PIFOC Objective Scanning System 100 µm

High Dynamics Piezo Drive for Subnanometer Resolution

PD72Z1x

- Complete system with digital controller, software, and optional QuickLock thread adapter
- USB, RS-232, analog interfaces
- Travel range 100 µm
- Fine positioning of objectives with sub-nm resolution
- Zero-play, high-precision flexure guide system
- Direct position measuring with capacitive sensors
- Compatible with MetaMorph, µManager, and MATLAB
- All servo control parameters can be changed during operation

Fields of application

- Microscopy
- Confocal microscopy
- 3-D imaging
- Screening
- Autofocus systems
- Surface analysis
- Wafer inspection

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.

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.

Extensive software for rapid start of productive operation

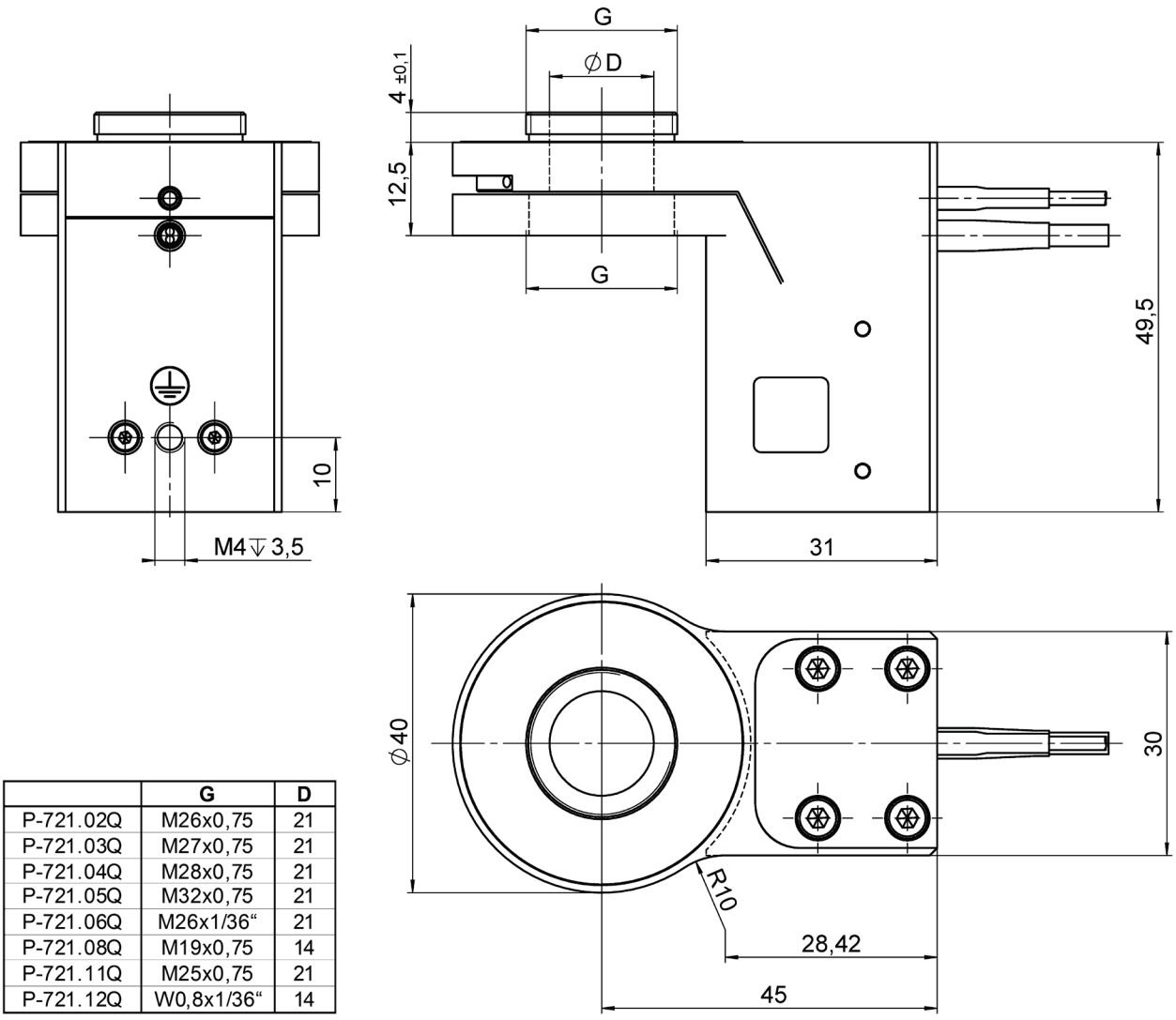
Thanks to support of MATLAB and NI LabVIEW as well as all common operating systems (Windows, Linux, and macOS), integration succeeds in virtually every environment – quickly and efficiently. Sophisticated programming examples and software tools such as PIMikroMove shorten the time to productive operation considerably.

Specifications

	PD72Z1SAA* PD72Z1SAQ** PD72Z1SA0***	PD72Z1CAA* PD72Z1CAQ** PD72Z1CA0***	Unit	Tolerance
Active axes	Z	Z		
Motion and positioning				
Integrated sensor	SGS	Capacitive		
Travel range, closed loop	100	100	µm	
Resolution, closed loop	5	1	nm	typ.
Linearity error, closed loop	0.2	0.06	%	typ.
Repeatability	±10	±5	nm	typ.
Tilt θ_X, θ_Y	13	13	µrad	typ.
Crosstalk in X, Y	100	100	nm	typ.
Settling time (0.5 µm step with 5 % accuracy, 150 g)	10	10	ms	typ.
Mechanical properties				
Stiffness in motion direction	0.3	0.3	N/µm	±20 %
Resonant frequency, no load	580	580	Hz	±20 %
Resonant frequency, under load, 120 g	235	235	Hz	±20 %
Resonant frequency, under load, 200 g	180	180	Hz	±20 %
Push/pull force capacity in motion direction	100 / 20	100 / 20	N	max.
Drive properties				
Piezo ceramic	PICMA® P-885	PICMA® P-885		
Miscellaneous				
Operating temperature range	10 to 50	10 to 50	°C	
Material	Aluminum	Aluminum		
Mass	0.22	0.24	kg	±5 %
Cable length	1	1	m	
Piezo controller	E-709 (in the scope of delivery)			
Communication interfaces	USB, RS-232, SPI			
I/O connector	HD Sub-D 26 1 analog input 0 to 10 V 1 sensor monitor 0 to 10 V 1 digital input (LVTTL, programmable) 1 analog output 5 digital outputs (LVTTL, 3 × predefined, 2 × programmable)			
Command set	PI General Command Set (GCS)			
User software	PIMikroMove			
Software drivers	NI LabVIEW drivers, shared libraries for Windows and Linux			
Supported functions	Wave generator, data recorder, autozero, trigger I/O, MATLAB, MetaMorph, µManager			
Controller dimensions	160 mm × 96 mm × 33 mm			

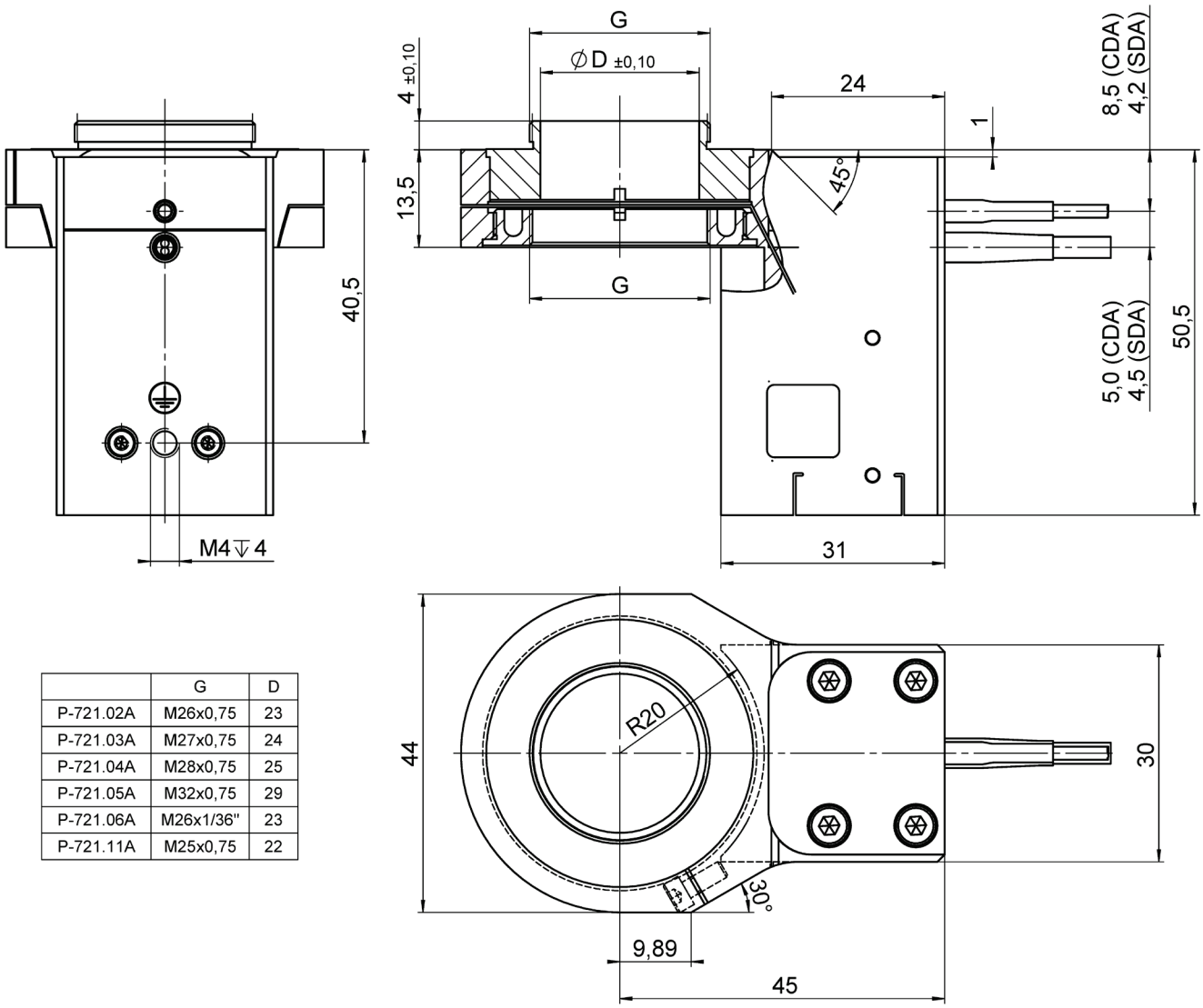
* With M32 QuickLock thread adapter with large aperture
** With M25 QuickLock adapter
*** Without QuickLock adapter (can be ordered separately)
The resolution of the system is limited only by the noise of the amplifier and the measuring technology because PI piezo nanopositioning systems are free of friction.
All specifications based on room temperature (22 °C ±3 °C).

Drawings / Images



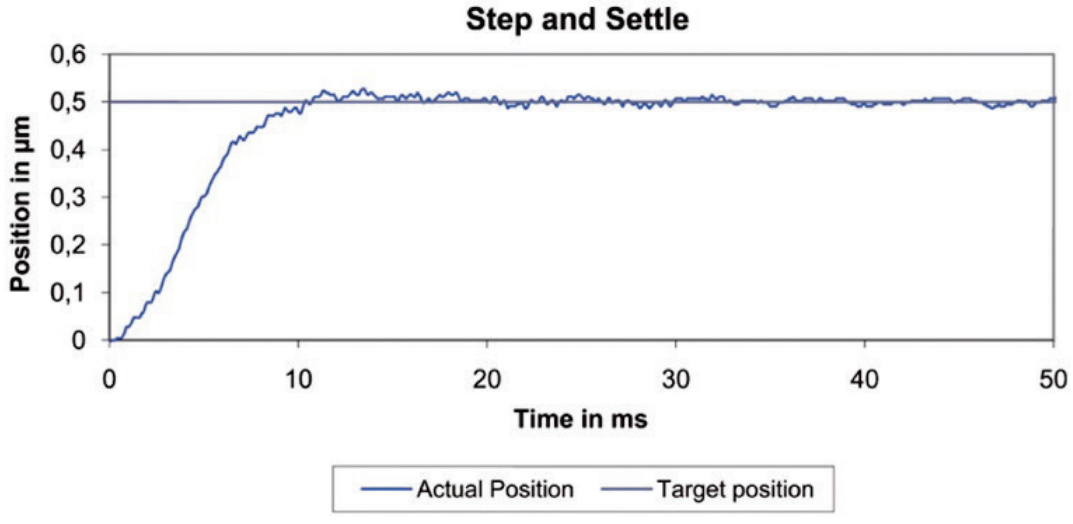
	G	D
P-721.02Q	M26x0,75	21
P-721.03Q	M27x0,75	21
P-721.04Q	M28x0,75	21
P-721.05Q	M32x0,75	21
P-721.06Q	M26x1/36“	21
P-721.08Q	M19x0,75	14
P-721.11Q	M25x0,75	21
P-721.12Q	W0,8x1/36“	14

PD72Z1xAQ / PD72Z1xA0, Dimensions in mm. P-721.xxQ: Suitable PIFOC QuickLock thread adapters.



	G	D
P-721.02A	M26x0,75	23
P-721.03A	M27x0,75	24
P-721.04A	M28x0,75	25
P-721.05A	M32x0,75	29
P-721.06A	M26x1/36"	23
P-721.11A	M25x0,75	22

PD72Z1xAA, Dimensions in mm. P-721.xxA: Suitable PIFOC QuickLock thread adapters.



Settling time of 10 ms with 150-g objective (PD72Z1CAQ system)

Ordering Information

PD72Z1CAA
Fast PIFOC piezo nanofocusing system, 100 µm, capacitive sensor, M32 QuickLock thread adapter with large aperture, digital controller with USB, RS-232

PD72Z1CAQ
Fast PIFOC piezo nanofocusing system, 100 µm, capacitive sensor, M25 QuickLock adapter, digital controller with USB, RS-232

PD72Z1CA0
Fast PIFOC piezo nanofocusing system, 100 µm, capacitive sensor, digital controller with USB, RS-232

PD72Z1SAA
Fast PIFOC piezo nanofocusing system, 100 µm, strain gauge sensor, M32 QuickLock thread adapter with large aperture, digital controller with USB, RS-232

PD72Z1SAQ
Fast PIFOC piezo nanofocusing system, 100 µm, strain gauge sensor, M25 QuickLock adapter, digital controller with USB, RS-232

PD72Z1SA0
Fast PIFOC piezo nanofocusing system, 100 µm, strain gauge sensor, digital controller with USB, RS-232