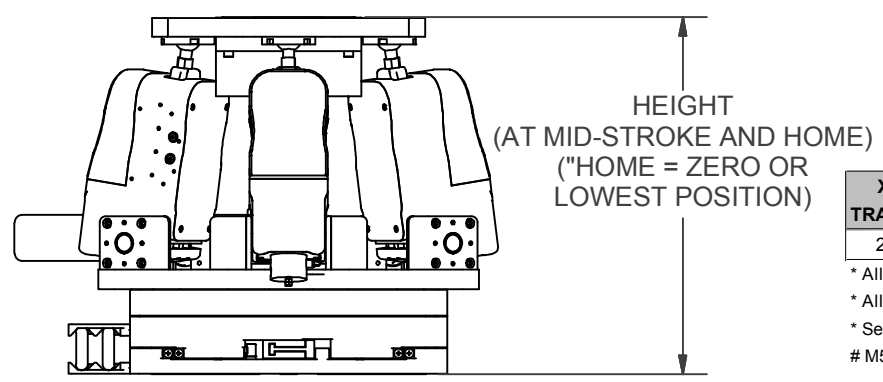
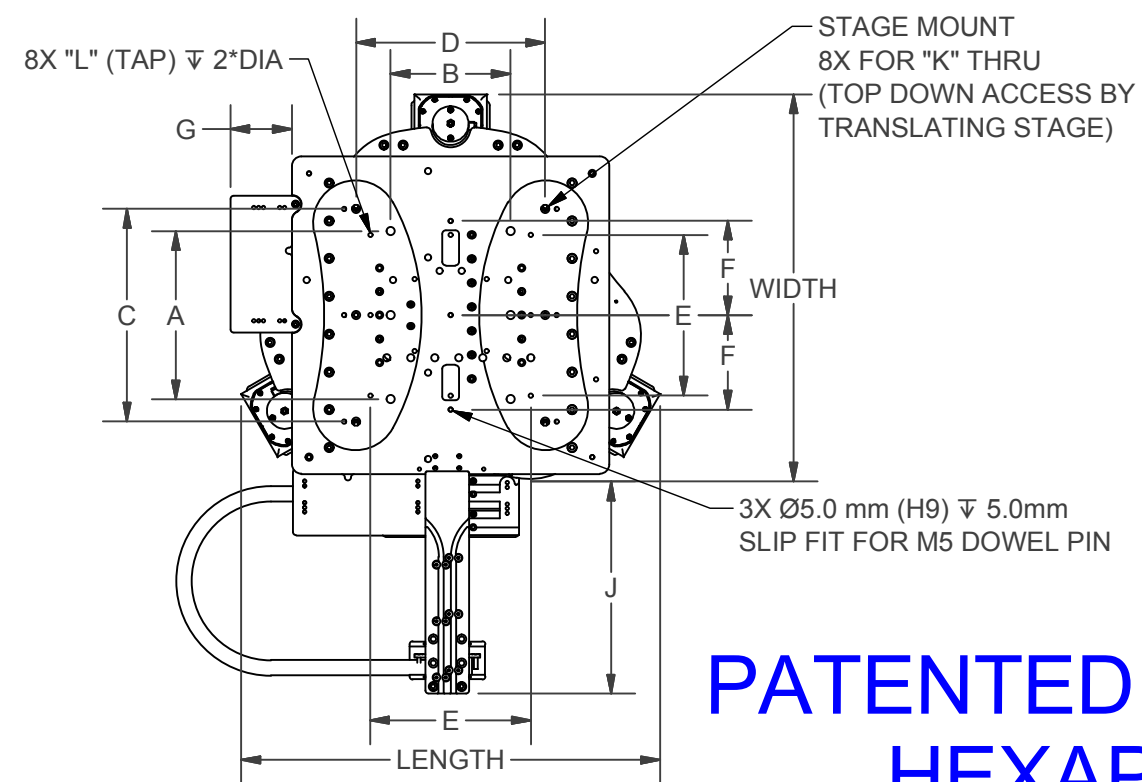


STANDARD FEATURES	
Stage	Hybrid Hexapod
Travel	6 Degrees of Freedom (X, Y, Z, Pitch, Roll, and Yaw)
XY Travel	200 mm
Z Travel	60 mm
Angular Travel	+/- 14 degrees (Pitch and Roll) 360 degrees continuous (Yaw)
Max Payload	20.0 kg
Motor	Ironless Core Linear Motor and Frameless Torque Motor with Precision Ball Screw
Brake	On all 3 Tripod Links; Pneumatic Release, Spring Lock
Feedback	Non-Contact Optical Incremental Encoder Optional: Absolute Encoder (BISS-C)
Scale	Gold Tape Scale and Stainless Steel Ring Optional: Near Zero CTE ZeroMet
Linear Resolution	~5 nm
Angular Resolution	< 0.02 arc-sec
Sensors	Integrated Home and End of Travel Limits
Bearings	High Precision Crossed Roller Bearings
Cables	High Flex, 10M Cycle, 3m Length
Structure	Anodized Aluminum 6061-T6 Optional: Stainless Steel
Environment	Standard Optional: Vacuum 10-5 Torr, Vacuum 10-7 Torr
Temperature	0°C to 50°C
Humidity	10% to 80% Non-Condensing
Precision	6-D Nano Precision™ Test Methods



XY TRAVEL	Z TRAVEL	PITCH & ROLL TRAVEL	R DIAMETER	OPTION	LENGTH	WIDTH	HEIGHT (at home)	HEIGHT (at mid-stroke)	A (inch)	B (inch)	C	D	E	F	G	H	I	J	K	L	M
200	60	+/- 14 degrees	154 (RA)	--	443.2	410.1	378.0	408.0	7	5	225	200	170	100	65	100	40	228.3	M6 or 1/4-20	M6	M5

* All units millimeters unless otherwise noted.
 * All hole patterns centered on M5 dowel pin at center of XY stage or centered on thru hole of top rotary stage.
 * See specification sheet and contact ALIO technical sales for assistance in model selection.
 # M5 dowel pins on the mount surface are rotated 90 degrees relative to dowel pins shown on this datasheet.



PATENTED HYBRID HEXAPOD

NOTE: MODEL AI-HH-BSD-200XY-60Z-154RA SHOWN.

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

DRAWN	QWOLF	2020-04-17			
CHECKED					
Tolerances: x.x ± 0.5 mm x.xx ± 0.13 mm x.xxx ± 0.05 mm ANGLES ± 0.5° MATERIAL			TITLE HYBRID HEXAPOD® MODEL: AI-HH-BSD-(XY TRAVEL)XY-(Z TRAVEL)Z-(R DIAMETER)R-(OPTION)		
Surface Roughness: <input checked="" type="checkbox"/> RMS MAX.			SIZE	DWG NO	REV
FINISH SEE NOTES			B	0010-08070	001
SCALE			ALIO STD TEMPLATE - REV 013	SHEET 1 OF 3	

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MODEL	UNITS	AI-HH-200XY-60Z-154RA			
OPTION	--	--			
XY TRAVEL	mm	200			
Z TRAVEL	mm	60			
PITCH AND ROLL TRAVEL [10]	deg	+/- 14			
YAW TRAVEL	deg	360 deg continuous			
PERFORMANCE SPECIFICATIONS [1]		(STD)	ULTRA	NANO	
BIDIRECTIONAL REPEATABILITY	XY	nanometers	+/- 100	+/- 70	
	Z	nanometers	+/- 100	+/- 70	
	PITCH AND ROLL	arc-sec	+/- 0.6	+/- 0.4	
	YAW	arc-sec	+/- 0.6	+/- 0.4	
BACKLASH	XY	nanometers	0 nm / arc-sec (no backlash on any axis)		
	Z	nanometers			
	PITCH AND ROLL	arc-sec			
	YAW	arc-sec			
MINIMUM INCREMENTAL STEP SIZE	XY	nanometers	< 20		
	Z	nanometers	< 20		
	PITCH AND ROLL	arc-sec	< 0.1		
	YAW	arc-sec	< 0.1		
3D ACCURACY [11]	LINEAR ACCURACY	um	CONTACT ALIO TO DISCUSS 3D ACCURACY		
	STRAIGHTNESS	um			
	FLATNESS [2]	um			
	PITCH	arc-sec			
	ROLL	arc-sec			
YAW RUNOUT	AXIAL RUNOUT	um	10	7	4
	RADIAL RUNOUT	um	10	7	4
	WOBBLE	arc-sec	20	10	6
RESOLUTION	XY	nanometers	~5 nm		
	Z	nanometers	~5 nm		
	PITCH AND ROLL	arc-sec	~0.02		
	YAW	arc-sec	~0.01		
MOTION PROFILE SPECIFICATIONS					
MAX LINEAR VELOCITY [3]	XY	mm/s	500.0		
	Z	mm/s	30.0		
MAX LINEAR ACCELERATION [3]		G	0.3		
MAX ANGULAR VELOCITY [3]	PITCH AND ROLL	deg/sec	60		
	YAW	deg/sec	1800		
MAX ANGULAR ACCELERATION [3]	PITCH AND ROLL	deg/sec^2	>1000		
	YAW	deg/sec^2	>3600		
MAX PAYLOAD		kg	20		
PAYLOAD CENTER OF GRAVITY [12]	MAX XY OFFSET	mm	50		
	MAX Z OFFSET	mm	50		
ASSEMBLY MASS		kg	57		
MOVING MASSES	X	kg	49		
	Y	kg	37		
	Z	kg	8.4		
	YAW	kg	2.00		
YAW MASS MOMENT OF INERTIA		kg*mm^2	7000		

Notes:

- Specifications measured on stage centerline, 50mm above mounting surface. ALIO provides NIST traceable proof for all options/specs per quote.
- Flatness specifications dependent on system base. Contact ALIO for more information.
- Stage limitation at no load. Does not account for drive or resolution limitations.
- 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 for Delta connection and 0.44 ohm/m for Wye Connection.
- 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.
- Angular travel is specified when the Z axis is at mid-stroke and all other angles are at zero degrees.
- Three dimensional accuracy is affected by all error sources of all axes as well as the infinite possible
- Payload Cg should be in line with the yaw rotation axis (centered on mounting surface). Offset payload
- Pneumatic counterbalance supply pressure specified is the estimated pressure required at the max payload.

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DRAWN	QWOLF	2020-04-17		
CHECKED				
Tolerances: Surface Roughness: x.x ± 0.5 mm x.xx ± 0.13 mm x.xxx ± 0.05 mm ANGLES ± 0.5° MATERIAL			TITLE HYBRID HEXAPOD MODEL: AI-HH-BSD-(XY TRAVEL)XY-(Z TRAVEL)Z-(R DIAMETER)R-(OPTION)	
FINISH SEE NOTES			SIZE	REV
			B	001
			DWG NO	0010-08070
			SCALE	ALIO STD TEMPLATE - REV 013
			SHEET	2 OF 3

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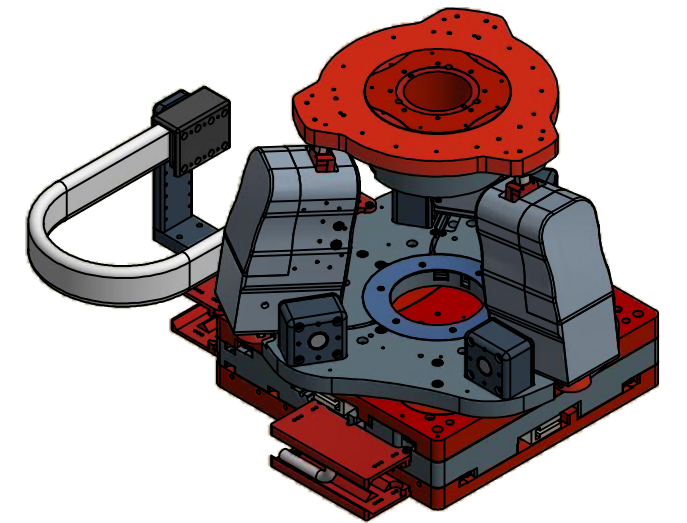
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MODEL	UNITS	AI-HH-200XY-60Z-154RA
OPTION	--	--
XY MOTOR INFORMATION		
MOTOR TYPE	--	--
MOTOR MODEL	--	AI-LM-256BSN-D
MAGNETIC PITCH (N-N)	mm	30.48
MAX VOLTAGE (LINE TO LINE) [4]	V	500
ELECTRICAL TIME CONSTANT	msec	0.20
MAX MOTOR TEMP	°C	130
MOTOR CONNECTION	--	DELTA
FORCE CONSTANT	N/Apk	28.7
PHASE RESISTANCE (@25° C) [5]	Ohm	11.7
PHASE RESISTANCE (@130° C) [5]	Ohm	16.6
INDUCTANCE	mH	2.3
CONTINUOUS FORCE [6]	N	93
CONTINUOUS CURRENT [6]	Apk	3.2
PEAK FORCE [7]	N	295
PEAK CURRENT [7]	Apk	10.3
BACK EMF CONSTANT	V/m/s	28.7
TRIPOD MOTOR INFORMATION		
MOTOR TYPE	FRAMELESS TORQUE AC SERVO	
MOTOR MODEL	--	AI-TM-64BE-Y
MAGNETIC PITCH (N-N)	deg	90
MAX VOLTAGE (LINE TO LINE) [4]	VDC	340
MAX MOTOR TEMP	°C	155
THERMAL SENSOR	--	NONE
MOTOR CONNECTION	--	WYE
TORQUE CONSTANT	Nm/Arms	0.4
PHASE RESISTANCE (@25° C) [5]	Ohm	5.6
INDUCTANCE	mH	10.2
CONTINUOUS TORQUE [6]	Nm	1.0
CONTINUOUS CURRENT [6]	Arms	2.4
PEAK TORQUE [7]	Nm	3.2
PEAK CURRENT [7]	Apk	7.7
BACK EMF CONSTANT	Vrms/krpm	25.8
ROTARY MOTOR INFORMATION		
MOTOR TYPE	FRAMELESS TORQUE AC SERVO	
MOTOR MODEL	--	AI-TM-133CN
MAGNETIC PITCH (N-N)	deg	25.714
MAX VOLTAGE (LINE TO LINE) [4]	VDC	230
MAX MOTOR TEMP	°C	110
MOTOR CONNECTION	--	WYE
TORQUE CONSTANT	Nm/Arms	2.10
PHASE RESISTANCE (@25° C) [5]	Ohm	4.2
INDUCTANCE	mH	11.5
CONTINUOUS TORQUE [6]	Nm	10.00
CONTINUOUS CURRENT [6]	Arms	4.7
PEAK TORQUE [7]	Nm	20.60
PEAK CURRENT [7]	Arms	13.3
BACK EMF CONSTANT	Vrms/krpm	126.0

- Notes:
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BRAKE SPECIFICATIONS

BRAKE DESCRIPTION		
ALL 3 LINKS HAVE THE SAME BRAKE DESIGN AND OPERATE ON A SINGLE PNEUMATIC CIRCUIT		
BRAKE LOCK (& FAILSAFE)	SPRING ACTIVATED	
BRAKE RELEASE	PNEUMATIC ACTIVATED	
BRAKE SUPPLY TUBE	4mm Outer Diameter High Flex	
MINIMUM SUPPLY PRESSURE	~0.1 Mpa	
MAXIMUM SUPPLY PRESSURE	1.0 MPa	
MAXIMUM THEORETICAL DISPLACEMENT UPON BRAKE ACTIVATION	LINK 1	~15 um
	LINK 2	~15 um
	LINK 3	~15 um
CUSTOMER TO SUPPLY AIR SUPPLY AND DIGITAL OUTPUT CONTROL OF PNEUMATIC VALVE FOR BRAKE ACTIVATION		
BRAKE ON/OFF VERIFICATION IS VIA INLINE PRESSURE SENSOR CONNECTED TO ONE DIGITAL INPUT		



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TITLE
HYBRID HEXAPOD
 MODEL: AI-HH-BSD-(XY TRAVEL)XY-(Z TRAVEL)Z-(R DIAMETER)R-(OPTION)

DRAWN	2020-04-17
QWOLF	
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	

SIZE	DWG NO	REV
B	0010-08070	001
SCALE	ALIO STD TEMPLATE - REV 013	SHEET 3 OF 3

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