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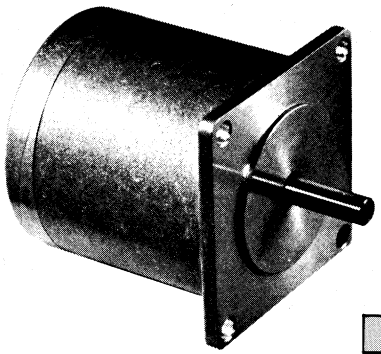
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Permanent Magnet Stepping Motor 1.8°



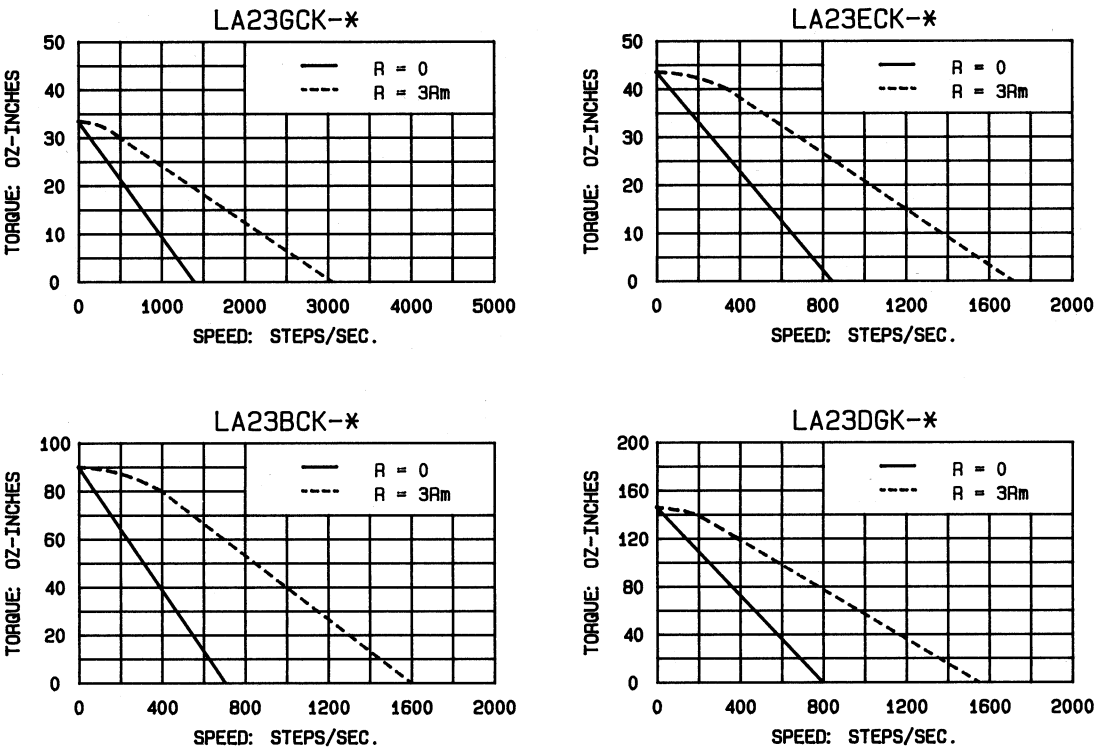
EAD Size 23 permanent magnet DC stepping motors are precision bi-directional devices with position accuracy of ± 3% noncumulative. Motors are totally enclosed with permanently lubricated ball bearings. Standard motors have 6 leads. Motors with 5 or 8 leads can be furnished to meet existing applications. These motors are also available in 5, 7.5, and 15 degree step angles.

		4 PHASE UNI-POLAR CONNECTION							
		2 PHASES ENERGIZED				1 PHASE ENERGIZED			
MODEL NUMBER	STEP ANGLE	RATED VOLTAGE VOLTS	RATED CURRENT AMPS	PHASE RESISTANCE OHMS	PEAK TORQUE OZ.-IN.	RATED VOLTAGE VOLTS	RATED CURRENT AMPS	PHASE RESISTANCE OHMS	PEAK TORQUE OZ.-IN.
LA23GCK-209		1.2	5.45	0.22		1.7	7.71	0.22	
LA23GCK-210		4.0	1.54	2.60		5.7	2.19	2.60	
LA23GCK-211	1.8	6.0	1.20	5.00	38.5	8.5	1.70	5.00	38.5
LA23GCK-212		12.0	0.60	20.00		17.0	0.85	20.00	
LA23GCK-213		24.0	0.30	80.00		34.0	0.42	80.00	
LA23ECK-3		1.4	3.89	0.36		2.0	5.55	0.36	
LA23ECK-6		3.4	1.55	2.20		4.8	2.18	2.20	
LA23ECK-4	1.8	5.1	1.00	5.10	57.5	7.2	1.41	5.10	57.5
LA23ECK-11		6.0	0.97	6.20		8.5	1.37	6.20	
LA23ECK-12		12.0	0.48	25.00		17.0	0.68	25.00	
LA23ECK-13		24.0	0.25	96.00		34.0	0.35	96.00	
LA23BCK-9		1.7	4.59	0.37		2.4	6.50	0.37	
LA23BCK-10		4.3	1.79	2.40		6.1	2.54	2.40	
LA23BCK-11	1.8	5.4	1.54	3.50	120.0	7.6	2.17	3.50	120.0
LA23BCK-47		6.0	1.25	4.80		8.5	1.77	4.80	
LA23BCK-40		12.0	0.66	18.20		17.0	0.93	18.20	
LA23BCK-41		24.0	0.36	66.00		34.0	0.51	66.00	
LA23DGK-1		2.2	4.58	0.48		3.1	6.46	0.48	
LA23DGK-2		3.4	2.83	1.20		4.8	4.00	1.20	
LA23DGK-23	1.8	6.0	1.76	3.40	168.0	8.5	2.50	3.40	168.0
LA23DGK-24		12.0	0.75	16.00		17.0	1.06	16.00	
LA23DGK-25		24.0	0.44	55.00		34.0	0.62	55.00	

		2 PHASE BI-POLAR SERIES CONNECTION							
		2 PHASES ENERGIZED				1 PHASE ENERGIZED			
MODEL NUMBER	STEP ANGLE	RATED VOLTAGE VOLTS	RATED CURRENT AMPS	PHASE RESISTANCE OHMS	PEAK TORQUE OZ.-IN.	RATED VOLTAGE VOLTS	RATED CURRENT AMPS	PHASE RESISTANCE OHMS	PEAK TORQUE OZ.-IN.
LA23GCK-209		1.7	3.86	0.44		2.4	5.45	0.44	
LA23GCK-210		5.7	1.10	5.20		8.0	1.54	5.20	
LA23GCK-211	1.8	8.5	0.85	10.00	48.0	12.0	1.20	10.00	48.0
LA23GCK-212		17.0	0.42	40.00		24.0	0.60	40.00	
LA23GCK-213		34.0	0.21	160.00		48.0	0.30	160.00	
LA23ECK-3		2.0	2.78	0.72		2.8	3.89	0.72	
LA23ECK-6		4.8	1.09	4.40		6.8	1.55	4.40	
LA23ECK-4	1.8	7.2	0.71	10.20	72.0	10.2	1.00	10.20	72.0
LA23ECK-11		8.5	0.68	12.40		12.0	0.97	12.40	
LA23ECK-12		17.0	0.34	50.00		24.0	0.48	50.00	
LA23ECK-13		34.0	0.18	192.00		48.0	0.25	192.00	
LA23BCK-9		2.4	3.25	0.74		3.4	4.59	0.74	
LA23BCK-10		6.1	1.27	4.80		8.6	1.79	4.80	
LA23BCK-11	1.8	7.6	1.09	7.00	150.0	10.8	1.54	7.00	150.0
LA23BCK-47		8.5	0.88	9.60		12.0	1.25	9.60	
LA23BCK-40		17.0	0.47	36.40		24.0	0.66	36.40	
LA23BCK-41		34.0	0.26	132.00		48.0	0.36	132.00	
LA23DGK-1		3.1	3.23	0.96		4.4	4.58	0.96	
LA23DGK-2		4.8	2.00	2.40		6.8	2.83	2.40	
LA23DGK-23	1.8	8.5	1.25	6.80	210.0	12.0	1.76	6.80	210.0
LA23DGK-24		17.0	0.53	32.00		24.0	0.75	32.00	
LA23DGK-25		34.0	0.31	110.00		48.0	0.44	110.00	

Note: All parameter values are based on constant power dissipation.

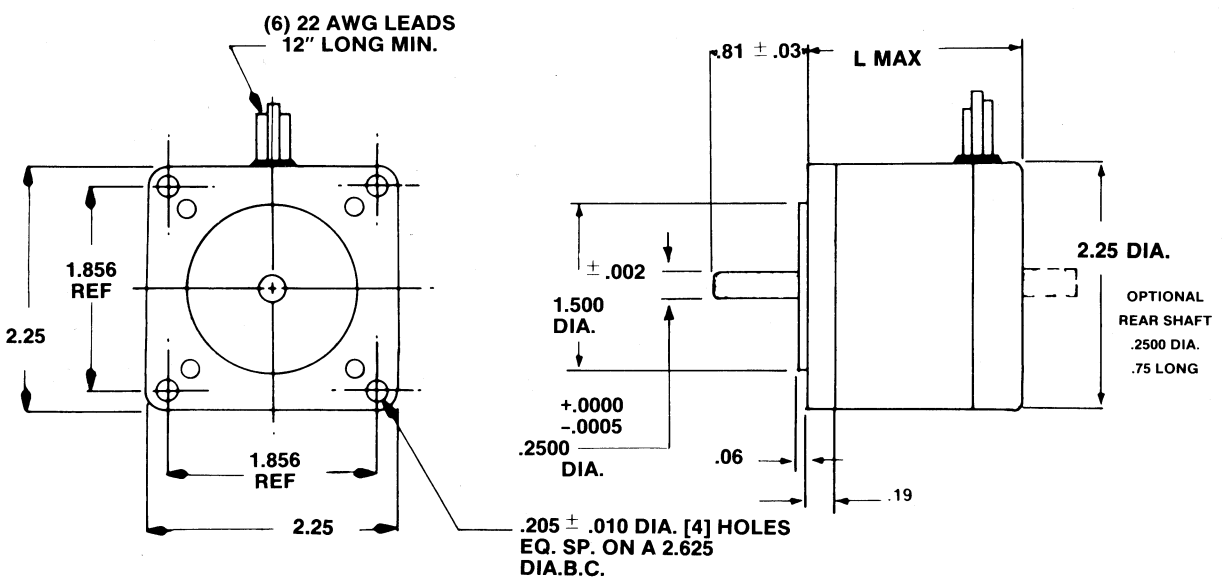
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TYPICAL PULLOUT TORQUE SPEED CURVES
UNI-POLAR DRIVE, 2 PHASE ON

See Page 25 for additional Torque Speed Curves with High Performance Drive.

MODEL NUMBER	INERTIA OZ.-IN.-SEC.²	WEIGHT OUNCES	DIM L INCHES
LA23GCK series	.81 E-3	14	1.60
LA23ECK series	1.66 E-3	19	2.00
LA23BCK series	3.31 E-3	32	3.00
LA23DGK series	4.97 E-3	47	4.00

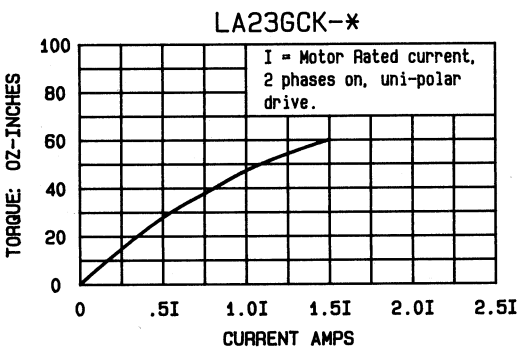


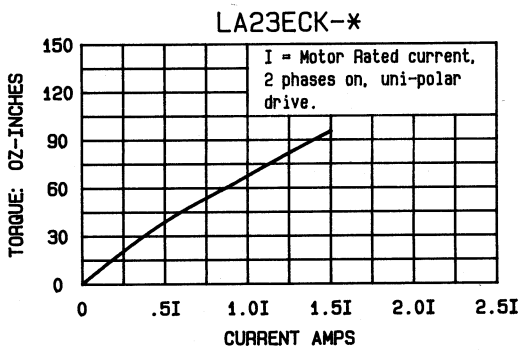
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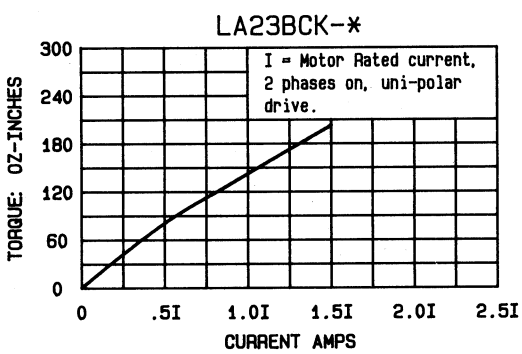
Permanent Magnet Stepping Motor 1.8°

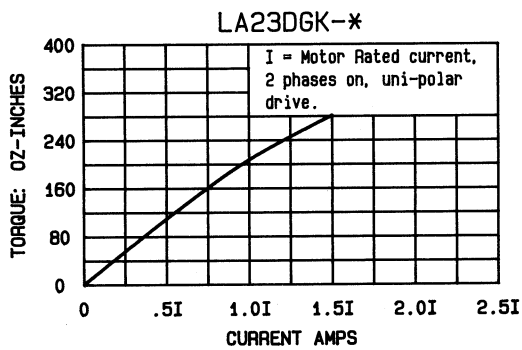
MODEL NUMBER	Dt OZ.-IN.	4 PHASE UNI-POLAR Kb V/RAD/SEC	4 PHASE UNI-POLAR Kt OZ.-IN./AMP	4 PHASE UNI-POLAR Lm mH	2 PHASE BI-POLAR Kb V/RAD/SEC	2 PHASE BI-POLAR Kt OZ.-IN./AMP	2 PHASE BI-POLAR Lm mH
LA23GCK-209	4	0.04	8.1	0.26	0.09	16.2	1.04
LA23GCK-210		0.15	28.4	3.18	0.30	56.8	12.71
LA23GCK-211		0.20	37.0	5.40	0.40	74.0	21.60
LA23GCK-212		0.40	74.0	21.60	0.79	148.0	86.40
LA23GCK-213		0.77	143.4	81.16	1.54	286.8	324.62
LA23ECK-3	6	0.09	14.6	0.61	0.17	29.2	2.44
LA23ECK-6		0.22	37.9	4.06	0.45	75.8	16.24
LA23ECK-4		0.34	58.6	9.72	0.69	117.2	38.88
LA23ECK-11		0.36	61.2	10.59	0.72	122.4	42.36
LA23ECK-12		0.71	120.6	41.19	1.42	241.2	164.76
LA23ECK-13		1.26	215.4	131.40	2.53	430.8	525.60
LA23BCK-9	13	0.11	18.1	0.76	0.21	36.2	3.04
LA23BCK-10		0.29	48.8	5.33	0.57	97.6	21.32
LA23BCK-11		0.34	58.6	7.80	0.69	117.2	31.20
LA23BCK-47		0.42	71.2	11.40	0.84	142.4	45.60
LA23BCK-40		0.80	136.7	41.15	1.61	273.4	164.60
LA23BCK-41		1.47	251.1	143.30	2.95	502.2	573.20
LA23DGK-1	18	0.20	36.34	1.10	0.39	72.6	4.40
LA23DGK-2		0.32	58.71	2.85	0.64	117.4	11.40
LA23DGK-23		0.55	100.65	8.35	1.09	201.2	33.40
LA23DGK-24		1.18	218.07	39.00	2.36	436.0	156.00
LA23DGK-25		2.04	377.42	117.10	4.09	754.8	468.00

Note: Dt = Unenergized detent torque.
Kb = Back EMF voltage constant.
Kt = Motor torque constant.
Lm = Phase inductance measured on a 1kHz bridge.

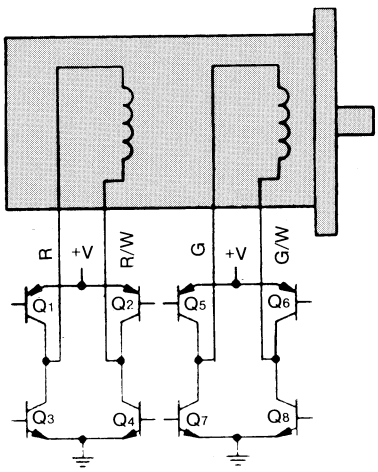




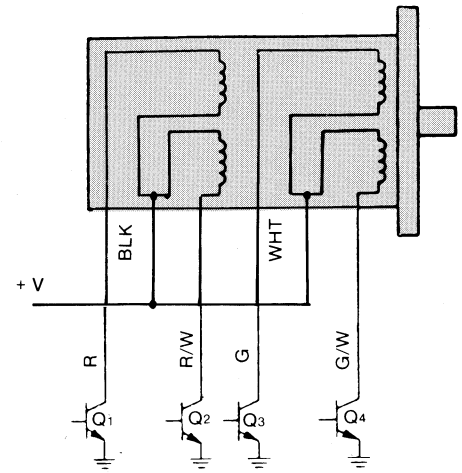




TYPICAL SATURATION CURVES



BIPOLAR



UNIPOLAR

CW ROTATION ↓ / CCW ROTATION ↑

Step	Q_1-Q_4	Q_2-Q_3	Q_5-Q_8	Q_6-Q_7
1	ON	OFF	ON	OFF
2	ON	OFF	OFF	ON
3	OFF	ON	OFF	ON
4	OFF	ON	ON	OFF
1	ON	OFF	ON	OFF

2 Phase On
Full Step
4 Step Sequence

Step	Q_1	Q_2	Q_3	Q_4
1	ON	OFF	ON	OFF
2	ON	OFF	OFF	ON
3	OFF	ON	OFF	ON
4	OFF	ON	ON	OFF
1	ON	OFF	ON	OFF

CW ROTATION ↓ / CCW ROTATION ↑

1	ON	OFF	ON	OFF
2	ON	OFF	OFF	OFF
3	ON	OFF	OFF	ON
4	OFF	OFF	OFF	ON
5	OFF	ON	OFF	ON
6	OFF	ON	OFF	OFF
7	OFF	ON	ON	OFF
8	OFF	OFF	ON	OFF
1	ON	OFF	ON	OFF

½ Step
8 Step Sequence

1	ON	OFF	ON	OFF
2	ON	OFF	OFF	OFF
3	ON	OFF	OFF	ON
4	OFF	OFF	OFF	ON
5	OFF	ON	OFF	ON
6	OFF	ON	OFF	OFF
7	OFF	ON	ON	OFF
8	OFF	OFF	ON	OFF
1	ON	OFF	ON	OFF

CW ROTATION ↓ / CCW ROTATION ↑

1	ON	OFF	OFF	OFF
2	OFF	OFF	OFF	ON
3	OFF	ON	OFF	OFF
4	OFF	OFF	ON	OFF
1	ON	OFF	OFF	OFF

1 Phase On
Full Step
4 Step Sequence

1	ON	OFF	OFF	OFF
2	OFF	OFF	OFF	ON
3	OFF	ON	OFF	OFF
4	OFF	OFF	ON	OFF
1	ON	OFF	OFF	OFF

Schematic Bipolar and Unpolar Switching Sequence. Direction of Rotation Viewed from Lead End.

NOTES:
- Angle accuracy error +/- 3% maximum.
- Other electrical and mechanical configurations available upon request.
- Class B insulation, 130°C standard, higher ratings available upon request.
- 4 and 8 lead motors are also available.
- 5, 7.5, and 15 degree step angles are also available.

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