

# Six Tips to Consider Before Purchasing High Force Electric Linear Actuators

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## Let your application specifications be your guide.

Both roller screw and ball screw linear actuators are available for high force applications in industries such as food and beverage, forestry and sawmilling, oil and gas, and others. Each technology has its advantages and disadvantages when compared to one another. Consider the application specifications, collecting as much data as you can, including force, speed, dwells, life estimates, and other factors in order to make the correct choice.

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## Take repeated stress seriously.

Applications such as pressing, inserting, crimping, forming, bending and riveting—found in automobile manufacturing, oil and gas, and wood processing industries—are applications with repeated stress. Standard planetary roller screws offer the highest dynamic load rating and have a significant increase in contact area, which allows for longer life and exerts higher forces in the same package size versus ball screws. However, this increased contact area also creates more heat with the same amount of work. Ball screws, because they have fewer contact points, are a little more efficient in heat management than roller screws, allowing them to operate cooler in high duty cycle and high-speed applications.

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## Know what DLR is and why it's important.

DLR, an industry-standard term meaning Dynamic Load Rating, represents an applicable constant load (in direction and magnitude), where a ball bearing device (or power screw) will achieve 1 million revolutions of rated life, or L10 life estimation, at 90% reliability. A DLR should be provided by the manufacturer.

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## Understand each available technology's benefits.

In the case of high force electrical linear actuators, there are three primary choices: standard (planetary) roller screw linear actuators, inverted roller screw linear actuators, and ball screw linear actuators. Ball screws have re-circulating ball bearings that fit between arch-shaped screw threads with corresponding threads in the nut. They provide higher thrust capabilities, longer service life, and higher efficiency than those with acme screw systems, but they can't match the performance of roller screw actuators. They're ideal for applications that require high duty cycles, moderately high thrust, and moderate speeds.

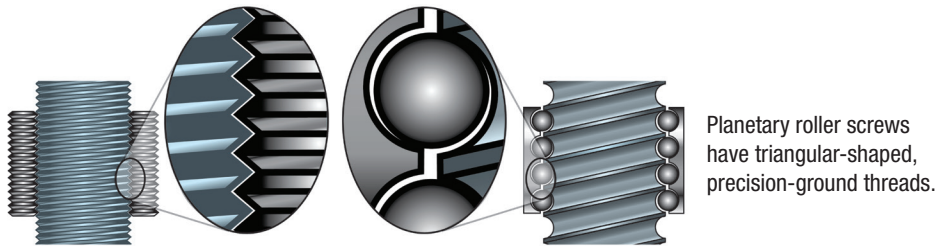


Re-circulating ball screws provide higher thrust capabilities and efficiency than those with acme screw systems.



Planetary roller screws have triangular-shaped, precision-ground threads that match multiple precision-ground threaded rollers in the nut. These rolling elements transmit force very effectively because they are designed with a fine pitch—providing more points of contact and a larger contact radius.

The result is less stress per point of contact and very high force transmission capabilities. They deliver high force, operate at high speeds, are long-lasting, and require little maintenance. The use of planetary roller screws is allowing engineers to specify electric actuators in applications that were once the sole province of hydraulic cylinders.



An inverted roller screw operates like a standard roller screw except the functions of the nut and screw are reversed—the rollers move inside the nut. Because they are produced using a process other than grinding to inexpensively create threads inside the nut, the result is a much shallower case hardness depth and softer threads than those of standard roller screws.

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### Understand each available technology's drawbacks.

Ball screw actuators can be back-driven and noisy. When it comes to comparing roller screw vs. ball screw of similar size and lead, a ball screw's ball bearings have fewer points of contact than roller screws, decreasing its load-bearing potential.

Roller screw technology produces more heat and, therefore, works best where constant stress isn't placed on the actuator. By incorporating the inverted roller screw design in an actuator, the unit may be a little more compact than an actuator with a standard roller screw, but this comes at a sacrifice of lower DLR.

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### Never take a one-technology approach.

As you can see, different technologies offer different benefits and drawbacks. Knowing what those are and how they affect your application, is critical. Some companies only sell ball screw linear actuators and some only sell roller screw linear actuators. Take caution when evaluating "there-is-only-one-technology" type vendors. When solving your high force linear actuator needs, consider all factors of your application, including best sizing and selection, quality of component, pricing, and delivery, as well as after-market services.