

# ANT95-V Series

## Single-Axis Lift Direct-Drive Nanopositioning Stage

Nanometer performance with 3 mm vertical travel

High resolution (1 nm), repeatability (100 nm), and accuracy (200 nm)

In-position stability of <1 nm

Anti-creep crossed-roller bearings

High dynamic performance

## nano Motion Technology



### Introduction

Aerotech's ANT series stages are the world's first nanometer-level positioning systems with multi-millimeter travel. The ANT95-V and ANT95-V-PLUS are linear-motor-driven wedge-style vertical lift stages. The stages are designed to be seamlessly integrated with other stages in the ANT95 family for superior multi-axis performance, and are offered in two accuracy grades.

### Noncontact Direct-Drive

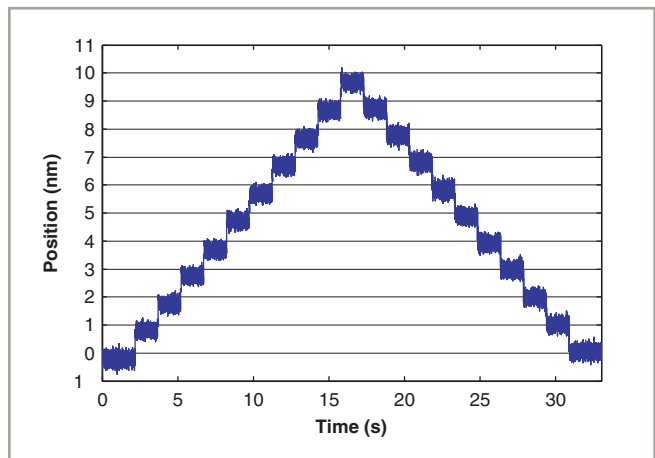
All of the original ANT series' direct-drive advantages have been preserved in the ANT95-V family. Only noncontact direct-drive technology offers the robust, accurate, and high-speed positioning necessary for mass production of precision devices. ANT95-V stages utilize advanced direct-drive technology 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 ANT95-V family has universal mounting and tabletop patterns that allow for easy system integration. Two, three, or more axes can be combined easily for flexible system designs and multi-axis configurations.

### System Characteristics

Outstanding accuracy, position repeatability, and in-position stability require high system resolution. The ANT95-V stage's industry-leading 1 nm minimum incremental step size provides this high level of performance. Excellent in-position stability is assisted by high-quality, anti-creep, crossed-roller bearings. The stage offers 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.



ANT95-3-V-PLUS 1 nm step plot. Best-in-class resolution and exceptional in-position stability for large travel stages.

## ANT95-V/ANT95-V-PLUS Series SPECIFICATIONS

Mechanical Specifications	ANT95-3-V	ANT95-3-V-PLUS
Travel	3 mm	
Accuracy <sup>(1)</sup>	±2 μm (±80 μin)	±200 nm (±8 μin)
Resolution	1 nm (0.04 μin)	
Repeatability (Bi-Directional) <sup>(4)</sup>	±150 nm (±6 μin)	±100 nm (±4 μin)
Repeatability (Uni-Directional)	±75 nm (±3 μin)	
Straightness <sup>(2)</sup>	±1.0 μm (±40 μin)	
Pitch <sup>(1)</sup>	20 arc sec	
Roll <sup>(1)</sup>	10 arc sec	
Yaw <sup>(1)</sup>	10 arc sec	
Maximum Speed	75 mm/s (3 in/s)	
Maximum Acceleration	0.4 g - 4 m/s <sup>2</sup> (No Load)	
Settling Time	See graphs for typical performance	
In-Position Stability <sup>(3)</sup>	<1 nm (<0.04 μin)	
Maximum Force (Continuous)	71 N	
Load Capacity <sup>(4)</sup>	1.5 kg (3.3 lb)	
Moving Mass	1.1 kg (2.42 lb)	
Stage Mass	2.0 kg (4.4 lb)	
Material	Aluminum and Stainless-Steel Body/Black Hardcoat Finish/Black Anodize Finish	
MTBF (Mean Time Between Failure)	30,000 Hours	

Notes:

1. Certified with each stage.
2. Measured perpendicular or parallel to wedge direction.
3. In-Position Stability listing is 3 sigma value.
4. Assumes loading along axis of travel.

• Specifications are per axis, 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.

• -PLUS requires the use of an Aerotech controller.

Electrical Specifications	ANT95-3-V
Drive System	Brushless Linear Servomotor
Feedback	Noncontact Linear Encoder
Maximum Bus Voltage	±40 VDC
Limit Switches	5 V, Normally Closed
Home Switch	Near Center

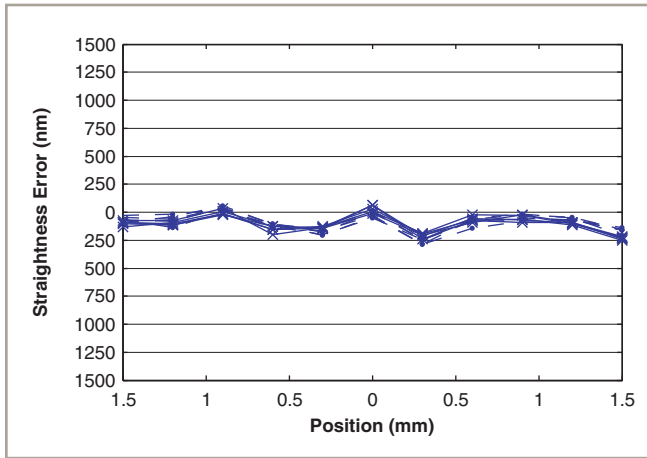
Recommended Controller	ANT95-3-V
Multi-Axis	A3200 Npaq-MXR Npaq MR-MXH Ndrive ML-MXH
	Ensemble Epaq-MXH Epaq MR-MXH Ensemble ML-MXH
Single Axis	Soloist Soloist ML-MXH

Notes:

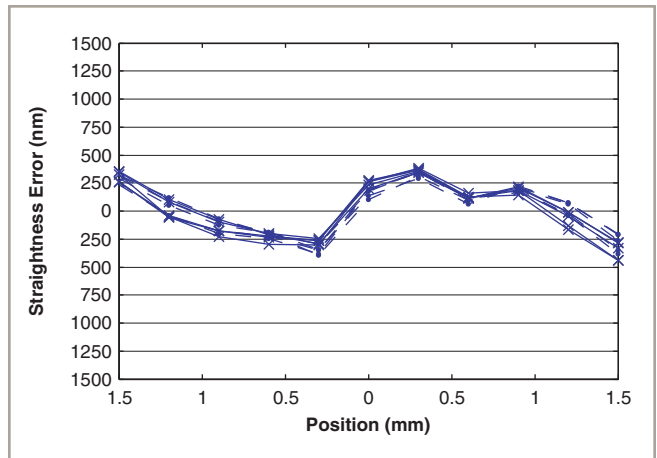
1. Linear amplifiers are required to achieve the listed specifications. Other options are available.

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 Application Engineering for more information.

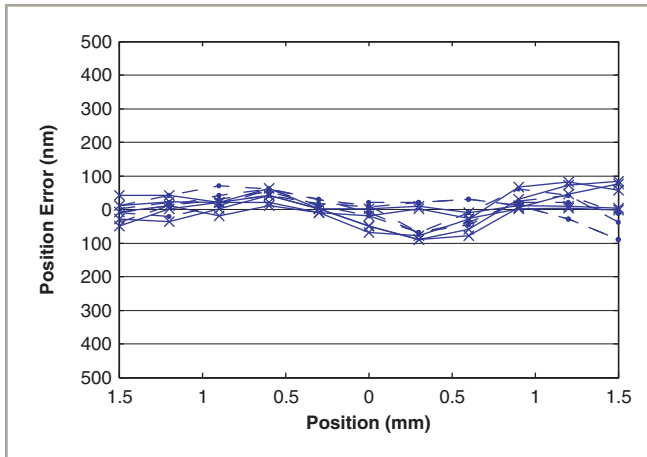
ANT95-V/ANT95-V-PLUS Series PERFORMANCE



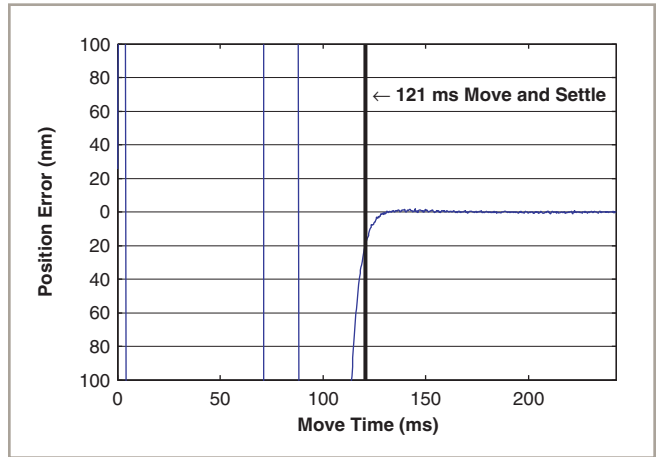
ANT95-3-V-PLUS straightness error, five runs, bi-directional, parallel to the wedge.



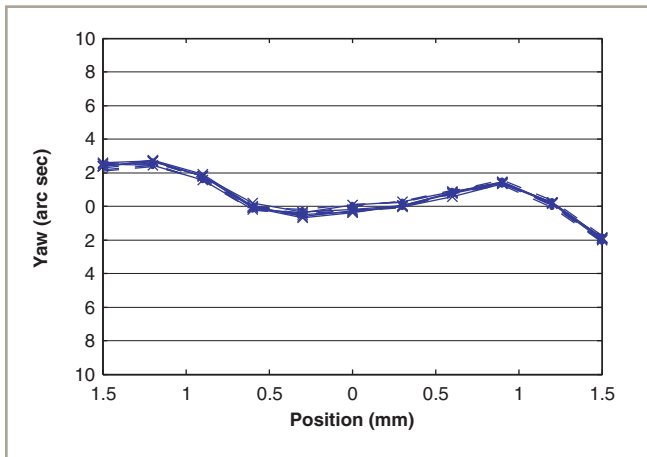
ANT95-3-V-PLUS straightness error, five runs, bi-directional, perpendicular to the wedge.



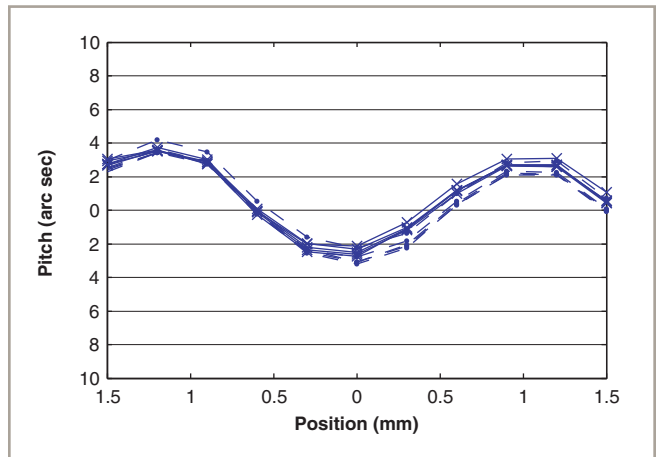
ANT95-3-V-PLUS accuracy and repeatability. This multiple test run over an extended period of time shows the high level of system accuracy and repeatability.



ANT95-3-V-PLUS step and settle performance at 75 mm/s, with a settle spec of  $\pm 20$  nm, and a step size of 3 mm. Outstanding settling time enhances throughput of most applications.

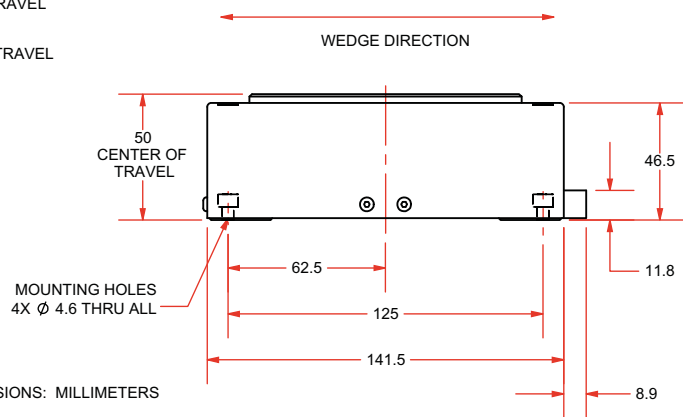
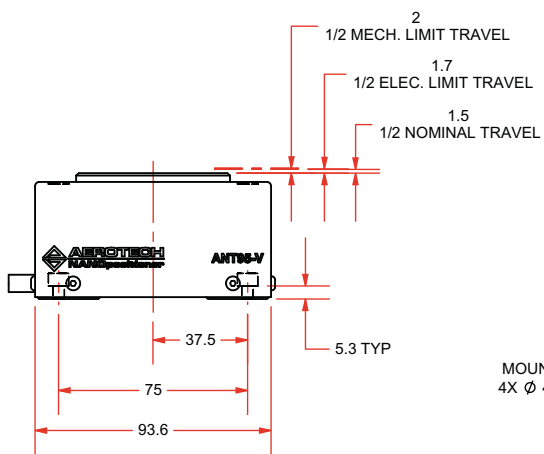
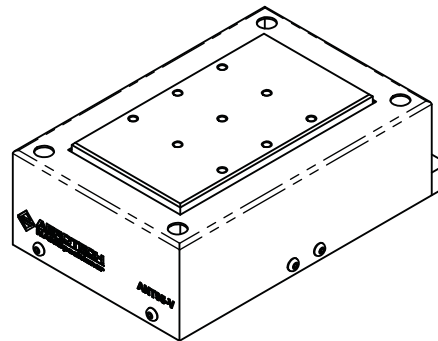
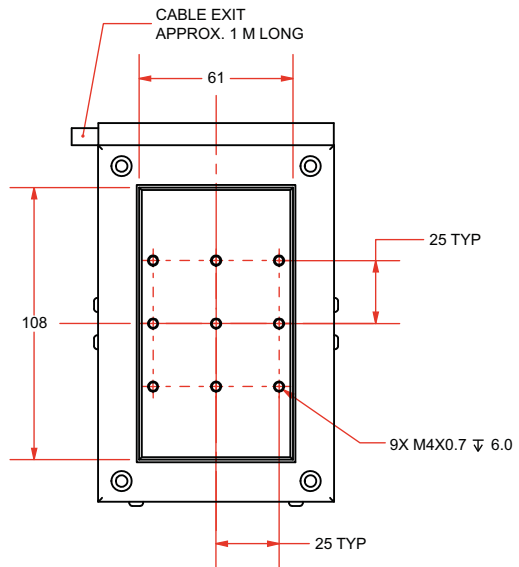


ANT95-3-V-PLUS yaw, five runs, bi-directional. Highly repeatable, minimal yaw error enhances system positioning accuracy.



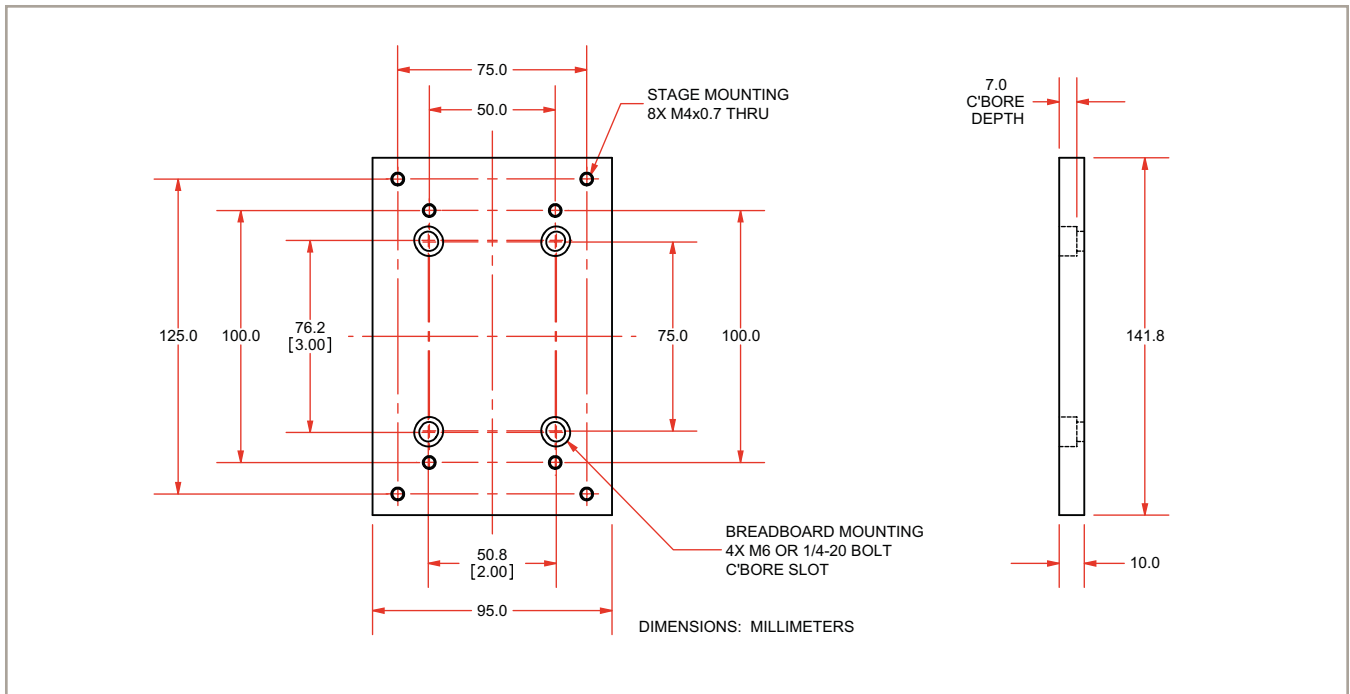
ANT95-3-V-PLUS pitch, five runs, bi-directional. Excellent repeatability/accuracy contribute to improved processing.

# ANT95-3-V/ANT95-3-V-PLUS DIMENSIONS



DIMENSIONS: MILLIMETERS

## ANT95-3-V/ANT95-3-V-PLUS Mounting Plate DIMENSIONS



## ANT95-V/ANT95-V-PLUS Series ORDERING INFORMATION

### ANT95-V Series Lift Stage

ANT95-V/ANT95-V-PLUS Aerotech nanotranslation crossed-roller bearing vertical lift positioner

### Linear Stage Travel

ANT95-3-V	3 mm vertical travel lift stage with proprietary direct-drive motor technology, 1 V <sub>p-p</sub> sinusoidal output linear encoder and limits
ANT95-3-V-PLUS	3 mm vertical travel lift stage with proprietary direct-drive motor technology, 1 V <sub>p-p</sub> sinusoidal output linear encoder and limits (High Accuracy Version)

### Options

-MP	Breadboard mounting plate
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