ASR2000 Series

High-Speed Spindle
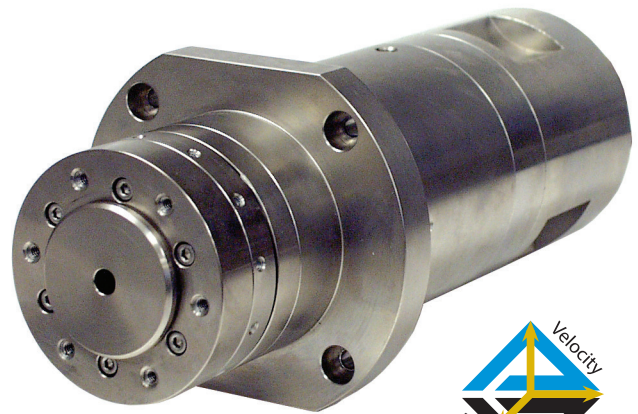
High-speed brushless servomotor

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

AEROTECH
CERTIFIED

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 ≤5 µm, and total axial error motion <2 µm, 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.
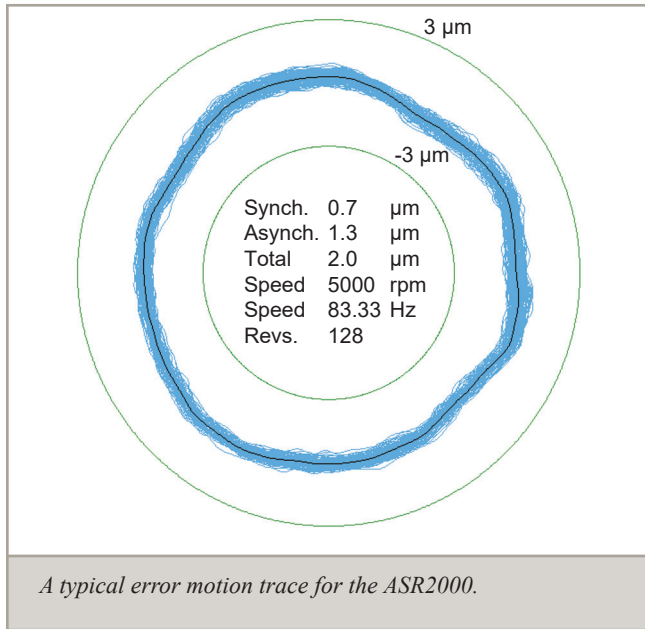
Flexible Configurations

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

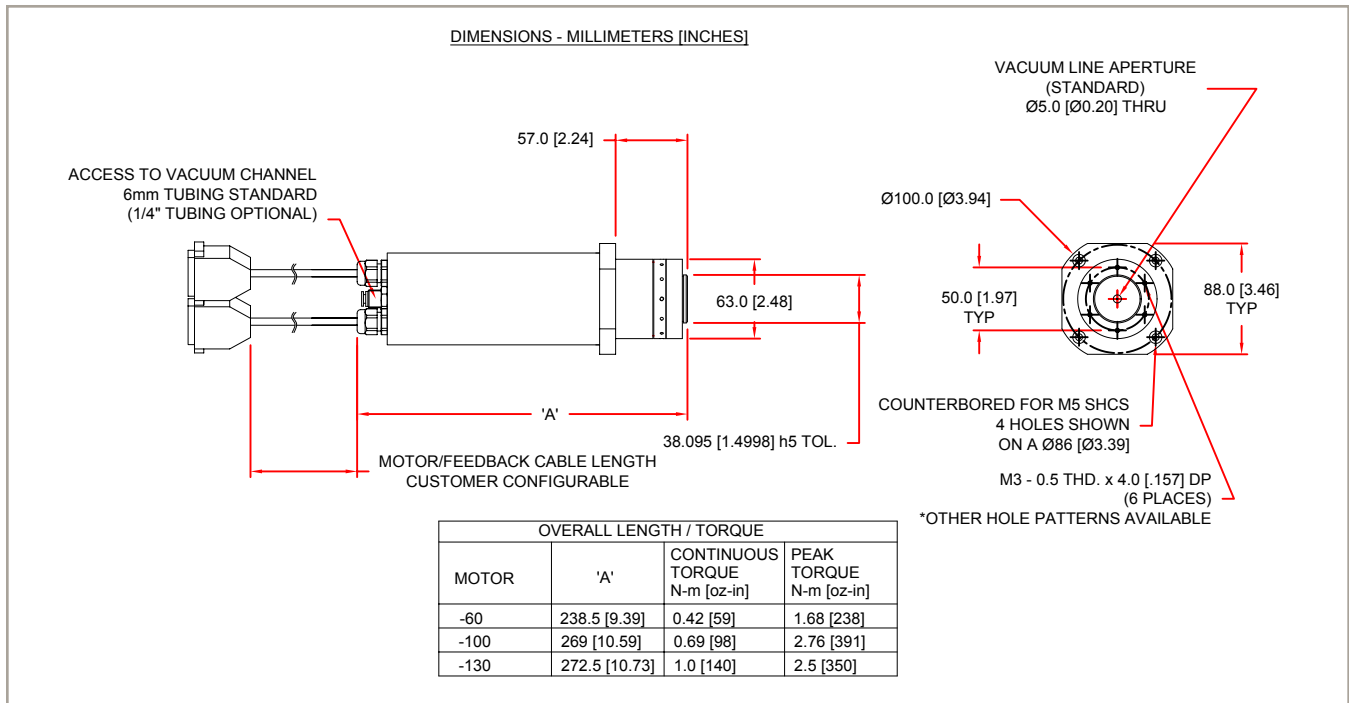| Basic Model		-60	-100	-130
Motor		S-50-S1-52-B	S-50-86-A	BM130
Continuous Current, Stall	A_{pk}	4.6 A	2.1 A	7.5 A
	A_{rms}	3.3 A	1.5 A	5.3 A
Feedback		Directly-Coupled Rotary Encoder		
Resolution		256-2048 lines/rev - other line counts available		
Rated Speed[1]		6000 rpm in < 1 second		
Maximum Load	Radial	89 N		
	Axial	89 N		
Inertia (Unloaded)		0.0002 kg-m^2		
Total Error Motion	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[2]		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 ISO 1940, "Mechanical vibration - balancing quality requirements of rigid rotors".

A typical error motion trace for the ASR2000.

ASR2000 Series DIMENSIONS

DIMENSIONS - MILLIMETERS [INCHES]

VACUUM LINE APERTURE
(STANDARD)
Ø5.0 [Ø0.20] THRU

ACCESS TO VACUUM CHANNEL
6mm TUBING STANDARD
(1/4" TUBING OPTIONAL)

57.0 [2.24]

Ø100.0 [Ø3.94]

63.0 [2.48]

50.0 [1.97]
TYP

88.0 [3.46]
TYP

'A'

38.095 [1.4998] h5 TOL.

COUNTERBORED FOR M5 SHCS
4 HOLES SHOWN
ON A Ø86 [Ø3.39]

MOTOR/FEEDBACK CABLE LENGTH
CUSTOMER CONFIGURABLE

M3 - 0.5 THD. x 4.0 [.157] DP
(6 PLACES)
*OTHER HOLE PATTERNS AVAILABLE

OVERALL LENGTH / TORQUE			
MOTOR	'A'	CONTINUOUS TORQUE N-m [oz-in]	PEAK TORQUE N-m [oz-in]
-60	238.5 [9.39]	0.42 [59]	1.68 [238]
-100	269 [10.59]	0.69 [98]	2.76 [391]
-130	272.5 [10.73]	1.0 [140]	2.5 [350]

ASR2000 Series ORDERING INFORMATION

ASR2000 High-Speed Spindle

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

Performance Grade (Required)

-PL3	Standard Performance

Integration

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.