LEM Brushless Linear Motor

Product Features

- Low force, epoxy core
- Integrated cooling for high duty cycle
- No cogging, no magnetic attraction
- Miniature design
- Ideal for high precision/smooth motion

Specifications

Performance Parameters	Symbol	Units	LEM-S-1			LEM-S-2-S			LEM-S-3-S			LEM-S-4-S		
Cooling Method			**NC**	**AC**	**WC**	**NC**	**AC**	**WC**	**NC**	**AC**	**WC**	**NC**	**AC**	**WC**
Continuous Force [1, 5, 6, 7]	F_{cTmax}	**N (lb$_f$)**	26 (6)	31 (7)	33 (7)	52 (12)	61 (14)	66 (15)	75 (17)	87 (20)	95 (21)	96 (22)	113 (25)	121 (27)
Peak Force [2]	F_p	**N (lb$_f$)**	83 (19)	83 (19)	83 (19)	165 (37)	165 (37)	165 (37)	238 (53)	238 (53)	238 (53)	302 (68)	302 (68)	302 (68)
Motor Constant [1]	K_M	**N/$\sqrt{W}$ (lb$_f$/$\sqrt{W}$)**	3.9 (0.9)	3.9 (0.9)	3.9 (0.9)	5.8 (1.3)	5.8 (1.3)	5.8 (1.3)	7.1 (1.6)	7.1 (1.6)	7.1 (1.6)	8.2 (1.8)	8.2 (1.8)	8.2 (1.8)
Thermal Resistance	R_{th}	**°C/W**	2.22	1.63	1.39	1.22	0.90	0.78	0.89	0.66	0.56	0.73	0.53	0.46
Max Power Dissipation	P_{cTmax}	**W**	45	62	72	82	111	129	113	152	177	136	190	217
Maximum Applied Bus Voltage	V_{DC}	**Volts**	325			325			325			325		
Electrical Cycle Length	E_c	**mm**	30			30			30			30		
Electrical Time Constant	τ_e	**msec**	0.5			0.5			0.5			0.5		
Maximum Coil Temperature	T_{max}	**°C**	125			125			125			125		
Force Constant [1, 8]	K_F	**N/A_{pk} (lb$_f$/A_{pk})**	5.3 (1.2)	5.3 (1.2)	5.3 (1.2)	11.0 (2.5)	11.0 (2.5)	11.0 (2.5)	16.7 (3.7)	16.7 (3.7)	16.7 (3.7)	22.2 (5.0)	22.2 (5.0)	22.2 (5.0)
Back EMF Constant p-p [3, 4, 8]	K_e	**V_p/m/s (V_p/in/s)**	6.3 (0.16)	6.3 (0.16)	6.3 (0.16)	13.0 (0.33)	13.0 (0.33)	13.0 (0.33)	19.7 (0.50)	19.7 (0.50)	19.7 (0.50)	26.3 (0.67)	26.3 (0.67)	26.3 (0.67)
Peak Current [1, 4]	I_p	**A_{pk} (A_{rms})**	15.6 (11.0)	15.6 (11.0)	15.6 (11.0)	15.0 (10.6)	15.0 (10.6)	15.0 (10.6)	14.3 (10.1)	14.3 (10.1)	14.3 (10.1)	13.6 (9.6)	13.6 (9.6)	13.6 (9.6)
Continuous Current [1, 4, 5, 6]	I_{cTmax}	**A_{pk} (A_{rms})**	4.9 (3.5)	5.8 (4.1)	6.3 (4.4)	4.8 (3.4)	5.5 (3.9)	6.0 (4.2)	4.5 (3.2)	5.2 (3.7)	5.7 (4.0)	4.3 (3.1)	5.1 (3.6)	5.4 (3.9)
Resistance p-p [3, 8] **@25°C**	R_{25}	**ohm**	1.8			3.5			5.3			7.1		
Inductance p-p [3]	L	**mH**	0.9			1.8			2.7			3.6		
Mechanical Parameters														
Magnetic Attraction	F_a	**N (lb$_f$)**	0 (0)			0 (0)			0 (0)			0 (0)		
Coil Mass [5]	M_c	**kg (lb$_m$)**	0.2 (0.3)	0.2 (0.3)	0.2 (0.3)	0.3 (0.7)	0.3 (0.7)	0.3 (0.7)	0.5 (1.0)	0.5 (1.0)	0.5 (1.0)	0.6 (1.4)	0.6 (1.4)	0.6 (1.4)
Magnetic Track Mass	M_n	**kg/m (lb/in)**	5.2 (0.29)			5.2 (0.29)			5.2 (0.29)			5.2 (0.29)		
Cooling Flow Rate	Q	**LPM (SCFM/GPM)**	n/a (n/a)	113.0 (3.9)	4.0 (1.1)	n/a (n/a)	108.0 (3.7)	4.0 (1.1)	n/a (n/a)	102.0 (3.5)	4.0 (1.1)	n/a (n/a)	93.0 (3.0)	4.0 (1.1)
Cooling Supply Pressure	P	**kPa (PSIG)**	n/a (n/a)	207 (30)	179 (26)	n/a (n/a)	207 (30)	193 (28)	n/a (n/a)	207 (30)	207 (30)	n/a (n/a)	207 (30)	276 (40)

Notes: Motor performance specifications are with sinusoidal commutation.

[1] Continuous forces, motor constant and currents listed are with coils at maximum temperature 125°C, mounted to a 254 x 254 x 25.4 mm (10" x 10" x 1") aluminum heat sink on top of coil, and at 25°C ambient.

[2] Max on time 1 sec,. assuming correct rms Force and Current, consult Anorad.

[3] All winding parameters listed are measured line-to-line (phase-to-phase).

[4] All currents and voltages listed are measured 0-peak of the sine wave unless noted rms.

[5] Continuous forces and currents are also based on coil moving with all phases sharing the same load in sinusoidal commutation.

[6] For stand still conditions multiply continuous force and continuous current by 0.9.

[7] Coil mountings on either of the two narrow sides reduces continuous force by 20%.

[8] All specifications are ±10%.