

2002 DRIVE AXLES

Differentials & Axle Shafts - Front - "K" Series

DESCRIPTION & OPERATION

NOTE: Models contained in this article include Avalanche, Escalade, Sierra, Silverado, Suburban, Tahoe, Yukon and Yukon XL.

NOTE: This article contains information on 3 slightly different front axle assemblies, two for K1 and K2 vehicles (selective and full-time) and one for K3 (selective) vehicles. Selective 4WD systems may be referred to S4WD. Full-time 4WD systems may be referred to as F4WD.

Differential contains a conventional ring and pinion gear set. Right side of axle assembly consists of a solid axle shaft that rides inside of a stationary axle tube. A short stub shaft with CV joint attached is bolted to right inner axle shaft flange. Left drive axle shaft consists of a flexible drive shaft using an inner tripod joint and outer CV joint. Left axle tripod joint housing is bolted to axle carrier output shaft drive flange. CV joint splined/threaded shaft on outer end of drive axle shaft slips through steering knuckle/hub assembly. See **Fig. 2**.

A thermal actuator solenoid on the right axle tube (selective shift) allows the front axle to be shifted into or out of 4WD while the vehicle is moving (under most conditions). See **Fig. 4** or **Fig. 6**. The solenoid contains a coil, fluid, and plunger. When current from the 4WD in/out select switch passes through the coil, heat causes the fluid to change to gas, extending the plunger. This engages or disengages the front axle.

AXLE RATIO & IDENTIFICATION

Front axle identification is located on tag attached near axle tube.

NOTE: Selective 4WD system is referred to S4WD. Full-time 4WD system is referred to as F4WD.

AXLE IDENTIFICATION

Application ⁽¹⁾	Axle Model
K1 (1/2 Ton) & K2 (3/4 Ton)	8.25" Ring Gear F4WD & 8.25" Ring Gear S4WD
K3 (1 Ton)	9.25" Ring Gear

(1) Chassis type and load range are indicated by fifth and sixth digits in VIN code.

LUBRICATION

FLUID TYPE & CAPACITY

Ensure vehicle is level. On models with S4WD, fill differential with (1052271) or 80W-90 GL5 gear lubricant to edge of filler hole. On models with F4WD, fill differential with (12378261) gear lubricant to edge of filler hole.

LUBRICATION CAPACITIES

Application	Qts. (L)
K2	1.75 (1.66)
K3	1.83 (1.73)

LUBRICANT CHANGE

NOTE: Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that application. Fasteners requiring replacement or fasteners requiring the use of thread locking compound or sealant are identified in the service procedure. DO NOT use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener. Use the correct tightening sequence and specifications when installing fasteners in order to avoid damage to parts and systems.

Raise and support the vehicle. Clean any dirt from around the differential drain plug. Position a drain pan under drain plug. Remove the drain plug and gasket from the differential, and drain the oil. Install the drain plug and gasket to the differential. Tighten the differential drain plug to specification. Clean any dirt from around the differential fill plug. Remove the fill plug from the differential. Fill the differential with synthetic gear oil. See **FLUID TYPE & CAPACITY**. Install the fill plug. Tighten the fill plug and tighten to specification. See **TORQUE SPECIFICATIONS**. Install front differential shield. Lower vehicle.

TROUBLE SHOOTING

NOTE: See **BASIC TROUBLE SHOOTING** article in **GENERAL INFORMATION**.

VISUAL/PHYSICAL INSPECTION

Inspect for aftermarket devices, which could affect the operation of the vehicle. Inspect the easily accessible or visible system components for obvious damage or conditions, which

could cause the symptom. Check for the correct lubricant level and the proper viscosity. Verify the exact operating conditions under which the concern exists. Note factors such as vehicle speed, road conditions, ambient temperature, and other specifics. Compare the driving characteristics or sounds (if applicable) to a known good vehicle and make sure you are not trying to correct a normal condition. Factors that may contribute to an inoperative rear differential include the following

- Low gear oil levels
- Differential inoperative due to Anti-lock Brake System (ABS) function
- Inoperative Powertrain Control Module (PCM) and/or wiring system
- A mini spare or different size tire installed
- A fluid over-temperature condition
- A defective rear differential assembly
- An inoperative transfer case assembly

VIBRATION DIAGNOSTIC PROCESS

Using the following steps of the vibration diagnostic process will help you to effectively narrow-down and pin-point the search for the specific source of a vibration concern and to arrive at an accurate repair. Gather specific information on the customer's vibration concern. Perform road testing in order to duplicate the customer's concern and evaluate the symptoms of the concern under changing conditions. Observe what the vibration feels like and what it sounds like. Observe when the symptoms first appear, when they change, and when they cease. Determine if the customer's vibration concern is truly an abnormal condition or something that is potentially an operating characteristic of the vehicle. Systematically eliminate or rule-out possible vehicle systems. Focus diagnostic efforts on the remaining vehicle system and systematically eliminate or rule-out possible components of that system. Make a repair on the remaining component, or components, which have not been eliminated systematically, and must therefore be the cause of the vibration. Verify that the customer's concern has been eliminated or at least brought to an acceptable level. Again perform the road test in order to verify that the vehicle did not have more than one vibration occurring.

Inspect for aftermarket equipment and modifications which could affect the operation of the vehicle rotating component systems. Inspect the easily accessible or visible components of the vehicle rotating component systems for obvious damage or conditions which could cause the symptom. Inspect the tire inflation pressures for the proper pressure.

CLICK NOISE IN TURNS

A Constant Velocity (CV) joint which is worn or damaged may cause a click noise during turns. This may be more apparent while simultaneously turning and accelerating. This click is caused by wear and/or damage to the CV joint bearings and/or races. Commonly, this damage or wear is caused by the loss of lubricating grease from the CV joint and the entry of

foreign material or contaminates. Carefully inspect the wheel drive shaft seals (boots) for cuts, tears or other damage which may allow the lubricating grease to escape. The loss of this grease will cause damage to the wheel drive shaft CV joint in a very short period of time. If the seals (boots) DO NOT exhibit evidence of lubricant loss or damage, remove the wheel drive shaft from the vehicle and rotate the CV joint by rotating in a circular motion. The action of the CV joint should be smooth and even. If any binding and/or roughness is felt while performing this inspection, the CV joint requires replacement.

CLUNK WHEN ACCELERATING FROM COAST

A clunk noise occurring when accelerating from coast or a standing start may be caused by a worn or damaged wheel drive shaft tripot joint. The common cause of wheel drive shaft tripot damage is the loss of lubricating grease and/or the presence of foreign material and contaminates in the joint. This usually occurs as a result of a torn or damaged tripot joint CV boot. Carefully inspect the wheel drive shaft tripot CV boot for cuts, tears or other signs of damage that may allow the loss of the lubricating grease and/or the entry of contaminates. If the boots appear intact, remove the wheel drive shaft from the vehicle and inspect the tripot joint. Rotate the tripot joint in a circular motion. DO NOT allow the tripot spider to become disengaged from the race housing, or damage to the tripot joint will occur. The movement of the tripot joint should be smooth and even. If any binding or impeded motion is felt, the tripot joint requires replacement.

CLUNK NOISE WHEN ACCELERATING DURING TURNS

A clunk noise that occurs while accelerating during turning may be caused by wear and/or damage to the inboard and the outboard joints in combination. Carefully inspect the CV boots for cuts, tears or other damage. Joint seals that are damaged may allow lubricant leakage and the entry of foreign materials and contaminates. The loss of lubricant and/or the presence of contaminates can cause damage to the internal components of the joints. If the CV boots are not damaged, remove the wheel drive shaft from the vehicle and rotate the joints in a circular motion. DO NOT allow the tripot spider to become disengaged from the housing (race). The movement of the joints should be smooth and even. If the joints exhibit any binding or inhibited movement, the joint requires replacement.

NOISY IN DRIVE

If front axle is noisy with vehicle in drive, diagnose using following table and make appropriate repairs.

VEHICLE IS NOISY IN DRIVE

Checks	Actions
Excessive Pinion-To-Ring Gear Backlash	Adjust Pinion-To-Ring Gear Backlash
Adjust Pinion-To-Ring Gear Backlash	Replace Pinion & Ring Gear
Worn Pinion Bearings	Replace Pinion Bearings

Loose Pinion Bearings	Adjust Pinion Bearings Preload
Excessive Pinion End Play	Adjust Pinion End Play
Worn Differential Bearings	Replace Differential Bearings
Loose Differential Bearings	Adjust Differential Bearing Preload
Excessive Ring Gear Runout	Replace Ring Gear
Low Oil Level	Fill Fluid Level To Specifications With Proper Lubricant
Wrong Or Poor Grade Oil	Drain & Refill System With Proper Lubricant
Bent Axle Housing	Replace Axle Housing

NOISY WHEN COASTING

If front axle is noisy while coasting, diagnose using following table and make appropriate repairs.

VEHICLE IS NOISY WHILE COASTING

Checks	Actions
Worn Pinion & Ring Gear	Adjust Or Replace Pinion & Ring Gear
Pinion & Ring Gear Too Tight	Adjust Pinion & Ring Gear Backlash

INTERMITTENT NOISE

If front axle has an intermittent noise, diagnose using following table and make appropriate repairs.

INTERMITTENT NOISE

Checks	Actions
Warped Ring Gear	Replace Ring Gear
Loose Differential Case Assembly	Set Differential Case Assembly To Proper Preload & Backlash

CONSTANT NOISE

If front axle has a constant noise, diagnose using following table and make appropriate repairs. See **CONSTANT NOISE** table.

CONSTANT NOISE

Checks	Actions
Flat Spot On Pinion Or Ring Gear Teeth	Replace Pinion and Ring Gear
Flat Spot On Pinion Bearing	Replace Bearing
Worn Pinion Splines	Replace Pinion

NOISY IN TURNS

If front axle is noisy while turning, diagnose using following table and make appropriate repairs. See **NOISY DURING TURNS** table.

NOISY DURING TURNS

Checks	Actions
Worn Differential Side Gears & Pinions	Replace Differential Side Gears & Pinions
Worn Differential Spider	Replace Spine Gears
Worn Axle Shaft Splines	Replace Axle Shaft

REMOVAL & INSTALLATION

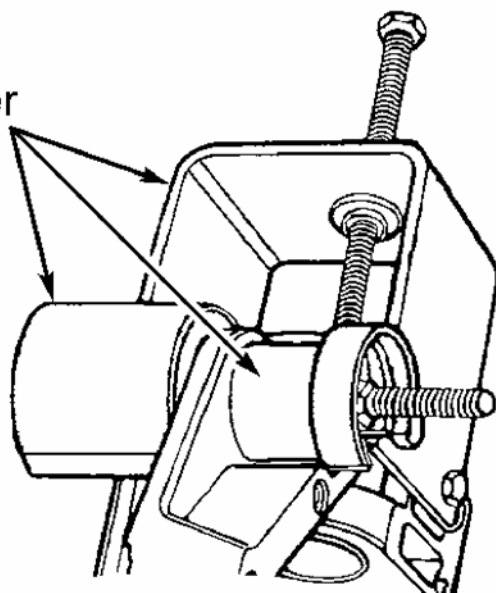
CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See **COMPUTER RELEARN PROCEDURES** article in **GENERAL INFORMATION** before disconnecting battery.

CARRIER CASE MOUNTING BUSHINGS

Removal & Installation

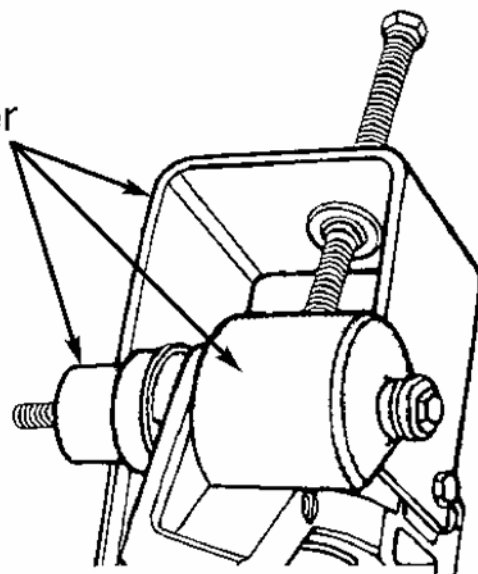
Remove front axle assembly. See **FRONT AXLE ASSEMBLY** . Using Carrier Bushing Remover/Installer (J-36616), press bushing out of carrier housing. See **Fig. 1** . To install, reverse tool and press NEW bushing into housing. Repeat procedure for other mounting bushing.

Carrier Bushing
Remover/Installer



REMOVAL

Carrier Bushing
Remover/Installer



INSTALLATION

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Fig. 1: Removing & Installing Carrier Case Bushing
Courtesy of GENERAL MOTORS CORP.

CARRIER SHIELD

Removal & Installation

Raise and support vehicle. Remove the front differential carrier shield bolts. Remove the front differential carrier shield. To install, reverse removal procedure. Tighten carrier shield bolts to specification. See **TORQUE SPECIFICATIONS** .

ELECTRIC MOTOR ACTUATOR

Removal & Installation

Raise the vehicle. Remove the front differential carrier shield. See **CARRIER SHIELD** . Disconnect the electrical connector from the actuator. Remove the electric motor actuator by turning the actuator counterclockwise. To install, reverse removal procedure. Apply Sealant (12346004) to the threads of the electric motor actuator before installation. Tighten actuator to specification. See **TORQUE SPECIFICATIONS** .

FRONT AXLE ASSEMBLY

Removal & Installation

1. Disconnect negative battery cable. Raise and support vehicle. Remove skid plate (if equipped). Remove wheels. Drain drive axle. Disconnect electrical connector from drive axle. Remove 6 bolts securing right stub shaft to output shaft flange, and 6 bolts securing left drive axle to output shaft flange. Wire left drive axle and right stub shaft aside.
2. Disconnect drive shaft at pinion yoke. Wrap tape around "U" joint caps to secure in position. Wire drive shaft aside. Disconnect vent hose at axle. Remove bolts securing right axle tube to frame rail.
3. Remove lower mounting bolt from axle assembly. Disconnect right side inner tie rod from steering linkage. Remove engine oil filter (if necessary). Support axle assembly using appropriate transmission jack. Remove upper axle assembly mounting bolt. Lower transmission jack, and remove axle assembly from vehicle.
4. To install axle assembly, reverse removal procedure. Tighten all nuts and bolts to specification. See **TORQUE SPECIFICATIONS** .

LEFT AXLE SHAFT

Removal

1. Raise and support vehicle. Remove skid plate (if equipped). Remove wheel. Remove stabilizer bar from lower control arm. If both ends of stabilizer bar are being removed, DO NOT mix left and right stabilizer bar components.

**CAUTION: DO NOT use wedge type remover tool on tie rod end.
Damage to tie rod end will result.**

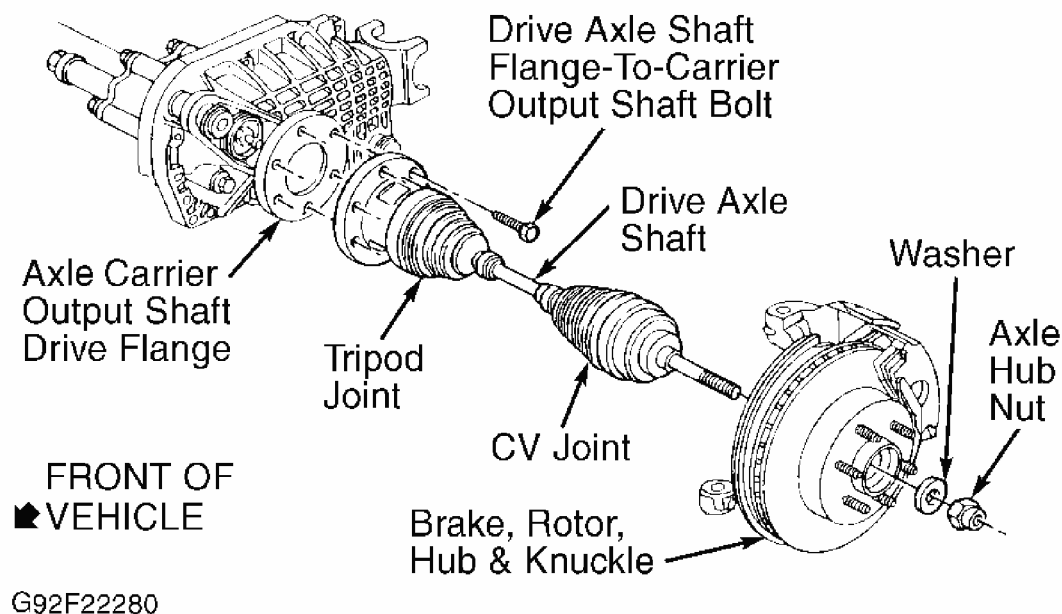


Fig. 2: Left Drive Axle Shaft With Tripot & CV Joints
Courtesy of GENERAL MOTORS CORP.

2. Disconnect left outer tie rod end from steering knuckle using Steering Linkage Puller (J-24319-01). Wire tie rod aside. Insert a long drift through caliper and into disc rotor vanes to prevent rotation. Remove axle hub nut and washer from axle shaft CV joint. See **Fig. 2** . Loosen 6 axle shaft flange bolts securing tripod joint housing to axle carrier output shaft drive flange.
3. Remove brakeline bracket from upper control arm. Remove shock absorber from lower control arm mounting bracket. Install floor stand or jack under lower control arm near ball joint to maintain spring tension and lower control arm position.
4. Remove nut securing upper ball joint to steering knuckle. Separate upper ball joint stud from knuckle. Using shop towel, cover lower shock mount ears on lower control arm to prevent CV joint boot damage when removing axle shaft. Install Puller (J-28733) to left rotor to push CV joint splined shaft through hub splines.
5. Remove 6 axle shaft flange bolts retaining tripod joint housing to axle carrier output shaft drive flange. DO NOT allow axle shaft to hang free. Pull slightly outward on top of steering knuckle to enable drive axle shaft removal. DO NOT stretch brake hose. Remove axle shaft.

Installation

1. Before installing axle shaft, inspect inner wheel bearing seal at rear of knuckle. Replace, if required, using Seal Installer (J-36605). Lube seal lip.
2. To install axle shaft, reverse removal procedure. Tighten all bolts and nuts to

specification. See **TORQUE SPECIFICATIONS** .

LEFT AXLE SHAFT OIL SEAL

Removal

1. Raise vehicle and support with stands. Drain front axle. Remove axle shaft. See **LEFT AXLE SHAFT** . Remove output shaft.

NOTE: **It may be necessary to install an extension on slide hammer to ease removal of bearing.**

2. Attach a slide hammer with adapter to output shaft, and pull from carrier case. Ensure case is not damaged during removal. Remove deflector. Remove seal by prying out with a screwdriver. Remove bearing using a slide hammer.

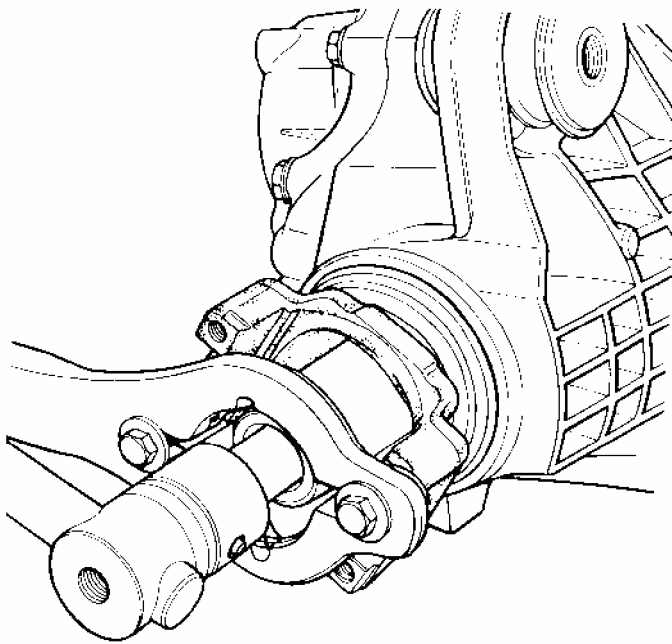
Installation

1. Install NEW bearing with square side facing in. Lubricate seal lips with grease. Install NEW oil seal with Seal Installer (J-36600 for K2 models, J-22833 for K3 models). Install deflector.
2. Install output shaft. Carefully tap output shaft into place with a soft mallet. Install axle shaft. Fill front axle.

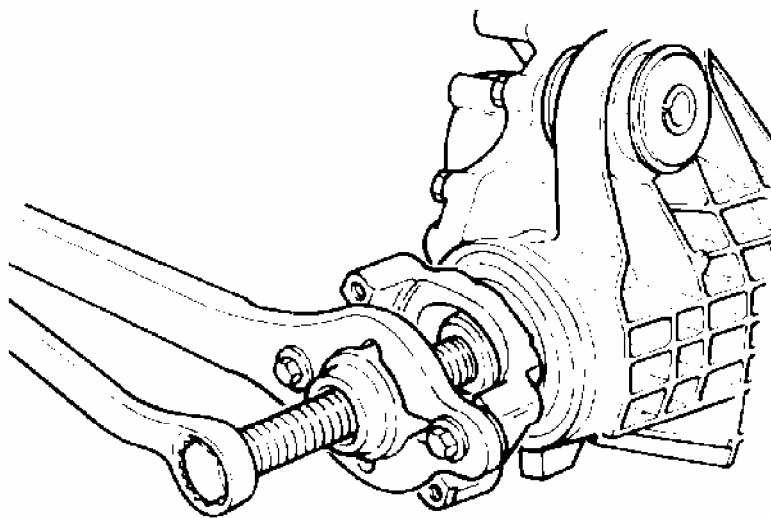
PINION FLANGE & OIL SEAL

Removal

1. Raise vehicle on hoist. Remove pinion flange retaining bolts. Mark position of drive shaft yoke ear to pinion flange to ensure correct installation. Remove drive shaft from pinion flange, and support shaft aside.
2. Scribe mark pinion, pinion nut and pinion flange to ensure proper alignment and bearing preload during installation. Count and record number of exposed threads on pinion. Using Pinion Flange Remover Set (J-8614-01), hold pinion flange stationary. Using large socket and wrench, remove pinion flange nut and washer.
3. Place drain pan under pinion area of differential carrier. Insert pinion flange remover through pinion flange holder and rotate 90 degrees. Tighten bolt to remove pinion flange. See **Fig. 3** . Pry pinion seal from housing. **DO NOT** damage differential carrier or seal running surface on pinion when removing pinion oil seal.
4. Clean pinion flange in solvent and inspect seal surface of pinion flange for nicks, burrs or damage (such as a groove worn into pinion flange by oil seal). Repair or replace as necessary.



PINION NUT REMOVAL



PINION FLANGE REMOVAL

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Fig. 3: Removing Pinion Nut & Flange
Courtesy of GENERAL MOTORS CORP.

Installation

1. Lubricate pinion flange seal running surface. Lubricate lip of oil seal. Install oil seal using Seal Installer (J-36366). Ensure seal is driven in straight, or aluminum housing

will be severely damaged.

CAUTION: DO NOT use "hard-face" hammer to drive/install flange onto pinion shaft, or ring gear, pinion and flange will be damaged.

2. Install NEW dust deflector onto pinion flange and stake in 3 places. Install pinion flange onto pinion shaft aligning marks made before removal. If required, use soft-face mallet to tap flange onto pinion.
3. Install pinion nut and tighten to no more than position marked on pinion shaft and flange. Note number of exposed threads. Tighten pinion nut no more than 1/16" beyond alignment marks. If this marked position is exceeded by more than 1/16", remove pinion and install NEW collapsible sleeve. Install drive shaft. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** . Check gear oil level.

RIGHT AXLE TUBE & INNER AXLE SHAFT

Removal

1. Disconnect negative battery cable. Raise and support vehicle. Remove skid plate (if equipped). Remove wheel. Remove stabilizer bar from both lower control arms. DO NOT mix left and right stabilizer bar components.
2. Disconnect right outer tie rod end from steering knuckle using Steering Linkage Puller (J-24319-01). Wire right outer tie rod linkage aside.
3. Remove stub axle shaft flange bolts from inner axle shaft flange. Turn right wheel outward to loosen stub axle shaft from inner axle shaft flange. Push stub axle shaft toward front of vehicle, and wire aside.
4. Disconnect harness connectors for indicator light switch and actuator solenoid at right axle tube. Place drain pan under drive axle. Remove drain plug and drain lubricant. Remove bolts retaining axle tube to right frame.
5. Remove bolts attaching axle tube to axle carrier. Remove axle tube by pulling away from axle carrier to clear shift shaft. While pulling axle tube away, note shifter fork spring location to keep from losing it. Ensure that open end of tube is pointed upward.

Installation

1. If internal carrier components have been changed, see reassembly steps 4 -9 of RIGHT AXLE TUBE ASSEMBLY under OVERHAUL. If internal carrier components have NOT been changed, clean mating surfaces thoroughly to remove any oil residue. Ensure shift shaft spring is in position.
2. Apply Sealant (1052942 or Loctite 518) to carrier sealing surfaces. Install axle tube onto carrier housing. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** . Connect stub shaft onto inner shaft flange and install 6 bolts.

Using a crisscross pattern, tighten bolts evenly to specification.

3. Raise axle tube and install bolts to secure frame onto tube. Tighten nuts to specification. Connect tie rod end onto steering knuckle. Tighten tie rod nut to specification.
4. Install stabilizer bar, link, nuts and bolts. Tighten bolts securing stabilizer bracket to frame. Tighten nut securing stabilizer bar onto lower control arm.
5. Reconnect harness connectors for indicator light switch and actuator solenoid at right axle tube. Install differential carrier drain plug. Fill drive axle with SAE 80W-90 GL5 gear lubricant. To complete installation, reverse removal procedure. Recheck gear oil when vehicle is level.

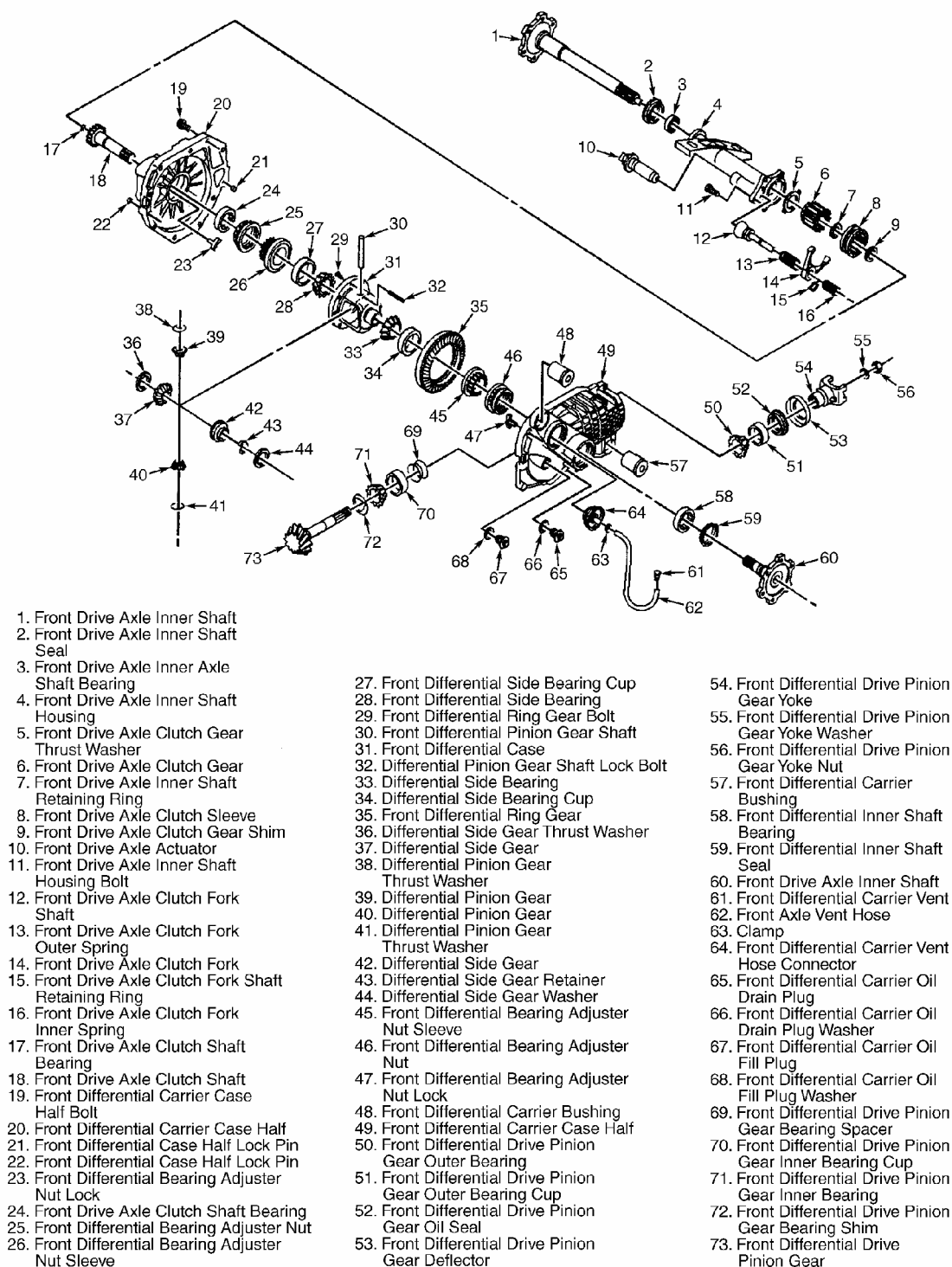
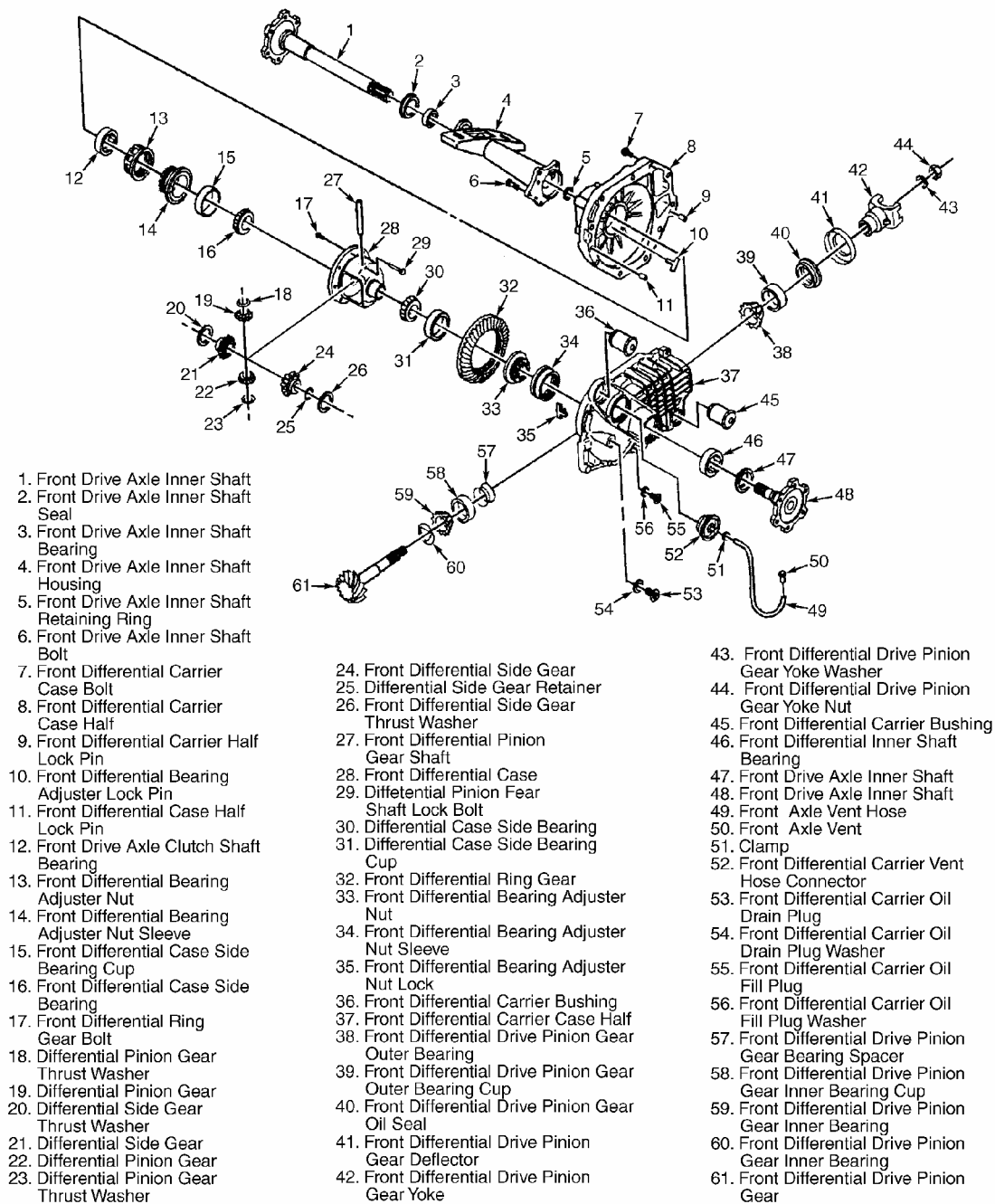
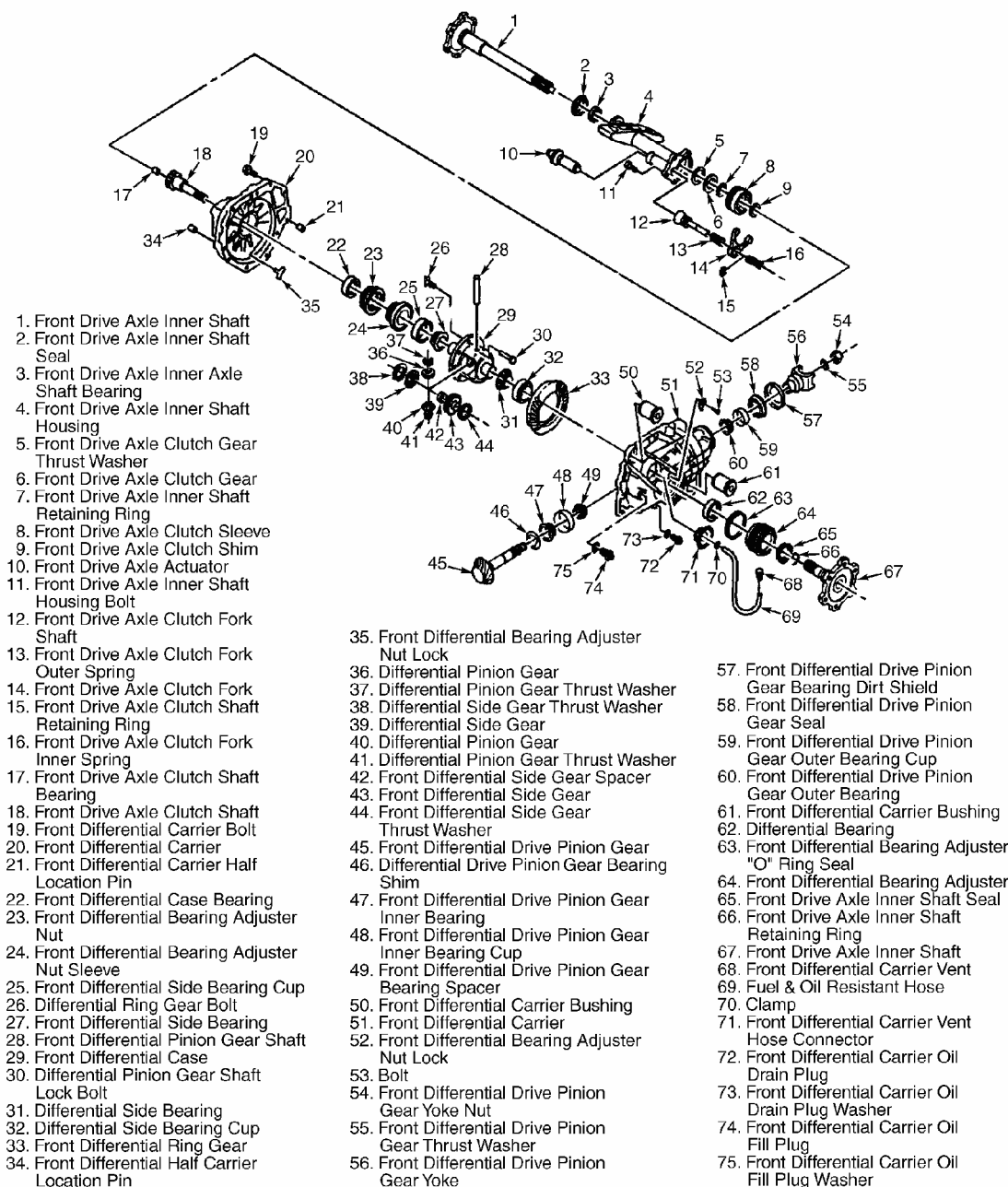


Fig. 4: Exploded View Of Front Axle Assembly (K1 & K2 Series-S4WD)
 Courtesy of GENERAL MOTORS CORP.



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Fig. 5: Exploded View Of Front Axle Assembly (K2 Series-F4WD)
Courtesy of GENERAL MOTORS CORP.



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Fig. 6: Exploded View Of Front Axle Assembly (K3 Series)
Courtesy of GENERAL MOTORS CORP.

RIGHT SIDE OUTPUT SHAFT PILOT BEARING

Removal & Installation

Remove right axle tube and inner axle shaft assembly. See **RIGHT AXLE TUBE & INNER AXLE SHAFT** . Remove shim. See **Fig. 4** , **Fig. 5** and **Fig. 6** . Remove pilot bearing using Pilot Bearing Remover (J-34011). Lubricate NEW pilot bearing with wheel bearing grease. Install pilot bearing using Pilot Bearing Installer (J-33842). Install shim. To complete

installation, reverse removal procedure.

OVERHAUL

RIGHT AXLE TUBE ASSEMBLY

Disassembly

1. Place mounting flange of axle tube assembly in a vise. Remove actuator solenoid and engagement switch from tube.

NOTE: For K2 Series 8.25 F4WD axle go to step 3 .

2. Remove shift shaft, springs, shift fork and differential sleeve. See **Fig. 4** or **Fig. 6** . Remove snap ring, connector gear (washer on K3), and thrust washer from axle shaft.
3. Using a soft mallet, tap on flange end of axle shaft to remove axle shaft from tube. DO NOT hammer on pilot bearing stem end of axle shaft, severe damage will result. Using a screwdriver, pry out deflector and oil seal.
4. To remove axle bearing from tube, use Bearing Remover (J-29369-1 for K2; J-29369-2 for K3). Using appropriate puller and slide hammer, remove axle bearing.

Cleaning & Inspection

Wash all parts in solvent and dry with compressed air. Inspect all parts for excessive wear and scoring. Inspect connector gear and axle shaft splines for wear, cracks, and twisted splines.

Reassembly

1. Clean gasket surfaces on axle tube and carrier housing. Lubricate NEW bearing using wheel bearing grease. Using Bearing Installer (J-36609), install axle bearing into tube. Lightly coat lip of NEW seal with grease. Install seal using Seal Installer (J-36600 for K2; J-22833 for K3).
2. Install deflector onto axle shaft (if removed) and insert axle shaft into axle tube. Install thrust washer, ensuring tube slots align with tabs on washer. See **Fig. 7** . Use wheel bearing grease to hold thrust washer in place.

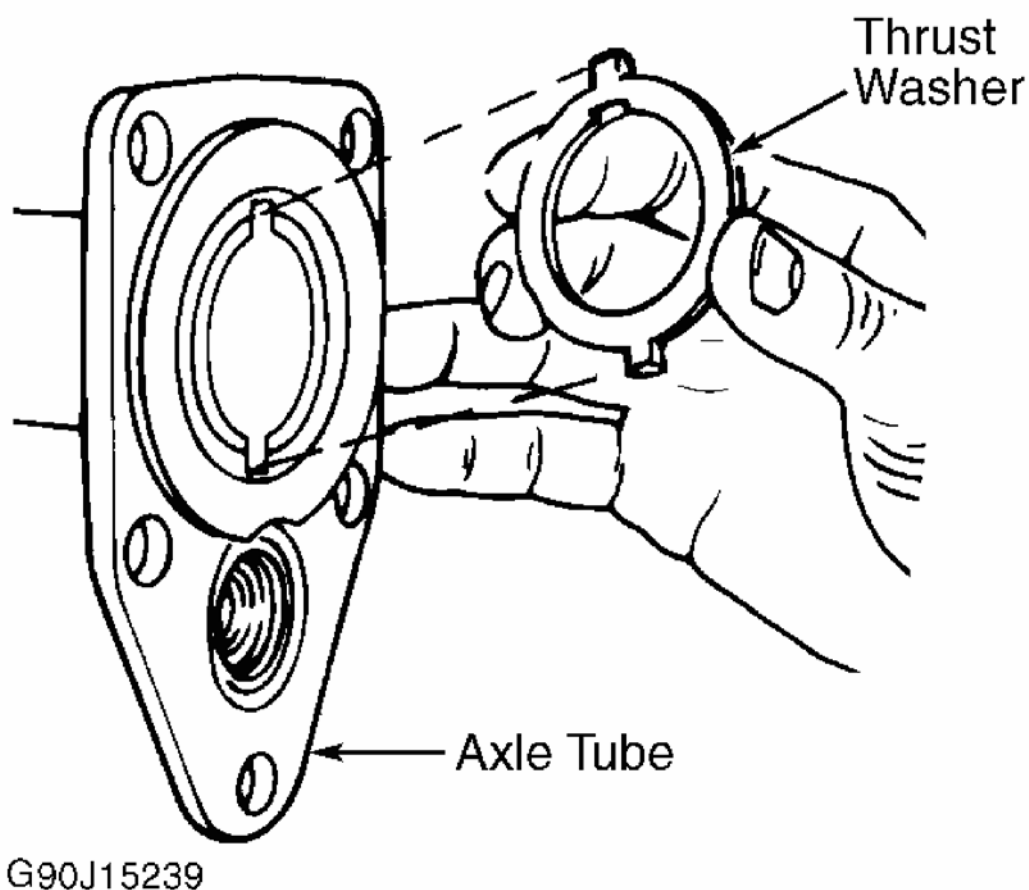


Fig. 7: Installing Axle Tube Thrust Washer
Courtesy of GENERAL MOTORS CORP.

3. On K2, install drive connector gear onto end of axle, using a plastic mallet. Install snap ring. On K3, install washer and snap ring. Ensure snap ring seats properly in groove. On all models, output shaft shim of proper thickness must be selected if any of following parts have been changed:
 - Differential case.
 - Inner shaft.
 - Connector gear (K2).
 - Axle tube.
 - Output shaft.
 - Carrier case.
 - Ring and Pinion.
 - Bearings.

See **Fig. 4** , **Fig. 5** or **Fig. 6** .

If no parts have been changed, go to step 6 .

4. If any of listed parts have been changed, use grease to hold original shim in place. Assemble axle tube and inner shaft assembly to carrier (use no sealer at this time). Tighten bolts to specification. See **TORQUE SPECIFICATIONS** .
5. Install dial indicator onto axle tube with dial indicator shaft at right angle to axle output shaft flange. Check axle shaft end play by pushing and pulling in and out on axle shaft. Maximum end play is .001-.020" (.03-.51 mm). If end play is incorrect, select shim as necessary to bring end play within specification. Remove axle tube from carrier.
6. Ensure axle tube and carrier case sealing surfaces are clean. Install correct shim onto output shaft using wheel bearing grease. Slip damper spring onto shift shaft. Slide shift fork onto shift shaft, ensuring damper spring fits into indentation in shift fork.
7. Install clip, ensuring clip seats properly into shift shaft groove. Install fork tension spring onto shift shaft. Insert shift fork into groove in differential sleeve. Install shift fork assembly into tube assembly at same time installing sleeve onto connector gear (axle shaft splines on K3).
8. Apply a bead of Sealant (1052942 or Loctite 518) to axle tube sealing surface. Assemble axle tube into carrier case. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** .
9. Inspect shift mechanism operation by inserting a drift into shift actuator hole on axle tube. Rotate axle shaft flange while moving shift mechanism back and forth with drift. Shift mechanism should work smoothly without binding.
10. Apply appropriate sealant (1052942 or Loctite 518) to threads of actuator solenoid and install solenoid onto axle tube. Repeat procedure with switch assembly.

FRONT AXLE ASSEMBLY

Disassembly

1. Remove axle carrier. See **FRONT AXLE ASSEMBLY** under REMOVAL & INSTALLATION. Remove actuator solenoid and indicator switch from right axle tube. Remove right axle tube and inner axle shaft assembly. See **RIGHT AXLE TUBE & INNER AXLE SHAFT** under REMOVAL & INSTALLATION.

NOTE: For K2 Series 8.25 F4WD axle, go to step 3 .

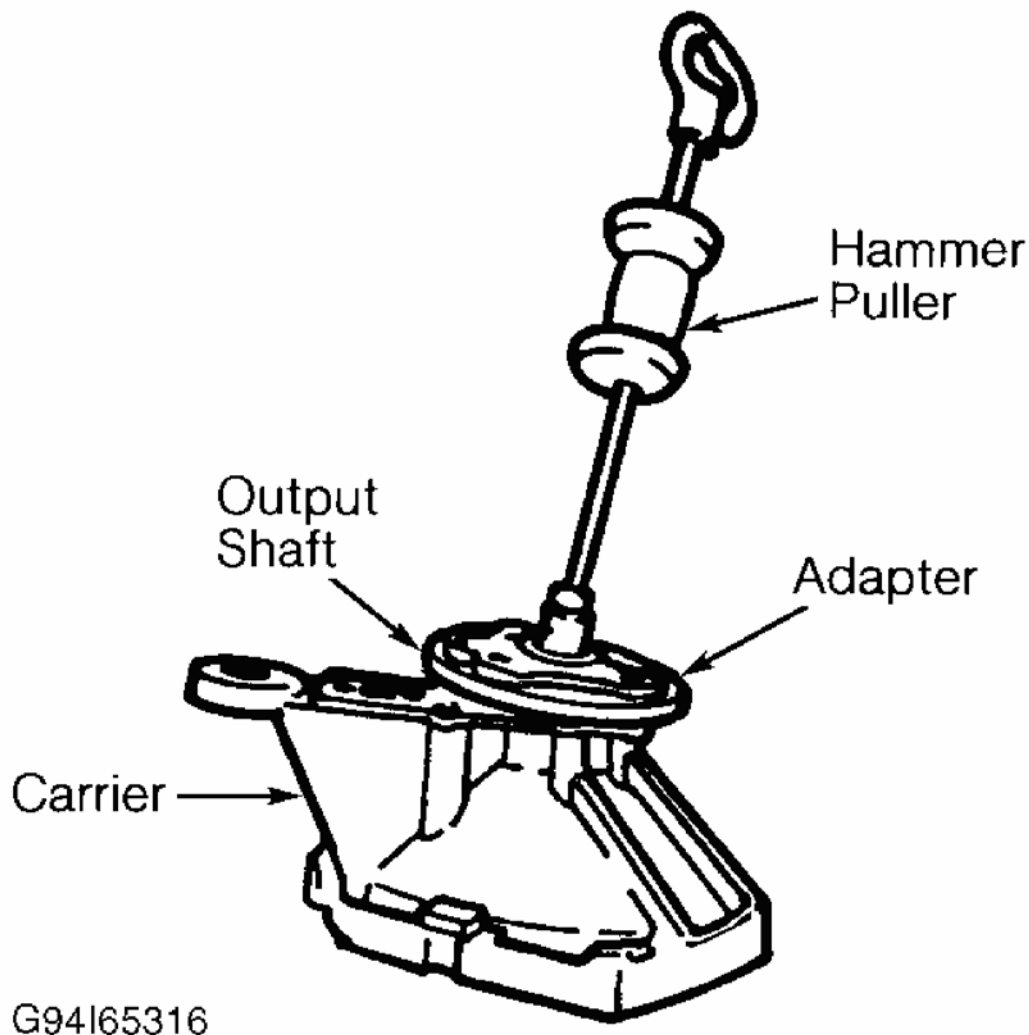


Fig. 8: Removing Left Output Shaft From Carrier
Courtesy of GENERAL MOTORS CORP.

2. Remove shift shaft assembly consisting of sleeve, damper spring, shift fork, clip and inner spring. Remove shim and output shaft from right side of carrier assembly. See **Fig. 4** or **Fig. 6** .
3. Remove left output shaft with deflector from carrier assembly using Slide Hammer (J-2619-1). See **Fig. 8** . Pry out left output flange seal with a screwdriver. Remove left and right output shaft bearings using Bearing Remover (J-29369-1 for K2; J-29369-2 for K3). Remove bolts holding carrier halves together. Tap on lugs provided to separate carrier halves.
4. Pry up on left and right side bearing locks (right side only on K3) and remove differential assembly from carrier. See **Fig. 4** , **Fig. 5** or **Fig. 6** . On K3, remove

adjuster plug lock and bolt on outer left half of carrier. See **Fig. 9** .

5. On all models, use Sleeve Adjuster (J-36599) to rotate sleeve, and push side bearings out of bores (right side only on K3). On K3 left side bearing, remove adjuster plug, bearing and "O" ring from left side of carrier by rotating adjuster plug using Adjuster Plug Remover (J-36615). See **Fig. 10** .

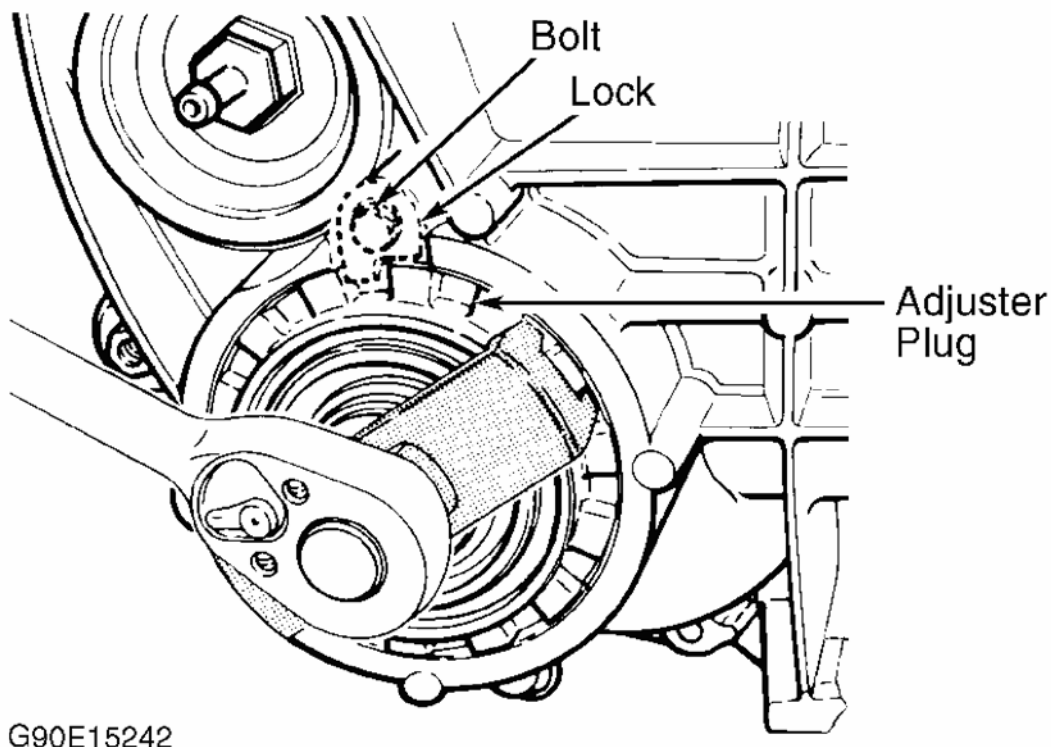


Fig. 9: Removing Bearing Using Adjuster Plug Remover (K3)
Courtesy of GENERAL MOTORS CORP.

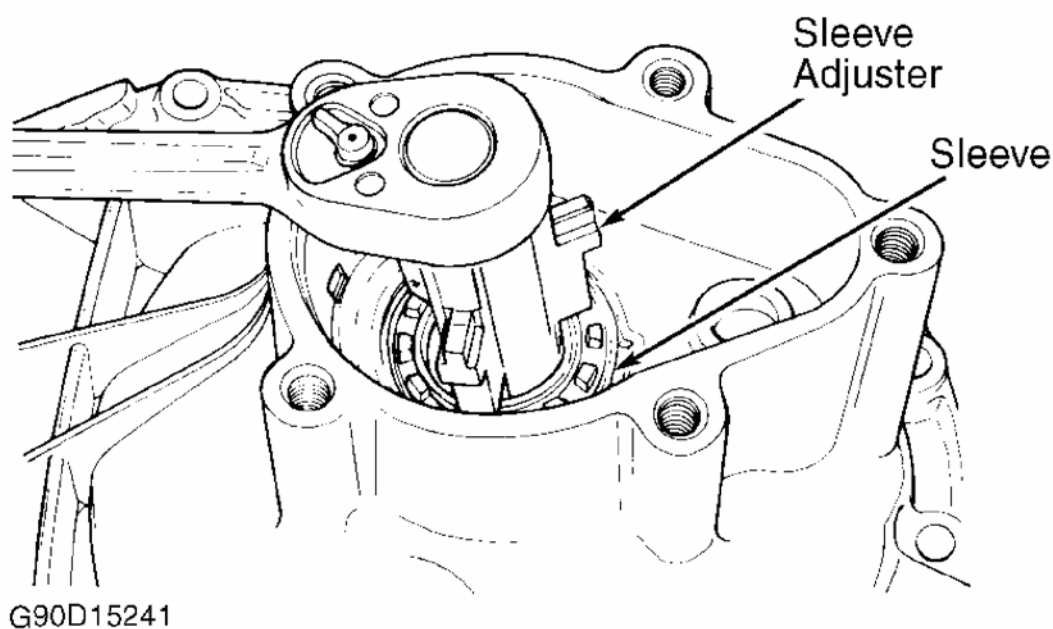


Fig. 10: Removing Bearing Using Sleeve Adjuster
Courtesy of GENERAL MOTORS CORP.

6. Using Pinion Flange Remover Set (J-8614-01), hold pinion flange stationary and remove pinion nut, flat washer and pinion flange. See **Fig. 3** . Remove deflector from pinion. Mount left carrier case half in holding fixture from Pinion Service Set (J-36598). See **Fig. 11** . On K2, use Adapter Plate (J-36598-6). On all models, press pinion from case. Remove pinion with attached shim, inner bearing and spacer as an assembly. Remove collapsible spacer from pinion.

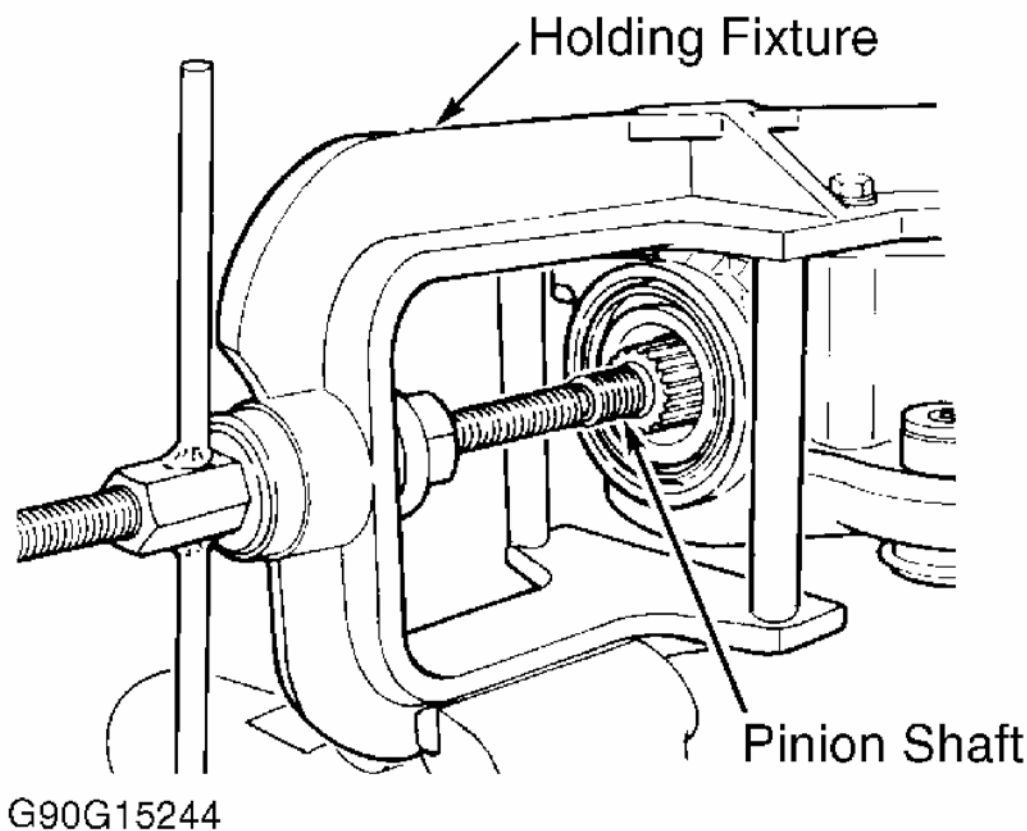


Fig. 11: Pressing Pinion From Carrier
Courtesy of GENERAL MOTORS CORP.

7. Using Pinion Bearing Remover (J-22912), press bearing from pinion. See **Fig. 12** . Remove shim(s) from pinion, keeping shims in order.
8. Using holding fixture and pinion service set, remove seal and outer bearing from left half of carrier. Using adapter plate, remove bearing races using same pinion service set. See **Fig. 13** .

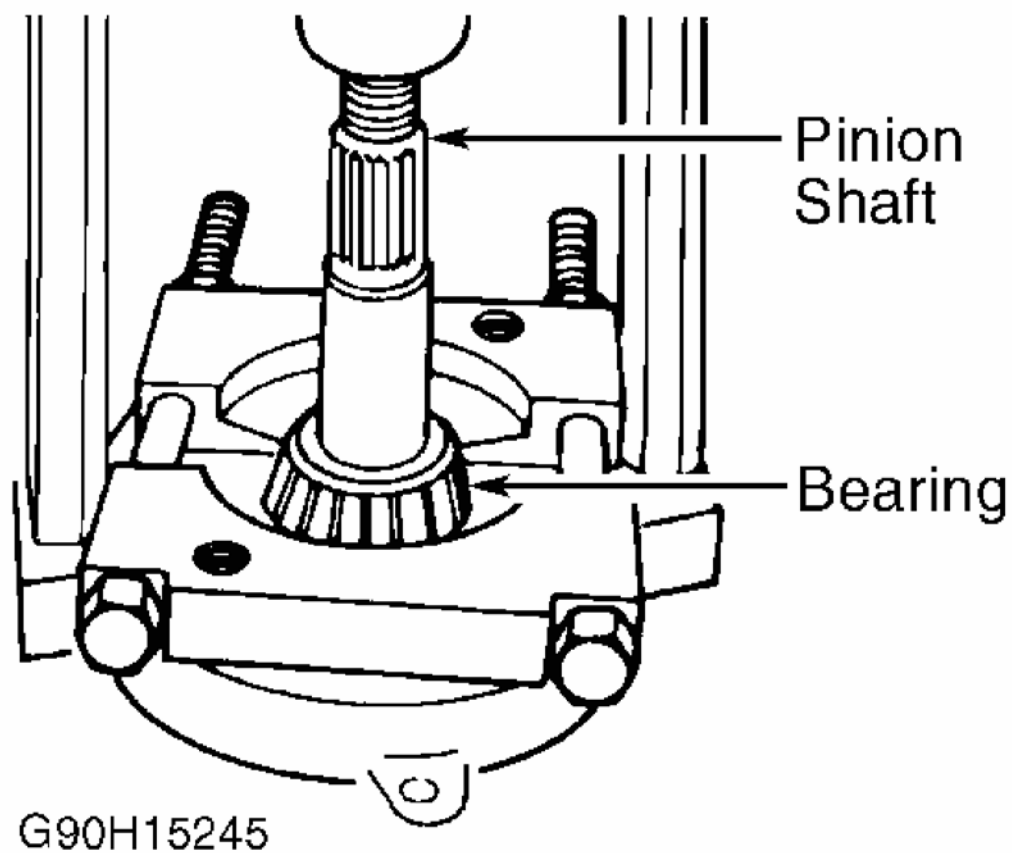
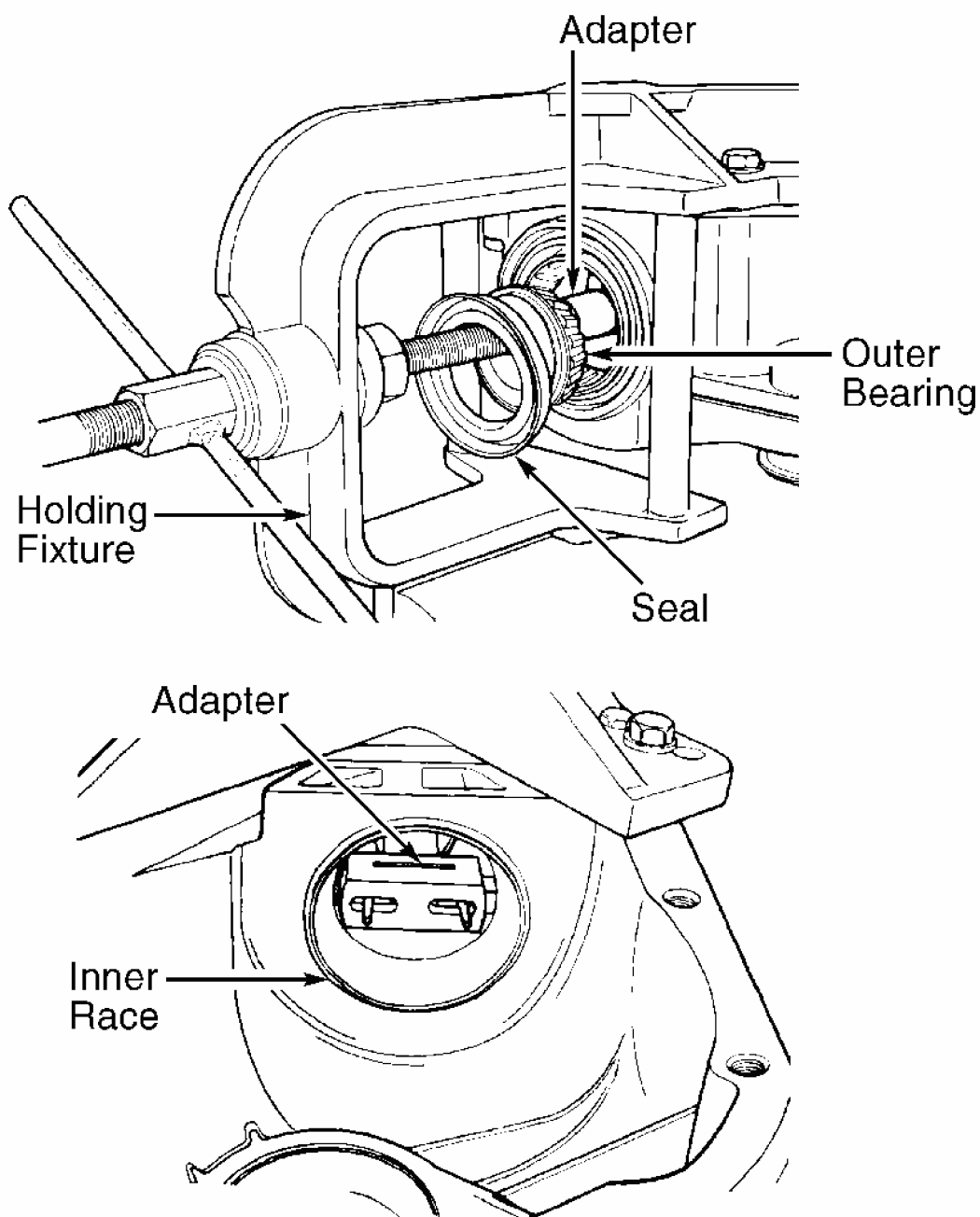


Fig. 12: Pressing Bearing From Pinion
Courtesy of GENERAL MOTORS CORP.



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Fig. 13: Removing Outer Bearing, Race, Seal & Inner Race From Carrier
Courtesy of GENERAL MOTORS CORP.

9. Using Puller (J-22888-D) and Adapter (J-8107-2 for K2; J-36597 for K3), remove side bearings from differential case assembly. See **Fig. 14** . Remove ring gear bolts (left-hand thread). Using a brass drift, drive ring gear from differential case. DO NOT pry ring gear from differential case, or damage to ring gear and differential case will occur.

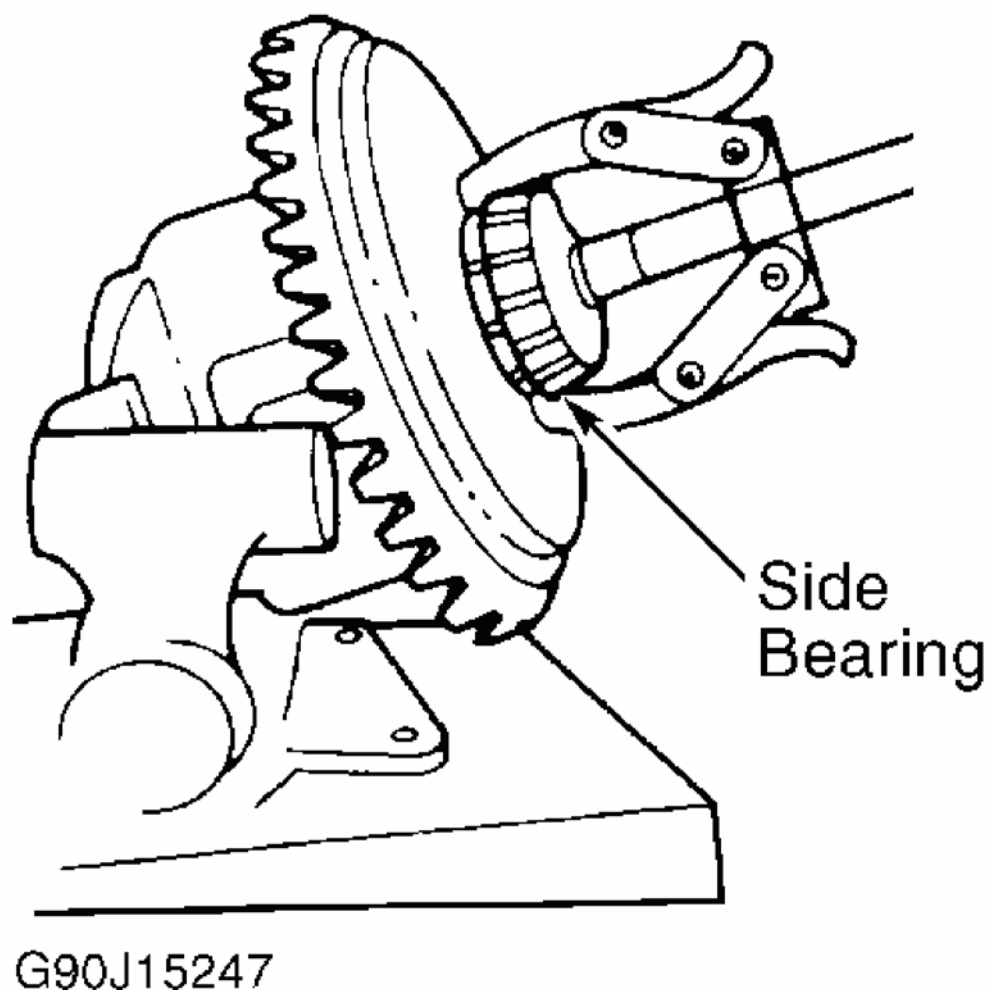


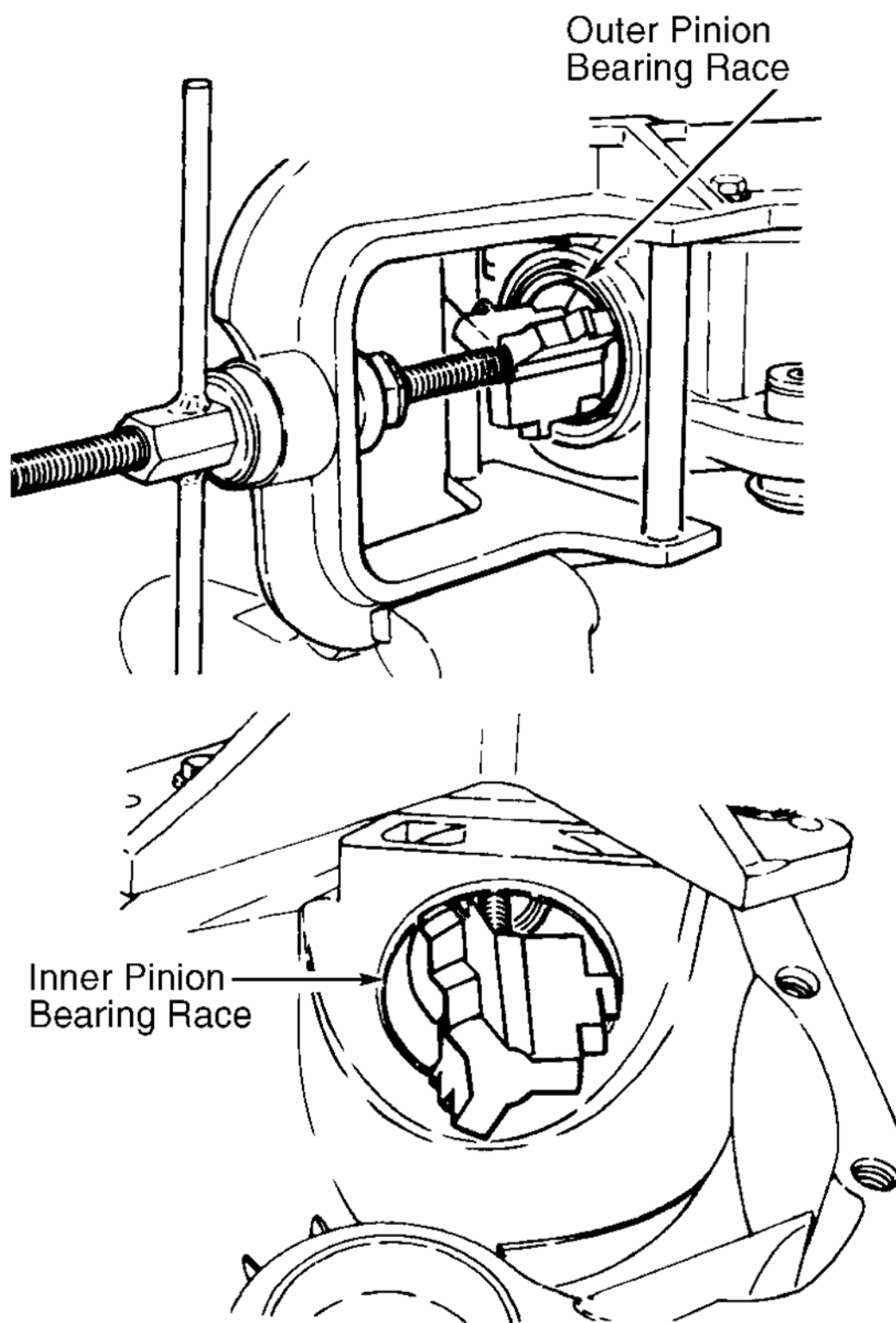
Fig. 14: Removing Side Bearing From Differential
Courtesy of GENERAL MOTORS CORP.

10. On K2, use a drift punch and hammer to drive out roll pin from differential pinion gear shaft. On K3, remove bolt from differential pinion gear shaft. On all models, remove pinion gear shaft. Roll pinion gears and thrust washers out of differential case.
11. Remove side gears and thrust washers, marking side gears and differential case left and right for reassembly reference. Remove spacer (K3). Using a 6-point socket, remove vent plug. Upper and lower carrier mounting bushings should be replaced using Remover/Installer (J-36616).

Clean all parts in solvent. Dry all parts completely. Inspect all parts for excessive wear. Replace as required.

Reassembly

1. To install pinion bearing races, install left carrier case to holding fixture from Pinion Service Set (J-36598). See **Fig. 15** . On K2, use Adapter Plate (J-36598-6). Lightly lubricate outer and inner pinion bearing races. Using Race Installer (J-36598-3 for K2; J-36598-4 for K3), press in outer pinion race and pull in inner pinion race until both are seated in housing. See **Fig. 15** . Lubricate inner and outer bearings. Set pinion depth. See **DRIVE PINION DEPTH** under ADJUSTMENTS.



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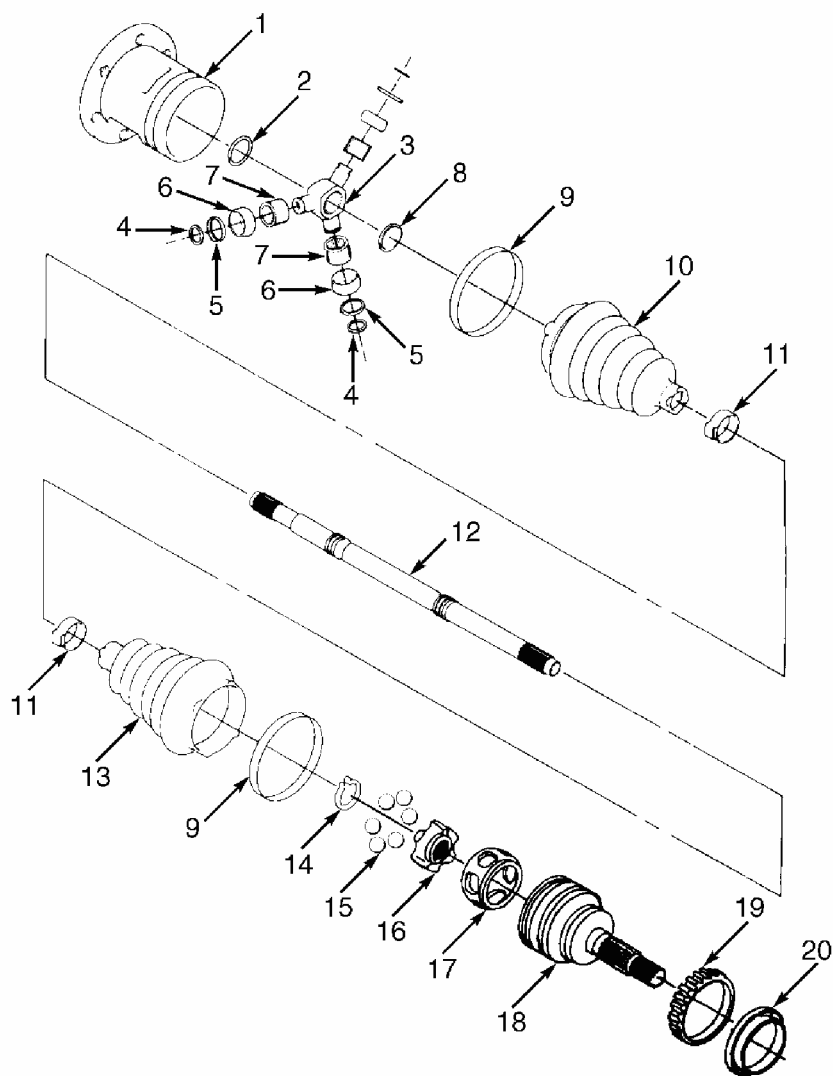
Fig. 15: Installing Pinion Races
Courtesy of GENERAL MOTORS CORP.

2. Install appropriate shim onto pinion. Shim size is determined during pinion depth adjustment. Using pinion bearing installer, install inner pinion bearing onto pinion. Install NEW collapsible spacer onto pinion shaft. Lubricate outer pinion bearing, and install bearing and pinion seal into carrier case using Seal Installer (J-36366). Insert pinion, with attached inner bearing and collapsible spacer, into carrier case.
3. Install deflector and pinion flange. Install pinion washer and nut. Install flange holder. Hold flange while slowly tightening nut and checking pinion flange until no end play is present. DO NOT tighten nut any further.
4. Rotate pinion several times to ensure bearings have been seated. Recheck end play. Set final pinion rotational preload to 10-25 INCH lbs. (1.1-2.8 N.m) by tightening pinion nut in small increments, testing pinion preload between increments. Each increment increases preload by several INCH lbs.
5. If preload specification is exceeded, remove pinion and install NEW collapsible spacer. Once preload has been obtained, rotate pinion several times to ensure bearings have seated and recheck preload.
6. Install side gears and thrust washers into differential case (on K3, install side gear spacer to left side). If old side gears are being reinstalled, place them in their original locations as marked during disassembly.
7. Position one pinion gear between side gears and rotate gears until pinion gear is directly opposite opening in case. Place remaining pinion gear between side gears. Ensure holes in both pinion gears line up. Rotate pinion gears toward opening just enough to allow installation of thrust washers.
8. Install differential pinion gear shaft. Install roll pin (or shaft bolt) through case and into pinion gear shaft. Install ring gear onto differential assembly. Tighten NEW bolts alternately in progressive steps to specification (left-hand thread). See **TORQUE SPECIFICATIONS** .
9. Press side bearings onto differential assembly using Adapter (J-8092) and Side Bearing Installer (J-22761 for K2; J-29710 for K3). Press bearings onto sleeves (and onto adjuster plug on left side of K3) using adapter and Bearing Installer (J-36612 for K2; J-36613 for K3).
10. On K3, install NEW "O" ring to adjuster plug. On all models, use sleeve adjusting wrench to install sleeves into carrier case (on left side on K3, install adjuster plug using adjuster plug wrench).
11. Install side bearing races into carrier using adapter and Race Installer (J-36603). Place differential assembly into left carrier case half. On K2, turn left sleeve inward until backlash is felt between ring and pinion. On K3, turn left adjuster plug inward until backlash is felt between ring and pinion.
12. On all models, remove carrier case from holding fixture, and attach carrier halves together using 4 bolts. If halves DO NOT make complete contact, back out right sleeve. Install carrier case bolts, and tighten to specification. Set ring gear backlash adjustment to specification. See **RING GEAR BACKLASH** .

13. On K2, bend lock tabs over left and right sleeves. On K3, install left adjuster plug lock and bolt, and bend lock tab over right sleeve. On all models, remove 4 bolts holding axle carrier halves together and separate housing halves. Apply Sealant (1052942 or Loctite 518) to one carrier housing surface.
14. Reconnect axle carrier housing halves. Install 10 attaching bolts and tighten to specification. See **TORQUE SPECIFICATIONS** . Using appropriate Seal Installer (J-36600 for K2; J-22833 for K3), install/drive seal into left side of carrier case. Install deflector onto left output shaft and insert shaft into left side of carrier. Drive shaft into place with a soft-faced mallet.
15. Install NEW pilot bearing into right output shaft using Pilot Bearing Installer (J-33842). Insert right output shaft into right side of carrier. Apply Sealant (1052942 or Loctite 518) to threads of vent plug. Install vent plug into left side of carrier.
16. Install right axle tube and inner shaft assembly. See **RIGHT AXLE TUBE & INNER AXLE SHAFT** under REMOVAL & INSTALLATION. To complete reassembly, reverse disassembly procedure.

LEFT AXLE SHAFT

NOTE: For exploded view of left axle shaft, see **Fig. 16** .



- | | |
|-------------------------|------------------------|
| 1. Tripod Housing | 11. Boot Ring |
| 2. Retainer Ring | 12. Axle Shaft |
| 3. Spider | 13. Dust Boot |
| 4. Needle Retainer Ring | 14. Race Retainer Ring |
| 5. Needle Retainer | 15. Ball |
| 6. Tripod Ball | 16. Inner Race |
| 7. Needle Roller | 17. Cage |
| 8. Spacer Ring | 18. Outer Race |
| 9. Boot Ring | 19. ABS Sensor Ring |
| 10. Dust Boot | 20. Deflector Ring |

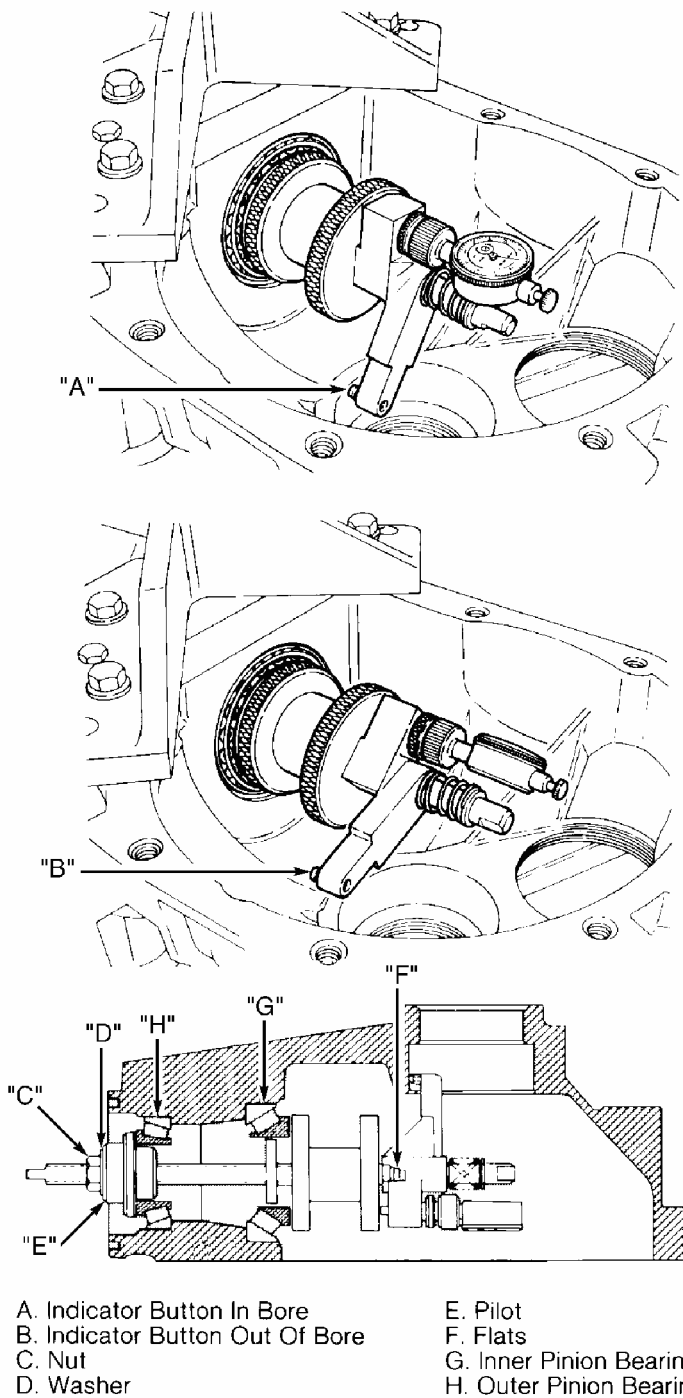
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Fig. 16: Exploded View Of Left Drive Axle Shaft
Courtesy of GENERAL MOTORS CORP.

ADJUSTMENTS

DRIVE PINION DEPTH

1. Lubricate inner and outer pinion bearings liberally with gear oil. Hold pinion bearings in position and install Pinion Shim Setting Gauge (J-36601-4 for K2; J-36601-3 for K3). Install Dial Indicator (J-29763) onto gauge. See **Fig. 17**.



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Fig. 17: Pinion Shim Setting Gauge/Dial Indicator Installation
 Courtesy of GENERAL MOTORS CORP.

2. With gauge installed, preload inner and outer pinion bearings to 9-14 INCH lbs. (1.0-1.6 N.m) by tightening shim setting gauge mounting bolt while holding end of gauge shaft with a wrench. Rotate shaft several times to ensure bearings have seated. Recheck preload.
3. Push dial indicator downward until needle rotates about 3/4 turn clockwise. Tighten dial indicator in this position. Set button of pinion shim setting gauge on differential bearing bore. See **Fig. 17** .

NOTE: **4WD front axle drive pinion gears are nominal or zero, and are not marked on pinion head surface. Shim thickness will equal dial indicator gauge reading.**

4. Rotate gauge slowly back and forth until dial indicator reads lowest point of bore. Set dial indicator to zero. Repeat rocking action of gauge to verify zero setting.
5. After satisfactory zero setting is obtained and verified, move gauge button out of differential side bearing bore. Record dial indicator reading. Use a shim that is exactly the same size as this indicator reading.
6. Remove dial indicator and gauge from carrier. Position correct shim on drive pinion. Install drive pinion bearing. Continue at step 2 of REASSEMBLY in FRONT AXLE ASSEMBLY under OVERHAUL.

RING GEAR BACKLASH

1. Using Sleeve Adjusting Wrench (J-36599) and torque wrench, tighten right adjusting sleeve until no backlash is present. Torque measurement should be about 100 ft. lbs. (136 N.m).
2. Using sleeve adjusting wrench for K2, or Adjuster Plug Wrench (J-36615) for K3, tighten left adjusting sleeve until no backlash is present, or until torque is about 100 ft. lbs. (136 N.m).
3. Mark location of adjusting sleeves (and adjuster plug on K3) in relation to carrier halves so notches can be counted when turned. Turn right sleeve OUT 2 notches using sleeve adjusting wrench. Turn left sleeve IN one notch (K2). Turn adjuster plug IN one notch (K3). Rotate pinion several times to seat bearings.
4. Mount base clamp of Dial Indicator Set (J-8001) so gauge plunger button contacts outer edge of pinion flange. Ensure plunger is at right angle to flange. See **Fig. 18** . Move pinion flange through its free play travel while holding differential carrier and ring gear stationary. Record dial indicator reading. Divide dial indicator reading by 2 to obtain backlash reading.

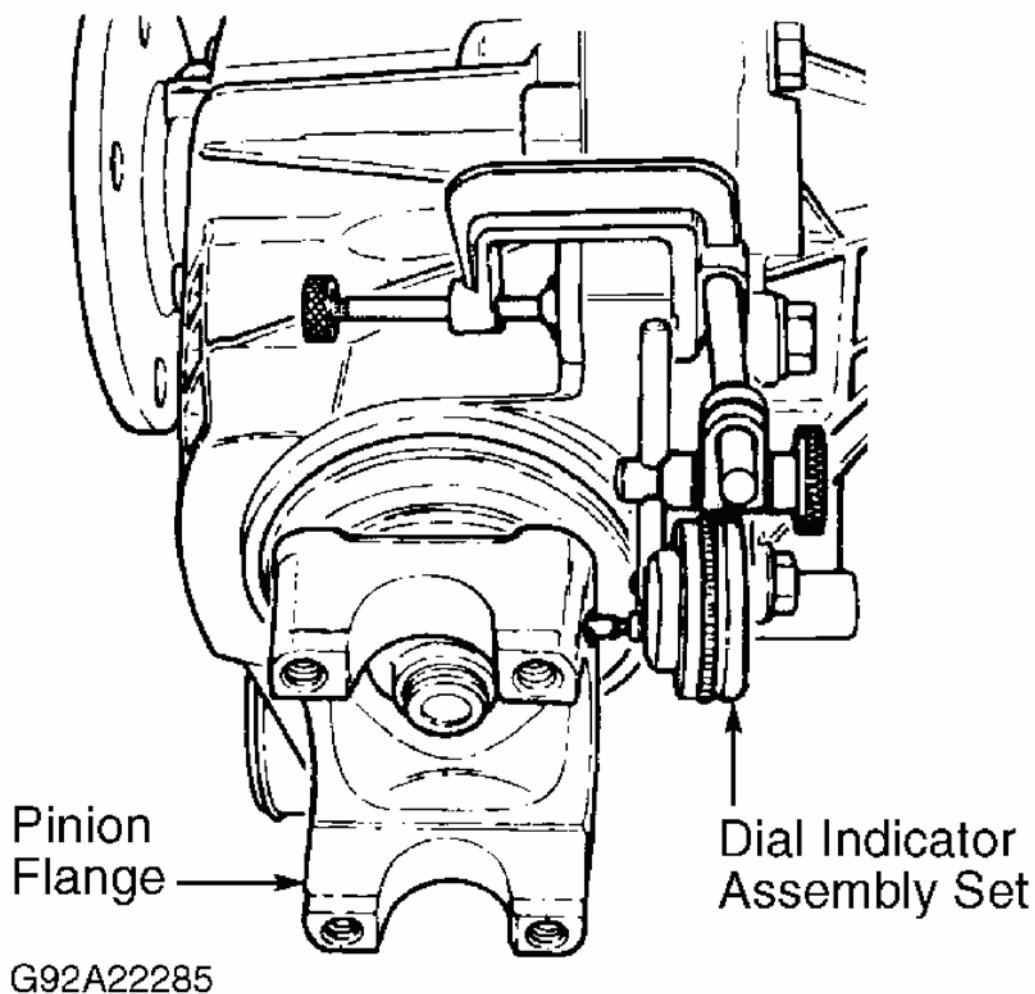


Fig. 18: Measuring Backlash At Pinion Flange
Courtesy of GENERAL MOTORS CORP.

5. Gear backlash at pinion flange should be .003-.010" (.08-.25 mm), with a preferred measurement of .005-.007" (.13-.18 mm). If backlash is not within specification, turn adjusting sleeves equally as necessary.
6. To increase backlash, turn left sleeve (adjuster plug on K3) in and turn right sleeve out an equal amount. To decrease backlash, turn right sleeve in and turn left sleeve (adjuster plug on K3) out an equal amount. Turning sleeve (or adjuster plug on K3) one notch will change backlash about .003" (.08 mm). DO NOT install or bend sleeve locks yet.
7. When backlash is within specification, perform gear tooth contact pattern check. See **GEAR TOOTH CONTACT PATTERNS** article in GENERAL INFORMATION. When pattern is satisfactory, continue at step 13 of **REASSEMBLY** in FRONT AXLE

ASSEMBLY under OVERHAUL.

AXLE ASSEMBLY SPECIFICATIONS**AXLE ASSEMBLY SPECIFICATIONS**

Application	Specification
Ring Gear Backlash	
Preferred	.005-.007" (.13-.18 mm)
Allowed	.003-.010" (.08-.25 mm)
Ring Gear Runout (Maximum)	.002" (.05 mm)
Pinion Bearing Preload	
New	15-30 INCH Lbs. (1.7-3.4 N.m)
Used	10-25 INCH Lbs. (1.1-2.8 N.m)

TORQUE SPECIFICATIONS**TORQUE SPECIFICATIONS**

Application	Ft. Lbs. (N.m)
Actuator Solenoid	15 (20)
Axle Assembly Mounting (Bushing) Bolt	81 (110)
Axle Hub Nut	155 (210)
Ball Joint Nut (Upper)	74 (100)
Carrier Case Bolt	35 (47)
Carrier Mounting Bolts & Nuts	75 (102)
Carrier Shield Bolt	15 (20)
Drain & Fill Plugs	24 (33)
Drive Axle/Stub Shaft-To-Output Flange Bolt	58 (79)
Right Axle Tube-To-Carrier Bolt	30 (41)
Right Axle Tube-To-Frame Bolt	75 (102)
Ring Gear Bolt (Left-Hand Thread)	88 (119)
Shock Absorber Lower Mounting Bolt	59 (80)
Skid Plate Screws	15 (20)
Stabilizer Bar Bushing Bracket-To-Frame Bolt	30 (41)
Stabilizer Bar-To-Lower Control Arm Nut	13 (18)
Tie Rod Nut	50 (68)
Wheel Lug Nut	140 (190)