4 mm Travel, NanoMax™ with Piezos

The MAX311 and MAX312 platforms have all the same features as the MAX313 with the added benefit of internal piezoelectric actuators. Additionally, the MAX311 has a strain gauge based displacement sensor incorporated into the piezoelectric actuator.

The internal actuators are built directly into the base and provide a 20 µm travel range in three directions. The MAX312 has a positional resolution of 20 nm, while the resolution of MAX311 is 5 nm due to the feedback from the strain gauge sensors. These resolutions were calculated based on using our BPC203 Piezo Controller. The resolution is limited by the noise characteristics of the controller, therefore use of a third party controller may result in a degradation in the positional resolution.

The strain gauge sensors improve the resolution by providing a voltage signal that is linearly proportional to the displacement of the piezoelectric element. When used with a closed-loop controller, like the BPC203, it is possible to compensate for hysteresis, creep, and thermal drift and improve the resolution.

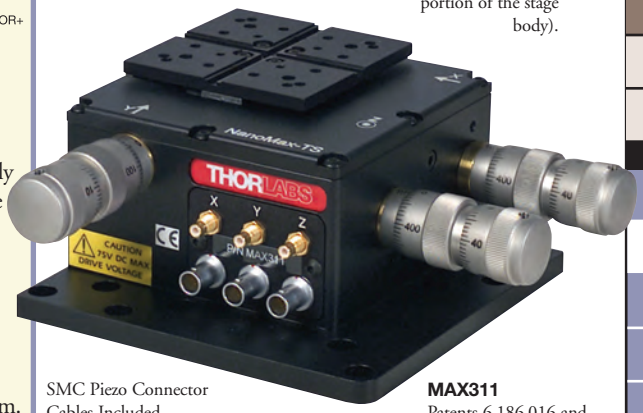
Mechanical Drawings Available on the WEB

Displacement Sensor

PIN 1: +15V
PIN 2: OSCILLATOR+
PIN 3: 0V
PIN 4: SIG OUT-
PIN 5: SIG OUT+
PIN 6: -15V
PIN 7: TRAVEL

The strain gauge displacement sensor, directly attached to the body of the piezoelectric element, provides an analog signal that is proportional to its displacement. When combined with low-noise electronics, the resolution obtained is better than 5 nm.

All 3 actuators are directly attached to the base (fixed portion of the stage body).



SMC Piezo Connector Cables Included

MAX311
Patents 6,186,016 and 6,467,762

Specifications

- **Manual Travel:** 0.16" (4 mm) in XYZ Direction
- **Thermal Stability:** 1 µm/°C
- **Differential Adjusters:**
  - Coarse Adjust: 0.5 mm/rev
  - Fine Adjust: 50 µm/rev
- **Piezoelectric Travel:** 20 µm in XYZ Directions
- **Manual Drive Resolution (Calculated):** 50 nm Resolution over a 300 µm Travel Range
- **Piezo Resolution (Calculated):** 5 nm (with Internal Piezo Displacement Sensors), 20 nm (without Sensors)
- **Max Piezoelectric Drive Voltage:** 75 VDC
- **Crosstalk:** Maximum 20 µm/mm of Travel
- **Repeatability:** 500 nm RMS Bidirectional
- **Load Capacity:** 2.2 lbs (1kg)
- **Resonant Frequency (±10%):** 375 Hz (No Load), 200 Hz (275 g Load), 150 Hz (575 g Load)
- **Weight:** 2.2 lbs (1 kg)
- **Deck Height:** 2.46" (62.5 mm) from the Bottom Surface of the Moving Platform. The Accessory Beam Height is 2.95" (75 mm) from the Bottom Surface of the Stage

Note: All measurements related to the performance of the piezoelectric actuators are made with the Thorlabs model BPC203 Piezo Driver, which can be found on page 568.

ITEM#	METRIC ITEM#	$	£	€	RMB	DESCRIPTION
MAX312	MAX312/M	$ 2,020.00	£ 1,400.50	€ 1.793,50	¥ 17,057.00	NanoMax™ Stage with Piezoeletric Actuator
MAX311	MAX311/M	$ 2,785.00	£ 1,930.50	€ 2.472,50	¥ 23,517.00	NanoMax™ Stage with Piezoeletric Actuator and Sensor