物镜扫描台

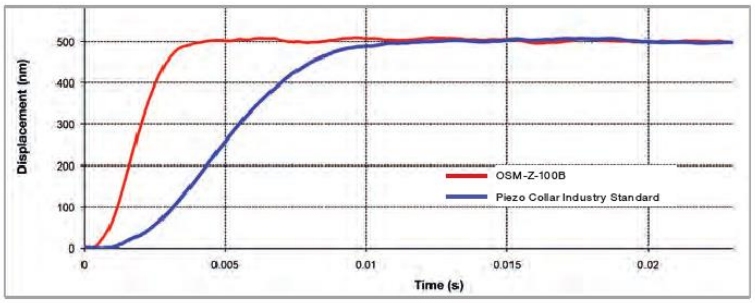
AU-OSM-Z 系列纳米定位工作台采用压电陶瓷直推驱动，以柔性铰链为运动副，使其结构紧凑、拥有小的体积、无摩擦、无间隙、定位分辨率高等优点。

全行程采用电容位移传感器闭环反馈控制系统设计，电容位移传感器是将位移变化转换为电容电量信号的变化。电容位移传感器简单易用，而且拥有极高的精度，可达到亚纳米量级。结合数字闭环控制器，纳米定位工作台的响应时间和稳定时间可达到毫秒量级。低的移动质量和高的刚度结合可以提供非常高的带宽。

采用目前业内最尖端的双传感技术，这一尖端的控制技术与以往相比，可实现更快、更准确以及更稳定的显微镜物镜聚焦。 全新双传感器技术克服了传统纳米定位系统的限制，可提供更快的阶跃响应，提高有效载荷出现变化时的稳定性，并且显著增加自动显微术应用时的机械带宽。这项突破性的技术能够应用于各种袖珍模拟和数字控制器，其操作简便，为用户提供顶尖性能。

物镜扫描台主要包含 AU-OSM-Z-100B 和 AU-OSM-Z-400A 两款产品：

AU-OSM-Z-100B 采用双传感技术，在不同负载下无需重复校正，提高有效载荷出现变化时的稳定性，并且显著增加自动显微术应用时的机械带宽。该产品具极短的稳定时间（<4ms），自振频率达到 600Hz，其极快的稳定时间为工业标准的 3 倍。采用电容纳米传感器定位系统，使该产品具有高的重复性（0.1nm）、直线性（0.01%）和极低的迟滞现象（0.005%）。材质采用不胀钢，刚度达到了 1.5N/μm。



Step and Settle performance of an OSM-Z-100B with NPC-A-1110DS vs Industry Standard: 500nm step with a 150g objective

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AU-OSM-Z-400A,为大行程的物镜扫描台，可达 400μm。同样采用双传感技术，拥有极短的稳定时间和高的带宽。利用电容位移传感技术，其分辨率达到 1nm。采用高刚度、无摩擦的柔性铰链为传动导向机构。

◆主要特点

- 亚纳米的分辨率
- 高的带宽
- 高速响应
- 高的可靠性
- 压电陶瓷驱动
- 柔性铰链设计
- 电容位移传感器闭环反馈
- 双传感器设计

◆主要应用

表面结构分析、 自动聚焦系统、共聚焦显微镜、扫描干涉仪等。

◆主要参数

AUNION TECH
昊量光电

OSM-Z-100B

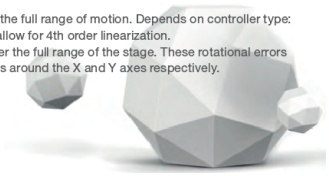
Specification

Parameter		Symbol	Value			Units	Comments
Static physical							
			Minimum	Typical	Maximum		
Material			Stainless Steel				
Size			56 long x 46 diameter			mm	
Cable Length			2			m	
Connector			15 Pins Sub-D				
*Range		$d_{zp\text{-}max}$		100		μm	
Static stiffness		k_z		1,5		N/μm	
Resonant frequency:	0g load	$f_{0\text{-}0}$		600		Hz	
	150g load	$f_{0\text{-}100}$		400		Hz	
	280g load	$f_{0\text{-}280}$		320		Hz	
	500g load	$f_{0\text{-}500}$		270		Hz	
Maximum load					0.6	Kg	Note 1
Dynamic physical (Typical values)							
				Medium			Note 2
3dB Bandwidth		$B_{z.p}$		210		Hz	
*Small signal settle time		$t_{zs\text{-}s}$		<4		ms	Note 3
*Position noise (1σ)		$\delta z_{p\text{-}n}$		0.5		nm	Note 4
Slew rate		$u_{zp\text{-}max}$		20		μm/ms	Note 5
Error terms							
			Minimum	Typical	Maximum		
*Residual hysteresis (peak to peak)		$\delta_{zp\text{-}hyst}$		0.005	0.01	%	Note 6
*Linearity error (peak)		$\delta_{zp\text{-}lin}$		0.01	0.1	%	Note 7
*Rotational error		$\delta\phi_z$		2	10	μradians	Note 8
*Rotational error		$\delta\gamma_z$		2	10	μradians	Note 8

Notes

*These parameters are measured and supplied with each mechanism.

1. Depends on orientation. 600g is the maximum load for gravity acting in the Z-direction. Loads greater than 0.6 Kg can cause damage to the flexure mechanism.
2. Dynamic operation servo-loop parameters depend on the payload. Fast means the fastest the stage can stably move with less than 20 grams load. Medium means the maximum stable speed for loads up to 150 grams. Slow means the speed at which the servo loop is stable for all masses up to the maximum allowed mass - equivalently low noise setting.
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. The value refers to the use with analogue controller NPC-A-1110DS.
5. The highest rate of change of true position with time that can be achieved. It is limited by the closed loop parameters and driver power. The value refers to the use with analogue controller NPC-A-1110DS.
6. Percent of the displacement. Depends on controller type and displacement: the hysteresis specification for 1μm displacement is 0.1 nm.
7. Percent error over the full range of motion. Depends on controller type: digital controllers allow for 4th order linearization.
8. Angular motion over the full range of the stage. These rotational errors are rotational errors around the X and Y axes respectively.



OSM-Z-400

Technical Specification

Parameter	Value	Unit	Tolerance	Note
Material	Titanium alloy	-	-	
Dimension	100 (L) x 49 (H) x 46 (Ø)	mm	±3%	
Mass	200	g	±5%	
Range	400	µm	min	
Resolution	1	nm	typical	With NPC-D-5110DS controller
Linearity	0.02	%	typical	
Rotation error	30	µrad	typical	
Repeatability	±1	nm	typical	
Stiffness	0.5	N·µm-1	±20%	
Resonant frequency unloaded	280	Hz	±20%	
Resonant frequency 150g	150	Hz	±20%	
Resonant frequency 500g	94	Hz	±20%	
Max load	500	g	max	
Bandwidth	100	Hz	typical	
Small signal settling time	10	ms	typical	
Cable Length	2	m	±20mm	

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