



Preliminary I70 Iron Core Linear Motor (Double Parallel & Higher Order Parallel Connection Specification)

General Motor Specifications	UNITS	Dash #	4	8	10	12
Attractive Preload Force using 0.5mm[.02"] clearance gap	N		1095	2189	2737	3284
	Lbf		246	492	615	738
Attractive Preload Force using 1.0mm[.04"] clearance gap	N		931	1861	2326	2792
	Lbf		209	418	523	628
Max Operating Temperature	°C		125	125	125	125
Maximum Temp. Rise	°C		105	105	105	105
Coil Resistance (6 lead @ 25°C)	Ω		0.63	1.26	1.01	1.89
Coil Resistance (6 lead @ Max. °C)	Ω		0.89	1.78	1.42	2.67
Inductance @ 1kHz	mH		1	2	1	3
Thermal Resistance (Bracket Top Mount)	°C/W		0.10	0.05	0.04	0.03
Continuous Power Top Mount (Max. °C)	W		931	1862	2328	2793
Continuous Power, top mount to plate**(Max. °C)	W		931	1862	2328	2793
Motor Constant	lb/sqrt(W)		1.6	2.2	2.5	2.7
	N/sqrt(W)		6.9	9.8	10.9	12.0
Peak Power (Max. °C, 10% Duty)	W		9311	18622	23278	27933
Electrical Time Constant (@ 25°C)	ms		1.4	1.4	1.4	1.4
Maximum Line to Line Voltage	Vrms		670	670	670	670
Coil Weight	Pounds		2.9	5.8	7.2	8.7
	Kilograms		1.3	2.6	3.3	4.0
Coil length (inside magnet track without HED)	inch		9.61	19.21	24.01	28.81
HED increases coil length by 1.48 inch (37.6mm)	mm		244	488	610	732
Delta Connected Specifications	UNITS	Dash #	4	8	10	12
Force Constant using 0.5mm[.02"] clearance gap	N/A		6.8	13.7	13.7	20.5
	lb/A		1.5	3.1	3.1	4.6
Force Constant using 1mm[.04"] clearance gap	N/A		6.2	12.3	12.6	18.5
	lb/A		1.4	2.8	2.8	4.2
Phase Resistance (Δ @ 25°C)	Ω		0.4	0.8	0.7	1.3
Phase Resistance (Δ @ Max. °C)	Ω		0.6	1.2	0.9	1.8
Inductance @ 1kHz	mH		0.6	1.2	0.9	1.8
Continuous Force using 0.5mm[.02"] clearance gap	N		218.8	437.6	437.6	656.5
	lb _f		49.2	98.4	98.4	147.6
Continuous Force using 1.0mm[.04"] clearance gap	N		196.9	393.9	402.6	590.8
	lb _f		44.3	88.6	90.5	132.8
Continuous Current	A		32.0	32.0	32.0	32.0
Peak Force* using 0.5mm[.02"] clearance gap	N		342	684	684	1026
	lb _f		77	154	154	231
Peak Force* using 1.0mm[.04"] clearance gap	N		308	615	629	923
	lb _f		69	138	141	208
Peak Current*	A		50.0	50.0	50.0	50.0
Continuous Force, aluminum plate heat sink** (see below)	N		270.9	541.9	677.3	812.8
	lbf		60.9	121.8	152.3	182.7
Back EMF Constant using 0.5mm[.02"] clearance gap	V/m/s		6.8	13.7	13.7	20.5
	V/inch/s		0.2	0.3	0.3	0.5
WYE connected Specifications	UNITS	Dash #	4	8	10	12
Force Constant using 0.5mm[.02"] clearance gap	N/A		11.8	23.7	23.7	35.5
	lb/A		2.7	5.3	5.3	8.0
	N/A		10.7	21.3	21.8	32.0
Force Constant using 1.0mm[.04"] clearance gap	lb/A		2.4	4.8	4.9	7.2
Phase Resistance (Ψ @ 25°C)	Ω		1.3	2.5	2.0	3.8
Phase Resistance (Ψ @ Max. °C)	Ω		1.8	3.6	2.8	5.3
Inductance @ 1kHz	mH		1.8	3.5	2.8	5.3
Continuous Force using 0.5mm[.02"] clearance gap	N		218.8	437.6	437.6	656.5
	lb _f		49.2	98.4	98.4	147.6
Continuous Force using 0.5mm[.02"] clearance gap	N		196.9	393.9	402.6	590.8
	lb _f		44.3	88.6	90.5	132.8
Continuous Current	A		18.48	18.48	18.48	18.48
Peak Force* using 0.5mm[.02"] clearance gap	N		592	1184	1184	1777
	lb _f		133	266	266	399
Peak Force* using 1.0mm[.04"] clearance gap	N		533	1066	1090	1599
	lb _f		120	240	245	359
Peak Current*	A		50.0	50.0	50.0	50.0
Continuous Force, aluminum plate heat sink** (see below)	N		270.9	541.9	677.3	812.8
	lbf		60.9	121.8	152.3	182.7
Back EMF Constant using 0.5mm[.02"] clearance gap	V/m/s		11.8	23.7	23.7	35.5
	V/inch/s		0.3	0.6	0.6	0.9

* 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 1.0 seconds.
 Back EMF plus IR drop must not exceed "Maximum Terminal Voltage" listed.
 Electrical cycle length is mm. Skewed Track Cogging force estimated at 45N.
 Resistance Specifications do not include the cable resistance.
 Cogging force due to magnet saliency is about 45N
 Custom cable required for peak current exceeding 50 ampere for any connection. Do not exceed 44 Ampere peak current (4-second maximum) for Double Parallel Connection
 Magnet track maximum environment temperature is 50 Deg. C.
 Cable adds 0.055Ω/m
 Shaded column represents "Special" model
 ** Heat Sink is a 0.5 meter wide, 15mm thick aluminum plate, extending 0.25 meter beyond each end of the coil bracket, suspended in 25°C free air using 0.5mm (.02") clearance gap.
 Magnet Track weight is 3.9kg/m (2.6 pounds/foot).