

Q: What is a keyed screw jack?

A: Some loads do not prevent lifting screw rotation—these applications require a **keyed jack**. A key, fixed to the jack housing and inserted into a keyway milled into the lifting screw, forces the lifting screw to translate without rotating. Several dimensions of keyed jacks differ from normal jacks—check the keyed jack drawings for each jack model. You can view a keyed jack in the Engineering Overview — Jack Designs on page 6.

Q: What is a Traveling Nut screw jack?

A: A **traveling nut jack** (sometimes referred to as a rotating screw jack) features a lifting screw keyed to the worm gear as a single unit, forcing the lifting screw to rotate, but not translate. A flanged traveling nut, attached to the load, is driven by the rotation of the lifting screw. This type of jack is ideal for applications that cannot accommodate a screw protection tube or require a flush mount. Refer to the keyed for traveling nut dimensional drawing for each jack model. You can view a keyed for traveling nut jack in the Engineering Overview — Jack Designs on page 6.

Q: How do I calculate linear travel speed of a screw jack?

A: Each screw jack has an inherent number of input shaft turns per inch (TPI) of screw travel. TPI is simply the result of the jack's gear ratio divided by screw lead. The TPI can be found on the jack specification pages at the beginning of each jack section. When the input RPM is divided by the TPI, the result is the linear speed of travel in inches per minute.
Example: A model WJT 242 has a TPI of 96, if 350 RPM is applied to the input shaft, the resultant linear speed is $(350/96)$ or 3.65 inches per minute.

Q: How fast can I move a load with a screw jack?

A: Machine screw jacks are designed to move loads at a typical rate of 10-22 inches per minute. For higher speeds, consider Ball Screw Jacks shown on page 50, Bevel Gear® Jacks shown on page 109 or Bevel Ball Actuators shown on page 118. For application assistance refer to your free JAX® Software or fill out the Jack/-Actuator Selection Guide on page 172 and fax or email to our office.

Q: What is meant by “duty cycle”?

A: An application duty cycle is the relationship between run time and total cycle time. Example: If a jack is on for 5 seconds of every minute, the duty cycle = $5/60$, or 8.3%.

Q: What is the allowable duty cycle of a screw jack?

A: The allowable duty cycle is based upon several application variables such as load, speed, and temperature. For application assistance refer to your free JAX® Software or fill out the Selection Guide on page 172 and fax, email or mail to our office.

Q: How do I calculate required input torque/horsepower?

A: Locate the Operating Torque Constant found on the jack specification pages at the beginning of each jack section. To calculate horsepower, multiply this constant times your load and divide by 63,025.

Example: WJT 242 has a torque constant of .009W with (W) representing the load. Using a 2000 pound load you have $(.009 \times 2000) = (18 \text{ inch lbs. of input torque})$ at the worm shaft. The formula for horsepower is $(\text{Input RPM} \times \text{Input Torque}/63025)$. Using 350 input RPM you have $(350 \times 18 / 63025) = .10$ or approximately 1/10 HP required.

Note: Unlike Bevel Gear® and Bevel Ball Actuators, Joyce Machine Screw Jack torque varies with speed, therefore the constants listed in the catalog are only accurate for the RPM listed. To calculate horsepower at speeds other than those listed, please refer to your free JAX® Software or fill out the Selection Guide on page 172 and fax, email or mail to our office.

Q: What is the difference between upright and inverted jack configurations?

A: The difference between an upright and inverted jack is the location at which the jackscrew exits the jack relative to the jack base. For example, an upright jack's lifting screw exits the jack opposite the base. An inverted jack's lifting screw exits the jack on the same side as the base. The choice between an inverted or upright jack is totally dependent upon your application. Upright and inverted jacks can be viewed on any of the jack drawings.

Note: An upright jack mounted upside down is still referred to as an upright jack.

Q: Can a Joyce screw jack backdrive? Does it require a braking device?

A: Most machine screw jacks will not be backdriven, that is, power to the input shaft is required for travel in both directions. Some exceptions include the standard WJ 500 and some DWJ (double lead) models. Under extreme vibration conditions any machine screw jack has the potential to backdrive. Brakemotors should be considered for all these exceptions.

Note: Bevel Ball and Ball screw Jacks will backdrive. Brakemotors are a requirement.

Q: What is the maximum allowable travel of a screw jack?

A: Either the column loading in compression or the availability of screw stock generally limits the maximum allowable travel. Column load limitations for guided, trunnion, and unguided conditions can be found on pages 8-13. For travels over 20 feet and long rises requiring horizontal mounting, please contact Joyce.

Q: What is the calculated life for a screw jack?

A: Because of the variables involved, it is impossible to accurately predict the life of a machine screw jack. Bevel Ball Actuators shown on page 118 should be specified if life predictability is required since they are the only screw jacks available with a completely mathematically predictable life. See Bevel Ball Actuator life expectancy charts on page 123.

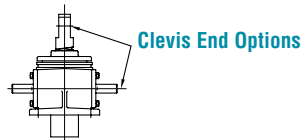
ENGINEERING INFORMATION—JACKS FAQ

Q: Can I buy a screw jack with a clevis on both ends?

A: Yes, when freedom of movement in two axes is required, a double clevis jack may be specified. This design incorporates a clevis machined or pinned on the screw end and a clevis welded to the protection tube. Double clevis units are useful in applications that require actuating a hinged platform or door.

Q: How is the clevis Positioned on keyed jacks?

A: The hole in the clevis end is parallel with the worm input shaft. Contact Joyce for other clevis end positions.



Q: What are the standard end conditions for the lifting screws on a screw jack?

A: Joyce Machine Screw and Bevel Gear® Jacks are available with any of the following four standard end conditions: Type 1 is a plain, turned-down end; Type 2 is a circular load pad with mounting holes; Type 3 is a threaded end; and Type 4 is a male clevis. Please refer to the jack drawings for dimensional information.

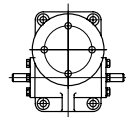
Note: Ball Screw Jacks and Bevel Ball Actuators have a Type 3 screw end standard. Optional ends are available. Please refer to the jack drawings for dimensional information.

Q: What do I need to consider when ordering a bellows boot to protect the jack lifting screw?

A: When a bellows boot is ordered for a jack, the closed height dimensions may change from those listed on the jacks without boots. Refer to the chart on pages 124-126 for jack closed height dimensions. When ordering a bellows boot for an inverted jack, the collar diameter for the end of the boot that fastens to the mounting structure must be customer specified. Zippered boots are available upon request.

Q: How is the load pad positioned on keyed jacks?

A: Two mounting holes are parallel with the worm input and two are perpendicular to the worm input.



Load Pad Option

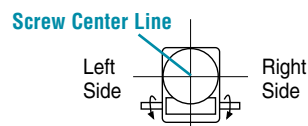
Q: Can I order a mechanical stop to limit jack screw travel?

A: Yes, an optional stop can be ordered on either or both ends of the screw. However, mechanical stops are not intended to be used as operating limits. Engaging the stop may prevent damage to your structure but will most likely damage the jack. To control jack travel, please refer to the limit switches shown on pages 134 & 135.

Note: Mechanical stops are standard on all Joyce ComDRIVE® jacks.

Q: How can I determine wormshaft rotation for raising and lowering the jack?

A: The worm shaft rotating as shown (looking down on the jack) raises the load.



Q: What does the (R) designation mean in 2-ton and 50-ton part numbers?

A: The R indicates "reverse" base sleeve. Refer to catalog pages 25 and 35.

Q: How much backlash is in a Joyce machine screw jack?

A: In machine screw jacks there are two types of backlash. Worm to worm gear backlash (typically 8-15 degrees worm rotation) and lifting screw to lifting nut backlash, sometimes called endplay (up to .020 inches on new standard jacks).

Note: Due to the high ratios in worm gearing, worm to worm gear backlash is not a significant factor in most jack applications since it normally corresponds to less than .002" backlash of the lifting screw.

Q: Can I reduce the screw backlash?

A: Yes, screw backlash (endplay) can be adjusted via any of three following optional anti-backlash devices: Standard split-nut design; A90 external nut adjustment; and our A95 design. Please consult page 127 for the features and benefits of each design.

Q: What is a screw jack's normal operating temperature?

A: Our standard lubrication and seals are rated for a temperature range of 0-250° F. For operation outside of this range, special lubricant and/or seals can be provided. Please contact Joyce for recommendations.

Q: Are Joyce screw jacks lubricated prior to shipment?

A: All Joyce Machine Screw, Ball Screw Jacks and Bevel Ball Actuators are lubricated for normal operation before leaving the factory and are ready for use. The standard lubricant provided is an extreme pressure NLGI grade #1 (EP1). Specific information and commercial brand names can be found in our O&M manual. The Bevel Gear® Jack utilizes both grease and oil. The upper bearing and jackscrew are both grease lubricated while the remaining internal components are oil lubricated. These jacks are grease lubricated prior to shipment; however oil must be added to the unit prior to operation.

Q: What is screw lead error?

A: The deviation from the mathematical lead expressed in inches per foot cumulative.

Q: What is the amount of lead error in a standard lifting screw?

A: Thread Milled Acme Screws up to .003"/ft. cumulative; Ball Screws up to .007"/ft. cumulative; Rolled Acme Screws up to .010"/ft. cumulative.

Q: How much side load can I place on a screw jack?

A: Standard jacks are not designed to accommodate side loads in a dynamic condition. We recommend the use of external guides when dynamic side loads are expected. Jacks can however accommodate some side loading in a static condition. The screw column length generally becomes the limiting factor in these applications. Please contact Joyce Application Engineering direct at 1-800-523-5204 for additional assistance.