BLMH Series

Linear Motors

70% greater continuous output force in the same physical envelope than competitive models

Continuous forces up to 548.8 N (123.4 lb); peak forces to 2195 N (493.5 lb)

Special magnet options available for increased force output

114.1 mm high x 50.8 mm wide cross section

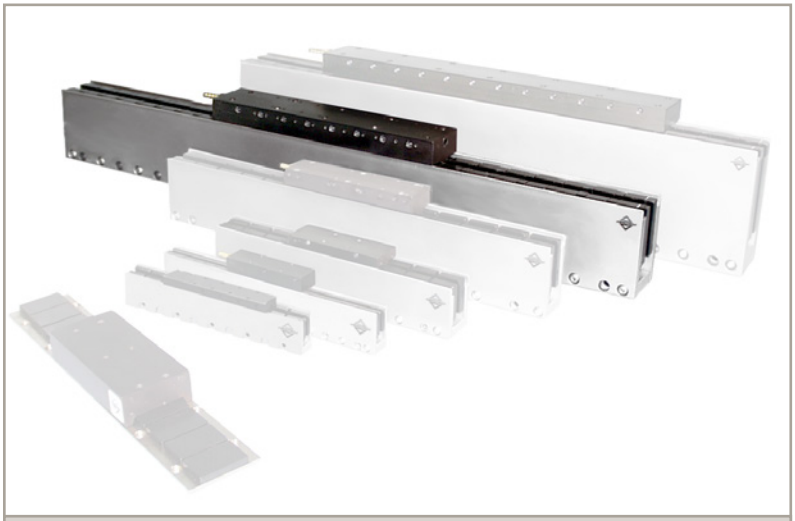
Follows the 2011/65/EU RoHS 2 Directive

The BLMH series "U-channel" brushless linear servomotors offer over 70% greater continuous output force in the same physical envelope than similar models from other manufacturers. BLMH series motors feature a high-efficiency magnetic circuit design that provides continuous force ratings to 548.8 N (123.4 lb) and peak forces to 2195 N (493.5 lb). This extremely high level of performance can be enhanced with special magnet options that increase force further, thereby lowering heat generation.

BLMH series linear motors are direct drive and consist of a noncontact forcer coil assembly with Hall-effect devices, a thermal sensor, and "U-channel" magnet track. This design eliminates magnetic attraction to allow for extremely smooth motion and very tight velocity and position control. In addition, backlash, windup, wear and maintenance issues associated with ball screws, belts, and rack and pinions are eliminated.

The BLMH 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 speeds with high loads. BLMH 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 industrial usage.

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



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

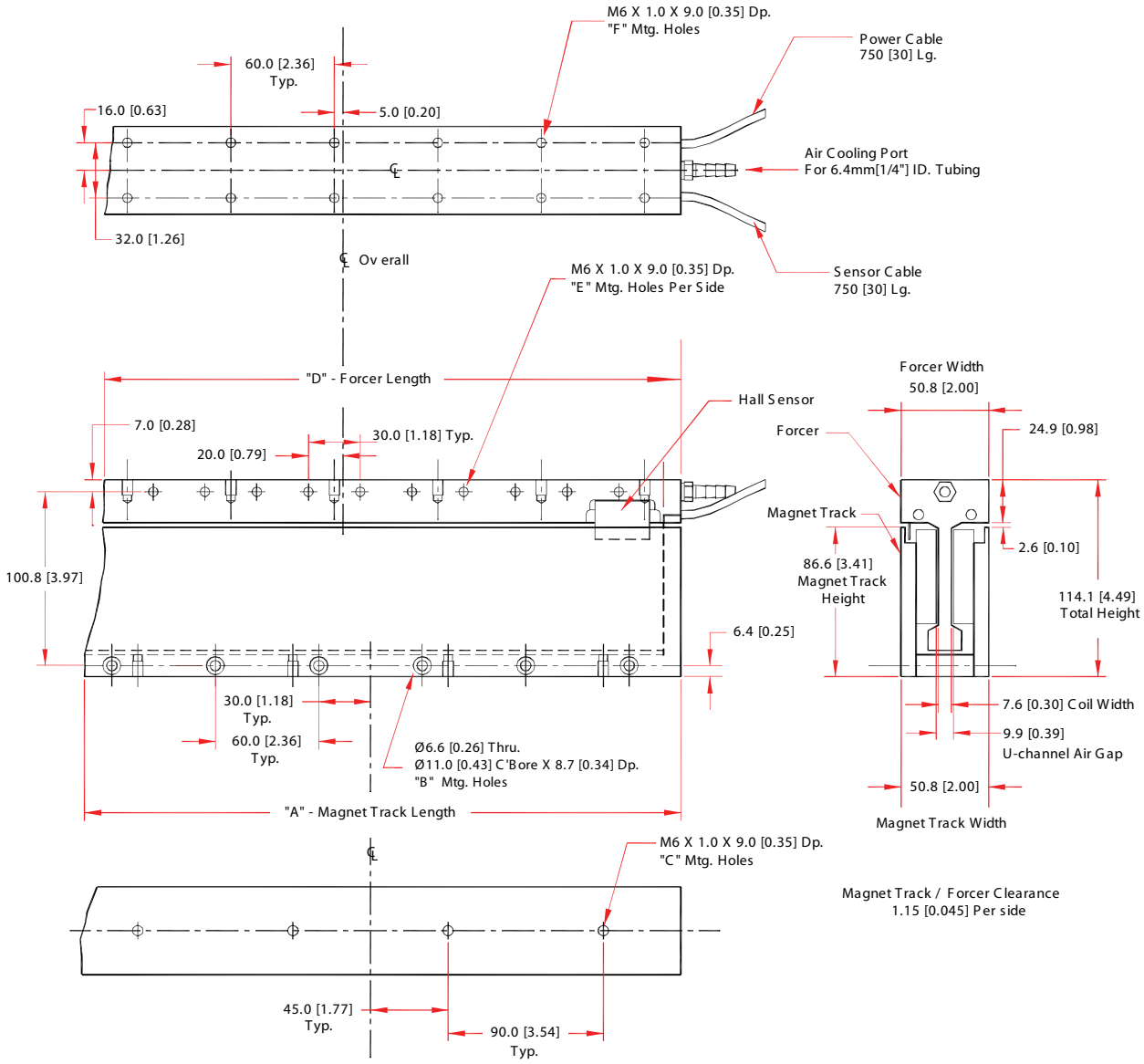
BLMH Series SPECIFICATIONS

Motor Model	Units	BLMH-142		BLMH-262		BLMH-382	
Performance Specifications(1,2)							
Continuous Force, 1.4 bar (20 psi)(3)	N (lb)	270.7 (60.9)		437.1 (98.3)		-A 435.8 (98.0)	-B (opt) 548.8 (123.4)
Continuous Force, No Forced Cooling(3)	N (lb)	150.0 (33.7)		266.2 (59.9)		357.9 (80.5)	
Peak Force(4)	N (lb)	1082.7 (243.4)		1748.6 (393.1)		2195.0 (493.5)	
Electrical Specifications(2)							
Winding Designation		-A	-B (opt)	-A	-B (opt)	-A	-B (opt)
BEMF Constant (Line-Line)	V/m/s (V/in/s)	32.11 (0.82)	64.22 (1.63)	64.42 (1.64)	128.85 (3.27)	45.71 (1.16)	91.42 (2.32)
Continuous Current,1.4 bar, 20 ps(3)	Amp_{pk} Amp_{rms}	9.69 6.85	4.85 3.43	7.80 5.52	3.90 2.76	10.96 7.75	6.90 4.88
Continuous Current, No Forced Cooling(3)	Amp_{pk} Amp_{rms}	5.37 3.80	2.69 1.90	4.75 3.36	2.38 1.68	9.00 6.36	4.50 3.18
Peak Current, Stall(4)	Amp_{pk} Amp_{rms}	38.76 27.41	19.38 13.70	31.20 22.06	15.60 11.03	55.20 39.03	27.60 19.52
Force Constant, Sine Drive(5,6)	N/Amp_{pk} (lb/Amp_{pk})	27.93 (6.28)	55.87 (12.56)	56.04 (12.60)	112.09 (25.20)	39.77 (8.94)	79.53 (17.88)
	N/Amp_{rms} (lb/Amp_{rms})	39.50 (8.88)	79.01 (17.76)	79.26 (17.82)	158.52 (35.64)	56.24 (12.64)	112.47 (25.29)
Motor Constant(3,5)	$N/\sqrt{W}$ $(lb/\sqrt{W})$	14.17 (3.19)		20.24 (4.55)		23.19 (5.21)	
Resistance, 25°C, (Line to Line)	ohms	3.7	14.8	7.3	29.2	2.8	11.2
Inductance (Line to Line)	mH	2.40	9.60	4.60	18.40	1.80	7.20
Thermal Resistance, 1.4 bar, 20 psi	°C/W	0.27		0.21		0.18	
Thermal Resistance, No Forced Cooling	°C/W	0.89		0.58		0.42	
Maximum Bus Voltage	VDC	340		340		340	
Mechanical Specifications							
Air Flow, 20 psi	m^3/s (SCFM)	$2.5x10^{-3}$ (5.3)		$2.8x10^{-3}$ (5.9)		$2.7x10^{-3}$ (5.8)	
Coil Weight	kg (lb)	1.10 (2.42)		2.10 (4.62)		3.10 (6.82)	
Coil Length	mm (in)	142.0 (5.59)		262.0 (10.31)		382.0 (15.04)	
Heat Sink	mm (in)	250x250x25 (10x10x1)		250x250x25 (10x10x1)		250x400x25 (10x16x1)	
Magnet Track Weight	kg/m (lb/ft)	20.4 (13.68)					
Magnet Pole Pitch	mm (in)	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.

BLMH linear motors are used in the high-performance Aerotech AGS15000 gantry system.

BLMH Series DIMENSIONS



Dimensions - millimeters [inches]

Magnet Track

Model No.	A	B	C
MTH240	240.0 [9.45]	4	2
MTH300	300.0 [11.81]	5	4
MTH360	360.0 [14.17]	6	4
MTH480	480.0 [18.90]	8	4
MTH600	600.0 [23.63]	10	6
MTH720	720.0 [28.35]	12	8

Forcer

Model No.	D	E	F
BLMH-142	152.0 [5.98]	4	6
BLMH-262	272.0 [10.71]	8	10
BLMH-382	392.0 [15.43]	12	14

BLMH Series ORDERING INFORMATION

BLMH Brushless Linear Servomotor

BLMH-142	Linear motor forcer with thermistor; 142 mm long
BLMH-262	Linear motor forcer with thermistor; 262 mm long
BLMH-382	Linear motor forcer with thermistor; 382 mm long

Winding Designation (Required)

-A	-A Winding

Note: Contact factory to inquire about or check availability of alternate winding options

Air Cooling (Required)

-NC	No air cooling fitting is installed
-AC	Includes air cooling fitting

Hall Effect Sensors (Required)

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

Preparation (Required)

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

Cable Length (Required)

-750	750 mm length high-flex cables
-5000	5.0 m length high-flex cables

Magnet Tracks (Optional)

MTH180P	“U” channel magnet track for use with BLMH-series forcers; 180 mm long
MTH210P	“U” channel magnet track for use with BLMH-series forcers; 210 mm long
MTH240P	“U” channel magnet track for use with BLMH-series forcers; 240 mm long
MTH300P	“U” channel magnet track for use with BLMH-series forcers; 300 mm long
MTH330P	“U” channel magnet track for use with BLMH-series forcers; 330 mm long
MTH360P	“U” channel magnet track for use with BLMH-series forcers; 360 mm long
MTH480P	“U” channel magnet track for use with BLMH-series forcers; 480 mm long
MTH600P	“U” channel magnet track for use with BLMH-series forcers; 600 mm long
MTH720P	“U” channel magnet track for use with BLMH-series forcers; 720 mm long
MTHxP	“U” channel magnet track for use with BLMH-series forcers; 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.