

## **DYNATRAC PRODUCTS**

### **1999-2009 4X4 FORD F250/F350 HEAVY DUTY BALL JOINT**

#### **PRO SERIES BALL JOINT REBUILD INSTRUCTIONS V1.0**

 **WARNING:** Improper use or installation of this product can cause major failures that could lead to injury or death.

 **WARNING:** Only perform this installation if you are a qualified and equipped mechanic.

 **WARNING:** Carefully read the instructions before you rebuild your ProSteer ball joints.

① **INFORMATION:** There is a replaceable ball socket inside of the ProSteer ball joints that may wear out over time. Dynatrac's rebuild kit, replaces the durable ball socket inside of the ProSteer Ball Joints. Carefully inspect your ball joints for damage, cracks or other defects. If the ball joints are worn beyond the replaceable ball socket, return the rebuild kit to Dynatrac and order a new set of ball joints.

#### **Common Tools Which Will be Required**

- Tools to assemble and disassemble the truck wheel end
- Punch set
- Snap ring pliers
- Utility Knife

#### **Preparation and Inspection**

Using the attached bill of materials verify the kit is complete. Contact Dynatrac if the kit does not include everything listed in the BOM ((714) 596 4469). It will take around 2 to 4 hours to rebuild the ball joints and an additional 4 to 8 hours to disassemble and reassemble the wheel end. Allow yourself plenty time to rebuild the ball joints. The installation should only be performed by a competent well equipped mechanic. If you are not experienced enough to perform the rebuild find a competent shop to perform the work needed.

**Note:** The wheel end of the vehicle must be disassembled to rebuild the ball joints. The ball joints cannot be rebuilt with wheel end assembled. Begin the installation by disassembling the wheel end.

#### **I. Removing the Knuckle**

1.1: Because there are multiple axle configurations, it is recommended a service manual specific to the vehicle is used. Publications are available online that offer detailed instructions for replacing ball joints and disassembling the wheel end. Begin the installation by disassembling the wheel end.

1.2: Remove the wheel hub assembly, brakes, tie rod and all other miscellaneous hardware as outlined in the service manual. Once the knuckle is exposed, loosen the two nuts located on the shaft of the upper and lower ball joint. Loosen the lower ball joint nut until 3-5 threads are still on the nut, this will prevent the knuckle from falling off. Since the ball joints have a tapered stud they will be firmly seated in the knuckle. To remove the ball joint stud from the knuckle, use a 5Lb metal hammer to hit the bottom of the end forging. Several hard well directed blows should cause the ball joint stud to fall out of the end forging. At this point you will have the end forging with the ball joints still pressed inside of them (Figure 1).

1.3: Once the knuckle has been removed from the axle place it in a sturdy vice. Hammering and wrenching will be required during the rebuild, make sure the knuckle is secure to avoid injury or damage.

1.4: Before you begin to disassemble the ball joints verify the knuckle has been removed from the assembly. Remember the rebuild cannot be performed without disassembling the wheel end.



Figure 1

## II. Disassembly of Upper Ball Joint

2.1: Use a screw driver or small pry bar to remove the E-Clip from the bottom of the ball joint (E-Clip, DA60-3050-E, Fig 2).



Figure 2

2.2: Use a screw driver or a small pry bar to remove the thread locker tab (Thread Locker, DA60-3050-E; Fig 3).



Figure 3

2.3: Use a 7/8 Socket to remove the back plug. The back plug should not be tight however over time sediment buildup may make it difficult to remove the plug without a wrench. Make sure the plug is

completely removed from the assembly (Plug, DA60-3050-D; Fig 4).



Figure 4

2.4: Next remove the rubber seal from the top of the ball joint. It is held in place with a specialized adherent. Use a utility knife to cut away at the bottom of the seal (Fig 5). A pair of pliers may be used to strip the seal from the cup (Seal, DA60-3050-J; Fig 6).



Figure 5



**Figure 6**

2.5: Now that the seal is removed, you can see the snap ring that retains the internal assembly. Make sure the ears of the snap ring are facing towards the inside of the knuckle in order to access them with snap-ring pliers. You can use one of the notches in the pliers to slide the snap ring ears to the front of the part (Fig 7).



**Figure 7**

2.6: With a pair of snap-ring pliers remove the snap ring from the ball joint cup (Snap Ring, DA60-3050-K; Fig 8).



**Figure 8**

2.7: Next you will remove the ball socket stud assembly from the ball joint cup. There should be a light to moderate press holding the assembly in place. There is a hole in the back of the stud that is used to press the assembly from the cup. Using a

punch and a hammer, remove the stud ball joint socket from the cup (Fig 9). NOTE: May cause damage to internal parts if a punch is not used.

After several hard blows if the ball socket has not started to move, the ball joint body may need to be removed from the knuckle. If this is the case call Dynatrac for a set of ball joint installation instructions.



**Figure 9**

2.8: The ball joint assembly should look like the image bellow once it's removed (Fig 10).



**Figure 10**

2.9: There is a snap ring that retains the stud in the ball socket. With a pair of snap-ring pliers remove the snap ring from the stud (Snap Ring, DA60-3050-H; Fig 11).



**Figure 11**

2.10: Using a vice or rest the ball socket in the sides of the vice (Ball Socket, DA60-3050-L). Do not clamp on the ball joint stud. Place a punch in the center

hole located in the back of the stud. NOTE: Do not hammer directly on the back of the stud or it will damage the component (Stud, DA.0-3050-C; Fig 12). Using a hammer hit the punch to remove the stud from the ball socket.



Figure 12

2.11: The two components should look like this when the ball socket is removed from the stud (Fig 13).



Figure 13

2.13: At this point the lower ball joint should be completely disassembled. Carefully inspect the Stud, Cup and plug for excessive wear or damage. If any one of the components appears to be unusable, call Dynatrac for a replacement part or return the rebuild kit and buy a new set of ball joints.

### **III. Disassembly of Upper Ball Joint**

3.1: Use a screw driver or small pry bar to remove the E-Clip from the bottom of the ball joint (E-Clip, DA60-3049-C; Fig 14).



Figure 14

3.3: Use a screw driver or a small pry bar to remove the thread locker tab (Thread Locker, DA60-3049-M; Fig 15).



Figure 15

3.3: Use a 3/4 Socket to remove the back plug (Back Plug, DA60-3049-C, Fig 16). The back plug should not be tight however over time sediment buildup may make it difficult to remove the plug without a wrench. Make sure the plug is completely removed from the assembly.



Figure 16

3.4: Next remove the rubber seal from the top of the ball joint (Seal, DA60-3049-J). It is held in place with a specialized adherent. Use a utility knife to cut away at the bottom of the seal (Fig 17). A pair of pliers may be used to strip the seal from the cup (Fig 18).



Figure 17



Figure 18

3.5: Now that the seal is removed, you can see the snap ring that retains the internal assembly. With a pair of snap-ring pliers remove the snap ring from the ball joint cup (Heim Snap Ring, DA60-3049-G; Fig 19).



Figure 19

3.6: Next you will remove the ball socket stud assembly from the ball joint cup. There should be a light to moderate press holding the assembly in place. There is a hole in the back of the stud that is used to press the assembly from the cup. Using a punch and a hammer, remove the stud ball joint socket from the cup. NOTE: May cause damage to internal parts if a punch is not used.

Push the stud sideways towards the front of the knuckle. This will allow you to angle the punch and create adequate clearance for the hammer (Fig 20).

After several hard blows if the ball socket has not started to move, the ball joint body may need to be removed from the knuckle to loosen the press fit. If this is the case call Dynatrac for a set of ball joint installation instructions.



Figure 20



Figure 21

3.7: The ball joint assembly should look like the image bellow once it's removed.



Figure 22

3.8: There is a snap ring that retains the stud in the ball socket. With a pair of snap-ring pliers remove the snap ring from the stud (Stud Snap Ring, DA60-3049-G).



Figure 23

3.9: Using a vice set the ball socket in the sides of the vice. Do not clamp on the ball joint stud. Place a punch in the center hole located in the back of the stud (Fig 24). NOTE: Do not hammer directly on the

back of the stud or it will damage the component. Using a hammer hit the punch to remove the stud from the ball socket.



Figure 24

3.10: The two components should look like this when the ball socket is removed from the stud (Fig 25).



Figure 25

3.11: At this point the lower ball joint should be completely disassembled. Carefully inspect the Stud, Cup and plug for excessive wear or damage. If any one of the components appears to be unusable, call Dynatrac for a replacement part or return the rebuild kit and buy a new set of ball joints.

#### **IV. Assembly Preparation**

NOTE: At this point the ball joints should be completely disassembled and ready for reassembly. Before the ball joints can be reassembled there are a couple preparation steps that should be performed.

4.1: With a shop rag or towels clean the bores of all the ball joint cups (Fig 26). You may also use grease cutting cleaners like Simple Green to expedite the

process. Also clean the studs and plugs because those components will be reused.



Figure 26

4.2: Using 100 grit sand paper, remove the seal and glue material from the top of the ball joint cup. This is important to create a new surface for the seal to adhere to.



Figure 27

4.3: Take the new ball sockets and sand the edges of the part. This will break the edge of the ball socket preventing damage to the ball joint cup.



Figure 28

4.4: Place a layer of axle grease in the ball joint bores.



Figure 29

## **V. Lower Ball Joint Assembly**

5.1: Place the new ball joint socket on the installation bushing. With a hammer drive the stud into the ball socket (Fig 30).



**Figure 30**

5.2: Install the new snap ring on the back of the ball joint stud with a pair of snap-ring pliers (Stud Snap Ring, DA60-3050-H).



**Figure 31**

5.3: Install the stud ball socket assembly into the lower cup. Place the install bushing over the ball socket and hit it in with a hammer (Install Bushing, DA60-3050-R; Fig 32).



**Figure 32**

5.4: Verify that the ball socket is fully seated in the ball joint bore. You should be able to see the entire snap ring groove above the ball socket assembly. Once you verify the ball socket is fully seated in the cup bore, install the ball socket retaining snap ring into the part (Retaining Snap Ring, DA60-3050-G; Fig 33).



**Figure 33**

5.5: With a 7/8 wrench install the plug into the ball joint cup (Plug, DA60-3050-D; Fig 34). **IMPORTANT:** Screw the plug into the cup until you feel it bottom out on the stud, then back it off 1/8 of a turn and continue to the next locking position. The ball joints are designed to have a slight gap between the stud and the plug.



**Figure 34**

5.6: Once the plug has been properly clocked, install the thread locker (Thread Locker, DA60-3050-E; Fig 35). You may have to tap the thread locker in with a light hammer to get the top surface flush with the back of the ball joint.



Figure 35

5.7: Install the E-Clip to retain the thread locker with a pair of pliers (E-Clip, DA60-3050-I; Fig 36).



Figure 36

5.8: Prep the top of the cup and the seal with acetone (Fig 37). This is very important to make sure the glue properly adheres to the cup.



Figure 37

5.9: Apply a thin layer of glue to the seal and quickly place it on the cup (Seal, DA60-3050-H; Fig 38).



Figure 38

5.10: Place the seal on the ball joint cup and hold it in place for several minutes to allow the glue to set (Fig 39).



Figure 39

5.11: Wait 2 to 3 hours before you fill the ball joint with grease.

## VI. Upper Ball Joint Assembly

6.1: Place the new ball joint socket on the installation bushing. With a hammer drive the stud into the ball socket (Stud, DA60-3049-C; Fig 40).



**Figure 40**

6.2: Install the new snap ring on the back of the ball joint stud with a pair of snap-ring pliers (Snap Ring, DA60-3049-E; Fig 41).



**Figure 41**

6.3: Install the stud ball socket assembly into the lower cup. Place the install bushing over the ball socket and hit it in with a hammer (Install Bushing Tool, DA60-3049-Q; Fig 42).



**Figure 42**

6.4: Verify that the ball socket is fully seated in the ball joint bore. Once you verify the ball socket is

fully seated in the bore, install the ball socket retaining snap ring into the part (Snap Ring, DA60-3049-G; Fig 43).



**Figure 43**

6.5: With a 7/8 wrench, install the plug into the ball joint cup (Plug, DA60-3049-N, Fig 44). **IMPORTANT:** Screw the plug into the cup until you feel it bottom out on the stud, then back it off 1/8 of a turn and continue to the next locking position. The ball joints are designed to have a slight gap between the stud and the plug.



**Figure 44**

6.6: Once the plug has been properly clocked, install the thread locker (Thread Locker, DA60-3049-E). You may have to tap the thread locker in with a light hammer to get the top surface flush with the back of the ball joint.



Figure 45

6.7: Install the E-Clip to retain the thread locker with a pair of pliers (E-Clip, DA60-3049-I, Fig 46).



Figure 46

6.8: Prep the top of the cup and the seal with acetone. This is very important to make sure the glue properly adheres to the cup (Fig 47).



Figure 47

6.9: Apply a thin layer of glue to the seal and quickly place it on the cup (Seal, DA60-3049-J; Fig 48).



Figure 48

6.10: Place the seal on the ball joint cup and hold it in place for several minutes to allow the glue to set.



Figure 49

6.11: Wait 2 to 3 hours before you fill the ball joint with grease.

## VII. Reassembly of Axle

7.1 Now the knuckle is ready for installation. A 1-5/16 socket and a 1-1/8 socket are required to tighten the ball joint nuts. Be sure to clean the tapered shafts with brake cleaner or acetone; this will help prevent the shaft from spinning during assembly. Place the knuckle into the end forging and lightly screw on the ball joint nuts, preventing the knuckle from sliding out.

7.2 Place a screw driver or pry bar under the camber bushing on the upper ball joint (Figure, 10). Tighten the upper ball joint with the pry bar underneath the bushing. This will seat the lower ball joint into the end

forging taper and allow you to tighten the lower ball joint to 35 ft. lbs of torque. Once the lower ball joint has been tightened to the first torque specification, remove the pry bar from the upper ball joint. Tighten the upper ball joint with an open ended wrench. There is a flat milled on the upper ball joint stud, so a second wrench may hold the shaft preventing it from spinning (Figure, 11). After the castle nut is drawn into the bushing, the upper ball joint may be torqued to the specified value of 71 ft. lbs.

**Torque Procedure**

- Torque lower ball joint to 35ft. lbs
- Torque upper ball joint to 71 ft. lbs, then turn the nut until the next slot lines up with the cotter pin.
- Insert the cotter pin into the hole and bend the tab over.
- Re-torque lower ball joint to 140/160 ft. lbs

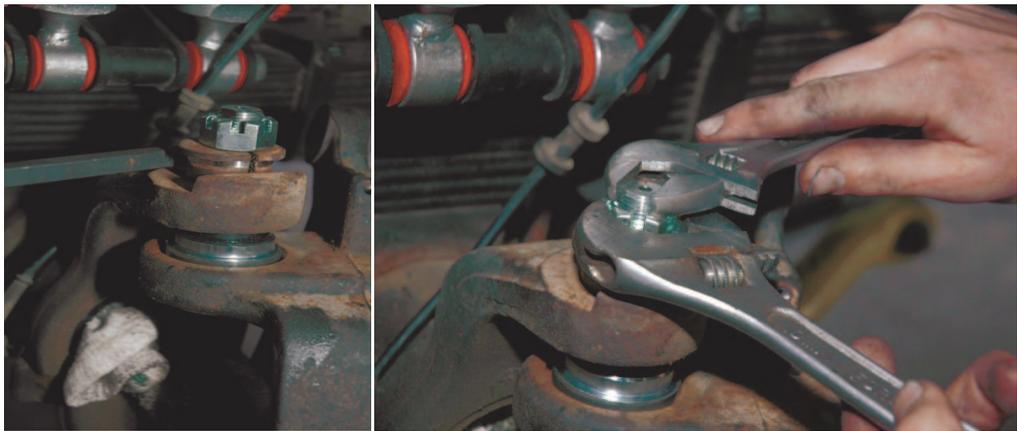


Figure 50, Pry Bar to Leverage Camber Bushing    Figure 51, Tightening the Upper Ball Joint

**Reassembly of Wheel end**

7.3 At this point the knuckle should be properly bolted to the end forging. Refer to the service manual and reassemble the wheel end. After everything has been installed check the wheel alignment. Make sure the axle is filled with gear oil if the differential was drained prior to disassembly.

**⚠ WARNING: Failure to properly refill the axle with Gear Oil can cause serious gear and bearing failure which could result in serious injury or death.**

**⚠ WARNING: Failure to check bolt and lug nut torque can cause serious accident, component failure, serious injury or death.**

**Bill of Materials**

DA60-1X3050-D, Ball Joint Rebuild Kit		
DA60-1X3050-B, Lower Ball Joint Parts		Qty
DA60-3050-L	Ball Socket	2
DA60-3050-E	Thread Locker	2
DA60-3050-J	Seal	2

DA60-3050-G	1.625 heim Snap Ring	2
DA60-3050-H	7/8 Stud Snap Ring	2
DA60-3050-I	Key Way E-Clip	2
DA60-3050-F	7/8-14 LOCK NUT	2
<b>DA60-1X3049-B, Upper Ball Joint Parts</b>		<b>Qty</b>
DA60-3049-J	Seal	2
DA60-3049-L	3/4 Spherical Heim	2
DA60-3049-H	3/4 Stud Snap Ring	2
DA60-3049-F	3/4-16 Castle Nut	2
DA60-3049-G	1.375 heim Snap Ring	2
DA60-3049-E	Thread Locker	2
DA60-3049-I	Key Way E-Clip	2
<b>Tools</b>		<b>Qty</b>
DA60-3049-P	1.375" Ball Socket Press Tool	2
DA60-3050-Q	1.625" Ball Socket press tool	2
Loctite 380	Super Glue	2

**Lower Ball Joint Components**

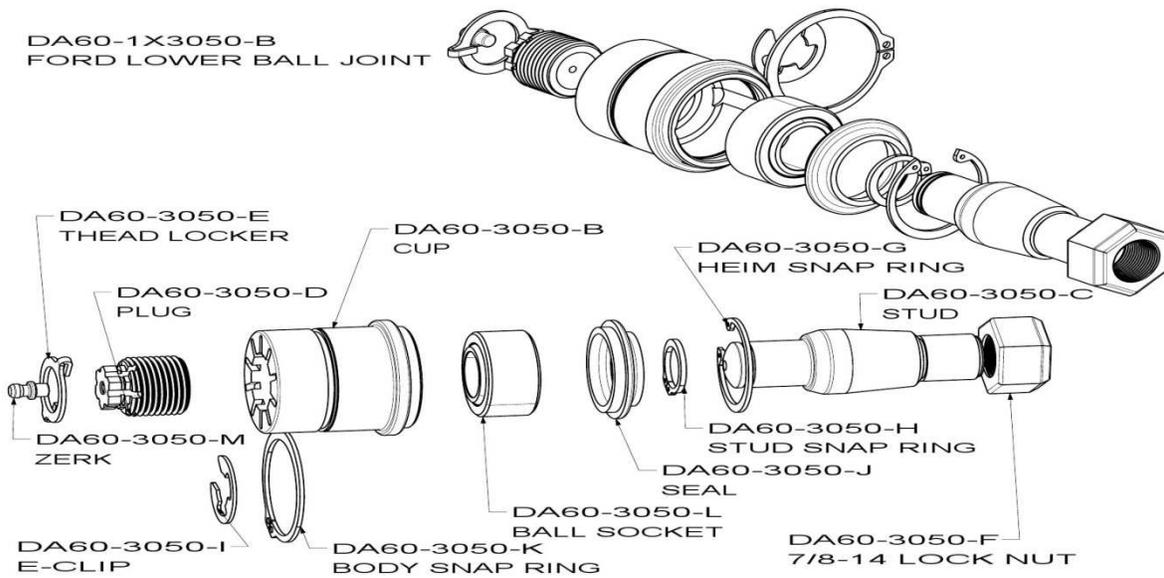


Figure 52

**Upper Ball Joint Components**

DA60-1X3049-B  
FORD UPPER BALL JOINT

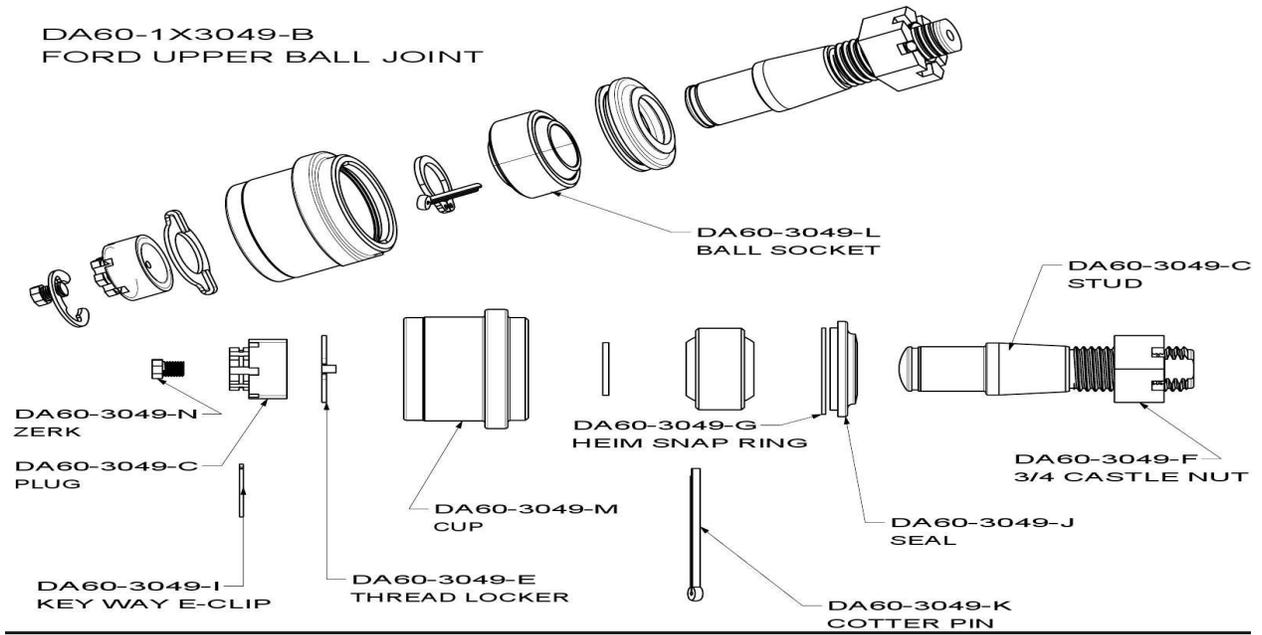


Figure 53

Installation Tools



Figure 54