

# ABL2000 Series

## Air Bearing, Linear Motor Stage

Fully preloaded air-bearing

Travel to 1.2 meter

Linear encoder or laser interferometer feedback

Complete noncontact design

Ultra-smooth design for outstanding velocity stability



The ABL2000 combines excellent pitch/yaw characteristics with the unsurpassed velocity control that is necessary for printing, imaging, semiconductor, and photonic applications.

### Air-Bearing Design

By utilizing a magnetic preload, the ABL2000 features a smaller cross-section than typical air-bearing stages without sacrificing load capability. The large air-bearing surfaces provide excellent stiffness, allowing for heavy loading.

Proprietary manufacturing techniques result in a stage with unsurpassed pitch, roll, and yaw characteristics. Manufactured in Aerotech's state-of-the-art production facility, the ABL2000 is machined with exacting tolerances that are unachievable by conventional methods.

### Linear Motor Drive

The driving force behind this stage is Aerotech's BLMC brushless linear servomotor. Aerotech's long history and experience as a motor manufacturer is reflected in this latest design. The BLMC utilizes an ironlessforcer, which means there is zero cogging and no attractive forces – resulting in unsurpassed smoothness of motion. Since the stage is friction-free and the motor has zero cogging, extremely fine resolutions are achievable.

### Zero Maintenance

Our totally noncontact air bearing, noncontact linear motor drive, and noncontact feedback device ensure years of maintenance-free operation at the high performance levels that are expected of Aerotech equipment. Because there is no mechanical contact between moving elements, the ABL2000 experiences no wear or reduction in performance over time. Service life is virtually unlimited, and since there is no lubrication – only clean, dry gas – air bearings are ideal for cleanroom and medical applications.

### Cable Management

Years of research have resulted in what is universally considered to be the best cable management system (CMS) in the industry. We carefully optimize the cable bend radius and utilize only the highest quality cable to ensure years of trouble-free operation. In the unlikely event of failure, Aerotech's modular design makes cable replacement quick and easy with minimal downtime.

To facilitate integration into the final system, we include all customer-required cables, air hoses, etc. in our CMS bundle. Both ends are fully connectorized for simple integration into the customer's machine. High flex ribbon cable versions are also available.

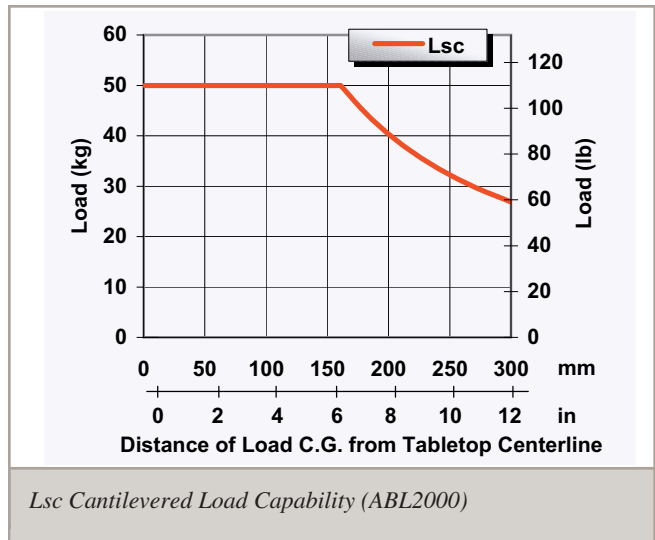
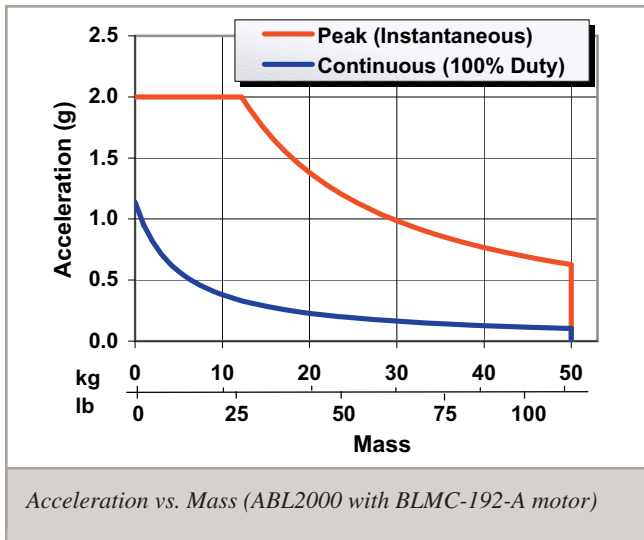
# ABL2000 Series SPECIFICATIONS

Basic Model		ABL20010	ABL20020	ABL20030	ABL20040	ABL20050	ABL20075	ABL20100	ABL20120	
Total Travel		100 mm (4 in)	200 mm (8 in)	300 mm (12 in)	400 mm (16 in)	500 mm (20 in)	750 mm (30 in)	1000 mm (40 in)	1200 mm (48 in)	
Motor Type		Linear Brushless Servomotor (BLMC-192-A)								
Bus Voltage		Up to 320 VDC								
Continuous Current	A <sub>pk</sub>	6.1 A								
	A <sub>rms</sub>	4.4 A								
Feedback		Noncontact Linear Encoder (LN, LT, or LZAS) or Laser Interferometer								
Encoder	LT	0.005 μm - 1.0 μm (0.2 μin - 40 μin)								
	LN	0.001 μm - 0.2 μm (0.04 μin - 8 μin)								
	LZAS	0.064 nm - 6.4 nm (0.0025 μin - 0.25 μin)								
	Laser Interferometer	0.3 nm - 79 nm (0.12 μin - 3.2 μin)								
Maximum Speed <sup>(2)</sup>		2 m/s (80 in/s)								
Maximum Acceleration		2 g - 20 m/s <sup>2</sup> (768 in/s <sup>2</sup> ) (no-load)								
Maximum Load <sup>(3)</sup>		50.0 kg (110.0 lb)								
Overall Accuracy	LT	HALAR <sup>(4)</sup>	±0.5 μm (±20 μin)			±0.75 μm (±30 μin)		±1 μm (±40 μin)		
		Standard	±4.0 μm (±160 μin)	±8.0 μm (±320 μin)	±12.0 μm (±480 μin)	±16.0 μm (±640 μin)	±20.0 μm (±800 μin)	±30.0 μm (±1200 μin)	±40.0 μm (±1600 μin)	±48.0 μm (±1960 μin)
	LN	HALAR <sup>(4)</sup>	±0.5 μm (±20 μin)			±0.75 μm (±30 μin)		±1 μm (±40 μin)		
		Standard	±5.0 μm (±200 μin)							
		Laser Interferometer	Standard ±10 ppm; Compensated ±1.5 ppm <sup>(5)</sup>							
		LZAS	±0.2 μm over entire travel (±8 μin)							
Repeatability	LT	±0.2 μm (±8 μin)			±0.3 μm (±12 μin)		±0.4 μm (±16 μin)			
	LN	±0.2 μm (±8 μin)			±0.3 μm (±12 μin)		±0.4 μm (±16 μin)			
	LZAS	±0.1 μm (±4 μin)								
Straightness and Flatness	Maximum Deviation	±0.25 μm (±10 μin)	±0.40 μm (±16 μin)	±0.75 μm (±30 μin)	±1.5 μm (±60 μin)	±2.0 μm (±80 μin)	±3.0 μm (±120 μin)	±4.0 μm (±160 μin)	±5.0 μm (±200 μin)	
Pitch/Roll/Yaw		1 arc sec	2 arc sec	3 arc sec	4 arc sec	5 arc sec	7.5 arc sec	10 arc sec	12 arc sec	
Nominal Stage Mass		30.0 kg (66.1 lb)	34.5 kg (76.1 lb)	39.5 kg (87.1 lb)	44.0 kg (97.0 lb)	49.0 kg (108.0 lb)	61.0 kg (134.5 lb)	72.5 kg (159.8 lb)	79.5 kg (175.3 lb)	
Operating Pressure <sup>(6)</sup>		80 psig ±5 psig								
Air Consumption <sup>(7)</sup>		0.7 SCFM (Single Axis)								
Moving Mass		9 kg								
Material		Aluminum								
Finish		Hard Coating (62 Rockwell Hardness)								

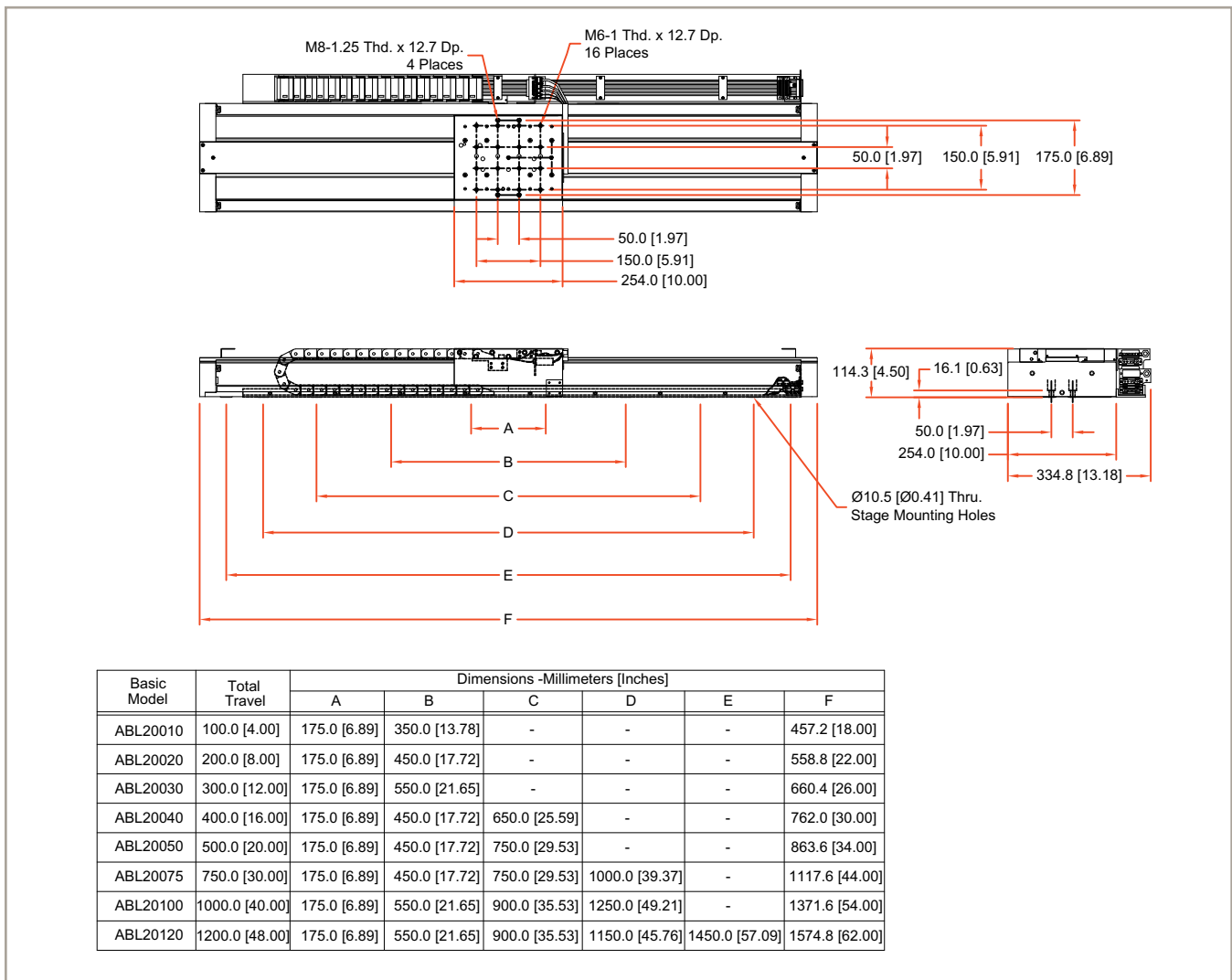
Notes:

- When mounting the ABL2000 in an XY configuration, the maximum upper axis length is 300 mm.
- Maximum speed based on stage capability; maximum application velocity may be limited by system data rate and system resolution.
- Maximum load based on bearing capability; maximum application load may be limited by acceleration requirements.
- Available with Aerotech controllers.
- Requires environmental compensation.
- To protect air bearing against under-pressure, an in-line pressure switch tied to the motion controller/amplifier E-stop input is recommended.
- Air supply must be clean, dry to 0° F dewpoint and filtered to 0.25 μm or better; recommend nitrogen at 99.9% purity.
- Specifications are for single-axis systems, measured 50 mm above the tabletop. Performance of multi-axis systems is payload and workpoint dependent. Consult factory for multi-axis or non-standard applications.

## ABL2000 Series SPECIFICATIONS



## ABL2000 Series DIMENSIONS



## ABL2000 Series ORDERING INFORMATION

### Ordering Example

ABL20	100	-10	-RIBBON	-LN100AS	-NC	
Series	Travel (mm)	Motor	Cabling	Linear Encoder	Limits	Options
	010	-10	-RIBBON	-LTnnAS	-NC	XY-CMS
	020		-ROUND	-LTnnX5	-NO	-HALAR
	030			-LNnnAS		
	040			-LZASnn		
	050			-LZR		
	075					
	100					
	120					

### ABL2000 Series Linear Air-Bearing Stage

ABL20010	100 mm (4 in) travel linear air-bearing stage with linear motor and limits
ABL20020	200 mm (8 in) travel linear air-bearing stage with linear motor and limits
ABL20030	300 mm (12 in) travel linear air-bearing stage with linear motor and limits
ABL20040	400 mm (16 in) travel linear air-bearing stage with linear motor and limits
ABL20050	500 mm (20 in) travel linear air-bearing stage with linear motor and limits
ABL20075	750 mm (30 in) travel linear air-bearing stage with linear motor and limits
ABL20100	1000 mm (40 in) travel linear air-bearing stage with linear motor and limits
ABL20120	1200 mm (48 in) travel linear air-bearing stage with linear motor and limits

### Motor

-10	Brushless linear motor (BLMC-192-A)
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### Cabling

-RIBBON	Flat ribbon cabling
-ROUND	E-chain and round wire cabling

### Standard Linear Encoders

-LT10AS	Linear encoder for ABL20010; amplified sine output
-LT20AS	Linear encoder for ABL20020; amplified sine output
-LT30AS	Linear encoder for ABL20030; amplified sine output
-LT40AS	Linear encoder for ABL20040; amplified sine output
-LT50AS	Linear encoder for ABL20050; amplified sine output
-LT75AS	Linear encoder for ABL20075; amplified sine output
-LT100AS	Linear encoder for ABL20100; amplified sine output
-LT120AS	Linear encoder for ABL20120; amplified sine output
-LT10X5	Linear encoder for ABL20010; 1.0 micron line driver output
-LT20X5	Linear encoder for ABL20020; 1.0 micron line driver output
-LT30X5	Linear encoder for ABL20030; 1.0 micron line driver output
-LT40X5	Linear encoder for ABL20040; 1.0 micron line driver output
-LT50X5	Linear encoder for ABL20050; 1.0 micron line driver output
-LT75X5	Linear encoder for ABL20075; 1.0 micron line driver output
-LT100X5	Linear encoder for ABL20100; 1.0 micron line driver output
-LT120X5	Linear encoder for ABL20120; 1.0 micron line driver output

## ABL2000 Series ORDERING INFORMATION

### High-Accuracy Linear Encoders

-LN10AS	High-accuracy linear encoder for ABL20010; amplified sine output
-LN20AS	High-accuracy linear encoder for ABL20020; amplified sine output
-LN30AS	High-accuracy linear encoder for ABL20030; amplified sine output
-LN40AS	High-accuracy linear encoder for ABL20040; amplified sine output
-LN50AS	High-accuracy linear encoder for ABL20050; amplified sine output
-LN75AS	High-accuracy linear encoder for ABL20075; amplified sine output
-LN100AS	High-accuracy linear encoder for ABL20100; amplified sine output
-LN120AS	High-accuracy linear encoder for ABL20120; amplified sine output

### High-Accuracy/High-Resolution Linear Encoders

-LZAS10	High-accuracy/high-resolution linear encoder for ABL20010; amplified sine output
-LZAS20	High-accuracy/high-resolution linear encoder for ABL20020; amplified sine output

Note: Maximum travel for this option is 200 mm.

### Laser Interferometer Feedback Option

-LZR	Laser interferometer feedback, amplified sine output
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### Limits

-NC	Normally-closed end of travel limit switches (standard)
-NO	Normally-open end of travel limit switches

### Options

-X-Y-CMS	Cable management system for X-Y assembly; order with X-axis only
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