

TRAVEL	THRU	LENGTH	HEIGHT	A (inch)	B (inch)	C	D	E	F	G	H	I	J	K	L
100	100	230	64	5	3	150	75	201.5	214.5	120	70	129.25	52	M6 or 1/4-20	M5
150	150	326.5	68	7	5	200	100	280	310	170	100	177.5	52	M6 or 1/4-20	M6
200	200	392	80	11	7	300	150	360	379	225	125	212	65	M6 or 1/4-20	M6
250	250	460	95	11	7	300	150	428	447	275	150	246	96	M6 or 1/4-20	M6
300	300	500	120	16	12	400	350	500	500	325	175	250	96	M8 or 5/16-18	M6
350	350	550	120	16	12	400	350	550	550	375	200	275	96	M8 or 5/16-18	M6
400	400	650	120	20	12	500	350	650	650	425	225	325	125	M12 or 1/2-13	M8

\* All units millimeters unless otherwise noted.  
 \* All hole patterns centered on aperture centerline.  
 \* All dimensions and visual representations reflect the stage at home or mid-stroke position.  
 \* Custom and intermediate sizes available.

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 5335 XENON ST, ARVADA, CO 80002 USA  
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STANDARD FEATURES	
Stage	Open Center Monolithic XY Stage
Travel	100mm to 400mm
Motor	Direct Drive Ironless Core Linear Motor
Feedback	Non-Contact Incremental Optical Linear Encoder Optional: Non-Contact Absolute Optical Linear Encoder
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 Customer Cable Routing Integrated Upon Request
Hard Stops	Integrated End-of-Travel Hard Stops
Oreintation	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 <sup>-6</sup> 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-15000E-150-XY SHOWN

NOTE: THRU HOLE AND TAP MOUNTING FEATURES (I & J) ARE PRESENT ON TOP AND BOTTOM MOUNTING SURFACES EVEN THOUGH DIMENSIONS ARE ONLY SHOWN ON ONE SURFACE.

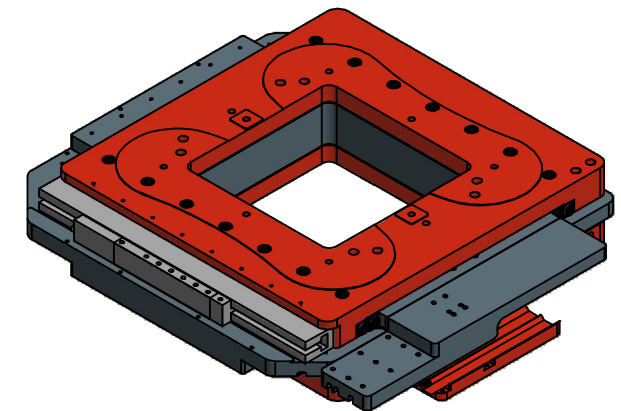
DRAWN	QWOLF	2022-07-13
CHECKED		
Tolerances:		Surface Roughness: RMS MAX.
MATERIAL		
FINISH SEE NOTES		

TITLE		
AI-LM-(TRAVEL)00E-(THRU)-XY		
SIZE	DWG NO	REV
B	0010-08001	007
SCALE	0090-07999-016 ALIO STD TEMPLATE	SHEET 1 OF 2



# ALIO STAGE AND MOTOR SPECIFICATIONS

MODEL	UNITS	AI-LM-10000-100-XY	AI-LM-15000-150-XY	AI-LM-20000-200-XY	AI-LM-25000-250-XY	AI-LM-30000-300-XY	AI-LM-35000-350-XY	AI-LM-40000-400-XY	
NOMINAL XY TRAVEL FROM HOME INDEX	mm	+/- 50	+/- 75	+/- 100	+/- 125	+/- 150	+/- 175	+/- 200	
MAGNETIC LIMIT LOCATIONS (+1/-3mm)	mm	+/- 50.5	+/- 75.75	+/- 101	+/- 126	+/- 150	+/- 175	+/- 201	
HARD STOP LOCATIONS (+/-1mm)	mm	+/- 52	+/- 77	+/- 103	+/- 127.5	+/- 152	+/- 177.5	+/- 203	
PERFORMANCE SPECIFICATIONS [1]		(STD) ULTRA NANO	(STD) ULTRA NANO	(STD) ULTRA NANO	(STD) ULTRA NANO	(STD) ULTRA NANO	(STD) ULTRA NANO	(STD) ULTRA NANO	
LINEAR DISPLACEMENT ACCURACY	um	+/- 4.0 +/- 1.0 +/- 0.5	+/- 4.0 +/- 1.2 +/- 0.6	+/- 6.0 +/- 1.5 +/- 0.8	+/- 6.0 +/- 1.5 +/- 1.0	+/- 8.0 +/- 1.5 +/- 1.0	+/- 10.0 +/- 2.0 +/- 1.5	+/- 16.0 +/- 2.5 +/- 1.5	
BIDIRECTIONAL LINEAR REPEATABILITY	nanometers	+/- 50							
HOME INDEX BIDIRECTIONAL REPEATABILITY		< +/- 1 encoder count							
RESOLUTION	nanometers	Standard: ~ 4.88nm after 4096 Interpolation (Digital AQB options available between 1nm and 5um) (Absolute options available between 1nr							
STRAIGHTNESS	um	+/- 2.0 +/- 1.0 +/- 0.5	+/- 3.0 +/- 1.2 +/- 0.6	+/- 3.0 +/- 1.5 +/- 0.8	+/- 4.0 +/- 1.5 +/- 1.0	+/- 5.0 +/- 1.5 +/- 1.0	+/- 6.0 +/- 2.0 +/- 1.5	+/- 10.0 +/- 2.5 +/- 1.5	
FLATNESS [2]	um	+/- 2.0 +/- 1.0	+/- 3.0 +/- 1.5	+/- 4.0 +/- 2.0	+/- 5.0 +/- 2.0	+/- 6.0 +/- 3.0	+/- 10.0 +/- 4.0	+/- 12.0 +/- 5.0	
PITCH [2]	arc-sec	+/- 10.0	+/- 15.0	+/- 15.0	+/- 18.0	+/- 18.0	+/- 20.0	+/- 20.0	
YAW	arc-sec	+/- 10.0	+/- 15.0	+/- 15.0	+/- 18.0	+/- 18.0	+/- 20.0	+/- 20.0	
ROLL	arc-sec	+/- 10.0	+/- 15.0	+/- 15.0	+/- 18.0	+/- 18.0	+/- 20.0	+/- 20.0	
ORTHOGONALITY	arc-sec	+/- 20.0 +/- 5.0 +/- 1.0	+/- 20.0 +/- 5.0 +/- 1.0	+/- 20.0 +/- 5.0 +/- 1.0	+/- 20.0 +/- 5.0 +/- 1.0	+/- 20.0 +/- 5.0 +/- 1.0	+/- 20.0 +/- 5.0 +/- 1.0	+/- 20.0 +/- 5.0 +/- 1.0	
MOTION PROFILE SPECIFICATIONS									
TOP AXIS MAX VELOCITY [3]	m/s	1.4	1.7	2.0	1.9	1.7	1.8	1.8	
BOT AXIS MAX VELOCITY [3]	m/s	0.8	1.0	1.1	1.3	1.2	1.1	1.0	
TOP AXIS MAX PEAK ACCELERATION [3]	G	4.0	4.0	4.0	3.0	2.0	2.0	1.8	
TOP AXIS MAX PEAK ACCELERATION [3]	G	1.6	1.4	1.4	1.4	1.0	0.8	0.6	
MAX PAYLOAD CAPABILITY	kg	25	25	30	40	50	50	50	
ASSEMBLY MASS	kg	6.5	14	23	37	58	64	104	
BOT AXIS MOVING MASS	kg	5.0	11	18	29	40	46	72	
TOP AXIS MOVING MASS	kg	1.8	3.7	6.5	11	17	20	30	
MOTOR INFORMATION									
MOTOR TYPE	-	LINEAR BRUSHLESS SERVO MOTOR							
MOTOR MODEL	-	AI-LM-144ASN-D	AI-LM-144BSN-D	AI-LM-256BSN-D	AI-LM-256CSN-D	AI-LM-256CSN-D	AI-LM-256CSN-D	AI-LM-256DSN-D	
MAGNETIC PITCH (N-N)	mm	30.48							
MAX VOLTAGE (LINE TO LINE) [4]	V	500							
ELECTRICAL TIME CONSTANT (@ 25°C)	msec	0.22	0.22	0.20	0.20	0.20	0.20	0.20	
MAX MOTOR TEMP	°C	125	125	130	130	130	130	130	
MOTOR THERMISTOR (options available)	-	NEGATIVE COEFFICIENT THERMISTOR: GE TYPE AL03006-5818-97-K, MATERIAL: GE9.7A							
MOTOR CONNECTION	-	DELTA							
MOTOR CONSTANT	N/sqrt(W)	2.96	4.18	7.04	8.62	8.62	8.62	9.96	
FORCE CONSTANT	N/Apk	8.4	16.8	28.7	43.0	43.0	43.0	57.4	
PHASE RESISTANCE (@ 25°C) [5]	Ohm	5.79	11.60	11.74	17.60	17.60	17.60	23.47	
PHASE RESISTANCE (@ MAX°C) [5]	Ohm	8.04	16.07	16.59	24.89	24.89	24.89	33.18	
INDUCTANCE @ 1kHz	mH	1.3	2.5	2.3	3.5	3.5	3.5	4.7	
CONTINUOUS FORCE [6]	N	26.7	53.3	93.1	139.7	139.7	139.7	186.3	
CONTINUOUS CURRENT [6]	Apk	3.18	3.18	3.25	3.25	3.25	3.25	3.25	
PEAK FORCE [7]	N	84	169	295	442	442	442	589	
PEAK CURRENT [7]	Apk	10.06	10.06	10.27	10.27	10.27	10.27	10.27	
BACK EMF CONSTANT	V/m/s	8.4	16.8	28.7	43.0	43.0	43.0	57.4	



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- Notes:
- 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.
  - Flatness specifications dependent on system base. Contact ALIO for more information.
  - Axis limitation at no payload. Based on 100% S-curve profile. Does not account for limitations due to amplifier, resolution, position error, or duty cycle.
  - Back EMF plus IR drop must not exceed maximum line to line bus voltage.
  - Resistance values do not include cable resistance. Cable resistance adds 0.146 ohm/m.
  - Continuous operating limits are based on continuous operation at maximum temperature with aluminum heat sink (300mm x 12.5mm x motor length).
  - Maximum on time at peak operating limits is 10 seconds.
  - All electrical specifications may vary by 12% from listed values.
  - Additional motor and travel options are available for each stage for optimized performance as necessary per customer requirements.

DRAWN <b>QWOLF</b> CHECKED  Tolerances: Surface Roughness: x.x ± 0.5 mm x.xx ± 0.13 mm x.xxx ± 0.05 mm ANGLES ± 0.5° MATERIAL FINISH <b>SEE NOTES</b>	2022-07-13   RMS MAX.	TITLE <b>AI-LM-(TRAVEL)00E-(THRU)-XY</b>	SIZE <b>B</b>	DWG NO <b>0010-08001</b>	REV <b>007</b>
SCALE		0090-07999-016 ALIO STD TEMPLATE SHEET 2 OF 2			

