... featuring easy to install “package” design consisting of the ballscrew, ballnut, and end mounting supports.
Comptrol Complete Ballscrew Assemblies

More Than Just a Screw and Nut Assembly

Comptrol Complete Ballscrew Assemblies are more than just a ballscrew and nut assembly. Each assembly is a complete “package” consisting of the ballscrew, ballnut, and end mounting bearing supports . . . delivered to you as one ready-to-install unit.

Select from standard components designed to work together

Instead of engineering components to meet your design requirements, you choose from a wide variety of standard ballscrew products to give you the “package” that is best suited to your application. Products which are pre-engineered and built to meet the rigorous performance requirements of industrial applications.

Products which include:

- Rolled thread ballscrews from 3/8” to 4” in diameter
- Single or preloaded ballnuts available in base, flange, cut-off flange, or trunnion mounting configurations
- End mounting bearing supports available in base, flange, and cut-off flange mounting configuration for simple and rigid ballscrew end support.

Assemblies for smaller or larger diameter inch, metric, and precision ground ballscrews are also available.

Comptrol Complete Ballscrew Assemblies let you mix and match standard components to meet the design specifications for your application.

In retrofit applications, replacing the complete assembly often allows you to upgrade the installation and improve performance.

Modified and Custom Assemblies

Our in-house engineering, machining, and assembly capability enable us to respond to your requirements for a modified or custom assembly . . . designed and built to fit your demanding design requirements.

Need help?

Put Comptrol's 39 years of ballscrew application experience to work for you. Our engineers will work with you to determine the most cost-effective solution for your application.

For your convenience we have included the Faxalog Data Request form on Page 26 for you to send or request information. Simply copy the form, fill in the information about your application, and fax it to Comptrol Incorporated.

Note: All dimensions and specifications in this catalog are subject to change without notice.

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Ballnut & End Support Dimensions:

<table>
<thead>
<tr>
<th>Ballscrew Diameter</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.625&quot;</td>
<td>5-6</td>
</tr>
<tr>
<td>0.750&quot;</td>
<td>7-8</td>
</tr>
<tr>
<td>1.000&quot;</td>
<td>9-10</td>
</tr>
<tr>
<td>1.150&quot;</td>
<td>11-12</td>
</tr>
<tr>
<td>1.500&quot;</td>
<td>13-14</td>
</tr>
<tr>
<td>2.000&quot;</td>
<td>15-16</td>
</tr>
<tr>
<td>2.250&quot;</td>
<td>17-18</td>
</tr>
<tr>
<td>2.500&quot;</td>
<td>19-20</td>
</tr>
<tr>
<td>3.000&quot;</td>
<td>21-22</td>
</tr>
</tbody>
</table>

Made in the U.S.A.
Single and Preloaded Ballnut Assemblies

Single Non-Preloaded Ballnuts

Operating at 90% mechanical efficiency, Comptrol single ballnuts offer a definite advantage over other methods of converting rotary motion to linear motion. The smooth rolling contact between the bearing balls and the ballscrew and nut assembly makes it possible to move heavy loads in small increments as low as .0001", often with less power than is required using conventional screws, pneumatics, or hydraulics.

Comptrol non-preloaded nut assemblies are ideal for applications where the applied load is always in one direction. In these types of applications, the bearing balls always ride on one side of the ball groove minimizing the effects of backlash on positioning accuracy and repeatability.

However, in positioning load applications where accuracy and repeatability must be considered, a Comptrol preloaded nut assembly is recommended.

Preloaded Zero Backlash Ballnuts

Designed for use with standard rolled thread ballscrews, Comptrol preloaded ballnuts offer performance normally expected from a precision ground screw, at a substantially lower price.

The unique design of Comptrol’s preloaded double nut assemblies allows the load to be attached to the center of the assembly. Centering the load between two opposing preloaded ballnuts eliminates backlash resulting in truer bi-directional positioning accuracy and repeatability, a more uniform preload, and low friction drag for optimum power transmission efficiency.

The factory set preload adapter allows the preload to be set at up to 30% of the applied load for the selected ballscrew. Once set, the preload remains constant throughout the life of the screw.

Ballnut Orientation

Ballnut orientation is determined by the type of ballnut required and how it is to be attached to the load.

Comptrol single and preloaded ballnut assemblies give you the design flexibility to select the ballnut orientation required for your application.

Therefore, it is an important consideration for any application and should be noted when specifying the ballnut and mounting configuration you select.
Comptrol has pre-engineered three types of standard mounting arrangements to meet your requirements for rigid and/or simple bearing support on one or both ends of the ballscrew. Mounting holes are counterbored and tapped for threading into or bolting through the support for added design versatility. And each unit is sealed and pre-lubricated to protect against contamination and ensure smooth operation.

Type A Bearing Support
Type A bearing supports are designed for applications that require a simple, single bearing mount arrangement for radial support.

Type B Bearing Support
Type B supports feature a pair of back-to-back bi-directional angular contact bearings to control end play and provide simple, radial and axial support.

Type C Bearing Support
Type C supports are designed for applications that require rigid support at one or both ends for the ballscrew. A pair of spaced bi-directional angular contact bearings provide maximum axial load capacity and prevent radial or axial movement.

Type D straight journals are available with all Comptrol end supports.

Custom and modified standard supports are also available upon request.

Three Standard Mounting Configurations
Comptrol Type A, B, and C end supports are available in base, flange, or cut-off flange mounting configurations to accommodate the four most common mounting combination used in ballscrew application. These combinations include: Rigid-Free, Simple-Simple, Simple-Rigid, and Rigid-Rigid.

Standard End Mounting Combinations
Selecting the proper ballscrew package for a specific application involves consideration of many interrelated factors. Some of these factors are: load, speed, travel rate, positioning accuracy, repeatability, mounting rigidity, and design life. Changing one of these factors often influences another and the final decision regarding the proper ballscrew package for the application.

In some cases, additional factors must be considered such as the operating environment, available drive torque, or side loading. Overturning or cocking type loads should be avoided whenever possible. If you have any questions regarding your specific application, please contact Comptrol Incorporated.

Defining the Application

Before starting the selection process, Comptrol suggests defining some basic operating parameters to determine the design requirements. These parameters include:

- Type of application, horizontal or vertical
- Total weight of the load
- Maximum travel rate
- Length of stroke
- Cycle rate
- Design life objective
- Type of end mounting
- Tension or compression loading

Proper lubrication and protective covers should also be considered with respect to the operating conditions and environment.

End Mounting Bearing Supports

The end bearing support arrangement is usually the one design parameter left to the discretion of the designer. It is also one of the most important because it affects critical speed, load capacities, and overall system stiffness.

Whenever possible, the ballscrew should be fixed at both ends using bi-directional thrust bearings and held in neither tension nor compression for maximum stiffness. If the screw must be held under stress, tension is always more desirable than compression.

Ballscrew Selection

In most applications, there are four main factors that must be considered when selecting the proper size ballscrew for an application. These factors include: the applied load, life expectancy, compression loading, and critical speed.

Remember the ballscrew you select should meet or exceed the application requirements. This may require selecting a larger ballscrew to meet the life expectancy, compression loading, and/or critical speed requirements even though a smaller ballscrew has sufficient static load capacity.

| EFFECTS OF CHANGE IN PARAMETER ON BALLSCREW CHARACTERISTICS |
|---------------------|-----------------|-----------|
| **INCREASE IN:**    | **AFFECTS**     | **HOW**   |
| Screw Length        | Critical Speed  | Decreases |
|                     | Column Load     |           |
| Lead                | Torque          | Increases |
|                     | Load Capacity   | Increases |
|                     | Positioning     | Decreases |
|                     | Accuracy        | Increases |
|                     | Angular Velocity| Increases |
|                     | Ball Diameter   | Increases |
| Angular Velocity    | Critical Speed  | Decreases |
| Load Number of Balls| Life            | Increases |
|                     | System Stiffness| Increases |
| Preload             | Positioning     | Increases |
|                     | Accuracy        | Increases |
|                     | System Stiffness| Increases |
|                     | Drag-torque     | Increases |
| Screw Diameter      | Critical Speed  | Increases |
|                     | Inertia         | Increases |
|                     | Stiffness       | Increases |
|                     | Spring Rate     | Increases |
|                     | Load Capacity   | Increases |
|                     | Column Load     | Increases |
| Mounting Rigidity   | Critical Speed  | Increases |
|                     | System Stiffness| Increases |
| Nut Length (7½ turns max.) | Load Capacity | Increases |
|                     | Stiffness       | Increases |
| Ball Diameter       | Life            | Increases |
|                     | Stiffness       | Increases |
|                     | Load Capacity   | Increases |

The alternative is to change the design parameters, such as the travel rate, end mounting, or life expectancy to allow a smaller diameter screw to be used. Any decision to change the design parameters must be based on good engineering practices to maintain the safe operating conditions of the overall system.

Specifying Complete Ballscrew Assemblies

Once the proper size ballscrew has been selected, the dimension drawings in this catalog, allow you to select the ballnut and end support configuration necessary to meet your space and mounting requirements.

The Faxalog on Page 26 makes it easy for you specify the ballscrew package you selected. Or fax us your application data and we will do the work for you.
.625" Ballnuts

Non-Preloaded Single Nut Assemblies

Zero Backlash Preloaded Assemblies

Note: All dimensions in inches. See table at bottom of next page for A, B, C, D, F and ballnut clearance dimensions.

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Type A feature single sealed ball bearing for radial support.
Type B feature back-to-back angular contact bearings for radial & axial support.
Type C feature spaced angular contact bearings for maximum radial and axial support.

**Standard Shaft Extension**

Note: Special lengths also available.

**Standard Mounting Hole**

- Drilled & C'bored for "B" size socket head cap screw

### Dimensions

1. All dimensions in inches unless otherwise noted.
2. Wipers standard with all ballnuts. Dimensions A & B below include wipers.
3. Custom and modified standard assemblies are available upon request.
4. Refer to Page 4 for model number designations.

### Ballnuts

<table>
<thead>
<tr>
<th>Model</th>
<th>Diameter x Lead</th>
<th>Single Ballnut</th>
<th>Preloaded Ballnut</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>C063020S</td>
<td>.625 x .200</td>
<td>2.108</td>
<td>1.358</td>
</tr>
<tr>
<td>CL063020S</td>
<td>.625 x .200 LH</td>
<td>2.108</td>
<td>1.358</td>
</tr>
<tr>
<td>C063020D</td>
<td>.625 x .200</td>
<td>3.265</td>
<td>2.515</td>
</tr>
</tbody>
</table>

**Use FAXALOG on Page 26 to send or request information.**
.750" Ballnuts

Non-Preloaded Single Nut Assemblies

See mounting hole detail on next page

Note: All dimensions in inches. See table at bottom of next page for A, B, C, D, F and ballnut clearance dimensions.

Zero Backlash Preloaded Assemblies

See mounting hole detail on next page

Note: All dimensions in inches. See table at bottom of next page for A, B, C, D, E, F and ballnut clearance dimensions.

Base

Flange

Cut-Off Flange

Trunnion

Note: All dimensions in inches. See table at bottom of next page for A, B, C, D, F and ballnut clearance dimensions.
Use FAXALOG on Page 26 to send or request information.
**1.000" Ballnuts**

### Non-Preloaded Single Nut Assemblies

See mounting hole detail on next page

- A
- B
- C
- D
- E
- F

**Note:** All dimensions in inches. See table at bottom of next page for A, B, C, D, F and ballnut clearance dimensions.

### Zero Backlash Preloaded Assemblies

See mounting hole detail on next page

- A
- B
- C
- D
- E
- F

**Note:** All dimensions in inches. See table at bottom of next page for A, B, C, D, E, F and ballnut clearance dimensions.

---

**Flange**

**Cut-Off Flange**

**Trunnion**

- See mounting hole detail on next page

**Note:** All dimensions in inches. See table at bottom of next page for A, B, C, D, F and ballnut clearance dimensions.

---

**Base**

- See mounting hole detail on next page

**Note:** All dimensions in inches. See table at bottom of next page for A, B, C, D, F and ballnut clearance dimensions.
Type A feature single sealed ball bearing for radial support
Type B feature back-to-back angular contact bearings for radial & axial support
Type C feature spaced angular contact bearings for additional radial and axial support

---

### Standard Mounting Hole

- **Base**
  - 1/2-20
  - 7/16-14
  - 0.500
- **Flange & Cut-Off Flange**
  - 5/16-24
  - 1/4-20
  - 0.750

### Ballnut Clearance

<table>
<thead>
<tr>
<th>Model</th>
<th>Nut Type</th>
<th>Circuits</th>
<th>N5</th>
<th>N6</th>
<th>N7</th>
</tr>
</thead>
<tbody>
<tr>
<td>C100025S</td>
<td>1</td>
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<td>1.913</td>
<td>1.191</td>
<td>1.12</td>
</tr>
<tr>
<td>CL100025S</td>
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<td>2</td>
<td>1.913</td>
<td>1.191</td>
<td>1.12</td>
</tr>
<tr>
<td>C100025D</td>
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<td>1.882</td>
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<td>1.13</td>
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<td>2</td>
<td>2.090</td>
<td>1.190</td>
<td>1.29</td>
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<tr>
<td>C100050D</td>
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<td>2</td>
<td>1.882</td>
<td>1.191</td>
<td>1.12</td>
</tr>
<tr>
<td>C100100D</td>
<td>2</td>
<td>2</td>
<td>2.172</td>
<td>1.200</td>
<td>1.17</td>
</tr>
</tbody>
</table>

### Notes

1. All dimensions in inches unless otherwise noted.
2. Wipers standard with all ballnuts. Dimensions A & B below include wipers.
3. Custom and modified standard assemblies available upon request.
4. Refer to Page 4 for model number designations.

---

### Table: Model Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Diameter x Lead</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
<th>Max. Preload (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C100025S</td>
<td>1.000 x .250</td>
<td>2.840</td>
<td>1.902</td>
<td>0.938</td>
<td>0.469</td>
<td>1.690</td>
<td>530</td>
</tr>
<tr>
<td>CL100025S</td>
<td>1.000 x .250 LH</td>
<td>2.840</td>
<td>1.902</td>
<td>0.938</td>
<td>0.469</td>
<td>1.690</td>
<td>530</td>
</tr>
<tr>
<td>C100025D</td>
<td>1.000 x .250</td>
<td>3.606</td>
<td>2.658</td>
<td>0.938</td>
<td>0.469</td>
<td>1.690</td>
<td>1225</td>
</tr>
<tr>
<td>CL100025D</td>
<td>1.000 x .250 LH</td>
<td>3.606</td>
<td>2.658</td>
<td>0.938</td>
<td>0.469</td>
<td>1.690</td>
<td>1225</td>
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<tr>
<td>CL100025T</td>
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<tr>
<td>C100050D</td>
<td>1.000 x .500</td>
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<td>2.658</td>
<td>0.938</td>
<td>0.469</td>
<td>1.690</td>
<td>1225</td>
</tr>
<tr>
<td>C100100D</td>
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<td>2.558</td>
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<td>0.469</td>
<td>1.641</td>
<td>610</td>
</tr>
</tbody>
</table>

---

### Standard Shaft Extension

- 1.250 (Ref.)
- .187 sq. x .625 lg. key

---

### Dimensions

- See shaft extension detail below
### 1.130" Ballnuts

#### Non-Preloaded Single Nut Assemblies

<table>
<thead>
<tr>
<th>Base</th>
<th>Flange</th>
<th>Cut-Off Flange</th>
<th>Trunnion</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Base Diagram" /></td>
<td><img src="image" alt="Flange Diagram" /></td>
<td><img src="image" alt="Cut-Off Flange Diagram" /></td>
<td><img src="image" alt="Trunnion Diagram" /></td>
</tr>
</tbody>
</table>

**Note:** All dimensions in inches. See table at bottom of next page for A, B, C, D, F and ballnut clearance dimensions.

#### Zero Backlash Preloaded Assemblies

<table>
<thead>
<tr>
<th>Base</th>
<th>Flange</th>
<th>Cut-Off Flange</th>
<th>Trunnion</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Base Diagram" /></td>
<td><img src="image" alt="Flange Diagram" /></td>
<td><img src="image" alt="Cut-Off Flange Diagram" /></td>
<td><img src="image" alt="Trunnion Diagram" /></td>
</tr>
</tbody>
</table>

**Note:** All dimensions in inches. See table at bottom of next page for A, B, C, D, E, F and ballnut clearance dimensions.

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**Note:** All dimensions in inches. See table at bottom of next page for A, B, C, D, E, F and ballnut clearance dimensions.
**1.130" End Supports**

### End View

<table>
<thead>
<tr>
<th>Type A</th>
<th>Type B</th>
<th>Type C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A feature single sealed ball bearing for radial support.</td>
<td>Type B feature back-to-back angular contact bearings for radial &amp; axial support.</td>
<td>Type C feature spaced angular contact bearings for maximum radial and axial support.</td>
</tr>
</tbody>
</table>

#### Base

- 1.500
- 2.625
- 5.250

See mounting hole detail below.

#### Flange

- 1.648
- 1.648
- 3.750

See shaft extension detail below.

#### Cut-Off Flange

- 1.625
- 1.625
- 3.750

See shaft extension detail below.

### Standard Shafts Extension

**Note:** Special lengths also available.

- 1.330 (Ref.)
- 0.750
- 0.7495

- .187 sq. x 1.000

### Standard Mounting Hole

**Drilled & C'bored for "B" size socket head cap screw**

<table>
<thead>
<tr>
<th>Mounting</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>1/2-20</td>
<td>7/16-14</td>
<td>0.500</td>
</tr>
<tr>
<td>Flange &amp; Cut-Off Flange</td>
<td>5/16-24</td>
<td>1/4-20</td>
<td>0.750</td>
</tr>
</tbody>
</table>

### Ballnut Clearance

<table>
<thead>
<tr>
<th>Ball screw Model</th>
<th>Nut Type</th>
<th>Circuits</th>
<th>N5</th>
<th>N6</th>
<th>N7</th>
</tr>
</thead>
<tbody>
<tr>
<td>C113020D</td>
<td>1</td>
<td>2</td>
<td>1.963</td>
<td>1.281</td>
<td>1.22</td>
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<tr>
<td>CL113020D</td>
<td>1</td>
<td>2</td>
<td>1.963</td>
<td>1.281</td>
<td>1.22</td>
</tr>
</tbody>
</table>

**Type 1**

<table>
<thead>
<tr>
<th>Model</th>
<th>Diameter x Lead</th>
<th>Single Ballnut</th>
<th>Preloaded Ballnut</th>
<th>Max. Preload (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C113020D</td>
<td>1.125 x .200</td>
<td>3.064 2.189 0.875 0.438 1.690</td>
<td>5.843 2.189 0.875 0.438 1.465 1.690</td>
<td>775</td>
</tr>
<tr>
<td>CL113020D</td>
<td>1.125 x .200</td>
<td>3.064 2.189 0.875 0.438 1.690</td>
<td>5.843 2.189 0.875 0.438 1.465 1.690</td>
<td>775</td>
</tr>
</tbody>
</table>

### Notes

1. All dimensions in inches unless otherwise noted.
2. Wipers standard with all ballnuts. Dimensions A & B below include wipers.
3. Custom and modified standard assemblies available upon request.
4. Refer to Page 4 for model number designation.

---

Use FAXALOG on Page 26 to send or request information.
Non-Preloaded Single Nut Assemblies

Zero Backlash Preloaded Assemblies

Note: All dimensions in inches. See table at bottom of next page for A, B, C, D, F and ballnut clearance dimensions.
Type A feature single sealed ball bearing for radial support.

Type B feature back-to-back angular contact bearings for radial & axial support.

Type C feature spaced angular contact bearings for maximum radial and axial support.

---

**End View**

Type A feature single sealed ball bearing for radial support.

Type B feature back-to-back angular contact bearings for radial & axial support.

Type C feature spaced angular contact bearings for maximum radial and axial support.

---

**Flange**

Type A feature single sealed ball bearing for radial support.

Type B feature back-to-back angular contact bearings for radial & axial support.

Type C feature spaced angular contact bearings for maximum radial and axial support.

---

**Cut-Off Flange**

Type A feature single sealed ball bearing for radial support.

Type B feature back-to-back angular contact bearings for radial & axial support.

Type C feature spaced angular contact bearings for maximum radial and axial support.

---

**Standard Shaft Extension**

- **Note:** Special lengths also available.
- **1.0000**
  - **.9995**
  - **.250 sq. x 1.000 lg. key**

**Standard Mounting Hole**

- **Drilled & C’bored for “B” size socket head cap screw**

**Ballnut Clearances**

- **Ballscrew Model**
  - **Nut Type**
  - **Circuits**
  - **N5**
  - **N6**
  - **N7**

---

**Notes**

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3. Custom and modified standard assemblies available upon request.
4. Refer to Page 4 for model number designations.

---

**Ball nut Clearance**

- **Model Diameter x Lead**
  - **A**
  - **B**
  - **C**
  - **D**
  - **F**
  - **G**
  - **H**
  - **I**
  - **J**
  - **K**
  - **L**
  - **M**
  - **N**
  - **O**
  - **P**
  - **Q**
  - **R**
  - **S**
  - **T**
  - **U**
  - **V**
  - **W**
  - **X**
  - **Y**
  - **Z**

---

**Dimensions**

**Notes**

- **Type A**
  - **Type B**
  - **Type C**

---

**Use FAXALOG on Page 26 to send or request information.**
Non-Preloaded Single Nut Assemblies

Zero Backlash Preloaded Assemblies

Note: All dimensions in inches. See table at bottom of next page for A, B, C, D, E, F and ballnut clearance dimensions.
Type A feature single sealed ball bearing for radial support.

Type B feature back-to-back angular contact bearings for radial & axial support.

Type C feature spaced angular contact bearings for maximum radial and axial support.

2.813 2.813 3.375 3.375 4.500

See shaft extension detail below

3.375 2.813 2.813 4.500

See shaft extension detail below

1.813

.359 Diameter thru used at assembly

Notes:
1. All dimensions in inches unless otherwise noted.
2. Wipers standard with all ballnuts. Dimensions A & B below include wipers.
3. Custom and modified standard assemblies available upon request.
4. Refer to Page 4 for model number designations.

Use FAXALOG on Page 26 to send or request information.
2.250" Ballnuts

Non-Preloaded Single Nut Assemblies

Zero Backlash Preloaded Assemblies

Note: All dimensions in inches. See table at bottom of next page for A, B, C, D, F and ballnut clearance dimensions.

See mounting hole detail on next page.

Note: All dimensions in inches. See table at bottom of next page for A, B, C, D, E, F and ballnut clearance dimensions.

See mounting hole detail on next page.

Note: All dimensions in inches. See table at bottom of next page for A, B, C, D, E, F and ballnut clearance dimensions.

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See mounting hole detail on next page.

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See mounting hole detail on next page.

Note: All dimensions in inches. See table at bottom of next page for A, B, C, D, E, F and ballnut clearance dimensions.
End View

<table>
<thead>
<tr>
<th>End View</th>
<th>Type A</th>
<th>Type B</th>
<th>Type C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type A feature single sealed ball bearing for radial support.</td>
<td>Type B feature back-to-back angular contact bearings for radial &amp; axial support.</td>
<td>Type C feature spaced angular contact bearings for maximum radial and axial support.</td>
</tr>
<tr>
<td></td>
<td><img src="image1" alt="Type A Diagram" /></td>
<td><img src="image2" alt="Type B Diagram" /></td>
<td><img src="image3" alt="Type C Diagram" /></td>
</tr>
<tr>
<td></td>
<td>See shaft extension detail below</td>
<td>See shaft extension detail below</td>
<td>See shaft extension detail below</td>
</tr>
<tr>
<td></td>
<td>.359 Diameter thru used at assembly</td>
<td>.359 Diameter thru used at assembly</td>
<td>.359 Diameter thru used at assembly</td>
</tr>
</tbody>
</table>

**Standard Shaft Extension**

- **Note:** Special lengths available.
- 2.000 (Ref.)
- 1.3750
- 1.3745
- .313 sq. x 1.500 lg. key

**Standard Mounting Hole**

- Drilled & C'bored for "B" size socket head cap screw
- "A" size tap thru
- C

<table>
<thead>
<tr>
<th>Mounting</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>5/8-11</td>
<td>1/2-13</td>
<td>1.000</td>
</tr>
<tr>
<td>Flange &amp; Cut-Off Flange</td>
<td>3/4-10</td>
<td>5/8-11</td>
<td>1.125</td>
</tr>
</tbody>
</table>

**Ballnut Clearance**

- **Model:** C225050D
- **Circuits:** 1
- **N5:** 3.995
- **N6:** 2.545
- **N7:** 2.48
- **Type 1**

<table>
<thead>
<tr>
<th>Ballscrew Model</th>
<th>Nut Type</th>
<th>Circuits</th>
<th>N5</th>
<th>N6</th>
<th>N7</th>
</tr>
</thead>
<tbody>
<tr>
<td>C225050D</td>
<td>3</td>
<td>3.995</td>
<td>2.545</td>
<td>2.48</td>
<td></td>
</tr>
<tr>
<td>C225050T</td>
<td>2</td>
<td>3.995</td>
<td>1.960</td>
<td>2.56</td>
<td></td>
</tr>
<tr>
<td>C225100D</td>
<td>2</td>
<td>3.995</td>
<td>2.545</td>
<td>2.48</td>
<td></td>
</tr>
</tbody>
</table>

**Notes**

1. All dimensions in inches unless otherwise noted.
2. Wipers standard with all ballnuts. Dimensions A & B below include wipers.
3. Custom and modified standard assemblies available upon request.
4. Refer to Page 4 for model number designations.
2.500" Ballnuts

Non-Preloaded Single Nut Assemblies

Zero Backlash Preloaded Assemblies

Base

See mounting hole detail on next page

Note: All dimensions in inches. See table at bottom of next page for A, B, C, D, E, F and ballnut clearance dimensions.

Flange

See mounting hole detail on next page

Note: All dimensions in inches. See table at bottom of next page for A, B, C, D, E, F and ballnut clearance dimensions.

Cut-Off Flange

See mounting hole detail on next page

Note: All dimensions in inches. See table at bottom of next page for A, B, C, D, E, F and ballnut clearance dimensions.

Trunnion

Note: All dimensions in inches. See table at bottom of next page for A, B, C, D, E, F and ballnut clearance

Note: All dimensions in inches. See table at bottom of next page for A, B, C, D, E, F and ballnut clearance dimensions.

Note: All dimensions in inches. See table at bottom of next page for A, B, C, D, E, F and ballnut clearance dimensions.
Use FAXALOG on Page 26 to send or request information.
### 3.000" Ballnuts

#### Non-Preloaded Single Nut Assemblies

<table>
<thead>
<tr>
<th>Flange</th>
<th>Cut-Off Flange</th>
<th>Trunnion</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Non-Preloaded Diagram" /></td>
<td><img src="image2" alt="Non-Preloaded Diagram" /></td>
<td><img src="image3" alt="Non-Preloaded Diagram" /></td>
</tr>
<tr>
<td><strong>Base</strong></td>
<td><strong>Flange</strong></td>
<td><strong>Trunnion</strong></td>
</tr>
<tr>
<td><img src="image4" alt="Base Diagram" /></td>
<td><img src="image5" alt="Flange Diagram" /></td>
<td><img src="image6" alt="Trunnion Diagram" /></td>
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</tbody>
</table>

**Note:** All dimensions in inches. See table at bottom of next page for A, B, C, D, E, F and ballnut clearance dimensions.

#### Zero Backlash Preloaded Assemblies

<table>
<thead>
<tr>
<th>Flange</th>
<th>Cut-Off Flange</th>
<th>Trunnion</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image7" alt="Zero Backlash Preloaded Diagram" /></td>
<td><img src="image8" alt="Zero Backlash Preloaded Diagram" /></td>
<td><img src="image9" alt="Zero Backlash Preloaded Diagram" /></td>
</tr>
<tr>
<td><strong>Base</strong></td>
<td><strong>Flange</strong></td>
<td><strong>Trunnion</strong></td>
</tr>
<tr>
<td><img src="image10" alt="Base Diagram" /></td>
<td><img src="image11" alt="Flange Diagram" /></td>
<td><img src="image12" alt="Trunnion Diagram" /></td>
</tr>
</tbody>
</table>

**Note:** All dimensions in inches. See table at bottom of next page for A, B, C, D, E, F and ballnut clearance dimensions.

---

*Use FAXALOG on Page 26 to send or request information.*
### 3.000" End Supports

#### End View

**Type A** feature single sealed ball bearing for radial support.

**Type B** feature back-to-back angular contact bearings for radial & axial support.

**Type C** feature spaced angular contact bearings for maximum radial and axial support.

#### Standard Shaft Extension

**Note:** Special lengths available.

#### Standard Mounting Hole

- Drilled & C’bored for "B" size socket head cap screw

#### Ballnut Clearance

<table>
<thead>
<tr>
<th>Ballscrew Model</th>
<th>Nut Type</th>
<th>Circuits</th>
<th>N5</th>
<th>N6</th>
<th>N7</th>
</tr>
</thead>
<tbody>
<tr>
<td>C300066T</td>
<td>1</td>
<td>3</td>
<td>5.486</td>
<td>3.356</td>
<td>3.34</td>
</tr>
<tr>
<td>C300150D</td>
<td>2</td>
<td>2</td>
<td>5.510</td>
<td>2.930</td>
<td>3.50</td>
</tr>
</tbody>
</table>

#### Dimensions

- Type 1
- Type 2

#### Notes

1. All dimensions in inches unless otherwise noted.
2. Wipers standard with all ballnuts. Dimensions A & B below include wipers.
3. Custom and modified standard assemblies available upon request.
4. Refer to Page 4 for model number designations.

#### Warranty

Comptrol Incorporated warrants its manufactured products to be free from any defects in material and workmanship for a period of one year from the date of installation or eighteen months from the time of shipment from Comptrol Incorporated, whichever expires first. Comptrol’s liability is limited to repairing, replacing, or issuing a credit, at its option, for defective products which are returned transportation prepaid by the original purchaser within the warranty period. Comptrol makes no warranty for its products used for any other purpose or under any other conditions other than those specified at the time of purchase, or for any accessories or wear items, such as bearings. Liability on any claim for loss or collateral or consequential damage arising out of the use of any Comptrol products shall in no event exceed the selling price of those products.

### Use FAXALOG on Page 26 to send or request information.
Static Load

Static load rating is the maximum non-operating load capacity. In all application the total weight of the load should not exceed the static load capacity of the ballscrew.

If a ballscrew is subject to a tension load, the static load capacity of the screw should be verified. However, if the screw is subject to a compression load, one that tends to buckle the screw, both the static and compression load capacities of the screw must be verified.

Applied Load

The applied load (the load seen by the screw) is dependent on whether the screw is to be used in a horizontal or vertical application, the total weight of the load that has to be moved, and the number of ballscrews used to move the load.

Whenever possible, the load direction should be coaxial with the screw. Overturning or cocking type loads should be avoided.

In vertical applications, such as lifting or jacking, the applied load is equal to the total weight of the load that has to be moved.

In horizontal applications the load seen by the screw is equal to the total weight of the load times the coefficient of friction for the type of ways used to guide the load as it moves.

Most applications only require one ballscrew. However, if more than one screw is required, the load seen by each screw is dependent on the distribution of the weight between the screws. For example, if the weight is equally distributed among four screws, the load seen by each screw would be one-fourth the total load.

Design Life Objective

After determining the applied operating load, the next step is to determine the design life objective, measured in inches of travel, for the application.

For a horizontal application, the formula for calculating the design life objective is:

\[ \text{Design Life} = S \times C \times H \times D \times Y \]

Where:
- \( S \) = Stroke Length, in inches
- \( C \) = Cycles per hour
- \( H \) = Operating hours per day
- \( D \) = Working days per year
- \( Y \) = Expected design life for the application, in years

For a vertical application, the above formula must be multiplied by 2 because the load is always applied to the same side of the ball groove.

Load/Life Relationship

The load-life relationship for a particular size ballscrew is an inverse cube ratio, analogous to the B10 rating common to the ball bearing industry.

For example, reducing the load on the ballscrew by 1/2 increases the life expectancy 8 times. Doubling the load decreases life to 1/8 the original expectation.

This makes the life of ballscrew predictable based on the applied operating load that has to be moved and the total inches of travel defined by the design life objective.

In most ballscrew applications, where the load is in tension, selection of the proper size ballscrew can be made based on the load-life relationship for a stated load and design life objective. However, in those applications where column loading, critical speed, or other factors come into play, additional considerations must be made.

Critical Speed

Critical speed is the speed at which the nut or screw has a tendency to develop severe vibrations. Under normal operating conditions, the maximum safe operating speed of a ballscrew assembly is 80 percent of the critical speed rating for the screw.

Critical speed is a function of the unsupported length of the screw, the screw diameter, and the type of end bearing supports. The unsupported length is the dominate factor, because the critical speed is inversely proportionate to the square of the unsupported length.

Compression Loading

Compression or column loads have a tendency to cause a ballscrew to buckle. Therefore, whenever a ballscrew is subject to these types of loads, the safe compression rating of the ballscrew must be verified.

The compression load capacity is dependent on the unsupported length of the ballscrew, the type of end bearing fixity, and the ballscrew diameter.
General Definitions:

Cycle - The complete forward and reverse motion of the screw (or nut) in moving the load. One cycle is equivalent to two strokes (one forward and one backward).

Lead - Axial distance screw or nut travels in one revolution.

Lead Error - The error in lead length per turn, per inch, per foot or, overall length compared to the basic lead specified.

Major Diameter - The outside diameter of the ballscrew shaft.

Minor (Root) Diameter - Diameter of the screw measured at the bottom of the ball track.

Pitch (Ball Circle) Diameter - The nominal diameter of a theoretical cylinder passing through the centers of the balls when they are in contact with the ballscrew and ball nut tracks.

Pitch - The axial distance between succeeding ball grooves. The distance from a point on a ball track to a corresponding point on the next track, parallel to the ballscrew or ball nut axis.

Life

Design Life Objective - The total number of inches that the ball nut will travel during the desired life of the machine.

Load/Life Rating - The usable life of a ballscrew assembly measured in inches of travel under a specific load.

Service Life - The number of years the machine is designed for.

Stroke - The axial distance in either direction that the screw or nut travels in moving the load.

Ball Circulation:

Backlash (End Play) - Axial free motion between the nut and the screw.

Circuit - The continuous closed path of recirculating balls in a ball nut.

Effective Ball Turns - The number of turns of balls contained within the ball nut body.

Load Carrying Balls - The balls in contact with the ball grooves of both the nut and the screw for load carrying purposes.

Return Tube - The tubular member that carries balls from the output to the input end of each ball circuit to complete a recirculating ball path.

Loading:

Compression Load - A load which would tend to compress or buckle the ballscrew shaft.

Dynamic Load Rating - The maximum load which a ball bearing screw assembly can maintain for a prescribed length of travel.

Off Center Load - A load tending to cock the ball nut on the screw, reducing the rated life. This must be considered in the selection of the ball bearing screw assembly.

Preload - The use of one group of bearing balls set in opposition to another to remove axial lash or backlash and increase ball bearing screw stiffness. All axial freedom is eliminated in preloading.

Side Load (Radial) - A load from the side that will reduce the rated life and must be considered in the selection of the ball bearing screw.

Static Load - The maximum non-operating load capacity above which brinelling of the ball track occurs.

Tension Load - A load which would tend to stretch the ballscrew shaft.

Thrust Load - Thrust load is loading parallel to and concentric with the centerline of the screw shaft which acts continuously in one direction. Thrust loading is the proper method of attaching the load to the ball bearing screw assembly.

Critical Speed

The speed at which the nut or screw has a tendency to develop severe vibrations. The desired speed should not exceed the safe rate of travel (revolutions per minute) for the unsupported length and type of mounting.
The chart below is provided to help you fill out the Faxalog Assembly Definition on the next page. Notice that each item which defines the assembly is assigned a number or letter. These items include:

- The model number for the desired ballscrew.
- The type of shaft extension required for each end.
- The type of end support and mounting for each end.

- The ballnut type, mounting, and orientation.
- The thread length and overall length for the desired ballscrew.

The Sample Assembly Definition below shows the definition for an assembly with a C075050 ballscrew.

---

**Table I**  
**Bearing Block & Ballnut Dimensions**

<table>
<thead>
<tr>
<th>Ballscrew Diameter</th>
<th>0.625</th>
<th>0.750</th>
<th>1.000</th>
<th>1.130</th>
<th>1.500</th>
<th>2.000</th>
<th>2.250</th>
<th>2.500</th>
<th>3.000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension Pages</td>
<td>5 &amp; 6</td>
<td>7 &amp; 8</td>
<td>9 &amp; 10</td>
<td>11 &amp; 12</td>
<td>13 &amp; 14</td>
<td>15 &amp; 16</td>
<td>17 &amp; 18</td>
<td>19 &amp; 20</td>
<td>21 &amp; 22</td>
</tr>
</tbody>
</table>

**Sample Assembly Definition**

<table>
<thead>
<tr>
<th>Ballscrew Model No.</th>
<th>Shaft Extension</th>
<th>End Support</th>
<th>Ballnut Type</th>
<th>Ballnut Mounting</th>
<th>Ballnut Orientation</th>
<th>End Support</th>
<th>Shaft Extension</th>
<th>Thread Length</th>
<th>Overall Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>C075050</td>
<td>A</td>
<td>K</td>
<td>P</td>
<td>01</td>
<td>13</td>
<td>J</td>
<td>C</td>
<td>20.25</td>
<td>27.30</td>
</tr>
</tbody>
</table>

C075050 = .750 Diameter, .500 Lead, RH Thread  
A = Standard Shaft Extension  
K = Type C Base Mount End Support  
P = Preloaded Nut Assembly  
01 = Base Mount Preloaded Nut Assembly  
13 = Ballnut Orientation  
J = Type B Base Mount End Support  
C = No Shaft Extension  
20.25 = Thread Length  
27.30 = Overall Length

---

Note: Include drawing or sketch for special or other shaft extension or mounting.

---

**Table I**  
**End Support**  
Refer to Table I below for dimension pages.

**Ballnut Type**  
Refer to Table I below for dimension pages.

**End Support**  
Refer to Table I below for dimension pages.

**Overall Length**  
Shaft Extension Length(s) + End Support Length(s) + Thread Length

**Thread Length**
FAXALOG DATA REQUEST

PHOTOCOPY AND FAX TO: COMPTROL INCORPORATED
U.S.A. & CANADA TELEFAX: (800) 544-2268

COMPANY: ___________________________ DATE: ________________
ADDRESS: ___________________________
INDIVIDUAL: _________________________
REFERENCE: _________________________

U.S.A. & CANADA TELEFAX: (800) 544-2268

SEND

COMPANY:_____________________________________________ DATE:  ________________________
ADDRESS: _____________________________________________ NUMBER OF PAGES: ______ ______
INDIVIDUAL:_____________________________________________ TELEPHONE:___________________
REFERENCE:____________________________________________

☐ Send Proposal per Assembly Definition below  ☐ Please contact me to discuss application described below

ASSEMBLY DEFINITION (Refer to chart on preceding page.)

<table>
<thead>
<tr>
<th>Ballscrew Model No.</th>
<th>Shaft Extension</th>
<th>End Support</th>
<th>Ballnut Type</th>
<th>Ballnut Mounting</th>
<th>Ballnut Orientation</th>
<th>End Support</th>
<th>Shaft Extension</th>
<th>Thread Length</th>
<th>Overall Length</th>
</tr>
</thead>
</table>

APPLICATION DATA

Type of Application: ___________________________

Load:
☐ Horizontal  ☐ Vertical
Maximum Operating Load: ________________ lbs.

Type of Ways:  ☐ Box  ☐ Dovetail  ☐ Ball Bushing
Other: ________________________________

Screw:
Diameter: _________ in.  Lead: _________ in.
Overall Length (with journals): _________ in.

Cycle Rate:
Total Travel Per Cycle: ________________ in.
Speed: ________________ r.p.m.

Service Life: ________________ years

Type of Lubrication: ___________________________

Maximum Allowable Backlash: ___________________

Comments: ____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

COMPTROL INCORPORATED
505 Midwest Avenue             Cleveland, Ohio 44125
Phone:  (216) 587-5200
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- End Mounting Bearing Supports
- Complete Ballscrew Assemblies
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- Single Axis Slides
- X-Y Tables
- Single or Multi-axis Positioning Systems
- Engineered Automation and Motion Control Solutions

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