PIFOC High-Load Focus Scanner

Highly Dynamic Focus Scanner with Long Travel Range for Heavy Objectives

P-726

- Highly dynamic positioning and scanning for large objectives
- Resonant frequency 1120 Hz; 560 Hz with 210 g objective mass
- Typ. step-and-settle about 6 ms
- Travel range 100 µm
- Highest linearity, stability, and control dynamics due to direct-measuring capacitive sensors
- Resolution 0.3 nm
- Zero-play, high-precision flexure guide system for better focus stability

Application fields

- Super-resolution microscopy
- Light disk microscopy
- Confocal microscopy
- 3-D imaging
- Screening
- Interferometry
- Measuring technology
- Autofocus systems
- Biotechnology
- Semiconductor tests

Outstanding lifetime thanks to PICMA® piezo actuators
The PICMA® piezo actuators are all-ceramic insulated. This protects them against humidity and failure resulting from an increase in leakage current. PICMA® actuators offer an up to ten times longer lifetime than conventional polymer-insulated actuators. 100 billion cycles without a single failure are proven.

Subnanometer resolution with capacitive sensors
Capacitive sensors measure with subnanometer resolution without contacting. They guarantee excellent linearity of motion, long-term stability, and a bandwidth in the kHz range.

High guiding accuracy due to zero-play flexure guides
Flexure guides are free of maintenance, friction, and wear, and do not require lubrication. Their stiffness allows high load capacity and they are insensitive to shock and vibration. They work in a wide temperature range.

Automatic configuration and fast component exchange
Mechanics and controllers can be combined as required and exchanged quickly. All servo and linearization parameters are stored in the ID chip of the D-sub connector of the mechanics. The autocalibration function of the digital controllers uses this data each time the controller is switched on.

Maximum accuracy due to direct position measuring
Motion is measured directly at the motion platform without any influence from the drive or guide elements. This allows optimum repeatability, outstanding stability, and stiff, fast-responding control.

Motion	Unit	Tolerance	P-726.1CD
Active axes			Z
Travel range in Z	µm		100
Travel range in Z, open loop	µm	+20 % / -0 %	100
Linearity error in Z	%	Typ.	0.02

Positioning	Unit	Tolerance	P-726.1CD
Point repeatabilitiy in Z, 10 % step, 1 sigma	nm		3
Resolution in Z, open loop	nm	Typ.	0.3
Integrated sensor			Capacitive, direct position measuring
System resolution in Z	nm		0.4

Drive properties	Unit	Tolerance	P-726.1CD
Drive type			PICMA®
Electrical capacitance in Z	µF	±20 %	6

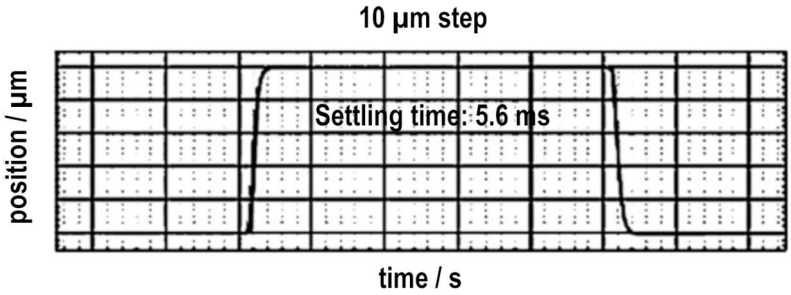
Mechanical properties	Unit	Tolerance	P-726.1CD
Stiffness in Z	N/µm	±20 %	3.4
Resonant frequency in Z, unloaded	Hz	±20 %	1120
Resonant frequency in Z, under load with 210 g	Hz	±20 %	560
Resonant frequency in Z, under load with 310 g	Hz	±20 %	480
Permissible push force in Z	N	Max.	100
Permissible pull force in Z	N	Max.	50
Guide			Flexure guide with lever amplification
Overall mass	g		575
Material			Aluminum, steel
Mechanical interface			M32 inner thread (can be adapted to all common threads using a QuickLock thread adapter)

Miscellaneous	Unit	Tolerance	P-726.1CD
Operating temperature range	°C		-20 to 80
Connector			D-sub 7W2 (m)
Cable length	m	+50 mm / -0 mm	1.5
Recommended controllers/ drivers			E-505, E-621, E-625, E-709.1C1L, E-754

The resolution of the system is limited only by the noise of the amplifier and the measuring technology because PI piezo nanopositioning systems are free of friction.

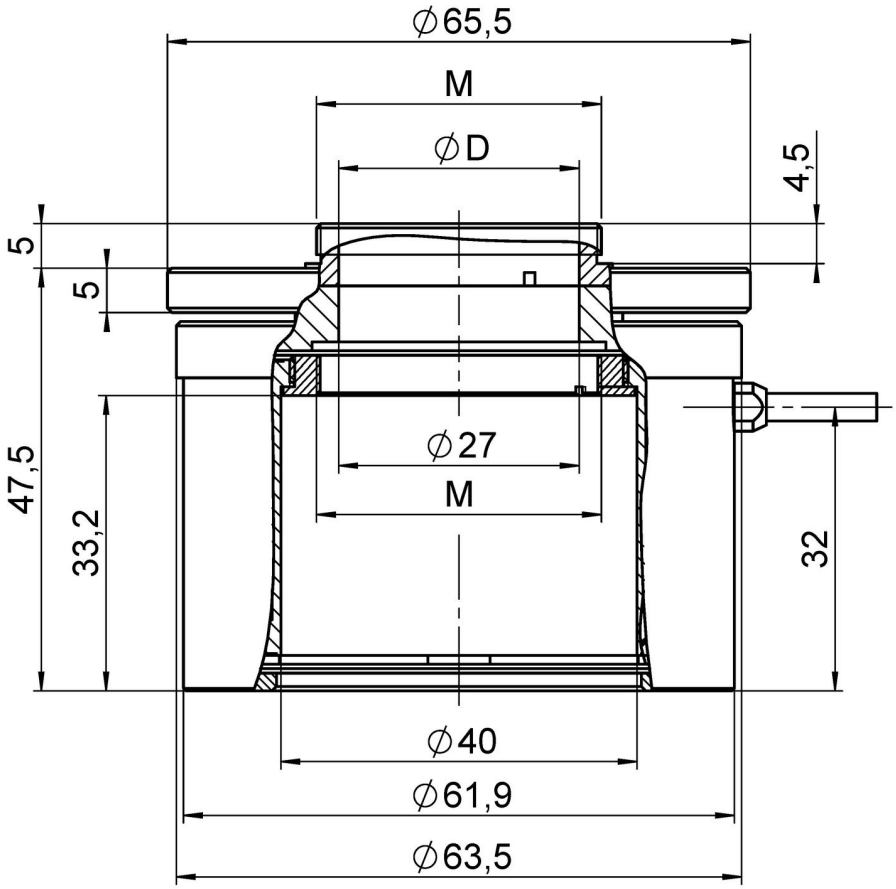
At PI, technical data is specified at 22 ±3 °C. Unless otherwise stated, the values are for unloaded conditions. Some properties are interdependent. The designation "typ." indicates a statistical average for a property; it does not indicate a guaranteed value for every product supplied. During the final inspection of a product, only selected properties are analyzed, not all. Please note that some product characteristics may deteriorate with increasing operating time.

Drawings / Images

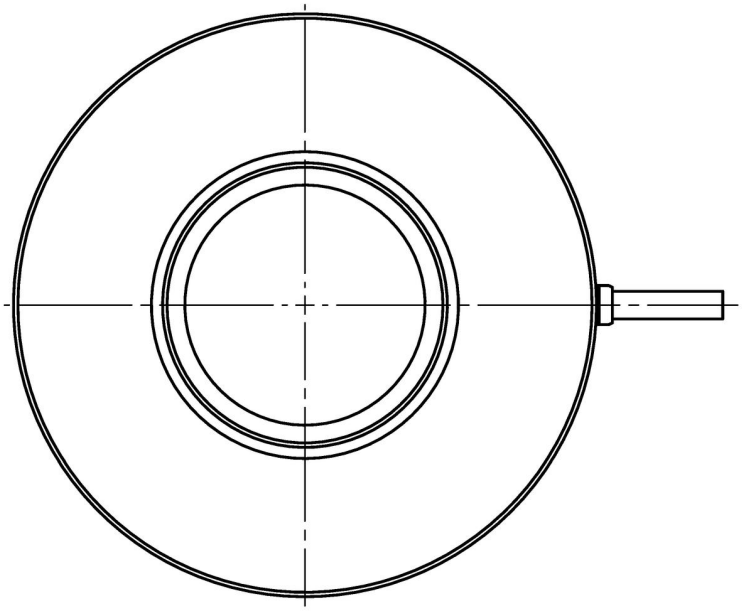


Settling behavior of the P-726 under load

Drawings / Images



Quicklock	M	D
P-726.04	M28x0,75	23
P-726.05	M32x0,75	27
P-726.06	M26x1/36"	21
P-726.11	M25x0,75	21
P-726.12	W0,8x1/36"	16



P-726 with QuickLock threaded adapter, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

Drawings / Images

Exploded view of the P-726 QuickLock adapter with P-726 PIFOC (mounting tools included in the scope of delivery)

Order Information

P-726.1CD
PIFOC high-load focus scanner; 100 µm travel range; capacitive, direct position measuring; D-sub 7W2 (m); 1.5 m cable length