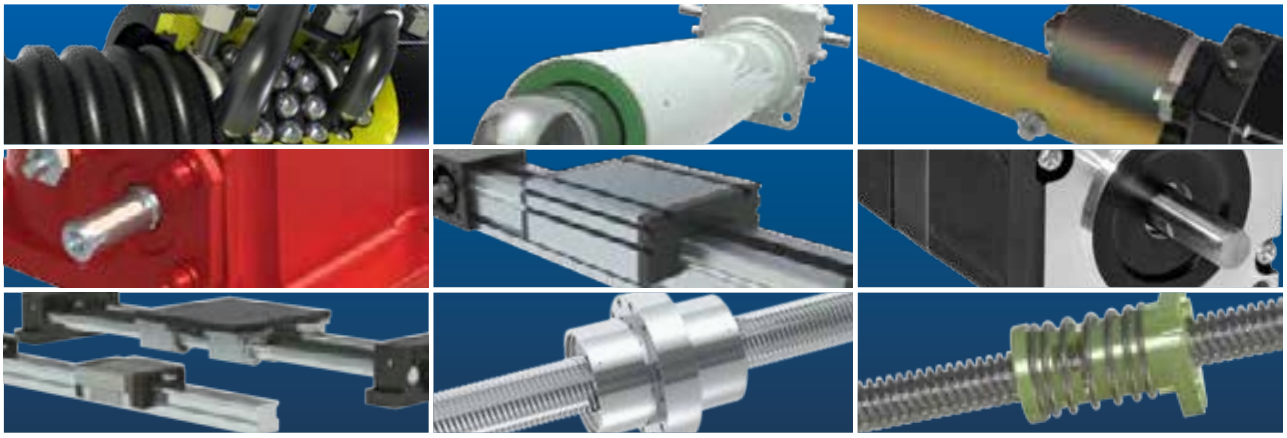
NOOK™



LINEAR MOTION PRODUCTS

acme & ball screws • actuators • linear motion drive components • engineering ingenuity

MAKING MOTION WORK
FASTER SMOOTHER SMARTER

www.nookindustries.com

In 1969, Joseph H. Nook Jr. founded Nook Industries, Inc., intent on becoming a global supplier of Linear Motion products. Ball screws, both rolled and ground, were the cornerstone products in the early '70s, putting Nook Industries on the map as a successful business and a trusted company.

Today, Nook Industries provides a complete line of linear motion products, serving a wide range of industries. As a leading manufacturer of engineered products, our expertise in testing and design, and our continual pursuit of new capabilities and skills create the best possible quality solutions to meet the most stringent customer requirements. This is underscored by the fact that companies around the world depend on the quality products provided by Nook Industries to ensure their success.

Pairing traditional and proven design with the latest technology, Nook Industries manufactures products that customers value. The expansion of product lines and the development of application specific components and engineered systems have propelled Nook Industries to the forefront of the industry.

Nook Industries is committed to customer satisfaction and providing high-quality, high-value products that are delivered on time at a competitive price.

AEROSPACE

AUTOMOTIVE

CHEMICAL

ELECTRONICS

ENTERTAINMENT

FACTORY AUTOMATION

MEDICAL

MILITARY & DEFENSE

PACKAGING

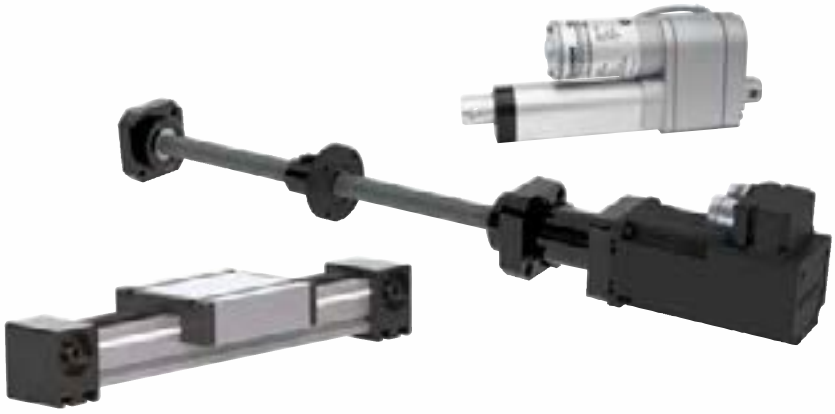
PULP & PAPER

SEMICONDUCTOR

STEEL PRODUCTION

TIRE MANUFACTURING

TRANSPORTATION



PTDA Member

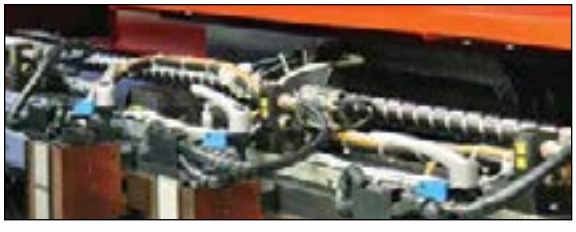
AMT

Certified Bearing Specialist

mca MEMBER

ASSOCIATION FOR HIGH TECHNOLOGY DISTRIBUTION AHTD

10 GOOD REASONS TO TAKE A LOOK AT NOOK FOR YOUR NEXT LINEAR MOTION PROJECT



QUALITY

We provide the quality you expect and deserve. (See page 14-15.)

SERVICE

Our sales teams are factory-trained specialists. From pricing and delivery inquiries, to determining product suitability — we are prepared to answer all your questions and provide excellent service.

VALUE

Nook Industries is committed to offering competitive pricing. Our applications engineers can provide you with options tailored to your budget.

DELIVERY

Need your order in a hurry? Ask about our express delivery. From prototypes to high-volume requirements, we work hard to ensure your parts are delivered on-time.

MADE IN AMERICA

As a veteran-owned company, we are proud that most of our products, including our components, are manufactured and assembled here in Cleveland, Ohio, USA.

VERTICAL INTEGRATION

Our vertically integrated facility allows greater control of all in-house processes from design engineering through shipping.

IN-HOUSE CAPABILITIES & TECHNOLOGY

In-house design/engineering capabilities in conjunction with our state-of-the-art manufacturing technology combines expertise with flexibility to provide you with a solution for your custom application.

VARIETY

We can offer you more than one solution for your requirement.

DESIGN

Our assembly drawings can be downloaded into your files to allow you to check dimensions before you purchase a product. Standard products can be modified to accommodate space constraints and custom envelopes.

INTERACTIVE WEBSITE

Our website provides comprehensive engineering resources such as downloadable 2D/3D drawings, engineering calculators and product specifications as well as the ability to communicate with our technical department at your convenience. (See back cover for more details.)

BALL SCREW PRODUCTS

Nook precision ball screws are available in hundreds of different designs to meet virtually any performance criteria. Ball screws are cataloged by screw thread accuracy: standard rolled, precision rolled and ground. Ball nuts are offered in standard and preloaded designs.

INCH BALL SCREWS

Type	Screw Thread	Material	Lead (in)	Lead Accuracy (in/ft)	Diameter (in)	Max Length (ft)	Max Load (lb)	
							Dynamic	Static
SRT*	**Standard Rolled**	Alloy or Stainless	0.125 to 1.875	±0.004	0.375 to 6.000	24	115,507	443,548
XPR	**Precision Rolled**	Alloy	0.125 to 5.000	±0.001	0.631 to 2.250	12	20,106	108,325
SGT*	**Ground**	Alloy	0.125 to 5.000	±0.0005	0.631 to 2.250	10	20,106	108,325

*Available in twin-lead configurations

METRIC BALL SCREWS

Type	Screw Thread	Material	Lead (mm)	Lead Accuracy (µm)	Class	Diameter (mm)	Max Length (m)	Max Load (kN)	
								Dynamic	Static
MRT	**Standard Rolled**	Alloy or Stainless	5 to 50	±52	T7	16 to 63	6	140	386
PMT	**Precision Rolled**	Alloy	5 to 12	±23	T5, T7	16 to 63	6*	76.9	193
PMBS	**Precision Rolled**	Alloy	2 to 40	±23	T5, T7	10 to 40	6*	62.3	153
	Precision Ground	Alloy	2 to 40	±12	T3	10 to 40	3	62.3	153

*4 m with lead documentation available

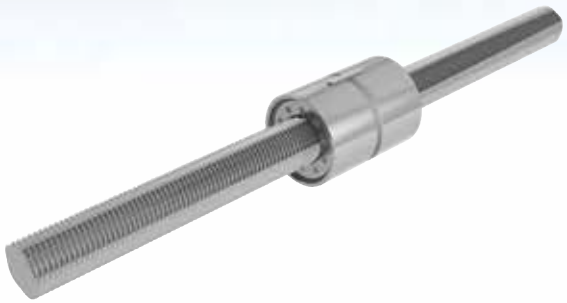
MINIATURE METRIC

For decades, Nook has produced custom small diameter ball screws and nuts for the aerospace and medical industries; these standard metric miniatures are the result of that experience. Available in alloy or stainless steel, small diameter screws provide engineers a globally accepted product for smaller footprint applications where high accuracy, repeatability and durability are prerequisite.

Diameter (mm)	Lead (mm)	Nut Style	Max Length (m)	Max Load (N)	
				Dynamic	Static
6 to 14	1.25 to 3	Keyed or V-Thread	1	5,812	10,340

PLANETARY ROLLER SCREWS

Nook planetary roller screws are used in the most demanding and precise linear motion applications. With a greater number of contact points a roller screw provides stiffness and higher load ratings compared to a ball screw.



Diameter (mm)	Accuracy Class/ Tolerance* (µm)	Lead (mm)	Nut Style	Max Length (mm)	Max Load (kN) Dynamic	Static
8 to 120	G1: ±6 G3: ±12 G5: ±23	2 to 50	One-piece or Split	Consult Factory	960	1,260

*Based on threaded length of 315 mm

END MACHINING

Linear motion applications utilizing a drive screw require high tolerance screw end machining matched with precision bearing mounts. Nook Industries has the complete capability to provide end machining including:

- Precision cut-to-length
- Annealing
- Straightening
- CNC turning and milling
- Grinding
- Assembly
- Inspection
- Specialized material handling and packaging

BEARING SUPPORTS

Bearing mounts must be designed to withstand both the radial and the thrust loads generated by the screw. Precision bearing blocks provide a complete solution for any linear motion application.

- Universal double and single-mount
- Flange single and double mount
- Integrated motor mounts available

WORM GEAR SCREW JACKS

Nook offers a complete line of standard and custom engineered ball screw and machine screw actuators for applications from 1/4 ton up to 100 tons. Actuators can be used individually or in multiple jack arrangements for a larger mechanical system. There are no standard travel lengths — each worm gear screw jack is built to specification. Configurations available include: linear or rotary motion output (upright or inverted), double clevis, keyed (anti-rotation), and anti-backlash.

INCH WORM GEAR SCREW JACKS

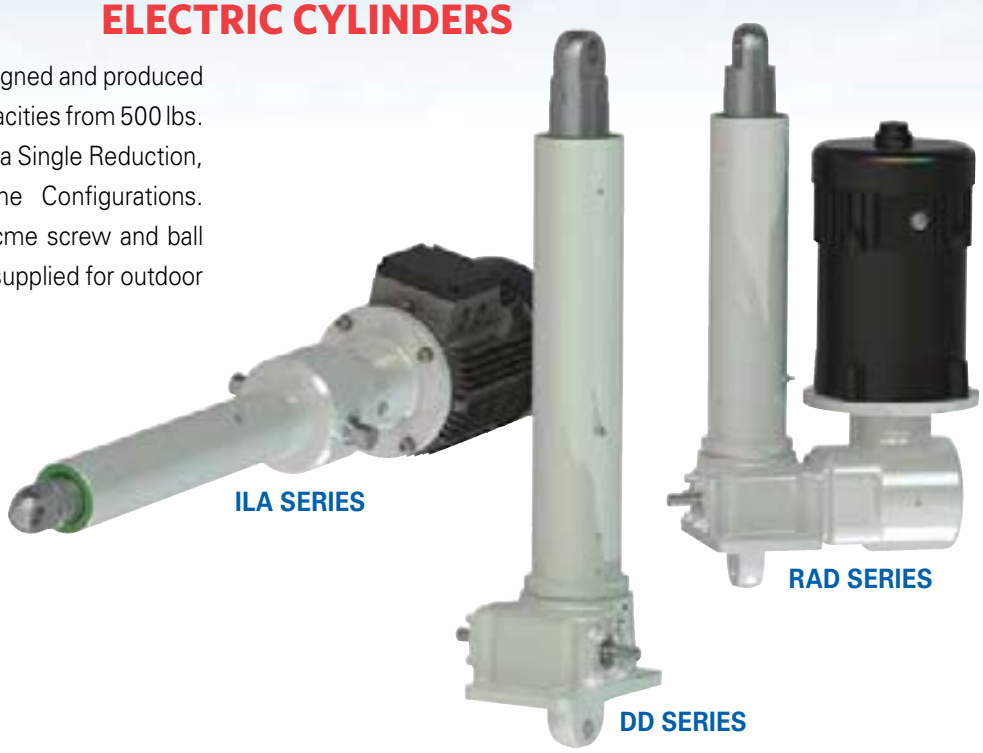
Series	Screw Jack Type	Gear Ratio	Screw Diameter (in)	Lead (in)	Max Input (hp)	Capacity (tons)
BSJ	**Ball Screw**	5:1 to 32:1	5/8 to 4	0.200 to 1.00	1/6 to 32	0.5 to 100
MSJ	**Machine Screw**	5:1 to 32:1	3/4 to 6	0.100 to 0.667	1/8 to 32	1 to 100
SS-MSJ	**Stainless Steel**	6:1 to 32:1	1 to 3-3/4	0.250 to 0.667	1/2 to 11	0.66 to 11.66
C-BSJ	**Cubic**	5:1 to 20:1	5/8 to 3/4	0.100 to 0.500	1/6 to 1/2	0.66 to 11.66
C-MSJ	**Cubic**	5:1 to 20:1	5/8 to 3/4	0.100 to 0.500	1/6 to 1/2	0.66 to 11.66

METRIC WORM GEAR SCREW JACKS

Series	Screw Jack Type	Gear Ratio	Screw Diameter (in)	Lead (in)	Max Input (hp)	Capacity (tons)
EM-BSJ	**Ball Screw**	5:1 to 32:1	16 to 63	5 to 12	0.09 to 3.75	5 to 200
EM-MSJ	**Trapezoidal**	5:1 to 24:1	16 to 65	4 to 12	0.13 to 5.60	5 to 200
EC-BSJ	**Cubic**	5:1 to 20:1	15.7 to 20	4 to 5	0.09 to 0.38	5 to 10
EC-MSJ	**Cubic**	5:1 to 20:1	15.7 to 20	4 to 5	0.09 to 0.38	5 to 10

ELECTRIC CYLINDERS

Electric cylinders are ruggedly designed and produced in standard models with thrust capacities from 500 lbs. to 40,000 lbs. They are supplied in a Single Reduction, Double Reduction, or an In-Line Configurations. Electric Cylinders are driven by acme screw and ball screws. Electric Cylinders can be supplied for outdoor applications.



Type	Motor-Cylinder Configuration	Screw	Motor	Duty Cycle	Thrust Capacity (lb)
DD	Right angle direct drive worm gear driven	Acme or ball screw	AC, DC, Stepper, Servo	25%	500 to 11,000
RAD	Reverse parallel with secondary worm gear reduction	Acme or ball screw	AC, DC, Stepper, Servo	25%	1,000 to 40,000
ILA	Direct coupling in-line motor	Ball screw	AC, DC, Stepper, Servo	Continuous	500 to 21,000

COMMERCIAL SERIES ACTUATORS

Nook offers a comprehensive line-up of actuator products to meet the diverse range of performance, power and package requirements. Whether you need a parallel or in-line configuration, AC or DC operation, intermittent or continuous duty, Nook Industries has the right actuation configuration to meet your design requirements.

SERIES 500™

CC™

∞ INFINITY 1™

Actuator Series	Performance Class	Screw	Motor	Duty Cycle	Max Stroke (in)	Max Load lbs (N)
CC	High-Performance	Ball or Acme	12 - 90 VDC or 110 VAC Stepper	25%	36	1,500 (6,675)
SERIES 500	High-Performance	Ball or Acme	Stepper or Servo	Continuous	24	1,000 (4,450)
INFINITY 1	High-Performance	Roller	Servo	Continuous	60	8,000 (35,600)
VMD3	General Purpose	Acme	12/24 VDC	25%	24	270 (1,200)
ND8 DC	General Purpose	Ball or Acme	12/24 VDC	25%	24	1,573 (7,000)
NIA5 AC	General Purpose	Ball or Acme	115 VAC/60 Hz or 230 VAC/50 Hz	25%	24	1,573 (7,000)

VMD3™

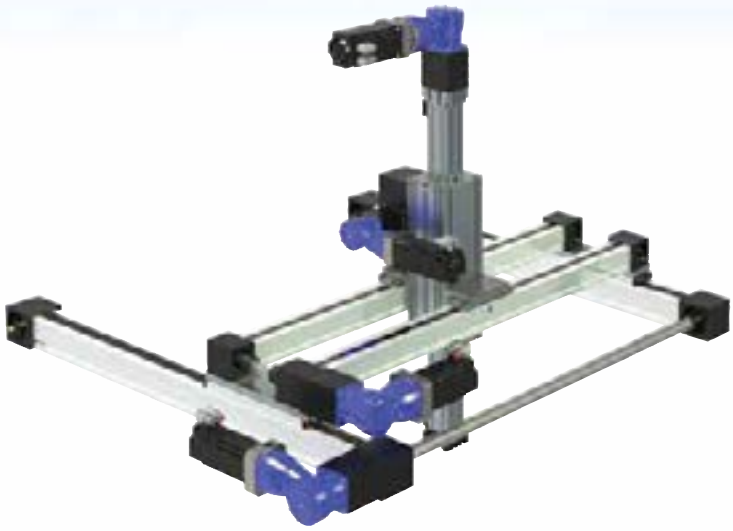
ND8 DC

NIA5 AC

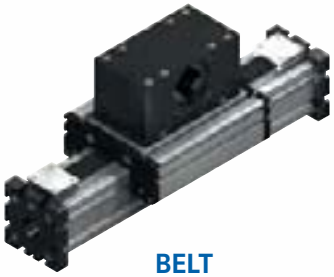
MODULAR ACTUATORS

Nook modular linear actuators are flexible positioning systems made of self-supporting and wear resistant aluminum profiles. Modular linear actuators can be used as a single axis solution or assembled for a multitude of gantry XY and XYZ positioning duties including inspection, pick-and-place, assembly or dispensing applications.

Nook modular linear actuators are fully assembled with either roller bearing, profile rail or V-groove guidance and are driven by a belt, ball screw, acme screw or rack and pinion. Matched non-driven models are available for system guidance requirements. Over 35 models, each with several available sizes, meet the requirements of guidance, load and speed for precision and commercial linear motion applications.



SCREW



BELT

Drive System	Guidance	Max Thrust Load (N)	Repeatability (mm)	Max Length (m)
SCREW	V-Guides, Rollers, Profile Rail	12000	±0.1	3
BELT	V-Guides, Rollers, Profile Rail	10400	±0.1	Unlimited
RACK & PINION	Rollers	2500	±0.2	Unlimited
NON-DRIVEN	V-Guides, Rollers, Profile Rail	—	—	Unlimited

RACK & PINION

NON-DRIVEN

AUTOMATION TECHNOLOGY AND CONTROL

Nook Automation Technology and Control (ATC) products include stepper and optional servo motors, drives, controls and power supplies. Nook ATC helps you size and select these components to suit your design requirements. We can also match them with your Nook screw assembly or actuator, and deliver you a complete integrated motion control solution that meets your application's size, performance and control objectives.

NOOK ATC SAVES TIME AND EFFORT WITH TURNKEY MECHATRONIC SOLUTIONS.

Let us help you early in the design phase of your application. Put our experience and expertise to work for you; our mechanical and electrical engineers can help you create the motion control solution that is right for your application, your budget and your development time line.

Nook ATC provides your company with the level of value-added support that is right for you and your motion control system:

- Assist with sizing and selection of required components and sub-systems including motors, drives, motion controllers, feedback, gear heads, controls, guidance and support to expedite getting your product to market
- Minimize delivery lead times by maintaining key inventories necessary to build your actuation motion control system

NEMA STEP MOTORS

Model	NEMA Size	Max Torque (oz-in)	Rotor Inertia (oz-in^2)
NR17	17	89	0.45
NR23	23	310	2.50
NR34	34	1,400	15.00

STEP DRIVES

Model	Max Input Voltage	Output Current Max (A)
NM-4022	40 VDC	2.2
NM-5042	50 VDC	4.2
NM-7070	70 VDC	7.0
NM-11082-AC	110 VAC	8.2

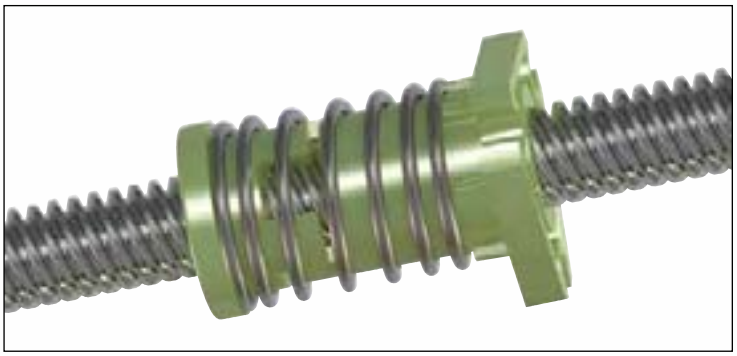
INTEGRATED CLOSED LOOP STEPPER (MOTOR, DRIVE, INDEXER, ENCODER)

Model	NEMA Size	Max Torque (oz-in)	Max Input Voltage	Output Current Max	Encoder
NISS23-20	23	283 oz-in	50 VDC	6 A	1000 line

HELIX LEAD SCREW PRODUCTS

HELIX™ Linear Technologies, a subsidiary of Nook Industries, is the most high-tech lead screw manufacturing facility in the world. With the release of our new precision lead screws, HELIX produces the broadest product line of any lead screw manufacturer globally. We offer a complete line of nuts in standard and anti-backlash designs with centralizing threads to match our precision lead screws. Our lead screw assemblies have the lowest backlash of any nut on the market. With the release of our new NAB and AAB product lines, HELIX has even more economical options in the 1/8" to 1" diameter range. We have also developed additional custom anti-backlash nut designs, which are available upon request.

When you need Acme, Trapezoidal, or Speedy (high lead) lead screws with a precision low backlash nut, or a state-of-the-art anti-backlash design, we deliver the highest quality and exceptional value to our customers.



	Acme & Trapezoidal Alloy	Stainless Steel
SCREW MATERIAL	4140	300 Series
MINIMUM HARDNESS	200 Brinnel	170 Brinnel
TENSILE ULTIMATE STRENGTH	95,000 psi	85,000 psi
FINISH	Black Oxide	Natural

Screw Type	Material	Thread Class	Lead Accuracy	Screw Diameter (in)	Length (in)
ROLLED	**Alloy**	2C or Stub	±0.0003 in/in	1/8 to 6	Unlimited
	Stainless	2C or Stub	±0.0003 in/in	1/8 to 1-1/2	Unlimited
MILLED	**Alloy**	2C or 3C	±0.002 in/ft	1/2 to 3	Up to 96
	Stainless	2C or 3C	±0.002 in/ft	1/2 to 3	Up to 96
GROUND	**Alloy**	3C or 4C	±0.0005 in/ft	1/4 to 4	Up to 120
	Stainless	2C or 3C	±0.0005 in/ft	1/4 to 4	Up to 120

PROFILE RAILS AND GUIDES

Precision profile rail linear guide systems provide stable and efficient linear motion guidance under variable speeds and high load conditions. The profile rail is offered in many sizes as well as caged ball technology.

Drive System	Profile Size (mm)	Max Speed (m/sec)	Preload Opt.	Max Length (m)
NON-CAGED	15 to 65	2	yes	4
CAGED	15 to 55	10	yes	4
MINIATURE	3 to 15	5	yes	1

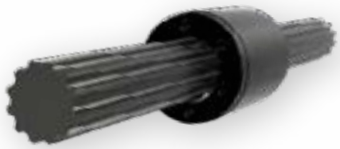
CROSS ROLLER/BALL RAILS AND CROSS ROLLER RAIL ASSEMBLIES

Drive System	Roller/Ball Diameter (mm)	Max Stroke Length (mm)
CROSS ROLLER RAILS	3 to 12	492
CROSS BALL RAILS	3 to 12	496

	Block Width (mm)	Max Stroke Length
CROSS ROLLER RAIL ASSEMBLY	30 to 100	335

BALL SPLINES

Ball splines are convenient and efficient devices that allow friction free linear motion while transmitting torque. Because of their reliability and high efficiency, they are utilized to replace conventional splines. In a ball spline assembly, recirculating bearing balls carry the load between the rotating member (inner race) and the rotating/sliding member (outer race).



Size (in)	Performance	Max Length (ft)	Max Torque (in-lb) Dynamic	Static
0.375 to 2.500	Standard or High-performance	12	27,000	62,250

ROUND RAIL LINEAR SLIDE SYSTEMS

Nook slide systems employ matched components that produce better system performance, are easier to specify and order, and reduce set-up and alignment time.

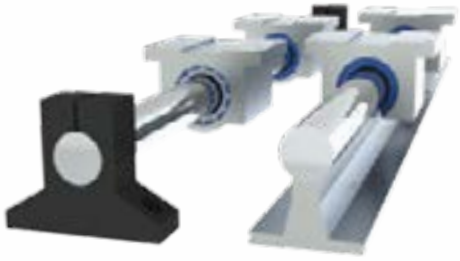
Shaft Diameter	Max Length	Max Load
1/4" to 1-1/2"	6 ft	5,504 lb

COMMON FEATURES INCLUDE:

- Unsupported, end supported or fully supported
- EXCEL™ self-aligning pillow blocks
- HRC 60 ground linear shafting
- Carriage plates (select models)
- With or without acme or ball screw, Imperial or metric
- Motor mounts for driven units

ROUND RAIL LINEAR SHAFTING, SUPPORTS, BEARINGS AND PILLOW BLOCKS

Hardened and ground shafting is manufactured for use with precision linear bearings and other applications requiring an accurate, round hardened shaft or guide rod. All linear shafting can be machined by Nook to any configuration.



Shaft Diameter	Max Length
1/4 to 2"	20 ft
10 to 50 mm	6 m

COMMON FEATURES INCLUDE:

- Solid shell LBB linear bearings
- EXCEL™ self-aligning linear bearings
- HG hardened and ground linear shafting
- Shafting, pillow blocks and complete slide systems

APPLICATION-SPECIFIC CUSTOM ENGINEERED PRODUCTS:

- Specialty materials
- Custom coatings
- Customer-specific testing
- MIL-spec

Nook Industries has the design expertise, manufacturing capability, and the experience to help your special projects from concept to start-up and beyond. Whether you need a simple modification, or an entirely new approach to a problem, contact us early in your design stage. We look forward to working with you.

When you select Nook Industries as your supplier, you are assured that your product will be designed, built and tested to perform to your expectation. Pre-production activity includes understanding your performance, price and delivery requirements. From this, engineering calculations, predictive modeling, prototype development, and form, fit, and function testing verify we meet your design criteria. Once in production, the following inspection and testing procedures insure quality is maintained throughout the process.

VALIDATION AND VERIFICATION

Through many years of rigorous development, Nook Industries has proven its designs and manufacturing processes against the most stringent standards and specifications. Design and process verification and validation tools are employed throughout the product life cycle.

CERTIFICATIONS

Nook Industries, Inc. is certified to ISO-9001-2008 Internationally Recognized Quality System. Nook also serves many customers in the Aerospace and Medical device markets and has complied with those Quality System Requirements as well.

ITAR

Nook Industries is registered with the Department Of State For International Traffic In Arms Compliance.

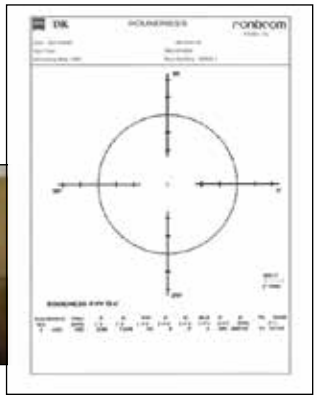
INSPECTION CAPABILITY

LASER LEAD MEASUREMENT

Precise lead error gauging is utilized to validate processes to conform to Nook internal specifications and customer requirements.

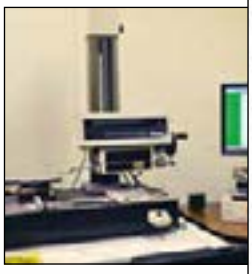
ROUNDNESS MEASUREMENT

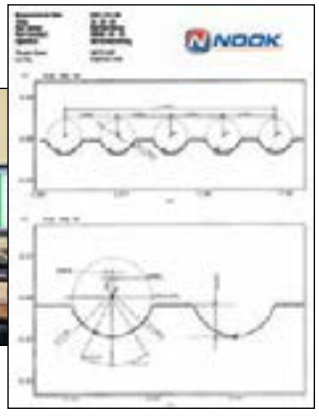
Critical to quality, characteristics such as roundness are monitored throughout the screw manufacturing process.



CONTOUR MEASUREMENT

Prior to the start of any production run, thread form geometry is precisely measured to stringent engineering specifications.





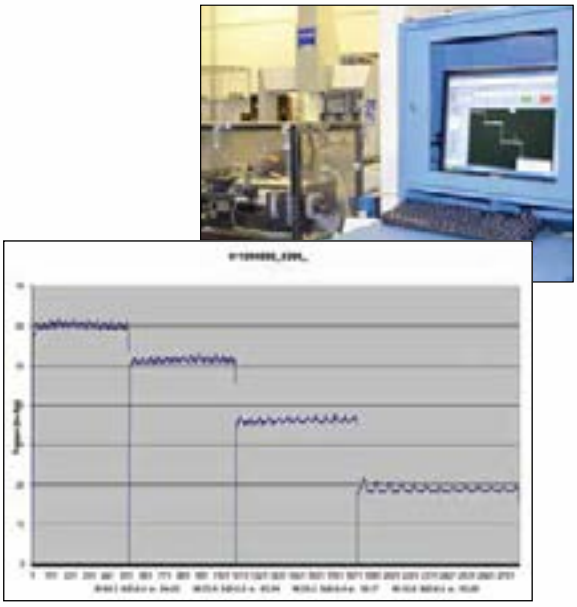
METALLURGICAL LAB

The metallurgical lab is capable of determining material composition from raw materials to final product. Micro-hardness and case depth inspection are routine checks that validate the heat treat process.

TESTING

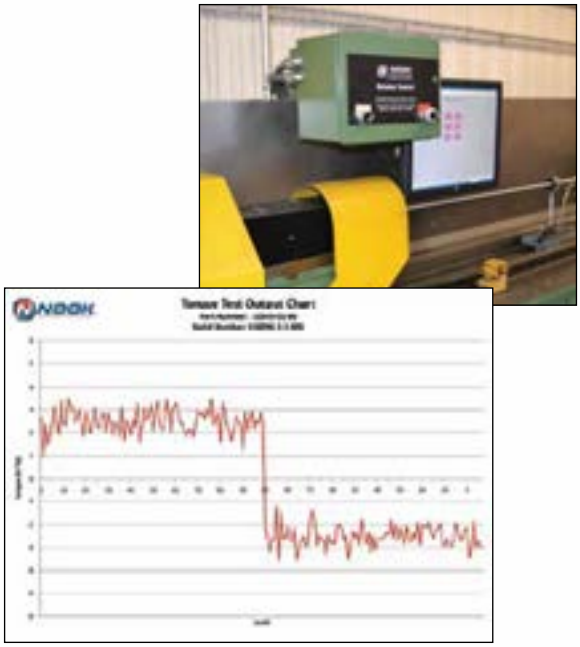
EFFICIENCY MEASUREMENT

Nook Engineering has designed test machines to measure and validate screw assembly efficiency.



Torque Measurement

Preloaded ball screw assemblies are evaluated to determine compliance with engineering specifications utilizing a Dynamic Torque Testing Machine.



FUNCTIONAL TESTING

Our engineered testing processes perform analysis and verification of product life, durability and performance as defined in your Product Launch Process and Assurance Plan.

The engineered testing provides predictive tools, generates data for prognostics, and validates performance wear models. Life tests can also help determine performance under multiple operating conditions. For customers developing new systems, Nook offers proof testing to help accelerate product release dates.

HIGH LOAD MODULAR TEST SYSTEM

40,000 LB LOAD
100" STROKE

CONVERTIBLE TEST SYSTEM

20,000 LB LOAD
100" STROKE

QUALITY TOOLS:

- Design for Six Sigma manufacturing
- D.O.E. (Design of Experiments)
- APQP (Advanced Product Quality Planning)
- DFMEA, PFEMA
- FEA (Finite Element Analysis)
- DVP&R (Design Verification Plan & Report)
- Reliability Testing
- Process validation to 21 CFR Part 82 (Medical Device)

YOUR ON-LINE RESOURCE FOR LINEAR MOTION

www.nookindustries.com

If you are looking for a precision linear motion solution, look to our website for all the design engineering expertise you need at the tip of your finger:

- Extensive product information
- Detailed diagrams and product data
- Engineering calculators
- Installation instruction and manuals
- Detailed application case studies and stories
- Downloadable CAD models and drawings
- Complete model download history so you can retrieve a previously downloaded model
- Fully configurable part numbers with 3D model representation
- Full catalog PDFs
- Online product quoting
- Live chat with customer service and application engineers
- Extensive linear library featuring a wide ranging product information

ACCESS COMPLETE ENGINEERING DATA AND PERFORMANCE SPECS IN OUR PRODUCT DESIGN CATALOGS...

Our comprehensive design engineering catalogs are available for instant access on-line, or contact us to receive a free hardcopy in the mail.

BALL SCREWS, SPLINES AND ROLLER SCREWS

ELECTRIC CYLINDERS AND LINEAR ACTUATORS

WORM GEAR SCREW JACKS

MODULAR LINEAR ACTUATORS

PROFILE RAIL SYSTEMS

LINEAR SLIDES AND GUIDANCE SYSTEMS

NOOK™

4950 East 49th Street | Cleveland, OH 44125-1016 USA | phone: 216.271.7900 | fax: 216.271.7020

800.321.7800 info@nookind.com www.**nookindustries**.com