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NPS-Z-15L Ultra High Load

Closed Loop 15 Micron Actuator

The NPS-Z-15L is a piezo-scanned stage optimized for high load applications.

The NPS-Z-15L offers over 20µm of closed loop travel, with sub- nanometre resolution and stability. This stage has been specifically designed for high stiffness, which allows loads of up to 500 Kg to be carried.

Optimised mechanical design has yielded a device with an unloaded resonant frequency of greater than 8000Hz. Super Invar construction means the stage has very high thermal and environmental stability. Dynamic optimisation via closed loop PID electronics maximise in-situ stepping response and position stability of the system. Electronic configurations can offer independent control of up to 3 or up to 6 stages, ideal for alignment/levelling of large optic or wafer/mask devices.

Key features

- >20µm travel with sub-nanometer resolution
- Typically <0.002% hysteresis and <0.01% linearity error
- First resonant frequency >8 KHz
- 500 Kg maximum load
- Robust and reliable
- Super Invar construction
- 3500N blocking force

Typical applications

- Semiconductor wafer/mask positioning systems
- Large optical position systems

Suggested controllers

- NPC-D-6110 Single channel digital controller
- NPC-D-6330 three channel digital controller

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 optimization 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 five slots are available for application specific settings.

Function playback provides user defined pre-programmed waveforms for applications such as rasta scanning or constant velocity scanning. The calibration and dynamic settings are held in the stage eprom which allows controllers to be interchanged with minimal performance changes.

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Technical specification NPS-X-15L

Parameter	Value			Units	Comments
Static physical					
Material	Super Invar (Bright nickel plated)				
Size	53.5 long x 60 diameter			mm	
	Minimum	Typical	Maximum		
Cable length	2000			mm	
*Range	± 8	± 28		µm	
Blocking force		35000		N	Note 1
Resonant frequency: 0g load		8000		Hz	
Maximum load			500	kg	on axis
Dynamic physical (Typical values)					
	Fast	Medium	Slow		
*Position noise (1σ)		0.2	0.1	nmrms	Note 3
Error terms					
	Minimum	Typical	Maximum		
*Hysteresis (peak to peak)		0.02	0.03	%	Note 5
*Linearity error (peak)		0.01	0.02	%	Note 6

Notes

*These parameters are measured and supplied with each mechanism

1. Force required to shop piezo expansion.
2. The actual position noise of the stage.
3. The highest rate of change of true position with time that can be achieved. It is limited by the closed loop parameters.
4. Percent of the displacement. The hysteresis specification for a displacement of less than 1µm amplitude is 0.1 nm (non vacuum).
5. Percent error over the full range of motion (non vacuum)

Ordering information

Product Ref	Description
QGNPS-Z-15L	NPS-Z-15L
QGNPS-Z-15L-UHV	
	Accessories or suggested controllers
QGNPC-D-6110	NPC-D-6110 Single channel
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.

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