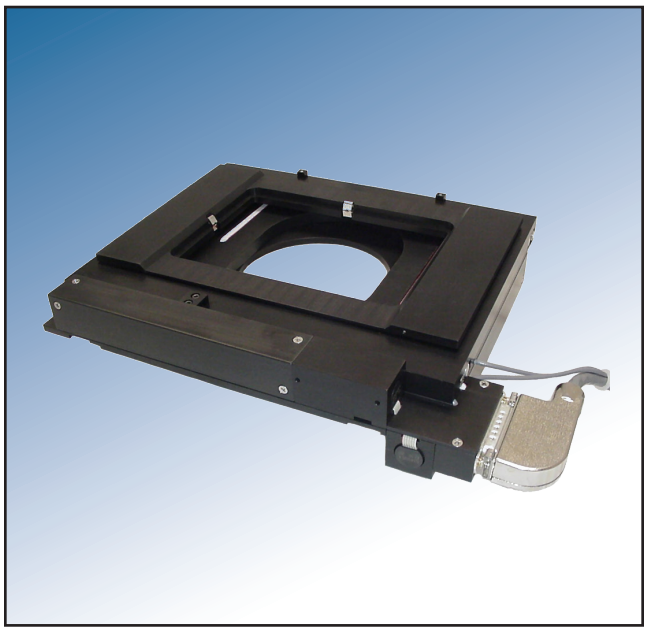
APPLIED SCIENTIFIC INSTRUMENTATION

PZU-2000 XYZ Automated Stage with Piezo Z-Axis Top Plate for Upright Microscopes

The PZU-2000 XYZ stage has been specifically designed to provide a high resolution, and highly repeatable, means of controlling the X, Y, and Z position of the microscope stage. The XY axes derive their precise control through the use of closed-loop DC servomotors employing high-resolution rotary encoders for positioning feedback. By using closed-loop control for the stage position, there is no chance that the stage will become lost, as can occur with open-loop micro-stepped stages after a number of moves and direction changes. The XY stage utilizes crossed-roller slides, high-precision lead screws, and zero-backlash miniature geared DC servomotors for smooth and accurate motion. The top plate of the stage accepts standard K-size slide inserts that are available for any sample, i.e., slides, petri dishes, multi-well plates, etc. The slide insert is moved in the Z-axis via a piezo element with a range of 150 µm with nanometer accuracy (300 µm & 500 µm range is also available). By moving the sample in the Z-plane, any objective can be used, eliminating twisting wires or needed spacers as required when a piezo element is put onto a single objective. The microprocessor-controlled MS-2000 control unit provides for RS-232 and USB communication with a host computer for control of the XYZ axis. Stages, controllers and top plates are sold separately.



Features

- Closed-loop control of the X, Y, and Z-axes for precise positioning and highly repeatable focusing
- Wide dynamic speed range with adjustable trapezoidal move profiles
- Smooth adjustable dual-range joystick control
- Backlit LCD display shows X, Y, and Z coordinates
- "Zero" and "Home" button for simple stand-alone operations
- Compact ergonomic tabletop control unit size is 6"D x 9"W x 3"H (9 x 23 x 16½ cm)
- Proven operation with many popular software packages

PZU-2000 Options

- XY axes Linear Encoders for high-accuracy positioning. Linear encoder resolution is 10 nm, with a scale accuracy of 0.3 µm per 10mm and 3 µm per 100mm. Positioning resolution at sample is < 50 nm.
- Auto Focus (requires NTSC or PAL composite video signal).
- ASI's proven line of Z-axis drives can also be added to the fine focus shaft of the microscope to provide Z-axis positioning with a resolution of 50 nm throughout the range of the microscope's travel. The piezo unit can then be used for fast and accurate Z-axis positioning to any point within the range of travel.
- Other lead screw pitches are available for faster XY translation, or for more precise positioning when using standard rotary encoders.

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Product Compatibility

- Leica – Aristoplan, DM4000, DM4500, DM5000, DM6000, DMLB, DMRB, DMRP, DMRXP
- Nikon – Eclipse 80i, Eclipse 90i, Eclipse 800, Eclipse 1000
- Olympus – AX70, BX41, BX50, BX51, BX60, BX61
- Zeiss – AxioImager, Axiolab, Axioplan, Axioplan II, Axiophot I, Axiophot II, Axioskop, Axioskop II, Axioskop FS IIDiaphot Eclipse TE300, Diaphot Eclipse TE2000, Eclipse Ti
- Olympus – BX50WI, BX51WI, BX61WI, IMT-2, IX50, IX51, IX70, IX71, IX81
- Zeiss – Axioskop FS, Axiovert 35, Axiovert 100, Axiovert 100M, Axiovert 135, Axiovert 135M, Axiovert 200, Axiovert 200M, Axio Observer, IMC 35

Specifications for Standard Configuration

XY axis range of travel	114mm x 100mm
XY axis resolution (encoder step)	0.088 µm
XY axis lead screw accuracy	0.25 µ/mm
XY axis RMS repeatability	< 0.7 µm
XY axis maximum velocity	7 mm/sec
Z axis range of travel	100 µm (175 µm version optional)
Z axis resolution	1.5nm
Z axis repeatability	±1 nm
Z axis maximum velocity with setting time	5 mm/sec (~10 ms per move)
Z axis resonant frequency (unloaded)	> 1 KHz
Z axis top plate maximum load	500 grams
Z axis top plate stiffness (+/- 20%)	3 N/µm
Z axis top plate in-plane tilt (typical)	10 µrad

ADEPT Piezo Controller Specifications

Specification	PZ-2150FT	PZ-2300FT	PZ-2500FT
Piezo Travel Range (+/- 5%)	150 µm	300 µm	500 µm
Piezo smallest move / resolution*	2.2 nm	4.5 nm	7.6 nm
Maximum Load for full range travel	2Kg	1Kg	1Kg
Transient Response time**	11 – 15 ms		
External Analog input (BNC)	0 to 10 Volts		
Maximum Input Frequency	20 Hz		
Maximum Continuous Output Current	13mA		

***Time taken to travel 10%-90% for moves below 30% travel range with 600 grams load.*

**In external input mode, use of a higher bit DAC will increase resolution. For example a 0-10 analog voltage from the DAC results in the following:*

PZ-2150FT

External Analog input	Steps	Resolution
16 Bit DAC	65536	2.2 nm
17 Bit DAC	131075	1.1 nm
18 Bit DAC	262144	0.55 nm

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