

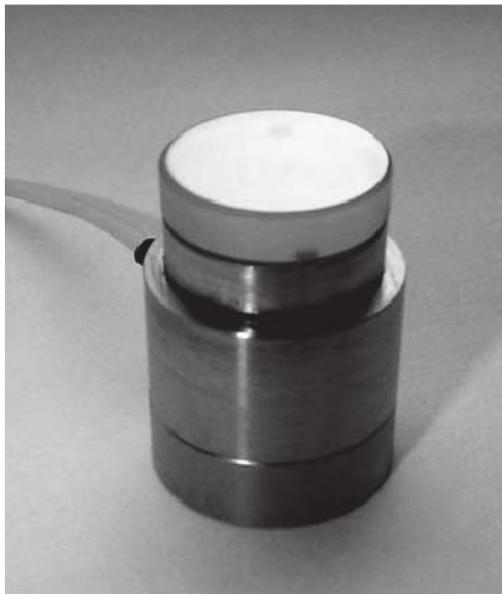
高精度压电偏转镜

高速精密压电偏转镜是为了满足在光学成像和检测系统中镜子超快超精密定位的需求设计的。高速精密压电偏转镜采用压电陶瓷为驱动，利用无摩擦的柔性铰链导向系统，使偏转镜拥有体积小、无摩擦，定位精度高等优点。

该偏转镜子只需要简单的固定到偏转台上，可提供 2 毫弧度的偏转行程。在整个偏转行程中可达到亚微弧度的分辨率。低的移动质量和优异的控制系統可以提供极佳的响应时间和速度。

上海昊量光电设备有限公司的高速精密压电偏转镜有以下几款产品：

AU-NPS- θ -2A 为 θ x 偏转镜，该偏转镜的偏转行程为 2 毫弧度，分辨率可达到亚微弧度。封闭的封装可以提供更高的稳定性和可靠性。采用不锈钢材质，以及柔性铰链导向系统和优异的闭环控制系统使其拥有极快的响应速度和时间，响应时间小于 1 毫秒。自振频率在空载下可达到 5000Hz。



AU-NPS- θ -2B 为快速 Tip/Tilt 偏转镜，该偏转镜的闭环摆角可达 ± 1 微弧度。在整个摆角行程中分辨率可达到亚微弧度量级。采用铝合金材质，低的移动质量以及优异的闭环控制系统可以提供极佳的响应时间和速度。

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AU-XPS-0γ-2A 为开环快速 Tip/Tilt 偏转镜，该偏转镜的开环摆角可达 ± 1 微弧度。在整个摆角行程中分辨率可达到亚微弧度量级。该产品的带宽可达到 2kHz，低的移动质量以及优异的开环控制系统可以提供极佳的响应时间和速度，信号响应时间可达到 5ms。



◆产品主要特点

- 亚微弧度的分辨率
- 超快响应时间
- 柔性铰链导向系统
- 高的可靠性
- 高的带宽

◆主要应用

精确光束控制、图像抖动校正等。

◆主要参数

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AU-NPS-0-2A

Specification

Parameter	Symbol	Value			Units	Comments
Static physical						
		Minimum	Typical	Maximum		
Material		Stainless steel				Note 1
Size		35 (high) by 30 (diameter)			mm	
Range	$d_{\theta p-max}$		± 1		mrads	
Resonant frequency: 0g load	f_{0-0}		5		KHz	
10g load	f_{0-10}		4.3		KHz	
Dynamic physical (Typical values)						
Loop setting		Fast	Medium	Slow		Note 2
Bandwidth	B_{zp}	1000	500		Hz	
Slew rate	$u_{\theta p-max}$		0.9		mrads/ms	Note 5
Settle time	$t_{\theta s-s}$	0.6			ms	Note 3
Position noise	$\delta_{\theta p-n}$	0.05			μ rad	Note 4
Error terms						
Hysteresis (peak to peak)	$\delta_{\theta p-hyst}$	0.2			%	Note 6
Linearity error (peak)	$\delta_{\theta p-lin}$	0.2			%	Note 7

Notes

*These parameters are measured and supplied with each mechanism

1. Clean finish, not plated.

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 20 g load. Medium means the maximum speed for loads up to 200 g. Slow means the speed at which the servo loop is stable for all masses up to 500 g – equivalent to 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 100 μ rad.

4. The actual position noise of the stage.

5. The highest rate of change of true position with time that can be achieved. It is limited by the closed loop parameters.

6. Percent of the displacement. The hysteresis specification for a displacement of less than 1 mrad is less than 1 μ rad.

7. Percent error over the full range of motion.

AU-XPS-0 γ -2A

Specification

Parameter	Symbol	Value			Units	Comments
Static physical						
		Minimum	Typical	Maximum		
Material		Aluminium (Electroless nickel plated)				
Size		35 high x 30 diameter			mm	
*Range	$d\theta p-max$	± 1.25	± 1.4		mrads	
Resonant frequency: 0g load	f_{0-0}		2000		Hz	Note 1
Dynamic physical						
		Minimum	Typical	Maximum		
Slew rate	$u\theta p-max$		0.9		mrads \cdot ms ⁻¹	Note 2

Notes

*These parameters are measured and supplied with each mechanism

1. This is the first resonant frequency of the stage.

2. The highest rate of change of true position with time that can be achieved.

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AU-NPS- $\theta\gamma$ -2B

Specification

Parameter	Symbol	Value			Units	Comments
Static physical						
		Minimum	Typical	Maximum		
Material		Aluminium (Electroless nickel plated)				
Size		56 high x 60 diameter			mm	
*Range	$d_{\theta p\text{-max}}$	± 1	± 1.05		mrad	
*Scale factor	$b_{\theta 1}$		1		mrad	Note 1
Scale factor uncertainty (1σ)	$\delta b_{\theta 1}$			0.1	%	
Resonant frequency:	0g load	$f_{0.0}$		1000	Hz	
	200g load	$f_{0.200}$		380	Hz	
Dynamic physical						
Loop setting		Fast	Medium	Slow		Note 2
3dB Bandwidth	$B_{\theta p}$	200	70	20	Hz	
*Small signal settle time	$t_{\theta s.s}$	3	10	100	ms	Note 3
*Position noise (1σ)	$\delta\theta_{p-n}$	15	6	2	nrad	Note 4
Slew rate	$u_{\theta p\text{-max}}$	0.25	0.1	0.01	mrad/ms	Note 5
Error terms						
		Minimum	Typical	Maximum		
*Hysteresis (peak to peak)	$\delta\theta_{p\text{-hyst}}$		0.05	0.1	%	Note 6
*Nonlinearity (peak)	$\delta\theta_{p\text{-lin}}$		0.03	0.05	%	Note 7
*Crosstalk	$\delta\theta_{x\gamma}$		0.05	0.1	mrad	Note 8

Notes

*These parameters are measured and supplied with each mechanism

- All position commands are given in mrad with 7 digit resolution.
- 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 20 g load. Medium means the maximum speed for loads up to 200 g. Slow means the speed at which the servo loop is stable for all masses up to 500 g – equivalent to low noise setting.
- This is the 2% settle time. It is a function of the servo loop parameters which are user controllable. The test step size is 100 μ rad.

- The actual position noise of the stage.
- The highest rate of change of true position with time that can be achieved. It is limited by the closed loop parameters.
- Percent of the displacement. The hysteresis specification for a displacement of less than 1 mrad is less than 1 μ rad.
- Percent error over the full range of motion.
- Measured over the full range of motion.

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