P-783

Piezoelectric Z-Nanopositioning Stage / Actuator with Direct Metrology

>> Click http://www.pi.ws/fwd/Piezo-Stage for the Latest Specs on these Products

P-783 nanopositioning stage, microprocessor shown for size comparison

Ordering Information

P-783.ZL
Vertical Piezo Flexure Stage, 300 µm, LVDT Sensor

Ask about custom designs!

- **Z-Travel to 300 µm**
- **Low Profile**
- **Frictionless Precision Flexure Guiding System**
- **Internal Motion Amplifier**
- **Closed-Loop Resolution <10 nm**
- **PICMA® High-Performance Piezo Drives**

Long Travel Range

The P-783 piezo nano-Z-axis stage is a compact, closed-loop actuator providing a positioning and scanning range of up to 300 µm. It is designed for applications with loads ranging from a few grams to a few hundred grams.

Direct-Metrology LVDT Sensor

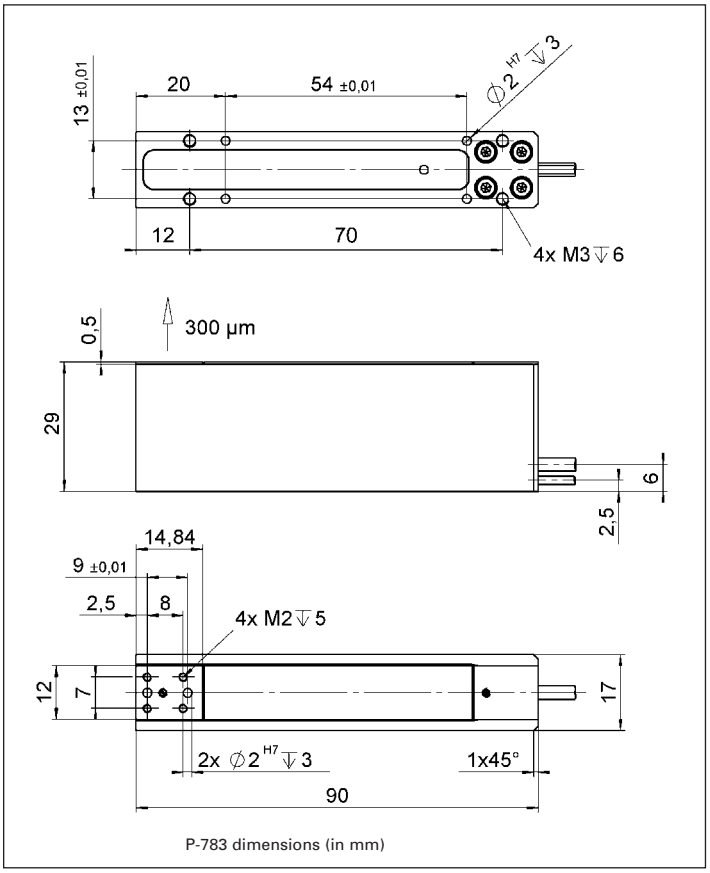
P-783 stages feature direct-measuring, non-contact LVDT sensors (direct metrology). Unlike indirect sensors, direct-metrology sensors measure the actual distance between the fixed frame and the moving part of the stage. This results in higher motion linearity, long-term stability, phase fidelity, and—because external disturbances are seen by the sensor immediately—a stiffer, faster-responding servo-loop. See p. 2-4 *ff.* and p. 5-2 *ff.* for more information.

Working Principle / Reliability

P-783 nanopositioning stages are equipped with the award winning PICMA® piezo drives, integrated into a sophisticated flexure guiding system. The wire-EDM-cut flexures are FEA

Application Examples

- Metrology
- Wafer inspection
- PCB inspection
- Nanopositioning
- Switching
- Biotechnology
- Micromanipulation



P-783 dimensions (in mm)

modeled for zero stiction, zero friction and exceptional guiding precision. The ceramic-encapsulated PICMA® drives are more robust than conventional piezo actuators, featuring superior lifetime and performance in both dynamic and static applications.
Because guidance, actuators and sensors are all frictionless and maintenance-free, these nanopositioning systems achieve outstanding levels of reliability.

Notes

See the "Piezo Drivers & Nanopositioning Controllers" section, p. 6-8 *ff.* for our comprehensive line of low-noise control electronics.
See the "Selection Guide" on p. 2-14 *ff.* for comparison with other nanopositioning systems.

Technical Data

Models	P-783.ZL	Units	Notes see p. 2-84
Active axes	Z		
Open-loop travel @ 0 to 100 V	300	µm ±20%	A2
Closed-loop travel	300	µm	A5
Integrated feedback sensor	LVDT		B
* Closed-loop / open-loop resolution	10 / 1	nm	C1
Closed-loop linearity (typ.)	0.1	%	
Full-range repeatability (typ.)	±15	nm	C3
Stiffness	0.15	N/µm ±20%	D1
Push / pull force capacity (in operating direction)	20 / 10	N	D3
Max. normal load	+20 / -5	N	D4
Lateral force limit	0.5	N	D5
Lateral runout (tip/tilt) (typ.)	10 / 25	µrad	E1
Electrical capacitance	5.4	µF ±20%	F1
** Dynamic operating current coefficient (DOCC)	2	µA/(Hz x µm)	F2
Unloaded resonant frequency	300	Hz ±20%	G2
Resonant frequency @ 24 g load	240	Hz ±20%	G3
Resonant frequency @ 100 g load	160	Hz ±20%	G3
Operating temperature range	-20 to 80	°C	H2
Voltage connection	VL		J1
Sensor connection	L		J2
Weight (with cables)	160	g ±5%	
Body material	Al, (platform: steel)		L
Recommended amplifier/controller (codes explained p. 2-17)	H, E		

* For calibration information see p. 2-8. Resolution of PI piezo nanopositioners is not limited by friction or stiction. The value given is noise equivalent motion with E-503 amplifier.
** Dynamic Operating Current Coefficient in µA per Hz and µm.
Example: Sinusoidal scan of 30 µm at 10 Hz requires approximately 0.6 mA drive current.