

LRS04 Motorized Linear Rails with 43000 Series

The LRS Linear Rail System in a variety of configurations, both motorized and non-motorized. These precision linear rail systems consist of a stationary base and a load bearing carriage that travels along a rigid extruded aluminum rail. The LRS Linear Rail System is available with several in-line motor options including a single stack or double stack size 17 stepper motor, a stepper motor with an integral chopper drive, or the IDEA™ programmable linear actuator, consisting of the stepper motor, drive, and controller programmed through a graphic user interface (GUI). The LRS is also available without a motor, easily allowing the designer flexibility to integrate with a variety of motor types and belt and pulley configurations.

Key Product Features

- "T" slots integrated into exterior rail bottom and sides that accommodate full length support and various mounting options.
- Loads easily attach to the compact, moving carriage with four or six M4 x 0.7 size screws.
- Load bearing carriage moves efficiently and smoothly within the internal rail geometry of this specially designed aluminum extrusion.
- Rail provides end-to-end axial stability and precise motion system accuracy.
- Automatic adjustments of slide bearing play with a patent pending "anti-backlash" linear bearing.
- Rated life equals that of the existing lead-screws of similar size.
- Lead screw end configurations adapt to various rotary motion sources.
- Kerkote® or Black Ice® TFE coatings on a 303 stainless steel lead-screw.
- Designed to Metric global engineering standards.
- For extreme control, LRS can be used with CMP or WDG high-precision anti-backlash nuts, as well as a freewheeling general purpose nut.

LRS with Size 17
Double Stack Hybrid
Linear Actuator with
IDEA programmable
Drive and Black Ice®
TFE Lead-screw.



LRS with
Size 17
Double Stack
Hybrid Linear Actuator

LRS Non-Motorized

To determine what is best for your application see the [Linear Rail Applications Checklist](#).

■ Identifying the LRS04 Part Number Codes when Ordering

LR	W	04	B	M	0025	XXX
Prefix	Frame Style	Frame Size Load*	Lubrication	Drive / Mounting	Nominal Thread Lead Code	Unique Identifier
LR = Linear Rail System (LRS)	B = BFW nut C = CMP nut W = WDG nut G = Guide only	04 = 50 lbs (222 N) (Maximum static load)	S = Uncoated B = Black Ice® TFE N = No screw	A = None M = Motorized 43000 Series Size 17 Hybrid G = Motor with IDEA™ integrated programmable drive - USB communications J = Motor with IDEA™ integrated programmable drive - RS485 communications	0000 = No screw 0025 = .25-in (.635) 0031 = .03125-in (.794) 0039 = .0394-in (1.0) 0050 = .05-in (1.27) 0063 = .0625-in (1.588) 0079 = .0787-in (2.0) 0100 = .01-in (2.54) 0125 = .125-in (3.175) 0197 = .1969-in (5.0) 0250 = .25-in (6.35) 0394 = .3937-in (10.0) 0500 = .5-in (12.7) 0750 = .75-in (19.05) 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.

NOTE: Dashes must be included in Part Number (–) as shown above. For assistance call our Engineering Team at 603 213 6290.

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

■ LRS04 Linear Rail with 43000 Series Size 17 Linear Actuator

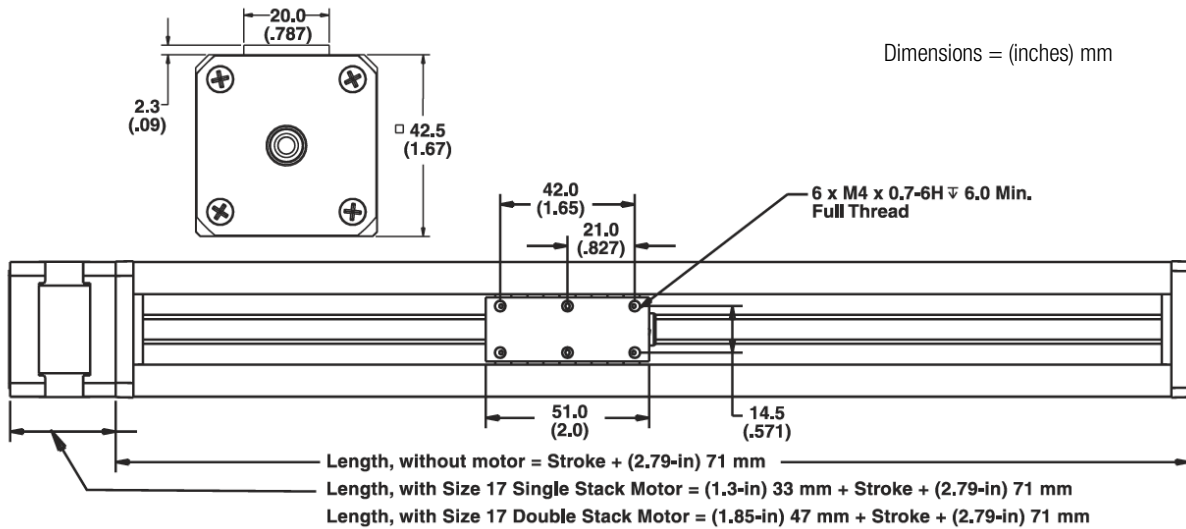
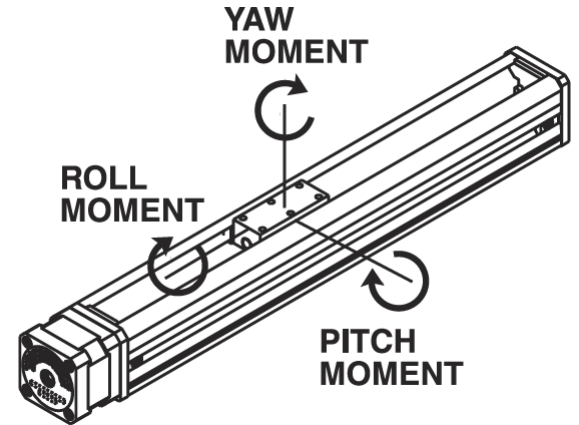
Recommended for horizontal loads up to 50 lbs (222 N)

Specifications

Width	Length of stroke (max)	Speed (max)	Straight line accuracy	Twist
1-5/8 in square (4.3 cm square)	40 in (1000 mm)	20 in/sec (0.5 M/sec)	+/- 0.012 in/ft (+/- 1.0 mm/M)	+/- 0.25° in/ft (+/- 0.75° /M)

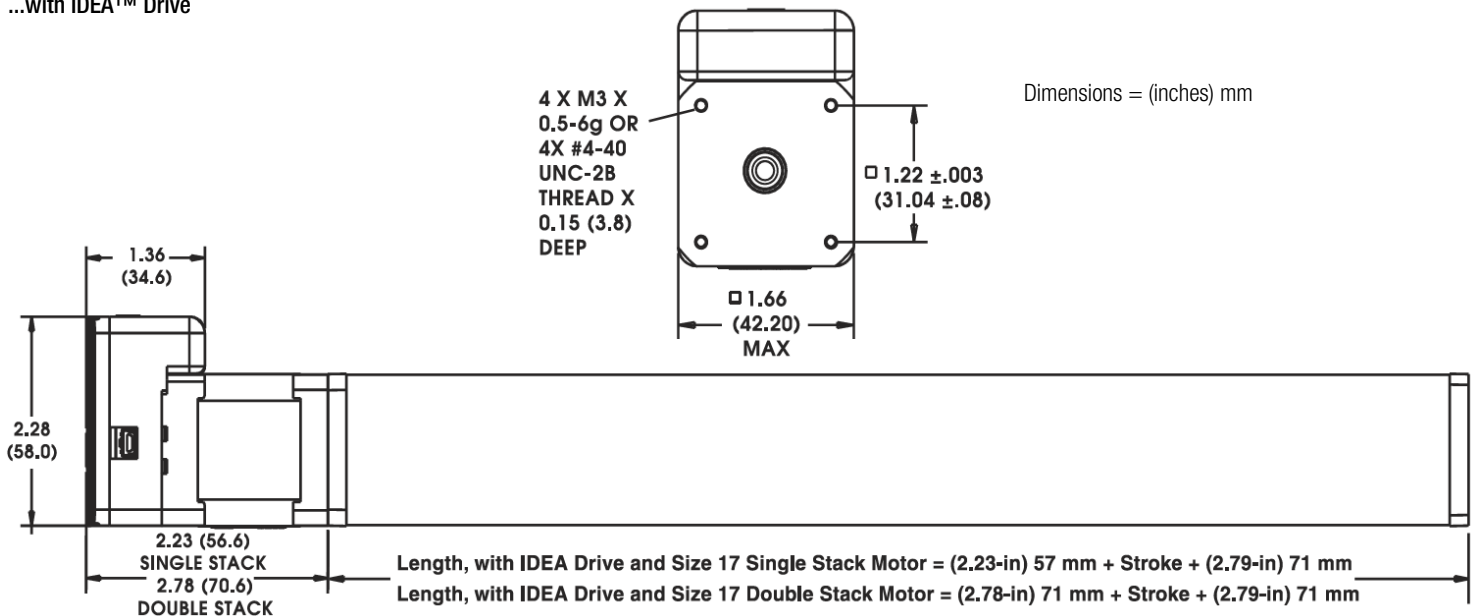
Load Ratings (max)

Top load "Z" direction	Hanging / Gantry	Max. Pitch Moment	Max. Moment Roll	Max. Moment Yaw
50 lbs. (225 N)	50 lbs. (225 N)	75 in - lbs (8.5 N - M)	75 in - lbs (8.5 N - M)	(8.5 N - M)



Dimensions = (inches) mm

...with IDEA™ Drive



Dimensions = (inches) mm

Single Stack

■ 43000 Series Size 17

Size 23: 57 mm (2.3-in) Hybrid Linear Actuator (1.8° Step Angle)

Wiring	Bipolar			Unipolar**	
Programmable Drive	IDEA Drive option available			Not applicable	
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 mH	5.3 mH	23.6 mH
Power Consumption	13 W				
Rotor Inertia	166 gcm ²				
Insulation Class	Class B (Class F available)				
Weight	18 oz (511 g)				
Insulation Resistance	20 M Ω				

* 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.

Size 17
Single Stack
External Linear
with IDEA Drive



Size 17
Single Stack
External Linear

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 [IDEA™ Drive Data Sheet](#)

Double Stack

■ 43000 Series Size 17

Size 23 Double Stack: 57 mm (2.3-in) Hybrid Linear Actuator (1.8° Step Angle)

Wiring	Bipolar		
Programmable Drive	IDEA Drive option available		
Winding Voltage	3.25 VDC	5 VDC	12 VDC
Current (RMS)/phase	3.85 A	2.5 A	1 A
Resistance/phase	0.98 Ω	2.0 Ω	12.0 Ω
Inductance/phase	2.3 mH	7.6 mH	35.0 mH
Power Consumption	25 W Total		
Rotor Inertia	321 gcm ²		
Insulation Class	Class B (Class F available)		
Weight	32 oz (958 g)		
Insulation Resistance	20 M Ω		

* 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.

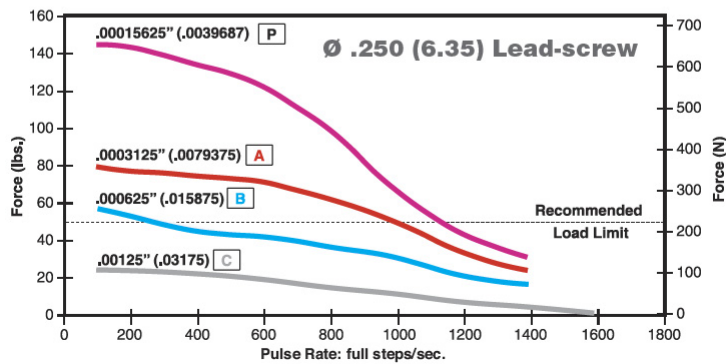
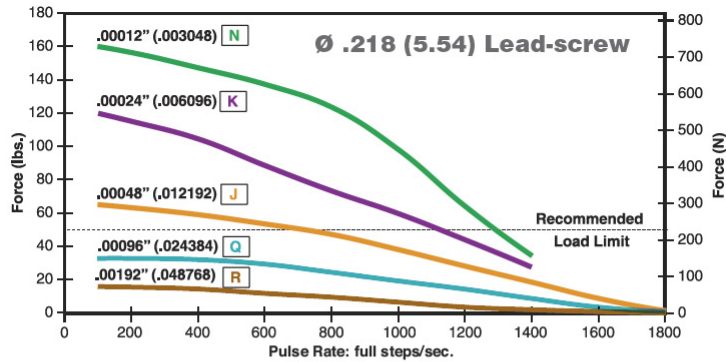
Size 17
Double Stack
External Linear



Single Stack

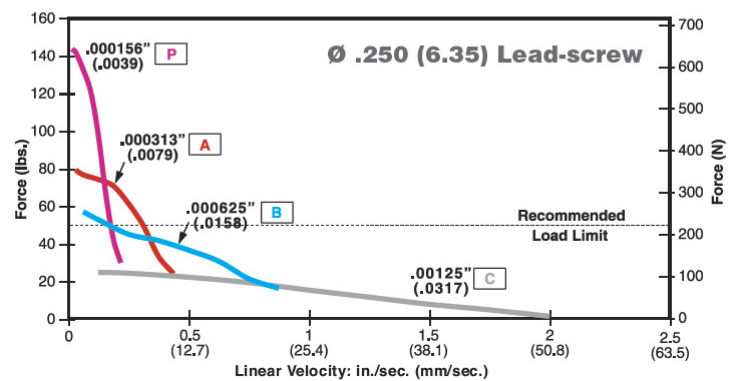
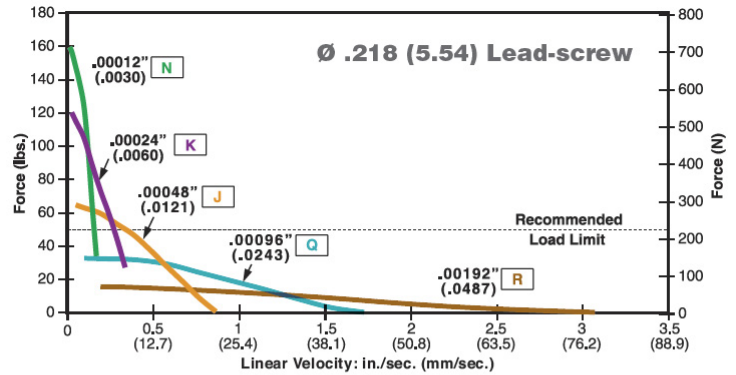
FORCE vs. PULSE RATE

– Chopper – Bipolar – 100% Duty Cycle



FORCE vs. LINEAR VELOCITY

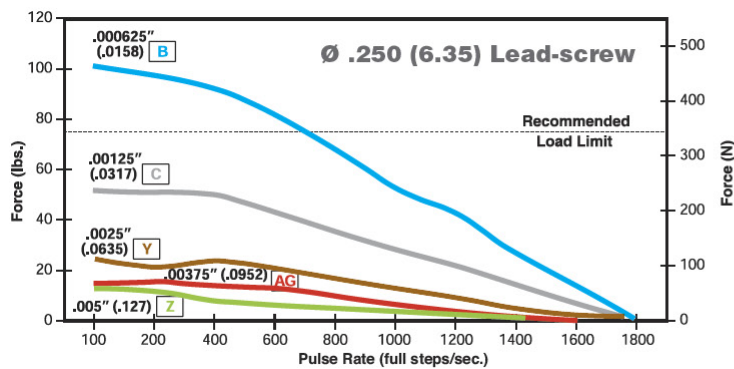
– Chopper – Bipolar – 100% Duty Cycle



Double Stack

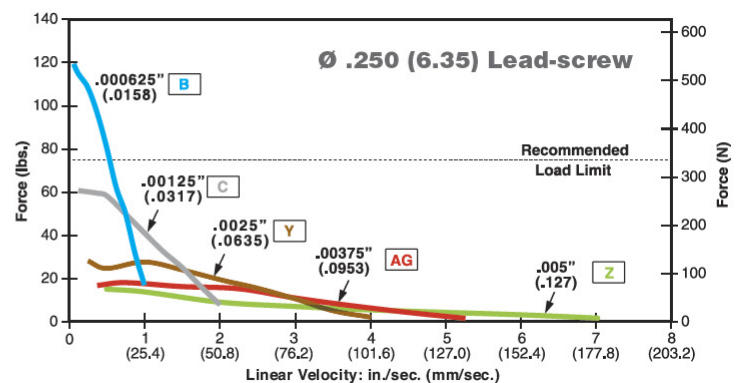
FORCE vs. PULSE RATE

– 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

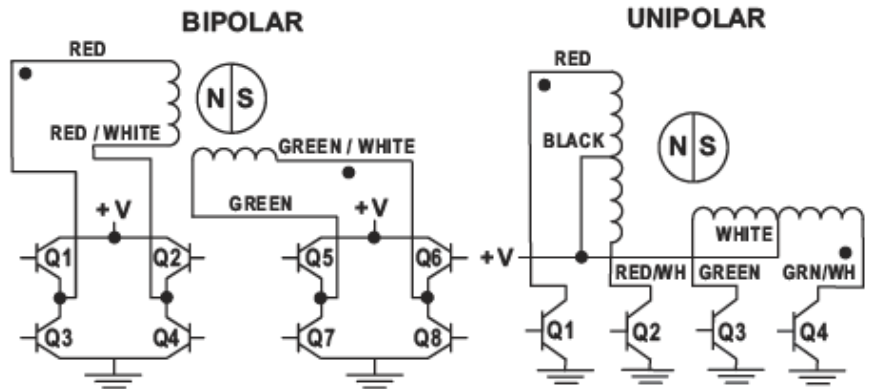
43000 Series Size 17

Hybrids: Stepping Sequence

Hybrids: Wiring

	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	

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



Size 17 43000 Series • Integrated Connectors

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 Drawings

Integrated Connector with 43000 Series Size 17

Dimensions = (mm) inches

