

# ABL1500WB Series

## Air Bearing, Linear Motor Stage

Wide base for large offset loads

Powerful dual linear motor drive

Designed for high-performance scanning and inspection

Active air preload on all air-bearing surfaces

Linear encoder feedback provides sub-nanometer resolution

High stiffness for heavy loads and excellent geometrical performance

Four models with travels from 200 mm to 500 mm

The ABL1500WB is a wide-base version of the ABL1500 series air-bearing stage. The wider base makes the ABL1500WB ideally suited for applications with large offset loads, and it is ideal as the lower axis in XY stage systems with large travel. The ABL1500WB incorporates dual linear motors, effectively doubling the force output of a standard ABL1500 stage.

Leading-edge industries, particularly in the semiconductor and high-performance test and measurement fields, demand positioning tolerances beyond the capability of conventional ball-screw and mechanical-bearing positioning systems. The ABL1500WB, with its fully active preload, exceptionally high stiffness, and excellent geometric characteristics was designed specifically to meet those demands.

### Air-Bearing Design for High Dynamic Performance

The ABL1500WB incorporates an air-on-air preload on both the vertical and horizontal surfaces. The opposing thin-film pressure maintains the bearing nominal gap tolerance. This design, in addition to the large air-bearing surface that distributes the load over a large surface area, results in a stage with outstanding stiffness that is ideal for heavy or offset loading.



*The ABL1500WB is designed for high-performance scanning and inspection.*

Aerotech's proprietary manufacturing techniques result in a stage with unsurpassed geometrical characteristics, which maximize performance by yielding superior pitch, roll, yaw, straightness, and flatness specifications.

### Linear Motor Drive

The driving force behind this stage is Aerotech's BLMC series brushless linear servomotor. The BLMC utilizes an ironlessforcer, which means there is zero cogging and no attractive forces, resulting in unsurpassed smoothness of motion.

### 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 expected of Aerotech equipment. Because there is no mechanical contact between moving elements, the ABL1500WB experiences no wear or reduction in performance over time. Service life is virtually unlimited and because there is no lubrication – only clean, dry gas – air bearings are ideal for cleanroom and medical applications.

### Cable Management

We carefully optimize the cable bend radius 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.

We include all customer-required cables, air hoses, etc. in our CMS bundle to facilitate integration into the final system. Both ends are fully connectorized for simple integration into the customer's machine.

## ABL1500WB Series SPECIFICATIONS

Mechanical Specifications			ABL1500WB-200	ABL1500WB-300	ABL1500WB-400	ABL1500WB-500
<b>Travel</b>			200 mm (8 in)	300 mm (12 in)	400 mm (16 in)	500 mm (20 in)
<b>Accuracy<sup>(1)</sup></b>	<b>E1</b>	<b>Calibrated</b>	±0.5 µm (±20 µin)	±0.5 µm (±20 µin)	±0.6 µm (±24 µin)	±0.6 µm (±24 µin)
		<b>Standard</b>	±8.0 µm (±320 µin)	±12.0 µm (±480 µin)	±16.0 µm (±640 µin)	±20.0 µm (±800 µin)
	<b>E3</b>	<b>Calibrated</b>	±0.4 µm (±16 µin)	±0.4 µm (±16 µin)	±0.5 µm (±20 µin)	±0.5 µm (±20 µin)
		<b>Standard</b>	±5.0 µm (±200 µin)	±5.0 µm (±200 µin)	±5.0 µm (±200 µin)	±5.0 µm (±200 µin)
<b>Repeatability (Bi-Directional)<sup>(1)</sup></b>	<b>E1</b>	±0.2 µm (±8 µin)			±0.3 µm (±12 µin)	
	<b>E3</b>	±0.1 µm (±4 µin)	±0.15 µm (±6 µin)	±0.2 µm (±8 µin)		
<b>Straightness<sup>(1)</sup></b>			±0.5 µm (±20 µin)	±0.75 µm (±30 µin)	±1.5 µm (±60 µin)	±2.0 µm (±80 µin)
<b>Flatness<sup>(1)</sup></b>			±0.5 µm (±20 µin)	±0.75 µm (±30 µin)	±1.5 µm (±60 µin)	±2.0 µm (±80 µin)
<b>Pitch</b>			±2 arc sec	±3 arc sec	±4 arc sec	±5 arc sec
<b>Roll</b>			±2 arc sec	±3 arc sec	±4 arc sec	±5 arc sec
<b>Yaw</b>			±2 arc sec	±3 arc sec	±4 arc sec	±5 arc sec
<b>Maximum Speed</b>			2 m/s (80 in/s)			
<b>Maximum Acceleration</b>			2 g - 20 m/s <sup>2</sup> - 768 in/s <sup>2</sup> (No Load)			
<b>Maximum Force (Continuous)</b>			187.2 N (42.0 lb)			
<b>Load Capacity<sup>(2)</sup></b>	<b>Horizontal</b>		60 kg (132.3 lb)			
	<b>Side</b>		25 kg (55 lb)			
<b>Operating Pressure</b>			80 psi (5.5 bar) ±5 psig (0.3 bar)			
<b>Air Consumption</b>			32-40 SLPM @ 552 kPa (1.13-1.4 SCFM @ 5.52 bar)			
<b>Moving Mass (No Load)</b>			11.5 kg (25.4 lb)			
<b>Stage Mass</b>			39.8 kg (87.7 lb)	45.0 kg (99.2 lb)	50.3 kg (110.9 lb)	55.5 kg (122.4 lb)
<b>Material</b>			Aluminum			
<b>MTBF (Mean Time Between Failure)</b>			30,000 Hours			

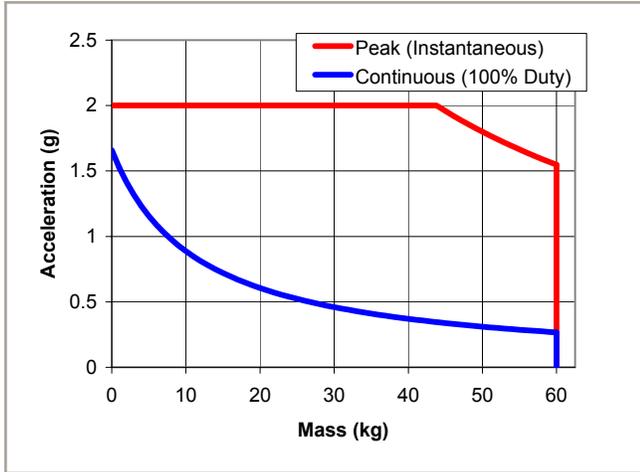
**Notes:**

1. Certified with each stage.
2. Axis orientation for on-axis loading is listed.
3. Specifications are for single-axis systems measured 25 mm above the tabletop. Performance of multi-axis systems is payload and workpoint dependent. Consult factory for multi-axis or non-standard applications.
4. To protect air bearing against under-pressure, an in-line pressure switch tied to the motion controller/amplifier ESTOP input is recommended.
5. Air supply must be clean, dry to 0° F dewpoint and filtered to 0.25 µm or better; recommend nitrogen at 99.9% purity.
6. For XY configurations, the maximum upper axis travel is 500 mm.

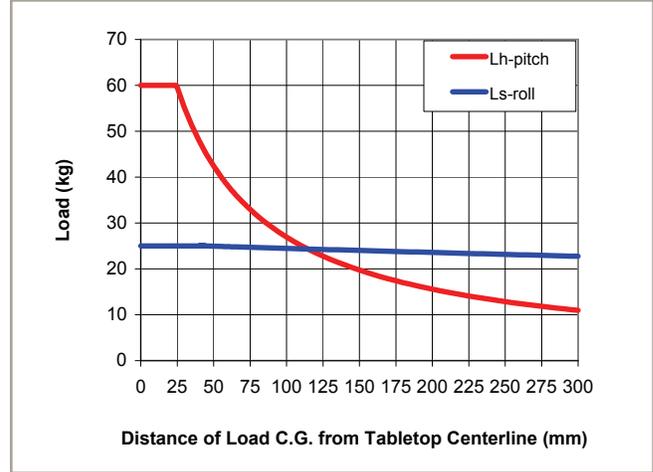
Electrical Specifications	
<b>Drive System</b>	Brushless Linear Servomotor
<b>Feedback</b>	Noncontact Linear Encoder (see signal period options on Order Information page)
<b>Maximum Bus Voltage</b>	up to 80 VDC
<b>Limit Switches</b>	5 V, Normally Closed
<b>Home Switch</b>	Near Center

Recommended Controller		
<b>Multi-Axis</b>	<b>A3200</b>	Ndrive MP/Ndrive CP/Ndrive HLe/Npaq MXR
	<b>Ensemble</b>	Ensemble MP/Ensemble CP/Ensemble HLe/Epaq
<b>Single Axis</b>	<b>Soloist</b>	Soloist MP/Soloist CP/Soloist HLe

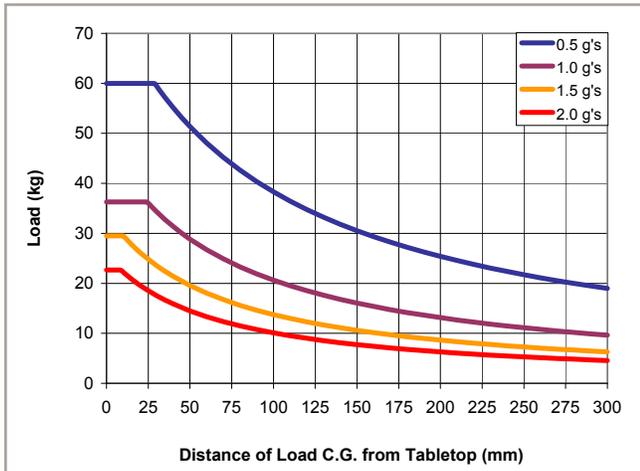
## ABL1500WB Series SPECIFICATIONS



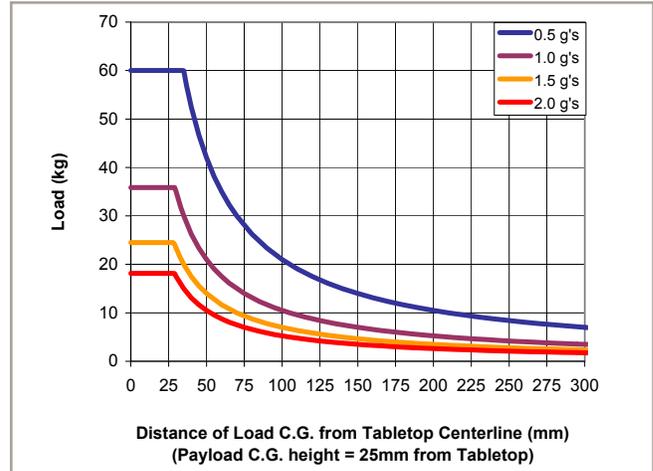
Acceleration versus mass for the ABL1500WB with two BLMC-192-A motors.



Cantilevered load capability (static conditions) for the ABL1500WB.

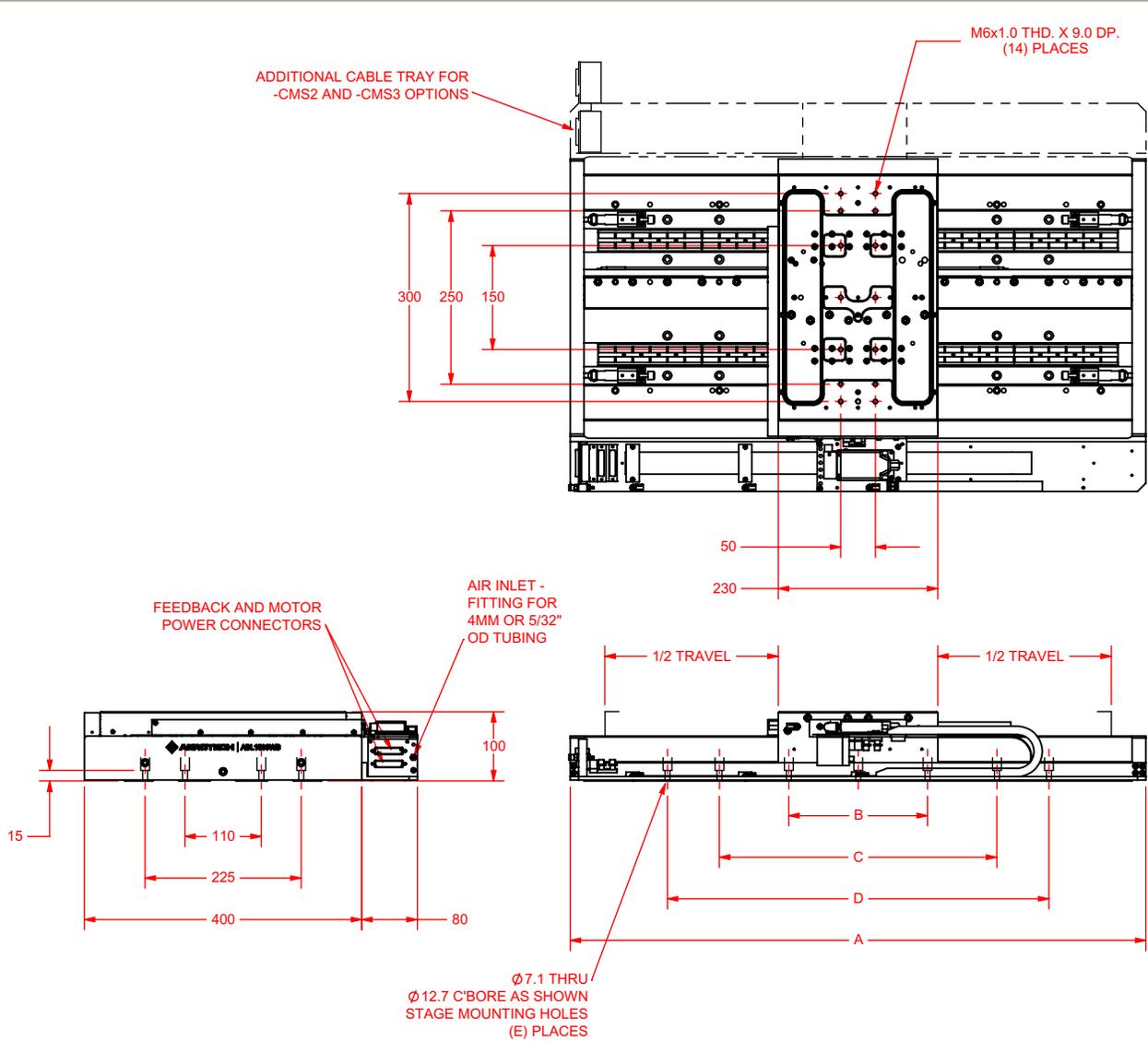


Pitch offsets with varying C.O.G. height and laterally centered payload.



Yaw offsets with payload C.O.G. 25mm above the tabletop.

# ABL1500WB Series DIMENSIONS



BASIC MODEL	NOMINAL TRAVEL	ELEC LIMIT TRAVEL	MECH LIMIT TRAVEL	DIMENSIONS - MILLIMETERS				
				A	B	C	D	E
ABL1500WB-200	200	210	255	530	200	-	-	12
ABL1500WB-300	300	310	355	630	200	350	-	20
ABL1500WB-400	400	410	455	730	200	400	-	20
ABL1500WB-500	500	510	555	830	200	400	550	28

## ABL1500WB Series ORDERING INFORMATION

### Travel (Required)

-200	200 mm travel
-300	300 mm travel
-400	400 mm travel
-500	500 mm travel

### Feedback (Required)

-E1	Incremental linear encoder, 1 Vpp amplified sine output
-E2	Incremental linear encoder, 0.1 $\mu$ m TTL line driver output
-E3	High-accuracy incremental linear encoder, 1 Vpp amplified sine output

### Cable Management (Required)

-CMS1	Single axis cable management system
-CMS2	Cable management system for XY assembly
-CMS3	Cable management system for XYZ axis

### 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	<p><b>Integration - Test as system</b></p> <p>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.</p>
-TAC	<p><b>Integration - Test as components</b></p> <p>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.</p>

### Accessories (to be ordered as a separate line item)

ALIGN-NPA	Non-precision XY assembly
ALIGN-PA10	XY assembly; 10 arc sec orthogonality. Alignment to within 7 microns orthogonality for short travel stages.
ALIGN-PA5	XY assembly; 5 arc sec orthogonality. Alignment to within 3 microns orthogonality for short travel stages.
ABF	Air-bearing filtration kit