

queensgate

Nanopositioning Stage: NPS-X-5A Ultra Compact 5 Micron Stage

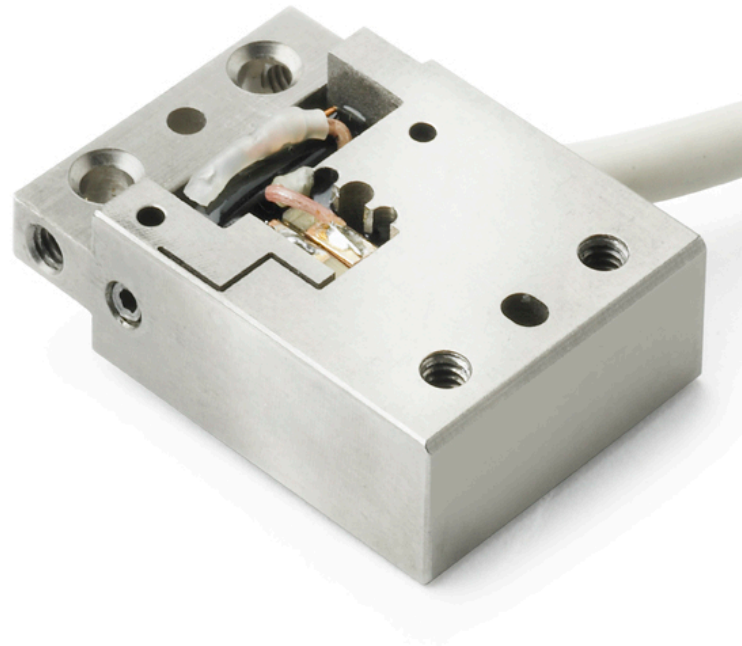
The NPS-X-5A has been specifically designed for applications requiring a compact, high speed, ultra-precision motion stage.

Its very small size makes it ideal for use in systems where space is limited. Sub-millisecond response time is ideal for applications high reliability and throughput are essential. A low moving mass and high stiffness combine to offer extremely high bandwidth.

The capacitive sensor design provides the sub-nanometer displacement measurement and closed-loop feedback over a range in excess of 6 microns. Flexure guidance offers high purity of motion, with parasitic motion reduced to less than 5 microradians. Combined with Queensgate's digital closed-loop controllers, the NPS-X-5A can achieve sub-millisecond response and settle times.

Key features

- **>6 μ m travel with sub-nanometer resolution**
- **First resonant frequency >8KHz (typical)**
- **Sub-millisecond response time with a load of 5g**
- **In-situ scanning and stepping response optimization**
- **Robust and reliable for production test**
- **Plug and play facilities for low down-time**



Suggested controllers

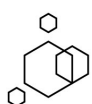
- NPC-D-5200 Digital Controller
- NPC-D-6000 Series Multi-channel Closed Loop Controller

Designed specifically to control Queensgate's Nanometer Precision Mechanisms. They use modern DSP techniques and combine piezo drive amplifiers, capacitance position sensing circuitry and servo control capability.

Use of PID (proportional integral differential) feedback terms greatly improves settle times and minimizes the effect of mechanical resonances. The virtual front panel software facilitates user control of all operating parameters, including PID loop set up.

Typical applications

- MR head and disk drive testing
- Semiconductor Inspection
- Metrology
- AFM



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QGNPS-X-5A 2017 v1

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Technical specification

Parameter	Symbol	Value			Units	Comments
Static physical						
		Minimum	Typical	Maximum		
Material		Aluminum				
Size		23 long x 16.5 wide x 7.6 high			mm	
•Range	d_{xp-max}		6.5		μm	
Scale factor	b_{x1}		1		μm	Note 1
Scale factor error (1σ)	δb_{x1}		<0.1		%	
Resonant frequency: 0g load	f_{0-0}		8000		Hz	
Maximum load				5	g	Note 2
Dynamic physical (Typical values)						
3dB Bandwidth	B_{x-p}		500	800	Hz	
*Small signal settle time	t_{x-s-s}		1.6		ms	Note 3
*Position noise (1σ)	δx_{p-n}		0.1		nm_{rms}	Note 4
Error terms						
*Hysteresis (peak to peak)	δx_{p-hyst}		0.1	0.2	%	Note 5
*Linearity error (peak)	δx_{p-lin}		0.1	0.2	%	Note 6

Notes

*These parameters are measured and supplied with each mechanism

1. All position commands are given in micrometers with seven digit resolution.
2. This is the maximum load for gravity acting in the Z-direction to avoid damage to the stage mechanism.
3. This is the 2% settle time. It is a function of the servo loop parameters which are user controllable. The test step size is 500 nm.
4. The actual position noise of the stage.
5. Percent of the displacement. The hysteresis specification for a displacement of less than $1\mu\text{m}$ amplitude is 0.1 nm.
6. Percent error over the full range of motion.

Ordering information

Product Ref	Description
QGNPS-X-5A	NPS-X-5A Ultra Compact 5 Micron Stage
	Accessories or suggested controllers
QGNPC-D-5200	NPC-D-5200 Digital Controller
QGNPC-D-6330	NPC-D-6330 Three-channel Closed Loop Controller

Owing to continuous development, we reserve the right to introduce improvements and modify specifications without prior notice.

**Our sales team can be contacted on:
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