

ANT95-L Series nano Motion Technology

Mechanical Bearing, Linear Motor Stage

Noncontact, non-cogging, frictionless direct-drive – zero backlash or hysteresis

High resolution (1 nm), repeatability (50 nm), and accuracy (250 nm)

In-position stability of 3 nm

Anti-creep cross-roller bearings

High dynamic performance

Available in X, XY, XYZ, and many other combinations



Introduction

Aerotech's NanoTranslation (ANT95-L, ANT95-L-H) cross-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. Product improvements such as 5 g acceleration, 500 mm/s velocity, enhanced load capacity, and standardized, universal base mounting patterns allow the use of this flexible stage family in an even wider range of configurations than its predecessors.

Noncontact Direct-Drive

All of the original ANT series' direct-drive advantages have been preserved in the ANT95-L family. Only noncontact direct-drive technology offers the robust, accurate, and high-speed positioning necessary for mass production of precision devices. ANT95-L 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, and the use of anti-creep cross-roller bearing elements allows even higher precision, smaller incremental moves to be accomplished reliably and repeatably. 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.

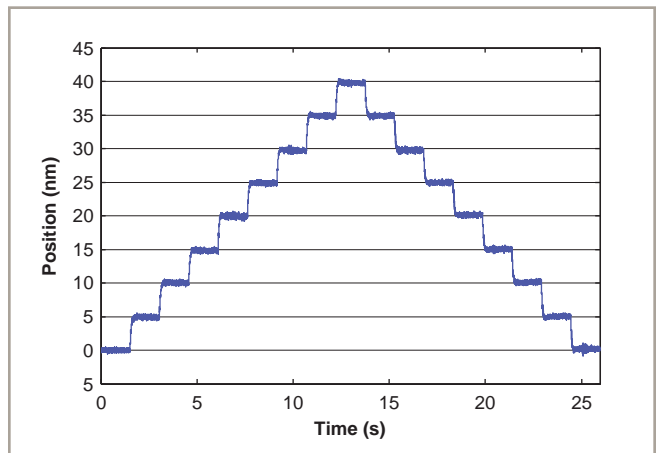
Flexible System Design

The ANT95-L 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 ANT95-L 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 cross-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.



ANT95-50-L-H 5 nm step plot. Best-in-class resolution and exceptional in-position stability for large travel stages.

ANT95-L Series SPECIFICATIONS

Mechanical Specifications		ANT95-25-L	ANT95-25-L-H	ANT95-50-L	ANT95-50-L-H
Travel		25 mm (1 in)	25 mm (1 in)	50 mm (2 in)	50 mm (2 in)
Accuracy ⁽¹⁾		±3.0 µm (±120 µin)	±250 nm (±10 µin)	±3.0 µm (±120 µin)	±250 nm (±10 µin)
Resolution		1 nm	1 nm	1 nm	1 nm
Repeatability (Bidirectional) ⁽¹⁾		±100 nm	±50 nm	±100 nm	±50 nm
Straightness ⁽¹⁾		±1.5 µm (±60 µin)	±1.5 µm (±60 µin)	±2.0 µm (±80 µin)	±2.0 µm (±80 µin)
Flatness ⁽¹⁾		±2.0 µm (±80 µin)	±2.0 µm (±80 µin)	±2.5 µm (±100 µin)	±2.5 µm (±100 µin)
Pitch		5 arc sec	5 arc sec	7 arc sec	7 arc sec
Roll		5 arc sec	5 arc sec	7 arc sec	7 arc sec
Yaw		5 arc sec	5 arc sec	5 arc sec	5 arc sec
Maximum Speed		500 mm/s (20 in/s)	500 mm/s (20 in/s)	500 mm/s (20 in/s)	500 mm/s (20 in/s)
Maximum Acceleration		5 g - 50 m/s ² (No Load)	5 g - 50 m/s ² (No Load)	4 g - 40 m/s ² (No Load)	4 g - 40 m/s ² (No Load)
Speed Stability		See graph for typical performance			
Settling Time		See graph for typical performance			
In-Position Stability ⁽²⁾		3 nm	3 nm	3 nm	3 nm
Maximum Force (Continuous)		7.75 N	7.75 N	9.5 N	9.5 N
Load Capacity ⁽³⁾	Horizontal	5.0 kg (11 lb)	5.0 kg (11 lb)	7.0 kg (15.4 lb)	7.0 kg (15.4 lb)
	Side	5.0 kg (11 lb)	5.0 kg (11 lb)	5.0 kg (11 lb)	5.0 kg (11 lb)
Moving Mass		0.46 kg (1.0 lb)	0.46 kg (1.0 lb)	0.52 kg (1.1 lb)	0.52 kg (1.1 lb)
Stage Mass		0.8 kg (1.8 lb)	0.8 kg (1.8 lb)	1.2 kg (2.7 lb)	1.2 kg (2.7 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. -H requires the use of an Aerotech controller.

Electrical Specifications	ANT95-25-L	ANT95-25-L-H	ANT95-50-L	ANT95-50-L-H
Drive System	Brushless Linear Servomotor			
Feedback	Noncontact Linear Encoder			
Maximum Bus Voltage	±40 VDC			
Limit Switches	5 V, Normally Closed			
Home Switch	Near Center			

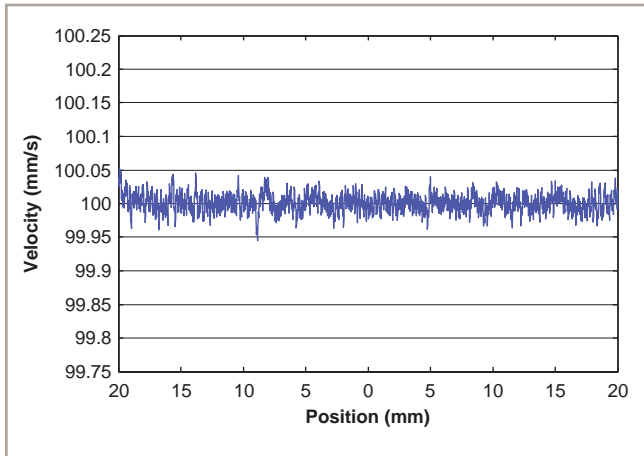
Recommended Controller		ANT95-25-L	ANT95-25-L-H	ANT95-50-L	ANT95-50-L-H
Multi-Axis	A3200	Npaq-MXR Npaq MR-MXH Ndrive ML-MXH			
	Ensemble	Epaq-MXH Epaq MR-MXH Ensemble ML-MXH			
Single Axis	Soloist	Soloist ML-MXH			

Notes:

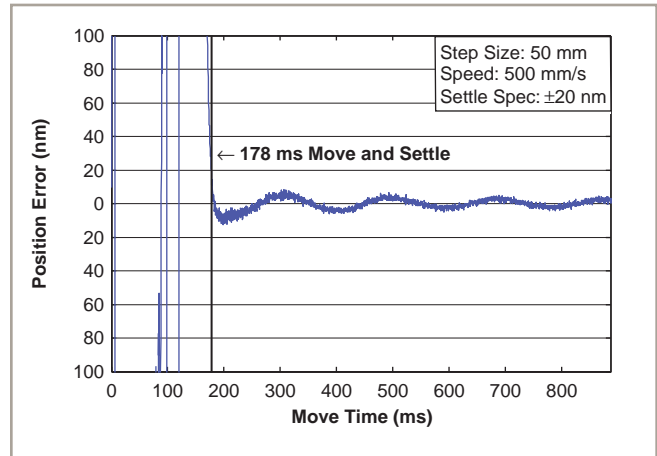
1. Linear amplifiers are required to achieve the listed specifications. Other options are available.

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.

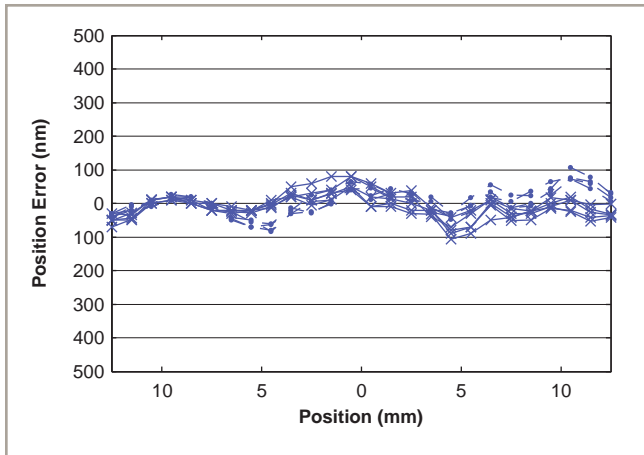
ANT95-L/ANT95-L-H Series PERFORMANCE



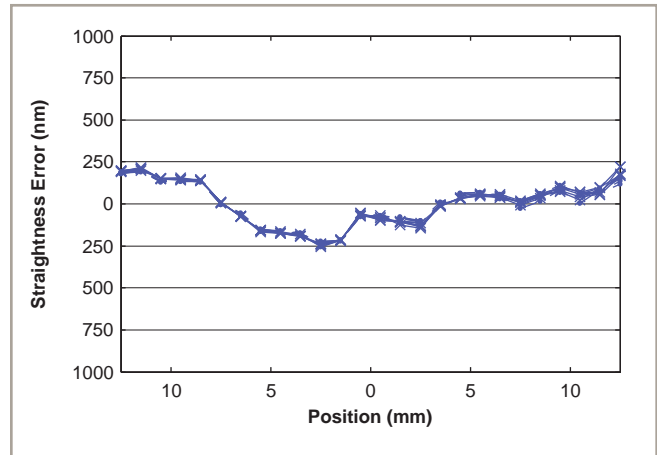
ANT95-50-L-H velocity performance at 100 mm/s and 1 kg payload. Excellent speed stability is another feature of the ANT Series stages.



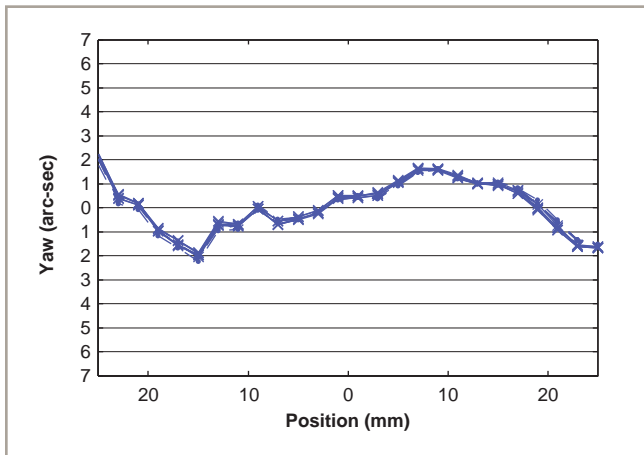
ANT95-50-L-H step and settle performance at full travel and 1 kg payload. Outstanding settling time enhances throughput of most applications.



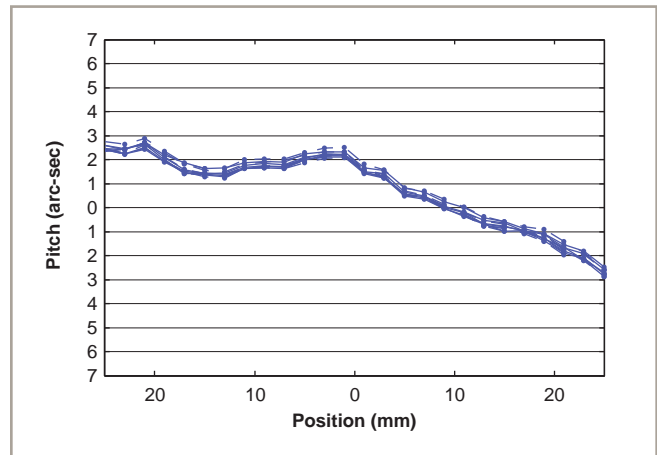
ANT95-25-L-H accuracy and repeatability. This multiple test run over an extended period of time shows the high level of system accuracy and repeatability.



ANT95-25-L-H straightness error, five runs, bi-directional. Exceptional and highly repeatable – five times more accurate than the stated specification.

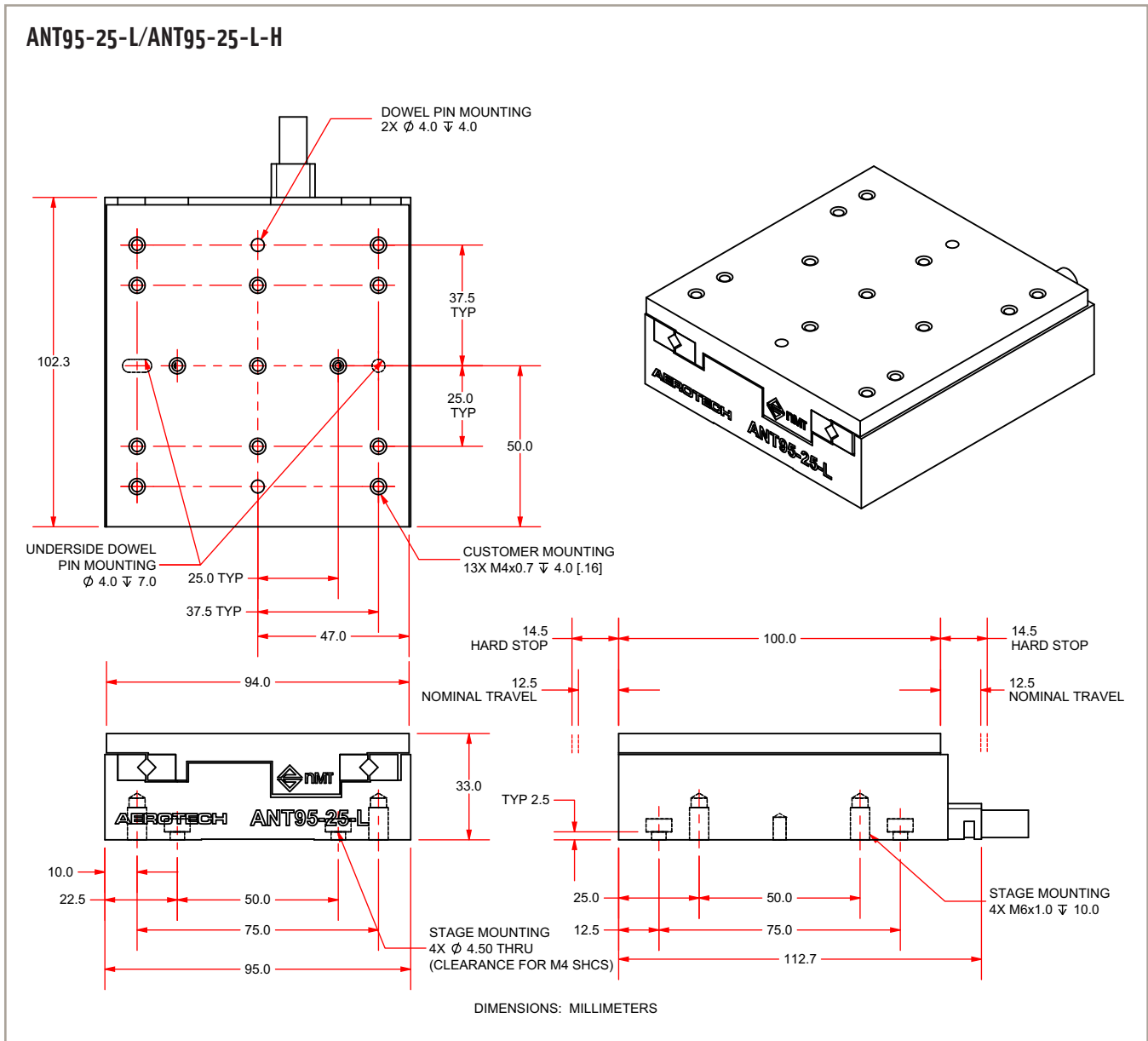


ANT95-50-L-H yaw, five runs, bi-directional. Highly repeatable, minimal yaw error enhances system positioning accuracy.

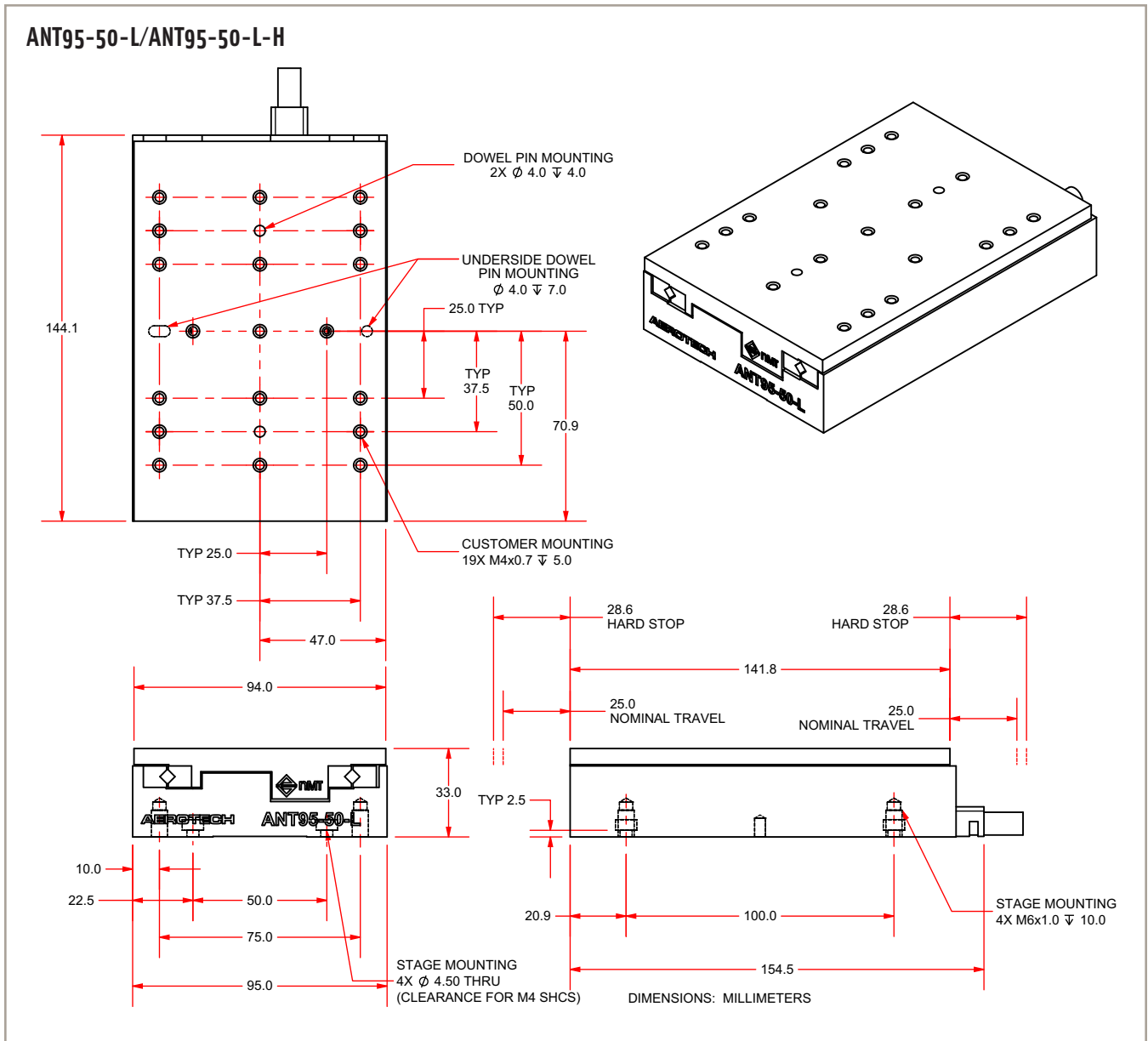


ANT95-50-L-H pitch, five runs, bi-directional. Excellent repeatability/accuracy contribute to improved processing.

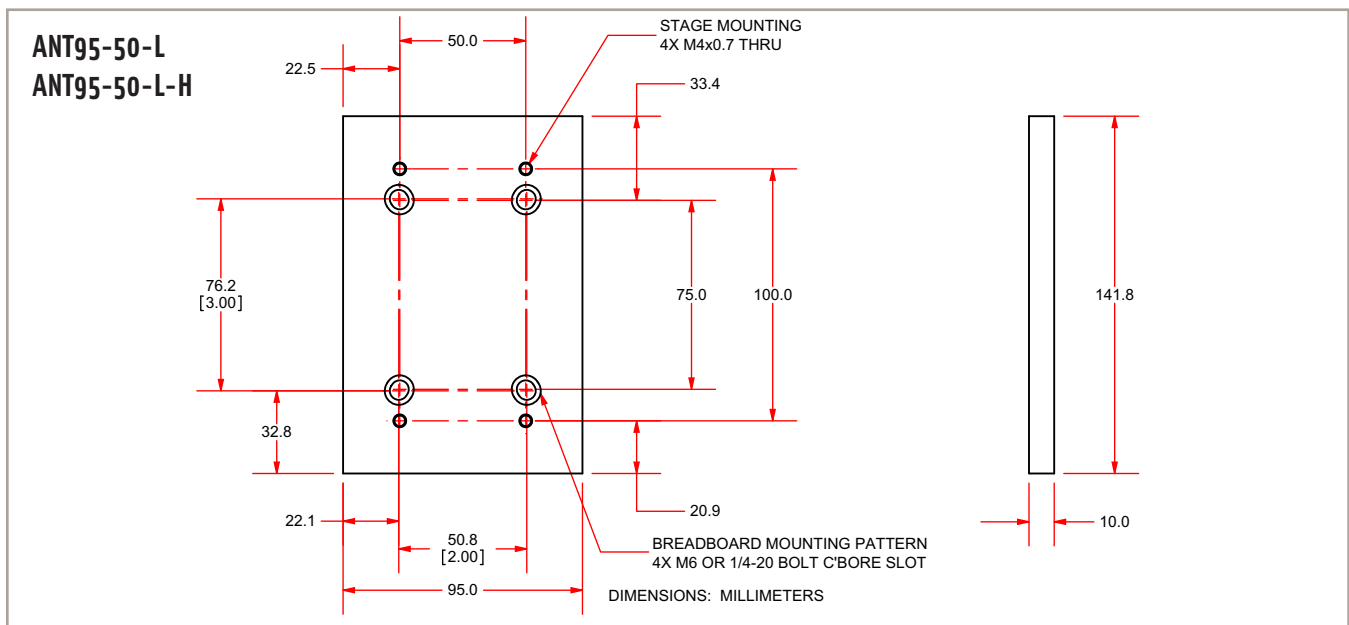
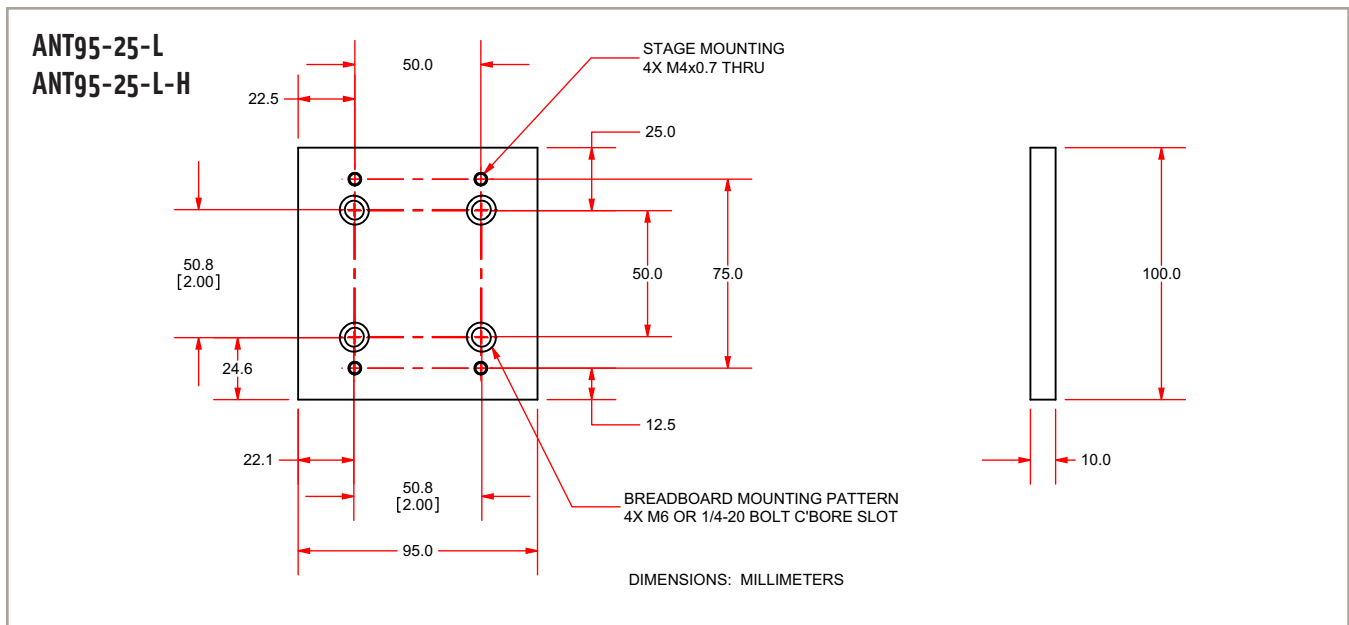
ANT95-25-L/ANT95-25-L-H DIMENSIONS



ANT95-50-L/ANT95-50-L-H DIMENSIONS



ANT95-25-L/ANT95-50-L and ANT95-25-L-H/ANT95-50-L-H Mounting Plate DIMENSIONS



ANT95-L Series ORDERING INFORMATION

ANT95-L Series Linear Stage

ANT95-L Aerotech's nanotranslation cross-roller linear positioner

Linear Stage Travel (X,Y)

ANT95-25-L	25 mm (1 in) travel stage with proprietary direct-drive motor technology, 1 Vp-p sinusoidal output linear encoder and limits
ANT95-25-L-H	25 mm (1 in) travel stage with proprietary direct-drive motor technology, 1 Vp-p sinusoidal output linear encoder and limits (High Accuracy Version)
ANT95-50-L	50 mm (2 in) travel stage with proprietary direct-drive motor technology, 1 Vp-p sinusoidal output linear encoder and limits
ANT95-50-L-H	50 mm (2 in) travel stage with proprietary direct-drive motor technology, 1 Vp-p sinusoidal output linear encoder and limits (High Accuracy Version)

Options

-MP	Breadboard mounting plate
-AP	XY adapter plate (ANT95-50-L and ANT95-50-L-H only)