

# Linear Induction Motor



<b>Travel</b>	Unlimited	Unlimited
<b>Velocity</b>	1800 in/sec	45 m/sec
<b>Acceleration</b>	5 g's	5 g's
<b>Peak Force</b>	214 lbs	[950 N]
<b>Continuous Force</b>	43 lbs	[190 N]

## What Is A Linear Induction Motor?

A Linear Induction Motor (LIM) is a non-contacting, high speed, linear motor that operates on the same principal as a rotary, squirrel cage, induction motor. They are capable of speeds up to 1800 in/sec [45 m/s] and are typically used in applications where accurate positioning is not required. LIM's can also be operated at stall to produce static thrust

The 3-phase coil assembly can be directly connected to the AC line for single speed applications or to an adjustable frequency drive for precise variable control of the speed of the motor. The motors are reversible and can also be dynamically braked.

The laminated coil assembly (shown above) is used in conjunction with a customer supplied aluminum and steel reaction plate to produce a force. A customer supplied bearing system is required to maintain the .040" - .060" [1 - 1.5 mm] air gap between the coil assembly and the reaction plate. The length of the reaction plate is equal to the coil length plus the stroke.

The amount of thrust produced by the LIM is proportional to the active surface area of the motor.

There is an attractive force between the coil assembly and the steel in the reaction plate only when power is applied to the coil assembly.

Multiple coil assemblies can be used together to produce larger forces.

If the reaction plate is a disc, then rotary motion can be produced.

Either the LIM or the reaction plate can move while the other is fixed.

In hostile environments a non-magnetic stainless steel barrier can be used between coil assembly and the reaction plate to provide a seal.

## Advantages:

- Only 2 parts
- Wide speed range
- No Maintenance
- Non-contact
- Ease of Control and Installation

## Applications:

- Conveying Systems
- Cranes Drives
- Baggage Handling
- Vision Inspection Equipment
- Personal Rapid Transport Systems
- Theme Park Rides

## The LIM consists of 2 main components;

- **3 Phase Coil Assembly:** The coil assembly is comprised of a 3-phase winding that is wound and inserted into a steel lamination stack with thermal protection devices. The entire assembly is then encapsulated with thermally conductive epoxy. Steel Angles with mounting holes are provided for mounting the coil assembly to the customers system. The coil assembly is available in many different widths and lengths, to meet the customers force and packaging requirements. The coil assembly can be used in a *single sided* or *double-sided* configuration. The single sided configuration consists of a single coil assembly that is used in conjunction with an aluminum plate backed by a steel reaction plate. The double-sided configuration is where 2 coil assemblies are facing each other, separated by a gap of .25" [6 mm] and only an aluminum reaction plate passes thru the gap. Multiple coil assemblies can be used together to produce larger forces. The standard sizes for the coil assemblies are shown on the following page.
- **Reaction Plate:** The customer supplied reaction plate is required for proper operation of the LIM. The reaction plate is made up of standard, readily available 1018 steel, aluminum, and / or copper. For *single sided* operation, the required reaction plate consists of a .125" [3 mm] thick aluminum or a .080" [2 mm] thick copper plate that is backed by a .25" [6 mm] thick ferrous steel plate. The steel plate can be omitted but the force will be dramatically reduced. For *double-sided* operation only a conductive plate of copper or aluminum is required.



**Required Electronics:**

A 3-phase AC voltage directly from the line, an adjustable frequency supply, or a vector drive can be used to drive the LIM. The LIMs can be supplied for single phase AC, but the result is a less efficient motor. All standard voltages are available; 220, 380, 400, 415, 460, 600 @ 50 / 60 Hz. The speed of the LIM is proportional to the input frequency (which can be variable) and the pole pitch of the lamination stack (which is fixed). Connecting directly to the AC line at 50 or 60 Hz will produce a constant linear speed. Using an adjustable frequency drive (or inverter) will allow speeds as slow as 6 in/sec [0.15 m/s] and as fast as 1800 in/sec [45 m/s] at 400 Hz.

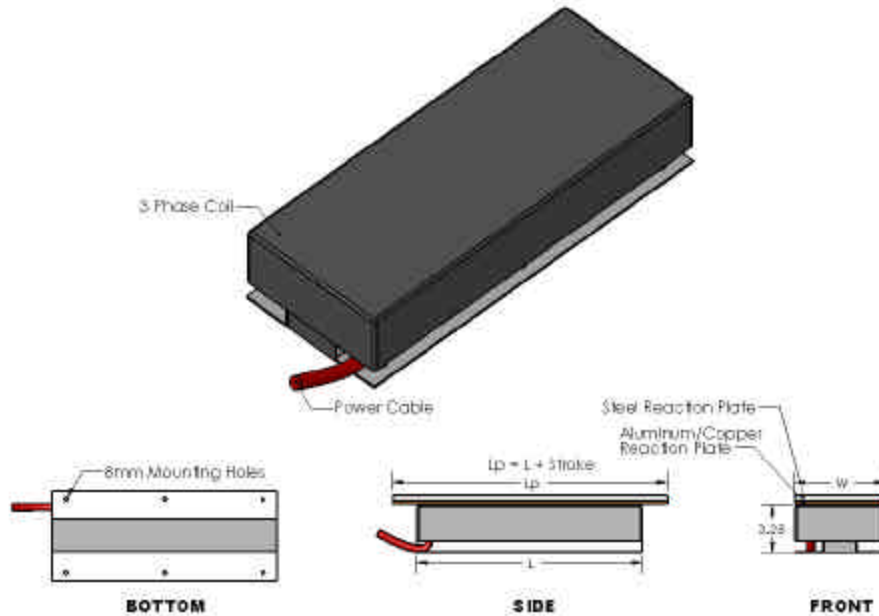
**Mounting:**

There are thru holes in the angles of the coil assembly for mounting to the customers system.

**Ordering Info:**

Individual LIM's can be ordered for any peak force up to 214 lbs [950 N]. Higher forces can be achieved by adding additional coil assemblies in series.

**Single Sided LIM**



Model #	Fc		Fp		Ic	Ip	L		W		Weight	
	lbs	[N]	lbs	[N]			In	[mm]	In	[mm]	Lbs	[Kg]
LMA-03-020	4	[18]	20	[90]	0.6	3.0	6.9	[175]	5.5	[140]	13	[6]
LMA-05-030	6	[27]	30	[135]	0.9	4.5	11.0	[280]	5.5	[140]	22	[10]
LMB-03-026	5	[23]	26	[115]	0.7	3.5	6.9	[175]	6.3	[160]	17	[8]
LMB-05-038	8	[34]	38	[170]	1.0	5.0	11.0	[280]	6.3	[160]	28	[13]
LMB-07-051	10	[45]	51	[225]	1.4	7.0	15.4	[390]	6.3	[160]	40	[18]
LMC-07-066	13	[59]	66	[295]	1.7	8.5	15.4	[390]	7.5	[190]	51	[23]
LMC-09-081	16	[72]	81	[360]	2.1	10.5	19.7	[500]	7.5	[190]	66	[30]
LMD-09-101	20	[90]	101	[450]	2.6	13.0	19.7	[500]	8.7	[220]	82	[37]
LMD-11-118	24	[105]	118	[525]	3.0	15.0	23.8	[605]	8.7	[220]	100	[45]
LMD-14-143	29	[127]	143	[635]	3.7	18.5	28.0	[710]	8.7	[220]	117	[53]
LME-14-164	33	[146]	164	[730]	4.2	21.0	28.0	[710]	9.8	[250]	139	[63]
LME-16-189	38	[168]	189	[840]	4.8	24.0	32.3	[820]	9.8	[250]	161	[73]
LME-18-214	43	[190]	214	[950]	5.4	27.0	36.4	[925]	9.8	[250]	183	[83]

Fc= Continuous Force @ 460V 3 phase @ 100% Duty, Fp = Peak Force @ 460V 3 phase @ 20% Duty  
 Ic = Continuous Current @ 460V 3 phase @ 100% Duty, Ip = Peak Current @ 460V 3 phase @ 20 % Duty

Model # LMX-AA-BBB

where: X is the width from A to E

AA is the number of poles

BBB is the Peak Force (Fp) in lbs

(i.e. LMC-09-081 is 7.5" wide Linear Induction Motor with 9 poles and a Peak Force of 81 lbs)