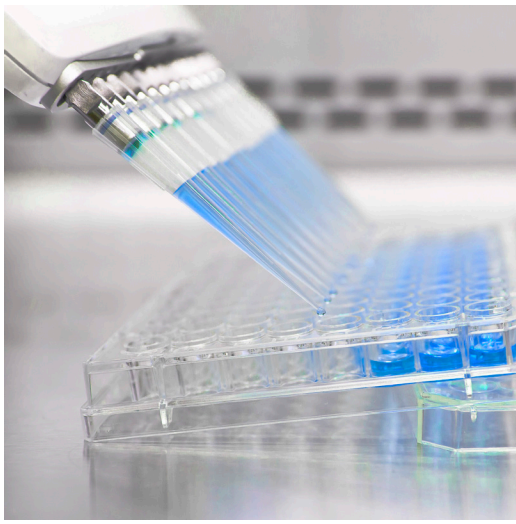
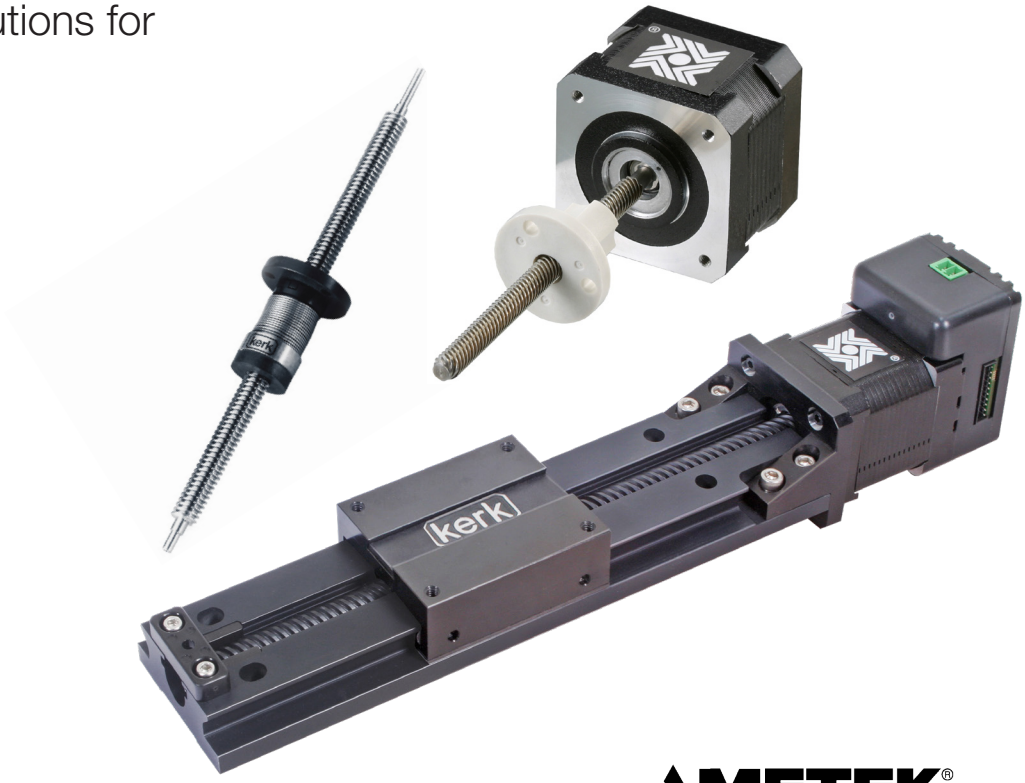
Haydon kerk Motion Solutions

Product Guide



Advanced linear solutions for precise applications



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AMETEK®
ADVANCED MOTION SOLUTIONS

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ADVANCED MOTION SOLUTIONS

Haydon kerk® Motion Solutions

Haydon Kerk

A full line of high quality stepper motor based linear actuators, precision lead screw and anti-backlash nut assemblies, linear rail and guide systems, gearmotors, drives and complete custom automation sub-systems.

Custom linear and rotary motion solutions with nearly 60 years experience of innovative engineering and vertically integrated manufacturing to solve your unique system needs. Products designed specifically for your application needs to streamlife and simplifiy your product design and manufacturing.

Hybrid Stepper Linear Actuators

Our unique line offers high performance and exceptional endurance in a very small package.

- Captive, non-captive and external linear configurations available
- Proprietary manufacturing process uses engineered thermoplastics in the rotor drive nut
- Stainless steel lead screw
- Quieter, more efficient and more durable than the commonly used v-thread and bronze nut configurations
- Optional integrated IDEA™ Drive in the size 17, 43000 series, single or double stack. When integrated with an IDEA Drive, the system combines hybrid linear actuator technology with a fully programmable, integrated stepper motor drive, improving system integration, while lowering costs, and simplifying product development *(see page 10 for more info)*

Hybrid Stepper Linear Actuators

Frame	Series	Size inch [mm]	Integrated IDEA Drive Option	Travel / Step [µm]		Max Force Range [N]		Stroke [mm]*	
				Single Stack	Double Stack	Single Stack	Double Stack	Captive	Non-Captive & External
Size 8	21000	0.8 [21]		1.5 - 40	2.5 - 40	2 - 45	2 - 75	9.0 - 38.1	< 200
Size 11	28000	1.1 [28]		3 - 50		15 - 90	30 - 133	12.7 - 63.5	< 250
Size 14	35000	1.4 [35]		1.5 - 50	15.8 - 127	50 - 220		12.7 - 63.5	< 300
Size 17	43000	1.7 [43]	•	1.5 - 50	15.8 - 127	100 - 220	50 - 337	12.7 - 63.5	< 400
Size 23	57000	2.3 [57]		4 - 50	12.7 - 127	300 - 890	150 - 890	12.7 - 63.5	< 500
Size 34	87000	3.4 [87]		12.7 - 127	n/a	400 - 2224	n/a	12.7 - 63.5	< 500

*Please consult within for longer stroke requirements.

Can-Stack Stepper Motor Linear Actuators

Reliable and consistent performance for precise step accuracy and long life. The captive and non-captive actuators incorporate a threaded rotor in conjunction with a (lead screw) shaft to provide rapid linear movement in two directions, inward and outward. The external linear actuators have a polymer nut traveling along their lead lead screw.

- Captive, non-captive and external linear configurations available
- Captive shaft configuration features a built-in anti-rotation design, non-captive shaft requires external anti-rotation
- Linear step accuracy ranging from 3 - 400 microns
- Dual ball bearings for greater precision and durability
- Unipolar and bipolar coil configurations available
- Ruggedness and reliability that assure long life and consistent performance
- Black Ice coated lead screws available *(see page 7 for more info)*
- AC Synchronous

Can-Stack Stepper Motor Linear Actuators

Diameter in [mm]	Series	Travel / Step [µm]	Max Force Range [N]	Stroke [mm]*	
				Captive	Non-Captive & External
.59 [15]	15000	20	7	12.7	-
.79 [20]	Z20000	25 - 100	3 - 35	12.7	< 150
.79 [20]	G4 19000	25 - 100	3 - 50	14	< 150
.98 [25]	G4 25000	6 - 100	10 - 90	12.7 - 31	< 150
1 [26]	Z26000	6 - 100	10 - 80	12.7 - 31	< 150
1.4 [36]	36000	3 - 100	15 - 160	15.5	< 150
1.4 [36]	G4 37000	13 - 100	70 - 260	17 - 43	< 150
1.8 [46]	46000	12.7 - 400	20 - 260	23.1	< 200

*Please consult within for longer stroke requirements.

Dual Motion Linear Actuators

Combined linear and rotary motion in one simple, compact actuator. Each actuator incorporates two stepper motors which can be controlled independently using a standard two axis driver.

- Available in bipolar and unipolar coils
- Step resolution of 0.9° and 1.8°
- Standard or custom winding voltages
- Large range of leads

Dual Motion Linear Actuators

Frame	Series	Size inch [mm]	Travel / Step [µm]	Max Force Range	Max Stroke [mm]	Max. Hold Torque [Ncm]
Size 14	35000	1.4 [35]	2.5 - 40	50 - 220 N	< 101.6	18
Size 17	43000	1.7 [43]	1.5 - 48.7	100 - 220 N	< 101.6	53

Lead Screw and Nut Assemblies

Modified thread forms optimized for performance and available in a broad range of lead screw diameters, leads and nut styles, custom designed for your application.

- Standard lead screw diameters from 5/64 in (2 mm) to 15/16 in (24 mm)
- Thrusts up to 500 lbs (2224 N) with positional accuracies to .0001 in/in (mm/mm)
- Self-adjusting, maintenance-free and require no lubrication
- Maximum accuracy, high reliability, smooth, quiet operation and low cost
- High performance linear motion control

Lead Screw and Nut Assemblies	Units	*Available Nut Styles* • = Good •• = Better ••• = Best							
									
		ZBX	**ZBA**	**ZBM**	**KHD**	**WDG**	**NTB**	**VHD**	**BFW**
Max Dynamic Load	lb	35	55	1	20	75	200	350	500
	N	155	245	4.4	89	333	890	1557	2224
Compactness		••	••	•••	••	•••	••	•	•••
Typical Drag Torque		••	••	••	•••	••	••	•••	N/A
Vibration Damping [horizontal]		•••	•••	•••	••	•	•	••	N/A
Vibration Damping [vertical]		•••	•••	•••	•	•	•	•	N/A
Smoothness		••	•••	••	••	••	••	••	•
Backlash Compensation		••	•	••	•••	•••	•••	•••	N/A
Drag Adujusted		N/A	•••	N/A	••	N/A	•	••	N/A
Stiffness		••	••	••	•••	•••	•••	•••	N/A
Easy to Modify		••	•	•	•	•	•••	•	•••
Custom Material		••	••	•	•	•	•••	•	•••
Best for Fine Leads	<.2",5mm	•••	•••	•••	•••	•••	•	•••	•••
Best for Long Leads	>1",25mm	•••	•••	N/A	•••	•••	•••	•••	•••

Lead Screw Sizes

We use a unique precision rolling process for screw manufacturing, with a thread form designed for maximum life, quiet operation, and optimized for performance.

- Available in a broad range of lead screw diameters
- .0006 in/in (mm/mm) standard lead accuracy, available up to .0001 in/in (mm/mm)
- Metric and left hand threads available
- Extremely high bi-directional repeatability of 50 micro-inches (1.25 microns)
- Custom machined screws to your specifications or can provide cut-to-length screws for your own machining
- 303 stainless steel – other lead screw materials available for application specific requirements

Lead Screw and Nut Assemblies		*Dynamic Load by Nut Type lb [N]*							
Screw Diameter inch [mm]	Lead Range inch [mm]	ZBX	ZBA	ZBM	KHD	WDG	NTB	VHD	BFW
5/64 [2]	0.012-0.079 [0.3-2.00]			1 [4.4]					10 [44]
1/8 [3.2]	0.024-0.125 [0.61-3.18]						5 [22]		25 [111]
0.132 [3.3]	0.020-0.315 [0.50-8.00]						5 [22]		25 [111]
9/64 [3.6]	0.012-0.394 [0.30-10.00]						5 [22]		25 [111]
5/32 [4]	0.033-0.500 [0.84-12.70]						5 [22]		25 [111]
3/16 [5]	0.020-0.050 [0.50-12.70]					10 [44]	5 [22]		25 [111]
7/32 [5.6]	0.024-0.384 [0.61-9.75]					10 [44]	5 [22]		25 [111]
1/4 [6]	0.024-1.000 [0.61-25.4]	5 [22]	5 [22]			10 [44]	10 [44]		50 [222]
5/16 [8]	0.039-0.800 [1.00-20.32]	10 [44]	10 [44]		20 [89]	25 [111]	20 [89]		75 [334]
3/8 [10]	0.025-1.500 [0.64-38.10]	10 [44]	10 [44]		20 [89]	25 [111]	20 [89]		75 [334]
7/16 [11]	0.050-0.615 [1.27-15.62]	15 [67]	15 [67]			75 [334]	30 [133]		90 [400]
1/2 [13]	0.050-2.000 [1.27-50.80]	25 [111]	25 [111]			75 [334]	100 [445]	150 [667]	150 [667]
5/8 [16]	0.100-2.000 [2.54-50.80]	35 [156]	35 [156]				125 [556]	250 [1112]	225 [1001]
3/4 [19]	0.0625-3.622 [1.59-92.00]		55 [245]				150 [667]	350 [1557]	350 [1557]
7/8 [22]	0.200-1.000 [5.08-25.4]		55 [245]				200 [890]	350 [1557]	500 [2224]
15/16 [24]	0.050-3.000 [1.27-76.20]		55 [245]				200 [890]		500 [2224]

Teflon TFE Coatings

When maximum performance is required, Kerkote® and Black Ice® Teflon TFE coatings provide unmatched results in the most demanding applications. The purpose of TFE coating is to supply a more even distribution of lubricant than is normally found when using standard self-lubricating plastics on steel.

Kerkote®	Black Ice®
Lubrication to the nut/screw interface occurs by the nut picking up Kerkote® TFE particles from the soft coating as well as from the migration of the internal lubricant within the plastic nut. The lubricant, although solid, has some "spreading" ability as in fluid lubricants.	Hard coating that remains on the screw. Rather than acting as a dry lubricant, it is an anti-friction coating whose surface properties displace the metal to which it is applied.
• Ideal for most environments (Black Ice recommended for harsh environments) • Soft coating • Dry lubricant • Long term • Maintenance-free • Optimized for softer plastics (acetals/nylons), with or without mechanical reinforcement • Provides maximum level of self-lubrication • Not intended to be used with additional lubricants • Should not be used in environments where oils or other lubricant contamination is possible	• Ideal for harsh environments or if reduced friction and a permanent coating is desired • Hard coating • Long term • Maintenance free • Low friction surface upon which the nut travels • Exceptionally durable with virtually any type of polymer nut • Not intended for use with metal or glass fiber reinforced nuts, although can withstand abrasion from contamination, rigid polymer systems, fluid impingement and wash down applications • Not intended to be used with additional lubricants

Greases

Teflon TFE coatings are intended to be used without additional lubricants. However, there are certain applications where external lubrication may be desired. These include the use of nut materials such as glass reinforced plastic or metal. We offer a selection of greases developed specifically for these applications.

Nut Materials

In addition to the Kerk® self-lubricating acetal nut material, we offer a variety of custom compounded Kerkite® composite polymers, formulated to provide optimum performance in their target conditions and applications.

- High performance materials
- Exceptional wear properties
- Cost and design advantages afforded through injection molding
- Mechanical, thermal and electrical properties; compatible with many chemicals and environmental conditions
- Compounded with lubricants, reinforcements and thermoplastic polymers

We can also roll screws in many materials and produce nuts in alternative plastics. If the material can be molded, machined, ground, or rolled, we can likely process it.

Slide Guided Systems

Available in four different series, each having different capabilities to meet your application needs.

- Motorized, non-motorized and guide only solutions for precise positioning
- Lengths up to 8 ft (2.4 m), except the LRS
- Load capacity range from 15 lbs (67N) to 100 lbs (445 N)
- Wear-compensating, anti-backlash driven carriages available to insure repeatability and accurate positioning
- Engineered polymers for a precise, strong and stable platform on all moving surfaces
- Aluminum rail with wear compensation
- Optional integrated IDEA™ Drive for many rails. When integrated with an IDEA Drive, the system combines hybrid linear actuator technology with a fully programmable, integrated stepper motor drive, improving system integration, while lowering costs, and simplifying product development *(see page 10 for more info)*

Slide Guided Systems								
Series	**Sizes**	**Max Stroke [m]**	**Max Load [N]**	**Motorized**	**Rail Only**	**Guide Only**	**Stiffness**	**Major Attribute**
RGS	4, 6, 8, 10	2.5	67 - 445	X	X	X	*	High Speed
RGW	6, 10	2.5	156 - 445	X	X	X	**	Wide base
WGS	6	2.5	156	X	X		***	Low profile
LRS	4	1	222	X	X		***	Higher thrust

Ball Guided Systems

Many technologies combined into a single integrated system, and designed to position heavy loads. A precision lead screw, driving a carriage mounted upon a precision ball slide, this structure results in the most rigid, smooth operating, and precise slide with excellent roll, pitch, and yaw characteristics.

- Complete solution, eliminates the need for rotary-to-linear conversion providing simplified product development and lower costs
- Motorized with an external hybrid actuator directly coupled to the lead screw
- Load capacity ranges from 22 lbs (100 N) to 225 lbs (1000 N)
- Engineered for both normal and overhanging loads
- Tight accuracy and repeatability, even with significant cantilevered loading
- Wear-compensating anti-backlash driven carriage available
- Screw is coated with Black Ice® TFE coating (see page 8), providing a permanent wear-resistant coating
- Optional integrated IDEA™ Drive. When integrated with an IDEA Drive, the system combines hybrid linear actuator technology with a fully programmable, integrated stepper motor drive, improving system integration, while lowering costs, and simplifying product development *(see page 10 for more info)*

Ball Guided Systems				
Size	**Rail Width [mm]**	**Rail Height [mm]**	**Max Stroke [m]**	**Max Load [N]**
BGS 04	19	31	0.46	100
BGS 06	29	38	0.61	600
BGS 08	41	45	0.76	1000

ScrewRail® Linear Actuators

Our compact ScrewRail® is combined with both drive and support/guidance functions in a single, coaxial component, eliminating the need for external rail-to-screw alignment. Because of this, support and positioning of the ScrewRail® is much less critical than with traditional slide assemblies.

- Simplifies the design, manufacturing and assembly of motion systems
- Saves as much as 80% of the space used by a two-rail system
- Three-dimensional motion from a single ScrewRail®
- Cost savings can be substantial due to lower component costs and reduced labor
- Available in four sizes, with or without wear compensation
- Stroke lengths up to 1.5 meter
- Kerkote® TFE coating and self-lubricating nut ensure long life without maintenance *(see page 7 for more info)*

Spline Shafts and Guide Rails

Deliver high precision, stability, low friction and long life for a variety of linear motion applications at a low cost.

Spline Shafts

- Light to moderate load applications, where low cost, low friction, and long life are desired
- Excellent solution for applications where hex shafts, square shafts and high-cost ball splines are typically used
- Stainless steel spline shaft treated with Kerkote® TFE coating for low friction *(see page 8 for more info)*, mated with a Kerkite® composite polymer bushing
- Anti-rotation spline for one axis motion or a drive mechanism with rotation for two axes of motion
- Maximum twist of 3°/ft (300 mm)
- Bushing supplied with an integral brass collar to facilitate various mounting configurations without nut distortion

Guide Rails

- Light load applications where low cost, minimum frictional drag and long wear life are desired
- Centerless ground and burnished stainless steel shaft mated with a Kerkite® composite polymer bushing
- Material combinations selected for minimal effect on system performance due to thermal fluctuations
- Available in stainless steel or alloy steel
- Optional Kerkote® TFE coating on support shafts *(see page 7 for more info)*

Spline Shafts and Guide Rails

Series	Sizes	Description	Diameter [mm]	Max Stroke [m]	Guide Only	Stiffness	Major Attribute
SS	2, 4, 6, 8, 12	Spline shaft with polymer bushing	3.2 - 19	0.45 - 3	X	****	Low friction, Long life
SZ	2, 4, 6, 8, 12	Spline shaft with polymer bushing	3.2 - 19	0.45 - 3	X	****	Anti-Backlash
GR	4, 6, 8, 12	Guide rod with polymer bushing	6.3 - 19	0.9 - 3	X	****	Low friction, Long life

Stepper Motor Programmable IDEA™ Drives

The IDEA™ family of fully programmable stepper motor controllers uses an intuitive patent-pending Graphic User Interface (GUI), simplifying set up and use in the machine design process.

- RoHS Compliant
- Stand-alone drive unit or integrated directly onto a linear actuator
- Programming done through GUI with easy on-screen buttons
- Automatic population of motor and drive parameters
- Programmable speed, current, accel-decel, current boost, interrupts, and I/O
- Encoder input, stall detection with compensation, and position verification
- USB or RS-485 Communication protocols
- Movement profile plotter
- Interactive program debug feature

Stepper Motor Programmable Drives				
Part Number	**Input Voltage**	**Current Continuous**	**Current Peak**	**Communication**
PCM4806E	12 to 48 VDC	0.6 A rms	+30%	USB
PCM4826E	12 to 48 VDC	2.6 A rms	+30%	USB
ACM4806E	12 to 48 VDC	0.6 A rms	+30%	RS-485
ACM4826E	12 to 48 VDC	2.6 A rms	+30%	RS-485

Stepper Motor Non-Programmable Drives

We offer a range of non-programmable stepper motor drives controlled with step, direction and enable commands. These microstepping chopper drives provide a simple solution for initial developmental and production phases of your project.

- A simple solution for production volumes
- Bipolar constant current technology
- Selectable micro stepping modes
- Ratings up to 80 VDC and 5.5 Arms
- Compact enclosures
- Haydon brand motors will deliver rated performances when controlled by these drivers

Stepper Motor Non-Programmable Drives			
Part Number	**Input Voltage**	**Current Continuous**	**Communication**
DCS4020	12 to 40 VDC	2.0 A rms	Pulse & Direction
DCM4826E	12 to 48 VDC	2.6 A rms	
DCM8027	20 to 80 VDC	2.8 A rms	
DCM8054	20 to 80 VDC	5.5 A rms	

Custom System Solutions

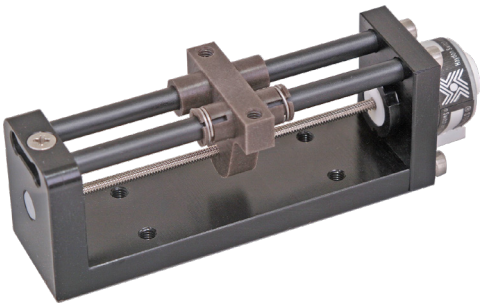
Whether you are in the early proof of concept phase for your project, or the later stages of optimizing for production, we can help. Our design services can eliminate components and lower costs, reduce system noise, or help with other motion control challenges you face.

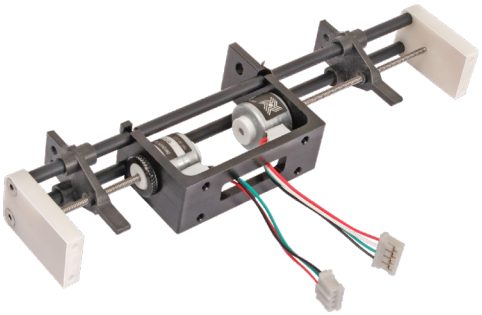
Our in-depth knowledge and experience in diverse motion applications and industries, make us an invaluable resource for your next motion control project.

We serve many markets for motion control solutions including medical equipment, laboratory instrumentation, industrial automation, semiconductor, transportation, and business machines.

Our extensive in-house resources provide:

- Design services for high precision motion systems at any level of sophistication and integration
- Collaboration between customer and our design teams to develop the right solution
- High-end engineering and application expertise with mechanical, electrical, and software engineering teams
- Drive and software development and integration
- Vertical manufacturing enables quick delivery of prototypes using our in-house tool design and fabrication, injection molding, EDM, precision machining, 3D printing, coating, finishing, cabling. wiring, assembly
- Proprietary and patented products and processes – low friction coatings, in-house developed polymers
- Full inspection and testing capabilities – interferometry, vision inspection, environmental, vibration, noise
- Solutions for specific IP or Environmental Protection Rating requirements
- ISO certified and RoHS compliant
- Worldwide technical assistance





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