Section 6 Wheels and Tires/Axles/Central Air Inflation System (CTIS)

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WHEEL REPLACEMENT

WARNING: Always take the wheel to an authorized service center for proper servicing. Use 16.5 inch diameter tires only. Mismatching tire and rim diameters is dangerous. A mismatched tire and rim assembly may explode and can result in serious injury or death.

WARNING: Put transmission into the PARK position, apply parking brake, and chock opposite wheel before removing wheel. Avoid removing any wheel when vehicle is on sloping terrain. Injury or damage to equipment may result. Remove only the inner group of lug nuts when removing a wheel from the vehicle. Removing the outer nuts which hold the rim together while the assembly is inflated could result in serious injury or death.

WARNING: Never mix tires of different size or design. Mixing tire types will adversely affect road handling and can lead to loss of vehicle control, and could result in serious injury or death. Match-mark wheel assembly to spindle for correct installation. Depress the quick-disconnect valve tab attached to the opposite side valve spindle nut to prevent air loss from the other tire.

NOTE: One- and two-piece tire and wheel assemblies are replaced basically the same. Match-mark wheel assembly to spindle for correct installation. Depress the quick-disconnect valve tab attached to the opposite side valve spindle nut to prevent air loss from the other tire.

Removal

NOTE: Perform step 1 for vehicles equipped with central tire inflation system (CTIS).

1. Remove tube and quick-disconnect valve from spindle.
2. Loosen eight lug nuts, but do not remove (Figure 6-1).
3. Raise and support corner of vehicle.
4. Remove eight lug nuts and wheel from geared hub spindle.

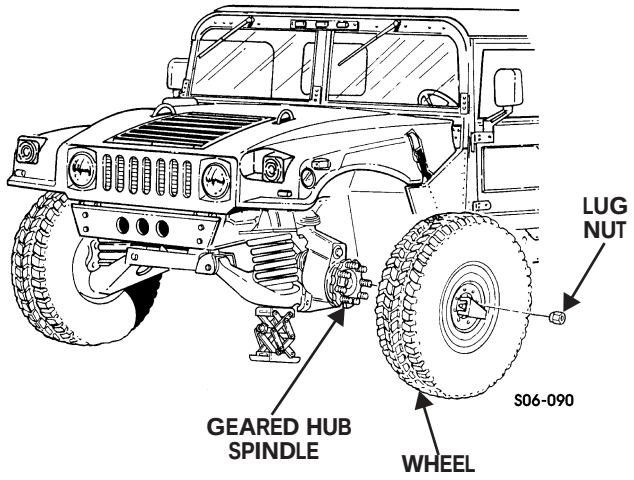


Figure 6-1: Geared Hub Spindle

Installation

NOTE: The Wrangler GS-A, 37 X 12.50R16.5 LTD touring radial tire has a directional tire tread. The heavier, stiffer tread on the outside shoulder of tire must face outward when being installed. Before installing, inspect sidewall of tire and ensure THIS SIDE OUTWARDS imprint is facing outward (Figure 6-2).

NOTE: Install lug nuts with fingers to full engagement. If nuts resist finger tightening, discard nuts. Examine studs for damage and replace if damaged.

1. Install wheel on geared hub spindle with eight lug nuts (Figure 6-1).

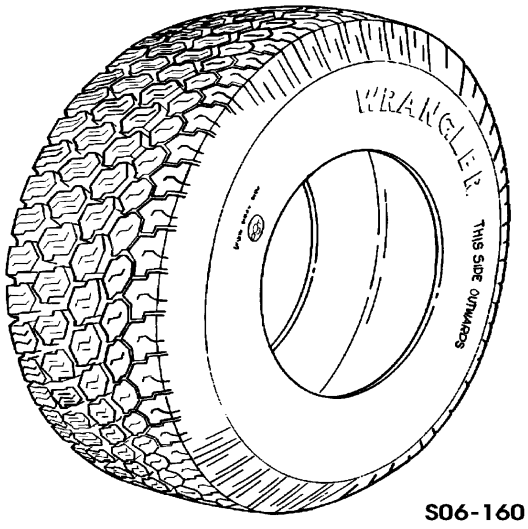


Figure 6-2: This Side Outwards

2. Remove support and lower corner of vehicle.
3. Tighten eight lug nuts to 99-121 lb-ft (134-164 N•m) in tightening sequence shown (Figure 6-3).

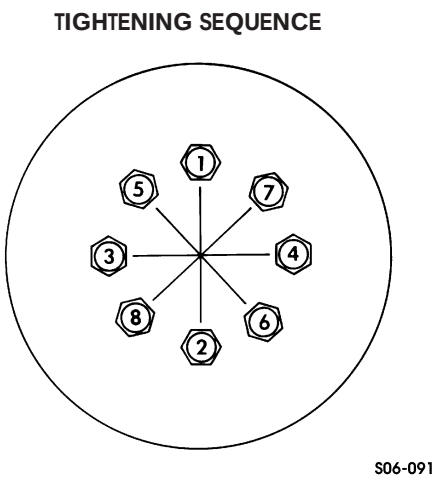


Figure 6-3: Lug Nut Tightening Sequence

CAUTION: *Do not allow sealant into air system. Sealant will damage CTIS components.*

NOTE: Perform step 4 for vehicles equipped with central tire inflation system.

4. Install quick-disconnect valve and tube on spindle.

TIRE, TWO-PIECE WHEEL, AND RUBBER RUNFLAT MAINTENANCE

WARNING: Do not use tire machine. Injury or damage to equipment may result.

NOTE: The HUMMER is equipped with specially designed two-piece take-apart wheels, tires, and runflats. Care must be taken during disassembly and assembly.

Disassembly

1. Remove wheel from vehicle.
2. Place wheel in a tire inflation cage.

WARNING: In all disassembly operations, ensure tire is totally deflated before removing wheel locknuts. Failure to follow proper safety precautions could cause serious injury or death.

3. Remove valve core from valve bore and deflate tire. Run a piece of wire through valve bore to ensure it is not plugged (Figure 6-4).

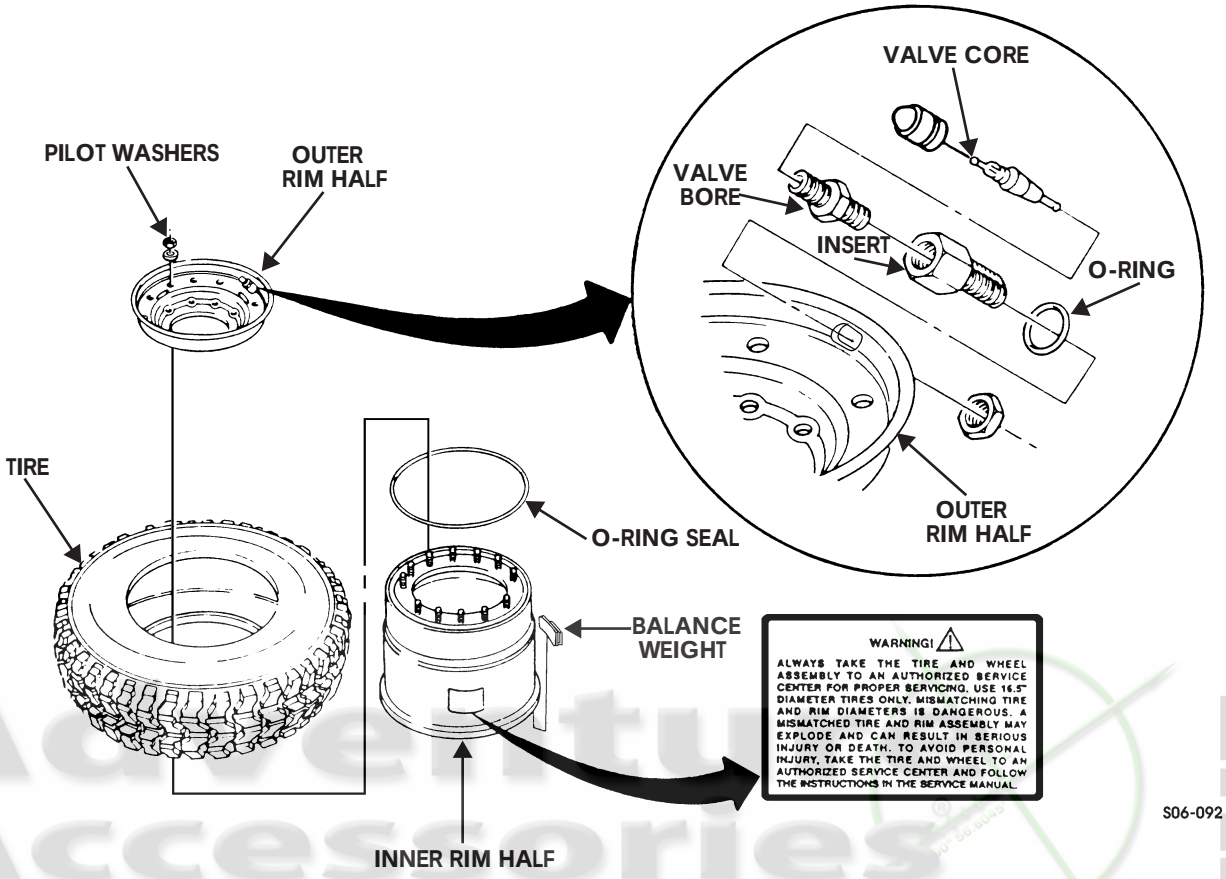


Figure 6-4: Two-Piece Wheel

NOTE: A special pentagon-shaped socket is required for removal and installation of two-piece wheel locknuts. Refer to Section 1, special tools.

WARNING: Do not use unauthorized tools. Damage to equipment, serious injury, or death may result.

4. When tire is fully deflated, use a circular pattern and loosen twelve wheel locknuts securing rim halves together. If you hear air escaping, do not proceed. Wait until the sound stops and recheck valve bore. When you are certain the tire is fully deflated, continue to remove wheel locknuts. Discard locknuts. Remove and discard three pilot washers.

WARNING: Never inflate a two-piece wheel assembly with the wheel locknuts removed in an attempt to separate inner and outer rim halves. The assembly will separate under pressure resulting in serious injury or death.

5. Remove outer rim half from tire.

NOTE: Perform steps 6, 7, and 8 only if damage to valve bore, insert, or O-ring is evident.

6. Inspect valve core and insert for damage. Replace if damaged.
7. Remove valve core housing from insert. Remove insert and locknut from outer rim half. Discard locknut.
8. Remove O-ring from insert. Discard O-ring.
9. Remove O-ring seal from inner rim half. Discard O-ring seal.
10. Remove tire from inner rim half.
11. Remove balance weights from rim halves. Discard balance weights.
12. Lay tire flat.

WARNING: To avoid injury, ensure runflat compressor strap is centered around runflat.

NOTE: Remove any gel lubricant from runflat prior to installing compressor.

13. Position runflat compressor on runflat so that runflat compressor hex drive is facing up and strap is centered around runflat (Figure 6-5).

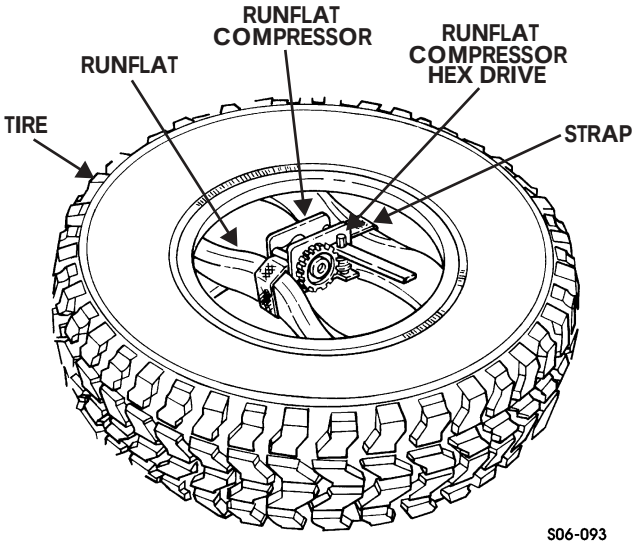


Figure 6-5: Runflat Compressor

NOTE: Compress runflat by rotating hex drive in either direction. Rotate hex drive in opposite direction to loosen.

14. Using runflat compressor, compress runflat.
15. Position runflat compressor on an outer edge of runflat with handle assembly facing up and strap centered around runflat (Figure 6-6).

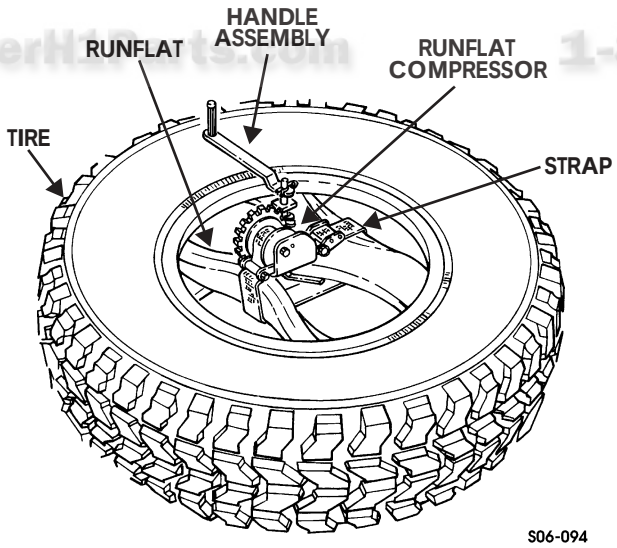


Figure 6-6: Handle Assembly

NOTE: Compress runflat by rotating the handle assembly in a clockwise direction. Rotate handle assembly counterclockwise to loosen.

16. Using runflat compressor, compress runflat.

NOTE: It may be necessary to use a tire spoon and tire soap to remove runflat from tire. When using runflat compressor with handle, it may be necessary to remove handle before removing runflat.

17. Remove runflat from tire and remove runflat compressor from runflat (Figure 6-7).

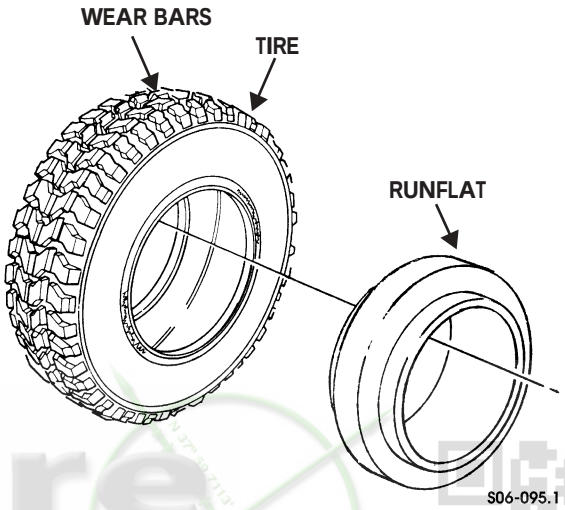


Figure 6-7: Runflat Tire Assembly

Inspection and Cleaning

***CAUTION**: Do not reuse a tire which has been run flat without thoroughly inspecting for damage. Failure to follow these instructions may result in damage to equipment.*

1. Remove any existing lubricant that has been previously applied to the inside of the tire using a mild detergent soap and water.
2. Dry all wheel and tire parts. Ensure inside of tire is free of any runflat lubricant, dirt, debris, rust, or moisture.
3. Inspect inside of tire for cord or belt separation and inner liner damage. Replace tire if damaged.
4. Inspect tire bead for abrasions. Replace tire if damaged.
5. Check for protruding objects inside tire which may not be visible from outside. If tire is damaged, repair with internal (05710215) or external (05710216) tire repair kit.
6. Check tread depth on tire. Tread should not be worn below level of wear bars. Markings on the sides of the tires (e.g., the letters "TWI" or a triangle) show the location of wear bars. Replace tire if tread is worn below wear bars or 3/32 inch (2.38 mm).
7. Inspect runflat for splitting, wear, or excessive chafing. Replace runflat if damaged (Figure 6-7).
8. Inspect outside of tire for sidewall damage. Replace tire if damaged.
9. Inspect outside of tire for tread damage. If beyond inside patch repair, replace tire.

WARNING: O-ring sealing surfaces and pressure relief grooves must be kept clean and free from rust and dirt. Failure to do so could cause the wheel assembly to separate under pressure causing serious injury or death.

10. Using wire brush, clean studs. Clean all dirt and foreign material from rim halves with soap and water and allow to air dry. Ensure O-ring sealing surfaces on rim halves are smooth and clean (Figure 6-8).
11. Inspect rim halves for cracks, bent sealing surfaces, or oversized mounting holes. Replace rim halves if cracked, bent, or if mounting holes are oversized.

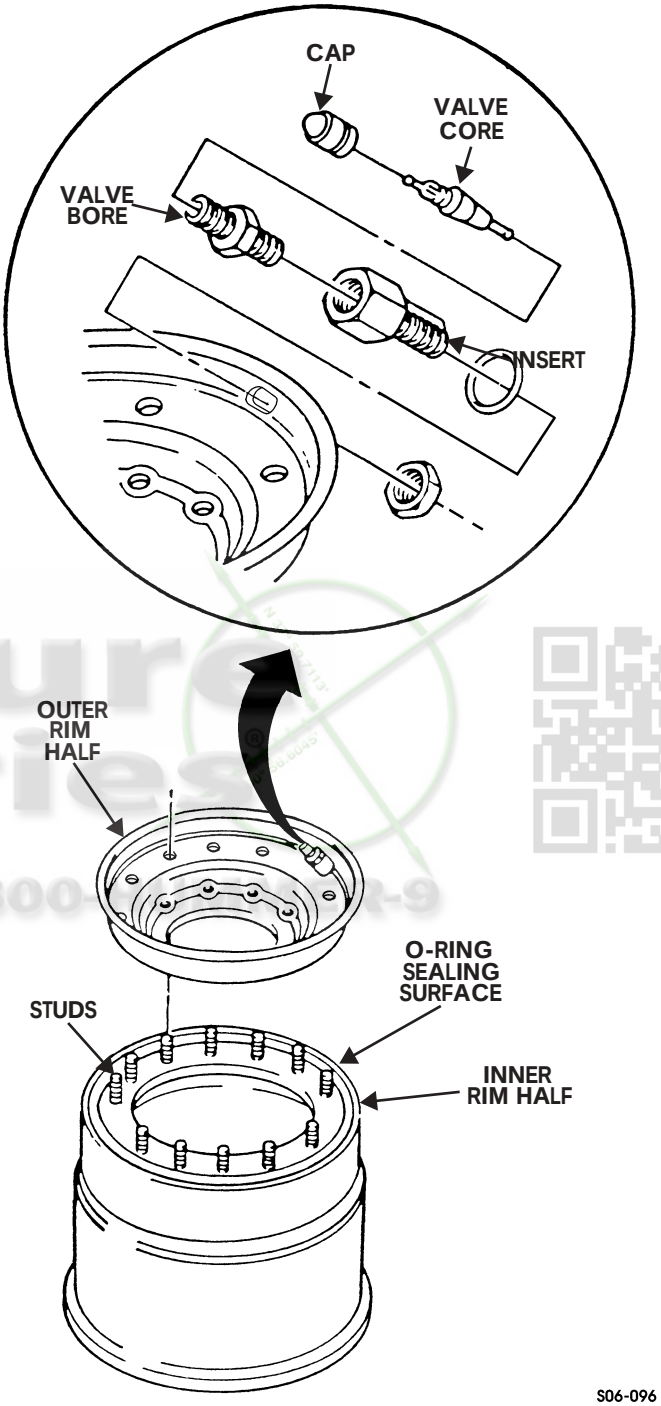


Figure 6-8: Rim Halves

WARNING: Never use wheel assemblies with studs that are damaged, loose, or have stripped threads. Damaged studs can cause improper assembly which could cause individual fasteners to fail. Any of these situations could cause serious injury or death.

NOTE: When replacing a damaged stud, also replace two adjacent studs.

12. Inspect inner rim half for cracked, broken, rusted, pitted, bent, loose, or stripped studs. Replace damaged studs along with two adjacent studs.
13. Inspect valve core for cracks or deterioration. Replace valve core if damaged (Figure 6-8).
14. Inspect valve bore for cracks or deterioration. Replace if damaged.
15. Inspect insert and cap for damage. Replace if damaged.

Repair

1. If studs are damaged, drive studs out of inner rim half. Discard studs (Figure 6-9).
2. Align splines on studs with splines in inner rim half and drive studs into inner rim half until shoulders seat against inner rim half.

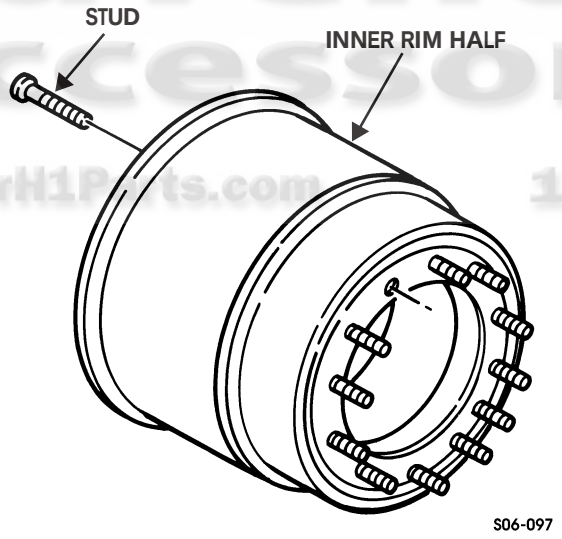


Figure 6-9: Inner Rim Half

Assembly

WARNING: Never use tubes in the wheel assemblies. Use of a tube defeats built-in safety features, and could cause the wheel to come apart under pressure, resulting in serious injury or death. Use only replacement parts specified in parts manual. Wheels assembled with components which do not meet specifications could cause the assembly to separate under pressure, resulting in serious injury or death. To avoid injury ensure runflat compressor strap is centered on runflat.

1. Apply one 11-ounce tube of gel lubricant around inside of tire at crown area. Using clean brush, evenly spread gel lubricant 4 to 5 inches wide on tire crown area (Figure 6-10).

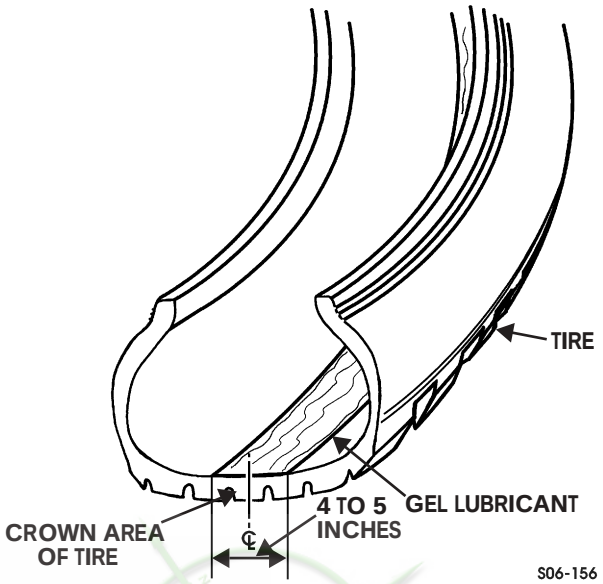


Figure 6-10: Runflat Gel Lubricant

NOTE: Perform steps 2 and 3 when using runflat compressor without handle. Perform steps 4 and 5 when using runflat compressor with handle.

2. Position runflat compressor on runflat so that runflat compressor hex drive is facing up and strap is centered around runflat (Figure 6-11).

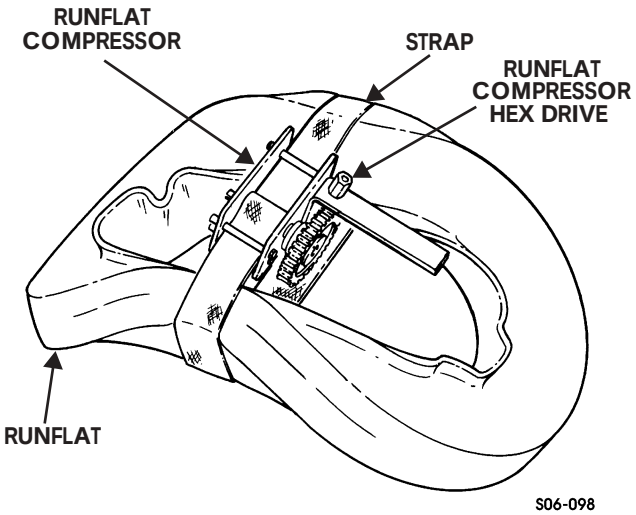


Figure 6-11: Runflat Compressor

NOTE: Compress runflat by rotating hex drive in either direction. Rotate hex drive in opposite direction to loosen.

3. Using runflat compressor, compress runflat.
4. Position runflat compressor on an outer edge of runflat with handle assembly facing up and strap centered around runflat (Figure 6-12).

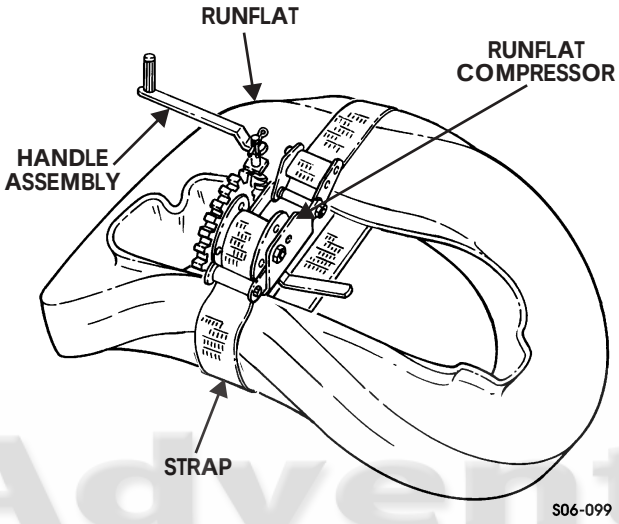


Figure 6-12: Runflat Compression

NOTE: Compress runflat by rotating the handle assembly in a clockwise direction. Rotate handle assembly counterclockwise to loosen.

5. Using runflat compressor, compress runflat.
6. Stand tire up and lubricate tire bead and runflat with tire soap (Figure 6-13).

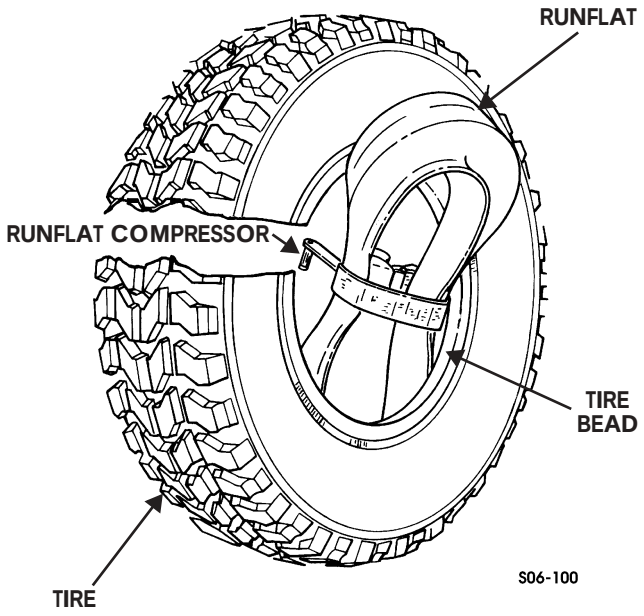


Figure 6-13: Runflat Insertion

NOTE: It may be necessary to remove the handle assembly on runflat compressor before inserting runflat into tire.

7. Insert runflat compressor side first as far as possible into tire.
8. Lay tire flat on side. Slowly loosen compressor. Runflat should insert itself inside tire. If not, repeat steps 6 through 8 and/or use a tire spoon to assist in installation.

NOTE: If required, clean and lubricate bearing assembly on runflat compressor after removal.

9. Loosen runflat compressor and remove from tire.

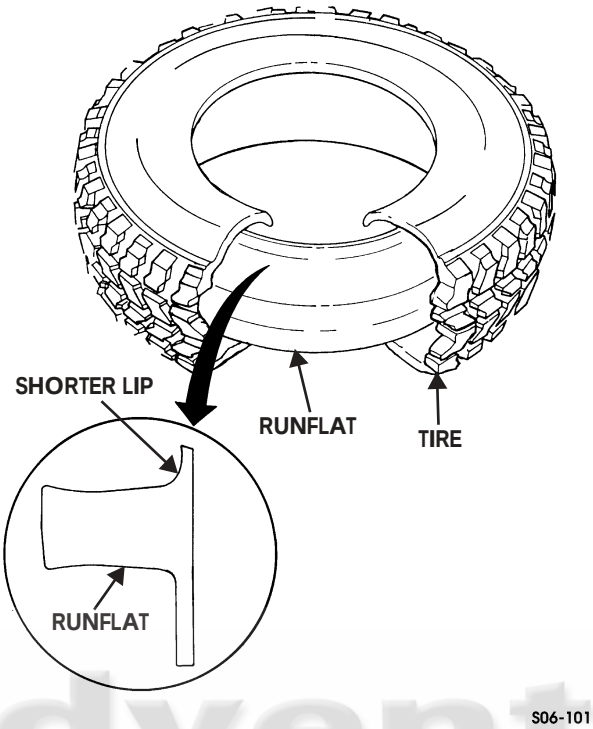


Figure 6-14: Runflat

NOTE: Ensure shorter lip of runflat faces inner rim side of tire (Figure 6-14).

10. Lubricate O-ring seal with tire soap and install O-ring seal on first ledge of inner rim half. Ensure O-ring seal is not twisted and is uniformly positioned in the groove outside of the studs. Do not overstretch O-ring seal (Figure 6-15).
11. Lubricate tire bead and rim bead seat areas with tire soap.

NOTE: Before installing tire on inner rim half, inspect tire sidewalls for a "paint dot." Paint dots are often painted on tires to indicate the tire's light spot for balancing purposes. If paint dot is present, position tire on rim halves so that paint dot is aligned with insert hole on outer rim half.

NOTE: The Wrangler GS-A, 37 X 12.50R16.5 LTD touring radial tire has a directional tire tread. The heavier, stiffer tread on the outside shoulder of tire must face outward when being installed. Before installing, inspect sidewall of tire and ensure THIS SIDE OUTWARDS imprint is facing outward (Figure 6-16).

1. Center runflat in tire. Carefully lower tire over inner rim half. Check to ensure O-ring seal has not been disturbed (Figure 6-15).

***CAUTION**: Ensure the runflat is properly aligned with the valve stem in the wheel. Improper alignment can result in non-uniform bead pressure and improper runflat operation.*

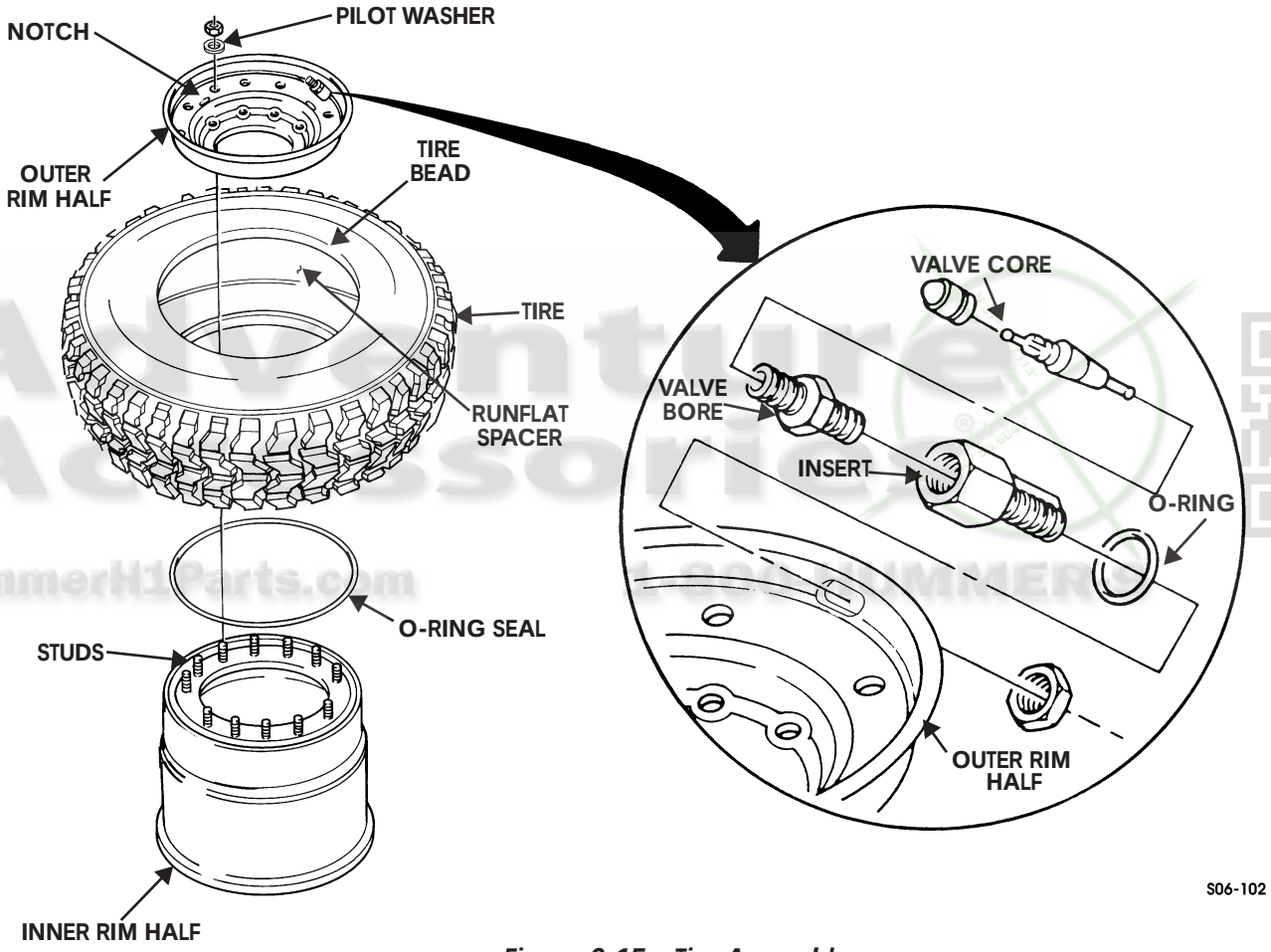


Figure 6-15: Tire Assembly

12. Ensure runflat is not binding on flat portion of inner rim half. Runflat should clear inner rim half.
13. Install valve core in valve bore.

NOTE: Perform step 15 only if valve bore and insert were removed.

14. Install O-ring into pocket on insert. Install insert into valve hole of outer rim half with locknut. Tighten locknut to 40-60 lb-in. (5-7 N•m). Apply thread-locking compound to valve bore and install valve bore into insert. Tighten valve bore to 25-30 lb-ft (34-41 N•m).
15. Install outer rim half on inner rim half.
16. Install three pilot washers spaced equally apart on studs located left of outer rim half notches (ensure washers are seated in outer rim half).

***CAUTION**: Tighten locknuts gradually to avoid bent and broken studs, or damage to wheel components.*

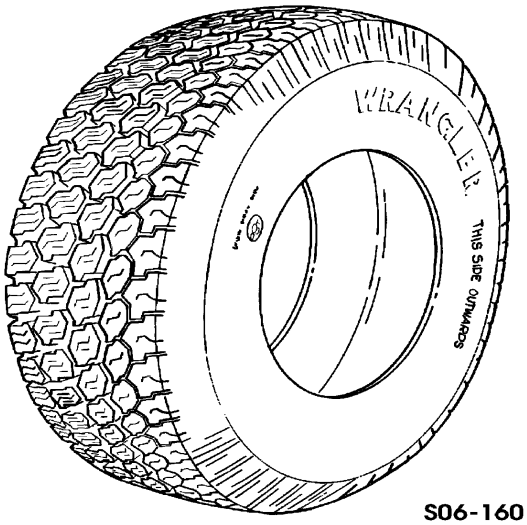


Figure 6-16: This Side Outwards

NOTE: If vehicle is equipped with central tire inflation system, position shield bracket on outer rim.

17. Secure outer rim half on inner rim half with twelve locknuts.

NOTE: If tire bead does not seat on the rim flange after inflation, deflate tire completely and remove from rim. Check to ensure that a 16.5 inch diameter tire is being used. Also check for bent or damaged components and replace if necessary. Apply tire soap to tire bead and rim mating surfaces and reinstall tire on rim.

NOTE: Never tighten locknuts when tire is in an inflated condition. This will result in a less effective torque. Tighten locknuts to proper torque specifications every 6,000 miles (9600 km).

18. Tighten locknuts to 85 lb-ft (115 N•m) in tightening sequence shown (Figure 6-17).

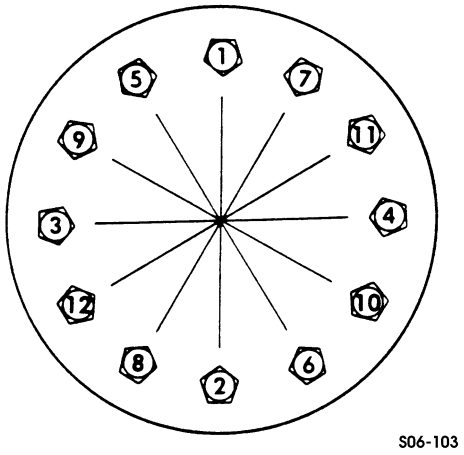


Figure 6-17: Locknut Tightening Sequence

19. Retighten locknuts to 125 lb-ft (170 N•m) in sequence shown.
20. Check wheel assembly for gaps at each stud. Use a 0.0015 inch (0.038 mm) thickness gauge to detect gaps. If gaps are detected, disassemble and reassemble wheel assembly and recheck for gaps. If gaps are still detected, replace outer rim half (Figure 6-18).

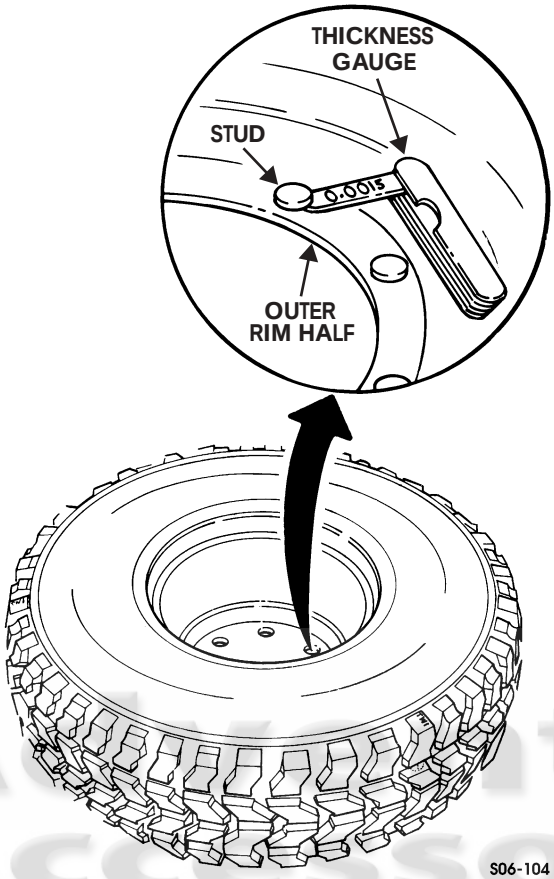


Figure 6-18: Gap Checking

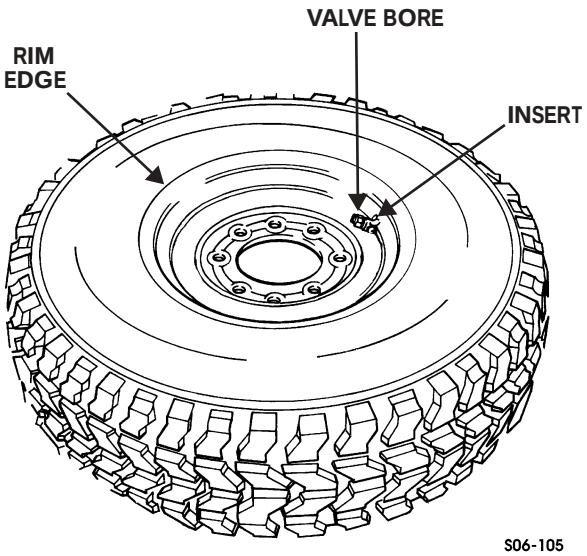


Figure 6-19: Check Areas

NOTE: Check alignment between outer rim half and inner rim half every 3,000 miles (4800 km).

WARNING: Never inflate a tire without having checked wheel locknut torques to ensure the wheel locknuts are tightened to specifications. A wheel with improperly tightened locknuts could separate under pressure, resulting in serious injury or death. Always use a tire inflation cage for inflation purposes. Stand on one side of cage during inflation, never directly in front. Keep hands out of the cage during inflation. Inflate tire to recommended pressure using a clip-on air chuck. Do not exceed 50 psi (345 kPa) cold inflation pressure. Failure to follow these instructions may result in serious injury or death.

21. Place wheel in safety cage and inflate tire to recommended tire pressure.
22. Check for leaks around rim edges, insert, and valve bore with soapy solution (Figure 6-19).

TIRE, ONE-PIECE WHEEL, AND TWO-PIECE RUNFLAT MAINTENANCE

WARNING: Do not use tire machine. Injury or damage to equipment may result.

Disassembly

1. Remove wheel from vehicle.
2. Place wheel in a tire inflation cage.
3. Remove valve core from valve bore and deflate tire. Run a piece of wire through valve bore to ensure it is not plugged (Figure 6-20).
4. Remove outboard side of tire from outboard side of wheel (Figure 6-21).
5. Inspect valve bore and insert for damage. Replace either if damaged (Figure 6-20).

NOTE: Perform steps 6, 7, and 8 only if damage to valve bore, insert, or O-ring is evident.

6. Remove valve bore, insert, and locknut from wheel. Discard locknut.
7. Remove O-ring from insert. Discard O-ring.
8. Remove balance weights from wheel if present. Discard balance weights.
9. Remove two capscrews, screws, lock-clips, and runflat halves from wheel (Figure 6-21).

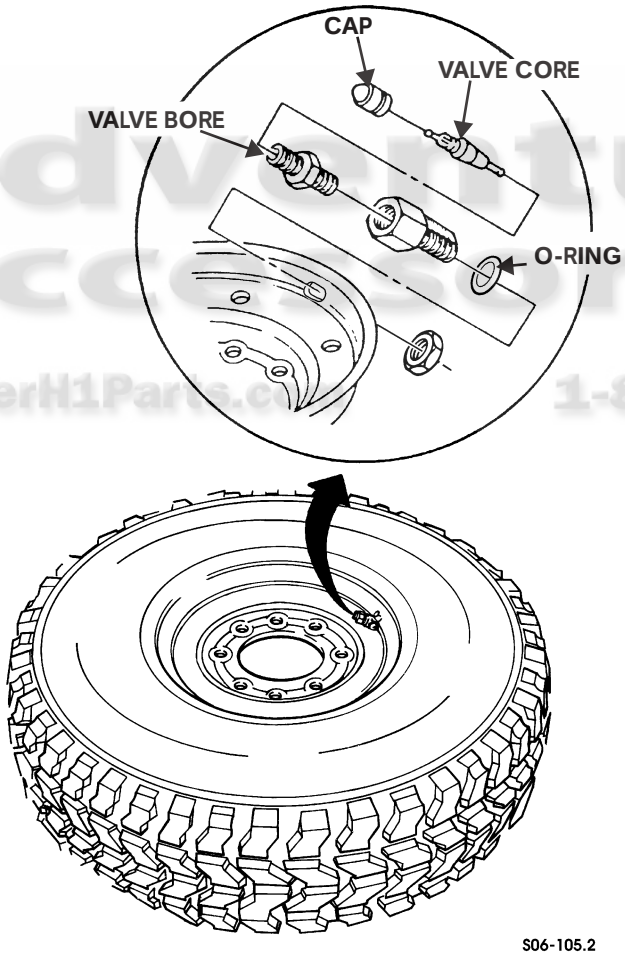


Figure 6-20: One-Piece Wheel

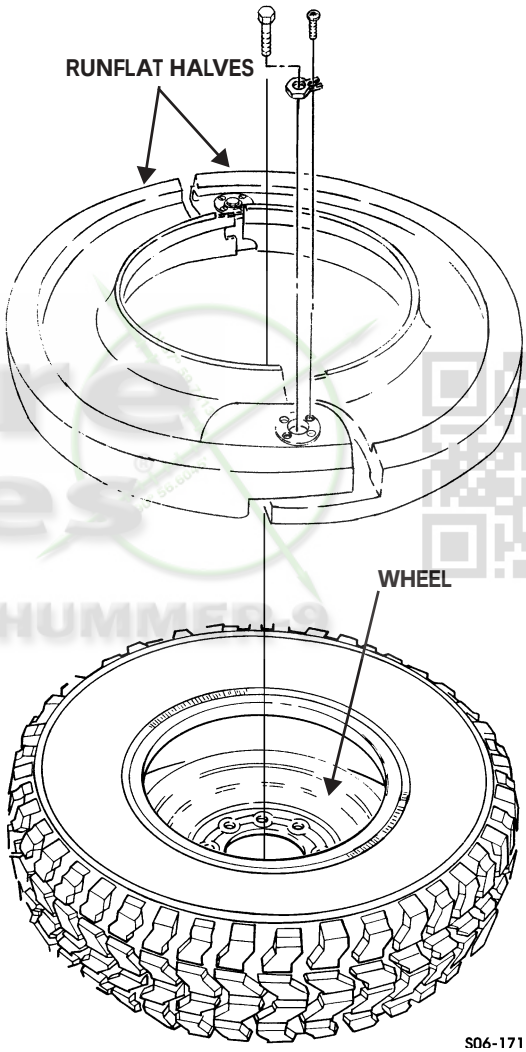


Figure 6-21: Two-piece Runflat

Inspection and Cleaning

***CAUTION**: Do not reuse a tire which has been run flat without thoroughly inspecting for damage. Failure to follow these instructions may result in damage to equipment.*

1. Remove any existing lubricant that has been applied to the inside of the tire, using a mild detergent soap and water.
2. Dry all wheel and tire parts. Ensure inside of tire is free of any runflat lubricant, dirt, debris, rust or moisture.
3. Inspect inside of tire for cord or belt separation and inner liner damage. Replace tire if damaged.
4. Inspect tire bead for abrasions caused from runflat. Replace tire if damaged.
5. Check for protruding objects inside tire which may not be visible from outside. If tire is damaged, repair with internal (05710215) or external (05710216) tire repair kit.
6. Check tread depth on tire. Tread should not be worn below level of wear bars. Markings on the sides of the tires (e.g., the letters "TWI" or a triangle) show the location of wear bars. Replace tire if tread is worn below wear bars or 3/32 inch (2.38 mm).
7. Inspect runflat for splitting, wear, or excessive chafing. Replace runflat if damaged.
8. Inspect wheel. Replace wheel if cracked or bent.
9. Inspect valve core for cracks or deterioration. Replace if damaged.
10. Inspect valve bore for cracks or deterioration. Replace if damaged.
11. Inspect insert and cap for damage. Replace if damaged.

Assembly

1. Apply one 11-ounce tube of gel lubricant around inside of tire at crown area. Using clean brush, evenly spread gel lubricant 4 to 5 inches wide on tire crown area (Figure 6-22).

NOTE: It may be necessary to use two steel mounting rods and adjustment band to install runflat on wheel.

NOTE: Ensure shorter lip of runflat faces inboard side of tire.

NOTE: Ensure that a 16.5 inch diameter tire is being used.

2. Lubricate tire bead and wheel bead seat areas with tire soap.

NOTE: Before installing tire inspect tire sidewalls for a "paint dot." Paint dots are often painted on tires to indicate the tire's light spot for balancing purposes. If paint dot is present, position tire on wheel so that paint dot is aligned with insert hole on wheel.

3. Install inboard side of tire on outboard side of wheel (Figure 6-23).
4. Install runflat halves on wheel with two capscrews. Tighten capscrews to 240 lb-in. (27 N•m) (Figure 6-24).

NOTE: Perform adjustment procedure if runflat is not tightly seated on wheel. Then continue to step 5.

5. Install two lock-clips, capscrews, and screws on runflat (Figure 6-21).

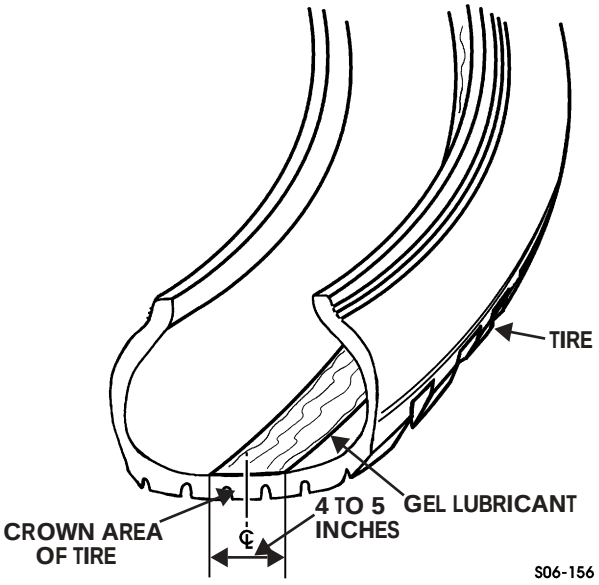


Figure 6-22: Runflat Gel Lubricant

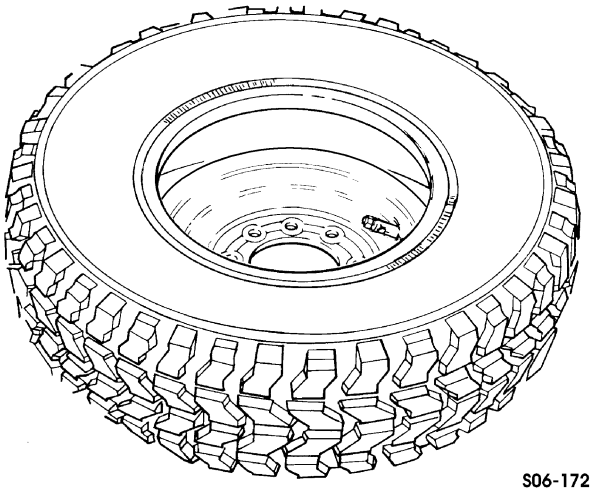


Figure 6-23: Partial Tire Installation

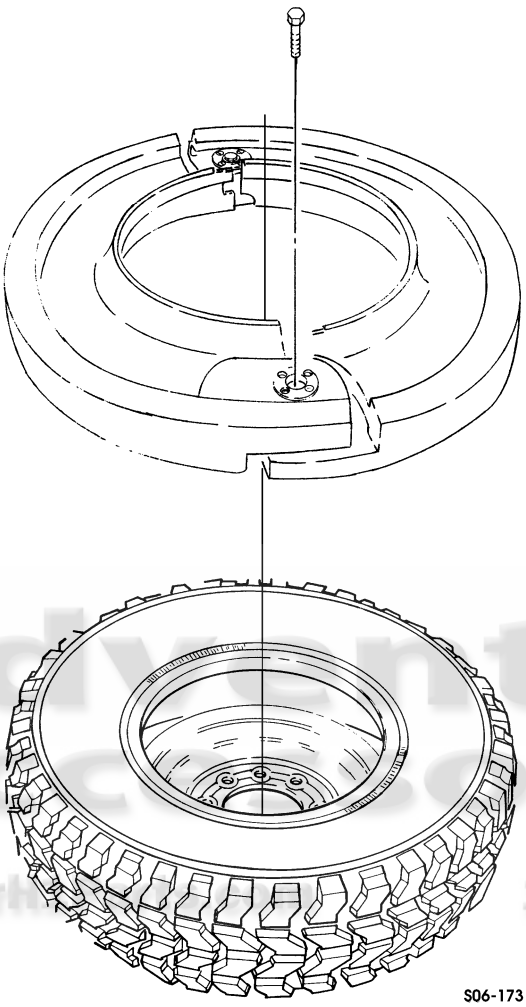


Figure 6-24: Two-Piece Runflat

6. Install valve core in valve bore (Figure 6-25).
7. Install O-ring into pocket on insert. Install insert into valve hole. Install locknut on insert and tighten to 40-60 lb-in. (5-7 N•m). Apply thread-locking compound to valve bore and install valve bore into insert. Tighten valve bore to 25-30 lb-ft (24-41 N•m).
8. Install outboard side of tire on outboard side of wheel (Figure 6-26).

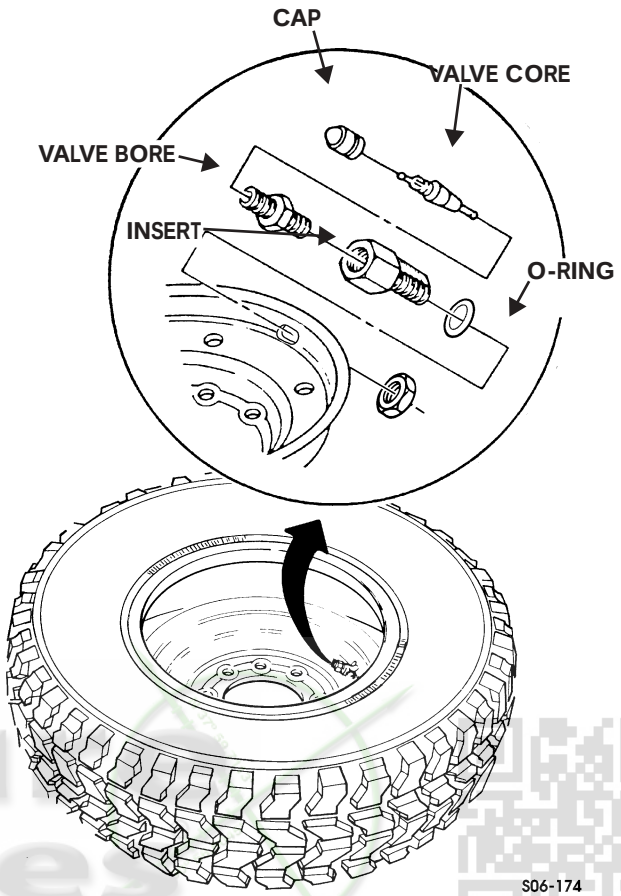


Figure 6-25: Valve Assembly

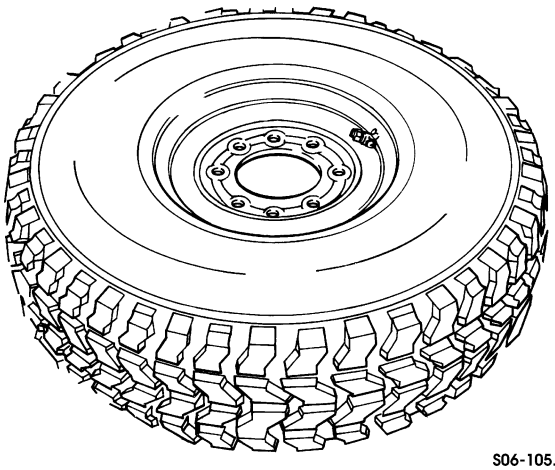


Figure 6-26: Tire

WARNING: Always use a tire inflation cage for inflation purposes. Stand one side of cage during inflation, never directly in front. Keep hands out of the cage during inflation. Inflate assembly to recommended pressure using a clip-on air chuck. Do not exceed 50 psi (345 kPa) cold inflation pressure. Failure to follow these instructions may result in serious injury or death.

9. Inflate tire to recommended tire pressure.
10. Check for leaks around wheel edges, insert, and valve bore with soapy solution (Figure 6-27).

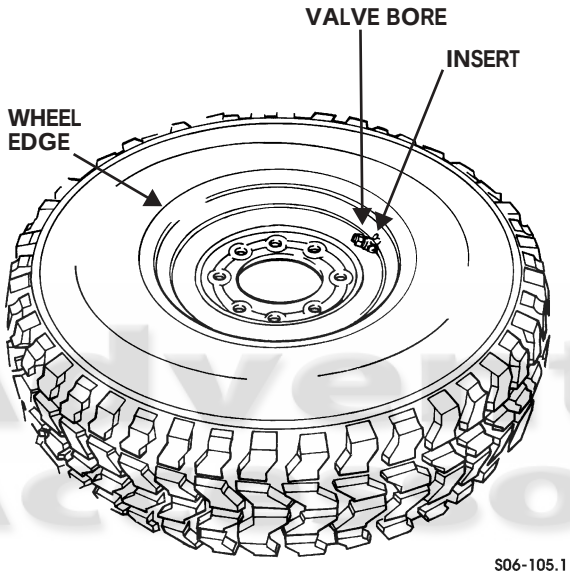


Figure 6-27: Leak Check Areas

11. Install wheel on vehicle.

Adjustment

CAUTION: *Do not make adjustments on only one eccentric washer. Failure to alternate between the two eccentric washers, when required, will result in damage to equipment.*

1. Remove three screws from eccentric washer (Figure 6-21).
2. Rotate eccentric washer 180 degrees.

NOTE: If runflat seating is not corrected, perform steps 1 and 2 for the other eccentric washer.

NOTE: If runflat seating is not corrected, perform step 2 alternating between the two eccentric washers.

NOTE: Perform step 3 for both washers if necessary.

3. Install 3 screws on eccentric washers.

RUNFLAT COMPRESSOR BELT REPLACEMENT

Removal

NOTE: Perform steps 1 through 3 for runflat compressor without handle. Perform step 4 for runflat compressor with handle. Note position of belts for installation.

1. Remove small pin from belt and worm gear shaft assembly. Discard small pin (Figure 6-28).

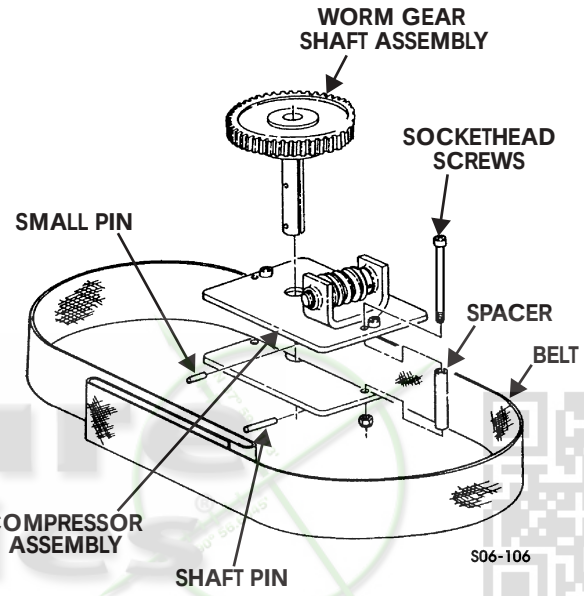


Figure 6-28: Remove and Discard Small Pin

2. Remove shaft pin and worm gear shaft assembly from compressor assembly. Discard shaft pin.
3. Remove two locknuts, sockethead screws, and spacers from belt and compressor assembly. Discard locknuts.
4. Remove locknut, capscrew, and belt from compressor. Discard locknut (Figure 6-28).

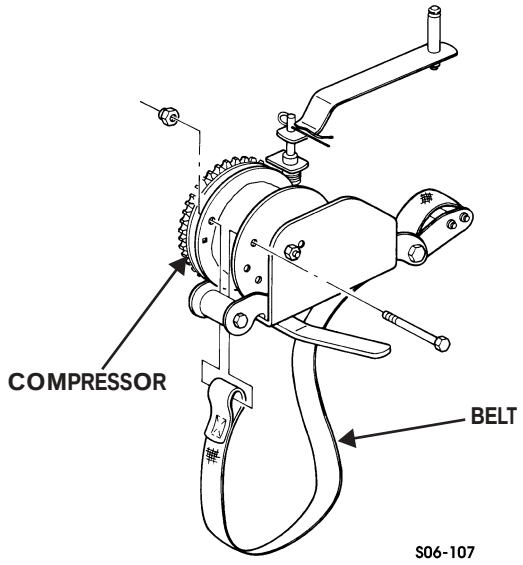


Figure 6-29: Removing Runflat Compressor Belt

Installation

NOTE: Belt overlap is to be positioned so that you have equal amount of belt on each side of the worm gear shaft assembly. Perform steps 1 through 3 for runflat compressor without handle. Perform steps 4 and 5 for runflat compressor with handle.

1. Install belt on compressor assembly with two spacers, sockethead screws, and locknuts (Figure 6-29).
2. Install worm gear shaft assembly on compressor assembly with shaft pin.
3. Secure belt on worm gear shaft assembly with small pin.
4. Install belt on compressor with capscrew and locknut (Figure 6-29).
5. Loop free end of belt around retaining bracket (Figure 6-30).

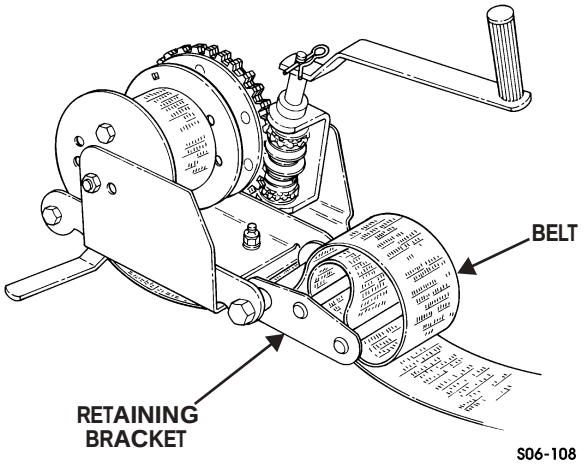


Figure 6-30: Loop Belt Around Retaining Bracket

WHEEL AND TIRE BALANCING

General

There are two types of tire and wheel balancing: static and dynamic. Static balance is the equal distribution of weight around the wheel. Wheel that are statically unbalanced cause a bouncing action called vehicle shake and possible steering nibble or oscillation. This condition will eventually cause uneven tire wear (Figure 6-31).

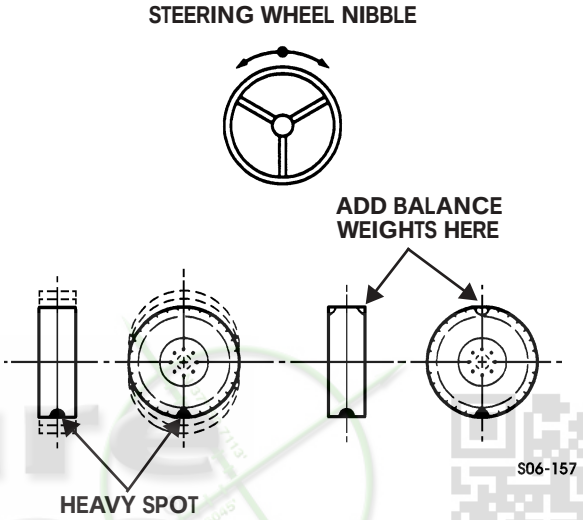


Figure 6-31: Steering Nibble

Dynamic balance is the equal distribution of weight on each side of the centerline, so that when the wheel spins there is no tendency for it to move from side to side. Wheels that are dynamically unbalanced may cause wheel shimmy, vehicle shake or a steering wheel vibration called nibble or oscillation (Figure 6-32).

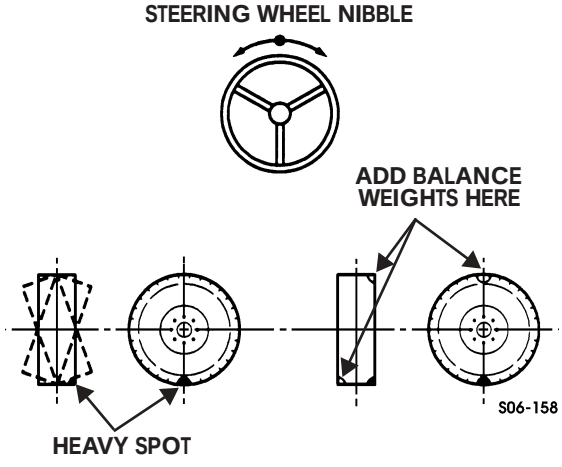


Figure 6-32: Dynamic Imbalance and Lateral Runout

NOTE: Most electronic off-vehicle balancers are more accurate than on-vehicle spin balancers. They are easy to use and give a dynamic (two-plane) balance. On-vehicle balancing is not recommended. When balancing off-vehicle, the wheel should be on the balancer with a cone through the back side of the center pilot hole or by the wheel (spindle) stud holes. The spindle stud method is recommended for CTIS wheels.

Balancing

1. Remove wheel and tire assembly from the vehicle.

WARNING: Remove all stones and foreign material from the tire tread before spin balancing. Failure to follow this warning may result in injury.

NOTE: Deposits of foreign material must be cleaned from the inside of the wheel and the tire tread to obtain a good balance. The tire should be inspected for obvious damage, then balanced according to the equipment manufacturers recommendations.

2. Mount wheel and tire assembly, curb side out, on dynamic balancer and start balance cycle (Figure 6-33).

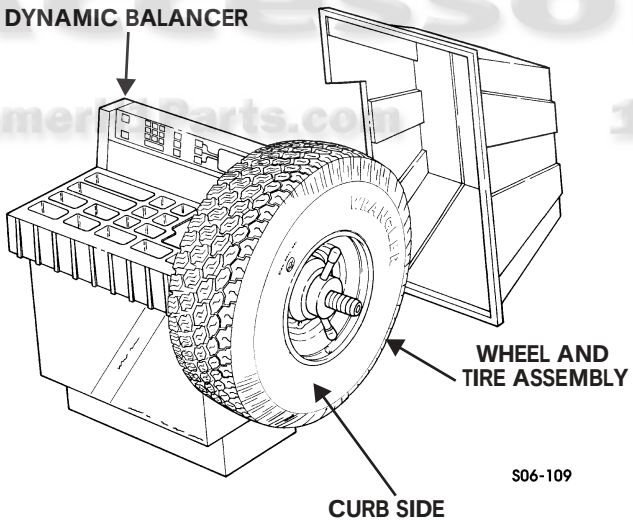


Figure 6-33: Dynamic Balancer

3. Locate and mark light spot on tire (Figure 6-34).
4. Record weight and position readings.

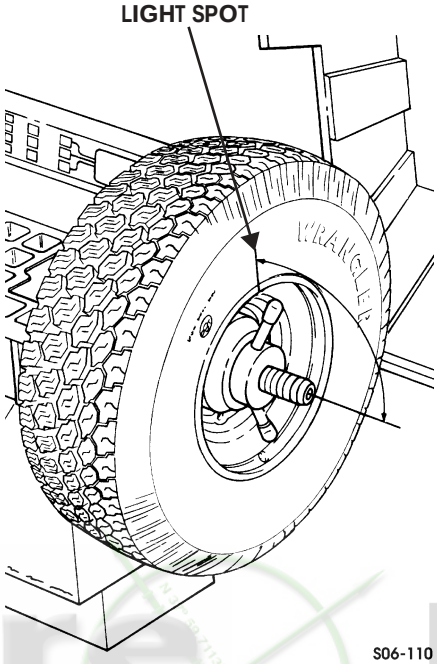


Figure 6-34: Light Spot

NOTE: If more than 15 oz. of weight is required to balance tire, wheel and runflat (if installed) must be disassembled and tire rotated 180° on wheel. Tires can be balanced using either adhesive backed tape-on or clip-on type weights. Do not use wheel balancing liquids to balance wheel and tire assembly.

5. Attach weights to inner and/or outer edges of wheel (indicated by dynamic balancer), ensuring weight clips are centered on light spot, or weights are placed evenly to sides of light spot if more than one weight is used. If installing weight clips, use a small hammer or clip-clawhammer tool. Tap weights to conform to wheel edge contour (Figure 6-35).
6. Start balance cycle and repeat steps 3 through 5 until tire is properly balanced.

7. Remove wheel and tire assembly from dynamic balancer and install on vehicle.

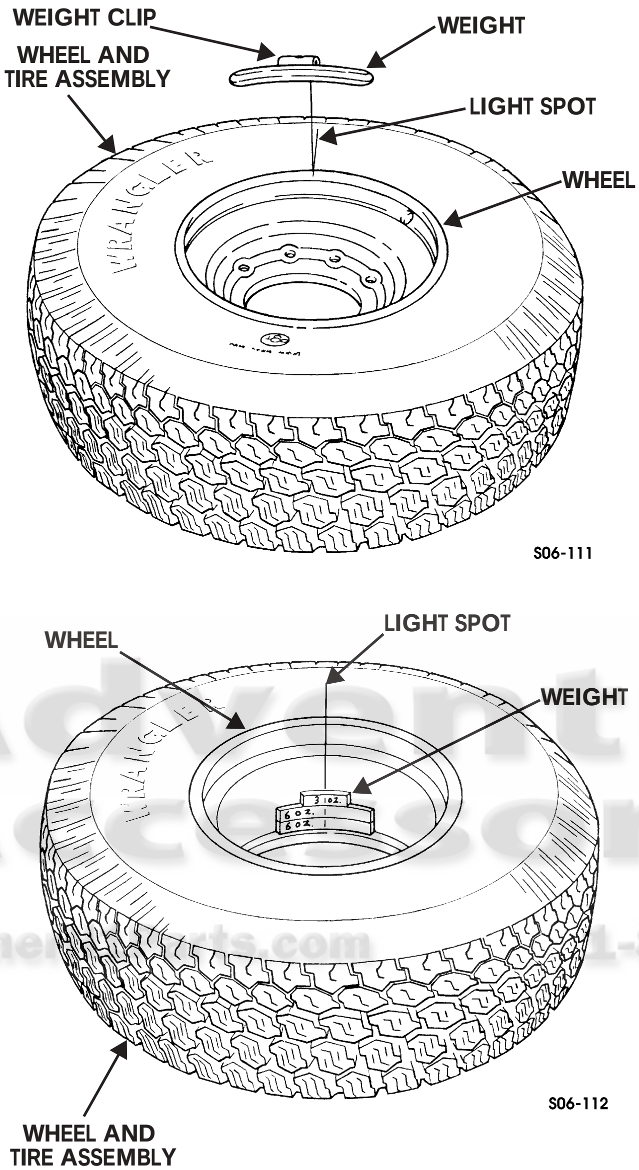


Figure 6-35: Weight Clips Placement

Non-Balancing Wheel and Tire Assembly

NOTE: If a wheel and tire assembly cannot be balanced, or balance cannot be maintained, any of the following conditions may be causing the problem:

- A ruptured or loose lubricant packet (grease pack) in a tire that had been driven with low tire pressure.
- Runflat movement on the runflat spacer and rim.
- Excessive runout condition on the wheel rim.
- Improper seating of tire bead on the rim flange.

NOTE: Perform steps 1 through 6 if a lubricant packet has ruptured, becomes loose, or the runflat is moving on the runflat spacer and rim. If an excessive runout condition on the rim is suspected, proceed to Wheel Runout Inspection.

1. Disassemble wheel and remove runflat from tire.
2. If lubricant packet has ruptured, remove existing adhesive tape, ruptured lubricant packet, and strapping tape from the runflat.
3. Clean inside of tire, rim, runflat spacer, and O-ring seal with cleaning fluid. Allow parts cleaned with fluid to dry prior to assembly.
4. Apply gel lubricant at crown area on inside tire area.
5. Install runflat into tire and assemble wheel.
6. Balance wheel and tire assembly.

WHEEL RUNOUT INSPECTION

NOTE: It is suggested that the lateral runout check be done first, as excessive lateral runout can affect radial runout.

1. Clean dirt, debris, or rust from wheel.
2. Inspect wheel and wheel centering washers for wear or damage. Repair as needed.

NOTE: Ensure measurements are taken from the inboard and outboard rim flanges for radial and lateral runout. Ensure measurements are taken on a smooth rim surface area having no welds, paint runs, or scratches (Figure 6-36). Runout measuring can be performed with the wheel completely assembled or just with the rim(s). If an improperly seated tire bead on the rim flange is suspected, perform steps 4 through 7.

1. With wheel or rim on wheel balancer, place dial indicator in position and slowly rotate wheel one revolution. Record measurement (Figure 6-36).
2. If **lateral** runout exceeds 0.060 in. (1.52 mm), replace inner or outer rim (as applicable) on wheels equipped with two-piece rims and entire rim on wheels equipped with one-piece rims.
3. If **radial** runout exceeds 0.060 in. (1.52 mm), replace inner or outer rim (as applicable) on wheels equipped with two-piece rims and entire rim on wheels equipped with one-piece rims.
4. With new rim(s), assemble and balance wheel and tire assembly.
5. Ensure that the tire is properly mounted and seated on the rim. Check the distance between the GG rings on the tire and the rim flange. The distance between the GG rings and the rim flange should be the same (concentric) all the way around the tire (Figure 6-37).
6. Ensure GG rings are not recessed below the rim flange at any point around the rim.
7. If the GG rings are recessed below the rim flange, remove the tire from the rim and reinstall it.
8. Balance wheel and tire assembly.

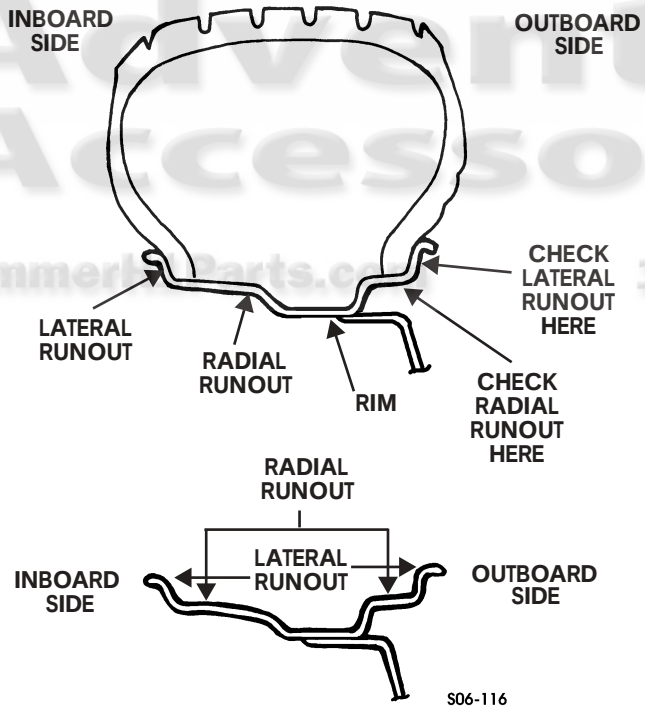


Figure 6-36: Wheel Runout Inspection Points

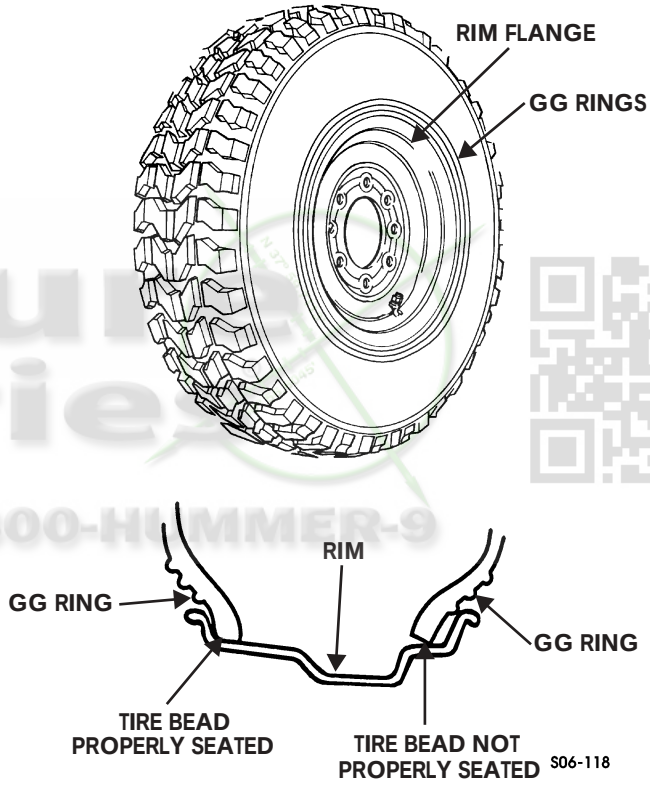
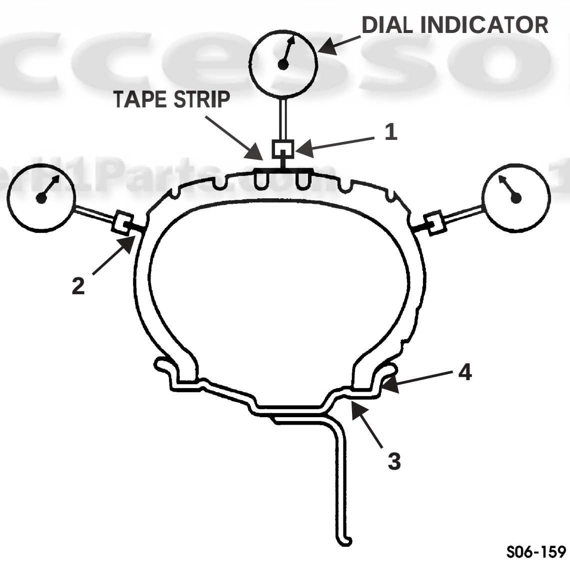


Figure 6-37: Checking the Bead Seating

Wheel And Tire Assembly Runout

NOTE: Before measuring the runout of a tire and wheel assembly, drive the vehicle long enough to warm up the tires. Then do the following:

1. Install tire and wheel assembly on wheel balancer.
2. Apply 2 inch wide tape strip around tire circumference (Figure 6-38).
3. Position a dial indicator with a magnetic base and a roller tip on the balancer so the different runout checks can be done (Figure 6-38).
4. DO NOT start the wheel balancer with the dial indicator in place. The checks should be done by slowly rotating the tire BY HAND ONLY.
5. Slowly rotate the assembly one complete turn and zero the dial indicator on the low spot.
6. Rotate assembly one more complete turn and note amount of runout.
7. When measuring at points 1 and 3 the maximum allowable wheel and tire radial runout is 0.210 in. and maximum allowable lateral runout is 0.120 in. (Figure 6-38).



1. Tire Radial Runout Checkpoint
2. Tire Lateral Runout Checkpoint
3. Wheel Radial Runout Checkpoint
4. Wheel Lateral Runout Checkpoint

Figure 6-38: Tire and Wheel Runout Checkpoints

Geared Hubs Spindle and Stud Runout

When wheel and tire runout occurs on the vehicle and does not occur in off-vehicle testing, the geared hub spindle should be checked (Figure 6-39).

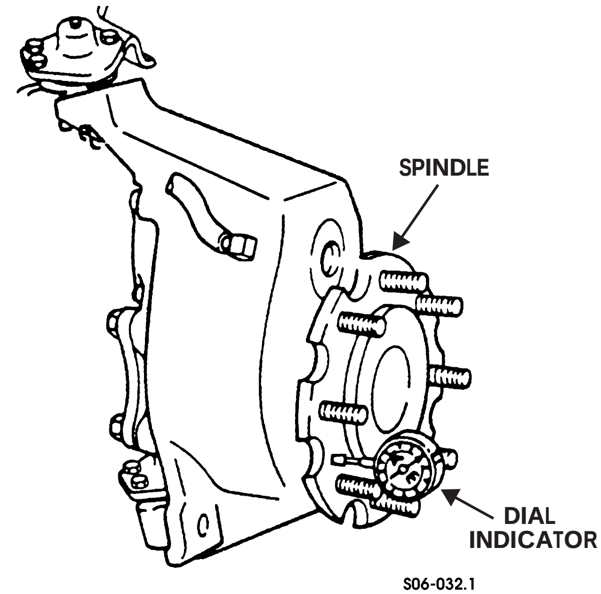


Figure 6-39: Geared Hub Spindle Runout Check

Geared Hub Spindle Runout

Using a dial indicator, position the roller tip on the machined surface outside the bolts on the spindle face.

Measure the runout using the following method:

1. Turn the spindle to locate the low spot.
2. Zero the dial indicator.
3. Turn the spindle to check the total lateral runout.
4. 0.005 inch is the acceptable lateral runout.

Measuring Spindle Stud Runout

Position the dial indicator roller to contact the outer edge of each spindle stud. Ensure that stud(s) are fully pressed in, if not replace the stud(s) (Figure 6-40).

Measure the runout using the following method:

1. Turn the spindle to register on each of the studs.
2. Zero the dial indicator on the lowest stud.
3. Check the total runout on the remaining studs.

4. 0.020 inch is the acceptable radial runout.

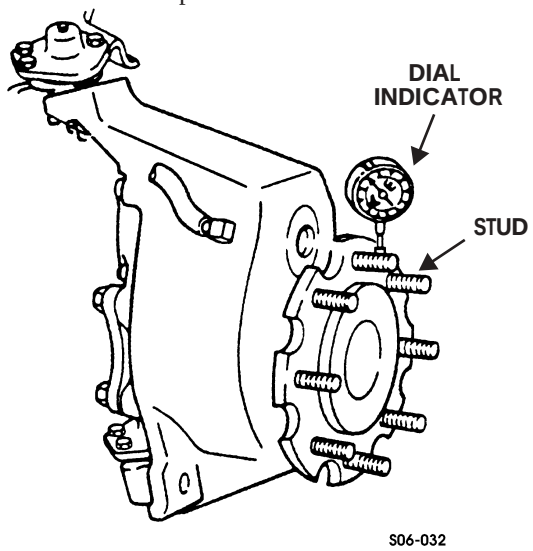


Figure 6-40: Spindle Studs Runout Check

WHEEL ALIGNMENT

Perform alignment checks on an alignment rack with the front tires in a straight-ahead position. Refer to illustration for component identification as necessary (Figure 6-41).

To complete the toe check and settings, position the vehicle so that both wheels are on the alignment turntables. Set the turntables to zero with both wheels in the straight-ahead position.

Preliminary Inspection

1. Check all tires for condition, uniform tread wear, excessive run-out, and proper inflation.
2. Raise and support the vehicle. Secure the steering wheel.
3. Check geared hubs for output spindle end play or side-to-side movement by grasping the edge of the tire and attempting to move the tire up and down (Figure 6-42).

NOTE: If any spindle movement is apparent, adjust the spindle bearings.

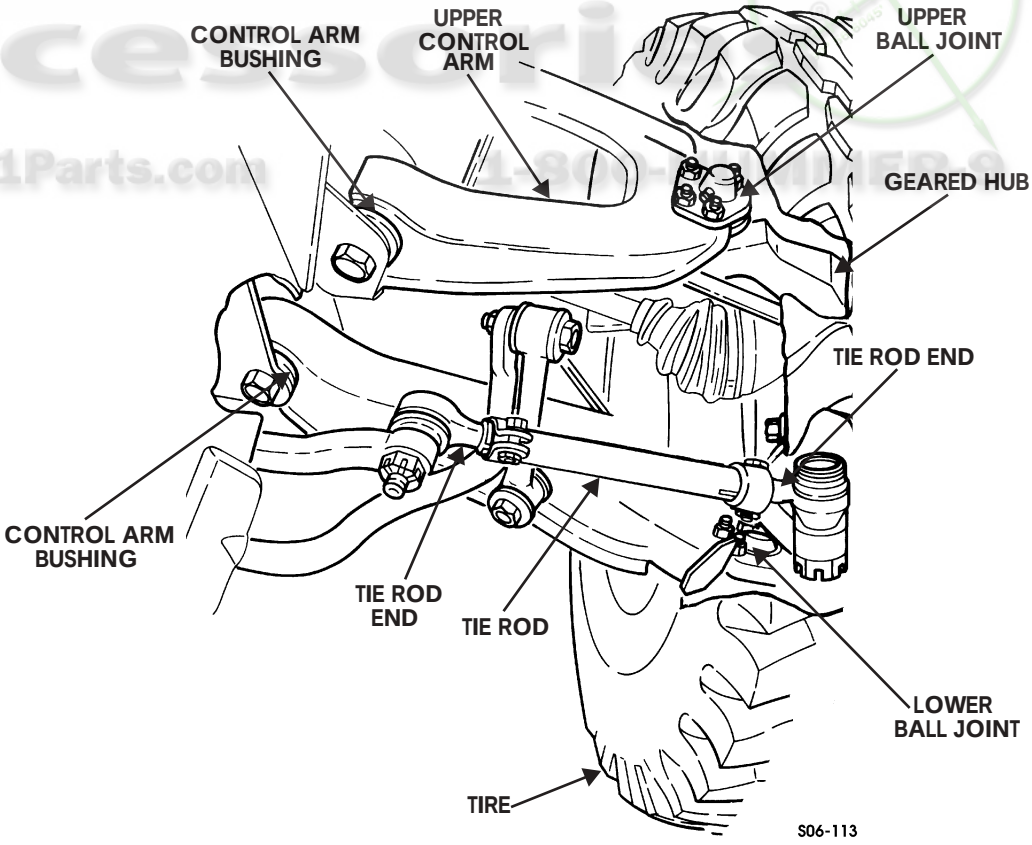


Figure 6-41: Suspension Components

4. Check the upper ball joints for looseness by grasping the top of the tire and attempting to move the tire in and out. Replace the upper ball joint(s) if tire movement at the tire's top outer edge is 3/8 inch (10 mm) or more.

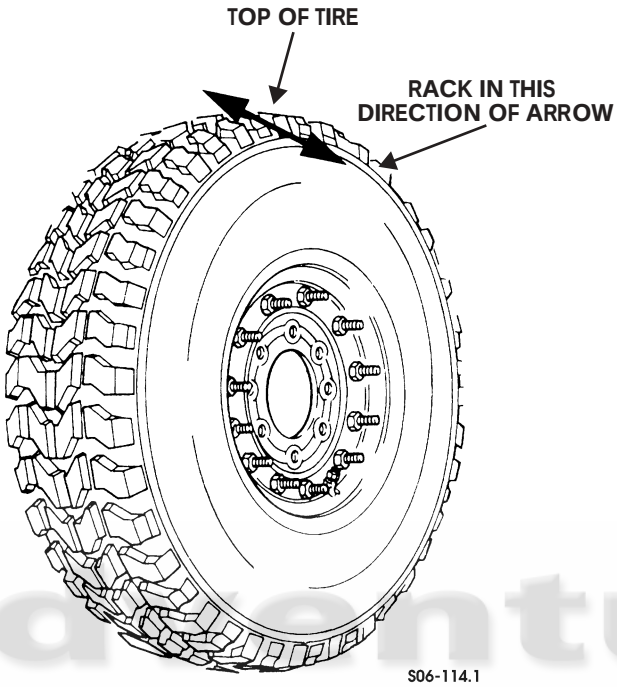


Figure 6-42: Spindle and Ball Joint Check

5. Inspect for worn, missing, or damaged control arm bushings. Replace bushings if necessary.
6. Check the lower ball joints for looseness by grasping the bottom of the tire and attempting to move the tire in and out. Replace the lower joint(s) if tire movement at the bottom outer edge of the tire is 1/2 inch (13 mm) or more.
7. Check for looseness in the idler arm and pitman arm by grasping the tires at the front and rear outer edges and moving the tires in and out. Replace the idler arm if vertical motion at the center link exceeds 5/16 inch (8 mm) or if the ball joint lateral motion exceeds 1/8 inch (3 mm). Replace the steering shaft if vertical motion at the center link exceeds 1/8 inch (3 mm) or if the ball joint lateral motion exceeds 1/32 inch (0.8 mm) (Figure 6-43).
8. Lower the vehicle.
9. Check the tie rod ends for looseness by attempting to move the tie rod vertically and horizontally. Replace the tie rod end(s) if any movement is apparent.
10. Inspect the center link for distortion. Center link deformation may be indicated by noticeable front wheel toe-out. If center link deformation is suspected, remove the suspect center link from the vehicle and place it on a level surface next to a new center link. Carefully compare the two parts, checking for distortion and tapered hole wear. Replace the suspect center link if tapered holes are worn or if the center link is found to be distorted.
11. Check the center link and stabilizer bar for nicks, cracks, or bends. Replace if necessary.
12. Inspect the stabilizer bar bushings for excessive wear and/or distortion. Replace if necessary.
13. Check the steering gear for looseness-to-frame, proper

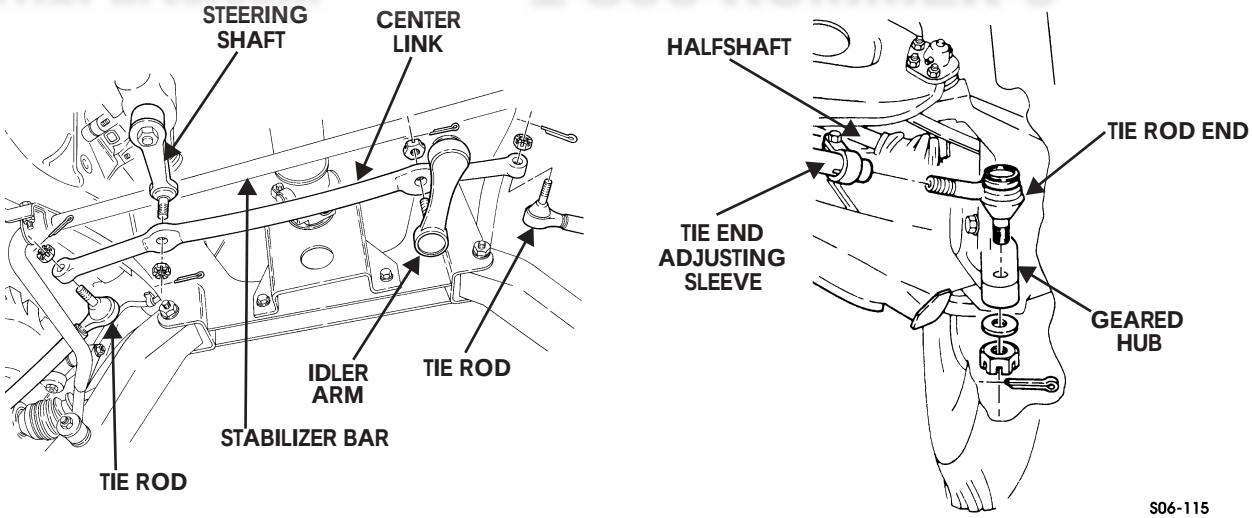


Figure 6-43: Suspension Component

CHECKING WHEEL ALIGNMENT

1. Move vehicle onto alignment rack and position front tires on alignment rack turntables.
2. Place front wheels in straight ahead position and zero turntables.
3. Install alignment measuring equipment on vehicle wheels. Follow manufacturers instructions to avoid incorrect measurements.
4. Measure and record caster, camber, toe-in, and toe-out. Refer to alignment specifications (Figure 6-44).
5. If alignment angles are within specified limits, move vehicle from rack. However, if angles are incorrect, leave vehicle on alignment rack and proceed to Wheel Alignment Correction.

WHEEL ALIGNMENT SPECIFICATIONS

		SERVICE CHECKING			SERVICE SETTING		
Wheel Suspension	**Tire Pressure (PSI)**	**Caster (Degrees)**	**Camber (Degrees)**	**Toe-Total (Degrees)**	**Caster (Degrees)**	**Camber (Degrees)**	**Toe-Total (Degrees)**
Front	26	+ 1.5 to + 4.0 (b)	-0.2 to +1.75 (b)	0 to +0.25 (c)	+ 2.5 to + 3.5 (a)	+ 0 to + 0.50 (a)	+ 0 to +0.19 (e)
Rear	28	na	-0.2 to +1.75 (b)	(-0.25 to 0) (d)	na	+.25 to +0.75 (a)	(-0.19 to 0) (e)

(a) Left and right side to be equal within 0.5 degrees.

(b) Left and right side to be equal within 1.0 degrees.

(c) Toe-in (Positive sense) left and right sides to be set separately per wheel. Steering wheel must be held in a center position within + or - 5 degrees.

(d) Toe-out (negative sense) left and right side to be set separately per wheel.

(e) Left and right sidetoe settings to be equal within 0.10 degree

NOTE: Alignment settings should be checked and adjusted on a rack that allows all four wheels/tires to support vehicle weight.

Set wheel alignment while the vehicle is in a normally loaded condition.

Vehicles regularly operated with heavy, on-board loads should have alignment adjusted with the load in the vehicle.

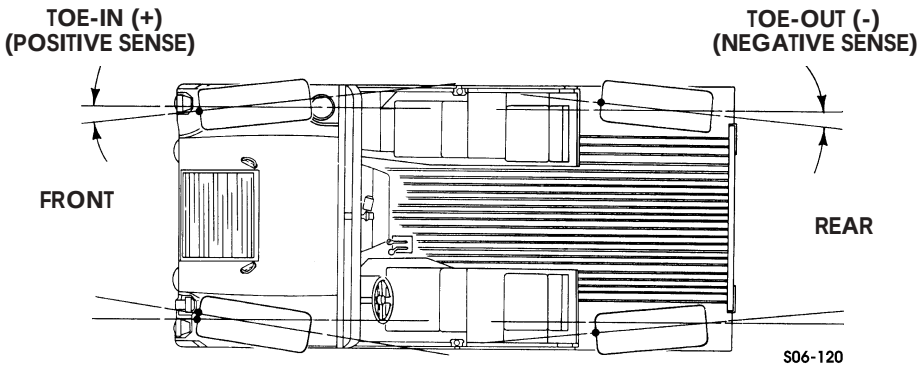


Figure 6-44: Wheel Alignment Specifications

WHEEL ALIGNMENT CORRECTION

Alignment adjustments should be performed one at a time and in sequence to avoid errors. Recommended adjustment sequence is:

a. caster

b. camber

c. front toe setting

d. rear toe setting

e. steering stops

Leave the vehicle on the alignment rack for each of the adjustment procedures. This way, angle correction can be monitored continuously during actual adjustment.

Caster Adjustment

Caster adjustment applies to the front wheels only. It is controlled by a shim installed between the airlift bracket and upper control arm front bracket (Figure 6-45). A positive caster angle is required on all Hummer vehicles.

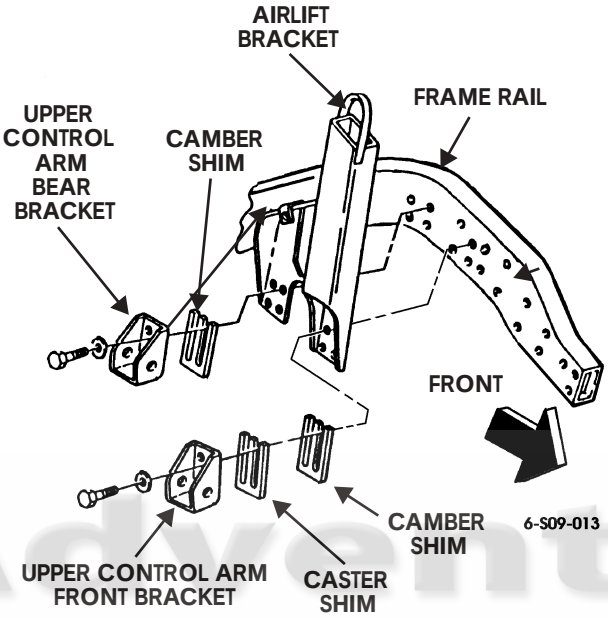


Figure 6-45: Caster Shim Location (Front Passenger Side Shown)

Preferred caster angle is +2.5 to +3.5 degrees. Maximum allowable side-to-side variation is 0.5 degree.

1. Support lower control arms and geared hubs with jack built into alignment rack. Or, use floor jack and jack stands if rack is not equipped with built-in jack.
2. Remove front wheels.
3. Remove upper control arm pivot bolts (Figure 6-46). Retain bolts and washers but discard nuts if they are lock-type.
4. Loosen bolts that attach upper control arm brackets to airlift bracket and frame (Figure 6-46). Do not remove the bolts; just loosen them.
5. Adjust caster angle by changing caster shim between control arm front bracket and airlift bracket (Figure 6-43):
   - Preferred caster is +2.5 to +3.5 degrees and left-right variation must not exceed 0.5 degree
   - A thicker shim increases positive caster while a thinner shim decreases it
   - Shims are available in 0.060 inch and 0.120 inch (1.5 and 3.0 mm) thicknesses for adjustment purposes. An 0.060 inch shim will change caster approximately 0.3 degrees and a 0.120 inch shim will change caster approximately 0.6 degrees.
6. Add or remove shims as needed. Then tighten control arm and airlift bracket attaching bolts to 60 ft.lbs. (81 N.m) torque.
7. Install but do not fully tighten upper control arm pivot bolts.
8. Install front wheels.
9. Remove supports and position front wheels on turntables.
10. Tighten control arm pivot bolts to 260 ft. lbs. (352 N.m) torque.
11. Verify correct caster angle at both front wheels. Be sure side-to-side caster variation does not exceed 0.5 degree.
12. Leave vehicle on rack for camber and toe adjustments.

Camber Adjustment

Camber adjustment applies to the front and rear wheels equally. It is controlled by shims installed between each upper control arm bracket and the airlift bracket (Figure 6-44).

Preferred camber for all Hummer vehicles is zero to +0.5 degrees at the front and +0.25 to +0.75 degrees at the rear. Maximum allowable side-to-side variation is 0.5 degree front and rear.

1. Support lower control arms and geared hubs with jack built into alignment rack. Or, use floor jack and jack stands if rack is not equipped with built-in jack.
2. Remove front and/or rear wheels as needed.
3. Remove upper control arm pivot bolts (Figure 6-44). Retain bolts and washers but discard nuts if they are lock-type.
4. Loosen bolts that attach upper control arm brackets to airlift bracket and frame (Figures 6-43 and 6-44). Do not remove the bolts; just loosen them.
5. Adjust camber angle by changing shim between each control arm bracket and airlift bracket (Figure 6-44):
   - Use the same thickness shims between each control arm bracket and the airlift bracket
   - Do not disturb the previously installed front wheel caster shims. Simply insert the camber shims behind, or in front of the caster shims.
   - A thicker shim increases positive camber. A thinner shim decreases positive camber. Shims are available in 0.060 inch and 0.120 inch (1.5 and 3.0 mm) thicknesses for adjustment purposes.
6. Add or remove shims as needed. Then tighten control arm and airlift bracket attaching bolts to 60 ft.lbs. (81 N.m) torque.
7. Install but do not fully tighten upper control arm pivot bolts.
8. Install front and/or rear wheels as needed.
9. Remove supports and position front wheels on turntables.
10. Tighten control arm pivot bolts to 260 ft. lbs. (352 N.m) torque.
11. Verify correct camber angle at both front wheels. Be sure side-to-side variation does not exceed 0.5 degree.
12. Leave vehicle on rack for toe settings and steering stop adjustment

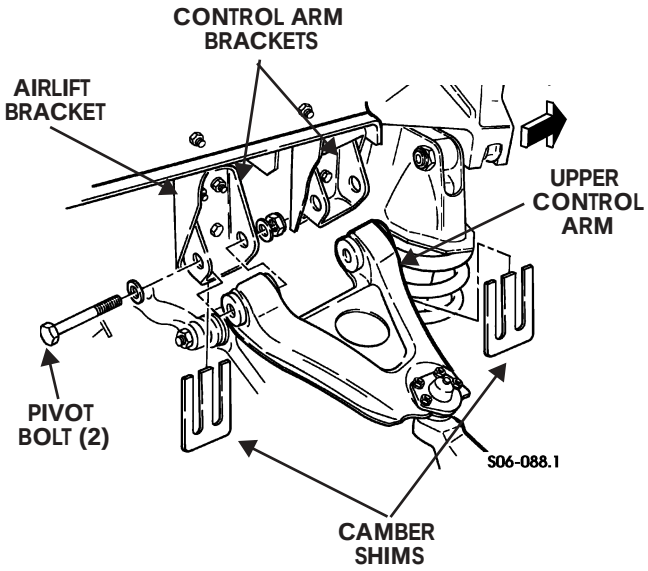


Figure 6-46: Camber Shim Locations (Front Passenger Side Shown)

Front Wheel Toe Adjustment

1. Position the vehicle so that both front wheels are on turn tables. Set the turn tables to zero with the front wheels in the straight-ahead position. Center the steering gear to set the front wheels in the straight-ahead position.
2. Loosen four locknuts securing clamps on two tie rod assemblies. Turn the adjusting sleeves until toe measurement is within specifications. Tighten the adjusting sleeve clamp nuts and recheck toe adjustment. Compare with alignment specifications (Figure 6-47).

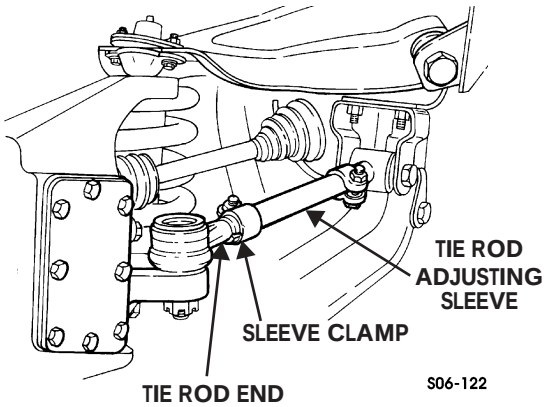


Figure 6-47: Front Wheel Toe Adjustment Point

***CAUTION**: Ensure that the bolt and nut on the adjusting sleeve clamp nut nearest to the geared hub is facing the halfshaft. The bolt and nut on the adjusting sleeve clamp nearest to the frame must be facing away (180 degrees) from the stabilizer bar. After adjustment, the lengths of*

both tie rod end assemblies should be the same, plus or minus 1/16 inch (1.6 mm) (Figure 6-48).

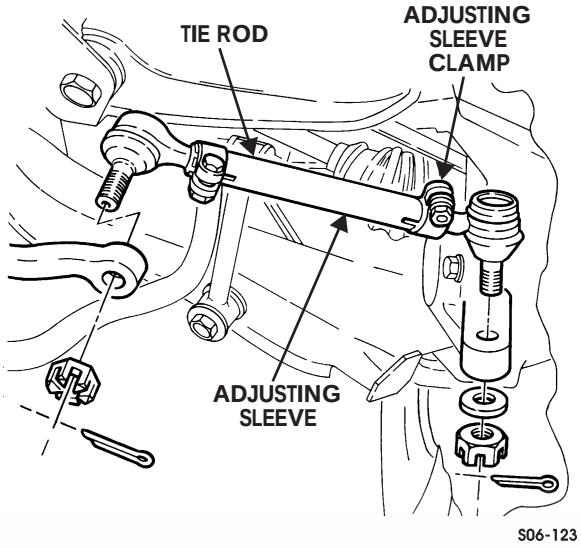


Figure 6-48: Tie Rod Adjusting Sleeve Location

3. Check steering wheel orientation. If incorrect, reposition to the straight-ahead position.

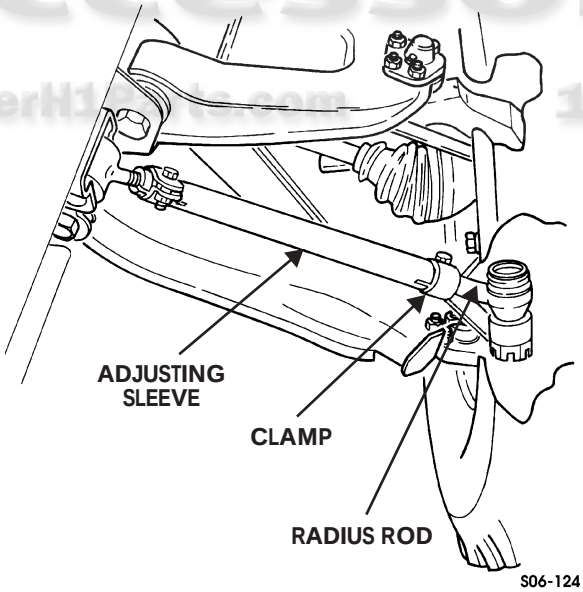


Figure 6-49: Rear Wheel Toe Adjustment Point

Rear Wheel Toe Adjustment

1. Position the vehicle so that both rear wheels are on turntables.
2. Loosen four locknuts securing four clamps on two rods. Turn the adjusting sleeves until toe measurement is within specifications (Table 2). Tighten the adjusting clamp nuts and recheck toe adjustment. Compare with alignment specifications (Figure 6-49).

Steering Stop Adjustment

1. Position the vehicle so that both front wheels are on turn tables. Set the turn tables to zero with front wheels in the straight-ahead position.
2. Turn the steering wheel full left and record the steering stop angle.
3. Turn the steering wheel full right and record the steering stop angle.
4. If both of the steering stop angles are within 34-36 degrees, no adjustment is necessary.
5. To adjust the steering stop angle, loosen the jamnut and turn the capscrew all the way in (Figure 6-50).
6. Turn the steering wheel until the wheel requiring adjustment obtains the steering stop angle.
7. Loosen the capscrew until the head makes contact with the wheel stop on the lower control arm.
8. Secure the steering stop capscrew with jamnut.
9. Be sure there is adequate clearance between the tie rod clamp and the rim. If clip-on wheel weights are mounted on the rim, ensure that they do not hit the tie rod clamp or geared hub.

***CAUTION**: Ensure that the bolt and nut on the adjusting sleeve clamp nut nearest to the geared hub is facing the halfshaft. The bolt and nut on the adjusting sleeve clamp nearest to the frame must be facing away (180 degrees) from the stabilizer bar. After adjustment, the lengths of both tie rod end assemblies should be the same, plus or minus 1/16 inch (1.6 mm).*

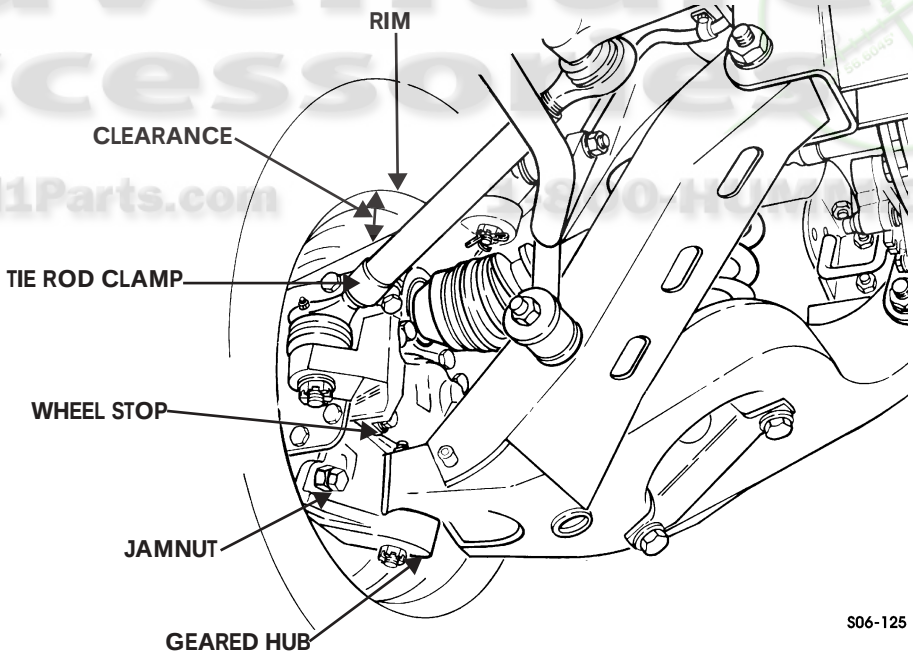


Figure 6-50: Steering Stop Adjustment

HALFSHAFT BOOT MAINTENANCE

Removal

NOTE: Inner and outer boots are replaced similar. This procedure covers the inner boot only.

1. Remove wheel.
2. Remove access plug and washer from geared hub (Figure 6-51).
3. Remove halfshaft retaining capscrew, lockwasher, and halfshaft from geared hub. Discard lockwasher.
4. Remove six capscrews, lockwashers, and halfshaft from rotor. Discard lockwashers.

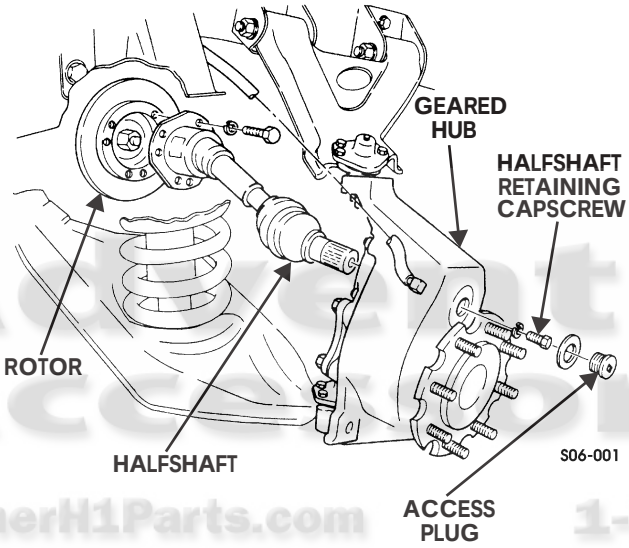


Figure 6-51: Halfshaft Retaining Capscrew

5. Loosen two clamps securing inner boot to inner joint and shaft (Figure 6-52).
6. Remove inner boot from inner joint and slide up on shaft.
7. Clamp shaft in soft-jawed vise.
8. Remove retainer clip from inner joint.
9. Remove inner joint, retainer clip, and six ball bearings from bearing assembly.

NOTE: Remove excess grease from bearing assembly.

10. Use boot clamp pliers, special tool 5743141, remove spacer ring from groove and slide spacer and bearing assembly up on shaft - 3/8 in. (Figure 6-53).
11. Pry exposed retaining ring from shaft. Discard retaining ring.
12. Remove bearing assembly and spacer ring from shaft. Discard spacer ring (Figure 6-53).

Cleaning and Inspection

NOTE: Clean all components, examine for wear or damage, and replace halfshaft if necessary.

1. Clean all metallic parts with solvent.
2. Inspect shaft assembly for damage, and replace if damaged.
3. Inspect splined end of halfshaft for damage.

Installation

1. Clamp shaft in soft-jawed vise.
2. Position two clamps on shaft (Figure 6-55).
3. Install inner boot on shaft. Push boot past groove on shaft.
4. Install the spacer ring and retaining ring into ring grooves on shaft (Figures 6-53 and 6-54).
5. Align chamfer splines of inner bearing assembly with spline of shaft. Use press or rawhide hammer to install bearing assembly until it snaps in place - flush against spacer ring.
6. Position six ball bearings into bearing assembly and retain with a slight amount of grease (Figure 6-52).

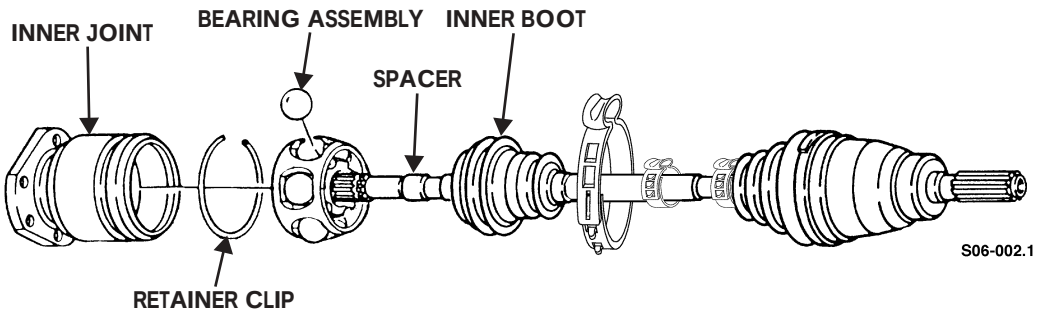


Figure 6-52: Halfshaft Assembly

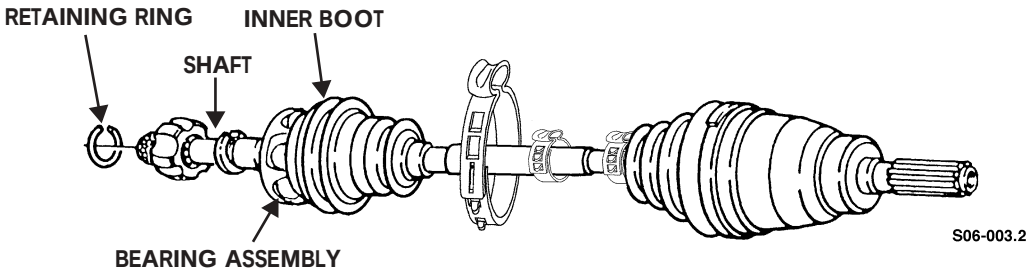


Figure 6-53: Halfshaft Assembly

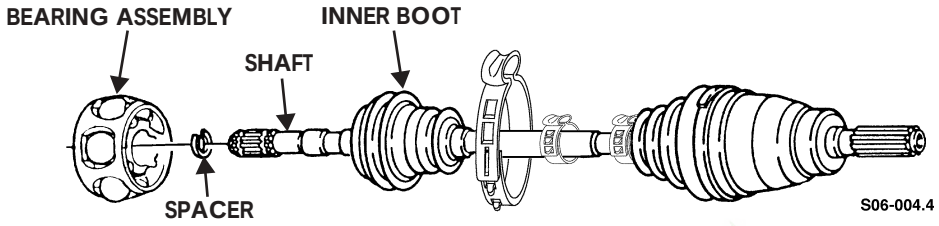


Figure 6-54: Halfshaft Assembly

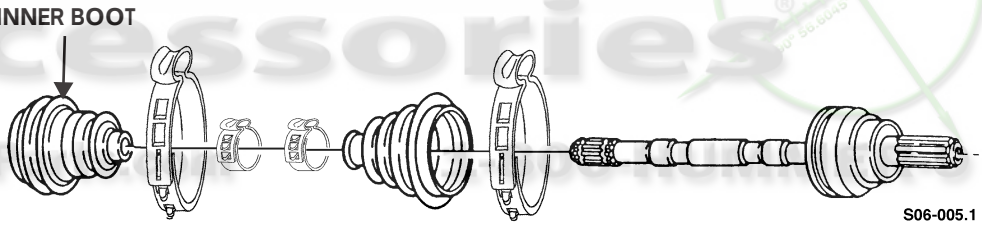


Figure 6-55: Halfshaft Assembly

7. Position joint inner housing over bearing assembly.

NOTE: Ensure all ball bearings are in the tracks of the inner joint.

8. Secure retainer clip in groove of inner joint housing.
9. Fill inner joint with grease from grease packet.
10. Move inner boot on shaft until boot seats in groove of shaft.
11. Secure inner boot on shaft with clamp.
12. Install inner boot on inner joint. Ensure boot seats in groove of joint.
13. Secure inner boot on inner joint with clamp. Use boot clamp plier, special tool 05743141.
14. Install halfshaft into geared hub.
15. Apply thread-locking compound to halfshaft retaining capscrew and install halfshaft on geared hub with lockwasher and halfshaft retaining capscrew. Tighten halfshaft retaining capscrew to 37 lb-ft (50 N•m) (Figure 6-51).
16. Install washer and access plug into geared hub. Tighten access plug to 8-13 lb-ft (11-18 N•m).

NOTE: Ensure all six capscrew holes in the rotor align with holes in output flange.

17. Apply Loctite 272 to six capscrews. Install halfshaft to rotor with six lockwashers and capscrews. Tighten capscrews to 48 lb-ft (65 N•m).
18. Install wheel.

GEARED HUB REPLACEMENT

NOTE: Replacement procedures are basically the same for front and rear geared hubs. This procedure covers the front geared hub.

Removal

1. Remove wheel.
2. Remove drainplug from geared hub and drain geared hub (Figure 6-56).

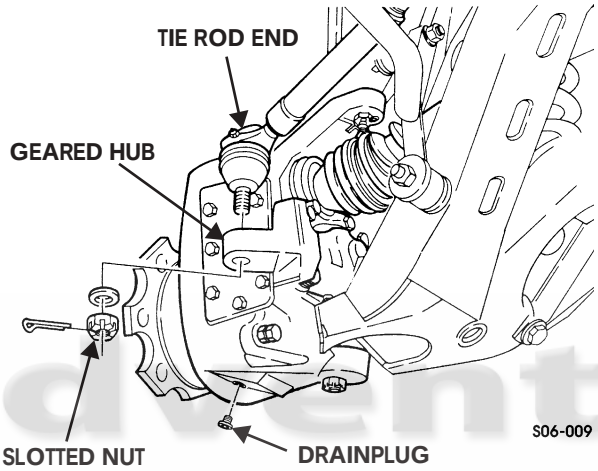


Figure 6-56: Geared Hub and Drainplug

3. Install drainplug in geared hub.
4. Remove capscrew, washer, and vent line bracket from geared hub (Figure 6-57).
5. Disconnect vent line from geared hub fitting.
6. Remove cotter pin, slotted nut, and washer from tie rod end. Discard cotter pin (Figure 6-56).
7. Using puller, disconnect tie rod end from geared hub.
8. Remove access plug, washer, halfshaft retaining capscrew, lockwasher, and halfshaft from geared hub. Discard lockwasher (Figure 6-57).

WARNING: Geared hub must be supported during removal and installation. Failure to support geared hub may cause injury to personnel or damage to equipment.

9. Remove cotter pin and slotted nut from upper ball joint. Discard cotter pin.
10. Remove cotter pin and slotted nut from lower ball joint. Discard cotter pin.
11. Lower support and remove geared hub.

Installation

WARNING: To avoid injury and damage to equipment, support geared hub during removal and installation.

1. Position geared hub between upper and lower control arms and install upper ball joint to geared hub with slotted nut, but do not tighten (Figure 6-57).
2. Install lower ball joint to geared hub with slotted nut, but do not tighten.

***CAUTION**: Do not loosen slotted nut to install cotter pin. Doing this may result in damage to equipment.*

3. Tighten slotted nut securing upper ball joint to geared hub to 65 lb-ft (88 N•m). Install cotter pin.
4. Install halfshaft into geared hub.
5. Apply thread-locking compound to halfshaft retaining capscrew and install halfshaft on geared hub with lockwasher and halfshaft retaining capscrew. Tighten halfshaft retaining capscrew to 37 lb-ft (50 N•m).
6. Install washer and access plug to geared hub. Tighten access plug to 8-13 lb-ft (11-18 N•m).

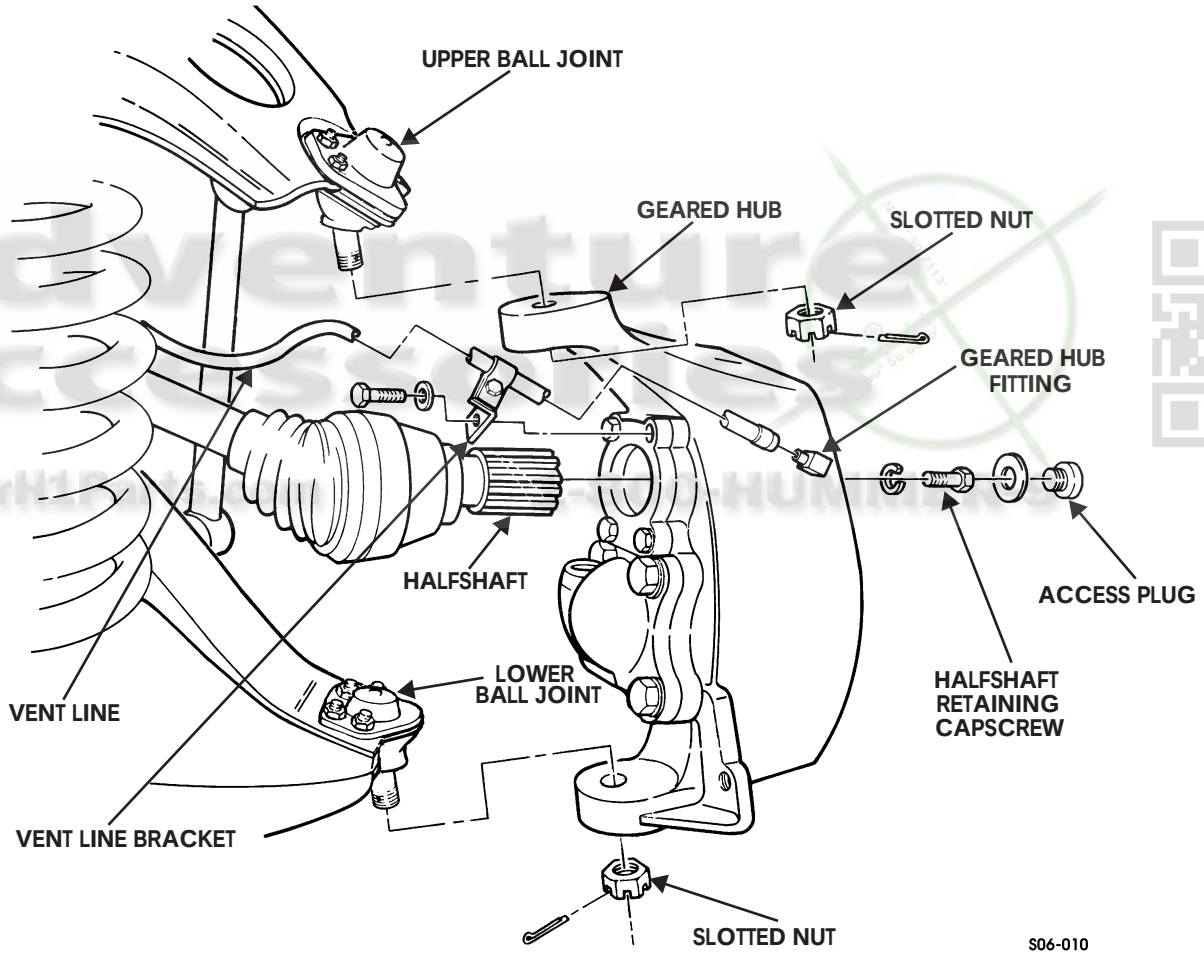


Figure 6-57: Geared Hub Assembly

***CAUTION**: Do not loosen slotted nut to install cotter pin. Doing this may result in damage to equipment.*

7. Tighten slotted nut securing lower ball joint to geared hub to 73 lb-ft (99 N•m). Install cotter pin.
8. Install tie rod end into geared hub and secure with washer and slotted nut. Tighten slotted nut to 70 lb-ft (95 N•m). Install cotter pin (Figure 6-56).
9. Connect vent line to geared hub fitting (Figure 6-59).

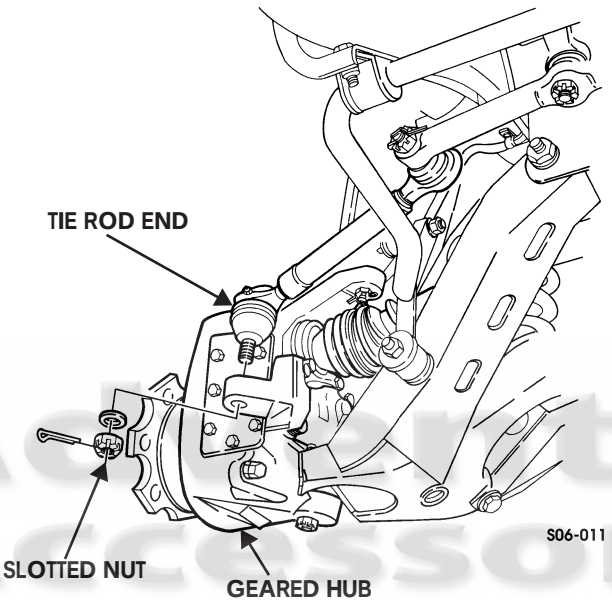


Figure 6-58: Tie Rod End Into Geared Hub

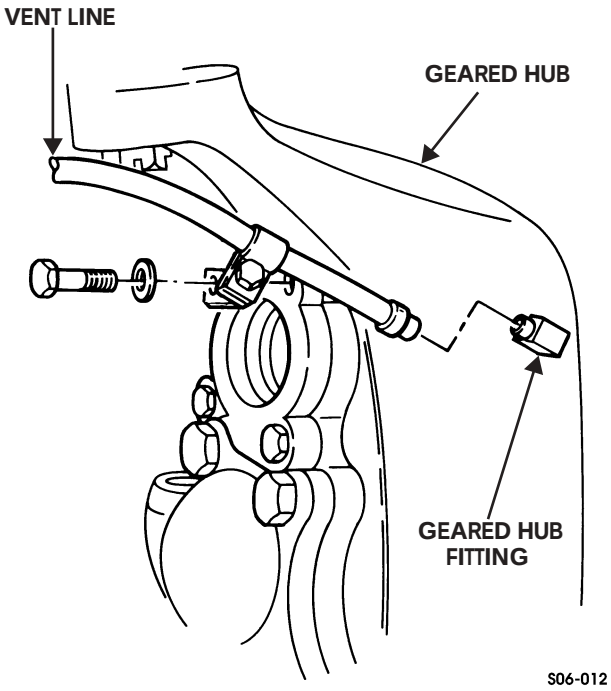


Figure 6-59: Vent Line

10. Install vent line and clamp to geared hub with washer and capscrew. Tighten capscrew to 38 lb-ft (52 N•m).
11. Remove fill plug and washer from geared hub (Figure 6-60).

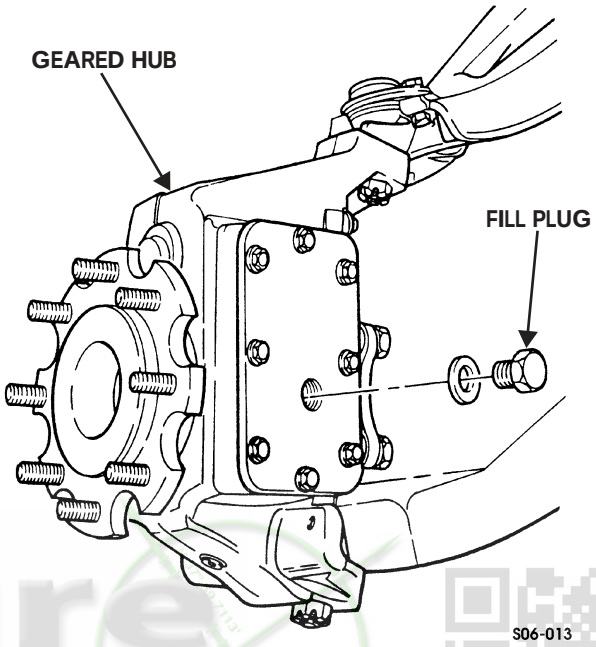


Figure 6-60: Geared Hub Fill Hub

12. Fill geared hub to proper oil level (Section 1).
13. Install washer and fill plug on geared hub. Tighten fill plug to 8-13 lb-ft (11-18 N•m).
14. Install wheel.
15. Check alignment.

GEARED HUB SIDE COVER MAINTENANCE

NOTE: Geared hub side cover replacement procedures are basically the same for front and rear covers. This procedure covers the front side cover.

Removal

1. Remove wheel.
2. Remove drainplug from geared hub and drain geared hub (Figure 6-61).
3. Install drainplug in geared hub.
4. Remove eight capscrews, washers, and side cover from geared hub.

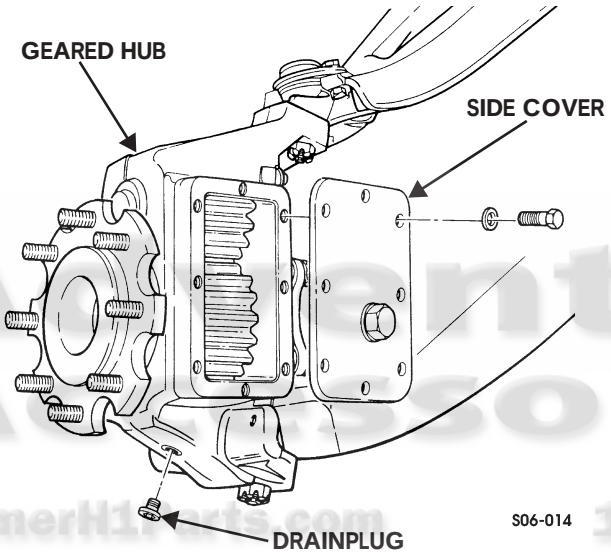


Figure 6-61: Geared Hub Side Cover

Cleaning and Inspection

NOTE: Clean all components, examine for wear or damage, and replace if necessary.

1. Using solvent, clean side cover.
2. Inspect side cover for damage.

Installation

1. Apply anaerobic sealant to side cover and install side cover on geared hub.
2. Apply thread-locking compound to capscrews and install side cover to geared hub with eight washers and capscrews. Tighten capscrews to 15 lb-ft (20 N•m).
3. Fill geared hub to proper oil level (Section 1).
4. Install wheel.

GEARED HUB INPUT SEAL REPLACEMENT

Removal

1. Remove wheel.
2. Remove access plug and washer from geared hub (Figure 6-57).
3. Remove halfshaft retaining capscrew, lockwasher, and halfshaft from geared hub. Discard lockwasher.

NOTE: Shim gaskets must be reused to maintain proper drive gear bearing adjustment.

4. Remove capscrew, washer, and vent line bracket from drive gear retainer (Figure 6-62).

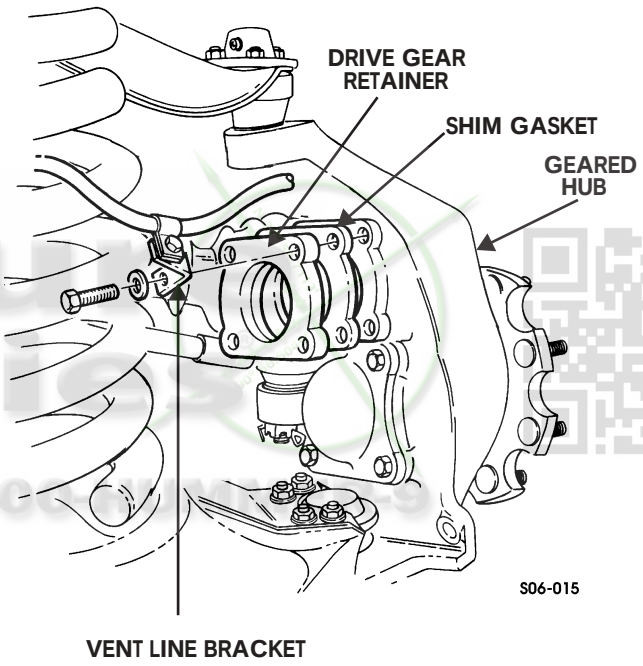


Figure 6-62: Geared Hub Shim Gaskets

5. Remove three capscrews, washers, drive gear retainer, and shim gasket(s) from geared hub.
6. Secure drive gear retainer in vise with inserts and remove input seal. Discard input seal (Figure 6-63).

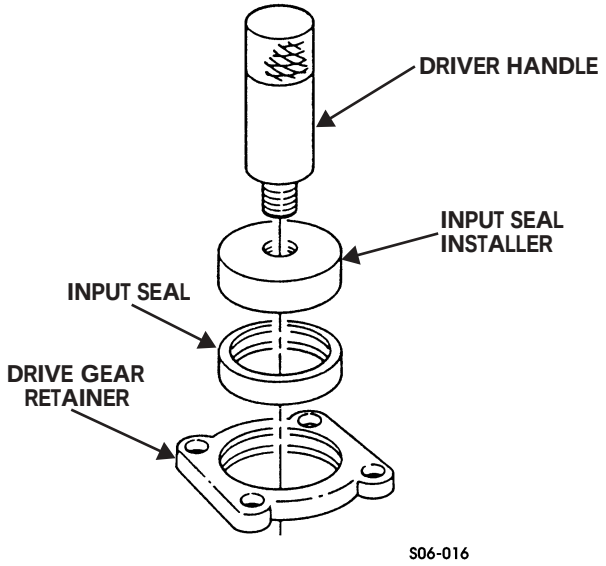


Figure 6-63: Drive Gear Retainer

Installation

1. Using driver handle and input seal installer, install input seal in drive gear retainer, seal will be recessed 0.200". Ensure radius on outer diameter of input seal faces toward inside of geared hub (Figure 6-63).
2. Install shim gasket(s) and drive gear retainer to geared hub and secure with three washers and capscrews. Tighten capscrews to 38 lb-ft (52 N•m) (Figure 6-62).
3. Install vent line bracket to drive gear retainer with washer and capscrew. Tighten capscrew to 38 lb-ft (52 N•m).
4. Coat lip of input seal with lubricating oil (Figure 6-63).
5. Apply thread-locking compound to halfshaft retaining capscrew and install halfshaft on geared hub with lockwasher and halfshaft retaining capscrew. Tighten halfshaft retaining capscrew to 37 lb-ft (50 N•m) (Figure 6-64).
6. Install washer and access plug into geared hub. Tighten access plug to 8-13 lb-ft. (11-18 N•m).
7. Install wheel.

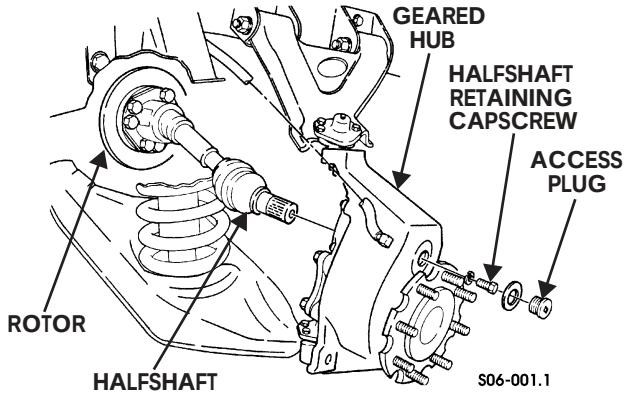


Figure 6-64: Halfshaft and Geared Hub

GEARED HUB REPAIR

Disassembly

1. Remove geared hub.
2. Position geared hub with spindle supporting geared hub (Figure 6-65).

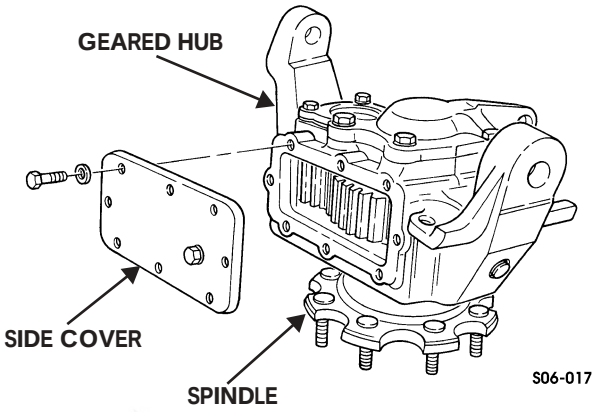


Figure 6-65: Geared Hub and Spindle

3. Remove eight capscrews, washers, and side cover from geared hub.

NOTE: If backlash between drive and driven gears is more than 0.018 inch (0.46 mm), both gears must be replaced.

4. Mount dial indicator on geared hub and index indicator to register from one drive gear tooth. Move drive gear back and forth while holding driven gear stationary to read backlash (Figure 6-66).

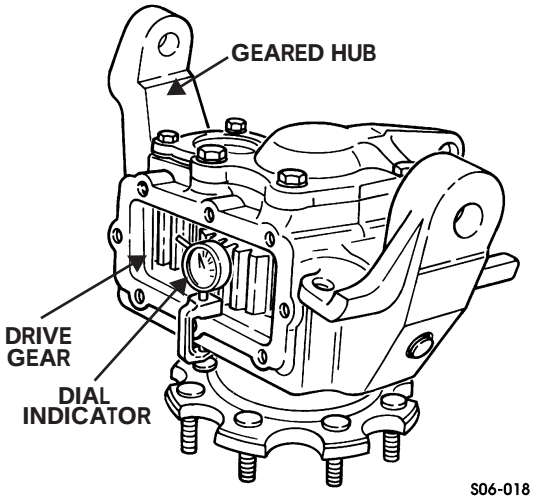


Figure 6-66: Dial Indicator

5. Remove four capscrews, washers, and steering arm cover from geared hub (Figure 6-67).

6. Remove clamp nut lock screw from clamp nut.
7. Using spanner socket, remove clamp nut and keyed washer from spindle.

NOTE: It may be necessary to lightly tap threaded end of spindle to release it from the inner spindle bearing.

8. Lift geared hub off spindle.
9. Remove inner bearing, bearing spacer, and driven gear from geared hub.
10. Remove outer bearing spacer from spindle.
11. Remove four capscrews, washers, drive gear retainer, shim gasket, inboard bearing cup, and drive gear from geared hub (Figure 6-68).
12. Remove retaining washer from inside drive gear or geared hub.
13. Remove spindle seal from geared hub. Discard seal.

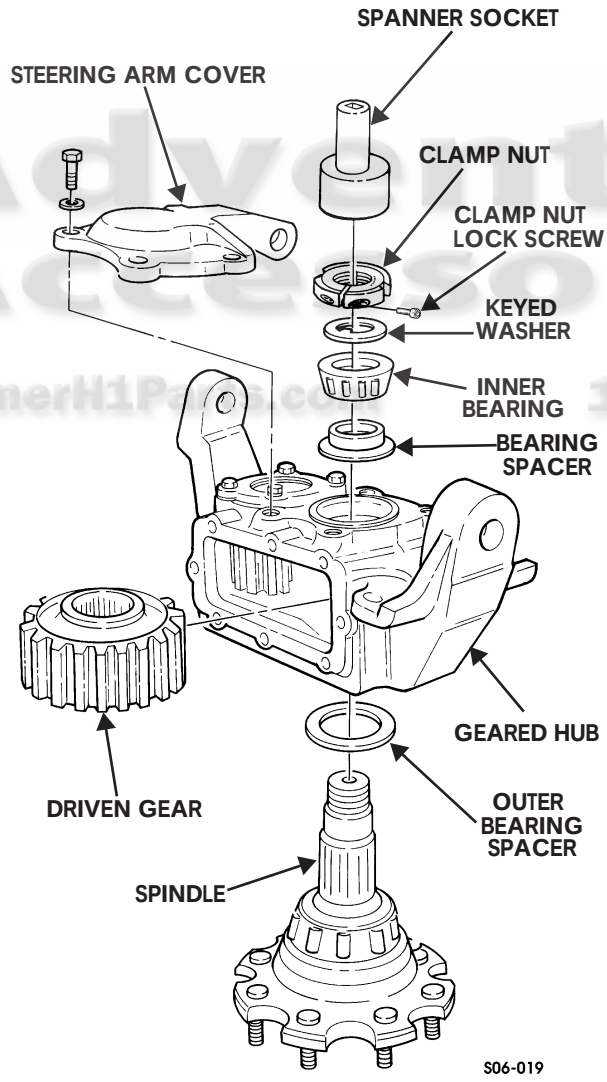


Figure 6-67: Geared Hub

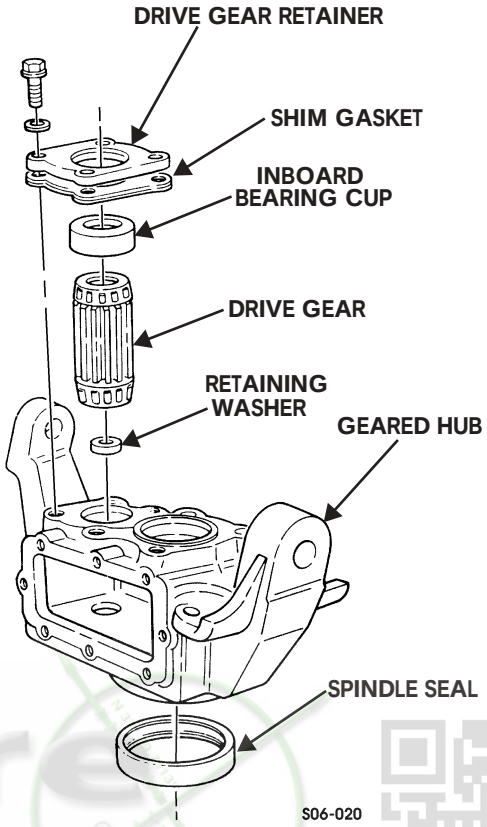


Figure 6-68: Drive Gear

14. Remove input seal from drive gear retainer. Discard seal (Figure 6-69).

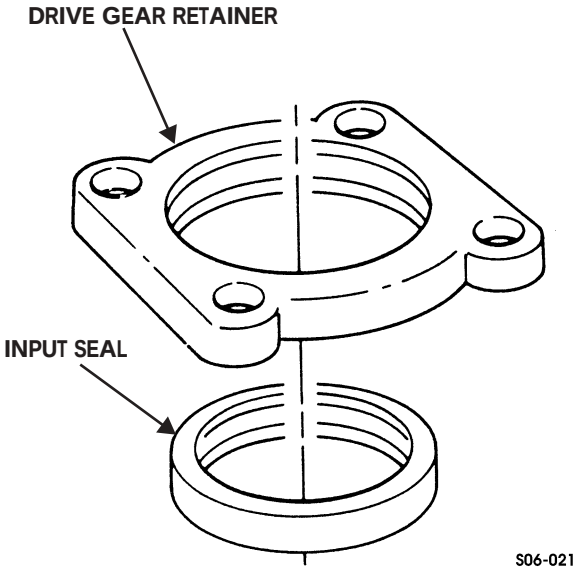


Figure 6-69: Drive Gear Retainer

Inspection

NOTE: Clean all components, examine for wear or damage, and replace if necessary. Drive and driven gears must be replaced as matched set (Figure 6-70).

1. Inspect splines and gear teeth on drive gear and driven gear for damage.
2. Inspect spindle for damage and rough or corroded sealing surface.
3. Inspect all bearings and bearing races for damage.
4. Inspect steering arm cover for damage.
5. Inspect geared hub and all threaded holes for damage. Repair any damaged holes using thread repair inserts.

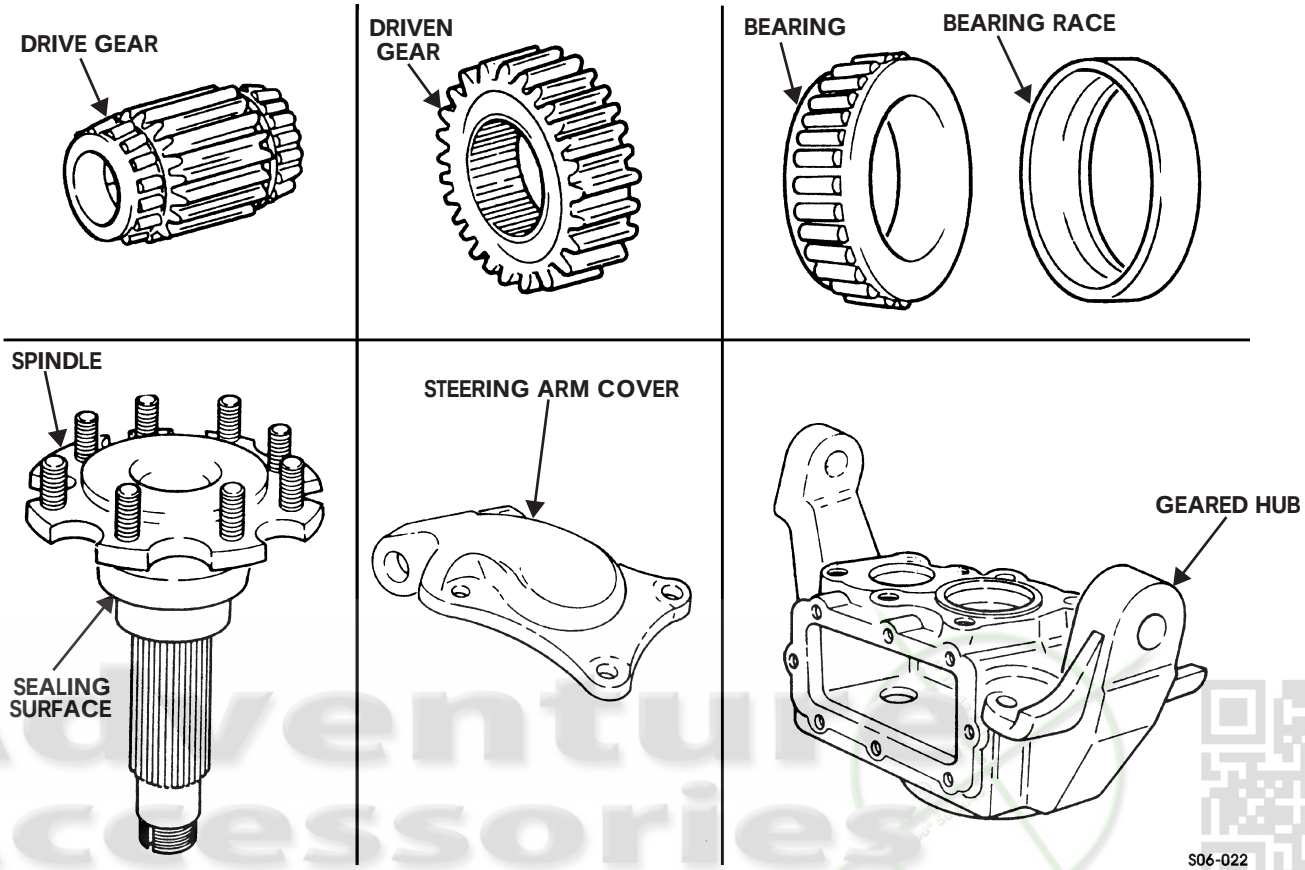


Figure 6-70: Drive Gear Assembly

Assembly

1. Using driver handle and spindle seal installer, install spindle seal in geared hubuntil seal bottoms in housing (Figure 6-71).

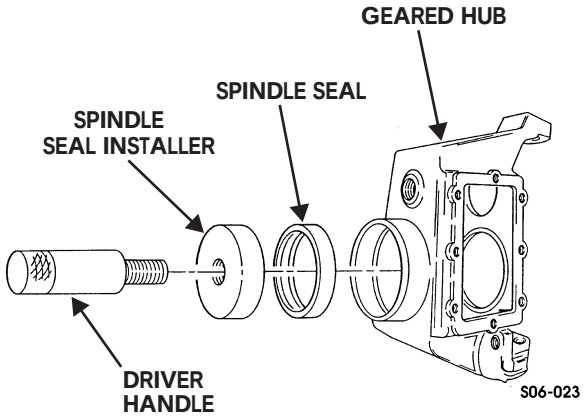


Figure 6-71: Spindle Seal

2. Ensure radius on outer diameter of input seal faces inside drive gear retainer. Using input seal installer and driver handle, install input seal in drive gear retainer, seal will be recessed 0.200" (Figure 6-72).

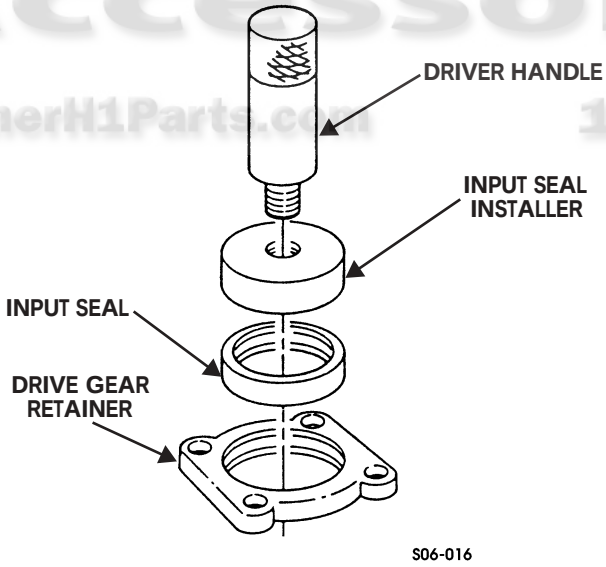


Figure 6-72: Input Seal

3. Install retaining washer in shallow end of drive gear (Figure 6-73).

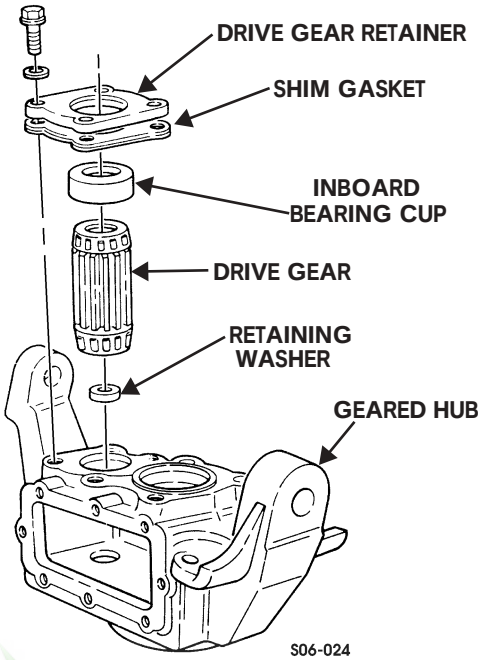


Figure 6-73: Drive Gear Assembly

4. Install drive gear and inboard bearing cup in geared hub.
5. Apply thread-locking compound on capscrews. Install shim gasket and drive gear retainer on geared hub and secure with four washers and capscrews. Tighten capscrews to 25-35 lb-ft (40-48 N•m).
6. Mount dial indicator on geared hub and index indicator to register on end of drive gear (Figure 6-74).

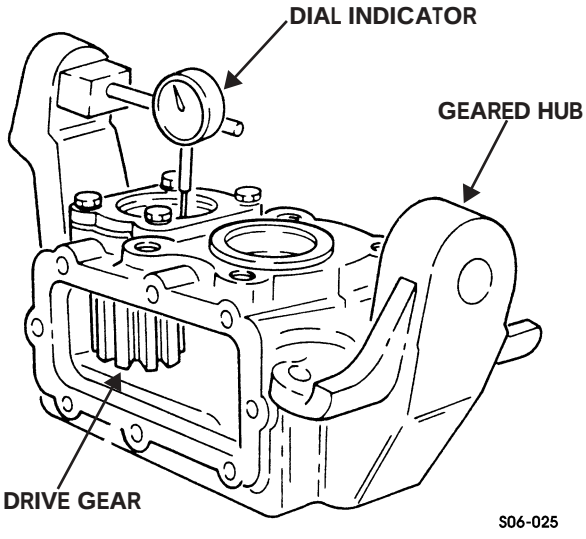


Figure 6-74: Dial Indicator on Geared Hub

7. Move drive gear up and down to read end play. End play should be 0.001-0.006 inch (0.03-0.15 mm). If end play is incorrect, add or subtract shim gaskets and recheck end play.

8. Install driven gear and bearing spacer in geared hub (Figure 6-75).

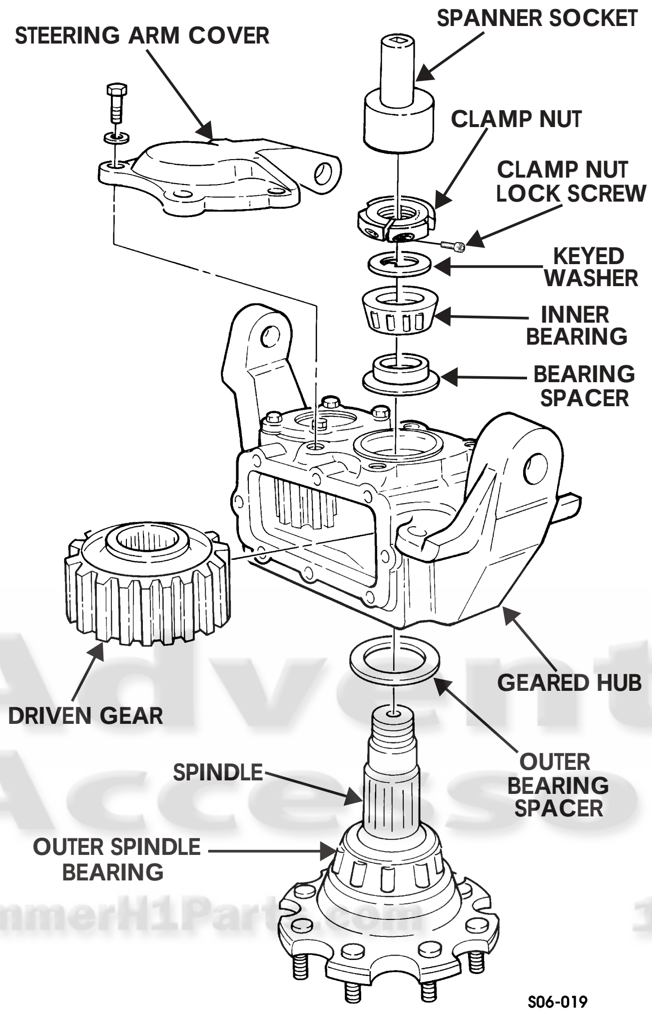


Figure 6-75: Driven Gear into Geared Hub

9. Install outer bearing spacer on spindle.
10. Lower geared hub onto spindle and align splines on driven gear with splines on spindle. Ensure outer spindle bearing seats in bearing cup.
11. Install inner bearing and keyed washer on spindle.

NOTE: After clamp nut lock screw is installed into clamp nut, clamp nut must be completely installed on spindle within a ten minute limit.

12. Install clamp nut lock screw three to five turns into clamp nut.

***CAUTION**: Ensure clamp nut is installed on spindle with boss (protruding side) facing inward toward bearing and large chamfer side with engraved part number facing away from bearing.*

13. Apply a thin coat of grease to boss (protruding side) of clamp nut and install clamp nut on spindle.

NOTE: If an excessive amount of torque (18-26 lb-in. (2-3 N•m)) is required to tighten clamp nut lock screw to remove clamp nut wobble, remove screw. Ensure threads of clamp nut are clean and free of Loctite. Replace screw with a new one, or remove all previously applied Loctite from threads of old screw and apply fresh Loctite 272 to old screw threads prior to reinstallation. Use a hexagon-head socket with a calibrated torque wrench to tighten and check torque of screw.

14. Tighten clamp nut lock screw until all clamp nut wobble is removed and clamp nut can still be rotated by hand.
15. Using spanner socket, tighten clamp nut to 40 lb-ft (54 N•m). Rotate spindle five revolutions both clockwise and counterclockwise to seat bearings.
16. Loosen and retighten clamp nut to 25 lb-ft (34 N•m).

NOTE: Ensure clamp nut does not move while clamp nut lock screw is being tightened.

17. Using a hexagon-head socket and pre-set calibrated torque wrench, tighten clamp nut lock screw to 90 lb-in. (10 N•m).
18. Mark a temporary line across end of spindle and clamp nut.

NOTE: Using a feeler gauge, ensure a gap exists between clamp nut joint surfaces. If no gap exists, remove and discard clamp nut lock screw and clamp nut. Acquire new screw and nut and repeat steps 12-18.

19. Using preset torque wrench, apply pressure to clamp nut in a counterclockwise direction until torque wrench clicks, indicating 90 lb-ft (122 N•m) of loosening torque was applied to clamp nut.

NOTE: Clamp nut should not move. To verify no movement occurred, check temporary mark across spindle and clamp nut. If clamp nut moves, remove and discard clamp nut lock screw and clamp nut. Repeat steps 12-19 with new screw and nut.

20. Paint or scribe a permanent line across end of spindle and clamp nut.

NOTE: Immediately install steering arm cover after application of sealer.

21. Clean sealing surfaces on geared hub and steering arm cover. Apply anaerobic sealer to steering arm cover and install steering arm cover on geared hub.

22. Apply thread-locking compound to capscrews. Install steering arm cover to geared hub with four washers and capscrews. Tighten capscrews to 65 lb-ft (88 N•m).
23. Clean sealing surfaces on geared hub and side cover. Apply anaerobic sealer to side cover and install on geared hub (Figure 6-76).

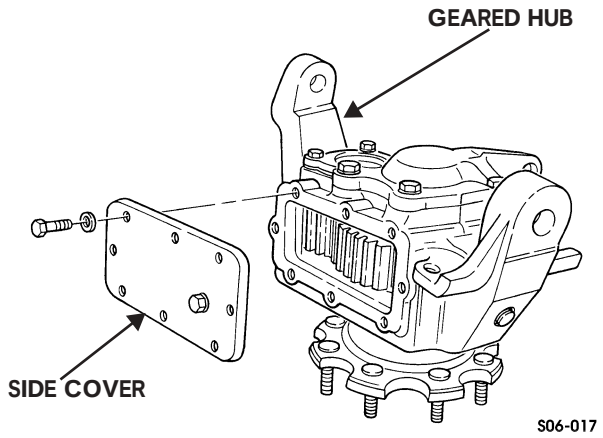


Figure 6-76: Side Cover on Geared Hub

24. Apply thread-locking compound to capscrews. Install side cover to geared hub with eight washers and capscrews. Tighten capscrews to 8-13 lb-ft (11-18 N•m).
25. Install geared hub.

GEARED HUB SPINDLE SEAL MAINTENANCE

Removal

1. Remove wheel.
2. Remove drainplug from geared hub and drain geared hub oil. Install drainplug in geared hub. Tighten drainplug to 8-13 lb-ft (11-18 N•m) (Figure 6-77).

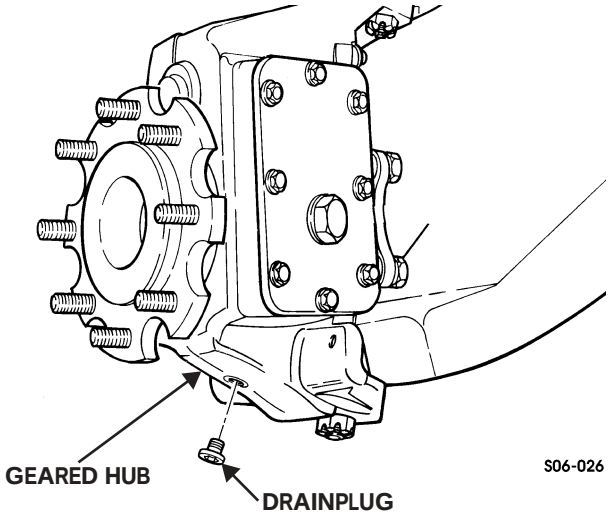


Figure 6-77: Geared Hub and Drainplug

3. Remove four capscrews, washers, and steering arm cover from geared hub (Figure 6-78).

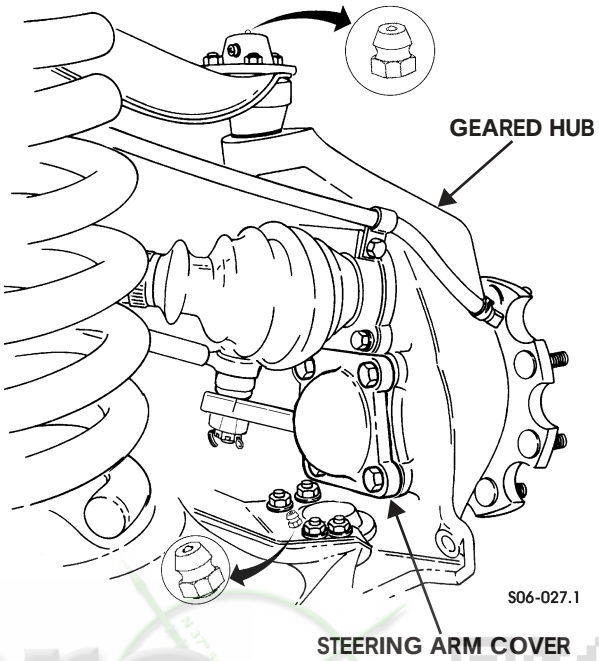


Figure 6-78: Steering Arm Cover And Geared Hub

4. Remove clamp nut lock screw from clamp nut (Figure 6-79).

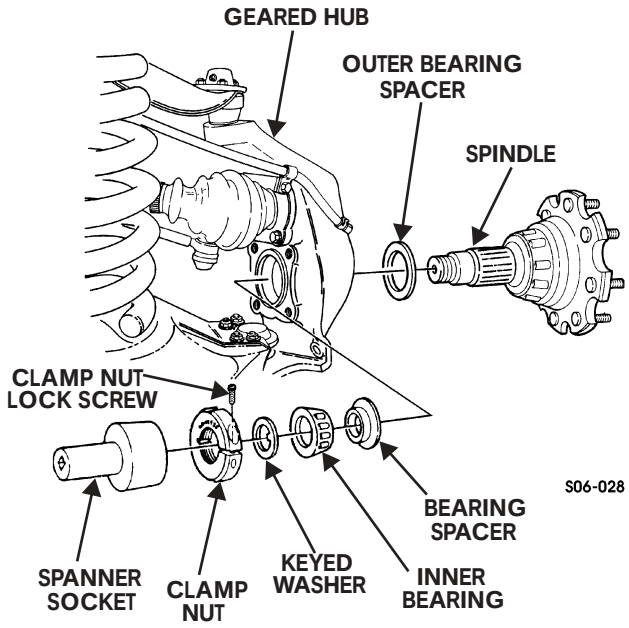


Figure 6-79: Clamp Nut

5. Using spanner socket, remove clamp nut and keyed washer from spindle.
6. Remove spindle, bearing spacer, inner bearing, and outer bearing spacer from geared hub.
7. Remove spindle seal from geared hub. Discard spindle seal (Figure 6-80).

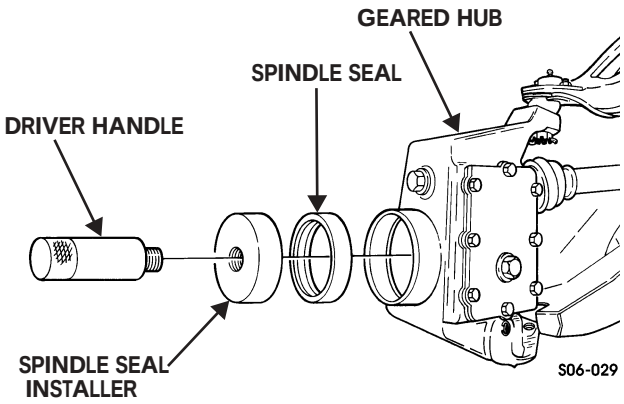


Figure 6-80: Removing Spindle Seal

Cleaning and Inspection

1. Inspect spindle for rough or corroded sealing surface. Replace if damaged (Figure 6-79).
2. Inspect bearings for damage. Replace if damaged.

Installation

1. Using driver handle and spindle seal installer, install spindle seal in geared hub (Figure 6-80).
2. Coat seal with lubricating oil.
3. Install outer bearing spacer and spindle in geared hub (Figure 6-79).
4. Install bearing spacer, inner bearing, and keyed washer on spindle.

NOTE: After clamp nut lock screw is installed into clamp nut, clamp nut must be completely installed on spindle within a ten minute limit.

5. Install clamp nut lock screw three to five turns into clamp nut.

***CAUTION**: Ensure clamp nut is installed on spindle with boss (protruding side) facing inward toward bearing and large chamfer side with engraved part number facing away from bearing.*

6. Apply a thin coat of grease to boss (protruding side) of clamp nut and install clamp nut on spindle.

NOTE: If an excessive amount of torque (18-26 lb-in. (2-3 N•m)) is required to tighten clamp nut lock screw to remove clamp nut wobble, remove clamp nut lock screw. Ensure threads of clamp nut are clean and free of Loctite. Replace screw with a new one or remove all previously applied Loctite from threads of old screw and apply fresh Loctite 272 to old screw threads prior to reinstallation. Use hexagon-head socket with a calibrated torque wrench to tighten and check torque of screw.

7. Tighten clamp nut lock screw until all clamp nut wobble is removed and clamp nut can still be rotated by hand.
8. Using spanner socket, tighten clamp nut to 40 lb-ft (54 N•m). Rotate spindle five revolutions both clockwise and counterclockwise to seat bearings.
9. Loosen and retighten clamp nut to 25 lb-ft (34 N•m).

NOTE: Ensure clamp nut does not move while clamp nut lock screw is being tightened.

10. Using a hexagon-head socket and pre-set calibrated torque wrench, tighten clamp nut lock screw to 90 lb-in. (10 N•m).
11. Mark a temporary line across end of spindle and clamp nut.

NOTE: Using a feeler gauge, ensure a gap exists between clamp nut joint surfaces. If no gap exists, remove and discard clamp nut lock screw and clamp nut. Acquire new screw and nut and repeat steps 5-11.

12. Using pre-set torque wrench, apply pressure to clamp nut in a counterclockwise direction until torque wrench clicks, indicating 90 lb-ft (122 N•m) of loosening torque was applied to clamp nut (Figure 6-81).

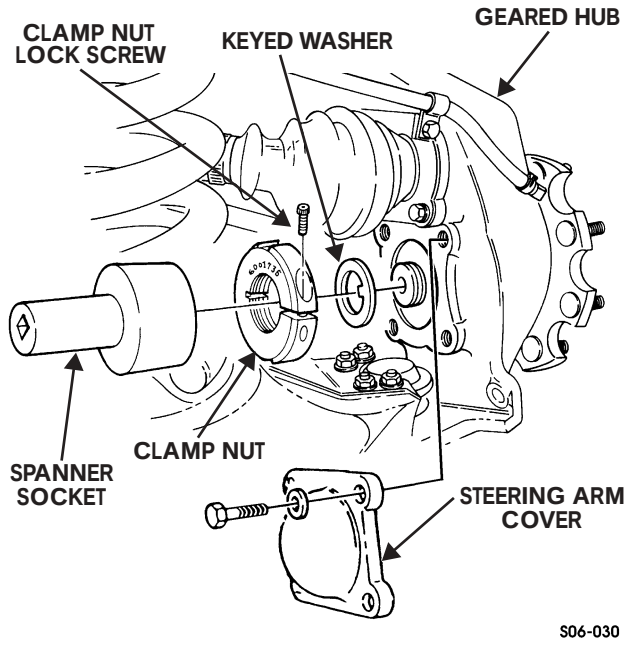


Figure 6-81: Clamp Nut

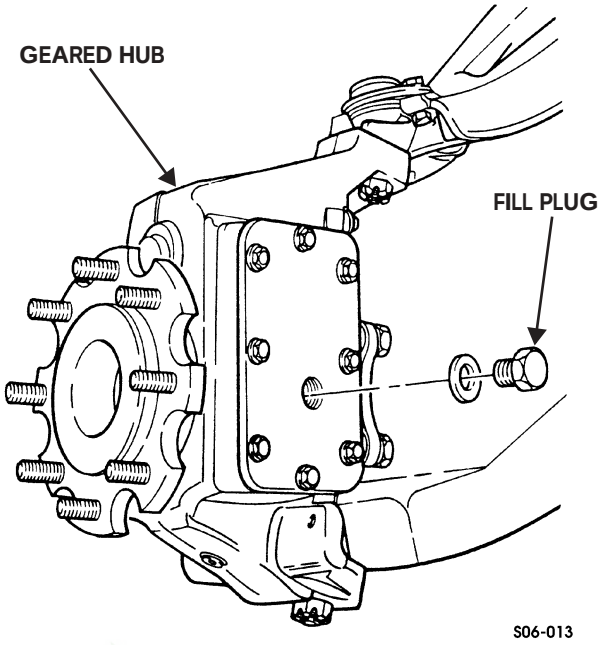


Figure 6-82: Geared Hub Drainplug

NOTE: Clamp nut should not move. To verify no movement occurred, check temporary mark across spindle and clamp nut. If clamp nut moved, remove and discard clamp nut lock screw and clamp nut. Repeat steps 5-12 with new screw and nut.

13. Paint or scribe a permanent line across end of spindle and clamp nut.

NOTE: Immediately install steering arm cover after application of sealant.

14. Clean sealing surfaces on geared hub and steering arm cover. Apply anaerobic sealant to steering arm cover and install on geared hub.
15. Apply thread-locking compound to capscrew threads and install steering arm cover on geared hub with four washers and capscrews. Tighten capscrews to 65 lb-ft (88 N•m).
16. Remove fill plug and washer from geared hub (Figure 6-82).
17. Fill geared hub to proper oil level (Section 1).
18. Install washer and fill plug to geared hub. Tighten fill plug to 8-13 lb-ft (11-18 N•m).
19. Install wheel and check alignment.

GEARED HUB SPINDLE BEARING ADJUSTMENT

Adjustment

1. Remove wheel.
2. Remove drainplug and drain geared hub oil. Install drainplug into geared hub. Tighten drainplug to 8-13 lb-ft (11-18 N•m) (Figure 6-83).

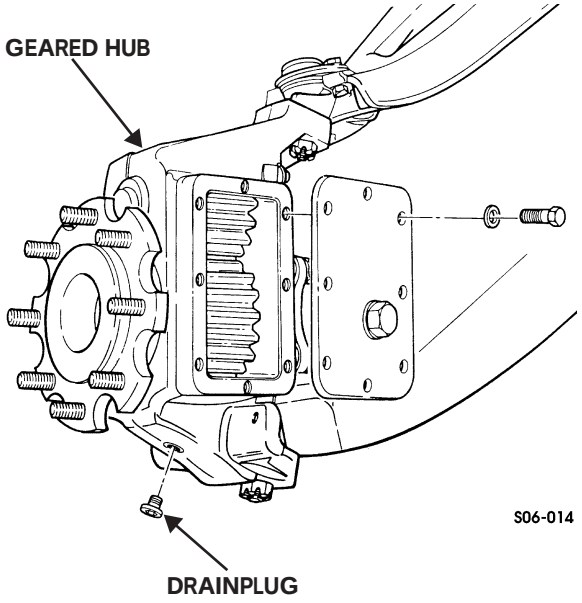


Figure 6-83: Geared Hub Drainplug

3. Remove four capscrews, washers, and steering arm cover from geared hub. Push steering arm cover away from geared hub (Figure 6-85).
4. Remove clamp nut lock screw from clamp nut.
5. Using spanner socket, remove clamp nut and keyed washer from spindle.

NOTE: After clamp nut lock screw is installed into clamp nut, clamp nut must be completely installed on spindle within a ten minute limit.

6. Install clamp nut lock screw three to five turns into clamp nut.

***CAUTION**: Ensure clamp nut is installed on spindle with boss (protruding side) facing inward toward bearing and large chamfer side with engraved part number facing away from bearing.*

7. Apply a thin coat of grease to boss (protruding side) of clamp nut and install clamp nut on spindle.

NOTE: If an excessive amount of torque (18-26 lb-in. (2-3 N•m)) is required to tighten clamp nut lock screw to remove clamp nut wobble, remove screw. Ensure threads of clamp nut are clean and free of Loctite. Replace screw with a new one or remove all previously applied Loctite from threads of old screw and apply fresh Loctite 272 to old screw threads prior to reinstallation. Use a hexagon-head socket with a calibrated torque wrench to tighten and check torque of screw.

8. Tighten clamp nut lock screw until all clamp nut wobble is removed and clamp nut can still be rotated by hand.
9. Using spanner socket, tighten clamp nut to 40 lb-ft (54 N•m). Rotate spindle five revolutions both clockwise and counterclockwise to seat bearings (Figure 6-84).

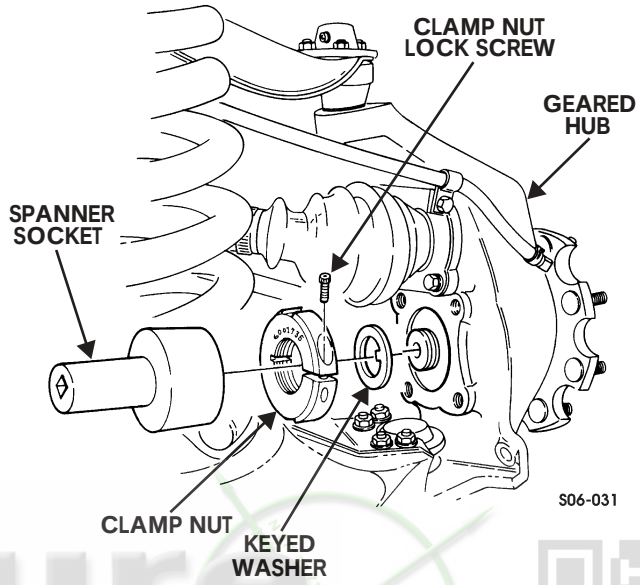


Figure 6-84: Clamp Nut

10. Loosen and retighten clamp nut to 25 lb-ft (34 N•m).

NOTE: Ensure clamp nut does not move while clamp nut lock screw is being tightened.

11. Using a hexagon-head socket and pre-set calibrated torque wrench, tighten clamp nut lock screw to 90 lb-in. (10 N•m).
12. Mark a temporary line across end of spindle and clamp nut.

NOTE: Using a feeler gauge, ensure a gap exists between clamp nut joint surfaces. If no gap exists, remove and discard clamp nut lock screw and clamp nut. Acquire new screw and nut and repeat steps 6-12.

13. Using pre-set torque wrench, apply pressure to clamp nut in counterclockwise direction until torque wrench clicks, indicating 90 lb-ft (122 N•m) of loosening torque was applied to clamp nut.

NOTE: Clamp nut should not move. To verify no movement occurred, check temporary mark across spindle and clamp nut. If clamp nut moved, remove and discard clamp nut lock screw and clamp nut. Repeat steps 6-13 with new screw and nut.

14. Paint or scribe a permanent line across end of spindle and clamp nut.

NOTE: Immediately install steering arm cover after application of sealant.

15. Clean sealing surfaces on geared hub and steering arm cover. Apply anaerobic sealant to steering arm cover and install on geared hub (Figure 6-85).

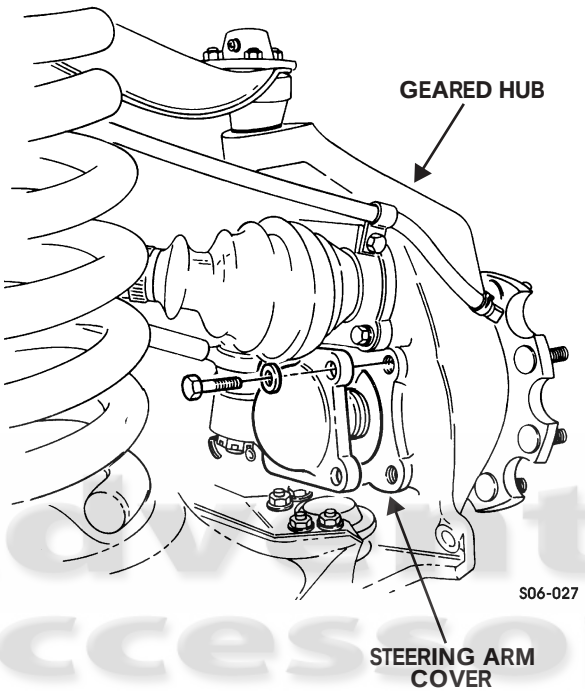


Figure 6-85: Steering Arm Cover

16. Apply thread-locking compound to capscrew threads and secure steering arm cover to geared hub with four washers and capscrews. Tighten capscrews to 65 lb-ft (88 N•m).
17. Remove fill plug and washer from geared hub (Figure 6-82).
18. Fill geared hub to proper oil level (Section 1).
19. Install washer and fill plug to geared hub. Tighten fill plug to 8-13 lb-ft (11-18 N•m).

GEARED HUB SPINDLE STUD REPLACEMENT

WARNING: Always wear eye protection when replacing spindle studs. Severe eye injury may result if metal chips contact eyes.

Removal

1. Remove wheel.
2. Rotate spindle to allow clearance for removal of stud from spindle (Figure 6-86).
3. Drive stud from spindle. Discard stud.

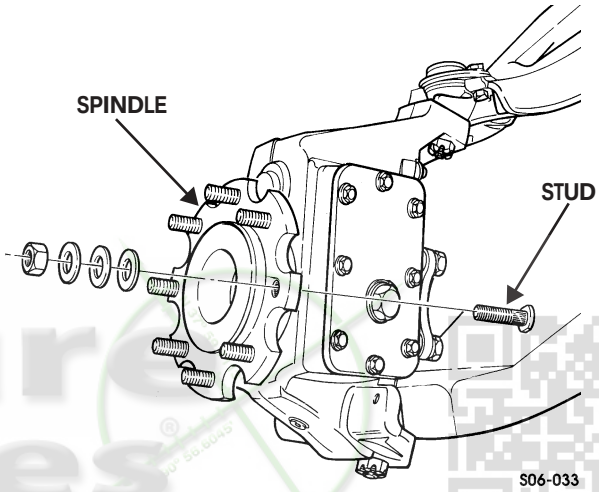


Figure 6-86: Geared Hub Spindle Stud

Installation

1. Install stud in spindle (Figure 6-86).
2. Install three flat washers and hex nut on stud.
3. Tighten hex nut until head on stud seats against spindle.
4. Remove and discard hex nut and three flat washers.

AXLE VENT LINE REPLACEMENT

NOTE: Axle vent line replacement procedures are basically the same. This procedure covers the rear axle vent line.

Removal

1. Disconnect vent line from axle fitting and tee fitting and remove vent line (Figure 6-87).
2. Remove two line clips and vent line from brake line.
3. Disconnect vent line from two tee fittings and remove vent line.

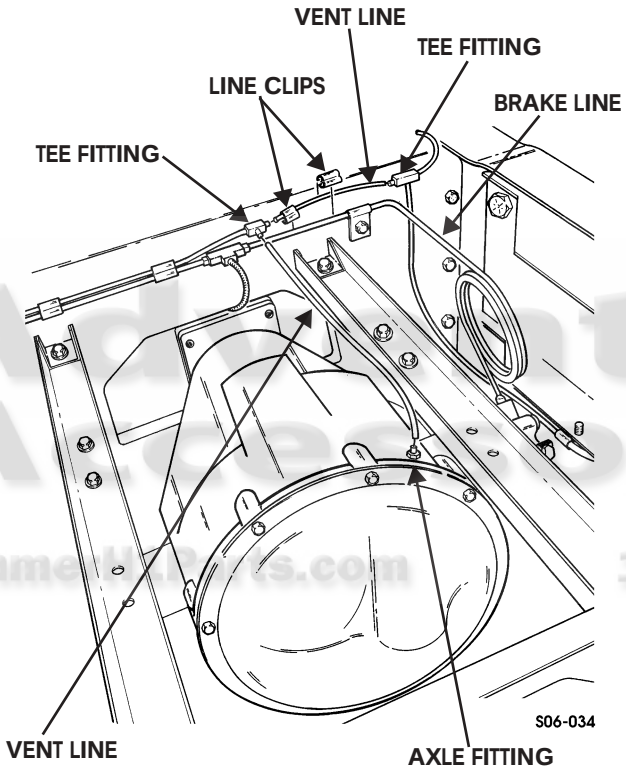


Figure 6-87: Axle Vent Line

Installation

1. Install vent line and connect to two tee fittings (Figure 6-87).
2. Secure vent line to brake line with two line clips.
3. Connect vent line to axle fitting and tee fitting.

GEARED HUB VENT LINE REPLACEMENT

NOTE: All geared hub vent line replacement procedures are basically the same. This procedure covers the right rear geared hub vent line.

Removal

1. Disconnect vent line from geared hub fitting (Figure 6-88).
2. Remove capscrew, clamp, and vent line from bracket.
3. Remove capscrew, clamp, and vent line from control arm.
4. Remove capscrew, clamp, and vent line from bracket.
5. Remove capscrew, clamp, and vent line from frame (Figure 6-89).
6. Disconnect vent line from tee fitting.

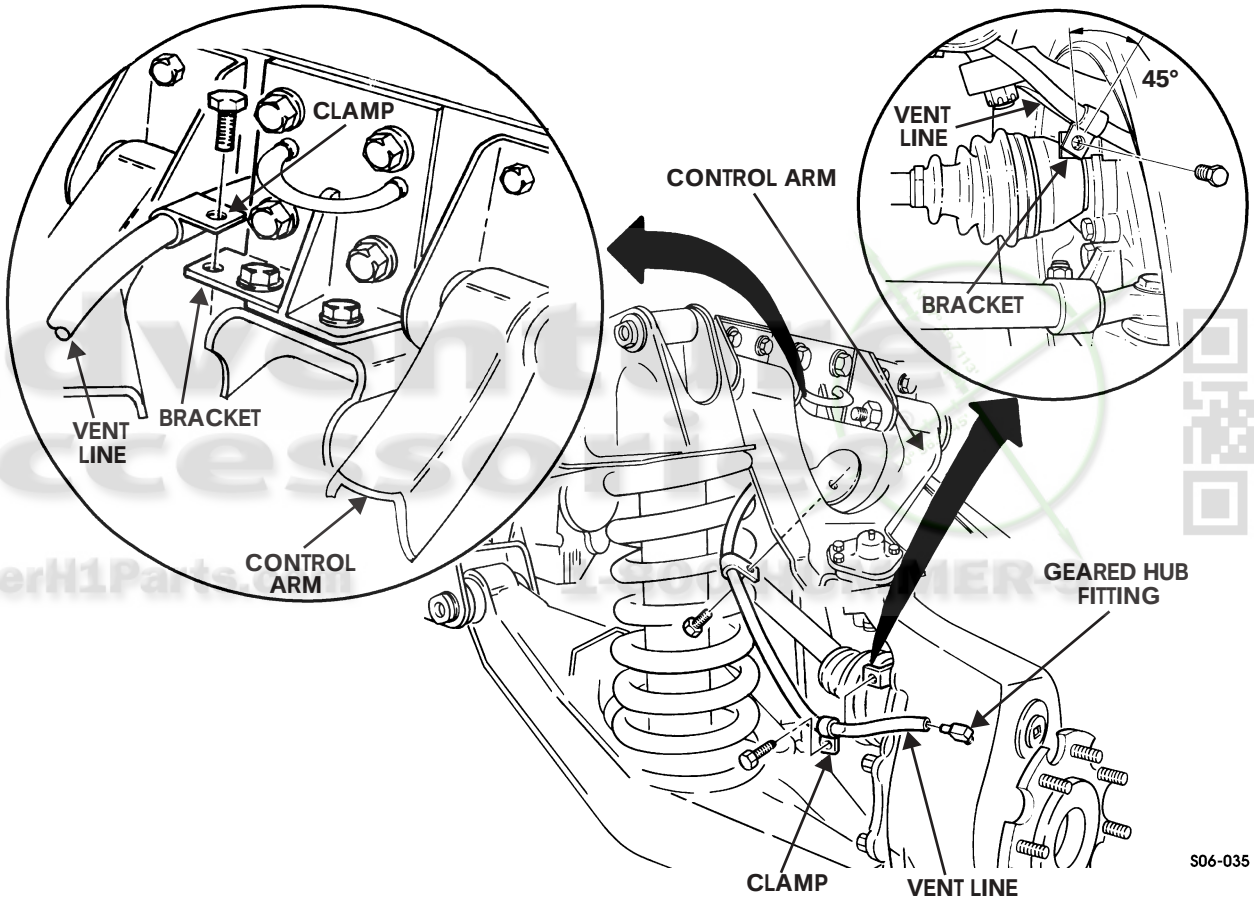


Figure 6-88: Geared Hub Vent Line

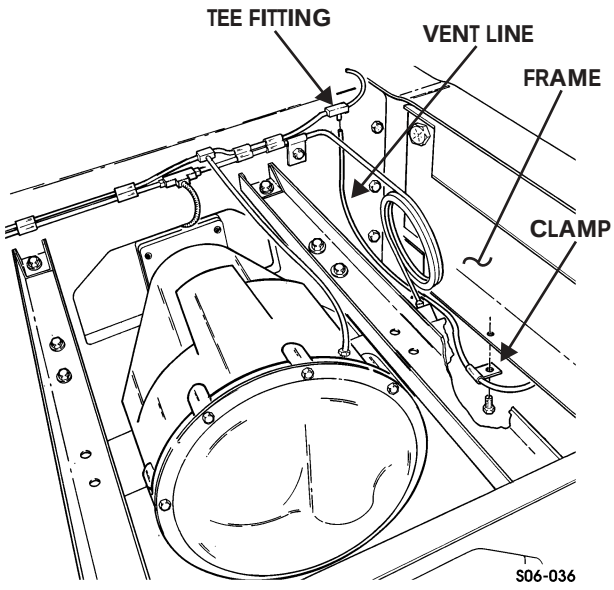


Figure 6-89: Vent Line

Installation

1. Install vent line to frame with clamp and capscrew (Figure 6-89).
2. Install vent line to bracket with clamp and capscrew (Figure 6-88).
3. Connect vent line to tee fitting and geared hub fitting (Figures 6-88 and 6-89).
4. Install vent line to control arm with clamp and capscrew (Figure 6-88).

NOTE: Position clamp at a 45 degree angle toward the wheel before securing with capscrew.

5. Install vent line to bracket with clamp and capscrew.

STEERING STOP ADJUSTMENT

NOTE: Alignment equipment currently used in the automotive field should be used for steering stop adjustment procedure. This procedure should be followed if alignment equipment is not available.

Removal

1. Loosen jamnut and remove capscrew and jamnut from geared hub (Figure 6-90).
2. Remove jamnut from capscrew.

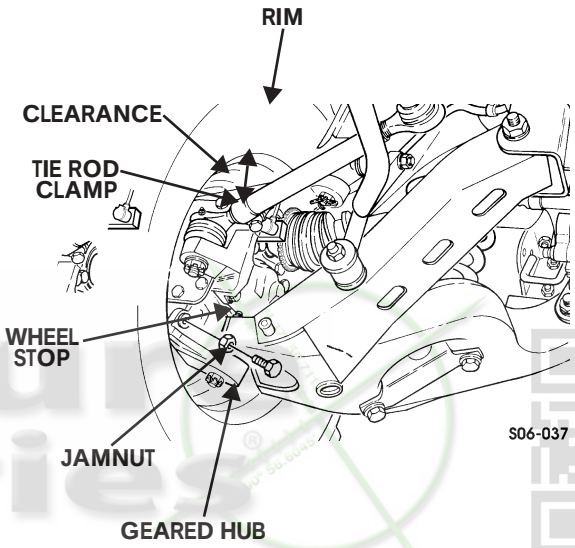


Figure 6-90: Steering Stop Adjustment

Installation

1. Apply thread-locking compound to capscrew (Figure 6-90).
2. Install jamnut on capscrew.
3. Install capscrew and jamnut on geared hub. Tighten capscrew finger tight.

Adjustment

NOTE: Prior to adjustment, ensure length of each tie rod is the same. If tie rod lengths are not the same ± 1/8 in. (3 mm), check toe-in alignment.

1. Draw a reference chalk line 30 feet long. Mark this line A (Figure 6-91).

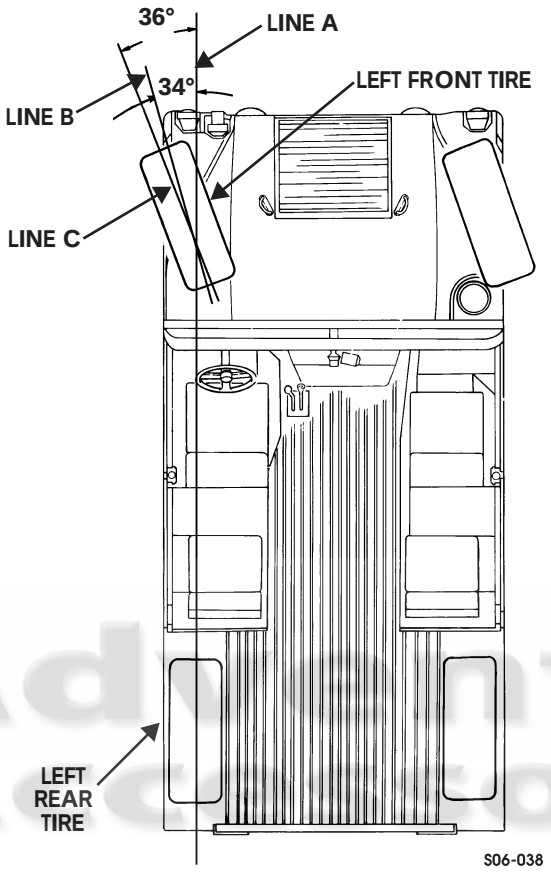


Figure 6-91: Checking Alignment

2. Position vehicle so that center of left rear and left front tires are positioned directly on reference line A.
3. Using a protractor, draw a reference line at 34 degrees from line A. Mark this line B.
4. Again, using a protractor, draw a reference line at 36 degrees from line A. Mark this line C.
5. Roll vehicle forward until center of left front tire is over intersection of lines A, B, and C.
6. Turn steering wheel full left.
7. If centerline of front and rear of left front tire is over area between lines B and C, no adjustment is necessary.
8. If centerline of front and rear of left front tire is not over area between lines B and C, loosen jamnut and turn capscrew all the way in.
9. Turn steering wheel until centerline of front and rear of left front tire is over area between lines B and C.
10. Unscrew capscrew until head makes contact with wheel stop on lower control arm (Figure 6-90).
11. Secure capscrew with jamnut.
12. Check for clearance between tie rod clamp and the rim.
13. Repeat adjustment procedure for opposite side.

AXLE ASSEMBLY COVER MAINTENANCE

Removal

1. Remove drainplug from axle assembly and drain axle assembly (Figure 6-92).
2. Remove twelve capscrews and cover from axle assembly.

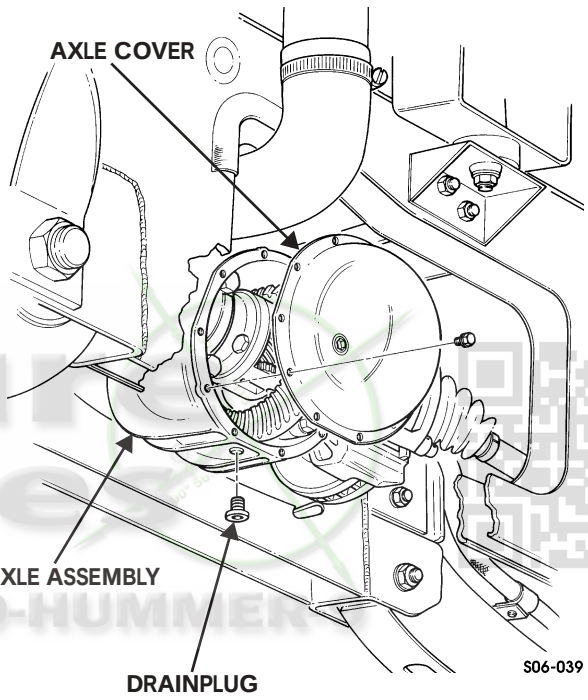


Figure 6-92: Axle Assembly And Cover

Cleaning and Inspection

NOTE: Clean all components, examine for wear or damage, and replace if necessary.

1. Clean axle assembly cover, capscrews, and axle assembly with solvent (Figure 6-92).
2. Inspect axle assembly cover for cracks, wear, or breaks.

Installation

1. Apply RTV sealant to cover sealing surface and install cover on axle assembly with twelve capscrews. Tighten capscrews to 16 lb-ft (22 N•m).
2. Install drainplug into axle assembly and tighten to 13-18 lb-ft (18-25 N•m) (Figure 6-92).
3. Fill axle assembly to proper oil level (Section 1).

AXLE OUTPUT SHAFT SEAL REPLACEMENT

Removal

1. Remove axle assembly support bracket (Section 9).
2. Remove output shaft seal from axle (Figure 6-93).

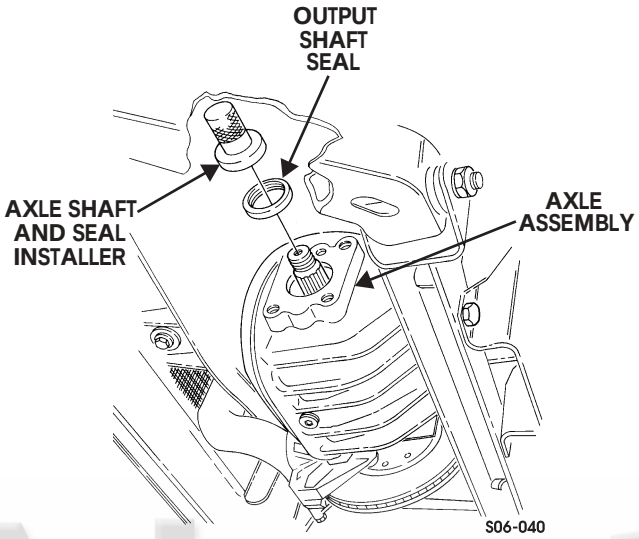


Figure 6-93: Axle Output Shaft Seal

Installation

1. Using axle shaft and seal installer, install output shaft seal in axle assembly (Figure 6-93).
2. Install axle assembly support bracket (Section 9).

PINION SEAL REPLACEMENT

NOTE: Removal and installation procedures for pinion seals are basically the same for front and rear axle assemblies. This procedure covers the rear axle assembly pinion seal.

Removal

1. Remove six capscrews, lockwashers, and halfshaft from each output flange rotor (Figure 6-51).
2. Remove four capscrews, two straps, and rear propeller shaft from pinion yoke (Figure 6-94).
3. Using a lb-in. torque wrench, measure torque required to rotate pinion and record measurement.
4. Count and record number of exposed threads on end of pinion and mark locknut and pinion for assembly.
5. Remove locknut and pinion yoke from pinion.
6. Remove pinion seal from pinion.

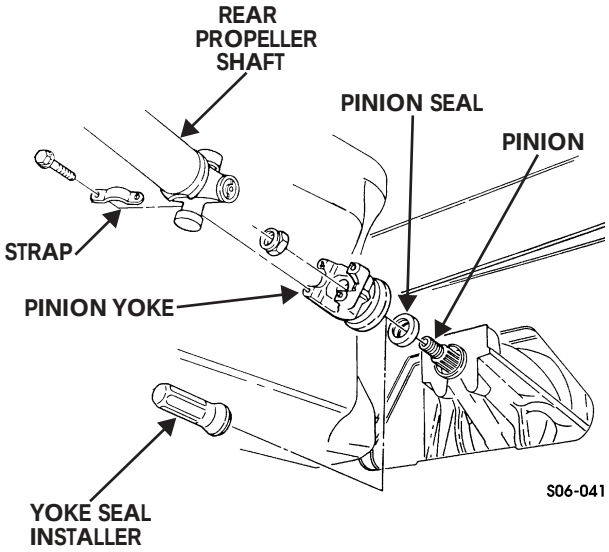


Figure 6-94: Pinion Seal

Installation

1. Using yoke seal installer, install pinion seal on pinion (Figure 6-94).
2. Install pinion yoke on pinion with locknut.
3. Tighten locknut to original position.
4. Tighten locknut in small increments, until torque required to rotate pinion exceeds original measurement by 2 lb-in. (0.2 N•m).
5. Install rear propeller shaft on pinion yoke with four capscrews and two straps. Tighten capscrews to 60 lb-ft (81 N•m).
6. Apply Loctite 272 to capscrews.
7. Install halfshaft on each output flange rotor with six lockwashers and capscrews. Tighten to 48-lb-ft (65 N•m).

AXLE ASSEMBLY REPLACEMENT

Removal

NOTE: Removal and installation procedures are basically the same for front and rear axle assemblies. This procedure covers both front and rear axle assemblies except where noted.

1. Remove service brake rotor (Section 7).
2. Remove drainplug from axle assembly. Allow oil to drain and install drainplug (Figure 6-95).

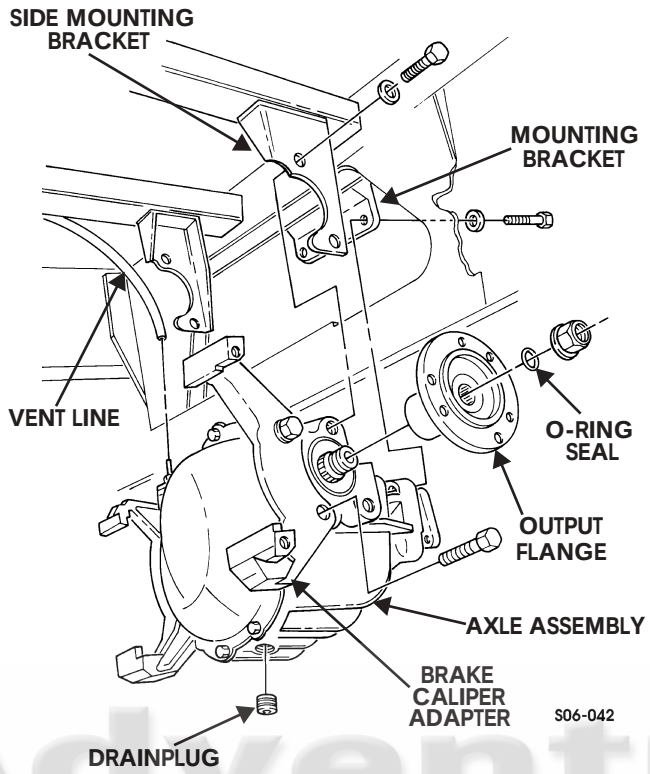


Figure 6-95: Rear Axle Assembly

3. Remove four capscrews, two straps, and rear propeller shaft from pinion yoke (Figure 6-96).
4. Remove rear propeller shaft from transfer case.

NOTE: No washers are required when securing front axle assembly to mounting bracket.

5. Remove two capscrews and washers securing axle assembly to mounting bracket (Figure 6-95).
6. Remove two locknuts, two O-ring seals and two output flanges from axle assembly. Discard locknuts and O-ring seals.

WARNING: Axle assembly must be supported during removal and installation. Failure to do this may cause injury or damage to equipment.

7. Support axle assembly.
8. Remove four capscrews and washers securing axle assembly to side mounting brackets.
9. Lower axle assembly slightly and disconnect vent line from axle assembly.
10. Remove axle assembly.
11. Remove four capscrews and two brake caliper adapters from axle assembly.
12. Using a lb-in. torque wrench, measure torque required to rotate pinion and record measurement.
13. Count and record number of exposed threads on end of pinion and mark locknut and pinion for assembly.
14. Remove locknut and rear pinion yoke from axle assembly (Figure 6-97).

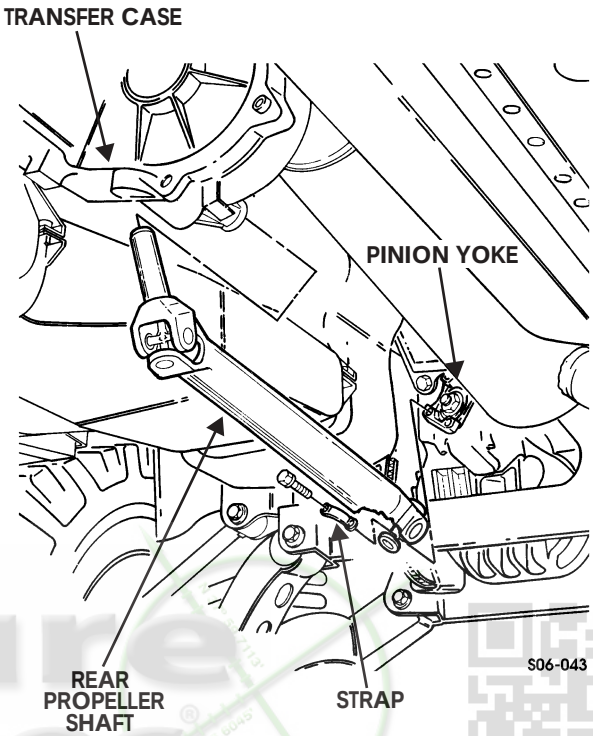


Figure 6-96: Rear Propeller Shaft

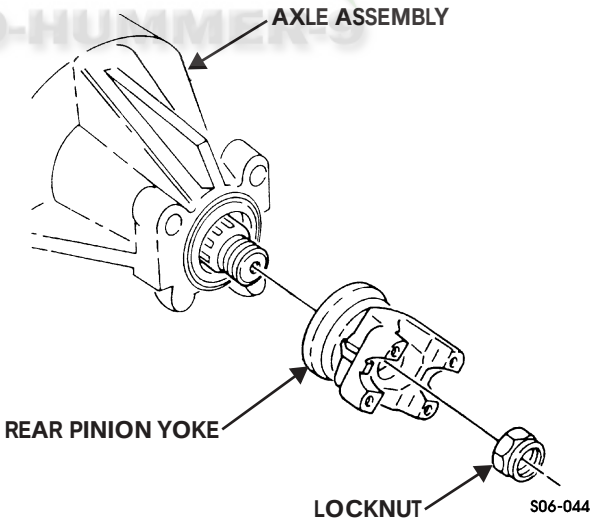


Figure 6-97: Rear Pinion Yoke and Axle Assembly

Installation

1. Install rear pinion yoke on axle assembly with locknut (Figure 6-97).
2. Tighten locknut in small increments, until torque required to rotate pinion yoke exceeds original measurement by 2 lb-in. (0.2 N•m).

3. Apply thread-locking compound to axle assembly tapped holes. Install two brake caliper adapters on axle assembly with four capscrews. Tighten capscrews to 110-140 lb-ft (149-190 N•m) (Figure 6-98).

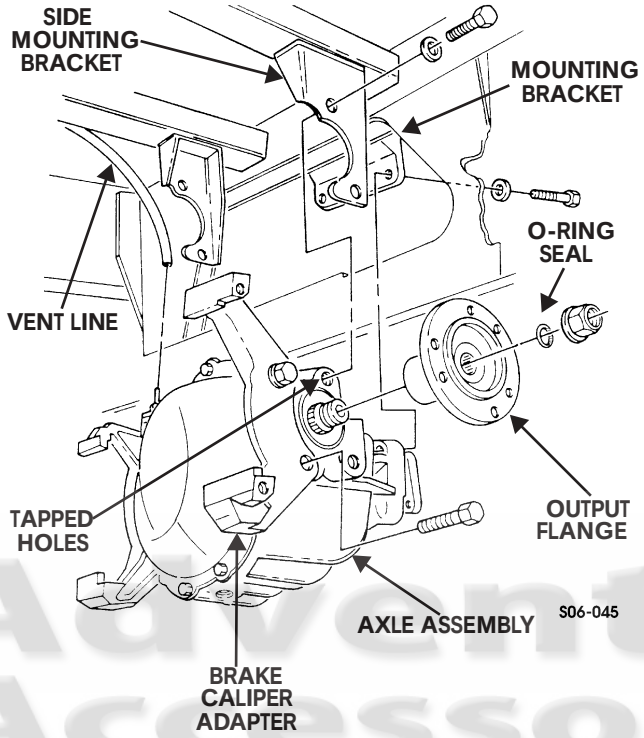


Figure 6-98: Rear Axle Assembly

4. Raise axle assembly into place and connect vent line.
5. Apply thread-locking compound to axle assembly tapped holes. Install axle assembly on side mounting brackets with four washers and capscrews.
6. Install two output flanges and two O-ring seals to axle assembly with two locknuts. Tighten locknuts to 165-195 lb-ft (224-264 N•m).

NOTE: No washers required when securing front axle assembly to mounting bracket.

7. Apply thread-locking compound to capscrews. Install two washers, capscrews, and axle assembly to mounting bracket.
8. Tighten six capscrews securing axle assembly to brackets to 110-139 lb-ft (149-188 N•m).
9. Install rear propeller shaft in transfer case (Figure 6-96).
10. Install rear propeller shaft to pinion yoke with four capscrews and two straps. Tighten capscrews to 60 lb-ft (81 N•m) (Figure 6-96).
11. Install service brake rotors (Section 7).
12. Fill axle assembly to proper oil level (Section 1).
13. Install vent line to axle assembly.

AXLE ASSEMBLY REPAIR

Disassembly

1. Remove axle assembly.

NOTE: Work area should be a clean, well-ventilated place, free from blowing dirt and dust.

2. Loosen locknut on output shaft assembly (Figure 6-99).

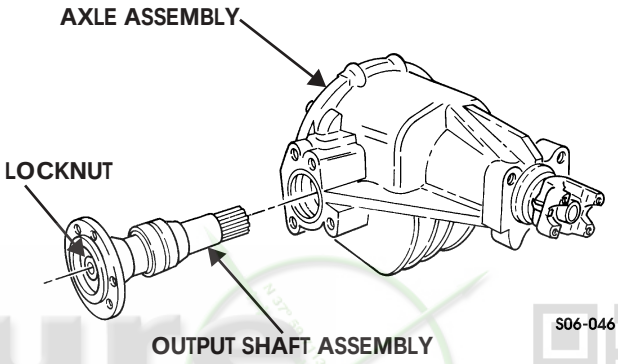


Figure 6-99: Output Shaft and Axle Assembly

3. Using a slide hammer, remove output shaft assembly from axle assembly.
4. Remove locknut, one O-ring seal, output flange and output shaft seal from output shaft. Discard O-ring seal, output shaft seal, and locknut (Figure 6-100).

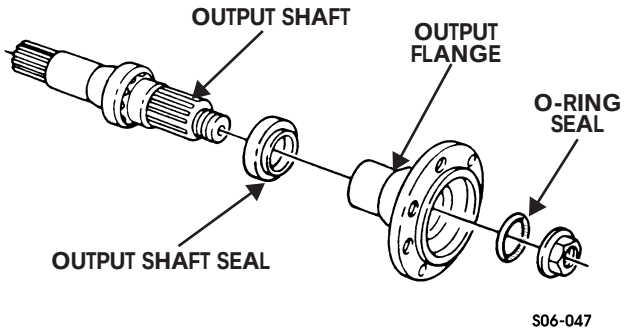


Figure 6-100: Output Shaft Assembly

5. Repeat steps 2 through 4 for opposite side.
6. Install two axle holding fixture adapters on housing with four capscrews. Place housing in holding stand (Figure 6-101).

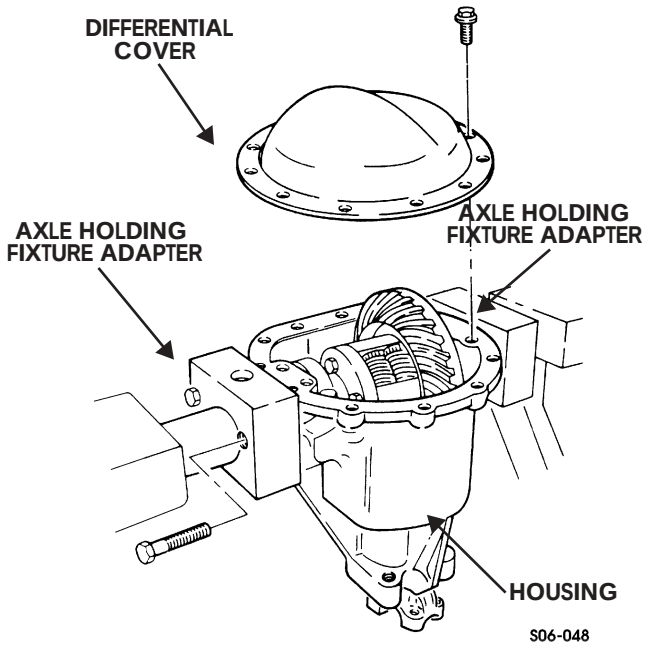


Figure 6-101: Axle Holding Fixture Adapters

7. Position housing so cover faces up. Remove twelve capscrews and cover from housing.
8. Mark bearing caps and housing for assembly and remove four capscrews and two bearing caps from housing (Figure 6-102).

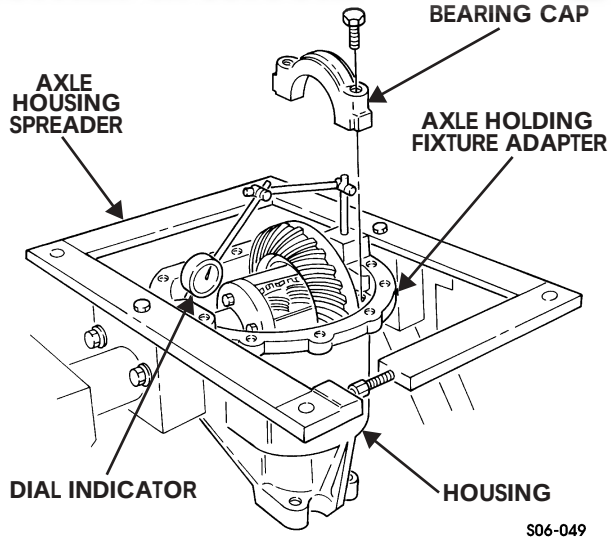


Figure 6-102: Housing

9. Install axle housing spreader into holes in axle holding fixture adapters and install dial indicator to read from each end of housing. Dial indicator must have preload setting of 0.020 inch (0.5 mm).

***CAUTION**: Over-tightening of axle housing spreader will damage axle housing.*

10. Spread housing 0.010 inch (0.25 mm) and remove dial indicator.

NOTE: Tag bearing shims and bearing cups for assembly.

11. Remove differential assembly, two bearing cups, and shims from housing (Figure 6-103).

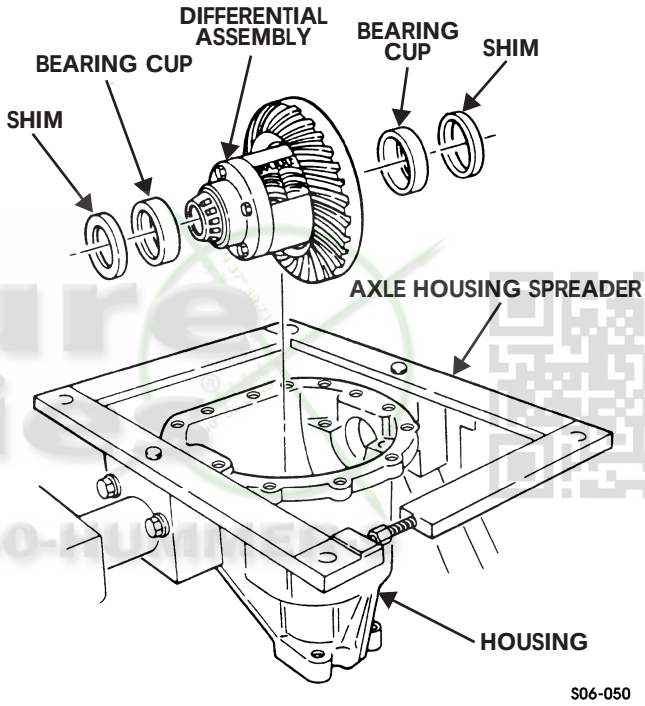


Figure 6-103: Differential Assembly

12. Relieve pressure on axle housing spreader and remove from housing.

***CAUTION**: To avoid damage, do not chisel or wedge ring gear from axle assembly.*

13. Remove eight capscrews and ring gear from differential assembly (Figure 6-104).

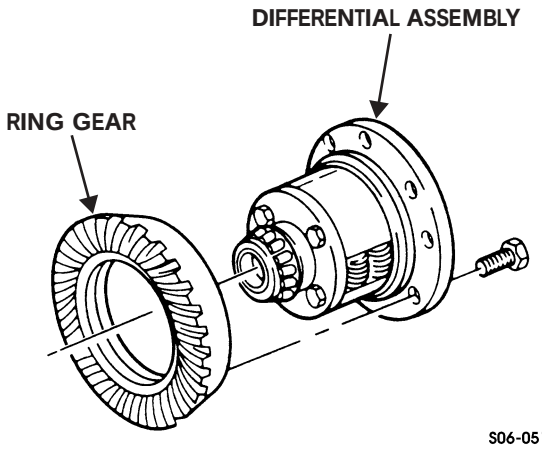


Figure 6-104: Differential Assembly and Ring Gear

14. Rotate housing 90 degrees. Install cover on housing with two capscrews (Figure 6-105).
15. Remove pinion nut and pinion yoke from pinion gear.
16. Drive pinion gear out of front pinion bearing.

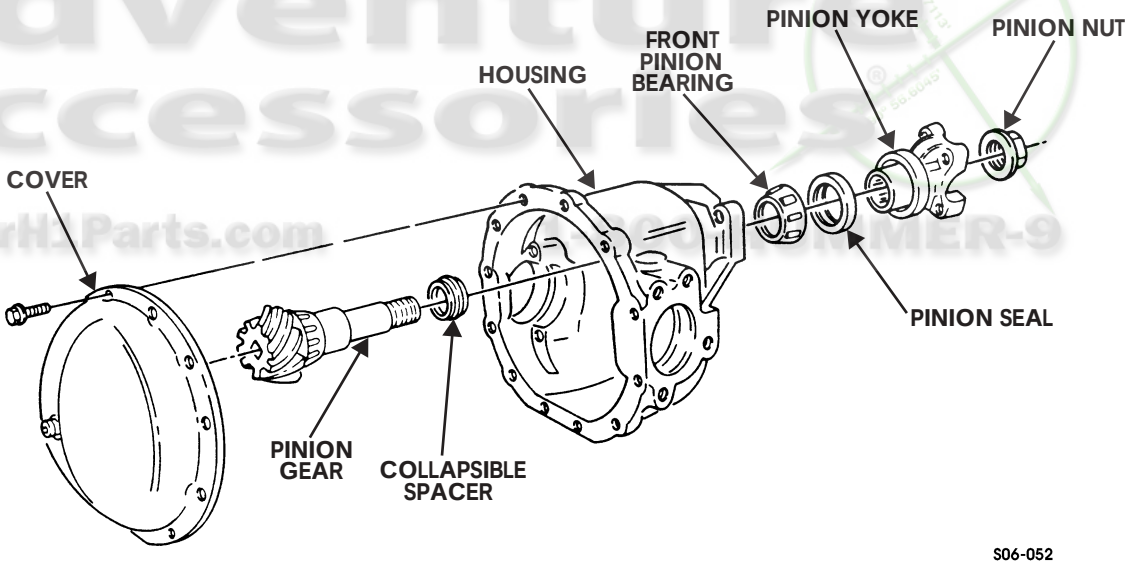


Figure 6-105: Axle Housing

17. Remove cover, pinion gear, and collapsible spacer from housing. Discard collapsible spacer.
18. Remove pinion seal and front pinion bearing from housing. Discard pinion seal.
19. Rotate front of housing upward 90 degrees. Using driver handle and rear pinion bearing cup remover, remove rear pinion bearing cup and pinion depth shim from housing (Figure 6-106).

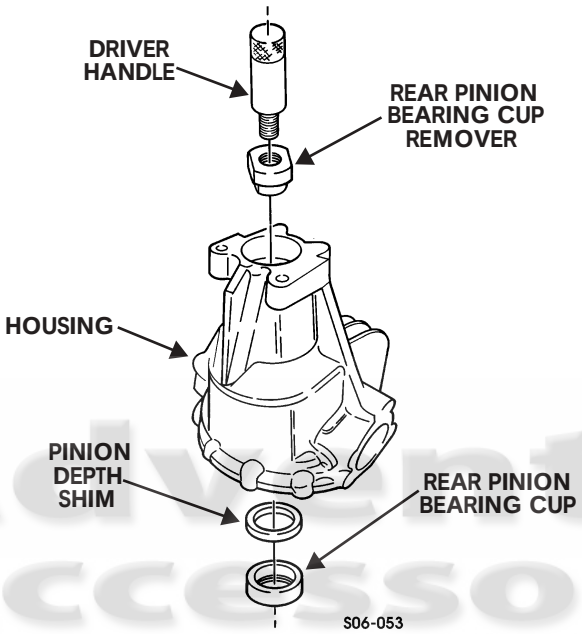


Figure 6-106: Rear Pinion Bearing Cup

20. Rotate housing 180 degrees. Using driver handle and front pinion bearing cup remover, remove front pinion bearing cup from housing (Figure 6-107).

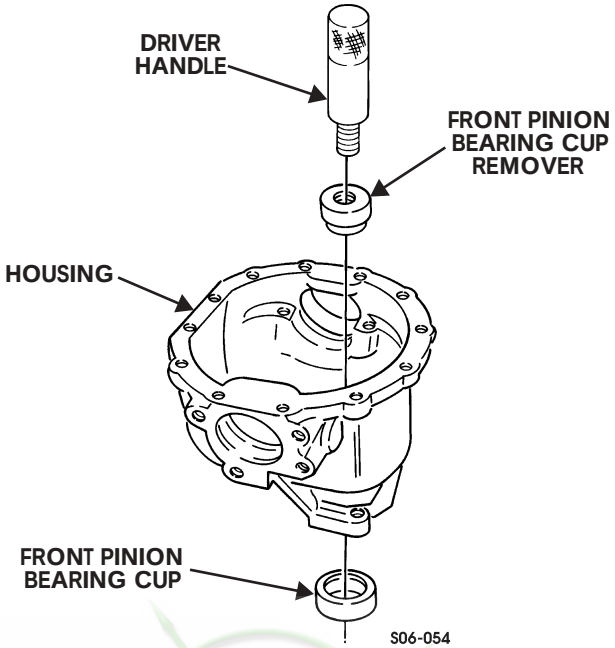


Figure 6-107: Front Pinion Bearing Cup

21. Remove two differential side bearings from differential assembly (Figure 6-108).

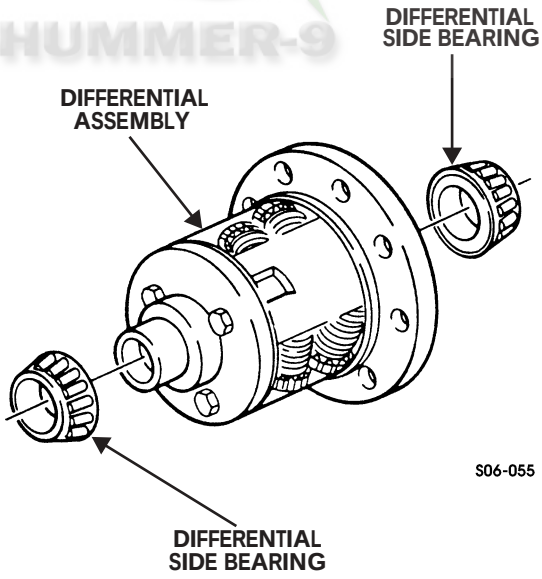


Figure 6-108: Differential Side Bearings

22. Remove rear pinion bearing from pinion gear (Figure 6-109).

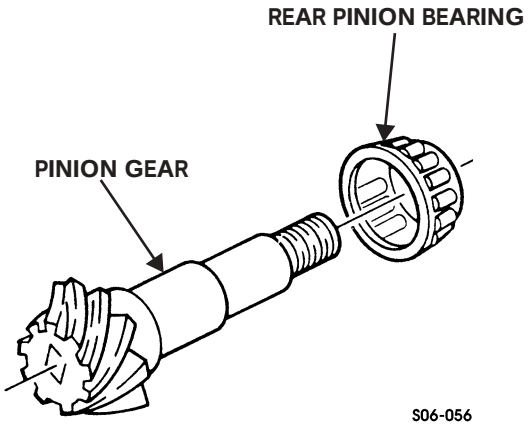


Figure 6-109: Pinion Gear

23. Remove bearing from output shaft (Figure 6-110).

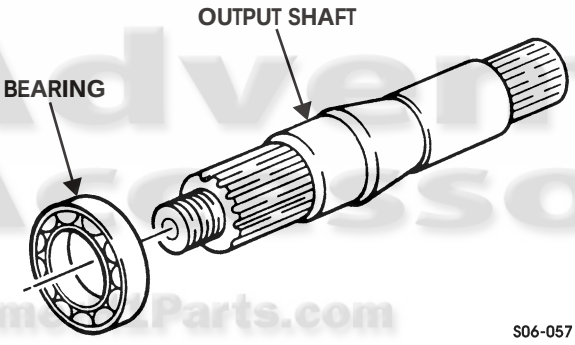


Figure 6-110: Output Shaft

Cleaning and Inspection

NOTE: Clean all components. Examine for wear or damage and replace if necessary.

1. Inspect housing and all threaded holes for damage. Repair any damaged threads with thread repair inserts. Replace axle assembly if housing is damaged (Figure 6-111).

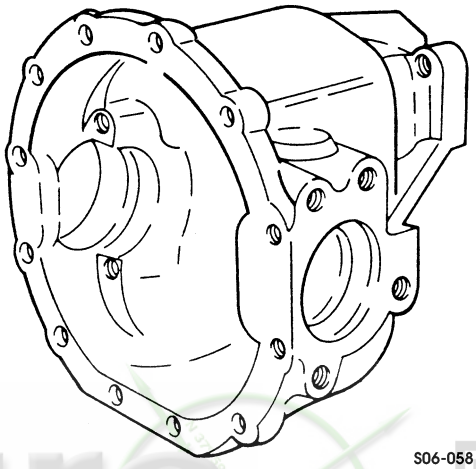


Figure 6-111: Housing

NOTE: Ring and pinion gears must be replaced as matched set.

2. Inspect splines and gear teeth on pinion gear and ring gear for damage. Replace both pinion gear and ring gear if either are damaged (Figures 6-112 and 6-113).

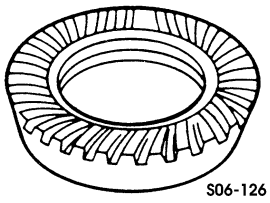


Figure 6-112: Ring Gear

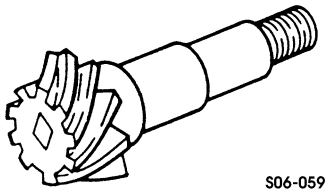


Figure 6-113: Pinion Gear

3. Inspect splines and sealing surfaces on output flanges, pinion yoke, and output shaft for damage (Figures 6-114, 6-115, and 6-116).

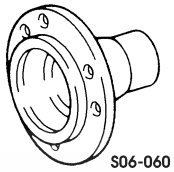


Figure 6-114: Output Flange

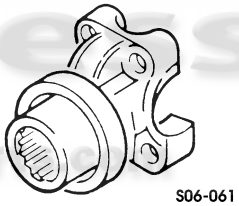


Figure 6-115: Pinion Yoke

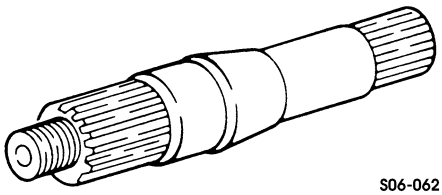


Figure 6-116: Output Shaft

4. Inspect all bearings and bearing cups for damage (Figure 6-117).

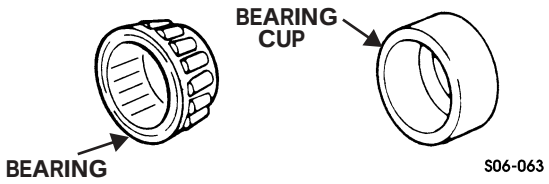


Figure 6-117: Bearing and Bearing Cup

5. Inspect differential assembly case for damage (Figure 6-118).

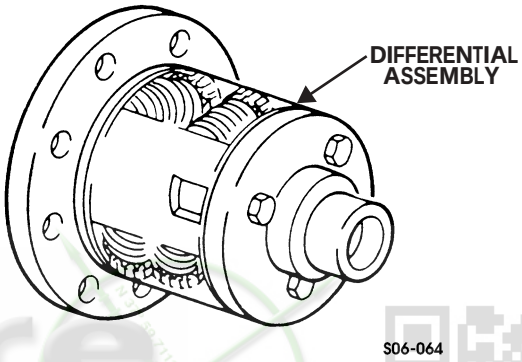


Figure 6-118: Differential Assembly

Assembly

NOTE: For general assembly instructions, refer to Section 1. Pinion gear depth is the distance from the end face of the pinion to the center line of the output shafts. The dimension is controlled by shims between pinion gear rear bearing cup and differential housing. The pinion gear is etched with two identifying numbers. The first number identifies ring gear and pinion gear as a matched set, and the second number represents pinion depth variance. The second number is preceded by a plus (+) or minus (-) which represents the amount the gear set varies from the standard setting of 2.547 inch (6.46 cm). If using original gear set, use original pinion depth shim as a starter shim and proceed to step 4.

1. Measure thickness of original pinion depth shim and record for reference (Figure 6-119).

Figure 6-119: Pinion Depth Shim

2. Check pinion depth variance number marked on old and new pinion gears and record (Figure 6-120) (Table 1).

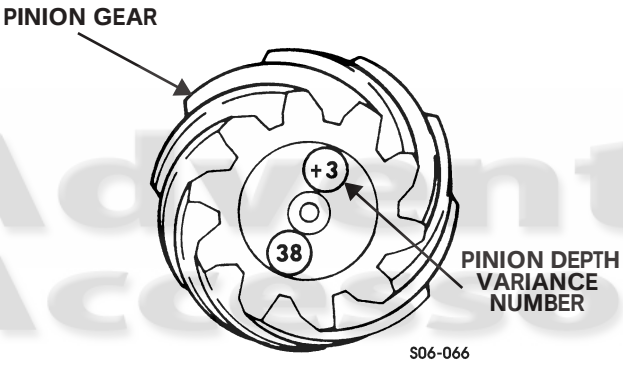


Figure 6-120: Pinion Depth Variance Number

NOTE: If the old pinion is marked -3 and the new pinion is marked +2, the procedure would be as follows: Refer to Old Pinion Marking column at left side of table and locate -3 in this column. Then read to right, across table, until under +2 in New Pinion Marking column. The box where two columns intersect is amount of shim thickness change required. In this case, the number in the intersecting box is -0.005 inch (0.13 mm) which represents the amount to be subtracted from the old shim thickness. If the box number had been a (+) figure, this amount would be added to the old shim thickness. The actual pinion depth measurement must be performed and final shim thickness adjusted as necessary. Pinion shims are available from 0.084-0.111 inch (2.13-2.82 mm) in increments of 0.0005 inch (0.0127 mm).

3. Refer to Old and New Pinion Marking columns on pinion variance table. Note on table where old and new pinion depth variances intersect. This will determine amount to be added or subtracted from original pinion depth shim for desired pinion depth starter shim.

Table 1: Pinion Variance Table - Inches (millimeters)

OLD PINION MARKING	NEW PINION MARKING								
	-4	-3	-2	-1	0	+1	+2	+3	+4
+4	+0.008 (0.20)	+0.007 (+0.18)	+0.006 (+0.15)	+0.005 (+0.13)	+0.004 (+0.10)	+0.003 (+0.08)	+0.002 (+0.05)	+0.001 (+0.03)	0 0
+3	+0.007 (+0.18)	+0.006 (+0.15)	+0.005 (+0.13)	+0.004 (+0.10)	+0.003 (+0.08)	+0.002 (+0.05)	+0.001 (+0.03)	0 0	-0.001 (-0.03)
+2	+0.006 (+0.15)	+0.005 (+0.13)	+0.004 (+0.10)	+0.003 (+0.08)	+0.002 (+0.05)	+0.001 (+0.03)	0 0	-0.001 (-0.03)	-0.002 (-0.05)
+1	+0.005 (+0.13)	+0.004 (+0.10)	+0.003 (+0.08)	+0.002 (+0.05)	+0.001 (+0.03)	0 0	-0.001 (-0.03)	-0.002 (-0.05)	-0.003 (-0.08)
0	+0.004 (+0.10)	+0.003 (+0.08)	+0.002 (+0.05)	+0.001 (+0.03)	0 0	-0.001 (-0.03)	-0.002 (-0.05)	-0.003 (-0.08)	-0.004 (-0.10)
-1	+0.003 (+0.08)	+0.002 (+0.05)	+0.001 (+0.03)	0 0	-0.001 (-0.03)	-0.002 (-0.05)	-0.003 (-0.08)	-0.004 (-0.10)	-0.005 (-0.13)
-2	+0.002 (+0.05)	+0.001 (+0.03)	0 0	-0.001 (-0.03)	-0.002 (-0.05)	-0.003 (-0.08)	-0.004 (-0.10)	-0.005 (-0.13)	-0.006 (-0.15)
-3	+0.001 (+0.03)	0 0	-0.001 (-0.03)	-0.002 (-0.05)	-0.003 (-0.08)	-0.004 (-0.10)	-0.005 (-0.13)	-0.006 (-0.15)	-0.007 (-0.18)
-4	0 0	-0.001 (-0.03)	-0.002 (-0.05)	-0.003 (-0.08)	-0.004 (-0.10)	-0.005 (-0.13)	-0.006 (-0.15)	-0.007 (-0.18)	-0.008 (-0.20)

4. Rotate housing so front pinion bearing cup bore faces up (Figure 6-121).

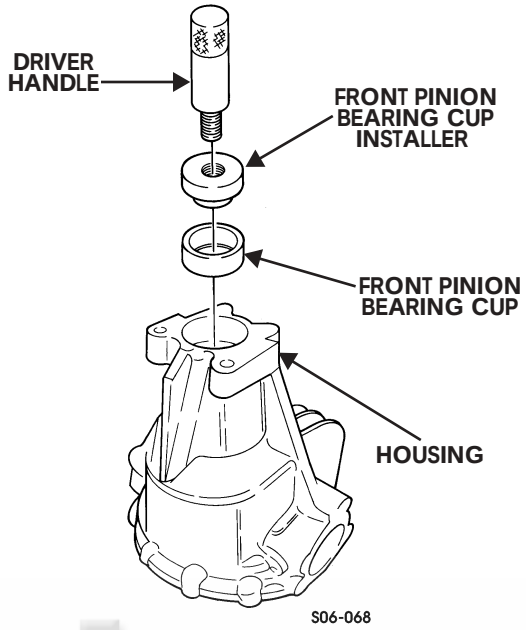


Figure 6-121: Front Pinion Bearing Cup

5. Lubricate outside diameter of front pinion bearing cup with lubricating oil. Using a driver handle and front pinion bearing cup installer, install cup in housing.
6. Install rear pinion bearing on pinion gear (Figure 6-122).

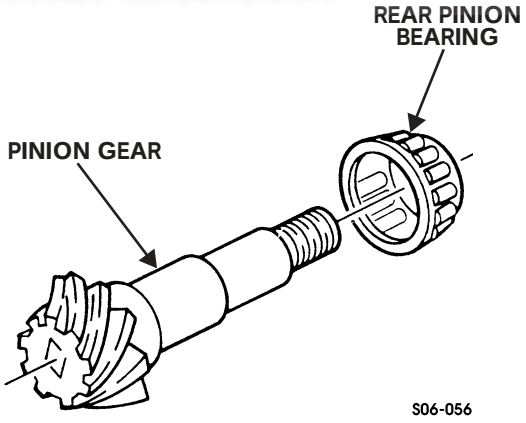


Figure 6-122: Rear Pinion Bearing and Pinion Gear

7. Using pinion setting gauge set, install gauge block, rear pinion bearing cup, rear pinion bearing, and pilot washer on stud and secure with gauge block (Figure 6-123).

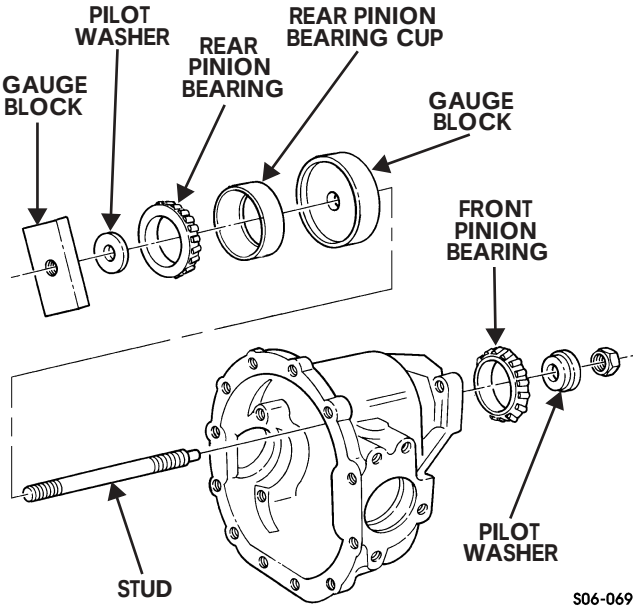


Figure 6-123: Pinion Setting Gauge Set

8. Position stud assembly in housing and secure with front pinion bearing, pilot washer, and nut. Tighten nut to 10 lb-inch (1.1 N•m). Rotate the assembly several revolutions to seat the bearing and recheck the torque.
9. Rotate front of housing downward 90 degrees. Assemble arbor and two discs and install in housing (Figure 6-124).

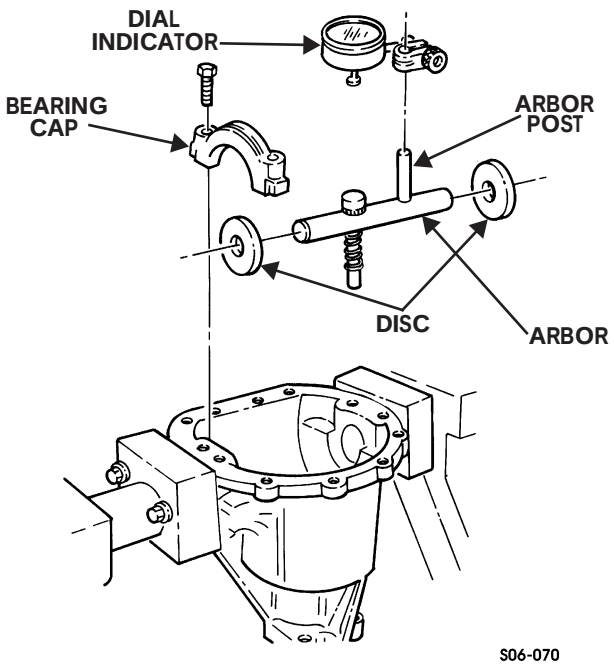


Figure 6-124: Arbor and Discs In Housing

10. Install two bearing caps and four capscrews in housing and finger tighten capscrews.
11. Install the dial indicator on the arbor post. Push the dial indicator downward until the needle rotates approximately one full turn clockwise. Tighten the dial indicator in this position and recheck.
12. Rotate the gauge shaft slowly back and forth until the dial indicator reads the greatest deflection. At the point of greatest deflection, set the dial indicator to zero. Repeat the rocking action of the gauge shaft to verify the gauge setting (Figure 6-125).

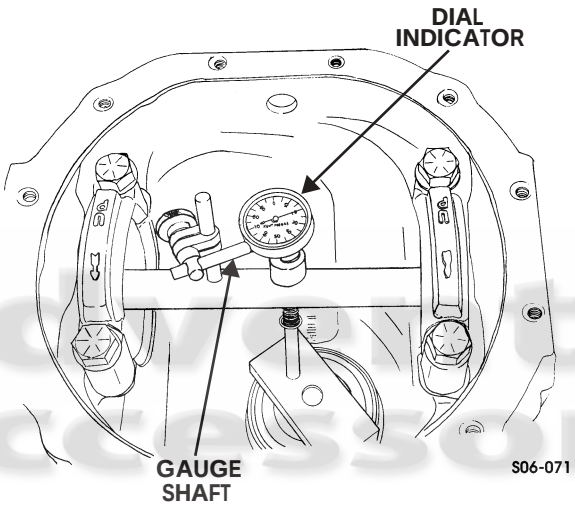


Figure 6-125: Gauge Setting

13. After the zero setting is obtained, rotate the gauge shaft until the dial indicator plunger does not touch the gauge block.
14. Record the dial indicator reading. Example: If the pointer moved counterclockwise and stops between 0 and 11, add 100 inches to measurement for shim thickness. If the pointer moves counterclockwise and stops between 84 and 99, correct shim thickness is indicated.
15. This reading indicates the shim thickness required for a pinion etched with a zero (0) on the pinion head. If the pinion being installed has a plus (+) or minus (-) etching, then an adjustment of the shim thickness is required. Example: If a pinion is etched +3, then 0.003 inches less shim thickness is required. Subtract 0.003 inches from the indicator reading. If a pinion is etched -3, then 0.003 inches more shim thickness is required. Add 0.003 inches to the indicator reading.
16. Remove dial indicator from arbor (Figure 6-124).
17. Remove four capscrews, two bearing caps, discs, and arbor from housing.
18. Remove nut, pilot washer, front pinion bearing, and stud assembly from housing (Figure 6-126).

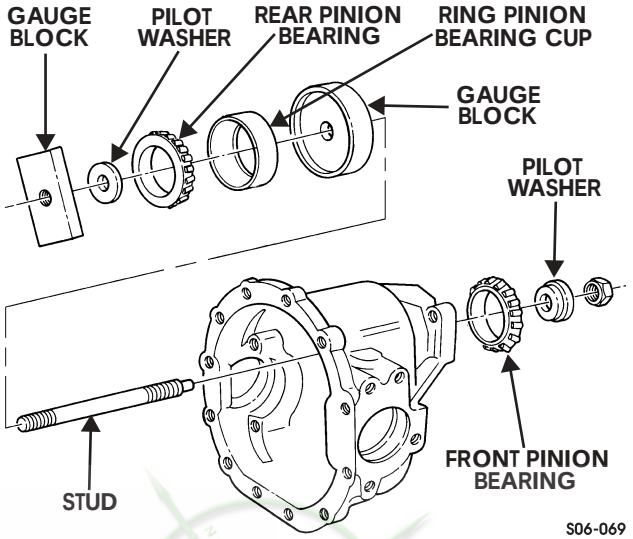


Figure 6-126: Bearing Assemblies

19. Remove gauge block, pilot washer, rear pinion bearing, rear pinion bearing cup, and gauge block from stud.
20. Note pinion depth variance marked on pinion gear. If number is preceded by a plus (+) sign, add that amount in thousands to standard setting of 2.547 inch (6.46 cm). If number is preceded by minus (-) sign, subtract that amount in thousands from standard setting of 2.547 inch (6.46 cm). The result of this addition or subtraction is desired pinion depth. Record for reference (Figure 6-127).

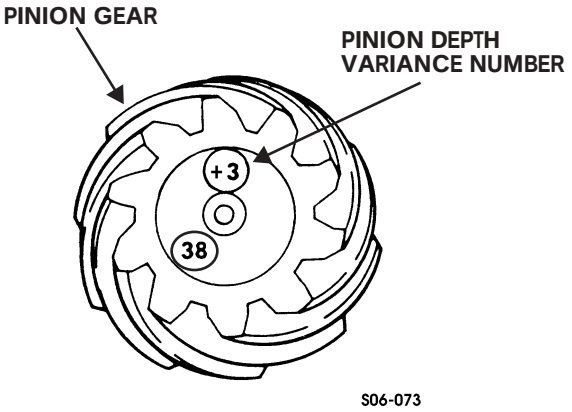


Figure 6-127: Pinion Depth Variance Number

21. Subtract desired pinion depth (step 14) from total measured pinion depth (step 15). Result of this subtraction is correct pinion depth shim thickness.
22. Lubricate front pinion bearing and pinion seal with lubricating oil. Using yoke seal installer, install front pinion bearing and pinion seal in housing (Figure 6-128).

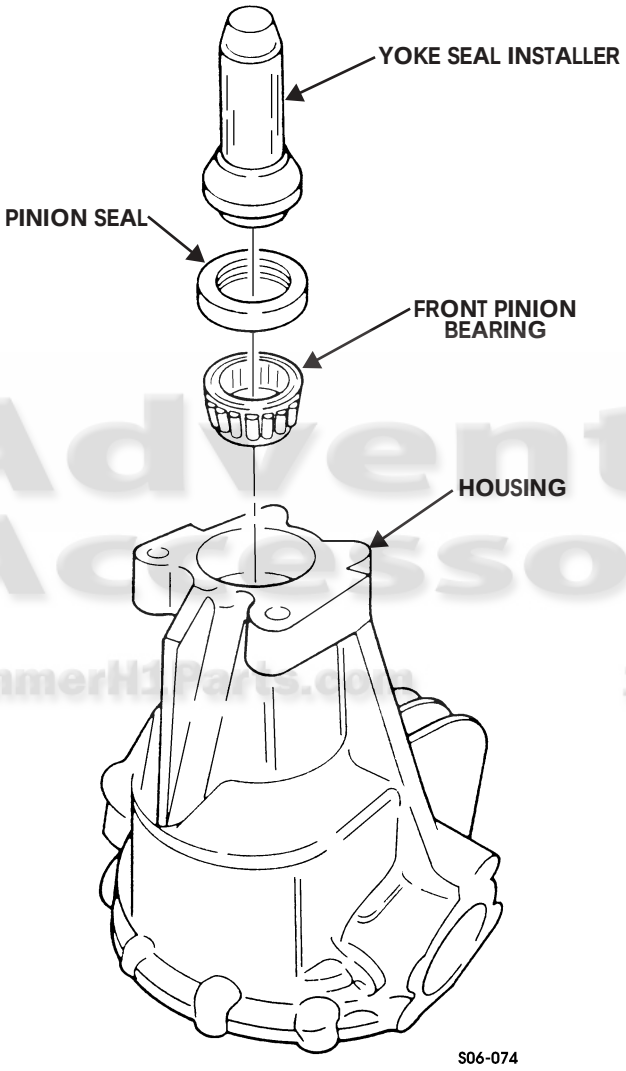


Figure 6-128: Yoke Seal

23. Rotate housing 180 degrees. Lubricate outside diameter of rear pinion bearing cup with lubricating oil (Figure 6-129).

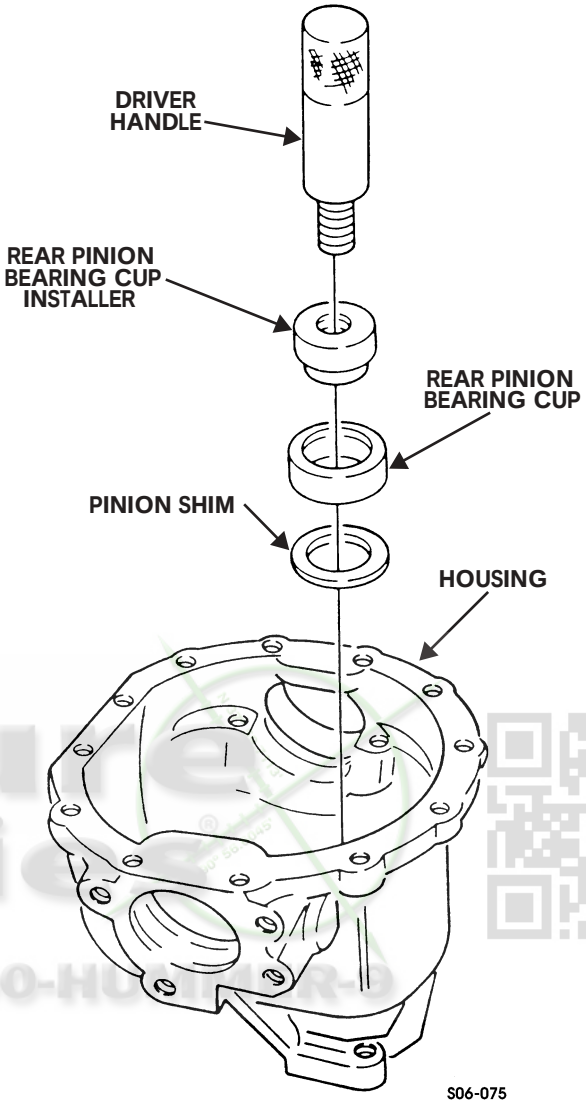


Figure 6-129: Rear Pinion Bearing

NOTE: If pinion shim is beveled, ensure beveled side faces bottom of bearing cup bore.

24. Using driver handle and rear pinion bearing cup installer, install correct thickness pinion shim and rear pinion bearing cup in housing.
25. Rotate housing 90 degrees. Lubricate rear pinion bearing with lubricating oil (Figure 6-130).

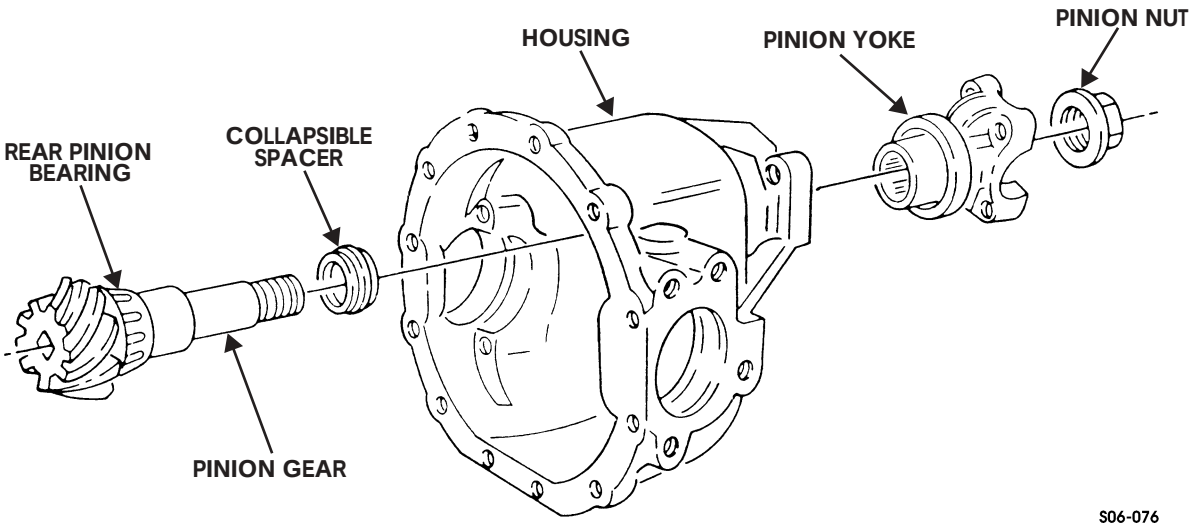


Figure 6-130: Rear Pinion Bearing Assembly

***CAUTION**: Collapsible spacer controls pinion bearing preload. Do not reuse old spacer, or pinion bearing damage may result.*

26. Install collapsible spacer on pinion gear and install pinion gear in housing.
27. Install pinion yoke on pinion gear with pinion nut.

***CAUTION**: Do not exceed specified preload torque on pinion bearings. Do not loosen locknut to replace preload torque or pinion bearing damage may result. If specified torque is exceeded, remove pinion gear and replace collapsible spacer and locknut and adjust preload again.*

28. Tighten pinion nut only enough to remove end play and seat pinion bearings in housing. Rotate pinion yoke while tightening to seat bearings evenly.
29. Measure torque required to rotate pinion gear. Correct pinion bearing preload torque is 17-25 lb-in. (2-3 N•m) with new bearings and 10-15 lb-in. (1-2 N•m) with used bearings.
30. Continue to tighten pinion nut in small increments until pinion bearing preload torque meets specifications.
31. Install two side bearings on differential assembly (Figure 6-131).

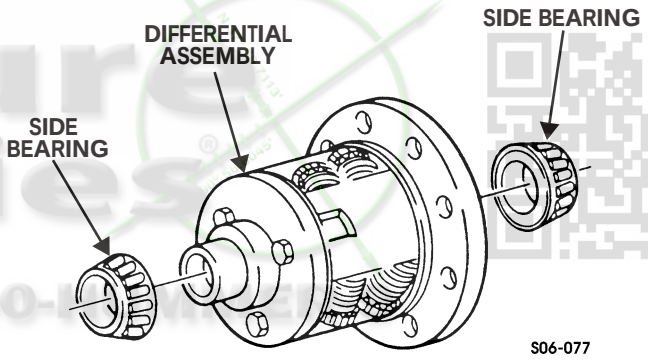


Figure 6-131: Side Bearings

NOTE: Side bearing shims are available in thickness from 0.077-0.117 in. (1.96-2.97 mm) in increments of 0.001 in. (0.025 mm).

32. Rotate housing downward 90 degrees. Install side bearing cups and side bearing shims on side bearings. Use 0.080 inch (2 mm) shims as a starting point (Figure 6-132).

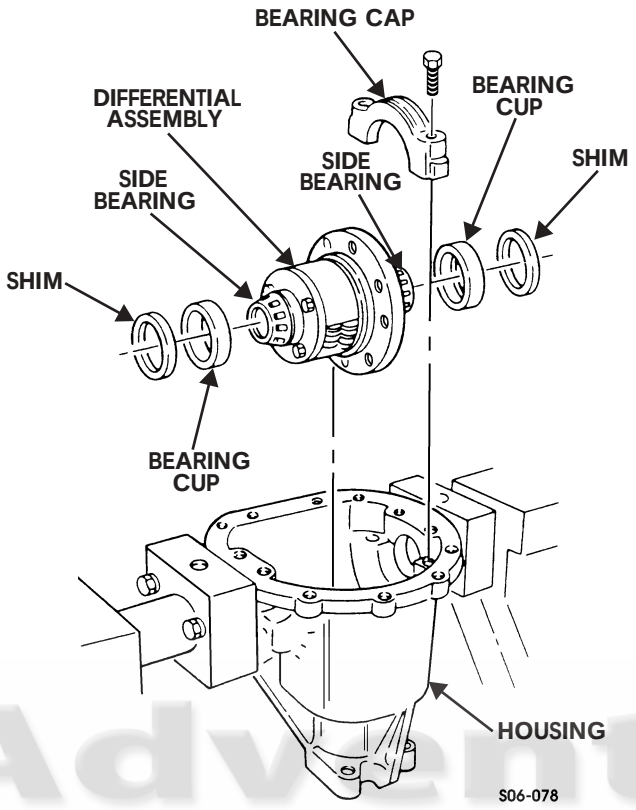


Figure 6-132: Side Bearing Cups and Shims

33. Install differential assembly, bearing cups, and shims in housing.
34. Install two bearing caps and four capscrews in housing. Snug capscrews.
35. Mount dial indicator on housing and position indicator to read off ring gear mounting surface of differential assembly (Figure 6-133).

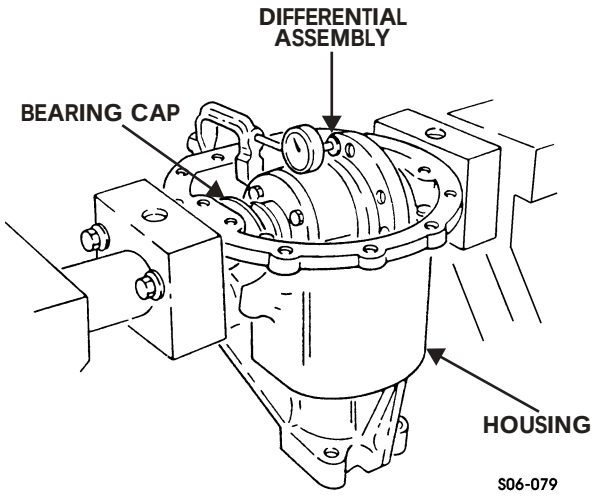


Figure 6-133: Differential Assembly in Housing

36. Pry between differential assembly and bearing cap on one side of indicator. Pry on opposite side to read end play.
37. Amount read on indicator is shim thickness that should be added to side bearing shims to arrive at zero end play. Add necessary shims and repeat procedure to ensure accuracy.

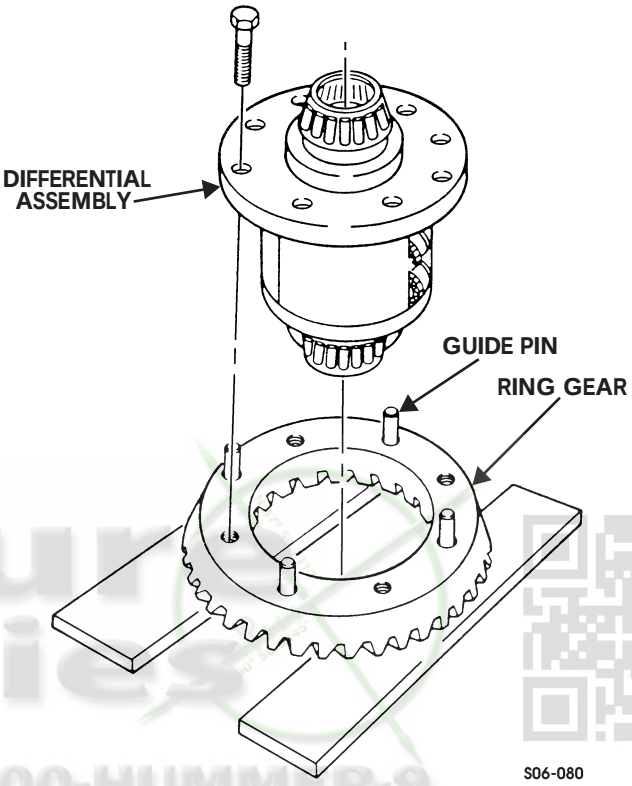


Figure 6-134: Guide Pins in Ring Gear

38. Tighten four capscrews to 87 lb-ft (118 N•m).
39. Rotate differential assembly and check runout. Runout should not exceed 0.002 in. (0.05 mm).
40. Remove dial indicator from housing.

NOTE: Tag shims and bearing cups for assembly.

41. Remove four capscrews, two bearing caps, bearing cups, shims, and differential assembly from housing (Figure 6-135).
42. Install four guide pins in ring gear (Figure 6-134).

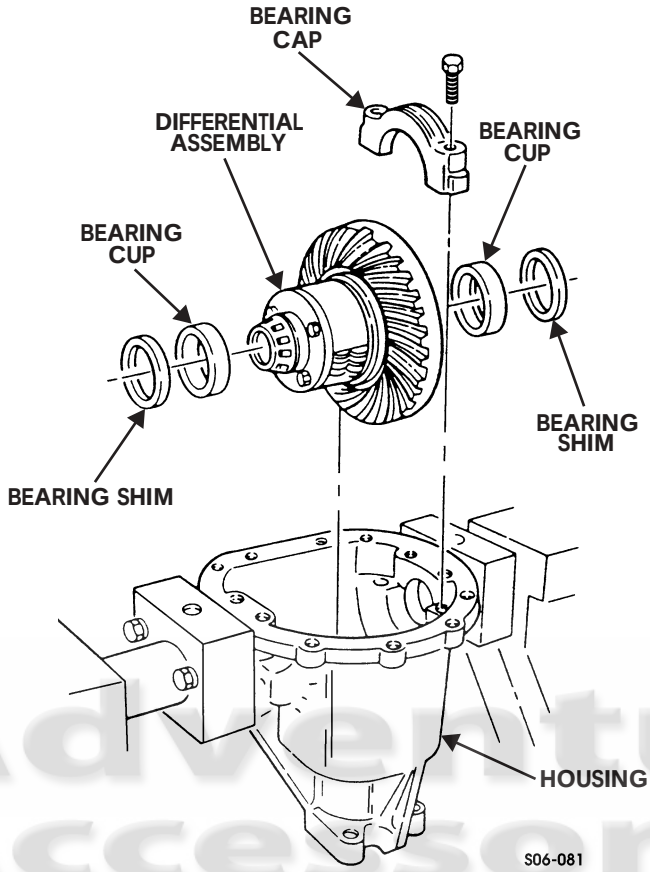


Figure 6-135: Differential Assembly

43. Support ring gear with wood blocks in press.
44. Press differential assembly on ring gear.
45. Remove four guide pins from ring gear.
46. Install ring gear on differential assembly with eight capscrews. Tighten capscrews to 95-115 lb-ft (129-156 N•m).
47. Install side bearing shims, previously selected to remove differential assembly side play, slide bearing cups, and differential assembly in housing (Figure 6-135).
48. Install two bearing caps in housing with four capscrews. Tighten capscrews to 87 lb-ft (118 N•m).
49. Attach dial indicator to housing and position indicator to read off drive side of ring gear tooth at a right angle (Figure 6-136).

NOTE: Backlash must be checked at four equally spaced points on ring gear and must not vary more than 0.002 in. (0.05 mm) between four points checked.

50. Move ring gear back and forth while holding pinion yoke stationary. Note backlash registered on indicator.
51. Ring gear backlash should be 0.005-0.009 inch (0.13-0.23 mm) with 0.008 inch (0.20 mm) desired. If backlash must be adjusted perform steps 52 through 55, if not go to step 56.

NOTE: Tag shims and bearing cups for assembly.

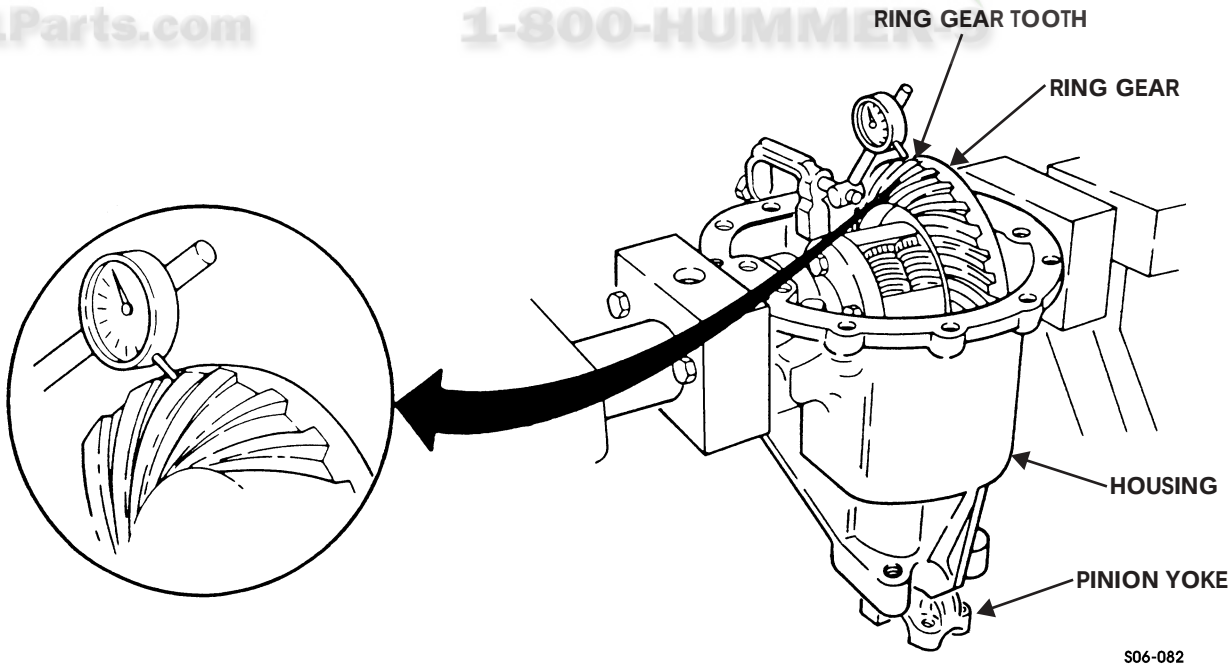


Figure 6-136: Dial Indicator Attached To Housing

52. Remove four capscrews, two bearing caps, bearing cups, shims, and differential assembly from housing (Figure 6-135).

NOTE: The following example will explain the procedure for adjusting backlash: If side play was removed us-

ing 0.090 inch (2.29 mm) shims on each side totaling 0.180 inch (4.57 mm) and backlash, when checked, is found to be 0.011 inch (0.28 mm), add 0.004 inch (0.10 mm) to shim on ring gear side and subtract 0.004 inch (0.10 mm) from shim on opposite side to correct backlash. This will result in 0.094 inch (2.39 mm) shim on ring gear side and 0.086 inch (2.18 mm) shim on other side. Backlash will be approximately 0.007-0.008 inch (0.18 to 0.20 mm). Total Shim Thickness remains 0.180 inch (4.57 mm).

53. To increase backlash, install thinner shim on ring gear side and thicker shim on opposite side. To decrease backlash, install thicker shim on ring gear side and thinner shim on opposite side. Do not change total shim thickness.
54. Install shims, bearing cups, differential assembly, and bearing caps in housing and secure with four capscrews. Tighten capscrews to 87 lb-ft (118 N•m).
55. Mount dial indicator and recheck backlash. If necessary, repeat steps 52 through 54.

NOTE: Tag shims and bearing cup for assembly.

56. Remove four capscrews, bearing caps, bearing cup, shims, and differential assembly from housing.
57. Install axle housing spreader into holes in axle holding fixture adapters and install dial indicator to read from each end of housing. Indicator must have preload setting of 0.020 inch (0.50 mm) (Figure 6-137).

CAUTION: Over-spreading of axle housing spreader will damage housing.

58. Spread housing 0.010 inch (0.25 mm) and remove dial indicator.

NOTE: Differential bearings must be preloaded to compensate for heat and loads during operation.

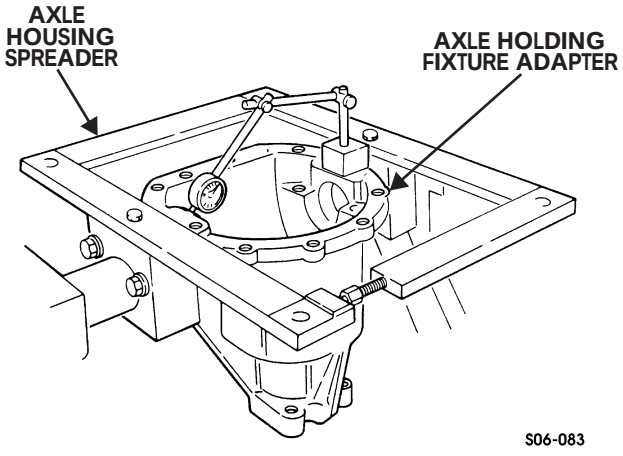


Figure 6-137: Axle Housing Spreader

59. Preload differential side bearings by increasing shim thickness at each side of differential assembly by 0.004 inch (0.10 mm) for a total bearing preload of 0.008 inch (0.20 mm) (Figure 6-135).
60. Lubricate side bearings with lubricating oil and install differential assembly, bearing cups, shims, and bearing caps in housing and secure with four capscrews (Figure 6-135).

NOTE: Preloaded differential bearings may change backlash setting. Check and correct backlash if necessary.

61. Remove housing spreader and tighten capscrews to 87 lb-ft (118 N•m).
62. Apply silicone sealant to cover sealing surface and install cover on housing with twelve capscrews. Tighten capscrews to 16 lb-ft (22 N•m) (Figure 6-138).

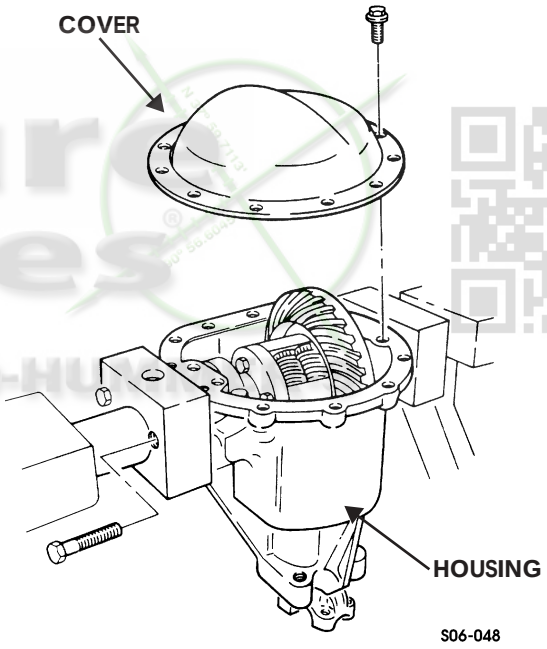


Figure 6-138: Housing and Cover

63. Remove housing from holding fixture.
64. Remove four capscrews and two axle holding fixture adapters from housing.
65. Using press, install output shaft bearings on output shafts (Figure 6-139).

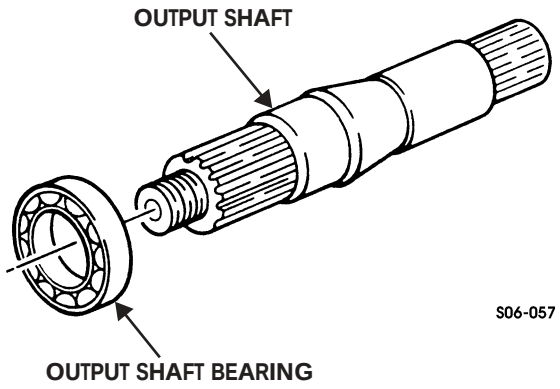


Figure 6-139: Output Shaft And Bearing

66. Using axle shaft and seal installer, install output shaft assemblies into axle assembly (Figure 6-140).

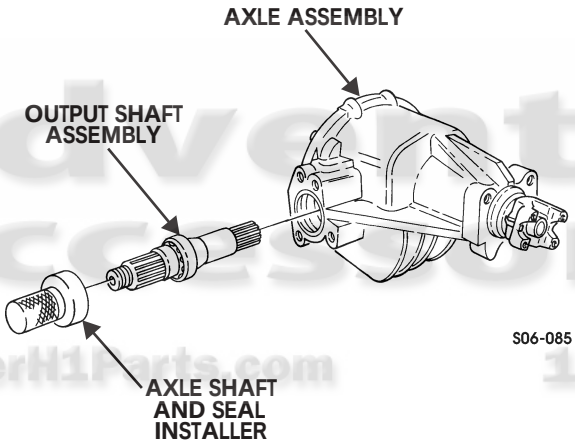


Figure 6-140: Axle Shaft And Seal Installer

67. Using axle shaft and seal installer, install output shaft seals in axle assembly (Figure 6-141).

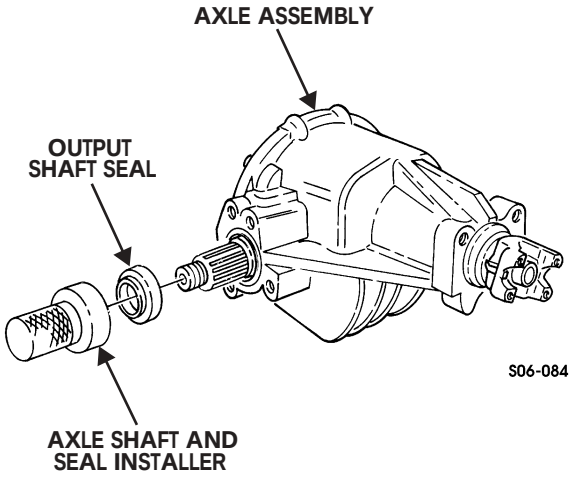


Figure 6-141: Output Shaft Seal

68. Lubricate sealing surface on output flanges with lubricating oil (Figure 6-142).

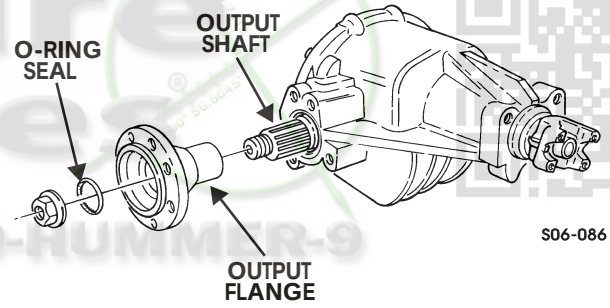


Figure 6-142: Output Shaft O-Ring Seals

69. Install two output flanges, two O-ring seals, and two locknuts on output shafts. Finger tighten locknuts.
70. Install axle assembly.

CONTROL ARM BUSHING REPLACEMENT

Removal

NOTE: Control arm bushings must be replaced as a set (Figure 6-143).

1. Remove control arm (Section 9).
2. Support control arm and press bushing out of control arm.

Installation

1. Lubricate outside diameter of bushing with grease.
2. Insert bushing in control arm (Figure 6-143).
3. Support control arm and press bushing into control arm until flange on bushing seats on control arm.
4. Install control arm (Section 9).
5. Adjust caster and camber.

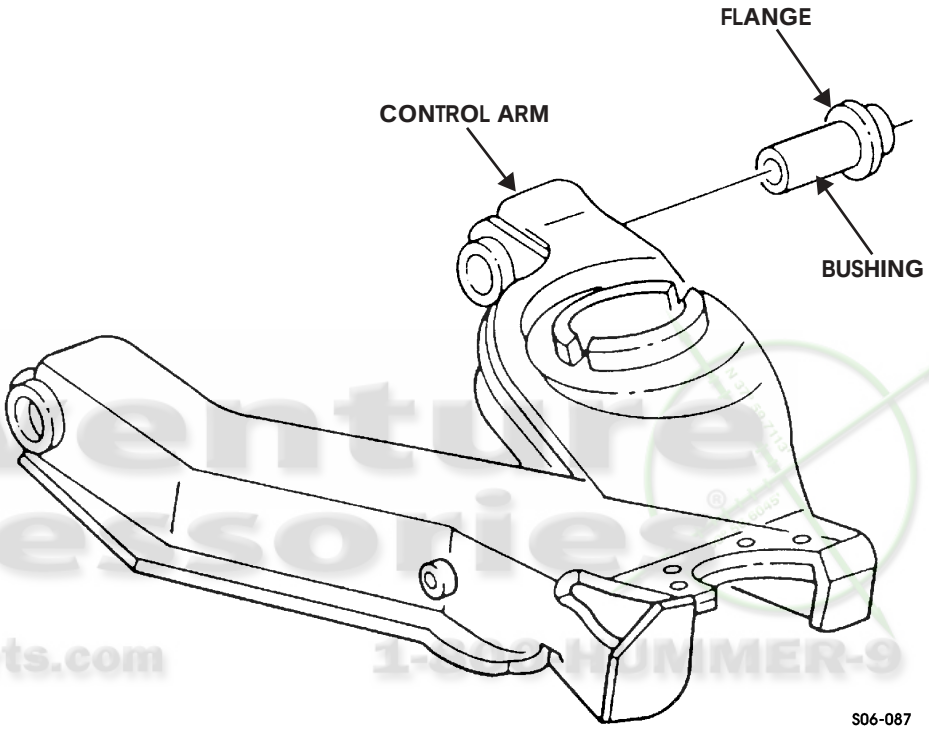


Figure 6-143: Control Arm Bushing

CENTRAL TIRE INFLATION SYSTEM

The optional Central Tire Inflation System (CTIS) is unique to the HUMMER. The CTIS allows the driver to increase or decrease tire pressure based on terrain and climate conditions. The system can also be used to direct air to a tire that has a leak.

The CTIS controls are located on the instrument panel. An inflate/deflate switch determines if air is added to the tires or released from the tires. When the tires are being inflated, an indicator light on the instrument panel illuminates. If the pressure in any of the tires drops to 8 psi (55 kPa) or below, the low pressure indicator light will illuminate and an alarm will sound. If the tire pressure ever exceeds 45 psi (310 kPa), a relief valve automatically relieves any excess pressure. The tire selector valve position determines whether the pressure in the front, rear or all four tires will be adjusted. The air pressure gauge indicates the current pressure in the tires. Refer to the short, white needle for front tire pressure and the longer, orange needle for the pressure in the rear tires. Temperature rise and fall affects air pressure in a tire. As the vehicle is operated it is typical for the air pressure to rise 3-5 psi (21-34 kPa). As the wheels and tires cool down, the air pressure will drop. This is normal and such a drop in tire pressure does not indicate any leaks in the system.

The CTIS consists of an electric air compressor that pumps air through a series of valves, tubes, and hoses to the front and/or rear tires. Air from the compressor travels to a three-port, two-way tire selector valve, where it is directed to the front and/or rear tires. When deflation is selected, air is routed from the tires through the tire selector valves and is exhausted through the deflate valves (Figure 6-144).

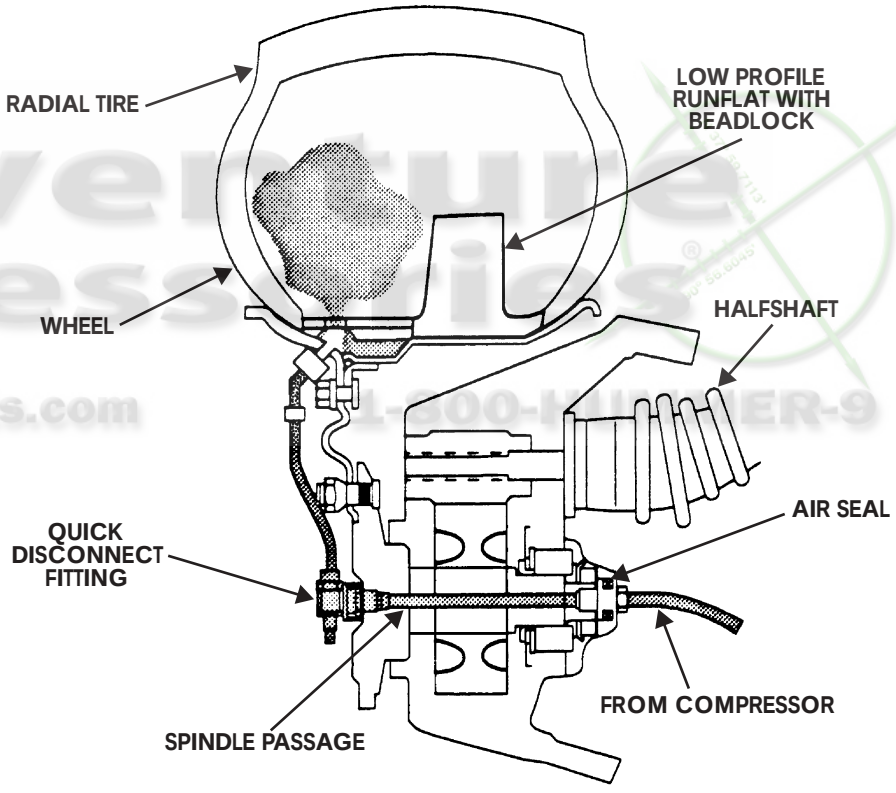


Figure 6-144: Central Tire Inflation System (CTIS)

Each wheel assembly has a manual quick-disconnect valve which can be used to prevent air flow to and from the tire, such as during long-term storage or while changing a tire. If the vehicle will remain dormant for two weeks or more, it is a good practice to disconnect the system at the wheels. These quick-disconnect valves are also used to restrict air flow to the operational tires when the driver wants to direct air flow to the damaged tire. For example, if a tire has a small puncture and has a leak, the quick-disconnect valves on the operational tires can be disconnected, enabling compressed air to be directed exclusively to the leaking tire. This may maintain enough tire pressure in the leaking tire to allow the driver to get the vehicle to an appropriate location for safe tire repair or replacement (Figure 6-145).

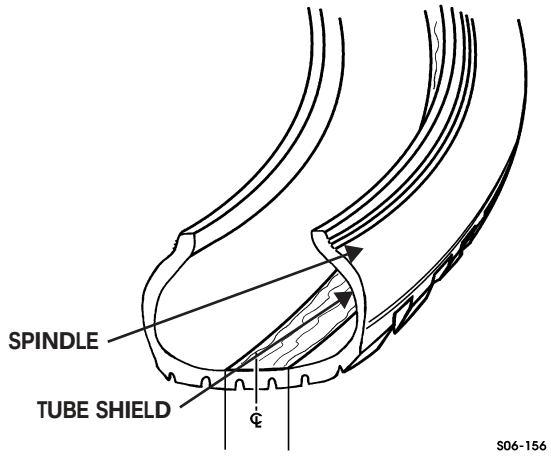


Figure 6-145: Quick-Disconnect Valve

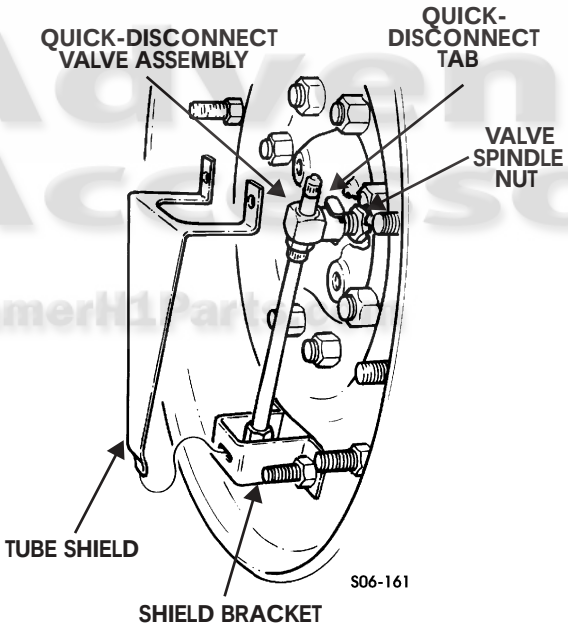


Figure 6-146: Quick-Disconnect Tab

To disconnect the CTIS from the wheel assemblies, first turn the tire selector valve to the OFF position. Release the four quick-disconnect valve assemblies from all four spindles by depressing the quick-disconnect valve tabs attached to the valve spindle nuts (Figure 6-146). When the tabs are depressed, the valve assemblies will spring away from the spindles about 1/2 inch (12.7 mm). To reconnect the quick-disconnect valve assemblies, push the valve assemblies toward the spindles until they click into place.

Compressor Maintenance

WARNING: CTIS components are subject to high air pressure. Always relieve air pressure before loosening or removing air system components by disconnecting quick-disconnect valve assemblies. Failure to follow this warning may result in serious injury.

Removal

1. Raise and secure hood.
2. Disconnect leads from compressor (Figure 6-147).
3. Loosen clamp securing air intake hose to fitting and disconnect hose from fitting.
4. Disconnect compressor-to-deflate valve tube from elbow.
5. Loosen two clamps securing compressor to bracket and remove compressor.
6. Remove relief valve, elbow, tee, and fitting from compressor.
7. Remove four locknuts, upper brackets, clamps, and four isolators from lower brackets. Discard locknuts.

Cleaning and Inspection

Clean and inspect compressor, leads, fittings, and mounting hardware. Check for cracks, frayed wire, stripped threads, and improper operation. Replace defective parts.

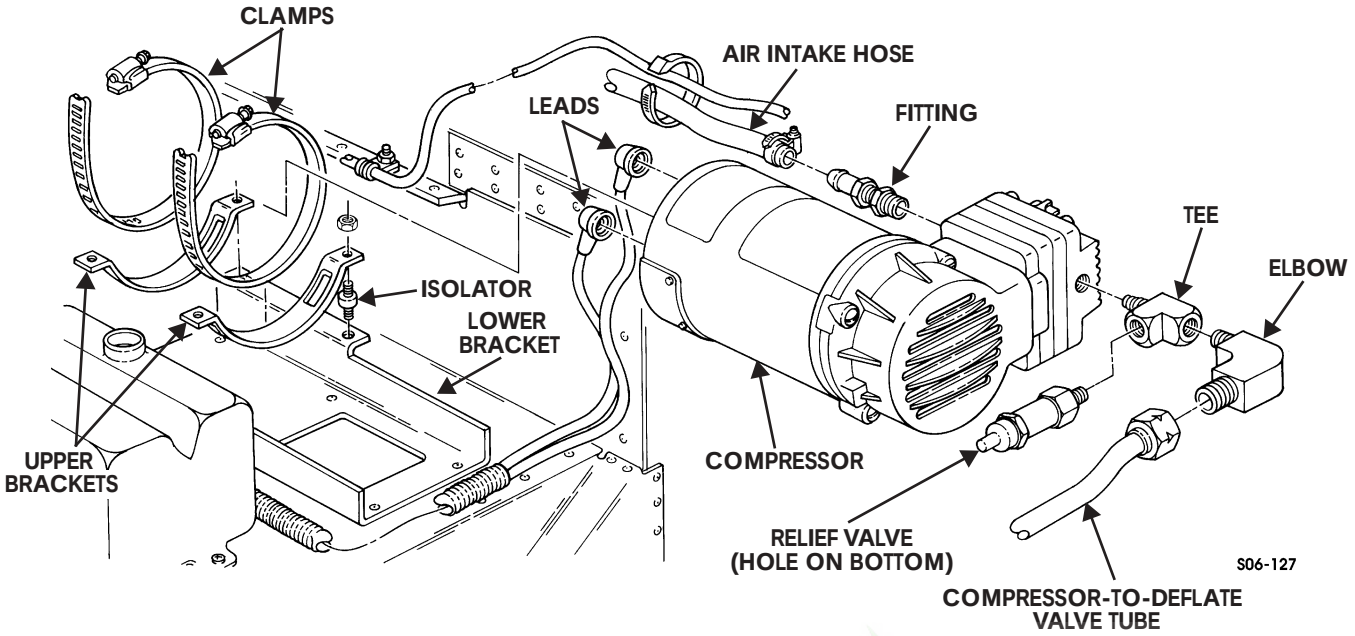


Figure 6-147: CTIS Compressor

Installation

1. Install four isolators, two upper brackets, and clamps to lower bracket with four locknuts (Figure 6-147).
2. Install fitting, tee, elbow, and relief valve to compressor.

NOTE: Ensure that the breather hole in the pressure relief valve is pointed downward.

CAUTION: *Do not allow sealant into air system. Sealant will damage CTIS components.*

NOTE: Apply sealant to all threads before installation.

3. Install compressor on bracket with two clamps.
4. Connect compressor-to-deflate valve tube to elbow.
5. Connect air intake hose to fitting and secure with hose clamp.
6. Connect leads to compressor.
7. Lower and secure hood.

CTIS INSTRUMENT PANEL MAINTENANCE

WARNING: CTIS components are subject to high air pressure. Always relieve air pressure before loosening or removing air system components by disconnecting quick-disconnect valve assemblies. Failure to follow this warning may result in serious injury.

NOTE: Prior to removal, tag all leads for installation.

Removal

1. Disconnect battery ground cable (Section 12).
2. Remove four capscrews and CTIS instrument panel from instrument panel. Discard CTIS instrument panel if damaged. (Figure 6-148).

Disassembly

1. Remove inflate/deflate switch.
2. Remove compressor/pressure indicator light.
3. Remove air pressure gauge.

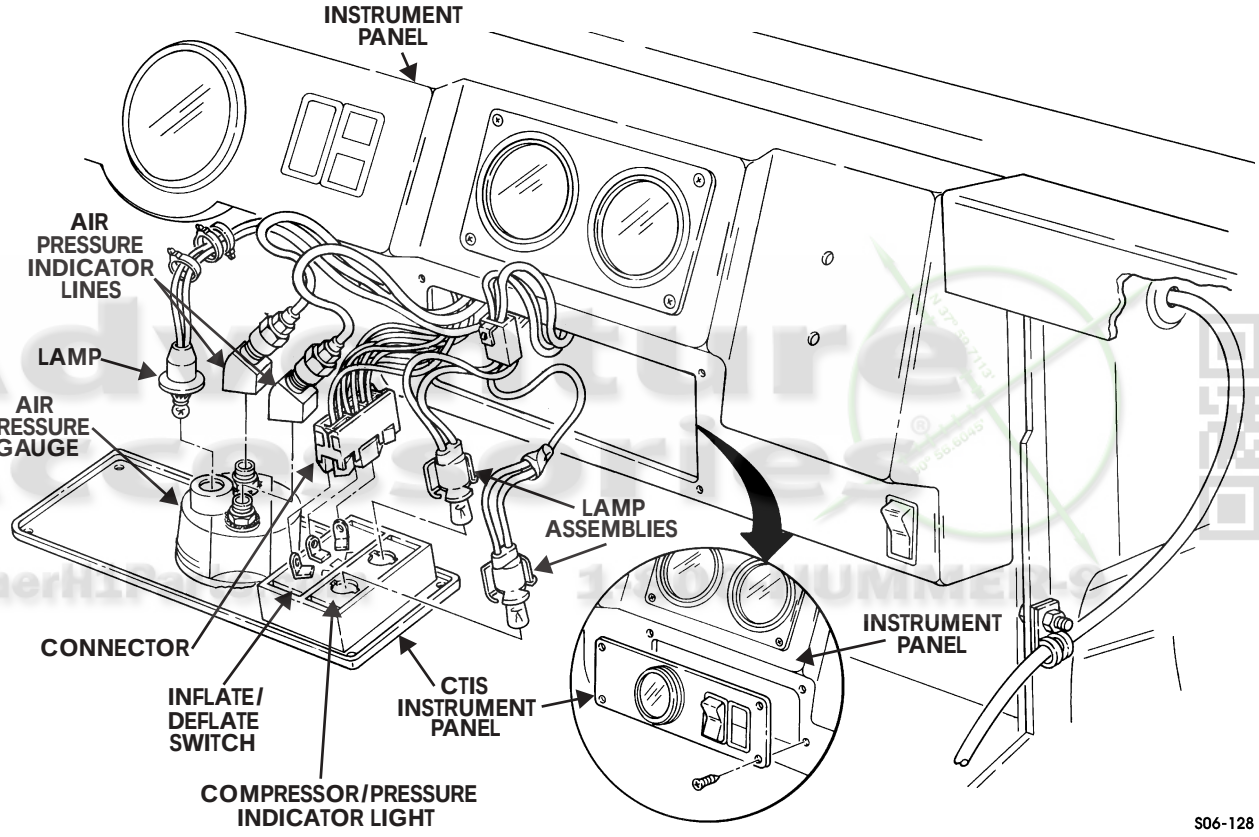


Figure 6-148: CTIS Instrument Panel

Assembly

1. Install air pressure gauge.
2. Install compressor/pressure indicator light.
3. Install inflate/deflate switch.

Installation

1. Install CTIS instrument panel on instrument panel with four capscrews (Figure 6-148).
2. Connect battery ground cable (Section 12).

INFLATE/DEFLATE SWITCH MAINTENANCE

Removal

1. Remove CTIS instrument panel.
2. Disconnect connector from inflate/deflate switch (Figure 6-149).
3. Remove two lamp assemblies from compressor/pressure indicator light.
4. Remove inflate/deflate switch from CTIS instrument panel and housing.

Cleaning and Inspection

Clean and inspect inflate/deflate switch and lamp assemblies for damage. Replace defective parts.

Installation

1. Install inflate/deflate switch in housing on CTIS instrument panel (Figure 6-149).
2. Install two lamp assemblies in compressor/pressure indicator light.
3. Connect connector to inflate/deflate switch.
4. Install CTIS instrument panel.
5. Start engine and ensure lamp and inflate/deflate switch operate properly.

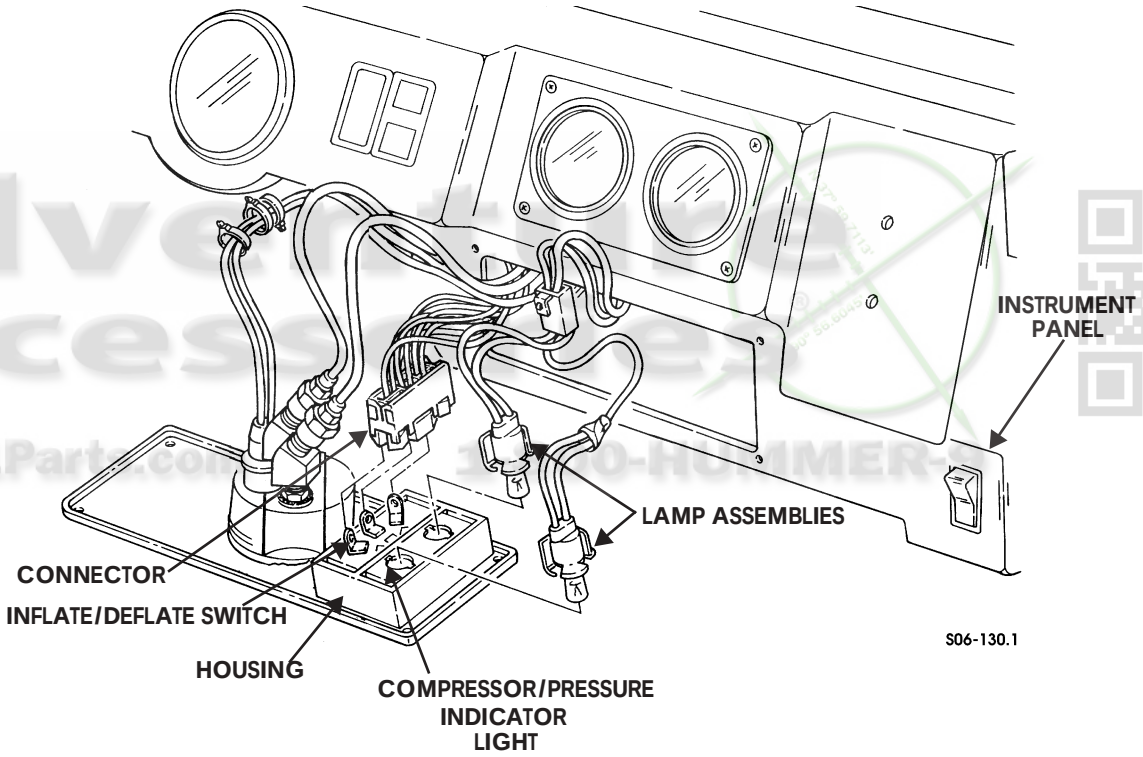


Figure 6-149: Inflate/Deflate Switch and Indicator Light

INFLATE/DEFLATE SWITCH INDICATOR LIGHT MAINTENANCE

Removal

1. Remove CTIS instrument panel.
2. Remove lamp assemblies from compressor/pressure indicator light (Figure 6-149).
3. Turn lamp one quarter turn, and remove lamps from sockets.

Cleaning and Inspection

Clean and inspect inflate/deflate switch and lamps for damage. Replace defective parts.

Installation

1. Install lamps in sockets and turn one quarter turn (Figure 6-149).
2. Install lamp assemblies in compressor/pressure indicator light.
3. Install CTIS instrument panel.
4. Start engine, and ensure lamp and switch operate properly.

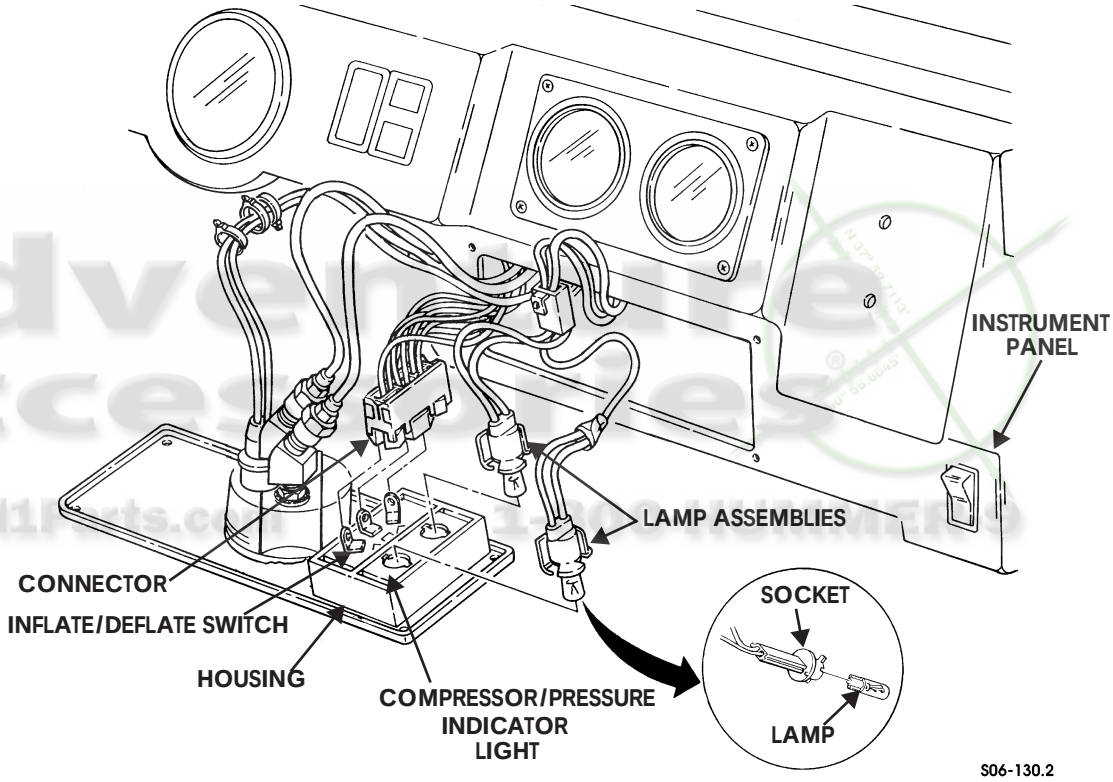


Figure 6-150: Inflate/Deflate Switch Indicator Light

AIR PRESSURE GAUGE MAINTENANCE

WARNING: CTIS components are subject to high air pressure. Always relieve air pressure before loosening or removing air system components by disconnecting quick-disconnect valve assemblies. Failure to follow this warning may result in serious injury.

Removal

1. Remove CTIS instrument panel.
2. Remove lamp from air pressure gauge (Figure 6-151).
3. Disconnect two air pressure indicator lines from air pressure gauge.
4. Remove two nuts, lockwashers, air pressure gauge, and bracket from CTIS instrument panel. Discard lockwashers.

Cleaning and Inspection

Clean and inspect air pressure gauge and lamp. Check for cracks and stripped threads. Replace defective parts.

CAUTION: Do not allow sealant into air system. Sealant will damage CTIS components.

NOTE: Apply sealant to threads prior to installation.

Installation

1. Install air pressure gauge and bracket on CTIS instrument panel with two nuts and lockwashers. Tighten nuts to 8 lb-in. (0.9 N•m) (Figure 6-151).
2. Connect two air pressure indicator lines to air pressure gauge.
3. Install lamp in air pressure gauge.
4. Install CTIS instrument panel.
5. Start engine and ensure air pressure gauge operates properly.

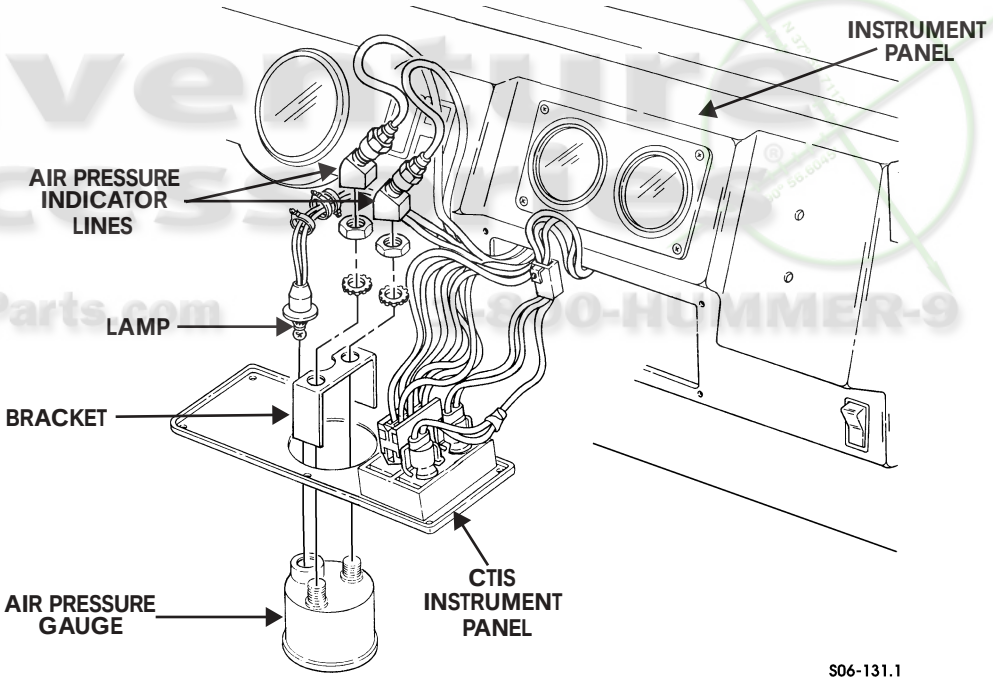


Figure 6-151: Air Pressure Gauge

AIR PRESSURE GAUGE LAMP REPLACEMENT

Removal

1. Remove CTIS instrument panel.
2. Remove lamp from air pressure gauge (Figure 6-152).
3. Remove lamp from socket. Discard lamp if defective.

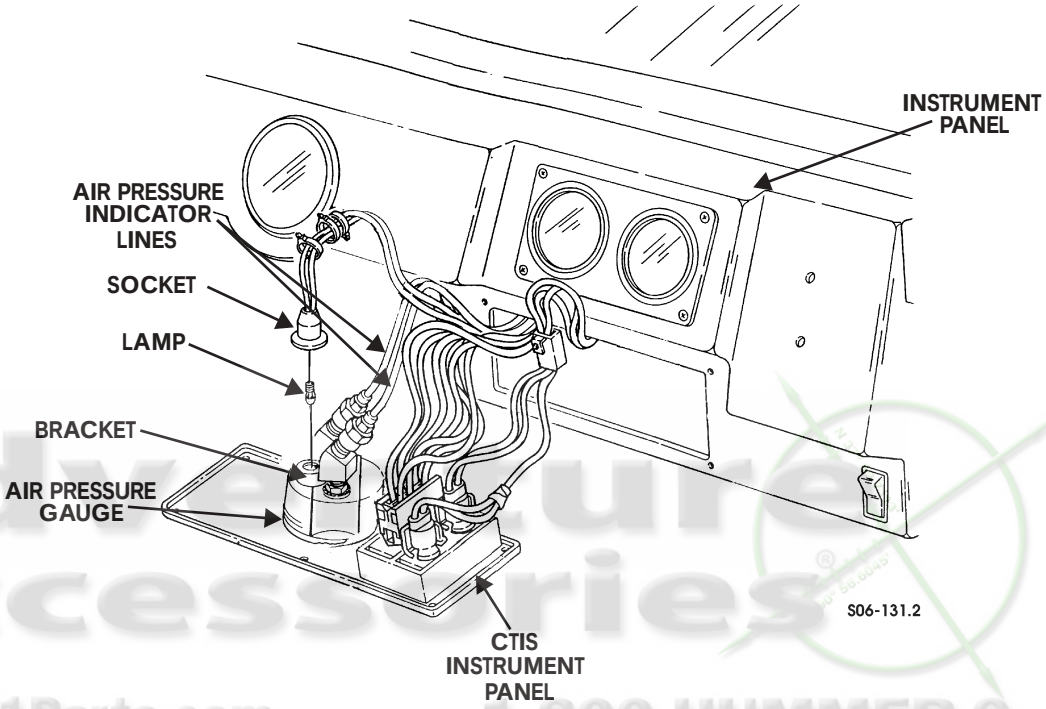


Figure 6-152: Air Pressure Gauge Lamp

Installation

1. Install lamp in socket (Figure 6-152).
2. Install lamp in air pressure gauge.
3. Install CTIS instrument panel.
4. Start engine and ensure air pressure gauge lamp operates properly.

CTIS LOW PRESSURE ALARM REPLACEMENT

Removal

1. Remove CTIS instrument panel.
2. Remove low pressure alarm from flasher connector (Figure 6-153).

Installation

1. Install low pressure alarm on flasher connector
2. Install CTIS instrument panel (Figure 6-153).

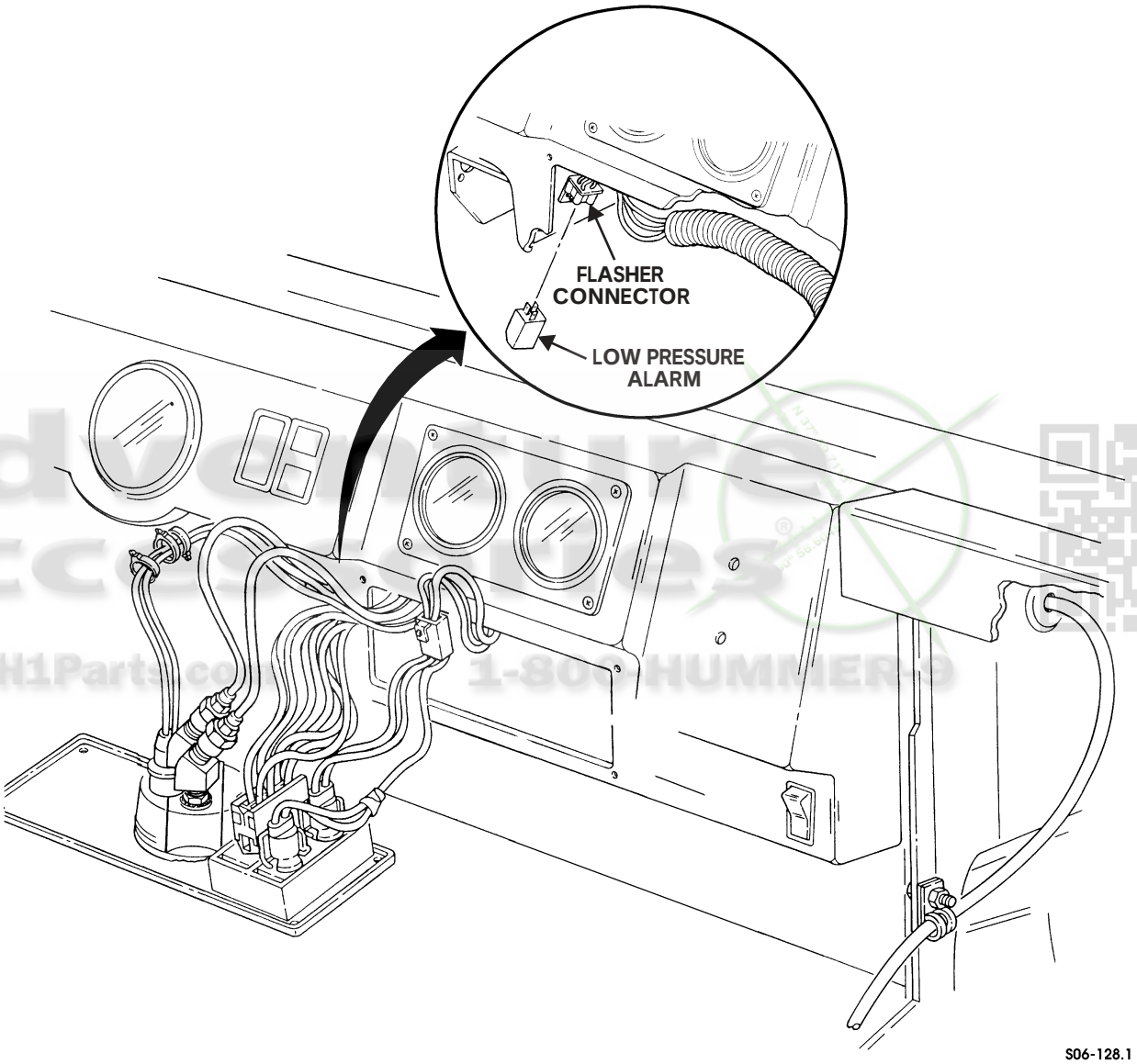


Figure 6-153: Low Pressure Alarm

CTIS INTERIOR HARNESS MAINTENANCE

NOTE: Prior to removal, tag all leads for installation.

Removal

1. Disconnect battery ground cable (Section 12).
2. Remove CTIS instrument panel.
3. Disconnect connector from inflate/deflate switch (Figure 6-154).
4. Remove two lamp assemblies from compressor/pressure indicator light.
5. Remove lamp from air pressure gauge.
6. Remove low pressure alarm.
7. Remove two screws and flasher connector from steering column mounting bracket.
8. Disconnect harness connector from body harness connector and remove interior harness.

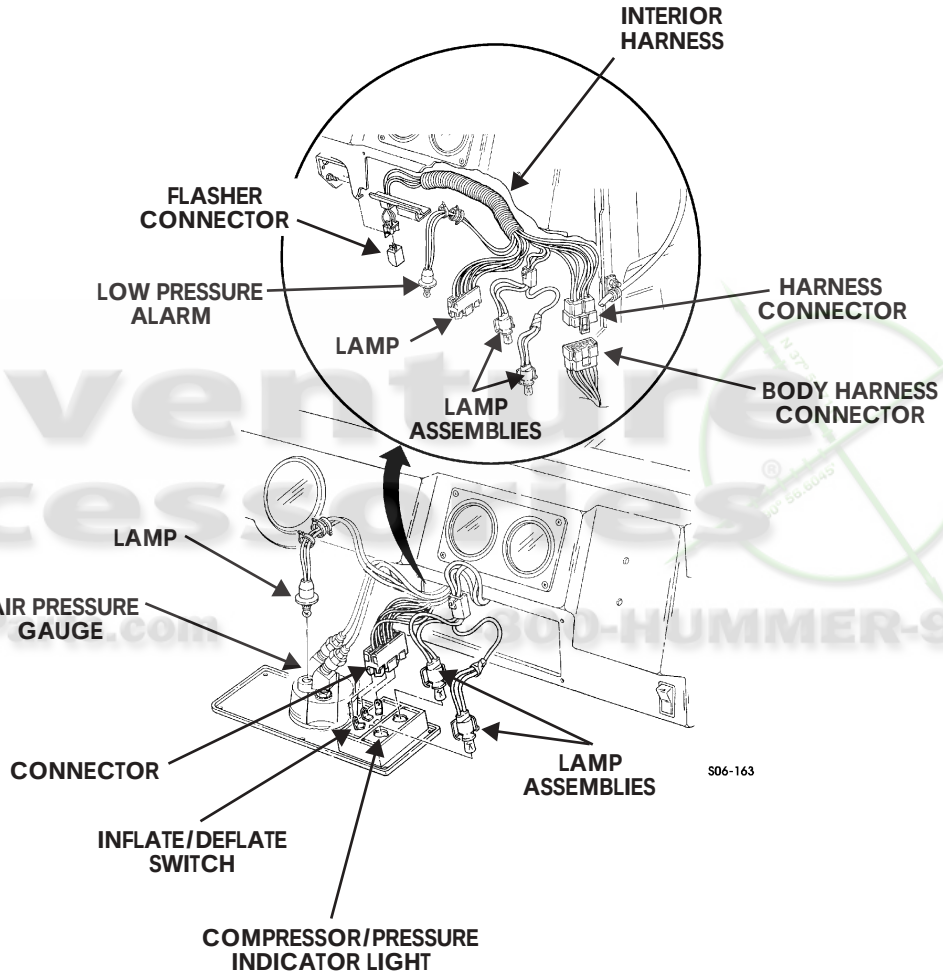


Figure 6-154: CTIS Interior Harness Assembly

Cleaning and Inspection

Clean and inspect CTIS harness and connectors. Check for defects such as frayed wires and cracks. Repair or replace defective parts.

Installation

1. Position interior harness in approximate mounting location and connect harness connector to body harness connector (Figure 6-154).
2. Install flasher connector on steering column mounting bracket with two screws.
3. Install low pressure alarm on flasher connector.
4. Install lamp in air pressure gauge.
5. Install two lamp assemblies to compressor/pressure indicator light.
6. Connect connector to inflate/deflate switch.
7. Install CTIS instrument panel.
8. Connect battery ground cable.

AIR PRESSURE SWITCH REPLACEMENT

WARNING: CTIS components are subject to high air pressure. Always relieve air pressure before loosening or removing air system components by disconnecting quick-disconnect valve assemblies. Failure to follow this warning may result in serious injury.

Removal

NOTE: Replacement procedures for the front and rear air pressure switches are basically the same. This procedure covers the front air pressure switch.

1. Remove two front indicator lines and tee from bulkhead connector (Figure 6-155).

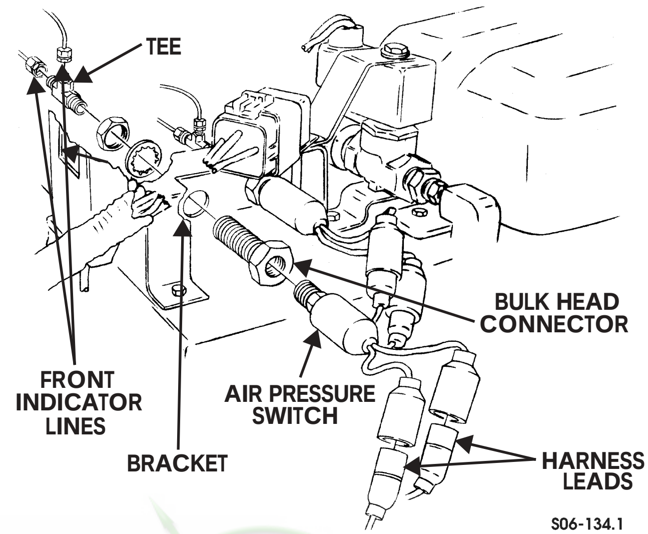


Figure 6-155: Air Pressure Switch

2. Disconnect harness leads from air pressure switch.
3. Remove nut, star washer, air pressure switch, and bulkhead connector assembly from bracket.
4. Remove air pressure switch from bulkhead connector. Discard air pressure switch if damaged.

CAUTION: *Do not allow sealant into air system. Sealant will damage CTIS components.*

NOTE: Apply sealant to threads prior to installation.

Installation

1. Install bulkhead connector on air pressure switch (Figure 6-155).
2. Install bulkhead connector and air pressure switch on bracket with star washer and nut.
3. Connect harness leads to air pressure switch.
4. Install tee and two front indicator lines on bulkhead connector.

AIR PRESSURE INDICATOR LINES REPLACEMENT

WARNING: CTIS components are subject to high air pressure. Always relieve air pressure before loosening or removing air system components by disconnecting quick-disconnect valve assemblies. Failure to follow this warning may result in serious injury.

Removal

NOTE: Replacement procedures for the front and rear air pressure indicator lines are basically the same. This procedure covers the front air pressure indicator line.

1. Remove CTIS instrument panel.
2. Disconnect front air pressure indicator line from air pressure gauge (Figure 6-156).
3. Disconnect front air pressure indicator line from tire selector valve (Figure 6-157).
4. Remove two front indicator lines from tee (Figure 6-158).

***CAUTION:** Do not allow sealant into air system. Sealant will damage CTIS components.*

NOTE: Apply sealant to threads prior to installation.

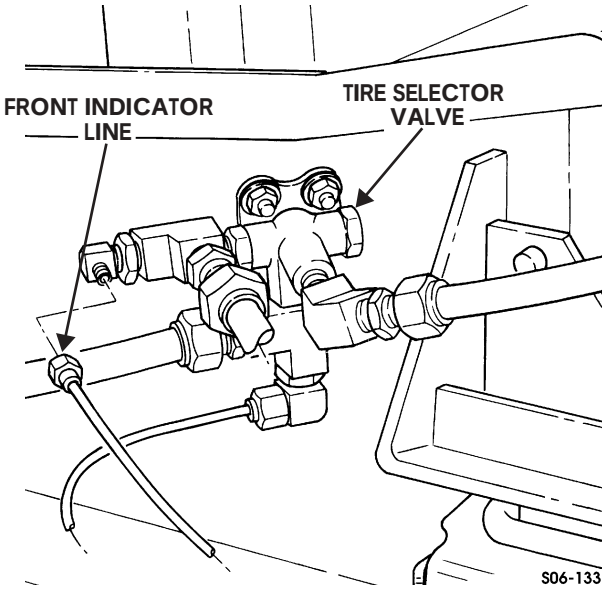


Figure 6-157: Bulk Head Connector

Installation

1. Install two front indicator lines on tee. (Figure 6-158).
2. Connect front air pressure indicator line to tire selector valve (Figure 6-157).
3. Connect front air pressure indicator line to air pressure gauge (Figure 6-156).
4. Install CTIS instrument panel.

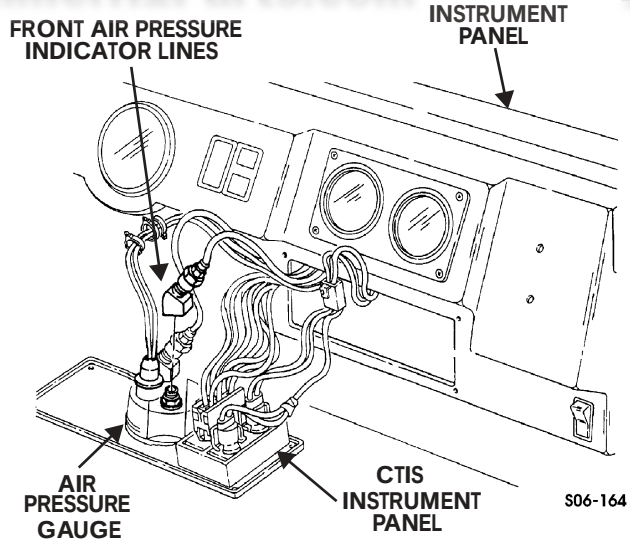


Figure 6-156: Front Air Pressure Indicator Line

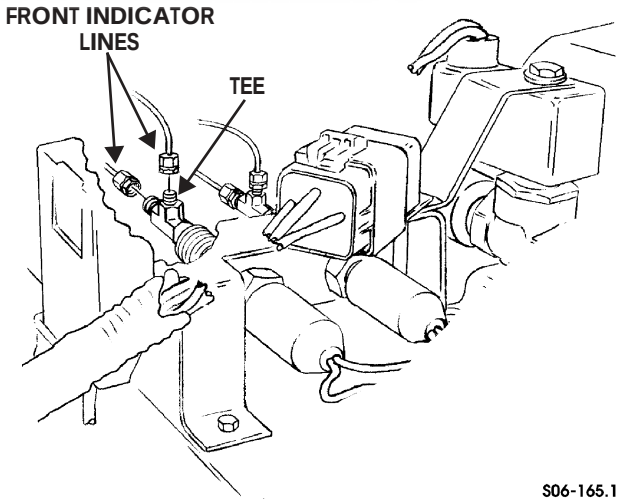


Figure 6-158: Front Indicator Lines

TIRE SELECTOR VALVE ASSEMBLY MAINTENANCE

WARNING: CTIS components are subject to high air pressure. Always relieve air pressure before loosening or removing air system components by disconnecting quick-disconnect valve assemblies. Failure to follow this warning may result in serious injury.

Removal

1. Remove engine access cover (Section 10).
2. Remove front pressure indicator line, elbow, and bushing from tee (Figure 6-159).
3. Remove selector-to-front tee tube and connector from tee.
4. Remove rear pressure indicator line, elbow, and bushing, from tee.
5. Remove selector-to-union tube and connector from tee.
6. Remove selector-to-deflate valve tube, connector, and elbow from tire selector valve.
7. Remove two tees from tire selector valve.
8. Remove socket plug from tire selector valve.
9. Remove handle from tire selector valve (Figure 6-160).
10. Remove tire selector valve nameplate decal from body panel.
11. Remove interior trim panel (Section 10).
12. Remove two nuts, washers, capscrews, and tire selector valve from body panel.

Cleaning and Inspection

Clean and inspect tire selector valve, fittings, and lines. Check for cracks and stripped threads. Replace defective parts.

CAUTION: *Do not allow sealant into air system. Sealant will damage CTIS components.*

NOTE: Apply sealant to threads prior to installation.

Installation

1. Install tire selector valve on body panel with two capscrews, washers, and nuts (Figure 6-160).
2. Install interior trim panel (Section 10).
3. Install tire selector valve nameplate decal on body panel.
4. Install handle on tire selector valve.
5. Install socket plug on tire selector valve (Figure 6-159).
6. Install two tees on tire selector valve.
7. Install elbow, connector, and selector-to-deflate valve tube on tire selector valve.
8. Install connector and selector-to-union tube on tee.
9. Install bushing, elbow, and rear pressure indicator line on tee.
10. Install connector and selector-to-front tee tube on tee.
11. Install bushing, elbow, and front pressure indicator line on tee.
12. Install engine access cover.

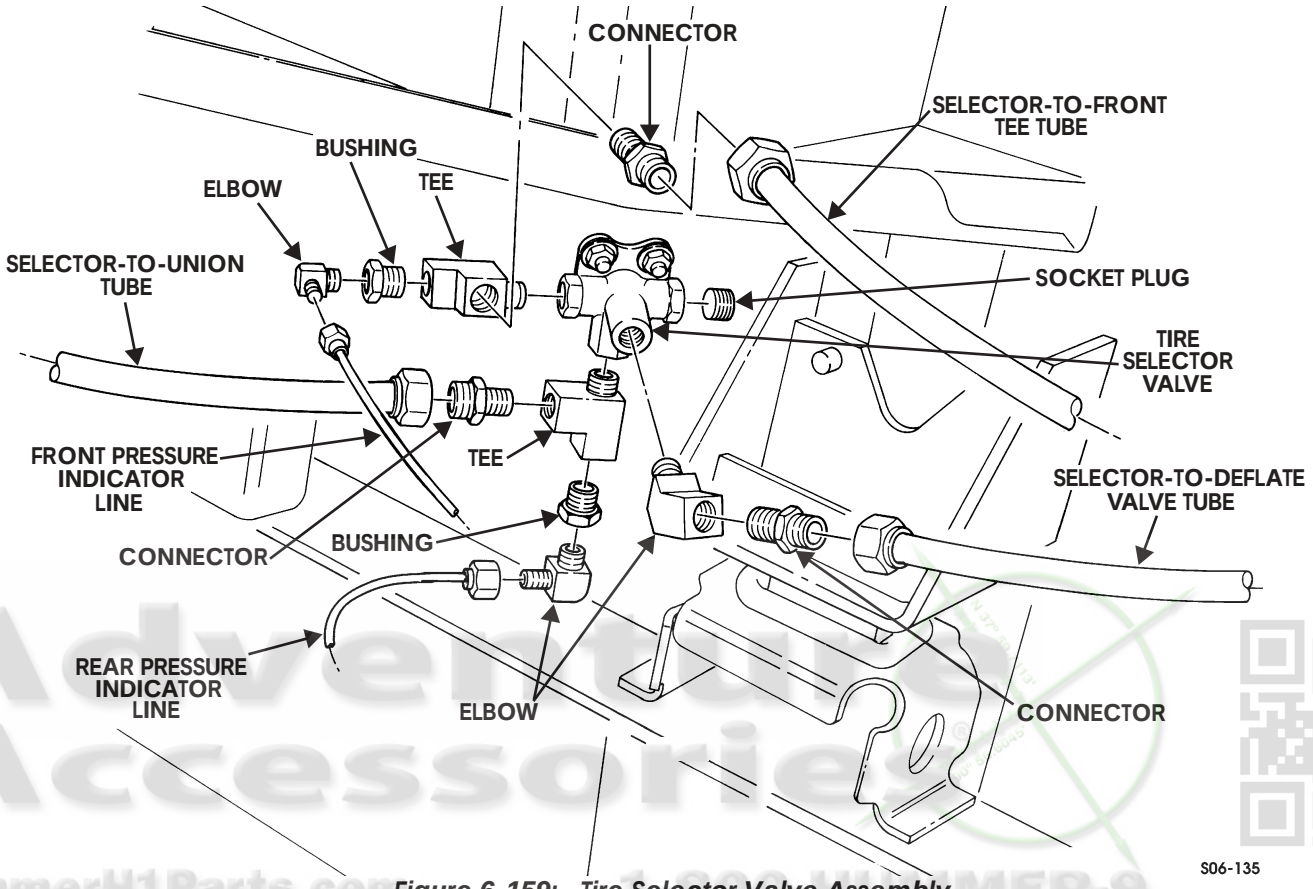


Figure 6-159: Tire Selector Valve Assembly

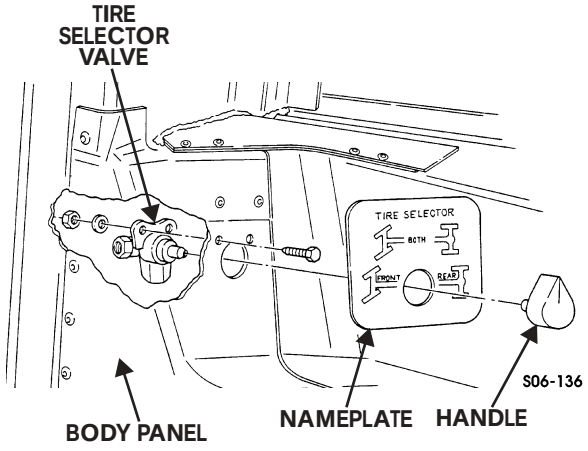


Figure 6-160: Tire Selector Valve Controls

CTIS JUMPER HARNESS MAINTENANCE

NOTE: Prior to removal, tag all leads for installation.

Removal

1. Raise and secure hood.
2. Disconnect battery ground cable (Section 12).
3. Remove two nuts, red lead, and black lead from power/ground stud (Figure 6-161).
4. Remove plastic cover from fuse housing.
5. Remove two screws, yellow lead, and red lead from fuse housing.
6. Disconnect connector from wiring harness.
7. Disconnect connector from relay.
8. Disconnect four leads from pressure switches.
9. Disconnect two leads from deflate valve leads.
10. Slide two boots off compressor terminals.
11. Remove two nuts and leads from compressor and remove jumper harness from vehicle.

Inspection

Inspect CTIS leads, connectors, and wiring. Check for cracks, shorts, and frayed wires. Replace defective parts.

Installation

1. Position jumper harness in approximate mounting location on vehicle.
2. Install two leads on compressor with nuts and slide two boots over terminals (Figure 6-161).
3. Connect two leads to deflate valve lead.
4. Connect four leads to pressure switches.
5. Connect connector to relay.
6. Connect connector to wiring harness.
7. Secure yellow lead and red lead to fuse with two screws.
8. Install plastic cover on fuse housing.
9. Connect black and red leads to power/ground stud.
10. Connect battery ground cable (Section 12).
11. Lower and secure hood.

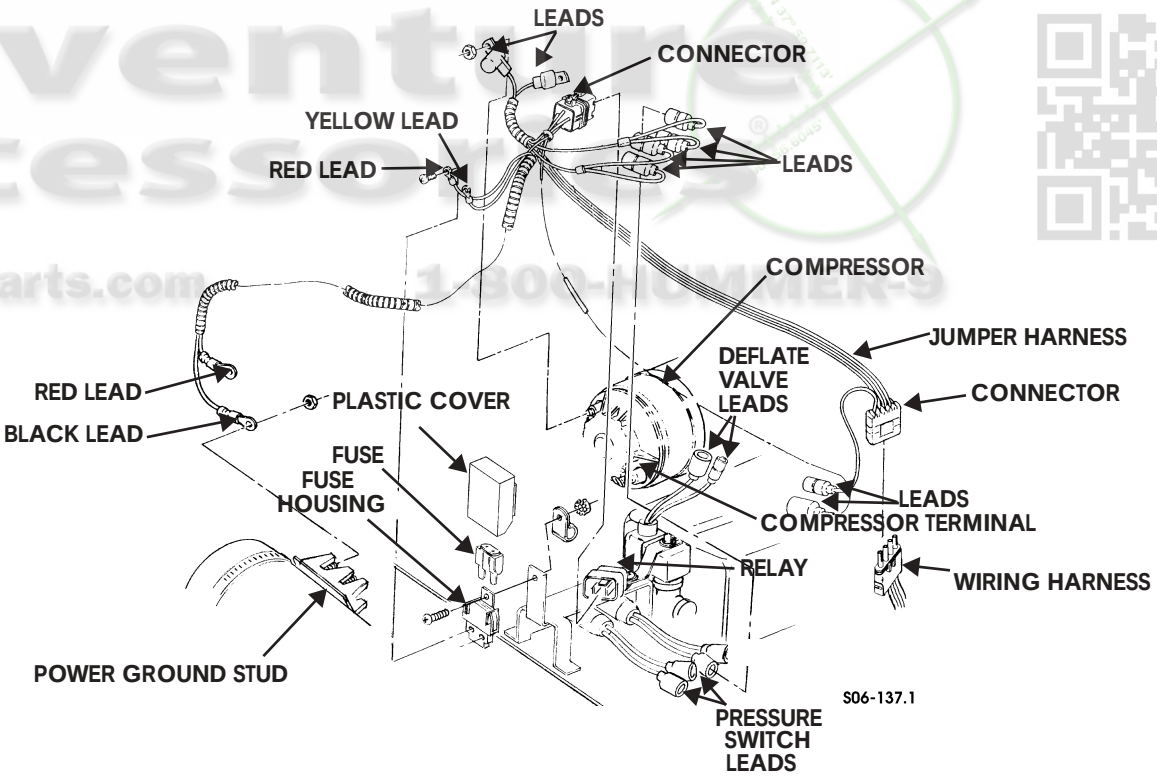


Figure 6-161: CTIS Jumper Harness

CTIS COMPRESSOR FUSE MAINTENANCE

NOTE: Prior to removal, tag all leads for installation.

Removal

1. Raise and secure hood.
2. Disconnect battery ground cable (Section 12).
3. Remove plastic cover from fuse housing (Figure 6-162).
4. Remove two screws and leads from fuse housing.
5. Remove fuse from housing.

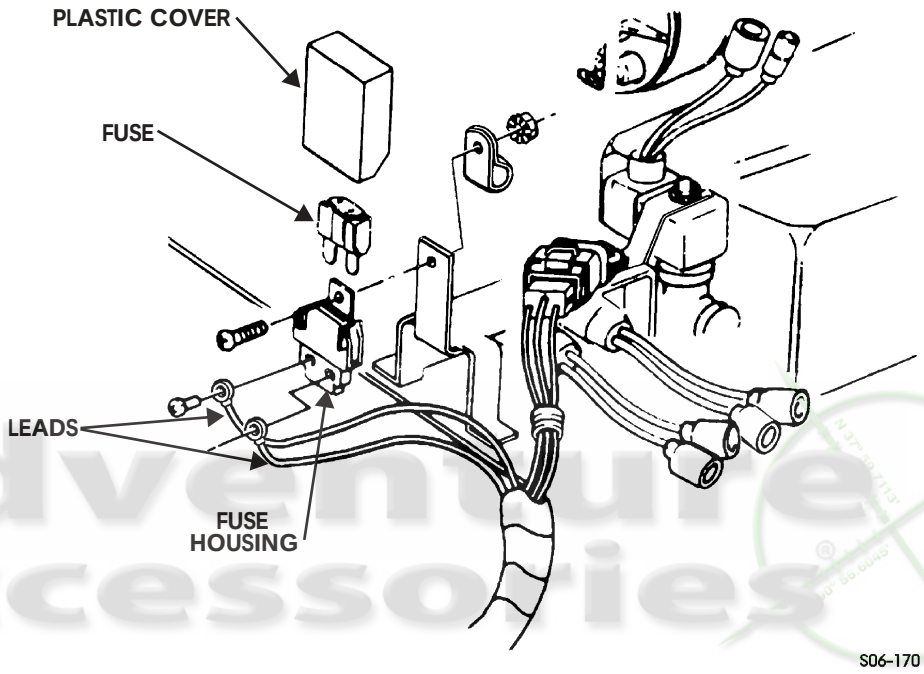


Figure 6-162: CTIS Compressor Fuse

Inspection

Inspect CTIS leads, connectors, and wiring. Check for cracks, shorts, and frayed wires. Replace defective parts.

Installation

1. Install fuse in housing (Figure 6-162).
2. Install two leads on fuse housing with screws.
3. Install plastic cover on fuse housing.
4. Connect battery ground cable (Section 12).
5. Lower and secure hood.

CTIS COMPRESSOR RELAY MAINTENANCE

NOTE: Prior to removal, tag all leads for installation.

Removal

1. Raise and secure hood.
2. Disconnect battery ground cable (Section 12).
3. Disconnect connector from relay (Figure 6-163).
4. Remove nut, lockwasher, screw, and relay from bracket. Discard lockwasher.

Inspection

Inspect CTIS leads, connectors, and wiring. Check for cracks, shorts, and frayed wires. Replace defective parts.

Installation

1. Install relay on bracket with screw, lockwasher, and nut (Figure 6-163).
2. Connect connector to relay.
3. Connect battery ground cable (Section 12).
4. Lower and secure hood.

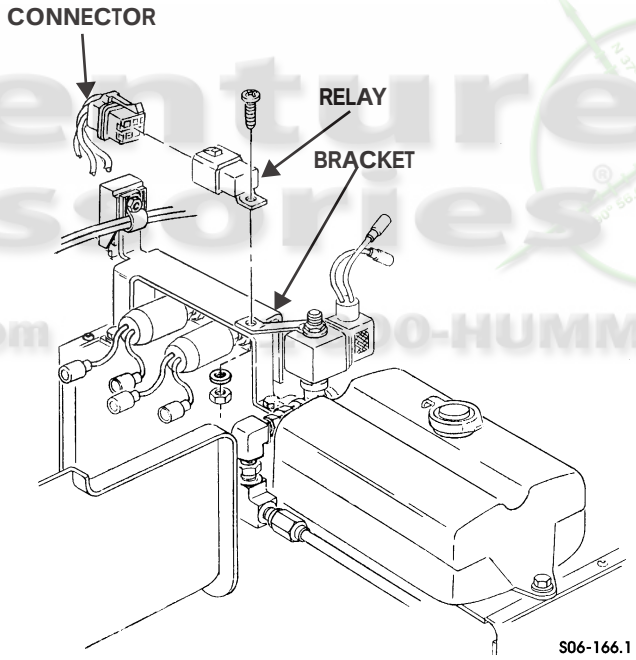


Figure 6-163: CTIS Compressor Relay

CHECK VALVE REPLACEMENT

WARNING: CTIS components are subject to high air pressure. Always relieve air pressure before loosening or removing air system components by disconnecting quick-disconnect valve assemblies. Failure to follow this warning may result in serious injury.

Removal

1. Raise and secure hood.
2. Disconnect battery ground cable (Section 12).
3. Remove check valve from tee (Figure 6-164).
4. Remove check valve from hose.

Cleaning and Inspection

Clean and inspect check valve for stripped threads. Replace if defective.

Installation

CAUTION: *Do not allow sealant into air system. Sealant will damage CTIS components.*

NOTE: Apply sealant to threads prior to installation.

1. Install hose on check valve (Figure 6-164).
2. Install check valve on tee.
3. Connect battery ground cable (Section 12).
4. Lower and secure hood.

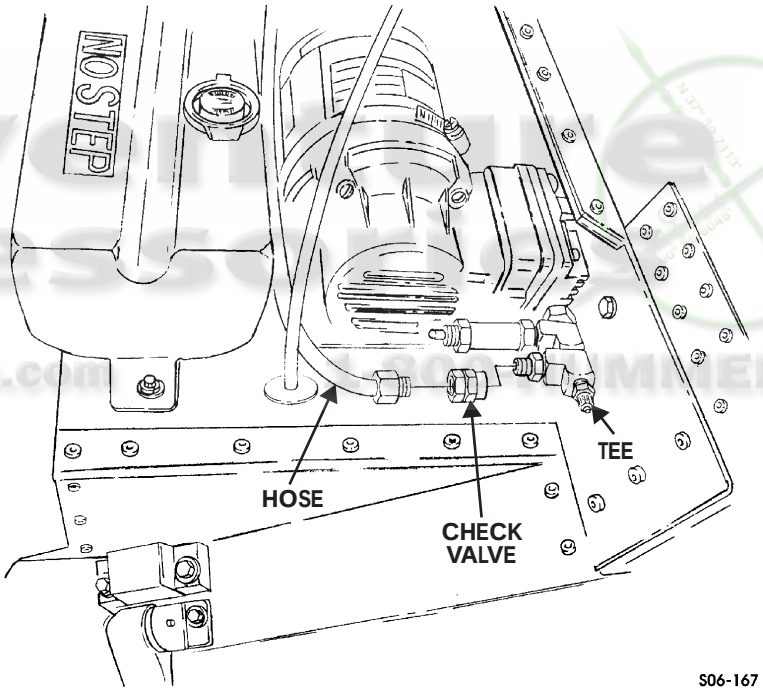


Figure 6-164: Check Valve Assembly

DEFLATE VALVE ASSEMBLY MAINTENANCE

WARNING: CTIS components are subject to high air pressure. Always relieve air pressure before loosening or removing air system components by disconnecting quick-disconnect valve assemblies. Failure to follow this warning may result in serious injury.

Removal

1. Raise and secure hood.
2. Disconnect battery ground cable (Section 12).
3. Disconnect leads 438A and 57R from deflate valve leads (Figure 6-165).
4. Remove two capscrews, lockwashers, washers and deflate valve from bottom of bracket. Discard lockwashers.
5. Remove nut and washer securing deflate valve to top of bracket and remove deflate valve.
6. Remove deflate valve from connector.

Cleaning and Inspection

Clean and inspect deflate valve and bracket. Check for cracks and stripped threads. Replace if defective.

Installation

CAUTION: *Do not allow sealant into air system. Sealant will damage CTIS components.*

NOTE: Apply sealant to threads prior to installation.

1. Install deflate valve on connector (Figure 6-165).
2. Install deflate valve on bottom of bracket with two washers, lockwashers, and capscrews.
3. Secure deflate valve top of bracket with washer and nut.
4. Connect leads 438A and 57R to deflate valve leads.
5. Connect battery ground cable (Section 12).
6. Lower and secure hood.

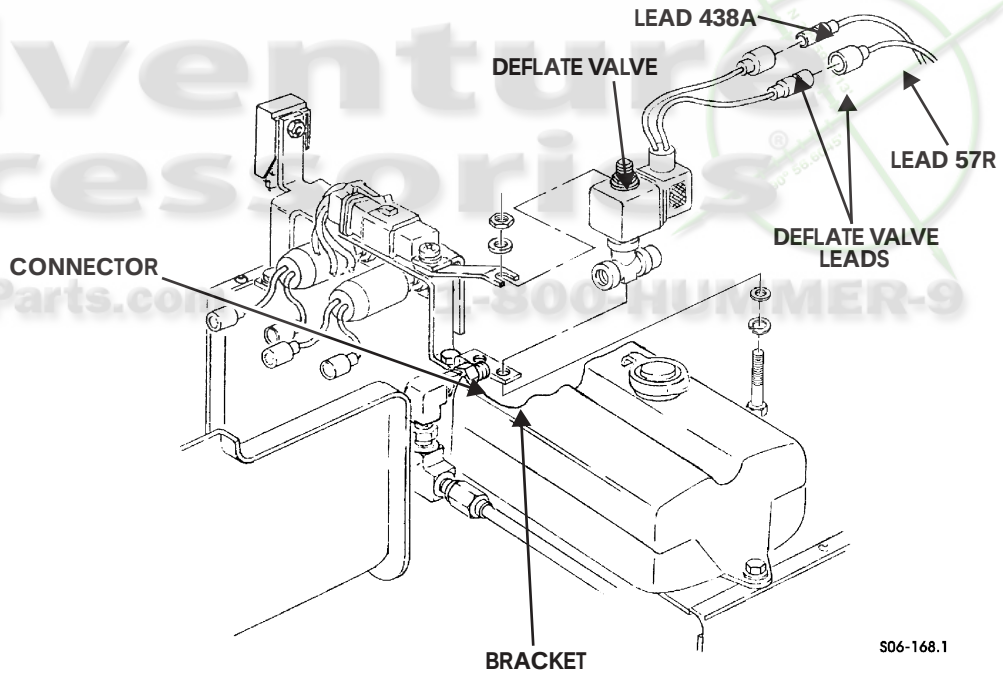


Figure 6-165: Deflate Valve Assembly

DUST EXCLUDER MAINTENANCE

WARNING: CTIS components are subject to high air pressure. Always relieve air pressure before loosening or removing air system components by disconnecting quick-disconnect valve assemblies. Failure to follow this warning may result in serious injury.

Removal

1. Raise and secure hood.
2. Disconnect battery ground cable (Section 12).
3. Remove dust excluder from deflate valve (Figure 6-164).

Cleaning and Inspection

Clean and inspect dust excluder. Check for cracks and stripped threads. Replace if defective.

Installation

CAUTION: *Do not allow sealant into air system. Sealant will damage CTIS components.*

NOTE: Apply sealant to threads prior to installation.

1. Install dust excluder on deflate valve (Figure 6-164).
2. Connect battery ground cable.
3. Lower and secure hood.

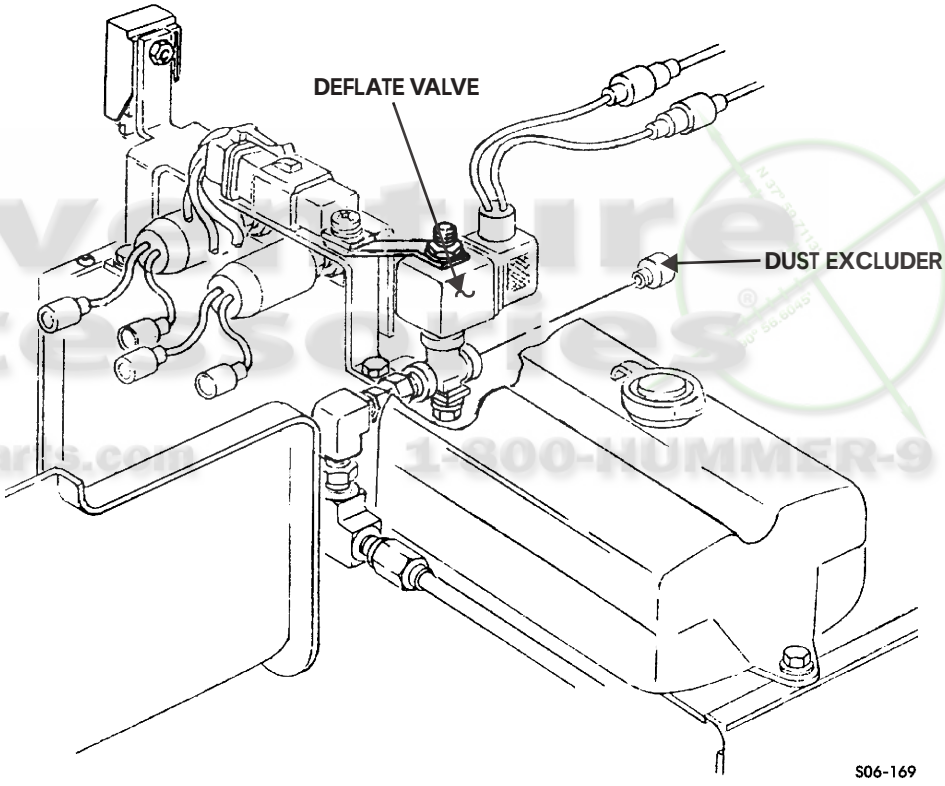


Figure 6-166: Dust Excluder

FRONT SUPPLY TUBE AND HOSE REPLACEMENT

WARNING: CTIS components are subject to high air pressure. Always relieve air pressure before loosening or removing air system components by disconnecting quick-disconnect valve assemblies. Failure to follow this warning may result in serious injury.

NOTE: The HUMMER CTIS uses two types of air lines: rubber hoses and nylon tubing. Damaged portions of any air line type should be removed, discarded, and replaced with a new section. Leaks in air lines usually develop where there is constant rubbing or friction against another component, existing air lines, fasteners, frame rail, or air line clamp. Such leaks are usually small and difficult to detect unless adequate air pressure of approximately 20-30 psi (138-207 kPa) is in the line. If a leak is suspected, apply soap suds to the affected area for easier detection and replace damaged section.

Removal

1. Disconnect tee-to-selector tube from connector on tire selector valve. Remove nut and sleeve assembly and insert from tube (Figure 6-167).
2. Remove tiedown straps securing tee-to-selector tube to oil cooler lines. Discard tiedown straps.
3. Disconnect tee-to-selector tube and connector from tee. Remove nut and sleeve assembly and insert from tube (Figure 6-168).
4. Remove self-tapping screw and clamp securing tee-to-selector tube to oil cooler line support.

NOTE: The removal of the left and right front wheel-to-tee hose is basically the same. The following steps cover the right front wheel-to-tee hose.

5. Loosen hose clamp and disconnect wheel-to-tee hose from elbow on tee.
6. Remove elbow from tee.
7. Remove tiedown straps securing wheel-to-tee hose and vent line together. Discard tiedown straps.
8. Remove self-tapping screws and clamps securing wheel-to-tee hose to frame.
9. Loosen hose clamp and disconnect wheel-to-tee hose from connector (Figure 6-169).
10. Remove self-tapping screw, clamp, and wheel-to-tee hose from support bracket on lower control arm.
11. Remove capscrew, lockwasher, and support bracket from lower control arm. Discard lockwasher.

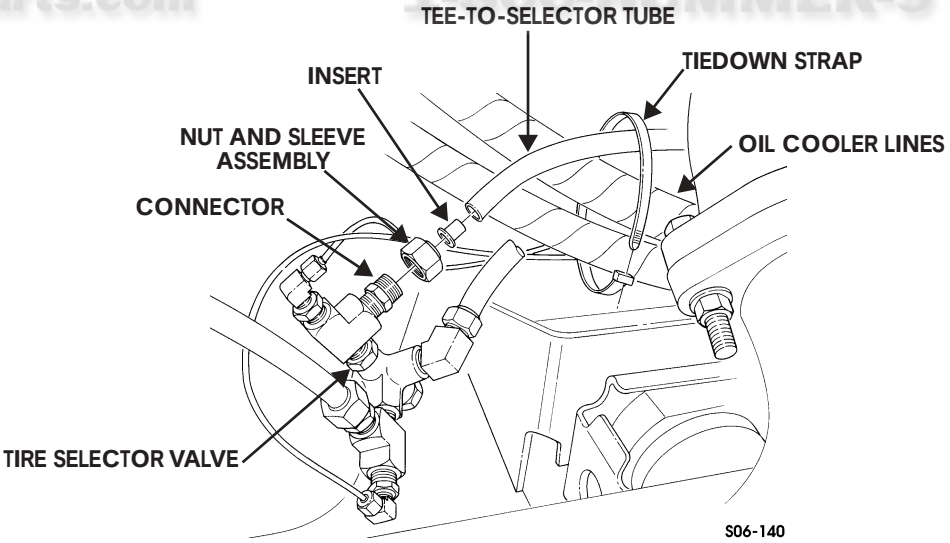


Figure 6-167: Front Supply Tubes

Installation

CAUTION: *Do not allow sealant into air system. Sealant will damage CTIS components.*

NOTE: Apply sealant to threads prior to installation.

1. Install nut and sleeve assembly and insert on tee-to-selector tube and connect to tire selector valve (Figure 6-167).
2. Secure tee-to-selector tube to oil cooler lines with tiedown straps.
3. Install connector to tee (Figure 6-168).
4. Install nut and sleeve assembly and insert on tee-to-selector tube and connect tube to connector on tee.
5. Secure tee-to-selector tube to oil cooler line support with self-tapping screw and clamp.

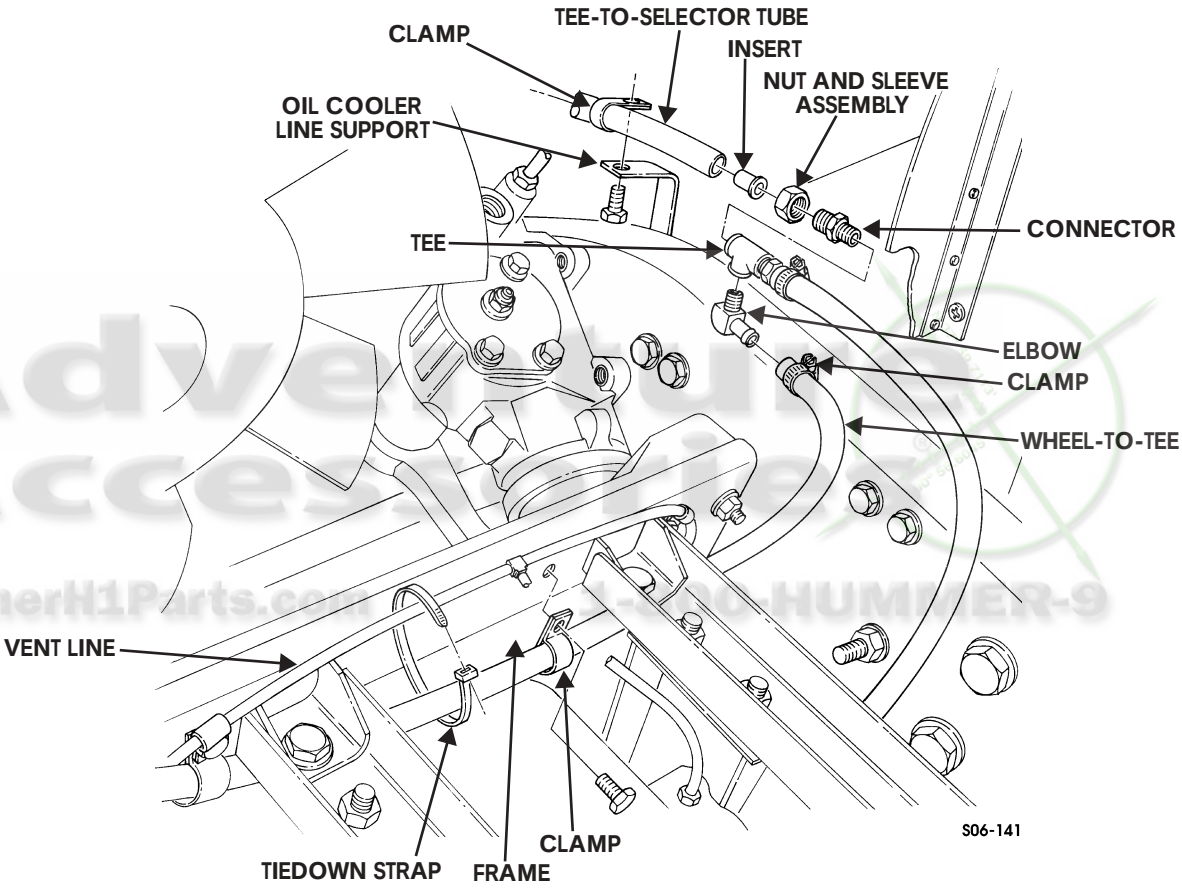


Figure 6-168: Tee-To-Selector Tube

NOTE: The installation of the left and right front wheel-to-tee hose is basically the same. The following steps cover the right front wheel-to-tee hose.

6. Install elbow on tee.
7. Connect wheel-to-tee hose to elbow and secure with hose clamp.
8. Secure wheel-to-tee hose to frame with self-tapping screws and clamps.
9. Secure wheel-to-tee hose to vent line with tiedown straps.
10. Connect wheel-to-tee hose to connector in steering arm cover and secure with hose clamp (Figure 6-169).
11. Install support bracket on lower control arm with capscrew and lockwasher.
12. Install wheel-to-tee hose on support bracket with self-tapping screw and clamp.
13. Start engine. Allow vehicle's air system to build up to normal operating pressure.
14. Apply soap suds to hose connections. Inspect for leaks and replace as needed.

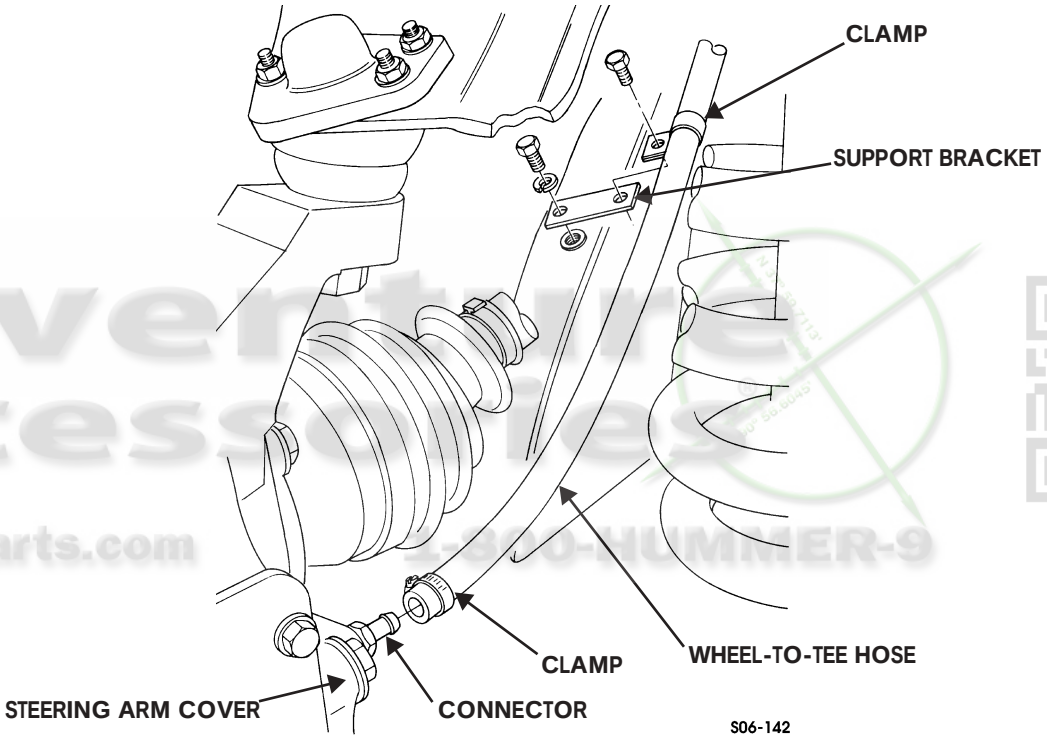


Figure 6-169: Wheel-to-Tee Hose

REAR SUPPLY TUBES REPLACEMENT

WARNING: CTIS components are subject to high air pressure. Always relieve air pressure before loosening or removing air system components by disconnecting quick-disconnect valve assemblies. Failure to follow this warning may result in serious injury.

Removal

1. Disconnect selector-to-union tube from connector on tire selector valve. Remove nut and sleeve assembly and insert from tube (Figure 6-170).
2. Remove two screws, nut and lockwasher assemblies, clamps, and selector-to-union tube from crossmember. Discard nut and lockwasher assemblies.
3. Remove fuel tank (Section 3).
4. Disconnect selector-to-union tube from union. Remove nut and sleeve assembly and insert from tube (Figure 6-171).

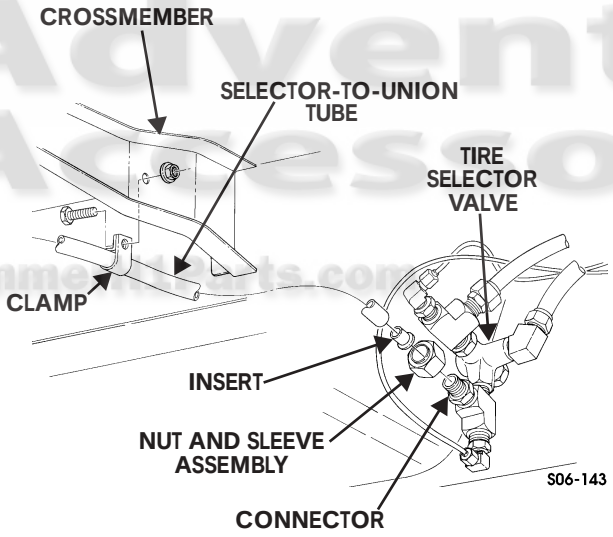


Figure 6-170: Wheel-to-Tee Hose

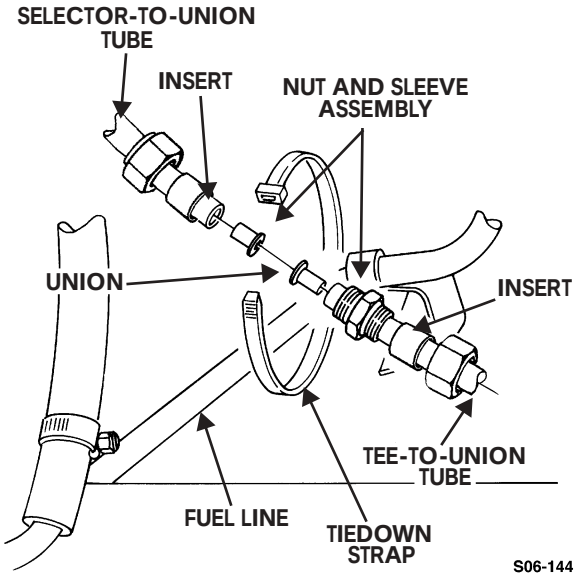


Figure 6-171: Selector-to-Union Tube

5. Disconnect tee-to-union tube from union. Remove nut and sleeve assembly and insert from tube.
6. Disconnect tee-to-union tube from connector on tee. Remove nut and sleeve assembly and insert from tube (Figure 6-172).

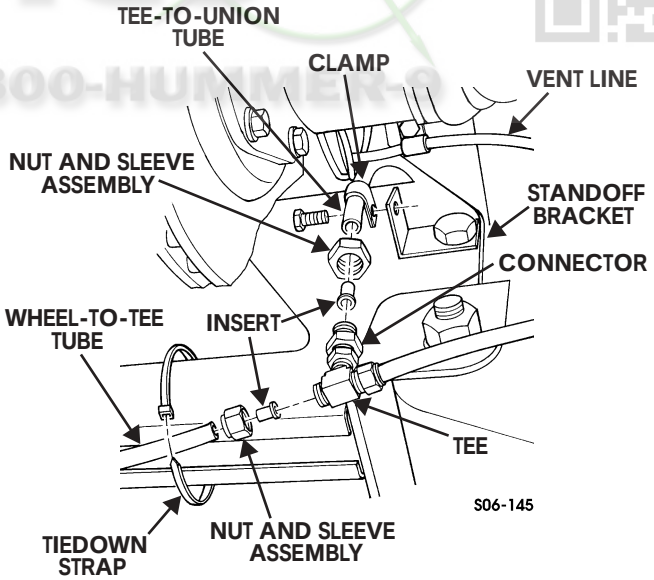


Figure 6-172: Tee-to-Union Tube

7. Remove self-tapping screw, clamp, and tee-to-union tube from standoff bracket.
8. Remove tiedown straps and rear tee-to-union tube from fuel lines and vent lines. Discard tiedown straps (Figures 6-171 and 6-172).

NOTE: The removal of the left and right rear wheel-to-tee tube is basically the same. The following steps cover the left rear wheel-to-tee tube.

9. Disconnect wheel-to-tee tube from tee. Remove nut and sleeve assembly, insert, and tiedown strap from tube. Discard tie down strap.
10. Disconnect wheel-to-tee tube from connector in steering arm cover. Remove nut and sleeve assembly and insert from tube (Figure 6-173).

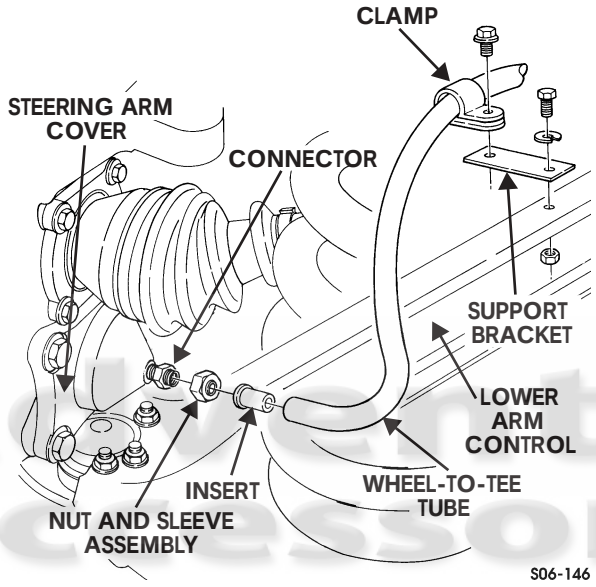


Figure 6-173: Wheel-to-Tee Tube

11. Remove self-tapping screw, clamp, and tube from support bracket on lower control arm.
12. Remove capscrew, lockwasher, support bracket, and nut from lower control arm. Discard lockwasher.

Installation

CAUTION: *Do not allow sealant into air system. Sealant will damage CTIS components.*

NOTE: Apply sealant to threads prior to installation.

1. Install nut and sleeve assembly, insert, and selector-to-union tube to connector on tire selector valve (Figure 6-170).
2. Install selector-to-union tube on cross-member with two clamps, nut and lockwasher assemblies, and screws.
3. Install nut and sleeve assembly, insert, and selector-to-union tube on union (Figure 6-171).
4. Install nut and sleeve assembly, insert, and tee-to-union tube on union.
5. Install fuel tank (Section 3).
6. Install nut and sleeve assembly, insert, and tee-to-union tube on connector (Figure 6-172).
7. Install tee-to-union tube on standoff bracket with clamp and self-tapping screw.
8. Secure tee-to-union tube to fuel lines and vent lines with tiedown straps (Figures 6-171 and 6-172).

NOTE: The installation of the left and right rear wheel-to-tee tube is basically the same. The following steps cover the left rear wheel-to-tee tube.

9. Install nut and sleeve assembly, insert, and wheel-to-tee tube on tee.
10. Install nut and sleeve assembly, insert, and wheel-to-tee tube on connector in steering arm cover (Figure 6-173).
11. Install support bracket on lower control arm with capscrew and lockwasher.
12. Install wheel-to-tee tube on support bracket with self-tapping screw, clamp, and nut.
13. Start engine. Allow vehicle's air system to build up to normal operating pressure.
14. Apply soap suds to hose connections. Inspect for leaks and replace as needed.

AIR INTAKE LINE AND ASSEMBLY MAINTENANCE

Removal

1. Raise and secure hood.
2. Loosen hose clamp and disconnect air intake hose from connector (Figure 6-174).

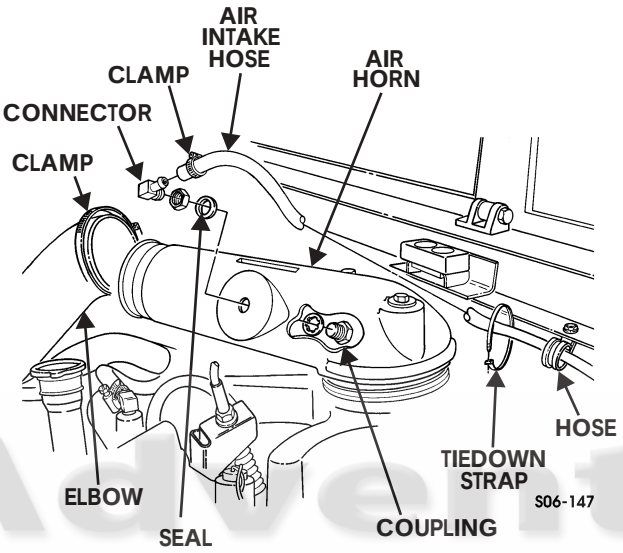


Figure 6-174: Air Intake Hose

3. Loosen clamp and disconnect air cleaner elbow from air horn.
4. Remove nut, washer, coupling, connector, and seal from air horn.
5. Loosen hose clamp securing air intake hose to fitting (Figure 6-175).

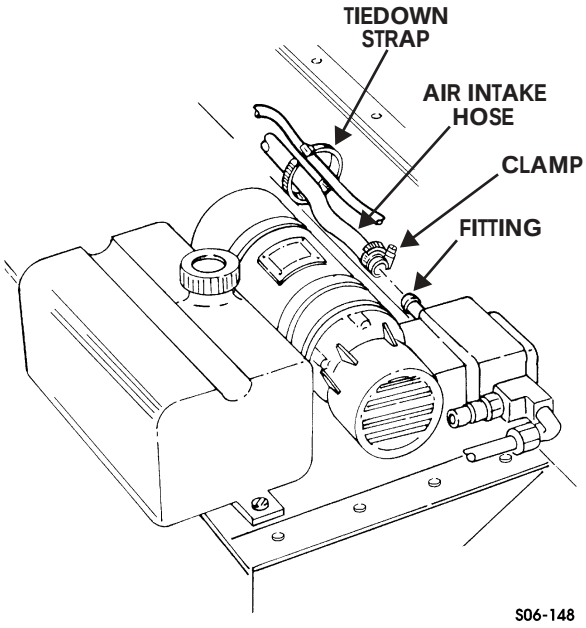


Figure 6-175: Air Intake Hose to Fitting

6. Remove tiedown straps and air intake hose from hoses.

Cleaning and Inspection

Clean and inspect air intake hose, elbow, coupling assembly and seal. Check for leaks, cracks, and stripped threads.

CAUTION: Do not allow sealant into air system. Sealant will damage CTIS components.

NOTE: Apply sealant to threads prior to installation.

Installation

1. Connect air intake hose to fitting and secure with hose clamp (Figure 6-175).
2. Install seal, coupling, washer, nut, and connector to air horn (Figure 6-174).
3. Connect air cleaner elbow to air horn and secure with clamp.
4. Connect air intake hose to air horn connector and secure with hose clamp.
5. Secure air intake hose to hoses with tiedown straps (Figure 6-175).
6. Lower and secure hood.

TUBE SHIELD REPLACEMENT

NOTE: The replacement of the front and rear tube shields is basically the same. This procedure covers the rear tube shield.

Removal

1. Raise and support vehicle.
2. Remove valve core from manual air fill stem and deflate tire completely.
3. Remove four capscrews, lockwashers, and tube shield from spindle. Discard lockwashers (Figure 6-176).

WARNING: In all disassembly operations, ensure the tire is totally deflated before removing wheel locknuts. Failure to follow proper safety precautions could cause serious injury or death.

4. Remove two wheel locknuts and shield bracket from outer rim. Discard wheel locknuts.

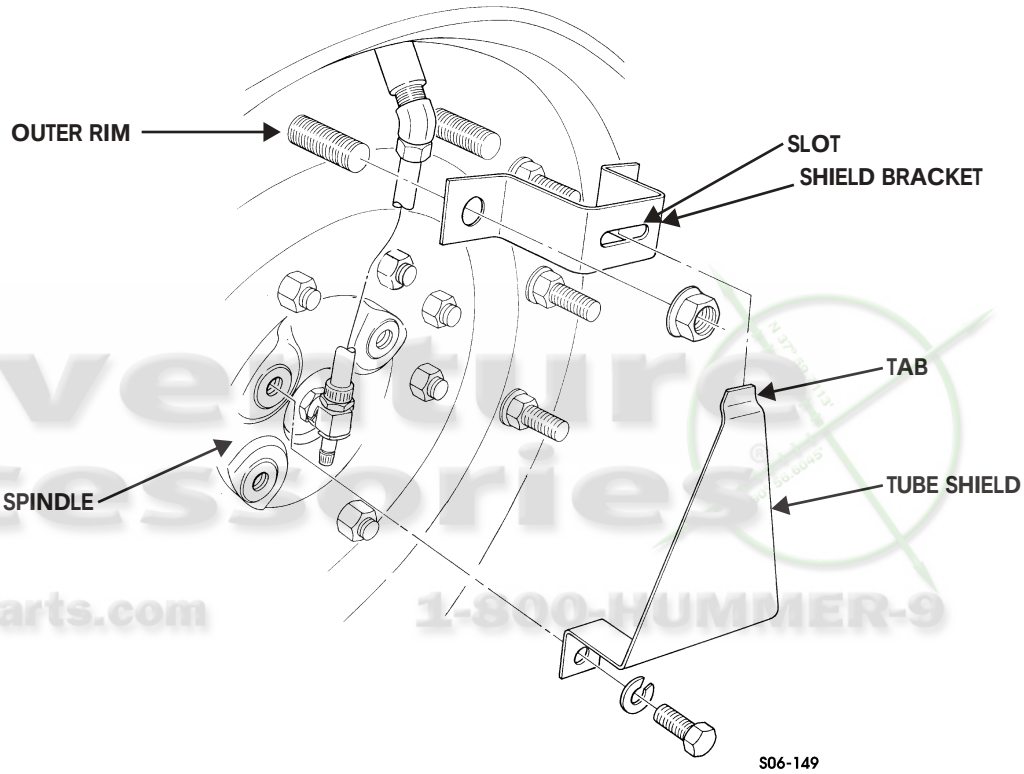


Figure 6-176: Tube Shield Assembly

Installation

1. Install shield bracket to outer rim with two wheel locknuts. Tighten wheel locknuts to 43 lb-ft (58 N•m) (Figure 6-176).
2. Insert tube shield tab into slot in shield bracket.
3. Install tube shield on spindle with four lockwashers and capscrews. Tighten capscrews to 43 lb-ft (58 N•m).
4. Lower vehicle.

QUICK-DISCONNECT VALVE AND TUBE MAINTENANCE

WARNING: CTIS components are subject to high air pressure. Always relieve air pressure before loosening or removing air system components by disconnecting quick-disconnect valve assemblies. Failure to follow this warning may result in serious injury.

NOTE: The replacement of all four quick-disconnect valves and tube assemblies is identical.

Removal

1. Raise and support vehicle.
2. Remove tube shield.
3. Remove tube and nut from quick-disconnect valve (Figure 6-177).

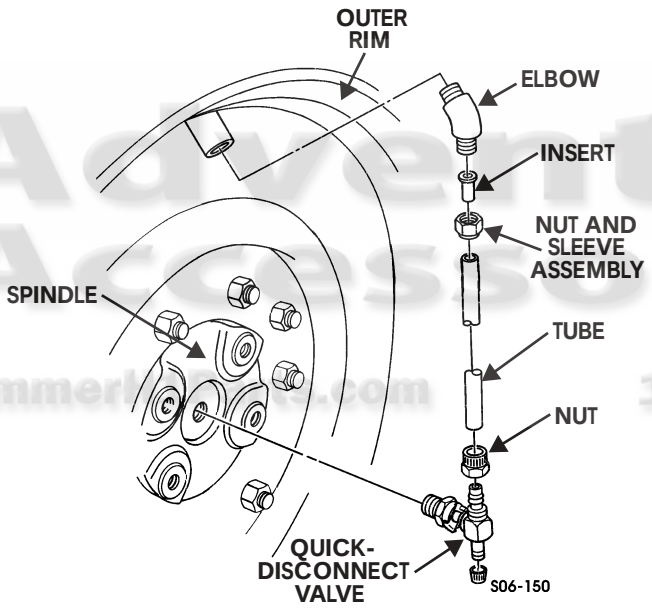


Figure 6-177: Quick-Disconnect Valve Assembly

CAUTION: *Do not force apart quick-disconnect valve. The quick-disconnect valve is a one-piece component. Damage to quick-disconnect valve will result if forced apart.*

4. Remove quick-disconnect valve from spindle.
5. Disconnect tube from elbow and remove nut and sleeve assembly and insert from tube.
6. Remove elbow from outer rim.

Cleaning and Inspection

Clean and inspect tube and quick-disconnect valve. Check for leaks, stripped threads, and cracks. Replace defective parts.

Installation

CAUTION: *Do not allow sealant into air system. Sealant will damage CTIS components.*

NOTE: Apply sealant to threads prior to installation.

1. Install quick-disconnect valve into spindle (Figure 6-177).
2. Install elbow to outer rim.
3. Install nut on tube and connect tube to quick-disconnect valve.
4. Install nut and sleeve assembly and insert on tube and connect tube to elbow.
5. Install tube shield.
6. Lower vehicle.

REAR TUBE CONNECTION SHIELD MAINTENANCE

NOTE: The replacement of the left and right rear tube connection shields is basically the same. This procedure covers the left rear tube connection shield.

Removal

Remove two capscrews, washers, shield, and two washers from steering arm cover (Figure 6-178).

Cleaning and Inspection

Clean and inspect shield and mounting hardware. Check for cracks and stripped threads. Replace defective parts.

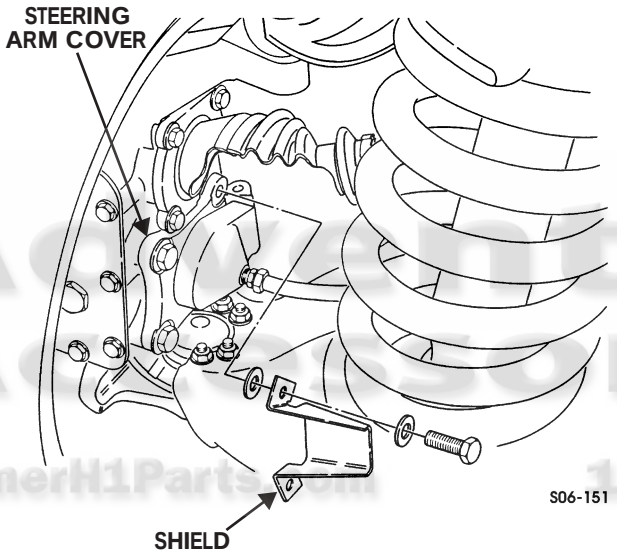


Figure 6-178: Rear Tube Connection Shield

Installation

Install shield on steering arm cover with two washers, capscrews, and two washers. Tighten capscrew to 75 lb-ft (102 N•m) (Figure 6-178).

GEARED HUB REPLACEMENT (CTIS)

WARNING: CTIS components are subject to high air pressure. Always relieve air pressure before loosening or removing air system components by disconnecting quick-disconnect valve assemblies. Failure to follow this warning may result in serious injury.

NOTE: The geared hub spindle has been bored to allow a direct air passage through the spindle to the quick-disconnect valve assembly. The front of the spindle is bored and tapped to allow installation of a quick-disconnect coupling. The rear of the spindle is bored for the insertion of a spindle extension, which creates an air-tight passageway into the steering arm cover. A bored hole in the steering arm cover allows the installation of a rotary seal and an air line, which routes compressed air to the tires.

Removal

1. Remove tube shield.
2. Remove rear tube connection shield.
3. Loosen clamp and disconnect hose from connector (front hose only) (Figure 6-179).

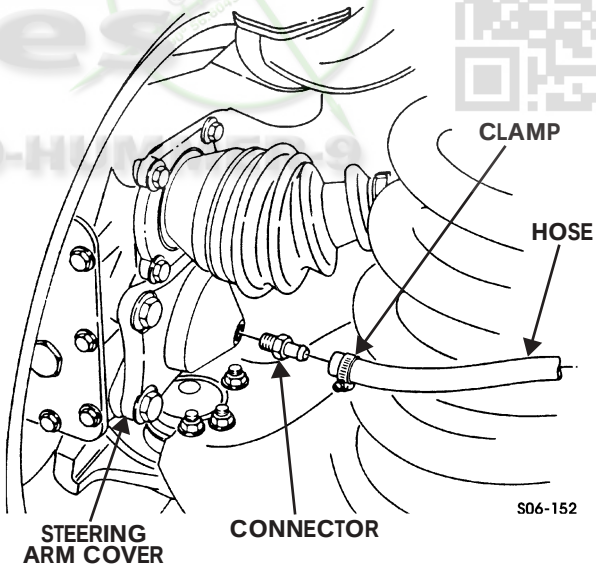


Figure 6-179: Front Geared Hub Connector

4. Disconnect tube from connector (rear tube only) (Figure 6-180).

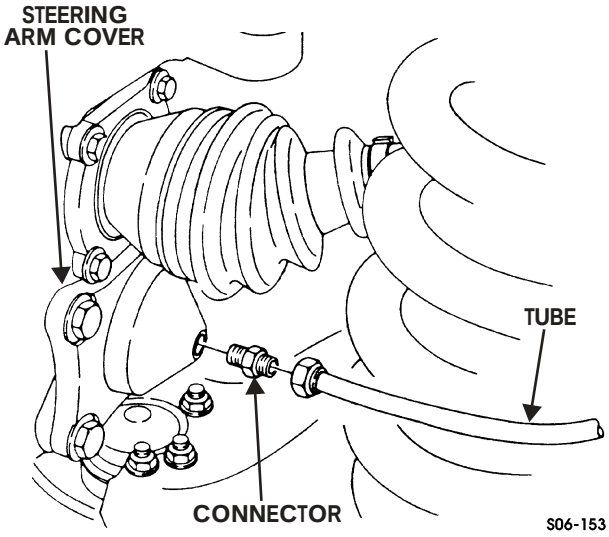


Figure 6-180: Steering Arm Cover

5. Remove connector from steering arm cover (Figures 6-179 and 6-180).
6. Remove geared hub.

Installation

1. Install geared hub.

CAUTION: *Do not allow sealant into air system. Sealant will damage CTIS components.*

2. Apply sealant to connector and install in steering arm cover (Figures 6-179 and 6-180).
3. Connect hose to connector and tighten clamp (front hose only) (Figure 6-179).
4. Connect tube to connector and tighten nut (rear tube only) (Figure 6-180).
5. Install rear tube connection shield.
6. Install tube shield.

SPINDLE EXTENSION AND SEAL MAINTENANCE

Removal

1. Remove rear tube connection shield.
2. Remove four capscrews, washers, and steering arm cover from geared hub (Figure 6-181).
3. Remove retaining ring and seal from steering arm cover.
4. Remove spindle extension from spindle.

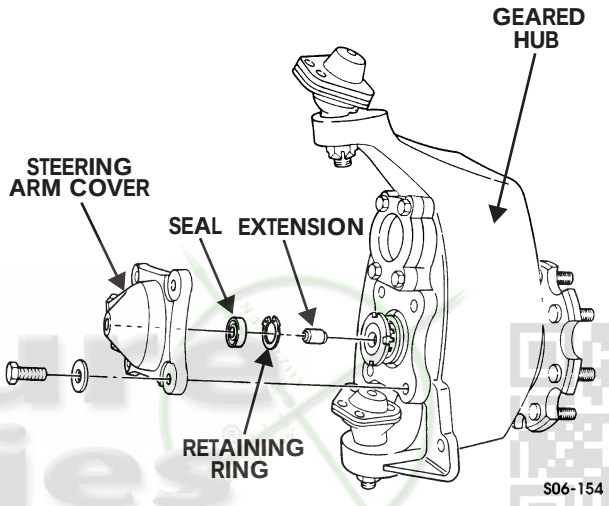


Figure 6-181: Spindle Extension and Seal

Cleaning and Inspection

Clean and inspect spindle extension and seal. Check for leaks and cracks. Replace defective parts.

Installation

CAUTION: *Do not allow sealant or adhesive into air system. Sealant will damage CTIS components.*

1. Apply sealant to seal and install seal in steering arm cover (Figure 6-181).
2. Secure seal to steering arm cover with retaining ring.
3. Apply a small amount of adhesive to end of spindle extension and install into spindle.
4. Install steering arm cover on geared hub with four washers and capscrews. Tighten capscrews to 75 lb-ft (102 N•m).
5. Install rear tube connection shield.

INNER RIM STUD MAINTENANCE

Removal

1. Remove wheel from vehicle.
2. Place wheel in tire inflation cage.

WARNING: Ensure the tire is totally deflated before removing wheel locknuts. Failure to follow proper safety precautions may result in serious injury or death.

3. Remove valve core from valve bore and deflate tire. Run a wire through valve bore to ensure it is not plugged (Figure 6-182).

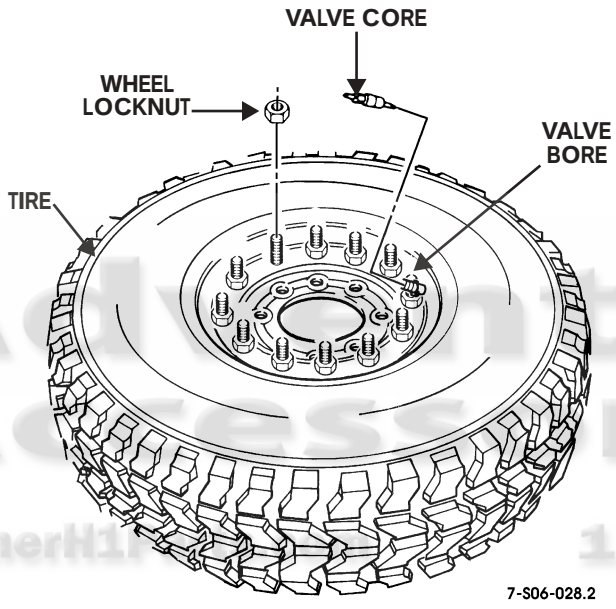


Figure 6-182: Valve Core and Valve Bore

NOTE: When replacing broken rim stud(s), replace studs on both sides of broken stud(s).

4. When tire is fully deflated, loosen wheel locknuts on each side of the broken stud(s). If you hear escaping air, do not proceed. Wait until the sound stops and recheck valve bore. When you are certain tire is fully deflated, proceed to remove wheel locknut. Discard locknut.
5. Drive studs out of inner rim. Discard studs (Figure 6-183).

Cleaning and Inspection

1. Using wire brush, clean remaining studs. Clean all dirt and foreign material from rim with soap and water and allow to air dry.

WARNING: Never use wheel assemblies with studs that are damaged, loose, or have damaged threads. Damaged studs can cause improper assembly, which could cause individual fasteners to fail. Any of these situations may result in serious injury or death.

2. Inspect inner rim for cracked, broken, rusted, pitted, bent, or loose studs, and studs with damaged, mutilated, or deformed threads. Replace defective parts (Figure 6-183).

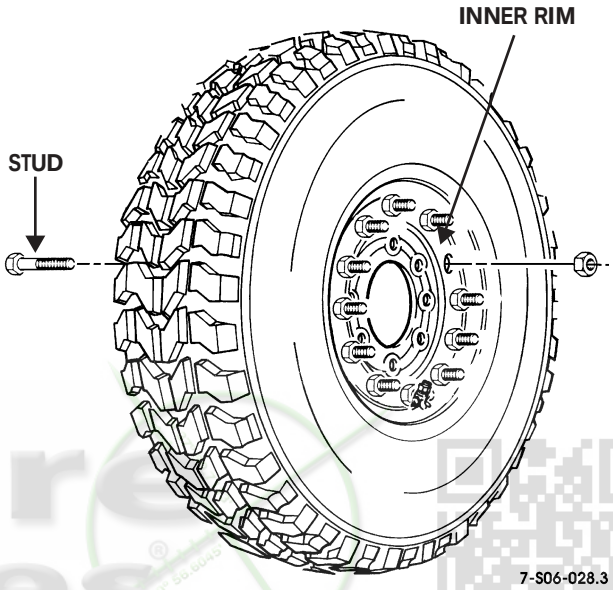


Figure 6-183: Inner Rim Stud

Installation

1. Align stud with splines in inner rim and drive stud into inner rim until stud shoulder seats against inner rim (Figure 6-183).
2. Repeat step 1 for all studs being replaced.

***CAUTION**: Tighten locknuts gradually to avoid bent and broken studs, or damage to wheel components will result.*

3. Install locknuts on new studs.

NOTE: After replacing broken stud(s), all wheel locknuts must be re-torqued.

4. Tighten locknuts to 85 lb-ft (115 N•m) in sequence shown (Figure 6-184).
5. Tighten locknuts to 125 lb-ft (170 N•m) in sequence shown.

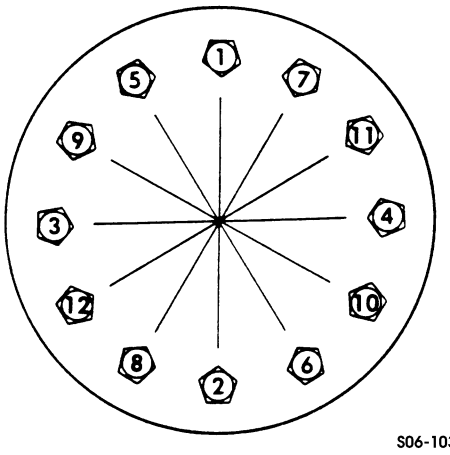


Figure 6-184: Lug Nut Tightening Sequence

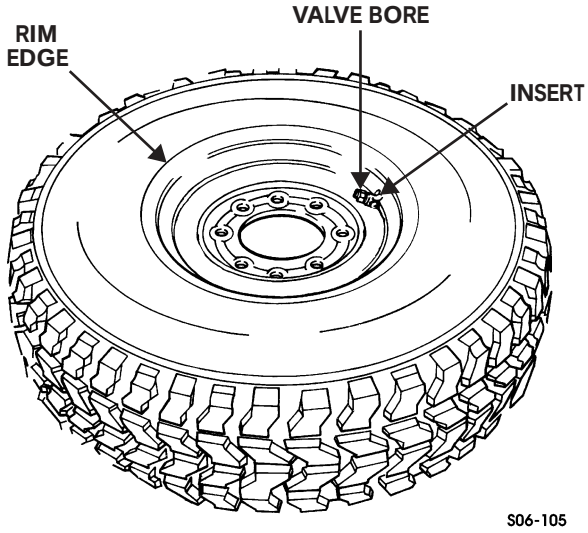


Figure 6-185: Leak Check Areas

6. Check wheel assembly for gaps at each stud. Use a 0.0015 inch (0.038 mm) thickness gauge to detect gaps. If gaps are detected, disassemble and reassemble wheel assembly and recheck for gaps. If gaps are still detected, replace outer rim half.

WARNING: Never inflate a wheel assembly without having checked wheel locknut torques to ensure the wheel locknuts are tightened to specifications. An assembly with improperly tightened locknuts could separate under pressure, resulting in serious injury or death.

WARNING: Always use a tire inflation cage for inflation purposes. Stand on one side of the cage during inflation, never directly in front. Keep hands out of cage during inflation. Inflate assembly to recommended pressure, using a clip-on air chuck. Do not exceed 50 psi (345 kPa) cold inflation pressure. Failure to follow these instructions may result in serious injury or death.

7. Place wheel in safety cage and inflate tire to the recommended tire pressure.
8. Check for leaks around rim edges and valve bore with soapy water (Figure 6-185).
9. Install wheel on vehicle.