Air-Bearing, Direct-Drive
Linear Stage with Bellows

ABL1500-B

Industry-Leading Performance with Contamination Protection

The ABL1500-B linear air-bearing stage features an integrated bellows waycover to mitigate the risk of contamination in processes that generate debris, ensuring a long, productive service life free from particulate-induced performance degradation. Like the ABL1500, it offers the exceptionally high stiffness and geometric performance for which our air bearing stages are known.

Key Applications

The ABL1500-B is ideal for ultra-high precision applications in environments with the potential for contamination, including:

- Laser cutting, drilling & marking
- Optics manufacturing
- Medical device manufacturing
- High-precision micromachining
- In-situ measurement, inspection & quality control

KEY FEATURES:

- Ensures **MAXIMUM PERFORMANCE** in unclean environments with integrated bellows waycover
- Delivers **GUARANTEED REPEATABILITY** to ±150 nm
- Supports **LARGE PAYLOADS** to 35 kg with air-on-air preload design
- Provides virtually **UNLIMITED SERVICE LIFE** and maintenance-free operation due to zero mechanical contact between moving elements
- Available with **INTEGRATED CABLE MANAGEMENT** for multi-axis assemblies

ABL1500-B Series SPECIFICATIONS

Mechanical Specifications			ABL1500-B-050	ABL1500-B-100	ABL1500-B-200
Travel			50 mm	100 mm	200 mm
Accuracy[1]	E1	Calibrated	±0.4 µm	±0.4 µm	±0.7 µm
		Standard	±2.0 µm	±4.0 µm	±8.0 µm
	E3	Calibrated	±0.3 µm	±0.3 µm	±0.5 µm
		Standard	±1.0 µm	±2.0 µm	±5.0 µm
Repeatability (Bi-Directional)[1]	E1		±0.15 µm	±0.25 µm	±0.25 µm
	E3		±0.15 µm	±0.15 µm	±0.25 µm
Straightness[1]			±0.25 µm	±0.4 µm	±0.5 µm
Flatness[1]			±0.25 µm	±0.4 µm	±0.5 µm
Pitch			±0.5 arc sec	±1 arc sec	±2 arc sec
Roll			±0.5 arc sec	±1 arc sec	±2 arc sec
Yaw			±0.5 arc sec	±1 arc sec	±2 arc sec
Maximum Speed			2 m/s		
Maximum Acceleration			2 g (No Load)		
Maximum Force (Continuous)			93.6 N		
Load Capacity[2]	Horizontal		35 kg		
	Side		25 kg		
Operating Pressure			80 psi ±5 psig		
Air Consumption			24-30 slpm @ 551 kPa		
Moving Mass (No Load)			5.9 kg		
Stage Mass			19.4 kg	21.0 kg	25.2 kg
Material			Aluminum		
MTBF (Mean Time Between Failure)			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 aove 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 E-stop 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. Maximum upper-axis travel length is 100 mm when mounting the ABL1500-B in an XY configuration.

ABL1500-B Series SPECIFICATIONS

Mechanical Specifications			ABL1500-B-300	ABL1500-B-400	ABL1500-B-500
Travel			300 mm	400 mm	500 mm
Accuracy[1]	**E1**	**Calibrated**	±0.7 µm	±0.8 µm	±0.8 µm
		Standard	±12 µm	±16 µm	±20 µm
	E3	**Calibrated**	±0.6 µm	±0.75 µm	±0.75 µm
		Standard	±5.0 µm	±5.0 µm	±5.0 µm
Repeatability (Bi-Directional)[1]	**E1**		±0.25 µm	±0.3 µm	
	E3		±0.25 µm	±0.3 µm	
Straightness[1]			±0.75 µm	±1.5 µm	±2.0 µm
Flatness[1]			±0.75 µm	±1.5 µm	±2.0 µm
Pitch			±3 arc sec	±4 arc sec	±5 arc sec
Roll			±3 arc sec	±4 arc sec	±5 arc sec
Yaw			±3 arc sec	±4 arc sec	±5 arc sec
Maximum Speed			2 m/s		
Maximum Acceleration			2 g (No Load)		
Maximum Force (Continuous)			93.6 N		
Load Capacity[2]	**Horizontal**		35 kg		
	Side		25 kg		
Operating Pressure			80 psi ±5 psig		
Air Consumption			24-30 slpm @ 551 kPa		
Moving Mass (No Load)			5.9 kg		
Stage Mass			29.0 kg	33.2 kg	37.1 kg
Material			Hardcoat Anodized Aluminum		
MTBF (Mean Time Between Failure)			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 aove 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 E-stop 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. Maximum upper-axis travel length is 100 mm when mounting the ABL1500-B in an XY configuration.

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

Travel (Required)

-050	50 mm travel
-100	100 mm travel
-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 µm 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 XIO, 2 extra cables, 1 extra air
-CMS4	Cable management system for Y axis, upper axis only
-CMS5	Cable management system for YZ assembly, upper axis only
-CMS6	Cable management system for YIO, 2 extra cables, 1 extra air, upper axis only

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.

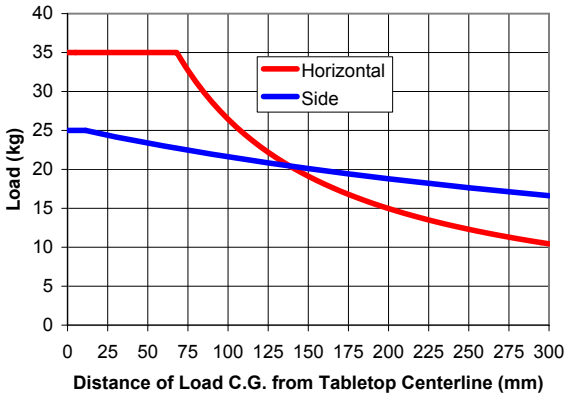
-TAC **Integration - Test as components**
Testing and integration of individual items as discrete components that ship together. This is typically used for spareparts, replacement parts, or items that will not be used together. These components may or may not be part of a larger system.

ABL1500-B Series ORDERING OPTIONS

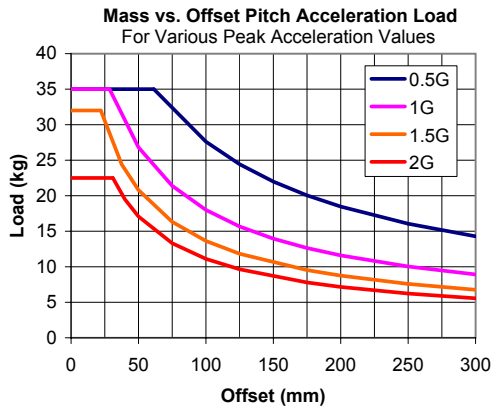
Accessories (To Be Ordered As Separate Line Item)

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

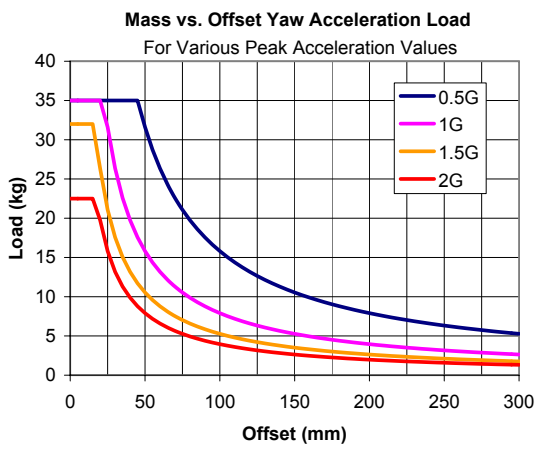
An example of an ABL1500-B/ABL1500WB-B in an XY configuration.



Cantilever load performance for the ABL1500-B.



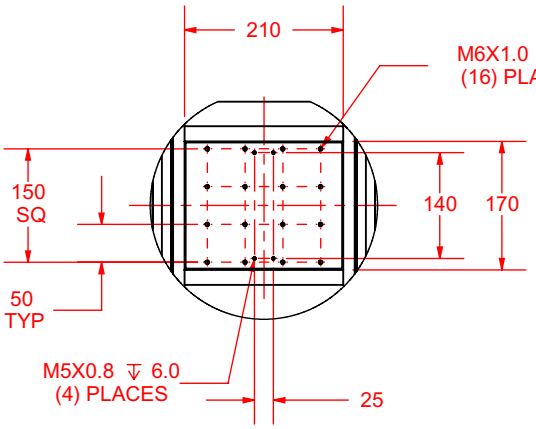
Mass versus offset pitch acceleration load for the ABL1500-B.



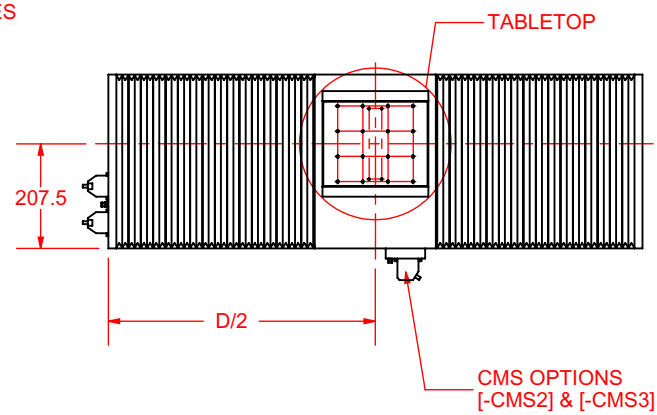
Mass versus offset yaw acceleration load for the ABL1500-B.

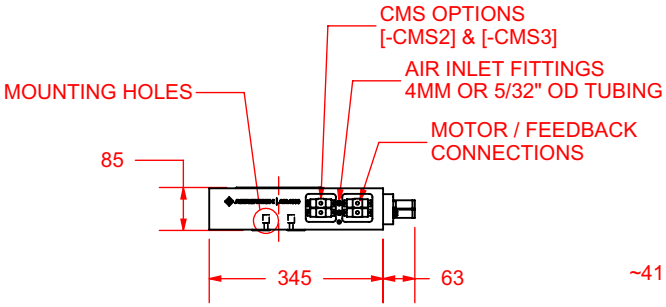
ABL1500-B Series DIMENSIONS

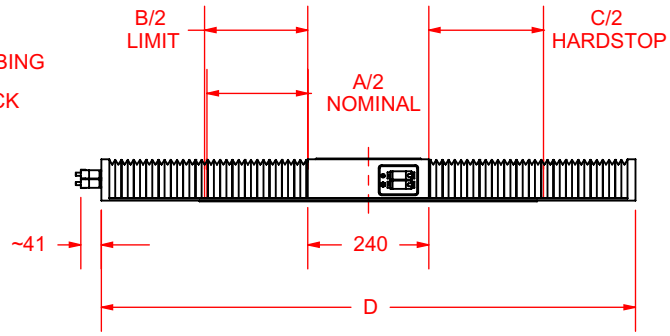
ABL1500-B

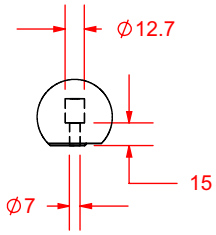


DETAIL TABLETOP
MOUNTING PATTERN CENTERED
ON CARRIAGE
SCALE 1 : 10

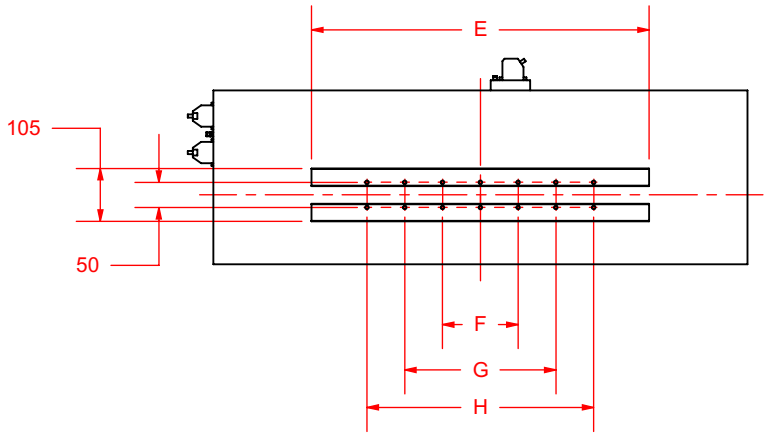








DETAIL MOUNTING HOLES
(J) PLACES
SCALE 1 : 5

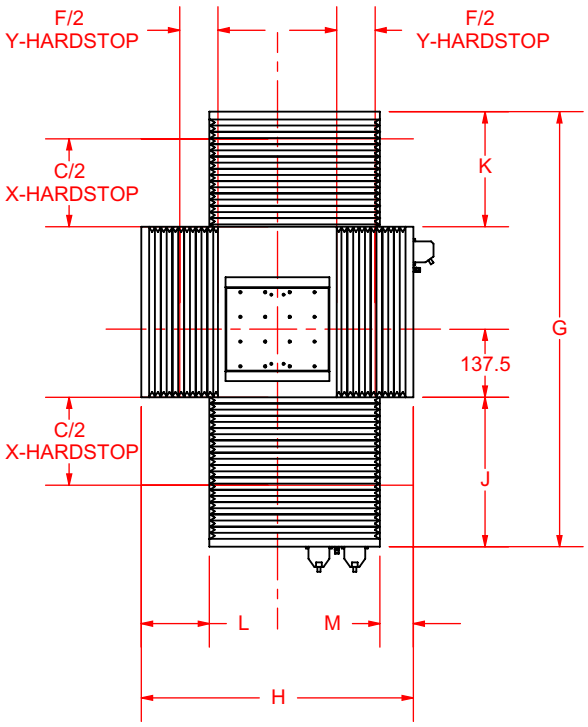


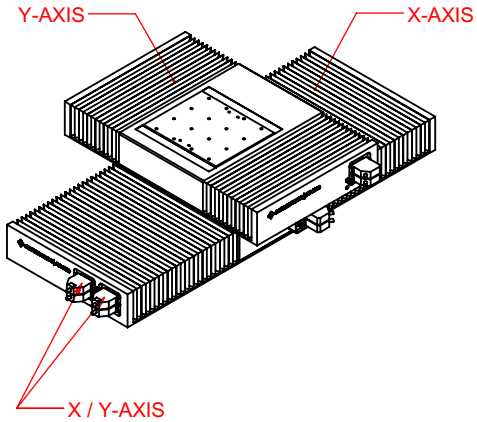
MODEL #	A	B	C	D	E	F	G	H	J
ABL1500-B-050	50	60	105	500	320	200	-	-	4
ABL1500-B-100	100	110	155	550	370	150	-	-	4
ABL1500-B-200	200	210	255	730	470	150	250	-	8
ABL1500-B-300	300	310	355	880	570	150	300	-	8
ABL1500-B-400	400	410	455	1060	670	150	300	450	14
ABL1500-B-500	500	510	555	1220	770	150	300	500	14

DIMENSIONS: MILLIMETERS

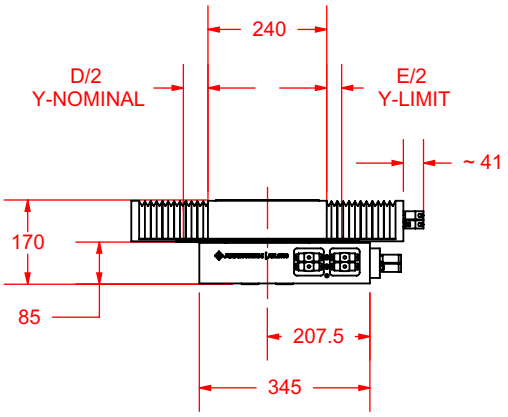
ABL1500-B-XY Series DIMENSIONS

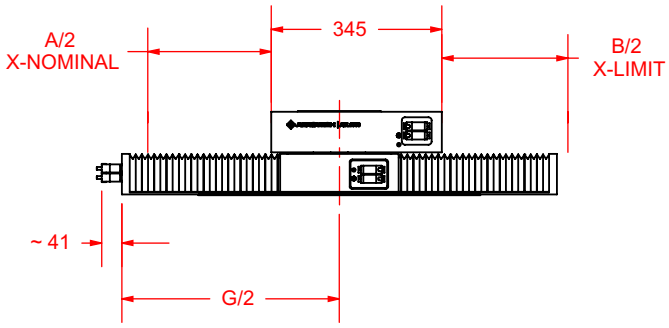
ABL1500-B-XY





CMS CONFIG.	X-AXIS OPTION	Y-AXIS OPTION
1	-CMS2	-CMS4





** REFER TO ABL1500-B SINGLE AXIS CATALG DRAWING FOR TABLETOP AND STAGE MOUNTING INFORMATION. **

MODEL #		A	B	C	D	E	F	G	H	J	K	L	M
X-AXIS	Y-AXIS												
ABL1500-B-050	ABL1500-B-050	50	60	105	50	60	105	500	500	112.5	42.5	112.5	42.5
ABL1500-B-100		100	110	155				550		137.5	67.5		
ABL1500-B-200		200	210	255				730		227.5	157.5		
ABL1500-B-300		300	310	355				880		302.5	232.5		
ABL1500-B-400		400	410	455				1060		392.5	322.5		
ABL1500-B-500		500	510	555				1220		472.5	402.5		
ABL1500-B-050	ABL1500-B-100	50	60	105	100	110	155	500	550	112.5	42.5	137.5	67.5
ABL1500-B-100		100	110	155				550		137.5	67.5		
ABL1500-B-200		200	210	255				730		227.5	157.5		
ABL1500-B-300		300	310	355				880		302.5	232.5		
ABL1500-B-400		400	410	455				1060		392.5	322.5		
ABL1500-B-500		500	510	555				1220		472.5	402.5		

DIMENSIONS: MILLIMETERS