

# FiberGrate® 2000 Series

## Linear, Air Bearing Subsystem

Fully preloaded air bearing

Advanced Automation 3200 PC-based controller

Low-noise linear amplifiers

Complete noncontact design

Includes granite base, optional vibration isolation system, and optional laser interferometer feedback

Ultra-precise velocity control

FiberGrate® is a high precision, high-performance motion sub-system specifically designed for the manufacture of fiber Bragg gratings. A flexible workspace allows the system to be optimized for the unique needs of each manufacturer.

FiberGrate represents a major evolution as only Aerotech has the breadth of product line to offer a single-source motion solution that requires no integration by the end-user. All components are designed and manufactured by Aerotech's motion control experts, ensuring a fully optimized solution.

### Linear Stage

The linear positioner is based on Aerotech's ABL2000 series linear air bearing, and is a fully preloaded, noncontact design. Inherently frictionless, air bearings have proven to be the standard in precision applications. Driven by a noncontact linear brushless servomotor, this stage proves the ultimate solution whether the application requires small, accurate steps or constant smooth velocity. Years of research have resulted in a robust and perturbation-free cable management system. High-flex ribbon cable ensures years of maintenance-free operation.

### Feedback and Control System

Aerotech's optional laser interferometer feedback provides high stability, high resolution (0.3 nm) feedback. Designed for use with Aerotech's Automation 3200 series controller, the interface between the interferometer and control systems is seamless. The laser is positioned at the height of



*The FiberGrate 2000 is designed for the manufacture of fiber Bragg gratings.*

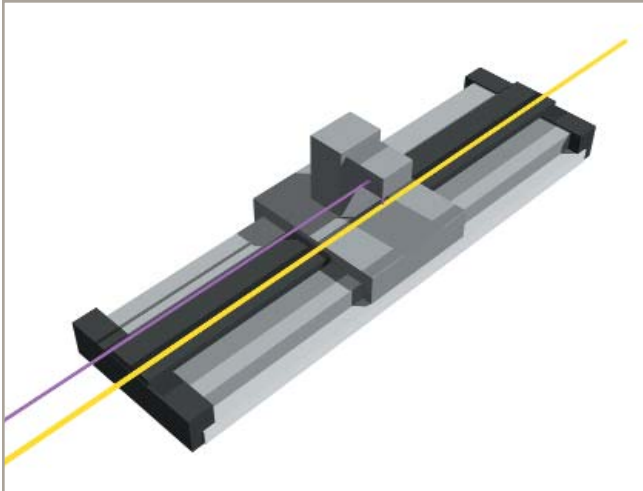
the fiber and mask to eliminate Abbe error, resulting in exceptional accuracy. For less stringent applications, two different noncontact linear encoders are offered. A wide selection of state-of-the-art controllers are available. Options range from single-axis, stand-alone controllers to the Automation 3200 software-only controller capable of 32 axes of synchronized control. All of Aerotech's controllers offer position synchronized output pulses to control the laser. In addition, real-time position information may be logged on-board the controller, or read over high-speed parallel or serial interfaces.

### Options

The FiberGrate may be configured with standard or custom granite, as well as vibration isolation systems. Additional indexing axes are available and are readily interfaced with the control and drive system. Convenient rack- or panel-mount amplifiers are included with all systems. All systems have provisions for customer cabling.

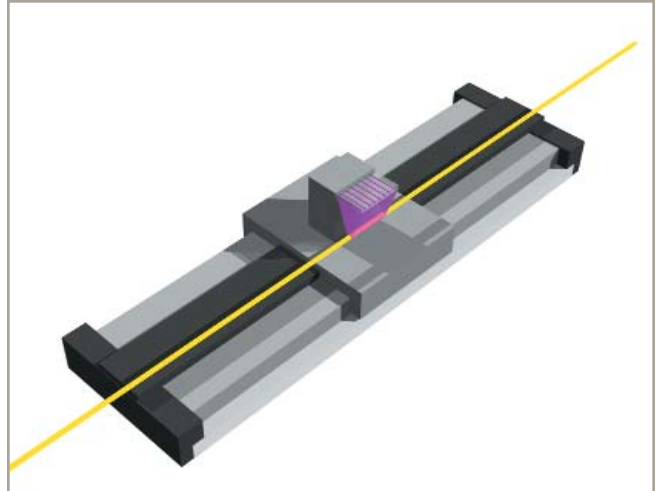
Aerotech's expert technical staff is experienced in custom system designs and will work with you to generate a system to meet the unique needs of your application.

**FiberGrate 2000 Series SPECIFICATIONS**



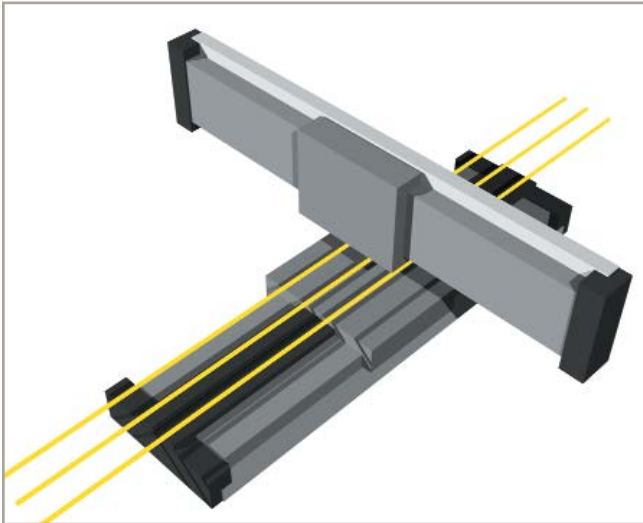
**Direct Writing with PSO**

*Aerotech's Position Synchronized Output (PSO) function triggers laser firing as a function of position, making accurate direct writing possible.*



**Writing with Mask**

*Accurate positioning and unparalleled velocity control make FiberGrate the ideal solution for writing with a mask.*



**Secondary Axes**

*Aerotech has a wide range of positioning stages. Alternate and custom configurations are readily available.*

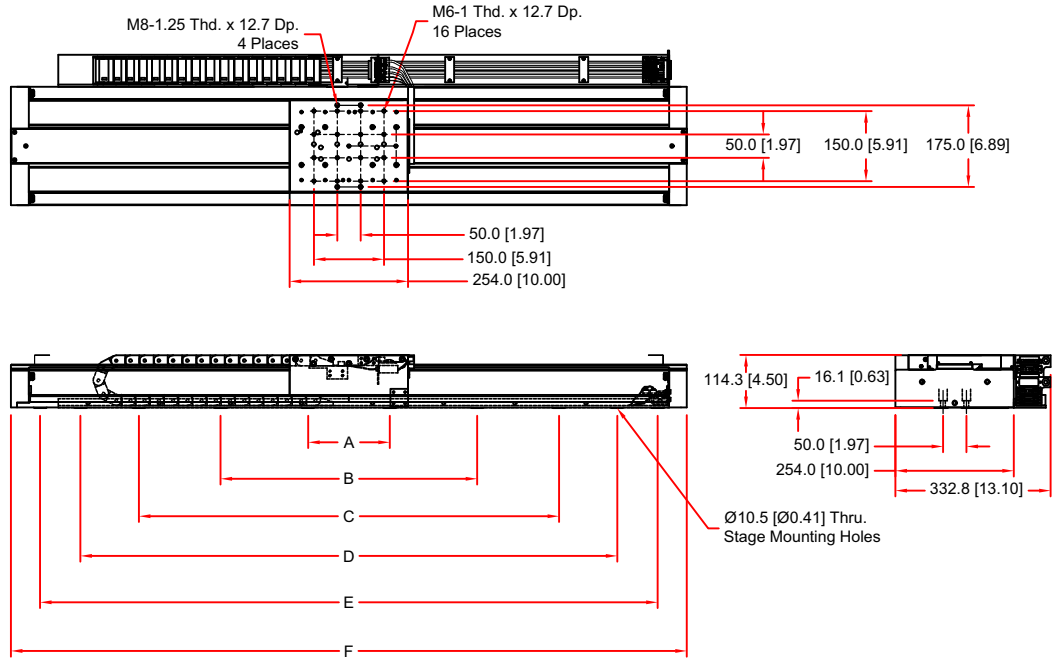
# FiberGrate 2000 Series SPECIFICATIONS

Basic Model		FG-100	FG-200	FG-300	FG-400	FG-500	FG-750	FG-1000	FG-1200	
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 <sup>(1)</sup>		80 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>(3)</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>(4)</sup>		50.0 kg (110.0 lb)								
Overall Accuracy	LT	HALAR <sup>(5)</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)	±11.5 μm (±460 μin)	±14.0 μm (±560 μin)	±15.75 μm (±630 μin)	±18.5 μm (±740 μin)	±20.0 μm (±800 μin)	±21.0 μm (±840 μin)
	LN	HALAR <sup>(5)</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>(6)</sup>							
		LZAS	±0.2 μm over entire travel (±8 μin)		N/A					
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)		N/A						
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>(7)</sup>		80 psig ±5 psig								
Air Consumption <sup>(8)</sup>		19.8 SLPM (0.7 SCFM) (Single Axis)								
Moving Mass		9 kg								
Material		Aluminum								
Finish		Hard Coating (62 Rockwell Hardness)								

**Notes:**

- 80 VDC bus limit with standard ribbon cable. Up to 320 VDC is available with round cables.
- 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 25 mm above the tabletop. Performance of multi-axis systems is payload and workpoint dependent. Consult factory for multi-axis or non-standard applications.

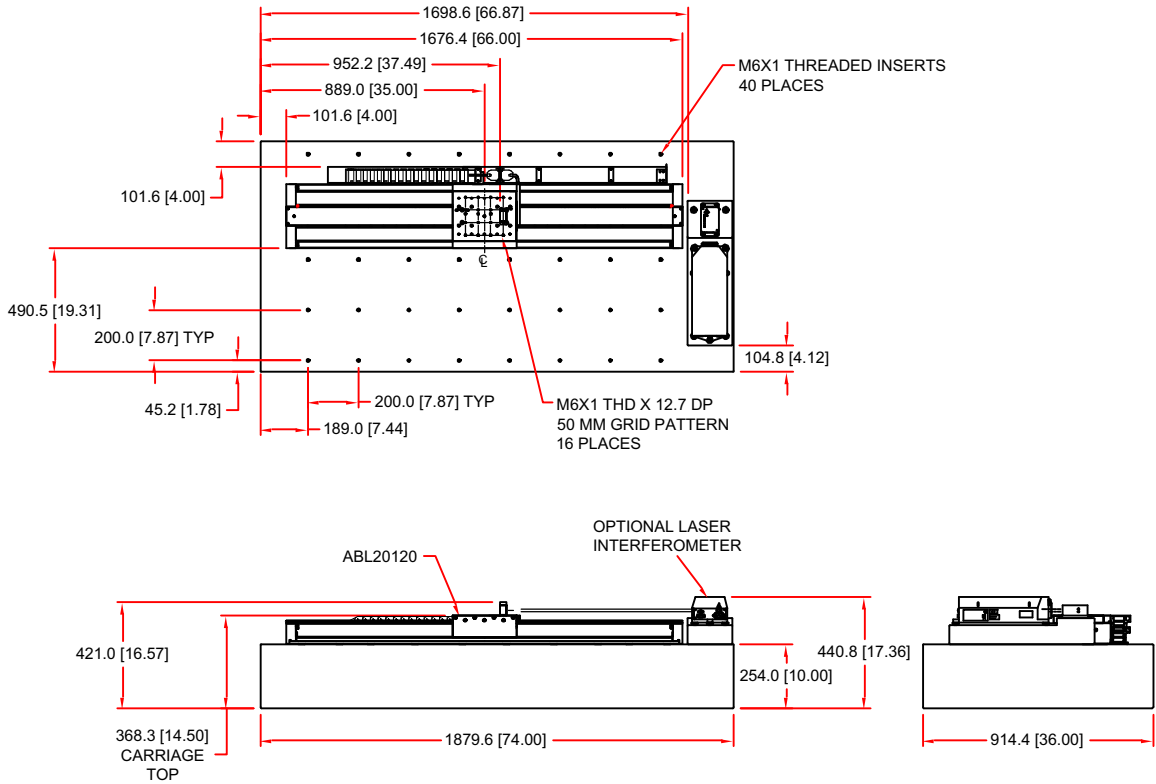
## FiberGrate 2000 Series DIMENSIONS



Basic Model	Total Travel	Dimensions -Millimeters [Inches]					
		A	B	C	D	E	F
ABL20010	100.0 [4.00]	175.0 [6.89]	350.0 [13.78]	-	-	-	457.2 [18.00]
ABL20020	200.0 [8.00]	175.0 [6.89]	450.0 [17.72]	-	-	-	558.8 [22.00]
ABL20030	300.0 [12.00]	175.0 [6.89]	550.0 [21.65]	-	-	-	660.4 [26.00]
ABL20040	400.0 [16.00]	175.0 [6.89]	450.0 [17.72]	650.0 [25.59]	-	-	762.0 [30.00]
ABL20050	500.0 [20.00]	175.0 [6.89]	450.0 [17.72]	750.0 [29.53]	-	-	863.6 [34.00]
ABL20075	750.0 [30.00]	175.0 [6.89]	450.0 [17.72]	750.0 [29.53]	1000.0 [39.37]	-	1117.6 [44.00]
ABL20100	1000.0 [40.00]	175.0 [6.89]	550.0 [21.65]	900.0 [35.53]	1250.0 [49.21]	-	1371.6 [54.00]
ABL20120	1200.0 [48.00]	175.0 [6.89]	550.0 [21.65]	900.0 [35.53]	1150.0 [45.76]	1450.0 [57.09]	1574.8 [62.00]

**FiberGrate 2000 (ABL2000 air bearing shown)**

# FiberGrate 2000 Series DIMENSIONS



- NOTES: 1. MUST BE MOUNTED ON AN AIR ISOLATION SYSTEM.  
 2. OTHER TRAVEL LENGTHS AVAILABLE. PLEASE CONSULT AEROTECH POSITIONING SYSTEMS CATALOG #6.

DIMENSIONS - MILLIMETERS [INCHES]

**FiberGrate 2000 (1.2 m travel shown with typical granite configuration)**

## FiberGrate 2000 Series ORDERING INFORMATION

### Ordering Example

FG2000	-1200	-LN	-GRANITE
Series	Travel (mm)	Feedback Options	Options
	-100 -200 -300 -400 -500 -750 -1000 -1200	-LN -LT -LZAS -LZR	-GRANITE -ISOLATION

### FiberGrate 2000 Series Fiber Bragg Grating Positioner

FG2000 Linear air-bearing fiber/mask positioner

Note: Requires clean, dry air supply. In-line under-pressure switch required.

#### Linear Stage Travel

-100	100 mm (4 in) travel stage with linear motor
-200	200 mm (8 in) travel stage with linear motor
-300	300 mm (12 in) travel stage with linear motor
-400	400 mm (16 in) travel stage with linear motor
-500	500 mm (20 in) travel stage with linear motor
-750	750 mm (30 in) travel stage with linear motor
-1000	1000 mm (40 in) travel stage with linear motor
-1200	1200 mm (48 in) travel stage with linear motor

#### Feedback Options

-LNxxAS	High-accuracy linear encoder feedback; “xx” designates travel length; amplified sine wave output
-LTxxAS	Linear encoder feedback; “xx” designates travel length; amplified sine wave output
-LZxxAS	High-accuracy/high-resolution linear encoder; “xx” designates travel length; amplified sine wave output
-LZR	Laser interferometer feedback; includes environmental compensation package

Note: Specify travel length ‘xx’ in cm

#### Controller Platform

-A3200	Automation 3200 software-only controller; linear amplifier, cables, software included
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See Motion Controllers section for specifications.

#### Options

-GRANITE	Granite to accommodate stage and customer fixturing. Requires user-approved drawing (ESxxxxx) to specify user-defined mounting holes.
-ISOLATION	Vibration isolation system. Requires GRANITE option.