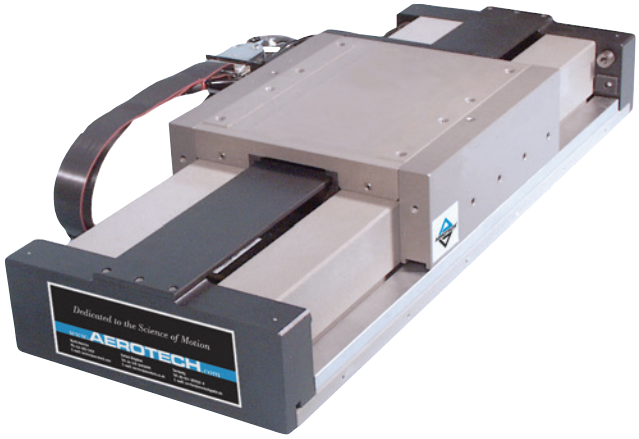
ABL2000 Series

Air Bearing, Direct-Drive Linear Stage

- Fully preloaded air-bearing
- Available with up to 1000 mm travel
- High-accuracy linear encoder 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 superior 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. The BLMC utilizes an ironless forcer, which means there is zero cogging and no attractive forces – resulting in unrivaled 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.

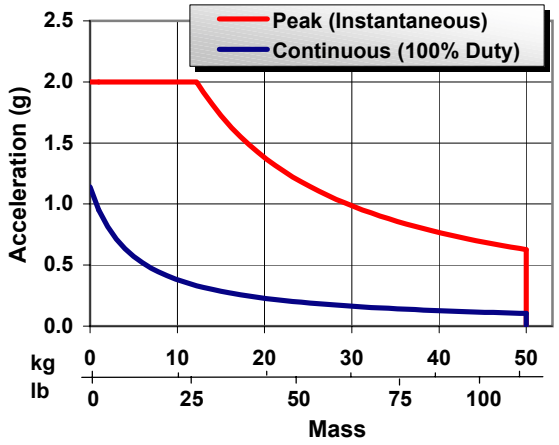
ABL2000 Series SPECIFICATIONS

Mechanical Specifications			ABL2000-0100	ABL2000-0200	ABL2000-0300	ABL2000-0400	ABL2000-0500	ABL2000-0750	ABL2000-1000
Total Travel			100 mm	200 mm	300 mm	400 mm	500 mm	750 mm	1000 mm
Motor Type			Linear Brushless Servomotor						
Bus Voltage			80 VDC						
Feedback			Noncontact Linear Encoder						
Maximum Speed[1]			2 m/s						
Maximum Acceleration			2 g (No Load)						
Maximum Load[2]			50.0 kg						
Accuracy	-E1 Encoder	Calibrated[3]	±0.5 µm			±0.75 µm		±1 µm	
		Standard	±4.0 µm	±8.0 µm	±11.5 µm	±14.0 µm	±15.75 µm	±18.5 µm	±20.0 µm
	-E4 Encoder	Calibrated[3]	±0.5 µm			±0.75 µm		±1 µm	
		Standard	±5.0 µm						
Repeatability	-E1 Encoder		±0.2 µm			±0.3 µm		±0.4 µm	
	-E4 Encoder		±0.2 µm			±0.3 µm		±0.4 µm	
Straightness and Flatness	Maximum Deviation		±0.25 µm	±0.40 µm	±0.75 µm	±1.5 µm	±2.0 µm	±3.0 µm	±4.0 µm
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
Nominal Stage Mass			30.0 kg	34.5 kg	39.5 kg	44.0 kg	49.0 kg	61.0 kg	72.5 kg
Operating Pressure[4]			80 psig ±5 psig						
Air Consumption[5]			19.8 SLPM (0.7 SCFM) (Single Axis)						
Moving Mass			9 kg						
Material			Hardcoat Anodized Aluminum						

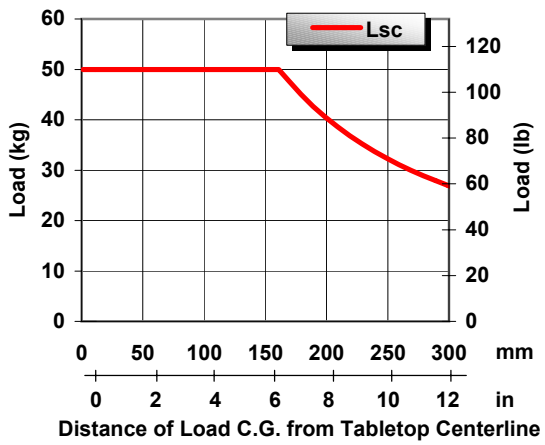
Notes:
1. Maximum speed based on stage capability; maximum application velocity may be limited by system data rate and system resolution.
2. Maximum load based on bearing capability; maximum application load may be limited by acceleration requirements.
3. Available with Aerotech controllers.
4. To protect air bearing against under-pressure, an in-line pressure switch tied to the motion controller/amplifier E-Stop 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.

NOTES:
When mounting the ABL2000 in an XY configuration, the maximum upper axis length is 300 mm.
Specifications are for single-axis systems measured 25 mm above the tabletop; performance of multi-axis system is payload and workpoint dependent. Consult the Aerotech factory for multi-axis or non-standard applications.

ABL2000 Series SPECIFICATIONS

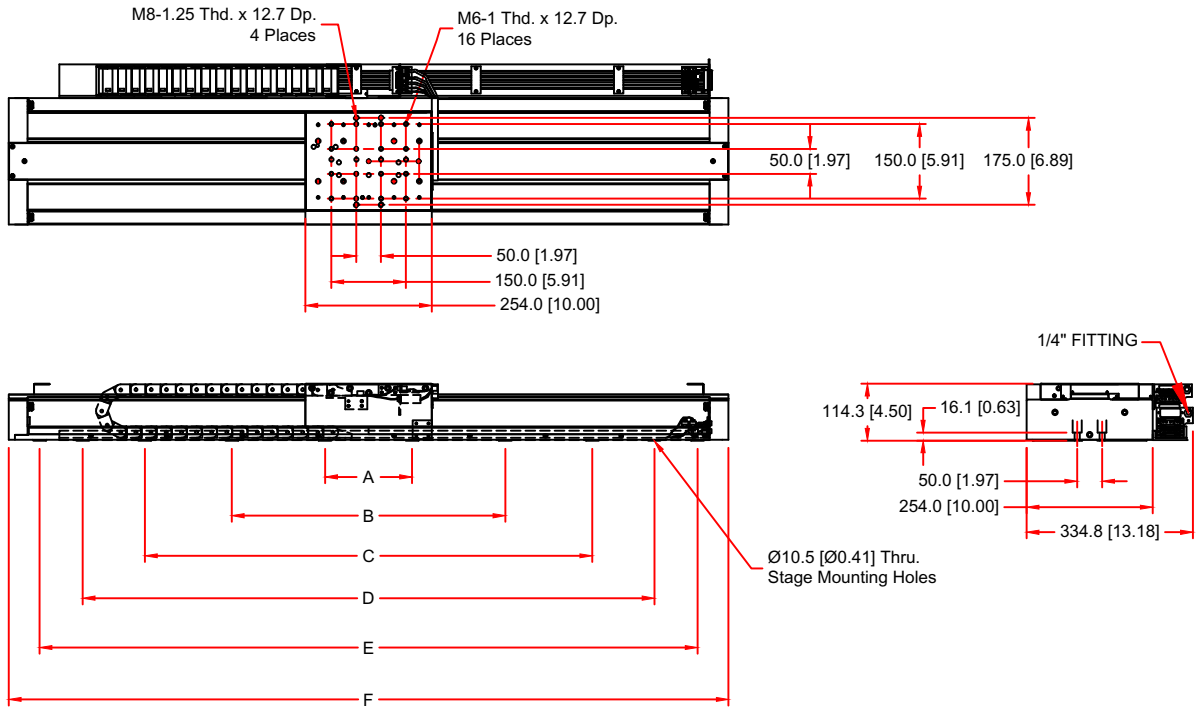


Acceleration vs. Mass (ABL2000)



Cantilevered Load Capability (ABL2000)

ABL2000 Series DIMENSIONS



Basic Model	Total Travel	Dimensions -Millimeters [Inches]					
		A	B	C	D	E	F
ABL2000-0100	100.0 [4.00]	175.0 [6.89]	350.0 [13.78]	-	-	-	457.2 [18.00]
ABL2000-0200	200.0 [8.00]	175.0 [6.89]	450.0 [17.72]	-	-	-	558.8 [22.00]
ABL2000-0300	300.0 [12.00]	175.0 [6.89]	550.0 [21.65]	-	-	-	660.4 [26.00]
ABL2000-0400	400.0 [16.00]	175.0 [6.89]	450.0 [17.72]	650.0 [25.59]	-	-	762.0 [30.00]
ABL2000-0500	500.0 [20.00]	175.0 [6.89]	450.0 [17.72]	750.0 [29.53]	-	-	863.6 [34.00]
ABL2000-0750	750.0 [30.00]	175.0 [6.89]	450.0 [17.72]	750.0 [29.53]	1000.0 [39.37]	-	1117.6 [44.00]
ABL2000-1000	1000.0 [40.00]	175.0 [6.89]	550.0 [21.65]	900.0 [35.43]	1250.0 [49.21]	-	1371.6 [54.00]
ABL2000-1200	1200.0 [48.00]	175.0 [6.89]	550.0 [21.65]	900.0 [35.43]	1150.0 [45.28]	1450.0 [57.09]	1574.8 [62.00]

DIMENSIONS: MILLIMETERS

ABL2000 Series ORDERING INFORMATION

Travel (Required)

-0100	100 mm travel
-0200	200 mm travel
-0300	300 mm travel
-0400	400 mm travel
-0500	500 mm travel
-0750	750 mm travel
-1000	1000 mm travel

Feedback (Required)

-E1	Incremental linear encoder; 1 Vpp amplified sine output
-E4	High-accuracy incremental linear encoder; 1 Vpp amplified sine output

Cable Management (Optional)

-CMS1	Cable management system for lower-axis of XY assembly
-CMS2	Cable management system for upper-axis of XY assembly

Metrology (Required)

-PL1	Metrology, uncalibrated with performance plots
-PL2	Metrology, calibrated (HALAR) with performance plots

Integration (Required)

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.

Accessories (to be ordered as a separate line item)

ABF	Air-bearing filtration kit