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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 a wide variety of industries and 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	> 1000 km / typ. 20 million cycles
control principle	closed-loop position control

MODEL CODE STRUCTURE

BASE SPECIFICATION			OPTIONAL			CONNECTOR/CABLE	
stage type	**stage length (mm)**	**encoder resolution (nm)**	**vacuum compatibility**	**short cage for increased stroke**	**light shield[1]**	**connector type**	**cable length**
XLS-1	-40	-1250	-HV (10^{-6} mbar) -UHV (10^{-9} mbar)	-SC	-LS	see tables below	
		-312					
		-78					
		-5					
	-60	same as for XLS-1-40					

[1] *light shield around optical encoder to reduce light scattering*

CONNECTOR OPTION	stage environment		
	standard	**-HV**	**-UHV**
-C0 (OEM)	available as from 10/2025	not recommended	
-C1 (scientific)	15p D-sub HD male	15p D-sub LD female	
-C2	12p Fischer (S 103 Z062-130+)		not possible

Disclaimer: The product images shown may be for illustration purposes only and may not be an exact representation of the product.

CABLE LENGTH OPTION	length
-L25	25 cm
-L50	50 cm
-L150 (standard)	150 cm
-L300	300 cm

Example: **XLS-1-40-312-HV-SC-C1-L150**

- XLS-1 series linear stage
- Stage length of 40 mm
- Encoder feedback with a resolution of 312 nm
- Vacuum compatibility (HV)
- Short-cage option for increased stroke (SC)
- D-sub connector option (C1)
- Cable length of 150 cm

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
internal operation voltage	48 V (XD-C, XD-M and XD-19 controller); 60 V (XD-OEM controller)

MOTION PERFORMANCE

resolution			XLS-1 all lengths				unit	tole-rance
			-1250	-312	-78	-5		
ENCODER	type		optical, incremental					
	grating period		79.8 318		20 1270		µm LPI	
	resolution	rounded effective	1250 1248.035	312 312.009	78 78.125	5 5	nm	
	index		1 per full stroke					
STAGE	positioning	resolution = min. step size = min. incremental motion (MIM)	1250	350	80	50	nm	typ.
		unidirectional repeatability	± 1250	± 350	± 80	± 50	nm	typ.
		bidirectional repeatability	± 2500	± 700	± 160	± 100	nm	typ.
	speed	max. speed (for -HV/-UHV)	50				mm/s	typ.
		max. speed	200			50	mm/s	typ.
		min. speed	5			2	µm/s	typ.
		stability (at typical speed of 10 mm/s)	± 1				%	typ.
		point-to-point positioning time[1]	10 mm 1 mm 100 µm		75 30 20	300 150 90	msec	typ.
		operation duty cycle (for -HV/-UHV)	50 120				% sec	max. max.

[1] conditions: settling within bidirectional repeatability range, <50 g horizontal payload, communication delay not taken into account

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-1-40	XLS-1-60	unit	tole-rance
dimensions	length	40	60	mm	± 0.1
	width	34			
	height	13			
stroke/ travel range	standard cage short cage (-SC)	25 30	40 48	mm	± 0.1
max. acceleration		42	25	m/s^2	typ.
mass (w/o connector)		51	74	g	± 5%
load capacity (payload limitation)		0.5		kg	max.
load capacity[1] (bearing force limitation)	vertical lateral	396 396	633 633	N	max.
	tilt around pitch axis tilt around yaw axis tilt around roll axis	1.50 1.50 5.05	2.25 2.25 8.07	Nm	
driving force		1	0.8	N	min.
holding force		1		N	min.
passive holding stiffness		0.5		N/µm	typ.
stage materials	slider/base coating bearings	aluminium none (blank) stainless steel 440C			
cable	length	150 (standard)		cm	± 5
	type[2]	2x shielded cable, PFA insulation and sheat (standard/-HV) 2x shielded cable, PFA insulation w/o sheat (-UHV)			
	diameter	Ø1.7 (standard and -HV) Ø1.4 (-UHV)		mm	± 0.2

[1] valid for stages with standard cage
[2] stages with resolution -1250 and -78 have a single cable

ERROR MOTION

		XLS-1-40	XLS-1-60	unit	tole-rance
error motion	straightness	± 2	± 2	µm	max.
	flatness	± 2	± 2	µm	max.
	pitch	± 200 ± 40	± 100 ± 20	µrad arcsec	max.
	roll	± 150 ± 30	± 150 ± 30	µrad arcsec	max.
	yaw	± 250 ± 50	± 250 ± 50	µrad arcsec	max.

valid for stages with standard cage

CONTROLLER/SOFTWARE

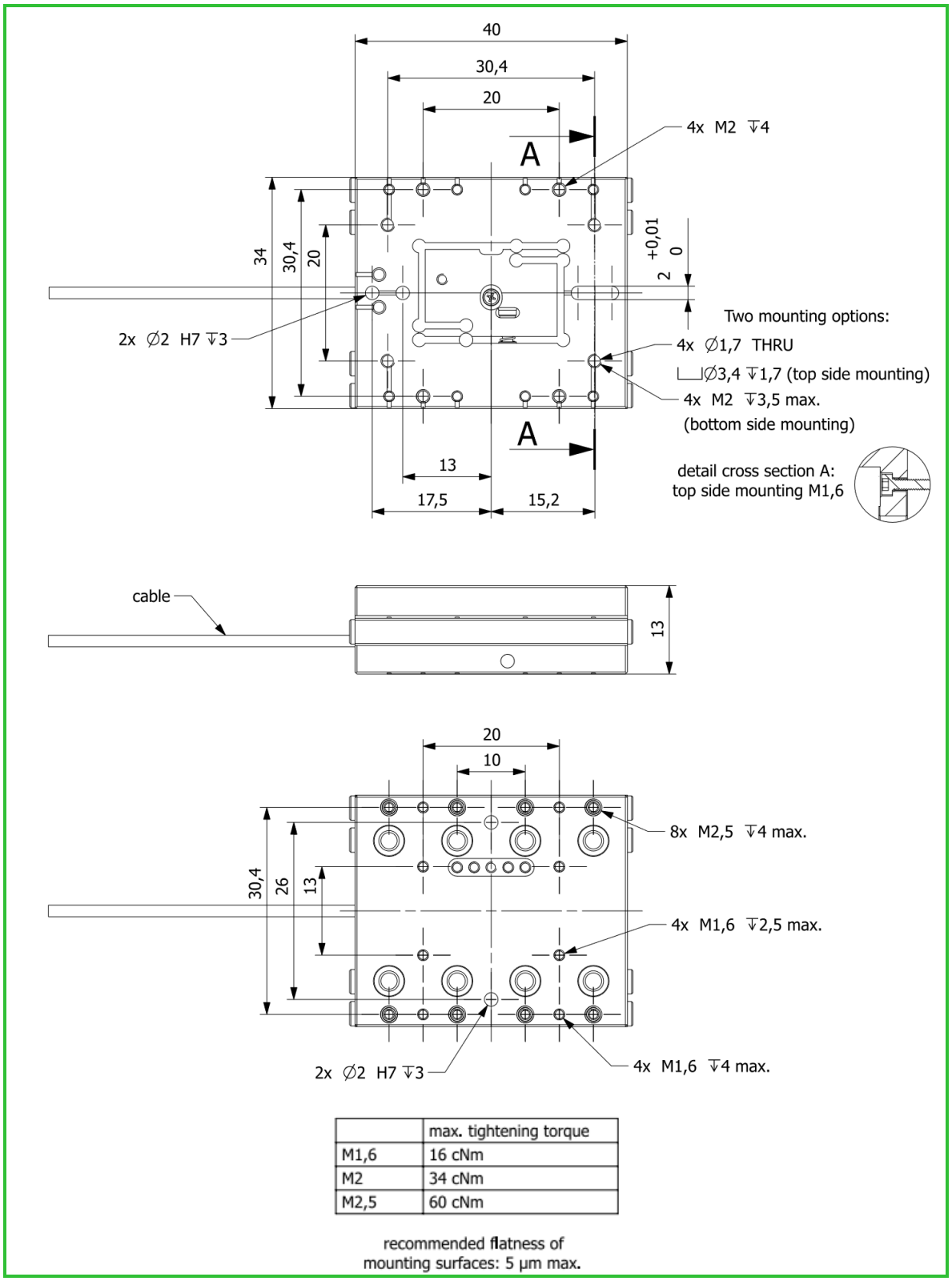
The XLS-1 series linear stages are compatible with the XD-C, XD-M, XD-19 and XD-OEM controller. Stages with resolution -5 need to be connected to an XD-M controller. Controlling of the stage is done with:

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

Last updated: 27/05/2025. All specifications are subject to change without prior notice.

DRAWINGS (STEP-FILES ARE AVAILABLE ON OUR WEBSITE)

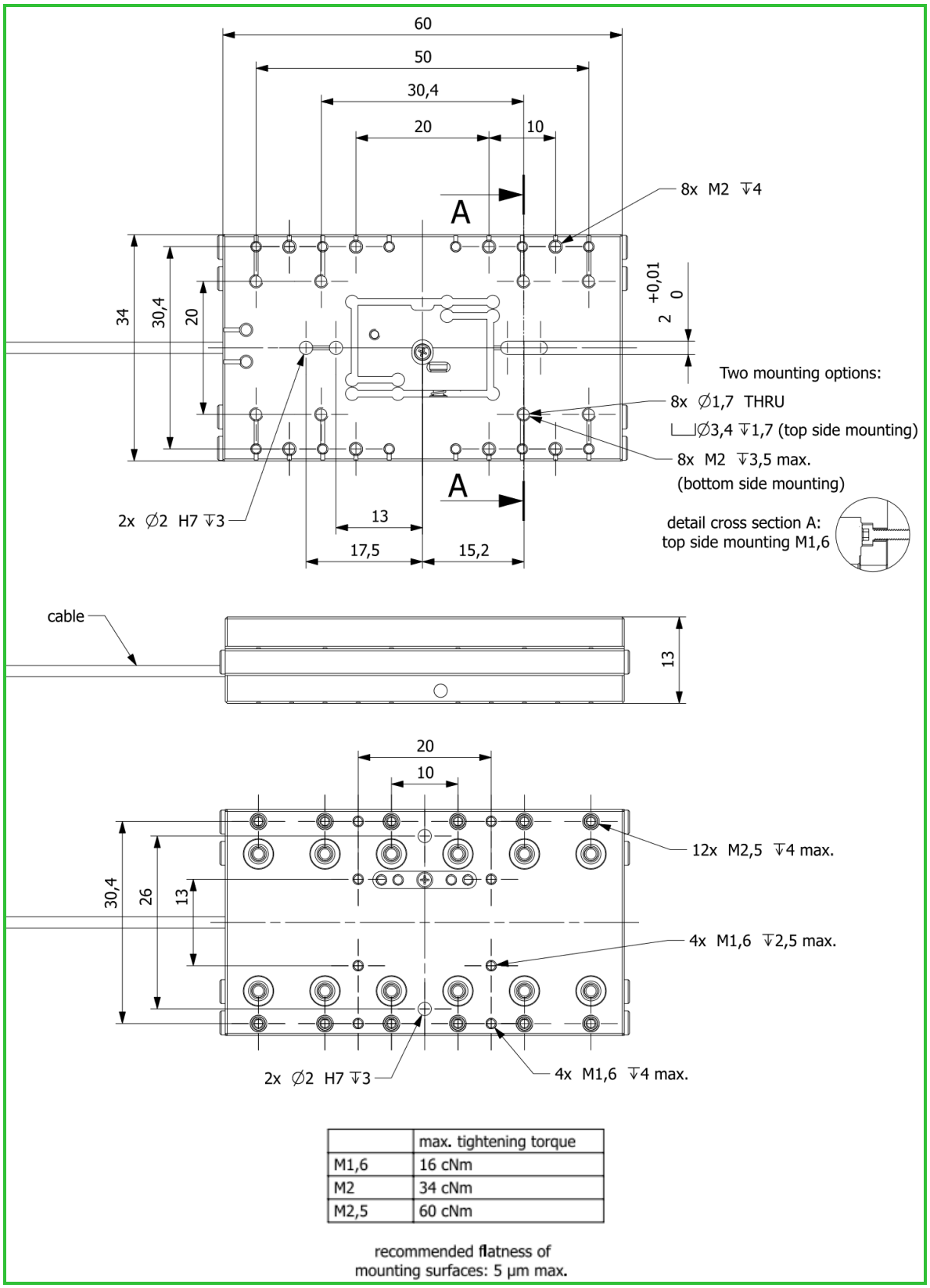
XLS-1-40 assy J6



	max. tightening torque
M1,6	16 cNm
M2	34 cNm
M2,5	60 cNm

recommended flatness of
mounting surfaces: 5 µm max.

XLS-1-60 assy J6



	max. tightening torque
M1,6	16 cNm
M2	34 cNm
M2,5	60 cNm

recommended flatness of
mounting surfaces: 5 µm max.