

# XLS-1 series

## Compact and precise linear piezo stage



The XLS-1 series are precise linear stages driven by an ultrasonic piezo motor. These stages combine high-speed positioning with nanometre precision. 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-1 is used in metrology applications, e.g. for part alignment or sample manipulation. The XLS-1 series is available in different lengths and are easily stacked into an XY-assembly. All stages can be equipped with a short cage to increase the stroke.

### Key features

drive principle	patented Crossfixx™ ultrasonic piezo technology
bearings	precision crossed-roller
lifetime distance	> 100 km
control principle	closed-loop position control
operating voltage	20 to 48 V

### Model code structure

stage type	stage length (mm)	encoder resolution (nm)	optional	
			vacuum compatibility (10 <sup>-6</sup> mbar)	short cage for increased stroke
XLS-1	-30	-1250	-HV	-SC
		-312		
		-78		
		-1		
	-40	same as for XLS-1-30		not available for XLS-1-40
	-50			-SC
	-60			
	-70			
	-80			
	-100			
-120				

### Environmental compatibility

temperature range	-30°C to +70°C
humidity range	20% to 90% RH (non-condensing)
heat dissipation (motor only)	< 1 W
mounting surface flatness	< flatness specification of stage

## Motion performance

		XLS-1 all lengths				unit	tolerance	
resolution		-1250	-312	-78	-1			
ENCODER	type	inductive, incremental		optical, incremental				
	grating period	1280		20		µm		
	resolution	1250	312	78	1	nm		
	index	1 per full stroke						
	accuracy	± 10	± 5	± 1		µm	typ.	
STAGE	positioning	resolution = min. step size = min. incremental motion (MIM)	1250	350	80	25	nm	typ.
		unidirectional repeatability	± 1250	± 350	± 80	± 25	nm	typ.
		bidirectional repeatability	± 2500	± 700	± 160	± 50	nm	typ.
	speed	max. speed	200				mm/s	typ.
		min. speed	2 to 5				µm/s	typ.
		stability (at typical speed of 10 mm/s)	± 1				%	typ.
		point-to-point positioning time for a 1 mm step*	0 g load	300			msec	typ.
		100 g load	500			msec		

\* 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-1 -30	XLS-1 -40	XLS-1 -50	XLS-1 -60	XLS-1 -70	XLS-1 -80	XLS-1 -100	XLS-1 -120	unit	tolerance
dimensions	length	30	40	50	60	70	80	100	120	mm	± 0.1
	width	34									
	height	13									
stroke/ travel range	standard cage	10	28	32	38	42	52	72	92	mm	± 0.1
	short cage (-SC)	19	-	38	50	57	64	82	102		
mass (w/o connector)		40	50	63	76	88	105	126	151	g	± 5%
load capacity (payload limitation)		0.5								kg	max.
load capacity* (bearing force limitation)	vertical	237	396	475	633	712	792	990	1188	N	max.
	lateral	237	396	475	633	712	792	990	1188		
	tilt around pitch axis	1.13	1.50	1.88	2.25	2.63	3.00	3.75	4.5	Nm	
	tilt around yaw axis	1.13	1.50	1.88	2.25	2.63	3.00	3.75	4.5		
	tilt around roll axis	3.02	5.05	6.06	8.07	9.08	10.10	12.62	15.15		
holding force		1								N	min.
driving force		1								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)									

\* valid for stages with standard cage

\*\* extension cables available or shorter cable on request

## Error motion

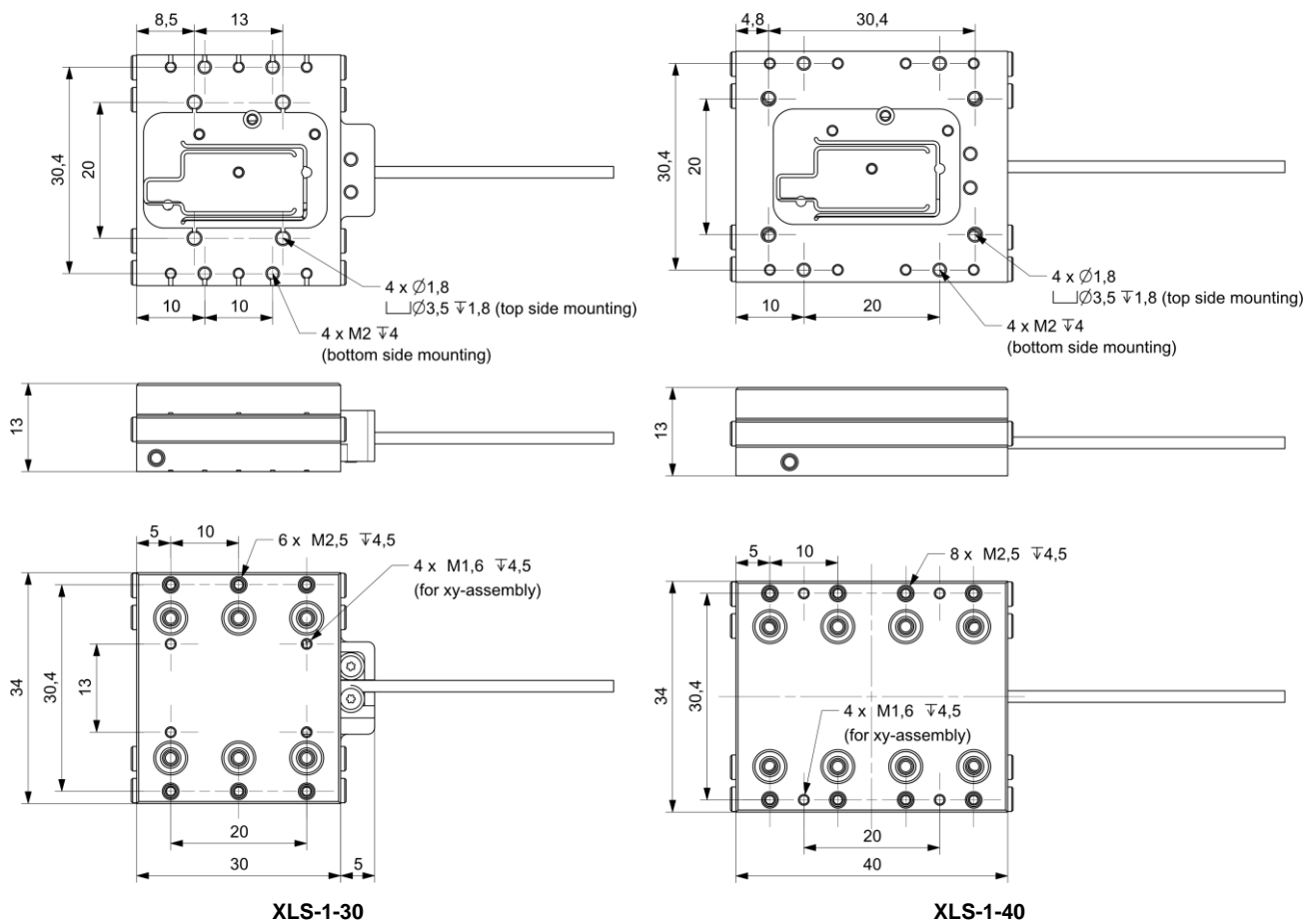
		XLS-1 length 30 to 70		XLS-1 length 80 to 120		unit	tolerance
		-1250 -312	-78 -1	-1250 -312	-78 -1		
error motion	straightness	± 5	± 1	± 10	± 2	µm	max.
	flatness	± 5	± 1	± 10	± 2	µm	max.
	pitch	120	24	120	24	µrad arcsec	max.
		25	5	25	5		
	roll	120	24	120	24	µrad arcsec	max.
25		5	25	5			
yaw	60	12	60	12	µrad arcsec	max.	
	12.5	2.5	12.5	2.5			

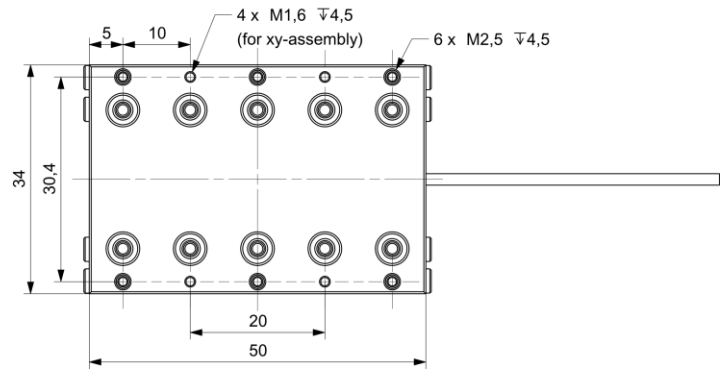
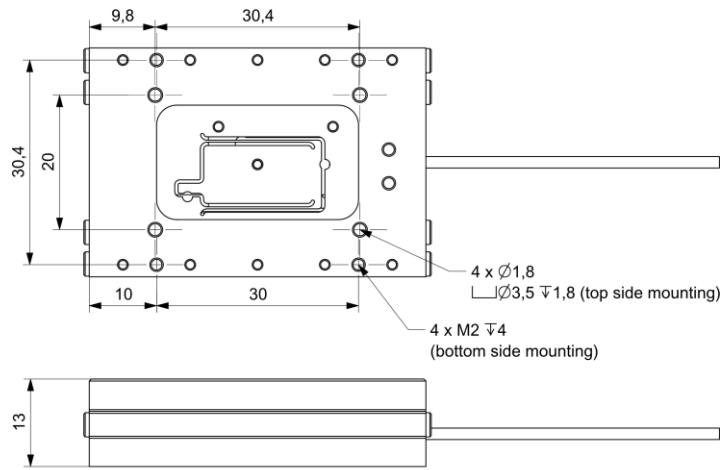
## Controller/software

The XLS-1 series linear stages are compatible with all Xeryon controllers. Controlling of the stage is done with:

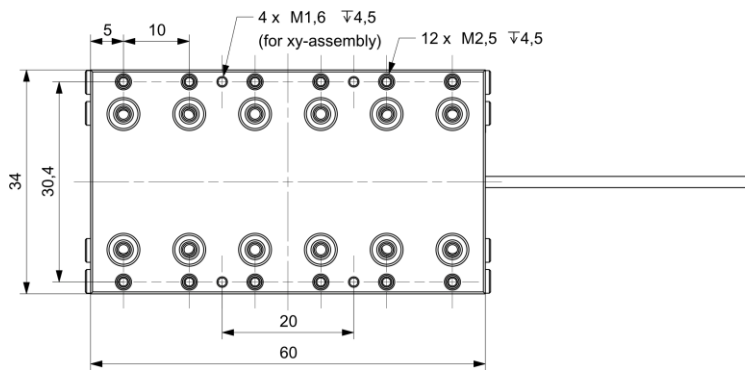
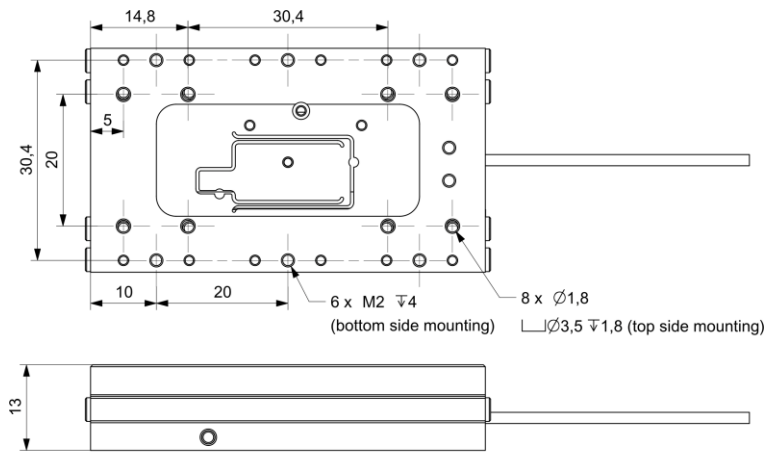
- easy-to-use Windows interface
- LabVIEW interface program (compiled program or source)
- MATLAB interface script
- C++ and Python libraries

## Drawings

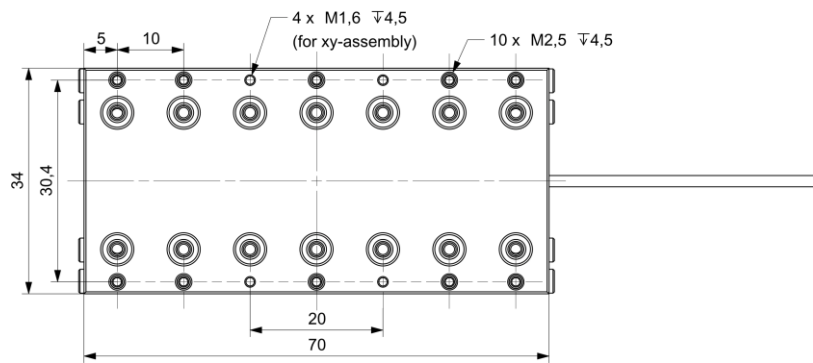
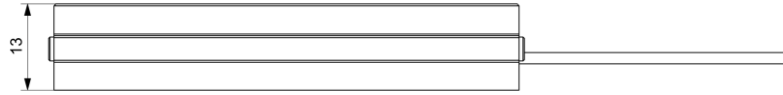
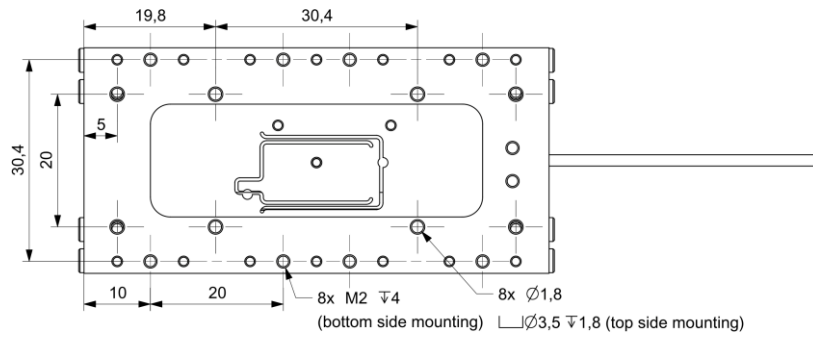




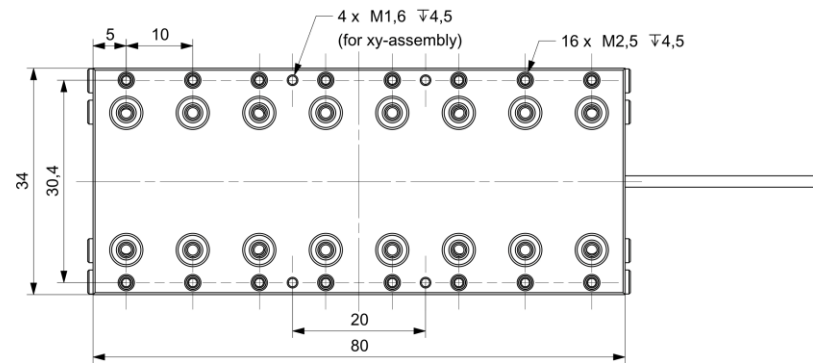
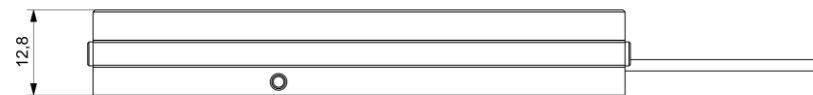
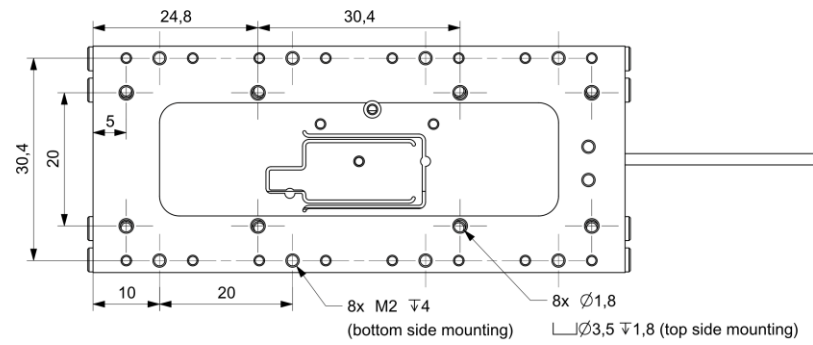
**XLS-1-50**



**XLS-1-60**



**XLS-1-70**



**XLS-1-80**

