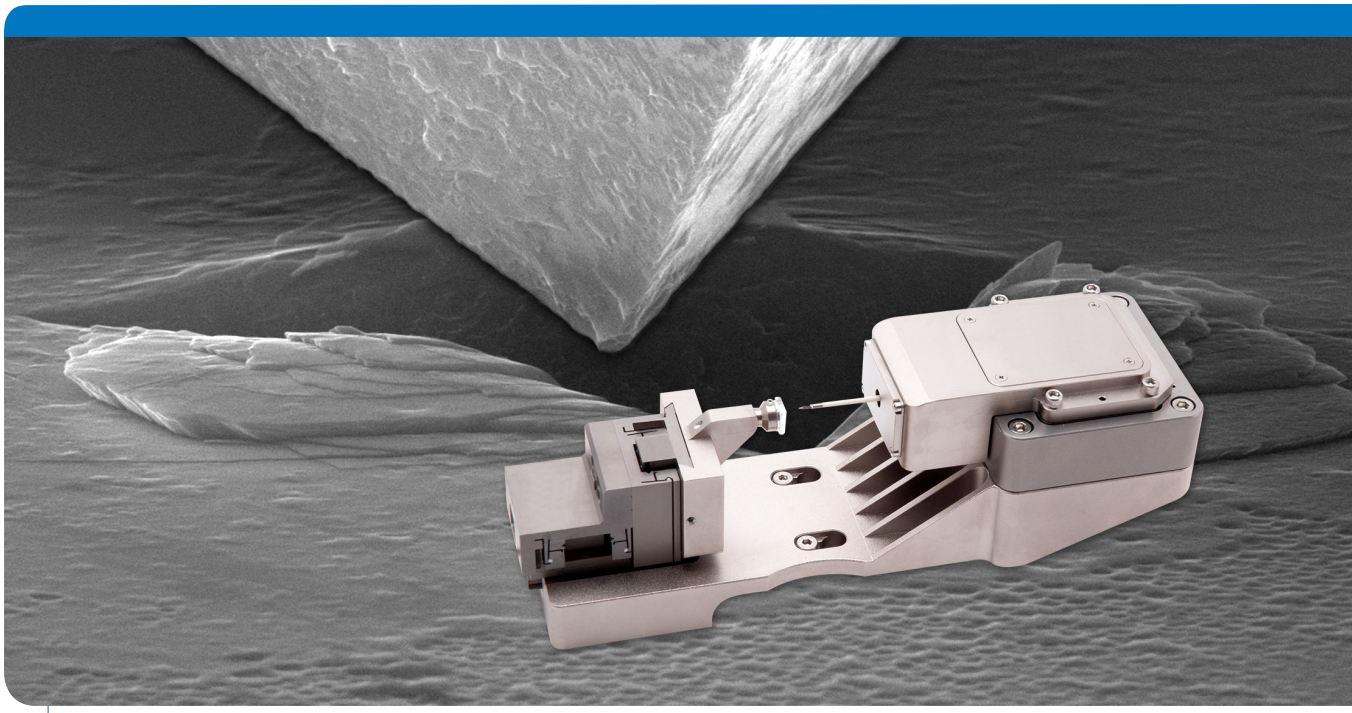

Hysitron PI 88 SEM PicoIndenter

The Next-Generation In-Situ Nanomechanical Test Instrument

Bruker's SEM PicoIndenter® instruments are depth-sensing nanomechanical test systems that are specifically designed to leverage the advanced imaging capabilities of scanning electron microscopes (SEM, FIB/SEM). With these systems, it is possible to perform quantitative nanomechanical testing while simultaneously imaging with the SEM. The Hysitron® PI 88 is Bruker's most comprehensive in-situ nanomechanical test instrument for SEM and FIB/SEM.

Built upon Bruker's leading-edge capacitive transducer technology, Hysitron PI 88 delivers extraordinary performance and versatility, as well as a modular design that supports a full suite of in-situ testing techniques and future upgrades, now including 800°C heating, scratch testing, 5-axis sample positioning, electrical characterization, dynamic fatigue testing, and an interchangeable extended range (500 mN, 150 µm) transducer.

Hysitron PI 88 Features

- Quantitative measurement of nanomechanical properties—hardness, stiffness, and elastic modulus
- Performech® II Advanced Control Module with 78 kHz feedback rate and data acquisition up to 39 kHz to capture transient events, such as fracture initiation
- Futureproof modular design that allows for upgradability to our full suite of testing techniques
- Unique interchangeable transducer technologies optimized for nanoscale-to-microscale in-situ mechanical testing regimes
- 3-axis (X, Y, Z) or 5-axis (X, Y, Z, tilt, rotation) sample positioning stages
- Load or displacement controlled testing modes for nanoindentation, compression, tension, or bending tests
- Patented Q-Control mode actively dampens transducer oscillations for superior stability

Designed for Performance

The Hysitron PI 88 mounts easily to the SEM stage without being a permanent fixture in the microscope. The compact design of the instrument allows for maximum stage tilt and minimum working distance to enable optimal imaging during testing. Through a custom feedthrough, the system connects to Bruker's Performech II Advanced Control Module, which boasts an ultra-low noise floor, a 78 kHz digital feedback routine, and data acquisition rates up to 39 kHz.

The Hysitron PI 88 features a vacuum-compatible version of Bruker's nanoscale transducer and conductive diamond probe. The transducer applies force electrostatically while displacement is measured capacitively The low-current design minimizes thermal drift and provides unprecedented sensitivity. Coupled with the transducer is an advanced XYZ sample-positioning stage with >8 mm of range in all three axes, providing greater access to larger samples with superior lateral precision and linearity. This mechanical integration of the sample stage and the transducer on a single platform provides a stable, rigid platform for nanomechanical testing.

Hysitron PI 88 is highly configurable to meet your research needs.

Full suite of available options include:

Hysitron PI 88 Upgrade Options

400°C or 800°C Heating	Add heating capabilities for direct measurement and observation of thermally initiated material transformations, which is ideal for testing materials that demand reliability under extreme conditions
Sample Tilt and Rotation Stage	Add optional encoded tilt and rotation stage for full five degrees of sample positioning freedom, providing seamless access to EBSD, EDS, and FIB Tilt Range: 180° | Tilt Accuracy: <0.33° | Rotation Range: 180° | Rotation Accuracy: <0.12°
Extended Range (xR) Load Cell	Impose greater forces and strains with the user-changeable xR transducer, enabling testing of larger or more robust structures with >500 mN of force and >150 µm of displacement
Electrical Characterization Module (ECM)	Add simultaneous measurement of electrical and mechanical properties during nanoindentation, compression, or tensile loading to understand origins of electrical property changes in materials or devices
Nanoscratch with Lateral Force Sensing	Shed light on deformation processes occurring at the sliding interface with in-situ tribology, or measure frictional properties while directly viewing wear evolution
Push-to-Pull (PTP) and Electrical Push-to-Pull (E-PTP)	Mount and test free-standing thin films in tension using these MEMS fabricated devices; an electrical version of the device further expands capabilities and enables four-point electrical measurements throughout the tensile experiment
nanoDynamic™ Mode	Apply an oscillating force to continuously measure viscoelastic and fatigue properties as a function of contact depth, frequency, and time

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