

Unipolar Phase Energizing Sequences

Full Step (1.8°) Coil Energizing Sequence

CW ¹		CCW ¹	
2θ-On	1θ-On	2θ-On	1θ-On
A + D	A	A + D	A
A + B	B	C + D	D
C + B	C	C + B	C
C + D	D	A + B	B
A + D	A	A + D	A

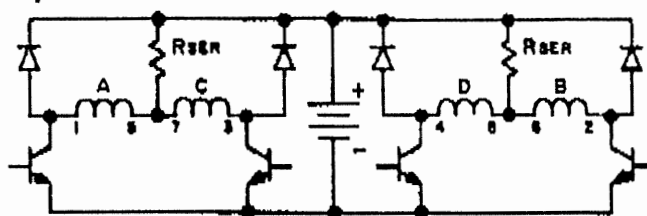
Note: 1. Viewed when facing the Mounting End of the Motor.

Half Step (0.9°) Phase Energizing Sequence (Alternate 1 θ On & 2 θ On)

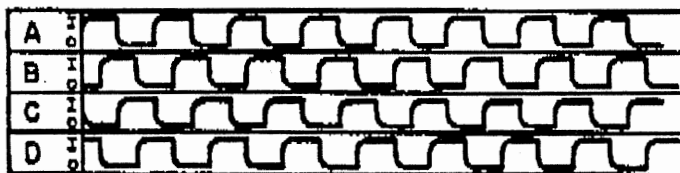
CW ¹		CCW ¹	
A + D	A + D	A + D	A + D
A	D	D	A
A + B	C + D	C + D	A + B
B	C	C	B
B + C	B + C	B + C	B + C
C	B	B	C
C + D	A + B	A + B	C + D
D	A	A	D
A + D	A + D	A + D	A + D

Note: 1. Viewed when facing the Mounting End of the Motor.

Unipolar Drive Circuit



Full Step CW Rotation Coil Currents (2θ On, Unipolar)



Motor Lead Identification

(Number to Color Conversion)

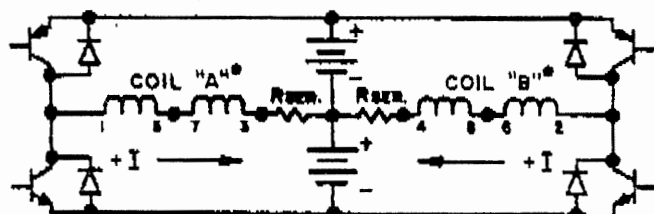
A Phase:	1 = Brown	5 = White/Brown Tracer
B Phase:	2 = Red	6 = White/Red Tracer
C Phase:	3 = Orange	7 = White/Orange Tracer
D Phase:	4 = Yellow	8 = White/Yellow Tracer

Bipolar Phase Energizing Sequences

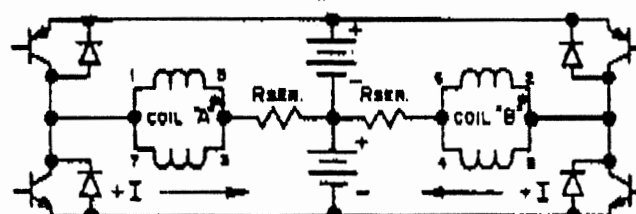
Under static or low speed conditions, bipolar drive can increase the torque from 20 to 40%. Eight lead motors may be connected for unipolar, series winding bipolar or parallel winding bipolar. In the bipolar mode (all windings simultaneously energized) current per phase must be limited to no more than 140% of the

Two-Phase-On unipolar rating for parallel coils or 70% for series coils to prevent overheating. For continuous duty, the total input power (watts) to the motor must not exceed its unipolar rating. Series coil configurations are not suitable for low voltage, high speed operation. Unipolar Two-Phase-On sequencing logic is often compatible with certain bipolar drives.

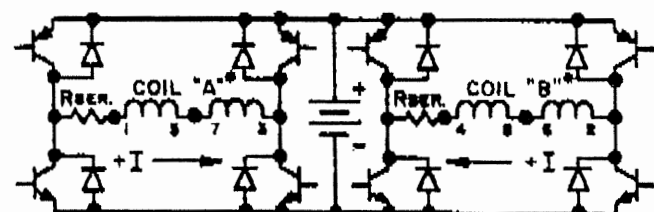
Dual Supply—Series Bipolar Drive Circuit



Dual Supply—Parallel Bipolar Drive Circuit

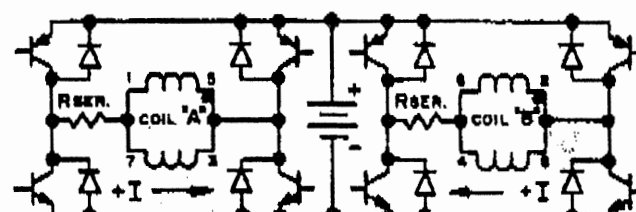


Single Supply—Series Bipolar Drive Circuit

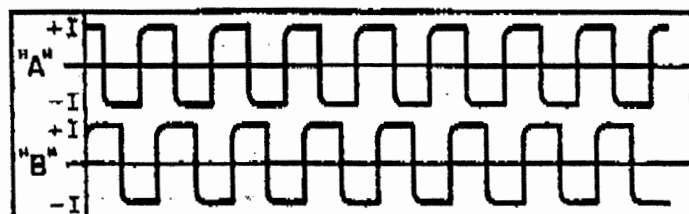


*Coil "A" and Coil "B" notation refers to 2 coils in series or parallel, not to the A and B coils shown in the unipolar schematic.

Single Supply—Parallel Bipolar Drive Circuit



Full Step CW* Rotation Coil Currents



*Coil "A" and Coil "B" notation refers to 2 coils in series or parallel, not to the A and B coils shown in the unipolar schematic.

Half Step (0.9°) Coil Energizing Sequence

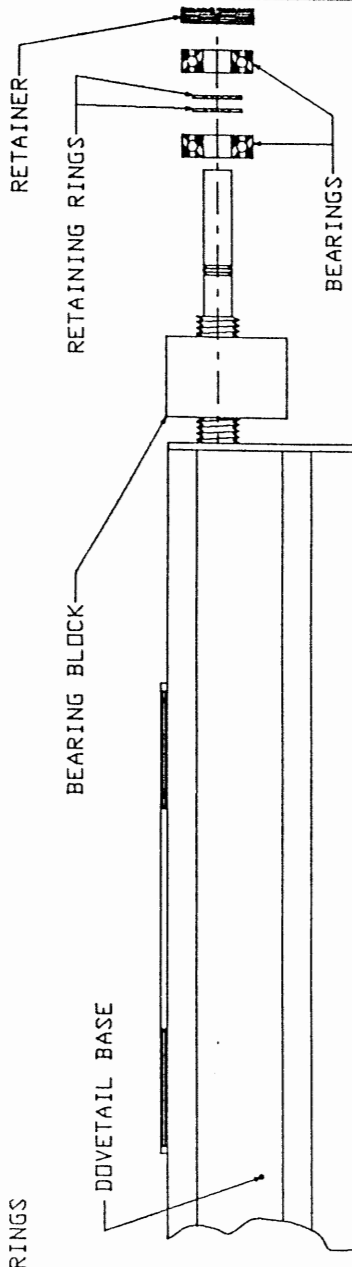
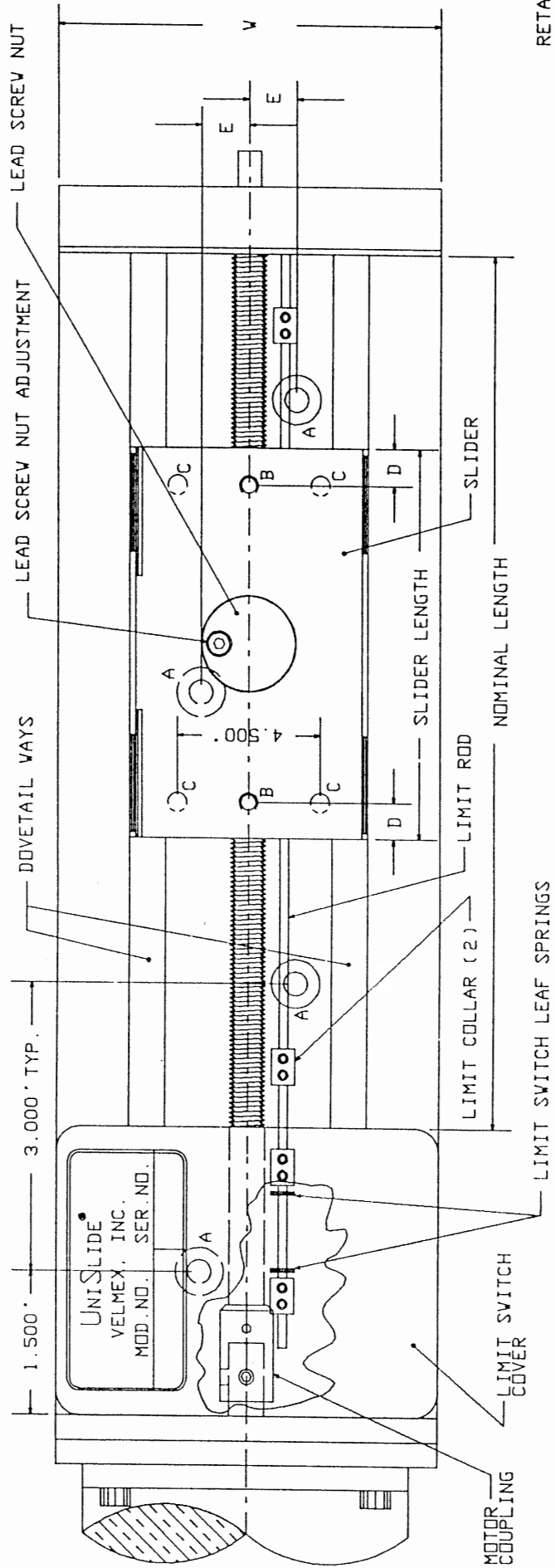
CW ¹		CCW ¹	
A*	B*	A*	B*
+I	+I	+I	+I
0	+I	+I	0
-I	+I	+I	-I
-I	0	0	-I
-I	-I	-I	-I
0	-I	-I	0
+I	-I	-I	+I
+I	0	0	+I

Note: 1. Viewed when facing the Mounting End of Motor.

Full Step (1.8°) Phase Energizing Sequence

CW ¹		CCW ¹	
A*	B*	A*	B*
+I	+I	+I	+I
-I	+I	+I	-I
-I	-I	-I	-I
+I	-I	-I	+I
+I	+I	+I	+I

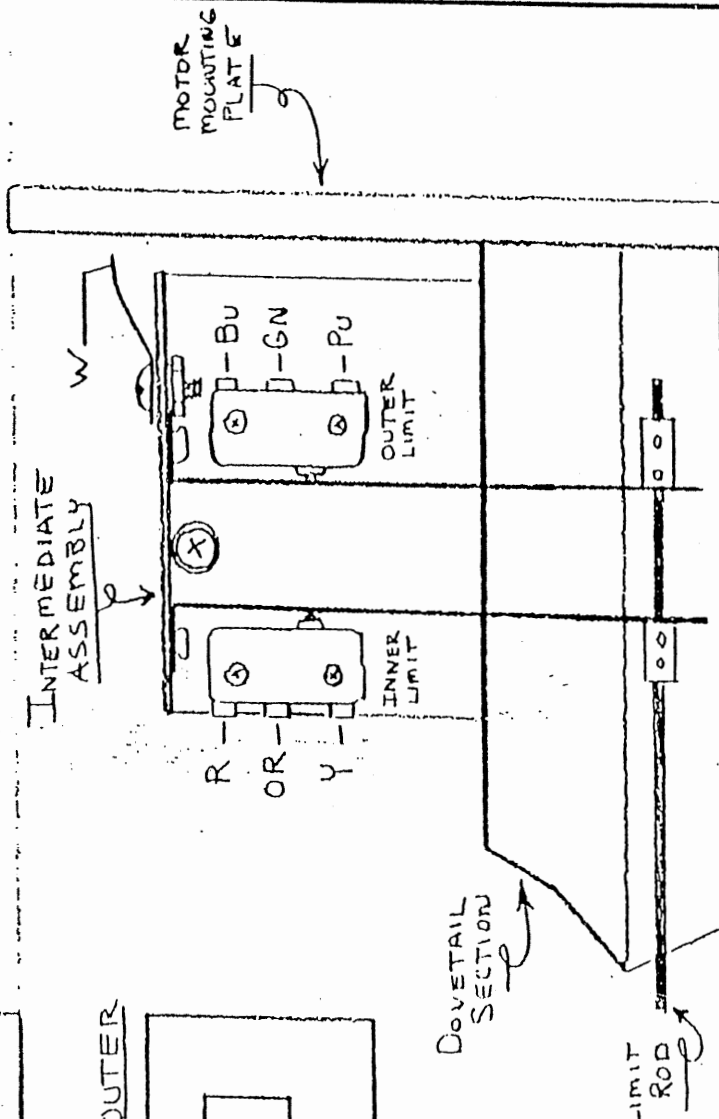
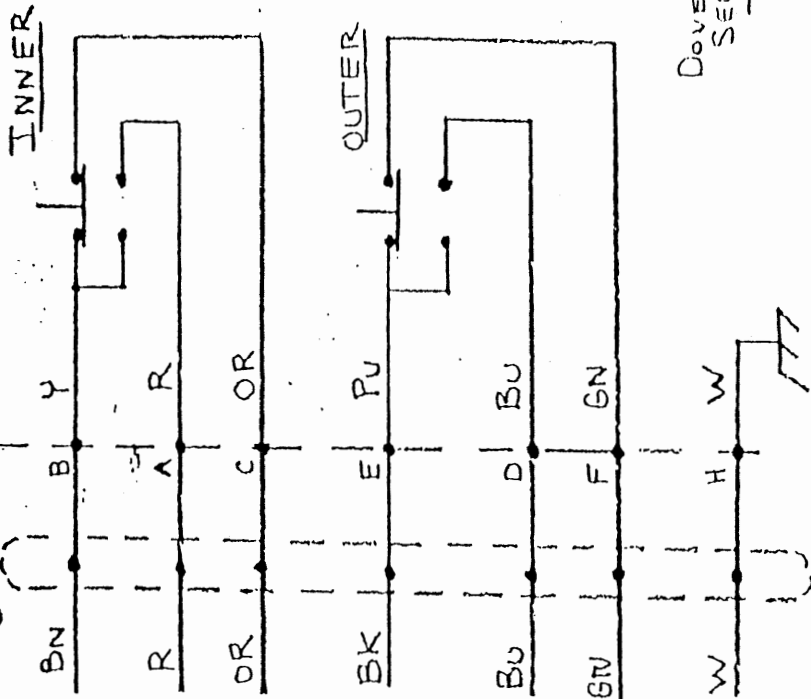
Note: 1. Viewed when facing the Mounting End of Motor.



VELMEX, INC.					DRAWN BY M.L.E.	
					SCALE	
					TITLE UNISLIDE MOTOR DRIVEN ASSEMBLY	
					DATE 11-16-87	
					DVG NUMBER 8909-A3	
SERIES	A ¹ (clearance for)	B	C	D	E	V
B2500	10-32	8-32	B9000	7/32	11/32	2.5
B4000	1/4-20	10-32	SERIES	3/8	1/2	4.0
B6000	5/16-18	1/4-20	ONLY	1/2	3/4	6.0
B9000	3/8-20	1/4-20 5° APART	5/16-18	1	1 7/8	9.0

7 COND. CABLE

7 PIN AMPHENOL
CONNECTOR

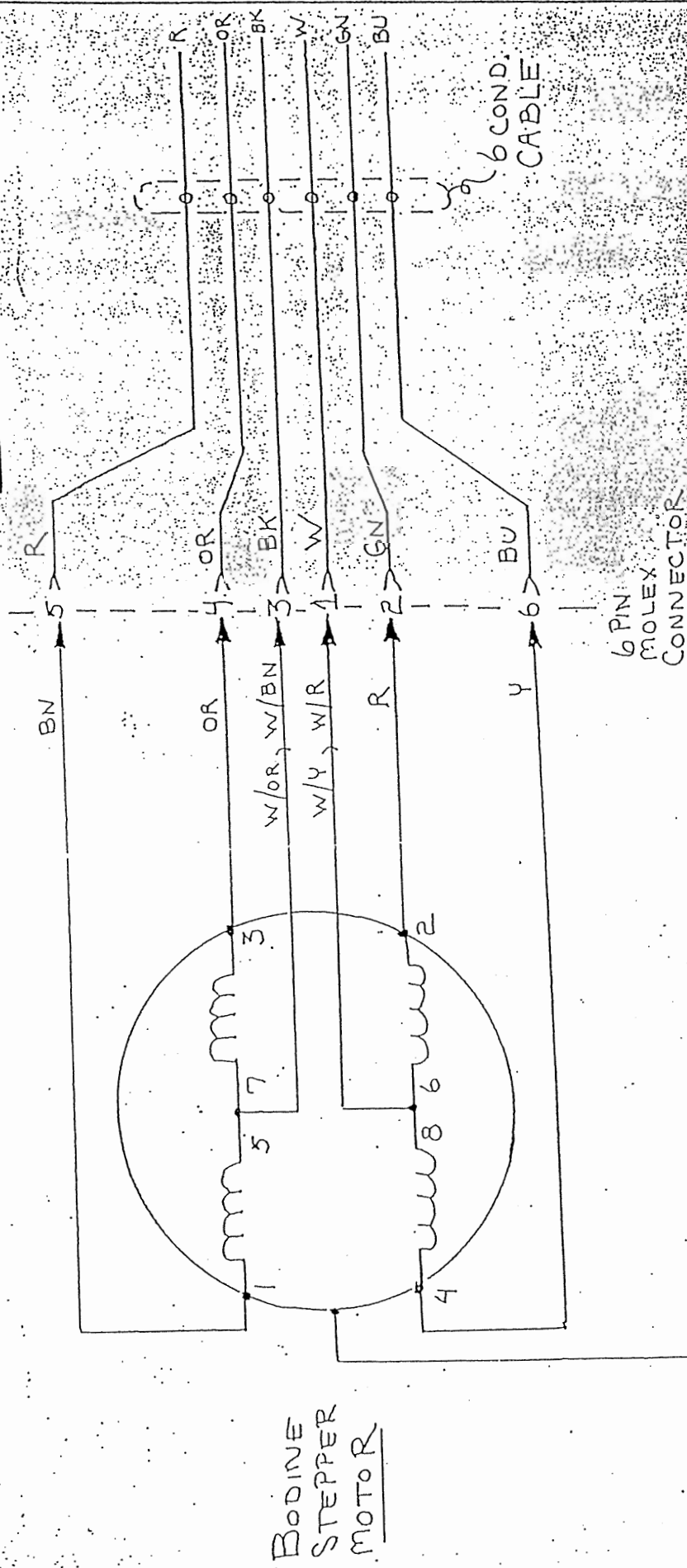


LIMIT SWITCHES - MICRO IIS M1

SPEC. NOTE:

TOLERANCES (EXCEPT AS NOTED)		VELMEX, INC.	
DECIMAL	±	SCALE	DRAWN BY
FRACTIONAL	±	APPROVED BY	
ANGULAR	±	TITLE INTERMEDIATE ASSEMBLY AND LIMIT SWITCH CONNECTIONS P	
DATE		DRAWING NUMBER	

DATE	SYM	REVISION RECORD	TH	DR.	CK.



TOLERANCES (EXCEPT AS NOTED)	VELMEX, INC.		
DECIMAL	SCALE	DRAWN BY	APPROVED BY
FRACTIONAL	TITLE BODINE STEPPER MOTOR WITH MOLEX CONNECTOR & CABLE		
ANGULAR	DATE	DRAWING NUMBER	070985A