

ALS3600 Series

Mechanical Bearing, Linear Motor Stage

Large clear aperture

Travel range from 100 mm x 100 mm to 400 mm x 400 mm

High performance linear motion guides

15 arc sec orthogonality

Noncontact linear encoder for high accuracy



The demand for a high-accuracy, robust, open-frame stage is met with the ALS3600. This dual-axis, large aperture, open-frame stage addresses the unique needs of scanning microscopy, wafer and printed circuit board inspection, and automated assembly.

Design and Construction

Unlike other designs that are assembled from several discrete pieces, the ALS3600 is a three-piece design. This allows critical components such as orthogonality, straightness, and flatness to be controlled during the initial machining—resulting in a stage with exceptional geometrical tolerances and inherent orthogonality.

The ALS3600 utilizes high-precision linear motion guide (LMG) bearings, with a total of four trucks per axis. These make the ALS3600 ideal for fast, repetitive operations. The LMG bearings also exhibit exceptional stiffness, high load capacity, and extremely low friction.

The high stiffness inherent in this stage allows it to be side-driven, yet still retain excellent performance characteristics. The ALS3600 represents a major upgrade in performance over typical side-drive stages.

Brushless Linear Servomotor

The ALS3600 incorporates a high power linear motor to meet the needs of the most demanding applications. This results in a stage with all of the advantages of a direct-drive mechanism: zero backlash, no windup, exceptional acceleration, zero friction, and outstanding servo stiffness. Many applications require extreme stability of motion that can only be met with a linear motor drive. Since the drive train has zero friction and no recirculating elements, the ALS3600 is ideal for scanning, imaging, or any other precision application.

High-Accuracy Linear Encoder Feedback

The standard feedback device is a high-resolution, noncontact, linear encoder. This noncontact encoder offers exceptional repeatability and stability over a range of operating conditions. Both digital and analog output versions are available. The digital version has a resolution of 1 μm , while the analog version, when coupled with an Aerotech multiplier box, can reach resolutions of 20 nm.

Alternate Configurations

All stage travels offer both single- and dual-axis designs, as well as the option for a solid tabletop. Miniature microscope-size stages are available, as are ball-screw-driven versions (please refer to ATS3600).

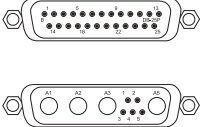
ALS3600 Series SPECIFICATIONS

Basic Model		ALS36010	ALS36020	ALS36030	ALS36040
Total Travel		100 mm (4 in)	200 mm (8 in)	300 mm (12 in)	400 mm (16 in)
Drive System		Linear Brushless Servomotor (BLMFI-142-A)			
Feedback		Noncontact Linear Encoder			
Resolution		0.005 μm - 1.0 μm (0.2 μin - 40 μin)			
Maximum Travel Speed ⁽¹⁾		300 mm/s (12 in/s)			
Maximum Load ⁽²⁾		90.0 kg (198.4 lb)			
Continuous Force ^(3,4)		48.0 N (10.7 lb)			
Peak Force ⁽⁴⁾		190.0 N (43.0 lb)			
Accuracy	HALAR ⁽⁵⁾	$\pm 2.0 \mu\text{m}$ ($\pm 80 \mu\text{in}$)			
	Standard	$\pm 4.0 \mu\text{m}$ ($\pm 160 \mu\text{in}$)	$\pm 8.0 \mu\text{m}$ ($\pm 320 \mu\text{in}$)	$\pm 12.0 \mu\text{m}$ ($\pm 480 \mu\text{in}$)	$\pm 16.0 \mu\text{m}$ ($\pm 640 \mu\text{in}$)
Repeatability		$\pm 1.0 \mu\text{m}$ ($\pm 40 \mu\text{in}$)			
Orthogonality		<15 arc sec			
Straightness and Flatness	Differential	1.0 $\mu\text{m}/25\text{mm}$ (40 $\mu\text{in}/\text{in}$)			
	Maximum Deviation	$\pm 2.0 \mu\text{m}$ ($\pm 80 \mu\text{in}$)	$\pm 4.0 \mu\text{m}$ ($\pm 160 \mu\text{in}$)	$\pm 6.0 \mu\text{m}$ ($\pm 240 \mu\text{in}$)	$\pm 8.0 \mu\text{m}$ ($\pm 320 \mu\text{in}$)
Pitch/Yaw		10 arc sec	15 arc sec	18 arc sec	20 arc sec
Nominal Stage Weight		30.0 kg (66.1 lb)	45.0 kg (99.2 lb)	58.0 kg (127.9 lb)	76.0 kg (167.6 lb)
Material		Aluminum			
Finish		Black Anodize			

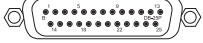
Notes:

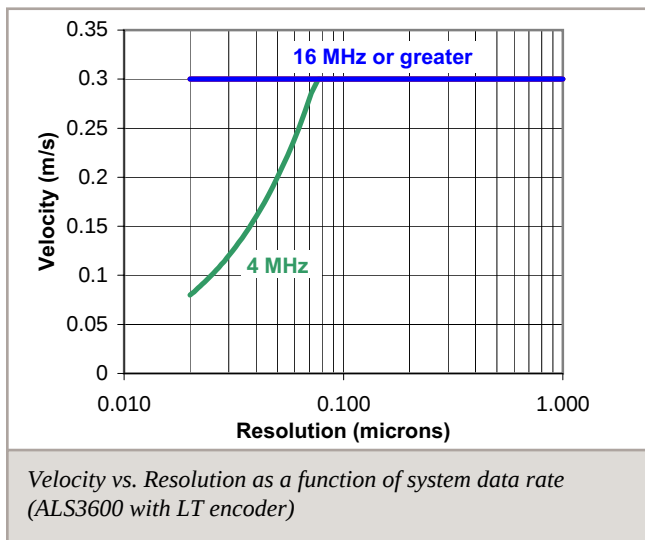
- Maximum speed based on stage capability; maximum application velocity may be limited by system data rate and system resolution.
- Maximum load based on bearing capability; maximum application load may be limited by acceleration requirements.
- Thermal limitations of positioning stage with respect to performance may limit continuous force output.
- Force may be limited by amplifier output.
- Available with Aerotech controllers.

Standard Motor Information

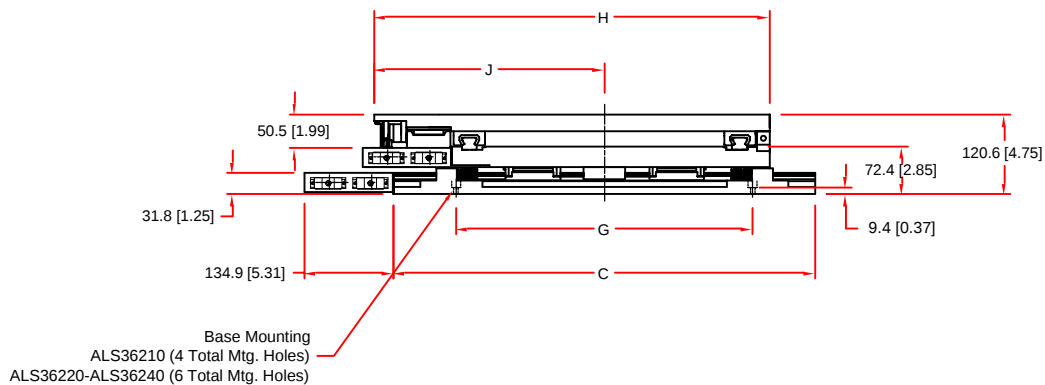
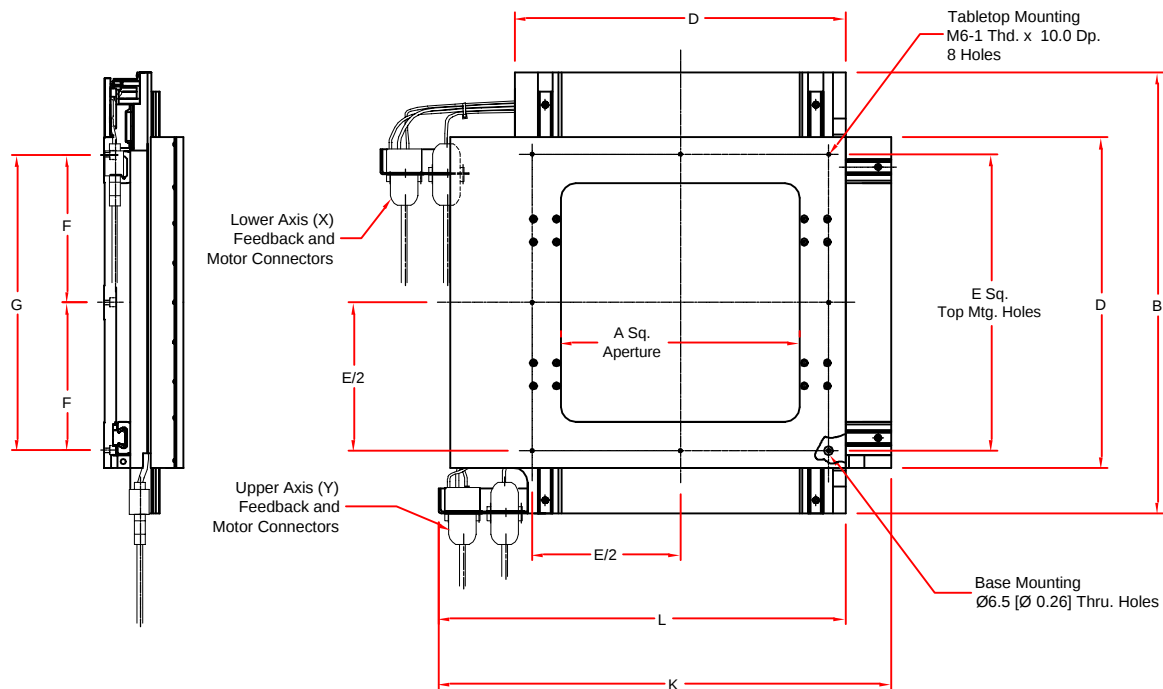
Code	Type	Model	Bus	Current	Cables Motor/Feedback	Driver	Motor Connector
-10	Linear Brushless Servo	BLMFS-142-A	up to 320 VDC	up to 2.5 A _{rms} Cont up to 9.7 A _{rms} Peak	C19802/C16501	NPaq	
					C19360/C16501	NDrive	
					C16951/C16501	U511/DR500/DR600	
					C17891/C16501	BB501 + BA	
					C17891/C16501	BAI	
					C18101/C16501	U100Z	

Resolution Information

Code	Signal Period	Travel/Step	Multiplier	Maximum Speed	Signal Type	Encoder Connector
LTAS	20 μm	0.02 μm - 1.0 μm	Requires External	System Data Rate		
LTX5	20 μm	1.0 μm	Integral x5	300 mm/s		



ALS3600 Series DIMENSIONS



Basic Model	Total Travel	Dimensions - Millimeters [Inches]				
		A	B	C	D	E
ALS36210	100.0 [4.00]	158.8 [6.25]	425.4 [16.75]	355.6 [14.00]	300.99 [11.85]	250.0 [9.84]
ALS36220	200.0 [8.00]	260.4 [10.25]	556.6 [21.91]	516.4 [20.33]	400.0 [15.75]	350.0 [13.78]
ALS36230	300.0 [12.00]	362.0 [14.25]	670.1 [26.38]	640.0 [25.20]	501.7 [19.75]	450.0 [17.72]
ALS36240	400.0 [16.00]	463.6 [18.25]	800.0 [31.50]	800.0 [31.50]	603.3 [23.75]	550.0 [21.65]
	F	G	H	J	K	L
ALS36210	-	250.0 [9.84]	396.8 [15.62]	247.6 [9.75]	443.0 [17.44]	415.7 [16.37]
ALS36220	175.0 [6.89]	350.0 [13.78]	498.4 [19.62]	298.4 [11.75]	574.2 [22.61]	516.0 [20.32]
ALS36230	225.0 [8.86]	450.0 [17.72]	599.6 [23.61]	348.8 [13.73]	686.4 [27.02]	617.3 [24.30]
ALS36240	275.0 [10.83]	550.0 [21.65]	701.6 [27.62]	400.0 [15.75]	817.6 [32.19]	719.2 [28.32]

ALS3600 Series INFORMATION

Ordering Example

ALS362	10	-5	-NC	-2LT10X5
Series	Travel (mm)	Motor	Limits	Linear Encoder
	10	-5	-NC	-2LTnnX5
	20	-10	-NO	-2LTnnAS
	30			
	40			

ALS3620 Series Two-Axis, Open Frame, Linear Motor Stage

ALS36210	100 mm x 100 mm (4 in x 4 in) travel stage with linear motor and limits
ALS36220	200 mm x 200 mm (8 in x 8 in) travel stage with linear motor and limits
ALS36230	300 mm x 300 mm (12 in x 12 in) travel stage with linear motor and limits
ALS36240	400 mm x 400 mm (16 in x 16 in) travel stage with linear motor and limits

Motor

-5	Brushless linear motor (BLMFI-142-A), one per axis (standard)
-10	Brushless linear motor (BLMFS-142-A), one per axis

Limits

-NC	Normally-closed end of travel limit switches (standard)
-NO	Normally-open end of travel limit switches

Standard Linear Encoders (for ALS3620)

-2LT10AS	Linear encoder set for model ALS36210; amplified sine output
-2LT20AS	Linear encoder set for model ALS36220; amplified sine output
-2LT30AS	Linear encoder set for model ALS36230; amplified sine output
-2LT40AS	Linear encoder set for model ALS36240; amplified sine output
-2LT10X5	Linear encoder set for model ALS36210; 1.0 micron line driver output
-2LT20X5	Linear encoder set for model ALS36220; 1.0 micron line driver output
-2LT30X5	Linear encoder set for model ALS36230; 1.0 micron line driver output
-2LT40X5	Linear encoder set for model ALS36240; 1.0 micron line driver output

Accessories (to be ordered as separate line item)

MXH5-D-mm	External 20-times multiplier, 32 MHz maximum data rate, 1.0 µm (LTAS)
MXH10-D-mm	External 40-times multiplier, 32 MHz maximum data rate, 0.5 µm (LTAS)
MXH25-D-mm	External 100-times multiplier, 32 MHz maximum data rate, 0.2 µm (LTAS)
MXH50-D-mm	External 200-times multiplier, 32 MHz maximum data rate, 0.1 µm (LTAS)
MXH100-D-mm	External 400-times multiplier, 32 MHz maximum data rate, 0.05 µm (LTAS)
MXH200-D-mm	External 800-times multiplier, 32 MHz maximum data rate, 0.025 µm (LTAS)
MXH250-D-mm	External 1000-times multiplier, 32 MHz maximum data rate, 0.02 µm (LTAS)
MXH500-D-mm	External 2000-times multiplier, 32 MHz maximum data rate, 0.01 µm (LTAS)
Specify rate "mm"	2M=2 MHz, 4M=4MHz, 8M=8 MHz, 16M=16 MHz, 32M=32 MHz
MXC-nn	Multiplier to controller cable; specify length '-nn' in feet
HALAR	High-accuracy system — linear error correction for accuracy and repeatability