BALL SCREWS, PLANETARY AND INVERTED ROLLER SCREWS
Moog has over 30 years experience in producing and designing customized high precision ball and planetary roller screws that are suitable for a variety of markets and challenging motion control applications.

Developed to meet the needs of leading-edge machine manufacturers across a wide range of industries, Moog ball screws and planetary roller screws are flexible and designed to provide a unique and competitive advantage.

The range accommodates a wide variety of static and dynamic load and acceleration. Alternative designs are available which ensure that the most stringent noise and vibration requirements can be met.

**FLEXIBLE DESIGN AND SUPERIOR ACCURACY FOR HIGH PERFORMANCE APPLICATIONS**

**Ball screws**

- Ground ball screws and roller screws ISO 3408-3 classes 1-3-5-7
- Various screw diameter-pitch combinations available (screw load capacity and dynamic performance)
- Wide selection of screw end shafts (bearing housings, metric threads, socket heads, wrenches, bored heads, etc.)
- Nut customization (shape, flange, coupling, number of circuits, special machining processes)
- Various lubrication options (selection of the right lubricant for the application, positioning of the lubrication holes)
- Selection of materials and special processing (standard and special materials, surface treatments appropriate for the type of application)
- Extremely quite operation for low disturbance and low noise applications
- Compact design thanks to the Moog recirculating system design that allows a better load distribution
- Robust design suited to heavy duty applications, vibration and harsh environments.

**Planetary roller screws**

- Ground ball screws and roller screws ISO 3408-3 classes 1-3-5-7
- Various screw diameter-pitch combinations available (screw load capacity and dynamic performance)
- Wide selection of screw end shafts (bearing housings, metric threads, socket heads, wrenches, bored heads, etc.)
- Nut customization (shape, flange, coupling, number of circuits, special machining processes)
- Various lubrication options (selection of the right lubricant for the application, positioning of the lubrication holes)
- Selection of materials and special processing (standard and special materials, surface treatments appropriate for the type of application)
- Extremely quite operation for low disturbance and low noise applications
- Compact design thanks to the Moog recirculating system design that allows a better load distribution
- Robust design suited to heavy duty applications, vibration and harsh environments.

**Inverted roller screws**

- Works on same principle as a planetary roller screw. In order to reduce the overall actuator dimensions: Either the nut or screw can be directly used as a push tube
- Same high speed capability similar to a planetary roller screw, load acts directly on the translating push tube
- Acceleration and shock resistance beyond limits of ball screw technology
- Compactness, and ease of rotor integration: Reduced number of parts in customer system
- Strongly customized design of screw end shaft and nut
- Provide powerful and reliability
- Electro-mechanical actuation where compactness and high load capability are required
- Grinding to ISO 3408-3 classes 3-5
- Axial play or backlash zero by oversized rollers
- Various diameter-pitch combinations available. Stroke depending on nominal diameter.
**ISO 3408-3 classes 1-3-5-7**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>12 to 100 mm (0.47 to 3.93 in)</td>
</tr>
<tr>
<td>Pitch</td>
<td>1.5 to 80 mm (0.06 to 3.14 in)</td>
</tr>
<tr>
<td>Length</td>
<td>up to 6,200 mm (244 in)</td>
</tr>
<tr>
<td>Load capacity:</td>
<td>Dynamic load up to 1,450 kN</td>
</tr>
<tr>
<td>Acceleration</td>
<td>15 to 30 m/s²</td>
</tr>
<tr>
<td>Single or multi-start</td>
<td></td>
</tr>
</tbody>
</table>

1) ISO 3408-3 defines key geometric features and tolerances of ball screws
2) Smaller diameters (less than 12 mm) available upon request
3) In special condition reachable length 7,000 mm (275 in)

**ISO 3408-3 classes 1-3**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>15 to 100 mm (0.6 to 3.93 in)</td>
</tr>
<tr>
<td>Pitch</td>
<td>2 to 42 mm (0.08 to 1.65 in)</td>
</tr>
<tr>
<td>Length</td>
<td>up to 4,000 mm (157.5 in)</td>
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<tr>
<td>Load capacity:</td>
<td>Dynamic load up to 1,250 kN</td>
</tr>
<tr>
<td>Acceleration</td>
<td>up to 40 m/sec²</td>
</tr>
<tr>
<td>Number of starts</td>
<td>5 to 6</td>
</tr>
</tbody>
</table>

1) ISO 3408-3 defines key geometric features and tolerances of ball screws
2) Special combination of diameter and lead available upon request

**ISO 3408-3 classes 3-5**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>up to 48 mm (1.89 in)</td>
</tr>
<tr>
<td>Pitch</td>
<td>3 to 20 mm (0.12 to 0.787 in)</td>
</tr>
<tr>
<td>Length</td>
<td>up to 180 mm (7.08 in)</td>
</tr>
<tr>
<td>Load capacity:</td>
<td>Dynamic load up to 300 kN</td>
</tr>
<tr>
<td></td>
<td>Static Load up to 750 k</td>
</tr>
</tbody>
</table>

1) ISO 3408-3 defines key geometric features and tolerances of ball screws
2) Special combination of diameter and lead available upon request
Designers considering using Inverted Roller Screws should note the following:
1. Only screws up to 48 mm (1.89 inches) are available as an inverted option.
2. For these sizes, designers can consider the same load carrying capabilities and nut dimensions specified in the catalog.
3. Nut dimensions can be adjusted upon request.

Not all combinations of shaft diameter and lead are possible, contact Moog for technical support.
**THE MOOG DIFFERENCE**

- Fully customizable (even for smaller quantities) to meet all performance requirements within market standard lead times
- Maximum flexibility in terms of design and performance range
- Extremely quiet and low vibration functionality inherent in the excellent smoothness in the design
- High acceleration capability for fast high duty cycle machines
- Can be used in conjunction with Moog's complementary range of best-in-class electro-mechanical products and systems such as servodrives, servomotors and motion controllers, to realise cutting-edge electro-mechanical solutions
- Moog expertise and close collaboration with customers ensuring solutions that meet today's toughest challenges
- Very competitive lead time for fully customised screws:
  - From 5 weeks for ball screws
  - From 8 weeks for roller screws
- We are able to replicate a ball/roller screw based on screws drawings and/or measurements of an existing screw

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**SPECIALIST TREATMENTS AND FINISHES AVAILABLE FOR ALL PRODUCTS:**

- Corrosion
- Increased resistance (aeronautic and motorsports application)
- Friction reduction to reduce wear and increase lifetime
MORE PRODUCTS. MORE SUPPORT.

Moog designs a range of motion control products to complement those featured in this document. Moog also provides service and support for all of our products. For more information, contact the Moog facility closest to you.

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