

# AEROTECH

## High-Performance Rotary Air-Bearing Stages

# ABRX



### The World's Highest Performance Rotary Air-Bearing Stages

Aerotech's ABRX family of high-performance, direct-drive, rotary air-bearing stages delivers the most precise rotational motion available. In addition to bringing you market-leading axial-, radial and tilt-error motion performance, ABRX stages offer superb rotational accuracy and repeatability, as well as impressive load-carrying capabilities - all in a favorable form factor that easily integrates into your multi-axis motion systems and machines.

### Key Applications

ABRX stages are ideal for high-precision applications, including:

- ◆ Surface metrology, including the measurement of roundness, flatness, and form error
- ◆ Micro- and nanotomography
- ◆ Beamline and synchrotron research
- ◆ Precision manufacturing, including diamond turning, grinding and other high-performance machine tool applications
- ◆ Optical alignment, inspection and calibration systems

### KEY FEATURES:

- ◆ Delivers **BEST-IN-CLASS** rotational motion, helping you to optimize your high-precision process
- ◆ **MINIMIZES** axial-, radial-, and tilt error motions, reducing the need for extensive post-processing of parts and measurement data
- ◆ Offers **EXCELLENT POSITIONING** performance and velocity stability with high-resolution feedback
- ◆ Features a novel, **NON-INFLUENCING MOTOR DESIGN** that contributes to ultra-precise motion performance
- ◆ Provides **GENEROUS LOAD-CARRYING CAPACITY** without compromising on motion quality

## ABRX SPECIFICATIONS

Mechanical Specifications		ABRX100	ABRX150	ABRX250
Travel		360° Continuous		
Accuracy <sup>(1)</sup>	Standard (-E1, -E3)	± 1 arc sec		
	High-Performance (-E2)	± 0.5 arc sec		
Bidirectional Repeatability <sup>(1)</sup>		± 0.2 arc sec		
Resolution (Minimum Incremental Motion) <sup>(2)</sup>		0.05 arc sec	0.03 arc sec	0.02 arc sec
Total Tilt Error Motion <sup>(3)</sup>		0.2 arc sec		0.1 arc sec
Total Axial Error Motion <sup>(3)</sup>		25 nm		30 nm
Total Radial Error Motion <sup>(3)</sup>		25 nm		30 nm
Maximum Speed <sup>(4)</sup>		1500 rpm	1200 rpm	800 rpm
Maximum Torque	Peak	1.16 N·m	2.84 N·m	9.35 N·m
	Continuous	0.19 N·m	0.44 N·m	2.34 N·m
Working Load <sup>(5)</sup>	Axial	17 kg	40 kg	110 kg
	Radial	7 kg	14 kg	72 kg
	Tilt	3.8 N·m	10 N·m	110 N·m
Operating Pressure <sup>(6)(7)</sup>		80 psig		
Air Consumption		18 SLPM	25 SLPM	30 SLPM
Rotor Inertia		0.0005 kg·m <sup>2</sup>	0.0022 kg·m <sup>2</sup>	0.0308 kg·m <sup>2</sup>
Stage Mass		3.2 kg	7.2 kg	25.4 kg
Material		Anodized aluminum		

1. Certified with each stage. Requires the use of an Aerotech controller.
2. With -E2 feedback option.
3. Error motion specified at 60 rpm. Certified with each stage.
4. Maximum speed based on stage capability assuming 340 VDC bus and balanced loading conditions. Maximum application speed may be limited by system resolution and data rate. Consult factory for additional details.
5. Loads are mutually exclusive.
6. To protect air bearing against under-pressure, an in-line pressure switch tied to the motion controller is recommended.
7. Air supply must be clean, dry to 0°F dew point and filtered to 0.25 µm or better. It is recommended to use nitrogen at 99.9% purity.

Electrical Specifications		ABRX100	ABRX150	ABRX250
Drive System		Non-influencing, direct-drive motor		
Maximum Bus Voltage		340 VDC		
Fundamental Resolution	-E1	5,000 lines/rev	10,052 lines/rev	22,304 lines/rev
	-E2	23,000 lines/rev	30,000 lines/rev	63,000 lines/rev
	-E3	5,000 lines/rev	10,052 lines/rev	22,304 lines/rev
Electrical Resolution <sup>(1)</sup>	-E1	0.016 arc sec	0.008 arc sec	0.004 arc sec
	-E2	0.004 arc sec	0.003 arc sec	0.001 arc sec
	-E3	0.130 arc sec	0.130 arc sec	0.116 arc sec
Home Switch		5 VDC, Normally Closed		

1. -E1, -E2 shown with 16,000x total multiplication (including quadrature). Higher multiplication factors are available. Contact Aerotech for details.

## ABRX ORDERING OPTIONS

### ABRX High-Performance Rotary Air-Bearing Stage

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**ABRX100**      ABRX100 high-performance rotary air-bearing stage

**ABRX150**      ABRX150 high-performance rotary air-bearing stage

**ABRX250**      ABRX250 high-performance rotary air-bearing stage

### Feedback (Required)

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**-E1**      Incremental encoder, 1 Vpp

**-E2**      Incremental encoder, 1 Vpp, high performance

**-E3**      Incremental encoder, Digital RS422, electrical resolution 0.130 arc (ABRX100, ABRX150) or 0.116 arc sec (ABRX250)

*Note: Maximum speed with -E3 option is limited to 170 rpm for ABRX100 and ABRX150, and 155 rpm for ABRX250.*

### Integration (Required)

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Aerotech offers both standard and custom integration services to help you get your system fully operational as quickly as possible. The following standard integration options are available for this system. Please consult Aerotech if you are unsure what level of integration is required or if you desire custom integration support with your system.

**-TAS      Integration - Test as system**

Testing, integration and documentation of a group of components as a complete system that will be used together (ex: drive, controller and stage). This includes parameter file generation, system tuning and documentation of the system configuration.

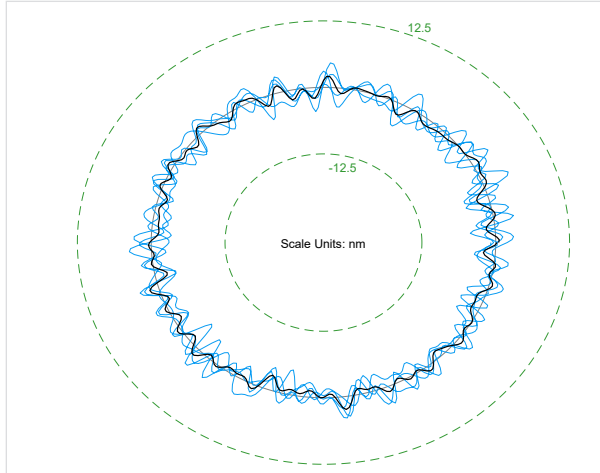
**-TAC      Integration - Test as components**

Testing and integration of individual items as discrete components. This is typically used for spare parts, replacement parts or items that will not be used or shipped together (ex: stage only). These components may or may not be part of a larger system.



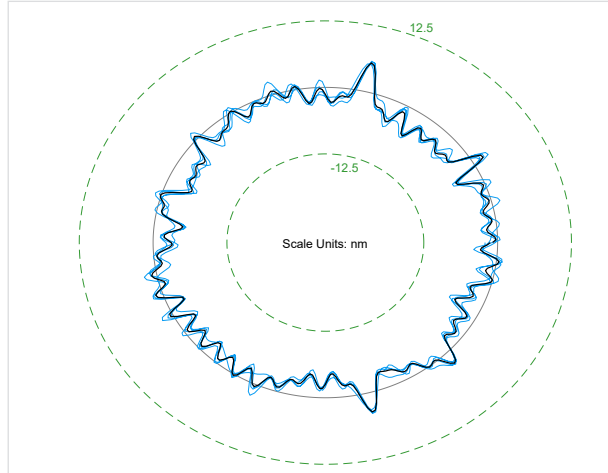
## ABRX SPECIFICATIONS

Axial Error, ABRX100



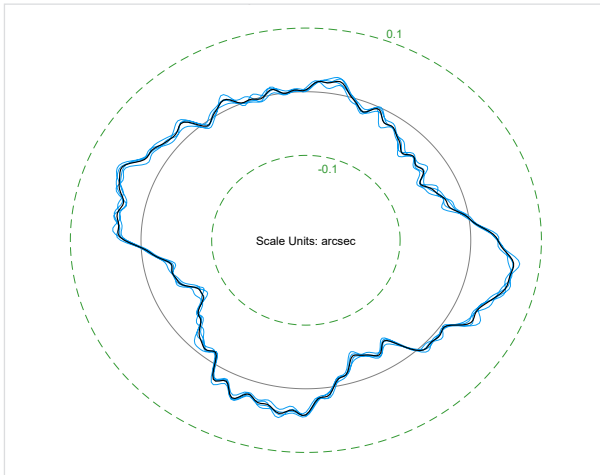
ABRX100 axial error motion plot illustrating outstanding synchronous and asynchronous error motion performance. Total axial error motion: 10 nm

Radial Error, ABRX100



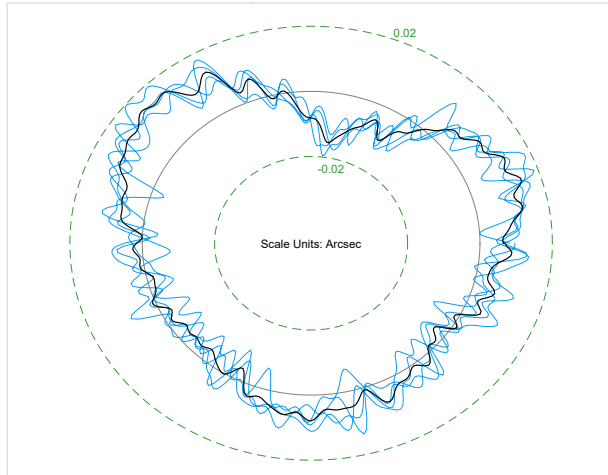
ABRX100 radial error motion plot illustrating outstanding synchronous and asynchronous error motion performance. Total radial error motion: 12 nm

Tilt Error, ABRX100



ABRX100 tilt error motion plot illustrating outstanding synchronous and asynchronous error motion performance. Total tilt error motion: 0.14 arc sec

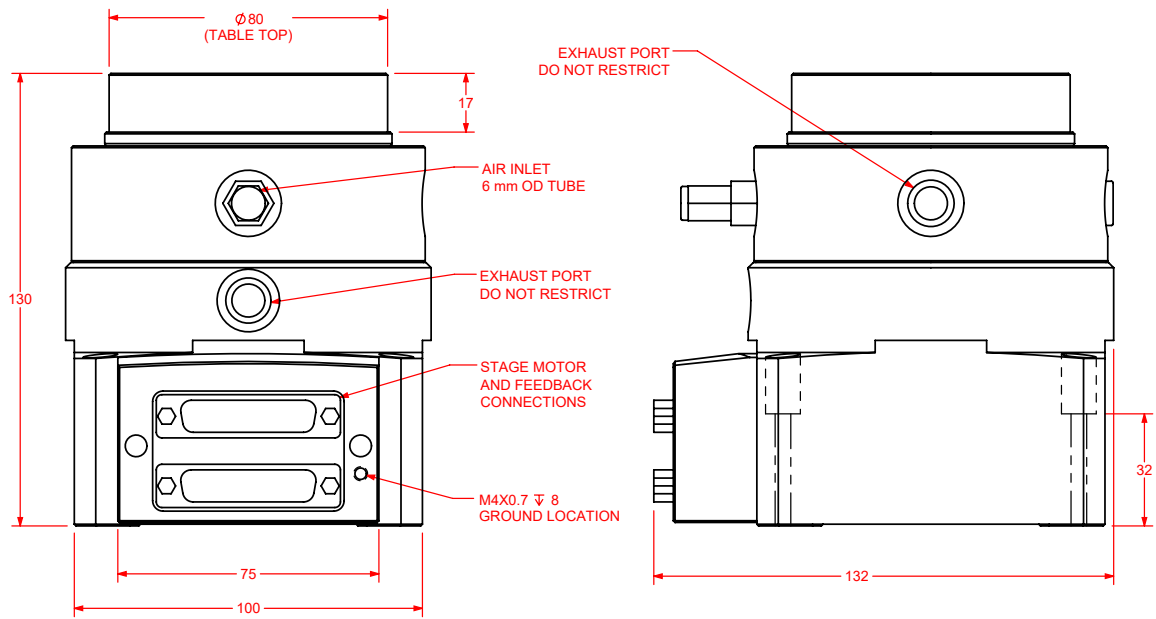
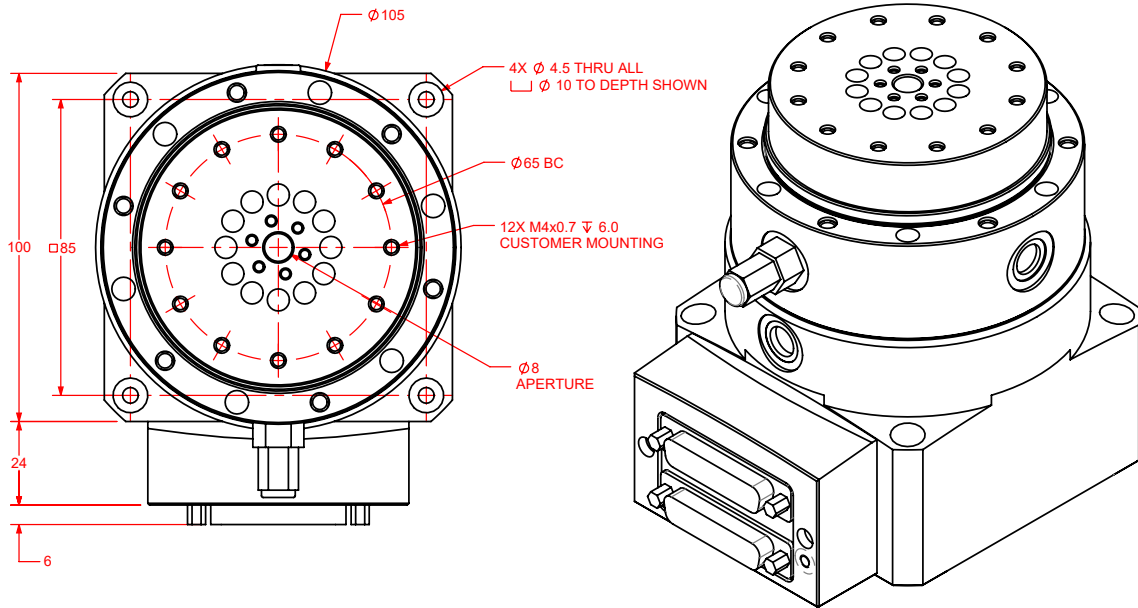
Tilt Error, ABRX250



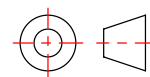
ABRX250 tilt error motion plot illustrating outstanding synchronous and asynchronous error motion performance. Total tilt error motion: 0.039 arc sec

# ABRX DIMENSIONS

## ABRX100

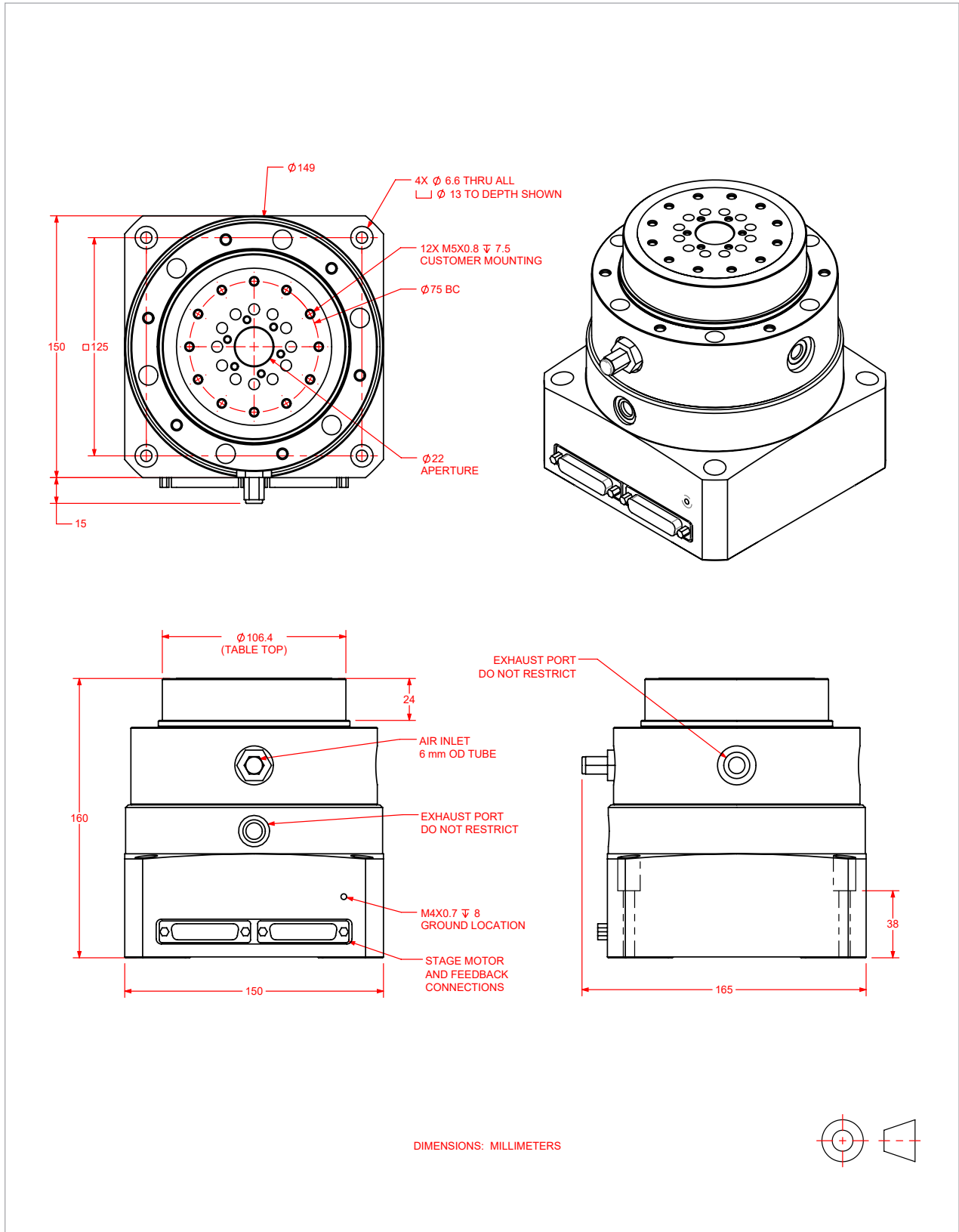


DIMENSIONS: MILLIMETERS



# ABRX DIMENSIONS

## ABRX150



# ABRX DIMENSIONS

## ABRX250

