

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



The PZ-2000FT 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 stage position, there is no chance that the stage will become lost, as can occur with open-loop microstepped 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  $\mu\text{m}$  with nanometer accuracy (300  $\mu\text{m}$  and 500  $\mu\text{m}$  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.

### Features

- Flat stage top allows easy placement of micromanipulators on either side
- 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" buttons for simple stand-alone operations
- Compact ergonomic tabletop control unit size is 6" D x 9" W x 3" H (9 cm x 23 cm x 16.5 cm). Rack mount controller with stand-alone joystick is also available
- Travel Range will scan full well plate in most circumstances
- Proven operation with many software packages

## PZ-2000FT Options

- XY axes Linear Encoders for high-accuracy positioning. Linear encoder resolution is 10 nm, with a scale accuracy of 0.3  $\mu\text{m}$  per 10mm and 3  $\mu\text{m}$  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.

## ADEPT Piezo Controller Specifications

| Specification                      | PZ-2150FT         | PZ-2300FT         | PZ-2500FT         |
|------------------------------------|-------------------|-------------------|-------------------|
| Piezo Travel Range (+/- 5%)        | 150 $\mu\text{m}$ | 300 $\mu\text{m}$ | 500 $\mu\text{m}$ |
| 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 10Volts      |                   |                   |
| 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.

## Product Compatibility

- Leica – DMI3000, DMI4000, DMI5000, DMI6000, DMIRB, DMIRBE, DMIRE, DMIRE2
- Nikon – Diaphot Eclipse TE2000, Eclipse Ti
- Olympus – BX50WI, BX51WI, BX61WI, IX70, IX71, IX81
- Zeiss – Axiovert 200, Axio Observer

## Specifications for Standard Configuration

|  |                              |
|--|------------------------------|
| <b>XY axis range of travel</b>           | 120 mm x 110 mm              |
| <b>XY axis resolution (encoder step)</b> | 0.088 $\mu\text{m}$          |
| <b>XY axis lead screw accuracy</b>       | 0.25 $\mu\text{m}/\text{mm}$ |
| <b>XY axis RMS repeatability</b>         | < 0.7 $\mu\text{m}$          |
| <b>XY axis maximum velocity</b>          | 7 mm/sec                     |

\*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    |