

PZ-2000 Series Automated Stage with Piezo Z-Axis Top Plate



The PZ-2000 XY stage has been designed to provide a high resolution, and highly repeatable, means of controlling the X-, Y-, and Z-position of the microscope stage. The X- and Y-axes derive their precise control through the use of closed-loop DC servo motors 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 servo motors 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 and 500 μm range is also available). By moving the sample along Z-axis, 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 X-, Y-, and Z-axes. The stage, controllers, and top plate 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
- Proven operation with many popular software packages
- Travel range will scan full well plate in most circumstances

PZ-2000 Options

- X- and Y-axes linear encoders for high-accuracy positioning. Linear encoder resolution is 10 nm, with a scale accuracy of 0.3 μm per 10 mm and 3 μm per 100 mm. 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
- Stage wings for even more room for attachments

Specifications for Standard Configuration

X- and Y-axes range of travel	120 mm x 110 mm
X- and Y-axes resolution (encoder step)	0.088 μm
X- and Y-axes lead screw accuracy	0.25 $\mu\text{m}/\text{mm}$
X- and Y-axes RMS repeatability	< 0.7 μm
X- and Y-axes maximum velocity	7 mm/s

Product Compatibility

- Leica – DMI3000, DMI4000, DMI5000, DMI6000, DMIRB, DMIRBE, DMIRE, DMIRE2
- Nikon – Diaphot 200, Diaphot 300, Diaphot Eclipse TE200, Diaphot 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

ADEPT Piezo Controller Specifications

Specification	PZ-2150FT	PZ-2300FT	PZ-2500FT
Piezo travel range ($\pm 5\%$)	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	2 kg	1 kg	1 kg
Transient response time**	11 – 15 ms		
External analog input (BNC)	0 - 10 V		
Maximum input frequency	20 Hz		
Maximum continuous output current	13 mA		

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