100 µm XYZ Piezo Scanner for TT-2 AFM

Model ID: PS-2019

50 µm XYZ Piezo Scanner for TT-2 AFM

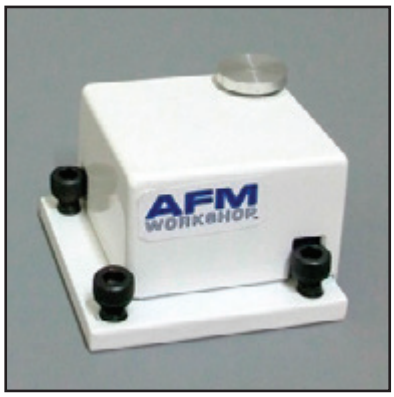
Model ID: PS-2010

15 µm XYZ Piezo Scanner for TT-2 AFM

Model ID: PS-2011

The PS-2010, PS-2011, and PS-2019 **piezoelectric scanners** are designed for use with the AFMWorkshop TT-AFM, and scan samples in the X- Y- and Z-axis. All three scanners use temperature compensated strain gauges for linearizing scans in the X- and Y-axis. The PS-2010 and PS-2019 have a temperature compensated strain gauge in the Z axis, while the PS-2011 does not.

All three scanners use a modified tripod design for creating motion in the XY-axis. Motion is generated through a lever arm. Animations on the AFMWorkshop website (www.afmworkshop.com) illustrate how the scanners operate. Each scanner contains a PC board with circuits for measuring ceramic motion with the strain gauge as well as a 20 pin ribbon cable connector. The scanners are attached to the XY manual positioner with three M6 socket head screws.



PS-2010 scanner with standard sample holder. Two magnet secure AFM sample disks.

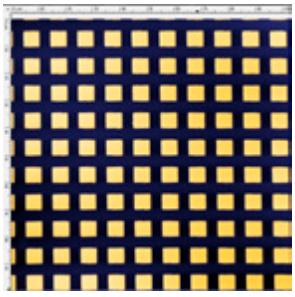
PS-2011 scanner with leveling sample puck.

Sample Holding Stage

Mounted on standard AFM metal disks, samples are held on an aluminum metal plate with two magnets. As shipped, the sample holder is electronically grounded to the microscope stage to help eliminate unwanted effects from sample charging. Included with each scanner is a leveling sample puck. The puck enables samples to be leveled, reducing the AFM image background bow to less than a few nanometers. The leveling sample puck is magnetically held to the sample stage and has three set screws to level the puck relative to the XY scan axis.

Interchangeable

All three scanners are interchangeable. The scanners are removed from the TT-AFM stage by simply unscrewing three M6 socket head screws and unplugging a 20 pin ribbon cable. It takes less than 5 minutes to remove one scanner and to replace it with another scanner.



Vibrating mode AFM image of a test pattern illustrating a 100 X 100 µm scan. The pitch in the XY-axis is 10 µm. Measured with the PS-2019 scanner.

Scanner Specifications

	100 X 100 X 17	50 X 50 X 17	15 X 15 X 7
Engineering Specifications			
» XY Resolution	0.010 nm	0.005 nm	0.003 nm
» XY Linearity	<0.1%	<0.1%	<0.1%
» Z Resolution	0.003 nm	0.003 nm	0.0015 nm
» Z Linearity	<0.1%	<0.1%	<0.1%
Performance Specifications			
» XY Range	100 µm	50 µm	15 µm
» XY Linearity	<1%	<1%	<1%
» XY Resolution			
• Closed Loop	<6 nm	<3 nm	<1 nm
• Open Loop	<1 nm	<1 nm	<0.3 nm
» Z Range	17 µm	17 µm	7 µm
» Z Linearity			
• Open Loop	<5%	<5%	<5%
• Closed Loop	<1%	<1%	N.A.
» Z Sensor Noise	1 nm	1 nm	N.A.
» Z Feedback Noise	<0.15 nm	<0.15 nm	<0.08 nm
Actuator Type	Piezo	Piezo	Piezo
Design	Modified Tripod	Modified Tripod	Modified Tripod
XY Sensor Type	Strain Gauge	Strain Gauge	Strain Gauge
Z Sensor Type	Strain Gauge	Strain Gauge	N.A.