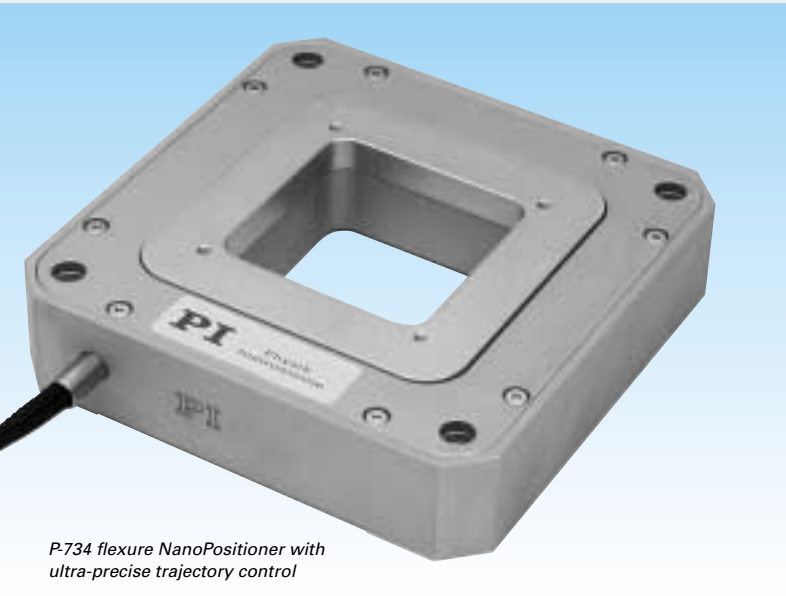


**P-734**

**Single-Module, XY Piezo Flexure NanoPositioners and Scanners**



*P-734 flexure NanoPositioner with ultra-precise trajectory control*

**Application Examples**

- Scanning microscopy
- Metrology
- Surface structure analysis
- Semiconductor test equipment
- Precision mask and wafer alignment
- Scanning interferometry
- Imaging (resolution enhancement)
- Biotechnology
- Micromanipulation and other applications where single-plane high-precision XY motion is required

- **Single-Module, Parallel-Kinematics Design Features Enhanced Responsiveness and Automatic Runout Compensation**
- **Ultra-Precision Trajectory Control, Ideal for Surface Analysis and Scanning Microscopy**
- **Flatness in the Low Nanometer Range**
- **100 × 100 µm Travel Range**
- **Integrated Capacitive Sensors for Resolution < 0.5 nm**
- **50 × 50 mm Clear Aperture**

P-734 NanoPositioning stages are fast and highly accurate, low-profile, XY scanning and positioning systems. They provide a positioning and scanning range of 100 × 100 µm and are equipped with capacitive feedback sensors for highest accuracy and repeatability in the nanometer and sub-nanometer range.

**Ultra-Precise Trajectory Control**

The P-734 features an ultra-precise flexure guiding system, confining motion to the XY plane and reducing runout in Z to a few nanometers or less. This unsurpassed trajectory precision is fundamental for precise surface inspection and scanning microscopy measurements.

**Parallel Kinematics**

A major advantage of the single-module, parallel-kinematics design is that there are no moving cables and no cable management issues to be resolved when integrating the unit. This design increases reliability, enhances responsiveness and also increases repeatability and accuracy at the nanometer level, because the friction and force exerted by a moving cable are eliminated (see the "Tutorial" section, page 4-1 ff. for further details).

**Clear Aperture**

The 50 × 50 mm clear aperture is ideal for transmitted-light applications, such as near-field scanning microscopy, confocal microscopy or mask alignment. P-734 stages are designed for applications with loads up to 2 kg.

**Working Principle**

P-734 NanoPositioners are equipped with low-voltage piezoelectric drives (0 to 100 V) integrated into a sophisticated flexure guiding system. The force exerted by the piezo drive pushes a multi-flexure parallelogram via an integrated motion amplifier. The wire-EDM-cut flexures are FEA modeled for zero stiction/friction, ultra-high resolution and exceptional guiding precision. Integrated capacitive position feedback sensors provide sub-nanometer resolution and stability in closed-loop operation (with PI electronics).

## Ordering Information

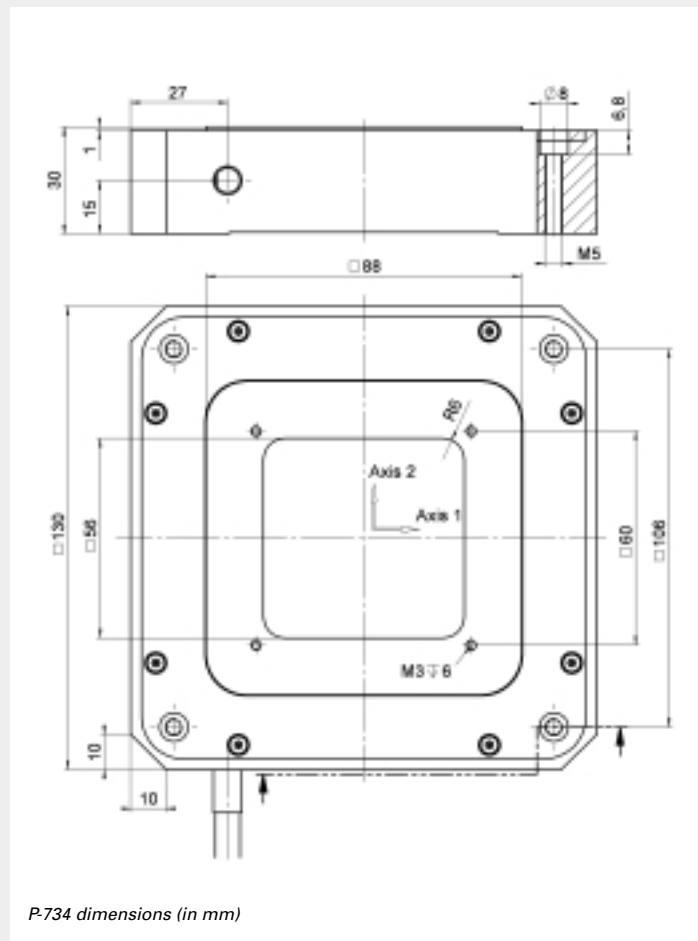
### P-734.2CL

XY PZT Flexure Stage, Ultra-Precision Trajectory Control,  $100 \times 100 \mu\text{m}$ , Capacitive Sensors, Lemo Connectors

### P-734.2CD

XY PZT Flexure Stage, Ultra-Precision Trajectory Control,  $100 \times 100 \mu\text{m}$ , Capacitive Sensors, sub-D Connector

**Custom Designs  
for Volume Buyers**



P-734 dimensions (in mm)

## Technical Data

Models	P-734.2CL	P-734.2CD	Units	Notes see p. 2-44
Active axes	X,Y	X,Y		
Open-loop travel @ 0 to 100 V	$100 \times 100$	$100 \times 100$	$\mu\text{m} \pm 20\%$	A2
Closed-loop travel $\geq$	$100 \times 100$	$100 \times 100$	$\mu\text{m}$	A5
Integrated feedback sensor	2 x capacitive	2 x capacitive		B
Closed-loop / open-loop ** resolution $\leq$	0.5 / 0.5	0.5 / 0.5	nm	C1
Closed-loop linearity (typ.)	0.03	0.03	%	
Full-range repeatability (typ.)	$\pm 2.5$	$\pm 2.5$	nm	C3
Stiffness	3	3	N/ $\mu\text{m} \pm 20\%$	D1
Push/pull force capacity (in operating direction)	300 / 100	300 / 100	N	D3
Max. (+/-) normal load	2	2	kg	D4
Electrical capacitance	7.2 / axis	7.2 / axis	$\mu\text{F} \pm 20\%$	F1
* Dynamic operating current coefficient (DOCC)	9 / axis	9 / axis	$\mu\text{A}/(\text{Hz} \times \mu\text{m})$	F2
Unloaded resonant frequency	500	500	Hz $\pm 20\%$	G2
Resonant frequency @ 200 g load	350	350	Hz $\pm 20\%$	G3
Resonant frequency @ 500 g load	250	250	Hz $\pm 20\%$	G3
Operating temperature range	- 20 to 80	- 20 to 80	$^{\circ}\text{C}$	H2
Voltage connection	2 x VL	sub-D, special		J1
Sensor connection	4 x C	sub-D, special		J2
Weight (with cables)	580	580	g $\pm 5\%$	
Body material	Al	Al		L
Recommended Amplifier/Controller (codes explained p. 6-46)	H, E, L	K		

\* Dynamic Operating Current Coefficient in  $\mu\text{A}$  per hertz and  $\mu\text{m}$ .

Example: Sinusoidal scan of  $30 \mu\text{m}$  at 10 Hz requires approximately 2.7 mA drive current.

\*\* Resolution of PZT NanoPositioners is not limited by friction or stiction. Noise equivalent motion with E-503 amplifier.

## Notes

See the "PZT Control Electronics" section for our comprehensive line of low-noise modular and OEM control electronics for computer and manual control.