

Specifications	Model:	AI-LM-5000	AI-LM-10000	AI-LM-15000	AI-LM-20000	AI-LM-25000	AI-LM-30000
Travel		50 mm	100 mm	150 mm	200 mm	250 mm	300 mm
Performance Spec's ⁽¹⁾: Precision Grade		(Std.) ULTRA NANO	(Std.) ULTRA NANO	(Std.) ULTRA NANO	(Std.) ULTRA NANO	(Std.) ULTRA NANO	(Std.) ULTRA NANO
Linear Displacement Accuracy		± 3.0 µm ± 0.2 µm ± 0.2 µm	± 3.0 µm ± 0.2 µm ± 0.2 µm	± 3.0 µm ± 0.3 µm ± 0.3 µm	± 3.0 µm ± 0.3 µm ± 0.3 µm	± 5.0 µm ± 0.5 µm ± 0.5 µm	± 5.0 µm ± 0.5 µm ± 0.5 µm
Straightness		± 1.0 µm ± 0.2 µm ± 0.2 µm	± 1.0 µm ± 0.2 µm ± 0.2 µm	± 1.5 µm ± 0.3 µm ± 0.3 µm	± 1.5 µm ± 0.3 µm ± 0.3 µm	± 2.0 µm ± 0.5 µm ± 0.5 µm	± 2.0 µm ± 0.5 µm ± 0.5 µm
Flatness ⁽²⁾		± 1.0 µm	± 1.0 µm	± 1.5 µm	± 1.5 µm	± 2.0 µm	± 2.0 µm
Bi-Directional Linear Repeatability		± 30 nm	± 30 nm	± 30 nm	± 30 nm	± 30 nm	± 30 nm
Resolution		5 nm (Standard; Options avail.)	5 nm (Standard; Options avail.)	5 nm (Standard; Options avail.)	5 nm (Standard; Options avail.)	5 nm (Standard; Options avail.)	5 nm (Standard; Options avail.)
Feedback		Non-Contact Linear Encoder	Non-Contact Linear Encoder	Non-Contact Linear Encoder	Non-Contact Linear Encoder	Non-Contact Linear Encoder	Non-Contact Linear Encoder
Pitch (all +/-)		10 arc-sec	10 arc-sec	15 arc-sec	15 arc-sec	18 arc-sec	18 arc-sec
Yaw (all +/-)		10 arc-sec	10 arc-sec	15 arc-sec	15 arc-sec	18 arc-sec	18 arc-sec
Roll (all +/-)		8 arc-sec	8 arc-sec	8 arc-sec	8 arc-sec	10 arc-sec	10 arc-sec
Motion Profile Specifications		Motion Profile Specifications					
Max Velocity ⁽³⁾		0.7 m/sec	0.7 m/sec	0.7 m/sec	1.0 m/sec	1.0 m/sec	1.0 m/sec
Max Acceleration ⁽³⁾		1.0 G	1.0 G	1.0 G	1.0 G	0.7 G	0.7 G
Max Payload Capability		20 kg	25 kg	25 kg	30 kg	40 kg	50 kg
Assembly Mass		2.2 kg	4.0 kg	4.4 kg	7.8 kg	9.4 kg	15.2 kg
Moving Mass		1.4 kg	2.4 kg	2.7 kg	4.7 kg	4.6 kg	9.0 kg
Motor Information		Motor Information					
Drive Type		Ironless, Brushless Servomotor	Ironless, Brushless Servomotor	Ironless, Brushless Servomotor	Ironless, Brushless Servomotor	Ironless, Brushless Servomotor	Ironless, Brushless Servomotor
Motor Model		P12-1	P12-2	P12-2	P16-2	P16-2	P16-3
Magnetic Pitch (N-N)		30.48 mm	30.48 mm	30.48 mm	30.48 mm	30.48 mm	30.48 mm
Maximum line to line Voltage ⁽⁴⁾		500 VDC	500 VDC	500 VDC	500 VDC	500 VDC	500 VDC
Electrical Time Constant		0.19 msec	0.19 msec	0.19 msec	0.20 msec	0.20 msec	0.20 msec
Maximum Motor Temp		130 °C	130 °C	130 °C	130 °C	130 °C	130 °C
Force Constant		8.1 N/Apk	16.3 N/Apk	16.3 N/Apk	28.7 N/Apk	28.7 N/Apk	43.0 N/Apk
Phase Resistance (@ 25 °C) ⁽⁵⁾		5.8 Ω	11.6 Ω	11.6 Ω	11.7 Ω	11.7 Ω	17.6 Ω
Phase Resistance (@ 130 °C) ⁽⁵⁾		8.2 Ω	16.4 Ω	16.4 Ω	16.6 Ω	16.6 Ω	24.9 Ω
Inductance		1.1 mH	2.1 mH	2.1 mH	2.3 mH	2.3 mH	3.5 mH
Continuous Force ⁽⁶⁾	Motor Connection: Delta	23 N	47 N	47 N	93 N	93 N	140 N
Continuous Current ⁽⁶⁾	Motor Connection: Delta	Up to 2.90 A	Up to 2.90 A	Up to 2.90 A	Up to 3.20 A	Up to 3.20 A	Up to 3.20 A
Peak Force ⁽⁷⁾	Motor Connection: Delta	75 N	151 N	151 N	295 N	295 N	442 N
Peak Current ⁽⁷⁾	Motor Connection: Delta	9.2 A	9.2 A	9.2 A	10.3 A	10.3 A	10.3 A
Back EMF Constant		8.1 V/m/sec	16.3 V/m/sec	16.3 V/m/sec	28.7 V/m/sec	28.7 V/m/sec	43.0 V/m/sec
Corresponding ALIO Drawing #		001-08002-001	001-08002-001	001-08002-001	001-08002-001	001-08002-001	001-08002-001
Mean Time Between Failure		100,000 Hrs	100,000 Hrs	100,000 Hrs	100,000 Hrs	100,000 Hrs	100,000 Hrs

Notes:

- (1) Specifications measured on stage centerline, 50mm above mounting surface. ALIO provides NIST traceable proof for all options/spec per quote.
- (2) Flatness specifications dependent on system base. Contact ALIO for more information.
- (3) Stage limitation at no load. Does not account for drive or resolution limitations.
- (4) Back EMF plus IR drop must not exceed maximum line to line bus voltage.
- (5) 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.
- (6) Continuous operating limits are based on continuous operation at maximum temperature with aluminum heat sink (300mm x 12.5mm x motor length).
- (7) Maximum on time at peak operating limits is 10 seconds.
- (8) All electrical specifications may vary by 12% from listed values.
- (9) Additional motor and travel options are available for each stage for optimized performance as necessary per customer requirements.
- (10) Lack of mounting surface quality and environmental control may force stages out of these specifications.

