

TRAVEL	A (QTY)	B (QTY)	C
50	6	4	50
100	6	4	75
150	8	6	100
200	8	6	125
250	10	8	150
300	10	8	175
350	12	10	200
400	12	10	225
450	12	10	250
500	14	12	275

\* All units millimeters unless otherwise noted.  
 \* All hole patterns centered on M5 dowel pin hole at center of stage.

STANDARD FEATURES	
Stage	Linear Stage
Travel	50mm to 500mm
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 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	Dual Recirculating Ball Rail Bearings
Brake Options	Standard: No Brake Included Optional: Pneumatic Release, Spring Engage Brake (-PBRK) Optional: Electric 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)
Cable Routing	Integrated ALIO Cable Routing; Customer Cable Routing Upon Request
Hard Stops	Integrated End-of-Travel Rubber Bumpers
Orientation	Any (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 <sup>-6</sup> 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

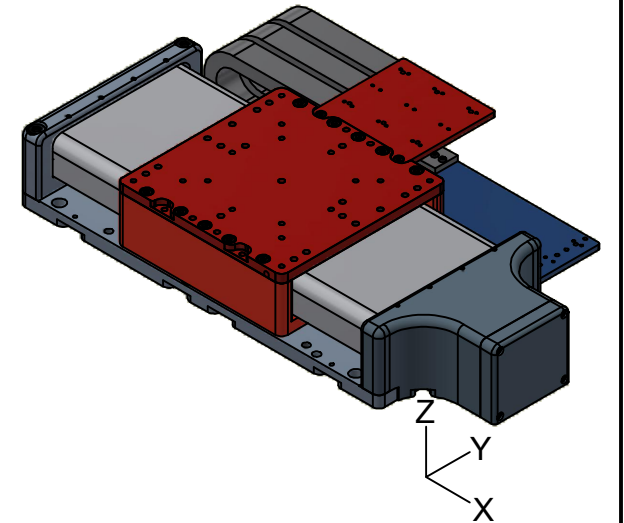
ALIO INDUSTRIES PROPRIETARY DOCUMENT  
 5335 XENON ST, ARVADA, CO 80002 USA  
 (Tel) 303.339.7500 - WWW.ALIOINDUSTRIES.COM

DRAWN	QWOLF	2021-01-29
CHECKED		
Tolerances: Surface Roughness: x.x ± 0.5 mm x.xx ± 0.13 mm x.xxx ± 0.05 mm ANGLES ± 0.5° MATERIAL		RMS MAX.
FINISH	SEE NOTES	

TITLE		
AI-SBS-(TRAVEL)00-μII-(BRAKE OPTION)		
SIZE	DWG NO	REV
B	0010-08057	003
SCALE	0090-07999-016 ALIO STD TEMPLATE	SHEET 1 OF 2

NOTE: MODEL AI-SBS-15000-UII SHOWN.

# ALIO STAGE AND MOTOR SPECIFICATIONS



MODEL	UNITS	AI-SBS-5000-UII	AI-SBS-10000-UII	AI-SBS-15000-UII	AI-SBS-20000-UII	AI-SBS-25000-UII	AI-SBS-30000-UII	AI-SBS-35000-UII	AI-SBS-40000-UII	AI-SBS-45000-UII	AI-SBS-50000-UII
NOMINAL TRAVEL	mm	50	100	150	200	250	300	350	400	450	500
TRAVEL B/W LIMITS (+1/-3mm)	mm	+/- 25.5	+/- 50.5	+/- 75.5	+/- 100.5	+/- 125.5	+/- 150.5	+/- 175.5	+/- 200.5	+/- 225.5	+/- 250.5
TRAVEL B/W HARD STOPS (+/- 1mm)	mm	+/- 57	+/- 52	+/- 77	+/- 102	+/- 127	+/- 152	+/- 177	+/- 202	+/- 227	+/- 252
PERFORMANCE SPECIFICATIONS [1]		(STD)	ULTRA	(STD)	ULTRA	(STD)	ULTRA	(STD)	ULTRA	(STD)	ULTRA
LINEAR DISPLACEMENT ACCURACY	um	+/- 5	+/- 2	+/- 5	+/- 2	+/- 6	+/- 2	+/- 8	+/- 2	+/- 10	+/- 2
BACKLASH	micrometers	0									
BIDIRECTIONAL REPEATABILITY	um	+/- 1.0	+/- 1.0	+/- 1.0	+/- 1.0	+/- 1.0	+/- 1.0	+/- 1.0	+/- 1.0	+/- 1.0	+/- 1.0
HOME INDEX BIDIRECTIONAL REPEATABILITY	--	< +/- 1 encoder count									
RESOLUTION	--	Standard: ~ 4.88nm with 4096 Interpolation (digital AQB options available between 1nm and 5um) (Absolute options available between 1nm									
STRAIGHTNESS IN Y	um	+/- 3	+/- 2	+/- 3	+/- 2	+/- 3	+/- 2	+/- 4	+/- 3	+/- 5	+/- 3
STRAIGHTNESS IN Z [2]	um	+/- 3	+/- 2	+/- 3	+/- 2	+/- 3	+/- 2	+/- 4	+/- 3	+/- 5	+/- 3
PITCH ABOUT Y [2]	arc-sec	+/- 12	+/- 12	+/- 12	+/- 12	+/- 15	+/- 15	+/- 18	+/- 18	+/- 18	+/- 18
PITCH ABOUT Z	arc-sec	+/- 12	+/- 12	+/- 12	+/- 12	+/- 15	+/- 15	+/- 18	+/- 18	+/- 18	+/- 18
PITCH ABOUT X	arc-sec	+/- 12	+/- 12	+/- 12	+/- 12	+/- 15	+/- 15	+/- 18	+/- 18	+/- 18	+/- 18
MOTION PROFILE SPECIFICATIONS											
MAX VELOCITY [3]	m/s	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
MAX PEAK ACCELERATION [3]	G	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
MAX PAYLOAD CAPABILITY WITH AXIS ORIENTED HORIZONTALLY	kg	70	70	70	70	70	70	70	70	70	70
MAX PAYLOAD CAPABILITY WITH AXIS ORIENTED VERTICALLY	kg	40	40	40	40	40	40	40	40	40	40
ASSEMBLY MASS	kg	11	11	11.5	12	12.5	13	13.5	14.5	15	15.5
MOVING MASS	kg	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5

MOTOR INFORMATION	
MOTOR TYPE	FRAMELESS TORQUE MOTOR
MOTOR MODEL	AI-TM-064B7-W
MAGNETIC PITCH (N-N)	90
MAXIMUM VOLTAGE (LINE TO LINE) [4]	340
MAX MOTOR TEMP	155
MOTOR THERMISTOR	NONE
MOTOR CONNECTION	WYE
MOTOR CONSTANT	Nm/sqrt(W)
TORQUE CONSTANT	Nm/Arms
PHASE RESISTANCE (@ 25°C) [5]	Ohm
INDUCTANCE @ 1kHz	mH
CONTINUOUS STALL TORQUE [6]	Nm
CONTINUOUS STALL CURRENT [6]	Apk
PEAK TORQUE [7]	Nm
PEAK CURRENT [7]	Apk
BACK EMF CONSTANT	Vrms/krpm

BALL SCREW INFORMATION	
SCREW LEAD	5
SCREW DIAMETER	12
SCREW EFFICIENCY	80%
MAGNETIC PITCH (N-N)	1.25
MOTOR CONSTANT	N/sqrt(W)
FORCE CONSTANT	N/Arms
CONTINUOUS FORCE	1050
PEAK FORCE	3310
BACK EMF CONSTANT	V/m/s
BACKDRIVING FORCE	~ 10-40

OPTIONAL 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	~ 0.2mm
HOLDING FORCE	400N
ENGAGEMENT TIME	<500ms
AIR CONSUMPTION WHILE RELEASED	NEGLECTIBLE
RECOMMENDED AIR QUALITY	5um PARTICLE FILTER AND 1.0mg/m <sup>3</sup> OIL (INCLUDING VAPOR) FILTER AND -20°C WATER PRESSURE DEWPOINT (128PPM VOL.) @ 0.7MPa (ISO 8573.1 CLASS 3)

OPTIONAL ELECTRIC SOLENOID BRAKE SPECS	
BRAKE TYPE	HOLDING 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	~ 0.2mm
HOLDING FORCE	400N
ENGAGEMENT TIME	<500ms
BRAKE CABLE PINOUT	WHITE - SOLENOID + BLACK - SOLENOID -

- Notes:
- Specifications measured on stage centerline at nominal 20°C, ~ 50mm above mounting surface with no payload with axis horizontal. Standard describes typical values, Ultra is 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.
  - 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 available for each stage for optimized performance as necessary per customer requirements.

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SEE NOTES			B	003
SCALE			DWG NO	
			0010-08057	
			SHEET	2 OF 2
			0090-07999-016 ALIO STD TEMPLATE	