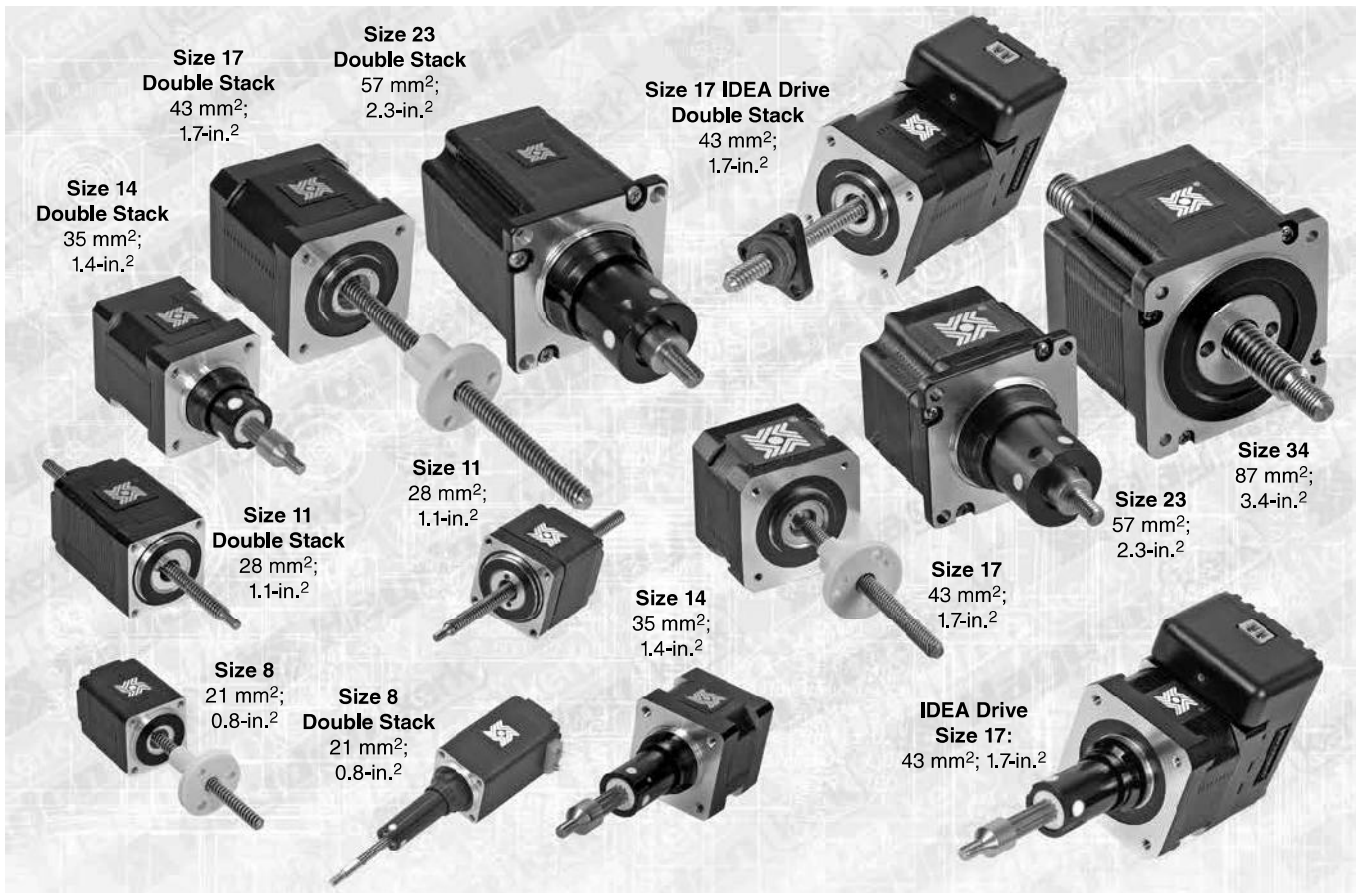




Hybrid Linear Actuators



Haydon Kerk Motion Solutions hybrid linear actuators open new avenues for equipment designers who require high performance and exceptional endurance in a very small package. The various designs use a proprietary manufacturing process, which incorporates engineering thermoplastics in the rotor drive nut and a stainless steel lead-screw. This allows the motor to be much quieter, more efficient and more durable than the v-thread and bronze nut configuration commonly used in other actuators. Motor life is improved more than 10 times over the traditional bronze nut style – and it requires no maintenance and does not affect the cost. An additional feature is the bearing preload adjustment which, unlike other designs, does not protrude from the motor configuration commonly used in other actuators.

The hybrid actuators come in six sizes, from 21 mm square to 87 mm square. Each size has three designs available – captive, non-captive and an external linear version. Haydon also offers a series of Double Stack enhanced performance hybrid linear actuators available in sizes from 21 mm to 57 mm square. An integrated, programmable IDEA™ Drive is available for the Size 17 (43 mm) hybrid and Double Stack hybrid motors.

There are 28 different travels per step available, from .00006 inch (.001524 mm) to .005 inch (.127 mm). Micro stepping can be used for even finer resolution. Our 87 mm actuator delivers up to 500 pounds (2224 N) of force.

These linear actuators are ideal for applications requiring a combination of precise positioning, rapid motion and long life.

Typical applications include X-Y tables, medical equipment, semiconductor handling, telecommunications equipment, valve control, and numerous other uses. Sold at competitive prices, this product is an excellent value for incorporation into your next project. In addition to standard configurations, Haydon Kerk Motion Solutions can custom design these motors to meet your specific application needs. Lead time for standard prototype designs is usually 2 to 3 days, and 4 to 6 weeks for production orders.

One of the world’s smallest linear actuators, the Size 8 precision motor is a recent addition to our extensive, award winning miniature stepper motor product line.

Equipment designers and engineers now have an even more compact option for their motion applications. The Haydon® 21000 Series Size 8 linear actuator occupies a minimal 0.8” (21 mm) space and includes numerous patented innovations that provide customers high performance and endurance in a very small package.

Three designs are available, captive, non-captive and external linear versions. The 21000 Series is available in a wide variety of resolutions - from 0.00006” (.0015 mm) per step to 0.00157” (0.04 mm) per step. The Size 8 actuator delivers thrust of up to 10 lbs. (44 N).



HYBRID LINEAR ACTUATOR
STEPPER MOTORS

Specifications

Size 8: 21 mm (0.8-in) Hybrid Linear Actuator (1.8° Step Angle)			
Part No.	Captive	21H4 ■ - ■■ - ■■■ †	
	Non-captive	21F4 ■ - ■■ - ■■■ †	
	External Lin.	E21H4 ■ - ■■ - ■■■ †	
Wiring		Bipolar	
Winding Voltage	2.5 VDC	5 VDC	7.5 VDC
Current (RMS)/phase	.49 A	.24 A	.16 A
Resistance/phase	5.1 Ω	20.4 Ω	45.9 Ω
Inductance/phase	1.5 mH	5.0 mH	11.7 mH
Power Consumption	2.45 W Total		
Rotor Inertia	1.4 gcm ²		
Insulation Class	Class B (Class F available)		
Weight	1.5 oz (43 g)		
Insulation Resistance	20 MΩ		

† Part numbering information on page 72.

Linear Travel / Step		Order Code I.D.
Screw Ø.14-in(3.56 mm)	inches	
.00006	.0015*	U**
.000098*	.0025	AA**
.00012	.0030*	N
.00019*	.005	AB
.00024	.006*	K
.00039*	.01	AC
.00048	.0121*	J
.00078*	.02	AD
.00157*	.04	AE

*Values truncated

**TFE coating not available

Standard motors are Class B rated for maximum temperature of 130°C.

Special drive considerations may be necessary when leaving shaft fully extended or fully retracted.

21000 Series: Hybrid Size 8 Single Stack Part Number Identification



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Identifying the Hybrid part number codes when ordering



HYBRID LINEAR ACTUATOR STEPPER MOTORS

E	21	H	4	AB	-	7.5	-	910
<p>Prefix (include only when using the following)</p> <p>A = A Coil (See AC Synchronous page 189)</p> <p>E = External</p> <p>K = External with 40° thread form</p> <p>P = Proximity Sensor</p>	<p>Series number designation 21 = 21000</p> <p>(Series numbers represent approximate width of motor body)</p>	<p>Style</p> <p>F = 1.8° Non-captive</p> <p>H = 1.8° Captive or External (use "E" or "K" Prefix for External version)</p>	<p>Coils</p> <p>4 = Bipolar (4 wire)</p>	<p>Code ID Resolution Travel/Step</p> <p>U* = .00006-in (.0015)</p> <p>AA* = .000098-in (.0025)</p> <p>N = .00012-in (.0030)</p> <p>AB = .00019-in (.005)</p> <p>K = .00024-in (.006)</p> <p>AC = .00039-in (.01)</p> <p>J = .00048-in (.0121)</p> <p>AD = .00078-in (.02)</p> <p>AE = .00157-in (.04)</p>		<p>Voltage</p> <p>2.5 = 2.5 VDC</p> <p>05 = 5 VDC</p> <p>7.5 = 7.5 VDC</p> <p><i>Custom V available</i></p>		<p>Suffix</p> <p>Stroke <i>Example: -910 = 1-in (Refer to Stroke chart on Captive motor series product page 73.)</i></p> <p>Suffix also represents:</p> <p>-800 = Metric</p> <p>-900 = External Linear with grease and flanged nut</p> <p>-XXX = Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part.</p>

*TFE not available

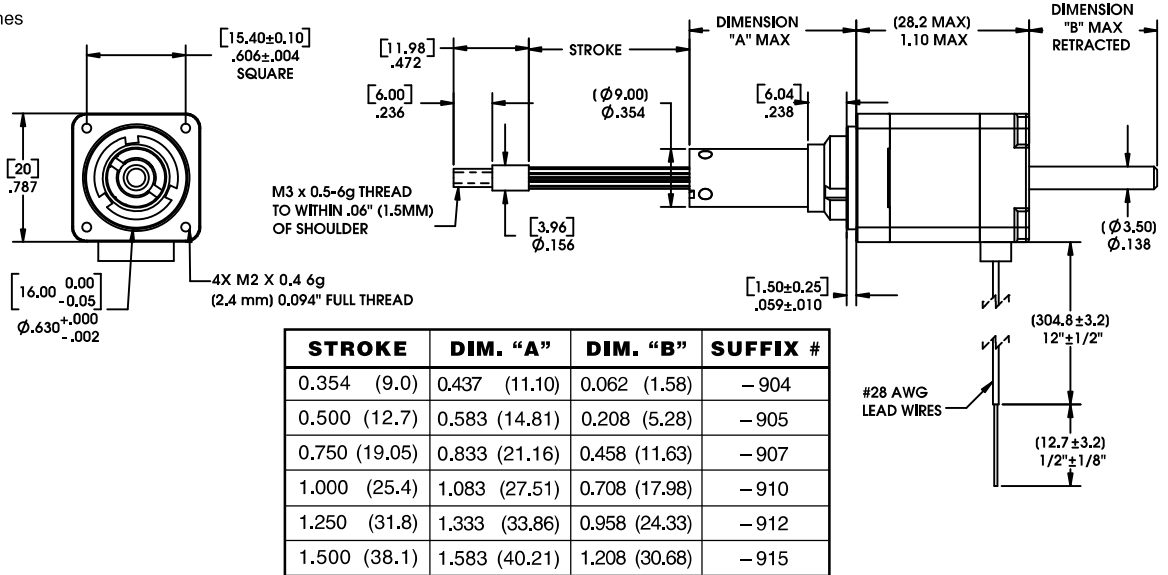
NOTE: Dashes must be included in Part Number (-) as shown above. For assistance or order entry, call our engineering team at 203 756 7441.

ENCODERS and other **OPTIONAL ASSEMBLIES** also available

Haydon Kerk Motion Solutions, Inc. • www.haydonkerkpittman.com • Phone: 800 243 2715 • International: 203 756 7441

Captive Lead-screw

Dimensions = (mm) inches

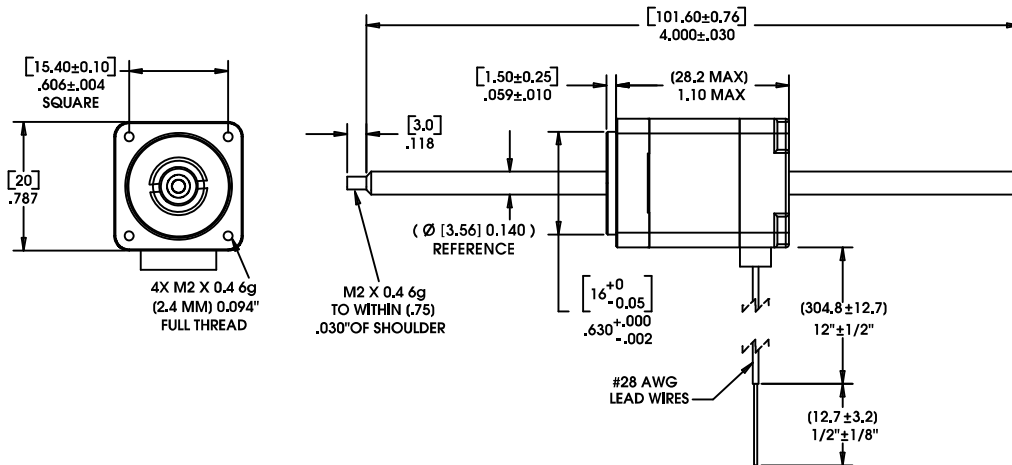


HYBRID LINEAR ACTUATOR
STEPPER MOTORS

Non-Captive Lead-screw

Dimensions = (mm) inches

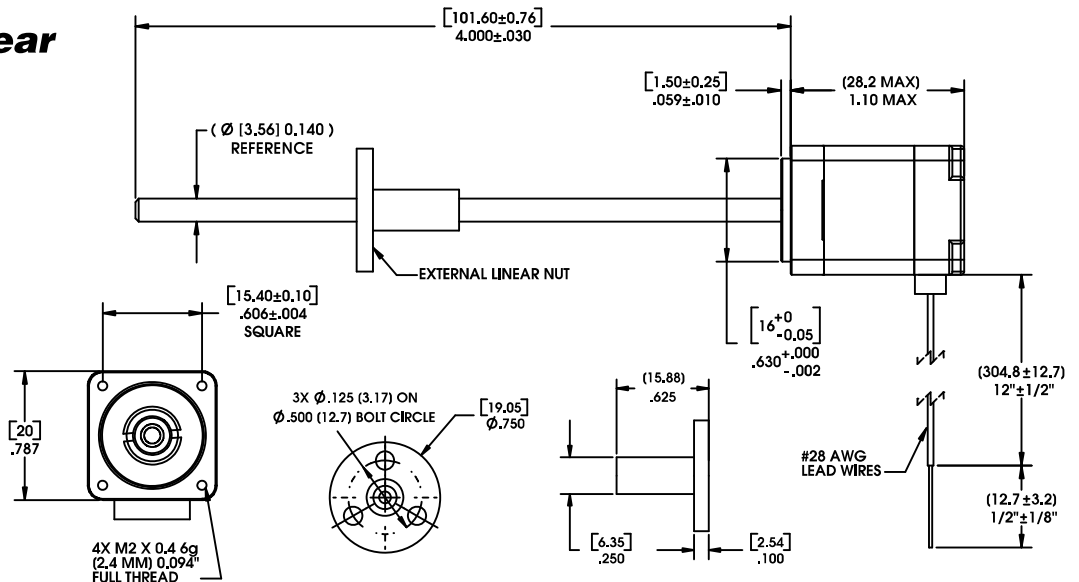
Up to 6-in (152 mm) standard screw lengths. Longer screw lengths are available.



External Linear

Dimensions = (mm) inches

Up to 6-in (152 mm) standard screw lengths. Longer screw lengths are available.

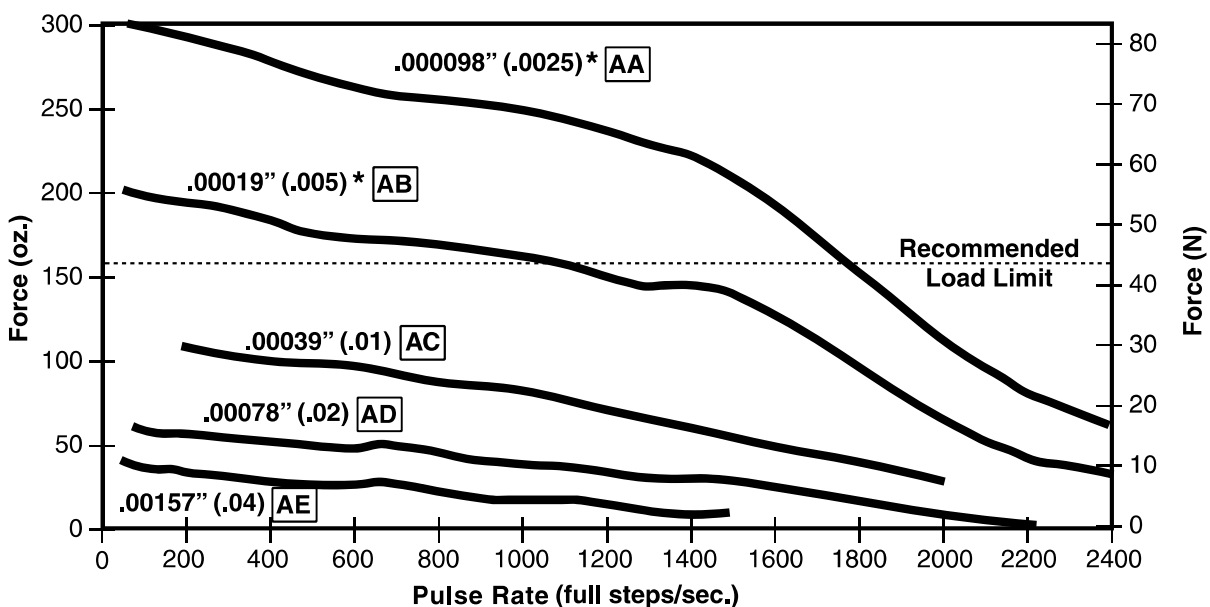
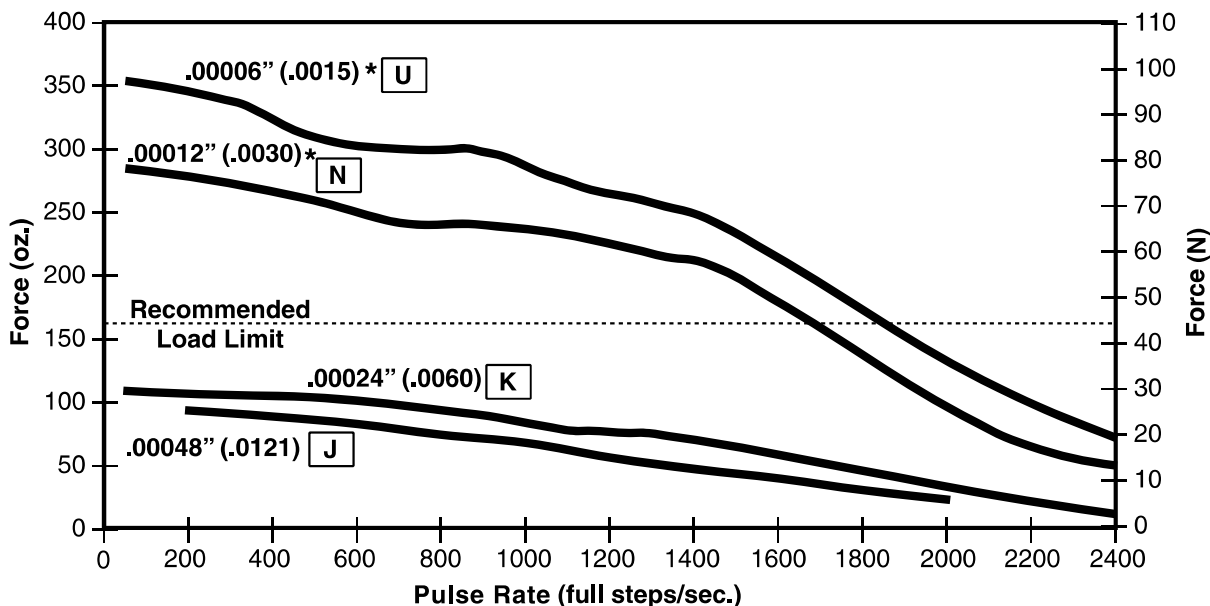


FORCE vs. PULSE RATE

Chopper • Bipolar • 100% Duty Cycle • 8:1 Motor Coil to Drive Supply Voltage

Ø .14 (3.56) Lead-screw

HYBRID LINEAR ACTUATOR
STEPPER MOTORS



*Care should be taken when utilizing these screw pitches to ensure that the physical load limits of the motor are not exceeded. Please consult the factory for advice in selecting the proper pitch for your application.

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

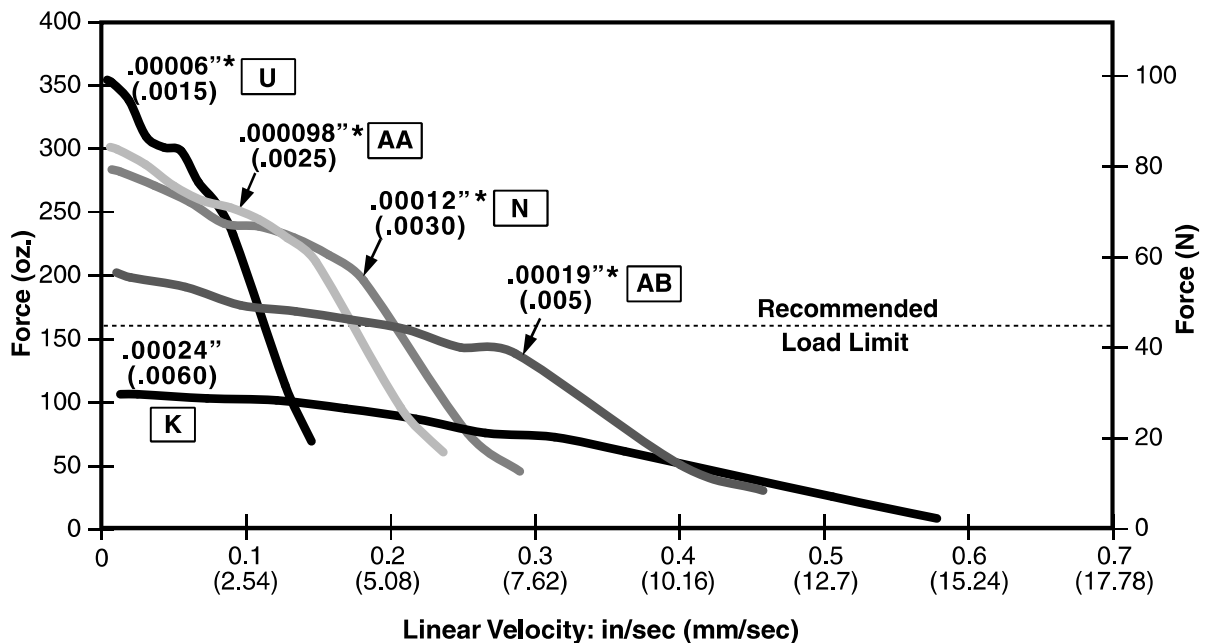
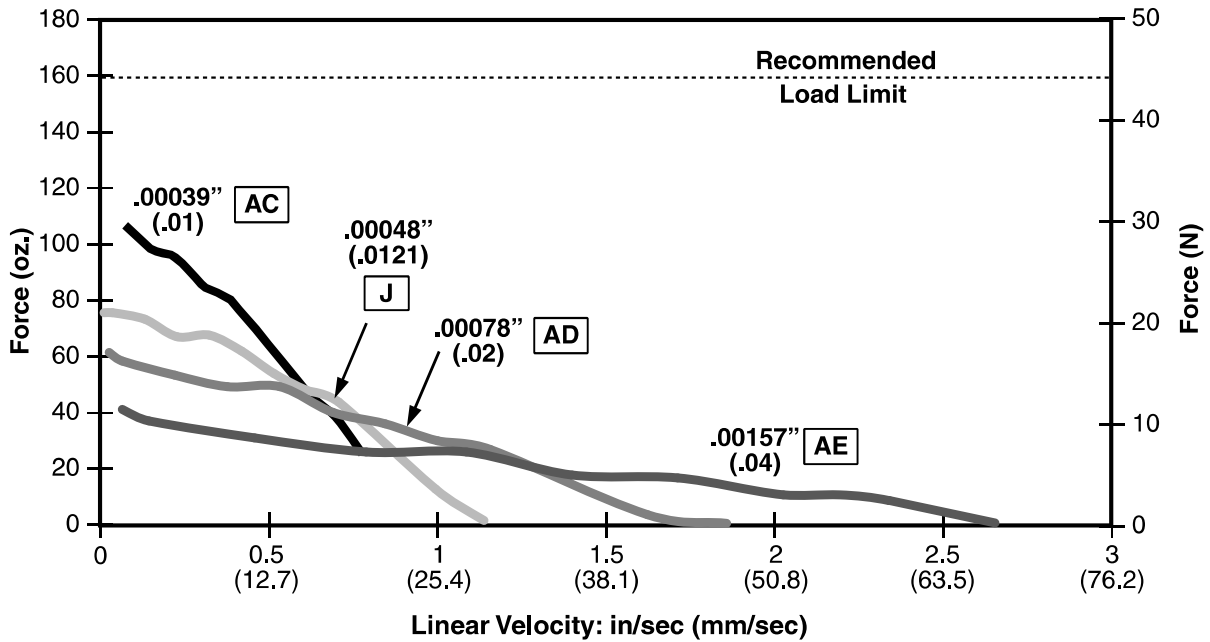
Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

With L/R drives peak force and speeds are reduced, using a unipolar drive will yield a further 30% force reduction.

FORCE vs. LINEAR VELOCITY

Chopper • Bipolar • 100% Duty Cycle • 8:1 Motor Coil to Drive Supply Voltage

Ø .14 (3.56) Lead-screw



*Care should be taken when utilizing these screw pitches to ensure that the physical load limits of the motor are not exceeded. Please consult the factory for advice in selecting the proper pitch for your application.

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.

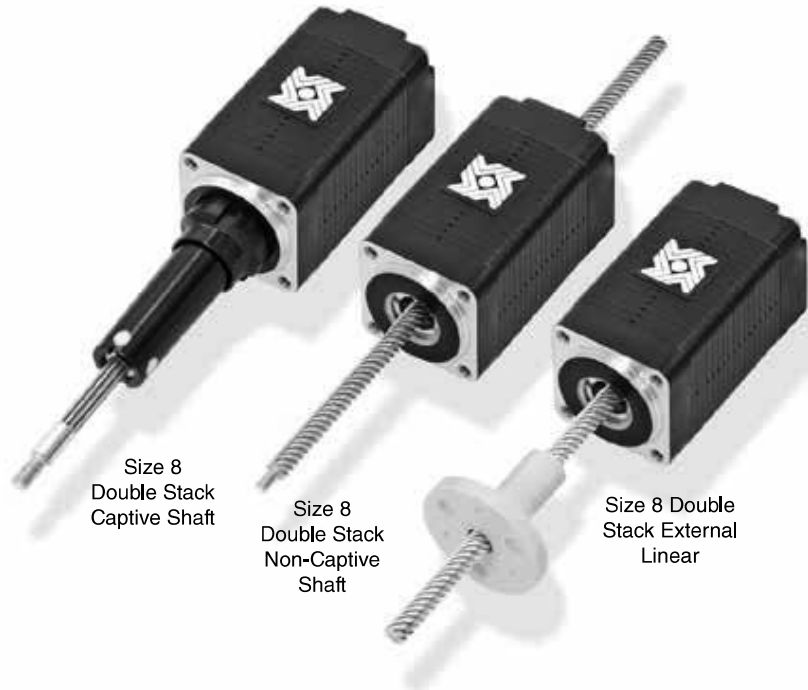
With L/R drives peak force and speeds are reduced, using a unipolar drive will yield a further 30% force reduction.

Haydon® 21000 Series Size 8 Double Stack hybrid linear actuators provide enhanced performance over a single stack.

Size 8 Double Stack models deliver improved performance and new linear motion design opportunities in a 20 mm frame size.

Three designs are available, captive, non-captive and external linear versions. The 21000 Series is available in a wide variety of resolutions - from 0.000098 in (.0025 mm) per step to 0.00157 in (0.04 mm) per step. The Size 8 actuator delivers thrust of up to 17 lbs. (75 N).

Assembly options include: Incremental encoders, proximity sensors (captive types only), anti-backlash and custom nuts, and TFE coated lead-screws.



Size 8
Double Stack
Captive Shaft

Size 8
Double Stack
Non-Captive
Shaft

Size 8 Double
Stack External
Linear

HYBRID LINEAR ACTUATOR
STEPPER MOTORS

Specifications

Size 8 Double Stack: 21 mm (0.8-in) Hybrid Linear Actuator (1.8° Step Angle)			
Part No.	Captive	21M4 ■-■-■-■-■†	
	Non-captive	21L4 ■-■-■-■-■†	
	External Lin.	E21M4 ■-■-■-■-■†	
Wiring		Bipolar	
Winding voltage	2.5 VDC	5 VDC	7.5 VDC
Current (RMS)/phase	1.32 A	.65 A	.43 A
Resistance/phase	1.9 Ω	7.7 Ω	17.3 Ω
Inductance/phase	1.91 mH	7.02 mH	15.95 mH
Power consumption	6.5 W Total		
Rotor inertia	2.6 gcm ²		
Insulation Class	Class B (Class F available)		
Weight	2.4 oz (68 g)		
Insulation resistance	20 MΩ		

Linear Travel / Step		Order Code I.D.
Screw Ø.14-in(3.56 mm) inches	mm	
.000098*	.0025	AA
.00012	.0030*	N
.00019*	.005	AB
.00024	.006*	K
.00039*	0.01	AC
.00048	.0121*	J
.00078*	.02	AD
.00157*	.04	AE

*Values truncated

Standard motors are Class B rated for maximum temperature of 130°C.

Special drive considerations may be necessary when leaving shaft fully extended or fully retracted.

† Part numbering information on page 77.

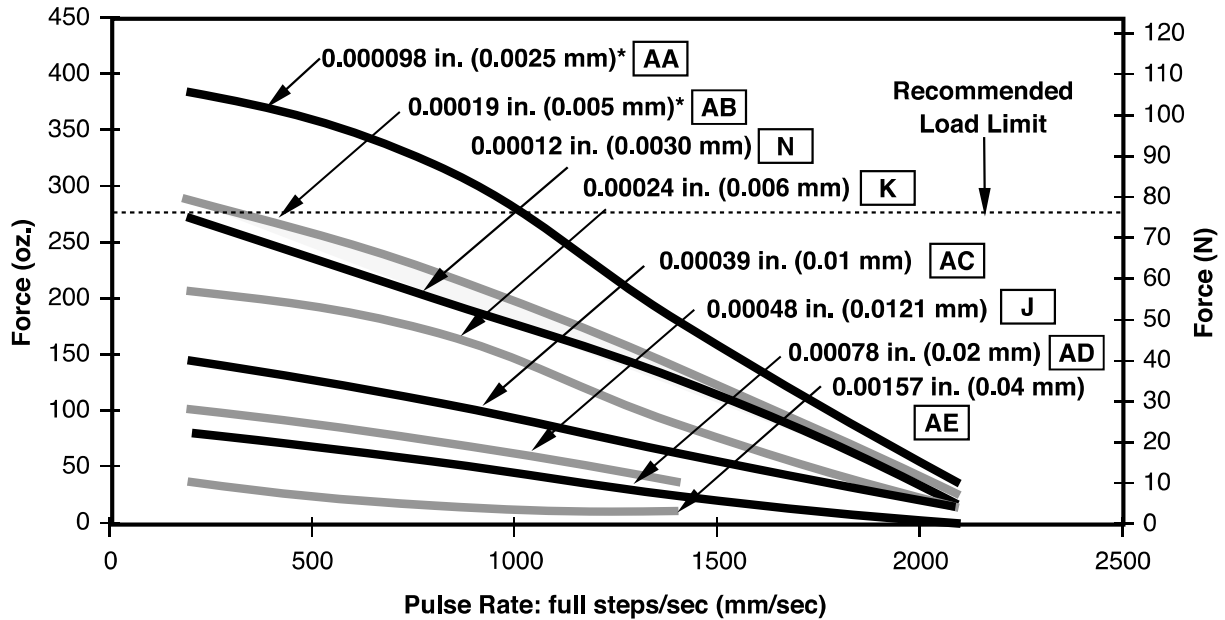
Identifying the Hybrid part number codes when ordering

E	21	M	4	N	2.5	910
<p>Prefix (include only when using the following)</p> <p>A = A Coil (See AC Synchronous page 189)</p> <p>E = External</p> <p>K = External with 40° thread form</p> <p>P = Proximity Sensor</p>	<p>Series number designation 21 = 21000</p> <p>(Series numbers represent approximate width of motor body)</p>	<p>Style</p> <p>L = 1.8° Non-captive</p> <p>M = 1.8° Captive or External (use "E" or "K" Prefix for External version)</p>	<p>Coils</p> <p>4 = Bipolar (4 wire)</p>	<p>Code ID Resolution Travel/Step</p> <p>AA* = .000098-in (.0025)</p> <p>N = .00012-in (.0030)</p> <p>AB = .00019-in (.005)</p> <p>K = .00024-in (.006)</p> <p>AC = .00039-in (.01)</p> <p>J = .00048-in (.0121)</p> <p>AD = .00078-in (.02)</p> <p>AE = .00157-in (.04)</p> <p><i>*TFE not available</i></p>	<p>Voltage</p> <p>2.5 = 2.5 VDC</p> <p>05 = 5 VDC</p> <p>7.5 = 7.5 VDC</p> <p><i>Custom V available</i></p>	<p>Suffix</p> <p>Stroke Example: -910 = 1-in (Refer to Stroke chart on Captive motor series product page 78.)</p> <p>Suffix also represents:</p> <p>-800 = Metric</p> <p>-900 = External Linear with grease and flanged nut</p> <p>-XXX = Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part.</p>

NOTE: Dashes must be included in Part Number (-) as shown above. For assistance or order entry, call our engineering team at 203 756 7441.

ENCODERS and other **OPTIONAL ASSEMBLIES** also available

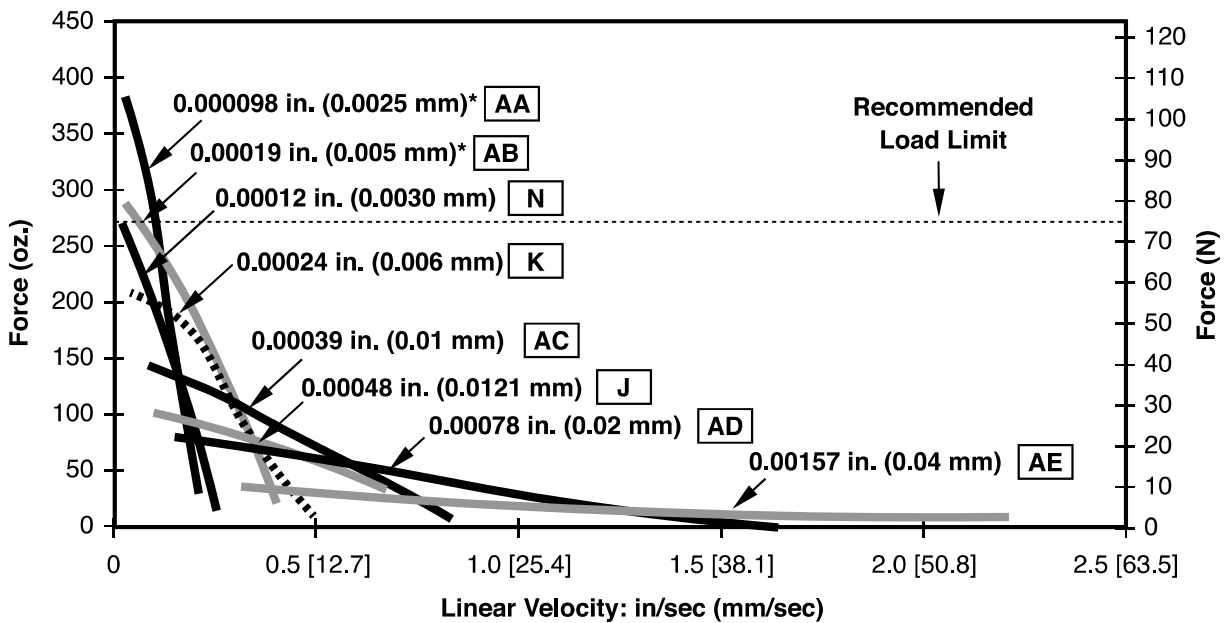
FORCE vs PULSE RATE Chopper • Bipolar • 100% Duty Cycle • 8:1 Motor Coil to Drive Supply Voltage
Ø .14 (3.56) Lead-screw



HYBRID LINEAR ACTUATOR
STEPPER MOTORS

FORCE vs LINEAR VELOCITY

Chopper • Bipolar • 100% Duty Cycle • 8:1 Motor Coil to Drive Supply Voltage
Ø .14 (3.56) Lead-screw



*Care should be taken when utilizing these screw pitches to ensure that the physical load limits of the motor are not exceeded. Please consult the factory for advice in selecting the proper pitch for your application.

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.

With L/R drives peak force and speeds are reduced, using a unipolar drive will yield a further 30% force reduction.

28000 Series: Hybrid Size 11 Single Stack Linear Actuator Stepper Motor



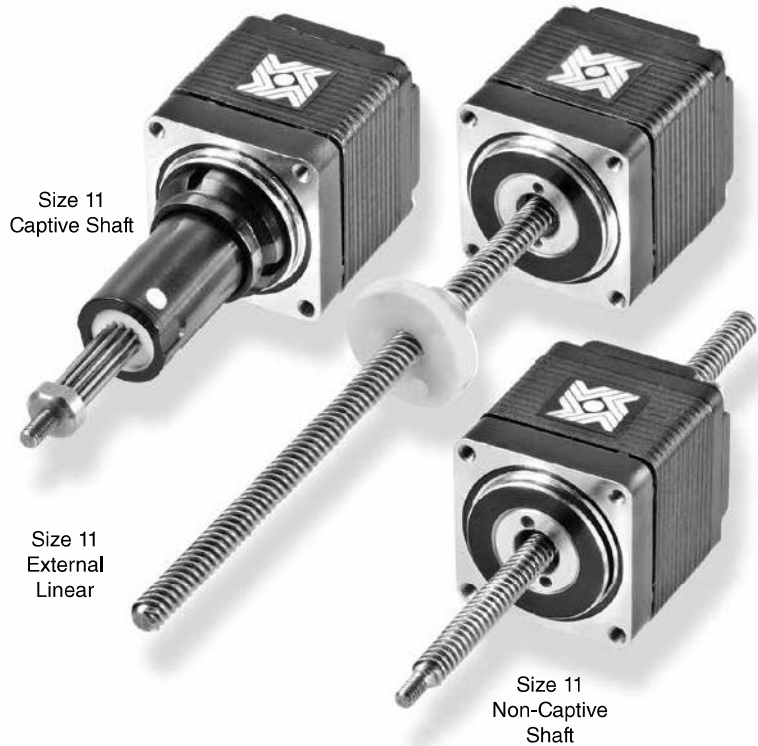
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Haydon® brand Size 11 hybrid linear actuators offer compact, production-proven precision in motion.

HYBRID LINEAR ACTUATOR STEPPER MOTORS

The various patented designs deliver high performance, opening avenues for equipment designers who require performance and endurance in a very small package.

Three designs are available, captive, non-captive and external linear versions. The 28000 Series is available in a wide variety of resolutions - from 0.000125-in (.003175 mm) per step to 0.002-in (.0508 mm) per step. The Size 11 actuator delivers thrust of up to 20 lbs. (90 N).



Specifications

Size 11: 28 mm (1.1-in) Hybrid Linear Actuator (1.8° Step Angle)						
Part No.	Captive	28H4 ■ - ■ - ■ - ■ - ■ †		28H6 ■ - ■ - ■ - ■ - ■ †		
	Non-captive	28F4 ■ - ■ - ■ - ■ - ■ †		28F6 ■ - ■ - ■ - ■ - ■ †		
	External Lin.	E28H4 ■ - ■ - ■ - ■ - ■ †		E28H6 ■ - ■ - ■ - ■ - ■ †		
Wiring		Bipolar			Unipolar**	
Winding Voltage		2.1 VDC	5 VDC	12 VDC	5 VDC	12 VDC
Current (RMS)/phase		1.0 A	0.42 A	0.18 A	0.42 A	0.18 A
Resistance/phase		2.1 Ω	11.9 Ω	68.6 Ω	11.9 Ω	68.6 Ω
Inductance/phase		1.5 mH	6.7 mH	39.0 mH	3.3 mH	19.5 mH
Power Consumption		4.2 W				
Rotor Inertia		9.0 gcm ²				
Insulation Class		Class B (Class F available)				
Weight		4.2 oz (119 g)				
Insulation Resistance		20 MΩ				

Linear Travel / Step Screw Ø.1875" (4.76mm)		Order Code I.D.
inches	mm	
.000125	.0031*	7
.00025	.0063*	9
.0005	.0127	3
.001	.0254	1
.002	.0508	2

*Values truncated

Standard motors are Class B rated for maximum temperature of 130°C.

Special drive considerations may be necessary when leaving shaft fully extended or fully retracted.

† Part numbering information on page 81

** Unipolar drive gives approximately 30% less thrust than bipolar drive.

Identifying the Hybrid part number codes when ordering



E

Prefix
(include only when using the following)

- A** = A Coil (See AC Synchronous page 189)
- E** = External
- K** = External with 40° thread form
- P** = Proximity Sensor
- S** = Home Switch

28

Series number designation
28 = 28000

(Series numbers represent approximate width of motor body)

H

Style

- F** = 1.8° Non-captive
- H** = 1.8° Captive or External (use "E" or "K" Prefix for External version)

4

Coils

- 4** = Bipolar (4 wire)
- 6** = Unipolar (6 wire)

7

Code ID Resolution Travel/Step

- 1** = .001-in (.0254)
- 2** = .002-in (.0508)
- 3** = .0005-in (.0127)
- 7** = .000125-in (.0031)
- 9** = .00025-in (.0063)

05

Voltage

- 2.1** = 2.1 VDC (Bipolar only)
- 05** = 5 VDC
- 12** = 12 VDC
- Custom V available*

910

Suffix

Stroke
Example: -910 = 1-in (Refer to Stroke chart on Captive motor series product page 82.)

Suffix also represents:

- 800 = Metric
- 900 = External Linear with grease and flanged nut
- XXX = Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part.

NOTE: Dashes must be included in Part Number (-) as shown above. For assistance or order entry, call our engineering team at 203 756 7441.

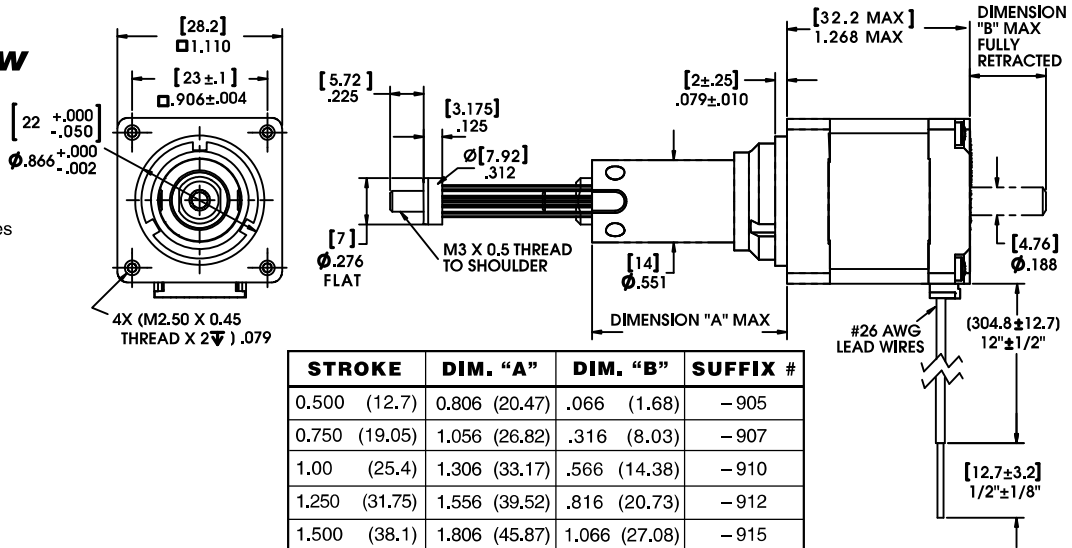
ENCODERS and other OPTIONAL ASSEMBLIES also available

28000 Series: Hybrid Size 11 Single Stack Dimensional Drawings



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Captive Lead-screw



Dimensions = (mm) inches

STROKE	DIM. "A"	DIM. "B"	SUFFIX #
0.500 (12.7)	0.806 (20.47)	.066 (1.68)	-905
0.750 (19.05)	1.056 (26.82)	.316 (8.03)	-907
1.00 (25.4)	1.306 (33.17)	.566 (14.38)	-910
1.250 (31.75)	1.556 (39.52)	.816 (20.73)	-912
1.500 (38.1)	1.806 (45.87)	1.066 (27.08)	-915
2.00 (50.8)	2.306 (58.57)	1.566 (39.78)	-920
2.500 (63.5)	2.806 (71.27)	2.066 (52.48)	-925

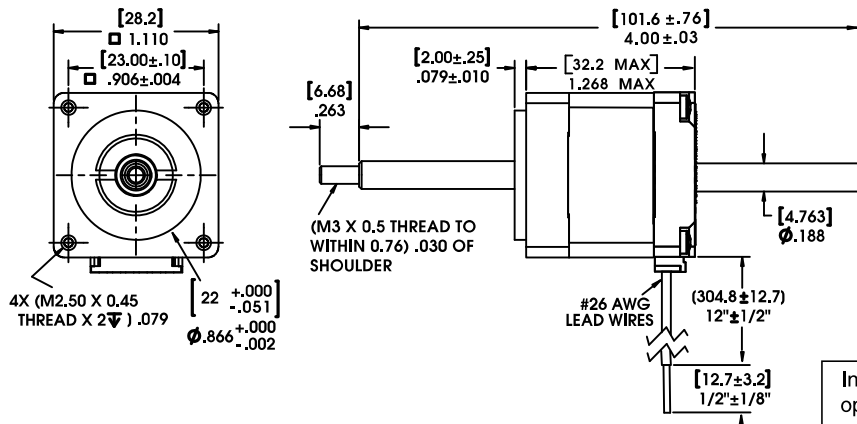
Integrated connector option, see page 117

HYBRID LINEAR ACTUATOR STEPPER MOTORS

Non-Captive Lead-screw

Dimensions = (mm) inches

Up to 8-in (203 mm) standard screw lengths. Longer screw lengths are available.

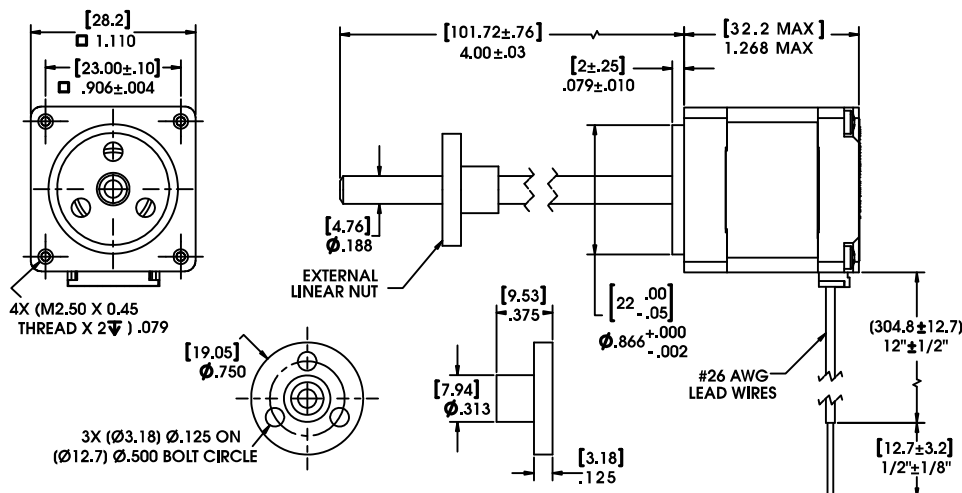


Integrated connector option, see page 117

External Linear

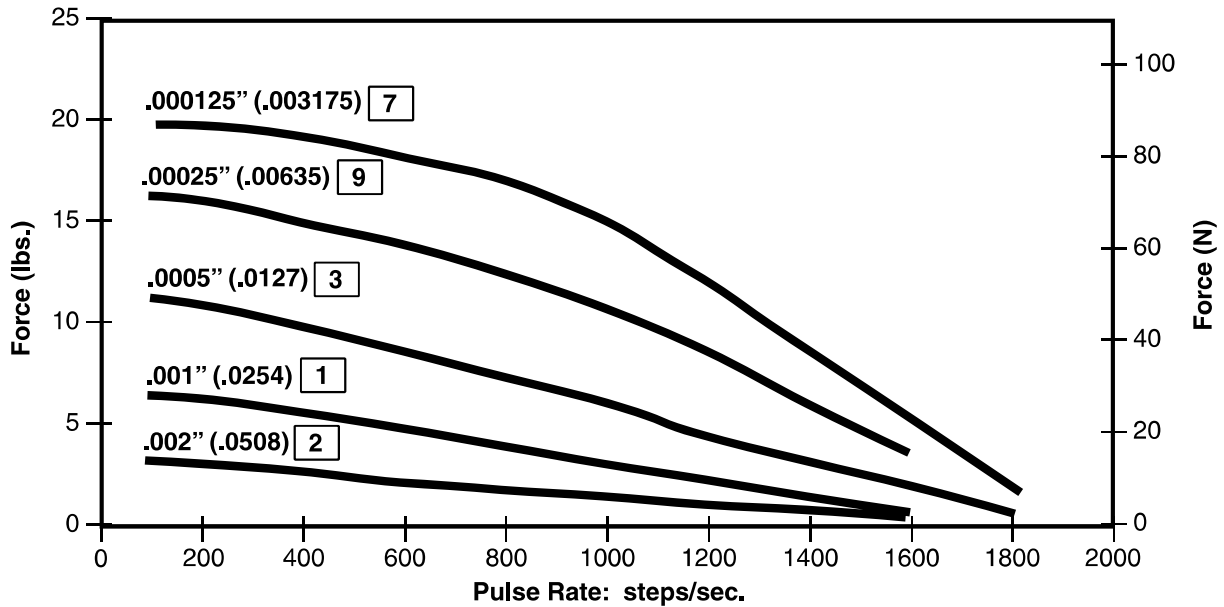
Dimensions = (mm) inches

Up to 8-in (203 mm) standard screw lengths. Longer screw lengths are available.



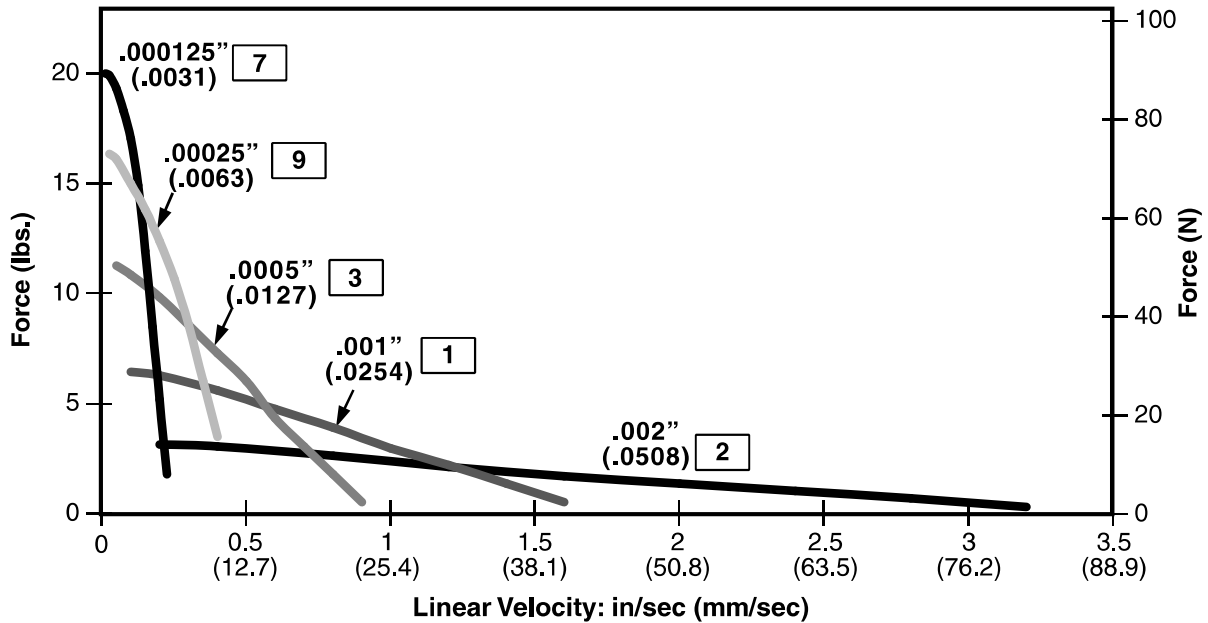
Integrated connector option, see page 117

FORCE vs. PULSE RATE Chopper • Bipolar • 100% Duty Cycle • 8:1 Motor Coil to Drive Supply Voltage
Ø .187 (4.75) Lead-screw



HYBRID LINEAR ACTUATOR
STEPPER MOTORS

FORCE vs. LINEAR VELOCITY
Chopper • Bipolar • 100% Duty Cycle • 8:1 Motor Coil to Drive Supply Voltage
Ø .187 (4.75) Lead-screw



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.

With L/R drives peak force and speeds are reduced, using a unipolar drive will yield a further 30% force reduction.

28000 Series: Hybrid Size 11 Double Stack Linear Actuator



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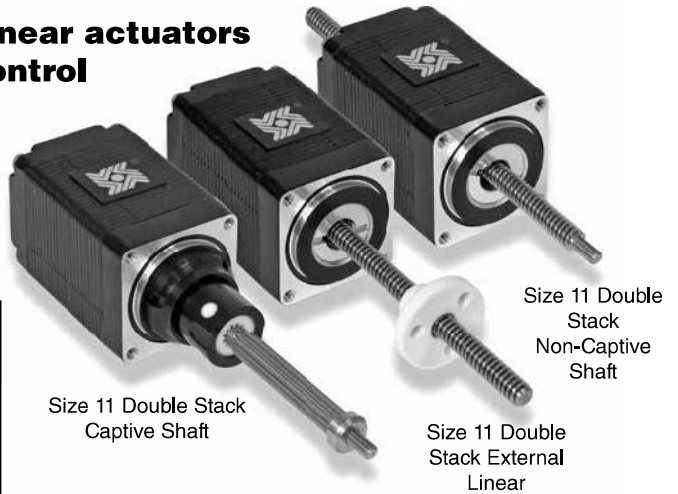
Haydon® Size 11 Double Stack hybrid linear actuators for enhanced performance in motion control

Three designs are available, captive, non-captive and external linear versions. The 28000 Series is available in a wide variety of resolutions - from 0.000125-in (.003175 mm) per step to 0.002-in (.0508 mm) per step. The Size 11 actuator delivers thrust of up to 30 lbs. (133 N).

Specifications

Size 11: 28 mm (1.1-in) Double Stack Hybrid Linear Actuator (1.8° Step Angle)			
Part No.	Captive	28M4 ■-■-■-■-■†	
	Non-captive	28L4 ■-■-■-■-■†	
	External Lin.	E28M4 ■-■-■-■-■†	
Wiring		Bipolar	
Winding Voltage	2.1 VDC	5 VDC	12 VDC
Current (RMS)/phase	1.9 A	750 mA	313 mA
Resistance/phase	1.1 Ω	6.7 Ω	34.8 Ω
Inductance/phase	1.1 mH	5.8 mH	35.6 mH
Power Consumption	7.5 W Total		
Rotor Inertia	13.5 gcm ²		
Insulation Class	Class B (Class F available)		
Weight	5.8 oz (180 g)		
Insulation Resistance	20 MΩ		

† Part numbering information below.



Size 11 Double Stack Captive Shaft

Size 11 Double Stack Non-Captive Shaft

Size 11 Double Stack External Linear

Linear Travel / Step		Order Code I.D.
Screw Ø.1875" (4.76mm) inches	mm	
.000125	.0031*	7
.00025	.0063*	9
.0005	.0127	3
.001	.0254	1
.002	.0508	2

*Values truncated

Standard motors are Class B rated for maximum temperature of 130°C.

Special drive considerations may be necessary when leaving shaft fully extended or fully retracted.



Identifying the Hybrid part number codes when ordering

E	28	M	4	7	-	05	-	910
Prefix (include only when using the following) A = A Coil (See AC Synchronous page 189) E = External K = External with 40° thread form P = Proximity Sensor S = Home Switch	Series number designation 28 = 28000 (Series numbers represent approximate width of motor body)	Style L = 1.8° Non-captive M = 1.8° Captive or External (use "E" or "K" Prefix for External version)	Coils 4 = Bipolar (4 wire)	Code ID Resolution Travel/Step 1 = .001-in (.0254) 2 = .002-in (.0508) 3 = .0005-in (.0127) 7 = .000125-in (.0031) 9 = .00025-in (.0063)		Voltage 2.1 = 2.1 VDC 05 = 5 VDC 12 = 12 VDC <i>Custom V available</i>		Suffix Stroke Example: -910 = 1-in (Refer to Stroke chart on Captive motor series product page 85.) Suffix also represents: -800 = Metric -900 = External Linear with grease and flanged nut -XXX = Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part.

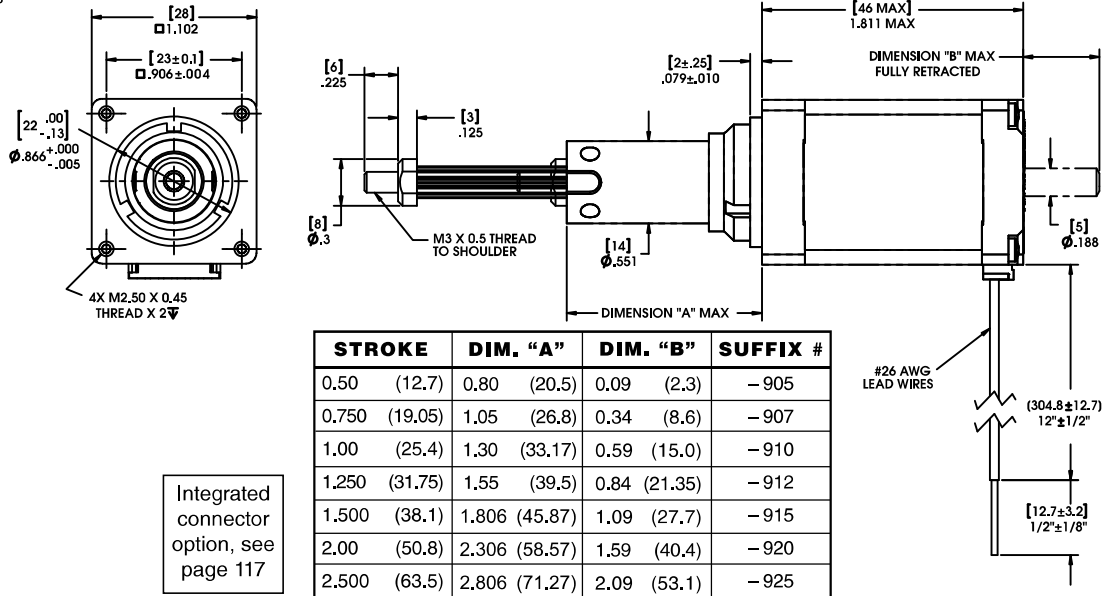
NOTE: Dashes must be included in Part Number (-) as shown above. For assistance or order entry, call our engineering team at 203 756 7441.

ENCODERS and other OPTIONAL ASSEMBLIES also available

HYBRID LINEAR ACTUATOR STEPPER MOTORS

Captive Lead-screw

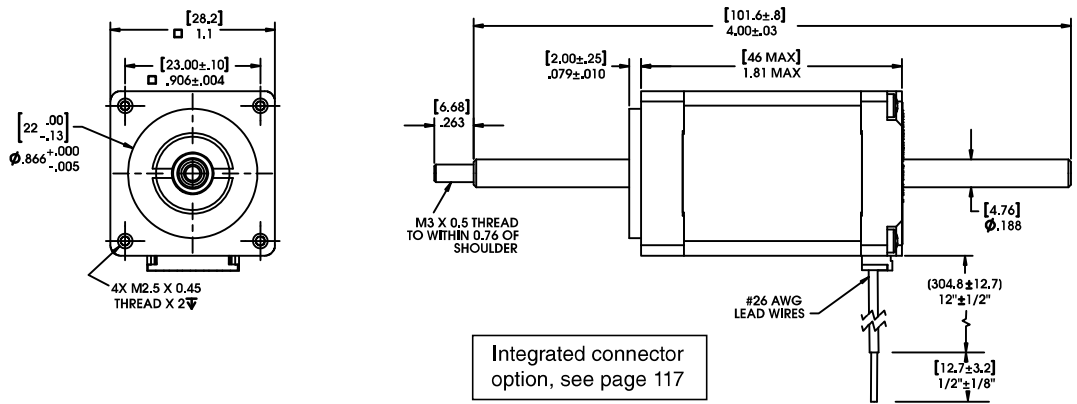
Dimensions = (mm) inches



Non-Captive Lead-screw

Dimensions = (mm) inches

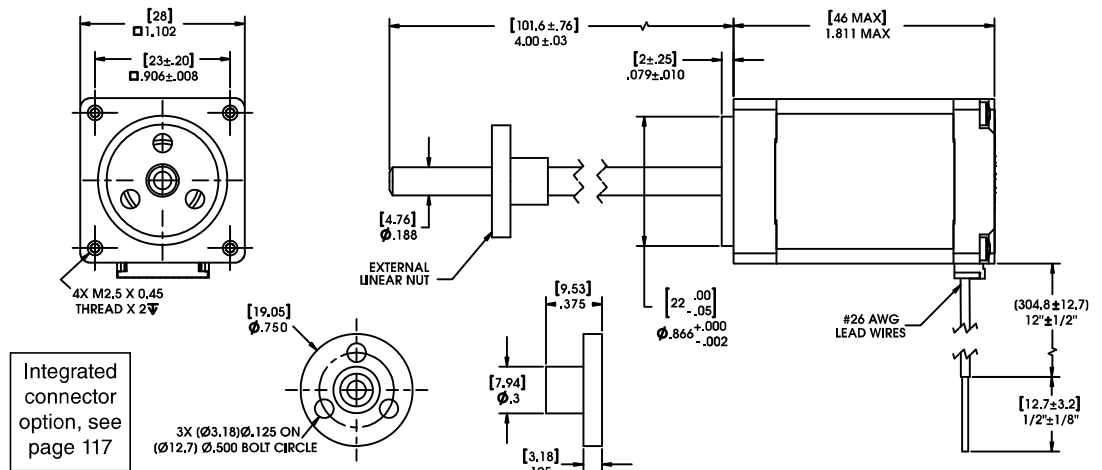
Up to 6-in (152 mm) standard screw lengths. Longer screw lengths are available.



External Linear

Dimensions = (mm) inches

Up to 6-in (152 mm) standard screw lengths. Longer screw lengths are available.



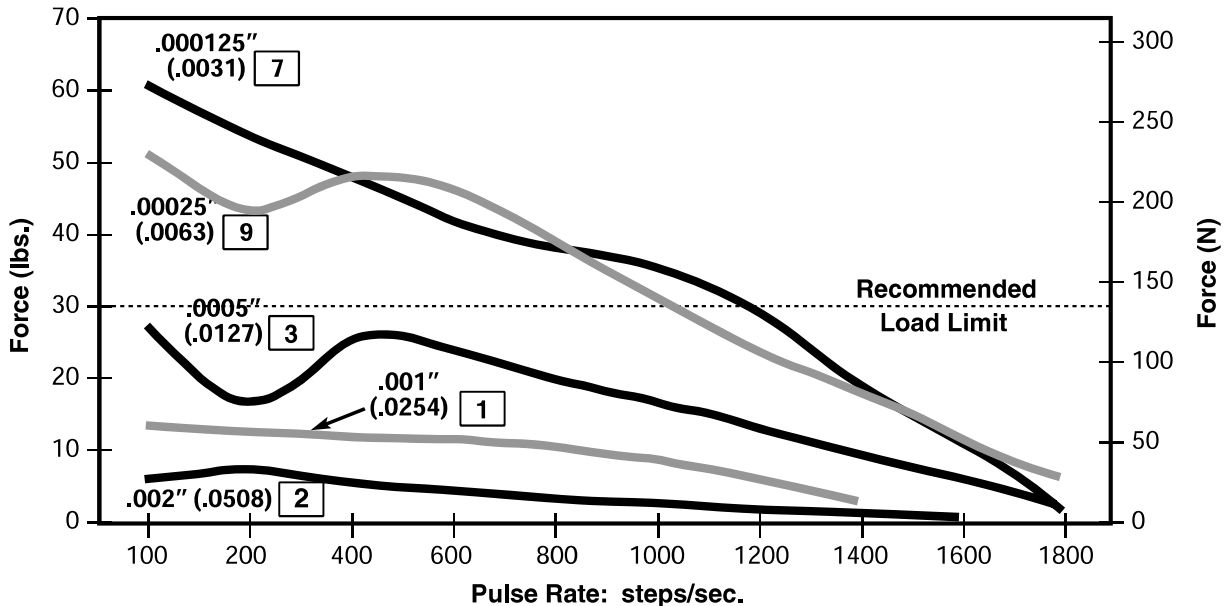
28000 Series: Hybrid Size 11 Double Stack Performance Curves



Haydon Kerk Motion Solutions, Inc. • www.haydonkerkpittman.com • Phone: 800 243 2715 • International: 203 756 7441

FORCE vs. PULSE RATE Chopper • Bipolar • 100% Duty Cycle • 8:1 Motor Coil to Drive Supply Voltage

Ø .187 (4.75) Lead-screw

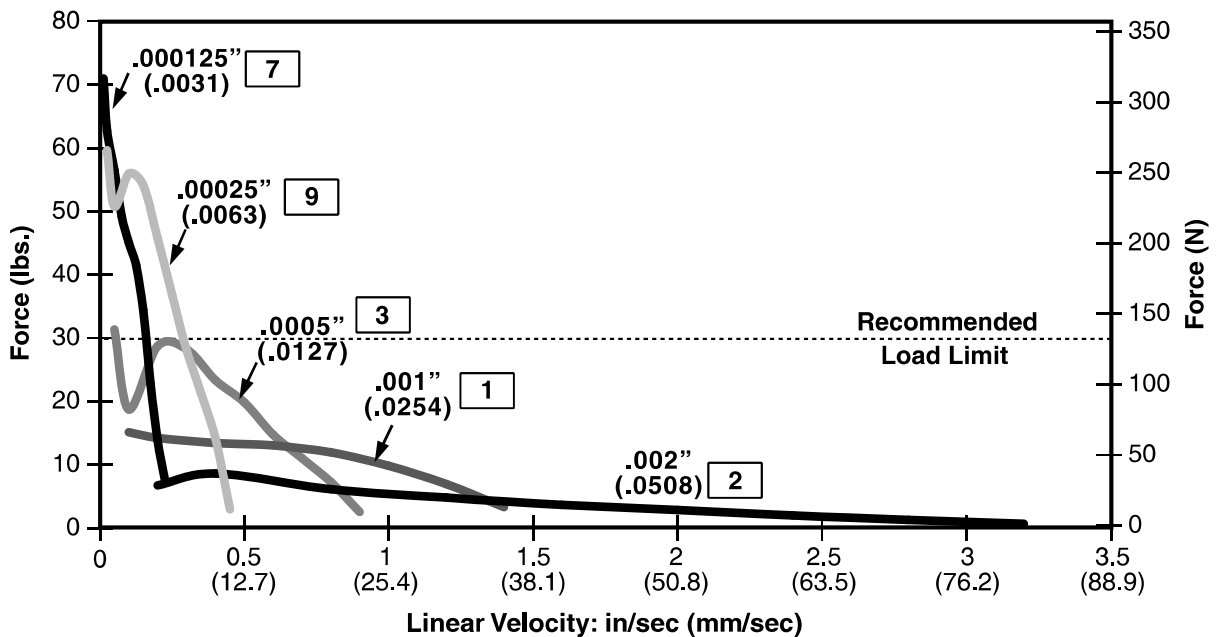


HYBRID LINEAR ACTUATOR
STEPPER MOTORS

FORCE vs. LINEAR VELOCITY

Chopper • Bipolar • 100% Duty Cycle • 8:1 Motor Coil to Drive Supply Voltage

Ø .187 (4.75) Lead-screw



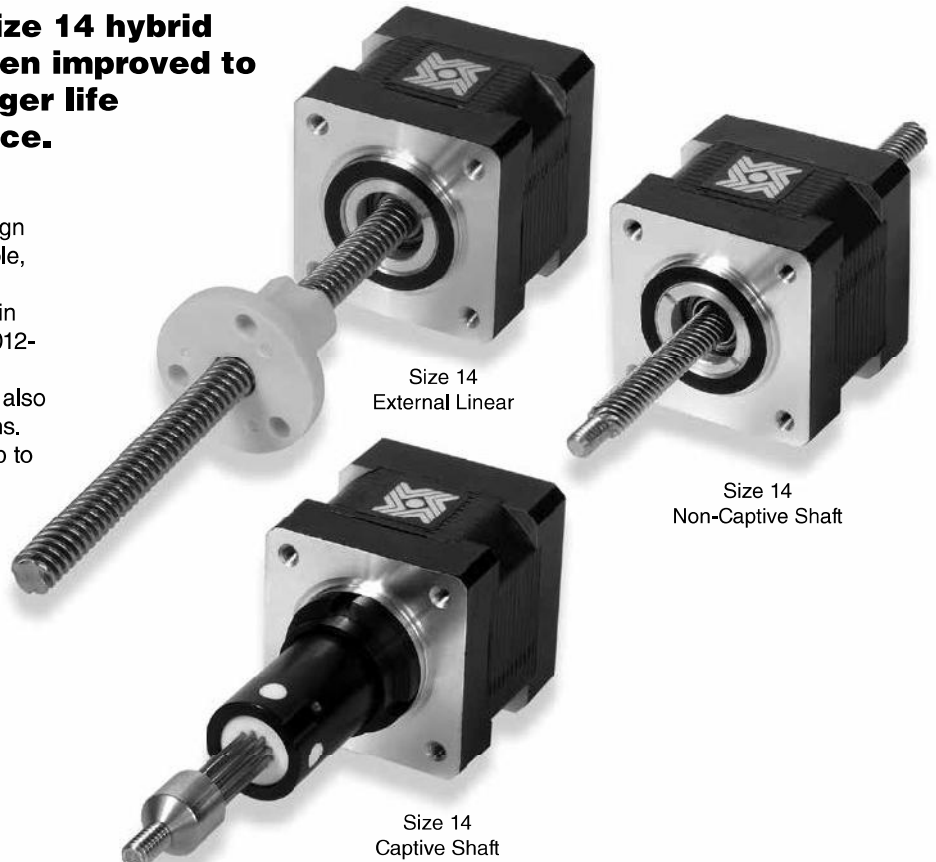
NOTE: All chopper drive curves were created with a 5 volt motor and a 40 volt power supply.

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.

With L/R drives peak force and speeds are reduced, using a unipolar drive will yield a further 30% force reduction.

Haydon® 35000 Series Size 14 hybrid linear actuators have been improved to provide higher force, longer life and improved performance.

The various designs deliver exceptional performance and new linear motion design opportunities. Three designs are available, captive, non-captive and external linear versions. The 35000 Series is available in a wide variety of resolutions - from 0.00012-in (.003048 mm) per step to 0.00192-in (.048768 mm) per step. The motors can also be microstepped for even finer resolutions. The Size 14 actuator delivers thrust of up to 50 lbs. (222 N).



HYBRID LINEAR ACTUATOR STEPPER MOTORS

Specifications

Size 14: 35 mm (1.4-in) Hybrid Linear Actuator (1.8° Step Angle)						Linear Travel / Step							
Part No.	Captive Non-captive External Lin.	35H4 ■■■-■■■-■■■†			35H6 ■■■-■■■-■■■†			Screw Ø .218" (5.54 mm)		Order Code I.D.	Screw Ø .250" (6.35 mm)		Order Code I.D.
		35F4 ■■■-■■■-■■■†			35F6 ■■■-■■■-■■■†			inches	mm		inches	mm	
		E35H4 ■■■-■■■-■■■†			E35H6 ■■■-■■■-■■■†			.00012	.0030*	N	.00015625	.0039*	P
								.00024	.0060*	K	.0003125	.0079*	A
								.00048	.0121*	J	.000625	.0158*	B
								.00096	.0243*	Q	.00125	.0317*	C
								.00192	.0487*	R			
Wiring		Bipolar			Unipolar**								
Winding Voltage		2.33 VDC	5 VDC	12 VDC	5 VDC	12 VDC							
Current (RMS)/phase		1.25 A	0.57 A	0.24 A	0.57 A	0.24 A							
Resistance/phase		1.86 Ω	8.8 Ω	50.5 Ω	8.8 Ω	50.5 Ω							
Inductance/phase		2.8 mH	13 mH	60 mH	6.5 mH	30 mH							
Power Consumption		5.7 W											
Rotor Inertia		16.0 gcm ²											
Insulation Class		Class B (Class F available)											
Weight		5.7 oz (162 g)											
Insulation Resistance		20 MΩ											

*Values truncated

Standard motors are Class B rated for maximum temperature of 130°C.

Special drive considerations may be necessary when leaving shaft fully extended or fully retracted.

† Part numbering information on page 88.

** Unipolar drive gives approximately 30% less thrust than bipolar drive.

35000 Series: Hybrid Size 14 Single Stack Part Number Identification



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Identifying the Hybrid part number codes when ordering

HYBRID LINEAR ACTUATOR STEPPER MOTORS

E

Prefix
(include only when using the following)

- A** = A Coil (See AC Synchronous page 189)
- E** = External
- K** = External with 40° thread form
- P** = Proximity Sensor
- S** = Home Switch

35

Series number designation
35 = 35000

(Series numbers represent approximate width of motor body)

H

Style

- F** = 1.8° Non-captive
- H** = 1.8° Captive or External (use "E" or "K" Prefix for External version)
- J** = 0.9° Non-captive
- K** = 0.9° Captive or External (use "E" or "K" Prefix for External version)

4

Coils

- 4** = Bipolar (4 wire)
- 6** = Unipolar (6 wire)

N

Code ID Resolution Travel/Step

- N** = .00012-in (.0030)
- K** = .00024-in (.0060)
- J** = .00048-in (.0121)
- Q** = .00096-in (.0243)
- P** = .0015625-in (.0039)
- A** = .0003125-in (.0079)
- B** = .000625-in (.0158)
- C** = .00125-in (.0317)
- R** = .00192-in (.0478)

High Resolution

- U** = .00006-in (.0015)
- V** = .000078-in (.00198)

2.33

Voltage

- 2.33** = 2.33 VDC
 - 05** = 5 VDC
 - 12** = 12 VDC
- Custom V available

910

Suffix

Stroke
Example: -910 = 1-in (Refer to Stroke chart on Captive motor series product page 89.)

Suffix also represents:

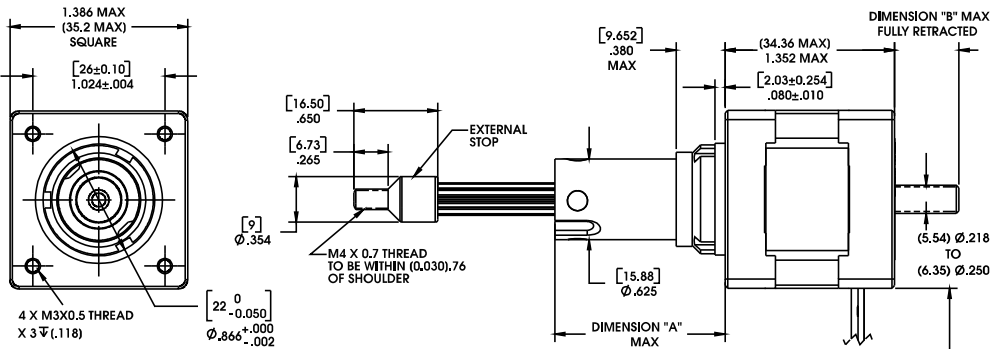
- 800 = Metric
- 900 = External Linear with grease and flanged nut
- XXX = Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part.

ENCODERS and other OPTIONAL ASSEMBLIES also available

NOTE: Dashes must be included in Part Number (-) as shown above. For assistance or order entry, call our engineering team at 203 756 7441.

Captive Lead-screw

Dimensions = (mm) inches



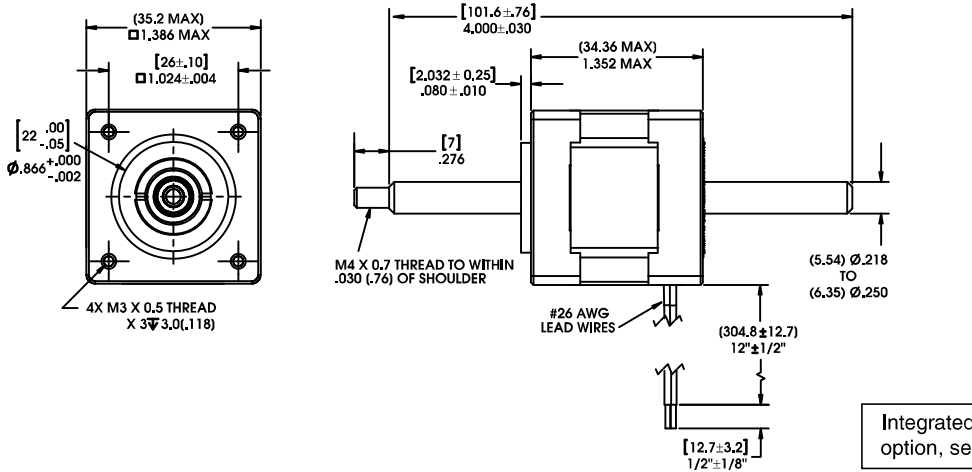
STROKE	DIM. "A"	DIM. "B"	SUFFIX #
0.50 (12.7)	0.82 (20.8)	0.04 (1.0)	-905
0.750 (19.05)	1.07 (27.2)	0.29 (7.4)	-907
1.00 (25.4)	1.32 (33.5)	0.54 (13.7)	-910
1.250 (31.8)	1.57 (39.9)	0.79 (20.1)	-912
1.500 (38.1)	1.82 (46.2)	1.04 (26.4)	-915
2.00 (50.8)	2.32 (58.9)	1.54 (39.1)	-920
2.500 (63.5)	2.82 (71.6)	2.04 (51.8)	-925

Integrated connector option, see page 117

Non-Captive Lead-screw

Dimensions = (mm) inches

Up to 10-in (254 mm) standard screw lengths. Longer screw lengths are available.

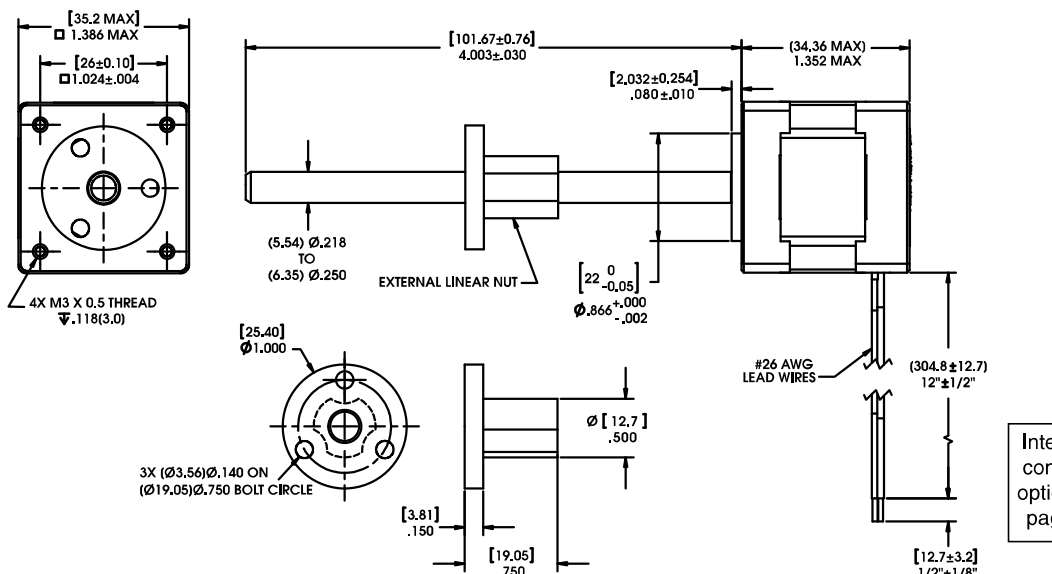


Integrated connector option, see page 117

External Linear

Dimensions = (mm) inches

Up to 10-in (254 mm) standard screw lengths. Longer screw lengths are available.



Integrated connector option, see page 117

HYBRID LINEAR ACTUATOR STEPPER MOTORS

35000 Series: Hybrid Size 14 Single Stack Performance Curves



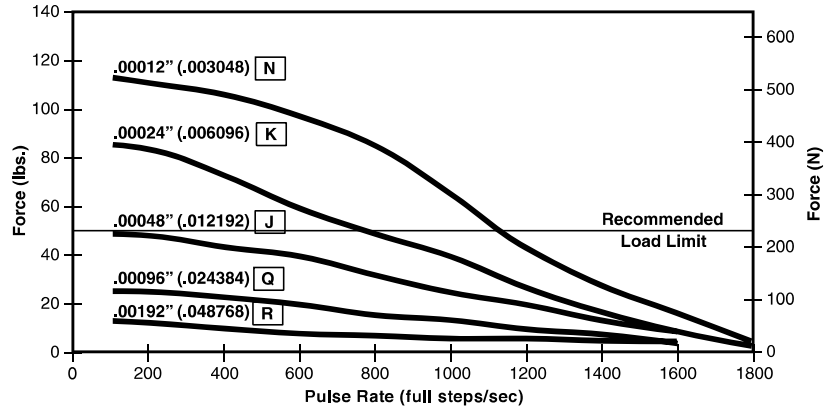
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HYBRID LINEAR ACTUATOR
STEPPER MOTORS

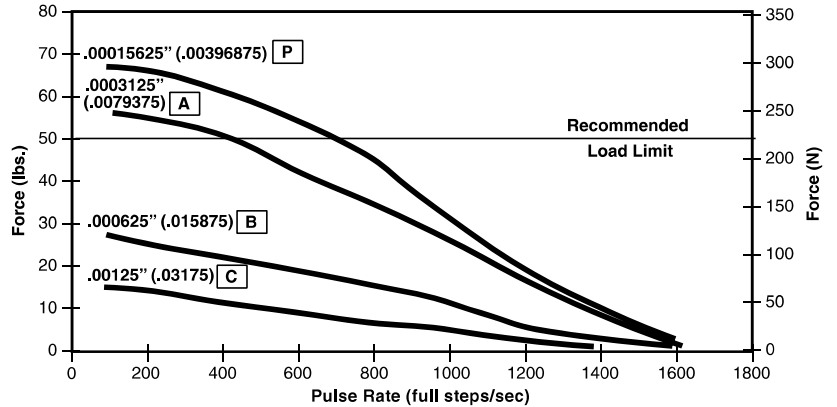
FORCE vs. PULSE RATE

- Chopper
- Bipolar
- 100% Duty Cycle
- 8:1 Motor Coil to Drive Supply Voltage

Ø .218 (5.54)
Lead-screw >



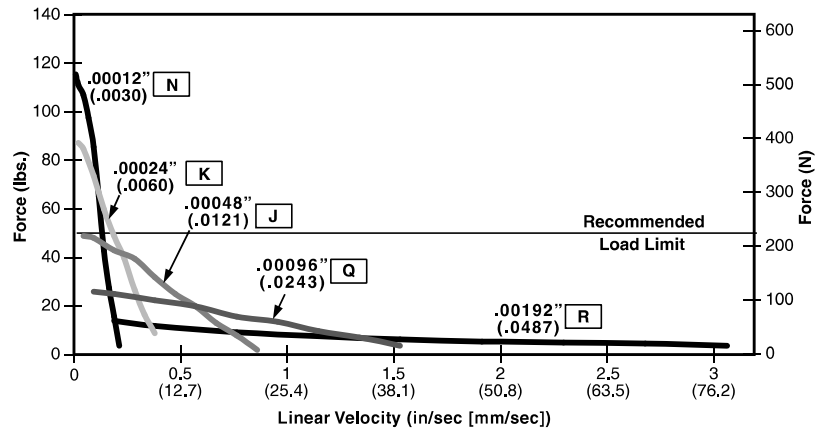
Ø .250 (6.35)
Lead-screw >



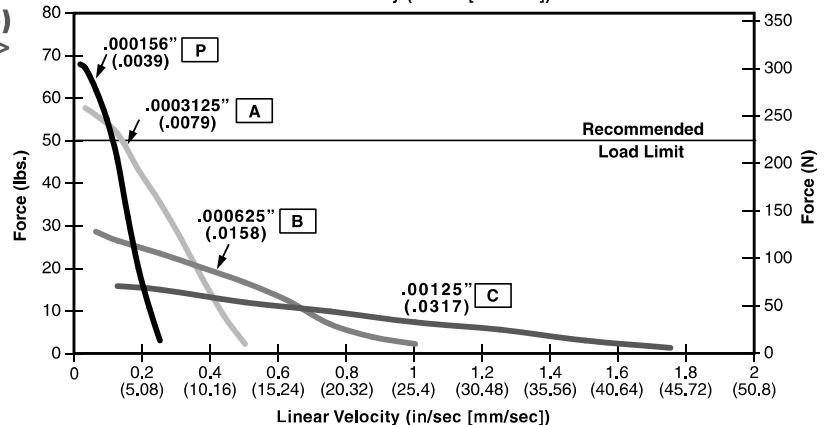
FORCE vs. LINEAR VELOCITY

- Chopper
- Bipolar
- 100% Duty Cycle
- 8:1 Motor Coil to Drive Supply Voltage

Ø .218 (5.54)
Lead-screw >



Ø .250 (6.35)
Lead-screw >



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.

With L/R drives peak force and speeds are reduced, using a unipolar drive will yield a further 30% force reduction.

The Haydon® 35000 Series Size 14, 0.9° high resolution motor

Compared to the standard resolution (1.8°) this motor has been engineered to precisely deliver reliable high speed, force, up to 50 lbs (222 N), as well as a full step movement as low as 1.5 microns.

Specifications

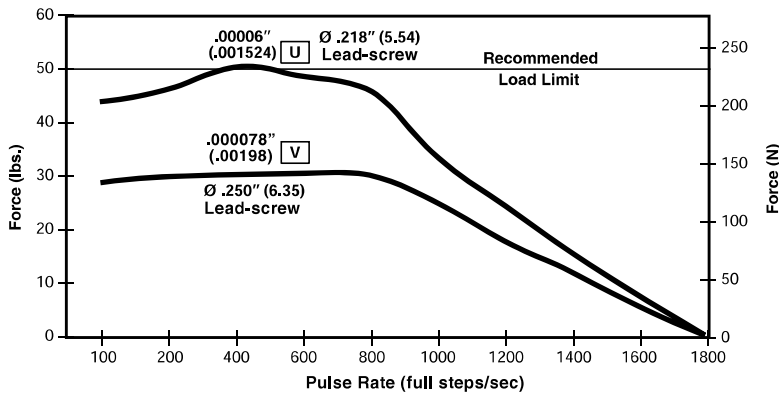
Size 14: 35 mm (1.4-in) Hybrid Linear Actuator (0.9° Step Angle)						Linear Travel / Step							
Part No.	Captive Non-captive External Lin.	35K4 ■■■■■†			35K6 ■■■■■†			Screw Ø .218" (5.54 mm)		Screw Ø .250" (6.35 mm)		Order Code I.D.	Order Code I.D.
		35J4 ■■■■■†			35J6 ■■■■■†			inches	mm	inches	mm		
		E35K4 ■■■■■†			E35K6 ■■■■■†								
Winding		Bipolar			Unipolar**			.00006	.0015*	U	.000078*	.00198*	V
Winding Voltage		2.33 VDC	5 VDC	12 VDC	5 VDC	12 VDC	.00012	.0030*	N	.00015625	.0039*	P	
Current (RMS)/phase		1.25 A	0.57 A	0.24 A	0.57 A	0.24 A	.00024	.0060*	K	.0003125	.0079*	A	
Resistance/phase		1.86 Ω	8.8 Ω	50.5 Ω	8.8	50.5 Ω	.00048	.0121*	J	.000625	.0158*	B	
Inductance/phase		2.8 mH	13 mH	60 mH	6.5 mH	30 mH	.00096	.0243*	Q				
Power Consumption		5.7 W					*Values truncated						
Rotor Inertia		16 gcm ²					Special drive considerations may be necessary when leaving shaft fully extended or fully retracted.						
Insulation Class		Class B (Class F available)					NOTE: Refer to performance curves on page 100 for codes N, K, J, Q, P, A, B						
Weight		5.7 oz (162 g)					† Part numbering information on page 88.						
Insulation Resistance		20 MΩ					** Unipolar drive gives approximately 30% less thrust than bipolar drive.						

HYBRID LINEAR ACTUATOR
STEPPER MOTORS

FORCE vs. PULSE RATE

- Chopper
- Bipolar
- 100% Duty Cycle
- 8:1 Motor Coil to Drive Supply Voltage

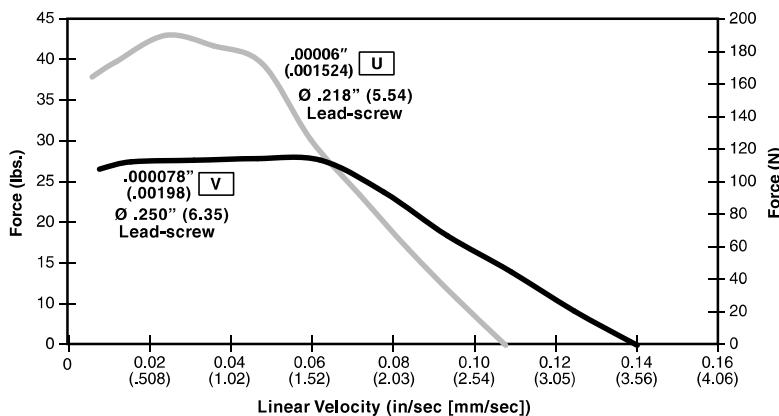
– with two available lead-screw diameters



FORCE vs. LINEAR VELOCITY

- Chopper
- Bipolar
- 100% Duty Cycle
- 8:1 Motor Coil to Drive Supply Voltage

– with two available lead-screw diameters



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.

With L/R drives peak force and speeds are reduced, using a unipolar drive will yield a further 30% force reduction.

35000 Series: Size 14 Double Stack Linear Actuator



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35000 Series Size 14 Double Stack linear actuators for improved force and performance

The Size 14 Double Stack designs deliver exceptional performance and new linear motion design opportunities.

Three designs are available, captive, non-captive and external linear versions. The 35000 Series is available in a wide variety of resolutions - from 0.000625-in (.0158 mm) per step to 0.005-in (.127 mm) per step. The motors can also be microstepped for even finer resolutions. The Size 14 actuator delivers thrust of up to 50 lbs. (222 N).



Size 14 Double Stack Captive Shaft

Size 14 Double Stack External Linear Non-Captive Shaft

HYBRID LINEAR ACTUATOR STEPPER MOTORS

Specifications

Size 14: 35 mm (1.4-in) Double Stack Hybrid Linear Actuator (1.8° Step Angle)			
Part No.	Captive	35M4 ■ - ■ ■ - ■ ■ ■	
	Non-captive	35L4 ■ - ■ ■ - ■ ■ ■	
	External Lin.	E35M4 ■ - ■ ■ - ■ ■ ■	
Wiring		Bipolar	
Winding Voltage	2.33 VDC	5 VDC	12 VDC
Current (RMS)/phase	2 A	910 mA	380 mA
Resistance/phase	1.2 Ω	5.5 Ω	31.6 Ω
Inductance/phase	1.95 mH	7.63 mH	65.1 mH
Power Consumption	9.1 W Total		
Rotor Inertia	30 gcm ²		
Insulation Class	Class B (Class F available)		
Weight	8.5 oz (240 g)		
Insulation Resistance	20 MΩ		

Linear Travel / Step		Order Code I.D.
Screw Ø.250" (6.35 mm) inches	mm	
.000625	.0158*	B
.00125	.0317*	C
.0025	.0635	Y
.00375	.0953	AG
.005	.127	Z

*Values truncated

Standard motors are Class B rated for maximum temperature of 130°C.

Special drive considerations may be necessary when leaving shaft fully extended or fully retracted.



www.HaydonKerkExpress.com
Standard products available 24-hrs.

Identifying the Hybrid part number codes when ordering



Prefix
(include only when using the following)

- A** = A Coil (See AC Synchronous page 189)
- E** = External
- K** = External with 40° thread form
- P** = Proximity Sensor
- S** = Home Switch

Series number designation
35 = 35000

(Series numbers represent approximate width of motor body)

Style
L = 1.8° Non-captive
M = 1.8° Captive or External (use "E" or "K" Prefix for External version)

Coils
4 = Bipolar (4 wire)

Code ID Resolution Travel/Step

- B** = .000625-in (.0158)
- C** = .00125-in (.0317)
- Y** = .0025-in (.0635)
- AG** = .00375-in (.0953)
- Z** = .005-in (.127)

Voltage
2.33 = 2.33 VDC
05 = 5 VDC
12 = 12 VDC

Custom V available

Suffix
Stroke
Example: -910 = 1-in (Refer to Stroke chart on Captive motor series product page 93.)

Suffix also represents:
- 800 = Metric
- 900 = External Linear with grease and flanged nut
- XXX = Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part.

NOTE: Dashes must be included in Part Number (-) as shown above. For assistance or order entry, call our engineering team at 203 756 7441.

ENCODERS and other **OPTIONAL ASSEMBLIES** also available

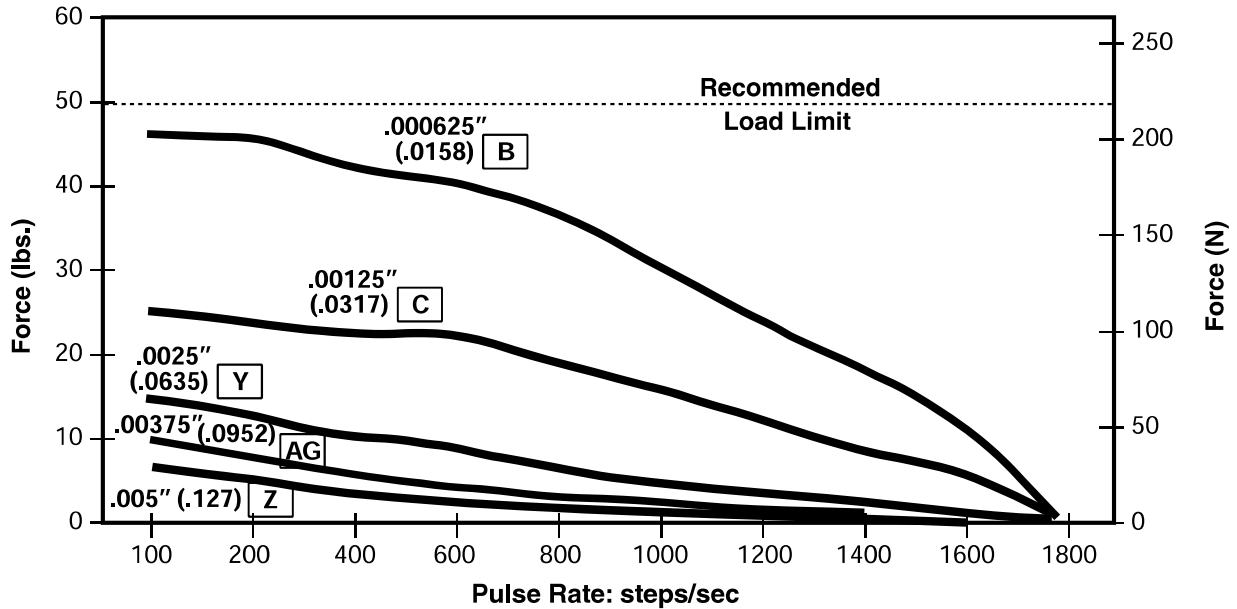
**35000 Series: Size 14
Double Stack Performance Curves**



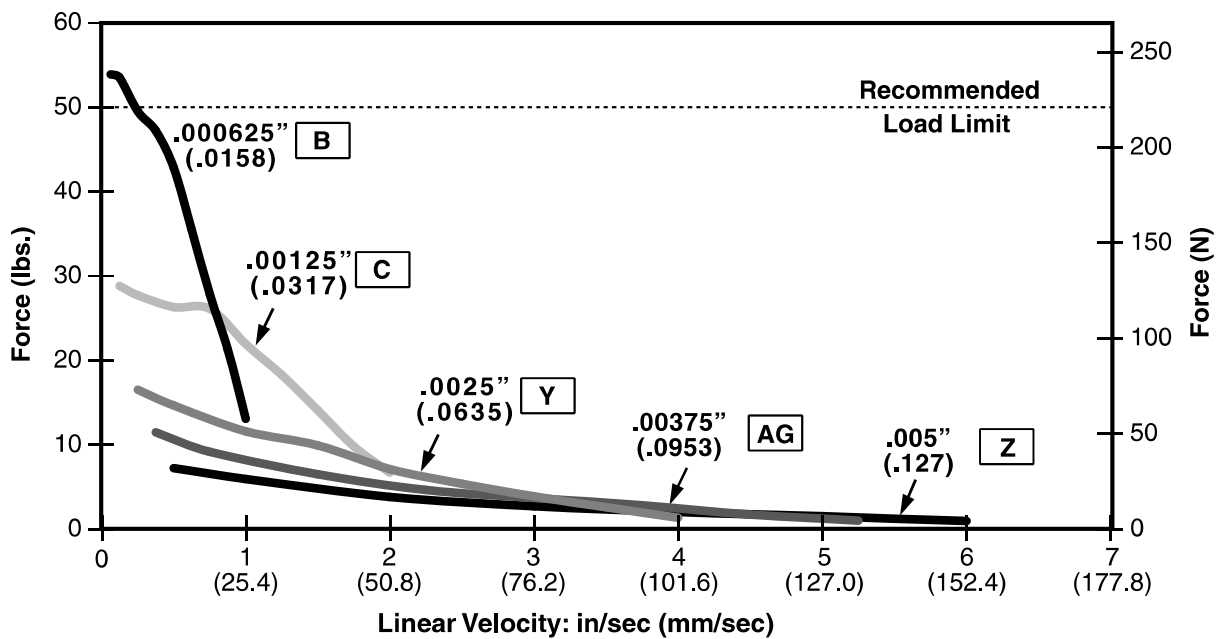
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FORCE vs. PULSE RATE Chopper • Bipolar • 100% Duty Cycle • 8:1 Motor Coil to Drive Supply Voltage
Ø .250 (6.35) Lead-screw

HYBRID LINEAR ACTUATOR
STEPPER MOTORS



FORCE vs. LINEAR VELOCITY
Chopper • Bipolar • 100% Duty Cycle • 8:1 Motor Coil to Drive Supply Voltage
Ø .250 (6.35) Lead-screw



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.

With L/R drives peak force and speeds are reduced, using a unipolar drive will yield a further 30% force reduction.

43000 Series: Hybrid Size 17 Single Stack Part Number Identification



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Identifying the Hybrid part number codes when ordering



HYBRID LINEAR ACTUATOR STEPPER MOTORS

E

Prefix
(include only when using the following)

- A** = A Coil (See AC Synchronous page 189)
- E** = External
- K** = External with 40° thread form
- P** = Proximity Sensor
- S** = Home Switch

43

Series number designation

43 = 43000

(Series numbers represent approximate width of motor body)

H

Style

- F** = 1.8° Non-captive
- H** = 1.8° Captive or External (use "E" or "K" Prefix for External version)
- J** = 0.9° Non-captive
- K** = 0.9° Captive or External (use "E" or "K" Prefix for External version)

6

Coils

- 4** = Bipolar (4 wire)
- 6** = Unipolar (6 wire)
- G** = IDEA Drive (Size 17, 43000 Series, Bipolar only)

N

Code ID Resolution Travel/Step

- N** = .00012-in (.0030)
- K** = .00024-in (.0060)
- J** = .00048-in (.0121)
- Q** = .00096-in (.0243)
- P** = .00015625-in (.0039)
- A** = .0003125-in (.0079)
- B** = .000625-in (.0158)
- C** = .00125-in (.0317)
- R** = .00192-in (.0478)

High Resolution

- U** = .00006-in (.0015)
- V** = .000078-in (.00198)

2.33

Voltage

- 2.33** = 2.33 VDC
- 05** = 5 VDC
- 12** = 12 VDC

Custom V available

910

Suffix

Stroke

Example: -910 = 1-in (Refer to Stroke chart on Captive motor series product page 97.)

Suffix also represents:

-800 = Metric

-900 = External Linear with grease and flanged nut

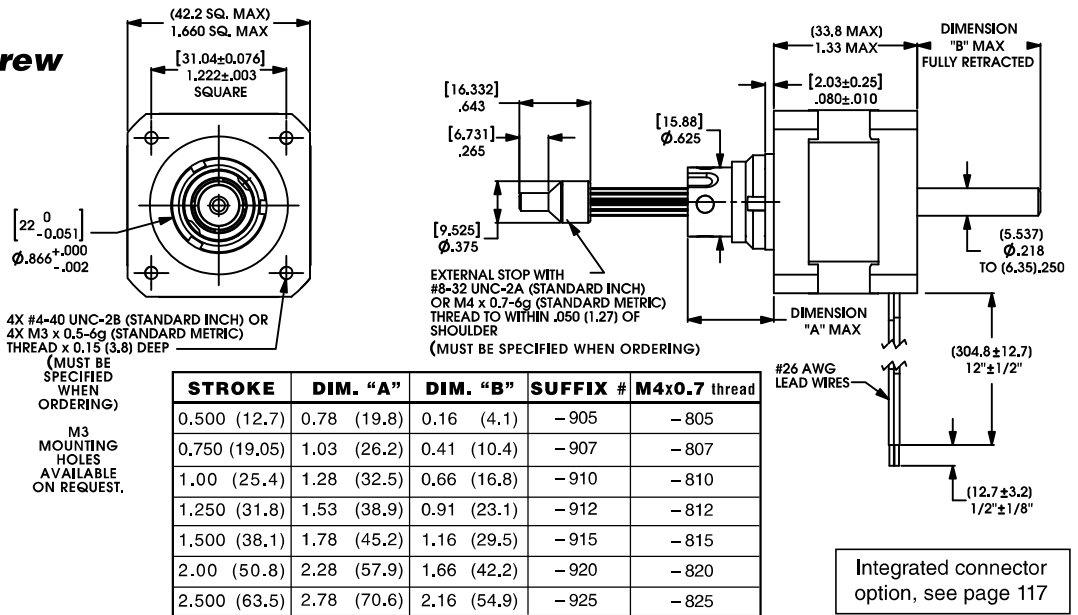
-XXX = Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part.

NOTE: Dashes must be included in Part Number (-) as shown above. For assistance or order entry, call our engineering team at 203 756 7441.

ENCODERS and other OPTIONAL ASSEMBLIES also available

Captive Lead-screw

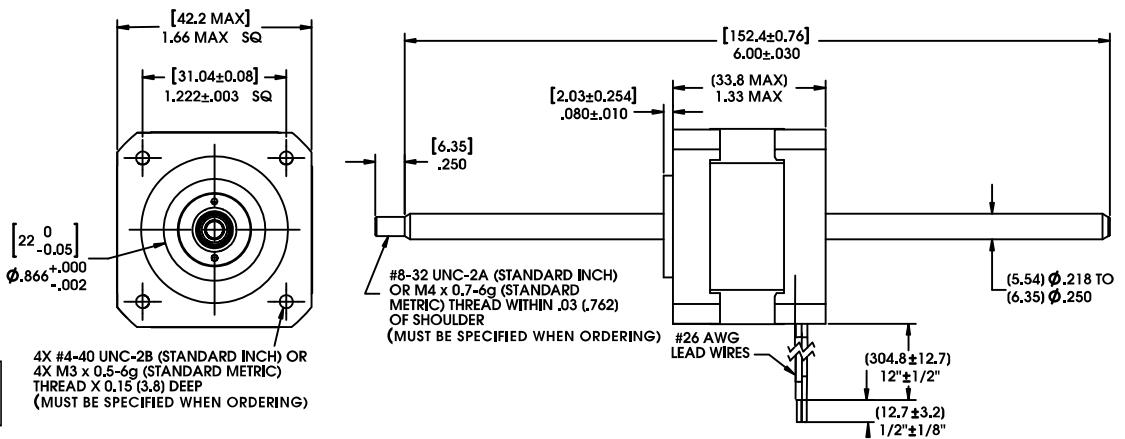
Dimensions = (mm) inches



Non-Captive Lead-screw

Dimensions = (mm) inches

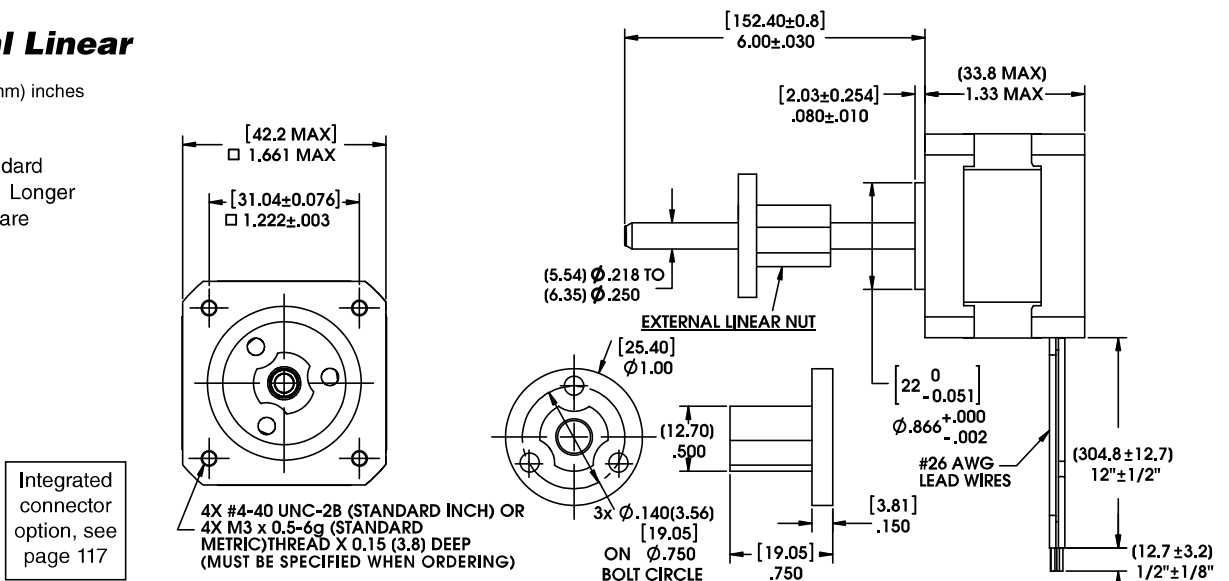
Up to 10-in (254 mm) standard screw lengths. Longer screw lengths are available.



External Linear

Dimensions = (mm) inches

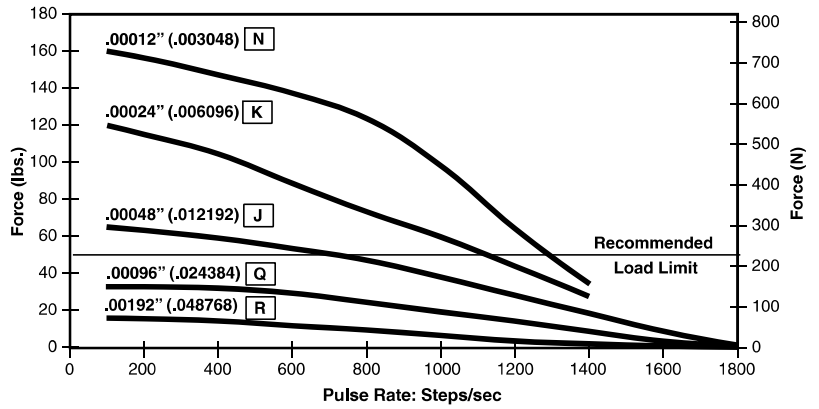
Up to 10-in (254 mm) standard screw lengths. Longer screw lengths are available.



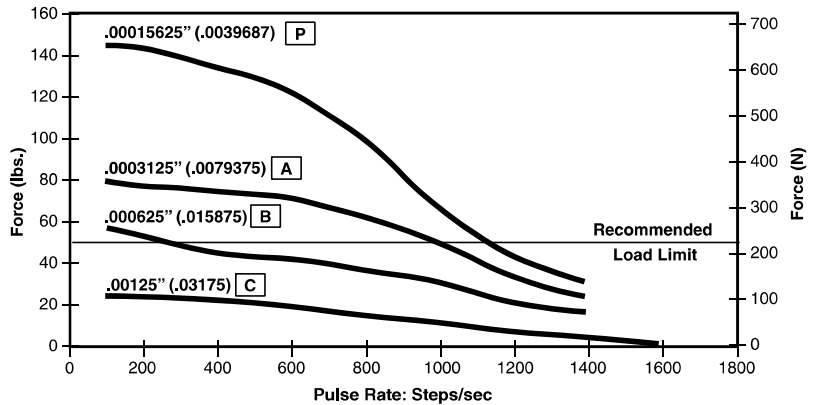
FORCE vs. PULSE RATE

- Chopper
- Bipolar
- 100% Duty Cycle
- 8:1 Motor Coil to Drive Supply Voltage

Ø .218 (5.54)
Lead-screw >



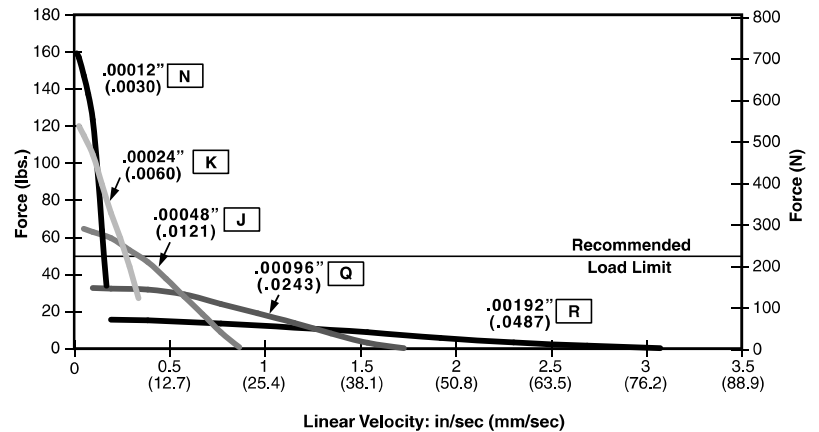
Ø .250 (6.35)
Lead-screw >



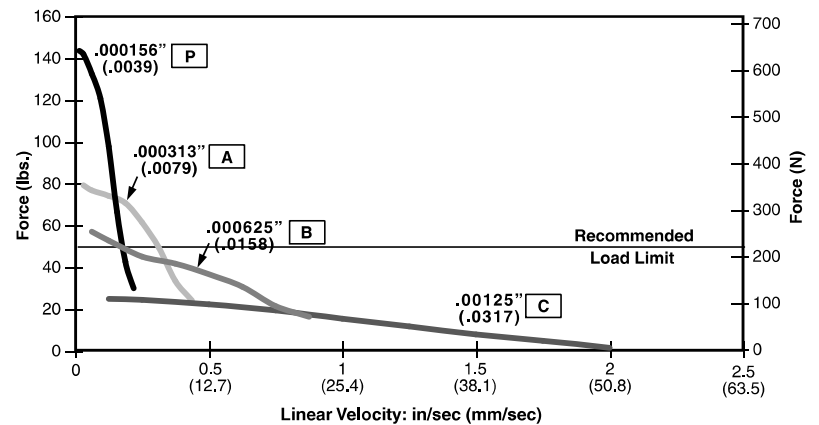
FORCE vs. LINEAR VELOCITY

- Chopper
- Bipolar
- 100% Duty Cycle
- 8:1 Motor Coil to Drive Supply Voltage

Ø .218 (5.54)
Lead-screw >



Ø .250 (6.35)
Lead-screw >



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.

With L/R drives peak force and speeds are reduced, using a unipolar drive will yield a further 30% force reduction.

The Haydon® 43000 Series Size 17, 0.9° High Resolution Motor

The Size 17 High Resolution Actuator features a production-proven, patented rotor drive nut that delivers trouble-free, long-term performance.

Specifications

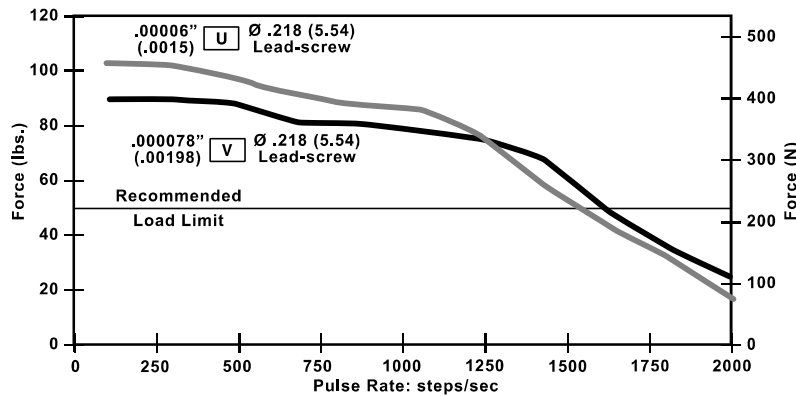
Size 17: 43 mm (1.7-in) Hybrid Linear Actuator (0.9° Step Angle)						Linear Travel / Step						
	Screw Ø .218" (5.54 mm)		Screw Ø .250" (6.35 mm)			Screw Ø .218" (5.54 mm)		Screw Ø .250" (6.35 mm)				
	Order Code I.D.	Order Code I.D.	Order Code I.D.	Order Code I.D.		Order Code I.D.	Order Code I.D.	Order Code I.D.	Order Code I.D.			
Captive	43K4	43K6				.00006	.0015*	U	.000078*	.00198*	V	
Non-captive	43J4	43J6				.00012	.0030*	N	.00015625	.0039*	P	
External Lin.	E43K4	E43K6				.00024	.0060*	K	.0003125	.0079*	A	
Wiring	Bipolar			Unipolar**			.00048	.0121*	J	.000625	.0158*	B
Winding Voltage	2.33 VDC	5 VDC	12 VDC	5 VDC	12 VDC	.00096	.0243*	Q				
Current (RMS)/phase	1.5 A	700 mA	290 mA	700 mA	290 mA	*Values truncated Special drive considerations may be necessary when leaving shaft fully extended or fully retracted. NOTE: Refer to performance curves on page 98 for codes N, K, J, Q, P, A, B † Part numbering information on page 96. ** Unipolar drive gives approximately 30% less thrust than bipolar drive.						
Resistance/phase	1.56 Ω	7.2 Ω	41.5 Ω	7.2 Ω	41.5 Ω							
Inductance/phase	2.6 mH	12.0 mH	70.0 mH	6.0 mH	35.0 mH							
Power Consumption	7 W											
Rotor Inertia	37 gcm ²											
Insulation Class	Class B (Class F available)											
Weight	8.5 oz (241 g)											
Insulation Resistance	20 MΩ											

HYBRID LINEAR ACTUATOR
STEPPER MOTORS

FORCE vs. PULSE RATE

- Chopper
- Bipolar
- 100% Duty Cycle
- 8:1 Motor Coil to Drive Supply Voltage

– with two available lead-screw diameters

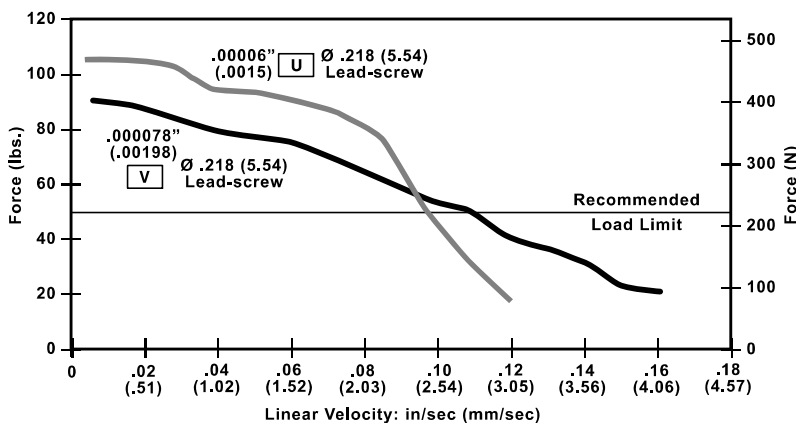


NOTE: All chopper drive curves were created with a 5 volt motor and a 40 volt power supply.

FORCE vs. LINEAR VELOCITY

- Chopper
- Bipolar
- 100% Duty Cycle
- 8:1 Motor Coil to Drive Supply Voltage

– with two available lead-screw diameters



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.

With L/R drives peak force and speeds are reduced, using a unipolar drive will yield a further 30% force reduction.

43000 Series: Size 17 with Programmable IDEA™ Drive



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The Haydon® 43000 Series Size 17 Hybrid Linear Actuators with integrated IDEA™ Drive – high performance in a compact package

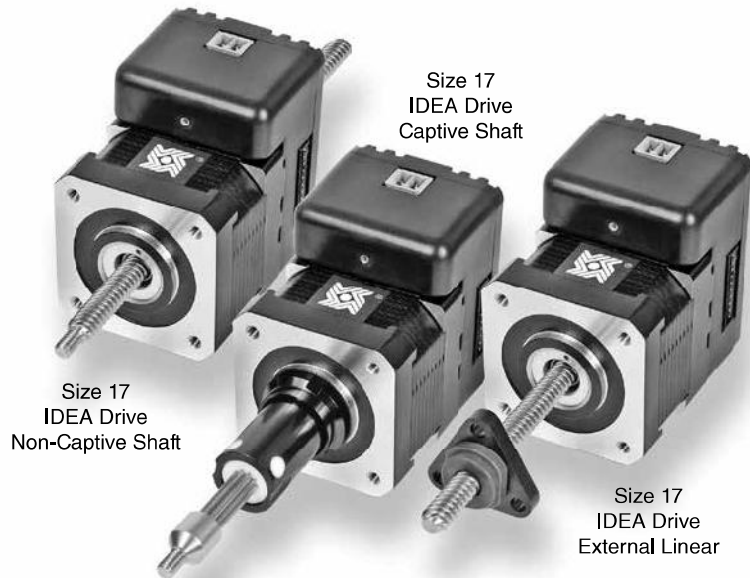
The **43000 Series Single Stack actuator** is available in a wide variety of resolutions – from 0.00006-in (.001524 mm) per step to 0.00192-in (.048768mm) per step. Delivers output force of up to 50 lbs (220N), or speeds exceeding 3 inches (7.62 cm) per second.

HYBRID LINEAR ACTUATOR
STEPPER MOTORS

Programmable 43000 Series with IDEA™ Drive Features:

- Fully Programmable
- RoHS Compliant
- USB or RS-485 Communication
- Microstepping Capability
 - Full, 1/2, 1/4, 1/8, 1/16, 1/32, 1/64
- Graphic User Interface
- Auto-population of Drive Parameters
- Programmable Acceleration/Deceleration and Current Control

Note: For more information about the IDEA™ Drive see page 194.



Single Stack Specifications

Size 17: 43 mm (1.7-in) Hybrid Linear Actuator (1.8° Step Angle)		
Part No.	Captive	43HG ■-■-■-■-■†
	Non-captive	43FG ■-■-■-■-■†
	External Lin.	E43HG ■-■-■-■-■†
Wiring		Bipolar
Winding voltage		2.33 VDC**

Linear Travel / Step					
Screw Ø		Order Code	Screw Ø		Order Code
.218" (5.54 mm)	inches	I.D.	.250" (6.35 mm)	inches	I.D.
.00012	.0030*	N	.00015625	.0039*	P
.00024	.0060*	K	.0003125	.0079*	A
.00048	.0121*	J	.000625	.0158*	B
.00096	.0243*	Q	.00125	.0317*	C
.00192	.0487*	R			

*Values truncated

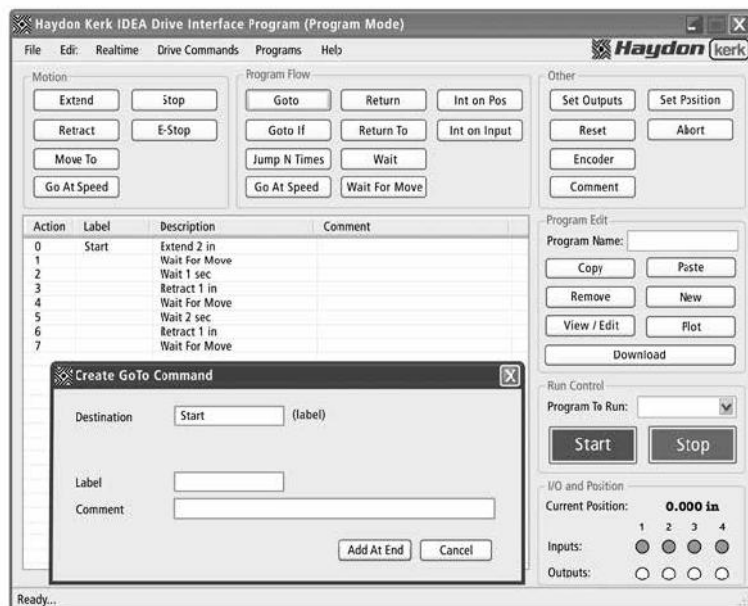
† Part numbering information on page 96.

**Contact Haydon Kerk if a higher voltage motor is desired.

Special drive considerations may be necessary when leaving shaft fully extended or fully retracted.

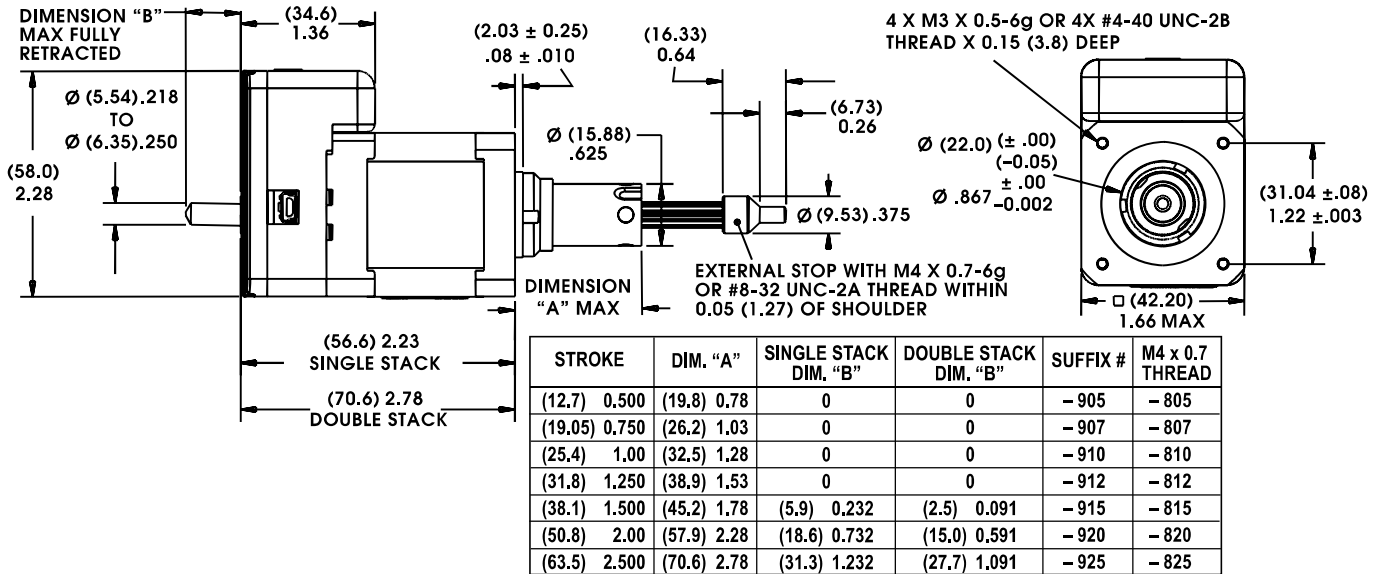
IDEA™ Drive software is simple to use with on-screen buttons and easy-to-understand programming guides.

The software program generates motion profiles directly into the system and also contains a “debug” utility allowing line-by-line execution of a motion program for easy troubleshooting.



Captive Lead-screw

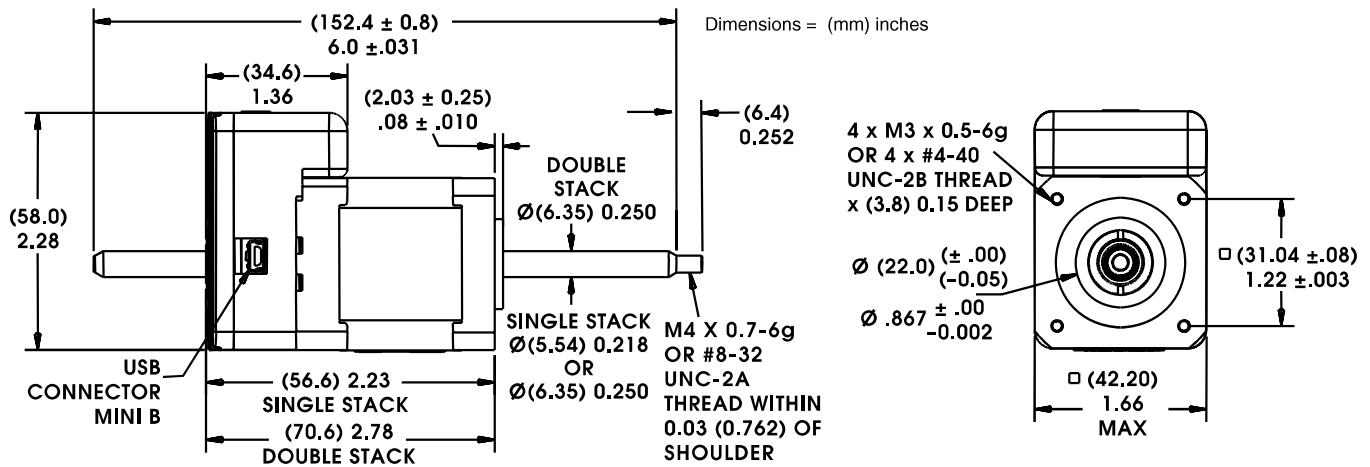
Dimensions = (mm) inches



HYBRID LINEAR ACTUATOR STEPPER MOTORS

Non-Captive Lead-screw

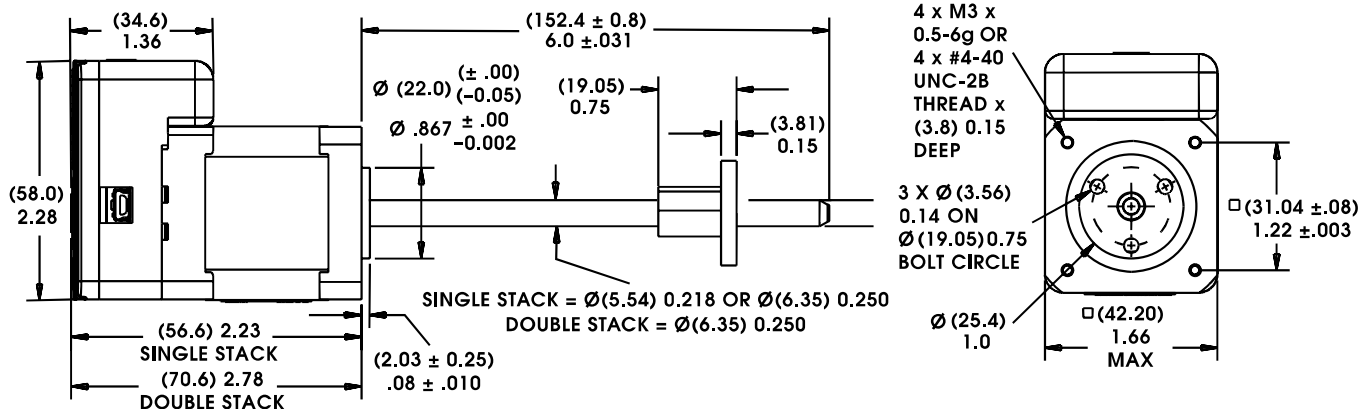
Up to 10-in (254 mm) standard screw lengths. Longer screw lengths are available.



External Linear

Up to 10-in (254 mm) standard screw lengths. Longer screw lengths are available.

Dimensions = (mm) inches



Identifying the Hybrid part number codes when ordering



Prefix
(include only when using the following)

- A** = A Coil (See AC Synchronous page 189)
- E** = External
- K** = External with 40° thread form
- P** = Proximity Sensor
- S** = Home Switch

Series number designation

43 = 43000

(Series numbers represent approximate width of motor body)

Style

- L** = 1.8° Non-captive
- M** = 1.8° Captive or External (use "E" or "K" Prefix for External version)

Coils

- 4** = Bipolar (4 wire)
- G** = IDEA Drive (Size 17, 43000 Series, Bipolar only)

Code ID Resolution Travel/Step

- B** = .000625-in (.0158)
- C** = .00125-in (.0317)
- Y** = .0025-in (.0635)
- AG** = .00375-in (.0953)
- Z** = .005-in (.127)

Voltage

- 2.33** = 2.33 VDC
 - 05** = 5 VDC
 - 12** = 12 VDC
- Custom V available

Suffix

Stroke
Example: -910 = 1-in (Refer to Stroke chart on Captive motor series product page 104.)

Suffix also represents:

- 800 = Metric
- 900 = External Linear with grease and flanged nut
- XXX = Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part.

NOTE: Dashes must be included in Part Number (-) as shown above. For assistance or order entry, call our engineering team at 203 756 7441.



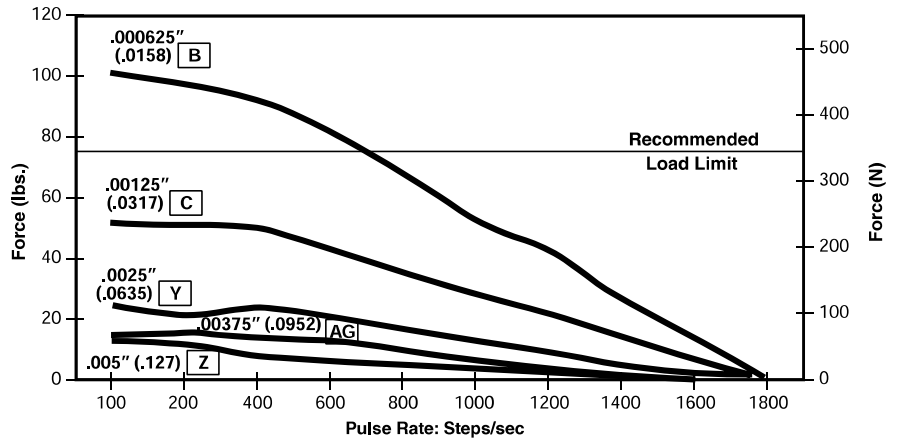
ENCODERS and other **OPTIONAL ASSEMBLIES** also available

43000 Series: Size 17 Double Stack Performance Curves

FORCE vs. PULSE RATE

- Chopper
- Bipolar
- 100% Duty Cycle
- 8:1 Motor Coil to Drive Supply Voltage

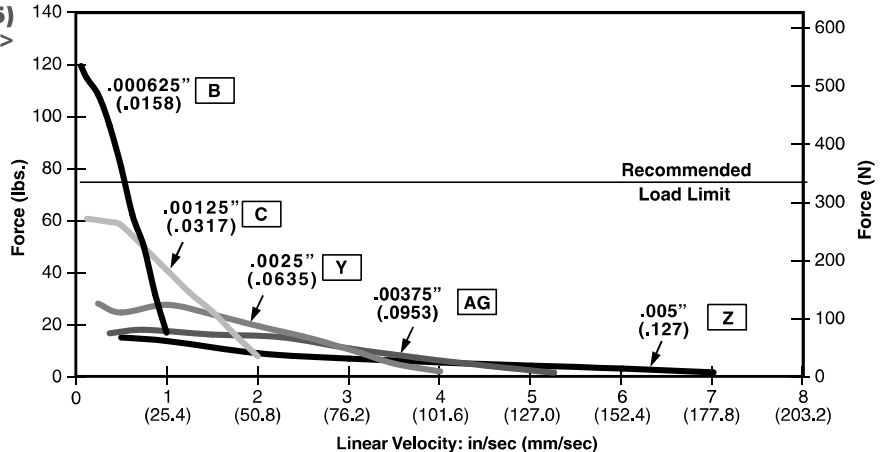
Ø .250 (6.35)
Lead-screw >



FORCE vs. LINEAR VELOCITY

- Chopper
- Bipolar
- 100% Duty Cycle
- 8:1 Motor Coil to Drive Supply Voltage

Ø .250 (6.35)
Lead-screw >



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.

With L/R drives peak force and speeds are reduced, using a unipolar drive will yield a further 30% force reduction.

43000 Series: Size 17 Double Stack Dimensional Drawings

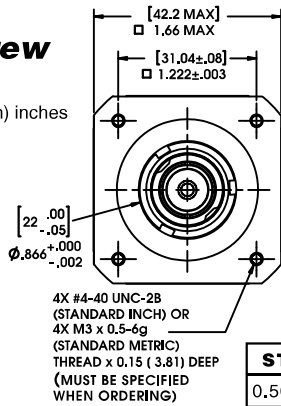


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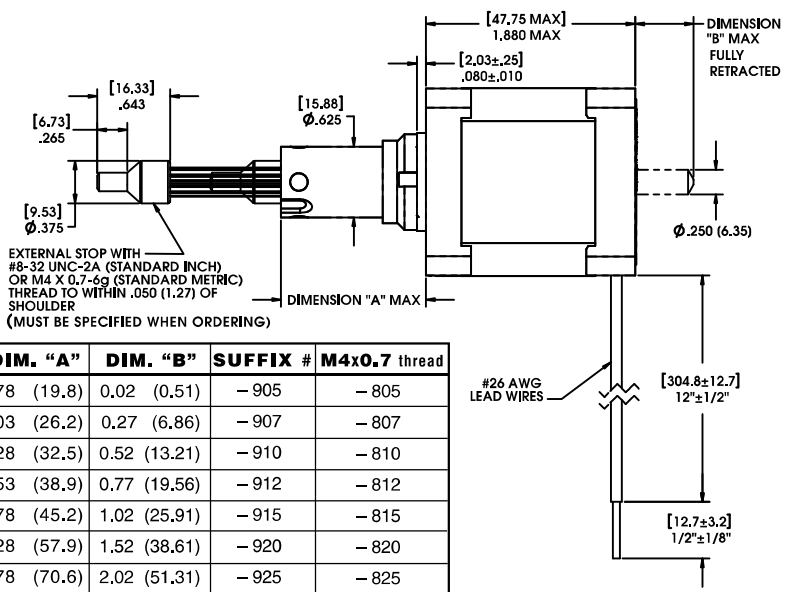
HYBRID LINEAR ACTUATOR STEPPER MOTORS

Captive Lead-screw

Dimensions = (mm) inches



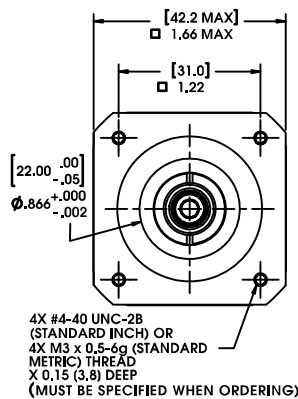
Integrated connector option, see page 117



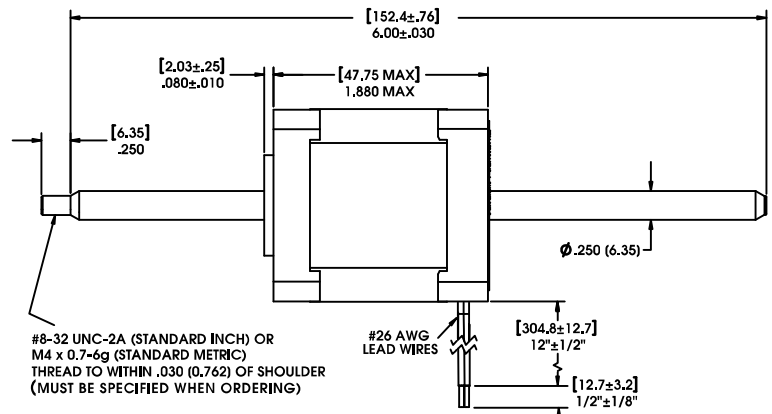
Non-Captive Lead-screw

Dimensions = (mm) inches

Up to 10-in (254 mm) standard screw lengths. Longer screw lengths are available.



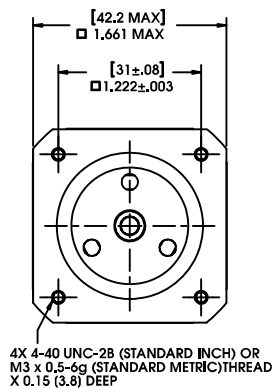
Integrated connector option, see page 117



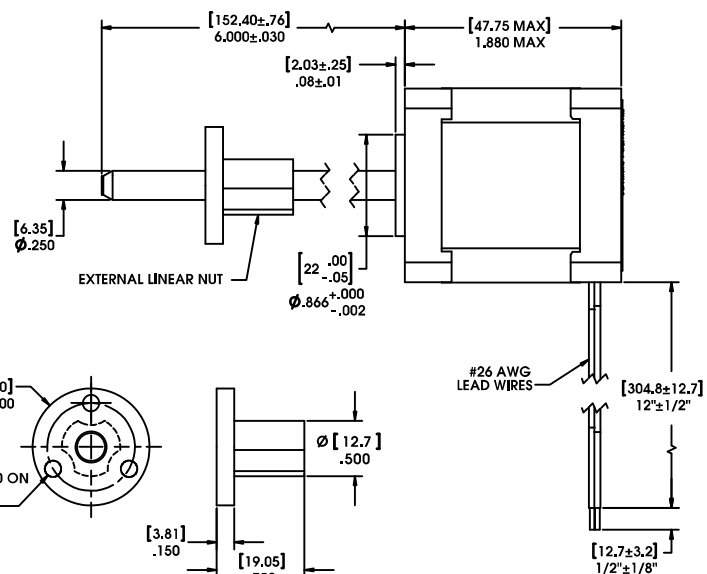
External Linear

Dimensions = (mm) inches

Up to 10-in (254 mm) standard screw lengths. Longer screw lengths are available.



Integrated connector option, see page 117

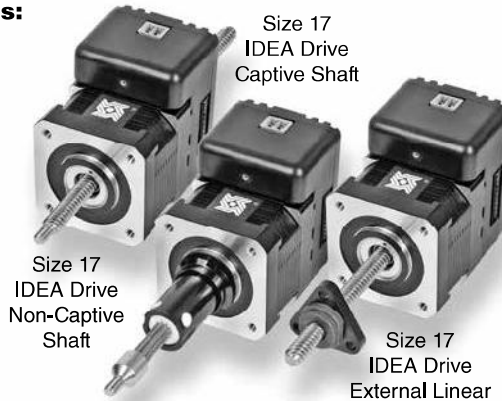


The Haydon® 43000 Series Size 17 Double Stack Hybrid Linear Actuators with integrated IDEA™ Drive – programmable, improved performance

The **43000 Series Double Stack actuator** is available in a wide variety of resolutions – from 0.000625-in (.0158 mm) per step to 0.005-in (.127 mm) per step. Delivers output force of up to 75 lbs (337N).

Programmable IDEA™ Drive Features:

- Fully Programmable
- RoHS Compliant
- USB or RS-485 Communication
- Microstepping Capability – Full, 1/2, 1/4, 1/8, 1/16, 1/32, 1/64
- Graphic User Interface
- Auto-population of Drive Parameters
- Programmable Acceleration/Deceleration and Current Control



Dimensional Drawings
See page 101.

Note: See page 194 for more information on the IDEA™ Drive

Double Stack Specifications

Size 17 DS: 43 mm (1.7-in) Hybrid Linear Actuator (1.8° Step Angle)	
Part No.	Captive 43MG ■-■-■-■-■
	Non-captive 43LG ■-■-■-■-■
	External Lin. E43MG ■-■-■-■-■
Wiring	Bipolar
Winding voltage	2.33 VDC**

Linear Travel / Step Order Code I.D.		
Screw Ø inches	mm	
.000625	.0158*	B
.00125	.0317*	C
.0025	.0635*	Y
.00375	.0953*	AG
.005	.127*	Z

*Values truncated
**Contact Haydon Kerk if a higher voltage motor is desired.

Special drive considerations may be necessary when leaving shaft fully extended or fully retracted.

Identifying the Hybrid part number codes when ordering

E	43	M	G	N	-	2.33	-	910
Prefix (include only when using the following) A = A Coil (See AC Synchronous page 189) E = External K = External with 40° thread form P = Proximity Sensor S = Home Switch	Series number designation 43 = 43000 (Series numbers represent approximate width of motor body)	Style L = 1.8° Non-captive M = 1.8° Captive or External (use "E" or "K" Prefix for External version)	Coils 4 = Bipolar (4 wire) G = IDEA Drive (Size 17, 43000 Series, Bipolar only)	Code ID Resolution Travel/Step B = .000625-in (.0158) C = .00125-in (.0317) Y = .0025-in (.0635) AG = .00375-in (.0953) Z = .005-in (.127)	-	Voltage 2.33 = 2.33 VDC 05 = 5 VDC 12 = 12 VDC Custom V available	-	Suffix Stroke Example: -910 = 1-in (Refer to Stroke chart on Captive motor series product page 104.) Suffix also represents: -800 = Metric -900 = External Linear with grease and flanged nut -XXX = Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part.

NOTE: Dashes must be included in Part Number (-) as shown above. For assistance or order entry, call our engineering team at 203 756 7441.

www.HaydonKerkExpress.com
Standard products available 24-hrs.

ENCODERS and other OPTIONAL ASSEMBLIES also available

Identifying the Hybrid part number codes when ordering

E	57	H	6	7	-	3.25	-	910
<p>Prefix (include only when using the following)</p> <p>A = A Coil (See AC Synchronous page 189)</p> <p>E = External</p> <p>K = External with 40° thread form</p> <p>P = Proximity Sensor</p> <p>S = Home Switch</p>	<p>Series number designation 57 = 57000</p> <p>(Series numbers represent approximate width of motor body)</p>	<p>Style</p> <p>F = 1.8° Non-captive</p> <p>H = 1.8° Captive or External (use "E" or "K" Prefix for External version)</p> <p>J = 0.9° Non-captive</p> <p>K = 0.9° Captive or External (use "E" or "K" Prefix for External version)</p>	<p>Coils</p> <p>4 = Bipolar (4 wire)</p> <p>6 = Unipolar (6 wire)</p>	<p>Code ID Resolution Travel/Step</p> <p>7 = .000125-in (.0031)</p> <p>S = .0004167-in (.01058418)</p> <p>3 = .0005-in (.0127)</p> <p>1 = .001-in (.0254)</p> <p>A = .0003125-in (.0079)</p> <p>T = .0008333-in (.0211)</p> <p>2 = .002-in (.0508)</p> <p>High Resolution</p> <p>P = .00015625-in (.003969)</p> <p>X = .00020833-in (.00529166)</p> <p>9 = .00025-in (.0635)</p>		<p>Voltage</p> <p>3.25 = 3.25 VDC</p> <p>05 = 5 VDC</p> <p>12 = 12 VDC</p> <p>Custom V available</p>		<p>Suffix</p> <p>Stroke Example: -910 = 1-in (Refer to Stroke chart on Captive motor series product page 108.)</p> <p>Suffix also represents:</p> <p>-800 = Metric</p> <p>-900 = External Linear with grease and flanged nut</p> <p>-XXX = Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part.</p>
<p>NOTE: Dashes must be included in Part Number (-) as shown above. For assistance or order entry, call our engineering team at 203 756 7441.</p>								
							<p>ENCODERS and other OPTIONAL ASSEMBLIES also available</p>	

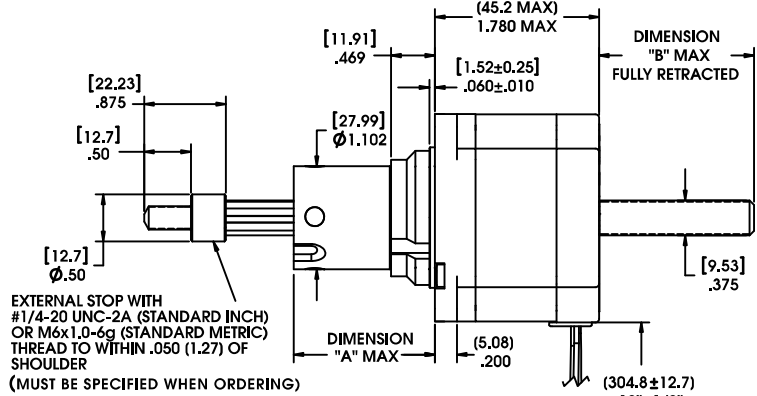
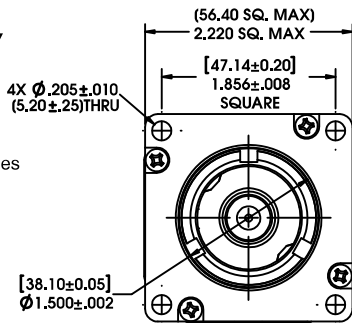
57000 Series: Size 23 Single Stack Dimensional Drawings



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Captive Lead-screw

Dimensions = (mm) inches



EXTERNAL STOP WITH #1/4-20 UNC-2A (STANDARD INCH) OR M6x1.0-6g (STANDARD METRIC) THREAD TO WITHIN .050 (1.27) OF SHOULDER (MUST BE SPECIFIED WHEN ORDERING)

STROKE	DIM. A	DIM. B	SUFFIX #	M6 x 1.0 thread
0.500 (12.7)	1.01 (25.7)	0.06 (1.5)	-905	-805
0.750 (19.05)	1.26 (32.0)	0.31 (7.9)	-907	-807
1.00 (25.4)	1.51 (38.4)	0.56 (14.2)	-910	-810
1.250 (31.8)	1.76 (44.7)	0.81 (20.6)	-912	-812
1.500 (38.1)	2.01 (51.1)	1.06 (26.9)	-915	-815
2.00 (50.8)	2.51 (63.8)	1.56 (39.6)	-920	-820
2.500 (63.5)	3.01 (76.5)	2.06 (52.3)	-925	-825

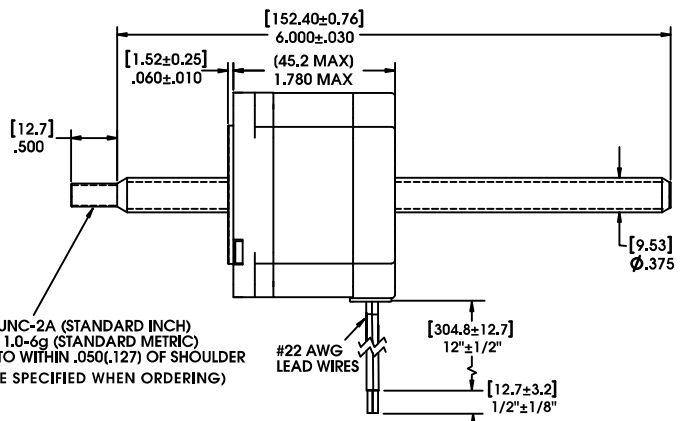
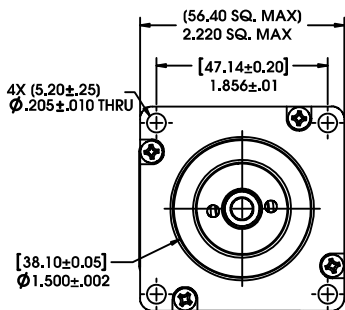
#22 AWG LEAD WIRES

HYBRID LINEAR ACTUATOR STEPPER MOTORS

Non-Captive Lead-screw

Dimensions = (mm) inches

Up to 10-in (254 mm) standard screw lengths. Longer screw lengths are available.

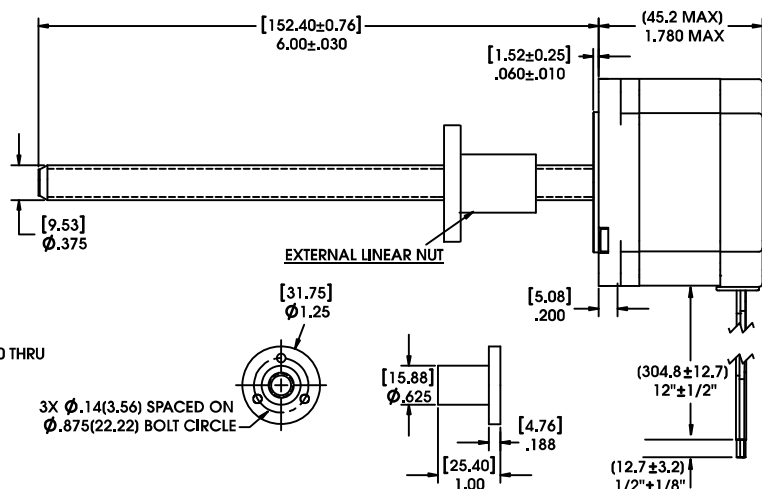
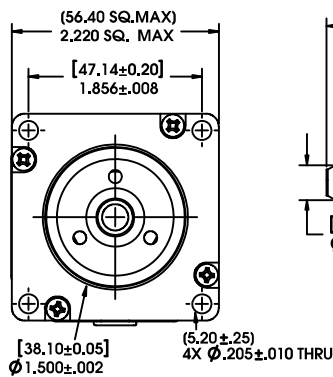


#1/4-20 UNC-2A (STANDARD INCH) OR M6 x 1.0-6g (STANDARD METRIC) THREAD TO WITHIN .050 (1.27) OF SHOULDER (MUST BE SPECIFIED WHEN ORDERING)

External Linear

Dimensions = (mm) inches

Up to 12-in (305 mm) standard screw lengths. Longer screw lengths are available.

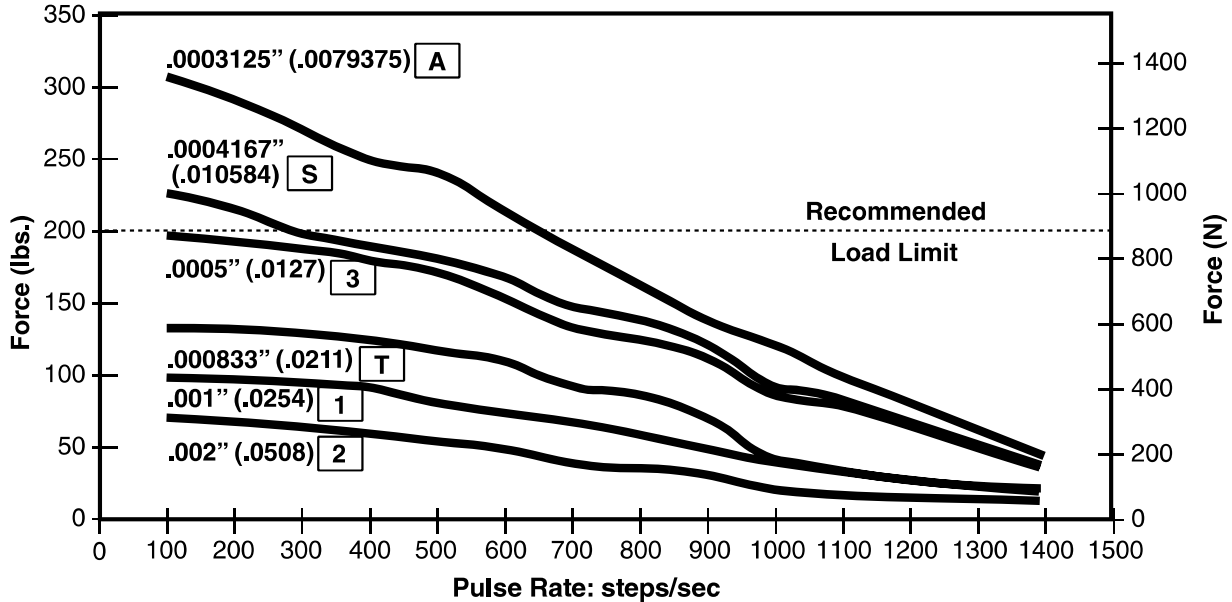


EXTERNAL LINEAR NUT

3X Ø.14(3.56) SPACED ON Ø.875(22.22) BOLT CIRCLE

FORCE vs. PULSE RATE

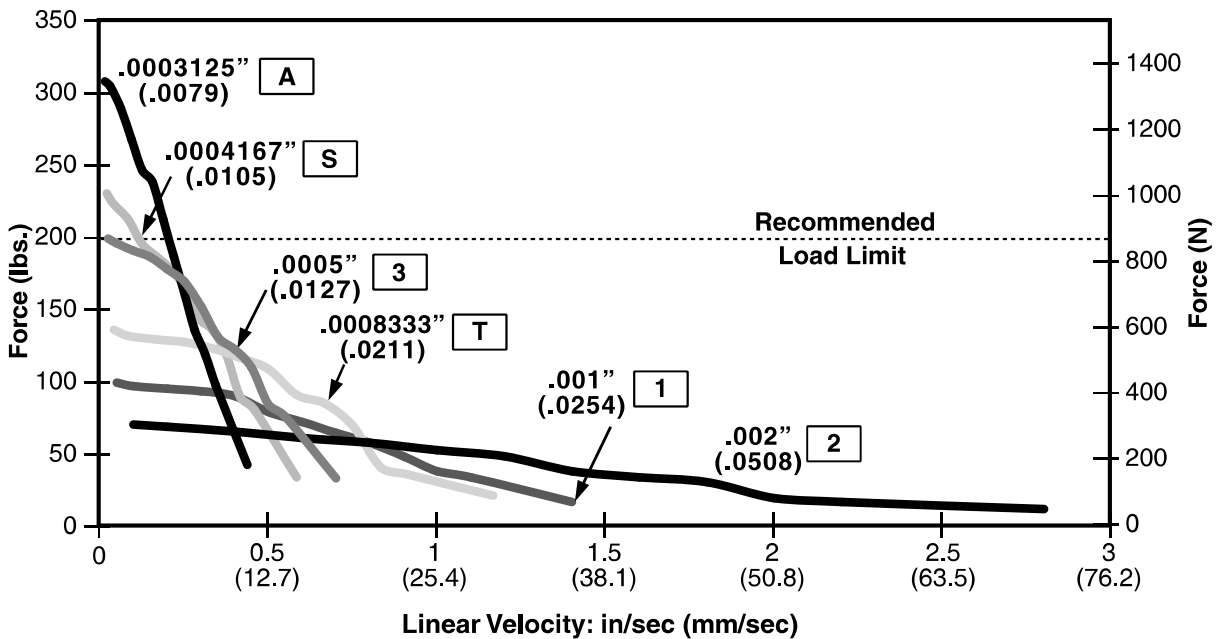
Chopper • Bipolar • 100% Duty Cycle • 8:1 Motor Coil to Drive Supply Voltage
 Ø .375 (9.53) Lead-screw



HYBRID LINEAR ACTUATOR STEPPER MOTORS

FORCE vs. LINEAR VELOCITY

Chopper • Bipolar • 100% Duty Cycle • 8:1 Motor Coil to Drive Supply Voltage
 Ø .375 (9.53) Lead-screw



NOTE: All chopper drive curves were created with a 5 volt motor and a 75 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.

With L/R drives peak force and speeds are reduced, using a unipolar drive will yield a further 30% force reduction.

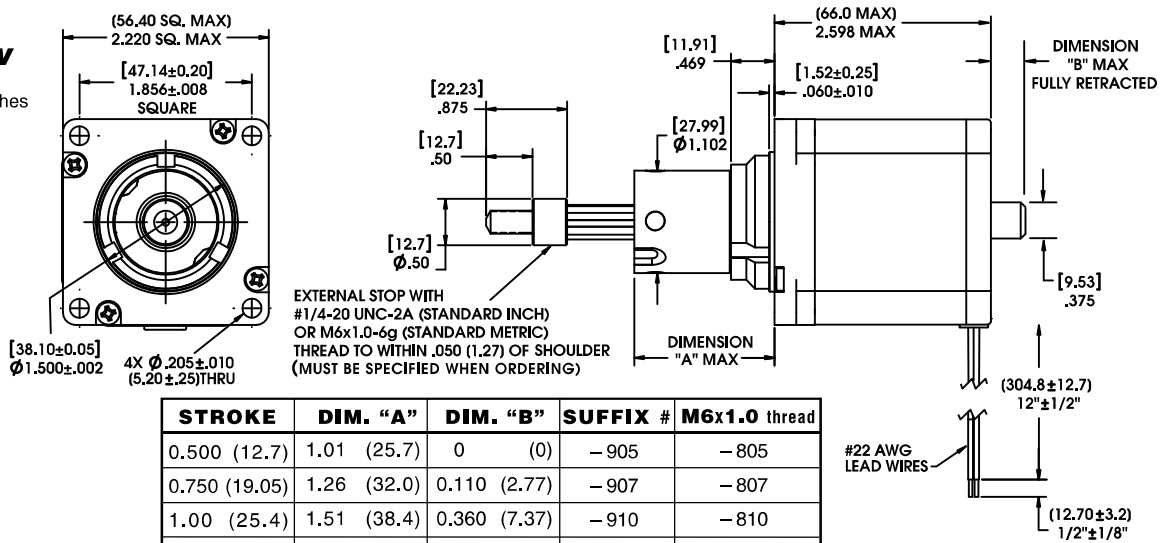
57000 Series: Size 23 Double Stack Dimensional Drawings



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Captive Lead-screw

Dimensions = (mm) inches

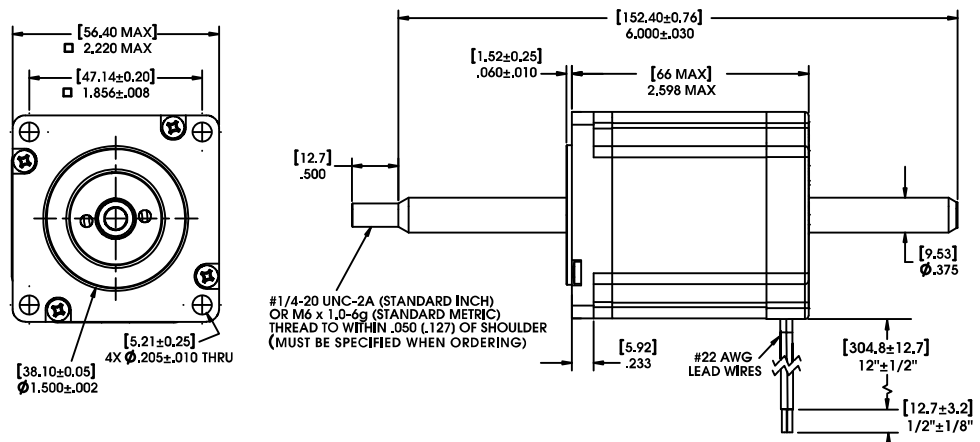


STROKE	DIM. "A"	DIM. "B"	SUFFIX #	M6x1.0 thread
0.500 (12.7)	1.01 (25.7)	0 (0)	-905	-805
0.750 (19.05)	1.26 (32.0)	0.110 (2.77)	-907	-807
1.00 (25.4)	1.51 (38.4)	0.360 (7.37)	-910	-810
1.250 (31.8)	1.76 (44.7)	0.610 (15.47)	-912	-812
1.500 (38.1)	2.01 (51.1)	0.860 (21.83)	-915	-815
2.00 (50.8)	2.51 (63.8)	1.360 (34.52)	-920	-820
2.500 (63.5)	3.01 (76.5)	1.860 (47.22)	-925	-825

Non-Captive Lead-screw

Dimensions = (mm) inches

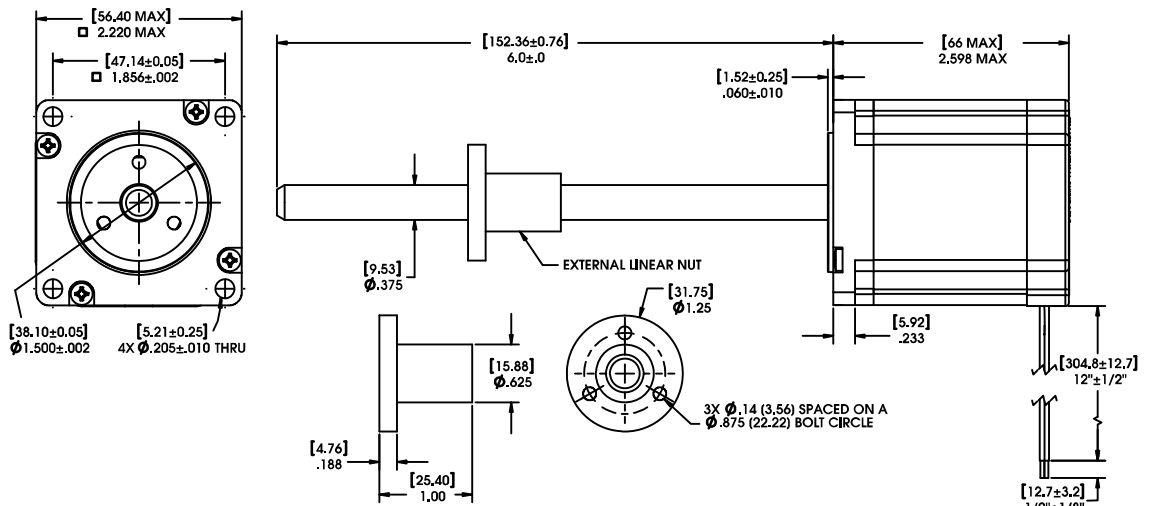
Up to 18-in (457 mm) standard screw lengths. Longer screw lengths are available.



External Linear

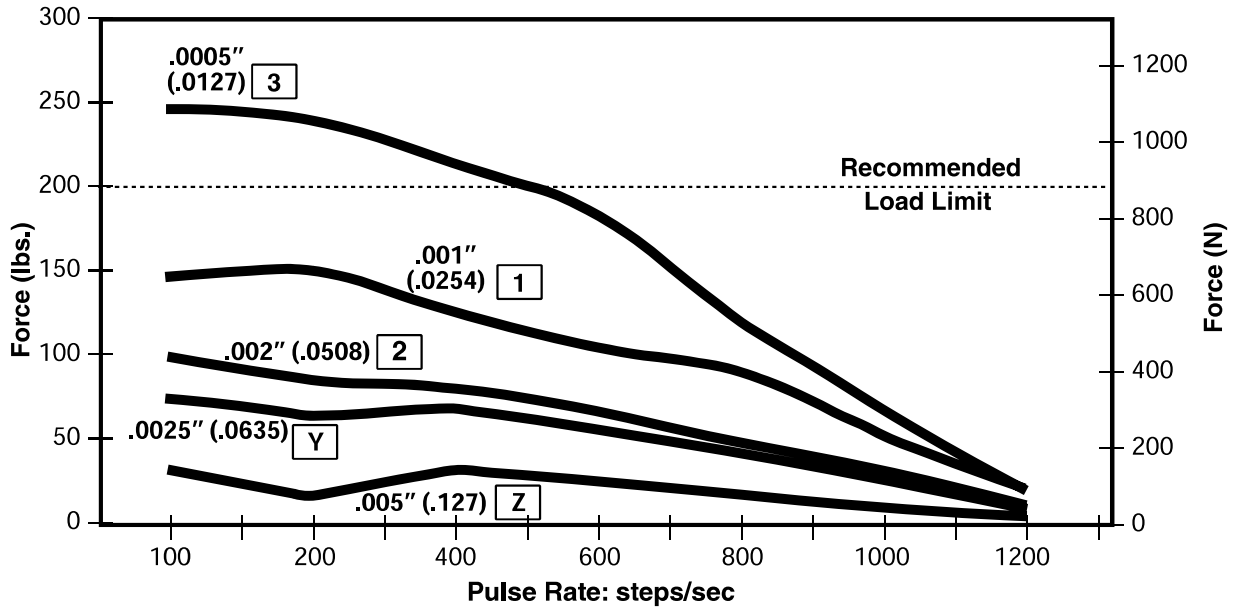
Dimensions = (mm) inches

Up to 12-in (305 mm) standard screw lengths. Longer screw lengths are available.



FORCE vs. PULSE RATE

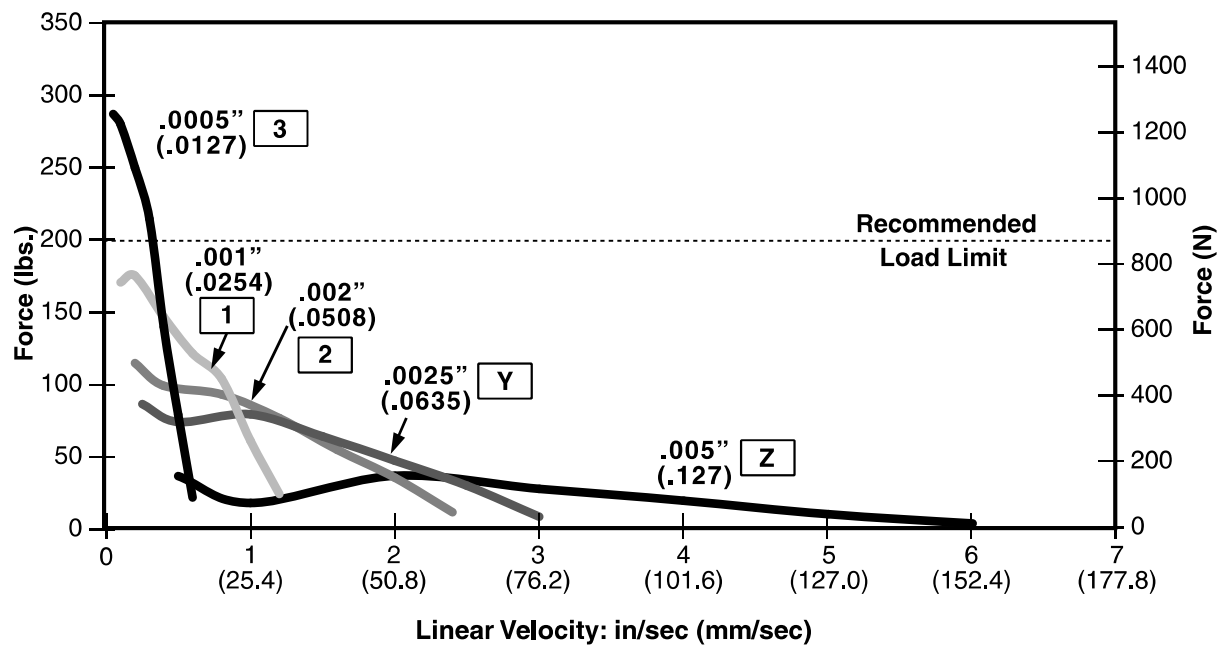
Chopper • Bipolar • 100% Duty Cycle • 8:1 Motor Coil to Drive Supply Voltage
Ø .375 (9.53) Lead-screw



HYBRID LINEAR ACTUATOR
STEPPER MOTORS

FORCE vs. LINEAR VELOCITY

Chopper • Bipolar • 100% Duty Cycle • 8:1 Motor Coil to Drive Supply Voltage
Ø .375 (9.53) Lead-screw



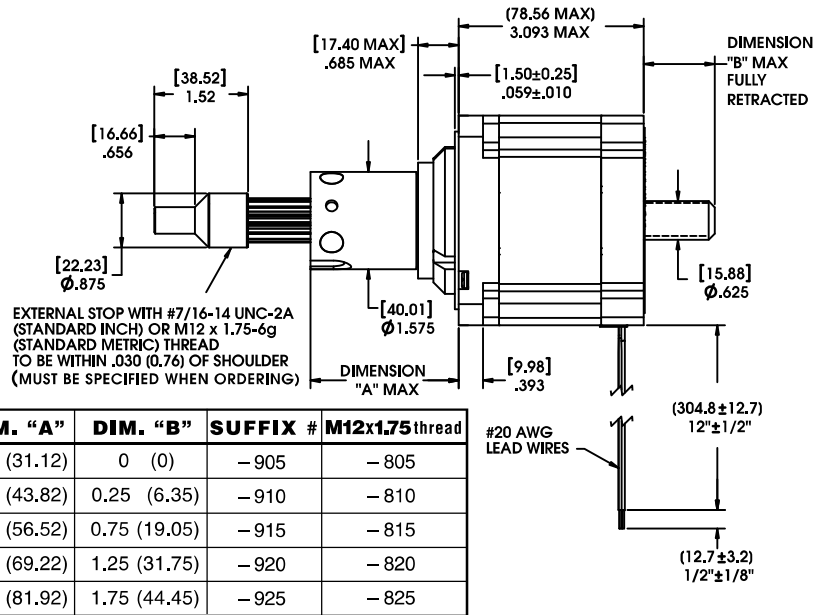
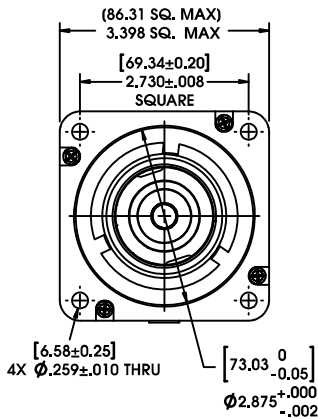
NOTE: All chopper drive curves were created with a 5 volt motor and a 75 volt power supply.

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.

With L/R drives peak force and speeds are reduced, using a unipolar drive will yield a further 30% force reduction.

Captive Lead-screw

Dimensions = (mm) inches

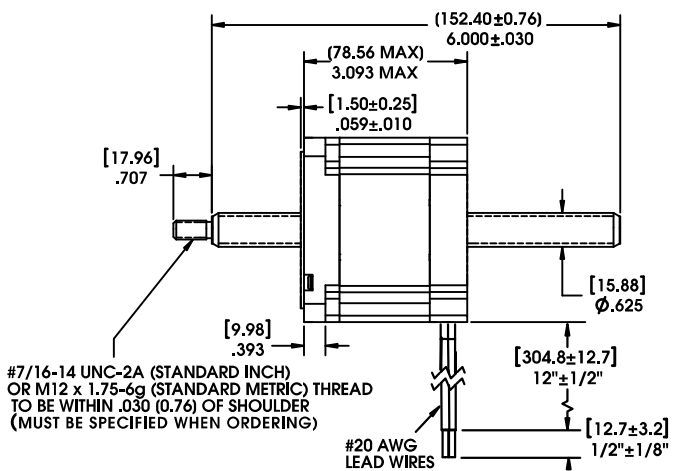
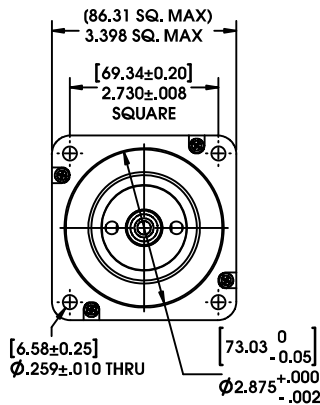


STROKE	DIM. "A"	DIM. "B"	SUFFIX #	M12x1.75 thread
0.50 (12.7)	1.225 (31.12)	0 (0)	-905	-805
1.00 (25.4)	1.725 (43.82)	0.25 (6.35)	-910	-810
1.50 (38.1)	2.225 (56.52)	0.75 (19.05)	-915	-815
2.00 (50.8)	2.725 (69.22)	1.25 (31.75)	-920	-820
2.50 (63.5)	3.225 (81.92)	1.75 (44.45)	-925	-825

Non-Captive Lead-screw

Dimensions = (mm) inches

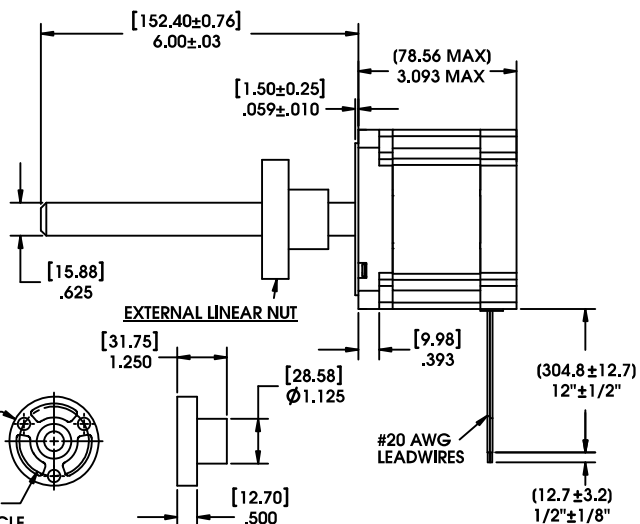
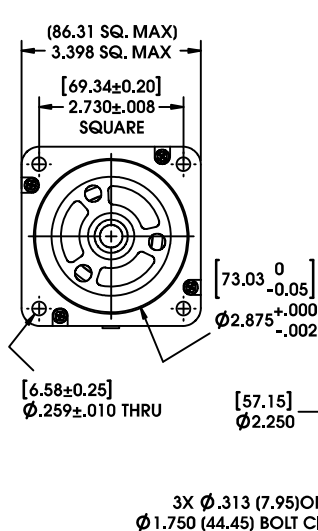
Up to 18-in (457 mm) standard screw lengths. Longer screw lengths are available.



External Linear

Dimensions = (mm) inches

Up to 12-in (305 mm) standard screw lengths. Longer screw lengths are available.



87000 Series: Size 34 Single Stack Ordering Code and Performance Curves



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Identifying the Hybrid part number codes when ordering



Prefix
(include only when using the following)

- A** = A Coil (See AC Synchronous page 189)
- E** = External
- K** = External with 40° thread form
- P** = Proximity Sensor
- S** = Home Switch

Series number designation

87 = 87000

(Series numbers represent approximate width of motor body)

Style

- F** = 1.8° Non-captive
- H** = 1.8° Captive or External (use "E" or "K" Prefix for External version)

Coils

- 4** = Bipolar (4 wire)
- 6** = Unipolar (6 wire)

Code ID Resolution Travel/Step

- 3** = .0005-in (.0127)
- B** = .000625-in (.0158)
- C** = .00125-in (.0317)
- Y** = .0025-in (.0635)
- Z** = .005-in (.127)

Voltage

- 2.85** = 2.85 VDC
 - 05** = 5 VDC
 - 12** = 12 VDC
- Custom V available

Suffix

Stroke
Example: -910 = 1-in (Refer to Stroke chart on Captive motor series product page 115.)

Suffix also represents:

- 800 = Metric
- 900 = External Linear with grease and flanged nut
- XXX = Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part.

NOTE: Dashes must be included in Part Number (-) as shown above. For assistance or order entry, call our engineering team at 203 756 7441.



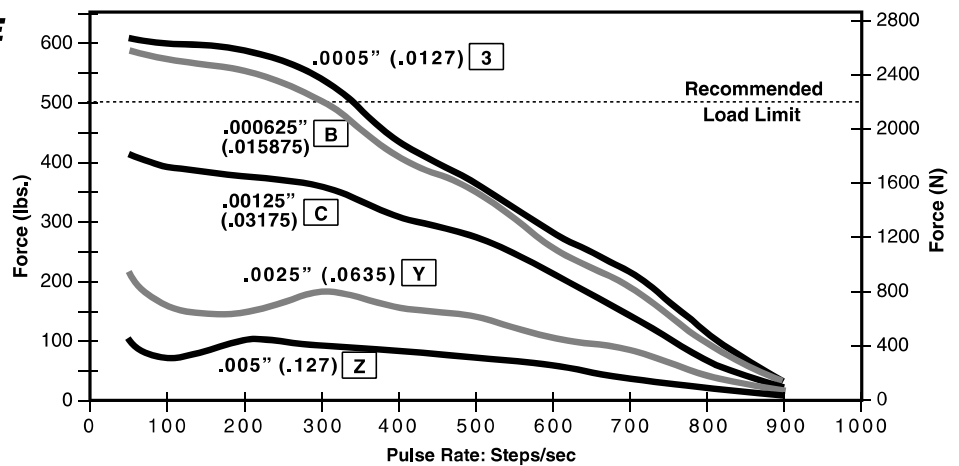
HYBRID LINEAR ACTUATOR STEPPER MOTORS

87000 Series: Size 34 Single Stack Performance Curves

FORCE vs. PULSE RATE

- Chopper
- Bipolar
- 100% Duty Cycle
- 8:1 Motor Coil to Drive Supply Voltage

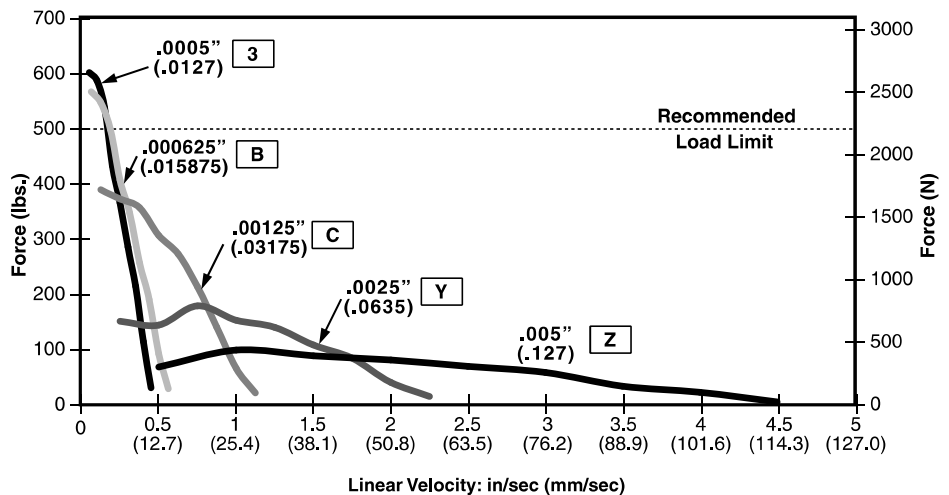
Ø .625 (15.88) Lead-screw >



FORCE vs. LINEAR VELOCITY

- Chopper
- Bipolar
- 100% Duty Cycle
- 8:1 Motor Coil to Drive Supply Voltage

Ø .625 (15.88) Lead-screw >



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.

With L/R drives peak force and speeds are reduced, using a unipolar drive will yield a further 30% force reduction.

Integrated Connectors for Series 28000, 35000 and 43000 Hybrid Stepper Motor Linear Actuators

Motor Connector:

JST part # S06B-PASK-2

Mating Connector:

JST part # PAP-06V-S

Haydon Kerk Part #56-1210-5 (12 in. Leads)

Wire to Board Connector:

JST part number SPHD-001T-P0.5

Pin #	Bipolar	Unipolar	Color
1	Phase 2 Start	Phase 2 Start	G/W
2	Open	Phase 2 Common	—
3	Phase 2 Finish	Phase 2 Finish	Green
4	Phase 1 Finish	Phase 1 Finish	R/W
5	Open	Phase 1 Common	—
6	Phase 1 Start	Phase 1 Start	Red



43000 Series,
Size 17 captive
with integrated
connector

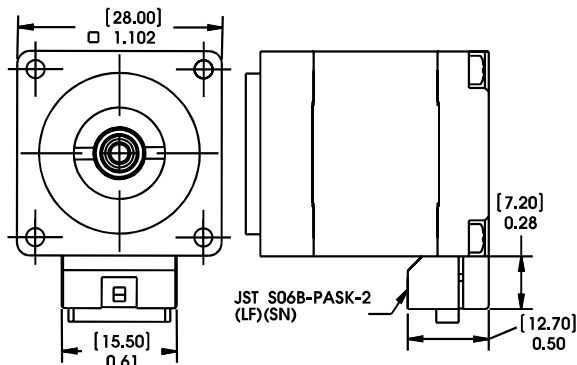
Hybrid Series 28000, 35000 and 43000 (Size 11, 14, and 17) linear actuators are available with an integrated connector. Offered alone or with a harness assembly, this connector is RoHS compliant and features a positive latch in order for high connection integrity. The connector is rated up to 3 amps and the mating connector will handle a range of wire gauges from 22 to 28. This motor is ideal for those that want to plug directly to pre-existing harnesses.

HYBRID LINEAR ACTUATOR
STEPPER MOTORS

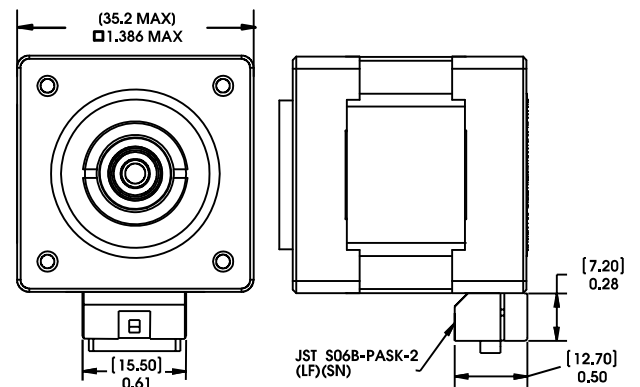
Integrated Connectors: Dimensional Drawings

Dimensions = (mm) inches

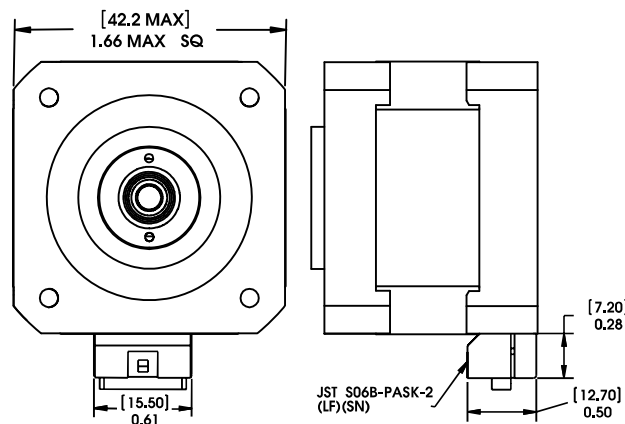
28000 Series: Size 11 Integrated Connector



35000 Series: Size 14 Integrated Connector



43000 Series: Size 17 Integrated Connector



**Encoders designed for all sizes of hybrid linear actuators:
Series 21000, 28000, 35000, 43000, 57000 and 87000**

All Haydon® hybrid linear actuators are available with specifically designed encoders for applications that require feedback. The compact optical incremental encoder design is available with two channel quadrature TTL squarewave outputs. An optional index is also available as a 3rd channel. The Size 8 encoder provides resolutions for applications that require 250 and 300 counts per revolution. The Size 11, 14 and 17 encoder provides resolutions for applications that require 200, 400 and 1,000 counts per revolution. The Size 23 and 34 encoder is offered in resolutions of 200, 400, 1,000 and 2,000 counts per revolution. Encoders are available for all motor configurations – captive, non-captive and external linear.

Simplicity and low cost make the encoders ideal for both high and low volume motion control applications. The internal monolithic electronic module converts the real-time shaft angle, speed, and direction into TTL compatible outputs. The encoder module incorporates a lensed LED light source and monolithic photodetector array with signal shaping electronics to produce the two channel bounceless TTL outputs.



Size 8 with encoder



Size 17 with encoder



Size 23 with encoder

Electrical Specifications

	Minimum	Typical	Maximum	Units
Input voltage	4.5	5.0	5.5	VDC
Output signals	4.5	5.0	5.5	VDC

- 2 channel quadrature TTL squarewave outputs.
- Channel B leads A for a clockwise rotation of the rotor viewed from the encoder cover.
- Tracks at speeds of 0 to 100,000 cycles/sec.
- Optional index available as a 3rd channel (one pulse per revolution).

Operating Temperature

Size 8	
Minimum	- 10°C (14°F)
Maximum	85°C (185°F)

Size 11, 14, 17, 23, 34	
Minimum	- 40°C (- 40°F)
Maximum	100°C (212°F)

Single Ended Encoder Pinout Size 8

Connector Pin #	Description
1	+5 VDC Power
2	Channel A
3	Ground
4	Channel B

Single Ended Encoder Pinout Size 11, 14, 17 23, 34

Connector Pin #	Description
1	Ground
2	Index (optional)
3	Channel A
4	+5 VDC Power
5	Channel B

Mechanical Specifications

	Maximum
Acceleration	250,000 rad/sec ²
Vibration (5 Hz to 2 kHz)	20 g

Resolution 4 standard Cycles Per Revolution (CPR) or Pulses Per Revolution (PPR)

Size 8 Encoder

CPR	250	300
PPR	1000	1200

Others are available.

Size 11, 14 & 17 Encoders

CPR	200	400	1000*
PPR	800	1600	4000*

Size 23 and 34 Encoders

CPR	200	400*	1000	2000
PPR	800	1600*	4000	8000

*Index Pulse Channel not available.

Differential Ended Encoder Pinout Size 11, 14, 17 23, 34

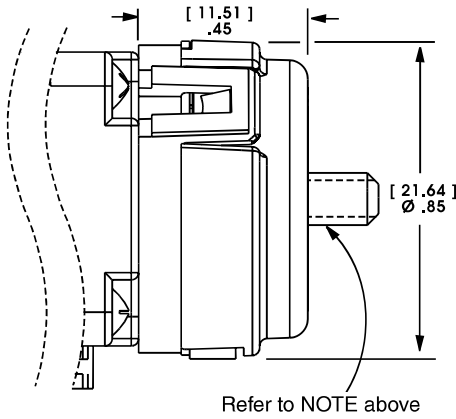
Connector Pin #	Description
1	Ground
2	Ground
3	- Index
4	+ Index
5	Channel A -
6	Channel A +
7	+5 VDC Power
8	+5 VDC Power
9	Channel B -
10	Channel B +

Hybrid Encoders: Dimensional Drawings

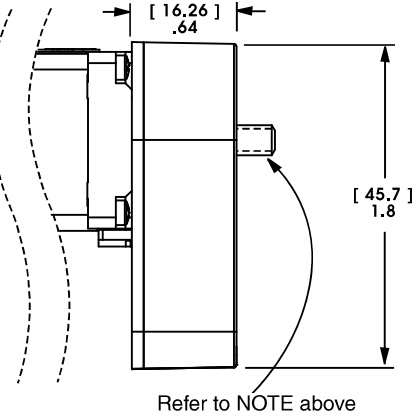
NOTE: Lead-screw extends beyond encoder on specific captive and non-captive motors.
External linear shaft extension is available upon request.

Dimensions = [mm]
 [inches]

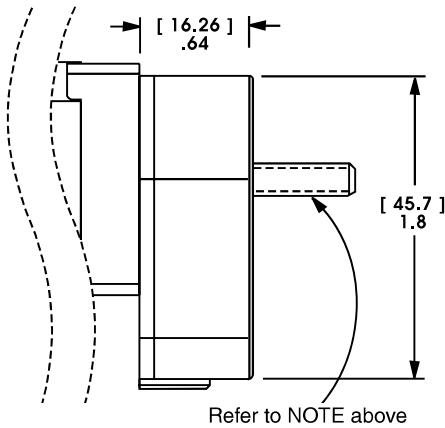
21 mm with 21000 Series Size 8



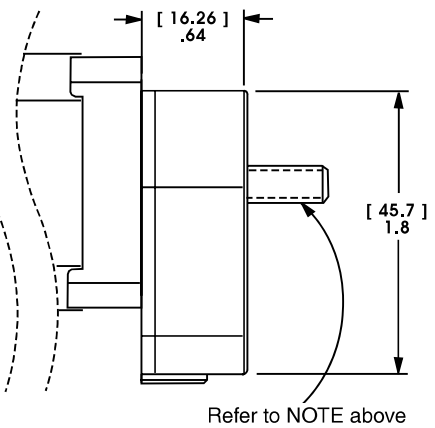
30 mm with 28000 Series Size 11



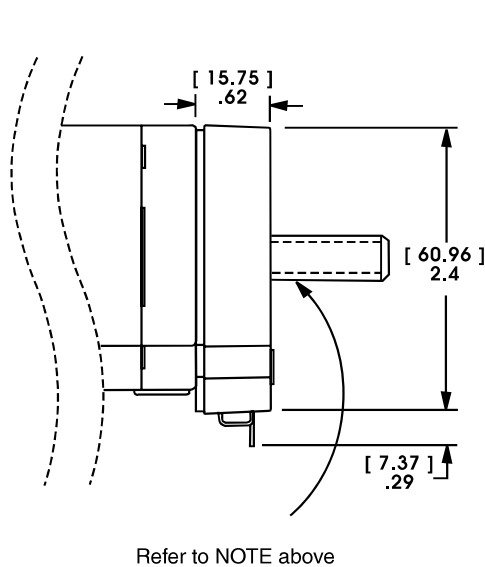
30 mm with 35000 Series Size 14



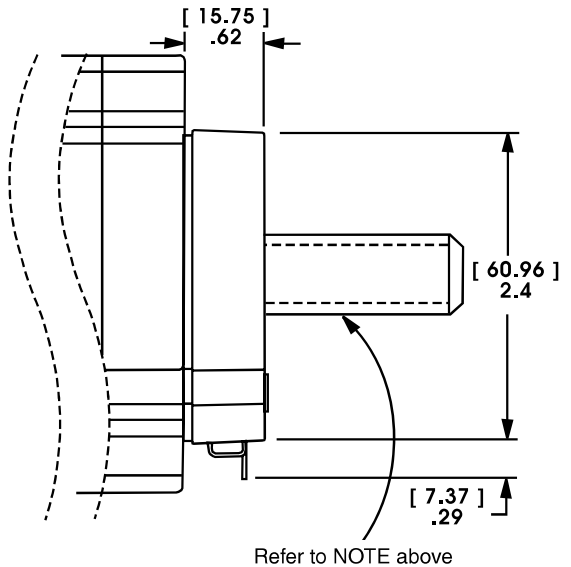
30 mm with 43000 Series Size 17

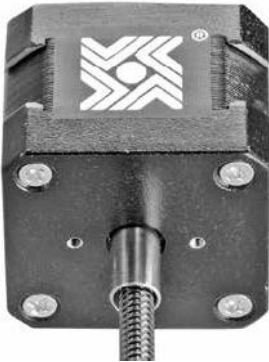


57 mm with 57000 Series Size 23



57 mm with 87000 Series Size 34



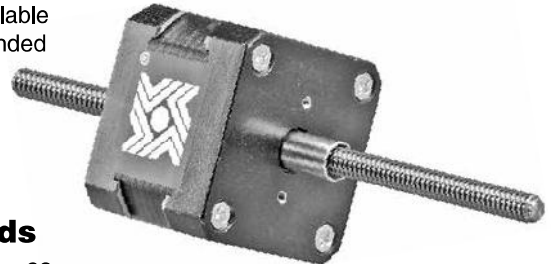


Encoder Ready Option for all sizes of Hybrids

Haydon Hybrid Linear Actuators can now be manufactured as an encoder ready actuator. These encoder ready actuators can be used to install several popular hollow shaft encoders. They are available with an extended rotor journal and a threaded rear housing. The motors use a proprietary manufacturing process which incorporates engineering thermoplastics in the rotor drive nut and a stainless steel Acme lead-screw that allows the motor to be much more efficient and durable than today's more commonly used V-thread/bronze nut configurations.

Extended Rotor Journal for all Hybrid sizes

Haydon Hybrid Linear Actuators are available with an extended rotor journal. This extended rotor journal can be used for encoder installation, manual adjustment, or flag installation for a positioning sensor.



Size 23 Mounting Face Plate for Size 17 Hybrids

Haydon Kerk Motion Solutions, Inc. offers a Size 23 mounting pattern for its hybrid 43000 Series, Size 17 linear actuators.



Home Position Switch for Hybrids

A miniature electronic home position switch capable of monitoring the home positions of linear actuators. The switch mounts on the rear sleeve of captive linear motors and allows the user to identify start, stop or home positions. When ordering motors with the home position switch, the part number should be preceded by an "S" prefix.



End of Stroke Proximity Sensor for all sizes of Hybrids

The sensor incorporates a hall effect device, which is activated by a rare earth magnet embedded in the end of the internal screw. The compact profile of the sensor allows for installation in limited space applications.

The sensor has virtually unlimited cycle life. Special cabling and connectors can also be provided. When ordering motors with the proximity sensor, the part number should be preceded by a "P" prefix.



Black Ice® and Kerkote® TFE Coated Lead-screws (certain conditions apply)

Where applications require the use of a "greaseless" screw and nut interface Haydon Kerk Motion Solutions offers TFE coated lead-screws.

A "dry" (non-lubricated) TFE coated lead-screw provides improved performance in both life and thrust as compared to a conventional stainless steel lead-screw. TFE can be applied to a wide variety of lead-screw pitches and is available for Haydon® brand captive, non-captive and external linear linear actuators.

Integrated Anti-backlash Nut for Hybrids

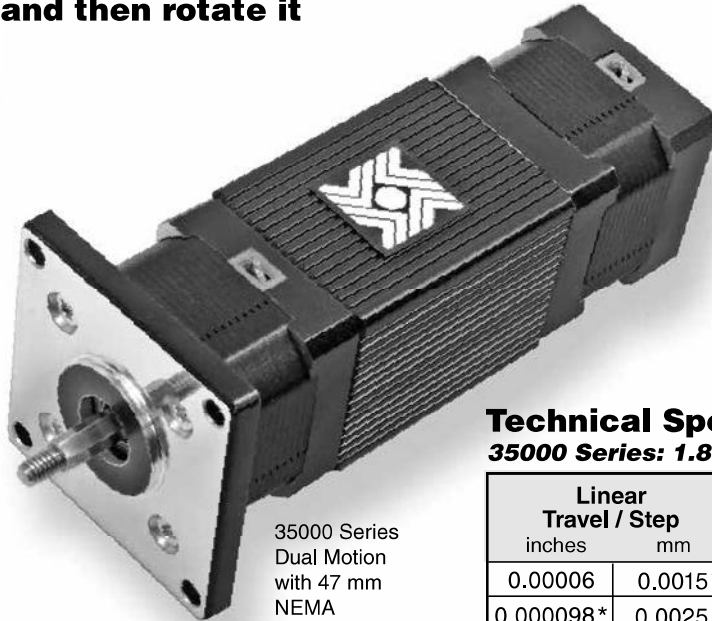
All sizes (except 87000 Series, Size 34) of captive and non-captive hybrid stepper motors can be equipped with an integral anti-backlash feature.

There is a normal backlash between the lead-screw and integral rotor nut. Haydon® actuators are designed for millions of cycles. However, over time additional backlash could increase and eventually double. Haydon Kerk Motion Solutions Integrated Anti-backlash nut can eliminate all backlash. Designed specifically for the Haydon captive and non-captive hybrid motors, these nuts use an opposing spring force to eliminate backlash between the screw and the nut interface. The nuts will self-compensate and accommodate any wear.

Haydon Kerk Motion Solutions application engineers can help you select the appropriate preload for your application.



Haydon® Size 14 Dual Motion actuators axially move components to their insertion positions and then rotate it



35000 Series Dual Motion with 47 mm NEMA

The actuators are based on unique, patented designs and incorporate proven motor technology. These units simplify product development by replacing what would otherwise be far more bulky and complex mechanisms. Another feature of this design is to provide an electric motor in which linear and rotary motions are controllable independently of one another.

For a rotary/linear motor, it is desirable that the linear and rotary motions be controllable independently of one another. These devices can be run using a standard two axis stepper motor driver. Performance can be enhanced using chopper and/or microstepping drives.

Technical Specifications

35000 Series: 1.8° Step Angle

Linear Travel / Step		Load Limit		Order Code I.D.
inches	mm	lbs	N	
0.00006	0.0015*	10	44.4	U
0.000098*	0.0025	10	44.4	AA
0.00012	0.0030*	15	67	N
0.00019*	0.005	15	67	AB
0.00024	0.0061*	15	67	K
0.00039*	0.01	15	67	AC
0.00048	0.0121*	15	67	J
0.00078*	0.02	15	67	AD
0.00157*	0.04	15	67	AE

35000 Series: 0.9° Step Angle

Linear Travel / Step		Load Limit		Order Code I.D.
inches	mm	lbs	N	
0.00003	0.00076*	10	44.4	BP
0.00005*	0.00125	10	44.4	AY
0.00006	0.0015*	15	67	U
0.000098*	0.0025	15	67	AA
0.00012	0.0030*	15	67	N
0.00019*	0.005	15	67	AB
0.00024	0.0061*	15	67	K
0.00039*	0.01	15	67	AC
0.00079*	0.02	15	67	AD

*Values truncated

Standard motors are Class B rated for maximum temperature of 130°C.

Identifying the Series 35000 Series dual motion part number codes when ordering

LR	35	H	H	4	J	-	05	-	910
Prefix LR = Linear/Rotary	Series number designation 35 = 35000	Rotary Step Angle H = 1.8° K = 0.9° M = 1.8° Double Stack P = 0.9° Double Stack	Linear Step Angle H = 1.8° K = 0.9°	Coils 4 = Bipolar (4 wire) 6 = Unipolar (6 wire)	Code ID Resolution Travel/Step 1.8° Step Angle U = .00006-in (.0015) AA = .000098-in (.0025) N = .00012-in (.0030) AB = .00019-in (.005) K = .00024-in (.0061) AC = .00039-in (.01) J = .00048-in (.0121) AD = .00078-in (.02) AE = .00157-in (.04) 0.9° Step Angle BP = .00003-in (.00076) AY = .00005-in (.00125) U = .00006-in (.0015) AA = .000098-in (.0025) N = .00012-in (.0030) AB = .00019-in (.005) K = .00024-in (.0061) AC = .00039-in (.01) AD = .00078-in (.02)		Voltage 05 = 5 VDC 12 = 7.5 VDC SP = Mixed Voltages Custom V available		Suffix: Stroke Example: -910 = 1-in (26 mm) -XXX = Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part.

NOTE: Dashes must be included in Part Number (-) as shown above. For assistance or order entry, call our engineering team at 203 756 7441.

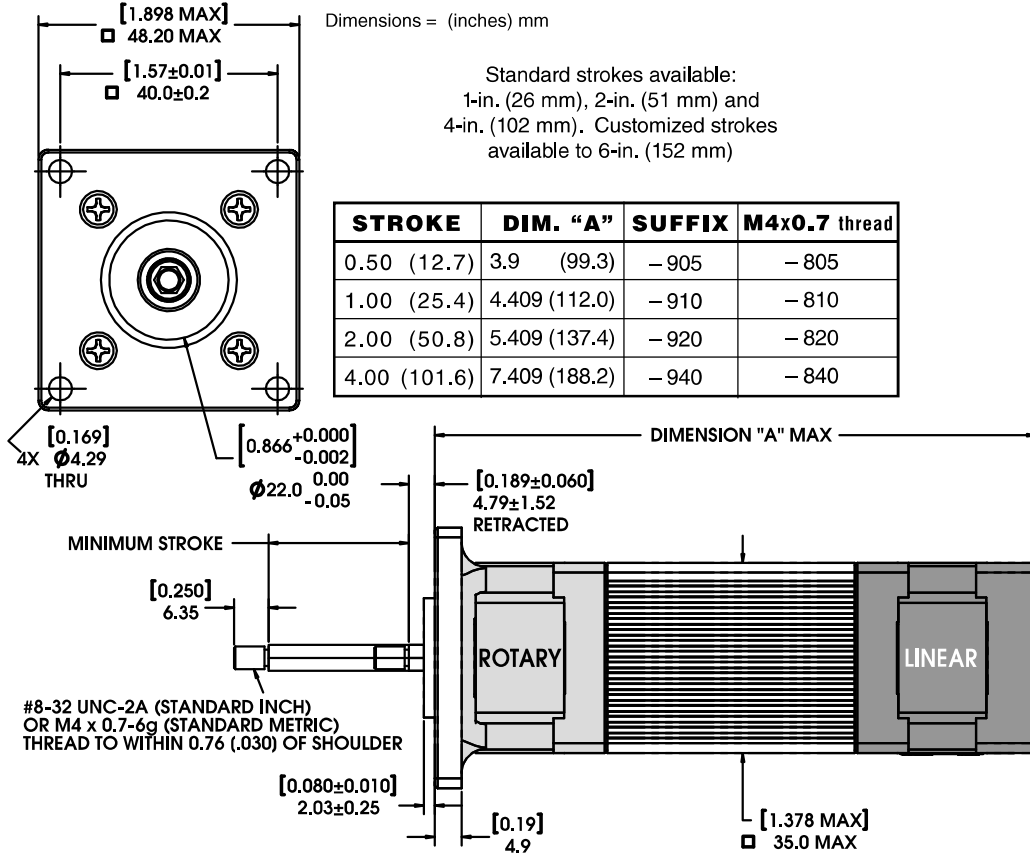
NOTE: SEE PAGE 87
35000 SERIES HYBRID FOR MORE DETAILED MOTOR INFORMATION

Dual Motion 35000 Series: Size 14 Dimensional Drawings



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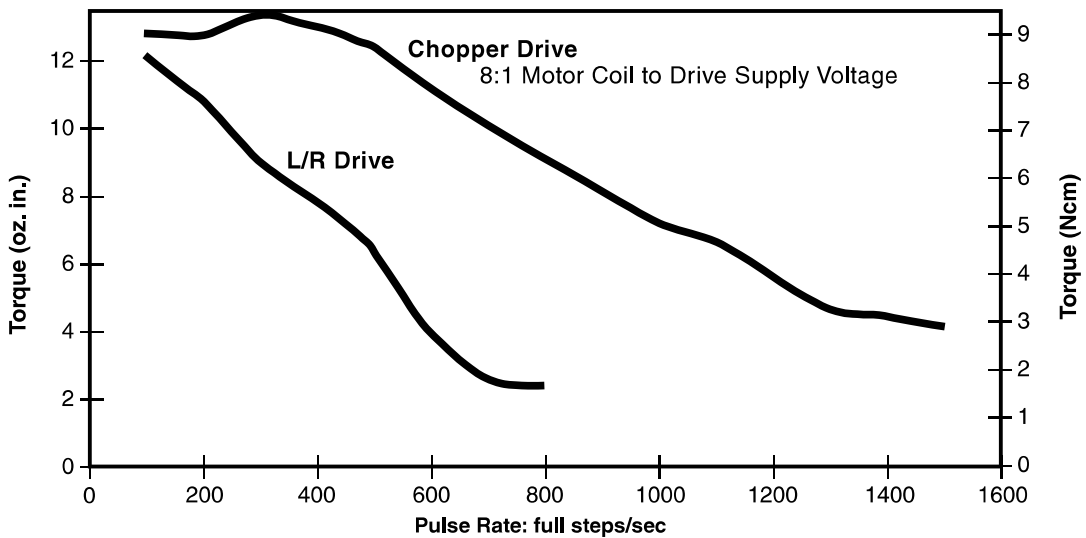
Dimensional Drawings



DUAL MOTION ACTUATOR
LINEAR & ROTARY MOTION

TORQUE vs. PULSE RATE: ROTARY FUNCTION

Bipolar • 100% Duty Cycle



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.

With L/R drives peak force and speeds are reduced, using a unipolar drive will yield a further 30% force reduction.

Haydon® Size 17 dual motion actuators provide linear and rotary motions, controllable independently of one another

For a rotary/linear motor, it is desirable that the linear and rotary motions be controllable independently of one another. These devices can be run using a standard two axis stepper motor driver. Performance can be enhanced using chopper and/or microstepping drives.

The actuators are based on unique, patented designs and incorporate proven motor technology. These units simplify product development by replacing what would otherwise be far more bulky and complex mechanisms.



43000 Series
Dual Motion
with 57 mm NEMA

Identifying the 43000 Series Dual Motion part number codes when ordering



Prefix	Series number designation	Rotary Step Angle	Linear Step Angle	Coils	Code ID	Resolution Travel/Step	Voltage	Suffix:
LR = Linear/Rotary	43 = 43000	H = 1.8° K = 0.9° M = 1.8° Double Stack P = 0.9° Double Stack	H = 1.8° K = 0.9°	4 = Bipolar (4 wire) 6 = Unipolar (6 wire)	1.8° Step Angle N = .00012-in (.003) 7 = .000125-in (.0031) P = .00015625-in (.0039) AB = .00019-in (.005) K = .00024-in (.006) 9 = .00025-in (.0063) A = .0003125-in (.0079) AC = .00039-in (.01) J = .00048-in (.0121) 3 = .0005-in (.0127) B = .000625-in (.0158) AQ = .00098-in (.025) Q = .00096-in (.0243) C = 0.00125-in (.0317) BH = .00196-in (.05) R = 0.00192-in (.0487) Y = .0025-in (.0635) AG = .00375-in (.0953) Z = .005-in (.127)	0.9° Step Angle U = .00006-in (.0015) BB = .0000625-in (.0016) V = .00007825-in (.00198) AA = .000098-in (.0025) N = .00012-in (.003) 7 = .000125-in (.0031) P = .00015625-in (.0039) AB = .00019-in (.005) K = .00024-in (.006) 9 = .00025-in (.0063) A = .0003125-in (.0079) BG = .00049-in (.0125) J = .00048-in (.0121) B = .000625-in (.0158) AQ = .00098-in (.025) Q = .00096-in (.0243) C = 0.00125-in (.0317) AF = .001875-in (.0476) Y = .0025-in (.0635)	05 = 5 VDC 12 = 7.5 VDC SP = Mixed Voltages <i>Custom V available</i>	Stroke Example: -910 = 1-in (26 mm) -XXX = Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part.

NOTE: Dashes must be included in Part Number (-) as shown above.
For assistance or order entry, call our engineering team at 203 756 7441.

NOTE: SEE PAGE 95 43000 SERIES HYBRID FOR MORE DETAILED MOTOR INFORMATION

DUAL MOTION ACTUATOR
LINEAR & ROTARY MOTION

Dual Motion 43000 Series: Size 17 Specifications and Dimensional Drawings



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Technical Specifications

43000 Series: 1.8° Step Angle

43000 Series: 0.9° Step Angle

Linear Travel / Step		Load Limit		Order Code I.D.
inches	mm	lbs	N	
0.00012	0.003*	30	133	N
0.000125	0.0031*	30	133	7
0.00015625	0.0039*	30	133	P
0.00019*	0.005	30	133	AB
0.00024	0.0060*	30	133	K
0.00025	0.0063*	30	133	9
0.0003125	0.0079*	50	222	A
0.00039*	0.01	50	222	AC
0.00048	0.0121*	50	222	J
0.0005	0.0127*	50	222	3
0.000625	0.0158*	50	222	B
0.00098*	0.025	50	222	AQ
0.00096	0.0243*	50	222	Q
0.00125	0.0317*	50	222	C
0.00196*	0.05	50	222	BH
0.00192	0.0487*	50	222	R
0.0025	0.0635	50	222	Y
0.00375	0.0953*	50	222	AG
0.005	0.127	50	222	Z

Linear Travel / Step		Load Limit		Order Code I.D.
inches	mm	lbs	N	
0.00006	0.0015*	30	133	U
0.0000625	0.0016*	30	133	BB
0.00007825	0.00198*	30	133	V
0.000098*	0.0025	30	133	AA
0.00012	0.003*	30	133	N
0.000125	0.0031*	30	133	7
0.00015625	0.0039*	50	222	P
0.00019*	0.005	50	222	AB
0.00024	0.0060*	50	222	K
0.00025	0.0063*	50	222	9
0.0003125	0.0079*	50	222	A
0.00049*	0.0125	50	222	BG
0.00048	0.0121*	50	222	J
0.000625	0.0158*	50	222	B
0.00098*	0.025	50	222	AQ
0.00096	0.0243*	50	222	Q
0.00125	0.0317*	50	222	C
0.001875	0.0476*	50	222	AF
0.0025	0.0635	50	222	Y

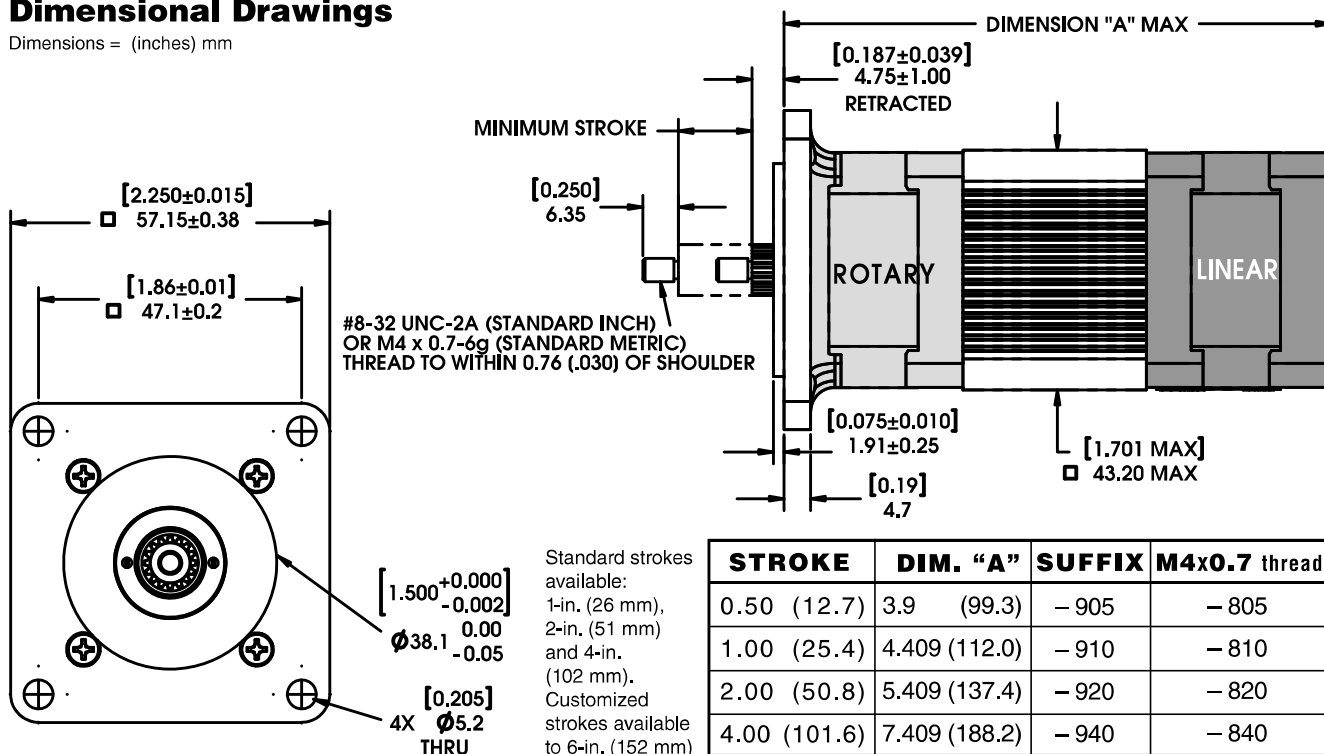
*Values truncated

Standard motors are Class B rated for maximum temperature of 130°C.

DUAL MOTION ACTUATOR
LINEAR & ROTARY MOTION

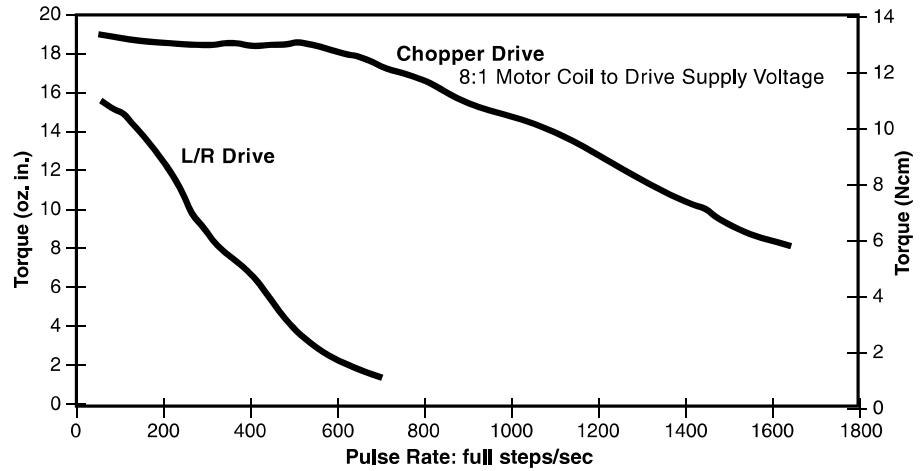
Dimensional Drawings

Dimensions = (inches) mm



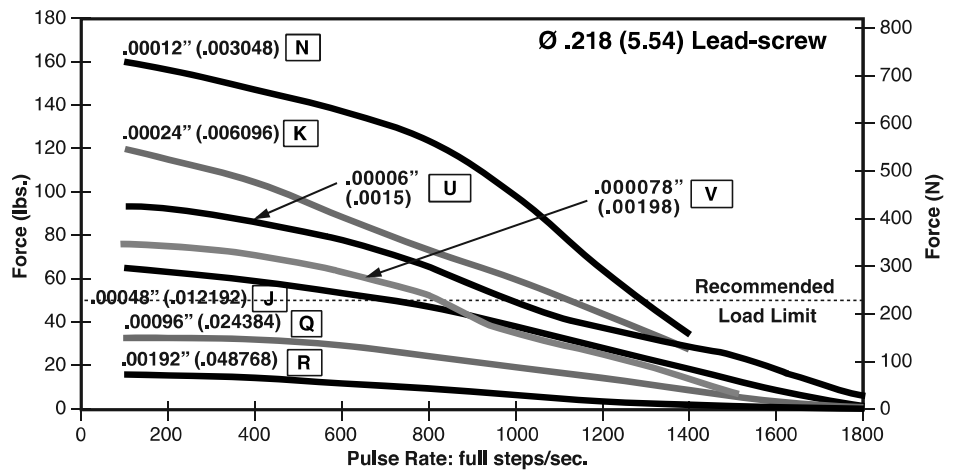
**TORQUE vs.
PULSE RATE:
ROTARY FUNCTION**

- Bipolar
- 100% Duty Cycle



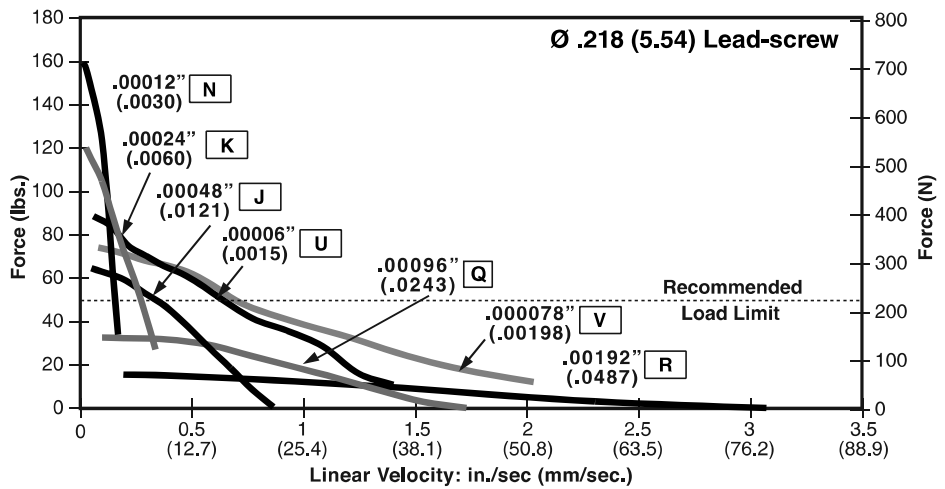
**FORCE vs.
PULSE RATE:
LINEAR FUNCTION**

- Chopper
- Bipolar
- 100% Duty Cycle
- 8:1 Motor Coil to Drive Supply Voltage



**FORCE vs.
LINEAR VELOCITY**

- Chopper
- Bipolar
- 100% Duty Cycle
- 8:1 Motor Coil to Drive Supply Voltage



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.

With L/R drives peak force and speeds are reduced, using a unipolar drive will yield a further 30% force reduction.

The background is a dense, repeating pattern of the AMETEK and Haydon kerk logos, along with various mechanical components like gears, springs, and bolts. The logos are in a light gray color, and the mechanical parts are in a slightly darker gray, creating a textured, industrial look.

Can-Stack Linear Actuators