



XLS-5 series

Precise linear piezo stage with high force output

The XLS-5 series are precise linear stages driven by an ultrasonic piezo motor. 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 XLS-5 is used in a wide variety of industries and applications, e.g. for part alignment or sample manipulation. The XLS-5 series is available in different lengths and are easily stacked into an XY- or XYZ-assembly.

Key features

drive principle	patented Crossfixx™ ultrasonic piezo technology
bearings	precision crossed-roller
lifetime distance	> 1000 km / typ. 20 million cycles
control principle	closed-loop or open-loop position control
input voltage	48 V

Model code structure

otoro	stage	encoder	optional				
type	type length resolution (mm) (nm)		vacuum compatibility	low- or non-magnetic bearings	short cage for increased stroke		
		-OPEN			-SC		
		-1250	-HV (10-6 mbar) -UHV (10-9 mbar)	-LM / -NM			
	-40	-312					
		-78					
		-5					
XLS-5		-1					
	-60						
	-80 sai -100 X -120	same as for					
		XLS-5-40					

Environmental compatibility

temperature range	-30°C to +70°C
humidity range	20% to 90% RH (non-condensing)
heat dissipation (motor only)	< 5 W
mounting surface flatness	< flatness specification of stage
Internal operation voltage	< 60 V

Motion performance

			XLS-5 all lengths						unit	tole-	
resolution				-OPEN	-1250	-312	-78	-5	-1		rance
		type	NA ¹	optical, incremental							
DER		grating period	NA ¹	79.8 20			μm				
20		resolution	NA ¹	1250	312	78	5 1		nm		
ũ		index		NA ¹		1 pe	full stroke				
		accuracy	NA ¹	± 10	± 5		± 1		μm	typ.	
	oning	resolution = min. step size = min. incremental motion (MIM)		50000 ²	1250	350	80	50		nm	typ.
	ositi	unidirectional repeatability		$\pm 50000^{2}$	± 1250	± 350	± 80	± 50		nm	typ.
	d	bidirectional repeatability		$\pm 50000^{2}$	± 2500	± 700	± 160	± 100		nm	typ.
		max. speed (for -HV/-UHV)		500	50 50 25		25	mm/s	typ.		
AGE		max. speed		1000	200 1		150	25	mm/s	typ.	
ST/		min. speed		5000 ³	5 2 1		1	µm/s	typ.		
	eed	stability (at typical speed of 10 mm	± 10	± 1				%	typ.		
	spe	point-to-point positioning 0 time for a 1 mm step ⁴ 100) g load) g load	NA	2 4	5 0	80 120	250 450		msec msec	typ.
		point-to-point positioning 10 mm time 10 μm		NA	13017025802050		170 80 50	500 250 150		msec msec msec	typ.
		operation duty avala (for 10//100		50					%	max.	
		operation duty cycle (for -HV/-UHV			120				sec	max.	

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

 $^{\rm 2}$ when using stage in burst mode (50 μm 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

		XLS-5 -40	XLS-5 -60	XLS-5 -80	XLS-5 -100	XLS-5 -120	unit	tolerance
	length	40	60	80	100	120		
dimensions	width	47.6						± 0.1
	height	16.8						
stroke/	standard cage	25	40	50	75	100	mm	+01
travel range	short cage (-SC)	30	48	69	85	109		± 0.1
max. acceleration		100	60	55	45	40	mm/s ²	typ.
mass (w/o connecto	or)	81	120	161	201	241	g	± 5%
load capacity (paylo	2						max.	
	vertical	396	633	792	990	1188	N	
load capacity*	lateral	396	633	792	990	1188	IN	
(bearing force	tilt around pitch axis	1.50	2.25	3.00	3.75	4.50		max.
limitation)	tilt around yaw axis	1.50	2.25	3.00	3.75	4.50	Nm	
	tilt around roll axis	7.74	12.38	15.48	19.35	23.23		
driving force		5					Ν	min.
holding force	5					Ν	min.	
passive holding stiff	1						typ.	
ete e e esteriel	slider/base	aluminium						
stage material	bearings	stainless steel						
cable length**	1.5						± 0.1	
connector (stage to controller)		1x 15-pin D-sub HD male (standard)						
	1x 15-pin D-sub female (-HV)							

* valid for stages with standard cage

Error motion

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		XLS-3 length 40 to 60	XLS-3 length 80 to 120	unit	tolerance	
	straightness	± 2	± 5	μm	max.	
error motion*	flatness	±2	± 5	μm	µm max.	
	pitch	± 120 ± 25	± 120 ± 120 ± 25 ± 25		max.	
	roll ± 100 ± 100 ± 20 ± 20		µrad arcsec	max.		
	yaw	± 250 ± 50	± 250 ± 50	µrad arcsec	max.	

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These values are valid for stages with standard cage.

Better straightness and flatness are available upon request.

Controller/software

The XLS-5 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



recommended flatness of mounting surfaces: 5 µm max.

XLS-3-40 assy H7



XLS-3-60 assy H7



recommended flatness of mounting surfaces: 5 μm max.

XLS-3-80 assy H7







recommended flatness of mounting surfaces: 5 μm max.

XLS-3-120 assy H7



Typical error motion values measured on an XLS-5-40 stage.