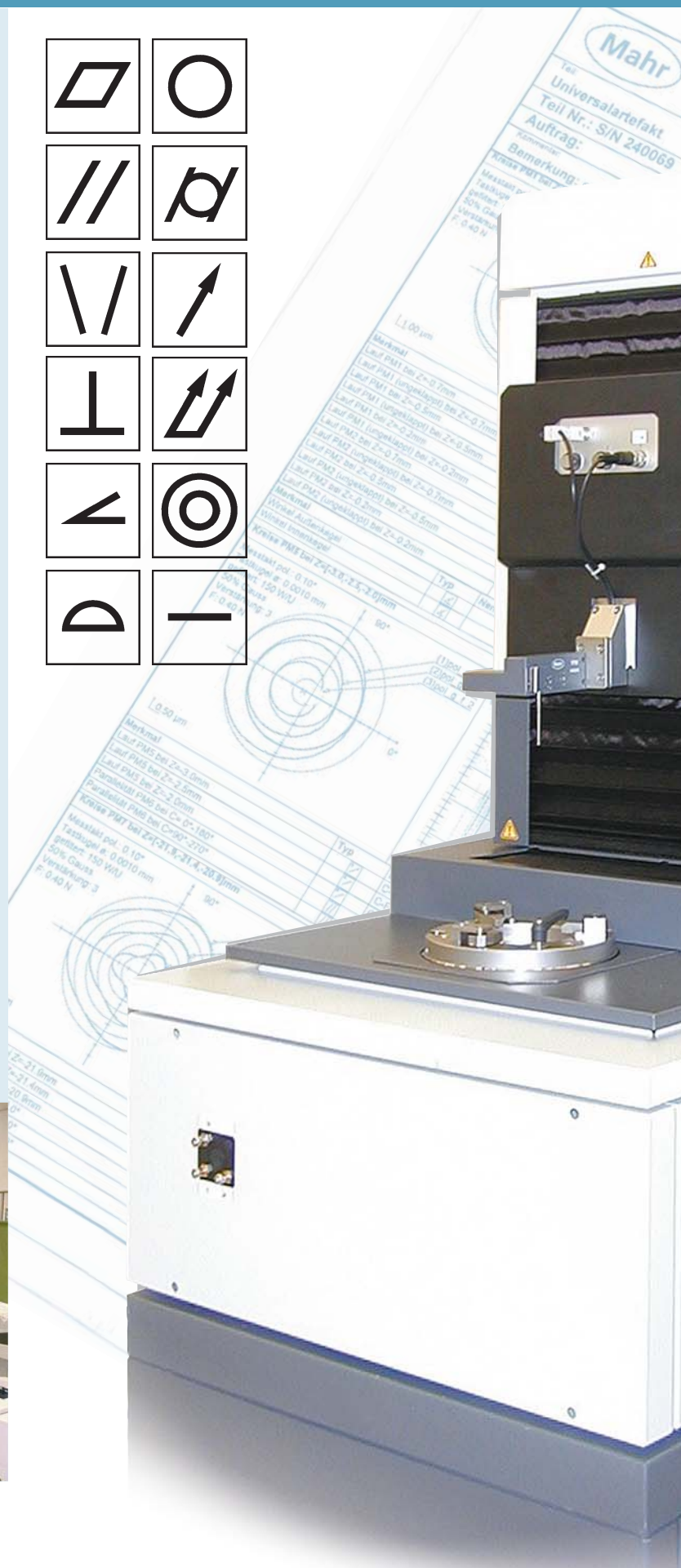
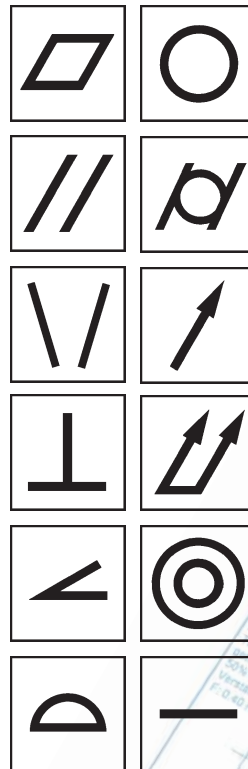
MarForm MFU 100 offers performance and possibilities in the reference class which in the past were only possible with much larger investments.

Thanks to its active air-conditioned cabin, the machine can also be used on the shop floor. Shorter distances and a faster intervention into the production process control reduce your costs and optimize the quality of your products.

Set-up

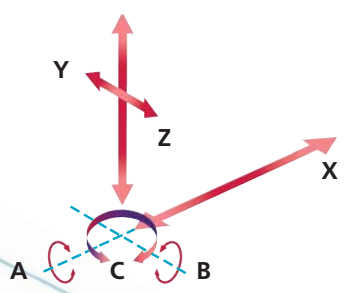
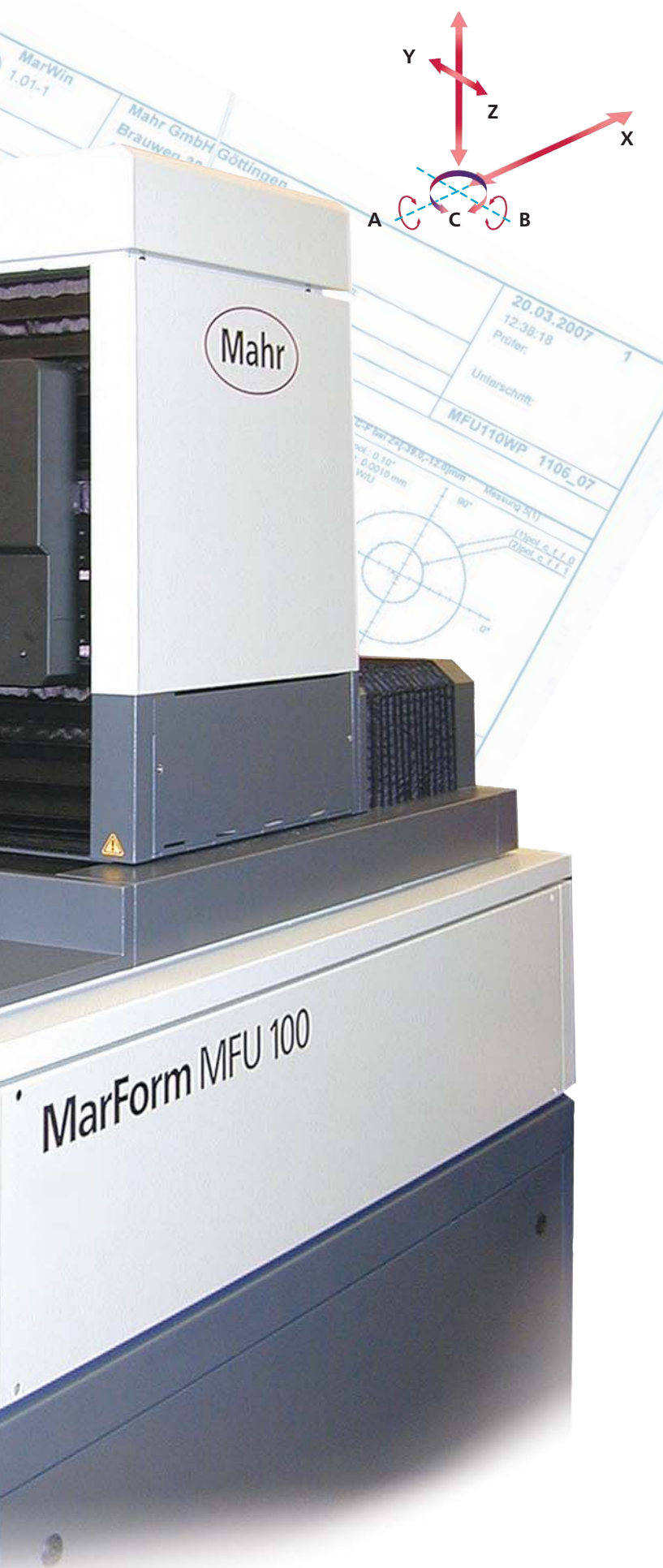
A high degree of automation is achieved through the motorized centering and tilting table, which is a core component of Formtesters, and the use of the motorized, 360° swiveling **T7W probe**.

In addition to multiple probe elements, the **T7W** can also be equipped with an optical sensor / probe element, to alternate between optical and tactile measuring.



MarForm MFU 100 in the version for the inspection room

ction Environment in a New Dimension. Now also Non-Contact with Optical Probe Arm



The complete **MarForm MFU 100** measuring station consists of the following components:

- Circular roundness measuring unit (C)
- Motorized centering and tilting table (X, Y, A, B)
- Vertical straightness measuring axis (Z)
- Horizontal straightness measuring axis (X)
- Tangential multifunction axis (Y)
- Motorized probe T7W
- **MarWin** evaluation software for form and location parameters

All axes are combined in a way to achieve maximum measuring certainty. The horizontal X-axis passes the workpiece center and, thus, permits the inspection of "true parallelism" free from other measurement influences. The tangential Y-axis is a new and innovative feature.

This additional axis, which is new on conventional Formtesters, helps to find the zenith of extremely small workpiece geometries motorically and free from operator influences so that the actual precision measurement can start at the right position.

This assures process accuracy!

In combination with the vertical Z-axis and the horizontal X-axis, the Y-axis also is the instrument that permits the determination of the workpiece diameter. For the first time, the inspection of tolerances conforming-to-standards can, thus, be realized in the sub- μm range under the maximum material condition at a unique price/performance ratio. In combination with the electronic system of the machine, high-resolution digital scales allow for a positioning quality that enables even extremely small workpiece geometries to be checked. If need be, **MarForm MFU 100** can also be used to make perfect surface scans.

The **MarWin** software package offers all the features of a modern measurement and evaluation software. As a matter of course, impressive records and the electronic documentation on company networks are also available.

Future-proof

Due to complete separation of machine control and profile evaluation, the **MFU 100** is easily expandable and ready for the future. The addition of other languages or special evaluations is possible, as well as the implementation of new standards. With the use of the non-contact **optical sensor WP**, this contacting solution with neutral measuring force is available for all form measuring tasks.



Left the tactile probe, right in the picture the optical sensor in use on the testpiece

MarForm MFU 100

Technical Data

MarForm MFU 100

Order No.

5440160

Roundness measuring unit, C-axis

Roundness error ($\mu\text{m} + \mu\text{m}/\text{mm}$ meas. height)**	0.02 + 0.0004 (filter 15 upr)	0.03 + 0.0005 (filter 50 upr)
Axial run-out deviation ($\mu\text{m} + \mu\text{m}/\text{mm}$ meas. radius)**	0.04 + 0.0005 (filter 15 upr)	0.05 + 0.0005 (filter 50 upr)
Resolution (interpolated)	0.0001°	

Centering and tilting table

Table diameter	180 mm (7.0866 in)
Table load, centric	200 N (44.9 lbf)
Number of revolutions 50 Hz/60 Hz	0.1 1/min to 15 1/min

Vertical straightness measuring unit, Z-axis

Measuring path	320 mm (12.5984 in)
Measuring path limitation	programmable limit switch
Straightness error/100 mm**	0.1 μm (0.00000393 in)
Straightness error/200 mm**	0.2 μm (0.00000786 in)
Straightness error/320 mm**	0.3 μm (0.00001179 in)
Parallelism error, Z-/C-axis in tracing direction	0.6 μm (0.00002358 in)
Measuring speed	0.1 mm/s to 50 mm/s (0.00394 in/s to 1.97 in/s)
Positioning speed	0.1 mm/s to 50 mm/s (0.00394 in/s to 1.97 in/s)
Positioning accuracy*	2 μm (0.0000786 in)
Resolution (interpolated)	0.001 μm (0.0000000393 in)

Horizontal straightness measuring unit, X-axis

Measuring path	190 mm (7.4803 in)
Measuring path limitation	programmable limit switch
Straightness error /100 mm**	0.15 μm (0.000005895 in)
Straightness error/190 mm**	0.3 μm (0.00001179 in)
Perpendicularity error X-/C-Axis	0.3 μm (0.00001179 in)
Measuring speed	0.1 mm/s to 50 mm/s (0.00394 in/s to 1.97 in/s)
Positioning speed	0.1 mm/s to 50 mm/s (0.00394 in/s to 1.97 in/s)
Positioning accuracy*	2 μm (0.0000786 in)
Diameter measuring accuracy	0.2 μm (0.00000786 in)
Resolution (interpolated)	0.001 μm (0.0000000393 in)

Horizontal straightness measuring unit, Y-axis

Measuring path	6 mm (0.23622 in)
Measuring path limitation	programmable limit switch
Straightness error	0.5 $\mu\text{m}/5$ mm (filter 0.25 mm) (0.00001965 in/0.19685 in (filter 0.0098425 in))
Perpendicularity error Y-/X-axis	1 μm (0.0000393 in)
Resolution (interpolated)	0.005 μm (0.0000001965 in)

Optical sensor WP (option)

Technical data on request

* (Sum error P according to VDI 3441)

** All values according to DIN ISO 1101 at 20 °C \pm 1 °C (68 °F \pm 33.8 °F) in an anti-vibration environment, filter 15 upr or 0.8 μm , LSC or LSS, 5 rpm or 5 mm/s (0.197 in/s) and standard probe arm with ball \varnothing 3 mm (0.11811). Evidence is made on a standard by means of error separation techniques.

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