

# ASR2000 Series

## High-Speed Spindle

High-speed brushless servomotor

Instrument-grade precision

ABEC-7 angular contact bearings

Balanced to ISO 1940 G 1.0

High acceleration capability – 6000 rpm in  
< 1 second

Custom configurations available



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Aerotech's ASR series direct-drive spindles were designed to provide superior angular positioning and velocity control for applications including disk drive testing, imaging applications, and precision wafer inspection.

### Superior Mechanical Design

Matched angular contact bearing sets minimize spindle error motions. In addition, the ASR2000 is balanced to ISO 1940 G 1.0 tolerances. This unique design includes externally accessible balancing screws that can be adjusted with final payload in place. The design also uses labyrinth-type sealing to minimize particle migration from the spindle, resulting in certification for Class 1 clean-room operation. An integral rotary union is provided for a vacuum supply.

### Brushless Direct Drive

To maximize positioning performance, the ASR series utilizes Aerotech's brushless motor technology. These motors have all the advantages of a brushless direct-drive motor — no brushes to wear, and high acceleration and

high speeds. With its low inherent inertia and high torque output, the ASR is capable of extremely high speeds and accelerations. In addition, the efficient electromagnetic design provides high performance with lower operating temperatures than comparable products.

### Accurate Positioning

With a velocity ripple of <0.1%, a total radial error motion  $\leq 5 \mu\text{m}$ , and total axial error motion  $< 2 \mu\text{m}$ , the Aerotech spindle offers superior performance for high accuracy applications. The high performance motor and rotary encoder are directly coupled to a common shaft. The absence of gear trains and mechanical couplings means no position errors caused by hysteresis, windup, or backlash.

### Flexible Configurations

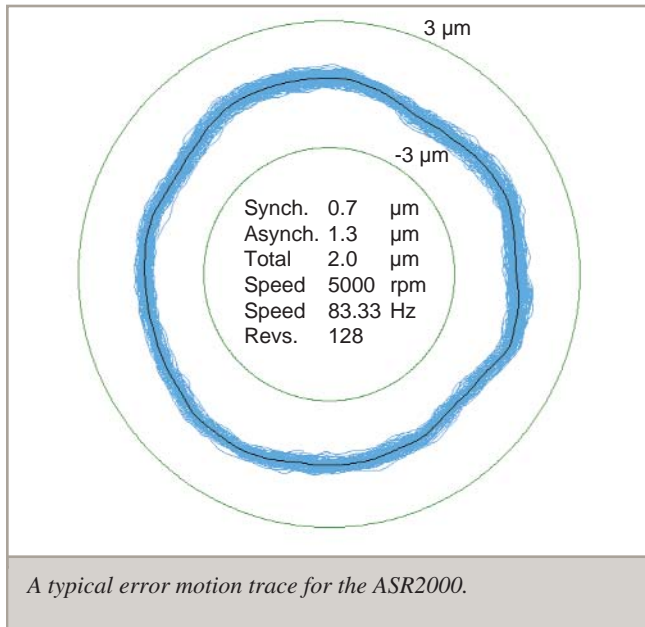
Options include mechanical or vacuum chuck configurations. Aerotech manufactures a wide range of servo amplifiers and advanced controllers to provide a complete, integrated package.

# ASR2000 Series SPECIFICATIONS

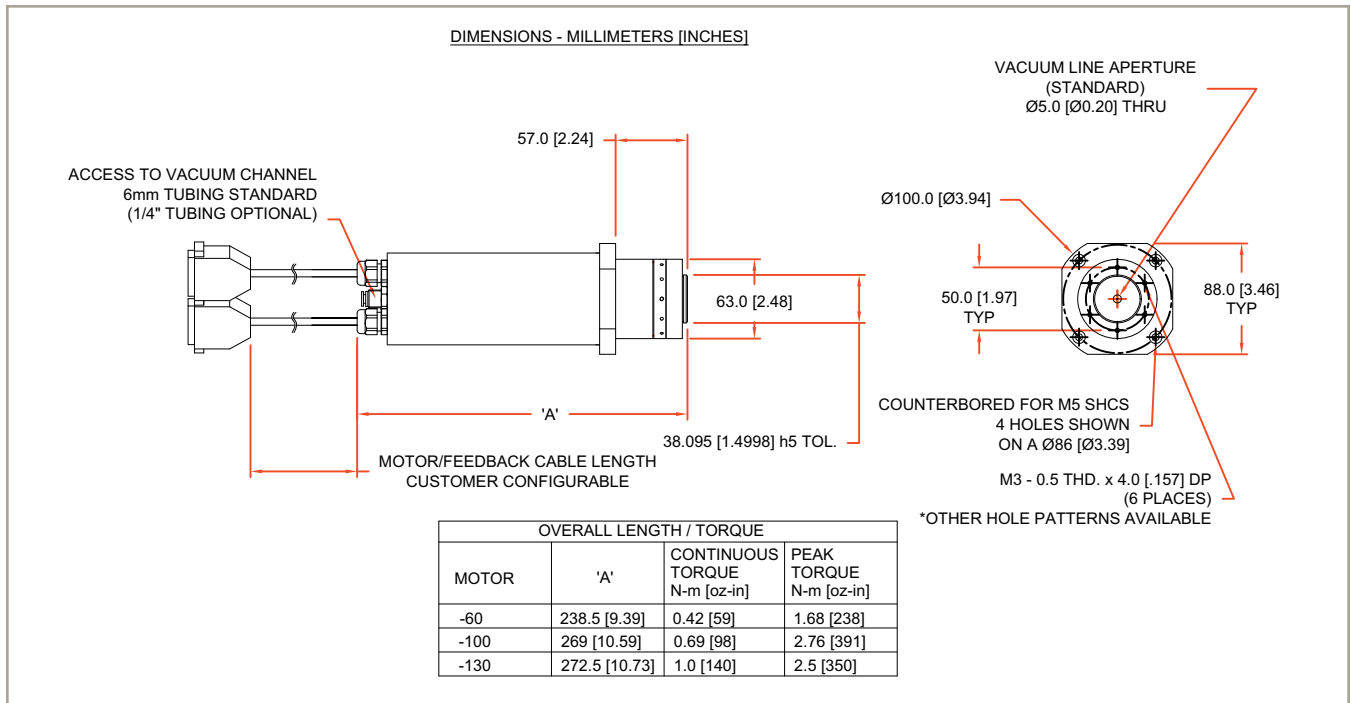
Basic Model		-60	-100	-130
Motor		S-50-S1-52-B	S-50-86-A	BM130
Continuous Current, Stall	A <sub>pk</sub>	4.6 A	2.1 A	7.5 A
	A <sub>rms</sub>	3.3 A	1.5 A	5.3 A
Feedback		Directly-Coupled Rotary Encoder		
Resolution		256-2048 lines/rev - other line counts available		
Rated Speed <sup>(1)</sup>		6000 rpm in < 1 second		
Maximum Load	Radial	89 N		
	Axial	89 N		
Inertia (Unloaded)		0.0002 kg-m <sup>2</sup>		
Total Error Motion <sup>(2)</sup>	Radial	5 μm		
	Axial	2 μm		
Asynchronous Error Motion	Radial	3.5 μm		
	Axial	1.5 μm		
Velocity Ripple		<0.1% at 6000 rpm		
Balance Grade <sup>(3)</sup>		ISO 1940 G 1.0		
Bearing Rigidity	Radial	20 N/μm		
	Axial	20 N/μm		
Spindle Weight		33 N		
Material	Shaft	Steel		
	Housing	Aluminum (Steel Available)		
Finish		Electroless Nickel Plating or Black Hardcoat Available		

**Notes**

1. Maximum speed based on stage capability; maximum application velocity may be limited by system data rate and system resolution.
2. Per ANSI B89.3.4M, "Axes of rotation methods for specifying and testing".
3. Per ISO 1940, "Mechanical vibration - balancing quality requirements of rigid rotors".



# ASR2000 Series DIMENSIONS



## ASR2000 Series ORDERING INFORMATION

### Ordering Example

ASR2000	-60	-M	-2048H
Series	Motor	Mounting and Grid pattern	Position Transducer
	-60 -100 -130	-M	-2048H

### ASR2000 High-Speed Spindle

ASR2000-M-60	63 mm (2.48 in) diameter rotary spindle 0.42 Nm (59 oz-in) motor
ASR2000-M-100	63 mm (2.48 in) diameter rotary spindle 0.69 Nm (98 oz-in) motor
ASR2000-M-130	63 mm (2.48 in) diameter rotary spindle 1.0 Nm (140 oz-in) motor

### Mounting and Grid Pattern

-M	Metric-dimension mounting pattern and holes
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### Position Transducer

-2048H	2048 lines/rev directly-coupled rotary encoder
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