

RECTANGULAR LINEAR VOICE COIL ACTUATORS (VCA)

Introduction

Rectangular voice coil actuators (VCA) are linear VCAs just like the cylindrical models, but are often used for applications that require a higher force and/or a longer stroke. Due to their shape, they can be designed to fit into tighter or thinner systems or optimized for their sheer power and high speeds. Rectangular voice coil actuators feature all of the inherent advantages of VCA technology, such as direct-drive, zero backlash and cog free operation for accurate motion, as well as high acceleration and use of single phase.



Features

- Zero friction caused by moving parts
- Ideal for high acceleration applications
- Offers higher forces than cylindrical actuators based on their size



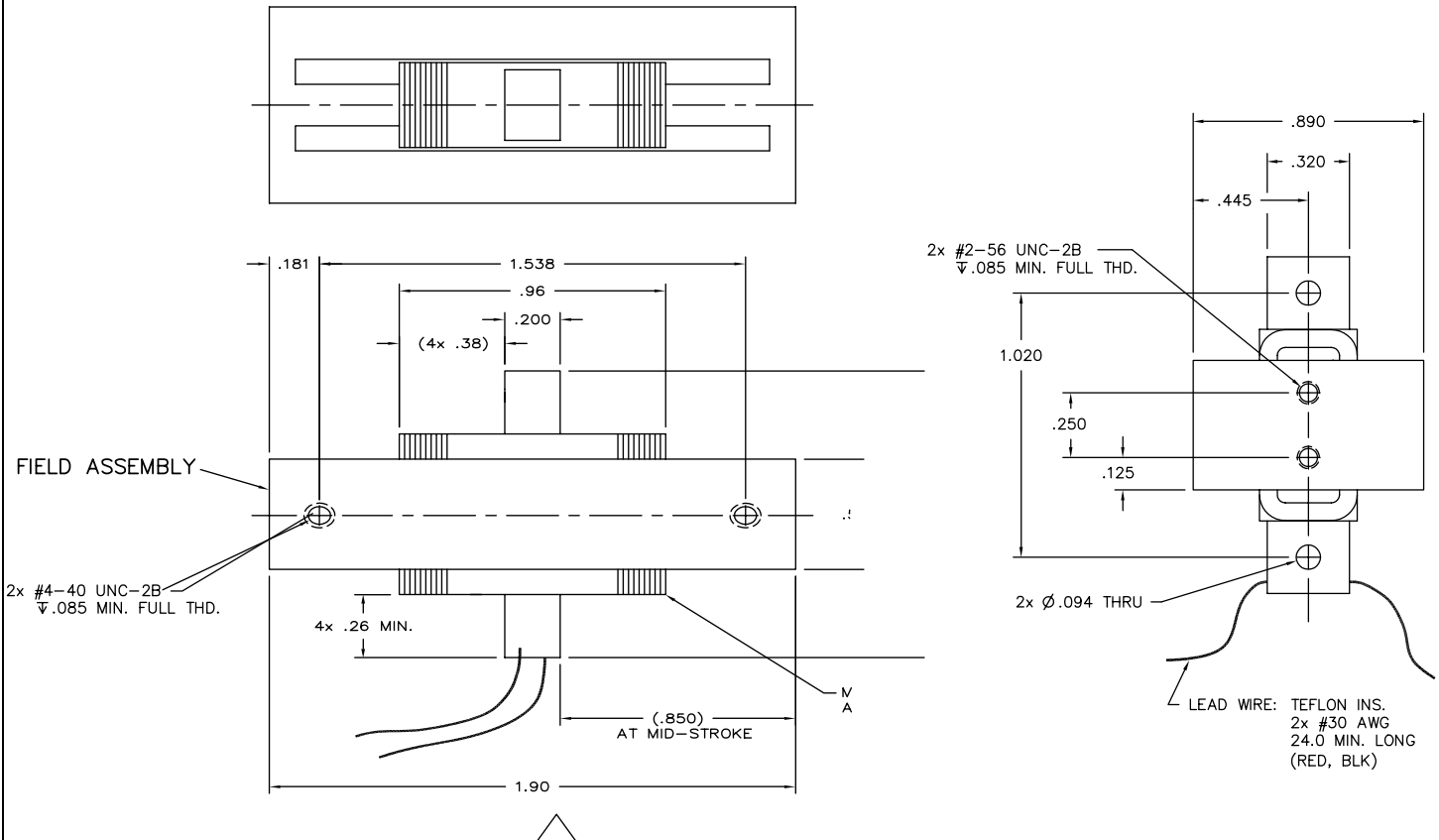
RECTANGULAR LINEAR VOICE COIL ACTUATORS (VCA) CONFIGURATIONS

Part Number	Peak Force (N / lb)	Total Stroke (mm / in)	Continuous Stall Force (N / lb)	Actuator Constant (N/√watt lb/√watt)	Outside Diameter/Width (mm/in)	Length at Mid-stroke (mm/in)
LA05-30-001Z	37.8 / 8.5	10 / 0.394	15.1 / 3.39	4.13 / 0.93	12 / 0.47	74 / 2.91
LA13-30-000A	13.3 / 3	25 / 1.26	5.5 / 1.2	1.7 / 0.38	33.66 / 1.325	7602 / 3
LA15-65-000A	66.72 / 15	101.6 / 4	18.9 / 4.25	4.003 / 0.9	38.1 / 1.5	165.1 / 605
LA09-19-000A	6.25/1.406	10.16/0.40	2.31/0.52	1.25/0.28	22.6/0.89	48.2/1.90
LA12-50-001A	2.22/50	76.2/3.00	.14/0.62	.072/0.322	33.02 / 1.3	114.3 / 4.5
LA14-24-000A	31.13 / 7.0	22.2 / 0.87	14.9 / 3.35	3.2 / 0.72	80.77 / 3.18	60.3 / 2.375
LA18-32-000A	142.34 / 32.0	12.7 / 0.50	43.15 / 9.7	9.03 / 2.03	88.9 / 3.5	82.5 / 3.25

MECHANICAL SPECIFICATIONS

WINDING CONSTANTS	UNITS	TOL.	SYM.	WDG A
DC RESISTANCE	OHMS	±12.5%	R	12.4
VOLTAGE AT FORCE 22.5 OZ	VOLTS	NOMINAL	Vc	17.4
CURRENT AT FORCE 22.5 OZ	AMPERES	NOMINAL	Ic	1.41
FORCE SENSITIVITY	OZ/AMP	±10%	Kf	16.0
BACK EMF CONSTANT	VOLTS/FT/SEC	±10%	Kb	1.356
INDUCTANCE	MICRO-HENRY	±30%	L	2,130
LINEAR ACTUATOR PARAMETERS	UNITS	SYM.	VALUE	
PEAK FORCE *	OZ	Fp	22.5	
CONTINUOUS STALL FORCE **	OZ	Fcs	8.3	
ACTUATOR CONSTANT	OZ/√WATT	Ka	4.54	
ELECTRICAL TIME CONSTANT	MICRO-SEC	Te	1.78	
MECHANICAL TIME CONSTANT	MILLI-SEC	Tm	5.1	
POWER I ² R AT FORCE 22.5 OZ	WATTS	P	24.5	
STROKE AXIAL	± IN	NOMINAL	.200	
CLEARANCE ON EACH SIDE OF COIL	IN	NOMINAL	.015	
THERMAL RESISTANCE OF COIL	°C/WATT	Th	25.8	
MAX ALLOWABLE TEMP. OF COIL	°C	TEMP	155	
WEIGHT OF COIL ASSEMBLY	OZ	WTc	.29	
TOTAL WEIGHT	OZ	WTt	2.2	

* 10 SEC. AT 25°C AMBIENT, 155°C COIL TEMP
 ** 25°C AMBIENT, 155°C WINDING TEMPERATURE



1. A POSITIVE (+) VOLTAGE APPLIED TO THE RED LEAD WILL PRODUCE A FORCE IN THE POSITIVE (+) DIRECTION.
 NOTES: UNLESS OTHERWISE SPECIFIED

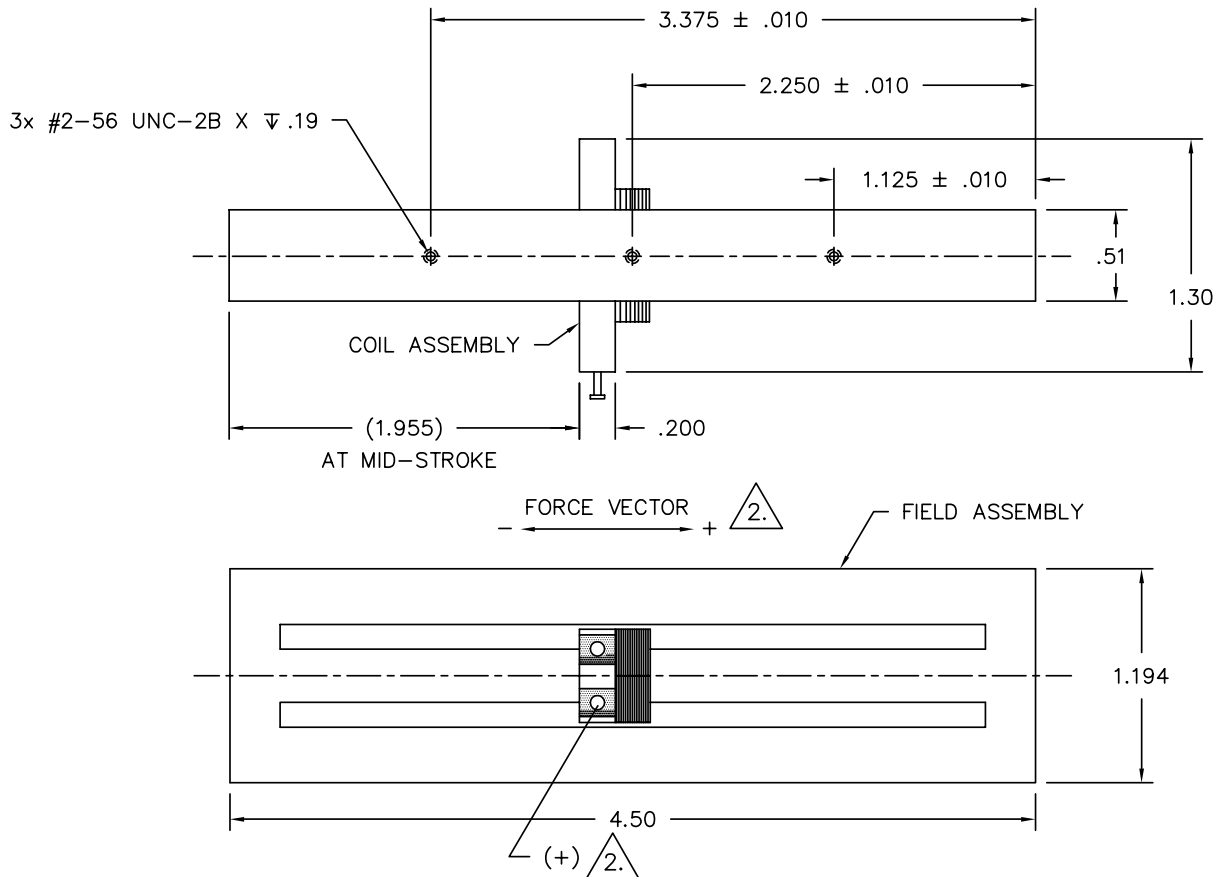
U.S. PATENT NO. 4,808,955

DO NOT SCALE DRAWING
 DIMENSIONS ARE IN INCHES
 TOLERANCES ARE
 ANGULAR = ± 30' .X = ± .03
 .XX = ± .01 .XXX = ± .005

SIZE B	FSCM NO. 55789	BEI KIMCO MAGNETICS DIVISION SAN MARCOS, CA 92069
TITLE: LINEAR ACTUATOR		DWG NO: LA09-19-000A
SCALE: 2/1 SHT: 1 OF 1		DRN: R. ELLIOTT 1/13/93 APP'D: A. MORCOS 1/13/93

WINDING CONSTANTS	UNITS	TOL	SYM	WDG A
DC RESISTANCE	OHMS	±12.5%	R	7.2
VOLTAGE @ FORCE 8.0 OZ	VOLTS	NOMINAL	Vc	18.6
CURRENT @ FORCE 8.0 OZ	AMPERES	NOMINAL	Ic	2.58
FORCE SENSITIVITY	OZ/AMP	±10%	Kf	3.1
BACK EMF CONSTANT	VOLTS/FT/SEC	±10%	Kb	.263
INDUCTANCE	MILLI-HENRY	±30%	L	1230
LINEAR ACTUATOR PARAMETERS	UNITS	SYM	VALUE	
PEAK FORCE *	OZ	Fp	8.0	
CONTINUOUS STALL FORCE **	OZ	Fcs	2.26	
ACTUATOR CONSTANT	oz/√WATT	Ka	1.16	
ELECTRICAL TIME CONSTANT	MICRO-SEC	Te	171	
MECHANICAL TIME CONSTANT	MILLI-SEC	Tm	63.1	
POWER I ² R @ FORCE 8.0 OZ	WATTS	P	48	
STROKE	± IN		1.5	
CLEARANCE ON EACH SIDE OF COIL	IN		.025	
THERMAL RESISTANCE OF COIL	°C/WATT	⊙th	22.6	
MAX ALLOWABLE TEMP OF COIL	°C	TEMP	155	
WEIGHT OF COIL ASSEMBLY	OZ	WTc	.23	
TOTAL WEIGHT	OZ	WTt	10.04	

* 10 SEC @ 25°C AMBIENT, 155°C WINDING TEMP
 ** 25°C AMBIENT, 155°C WINDING TEMP



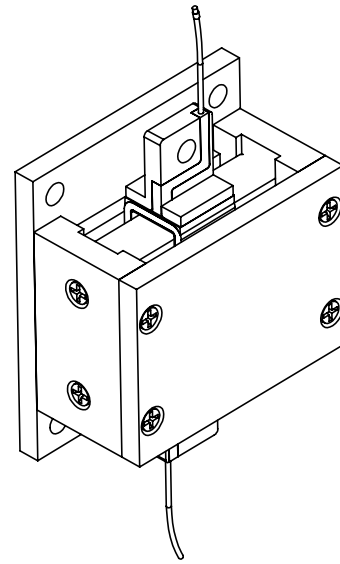
1. A POSITIVE (+) VOLTAGE APPLIED TO THE RED LEAD WILL PRODUCE A FORCE IN THE POSITIVE (+) DIRECTION.
 NOTES: UNLESS OTHERWISE SPECIFIED

DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ARE ANGULAR = ± 30' .X = ± .03 .XX = ± .01 .XXX = ± .005

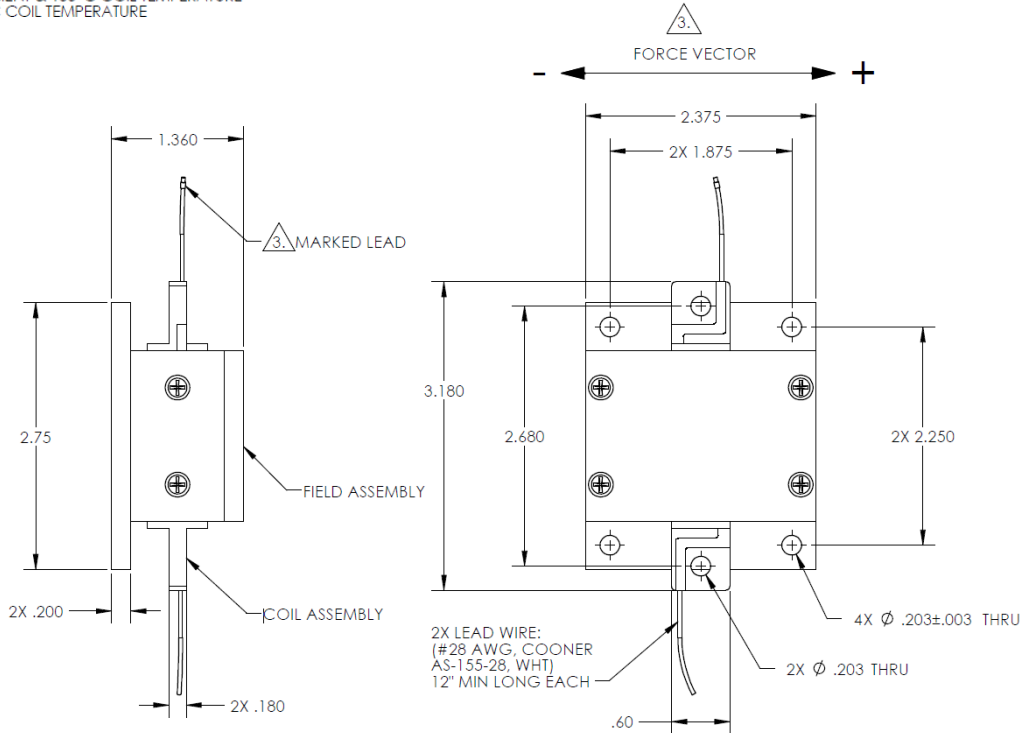
SIZE B	FSCM NO. 55789	BEI	KIMCO MAGNETICS DIVISION SAN MARCOS, CA 92069
TITLE: LINEAR ACTUATOR		DWG NO: LA12-50-001A	
SCALE: 1/1		SHT 1 OF 1	DRN: McGHEE 2/3/94 APP'D: A. MORCOS 2/3/94

Winding Constants *	Units	Tol	Symbol	Wdg	A
DC Resistance	Ohms	± 12.5%	R	5	
Voltage @ F _P	Volts	Nominal	V _P	21.9	
Current @ F _P	Amps	Nominal	I _P	4.38	
Force Sensitivity	LB/Amp	± 10%	K _F	1.6	
	N/Amp	± 10%		7.12	
Back EMF Constant	V/(ft/sec)	± 10%	K _B	2.17	
	V/(m/sec)	± 10%		7.12	
Inductance ****	micro-Henry	± 15%	L	3.5	

Linear Actuator Parameters *	Units	Symbol	Value
Peak Force **	LB	F _P	7
	N		31.1
Continuous Stall Force ***	LB	F _{CS}	3.35
	N		14.9
Actuator Constant	LB/√Watt	K _A	0.72
	N/√Watt		3.2
Electrical Time Constant	micro-sec	τ _E	700
Mechanical Time Constant	milli-sec	τ _M	34.4
Power FR @ F _P	Watts	P _P	95.7
Stroke	± in		0.437
	± mm		11.1
Clearance on Each side of Coil	in		0.02
	mm		0.50
Thermal Resistance of Coil	°C/Watt	θ _{JH}	3.4
Maximum Allowable Coil Winding Temp	°C	Temp	155
Weight of Coil Assembly	OZ	WT _C	0.77
	G		21.8
Weight of Field Assembly	OZ	WT _T	227
	G		643.5



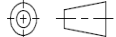
* AT MID-STROKE POSITION AND @ 25°C AMBIENT TEMPERATURE
 ** 10 SECONDS @ 25°C AMBIENT & 155°C COIL TEMPERATURE
 *** @ 25°C AMBIENT & 155°C COIL TEMPERATURE
 **** MEASURED AT 1000 HZ.



3. A POSITIVE (+) VOLTAGE APPLIED TO THE MARKED LEAD WILL PRODUCE A FORCE ON THE COIL ASSEMBLY IN THE POSITIVE (+) DIRECTION.
 2. INTERPRET DRAWING IAW Y14.100.
 1. INTERPRET DIMENSIONING AND TOLERANCING IAW ASME Y14.5M-1994.
 NOTES: UNLESS OTHERWISE SPECIFIED

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THIRD ANGLE PROJECTION



UNLESS OTHERWISE SPECIFIED:
 -ALL DIMENSIONS ARE IN INCHES
 -BREAK SHARP EDGES .015 MAX
 -SURFACE ROUGHNESS 63 ✓
 -DIMENSIONS APPLY AFTER FINISH
 -MAX FILLET R.010
 -DIAMETERS SHALL NOT EXCEED A RUNOUT OF .005 FIM

TOLERANCES:
 DECIMALS .XX ±.03 ANGULAR ±0°30'
 .XXX ±.005
 DO NOT SCALE DRAWING

BEI KIMCO MAGNETICS DIVISION
 VISTA, CA 92081

DRAWN	DATE	TITLE	SIZE	FSCM NO.	DWG NO.	REV
VERNACCHIA	09/16/88	LINEAR ACTUATOR	C	55789	LA14-24-000A	B
CHECK	06/03/10					
APPD	06/13/96	SCALE: NONE	SHEET: 1 OF 1			
FILE NO.	L\TOL LEVEL\LA\					

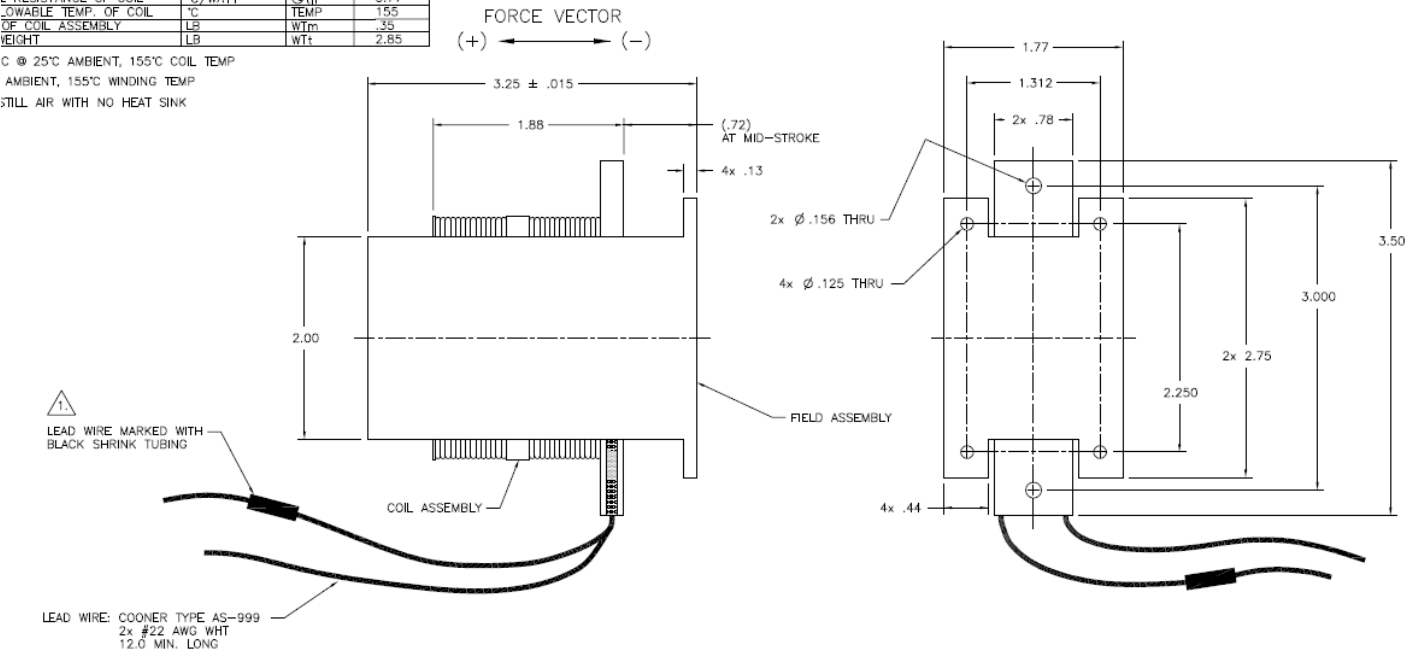
WINDING CONSTANTS	UNITS	TOL	SYM	WDG A
DC RESISTANCE		±12.5%	R	3.42
VOLTAGE @ FORCE 32.5 LB	OHMS		Vc	29.6
CURRENT @ FORCE 32.5 LB	VOLTS	NOMINAL	Ic	8.67
FORCE SENSITIVITY	AMPERES	NOMINAL	Kf	3.75
BACK EMF CONSTANT	LB/AMP	±10%	Kb	5.09
INDUCTANCE	VOLTS/FT/SEC	±10%	L	1.94
	MILLI-HENRY	±30%		

LINEAR ACTUATOR PARAMETERS	UNITS	SYM	VALUE
PEAK FORCE *	LB	Fp	32.5
CONTINUOUS STALL FORCE **	LB	Fcs	9.7
ACTUATOR CONSTANT	LB/√WATT	Ka	2.03
ELECTRICAL TIME CONSTANT	MICRO-SEC	Te	567
MECHANICAL TIME CONSTANT	MILLI-SEC	Tm	2.0
POWER @ R @ FORCE 32.5 LB	WATTS	P	257
STROKE	± IN		.25
CLEARANCE ON EACH SIDE OF COIL	IN		.018
THERMAL RESISTANCE OF COIL ***	°C/WATT	Qth	3.77
MAX ALLOWABLE TEMP. OF COIL	°C	TEMP	155
WEIGHT OF COIL ASSEMBLY	LB	WTm	.35
TOTAL WEIGHT	LB	WTt	2.85

* 10 SEC @ 25°C AMBIENT, 155°C COIL TEMP
 ** 25°C AMBIENT, 155°C WINDING TEMP
 *** IN STILL AIR WITH NO HEAT SINK

± IN		.25
IN		.018
°C/WATT	Qth	3.77
°C	TEMP	155
LB	WTm	.35
LB	WTt	2.85

C @ 25°C AMBIENT, 155°C COIL TEMP
 AMBIENT, 155°C WINDING TEMP
 STILL AIR WITH NO HEAT SINK



NOTES: UNLESS OTHERWISE SPECIFIED

1. A POSITIVE (+) VOLTAGE APPLIED TO THE LEAD MARKED WITH BLACK SHRINK TUBING SHALL PRODUCE A FORCE THE POSITIVE (+) DIRECTION.

REV	DCN NO.	DESCRIPTION	DRN	APP'D	DATE
A	93-1251	UPDATE LEAD CALL OUT	SLM	ACM	10/25/93

U.S. PATENT NO. 4,808,955	DO NOT SCALE DRAWING DIMENSIONS ARE IN INCHES DIMENSIONS ARE AFTER PLATING TOLERANCES ARE ANGULAR = ± 30' .X = ± .03 .XX = ± .01 .XXX = ± .005	SIZE B	FSCM NO. 55789	BEI KIMCO MAGNETICS DIVISION SAN MARCOS, CA 92069
		TITLE: LINEAR ACTUATOR		
		SCALE: 1/1	SHT. 1 OF 1	DRN: BUTTERFIELD 9/18/91 APP'D: A. MORCOS 9/25/91

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