BLMUC Series

Linear Motors

Ultra-compact size for tight space constraints; 52.0 mm x 20.8 mm cross section

Continuous force to 58.0 N (13.0 lb); peak force to 231.8 N (52.1 lb)

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

Ideal for pick-and-place machines where Z-axis space is limited

Follows the 2011/65/EU RoHS 2 Directive

The BLMUC linear motor is an ultra-compact "U-channel" motor measuring only 52.0 mm x 20.8 mm in cross section, designed to provide high force in an ultra-compact package. The BLMUC is ideally suited for small load applications with tight space constraints such as a pick head on a pick-and-place machine, and low-mass, high-acceleration material handling machines.

The motor consists of a noncontact forcer coil assembly with Hall-effect devices, thermal sensor, and "U-channel" magnet track. This design eliminates backlash, windup, wear and maintenance issues associated with ball screws, belts, and rack and pinions.

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

The moving forcer coil assembly is a compact, reinforced ceramic epoxy structure. The ironless design eliminates cogging and eddy-current losses that otherwise would limit speed and produce additional heat. To produce the highest rms force, air cooling is standard.

These linear motors are ideal for any application that requires high levels of positioning resolution and accuracy. BLMUC 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 BLMUC can be driven using standard Aerotech brushless amplifiers and controllers to provide a complete integrated system.

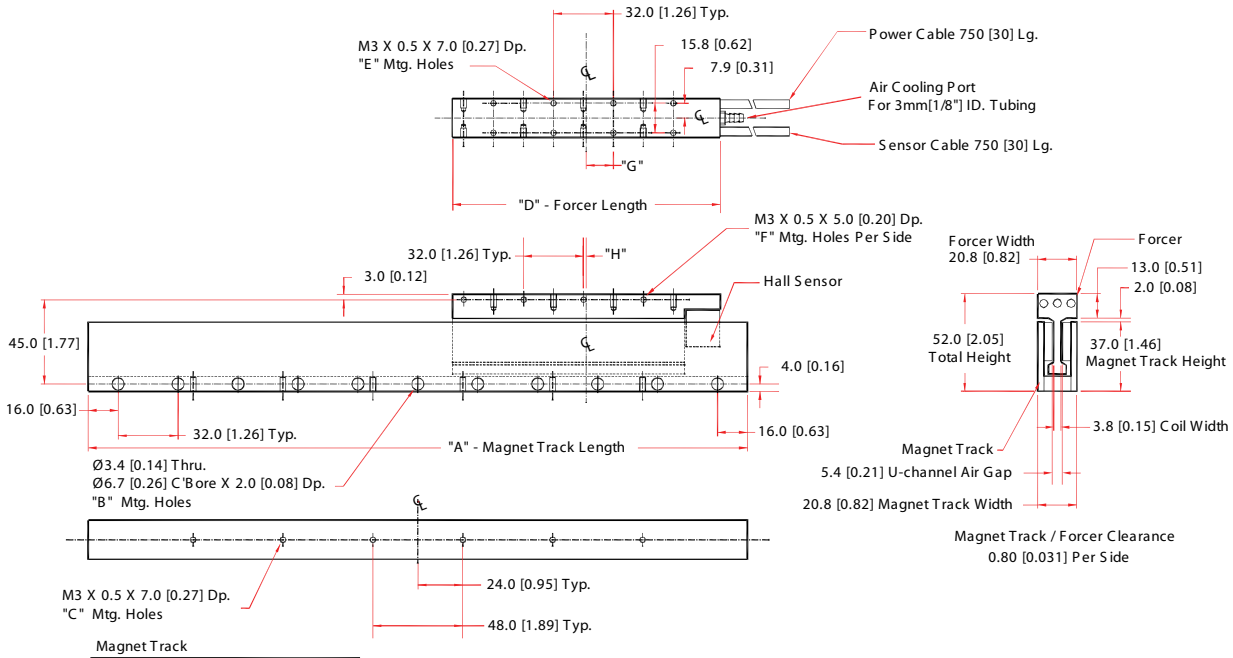
BLMUC Series SPECIFICATIONS

Motor Model	Units	BLMUC-79	BLMUC-95	BLMUC-111	BLMUC-143
Performance Specifications[1,2]					
Continuous Force, 1.4 bar (20 psi)[3]	N (lb)	31.4 (7.0)	40.5 (9.1)	46.9 (10.5)	58.0 (13.0)
Continuous Force, No Forced Cooling[3]	N (lb)	18.3 (4.1)	23.0 (5.2)	30.6 (6.9)	39.8 (9.0)
Peak Force[4]	N (lb)	125.4 (28.2)	161.9 (36.4)	187.6 (42.2)	231.8 (52.1)
Electrical Specifications[2]					
Winding Designation		-A	-A	-A	-A
BEMF Constant (line-line, max)	V/m/s (V/in/s)	6.80 (0.17)	9.00 (0.23)	11.35 (0.29)	15.90 (0.40)
Continuous Current, 1.4 bar (20 psi)[3]	Amp_{pk} Amp_{rms}	5.30 3.75	5.17 3.66	4.75 3.36	4.19 2.96
Continous Current, No Forced Cooling[3]	Amp_{pk} Amp_{rms}	3.10 2.19	2.94 2.08	3.10 2.19	2.88 2.04
Peak Current, Stall[4]	Amp_{pk} Amp_{rms}	21.20 14.99	20.68 14.62	19.00 13.44	16.76 11.85
Force Constant, Sine Drive[5,6]	N/Amp_{pk} (lb/Amp_{pk})	5.92 (1.33)	7.83 (1.76)	9.87 (2.22)	13.83 (3.11)
	N/Amp_{rms} (lb/Amp_{rms})	8.37 (1.88)	11.07 (2.49)	13.96 (3.14)	19.56 (4.40)
Motor Constant[3,5]	N/√W (lb/√W)	2.89 (0.65)	3.35 (0.75)	3.78 (0.85)	4.53 (1.02)
Resistance, 25° C, Line-Line	ohms	4.0	5.2	6.5	8.9
Inductance, Line-Line	mH	0.51	0.70	0.87	1.10
Thermal Resistance, 1.4 bar (20 psi)	°C/W	0.85	0.69	0.65	0.61
Thermal Resistance, No Forced Cooling	°C/W	2.48	2.12	1.52	1.29
Maximum Bus Voltage	VDC	340			
Mechanical Specifications					
Air Flow, 20 psi	m^3/s (SCFM)	$1.5x10^{-3}$ (3.12)	$1.5x10^{-3}$ (3.15)	$1.5x10^{-3}$ (3.22)	$1.5x10^{-3}$ (3.12)
Coil Weight	kg (lb)	0.10 (0.22)	0.12 (0.26)	0.14 (0.31)	0.20 (0.44)
Coil Length	mm (in)	80.0 (3.15)	96.0 (3.78)	112.0 (4.41)	144.0 (5.61)
Heat Sink	mm (in)	250x250x25 (10x10x1)	250x250x25 (10x10x1)	250x250x25 (10x10x1)	250x250x25 (10x10x1)
Magnet Track Weight	kg/m (lb/ft)	3.33 (2.23)			
Magnet Pole Pitch	mm (in)	16.00 (0.63)	16.00 (0.63)	16.00 (0.63)	16.00 (0.63)
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 force 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.

The Planar$_{DL}$-200XY linear motor is used in Aerotech's high-performance ALS130 positioning stage.

BLMUC Series DIMENSIONS



Magnet Track

Model No.	A	B	C
MTUC64	64.0 [2.52]	2	0
MTUC96	96.0 [3.80]	3	2
MTUC128	128.0 [5.04]	4	2
MTUC160	160.0 [6.30]	5	2
MTUC192	192.0 [7.56]	6	4
MTUC224	224.0 [8.82]	7	4
MTUC256	256.0 [10.08]	8	4
MTUC288	288.0 [11.34]	9	6
MTUC352	352.0 [13.86]	11	6
MTUC416	416.0 [16.38]	13	8

Dimensions - millimeters [inches]

Forcer

Model No.	D	E	F	G	H
BLMUC-79	80.0 [3.15]	4	2	14.0 [0.55]	2.0 [0.08]
BLMUC-95	96.0 [3.78]	6	2	22.0 [0.87]	26.0 [1.02]
BLMUC-111	112.0 [4.41]	6	3	30.0 [1.18]	18.0 [0.71]
BLMUC-143	144.0 [5.67]	8	4	14.0 [0.55]	2.0 [0.08]

BLMUC Series ORDERING INFORMATION

BLMUC Brushless Linear Servomotor

BLMUC-79	Linear motor forcer with thermistor
BLMUC-95	Linear motor forcer with thermistor
BLMUC-111	Linear motor forcer with thermistor
BLMUC-143	Linear motor forcer with thermistor

Winding Designation (Required)	Description
-A	76 cm (2.5 ft) flying leads (standard)

Air Cooling (Required)	Description
-NC	No air cooling fitting is installed
-AC	Includes air cooling fitting

Hall Effect Sensors (Required)	Description
-H	Hall effect sensors included
-NH	No hall effect sensors included

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

Cable Length (Required)	Description
-750	750 mm length high-flex cables
-5000	5.0 m length high-flex cables

Magnet Tracks (Optional)	Description
MTUC64P	“U” channel magnet track for use with BLMUC-series forcers, 64 mm long
MTUC96P	“U” channel magnet track for use with BLMUC-series forcers, 96 mm long
MTUC112P	“U” channel magnet track for use with BLMUC-series forcers, 112 mm long
MTUC128P	“U” channel magnet track for use with BLMUC-series forcers, 128 mm long
MTUC144P	“U” channel magnet track for use with BLMUC-series forcers, 144 mm long
MTUC160P	“U” channel magnet track for use with BLMUC-series forcers, 160 mm long
MTUC192P	“U” channel magnet track for use with BLMUC-series forcers, 192 mm long
MTUC224P	“U” channel magnet track for use with BLMUC-series forcers, 224 mm long
MTUC256P	“U” channel magnet track for use with BLMUC-series forcers, 256 mm long
MTUC288P	“U” channel magnet track for use with BLMUC-series forcers, 288 mm long
MTUC352P	“U” channel magnet track for use with BLMUC-series forcers, 352 mm long
MTUC400P	“U” channel magnet track for use with BLMUC-series forcers, 400 mm long
MTUC416P	“U” channel magnet track for use with BLMUC-series forcers, 416 mm long
MTUCxP	“U” channel magnet track for use with BLMUC-series forcers, custom length
MTUC64S	“U” channel magnet track for use with BLMUC-series forcers, 64 mm long
MTUC96S	“U” channel magnet track for use with BLMUC-series forcers, 96 mm long
MTUC112S	“U” channel magnet track for use with BLMUC-series forcers, 112 mm long
MTUC128S	“U” channel magnet track for use with BLMUC-series forcers, 128 mm long
MTUC144S	“U” channel magnet track for use with BLMUC-series forcers, 144 mm long
MTUC160S	“U” channel magnet track for use with BLMUC-series forcers, 160 mm long
MTUC192S	“U” channel magnet track for use with BLMUC-series forcers, 192 mm long
MTUC224S	“U” channel magnet track for use with BLMUC-series forcers, 224 mm long
MTUC256S	“U” channel magnet track for use with BLMUC-series forcers, 256 mm long
MTUC288S	“U” channel magnet track for use with BLMUC-series forcers, 288 mm long
MTUC352S	“U” channel magnet track for use with BLMUC-series forcers, 352 mm long
MTUC400S	“U” channel magnet track for use with BLMUC-series forcers, 400 mm long
MTUC416S	“U” channel magnet track for use with BLMUC-series forcers, 416 mm long
MTUCxS	“U” channel magnet track for use with BLMUC-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. Magnet track numbers ending with “S” are standard performance grade, including magnets on a single side of the track.

BLMUC Series ORDERING INFORMATION

Integration

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. This is typically used for spare parts, replacement parts, or items that will not be used or shipped together (ex: stage only). These components may or may not be part of a larger system.