

STANDARD FEATURES	
Stage	Linear Stage
Travel	60mm to 300mm
Motor	Direct Drive Frameless Torque Motor
Drive	Precision Ball Screw with Anti-Backlash Nut
Feedback	Non-Contact Incremental Optical Linear Encoder Optional: Non-Contact Absolute Optical Linear Encoder (Required for Vertical Axis)
Scale	20um Pitch Gold Plated 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 5000nm (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
Brake Options	Standard: No Brake Included Optional: Pneumatic Release, Spring Engage Brake (-PBRK) Optional: Electric 24VDC Release, Spring Engage Brake (-EBRK)
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 Hard Stops
Orientation	Vertical or Horizontal or Inverted
Structure	Black Anodized Aluminum 6061-T6
Maintenance	Stages are Greased for Life in Normal Environment; No Maintenance
Environment	Standard Optional: Clean Room and Vacuum ( $10^{-6}$ Torr)
Temperature	Operating: 0°C to 50°C (performance 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	LENGTH (-PBRK)	LENGTH (-EBRK)	WIDTH	HEIGHT	A (inch)	B (inch)	C	D	E	F	G	H	I	J	K	L	M
60	225	259	307	120	50	4	2	100	50	80	100	140	50	60	37.5	M6 OR 1/4-20	M5	M5
100	295	329	377	120	50	6	2	125	50	80	100	190	50	60	75	M6 OR 1/4-20	M5	M5
150	370	404	452	120	50	6	2	175	50	80	100	230	50	60	75	M6 OR 1/4-20	M5	M5
200	492	524	571	154	50	12	2	275	50	80	100	335	50	60	100	M6 OR 1/4-20	M6 (8X)	M5 (10X)
250	COMING SOON																	
300	COMING SOON																	

\* 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.

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



AI-VBS-(TRAVEL)00-(BRAKE OPTION)

DRAWN	QWOLF	2020-11-13	TITLE		
CHECKED			AI-VBS-(TRAVEL)00-(BRAKE OPTION)		
<p>Tolerances: Surface Roughness:          x.x <math>\pm</math> 0.5 mm          x.xx <math>\pm</math> 0.13 mm          x.xxx <math>\pm</math> 0.05 mm          ANGLES <math>\pm</math> 0.5°          MATERIAL</p>			SIZE	DWG NO	REV
FINISH			B	0010-08056	005
SEE NOTES			SCALE	0090-07999-016 ALIO STD TEMPLATE	SHEET 1 OF 2

NOTE: MODEL AI-VBS-10000-EBRK SHOWN.



# ALIO STAGE AND MOTOR SPECIFICATIONS

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MODEL	UNITS	AI-VBS-6000			AI-VBS-10000			AI-VBS-15000			AI-VBS-20000		
NOMIAL TRAVEL FROM HOME INDEX	mm	60			100			150			200		
MAGNETIC LIMIT LOCATIONS (+1/-3mm)	mm	+/-31			+/- 51			+/- 76			+/- 101		
HARD STOP LOCATIONS (+/- 1mm)	mm	+/- 32			+/- 52			+/-77			+/- 102		
PERFORMANCE SPECIFICATIONS [1]		(STD)	ULTRA	NANO	(STD)	ULTRA	NANO	(STD)	ULTRA	NANO	(STD)	ULTRA	NANO
LINEAR DISPLACEMENT ACCURACY	um	+/- 3	+/- 0.7	+/- 0.3	+/- 3	+/- 1.0	+/- 0.3	+/- 3	+/- 1.0	+/- 0.4	+/- 4	+/- 1.0	+/- 0.4
BACKLASH	nanometers	0											
BIDIRECTIONAL LINEAR REPEATABILITY	nanometers	+/- 100											
HOME INDEX BIDIRECTIONAL REPEATABILITY													
RESOLUTION	nanometers	Standard: ~4.88nm with 4096 Interpolation (Digital AQB options available between 1nm and 5000nm) (Absolute options available between 1nm and 100nm)											
STRAIGHTNESS IN Y	um	+/- 2.5	+/- 1.5	+/- 1.0	+/- 2.5	+/- 1.5	+/- 1.2	+/- 3.5	+/- 2.5	+/- 1.5	+/- 5	+/- 4	+/- 3
STRAIGHTNESS IN Z [2]	um	+/- 2.5	+/- 1.5	+/- 3.0	+/- 1.5	+/- 4.0	+/- 2.0	+/- 5.0	+/- 3.0				
PITCH ABOUT Y [2]	arc-sec	+/- 15			+/- 15			+/- 15			+/- 15		
PITCH ABOUT Z	arc-sec	+/- 15			+/- 15			+/- 15			+/- 15		
PITCH ABOUT X	arc-sec	+/- 15			+/- 15			+/- 15			+/- 15		
MOTION PROFILE SPECIFICATIONS													
MAX VELOCITY [3]	m/s	0.3			0.3			0.3			0.3		
MAX PEAK ACCELERATION [3]	G	1.0			1.0			1.0			1.0		
MAX PAYLOAD CAPABILITY W/ AXIS ORIENTED HORIZONTAL	kg	20			25			25			25		
MAX PAYLOAD CAPABILITY W/ AXIS ORIENTED VERTICAL	kg	12			12			12			12		
ASSEMBLY MASS	kg	3.0			3.8			4.6			8		
MOVING MASS	kg	0.9			1.3			1.7			2.9		

MOTOR INFORMATION		
MOTOR TYPE	--	FRAMELESS TORQUE MOTOR
MOTOR MODEL	--	AI-TM-044B8-W
MAGNETIC PITCH (N-N)	deg	120
MAX VOLTAGE (LINE TO LINE) [4]	V	340
MAX MOTOR TEMP	°C	155
MOTOR THERMISTOR	--	NONE
MOTOR CONNECTION	--	WYE
MOTOR CONSTANT	Nm/sqrt(W)	0.073
TORQUE CONSTANT	Nm/Arms	0.115
PHASE RESISTANCE (@ 25°C) [5]	Ohm	2.4
INDUCTANCE @ 1kHz	mH	2.5
CONTINUOUS TORQUE [6]	Nm	0.36
CONTINUOUS CURRENT [6]	Arms	3.19
PEAK TORQUE [7]	Nm	1.16
PEAK CURRENT [7]	Apk	10.09
BACK EMF CONSTANT	Vrms/krpm	6.931

BALL SCREW INFORMATION	
SCREW LEAD	2mm
SCREW DIAMETER	10mm
SCREW EFFICIENCY	80%
MAGNETIC PITCH (N-N)	0.667mm
MOTOR CONSTANT	60N/sqrt(W)
FORCE CONSTANT	280N/Arms
CONTINUOUS FORCE	905N
PEAK FORCE	2920N
BACK EMF CONSTANT	200V/m/s
BACKDRIVING FORCE	3N-90N

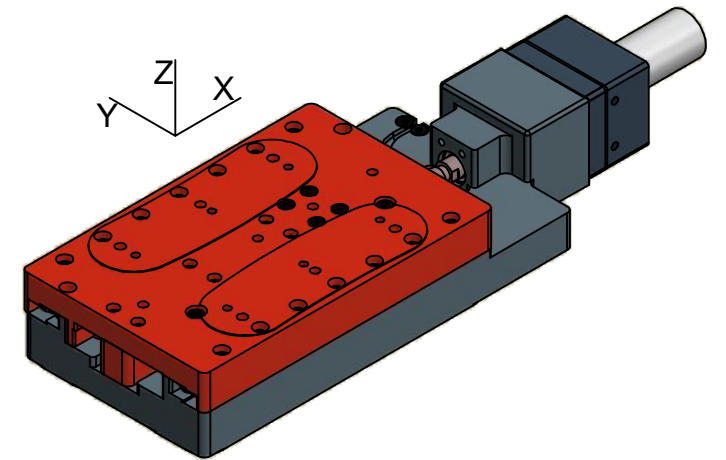
- Notes:
- Specifications measured on stage centerline at 20 +/-1 (performance only guaranteed at actual testing temperature), ~50mm above mounting surface with no payload with axis horizontal. ALIO provides NIST traceable proof for all options/specs per quote.
  - Flatness and Pitch specifications dependent on system base. Contact ALIO for more information.
  - Horizontal stage limitation at no load. 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 0.117 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.

PNEUMATIC BRAKE SPECIFICATIONS	
BRAKE TYPE	HOLDING BRAKE ONLY
BRAKE LOCK (& FAILSAFE)	SPRING ACTIVATED
BRAKE RELEASE	PNEUMATIC ACTIVATED
BRAKE SUPPLY TUBE	4mm Outer Diameter High Flex
MINIMUM SUPPLY PRESSURE	~0.3 Mpa
MAXIMUM SUPPLY PRESSURE	1.0 MPa
MAXIMUM THEORETICAL DISPLACEMENT UPON BRAKE ACTIVATION	~0.1mm
HOLDING FORCE	200N
ENGAGEMENT TIME	<500ms
AIR CONSUMPTION WHILE RELEASED	NEGLIGIBLE
RECOMMENDED AIR QUALITY	5um PARTICLE FILTER AND 1.0mg/m^3 OIL (INCLUDING VAPOR) FILTER AND -20°C WATER PRESSURE DEWPOINT (128PPM VOL.) @ 0.7MPa (ISO 8573.1 CLASS 3)

ALIO provides all pneumatic and electrical circuitry related to brake control only when the stage is sold with a controller.

ELECTRIC SOLENOID BRAKE SPECIFICATIONS	
BRAKE TYPE	HOLIDNG BRAKE ONLY
BRAKE LOCK (& FAILSAFE)	SPRING ACTIVATED
BRAKE RELEASE	ELECTRICALLY ACTIVATED
BRAKE SUPPLY CABLE	5mm Outer Diameter High Flex 3 Lead
VOLTAGE	24V
CURRENT	0.32 Amps
RESISTANCE	744 Ohms
POWER	8 Watts
DUTY CYCLE	100% Continuous
MAXIMUM THEORETICAL DISPLACEMENT UPON BRAKE ACTIVATION	~0.1mm
HOLDING FORCE	200N
ENGAGEMENT TIME	<500ms
BRAKE CABLE PINOUT	WHITE - SOLENOID + BLACK - SOLENOID -

ALIO provides all electrical circuitry related to brake control only when the stage is sold with a controller.



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			TITLE		
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MATERIAL		SIZE	DWG NO	REV	
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SEE NOTES		SCALE	0090-07999-016 ALIO STD TEMPLATE	SHEET	2 OF 2