



**Haydon**  
Motion Solutions



TM

## Precision Linear Motion Products Catalog and Design Guide



Leadscrews



Anti-Backlash  
Nuts



Custom Leadscrew  
Assemblies



Can-Stack Linear Actuators



Hybrid Linear  
Actuators



LRS™ Motorized  
Linear  
Rail Systems



ScrewRail®  
Assemblies



RGS®  
Rapid Guide  
Screws



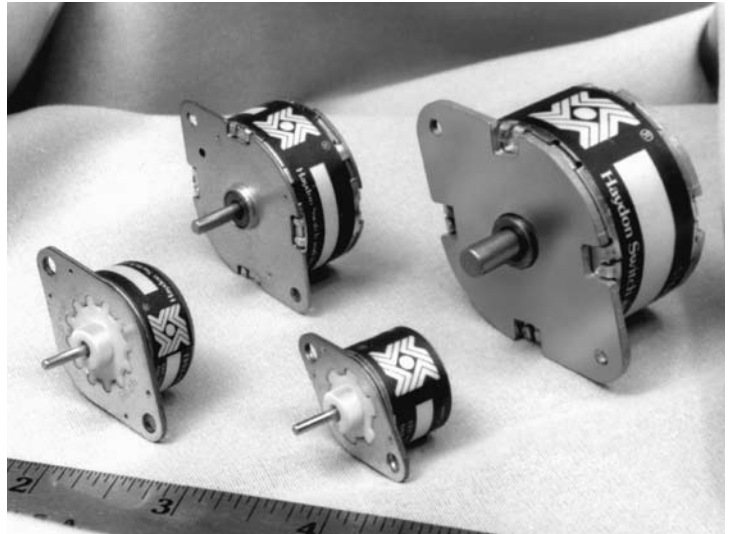
Spline Shafts,  
Slides and  
Linear Guides

## HaydonKerk Motion Solutions™ also offers rotary motors that are built to provide exceptionally high torque to size ratios.

By utilizing a patented enlarged rotor with low inductance coils, the motors provide superior torque and continuous, reliable high performance. At rated voltage, the 46 mm motor produces 16 oz.-in. of holding torque, the 36 mm motor produces 4.5 oz.-in., the 26 mm motor produces 1.8 oz.-in. and the 20 mm motor produces 0.65 oz.-in. Optional rare earth magnets may be specified for even higher torque. Bronze sleeve bearings are standard, ball bearings are also available.

HaydonKerk Motion Solutions™ has patented technology and the facilities to produce these motors in high volume. We provide rapid turn-around for prototypes and production orders. Custom designs and special engineering requirements such as special shaft diameters, lengths and mounting flanges are welcome.

Some typical applications for Haydon rotary motors include medical equipment, bar code scanning devices, printing equipment, laboratory instrumentation and other high torque, small space mechanisms.



## Part Number Construction: Rotary Stepper Motors

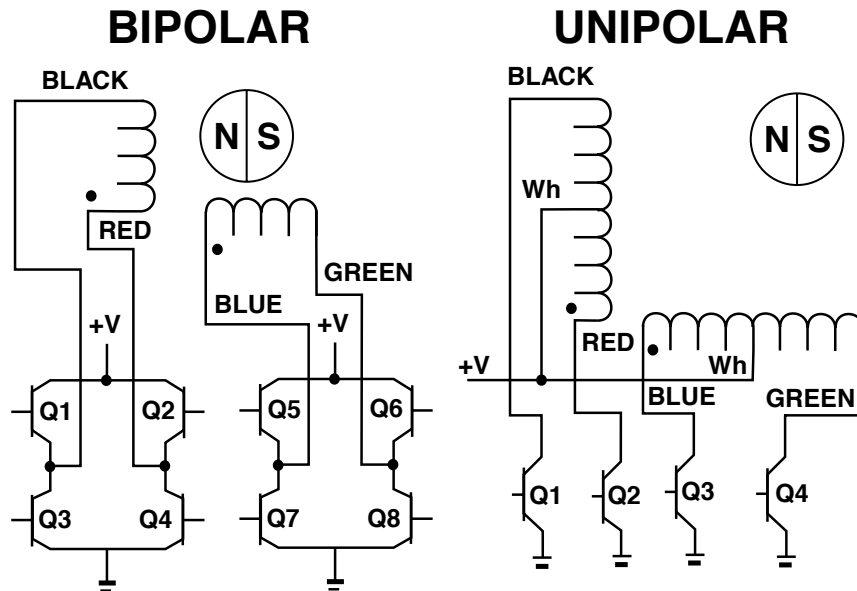
<b>T</b>	<b>26</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>05</b>	<b>999</b>
<b>Prefix</b> (only when using the following)	<b>Series number designation:</b> <b>26 = 26000</b>	<b>Style</b> <b>4 = 7.5°</b> <b>5 = 15°</b>	<b>Coils</b> <b>4 = Bipolar (4 wire)</b> <b>6 = Unipolar (6 wire)</b>	<b>Code ID Resolution Travel/Step</b> <b>0 = Rotary</b>	<b>Voltage</b> (Example: <b>05 = 5 VDC;</b> <b>12 = 12 VDC)</b> Custom V available	<b>Suffix:</b> <b>-999 = ball bearings</b> <b>-XXX = Special or custom</b> (Special part numbers for custom screw lengths and design options will require an issued 3 digit suffix number. Please contact our sales or applications engineering department for assistance.)
<b>T =</b> High Temp.	Available Series: <b>Z20000</b> <b>Z26000</b> <b>36000</b> <b>46000</b>					
<b>R =</b> Rare earth magnet	(Series numbers represent diameters of motor body)					

### EXAMPLES:

**T26440-05** = High temperature, 26000 series (Ø26 mm, 1-in), 7.5°, bipolar coils, rotary motor, 5 VDC

**36540-12-999** = 36000 series (Ø36 mm, 1.4-in), 15°, bipolar coils, rotary motor, 12 VDC, ball bearings





## Rotary Stepper Motors: Stepping Sequence

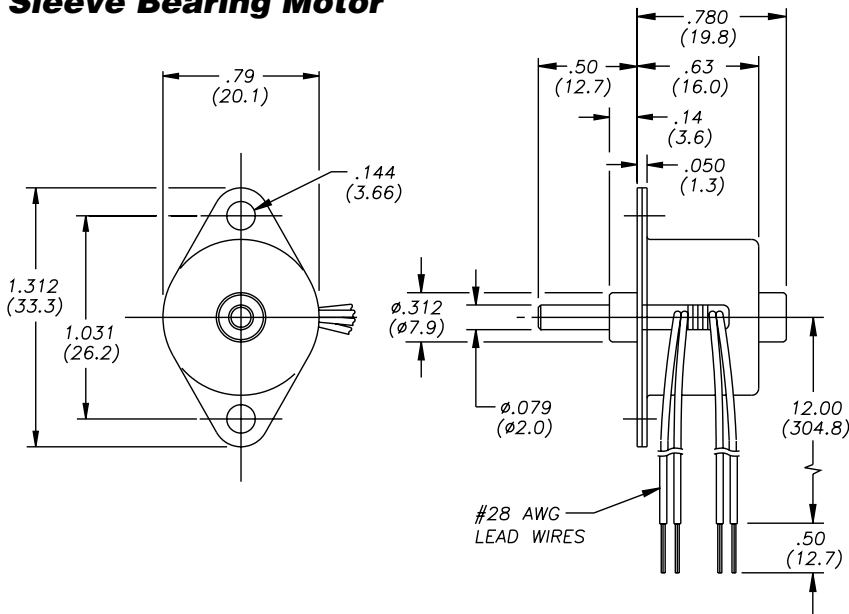
	Bipolar	Q2-Q3	Q1-Q4	Q6-Q7	Q5-Q8
	Unipolar	Q1	Q2	Q3	Q4
	Step				
1		ON	OFF	ON	OFF
2		OFF	ON	ON	OFF
3		OFF	ON	OFF	ON
4		ON	OFF	OFF	ON
1		ON	OFF	ON	OFF

CW Rotation
CCW Rotation

**Note:** Half stepping is accomplished by inserting an off state between transitioning phases. Shaft rotation as viewed from the output shaft.

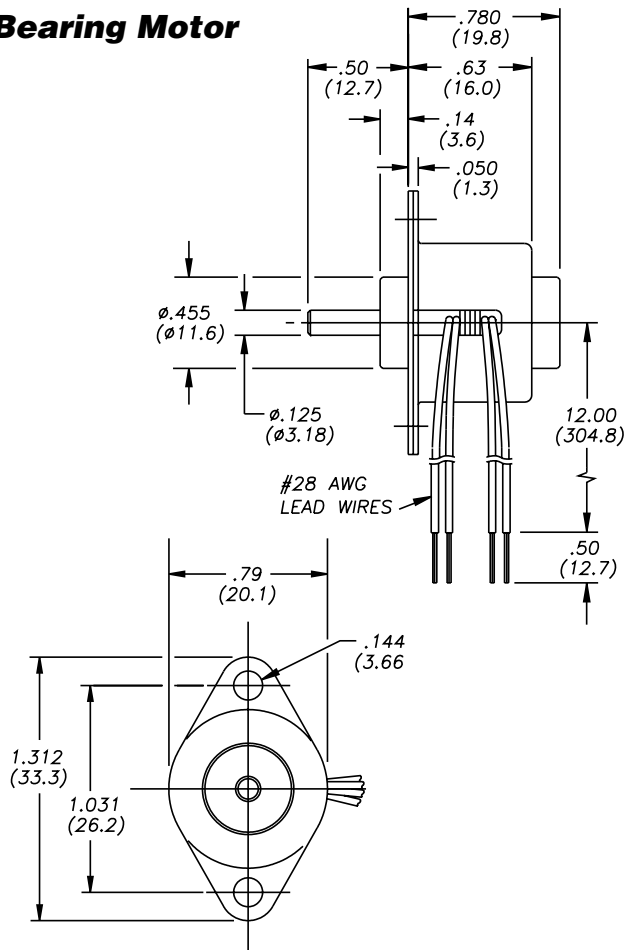
**Z20000 Series: Ø 20 mm (.79-in) Rotary Motors**

**Sleeve Bearing Motor**



Select Sleeve or Ball Bearing Designs

**Ball Bearing Motor**

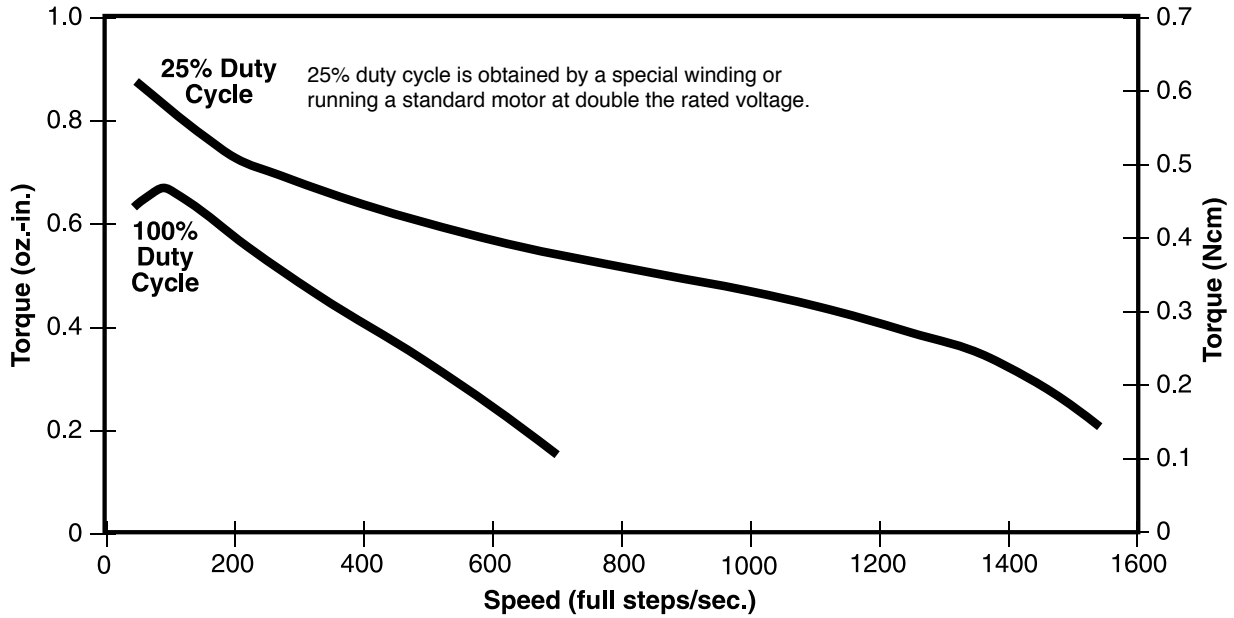


**Salient Characteristics**

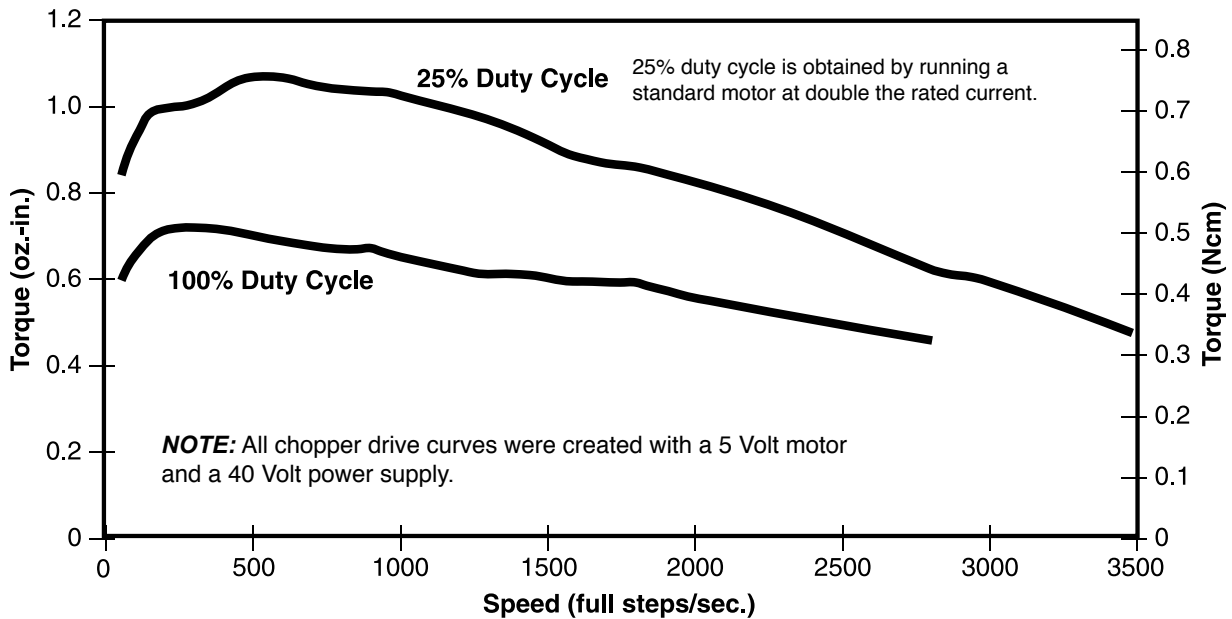
Ø 20 mm (3/4") Rotary Stepper		
Wiring	Bipolar	
Part No. (Sleeve)*	Z20540-05	Z20540-12
Step angle	15°	
Winding voltage	5 VDC	12 VDC
Current/phase	250 mA	100 mA
Resistance/phase	20 Ω	118 Ω
Inductance/phase	5.5 mH	32 mH
Hold torque	.65 oz-in. (.46 Ncm)	
Detent torque	.17 oz-in. (.12 Ncm)	
Power consumption	2.5 W	
Rotor Inertia	1.13 gcm <sup>2</sup>	
Weight	.80 oz. (22.7 g)	
Insulation resistance	20 MΩ	
Temperature rise	135°F Rise (75°C Rise)	

\*For Ball Bearings add " -999" to the end of this number

**TORQUE vs FULL STEP/SECOND**  
**L/R DRIVE • BIPOLAR • 15° STEP ANGLE**



**CHOPPER DRIVE • BIPOLAR • 15° STEP ANGLE**



**FOR BOTH L/R and CHOPPER DRIVES:** Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

## 26000 Series: Ø 26 mm (1-in) Rotary Motors

Select Sleeve  
or Ball Bearing  
Designs

Other styles available...

- Z-Series
- High Temperature Option



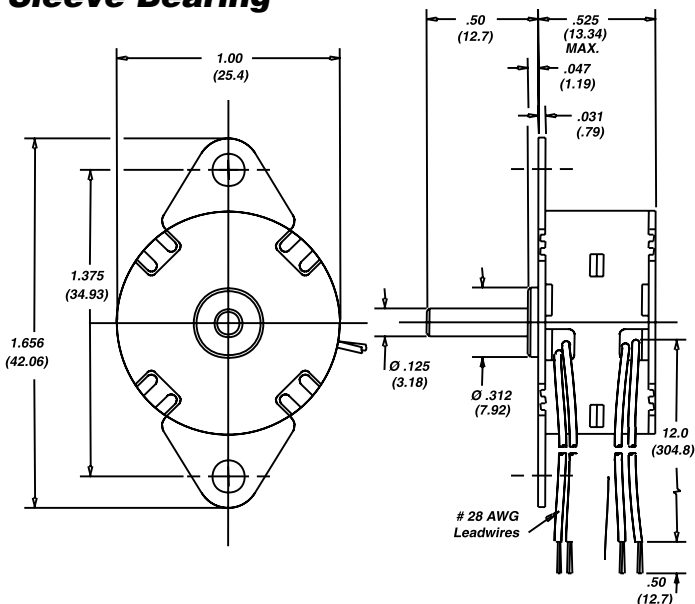
### Salient Characteristics

Ø 26 mm (1-in) Rotary Stepper Motor				
Wiring	Bipolar			
Part No. (Sleeve)*	26440-05	26440-12	26540-05	26540-12
Step angle	7.5°		15°	
Winding voltage	5 VDC	12 VDC	5 VDC	12 VDC
Current/phase	340 mA	140 mA	340 mA	140 mA
Resistance/phase	14.7 Ω	84 Ω	14.7 Ω	84 Ω
Inductance/phase	8.5 mH	55 mH	6.7 mH	44 mH
Hold torque	1.6 oz-in. (1.13 Ncm)		1.3 oz-in. (.92 Ncm)	
Detent torque	.12 oz-in. (.09 Ncm)		.14 oz-in. (.10 Ncm)	
Power consumption	3.4 W			
Rotor Inertia	1.2 gcm <sup>2</sup>			
Weight	1 oz. (28 g)			
Insulation resistance	20 MΩ			
Temperature rise	135°F Rise (75°C Rise)			

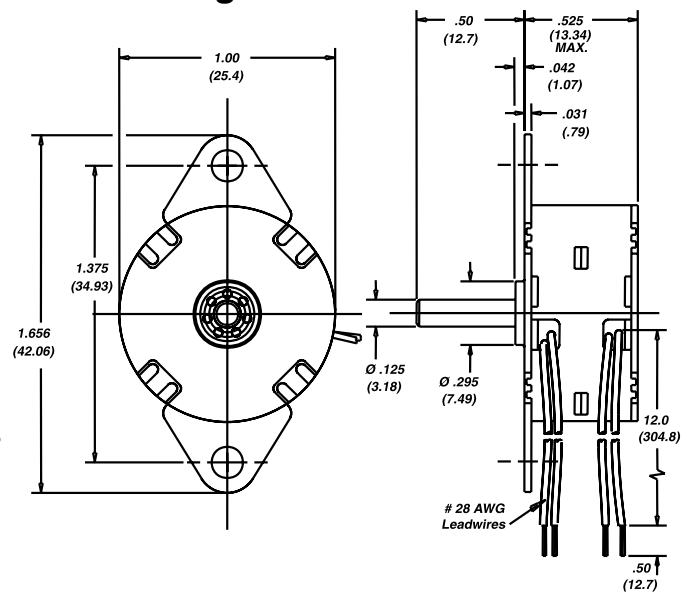
Ø 26 mm (1-in) Rotary Stepper Motor				
Unipolar				
Part No.	26460-05	26460-12	26560-05	26560-12
Step angle	7.5°		15°	
Winding voltage	5 VDC	12 VDC	5 VDC	12 VDC
Current/phase	340 mA	140 mA	340 mA	140 mA
Resistance/phase	14.7 Ω	84 Ω	14.7 Ω	84 Ω
Inductance/phase	4.3 mH	24 mH	3.4 mH	19 mH
Hold torque	1.2 oz-in. (.85 Ncm)		.9 oz-in. (.64 Ncm)	
Detent torque	.12 oz-in. (.09 Ncm)		.14 oz-in. (.10 Ncm)	
Power consumption	3.4 W			
Rotor Inertia	1.2 gcm <sup>2</sup>			
Weight	1 oz. (28 g)			
Insulation resistance	20 MΩ			
Temperature rise	135°F Rise (75°C Rise)			

\*For Ball Bearings add “-999” to the end of this number

### Dimensional Drawings: Sleeve Bearing



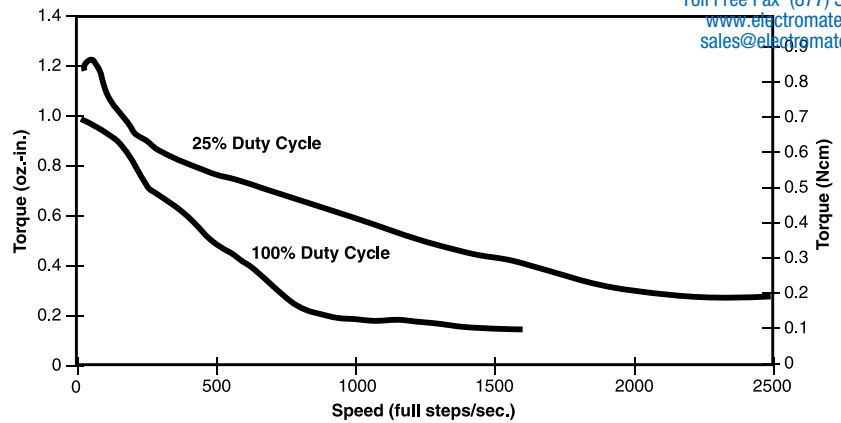
### Ball Bearing



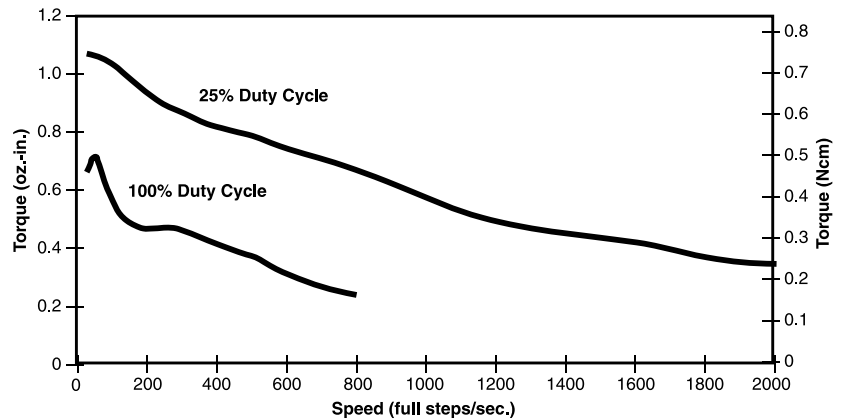
## TORQUE vs FULL STEPS/SECOND

### Bipolar • L/R Drive 7.5° Step Angle

25% duty cycle is obtained by a special winding or running a standard motor at double the rated voltage.

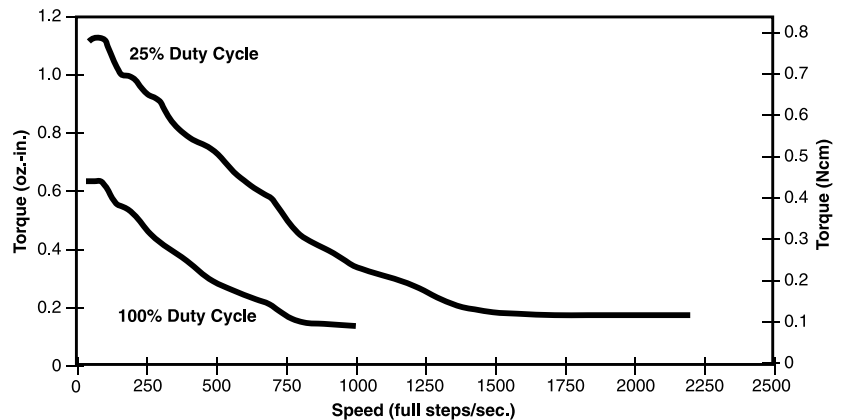


### Bipolar • L/R Drive 15° Step Angle



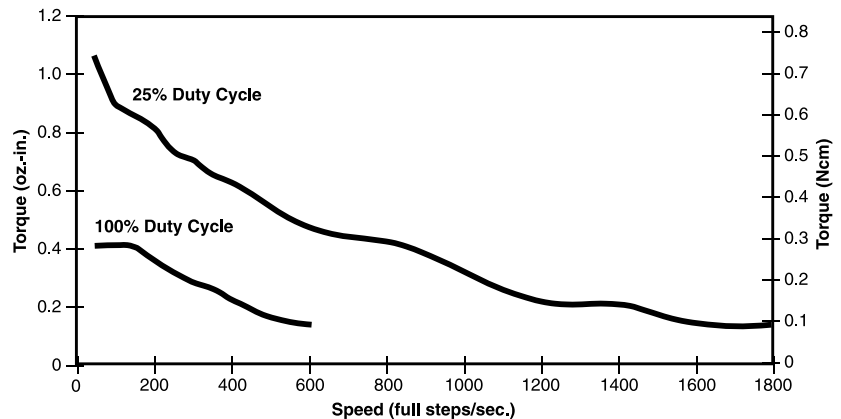
### Unipolar • L/R Drive 7.5° Step Angle

25% duty cycle is obtained by a special winding or running a standard motor at double the rated voltage.

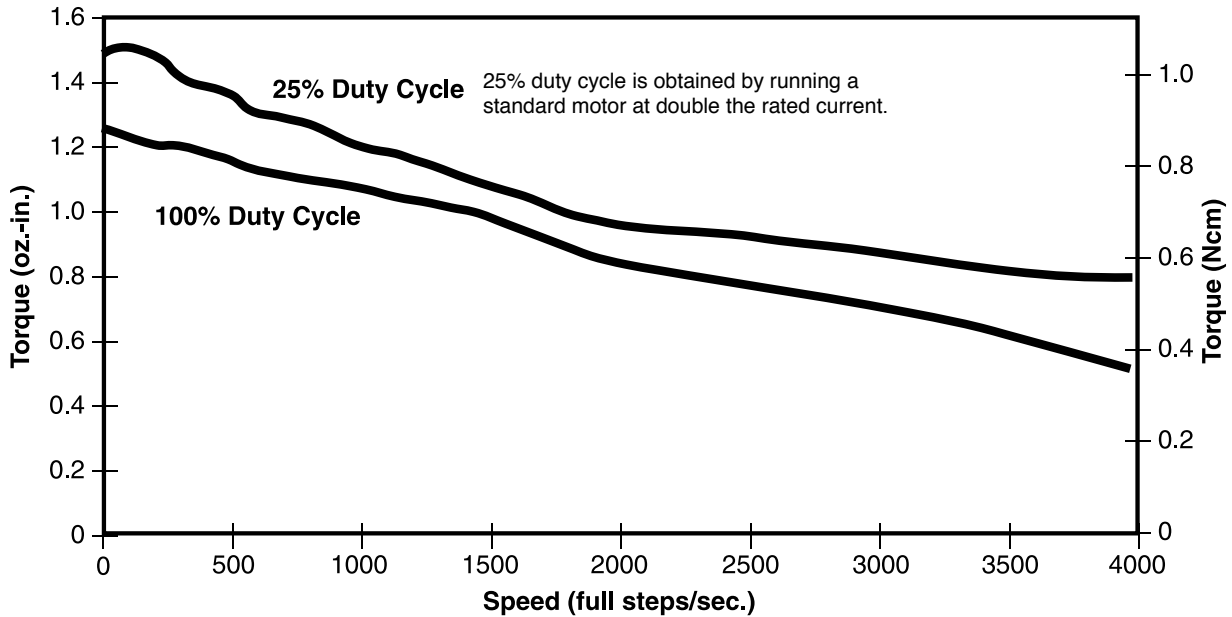


### Unipolar • L/R Drive 15° Step Angle

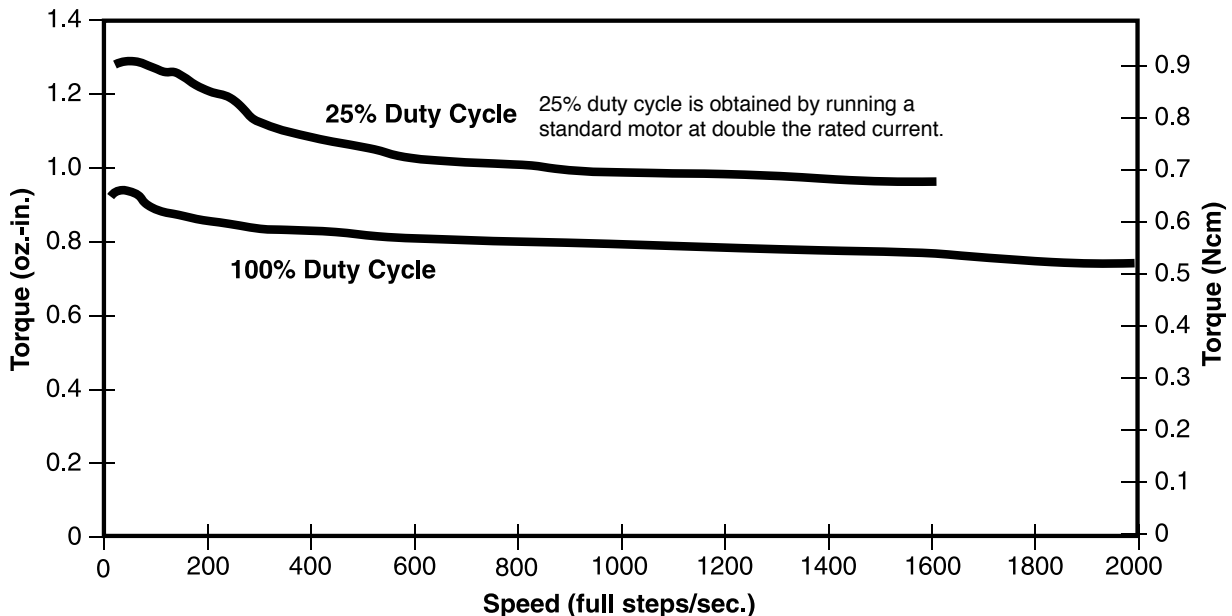
**NOTE:** Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.



**TORQUE vs FULL STEP/SECOND**  
**CHOPPER DRIVE • BIPOLAR • 7.5° STEP ANGLE**



**CHOPPER DRIVE • BIPOLAR • 15° STEP ANGLE**



**NOTE:** All chopper drive curves were created with a 5 Volt motor and a 40 Volt power supply.

Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.



# Z26000 Series: Ø 26 mm (1-in) Rotary Motors



HaydonKerk Motion Solutions™

Sold & Serviced By:  
**ELECTROMATE**

Toll Free Phone (877) SERV098  
Toll Free Fax (877) SERV099  
www.electromate.com  
sales@electromate.com



## Z26000 Series: Ø 26 mm (1.0-in) Economy Rotary Motors

Designed for high volume production

Select Sleeve  
or Ball Bearing  
Designs

### Salient Characteristics

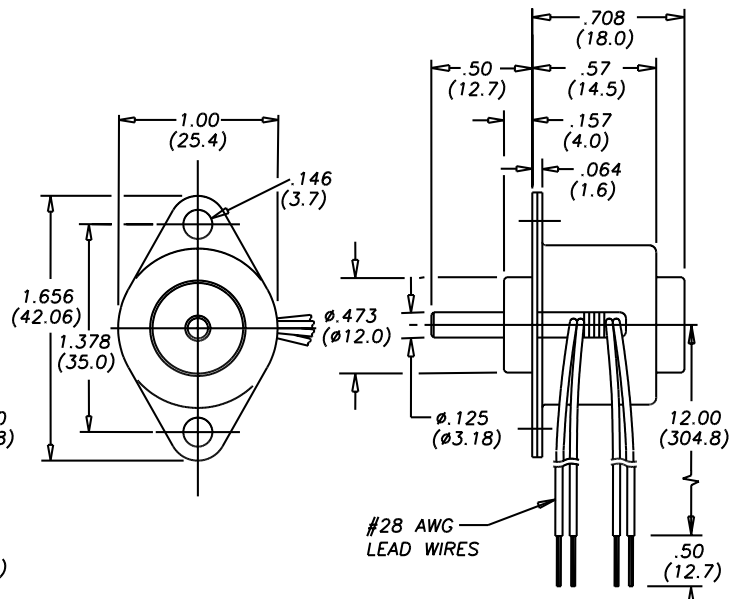
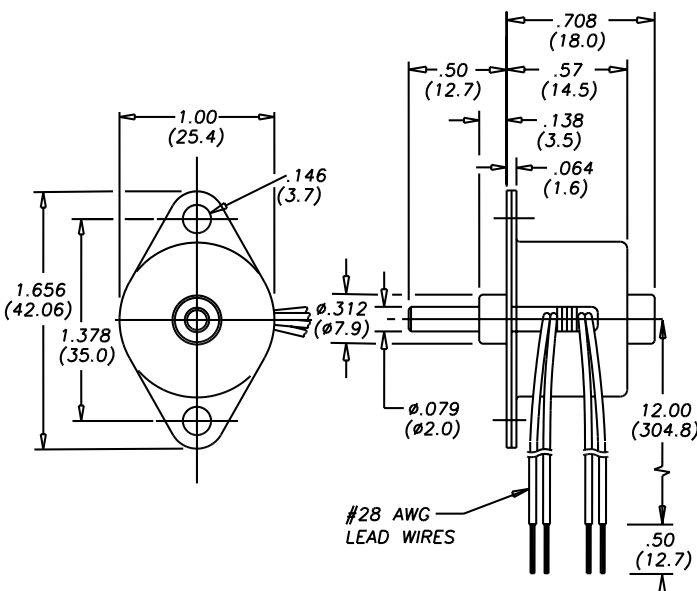
Ø 26 mm (1-in) Rotary Stepper Motor				
Wiring	Bipolar			
Part No. (Sleeve)*	Z26440-05	Z26440-12	Z26540-05	Z26540-12
Step angle	7.5°		15°	
Winding voltage	5 VDC	12 VDC	5 VDC	12 VDC
Current/phase	340 mA	140 mA	340 mA	140 mA
Resistance/phase	14.7 Ω	84 Ω	14.7 Ω	84 Ω
Inductance/phase	8.5 mH	55 mH	6.7 mH	44 mH
Hold torque	1.8 oz-in. (1.27 Ncm)		1.5 oz-in. (1.06 Ncm)	
Detent torque	.25 oz-in. (.18 Ncm)		.35 oz-in. (.25 Ncm)	
Power consumption	3.4 W			
Rotor Inertia	1.40 gcm <sup>2</sup>			
Weight	1.15 oz. (32.6 g)			
Insulation resistance	20 MΩ			
Temperature rise	135°F Rise (75°C Rise)			

Ø 26 mm (1-in) Rotary Stepper Motor				
Unipolar				
Z26460-05	Z26460-12	Z26560-05	Z26560-12	
7.5°		15°		
5 VDC	12 VDC	5 VDC	12 VDC	
340 mA	140 mA	340 mA	140 mA	
14.7 Ω	84 Ω	14.7 Ω	84 Ω	
4.3 mH	24 mH	3.4 mH	19 mH	
1.3 oz-in. (.92 Ncm)		1 oz-in. (.71 Ncm)		
.25 oz-in. (.18 Ncm)		.35 oz-in. (.25 Ncm)		
3.4 W				
1.40 gcm <sup>2</sup>				
1.15 oz. (32.6 g)				
20 MΩ				
135°F Rise (75°C Rise)				

\*For Ball Bearings add “-999” to the end of this number

### Dimensional Drawings: Sleeve Bearing

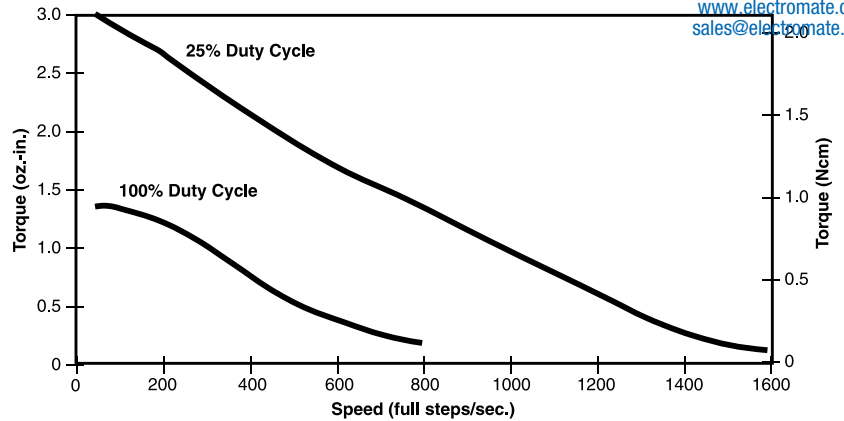
### Ball Bearing



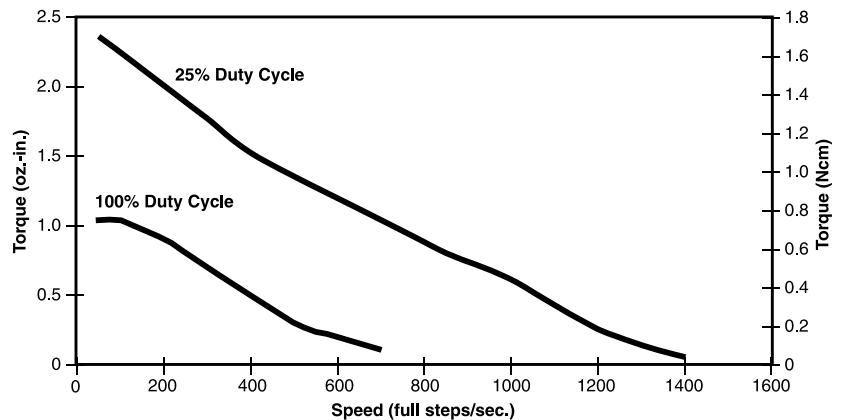
**TORQUE vs  
FULL STEPS/SECOND**

**Bipolar • L/R Drive  
7.5° Step Angle**

25% duty cycle is obtained by a special winding or running a standard motor at double the rated voltage.

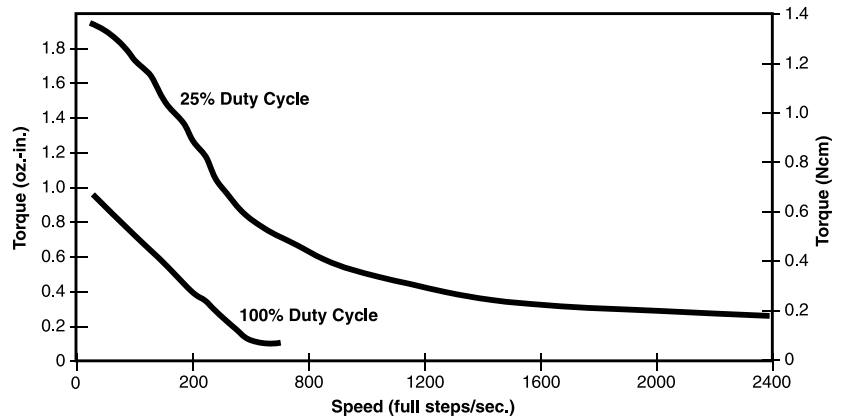


**Bipolar • L/R Drive  
15° Step Angle**



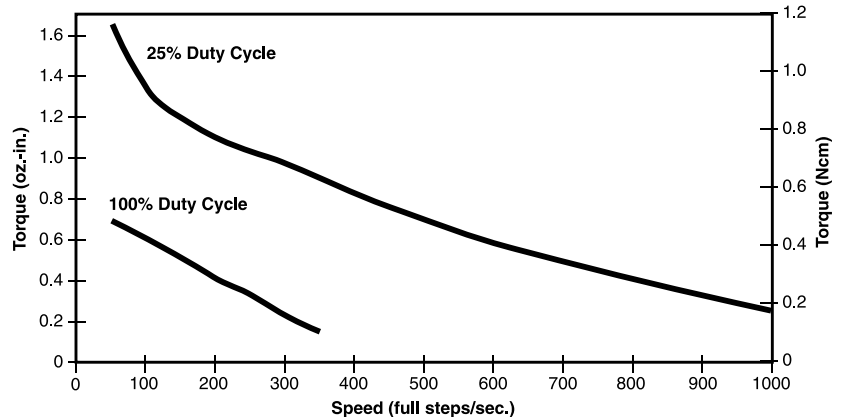
**Unipolar • L/R Drive  
7.5° Step Angle**

25% duty cycle is obtained by a special winding or running a standard motor at double the rated voltage.

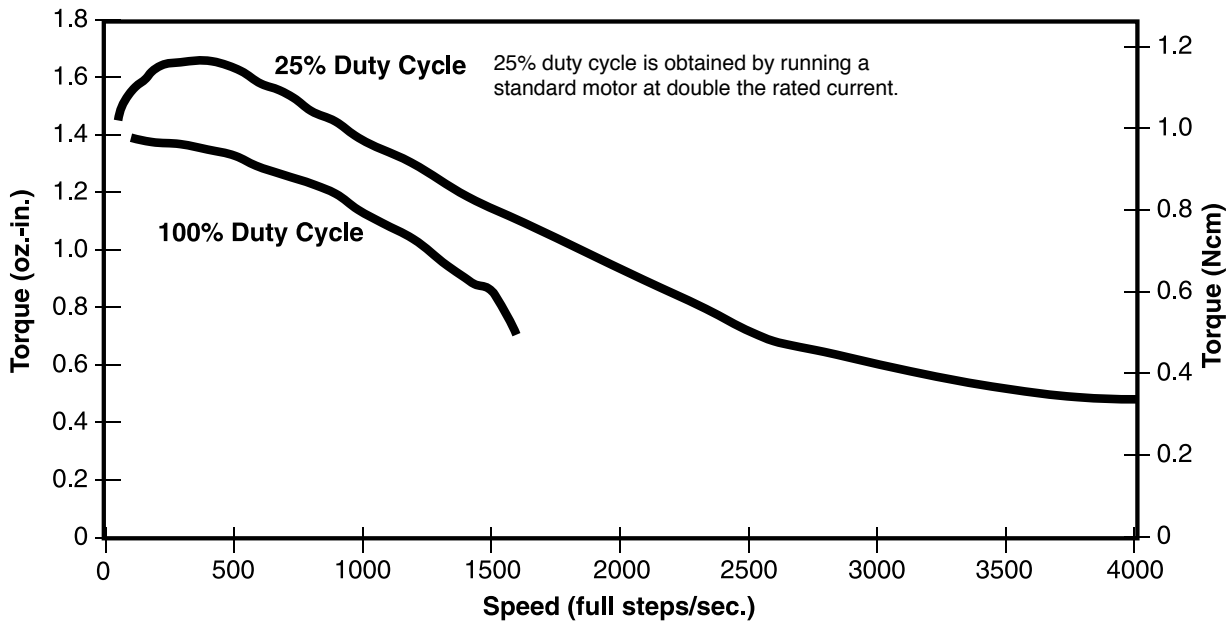


**Unipolar • L/R Drive  
15° Step Angle**

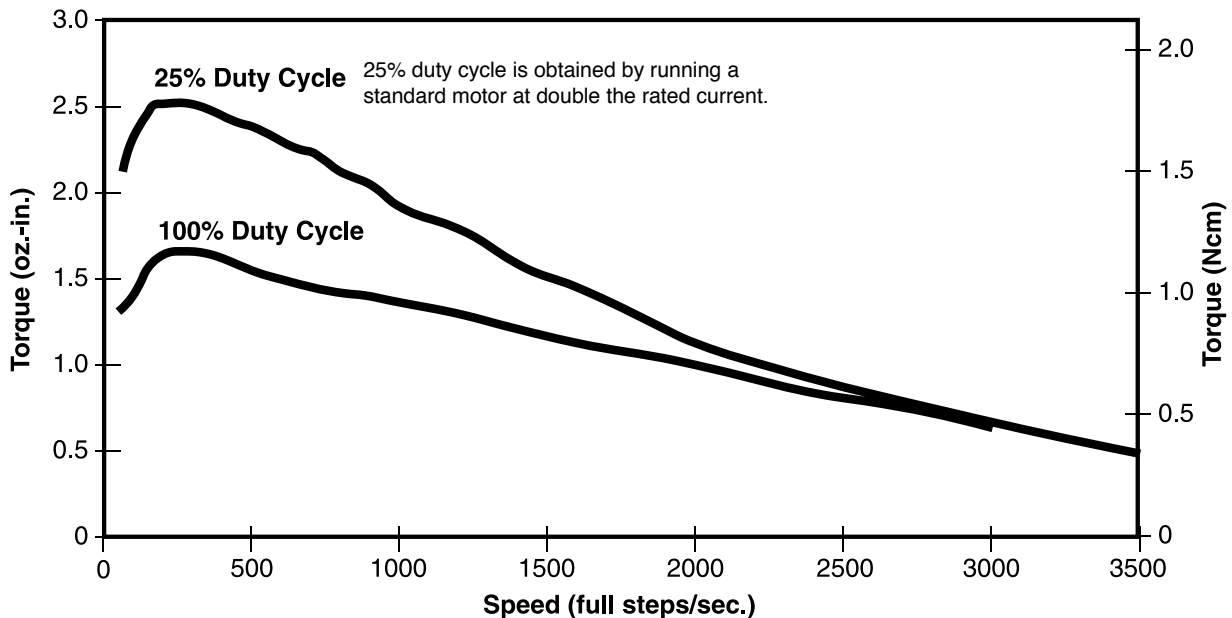
**NOTE:** Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.



**TORQUE vs FULL STEP/SECOND**  
**CHOPPER DRIVE • BIPOLAR • 7.5° STEP ANGLE**



**CHOPPER DRIVE • BIPOLAR • 15° STEP ANGLE**



**NOTE:** All chopper drive curves were created with a 5 Volt motor and a 40 Volt power supply.

Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

## 36000 Series: Ø 36 mm (1.4-in) Rotary Motors

Select Sleeve  
or Ball Bearing  
Designs

Other styles available...

- High Temperature Option



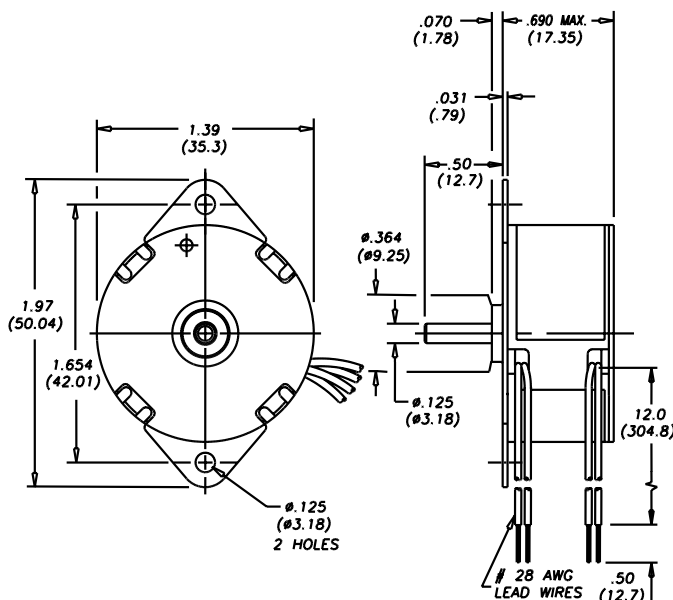
### Salient Characteristics

Ø 36 mm (1.4-in) Rotary Stepper Motor				
Wiring	Bipolar			
Part No. (Sleeve)*	36440-05	36440-12	36540-05	36540-12
Step angle	7.5°		15°	
Winding voltage	5 VDC	12 VDC	5 VDC	12 VDC
Current/phase	460 mA	190 mA	460 mA	190 mA
Resistance/phase	11 Ω	63 Ω	11 Ω	63 Ω
Inductance/phase	7.2 mH	45 mH	5.5 mH	35 mH
Hold torque	4.5 oz-in. (3.18 Ncm)		2.9 oz-in. (2.05 Ncm)	
Detent torque	.28 oz-in. (.20 Ncm)		.37 oz-in. (.26 Ncm)	
Power consumption	4.6 W			
Rotor Inertia	10.5 gcm <sup>2</sup>			
Weight	2.5 oz. (70 g)			
Insulation resistance	20 MΩ			
Temperature rise	135°F Rise (75°C Rise)			

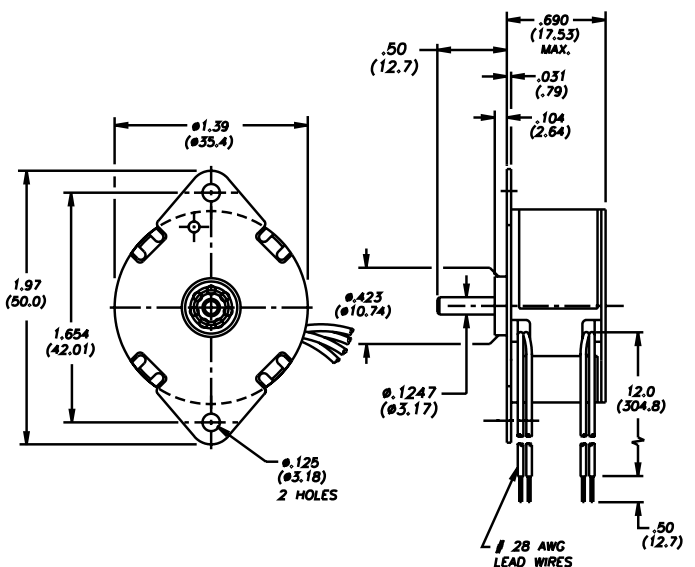
Ø 36 mm (1.4-in) Rotary Stepper Motor				
Unipolar				
Part No.	36460-05	36460-12	36560-05	36560-12
Step angle	7.5°		15°	
Winding voltage	5 VDC	12 VDC	5 VDC	12 VDC
Current/phase	460 mA	190 mA	460 mA	190 mA
Resistance/phase	11 Ω	63 Ω	11 Ω	63 Ω
Inductance/phase	3.8 mH	19 mH	3.0 mH	15 mH
Hold torque	3.0 oz-in. (2.12 Ncm)		2.0 oz-in. (1.41 Ncm)	
Detent torque	.28 oz-in. (.20 Ncm)		.37 oz-in. (.26 Ncm)	
Power consumption	4.6 W			
Rotor Inertia	10.5 gcm <sup>2</sup>			
Weight	2.5 oz. (70 g)			
Insulation resistance	20 MΩ			
Temperature rise	135°F Rise (75°C Rise)			

\*For Ball Bearings add “-999” to the end of this number

### Dimensional Drawings: Sleeve Bearing



### Ball Bearing

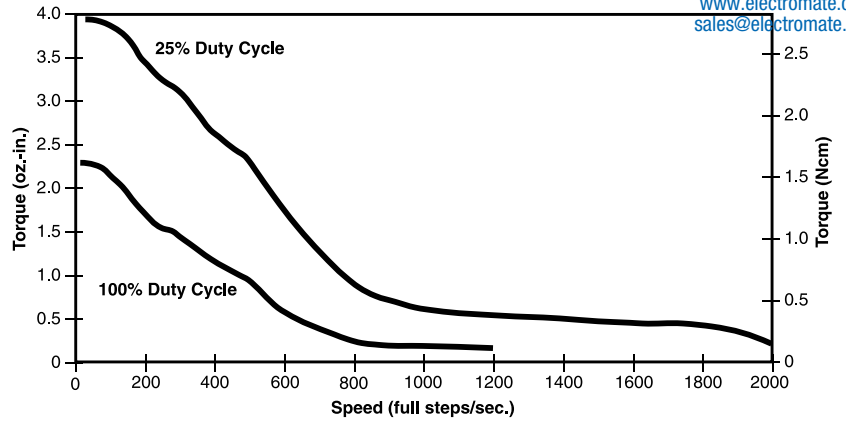




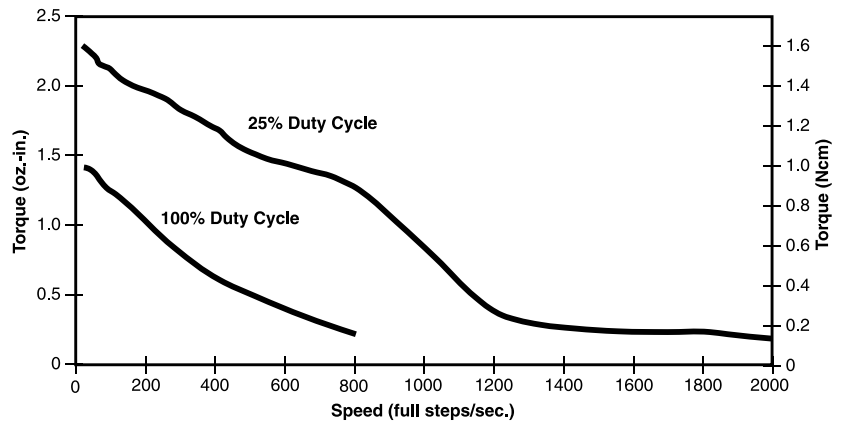
## TORQUE vs FULL STEPS/SECOND

### Bipolar • L/R Drive 7.5° Step Angle

25% duty cycle is obtained by a special winding or running a standard motor at double the rated voltage.

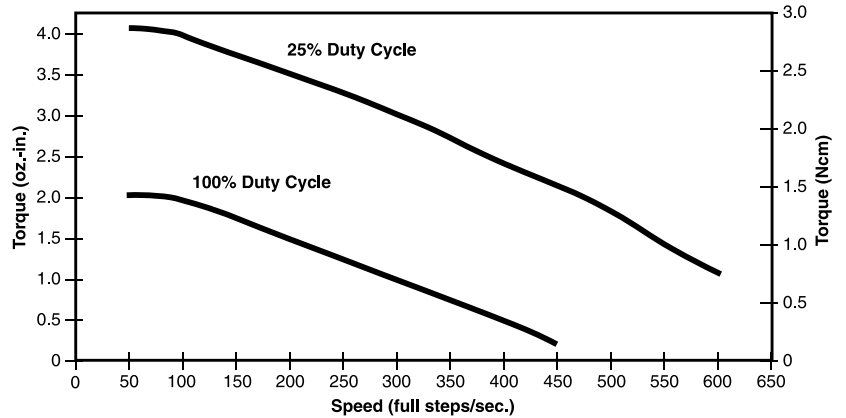


### Bipolar • L/R Drive 15° Step Angle



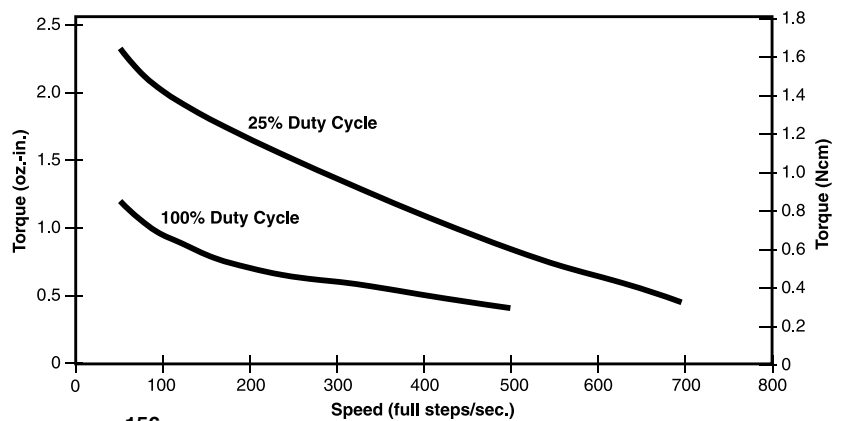
### Unipolar • L/R Drive 7.5° Step Angle

25% duty cycle is obtained by a special winding or running a standard motor at double the rated voltage.

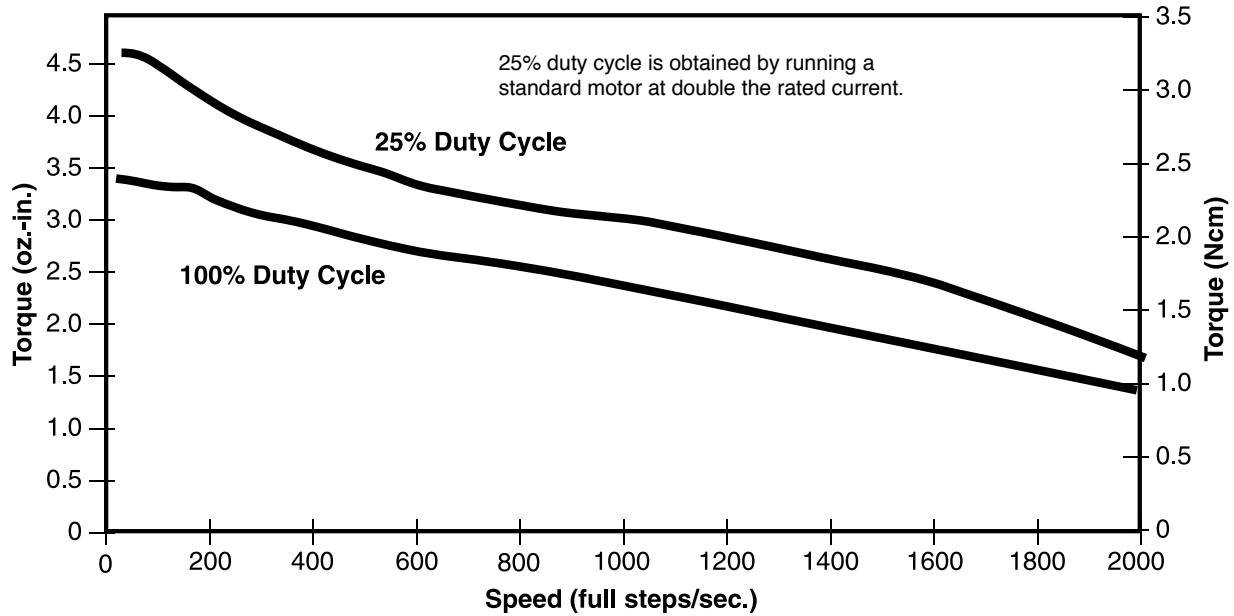


### Unipolar • L/R Drive 15° Step Angle

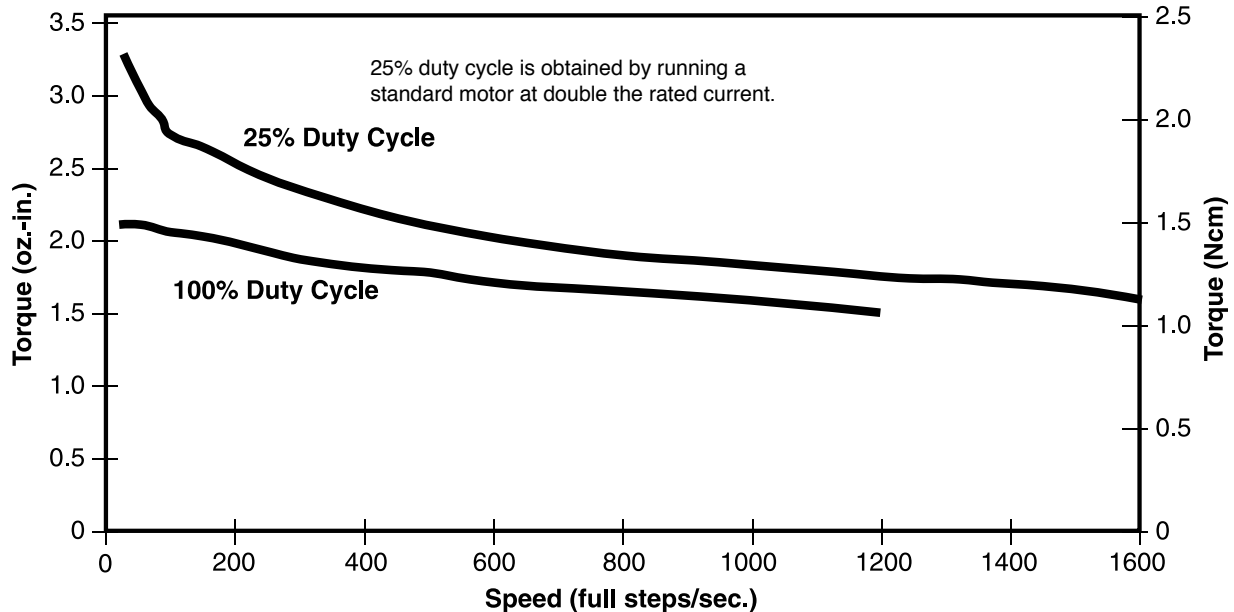
**NOTE:** Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.



**TORQUE vs FULL STEP/SECOND**  
**CHOPPER DRIVE • BIPOLAR • 7.5° STEP ANGLE**



**CHOPPER DRIVE • BIPOLAR • 15° STEP ANGLE**



**NOTE:** All chopper drive curves were created with a 5 Volt motor and a 40 Volt power supply.

Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

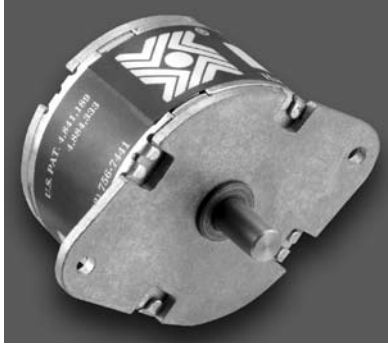
# 46000 Series: Ø 46 mm (1.8-in) Rotary Motors



HaydonKerk Motion Solutions™

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**ELECTROMATE**

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Toll Free Fax (877) SERV099  
www.electromate.com  
sales@electromate.com



## 46000 Series: Ø 46 mm (1.8-in) Rotary Motors

**Our most powerful rotary motor**

Select Sleeve  
or Ball Bearing  
Designs

Other styles available...

- High Temperature Option

### Salient Characteristics

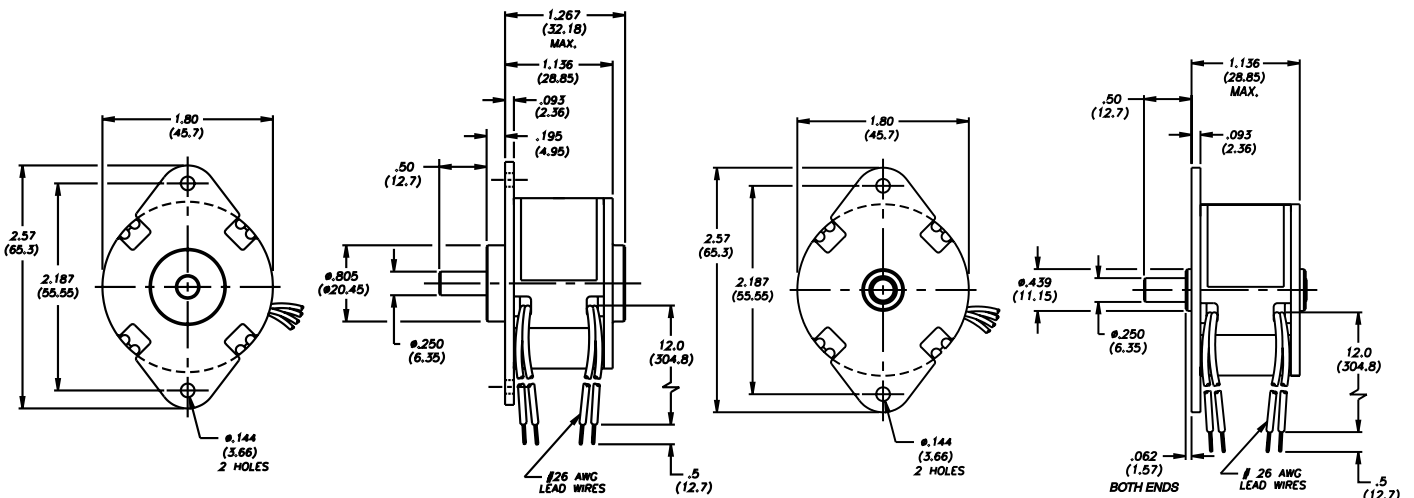
Ø 46 mm (1.8-in) Rotary Stepper Motor				
Wiring	Bipolar			
Part No. (Sleeve)*	46440-05	46440-12	46540-05	46540-12
Step angle	7.5°		15°	
Winding voltage	5 VDC	12 VDC	5 VDC	12 VDC
Current/phase	1.0 A	.41 A	1.0 A	.41 A
Resistance/phase	5 Ω	29 Ω	5 Ω	29 Ω
Inductance/phase	9.0 mH	52 mH	7.1 mH	39 mH
Hold torque	16 oz-in. (11.30 Ncm)		8.5 oz-in. (6.00 Ncm)	
Detent torque	.90 oz-in. (.64 Ncm)		1.0 oz-in. (.71 Ncm)	
Power consumption	10 W			
Rotor Inertia	25.0 gcm <sup>2</sup>			
Weight	7.8 oz. (220 g)			
Insulation resistance	20 MΩ			
Temperature rise	135°F Rise (75°C Rise)			

Ø 46 mm (1.8-in) Rotary Stepper Motor				
Unipolar				
Part No. (Sleeve)*	46460-05	46460-12	46560-05	46560-12
Step angle	7.5°		15°	
Winding voltage	5 VDC	12 VDC	5 VDC	12 VDC
Current/phase	1.0 A	.41 A	1.0 A	.41 A
Resistance/phase	5 Ω	29 Ω	5 Ω	29 Ω
Inductance/phase	4.5 mH	26 mH	3.5 mH	20 mH
Hold torque	13.0 oz-in. (9.18 Ncm)		6.0 oz-in. (4.24 Ncm)	
Detent torque	.90 oz-in. (.64 Ncm)		1.0 oz-in. (.71 Ncm)	
Power consumption	10 W			
Rotor Inertia	25 gcm <sup>2</sup>			
Weight	7.8 oz. (220 g)			
Insulation resistance	20 MΩ			
Temperature rise	135°F Rise (75°C Rise)			

\*For Ball Bearings add “-999” to the end of this number

### Dimensional Drawings: Sleeve Bearing

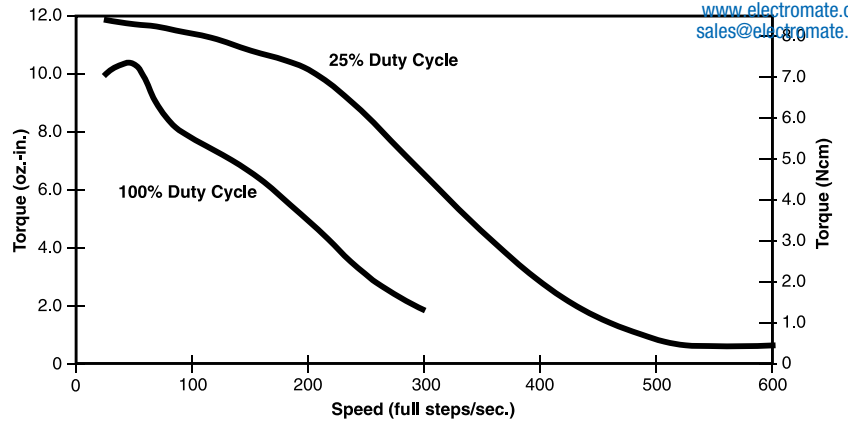
### Ball Bearing



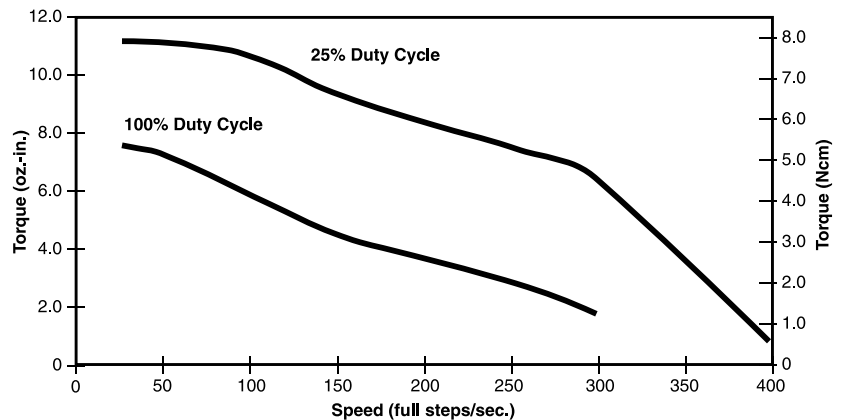
**TORQUE vs  
FULL STEPS/SECOND**

**Bipolar • L/R Drive  
7.5° Step Angle**

25% duty cycle is obtained by a special winding or running a standard motor at double the rated voltage.

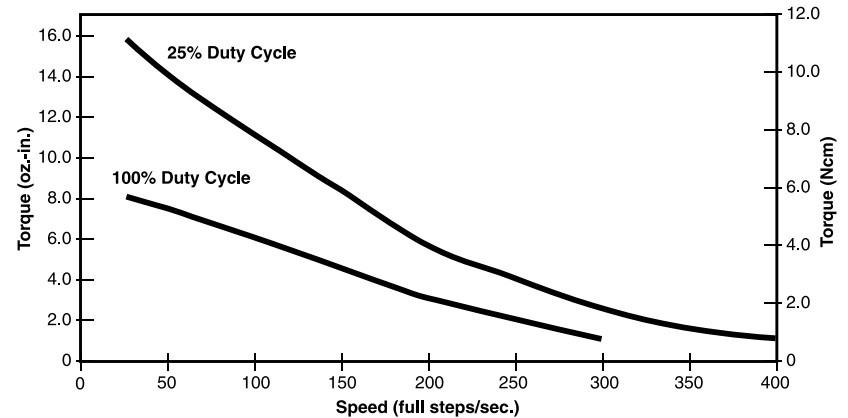


**Bipolar • L/R Drive  
15° Step Angle**



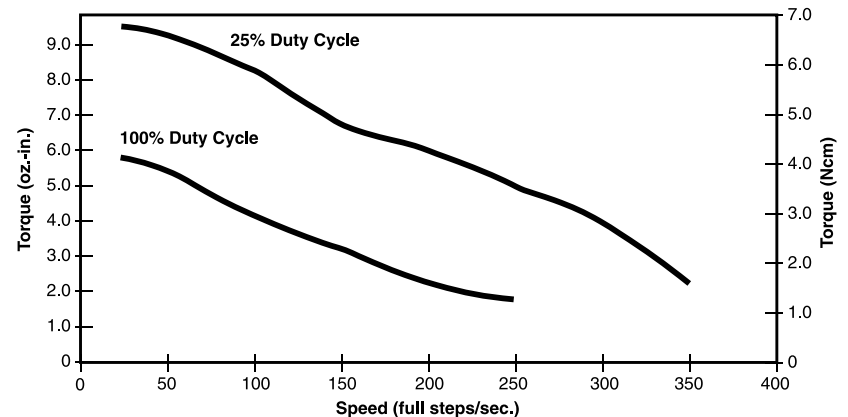
**Unipolar • L/R Drive  
7.5° Step Angle**

25% duty cycle is obtained by a special winding or running a standard motor at double the rated voltage.



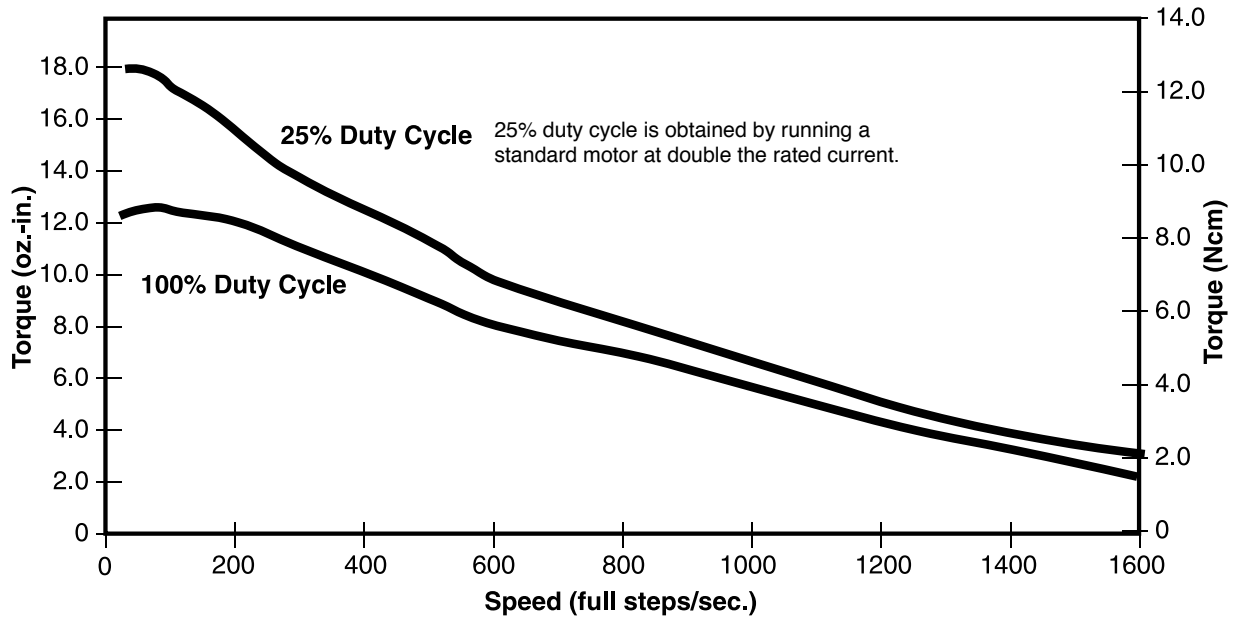
**Unipolar • L/R Drive  
15° Step Angle**

**NOTE:** Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

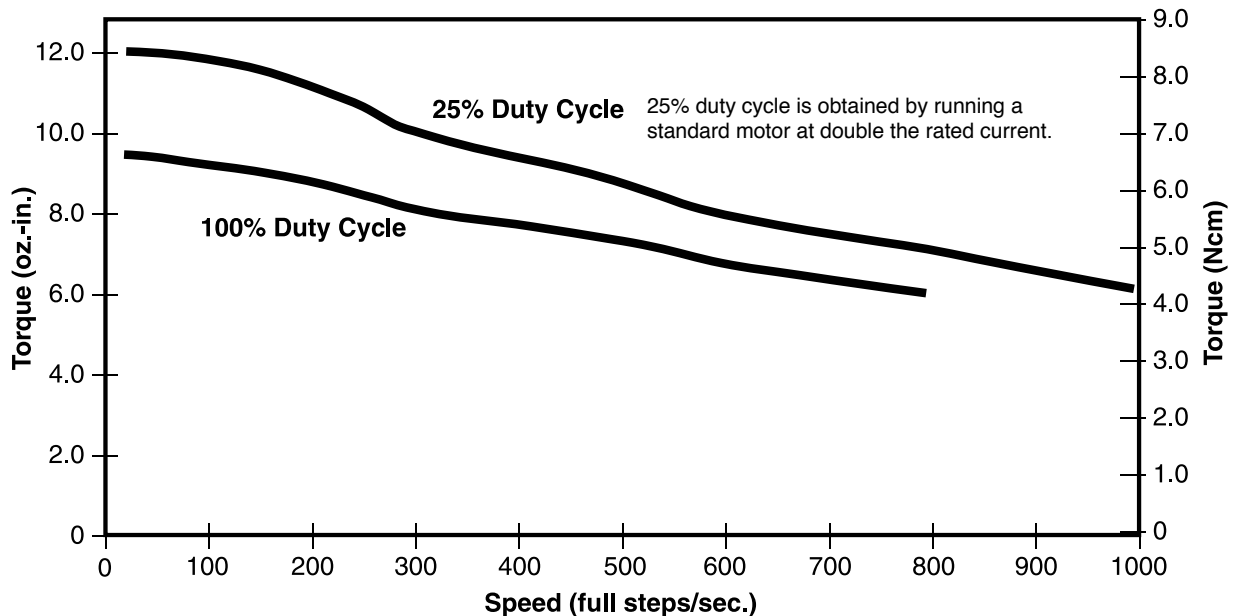




## TORQUE vs FULL STEP/SECOND CHOPPER DRIVE • BIPOLAR • 7.5° STEP ANGLE



## CHOPPER DRIVE • BIPOLAR • 15° STEP ANGLE



**NOTE:** All chopper drive curves were created with a 5 Volt motor and a 40 Volt power supply.

Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.