PIFOC High Dynamics Piezo Scanner

Nanopositioner and Scanner for Microscope Objectives

P-725.CDD

- Shortest settling time under 5 ms with microscope objective
- Travel range 18 µm
- Fine positioning of objectives with sub-nm resolution
- Minimum objective shift due to parallel flexure guiding
- Highest linearity due to direct measuring technology with capacitive sensors
- Outstanding lifetime due to PICMA® piezo actuators
- QuickLock adapter for easy installation

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	Toleran-ce	P-725.CDD
Active axes			Z
Travel range in Z	µm		18
Travel range in Z, open loop	µm	±20%	18
Linearity error in Z	%	Typ.	0.05
Flatness (Linear crosstalk in X with motion in Z)	nm	Typ.	150
Straightness (Linear cross-talk in Y with motion in Z)	nm	Typ.	150
Yaw (Rotational crosstalk in θX with motion in Z)	µrad	Typ.	2
Pitch (Rotational crosstalk in θY with motion in Z)	µrad	Typ.	2

Positioning	Unit	Toleran-ce	P-725.CDD
Bidirectional repeatability in Z	nm	Typ.	3
Resolution in Z, open loop	nm	Typ.	0.2
Integrated sensor			Capacitive, direct position measuring
System resolution in Z	nm		0.2

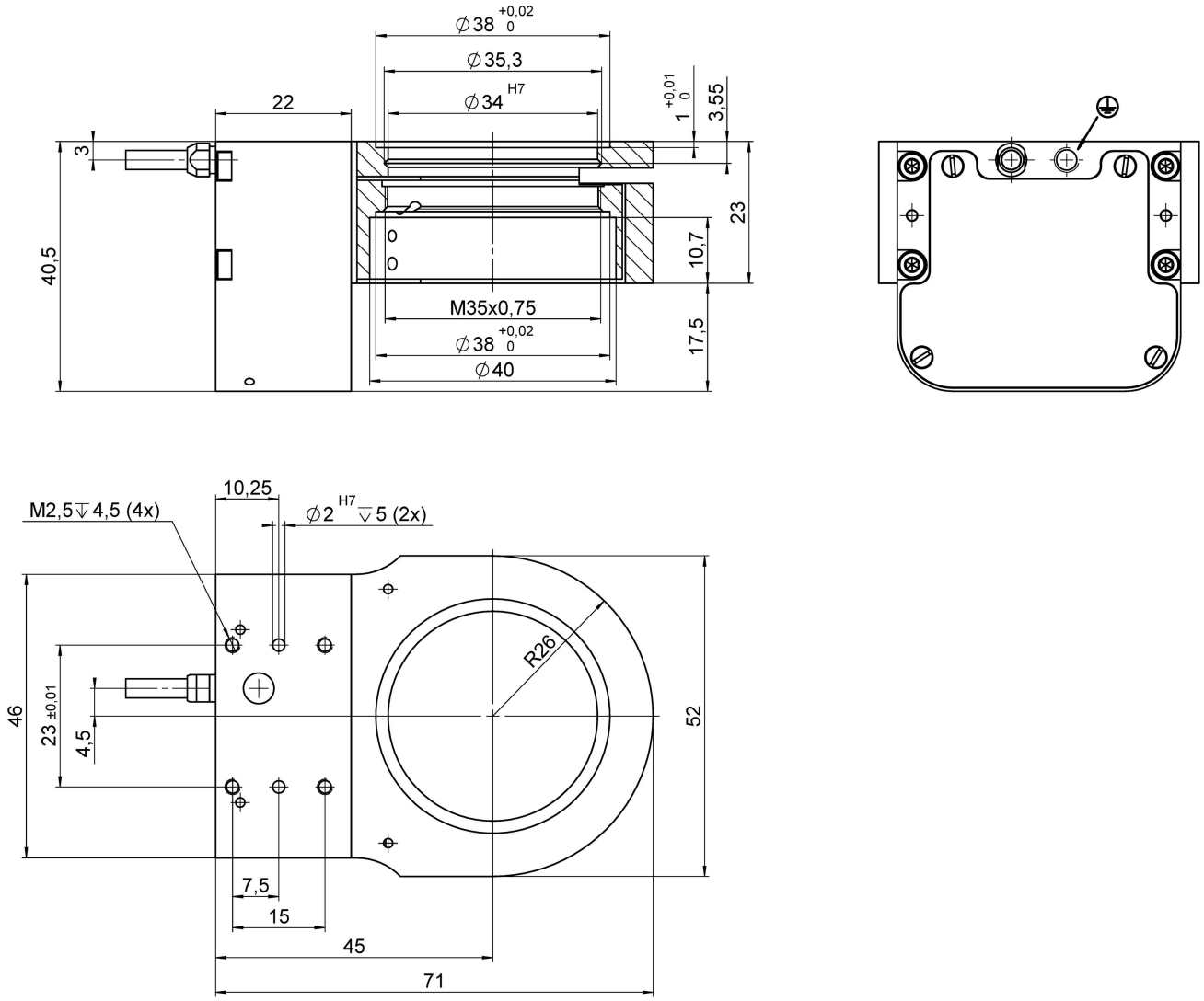
Drive Properties	Unit	Toleran-ce	P-725.CDD
Drive type			PICMA®
Electrical capacitance in Z	µF	±20%	3.1

Mechanical Properties	Unit	Toleran-ce	P-725.CDD
Stiffness in Z	N/µm	±20%	1.5
Resonant frequency in Z, unloaded	Hz	±20%	1180
Resonant frequency in Z, under load with 200 g	Hz	±20%	450
Permissible push force in Z	N	Max.	100
Permissible pull force in Z	N	Max.	20
Guide			Flexure guide with direct drive
Overall mass	g		210
Material			Aluminum

Miscellaneous	Unit		P-725.CDD
Operating temperature range	°C		-20 to 80
ID chip			Yes
Connector			D-sub 7W2 (m)
Cable length	m		1.5
Recommended controllers / drivers			E-610, E-625, E-709.1C1L, E-754

With analog controllers, the typical linearity error for direct drive positioners can be up to 0.1 %.
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.

Drawings / Images



P-725.CDD, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

Order Information

P-725.CDD
High-dynamics PIFOC piezo scanner; 18 µm travel range; capacitive, direct position measuring; D-sub 7W2 (m); 1.5 m cable length