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XLS-5 series

Precise linear piezo stage with high force

The XLS-5 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-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 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-5	-40	-1250	not possible	-NM	-SC	-LS	see tables below	
		-312						
		-78						
	-60	same as for XLS-5-40		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-5-40-312-SC-C1-L150**

- XLS-5 series linear stage
- Stage length of 40 mm
- Encoder feedback with a resolution of 312 nm
- 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)	< 6 W
mounting surface flatness	< flatness specification of stage
internal operation voltage	60 V

MOTION PERFORMANCE

resolution			XLS-5 all lengths			unit	tole-rance
			-1250	-312	-78		
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	nm	
	index		1 per full stroke				
STAGE positioning	resolution = min. step size = min. incremental motion (MIM)		1250	350	80	nm	typ.
	unidirectional repeatability		± 1250	± 350	± 80	nm	typ.
	bidirectional repeatability		± 2500	± 700	± 160	nm	typ.
STAGE speed	max. speed		200			mm/s	typ.
	min. speed		5			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	65 30 20			msec	typ.

[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-5 -40	XLS-5 -60	XLS-5 -80	XLS-5 -120	unit	tole-rance
dimensions	length	40	60	80	120	mm	± 0.1
	width	47.6					
	height	16.8					
stroke/ travel range	standard cage short cage (-SC)	25 30	40 48	50 69	100 109	mm	± 0.1
max. acceleration		123	75	55	37	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 lateral	396 396	633 633	792 792	1188 1188	N	max.
	tilt around pitch axis tilt around yaw axis tilt around roll axis	1.50 1.50 7.74	2.25 2.25 12.38	3.00 3.00 15.48	4.50 4.50 23.23	Nm	
driving force		5				N	min.
holding force		5				N	min.
passive holding stiffness		1				N/µm	typ.
stage materials	slider/base coating bearings fasteners	aluminium none (blank) stainless steel 440C; full ceramic (-NM) stainless steel grade A4					
cable	length	150 (standard)				cm	± 5
	type	2x shielded cable, PFA insulation and sheat					
	diameter	Ø1.7				mm	± 0.2

[1] *valid for stages with standard cage*

ERROR MOTION

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

valid for stages with standard cage

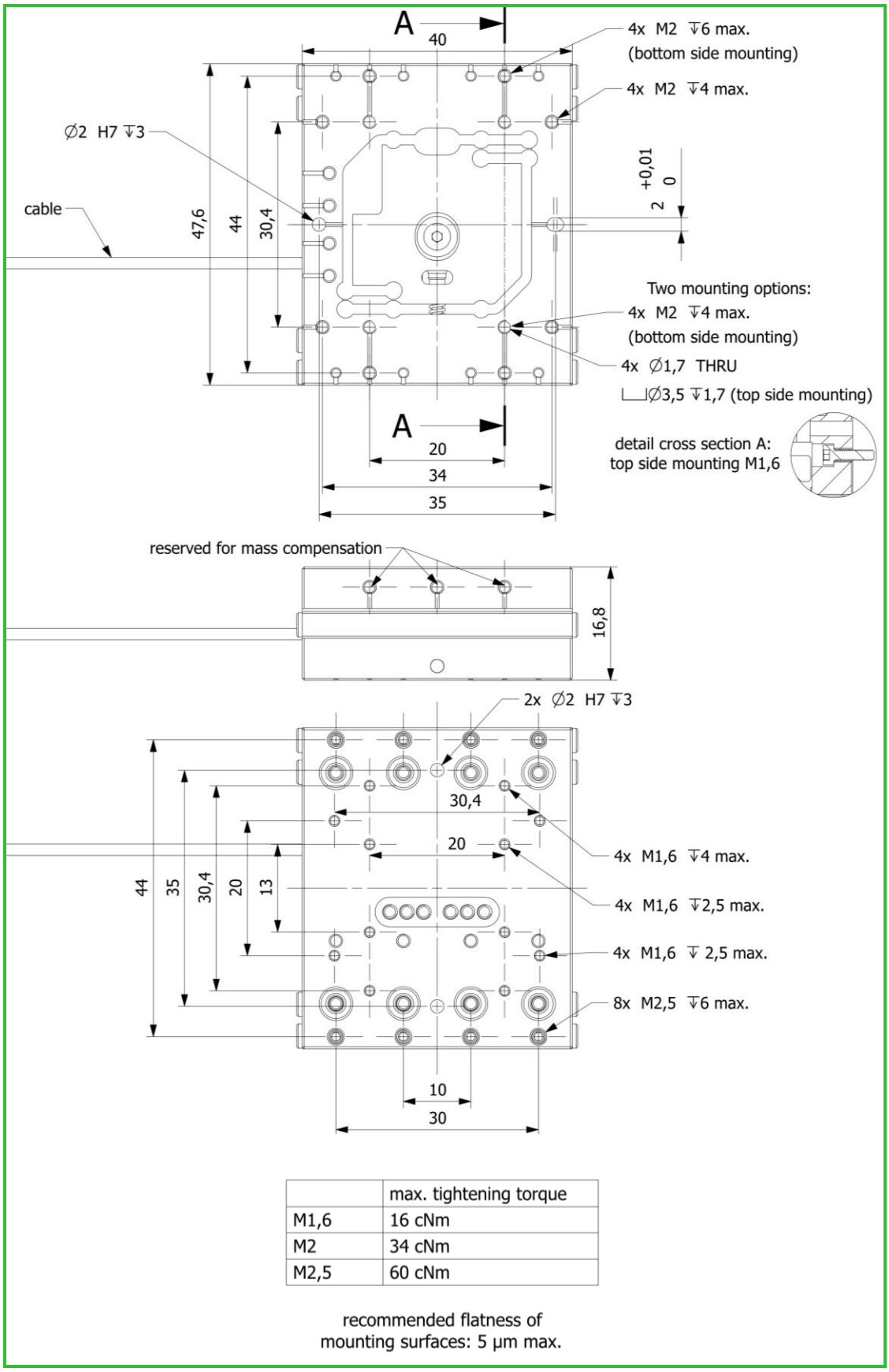
CONTROLLER/SOFTWARE

The XLS-5 series linear stages are compatible with the XD-OEM 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)

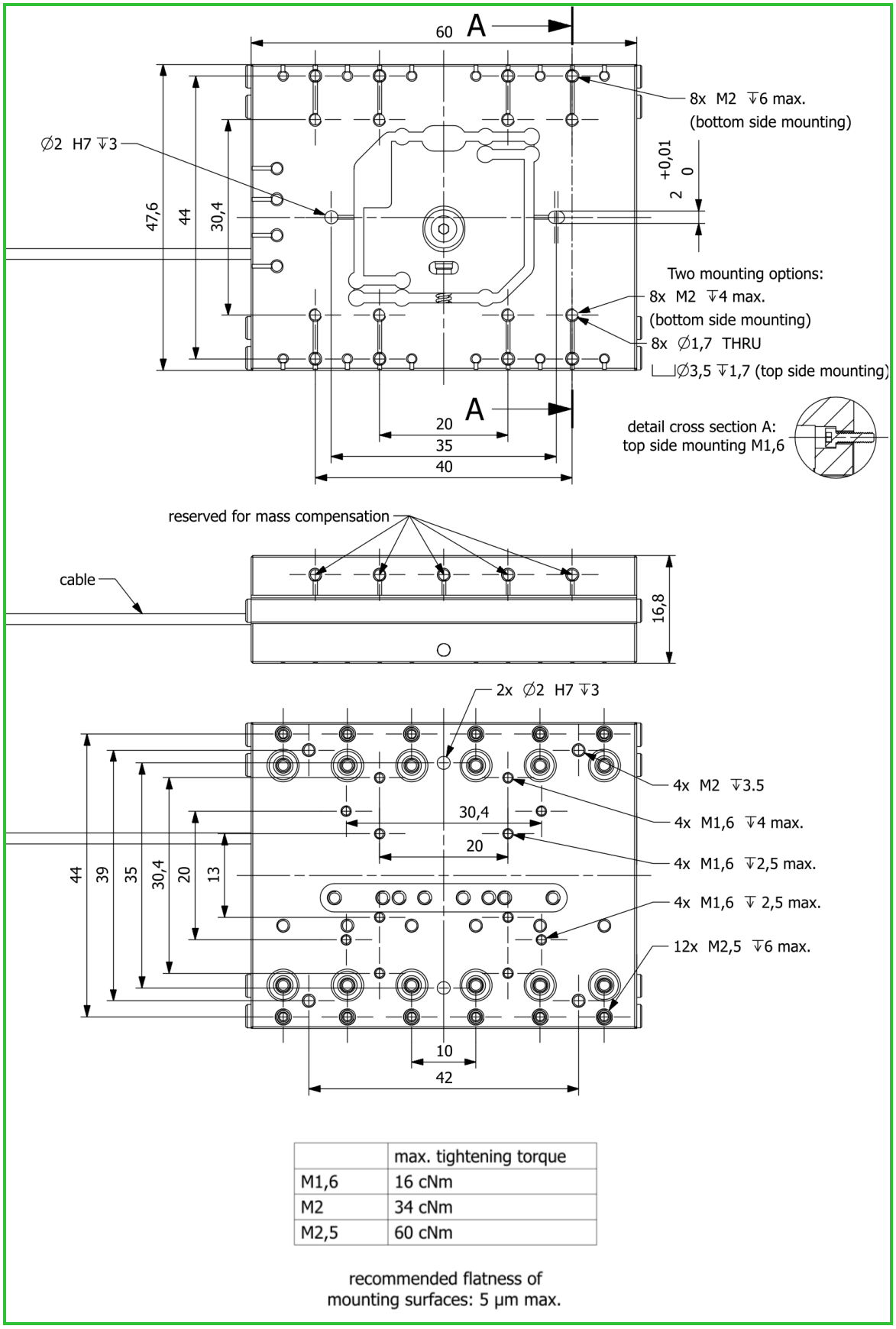
XLS-5-40 assy H7



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

recommended flatness of
mounting surfaces: 5 µm max.

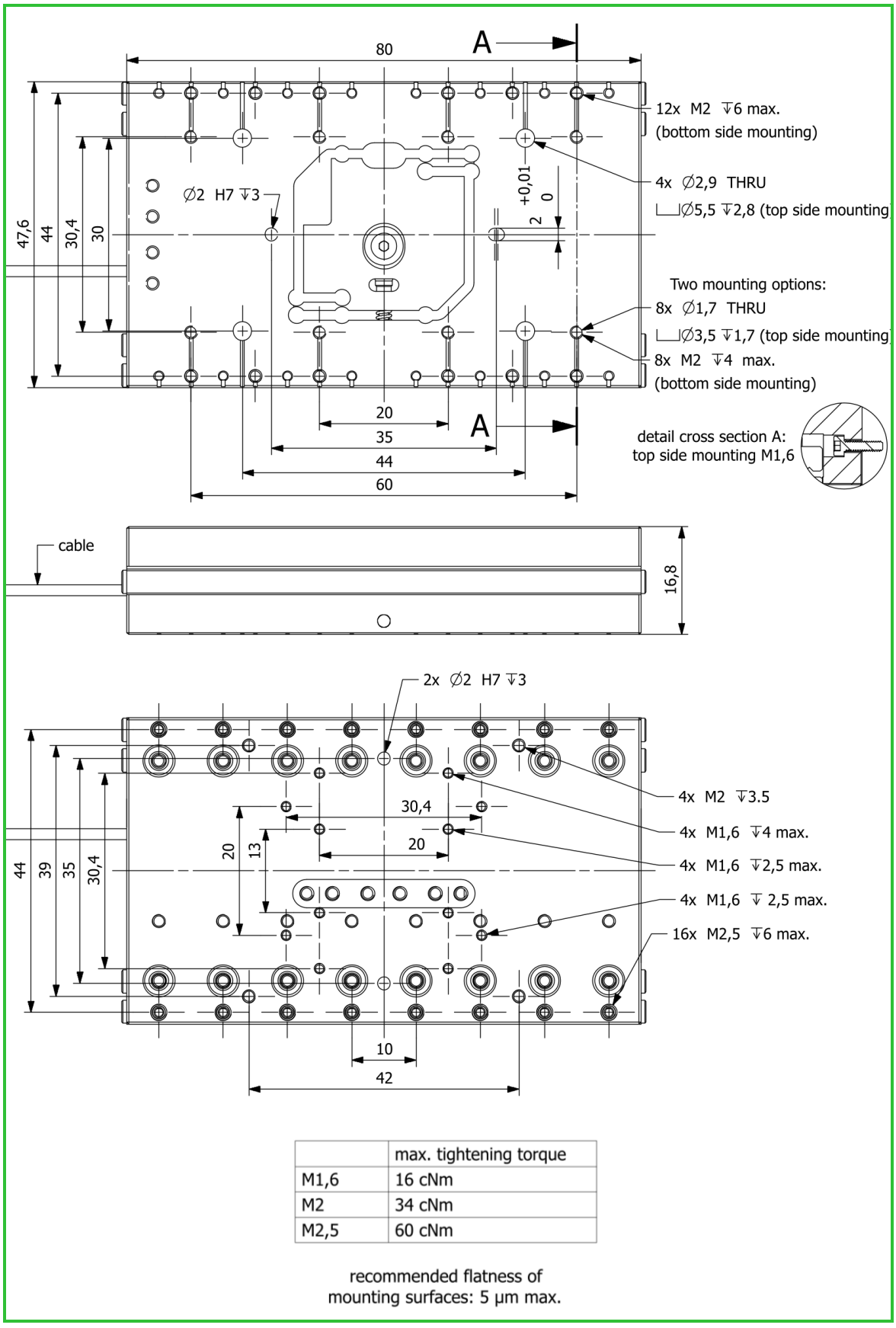
XLS-5-60 assy H7



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

recommended flatness of
mounting surfaces: 5 µm max.

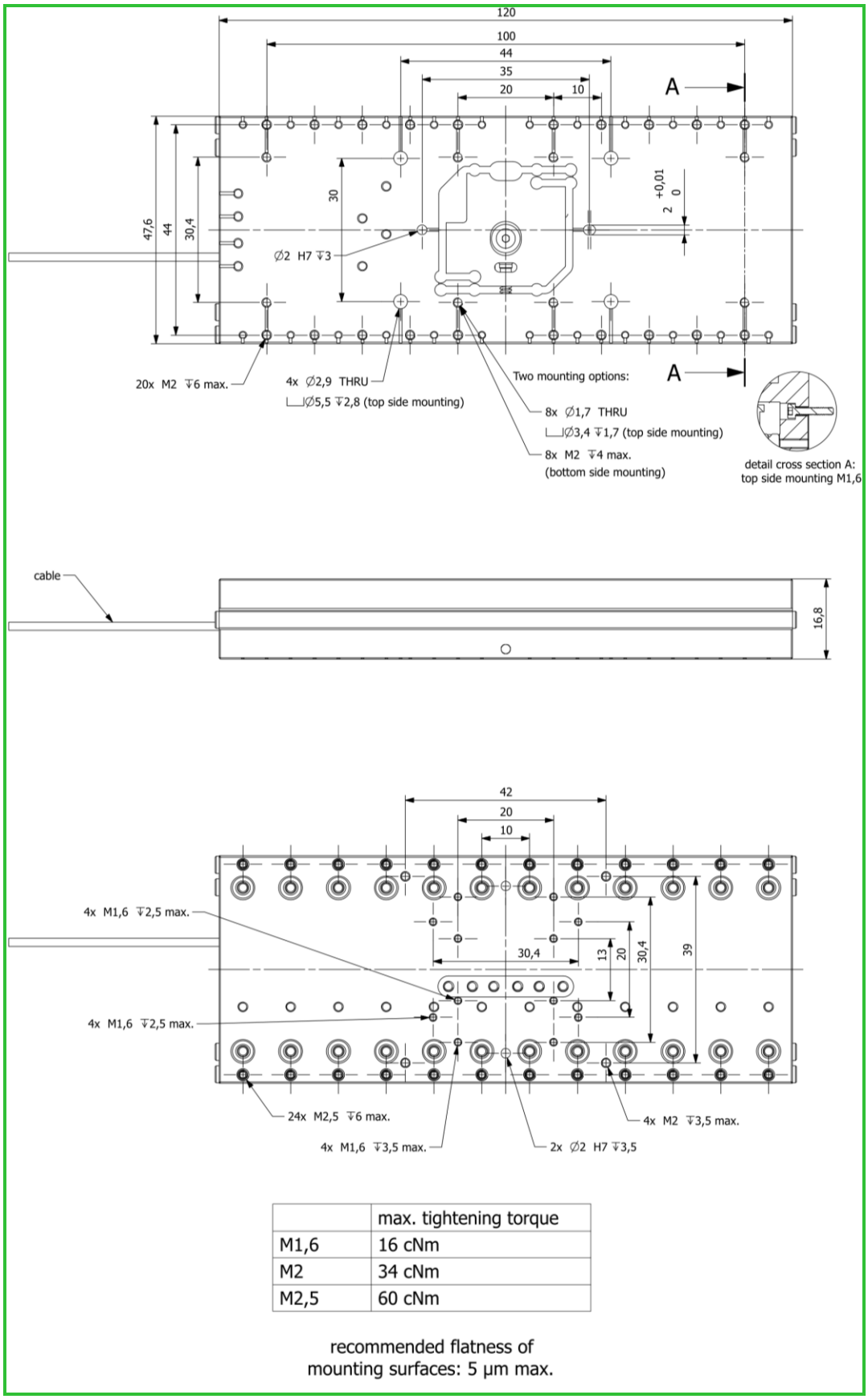
XLS-5-80 assy H7



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

recommended flatness of
mounting surfaces: 5 µm max.

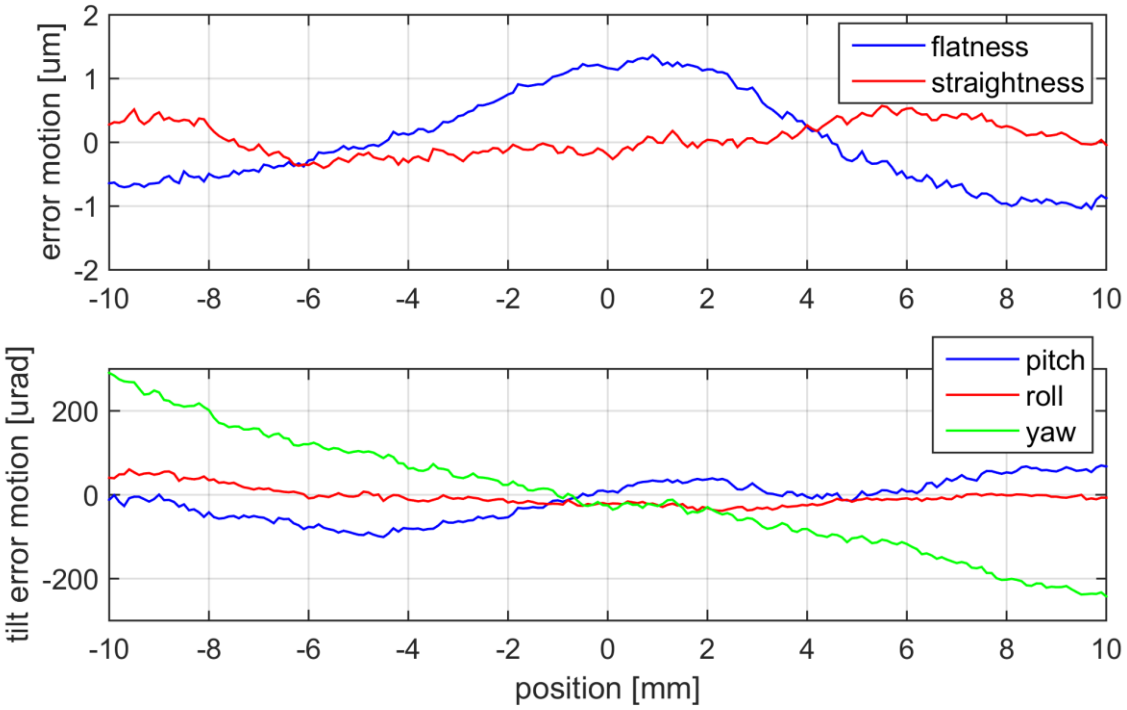
XLS-5-120 assy H7



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

recommended flatness of
mounting surfaces: 5 µm max.

MEASUREMENT DATA



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