

# BLMC Series

## Linear Motors

**Compact size for tight space constraints;  
57.2 mm x 31.8 mm cross section**

**Continuous force to 161.4 N (36.3 lb);  
peak force to 645.6 N (145.2 lb)**

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

**Optional cooling for higher rms force**



Aerotech's "U-channel" BLMC series compact linear motors are only 57.2 mm x 31.8 mm and designed for high force in a compact package.

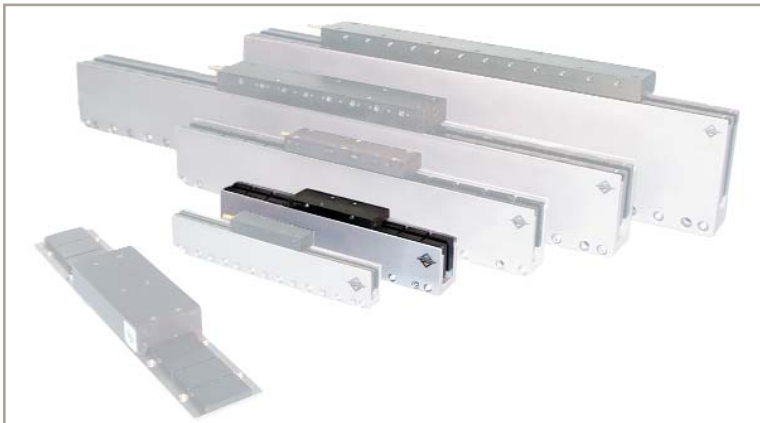
Ideal for both high-accuracy positioning and high-throughput applications, BLMC series motors are direct drive consisting of a noncontacting forcer coil and "U-channel" rare-earth magnet track. This design eliminates backlash, windup, wear and maintenance issues associated with ball screws, belts, and rack and pinions.

The compact moving forcer coil assembly contains Hall-effect devices, and a thermal sensor, and is constructed of reinforced ceramic epoxy. This ironless design eliminates eddy-current losses that otherwise would limit speed and produce additional heat. For highest rms force, optional air

cooling is available. Offering high peak forces in its standard configuration, BLMC motors are available with special high-power magnets that can increase output force.

The BLMC series nonmagnetic forcer eliminates cogging and magnetic attraction to allow for extremely smooth motion and very tight velocity and position control. These linear motors are ideal for any application that requires high levels of positioning resolution and accuracy. BLMC series linear motors are forgiving to align, easy to assemble, and keep the magnetic field well-contained. Magnet tracks are stackable for any travel length. They are also suited for cleanroom use as they produce no particulates.

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



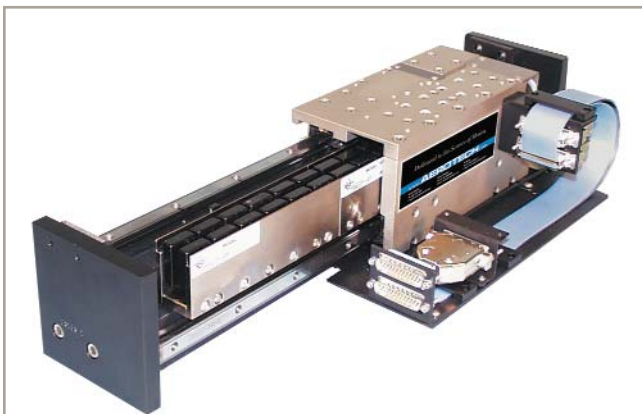
*The BLMC is shown with Aerotech's linear motor line.*

## BLMC Series SPECIFICATIONS

Motor Model	Units	BLMC-92	BLMC-142	BLMC-192	BLMC-267
<b>Performance Specifications<sup>(1,5)</sup></b>					
Continuous Force, 1.4 bar (20 psi) <sup>(2)</sup>	N (lb)	65.9 (14.8)	105.5 (23.7)	135.7 (30.5)	161.4 (36.3)
Continuous Force, No Air <sup>(2)</sup>	N (lb)	39.0 (8.8)	68.2 (15.3)	93.6 (21.0)	108.3 (24.4)
Peak Force <sup>(3)</sup>	N (lb)	263.7 (59.3)	422.1 (94.9)	542.8 (122.0)	645.6 (145.2)
<b>Electrical Specifications<sup>(5)</sup></b>					
Winding Designation		-A	-A	-A	-A
BEMF Constant (Line-Line, Max)	V/m/s (V/in/s)	9.97 (0.25)	18.66 (0.47)	26.89 (0.68)	36.10 (0.92)
Continuous Current, 1.4 bar (20 psi) <sup>(2)</sup>	Amp <sub>pk</sub>	7.60	6.50	5.80	5.14
	Amp <sub>rms</sub>	5.37	4.60	4.10	3.63
Continuous Current, No Air <sup>(2)</sup>	Amp <sub>pk</sub>	4.50	4.20	4.00	3.45
	Amp <sub>rms</sub>	3.18	2.97	2.83	2.44
Peak Current, Stall <sup>(3)</sup>	Amp <sub>pk</sub>	30.40	26.00	23.20	20.56
	Amp <sub>rms</sub>	21.50	18.38	16.40	14.54
Force Constant, Sine Drive <sup>(4,8)</sup>	N/Amp <sub>pk</sub> (lb/Amp <sub>pk</sub> )	8.67 (1.95)	16.24 (3.65)	23.40 (5.26)	31.40 (7.06)
	N/Amp <sub>rms</sub> (lb/Amp <sub>rms</sub> )	12.27 (2.76)	22.96 (5.16)	33.09 (7.44)	44.41 (9.98)
Motor Constant <sup>(2,4)</sup>	N/√W (lb/√W)	4.97 (1.12)	7.23 (1.63)	9.03 (2.03)	10.10 (2.27)
Resistance, 25°C (Line-Line)	ohms	2.9	4.8	6.4	9.2
Inductance (Line-Line)	mH	0.83	1.33	1.90	3.40
Thermal Resistance, 1.4 bar (20 psi)	°C/W	0.57	0.47	0.44	0.39
Thermal Resistance (No Cooling)	°C/W	1.62	1.12	0.93	0.87
Maximum Bus Voltage	VDC	340	340	340	340
<b>Mechanical Specifications</b>					
Air Flow, 20 psi	m <sup>3</sup> /s	1.3x10 <sup>-3</sup>	1.7x10 <sup>-3</sup>	1.4x10 <sup>-3</sup>	1.5x10 <sup>-3</sup>
	SCFM	2.9	3.6	2.9	3.2
Coil Weight	kg (lb)	0.16 (0.35)	0.26 (0.57)	0.34 (0.75)	0.52 (1.14)
Coil Length	mm (in)	91.0 (3.58)	142.0 (5.59)	192.0 (7.56)	267.0 (10.51)
Heat Sink	mm (in)	250x250x25 (10x10x1)	250x250x25 (10x10x1)	250x250x25 (10x10x1)	250x250x25 (10x10x1)
Magnet Track Weight	kg/m (lb/ft)	9.06 (6.08)	9.06 (6.08)	9.06 (6.08)	9.06 (6.08)
Magnetic Pole Pitch	mm (in)	25.00 (0.98)	25.00 (0.98)	25.00 (0.98)	25.00 (0.98)

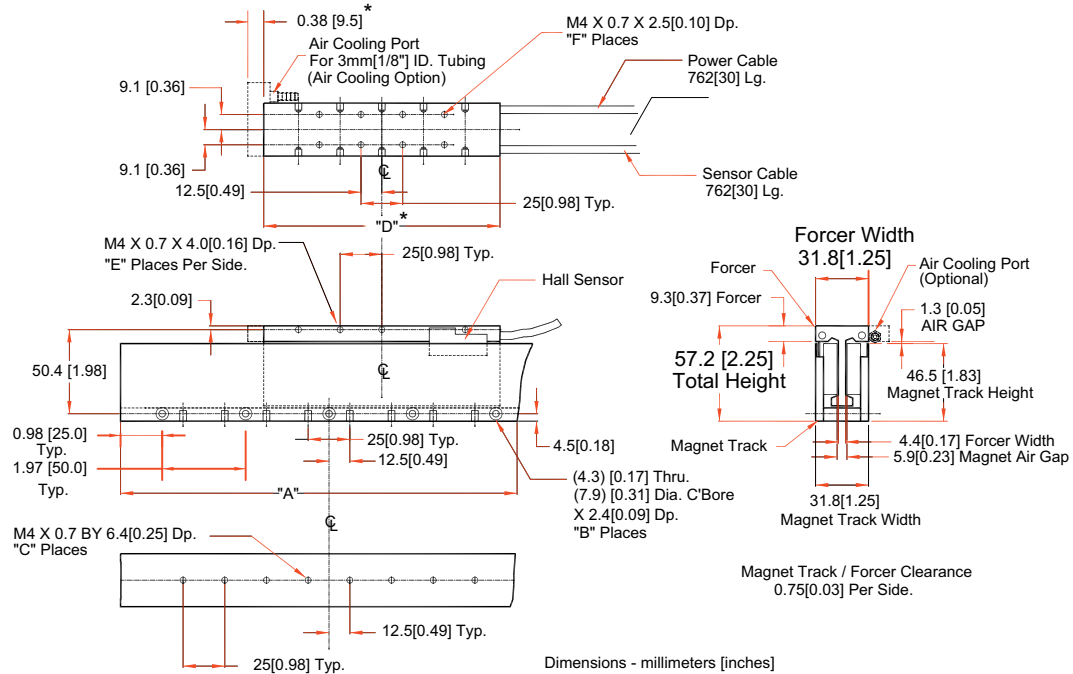
**Notes:**

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



*BLMC linear motor is used in a high-performance Aerotech precision positioning stage.*

# BLMC Series DIMENSIONS



Dimensions - millimeters [inches]

Magnet Track

Model No.	A	B	C
MTC150	150mm 5.91"	3	4
MTC250	250mm 9.84"	5	8
MTC350	350mm 13.78"	7	12
MTC450	450mm 17.72"	9	16
MTC500	500mm 19.68"	10	18

Forcer

Model No.	D	E	F
BLMC-92	92mm 3.62"	2	4
BLMC-142	142mm 5.59"	5	8
BLMC-192	192mm 7.56"	7	12
BLMC-267	266mm 10.50"	8	20

\*Add 9.5[0.38] To Forcer Length  
For Optional Cooling

MTCx custom track lengths available

## BLMC Series ORDERING INFORMATION

### Ordering Example

BLMC	-92	-A
Motor Series	Forcer Coil Length	Standard Winding
	92 mm, 142 mm, 192 mm, 267 mm	76 cm (2.5 ft) flying leads std

### Brushless Linear Servomotors - BLMC Series Compact "U" Channel Forcer Coils

BLMC-92-A	Linear motor coil, with HED, air cooling and temperature switch, Fcont = 65.9 N (14.8 lb) @ 20 psi
BLMC-142-A	Linear motor coil, with HED, air cooling and temperature switch, Fcont = 105.5 N (23.7 lb) @ 20 psi
BLMC-192-A	Linear motor coil, with HED, air cooling and temperature switch, Fcont = 135.7 N (30.5 lb) @ 20 psi
BLMC-267-A	Linear motor coil, with HED, air cooling and temperature switch, Fcont = 161.4 N (36.3 lb) @ 20 psi

### BLMC Options

-LH	Remove HED sensor from BLMC series forcer coil
-AC	Air cooling fitting
-V	Vacuum prepared

### "U" Channel Magnet Tracks – MTC Series for BLMC motors

MTC150	"U" channel magnet track for use with BLMC forcer coil, 150 mm (5.9 in) length
MTC250	"U" channel magnet track for use with BLMC forcer coil, 250 mm (9.8 in) length
MTC350	"U" channel magnet track for use with BLMC forcer coil, 350 mm (13.8 in) length
MTC450	"U" channel magnet track for use with BLMC forcer coil, 450 mm (17.7 in) length
MTC500	"U" channel magnet track for use with BLMC forcer coil, 500 mm (19.7 in) length
MTCx	Custom magnet track lengths available. Please consult factory.