

SECTION 4C

FRONT DRIVING AXLE

CAUTION: This vehicle is equipped with Supplemental Inflatable Restraint (SIR). Refer to CAUTIONS in SECTION 9J under "ON-VEHICLE SERVICE" and the SIR Component and Wiring Location view in SECTION 9J before performing service on or around SIR components or wiring. Failure to follow CAUTIONS could result in possible air bag deployment, personal injury, or otherwise unneeded SIR system repairs.

NOTICE: Always use the correct fastener in the correct location. When you replace a fastener, use ONLY the exact part number for that application. General Motors will call out those fasteners that require a replacement after removal. General Motors will also call out the fasteners that require thread lockers or thread sealant. **UNLESS OTHERWISE SPECIFIED**, do not use supplemental coatings (paints, greases, or other corrosion inhibitors) on threaded fasteners or fastener joint interfaces. Generally, such coatings adversely affect the fastener torque and joint clamping force, and may damage the fastener. When you install fasteners, use the correct tightening sequence and specifications. Following these instructions can help you avoid damage to parts and systems.

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GENERAL DESCRIPTION

The front axle on all-wheel drive (AWD) models uses a conventional ring and pinion gear set to transmit the driving force from the engine to the wheels. The axle is designed to remain in constant four-wheel drive operation and has no disconnect feature. The front driving axle on four-wheel drive (4WD) models use a central disconnect type front axle/transfer case system that allows shifting in and out of 4WD when the vehicle is moving under most driving conditions.

The differential allows the wheels to turn at different rates of speed while the front axle continues to transmit the driving force. This prevents tire scuffing and premature wear on internal axle parts. The differential case is supported in the axle housing by two tapered roller bearings. The differential and ring gear are located in relationship to the pinion using threaded adjusters. The ring gear is bolted to the differential case with left-hand thread bolts.

- Perform the road test on a smooth road to minimize tire noises.
- Perform the road test at various speeds in drive, float, and coast.
- Rear pinion bearing noise may be louder on acceleration.
- Front pinion bearing noise may be louder on deceleration.

The second type of gear noise pertains to the mesh pattern of the gear teeth. This form of abnormal gear noise can be recognized because it produces a cycling pitch (whine) and will be very pronounced in the speed range at which it occurs, appearing under either drive, float, or coast conditions. Gear noise tends to peak in a narrow speed range or ranges, and will tend to remain constant in pitch. Bearing noise will vary in pitch with vehicle speeds.

- Rough running or a whine noise should increase with speed.
- Noise pitch should be higher than differential noise.

DIAGNOSIS OF DRIVE AXLES

PROBLEM	POSSIBLE CAUSE	CORRECTION
Clicking Noise In Turns	Worn or damaged outer CV joint	Replace.
"Clunk" When Accelerating From "Coast"	1. Loose CV joint to output shaft bolts. 2. Damaged inner CV joint.	1. Tighten. 2. Replace.
Shudder Or Vibration During Acceleration	1. Excessive CV joint angle. 2. Worn or damaged CV joints. 3. Sticking spider assembly (inner CV joint). 4. Sticking joint assembly (outer CV joint).	1. Repair. 2. Replace. 3. Lubricate or replace. 4. Lubricate or replace.
Vibration At Highway Speeds	1. Out of balance or out of round tires. 2. Front end out of alignment.	1. Balance or replace. 2. Align.

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ON-VEHICLE SERVICE

SHAFT AND TUBE ASSEMBLY REPLACEMENT

Remove or Disconnect (Figures 1 through 6)

1. Battery and battery tray. Refer to SECTION 6D1.
2. Shift cable from the vacuum actuator. Refer to "Shift Cable Replacement" in this Section.
- Unlock the steering column so the linkage is free to move.
- Raise the vehicle and support with safety stands.
3. Front wheels. Refer to SECTION 3E.
4. Front differential carrier body shield, if equipped (Figure 4).
5. Right side caliper. Refer to SECTION 5B1.
6. Right upper ball joint.
- A. Support the right lower control arm.
- B. Unload torsion bar. Refer to SECTION 3C.
- C. Disconnect the ball joint as outlined in SECTION 3C.
- D. Remove the support so the control arm will hang free.
- E. Insert a drift through the opening in the top of the brake caliper into the vanes in the brake

- It is essential that the positions of all driveline components relative to the propeller shaft and axles be observed and accurately reference marked prior to disassembly. These components include the propeller shafts, drive axles, pinion flanges, output shafts, etc. All components must be reassembled in the exact relationship to each other as they were when removed. Specifications and torque values, as well as any measurements made prior to disassembly, must be followed.
- 7. Bolts. Then remove the drift from the brake rotor.
- 8. Wire from indicator switch.
- 9. Shift cable housing and shift cable. Refer to "Shift Cable Replacement" in this Section.
- 10. Bolts, nuts, and washers.
- 11. Remaining two upper bolts.
- 12. Shaft and tube, by working it around the drive axle. Do not allow the thrust washers, carrier connector, sleeve, or output shaft to fall out of the carrier assembly or become damaged.

Important

rotor. This will keep the axle from turning.

4C-4 FRONT DRIVING AXLE

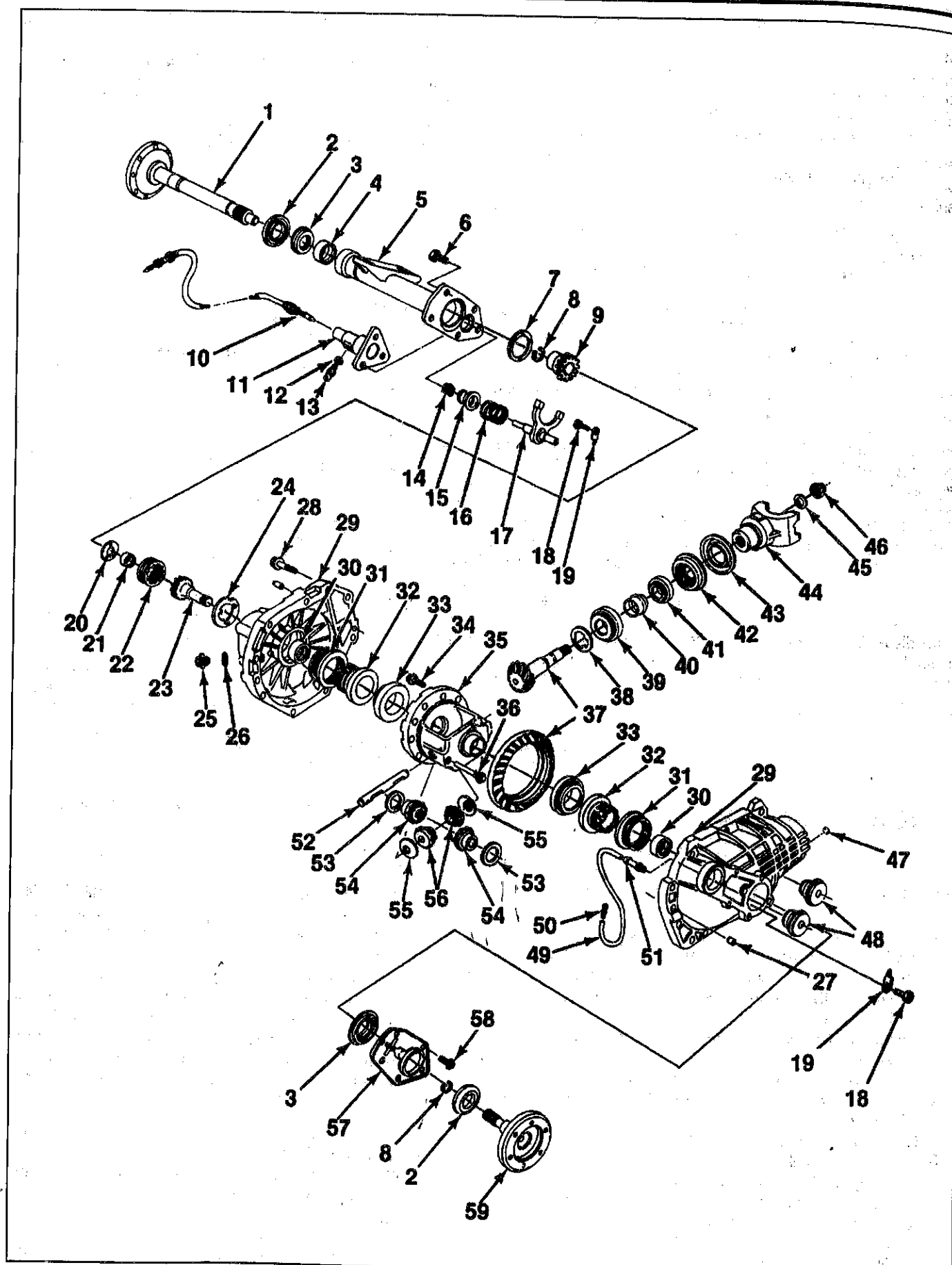


Figure 1—4X4 Front Axle Components

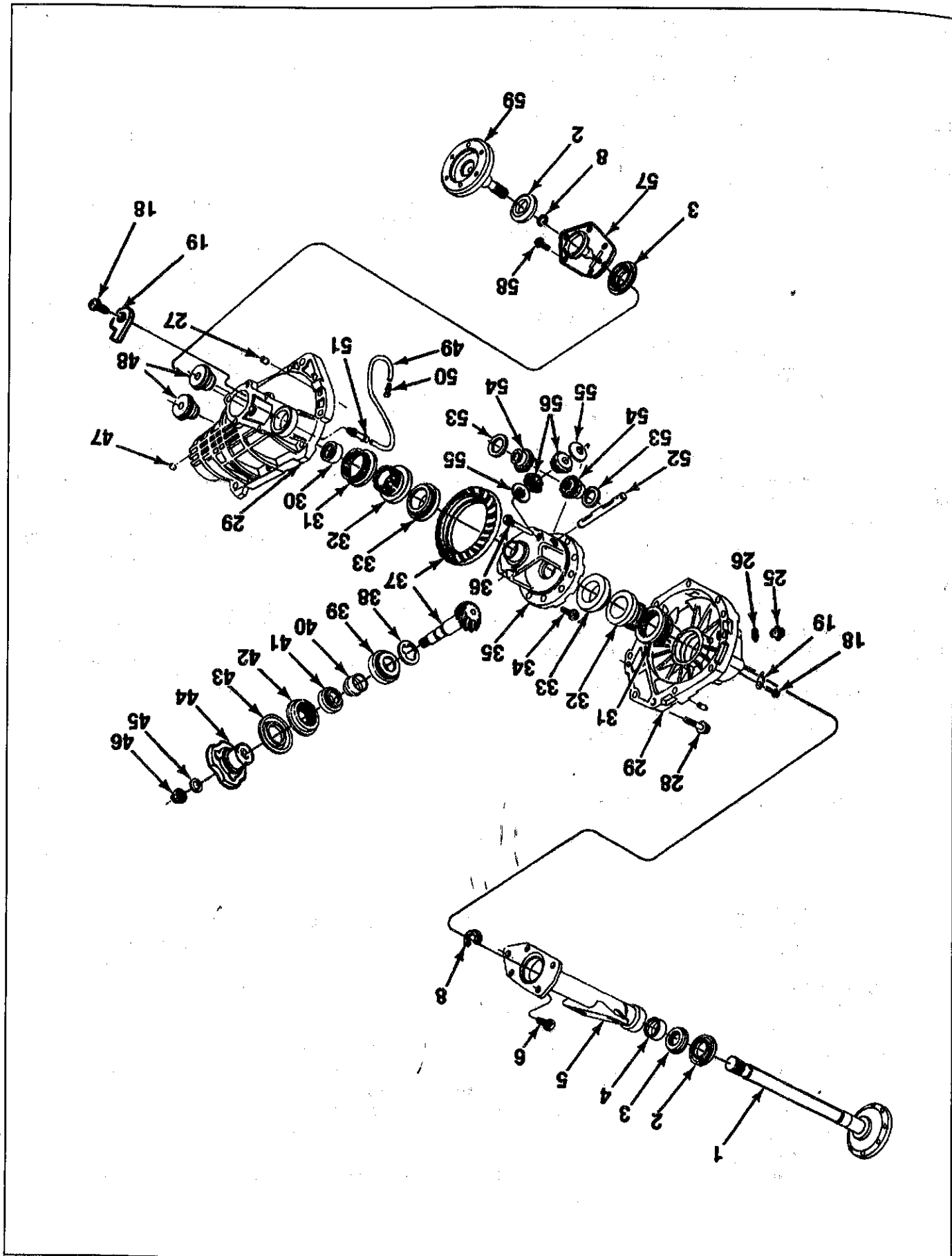


Figure 2—AWD Front Axle Components

4C-6 FRONT DRIVING AXLE

1. Shaft	16. Spring	31. Insert	46. Nut
2. Deflector	17. Shift Shaft and Fork	32. Sleeve	47. Plug
3. Seal	18. Bolt	33. Side Bearing	48. Bushing
4. Bearing	19. Lock Tab	34. Bolt	49. Vent Hose
5. Tube	20. Thrust Washer	35. Differential Case	50. Vent
6. Bolt	21. Differential Pilot Bearing	36. Bolt	51. Fitting
7. Thrust Washer	22. Sleeve	37. Ring and Pinion Gears	52. Shaft
8. Retaining Ring	23. Output Shaft	38. Shim	53. Thrust Washer
9. Carrier Connector	24. Washer	39. Bearing	54. Side Gear
10. Shift Cable	25. Plug	40. Spacer	55. Thrust Washer
11. Shift Cable Housing	26. Washer	41. Bearing	56. Differential Pinion Gear
12. Gasket	27. Pin	42. Seal	57. Cover
13. Indicator Switch	28. Bolt	43. Deflector	58. Bolt
14. Spring	29. Carrier Case	44. Flange	59. Shaft
15. Seal	30. Bearing	45. Washer	

Figure 3—Axle Components - Legend



Disassemble (Figures 1 through 3)

Tool Required:

J 29369-2 Bearing Remover

1. Shaft.
 - A. Hold the tube in a vise by the mounting flange.
 - B. Tap the shaft out with a soft mallet.
2. Deflector.
3. Seal using a seal removal tool.
4. Bearing with J 29369-2 and a slide hammer.
5. Shift cable housing seal.
 - Drive out with a punch.
6. Retaining ring and output shaft.
7. Pilot bearing.



Assemble (Figures 1 through 3, and 8 through 10)

Tools Required:

J 33799 Shift Cable Housing Seal Installer

J 33844 Bearing Installer

J 33893 Shaft Seal Installer

1. Pilot bearing.
2. Output shaft and retaining ring.
3. Seal using J 33799 (Figure 8).
4. Bearing using J 33844.
 - When the tool is flush with the tube end, the bearing is installed to the proper depth. Lubricate the bearing with axle lubricant. Refer to SECTION 0B.
5. Seal with J 33893 (Figure 9).
 - A. Drive the seal in until the seal flange is flush with the tube end.
 - B. Apply grease to the seal lips.
6. Deflector.
7. Shaft.



Clean (Figures 1 through 3)

- Sealing surfaces of tube and carrier assembly with a chlorinated solvent.



Install or Connect (Figures 1 through 7, 11, and 12)

Tool Required:

J 33798 Hub Engagement Tool

- Apply a bead of sealer GM P/N 12345739 or equivalent to the carrier sealing surface.
 - Make sure the washer, output shaft, sleeve, thrust washer, and carrier connector are in place in the carrier assembly.
1. Thrust washer to the tube as shown in Figure 10. Use grease to hold it in place.
 2. Shaft and tube assembly to the carrier.
 3. Bolt at the one o'clock position. Leave finger tight.
 - Pull the shaft and tube assembly down until the remaining bolts can be installed.
 4. Shift cable housing and remaining bolts.



Tighten

- Bolts to 48 N.m (36 lb. ft.).
5. Bolts, washers, and nuts (Figures 6 and 7).



Tighten

- Nuts to 98 N.m (72 lb. ft.)



Inspect

- Operation of shift mechanism. Use J 33798 (Figure 11). Insert the tool into the shift fork and check for rotation of the axle shaft.
6. Shift cable. Refer to "Shift Cable Replacement" in this Section.
 7. Wire to the indicator switch.
 8. Upper ball joint. Refer to SECTION 3C.
 9. Drive axle to the shaft.
 10. Bolts (Figure 5).
 - A. Install one bolt finger tight.
 - B. Rotate the axle shaft to install the remaining bolts.

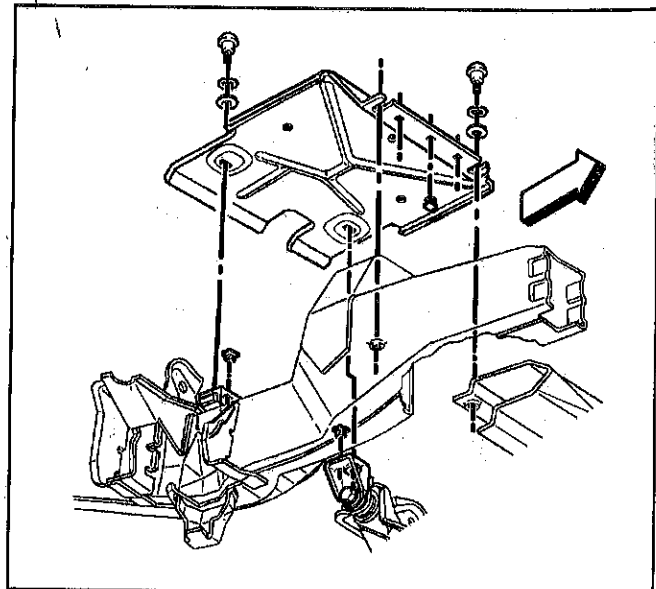


Figure 4—Front Differential Carrier Shield

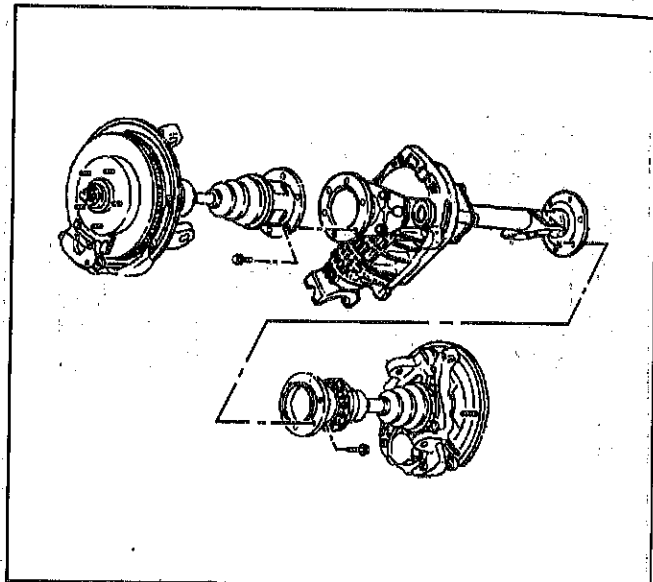


Figure 5—Drive Axles

C. Hold the axle by inserting a drift in the top of the brake caliper and into the vanes in the brake rotor.

Tighten

- Bolts to 83 N.m (61 lb. ft.).
- Remove the drift from the brake rotor.
- 11. Caliper assembly. Refer to SECTION 5B1.
- 12. Front axle under body shield (if equipped).
- 13. Front wheels. Refer to SECTION 3C.

Inspect

- Axle lubricant level, and add lubricant as necessary.
- Lower the vehicle.
- 14. Shift cable to the vacuum actuator. Refer to "Shift Cable Replacement" in this Section.
- 15. Battery and battery tray. Refer to SECTION 6D1.

DIFFERENTIAL PILOT BEARING REPLACEMENT

Remove or Disconnect (Figures 1 through 3)

- Tool Required:
- 1. Differential pilot bearing using J 33842.
 - Lubricate the bearing with axle lubricant, as specified in SECTION 0B.
 - 2. Shaft and tube assembly. Refer to "Shaft and Tube Assembly Replacement" in this Section.

Install or Connect (Figures 1 through 3)

- Tool Required:
- 1. Differential pilot bearing using J 33842.
 - Lubricate the bearing with axle lubricant, as specified in SECTION 0B.
 - 2. Shaft and tube assembly. Refer to "Shaft and Tube Assembly Replacement" in this Section.

Figure 7—Carrier Assembly Installation

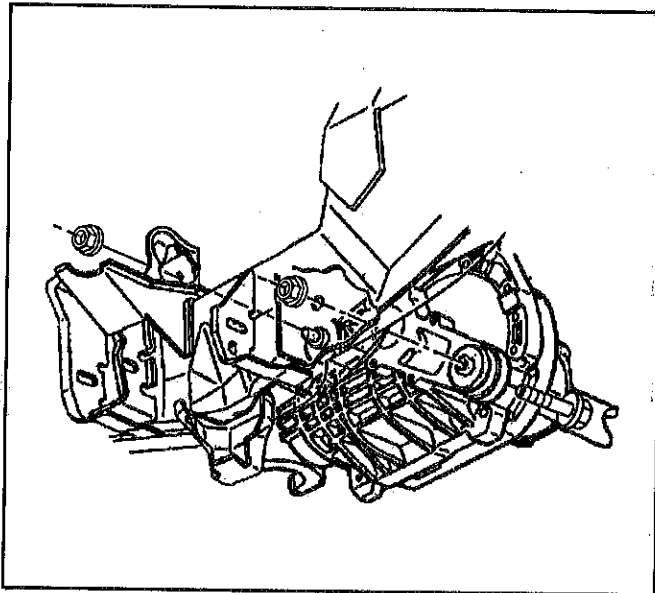
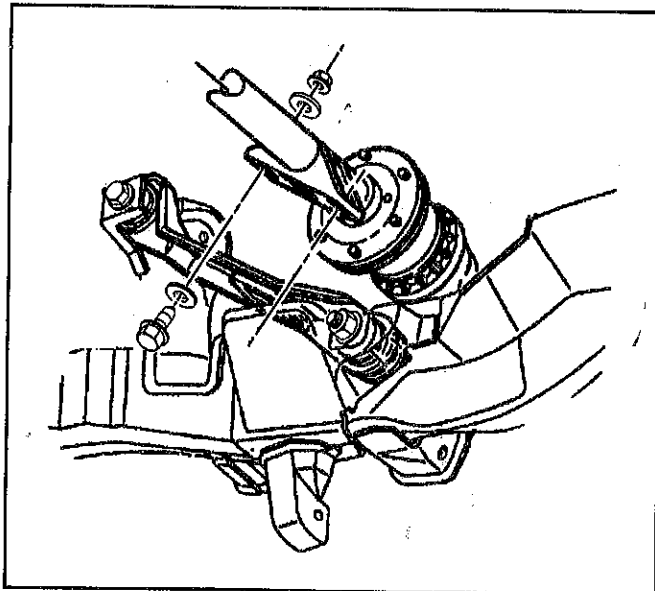


Figure 6—Axle Tube Installation



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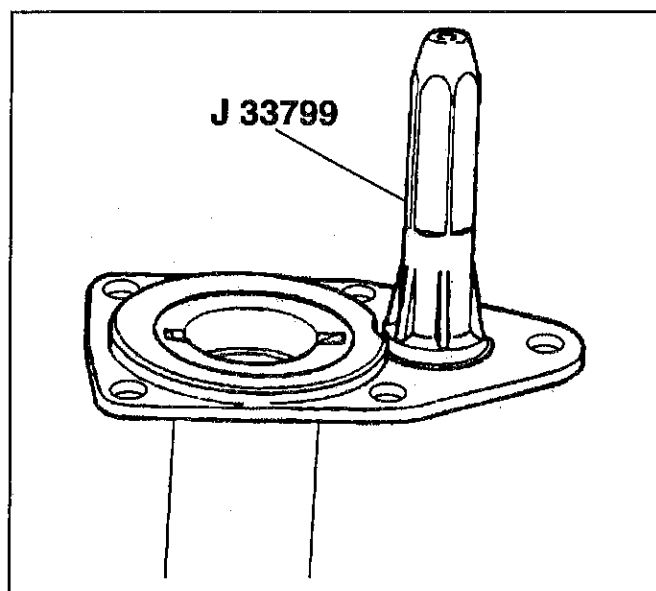


Figure 8—Installing the Shift Cable Housing Seal

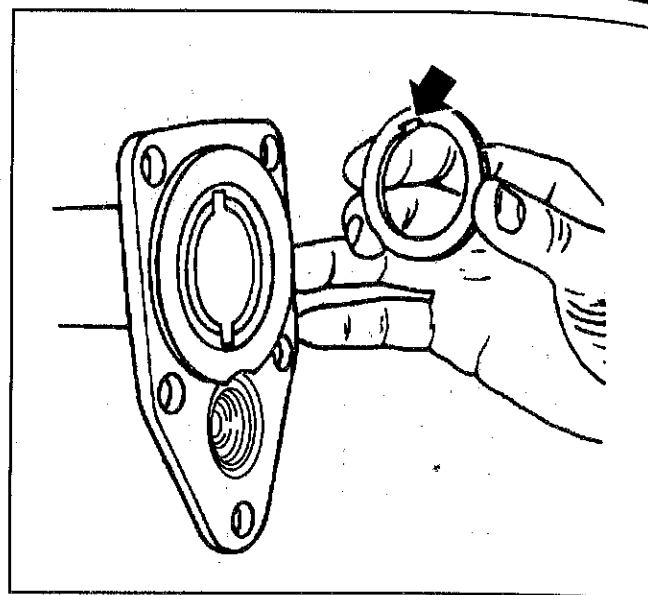


Figure 10—Installing the Thrust Washer

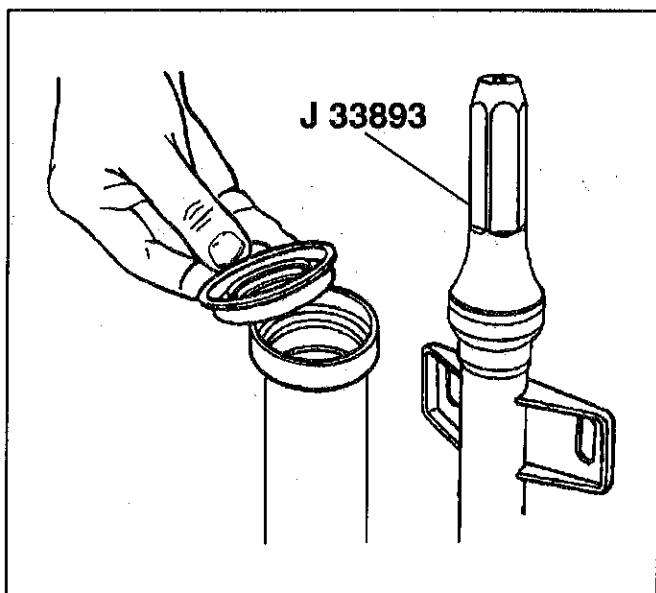


Figure 9—Installing the Shaft Seal

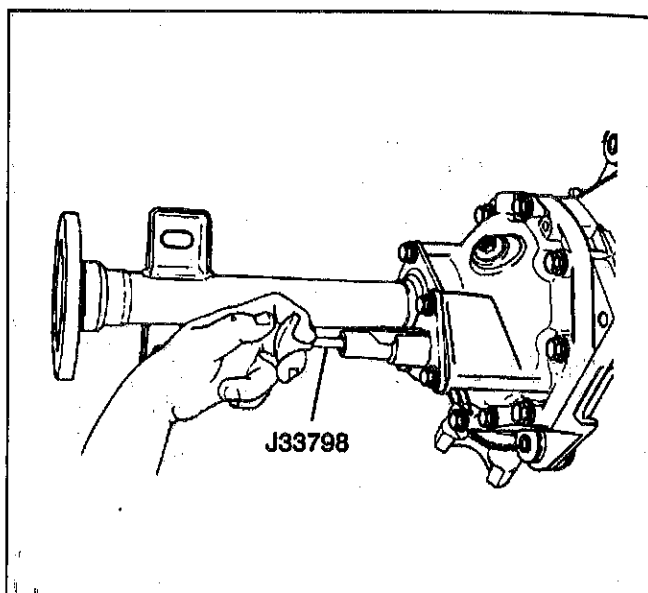


Figure 11—Checking the Shift Mechanism

DIFFERENTIAL CARRIER ASSEMBLY REPLACEMENT

↔ Remove or Disconnect (Figures 1 through 8, and 12)

- Unlock the steering column so the linkage is free to move.
 - Disconnect the shift cable from the vacuum actuator.
 - Raise the vehicle and support with safety stands.
1. Battery and battery tray. Refer to SECTION 6D1.
 2. Front wheels. Refer to SECTION 3E.
 3. Front axle, under body shields, if equipped.
 4. Drain plug and flat washer.
 - Drain lubricant from carrier.
 5. Right side lower shock bolt, Refer to SECTION 3C.
 6. Wire from indicator switch.

7. Shift cable housing and shift cable from the carrier housing. Refer to "Shift Cable Replacement" in this Section.
8. Vent hose.
9. Steering relay rod from idler arm and pitman arm. Refer to SECTION 3B3.

- Hold the left drive axle by inserting a drift in the top of the brake caliper and into the vanes in the brake rotor.

! Important

- It is essential that the positions of all driveline components relative to the propeller shaft and axles be observed and accurately reference marked prior to disassembly. These components include the propeller shafts, drive axles, pinion flanges, output shafts, etc. All components must be reassembled in the exact relationship to each other as they were when

removed. Additionally, the published specifications and torque values, as well as any measurements made prior to disassembly must be followed.

10. Bolts.
• Remove the drift from the brake rotor.

11. Bolts and nuts.
12. Front propeller shaft with a quick tug to disengage retaining ring (Figure 12).

• Support both lower control arms with suitable stands at edge of stabilizer shaft. Lower vehicle until front end weight is resting on stands.

13. Bolts and nuts (Figures 6 and 7).
• Hold the upper nut with an 18 mm wrench inserted through the frame.

14. Carrier assembly. Roll the carrier counterclockwise while lifting up to gain clearance from the mounting ears.

15. Tube bolts from carrier.

Install or Connect (Figures 1, 2, 3, 6, 7, 8, and 10)

1. Tube assembly.
2. Tube assembly bolts to carrier assembly.
3. Carrier assembly to the vehicle.
4. Bolts and nuts (Figures 6 and 7).

Tighten

• Bolts to 103 N.m (76 lb. ft.) or nuts to 75 N.m (55 lb. ft.).
5. Upper mounting bolt, washer, and nut.

Tighten

• Bolts to 48 N.m (36 lb. ft.).
6. Front propeller shaft retainers and bolts (Figure 12).

Tighten

• Bolts to 20 N.m (15 lb. ft.).

Figure 12—Front Propeller Shaft

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Figure 12—Front Propeller Shaft

7. Bolts (Figure 5).
• Install one bolt finger tight.
• Rotate the axle shaft to install the remaining bolts.
• Hold the axle by inserting a drift in the top of the brake caliper and into the vanes in the brake rotor.

Tighten

• Bolts to 80 N.m (60 lb. ft.).
• Remove the drift from the brake rotor.

8. Vent hose.
9. Idler and pitman arms to steering relay rod. Refer to SECTION 3B3.

10. Shaft and tube assembly. Refer to "Shaft and Tube Assembly Replacement" in this Section.

11. Indicator switch wire.
12. Shift cable to shift cable housing. Refer to "Shift Cable Replacement" in this Section.

13. Lower shock bolt and nut. Refer to SECTION 3C.

Inspect

• Axle lubricant level. Refer to SECTION 0A.
14. Drain plug and flat washer.

Tighten

• Plug to 33 N.m (24 lb. ft.).
15. Under body shield, if equipped.

16. Tires and wheels.
• Remove safety stands and lower vehicle.

17. Shift cable to vacuum actuator.
18. Battery tray and battery. Refer to SECTION 6D1.

DIFFERENTIAL CARRIER BUSHING REPLACEMENT

Remove or Disconnect (Figures 1 through 3, 13 and 14)

Tool Required:
J 33791 Bushing Remover and Installer Set

1. Differential carrier assembly. Refer to "Differential Carrier Assembly Replacement" in this Section.
2. Bushing with J 33791 (Figures 13 and 14).

Install or Connect (Figures 1 through 3, 13 and 14)

Tool Required:
J 33791 Bushing Remover and Installer Set

1. Bushing with J 33791 (Figures 13 and 14).

Important

• Be sure the spacer (J 33791-3) is correctly installed between the bushing and carrier ear to prevent the bushing from being pressed in too deeply.

2. Differential carrier assembly. Refer to "Differential Carrier Assembly Replacement" in this Section.

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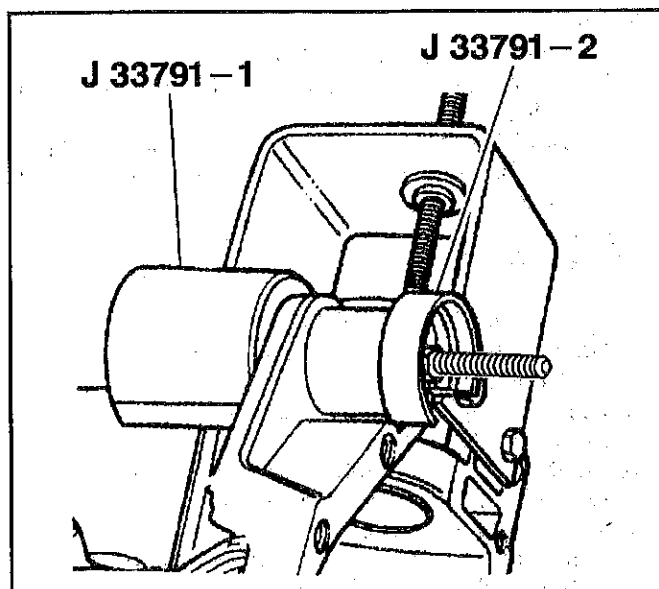


Figure 13—Removing the Case Bushings

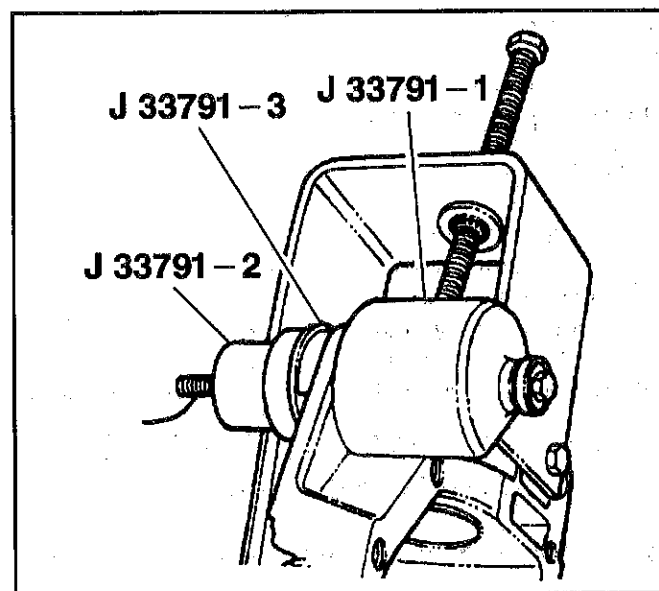


Figure 14—Installing the Case Bushings

FRONT AXLE VENT HOSE

When replacing the hose, make sure that it is routed as shown, free of kinks, and routed clear of sharp components (Figure 15). Make sure the vent is not plugged.

SHIFT CABLE REPLACEMENT

↔ Remove or Disconnect (Figures 16 through 21)

1. Shift cable from the vacuum actuator.
 - A. Bend the tang on the lock spring as shown in Figure 17.
 - B. Push the diaphragm in to release the cable end.
 - C. Squeeze the two locking fingers of the cable ferrule with pliers (Figure 16). Then pull the cable from the bracket.
 - Raise the vehicle and support with safety stands.
2. Bolts (Figure 16).
 - DO NOT unscrew the coupling nut at this time.

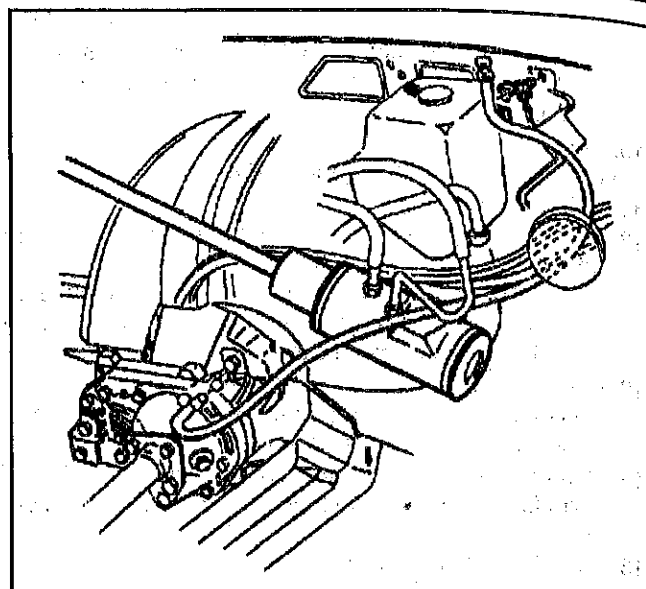


Figure 15—Vent Hose

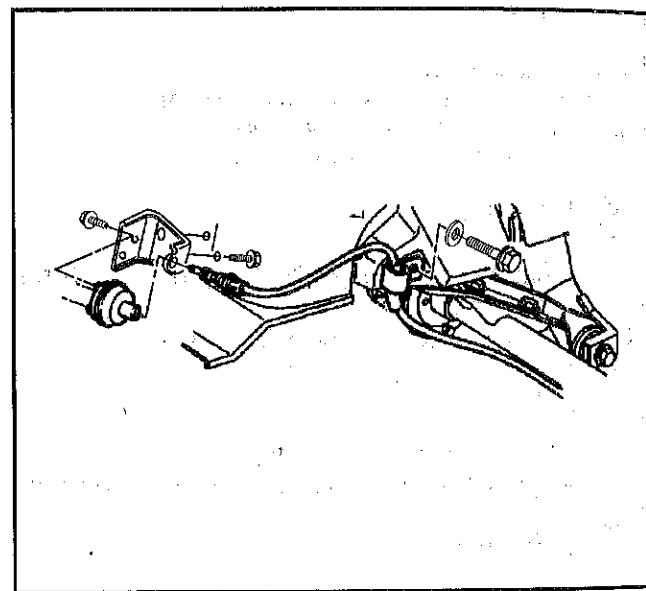


Figure 16—Shift Cable

3. Shift cable housing from the carrier assembly. Pull out about 20 mm (3/4 inch) (Figure 19).
4. Cable end from the shift fork shaft. Bend the tang of the locking spring as shown in Figure 18, then pull the cable end from the shift fork shaft.
5. Shift cable from the shift cable housing by unscrewing the coupling nut.
6. Shift cable from the vehicle.

→ Install or Connect (Figures 16, 18, and 21)

1. Shift cable housing to the carrier assembly.
2. Bolts.

⌚ Tighten

- Bolts to 48 N.m (36 lb. ft.).
3. Shift cable to the shift cable housing (Figure 18).
 - A. The shift cable must be attached to the housing before it is routed.

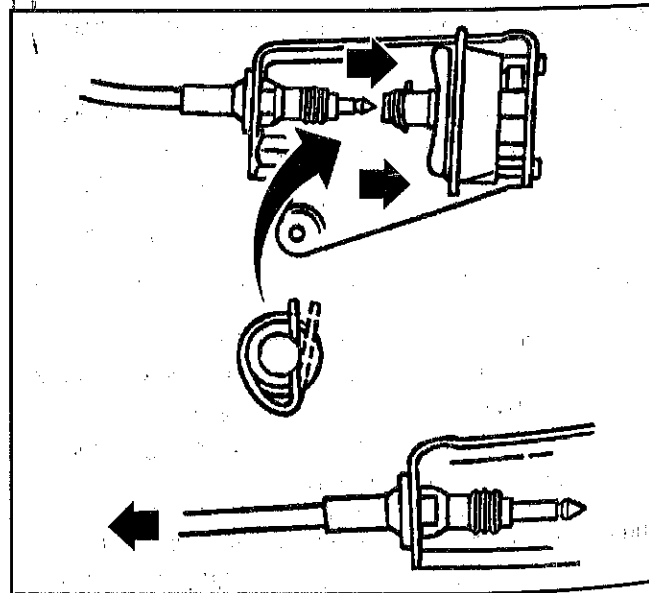


Figure 17—Disconnecting the Shift Cable from the Vacuum Actuator

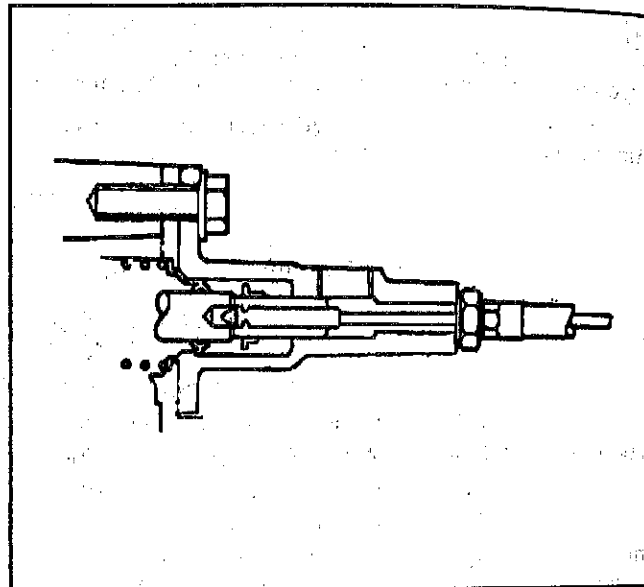


Figure 18—Shift Cable and Housing

- B. Guide the cable end through the hole in the shift cable housing (Figure 20).
- C. Push the cable end into the shift fork shaft. It should snap into place.
- D. Thread the coupling nut into the housing by hand to avoid cross threading.

Tighten

- Coupling nut to 10 N.m (90 lb. in.).
- Lower the vehicle.
- 4. Shift cable to the vehicle.
- Route as shown in Figure 15.

- 5. Shift cable to the vacuum actuator.
- Push the cable into the hole in the bracket. The cable end and ferrule should snap together (Figure 21).

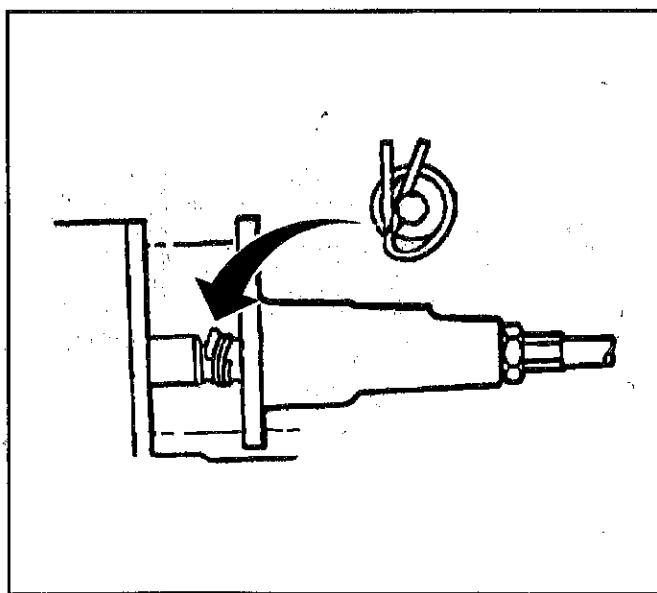


Figure 19—Disconnecting the Shift Cable from the Carrier

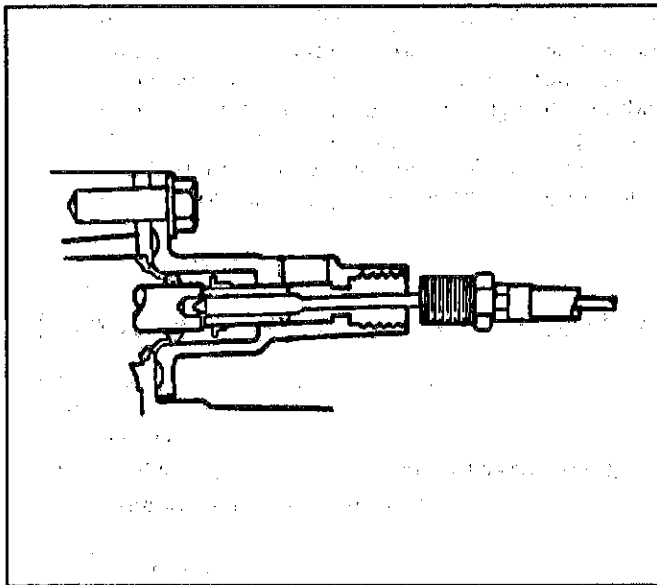


Figure 20—Connecting the Shift Cable to the Carrier

VACUUM ACTUATOR REPLACEMENT

Remove or Disconnect (Figure 16)

1. Battery. Refer to SECTION 6D1.
2. Vacuum hose from the vacuum actuator.
3. Shift cable from the vacuum actuator.
- Refer to "Shift Cable Replacement" in this Section.
4. Bolts.
5. Vacuum actuator.

Install or Connect (Figure 16)

1. Vacuum actuator.
2. Bolts.

4C-12 FRONT DRIVING AXLE

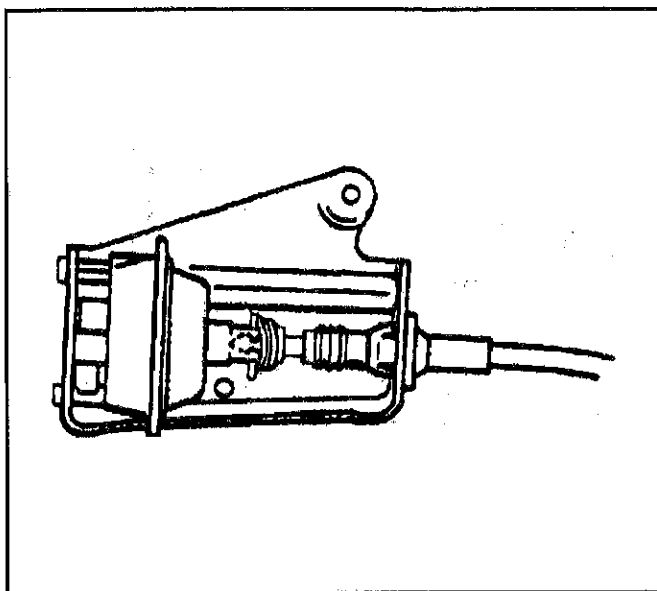


Figure 21—Connecting the Shift Cable to the Vacuum Actuator



Tighten

- Tighten to 1.4 N·m (13 lb. in.).
- 3. Shift cable. Refer to "Shift Cable Replacement" in this Section.
- 4. Vacuum hose.
- 5. Battery. Refer to SECTION 6D1.

PINION FLANGE REPLACEMENT



Important

- It is essential that the positions of all driveline components relative to the propeller shaft and axles be observed and accurately reference marked prior to disassembly. These components include the propeller shafts, drive axles, pinion flanges, output shafts, etc. All components must be reassembled in the exact relationship to each other as they were when removed. Additionally, the published specifications and torque values, as well as any measurements made prior to disassembly must be followed.



Remove or Disconnect (Figures 1, 2, 3, 12, 22, and 23)

Tool Required:

J 8614-01 Companion Flange Holder

- Unlock the steering column so the linkage is free to move.
- Raise the vehicle and support with safety stands.
- 1. Negative battery cable.
- 2. Front under body shields, if equipped.
- 3. Left front, under body shield bracket.
- 4. Bolts from propeller shaft flange to front axle. Refer to SECTION 4A.
- Accurately mark the propeller shaft and pinion flange.

5. Propeller shaft. Refer to SECTION 4A.

- Mark the pinion flange, pinion shaft and the nut before disassembly so that the same preload torque can be maintained upon assembly.

6. Pinion flange nut and washer.

- Hold the pinion flange with J 8614-01 (Figure 22).

7. Pinion flange using J 8614-01 (Figure 22).

- Have a suitable container to catch lubricant.



Install or Connect (Figures 1, 2, 3, 12, 22, and 23)

Tool Required:

J 8614-01 Companion Flange Holder

1. Special seal lubricant GM P/N 1052366 or equivalent to the outside of the pinion flange.
2. New pinion flange.
3. Washer and a new nut using J 8614-01 (Figure 22).



Tighten

- Nut to the same position as marked during removal, then continue to tighten the nut 10 degrees after the marks.
- 4. Propeller shaft. Refer to SECTION 4A.
- Align the marks made during removal. Components must be reassembled in the same position.
- 5. Bolts to flange.



Tighten

- Bolts to 75 N·m (55 lb. ft.).



Inspect

- Axle lubricant level and add lubricant as necessary. Refer to SECTION 0A.
- 6. Left front, under body shield bracket, if equipped.
- 7. Front under body shields, if equipped.
- 8. Negative battery cable.

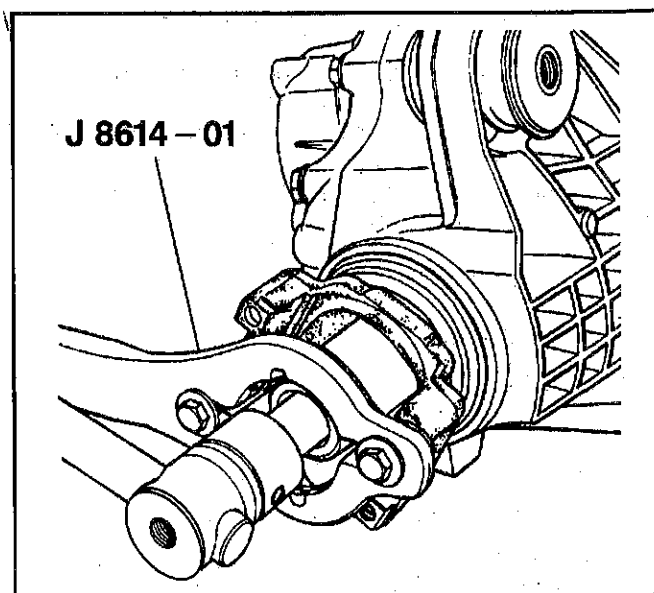


Figure 22—Removing the Pinion Nut and Flange

PINION PRELOAD CHECK

Remove or Disconnect (Figure 23)

Tool Required
J 2619-01 Slide Hammer

1. Front differential carrier under body shield, if equipped.

2. Transfer case under body shield, if equipped.

3. Left side bracket holding front differential under body shield.

4. Front propeller shaft. Refer to "Differential Carrier Assembly Replacement" in this Section (Figure 12).

5. Pinion preload.

• Place the torque wrench and socket on the pinion flange nut and slowly turn clockwise while recording the preload.

Install or Connect

1. Front propeller shaft

2. Left side bracket holding front differential under body shield.

Tighten

• Bolts to 100 N.m (74 lb. ft.).

3. Transfer case under body shield

Tighten

• Bolts to 30 N.m (22 lb. ft.).

4. Front differential carrier under body shield.

Tighten

• Bolts to 23 N.m (17 lb. ft.).

PINION OIL SEAL REPLACEMENT

Remove or Disconnect (Figures 1, 2, 3, 12, and 24)

Tool Required:
J 8614-01 Companion Flange Holder

Important

• It is essential that the positions of all driveline components relative to the propeller shaft and axles be observed and accurately reference marked prior to disassembly. These components include the propeller shafts, drive axles, pinion flanges, output shafts, etc. All components must be reassembled in the exact relationship to each other as they were when removed. Additionally, the published specifications and torque values, as well as any measurements made prior to disassembly must be followed. Front under body shields, if equipped.
2. Left front, under body shield bracket.
3. Bolts and retainers from the pinion flange.
4. Accurately mark the propeller shaft and pinion flange.

Figure 24—Installing the Pinion Oil Seal

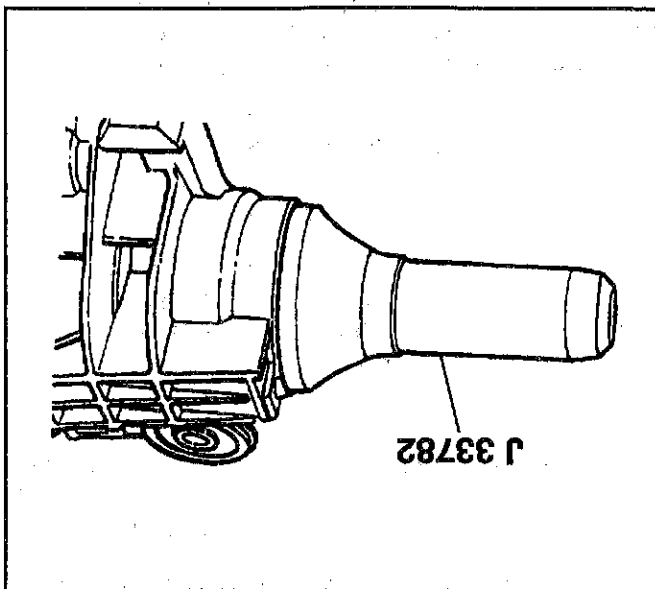
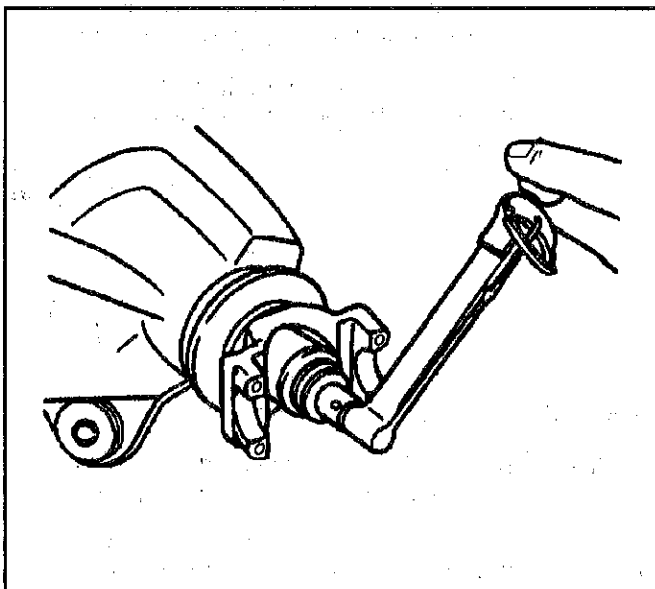


Figure 23—Checking Pinion Preload



• Seal surface of the pinion flange for tool marks, nicks, or damage, such as a groove worn by the seal.

Inspect

• Do not damage the carrier.

8. Pinion oil seal by driving it out of the carrier with a blunt punch or drift.

• Have a suitable container in place to catch lubricant.

7. Pinion flange (Figure 22).

• Use J 8614-01 to hold the pinion flange.

6. Pinion flange nut and washer.

torque can be maintained upon assembly.

• Mark the pinion flange, pinion shaft and the nut before disassembly so that the same preload

4. Propeller shaft from the pinion flange. Refer to SECTION 4A.

5. Propeller shaft.

4C-14 FRONT DRIVING AXLE

- Carrier bore for burrs that might cause leaks around the outside of the seal.

Install or Connect (Figures 1, 2, 3, 12, and 24)

Tools Required:

J 8614-01 Companion Flange Holder

J 33782 Pinion Oil Seal Installer

1. New pinion oil seal using J 33782 (Figure 23).
2. Special seal lubricant GM P/N 1050169 or equivalent to the outside of the pinion flange and the sealing lip of the new pinion oil seal.
3. Pinion flange in the exact spline relationship as it was removed.
4. Washer and nut using J 8614-01 (Figure 22).

Tighten

- Nut to the same position as marked during removal, then continue to tighten the nut 10 degrees after the marks.
5. Propeller shaft to the pinion flange.
 6. Propeller shaft flange to front axle flange bolts.
 - Align the marks made during removal. Components must be reassembled in the same position.

Tighten

- Bolts to 75 N·m (55 lb. ft.).

Inspect

- Axle lubricant level and add as necessary. Refer to SECTION 0B.
7. Left front, under body shield bracket.
 8. Under body shields, if equipped.

DRIVE AXLE REPLACEMENT

AXLE REMOVAL

Remove or Disconnect (Figures 25 through 34)

Tools Required:

J 28733-B Axle Remover

J 24319-B Tie Rod Puller

J 8059 Snap Ring Pliers

J 35910 Boot Clamp Tool

- Raise the vehicle and support it with suitable safety stands.
1. Front axle under body shield, if equipped.
 2. Tires and wheels.
 - Insert a drift through the brake caliper into one of the brake rotor vanes to prevent the drive axle from turning (Figure 27).

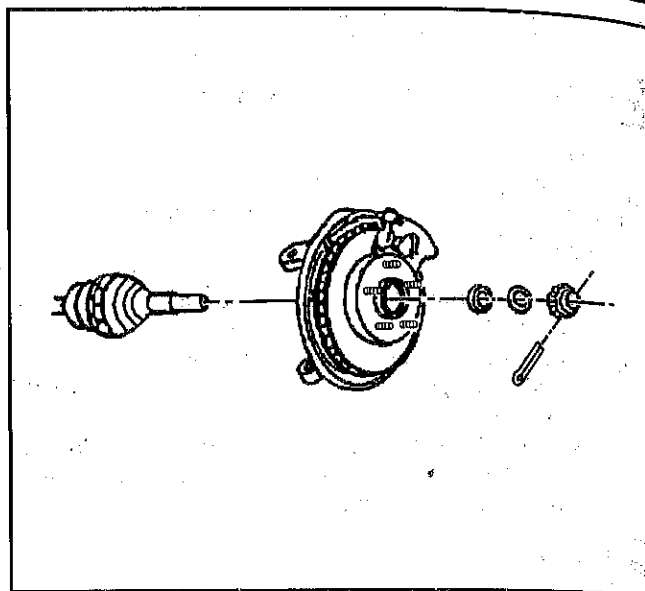


Figure 25—Drive Axles and Components

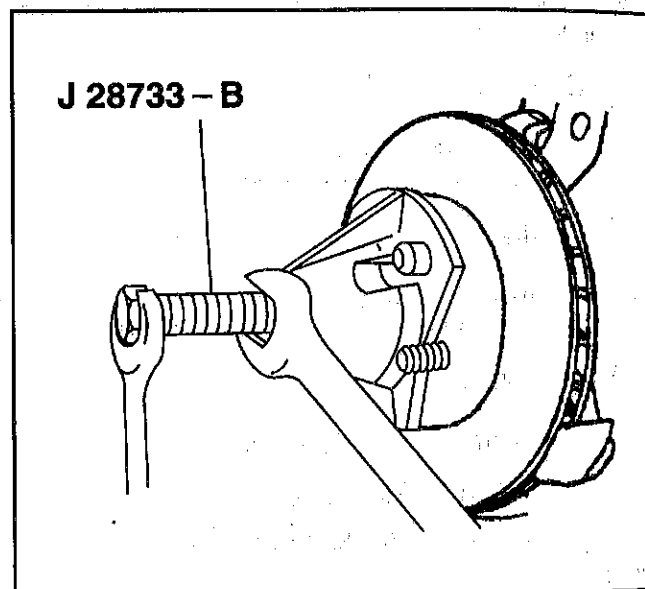


Figure 26—Disconnecting the Drive Axle from the Hub

3. Cotter pin, retainer, nut, and washer (Figure 25).

Important

- It is essential that the positions of all driveline components relative to the propeller shaft and axles be observed and it accurately reference marked prior to disassembly. These components include the propeller shafts, drive axles, pinion flanges, output shafts, etc. All components must be reassembled in the exact relationship to each other as they were when removed. Specifications and torque values, as well as any measurements made prior to disassembly must be followed.
 - Loosen, but do not remove, the six bolts securing the inboard C/V joint flange to the output shaft companion flange (Figure 28).
4. Brake line support bracket from the upper control arm to allow extra knuckle travel (Figure 29).

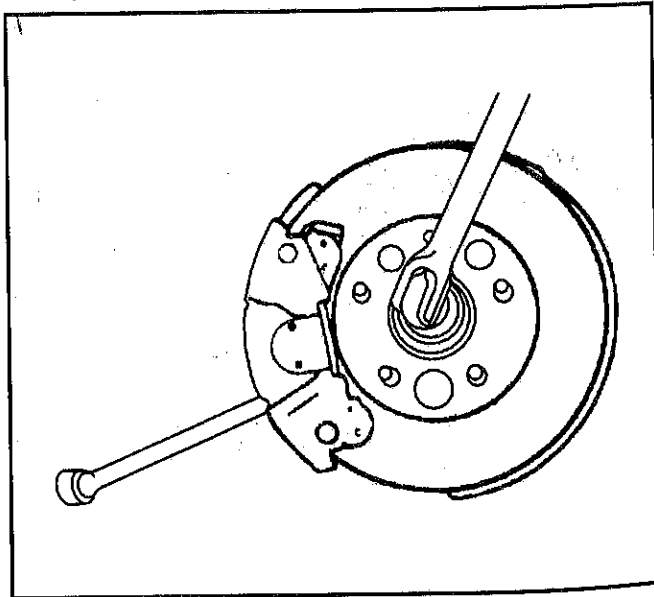


Figure 27—Preventing the Shaft From Turning

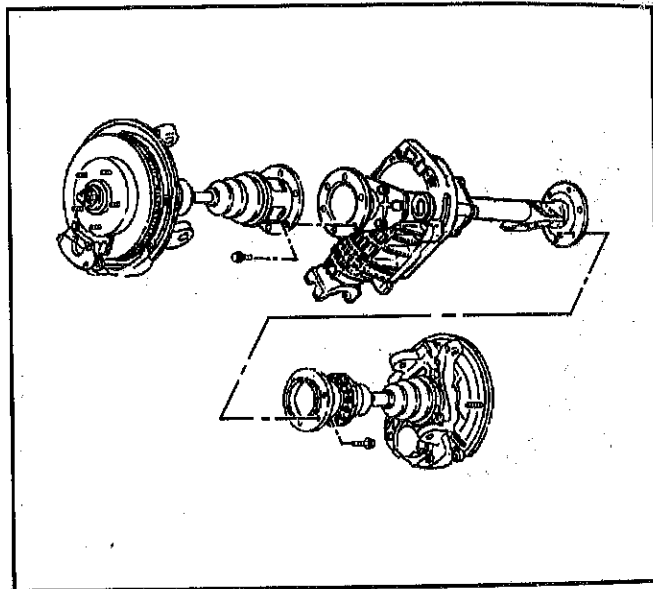


Figure 28—Flange Bolt Removal

5. Cotter pin and nut from outer tie rod.
- A. Separate the outer tie rod ball stud from the steering knuckle using J 24319-B (Figure 30).

NOTICE: Do not attempt to disengage the joint by driving a wedge type tool between the joint and knuckle as the seal may be damaged.

- B. Push the linkage to the opposite side of the vehicle and secure the outer tie rod up and out of the way, this will provide the needed clearance to remove the drive axle.
- C. Support lower control arm.
6. Lower shock mounting nut and bolt (Figure 31).
- A. Collapse/compress the shock absorber and secure it up and out of the way.

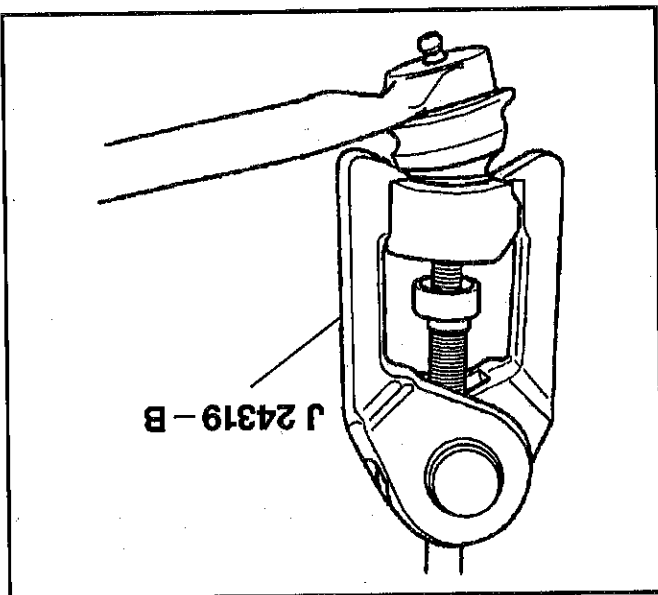
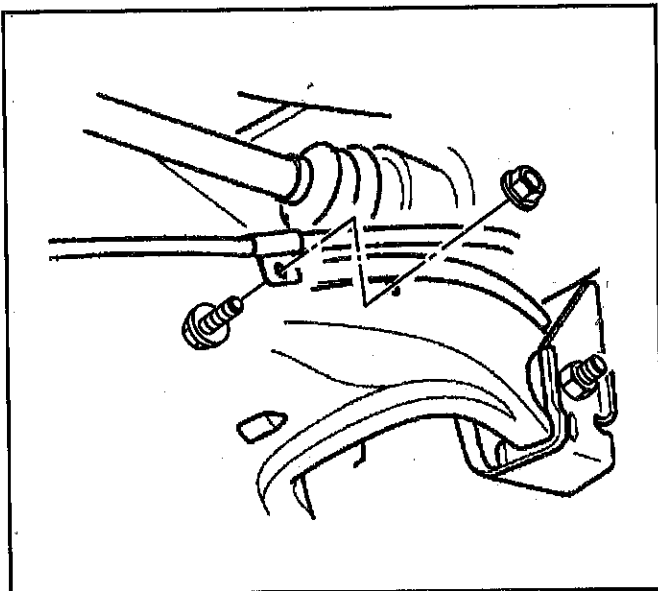


Figure 29—Brake Line Bracket Removal



CAUTION: The floor jack or stand must remain under the control arm spring seat while servicing the drive axle to maintain spring and control arm position. Failure to do so could result in personal injury and/or component damage.

- B. Depending on the type of hoist, it may be necessary to position the floor stand between the spring seats and lower control arm ball joint for maximum leverage. The weight of the vehicle is used to relieve the spring tension on the upper control arm.
7. Disconnect the cotter pin from the upper control arm ball joint stud (Figure 32).
- Loosen (do not remove at this time) the stud nut on the upper ball joint stud.
- Loosen the stud from the knuckle.
8. Nut.
- A. Tip the knuckle out and toward the rear of the vehicle.

4C-16 FRONT DRIVING AXLE

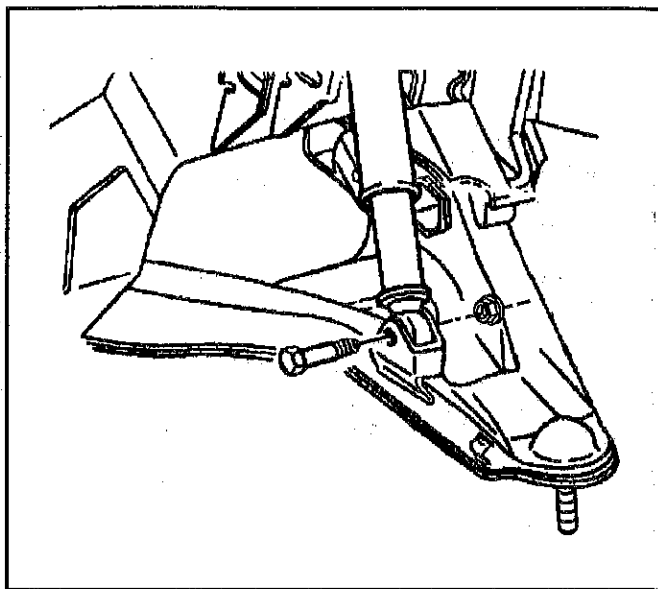


Figure 31—Disconnecting the Lower Shock Mount

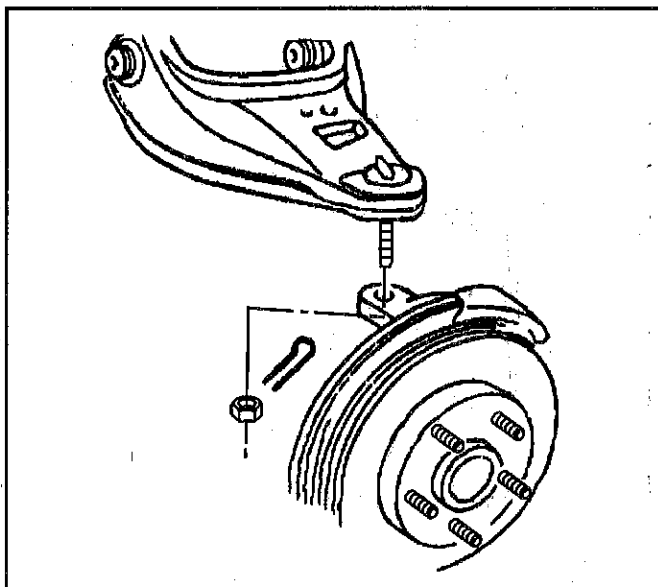


Figure 32—Separating the Ball Joint From the Knuckle

- B. Suspend the knuckle from the upper control arm to prevent straining the brake line (Figure 33).
9. Stud from knuckle (Figure 33).

NOTICE: Cover the shock mounting bracket and the ball stud on the lower control arm with a shoptowel to prevent possible drive axle seal damage during removal and installation.

10. Spline shaft from the knuckle using J 28733-B (Figure 34).
11. Inboard flange bolts loosened earlier.
12. Drive axle from the vehicle.
- Support the drive axle while removing it so as not to tear the boot.

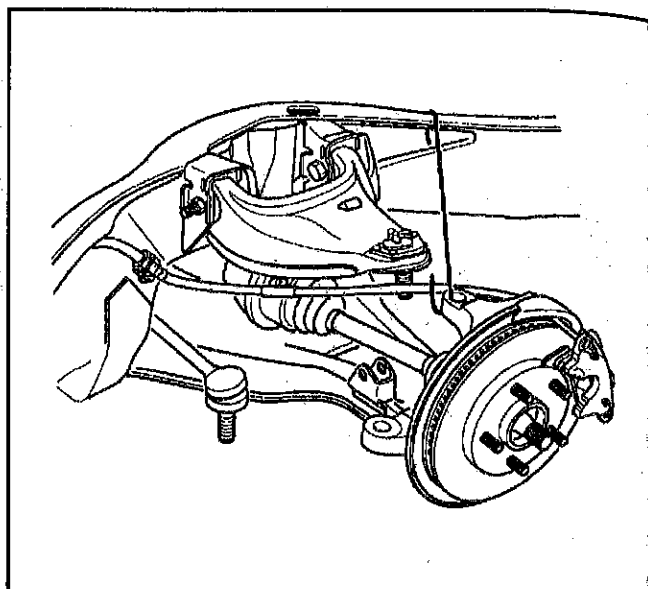


Figure 33—Suspending the Knuckle

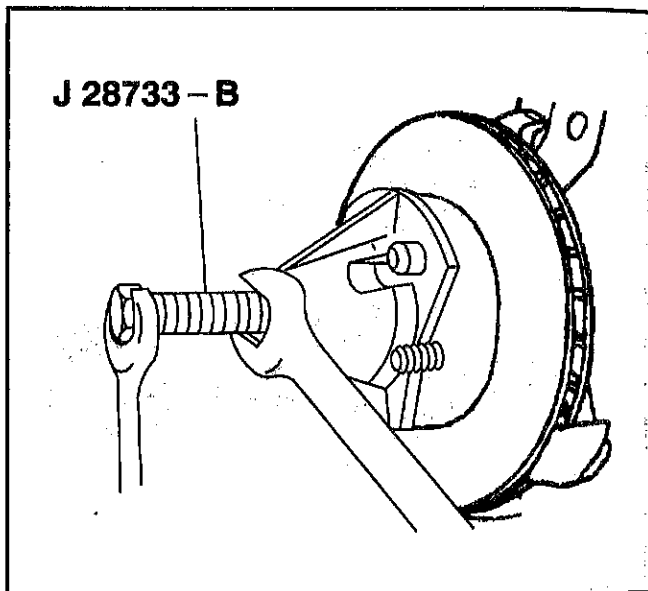


Figure 34—Separating the Splined Shaft From the Knuckle

CAUTION: Do not allow the vehicle's weight to load the front wheels, or attempt to operate the vehicle, when the drive axle(s) or hub nut(s) are removed. To do so may cause the front wheel bearing inner races to separate, resulting in damage to front brake and suspension components and/or personal injury.

Important

- Wipe the wheel bearing seal area on the knuckle clean. Then check seal for cuts or tears.
13. Lubricate the seal lip.
- If the seal is cut or torn, inspect the wheel bearing for damage and replace the seal.
14. Wheel bearing seal by prying the seal out of the knuckle.
- Discard the old seal.

Important

- Lubricate a new wheel bearing seal with chassis grease. Use a flat plate to press the seal down flush with the knuckle.

AXLE INSTALLATION

Install or Connect (Figures 25, 29, 31, and 32)

- Support bracket to 17 N.m (13 lb. ft.).

Tighten

- 9. Cotter pin in the tie rod end.
(Figure 29).
- 10. Brake line support bracket to the upper control arm

- Make sure that the brake hose is not twisted or kinked because damage to the hose could result.
- 11. A drift through the brake caliper to prevent the drive axle from turning.
- 12. Inboard flange bolts.

Tighten

- Bolts to 83 N.m (61 lb. ft.)

Tighten

- Nut to 245 N.m (180 lb. ft.).

- 14. Retainer and cotter pin.
- Align cotter pin hole with retainer slot by rotating retainer.

Important

- Do not back off or tighten hub nut more than specified to install cotter pin

- 15. A new cotter pin.

- Make sure the cotter pin is bent over the retainer to prevent the pin from rattling Remove drift tool

- 16. Brake calipers and hoses. Refer to SECTION 5B1.
- 17. Wheels and tires.
- 18. Front axle under body shield, if equipped.

- Lower the vehicle.

Important

- Tie rod nut to 53 N.m (39 lb. ft.)

Tighten

- Nut and bolt to 73 N.m (54 lb. ft.)
- 8. Tie rod to steering knuckle. Refer to SECTION 3C.

Tighten

- 7. Shock absorber to lower shock mounting bracket with bolt and nut (Figure 31).
- Remove the floor jack or stand from beneath lower control arm, if used.
- Lube the upper ball joint until grease appears at the seal. Refer to SECTION 0B.
- Remove the floor jack or stand from beneath lower control arm, if used.

- 6. Cotter pin.

- Nut to 83 N.m (61 lb. ft.)

Tighten

- 5. Upper ball joint nut (Figure 32).
- 4. Upper ball joint to steering knuckle.
- 3. Bolts but do not tighten.
- 2. Washer and nut.
- 1. Insert and draw up outer C/V joint splined shank into knuckle hub then secure inboard C/V joint flange to companion flange with bolts (do not tighten bolts) (Figure 25).

- Prior to drive axle installation, cover the shock mounting bracket, lower control arm ball stud, and all other sharp edges with a shop towel so as not to damage the boot.

- Align the cotter pin hole by rotating the retainer. DO NOT back off the nut, or tighten nut more than specified, to install the cotter pin. Bend the cotter pin so the retainer is held snugly, to prevent rattling

4C-2 FRONT DRIVING AXLE

The pinion gear is supported by two tapered roller bearings. The pinion depth is set by a shim pack located between the gear end of the pinion and the roller bearing that is pressed onto the pinion. The pinion bearing preload is set by crushing a collapsible spacer between the pinion bearings in the axle housing.

The axle identification code is stamped on the top of the carrier case along the edge of the machined face of the left half.

DIAGNOSIS OF FRONT AXLE NOISE

NOTICE: *The front suspension SHOULD NOT be allowed to hang free. When the CV joint is run at a very high angle, extra vibrations can occur, resulting in damage to seals and joints. Always follow equipment manufacturer's instructions.*

Any gear-driven unit produces a certain amount of noise that is normal and cannot be eliminated by conventional repairs or adjustment. Slight noise that is heard only at a certain speed or under unusual or remote conditions is acceptable. For example, a noise that tends to reach a peak at speeds from 60 to 100 km/h (40 to 60 mph) depending on road conditions, load conditions, gear ratio, or tire size does not indicate trouble in the axle assembly.

When an axle is suspected of being noisy, check to determine whether the noise originates in the tires, road surface, wheel bearings, engine, transmission, propeller shaft, or axle assembly. Raising tire pressure to eliminate tire noise (although this will not silence tread noise of mud and snow tires), and listening for the noise at varying speeds and road surfaces, on drive, float, and coast conditions will help to locate the source of the noise.

DETERMINING THE SOURCE OF THE NOISE

Road Noise —Some road surfaces, such as brick or rough-surfaced concrete, cause noise that may be mistaken for tire or axle noise. Driving on a different type of road, such as smooth asphalt or dirt, will quickly show whether the road surface is the cause of the noise. Road noise is usually the same on drive or coast.

- Check tires for irregular wear.
- Check tire pressure.
- Check axle lubricant level.
- Drive to warm up the front axle.
- Test at various speeds in drive, float, coast, and while cornering.

Tire Noise —Tire noise may easily be mistaken for axle noise. Tire noise, however, changes with different road surfaces. Axle noise does not. Temporarily inflating all tires to 345 kPa (50 psi) pressure before test purposes only will materially alter noise caused by tires but will not affect noise caused by the axle. Axle noise usually stops when coasting at speeds under 48 km/h (30 mph); however, tire noise continues with lower tone as the vehicle speed is reduced.

The drive axles are completely flexible assemblies, consisting of inner and outer constant velocity (CV) joints connected by an axle shaft. The inner CV joint is a "tripot" design that is completely flexible, and also can move in and out. The outer CV joint is a "Rzeppa" design that is flexible but cannot move in and out.

- Change the tire pressure to minimize noises.
- Drive over different road surfaces.
- Drive on smooth black-top minimizes tire noise.
- Cross switch the tires, if necessary.
- Remember that snow tire treads and studs cause added noises.

Engine and Transmission Noises —To determine which unit is causing the noise, take note of approximate vehicle speeds and conditions under which the noise is most pronounced, then stop the vehicle in a quiet place to stop interfering noises. With the transmission in neutral, run the engine slowly up and down the engine speeds corresponding to the vehicle speed at which the noise was most pronounced. If a similar noise is produced with the vehicle standing, it is caused by the engine or transmission and not the axle.

- A. Drive slightly above the speed where the noise occurs, then place transmission in neutral.
- B. Let the engine speed drop to idle.
- C. Stop the vehicle.
- D. Run the engine at various speeds.

Wheel Bearing Noise —A brinelled wheel bearing causes a knock or click approximately every two revolutions of the wheel, since the bearing rollers do not travel at the same speed as the axle and wheel. With the wheels jacked up, spin the wheels by hand while listening at the hubs for evidence of a rough or brinelled wheel bearing, or loose bearings.

- A. Drive the vehicle at low speed on a smooth road.
- B. Drive the vehicle, turning to the left and right. Noise should change due to cornering loads.
- C. Jack up the wheels to verify roughness at the wheels.

Gear Noise —There are two basic types of gear noise. The first type is produced by broken, bent, or forcibly damaged gear teeth, is usually quite audible over the entire speed range, and presents no difficulty in diagnosis. For example, hypoid gear tooth scoring generally results from the following: insufficient lubricant, improper lubricant, improper break-in, wrong lubricant, insufficient gear backlash, improper ring and pinion alignment, or loss of drive pinion nut torque. The scoring will progressively lead to complete erosion of the gear tooth or gear tooth pitting and then eventual fracture if the initial scoring is not corrected. Another cause of hypoid gear fracture is extended overloading of the gear set. This will produce fatigue fracture, or shock loading, and will result in sudden failure.

4C-18 FRONT DRIVING AXLE

SPECIFICATIONS

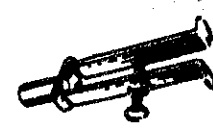
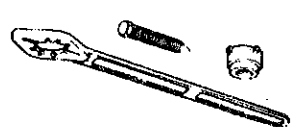
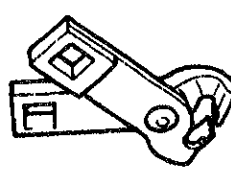
FASTENER TIGHTENING SPECIFICATIONS

ITEM	N·m	Lbs. Ft.	Lbs. In.
Brake Line Support Bracket Mounting Bolts	17	13	—
Carrier Assembly Mounting Bolts	103	76	—
Carrier Output Shaft to Drive Axle Bolts	83	61	—
Drive Axle Nut at Front Hub	245	180	—
Front Prop Shaft Clamp Bolts	20	15	—
Prop Shaft Flange to Front Axle Bolts	75	55	—
Right Side Axle Tube to Carrier Bolts	48	36	—
Right Side Axle Tube to Frame Nuts	98	72	—
Shift Cable Coupling Nut	10	—	90
Shift Cable Housing to Carrier Bolts	48	36	—
Shock Absorber Mounting Bolt Nut	73	54	—
Tie Rod to Steering Knuckle	53	39	—
Upper Ball Joint Stud Nut	83	61	—
Vacuum Actuator Bolts	1.4	—	13

LUBRICATION

Capacity 1.2L (2.6 Pts.)
Type SAE 80-W-90 GL-5 Gear Lubricant
T3377

SPECIAL TOOLS

1. SNAP RING PLIERS	J 8059	1.	
2. AXLE REMOVER	J 28733	2.	
3. BEARING REMOVER	J 29369-2	3.	
4. PILOT BEARING REMOVER AND INSTALLER SET	J 34011	4.	
5. HUB ENGAGEMENT TOOL	J 33791	5.	
6. BUSHING REMOVER	J 8614-01	6.	
7. SHIFT CABLE HOUSING SEAL INSTALLER	J 33799	7.	
8. PILOT BEARING INSTALLER	J 33842	8.	
9. BEARING SEAL INSTALLER	J 33844	9.	
10. CLAMP SEAL INSTALLER	J 33893	10.	
11. PINION OIL SEAL REMOVER	J 35910	11.	
12. UNIVERSAL STEERING LINKAGE PULLER	J 24319-01	12.	