ANT130-XY Series

Two-Axis Mechanical Bearing, Linear Motor Stage

nano Motion Technology

- Integrated low profile XY 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

Introduction

The ANT130-XY cross-roller-bearing, linear motor, dual-axis stage continues the evolution of the ANT series of stages. The ANT130-XY and ANT130-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 85 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 ANT130-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. All travel options (60 mm x 60 mm, 110 mm x 110 mm, 160 mm x 160 mm) come with the 85 mm profile height.

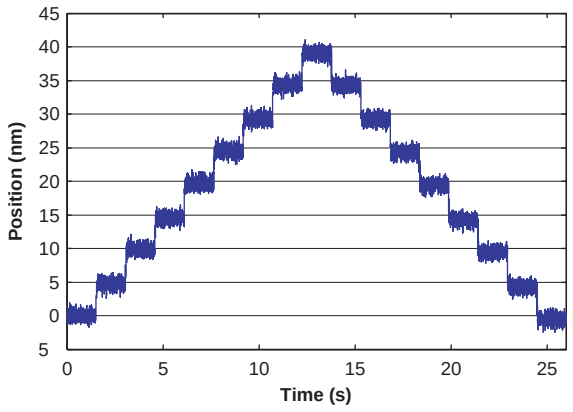
The ANT130-XY uses anti-creep cross-roller bearings for improved load capacity as well as higher precision and smaller incremental moves when compared to linear motion guides. You can expect outstanding accuracy, position repeatability, and in-position stability with the ANT130-XY stage.

Noncontact Direct-Drive

Only noncontact direct-drive technology offers the robust, accurate, and high-speed positioning necessary for mass production of precision devices. ANT130-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 ANT130-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.



ANT130-60-XY-H 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
Aerotech, Ltd., United Kingdom • Phone: +44-118-9409400 • Email: sales@aerotech.co.uk
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

ANT130-XY/ANT130-XY-H Series SPECIFICATIONS

Mechanical Specifications		ANT130-60-XY	ANT130-60-XY-H	ANT130-110-XY	ANT130-110-XY-H
Travel		60 mm	60 mm	110 mm	110 mm
Accuracy[1]		±3.5 µm (±140 µin)	±250 nm (±10 µin)	±5.0 µm (±200 µin)	±300 nm (±12 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]		±1.75 µm (±70 µin)	±1.75 µm (±70 µin)	±2.5 µm (±100 µin)	±2.5 µm (±100 µin)
Pitch		10 arc sec	10 arc sec	12 arc sec	12 arc sec
Roll		10 arc sec	10 arc sec	12 arc sec	12 arc sec
Yaw		5 arc sec	5 arc sec	6 arc sec	6 arc sec
Orthogonality		10 arc sec	3 arc sec	10 arc sec	3 arc sec
Maximum Speed		350 mm/s (14 in/s) (Upper Axis)	350 mm/s (14 in/s) (Upper Axis)	350 mm/s (14 in/s) (Upper Axis)	350 mm/s (14 in/s) (Upper Axis)
Maximum Acceleration		1 g - 10 m/s² (No Load) (Upper Axis)	1 g - 10 m/s² (No Load) (Upper Axis)	1 g - 10 m/s² (No Load) (Upper Axis)	1 g - 10 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)		23 N	23 N	23 N	23 N
Load Capacity[3]	**Horizontal**	12.0 kg (26.5 lb)	12.0 kg (26.5 lb)	12.0 kg (26.5 lb)	12.0 kg (26.5 lb)
Moving Mass	**Upper**	1.5 kg (3.3 lb)	1.5 kg (3.3 lb)	2.1 kg (4.6 lb)	2.1 kg (4.6 lb)
	Lower	4.2 kg (9.2 lb)	4.2 kg (9.2 lb)	5.7 kg (12.5 lb)	5.7 kg (12.5 lb)
Stage Mass		5.5 kg (12.1 lb)	5.5 kg (12.1 lb)	7.4 kg (16.3 lb)	7.4 kg (16.3 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.

Mechanical Specifications		ANT130-160-XY	ANT130-160-XY-H
Travel		160 mm	160 mm
Accuracy[1]		±7.0 µm (±280 µin)	±300 nm (±12 µin)
Resolution		1 nm	1 nm
Repeatability (Bi-Directional)[1]		±100 nm	±50 nm
Straightness[1]		±2.5 µm (±100 µin)	±2.5 µm (±100 µin)
Flatness[1]		±3.0 µm (±120 µin)	±3.0 µm (±120 µin)
Pitch		15 arc sec	15 arc sec
Roll		15 arc sec	15 arc sec
Yaw		8 arc sec	8 arc sec
Orthogonality		10 arc sec	3 arc sec
Maximum Speed		350 mm/s (14 in/s) (Upper Axis)	350 mm/s (14 in/s) (Upper Axis)
Maximum Acceleration		1 g - 10 m/s² (No Load) (Upper Axis)	1 g - 10 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
Maximum Force (Continuous)		23 N	23 N
Load Capacity[3]	**Horizontal**	12.0 kg (26.5 lb)	12.0 kg (26.5 lb)
Moving Mass	**Upper**	2.4 kg (5.3 lb)	2.4 kg (5.3 lb)
	Lower	6.9 kg (15.2 lb)	6.9 kg (15.2 lb)
Stage Mass		8.9 kg (19.6 lb)	8.9 kg (19.6 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.

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ANT130-XY/ANT130-XY-H Series SPECIFICATIONS

Electrical Specifications	ANT130-60-XY ANT130-60-XY-H	ANT130-110-XY ANT130-110-XY-H	ANT130-160-XY ANT130-160-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		ANT130-60-XY ANT130-60-XY-H	ANT130-110-XY ANT130-110-XY-H	ANT130-160-XY ANT130-160-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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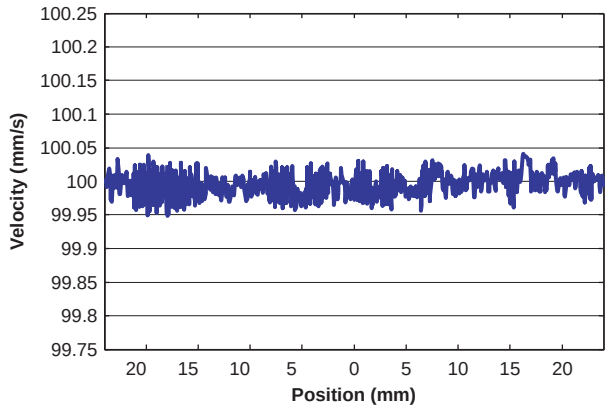
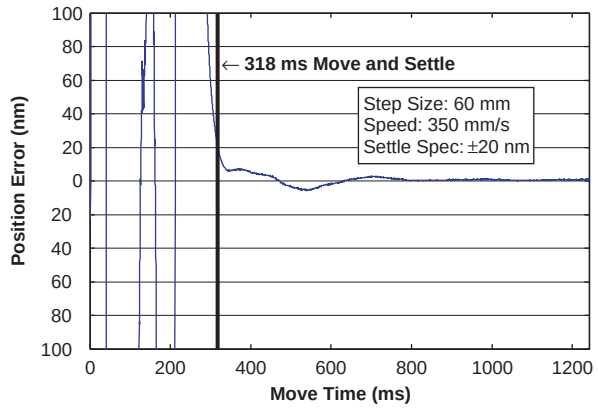
Aerotech China • Phone: +852-3793-3488 • Email: saleschina@aerotech.com

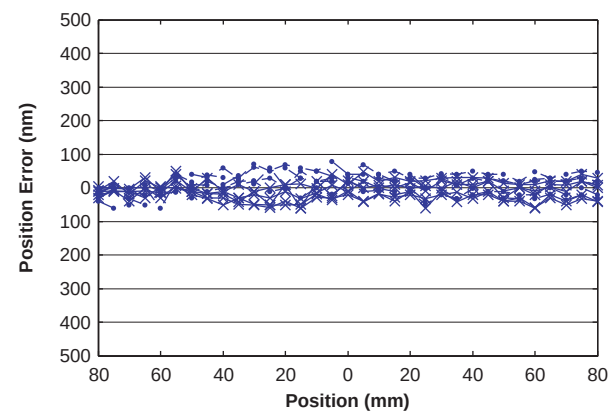
ANT130-XY/ANT130-XY-H Series PERFORMANCE



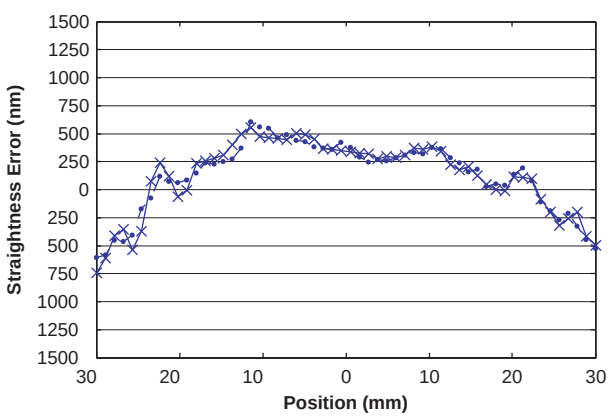
ANT130-60-XY-H velocity performance at 100 mm/s and 1 kg payload for the X (lower) axis. This outstanding speed stability enhances most scanning or laser machining applications.



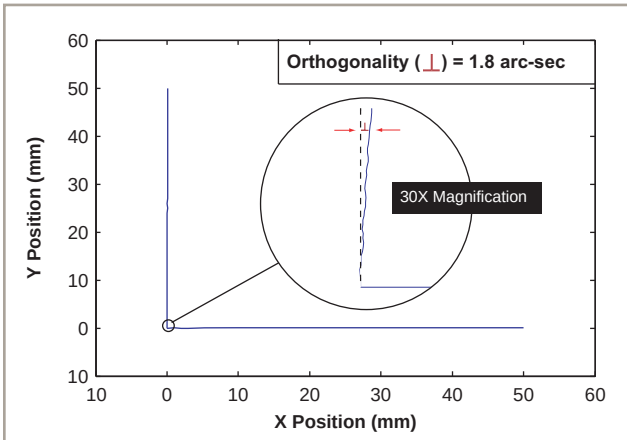
ANT130-60-XY-H step and settle performance at full travel and 1 kg payload for the X (lower) axis. Industry-best settling times significantly improve throughput for most applications.



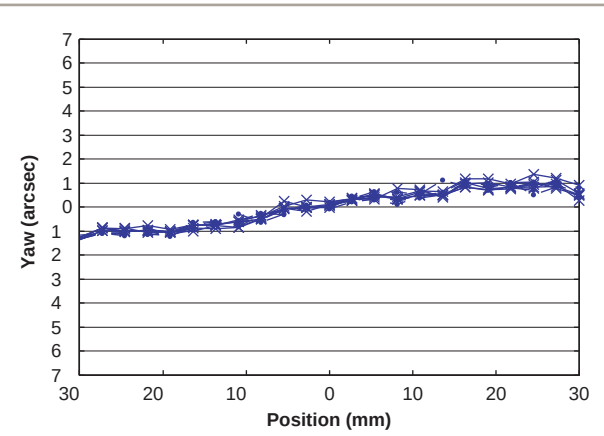
ANT130-160-XY-H accuracy and repeatability, five runs, bi-directional for the Y (upper) axis. The total accuracy of ±75 nm over 160 mm travel is significantly better than other offerings.



ANT130-60-XY-H bi-directional straightness error for the Y (upper) axis. Significantly (five times) better than stated specification.



ANT130-60-XY-H orthogonality. The inset is exaggerated 30X for clarity. Exceptionally small angular (orthogonality) error significantly enhances system accuracy.



*ANT130-60-XY-H Y (upper) axis yaw, five runs, bi-directional. Highly repeatable, lowest angular error over **full** travel.*

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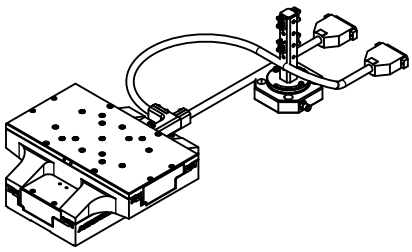
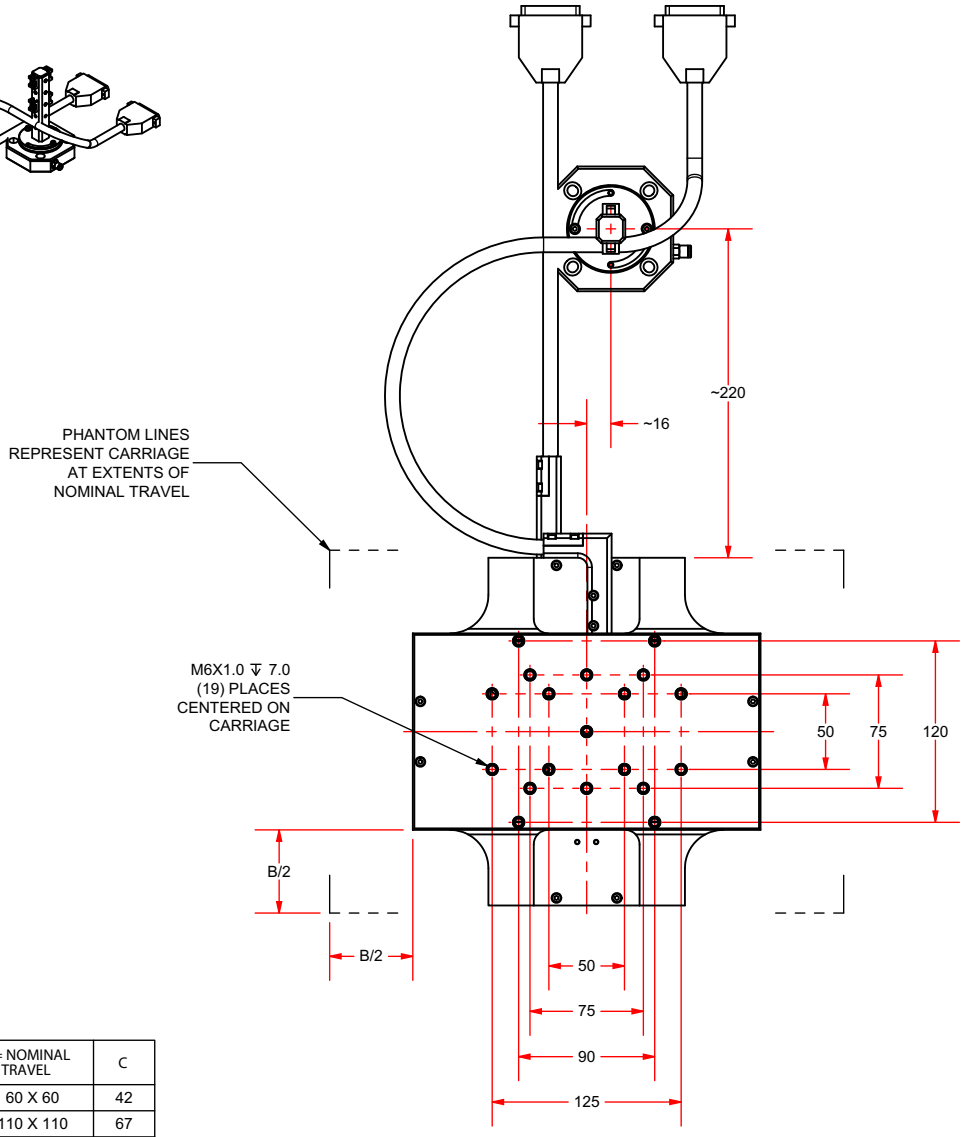
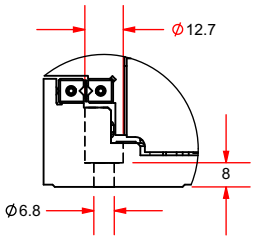
Aerotech China • Phone: +852-3793-3488 • Email: saleschina@aerotech.com

ANT130-XY/ANT130-XY-H Series DIMENSIONS

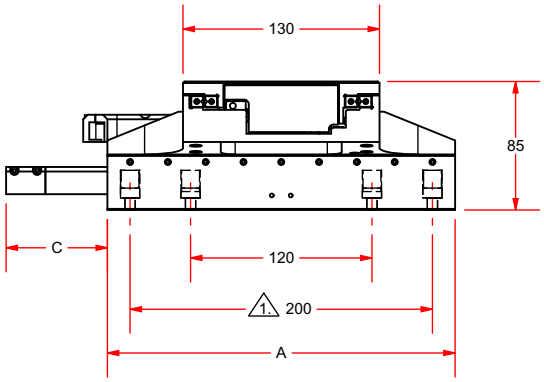


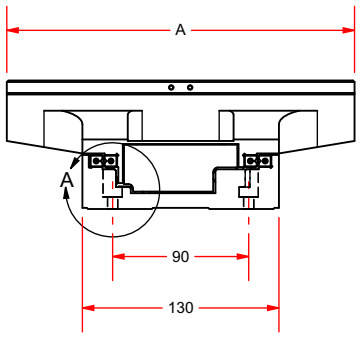




DETAIL A
SCALE 2 : 5
MOUNTING HOLE TYP.

MODEL	A = STAGE LENGTH	B = NOMINAL TRAVEL	C
ANT130-060-XY	180	60 X 60	42
ANT130-110-XY	230	110 X 110	67
ANT130-160-XY	280	160 X 160	92





1. ANT130-110-XY AND ANT130-160-XY ONLY

DIMENSIONS: MILLIMETERS

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ANT130-XY/ANT130-XY-H Series ORDERING INFORMATION

ANT130-XY Series Linear Motor Stage

ANT130-XY/ANT130-XY-H	Aerotech nanotranslation cross-roller linear positioner

ANT130-XY Series Linear Motor Stage

ANT130-060-XY	60 mm travel XY stage with linear motor and limits
ANT130-060-XY-H	60 mm travel XY stage with linear motor and limits
ANT130-110-XY	110 mm travel XY stage with linear motor and limits
ANT130-110-XY-H	110 mm travel XY stage with linear motor and limits
ANT130-160-XY	160 mm travel XY stage with linear motor and limits
ANT130-160-XY-H	160 mm travel XY stage with linear motor and limits

Accessories

-MP-ANT130-035/060	Breadboard mounting plate
-MP-ANT130-110/160	Breadboard mounting plate

Output Cable Connectors

-25DU	Single 25-pin D connector (standard)
-4DU-25DU	4-pin HPD and 25-pin D connectors

Note: -25DU single 25-pin connector option not valid for systems using bus voltages greater than 80 V

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