

NANOStation® 300 - Air-Bearing Stage System for Ultra-High Precision Inspection

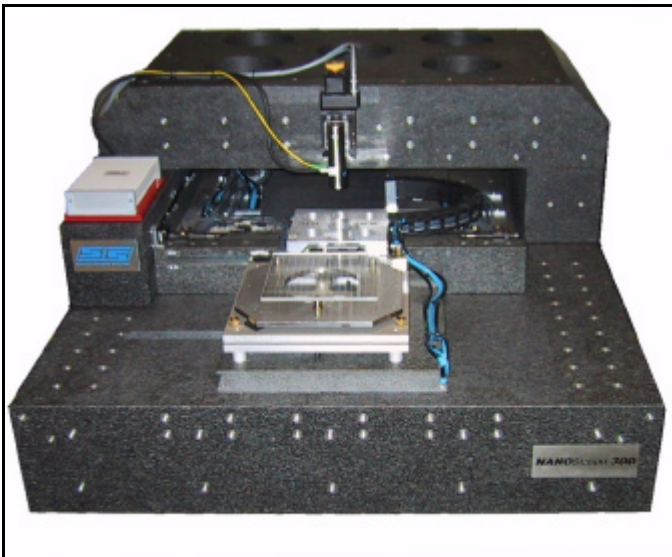


SURFACE IMAGING SYSTEMS

The new NANOStation® 300 air-bearing stage for nanometer scale inspection of 300mm wafers, masks and other large samples is the result of more than a decade in AFM/SPM development. The system is designed to provide highest stability and precision in surface measuring applications. The single plane architecture with the rigid granite base provides significant advantages over multi-component metal-made translation systems. Higher strength, smaller thermal expansion and lower mass enables rapid positioning with great accuracy.

The NANOStation® 300 provides sub-nanometer resolution in vertical and sub-micrometer resolution in the lateral direction.

A large amount of open area accommodates the S.I.S. ULTRAObjective® AFM/SPM inspection head in combination with various other optical measuring devices or microscopes. The integrated combination of different characterization systems in one stage system makes the NANOStation 300 the most cost effective ultra-high precision stage for wafer, masks and reticle inspection.



Highest Stability:

The NANOStation® 300 provides a travel range of 550 mm x 300 mm with fast point-to-point movements. The air-bearing stage slides on a granite reference plane for positioning, and can be lowered to contact during the AFM/SPM measurement. A resolution level of less than 0,1 nm is achieved.

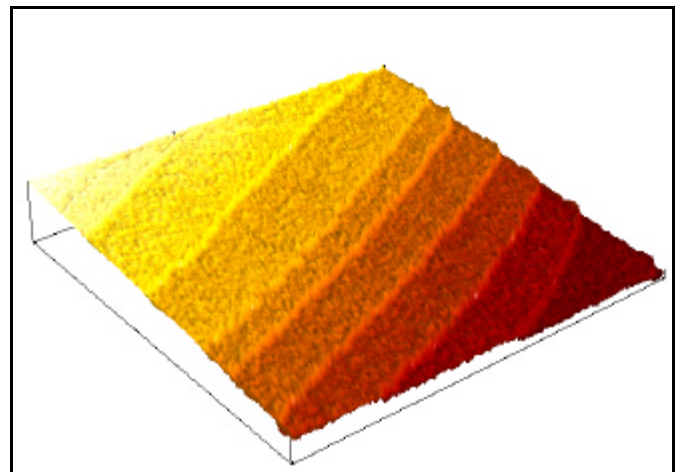
The image shows the NANOStation® 300 in combination with the S.I.S. ULTRAObjective® AFM/SPM. Additional inspection instruments, e.g. optical microscopes, can be placed on a separate gantry (not shown). Sample translation between the different measurement devices is achieved without loss of productivity due to the high-speed, high precision positioning capability of the system.

Providing AFM/SPM Resolution:

The ultra-high stability is demonstrated by clearly imaging the surface of a slightly misaligned oxidized Si 111 wafer. The terraces with a step height of 0.3 nm are detected without filtering.

Contactless linear motors with optical encoders provide a 10 nm resolution with a $\pm 1 \mu\text{m}$ absolute positioning accuracy. The repeatability is better than $\pm 250 \text{ nm}$.

The standard NANOStation® 300 system is equipped with three-point mounting interface for a wafer chuck, mask holder or other sample support devices.



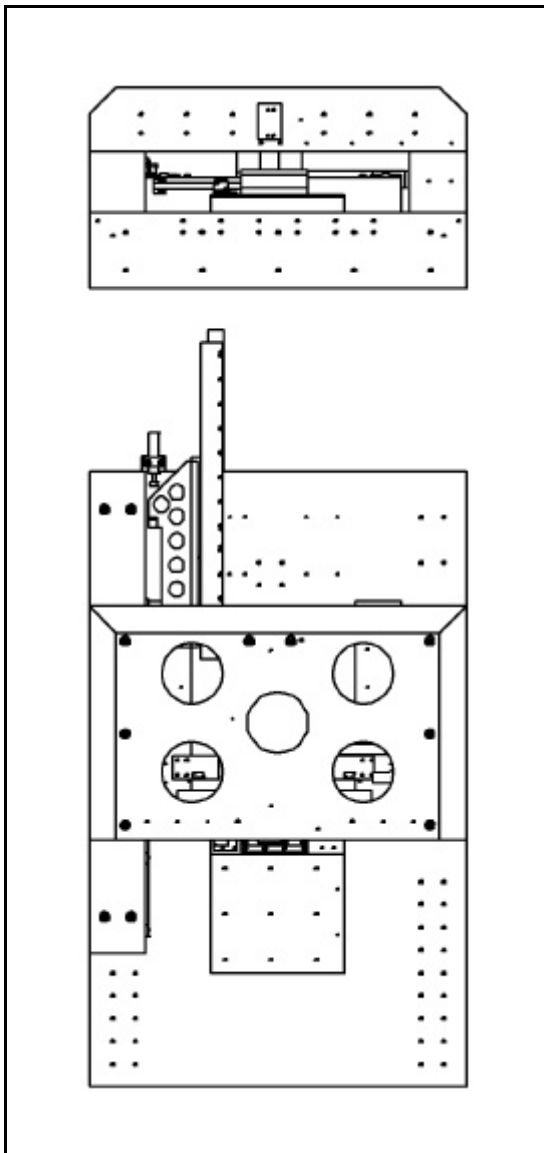
NANOStation® 300 - AFM/SPM Large Sample Platform



SURFACE IMAGING SYSTEMS

The S.I.S. NANOStation® 300: Ultra-High Resolution Inspection Stage

- Lowest noise floor down to the sub-nanometer level
- Single plane design with air-bearing for high velocity movements
- High position accuracy and repeatability
- Modular design for the integration of AFM/SPM instrumentation with additional inspection techniques, e.g. optical microscopy, phase-shift interferometry, etc.
- Easily accessible for various types of wafer robots and mask handling systems
- Designed for optimal air flow and heat removal, low thermal drift



Applications:

- 300 mm wafer inspection
- Un-patterned wafer inspection
- Patterned wafer inspection
- Reticle inspection
- Critical dimension (CD) metrology
- Overlay metrology
- Filter/TFT inspection

Specifications (preliminary)

principle:	single plane, dual axis air-bearing stage
motor:	electromagnetic, contactless linear motor
optical encoder:	accuracy class 1µm (Heidenhain LIP581)
travel range, X-Y:	550 mm x 300 mm
stage resolution:	10 nm
absolute accuracy:	± 1 µm
stage repeatability:	± 250 nm
vertical stability:	< 0,1 nm
maximum velocity:	500 mm/s
dimensions (LxWxH):	1620 mm x 990 mm x 530 mm
weight:	ca. 1.400 kg