After installing MOOG ball joints on Ford Super Duty and Dodge Ram HD straight axle 4x4 and twin I-beam trucks, some customers may encounter poor steering wheel return (referred to as “memory steer”), a tight feel on center on the highway and difficulty when turning the knuckle. This may be the result of ball joint binding due to improper installation. All straight axle and twin I-beam designs have manufacturing variations horizontally between upper and lower taper holes in the knuckle/axle and also variation between mounting locations of the upper and lower ball joint.

MOOG ball joints have precision metal tolerances (similar to a crankshaft bearing.) When installed properly, they will provide superior service life. Using improper procedures can effect product operation and shorten service life due to the excessive load that these variations can place on ball joints.

We recommend installing MOOG Problem Solver ball joints:
K80026  Upper, K8607T  Lower
(See MOOG Problem Solver Bulletin 212002 to learn more about these specific ball joints.)

Proper installation procedures with MOOG Problem Solver ball joints will ensure a more profitable job, with less comebacks and more satisfied customers.

In addition, close attention should be paid to the steering gear box, steering damper, and front axle u-joints during the repair procedure. These components, if faulty, can cause symptoms similar to failed ball joints and will result in comebacks and time-consuming diagnostics.

**Removal Procedure**

1. Remove the upper ball joint cotter pin and nut. Loosen, but do not remove, the lower ball joint nut.

2. Strike the lower and upper end of the axle to loosen the ball joints. (FIG 3)

3. Remove the wheel hub, bearing and axle. Refer to the factory service manual for proper safety and repair procedures.

4. With the axle out, inspect the u-joint. If the u-joint is in poor shape it should be replaced. Failed u-joints can cause noise and binding, and are easily replaced at this point. We recommend replacing with MOOG premium u-joint 374.

5. Remove the tie rod cotter pin and the tie rod end nut. (FIG 1)

6. Using an appropriate tool, disconnect the tie rod end from the wheel knuckle. (FIG 2)

7. Remove the lower ball joint nut and the wheel knuckle.

Now remove the ball joints from the knuckle. It is easier to remove the lower ball joint first. First, remove the snap ring, then use a ball joint press and appropriate receiving cups and adapters.

Then remove the upper ball joint from the knuckle, utilizing a ball joint press and appropriate receiving cups and adapters. (FIG 5)

**Vehicles Affected**

<table>
<thead>
<tr>
<th>DODGE</th>
<th>1998-1994</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAM 2500</td>
<td></td>
</tr>
<tr>
<td>RAM 3500</td>
<td>1998-1994</td>
</tr>
<tr>
<td>RAM 3500 PICKUP</td>
<td>1999</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FORD</th>
<th>2000-2009</th>
</tr>
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<tbody>
<tr>
<td>F-250 SUPER DUTY</td>
<td>2010-1999</td>
</tr>
<tr>
<td>F-350</td>
<td>1997-1992</td>
</tr>
<tr>
<td>F-350 SUPER DUTY</td>
<td>2010-1999</td>
</tr>
<tr>
<td>F-450 SUPER DUTY</td>
<td>2004-1999</td>
</tr>
<tr>
<td>F-550 SUPER DUTY</td>
<td>2004-1999</td>
</tr>
</tbody>
</table>

**Removal Procedure (con’t)**

Remove the upper ball joint cotter pin and nut. Loosen, but do not remove, the lower ball joint nut.

Strike the lower and upper end of the axle to loosen the ball joints. (FIG 3)

On Ford applications - Use the Ford service tool to remove the camber adjuster. Note its position. (FIG 4). IT IS IMPERATIVE THAT YOU REMOVE THE BUSHING AND CLEAN THE MATING SURFACES BEFORE PROCEEDING.

Remove the tie rod cotter pin and the tie rod end nut. (FIG 1)

Using an appropriate tool, disconnect the tie rod end from the wheel knuckle. (FIG 2)

Remove the lower ball joint nut and the wheel knuckle.

Now remove the ball joints from the knuckle. It is easier to remove the lower ball joint first. First, remove the snap ring, then use a ball joint press and appropriate receiving cups and adapters.

Then remove the upper ball joint from the knuckle, utilizing a ball joint press and appropriate receiving cups and adapters. (FIG 5)
Installing Adapter #204508A
Installing Cup #38355A
Installing Cup #38354

IMPORTANT: THOROUGHLY clean the surface where the new ball joints will seat. DIRTY MATING SURFACES WILL AFFECT BALL JOINT ALIGNMENT AND TORQUING.

Using a ball joint press, press in the new ball joints. It is IMPORTANT that the ball joints are installed properly to prevent misalignment and binding! Be sure to use the correct size adapter. Refer to the following diagrams.

### Installation Procedures

**OTC COMPONENTS REQUIRED:**
- Installing Adapter #204508A
- Installing Cup #38355A
- Installing Cup #38354

**Installation Procedure (con't)**

**Incorrect fit, not against outer step**

The upper ball joint must be installed before the lower ball joint.

1. Clean the knuckle ball joint mating surfaces thoroughly.
2. Apply a suitable lubricant to the ball joint mating surface and assemble the ball joint into the knuckle.
3. Assemble the ball joint press components as shown in Fig 6. Check the alignment of all components. Tighten the forcing screw until the ball joint is firmly seated.
4. Install the snap ring on the upper ball joint.
5. Repeat Steps 1-3 to install the lower ball joint. Install the snap ring.
6. Install the knuckle assembly to the vehicle according to the vehicle service manual procedures.

**Installation Procedure (con't)**

**Correct fit, against outer step**

The lower ball joint must be installed before the upper ball joint.

1. Clean the knuckle ball joint mating surfaces thoroughly.
2. Apply a suitable lubricant to the ball joint mating surface and assemble the ball joint into the knuckle.
3. Assemble the ball joint press components as shown in Fig 6. Check the alignment of all components. Tighten the forcing screw until the ball joint is firmly seated.
4. Install the snap ring on the lower ball joint.
5. Repeat Steps 1-3 to install the upper ball joint. Install the snap ring.
6. Install the camber adjuster sleeve (if equipped). Position the wheel knuckle onto the axle and install the nut onto the upper ball joint. Do not tighten the nut at this time.
7. Apply threadlock and sealer to the threads of the lower ball joint and install the nut onto the lower ball joint. Do not tighten the nut at this time.
8. Install the camber adjuster sleeve (if equipped). Position the wheel knuckle onto the axle and install the nut onto the upper ball joint. Do not tighten the nut at this time.
9. Tighten the LOWER ball joint nut to 204 Nm (150 ft. lbs.) DO NOT USE AN IMPACT WRENCH. An impact wrench can spin the stud at high speed and cause premature failure. (FIG 7)

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5. Repeat Steps 1-3 to install the lower ball joint. Install the snap ring.
6. Install the camber assembly to the vehicle according to the vehicle service manual procedures.

**Installation Procedure (con't)**

**Correct fit, against outer step**

These ball joints press in and apply force on the stud end of these applications. It is important that the installation cup be placed on the outer step of the ball joint housing. Pressing in the ball joint with force against the inside lip may push the lip and lower bearing into the stud, causing binding and premature failure. Always press in these ball joints using the outer step.

**Installation Procedure (con't)**

**Correct fit, against outer step**

The lower ball joint must be installed before the upper ball joint.

1. Clean the knuckle ball joint mating surfaces thoroughly.
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3. Assemble the ball joint press components as shown in Fig 6. Check the alignment of all components. Tighten the forcing screw until the ball joint is firmly seated.
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5. Repeat Steps 1-3 to install the upper ball joint. Install the snap ring.
6. Install the camber assembly to the vehicle according to the vehicle service manual procedures.

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