

# ROTARY STAGES **ABRS SERIES**



Aerotech's ABRS series rotary air-bearing stages provide superior angular positioning, velocity stability, and error motion performance in an exceptionally low-profile package. The ABRS is designed to meet the exacting requirements of wafer inspection, high precision metrology, x-ray diffraction systems, optical inspection and fabrication, and MEMS/nanotechnology device fabrication.

#### **Compact Package**

The design of the ABRS series direct-drive rotary stage has been optimized to minimize stage height. The low profile of the stage reduces the effective working height of the system, minimizing "stack-up" related errors. In addition to the low overall height, the ABRS series provides a clear aperture that can be used for product feed-through, laser beam delivery, cable clearance, or application-specific requirements.

#### **Superior Mechanical Design**

The ABRS design features large air-bearing surfaces for high stiffness and load capacity, producing not only excellent axial and radial error motions, but outstanding tilt error motion, as well. The resultant face error motion is significantly better than

other rotary air-bearing tables and spindles, greatly benefiting applications requiring exceptional planar performance.

#### **Brushless Direct-Drive**

To maximize positioning performance, the ABRS series utilizes 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 the ABRS stages ideal for applications requiring smooth scan velocities at low or high speeds.

#### **Accurate Positioning**

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

#### **Custom Designs**

Custom versions of the ABRS are available for rate table and inertial guidance test-stand applications.

## — PRODUCT HIGHLIGHTS —

- Direct-drive, slotless, brushless servomotor
- Zero cogging motor for outstanding velocity stability
- Outstanding error motion and wobble performance
- Direct coupled, high accuracy rotary encoder
- Low profile, planar design
- No mechanical contact

## ABRS Series Specifications

Specifications		ABRS150MP	ABRS200MP	ABRS250MP	ABRS300MP
Width		150 mm	200 mm	250 mm	300 mm
Tabletop Diameter		128.1 mm	178.1 mm	228.1 mm	278.1 mm
Height		80 mm	90 mm	100 mm	110 mm
Aperature		8 mm	20 mm	35 mm	75 mm
Total Travel		360° Continuous			
Bus Voltage		80 VDC	340 VDC		
Fundamental Encoder Resolution		3600 lines/rev	8192 lines/rev	11,840 lines/rev	18,000 lines/rev
Max Speed <sup>1</sup>		300 rpm		500 rpm	
Accuracy <sup>2</sup>		±3 arc sec	±2 arc sec		
Repeatability (Bi-Directional)		<2 arc sec	<1 arc sec		
Max Load <sup>3</sup>	Axial	8 kg	31 kg	66 kg	97 kg
	Radial	4 kg	15 kg	36 kg	51 kg
	Tilt	3 N-m	10 N-m	28 N-m	45 N-m
Axial Error Motion (Synchronous)		<175 nm	<100 nm		
Radial Error Motion (Synchronous)		<450 nm	<250 nm		
Tilt Error Motion (Synchronous)		<9.7 μrad (<2.0 arc sec)	<3.4 μrad (<0.7 arc-sec)	<2.4 μrad (<0.5 arc sec)	<2.4 μrad (<0.5 arc sec)
Axial Error Motion (Asynchronous)		<20 nm			
Radial Error Motion (Asynchronous)		<20 nm			
Tilt Error Motion (Asynchronous)		<0.4 μrad (<0.08 arc sec)	<0.3 μrad (<0.06 arc-sec)	<0.2 μrad (<0.04 arc sec)	<0.2 μrad (<0.04 arc sec)
Operating Pressure <sup>4</sup>		80 psig (5.5 bar) + 0 psig (0.0 bar) / - 10 psig (0.7 bar)			
Air Consumption <sup>5</sup>		<56.6 SLPM (<2 SCFM)			
Inertia	Unloaded	3850 kg-mm <sup>2</sup>	13,800 kg-mm <sup>2</sup>	39,100 kg-mm <sup>2</sup>	102,000 kg-mm <sup>2</sup>
Total Mass		4.8 kg	9.1 kg	15.6 kg	24.5 kg
Material		Aluminum			
Finish		Hardcoat (62 Rockwell Hardness)			

1 Maximum speed based on stage capability. Maximum application velocity may be limited by system data rate and system resolution.

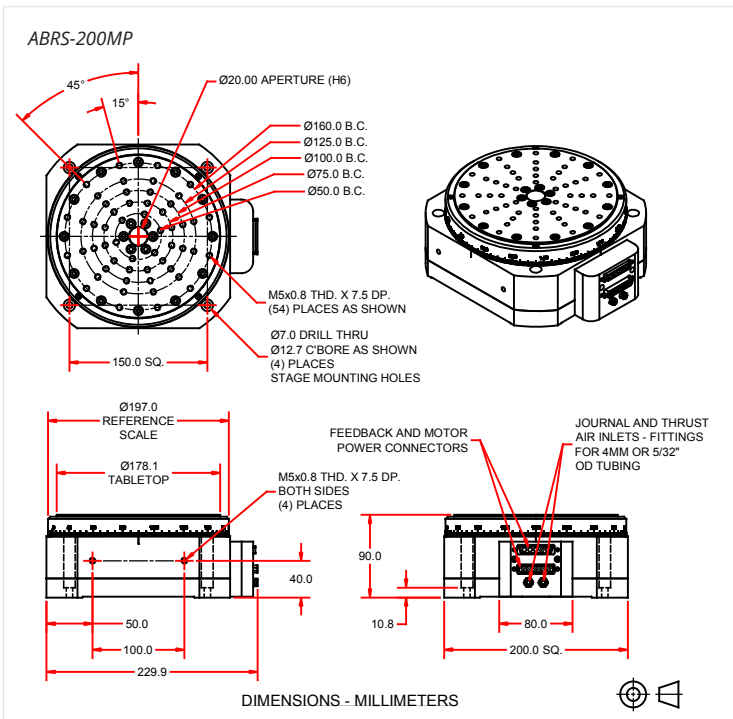
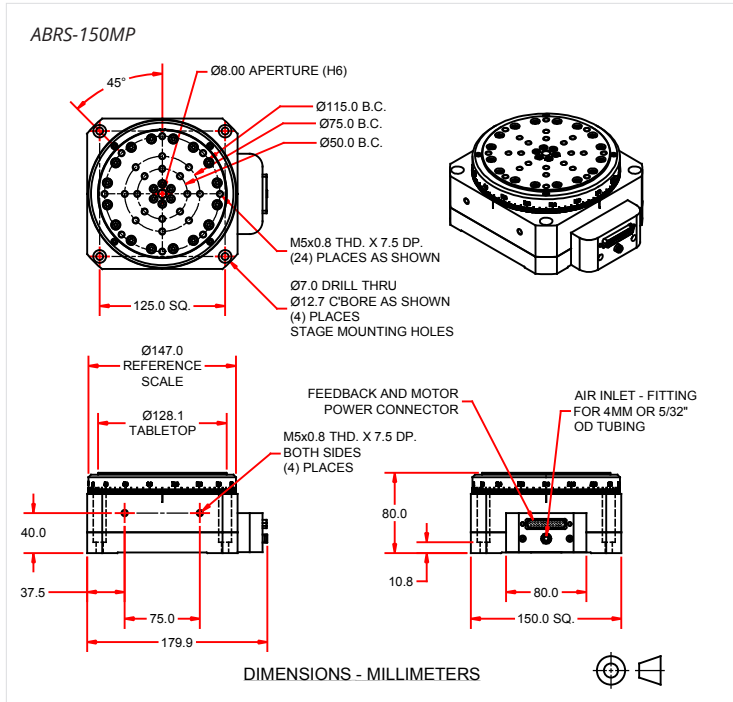
2 Certified with each stage. Requires the use of an Aerotech controller.

3 Maximum loads are mutually exclusive.

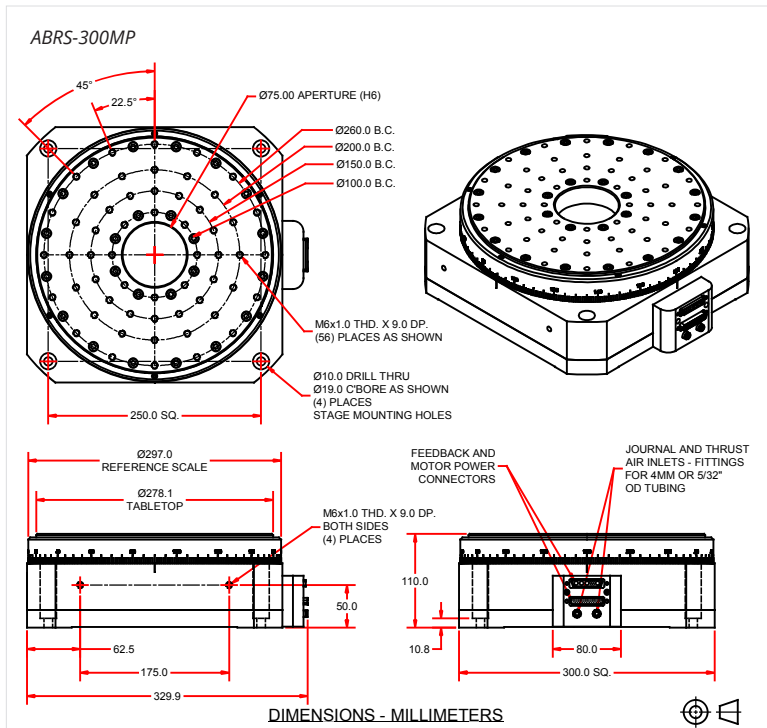
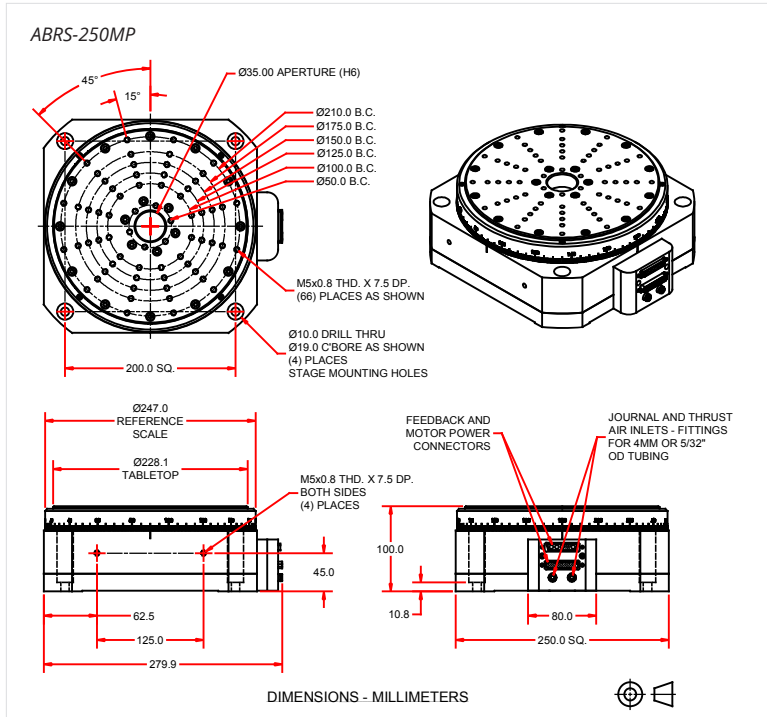
4 To protect air bearing against under-pressure, an in-line pressure switch tied to the motion controller is recommended.

5 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.

## ABRS Series Dimensions



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## ABRS Series **Ordering Information**

### ABRS Air-Bearing Direct-Drive Rotary Stage

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ABRS150MP	150 mm wide air-bearing direct-drive rotary stage
ABRS200MP	200 mm wide air-bearing direct-drive rotary stage
ABRS250MP	250 mm wide air-bearing direct-drive rotary stage
ABRS300MP	300 mm wide air-bearing direct-drive rotary stage

### Feedback (Required)

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-E1	Incremental encoder, 1 Vpp
-E2	Incremental encoder, TTL, x50 interpolation

### 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.

### Accessories (To Be Ordered As Separate Line Item)

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-ABF	Air-bearing filtration kit
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