

STANDARD FEATURES	
Stage	Linear Stage
Travel	30mm to 300mm
Motor	Direct Drive Ironless Core Linear Motor
Feedback	Non-Contact Incremental Optical Linear Encoder
Scale	20um Pitch Gold Tape Scale Optional: 20um Pitch 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)
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)
Hard Stops	Integrated End-of-Travel Hard Stops
Orientation	Horizontal Only; Can be Mounted on Horizontal or Vertical Surface; 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 through entire range) Storage/Transport: -20°C to 70°C
Humidity	10% to 80% Non-Condensing
Precision	6-D Nano Precision™ Test Methods

TRAVEL	LENGTH	WIDTH	HEIGHT	A (inch)	B (inch)	C	D	E	F	G	H	I	J
30	104	120	32	3	2	80	100	25	60	37.5	M4	M5	M4
60	130	120	32	4	2	80	100	50	60	37.5	M6 OR 1/4-20	M5	M5
100	190	120	32	6	2	80	100	50	60	75	M6 OR 1/4-20	M5	M5
150	229	120	32	6	2	80	100	50	60	75	M6 OR 1/4-20	M5	M5
200	279	120	32	6	2	80	100	50	60	75	M6 OR 1/4-20	M5 (8X)	M5 (10X)
250	404	154	48	13	3	80	100	50	75	100	M6 OR 1/4-20	M6 (8X)	M6 (10X)
300	506	120	48	15	3	80	100	50	75	100	M6 OR 1/4-20	M6 (8X)	M6 (10X)

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

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 5335 XENON ST, ARVADA, CO 80002 USA  
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DRAWN	QWOLF	2021-02-04
CHECKED		
Tolerances: Surface Roughness: x.x ± 0.5 mm x.xx ± 0.13 mm x.xxx ± 0.05 mm ANGLES ± 0.5° MATERIAL FINISH SEE NOTES		

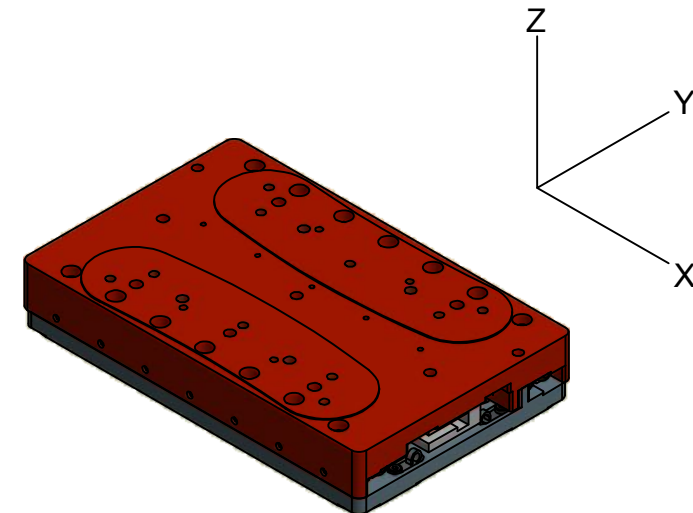
TITLE		
AI-CM-(TRAVEL)00		
SIZE	DWG NO	REV
B	0010-08003	008
SCALE	0090-07999-016 ALIO STD TEMPLATE SHEET 1 OF 2	

NOTE: MODEL AI-CM-10000 SHOWN.



# ALIO STAGE AND MOTOR SPECIFICATIONS

MODEL	UNITS	AI-CM-3000	AI-CM-6000	AI-CM-10000	AI-CM-15000	AI-CM-20000	AI-CM-25000	AI-CM-30000															
NOMINAL TRAVEL FROM HOME INDEX	mm	+/- 15	+/- 30	+/- 50	+/- 75	+/- 100	+/- 125	+/- 150															
MAGNETIC LIMIT LOCATIONS (+1/-3mm)	mm	+/- 14.5	+/- 31	+/- 51	+/- 76	+/- 101	+/- 126	+/- 151															
HARD STOP LOCATIONS (+/- 1mm)	mm	+/- 16	+/- 32	+/- 52	+/- 77	+/- 102	+/- 127	+/- 152															
PERFORMANCE SPECIFICATIONS [1]		(STD)	ULTRA	NANO	(STD)	ULTRA	NANO	(STD)	ULTRA	NANO	(STD)	ULTRA	NANO	(STD)	ULTRA	NANO	(STD)	ULTRA	NANO				
LINEAR DISPLACEMENT ACCURACY	um	+/- 3.0	+/- 0.5	+/- 0.2	+/- 3.0	+/- 0.7	+/- 0.3	+/- 3.0	+/- 1.0	+/- 0.3	+/- 3.0	+/- 1.0	+/- 0.4	+/- 4.0	+/- 1.0	+/- 0.4	+/- 5.0	+/- 1.0	+/- 0.5	+/- 6.0	+/- 1.0	+/- 0.6	
BIDIRECTIONAL LINEAR REPEATABILITY	nanometers	+/- 30																					
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 1nm and 100nm)																					
STRAIGHTNESS IN Y	um	+/- 2.5	+/- 1.5	+/- 1.0	+/- 2.5	+/- 1.5	+/- 1.0	+/- 2.5	+/- 1.5	+/- 1.2	+/- 3.5	+/- 2.5	+/- 1.5	+/- 5.0	+/- 4.0	+/- 3.0	+/- 6.0	+/- 4.0	+/- 3.0	+/- 8.0	+/- 6.0	+/- 4.0	
STRAIGHTNESS IN Z [2]	um	+/- 2.0	+/- 1.0	+/- 1.0	+/- 2.5	+/- 1.5	+/- 1.5	+/- 3.0	+/- 1.5	+/- 4.0	+/- 4.0	+/- 2.0	+/- 5.0	+/- 3.0	+/- 3.0	+/- 6.0	+/- 4.0	+/- 4.0	+/- 8.0	+/- 8.0	+/- 5.0		
PITCH ABOUT Y [2]	arc-sec	+/- 12.0			+/- 12.0			+/- 12.0			+/- 15.0			+/- 15.0			+/- 15.0			+/- 15.0			
PITCH ABOUT Z	arc-sec	+/- 12.0			+/- 12.0			+/- 12.0			+/- 15.0			+/- 15.0			+/- 15.0			+/- 15.0			
PITCH ABOUT X	arc-sec	+/- 12.0			+/- 12.0			+/- 12.0			+/- 15.0			+/- 15.0			+/- 15.0			+/- 15.0			
MOTION PROFILE SPECIFICATIONS																							
MAX VELOCITY [3]	m/s	0.7			0.9			1.0			1.1			1.4	COMING SOON								
MAX ACCELERATION [3]	G	4.0			3.0			2.0			1.8			2.0	COMING SOON								
MAX PAYLOAD CAPABILITY	kg	8			10			12			12			12	COMING SOON								
ASSEMBLY MASS	kg	1.1			1.4			2.2			2.5			3.2	COMING SOON								
MOVING MASS	kg	0.7			0.8			1.3			1.5			1.9	COMING SOON								
MOTOR INFORMATION		LINEAR BRUSHLESS SERVO MOTOR																					
MOTOR TYPE	--	LINEAR BRUSHLESS SERVO MOTOR																					
MOTOR MODEL	--	AI-CM-144AEP-D	AI-CM-144AEP-D	AI-CM-144AEP-D	AI-CM-144AEP-D	AI-CM-144BEP-D	AI-CM-256CEP-D	AI-CM-256CEP-D															
MAGNETIC PITCH (N-N)	mm	30.48																					
MAX VOLTAGE (LINE TO LINE) [4]	V	250																					
ELECTRICAL TIME CONSTANT (@ 25°C)	msec	0.2	0.2	0.2	0.2	0.2	0.12	0.12															
MAX MOTOR TEMP	°C	130																					
MOTOR THERMISTOR (options available)		POSITIVE COEFFICIENT PTC THERMISTOR																					
MOTOR CONNECTION	--	DELTA																					
MOTOR CONSTANT	N/sqrt(W)	1.4	1.4	1.4	1.4	2.0	3.7	3.7															
FORCE CONSTANT	N/Apk	3.4	3.4	3.4	3.4	6.8	17.8	17.8															
PHASE RESISTANCE (@ 25°C) [5]	Ohm	2.8	2.8	2.8	2.8	5.65	8.27	8.27															
PHASE RESISTANCE (@ 130°C) [5]	Ohm	4.0	4.0	4.0	4.0	8.1	11.86	11.86															
INDUCTANCE @ 1kHz	mH	0.6	0.6	0.6	0.6	1.1	1.0	1.0															
CONTINUOUS FORCE [6]	N	10.2	10.2	10.2	10.2	20.5	53.5	53.5															
CONTINUOUS CURRENT [6]	Apk	3.00	3.00	3.00	3.00	3.00	3.00	3.00															
PEAK FORCE [7]	N	30	30	30	30	41	107	107															
PEAK CURRENT [7]	Apk	6.00	6.00	6.00	6.00	6.00	6.00	6.00															
BACK EMF CONSTANT	V/m/s	3.4	3.4	3.4	3.4	6.82	17.8	17.8															



- 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 and Pitch specifications dependent on system base. Contact ALIO for more information.
  - Axis limitation at no payload. Based on 100% S-curve. 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 0.43 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.

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FINISH			SIZE	DWG NO	REV
SEE NOTES			B	0010-08003	008
SCALE			0090-07999-016 ALIO STD TEMPLATE SHEET 2 OF 2		