



Air Bearing, Direct-Drive Linear Stage

# ABL1500WB



## Ultra-Precise Motion with High Load Capacity

The ABL1500WB—with its fully active air preload, exceptionally high stiffness and excellent geometric performance characteristics—meets demanding motion performance requirements that other stages cannot. The wide-body design with dual ironless linear motors is optimized for large, heavy payloads, and it's also an ideal lower axis for XY stage assemblies due to its superior stiffness and high resistance to error motions. Its non-contact design results in virtually unlimited operational life without the need for regular maintenance or servicing.

## Key Applications

ABL1500WB linear air-bearing stages are ideal for applications and processes requiring outstanding precision, geometric and dynamic performance, and ultra-smooth motion, including:

- ◆ Semiconductor manufacturing & inspection
- ◆ Lithography
- ◆ Surface metrology
- ◆ Photonic device manufacturing
- ◆ Advanced packaging
- ◆ Laser microprocessing
- ◆ Synchrotron, beamline & other research applications

## KEY FEATURES:

- ◆ Travel options from **200–500 mm**
- ◆ Wide-body design supports payloads up to **60 kg**
- ◆ Dual ironless linear motors provide **HIGH FORCE OUTPUT & ULTRA-SMOOTH MOTION** with zero cogging
- ◆ Optional 4  $\mu\text{m}$  encoder scale option provides **SUB-NANOMETER RESOLUTION** for superior dynamic accuracy & velocity stability
- ◆ Rated for **NORMAL- & SIDE-MOUNTING**
- ◆ **EASY TO INTEGRATE** with other ABL1500 stages & more to build multi-axis systems

## ABL1500WB Series SPECIFICATIONS

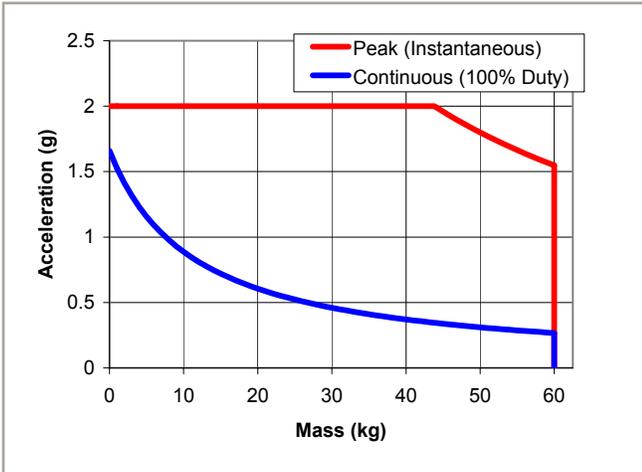
Mechanical Specifications		ABL1500WB-200	ABL1500WB-300	ABL1500WB-400	ABL1500WB-500	
<b>Travel</b>		200 mm	300 mm	400 mm	500 mm	
<b>Accuracy<sup>(1)</sup></b>	E1	Calibrated (PL2-)	±0.5 µm	±0.5 µm	±0.6 µm	±0.6 µm
		Standard	±8.0 µm	±12.0 µm	±16.0 µm	±20.0 µm
	E3	Calibrated (PL2-)	±0.4 µm	±0.4 µm	±0.5 µm	±0.5 µm
		Standard	±5.0 µm	±5.0 µm	±5.0 µm	±5.0 µm
<b>Repeatability (Bi-Directional)<sup>(1)</sup></b>	E1	±0.2 µm		±0.3 µm		
	E3	±0.1 µm	±0.15 µm	±0.2 µm		
<b>Straightness<sup>(1)</sup></b>		±0.5 µm	±0.75 µm	±1.5 µm	±2.0 µm	
<b>Flatness<sup>(1)</sup></b>		±0.5 µm	±0.75 µm	±1.5 µm	±2.0 µm	
<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				
<b>Maximum Acceleration</b>		2 g (No Load)				
<b>Maximum Force (Continuous)</b>		187.2 N				
<b>Load Capacity<sup>(2)</sup></b>	Horizontal	60 kg				
	Side	25 kg				
<b>Operating Pressure</b>		80 psi (5.5 bar) ±5 psig (0.3 bar)				
<b>Air Consumption</b>		32-40 SLPM @ 552 kPa				
<b>Moving Mass (No Load)</b>		11.5 kg				
<b>Stage Mass</b>		39.8 kg	45.0 kg	50.3 kg	55.5 kg	
<b>Material</b>		Hardcoat Anodized Aluminum				
<b>MTBF (Mean Time Between Failure)</b>		30,000 Hours				

**Notes:**

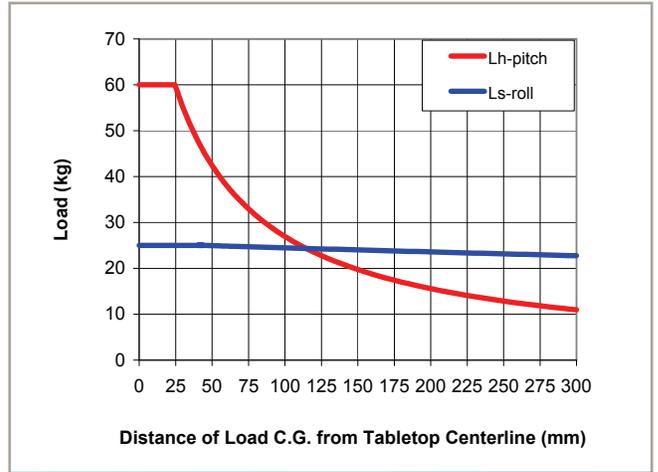
- Certified with each stage.
- Axis orientation for on-axis loading is listed.
- Specifications are for single-axis systems measured 25 mm above the tabletop. Performance of multi-axis systems is payload and workpoint dependent. Consult factory for multi-axis or non-standard applications.
- To protect 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.
- For ABL1500WB XY assemblies, the maximum upper axis travel is 500 mm.
- For XY assemblies in which the lower axis is ABL1500WB and the upper axis is ABL1500, the upper axis must have at least 300 mm travel. Consult factory for ABL1500WB/ABL1500 XY assemblies in which the ABL1500 upper axis travel is 200 mm or less.

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

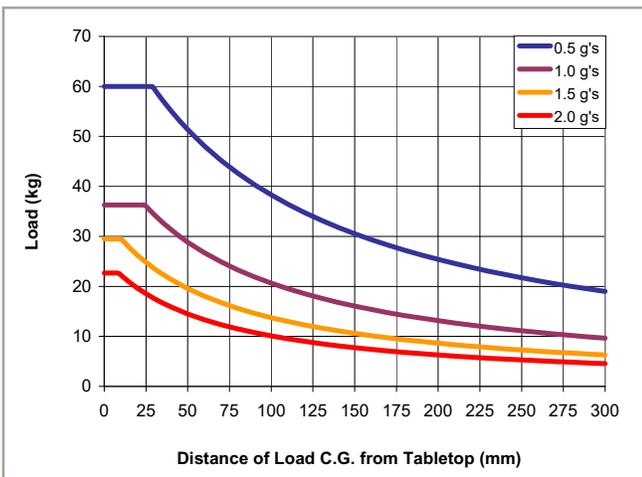
## ABL1500WB Series SPECIFICATIONS



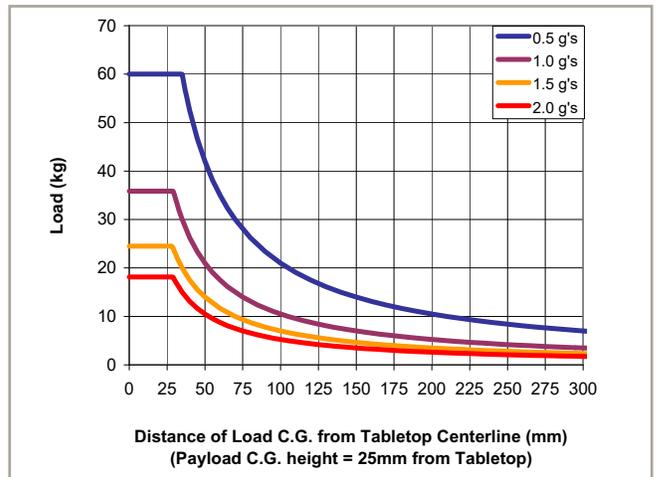
Acceleration versus mass for the ABL1500WB with two BLMC-192-A motors.



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. 25 mm above the tabletop.

## ABL1500WB Series ORDERING OPTIONS

### Travel (Required)

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

### Feedback (Required)

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- E1 Incremental linear encoder, 1 Vpp amplified sine output
- E3 High-accuracy incremental linear encoder, 1 Vpp amplified sine output

### Cable Management (Required)

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

*Note: For XY assemblies in which the lower axis is ABL1500WB and the upper axis is ABL1500, the upper axis must have at least 300 mm travel. Consult factory for ABL1500WB/ABL1500 XY assemblies in which the ABL1500 upper axis travel is 200 mm or less.*

### Metrology (Required)

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

### Integration (Required)

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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 spareparts, replacement parts, or items that will not be used together. These components may or may not be part of a larger system.

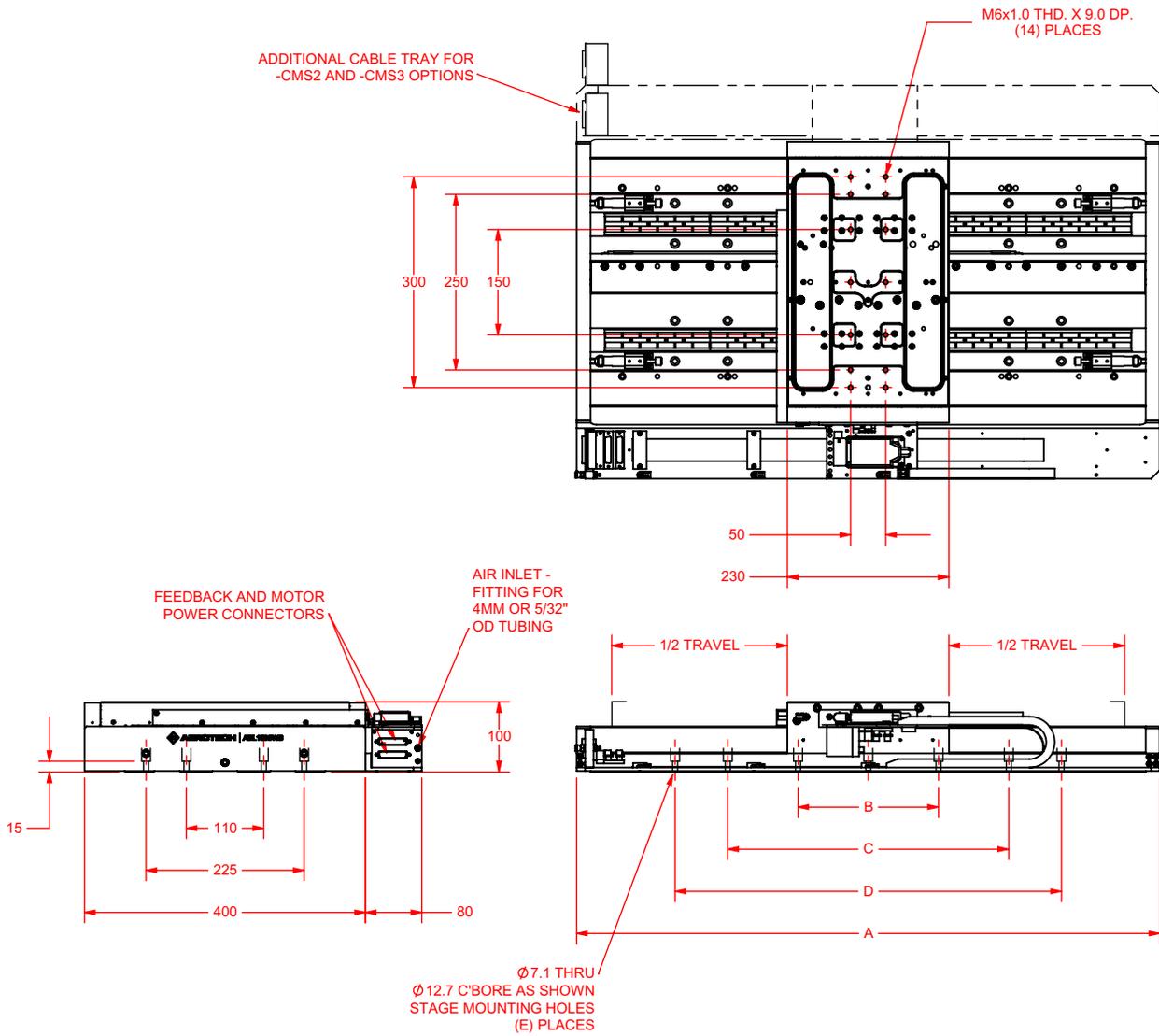
### Accessories (To Be Ordered As Separate Line Item)

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- 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

# ABL1500WB Series DIMENSIONS

## ABL1500WB



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