

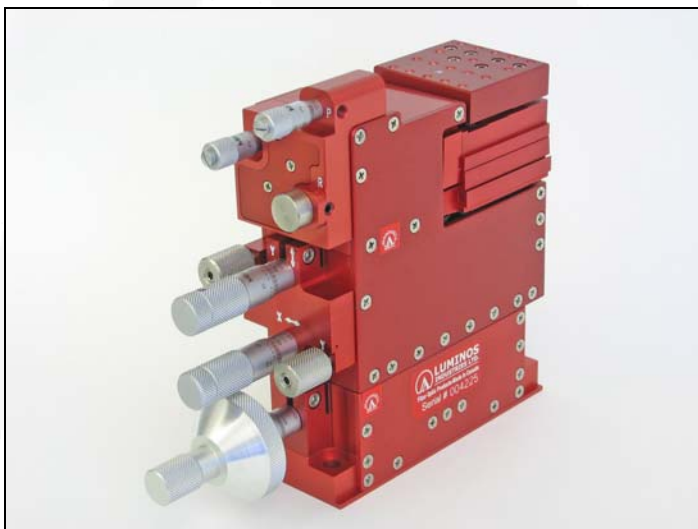
## Yaw, Pitch, XYZ Manual 5-Axis Stage

### **SUPERIOR PERFORMANCE**

Imagine a positioning system so stable and easy to adjust that singlemode optical fiber alignment is as simple as tuning a radio! No need to let go of the micrometers while adjusting - the I5000 is *extremely* touch insensitive. And with the patented ergonomic inline design, all the micrometers are easily accessible on one side - just rest your hand comfortably on the table and enjoy the ease and efficiency of quickly aligning any type of fiber. No fiber alignment challenge is too difficult - even 1-2 micron core lensed fibers can easily be aligned. This is possible because of the radical departure from conventional design.

### **FEATURES**

- Patented Inline actuators provide ease of access.
- Patented 25x Ratio Drive™ system affords superior resolution for far less cost.
- Small footprint allows multiple unit workstations.
- Onboard controller for actuators avoids high cost of separate motion controllers.
- Damped exterior shell design provides superior vibration and touch insensitivity.
- Lightweight aluminum construction allows system to be moved easily by other motion equipment.
- High mechanical stiffness affords rugged and stable base system.
- Patented linear dual flexure Z offers frictionless repeatable straight travel.
- Dual flexure Yaw and Pitch stages provide extreme resolution without arc error.



### **INNOVATION**

The Luminos I5000 benefits from our patented Ratio Drive™ on the X & Y Axes. A standard micrometer, which has about 1/3 the backlash of a differential micrometer, is further improved by the 25x Ratio Drive™ resulting in a backlash of only 20 nanometers and an incredible single-sided resolution of just 1 nanometer! The roll, yaw, and pitch axes use similar leverage techniques to transform linear motion from the actuator into extremely precise rotational movements at the output.

The I5000 is extremely vibration and temperature insensitive. Internal damping eliminates many of the resonance effects typically associated with flexure stages.

### **ACCESSORIES**

With accessories ranging from fiber array holders to contact sensors, Luminos can get you out-fitted and up-and-running quickly on your applications

### **AUTOMATION**

With this advanced design, upgrading to automation is easy and inexpensive. Our standard, low cost stepper motor option provides the I5000 with a resolution of 4 nanometers and a 1/2 millimeter of travel on the X and Y axes. An additional 2 millimeters of manual travel is still available using the coarse adjustments. If you require more travel to be available using the actuator, consider the I5005. The Z axis provides a larger ½ inch (12.5mm) travel on the focal axis and a resolution of 100 nanometers. Using the internal Linear Motors option, the I5000 is capable of ½ nanometer movements on the X and Y axes. The Z axis provides a larger ½ inch (12.5mm) travel on the focal axis and a resolution of 0.1 micrometers. The same gives a resolution of 0.2 arc seconds on the pitch and yaw axes..

### **ORDERING INFORMATION**

#### **Part # and Description**

P5-M-M-M-M-M-N-1-H-N

**I5000:** 5-Axis Positioner, Z-Axis Actuator: Imperial Micrometer, X-Axis Actuator: Manual Micrometer, Y-Axis Actuator: Manual Micrometer, Yaw Actuator: Manual Micrometer, Pitch Actuator: Manual Micrometer, XY Linear Motors: None, XY Coarse Adjust: 40 pitch set screw, Mounting Axis: Horizontal, Side Damper: None

P5A-M-M-M-M-M-H-N

**I5005:** 5-Axis Positioner (5x), Z-Axis Actuator: Imperial Micrometer, X-Axis Actuator: Manual Micrometer, Y-Axis Actuator: Manual Micrometer, Yaw Actuator: Manual Micrometer, Pitch Actuator: Manual Micrometer, Mounting Axis: Horizontal, Side Damper: None



# 15000/15005 Specifications

Travel				
Axis		Actuator <sup>1</sup>	Coarse	Total
Z – focus		12.7mm (0.5")	N/A	12.7mm (0.500")
15000	Y – vertical	0.5mm (0.02")	2mm (0.080")	2.5mm (0.1")
	X – lateral	0.5mm (0.02")	2mm (0.080")	2.5mm (0.1")
15005	Y – vertical	2.5mm (0.1")	N/A	2.5mm (0.1")
	X – lateral	2.5mm (0.1")	N/A	2.5mm (0.1")
Yaw		3 degrees	N/A	3 degrees
Pitch		3 degrees	N/A	3 degrees
Setability <sup>2</sup> (Micrometer)				
Axis		Resolution	Movement /Division	
Z		0.25 micron (10µ-inch)	0.001"	
15000	Y	10nm (0.4µ-inch)	1µm - 25x Ratio Drive™	
	X	10nm (0.4µ-inch)	1µm - 25x Ratio Drive™	
15005	Y	50nm (2µ-inch)	5µm - 5x Ratio Drive™	
	X	50nm (2µ-inch)	5µm - 5x Ratio Drive™	
Yaw		0.2 arc sec	30 arc sec	
Pitch		0.2 arc sec	30 arc sec	
Resolution (Stepper Motor)				
Axis		Resolution	Total Steps	
Z		100nm (4µ-inch)	128 000	
15000	Y	4nm (0.16µ-inch)	128 000 - 25x Ratio Drive™	
	X	4nm (0.16µ-inch)	128 000 - 25x Ratio Drive™	
15005	Y	20nm (0.8µ-inch)	128 000 - 5x Ratio Drive™	
	X	20nm (0.8µ-inch)	128 000 - 5x Ratio Drive™	
Yaw		0.2 arc sec	60 416	
Pitch		0.2 arc sec	60 416	
Stage Configuration & Arc Error Motion				
Axis		Flexure Type	Arc Error	
Z		Dual	None - True Linear Motion	
Y		Single	Max 30µm - Arc Error in Z only	
X		Single	Max 30µm - Arc Error in Z only	
Yaw		Dual	None	
Pitch		Dual	None	
Linear Stiffness				
Along Axis		Stiffness	Comments	
Z		130 kN/m	measured at the rotation center	
Y		95 kN/m	measured at the rotation center	
X		40 kN/m	measured at the rotation center	
Torsional Stiffness				
About Axis		Stiffness	Comments	
Z – roll		75Nm/rad	measured at the rotation center	
Y – yaw		100Nm/rad	measured at the rotation center	
X – pitch		130Nm/rad	measured at the rotation center	
Maximum Load				
Static Load		Transient Load	Comments	
2.2 lbs (1kg)		10 lbs (4.5kg)	stage must be protected from shock loading during transport and usage	
Physical Properties				
Characteristic		Specifications	Comments	
Construction		Aluminum	6061 & 7075 - T6 anodized	
Weight		1.5kg	Approximate	
Body Dimensions		5.79" x 1.75" x 5.19"	L x W x H excluding micrometers	
Mounting Height		5.19"	Base to top of mounting plate	
Mounting Configuration.		0.26" diameter holes	1.00" x 4.00" <sup>3</sup> centers	
Concurrent Rotation Center		1/2"	Above top of mounting plate	
		1"	Out from end of mounting plate	

<sup>1</sup> 'Actuator' refers to a micrometer or stepper motor.

<sup>2</sup> Operator dependent

<sup>3</sup> Compatible with 1.00" grid optical tables, units mount on 2" intervals with 0.25" allowance for routing of cables etc.

