ALS135 Series

Mechanical Bearing, Linear Motor Stage

Direct-drive linear motor for ultra-precise motion

High-accuracy noncontact linear encoder

Outstanding performance in a small footprint

The ALS135, with its low profile and outstanding performance characteristics, is the ultimate solution for high-accuracy alignment and inspection stations.

Linear Motor Drive

Unlike many stages that utilize a side-drive lead screw, the ALS135 employs a center-driven, non-cogging linear motor as the driving element. Since the linear motor is a direct-drive device, there is no backlash, windup, or "stiction" that is normally associated with a lead screw or ball screw drive.

The linear motor drive also offers the advantage of higher speeds and accelerations. The compact yet powerful linear motor drives the ALS135 to a peak unloaded acceleration of 1 g and a maximum velocity of 300 mm/s. The result is a high-accuracy device with outstanding throughput that significantly outperforms comparable high-accuracy screw-driven stages.

Outstanding Resolution

For alignment applications, outstanding step-to-step resolution is critical. The ALS135 meets this demand with a resolution of 10 nm when coupled with Aerotech controls. The direct-drive linear motor allows the ALS135 to make precise, small resolution steps. This is particularly important in alignment applications where step accuracy is critical.

Superior Geometry

Aerotech's ultra-stiff construction and compact two-piece design results in a stage with unmatched geometrical tolerances. As a result, straightness and flatness for the standard stage is <±2 µm over the entire travel. The effects of Abbe error are nearly eliminated, vastly improving overall system accuracy.

Smooth Travel

Designed for smooth, vibration-free motion, the ALS135 exhibits the outstanding ripple-free motion required for scanning and inspection applications.

Designed for Long Life

Like all stages in the Aerotech product family, the ALS135 was designed for outstanding long-term performance. Both the linear motor and linear encoder are noncontact devices — they not only exhibit long-life, but are totally maintenance free. A moving magnet track design eliminates the need for cable management, further improving long-term reliability.

Precision Alignment

ALS135 series stages are easily configured as XY assemblies. Options include precision orthogonality alignment to 5 arc seconds and available vertical axis solutions.

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ALS135 Series SPECIFICATIONS

Basic Model		ALS135-25	ALS135-50	ALS135-100	ALS135-150	ALS135-200
Total Travel		25 mm (1 in)	50 mm (2 in)	100 mm (4 in)	150 mm (6 in)	200 mm (8 in)
Drive System		Linear Brushless Servomotor (BLMUC-95-A)				
Bus Voltage		Up to 80 VDC with a single 25-pin D connector Up to 160 VDC with split feedback and power – two 25-pin D connectors				
Continuous Current	A_{pk}	2.94				
	A_{rms}	2.08				
Feedback		Noncontact Linear Encoder				
Resolution		0.0025 µm - 1.0 µm (0.1 µin - 40 µin)				
Maximum Travel Speed[1]		300 mm/s (12 in/s)				
Maximum Linear Acceleration		1 g (10 m/s²)(384 in/s²)(No Load)				
Maximum Load[2]	**Horizontal**	15.0 kg (33 lb)				
	Side	10.0 kg (22.0 lb)				
Accuracy	**HALAR**[3]	±0.3 µm (±12 µin)				
	Standard	±2.0 µm (±80 µin)	±2.0 µm (±80 µin)	±4.0 µm (±160 µin)	±6.0 µm (±240 µin)	±8.0 µm (±320 µin)
Repeatability[3]		±100 nm (±4 µin)				
Straightness and Flatness	**Maximum Deviation**	±1 µm	±1.5 µm	±1.5 µm	±2 µm	±2 µm
Pitch		5 arc-sec	6 arc-sec	8 arc-sec	10 arc-sec	12 arc-sec
Roll		5 arc-sec	6 arc-sec	8 arc-sec	10 arc-sec	12 arc-sec
Yaw		5 arc-sec	5 arc-sec	6 arc-sec	7 arc-sec	9 arc-sec
Nominal Stage Weight		2.8 kg (6.2 lb)	3.0 kg (6.5 lb)	3.8 kg (8.4 lb)	4.6 kg (10.1 lb)	5.4 kg (11.9 lb)
Moving Mass		0.9 kb (2.0 lb)	1 kg (2.2 lb)	1.2 kg (2.6 lb)	1.4 kg (3.1 lb)	1.6 kg (3.5 lb)
Construction		Aluminum Body/Black Anodize Finish				

Notes:
1. Maximum speed based on stage capability. Maximum application velocity may be limited by system data rate and system resolution.
2. Maximum load based on bearing capability. Maximum application load may be limited by acceleration requirements.
3. Value with Aerotech controls and HAL option.
4. Specifications are for single-axis systems, measured 50 mm above the tabletop. Performance of multi-axis systems is payload and workpoint dependent. Consult factory for multi-axis or non-standard applications.

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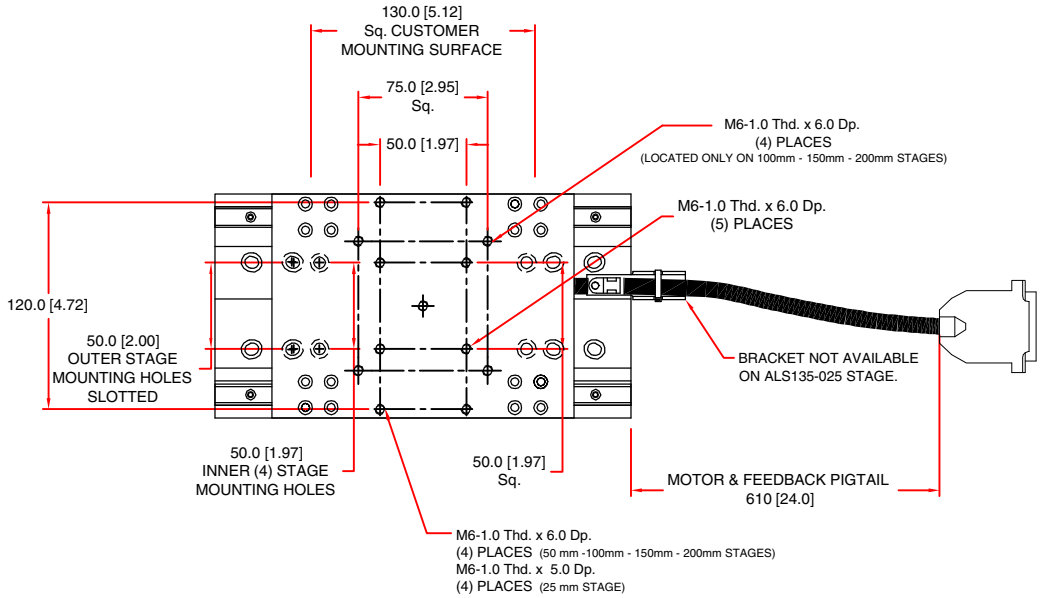
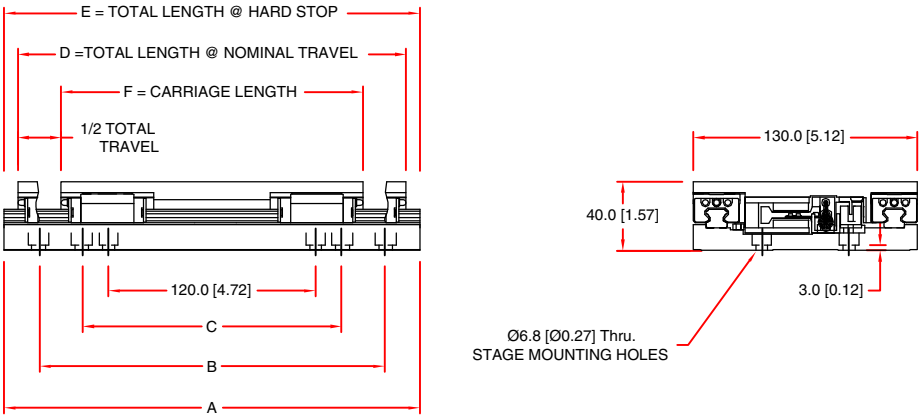
ALS135 Series DIMENSIONS





Basic Model	Total Travel	Dimensions - Millimeters [Inches]					
		A	B	C	D	E	F
ALS135-025	25.0 [1.00]	191.2 [7.53]	------	------	175.0 [6.89]	191.1 [7.53]	150.0 [5.91]
ALS135-050	50.0 [2.00]	241.0 [9.49]	------	150.0 [6.00]	225.0 [8.86]	241.0 [9.49]	175.0 [6.89]
ALS135-100	100.0 [4.00]	341.1 [13.43]	250.0 [10.00]	150.0 [6.00]	325.0 [12.80]	341.1 [13.43]	225.0 [8.86]
ALS135-150	150.0 [6.00]	442.7 [17.43]	400.0 [16.00]	200.0 [8.00]	425.0 [16.73]	442.7 [17.43]	275.0 [10.83]
ALS135-200	200.0 [8.00]	544.2 [21.43]	400.0 [16.00]	200.0 [8.00]	525.0 [20.67]	542.0 [21.34]	325.0 [12.80]

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ALS135 Series ORDERING INFORMATION

Ordering Example

ALS135	-100	-NC	-LT10X50	-25DU
Series	Travel (mm)	Limits	Linear Encoder	Output Cable Connectors
	-025 -050 -100 -150 -200	-NC -NO	-LTnnAS -LTnnX5 -LTnnX50	-25DU -4DU-25DU

ALS135 Series Linear Motor Stage

ALS135-025	25 mm (1 in) travel stage with linear motor and limits
ALS135-050	50 mm (2 in) travel stage with linear motor and limits
ALS135-100	100 mm (4 in) travel stage with linear motor and limits
ALS135-150	150 mm (6 in) travel stage with linear motor and limits
ALS135-200	200 mm (8 in) travel stage with linear motor and limits

Limits

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

Encoder

-LTAS	Linear encoder for ALS135 with amplified sine read-head; requires external multiplier
-LTX5	Linear encoder for ALS135 with 1.0 µm digital TTL output
-LTX50	Linear encoder for ALS135 with 0.1 µm digital TTL output

Note: Amplified sine output (LTAS) linear encoders require external multiplier. MX50 required for 0.1 micron resolution.

Accessories

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 data rate “mm” 2M=2 MHz, 4M=4 MHz, 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
HALSF	High-accuracy system — improved straightness and flatness
ALIGNMENT-NPA	Non-precision XY assembly
ALIGNMENT-PA10	XY assembly; 10 arc sec orthogonal
ALIGNMENT-PA5	XY assembly; 5 arc sec orthogonal

Output Cable Connectors

-25DU	Single 25-pin D connector (standard)
-4DU-25DU	4-pin HPD and 25-pin D connectors

Note: -25DU single 25-pin connector option not valid for systems using bus voltages greater than 80 V.

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