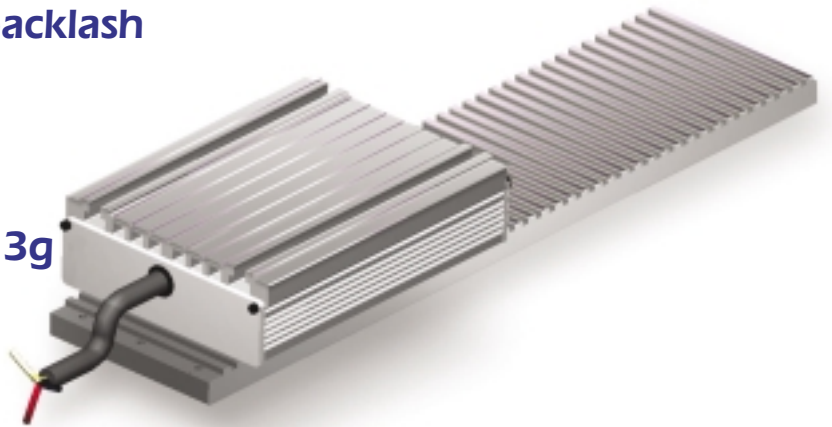


HyCore™ 10

Hybrid Core Linear Motor

- Affordable linear motor
- Accurate positioning
- High performance - zero backlash
- Very fast - speeds to 1.5m/sec (60 inches/sec)
- High accelerations - up to 3g
- High peak forces to 800N



Baldor has redefined linear motors with a technological breakthrough. Baldor's new HyCore™ motor combines the best features and performance of traditional high speed, high force, closed loop brushless linear servo motors, with the cost advantages of open loop linear stepper motor technology. HyCore™ includes benefits, which linear motors bring to an application: zero backlash; high efficiency; unlimited travel; fast velocities and high accelerations.

Linear motors consist of two parts – a stationary "platen" and a moving "forcer". Baldor's unique HyCore™ contains no magnets on the stationary platen, thus it can easily be cut to length to suit the application. This also includes the benefit of not attracting metal particles.

The HyCore™ "forcer" consists of a three phase servo motor winding. It is controlled via closed loop using feedback from an external encoder. This provides benefits of higher performance, higher forces, and improved accuracy.

Baldor's new HyCore™ provides the highest forces per cost of any linear design available in the marketplace. Additionally, the continuous force capability can be extended by 20% with air cooling, increasing value further.

HyCore™ is extremely cost effective in applications requiring long stroke or high continuous duty. It has been designed to replace ball screw and belt/pulley actuators in many applications.

Baldor's range of *FlexDrive™*, *MintDrive™*, and MicroFlex controls are ideally matched to the HyCore™ motor, offering the highest performance.

Baldor is able to offer a complete range of motion control components including rotary servo motors, programmable motion controllers, servo drives and programmable servo drives.

Contact Baldor today and find out how HyCore™ can increase the performance of your machine.

Applications:

- In place of ballscrews or belts and pulleys
- Inspection
- Imaging
- Pick and place
- Transfer
- Load and unload

HyCore Design Specifications

- Velocities to 1.5 m/s (60 ips)
- Accelerations to 3g
- Peak forces to 800 N (180 lbs)
- Continuous force to 465 N (105 lbs)
- Low velocity ripple
- Unlimited travels >100m (4000 inch)
- Large air gap .25-.75mm (0.01 - 0.03 inch)
- Rapid settling times
- Compatible with existing drives

Feature/Customer benefits of Baldor’s HyCore Motor...

- Highly efficient – provides higher forces with an overall smaller electrical load
- Modular design – quick for you to assemble, saving time and money
- Large air gap – for simplicity during assembly, making your job easier
- Stationary "platen" without magnets – no attraction of loose metal particles
- Quick move-and-settle time – improves machine accuracy, repeatability and throughput
- Compact package – allows machine designers to work with smaller footprint which easily fits
- Accuracy and repeatability of close loop packages – to improve machines’ quality and reliability
- Optional forced air cooling – increases force up to 20% additional capability

Selecting HyCore™ motors

In linear applications, motors are defined and selected based upon continuous force (defined as force which will not overheat the motor = Fcont) and peak force (acceleration force = Fpeak). From speed, acceleration time and moving mass, acceleration and continuous forces are determined for the application:

$$F_{peak} = \text{mass} \times \text{speed/accel time} = \text{mass} \times \text{acceleration rate, and}$$

$$F_{cont} = \text{accel force} \times \text{duty cycle}$$

These forces are then used along with "force-airgap" and "force-speed" curves to select a motor based upon the dynamic performance .

The "force-airgap" (Fn) and "force-speed" (Fs) curves take linear motor parameters into consideration in the selection process (i.e. airgap, back-emf, efficiency, and inductance, etc). These considerations are based upon 230 VAC input drives. Consult the factory for other voltages.

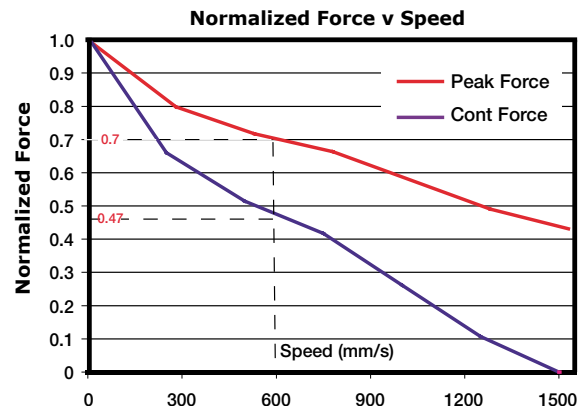
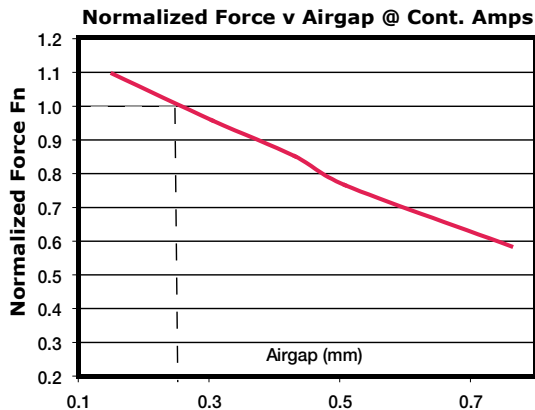
To understand how to use the curves, consider an application which requires a slew speed of 600mm/s (24ips) with Fpeak = 160N (35lbs) and Fcont = 90N (20lbs). From the "force-airgap" curve with a typical airgap, Fn is determined to be equal to 1. From the "force-speed" curve with a speed of 600 mm/s, Fs is determined to be equal to 0.47 for continuous and 0.7 for peak force.

Therefore the motor selected must deliver forces of at least

$$F_{normalized\ peak} = (F_{peak}) / (F_n \times F_s) = 160/(1)(0.7) = 229N (51lbs)$$

$$F_{normalized\ cont} = (F_{cont}) / (F_n \times F_s) = 90/(1)(0.47) = 190N (43lbs)$$

Reviewing the table of technical motor data, it can be determined that the LMHS10B-6C0A with a Fcont = 209N (47 lbs) and Fpeak = 289N (65 lbs) would be adequate for the application.

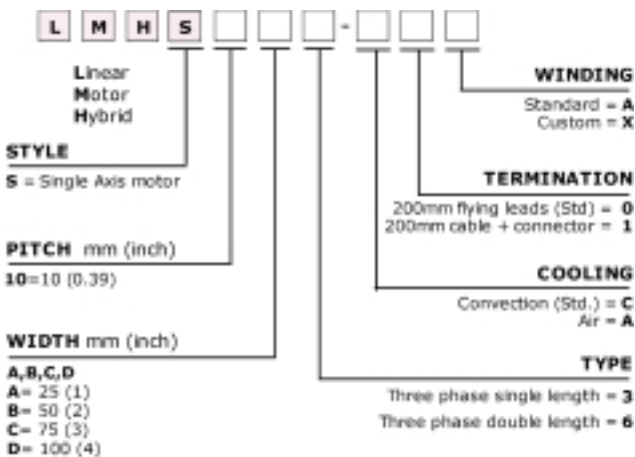


Technical Data - Three phase 10mm pitch motors

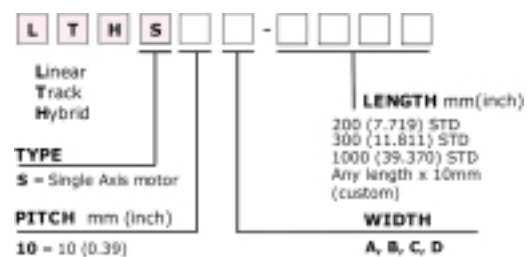
	UNITS	LMHS10A-3COA	LMHS10B-3COA	LMHS10C-3COA	LMHS10B-6COA	LMHS10D-3COA	LMHS10C-6COA	LMHS10D-6COA
Performance:								
Continuous Force Fc	N (Lbs)	53 (11.8)	105 (23.5)	158 (35)	209 (47)	209 (47)	316 (71)	418 (94)
Peak Force @70% Duty FP	N (Lbs)	73 (16.3)	145 (32.5)	215 (48)	289 (65)	289 (65)	431 (97)	578 (130)
Peak Force @10% Duty FP	N (Lbs)	95 (21.5)	189 (42.5)	283 (64)	378 (85)	378 (85)	567 (128)	756 (170)
Motor Constant Km	N/√W (Lb/√W)	9.1 (2.04)	15.3 (3.4)	19 (4.3)	21.6 (4.85)	22.3 (5)	27 (6.1)	31.6 (7.1)
Continuous Power Pc	Watts	34	47	69	94	88	138	175
Attractive Force Fa	N (Lbs)	142 (32)	284 (64)	426 (96)	567 (127)	567 (127)	851 (191)	1134 (255)
Electrical (phase to phase):								
Continuous Current Ic	Amps RMS	2.5	2.5	5	5	5	10	10
Peak Current @ 70% Duty	Amps RMS	3.75	3.75	7.5	7.5	7.5	15	15
Peak Current @ 10% Duty Ip	Amps RMS	7.5	7.5	15	15	15	30	30
Force Constant @ 100% DC Kf	N/A (Lbs/A)	21 (4.7)	41.8 (9.4)	31.6 (7.1)	41.8 (9.4)	41.8 (9.4)	31.6 (7.1)	41.8 (9.4)
B _{EMF} Constant K _{emf} (p-p)	V/in/s (V/m/s)	0.53 (21)	1.05 (41.8)	0.8 (31.6)	1.05 (41.8)	1.05 (41.8)	0.8 (31.6)	1.05 (41.8)
Resistance @ 25°C R _(p-p)	Ohms	2.2	3.0	1.2	1.5	1.4	0.6	0.7
Inductance L _(p-p)	mH	10	20	7.6	10	10	3.8	5.0
Electrical Time Const. Kt	ms	4.5	6.7	6.3	6.7	7.1	6.3	7.1
Mechanical:								
Primary Mass M _p	Kg (Lbs)	1.43 (3.2)	2.85 (6.3)	4.4 (9.6)	5.7 (12.5)	5.7 (12.5)	8.7 (19.2)	11.4 (25)
Secondary Mass M _s	Kg/m (Lbs/in)	1.3 (0.075)	2.6 (0.15)	4 (0.22)	2.6 (0.15)	5.1 (0.28)	4 (0.22)	5.1 (0.28)
Thermal Resistance T _r	W/deg C	0.42	0.375	0.55	0.75	0.7	1.1	1.4
Max. Coil Temp T _{max}	°C	125	125	125	125	125	125	125

Ordering Information:

Catalog Number - Primary (forcer)



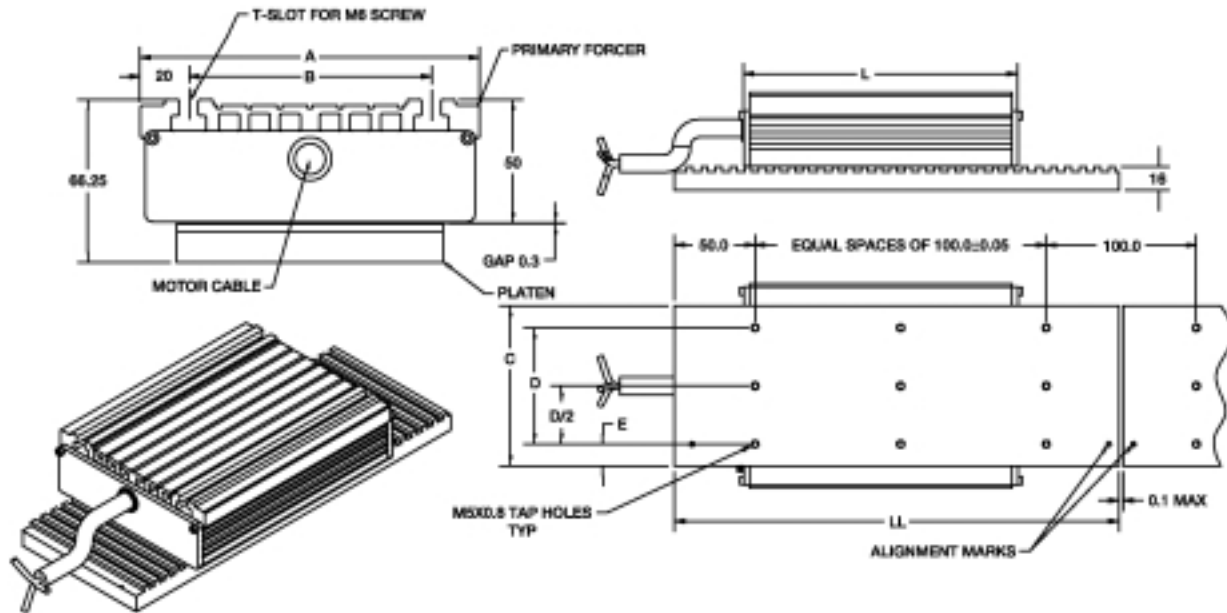
Catalog Number - Secondary (Platen)



Notes:

1. The platen is available in modular lengths as above or as custom single pieces up to 3m.
2. Platen can be ordered wider than forcer i.e. C platen with a B forcer, but not narrower

Mechanical Dimensions LMHS10 Series HyCore™ Motor Units = mm



Primary forcer dimensions (mm)

Platen dimensions (mm)

Catalog No.	A	B	L	C	D	E
LMHS10A-3COA	64	25	188	30	-	15
LMHS10B-3COA	90	50	188	55	25	15
LMHS10B-6COA	90	50	358	55	25	15
LMHS10C-3COA	115	75	188	80	50	15
LMHS10C-6COA	115	75	358	80	50	15
LMHS10D-3COA	140	100	188	110	80	15
LMHS10D-6COA	140	100	358	110	80	15

Platen Lengths (mm)

Catalog No.	LL
LTHS10X-0200	200
LTHS10X-0300	300
LTHS10X-1000	1000

Baldor's Motion Products

Baldor's product range offers powerful solutions for motion control for OEMs and machine builders. Every controller is compatible with Baldor's powerful easy to use Mint programming language, this development environment for applications boosts development flexibility and speed. Products share common keywords—the same whether programming in MintMT, 'C' or Windows—providing a versatile and cost saving platform.

Contact Baldor today for more information on:

- Rack mounted and PCibus motion controllers
- Standalone motion controllers
- Rotary and linear servo motors
- Rotary and linear controls

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