

# ANT130-L-Z Series nano Motion Technology

## Mechanical Bearing, Linear Motor Vertical Stage

Nanometer performance in a large travel format

High resolution (1 nm), repeatability (75 nm),  
and accuracy (300 nm)

In-position stability of 5 nm

Anti-creep crossed-roller bearings

High dynamic performance



### Introduction

Aerotech's ANT130 series stages are the world's first nanometer-level positioning systems with greater than 25 mm travel. The ANT130-L-Z and ANT130-L-Z-PLUS crossed-roller stages are the best-in-class in combining speed, accuracy, resolution, repeatability, reliability, and size, and are offered in two accuracy grades. As an evolution of the popular ANT stage family, these linear stages exhibit enhanced motion performance over Aerotech's first generation ANT series.

### Noncontact Direct-Drive

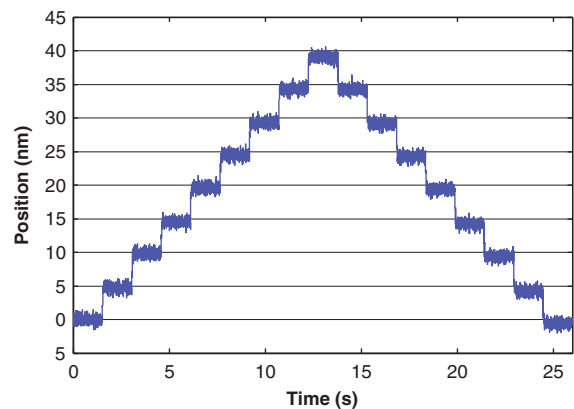
All of the original ANT series' direct-drive advantages have been preserved in the ANT130-L-Z family. Only noncontact direct-drive technology offers the robust, accurate, and high-speed positioning necessary for mass production of precision devices. ANT130-L-Z stages utilize advanced direct-drive technology pioneered by Aerotech to achieve the highest level of positioning performance. This direct-drive technology is high-performance, non-cogging, noncontact, high-speed, high-resolution, and high-accuracy. This unique drive and bearing combination, packaged in an extremely small-profile and footprint, offers tangible advantages in many applications such as high-precision positioning, disk-drive fabrication, fiber alignment, optical delay element actuation, sensor testing, and scanning processes that demand smooth and precise motion.

### Flexible System Design

The ANT130-L-Z family has universal mounting and tabletop patterns that allow for easy system integration. Two, three, or more axes can be easily combined for flexible system designs and multi-axis configurations.

### System Characteristics

Outstanding accuracy, position repeatability, and in-position stability require high system resolution. The ANT130-L-Z stage's industry-leading 1 nm minimum incremental step size provides this high level of performance. Excellent in-position stability, assisted by high-quality, anti-creep crossed-roller bearings, enables virtually maintenance-free operation over the life of the product. Aerotech's direct-drive technology has no hysteresis or backlash, enabling accurate and repeatable nanometer-scale motion.



ANT130-50-L-Z-PLUS 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.

## ANT130-L-Z Series SPECIFICATIONS

Mechanical Specifications	ANT130-35-L-Z	ANT130-35-L-Z-PLUS	ANT130-60-L-Z	ANT130-60-L-Z-PLUS
Travel	35 mm	35 mm	60 mm	60 mm
Accuracy <sup>(1)</sup>	±3 µm (±120 µin)	±300 nm (±12 µin)	±3 µm (±120 µin)	±300 nm (±12 µin)
Resolution	2 nm	2 nm	2 nm	2 nm
Repeatability (Bi-Directional) <sup>(1)</sup>	±100 nm	±75 nm	±100 nm	±75 nm
Repeatability (Uni-Directional) <sup>(1)</sup>	±50 nm	±50 nm	±50 nm	±50 nm
Straightness <sup>(1)</sup>	±2.0 µm (±80 µin)	±2.0 µm (±80 µin)	±2.0 µm (±80 µin)	±2.0 µm (±80 µin)
Flatness <sup>(1)</sup>	±2.0 µm (±80 µin)	±2.0 µm (±80 µin)	±2.0 µm (±80 µin)	±2.0 µm (±80 µin)
Pitch	10 arc sec	10 arc sec	10 arc sec	10 arc sec
Roll	10 arc sec	10 arc sec	10 arc sec	10 arc sec
Yaw	5 arc sec	5 arc sec	5 arc sec	5 arc sec
Maximum Speed	200 mm/s (8 in/s)	200 mm/s (8 in/s)	200 mm/s (8 in/s)	200 mm/s (8 in/s)
Maximum Acceleration	1 g - 10 m/s <sup>2</sup> (No Load)	1 g - 10 m/s <sup>2</sup> (No Load)	1 g - 10 m/s <sup>2</sup> (No Load)	1 g - 10 m/s <sup>2</sup> (No Load)
In-Position Stability <sup>(2)</sup>	5 nm	5 nm	5 nm	5 nm
Maximum Force (Continuous)	23 N	23 N	23 N	23 N
Load Capacity <sup>(3)</sup>	Vertical	10 kg	10 kg	10 kg
Moving Mass	1.2 kg (2.6 lb)	1.2 kg (2.6 lb)	1.4 kg (3.1 lb)	1.4 kg (3.1 lb)
Stage Mass	2.1 kg (4.6 lb)	2.1 kg (4.6 lb)	2.5 kg (5.5 lb)	2.5 kg (5.5 lb)
Material	Aluminum Body/Black Hardcoat Finish			
MTBF (Mean Time Between Failure)	30,000 Hours			

**Notes:**

1. Certified with each stage.
2. In-Position Jitter listing is 3σ value.
3. Axis orientation for on-axis loading is listed.
4. 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.
5. -PLUS requires the use of an Aerotech controller.

Electrical Specifications	ANT130-35-L-Z	ANT130-35-L-Z-PLUS	ANT130-60-L-Z	ANT130-60-L-Z-PLUS
Drive System	Brushless Linear Servomotor			
Feedback	Noncontact Linear Encoder			
Maximum Bus Voltage	±40 VDC			
Limit Switches	5 V, Normally Closed			
Home Switch	Near Center			

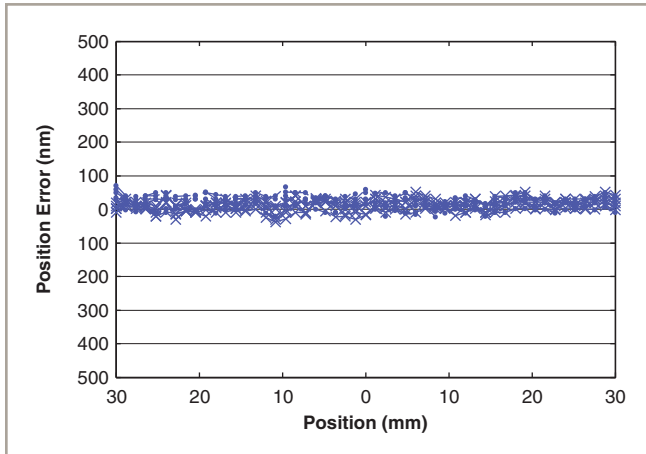
Recommended Controller	ANT130-35-L-Z	ANT130-35-L-Z-PLUS	ANT130-60-L-Z	ANT130-60-L-Z-PLUS
Multi-Axis	A3200	Npaq-MXR Npaq MR-MXH Ndrive ML-MXH		
	Ensemble	Epaq-MXH Epaq MR-MXH Ensemble ML-MXH		
Single Axis	Soloist	Soloist ML-MXH		

**Notes:**

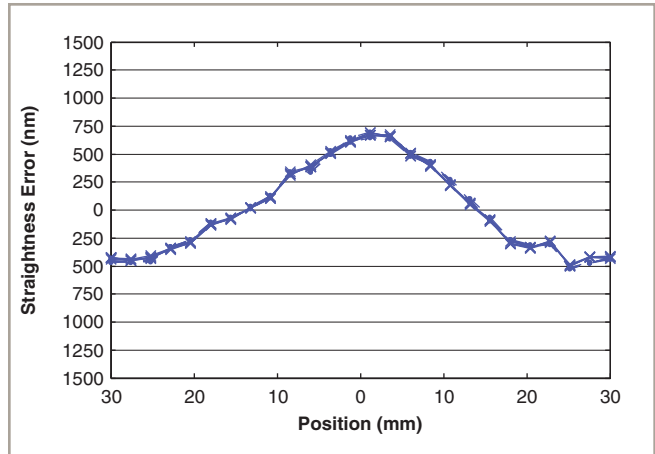
1. Linear amplifiers are required to achieve the listed specifications. Other options are available.

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.

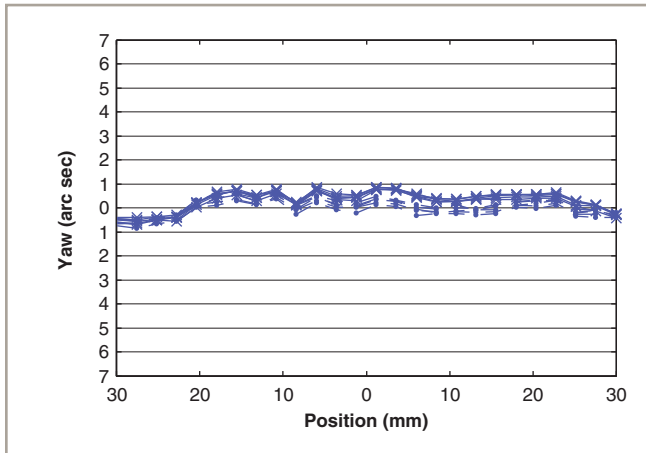
## ANTI30-L-Z/ANTI30-L-Z-PLUS Series PERFORMANCE



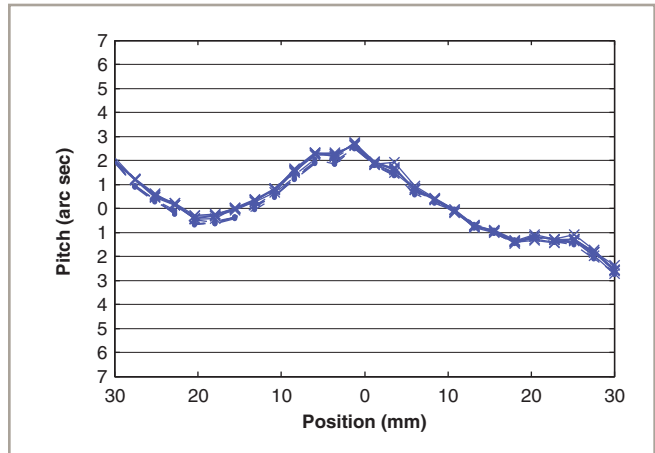
*ANTI30-60-L-Z-PLUS accuracy and repeatability, five runs, bi-directional over an extended period of time shows the high level of system accuracy and repeatability.*



*ANTI30-60-L-Z-PLUS straightness error, five runs, bi-directional. Exceptional and highly repeatable performance is assured with minimal straightness error.*



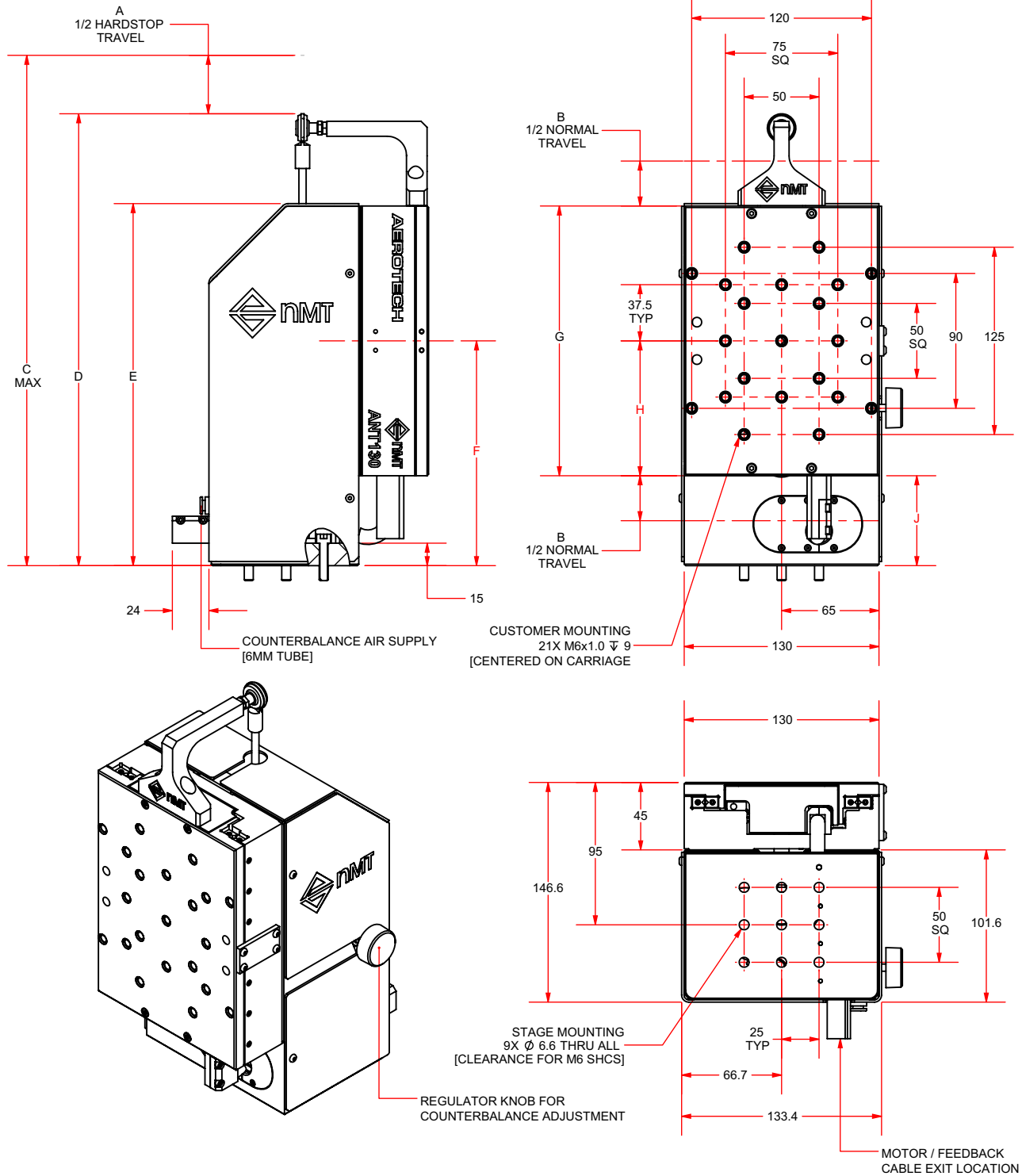
*ANTI30-60-L-Z-PLUS yaw, five runs, bi-directional. Highly repeatable, minimal yaw error enhances system positioning accuracy.*



*ANTI30-60-L-Z-PLUS pitch, five runs, bi-directional. Excellent repeatability/accuracy contribute to improved processing.*

ANT130-L-Z DIMENSIONS

ANT130-L-Z/ANT130-L-Z-PLUS



Model	A	B	C	D	E	F	G	H	J
ANT130-035-L-Z	26.5	17.5	278.1	251.6	204.1	125.0	155.0	77.5	47.5
ANT130-060-L-Z	39.0	30.0	340.6	301.6	241.6	150.0	180.0	90.0	60.0

DIMENSIONS: MILLIMETERS

## ANT130-L-Z Series ORDERING INFORMATION

### ANT130-L-Z Series Linear Stage

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ANT130-LZ Aerotech's nanotranslation crossed-roller vertical positioner

### Linear Stage Travel (X,Y)

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ANT130-35-L-Z 35 mm vertical travel stage with proprietary direct-drive motor technology, 1 Vp-p sinusoidal output linear encoder and limits

ANT130-35-L-Z-PLUS 35 mm vertical travel stage with proprietary direct-drive motor technology, 1 Vp-p sinusoidal output linear encoder and limits (High Accuracy Version)

ANT130-60-L-Z 60 mm vertical travel stage with proprietary direct-drive motor technology, 1 Vp-p sinusoidal output linear encoder and limits

ANT130-60-L-Z-PLUS 60 mm vertical travel stage with proprietary direct-drive motor technology, 1 Vp-p sinusoidal output linear encoder and limits (High Accuracy Version)

### Options

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-25DU Single 25-pin D (standard)

-4DU-25DU Motor 4-pin HPD; feedback 25-pin D