

C-Series Ironless Linear Motors

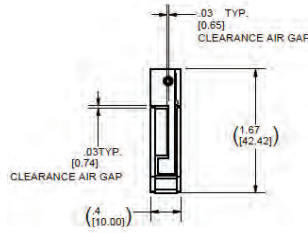
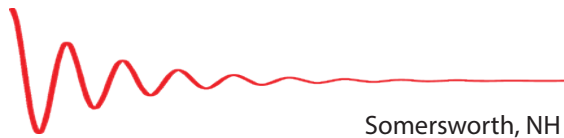
Low Profile C-Series



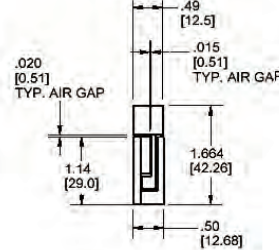
The Airex Advantage - High Density Coils

- Linear Motor force is produced by the interaction of the fixed field created by permanent magnets and the current flowing through each conductor in the coil (Lorentz Force).
- The concept is simple...more conductors equals more force...and that means faster acceleration and a more responsive linear motion system.
- Conventional linear motor coils are "bobbin wound" resulting in less active copper.
- Airex achieves the highest coil density in the industry through a proprietary winding design and process perfected over 20 years.
- Airex Ironless Linear Motors produce 20-60% more force per mm of coil length.
- If you care about performance, let the Airex Advantage empower your success.

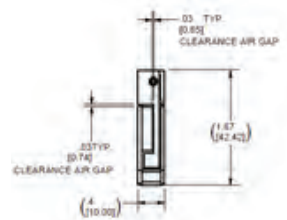
POWERED BY INNOVATION



C10 Coil and Magnet Track Assembly



C12 Coil and Magnet Track Assembly



C16 Coil and Magnet Track Assembly

Order your Airex Linear Motor with the part numbers as described below. A complete motor consists of a Linear Motor Coil (LMC) and one or more Linear Motor Magnet Tracks (LMDT), each ordered separately. Magnet Tracks can be assembled end to end to achieve desired travel length.

LINEAR MOTOR COIL	MOTOR SERIES	# OF POLES	COMMUTATION	INTERNAL CONNECTION	CABLE LENGTH	THERMAL DEVICE
L M C	- P 1 2	- 1	3	S	72	P
LMC	C10 C12 C16 P12 P15 P16 P20	1 - 4 1 - 4 1 - 4 1 - 4 1 - 5 1 - 5 1 - 6	1 = coil only 3 = coil with 120° Hall Effect Device	** Y or D = C series only S = series connection P=parallel Connection *D=double parallel	72 = 72" (1.8 m) Standard	X = none L/F = NC/NO thermostat (P15 & P20) N/P = Negative/Positive temperature coefficient thermistor (standard) C = temperature to current thermistor

LINEAR MOTOR TRACK	MOTOR SERIES	TRACK LENGTH	MAGNET	PROFILE
L M D T	- P 1 2	- 12 . 0	F	S
LMDT- For P series LMST- For C series	C10 C12 C16 P12 P15 P16 P20	Length in inches (i.e. 12.0 = 12.0") C10,C12, C16,P12,P15 & P16 have 1.20" [30.5 mm] increments P20 has 2.40" [61.0 mm] increments	F = standard for C12, P12,P15 & P16 B = standard for P20 series	S = standard



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C10 Series Connected Coil Performance Specification (V3.61) Rev.B							
General and 6 Lead Motor Specifications	UNITS	Dash #	0.5	1	2	3	4
Force Constant	lbf/A		0.3	0.6	1.3	1.9	2.5
	N/A		1.4	2.8	5.6	8.4	11.2
Max Operating Temperature	°C		130	130	130	130	130
Maximum Temp. Rise	°C		110	110	110	110	110
Coil Resistance (6 lead @ 25°C)	Ω		2.05	4.09	8.18	12.28	16.37
Coil Resistance (6 lead @ Max. °C)	Ω		2.9	5.9	11.7	17.6	23.5
Inductance @ 1kHz	mH		0.3	0.5	1.1	1.6	2.2
Thermal Resistance	°C/W		4.00	2.00	1.00	0.67	0.50
Continuous Power std. Mount (Max. °C)	W		28	55	110	165	220
Continuous Power, mounted to plate**(Max. °C)	W		19.8	33.6	61.16	84.02	106.25
Motor Constant	lbf/sqrt(W)		0.2	0.3	0.4	0.4	0.5
	N/sqrt(W)		0.80	1.13	1.60	1.96	2.27
Peak Power (Max. °C, 10% Duty) ***	W		275	550	1100	1650	2200
Back EMF Constant	V/inch/s		0.04	0.07	0.14	0.21	0.28
	V/m/s		1.4	2.8	5.6	8.4	11.2
Electrical Time Constant (@ 25°C)	ms		0.13	0.13	0.13	0.13	0.13
(@ 130°C)	ms		0.09	0.09	0.09	0.09	0.09
Maximum Line to Line Voltage	Vrms & DC		250	250	250	250	250
Coil Weight	Pounds		0.02	0.05	0.10	0.16	0.21
	Kilograms		0.01	0.02	0.05	0.07	0.10
Coil length (inside magnet track)	inch		1.21	2.41	4.81	7.21	9.61
	mm		30.7	61.2	122.2	183.1	244.1
Delta Connected Specifications	UNITS	Dash #	0.5	1	2	3	4
Force Constant	lbf/A		0.3	0.6	1.3	1.9	2.5
	N/A		1.40	2.80	5.60	8.40	11.20
Phase Resistance (D @ 25°C)	Ω		1.4	2.7	5.5	8.2	10.9
Phase Resistance (D @ Max. °C)	Ω		2.0	3.9	7.8	11.7	15.6
Inductance @ 1kHz	mH		0.4	0.4	0.7	1.1	1.4
Continuous Force	lbf		0.9	1.9	3.8	5.7	7.6
	N		4.2	8.4	16.8	25.2	33.6
Continuous Current	A		3.00	3.00	3.00	3.00	3.00
Peak Force*	lbf		1.9	3.8	7.6	11.3	15.1
	N		8	17	34	50	67
Peak Current*	A		6.00	6.00	6.00	6.00	6.00
Continuous Force, aluminum plate heat sink** (see below)	lbf		1.0	1.8	3.4	4.9	6.4
	N		4.5	8.2	15.1	21.8	28.3
Back EMF Constant	V/inch/s		0.0	0.1	0.1	0.2	0.3
	V/m/s		1.4	2.8	5.6	8.4	11.2
WYE connected Specifications	UNITS	Dash #	0.5	1	2	3	4
Force Constant	lbf/A		0.5	1.1	2.2	3.3	4.4
	N/A		2.4	4.8	9.7	14.5	19.4
Phase Resistance (Y @ 25°C)	Ω		4.09	8.18	16.37	24.55	32.74
Phase Resistance (Y @ Max. °C)	Ω		5.9	11.7	23.5	35.2	46.9
Inductance @ 1kHz	mH		0.5	1.1	2.2	3.2	4.3
Continuous Force	lbf		1.2	2.4	4.7	7.1	9.4
	N		5.3	10.5	21.0	31.5	42.0
Continuous Current	A		2.17	2.17	2.17	2.17	2.17
Peak Force*	lbf		3.3	6.5	13.1	19.6	26.2
	N		15	29	58	87	116
Peak Current*	A		6.00	6.00	6.00	6.00	6.00
Continuous Force, aluminum plate heat sink** (see below)	lbf		1.0	1.8	3.4	4.9	6.4
	N		4.5	8.2	15.1	21.8	28.3
Back EMF Constant	V/inch/s		0.1	0.1	0.2	0.4	0.5
	V/m/s		2.4	4.8	9.7	14.5	19.4
* Notes:							
Specifications based on heat sink maintained within 10°C of ambient temperature at motor bracket interface.							
On time of "Peak Power" (duration) less than 1 second.							
Back EMF plus IR drop must not exceed "Maximum Terminal Voltage" listed.							
Electrical cycle length is 1.2 inch (30.5mm).							
Resistance specifications do not include the cable resistance.							
*Do not exceed 3A continuous in Delta (2.12A WYE) or 6A peak (cable current limit)							
Cable adds 0.Ω/m to Wye and Delta phase resistance. Cable adds 0.25Ωm/m to the bracket ground resistance.							
** Heat Sink is a 12" wide, 1/2" thick aluminum plate, extending 2" beyond each end of the coil bracket, in 258C free air.							
*** Theoretical - limited by cable capability.							
Magnet Track weight is 1.06kg/m (.71 pounds/foot).							



C12 Series Connected Coil Performance Specification (Version 3.4 (Ref coil dwg 52439))

General and 6 Lead Motor Specifications	UNITS	Dash #	1	2	3	4
Force Constant	lbf/A		0.77	1.53	2.30	3.07
	N/A		3.41	6.82	10.23	13.64
Max Operating Temperature	°C		130.00	130.00	130.00	130.00
Maximum Temp. Rise	°C		110.00	110.00	110.00	110.00
Coil Resistance (6 lead @ 25°C)	Ω		4.24	8.48	12.71	16.95
Coil Resistance (6 lead @ Max. °C)	Ω		6.07	12.15	18.22	24.30
Inductance @ 1kHz	mH		0.83	1.67	2.50	3.33
Thermal Resistance	°C/W		2.00	1.00	0.67	0.50
Continuous Power (Max. °C)	W		55.00	110.00	165.00	220.00
Continuous Power, mounted to plate**(Max. °C)	W		33.65	57.19	79.00	100.20
Motor Constant	lbf/sqrt(W)		0.31	0.44	0.54	0.62
	N/sqrt(W)		1.38	1.95	2.39	2.76
Peak Power (Max. °C, 10% Duty) ***	W		550.00	1100.00	1650.00	2200.00
Back EMF Constant	V/inch/s		0.09	0.17	0.26	0.35
	V/m/s		3.41	6.82	10.23	13.64
Electrical Time Constant (@ 25°C)	ms		0.20	0.20	0.20	0.20
(@ 130°C)	ms		0.14	0.14	0.14	0.14
Maximum Line to Line Voltage	Vrms & DC		250.00	250.00	250.00	250.00
Coil Weight	Pounds		0.06	0.13	0.19	0.26
	Kilograms		0.03	0.06	0.09	0.12
Coil length (inside magnet track)	inch		2.41	4.81	7.21	9.61
	mm		61.21	122.17	183.13	244.09
Delta Connected Specifications	UNITS	Dash #	1	2	3	4
Force Constant	lbf/A		0.8	1.5	2.3	3.1
	N/A		3.4	6.8	10.2	13.6
Phase Resistance (D @ 25°C)	Ω		2.8	5.65	8.5	11.3
Phase Resistance (D @ Max. °C)	Ω		4.0	8.1	12.1	16.2
Inductance @ 1kHz	mH		0.6	1.1	1.7	2.2
Continuous Force	lbf		2.3	4.6	6.9	9.2
	N		10.2	20.5	30.7	40.9
Continuous Current	A		3.00	3.00	3.00	3.00
Peak Force*	lbf		4.6	9.2	13.8	18.4
	N		20	41	61	82
Peak Current*	A		6.00	6.00	6.00	6.00
Continuous Force, aluminum plate heat sink** (see below)	lbf		2.2	4.1	5.9	7.6
	N		9.8	18.1	26.1	33.9
Back EMF Constant	V/inch/s		0.1	0.2	0.3	0.3
	V/m/s		3.4	6.82	10.2	13.6
WYE connected Specifications	UNITS	Dash #	1	2	3	4
Force Constant	lbf/A		1.3	2.7	4.0	5.3
	N/A		5.9	11.8	17.7	23.6
Phase Resistance (Y @ 25°C)	Ω		8.5	17.0	25.4	33.9
Phase Resistance (Y @ Max. °C)	Ω		12.1	24.3	36.4	48.6
Inductance @ 1kHz	mH		1.7	3.3	5.0	6.7
Continuous Force	lbf		2.8	5.7	8.5	11.3
	N		12.6	25.1	37.7	50.3
Continuous Current	A		2.13	2.13	2.13	2.13
Peak Force*	lbf		8.0	15.9	23.9	31.9
	N		35	71	106	142
Peak Current*	A		6.00	6.00	6.00	6.00
Continuous Force, aluminum plate heat sink** (see below)	lbf		2.2	4.1	5.9	7.6
	N		9.8	18.1	26.1	33.9
Back EMF Constant	V/inch/s		0.1	0.3	0.4	0.6
	V/m/s		5.9	11.8	17.7	23.6

* Notes:

- Specifications based on heat sink maintained within 10°C of ambient temperature at motor bracket interface.
- On time of "Peak Power" (duration) less than 1 second.
- Back EMF plus IR drop must not exceed "Maximum Terminal Voltage" listed.
- Electrical cycle length is 1.2 inch (30.5mm).
- Resistance specifications do not include the cable resistance.
- Do not exceed 3A continuous or 6A peak (cable limit)
- Cable adds 0.5Ω/m to Wye and Delta phase resistance. Cable adds 0.250Ωm to the bracket ground resistance.
- ** Heat Sink is a 12" wide, 1/2" thick aluminum plate, extending 2" beyond each end of the coil bracket, in 258C free air.
- *** Theoretical - limited by cable capability.
- Magnet Track weight is 1.94kg/m (1.3 pounds/foot).

C16 Series Connected Coil Performance Specification

General and 6 Lead Motor Specifications	UNITS	Dash #	1	2	3	4
Force Constant	lb _f /A		1.3	2.7	4.0	5.3
	N/A		5.9	11.9	17.8	23.8
Max Operating Temperature	°C		130	130	130	130
Maximum Temp. Rise	°C		110	110	110	110
Coil Resistance (6 lead @ 25°C)	Ω		4.1	8.3	12.4	16.5
Coil Resistance (6 lead @ Max. °C)	Ω		5.9	11.9	17.8	23.7
Inductance @ 1kHz	mH		0.5	1.0	1.4	1.9
Thermal Resistance (Bracket Side Mount)	°C/W		1.60	0.80	0.53	0.40
Continuous Power Top Mount (Max. °C)	W		69	138	206	275
Thermal Resistance, Top mount (SP85,SP86)	°C/W		1.60	0.80	0.53	0.40
Continuous Power using threaded hole Top Mount (Max. °C)	W		69	138	206	275
Continuous Power, top mount to plate**(Max. °C)	W		38.3	63.8	87.4	110.2
Motor Constant	lb _f /sqrt(W)		0.5	0.7	0.8	1.0
	N/sqrt(W)		2.15	3.04	3.73	4.30
Peak Power (Max. °C, 10% Duty)	W		688	1375	2063	2750
Back EMF Constant	V/inch/s		0.15	0.30	0.45	0.60
	V/m/s		5.9	11.9	17.8	23.8
Electrical Time Constant (@ 25°C)	ms		0.12	0.12	0.12	0.12
(@ 130°C)	ms		0.08	0.08	0.08	0.08
Maximum Line to Line Voltage	Vrms & DC		300	300	300	300
Coil Weight	Pounds		0.07	0.15	0.23	0.31
	Kilograms		0.03	0.06	0.10	0.13
Coil length (inside magnet track)	inch		2.41	4.81	7.21	9.61
	mm		61.2	122.2	183.1	244.1
Delta Connected Specifications	UNITS	Dash #	1	2	3	4
Force Constant	lb _f /A		1.3	2.7	4.0	5.3
	N/A		5.9	11.9	17.8	23.8
Phase Resistance (Δ @ 25°C)	Ω		2.76	5.51	8.27	11.03
Phase Resistance (Δ @ Max. °C)	Ω		3.95	7.90	11.86	15.81
Inductance @ 1kHz	mH		0.3	0.6	1.0	1.3
Continuous Force	lb _f		4.0	8.0	12.0	16.0
	N		17.8	35.7	53.5	71.4
Continuous Current	A		3.00	3.00	3.00	3.00
Peak Force*	lb _f		8.0	16.0	24.1	32.1
	N		36	71	107	143
Peak Current*	A		6.00	6.00	6.00	6.00
Continuous Force, aluminum plate heat sink** (see below)	lb _f		4.2	7.6	10.9	14.1
	N		18.5	33.8	48.4	62.8
Back EMF Constant	V/inch/s		0.2	0.3	0.5	0.6
	V/m/s		5.9	11.9	17.8	23.8
WYE connected Specifications	UNITS	Dash #	1	2	3	4
Force Constant	lb _f /A		2.3	4.6	6.9	9.3
	N/A		10.3	20.6	30.9	41.2
Phase Resistance (Ψ @ 25°C)	Ω		8.27	16.54	24.81	33.09
Phase Resistance (Ψ @ Max. °C)	Ω		11.86	23.71	35.57	47.43
Inductance @ 1kHz	mH		1.0	1.9	2.9	3.8
Continuous Force	lb _f		5.6	11.2	16.7	22.3
	N		24.8	49.6	74.4	99.2
Continuous Current	A		2.41	2.41	2.41	2.41
Peak Force*	lb _f		13.9	27.8	41.7	55.6
	N		62	124	185	247
Peak Current*	A		6.00	6.00	6.00	6.00
Continuous Force, aluminum plate heat sink** (see below)	lb _f		4.2	7.6	10.9	14.1
	N		18.5	33.8	48.4	62.8
Back EMF Constant	V/inch/s		0.3	0.5	0.8	1.0
	V/m/s		10.3	20.6	30.9	41.2

*** Notes:**

Specifications based on heat sink maintained within 10°C of ambient temperature at motor bracket interface.

On time of "Peak Power" (duration) less than 1 second.

Back EMF plus IR drop must not exceed "Maximum Terminal Voltage" listed.

Electrical cycle length is 1.2 inch (30.5mm).

Resistance specifications do not include the cable resistance.

Do not exceed 3A continuous or 6A peak (cable limit)

Cable adds 0.5Ω/m to Wye and Delta phase resistance. Cable adds 0.250Ω/m to the bracket ground resistance.

** Heat Sink is a 12" wide, 1/2" thick aluminum plate, extending 2" beyond each end of the coil bracket, in 25°C free air.

Magnet Track weight is 3.8kg/m (2.6 pounds/foot).