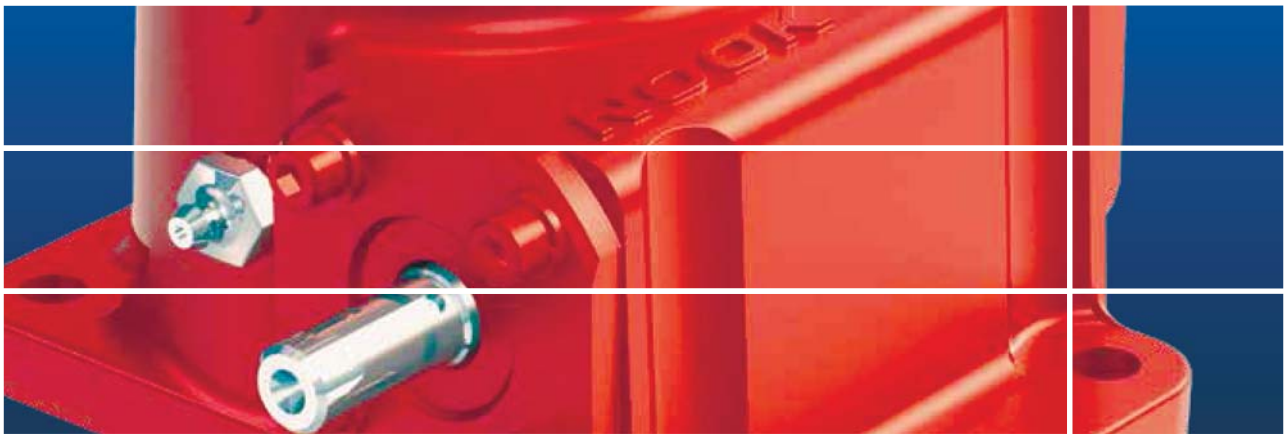


WORM GEAR SCREW JACKS

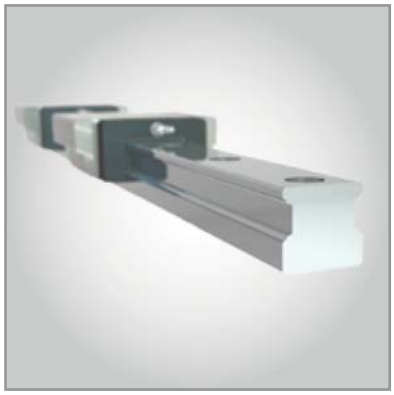
Version 3.00.04

Precision Ball Screws

Ball Splines

CC™ Cylinders

Worm Gear Screw Jacks



Profile Rails

Planetary Roller Screws

NOOK HISTORY

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.

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, stereo-lithography 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.

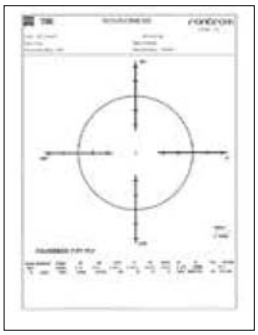
ITAR

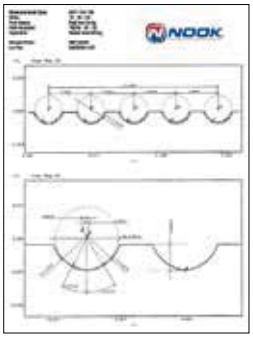
Nook Industries is registered with the Department Of State For International Traffic In Arms Compliance.

INSPECTION CAPABILITY

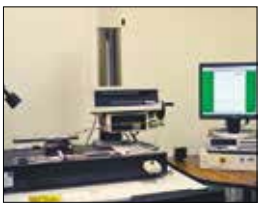
Laser Lead Measurement - Precise lead error gauging is utilized to validate processes to conform to Nook internal specifications and customer requirements.

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

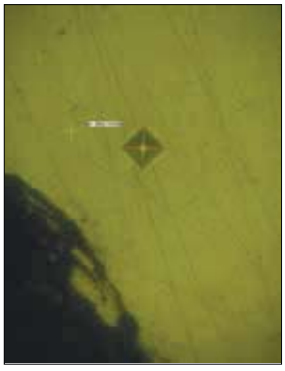




Zeiss Contour Readers - Prior to the start of any production run, thread form geometry is precisely measured to stringent engineering specifications.



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.



Actionjac™

PRECISION SCREW JACK ACTUATORS

Nook worm gear screw jacks are used in many military applications.

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 anti-friction 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.

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.

JACK CONFIGURATIONS

TRANSLATING JACKS

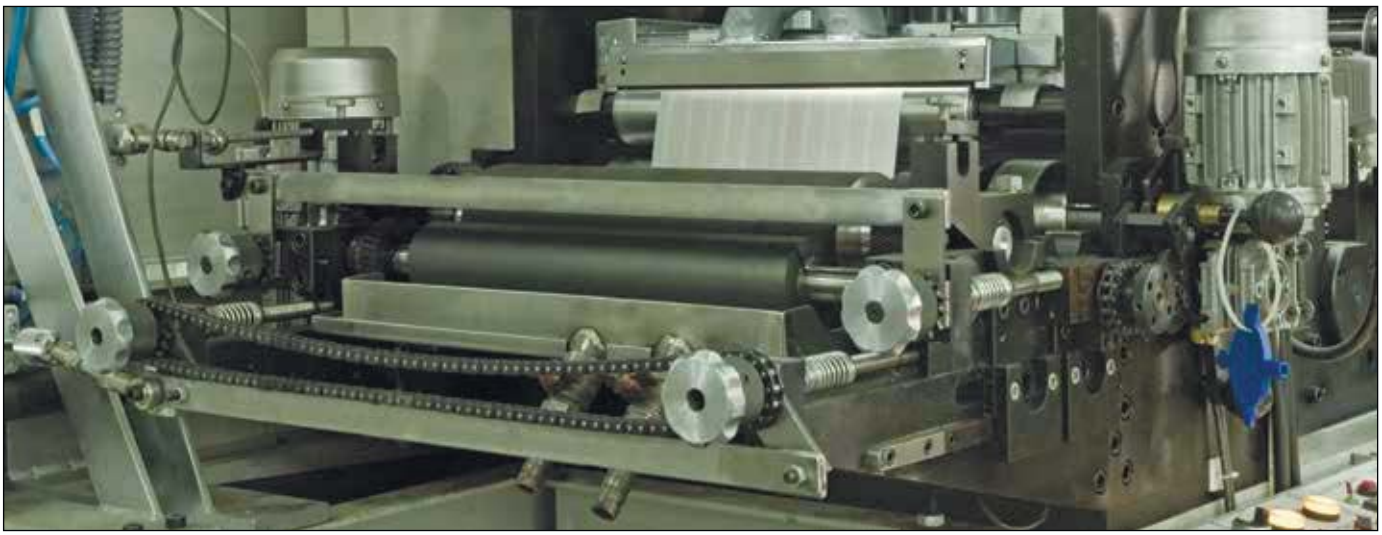
A translating jack has a lifting shaft that moves through the gear box. A nut is integrated with the worm gear such that the worm gear and nut rotate together. When the lift shaft is held to prevent rotation, the lift shaft will move linearly through the gear box to move the load.

Upright Translating
Ball Screw Jack

Upright Translating
Machine Screw Jack

Inverted Translating
Ball Screw Jack

Inverted Translating
Machine Screw Jack



This printing press application utilizes two upright translating ball screw jacks to set the proper gauge on the feed rollers.

NOOK

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.

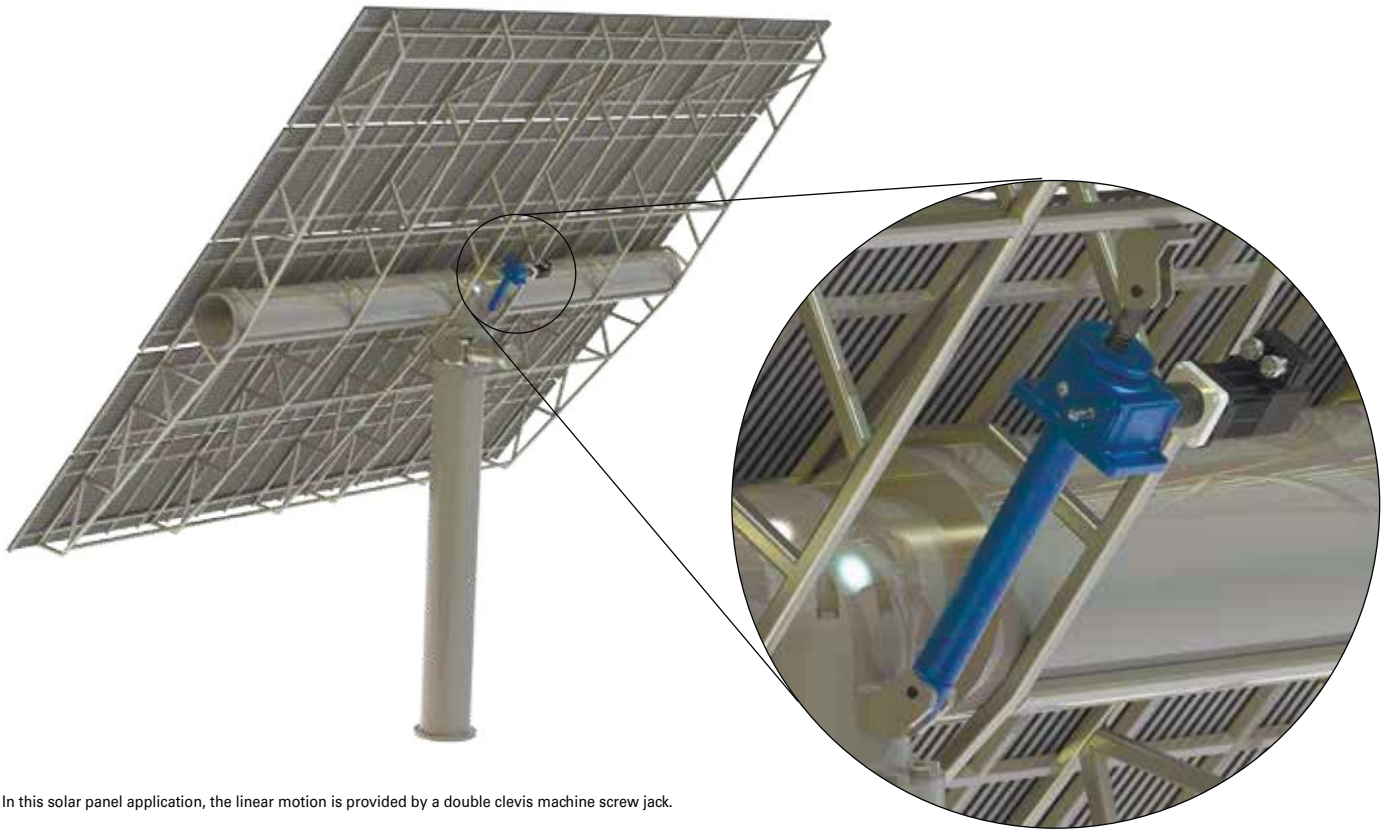
To check column strength limitations for each application, use the extended pin-to-pin dimension and the column strength chart on pages 30 and 68.

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).

Double Clevis
Ball Screw Jack

Double Clevis
Machine Screw Jack



In this solar panel application, the linear motion is provided by a double clevis 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" - 0.005". Precision ball screws with preloaded ball nuts can be supplied to achieve zero lift shaft backlash.

Upright Anti-Backlash Machine Screw Jack

Inverted Anti-Backlash Machine Screw Jack

In this steel press application, the inverted translating anti-backlash jacks set the roller height with precision control.

DEFINITIONS AND TECHNICAL DATA (CONTINUED)

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, are self-locking and, in the absence of vibration, will hold loads without backdriving. All other ratios may 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 represents 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 in standard units 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.

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 jacks 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.

Nook worm gear screw jacks are used widely in sawmills.

DESIGN CONSIDERATIONS (CONTINUED)

For multiple jack arrangements, total horsepower required depends on horsepower per jack, number of jacks, the efficiency of the gear box(es) 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:

$$\text{Horsepower Arrangement} = \frac{\text{HP per jack} \times \text{Number of jacks}}{\text{Arrangement Efficiency} \times (\text{Gearbox Efficiency})^{N}}$$

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. Refer to the acme screw and ball screw technical sections 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.

Charts are provided in each section to determine the required jack size in applications where the lift shaft is loaded in compression. To use the charts (pages 30, 68, 102, 122, 140, 158, and 159), 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.

Maximum Length – The maximum length includes travel, housing length, starting/stopping distance, extra length for boots and length to accommodate attachment of the load.

If column strength is exceeded for the jack selected, consider the following options:

- Change the jack configuration to put the lift shaft in tension
- Increase size of jack.
- Add a bearing mount (like the EZZE-MOUNT™) for rotating jacks.
- Change the lift shaft mounting condition (e.g. from clevis to top plate).

CAUTION: Chart does not include a design factor.

The charts assume 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.

CRITICAL SPEED

The speed that excites the natural frequency of the screw is referred to as the critical speed. Resonance at the natural frequency of the screw will occur regardless of the screw orientation or configurations of the jack (vertical, horizontal, translating, rotating, etc.). The critical speed will vary with the diameter, unsupported length, end fixity and rpm 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

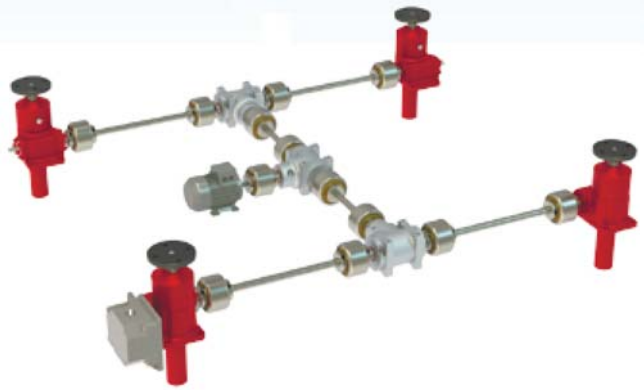
Linear motion systems require both thrust and guidance. Jacks are designed to provide thrust only and provide insufficient guidance support. The guidance system must be designed to absorb all loads other than thrust.

Nook Industries can provide either hardened ground round shafting or square profile rail to support and guide linear motion systems.

NOOK

APPLICATION EXAMPLES

H ARRANGEMENT



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 grip 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 extended 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 the retracted position and be unloaded as they extended. Considering the worst case scenario with the full load at the full extended position, the load will be 16,800 lbs lifted by four jacks, and extended to 6" of travel. When considering column strength, the 2.5-BSJ-U jack can be used.

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.

$$HP_{\text{per jack}} = \frac{.0102 \text{ in-lb} \times 4{,}200 \text{ lb} \times 720 \text{ rpm}}{63{,}025} = .489 \text{ hp / jack}$$ (during extension)

$$HP_{\text{arrangement}} = \frac{.489 \text{ hp per jack} \times 4 \text{ jacks}}{.85 \times (.9)^3} = 2.87 \text{ total hp}$$ (during extension)

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

$$N_{\text{Speed}} = .6192 \times \left(\frac{\pi}{29 \text{ in}}\right)^2 \times 5.851 \times 10^5 = 4{,}252 \text{ rpm}$$

$$N_{\text{Twist}} = 42.84 \text{ in-lb} \times \left(\frac{29 \text{ in}}{6{,}250}\right) = .199°$$

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.

SELECTION

Reference Number: From page 31,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 jacks 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 6:1/2CA-3C/SSE-2/FP/6/S

Gearboxes:

(2) GB210S Type E

(1) GB210S Type D

Shafting:

(4) LJ-12 29" OAL

(2) LT-12 14" OAL

Couplings:

(4) P-2200-185 (½ - ¾)

(8) P-2200-178 (¾ - ¾)

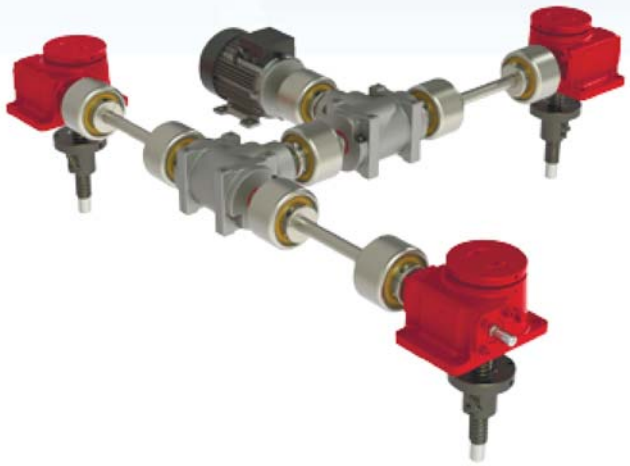
Motor:

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

NOOK

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 insure 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 jacks 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 running at 1750 rpm will be adequate for the requirements.

$$HP_{\text{per jack}} = \frac{.0244 \text{ in-lb} \times 566 \text{ lb} \times 1{,}725 \text{ rpm}}{63{,}025} = .38 \text{ hp / jack}$$

$$HP_{\text{arrangement}} = \frac{.38 \text{ hp per jack} \times 3 \text{ jacks}}{.9 \times (.9)^2} = 1.55 \text{ total hp}$$

LinkJac™ Line Shafting: The longest center to center distance between the jack and gearbox is 24 inches, leaving a shaft length of 17 inches. Using the formula on page 193 based on Torsional Twist, the proper Line Shafting to use would be the LJ-8.

$$N_{\text{Speed}} = .6692 \times \left(\frac{\pi}{17 \text{ in}}\right)^2 \times 3.895 \times 10^5 = 44{,}547 \text{ rpm}$$

$$N_{\text{Twist}} = 41.48 \text{ in-lb} \times \left(\frac{17 \text{ in}}{1{,}235}\right) = .57°$$

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-IR 12:1/SSE-1/SSE-2/FA/15/S

Gearboxes:

(2) GB210 Type D

Shafting:

(2) LJ-8 17" OAL

(1) LJ-8 12" OAL

Couplings:

(3) P-2200-XX (½ - ½)

(5) P-2200-178 (¾- ¾)

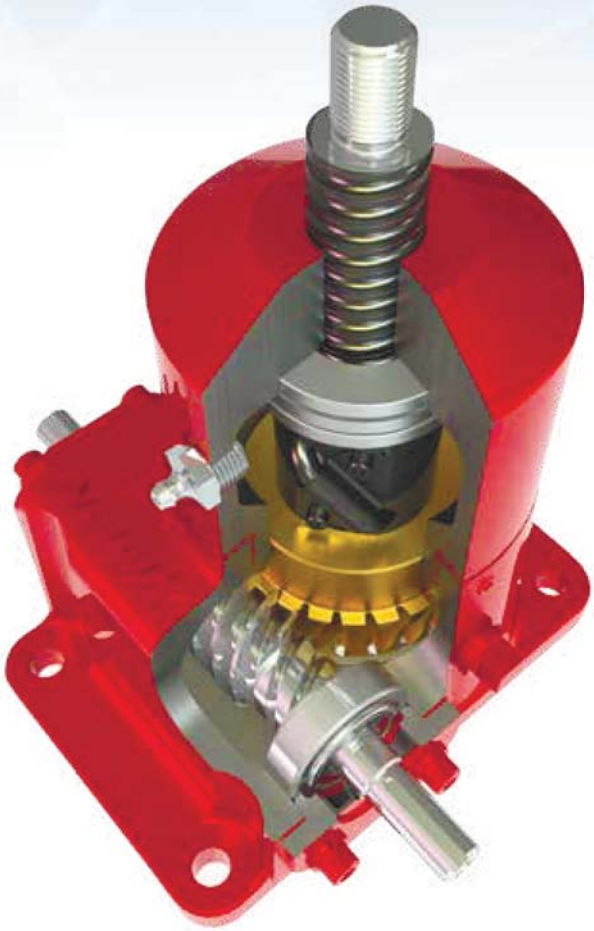
Motor:

2 HP AC Motor 1750 rpm

NOOK™

BALL SCREW JACKS

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.



Nook ball screw jacks are used extensively in the automobile manufacturing industry.

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 inch/foot when shipped from the factory, and do not exceed .030 inch in any 6 foot section.

Material	Surface	Lead Accuracy	Screw Dia.		Screw Lengths
Alloy	black	± .004 in/ft	0.375"	to	up to 24'
			6.000"		

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

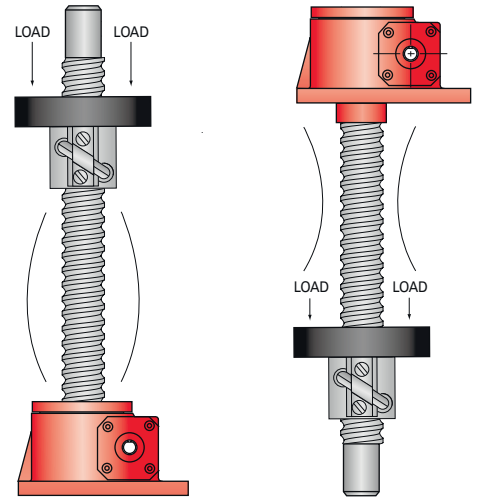
CAPACITY - The maximum thrust load – including shock – that can be applied to the ball nut without damaging the assembly.

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)

FIG. 1



NOOK

QUICK REFERENCE
BALL SCREW JACKS

MODEL	Gear ratio	Capacity (tons)	Lifting Screw Dia (in)	Screw Lead (in)	Root Dia (in)	Turns of Worm for 1" travel	Max input Torque (in.-lb.)	Max Input (hp)	Max Worm Speed at Rated Load (rpm)	Max Load at 1,750 rpm (lb)	Torque to Raise 1 lb. (in-lb)	Tare Drag Torque (in-lb)	Backdrive Holding Torque (ft-lb)
0.5-BSJ	5:1	½	⅝	.200	.500	25	9.5	⅓	1,800	1,000	.0095	1	1.0
	20:1	½	⅝	.200	.500	100	4.0	1/6	1,800	1,000	.0040	1	.25
0.5HL-BSJ	5:1	½	⅝	.500	.500	10	24.2	⅓	868	496	.0242	1	2
	20:1	½	⅝	.500	.500	40	10.2	1/6	1,030	588	.0102	1	1
1-BSJ	5:1	1	¾	.200	.602	25	19	½	1,660	1,895	.0095	3	1.5
	20:1	1	¾	.200	.602	100	9	¼	1,750	2,000	.0045	3	.50
1HL-BSJ	5:1	1	¾	.500	.602	10	48.2	½	654	747	.0241	3	3.5
	20:1	1	¾	.500	.602	40	9	¼	691	790	.0114	3	1.5
2-BSJ	6:1	2	1	.250	.820	24	40	2	1,800	4,000	.0100	4	3
	12:1	2	1	.250	.820	48	26	1½	1,800	4,000	.0064	4	1.5
	24:1	2	1	.250	.820	96	17	½	1,800	4,000	.0043	4	1
2R-BSJ	6:1	2	1	.250	.820	24	40	2	1,800	4,000	.0100	4	3
	12:1	2	1	.250	.820	48	26	1½	1,800	4,000	.0064	4	1.5
	24:1	2	1	.250	.820	96	17	½	1,800	4,000	.0043	4	1
2.5-BSJ	6:1	2½	1	.250	.820	24	51	2	1,800	5,000	.0102	5	4
	12:1	2½	1	.250	.820	48	31	1½	1,800	5,000	.0061	5	2
	24:1	2½	1	.250	.820	96	21	½	1,500	4,287	.0042	5	1.5
2.5HL-BSJ	6:1	2½	1	1.00	.820	6	202	2	624	1,783	.0404	5	14
	12:1	2½	1	1.00	.820	12	122	1½	775	2,214	.0244	5	6
	24:1	2½	1	1.00	.820	24	85	½	371	1,059	.0170	5	5
3-BSJ	6:1	3	1 11/64	.413	.870	14.53	100	2	1,260	4,313	.0167	6	6
	24:1	3	1 11/64	.413	.870	58.10	42	½	750	2,572	.0070	6	2

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.

3) Maximum (allowable) horsepower ratings are based on a 35% 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 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 operate in this range.

For higher or lower operating temperature ranges consult Nook Industries.

NOOK

LIFE EXPECTANCY
BALL SCREW JACKS

MODEL	OPERATING LOAD (lbs)	MINIMUM INCHES OF TRAVEL (in. × 10^3)			
		UPRIGHT & INVERTED		UPRIGHT & INVERTED ROTATING	
		Standard (in)	High-lead (in)	Standard (in)	High-lead (in)
0.5-BSJ 0.5HL-BSJ	1,000	377	708	471	885
	750	893	1,678	116	2,097
	500	3,014	5,662	3,767	7,078
	250	24,111	45,299	56,623	56,623
1-BSJ 1HL-BSJ	2,000	133	2,019	166	2,524
	1,500	316	4,785.9	394	5,982
	1,000	1,065	16,152	1,331	20,190
	500	8,518	129,218	10,648	161,523
2-BSJ 2R-BSJ	4,000	52	—	66	—
	3,000	124	—	155	—
	2,000	419	—	524	—
	1,000	3,351	—	4,189	—
2.5-BSJ 2.5HL-BSJ	5,000	27	63	34	79
	3,750	64	149	79	186
	2,500	215	503	268	629
	1,250	1,716	4,026	2,145	5,031
3-BSJ	6,000	219	—	273	—
	4,500	518	—	648	—
	3,000	1,750	—	2,187	—
	1,500	13,996	—	17,495	—
5-BSJ 5HL-BSJ	10,000	812	346	1,015	432
	7,500	1,925	819	2,406	1,024
	5,000	6,497	2,765	8,121	1,024
	2,500	51,972	22,123	64,965	27,653

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

NOOK

COLUMN STRENGTH
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. 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.

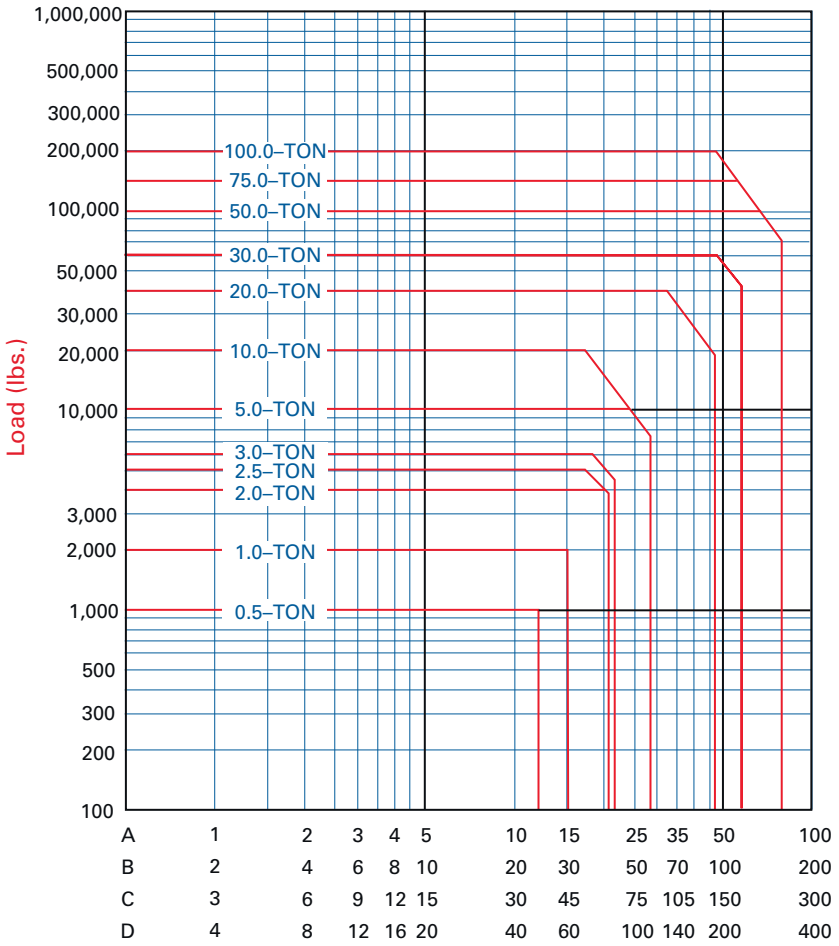
The chart below is used to determine the required jack size in applications where the lift shaft is loaded in compression.

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.

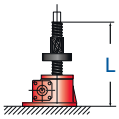
The chart assumes proper jack alignment with no bending loads on the screw. Effects from side loading are not included in this chart. Jacks operating horizontally with long lift shafts can experience bending from the weight of the screw.



MOUNTING CONDITIONS

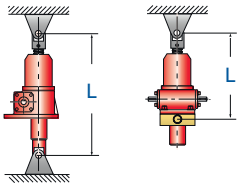
A

ONE END FIXED
ONE END FREE



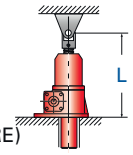
B

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

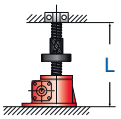


C

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

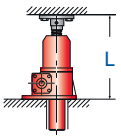


ONE END FIXED,
ONE END
SUPPORTED
(RADIAL BEARING)



D

BOTH ENDS FIXED
(TOP PLATE
ATTACHED TO
GUIDED
STRUCTURE)



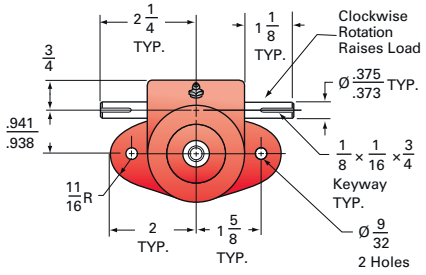
AVAILABLE LIFT SCREW LENGTHS

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 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.

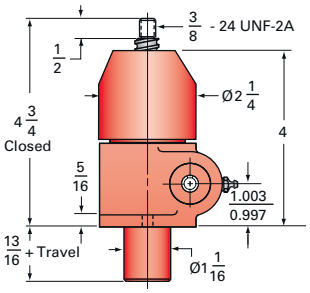
NOOK

0.5-BSJ
0.5HL-BSJ

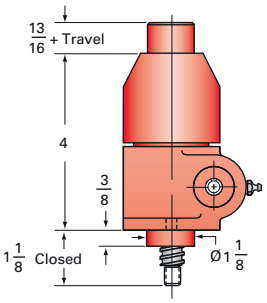
0.5-BSJ & 0.5HL-BSJ TOP VIEW



0.5-BSJ-U & 0.5HL-BSJ-U UPRIGHT



0.5-BSJ-I & 0.5HL-BSJ-I INVERTED



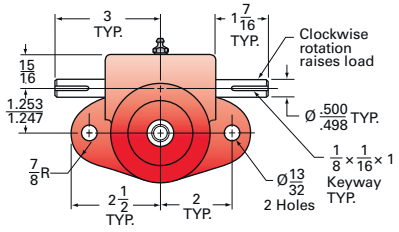
	MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)	Backdrive Holding Torque (ft-lb)
0.5-BSJ	Capacity: 0.5 tons Screw: 0631-0200	5:1	25	9.5	⅓	1	1.0
		20:1	100	4.0	⅙	1	.25
0.5HL-BSJ	Capacity: 0.5 tons Screw: 0631-0500	5:1	10	24.2	⅓	1	2
		20:1	40	10.2	⅙	1	1

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

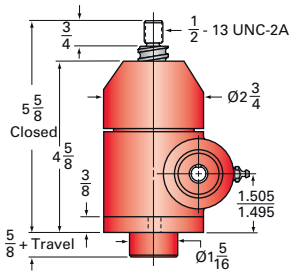
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

1-BSJ

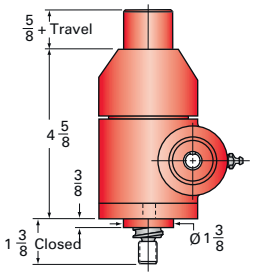
1-BSJ TOP VIEW



1-BSJ-U UPRIGHT



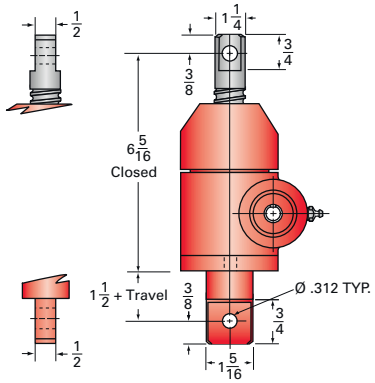
1-BSJ-I INVERTED



MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)	Backdrive Holding Torque (ft-lb)
1-BSJ Capacity: 1 ton Screw: 0750-0200	5:1	25	19	½	3	1.5
	20:1	100	9	¼	3	.5

Screw Specs:
Root diameter (in): 0.602
Start torque = 1.5 × Running Torque
Approximate weight (lbs)
"0" Travel: 8
Per inch travel: 0.04
Grease: 0.5

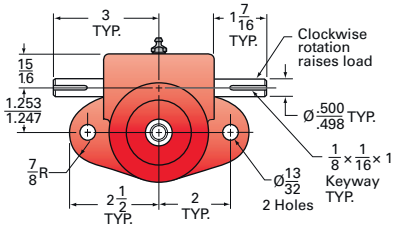
1-BSJ-DC DOUBLE CLEVIS



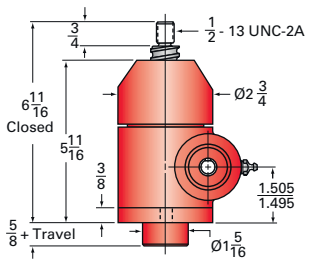
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

1HL-BSJ

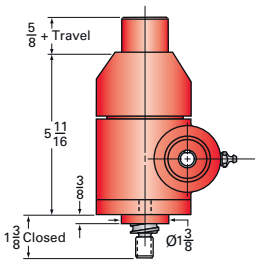
1HL-BSJ TOP VIEW



1HL-BSJ-U UPRIGHT



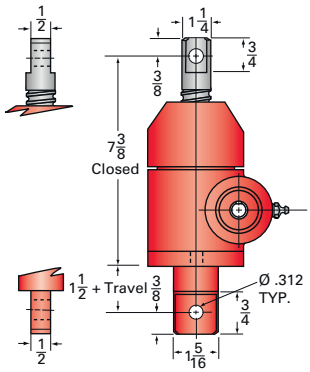
1HL-BSJ-I INVERTED



MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)	Backdrive Holding Torque (ft-lb)
1HL-BSJ Capacity: 1 ton Screw: 0750-0500	5:1	10	48.2	½	3	3.5
	20:1	40	22.8	¼	3	1.5

Screw Specs:
Root diameter (in): 0.602
Start torque = 1.5 × Running Torque
Approximate weight (lbs)
"0" Travel: 8
Per inch travel: 0.04
Grease: 0.5

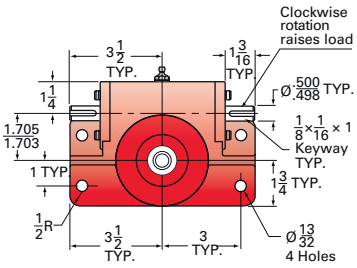
1HL-BSJ-DC DOUBLE CLEVIS



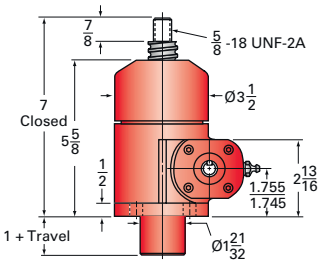
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

2-BSJ

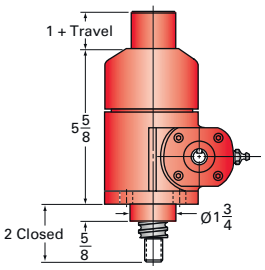
2-BSJ TOP VIEW



2-BSJ-U UPRIGHT



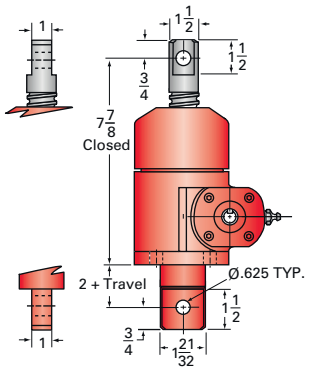
2-BSJ-I INVERTED



MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)	Backdrive Holding Torque (ft-lb)
2-BSJ Capacity: 2 tons Screw: 1000-0250	6:1	24	40	2	4	3
	12:1	48	26	1½	4	1.5
	24:1	96	17	½	4	1

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-DC DOUBLE CLEVIS

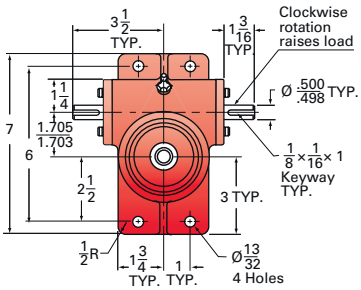


Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

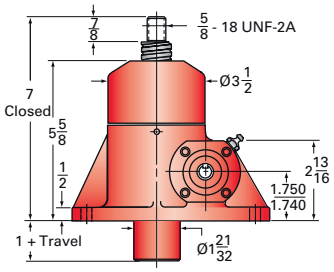
NOOK

2R-BSJ

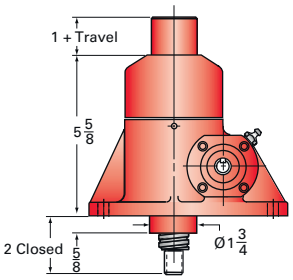
2R-BSJ TOP VIEW



2R-BSJ-U UPRIGHT



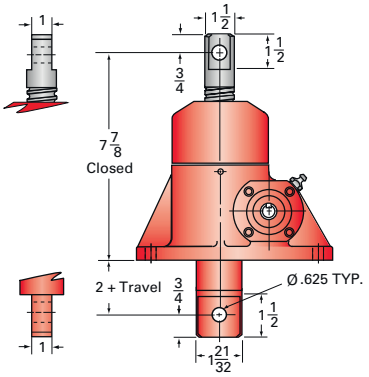
2R-BSJ-I INVERTED



MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)	Backdrive Holding Torque (ft-lb)
2R-BSJ Capacity: 2 tons Screw: 1000-0250	6:1	24	40	2	4	3
	12:1	48	26	1½	4	1.5
	24:1	96	17	½	4	1

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

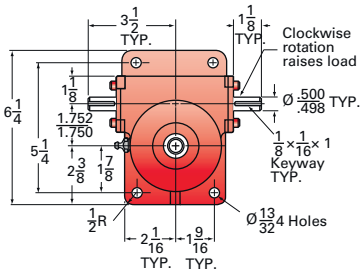
2R-BSJ-DC DOUBLE CLEVIS



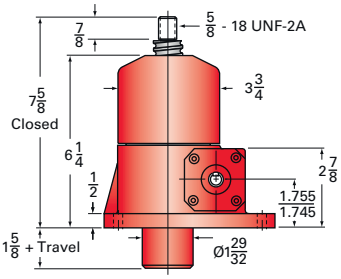
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

2.5-BSJ

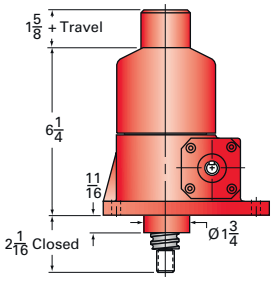
2.5-BSJ TOP VIEW



2.5-BSJ-U UPRIGHT



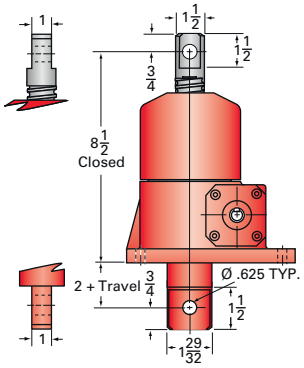
2.5-BSJ-I INVERTED



MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)	Backdrive Holding Torque (ft-lb)
2.5-BSJ	6:1	24	51	2	5	4
Capacity: 2.5 tons Screw: 1000-0250	12:1	48	31	1½	5	2
	24:1	96	21	½	5	1.5

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

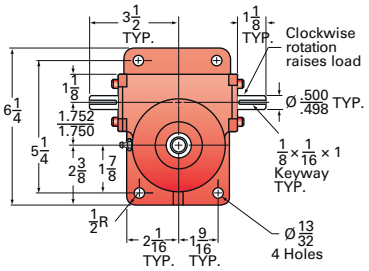
2.5-BSJ-DC DOUBLE CLEVIS



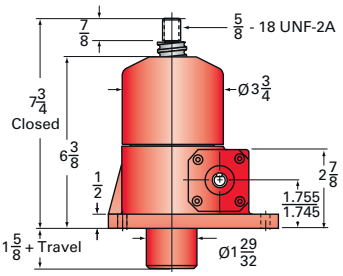
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

2.5HL-BSJ

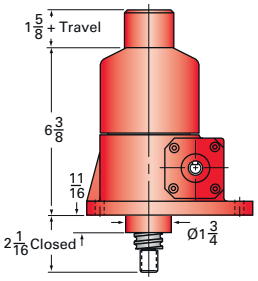
2.5HL-BSJ TOP VIEW



2.5HL-BSJ-U UPRIGHT



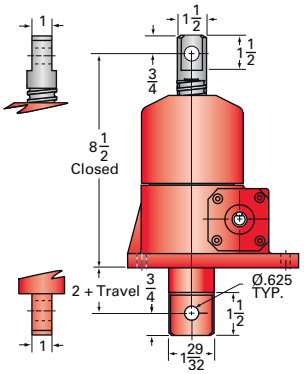
2.5HL-BSJ-I INVERTED



MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)	Backdrive Holding Torque (ft-lb)
2.5HL-BSJ Capacity: 2.5 tons Screw: 1000-1000	6:1	6	202	2	5	14
	12:1	12	122	1½	5	6
	24:1	24	85	½	5	5

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: 0.5

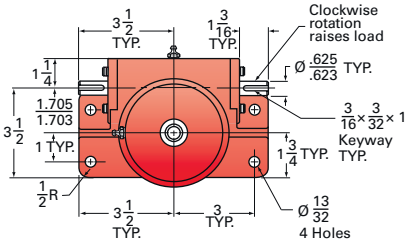
2.5HL-BSJ DOUBLE CLEVIS



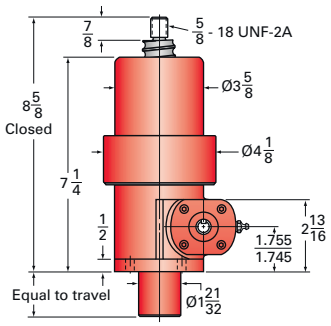
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

3-BSJ

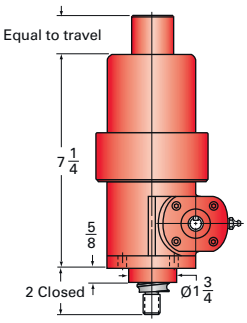
3-BSJ TOP VIEW



3-BSJ-U UPRIGHT



3-BSJ-I INVERTED



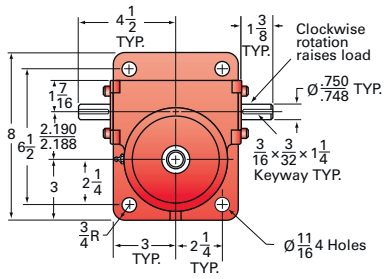
MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)	Backdrive Holding Torque (ft-lb)
3-BSJ	6:1	14.53	100	2	6	6
Capacity: 3 tons Screw: 1171-0413	24:1	58.10	42	½	6	2

Screw Specs:
Root diameter (in): 0.870
Start torque = 1.5 × Running Torque
Approximate weight (lbs)
"0" Travel: 18.5
Per inch travel: 0.6
Grease: 0.5

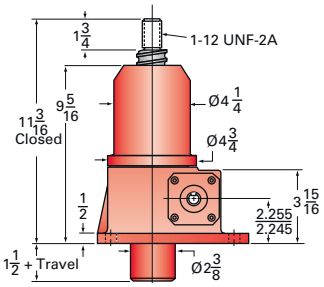
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

5-BSJ
5HL-BSJ

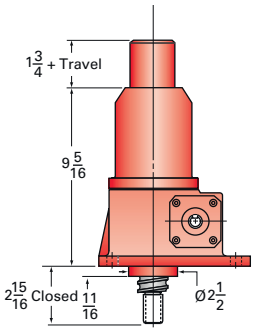
5-BSJ & 5HL-BSJ TOP VIEW



5-BSJ-U & 5HL-BSJ-U UPRIGHT



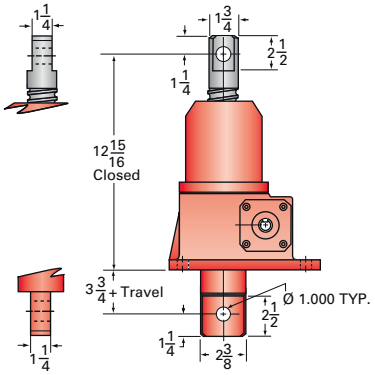
5-BSJ-I & 5HL-BSJ-I INVERTED



MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)	Backdrive Holding Torque (ft-lb)
5-BSJ Capacity: 5 tons Screw: 1500-0473	6:1	12.66	183	3	10	14
	24:1	50.66	73	¾	10	5
5-HL-BSJ Capacity 5 tons Screw: 1500-1000	6:1	6	387	3	10	30
	24:1	24	153	¾	10	10

Screw Specs:
Root diameter (in): 1.140
Start torque = 1.5 × Running Torque
Approximate weight (lbs)
"0" Travel: 35
Per inch travel: 0.6
Grease: 1

5-BSJ-DC & 5HL-BSJ-DC DOUBLE CLEVIS

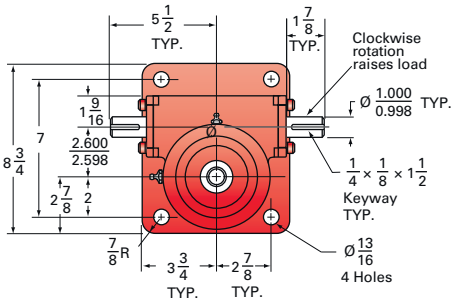


Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

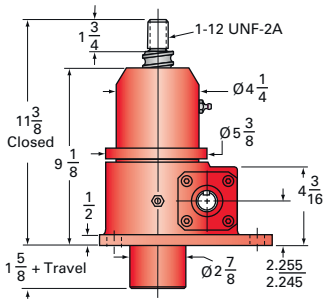
NOOK

10-BSJ
10HL-BSJ

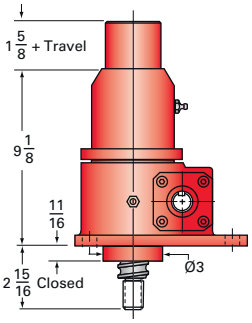
10-BSJ & 10HL-BSJ TOP VIEW



10-BSJ-U & 10HL-BSJ-U UPRIGHT



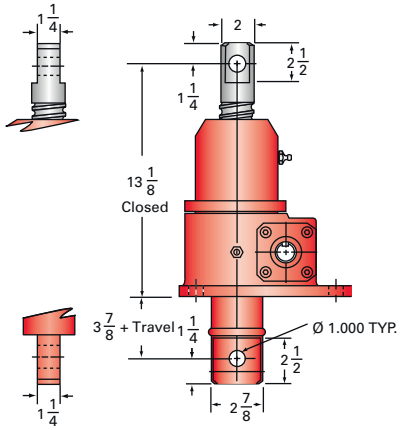
10-BSJ-I & 10HL-BSJ-I INVERTED



MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)	Backdrive Holding Torque (ft-lb)
10-BSJ Capacity: 10 tons Screw: 1500-0473	8:1	16.88	302	5	20	13
	24:1	50.66	153	1½	20	4
10-HL-BSJ Capacity 10 tons Screw: 1500-1000	8:1	8	638	5	20	26
	24:1	24	323	1½	20	6

Screw Specs:
Root diameter (in): 1.140
Start torque = 1.5 × Running Torque
Approximate weight (lbs)
"0" Travel: 50
Per inch travel: 0.8
Grease: 1.5

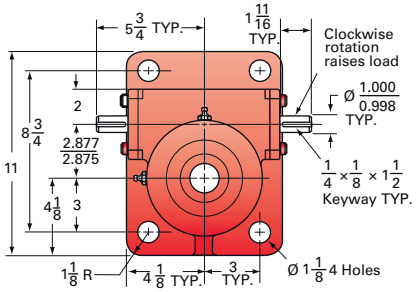
10-BSJ-DC & 10HL-BSJ-DC DOUBLE CLEVIS



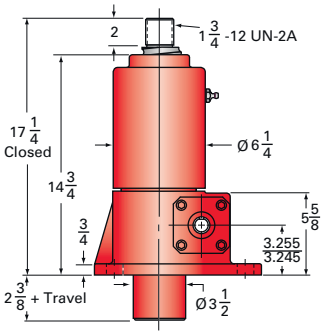
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

20-BSJ
20HL-BSJ

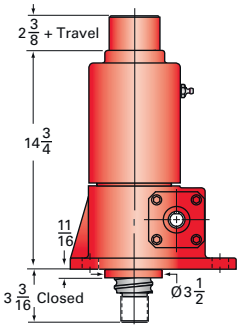
20-BSJ & 20HL-BSJ
TOP VIEW



20-BSJ-U & 20HL-BSJ-U
UPRIGHT



20-BSJ-I & 20HL-BSJ-I
INVERTED



MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)	Backdrive Holding Torque (ft-lb)
20-BSJ Capacity: 20 tons Screw: 2250-0500	8:1	16	626	7½	40	27
	24:1	48	314	2½	40	7
20-HL-BSJ Capacity 20 tons Screw: 2250-1000	8:1	8	1,253	7½	40	54
	24:1	24	628	2½	40	13

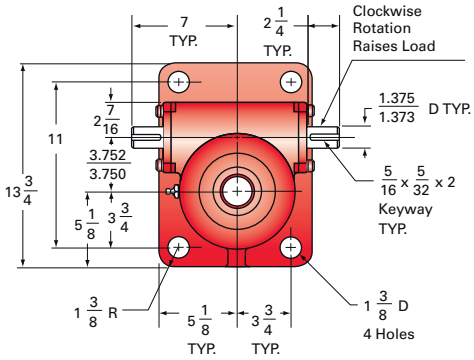
Screw Specs:
Root diameter (in): 1.850
Start torque = 1.5 × Running Torque
Approximate weight (lbs)
"0" Travel: 85
Per inch travel: 1.5
Grease: 2.2

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

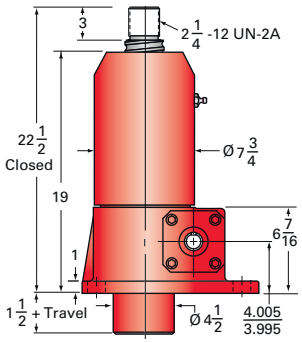
NOOK

30-BSJ
30HL-BSJ

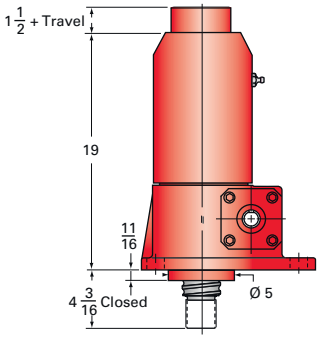
30-BSJ & 30HL-BSJ
TOP VIEW



30-BSJ-U & 30HL-BSJ-U
UPRIGHT



30-BSJ-I & 30HL-BSJ-I
INVERTED



MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)	Backdrive Holding Torque (ft-lb)
30-BSJ Capacity: 30 tons Screw: 3000-0660	10⅔:1	16.16	989	11	60	21
	32:1	48.48	503	3½	60	5
30HL-BSJ Capacity 30 tons Screw: 3000-1500	10⅔:1	7.11	2,292	11	60	67
	32:1	21.33	1,144	3½	60	15

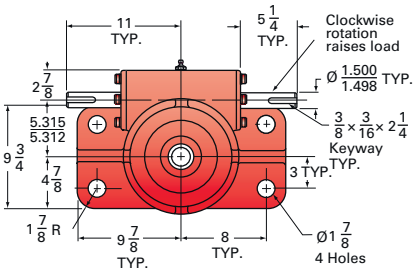
Screw Specs:
Root diameter (in): 2.480
Start torque = 1.5 × Running Torque
Approximate weight (lbs)
"0" Travel: 220
Per inch travel: 2.4
Grease: 3.5

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

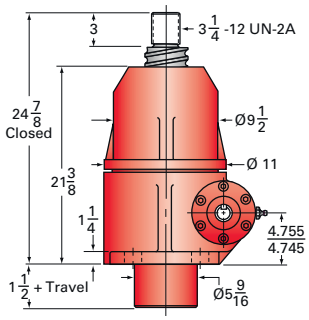
NOOK

50-BSJ

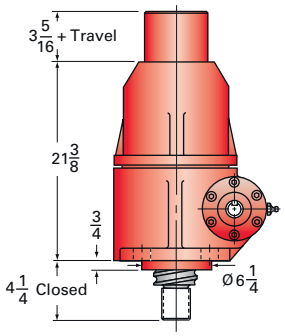
50-BSJ TOP VIEW



50-BSJ-U UPRIGHT



50-BSJ-I INVERTED



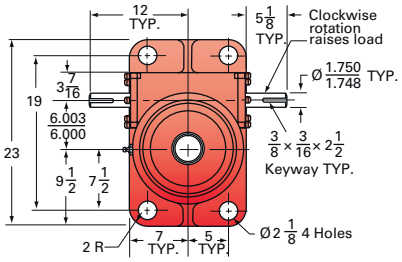
MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)	Backdrive Holding Torque (ft-lb)
50-BSJ Capacity: 50 tons Screw: 4000-1000	10⅔:1	10.66	2,560	16	90	40
	32:1	32	1,390	5	90	10

Screw Specs:
Root diameter (in): 3.338
Start torque = 1.5 × Running Torque
Approximate weight (lbs)
"0" Travel: 490
Per inch travel: 5.0
Grease: 5.0

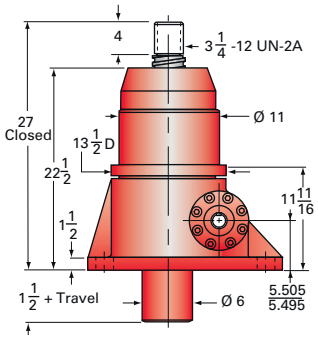
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

75-BSJ

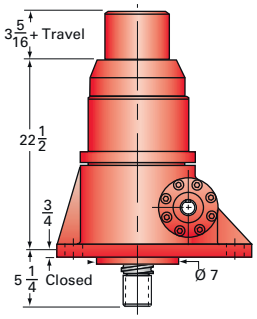
75-BSJ TOP VIEW



75-BSJ-U UPRIGHT



75-BSJ-I INVERTED



MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)	Backdrive Holding Torque (ft-lb)
75-BSJ Capacity: 75 tons Screw: 4000-1000	10⅔:1	10.66	3,660	28	155	110
	32:1	32	1,680	9	155	25

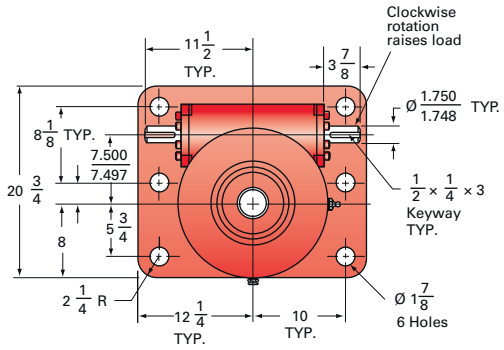
Screw Specs:
Root diameter (in): 3.338
Start torque = 1.5 × Running Torque
Approximate weight (lbs)
"0" Travel: 650
Per inch travel: 5.0
Grease: 9.0

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

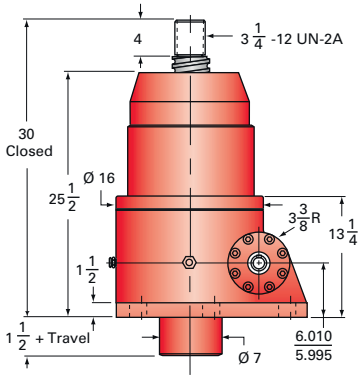
NOOK

100-BSJ

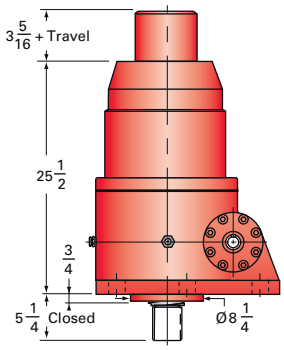
100-BSJ TOP VIEW



100-BSJ-U UPRIGHT



100-BSJ-I INVERTED



MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)	Backdrive Holding Torque (ft-lb)
100-BSJ Capacity: 100 tons Screw: 4000-1000	10⅔:1	10.66	4,880	32	205	152
	32:1	32	2,760	12½	205	25

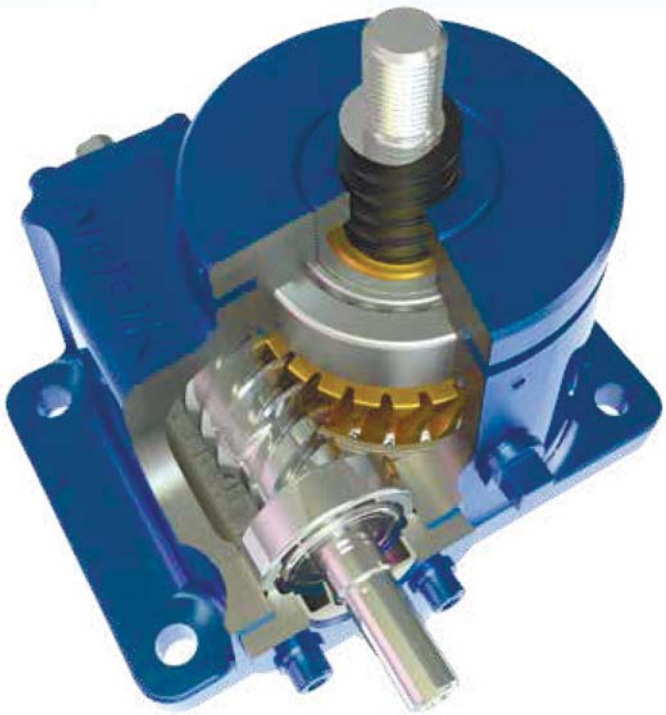
Screw Specs:
Root diameter (in): 3.338
Start torque = 1.5 × Running Torque
Approximate weight (lbs)
"0" Travel: 1100
Per inch travel: 5.0
Grease: 16.0

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

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*. The drive sleeve is supported on anti-friction tapered roller or ball thrust bearings. 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

Nook machine screw jacks used in a satellite dish application .

MACHINE SCREW JACKS
ACME SCREW TECHNICAL INFORMATION

Nook Machine Screw Jacks are fitted with Nook's own PowerAc™ Acme Lead Screws and Nuts. Nook Industries manufactures PowerAc™ precision acme screws by thread rolling for ActionJac™ Worm Gear Machine Screw Jacks, a process that produces high-precision screws. Nook Acme Screw products feature centralizing thread forms for smooth, no-wedging performance.

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.

Material	Surface	Lead Accuracy	Screw Dia.	Screw Lengths
Alloy	black	± .0003"/" up to 1½" dia.	¼" to 1½"	Limited only by material availability
Stainless	steel	± .0003"/" up to 1½" dia.	¼" to 1½"	Limited only by material availability

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)

Nook machine screw jacks are used in large material transfer applications.

NOOK

QUICK REFERENCE
MACHINE SCREW JACKS

MODEL	Gear Ratio	Capacity (tons)	Lifting Screw Dia (in)	Screw Lead (in)	Root Dia (in)	Turns of Worm for 1" Travel	Max Input Torque (in.-lb.)	Max Input (hp)	Max Worm Speed at Rated Load (rpm)	Max Load at 1,750 rpm (lb)	Torque to Raise 1 lb. (in-lb)	Tare Drag Torque (in-lb)
1-MSJ	5:1	1	¾	.200	.502	25	45	½	700	800	.0225	3
	20:1	1	¾	.200	.502	100	21	¼	750	857	.0105	3
2-MSJ	6:1	2	1	.250	.698	24	100	2	1,260	2,881	.0250	4
	12:1	2	1	.250	.698	48	62	1½	1,525	3,456	.0154	4
	24:1	2	1	.250	.698	96	42	½	750	1,715	.0105	4
2R-MSJ	6:1	2	1	.250	.698	24	100	2	1,260	2,881	.0250	4
	12:1	2	1	.250	.698	48	62	1½	1,525	3,486	.0154	4
	24:1	2	1	.250	.698	96	42	½	750	1,715	.0105	4
2.5-MSJ	6:1	2½	1	.250	.698	24	126	2	1,000	2,858	.0252	5
	12:1	2½	1	.250	.698	48	74	1½	1,277	3,650	.0148	5
	24:1	2½	1	.250	.698	96	53	½	594	1,699	.0106	5
5-MSJ	6:1	5	1½	.375	1.066	16	376	3	500	2,873	.0376	10
	24:1	5	1½	.375	1.066	64	144	¾	330	1,875	.0144	10
10-MSJ	8:1	10	2	.500	1.410	16	753	5	418	4,766	.0377	20
	24:1	10	2	.500	1.410	48	384	1½	246	2,813	.0192	20
15-MSJ	8:1	15	2¼	.500	1.684	16	1,221	5	258	4,424	.0407	20
	24:1	15	2¼	.500	1.684	48	654	1½	144	2,478	.0218	20
20-MSJ	8:1	20	2½	.500	1.908	16	1,740	7½	272	6,209	.0435	40
	24:1	20	2½	.500	1.908	48	873	2½	180	4,130	.0218	40
30-MSJ	10⅔:1	30	3⅜	.667	2.652	16	2,710	11	256	8,764	.0452	50
	32:1	30	3⅜	.667	2.652	48	1,411	3½	156	5,364	.0235	50
35-MSJ	10⅔:1	35	3¾	.667	3.009	16	3,450	11	200	8,035	.0493	50
	32:1	35	3¾	.667	3.009	48	1,800	3½	122	4,904	.0257	50
50-MSJ	10⅔:1	50	4½	.667	3.782	16	5,555	16	181	10,382	.0555	100
	32:1	50	4½	.667	3.782	48	3,014	5	104	5,982	.0301	100
75-MSJ	10⅔:1	75	5	.667	4.286	16	8,236	28	214	18,368	.0549	155
	32:1	75	5	.667	4.286	48	3,780	9	150	12,862	.0252	155
100-MSJ	10⅔:1	100	6	.667	5.254	16	13,166	32	153	17,330	.0665	205
	32:1	100	6	.667	5.254	48	7,460	12½	106	11,941	.0377	205

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. For loads less than 25% of rated loads add tare drag torque.

3) Maximum allowable horsepower 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 200°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 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°F or higher than +200°F. Factory supplied grease in standard units will

NOOK

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. Refer to the acme 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.

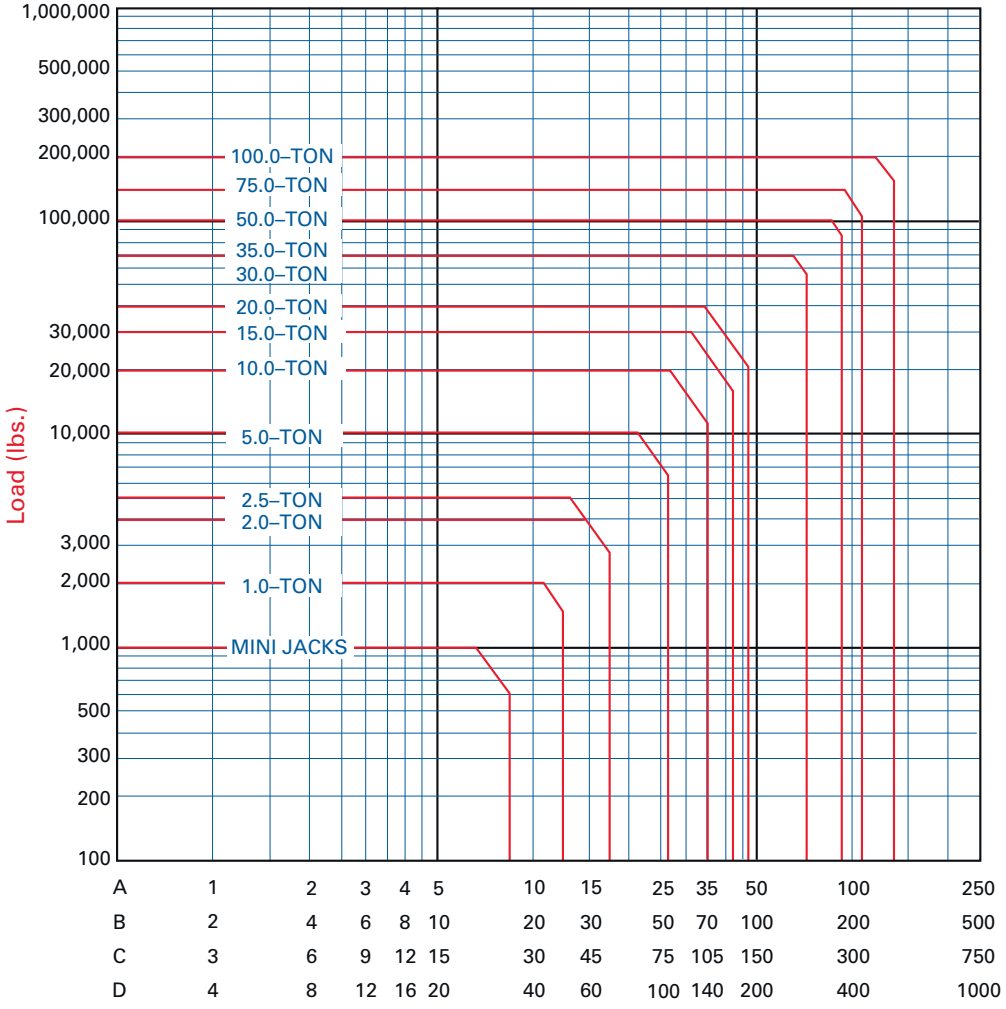
The chart below is used to determine the required jack size in applications where the lift shaft is loaded in compression.

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.

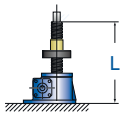
The chart assumes proper jack alignment with no bending loads on the screw. Effects from side loading are not included in this chart. Jacks operating horizontally with long lift shafts can experience bending from the weight of the screw.



MOUNTING CONDITIONS

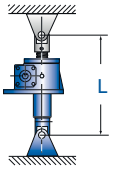
A

ONE END FIXED
ONE END FREE

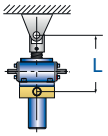


B

BOTH ENDS SUPPORTED BY CLEVIS ENDS

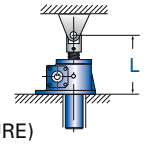


ONE END BY CLEVIS END, ONE BY TRUNNION MOUNT

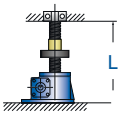


C

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

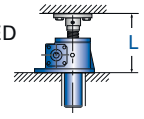


ONE END FIXED, ONE END SUPPORTED (RADIAL BEARING)



D

BOTH ENDS FIXED (TOP PLATE ATTACHED TO GUIDED STRUCTURE)



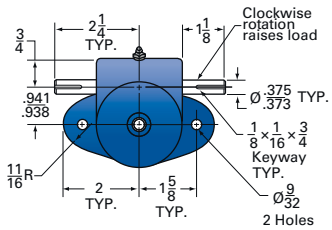
AVAILABLE LIFT SCREW LENGTHS

As a major manufacturer of industrial lead screws, Nook Industries stocks a wide selection of 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.

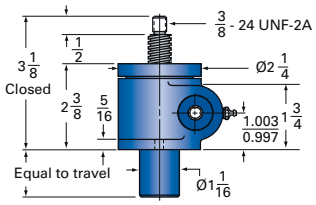
NOOK

MINI JACKS

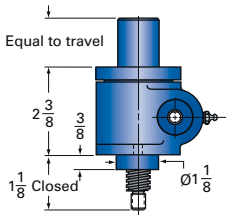
MJ-xx TOP VIEW



MJ-xx-U UPRIGHT



MJ-xx-I INVERTED

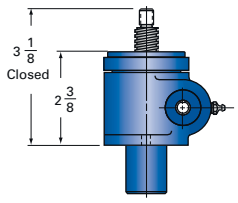


MODEL	Gear Ratio	Turns of Worm for 1" Travel	Torque at 1,000 lb. Load (in-lb)	Max Allowable Input (hp)	Screw Size†
MJ-20	5:1	20	19.3	1/3	1/2-4
MJ-25	5:1	25	20.7	1/3	5/8-5
MJ-40	5:1	40	16.7	1/3	5/8-8
MJ-50	5:1	50	13.5	1/3	1/2-10
MJ-80	20:1	80	8.0	1/6	1/2-4
MJ-100	20:1	100	8.7	1/6	5/8-5
MJ-160	20:1	160	7.0	1/6	5/8-8
MJ-200	20:1	200	5.7	1/6	1/2-10

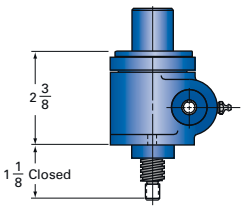
† Lift shafts are made from 300 series stainless steel material except for 5/8-5 and 5/8-8.

Mini Jack Standard:
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 2.5
Per inch travel: 0.2
Grease: 0.5

MJAB-xx-U
UPRIGHT ANTI-BACKLASH



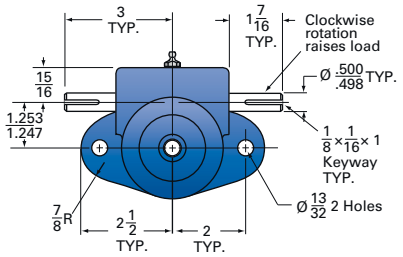
MJAB-xx-I
INVERTED ANTI-BACKLASH



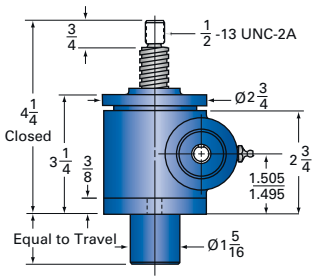
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

1-MSJ

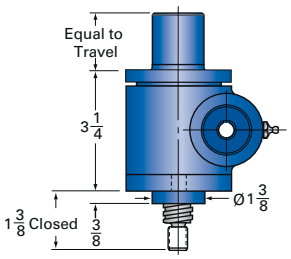
1-MSJ TOP VIEW



1-MSJ-U UPRIGHT



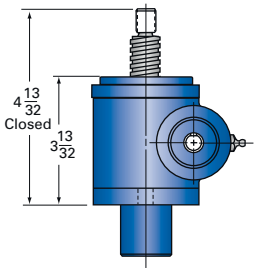
1-MSJ-I INVERTED



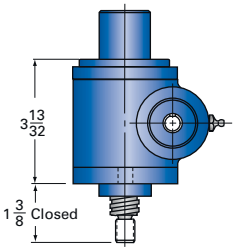
MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)
1-MSJ Capacity: 1 ton Screw: ¾-5	5:1	25	45	½	3
	20:1	100	21	¼	3

Screw Specs:
Root diameter (in): 0.502
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

1AB-MSJ-U
UPRIGHT ANTI-BACKLASH



1AB-MSJ-I
INVERTED ANTI-BACKLASH

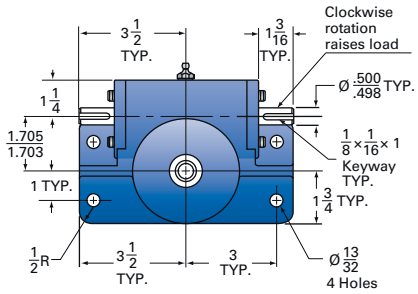


Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

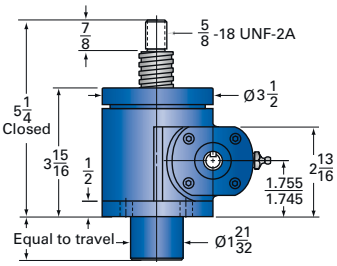
NOOK

2-MSJ

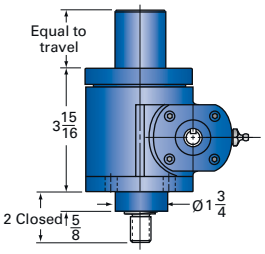
2-MSJ TOP VIEW



2-MSJ-U UPRIGHT



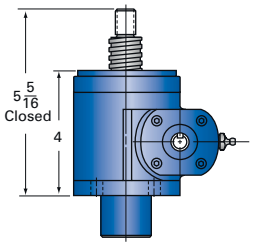
2-MSJ-I INVERTED



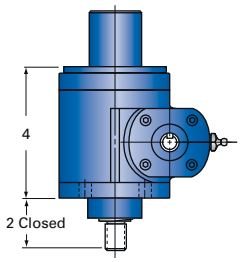
MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)
2-MSJ Capacity: 2 tons Screw: 1-4	6:1	24	100	2	4
	12:1	48	62	1½	4
	24:1	96	42	½	4

Screw Specs:
Root diameter (in): 0.698
Screw lead (in): 0.250
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 15
Per inch travel: 0.45
Grease: 0.5

2AB-MSJ-U
UPRIGHT ANTI-BACKLASH



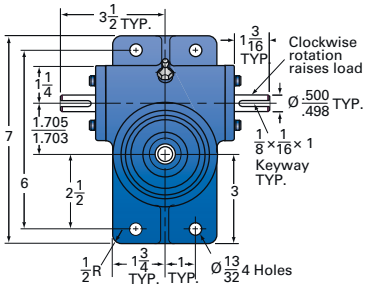
2AB-MSJ-I
INVERTED ANTI-BACKLASH



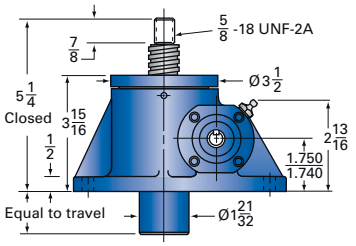
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

2R-MSJ

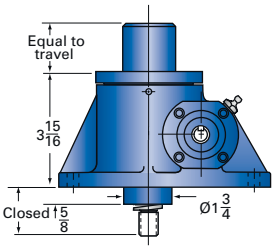
2R-MSJ TOP VIEW



2R-MSJ-U UPRIGHT



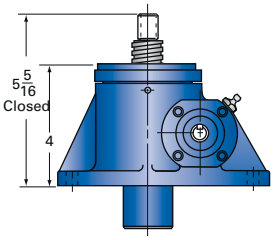
2R-MSJ-I INVERTED



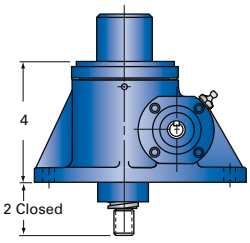
MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)
2R-MSJ Capacity: 2 tons Screw: 1-4	6:1	24	100	2	4
	12:1	48	62	1½	4
	24:1	96	42	½	4

Screw Specs:
Root diameter (in): 0.698
Screw lead (in): 0.250
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 15
Per inch travel: 0.45
Grease: 0.5

2RAB-MSJ-U
UPRIGHT ANTI-BACKLASH



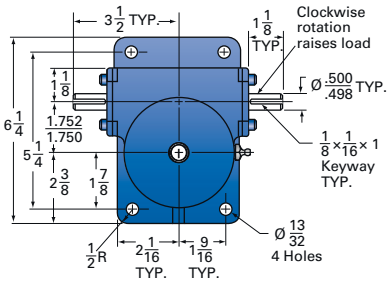
2RAB-MSJ-I
INVERTED ANTI-BACKLASH



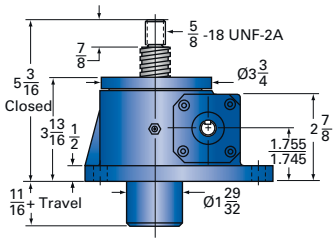
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

2.5-MSJ

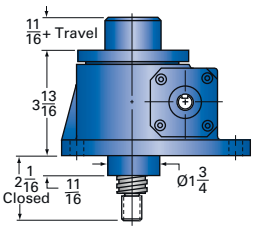
2.5-MSJ TOP VIEW



2.5-MSJ-U UPRIGHT



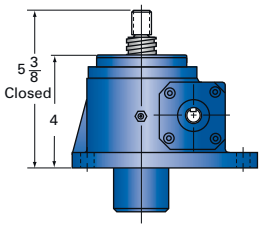
2.5-MSJ-I INVERTED



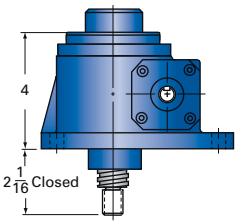
MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)
2.5-MSJ Capacity: 2.5 tons Screw: 1-4	6:1	24	126	2	5
	12:1	48	74	1½	5
	24:1	96	53	½	5

Screw Specs:
Root diameter (in): 0.698
Screw lead (in): 0.250
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 17
Per inch travel: 0.45
Grease: 0.5

2.5AB-MSJ-U
UPRIGHT ANTI-BACKLASH



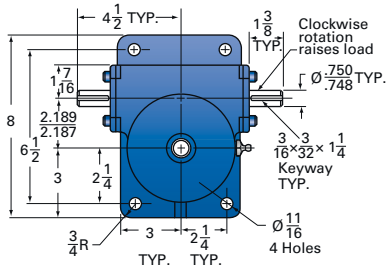
2.5AB-MSJ-I
INVERTED ANTI-BACKLASH



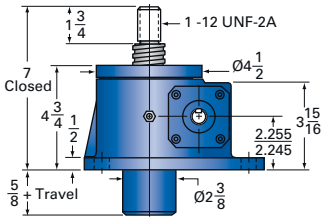
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

5-MSJ

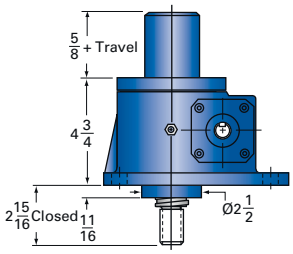
5-MSJ TOP VIEW



5-MSJ-U UPRIGHT



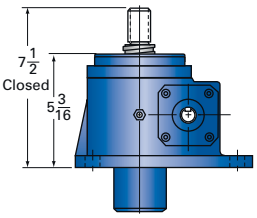
5-MSJ-I INVERTED



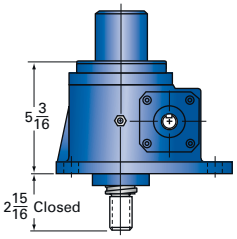
MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)
5-MSJ Capacity: 5 tons Screw: 1½-2⅔	6:1	16	376	3	10
	24:1	64	144	¾	10

Screw Specs:
Root diameter (in): 1.066
Screw lead (in): 0.375
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 30.0
Per inch travel: 0.7
Grease: 1.0

5AB-MSJ-U
UPRIGHT ANTI-BACKLASH



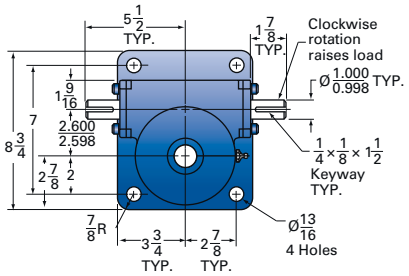
5AB-MSJ-I
INVERTED ANTI-BACKLASH



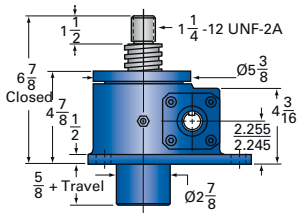
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

10-MSJ

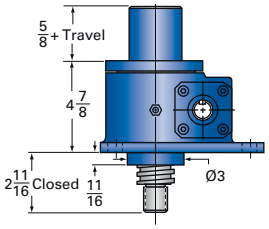
10-MSJ TOP VIEW



10-MSJ-U UPRIGHT



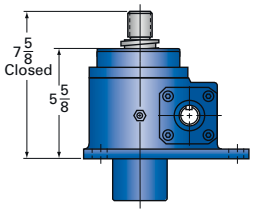
10-MSJ-I INVERTED



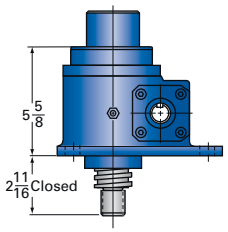
MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)
10-MSJ **Capacity:** 10 tons **Screw:** 2-2	8:1	16	753	5	20
	24:1	48	384	1½	20

Screw Specs:
Root diameter (in): 1.410
Screw lead (in): 0.5
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 45.0
Per inch travel: 1.2
Grease: 1.5

10AB-MSJ-U
UPRIGHT ANTI-BACKLASH



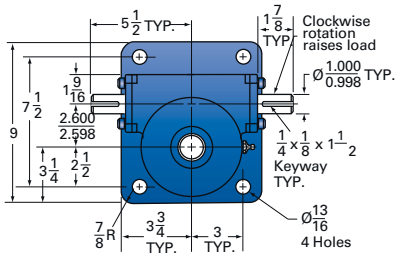
10AB-MSJ-I
INVERTED ANTI-BACKLASH



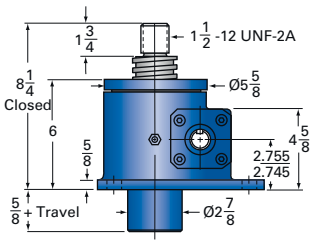
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

15-MSJ

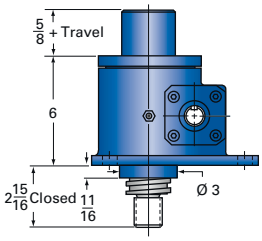
15-MSJ TOP VIEW



15-MSJ-U UPRIGHT



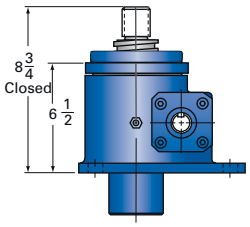
15-MSJ-I INVERTED



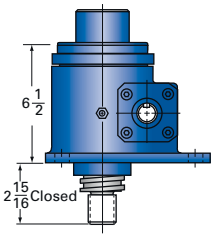
MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)
15-MSJ Capacity: 15 tons Screw: 2¼-2	8:1	16	1,221	5	20
	24:1	48	654	1½	20

Screw Specs:
Root diameter (in): 1.684
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

15AB-MSJ-U
UPRIGHT ANTI-BACKLASH



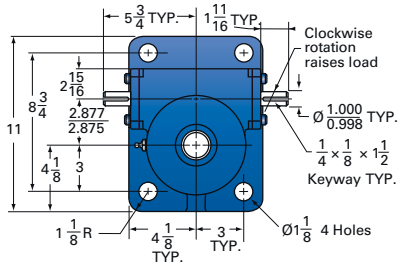
15AB-MSJ-I
INVERTED ANTI-BACKLASH



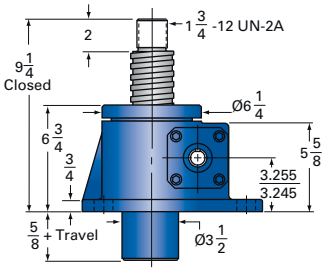
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

20-MSJ

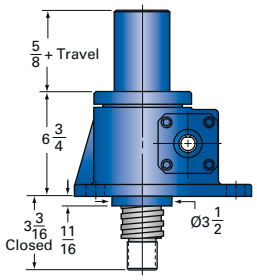
20-MSJ TOP VIEW



20-MSJ-U UPRIGHT



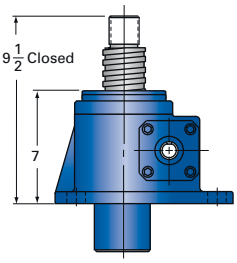
20-MSJ-I INVERTED



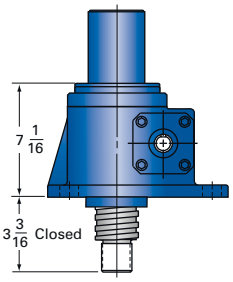
MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)
20-MSJ Capacity: 20 tons Screw: 2½-2	8:1	16	1,740	7½	40
	24:1	48	873	2½	40

Screw Specs:
Root diameter (in): 1.908
Screw lead (in): 0.500
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 80.0
Per inch travel: 1.8
Grease: 2.25

20AB-MSJ-U
UPRIGHT ANTI-BACKLASH



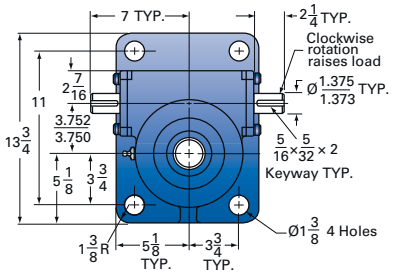
20AB-MSJ-I
INVERTED ANTI-BACKLASH



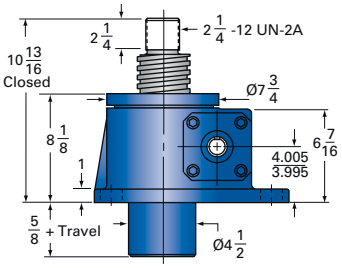
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

30-MSJ

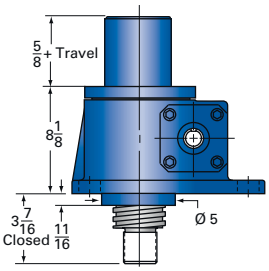
30-MSJ TOP VIEW



30-MSJ-U UPRIGHT



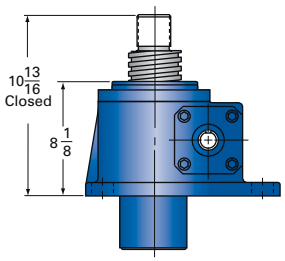
30-MSJ-I INVERTED



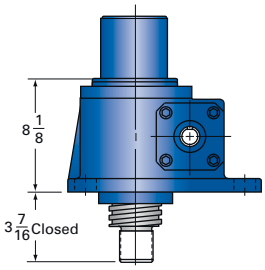
MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)
30-MSJ Capacity: 30 tons Screw: 3⅜-1½	10⅔:1	16	2,710	11	50
	32:1	48	1,411	3½	50

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

30AB-MSJ-U
UPRIGHT ANTI-BACKLASH



30AB-MSJ-I
INVERTED ANTI-BACKLASH

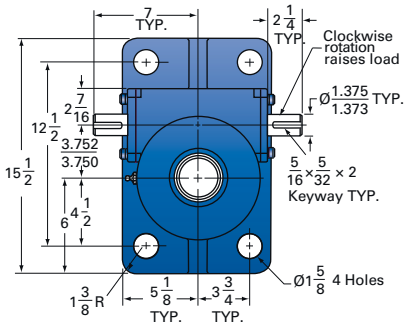


Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

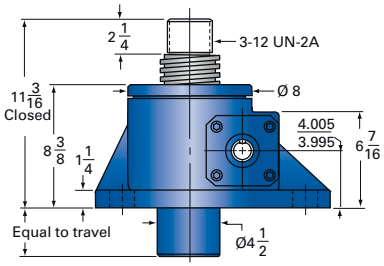
NOOK

35-MSJ

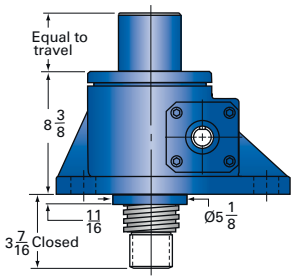
35-MSJ TOP VIEW



35-MSJ-U UPRIGHT



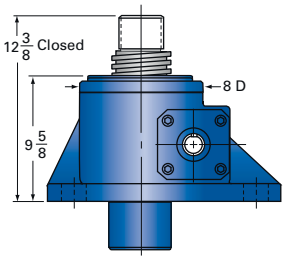
35-MSJ-I INVERTED



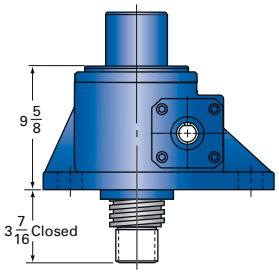
MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)
35-MSJ Capacity: 35 tons Screw: 3¾-1½	10⅔:1	16	3,450	11	50
	32:1	48	1,800	3½	50

Screw Specs:
Root diameter (in): 3.009
Screw lead (in): 0.667
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 145.0
Per inch travel: 3.4
Grease: 3.5

35AB-MSJ-U
UPRIGHT ANTI-BACKLASH



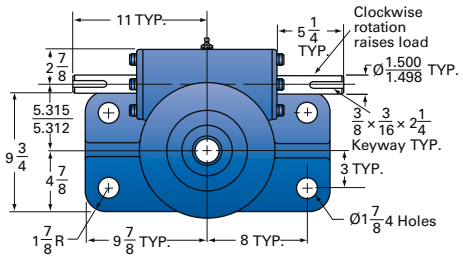
35AB-MSJ-I
INVERTED ANTI-BACKLASH



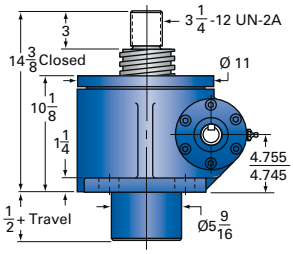
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

50-MSJ

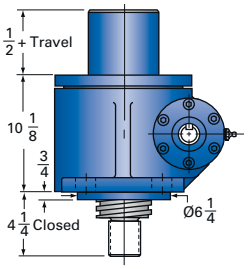
50-MSJ TOP VIEW



50-MSJ-U UPRIGHT



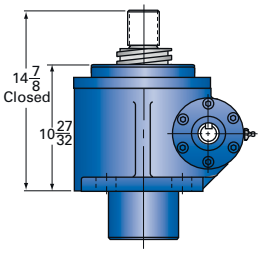
50-MSJ-I INVERTED



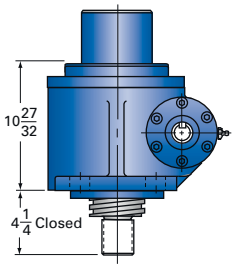
MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)
50-MSJ Capacity: 50 tons Screw: 4½-1½	10⅔:1	16	5,555	16	100
	32:1	48	3,014	5	100

Screw Specs:
Root diameter (in): 3.782
Screw lead (in): 0.667
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 280.0
Per inch travel: 5.0
Grease: 5.8

50AB-MSJ-U
UPRIGHT ANTI-BACKLASH



50AB-MSJ-I
INVERTED ANTI-BACKLASH

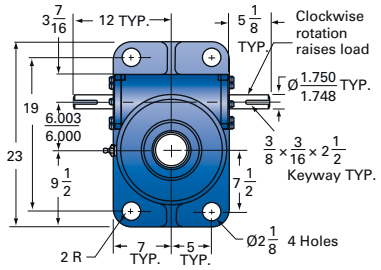


Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

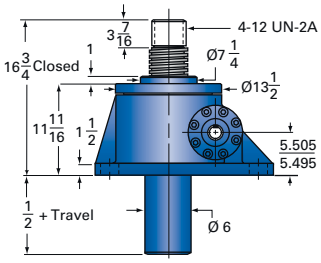
NOOK

75-MSJ

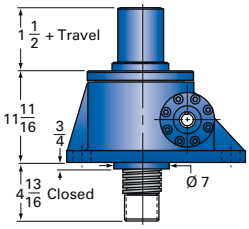
75-MSJ TOP VIEW



75-MSJ-U UPRIGHT



75-MSJ-I INVERTED



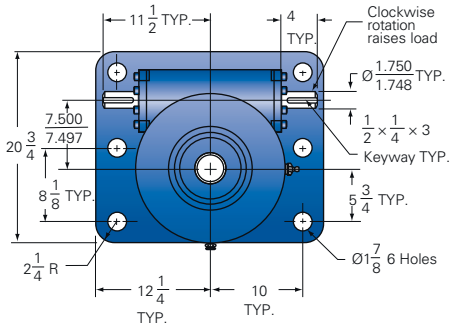
MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)
75-MSJ Capacity: 75 tons Screw: 5-1½	10⅔:1	16	8,236	28	155
	32:1	48	3,780	9	155

Screw Specs:
Root diameter (in): 4.286
Screw lead (in): 0.667
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 610.0
Per inch travel: 6.5
Grease: 9.0

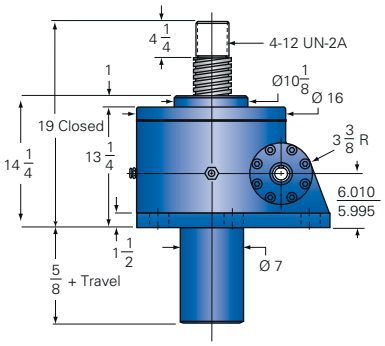
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

100-MSJ

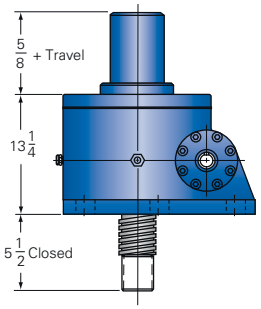
100-MSJ TOP VIEW



100-MSJ-U UPRIGHT



100-MSJ-I INVERTED



MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)
100-MSJ Capacity: 100 tons Screw: 6-1½	10⅔:1	16	13,166	32	205
	32:1	48	7,460	12½	205

Screw Specs:
Root diameter (in): 5.254
Screw lead (in): 0.667
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 975.0
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.

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.

Nook stainless steel machine screw jacks are used extensively in the paper industry.

NOOK™

QUICK REFERENCE
STAINLESS STEEL JACKS

MODEL	Gear Ratio	Capacity (tons)	Lifting Screw Dia (in)	Screw Lead (in)	Root Dia (in)	Turns of Worm for 1" Travel	Max Input Torque (in.-lb.)	Max Input (hp)	Max Worm Speed at Rated Load (rpm)	Max Load at 1,750 rpm (lb)	Torque to Raise 1 lb. (in-lb)	Tare Drag Torque (in-lb)
2SS-MSJ	6:1	0.66	1	.250	.698	24	33	2	1,800	1,320	.0250	4
	24:1	0.66	1	.250	.698	96	14	½	1,800	1,320	.0150	4
5SS-MSJ	6:1	1.67	1½	.375	1.066	16	125	3	1,510	2,873	.0376	10
	24:1	1.67	1½	.375	1.066	64	48	¾	985	1,875	.0144	10
10SS-MSJ	8:1	3.33	2	.500	1.410	16	251	5	1,255	4,775	.0377	20
	24:1	3.33	2	.500	1.410	48	128	1½	739	2,813	.0192	20
15SS-MSJ	8:1	5.00	2¼	.500	1.684	16	407	5	774	4,424	.0407	20
	24:1	5.00	2¼	.500	1.684	48	218	1½	434	2,478	.0218	20
20SS-MSJ	8:1	6.66	2½	.500	1.908	16	580	5	540	4,140	.0435	40
	24:1	6.66	2½	.500	1.908	48	291	1½	325	2,478	.0218	40
25SS-MSJ	10⅔:1	8.30	3	.667	2.287	16	903	11	768	8,764	.0452	50
	32:1	8.30	3	.667	2.287	48	471	3½	468	5,364	.0235	50
35SS-MSJ	10⅔:1	11.66	3¾	.667	3.0	16	1,150	11	603	8,035	.0493	50
	32:1	11.66	3¾	.667	3.0	48	600	3½	368	5,022	.0251	50

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

Nook stainless steel jacks are used widely in the commercial food industry.

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. If there is any possibility for the lift shaft to go into compression, the application should be sized for sufficient column strength.

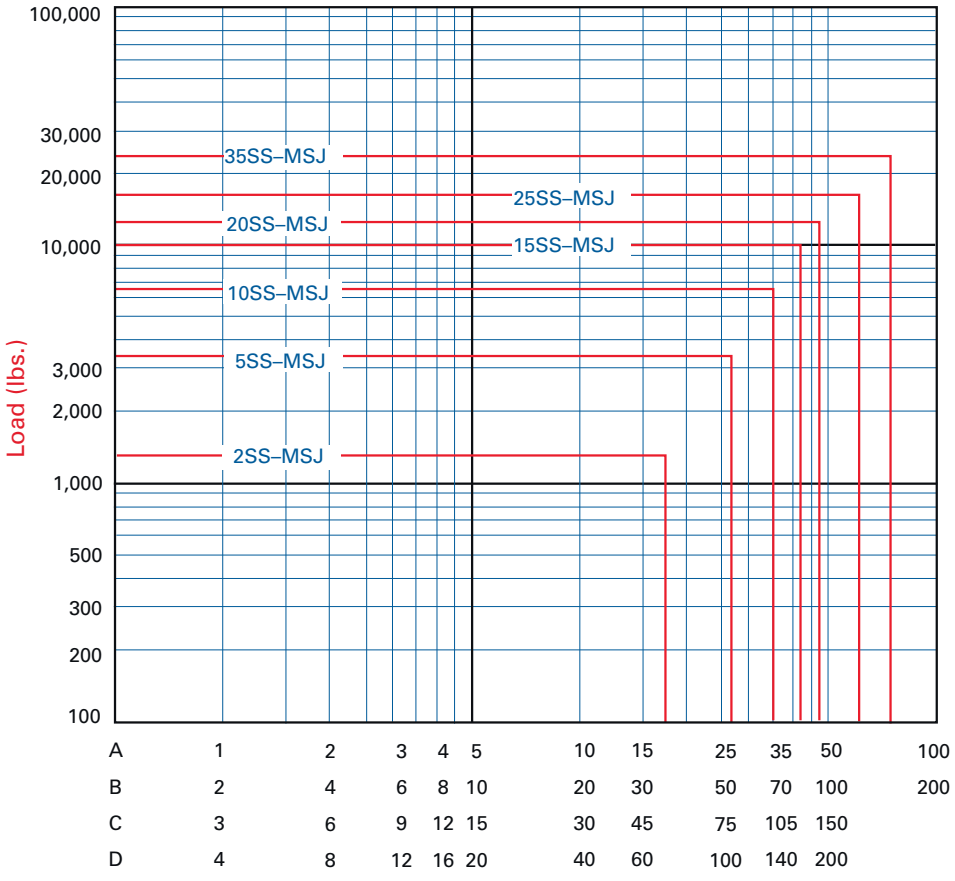
The chart below is used to determine the required jack size in applications where the lift shaft is loaded in compression.

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.

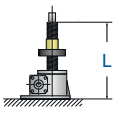
The chart assumes proper jack alignment with no bending loads on the screw. Effects from side loading are not included in this chart. Jacks operating horizontally with long lift shafts can experience bending from the weight of the screw.



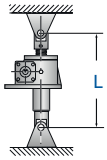
Inch Stainless Steel Machine Screw Jack

MOUNTING CONDITIONS

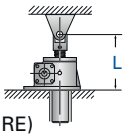
A
ONE END FIXED
ONE END FREE



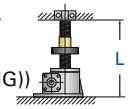
B
BOTH ENDS SUPPORTED BY CLEVIS ENDS



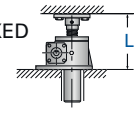
C
ONE END FIXED, ONE END SUPPORTED (CLEVIS ATTACHED TO GUIDE STRUCTURE)



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



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



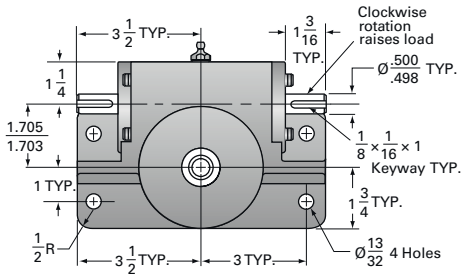
AVAILABLE LIFT SCREW LENGTHS

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.

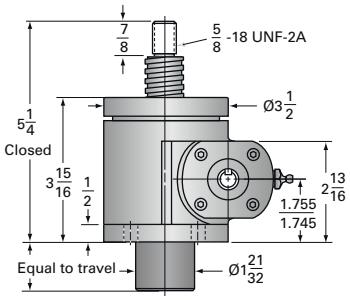
Rotating screw jacks can be built with a larger diameter lift screw for greater column strength, or a different lead to change the jack operating speed.

2SS-MSJ STAINLESS STEEL

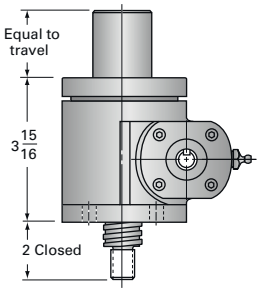
2SS-MSJ TOP VIEW



2SS-MSJ-U UPRIGHT



2SS-MSJ-I INVERTED



MODEL	Gear Ratio	Capacity* (tons)	Turns of Worm for 1" Travel	Max Input Torque (in-lb)
2SS-MSJ	6:1	0.66	24	33
	24:1	0.66	96	14

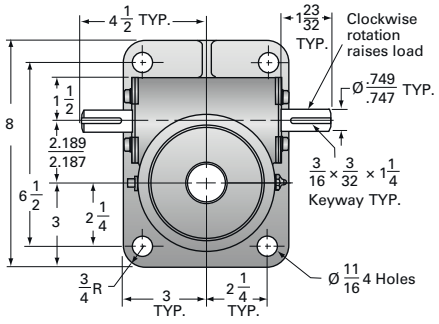
* For greater capacity, specify a 17-4PH hardened worm.

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: 17.0
Per inch travel: 0.5
Grease: 0.5

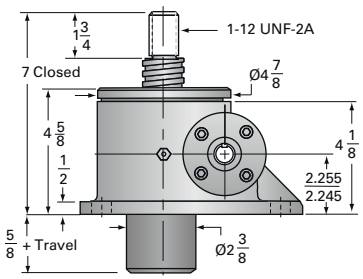
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

5SS-MSJ STAINLESS STEEL

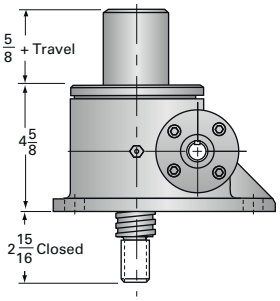
5SS-MSJ TOP VIEW



5SS-MSJ-U UPRIGHT



5SS-MSJ-I INVERTED



MODEL	Gear Ratio	Capacity* (tons)	Turns of Worm for 1″ Travel	Max Input Torque (in-lb)
5SS-MSJ	6:1	1.67	16	125
	24:1	1.67	64	48

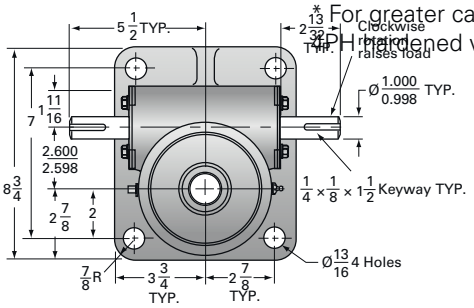
* For greater capacity, specify a 17-4PH hardened worm.

Screw Specs:
Screw: 1½-2⅔
Root diameter (in): 1.066
Screw lead (in): 0.375
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 32.0
Per inch travel: .7
Grease: 1.0

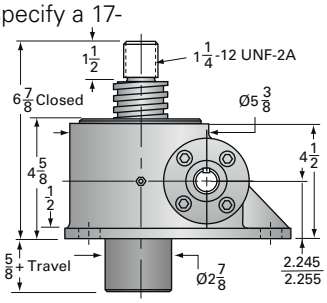
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

10SS-MSJ STAINLESS STEEL

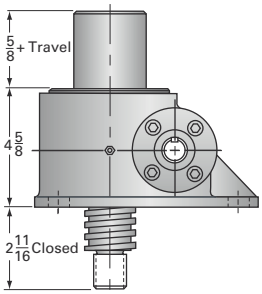
10SS-MSJ TOP VIEW



10SS-MSJ-U UPRIGHT



10SS-MSJ-I INVERTED



MODEL	Gear Ratio	Capacity* (tons)	Turns of Worm for 1″ Travel	Max Input Torque (in-lb)
10SS-MSJ	8:1	3.33	16	251
	24:1	3.33	48	128

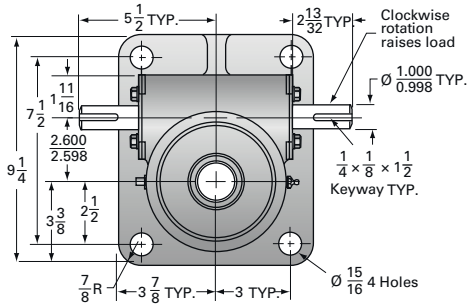
* For greater capacity, specify a 17-4PH hardened worm.

Screw Specs:
Screw: 2-2
Root diameter (in): 1.410
Screw lead (in): 0.500
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 50.0
Per inch travel: 1.2
Grease: 1.5

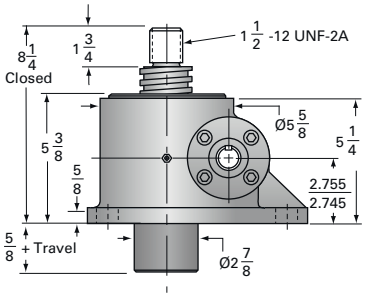
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

15SS-MSJ STAINLESS STEEL

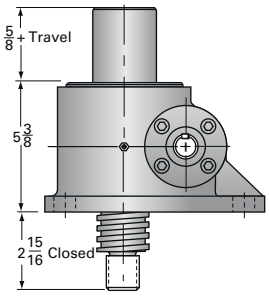
15SS-MSJ TOP VIEW



15SS-MSJ-U UPRIGHT



15SS-MSJ-I INVERTED



MODEL	Gear Ratio	Capacity* (tons)	Turns of Worm for 1″ Travel	Max Input Torque (in-lb)
15SS-MSJ	8:1	5.00	16	407
	24:1	5.00	48	218

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

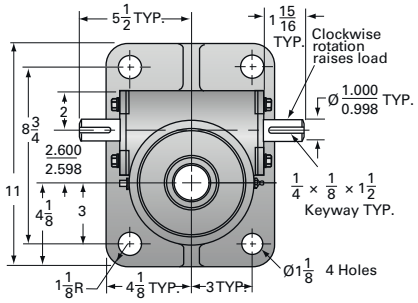
Screw Specs:
Screw: 2¼-2
Root diameter (in): 1.684
Screw lead (in): 0.500
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 60.0
Per inch travel: 1.4
Grease: 1.50

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

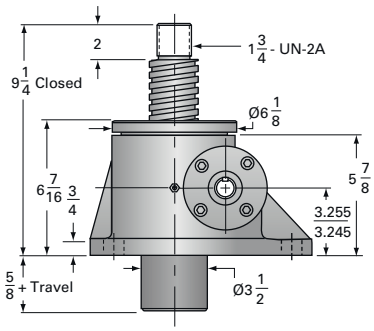
NOOK

20SS-MSJ STAINLESS STEEL

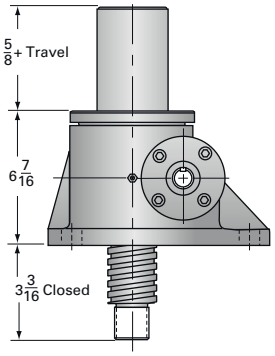
20SS-MSJ TOP VIEW



20SS-MSJ-U UPRIGHT



20SS-MSJ-I INVERTED



MODEL	Gear Ratio	Capacity* (tons)	Turns of Worm for 1″ Travel	Max Input Torque (in-lb)
20SS-MSJ	8:1	6.66	16	580
	24:1	6.66	48	291

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

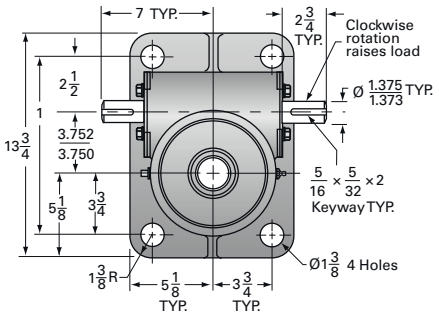
Screw Specs:
Screw: 2½-2
Root diameter (in): 1.908
Screw lead (in): 0.500
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 85.0
Per inch travel: 2.0
Grease: 2.25

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

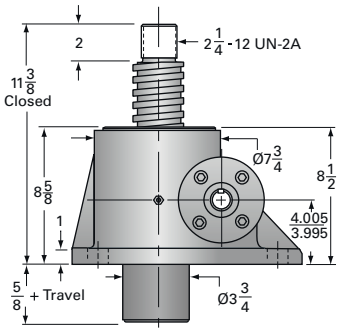
NOOK

25SS-MSJ STAINLESS STEEL

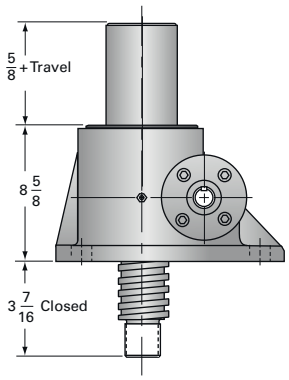
25SS-MSJ TOP VIEW



25SS-MSJ-U UPRIGHT



25SS-MSJ-I INVERTED



MODEL	Gear Ratio	Capacity* (tons)	Turns of Worm for 1" Travel	Max Input Torque (in-lb)
25SS-MSJ	10⅔:1	8.30	16	903
	32:1	8.30	48	471

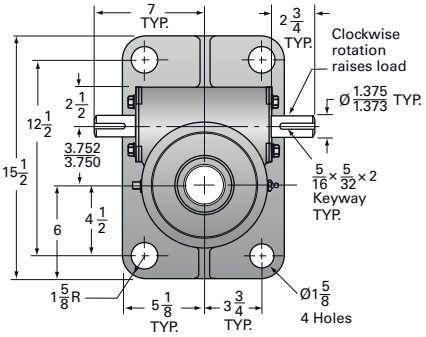
* For greater capacity, specify a 17-4PH hardened worm.

Screw Specs:
Screw: 3-1½
Root diameter (in): 2.287
Screw lead (in): 0.667
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 155.0
Per inch travel: 3.1
Grease: 3.50

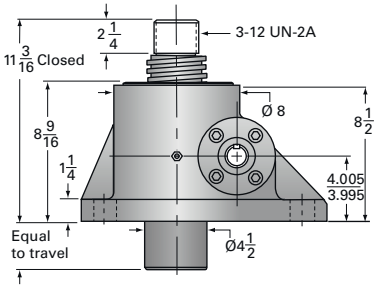
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

35SS-MSJ STAINLESS STEEL

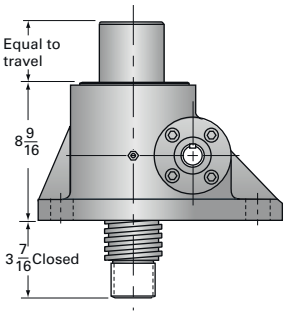
35SS-MSJ TOP VIEW



35SS-MSJ-U UPRIGHT



35SS-MSJ-I INVERTED



MODEL	Gear Ratio	Capacity* (tons)	Turns of Worm for 1″ Travel	Max Input Torque (in-lb)
35SS-MSJ	10⅔:1	11.66	16	1,150
	32:1	11.66	48	600

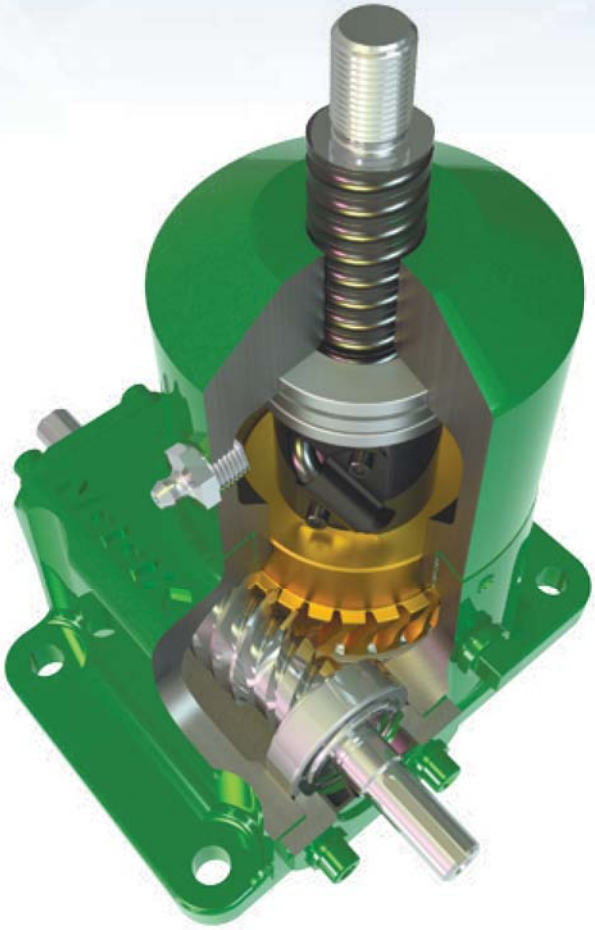
* For greater capacity, specify a 17-4PH hardened worm.

Screw Specs:
Screw: 3¾-1½
Root diameter (in): 3.009
Screw lead (in): 0.667
Start torque = 2 × Running Torque
Approximate weight (lbs)
“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.

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 also available.



Nook metric ball screw jacks used in a wind power application.

NOOK

QUICK REFERENCE
METRIC BALL SCREW JACKS

MODEL	Gear Ratio	Capacity (kN)	Lifting Screw Dia (mm)	Screw Lead (mm)	Root Dia (mm)	Raise for One Turn of Worm (mm)	Max Input Torque (N·m)	Max Input (kW)	Max Worm Speed at Rated Load (rpm)	Max Load at 1,425 rpm (kN)	Torque to Raise 1 kN (N·m)	No Load Torque (N·m)	Back Drive Holding Torque
EM05-BSJ	5:1	5	16	5	12.9	1.00	1.21	0.21	1,625	5.0	0.24	0.11	1.0
	20:1	5	16	5	12.9	0.25	0.51	0.09	1,625	5.0	0.10	0.11	0.5
EM1-BSJ	5:1	10	20	5	17.5	1.00	2.41	0.38	1,500	10.0	0.24	0.34	2.0
	20:1	10	20	5	17.5	0.25	1.14	0.19	1,585	10.0	0.11	0.34	1.0
EM2.5-BSJ	6:1	25	25	5	22.5	0.83	5.05	1.08	2,035	25.0	0.20	0.56	4.5
	12:1	25	25	5	22.5	0.42	3.05	0.65	2,035	25.0	0.12	0.56	2.5
	24:1	25	25	5	22.5	0.21	2.13	0.38	1,695	25.0	0.09	0.56	2.0
EM5-BSJ	6:1	50	40	10	34.8	1.67	19.3	2.28	1,125	39.4	0.39	1.13	16.0
	24:1	50	40	10	34.8	0.42	7.7	0.56	695	24.4	0.15	1.13	6.5
EM10-BSJ	8:1	100	50	10	45.2	1.25	31.9	3.75	1,125	78.9	0.32	2.26	26.0
	24:1	100	50	10	45.2	0.42	16.2	1.12	665	46.6	0.16	2.26	13.5
EM20-BSJ	8:1	200	63	12	57	1.50	75.2	5.6	710	99.8	0.38	4.52	61.0
	24:1	200	63	12	57	0.50	37.7	1.9	470	66.1	0.19	4.52	31.0

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. 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: 0% for dynamic loads, 20% 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 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 +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 is100% greater than torque shown.

$$\text{kW per jack} = \frac{\left(\left(\text{Torque to raise one kN(N•m)} \times \text{Number of kN to be raised}\right) + \text{Tare Drag Torque}\right) \times \text{RPM}}{9{,}549}$$

12) No load torque need only be added if operating under 25% rated load.

NOOK

COLUMN STRENGTH
METRIC 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.

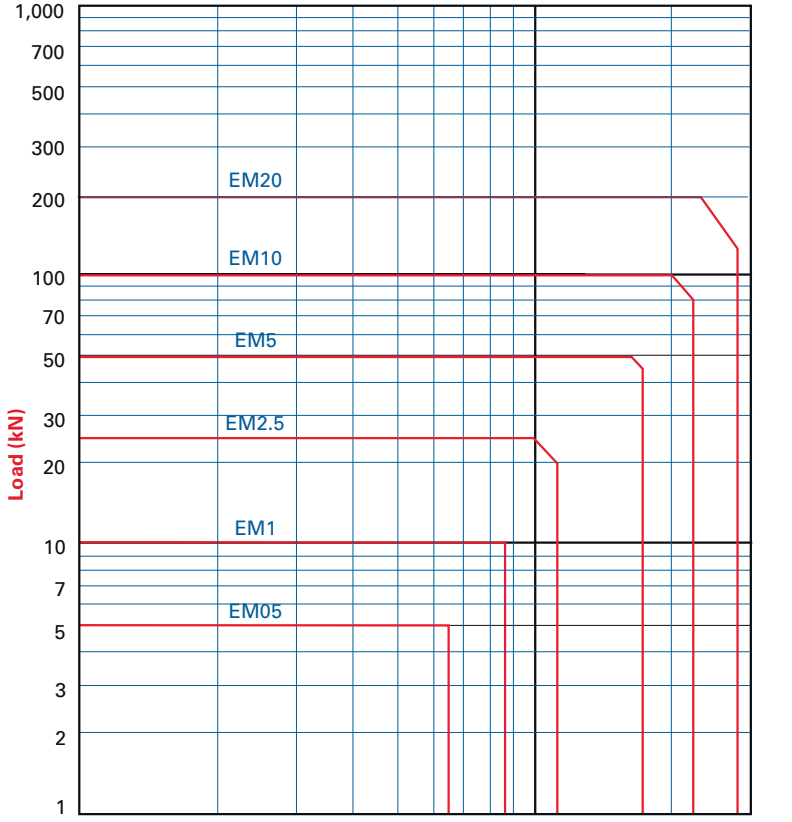
If the lift shaft is in tension only, the screw jack travel is limited by the available screw material or by the critical speed of the screw. Refer to the ball screw technical section for critical speed limitations. If there is any possibility for the lift shaft to go into compression, the application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



A	50	100	150	250	350	500	1,000	1,500
B	100	200	200	500	700	1,000	2,000	3,000
C	150	300	450	750	1,050	1,500	3,000	4,500
D	200	400	600	1,000	1,400	2,000	4,000	6,000

"L" (mm)

Metric Ball Screw Jack

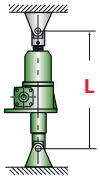
MOUNTING CONDITIONS

A

ONE END FIXED
ONE END FREE

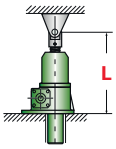
B

BOTH ENDS SUPPORTED BY CLEVIS ENDS



C

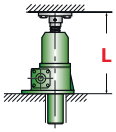
ONE END FIXED, ONE END SUPPORTED (CLEVIS ATTACHED TO GUIDE STRUCTURE)



ONE END FIXED, ONE END SUPPORTED (RADIAL BEARING)

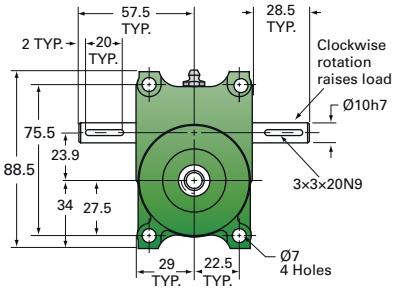
D

BOTH ENDS FIXED (TOP PLATE ATTACHED TO GUIDED STRUCTURE)

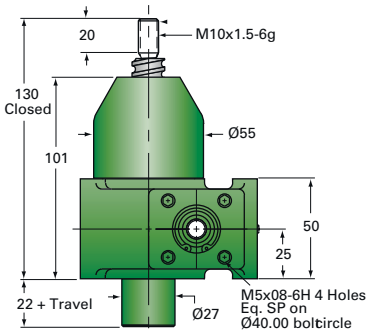


EM05-BSJ

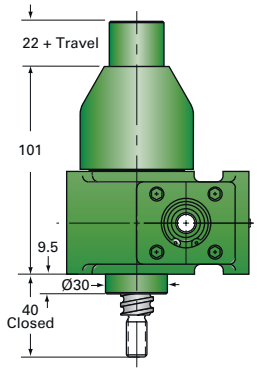
EM05-BSJ TOP VIEW



EM05-BSJ-U UPRIGHT



EM05-BSJ-I INVERTED



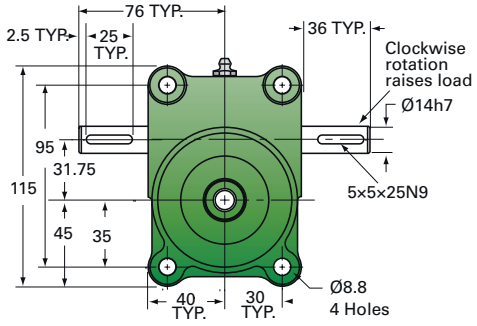
MODEL	Gear Ratio	Capacity (kN)	Raise for One Turn of Worm (mm)	Max Input Torque (N-m)
EM05-BSJ	5:1	5	1.00	1.21
	20:1	5	0.25	0.51

Screw Specs:
Screw: MRT 16x5
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
Grease: 0.14

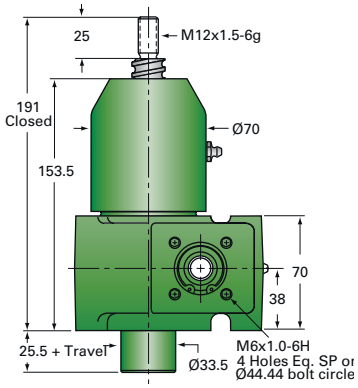
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

EM1-BSJ

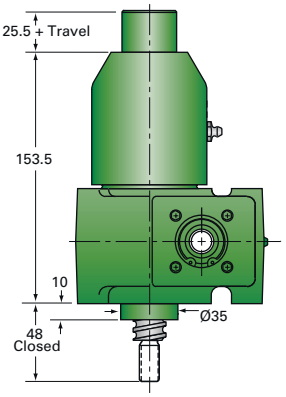
EM1-BSJ TOP VIEW



EM1-BSJ-U UPRIGHT



EM1-BSJ-I INVERTED



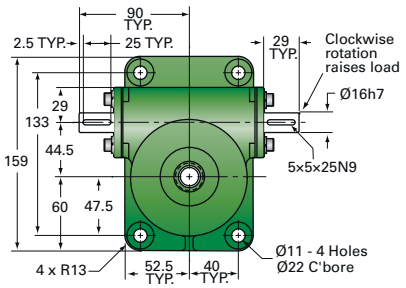
MODEL	Gear Ratio	Capacity (kN)	Raise for One Turn of Worm (mm)	Max Input Torque (N-m)
EM1-BSJ	5:1	10	1.00	2.41
	20:1	10	0.25	1.14

Screw Specs:
Screw: MRT 20x5
Root diameter (mm): 17.5
Drag torque (N-m): 0.34
Start torque = 1.5 × Running Torque
Approximate weight (Kg)
"0" Travel: 3.6
Per 100mm travel: 0.23
Grease: 0.23

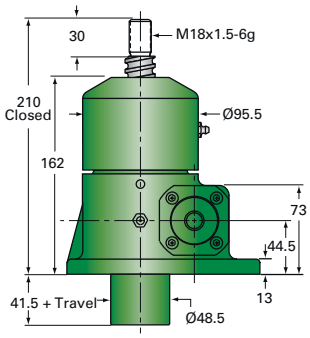
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

EM2.5-BSJ

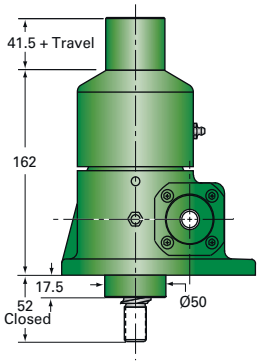
EM2.5-BSJ TOP VIEW



EM2.5-BSJ-U UPRIGHT



EM2.5-BSJ-I INVERTED



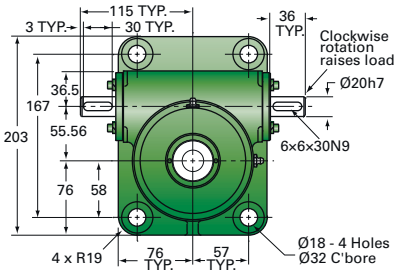
MODEL	Gear Ratio	Capacity (kN)	Raise for One Turn of Worm (mm)	Max Input Torque (N-m)
EM2.5-BSJ	6:1	25	0.83	5.05
	12:1	25	0.42	3.05
	24:1	25	0.21	2.13

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

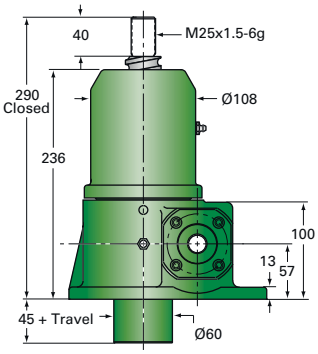
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

EM5-BSJ

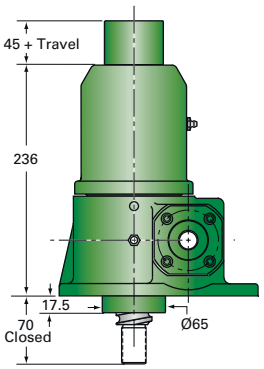
EM5-BSJ TOP VIEW



EM5-BSJ-U UPRIGHT



EM5-BSJ-I INVERTED



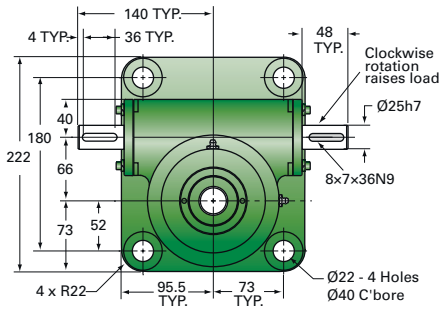
MODEL	Gear Ratio	Capacity (kN)	Raise for One Turn of Worm (mm)	Max Input Torque (N-m)
EM5-BSJ	6:1	50	1.67	19.3
	24:1	50	0.42	7.7

Screw Specs:
Screw: MRT 40x10
Root diameter (mm): 34.8
Drag torque (N-m): 1.13
Start torque = 1.5 × Running Torque
Approximate weight (Kg)
"0" Travel: 15.9
Per 100mm travel: 0.93
Grease: 0.45

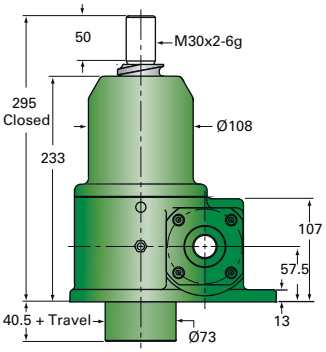
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

EM10-BSJ

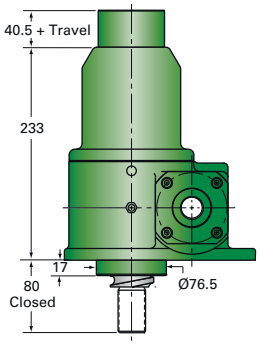
EM10-BSJ TOP VIEW



EM10-BSJ-U UPRIGHT



EM10-BSJ-I INVERTED



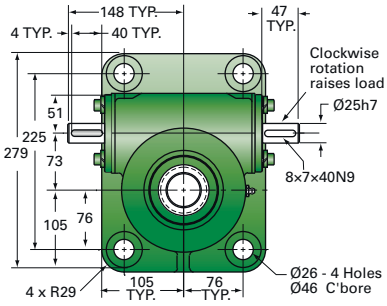
MODEL	Gear Ratio	Capacity (kN)	Raise for One Turn of Worm (mm)	Max Input Torque (N-m)
EM10-BSJ	6:1	100	1.25	31.9
	24:1	100	0.42	16.2

Screw Specs:
Screw: MRT 50x10
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

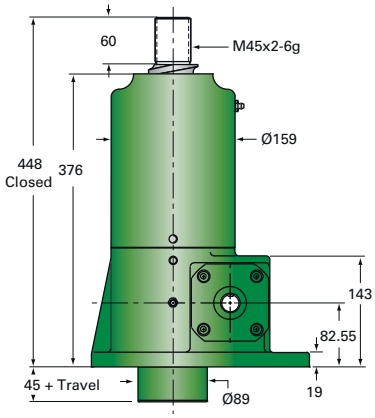
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

EM20-BSJ

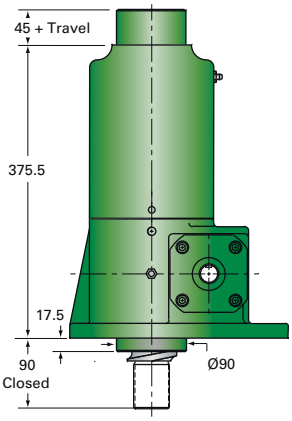
EM20-BSJ TOP VIEW



EM20-BSJ-U UPRIGHT



EM20-BSJ-I INVERTED



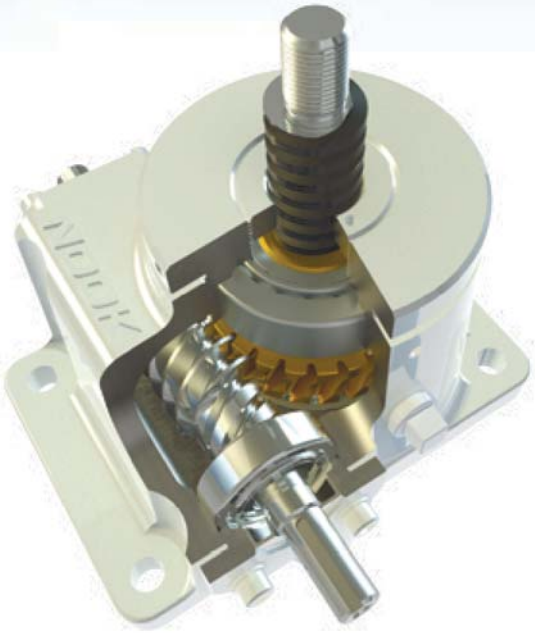
MODEL	Gear Ratio	Capacity (kN)	Raise for One Turn of Worm (mm)	Max Input Torque (N-m)
EM20-BSJ	8:1	200	1.5	75.2
	24:1	200	0.5	37.7

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.

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.



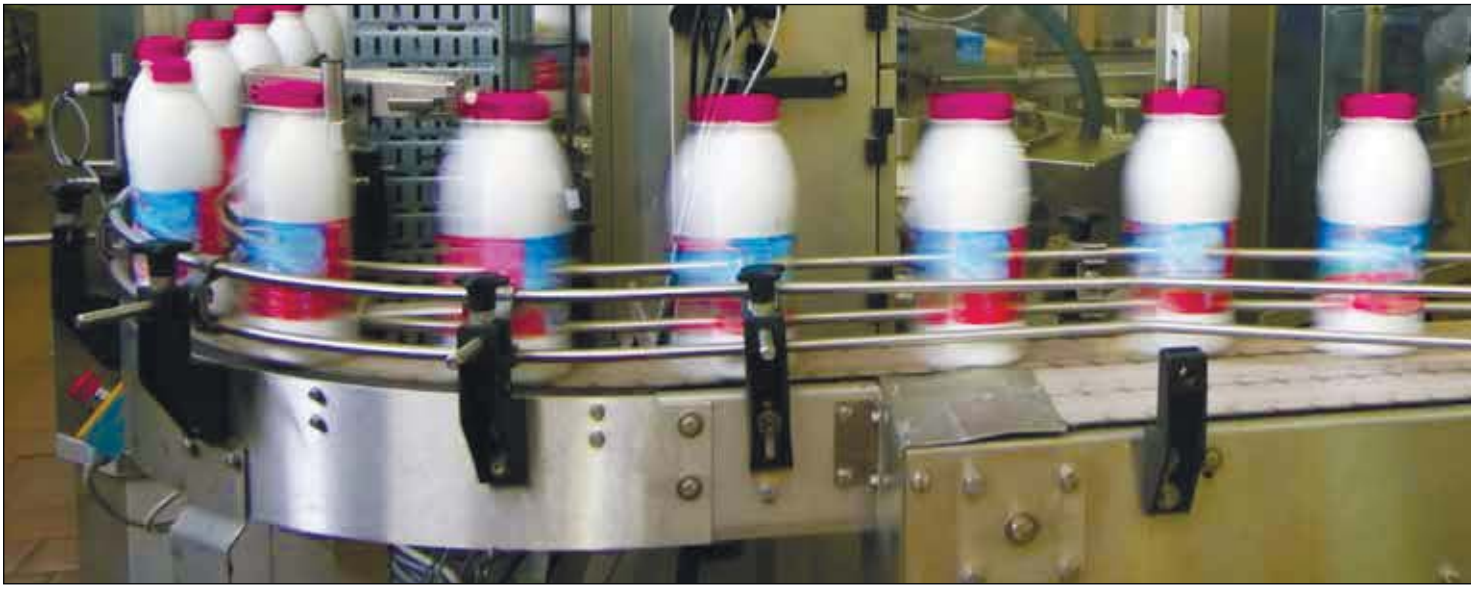
Nook worm gear screw jacks are used widely in the nuclear industry.

NOOK

QUICK REFERENCE

METRIC TRAPEZOIDAL SCREW JACKS

MODEL	Gear Ratio	Capacity (kN)	Lifting Screw Dia (mm)	Screw Lead (mm)	Root Dia (mm)	Raise for One Turn of Worm (mm)	Max Input Torque (N·m)	Max Input (kW)	Max Worm Speed at Rated Load (rpm)	Max Load at 1,425 rpm (kN)	Torque to Raise 1 kN (N·m)	No Load Torque (N·m)
EM05-MSJ	5:1	5	16	4	10.9	0.80	2.25	0.27	1,130	4.0	0.45	0.11
	20:1	5	16	4	10.9	0.20	0.94	0.13	1,130	4.6	0.19	0.11
EM1-MSJ	5:1	10	20.0	5	17.5	0.80	5.19	0.36	665	4.7	0.52	0.34
	20:1	10	20.0	5	17.5	0.20	2.44	0.19	730	5.1	0.24	0.34
EM2.5-MSJ	6:1	25	26	6	17.8	1.0	14.9	1.51	975	17.0	0.59	0.56
	24:1	25	26	6	17.8	0.25	6.3	0.38	575	10.1	0.25	0.56
EM5-MSJ	6:1	50	40	7	30.9	1.17	40.3	1.87	445	15.6	0.81	1.13
	24:1	50	40	7	30.9	0.29	16.0	0.51	300	10.7	0.32	1.13
EM10-MSJ	8:1	100	55	12	40.0	1.50	97.2	3.65	360	25.2	0.97	2.26
	24:1	100	55	12	40.0	1.50	215	5.60	250	14.8	0.50	2.26
EM20-MSJ	8:1	200	65	12	50.0	1.50	215	5.60	250	35.0	1.08	4.52
	24:1	200	65	12	50.0	0.50	108	1.9	165	23.0	0.54	4.52



Nook worm gear screw jacks are used in many conveyor applications.

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 application should be sized for sufficient column strength.

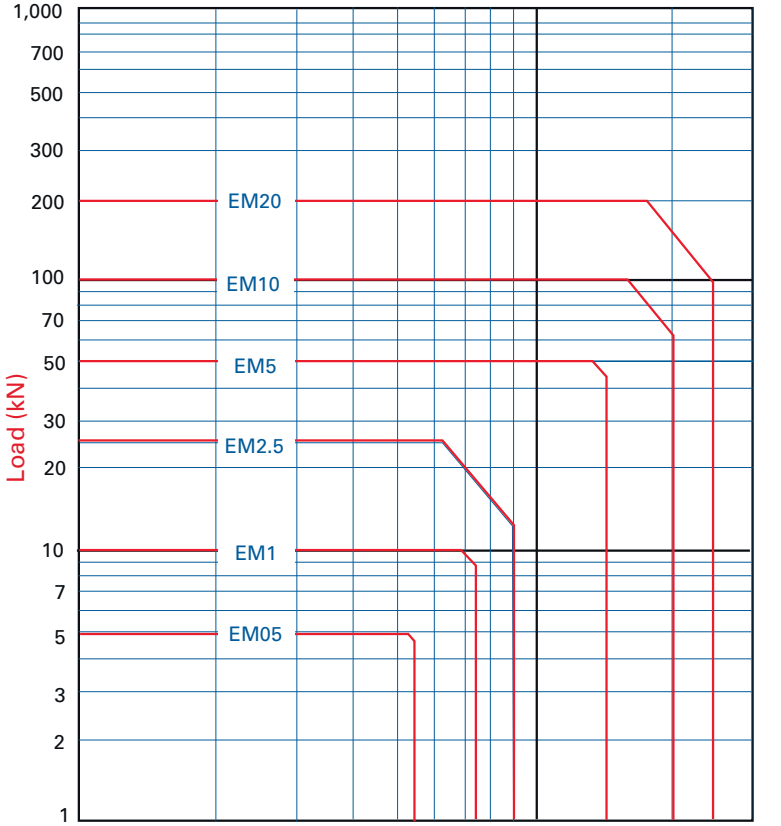
The chart below is used to determine the required jack size in applications where the lift shaft is loaded in compression.

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.



A	50	100	150	250	350	500	1,000	1,500
B	100	200	300	500	700	1,000	2,000	3,000
C	150	300	450	750	1,050	1,500	3,000	4,500
D	200	400	600	1,000	1,400	2,000	4,000	6,000

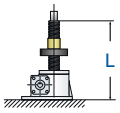
"L" (mm)

Metric Trapezoidal Screw Jacks

MOUNTING CONDITIONS

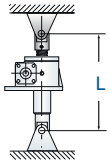
A

ONE END FIXED
ONE END FREE



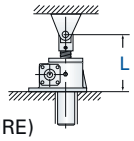
B

BOTH ENDS SUPPORTED BY CLEVIS ENDS

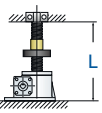


C

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

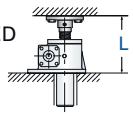


ONE END FIXED, ONE END SUPPORTED (RADIAL BEARING))



D

BOTH ENDS FIXED (TOP PLATE ATTACHED TO GUIDED STRUCTURE)



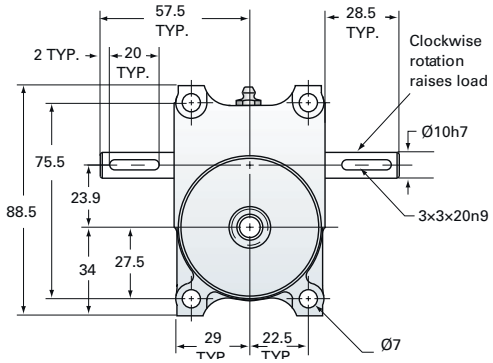
AVAILABLE LIFT SCREW LENGTHS

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.

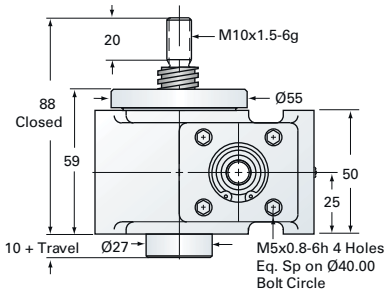
Rotating screw jacks can be built with a larger diameter lift shaft for greater column strength.

EM05-MSJ

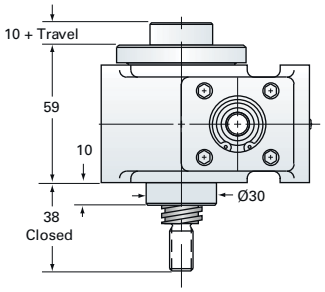
EM05-MSJ TOP VIEW



EM05-MSJ-U UPRIGHT



EM05-MSJ-I INVERTED



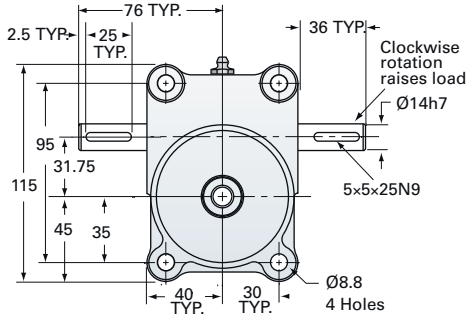
MODEL	Gear Ratio	Capacity (kN)	Raise for One Turn of Worm (mm)	Max Input Torque (N-m)
EM05-MSJ	5:1	5	0.80	2.25
	20:1	5	0.21	0.94

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

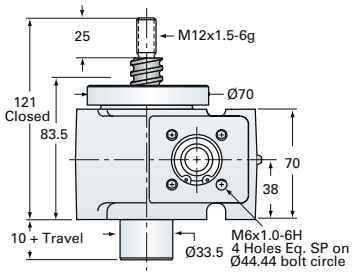
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

EM1-MSJ

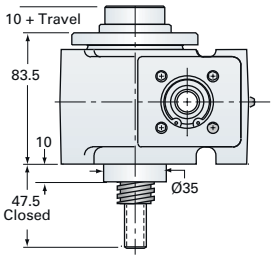
EM1-MSJ TOP VIEW



EM1-MSJ-U UPRIGHT



EM1-MSJ-I INVERTED



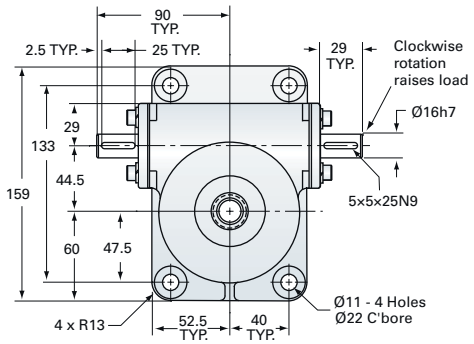
MODEL	Gear Ratio	Capacity (kN)	Raise for One Turn of Worm (mm)	Max Input Torque (N-m)
EM1-MSJ	5:1	10	0.80	5.19
	20:1	10	0.20	2.44

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

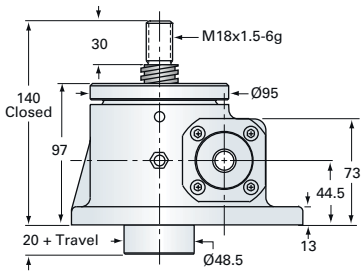
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

EM2.5-MSJ

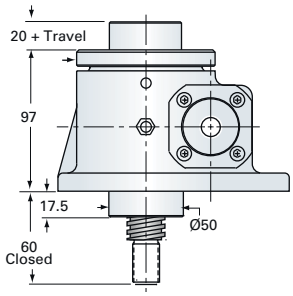
EM2.5-MSJ TOP VIEW



EM2.5-MSJ-U UPRIGHT



EM2.5-MSJ-I INVERTED



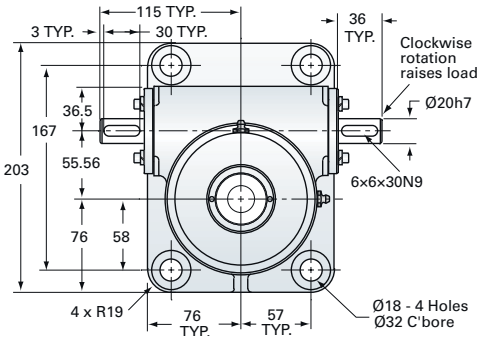
MODEL	Gear Ratio	Capacity (kN)	Raise for One Turn of Worm (mm)	Max Input Torque (N-m)
EM2.5-MSJ	6:1	25	1.0	14.9
	24:1	25	0.25	6.3

Screw Specs:
Screw: Tr26x6
Root diameter (mm): 17.8
Start torque = 2 × Running Torque
Approximate weight (Kg)
"0" Travel: 7.7
Per 100mm travel: 0.32
Grease: 0.22

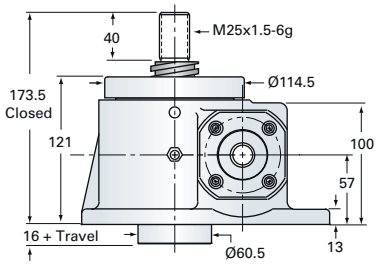
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

EM5-MSJ

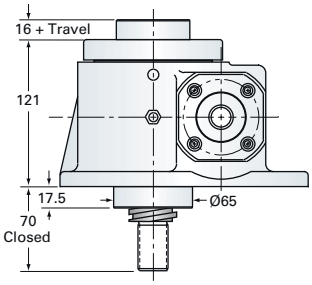
EM5-MSJ TOP VIEW



EM5-MSJ-U UPRIGHT



EM5-MSJ-I INVERTED



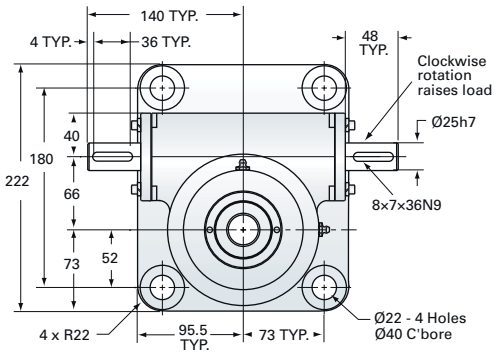
MODEL	Gear Ratio	Capacity (kN)	Raise for One Turn of Worm (mm)	Max Input Torque (N-m)
EM5-MSJ	6:1	50	1.17	40.3
	24:1	50	0.29	16.0

Screw Specs:
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

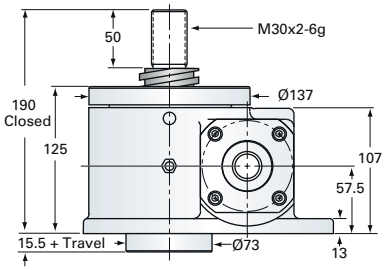
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

EM10-MSJ

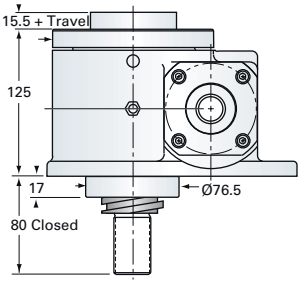
EM10-MSJ TOP VIEW



EM10-MSJ-U UPRIGHT



EM10-MSJ-I INVERTED



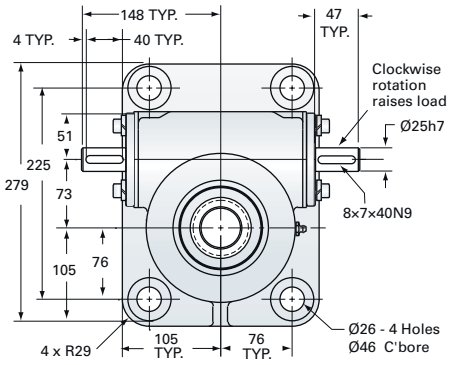
MODEL	Gear Ratio	Capacity (kN)	Raise for One Turn of Worm (mm)	Max Input Torque (N-m)
EM10-MSJ	8:1	100	1.50	97.2
	24:1	100	0.50	21.5

Screw Specs:
Screw: Tr55x12
Root diameter (mm): 40
Start torque = 2 × Running Torque
Approximate weight (Kg)
"0" Travel: 20.4
Per 100mm travel:1.46
Grease: 0.68

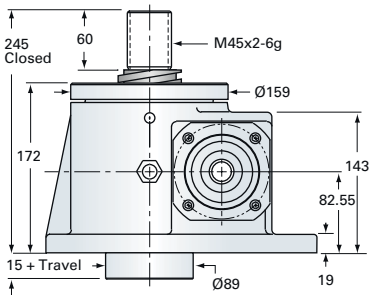
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

EM20-MSJ

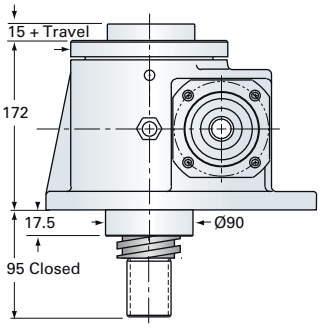
EM20-MSJ TOP VIEW



EM20-MSJ-U UPRIGHT



EM20-MSJ-I INVERTED



MODEL	Gear Ratio	Capacity (kN)	Raise for One Turn of Worm (mm)	Max Input Torque (N-m)
EM20-MSJ	8:1	200	1.50	215
	24:1	200	0.50	108

Screw Specs:
Screw: Tr65x12
Root diameter (mm): 50
Start torque = 2 × Running Torque
Approximate weight (Kg)
"0" Travel: 36.3
Per 100mm travel: 2.12
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.

CUBIC JACKS
MACHINE AND BALL SCREW

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.

NOOK

QUICK REFERENCE
INCH CUBIC JACKS

MODEL	Gear Ratio	Capacity (tons)	Lifting Screw Dia (in)	Screw Lead (in)	Root Dia (in)	Turns of Worm for 1" travel	Max input Torque (in.-lb.)	Max Input (hp)	Max Worm Speed at Rated Load (rpm)	Max Load at 1,750 rpm (lb)	Torque to Raise 1 lb. (in-lb)	Tare Drag Torque (in-lb)	Back Drive Holding Torque
0.5C-BSJ	5:1	½	⅝	.200	.500	25	9.5	⅓	1,800	1,000	.0095	1	1.0
	20:1	½	⅝	.200	.500	100	4.0	⅙	1,800	1,000	.0040	1	.25
0.5CHL-BSJ	5:1	½	⅝	.500	.500	10	24.2	⅓	868	496	.0242	1	2
	20:1	½	⅝	.500	.500	40	10.2	⅙	1,030	588	.0102	1	1
1C-BSJ	5:1	1	¾	.200	.602	25	19	½	1,660	1,895	.0095	3	1.5
	20:1	1	¾	.200	.602	100	9	¼	1,750	2,000	.0045	3	.50
1CHL-BSJ	5:1	1	¾	.500	.602	10	48.2	½	654	747	.0241	3	3.5
	20:1	1	¾	.500	.602	40	9	¼	691	790	.0114	3	1.5
MJC-20	5:1	.5	½	.250	.332	20	19	⅓	1,090	631	.019	—	—
MJC-25	5:1	.5	⅝	.200	.377	25	21	⅓	1,040	571	.021	—	—
MJC-40	5:1	.5	⅝	.125	.457	40	17	⅓	1,260	706	.017	—	—
MJC-50	5:1	.5	½	.100	.359	50	14	⅓	1,560	857	.014	—	—
MJC-80	20:1	.5	½	.250	.332	80	8	⅙	1,310	750	.008	—	—
MJC-100	20:1	.5	⅝	.200	.377	100	9	⅙	1,210	667	.009	—	—
MJC-160	20:1	.5	⅝	.125	.457	160	7	⅙	1,500	857	.007	—	—
MJC-200	20:1	.5	½	.100	.359	200	6	⅙	1,800	1,000	.006	—	—
1C-MSJ	5:1	1	¾	.200	.502	25	45	½	700	800	.0225	3	—
	20:1	1	¾	.200	.502	100	21	¼	750	857	.0105	3	—

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 for Machine Screw Jacks and 50% greater than torque shown for Ball Screw Jacks. Tare drag torque should be added for all loads.

3) Maximum allowable horsepower 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 200°F.

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

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

12) Measurements are for non-keyed units. See individual jack pages for keyed jack info.

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. If there is any possibility for the lift shaft to go into compression, the application should be sized for sufficient column strength.

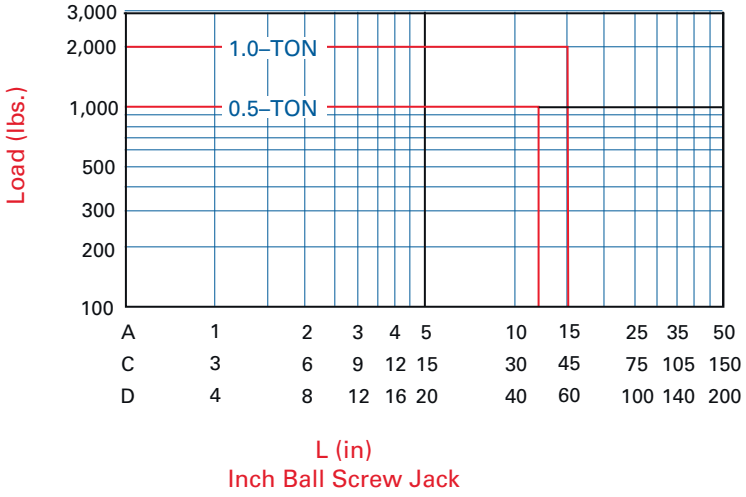
The chart below is used to determine the required jack size in applications where the lift shaft is loaded in compression.

TO USE THESE CHARTS:

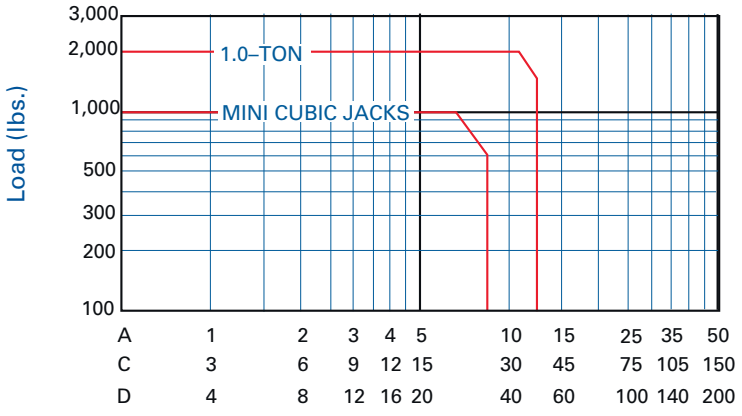
Find a point at which the maximum length "L" intersects the maximum load. Be sure the jack selected is above and to the right of that point.

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.

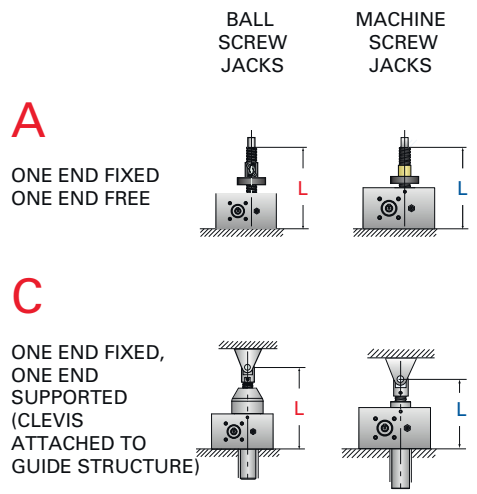


Inch Ball Screw Jack



Inch Machine Screw Jack

MOUNTING CONDITIONS



NOOK

LIFE EXPECTANCY
INCH BALL SCREW CUBIC JACKS

MODEL	OPERATING LOAD (lbs)	MINIMUM INCHES OF TRAVEL (in. × 103)			
		UPRIGHT & INVERTED		UPRIGHT & INVERTED ROTATING	
		Standard (in)	High-lead (in)	Standard (in)	High-lead (in)
0.5C-BSJ 0.5HLC-BSJ	1,000	377	708	471	885
	750	893	1,678	116	2,097
	500	3,014	5,662	3,767	7,078
	250	24,111	45,299	56,623	56,623
1C-BSJ 1HLC-BSJ	2,000	133	2,019	166	2,524
	1,500	316	4,785.9	394	5,982
	1,000	1,065	16,152	1,331	20,190
	500	8,518	129,218	10,648	161,523

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

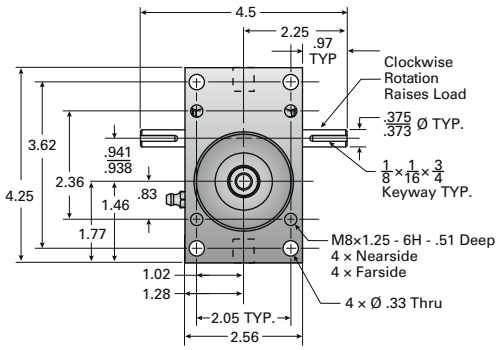
MODEL	OPERATING LOAD (kN)	MINIMUM METERS OF TRAVEL	
		UPRIGHT & INVERTED	UPRIGHT ROTATING
		Standard	Standard
EM05C-BSJ	4	34,295	42,869
	2	274,360	342,950
	1	2,194,880	2,743,600
EM1C-BSJ	8	21,455	26,819
	5	87,880	109,850
	2.5	703,040	878,800

NOTES:

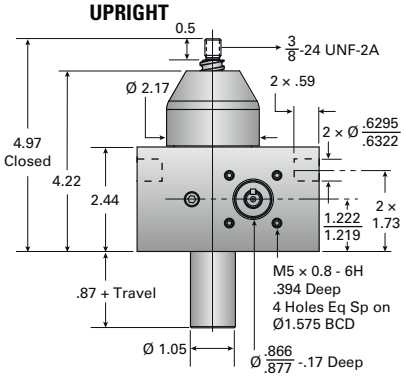
- Refer to Lubrication Instructions in order to obtain maximum life from ball screw assemblies
- These values may be greatly reduced if the units are subjected to misalignment, shock loads, side thrust, contamination or lack of proper lubrication and maintenance.

0.5C-BSJ
0.5CHL-BSJ

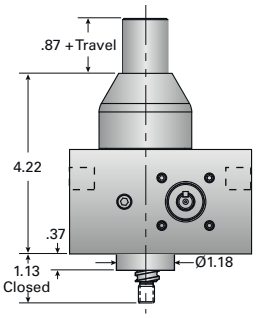
0.5C-BSJ & 0.5CHL-BSJ TOP VIEW



0.5C-BSJ-U & 0.5CHL-BSJ-U UPRIGHT



0.5C-BSJ-I & 0.5CHL-BSJ-I INVERTED



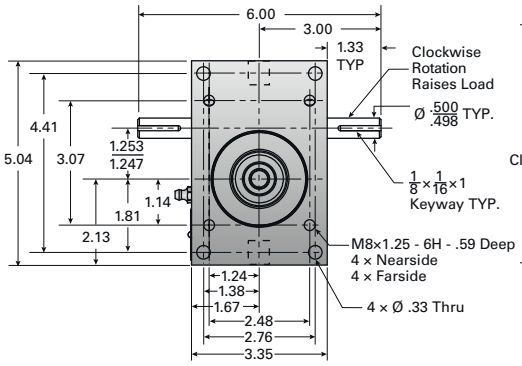
MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)	Backdrive holding torque (ft-lb)
0.5-BSJ Capacity: 0.5 tons Screw: 0631-0200	5:1	25	9.5	⅓	1	1.0
	20:1	100	4.0	⅙	1	.25
0.5HL-BSJ Capacity: 0.5 tons Screw: 0631-0500	5:1	10	24.2	⅓	1	2
	20:1	40	10.2	⅙	1	1

Screw Specs:
Root diameter (in): 0.500
Start torque = 1.5 × Running Torque
Approximate weight (lbs)
"0" Travel: 3.5
Per inch travel: 0.3
Grease: 0.3

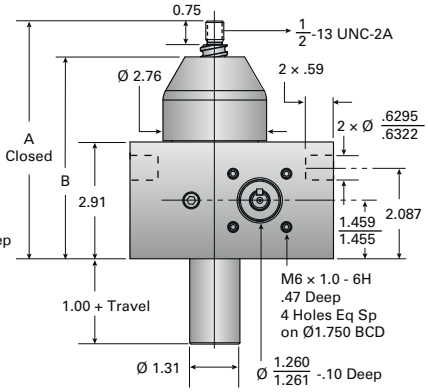
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

1C-BSJ
1CHL-BSJ

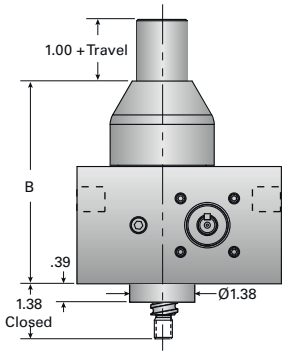
1C-BSJ & 1CHL-BSJ TOP VIEW



1C-BSJ-U & 1CHL-BSJ-U UPRIGHT



1C-BSJ-I & 1CHL-BSJ-I INVERTED



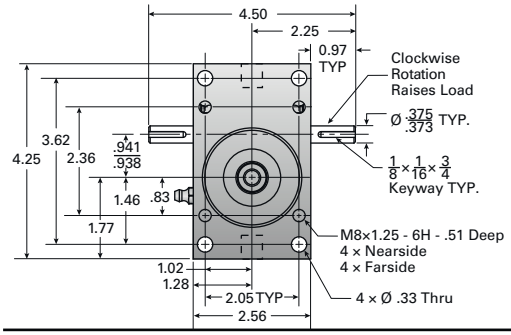
MODEL	Gear Ratio	Turns of Worm for 1" Travel	Max Input Torque (in-lb)	Max Allowable Input (hp)	Tare Drag Torque (in-lb)	Backdrive holding torque (ft-lb)	A (in)	B (in)
1C-BSJ Capacity: 1 ton Screw: 0750-0200	5:1	25	19	½	3	1.5	5.57	4.57
	20:1	100	9	¼	3	.5	5.57	4.57
1CHL-BSJ Capacity: 1 ton Screw: 0750-0500	5:1	10	48.2	½	3	3.5	6.62	5.62
	20:1	40	9	¼	3	1.5	6.62	5.62

Screw Specs:
Root diameter (in): 0.602
Start torque = 1.5 × Running Torque
Approximate weight (lbs)
"0" Travel: 7.2
Per inch travel: 0.04
Grease: 0.5

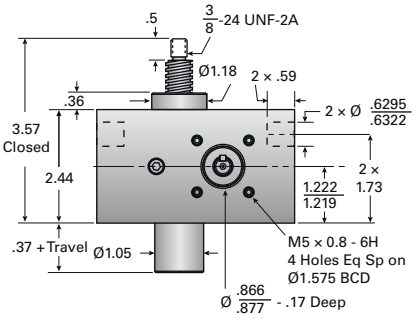
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

MINI CUBIC JACKS

MJC-xx TOP VIEW



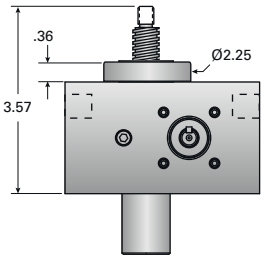
MJC-xx-U UPRIGHT & INVERTED



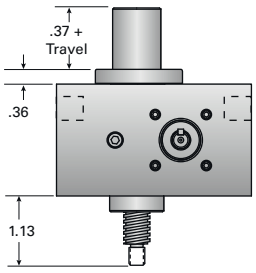
MODEL	Gear Ratio	Turns of Worm for 1" Travel	Torque at 1,000 lb. Load (in-lb)	Max Allowable Input (hp)	Screw size
MJC-20	5:1	20	19.3	1/3	1/2-4
MJC-25	5:1	25	20.7	1/3	5/8-5
MJC-40	5:1	40	16.7	1/3	5/8-8
MJC-50	5:1	50	13.5	1/3	1/2-10
MJC-80	20:1	80	8.0	1/6	1/2-4
MJC-100	20:1	100	8.7	1/6	5/8-5
MJC-160	20:1	160	7.0	1/6	5/8-8
MJC-200	20:1	200	5.7	1/6	1/2-10

Mini Jack Standard:
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 3.0
Per inch travel: 0.2
Grease: 0.5

MJABC-xx-U UPRIGHT ANTI-BACKLASH



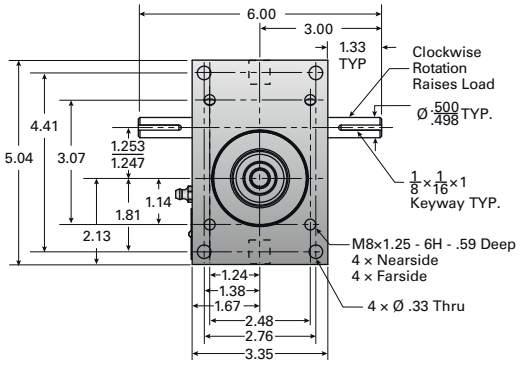
MJABC-xx-I INVERTED ANTI-BACKLASH



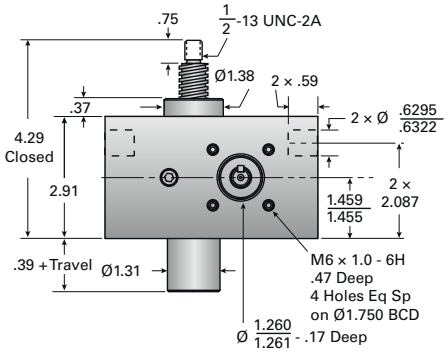
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

1C-MSJ

1C-MSJ TOP VIEW



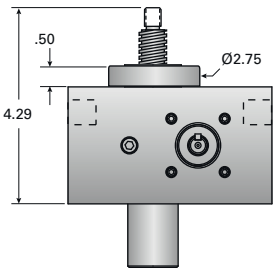
1C-MSJ-U UPRIGHT & INVERTED



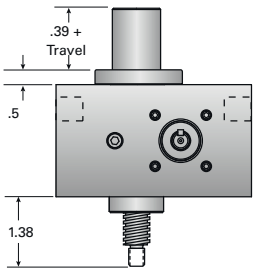
MODEL	Gear Ratio	Turns of Worm for 1″ Travel	Max Input Torque (in-lb)	Max allowable Input (hp)	Tare Drag Torque (in-lb)
1C-MSJ Capacity: 1 ton Screw: ¾-5	**5:1**	25	45	½	3
	20:1	100	21	¼	3

Screw Specs:
Root diameter (in): 0.502
Screw lead (in): 0.200
Start torque = 2 × Running Torque
Approximate weight (lbs)
"0" Travel: 5.2
Per inch travel: 0.3
Grease: 0.5

1ABC-MSJ-U
UPRIGHT ANTI-BACKLASH



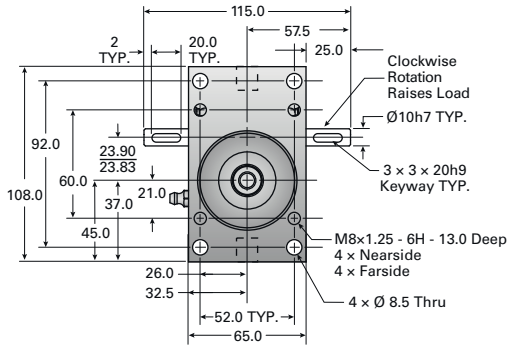
1ABC-MSJ-I
INVERTED ANTI-BACKLASH



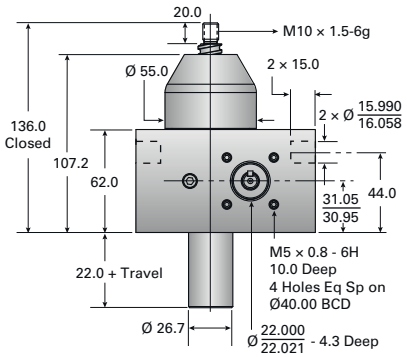
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

EM05C-BSJ

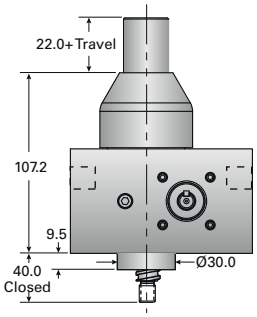
EM05C-BSJ TOP VIEW



EM05C-BSJ-U UPRIGHT



EM05C-BSJ-I INVERTED



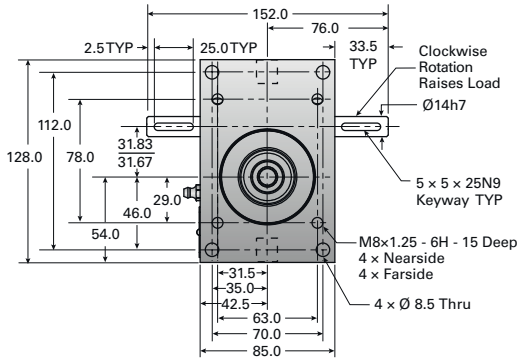
MODEL	Gear Ratio	Capacity (kN)	Raise for One Turn of Worm (mm)	Max Input Torque (N-m)
EM05C-BSJ	5:1	5	1.00	1.21
	20:1	5	0.25	0.51

Screw Specs:
Screw: MRT 16x5
Root diameter (mm): 12.9
Start torque = 1.5 × Running Torque
Drag torque (N-m): 0.11
Approximate weight (Kg)
"0" Travel: 1.58
Per 100mm travel: 0.14
Grease: 0.14

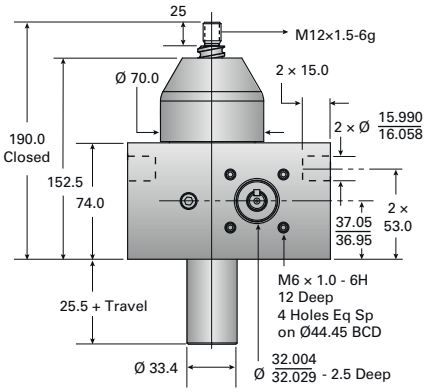
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

EM1C-BSJ

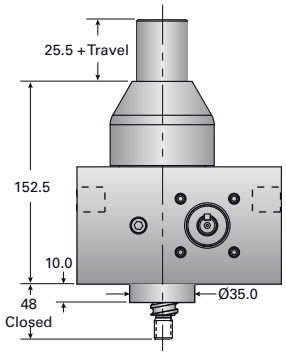
EM1C-BSJ TOP VIEW



EM1C-BSJ-U UPRIGHT



EM1C-BSJ-I INVERTED



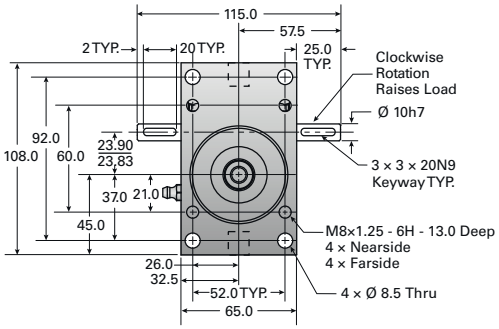
MODEL	Gear Ratio	Capacity (kN)	Raise for One Turn of Worm (mm)	Max Input Torque (N-m)
EM1-BSJ	5:1	10	1.00	2.41
	20:1	10	0.25	1.14

Screw Specs:
Screw: MRT 20x5
Root diameter (mm): 17.5
Start torque = 1.5 × Running Torque
Drag torque (N-m): 0.34
Approximate weight (Kg)
"0" Travel: 3.3
Per 100mm travel: 0.23
Grease: 0.23

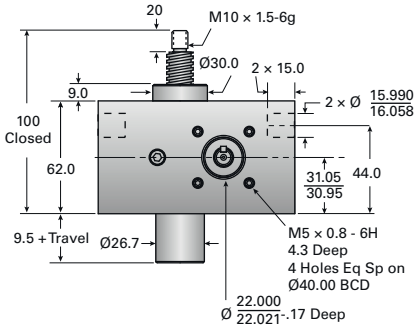
Caution: Jack is self-lowering. Lifting screw must be secured to prevent rotation for non-keyed units.

EM05C-MSJ

EM05C-MSJ TOP VIEW



EM05C-MSJ-U UPRIGHT & INVERTED



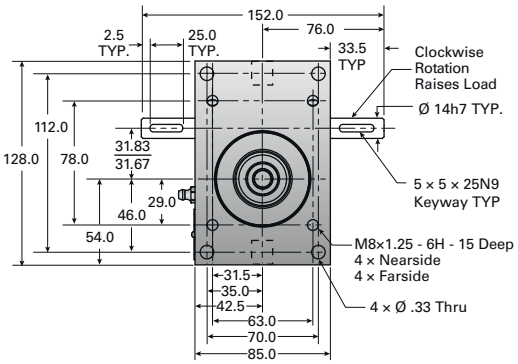
MODEL	Gear Ratio	Capacity (kN)	Raise for One Turn of Worm (mm)	Max Input Torque (N-m)
EM05C-MSJ	5:1	5	0.80	2.25
	20:1	5	0.21	0.94

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

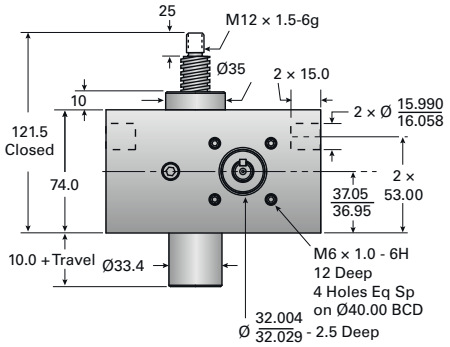
Lifting screw must be secured to prevent rotation for non-keyed units.
Caution: Jack may be self-lowering in some operating conditions.

EM1C-MSJ

EM1C-MSJ TOP VIEW



EM1C-MSJ-U UPRIGHT & INVERTED



MODEL	Gear Ratio	Capacity (kN)	Raise for One Turn of Worm (mm)	Max Input Torque (N-m)
EM1C-MSJ	5:1	10	0.80	5.19
	20:1	10	0.20	2.44

Screw Specs:
Screw: Tr20x4
Root diameter (mm): 14.9
Start torque = 2 × Running Torque
Approximate weight (Kg)
"0" Travel: 2.4
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.

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

MITER GEAR ASSEMBLIES
page 191

LINKJAC™ SHAFTING
page 192-193

FLEXIBLE COUPLINGS
page 194-195

IN-LINE ENCODERS
page 202

COUNTERS
page 203

CONTROL PANELS
page 204-205

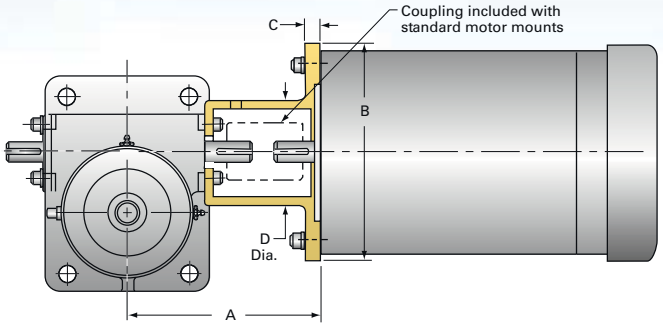
MOTOR MOUNTS WITH AND WITHOUT BRAKEMOTORS

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 mounts 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 mounts can be custom manufactured for other jack sizes, please contact Nook Engineering.

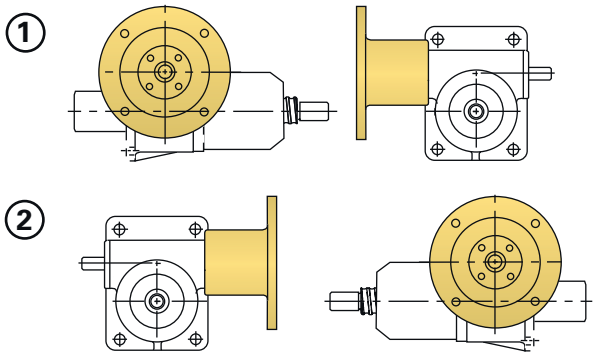
CAUTION: Ball Screw Jacks are self-lowering. A brake of sufficient torque is required to hold the load with a ball screw jack. Be sure to verify that the brakemotor selected has sufficient brake torque for your application.



JACK SIZE (TONS)	NEMA FRAME SIZE	PRODUCT CODE WITHOUT MOTOR	DIMENSIONS			
			A	B	C	D
2.5	56C	X05	6.25	6.63	.63	3.50
	140TC	X14	6.25	6.63	.63	3.50
5	56C	X05	7.25	6.75	.56	3.75
	140TC	X14	7.25	6.75	.56	3.75
	180TC	X18	8.00	9.25	.75	3.75
10, 15	56C	X05	8.25	6.75	.50	4.38
	140TC	X14	8.25	6.75	.50	4.38
	180TC	X18	9.00	9.25	.75	4.38
20	56C	X05	8.66	6.75	.50	3.75
	140TC	X14	8.66	6.75	.50	3.75
	180TC	X18	9.00	9.25	.63	5.19
	213TC	X21	9.68	8.88	.88	5.69

For all other sizes and configurations, contact Nook Engineering.

MOTOR MOUNT MOUNTING POSITIONS



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

EXAMPLE WITH MOTOR:
2.5-BSJ-U 6:1 / **10BT-1** / SSE-2 / FT / 12.0 / S

Motor Product Code — Mounting Position
(see page 188)

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.

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 installed on Keyed or Anti-Backlash Machine Screw Jack models. Special consideration must be given when installing onto a Double-Clevis Jack due to the additional weight of the reducer.

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 / **05BTR7** - **7** / 2CA-2 / FT / 24.5 / S

Motor Product Code (see page 188)

Mounting Position (see page 185)

CODE	Gear Ratio
R5	5:1
R7	7.5:1
R10	10:1
R15	15:1

BALL SCREW JACKS

Jack Model-Ratio	Reducer Ratio	Travel Rate*	Dynamic Capacity per Motor Horsepower (lb) **					
			¼	⅓	½	¾	1	1½
2.5-BSJ-6:1	5:1	14.38	3,780	5,000	–	–	–	–
	7.5:1	9.58	5,000	–	–	–	–	–
	10:1	7.19	5,000	–	–	–	–	–
	15:1	4.79	5,000	–	–	–	–	–
2.5-BSJ-24:1	5:1	3.59	5,000	–	–	–	–	–
	7.5:1	2.40	5,000	–	–	–	–	–
	10:1	1.80	5,000	–	–	–	–	–
	15:1	1.20	5,000	–	–	–	–	–
2.5HL-BSJ-6:1	5:1	57.50	950	1,270	1,910	2,860	3,820	5,000
	7.5:1	38.33	1,400	1,860	2,800	4,190	5,000	–
	10:1	28.75	1,820	2,430	3,640	5,000	–	–
	15:1	19.17	2,640	3,520	5,000	–	–	–

* measured in in/min.@ 1,725 rpm
** Full nominal static capacity of jack is retained

RIGHT ANGLE REDUCERS (CONTINUED)

HIGH EFFICIENCY RIGHT-ANGLE REDUCERS

MACHINE SCREW JACKS

Jack Model-Ratio	Reducer Ratio	Travel Rate*	Dynamic Capacity per Motor Horsepower (lb)**						
			¼	⅓	½	¾	1	1½	2
2.5-MSJ-6:1	5	14.38	1,530	2,040	3,060	4,590	5,000	–	–
	7.5	9.58	2,240	2,990	4,480	5,000	–	–	–
	10	7.19	2,920	3,890	5,000	–	–	–	–
	15	4.79	4,230	5,000	–	–	–	–	–
2.5-MSJ-24:1	5	3.59	3,640	4,850	5,000	–	–	–	–
	7.5	2.40	5,000	–	–	–	–	–	–
	10	1.80	5,000	–	–	–	–	–	–
	15	1.20	5,000	–	–	–	–	–	–
5-MSJ-6:1	5	21.56	–	–	2,050	3,080	4,100	6,150	8,210
	7.5	14.38	–	–	3,050	4,570	6,100	9,150	10,000
	10	10.78	–	–	3,960	5,940	7,930	10,000	–
	15	7.19	–	–	5,670	8,510	10,000	–	–
5-MSJ-24:1	5	5.39	–	–	5,360	8,030	–	–	–
	7.5	3.59	–	–	7,960	–	–	–	–
	10	2.70	–	–	10,000	–	–	–	–
	15	1.80	–	–	10,000	–	–	–	–
10-MSJ-8:1	7.5	14.38	–	–	–	4,550	6,070	9,110	12,140
	10	10.78	–	–	–	6,010	8,010	12,020	16,020
	15	7.19	–	–	–	8,610	11,480	17,210	20,000
10-MSJ-24:1	7.5	4.79	–	–	–	8,940	11,920	17,880	–
	10	3.59	–	–	–	11,800	15,730	20,000	–
	15	2.40	–	–	–	16,900	20,000	–	–
15-MSJ-8:1	7.5	14.38	–	–	–	4,220	5,620	8,440	11,250
	10	10.78	–	–	–	5,570	7,420	11,130	14,840
	15	7.19	–	–	–	7,970	10,630	15,950	21,260
15-MSJ-24:1	7.5	5.99	–	–	–	7,880	10,500	15,750	–
	10	3.59	–	–	–	10,390	13,850	20,780	–
	15	2.40	–	–	–	14,880	19,850	29,770	–
20-MSJ-8:1	7.5	14.38	–	–	–	–	–	7,990	10,650
	10	10.78	–	–	–	–	–	10,520	14,030
	15	7.19	–	–	–	–	–	15,240	20,320
20-MSJ-24:1	7.5	4.79	–	–	–	–	–	15,940	21,250
	10	3.59	–	–	–	–	–	20,990	27,990
	15	2.40	–	–	–	–	–	30,410	40,000

* measured in in/min.@ 1,725 rpm
** Full nominal static capacity of jack is retained

NOOK

RIGHT ANGLE REDUCERS

STANDARD EFFICIENCY RIGHT-ANGLE REDUCERS

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 standard NEMA C-face.

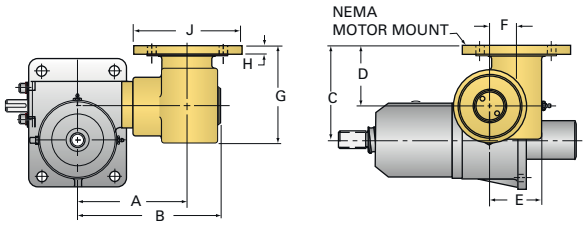
Consult the data charts for jack capacity when a Right-Angle Reducer is used. Ratings given on the chart may differ when a Right-Angle Reducer is installed on Keyed or Anti-Backlash Machine Screw Jack models. Special consideration must be given when installing onto a Double-Clevis Jack due to the additional weight of the reducer.

HOW TO ORDER A STANDARD EFFICIENCY 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 / 2CA-1 / **05BTR6** - **4** / FT / 24.5 / S

Product Code — Mounting Position



BALL SCREW JACKS

Jack Model-Ratio	Reducer Ratio	Travel Rate*	Brake Motor (hp)	Dynamic Capacity (lbs)**	PRODUCT CODE*** W/1-Ph Motor	W/3-Ph Motor	Without Motor	Motor Size	REDUCER DIMENSIONS (in) A	B	C	D	E	F	G	H	J
2.5-BSJ-6:1	6:1	12.0	½	5,000	05BSR6	05BTR6	X05R6	56C	5.63	7.44	5.44	3.69	3.31	1.750	5.88	.50	6.69
	12:1	5.99	⅓	5,000	03BSR12	03BTR12	X05R12	56C	5.63	7.44	5.44	3.69	3.31	1.750	5.88	.50	6.69
2.5-BSJ-24:1	6:1	2.99	¼	5,000	02BSR6	02BTR6	X05R6	56C	5.63	7.44	5.44	3.69	3.31	1.750	5.88	.50	6.69
	12:1	1.48	¼	5,000	02BSR12	02BTR12	X05R12	56C	5.63	7.44	5.44	3.69	3.31	1.750	5.88	.50	6.69
2.5HL-BSJ-6:1	6:1	47.9	1	3,550	10BSR6	10BTR6	X05R6	56C	5.63	7.44	5.44	3.69	3.31	1.750	5.88	.50	6.69
	12:1	24.0	1	5,000	10BSR12	10BTR12	X05R12	56C	5.63	7.44	5.44	3.69	3.31	1.750	5.88	.50	6.69
5-BSJ-6:1	6:1	22.7	1	7,500	10BSR6	10BTR6	X05R6	56C	6.50	8.50	5.88	3.69	3.31	1.750	5.88	.50	6.69
	12:1	11.3	1	10,000	10BSR12	10BTR12	X05R12	56C	6.50	8.50	5.88	3.69	3.31	1.750	5.88	.50	6.69
5-BSJ-24:1	6:1	5.67	1	10,000	10BSR6	10BTR6	X05R6	56C	6.50	8.50	5.88	3.69	3.31	1.750	5.88	.50	6.69
	12:1	2.83	½	10,000	05BSR12	05BTR12	X05R12	56C	6.50	8.50	5.88	3.69	3.31	1.750	5.88	.50	6.69
5HL-BSJ-6:1	6:1	47.9	1	3,500	10BSR6	10BTR6	X05R6	56C	6.50	8.50	5.88	3.69	3.31	1.750	5.88	.50	6.69
5HL-BSJ-24:1	6:1	12.0	1	8,000	10BSR6	10BTR6	X05R6	56C	6.50	8.50	5.88	3.69	3.31	1.750	5.88	.50	6.69
10-BSJ-8:1	6:1	17.0	1	9,000	10BSR6	10BTR6	X05R6	56C	7.25	9.25	6.29	3.69	3.31	1.750	5.88	.50	6.69
	12:1	8.50	1	15,000	10BSR12	10BTR12	X05R12	56C	7.25	9.25	6.29	3.69	3.31	1.750	5.88	.50	6.69
10-BSJ-24:1	6:1	5.67	1	17,000	10BSR6	10BTR6	X05R6	56C	7.25	9.25	6.29	3.69	3.31	1.750	5.88	.50	6.69
	12:1	2.83	1	20,000	10BSR12	10BTR12	X05R12	56C	7.25	9.25	6.29	3.69	3.31	1.750	5.88	.50	6.69
10HL-BSJ-8:1	6:1	35.9	1	4,275	10BSR6	10BTR6	X05R6	56C	7.25	9.25	6.29	3.69	3.31	1.750	5.88	.50	6.69
20-BSJ-8:1	8:1	13.5	3	35,000	N/A	30BTR8	X18R8	180TC	9.00	11.75	9.00	6.12	5.38	2.875	9.00	.88	9.12
20-BSJ-24:1	8:1	4.49	2	40,000	N/A	20BTR8	X18R8	180TC	9.00	11.75	9.00	6.12	5.38	2.875	9.00	.88	9.12
20HL-BSJ8:1	8:1	26.9	5	30,000	N/A	50BTR8	X18R8	180TC	9.00	11.75	9.00	6.12	5.38	2.875	9.00	.88	9.12
20HLBSJ-24:1	8:1	8.98	3	35,000	N/A	30BTR8	X18R8	180TC	9.00	11.75	9.00	6.12	5.38	2.875	9.00	.88	9.12

* measured in in/min.@ 1,725 rpm
** Full nominal static capacity of jack is retained
*** Motor specified is internally wired brake motor, for additional motor options see page 188

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.

Standard motors are: 3 phase 208-230 / 460 VAC, 60 Hz. 1,725 rpm. Also available are single phase motors at: 115 / 230 VAC, 60 Hz. 1,725 rpm. Standard 3 phase and single phase motors are rated for 50% duty. Wash Down and Explosion Proof motors are rated for continuous duty.

NOTE: for inverter duty motors or additional options, contact Nook Industries.

For HOW TO ORDER see page 180.

INTERNALLY WIRED BRAKE MOTOR PRODUCT CODE

Motor HP	STD Motor 208-230/460 3PH	Single Phase 115/230 1PH
¼	02BT	02BS
⅓	03BT	03BS
½	05BT	05BS
¾	07BT	07BS
1	10BT	10BS
1½	15BT	–
2	20BT	–
3	30BT	–
5	50BT	–
7½	75BT	–

EXTERNALLY WIRED BRAKE MOTOR PRODUCT CODE

Motor HP	STD Motor 208-230/460 3PH	Wash Down MOTOR IP55 • 208-230/460 3PH	Explosion Proof DIVISION 1 • CLASS 1,2 • GROUP F & G • 208/230/460 • 3PH	Economy Motor* 208-230/460 3PH SLIPPAGE ~ 10%
¼	–	–	–	02MT
⅓	–	–	–	03MT
½	05RT	05RW	05RE	05MT
¾	07RT	07RW	07RE	07MT
1	10RT	10RW	10RE	10MT
1½	15RT	15RW	15RE	15MT
2	20RT	20RW	20RE	20MT
3	30RT	30RW	30RE	30MT
5	50RT	50RW	50RE	50MT
7½	75RT	–	–	75MT

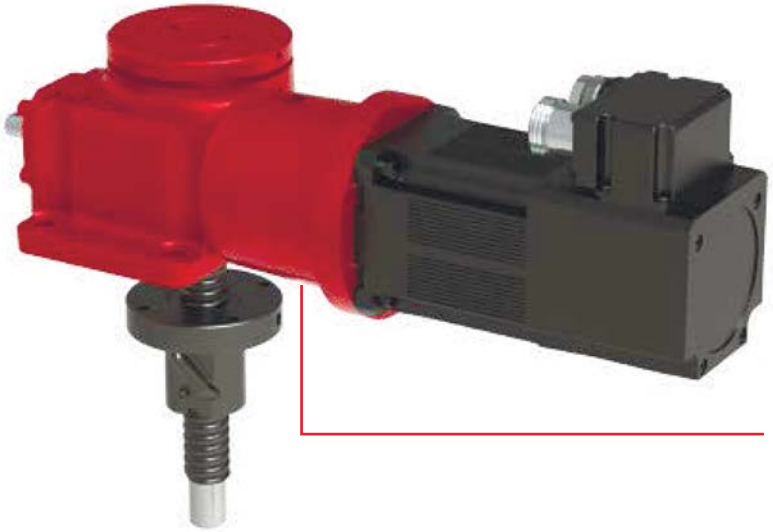
* Motor rpm between 1620 and 1680 for Economy motors. For speed critical application please contact Nook Engineering.

NOOK

SERVO/STEPPER MOTORS

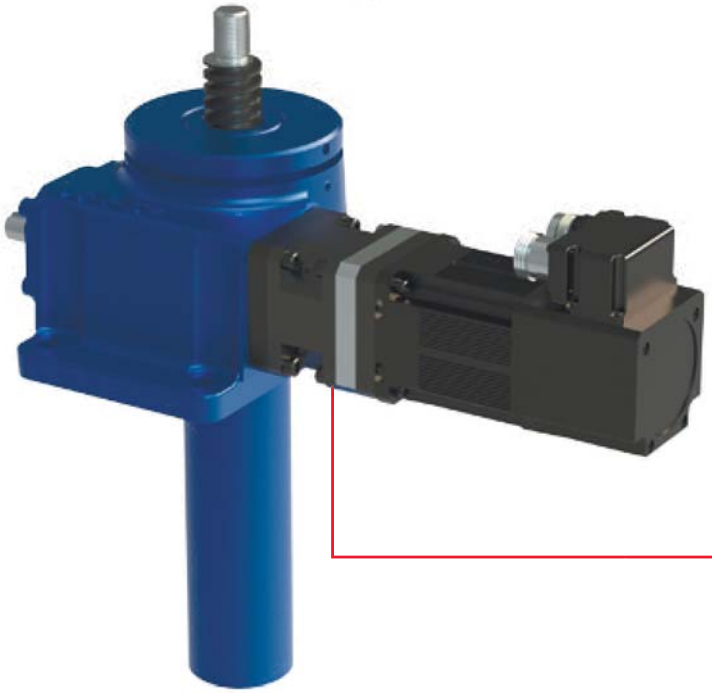
ActionJac™ Servo or Stepper Jacks offer the ability to attach a servo or stepper motor to a ball screw or machine screw jack. Using an ActionJac™ Worm Gear Screw Jack with a servo or stepper motor increases control of acceleration, deceleration, travel rate and positioning accuracy compared with standard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

Illustrated below are two examples of jacks with stepper/servo motor adaptors manufactured by Nook Industries. Custom Motor Adaptors are designed to accommodate any specified coupling and motor. Servo or Stepper Jacks can be delivered as a complete assembly, including a vendor-specified motor. Contact Nook Industries for further assistance with jack applications requiring servo or stepper motors.



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

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



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

Bayside
Apex
Alpha
CGI

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LINKJAC™ SHAFTING

ActionJac™ LinkJac™ Line Shafting is used to interconnect the input shafts of ActionJac™ Worm Gear Screw Jacks used in a multiple arrangement. 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;

$$N_{Speed} = .6192 \times \left(\frac{\pi}{L}\right)^2 \times C_s$$

WHERE:

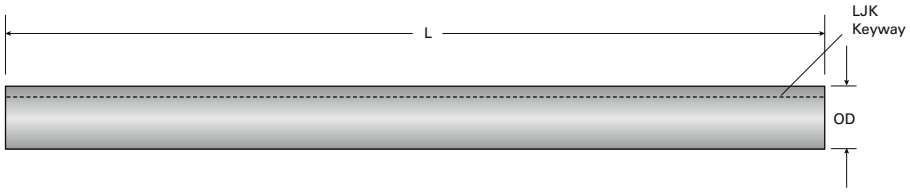
N = Critical Speed in revolutions per minute

L = Length of unsupported shaft in inches

Cs = Value list from table below

Radial support bearings may be needed in order to accommodate the required input rpm. See page 210 - 211 for radial support bearing selection.

LINE SHAFTING



	OD (in)	Keyway (in)	Keyway Length (in)	A	B	Material	C_t	C_s	Weight/in (lb)
LJ-8	½	-	-	-	-	Steel	1,235	3.895×10^5	0.056
LJ-12	¾	-	-	-	-	Steel	6,250	5.851×10^5	0.125
LJ-16	1	-	-	-	-	Steel	19,500	1.168×10^6	0.223
LJ-24	1½	-	-	-	-	Steel	95,000	1.169×10^6	0.502
LJK-8	½	⅛ × 1⁄16	Full Length	-	-	Steel	1,235	3.895×10^5	0.056
LJK-12	¾	3⁄16 × 3⁄32	Full Length	-	-	Steel	6,250	5.851×10^5	0.125
LJK-16	1	¼ × ⅛	Full Length	-	-	Steel	19,500	1.168×10^6	0.223
LJK-24	1½	⅜ × 3⁄16	Full Length	-	-	Steel	95,000	1.169×10^6	0.502

* 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:

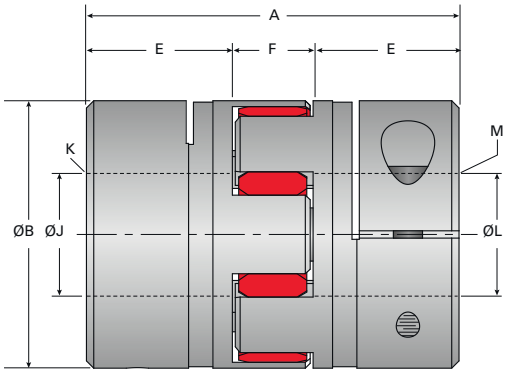
1) Refer to the jack specification tables to determine torque requirements per jack for your application.

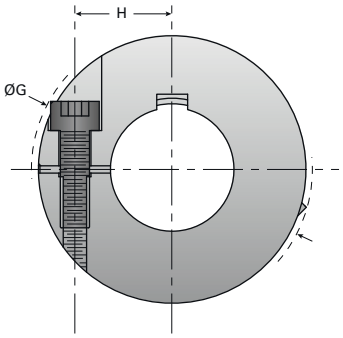
2) Determine total coupling capacity required by multiplying the torque required per jack by the number of jacks to be driven by the coupling.

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

Product Code	Max. Torque Rating (in-lb)	Approx. Wt. (lb)	Clamp Bolt Torque (in-lb)	Coupling Dimensions (in)						Bore Sizes (in)			
				A	B	E	F	G	H	J	Keyway K	L	Keyway M
C-3020-01	111	0.10	12	1.38	1.18	0.43	0.51	1.27	0.45	0.375	1/8 x 1/16	0.375	1/8 x 1/16
C-3025-01	185	0.30	93	2.60	1.57	0.98	0.63	1.81	0.57	0.500	1/8 x 1/16	0.500	1/8 x 1/16
C-3025-05	185	0.30	93	2.60	1.57	0.98	0.63	1.81	0.57	0.500	1/8 x 1/16	0.625	1/8 x 1/16
C-3025-02	185	0.30	93	2.60	1.57	0.98	0.63	1.81	0.57	0.500	1/8 x 1/16	0.750	3/16 x 3/32
C-3025-03	185	0.30	93	2.60	1.57	0.98	0.63	1.81	0.57	0.625	1/8 x 1/16	0.625	1/8 x 1/16
C-3025-04	185	0.30	93	2.60	1.57	0.98	0.63	1.81	0.57	0.625	1/8 x 1/16	0.750	3/16 x 3/32
C-3025-06	185	0.30	93	2.60	1.57	0.98	0.63	1.81	0.57	0.750	3/16 x 3/32	0.750	3/16 x 3/32
C-3030-01	531	0.62	93	3.07	2.17	1.18	0.71	2.26	0.79	0.750	3/16 x 3/32	1.000	1/4 x 1/8
C-3030-02	531	0.62	93	3.07	2.17	1.18	0.71	2.26	0.79	1.000	1/4 x 1/8	1.000	1/4 x 1/8

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 — Position

Examples of compact limit switch designations:

CLSS-8 – Standard CLS w. SPDT limit switches only, Position #8

CLSR-4 – Standard CLS w. SPDT 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 water-tight connection, water-tight connector and sealant should be used.

The Compact Limit Switch is not intended to be used as a safety device.

Product Code	Switch Type	Feedback
CLSS	SPDT	–
CLSR	SPDT	Reed Switch
CLSH	SPDT	Hall Effect Sensor
CLSP	SPDT	Potentiometer

ROTARY LIMIT SWITCH

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 senses 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 or 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.

Product Code	Number of Circuits	Switch Type	Potentio-meter
2CA	2	SPDT	no
2CC	2	DPDT	no
4CA	4	SPDT	no
4CE	4	DPDT	no
PTA	2	SPDT	yes
PTC	2	DPDT	yes

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-U 6:1 / SSE-1 / **2CA-4E** / FT / 24.5 / S

Extension Shaft Designation — Position

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 on
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.

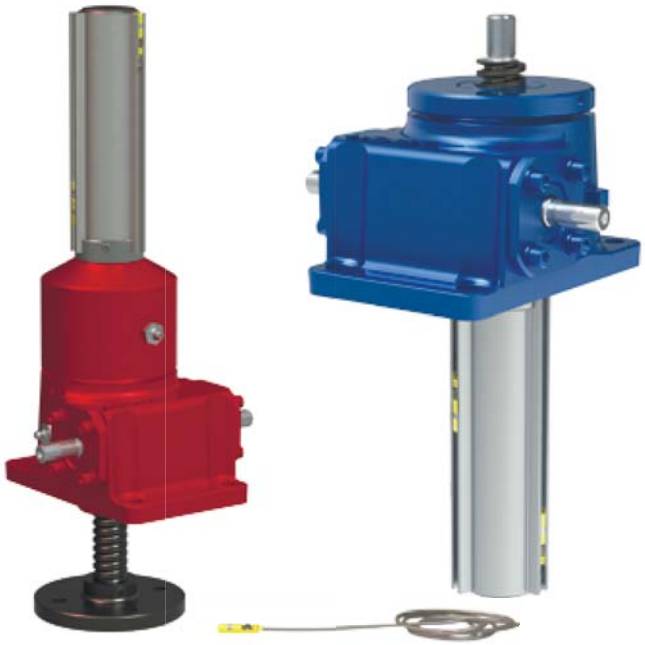
CAUTION: Limit switches are not adjusted at the factory. Switches should be set during installation.

Instructions for setting the limit switch is available online at www.nookindustries.com.

NOOK SENSOR SYSTEM™ (NSS) PATENT PENDING

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" (0.1MM). 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 open) switches. For additional switches or to order a normally closed switch, contact Nook Application Engineers.



HOW TO ORDER THE NOOK SENSOR SYSTEM™

EXAMPLE: 2.5-MSJ-U 6:1 / SSC-1 / SSE-2 / FT / 8 / **P**S

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.

MAX OPERATING SPEED WHEN USING THE NOOK SENSOR SYSTEM IS 60 IN/MIN

Nook worm gear screw jacks are used widely in the commercial food industry.

IN-LINE ENCODER

IN-LINE ENCODER IS INSTALLED BETWEEN THE MOTOR ADAPTER AND MOTOR.

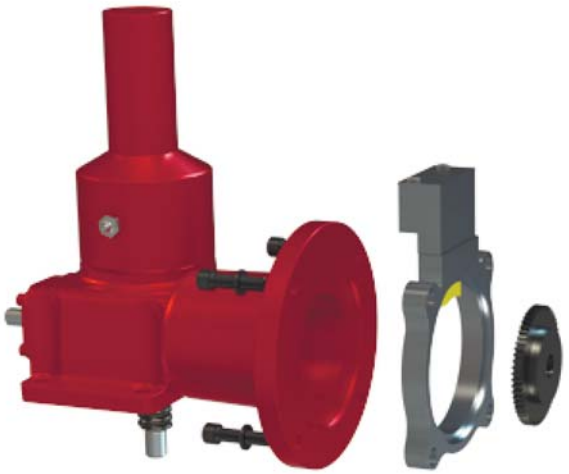
For precise position sensing at the input shaft, an ActionJac™ in-line encoder option may be factory installed between the motor and motor adapter or Right-Angle Reducer. This lowcost option requires minimal space, leaving the extension shaft side of the jack free for clearance, for a rotary limit switch, or for coupling to another jack.

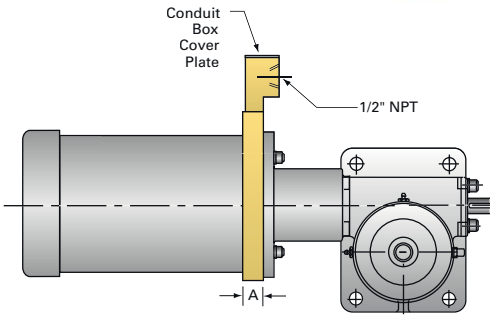
The in-line encoder's quadrature output design allows detection of both speed and direction of shaft rotation.

The ActionJac™ in-line encoder option requires an optional motor mount or Right-Angle Reducer..

- Sensing speed range: 0 -10,000 rpm
- Pulse output: 60 Pulses per revolution
- Supply voltage: +5 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

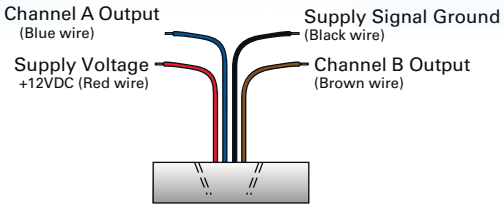
The encoder is face mounted between the motor and motor mount and will offset the length of the motor .61 inches for NEMA 56 and 140 frames and .88 inches for NEMA 180 and 210 frames.



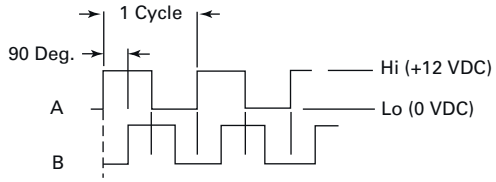


FRAME-SIZE	56C/140TC	180TC/210TC
OFFSET A	.61	.88

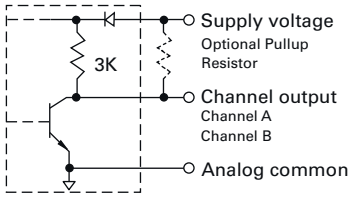
ELECTRICAL CONNECTIONS



OUTPUT CHANNEL WAVEFORMS



OUTPUT CHANNEL SCHEMATIC (CHANNELS A & B)



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-MSJ-U 6:1 / 10BT-1 / 2CA-4E / FT / 24.5 / **E**S

Product Code

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 Indicators 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.

Pendant Control

Contact Nook Engineering for ordering information

20 ft Cable

TRUNNION ADAPTERS

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
2.5-MSJ	TA-0025	6.50	3.88	1.25	0.7491 - 0.7479	1.25	.13	1.750
5-MSJ	TA-0050	8.25	5.75	1.50	0.9991 - 0.9979	1.50	.13	2.188
10-MSJ	TA-0100	9.00	7.25	2.00	1.2488 - 1.2472	1.50	.13	2.600
20-MSJ	TA-0200	11.25	8.00	2.25	1.4988 - 1.4972	1.75	.13	2.875
2.5-BSJ	TA-0025	6.50	3.88	1.25	0.7491 - 0.7479	1.25	.13	1.750
5-BSJ	TA-0050	8.25	5.75	1.50	0.9991 - 0.9979	1.50	.13	2.188
10-BSJ	TA-0100	9.00	7.00	2.00	1.2488 - 1.2472	1.38	.13	2.600
20-BSJ	TA-0200	11.25	8.00	2.25	1.4988 - 1.4972	1.75	.13	2.875

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.

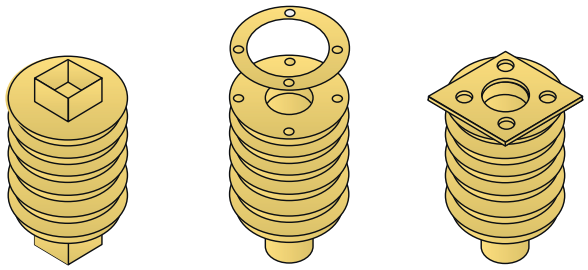
Standard boots are sewn from black neoprene-covered nylon fabric for oil, water and weather resistance and are acceptable for use in -30° to +300°F environments. Optional materials are available for specific operating conditions (see chart).

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 = one guide, 48 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



Square Cuff | Flange End | Square Flange

Bellows Boot **Metal cover**

SPECIAL BOOT MATERIALS

DESCRIPTION TEMPERATURE	RANGE	APPLICATION COMMENTS
Hypalon-Coated Nylon	-30° TO +300°F	Chemical Resistance, Wash Down
Silicone Coated Fiberglass	-67°F TO +550°F	High Temperature
Aluminum-Coated Fiberglass	-65°F TO +700°F	High Temperature, Hot Chips, Welding Splatter
Metal cover	Contact Nook Engineering for details	Contact Nook Engineering for details

Note: Retracted boot length may increase with some special materials.

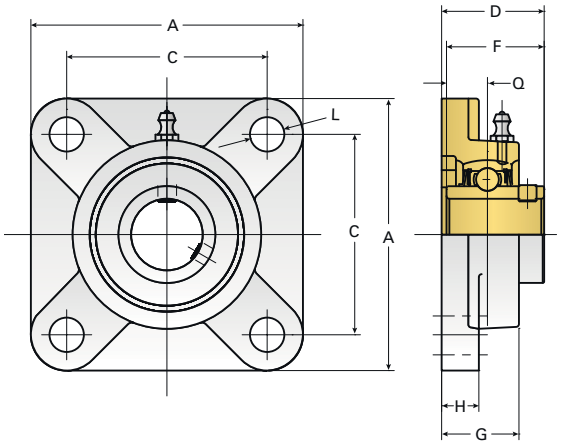
Nook worm gear screw jacks used in a steel press application.

NOOK

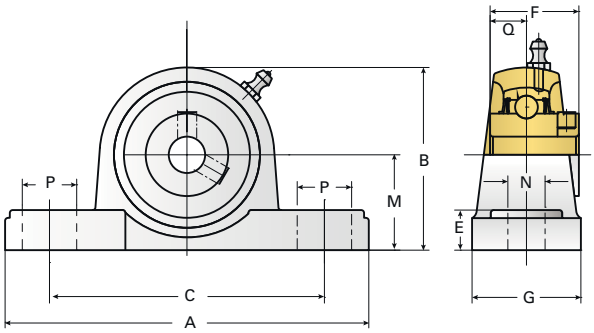
RADIAL SUPPORT BEARINGS

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 dislodge 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.



FLANGE MOUNT RADIAL SUPPORT BEARING



BASE MOUNT RADIAL SUPPORT BEARING

RADIAL SUPPORT BEARING SELECTION TABLE

BASE MOUNT	FLANGE MOUNT	BSJ	MSJ	SS-MSJ	EM-BSJ	EM-MSJ	BEVEL	LINK SHAFT
EZCP201-8	EZCF201-8							LJ/LJK-8
EZCP202-10	EZCF202-10		2/2R/2.5-MSJ	2SS-MSJ				
EZCP204	EZCF204	2.5/2.5HL-BSJ			EM2.5-BSJ		G1	
EZCP204-12	EZCF204-12	2/2R/3-BSJ						LJ/LJK-12
EZCP205	EZCF205	5/5HL/10/10HL-BSJ			EM5-BSJ	EM5-MSJ	G2	
EZCP205-16	EZCF205-16		5-MSJ	5SS-MSJ				LJ/LJK-16
EZCP206	EZCF206				EM10-BSJ	EM10-MSJ		
EZCP206-20	EZCF206-20		10-MSJ	10SS-MSJ				
EZCP208	EZCF208							LJT-40
EZCP208-24	EZCF208-24		15-MSJ	15SS-MSJ				LJ/LJK-24
EZCP209	EZCF209	20/20HL-BSJ			EM-20-BSJ	EM20-MSJ	G3	
EZCP209-28	EZCF209-28		20-MSJ	20SS-MSJ				
EZCP210	EZCF210							LJT-50
EZCP212	EZCF212	30/30HL-BSJ						LJT-60
EZCP212-36	EZCF212-36			25SS-MSJ				
EZCP213-40	EZCF213-40		30-MSJ					
EZCP215-48	EZCF215-48		35-MSJ					

LUBRICANTS

LUBRICATION

ActionJac™ Worm Gear Screw Jacks require lubrication to operate efficiently and with maximum life.

Standard lubrication is NLGI #2 grease. Lubricants are available for both high and low temperature application. If operating conditions exceed 200°F or -20°F, contact Nook Industries for alternative lubricants.

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.

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.

JACK GEARBOX LUBRICANT

GEAR BOX LUBRICANT	USAGE	NLGI GRADE NUMBER	GELLING AGENT	TEMP. RANGE	NET CONTENTS PER UNIT	PART NO.	NET WEIGHT
GBL- 400	Standard applications	2	Lithium	20° F to 280°F	1 tube	NLU-3001	14.1 oz
					Case of 10	NLU-6001	—
GBL- 800	High temp applications	1.5	Clay	-50°F to 350°F	1 tube	NLU-3005	12.5 oz
					Case of 10	NLU-6005	—

MACHINE SCREW JACK LIFT SHAFT LUBRICANT

LIFT SHAFT LUBRICANT	USAGE	NLGI GRADE NUMBER	GELLING AGENT	TEMP. RANGE	NET CONTENTS PER UNIT	PART NO.	NET WEIGHT
PAG-1 Grease	Acme Screws and Nuts	2	Calcium	15°F to 400°F	1	NLU-1001	16 oz
					Case of 12	NLU-2001	—
E-100 Spray	Acme Screws and Nuts	2	Calcium	15°F to 400°F	1	NLU-1002	12 oz
					Case of 12	NLU-2002	—

BALL SCREW JACK LIFT SHAFT LUBRICANT

LIFT SHAFT LUBRICANT	USAGE	NLGI GRADE NUMBER	GELLING AGENT	TEMP. RANGE	NET CONTENTS PER UNIT	PART NO.	NET WEIGHT
E-900 Spray	Ball Screws and Nuts	N/A	N/A	-65°F to 350°F	1	NLU-1003	12 oz
					Case of 12	NLU-2003	—
E-900L Oil	Ball Screws and Nuts	N/A	N/A	-65°F to 350°F	1	NLU-1004	32 oz
					Case of 12	NLU-2004	—

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 surface(s) 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 nearly in contact with the load. Adjust the position of the jacks so that the jack attachment points are centered on the load mounting points. Tighten the jack mounting screws. If a compliant material is installed, make sure that the fasteners do not compress the material and that there is clearance around the fasteners.

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.

Nook worm gear screw jacks are used widely in the manufacturing industry.

Also find us at:

4950 East 49th Street | Cleveland, OH 44125-1016 USA | 216.271.7900 | toll-free: 800.321.7800 | f: 216.271.7020 | email: nook@nookind.com