

# ANT95-R Series

## Single-Axis Rotary Direct-Drive Nanopositioning Stages

High resolution (0.01 arc sec)

High performance

Unlimited rotation

Outstanding error motion specifications

Excellent in-position stability

Multi-axis configurations

High dynamic performance

## nano Motion Technology



### Introduction

The ANT95-R and ANT95-R-PLUS direct-drive rotary stages are designed as part of Aerotech's nano Motion Technology product family. Our rotary stages offer unprecedented in-position stability (0.005 arc sec) and sub 0.01 arc-sec incremental motion performance, and are offered in two grades of accuracy.

### Multi-Axis Capabilities

The ANT95-R series is designed for compatibility and easy integration with Aerotech's ANT linear stage product offerings. Together these stages provide accuracy, stability,

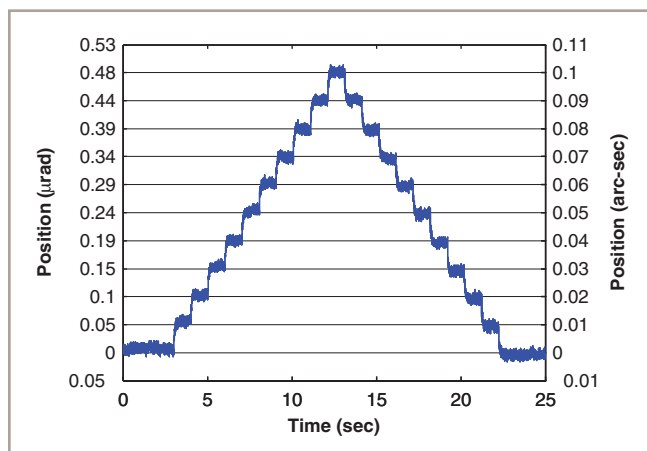
and small-size performance capability for almost any nano-manufacturing or inspection application.

### Dynamic Performance

In addition to the high precision levels, these systems offer high dynamic performance and throughput ideal for disk drive manufacture and test.

### Durability

The ANT95-R stage series was designed to operate in a 24/7 manufacturing environment. Unlike other rotary devices, the ANT95-R requires no periodic maintenance, assuring years of trouble-free operation.



ANT95-R 0.01 arc sec step plot. Best-in-class resolution and exceptional in-position stability for unlimited rotation stages.

## ANT95-R/ANT95-R-PLUS Series SPECIFICATIONS

Mechanical Specifications		ANT95-20-R	ANT95-20-R-PLUS	ANT95-180-R	ANT95-180-R-PLUS	ANT95-360-R	ANT95-360-R-PLUS
Rotation Angle		20°	20°	180°	180°	±360° Continuous	±360° Continuous
Accuracy <sup>(1)</sup>		10 arc sec	3 arc sec	10 arc sec	3 arc sec	10 arc sec	3 arc sec
Resolution		0.01 arc sec	0.01 arc sec	0.01 arc sec	0.01 arc sec	0.01 arc sec	0.01 arc sec
Repeatability (Bi-Directional) <sup>(1)</sup>		1.5 arc sec	1.5 arc sec	1.5 arc sec	1.5 arc sec	1.5 arc sec	1.5 arc sec
Repeatability (Uni-Directional)		0.5 arc sec	0.5 arc sec	0.5 arc sec	0.5 arc sec	0.5 arc sec	0.5 arc sec
Tilt Error Motion	Synchronous	NA	NA	NA	NA	10 arc sec	10 arc sec
	Asynchronous	NA	NA	NA	NA	3 arc sec	3 arc sec
Axial Error Motion <sup>(4)</sup>	Synchronous	NA	NA	NA	NA	2 µm	2 µm
	Asynchronous	NA	NA	NA	NA	0.5 µm	0.5 µm
Radial Error Motion <sup>(4)</sup>	Synchronous	NA	NA	NA	NA	3 µm	3 µm
	Asynchronous	NA	NA	NA	NA	1 µm	1 µm
Maximum Speed		20 rpm	20 rpm	20 rpm	20 rpm	200 rpm	200 rpm
Maximum Acceleration		400 rad/s <sup>2</sup>	400 rad/s <sup>2</sup>	400 rad/s <sup>2</sup>	400 rad/s <sup>2</sup>	400 rad/s <sup>2</sup>	400 rad/s <sup>2</sup>
In-Position Stability <sup>(2)</sup>		0.005 arc sec	0.005 arc sec	0.005 arc sec	0.005 arc sec	0.005 arc sec	0.005 arc sec
Aperture		11 mm (0.433 in)	11 mm (0.433 in)	11 mm (0.433 in)	11 mm (0.433 in)	11 mm (0.433 in)	11 mm (0.433 in)
Maximum Torque (Continuous)		0.2 Nm	0.2 Nm	0.2 Nm	0.2 Nm	0.2 Nm	0.2 Nm
Load Capacity <sup>(5)</sup>	Axial	2.0 kg (4.4 lb)	2.0 kg (4.4 lb)	2.0 kg (4.4 lb)	2.0 kg (4.4 lb)	2.0 kg (4.4 lb)	2.0 kg (4.4 lb)
	Radial	1.5 kg (3.3 lb)	1.5 kg (3.3 lb)	1.5 kg (3.3 lb)	1.5 kg (3.3 lb)	1.5 kg (3.3 lb)	1.5 kg (3.3 lb)
	Moment	2 Nm	2 Nm	2 Nm	2 Nm	2 Nm	2 Nm
Rotor Inertia (Unloaded)		0.00065 kg-m <sup>2</sup>	0.00065 kg-m <sup>2</sup>	0.00066 kg-m <sup>2</sup>	0.00066 kg-m <sup>2</sup>	0.00069 kg-m <sup>2</sup>	0.00069 kg-m <sup>2</sup>
Stage Mass		1.2 kg (2.6 lb)	1.2 kg (2.6 lb)	1.2 kg (2.6 lb)	1.2 kg (2.6 lb)	1.2 kg (2.6 lb)	1.2 kg (2.6 lb)
Material		Aluminum Body/Black Hardcoat Finish					
MTBF (Mean Time Between Failure)		30,000 Hours					

Notes:

1. Certified with each stage. Requires the use of an Aerotech controller.
  2. In-Position Jitter listing is 3 sigma value.
  3. Axis orientation for on-axis loading is listed.
- Specifications are per axis, measured 25 mm above the tabletop. Consult factory for multi-axis or non-standard applications.
  - All error motion specifications are measured at 60 rpm.
  - For high speed operation, customer payload must be balanced to G1.0 per ISO 1940.

Electrical Specifications	ANT95-20-R ANT95-20-R-PLUS	ANT95-180-R ANT95-180-R-PLUS	ANT95-360-R ANT95-360-R-PLUS
Drive System	Slotless, Brushless, Direct-Drive Rotary Motor		
Feedback	Noncontact Rotary Encoder		
Maximum Bus Voltage	±40 VDC		
Limit Switches	5 V, Normally Closed		
Home Switch	Near Center		

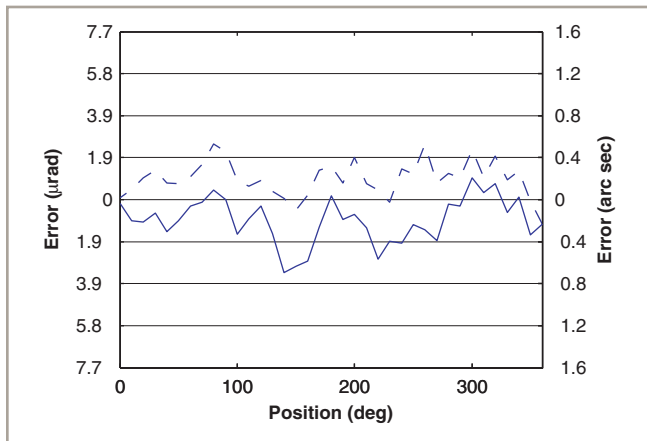
Recommended Controller	ANT95-20-R ANT95-20-R-PLUS	ANT95-180-R ANT95-180-R-PLUS	ANT95-360-R ANT95-360-R-PLUS
Multi-Axis	A3200	Npaq MXR Npaq MR-MXH Ndrive ML-MXH	
	Ensemble	Epaq MXR Epaq MR-MXH Ensemble ML-MXH	
Single Axis	Soloist	Soloist ML-MXH	

Notes:

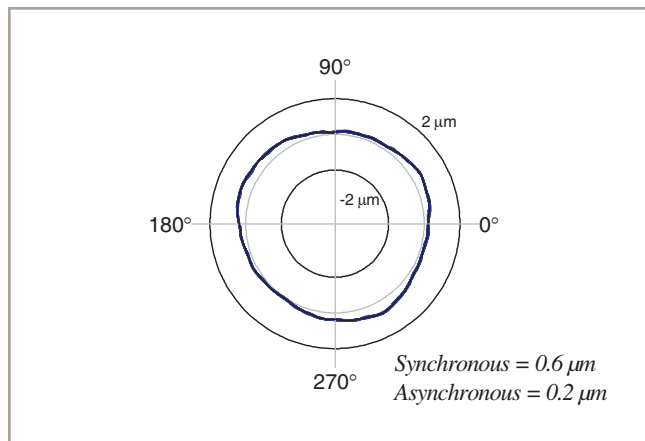
1. Linear amplifiers are required to achieve the listed specifications. Other options are available.

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.

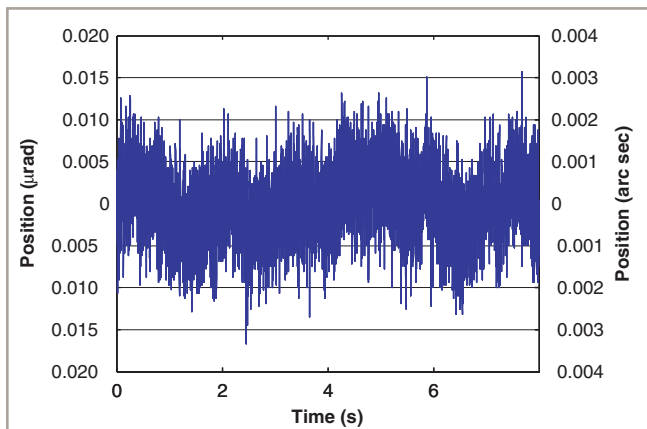
## ANT95-R/ANT95-R-PLUS Series PERFORMANCE



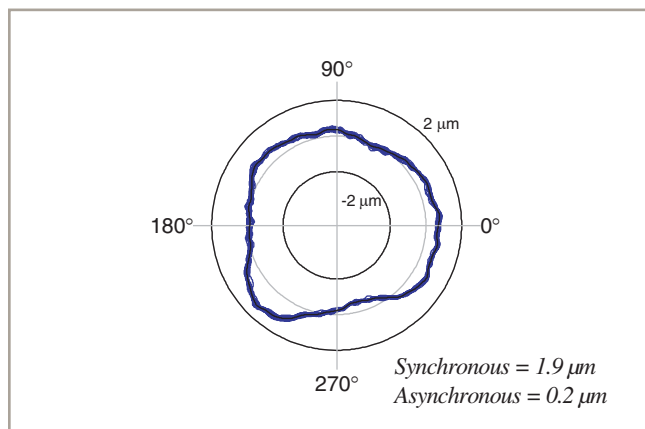
ANT95-R-PLUS accuracy plot showing excellent accuracy and bi-directional positioning capability.



ANT95-R axial error plot illustrating outstanding synchronous and asynchronous error motion performance.

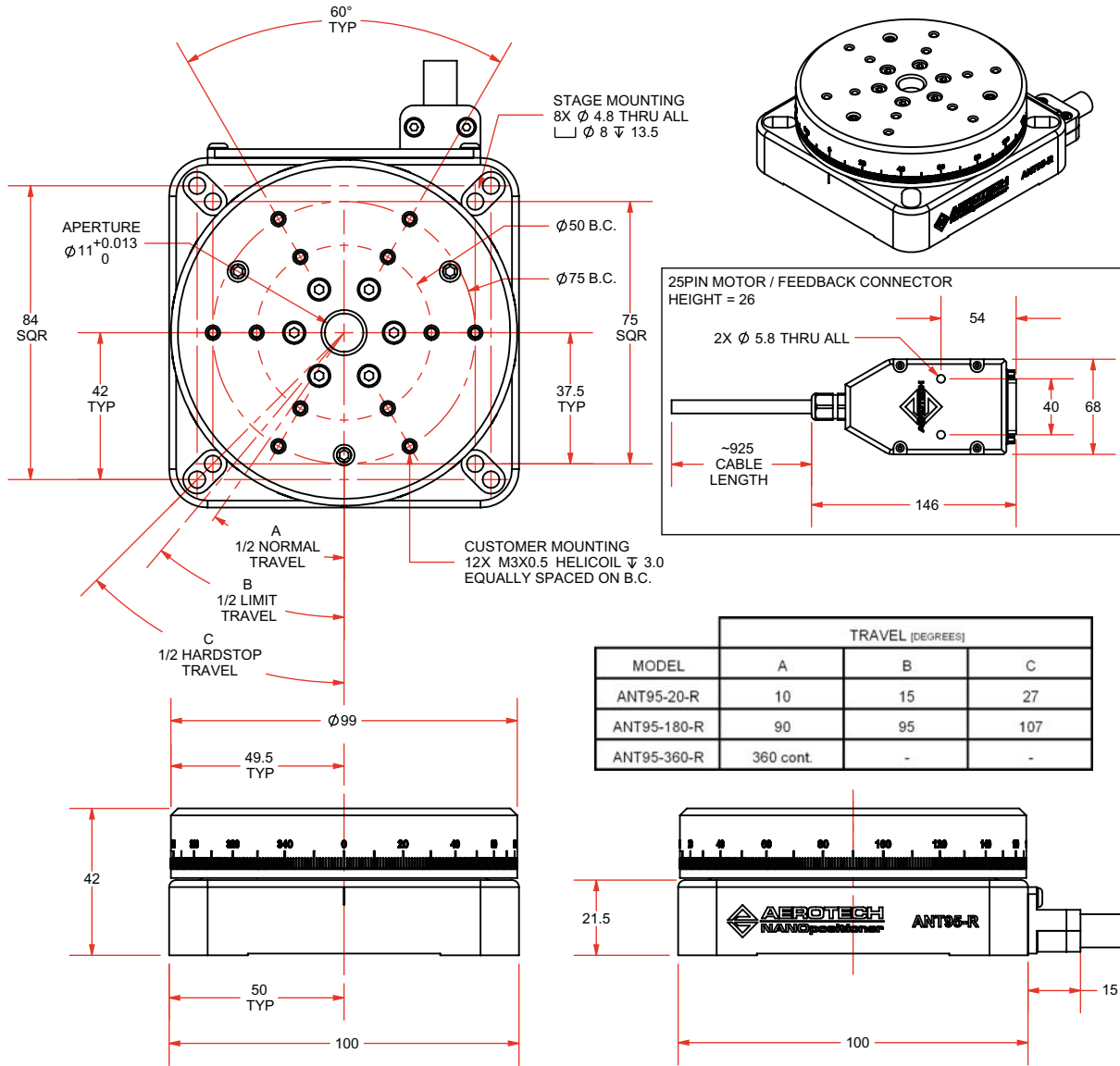


ANT95-R plot showing best-in-class in-position stability.

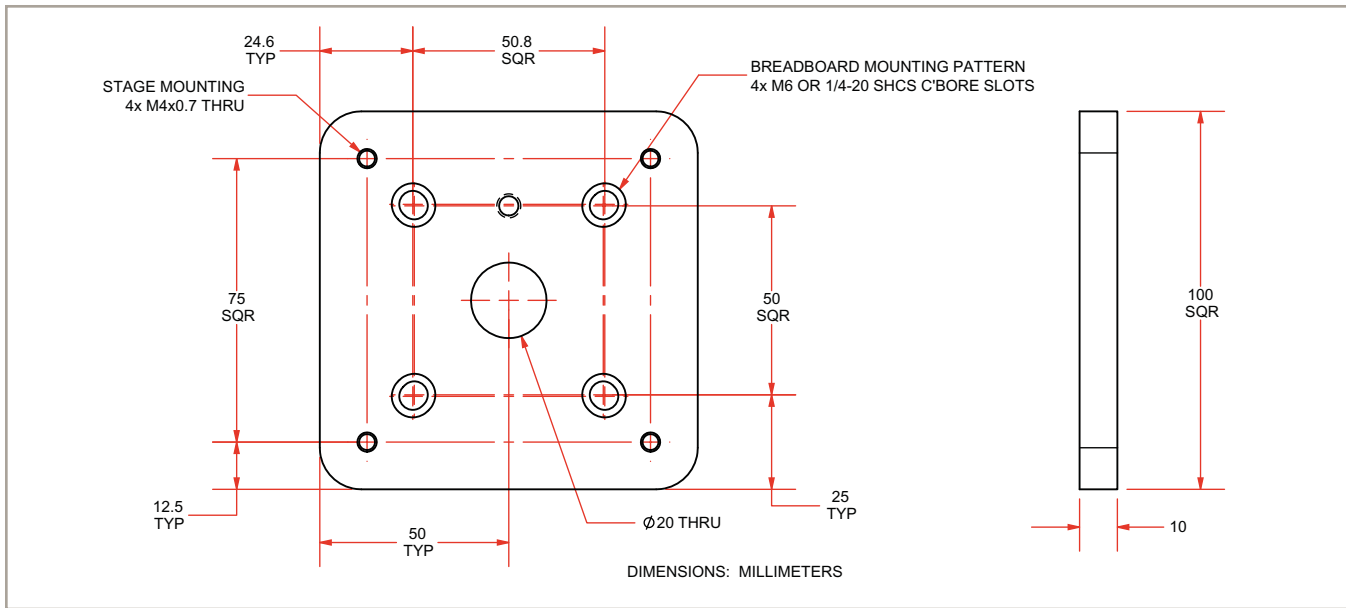


ANT95-R radial error plot illustrating outstanding synchronous and asynchronous error motion performance.

# ANT95-R/ANT95-R-PLUS DIMENSIONS



## ANT95-R/ANT95-R-PLUS Mounting Plate DIMENSIONS



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

### ANT95-R Series Rotary Stage

ANT95-R Aerotech direct-drive rotary positioner

### Rotary Stage Travel

ANT95-20-R	20° rotation stage with slotless, brushless, direct-drive motor, direct-coupled high-accuracy rotary encoder, optical limits, and hard stops
ANT95-20-R-PLUS	20° rotation stage with slotless, brushless, direct-drive motor, direct-coupled high-accuracy rotary encoder, optical limits, and hard stops (high accuracy version)
ANT95-180-R	180° rotation stage with slotless, brushless, direct-drive motor, direct-coupled high-accuracy rotary encoder, optical limits, and hard stops
ANT95-180-R-PLUS	180° rotation stage with slotless, brushless, direct-drive motor, direct-coupled high-accuracy rotary encoder, optical limits, and hard stops (high accuracy version)
ANT95-360-R	360° continuous rotation stage with slotless, brushless, direct-drive motor, direct-coupled high-accuracy rotary encoder, and optical limits
ANT95-360-R-PLUS	360° continuous rotation stage with slotless, brushless, direct-drive motor, direct-coupled high-accuracy rotary encoder, and optical limits (high accuracy version)

### Options

-MP Breadboard mounting plate