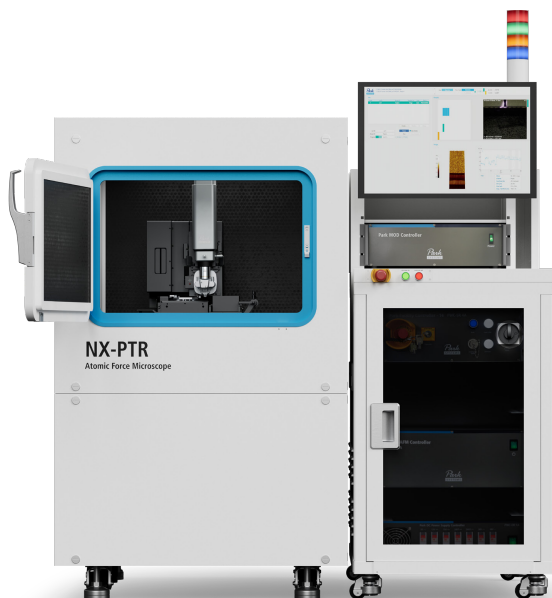
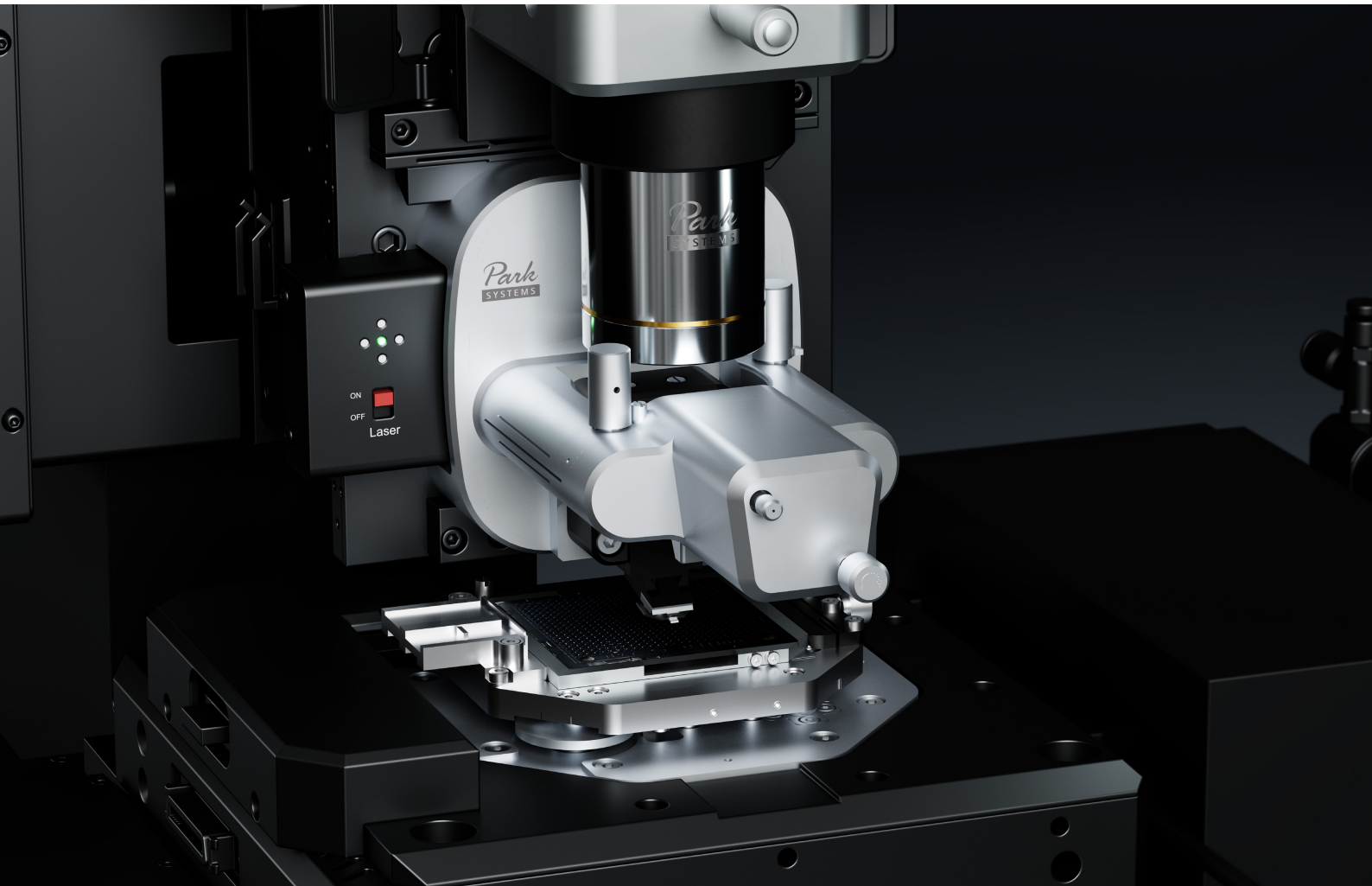


Park NX-PTR

Industry's Leading Automated AFM
for Precise In-line Metrology of Hard Disk Head Sliders



Park
SYSTEMS

Park NX-PTR is an AFM system designed specifically for pole tip recess (PTR) metrology of HDD heads in manufacturing environments. Two custom sample holders for row bars and slider trays enable quick exchange, while a dual-axis tilting stage and proprietary mapping algorithm ensure accurate site targeting regardless of sample position. Built on Park AFM's core technologies including a decoupled XY and Z scanner, dual-servo XY control, high-bandwidth Z scanner, and True Non-contact™ mode, NX-PTR delivers sub-angstrom vertical accuracy, extended tip life, and proven GR&R performance trusted by leading HDD manufacturers worldwide.

Park NX-PTR

Key Features

Hard Disk Fab Integrability

- Automated operation through XEA software with an intuitive UI
- Customized loading solutions for row Bars and slider trays
- Complete sample surface leveling with dual-axis tilting stage
- Automatic probe exchange

High-Precision AFM Technology

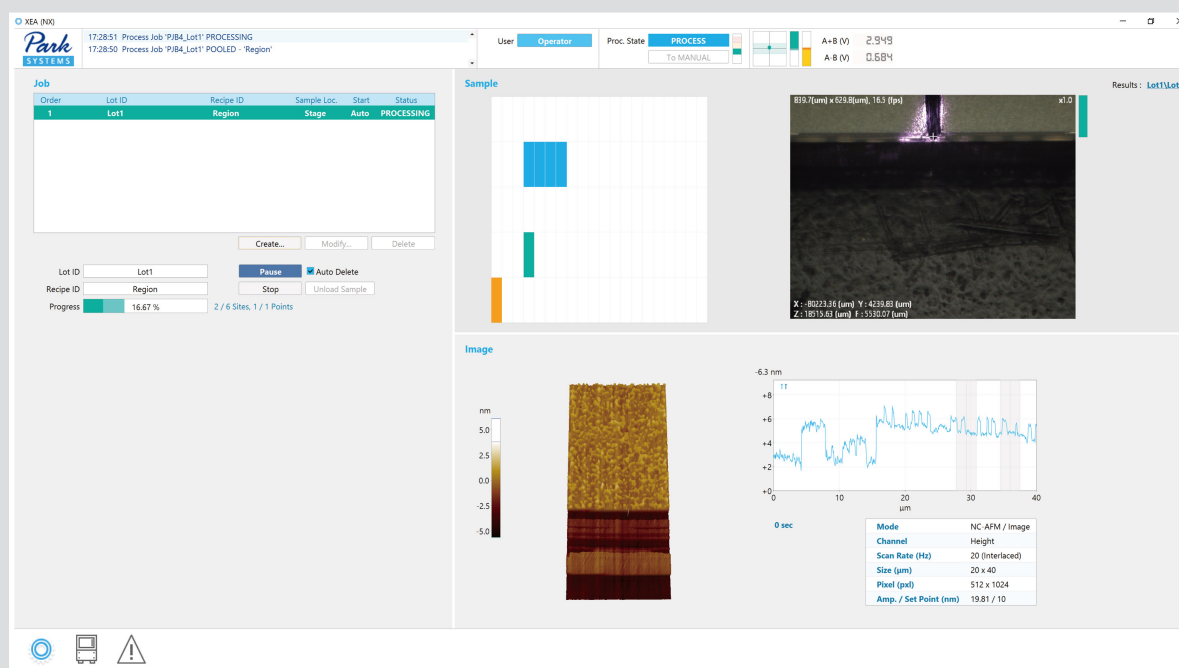
- Minimized out-of-plane motion through a decoupled XY and Z scanner architecture
- Precise orthogonality and positioning via dual-servo XY control
- True Non-contact™ mode preserves tip shape and extends tip lifetime

Versatile Applications

- High-throughput automated multi-point measurements and analysis
- Automatic wall angle measurement and analysis
- Automatic defect measurement and analysis

Automatic Measurement Control for Accurate Scans with Minimal Effort

Park NX-PTR is equipped with automated software that makes operation nearly effortless. Simply select the desired measurement program to get precise multi-site analysis with optimized settings for cantilever tuning, scan rate, gain, and setpoint parameters. Park's user-friendly software interface gives you the flexibility to create customized operation routines, allowing you to access the full power of the NX-PTR and get the measurements you need. Creating a new routine is straightforward—it takes about 10 minutes from scratch, or less than 5 minutes to modify an existing one.

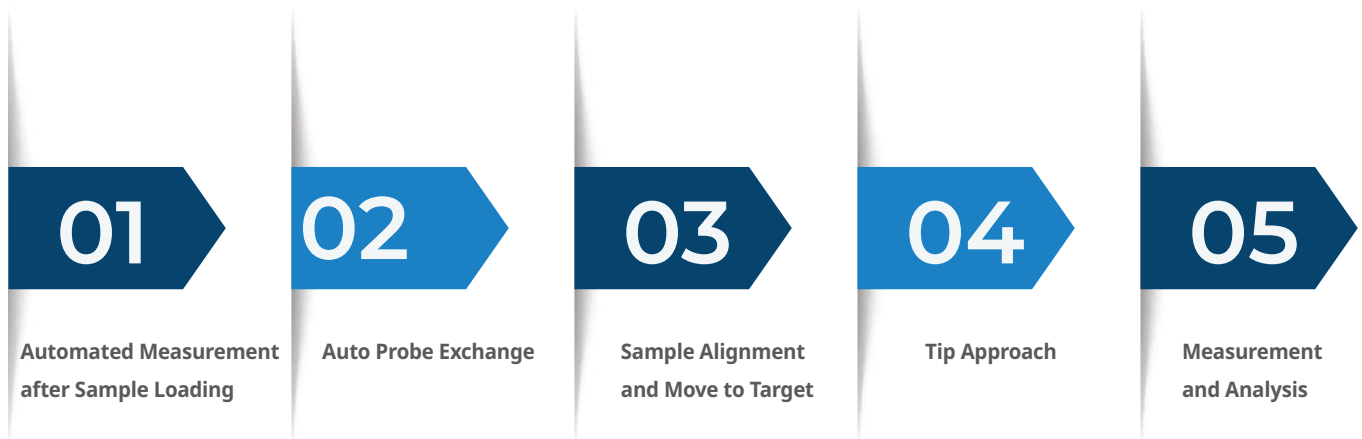


Park NX-PTR

One Platform for HDD R&D and FA

Automated Operation

The NX-PTR enables automated operation from measurement to analysis — automatically selecting the appropriate tip, scanning multiple target areas, analyzing data, and generating reports.

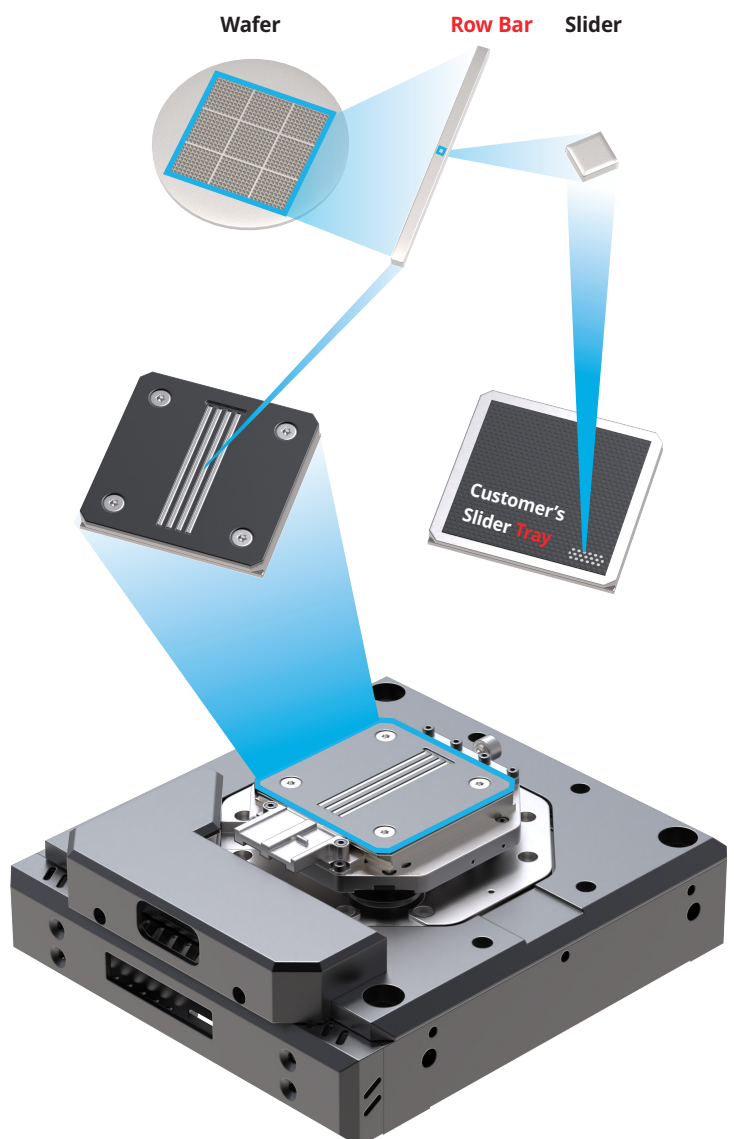


Customized Loading Solutions for Row Bars and Slider Trays

HDD heads are fabricated from wafers through row bar and slider stages. Their extremely small size makes handling quite challenging. However, with a customized sample holder, handling row bars or slider trays becomes simple and convenient. Multiple samples can be mounted on the holder simultaneously, enabling automated measurements.

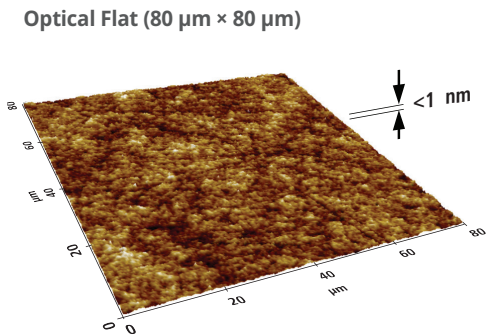
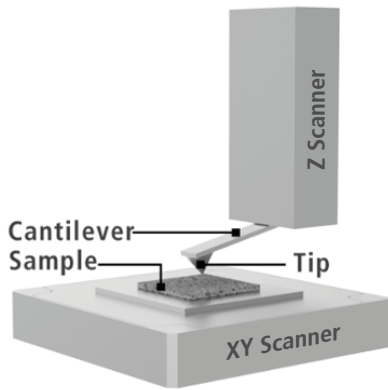
Complete Sample Surface Leveling with Dual-Axis Tilting Stage

The NX-PTR's Z-detector-based topography, combined with a dual-axis tilting stage that automatically levels the sample surface via precision XY pivot control, effectively minimizes slope effects. This eliminates Z-scanner hysteresis and measurement artifacts common in conventional AFM systems, ensuring accurate surface topography.



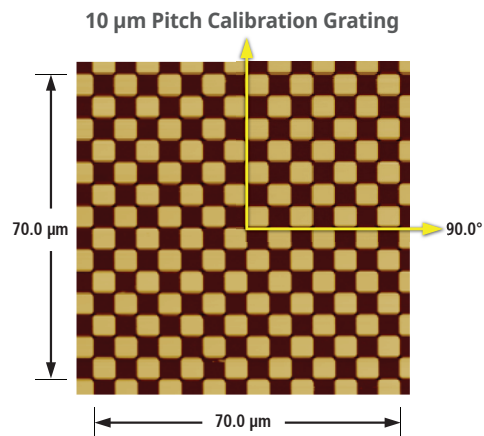
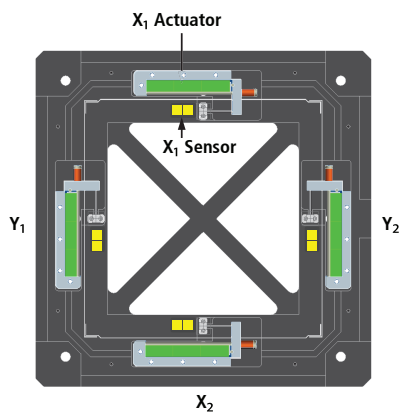
Decoupled XY and Z Scanner System

The separated flexure-guided 2D XY scanner and 1D Z scanner system minimizes out-of-plane motion by eliminating crosstalk between horizontal and vertical motion. The independent Z scanner enables precise, linear, and fast dynamic performance.



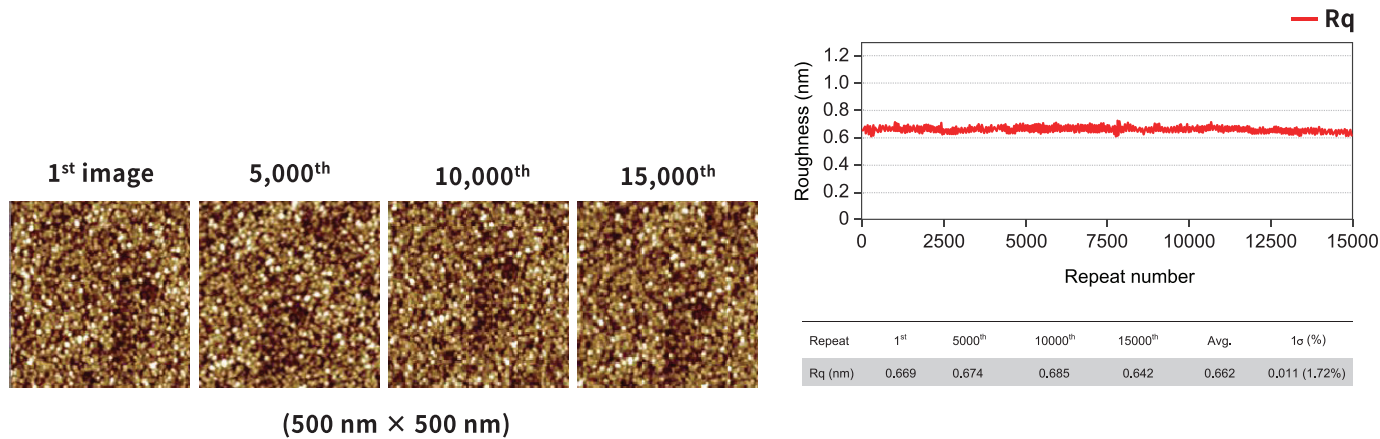
Orthogonal Scan for XY Scanner

The XY scanner features a dual-servo architecture with two pairs of actuators and position sensors mounted on opposite sides of each axis, providing precise orthogonality and accurate positioning across the entire scan area.



True Non-Contact™ Mode

True Non-contact™ mode, a proprietary technology offered by Park Systems, obtains topography by detecting the attractive van der Waals force between the tip and sample surface. The key advantage of True Non-contact mode is the prevention of tip wear and sample damage, ensuring consistent results with superior data reliability. This also reduces the total cost of ownership by extending tip life. The system also supports contact mode and tapping mode when required.

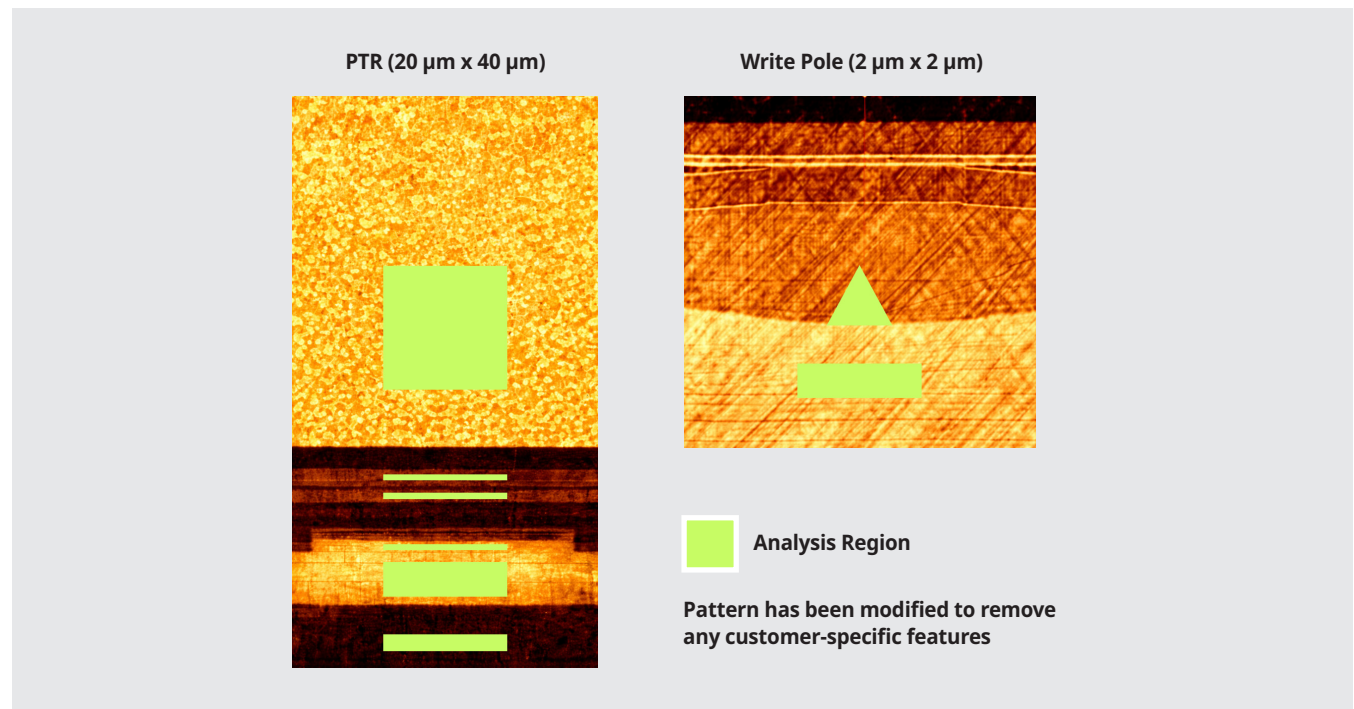


Park NX-PTR

Versatile Applications

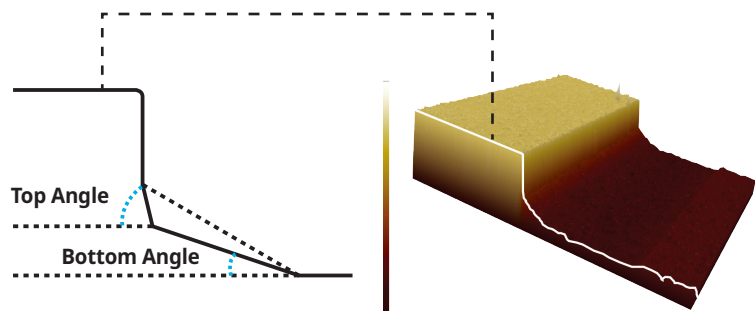
High-Throughput Automated Multi-Point Measurements and Analysis

The NX-PTR supports multi-point measurements within a single image, applying point-specific measurement methods with adaptive image sizes. For example, after measuring a $20\text{ }\mu\text{m} \times 40\text{ }\mu\text{m}$ PTR, the system can automatically zoom in to measure the writing pole. This streamlines the entire workflow through a unified recipe, minimizing setup time and operator intervention.



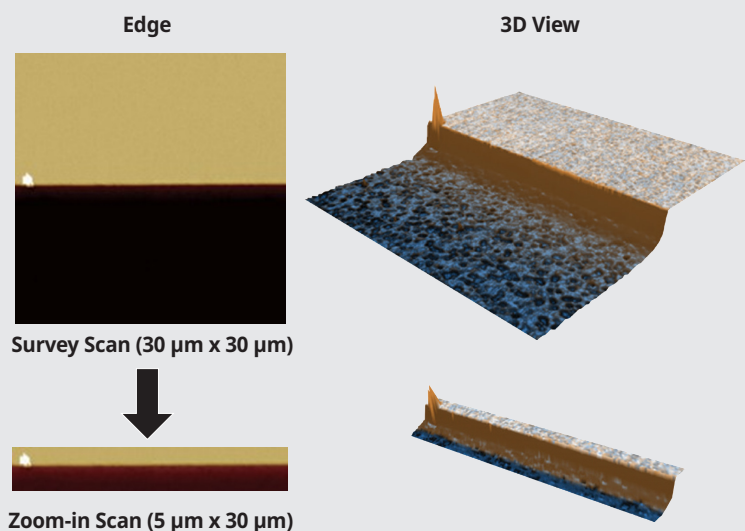
Automatic Wall Angle Measurement and Analysis

The NX-PTR automatically measures and analyzes wall angles across a variety of applications, delivering consistent results without manual intervention.



Automatic Defect Measurement and Analysis

The NX-PTR automatically proceeds from a survey scan to a zoom-in scan upon detecting edge spikes, enabling fast and efficient defect measurement.



Park NX-PTR

Technical Specifications

AFM Modes

- True Non-contact™ Mode
- Tapping Mode
- Contact Mode

Scanner

- Dual-servo XY scanner (100 µm × 100 µm)
- Flexure-guided Z scanner (15 µm or 30 µm) *

On-Axis Optics

- Direct on-axis vision of sample surface and cantilever
- Field of view: 840 µm × 630 µm (w/ 10× objective lens)
- CCD: 5 M pixels

Automatic Tip Exchanger *

- 24 pre-mounted probes (12 probes per cassette)

Sample Handling Capability

- Row bars and sliders **

Dimension and Weight (Approx.)

- 1,400 mm × 980 mm × 1,900 mm (880 kg)

Required Environment

- Room Temperature (Stand By): 10 °C ~ 40 °C
- Room Temperature (Operating): 18 °C ~ 24 °C
- Humidity: 30% to 60% (not condensing)
- Floor Vibration Level: VC-D (6.25 µm/sec)
- Acoustic Noise: Below 65 dB
- Pneumatics: CDA 0.7 MPa, Vacuum -80 kPa
- Power Supply Rating: 208 ~ 240 V, 1 Phase, 50/60 Hz
- Ground Resistance: Below 1 Ω



* Requires additional options

** Consult with Park Systems