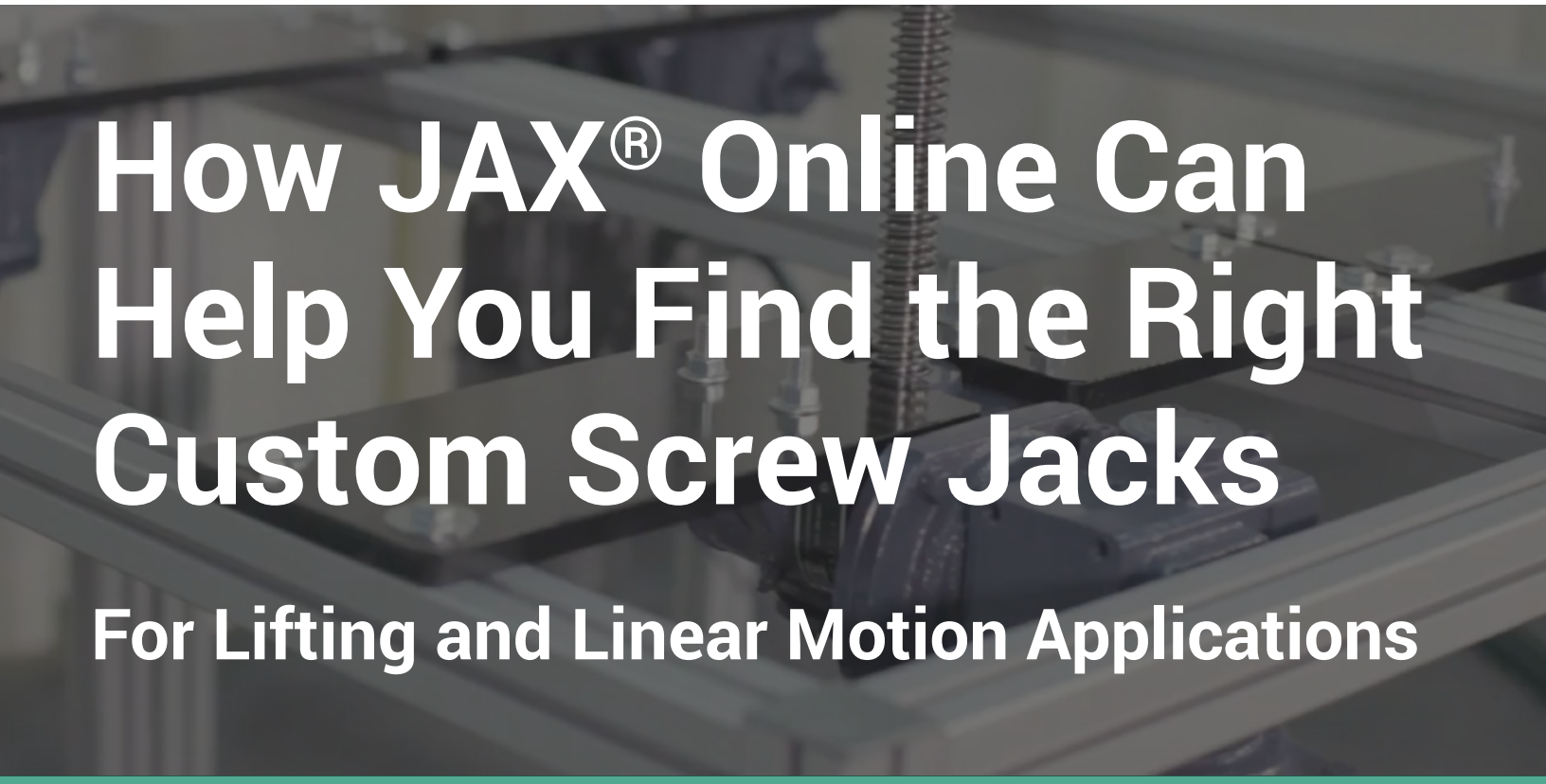

How JAX® Online Can Help You Find the Right Custom Screw Jacks

For Lifting and Linear Motion Applications

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Joyce/Dayton provides engineers and designers with the tools to succeed. Our JAX® Online proprietary software is a free web-based linear motion design platform that allows for the quick specification of the best custom screw jacks, actuators, or other components for your linear motion or lifting system.

Users just enter a few simple inputs or a complete set of requirements to receive a list of ideal suggested components. By providing detailed reports for technical project files, JAX® Online is a convenient time-saver for any lifting or linear motion project. Learn more about the different types of jacks available, engineering considerations for selecting the right ones, and how to use JAX® Online for design modeling and more.

Production Information & Sourcing

Jacks are available in three main designs:

- Translating
- Keyed for Traveling Nut (KFTN)
- Keyed for Non-Rotation

There is a selection of four different standard screw ends, which include:

- T1 - plain turned end
- T2 - load pad end
- T3 - threaded end
- T4 - male clevis end

Translating Screw Jacks

The most frequently specified jacks are translating screw jacks. A driven worm interacts with an internal worm gear, causing a lifting screw to retract or extend. For proper functioning, the rotation of the lifting screw must stay restrained while torque is applied to the input shaft.

Most applications utilize this type of jack design, achieving effective operation by:

- Using guides
- Attaching a load across multiple jacks
- Attaching the jack to a load to overcome inherent rotational forces

Keyed Jacks for Non-Rotation

In keyed jacks for non-rotation, a key is fixed to the housing of the jack and inserted into a keyway in the lifting screw, which translates without rotating. These jacks are ideal solutions for applications that require a single jack to extend to move or meet unattached loads. They are often found in single-jack situations where restraining the rotation of the jack screw would be otherwise impossible.

Keyed for Traveling Nut Jacks (KFTN)

KFTN jacks have a lifting screw keyed to an internal worm gear. The single unit forces the lifting screw to rotate without translating. The rotation of the lifting screw drives a flanged traveling nut, which is attached to the load. It is imperative to restrain the rotation of the traveling nut by guiding the load or securing it across multiple jacks. KFTN jacks are mounted flush and are an ideal solution for applications that do not have enough space for the protection tube.

Engineering Considerations for Screw Jacks

- **Load Capacity:** The jack's load capacity gets limited by certain physical constraints of the lift shaft, drive sleeve, bearings, and other components. Proper calculations will ensure all loads meet the capacity rating of the jack. Loads may include dynamic, static, moving, and acceleration/deceleration loads, as well as any reactionary forces. The design must be able to handle shock loads and, for optimal performance, should never exceed the jack's capacity rating.
- **Duty Cycle:** The duty cycle refers to the percentage of time the jack operates in relation to its rest time. The most significant factor in calculating the duty cycle is the screw jack's ability to dissipate heat buildup during operation. As generated heat increases or decreases, it can impact the estimated duty cycle. Ball screw jacks can be used for higher duty cycles as their high efficiency limits heat generation.
- **Type of Guidance:** The three types of guidance are Unguided, Guided, and Trunnion. A system is considered unguided if the screw is the only support for the load. Guided loading is often referred to as «Fixed-Fixed» and is when the load is rigidly held with linear guides such as profile rails or linear bearings. A guided load should prevent any side load or moment from being transferred to the screw or nut. Trunnion Mounting is when the jack base is mounted on a pivoting frame and the jack pivots while lifting. Select the appropriate type of guidance when sizing your jack.
- **Critical Speed:** The critical speed refers to the speed at which the screw vibrates at its natural frequency. It can vary depending on the unsupported length, diameter, rpm, and end fixity of the screw.
- **Column Strength:** If a lift shaft can hold a compressive load without buckling, then it has sufficient column strength. Depending on the length of the screw, column strength can be much lower than the nominal capacity of the jack. If the lift shaft is solely in tension, the screw jack can only travel based on the screw's critical speed or available screw material.
- **Motor Sizing:** The JAX® software will help determine the horsepower and motor size requirement based on your load and input speed both for single-jack and multiple-jack system arrangements. Ballscrews and double-lead machine screws should utilize a brake motor in order to hold their load in position.
- **Ball Screw Life:** JAX® will provide an estimated ballnut life based on your specific load. A significant benefit of using a ball screw jack is being able to predict the lifespan of the ball screw.

Understanding and considering these key factors is the first step to choosing the right ball screw jacks or machine screw jacks. Doing so can help you maximize the benefits of the ideal screw jack for your application.

Product Design & Retrofitting

Joyce/Dayton worm gear screw jacks can accurately lift and position loads ranging from 250 pounds to 250 tons. Inverted or upright jacks can operate at total capacity in compression or tension.

WJ and RWJ models are self-locking single-lead jacks. DWJ and DRWJ models are double lead jacks that provide increased travel speed, requiring an external locking device or brake to hold loads in position.

Product design and retrofitting options include:

- Aluminum bronze worm gears
- Alloy steel input shafts
- Ball thrust or tapered bearings for greater durability and reliability
- Standard double-input shafts
- Protective boots
- Anti-backlash devices
- Customized mechanical jacks built to desired specifications
- Custom finishes

The O&M Manual contains exploded views and a parts list, and the product housing contains the serial number. We offer motor controls that range from simple motor starters to complex, custom positioning systems.

Every electric linear motion system needs a control system. Joyce/Dayton's experienced engineers can assist customers throughout the product selection process.

2D and 3D Modeling Custom Designs for Screw Jacks

Joyce/Dayton lifting systems and screw jacks provide a broad range of lifting and positioning solutions for a variety of industries. Our reliable jacks accurately position and move loads up to 250 tons. We also configure them with the following components to create multi-jack systems:

- Motors
- Coupling
- Shafting
- Gear reducers
- Motion control devices

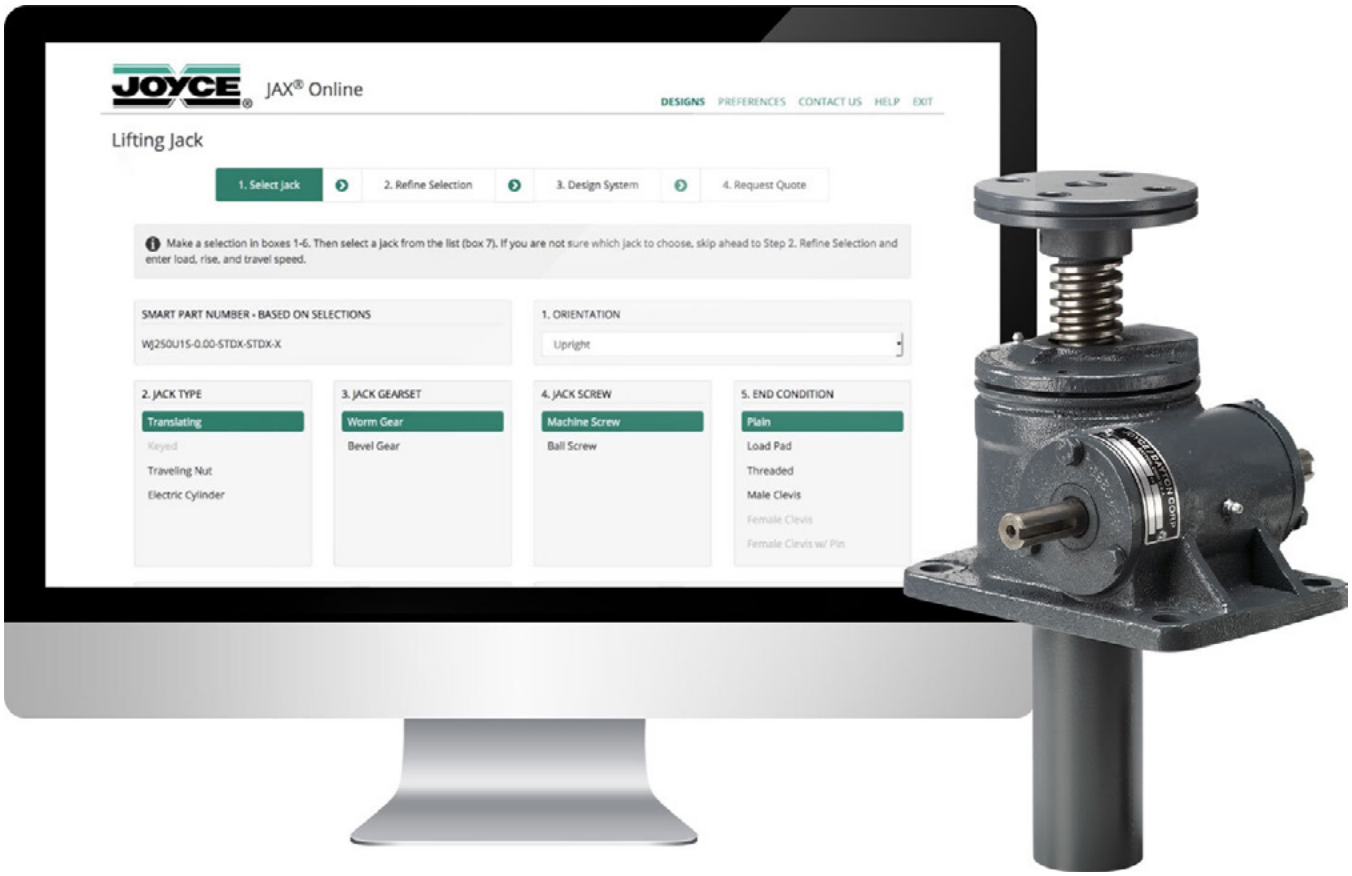
Using our exclusive JAX® Online software is free and helps you specify a complete system with single or multiple screw jacks to meet the needs of your application. The software can calculate the horsepower of a motor as well as shaft torque and diameter. While common arrangements are available, you can custom-design your own for a best-fit solution.

JAX® Online by Joyce/Dayton

From any computer, you can use the JAX® Online tool to:

- Size screw jacks and complete systems
- Automatically download and configure 2D and 3D models
- Save files to a private account and return to designs anytime
- Assess multiple options and combinations before selecting a final design
- Automatically generate a bill of materials
- Request a quote and send requirements with one click

Since 1873, Joyce/Dayton has designed and manufactured high-quality actuators, screw jacks, and lifting equipment. Request a quote to see how we can meet the demands of your next application.



About Us

Joyce/Dayton Corp., the premier manufacturer of Screw Jacks, Actuators, and Lifting Equipment in North America, has remained in continuous operation since it was established in 1873. Our long history of designing and manufacturing high quality products is unparalleled in the industry. Joyce Engineers are tenured and have the expertise needed to develop innovative solutions for today's customers.

Contact Us

Request for Quote

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