

NPS-Z-500B-UHV

Nanopositioning Stage

The NPS-Z-500B-UHV delivers over 100 μm full range at 80K at 10⁻⁹ torr. The stage is designed to operate in closed loop mode using capacitive positioning sensors.

The advanced flexure design results in a highly linear device with outstanding resolution, repeatability, stiffness and stability. Low off-axis errors and a high resonant frequency further enhance the performance of this advanced design.

Designed specifically to control Queensgate's Nanometer Precision Mechanisms incorporating capacitive sensors. They give precise positional feedback delivering high resolution and linearity of movement.

The fast update rate and Queensgate control algorithms contribute to high speed positioning accuracy for dynamic applications that require high speed movement of the stage.

The PC software facilitates user optimisation of all operating parameters, including PID and notch filter set up. There are eight programmable slots, three which are populated to provide fast, medium and slow PID settings, the addition of five slots are available for application specific settings.

The calibration and dynamic settings are held in the stage eeprom which allows controllers to be interchanged with minimal performance changes.



Key features

- >100 μm closed loop displacement at 80K in UHV
- Highly parallel motion with minimal off-axis deviation
- 1nm position noise
- 0.01% linearity
- 0.02% residual hysteresis

Typical applications

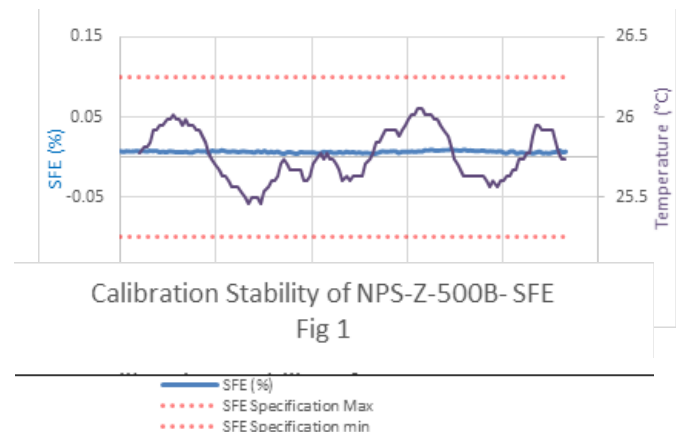
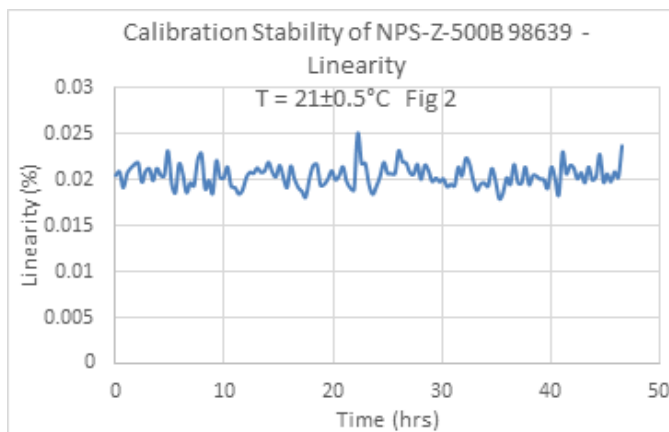
- Crystal bending: Beamline
- Monochromators
- Synchrotrons

Suggested controllers

- NPC-D-5200 Digital Controller
- NPC-D-6000 Series Digital Controllers

Technical specification

Parameter	Symbol	Value	Units	Comments		
Static physical						
Material		Titanium and Aluminium Alloy				
Size		60 L x 49.5 W x 30 H		mm		
		Minimum	Typical	Maximum		
*Closed Loop Range at Room Temperature	dzp-max		550	μm	Note 1	
Resonant frequency	f0-0		170	Hz	Note 2	
*Small signal settle time	tzs-s		15	ms	Note 3	
*Position noise (1σ)	$\delta\text{zp-n}$		1	nm	Note 4	
Error terms						
		Typical		Maximum		
*Hysteresis (peak to peak)	$\delta\text{xp-hyst}$	0.01		0.02	%	Note 5
*Linearity error (peak)	$\delta\text{xp-lin}$	0.02		0.1	%	Note 6



Notes

*These parameters are measured and supplied with each mechanism

1. This is the measured range for $\pm 250\mu\text{m}$ command input; the maximum closed loop range is greater than $500\mu\text{m}$.
2. This is the first resonant frequency for the unloaded NPS-Z-500B.
3. 2% step and settle time. Dynamic operation is a function of the servo loop parameters that are user settable via software in our digital controllers.
4. The actual position noise of the stage measured with a laser interferometer.
5. Per cent of the displacement. The hysteresis specification for a displacement of less than $1\mu\text{m}$ amplitude is 0.2nm. NPS-Z-500A requires external preload to achieve this.
6. Percent error over the full range motion, using NPC-D-6330 4th order linearization (typical)

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