



ALIO STAGE AND MOTOR SPECIFICATIONS

MODEL		UNITS	AI-6D-100XY-24Z-56R-VAC-CM-MS	AI-6D-100XY-24Z-56R-VAC-MS
OPTION		--	"CM" ³ -LOW FORCE XY	"MS" ³ -MAGNETIC SPRING
VACUUM LEVEL			10 ⁻³ Torr	10 ⁻⁷ Torr
XY TRAVEL		mm	100	100
Z TRAVEL		mm	24	24
PITCH AND ROLL RANGE [9]		deg	+/- 12	+/- 12
YAW TRAVEL		deg	360 degrees continuous	
MAX LINEAR VELOCITY [10]		m/s	0.05	0.5
MAX ANGULAR VELOCITY (PITCH & ROLL) [10]		deg/s	90	90
MAX ANGULAR VELOCITY (YAW) [10]		deg/s	720	720
ASSEMBLY MASS		kg	13.1	20
MOVING MASS		kg	11.3	17.1
MOVING MASS		kg	9.0	10.5
MOVING MASS		kg	2.6	2.6
YAW MOVING MASS		kg	0.25	0.25
YAW MASS MOMENT OF INERTIA		kg*mm ²	85	85
MAX PAYLOAD [11]		kg	2.5	2.5
MAX CENTER OF GRAVITY HEIGHT [11,12]		mm	40	40
COUNTERBALANCE PRESSURE [13]		psi	--	--
LINEAR RESOLUTION		mm	--	--
PITCH AND ROLL RESOLUTION		arc-sec	-0.02	-0.02
YAW RESOLUTION		arc-sec	0.04	0.04
XY ROTARY STAGE		Model	AI-TM-56R	AI-TM-56R
XY LINEAR STAGE		Model	AI-CM-10000-XY	AI-LM-10000-XY
TRIPOD MOTOR INFORMATION				
MOTOR TYPE		--	LINEAR BRUSHLESS	LINEAR BRUSHLESS
MOTOR MODEL		--	P16-0.5	P16-0.5
MAGNETIC PITCH (N-N)		mm	30.48	30.48
MAX VOLTAGE (LINE TO LINE) [1]		V	500	500
ELECTRICAL TIME CONSTANT		msec	0.20	0.20
MAX MOTOR TEMP		°C	130	130
MOTOR CONNECTION		--	DELTA CONNECTED	DELTA CONNECTED
FORCE CONSTANT		N/Apk	7.2	7.2
PHASE RESISTANCE (@25°C) [2,3]		Ohm	2.9	2.9
PHASE RESISTANCE (@130°C) [2,3]		Ohm	4.2	4.2
INDUCTANCE		mH	0.6	0.6
CONTINUOUS FORCE [4]		N	15	15
CONTINUOUS CURRENT [4]		Apk	2.1	2.1
PEAK FORCE [5]		N	74	74
PEAK CURRENT [5]		Apk	10.3	10.3
BACKEMF CONSTANT		V/m/s	7.2	7.2
YAW MOTOR INFORMATION				
MOTOR TYPE		--	FRAMELESS TORQUE MOTOR	FRAMELESS TORQUE MOTOR
MOTOR MODEL		--	RBET1212	044050-EY
MAGNETIC PITCH (N-N)		deg	90	120
MAX VOLTAGE (LINE TO LINE) [1]		VDC	340	340
MAX MOTOR TEMP		°C	120	155
TORQUE CONSTANT		Nm/Arms	0.060	0.091
PHASE RESISTANCE (@25°C) [1,4]		Ohm	0.8	4.5
INDUCTANCE		mH	0.4	3.2
CONTINUOUS TORQUE [15]		Nm	0.31	0.21
CONTINUOUS CURRENT [15]		Arms	5.4	2.3
PEAK TORQUE		Nm	1.18	0.66
PEAK CURRENT		Arms	20.0	7.3
BACKEMF CONSTANT		V/rms/krpm	6.3	5.5
XY MOTOR INFORMATION				
MOTOR TYPE		--	LINEAR BRUSHLESS	LINEAR BRUSHLESS
MOTOR MODEL		--	C12-1	P12-2
MAGNETIC PITCH (N-N)		mm	30.48	30.48
MAX VOLTAGE (LINE TO LINE) [1]		V	500	500
ELECTRICAL TIME CONSTANT		msec	0.14	0.19
MAX MOTOR TEMP		°C	130	130
MOTOR CONNECTION		--	DELTA CONNECTED	DELTA CONNECTED
FORCE CONSTANT		N/Apk	3.5	16.3
PHASE RESISTANCE (@25°C) [2,3]		Ohm	2.9	11.6
PHASE RESISTANCE (@130°C) [2,3]		Ohm	4.2	16.4
INDUCTANCE		mH	0.6	2.1
CONTINUOUS FORCE [4]		N	10	47
CONTINUOUS CURRENT [4]		Apk	2.8	2.9
PEAK FORCE [5]		N	21	151
PEAK CURRENT [5]		Apk	6.0	9.2

VACUUM SYSTEM NOTES	
Counterbalance	<p>Contact ALIO concerning any vacuum specifications, questions, or options.</p> <p>Non-Contact Magnetic Spring (Laser Welded Stainless Steel Shaft, Electroless Nickel Plated Stator)</p> <p>Counterbalance is not adjustable.</p> <p>Payload to be defined to ALIO within 2 weeks of issuing PO. Payload must not vary by more than +/- 0.2 kg.</p>
Cables	<p>Vacuum: 1.5 meters (Default Length)</p> <p>Option: Customer Defined Length</p> <p>Customer responsible for vacuum cable routing from stage to feed through.</p> <p>Tinned Copper Braided Single Screen. FEP Core Insulation</p> <p>Atmospheric: 3.0 meters (Default Length)</p> <p>Option: Customer Defined Length</p> <p>Encoder cable is 1.0 meter cable from vacuum feed through connected to an extension cable.</p> <p>Atmospheric cables are high flex. Minimum bend radius: Static - 10mm, Dynamic - 25mm</p>
Connectors	<p>Vacuum Connectors:</p> <p>Encoder: 15 Pin Female D-sub, Accuglass P/N: 100450</p> <p>Motor: 5 Pin Female Power Connector, Accuglass P/N: 100933</p> <p>Atmospheric Connectors:</p> <p>Encoder: 15 Pin Female D-sub</p> <p>Motor: 5 Pin Female Power Connector, Accuglass P/N: 100931</p> <p>Male-Male Straight Through, CF Flange (ALIO or Customer Provided)</p> <p>80 Degrees C Maximum</p> <p>Linear: All Stainless Steel</p> <p>Rotational: Stainless Steel Races and Separators, Ceramic Balls</p> <p>Spherical:</p> <p>Option: Steel Housing, Steel Balls, Brass Separator</p> <p>Option: Steel Housing, Stainless Steel Balls, Stainless Steel Separator</p> <p>Option: All Stainless Steel</p> <p>Krytox LVP Grease (Thin Film)</p>
Vacuum Feed Through	Male-Male Straight Through, CF Flange (ALIO or Customer Provided)
Bakeout Temperature	80 Degrees C Maximum
Bearings	Linear: All Stainless Steel Rotational: Stainless Steel Races and Separators, Ceramic Balls Spherical:
Lubrication	Krytox LVP Grease (Thin Film)

Notes:

- Back EMF plus IR drop must not exceed maximum line to line voltage.
- Resistance values do not include cable resistance. For P16 motors cable resistance adds 0.146 ohm/m for Delta connection and 0.44 ohm/m for Wye Connection.
- Resistance values do not include cable resistance. For C12 motors cable resistance adds 0.251 ohm/m for Delta connection.
- Continuous operating limits are based on continuous operation at maximum temperature with aluminum heatsink (300mm x 12.5mm x motor length).
- Maximum on time at peak operating limits is 10 seconds.
- Motor Connection type is internal to motor. All stages provided with default Delta connection unless otherwise specified.
- All electrical specifications may vary by 12% from listed values.
- Additional motor options are available for each stage for optimized performance as necessary per customer requirements.
- Angular travel is measured when the Z axis is at mid-stroke and the other angle is zero degrees. Deviation from this specified off axis position reduces angular travel.
- Maximum velocity specified is for motor in unloaded state. Stage velocity limitations vary greatly depending on stage load and motion profile.
- Higher payload options available upon special request.
- Contact ALIO technical sales for questions concerning high or offset centers of gravity.
- Pneumatic counterbalance supply pressure listed is the estimated pressure required at the max payload.
- Resistance values do not include cable resistance. Cable resistance adds 0.3 ohm/m.
- Continuous operating limits are based on continuous operation at maximum temperature with aluminum heat sink (300mm x 300mm x 25mm).

ALIO 6-D

AI-6D-(XY TRAVEL)XY-(Z TRAVEL)Z-(R DIAMETER)R -VAC-(OPTION)

SIZE: B DWG NO: 0010-08036

FINISH: SEE NOTES SCALE: 1 OF 1

ALIO INDUSTRIES PROPRIETARY INFORMATION
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NBROWN

CHECKED

Surface Roughness:
x.x ± .05 in [1.3 mm]

x.xx ± .01 in [0.25 mm]

x.xxx ± .005 in [0.13 mm]

Angles ± 0.5

MATERIAL

B

A