queensgate
a brand of PRIOR

QGNPS-X-250B and QGNPS-Z-250B

High-load 250 µm piezo stage with capacitive sensor

Queensgate's nanopositioning stage (NPS) series are designed to provide optimal performance in the most demanding high-speed and high-precision applications.

The high-load lever amplified version is available calibrated in either the X (horizontal) or Z (vertical) orientation for the best performance in the customer's system.

Flexure-guided motion minimizes rotational errors and direct metrology of the moving platform with low-noise capacitive sensors ensures the highest precision of positioning.

User selectable calibration parameters provide optimal tuning for fast step-and-settle with different payloads (up to 6 kg as standard).

Key Features

- 250 µm travel with sub-nanometer resolution.
- Typically 0.005% hysteresis and 0.004% linearity error.
- Load capacity up to 6 kg.
- Flexure guided with lever amplification.
- Calibration for optimal performance in horizontal or vertical orientation.
- Direct moving platform measurement with capacitive sensors.

Typical Applications

- Optical nosepiece positioning
- White light surface metrology
- Semiconductor inspection
- Precision manufacturing

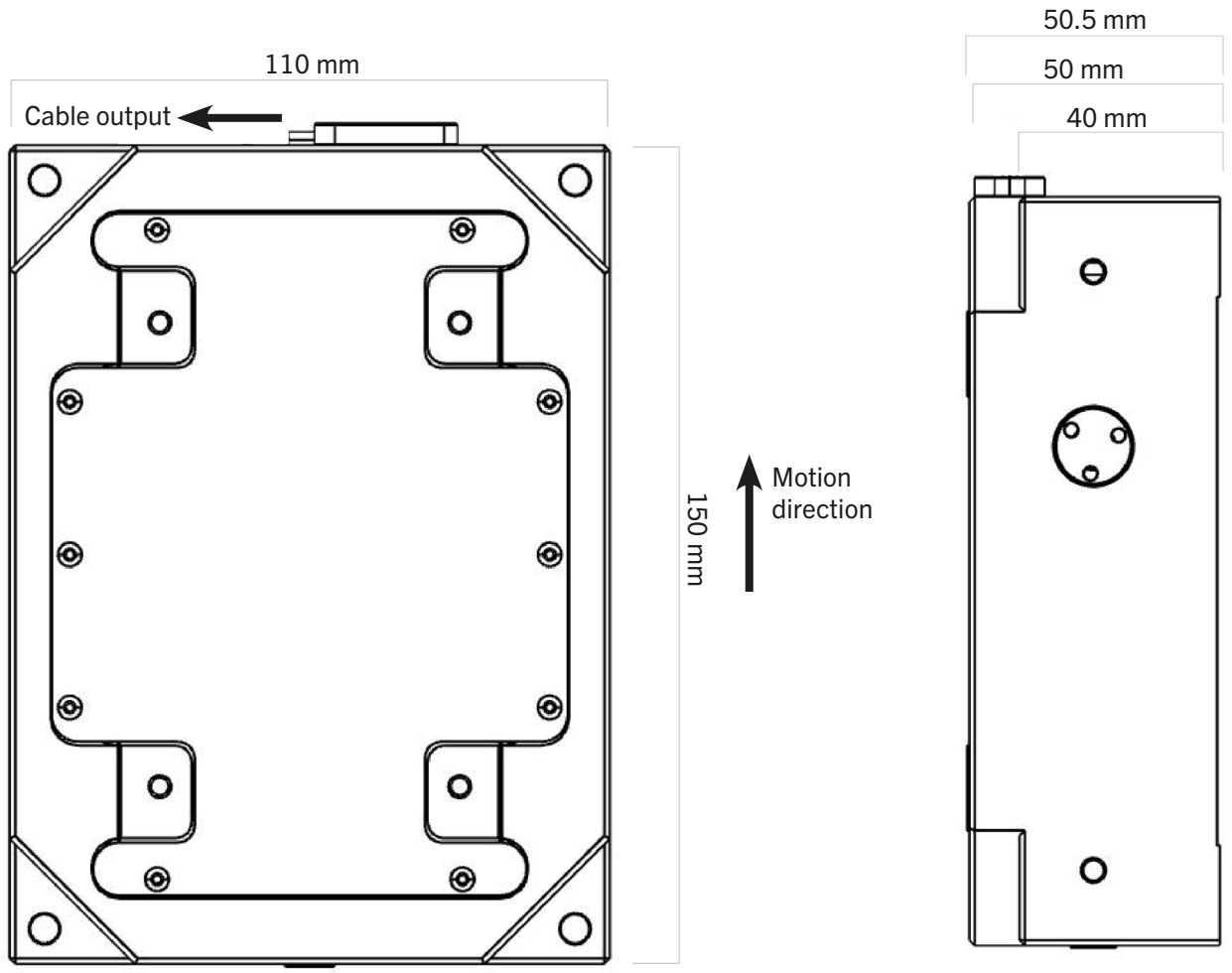
Specifications

Parameter	Value			Units	Comments
Static physical					
Material	Aluminum (nickel plated)				
Size	150 x 110 x 50			mm	
Stage mass	2.0			kg	Excluding cable
Cable length	2			m	
*Open-loop range	310			µm	[Typical]
*Closed-loop range	250			µm	
Static stiffness	1.9			N·µm-1	
Resonant frequency	0 g load:	X: 325	Z: 315	Hz	[Typical]
	1 kg load:	X: 195	Z: 195		
	2 kg load:	X: 155	Z: 120		
	6 kg load:	X: 100	Z: 85		
Maximum load	6			kg	Note 1
Dynamic physical (typical values)					
	Fast (1 kg)	**Medium (2 kg)**	**Slow (6 kg)**		Note 2
*Settle time – 2 µm step	9	11	18	ms	Note 3
Settle time – 100 µm step	18	18	33		
*Position noise (1 σ)	0.6	0.6	0.6	nm_{rms}	Note 4
Error terms					
	Typical		**Maximum**		
*Hysteresis (peak to peak)	0.005		0.02	%	Note 5
*Linearity Error (peak)	0.004		0.01		
Rotational error - roll	1			µradians	Note 6
Rotational error - pitch	1				
Rotational error - yaw	4				

Preliminary specifications. Subject to change without notification.

Notes:
* These parameters are measured and supplied with each mechanism.
1. Depends on load mass geometry and center of mass/gravity.
2. For dynamic operation the servo-loop parameters are preset for different performances; the parameters are user settable via software control. Fast means the fastest the stage can stably move with less than 1 kg load. Medium means the maximum stable speed for loads up to 2 kg. Slow means the speed at which the servo loop is stable for all masses up to the maximum allowed mass (6 kg).
3. This is the 2 % settle time. It is a function of the servo loop parameters which are user controllable.
4. The actual position noise of the stage as measure with a laser interferometer.
5. Percent error over the closed-loop range.
6. Angular motion over the full closed-loop range of the stage.

Dimensions*



*Please refer to the Installation Drawing for complete dimensions.

Ordering Information

Part Number	Description
QGNPS-X-250B-D1	NPS-X-250B Piezo Stage System with a NPC-D-6110 (Horizontal Cal., 250 µm).
QGNPS-Z-250B-D1	NPS-Z-250B Piezo Stage System with a NPC-D-6110 (Vertical Cal., 250 µm)

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