Selection of Lubricants
You must know the operating temperature and speed (RPM) of the Cooper bearing being evaluated. Select the appropriate bearing geometry factor from the table provided. Multiply the geometry factor by the shaft RPM to obtain the velocity factor.

On the graph below, draw a vertical line up from the calculated velocity factor and a horizontal line from the bearing operating temperature. If the lines meet in the shaded area, the listed viscosity grade is suitable. Please consult our engineering department with any questions.

Cooper Bearing recommended speed and temperature range for ISO VG 150 grease and oils

Metric screw and wrench sizes 01 Series

Cooper Bearing recommended speed and temperature range for ISO VG 220 grease and oils

Metric screw and wrench sizes 02 Series

Some components have sharp edges. Please read instructions before assembly.

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Step 1: Checking the Shaft

The shaft diameter at the bearing seat should be within tolerance as shown in our Product Catalog. As a general guide, +0.001" to -0.002" is adequate. Any taper in the shaft should be less than 0.001". Shaft surface finish should be 63 to 125 micro-inch.

To check the shaft for taper, it must be measured at two or three points, usually the left side, right side and center of the inner race position. The diameter should not vary by more than 0.001" from side to side or 0.0005" from side to center. To check the shaft for roundness, the diameter should be checked at three places around the Helix: vertically (12 o'clock), 60° away from top center (2 o'clock) and 120° away from top center (4 o'clock). These measurements should not vary by more than 0.001".

Step 2: Aluminum Triple Labyrinth Seals

Disassemble the supplied components and remove the ATL seals. Separate the halves by driving out the two joining pins. Lubricate the "O" rings in the bore with grease.

Assemble the halves on the shaft. Ensure that "COPER" and the shaft size are stamped on the outer edge of the seal. A hole clamp can be used to compress the seal on the shaft while the pins are reinserted.

Channel-locks can be used to push the pins back into the seal. Push the assembled seal sideways to be out of the way when assembling the inner race.

Step 3: Pedestal Base and Lower Half Flange

Position the lower half pedestal or flange and engage the hold down bolts with flat washers under the bolt heads. You may wish to leave the bolts slightly loose until final alignment is achieved. If ships are made, ensure that the whole base is supported with a full shim.

Step 4: Inner Race

Separate the roller and cage assembly by removing the "U" clips from the joints or separating the joint plates with a flat head screwdriver. For the OIE Series (with steel cage), separate both sides of the cage halves as shown in step 5. Disassemble both joints before removing the roller cage from the inner race.

Peel off the protective tape from the inner race.

Make sure the shaft is clean and dry. SOLVENT CLEAN THE PACKING GREASE OR PRESERVATIVE OFF ALL BEARING PARTS. Disassemble the inner race and clamp rings keeping matched halves together. The side face of the two clamp rings and inner race will have match numbers near the joint.

Position the two inner race halves on the shaft centered on the spherical seat of the pedestal. Joints of the race should be vertical (at 12 o'clock and 6 o'clock positions)

• Put a 0.001" thick feeler gauge in the bottom joint to keep the joint from closing up. There should be a gap in the inner race joints, usually between 0.015" and 0.022" per side. Put one half of one clamp ring in one of the inner race grooves with the guide lip toward the roller path, off-setting the clamp ring joint from the inner race joint. The offset can be as little as 20° or up to 90°.

The clamp ring half should hold the inner race on the shaft. It is best to arrange the clamp rings so that the half with the through holes is on top and the half with the thread holes is on the bottom. This will keep the heads of the clamp ring screws pointed upwards allowing tool access.

Tighten the clamp rings all around to seat them, then tighten the screws with an allen wrench.

DO NOT TIGHTEN THE CLAMP RING SCREWS UNTIL THE INNER RACE IS POSITIONED ON THE SHAFT.

Positioning of GR Inner Race

Remove the feeler gauge from the bottom inner race joint. Rotate the lower half cartridge with EX outer race into position. Place one half of the roller and cage assembly in position on top of the inner race. Slide or tap the inner race sideways until the roller/cage assembly will rotate freely into the lower half outer race. This ensures the inner and outer races are properly aligned. Tighten the clamp ring screws to secure the inner race in place. Remove the lower half cartridge and half roller/cage assembly.

Positioning of the EX Inner Race

Remove the feeler gauge from the bottom inner race joint. Slide or tap the inner race sideways to center it on the pedestal base. Rotate the lower half cartridge with EX outer race into position. Place one half of the roller and cage assembly in position on top of the inner race. Rotate the roller and cage into the bottom half outer race. Check to ensure the rollers are centered on the outer race. Tap or slide the inner race if adjustments are needed for centering. Tighten the clamp ring screws to secure the inner race in place. Remove the lower half cartridge and half roller/cage assembly.

Seating and Torquing Clamp Rings

Use a wood or plastic mallet to seat the clamp rings down into the clamp ring grooves. There should be a gap at both joints for each clamp ring. The screws should be tightened in such a manner to keep the gaps approximately equal. Torque both screws on one of the rings to the torque value shown on the attached charts. Seat the clamp rings down hard a second time with the mallet and re-torque. Torque the screws on the other end of the cage ring, tap them hard and re-torque. Check to ensure there are gaps at the inner race joints and that they are approximately equal. Lightly grease the roller path of the inner race.

Step 5: Roller and Cage Assembly

Lightly grease the rollers, rotating them to force some grease into the cage pockets. One side of the cage will have circular impressions, use this as the match mark for the cage halves.

Aluminum Cages

Assemble the halves around the inner race and push in the "U" clips on joint plates at the joints to hold the halves together.

OIE Series with Steel Cages

Engage the tabs on one half with the cage half of the other half. Press together until the joint snaps closed. Repeat for the other cage joint.

Step 6: Fitting of the Outer Race into Cartridge

The following procedure should be used only when mounting a new bearing (inner race, clamp rings, roller & cage, and outer race) in an existing cartridge housing:

1. Clean the outer race seat of the cartridge to ensure it is dry and free of contamination.

2. Clean the outer race and place in the cartridge halves so that the match marks coincide and the outer race half with the lubrication hole is in the top half housing.

3. Enter the radial securing screws (D) (OIE Series 712" and up, OIE Series 611/6" and up, and all OIE Series), finger tight only—it is important to fit the washers.

4. Fit the side rods and screws (C) where provided (GR cartridge only), and tighten these against the outer race very lightly. (Note: some designs have only side screws and no side rods.)

5. Assemble the two halves of the cartridge together and fully tighten the joint screws (B). Ease the pressure on these screws, then fully tighten the radial securing screws (D) and/or the side screws (C).

6. Re-tighten the cartridge joint screws and check the joints of the outer race track for a smooth transition.

7. Ensure that all grease passages are full by applying a grease gun to the grease fitting and noting fresh grease discharging through the lubrication hole in the top half. Disassemble the cartridge and proceed with the bearing installation.

Step 7: Lower Half Cartridge

Coat the outer race roller path and fill the center grooves of the seal labyrinth with grease. Coat the spherical OD with an anti-seize compound or slide the ATL seals into position to engage the lubrication in the cartridge.

The grease boss is located on one end of the cartridge. Decide which end you prefer to have the grease boss on before putting the lower half cartridge in place. Raise the shaft sufficiently (typically 0.010") to roll the lower half cartridge into the pedestal base.

Step 8: Upper Half Cartridge

The top half outer race has a lubrication entrance hole at top center. Make sure the race half with the hole is in the top half cartridge. Coat the outer race roller path and fill the center grooves of the seal labyrinth with grease.

Coat the spherical OD with an anti-seize compound. Assemble the top half cartridge onto the lower half cartridge for checking for mark stamps matched into the joint faces of the halves.

Torque the four cartridge joint screws to the torque values shown in the attached charts. The same wrench used for the clamp ring screws will fit the cartridge joint screws.

NOTE: For the fixed (GR) unit only, the side fixing screws on the cartridge face opposite the lub boss are to be tightened AFTER completely tightening the joint screws.

If supplied, the radial screws on the OD of the cartridge (illustrated in step 6) should also be checked to ensure they are tight.

Step 9 Pedestal Cap and Top Half Flange

Assemble the pedestal cap or top half flange onto the bottom half checking for mark stamps matched into the joint faces. Finger tighten the two screws. Remove the feeler gauge and check the gap between the pedestal cap and the flange or plate to align itself.

Tighten the bolts using an allen wrench and an extension.

Torque values can be seen in the charts below.

Tightening torquings for cartridge radial screws are 50% of tightening torquings for clamping rings with the same thread size.

Tightening torques for side screws are as follows:

M1.5: 4 ft lb, M1.6: 5 lb ft, M1.8: 22 lb ft

For vertical or high thrust applications, this value can be increased by up to 20%.

### Screw Torques (lb ft) 01 Series

<table>
<thead>
<tr>
<th>Shaft Size</th>
<th>Clamping Screw</th>
<th>Cartridge Screw</th>
<th>Plow Screw</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4 to 3/8</td>
<td>3.5 to 6</td>
<td>3.5 to 6</td>
<td>6.5 to 6</td>
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<tr>
<td>3/8 to 1/2</td>
<td>5.5 to 6</td>
<td>5.5 to 6</td>
<td>6.5 to 6.5</td>
</tr>
<tr>
<td>1/2 to 9/16</td>
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<td>3.5 to 6</td>
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<td>6.5 to 6</td>
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<tr>
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<td>2.5 to 3</td>
<td>2.5 to 3</td>
<td>2.5 to 2.5</td>
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<tr>
<td>1/8 to 1/16</td>
<td>1.5 to 2</td>
<td>1.5 to 2</td>
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</tr>
<tr>
<td>1/16 to 1/32</td>
<td>0.5 to 1</td>
<td>0.5 to 1</td>
<td>0.5 to 1</td>
</tr>
</tbody>
</table>

* For vertical or high thrust applications, this value can be increased by up to 20%.

### Screw Torques (lb ft) 02 Series

<table>
<thead>
<tr>
<th>Shaft Size</th>
<th>Clamping Screw</th>
<th>Cartridge Screw</th>
<th>Plow Screw</th>
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<td>0.5 to 1</td>
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</tbody>
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