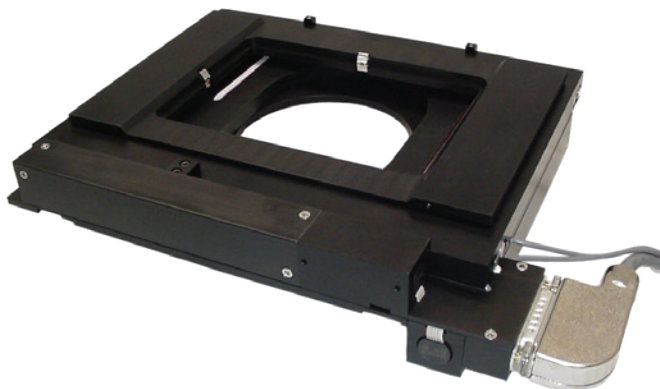


## PZU-2000 XYZ Automated Stage with Piezo Z-Axis Top Plate



The PZU-2000 XYZ 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  $\mu\text{m}$  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 X-, Y-, and Z-axes.

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
- Proven operation with many popular software packages

### PZU-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  $\mu\text{m}$  per 10 mm 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.

## Specifications for Standard Configuration

|  |   |
|--|---|
| <b>X- and Y-axes range of travel</b>                     | 114 mm x 100 mm                               |
| <b>X- and Y-axes resolution (encoder step)</b>           | 0.088 $\mu$ m                                 |
| <b>X- and Y-axes lead screw accuracy</b>                 | 0.25 $\mu$ m/mm                               |
| <b>X- and Y-axes RMS repeatability</b>                   | < 0.7 $\mu$ m                                 |
| <b>X- and Y-axes maximum velocity</b>                    | 7 mm/s  |
| <b>Z-axis range of travel</b>                            | 100 $\mu$ m<br>(175 $\mu$ m version optional) |
| <b>Z-axis resolution</b>                                 | 1.5nm   |
| <b>Z-axis repeatability</b>                              | $\pm$ 1 nm                                    |
| <b>Z-axis maximum velocity with setting time</b>         | 5 mm/s<br>(~10 ms per move)                   |
| <b>Z-axis resonant frequency (unloaded)</b>              | > 1 kHz                                       |
| <b>Z-axis top plate maximum load</b>                     | 500 g   |
| <b>Z-axis top plate stiffness (<math>\pm</math> 20%)</b> | 3 N/ $\mu$ m                                  |
| <b>Z-axis top plate in-plane tilt (typical)</b>          | 10 $\mu$ rad                                  |

## 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

## ADEPT Piezo Controller Specifications

| Specification                      | PZ-2150FT   | PZ-2300FT   | PZ-2500FT   |
|------------------------------------|-------------|-------------|-------------|
| Piezo travel range ( $\pm$ 5%)     | 150 $\mu$ m | 300 $\mu$ m | 500 $\mu$ m |
| 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 - 10V     |             |             |
| 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    |