Piezo Nanopositioners for R&D, Manufacturing, and Test

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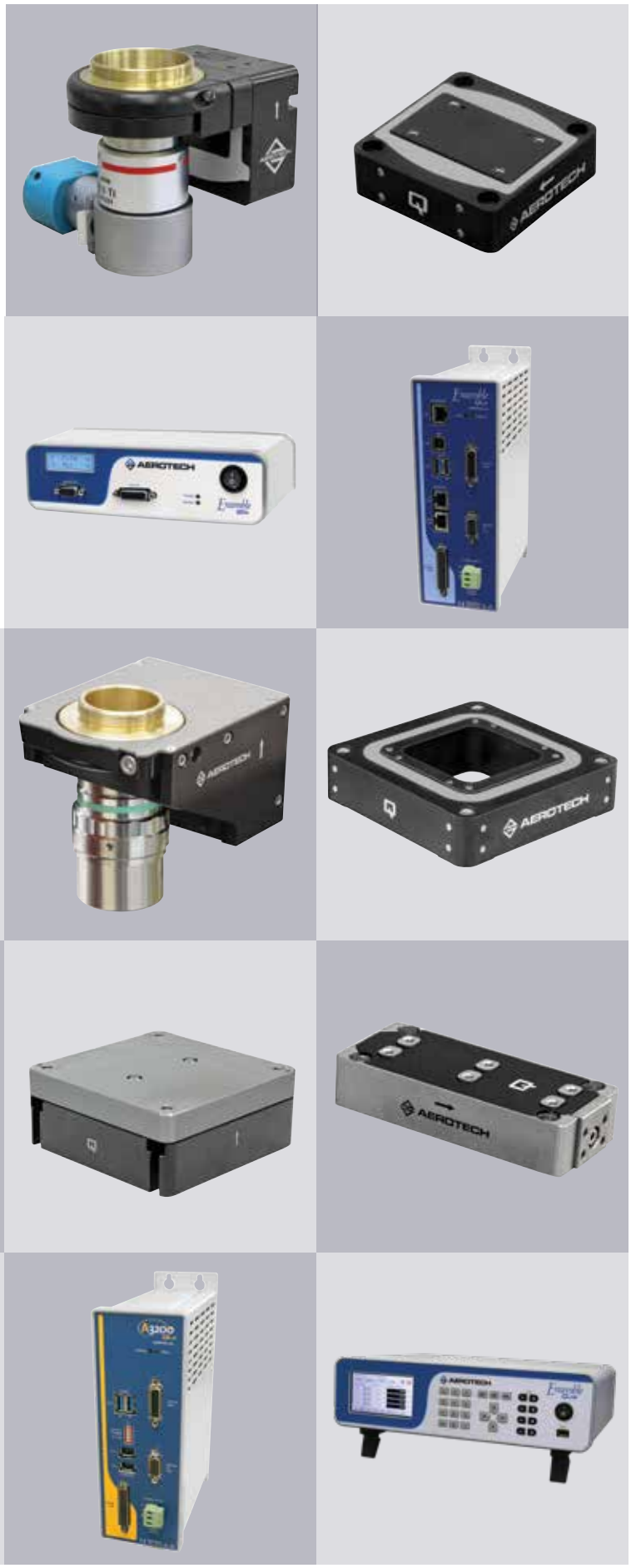
Introduction

Advancing the state-of-the-art requires better image quality, faster response times, finer resolution, and more accurate positioning of optics, samples, and test fixtures. Aerotech's line of piezo positioning stages and industry leading control systems enable the success of your cutting-edge projects in R&D as well as manufacturing with unparalleled precision and throughput, with the lowest cost of ownership for any piezo positioners.

Aerotech offers system-level mechatronic solutions for these applications and many more.

- Interferometry
- Time Domain Spectroscopy
- X-Ray Tomography
- Microscopy
- Biophysics/Cell Physics
- Astronomy
- Nanomechanical Testing
- High-Speed Imaging
- Fiber Alignment
- Data Storage
- Automated Optical Inspection
- Auto-Focus
- Nanophotonics
- Nonlinear Optical Spectroscopy
- Nanopositioning



QNP-L Piezo Nanopositioners

- High-precision, frictionless flexure guidance system
- Proprietary piezo multi-layer stack actuator
- Closed-loop travel options of 100, 250, and 500 µm
- Superior-positioning resolution and linearity with direct-metrology capacitive sensor options
- Mounting compatibility with other QNP-series piezo nanopositioners
- Open-loop and vacuum versions

QNP-L Series			
Features	QNP-40-100L	QNP-50-250L	QNP-60-500L
Closed- Loop Travel	100 µm	250 µm	500 µm
Open-Loop Travel	120 µm	300 µm	600 µm
Linearity	0.01%	0.01%	0.007%

QNP-XY Piezo Nanopositioners

- High-precision, frictionless flexure guidance system
- Proprietary piezo multi-layer stack actuator
- Closed-loop travel options of 100, 250, and 500 µm
- Superior-positioning resolution and accuracy with direct-metrology capacitive sensor options
- Mounting compatibility with other QNP-series piezo nanopositioners
- Open-loop and vacuum versions

QNP-XY Series			
Features	QNP-40-100XY	QNP-50-250XY	QNP-60-500XY
Closed-Loop Travel	100 µm x 100 µm	250 µm x 250 µm	500 µm x 500 µm
Open-Loop Travel	120 µm x 120 µm	300 µm x 300 µm	600 µm x 600 µm
Linearity	0.01%	0.01%	0.007%

QNP-Z Piezo Nanopositioners

- High-precision, frictionless flexure guidance system
- Proprietary piezo multi-layer stack actuator
- Closed-loop travel options of 100, 250, and 500 µm
- Superior-positioning resolution and accuracy with direct-metrology capacitive sensor options
- Mounting compatibility with other QNP-series piezo nanopositioners
- Open-loop and vacuum versions

QNP-Z Series			
Features	**QNP-40-100Z**	**QNP-50-250Z**	**QNP-60-500Z**
Closed- Loop Travel	100 µm	250 µm	500 µm
Open-Loop Travel	140 µm	300 µm	600 µm
Linearity	0.01%	0.01%	0.007%

QNP_{HD} Piezo Nanopositioners

- Closed-loop travels from 10 µm to 40 µm
- Direct-drive actuation enables fast response times and higher throughput processes
- High-precision, frictionless flexure guidance
- Long device lifetime
- Superior positioning resolution and linearity with direct-metrology capacitive sensor option
- Open-loop and vacuum versions

QNP_{HD} Series			
Features	**QNP_{HD}-30-10L**	**QNP_{HD}-30-25L**	**QNP_{HD}-30-40L**
Closed- Loop Travel	10 µm	25 µm	40 µm
Open-Loop Travel	12 µm	32 µm	50 µm
Linearity	0.02%	0.02%	0.02%

QNP2 Two-Axis, Parallel Kinematic, XY Piezo Nanopositioners

- Travels to 240 µm x 240 µm
- Square clear aperture up to 70 mm x 70 mm
- Superior multi-axis accuracy via parallel-kinematic design
- High-stiffness and dynamics resulting in high process throughput
- High-precision, frictionless flexure guidance
- Patent-pending design provides unmatched geometric performance
- Long device lifetime
- Superior positioning resolution and linearity with direct-metrology capacitive sensor option
- Open-loop and vacuum versions

QNP2- Series		
Features	QNP2-100XYA-100	QNP2-150XYA-200
Closed- Loop Travel	100 µm x 100 µm	200 µm x 200 µm
Open-Loop Travel	120 µm x 120 µm	240 µm x 240 µm
Linearity	0.01%	0.01%

QNP3 Three-Axis, Parallel Kinematic, XYZ Piezo Nanopositioners

- Travels to 240 µm x 240 µm x 25 µm
- Square clear aperture up to 66 mm x 66 mm
- Superior multi-axis accuracy via parallel kinematic design
- High-stiffness and dynamics resulting in high process throughput
- High-precision, frictionless flexure guidance
- Patent-pending design provides unmatched geometric performance
- Long device lifetime
- Superior positioning resolution and linearity with direct-metrology capacitive sensor option
- Open-loop and vacuum versions

QNP3- Series		
Features	QNP3-100XYAZ-100-10	QNP3-150XYAZ-200-20
Closed-Loop Travel (X x Y x Z)	100 µm x 100 µm x 10 µm	200 µm x 200 µm x 20 µm
Open-Loop Travel	120 µm x 120 µm x 12 µm	240 µm x 240 µm x 25 µm
Linearity	0.01% (XY); 0.02% (Z)	0.01% (XY); 0.02% (Z)

Microscope-Objective Piezo Nanopositioners

QFOCUS QF1	
Features	**QFOCUS QF1**
Closed-Loop Travel	100 µm
Open-Loop Travel	120 µm
Linearity	0.01%

QFOCUS QF1

- 100 µm closed-loop and 120 µm open-loop travels (custom travels available)
- High-stiffness and dynamics resulting in outstanding step-and-settle and scanning performance
- High-precision, frictionless flexure guidance
- Long device lifetime
- Superior positioning resolution and linearity with direct-metrology capacitive sensor option
- Variety of threaded adapters for quick and easy attachment to the microscope and objective
- Clear aperture to 29 mm

QFOCUS QF46Z Series		
Features	**QF46Z-100**	**QF46Z-250**
Closed-Loop Travel	100 µm	250 µm
Open-Loop Travel	120 µm	300 µm
Linearity	0.01%	0.01%

QFOCUS QF-46

- Travels from 100 µm to 300 µm
- High-stiffness and dynamics resulting in outstanding step-and-settle and scanning performance
- High-precision, frictionless flexure guidance
- Long device lifetime
- Superior positioning resolution and linearity with direct-metrology capacitive sensor option
- Mounting flexibility with a variety of threaded adapters or mounting holes for custom mounting arrangements
- Clear aperture to 29 mm diameter

QFOCUS QF50Z-400	
Features	**QF50Z-400**
Closed-Loop Travel	400 µm
Open-Loop Travel	450 µm
Linearity	0.01%

QFOCUS QF-50

- 400 µm closed-loop travel; 450 µm open-loop travel
- Outstanding step-and-settle and scanning performance
- Designed for use with larger, high-NA objectives
- Superior positioning resolution and linearity
- Mounting flexibility
- 29 mm diameter clear aperture

Ensemble QDe Networked Desktop Piezo Drive

- Networkable with any Ensemble drive to control up to ten axes of piezo and/or servomotor stages
- Multi-axis Position Synchronized Output (PSO) for real-time triggering of events
- High-precision 20-bit sensor resolution for capacitive sensor feedback
- Thermally-stable feedback circuit design
- Configurable 18-bit analog input for external feedback sensor integration or command generation

Ensemble QL/QLe Networked Panel-Mount Piezo Drive

- Networkable with any Ensemble drive to control up to ten axes of piezo and/or servomotor stages
- Single or multi-axis Position Synchronized Output (PSO) for real-time triggering of events
- Available with high-precision (to 20-bit) sensor resolution for capacitive sensor feedback
- Thermally-stable feedback circuit design option
- Configurable analog input (to 18-bit) for external feedback sensor integration or command generation
- Advanced control features such as learning control, harmonic cancellation, and command shaping improve tracking error and overall process throughput
- Ethernet and USB 2.0 communication interfaces

Ndrive QL/QLe Digital Panel-Mount Piezo Drive

- Designed to be used with the Automation 3200 (A3200) motion controller
- Real-time distributed control architecture allows synchronized motion control on up to 32 axes of piezo and/or servomotor stages
- Deterministic FireWire® high-speed serial communication protocol
- Single- or multi-axis Position Synchronized Output (PSO) for real-time triggering of events
- Available with high-precision (to 20-bit) sensor resolution for capacitive sensor feedback
- Configurable analog input (to 18-bit) for external feedback sensor integration or command generation

Ensemble QLAB™ Stand-Alone, 1-4 Axes Piezo Motion Controller

- Control 1 to 4 axes of piezo nanopositioning stages in open or closed-loop operation
- Configurable open-loop and closed-loop control in one controller platform
- High-precision 20-bit sensor resolution for capacitive sensor feedback in closed-loop operation
- Thermally-stable feedback circuit design
- Configurable, high-resolution analog input for external feedback sensor integration or command generation
- Advanced control features such as learning control, harmonic cancellation, and command shaping improve tracking error and overall process throughput
- Touch screen with intuitive menu-driven interface for quick and easy access to system functionality
- Ethernet and USB 2.0 communication interfaces
- CE approved and NRTL safety certification; follows the 2011/65/EU RoHS 2 Directive
- Advanced Windows®-based remote diagnostics, tuning, and programming interface software
- Program in AeroBasic™ using Aerotech's IDE or create custom remote interfaces with Microsoft .NET including C#, VB.NET, C++/CLI, LabVIEW®, MATLAB®, EPICS, or TANGO