XVP series

Precise vertical piezo stage with high force output

The XVP series are precise linear stages driven by two ultrasonic piezo motors. It's specifically design to handle large payloads in the vertical direction. These stages combine high-speed positioning with nanometre precision and generate a high force output within a small volume. Xeryon's ultrasonic piezo motor ensures you a long lifetime, noiseless and vibration-free operation. In addition, the self-locking piezo motor holds the position of the stage when powered off. The reduced heat dissipation leads to a very stable nano-positioning system. The XVP is used in metrology applications, e.g. for part alignment or sample manipulation. The XVP can be easily stacked into an XZ- or XYZ-assembly.

Key features

drive principle	patented Crossfixx™ ultrasonic piezo technology (2x)
bearings	precision crossed-roller
lifetime distance	> 300 km (horizontal movement)
control principle	closed-loop position control
operating voltage	12 V

Model code structure

stage type	encoder resolution (nm)	optional	
		vacuum compatibility (10^{-6} mbar / 10^{-9} mbar)	low- or non-magnetic bearings
XVP	-OPEN	-HV / -UHV	-LM / -NM
	-1250		
	-312		
	-78		
	-5		
	-1		

Environmental compatibility

temperature range	-30°C to +70°C
humidity range	20% to 90% RH (non-condensing)
heat dissipation (motor only)	< 2 x 5 W
mounting surface flatness	< flatness specification of stage

Motion performance

			XVP all lengths						unit	tole-rance
		resolution	-OPEN	-1250	-312	-78	-5	-1		
ENCODER		type	NA[1]	optical, incremental						
		grating period	NA[1]	1280		20			µm	
		resolution	NA[1]	1250	312	78	5	1	nm	
		index	NA[1]	1 per full stroke						
		accuracy	NA[1]	± 10	± 5	± 1			µm	typ.
STAGE	positioning	resolution = min. step size = min. incremental motion (MIM)	50000[2]	1250	350	80	25		nm	typ.
		unidirectional repeatability	± 50000[2]	± 1250	± 350	± 80	± 25		nm	typ.
		bidirectional repeatability	± 50000[2]	± 2500	± 700	± 160	± 50		nm	typ.
	speed	max. speed	1000	50			50	25	mm/s	typ.
		min. speed	5000[3]	5			2	1	µm/s	typ.
		stability (at typical speed of 10 mm/s)	± 10	± 1					%	typ.
		point-to-point positioning time for a 1 mm step[4] 0 g load 300 g load	NA	600 1000			1000 1300		msec msec	typ.

[1] a closed-loop control can be achieved by connecting an external position encoder to the controller

[2] when using stage in burst mode (50µm bursts)

[3] lower average speeds can be achieved when using burst mode

[4] settling within bidirectional repeatability range

Note: a detailed description of the technical terms used in this datasheet can be found on the Terminology page of our website.

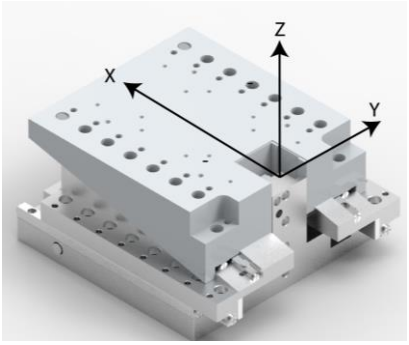
Mechanical properties

		XVP-80	unit	tolerance
dimensions	length	80 (+/- 25 hor.travel)	mm	± 0.1
	width	80		
	height	40 (+10 vert. travel)		
stroke/ travel range	standard cage	10	mm	± 0.1
mass (w/o connector)		800	g	± 5%
payload limitation		2.5	kg	max.
holding force		30	N	min.
driving force		15	N	min.
stage material	slider/base bearings	anodised aluminium stainless steel		
cable length*		1.5	m	± 0.1
connector (stage to controller)		1x 15-pin D-sub HD male (standard) 1x 15-pin D-sub female (-HV)		

* extension cables available or shorter cable on request

Error motion

		XVP	unit	tolerance
error motion	x-straightness	± 2	µm	max.
	y-straightness	± 2	µm	max.
	pitch (θy)	140 29	µrad arcsec	max.
	roll (θz)	35 7	µrad arcsec	max.
	yaw (θx)	60 12	µrad arcsec	max.



Controller/software

The XVP series linear stages are compatible with all Xeryon controllers. Controlling of the stage is done with:

- easy-to-use Windows interface
- LabVIEW interface program (compiled program or source)
- MATLAB interface script
- C++ and Python libraries

Last updated: 1/06/2022. All specifications are subject to change without prior notice.