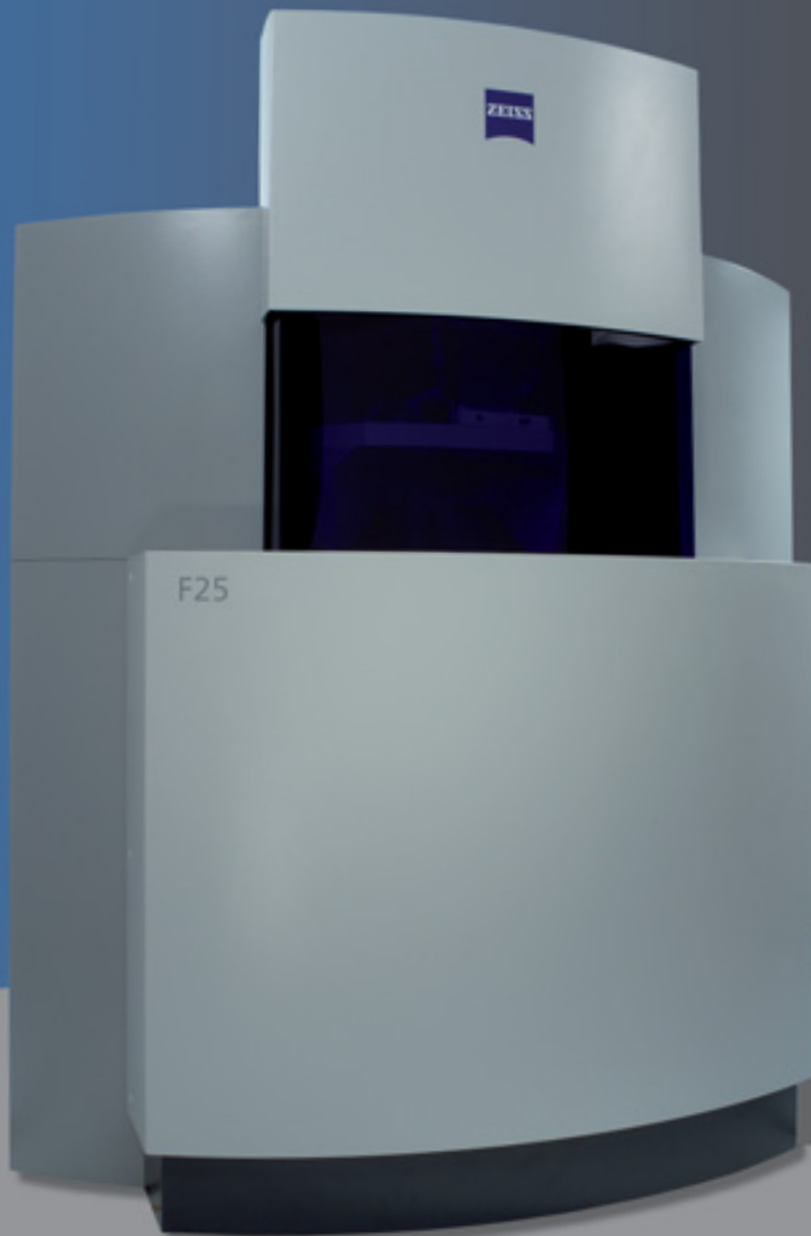


F25

Measuring Nanometers



- Ultra-precise kinematics
- Contact miniature stylus
- Multi-sensor system



We make it visible.

Smallest Parts - Maximum Precision



Micro-motors, micro-switches and precision components are showing up in more and more areas of our lives. Their reliability depends on their quality which is defined by measuring. With its intricate parts, micro-system technology is the challenge facing contact or optical measuring. Extremely small dimensions and different forces exist here; other principles apply.

With the F25, Carl Zeiss has developed a coordinate measuring machine capable of measuring micro-system components.

Overview

3D coordinate measuring machines supported on air bearings with a measuring volume of one cubic decimeter. The ultra-precise kinematics combined with the highly accurate measuring system enable measuring uncertainty of 250 nanometers at a resolution of 2.5 nanometers. Using minimal probe forces, this resolution, along with optimum control of the linear drives, enables contact measurements even in bores less than one millimeter in diameter.



Contact scanning sensor

A 6.5 x 6.5 mm contact, passive measuring stylus consisting of a silicon chip membrane and integrated piezo-resistive elements was developed based on solid state joint kinematics. This stylus permits measurements in both single point and scanning mode.

The 3D micro-stylus is designed for stylus diameters of 50 – 500 micrometers and stylus tip diameters of 100 – 700 micrometers. With a free shaft length of up to 4 mm, it is possible to measure in small, deep-lying structures with probe forces of less than 0.5 mN/μm.

Optical sensor

The ViScan camera sensor from the standard program, combined with an objective lens based on those used in Zeiss microscopy, is used as an optical sensor for 2D measurements. These optics, which have been optimized for depth of field and have minimized distortion, ensure accurate measuring results with maximum resolution in reflected and transmitted light.

Multi-sensor system

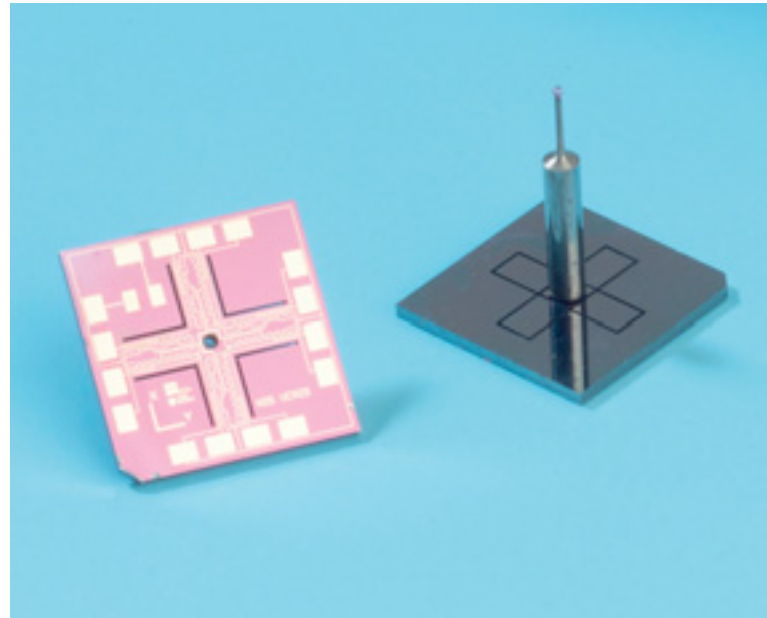
The combination of contact and optical sensors enables measurements of 2D and 3D structures in the same coordinate system. An additional camera aids visualization when probing the miniaturized features, thus simplifying part programming.

Software

Time-tested CALYPSO from Carl Zeiss enables you to evaluate captured data using standard measuring software with an intelligent user interface that can also be used on all other coordinate measuring machines.

Range of applications

- Rotationally symmetrical parts with free-form surfaces, small radii, undercuts
- Prismatic parts with small and deep bores
- Flat metal parts with low form stability
- 2D parts with bores and cut-outs



F25 description

Kinematics	Highly accurate, air-bearing kinematics consisting of hard stone and carat technology with linear drives and base with active air damping
Measuring systems	Ultra-precise, incremental length measuring systems with glass-ceramic scales in all machine axes with a resolution of 0.25 nm
Contact sensor system	(SSP) Small Silicon Probe based on solid state joint kinematics
Optical sensor system	
Camera system for image analysis	S/W CCD camera (based on ViSCAN)
Illumination	Reflected light LED ring (green 532 nm) Transmitted light light table white
Optical system	10x (20x optional) total magnification comprising: tube extension and 5x highly accurate lens, 45 mm (54.5 mm, 10x) working distance
Observation camera	To visualize the work environment of the contact sensor (SSP)

F25 measuring ranges, dimensions, weight

Measuring range	Contact	Optical	Tactile and optical
X [mm]	130	130	88
Y [mm]	130	130	88
Z [mm]	100	100	74

Dimensions (W x H x D) approx. 1650 x 1450 x 2000

Max. workpiece weight up to 5 kg

F25 weight 600 kg

Weight of base 150 kg

F 25 accuracy

Solid state joint stylus

Linear measuring tolerance

MPE complies with DIN EN ISO 10360-2

*L = measuring length in mm

for E (µm) at 19.5 – 20.5 °C (67.7 – 68.9 °F) $0.25 + L*/666$

Probing tolerance

MPE complies with DIN EN ISO 10360-2

for P (µm) 0.3

ViScan (optical image analysis)

Probing tolerance

Complies with VDI/VDE 2617-6

R₂ (µm) 0.6 total magnification 10x
0.5 total magnification 20x (optional)

Acceleration 300 mm/s² per axis

Travel speed 20 mm/s per axis

F 25 ambient conditions

Humidity 40% to 60%

Ambient temperature for operational readiness +15 °C to +30 °C

Temperature conditions to guarantee specifications

Complies with measuring lab class 1 in accordance with VDI/VDE 2627

Ambient temperature 20 °C (68 °F) ± 0.5 K

Temperature gradient 0.2 K/h 0.4 K/d 0.1 K/m

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