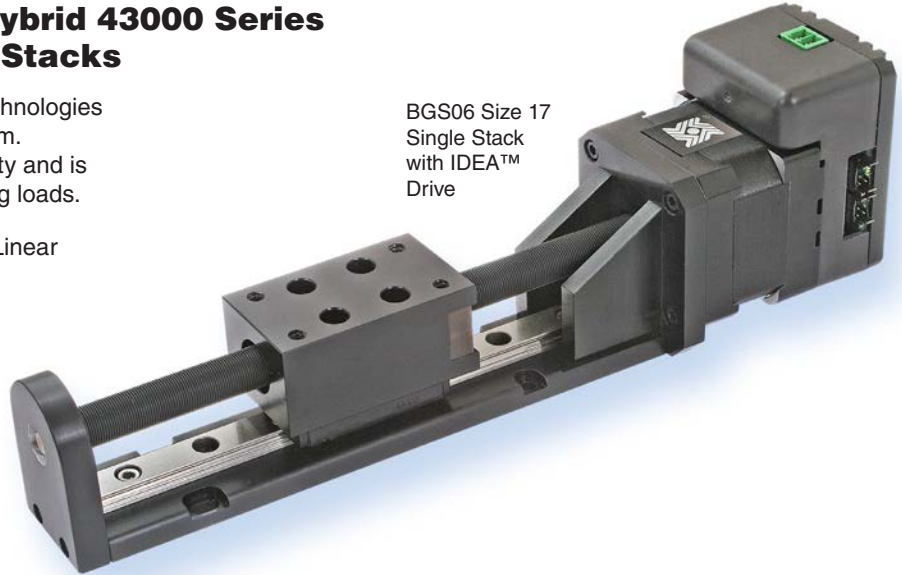


**BGS06™ Linear Rail with Hybrid 43000 Series
 Size 17 Single and Double Stacks**

The **BGS™** Linear Rail combines many technologies into a single integrated linear motion platform. The system provides excellent load capability and is engineered for both normal and overhanging loads.

Technical specifications for Size 17 Hybrid Linear Actuator Stepper Motors are on page 3.

BGS06 Size 17
 Single Stack
 with IDEA™
 Drive



**BGS06
 Specifications**

BGS06 with Hybrid Linear Actuator Motor...	Size 17 Single Stack* Size 17 Double Stack*
Max. Stroke Length	24-in (610 mm)
Max. Load (Horizontal)**	135 lbs (600N)
Roll Moment	11.62 lbs-ft (15.75 Nm)
Pitch Moment	7.93 lbs-ft (10.75 Nm)
Yaw Moment	9.15 lbs-ft (12.40 Nm)

Nominal Thread	Lead		Lead Code
	inches	mm	
0.050	1.27		0050
0.079	2.00		0079
0.100	2.54		0100
0.157	4.00		0157
0.197	5.00		0197
0.200	5.08		0200
0.250	6.35		0250
0.375	9.53		0375

Nominal Thread	Lead		Lead Code
	inches	mm	
0.400	10.16		0400
0.472	12.00		0472
0.500	12.70		0500
0.750	19.05		0750
0.984	25.00		0984
1.000	25.40		1000
1.200	30.48		1200

* Available with an optional programmable IDEA™ Drive.

** To determine what is best for your application see the Linear Rail Applications Checklist on page 7.

Identifying the Motorized BGS part number codes when ordering

BG	S	06	B	-	G	0079	-	XXX
Prefix	Frame Style	Frame Size Load*	Coating		Drive / Mounting	Nominal Thread Lead Code		Unique Identifier
BG = Ball Guide System	S = Standard	06 = Max. static load 135 lbs (600 N)	B = TFE wear resist, dry lubricant Black Ice®		M = Motorized G = IDEA™ integrated programmable drive - USB communications J = IDEA™ integrated programmable drive - RS485 communications	0079 = .079-in (2.0) (see Lead Code charts above)		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 603 213 6290.

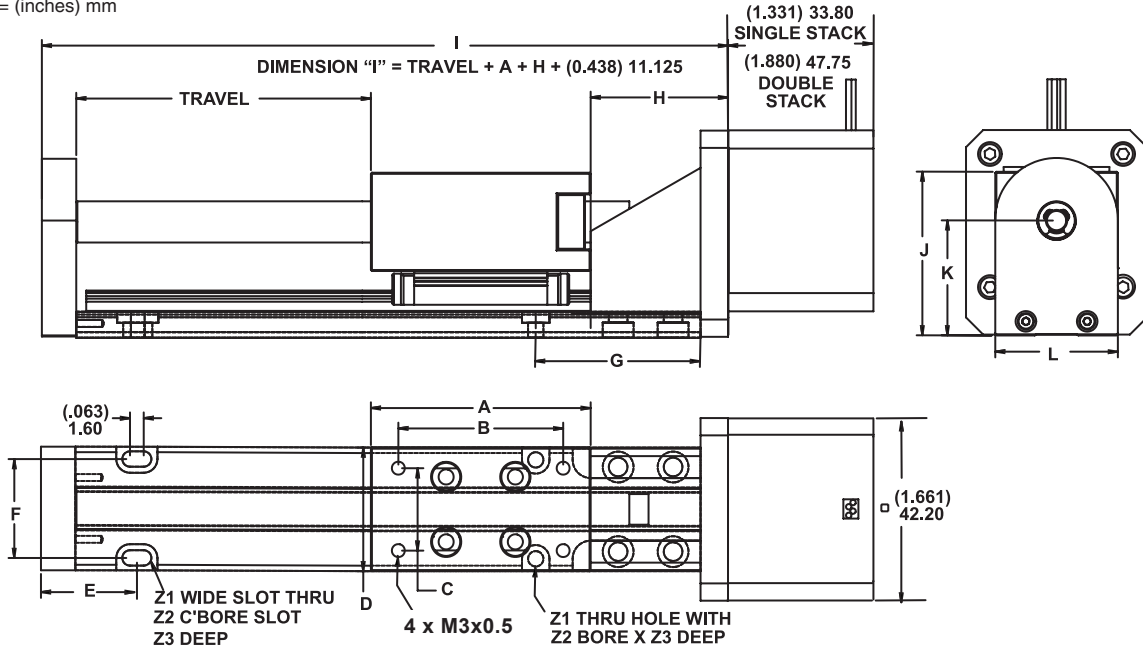
Carriage holes available in Metric sizes
M3
M3.5
M4

BGS06™ Linear Rail with Hybrid 43000 Size 17 linear motors are recommended for horizontal loads up to 135 lbs (600 N)

	A	B	C	D	E	F	G	H	I	J	K	L	Z1	Z2	Z3
(inch)	(2.00)	(1.50)	(0.75)	(1.13)	(0.81)	(0.90)	(1.50)	(1.25)	*	(1.50)	(1.05)	(1.13)	(0.14)	(0.25)	(0.13)
mm	50.80	38.10	19.05	28.58	20.57	22.86	38.10	31.75	*	38.15	26.77	28.58	3.6	6.4	3.3

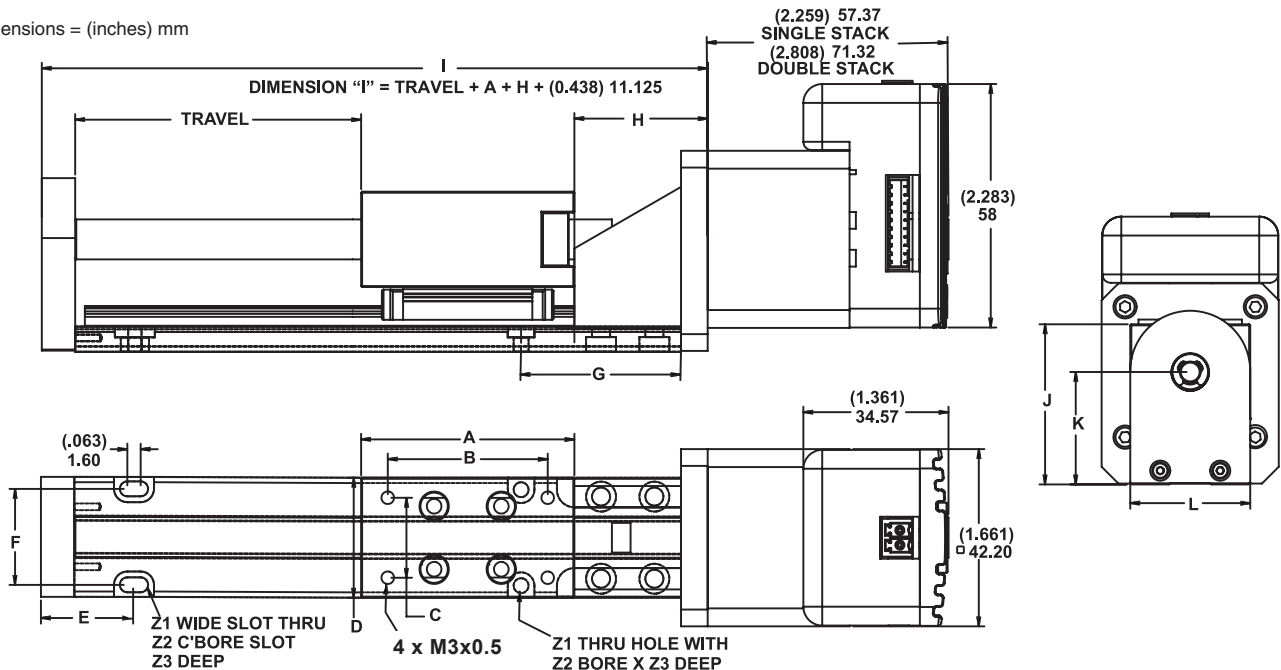
* Dimension "I" is a function of required travel distance.

Dimensions = (inches) mm



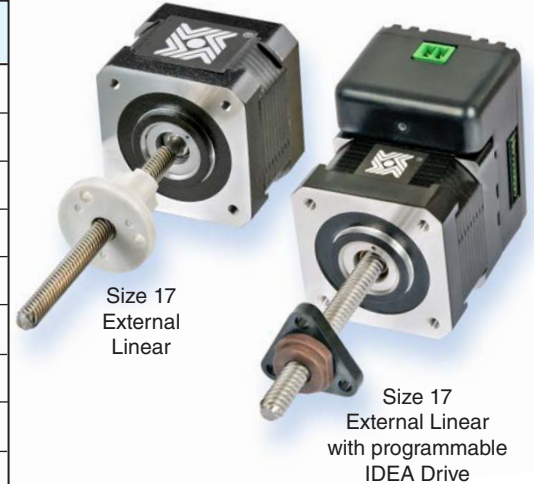
BGS06™ Linear Rail with Hybrid 43000 Size 17 linear motors with programmable IDEA™ Drive

Dimensions = (inches) mm



Specifications: Haydon[®] 43000 Series Size 17 Single Stack

Size 17: 43 mm (1.7-in) Hybrid Linear Actuator (1.8° Step Angle)					
Wiring	Bipolar			Unipolar**	
Programmable Drive	IDEA™ Drive Option Available			Not Applicable	
Winding Voltage	2.33 VDC*	5 VDC	12 VDC	5 VDC	12 VDC
Current (RMS)/phase	1.5 A	700 mA	290 mA	700 mA	290 mA
Resistance/phase	1.56 Ω	7.2 Ω	41.5 Ω	7.2 Ω	41.5 Ω
Inductance/phase	1.9 mH	8.7 mH	54.0 mH	4.4 mH	27.0 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				



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

- 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

For more information see the Haydon Kerk **IDEA™ Drive** Data Sheet

Specifications: Haydon[®] 43000 Series Size 17 Double Stack

Size 17: 43 mm (1.7-in) Double Stack Hybrid Linear Actuator (1.8° Step Angle)			
Wiring	Bipolar		
Programmable Drive	IDEA™ Drive Option Available		
Winding Voltage	2.33 VDC*	5 VDC	12 VDC
Current (RMS)/phase	2.6 A	1.3 A	550 mA
Resistance/phase	0.9 Ω	3.8 Ω	21.9 Ω
Inductance/phase	1.33 mH	8.21 mH	45.1 mH
Power Consumption	10.4 W Total		
Rotor Inertia	78 gcm ²		
Insulation Class	Class B (Class F available)		
Weight	12.5 oz (352 g)		
Insulation Resistance	20 MΩ		



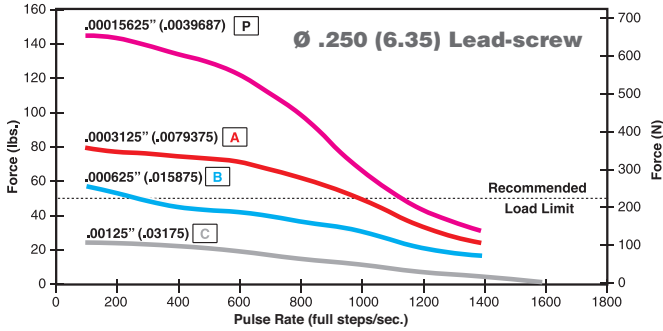
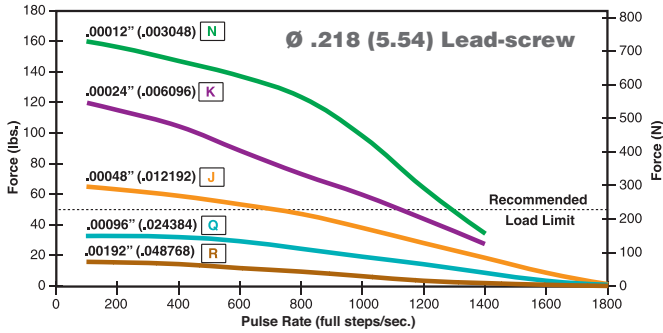
* 43000 Series Single Stack with IDEA programmable drive. Contact Haydon Kerk if higher voltage motor is desired.

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

Performance Curves: Haydon® 43000 Series Size 17 Single Stack

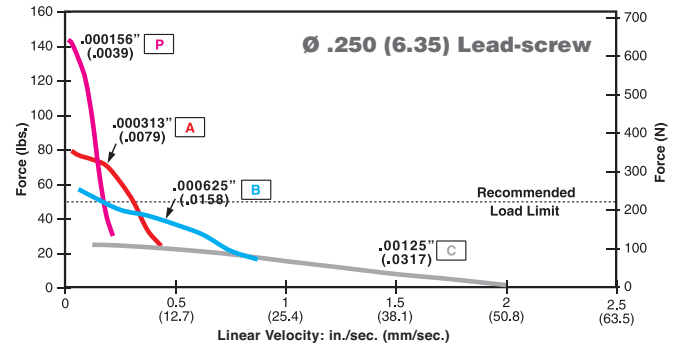
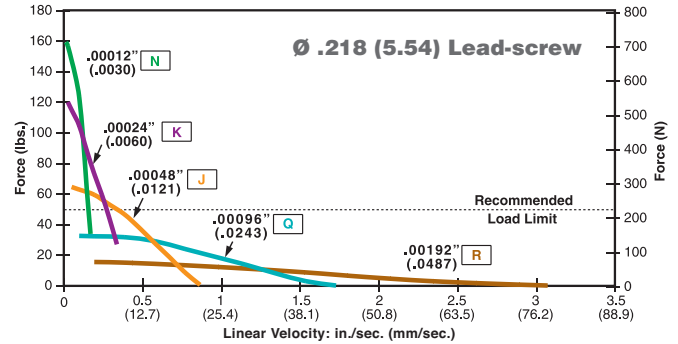
FORCE vs. PULSE RATE

Chopper • Bipolar • 100% Duty Cycle



FORCE vs. LINEAR VELOCITY

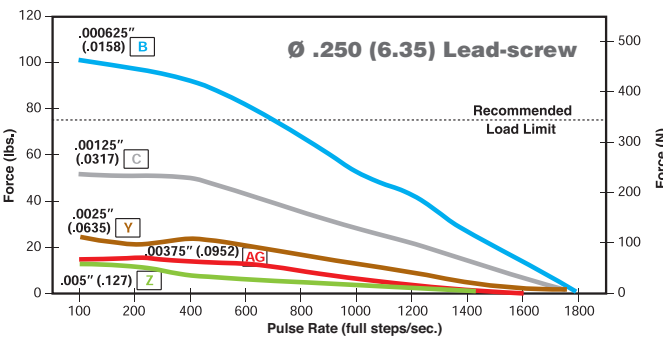
Chopper • Bipolar • 100% Duty Cycle



Performance Curves: Haydon® 43000 Series Size 17 Double Stack

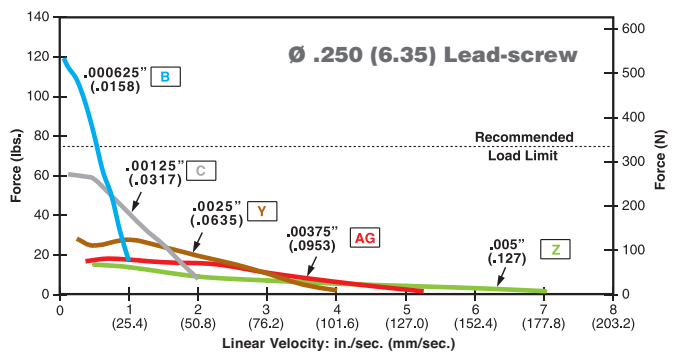
FORCE vs. PULSE RATE

Chopper • Bipolar • 100% Duty Cycle



FORCE vs. LINEAR VELOCITY

Chopper • 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.

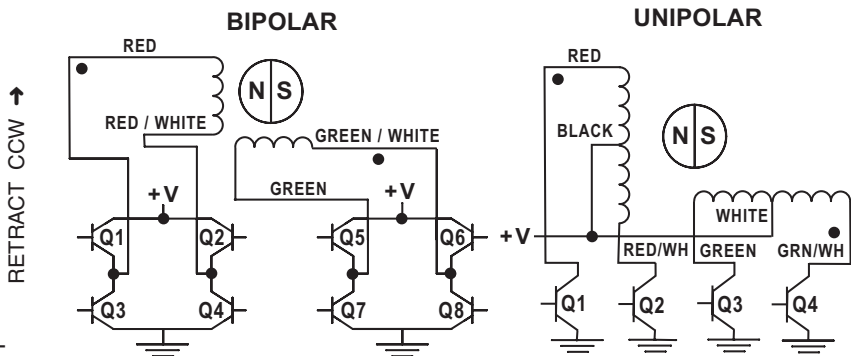
The Haydon® 43000 Series Size 17

Hybrids: Stepping Sequence

	Bipolar	Q2-Q3	Q1-Q4	Q6-Q7	Q5-Q8
	Unipolar	Q1	Q2	Q3	Q4
EXTEND CW ←	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

Note: Half stepping is accomplished by inserting an off state between transitioning phases.

Hybrids: Wiring



Integrated Connectors for 43000 Series Size 17



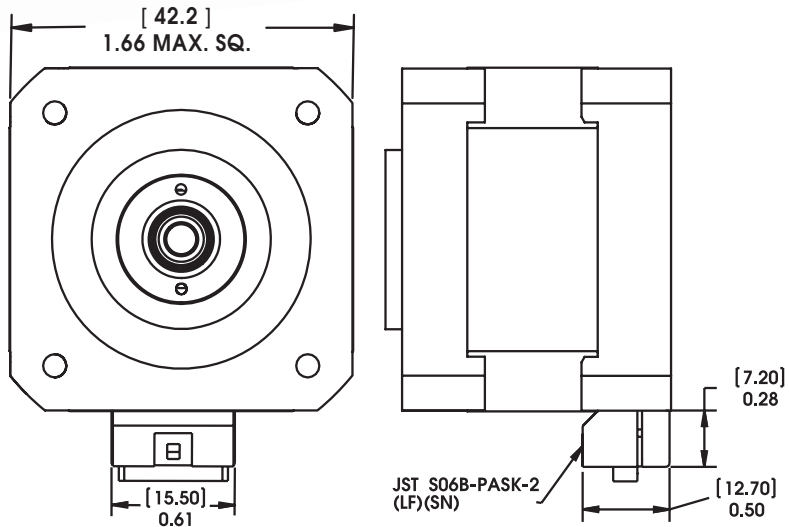
Hybrid Size 17 linear actuators are available with an integrated connector. Offered alone or with a harness assembly, this connector is RoHS compliant and features a positive latch in order for high connection integrity. The connector is rated up to 3 amps and the mating connector will handle a range of wire gauges from 22 to 28. This motor is ideal for those that want to plug in directly to pre existing harnesses. In addition to standard configurations, Haydon Kerk Motion Solutions can custom design this motor to meet your specific application requirements.

- 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

Dimensional Drawing: 43000 Series Size 17 with Integrated Connector

Dimensions = (mm) inches



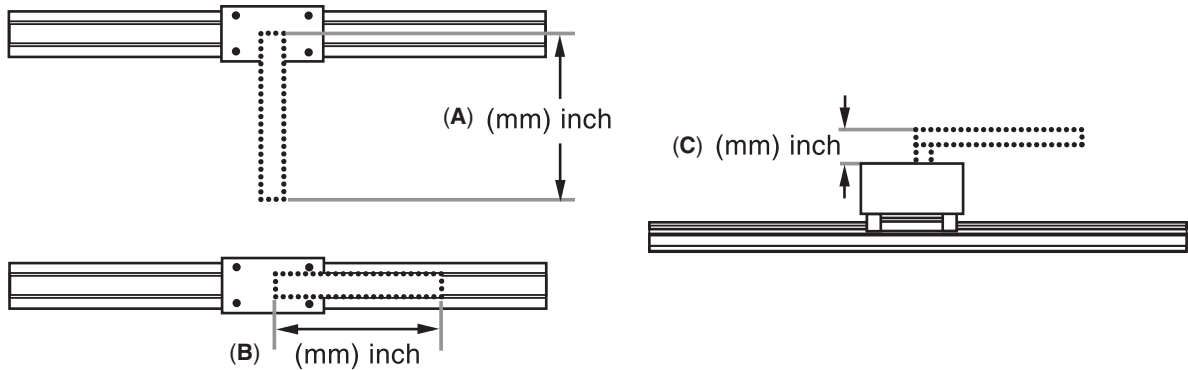
Information needed to properly size a linear rail system

Haydon Kerk™ Linear Rail Systems are designed to be **precision motion devices**. Many variables must be considered before applying a particular rail system in an application. The following is a basic checklist of information needed that will make it easier for the Haydon Kerk engineering team to assist you in choosing the proper linear rail.

Linear Rail Application Checklist

- 1) **Maximum Load?** _____ (N or lbs.)
- 2) **Load Center of Gravity (cg) Distance and Height** (mm or inches)? See illustrations (A) (B) (C) below.
Dimensions (mm / inch):

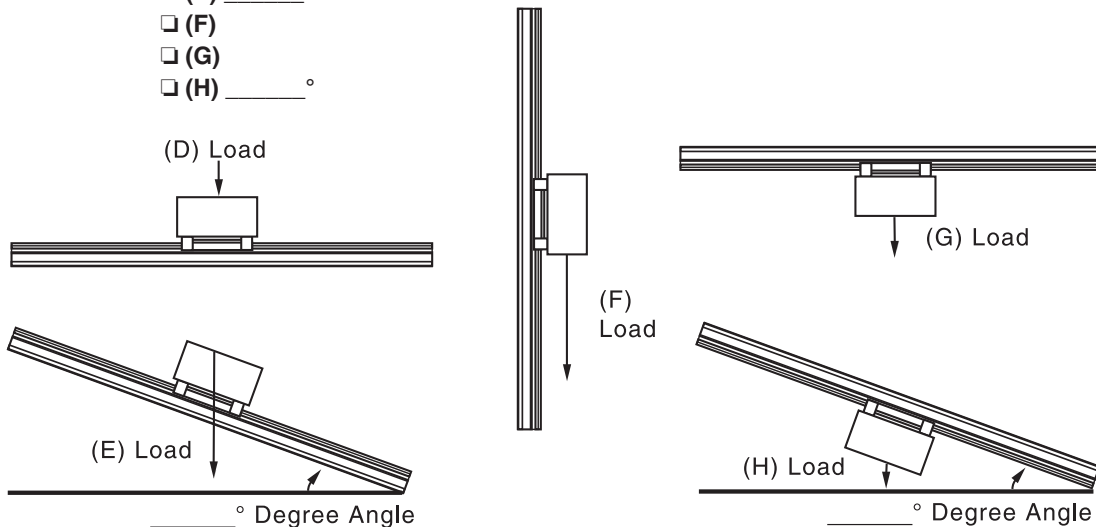
(A) _____ ... OR... (B) _____ AND... (C) _____



- 3) **Rail Mount Orientation?** The force needed to move the load is dependent on the orientation of the load relative to the force of gravity. For example, total required force in the horizontal plane (D) is a function of friction and the force needed for load acceleration ($F_f + F_a$). Total force in the vertical plane is a function of friction, load acceleration, and gravity ($F_f + F_a + F_g$).

Orientation:

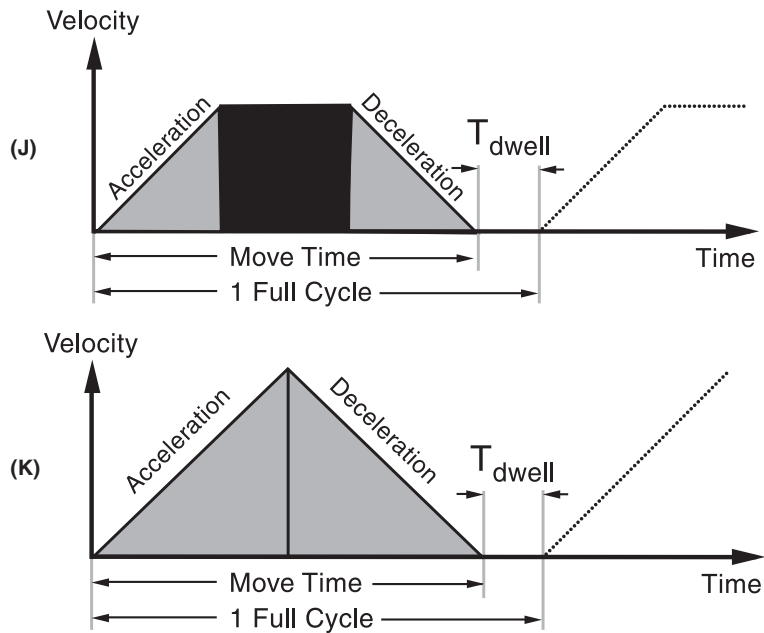
- (D)
 (E) _____ °
 (F)
 (G)
 (H) _____ °



Linear Rail Application Checklist (Continued)

4) **Stroke Length to Move Load?** _____ (mm or inches)
 Overall rail size will be a function of stroke length needed to move the load, the rail frame size (load capability), the motor size, and whether or not an integrated stepper motor programmable drive system is added.

5) **Move Profile?**
 A **trapezoidal** move profile divided into 3 equal segments (J) is a common move profile and easy to work with. Another common move profile is a **triangular** profile divided into 2 equal segments (K).



If using a **trapezoidal** (J) or **triangular** (K) move profile, the following is needed...

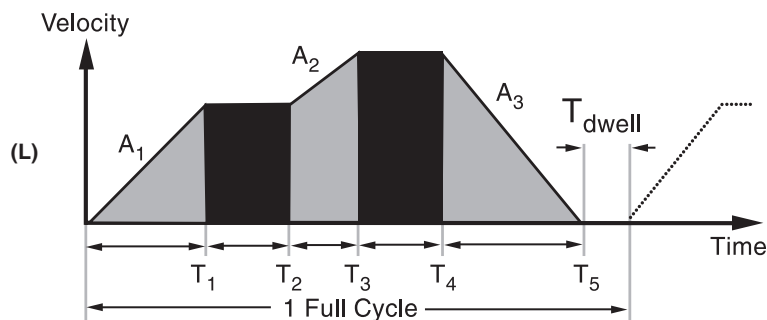
- a) Point to point move distance _____ (mm or inches)
- b) Move time _____ (seconds) including time of acceleration and deceleration
- c) Dwell time between moves _____ (seconds)

The trapezoidal move profile (J) is a good starting point in helping to size a system for prototype work.

A **complex** move profile (L) requires more information.

- a) Time (in seconds) including: $T_1, T_2, T_3, T_4, T_5 \dots T_n$ and T_{dwell}
- b) Acceleration / Deceleration (mm/sec^2 or $\text{inches}/\text{sec}^2$) including: $A_1, A_2, A_3 \dots A_n$

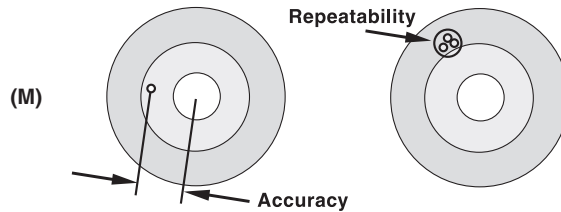
For more information call Haydon Kerk Motion Solutions Engineering at 203 756 7441.



Linear Rail Application Checklist (Continued)

6) **Position Accuracy Required?** _____ (mm or inches)
 Accuracy is defined as the difference between the theoretical position and actual position capability of the system. Due to manufacturing tolerances in components, actual travel will be slightly different than theoretical "commanded" position. See figure (M) below.

7) **Position Repeatability Required?** _____ (mm or inches)
 Repeatability is defined as the range of positions attained when the rail is commanded to approach the same position multiple times under identical conditions. See figure (M) below.



8) **Positioning Resolution Required?** _____ (mm/step or inches/step)
 Positioning resolution is the smallest move command that the system can generate. The resolution is a function of many factors including the drive electronics, lead screw pitch, and encoder (if required). The terms "resolution" and "accuracy" should never be used interchangeably.

9) **Closed-Loop Position Correction Required?** YES NO
 In stepper motor-based linear rail systems, position correction is typically accomplished using a rotary incremental encoder (either optical or magnetic).

10) **Life Requirement?** (select the most important application parameter)
 a) Total mm or inches _____
 ... or ... b) Number of Full Strokes _____
 ... or ... c) Number of Cycles _____

11) **Operating Temperature Range** _____ (°C or °F)
 a) Will the system operate in an environment in which the worst case temperature is above room temperature?
 b) Will the system be mounted in an enclosure with other equipment generating heat?

12) **Controller / Drive Information?**
 a) Haydon Kerk IDEA™ Drive (with Size 17 Stepper Motors only)
 b) Customer Supplied Drive... Type? Chopper Drive L / R Drive
 Model / Style of Drive: _____

13) **Power Supply Voltage?** _____ (VDC)

14)* **Step Resolution?** a) Full Step b) Half-Step c) Micro-Step

15)* **Drive Current?** _____ (A_{rms} / Phase) and _____ (A_{peak} / Phase)

16)* **Current Boost Capability?** _____ (%)

* If the Haydon Kerk IDEA™ Drive is used disregard items 14, 15, and 16.