

BLMF Series

Linear Motors

Non-magnetic forcer coil provides high force with zero cogging for super-smooth velocity and position control

Continuous force to 159.4 N (35.8 lb); peak force to 637.7 N (143.4 lb)

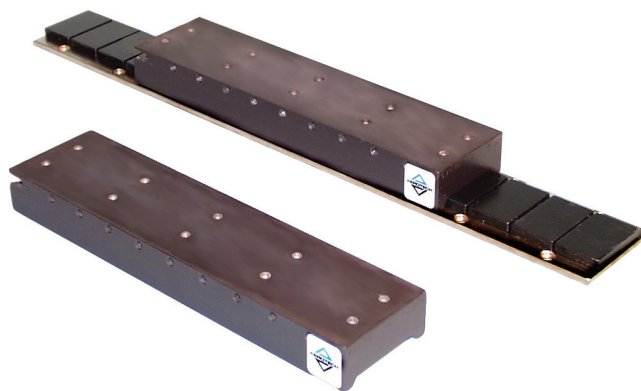
Unlimited travel length by stacking magnet tracks

High-energy, rare-earth magnets used in magnet track for high acceleration capability

Follows the 2011/65/EU RoHS 2 Directive

The BLMF series linear motors are designed to provide a lower cost and lower profile alternative to conventional linear motor applications. The BLMFI forcer contains no magnetic material to achieve zero cogging and magnetic attraction. The BLMFS forcer contains magnetic material to achieve higher force per unit volume. The flat magnet track can accommodate either the BLMFI or BLMFS.

The moving forcer coil assembly contains Hall-effect devices, and a thermal sensor, and is a compact, reinforced ceramic epoxy structure.



The BLMFI series nonmagnetic forcer eliminates cogging and magnetic attraction to allow for extremely smooth motion and very tight velocity and position control.

The BLMFS series utilizes steel laminations to produce more force for a given forcer coil length. This makes it ideal for high speed point-to-point motion. The attraction force can also be used as a bearing pre-load.

Offering high peak forces in its standard configuration, BLMF motors are available with higher-power magnets that can be used to increase output force.



The BLMF is shown with Aerotech's linear motor line.

These linear motors are ideal for any application requiring high levels of positioning resolution and accuracy. Tracks are stackable for any travel length. The BLMF linear motors are also for cleanroom use as they produce no particulates.

The BLMF can be driven using standard Aerotech brushless amplifiers and controllers to provide a complete, integrated system.

BLMF Series SPECIFICATIONS

BLMFI “Ironless” Forcer Models

Motor Model	Units	BLMFI-81	BLMFI-142	BLMFI-264	BLMFI-325	5 BLMFI-386					
Performance Specifications^(1,2)											
Continuous Force, No Forced Cooling ⁽³⁾	N (lb)	22.7 (5.1)	39.3 (8.8)	78.6 (17.7)	109.4 (24.6)	136.0 (30.6)					
Peak Force ⁽⁴⁾	N (lb)	90.6 (20.4)	157.3 (35.4)	314.2 (70.6)	437.5 (98.4)	543.9 (122.3)					
Attraction Force	N (lb)	0	0	0	0	0					
Electrical Specifications⁽²⁾											
Winding Designation		-A	-B	-A	-B	-A	-B	-A	-B	-A	-B
BEMF Constant (Line-Line, Max)	V/m/s (V/in/s)	8.68 (0.22)	4.34 (0.11)	16.75 (0.43)	8.37 (0.21)	17.37 (0.44)	34.73 (0.88)	22.45 (0.57)	44.90 (1.14)	27.91 (0.71)	55.82 (1.42)
Continuous Current, No Forced Cooling ⁽³⁾	Amp _{pk}	3.00	6.00	2.70	5.40	5.20	2.60	5.60	2.80	5.60	2.80
	Amp _{rms}	2.12	4.24	1.91	3.82	3.68	1.84	3.96	1.98	3.96	1.98
Peak Current, Stall ⁽⁴⁾	Amp _{pk}	12.00	24.00	10.80	21.60	20.80	10.40	22.40	11.20	22.40	11.20
	Amp _{rms}	8.49	16.97	7.64	15.27	14.71	7.35	15.84	7.92	15.84	7.92
Force Constant, Sine Drive ^(5,6)	N/Amp _{pk} (lb/Amp _{pk})	7.55 (1.70)	3.78 (0.85)	14.57 (3.28)	7.28 (1.64)	15.11 (3.40)	30.21 (6.79)	19.53 (4.39)	39.06 (8.78)	24.28 (5.46)	48.56 (10.92)
	N/Amp _{rms} (lb/Amp _{rms})	10.68 (2.40)	5.34 (1.20)	20.60 (4.63)	10.30 (2.32)	21.36 (4.80)	42.73 (9.61)	27.62 (6.21)	55.24 (12.42)	34.34 (7.72)	68.67 (15.44)
Motor Constant ^(3,5)	N/√W (lb/√W)	3.14 (0.71)		4.31 (0.97)		6.40 (1.44)		7.48 (1.68)		8.38 (1.88)	
Resistance, 25°C, (Line to Line)	ohms	5.5	1.4	10.9	2.7	5.3	21.2	6.5	26.0	8.0	32.0
Inductance (Line to Line)	mH	2.90	0.73	6.50	1.63	3.50	14.00	4.48	17.92	5.30	21.20
Thermal Resistance, No Forced Cooling	°C/W	1.92		1.20		0.66		0.47		0.38	
Maximum Bus Voltage	VDC	340		340		340		340		340	
Mechanical Specifications											
Coil Weight	kg (lb)	0.50 (1.10)		0.84 (1.85)		1.10 (2.42)		1.40 (3.08)		1.70 (3.74)	
Coil Length	mm (in)	81.0 (3.19)		142.2 (5.60)		264.2 (10.40)		325.1 (12.80)		386.1 (15.20)	
Heat Sink	mm (in)	100x100x13 (4x4x0.5)		150x150x13 (6x6x0.5)		300x300x13 (12x12x0.5)		350x350x13 (14x14x0.5)		400x400x13 (16x16x0.5)	
Magnet Track Weight	kg/m (lb/ft)	4.70 (3.15)									
Magnet Pole Pitch	mm (in)	30.00 (1.18)		30.00 (1.18)		30.00 (1.18)		30.00 (1.18)		30.00 (1.18)	
Standards		2011/65/EU RoHS 2 Directive									

Notes:

- Performance is dependent upon heat sink configuration, system cooling conditions, and ambient temperature.
- All performance and electrical specifications ±10%.
- Values shown @ 100°C rise above a 25°C ambient temperature, with motor mounted to the specified aluminum heat sink.
- Peak force assumes correct rms current; consult Aerotech.
- Force constant and motor constant specified at stall.
- All Aerotech amplifiers are rated A_{pk}; use torque constant in N/A_{pk} when sizing.
- Maximum winding temperature is 125°C.
- Ambient operating temperature range 0°C - 25°C. Consult Aerotech for performance in elevated ambient temperatures.

BLMF Series SPECIFICATIONS

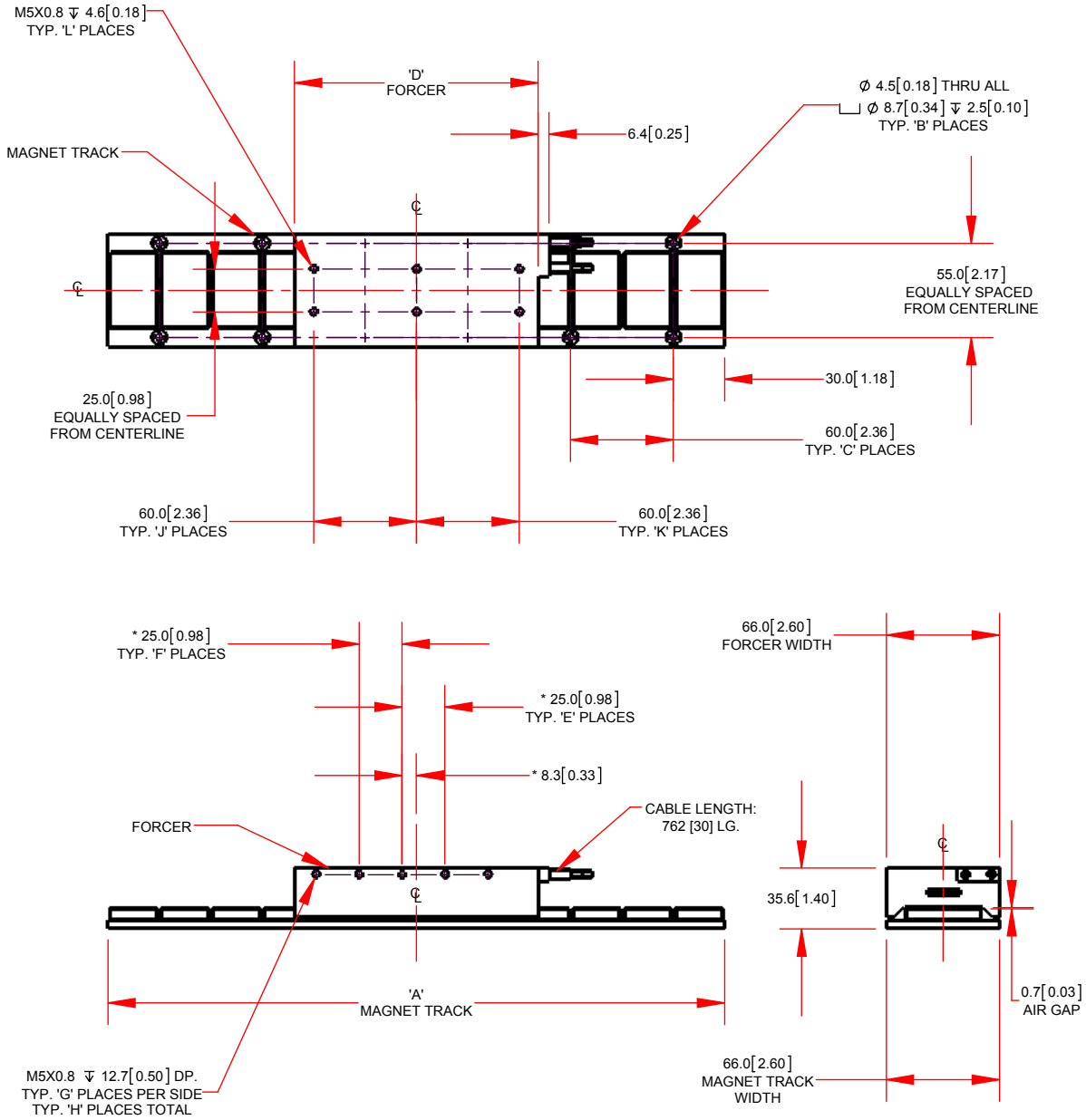
BLMFI “Steel Laminated” Forcer Models

Motor Model	Units	BLMFS-81	BLMFS-142	BLMFS-264	BLMFS-325	5 BLMFS-386					
Performance Specifications^(1,2)											
Continuous Force, No Forced Cooling ⁽³⁾	N (lb)	34.0 (7.6)	58.3 (13.1)	117.8 (26.5)	163.2 (36.7)	193.4 (43.5)					
Peak Force ⁽⁴⁾	N (lb)	136.0 (30.6)	233.1 (52.4)	471.3 (106.0)	652.6 (146.7)	773.5 (173.9)					
Attraction Force	N (lb)	197 (44)	341 (77)	628 (141)	787 (177)	925 (208)					
Electrical Specifications⁽²⁾											
Winding Designation		-A	-B	-A	-B	-A	-B	-A	-B	-A	-B
BEMF Constant (Line-Line, Max)	V/m/s (V/in/s)	13.02 (0.33)	6.51 (0.17)	24.81 (0.63)	12.40 (0.32)	26.05 (0.66)	52.10 (1.32)	33.49 (0.85)	66.98 (1.70)	39.69 (1.01)	79.39 (2.02)
Continuous Current, No Forced Cooling ⁽³⁾	Amp _{pk} Amp _{rms}	3.0 2.12	6.00 4.24	2.70 1.91	5.40 3.82	5.20 3.68	2.60 1.84	5.60 3.96	2.80 1.98	5.60 3.96	2.80 1.98
Peak Current, Stall ⁽⁴⁾	Amp _{pk} Amp _{rms}	12.00 8.49	24.00 16.97	10.80 7.64	21.60 15.27	20.80 14.71	10.40 7.35	22.40 15.84	11.20 7.92	22.40 15.84	11.20 7.92
Force Constant, Sine Drive ^(5,6)	N/Amp _{pk} (lb/Amp _{pk})	11.33 (2.55)	5.67 (1.27)	21.58 (4.85)	10.79 (2.43)	22.66 (5.09)	45.32 (10.19)	29.14 (6.55)	58.27 (13.10)	34.53 (7.76)	69.06 (15.53)
	N/Amp _{rms} (lb/Amp _{rms})	16.02 (3.60)	8.01 (1.80)	30.52 (6.86)	15.26 (3.43)	32.05 (7.20)	64.09 (14.41)	41.20 (9.26)	82.41 (18.53)	48.83 (10.98)	97.67 (21.96)
Motor Constant ^(5,5)	N/√W (lb/√W)	4.71 (1.06)		6.38 (1.43)		9.61 (2.16)		11.15 (2.51)		11.91 (2.68)	
Resistance, 25°C, (Line to Line)	ohms	5.5	1.4	10.9	2.7	5.3	21.2	6.5	26.0	8.0	32.0
Inductance (Line to Line)	mH	4.50	1.13	10.40	2.60	5.70	22.80	7.40	29.60	8.75	35.00
Thermal Resistance, No Forced Cooling	°C/W	1.92		1.20		0.66		0.47		0.38	
Maximum Bus Voltage	VDC	340		340		340		340		340	
Mechanical Specifications											
Coil Weight	kg (lb)	0.60 (1.32)		1.02 (2.24)		1.90 (4.18)		2.31 (5.08)		2.76 (6.07)	
Coil Length	mm (in)	81.0 (3.19)		142.2 (5.60)		264.2 (10.40)		325.1 (12.80)		386.1 (15.20)	
Heat Sink	mm (in)	100x100x13 (4x4x0.5)		150x150x13 (6x6x0.5)		300x300x13 (12x12x0.5)		350x350x13 (14x14x0.5)		400x400x13 (16x16x0.5)	
Magnet Track Weight	kg/m (lb/ft)	4.70 (3.15)									
Magnet Pole Pitch	mm (in)			30.00 (1.18)		30.00 (1.18)		30.00 (1.18)		30.00 (1.18)	
Standards		2011/65/EU RoHS 2 Directive									

Notes:

1. Performance is dependent upon heat sink configuration, system cooling conditions, and ambient temperature.
2. All performance and electrical specifications ±10%.
3. Values shown @ 100°C rise above a 25°C ambient temperature, with motor mounted to the specified aluminum heat sink.
4. Peak force assumes correct rms current; consult Aerotech.
5. Force constant and motor constant specified at stall.
6. All Aerotech amplifiers are rated A_{pk}; use torque constant in N/A_{pk} when sizing.
7. Maximum winding temperature is 125°C.
8. Ambient operating temperature range 0°C - 25°C. Consult Aerotech for performance in elevated ambient temperatures.

BLMF Series DIMENSIONS



DIMENSIONS - MILLIMETERS [INCHES]

MAGNET TRACK

MODEL NO.	A	B	C
MTF240P	240 [9.45]	8	3
MTF300P	300 [11.81]	10	4
MTF360P	360 [14.17]	12	5
MTF480P	480 [18.90]	16	7
MTF540P	540 [21.26]	18	8

FORCER

MODEL NO.	D	E	F	G	H	J	K	L
BLMF-81	81 [3.19]	1	1	2	4	1	1	4
BLMF-142	142 [5.59]	2	2	5	10	1	1	6
BLMF-264	264 [10.39]	4	4	9	16	2	2	10
BLMF-325	325 [12.80]	5	5	11	22	2	2	10
BLMF-386	386 [15.20]	7	7	15	30	3	3	14

*DIMENSIONS DO NOT APPLY TO BLMF-81
CONSULT AEROTECH INC.

BLMF Series ORDERING INFORMATION

BLMF Brushless Linear Servo Motor

BLMFI-81	Flat linear motor forcer, ironless design for zero cogging with thermistor; 81 mm long
BLMFI-142	Flat linear motor forcer, ironless design for zero cogging with thermistor; 142 mm long
BLMFI-264	Flat linear motor forcer, ironless design for zero cogging with thermistor; 264 mm long
BLMFI-386	Flat linear motor forcer, ironless design for zero cogging with thermistor; 386 mm long
BLMFS-81	Flat linear motor forcer, steel laminations for higher force with thermistor; 81 mm long
BLMFS-142	Flat linear motor forcer, steel laminations for higher force with thermistor; 142 mm long
BLMFS-264	Flat linear motor forcer, steel laminations for higher force with thermistor; 264 mm long
BLMFS-325	Flat linear motor forcer, steel laminations for higher force with thermistor; 325 mm long
BLMFS-386	Flat linear motor forcer, steel laminations for higher force with thermistor; 386 mm long

Winding Designation (Required)

-A	76 cm (2.5 ft) flying leads (standard)
-B	Optional winding

Hall Effect Sensors (Required)

-H	Hall effect sensors included
-NH	No hall effect sensors included

Vacuum Preparation (Optional)

-V	Vacuum preparation to 10^{-6} Torr
-UHV	Ultra-high vacuum preparation; contact factory

Note: Vacuum preparation motors are ordered as an Engineering Special line item

Flat Magnet Tracks (Optional)

MTF240P	Flat magnet track, for use with BLMFI or BLMFS forcer coil, 240 mm long
MTF300P	Flat magnet track, for use with BLMFI or BLMFS forcer coil, 300 mm long
MTF360P	Flat magnet track, for use with BLMFI or BLMFS forcer coil, 360 mm long
MTF420P	Flat magnet track, for use with BLMFI or BLMFS forcer coil, 420 mm long
MTF480P	Flat magnet track, for use with BLMFI or BLMFS forcer coil, 480 mm long
MTF540P	Flat magnet track, for use with BLMFI or BLMFS forcer coil, 540 mm long
MTFxxxP	Flat magnet track length available; custom length

Note: Magnet tracks are ordered as separate line items. Magnet track part numbers ending with "P" are high performance grade, including magnets on both sides of the track.

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.