

ANT180-L Series

Mechanical Bearing, Linear Motor Stage

Noncontact, non-cogging, frictionless direct-drive

Zero backlash or hysteresis

High resolution (1 nm), repeatability (± 100 nm), and accuracy (± 150 nm)

Anti-creep cross-roller bearings

Travel to 360 mm

Integral cable management for multi-axis systems



The ANT180-L continues the expansion of Aerotech's line of high precision cross-roller stages. With its nanometer resolution, superior bi-directional repeatability, and exceptional low-velocity performance, it is the ultimate solution for high-accuracy alignment, measurement, scanning, and other demanding applications.

Noncontact Direct-Drive

The ANT180-L is driven by a high-power linear motor with ironlessforcer and U-channel magnet track. The direct-drive linear motor drives the stage to a peak unloaded acceleration of 2 g and maximum velocity of 500 mm/s. Because the forcer is ironless, it is a cog-free design that provides exceptional velocity control.

Outstanding Resolution

The direct-drive linear motor and high-accuracy linear encoder make possible outstanding step-to-step resolution when coupled with an Aerotech control system. This is critical in spectroscopy, optical delay line, and other applications. Furthermore, the linear motor and high resolution linear encoder system also provide excellent in-position stability.

Superior Geometry for High Performance

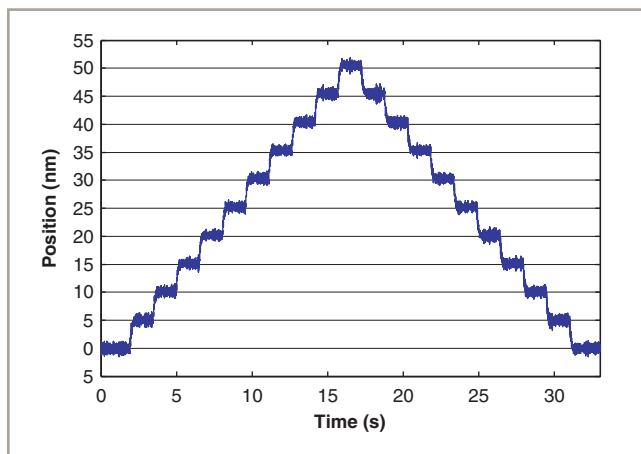
Its large cross section provides a robust and stable base axis for multi-axis systems. Aerotech's ultra-stiff construction and compact two-piece design result in a stage with unparalleled geometrical tolerances. As a result, the straightness and flatness typically are $< \pm 1 \mu\text{m}$ over the entire travel.

Designed for smooth, vibration-free motion, the ANT180-L utilizes precision anti-cage creep cross-roller bearings for

outstanding smoothness of motion. Since neither the bearing system nor the drive system utilize any recirculating elements, the ANT180-L exhibits the outstanding ripple-free motion required for scanning and inspection applications.

Precision Alignment and Cable Management

ANT180-L series stages are easily configured into XY and other multi-axis assemblies. Precision orthogonality alignment to 5 arc seconds and multi-axis cable management systems (CMS) are standard options. We include all customer-required cables, air hoses, etc. in our CMS bundle to facilitate incorporation into the final system. Both ends are fully connectorized for simple integration into the customer's machine.



ANT180-L 5 nm step plot. Best-in-class resolution and exceptional in-position stability for large travel stages. See additional performance graphs on the following pages.

ANT180-L/ANT180-L-PLUS Series SPECIFICATIONS

Mechanical Specifications			ANT180-160-L	ANT180-210-L	ANT180-260-L	ANT180-360-L
Travel			160 mm	210 mm	260 mm	360 mm
Accuracy ⁽¹⁾	LNAS	PLUS	±150 nm	±150 nm	±200 nm	±200 nm
		Standard	±2.0 µm	±2.5 µm	±3.0 µm	±3.5 µm
	LTAS	PLUS	±300 nm	±300 nm	±350 nm	±350 nm
		Standard	±4.0 µm	±5.0 µm	±6.0 µm	±7.0 µm
Resolution	LNAS		1 nm	1 nm	1 nm	1 nm
	LTAS		3 nm	3 nm	3 nm	3 nm
Repeatability (Bi-Directional) ⁽¹⁾	LNAS		±100 nm	±100 nm	±125 nm	±125 nm
	LTAS		±150 nm	±150 nm	±175 nm	±175 nm
Straightness ⁽¹⁾			±1.0 µm	±1.25 µm	±1.5 µm	±1.75 µm
Flatness ⁽¹⁾			±1.0 µm	±1.25 µm	±1.5 µm	±1.75 µm
Pitch			14 arc sec	14 arc sec	16 arc sec	16 arc sec
Roll			14 arc sec	14 arc sec	16 arc sec	16 arc sec
Yaw			10 arc sec	10 arc sec	12 arc sec	12 arc sec
Maximum Speed			500 mm/s	500 mm/s	500 mm/s	500 mm/s
Maximum Acceleration			2 g - 20 m/s ² (No Load)	2 g - 20 m/s ² (No Load)	2 g - 20 m/s ² (No Load)	2 g - 20 m/s ² (No Load)
Speed Stability			See graph for typical performance			
Settling Time			See graph for typical performance			
Maximum Force (Continuous)			110.5 N	110.5 N	110.5 N	110.5 N
Load Capacity ⁽³⁾	Horizontal		30 kg	30 kg	30 kg	30 kg
	Side		20 kg	20 kg	20 kg	20 kg
Moving Mass			6.6 kg	7.8 kg	9.2 kg	11.7 kg
Stage Mass			12.8 kg	14.9 kg	17.6 kg	22.4 kg
Material			Aluminum Body/Black Hardcoat Finish			
MTBF (Mean Time Between Failure)			30,000 Hours			

Notes:

1. Certified with each stage.
2. Axis orientation for on-axis loading is listed.
3. Specifications are for single-axis systems measured 25 mm above the tabletop. Performance of multi-axis systems is payload and workpoint dependent. Consult factory for multi-axis or non-standard applications.
4. -PLUS requires the use of an Aerotech controller.
5. Specifications are LNAS and LTAS only. Consult factory for specifications regarding the LTX50 option.

Electrical Specifications	ANT180-160-L	ANT180-210-L	ANT180-260-L	ANT180-360-L
	ANT180-160-L-PLUS	ANT180-210-L-PLUS	ANT180-260-L-PLUS	ANT180-360-L-PLUS
Drive System	Brushless Linear Servomotor			
Feedback	Noncontact Linear Encoder (see signal period options on Order Information page)			
Maximum Bus Voltage	±80 VDC			
Limit Switches	5 V, Normally Open			
Home Switch	Near Center			

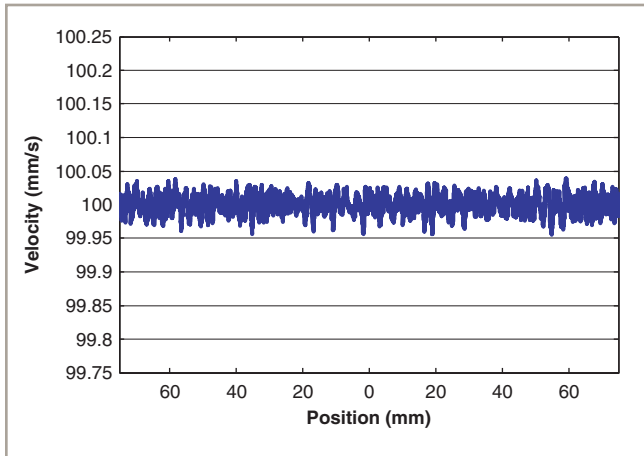
Recommended Controller	ANT180-160-L	ANT180-210-L	ANT180-260-L	ANT180-360-L
	ANT180-160-L-PLUS	ANT180-210-L-PLUS	ANT180-260-L-PLUS	ANT180-360-L-PLUS
Multi-Axis	A3200	Npaq-MXR Npaq MR-MXH Ndrive ML-MXH		
	Ensemble	Epaq-MXH Epaq MR-MXH Ensemble ML-MXH		
Single Axis	Soloist	Soloist ML-MXH		

Notes:

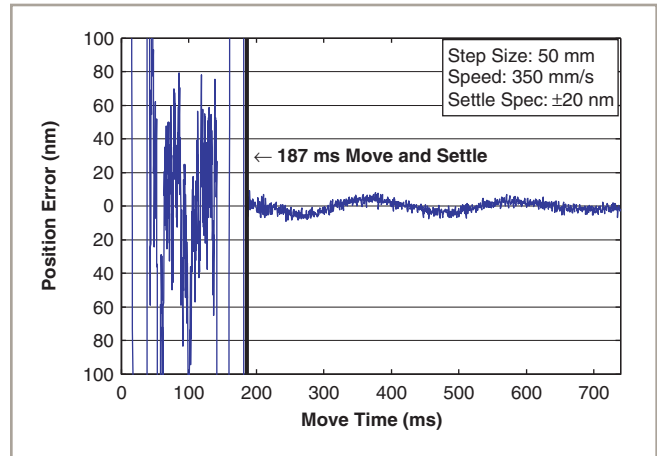
1. Linear amplifiers are required to achieve the listed specifications. Other options are available.

Note: To ensure the achievement and repeatability of specifications over an extended period of time, environmental temperature must be controlled to within 0.25°C/24 hours. If this is not possible, alternate products are available. Please consult Aerotech Sales Engineering for more information.

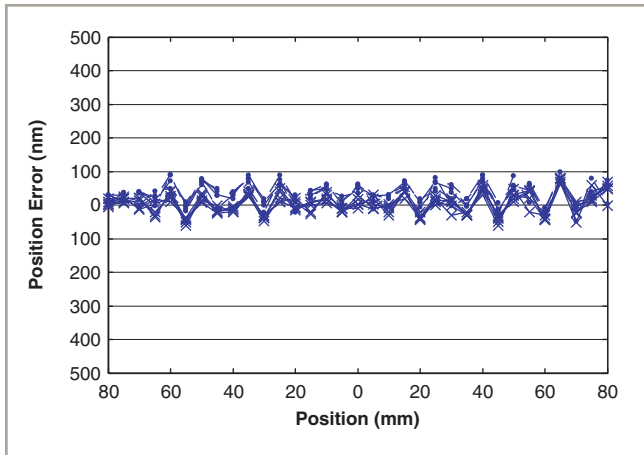
ANT180-L/ANT180-L-PLUS Series PERFORMANCE



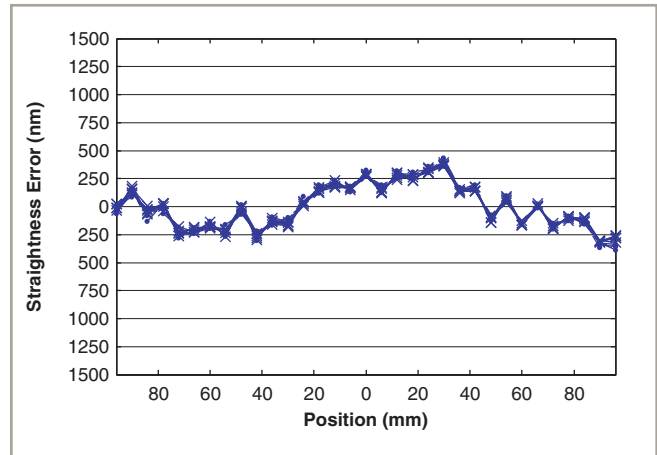
ANT180-160-L velocity performance at 100 mm/s and 1 kg payload. Excellent speed stability is another feature of the ANT Series stages.



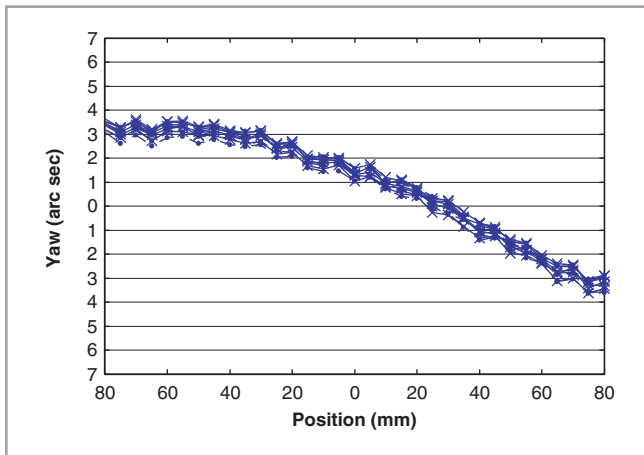
ANT180-160-L step and settle performance with 1 kg payload. Outstanding settling time enhances throughput of most applications.



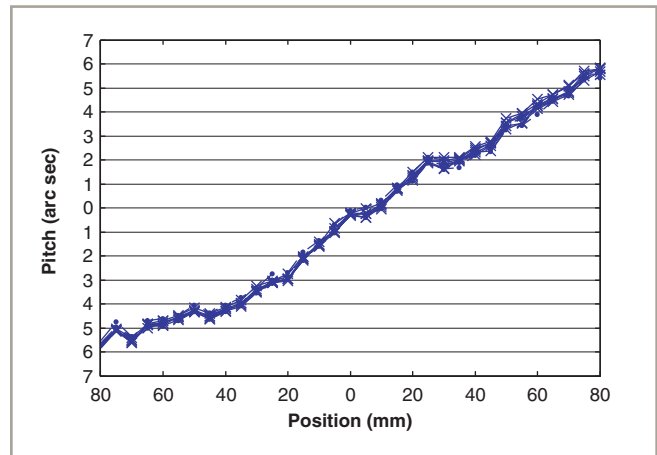
ANT180-160-L accuracy and repeatability, five runs, bi-directional over an extended period of time shows the high level of system accuracy and repeatability.



ANT180-160-L straightness error, one run, bi-directional. Exceptional and highly repeatable performance is assured with minimal straightness error.

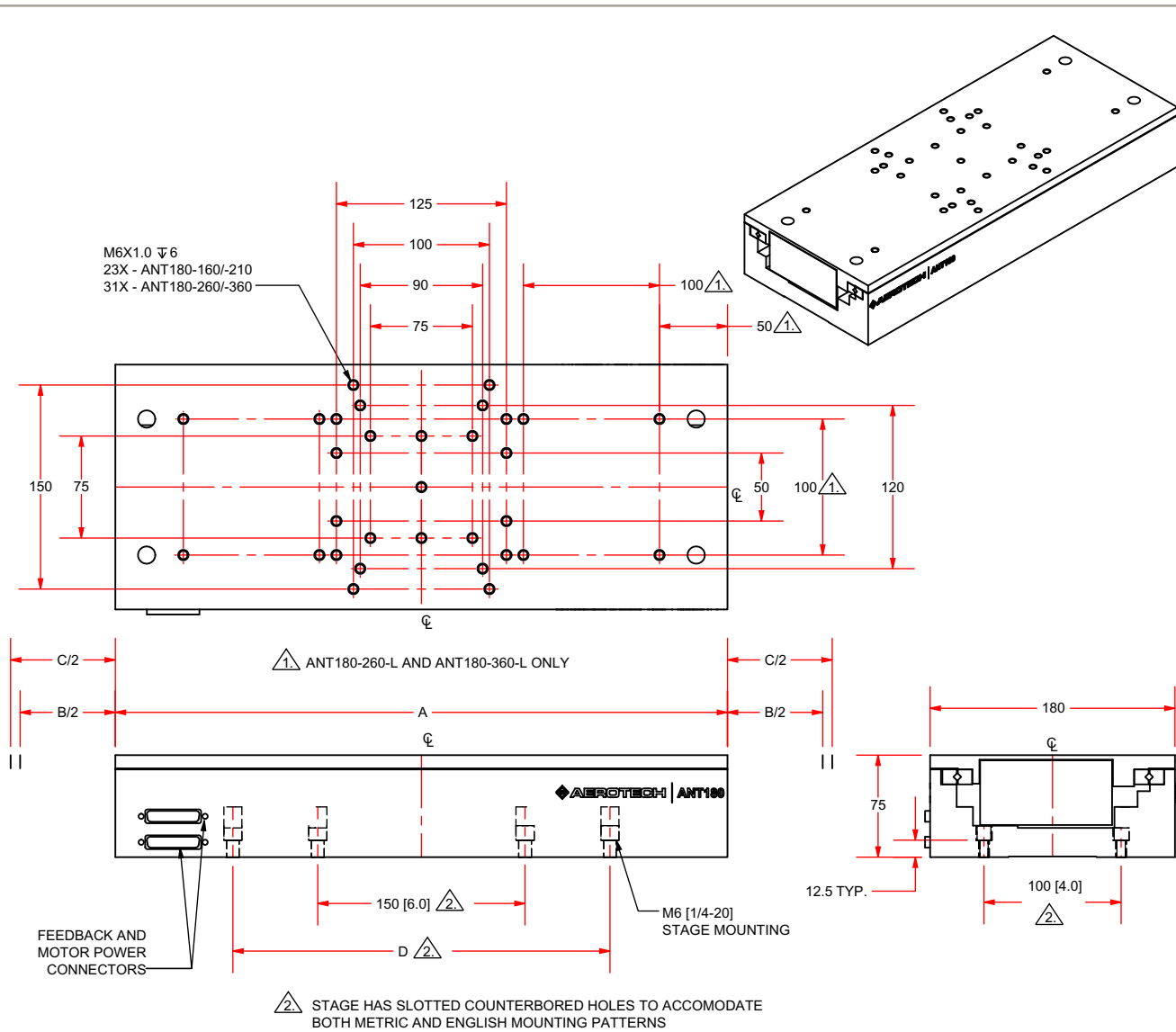


ANT180-160-L yaw, five runs, bi-directional. Highly repeatable, minimal yaw error enhances system positioning accuracy.



ANT180-160-L pitch, five runs, bi-directional. Excellent repeatability/accuracy contribute to improved processing.

ANT180-L/ANT180-L-PLUS Series DIMENSIONS



STAGE MODEL	A = STAGE LENGTH	B = NOMINAL TRAVEL	C = HARDSTOP TRAVEL	D = MOUNTING PATTERN LENGTH (mm [in])
ANT180-160-L	325	160	174	-
ANT180-210-L	375	210	224	225 [9.0]
ANT180-260-L	450	260	274	275 [11.0]
ANT180-360-L	575	360	374	350 [14.0]

DIMENSIONS: MILLIMETERS

ANT180-L/ANT180-L-PLUS Series ORDERING INFORMATION

ALS180-L Series Linear Motor Stage

ANT180-160-L	160 mm travel stage with linear motor and limits
ANT180-210-L	210 mm travel stage with linear motor and limits
ANT180-260-L	260 mm travel stage with linear motor and limits
ANT180-360-L	360 mm travel stage with linear motor and limits

Standard Linear Encoders

-LTAS	Amplified sine output 1 Vpp (20 μ m signal period) requires signal multiplier
-LTX50	0.1 micron line driver output

High-Accuracy Linear Encoder

-LNAS	High-accuracy amplified sine output 1 Vpp (4 μ m signal period) requires signal multiplier
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Cable Management System Options

-XY	Cable management system for X-Y assembly (only order with X axis)
-XY-AIR	Cable management system for X-Y assembly with 6 mm air line (only order with X axis)
-XYZ	Cable management system for X-Y-Z assembly (only order with X axis)
-XYZ-AIR	Cable management system for X-Y-Z assembly with 6 mm air line (only order with X axis)
-Y	Cable management system for X-Y assembly (only order with Y axis)
-Y-AIR	Cable management system for X-Y assembly with 6 mm air line (only order with Y axis)
-YZ	Cable management system for Y-Z assembly (only order with Y axis)
-YZ-AIR	Cable management system for Y-Z assembly with 6 mm air line (only order with Y axis)

Accessories (to be ordered as separate line item)

PLUS	High-accuracy version
ALIGNMENT-PA10	XY assembly; 10 arc sec orthogonal
ALIGNMENT-PA5	XY assembly; 5 arc sec orthogonal