

## PZM-2000 OEM Manual Stage with Piezo Z-Axis Top Plate



If you do not require automated XY movement, but do require automated Z-axis positioning for acquiring precise Z-axis stacks, then the PZM-2000 is the solution. On select models of inverted microscopes, ASI can modify or exchange your existing OEM stage with a PZM-2000 unit. We can procure a manual OEM stage for you, if necessary.

The PZM-2000 consists of ASI's proven piezo top plate mounted within your existing OEM stage. This requires a completely new top plate be machined for the OEM stage, however, this allows us to provide an elegant solution. The optional PZM-C Controller complements the ASI PZM-2000 piezo-Z manual microscope stage retrofit.

The PZM-2000 has been designed to provide a high resolution, and highly repeatable, means of controlling the Z-position of the microscope stage. The X- and Y-axes are manually controlled utilizing the original OEM stage controls. The piezo 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 100  $\mu\text{m}$  and with nanometer accuracy (200  $\mu\text{m}$  and 500  $\mu\text{m}$  ranges are also available). By moving the sample along the 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 piezo stage can be controlled remotely with a 0-10 VDC analog input voltage, or optionally, with a PZM-2000 controller or a calibrated manual ten-turn potentiometer.

### PZM-2000 Features

- Closed-loop control of Z-axis for precise and highly repeatable focusing
- Nanometer-scale resolution, repeatability, and accuracy
- Proven operation with many popular software packages
- Stage wings for even more room for attachments

### PZM-2000 Options

- X- and Y-axes linear encoders for high-accuracy positioning, incorporated into the stage plates
- Stage inserts to hold a variety of slides, dishes, sealed glass chambers, multi-well microplates, perfusers, heaters, and many other special items
- Other lead screw pitches are available, as shown below
- Stage wings for even more room for attachments



## Specifications

<b>X- and Y-axes range of travel</b>	Standard OEM Stage
<b>Z-axis range of travel (<math>\pm 5\%</math>)</b>	150 $\mu\text{m}$ , 300 $\mu\text{m}$ (100 $\mu\text{m}$ and 200 $\mu\text{m}$ versions optional)
<b>Z-axis resolution</b>	1.5 nm
<b>Z-axis repeatability</b>	$\pm 1$ nm
<b>Z axis maximum velocity with settling time (~ 10 ms per move)</b>	5 mm/s
<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 20\%</math>)</b>	3 N/ $\mu\text{m}$
<b>Z-axis top plate in-plane tilt (typical)</b>	10 $\mu\text{rad}$

## ADEPT Piezo Controller Specifications

Specification	PZ-2150FT	PZ-2300FT	PZ-2500FT
Piezo travel range ( $\pm 5\%$ )	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	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