MARKET SEGMENTS SERVED

- Aerospace
- Packaging
- Automotive
- Electronics
- Transportation
- Tire Manufacture
- Entertainment
- Semiconductor
- Military and Defense
- Factory Automation
- Pulp & Paper
- Steel
- Chemical
- Medical & Diagnostic

NOOK HISTOR Y

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 1970’s, putting Nook Industries on the map as a successful business and a trusted company.

Through the years, Nook Industries has served as a leading manufacturer of engineered products. From the first ball screws to the latest technologies, Nook Industries strives to provide customers with high quality products and engineered solutions.

Companies around the world depend on the quality products provided by Nook Industries to ensure their success. Nook Industries provides a complete line of linear motion products, serving a wide range of market segments.

NOOK MISSION

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.

NOOK PARTNERS

- PTDA Member
- AHD
- AMT
QUALITY

HISTORY

Since 1969, Nook Industries, Inc. has relentlessly and continuously developed the capabilities and skills to deliver products of the highest quality. Knowledge of testing and design, coupled with this experience working with stringent customer requirements in aerospace, medical, energy and military applications has provided the background to be a reliable partner.

HIGH TECH QUALITY EXPERIENCE

When you select Nook Industries as a supplier, you can be assured that your product will be designed and tested to rigorous product planning. Pre-design activity includes understanding of customer requirements applied to predictive models, engineering calculations and linear modeling through prototype development, stereolithography samples of form, fit, and function that verify design criteria.

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.

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

Zeiss Contour Readers - 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. A micro hardness and case depth inspection is a routine check that validates the heat treat process.

QUALITY TOOLS:

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

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

Nook test systems and engineered testing processes perform analysis, verification, and solidification of life, durability, and performance. The functional testing defines operating limits in specifications and helps set defined targets in Product Launch Process and Assurance Plans.

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

QUALITY SYSTEMS AND ACCREDITATIONS

DEVELOPED MANUFACTURING SYSTEMS

SUPPLY CHAIN APPROVAL PROCESS

STATE OF THE ART MANAGEMENT SYSTEMS

SYSTEM AND PROCESS PROTOCOLS

ENGINEERING ANALYSIS AND PREDICTIVE TOOLS

CTQ/KPV ENGINEERING SPECIFICATION PROCESSES

RELIABILITY ENGINEERING AND TESTING

DVPR AND TEST PLANNING

NOOK DESIGNED AND BUILT TEST MACHINES

CUSTOM ENGINEERED AND BUILT TEST INSTRUMENTATION

DESIGN AND TEST FOR FAULT TOLERANCE AND PROGNOSTICS

OVERLOAD/PROOF END OF LINE TESTING

CERTIFICATION TESTING
The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.
nookindustries.com
WORM GEAR SCREW JACKS

INTRODUCTION

JACK MODELS

ActionJac™ Worm Gear Screw Jack systems are ruggedly designed and produced in standard models with load handling capacities from 1/4 ton to 100 tons. They may be used individually or in multiple arrangements. There are no “standard” travel lengths and each Worm Gear Screw Jack is built to specification.

The jack housings are made of ductile iron and proportioned to support the rated capacity of the unit. MJ, 1/4 ton, and 1/2 ton models have aluminum housings. Each ActionJac™ Worm Gear Screw Jack incorporates an alloy steel worm which drives a high strength bronze worm gear (drive sleeve). The worm shaft is supported on antifriction tapered roller bearings with external seals provided to prevent loss of lubrication (sealed radial bearings on the MJ, 1/4, 1/2, and 1 ton units). The drive sleeve is supported on antifriction tapered roller or ball thrust bearings. Rotation of the drive sleeve causes the lifting screw to translate or rotate, depending upon jack configuration.

BALL SCREW JACKS

ActionJac™ Ball Screw Jacks use a ball screw and nut made from hardened alloy steel with hardened bearing balls carrying the load between nut and screw. This rolling action reduces friction between the nut and the screw permitting smooth and efficient movement of the load. Because of the greater efficiency and rolling action, the ball screw can operate at higher speeds or increased duty cycle when compared with the Machine Screw Jack. The addition of a high efficiency ball screw and nut reduces the required input torque to approximately one-third the torque required for the Machine Screw Jack.

STAINLESS STEEL SCREW JACKS

ActionJac™ Stainless Steel Machine Screw Jacks are ideal for use in demanding environments where corrosion resistance is required. All external components are manufactured from 300 Series Stainless Steel materials. These jacks use a stainless steel worm with a high strength bronze drive sleeve. Load capacities for Stainless Steel Machine Screw Jacks range from 1,300 to 23,000 pounds. For increased capacity, a 17-4PH hardened worm is available.

METRIC BALL SCREW JACKS

With over twenty-five years of experience manufacturing precision worm gear screw jacks, Nook Industries has expanded the ActionJac™ offering to include metric models providing design engineers a globally accepted product. All the efficiency advantages that come with ball screw technology are available in ActionJac™ Metric Ball Screw Jacks. A full line of IEC motor mounts are available as well.

MACHINE SCREW JACKS

ActionJac™ Machine Screw Jacks incorporate the use of an Acme Screw with a thread form of 2C. With the use of gear ratios of 20:1 or greater, the jacks can be considered to be self locking. Because the drive sleeve includes the acme thread form, it is possible to have an anti-backlash option.

METRICTRAPEZOIDAL SCREW JACKS

ActionJac™ Trapezoidal Screw Jacks utilize the same rugged design as ActionJac™ Machine Screw Jacks. These true metric jacks include a lift shaft with a special trapezoidal thread form. This thread form has been created to stay within ISO standards yet retains the centralizing feature of our 2C acme threads. These jacks can be supplied with IEC motor mounts.

STAINLESS STEEL SCREW JACKS

ActionJac™ Stainless Steel Machine Screw Jacks are ideal for use in demanding environments where corrosion resistance is required. All external components are manufactured from 300 Series Stainless Steel materials. These jacks use a stainless steel worm with a high strength bronze drive sleeve. Load capacities for Stainless Steel Machine Screw Jacks range from 1,300 to 23,000 pounds. For increased capacity, a 17-4PH hardened worm is available.

CUBIC JACKS

ActionJac™ Cubic Ball Screw and Machine Screw Jacks meet international Cubic Jack versatile mounting standards. Mounting versatility is further increased with the provision for trunnion mounting that is integral to the Cubic Jack housing. Housings are made from high quality, corrosion-resistant aluminum. Cubic Jacks are capable of directly mounting a wide array of motors and gear reducers. Available in true metric and inch execution.

The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. No liability is assumed beyond such replacement.

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**JACK CONFIGURATIONS**

### TRANSLATING JACKS

A translating jack has a lifting shaft that moves through the gear box. A nut is integrated with the worm gear such that the worm gear and nut rotate together. When the lift shaft is held to prevent rotation, the lift shaft will move linearly through the gear box to move the load.

- Upright Translating Ball Screw Jack
- Upright Translating Machine Screw Jack
- Inverted Translating Ball Screw Jack
- Inverted Translating Machine Screw Jack

### ROTATING JACKS

A rotating jack has a lift shaft that moves a nut as it turns. The lift shaft is fixed to the worm gear. This causes the load, which is attached to the travel nut, to move along the lift shaft.

- Upright Rotating Ball Screw Jack
- Upright Rotating Machine Screw Jack
- Inverted Rotating Ball Screw Jack
- Inverted Rotating Machine Screw Jack

The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. Further definitive data will be supplied when request is made. No liability is assumed beyond such replacement.
**JACK CONFIGURATIONS (CONTINUED)**

**DOUBLE CLEVIS JACKS**

Double Clevis Jacks are used when it is necessary to move a load through an arc, such as tracking antennas, hinged doors or air dampers. Machine Screw and Ball Screw Jacks from 1 ton to 15 ton capacities can be supplied with double clevis mounts. One clevis is mounted on the end of the lift shaft and the other clevis is welded to a heavy duty stem cover, which is welded to the housing. Double clevis designs are available with optional accessories such as boots, motor mounts, right-angle reducers, motors, encoders and rotary limit switches.

To check column strength limitations for each application, use the extended pin-to-pin dimension and the column strength chart on pages 30 and 68.

**NOTE:** Mounting hardware for double clevis jacks should be specified as heat treated alloy steel clevis pins with at least 100,000 psi ultimate tensile strength.

Double clevis jacks used horizontally will have reduced column strength and life. For most horizontal applications, Nook recommends the use of an Electric Cylinder (contact Nook Engineering for more information).

**KEYED JACKS**

The lift shaft of a translating style jack must be attached to something which prevents the lift shaft from rotating. If it is not, the lift shaft (and the load) will turn and not translate. A feature can be added to a machine screw jack to prevent lift shaft rotation. This type of jack is referred to as a “keyed jack” and is available in upright and inverted models. A keyed jack has a keyway machined along the length of the lifting screw. A matching key is fastened to the cover of the jack which will eliminate lift shaft rotation. The keyway in the screw causes greater than normal wear on the internal drive sleeve threads, somewhat reducing jack life.

Ball screw jacks can also be supplied with a device that prevents rotation of the lift shaft. Anti-rotation is accomplished by a square guide attached to the screw translating inside a square stem cover attached to the jack. The square stem tube is supplied with lube fittings.

**DOUBLE CLEVIS JACKS**

- Double Clevis Ball Screw Jack
- Double Clevis Machine Screw Jack

**KEYED JACKS**

- Upright Keyed Ball Screw Jack
- Upright Keyed Machine Screw Jack
- Inverted Keyed Ball Screw Jack
- Inverted Keyed Machine Screw Jack

In this solar panel application, the linear motion is provided by a double clevis machine screw jack. In this road barrier application, the linear motion is provided by an inverted keyed machine screw jack.
JACK CONFIGURATIONS (CONTINUED)

ANTI-BACKLASH JACKS

Anti-backlash Machine Screw Jacks are used wherever reversible load conditions require precision positioning control. Adjustable backlash Machine Screw Jack models are available to reduce backlash to approximately 0.003”.

An Anti-backlash Machine Screw Jack allows the lash between the drive sleeve thread and the lifting screw thread to be controlled by adjusting the top cover of the jack. The anti-backlash jack design has an upper drive sleeve and a lower drive sleeve. Adjustment of the cover changes the relative distance between the drive sleeves. This change in distance compensates for any lash. Because the drive sleeve is split, the life of an Anti-backlash Machine Screw Jack will be less.

Anti-backlash Machine Screw Jacks minimize backlash, but should not be used to completely eliminate backlash. While it may be desirable to totally eliminate backlash, the result would be a lock-up of lifting shaft and drive sleeve.

Ball Screw Jacks can be factory adjusted to reduce backlash by selecting bearing ball size in the ball nut. This selective fit technique can be used to achieve a lash between the ball nut and ball screw of 0.003” - 0.006”. Precision ball screws with preloaded ball nuts can be supplied to achieve zero lift shaft backlash.

DEFINITIONS AND TECHNICAL DATA

TRAVEL LENGTH

As a manufacturer of lead screws, Nook Industries stocks a wide selection of inch and metric ball, acme and trapezoid screws in long lengths. Jacks are not preassembled or stocked with standard length screws. Each jack is made to order based on travel length.

Nook Industries has the capability to manufacture long screws for special applications, limited only by the availability of raw materials. Rotating screw jacks may be assembled with a larger diameter lift screw for greater column strength. Jacks can be supplied with special pitch lift screws to change the jack operating speed.

TWIN LEAD SCREWS

Jacks can also be assembled with twin lead screws if required by the application. Contact the engineers at Nook Industries for availability.

TRAVEL VS. INPUT REVOLUTIONS

The number of turns of the worm required to move one inch is a function of the worm gear ratio and the lead of the screw. The charts at the front of each section give the number of "turns of worm for 1" raise" for each jack. The motor rpm divided by this number is the linear speed of the jack lift shaft or travel nut. Conversely, the desired travel rate multiplied by the "turns of worm for 1" raise" equals the input rpm required.

LEAD ACCURACY AND MATCHED LEAD

Lead accuracy is the difference between the actual distance traveled versus the theoretical distance traveled based on lead. For example: A screw with a 0.5 inch lead and ±0.004" per foot lead accuracy rotated 24 times theoretically moves the nut 12 inches. 24 Revolutions × .500 inches per revolution = 12.000 inches of travel. With a Lead accuracy of ±0.004" per foot, actual travel could be from 11.996 to 12.004 inches.

The rolled thread ball screw, as employed in ActionJac™ products, is held within ±0.004" per foot lead error. The rolled acme thread screws used in our machine screw jacks have a typical lead accuracy of ±0.004” per foot.

When multiple jacks are used to move a load with precise synchronicity, lift shafts of similar lead accuracy can be factory selected and supplied as sets. Consult factory for matched lead set tolerances.

INPUT TORQUE

The input torque is the rotary force required at the input of the jack to generate an output force at the lift shaft. The product specification pages show the torque necessary to raise one pound. This number multiplied by the load is the required input torque.

Due to static friction, starting or “breakaway” torque can be as much as two to three times running torque. If the load is moved horizontally, the force required to move the load will be lessened in proportion to the coefficient of friction of the surface along which the load is moved. In addition, the force needed to start, stop and hold the load (inertia loading) is provided by the jack. Jack sizing should consider all these forces. If an application calls for several jacks to be driven together in series, the first jack should be limited to three times the rated Maximum Input Torque, as listed in the Jack Selection chart for the particular selected jack. For multiple high lead ball screw jacks or belt/chain driven jacks contact Nook Industries for
allowable input torque values. Multiple jacks driven in a series may require operation at reduced load.

**TARE DRAG TORQUE**
The gear box components (bearings, seals and grease) in a jack add “tare drag.” The product specification pages show the tare drag torque. When loading ActionJac™ Worm Gear Screw Jacks with loads less than 25% of their rated capacity, tare drag torque needs to be added to the torque requirement.

**INPUT SPEED**
ActionJac™ Worm Gear Screw Jacks are rated for up to 3,000 rpm input speed, provided horsepower and temperature ratings are not exceeded. Contact Nook Industries engineers if higher input speeds are required.

**DUTY CYCLE**
Duty cycle is the ratio of run time to total cycle time. Some of the mechanical energy input to a worm gear screw jack is converted into heat caused by friction. The duty cycle is limited by the ability of the worm gear screw jack to dissipate heat. An increase in temperature can affect the properties of some components resulting in accelerated wear, damage and possible unexpected failure.

Maximum allowable horsepower ratings (see product specification pages) are based on intermittent operation. The approximate allowable duty cycles are: Ball Screw Jacks = 35% Machine Screw Jacks = 25%.

**SELF-LOCKING AND BRAKES**
Self-locking occurs when system efficiencies are low enough that the force on the lifting shaft cannot cause the drive system to reverse direction. Machine Screw Jacks having gear ratios between 20:1 and 32:1, can be considered self-locking. However, vibration, wear, temperature, or lubrication characteristics may cause any worm screw jack to backdrive and should be considered. All other ratios will require a brake to prevent backdriving. All Ball Screw Jacks can backdrive and require some means of holding the load, such as a brake on the motor. The product specification pages show holding torque values. Holding torque requires the amount of input torque required to restrain the load.

In addition to back driving, system inertia usually results in some over travel when the motor is switched off. The inertia of the system should be considered when determining the brake size required to stop a dynamic load.

**TEMPERATURE**
All ActionJac™ Worm Gear Screw Jacks are suitable for operation within the specified limits provided that the housing temperature is not lower than -20°F or higher than +200°F. Factory supplied grease will operate in this range. For higher or lower operating temperature ranges contact Nook Industries.

Housing temperature should be monitored and kept below 200°F maximum. Continuous or heavy duty operation is possible by de-rating the jack capacity, external cooling of the unit or through the use of a recirculating lubrication system.

**DESIGN CONSIDERATIONS**

**TRAVEL STOPS**
Travel stops are not standard. A limit switch and a brake should be used to stop the motor. Mechanical stops can cause damage to the jack because most electric motors will deliver stall torques much higher than their rated torques and motor inertia can cause severe shock loads. For hand operation, mechanical stops can be provided.

**BALL SCREW VS. MACHINE SCREW JACK**
The decision to use a ball screw jack or a machine screw jack is based on the application. For many applications, a ball screw model is the best choice. Ball screw jacks are more efficient and therefore require less power than a machine screw jack in the same application. For low duty cycle applications, for hand-operated applications, or if backdriving is not acceptable consider a machine screw jack.

**ActionJac™ Ball Screw Jacks** are preferred for:
- Long travel lengths
- Long, predictable life
- High duty cycles
- Oscillating motion

**ActionJac™ Machine Screw Jacks** are preferred for:
- Resistance to backdriving
- Vibration environments
- Manual operation
- High static loads

**JACK SIZING CONSIDERATIONS**
Jacks are limited by multiple constraints: load capacity, duty cycle, horsepower, column strength, critical speed, type of guidance, brake, motor size, and ball screw size. To size a screw jack for these constraints, application information must be collected.

**LOAD CAPACITY**
The load capacity of the jack is limited by the physical constraints of its components (drive sleeve, lift shaft, bearings, etc.). All anticipated loads should be within the rated capacity of the jack. Loads on the jack in most applications include: static loads, dynamic or moving loads, cutting forces or other reaction forces and acceleration/ deceleration loads.

For shock loads, the peak load must not exceed the rated capacity of the jack, and an appropriate design factor should be applied that is commensurate with the severity of the shock. For accidental overloads not anticipated in the design of the system, jacks can sustain the following overload conditions without damage: 10% for dynamic loads, 30% for static loads.

**Total Load** - The total load includes static loads, dynamic loads and inertia loads from acceleration and deceleration. Also consider reaction forces from the load such as drilling or cutting forces when using a jack to move a machine tool.

**HORSEPOWER RATINGS**
The horsepower limit of the jack is a result of the ability to dissipate the heat generated from the inefficiencies of its components. Maximum horsepower ratings are based on intermittent operation. Horsepower is calculated by using the following formula:

$$\text{Horsepower} = \frac{\text{Torque to raise one pound} \times \text{Number of pounds to be raised}}{63,025}$$

The product specification pages show the “torque to raise one pound” value for each jack. Add tare drag torque if operating under 25% rated load.

Horsepower values are influenced by many application specific variables including mountng, environment, duty cycle and lubrication. The best way to determine whether performance is within horsepower limits is to measure the jack temperature. The temperature of the housing near the worm must not exceed 200°F.

For multiple jack systems, load distribution should be considered. System stiffness, center of gravity, drive shaft windup and load variation in the lift shafts may result in unequal load distribution. Jacks of varying capacity with equal “turns of worm for 1” travel may be used by being unequally loaded.

Number of Jacks - The number of jacks used depends on physical size and design of the equipment. Stiffness of the equipment structure and guide system will determine the appropriate number of jacks required. Fewer jacks are easier to drive, align and synchronize.

**DUTY CYCLE**
Cycle Time – Total time the jack is operating in one complete cycle.

Duty Cycle – Percentage of time on versus total time.

Verify the duty cycle for the selected jack. Recommended duty cycles at max horsepower are:
- Ball screw jacks = 25% (65% time off)
- Machine screw jacks = 25% (75% time off)

Duty cycle is based on standard ambient temperature, with 1 minute on 2 minute off cycles. The ability of the jack to disperse the heat that builds during operation determines duty cycle. Anything that reduces the amount of heat generated or increases heat dissipation will allow higher duty cycles. Jacks may be limited by maximum temperature (200°F) and not duty cycle. Contact Nook Industries for assistance with these applications.
For multiple jack arrangements, total horsepower required depends on horsepower per jack, number of jacks, the efficiency of the gear boxes) and the efficiency of the arrangement.

**Arrangement efficiency** –
- Two jacks = 95%
- Three jacks = 90%
- Four jacks = 85%
- Six to eight jacks = 80%

The efficiency of each miter gearbox is 90%. Therefore, motor horsepower requirement for the arrangement:

\[
\text{HP per jack} \times \frac{\text{Number of jacks}}{\text{Efficiency}} \times \frac{(\text{Gearboxes})}{(\text{Efficiency})} = \text{HP required}
\]

where N = Number of gearboxes.

Do not exceed the maximum allowable input horsepower for a jack. Many models cannot lift the full rated load at 1,800 rpm.

If the horsepower required exceeds the maximum value for the jack selected, several solutions are possible.
- Use a larger jack model to increase the maximum allowable horsepower.
- Use a Ball Screw Jack to reduce the power required to do the same work.
- Operate at a lower input speed.
- Use a right angle reducer to bring the power requirement within acceptable limits.

When utilizing multiple jack arrangements, the input torque to the first jack must be considered. It is recommended that the number of jacks driven through a single jack input be limited to a maximum of three jacks. Consult Nook Application Engineers for arrangements where more than three jacks will be driven through a single jack input.

**COLUMN STRENGTH**

Column strength is the ability of the lift shaft to hold compressive loads without buckling. With longer screw lengths, column strength can be substantially lower than nominal jack capacity.

If the lift shaft is in tension only, the screw jack travel is limited by the available screw material or by the critical speed of the screw. Since critical speed can also be affected by the shaft straightness and assembly alignment, it is recommended that the maximum speed be limited to 80% of the calculated critical speed.

Because of the nature of most screw jack applications, critical speed is often overlooked. However, with longer travels, critical speed should be a major factor in determining the appropriate size jack. Refer to Nook Industries Precision Screw Assemblies Design Guide to best determine the appropriate critical speed for a particular jack selection.

**Travel Rate** – Establishing a travel rate allows for evaluation of critical speed and horsepower limits. Acceleration/deceleration time needs to be considered when determining maximum required travel rate.

**TYPE OF GUIDANCE**

Linear motion systems require both thrust and guidance. Jacks are designed to provide thrust only and provide insufficient guidance support. The guidance system must be designed to absorb all loads other than thrust. Nook Industries can provide either hardened ground round shafting or square profile rail to support and guide linear motion systems.
A manufacturer of steel frames used in the commercial dairy industry is building a material lift which contains a stack of prefabricated frames. The material lift will index up as each frame is removed by an automated gripper from the top of the stack. The jack will index up 1” in 2 seconds every 30 seconds. After the last frame is removed, the jacks will fully retract to the collapsed position in 6 seconds waiting for the next load of frames. Complete cycle time is 10 minutes running 6 hours per day, 5 days per week. The design calls for a four jack arrangement lifting from underneath the lifting stage, driven by a single motor.

**SPECIFICATIONS**

- When fully loaded with frames the total weight is 16,800 lbs.
- When fully loaded the total load is less than 5,000 lbs.
- The load will be in compression.
- Total travel: 6 inches
- Desired design life is one year.

**ANALYSIS**

**Configuration:** Due to frequent cycles and design life, the use of a ball screw jack would be best suited for this application. Using upright translating jacks will allow the jacks to be located under the material lift and not create any obstruction with the loading and unloading of the prefabricated frames.

**Column Strength:** The jacks will be fully loaded in both the retracted and extended position. Because of the retrofit condition, it is not possible to have a support bearing on the lift shaft. Using mounting condition A on the Column Strength Chart located on page 68 and the manufacturer’s safety requirements, the 10 ton jack was selected.

**Speed and Horsepower:** The extension travel rate of 1” in 2 seconds is 30"/min. The retraction travel rate of 6” in 6 seconds equates to 60"/min. This would require using the 6:1 gear ratio when using a 1750 rpm AC motor during retraction and 720 rpm during extension. Using the horsepower formulas on page 15 the total horsepower need when fully loaded is 3.0 HP with a dual speed 1750/800 AC motor.

\[
\text{HP per jack} = \frac{1,012 \text{ in-lb} \times 4,200 \text{ lb} \times 720 \text{ rpm}}{63,025} = 489 \text{ hp / jack} \\
\]

\[
\text{HP arrangement} = \frac{489 \text{ hp per jack} \times 4 \text{ jacks}}{.85 (\text{Factor of safety})} = 2,87 \text{ total hp} \\
\]

**Line Shafting:** The longest center to center distance between any jack and gearbox is 36 inches, leaving a shaft length of 29 inches. When using the formula on page 193 based on Torsional Twist, the proper Line Shafting to use would be the L-12.

\[
\text{N_torque} = 6192 \times \left( \frac{29}{6} \right) = 4,252 \text{ rpm} \\
\]

**Life:** Based on the indicated cycle rate the total number of cycles over three years is 9,360 cycles. Considering the worst case scenario with the full load to the full extended position, then unloaded for the retraction, the loaded travel inches is just over 56,160 inches. When considering the life expectancy chart on pages 28-29, the 2.5-BSJ-U jack can be used.

**CBIN ARRANGEMENT**

- Desired design life is one year.
- Total travel: 6 inches
- When fully loaded with frames the total weight is 16,800 lbs.

**REFERENCE NUMBER:** From page 69, create reference numbers for the following: four 2.5 ton ball screw jacks, inverted rotating configuration, 6:1 worm gear ration, top plate, 6 inches of travel. One jack to have a 2 circuit limit switch.

- **Jacks:**
  - (3) 2.5-BSJ-U 6:1/SSE-1/SSE-2/FP/6/S
  - (1) 2.5-BSJ-U 6:1CA/36/SSE-2/FP/6/S

- **Gearboxes:**
  - (2) GB210S Type D
  - (1) GB210S Type E

- **Shafting:**
  - (4) LT-12 29” OAL
  - (2) LT-12 14” OAL

- **Coupplings:**
  - (4) P-2200-185 (.1% - .4%)
  - (8) P-2200-178 (.4% - .7%)

- **Motor:**
  - 3 HP AC Motor capable of a dual speed 1750/800

**WORM GEAR SCREW JACKS**

**REFERENCE NUMBER:** From page 69, create reference numbers for the following: four 10 ton machine screws, upright rotating configuration, 24:1 worm gear ratio, 21 inches “L” dimension. One jack to have a 56C motor mount and a 5 HP brake motor, and one jack to have a 2 circuit limit switch.

- **Jacks:**
  - (2) 10-MSJ-UR 24:1/SSE-1/SSE-2/FA21/M
  - (1) 10-MSJ-UR 24:1/SSE-1/50B2/FA21/M
  - (1) 10-MSJ-UR 24:1/SSE-1/2CA/6/FA21/M

- **Motor:**
  - 5 HP AC Motor 1750rpm
**APPLICATION EXAMPLES**

### T ARRANGEMENT

A manufacturer is looking to periodically raise and lower a cylindrical mixer eight inches during the mixing cycle to allow product testing to ensure product quality and consistency. The cylinder weighs 1,700 lbs and is mounting on a movable cart allowing for the final product to be moved to a dispensing station. The customer wants a 4 times safety factor with respect to capacity.

**SPECIFICATIONS**
- Single motor and drive
- The load will be in tension.
- Total travel 8 inches
- 4 times safety factor
- 8 inches in 5 seconds

**ANALYSIS**

**Configuration:** To minimize the size of the motor drive, a Ball Screw jack will be used. Based on the mounting frame, the inverted rotating configurations will be used.

**Column Strength:** The jack will be loaded in tension, therefore column strength does not need to be considered.

**Speed and Horsepower:** Using a standard 1750 AC Motor and the 2.5HL -BSJ with the 12:1 gear ratio, full travel would be reached in 3.5 seconds. Using the horsepower formulas on page 15, a 2 HP AC Motor 1750 rpm and the 2.5-MSJ with 12:1 gear ratio, the travel rate will be .6 inches per second. Using the horsepower formula on page 15, the horsepower limit would be exceeded. Using the 5-MSJ 24:1 gear ratio, the travel rate will be .46 inches per second and the horsepower per jack will be sufficient to lift the load. A 3 HP Motor would be adequate for the requirements.

**Selection Reference Number:** From page 31, create reference numbers for the following: three 2.5 ton ball screw jacks, inverted rotating configuration, 12:1 worm gear ration, 15 inches “L” dimension.

**Jacks:**
- (3) 2.5-BSJ/12:1/SSE-1/SSE-2/FA/S/S/6/S

**Gearboxes:**
- (2) GB210Type D

**Shafting:**
- (2) LJ-8 17” OAL
- (1) LJ-8 12” OAL

**Couplings:**
- (5) P-2200-XX (¾ - ¾)
- (2) P-2200-178 (¾ - ¾)
- (2) GB210 Type D

**Motors:**
- 2 HP AC Motor 1750 rpm

**Analysis:**

- **Configuration:** Because of the possibility to be hand driven, a machine screw jack with 24:1 gear ratio is needed to prevent back driving. Based on the mounting constraints, the upright translating machine screw jack with 24:1 gear ratio is needed to prevent back driving. Due to the length of the feed table, four jacks will be used in-line with a center mounted motor driving. Based on the mounting constraints, the upright translating machine screw jack with a Clevis rod end will be used. Due to the length of the feed table, four jacks will be used in-line with a center mounted motor driving. Due to the length of the feed table, four jacks will be used in-line with a center mounted motor driving. Due to the length of the feed table, four jacks will be used in-line with a center mounted motor driving.

**Specifications:**
- Single motor and drive, with the possibility to remove the motor and drive by hand.
- The load will be in compression.
- Total travel 14 inches
- .25 inches in 1 second

**Analysis:**

- **Configuration:** The feed table length is 24 feet and weighs 5,600 lbs with a maximum height change is 9 inches. The travel rate is .45 inches per second. Using the horsepower formula on page 15, the horsepower per jack will .56 hp / jack.

**Selection Reference Number:** From page 31, create reference numbers for the following: three 2.5 ton ball jacks, upright translating configuration, 12:1 worm gear ration, 15 inches “L” dimension.

**Jacks:**
- (3) 2.5-BSJ/12:1/SSE-1/SSE-2/FA/S/S/6/S

**Gearboxes:**
- (2) GB210Type D

**Shafting:**
- (2) LJ-8 17” OAL
- (1) LJ-8 12” OAL

**Couplings:**
- (5) P-2200-XX (¾ - ¾)
- (2) P-2200-178 (¾ - ¾)

**LinkJacs™ Line Shafting:** The longest center to center distance between the jack and gearbox is 48 inches, leaving a shaft length of 41 inches. Since the motor is located in the middle, only half the total torque is needed for calculated torsional twist. Using the formula on page 193, the proper Line Shafting to use would be the LJ-16.

**Analysis:**

- **Configuration:** The feed table length is 24 feet and weighs 5,600 lbs with a maximum height change is 9 inches. The travel rate is .45 inches per second. Using the horsepower formula on page 15, the horsepower per jack will .56 hp / jack.

**Selection Reference Number:** From page 31, create reference numbers for the following: three 2.5 ton ball jacks, upright translating configuration, 24:1 worm gear ration, 14 inches travel.

**Jacks:**
- (4) 5-MSJ-U 24:1/SSE-1/SSE-2/FC/14/S

**Gearboxes:**
- (1) GB210S Type D

**Shafting:**
- (2) LJ-16 17” OAL
- (1) LJ-16 12” OAL

**Couplings:**
- (8) C-1805-02 (¼ - ¼)

**Motors:**
- 3 HP AC Motor 1750 rpm

---

**Column Strength:** The Jacks will be loaded in compression and in mounting condition D. Based on the load and number of jacks, the 2.5-MSJ jack or larger could be used.

**Speed and Horsepower:** Using a standard 1750 AC motor and the 2.5-MSJ with 12:1 gear ratio, the travel rate will be .6 inches per second. Using the horsepower formula on page 15, the horsepower limit would be exceeded. Using the 5-MSJ 24:1 gear ratio, the travel rate will be .46 inches per second and the horsepower per jack will be sufficient to lift the load. A 3 HP Motor would be adequate for the requirements.

**Motor:**
- (8) C-1805-02 (¼ - ¼)

---

**Reference Numbers:**
- From page 31, create reference numbers for the following: three 2.5 ton ball jacks, inverted rotating configuration, 12:1 worm gear ration, 15 inches “L” dimension.

**Jacks:**
- (3) 2.5-BSJ/12:1/SSE-1/SSE-2/FA/S/S/6/S

**Gearboxes:**
- (2) GB210Type D

**Shafting:**
- (2) LJ-8 17” OAL
- (1) LJ-8 12” OAL

**Couplings:**
- (5) P-2200-XX (¾ - ¾)
- (2) P-2200-178 (¾ - ¾)

**LinkJacs™ Line Shafting:** The longest center to center distance between the jack and gearbox is 24 inches, leaving a shaft length of 19 inches. Since the motor is located in the middle, only half the total torque is needed for calculated torsional twist. Using the formula on page 193, the proper Line Shafting to use would be the LJ-16.

**Analysis:**

- **Configuration:** The feed table length is 24 feet and weighs 5,600 lbs with a maximum height change is 9 inches. The travel rate is .45 inches per second. Using the horsepower formula on page 15, the horsepower per jack will .56 hp / jack.

**Selection Reference Number:** From page 31, create reference numbers for the following: three 2.5 ton ball jacks, upright translating configuration, 24:1 worm gear ration, 14 inches travel.
The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

Nook Industries products are used extensively in the automobile manufacturing industry. ActionJac™ Ball Screw Jacks have been designed to produce rated output forces with a minimum amount of input torque. Ball screw jacks use a worm gear set arrangement with an efficient ball screw and nut that reduces the amount of input torque to approximately one-third the torque required for the Machine Screw Jack.
BALL SCREW JACKS
BALL SCREW TECHNICAL INFORMATION

Nook ball screw jacks are fitted with Nook’s own PowerTrac™ Ball Screws and Nuts.

STRAIGHTNESS - PowerTrac™ Ball Screws are straight within .010 in/foot when shipped from the factory, and do not exceed .030 inch in any 6 foot section.

LIFE - A jack assembly uses rolling elements to carry a load similar to an anti-friction (ball) bearing. These elements do not wear during normal use, but rather fatigue. Therefore, ball screw life is predictable and is determined by calculating the fatigue failure of the components.

Proper lubrication, regular maintenance, and operation within specified limits will allow PowerTrac™ Ball Screws to operate to the predicted life.

BACKLASH - Backlash (lash) is the relative axial movement between a screw and nut without rotation of the screw or nut. The axial movement between a new PowerTrac™ ball nut and screw will range from .003” to .015” depending on size. Lash in ball screws will remain constant during normal use.

SELECTIVE FIT - When less than standard lash (listed above) is desired, ball nuts can be custom-fit to a specific screw with selected bearing balls to minimize lash to .003” to .005” depending on ball size. Select fitting may result in lower life.

LOAD DEFINITIONS

CAPACITY - The maximum thrust load – including shock – that can be applied to the ball nut without damaging the assembly.

OPERATING LOAD - The thrust load in pounds which, when applied to the ball nut and rotating screw assembly, will result in a minimum life of 1,000,000 inches of travel. Metric screw designs are per ISO 3408 and show the load ratings in kilonewtons for 1 million revolutions.

TENSION LOAD - A load that tends to “stretch” the screw. (See Fig. 1)

COMPRESSION LOAD - A load that tends to “squeeze” the screw. (See Fig. 1)

OVERTURNING LOAD - A load that tends to rotate the nut radially around the longitudinal axis of the screw. (See Fig. 2)

SIDE LOAD - A load that is applied radially to the nut. (See Fig. 2)

CAUTION: Although a side load will not prevent the ball screw from operating, the nut is not designed to operate with a side load, such as those generated from pulleys, drive belts, misalignment, etc.

THRUXT LOAD - A load parallel to and concentric with the axis of the screw. (See Fig. 2)

LOAD CAPACITIES

<table>
<thead>
<tr>
<th>Material Surface</th>
<th>Lead Accuracy</th>
<th>Screw Dia</th>
<th>Lengths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alloy black ± .004 in/ft</td>
<td>0.375” to up to 24”</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LIFE

- A load that tends to rotate the nut radially around the longitudinal axis of the screw. (See Fig. 2)

SIDE LOAD

- A load that is applied radially to the nut. (See Fig. 2)

CAUTION: Although a side load will not prevent the ball screw from operating, the nut is not designed to operate with a side load, such as those generated from pulleys, drive belts, misalignment, etc.

THRUXT LOAD

- A load parallel to and concentric with the axis of the screw. (See Fig. 2)

DESIGN CONSIDERATIONS

STANDARD FLANGE ORIENTATION - Standard flange orientation varies with the number of holes in the flange. Unless otherwise specified, a factory-assembled flange will be oriented on the nut as shown. (See Fig. 3)

PROPER BALL NUT ORIENTATION - When a ball screw assembly is used in an orientation other than vertical, it is important to orient the return tubes to optimize ball nut operation. (See Fig. 4)
**NOTES:**

1) The recommended maximum speed is 3,000 rpm provided that the recommended horsepower and temperature are not exceeded.

2) Input torque is shown as torque to lift one pound of load. Starting torque is 50% greater than torque shown. For loads less than 25% of rated loads add tare drag torque. For loads greater than 25% of rated loads add tare drag torque.

3) Maximum (allowable) horsepower ratings are based on a 35% duty cycle at standard ambient temperature, with a minute on 2 minute off cycles. For operation at higher duty cycles or repeated use over any segment of the total travel, temperature must be monitored and remain below 200°F.

4) Overload capacity of the Ball Screw Jack is as follows: 10% for dynamic loads, 30% for static loads.

5) All Ball Screw Jacks can backdrive and require some means of holding the load, such as a brake on the motor. The product specification pages show holding torque values. Holding torque represents the amount of input torque required to restrain the load and does not indicate recommended brake size to bring the dynamic load to a stop.

6) All units are suitable for intermittent operation providing that the housing temperature including ambient is not lower than -20°F or higher than +200°F. Factory supplied grease in standard units will remain serviceable.

7) Accessories such as boots, limit switches, top plates and clevises are available.

8) Catalog dimensions are representative only and are subject to change without notice. For construction, use only certified prints.

9) Measurements listed are for non-keyed jacks. See individual jack pages for keyed jack info.

10) End-of-travel stops are not provided.

11) Tare drag torque need only be added if operating under 25% rated load.

12) Starting Torque is 50% greater than torque shown.

13) Measurements listed for non-keyed jacks. See individual jack pages for keyed jack info.

---

### Table: Ball Screw Jacks Quick Reference

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Capacity (tons)</th>
<th>Lifting Screw Dia (in)</th>
<th>Screw Lead (in)</th>
<th>Root Diameter (in)</th>
<th>Worm for 1&quot; travel</th>
<th>Max Input Torque (lb. ft.)</th>
<th>Max Load @ 1,750 rpm (lb.)</th>
<th>Torque to Raise 1 lb. (in-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5-BSJ</td>
<td>6:1</td>
<td>1/2</td>
<td>.250</td>
<td>.820</td>
<td>24</td>
<td>1,800</td>
<td>4,000</td>
<td>.0043</td>
<td>4</td>
</tr>
<tr>
<td>2.5-BSJ</td>
<td>24:1</td>
<td>1/2</td>
<td>.250</td>
<td>.820</td>
<td>24</td>
<td>1,800</td>
<td>4,000</td>
<td>.0043</td>
<td>4</td>
</tr>
<tr>
<td>3-BSJ</td>
<td>6:1</td>
<td>3/16</td>
<td>.413</td>
<td>.870</td>
<td>14.65</td>
<td>.2</td>
<td>1,260</td>
<td>4,313</td>
<td>.0170</td>
</tr>
<tr>
<td>20:1-BSJ</td>
<td>1/2</td>
<td>.500</td>
<td>100</td>
<td>4.0</td>
<td>1,800</td>
<td>1,000</td>
<td>.0040</td>
<td>1</td>
<td>.25</td>
</tr>
<tr>
<td>5:1-BSJ</td>
<td>100-BSJ</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>50:1-BSJ</td>
<td>50-BSJ</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>10:1-BSJ</td>
<td>10-BSJ</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>1:1-BSJ</td>
<td>1-BSJ</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

---

**HORSEPOWER:**

- **Horsepower per jack =**

  - **Maximum worm speed =**
  - **Torque to raise one pound =**
  - **Number of pounds =**
  - **Number of rpm to be raised =**

**Note:**

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## LIFE EXPECTANCY

**BALL SCREW JACKS**

Nook ball screw jacks are used in the manufacture of airplane components.

### MINIMUM INCHES OF TRAVEL (in. x 10^3)

<table>
<thead>
<tr>
<th>MODEL</th>
<th>OPERATING LOAD (lbs)</th>
<th>UPRIGHT &amp; INVERTED</th>
<th>UPRIGHT &amp; INVERTED ROTATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5-BSJ</td>
<td>0.5HL-BSJ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>750</td>
<td>377</td>
<td>1,478</td>
<td>196</td>
</tr>
<tr>
<td>500</td>
<td>3,041</td>
<td>5,662</td>
<td>3,767</td>
</tr>
<tr>
<td>250</td>
<td>24,111</td>
<td>45,209</td>
<td>56,623</td>
</tr>
<tr>
<td>1,000</td>
<td>708</td>
<td>471</td>
<td>1,095</td>
</tr>
<tr>
<td>1,000</td>
<td>1,066</td>
<td>166</td>
<td>2,524</td>
</tr>
<tr>
<td>1,500</td>
<td>316</td>
<td>4,705</td>
<td>394</td>
</tr>
<tr>
<td>1,000</td>
<td>16,152</td>
<td>1,331</td>
<td>20,190</td>
</tr>
<tr>
<td>500</td>
<td>6,516</td>
<td>129,218</td>
<td>16,648</td>
</tr>
<tr>
<td>2-BSJ</td>
<td>2R-BSJ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4,000</td>
<td>52</td>
<td>86</td>
<td>—</td>
</tr>
<tr>
<td>3,000</td>
<td>124</td>
<td>166</td>
<td>—</td>
</tr>
<tr>
<td>2,000</td>
<td>419</td>
<td>524</td>
<td>—</td>
</tr>
<tr>
<td>1,000</td>
<td>3,351</td>
<td>4,198</td>
<td>—</td>
</tr>
<tr>
<td>5,000</td>
<td>27</td>
<td>34</td>
<td>79</td>
</tr>
<tr>
<td>3,750</td>
<td>64</td>
<td>149</td>
<td>79</td>
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<tr>
<td>2,500</td>
<td>215</td>
<td>268</td>
<td>629</td>
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<tr>
<td>1,250</td>
<td>1,716</td>
<td>4,026</td>
<td>2,145</td>
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<tr>
<td>5-BSJ</td>
<td>5HL-BSJ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10,000</td>
<td>812</td>
<td>107</td>
<td>1,015</td>
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<tr>
<td>5,000</td>
<td>2,765</td>
<td>8,121</td>
<td>1,024</td>
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<tr>
<td>2,500</td>
<td>22,123</td>
<td>64,565</td>
<td>27,653</td>
</tr>
</tbody>
</table>

No data is available for 10-BSJ.
The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. Nook Industries makes no representation or warranty as to the suitability, reliability or accuracy of the data contained herein, or liability in an event that such data is inaccurate.

Column strength is the ability of the lift shaft to hold compressive loads without buckling. With longer screw lengths, column strength may be substantially lower than nominal jack capacity. If the lift shaft is in tension only, the screw jack travel is limited by the available screw material or by the critical speed of the screw. For critical speed limitations, contact Nook Engineering. If there is any possibility for the lift shaft to go into compression, the application should be sized for sufficient column strength.

The chart below is used to determine the required jack size in applications where the lift shaft is loaded in compression. TO USE THIS CHART: Find a point at which the maximum length “L” intersects the maximum load. Be sure the jack selected is above and to the right of that point. CAUTION: chart does not include a design factor.

The chart assumes proper jack alignment with no bending loads on the screw. Effects from side loadings are not included in this chart. Jacks operating horizontally with long lift shafts can experience bending from the weight of the screw.

Nook Industries has the capacity to make long ball screws for special applications. Rotating stocks a wide selection of ball screws. Nook Industries has the capability to make long ball screws for special applications. Rotating stocks a wide selection of ball screws. Nook Industries has the capacity to make long ball screws for special applications. Rotating stocks a wide selection of ball screws.

### AVAILABLE LIFT SCREW LENGTHS

As a major manufacturer of industrial lead screws, Nook Industries stocks a wide selection of ball screws. Nook Industries has the capacity to make long ball screws for special applications. Rotating stocks a wide selection of ball screws. Nook Industries has the capacity to make long ball screws for special applications. Rotating stocks a wide selection of ball screws.

### MOUNTING CONDITIONS

#### A
ONE END FIXED, ONE END FREE

#### B
ONE END, BY CLEVIS, BASE END BY CLEVIS OR TRUNNION PLATE

#### C
ONE END FIXED, ONE END SUPPORTED (CLEVIS ATTACHED TO GUIDE STRUCTURE)

#### D
BOTH ENDS FIXED, TOP PLATE ATTACHED TO GUIDED STRUCTURE

### REFERENCE NUMBER SYSTEM

#### BALL SCREW MODEL

<table>
<thead>
<tr>
<th>BALL SCREW MODEL</th>
<th>2.5-BSJ-U 6:1 / 10BT-1 / 2CA-2C / FT / 24.5 / BS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model #</td>
<td>0.5-BSJ</td>
</tr>
<tr>
<td></td>
<td>0.5HL-BSJ</td>
</tr>
<tr>
<td></td>
<td>1-BSJ</td>
</tr>
<tr>
<td></td>
<td>1HL-BSJ</td>
</tr>
<tr>
<td></td>
<td>2-BSJ</td>
</tr>
<tr>
<td></td>
<td>2HR-BSJ</td>
</tr>
<tr>
<td></td>
<td>2.5-BSJ</td>
</tr>
<tr>
<td></td>
<td>2.5HL-BSJ</td>
</tr>
<tr>
<td></td>
<td>3-BSJ</td>
</tr>
<tr>
<td></td>
<td>5-BSJ</td>
</tr>
</tbody>
</table>

#### HOUSING CONFIGURATION

| F = Standard Flange Base |
| C = Clevis Base |
| T = Trunnion Base |

#### SCREW CONFIGURATION

**TRANSLATING - U AND I MODELS**

| T = Standard Threaded End |
| C = Clevis End |
| P = Top Plate |

**ROTATING - UR AND IR MODELS**

| A = Travel Nut Position “A” |
| B = Travel Nut Position “B” |

**LIFT**

| L-U = Upright Rotating |
| L-I = Inverted Rotating |

### SHAFT ORDER CODE

**SHAFTE**

Refer to product pages for available ratios.

**SHAFT ORDER CODE**

<table>
<thead>
<tr>
<th>SHAFT ORDER CODE</th>
<th>CCW Position 1, 3, 5 &amp; 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>10BT - 1</td>
<td>CCW Position 2, 4, 6 &amp; 8</td>
</tr>
</tbody>
</table>

### MODIFIER LIST

- **E** and/or 
- **B** Optional
- **E** = In-Line Encoder (Motor or motor mount required)
- **B** = Bellows Boots (See page 204-205. Must calculate extend and retract length.)
- **P** = Nook Tube Sensor System PNP
- **N** = Nook Tube Sensor System SPC

### TRAVEL

**FOR TRANSLATING SCREW MODELS (U AND I) USE ACTUAL TRAVEL IN INCHES.**

**FOR ROTATING SCREW MODELS (UR AND IR) USE “L” DIMENSION IN INCHES.**

### ORDER CODES (MUST INCLUDE A POSITION)

**NOTE:** Both Shaft Extensions Must Be Specified

**MODIFIER LIST**

- **S** or **M** Required
- **S** = Standard, no additional description required
- **M** = Modified, additional description required

**NO ACCESSORY**

- **50** = Standard Shaft Extension, Position 1 or 2
- **00** = Delete Shaft Extension, Position 1 or 2
- **SPC** = Special Modified Shaft Extension, Position 1 or 2

**MOTOR MOUNTS WITHOUT MOTOR**

- **Position 1 or 2**
- **Position 1 or 2, 25 to 20 Ton Jacks**
- **See label 180-181 for standard motor mount order codes.**

**MOTOR MOUNTS WITH MOTORS**

- **Position 1 or 2**
- **Position 1 or 2, 25 to 20 Ton Jacks**
- **See label 180-181 for available motors.**

**RIGHT ANGLE REDUCER**

- **Position 1 through 4**
- **Position 1 to 20 Ton Jacks**
- **See labels 182-183 for available Right Angle Reducers.**

**LIMIT SWITCHES**

- **Position 1 or C or E through 8 B or C or E**
- **Position 1 to 20 Ton Jacks**
- **See labels 182-183 for available limit switches.**

### AVAILABLE LIFT SCREW LENGTHS

**inch Ball Screw Jack**

**CAPACITY TO MAKE LONG BALL SCREWS**

**AVAILABLE LIFT SCREW LENGTHS**

- **100-TON**
- **75.0-TON**
- **50.0-TON**
- **30.0-TON**
- **20.0-TON**
- **10.0-TON**
- **5.0-TON**
- **2.0-TON**
- **1.0-TON**

**SUPPORTED ONE END**

- **ONE END FIXED, ONE END SUPPORTED (CLEVIS ATTACHED TO GUIDE STRUCTURE)**

**TRUNNION PLATE**

- **TRUNNION BASE**
- **CLEVIS OR TRUNNION PLATE**

**SUPPORTED ONE END**

- **ONE END FIXED, ONE END SUPPORTED (RADIAL BEARING)**

**ATTACHED TO GUIDED STRUCTURE**

**TOP PLATE ATTACHED TO GUIDED STRUCTURE**

**L” (inches) Inch Ball Screw Jack**
**BALL SCREW JACKS**

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nookindustries.com

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### NOOK PRECISION ACTUATORS

#### BALL SCREW JACKS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Capacity: 0.5 tons</th>
<th>Screw: 0.631-0200</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5-BSJ</td>
<td>5:1</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>20:1</td>
<td>100</td>
</tr>
<tr>
<td>0.5HL-BSJ</td>
<td>5:1</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>20:1</td>
<td>40</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gear Ratio</th>
<th>Turns of Worm for 1” Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Backdrive Holding Torque (ft-lb)</th>
<th>Torque to raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5:1</td>
<td>25</td>
<td>9.5</td>
<td>1/4</td>
<td>1</td>
<td>1</td>
<td>.0095</td>
<td>1,800 rpm</td>
<td>1,000</td>
</tr>
<tr>
<td>20:1</td>
<td>100</td>
<td>4.0</td>
<td>1/4</td>
<td>1</td>
<td>2</td>
<td>.0040</td>
<td>1,800 rpm</td>
<td>1,000</td>
</tr>
<tr>
<td>5:1</td>
<td>10</td>
<td>24.2</td>
<td>1/4</td>
<td>1</td>
<td>1</td>
<td>.0242</td>
<td>868 rpm</td>
<td>496</td>
</tr>
<tr>
<td>20:1</td>
<td>40</td>
<td>10.2</td>
<td>1/4</td>
<td>1</td>
<td>1</td>
<td>.0102</td>
<td>1,030 rpm</td>
<td>588</td>
</tr>
</tbody>
</table>

### NON-KEYED

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Capacity: 0.5 tons</th>
<th>Screw: 0.631-0500</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5-BSJ</td>
<td>5:1</td>
<td>5.0</td>
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<tr>
<td>0.5HL-BSJ</td>
<td>5:1</td>
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</table>

<table>
<thead>
<tr>
<th>Gear Ratio</th>
<th>Turns of Worm for 1” Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Backdrive Holding Torque (ft-lb)</th>
<th>Torque to raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
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<td>5:1</td>
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<td>25</td>
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<td>1</td>
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<td>.0095</td>
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</tr>
<tr>
<td>20:1</td>
<td>2.0</td>
<td>100</td>
<td>1/4</td>
<td>1</td>
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<td>.0040</td>
<td>1,800 rpm</td>
<td>1,000</td>
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</tbody>
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### KEYED

<table>
<thead>
<tr>
<th>MODEL</th>
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<th>Screw: 0.631-0200</th>
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<tbody>
<tr>
<td>0.5-BSJ</td>
<td>5:1</td>
<td>5.0</td>
</tr>
<tr>
<td>0.5HL-BSJ</td>
<td>5:1</td>
<td>2.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gear Ratio</th>
<th>Turns of Worm for 1” Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Backdrive Holding Torque (ft-lb)</th>
<th>Torque to raise 1 lb (in-lb)</th>
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<th>Max Load at 1,750 rpm (lb)</th>
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<td>.0095</td>
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</tr>
<tr>
<td>20:1</td>
<td>2.0</td>
<td>100</td>
<td>1/4</td>
<td>1</td>
<td>2</td>
<td>.0040</td>
<td>1,800 rpm</td>
<td>1,000</td>
</tr>
</tbody>
</table>

Screw Specs:
- Root diameter (in): 0.500
- Start torque = 1.5 x Running Torque
- Approximate weight (lbs)
  - 0” Travel: 3
  - Per inch travel: 0.03
- Grease: 0.3

Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

---

**FOR ORDERING:** Specify “L” dimension L (min) = Travel + 2

---

**2D/3D CAD ONLINE**

---

**NOOK PRECISION ACTUATORS**

---

**BAll SCREW JACKS**
### NOOK PRECISION ACTUATORS

**BALL SCREW JACKS**

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---

### 1-BSJ

**1-BSJ TOP VIEW**

- **1-BSJ UPRIGHT**
- **1-BSJ INVERTED**

### 1-BSJ Specifications

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1” Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Torque (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Backdrive Holding Torque (ft-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-BSJ</td>
<td>5:1</td>
<td>25</td>
<td>19</td>
<td>3</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>20:1</td>
<td>100</td>
<td>9</td>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

**Screw Specs:**
- Root diameter (in): 0.602
- Start torque = 1.5 x Running Torque
- Approximate weight (lbs)
  - “0” Travel: 8
  - Per inch travel: 0.04
  - Grease: 0.5

**Caution:** Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

---

### 1-BSJ Ball Nut and Flange

**1-BSJ-U DOUBLE CLEVIS**

**1-BSJ Ball Nut and Flange**

### 1-BSJ Options

**Top Plate (optional):** 9000-00-11
**Clevis End (optional):** 9001-00-11

---

For more information, please visit nookindustries.com.

---

For specifications and details, please contact Nook Industries directly.
### 1HL-BSJ

<table>
<thead>
<tr>
<th>Model</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Backdrive Holding Torque (ft-lb)</th>
<th>Torque to raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1HL-BSJ</td>
<td>5:1</td>
<td>10</td>
<td>48.2</td>
<td>1/8</td>
<td>3</td>
<td>3.5</td>
<td>.0241</td>
<td>654</td>
<td>747</td>
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<tr>
<td></td>
<td>20:1</td>
<td>20</td>
<td>22.8</td>
<td>1/8</td>
<td>3</td>
<td>1.5</td>
<td>.0114</td>
<td>691</td>
<td>790</td>
</tr>
</tbody>
</table>

**Screw Specs:**
- Root diameter (in): 0.602
- Start torque = 15 x Running Torque
- Approximate weight (lbs)
  - "O" Travel: 8
  - Per inch travel: 0.04
- Greaser: 0.5

**Caution:** Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.
### BALL SCREW JACKS

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#### NOOK PRECISION ACTUATORS

#### BALL SCREW JACKS

**NON-KEYED**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Torque (hp)</th>
<th>Max Input Torque (in-lb)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Backdrive Holding Torque (ft-lb)</th>
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</thead>
<tbody>
<tr>
<td>2-BSJ</td>
<td>6:1</td>
<td>24</td>
<td>40</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12:1</td>
<td>48</td>
<td>26</td>
<td>1½</td>
<td>4</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24:1</td>
<td>96</td>
<td>17</td>
<td>½</td>
<td>4</td>
<td>1</td>
<td></td>
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#### KEYED

<table>
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<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Torque (hp)</th>
<th>Max Input Torque (in-lb)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Backdrive Holding Torque (ft-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-BSJ</td>
<td>6:1</td>
<td>24</td>
<td>40</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
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<td>48</td>
<td>26</td>
<td>1½</td>
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</tr>
<tr>
<td></td>
<td>24:1</td>
<td>96</td>
<td>17</td>
<td>½</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Screw Specs:**  
- Root diameter (in): 0.820  
- Start torque = 1.5 × Running Torque  
- Approximate weight (lbs)  
  - "0" Travel: 18  
  - Per inch travel: 0.6  
- Grease: 0.5

**2-BSJ Ball Nut and Flange**

**2-BSJ Options**  
- Top Plate (optional): 9000-00-01  
- Clevis End (optional): 9001-00-01

**Caution:** Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

---

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**BALL SCREW JACKS**

**NON-KEYED**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Torque (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Backdrive Holding Torque (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2R-BSJ</td>
<td>6:1</td>
<td>24</td>
<td>40</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>12:1</td>
<td>48</td>
<td>26</td>
<td>1½</td>
<td>4</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>24:1</td>
<td>96</td>
<td>17</td>
<td>½</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

**KEYED**

<table>
<thead>
<tr>
<th></th>
<th>Torque to raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
<th>Torque to raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.0100</td>
<td>1,800</td>
<td>4,000</td>
<td>.0100</td>
<td>1,636</td>
<td>3,740</td>
</tr>
<tr>
<td></td>
<td>.0064</td>
<td>1,800</td>
<td>4,000</td>
<td>.0070</td>
<td>1,636</td>
<td>3,740</td>
</tr>
<tr>
<td></td>
<td>.0043</td>
<td>1,800</td>
<td>4,000</td>
<td>.0047</td>
<td>1,636</td>
<td>3,740</td>
</tr>
</tbody>
</table>

**Screw Specs:**
- Root diameter (in): 0.820
- Start torque = 1.5 x Running Torque
- Approximate weight (lbs)
- "0" Travel: 18
- Per inch travel: 0.6
- Gear ratio: 0.5

**Caution:** Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.
### 2.5-BSJ

#### Specifications

- **Gear Ratio**:
  - 6:1
  - 12:1
  - 24:1
- **Turns of Worm for 1" Travel**:
  - 24
  - 48
  - 96
- **Max Allowable Input Torque (in-lb)**:
  - 5
  - 5
  - 5
- **Tare Drag Torque (in-lb)**:
  - 2
  - 2
  - 2
- **Backdrive Holding Torque (ft-lb)**:
  - 4
  - 4
  - 4
- **Torque to raise 1 lb**:
  - 0.102
  - 0.0861
  - 0.042
- **Max Worm Speed at Rated Load (rpm)**:
  - 1,800
  - 1,800
  - 1,500
- **Max Load at 1,750 rpm (lb)**:
  - 5,000
  - 5,000
  - 4,287
- **Capacity**: 2.5 tons
- **Screw**: 1000-0250

#### Notes

- **Screw Specs**:
  - Root diameter (in): 0.820
  - Start torque = 1.5 × Running Torque
  - Approximate weight (lbs)
    - "0" Travel: 17
    - Per inch travel: 0.6
  - Grease: 0.5

- **Caution**: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

---

**2.5-BSJ Options**

- **Top Plate (optional)**: 9000-00-01
- **Clevis End (optional)**: 9001-00-01

---

**2.5-BSJ Ball Nut and Flange**

- **Motor Mount**: see pg. 180-181
- **Limit Switch**: see pg. 196-201
- **Secondary Reducer**: see pg. 182-187

---

**2.5-BSJ Options**

- **Top Plate (optional)**: 9000-00-01
- **Clevis End (optional)**: 9001-00-01

---

**2.5-BSJ Ball Nut and Flange**

- **Motor Mount**: see pg. 180-181
- **Limit Switch**: see pg. 196-201
- **Secondary Reducer**: see pg. 182-187
### NOOK PRECISION ACTUATORS

#### BALL SCREW JACKS

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---

**Model 2.5HL-BSJ**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Torque (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Max Input Torque (in-lb)</th>
<th>Backdrive Holding Torque (ft-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5HL-BSJ</td>
<td>6:1</td>
<td>6</td>
<td>202</td>
<td>2</td>
<td>5</td>
<td>14</td>
<td>Torque to raise 1 lb (in-lb)</td>
</tr>
<tr>
<td>Capacity: 2.5 tons</td>
<td>Screw: 1000-1000</td>
<td>6</td>
<td>202</td>
<td>2</td>
<td>5</td>
<td>14</td>
<td>Max Worm Speed at Rated Load (rpm)</td>
</tr>
<tr>
<td>12:1</td>
<td>12</td>
<td>122</td>
<td>1½</td>
<td>5</td>
<td>6</td>
<td>.0404</td>
<td>624</td>
</tr>
<tr>
<td>24:1</td>
<td>24</td>
<td>85</td>
<td>½</td>
<td>5</td>
<td>5</td>
<td>.0170</td>
<td>371</td>
</tr>
</tbody>
</table>

**Screw Specs:**

- Root diameter (in): 0.820
- Drag torque (in-lb): 5
- Start torque = 1.5 × Running Torque
- Approximate weight (lbs)

   - "0" Travel: 17
   - Per inch travel: 0.6
   - Grease: 0.6

**Caution:** Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

---

**Model 2.5HL-BSJ Double Clevis**

- **Ball Nut and Flange**
- **Options**
  - **Motors and Reducers**
  - **Limit Switches**
  - **Secondary Reducers**

---

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**SB-SJ & SHL-SBJ TOP VIEW**

**5-BSJ & 5-HL-BSJ**

**Model**

<table>
<thead>
<tr>
<th>Gear Ratio</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Backdrive Holding Torque (in-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:1</td>
<td>12.66</td>
<td>183</td>
<td>3</td>
<td>10</td>
</tr>
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<td>24:1</td>
<td>50.66</td>
<td>73</td>
<td>1/4</td>
<td>10</td>
</tr>
</tbody>
</table>

**Screw Specs:**
- Root diameter (in): 1.140
- Start torque = 15 x Running Torque
- Approximate weight (lbs)
  - 0” Travel: 35
  - Per inch travel: 0.6
- Grease: 1

**Screw Options:**
- 1-12 UNF-2A
- 1-12 UNF-2B

**Caution:** Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

**SB-SJ & SHL-SBJ DC DOUBLE CLEVIS**

**5-BSJ & 5-HL-BSJ**

**Model**

<table>
<thead>
<tr>
<th>Gear Ratio</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Backdrive Holding Torque (in-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:1</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>24:1</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

**SB-SJ & SHL-SBJ**

**Model**

<table>
<thead>
<tr>
<th>Gear Ratio</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Backdrive Holding Torque (in-lb)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>10</td>
<td>10</td>
</tr>
<tr>
<td>24:1</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

**Non-Keyed**

<table>
<thead>
<tr>
<th>Capacity (tons)</th>
<th>Torque to raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>.0183</td>
<td>1,033</td>
<td>5,904</td>
</tr>
<tr>
<td>24:1</td>
<td>.0773</td>
<td>547</td>
<td>3,700</td>
</tr>
</tbody>
</table>

**Keyed**

<table>
<thead>
<tr>
<th>Capacity (tons)</th>
<th>Torque to raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>.0201</td>
<td>941</td>
<td>6,375</td>
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<tr>
<td>24:1</td>
<td>.0080</td>
<td>590</td>
<td>3,376</td>
</tr>
</tbody>
</table>

**5-BSJ & SHL-BSJ Options**

- Top Plate (optional): 9000-00-02
- Clevis End (optional): 9001-00-02

**Conveyor Options:**

- Secondary Reducer

**Motor Mount See pg 180-181**

**Limit Switch See pg 196-201**

**Secondary Reducer See pg 182-187**
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**10-BSJ & 10HL-BSJ**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Terms of Warm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input (hp)</th>
<th>Tare Drag Torque (ft-lb)</th>
<th>Backdrive Torque (ft-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-BSJ</td>
<td>8:1</td>
<td>16.88</td>
<td>302</td>
<td>5</td>
<td>20</td>
<td>13</td>
<td>1,043</td>
<td>11,925</td>
</tr>
<tr>
<td>Capacity: 10 tons Screw: 1500-0473</td>
<td>24:1</td>
<td>50.66</td>
<td>153</td>
<td>1½</td>
<td>20</td>
<td>4</td>
<td>618</td>
<td>7,016</td>
</tr>
<tr>
<td>10-BSJ-UR</td>
<td>8:1</td>
<td>8</td>
<td>638</td>
<td>5</td>
<td>20</td>
<td>26</td>
<td>484</td>
<td>5,645</td>
</tr>
<tr>
<td>Capacity: 10 tons Screw: 1500-1000</td>
<td>24:1</td>
<td>24</td>
<td>323</td>
<td>1½</td>
<td>20</td>
<td>6</td>
<td>293</td>
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</table>

**10-HL-BSJ**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Terms of Warm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input (hp)</th>
<th>Tare Drag Torque (ft-lb)</th>
<th>Backdrive Torque (ft-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-BSJ</td>
<td>8:1</td>
<td>16.88</td>
<td>302</td>
<td>5</td>
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<td>13</td>
<td>1,043</td>
<td>11,925</td>
</tr>
<tr>
<td>Capacity: 10 tons Screw: 1500-0473</td>
<td>24:1</td>
<td>50.66</td>
<td>153</td>
<td>1½</td>
<td>20</td>
<td>4</td>
<td>618</td>
<td>7,016</td>
</tr>
<tr>
<td>10-BSJ-UR</td>
<td>8:1</td>
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<td>24</td>
<td>323</td>
<td>1½</td>
<td>20</td>
<td>6</td>
<td>293</td>
<td>3,334</td>
</tr>
</tbody>
</table>

**Non-Keyed**

**Keyed**

**10-BSJ-DC & 10HL-BSJ-DC** DOUBLE CLEVIS

**10-BSJ Ball Nut and Flange**

**10HL-BSJ Ball Nut and Flange**

Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

For specifications and details, this publication is intended to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.
**Ball Screw Jacks**

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---

**Non-Keyed**

<table>
<thead>
<tr>
<th>Model</th>
<th>Gear Ratio</th>
<th>TURNS OF WORM TO 1&quot; TRAVEL</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Hp (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Backdrive Holding Torque (ft-lb)</th>
<th>Torque to Raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-BSJ</td>
<td>8:1</td>
<td>16</td>
<td>626</td>
<td>7 1/2</td>
<td>40</td>
<td>27</td>
<td>0.0157</td>
<td>755</td>
<td>12,040</td>
</tr>
<tr>
<td></td>
<td>24:1</td>
<td>48</td>
<td>314</td>
<td>2 1/2</td>
<td>40</td>
<td>7</td>
<td>0.0079</td>
<td>501</td>
<td>11,397</td>
</tr>
<tr>
<td>20-HL-BSJ</td>
<td>8:1</td>
<td>8</td>
<td>1,253</td>
<td>7 1/2</td>
<td>40</td>
<td>54</td>
<td>0.0313</td>
<td>377</td>
<td>8,629</td>
</tr>
<tr>
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<td>628</td>
<td>2 1/2</td>
<td>40</td>
<td>13</td>
<td>0.0157</td>
<td>251</td>
<td>5,737</td>
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</tbody>
</table>

**Keyed**

<table>
<thead>
<tr>
<th>Model</th>
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<td>40</td>
<td>13</td>
<td>0.0157</td>
<td>251</td>
<td>5,737</td>
</tr>
</tbody>
</table>

---

Screw Specs:
- Root diameter (in): 1.850
- Start torque = 1.5 × Running Torque
- Approximate weight (lbs)
- "0" Travel: 85
- Per inch travel: 1.5
- Grease: 2

Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

---

**20-BSJ & 20HL-BSJ Options**

- **Motor Mount**
  - See pg 180-181
- **Limit Switch**
  - See pg 150-151
- **Secondary Reducer**
  - See pg 104-105

---

For specifications and details, visit our website or contact us directly for more information.
# BALL SCREW JACKS

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---

## NOOK PRECISION ACTUATORS

### BALL SCREW JACKS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Torque (in-lb)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Backdrive Holding Torque (ft-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-BSJ</td>
<td>30HL-BSJ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10:1:1</td>
<td></td>
<td>16.16</td>
<td>989</td>
<td>11</td>
<td>60</td>
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<tr>
<td>Capacity: 30 tons</td>
<td>Screw: 3000-0860</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30HL-BSJ</td>
<td>32:1</td>
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<td>48.48</td>
<td>503</td>
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<td>60</td>
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<tr>
<td>Capacity: 30 tons</td>
<td>Screw: 3000-1500</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### NON-KEYED

<table>
<thead>
<tr>
<th>Torque to raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>.0162</td>
<td>715</td>
<td>24,515</td>
</tr>
<tr>
<td>.0084</td>
<td>438</td>
<td>15,006</td>
</tr>
<tr>
<td>.0367</td>
<td>315</td>
<td>10,794</td>
</tr>
<tr>
<td>.0191</td>
<td>193</td>
<td>6,600</td>
</tr>
<tr>
<td>.0178</td>
<td>649</td>
<td>22,250</td>
</tr>
<tr>
<td>.0092</td>
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<td>13,680</td>
</tr>
<tr>
<td>.0404</td>
<td>286</td>
<td>9,805</td>
</tr>
<tr>
<td>.0210</td>
<td>175</td>
<td>6,000</td>
</tr>
</tbody>
</table>

### KEYED

<table>
<thead>
<tr>
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<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
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<tbody>
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<td>715</td>
<td>24,515</td>
</tr>
<tr>
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<td>438</td>
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</tr>
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<td>.0367</td>
<td>315</td>
<td>10,794</td>
</tr>
<tr>
<td>.0191</td>
<td>193</td>
<td>6,600</td>
</tr>
<tr>
<td>.0178</td>
<td>649</td>
<td>22,250</td>
</tr>
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<td>.0092</td>
<td>399</td>
<td>13,680</td>
</tr>
<tr>
<td>.0404</td>
<td>286</td>
<td>9,805</td>
</tr>
<tr>
<td>.0210</td>
<td>175</td>
<td>6,000</td>
</tr>
</tbody>
</table>

---

Screw Specs:
- Root diameter (in): 2.480
- Start torque: 1.5 x Running Torque
- Approximate weight (lbs)
- 1" Travel: 220
- Per inch travel: 2.4
- Grease: 3.5

Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

---

## 30-BSJ & 30HL-BSJ Options

- 30-BSJ Ball Nut and Flange
- 30HL-BSJ Ball Nut and Flange
- Top Flange (optional): 3000-BF-08
- Clevis Flange (optional): 3001-00-47
- Motor Mounting see pg 161-162
- Load Switch see pg 186-187

---

For specifications and data, see our publication entitled "The World of Nook." However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.
### Specifications:

<table>
<thead>
<tr>
<th>Model</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
<th>Torque to Raise 1 lb (in-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-BSJ</td>
<td>10 1:1</td>
<td>10.66</td>
<td>2,560</td>
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<td>90</td>
<td>0.0256</td>
<td>22,509</td>
<td>.0281</td>
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<td>32</td>
<td>1,390</td>
<td>5</td>
<td>90</td>
<td>0.0139</td>
<td>12,955</td>
<td>.0152</td>
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</tbody>
</table>

### Notes:
- Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

---

**Ball Nut and Flange**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ball Nut &amp; Flange</td>
<td>NOOK-BSJ-16</td>
</tr>
<tr>
<td>Gear Box Replacement</td>
<td>9001-00-05</td>
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</tbody>
</table>

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**Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Plate (Optional)</td>
<td>9000-00-09</td>
</tr>
<tr>
<td>Clevis End (Optional)</td>
<td>9001-00-09</td>
</tr>
</tbody>
</table>

---

**Limit Switch**

See pg 196-201
**75-BSJ**

**Top View**

**75-BSJ-U Upright**

**75-BSJ-I Inverted**

**75-BSJ-U Upright Rotating**

**75-BSJ-I Inverted Rotating**

**75-BSJ-UK Upright Keyed**

**75-BSJ-IR Inverted Keyed**

---

### Table: Specifications

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Torque (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Backdrive Holding Torque (ft-lb)</th>
<th>Torque to Raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
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<th>Torque to Raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>75-BSJ</td>
<td>10 1⁄2:1</td>
<td>10.66</td>
<td>3,660</td>
<td>28</td>
<td>155</td>
<td>110</td>
<td>.0244</td>
<td>482</td>
<td>41,326</td>
<td>.0268</td>
<td>439</td>
<td>37,627</td>
</tr>
<tr>
<td></td>
<td>32:1</td>
<td>32</td>
<td>1,680</td>
<td>9</td>
<td>155</td>
<td>25</td>
<td>.0112</td>
<td>338</td>
<td>28,970</td>
<td>.0123</td>
<td>307</td>
<td>26,352</td>
</tr>
</tbody>
</table>

**Screw Spacing:**
- Root diameter (in): 3.250
- Start torque = 1.5 x Running Torque
- Approximate weight (lbs)
  - "O" Travel: 650
  - Per inch travel: 5.0
- Gear: 9.0

**Caution:** Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

---

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## Ball Screw Jacks

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### Ball Screw Jacks

#### Specifications and Data

<table>
<thead>
<tr>
<th>Model</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Torque (in-lb)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Backdrive Holding Torque (ft-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-BSJ</td>
<td>10:1:1</td>
<td>10.66</td>
<td>4,880</td>
<td>32</td>
<td>205</td>
<td>152</td>
</tr>
<tr>
<td>100-BSJ</td>
<td>32:1</td>
<td>32</td>
<td>2,760</td>
<td>12½</td>
<td>205</td>
<td>25</td>
</tr>
</tbody>
</table>

**Screw Specs:**
- Root diameter (in): 3.338
- Start torque = 1.5 x Running Torque
- Approximate weight (lbs): 100/1,000
- Per inch travel: 5.0
- Grease: 16.0

**Caution:** Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

### Non-Keyed

<table>
<thead>
<tr>
<th>Model</th>
<th>Torque to Raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-BSJ</td>
<td>0.0244</td>
<td>413</td>
<td>42,232</td>
</tr>
<tr>
<td>100-BSJ</td>
<td>0.0138</td>
<td>285</td>
<td>32,621</td>
</tr>
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<table>
<thead>
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</tr>
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<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

### 100-BSJ Ball Nut and Flange

- Flange (optional): 9000-00-19
- Clevis End (optional): 9001-00-19
- Limit Switch: see pg 196-201

### 100-BSJ Options

- Top Plate (optional): 9000-00-19
- Keyway: 1 × 2
- Keyway: 1 × 3
- Keyway: 1 × 4

---

**Clockwise rotation raises load:**

**L:**
- Dimensions: 1 × 3
- Keyway: 1 × 4
- Keyway: 1 × 2

---

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MACHINE SCREW JACKS

The worm gear driven Machine Screw Jack incorporates an alloy steel worm which drives a high strength bronze worm gear (drive sleeve). The worm shaft is supported on anti-friction tapered roller bearings with external seals provided to prevent loss of lubrication*. Rotation of the drive sleeve causes the acme thread lifting screw to translate or rotate, depending upon jack configuration.

The jack housing is made of ductile iron** and proportioned to support the rated capacity of the unit. The lifting screw is made of alloy steel with a minimum tensile strength of 95,000 psi. The threads are precision formed, typically using Class 2-C (Centralizing) tolerances. Jack lift shaft lead tolerance is approximately ±0.004” per foot.

* sealed radial bearings on the MJ and 1 ton units
** MJ models have aluminum housings, aluminum optional on one ton models

BACKLASH - Backlash (lash) is the relative axial movement between a screw and nut without rotation of the screw or nut. The axial movement between a new PowerAc™ acme nut and screw will range from .003” to .015” depending on size. Lash in ball screws will remain constant during normal use.

LOAD DEFINITIONS

CAPACITY - The maximum thrust load – including shock – that can be applied to the nut without damaging the assembly.

TENSION LOAD - A load that tends to “stretch” the screw. (See FIG. 1)

COMPRESSION LOAD - A load that tends to “squeeze” the screw. (See FIG. 1)

OVERTURNING LOAD - A load that tends to rotate the nut radially around the longitudinal axis of the screw. (See FIG. 2)

SIDE LOAD - A load that is applied radially to the nut. (See FIG. 2)

CAUTION - Although a side load will not prevent the lead screw from operating, the nut is not designed to operate with a side load, such as those generated from pulleys, drive belts, misalignment, etc.

THRUST LOAD - A load parallel to and concentric with the axis of the screw. (See FIG. 2)

STRAIGHTNESS - PowerAc™ Acme Lead Screws are straight within .010 inch/foot when shipped from the factory, and do not exceed .030 inch in any 6 foot section.

MACHINE SCREW JACKS
ACME SCREW TECHNICAL INFORMATION

The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. Noor Industries reserves the right to make changes at any time without notice. All specifications subject to change and are intended as general guidelines only.

**TABLE 1:**

<table>
<thead>
<tr>
<th>Material</th>
<th>Lead Surface</th>
<th>Accuracy</th>
<th>Screw Dia.</th>
<th>Screw Lengths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alloy black</td>
<td>± .0003”/” up to 1½” dia.</td>
<td>Limited only by material availability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stainless steel</td>
<td>± .0003”/” up to 1½” dia.</td>
<td>Limited only by material availability</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**FIG. 1**

Compression Load

**FIG. 2**

Tension Load

Nook Machine Screw Jacks are used in large material transfer applications.
# Machine Screw Jacks

The specifications and data in this publication are believed to be accurate and reliable. However, changes in design or manufacture may take place without notice. The information contained herein is subject to change without notice. For construction, use only certified prints.

1) The recommended maximum speed is 1,800 rpm provided that the recommended horsepower and temperature are not exceeded.

2) Input torque is shown as torque to lift one pound of load. Starting Torque is 100% greater than shown. For loads less than 25% of rated loads add tare drag torque.

3) Maximum allowable horsepower ratings are based on a 25% duty cycle at standard ambient temperature, with 1 minute on 3 minute off cycles. For operation at higher duty cycles or repeated use over any segment of the total travel, temperature must be monitored and remain below 100°F.

4) Overload capacity of the Machine Screw Jack is as follows: 10% for dynamic loads, 30% for static loads.

5) Machine Screw Jacks having gear ratios between 20:1 and 32:1 are self-locking and will hold loads without backdriving in the backdriving.

6) Machine Screw Jacks having gear ratios between 20:1 and 32:1 are self-locking and will hold loads without backdriving in the backdriving.

7) All units are suitable for intermittent operation providing that the housing temperature including ambient is not lower than -20°F or lower than ambient temperature.

8) These jacks can be supplied with handwheels and counters (see ActionJac™ accessories section) to provide immediate positional feedback to an operator. ActionJac™ Numeric Ratio Anti-backlash Machine Screw Jacks retain all the performance characteristics of standard machine screw jacks.

9) NUMERIC RATIO JACKS

10) In operation, the maximum allowable horsepower rating should be used as the basis for determining the maximum allowable horsepower rating.

11) Tare drag torque need only be added if operating under 25% of rated load.

12) Starting Torque is 100% greater than torque shown.

13) Measurements listed are for non-keyed jacks. See individual jack pages for keyed jack info.

## Machine Screw Jacks

### Quick Reference

#### Machine Screw Jacks

<table>
<thead>
<tr>
<th>Model</th>
<th>Gear Ratio</th>
<th>Capacity (tons)</th>
<th>Lift Ring Screw Dia (in)</th>
<th>Screw Lead (in)</th>
<th>Root Dia (in)</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Input (rpm)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
<th>Torque to Raise 1 lb (in-lb)</th>
<th>Tare Drag Torque (in-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-MSJ</td>
<td>20:1 1/2</td>
<td>1/16</td>
<td>0.625</td>
<td>0.250</td>
<td>0.200</td>
<td>0.45</td>
<td>836</td>
<td>157</td>
<td>6.25</td>
<td>100</td>
<td>7.1</td>
<td>3.7</td>
</tr>
<tr>
<td>2-MSJ</td>
<td>20:1 1/2</td>
<td>1/16</td>
<td>0.625</td>
<td>0.250</td>
<td>0.200</td>
<td>0.45</td>
<td>836</td>
<td>157</td>
<td>6.25</td>
<td>100</td>
<td>7.1</td>
<td>3.7</td>
</tr>
<tr>
<td>3-MSJ</td>
<td>20:1 1/2</td>
<td>1/16</td>
<td>0.625</td>
<td>0.250</td>
<td>0.200</td>
<td>0.45</td>
<td>836</td>
<td>157</td>
<td>6.25</td>
<td>100</td>
<td>7.1</td>
<td>3.7</td>
</tr>
<tr>
<td>4-MSJ</td>
<td>20:1 1/2</td>
<td>1/16</td>
<td>0.625</td>
<td>0.250</td>
<td>0.200</td>
<td>0.45</td>
<td>836</td>
<td>157</td>
<td>6.25</td>
<td>100</td>
<td>7.1</td>
<td>3.7</td>
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</table>

### Quick Reference

#### Mini Jacks

<table>
<thead>
<tr>
<th>Model</th>
<th>Gear Ratio</th>
<th>Capacity (tons)</th>
<th>Lift Ring Screw Dia (in)</th>
<th>Screw Lead (in)</th>
<th>Root Dia (in)</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Input (rpm)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
<th>Torque to Raise 1 lb (in-lb)</th>
<th>Tare Drag Torque (in-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MJAB-100</td>
<td>20:1 1/8</td>
<td>0.600</td>
<td>0.375</td>
<td>0.250</td>
<td>0.200</td>
<td>0.45</td>
<td>836</td>
<td>157</td>
<td>6.25</td>
<td>100</td>
<td>7.1</td>
<td>3.7</td>
</tr>
<tr>
<td>1-AB-MJ</td>
<td>20:1 1/8</td>
<td>0.600</td>
<td>0.375</td>
<td>0.250</td>
<td>0.200</td>
<td>0.45</td>
<td>836</td>
<td>157</td>
<td>6.25</td>
<td>100</td>
<td>7.1</td>
<td>3.7</td>
</tr>
<tr>
<td>2-AB-MJ</td>
<td>20:1 1/8</td>
<td>0.600</td>
<td>0.375</td>
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<td>0.200</td>
<td>0.45</td>
<td>836</td>
<td>157</td>
<td>6.25</td>
<td>100</td>
<td>7.1</td>
<td>3.7</td>
</tr>
<tr>
<td>3-AB-MJ</td>
<td>20:1 1/8</td>
<td>0.600</td>
<td>0.375</td>
<td>0.250</td>
<td>0.200</td>
<td>0.45</td>
<td>836</td>
<td>157</td>
<td>6.25</td>
<td>100</td>
<td>7.1</td>
<td>3.7</td>
</tr>
<tr>
<td>4-AB-MJ</td>
<td>20:1 1/8</td>
<td>0.600</td>
<td>0.375</td>
<td>0.250</td>
<td>0.200</td>
<td>0.45</td>
<td>836</td>
<td>157</td>
<td>6.25</td>
<td>100</td>
<td>7.1</td>
<td>3.7</td>
</tr>
</tbody>
</table>

### Notes (Cont'd)

7) Accessories such as boots, limit switches, top plates and clevises are available.

8) Units are not to be used as personal support or movement.

10) End-of-travel stops are not provided.

11) Tare drag torque need only be added if operating under 25% rated load.
COLUMN STRENGTH
MACHINE SCREW JACKS

Column strength is the ability of the lift shaft to hold compressive loads without buckling. With longer screw lengths, column strength may be substantially lower than nominal jack capacity.

If the lift shaft is in tension only, the screw jack travel is limited by the available screw material or by the critical speed of the screw.

If there is any possibility for the lift shaft to go into compression, the operating horizontality with long lift shafts can experience bending from the weight of the screw.

To use this chart:
Find a point at which the maximum length “L” intersects the maximum load. Be sure the jack selected is above and to the right of that point.

CAUTION: Chart does not include a design factor.

The chart assumes proper jack alignment with no bending loads on the screw. Effects from side loading are not included in this chart.

Jacks operating horizontally with long lift shafts can experience bending from the weight of the screw.

The chart below is used to determine the required jack size in applications where the lift shaft is loaded in compression. The chart assumes proper jack alignment with no bending loads on the screw. Effects from side loading are not included in this chart.

If the lift shaft is in tension only, the screw jack travel is limited by the available screw material or by the critical speed of the screw. Refer to the acme screw technical section for critical speed limitations. If available screw material or by the critical speed of the screw. Refer to the acme screw technical section for critical speed limitations.

LOAD CAPACITY (lbs.)

As a major manufacturer of industrial lead screws, Nook Industries stocks a wide selection of some screws. Nook Industries has the capacity to make long acme screws for special applications. Rotating screw jacks can be built with a larger diameter lift screw for greater column strength, or a different lead to change the jack operating speed.

The chart below is used to determine the required jack size in applications where the lift shaft is loaded in compression. The chart assumes proper jack alignment with no bending loads on the screw. Effects from side loading are not included in this chart.

If the lift shaft is in tension only, the screw jack travel is limited by the available screw material or by the critical speed of the screw. Refer to the acme screw technical section for critical speed limitations. If available screw material or by the critical speed of the screw. Refer to the acme screw technical section for critical speed limitations.

REFERENCE NUMBER SYSTEM
MACHINE SCREW JACKS

MACHINE SCREW MODEL

Model #  Model #  Model #
MJ-20  2AB-MSJ  20-MSJ
MJ-25  2RB-MSJ  25-MSJ
MJ-30  2SB-MSJ  30-MSJ
MJ-40  2HB-MSJ  40-MSJ
MJ-50  2SB-MSJ  50-MSJ
MJ-60  2SB-MSJ  60-MSJ
MJ-80  2SB-MSJ  80-MSJ
MJ-100  2AB-MSJ  100-MSJ
MJ-150  2AB-MSJ  150-MSJ
MJ-200  2AB-MSJ  200-MSJ
1-MSJ  10AB-MSJ  10-MSJ
2-MSJ  15AB-MSJ  2-MSJ
3-MSJ  20AB-MSJ  3-MSJ
7-MSJ  25AB-MSJ  7-MSJ
20-MSJ  30AB-MSJ  20-MSJ
75-MSJ  35AB-MSJ  75-MSJ
75-MSJ  40AB-MSJ  75-MSJ
100-MSJ  50AB-MSJ  100-MSJ
100-MSJ  75AB-MSJ  100-MSJ

HOUSING CONFIGURATION

U = Upright
B = Bellows Boots (See page 204-205. Must calculate extend and retract length.)
CCW Position 1, 3, 5 & 7
C = Clevis End
CCW Position 1, 3, 5 & 7
A = Travel Nut Position “A”
CCW Position 1, 3, 5 & 7
I = Inverted
CCW Position 1, 3, 5 & 7
C + Clevis Base
CCW Position 1, 3, 5 & 7

Screw Configuration

TRANSLATING - U or I MODELS
T = Standard Threaded End
C + Clevis End
IK = Inverted Keyed
C Clevis End
IK = Inverted Keyed
C Clevis End

Right Angle Reducers (Position 1 through 8)

P = Top Plate
E = In-Line Encoder (Motor or motor mount required)
P = Top Plate
B = Bellows Boots (See page 204-205. Must calculate extend and retract length.)
S = Standard. no additional description required
U = Upright
C = Clevis End
I = Inverted
UR = Upright Rotating
C = Clevis End
IR = Inverted Rotating
C = Clevis End

Shaft Order Code

10BT  - 1

CCW Position 1, 3, 5 & 7
CW Position 2, 4, 6 & 8

Motor Mounts Without Motor (Position 1 or 2)
Used on 2.5 to 20 Ton Jacks. See pages 198-200.

Motor Mounts With Motors (Position 1 or 2)
Used on 2.5 to 20 Ton Jacks. See pages 198-200.

MODIFIER LIST

E = In-Line Encoder (Motor or motor mount required)
B = Bellows Boots (See page 204-205. Must calculate extend and retract length.)
P = Top Plate
C = Clevis End
I = Inverted
UR = Upright Rotating
IR = Inverted Rotating

AVAILBLE LIFT SCREW LENGTHS

Inch Machine Screw Jack
## NOOK PRECISION ACTUATORS

### MACHINE SCREW JACKS

#### Mini Jacks

**Mini Jack Standard:**
- Start torque = 2 \times \text{Running Torque}
- Approximate weight (lbs):
  - "10" Travel: 2.5
  - Per inch travel: 0.2
- Grease: 0.5

*Notes:
- Lifting screw must be secured to prevent rotation for non-keyed units.
- Caution: Jack may be self-lowering in some operating conditions.

**MJAB xx-U UPRIGHT ANTI-BACKLASH**

**MJAB xx-I INVERTED ANTI-BACKLASH**

---

### TABLE: Technical Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Torque at 1,000 lb. Load (in-lb)</th>
<th>Max Allowable Input (hp)</th>
<th>Screw Size</th>
<th>Model Gear Ratio</th>
<th>Lift Rate (in/min) at 1,000 lbs.</th>
<th>At Any Load</th>
<th>Max rpm at 1,000 Load</th>
<th>Torque* (in-lb)</th>
<th>Max rpm at Rated Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>MJ-20</td>
<td>5:1</td>
<td>20</td>
<td>19.3</td>
<td>1/4</td>
<td>½-4</td>
<td>631</td>
<td>90.0</td>
<td>72</td>
<td>8.75</td>
<td>0.019</td>
<td>1,090</td>
</tr>
<tr>
<td>MJ-25</td>
<td>5:1</td>
<td>25</td>
<td>20.7</td>
<td>1/4</td>
<td>½-5</td>
<td>571</td>
<td>72.0</td>
<td>8.3</td>
<td>9.38</td>
<td>0.021</td>
<td>1,040</td>
</tr>
<tr>
<td>MJ-40</td>
<td>5:1</td>
<td>40</td>
<td>16.7</td>
<td>1/4</td>
<td>½-8</td>
<td>706</td>
<td>45.0</td>
<td>11.88</td>
<td>11.88</td>
<td>0.017</td>
<td>1,260</td>
</tr>
<tr>
<td>MJ-50</td>
<td>5:1</td>
<td>50</td>
<td>13.5</td>
<td>1/4</td>
<td>½-10</td>
<td>687</td>
<td>36.0</td>
<td>8.3</td>
<td>9.38</td>
<td>0.014</td>
<td>1,560</td>
</tr>
<tr>
<td>MJ-80</td>
<td>20:1</td>
<td>80</td>
<td>8.0</td>
<td>1/4</td>
<td>½-4</td>
<td>750</td>
<td>22.5</td>
<td>7.2</td>
<td>8.75</td>
<td>0.008</td>
<td>1,310</td>
</tr>
<tr>
<td>MJ-100</td>
<td>20:1</td>
<td>100</td>
<td>8.7</td>
<td>1/4</td>
<td>½-5</td>
<td>667</td>
<td>18.0</td>
<td>8.3</td>
<td>9.38</td>
<td>0.009</td>
<td>1,210</td>
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<tr>
<td>MJ-160</td>
<td>20:1</td>
<td>160</td>
<td>7.0</td>
<td>1/4</td>
<td>½-8</td>
<td>857</td>
<td>11.2</td>
<td>11.88</td>
<td>11.88</td>
<td>0.007</td>
<td>1,500</td>
</tr>
<tr>
<td>MJ-200</td>
<td>20:1</td>
<td>200</td>
<td>5.7</td>
<td>1/4</td>
<td>½-10</td>
<td>1,000</td>
<td>9.0</td>
<td>8.3</td>
<td>9.38</td>
<td>0.006</td>
<td>1,800</td>
</tr>
</tbody>
</table>

**Notes:**
- *Torque to Raise 1 lb
- **Travel** is based on one end fixed and the other end free. See page 68 for other mounting considerations.

**MINI JACK Options**

- Acme Nut and Flange
- Top Plate (optional): 9000-00-12
- Clevis End (optional): 9001-00-12

---

**For specifications and details this publication entitlement is for accurate and reliable. However, it is the responsibility of the product user to determine the suitability of NOOK Industries product for a specific application. While defective products will be replaced without charge (except for freight), no liability is assumed beyond such replacement.**

nookindustries.com

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**RATING AT 1,750 RPM**

**COMPRESSION LOAD MAX TRAVEL**

**NON-KEYED**

**KEYED**

---

**2D/3D CAD ONLINE**
The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

NOOK PRECISION ACTUATORS

MACHINE SCREW JACKS

MACHINE SCREW JACKS

MODELS

1-MSJ

Capacity: 1 ton
Screw: 3⁄4-5

Screw Spacs:
Root diameer (in): 0.162
Screw lead (in): 0.200
Start torque = 2 × Running Torque
Approximate weight (lbs)
“0” Travel: 5.5
Per inch travel: 0.3
Grease: 0.5

Tare Drag
Torque

Max Allowable

Max Input

Worm for 1”

1" (in-lb)

Turns

(m-lb)

1" (in-lb)

Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.
## NOOK PRECISION ACTUATORS

### MACHINE SCREW JACKS

#### 2-MSJ

**Model:** 2-MSJ

**Capacity:** 2 tons

**Screw:** 1/4

**Screw Specs:**
- Root diameter (in): 0.698
- Screw lead (in): 0.250
- Start torque = 2 x Running Torque
- Approximate weight (lbs)
  - 0” Travel: 15
  - Per inch travel: 0.45
  - Gear: 0.5

### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1” Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Torque (in-lb)</th>
<th>Tare Drag Torque (in-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-MSJ</td>
<td>6:1</td>
<td>24</td>
<td>100</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>12:1</td>
<td>48</td>
<td>62</td>
<td>1½</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>24:1</td>
<td>96</td>
<td>42</td>
<td>½</td>
<td>4</td>
</tr>
</tbody>
</table>

**Lifting screw must be secured to prevent rotation for non-keyed units. Caution: Jack may be self-lowering in some operating conditions.**

### Options

- **Limit Switch:** See pg 196-201
- **Top Plate (optional):** 9000-00-01
- **Clevis End (optional):** 9001-00-01

For ordering, specify “L” dimension:
- L(min) = travel + 3
- L(min) = travel + 6

---

**Motor Mount:** See pg 180-181

---

**Acme nut:**
- Position A, Specify position B for opposite
- Acme nut position A, Specify position B for opposite
## NOOK PRECISION ACTUATORS
### MACHINE SCREW JACKS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Turns of Worm</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Hp</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Torque to Raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
<th>Torque to Raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2R-MSJ</td>
<td>6:1</td>
<td>24</td>
<td>100</td>
<td>2</td>
<td>4</td>
<td>0.0250</td>
<td>1,260</td>
<td>2,881</td>
<td>0.0288</td>
<td>1,096</td>
<td>2,505 lbs.</td>
</tr>
<tr>
<td></td>
<td>12:1</td>
<td>48</td>
<td>62</td>
<td>1.5</td>
<td>4</td>
<td>0.0154</td>
<td>1,525</td>
<td>3,486</td>
<td>0.0177</td>
<td>1,326</td>
<td>3,031 lbs.</td>
</tr>
<tr>
<td></td>
<td>24:1</td>
<td>96</td>
<td>42</td>
<td>1.5</td>
<td>4</td>
<td>0.0105</td>
<td>750</td>
<td>1,715</td>
<td>0.0121</td>
<td>651</td>
<td>1,488 lbs.</td>
</tr>
</tbody>
</table>

### Screw Specs:
- Root diameter (in): 0.698
- Screw lead (in): 0.250
- Start torque = 2 x Running Torque
- Approximate weight (lbs): 3
  - Per inch travel: 0.45
  - Gearcase: 0.5

Lifting screw must be secured to prevent rotation for non-keyed units.

Caution: Jack may be self-lowering in some operating conditions.

For specifications and data, this publication entitlement is for enclosed and sealed. However, it is the responsibility of the user to determine the suitability of Nook Industries’ product for specific application. While general products are not intended for use in explosive or hazardous environments, we do not exclude from liability when used in such applications.
## NOOK PRECISION ACTUATORS

### MACHINE SCREW JACKS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Turns of Gear Ratio for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Torque (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
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</thead>
<tbody>
<tr>
<td>2.5-MSJ</td>
<td>6:1</td>
<td>.0252</td>
<td>1,000</td>
<td>2,858</td>
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<td>789</td>
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<td>12:1</td>
<td>.0148</td>
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<td>3,174</td>
<td>969</td>
</tr>
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<td></td>
<td>24:1</td>
<td>.0106</td>
<td>394</td>
<td>1,699</td>
<td>1,476</td>
<td>594</td>
</tr>
</tbody>
</table>

### NON-KEYED

#### 2.5-MSJ-0 UPRIGHT ANTI-BACKLASH

- **Lifting screw must be secured to prevent rotation for non-keyed units.**
- **Caution:** Jack may be self-lowering in some operating conditions.

### KEYED

#### 2.5-MSJ-UK UPRIGHT KEYED

### OPTIONS

- **Motor Mount:** see pg 140-141
- **Limit Switch:** see pg 196-201
- **Secondary Reducer:** see pg 182-187

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For specifications and data, this publication is for accuracy and details. However, the responsibility of the product user to determine the suitability of Nook Industries products is a specific application. Where different products are required, without charge (except applicable, no liability when not imported equipment)
The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

For specifications and data in this publication as well as for the latest product information, please visit nookindustries.com

### 5-MSJ Specifications

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Torque (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
<th>Torque to Raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-MSJ</td>
<td>6:1</td>
<td>16</td>
<td>376</td>
<td>3</td>
<td>10</td>
<td>0.0376</td>
<td>500</td>
<td>2,873</td>
<td>0.0376</td>
<td>437</td>
</tr>
<tr>
<td></td>
<td>24:1</td>
<td>64</td>
<td>144</td>
<td>1/4</td>
<td>10</td>
<td>0.0144</td>
<td>330</td>
<td>1,875</td>
<td>0.0166</td>
<td>287</td>
</tr>
</tbody>
</table>

### Screw Spacing
- Root diameter: 0.966
- Screw lead (in): 0.375
- Start torque = 2 × Running Torque
- Approximate weight (lbs)
  - "0" Travel: 30.0
  - Per inch travel: 0.7
  - Overall: 1.0

### Notes
- Lifting screw must be secured to prevent rotation for non-keyed units.
- Caution: Jack may be self-lowering in some operating conditions.

### 5-MSJ Options
- Motor Mount
- Limit Switch
- Secondary Reducer
- Acme Nut and Flange

### 5-MSJ UPRIGHT ANTI-BACKLASH
- SAB-MSJ-U

### 5-MSJ INVERTED ANTI-BACKLASH
- SAB-MSJ-I

### 5-MSJ DOUBLE CLEVIS
- 5-MSJ-DC

### 5-MSJ Acme Nut and Flange
- 5-MSJ

### 5-MSJ UPRIGHT KEYED
- 5-MSJ-UK

### 5-MSJ INVERTED KEYED
- 5-MSJ-IR
- 5-MSJ-UR
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### NOOK PRECISION ACTUATORS

**MACHINE SCREW JACKS**

**NON-KEYED**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1” Travel</th>
<th>Max Input Torque (in-lbs)</th>
<th>Max Allowable Input Torque (in-lbs)</th>
<th>Tare Drag Torque (in-lbs)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
<th>Torque to Raise 1 lb (in-lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-MSJ</td>
<td>8:1</td>
<td>16</td>
<td>753</td>
<td>5</td>
<td>20</td>
<td>.0377</td>
<td>418</td>
<td>4,776</td>
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<tr>
<td></td>
<td>24:1</td>
<td>48</td>
<td>384</td>
<td>1 1/2</td>
<td>20</td>
<td>.0192</td>
<td>246</td>
<td>2,813</td>
</tr>
</tbody>
</table>

**Screw Specs:**
- Root diameter (in): 1.410
- Screw lead (in): 0.5
- Start torque = 2 x Running Torque
- Approximate weight (lbs)
- Per inch travel: 12
- Grease: 15

Lifting screw must be secured to prevent rotation for non-keyed units. Caution: Jack may be self-lowering in some operating conditions.

### OPTIONS

- **10-MSJ**
  - Acme Nut and Flange
  - Double Clevis
  - Upright Keyed
  - Inverted Keyed

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### NOOK PRECISION ACTUATORS

#### MACHINE SCREW JACKS

<table>
<thead>
<tr>
<th>NON-KEYED</th>
<th>KEYED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque to Raise 1 lb (in-lb)</td>
<td>Max Worm Speed at Rated Load (rpm)</td>
</tr>
<tr>
<td>0.0407</td>
<td>258</td>
</tr>
<tr>
<td>0.0218</td>
<td>244</td>
</tr>
</tbody>
</table>

**Model: 15-MSJ**

- Capacity: 15 tons
- Screw: 2 1/2-2

**Screw Specs:**
- Root diameter (in): 1.694
- Screw lead (in): 0.5
- Start torque = 2 × Running Torque

**Approximate weight (lbs):**
- "0" Travel: 55.0
- Per inch travel: 1.4
- Grease: 1.5

**Keyed Options:**
- 15AB-MSJ-U UPRIGHT ANTI-BACKLASH
- 15AB-MSJ-I INVERTED ANTI-BACKLASH
- 15-MSJ-DU DOUBLE CLEVIS

**Standard Nut and Flange:**
- 15-MSJ Acme Nut and Flange

**Lifting screw must be secured to prevent rotation for non-keyed units. Caution: Jack may be self-lowering in some operating conditions.**
## NOOK MACHINE SCREW JACKS

### 20-MSJ TOP VIEW

![20-MSJ Top View](image)

### 20-MSJ-U UPRIGHT

![20-MSJ Upright View](image)

### 20-MSJ-I INVERTED

![20-MSJ Inverted View](image)

### NON-KEYED

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Torque (in-lb)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Torque to Raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
<th>Max Allowable Input Torque (hp)</th>
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</thead>
<tbody>
<tr>
<td>20-MSJ</td>
<td>8:1</td>
<td>16</td>
<td>1,740</td>
<td>7½</td>
<td>40</td>
<td>0.0435</td>
<td>272</td>
<td>6,209</td>
<td>0.0500</td>
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<td></td>
<td>24:1</td>
<td>48</td>
<td>873</td>
<td>2½</td>
<td>40</td>
<td>0.0218</td>
<td>180</td>
<td>4,130</td>
<td>0.0251</td>
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### KEYED

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Torque (in-lb)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Torque to Raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
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<td></td>
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<td>48</td>
<td>873</td>
<td>2½</td>
<td>40</td>
<td>0.0218</td>
<td>180</td>
<td>4,130</td>
<td>0.0251</td>
</tr>
</tbody>
</table>

### Screw Specs:
- Root diameter (in): 1.908
- Screw lead (in): 0.500
- Start torque = 2 x Running Torque
- Approximate weight (lb): 8.0 D
- Grease: 2.25

### Lifting screw must be secured to prevent rotation for non-keyed units. Caution: Jack may be self-lowering in some operating conditions.

### 20AB-MSJ-U UPRIGHT ANTI-BACKLASH

![20AB-MSJ Upright Anti-Backlash View](image)

### 20AB-MSJ-I INVERTED ANTI-BACKLASH

![20AB-MSJ Inverted Anti-Backlash View](image)

### 20-MSJ Acme Nut and Flange

![20-MSJ Acme Nut View](image)

### 20-MSJ Options

- Grip Nut (Replacement) 3080.00-00
- Clutch End (Replacement) 3081.00-00

- Oil Plate (Optional) 9000-00-06

- Limit Switch (Optional) 9000-030

- Secondary Reduction (Optional) 9000-121

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### 30-MSJ Machine Screw Jacks

**Capacity:** 30 tons  
**Screw:** 33/8-11/2

**Screw Specs:**  
- Root diameter (in): 2.652  
- Screw lead (in): 0.667  
- Start torque = 2 × Running Torque

Approximate weight (lbs):  
- "0" Travel: 145.0  
- Per inch travel: 2.9  
- Grease: 3.5

**30-MSJ**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Torque (in-lb)</th>
<th>Tare Drag Torque (in-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-MSJ</td>
<td>10:1</td>
<td>16 2,710 11 50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>32:1</td>
<td>48 1,411 3½ 50</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**30-MSJ-U UPRIGHT ANTI-BACKLASH**  
**30-MSJ-I INVERTED ANTI-BACKLASH**

**30-MSJ-UR UPRIGHT ROTATING**  
Non-collapsing, specific "C" dimension  
- worm connected to a second worm

**30-MSJ-I INVERTED ROTATING**  
Non-collapsing, specific "C" dimension  
- worm connected to a second worm

**30-MSJ-UK UPRIGHT KEYED**  
**30-MSJ-IK INVERTED KEYED**

*For a 30 ton keyed jack, derate max capacity by 40%*

**30-MSJ-IK INVERTED KEYED**

**NON-KEYED**  
**KEYED**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Torque (in-lb)</th>
<th>Tare Drag Torque (in-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-MSJ</td>
<td>10:1</td>
<td>16 2,710 11 50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>32:1</td>
<td>48 1,411 3½ 50</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**30-MSJ-UR UPRIGHT ROTATING**  
- Max Worm Speed at Rated Load (rpm)  
- Max Load at 1,750 rpm (lb)  
- Torque to Raise 1 lb (in-lb)

**30-MSJ-I INVERTED ROTATING**  
- Max Worm Speed at Rated Load (rpm)  
- Max Load at 1,750 rpm (lb)  
- Torque to Raise 1 lb (in-lb)

**30-MSJ-UK UPRIGHT KEYED**  
**30-MSJ-IK INVERTED KEYED**

**Options**

- **Top Plate (optional):** 9000-00-07  
- **Clevis End (optional):** 9001-00-08  
- **Limit Switch:** see pg 196-201  
- **Motor Mount:** see pg 180-181

**Lifting screw must be secured to prevent rotation for non-keyed units.**  
**Caution:** Jack may be self-lowering in some operating conditions.
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**NOOK PRECISION ACTUATORS**

**MACHINE SCREW JACKS**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Torque (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35-MSJ</td>
<td>10 2:1</td>
<td>16</td>
<td>3,450</td>
<td>11</td>
<td>50</td>
<td>0.493</td>
<td>200</td>
<td>8,035</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.057</td>
<td>174</td>
<td>6,950</td>
</tr>
</tbody>
</table>

**NON-KEYED**

- **35AB-MSJ-U UPRIGHT ANTI-BACKLASH**
- **35AB-MSJ-I INVERTED ANTI-BACKLASH**

- **35-MSJ Acme Nut and Flange**
- **35-MSJ Options**

Lifting screw must be secured to prevent rotation for non-keyed units. Caution: Jack may be self-lowering in some operating conditions.

*For a 35 ton keyed jack, derate max capacity by 40%.*

Screw Specs:
- Root diameter (in): 3.009
- Screw lead (in): 0.667
- Approximate weight (lbs): 145.0
- Per inch travel: 3.4
- Grease: 3.5

For ordering, specify “L” dimension
- L (min) = travel + 18
- L (min) = travel + 10

Limit Switches see pg. 38-261

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### Machine Screw Jacks

#### NOOK Precision Actuators

**Model: 50-MSJ**

- **Capacity:** 50 tons
- **Screw:** 4½-11/16

<table>
<thead>
<tr>
<th>Model</th>
<th>Gear Ratio</th>
<th>Gear Ratio</th>
<th>Torque to Raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-MSJ</td>
<td>102:1</td>
<td>16</td>
<td>.0555</td>
<td>181</td>
<td>10,382</td>
</tr>
<tr>
<td></td>
<td>32:1</td>
<td>48</td>
<td>.0351</td>
<td>104</td>
<td>5,982</td>
</tr>
</tbody>
</table>

**Other Models: 50-MSJ-U (Upright), 50-MSJ-I (Inverted), 50-MSJ-UK (Upright Keyed), 50-MSJ-IK (Inverted Keyed)**

- For a 50 ton keyed jack, derate max capacity by 35%.

---

Lifting screw must be secured to prevent rotation for non-keyed units. Caution: Jack may be self-lowering in some operating conditions.

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### Non-Keyed Machine Screw Jacks

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input Torque (hp)</th>
<th>Max Drag Torque (in-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>75-MSJ</td>
<td>102/3:1</td>
<td>16</td>
<td>8,236</td>
<td>28</td>
<td>155</td>
</tr>
<tr>
<td></td>
<td>32:1</td>
<td>48</td>
<td>3,780</td>
<td>9</td>
<td>155</td>
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</table>

### Keyed Machine Screw Jacks

<table>
<thead>
<tr>
<th></th>
<th>Non-Keyed</th>
<th>KEYED</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX LOAD AT 1,750 RPM (lb)</td>
<td>Torque to Raise 1 lb (in-lb)</td>
<td>Max Worm Speed at Rated Load (rpm)</td>
<td>Max Load at 1,750 rpm (lb)</td>
</tr>
<tr>
<td>75-MSJ-U</td>
<td>0.0549</td>
<td>214</td>
<td>18,368</td>
</tr>
<tr>
<td>75-MSJ-UK</td>
<td>0.0252</td>
<td>150</td>
<td>12,862</td>
</tr>
</tbody>
</table>

**Screw Specs:**

- Root diameter (in): 4.286
- Screw lead (in): 0.667
- Start torque = 2 x Running Torque

**Approximate Weight (lbs):**

- "0" Travel: 010.0
- Per inch travel: 0.5
- Gearcase: 9.0

Lifting screw must be secured to prevent rotation for non-keyed units.

Caution: Jack may be self-lowering in some operating conditions.

*For a 75 ton keyed jack, derate max capacity by 35%.*
100-MSJ  TOP VIEW

Screw Specs:
Root diameter (in): 5.254
Screw lead (in): 0.667
Start torque = 2 × Running Torque
Approximate weight (lbs): 66
Per inch travel: 8.5
Grease: 16.0

Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

For ordering, specify “L” dimension
L(min) = travel + 23

100-MSJ Options

Screw Flats (optional): 9000-00-21
Cross Dowel (optional): 9001-00-21

Model Gear Ratio

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Turns of Worm for 1” Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-MSJ</td>
<td>100:1</td>
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<td>13,166</td>
<td>32</td>
</tr>
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<td>32:1</td>
<td>48</td>
<td>7460</td>
<td>12.5</td>
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</table>

NON-KEYED

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Torque to Raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-MSJ</td>
<td>0.0665</td>
<td>153</td>
<td>17230</td>
</tr>
<tr>
<td>KEYED</td>
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</table>

KEYED

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Torque to Raise 1 lb (in-lb)</th>
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</tr>
<tr>
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<td></td>
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</tr>
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</table>

100-MSJ Acme Nut and Flange
STAINLESS STEEL MACHINE SCREW JACKS

ActionJac™ Stainless Steel Machine Screw Jacks are ideal for use in demanding environments where corrosion resistance is required. All external components are manufactured from 300 series Stainless Steel materials. These jacks use a stainless steel worm with a high strength bronze drive sleeve. The worm and drive sleeve are supported by tapered roller bearings and sealed to prevent loss of lubrication and to resist contamination. The stainless steel lifting screw threads are precision formed to Class 2-C (centralizing) thread profiles.

Load capacities for Stainless Steel Machine Screw Jacks range from 1,300 to 23,000 pounds. A 17-4PH hardened worm is available for a 300% increase in capacity.
STAINLESS STEEL MACHINE SCREW JACKS

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NOOK PRECISION ACTUATORS

STAINLESS STEEL JACKS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Capacity (tons)</th>
<th>Lifting Screw Dia (in)</th>
<th>Screw Load (lb)</th>
<th>Root Dia (in)</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Input (ft-lb)</th>
<th>Max Warm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
<th>Torque to Raise 1 lb (in-lb)</th>
<th>Tare Drag Torque (in-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2SS-MSJ</td>
<td>6:1</td>
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<td>1</td>
<td>.250</td>
<td>.698</td>
<td>24</td>
<td>33</td>
<td>2</td>
<td>1,800</td>
<td>1,320</td>
<td>0.150</td>
<td>4</td>
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</tbody>
</table>

If the worm is changed to 17-4PH, refer to page 66 for jack capacity.

NOTES:
1) The recommended maximum speed is 1,800 rpm provided that the recommended horsepower and temperature are not exceeded.
2) Input torque is shown as torque to lift one pound of load. Starting Torque is 100% greater than torque shown. Tare drag torque should be added for all loads.
3) Maximum allowable horsepower ratings are based on 25% duty cycle at standard ambient temperature, with 1 minute on 2 minute off cycles. For operation at higher duty cycles or repeated use over any segment of the total travel, temperature must be monitored and remain less than 200°F.
4) Overload capacity of the Stainless Steel Machine Screw Jack is as follows: 10% for dynamic loads, 30% for static loads.
5) Stainless Steel Machine Screw Jacks having gear ratios between 20:1 and 32:1, are self-locking and will hold loads without backdriving in the absence of vibration. All other ratios may require a brake to prevent backdriving.
6) All units are suitable for intermittent operation providing that the housing temperature including ambient is not lower than -20°F or higher than +200°F. For operation at temperatures other than these limits consult Nook Industries.
7) Accessories such as boots, top plates and clevises are available.
8) Catalog dimensions are representative only and are subject to change without notice. For construction, use only certified prints.
9) Units are not to be used as personnel support or movement.
10) End-of-travel stops are not provided.
11) For greater capacity, specify a 17-4PH hardened worm.
12) Tare drag torque need only be added if operating under 25% rated load.
13) Starting Torque is 100% greater than torque shown.

Horsepower per jack = Torque to raise one pound x Number of pounds x rpm to be raised

Nook stainless steel jacks are used widely in the commercial food industry. Nook stainless steel jacks used in a dairy processing application.
COLUMN STRENGTH
STAINLESS STEEL JACKS

Column strength is the ability of the lift shaft to hold compressive loads without buckling. With longer screw lengths, column strength may be substantially lower than nominal jack capacity.

If the lift shaft is in tension only, the screw jack travel is limited by the available screw material or by the critical speed of the screw. Refer to the acme screw technical section for critical speed limitations.

The chart below is used to determine the required jack size in applications where the lift shaft is loaded in compression.

To use this chart:
Find a point at which the maximum length \( L \) intersects the maximum load. Be sure the jack selected is above and to the right of that point.

CAUTION: Chart does not include a design factor. The chart assumes proper jack alignment with no bending loads on the screw. Effects from side loading are not included in this chart. Jacks operating horizontally with long lift shafts can experience bending from the weight of the screw.

REFERENCE NUMBER SYSTEM
STAINLESS STEEL JACKS

STAINLESS STEEL MACHINE SCREW JACKS

The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

nookindustries.com

AVAILABLE LIFT SCREW LENGTHS
As a major manufacturer of industrial lead screws, Nook Industries stocks a wide selection of stainless acme screws. Nook Industries has the capacity to make long acme screws for special applications.

Rotating screw jacks can be built with a larger diameter lift screw for greater column strength, or a different lead to change the jack operating speed.

MOUNTING CONDITIONS

A
ONE END FIXED
ONE END FREE

B
BOTH ENDS SUPPORTED BY CLEVIS ENDS

C
ONE END FIXED, ONE END SUPPORTED (CLEVIS ATTACHED TO GUIDE STRUCTURE)
ONE END FIXED, ONE END SUPPORTED (RADIAL BEARING)

D
BOTH ENDS FIXED TOP PLATE ATTACHED TO GUIDED STRUCTURE

LOAD (lbs.)

A  1  2  3  4  5  10  15  25  35  50  70  100
B  2  4  6  8  10  20  30  50  70  100  200
C  3  6  9  12  15  30  45  75  105  150
D  4  8  12  16  20  40  60  100  140  200

"L" (inches) Inch Stainless Steel Machine Screw Jack
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NOOK PRECISION ACTUATORS
STAINLESS STEEL MACHINE SCREW JACKS
STAINLESS STEEL JACKS

2SS-MSJ STAINLESS STEEL

**2SS-MSJ TOP VIEW**

**2SS-MSJ UPRIGHT**

**2SS-MSJ INVERTED**

**MODEL** | **Gear Ratio** | **Capacity** | **Tons** | **Turns of Worm for 1” Travel** | **Max Allowable Input (hp)** | **Max Input Torque (in-lb)** | **Tare Drag Torque (in-lb)** | **Torque to Raise 1 lb (in-lb)** | **Max Worm Speed at Rated Load (rpm)** | **Max Load at 1,750 rpm (lb)** |
<table>
<thead>
<tr>
<th></th>
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<td>4</td>
<td>0.0150</td>
<td>1,800</td>
<td>1,320</td>
<td></td>
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</tbody>
</table>

* For greater capacity, specify a 17-4PH hardened worm.

Screw Specs:
- Screw: 1-4
- Root diameter (in): 0.698
- Screw lead (in): 0.250
- Start torque = 2 × Running Torque
- Approximate weight (lbs)
  - “0” Travel: 170
  - Per inch travel: 0.5
- Grease: 0.5

Lifting screw must be secured to prevent rotation for non-keyed units.

Caution: Jack may be self-lowering in some operating conditions.

For specifications and data, this publication pertains to 4140 hardened steel. However, it is the responsibility of the user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

nookindustries.com

**2SS-MSJ Acme Nut and Flange**

**2SS-MSJ-UR UPRIGHT ROTATING**

**2SS-MSJ-IR INVERTED ROTATING**

For ordering, specify “L” dimension

L(min) = travel + 3

For ordering, specify “L” dimension

L(min) = travel + 6

Acme nut position A, Specify position B for opposite

Motor Mounts see pg 180-181

Limit Switch see pg 196-201

For specifications and data, this publication pertains to 4140 hardened steel. However, it is the responsibility of the user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

nookindustries.com
### NOOK PRECISION ACTUATORS

**STAINLESS STEEL MACHINE SCREW JACKS**

#### 5SS-MSJ STAINLESS STEEL

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Capacity* (tons)</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Torque to Raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
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<td>24:1</td>
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<td>1,875</td>
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* For greater capacity, specify a 17-4PH hardened worm.

---

**Screw Specs:**

- **Screw:** 1½-22
- **Root diameter (in):** 1.000
- **Screw lead (in):** 0.375
- **Start torque = 2 × Running Torque**
- **Approximate weight (lbs):**
  - "O" Travel: 32.0
  - Per inch travel: 2
- **Grease:** 1.0

**Lifting screw must be secured to prevent rotation for non-keyed units. Caution: Jack may be self-lowering in some operating conditions.**

---

**5SS-MSJ Acme Nut and Flange**

- **Screw:** 1½-22
- **Root diameter (in):** 1.000
- **Screw lead (in):** 0.375
- **Start torque = 2 × Running Torque**
- **Approximate weight (lbs):**
  - "O" Travel: 32.0
  - Per inch travel: 2
- **Grease:** 1.0

For specifications and data, see pg 196-201

Motor Mounts:

- **See pg 180-181**

Limit Switches:

- **See pg 180-201**

---

**Stainless Steel Machine Screw Jacks**

While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

For more information, visit [nookindustries.com](http://nookindustries.com)
### 10SS-MSJ Stainless Steel Machine Screw Jacks

#### Specifications

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Capacity* (tons)</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Torque to Raise 1 lb (in-lb)</th>
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</table>

* For greater capacity, specify a 17-4PH hardened worm.

---

**Screw Specs:**
- **Screw:** 2-2
- **Root diameter (in):** 1.410
- **Screw lead (in):** 0.500
- **Start torque = 2 x Running Torque**
- **Approximate weight (lbs):**
  - "0" Travel: 50.0
  - Per inch travel: 1.2
- **Grease:** 5

Lifting screw must be secured to prevent rotation for non-keyed units.

**Caution:** Jack may be self-lowering in some operating conditions.
### 15SS-MSJ Stainless Steel Machine Screw Jacks

#### Specifications and Data

The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

For ordering, specify "L" dimension:

- For 15SS-MSJ: L(min) = travel + 9
- For 15SS-MSJ-U: L(min) = travel + 4

#### Model Gear Ratio Capacity\(^*\) Turns of Worm for 1" Travel Max Input Torque (in-lb) Max Allowable Input (hp) Tare Drag Torque (in-lb) Torque to Raise 1 lb (in-lb) Max Worm Speed at Rated Load (rpm) Max Load at 1,750 rpm (lb)

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</table>

\(^*\) For greater capacity, specify a 17-4PH hardened worm.

#### Screw Specifications

- Screw: 2 1/2-2
- Root diameter (in): 1.684
- Screw lead (in): 0.500
- Start torque = 2 × Running Torque
- Approximate weight (lbs):
  - 15SS-MSJ: 60.0
  - Per inch travel: 0.4
  - Grease: 1.4

#### Lifting Screw

- Must be secured to prevent rotation for non-keyed units.
- Caution: Jack may be self-lowering in some operating conditions.

#### Limit Switch

- See pg 196-201

#### Motor Mounts

- See pg 180-181

#### 15SS-MSJ Acme Nut and Flange

- Flange: 3 TYP.
- Keyway: 1 × 1 1/8
- Clockwise rotation raises load
- TYP. 1.010
- Ø 2 1/2
- 4 9

#### 15SS-MSJ Options

- Top Flange (optional): 15PH-05-05
- Limit Switch (optional): 15SW-05-05
- Motor Mounts (optional): 15MM-05-05

---

For specifications and data in this publication is not guaranteed and subject to change. However, Nook Industries is not responsible for the suitability of Nook Industries products for any specific application. While defective products will be replaced without charge, no liability is assumed beyond such replacement.
### 205S-MSJ Stainless Steel Machine Screw Jacks

#### Specifications

<table>
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<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Capacity* (tons)</th>
<th>Turns of Worm for 1” Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Torque to Raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
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</table>

* For greater capacity, specify a 17-4PH hardened worm.

**Notes:**
- **Screw Specs:**
  - Screw: 21/2-2
  - Root diameter (in): 1.908
  - Screw lead (in): 0.500
  - Start torque = 2 x Running Torque
  - Approximate weight (lbs): 90

- **Travel:** 85.0
- **Per inch travel:** 2.0
- **Grease:** 2.25

- Lifting screw must be secured to prevent rotation for non-keyed units.
- Caution: Jack may be self-lowering in some operating conditions.

---

**205S-MSJ Acme Nut and Flange**

- **Acme Nut:**
  - Pitch: 2.5
  - Size: 21/8-2
  - Approximate weight: 455 lbs

- **Flange:**
  - Diameter: 4.625

---

**205S-MSJ Options**

- **Limit Switch:**
  - See pg 196-201

- **Motor Mounts:**
  - See pg 180-181

---

For specifications and details, refer to the Nook Industries website at [nookindustries.com](http://nookindustries.com).
### Nox Industries

#### NOOK Precision Actuators

**25SS-MSJ Stainless Steel**

---

**25SS-MSJ Top View**

**25SS-MSJ Upright**

**25SS-MSJ Inverted**

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<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Capacity* (tons)</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Torque to Raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
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</table>

* For greater capacity, specify a 17-4PH hardened worm.

---

**25SS-MSJ Acme Nut and Flange**

**25SS-MSJ Options**

---

Lifting screw must be secured to prevent rotation for non-keyed units. Caution: Jack may be self-lowering in some operating conditions.
## 35SS-MSJ STAINLESS STEEL MACHINE SCREW JACKS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Capacity* (tons)</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Allowable Input (hp)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Torque to Raise 1 lb (in-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
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<td>.0251</td>
<td>368</td>
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</tbody>
</table>

* For greater capacity, specify a 17-4PH hardened worm.

### Screw Specs:
- Screw: 3¾-11⁄2
- Root diameter (in): 3.009
- Screw lead (int): 0.667
- Start torque = 2 × Running Torque
- Approximate weight (lb):
  - "0" Travel: 165.0
  - Per inch travel: 3.5
- Grease: 3.50

Lifting screw must be secured to prevent rotation for non-keyed units.

Caution: Jack may be self-lowering in some operating conditions.
With over twenty-five years of experience manufacturing precision worm gear screw jacks, Nook Industries has expanded the ActionJac™ offering to include metric models providing design engineers a globally accepted product. All the efficiency advantages that come with ball screw technology are available in ActionJac™ Metric Ball Screw Jacks. A full line of IEC motor mounts are also available.
## METRIC BALL SCREW JACKS

The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

### METRIC BALL SCREW JACKS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>OPERATING LOAD (kN)</th>
<th>UPRIGHT &amp; INVERTED</th>
<th>UPRIGHT &amp; INVERTED ROTATING</th>
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<tr>
<td>EM05-BSJ</td>
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<td>42,869</td>
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<tr>
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<td>24,155</td>
<td>24,819</td>
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<tr>
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### QUICK REFERENCE

**METRIC BALL SCREW JACKS**

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<tr>
<th>MODEL</th>
<th>OPERATING LOAD (kN)</th>
<th>UPRIGHT &amp; INVERTED</th>
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### LIFE EXPECTANCY

**METRIC BALL SCREW JACKS**

<table>
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<td></td>
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<td>444,444</td>
<td>555,555</td>
</tr>
</tbody>
</table>

### NOTES:

1) The recommended maximum speed is 3,000 rpm providing that the recommended horsepower and temperature are not exceeded.

2) Input torque is shown as torque to lift one kN of load. Starting torque is 50% greater than torque shown. For loads less than 25% of rated loads add tare drag torque.

3) Maximum allowable horsepower ratings are based on a 35% duty cycle at standard ambient temperature, with 1 minute on 2 minute off cycles. For operation at higher duty cycles or repeated use over any segment of the total travel, temperature must be monitored and remain less than 95°C.

4) Overload capacity of the Metric Ball Screw Jack is as follows:

5) All Ball Screw Jacks can backdrive and require some means of holding the load, such as a brake on the motor. The product specification pages show holding torque values. Holding torque represents the amount of input torque required to restrain the load and does not indicate recommended brake size to bring dynamic load to stop.

6) All units are suitable for intermittent operation providing that the housing temperature including ambient is not lower than -30°C or higher than +90°C. Factory supplied grease in standard units will operate in this range. For higher or lower operating temperature ranges consult Nook Industries.

7) Accessories such as boots, limit switches, top plates and clevises are available.

8) Catalog dimensions are representative only and are subject to change without notice. For construction, use only certified prints.

9) Units are not to be used as personnel support or movement.

10) End-of-travel stops are not provided.

11) Starting torque is 100% greater than torque shown.

12) No load (Tare Drag) torque need only be added if operating under 25% rated load.
Column strength is the ability of the lift shaft to hold compressive loads without buckling. With longer screw lengths, column strength may be substantially lower than nominal jack capacity.

If the lift shaft is in tension only, the screw jack travel is limited by the available screw material or by the critical speed of the screw. Refer to the ball screw technical section for critical speed limitations. If there is any possibility for the lift shaft to go into compression, the application should be sized for sufficient column strength.

The chart below is used to determine the required jack size in applications where the lift shaft is loaded in compression.

To use this chart: Find a point at which the maximum length "L" intersects the maximum load. Be sure the jack selected is above and to the right of that point.

CAUTION: Chart does not include a design factor.

The chart assumes proper jack alignment with no bending loads on the screw. Effects from side loading are not included in this chart.

Jacks operating horizontally with long lift shafts can experience bending from the weight of the screw.

Column strength in kN:

<table>
<thead>
<tr>
<th>Load (kN)</th>
<th>EM05-BSJ</th>
<th>EM10-BSJ</th>
<th>EM2.5-BSJ</th>
<th>EM20-BSJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100</td>
<td>200</td>
<td>300</td>
<td>500</td>
</tr>
<tr>
<td>2</td>
<td>200</td>
<td>400</td>
<td>600</td>
<td>1,000</td>
</tr>
<tr>
<td>3</td>
<td>300</td>
<td>600</td>
<td>900</td>
<td>1,500</td>
</tr>
<tr>
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<td>1,000</td>
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<td>2,500</td>
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<td>1,800</td>
<td>3,000</td>
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<td>800</td>
<td>1,600</td>
<td>2,400</td>
<td>4,000</td>
</tr>
</tbody>
</table>

For Translating Screw Models (U and I) use actual Travel in mm.

For Rotating Screw Models (UR and IR) use "L" Dimension in mm.

**Modifier List**

E and/or B optional

E = In-Line Encoder (Motor or motor mount is required.)

B = Bellows Boots (Must calculate retracted and extended boot length. See page 204-205.)

P = Nook Tube Sensor System PNP

N = Nook Tube Sensor System NPN

S or M Required

S = Standard, no additional description required

M = Modified, additional description required

**Housing Configuration**

F = Standard Flange Base

**Screw Configuration**

TRANSLATING - U and I MODELS

T = Standard Threaded End

C = Clevis End

P = Top Plate

ROTATING - UR and IR MODELS

A = Travel Nut Position "A"

B = Travel Nut Position "B"

UR = Upright Rotating

IR = Inverted Rotating

**Shaft Order Code**

CCW Position 1

CW Position 2

**Mounting Conditions**

A = ONE END FIXED, ONE END FREE

B = BOTH ENDS SUPPORTED BY CLEVIS ENDS

C = ONE END FIXED, ONE END SUPPORTED (CLEVIS ATTACHED TO GUIDE STRUCTURE)

D = BOTH ENDS FIXED (TOP PLATE ATTACHED TO GUIDED STRUCTURE)

Reference to product pages for available ratios.

**SSE - 1**

CCW Position 1

CW Position 2

**Order Codes** (Must Include A Position)

NOTE: Both Shaft Extensions Must Be Specified.
**EM05-BSJ**

**Top View**

**EM05-BSJ U Upright**

**EM05-BSJ I Inverted**

**EM05-BSJ U Upright Rotating**

**EM05-BSJ I Inverted Rotating**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Capacity (kN)</th>
<th>Raise for One Turn of Worm (mm)</th>
<th>Max Input Torque (N·m)</th>
<th>Max Allowable Input (kW)</th>
<th>No Load Torque (N·m)</th>
<th>Backdrive Holding Torque (N·m)</th>
<th>Torque to Raise 1 kN (N·m)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,425 rpm (kN)</th>
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</thead>
<tbody>
<tr>
<td>EM05-BSJ</td>
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<td>100</td>
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<td>0.21</td>
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<td>.10</td>
<td>1,625</td>
<td>5.0</td>
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</tbody>
</table>

**Screw Specs:**
- Screw: MRT 16×6
- Root diameter (mm): 12.9
- Drag torque (N·m): 0.11
- Start torque = 1.5 × Running Torque
- Approximate weight (Kg)
  - 0” Travel: 1.36
  - Per 100mm travel: 0.14
  - Overall: 0.14

**Caution:** Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

**EM05-BSJ Ball Nut and Flange**

**EM05-BSJ Options**

**Top Plate (Optional):** 9000-EM-12

**Clevis End (Optional):** 9001-EM-12

**Motor Mounts:**
- See pg. 180-181

**Limit Switch:**
- See pg. 180-181

For specifications and details in this publication, no liability is assumed beyond such replacement.
**EM1-BSJ**

**TOP VIEW**

**EM1-BSJ U UPRIGHT**

**EM1-BSJ I INVERTED**

**EM1-BSJ UR UPRIGHT ROTATING**

For ordered parts, specify "UR". L1 = 0.72L.

**EM1-BSJ IR INVERTED ROTATING**

For ordered parts, specify "IR". L1 = 0.72L.

---

### Screw Specs:

- **Screw:** MRT 20x6
- **Root diameter (mm):** 175
- **Drag torque (Nm):** 0.34
- **Start torque = 1.5 × Running Torque**
- **Approximate weight (kg):**
  - Per 100mm travel: 0.23
  - Grease: 0.23

---

Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

---

### Table: EM1-BSJ Specifications

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Capacity (kN)</th>
<th>Max Input Torque (N·m)</th>
<th>Max Allowable Input (kW)</th>
<th>Max Torque to Raise 1 kN (N·m)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,425 rpm (kN)</th>
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<td></td>
<td>2.0</td>
<td>.24</td>
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</tr>
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---

### EM1-BSJ Ball Nut and Flange

- **Top Plate (optional):** 9000-EM-11
- **Clevis End (optional):** 9001-EM-11

### EM1-BSJ Options

- **Trip Plate (optional):** N601-EM-11
- **Clevis End (optional):** N601-EM-11

---

For specifications and details, this publication entitles Nook Industries to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. With different products will be required without notice if essential, or liability is unless or in apparent defects.

---

For ordering, specify "L" dimension:

- **L(min) = travel + 164**
- **L(min) = travel + 90**
The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

EM2.5-BSJ

![EM2.5-BSJ TOP VIEW](image)

**Screw Specs:**
- Screw: MRT 25x5
- Root diameter (mm): 17.5
- Drag torque (N-m): 0.56
- Start torque = 1.5 x Running Torque
- Approximate weight (Kg)
  - "0" Travel: 7.7
  - Per 100mm travel: 0.36
  - Grease: 0.22

Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Capacity (kN)</th>
<th>Raise for One Turn of Worm (mm)</th>
<th>Max Input Torque (N-m)</th>
<th>Max Allowable Input (kW)</th>
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<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,425 rpm (kN)</th>
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</table>

**EM2.5-BSJ-UR UPRIGHT ROTATING**
- For ordering, specify "L" dimension
- L(min) = travel + 186

**EM2.5-BSJ-IR INVERTED ROTATING**
- For ordering, specify "L" dimension
- L(min) = travel + 107

**EM2.5-BSJ Ball Nut and Flange**

**EM2.5-BSJ Options**
- Metric Mounts seen pg 185-186
- Load Switch shown PG 185-205

For specifications and details in this publication, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.
EM5-BSJ TOP VIEW

**EM5-BSJ UPRIGHT**

**EM5-BSJ INVERTED**

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<td>7.7</td>
<td>0.56</td>
<td>1.13</td>
<td>6.5</td>
<td>0.15</td>
<td>695</td>
<td>24.4</td>
<td></td>
</tr>
</tbody>
</table>

Screw Specs:
- Screw: MRT 40x10
- Root diameter (mm): 34.8
- Drag torque (N·m): 1.13
- Start torque = 15 x Running Torque
- Approximate weight (Kg)
- "0" Travel: 15.9
- Per 100mm travel: 0.93
- Grease: 0.45

Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.
No specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

NOOK PRECISION ACTUATORS

METRIC BALL SCREW JACKS

EM10-BSJ

Screw Specs:
Screw: MRT50x10
Root diameter (mm): 45.2
Drag torque (N-m): 2.26
Start torque = 1.5 × Running Torque

Approximate weight (Kg)
“0” Travel: 22.7
Per 100mm travel: 1.46
Grease: 0.68

Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.
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For specifications and details of this publication e-mail us at sales@nookindustries.com or visit us at www.nookindustries.com
For ordering, specify "L" dimension
L(min) = travel + 370

**EM20-BSJ**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Capacity (kN)</th>
<th>Raise for One Turn of Worm (mm)</th>
<th>Max Input Torque (N/m)</th>
<th>Max Allowable Input (kW)</th>
<th>No Load Torque (N/m)</th>
<th>Backdrive Holding Torque (N/m)</th>
<th>Torque to Raise 1 kN (N/m)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,425 rpm (kN)</th>
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<tbody>
<tr>
<td>EM20-BSJ</td>
<td>8:1</td>
<td>200</td>
<td>1.5</td>
<td>75.2</td>
<td>5.6</td>
<td>4.52</td>
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**Screw Specs:**
- Screw: MRT 63x12
- Root diameter (mm): 56.98
- Drag torque (N/m): 4.52
- Start torque = 1.5 × Running Torque
- Approximate weight (kg)
  - "0" Travel: 38.6
  - Per 100mm travel: 2.31
- Grease: 1.0

Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

**EM20-BSJ Ball Nut and Flange**

**EM20-BSJ Options**
- Top Plate (Optional): 9000-EM-06
- Clevis End (Optional): 9001-EM-06
- Ø26 - 4 Holes on 140 BCD
- Ø46 C'bore

**EM20-BSJ-UR Upright Rotating**
For ordering, specify "UR" dimension
L(min) = travel + 215

**EM20-BSJ-IR Inverted Rotating**
For ordering, specify "IR" dimension
L(min) = travel + 195

**Model Gear Ratio**
- Capacity (kN)
- Raise for One Turn of Worm (mm)
- Max Input Torque (N/m)
- Max Allowable Input (kW)
- No Load Torque (N/m)
- Backdrive Holding Torque (N/m)
- Torque to Raise 1 kN (N/m)
- Max Worm Speed at Rated Load (rpm)
- Max Load at 1,425 rpm (kN)

For specifications and details of this publication e-mail us at sales@nookindustries.com or visit us at www.nookindustries.com
For ordering, specify "L" dimension
L(min) = travel + 370

**EM20-BSJ Ball Nut and Flange**

**EM20-BSJ Options**
- Top Plate (Optional): 9000-EM-06
- Clevis End (Optional): 9001-EM-06
- Ø26 - 4 Holes on 140 BCD
- Ø46 C'bore

Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

**EM20-BSJ TOP VIEW**

**EM20-BSJ-U UPRIGHT**

**EM20-BSJ-I INVERTED**

**EM20-BSJ-UR UPRIGHT ROTATING**
For ordering, specify "UR" dimension
L(min) = travel + 215

**EM20-BSJ-IR INVERTED ROTATING**
For ordering, specify "IR" dimension
L(min) = travel + 195
METRIC TRAPEZOIDAL MACHINE SCREW JACKS

ActionJac™ Metric Trapezoidal Screw Jacks utilize the same rugged design as the ActionJac™ Machine Screw Jacks. These true metric jacks include a lift shaft with a special trapezoidal thread form. This thread form has been created to stay within ISO standards yet retains the centralizing feature of our 2C acme threads. These jacks may be assembled with IEC motor mounts.
## METRIC TRAPEZOIDAL SCREW JACKS

### Quick Reference

<table>
<thead>
<tr>
<th>Model</th>
<th>Gear Ratio</th>
<th>Capacity (kN)</th>
<th>Screw Dia (mm)</th>
<th>Root Dia (mm)</th>
<th>Raise for One Turn of Worm (mm)</th>
<th>Max Input Torque (Nm)</th>
<th>Max Input (kW)</th>
<th>Max Warm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,425 rpm (kN)</th>
<th>Torque to Raise 1 kN (Nm)</th>
<th>No Load Torque (Nm)</th>
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<td>16</td>
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<td>1.9</td>
<td>165</td>
<td>23.0</td>
<td>0.54</td>
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</tbody>
</table>

### Notes:

1. The recommended maximum speed is 1,800 rpm providing the recommended horsepower and temperature are not exceeded.
2. Input torque is shown as torque to lift one kN of load. Starting torque is 100% greater than torque shown. For loads less than 25% of rated loads add idle drag torque.
3. Maximum allowable power ratings are based on a 25% duty cycle at standard ambient temperature, with 1 minute on 2 minute off cycles. For operation at higher duty cycles or repeated use over any segment of the total travel, temperature must be monitored and remain less than 95°C.
4. Overload capacity of the Trapezoidal Screw Jack is as follows: 10% for dynamic loads, 30% for static loads.
5. Trapezoidal Screw Jacks having gear ratios between 20:1 and 32:1, are self-locking and will hold loads without backdriving in the absence of vibrations. All other ratios may require a brake to prevent backdriving.
6. All units are suitable for intermittent operation providing that the housing temperature including ambient is not lower than -30°C or higher than +95°C. Factory supplied grease in standard units will operate in this range. For higher or lower operating temperature ranges consult Nook Industries.
7. Accessories such as boots, limit switches, top plates and clevises are available.
8. Catalog dimensions are representative only and are subject to change without notice. For construction, use only certified prints.
9. Units are not to be used as personnel support or movement.
10. End-of-travel stops are not provided.
11. Starting torque is 100% greater than torque shown.
12. No load torque need only be added if operating under 25% rated load.
COLUMN STRENGTH
METRIC TRAPEZOIDAL SCREW JACKS

Column strength is the ability of the lift shaft to hold compressive loads without buckling. With longer screw lengths, column strength may be substantially lower than nominal jack capacity.

If the lift shaft is in tension only, the screw jack travel is limited by the available screw material or by the critical speed of the screw. Refer to the trapezoidal screw technical section for critical speed limitations.

If there is any possibility for the lift shaft to go into compression, the trapezoidal screw technical section for critical speed limitations. Available screw material or by the critical speed of the screw. Refer to the trapezoidal screw technical section for critical speed limitations.

If the lift shaft is in tension only, the screw jack travel is limited by the available screw material or by the critical speed of the screw. Refer to the trapezoidal screw technical section for critical speed limitations.

Find a point at which the maximum length "L" intersects the maximum load. Be sure the jack selected is above and to the right of that point.

CAUTION: chart does not include a design factor.

The chart assumes proper jack alignment with no bending loads on the screw. Effects from side loading are not included in this chart. Jacks operating horizontally with long lift shafts can experience bending from the weight of the screw.

TO USE THIS CHART:

MOUNTING CONDITIONS

A

ONE END FIXED
ONE END FREE

B

BOTH ENDS SUPPORTED
BY CLEVIS ENDS

C

ONE END FIXED, ONE END
ATTACHED TO GUIDE STRUCTURE

D

BOTH ENDS FIXED
(TOP PLATE ATTACHED TO GUIDE STRUCTURE)

Available Lift Screw Lengths

As a major manufacturer of industrial lead screws, Nook Industries stocks a wide selection of trapezoidal screws. Nook Industries has the capacity to make long trapezoidal screws for special applications.

Rotating screw jacks can be built with a larger diameter lift shaft for greater column strength.

REFERENCE NUMBER SYSTEM
METRIC TRAPEZOIDAL SCREW JACKS

EM2.5-MSJ - U 6:1 / SSE-1 / 80B5-2 / FT / 580mm / BS

TRAPEZOIDAL SCREW MODEL

Model #
EM2.5-MSJ
EM10-MSJ
EM1-MSJ
EM5-MSJ
EM05-MSJ

HOUSING CONFIGURATION

F = Standard Flange Base

Screw Configuration

TRANSLATING - U and I MODELS
T = Standard Threaded End
C = Cone End
P = Top Plate

ROTATING - UR and IR MODELS
A = Travel Nut Position “A”
B = Travel Nut Position “B”

GEAR RATIO

Refer to product pages for available ratios.

SHAFT ORDER CODE

SSE - 1

CCW Position 1
CW Position 2

ORDER CODES (Must Include A Position)

NOTE: Both Shaft Extensions Must Be Specified.

No Accessory

SSE = Standard Shaft Extension, Position 1 or 2
60D = Delete Shaft Extension, Position 1 or 2
SPC = Special Modified Shaft Extension, Position 1 or 2

Motor Mounts Without Motor

(Position 1 or 2)

56B5 = EM05
56B14 = EM05
63B5 = EM1
63B14 = EM1
71B5 = EM1 and EM2.5
71B14 = EM1 and EM2.5
80B5 = EM2.5 and EM5
80B14 = EM2.5 and EM5
90B5 = EM5 and EM10
90B14 = EM5 and EM10
100B5 = EM10 and EM20
100B14 = EM10 and EM20

MODIFIER LIST

E and/or B Optional
E = In-Line Encoder (Motor or motor mount is required.)
B = Bellows Boots (Must calculate retracted and extended boot length. See page 204-205)
P = Nook Tube Sensor System PNP
N = Nook Tube Sensor System NPN
S or M Required
S = Standard, no additional description required
M = Modified, additional description required

For Translating Screw Models (U and I) use actual Travel in mm.

For Rotating Screw Models (UR and IR) use “L” Dimension in mm.
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**NOOK PRECISION ACTUATORS**

**METRIC TRAPEZOIDAL SCREW JACKS**

**EM05-MSJ**

**TOP VIEW**

**EM05-MSJ-U UPRIGHT**

**EM05-MSJ-I INVERTED**

**EM05-MSJ-UR UPRIGHT ROTATING**

**EM05-MSJ-IR INVERTED ROTATING**

**Screw Specs:**
- Screw: Tr16x4
- Root diameter (mm): 10.9
- Start torque = 2 × Running Torque
- Approximate weight (Kg): “0” Travel: 1.13
- Per 100mm travel: 0.12
- Grease: 0.23

Lifting screw must be secured to prevent rotation for non-keyed units. Caution: Jack may be self-lowering in some operating conditions.

**MODEL**

<table>
<thead>
<tr>
<th>Gear Ratio</th>
<th>Capacity (kN)</th>
<th>Raise for One Turn of Worm (mm)</th>
<th>Max Input Torque (Nm)</th>
<th>Max Allowable Input (kW)</th>
<th>Torque to Raise 1 kN (N·m)</th>
<th>Maxworm speed at Rated Load (rpm)</th>
<th>Max Load at 1,425 rpm (kN)</th>
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</thead>
<tbody>
<tr>
<td>EM05-MSJ</td>
<td>5:1</td>
<td>5</td>
<td>0.80</td>
<td>2.25</td>
<td>0.27</td>
<td>0.11</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>20:1</td>
<td>5</td>
<td>0.21</td>
<td>0.94</td>
<td>0.13</td>
<td>0.11</td>
<td>0.19</td>
</tr>
</tbody>
</table>

**EM05-MSJ Travel Nut and Flange**

**EM05-MSJ Options**

- Motor Mounts: see pg 180–181
- Limit Switch: see pg 188–201

For specifications and details of this publication or for inquiries, please visit nookindustries.com
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---

**NOOK PRECISION ACTUATORS**

**METRIC TRAPEZOIDAL SCREW JACKS**

---

**EM1-MSJ**

### Specifications

**MODEL** | Gear Ratio | Capacity (kN) | Raise for One Turn of Worm (mm) | Max Input Torque (N·m) | Max Allowable Input (kW) | No Load Torque (N·m) | Torque to Raise 1 kN (N·m) | Max worm speed at Rated Load (rpm) | Max Load at 1,425 rpm (kN) |
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
EM1-MSJ | 5:1 | 10 | 0.80 | 5.19 | 0.36 | 0.34 | 0.52 | 665 | 4.7 |
EM1-MSJ | 20:1 | 10 | 0.20 | 2.44 | 0.19 | 0.34 | 0.24 | 730 | 5.1 |

**Screw Specs:**

- Screw: Tr20x4
- Root diameter (mm): 14.9
- Start torque = 2 × Running Torque
- Approximate weight (kg):
  - "0" Travel: 2.5
  - Per 100mm travel: 0.19
- Grease: 0.23

**EM1-MSJ Travel Nut and Flange**

**EM1-MSJ Options**

- Limit Switch (Option): 5001-EM-11
- Motor Mounts (see pg 180-181)
- End Cap (Option): 5001-EM-11

**EM1-MSJ Travel Nut and Flange**

Lifting screw must be secured to prevent rotation for non-keyed units. Caution: Jack may be self-lowering in some operating conditions.
**EM2.5-MSJ Travel Nut and Flange**

**EM2.5-MSJ Options**

- Top Plate (optional): 9000-EM-01
- Clevis End (optional): 9001-EM-01

**EM2.5-MSJ Lifting Screw**

Lifting screw must be secured to prevent rotation for non-keyed units.

**Caution:** Jack may be self-lowering in some operating conditions.
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**EM5-MSJ Travel Nut and Flange**

- Gear Ratio: 6:1
- Capacity (kN): 50
- Raise for One Turn of Worm (mm): 1.17
- Max Input Torque (N·m): 40.3
- Max Allowable Input (kW): 1.87
- No Load Torque (N·m): 1.13
- Torque to Raise 1 kN (N·m): 0.81
- Max worm speed at Rated Load (rpm): 445
- Max Load at 1,425 rpm (kN): 15.6

**EM5-MSJ Options**

- Top Plate (optional): 9000-EM-02
- Clevis End (optional): 9001-EM-02

Lifting screw must be secured to prevent rotation for non-keyed units. Caution: Jack may be self-lowering in some operating conditions.

Screw Spacs:
- Screw: Tr40x7
- Root diameter (mm): 30.9
- Start torque = 2 × Running Torque
- Approximate weight (Kg):
  - “0” Travel: 13.6
  - Per 100mm travel: 0.81
  - Grease: 0.45

For ordering, specify “L” dimension
- L(min) = travel + 207

For ordering, specify “L” dimension
- L(min) = travel + 103
The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

**NOOK PRECISION ACTUATORS**

**METRIC TRAPEZOIDAL SCREW JACKS**

**EM10-MSJ**

**TOP VIEW**

**UPRIGHT**

**INVERTED**

**UR UPRIGHT ROTATING**

**IR INVERTED ROTATING**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Capacity (kN)</th>
<th>Raise for One Turn of Worm (mm)</th>
<th>Max Input Torque (N·m)</th>
<th>Max Allowable Input (kW)</th>
<th>No Load Torque (N·m)</th>
<th>Torque to Raise 1 kN (N·m)</th>
<th>Max worm speed at Rated Load (rpm)</th>
<th>Max Load at 1,425 rpm (kN)</th>
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**Screw Specs:**
- Screw: Tr55x12
- Root diameter (mm): 40
- Start torque = 2 × Running Torque
- Approximate weight (Kg): "0" Travel: 20.4
- Per 500mm travel: 1.46
- Grease: 0.68

**EM10-MSJ Travel Nut and Flange**

**EM10-MSJ Options**

- Limit Switch
- see pg 196-201
- Motor Mounts
- see pg 180-181

Lifting screw must be secured to prevent rotation for non-keyed units.

**Caution:** Jack may be self-lowering in some operating conditions.

For specifications and details of this publication enrollment, please contact Nook Industries for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.
## EM20-MSJ Specifications

<table>
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<th>Capacity (kN)</th>
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<td>0.54</td>
<td>165</td>
<td>23.0</td>
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</table>

### Screw Specifications
- **Screw**: Tr65x12
- **Root diameter (mm)**: 50
- **Start torque**: \(2\times\text{Running Torque}\)
- **Approximate weight (Kg)**:
  - "0" Travel: 36.3
  - Per 100mm travel: 2.12
- **Grease**: 1.0

### Notes
- Lifting screw must be secured to prevent rotation for non-keyed units.
- Caution: Jack may be self-lowering in some operating conditions.

---

**For ordering, specify “L” dimension**
- **L (min)** = travel + 285
- **L (min)** = travel + 135

**Limit Switch**
- See pg. 196-201

**Motor Mounts**
- See pg. 180-181

### EM20-MSJ Travel Nut and Flange
- **Travel nut position A**, specify B for opposite
- **Limit Switch**
- See pg. 196-201
- **Motor Mounts**
- See pg. 180-181
ActionJac™ Cubic Ball Screw and Machine Screw Jacks meet international Cubic Jack versatile mounting standards. Mounting versatility is further increased with the provision for trunnion mounting integral to the Cubic Jack housing. housings are made from high quality corrosion-resistant aluminum. Cubic Jacks are capable of directly mounting a wide array of motors and gear reducers. Available in true metric and inch standards.

Nook worm gear screw jacks are used widely in the solar industry.
QUICK REFERENCE
INCH CUBIC JACKS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Capacity (kN)</th>
<th>Lifting Screw Load (in-lb)</th>
<th>Screw Load (in-lb)</th>
<th>Root Dia (in)</th>
<th>Worm Dia (in)</th>
<th>Turns of Worm</th>
<th>Max Input Torque (in-lb)</th>
<th>Max Input RPM</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (kN)</th>
<th>Torque to Raise 1 lb. (in-lb)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Back Drive Torque (in-lb)</th>
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</table>

NOTES:
1) The recommended maximum speed is 1,800 rpm providing that the recommended horsepower and temperature are not exceeded.
2) Input torque is shown as torque to lift one kN of load. Starting torque is 100% greater than torque shown for Machine Screw Jacks and 50% greater than the torque shown for Ball Screw Jacks. For loads less than 25% of rated load, add tare drag torque.
3) Maximum allowable power ratings are based on a 25% duty cycle. Starting torque is 100% greater than torque shown for Machine Screw Jacks and 50% greater than the torque shown for Ball Screw Jacks. For loads less than 25% of rated load, add tare drag torque.
4) Overload capacity of the Cubic Jack is as follows: 10% for dynamic loads, 30% for static loads.
5) Cubic Machine Screw Jacks having gear ratios of 20:1 are self-locking and will hold loads without backdriving in the absence of vibrations. All other ratios may require a brake to prevent backdriving.
6) All units are suitable for intermittent operation providing that the housing temperature including ambient is not lower than -20°C or higher than +95°C. Factory supplied grease in standard units will operate in this range. For higher or lower operating temperatures consult Nook Industries.
7) Accessories such as boots, limit switches, top plates and clevises are available.
8) Catalog dimensions are representative only and are subject to change without notice. For construction, use only certified prints.
9) Units are not to be used as personnel support or movement.
10) End-of-travel stops are not provided.

QUICK REFERENCE
METRIC CUBIC JACKS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Capacity (kN)</th>
<th>Lifting Screw Load (mm)</th>
<th>Screw Load (mm)</th>
<th>Root Dia (mm)</th>
<th>Worm Dia (mm)</th>
<th>Turns of Worm</th>
<th>Max Input Torque (mm)</th>
<th>Max Input RPM</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,425 rpm (kN)</th>
<th>Torque to Raise 1 kN (Nm)</th>
<th>Tare Drag Torque (Nm)</th>
<th>Back Drive Torque (Nm)</th>
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<td>10</td>
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<td>0.6</td>
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</tr>
</tbody>
</table>

NOTES:
1) The recommended maximum speed is 1,800 rpm providing that the recommended horsepower and temperature are not exceeded.
2) Input torque is shown as torque to lift one kN of load. Starting torque is 100% greater than torque shown for Machine Screw Jacks and 50% greater than the torque shown for Ball Screw Jacks. For loads less than 25% of rated load, add tare drag torque.
3) Maximum allowable power ratings are based on a 25% duty cycle. For operation at higher duty cycles or repeated use over any segment of the total travel, temperature must be monitored and remain less than 35°C.
4) Overload capacity of the Cubic Jack is as follows: 10% for dynamic loads, 30% for static loads.
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6) All units are suitable for intermittent operation providing that the housing temperature including ambient is not lower than -20°C or higher than +95°C. Factory supplied grease in standard units will operate in this range. For higher or lower operating temperatures consult Nook Industries.
7) Accessories such as boots, limit switches, top plates and clevises are available.
8) Catalog dimensions are representative only and are subject to change without notice. For construction, use only certified prints.
9) Units are not to be used as personnel support or movement.
10) End-of-travel stops are not provided.
11) Starting torque is 100% greater than torque shown.
12) No load torque need only be added if operating under 25% rated load.
COLUMN STRENGTH
CUBIC INCH MACHINE AND BALL SCREW JACKS

Column strength is the ability of the lift shaft to hold compressive loads without buckling. With longer screw lengths, column strength may be substantially lower than nominal jack capacity.

If the lift shaft is in tension only, the screw jack travel is limited by the available screw material or by the critical speed of the screw. Refer to the ball screw technical section for critical speed limitations.

The chart below is used to determine the required jack size in applications where the lift shaft is loaded in compression.

TO USE THESE CHARTS:
Find a point at which the maximum length “L” intersects the maximum load. Be sure the jack selected is above and to the right of that point.

CAUTION: chart does not include a design factor.

The chart assumes proper jack alignment with no bending loads on the screw. Effects from side loading are not included in this chart.

Jacks operating horizontally with long lift shafts can experience bending from the weight of the screw.

AVAILABLE LIFT SCREW LENGTHS
As a major manufacturer of industrial lead screws, Nook Industries stocks a wide selection of screws. Nook Industries has the capacity to make long screws for special applications. Rotating screw jacks can be built with a larger diameter lift screw for greater column strength, or a different lead to change the jack operating speed.

The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. Nook Industries reserves the right to change any information or specification without prior notice and to correct any error or omission in any publication. The sale of any Nook Industries product does not imply or grant license of patents, copyrights or other rights. The information provided in this publication is intended as a guide to help select the appropriate product. Although every precaution has been taken to ensure accuracy, Nook Industries cannot assume responsibility for any errors or omissions. No liability is assumed beyond such replacement.
## LIFE EXPECTANCY
### INCH BALL SCREW CUBIC JACKS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>OPERATING LOAD (lb)</th>
<th>UPRIGHT &amp; INVERTED (in.)</th>
<th>UPRIGHT &amp; INVERTED (rotating)</th>
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<td></td>
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<td>High-load</td>
<td>Standard</td>
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<td>0.5HLC-BSJ</td>
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<tr>
<td></td>
<td>500</td>
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<td>5,662</td>
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<td>1C-BSJ</td>
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### METRIC BALL SCREW CUBIC JACKS

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### NOTES:
- Refer to Lubrication Instructions in order to obtain maximum life from ball screw assemblies.
- These values may be greatly reduced if the units are subjected to misalignment, shock loads, side thrust, contamination or lack of proper lubrication and maintenance.

## LIFE EXPECTANCY
### METRIC BALL SCREW CUBIC JACKS

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<thead>
<tr>
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<th>OPERATING LOAD (lbs)</th>
<th>UPRIGHT &amp; INVERTED (in. × 103)</th>
<th>UPRIGHT &amp; INVERTED (in. × 103)</th>
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<td>Standard</td>
<td>High-lead</td>
<td>Standard</td>
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<tr>
<td>0.5C-BSJ</td>
<td>1,000</td>
<td>377</td>
<td>708</td>
</tr>
<tr>
<td>0.5HLC-BSJ</td>
<td>750</td>
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<td>1,678</td>
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<td>129,218</td>
</tr>
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</table>

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## REFERENCE NUMBER SYSTEM
### CUBIC JACKS

### 1C-MSJ- U 6:1 / SSE-1 / SSE-2 / FT / 24.5 / BS

### HOUSING CONFIGURATION -
- F = Standard Flange Base

### SCREW CONFIGURATION -
- TRANSLATING - U and I MODELS
  - C = Clevis End
  - P = Top Plate
- ROTATING - UR and IR MODELS
  - A = Travel Nut Position “A”
  - B = Travel Nut Position “B”

### TRAVEL -
- Use “X” Dimension in Inches

### MODIFIER LIST -
- E and/or B Optional
  - E = In-Line Encoder (Motor or motor mount is required.)
  - B = Bellows Boots (See page 204-205. Must calculate extend and retract length.)

### GEARS RATIO -
- Refer to product pages for available ratios.

### SHAFT ORDER CODE -
- Refer to product pages for available Hand Wheels.

## LIFE EXPECTANCY
### CUBIC JACKS

### METRIC BALL SCREW CUBIC JACKS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>OPERATING LOAD (kN)</th>
<th>MINIMUM METERS OF TRAVEL</th>
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</thead>
<tbody>
<tr>
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<td>Standard</td>
<td>High-lead</td>
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<tr>
<td>EM05C-BSJ</td>
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<td>27,360</td>
</tr>
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<td>2,194,880</td>
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<tr>
<td>EM1C-BSJ</td>
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<tr>
<td></td>
<td>2.5</td>
<td>703,040</td>
</tr>
</tbody>
</table>

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## REFERENCE NUMBER SYSTEM
### CUBIC JACKS

### 1C-MSJ- U 6:1 / SSE-1 / SSE-2 / FT / 24.5 / BS

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- Refer to product pages for available Hand Wheels.

## LIFE EXPECTANCY
### METRIC BALL SCREW CUBIC JACKS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>OPERATING LOAD (lbs)</th>
<th>MINIMUM INCHES OF TRAVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard</td>
<td>High-lead</td>
</tr>
<tr>
<td>0.5C-BSJ</td>
<td>1,000</td>
<td>377</td>
</tr>
<tr>
<td>0.5HLC-BSJ</td>
<td>750</td>
<td>893</td>
</tr>
<tr>
<td></td>
<td>500</td>
<td>3,014</td>
</tr>
<tr>
<td>1C-BSJ</td>
<td>250</td>
<td>24,111</td>
</tr>
<tr>
<td>1HLC-BSJ</td>
<td>2,000</td>
<td>133</td>
</tr>
<tr>
<td></td>
<td>1,500</td>
<td>316</td>
</tr>
<tr>
<td></td>
<td>1,000</td>
<td>1,089</td>
</tr>
<tr>
<td></td>
<td>500</td>
<td>8,518</td>
</tr>
</tbody>
</table>

### NOTES:
- Refer to Lubrication Instructions in order to obtain maximum life from ball screw assemblies.
- These values may be greatly reduced if the units are subjected to misalignment, shock loads, side thrust, contamination or lack of proper lubrication and maintenance.

## LIFE EXPECTANCY
### INCH BALL SCREW CUBIC JACKS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>OPERATING LOAD (lb)</th>
<th>UPRIGHT &amp; INVERTED (in.)</th>
<th>UPRIGHT &amp; INVERTED (rotating)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard</td>
<td>High-load</td>
<td>Standard</td>
</tr>
<tr>
<td>0.5C-BSJ</td>
<td>1,000</td>
<td>377</td>
<td>708</td>
</tr>
<tr>
<td>0.5HLC-BSJ</td>
<td>750</td>
<td>893</td>
<td>1,678</td>
</tr>
<tr>
<td></td>
<td>500</td>
<td>3,014</td>
<td>5,662</td>
</tr>
<tr>
<td>1C-BSJ</td>
<td>250</td>
<td>24,111</td>
<td>45,259</td>
</tr>
<tr>
<td>1HLC-BSJ</td>
<td>2,000</td>
<td>133</td>
<td>2,019</td>
</tr>
<tr>
<td></td>
<td>1,500</td>
<td>316</td>
<td>7,875.9</td>
</tr>
<tr>
<td></td>
<td>1,000</td>
<td>1,089</td>
<td>14,752</td>
</tr>
<tr>
<td></td>
<td>500</td>
<td>8,518</td>
<td>129,218</td>
</tr>
</tbody>
</table>

### NOTES:
- Refer to Lubrication Instructions in order to obtain maximum life from ball screw assemblies.
- These values may be greatly reduced if the units are subjected to misalignment, shock loads, side thrust, contamination or lack of proper lubrication and maintenance.
### 0.5C-BSJ & 0.5CHL-BSJ

**Top View**

**Model**
- **0.5C-BSJ**
  - Capacity: 0.5 tons
  - Screw: 0631-0200
  - Gear Ratio: 5:1
  - Turns of Worm for 1” Travel: 25
  - Max Input Torque (in-lb): 9.5
  - Max Allowable Input Torque (lb-in): \( \frac{1}{4} \)
  - Tare Drag Torque (in-lb): 1
  - Backdrive holding torque (% lb): 10

- **0.5C-BSJ**
  - 20:1
  - Turns of Worm: 100
  - Max Input Torque (in-lb): 4.0
  - Max Allowable Input Torque (lb-in): \( \frac{1}{6} \)
  - Tare Drag Torque (in-lb): 1
  - Backdrive holding torque (% lb): 25

**Model**
- **0.5CHL-BSJ**
  - Capacity: 0.5 tons
  - Screw: 0631-0500
  - Gear Ratio: 20:1
  - Turns of Worm for 1” Travel: 40
  - Max Input Torque (in-lb): 10.2
  - Max Allowable Input Torque (lb-in): \( \frac{1}{4} \)
  - Tare Drag Torque (in-lb): 1
  - Backdrive holding torque (% lb): 1

Screw Specs:
- Root diameter (in): 0.500
- Start torque = \( 1.5 \times \) Running Torque
- Approximate weight (lb-in)
- "0" Travel: 3.5
- Per inch Travel: 0.3
- Grease: 0.3

**Caution:** Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

### Specifications & Data

- **Max Input Torque**
  - Model 0.5C-BSJ: 9.5 in-lb
  - Model 0.5C-BSJ: 4.0 in-lb
  - Model 0.5CHL-BSJ: 10.2 in-lb

- **Max Allowable Input Torque**
  - Model 0.5C-BSJ: \( \frac{1}{4} \) lb-in
  - Model 0.5C-BSJ: \( \frac{1}{6} \) lb-in
  - Model 0.5CHL-BSJ: \( \frac{1}{4} \) lb-in

- **Tare Drag Torque**
  - Model 0.5C-BSJ: 1 in-lb
  - Model 0.5C-BSJ: 1 in-lb
  - Model 0.5CHL-BSJ: 1 in-lb

- **Backdrive holding torque**
  - Model 0.5C-BSJ: 10%
  - Model 0.5C-BSJ: 25%
  - Model 0.5CHL-BSJ: 10%

### Options

- **Ball Nut and Flange**
  - Model 0.5C-BSJ: M8 x 1.25 - 6H - .51 Deep
  - Model 0.5CHL-BSJ: M5 x 0.8 - 6H - .394 Deep

- **Ball Nut Position**
  - Position A
  - Position B for opposite

- **Motor Mounts**
  - See pg 180-181

For specifications and data, this publication is intended for accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be repaired without charge (exceptly exempted, no liability is assumed beyond such replacement).
### NOOK PRECISION ACTUATORS

#### CUBIC JACKS

**NOOK PRECISION ACTUATORS**

**CUBIC JACKS**

---

**1C-BSJ & 1CHL-BSJ TOP VIEW**

---

**1C-BSJ & 1CHL-BSJ UPRIGHT**

**1C-BSJ & 1CHL-BSJ INVERTED**

---

**NON-KEYED**

**KEYED**

---

**1C-BSU-UK & 1CHL-BSU-UK UPRIGHT KEYED**

**1C-BSU-IK & 1CHL-BSU-IK INVERTED KEYED**

---

- **Caution:** Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

---

**Screw Specs:**
- Root diameter (in): 0.602
- Start torque = 1.5 x Running Torque
- Approximate weight (lbs)
- "0" Travel: 72
- Per inch travel: 0.04
- Grease: 0.5

---

**Capacity:** 1 ton

**Screw:** 0750-0200

---

**Capacity:** 1 ton

**Screw:** 0750-0500

---

**Tare Drag (in-lb)**

**Allowable input torque (in-lb)**

**Backdrive holding torque (in-lb)**

**Turns of Worm for 1" Travel**

**Max Worm Torque (in-lb)**

**Max Worm Speed at Rated Load (rpm)**

**Max Load at 1,750 rpm (lb)**

**Max Worm Speed at Rated Load (rpm)**

**Max Load at 1,750 rpm (lb)**

---

- **1C-BSJ**
  - Gear Ratio: 5:1
  - Capacity: 1 ton
  - Screw: 0750-0200

- **1CHL-BSJ**
  - Gear Ratio: 5:1
  - Capacity: 1 ton
  - Screw: 0750-0500

---

**1C-BSJ Ball Nut and Flange**

**1CHL-BSJ Ball Nut and Flange**

---

**For specifications and details:**

- **see pg 180-181**
## Mini Cubic Jacks

### Specifications and Data

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### NOOK Precision Actuators

#### Cubic Jacks

<table>
<thead>
<tr>
<th>Model</th>
<th>Gear Ratio</th>
<th>Turns of Worm for 1&quot; Travel</th>
<th>Torque at 1,000 lb. Load (in-lb)</th>
<th>Max Allowable Input (hp)</th>
<th>Screw Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>MJC-20</td>
<td>5:1</td>
<td>20</td>
<td>19.3</td>
<td>1/8</td>
<td>1/4-4</td>
</tr>
<tr>
<td>MJC-25</td>
<td>5:1</td>
<td>25</td>
<td>20.7</td>
<td>1/8</td>
<td>1/4-5</td>
</tr>
<tr>
<td>MJC-40</td>
<td>5:1</td>
<td>40</td>
<td>16.7</td>
<td>1/8</td>
<td>1/4-8</td>
</tr>
<tr>
<td>MJC-50</td>
<td>5:1</td>
<td>50</td>
<td>13.5</td>
<td>1/8</td>
<td>1/4-10</td>
</tr>
<tr>
<td>MJC-80</td>
<td>20:1</td>
<td>80</td>
<td>8.0</td>
<td>1/8</td>
<td>1/4-4</td>
</tr>
<tr>
<td>MJC-100</td>
<td>20:1</td>
<td>100</td>
<td>8.7</td>
<td>1/8</td>
<td>1/4-5</td>
</tr>
<tr>
<td>MJC-160</td>
<td>20:1</td>
<td>160</td>
<td>7.0</td>
<td>1/4</td>
<td>1/4-8</td>
</tr>
<tr>
<td>MJC-200</td>
<td>20:1</td>
<td>200</td>
<td>5.7</td>
<td>1/4</td>
<td>1/4-10</td>
</tr>
</tbody>
</table>

**Lifting Screw**
- For non-keyed units, the lifting screw must be secured to prevent rotation.
- Caution: Jack may be self-lowering in some operating conditions.

**Model Notes**
- Mini Jack Standard: Start torque = 2 × Running Torque
- Approximate weight (lbs): 0.2
- Grease: 0.5

**Motor Mounts**
- See pg 180-181

---

### Cubic Jack Options (Standard Steel Parts)

**Top Parts (Optionals)**: MJC-20-12
- With 1/4" UNF-2A Acme nut
- Position A, Specify position B for opposite

**Mini Cubic Jack Nut and Flange**
- 2 × .59 Ø .59
- 2 × .6295 Ø .6322
- 3.57 Ø2.25

---

**Cubic Jacks**

- Online: 2D/3D CAD

---

nookindustries.com
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**NON-KEYED**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Input HP</th>
<th>Max allowable Input (hp)</th>
<th>Max Input Torque (in-lb)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Torque to raise 1 lb (n-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1C-MSJ</td>
<td>5:1</td>
<td>25</td>
<td>45</td>
<td>1/2</td>
<td>3</td>
<td>0.0225</td>
<td>700</td>
<td>800</td>
<td>0.0259</td>
<td>608</td>
</tr>
</tbody>
</table>

**KEYED**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Worm for 1&quot; Travel</th>
<th>Max Input Torque (in-lb)</th>
<th>Input HP</th>
<th>Max allowable Input (hp)</th>
<th>Max Input Torque (in-lb)</th>
<th>Tare Drag Torque (in-lb)</th>
<th>Torque to raise 1 lb (n-lb)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,750 rpm (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1C-MSJ</td>
<td>20:1</td>
<td>100</td>
<td>21</td>
<td>1/2</td>
<td>3</td>
<td>0.0105</td>
<td>750</td>
<td>857</td>
<td>0.0121</td>
<td>651</td>
</tr>
</tbody>
</table>

Screw Specs:
- Root diameter (in): 0.502
- Screw lead (in): 0.200
- Start torque = 2 x Running Torque
- Approximate weight (lbs):
  - 0" Travel: 0.2
  - Per inch travel: 0.3
- Grease: 0.5

Lifting screw must be secured to prevent rotation for non-keyed units.

Caution: Jack may be self-lowering in some operating conditions.

**1ABC-MSJ-U UPRIGHT ANTI-BACKLASH**

**1ABC-MSJ-I INVERTED ANTI-BACKLASH**

**1C-MSJ UK UPRIGHT & INVERTED KEYED**

**1C-MSJ-UR UPRIGHT & INVERTED ROTATING**

**1C-MSJ-U TOP VIEW**

For specifications and order information, please refer to the Nook Industries website: nookindustries.com
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---

### EM05C-BSJ Table

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Capacity (kN)</th>
<th>Raise for One Turn of Worm (mm)</th>
<th>Max Input Torque (N·m)</th>
<th>Max Allowable Input (kW)</th>
<th>No Load Torque (N·m)</th>
<th>Backdrive Holding Torque (N·m)</th>
<th>Torque to Raise 1 kN (N·m)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,425 rpm (kN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM05C-BSJ</td>
<td>5:1</td>
<td>5</td>
<td>100</td>
<td>1.21</td>
<td>0.21</td>
<td>0.11</td>
<td>1.0</td>
<td>0.24</td>
<td>1,625</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>20:1</td>
<td>5</td>
<td>0.25</td>
<td>0.51</td>
<td>0.09</td>
<td>0.11</td>
<td>0.5</td>
<td>0.10</td>
<td>1,625</td>
<td>5.0</td>
</tr>
</tbody>
</table>

**Screw Specs:**
- Screw: MRT 16x6
- Root diameter (mm): 12.9
- Start torque = 1.5 x Running Torque
- Drag torque (N·m): 0.11
- Approximate weight (kg):
  - 0" Travel: 1.68
  - Per 100mm travel: 0.14
- Graphite: 0.14

**Caution:** Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.
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**NOOK PRECISION ACTUATORS**

**EM1C-BSJ**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Capacity (kN)</th>
<th>Raise for One Turn of Worm (mm)</th>
<th>Max Input Torque (N·m)</th>
<th>Max Allowable Input (kW)</th>
<th>No Load Torque (N·m)</th>
<th>Backdrive Holding Torque (N·m)</th>
<th>Torque to Raise 1 kN (N·m)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,425 rpm (kN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM1-BSJ</td>
<td>5:1</td>
<td>10</td>
<td>1.00</td>
<td>2.41</td>
<td>0.38</td>
<td>0.34</td>
<td>2.0</td>
<td>.24</td>
<td>1,500</td>
</tr>
<tr>
<td></td>
<td>20:1</td>
<td>10</td>
<td>0.25</td>
<td>1.14</td>
<td>0.19</td>
<td>0.34</td>
<td>1.0</td>
<td>.11</td>
<td>1,585</td>
</tr>
</tbody>
</table>

**Screw Specs:**
- Screw: MRT 20x6
- Root diameter (mm): 175
- Start torque = 15 x Running Torque
- Drag torque (N·m): 0.34
- Approximate weight (g)
  - 5” Travel: 3.3
  - Per 100mm Travel: 0.23
- Grease: 0.23

**Caution:** Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

**EM1C-BSJ Ball Nut and Flange**

**EM1C-BSJ Options (Standard Steel Parts)**

**Motor Mounts**

See pg 180-181
**EM05C-MSJ**

**TOP VIEW**

**EM05C-MSJ U UPRIGHT & INVERTED**

**EM05C-MSJ UR UPRIGHT & INVERTED ROTATING**

The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

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**NOOK PRECISION ACTUATORS**

**CUBIC JACKS**

**EM05C-MSJ**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Capacity (kN)</th>
<th>Raise for One Turn of Worm (mm)</th>
<th>Max Input Torque (N/m)</th>
<th>Max Allowable Input (kW)</th>
<th>No Load Torque (N/m)</th>
<th>Torque to Raise 1 kN (N/m)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,425 rpm (kN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM05C-MSJ</td>
<td>5:1</td>
<td>5</td>
<td>0.80</td>
<td>2.25</td>
<td>0.27</td>
<td>0.11</td>
<td>0.45</td>
<td>1,130</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>20:1</td>
<td>5</td>
<td>0.21</td>
<td>0.94</td>
<td>0.13</td>
<td>0.11</td>
<td>0.19</td>
<td>1,300</td>
<td>4.6</td>
</tr>
</tbody>
</table>

**Screw Specs:**
- Screw: Tr16x4
- Root diameter (mm): 10.9
- Start torque = 2 × Running Torque
- Approximate weight (kg)
- “0” Travel: 1.36
- Per 100mm travel: 0.12
- Grease: 0.23

Lifting screw must be secured to prevent rotation for non-keyed units.

Caution: Jack may be self-lowering in some operating conditions.

**EM05C-MSJ Nut and Flange**

**EM05C-MSJ Options (Standard Steel Parts)**

**Motor Mounts** see pg 180-181

**Keyway**
- M8 × 1.25 - 6H - 13.0 Deep
- 4 × Nearside
- 4 × Farside
- 4 × Ø 8.5 Thru

**M5 × 0.8 - 6H - 4.3 Deep**

**M10 × 1.5 - 6g - 20 TYP.**

**EM05-MSJ Options (Standard Steel Parts)**

**Top Plate (optional): 9000-EM-12**

**Clevis End (optional): 9001-EM-12**

**Motor Mounts** see pg 180-181

Lift nut must be secured at travel A, specify groove B for opposite rotation.

Caution: Jack may be self-lowering in some operating conditions.
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EM1C-MSJ

**Screw Specs:**
- Screw: Tr20x4
- Root diameter (mm): 14.9
- Start torque = 2 × Running Torque
- Approximate weight (lbf)
  - 0" Travel: 24
  - Per 100mm travel: 0.19
- Grease: 0.23

Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Gear Ratio</th>
<th>Capacity (kN)</th>
<th>Raise for One Turn of Worm (mm)</th>
<th>Max Input Torque (N·m)</th>
<th>Max Allowable Input (kW)</th>
<th>No Load Torque (N·m)</th>
<th>Torque to Raise 1 kN (N·m)</th>
<th>Max Worm Speed at Rated Load (rpm)</th>
<th>Max Load at 1,425 rpm (kN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM1C-MSJ</td>
<td>5:1</td>
<td>10</td>
<td>0.80</td>
<td>5.19</td>
<td>0.36</td>
<td>0.34</td>
<td>0.52 N·m</td>
<td>666 rpm</td>
<td>4.7 kN</td>
</tr>
<tr>
<td></td>
<td>20:1</td>
<td>10</td>
<td>0.20</td>
<td>2.44</td>
<td>0.19</td>
<td>0.34</td>
<td>0.24 N·m</td>
<td>730 rpm</td>
<td>5.1 kN</td>
</tr>
</tbody>
</table>

EM1C-MSJ-UR UPRIGHT & INVERTED ROTATING
No ordering, specify "U" dimension (worm is longer)

EM1C-MSJ Options Nut and Flange

EM1C-MSJ Options (Standard Steel Parts)

Motor Mounts
See pg 180-181
ACCESSORIES

Nook Industries offers many accessories to accommodate specific applications. From motor mounts to limit switches to lubricant, Nook has the jack accessories to realize the linear motion needs of any application.

- MOTOR MOUNTS: pages 180-181
- RIGHT ANGLE REDUCERS: page 182-187
- MOTORS: page 188
- SERVO/STEP MOTORS: page 188
- HANDWHEELS: page 189
- HANDBRAKES: page 190
- MITER GEAR ASSEMBLIES: page 191
- LINKJAC™ SHAFTING: page 192-193
- COMPACT LIMIT SWITCHES: page 196-197
- ROTARY LIMIT SWITCH: page 198-199
- NOOK SENSOR SYSTEM: page 200-201
- FLEXIBLE COUPLINGS: page 194-195
- IN-LINE ENCODERS: page 202
- COUNTERS: page 203
- CONTROL PANELS: page 204-205
- TRUNNION ADAPTERS: page 206-207
- BELLOWS BOOTS: page 208-209
- PILLOW BLOCKS: page 210
- LUBRICATION AND PAINT: page 211-212
MOTOR MOUNTS WITH AND WITHOUT BRAKEMOTORS

ActionJac™ Motor Mount assemblies are designed for standard motors and include jaw type couplings. These assemblies are available for the jack sizes listed in the table. Non-standard motor sizes can be designed for special requirements including, special couplings, small NEMA frame motors, DIN standard motors, stepper motor and servomotor designs. See page 190 for Servo Jack motor mount examples, contact Nook Industries for additional information.

ActionJac™ Worm Gear Screw Jacks can be ordered with industrial quality induction motors. Motors with internally and externally wired brake motors are available. Brake motors utilize an integral, spring actuated brake. Standard motors are 3-phase, 230-460 VAC, 60Hz, 1.725 rpm. Single-phase motors are 115-130 VAC, 60Hz, 1.725 rpm. All motors are rated for continuous duty. Specific duty motors such as wash down extended duty may be supplied upon request.

See charts for order codes and motor mount dimensions. Additional motor mount configurations can be custom manufactured for other jack sizes, please contact Nook Engineering.

**CAUTION:** Ball Screw Jacks are self-lowering. A brake of sufficient torque is required to hold the load with a ball screw jack. Be sure to verify that the brakemotor selected has sufficient brake torque for your application.

**MOTOR MOUNT MOUNTING POSITIONS**

1. Mounting Position
2. Mounting Position

**HOW TO ORDER A MOTOR ADAPTER WITH OR WITHOUT A BRAKEMOTOR**

**EXAMPLE WITHOUT MOTOR:**
2.5-BSJ-U 6:1 / X05 / 1 / SSE-2 / FT / 12.0 / S
No Motor Order Code
Mounting Position (see page 188)

**EXAMPLE WITH MOTOR:**
2.5-BSJ-U 6:1 / X05 / 1 / SSE-2 / FT / 12.0 / S
Motor Product Code
Mounting Position

**METRIC MOTOR MOUNTS**

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<th>MODEL</th>
<th>IEC FRAME</th>
<th>MOTOR SIZE</th>
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</table>

For all other sizes and configurations, contact Nook Engineering.
RIGHT ANGLE REDUCERS

The right angle reducer is a secondary worm gear reducer that reduces speed and increases torque to the input of the jack. If motor clearance is an issue, a right angle reducer may be added to most jacks to optimize motor orientation. Right-Angle Reducers are available in two different styles; High Efficiency and Standard Efficiency.

Right Angle Reducers may be installed on the standard ActionJac™ Machine Screw and Ball Screw Jacks listed below at the time of the order and are available with or without brakemotors. Right Angle Reducers may be installed on the standard ActionJac™ Machine Screw and Ball Screw Jacks listed below at the time of the order and are available with or without brakemotors.

HIGH EFFICIENCY RIGHT-ANGLE REDUCERS

The High Efficiency Right-Angle Reducer is a compact, high quality worm gear reducer enclosed in an aluminum casted housing. The reducer mounts directly to the input side of the jack. Motors mount quill-style to a standard NEMA C-face. The High Efficiency Right-Angle Reducers are non-vented, oil filled, and maintenance free. They are rated at 85% or greater efficiency - allowing for a smaller drive and motor when compared with standard efficiency right-angle reducers.

High Efficiency Right-Angle Reducers are available in a variety of NEMA motor mounts. Consult the data charts for jack capacity when a Right-Angle Reducer is used. Ratings given on the chart may differ when a Right-Angle Reducer is used. Consult the data charts for jack capacity when a Right-Angle Reducer is used. They are rated at 85% or greater efficiency - allowing for a smaller drive and motor when compared with standard efficiency right-angle reducers.

HOW TO ORDER A RIGHT ANGLE REDUCER

Right-Angle Reducer ratio, mounting position, and brakemotor size and type must be specified. The data chart below gives order codes for Right-Angle Reducers with and without brakemotors. Insert the order code and mounting position as shown on page 31, 69, 103, 123, 141, and 161.

EXAMPLE: 2.5 BSJ-U 6:1 / 05BSR7-7 / 2CA2 / FT / 24.5 / S

Motor Product Code (see page 188)

Mounting Position (see page 185)

BALL SCREW JACKS

<table>
<thead>
<tr>
<th>Jack Model Ratio</th>
<th>Reducer Ratio</th>
<th>Travel Rate*</th>
<th>Dynamic Capacity per Motor Horsepower (lb)**</th>
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<tbody>
<tr>
<td>2.5 BSJ-6:1</td>
<td>5:1</td>
<td>14.38</td>
<td>3,780 5,000 7,490 10,000 12,700 15,180</td>
</tr>
<tr>
<td>7.5:1</td>
<td>9.58</td>
<td>5,000</td>
<td>7,490 10,000 12,700 15,180</td>
</tr>
<tr>
<td>10:1</td>
<td>7.19</td>
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<td>7,490 10,000 12,700 15,180</td>
</tr>
<tr>
<td>15:1</td>
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<td>7,490 10,000 12,700 15,180</td>
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<td>10:1</td>
<td>7.19</td>
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<td>4.79</td>
<td>5,000</td>
<td>7,490 10,000 12,700 15,180</td>
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</tbody>
</table>

Motor Product Code: 2.5HL-BSJ-6:1 / 05BSR7-7 / 2CA2 / FT / 24.5 / S

* measured in in/min at the max rated rpm of 1,725 rpm
** Full nominal static capacity of jack is retained

The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of these products for a specific application. NOOK does not assume any liability for any damages incurred from the use of this data or this publication. ©2021 NOOK Industries, Inc.
### Machine Screw Jacks

#### Jack Model/Ratio

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<th>Reducer Rate</th>
<th>Travel Rate*</th>
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<th>1/2</th>
<th>3/4</th>
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<th>1 1/2</th>
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<td>75 9.58</td>
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* measured in in/min @ 1,725 rpm

** Full nominal static capacity of jack is retained

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**RIGHT ANGLE REDUCERS (CONTINUED)**

### High Efficiency Right-Angle Reducers

#### Dimensions (in)

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<th>Jack Size</th>
<th>NEMA Frame</th>
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<th>B</th>
<th>C</th>
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<td>0.22</td>
<td>3.19</td>
<td>1.97</td>
</tr>
<tr>
<td>5 TON</td>
<td>56C, 140TC</td>
<td>7.99</td>
<td>10.09</td>
<td>2.19</td>
<td>3.54</td>
<td>3.31</td>
<td>1.97</td>
<td>5.90</td>
<td>0.43</td>
<td>6.50</td>
<td>0.11</td>
<td>4.40</td>
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</tr>
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<td>10/15 TON</td>
<td>56C, 140TC</td>
<td>9.22</td>
<td>11.92</td>
<td>2.60</td>
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<td>20 TON</td>
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<td>8.35</td>
<td>0.43</td>
<td>6.50</td>
<td>0.10</td>
<td>2.60</td>
<td>3.38</td>
</tr>
</tbody>
</table>

**Jack Motor Mount**

*The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. No liability is assumed beyond such replacement.*
The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

Ball Screw Jacks

<table>
<thead>
<tr>
<th>Jack Model</th>
<th>Ratio</th>
<th>Size</th>
<th>Travel Rate</th>
<th>Dynamic Capacity (lbs)**</th>
<th>Reducer Dimensions (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5-BSJ-6:1</td>
<td>6:1</td>
<td>12.0 1½</td>
<td>5,000</td>
<td>05BSR6 02TR6 X05R6 56C</td>
<td>Motor Size</td>
</tr>
<tr>
<td>12:1</td>
<td>1.8</td>
<td>½</td>
<td>5,000</td>
<td>03BSR12 02TR12 X05R12 56C</td>
<td>Mounting Position</td>
</tr>
<tr>
<td>2.5-HLBSJ-6:1</td>
<td>6:1</td>
<td>5.99 1½</td>
<td>5,000</td>
<td>02BSR6 02TR6 X05R6 56C</td>
<td>Motor Size</td>
</tr>
<tr>
<td>12:1</td>
<td>4.49 1½</td>
<td>5,000</td>
<td>02TR6 X05R6 56C</td>
<td>Mounting Position</td>
<td></td>
</tr>
<tr>
<td>5-BSJ-6:1</td>
<td>6:1</td>
<td>22.7 1</td>
<td>7,500</td>
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<tr>
<td>2.5-HLBSJ-6:1</td>
<td>6:1</td>
<td>4.79 1½</td>
<td>5,000</td>
<td>02BSR6 02TR6 X05R6 56C</td>
<td>Motor Size</td>
</tr>
<tr>
<td>12:1</td>
<td>2.99 1½</td>
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<td>02TR6 X05R6 56C</td>
<td>Mounting Position</td>
<td></td>
</tr>
<tr>
<td>5-BSJ-24:1</td>
<td>6:1</td>
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<td>5,000</td>
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<td>02TR6 X05R6 56C</td>
<td>Mounting Position</td>
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<tr>
<td>2.5-HLBSJ-24:1</td>
<td>6:1</td>
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<td>5,000</td>
<td>02BSR6 02TR6 X05R6 56C</td>
<td>Motor Size</td>
</tr>
<tr>
<td>12:1</td>
<td>1.49 1½</td>
<td>5,000</td>
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<tr>
<td>10-BSJ-8:1</td>
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<td>10,000</td>
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<td>20-BSJ-8:1</td>
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<td>10,000</td>
<td>10BSR10 10TR10 X05R10 56C</td>
<td>Motor Size</td>
</tr>
<tr>
<td>12:1</td>
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<td>10-BSJ-24:1</td>
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</tr>
<tr>
<td>12:1</td>
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<td>10,000</td>
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<td>Mounting Position</td>
<td></td>
</tr>
<tr>
<td>20-BSJ-24:1</td>
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<td>5,000</td>
<td>02BSR6 02TR6 X05R6 56C</td>
<td>Motor Size</td>
</tr>
<tr>
<td>12:1</td>
<td>2.99 1½</td>
<td>5,000</td>
<td>02TR6 X05R6 56C</td>
<td>Mounting Position</td>
<td></td>
</tr>
</tbody>
</table>

** Full nominal static capacity of jack is retained
*** Motor specified is internally wired brake motor, for additional motor options see page 188

Machine Screw Jacks

<table>
<thead>
<tr>
<th>Jack Model</th>
<th>Ratio</th>
<th>Size</th>
<th>Travel Rate</th>
<th>Dynamic Capacity (lbs)**</th>
<th>Reducer Dimensions (in)</th>
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</thead>
<tbody>
<tr>
<td>2.5-MSJ-6:1</td>
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<tr>
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<td>5,000</td>
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</tr>
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<td>12:1</td>
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</tr>
<tr>
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<td>6:1</td>
<td>18.0 1½</td>
<td>10,000</td>
<td>10BSR10 10TR10 X05R10 56C</td>
<td>Motor Size</td>
</tr>
<tr>
<td>12:1</td>
<td>9.88 1½</td>
<td>10,000</td>
<td>10BSR12 10TR12 X05R12 56C</td>
<td>Mounting Position</td>
<td></td>
</tr>
<tr>
<td>5-MSJ-24:1</td>
<td>6:1</td>
<td>18.0 1½</td>
<td>10,000</td>
<td>10BSR10 10TR10 X05R10 56C</td>
<td>Motor Size</td>
</tr>
<tr>
<td>12:1</td>
<td>9.88 1½</td>
<td>10,000</td>
<td>10BSR12 10TR12 X05R12 56C</td>
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</table>

** Full nominal static capacity of jack is retained

Right-Angle Reducer Positions

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Mounting Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5-BSJ-U</td>
<td>6:1</td>
</tr>
</tbody>
</table>

The standard efficiency Right-Angle Reducer is a compact, high quality worm gear reducer enclosed in a ductile iron housing. The reducer mounts directly to the input side of the jack. Motors mount quill style to a NEMA C-face.

Consult the data charts for jack capacity when a Right-Angle Reducer is used. Ratings given on the chart may differ when a Right-Angle Reducer with and without brakemotors. Insert the order code and mounting position as shown on page 31, 69, 103, 125, 141, and 161.

Example: 2.5-BSJ-U 6:1 / 2CA-1 / 05BSR6 / FT / 24.5 / S
BRAKEMOTOR REFERENCE

ActionJac™ Worm Gear Screw jacks can be supplied with industrial quality. Brake motors include a spring actuated, electrically released braking mechanism which will hold a load when the power is off. In normal operation, power is applied and removed to the motor windings and brake release simultaneously.

If it is desired to operate the brake separately, as when used with a speed control, the brake needs to be wired externally. Motors provided by Nook Industries can either be supplied with the brake wired externally to accommodate speed controllers, or internally for simplicity of use.

SERVO/STEPPER MOTORS

ActionJac™ Servo or Stepper Jacks offer the ability to attach a servo or stepper motor to a ball screw or machine screw jack. Using a servo or stepper motor increases control of acceleration, deceleration, travel rate and positioning accuracy compared with standard NEMA framed motors.

HANDWHEELS

A handwheel is a convenient solution for manually operating a jack when using machine screw jacks in intermittent positioning applications. Handwheels are available in a range of diameters from 4 to 10 inches and can be adapted for use on jacks from the MJ series up to the 20 ton capacity model.

NOTE: Handwheels do not include a brake and therefore are not for use with ball screw jacks. When using handwheels with a jack that can backdrive (12:1 and lower) an additional locking mechanism may be required to prevent “creep.”

<table>
<thead>
<tr>
<th>JACK SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
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<tr>
<td>MJ</td>
<td>4</td>
<td>.75</td>
<td>1</td>
<td>3</td>
<td>2 1/4</td>
<td>3 1/16</td>
</tr>
<tr>
<td>1-MSJ</td>
<td>4</td>
<td>.50</td>
<td>1</td>
<td>3</td>
<td>2 1/4</td>
<td>3 1/16</td>
</tr>
<tr>
<td>2-MSJ</td>
<td>4</td>
<td>.50</td>
<td>1</td>
<td>3</td>
<td>2 1/4</td>
<td>3 1/16</td>
</tr>
<tr>
<td>2.5-MSJ</td>
<td>4</td>
<td>.50</td>
<td>1</td>
<td>3</td>
<td>2 1/4</td>
<td>3 1/16</td>
</tr>
<tr>
<td>5-MSJ</td>
<td>6</td>
<td>.75</td>
<td>2</td>
<td>3 1/2</td>
<td>2 3/16</td>
<td>7 1/8</td>
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<td>2</td>
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<td>2 3/16</td>
<td>7 1/8</td>
</tr>
<tr>
<td>15-MSJ</td>
<td>8</td>
<td>1</td>
<td>2 1/2</td>
<td>4 1/8</td>
<td>3 1/8</td>
<td>10 1/8</td>
</tr>
<tr>
<td>20-MSJ</td>
<td>8</td>
<td>1</td>
<td>2 1/2</td>
<td>4 1/8</td>
<td>3 1/8</td>
<td>10 1/8</td>
</tr>
</tbody>
</table>

HOW TO ORDER A JACK WITH A HANDWHEEL

1. Select the jack size
2. Select the Mounting Position
3. Order the handwheel

EXAMPLE:

2.5-MSJ / 24 / H064 / SSE-2 / FT / 12.0 / S

Below is a partial list of companies we have designed servo and stepper motor adaptors for:

- Allen Bradley
- Baldor
- Reliance
- Kolmorgen
- Mitsubishi
- Siemens
- Applied Motion
- Yasawa
- Parker
- Bosch Rexroth

Below is a partial list of companies we have designed planetary gear reducer adapters for:

- Racine
- Apex
- Alpha
- CDI

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### HANDBRAKES
A handbrake is a convenient solution for manually securing machine screw jacks. Handbrakes can be used on machine screw jacks 2.5 ton to the 5 ton capacity. Handbrakes can be ordered with either a standard shaft extension, an extended shaft extension, or with a handwheel. See page 189 for handwheel details.

### HANDBRAKE AS A KIT
Handbrake Kits come with Handbrake, Adjustable Handle, two socket head cap screw (SHCS), and two lock washers. To install, remove two adjacent SHCS, and lock washers securing the End Cap. Discard SHCS and lock washers. Clean shaft from any debris or contamination. Slide the Handbrake over the shaft until fully against the End Cap. Install the provided SHCS and lock washers in place of the two that were removed, securing the Handbrake and End Cap in place.

### HANDBRAKE POSITIONS

<table>
<thead>
<tr>
<th>Jack Size</th>
<th>Kit Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5-MSJ</td>
<td>HB-025</td>
</tr>
<tr>
<td>5-MSJ</td>
<td>HB-050</td>
</tr>
</tbody>
</table>

### HOW TO ORDER A JACK WITH A HANDBRAKE

**EXAMPLE:**

- 2.5-MSJ & 6.1 / HBT 1 / SSE-2 / FT / 12.0 / S

Product Code (from chart above)

<table>
<thead>
<tr>
<th>Mounting Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>HBE</td>
</tr>
<tr>
<td>HBT</td>
</tr>
<tr>
<td>HB.*</td>
</tr>
</tbody>
</table>

Example of counter designations:

- HBT2 - Handbrake with extended shaft extension, position 2
- Dash number designates mounting position

### CAUTION - Handbrakes are only intended to prevent “creep” due to vibration with machine screw jacks only. They are not designed to be used with ball screw jacks.

Depending on the magnitude of vibration and application life cycles, the handbrake may not be sufficient to secure the load. Handbrakes are not intended to be used where personal injury could occur.

### STANDARD MITER GEAR ASSEMBLIES

Jacks may be used in multiple arrangements by connecting shafting, couplings and gear boxes to simultaneously transmit power to the input shafts of the jacks. Nook Industries provides gearboxes for use with jacks. Make certain that the total torque and horsepower required by the arrangement does not exceed the ratings of the box. For optimum life and noise levels, operate below 900 rpm. Higher speeds are permissible at lower torque ratings. Noise levels may increase at higher speeds. The operating efficiency of a miter gear box is 90%.

#### GEAR RATIO 1:1 AND 2:1

Jacks may be used in multiple arrangements by connecting shafting, couplings and gear boxes to simultaneously transmit power to the input shafts of the jacks. Nook Industries provides gearboxes for use with jacks. Make certain that the total torque and horsepower required by the arrangement does not exceed the ratings of the box. For optimum life and noise levels, operate below 900 rpm. Higher speeds are permissible at lower torque ratings. Noise levels may increase at higher speeds. The operating efficiency of a miter gear box is 90%.

#### Gears are forged alloy steel. Shafts are stressproof steel ground and polished. Clockwise (CW) and counterclockwise (CCW) rotations indicate direction of shaft rotation when facing outer end of shaft. All shaft arrangements will operate opposite direction for that shown. To order specify model number and desired shaft arrangement.

#### GB210, GB210S, GB210S-R2
GB210, GB210S, and GB210S-R2 are filled with EP-90 Gear lubricant at time of shipment. GB15 and GB12 are shipped dry. Fill with EP-90 Gear lubricant of the correct grade.

### JACK ACCESSORIES

#### GB210, GB210S, GB210S-R2
GB210, GB210S, and GB210S-R2 are filled with EP-90 Gear lubricant at time of shipment. GB15 and GB12 are shipped dry. Fill with EP-90 Gear lubricant of the correct grade.
**LINKJAC™ SHAFTING**

ActionJac™ LinkJac™ Line Shafting is used to interconnect the input shafts of ActionJac™ Worm Gear Screw Jacks used in multiple arrangements. The shafts transfer the torque from the motor to the jack or from jack to jack. LinkJac™ is available in either steel Line Shafting available in standard lengths up to 144”, or in aluminum Tubular Shafting with bonded journals of stainless steel available in lengths up to 196”. Custom end machining and other diameters are available. Contact Nook Industries for information.

**SELECTION:**

There are two major concerns when selecting interconnect shaft:

- **Critical Speed:** How fast will the shaft be turning?
- **Torsional Twist:** How much torque will the shafts be transmitting?

The two characteristics of a LinkJac™ Line Shaft or Tubular Shafting which can be varied to accommodate these requirements are:

- Length of the shaft
- Diameter of the shaft

When selecting a LinkJac™ Line Shaft or Tubular Shafting, use the largest diameter or shortest length which satisfies both of the following equations.

**CRITICAL SPEED**

The speed that excites the natural frequency of the screw is referred to as the critical speed.

Since the speed can also be affected by shaft straightness and assembly alignment, it is recommended that the maximum speed be limited to 80% of the calculated critical speed value. The theoretical formula to calculate critical speed in rpm is:

\[ N_{\text{speed}} = 0.6192 \times \left( \frac{L}{C_t} \right)^{1/2} \times C_s \]

**TORSIONAL TWIST**

The degree of twist experienced by LinkJac™ Line Shaft or Tubular Shafting when a given amount of torque is applied. To insure proper synchronization of ActionJac™ motion, it is recommended not to exceed 1° of twist. The theoretical formula to calculate torsional twist in degrees is:

\[ N_{\text{twist}} = T \times \frac{L}{C_t} \]

**LINE SHAFTING**

- **OD (in)** Keyway (in) Length (in) OD (mm) Keyway (mm) Length (mm)
- **LJ-8** 5/32 (1.6) - - 8 0.3 16 1.92
- **LJ-12** 7/32 (2.3) - - 12 0.47 24 2.62
- **LJ-16** 9/32 (2.8) - - 16 0.56 32 3.55
- **LJ-24** 11/32 (3.3) - - 24 0.68 48 4.32

**METRIC TUBULAR SHAFTING**

- **OD (in)** Keyway (mm) Length (in) OD (mm) Keyway (mm) Length (mm)
- **LJT-27** 27 (68) 5 \times 2.5 27 68 5 \times 2.5 27
- **LJT-40** 40 (102) 6 \times 3 40 102 6 \times 3 40
- **LJT-50** 50 (127) 6 \times 3 50 127 6 \times 3 50
- **LJT-60** 60 (152) 8 \times 3 60 152 8 \times 3 60

**DESIGN INFORMATION**

The length used in the previously listed formulas is the unsupported length of the shaft. If support bearings are used on the shaft, the length is the longest unsupported length between bearings.

The previously listed formulas give a theoretical value of critical speed and torsional twist. Alignment, straightness and stiffness of the shaft all contribute to determining the actual value.

The torque in the system is also limited by the torque capacity of the coupling.

Nook Industries offers a range of couplings for use with LinkJac™ Line Shaft or Tubular Shafting and ActionJac™ products in both floating shaft and supported shaft applications. See pages 190-191 for more information.

*When adding modified keyways to standard LinkJac™ shafting, please contact Nook Engineering.*
### FLEXIBLE COUPLINGS

Jacks used alone or in multiple arrangements require couplings to transmit power to the input shaft. Nook Industries provides jaw type and flex type couplings for use with jacks. The selection process for couplings includes the following steps:

1. Refer to the jack specification tables to determine torque requirements per jack for your application.

2. Determine total coupling capacity required by multiplying the torque required per jack by the number of jacks to be driven by the coupling.

3. Check the torque required against maximum torque rating as shown in the table. Select a coupling with a maximum torque greater than the application torque.

4. If using flex type couplings, full-flex couplings should be used for close coupled arrangements. For floating shaft applications, use two flex-rigid couplings. The rigid half should be mounted on the floating shaft.

All jacks, shafts, couplings and motor should be carefully aligned for maximum performance. Couplings with bores other than those specified are available upon request.

### JAW TYPE SERIES

<table>
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<tr>
<th></th>
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<tbody>
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<td>C-3020-01</td>
<td>111</td>
<td>0.10</td>
<td>12</td>
</tr>
<tr>
<td>C-3025-01</td>
<td>150</td>
<td>0.30</td>
<td>93</td>
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<td>150</td>
<td>0.30</td>
<td>93</td>
</tr>
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<td>C-3025-03</td>
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<td>0.30</td>
<td>93</td>
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<td>150</td>
<td>0.30</td>
<td>93</td>
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<td>C-3025-05</td>
<td>150</td>
<td>0.30</td>
<td>93</td>
</tr>
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<td>93</td>
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<tr>
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### HEAVY DUTY SERIES

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<td>12</td>
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<tr>
<td>C-1800-02</td>
<td>150</td>
<td>0.30</td>
<td>93</td>
<td>2.60, 1.57, 0.98</td>
</tr>
<tr>
<td>C-1800-03</td>
<td>150</td>
<td>0.30</td>
<td>93</td>
<td>2.60, 1.57, 0.98</td>
</tr>
<tr>
<td>C-1800-04</td>
<td>150</td>
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<td>93</td>
<td>2.60, 1.57, 0.98</td>
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<td>C-1800-05</td>
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<td>2.60, 1.57, 0.98</td>
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<td>93</td>
<td>2.60, 1.57, 0.98</td>
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### ECONOMY SERIES

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
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<tbody>
<tr>
<td>C-1810-01</td>
<td>111</td>
<td>0.10</td>
<td>12</td>
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<td>C-1810-02</td>
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<td>2.60, 1.57, 0.98</td>
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<td>C-1810-03</td>
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<td>93</td>
<td>2.60, 1.57, 0.98</td>
</tr>
</tbody>
</table>

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nookindustries.com
COMPACT LIMIT SWITCH (CLS) PATENT PENDING

Every motorized Worm Gear Screw Jack must be controlled so that power to the motor is turned off and the brake engaged before the limits of mechanical travel are reached. The ActionJac™ Compact Limit Switch (CLS) senses extension shaft rotation and provides switch contact closures that can be used to control motors.

The CLS is an economical way to detect travel limits and prevent over travel of the Worm Gear Screw Jacks. The Single Pole Double Throw (SPDT) limit switches are useful for limiting the maximum and minimum extension.

The CLS is wired as a normally closed circuit, but can easily be wired as a normally open circuit. The CLS is provided with a standard terminal block for ease of set up. The CLS limit switches are adjustable in the field with the removal of the easily accessible enclosure cover.

The CLS is designed to accommodate a variety of standard options, which include a Hall Effect, Potentiometer, and Reed Switch. The potentiometer version is used to provide an analog signal for sensing jack position. The Hall Effect Sensor and Reed Switch are used to provide a pulse signal to indicate jack travel. The CLS has been designed to meet NEMA 4 standards for dust and water tightness. The CLS can be provided with a variety of gear ratios to accommodate virtually any travel.

TO ORDER A COMPACT LIMIT SWITCH
Specify:
- CLS code listed below
- Mounting position listed on the next page

Insert the correct designation in the ActionJac™ Worm Gear Screw Jack reference number (see page 31 and 69 for more information on jack reference numbers).

EXAMPLE:
2.5-BSJ-U 6:1; CLSH-8; SSE-1; FT/24/S

Product Code: CLSP
Position: SPDT Potentiometer

Examples of compact limit switch designations:
- CLSS-8 — Standard CLS w. SPDT limit switches only, Position #8
- CLSR-4 — Standard CLS w. SPOT limit switches, Reed Switch, Pos 4
- CLSH-3 — Standard CLS w. SPDT limit switches, Hall Effect, Pos 3
- CLSP-1 — Standard CLS w. SPDT limit switches, Potentiometer, Pos 1

IMPORTANT: These designation numbers are not complete part numbers. These assemblies contain gear reducers with ratios that vary according to the model and travel of the jack. If you are ordering a replacement switch assembly, complete information on the jack is required.

FEATURES:
- Light weight
- Twelve gear ratios to accommodate most travels
- Contains two limit switches
- Simple travel adjustment design
- Eight different mounting positions
- Available on 2 ton through 20 ton
- Optional Reed Switch, Hall Effect Sensor, or Potentiometer
- Internal Limit Switch temperature range from -20° to 150°F
- Feedback option available

Switches are factory installed to assure proper assembly in the correct orientation for specified mounting position.

CAUTION: Limit switches are not set at the factory. Switches must be set during installation and prior to use. The limit switch assembly will be permanently damaged if allowed to over travel. CLS is supplied with a plugged access hole. For a watertight connection, water-tight connector and sealant should be used.

The Compact Limit Switch is not intended to be used as a safety device.

ELECTRICAL RATINGS
DC Current — 120 Volts SPDT, 50 amps
AC Current — 250 Volts SPDT, 11 amps

10-TURN POTENTIOMETER: 10,000 Ohms, 2 Watt

TO ORDER

NOTE: While the 10-turn potentiometer is rated for 10,000 Ohms, as implemented in the compact limit switch assembly, it can not and should not operate over its full range. Minimum and maximum resistance values can not be known until the unit is installed and final travel limit adjustments have been made. Therefore, the device connected to the potentiometer should include provisions for trimming to compensate for these values.

JACK ACCESSORIES

WIRING DIAGRAMS

POTENTIALS

REFERENCE PLATE

BLUE

RED

WHITE

10-TURN POTENTIOMETER

STANDARD

REED SWITCH

HALL EFFECT SENSOR

110 VAC

120 VAC

220 VAC

240 VAC

110 VDC

120 VDC

220 VDC
HOW TO ORDER A ROTARY LIMIT SWITCH

SPECIFY:
- Product code (see table in the left column)
- Mounting Position (1 through 8)
- Close or Extended Mount (C or E)

Insert the correct designation in the ActionJac™ Worm Gear Screw Jack reference number (see page 31 and 69 for more information on jack reference numbers).

EXAMPLE:
2.5-MSJ/U61/ SSE-1/ 2CA-4E/ FT/ 245/ S

Examples of rotary limit switch designations:
2CA-4C = Rotary Limit Switch, 2-circuit, SPDT, position 4, close mount
4CE-1E = Rotary Limit Switch, 4-circuit, DPDT, position 1, extended mount

C = Close mount or
E = Extended mount (see following page)

IMPORTANT: These designation numbers are not complete part numbers. These assemblies contain gear reducers with ratios that vary according to the model and travel of the jack. If you are ordering a replacement switch assembly, complete information on the jack is required.

CAUTION: Limit switches are not adjusted at the factory. Switches should be set during installation. Instructions for setting the limit switch is available online at www.nookindustries.com.

EVERY MOTORIZED WORM GEAR SCREW JACK MUST BE CONTROLLED SO THAT POWER TO THE MOTOR IS TURNED OFF AND THE BRAKE ENGAGED BEFORE THE LIMITS OF MECHANICAL TRAVEL ARE REACHED. THE ACTIONJAC™ ROTARY LIMIT SWITCH SENSORS EXTENSION SHAFT ROTATION AND PROVIDES SWITCH CONTACT CLOSURES THAT CAN BE USED TO CONTROL MOTORS.

This sturdy, durable assembly is available with two or four circuits and two circuits and a potentiometer. Each circuit has a separate rotating cam that actuates a high quality switch. The switch actuation may be individually and infinitely adjusted anywhere within the travel of the jack.

These assemblies contain gear reducers with ratios that vary according to the model and travel of the jack. Nook selects ratios that result in maximum cam rotation for best accuracy, repeatability and minimum hysteresis. In most cases, with full travel of the actuator, the cam will rotate 3/8 to 7/8 of a revolution to actuate a switch. In the event that the cam continues to rotate, the switch returns to its original state after approximately 25° of rotation, with no damage to the limit switch assembly.

The 2-circuit switch assembly is useful for limiting the maximum and minimum extension. The 4-circuit assembly gives the possibility of additional signals for other user purposes. The potentiometer version is used to provide an analog signal for sensing jack position. Single Pole Double Throw (SPDT) switches are standard and Double Pole Double Throw (DPDT) switches are optional. These assemblies are dust protected and meet NEMA 4 and 5 standards for oil and water tightness.

The ActionJac™ rotary limit switch assembly is mounted to the extension shaft side of the ActionJac™ Worm Gear Screw Jack opposite the input.

The rotary limit switch is available for ActionJac™ Worm Gear Screw Jack sizes 2 tons and larger. Most jack models have close and extended mounts to provide clearance around the switch housing. See the following chart for dimensions.

Switches are factory installed to assure proper assembly in the correct orientation for the specified mounting position.

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Number of Circuits</th>
<th>Switch Type</th>
<th>Potential Type</th>
<th>CIRCUITS</th>
<th>Dimensions (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2CA</td>
<td>2</td>
<td>SPDT</td>
<td>no</td>
<td>LS-2C 2 CIRCUIT</td>
<td>2.46 5.25 8.24 9.62 1-NPT 3.25</td>
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<tr>
<td>4CA</td>
<td>4</td>
<td>SPDT</td>
<td>no</td>
<td>LS-4C 4 CIRCUIT</td>
<td>2.46 5.25 8.24 9.62 1-NPT 3.88</td>
</tr>
<tr>
<td>2CA</td>
<td>2</td>
<td>SPDT</td>
<td>yes</td>
<td>LS-2PT 2 CIRCUIT/ POTENTIOMETER</td>
<td>2.46 5.25 8.24 9.62 1-NPT 3.88</td>
</tr>
</tbody>
</table>

ROTARY LIMIT SWITCH POSITIONS

CIRCUIT DESCRIPTIONS:
- LS-2C: 2-circuit switch
- LS-4C: 4-circuit switch
- LS-2PT: 2-circuit switch with potentiometer

ELECTRICAL RATINGS:
SWITCHES:
- DC Current — 115 Volts SPDT, 0.50 amps
- DC Current — 125 Volts DPDT, 0.125 amps
- AC Current — 115 Volts SPDT, 0.50 amps
- AC Current — 125 Volts DPDT, 0.125 amps

10-TURN POTentiOMETER:
- 0-500 OHMs, 2 Watt

NOTE: While the 10-turn potentiometer is rated for 0-500 Ohms, as implemented in the rotary limit switch assembly, it can not and should not operate over its full range. Minimum and maximum resistance values can not be known until the unit is installed and final travel limit adjustments have been made, therefore, the device connected to the potentiometer should include provisions for trimming to compensate for these values.

CAUTION: Limit switches are not adjusted at the factory. Switches should be set during installation. Instructions for setting the limit switch is available online at www.nookindustries.com.

WIRING DIAGRAMS:
- SPDT: B A
- DPDT: B A C

To maintain safety, terminals must be common.

Must be the same polarity Switch 1 and 2 can be opposite polarity.
The Nook Sensor System (NSS) is designed to meet the need for low cost position sensing on worm-gear screw jacks. It is highly accurate, with repeatability up to ±.004" (0.1 MM). The patented design allows users to install and adjust sensors on a single screw jack and integrate easily with a motion control system. Since there is zero maintenance, the Nook Sensor System helps control screw jack systems in ways that have never before been possible.

The sensor system is supplied with two PNP or NPN (normally closed) switches. For additional switches or to order a normally open switch, contact Nook Application Engineers.

**PROXIMITY SENSORS**

24Vdc - PNP or NPN, N.C., Three Wires: +V, 0V, and Signal

**MAX OPERATING SPEED WHEN USING THE NOOK SENSOR SYSTEM IS 60 IN/MIN**

**HOW TO ORDER THE NOOK SENSOR SYSTEM™**

**EXAMPLE:** 2.5-MSJ-U 6:1 / SSE-1 / SSE-2 / FT / 8 / PS

Product Code  
P = PNP  
N = NPN

The NSS is designed to allow easy field adjustments. Two magnets are secured to the end of the lift shaft to ensure a positive response once it passes near the position sensor. To adjust the position sensors simply position the lift shaft in the correct position, loosen the locking screw, and then slide the movable sensor to the desired location until the sensor indicates a response. The NSS is supplied with three slots in the stem cover, and two position sensors. Additional sensors can be added or moved to any of the three slots. It is also possible to add multiple sensors to the same slot.

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nookindustries.com
IN-LINE ENCODER
IN-LINE ENCODER IS INSTALLED BETWEEN THE MOTOR ADAPTER AND MOTOR.

For precise position sensing at the input shaft, an ActionJac™ in-line encoder option may be factory installed between the motor and motor adapter or Right-Angle Reducer. This lowcost option requires minimal space, leaving the extension shaft side of the jack free for clearance, for a rotary limit switch, or for coupling to another jack.

The in-line encoder’s quadrature output design allows detection of both speed and direction of shaft rotation.

The ActionJac™ inline encoder option requires an optional motor mount or Right-Angle Reducer.

- Sensing speed range: 0 - 10,000 rpm
- Pulse output: 60 Poles per revolution
- Supply voltage: +6 to 24 Volts DC ±5%
- Supply current: 60 mA typical, 115 mA maximum
- Output drive capability: 250 mA per channel continuous
- Maximum load: 50 ohms per channel

The encoder is face mounted between the motor and motor mount and will offset the length of the motor .61 inches for NEMA 56 and 140 frames and .88 inches for NEMA 180 and 210 frames.

COUNTERS
For precise position display, a range of digital position indicators are available for use with ActionJac™ Worm Gear Screw Jacks. These indicators measure the rotation of the input shaft and display a corresponding position in a counter window. The display value per input shaft revolution is variable and is achieved through a series of gear reductions configured to accommodate different jack ratios, lift shaft leads and travel distances. Contact Nook Industries to determine actual readout scaling available for your application. Not for use with motorized applications. Long travel may result in counter “rolling over.”

SPECIFY:
- Determine Mounting Position
- Count Increase or Decreases with Extension of Shaft

EXAMPLE: 2.5-MSJU 6.1 / SSE-1 / CTI 2 / FT / 24.5 / S
Extension Shaft Designation

Example of counter designations:
CTI-2 – Counter increasing with extension of lift shaft, position 2
Dash number designates mounting position
Product code (see table on the right)

CAUTION: Consult Nook Engineering when adding a counter. Some jack configurations may have limited travel.

HOW TO ORDER AN IN-LINE ENCODER
Specify the Worm Gear Screw Jack reference number, using the system described on page 31, 69, 103, 123, 141, and 161.

EXAMPLE:
2.5-MSJU 6.1 / 10BT-1 / 2CA-4E / FT / 24.5 / E5

Frame Sizes

<table>
<thead>
<tr>
<th>Frame Size</th>
<th>56C/140TC</th>
<th>180TC/210TC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offset A</td>
<td>.61</td>
<td>.88</td>
</tr>
</tbody>
</table>

Product Code

<table>
<thead>
<tr>
<th>Increase or Decrease with Extension of Shaft</th>
<th>Shaft Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEI</td>
<td>without shaft extension</td>
</tr>
<tr>
<td>CED</td>
<td>without shaft extension</td>
</tr>
<tr>
<td>CTI</td>
<td>with worm shaft extension</td>
</tr>
<tr>
<td>CTD</td>
<td>with worm shaft extension</td>
</tr>
<tr>
<td>CAI</td>
<td>with 4&quot; handwheel*</td>
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<tr>
<td>CAD</td>
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<td>with 8&quot; handwheel*</td>
</tr>
<tr>
<td>CDI</td>
<td>with 10&quot; handwheel*</td>
</tr>
<tr>
<td>CDD</td>
<td>with 10&quot; handwheel*</td>
</tr>
</tbody>
</table>

* See handwheel page 189 to select the correct size for jack model.
CONTROL PANELS

Nook Industries control panels are designed to match the motor when shipped from the factory. The control panels are acceptable to use in most industrial environments (including automotive). Functionality of the control panel can be customized to match any application and spare parts are readily available. The control panel interconnects with other safety/control systems.

Benefits:
- The control matches the motor with no design time required
- The control is acceptable to use in most industrial environments (including automotive)
- Spare parts are readily available
- Functionality of the control can be customized to match any application
- The control interconnects with other safety/control systems

Motor Capacities:
- ¼ up to 2 HP 1-phase 115-230V
- ¼ up to 15 HP 3-phase 230-460-575 VAC induction motors with or without electrically operated brakes.
- NEMA 4/12 Enclosures
- NEMA 4X also available

Internal Wiring:
- Per NFPA-79
- Main fuses with disconnect models
- UL Listed

Limit Switches:
All units include the capacity to work with ActionJac™ limit switches, or custom supplied mechanical limit switches

Front Panel Controls include:
- Power Indicator

Front Panel Controls include:
- Maintained stop push-button; main power disconnect switch (optional); extend push-button; retract push-button, in auto mode, the load moves until limit is reached; in jog mode, the load moves while button is pressed.

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- ¼ up to 2 HP 1-phase 115-230V
- ¼ up to 15 HP 3-phase 230-460-575 VAC induction motors with or without electrically operated brakes.
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- The control interconnects with other safety/control systems

Motor Capacities:
- ¼ up to 2 HP 1-phase 115-230V
- ¼ up to 15 HP 3-phase 230-460-575 VAC induction motors with or without electrically operated brakes.
- NEMA 4/12 Enclosures
- NEMA 4X also available

Internal Wiring:
- Per NFPA-79
- Main fuses with disconnect models
- UL Listed

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All units include the capacity to work with ActionJac™ limit switches, or custom supplied mechanical limit switches

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Benefits:
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- Spare parts are readily available
- Functionality of the control can be customized to match any application
- The control interconnects with other safety/control systems

Motor Capacities:
- ¼ up to 2 HP 1-phase 115-230V
- ¼ up to 15 HP 3-phase 230-460-575 VAC induction motors with or without electrically operated brakes.
- NEMA 4/12 Enclosures
- NEMA 4X also available

Internal Wiring:
- Per NFPA-79
- Main fuses with disconnect models
- UL Listed

Limit Switches:
All units include the capacity to work with ActionJac™ limit switches, or custom supplied mechanical limit switches

Front Panel Controls include:
- Power Indicator

Front Panel Controls include:
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- Spare parts are readily available
- Functionality of the control can be customized to match any application
- The control interconnects with other safety/control systems

Motor Capacities:
- ¼ up to 2 HP 1-phase 115-230V
- ¼ up to 15 HP 3-phase 230-460-575 VAC induction motors with or without electrically operated brakes.
- NEMA 4/12 Enclosures
- NEMA 4X also available

Internal Wiring:
- Per NFPA-79
- Main fuses with disconnect models
- UL Listed

Limit Switches:
All units include the capacity to work with ActionJac™ limit switches, or custom supplied mechanical limit switches

Front Panel Controls include:
- Power Indicator

Front Panel Controls include:
- Maintained stop push-button; main power disconnect switch (optional); extend push-button; retract push-button, in auto mode, the load moves until limit is reached; in jog mode, the load moves while button is pressed.

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- The control interconnects with other safety/control systems

Motor Capacities:
- ¼ up to 2 HP 1-phase 115-230V
- ¼ up to 15 HP 3-phase 230-460-575 VAC induction motors with or without electrically operated brakes.
- NEMA 4/12 Enclosures
- NEMA 4X also available

Internal Wiring:
- Per NFPA-79
- Main fuses with disconnect models
- UL Listed

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All units include the capacity to work with ActionJac™ limit switches, or custom supplied mechanical limit switches

Front Panel Controls include:
- Power Indicator

Front Panel Controls include:
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Motor Capacities:
- ¼ up to 2 HP 1-phase 115-230V
- ¼ up to 15 HP 3-phase 230-460-575 VAC induction motors with or without electrically operated brakes.
- NEMA 4/12 Enclosures
- NEMA 4X also available

Internal Wiring:
- Per NFPA-79
- Main fuses with disconnect models
- UL Listed

Limit Switches:
All units include the capacity to work with ActionJac™ limit switches, or custom supplied mechanical limit switches

Front Panel Controls include:
- Power Indicator

Front Panel Controls include:
- Maintained stop push-button; main power disconnect switch (optional); extend push-button; retract push-button, in auto mode, the load moves until limit is reached; in jog mode, the load moves while button is pressed.
Nook ActionJac™ Trunnion adapter plates allow for easy installation in applications where the jack moves through an arc during operation. These jacks are typically configured with motor mounts or right angle reducers.

Trunnion adapter plates bolt to the jack flange and have precision bores for trunnion pins.

**DESIGN INFORMATION**

The trunnion pins should be supported to within 1/16 inch of the trunnion adapter plate. See the “A” dimension in the table for the width of the mounting plate. The maximum distance between the trunnion pin support mounting surfaces should be less than or equal to the “A” dimension plus 0.13 inches.

The trunnion pins should be ground to the “D” diameters shown in the table. The trunnion pins should be made from steel with a hardness greater than 30 HRC and a yield strength greater than 60,000 psi.

| JACK MODEL | TRUNNION PART NO. | A | B | C | D | E | F | G | H | J | P | K | M | N | K | M | N | K | M | N |
| 2.5-MSJ    | TA-0025          | 6.50 | 3.88 | 1.25 | 0.7691 - 0.7479 | 1.25 | 13 | 1.765 | 2.50 | 2.32 | .56 | 4.38 | 1.38 | 5.75 | 4.38 | .69 | 2.06 | 4.38 | 4.38 |
| 5-MSJ      | TA-0050          | 8.25 | 5.75 | 1.50 | 0.8991 - 0.9797 | 1.50 | 13 | 2.188 | 3.13 | 2.94 | .89 | 5.44 | 1.44 | 7.69 | 5.44 | .63 | 3.06 | 5.44 | 5.44 |
| 10-MSJ     | TA-0100          | 10.00 | 7.25 | 2.00 | 1.2448 - 1.2472 | 2.00 | 13 | 2.650 | 3.00 | 2.93 | .88 | 5.75 | 1.75 | 7.75 | 5.75 | .63 | 3.12 | 5.75 | 5.75 |
| 20-MSJ     | TA-0200          | 11.25 | 8.00 | 2.25 | 1.4968 - 1.4972 | 1.75 | 13 | 2.875 | 4.25 | 4.25 | 1.00 | 7.75 | 1.64 | 10.25 | 7.75 | .63 | 3.75 | 7.75 | 7.75 |
| 2.5-BSJ    | TA-0025          | 6.50 | 3.88 | 1.25 | 0.7691 - 0.7479 | 1.25 | 13 | 1.765 | 2.50 | 2.32 | .56 | 6.81 | 2.31 | 8.75 | 6.81 | 1.63 | 2.06 | 4.38 | 4.38 |
| 5-BSJ      | TA-0050          | 8.25 | 5.75 | 1.50 | 0.8991 - 0.9797 | 1.50 | 13 | 2.188 | 3.13 | 2.94 | .89 | 10.00 | 2.31 | 11.88 | 10.00 | 1.75 | 3.06 | 5.44 | 5.44 |
| 10-BSJ     | TA-0100          | 10.00 | 7.25 | 2.00 | 1.2448 - 1.2472 | 1.38 | 13 | 2.600 | 3.00 | 3.13 | .88 | 10.00 | 2.75 | 12.25 | 10.00 | 1.63 | 3.37 | 5.75 | 5.75 |
| 20-BSJ     | TA-0200          | 11.25 | 8.00 | 2.25 | 1.4968 - 1.4972 | 1.75 | 13 | 2.875 | 4.25 | 4.25 | 1.00 | 15.75 | 3.63 | 18.25 | 15.7 | 2.38 | 3.75 | 7.75 | 7.75 |
BELLows BOOTS

STANDARD AND SPECIAL BELLows BOOTS

Bellows boots are available for all sizes and configurations of ActionJac™ Worm Gear Screw Jacks. A boot protects the lifting shaft from contamination and helps retain lubricant to ensure long jack life.

Standard boots are sewn from black neoprene-covered nylon fabric for oil, water and weather resistance and are acceptable for use in -30° to +300°F environments. Optional materials are available for specific operating conditions (see chart).

Guides are recommended for all horizontal applications where travel exceeds 24 inches or if the boot needs to remain centered around the screw. The recommended number of guides is one guide for each 24 inches of travel length.

EXAMPLES: 12 inches of travel = no guides, 24 inches of travel = one guide, 47 inches of travel = two guides, etc.

Standard boots are furnished with tie straps for jacks with greater than 65 inches travel. Tie straps are attached from convolution to convolution and help the boot extend uniformly.

SPECIAL END CONFIGURATIONS

Special end configurations are available for standard boots. Convolution to convolution travel exceeding 24 inches travel are possible with special end configurations. For standard boots the increase in closed height is calculated using the formula shown.

SPECIAL BOOT MATERIALS

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>TEMPERATURE RANGE</th>
<th>APPLICATION COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hytrel-Coated Nylon</td>
<td>-30° to +300°F</td>
<td>Chemical Resistance, Wash Down</td>
</tr>
<tr>
<td>Silicone-Coated Fiberglass</td>
<td>-67° to +550°F</td>
<td>High Temperature</td>
</tr>
<tr>
<td>Aluminum-Coated Fiberglass</td>
<td>-69° to +700°F</td>
<td>High Temperature, Hot Chips, Welding Splatter</td>
</tr>
</tbody>
</table>

Note: Retracted boot length may increase with some special materials.

BELLows BOOTS FOR TRANSLATING SCREW JACKS

The end cuff is designed to fit standard end fittings, the top plate and the clevis end. When jack travel is greater than 6 inches, lift screw closed height increases to accommodate the length of the collapsed boot convolutions. For standard boots the increase in closed height is calculated using the formula shown.

HOW TO ORDER BOOTS FOR A TRANSLATING SCREW JACK

Boots may be ordered using the reference number system as shown below. Installation arrangements for rotating worm gear screw jacks vary, therefore boots for rotating jacks must be specified by the customer.

Examples: 5-MSJ-U 6:1 / SSE-1 / SSE-2 / FT / 36.0 / 0.63

For special material boots add “M” to the reference number and add the description.

EXAMPLE:

5-MSJ-U 6:1 / SSE-1 / SSE-2 / FT / 36.0 / 0.63
B = Standard Boot
G = with Optional Guide(s)

The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. Nook Industries will not be held responsible for changes in prices, design, etc., in原有 items manufactured and supplied.

FREE CATALOGUE

For special material boots add “M” to the reference number and add the description.

EXAMPLE:

5-MSJ-U 6:1 / SSE-1 / SSE-2 / FT / 36.0 / 0.63
B = Standard Boot
G = with Optional Guide(s)
Many applications require longer lift shafts, or jacks that are connected together with a common shaft that is a significant distance apart. Resonance Frequency can cause the lift shaft or link shaft to oscillate and whip, shortening the life of the lift shaft or dislodging the link shafting from its coupling. Radial Support Bearings are used to provide radial support for the lift shaft on rotating style screw jacks, as well as the link shafting products. By adding Radial Support Bearings, you can increase the effective speed of the lift shaft or link shafting.

There are two styles of Radial support Bearings; Flange Mount and Base Mount. The Flange Mount allows for perpendicular mounting with respect to the axis of rotation. The Base mount allow for in-line mounting with respect to the axis or rotation.

**Base Mount Radial Support Bearing**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DIA</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>M</th>
<th>N</th>
<th>P</th>
<th>Q</th>
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**Flange Mount Radial Support Bearing**

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</tbody>
</table>
The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

The jack gear boxes are furnished with a grease fitting and pipe plug. The jack gear boxes are shipped pre-greased unless otherwise specified. Before operating any unit, verify lubricant presence. All jack housings are furnished with a grease fitting and pipe plug.

Before operating any unit, verify lubricant presence. All jack gear boxes are shipped pre-greased unless otherwise specified. Before operating any unit, verify lubricant presence. All jack housings are furnished with a grease fitting and pipe plug. Lubrication inspection is recommended at regular intervals. Once every six months is satisfactory under normal operating conditions, unless experience indicates that regreasing should occur at shorter or longer intervals. Several operating conditions will shorten the lubrication inspection interval.

Lubricants containing additives such as molydisulfide or graphite should not be used. Ball Screw models need only a light film of lubricant on the lift shaft for most applications. Nook E-900 Ball Screw Lubricant may be applied with a cloth or spray. Operating a Ball Screw Jack lift shaft without lubrication will result in a ninety percent reduction in life.

Lubrication intervals for the lift shaft of Machine Screw models are determined by the application. Proper lubrication with E-100 spray lube or PAG-1 grease must be provided to achieve satisfactory service life. It is required that screw assemblies are lubricated often enough to maintain a film of lubricant on the screw.

Lubrication inspection is recommended at regular intervals. Once every six months is satisfactory under normal operating conditions, unless experience indicates that regreasing should occur at shorter or longer intervals. Several operating conditions will shorten the lubrication inspection interval.

Understanding your environmental condition is critical to any successful application.

To maximize life of any Nook Industries products, considering material and paint options is critical. Many of our products can be offered in anti-corrosion material, such as 304 stainless alloys. In addition, Nook Industries provides several paint options for a variety of environmental applications.

**Nook Paints**

**Nook Paint Options**

<table>
<thead>
<tr>
<th>PART NUM.</th>
<th>ENVIRONMENT CONDITIONS</th>
<th>DRY TIME</th>
<th>CURE TIME</th>
<th>PAINT TYPE</th>
<th>COLOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-100-61</td>
<td>Interior; Non-Humid; Clean Conditions</td>
<td>1 hr</td>
<td>7 Days</td>
<td>Quick Dry Enamel</td>
<td>Red/Blue/White</td>
</tr>
<tr>
<td>P-100-72</td>
<td>Exterior; All Weather; UV; Heavy Contamination &amp; Dust</td>
<td>2 Days</td>
<td>7 Days</td>
<td>Sherwin-Williams Acrylon 7300</td>
<td>White</td>
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<td>P-100-75</td>
<td>Exterior; Saltwater; All Weather; UV; Heavy Contamination &amp; Dust</td>
<td>2 Days</td>
<td>7 Days</td>
<td>Sherwin-Williams Sher-Linane 880</td>
<td>White</td>
</tr>
</tbody>
</table>

**ActionJac™ Worm Gear Screw Jacks**

ActionJac™ Worm Gear Screw Jacks are painted with a unique enamel color blend that is specific to Nook Industries. Nook Industries can provide alternative colors and epoxy paints upon request, including specific mil spec paints.

Nook Industries paints are available in 9 oz. aerosol cans in three different colors:

- Blue: P-100-25
- Red: P-100-26
- White: P-100-27
INSTALLATION & MAINTENANCE

INSTALLATION

Alignment of the jack (or jacks) directly affects service life. Jacks must be properly aligned in all planes so that the main drive shaft can be turned without evidence of binding. The following steps are suggested but may not always be applicable when installing jacks. It is the responsibility of the end user to determine specific installation procedures.

1) The mounting flange of the jack is a precision-machined surface. The worm shaft and lift shaft bearing bores are machined in tight relationship to the mounting flange. Better mounting surfaces will make it easier to align the jack to the load. The surfaces to which the jacks are mounted should be flat, smooth and perpendicular to the guides. Note: for rotating worm gear screw jacks, also ensure that the lift shaft is parallel to the guides.

2) Start with the load temporarily supported in a position closest to the jack housing(s). Locate the jack by putting the jack in place with the fasteners loosely assembled.

3) Level the jacks if necessary. For some applications, a piece of compliant material such as the rubber used for machine isolation bases will help compensate for potential misalignment.

4) Check the level of the load, then, actuate the jacks bringing the lift shaft or travel nut (or drive sleeve) greater than 1/4 the screw pitch indicates the need for replacement of the jack lift shaft drive components.

5) Rotate the worms to adjust the timing of the lift shafts as necessary to equally distribute the load. Assemble the load mounting hardware and tighten.

6) Cycle the jacks from closest to farthest point. For rotating jacks with a lift shaft bearing support, loosen the bearing support fasteners and re-tighten to ensure that the lift shaft is parallel to the guide system. Failure to do this could result in lift shaft stress fracture.

7) Cycle the jacks again and verify that no binding occurs. Check the lubrication levels, check the limit switch settings (note: rotary limit switches are not factory set), check the tightness of all fasteners and put the jacks in service.

MAINTENANCE

ActionJac™ Worm Gear Screw Jacks require minimum maintenance. In addition to maintaining lubrication levels in the gearbox, the following items should be checked: Lifting screws must be kept free of contaminants and should be lubricated. Refer to the lubrication section on page 212 for appropriate lubrications. If possible, screws should be booted or returned to retracted position when not in use.

For Machine Screw Jacks, lash between the lift shaft and travel nut (or drive sleeve) greater than 1/4 the screw pitch indicates the need for replacement of the jack lift shaft drive components.

For Ball Screw Jacks, the ball screw should be checked periodically for spalling of the raceway. In normal operation, ball screw lash does not change significantly over the life of the ball screw. For all jacks, check the backlash between the worm and worm gear. Lash in excess of 30° for ratios 5:1 to 8:1 and 60° for ratios 20:1 and 32:1 indicates the need to replace the worm and worm gear.

UNIT CONVERSION CHART

<table>
<thead>
<tr>
<th>ENGLISH TO METRIC</th>
<th>METRIC TO ENGLISH</th>
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<td><strong>Torque</strong></td>
</tr>
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<td>1 ft-lb = .001356 kN-m</td>
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<tr>
<td>1 ft = .3048 m</td>
<td>1 ft-lb = 1.356 N-m</td>
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<tr>
<td>1 in = 25.4 mm</td>
<td>1 ft-lb = 1383 kgf-m</td>
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<td>1 in-lb = .01152 kgf-m</td>
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<table>
<thead>
<tr>
<th><strong>Weight/Force</strong></th>
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<td>1 lb = .454 kgf</td>
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