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KERK: 603 213 6290
www.haydonkerkpittman.com

AMETEK®
ADVANCED MOTION SOLUTIONS

Haydon kerk®
Motion Solutions

WGS™ Motorized Linear Slides:
WGS06
Low Profile, Screw Driven Slide

WGS06™ Linear Rail with Hybrid 43000 Series Size 17 Single and Double Stacks and 57000 Series Size 23 Single and Double Stacks

Kerk® Motorized WGS Linear Slide utilizes a screw-driven carriage that offers reliable, continuous linear speed while maintaining accurate positioning. The length and speed of the WGS is not limited by critical screw speed, allowing high RPM, linear speed and long stroke lengths. The WGS slide has a unique, compact profile that provides improved torsional stiffness and stability over RGS and RGW products.

Technical specifications for Size 17 Hybrid Linear Actuator Stepper Motors and Haydon Kerk IDEA™ programmable drives are on page 3, Size 23 specifications are on page 5.

To determine which motor assembly is best for your application see the Linear Rail Applications Checklist on page 7.

WGS06 with Size 17 [43 mm]
hybrid linear stepper motor
– and –
WGS06 with Size 17 [43 mm]
with an optional PC programmable
IDEA™ Drive (not available for Size 23 motor)

Identifying the Motorized WGS part number codes when ordering

WG	S	06	K	–	G	0100	–	XXX

Prefix	*Frame Style*	*Frame Size Load**	*Coating*	*Drive / Mounting*	*Nominal Thread Lead Code*	*Unique Identifier*
WG = Wide Guide Screw	**S =** Standard	**06** = Max. static load 35 lbs (156 N)	**K** = TFE wear resist, dry lubricant Kerkote®	**M** = Motorized	**0100** = 0.1-in (2.54)	**– M43** = 43000 Series Size 17 Motor
			X = Special coating, *(Example: Kerkote® with grease)*	**G** = IDEA™ integrated programmable drive - USB communications	**0200** = 0.2-in (5.08)	**– G43** = 43000 Series Size 17 Motor with IDEA Drive
				J = IDEA™ integrated programmable drive - RS485 communications	**0500** = 0.5-in (12.7)	**– M57** = 57000 Series Size 23 Motor
					1000 = 1.0-in (25.4)	Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part.

*Carriage holes available in Metric sizes*
M3
M4
M5
M6

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

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WGS™ Motorized Linear Slides:
WGS06 / 43000 Series Motors
Dimensional Drawings

WGS06 Linear Slide with Hybrid 43000 Size 17 linear motors are recommended for horizontal loads up to 35 lbs (156 N)

Dimensions = (inches) mm

ADDITIONAL MOUNTING HOLES RECOMMENDED
EVERY 10 inches (254mm) FROM DRIVE END.
CONTACT HAYDON KERK FOR EXACT LOCATIONS
OR CUSTOM LOCATIONS.

2X ⌀ P1 THRU
⌀ P2 ▽ P3

4X 8-32 UNC - 2B*
▽ .250

⌀ P1 THRU
⌀ P2 ▽ P3
TYP.

U TYP.

SINGLE STACK B
DOUBLE STACK C

OVERALL RAIL LENGTH = STROKE + D + F + G
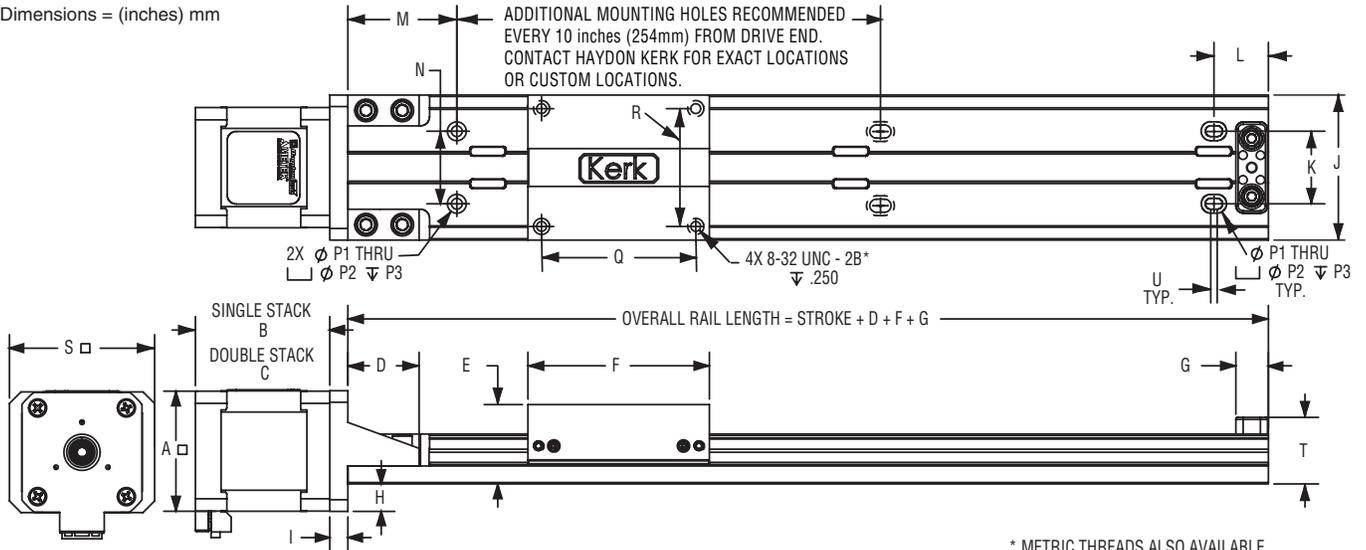
* METRIC THREADS ALSO AVAILABLE

(MM) INCH	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P1	P2	P3	Q	R	S	T	U
-M43 SIZE 17	(42.2) 1.660 MAX.	(33.8) 1.330 MAX.	(47.75) 1.880 MAX.	(24.9) .98	(27.9) 1.1	(63.5) 2.50	(11.2) .44	(9.7) .38	(6.4) .250	(50.8) 2.00	(25.4) 1.000	(19.1) .75	(38.1) 1.50	(25.4) 1.000	(3.81) .150	(6.60) .260	(6.50) .256	(53.95) 2.124	(41.25) 1.624	(50.8) 2.00	(23.3) .92	(2.3) .090

WGS06 Linear Slide with Hybrid 43000 Size 17 linear motors with programmable IDEA™ Drive

Wiring	Bipolar
Winding Voltage	2.33 VDC

Contact Haydon Kerk if a higher voltage motor is desired.

ADDITIONAL MOUNTING HOLES RECOMMENDED
EVERY 10 inches (254mm) FROM DRIVE END.
CONTACT HAYDON KERK FOR EXACT LOCATIONS
OR CUSTOM LOCATIONS.

2X ⌀ P1 THRU
⌀ P2 ▽ P3

4X 8-32 UNC - 2B*
▽ .250

⌀ P1 THRU
⌀ P2 ▽ P3 TYP.

U TYP.

SINGLE STACK B
DOUBLE STACK C

OVERALL RAIL LENGTH = STROKE + D + F + G

* METRIC THREADS ALSO AVAILABLE

Dimensions = (mm) inch

(MM) INCH	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P1	P2	P3	Q	R	S	T	U	V
-G43 SIZE 17	(58.0) 2.283 MAX.	(63.72) 2.509 MAX.	(77.67) 3.058 MAX.	(24.9) .98	(27.9) 1.1	(63.5) 2.50	(11.2) .44	(9.7) .38	(6.4) .250	(50.8) 2.00	(25.4) 1.000	(19.1) .75	(38.1) 1.50	(25.4) 1.000	(3.81) .150	(6.60) .260	(6.50) .256	(53.95) 2.124	(41.25) 1.624	(50.8) 2.00	(23.3) .92	(2.3) .090	(42.0) 1.66

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WGS™ Motorized Linear Slides:
WGS06 Motorized
43000 Series Size 17 Motors

Specifications: Motorized WGS06 with Size 17 Single Stack Hybrid Motor

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				

Nominal Thread Lead		Lead Code
inches	mm	
0.1	2.54	**0100**
0.2	5.08	**0200**
0.5	12.7	**0500**
1.0	25.4	**1000**

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

Size 17
Single Stack
External Linear
with IDEA Drive

Size 17
Single Stack
External Linear

Specifications: Motorized WGS06 with Size 17 Double Stack Hybrid Motor

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	290 mA
Resistance/phase	0.9 Ω	3.8 Ω	41.5 Ω
Inductance/phase	1.33 mH	8.21 mH	45.1 mH
Power Consumption	10.4 W		

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

Size 17
Double Stack
External Linear

- 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

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

Nominal Thread Lead		Lead Code
inches	mm	
0.1	2.54	**0100**
0.2	5.08	**0200**
0.5	12.7	**0500**
1.0	25.4	**1000**

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

Hybrids: Stepping Sequence

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

EXTEND CW ↓

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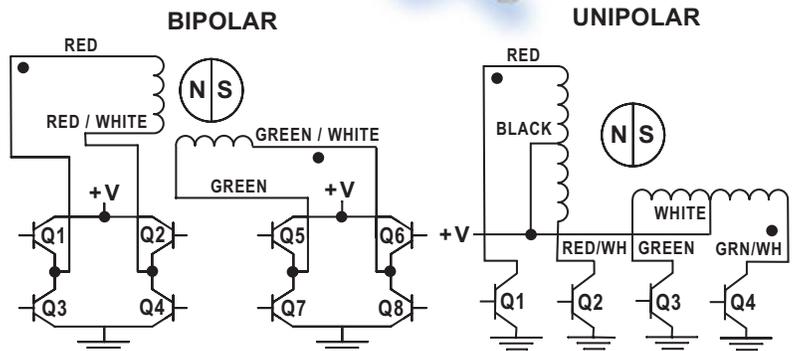
Note: Half stepping is accomplished by inserting an off state between transitioning phases.

Hybrids: Wiring

BIPOLAR

UNIPOLAR

3

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WGS™ Motorized Linear Slides:
WGS06 / 43000 Series Motors
Performance Curves

Performance Curves: WGS06 with 43000 Series Size 17 Single Stack

FORCE vs. PULSE RATE

Chopper • Bipolar • 100% Duty Cycle

Force shown is a total thrust force (acceleration, friction, miscellaneous drag forces)

0.1 in. (2.54 mm) Lead
0.2 in. (5.08 mm) Lead
0.5 in. (12.7 mm) Lead
1.0 in. (25.4 mm) Lead

Force (lbs) / Force (N)

Pulse Rate: in/sec (mm/sec)
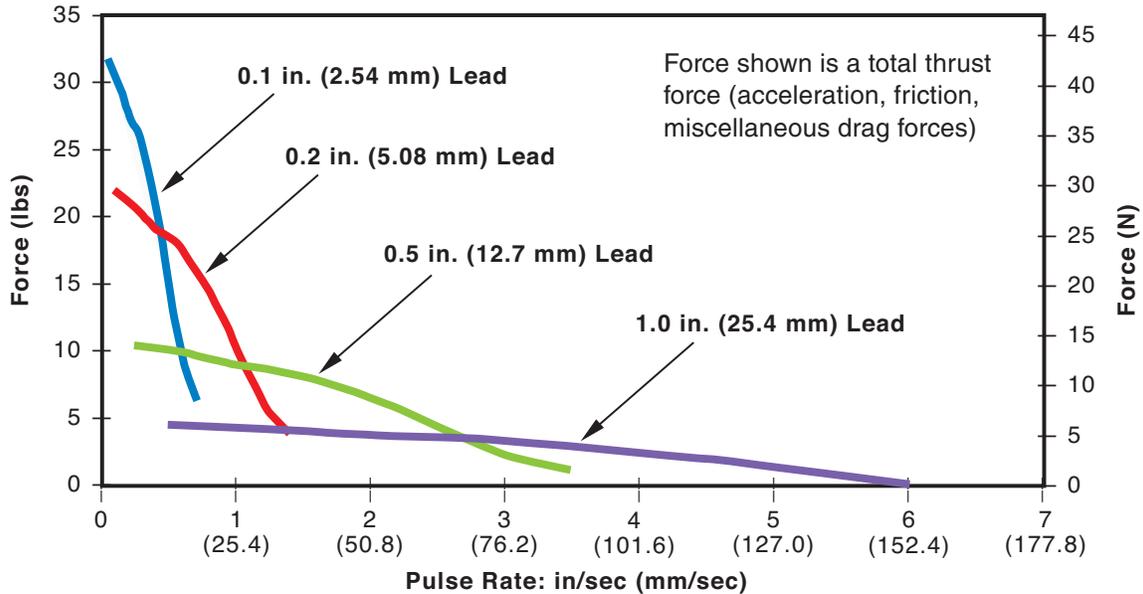
Performance Curves: WGS06 with 43000 Series Size 17 Double Stack

FORCE vs. PULSE RATE
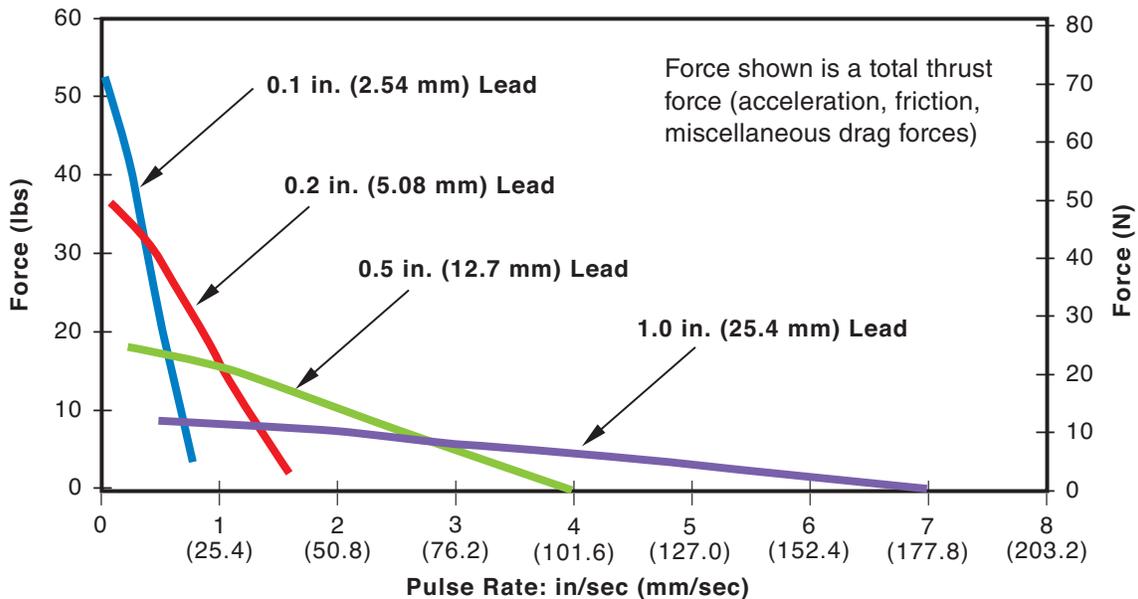
Chopper • Bipolar • 100% Duty Cycle

Force shown is a total thrust force (acceleration, friction, miscellaneous drag forces)

0.1 in. (2.54 mm) Lead
0.2 in. (5.08 mm) Lead
0.5 in. (12.7 mm) Lead
1.0 in. (25.4 mm) Lead

Force (lbs) / Force (N)

Pulse Rate: in/sec (mm/sec)

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

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WGS™ Motorized Linear Slides:
WGS06 Motorized
57000 Series Size 23 Motors

## Specifications: Haydon® 57000 Series Size 23 Single Stack

Size 23: 57 mm (2.3-in) Single Stack Hybrid Linear Actuator (1.8° Step Angle)					
Wiring	Bipolar			Unipolar**	
Winding Voltage	3.25 VDC	5 VDC	12 VDC	5 VDC	12 VDC
Current (RMS)/phase	2.0 A	1.3 A	.54 A	1.3 A	.54 A
Resistance/phase	1.63 Ω	3.85 Ω	22.2 Ω	3.85 Ω	22.2 Ω
Inductance/phase	3.5 mH	10.5 mH	58.0 mH	5.3 mH	23.6 mH
Power Consumption	13 W				

Nominal Thread Lead		Lead Code
inches	mm	
0.1	2.54	0100
0.2	5.08	0200
0.5	12.7	0500
1.0	25.4	1000

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

Size 23
Single Stack
External Linear

Specifications: Haydon® 57000 Series Size 23 Double Stack

Size 23: 57 mm (2.3-in) Double Stack Hybrid Linear Actuator (1.8° Step Angle)			
Wiring	Bipolar		
Winding Voltage	3.25 VDC	5 VDC	12 VDC
Current (RMS)/phase	3.85 A	2.5 A	1 A
Resistance/phase	0.8 Ω	2.0 Ω	12.0 Ω
Inductance/phase	2.3 mH	7.6 mH	35.0 mH
Power Consumption	25 W		

Nominal Thread Lead		Lead Code
inches	mm	
0.1	2.54	0100
0.2	5.08	0200
0.5	12.7	0500
1.0	25.4	1000

Size 23
Double Stack
External Linear

Dimensional Drawings: WGS06 with Size 23 Motor

WGS06 Linear Slide with **Hybrid 57000 Size 23** linear motors are recommended for horizontal loads up to 35 lbs (156 N)


ADDITIONAL MOUNTING HOLES RECOMMENDED EVERY 10 inches (254mm) FROM DRIVE END. CONTACT HAYDON KERK FOR EXACT LOCATIONS OR CUSTOM LOCATIONS.

2X ∅ P1 THRU
∅ P2 ▽ P3

4X 8-32 UNC - 2B*
▽ .250

∅ P1 THRU
∅ P2
▽ P3 TYP.

U TYP.

SINGLE STACK B
DOUBLE STACK C

OVERALL RAIL LENGTH = STROKE + D + F + G

* METRIC THREADS ALSO AVAILABLE

Dimensions = (mm) inch

(MM) INCH	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P1	P2	P3	Q	R	S	T	U
-M57 SIZE 23	(56.4) 2.220 MAX.	(45.2) 1.780 MAX.	(66) 2.598 MAX.	(24.9) .98	(27.9) 1.1	(63.5) 2.50	(11.2) .44	(16.5) .65	(6.4) .250	(50.8) 2.00	(25.4) 1.000	(19.1) .75	(38.1) 1.50	(25.4) 1.000	(3.81) .150	(6.60) .260	(6.50) .256	(53.95) 2.124	(41.25) 1.624	(56.4) 2.220 MAX.	(23.3) .92	(2.3) .090

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WGS™ Motorized Linear Slides:
WGS06 / 57000 Series Motors
Performance Curves

Performance Curves: WGS06 with 57000 Series Size 23 Single Stack

FORCE vs. PULSE RATE

Chopper • Bipolar • 100% Duty Cycle

Performance Curves: WGS06 with 57000 Series Size 23 Double Stack

FORCE vs. PULSE RATE
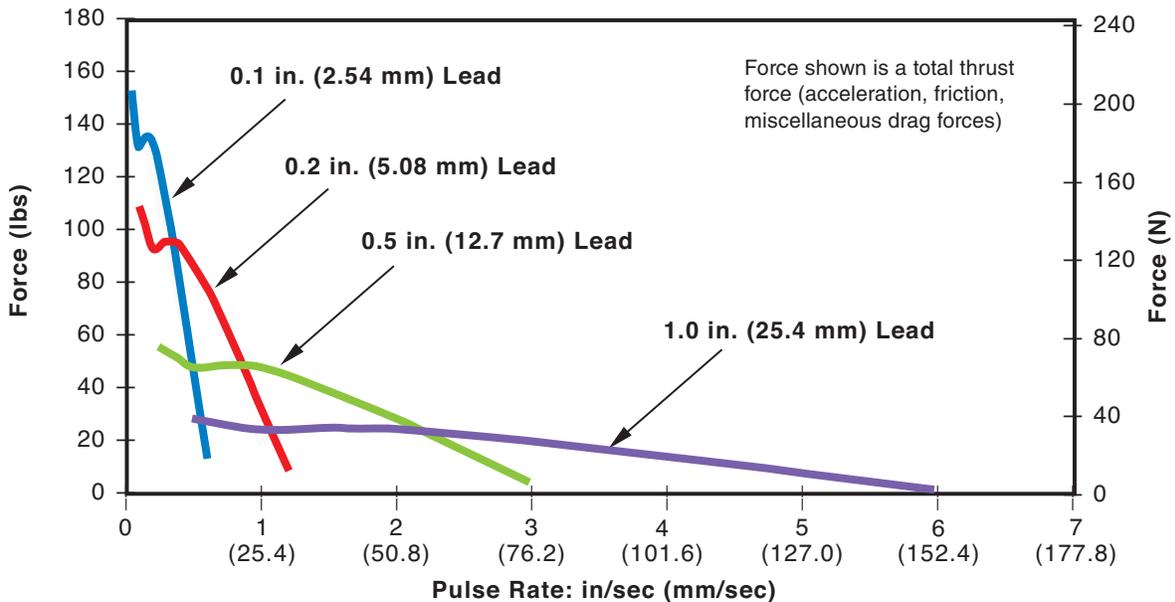
Chopper • Bipolar • 100% Duty Cycle

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

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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) _____

(A) (mm) inch

(C) (mm) inch

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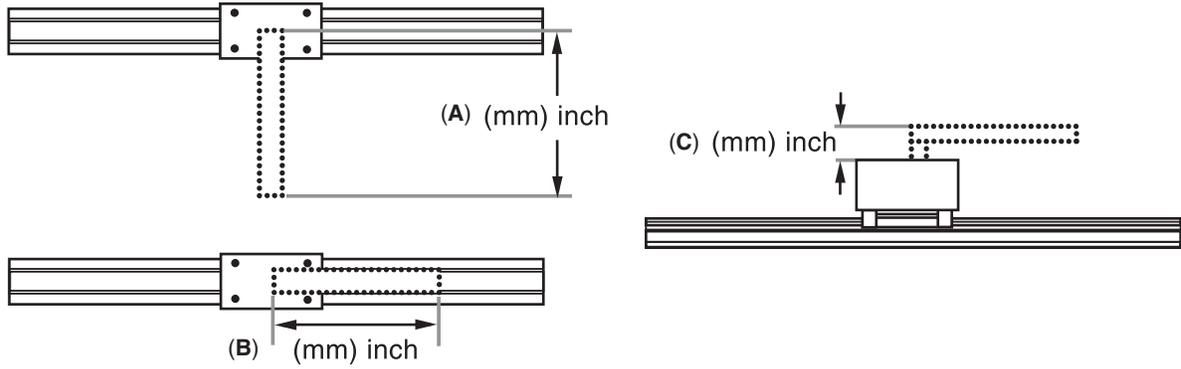
3) ❏ **Rail Mount Orientation?** The force needed to move the load is dependent on the orientation of the load relative to the force of gravity. For example, total required force in the horizontal plane (D) is a function of friction and the force needed for load acceleration ($F_f + F_a$). Total force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

(D) Load

(F) Load

(G) Load

(E) Load

_____° Degree Angle

(H) Load

_____° Degree Angle

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Linear Rails:
Properly Sizing A Linear
Rail System
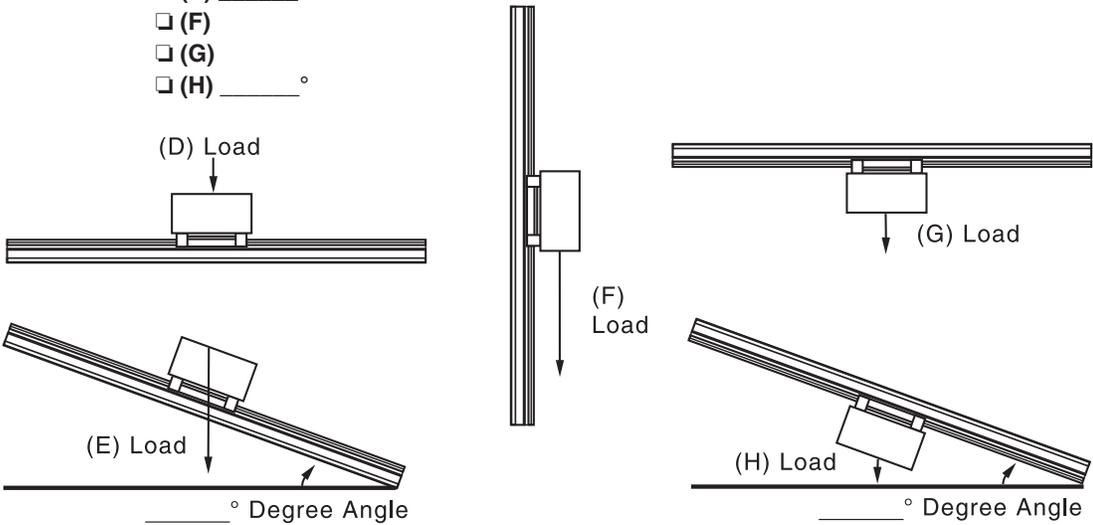
Linear Rail Application Checklist *(Continued)*

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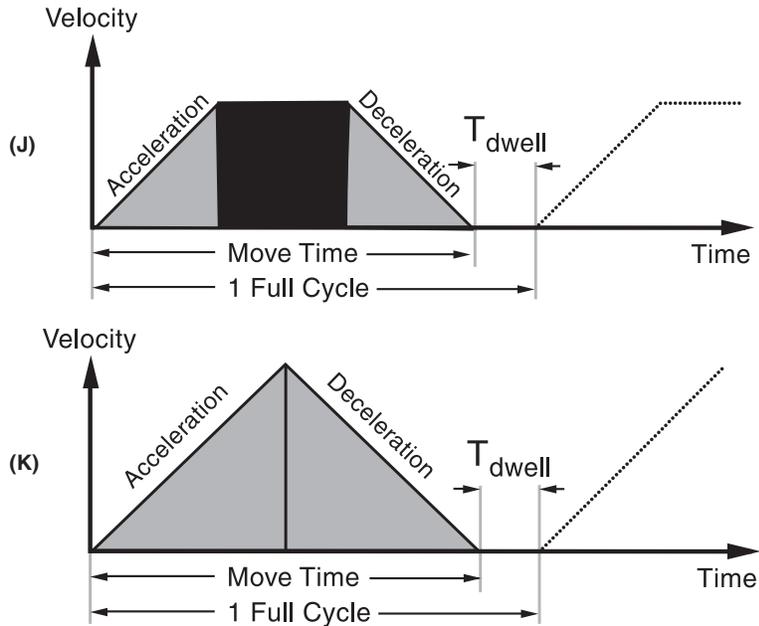
If using a **trapezoidal** (J) or **triangular** (K) move profile, the following is needed…

    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: $T_1, T_2, T_3, T_4, T_5…T_n$ and T_{dwell}

    b) ❏ Acceleration / Deceleration (mm/sec.^{2} or inches/sec.^{2}) including: $A_1, A_2, A_3…A_n$

For more information call Haydon Kerk Motion Solutions Engineering at 203 756 7441.
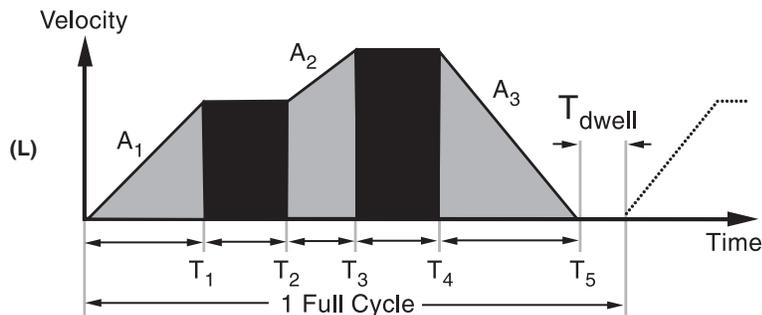
Linear Rail *Application Checklist* *(Continued)*

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.

(M)

Repeatability

Accuracy
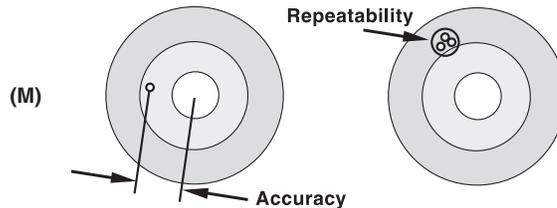
8) ❏ **Positioning Resolution Required?** _____ (mm/step or inches/step)
Positioning resolution is the smallest move command that the system can generate. The resolution is a function of many factors including the drive electronics, lead screw pitch, and encoder (if required). The terms "resolution" 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 with 43000 Series Size 17 motor disregard items 14, 15, and 16. IDEA Drive not available for 57000 Series Size 23 motors.