ANT95-XY Series nano Motion Technology

Two-Axis Mechanical Bearing, Linear Motor Stage

- Integrated low profile XY linear motor stage
- 25 mm x 25 mm or 50 mm x 50 mm travel
- 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

Introduction

The ANT95-XY cross-roller-bearing, linear motor, dual-axis stage continues the evolution of the ANT series of stages. The ANT95-XY and ANT95-XY-H are three-piece designs that allow travel in two dimensions (X and Y). The sleek design provides an extremely low profile of only 60 mm. The stage comes with proprietary direct-drive motor technology, noncontact linear encoders, limits, integrated cable management system, and two grades of accuracy.

Stage Design

The ANT95-XY design allows critical elements such as orthogonality, straightness, and flatness to be optimized, resulting in a stage with exceptional geometrical tolerances. Aerotech's direct-drive technology has no hysteresis or backlash, enabling accurate and repeatable nanometer-scale motion in both the X and Y dimensions. Both travel options (25 mm x 25 mm or 50 mm x 50 mm) come with the 60 mm profile height.

The ANT95-XY uses anti-creep cross-roller bearings for improved load capacity as well as higher precision and smaller incremental moves when compared to linear motion guides. You can expect outstanding accuracy, position repeatability, and in-position stability with the ANT95-XY stage.

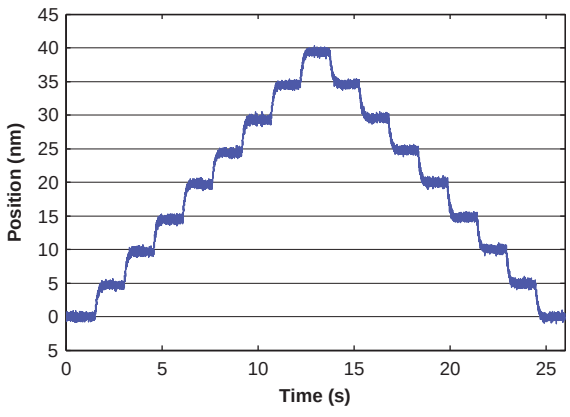
Noncontact Direct-Drive

Only noncontact direct-drive technology offers the robust, accurate, and high-speed positioning necessary for mass production of precision devices. ANT95-XY 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. The integrated cable management system is designed for long life and to minimize drag forces.

Multi-Axis Configurations

The ANT95-XY can be combined with other Aerotech ANT series products (vertical lift stages, direct-drive rotaries, and goniometers) to create unique, high performance, multi-axis systems.



ANT95-25-XY lower axis 5 nm step plot. Best-in-class resolution and exceptional in-position stability for large travel stages.

WORLD HEADQUARTERS: Aerotech, Inc., United States • Phone: +1-412-963-7470 • Email: sales@aerotech.com
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Aerotech GmbH, Germany • Phone: +49-911-9679370 • Email: sales@aerotechgmbh.de
Aerotech KK, Japan • Phone: +81-47-489-1741 • Email: sales@aerotechkk.co.jp
Aerotech China • Phone: +852-3793-3488 • Email: saleschina@aerotech.com

ANT95-XY Series SPECIFICATIONS

Mechanical Specifications		ANT95-25-XY	ANT95-25-XY-H	ANT95-50-XY	ANT95-50-XY-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 (Bi-Directional)[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
Orthogonality		10 arc sec	3 arc sec	10 arc sec	3 arc sec
Maximum Speed		500 mm/s (20 in/s) (Upper Axis)	500 mm/s (20 in/s) (Upper Axis)	500 mm/s (20 in/s) (Upper Axis)	500 mm/s (20 in/s) (Upper Axis)
Maximum Acceleration		4.5 g - 45 m/s² (No Load) (Upper Axis)	4.5 g - 45 m/s² (No Load) (Upper Axis)	2.75 g - 27 m/s² (No Load) (Upper Axis)	2.75 g - 27 m/s² (No Load) (Upper Axis)
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	4.0 kg (8.8 lb)	4.0 kg (8.8 lb)	6.0 kg (13.2 lb)	6.0 kg (13.2 lb)
Moving Mass	Upper Axis	0.45 kg (1.0 lb)	0.45 kg (1.0 lb)	0.8 kg (1.8 lb)	0.8 kg (1.8 lb)
	Lower Axis	1.13 kg (2.5 lb)	1.13 kg (2.5 lb)	2.1 kg (4.6 lb)	2.1 kg (4.6 lb)
Stage Mass		1.8 kg (4 lb)	1.8 kg (4 lb)	3.2 kg (7 lb)	3.2 kg (7 lb)
Material		Aluminum Body/Black Hardcoat Finish			
MTBF (Mean Time Between Failure)		20,000 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-XY	ANT95-25-XY-H	ANT95-50-XY	ANT95-50-XY-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-XY	ANT95-25-XY-H	ANT95-50-XY	ANT95-50-XY-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.

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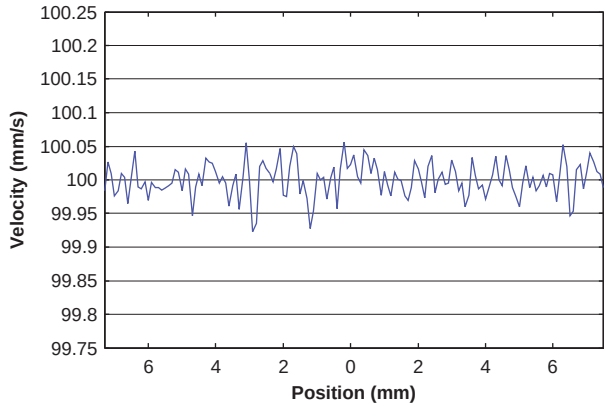
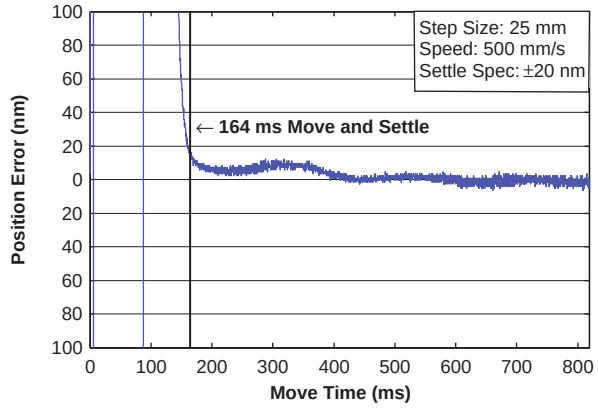
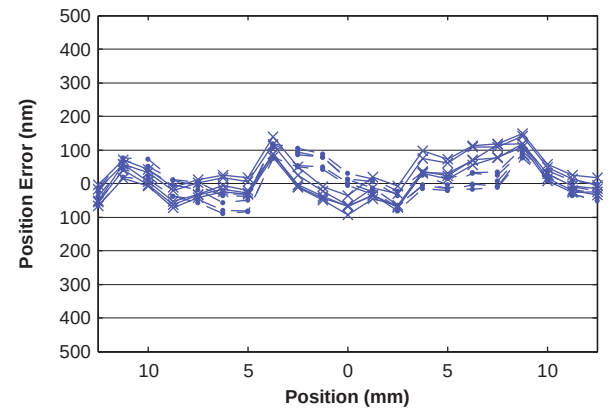
ANT95-XY/ANT95-XY-H Series PERFORMANCE



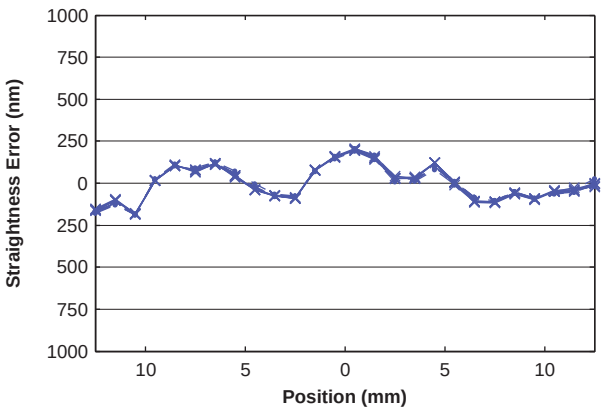
ANT95-25-XY-H velocity performance at 100 mm/s and 1 kg payload for the X (lower) axis. This outstanding speed stability enhances most scanning or laser machining applications.



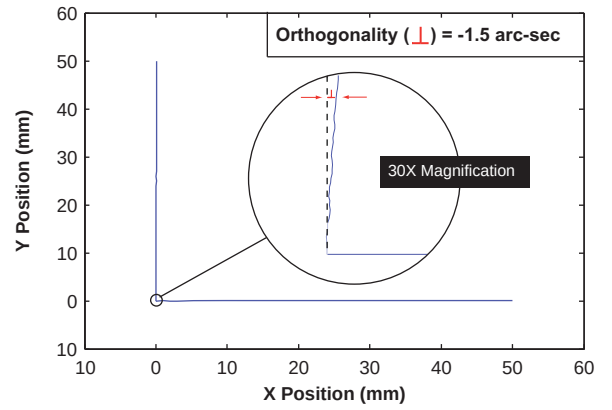
ANT95-25-XY-H step and settle performance at full travel and 1 kg payload for the X (lower) axis. Industry-best settling times significantly improve throughput for most applications.



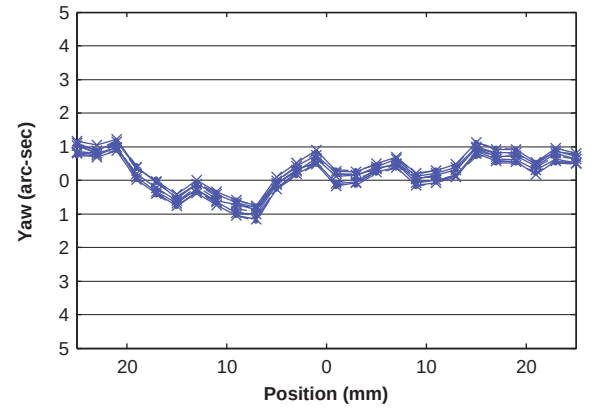
ANT95-25-XY-H accuracy and repeatability, five runs, bi-directional for the X (lower) axis. The total accuracy of 240 nm over 25 mm travel is significantly better than other offerings and half of its stated specification.



ANT95-25-XY-H bi-directional straightness error for the Y (upper) axis. Significantly (five times) better than stated specification.



ANT95-50-XY-H orthogonality. The inset is exaggerated 30X for clarity. Exceptionally small angular (orthogonality) error significantly enhances system accuracy.



*ANT95-50-XY-H Y (upper) axis yaw, five runs, bi-directional. Highly repeatable, lowest angular error over **full** travel.*

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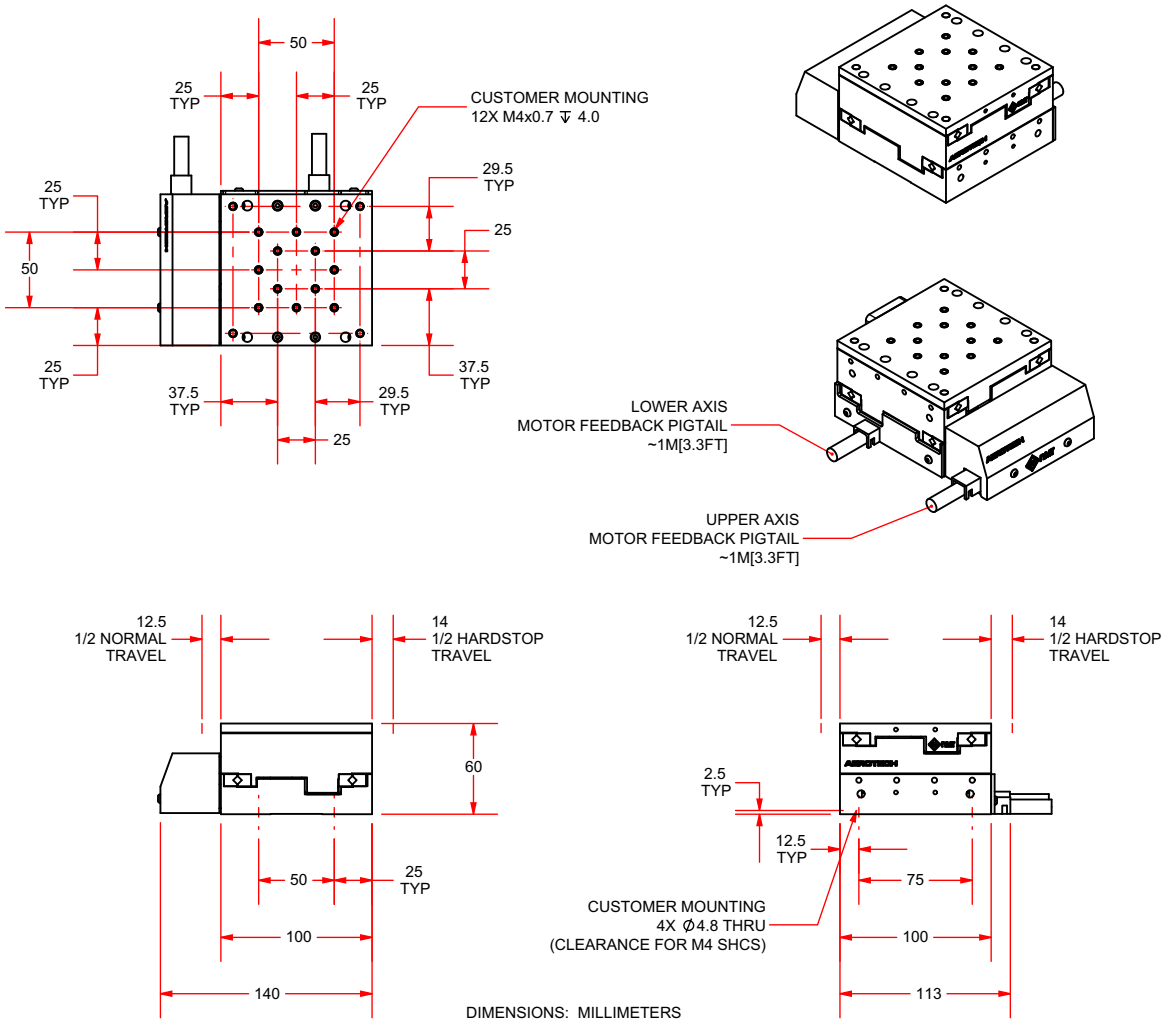
ANT95-25-XY/ANT95-25-XY-H DIMENSIONS

ANT95-25-XY/ANT95-25-XY-H



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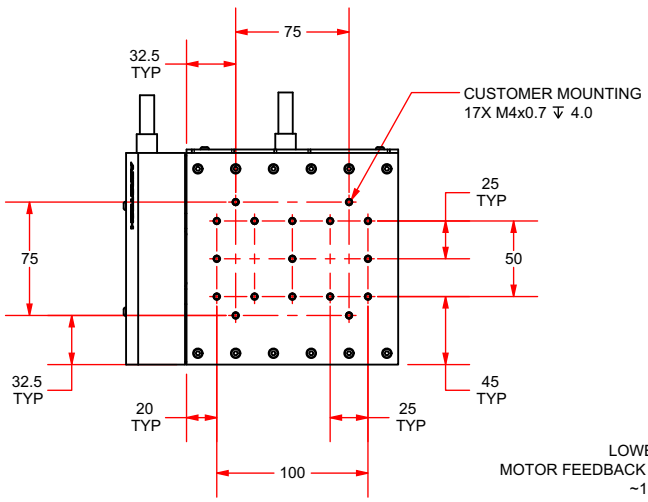
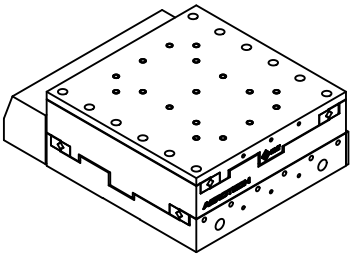
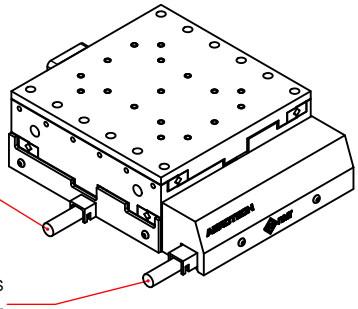
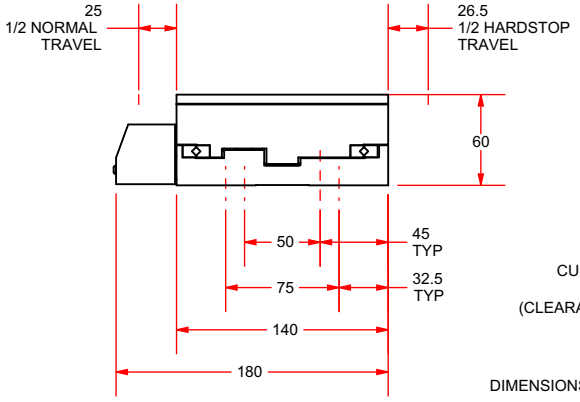
ANT95-50-XY/ANT95-50-XY-H DIMENSIONS

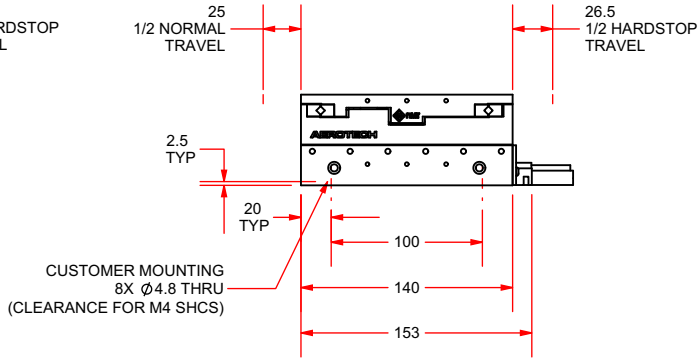
ANT95-50-XY/ANT95-50-XY-H











DIMENSIONS: MILLIMETERS

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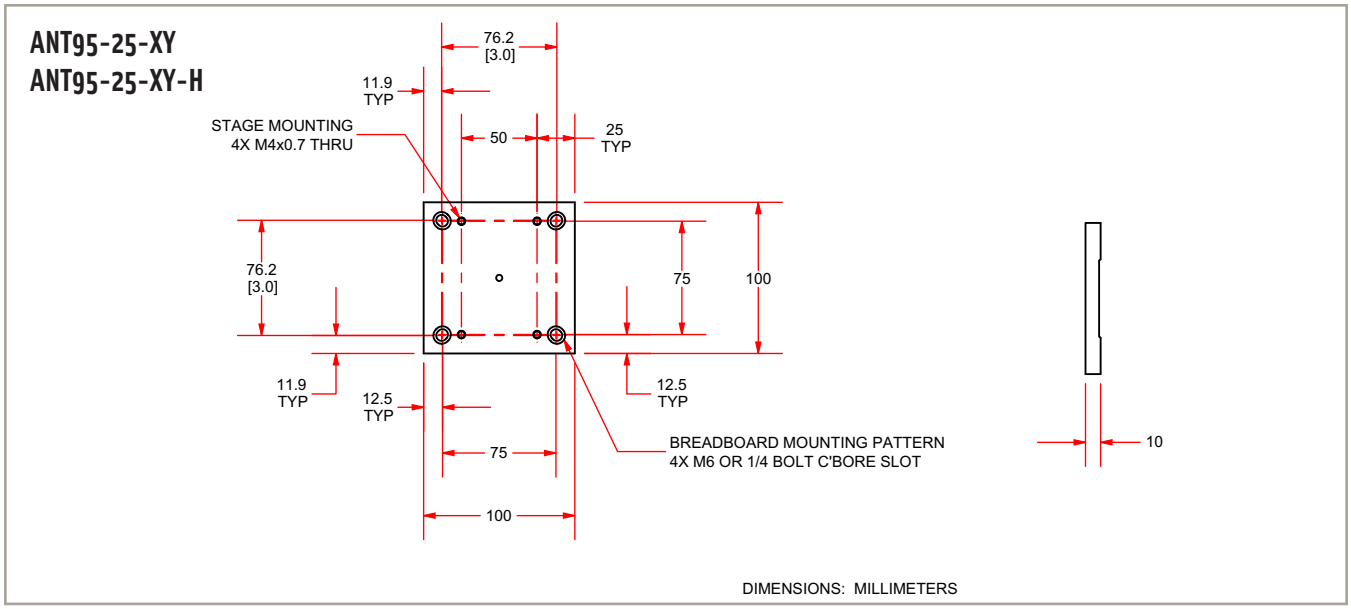
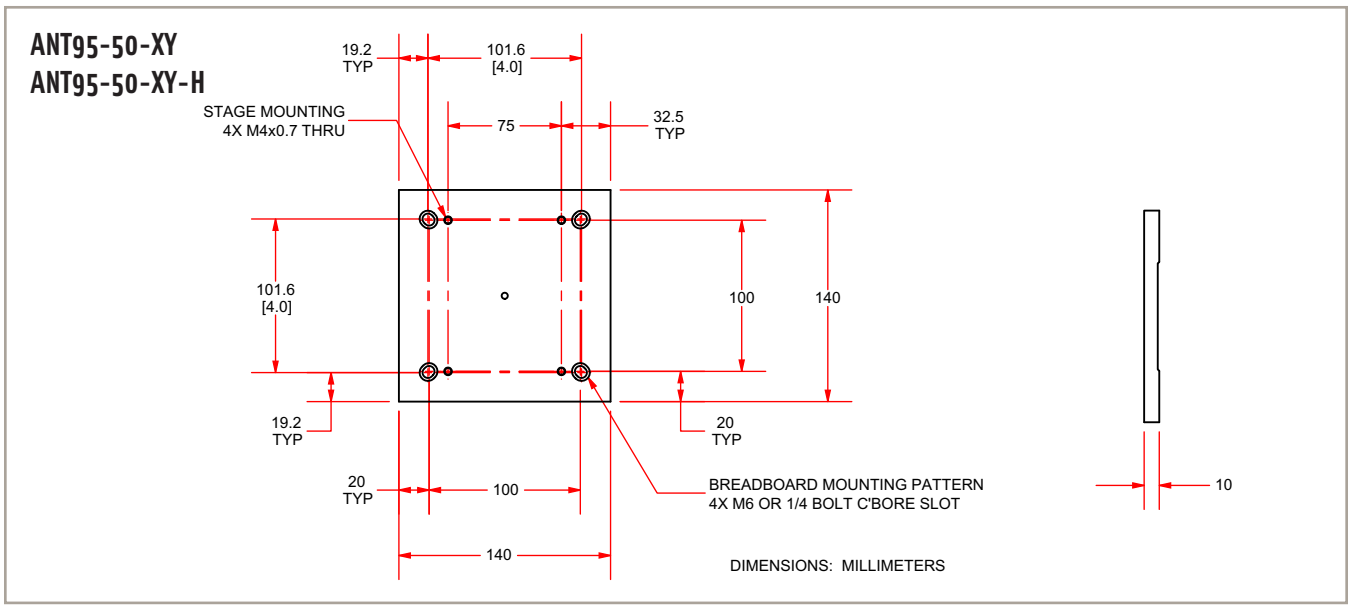
Aerotech China • Phone: +852-3793-3488 • Email: saleschina@aerotech.com

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





ANT95-XY Series ORDERING INFORMATION

ANT95-XY Series Linear Stage

ANT95-XY/ANT95-XY-H Aerotech nanotranslation cross-roller linear positioner

Linear Stage Travel (X,Y)

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

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