



Motion Solutions

Customized Nanopositioning Products

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attocube systems AG | Königinstrasse 11a | D - 80539 München | Germany
Tel.: +49 89 2877 809 - 0 | Fax: +49 89 2877 809 - 19 | info@attocube.com
www.attocube.com

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Motion Solutions

Customized Nanopositioning Products

15 years have passed since attocube presented its first piezo positioner for cryogenic environments enabling a multitude of novel experiments and widening the possibilities of many researchers. Constant innovation led to integrated position sensors, high reliability, large forces and - with the Industrial Line established five years ago - price efficiency at vacuum and ambient conditions.

Customizations play a large role in this process as we're striving to offer you the best solution for your application. Integrating several positioning axes with individual readout, be it magnetic, optoelectronic or even

Competitive Edge



Our cutting-edge systems deliver brand-new technology for tackling some of the hardest challenges be it in precision manufacturing, quality control or even fundamental research. Their first users will gain a tangible competitive edge over competitors by maximizing the resulting quality and at the same time minimizing the 'time-to-market'.

Expert Support



From the sales process to the maintenance after many years of usage: attocube and its engineers will support you in any stage personally, via phone as well as via remote desktop sessions, and never leave you alone with any open question regarding your positioning system.

Patented Positioning Technology



All nanopositioning stages based on our patented slip-stick principle, provide several degrees of freedom over macroscopic ranges down to sub-nm precision.

interferometric sensors leads to a ready-to-be-integrated motion stage. Multi-axes systems like the hexaCUBE provide a sophisticated programmable software interface. Customized stages provide highest stability for large loads and compact microscopy stages offer multi-dimensional movement with high speeds thanks our ultrasonic drive technology.

Contact us with your application and we'll find the solution suiting your needs best, together!

Customized to Individual Needs



No two applications are alike. So if none of our standard products offers the specifications of your demanding task don't despair! We try to satisfy even the most exotic requirements by adapting existing and developing completely new motion solutions.

Smart Engineering



'Convenience despite complexity' – although most of our systems are equipped with unprecedented features, we dedicate all of our experience to deliver user-friendly and robust solutions.

Vacuum and Variable Temperatures



Originally being the key market of attocube we feel comfortable with extreme environments such as vacuum or non-standard temperature ranges. We have a long tradition in building purely non-magnetic positioners for sensitive environments.

Microscopy Stages

ultrasonic xy piezo stages



Ultrasonic High-Precision xy Piezo Stages

A multitude of applications these days require very fast yet highly accurate sample positioning. This is particularly true for target motion in optical imaging such as super resolution microscopy (STED, PALM) or in cell array investigation. Being a perfect solution for these tasks, attocube's ultrasonic xy piezo stages offer highest precision motion on the nanometer scale over several centimeter travel range.

Furthermore, these ultrasonic driven piezo stages offer high drive velocity (up to 50 mm/s) combined with an unrivalled bi-directional repeatability of better than 50 nm. Operating at frequencies well above the audible range, the stages move silently and are therefore the perfect choice for noise sensitive applications.

Choices involve:

- footprint 50x50 mm up to 300x300 mm
- travel range 25x25 mm² up to 200x200 mm²
- max. drive velocity 50 mm/s (at 50 nm repeatability)
- up to 5N+ dynamic force

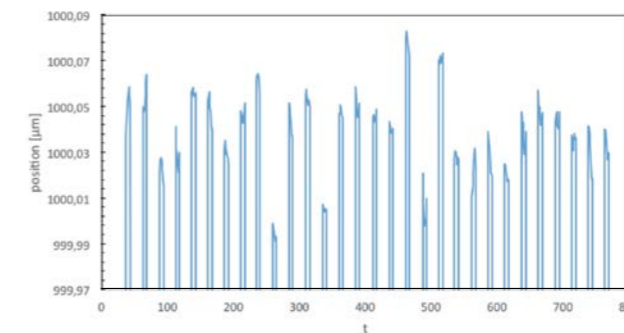
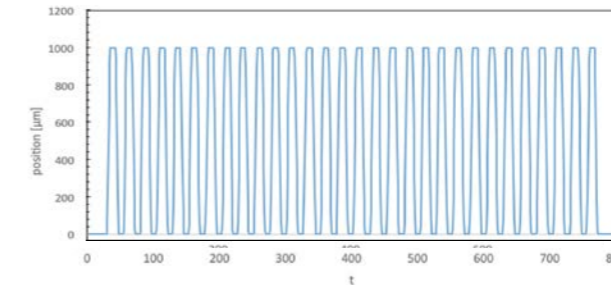
TYPICAL APPLICATIONS

- sample positioning in super resolution optical microscopy
- positioning of optics and optical components
- cell array investigation/manipulation



The hexaCUBE offers an outstanding repeatability of 50 nm for linear motion and 1 μ rad for rotational motion.

Linear Repeatability: Travel Range 1 mm



Premium Precision 6D Parallel Kinematics

With fabrication and production processes of today steadily requiring increasing accuracy, there exists a growing demand for compact yet highly accurate multi-degree-of-freedom positioning devices. attocube's piezoelectric 6D kinematics are precisely engineered for this challenge and provide unrivalled nanometer resolution and repeatability combined with mechanical robustness and compact design. Compared to other products on the market, attocube offers higher repeatability and better travel-range-to-build-volume than any other product.

Choices involve:

- size customization (footprint, height, travel range)
- load customization (travel range vs load, spring compensation)
- different material options
- extra low height version for constrained environments (down to 57mm)
- vacuum version

TYPICAL APPLICATIONS

- optics and fiber alignment in assembly lines
- 6D sample positioning for optics and microscopy

Technology		hexaCUBE 190
travel mechanism		six ECS5050/HL linear piezo positioners
Size and Dimensions		
footprint; height		190 mm x 180 mm; 105 mm
max installation space		220 mm x 210 mm; 125 mm
aperture		26 mm (1 inch)
weight		1.95 kg
load		0.7 kg
Travel Range		
linear x		± 15 mm
linear y		± 15 mm
linear z		$\pm 20,0$ mm
rotational Θ_x		+ 33 / - 19°
rotational Θ_y		$\pm 21^\circ$
rotational Θ_z		$\pm 19^\circ$

Repeatability (1 sigma)		
x, y, z		50 nm
$\Theta_x, \Theta_y, \Theta_z$		1 μ rad
Physical Properties		
materials		aluminum, stainless steel, plastic
stiffness		1 N/ μ m (x,y), 3 N/ μ m (z)
Working Conditions		
temperature		0..100°C
vacuum		HV/UHV models on request
Compatibility with Electronics		
		two ECC100/PRO required

Customized Piezo Positioners

tailored to individual needs



Flexure Scanners

smooth motion with individual stroke



Made-to-Measure Positioners

For many nano positioning applications, stability is - apart from highest precision - key factor for keeping a target position over long periods even during transport processes. The EOR6060 piezo rotator is designed for maximum rigidity and the perfect solution for applications where heavy loads have to be moved. Independently from orientation to gravity, it carries a maximum load of up to 1 kg with almost no tilt of the moving table.

Choices involve:

- number of degrees of freedom
- linear, goniometric, or rotational actuation
- custom-tailored physical dimensions
- individual travel range and speed
- customized payload
- sensorics from μm to sub-nm resolution
- OEM electronics

TYPICAL APPLICATIONS

- positioning of optics or optical components
- nanomanipulation of objects
- testing in quality control

High Performance Piezo Flexure Scanners

An increasing range of applications – such as image sensor interpolation or stabilization - require small to medium range sample positioning at high bandwidth/frequency. Due to our extensive engineering knowledge, we are capable to satisfy many of these requirements based on our piezo flexure technology: We put special focus to miniature designs with superior stiffness, which we develop by rapid prototyping using our finite element method (FEM) and electron-discharge milling (EDM) equipment.

Choices involve:

- one to three degrees of freedom
- linear, goniometric, or rotational actuation
- custom-tailored physical dimensions, stroke, payload
- advanced sensors and electronics
- customized payload
- simulated & verified dynamic performance

TYPICAL APPLICATIONS

- highly dynamic image interpolation for image sensors (typ. near to mid IR)
- image stabilization, widely applied from VIS to IR spectral range