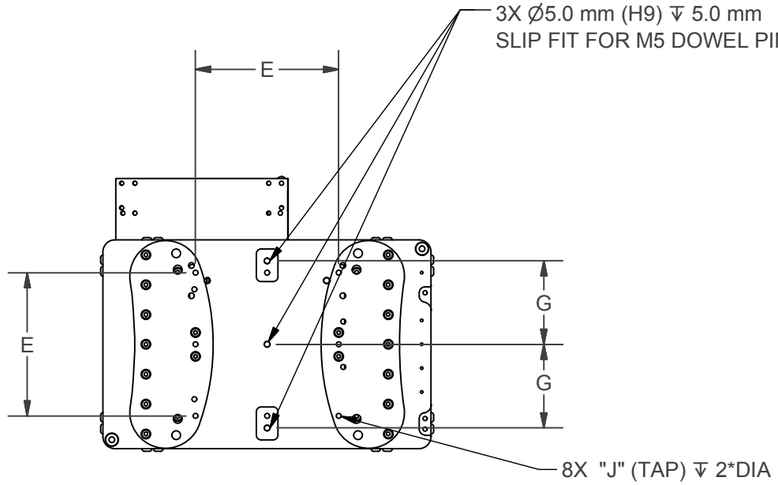
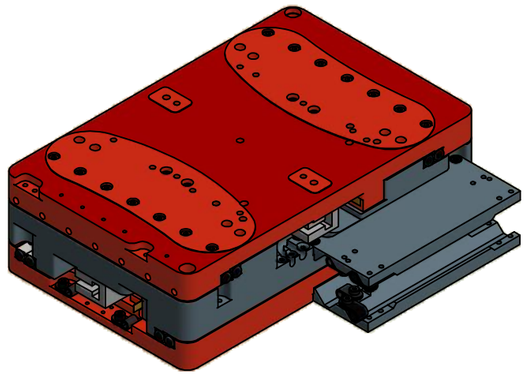
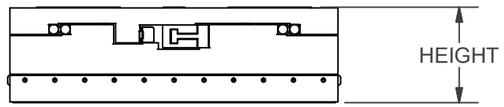
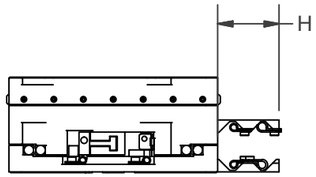
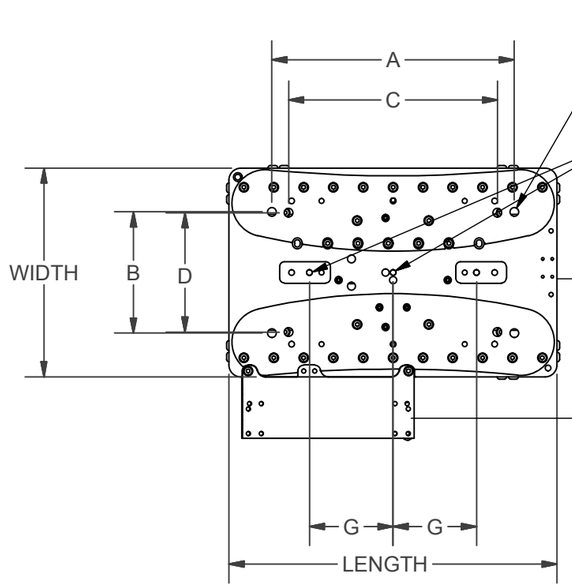








STANDARD FEATURES	
Stage	Monolithic Asymmetrical XY Stage
Travel	TRAVEL_X mm (BOTTOM) by TRAVEL_Y mm (TOP)
	Both X and Y Travles Range from 30mm to 300mm
Motor	Direct Drive Ironless Core Linear Motor
Feedback	Non-Contact Incremental Optical Linear Encoder
	Optional: Non-Contact Absolute Optical Linear Encoder (for Travel >= 60mm)
Scale	20um Pitch Gold Tape Scale
	Optional: 20um Pitch Near Zero CTE ZeroMet Scale
	Optional: Absolute Stainless Steel or Near Zero CTE ZeroMet Scale
Resolution	1Vp-p Sin-Cos Analog Output (~4.88nm with 4096 Interpolation)
	Digital AQB options available between 1nm and 5um (reduced speeds may apply)
	Absolute options available between 1nm and 100nm
Sensors	Integrated Optical Latching Home Index and End of Travel Magnetic NPN Limits
Bearings	High Precision Crossed Roller Bearings
Cables	High Flex, 10M Cycle, 3m Length from Component (Standard) (some length consumed inside stage), ~5mm OD, 20mm Dynamic Bend Radius (Motor and Encoder)
Cable Routing	Integrated Top Axis Cable Routing (for Travel >= 100mm)
	Customer Cable Routing Integrated Upon Request
Hard Stops	Integrated End-of-Travel Hard Stops
Orientation	Horizontal Only; Inverted Ok
Structure	Black Anodized Aluminum 6061-T6
Maintenance	Stages are Greased for Life in Normal Environment; No Maintenance
Environment	Standard
	Optional: Clean Room or Vacuum (10^-6 Torr)
Temperature	Operating: 0°C to 50°C (precision not guaranteed throughout entire range)
	Storage/Transport: -20°C to 70°C
Humidity	10% to 80% Non-Condensing
Precision	6-D Nano Precision ™ Test Methods



NOTE: MODEL AI-LM-160x100-XY SHOWN.

TRAVEL_X	TRAVEL_Y	LENGTH	WIDTH	HEIGHT	A (inch)	B (inch)	C	D	E	G	H	I	J
160	100	275	175	80	8	4	175	100	120	70	52	M6 or 1/4-20	M5

* All units millimeters unless otherwise noted.
* All hole patterns centered on M5 dowel pin hole at center of stage.
* All dimensions and visual representations reflect stage at mid-stroke or home position.
* Custom and intermediate sizes available.
* Compact sizes with minimal performance impact available.

DRAWN QWOLF 2021-01-12
CHECKED
Tolerances: x.x ± 0.5 mm, x.xx ± 0.13 mm, x.xxx ± 0.05 mm, ANGLES ± 0.5°
Surface Roughness: √ RMS MAX.
MATERIAL
FINISH SEE NOTES

ALIO 6-D

TITLE

AI-LM-(TRAVEL_X)x(TRAVEL_Y)-XY

SIZE B | DWG NO 0010-08064 | REV 002

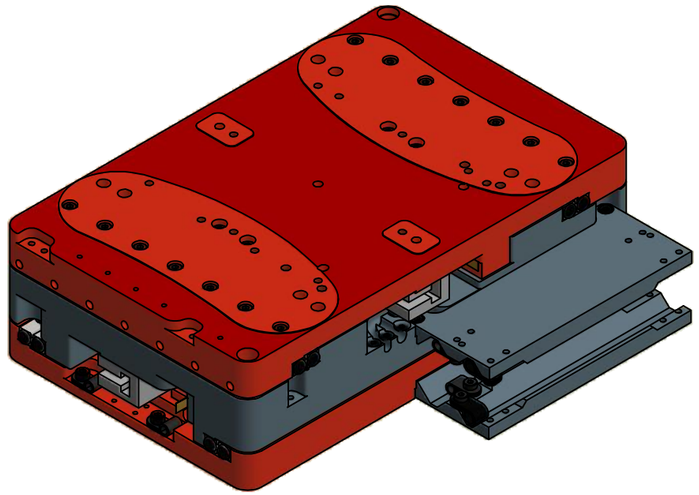
SCALE | 0090-07999-016 ALIO STD TEMPLATE | SHEET 1 OF 2

ALIO STAGE AND MOTOR SPECIFICATIONS

MODEL	UNITS	AI-LM-160x100-XY			
NOMINAL XY TRAVEL FROM HOME INDEX	mm	+/- 80	<--X	Y-->	+/- 50
MAGNETIC LIMIT LOCATIONS (+1/-3mm)	mm	+/- 82.5	<--X	Y-->	+-52.5
HARD STOP LOCATIONS (+/- 1mm)	mm	+/- 83.5	<--X	Y-->	+/- 53.5
PERFORMANCE SPECIFICATIONS [1]		(STD)	ULTRA		NANO
LINEAR DISPLACEMENT ACCURACY	um	+/- 3.0	+/- 0.7		+/- 0.4
BIDIRECTIONAL LINEAR REPEATABILITY	nanometers	+/- 30			
HOME INDEX BIDIRECTIONAL REPEATABILITY		< +/- 1 encoder count			
RESOLUTION	--	Standard: ~4.88nm after 4096 Interpolation (Digital AQB options available between 1nm and 5um) (Absolute options available between 1nm and 100nm)			
STRAIGHTNESS	um	+/- 1.0	+/- 0.7		+/- 0.4
FLATNESS [2]	um	+/- 3.0	+/- 1.5		
PITCH [2]	arc-sec	+/- 15.0			
YAW	arc-sec	+/- 15.0			
ROLL	arc-sec	+/- 8.0			
ORTHOGONALITY	arc-sec	+/- 20.0	+/- 5.0		+/- 1.0
MOTION PROFILE SPECIFICATIONS					
MAX VELOCITY [3]	m/s	1.0	<--X	Y-->	1.0
MAX PEAK ACCELERATION [3]	G	1.5	<--X	Y-->	2.5
MAX PAYLOAD CAPABILITY	kg	25			
ASSEMBLY MASS	kg	11.4			
MOVING MASS	kg	8.4	<--X	Y-->	2.9
MOTOR INFORMATION					
MOTOR TYPE	--	LINEAR BRUSHLESS SERVO MOTOR			
MOTOR MODEL	--	AI-LM-144BSN-D	<--X	Y-->	AI-LM-144ASN-D
MAGNETIC PITCH (N-N)	mm	30.48			
MAX VOLTAGE (LINE TO LINE) [4]	V	500			
ELECTRICAL TIME CONSTANT	msec	0.22			
MAX MOTOR TEMP	°C	125			
MOTOR THERMISTOR	--	NEGATIVE COEFICIENT THERMISTOR: GE TYPE AL03006-5818-97-K, MATL:GE9.7A			
MOTOR CONNECTION	--	DELTA			
MOTOR CONSTANT	N/sqrt(W)	4.18	<--X	Y-->	2.96
FORCE CONSTANT	N/Apk	16.8	<--X	Y-->	8.4
PHASE RESISTANCE (@ 25°C) [5]	Ohm	11.60	<--X	Y-->	5.79
PHASE RESISTANCE (@ 125°C) [5]	Ohm	16.07	<--X	Y-->	8.04
INDUCTANCE @ 1kHz	mH	2.5	<--X	Y-->	1.3
CONTINUOUS FORCE [6]	N	53.3	<--X	Y-->	26.7
CONTINUOUS CURRENT [6]	Apk	3.18	<--X	Y-->	3.18
PEAK FORCE [7]	N	169	<--X	Y-->	84
PEAK CURRENT [7]	Apk	10.06	<--X	Y-->	10.06
BACK EMF CONSTANT	V/m/s	16.8	<--X	Y-->	8.4

Notes:

1. Specifications measured on stage centerline at nominal 20°C, ~50mm above mounting surface with no payload. Standard describes typical values, Ultra and Nano are guaranteed. ALIO provides NIST traceable proof for all options/specs per quote.
2. Flatness specifications dependent on system base. Contact ALIO for more information.
3. Axis limitation at no load. Based on 100% S-curve profile. Does not account for limitatios due to amplifier, resolution, position error, or duty cycle.
4. Back EMF plus IR drop must not exceed maximum line to line bus voltage.
5. Resistance values do not include cable resistance. Cable resistance adds 0.146 ohm/m.
6. Continuous operating limits are based on continuous operation at maximum temperature with aluminum heat sink (300mm x 12.5mm x motor length).
7. Maximum on time at peak operating limits is 10 seconds.
8. All electrical specifications may vary by 12% from listed values.
9. Additional motor and travel options are available for each stage for optimized performance as necessary per customer requirements.



ALIO INDUSTRIES PROPRIETARY DOCUMENT
5335 XENON ST, ARVADA, CO 80002 USA
(Tel) 303.339.7500 - WWW.ALIOINDUSTRIES.COM

DRAWN	QWOLF 2021-01-12
CHECKED	
Tolerances: x.x ± 0.5 mm, x.xx ± 0.13 mm, x.xxx ± 0.05 mm, ANGLES ± 0.5˚	Surface Roughness: RMS MAX.
MATERIAL	
FINISH	SEE NOTES

ALIO 6-D

TITLE

AI-LM-(TRAVEL_X)x(TRAVEL_Y)-XY

SIZE	DWG NO	REV
B	0010-08064	002

SCALE | 0090-07999-016 ALIO STD TEMPLATE | SHEET 2 OF 2