

# ABRT Series

## Air-Bearing Direct-Drive Rotary Stage

High torque output, direct-drive, slotless, brushless servomotor

Zero cogging motor for outstanding velocity stability

Outstanding error motion and wobble performance

Direct coupled, high-accuracy rotary encoder

Large diameter clear aperture

No mechanical contact

Aerotech's ABRT series rotary air-bearing stages provide superior angular positioning, velocity stability, and error motion performance along with impressive payload capacity and outstanding radial and axial stiffness. The ABRT is designed to meet the exacting requirements of wafer inspection, high precision metrology applications, X-ray diffraction systems, optical inspection and fabrication, and MEMS/nanotechnology device fabrication.

The ABRT design features large air-bearing surfaces and innovative preloading for high stiffness and load capacity, producing not only excellent axial and radial error motions, but outstanding tilt error motion, as well. The resultant performance is significantly better than other rotary air-bearing tables and spindles, greatly benefiting applications requiring exceptional planar performance. Furthermore, this stage family provides a clear aperture that can be used for product feed-through, laser beam delivery, cable clearance, or application-specific requirements.

To maximize positioning performance, the ABRT series utilizes optimized versions of Aerotech's S-series slotless, brushless motor. The motor uses an advanced magnetic circuit design to produce high torque output with minimal heat generation. The slotless design is inherently zero-cogging and torque-ripple-free. This makes ABRT stages ideal for applications requiring smooth scan velocities at low or high speeds.



An optical encoder is standard with the ABRT. When coupled with Aerotech's feedback multipliers and controls, resolutions of  $<0.03$  arc second are achievable.

Custom versions of the ABRT are available to satisfy rate table and high precision inertial guidance test-stand applications. Other features, such as slip rings and rotary unions, are available.

Aerotech manufactures a wide range of servo amplifiers and advanced controllers to provide a complete, integrated package.

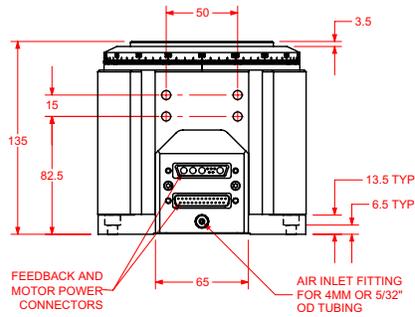
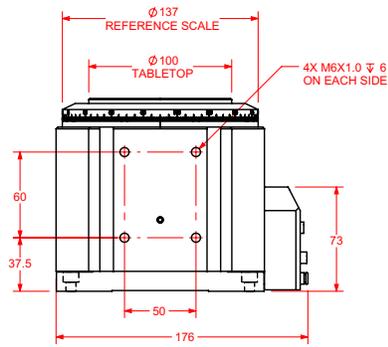
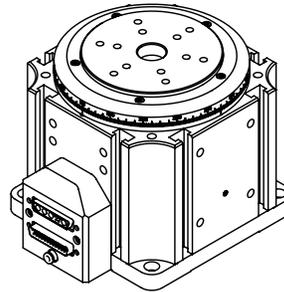
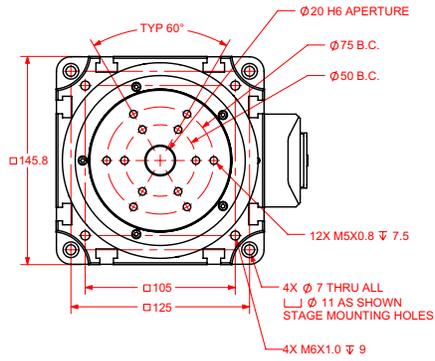
## ABRT Series SPECIFICATIONS

ABRT Series		ABRT150	ABRT200	ABRT260
Width		146 mm	196 mm	260 mm
Tabletop Diameter		100 mm	145 mm	200 mm
Height		135 mm	165 mm	185 mm
Aperture		20 mm	30 mm	50 mm
Total Travel		360° Continuous		
Bus Voltage		340 VDC		
Fundamental Encoder Resolution		11,840 lines/rev	18,000 lines/rev	23,600 lines/rev
Max Speed <sup>(1)</sup>		1200 rpm	800 rpm	600 rpm
Accuracy <sup>(2)</sup>		±2 arc sec		
Repeatability		<1 arc sec		
Max Load <sup>(3)</sup>	Axial	20 kg	41 kg	69 kg
	Radial	3 kg	6 kg	10 kg
	Tilt	3.5 N-m	8 N-m	18 N-m
Axial Error Motion (Synchronous)		<100 nm		
Radial Error Motion (Synchronous)		<150 nm		
Tilt Error Motion (Synchronous)		<2.4 µrad (<0.5 arc-sec)		
Axial Error Motion (Asynchronous)		<20 nm		
Radial Error Motion (Asynchronous)		<20 nm		
Tilt Error Motion (Asynchronous)		<0.2 µrad (<0.04 arc-sec)		
Operating Pressure <sup>(5)</sup>		80 psig (5.5 bar) ± 5 psig (0.3 bar)		
Air Consumption <sup>(6)</sup>		<56.6 SLPM (<2 SCFM)		
Inertia	Unloaded	2300 kg·mm <sup>2</sup>	13,500 kg·mm <sup>2</sup>	46,400 kg·mm <sup>2</sup>
Total Mass		6.7 kg	14.7 kg	27.1 kg
Material		Aluminum		
Finish		Hardcoat (62 Rockwell Hardness)		

Notes:

1. Maximum speed based on stage capability. Maximum application velocity may be limited by system data rate and system resolution.
2. Certified with each stage. Requires the use of an Aerotech controller.
3. Maximum loads are mutually exclusive.
4. All error motion specifications measured at 60 rpm.
5. To protect air bearing against under-pressure, an in-line pressure switch tied to the motion controller is recommended.
6. Air supply must be clean, dry to 0° F dew point, and filtered to 0.25 µm or better. Recommend nitrogen at 99.9% purity.

ABRT150

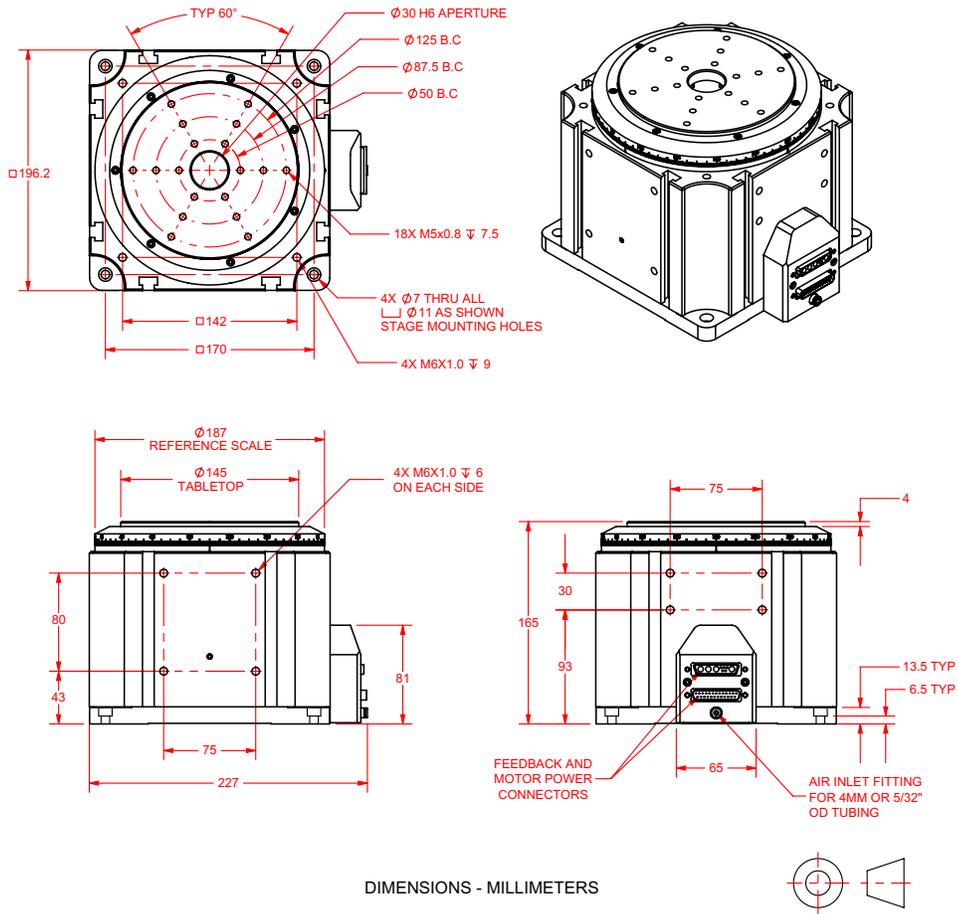


DIMENSIONS: MILLIMETERS



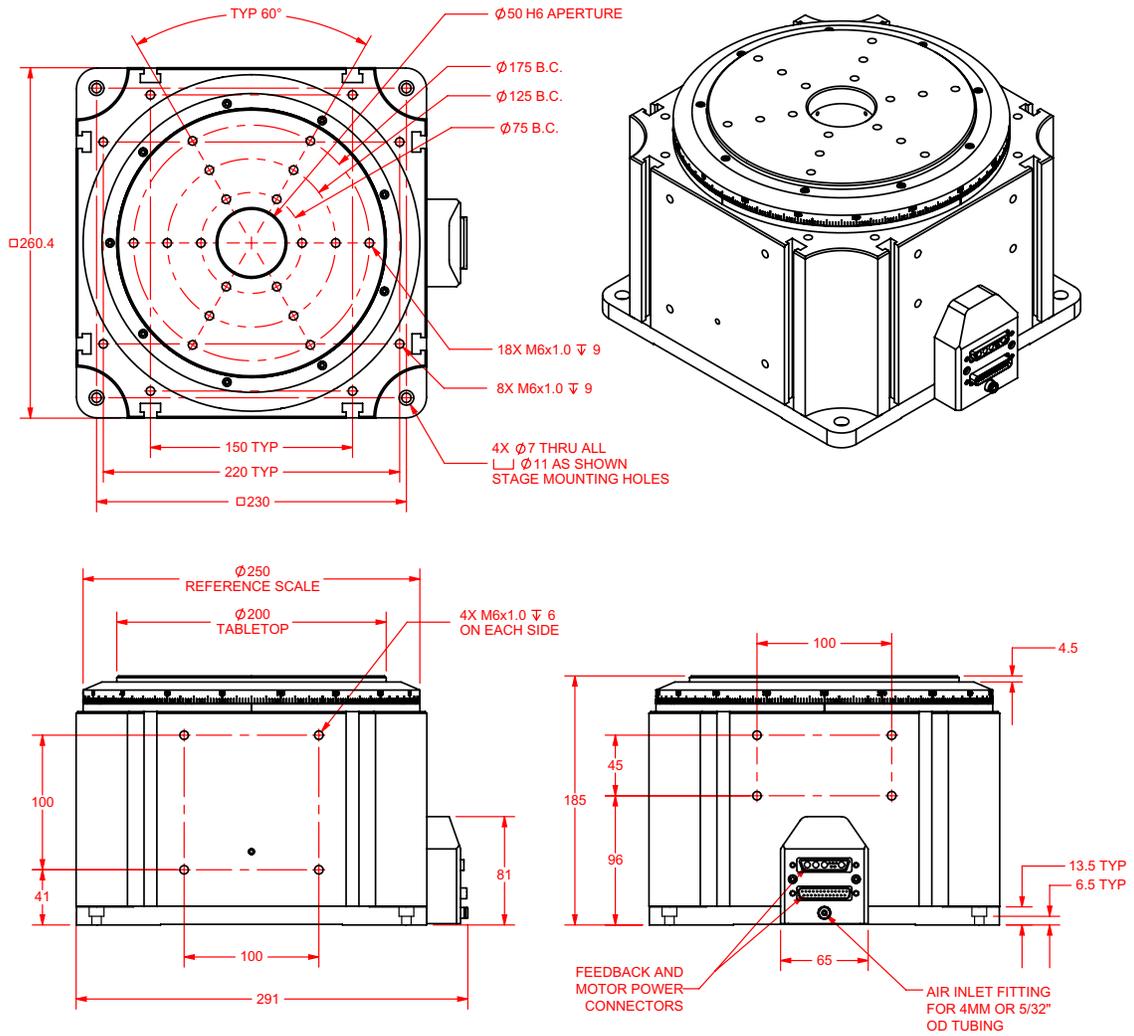
# ABRT Series DIMENSIONS

## ABRT200

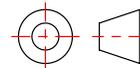


# ABRT Series DIMENSIONS

## ABRT260



DIMENSIONS - MILLIMETERS



## ABRT Series ORDERING INFORMATION

ABRT150	150 mm wide air-bearing direct-drive rotary stage
ABRT200	200 mm wide air-bearing direct-drive rotary stage
ABRT260	260 mm wide air-bearing direct-drive rotary stage
-E1	Incremental encoder, 1 Vpp
-E2	Incremental encoder, TTL, x50 interpolation

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 that ship together. This is typically used for spare parts, replacement parts, or items that will not be used together. These components may or may not be part of a larger system.
-ABF	Air-bearing filtration kit