



XLS-3 series

Precise linear piezo stage with high force

The XLS-3 series are precise linear stages driven by an ultrasonic piezo motor. These stages combine high-speed positioning with nanometer 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-3 is used in a wide variety of industries and applications, e.g. for part alignment or sample manipulation. The XLS-3 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	> 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	non-magnetic	short cage for increased stroke	light shield ¹	connector type	cable length
XLS-3	-40	-1250	-HV (10 ⁻⁶ mbar) -UHV (10 ⁻⁹ mbar)	-NM	-SC	-LS	see tables below	
		-312						
		-78						
		-5						
	-60	same as for XLS-3-40		not possible				
	-80			not possible				
	-120			-NM				

¹ light shield around optical encoder to reduce light scattering

CONNECTOR OPTION	stage environment		
	standard	-HV	-UHV
-C0 (OEM)	available as from 08/2025	not recommended	
-C1 (scientific)	15p D-sub HD male	15p D-sub LD female	
-C2	12p Fischer (S 103 Z062-130+)		not possible

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

Example: **XLS-3-40-312-HV-SC-C1-L150**

- XLS-3 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)	< 5 W (48 V) < 6 W (60 V)
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-3 all lengths				unit	tolerance
			-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
		operation duty cycle (for -HV/-UHV)	50 120				% sec	max. max.

¹ conditions: settling within bidirectional repeatability range, <100 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-3 -40	XLS-3 -60	XLS-3 -80	XLS-3 -120	unit	tolerance
dimensions	length	40	60	80	120	mm	± 0.1
	width	47.6					
	height	16.8					
stroke/ travel range	standard cage	25	40	50	100	mm	± 0.1
	short cage (-SC)	30	48	69	109		
max. acceleration		74	45	33	22	m/s ²	typ.
mass (w/o connector)		97	143	185	272	g	± 5%
load capacity (payload limitation)		1.5				kg	max.
load capacity ¹ (bearing force limitation)	vertical	396	633	792	1188	N	max.
	lateral	396	633	792	1188		
	tilt around pitch axis	1.50	2.25	3.00	4.50	Nm	
	tilt around yaw axis	1.50	2.25	3.00	4.50		
	tilt around roll axis	7.74	12.38	15.48	23.23		
driving force		3				N	min.
holding force		3				N	min.
passive holding stiffness		1				N/μm	typ.
stage materials		slider/base coating bearings fasteners					
cable	length	150 (standard)				cm	± 5
	type	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

ERROR MOTION

		XLS-3 length 40 to 60	XLS-3 length 80 to 120	unit	tolerance
error motion	straightness	± 2	± 5	μm	max.
	flatness	± 2	± 5	μm	max.
	pitch	± 150	± 120	μrad arcsec	max.
		± 30	± 25		
	roll	± 100	± 100	μrad arcsec	max.
		± 20	± 20		
	yaw	± 250 ± 50	± 250 ± 50	μrad arcsec	max.

valid for stages with standard cage

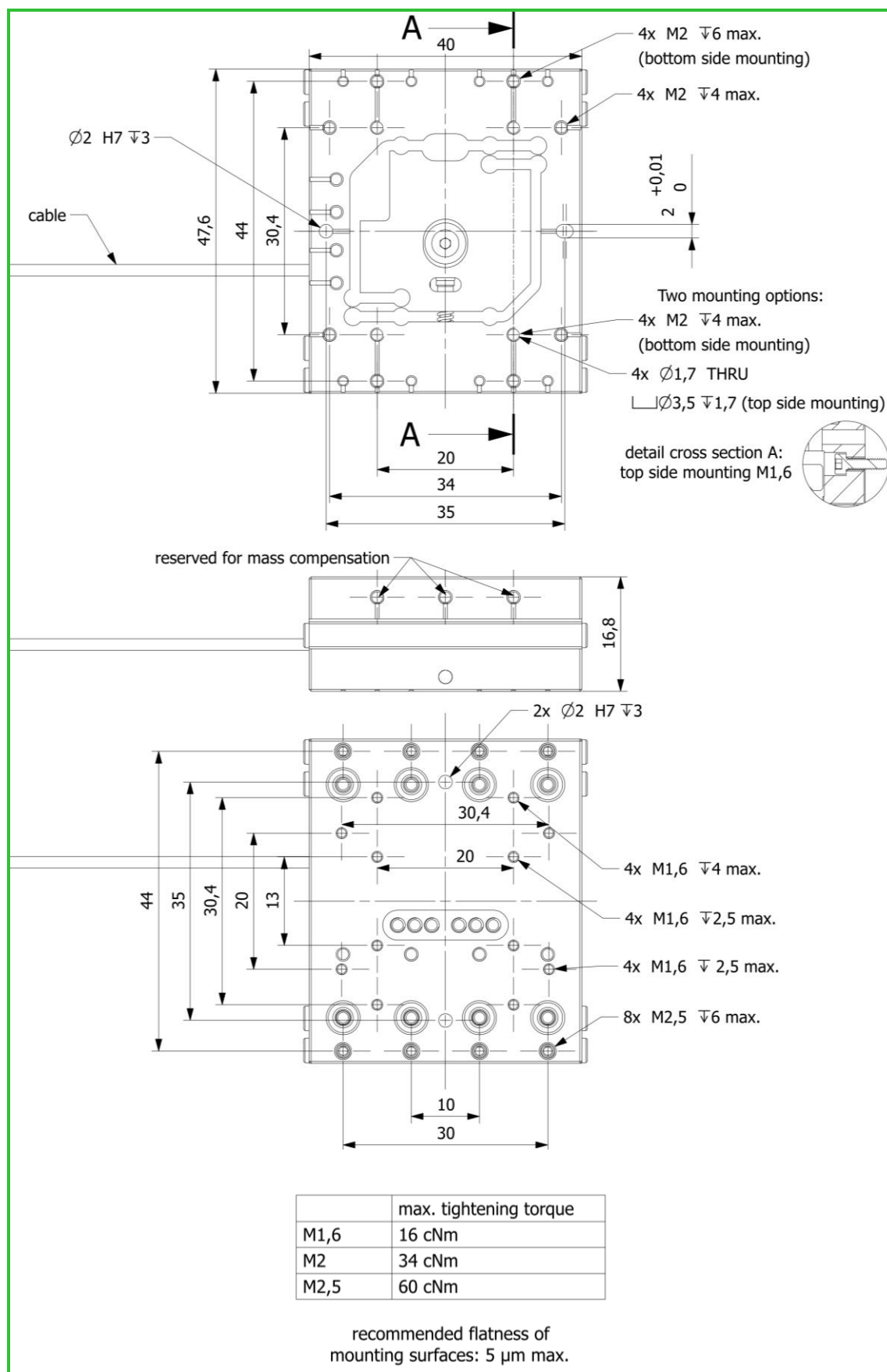
CONTROLLER/SOFTWARE

The XLS-3 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:

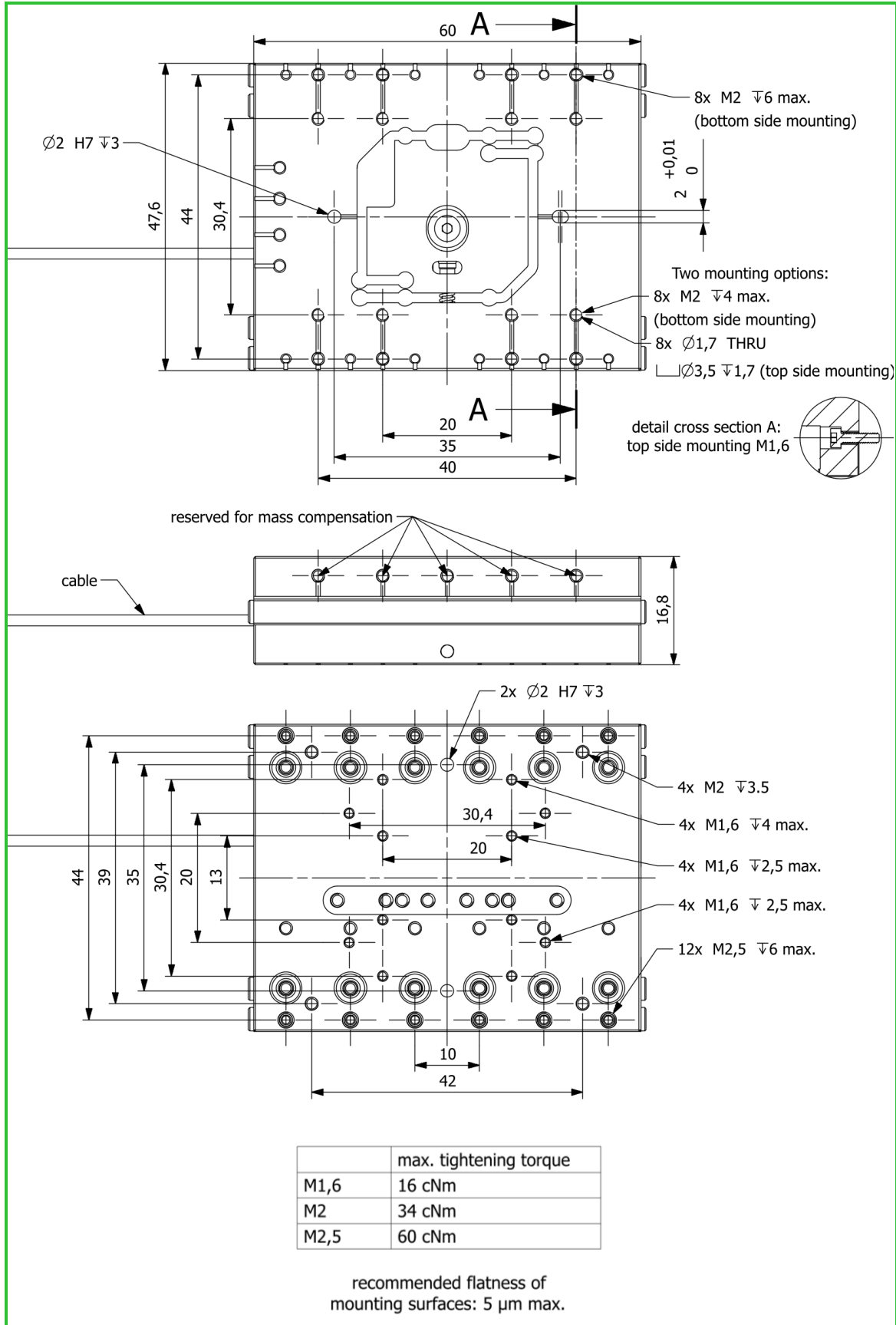
- easy-to-use Windows interface
- LabVIEW interface program (compiled program or source)
- MATLAB interface script
- C++ and Python libraries

DRAWINGS (STEP-FILES ARE AVAILABLE ON OUR WEBSITE)

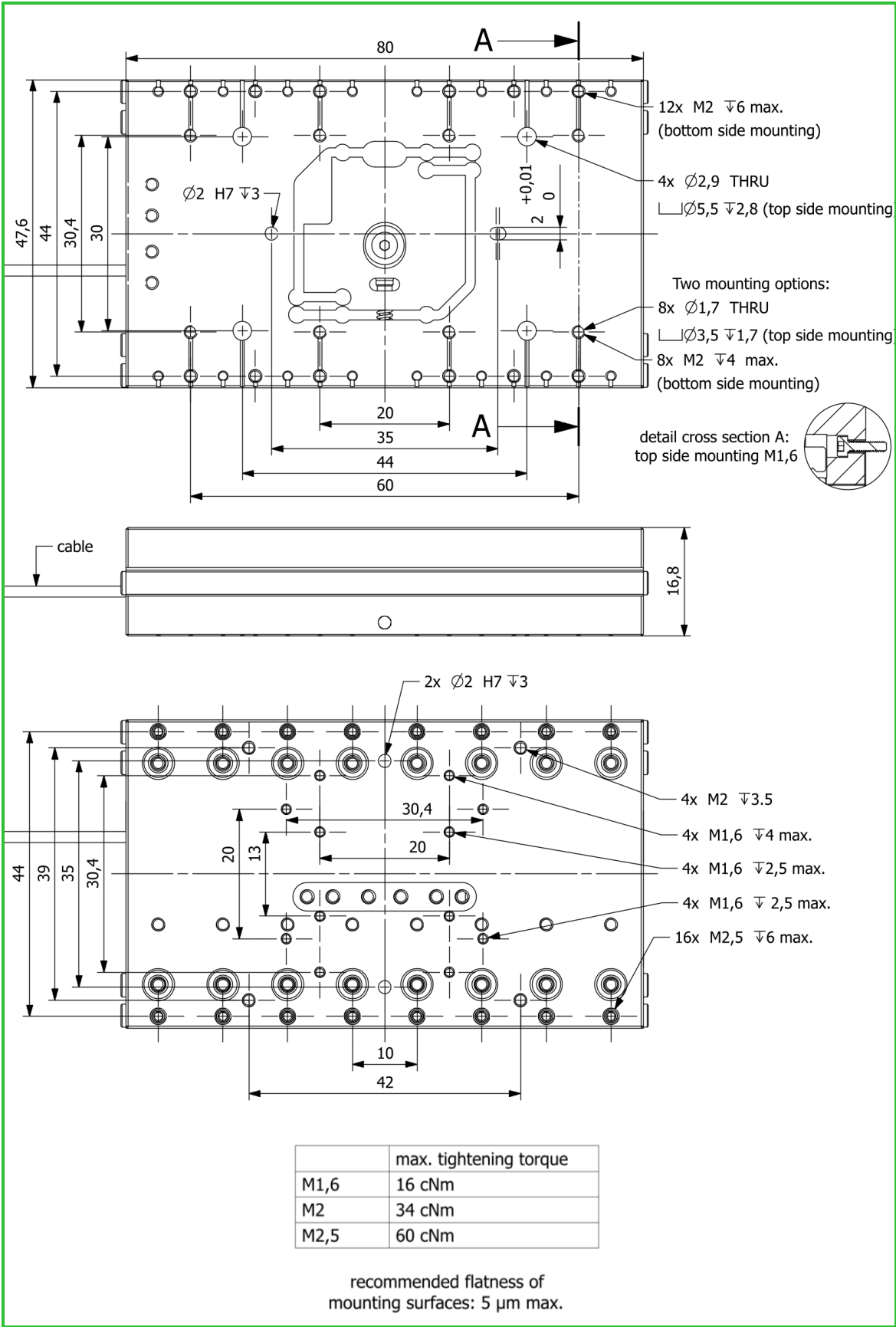
XLS-3-40 assy H7



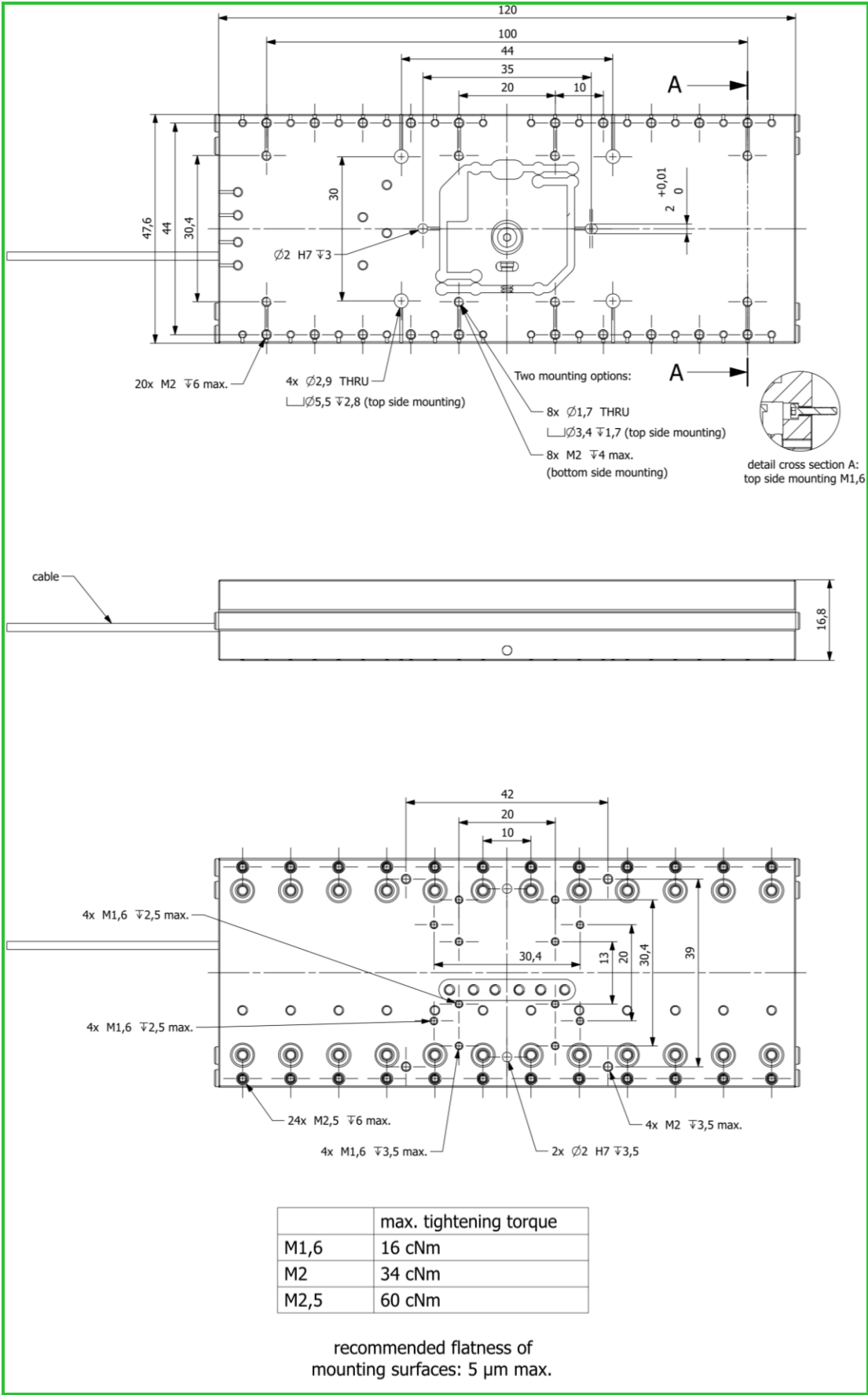
XLS-3-60 assy H7



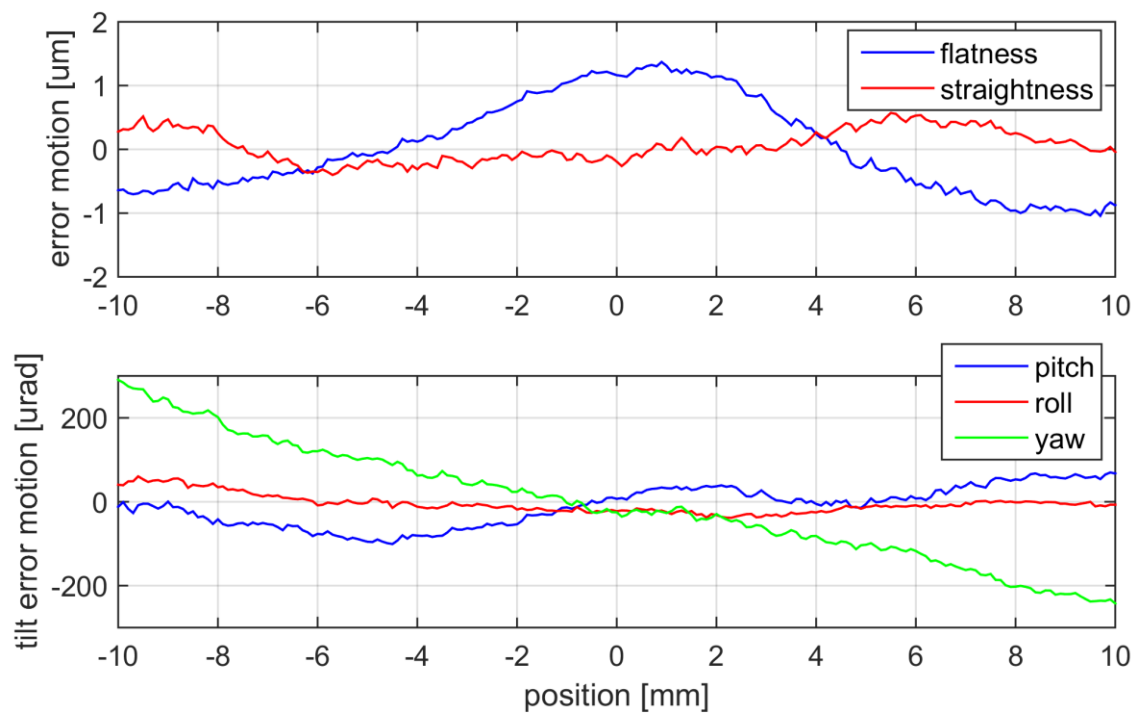
XLS-3-80 assy H7



XLS-3-120 assy H



MEASUREMENT DATA



Typical error motion values measured on an XLS-3-40 stage.