

SUSPENSION

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WHEEL ALIGNMENT

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DESCRIPTION AND OPERATION

WHEEL ALIGNMENT

Proper vehicle wheel alignment is the proper adjustment of all interrelated front and rear suspension angles. These angles are what affects the handling and steering of the vehicle when it is in motion.

The method of checking a vehicle's front and rear wheel alignment will vary depending on the type and manufacturer of the equipment being used. Instructions furnished by the manufacturer of the equipment being used should always be followed to ensure accuracy of the alignment, except when alignment specifications recommended by this corporation differ.

Typical wheel alignment angles and measurements are camber, caster, toe, and thrust angle.

- Camber is the number of degrees the top of the tire and wheel are tilted either inward or outward (Fig. 1). Camber is a tire wearing angle. Excessive negative camber will cause tread wear at the inside of the tire, while excessive positive camber will cause outside tire wear.

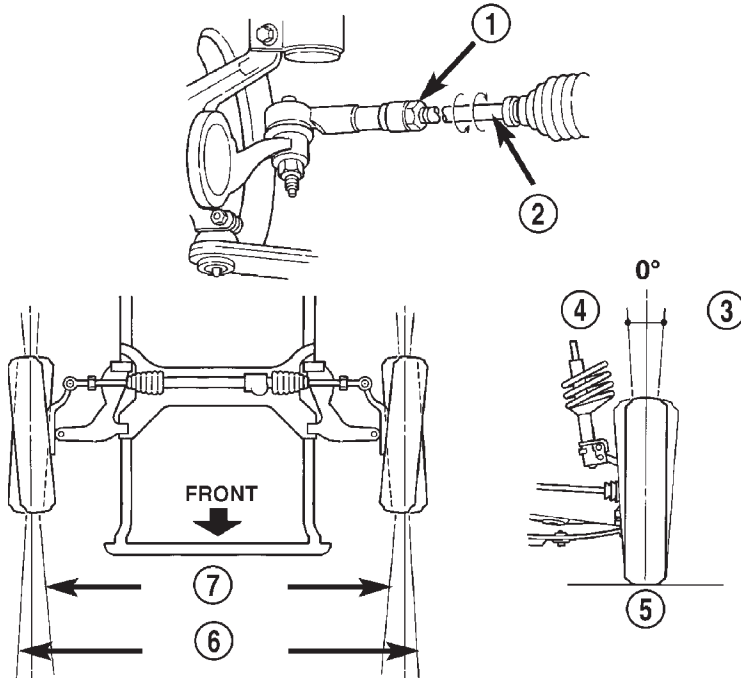
- Caster is the number of degrees of forward or rearward tilt of the steering knuckle. Forward tilt provides a negative caster angle, while rearward tilt provides a positive caster angle. Caster is not adjustable on this vehicle.

- Cross Camber is the difference between left and right camber. The right side camber is to be subtracted from the left, resulting in the cross camber reading. For example, if the left camber is +0.3° and the right camber is 0.0°, the cross camber would be +0.3°.

- Toe is measured in degrees or inches and is the difference in width between the centered leading and trailing edges of the tires on the same axle (Fig. 1). Toe-in means that the front width is more narrow than the rear. Toe-out means that the front width is wider than the rear.

- Thrust Angle is defined as the average of the toe settings on each rear wheel. If this measurement is out of specification, readjust the rear wheel toe so that each wheel has 1/2 of the total toe measurement. When readjusting, do not exceed the total toe specification.

DESCRIPTION AND OPERATION (Continued)



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Fig. 1 Alignment Camber And Toe

- 1 - LOOSEN NUT TO ADJUST TOE
- 2 - TOE ADJUSTMENT
- 3 - POSITIVE
- 4 - NEGATIVE

- 5 - CAMBER
- 6 - TOE-OUT
- 7 - TOE-IN

DIAGNOSIS AND TESTING

SUSPENSION AND STEERING DIAGNOSIS

CONDITION	POSSIBLE CAUSES	POTENTIAL CORRECTIONS
Front End Whine On Turns	<ol style="list-style-type: none"> 1. Defective Wheel Bearing 2. Incorrect Wheel Alignment 3. Worn Tires 	<ol style="list-style-type: none"> 1. Replace Wheel Bearing 2. Check And Reset Wheel Alignment 3. Replace Tires
Front End Growl Or Grinding On Turns	<ol style="list-style-type: none"> 1. Defective Wheel Bearing 2. Engine Mount Grounding Against Frame Or Body Of Vehicle. 3. Worn Or Broken C/V Joint 4. Loose Wheel Lug Nuts 5. Incorrect Wheel Alignment 6. Worn Tires 	<ol style="list-style-type: none"> 1. Replace Wheel Bearing 2. Check For Motor Mount Hitting Frame Rail And Reposition Engine As Required 3. Replace C/V Joint 4. Verify Wheel Lug Nut Torque 5. Check And Reset Wheel Alignment 6. Replace Tires
Front End Clunk Or Snap On Turns	<ol style="list-style-type: none"> 1. Loose Wheel Lug Nuts 2. Worn Or Broken C/V Joint 3. Worn Or Loose Tie Rod Or Ball Joint 4. Worn Control Arm Bushing 5. Loose Sway Bar Or Upper Strut Attachment 	<ol style="list-style-type: none"> 1. Verify Wheel Lug Nut Torque 2. Replace C/V Joint 3. Tighten Or Replace Tie Rod End Or Ball Joint 4. Replace Control Arm Bushing 5. Tighten Sway Bar Or Upper Strut Attachment To Specified Torque
Front End Whine With Vehicle Going Straight At A Constant Speed	<ol style="list-style-type: none"> 1. Defective Wheel Bearing 2. Incorrect Wheel Alignment 3. Worn Tires 	<ol style="list-style-type: none"> 1. Replace Wheel Bearing 2. Check And Reset Wheel Alignment 3. Replace Tires
Front End Growl Or Grinding With Vehicle Going Straight At A Constant Speed	<ol style="list-style-type: none"> 1. Engine Mount Grounding 2. Worn Or Broken C/V Joint 	<ol style="list-style-type: none"> 1. Reposition Engine As Required 2. Replace C/V Joint
Front End Whine When Accelerating Or Decelerating	<ol style="list-style-type: none"> 1. Worn Or Defective Transaxle Gears Or Bearings 	<ol style="list-style-type: none"> 1. Replace Transaxle Gears Or Bearings
Front End Clunk When Accelerating Or Decelerating	<ol style="list-style-type: none"> 1. Worn Or Broken Engine Mount 2. Worn Or Defective Transaxle Gears Or Bearings 	<ol style="list-style-type: none"> 1. Replace Engine Mount 2. Replace Transaxle Gears Or Bearings

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	POTENTIAL CORRECTIONS
	3. Loose Wheel Lug Nuts 4. Worn Or Broken C/V Joint 5. Worn Or Loose Ball Joint 6. Worn Or Loose Control Arm Bushing 7. Loose Crossmember Bolts	3. Verify Wheel Lug Nut Torque 4. Replace C/V Joint 5. Tighten Or Replace Ball Joint 6. Tighten To Specified Torque Or Replace Control Arm Bushing 7. Tighten Crossmember Bolts To Specified Torque
Road Wander	1. Incorrect Tire Pressure 2. Incorrect Front Or Rear Wheel Toe 3. Worn Wheel Bearings 4. Worn Control Arm Bushings 5. Excessive Friction In Steering Gear 6. Excessive Friction In Steering Shaft Coupling 7. Excessive Friction In Strut Upper Bearing	1. Inflate Tires To Recommended Pressure 2. Check And Reset Front Wheel Toe 3. Replace Wheel Bearing 4. Replace Control Arm Bushing 5. Replace Steering Gear 6. Replace Steering Coupler 7. Replace Strut Bearing
Lateral Pull	1. Unequal Tire Pressure 2. Radial Tire Lead 3. Incorrect Front Wheel Camber 4. Power Steering Gear Imbalance 5. Wheel Braking	1. Inflate All Tires To Recommended Pressure 2. Perform Lead Correction Procedure 3. Check And Reset Front Wheel Camber 4. Replace Power Steering Gear 5. Correct Braking Condition Causing Lateral Pull
Excessive Steering Free Play	1. Incorrect Steering Gear Adjustment 2. Worn Or Loose Tie Rod Ends 3. Loose Steering Gear Mounting Bolts 4. Loose Or Worn Steering Shaft Coupler	1. Adjust Or Replace Steering Gear 2. Replace Or Tighten Tie Rod Ends 3. Tighten Steering Gear Bolts To The Specified Torque 5. Replace Steering Shaft Coupler
Excessive Steering Effort	1. Low Tire Pressure 2. Lack Of Lubricant In Steering Gear 3. Low Power Steering Fluid Level 4. Loose Power Steering Pump Belt 5. Lack Of Lubricant In Steering Ball Joints 6. Steering Gear Malfunction 7. Lack Of Lubricant In Steering Coupler	1. Inflate All Tires To Recommended Pressure 2. Replace Steering Gear 3. Fill Power Steering Fluid Reservoir To Correct Level 4. Check and replace automatic belt tensioner as necessary. If drive belt is worn or glazed, replace belt. 5. Lubricate Or Replace Steering Ball Joints 6. Replace Steering Gear 7. Replace Steering Coupler

SERVICE PROCEDURES

CURB HEIGHT MEASUREMENT

The wheel alignment is to be checked and all alignment adjustments made with the vehicle at its required curb height specification.

Vehicle height is to be checked with the vehicle on a flat, level surface, preferably a vehicle alignment rack. The tires are to be inflated to the recommended pressure. All tires are to be the same size as standard equipment. Vehicle height is checked with the fuel tank full of fuel, and no passenger or luggage compartment load.

Vehicle height is not adjustable. If the measurement is not within specifications, inspect the vehicle for bent or weak suspension components. Compare the parts tag on the suspect coil spring(s) to the parts book and the vehicle sales code, checking for a match. Once removed from the vehicle, compare the

coil spring height to a correct new or known good coil spring. The heights should vary if the suspect spring is weak.

NOTE: Prior to reading the curb height measurement, the front and rear of the vehicle should be jounced. Induce jounce by grasping the center of the rear, then front bumper (or fascia) and jouncing the vehicle an equal number of times. Release the bumper at the bottom of the jounce cycle.

(1) Measure from the inboard edge of the wheel opening fender lip directly above the wheel center (spindle), to the floor or alignment rack surface.

(2) When measuring, maximum left-to-right differential is not to exceed 10 mm (0.39 in.).

(3) Compare the measurements to specifications listed in the following CURB HEIGHT SPECIFICATIONS chart.

CURB HEIGHT SPECIFICATIONS

VEHICLE	FRONT	REAR
ALL NEON	672 mm ± 8 mm 26.46 in. ± 0.32 in.	679 mm ± 8 mm 26.73 in. ± 0.32 in.

WHEEL ALIGNMENT

PRE-WHEEL ALIGNMENT VEHICLE INSPECTION

CAUTION: If during the inspection the front suspension crossmember shows any sign of impact damage, the steering column lower coupling must be inspected. Refer to **DIAGNOSIS AND TESTING** in the **STEERING** group in this service manual.

Before any attempt is made to change or correct the wheel alignment, the following inspection and necessary corrections must be made to the vehicle to ensure proper alignment.

(1) Be sure the fuel tank is full of fuel. If the fuel tank is not full, the reduction in weight will affect the curb height of the vehicle and the alignment specifications.

(2) The passenger and luggage compartments of the vehicle should be free of any load that is not factory equipment.

(3) Check the tires on the vehicle. The tires are to be inflated to the recommended air pressure. All tires must be the same size and in good condition with approximately the same tread wear.

(4) Check the front tire and wheel assemblies for excessive radial runout.

(5) Inspect all suspension component fasteners for looseness and torque.

(6) Inspect the lower front ball joints and all steering linkage for looseness and any sign of wear or damage.

(7) Inspect the rubber bushings on all the suspension components for signs of wear or deterioration. If any bushings show signs of wear or deterioration, they should be replaced prior to aligning the vehicle.

WHEEL ALIGNMENT SETUP

(1) Position the vehicle on an alignment rack.

(2) Install all required alignment equipment on the vehicle, per the alignment equipment manufacturer's instructions. On this vehicle, a four-wheel alignment is recommended.

NOTE: Prior to reading the vehicle's alignment readouts, the front and rear of vehicle should be jounced. Induce jounce (rear first, then front) by grasping the center of the bumper and jouncing each end of vehicle an equal number of times. The bumper should always be released when vehicle is at the bottom of the jounce cycle.

(3) Read the vehicle's current front and rear alignment settings. Compare the vehicle's current alignment settings to the vehicle specifications for camber, caster and toe-in. Refer to **WHEEL ALIGNMENT**

SERVICE PROCEDURES (Continued)

SPECIFICATIONS in this section of this service manual group.

(4) If the rear alignment is out of specification, adjust it first before proceeding to the front.

CAMBER AND CASTER

Front and rear camber and caster settings on this vehicle are determined at the time the vehicle is designed, by the location of the vehicle's suspension components. This is referred to as Net Build. The result is no required adjustment of camber and caster after the vehicle is built or when servicing the suspension components. Thus, when performing a wheel alignment, caster and camber are not normally considered adjustable angles. Camber and caster should be checked to ensure they meet vehicle specifications.

If either front or rear camber is found not to meet alignment specifications, it can be adjusted using an available camber adjustment bolt package. Before installing a camber adjustment bolt package on a vehicle found to be outside the specifications, inspect the suspension components for any signs of damage or bending.

No adjustment can be made to the caster setting on this vehicle. If the vehicle's caster is not within alignment specifications, check for damaged suspension components or body parts.

CAUTION: Do not attempt to adjust the vehicles wheel alignment by heating or bending any of the suspension components.

CAMBER ADJUSTMENT BOLT PACKAGE INSTALLATION

NOTE: The following procedure should only be used on vehicles without the ACR competition package.

The camber adjustment bolt package contains new bolts and nuts for attaching the strut clevis bracket to the steering knuckle. The bolts contained in the package are slightly undersize allowing for movement between the strut clevis bracket and the steering knuckle. The movement allowed by the undersize bolts provide approximately two degrees of camber adjustment per side of the vehicle. To install and adjust the camber adjustment bolt package, follow the procedure below.

CAUTION: There are separate camber adjustment bolt packages for the front and rear of the vehicle. Be sure to use the correct package.

(1) Raise the vehicle until its tires are not supporting the weight of the vehicle.

CAUTION: The knuckle to strut assembly attaching bolt shanks are serrated and must not be turned during removal. Remove the nuts while holding the bolts stationary.

(2) Remove the original upper bolt attaching the strut clevis bracket to the knuckle (Fig. 2) (Fig. 3).

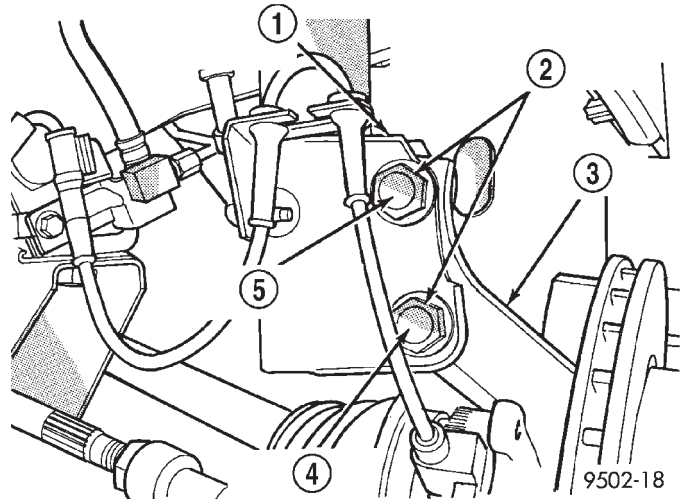


Fig. 2 Front Strut Clevis Bracket Attaching Bolts

- 1 - STRUT CLEVIS BRACKET
- 2 - STRUT CLEVIS BRACKET TO STEERING KNUCKLE ATTACHING BOLTS
- 3 - STEERING KNUCKLE
- 4 - LOOSEN THIS BOLT
- 5 - REMOVE AND REPLACE THIS BOLT

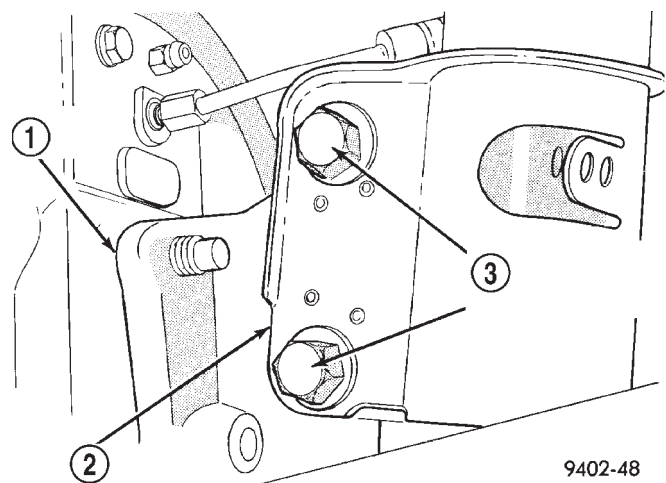


Fig. 3 Rear Strut Clevis Bracket Attaching Bolts

- 1 - KNUCKLE
- 2 - STRUT ASSEMBLY CLEVIS BRACKET
- 3 - CLEVIS BRACKET TO KNUCKLE ATTACHING BOLTS

(3) Install a bolt from the adjustment package into the hole where the original bolt was removed. Install the bolt from the rear.

SERVICE PROCEDURES (Continued)

(4) Install a nut provided in adjustment package on the replacement bolt. Tighten the nut until it's snug, but still allowing the knuckle to slide in the clevis bracket.

(5) Remove the original lower bolt.

(6) Install a bolt from the adjustment package into the bottom hole of the strut clevis bracket. Install the bolt from the rear.

(7) Install a nut provided in adjustment package on the replacement bolt. Tighten the nut until it's snug.

(8) Reinstall the tire and wheel assembly.

(9) Perform the above procedure to any of the remaining struts as required.

(10) Lower the vehicle and jounce the front and rear of the vehicle.

(11) Adjust the front or rear camber to the preferred setting by pushing or pulling on the top of the tire. When camber is set to specifications, tighten the upper and lower strut clevis bracket bolts. Again jounce the front and rear of the vehicle, then verify the camber settings.

(12) Torque front strut clevis bracket-to-steering knuckle attaching bolts to 53 N·m (40 ft. lbs.), plus an additional 1/4 turn after the torque is met. Torque the rear strut clevis bracket-to-rear knuckle attaching bolts to 95 N·m (70 ft. lbs.).

(13) Once camber is within specifications, adjust toe to meet the preferred specification setting. Refer to TOE within this wheel alignment service procedure.

TOE

(1) Center the steering wheel and lock it in place using a steering wheel clamp.

NOTE: When performing the toe setting procedure, make sure the rear toe is set to the preferred specification before setting the front toe to the preferred specification.

REAR TOE

(1) Loosen the nuts on the left and right rear lateral link attaching bolts at the rear crossmember as necessary to allow rotation of the rear toe adjustment cams (Fig. 4).

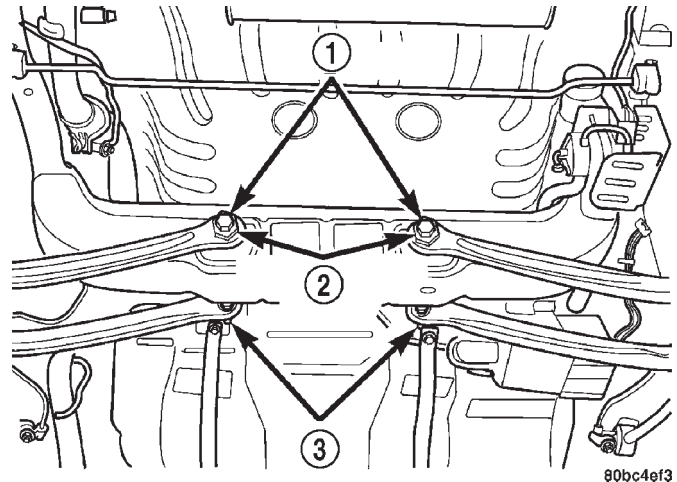


Fig. 4 Adjustment Cams

- 1 - BOLTS
- 2 - ADJUSTMENT CAMS
- 3 - NUTS

CAUTION: When adjusting rear toe, the notches on the toe adjustment cams are not to be facing down. The notches in the adjustment cams are only to be facing up or toward one side.

(2) Rotate each toe adjustment cam until the preferred rear toe specification is obtained (Fig. 4). Refer to WHEEL ALIGNMENT SPECIFICATIONS in this section of this service manual group.

(3) While holding the toe adjustment cams from turning, tighten the attaching bolt nuts. This will securely hold the adjustment cams in position. Tighten the attaching bolt nuts to a torque of 88 N·m (65 ft. lbs.).

(4) Proceed to FRONT TOE to set the front toe.

FRONT TOE

CAUTION: Do not twist the inner tie rod-to-steering gear rubber boots while turning the inner tie rod during the front toe adjustment.

(1) Loosen the tie rod adjusting jam nuts (Fig. 5). Grasp each inner tie rod at its hex and rotate it one way or the other until the front wheel toe is set to the preferred specification. Refer to WHEEL ALIGNMENT SPECIFICATIONS in this section of this service manual group.

SERVICE PROCEDURES (Continued)

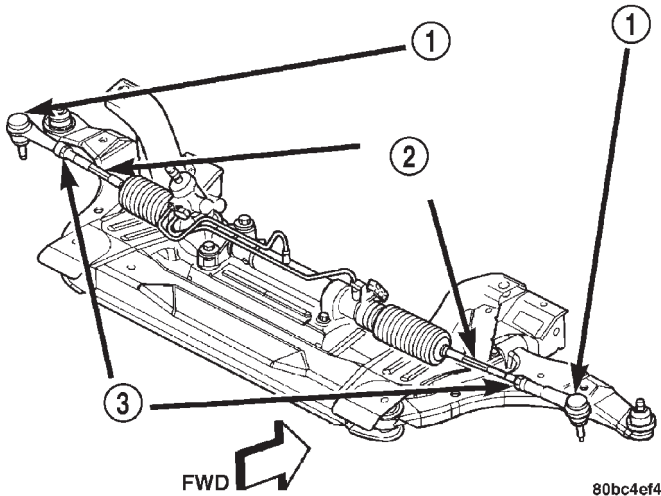


Fig. 5 Jam Nuts

- 1 - OUTER TIE ROD
- 2 - INNER TIE ROD HEX
- 3 - JAM NUT

(2) Tighten tie rod adjusting jam nuts to a torque of 75 N·m (55 ft. lbs.).

(3) Make sure the inner tie rod-to-steering gear rubber boots are not twisted. If twisted, loosen the boot clamp at the inner tie rod and move the boot as necessary.

(4) Remove steering wheel clamp.

(5) Remove the alignment equipment.

(6) Road test the vehicle to verify the steering wheel is straight and the vehicle does not pull or wander.

SPECIFICATIONS

WHEEL ALIGNMENT SPECIFICATIONS

NOTE: All specifications are given in degrees.

NOTE: All wheel alignments are to be set with the vehicle at curb height. Refer to CURB HEIGHT MEASUREMENT in SERVICE PROCEDURES.

FRONT WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
CAMBER	0.00°	-0.40° to +0.40°
Cross Camber (Maximum Side-To-Side Difference)	0.00°	0.50
CASTER	+2.60°	+1.60° to +3.60°
Cross Caster (Maximum Side-To-Side Difference)	0.00°	1.00°
TOTAL TOE*	+0.10°	-0.10° to +0.30°
REAR WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
CAMBER	-0.25°	-0.65° to +0.15°
TOTAL TOE*	+0.30°	+0.10° to +0.50°
THRUST ANGLE	0.00°	-0.10° to +0.10°

Note:

* TOTAL TOE is the sum of both the left and right wheel toe settings. TOTAL TOE must be equally split between each front wheel to ensure the steering wheel is centered after setting toe. Positive toe (+) is toe-in and negative toe (-) is Toe-out.

FRONT SUSPENSION

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DESCRIPTION AND OPERATION

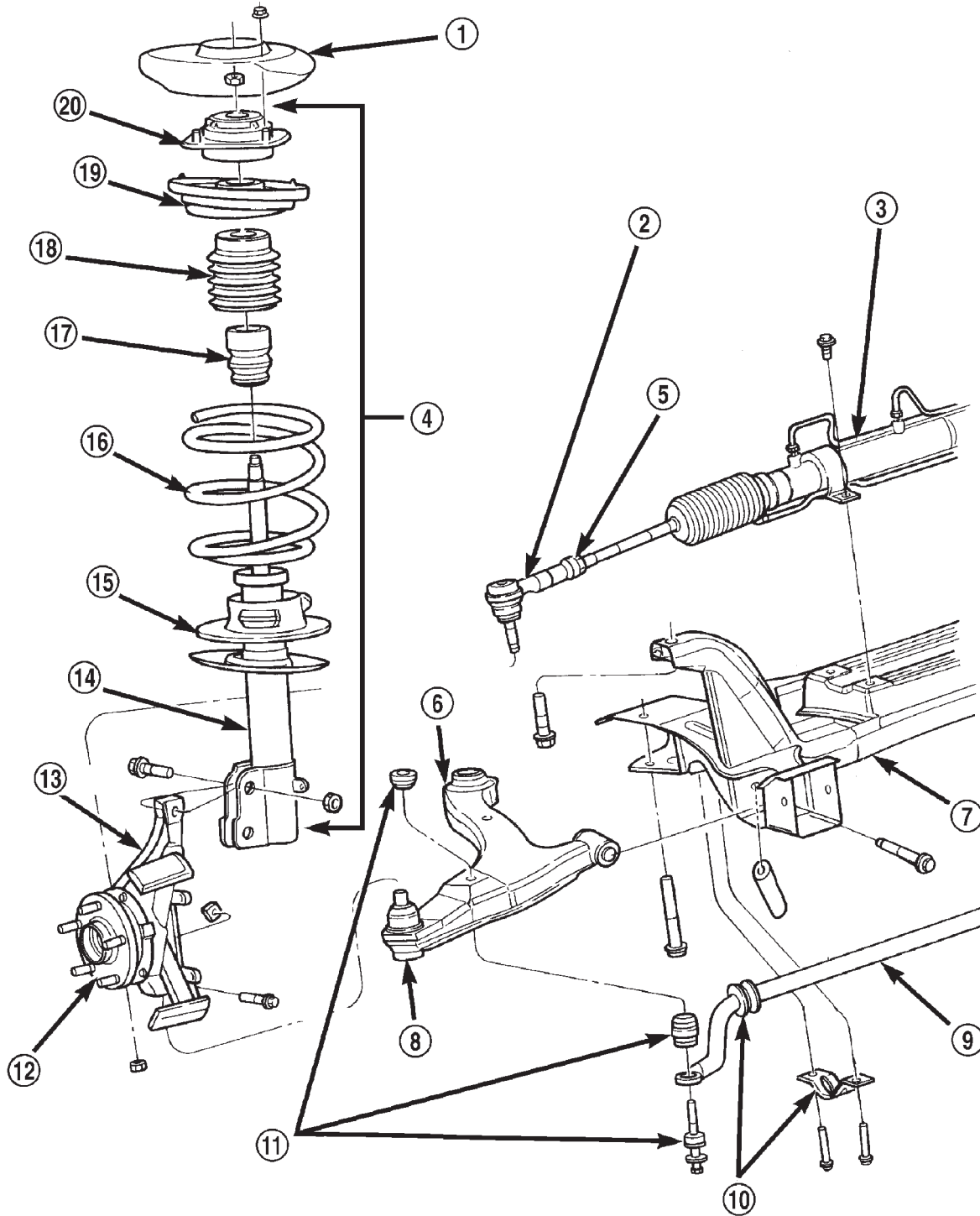
FRONT SUSPENSION SYSTEM

The front suspension allows each front wheel on a vehicle to adapt to different road surfaces and conditions without greatly affecting the opposite wheel and the ability to control the vehicle. Each side of the front suspension is allowed to pivot so the vehicle can be steered in the direction preferred.

This vehicle has a gas pressurized MacPherson strut type front suspension design (Fig. 1).

A strut assembly is used in place of the front suspension upper control arm and upper ball joint. When a vehicle strikes a bump, the force is transferred through the hub, bearing, and knuckle, into the strut assembly to absorb the force and dampen it. The top of the strut is mounted directly to the strut tower of the vehicle. During steering maneuvers, the strut assembly (through a pivot bearing in the upper strut mount) and steering knuckle (through the lower ball joint mounted on the lower control arm) turn as an assembly.

DESCRIPTION AND OPERATION (Continued)



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Fig. 1 Front Suspension System

DESCRIPTION AND OPERATION (Continued)

1 – VEHICLE STRUT TOWER	11 – STABILIZER BAR LINK
2 – OUTER TIE ROD	12 – HUB
3 – STEERING GEAR	13 – KNUCKLE
4 – STRUT ASSEMBLY	14 – STRUT
5 – JAM NUT	15 – LOWER SPRING ISOLATOR
6 – LOWER CONTROL ARM	16 – COIL SPRING
7 – CROSSMEMBER	17 – JOUNCE BUMPER
8 – BALL JOINT	18 – DUST SHIELD
9 – STABILIZER BAR	19 – SPRING SEAT AND BEARING
10 – STABILIZER BAR CUSHION AND RETAINER	20 – UPPER MOUNT

For more information on the description and operation of an individual component, refer to the applicable component heading in this section.

STRUT ASSEMBLY (FRONT)

A Macpherson type design strut assembly is used in place of the front suspension upper control arm and upper ball joint (Fig. 1). The bottom of the strut mounts directly to the steering knuckle using 2 attaching bolts and nuts going through the strut clevis bracket and steering knuckle. The top of the strut mounts directly to the strut tower of the vehicle using the three threaded studs on the strut assemblies upper mount. During steering maneuvers, the strut assembly (through a pivot bearing in the upper strut mount) and steering knuckle (through the lower ball joint) turn as an assembly. The strut assembly is used to dampen the front suspension and smooth the ride of the vehicle.

The strut assembly includes the following components: A rubber isolated upper mount, an upper spring seat and bearing, a dust shield, a jounce bumper, a coil spring, a lower spring isolator and a strut (Fig. 1). Each component is serviced by removing the strut assembly from the vehicle and disassembling it.

COIL SPRING

The strut and front suspension of the vehicle is supported by coil springs positioned around the upper half of each strut. The springs are contained between the upper and the lower seats of the strut assembly.

Coil springs are rated separately for each corner or side of the vehicle depending on optional equipment and type of vehicle service. During service procedures of the strut assembly, if both springs are removed, mark the springs to ensure installation in its original position.

NOTE: If a coil spring requires replacement, be sure that it is replaced with a spring meeting the correct load rating for the vehicle and its specific options.

STEERING KNUCKLE

The steering knuckle is a single casting with legs machined for attachment to the front strut assembly on the top and the lower control arm ball joint on the bottom (Fig. 1). The steering knuckle also has machined abutments on the casting to support and align the front brake caliper assembly.

WHEEL BEARING AND HUB

The knuckle also supports the wheel bearing and hub (Fig. 1). The wheel hub is pressed into a sealed for life wheel bearing that is pressed into the steering knuckle. A retainer plate also holds it in place. The hub supports the driveshaft outer constant velocity (C/V) joint. Each is splined and meshes in the center of the hub. The outer C/V joint is retained to the hub using a nut. The nut is held on the outer C/V stub shaft using a nut retainer and cotter pin.

The wheel bearing is a Unit 1 type cartridge bearing that requires no maintenance. The wheel bearing is serviced separately from the hub.

LOWER CONTROL ARM

There is one lower control arm on each side of the vehicle. Each lower control arm is a stamped steel unit using rubber isolated pivot bushings to isolate it from the front suspension crossmember and frame of the vehicle (Fig. 1). The rear bushing can be serviced separately.

The front of the lower control arm is bolted to the front crossmember using a bolt through the center of the rubber pivot bushing. The rear of the lower control arm is mounted to both the front crossmember and the frame rail of the vehicle using a thru-bolt. The thru-bolt goes through both the crossmember and rear lower control arm bushing, threading directly into the frame rail of the vehicle.

The left and right lower control arms are interconnected through a linked rubber isolated stabilizer bar.

The outboard end of each lower control arm connects to the steering knuckle using a ball joint.

DESCRIPTION AND OPERATION (Continued)

BALL JOINT

The lower control arm connects to the steering knuckle through a ball joint mounted at the outboard end of the arm (Fig. 1). The ball joint is pressed into the lower control arm and has a non-tapered stud with a notch for steering knuckle pinch bolt clearance. The ball joint stud is clamped and locked to the steering knuckle lower leg using a pinch bolt.

The ball joint is lubricated for life during the manufacturing process. Once lubricated for life, the grease fitting head is snapped off by the manufacturer. This is done to eliminate the possibility of lubrication later in the ball joints life thus damaging the non-vented ball joint seal boot.

The ball joint used on this vehicle is replaceable and, if found defective, can be serviced as a separate component of the lower control arm.

STABILIZER BAR (FRONT)

The stabilizer bar helps control vehicle body roll. Jounce and rebound movements affecting one wheel are partially transmitted to the opposite wheel of the vehicle to stabilize body roll.

The stabilizer bar interconnects both front lower control arms of the vehicle and is attached to the front suspension crossmember (Fig. 1).

Attachment of the stabilizer bar to the front suspension crossmember is through 2 rubber-isolator cushion and retainers (Fig. 1). The stabilizer bar attachment to the lower control arm is done by utilizing an isolated stabilizer bar link at each arm. All components of the stabilizer bar are serviceable.

DIAGNOSIS AND TESTING**STRUT ASSEMBLY (FRONT)**

Inspect the strut assembly for the following conditions (Fig. 3):

- Inspect for a damaged or broken coil spring.
- Inspect for a torn or damaged strut assembly dust shield.

- Lift the dust shield and inspect the strut assembly for evidence of fluid running from the upper end of the strut fluid reservoir. (Actual leakage will be a stream of fluid running down the side and dripping off lower end of unit.) A slight amount of seepage between the strut shaft and strut shaft seal is not unusual and does not affect performance of the strut assembly.

- Lift the dust shield and inspect the jounce bumper for signs of damage or deterioration.

- Inspect the clearance between the shock tower and the coil spring. Make sure no fasteners are protruding through the shock tower possibly contacting the coil spring and strut. Because of the minimum clearance in this area (Fig. 2), installation of metal fasteners could damage the coil spring coating and lead to a corrosion failure of the spring.

CAUTION: At no time when servicing a vehicle can a sheet metal screw, bolt or other metal fastener be installed into the shock tower to take the place of an original plastic clip. Also, do not drill holes into the front shock tower for the installation of any metal fasteners into the shock tower area indicated (Fig. 2).

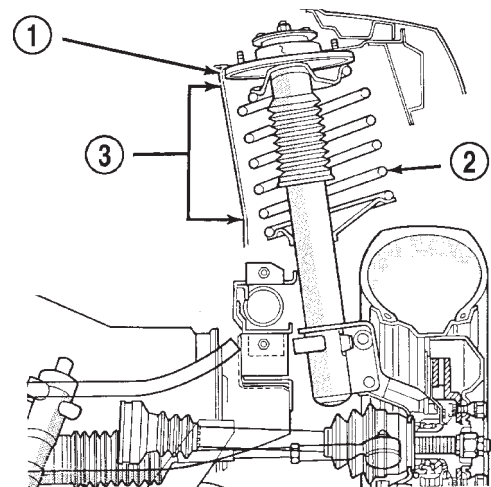


Fig. 2 Shock Tower Area (Typical)

- 1 - SHOCK TOWER
- 2 - COIL SPRING
- 3 - NO SHEET METAL SCREWS, BOLTS, OR ANY OTHER METAL FASTENERS ARE TO BE INSTALLED INTO SHOCK TOWER IN THIS AREA. ALSO, NO HOLES ARE TO BE DRILLED INTO SHOCK TOWER IN THIS SAME AREA.

DIAGNOSIS AND TESTING (Continued)

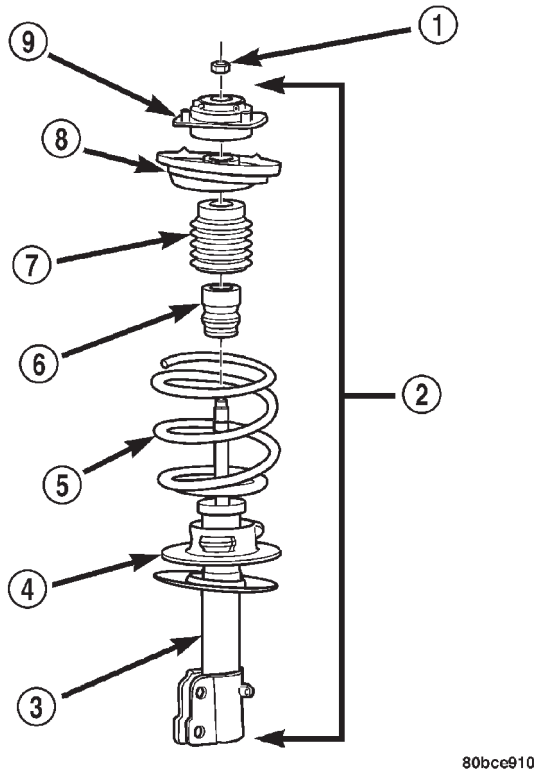


Fig. 3 Strut Assembly

- 1 - NUT
- 2 - STRUT ASSEMBLY
- 3 - STRUT
- 4 - LOWER SPRING ISOLATOR
- 5 - COIL SPRING
- 6 - JOUNCE BUMPER
- 7 - DUST SHIELD
- 8 - SPRING SEAT AND BEARING (WITH SPRING ISOLATOR)
- 9 - UPPER MOUNT

STEERING KNUCKLE

The front suspension steering knuckle is not a repairable component of the front suspension. It must be replaced if found to be damaged in any way. If it is determined that the steering knuckle is bent when servicing the vehicle, no attempt is to be made to straighten the steering knuckle.

WHEEL BEARING AND HUB

The wheel bearing is designed for the life of the vehicle and requires no type of periodic maintenance. The following procedure may be used for diagnosing the condition of the wheel bearing and hub.

With the wheel, disc brake caliper, and brake rotor removed, rotate the wheel hub. Any roughness or resistance to rotation may indicate dirt intrusion or a failed hub bearing. If the bearing exhibits any of these conditions during diagnosis, the hub bearing will require replacement. The bearing is not serviceable.

Damaged bearing seals and the resulting excessive grease loss may also require bearing replacement. Moderate grease weepage from the bearing is considered normal and should not require replacement of the wheel bearing.

To diagnose a bent hub, refer to BRAKE ROTOR in the DIAGNOSIS AND TESTING section in the BRAKES service manual group for the procedure on measuring hub runout.

LOWER CONTROL ARM

Inspect the lower control arm for signs of damage from contact with the ground or road debris. If the lower control arm shows any sign of damage, look for distortion. Do not attempt to repair or straighten a broken or bent lower control arm. If damaged, the lower control arm stamping is serviced only as a complete component.

The serviceable components of the lower control arm are: the ball joint, the ball joint grease seal and the lower control arm rear isolator bushing.

Inspect both lower control arm isolator bushings for severe deterioration and replace as required. Inspect the ball joint per the inspection procedure in this section of the service manual and replace as required. Refer to BALL JOINT in this section of this service manual group.

BALL JOINT

With the weight of the vehicle resting on the road wheels, grasp the headless grease fitting as shown (Fig. 4). With no mechanical assistance or added force, attempt to move the grease fitting. If the ball joint is worn, the grease fitting will move. If movement is noted, replace the ball joint.

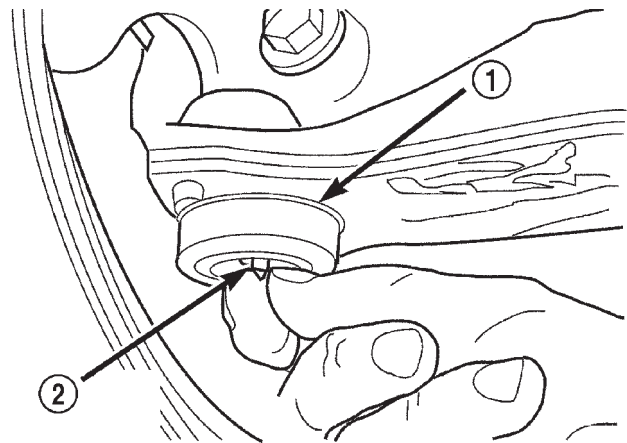


Fig. 4 Checking Ball Joint Wear

- 1 - BALL JOINT
- 2 - HEADLESS GREASE FITTING

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DIAGNOSIS AND TESTING (Continued)

CAUTION: No attempt should be made to service the headless grease fitting on the ball joint. It has been purposely snapped off by the manufacturer to avoid over-greasing.

STABILIZER BAR (FRONT)

Inspect for broken, cracked or distorted stabilizer bar cushions and retainers. Inspect for worn or damaged stabilizer bar links (Fig. 1).

SERVICE PROCEDURES

LUBRICATION

There are no serviceable lubrication points on the front suspension. The front lower ball joints have grease fittings which have had the head snapped off by the manufacturer after they have been filled. This has been done to eliminate the possibility of damaging the non-vented seals. Grease will not leak from the broken grease fittings. The ball joints are sealed for life and require no maintenance.

CAUTION: No attempt should be made to replace the ball joint grease fitting with a new fitting, then filling the ball joint with grease. Damage to the grease seal can result.

REMOVAL AND INSTALLATION

SERVICE WARNINGS AND CAUTIONS

WARNING: DO NOT REMOVE THE STRUT SHAFT NUT WHILE STRUT ASSEMBLY IS INSTALLED IN VEHICLE, OR BEFORE THE COIL SPRING IS COMPRESSED WITH A COMPRESSION TOOL. THE SPRING IS HELD UNDER HIGH PRESSURE.

CAUTION: Only frame contact hoisting equipment can be used on this vehicle. All vehicles have a fully independent rear suspension. The vehicles cannot be hoisted using equipment designed to lift a vehicle by the rear axle. If this type of hoisting equipment is used, damage to rear suspension components will occur.

CAUTION: At no time when servicing a vehicle can a sheet metal screw, bolt, or other metal fastener be installed in the shock tower to take the place of an original plastic clip. It may come into contact with the strut or coil spring.

CAUTION: Wheel bearing damage will result if after loosening the hub nut, the vehicle is rolled on the ground or the weight of the vehicle is allowed to be supported by the tires for a length of time.

STRUT ASSEMBLY (FRONT)

NOTE: Before proceeding with this procedure, review **SERVICE WARNINGS AND CAUTIONS** at the beginning of **REMOVAL AND INSTALLATION** in this section.

REMOVAL

(1) Raise the vehicle. Refer to **HOISTING** in the **LUBRICATION AND MAINTENANCE** group for the proper lifting procedure.

(2) Remove tire and wheel assembly from location on front of vehicle requiring strut removal.

(3) If both strut assemblies are to be removed, mark the strut assemblies right or left according to which side of the vehicle they were removed from.

(4) Remove the screw securing the ground strap to the rear of the strut (Fig. 5).

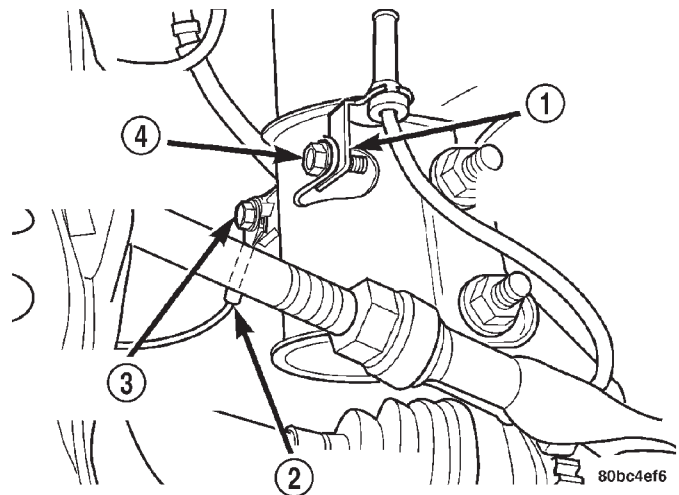


Fig. 5 Ground Strap And ABS Sensor Bracket

- 1 - ABS WHEEL SPEED SENSOR ROUTING BRACKET (IF EQUIPPED)
- 2 - GROUND STRAP
- 3 - GROUND STRAP SCREW
- 4 - ABS SENSOR BRACKET SCREW (IF EQUIPPED)

(5) If the vehicle is equipped with Antilock brakes (ABS), remove the screw securing the ABS wheel speed sensor to the rear of the strut (Fig. 5).

CAUTION: The strut assembly-to-steering knuckle attaching bolts are serrated and must not be turned during removal. Hold the bolts stationary in the steering knuckle while removing the nuts, then tap the bolts out using a pin punch.

REMOVAL AND INSTALLATION (Continued)

(6) Remove the two bolts attaching the strut to the steering knuckle (Fig. 1).

(7) Lower the vehicle just enough to open the hood, but without letting the tires touch the floor.

(8) Remove the three nuts attaching the upper mount of the strut assembly to the vehicle's strut tower (Fig. 6).

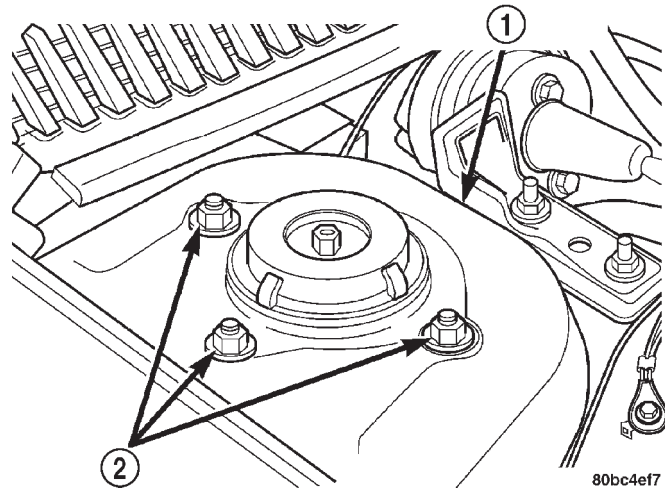


Fig. 6 Upper Mounting Nuts

- 1 - STRUT TOWER
- 2 - MOUNTING NUTS

(9) Remove the strut assembly from the vehicle.

(10) For disassembly and assembly procedures, refer to STRUT ASSEMBLY in the DISASSEMBLY AND ASSEMBLY section in this section of this service manual group.

INSTALLATION

(1) Install the strut assembly into the strut tower, aligning the three studs on the strut upper mount with the holes in strut tower. Install the three mounting nuts on the studs (Fig. 6). Tighten the three nuts to a torque of 34 N·m (300 in. lbs.).

(2) Close the hood of the vehicle.

CAUTION: The strut assembly-to-steering knuckle attaching bolts are serrated and must not be turned during installation. Install the nuts while holding the bolts stationary in the steering knuckle.

(3) Position the lower end of the strut assembly in line with the upper end of the steering knuckle and align the mounting holes (Fig. 1). Install the two attaching bolts. The bolts should be installed with so that the nuts face towards the front of the vehicle once installed. Install the nuts. Holding the bolts in place tighten the nuts to a torque of 53 N·m (40 ft. lbs.) plus an additional 90° turn after the specified torque is met.

(4) If the vehicle is equipped with Antilock brakes (ABS), attach the ABS wheel speed sensor to the rear of the strut (rearward ear) using its mounting screw (Fig. 5). Tighten the mounting screw to a torque of 13 N·m (120 in. lbs.).

(5) Attach the ground strap to the rear of the strut (forward ear) using its mounting screw (Fig. 5). Tighten the mounting screw to a torque of 13 N·m (120 in. lbs.).

(6) Install the tire and wheel assembly. Install and tighten the wheel mounting nuts in proper sequence until all nuts are torqued to half specification. Next, repeat the tightening sequence to the full specified torque of 135 N·m (100 ft. lbs.).

(7) Lower the vehicle.

STEERING KNUCKLE

NOTE: Before proceeding with this procedure, review SERVICE WARNINGS AND CAUTIONS at the beginning of REMOVAL AND INSTALLATION in this section.

REMOVAL

- (1) Apply the brakes and hold in place.
- (2) Raise the vehicle. Refer to HOISTING in the LUBRICATION AND MAINTENANCE group for the proper lifting procedure.
- (3) Remove the front tire and wheel assembly.
- (4) While the brakes are applied, loosen and remove the hub nut on the end of the driveshaft (Fig. 7).

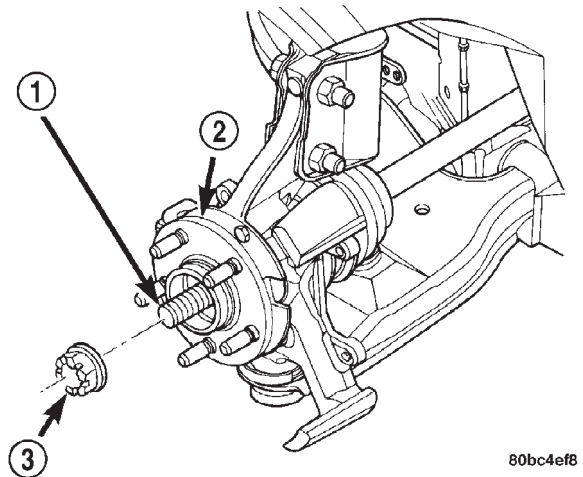


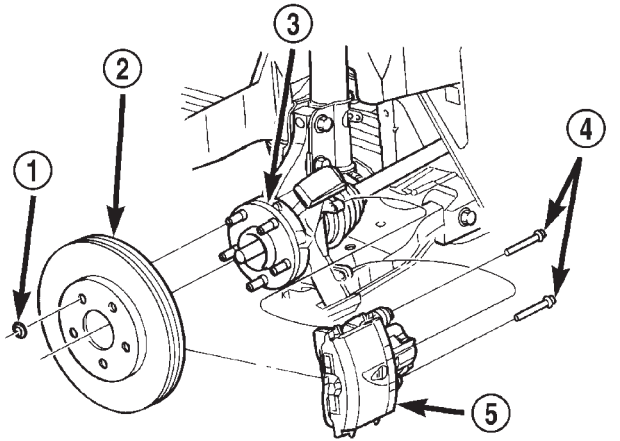
Fig. 7 Hub Nut

- 1 - DRIVESHAFT
- 2 - HUB
- 3 - HUB NUT

(5) Release the brakes.

REMOVAL AND INSTALLATION (Continued)

(6) Remove the two guide pin bolts securing the front disc brake caliper to the steering knuckle (Fig. 8).



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Fig. 8 Brake Caliper And Rotor

- 1 - RETAINER CLIP
- 2 - BRAKE ROTOR
- 3 - HUB
- 4 - GUIDE PIN BOLTS
- 5 - DISC BRAKE CALIPER

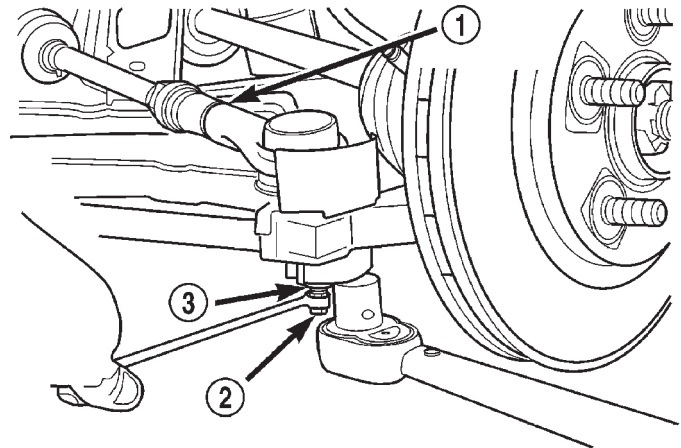
(7) Remove the disc brake caliper from the steering knuckle. The caliper is removed by first tipping either the top (right side) or bottom (left side) of the caliper away from the brake rotor, then pulling the caliper off the opposite end's caliper slide (on the knuckle) and rotor.

(8) Hang the caliper out of the way using a wire hanger or cord. Do not support the caliper by letting it hang by the hydraulic hose.

(9) Remove any retainer clips from the wheel mounting studs. Remove the brake rotor from the front hub (Fig. 8).

(10) Remove the nut attaching the outer tie rod to the steering knuckle. To do this, hold the tie rod end stud with a wrench while loosening and removing the nut with a standard wrench or crowfoot wrench (Fig. 9).

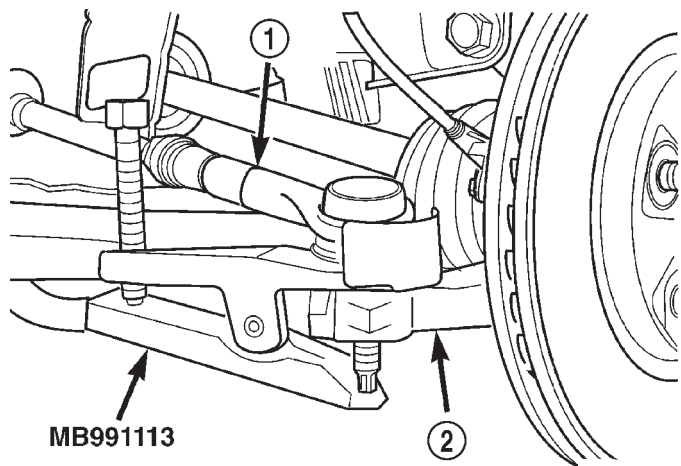
(11) Remove the tie rod end from the steering knuckle using Remover, Special Tool MB991113 (Fig. 10).



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Fig. 9 Tie Rod Nut Removal/Installation

- 1 - OUTER TIE ROD
- 2 - STUD
- 3 - NUT



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Fig. 10 Tie Rod Removal

- 1 - OUTER TIE ROD
- 2 - STEERING KNUCKLE

REMOVAL AND INSTALLATION (Continued)

- (12) Remove the tie rod heat shield.
- (13) Remove the nut and pinch bolt clamping the ball joint stud to the steering knuckle (Fig. 11).

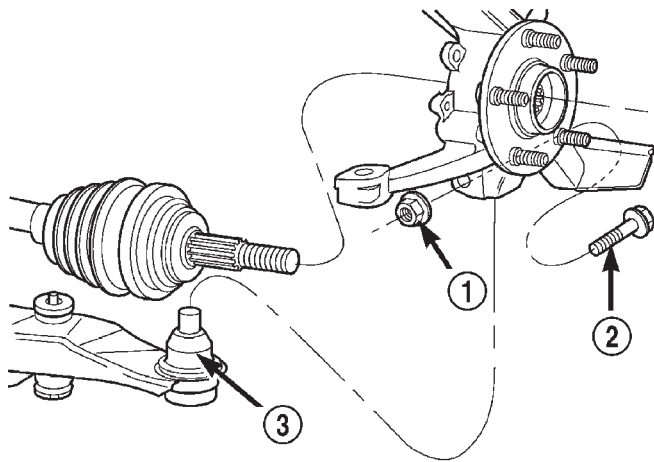


Fig. 11 Ball Joint Bolt And Nut

- 1 - NUT
- 2 - BOLT
- 3 - BALL JOINT

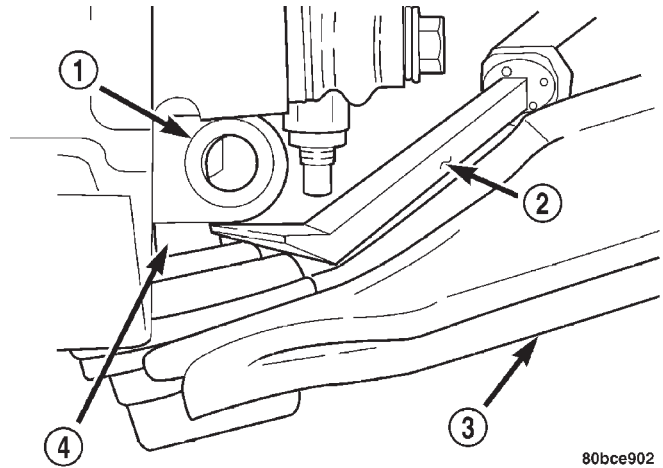


Fig. 12 Separate Ball Joint from Knuckle

- 1 - STEERING KNUCKLE
- 2 - PRY BAR
- 3 - LOWER CONTROL ARM
- 4 - BALL JOINT STUD

CAUTION: The strut assembly-to-steering knuckle attaching bolts are serrated and must not be turned during removal. Hold the bolts stationary in the steering knuckles while removing the nuts, then tap the bolts out using a pin punch.

(14) Remove the two bolts attaching the strut to the steering knuckle (Fig. 1).

NOTE: Use caution when separating the ball joint stud from the steering knuckle, so the ball joint seal does not get cut.

(15) Separate the ball joint stud from the steering knuckle by prying down on lower control arm and up against the ball joint boss on the steering knuckle (Fig. 12).

NOTE: Do not allow the driveshaft to hang by the inner C/V joint; it must be supported to keep the joint from separating during this operation.

(16) Pull the steering knuckle off the driveshaft outer C/V joint splines and remove the steering knuckle.

NOTE: The cartridge type front wheel bearing used on this vehicle is not transferable to the replacement steering knuckle. If the replacement steering knuckle does not come with a wheel bearing, a new bearing must be installed in the steering knuckle. Installation of the new wheel bearing and hub must

be done before installing the steering knuckle on the vehicle.

(17) If the steering knuckle is to be replaced, refer to STEERING KNUCKLE in the DISASSEMBLY AND ASSEMBLY section in this section of this service manual group for the wheel bearing and hub removal and installation procedure. Do not reuse the wheel bearing

INSTALLATION

(1) If the steering knuckle has been replaced, refer to STEERING KNUCKLE in DISASSEMBLY AND ASSEMBLY found in this section of this service manual group for the wheel bearing and hub installation procedure. Do not reuse the old wheel bearing.

(2) Slide the hub of the steering knuckle onto the splines on the driveshaft C/V joint.

(3) Install the steering knuckle onto the ball joint stud aligning the bolt hole in the knuckle boss with the notch formed in the side of the ball joint stud.

(4) Install a new ball joint stud pinch bolt and nut (Fig. 11). Tighten the nut to a torque of 95 N·m (70 ft. lbs.).

CAUTION: The strut assembly-to-steering knuckle attaching bolts are serrated and must not be turned during installation. Install the nuts while holding the bolts stationary in the steering knuckle.

(5) Position the lower end of the strut assembly in line with the upper end of the steering knuckle and align the mounting holes (Fig. 1). Install the two attaching bolts. The bolts should be installed with so that the nuts face towards the front of the vehicle

REMOVAL AND INSTALLATION (Continued)

once installed. Install the nuts. Holding the bolts in place tighten the nuts to a torque of 53 N·m (40 ft. lbs.) plus an additional 90° turn after the specified torque is met.

(6) Place the tie rod heat shield on the steering knuckle arm so that the shield is positioned straight away from the steering gear and tie rod end once installed. Align the hole in the shield with the hole in the steering knuckle arm.

(7) Install the outer tie rod ball stud into the hole in the steering knuckle arm. Start the tie rod attaching nut onto the stud. Hold the tie rod end stud with a wrench while tightening the nut with a standard wrench or crowfoot wrench (Fig. 9). To fully tighten the nut to specifications, use a crowfoot wrench on a torque wrench to turn the nut, and a wrench on the stud. Tighten the nut to a torque of 55 N·m (40 ft. lbs.).

(8) Install the brake rotor on the hub (Fig. 8).

(9) Install the disc brake caliper (with pads) on the brake rotor and steering knuckle. The left side caliper is installed by first sliding the top of the caliper past the top abutment on the steering knuckle to hook the top edge of the caliper, then pushing the lower end of the caliper into place against the knuckle (Fig. 13). The right side caliper is installed by first sliding the bottom edge of the caliper past the lower abutment on the steering knuckle to hook the lower edge of the caliper, then pushing the top of the caliper into place against the steering knuckle.

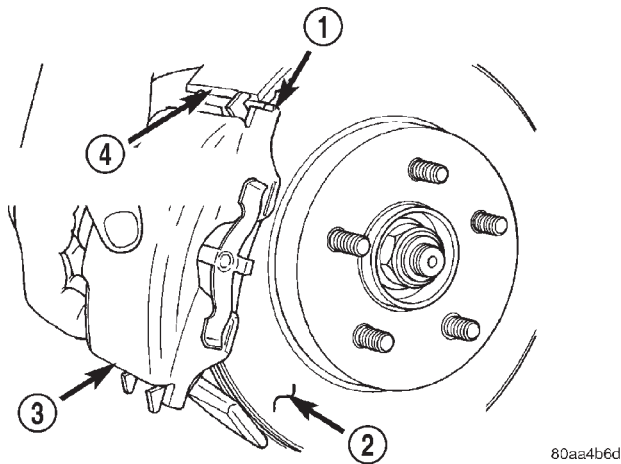


Fig. 13 Brake Caliper Installation

- 1 - SLIDE TOP OF BRAKE CALIPER UNDER TOP ABUTMENT OF STEERING KNUCKLE AS SHOWN
- 2 - BRAKING DISC
- 3 - DISC BRAKE CALIPER
- 4 - STEERING KNUCKLE BRAKE ABUTMENT

(10) Install the two guide pin bolts securing the front disc brake caliper to the steering knuckle (Fig. 8). Tighten the guide pin bolts to a torque of 22 N·m (192 in. lbs.).

(11) Clean all foreign matter from the threads of the driveshaft outer C/V joint (Fig. 7).

(12) Install the hub nut in the end of the driveshaft and snug it.

(13) Have a helper apply the brakes. With vehicle brakes applied to keep brake rotor and hub from turning, tighten the hub nut to a torque of 244 N·m (180 ft. lbs.).

(14) Install the tire and wheel assembly. Install the wheel mounting nuts and tighten them to a torque of 135 N·m (100 ft. lbs.).

(15) Lower the vehicle.

(16) Set the front toe on the vehicle to required specification. Refer to WHEEL ALIGNMENT in this service manual group.

LOWER CONTROL ARM

NOTE: Before proceeding with this procedure, review **SERVICE WARNINGS AND CAUTIONS** at the beginning of **REMOVAL AND INSTALLATION** in this section.

REMOVAL

(1) Raise the vehicle. Refer to **HOISTING** in the **LUBRICATION AND MAINTENANCE** group for the proper lifting procedure.

(2) Remove the front tire and wheel assembly.

(3) Remove both stabilizer bar links from the vehicle (Fig. 14). Remove each link by holding the upper retainer/nut with a wrench and turning the link bolt.

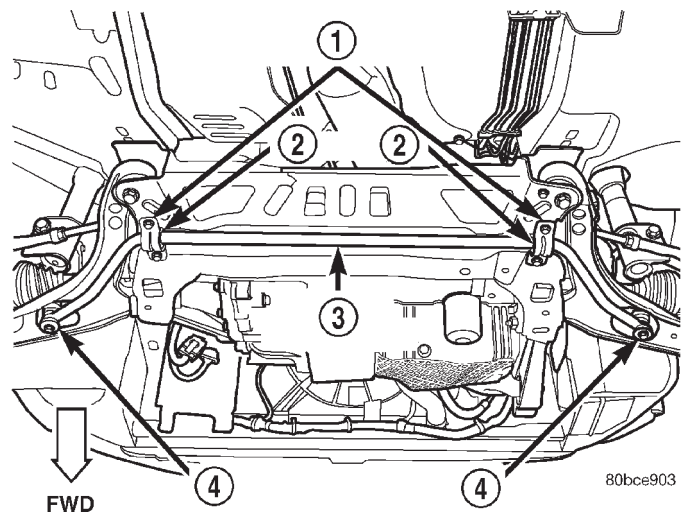


Fig. 14 Stabilizer Bar Links

- 1 - STABILIZER BAR CUSHION RETAINERS
- 2 - CUSHIONS
- 3 - FRONT STABILIZER BAR
- 4 - STABILIZER BAR LINKS

(4) Rotate the forward ends of the stabilizer bar downward. It may be necessary to loosen the stabi-

REMOVAL AND INSTALLATION (Continued)

lizer bar cushion retainer bolts a little to ease any turning resistance.

(5) Remove the nut and pinch bolt clamping the ball joint stud to the steering knuckle (Fig. 15).

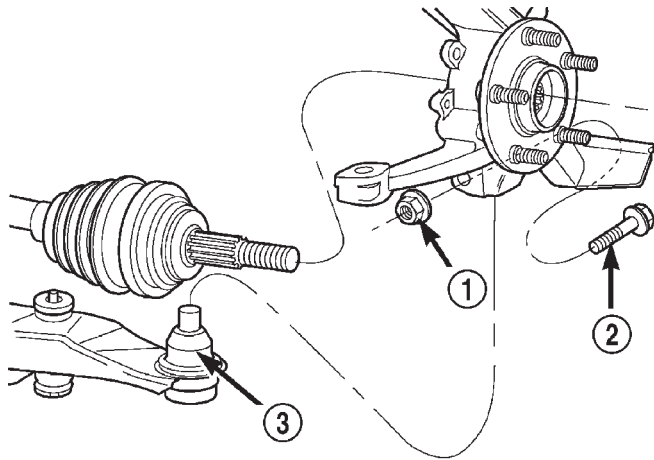


Fig. 15 Ball Joint Bolt And Nut

- 1 - NUT
- 2 - BOLT
- 3 - BALL JOINT

CAUTION: After removing the steering knuckle from the ball joint stud, do not pull outward on the knuckle. Pulling the steering knuckle outward at this point can separate the inner C/V joint on the driveshaft. Refer to FRONT DRIVESHAFTS in the DIFFERENTIAL AND DRIVELINE group for further information.

NOTE: Use caution when separating the ball joint stud from the steering knuckle, so the ball joint seal does not get cut.

(6) Separate the ball joint stud from the steering knuckle by prying down on lower control arm and up against the ball joint boss on the steering knuckle (Fig. 12).

(7) If the right lower control arm is being serviced, remove the bolts mounting the engine torque strut in place (Fig. 16), then remove the engine torque strut from the vehicle.

(8) Remove the front pivot bolt attaching the lower control arm to the front suspension crossmember (Fig. 17). Remove the rear pivot bolt attaching the lower control arm to the front suspension crossmember and frame rail. Remove the lower control arm from the crossmember.

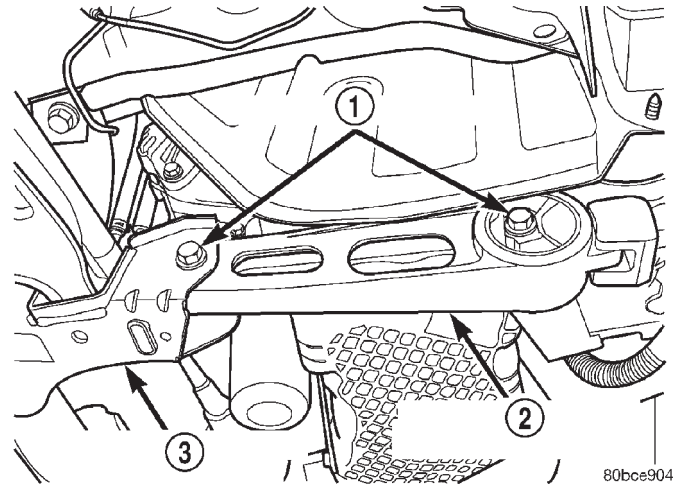


Fig. 16 Engine Torque Strut

- 1 - MOUNTING BOLTS
- 2 - ENGINE TORQUE ISOLATOR STRUT
- 3 - FRONT SUSPENSION CROSSMEMBER

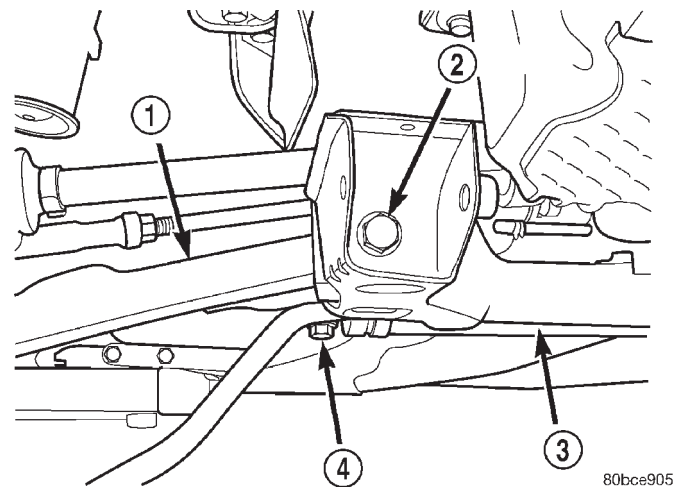


Fig. 17 Lower Control Arm Attaching Bolts

- 1 - LOWER CONTROL ARM
- 2 - FRONT BOLT
- 3 - CROSSMEMBER
- 4 - REAR BOLT

INSTALLATION

(1) Position the lower control arm into the crossmember (Fig. 17). Install, but do not fully tighten, the rear pivot bolt attaching the lower control arm to the front suspension crossmember and frame rail. Install the front pivot bolt attaching the lower control arm to the front suspension crossmember.

(2) Tighten the lower control arm rear pivot (and suspension crossmember) bolt to a torque of 203 N·m (150 ft. lbs.), then tighten the lower control arm front pivot bolt to a torque of 163 N·m (120 ft. lbs.).

(3) Install the ball joint stud into the steering knuckle aligning the bolt hole in the knuckle boss

REMOVAL AND INSTALLATION (Continued)

with the notch formed in the side of the ball joint stud.

(4) If the right lower control arm has been serviced, install the engine torque strut (Fig. 16). Follow the procedure described in the ENGINE service manual group to properly align and tighten the torque strut.

(5) Install a new ball joint stud pinch bolt and nut (Fig. 15). Tighten the nut to a torque of 95 N·m (70 ft. lbs.).

(6) Rotate the forward ends of the stabilizer bar into mounting position.

(7) Install both stabilizer bar links back on vehicle (Fig. 14). Start each stabilizer bar link bolt with bushing from the bottom, through the stabilizer bar, inner link bushings, lower control arm, and into the upper retainer/nut and bushing (Fig. 1). Do not fully tighten the link assemblies at this time.

(8) Lower the vehicle to ground level.

NOTE: It may be necessary to put the vehicle on a platform hoist or alignment rack to gain access to the stabilizer bar mounting bolts with the vehicle at curb height.

(9) Tighten each stabilizer bar link by holding the upper retainer/nut with a wrench and turning the link bolt. Tighten each link bolt to a torque of 23 N·m (200 in. lbs.).

(10) If previously loosened, tighten the stabilizer bar cushion retainer bolts to a torque of 28 N·m (250 in. lbs.).

STABILIZER BAR (FRONT)

NOTE: Before proceeding with this procedure, review SERVICE WARNINGS AND CAUTIONS at the beginning of REMOVAL AND INSTALLATION in this section.

REMOVAL

(1) Raise the vehicle. Refer to HOISTING in the LUBRICATION AND MAINTENANCE group for the proper lifting procedure.

(2) Remove both stabilizer bar links from the vehicle (Fig. 18). Remove each link by holding the upper retainer/nut with a wrench and turning the link bolt.

(3) Remove the stabilizer bar cushion retainer bolts and retainers (Fig. 18), and remove the stabilizer bar with cushions attached from the vehicle.

(4) To remove the cushions from the stabilizer bar, peel back each cushion at the slit and roll it off the bar.

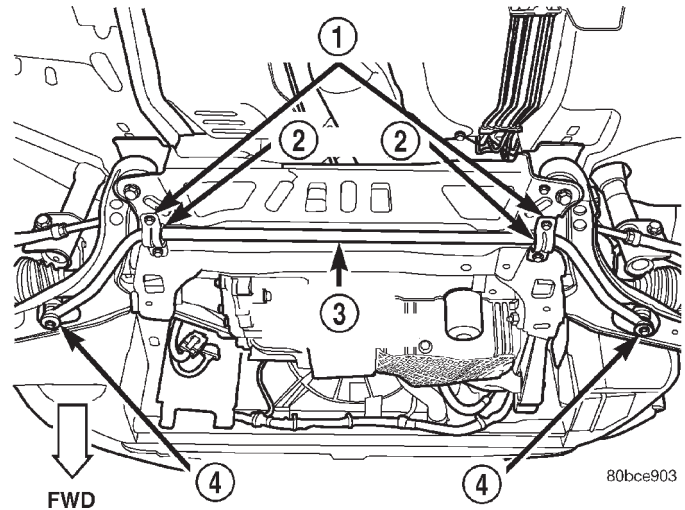


Fig. 18 Stabilizer Bar

- 1 - STABILIZER BAR CUSHION RETAINERS
- 2 - CUSHIONS
- 3 - FRONT STABILIZER BAR
- 4 - STABILIZER BAR LINKS

INSTALLATION

NOTE: Before stabilizer bar installation, inspect the cushions and links for excessive wear, cracks, damage and distortion. Replace any pieces failing inspection.

(1) If removed, install the stabilizer bar cushions on the stabilizer bar utilizing the slit in each cushion. Position the cushions at each end of the bar's straight beam, just before it begins to curve.

NOTE: Before installing the stabilizer bar, make sure the bar is not upside-down. The stabilizer bar must be installed with the curve on the outboard ends of the bar facing downward to clear the control arms once fully installed (Fig. 19).

(2) First, place the stabilizer bar in position on the front suspension crossmember. The slits in each cushion must point toward the front of the vehicle and sit directly on top of the raised beads formed into the stamping on the crossmember. Next, install the cushion retainers, matching the raised beads formed into the cushion retainers to the grooves formed into the cushions. Install the cushion retainer bolts, but do not completely tighten them at this time.

(3) Install both stabilizer bar links back on vehicle (Fig. 18). Start each stabilizer bar link bolt with bushing from the bottom, through the stabilizer bar, inner link bushings, lower control arm, and into the upper retainer/nut and bushing (Fig. 1). Do not fully tighten the link assemblies at this time.

REMOVAL AND INSTALLATION (Continued)

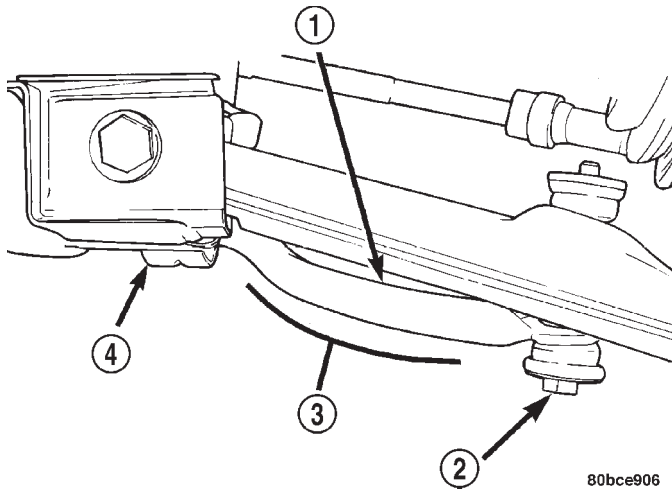


Fig. 19 Downward Curve

- 1 - STABILIZER BAR
- 2 - LINK
- 3 - DOWNWARD CURVE
- 4 - CUSHION RETAINER

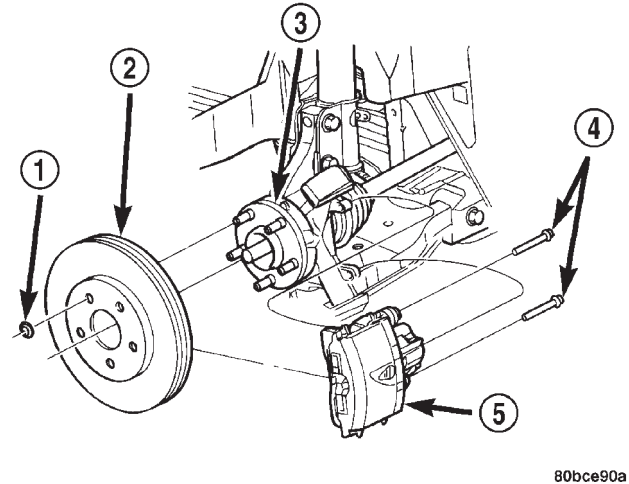


Fig. 20 Brake Caliper And Rotor

- 1 - RETAINER CLIP
- 2 - BRAKE ROTOR
- 3 - HUB
- 4 - GUIDE PIN BOLTS
- 5 - DISC BRAKE CALIPER

(4) Lower the vehicle.

NOTE: It may be necessary to put the vehicle on a platform hoist or alignment rack to gain access to the stabilizer bar mounting bolts with the vehicle at curb height.

(5) Tighten each stabilizer bar link by holding the upper retainer/nut with a wrench and turning the link bolt. Tighten each link bolt to a torque of 23 N·m (200 in. lbs.).

(6) Tighten the stabilizer bar cushion retainer bolts to a torque of 28 N·m (250 in. lbs.).

WHEEL MOUNTING STUD (FRONT)

NOTE: Before proceeding with this procedure, review **SERVICE WARNINGS AND CAUTIONS** at the beginning of **REMOVAL AND INSTALLATION** in this section.

Use the following procedure to remove and install one of five studs on one wheel hub.

REMOVAL

(1) Raise the vehicle. Refer to **HOISTING** in the **LUBRICATION AND MAINTENANCE** group for the proper lifting procedure.

(2) Remove the front tire and wheel assembly.

(3) Remove the two guide pin bolts securing the front disc brake caliper to the steering knuckle (Fig. 20).

(4) Remove the disc brake caliper from the steering knuckle. The caliper is removed by first tipping either the top (right side) or bottom (left side) of the

caliper away from the brake rotor, then pulling the caliper off the opposite end's caliper slide (on the knuckle) and rotor.

(5) Hang the caliper out of the way using a wire hanger or cord. Do not support the caliper by letting it hang by the hydraulic hose.

(6) Remove any retainer clips from the wheel mounting studs. Remove the brake rotor from the front hub (Fig. 20).

CAUTION: Do not hammer wheel mounting studs out of the hub. Damage to the wheel bearing will occur, leading to premature bearing failure.

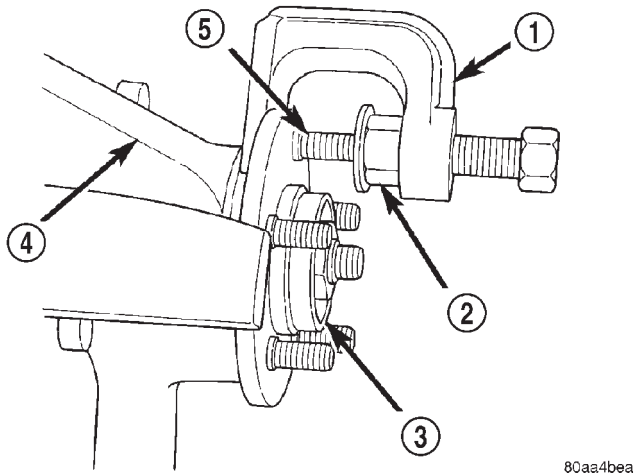
(7) Install a wheel mounting nut on the wheel mounting stud being removed from the hub far enough so the threads on the stud are even with end of lug nut. Rotate the hub so the stud requiring removal is aligned with notch cast into front of the steering knuckle. Install Remover, Special Tool C-4150, on hub flange and wheel stud (Fig. 21).

(8) Tighten the remover, pushing the wheel mounting stud out the rear of the hub flange. When the shoulder of the stud is past the flange, remove the remover from the hub. Remove the nut from the stud, then remove the stud from the flange.

INSTALLATION

(1) Install the wheel mounting stud in the flange of hub from the rear side. Install several washers and a wheel mounting nut on the stud (Fig. 22). The wheel mounting nut must be installed with the flat side of the wheel mounting nut against the washers to eliminate binding.

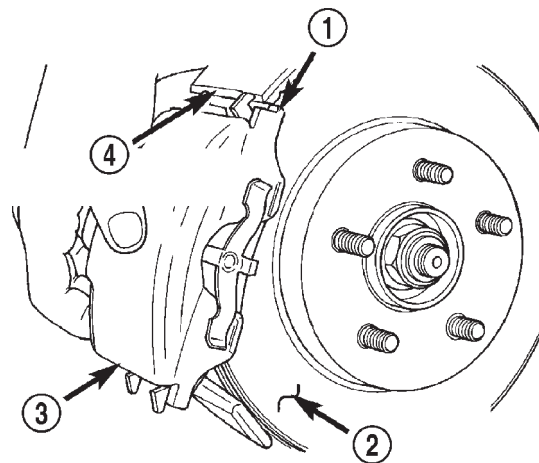
REMOVAL AND INSTALLATION (Continued)



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Fig. 21 Wheel Stud Removal

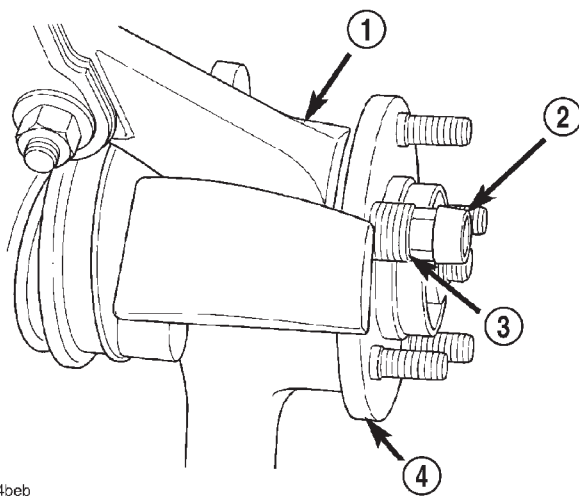
- 1 - SPECIAL TOOL C-4150A
- 2 - LUG NUT
- 3 - HUB/BEARING
- 4 - STEERING KNUCKLE
- 5 - WHEEL STUD



80aa4b6d

Fig. 23 Brake Caliper Installation

- 1 - SLIDE TOP OF BRAKE CALIPER UNDER TOP ABUTMENT OF STEERING KNUCKLE AS SHOWN
- 2 - BRAKING DISC
- 3 - DISC BRAKE CALIPER
- 4 - STEERING KNUCKLE BRAKE ABUTMENT



80aa4beb

Fig. 22 Installing Wheel Stud

- 1 - STEERING KNUCKLE
- 2 - WHEEL LUG NUT
- 3 - WASHERS
- 4 - HUB/BEARING

(2) Tighten the wheel mounting nut. This will pull the wheel mounting stud into the flange of the hub. When the head of the stud is fully seated against the rear of the hub flange, remove the wheel mounting nut and washers from the stud.

(3) Install the brake rotor on the hub (Fig. 20).

(4) Install the disc brake caliper (with pads) on the brake rotor and steering knuckle. The left side caliper is installed by first sliding the top of the caliper past the top abutment on the steering knuckle to hook the top edge of the caliper, then pushing the

lower end of the caliper into place against the knuckle (Fig. 23). The right side caliper is installed by first sliding the bottom edge of the caliper past the lower abutment on the steering knuckle to hook the lower edge of the caliper, then pushing the top of the caliper into place against the steering knuckle.

(5) Install the two guide pin bolts securing the front disc brake caliper to the steering knuckle (Fig. 20). Tighten the guide pin bolts to a torque of 22 N·m (192 in. lbs.).

(6) Install the tire and wheel assembly. Install the wheel mounting nuts and tighten them to a torque of 135 N·m (100 ft. lbs.).

(7) Lower the vehicle.

DISASSEMBLY AND ASSEMBLY

STRUT ASSEMBLY (FRONT)

The Strut assembly must be removed from the vehicle for it to be disassembled and assembled. Refer to REMOVAL AND INSTALLATION in this section for the required procedure.

For the disassembly and assembly of the strut assembly, use strut spring compressor, Pentastar Service Equipment (PSE) tool W-7200, or the equivalent, to compress the coil spring. Follow the manufacturer's instructions closely.

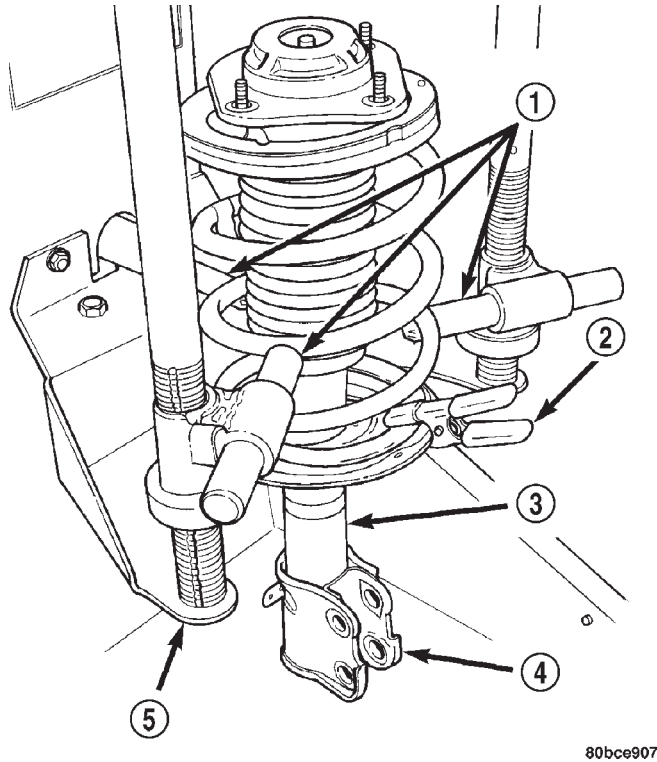
DISASSEMBLY

(1) If both struts are being serviced at the same time, mark the coil spring and strut assembly according to which side of the vehicle the strut was

DISASSEMBLY AND ASSEMBLY (Continued)

removed from, and which strut the coil spring was removed from.

(2) Position the strut assembly in the strut coil spring compressor following the manufacturers instructions. Set the lower hooks (Fig. 24), then set the upper hooks (Fig. 25). Position the strut clevis bracket straight outward away from the compressor. Place a clamp on the lower end of the coil spring, so the strut is held in place once the strut shaft nut is removed (Fig. 24).



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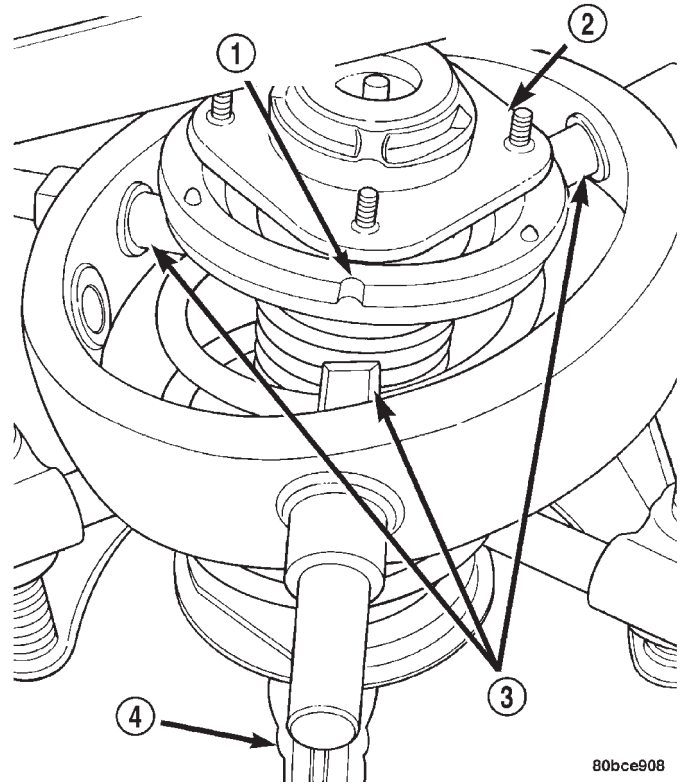
Fig. 24 Strut Assembly In Compressor (Lower)

- 1 - LOWER HOOKS
- 2 - CLAMP
- 3 - STRUT ASSEMBLY
- 4 - CLEVIS BRACKET
- 5 - SPRING COMPRESSOR

WARNING: DO NOT REMOVE THE STRUT SHAFT NUT BEFORE THE COIL SPRING IS COMPRESSED. THE COIL SPRING IS HELD UNDER PRESSURE AND MUST BE COMPRESSED, REMOVING SPRING TENSION FROM THE UPPER MOUNT AND PIVOT BEARING, BEFORE THE SHAFT NUT IS REMOVED.

(3) Compress the coil spring until all coil spring tension is removed from the upper mount.

(4) Once the spring is sufficiently compressed, install Strut Nut Socket, Special Tool 6864, on the strut shaft retaining nut (Fig. 26). Next, install a socket on the hex on the end of the strut shaft. While

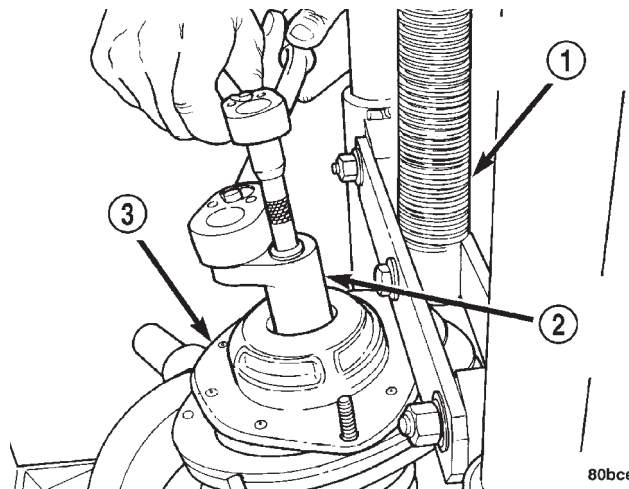


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Fig. 25 Strut Assembly In Compressor (Upper)

- 1 - NOTCH IN UPPER SEAT
- 2 - UPPER MOUNT
- 3 - UPPER HOOKS
- 4 - CLEVIS BRACKET

holding the strut shaft from turning, remove the nut from the strut shaft.



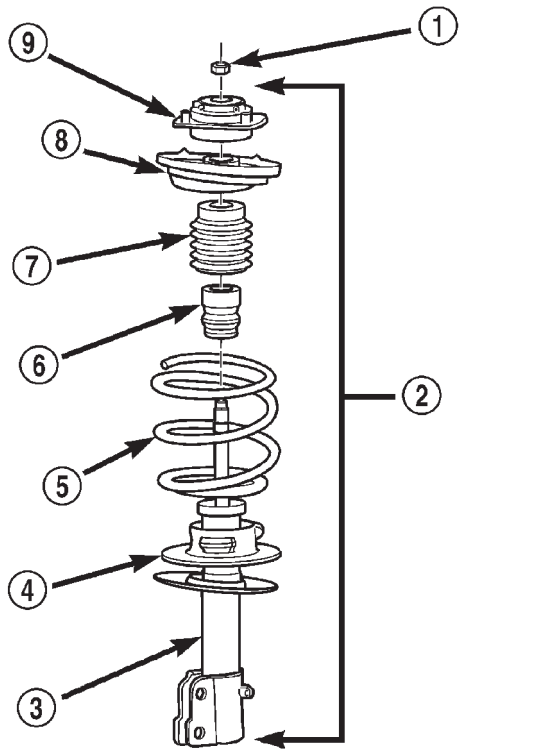
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Fig. 26 Shaft Nut Removal/Installation

- 1 - SPRING COMPRESSOR
- 2 - SPECIAL TOOL 6864
- 3 - UPPER MOUNT

DISASSEMBLY AND ASSEMBLY (Continued)

(5) Remove the upper mount from the strut shaft (Fig. 27).



80bce910

Fig. 27 Strut Assembly Components

- 1 - NUT
- 2 - STRUT ASSEMBLY
- 3 - STRUT
- 4 - LOWER SPRING ISOLATOR
- 5 - COIL SPRING
- 6 - JOUNCE BUMPER
- 7 - DUST SHIELD
- 8 - SPRING SEAT AND BEARING (WITH SPRING ISOLATOR)
- 9 - UPPER MOUNT

(6) Remove the upper spring seat and bearing, along with the upper spring isolator as an assembly from the top of the coil spring by pulling them straight up (Fig. 27). The upper spring isolator can be separated from the spring seat and bearing once removed from vehicle.

(7) Remove the dust shield, then the jounce bumper from the strut shaft by pulling each straight up (Fig. 27).

(8) Remove the clamp from the bottom of the coil spring and remove the strut out through the bottom of the coil spring.

(9) Remove the lower spring isolator from the lower spring seat on the strut.

NOTE: If the coil spring needs to be serviced, proceed with the next step, otherwise, proceed with step 11.

(10) Release the tension from the coil spring by backing off the compressor drive completely. Push back the compressor hooks and remove the coil spring.

(11) Inspect the strut assembly components for the following and replace as necessary:

- Inspect the strut for any condition of shaft binding over the full stroke of the shaft.
- Inspect the jounce bumper for cracks and signs of deterioration.
- Check the upper mount for cracks and distortion and its retaining studs for any sign of damage.
- Check the upper spring seat and bearing for cracks and distortion.
- Check for binding of the upper spring seat and bearing pivot bearing.
- Inspect the dust shield for rips and deterioration.
- Inspect the upper and lower spring isolators for material deterioration and distortion.
- Inspect the coil spring for any sign of damage to the coating.

ASSEMBLY

NOTE: If the coil spring has been removed from the spring compressor, proceed with the next step, otherwise, proceed with step 3.

(1) Place the coil spring in the compressor following the manufacturers instructions. Before compressing the spring, rotate the spring so the end of the top coil is directly in the back as shown (Fig. 28).

(2) Slowly compress the coil spring until enough room is available for strut assembly reassembly.

(3) Install the lower spring isolator on the lower spring seat of the strut.

(4) Install the strut through the bottom of the coil spring until the lower spring seat contacts the lower end of the coil spring. Rotate the strut as necessary until the clevis bracket is positioned straight outward away from the compressor (Fig. 24). Install the clamp on the lower end of the coil spring and strut, so the strut is held in place.

(5) Install the jounce bumper on the strut shaft. The jounce bumper is to be installed with the smaller end pointing downward toward the lower seat (Fig. 27).

(6) Install the dust shield on the strut shaft (Fig. 27). The bottom of the dust shield will snap past the retainer on top of the strut housing.

(7) If disassembled, reinstall the upper spring isolator on the upper spring seat and bearing.

(8) Install the upper spring seat and bearing on top of the coil spring. Position the notch formed into the edge of the upper seat straight out away from the compressor (Fig. 25).

DISASSEMBLY AND ASSEMBLY (Continued)

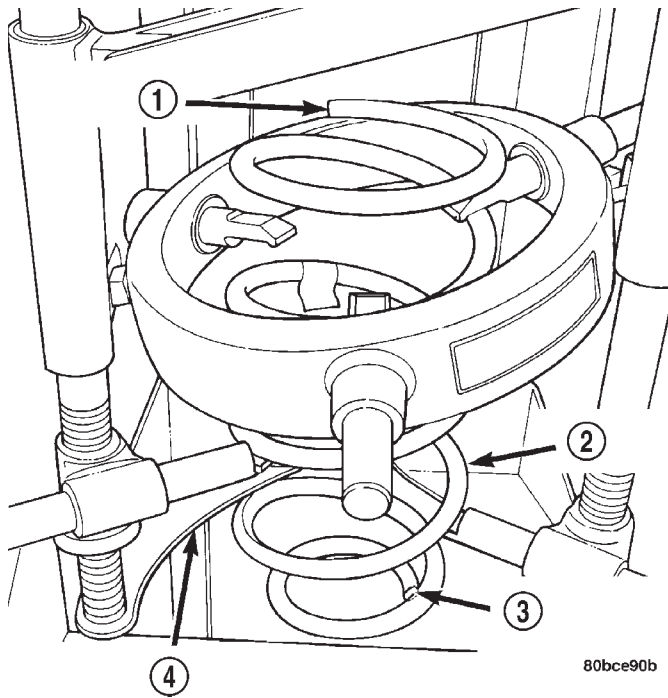


Fig. 28 Coil Spring Positioning

- 1 - UPPER END OF COIL
- 2 - COIL SPRING
- 3 - LOWER END OF COIL
- 4 - SPRING COMPRESSOR

(9) Install the strut upper mount over the strut shaft and onto the top of the upper spring seat and bearing.

(10) Loosely install the retaining nut on the strut shaft. Install Strut Nut Socket (on the end of a torque wrench), Special Tool 6864, on the strut shaft retaining nut (Fig. 26). Next, install a socket on the hex on the end of the strut shaft. While holding the strut shaft from turning, tighten the strut shaft retaining nut to a torque of 75 N·m (55 ft. lbs.).

(11) Slowly release the tension from the coil spring by backing off the compressor drive completely. As the tension is relieved, make sure the upper mount and seat and bearing align properly. Verify the upper mount does not bind.

(12) Remove the clamp from the lower end of the coil spring and strut. Push back the spring compressor upper and lower hooks, then remove the strut assembly from the spring compressor.

(13) Install the strut assembly on the vehicle. Refer to REMOVAL AND INSTALLATION in this section for the required procedure.

STEERING KNUCKLE (WHEEL BEARING AND HUB)

NOTE: The removal and installation of the wheel bearing and hub from the steering knuckle is only to be done with the steering knuckle removed from the vehicle. Removal of the wheel bearing from the steering knuckle must be done using the following procedure.

DISASSEMBLY

(1) Remove steering knuckle, hub, and wheel bearing as an assembly from the vehicle. Refer to STEERING KNUCKLE in the REMOVAL AND INSTALLATION section in this service manual group.

(2) Using Remover, Special Tool 4150A, (Fig. 29) press one wheel mounting stud out of hub flange. Rotate the hub to align the removed wheel mounting stud with the notch in bearing retainer plate (Fig. 30). Remove the wheel mounting stud from the hub.

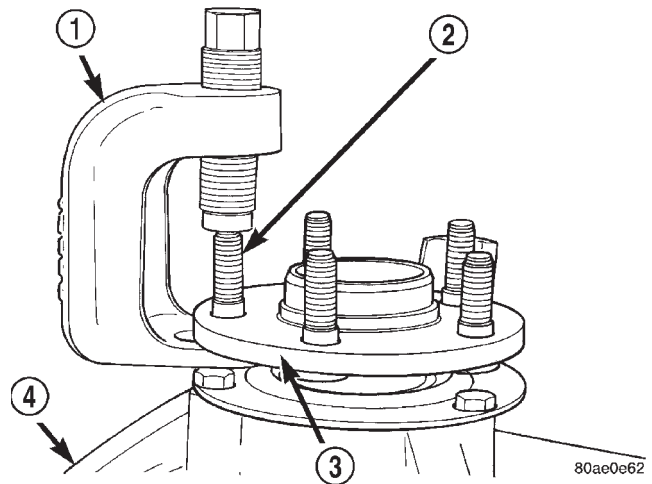


Fig. 29 Pressing Out Wheel Mounting Stud

- 1 - SPECIAL TOOL 4150A
- 2 - WHEEL MOUNTING STUD
- 3 - HUB FLANGE
- 4 - STEERING KNUCKLE

(3) Rotate the hub so the hole in the hub that wheel mounting stud was removed from is facing away from brake caliper lower rail on steering knuckle (Fig. 31). Install one half of the Bearing Splitter, Special Tool 1130, between the hub and the bearing retainer plate (Fig. 31).

NOTE: Align the threaded hole in this first half of the bearing splitter with the caliper rail on the steering knuckle (Fig. 31).

DISASSEMBLY AND ASSEMBLY (Continued)

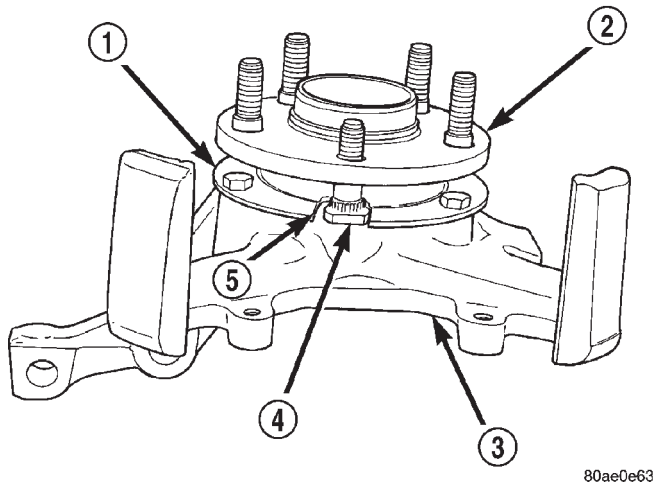


Fig. 30 Stud Removal From Hub

- 1 - BEARING RETAINER PLATE
- 2 - HUB
- 3 - STEERING KNUCKLE
- 4 - WHEEL MOUNTING STUD
- 5 - NOTCH

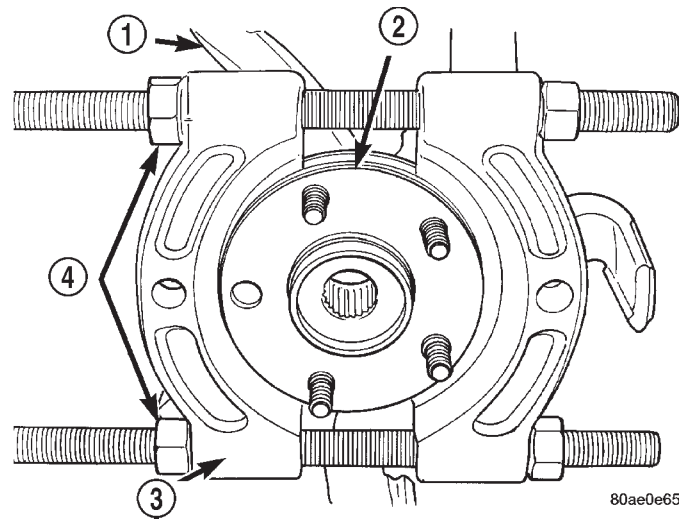


Fig. 32 Bearing Splitter Installed

- 1 - STEERING KNUCKLE
- 2 - HUB
- 3 - SPECIAL TOOL 1130
- 4 - NUTS

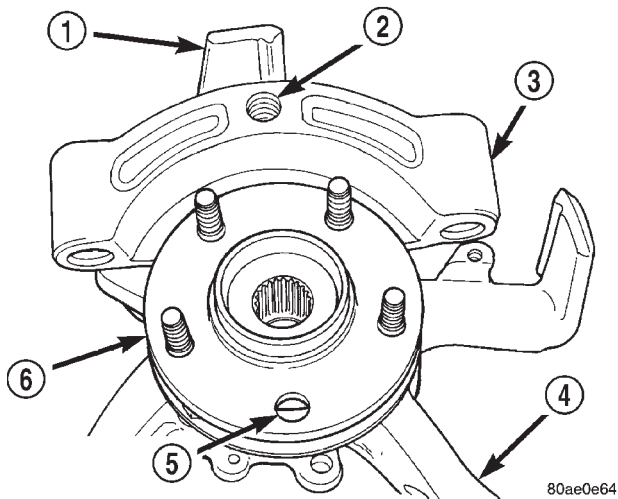


Fig. 31 Bearing Splitter Half Installed

- 1 - CALIPER RAIL
- 2 - THREADED HOLE
- 3 - SPECIAL TOOL 1130
- 4 - STEERING KNUCKLE
- 5 - HOLE FOR WHEEL MOUNTING STUD
- 6 - HUB

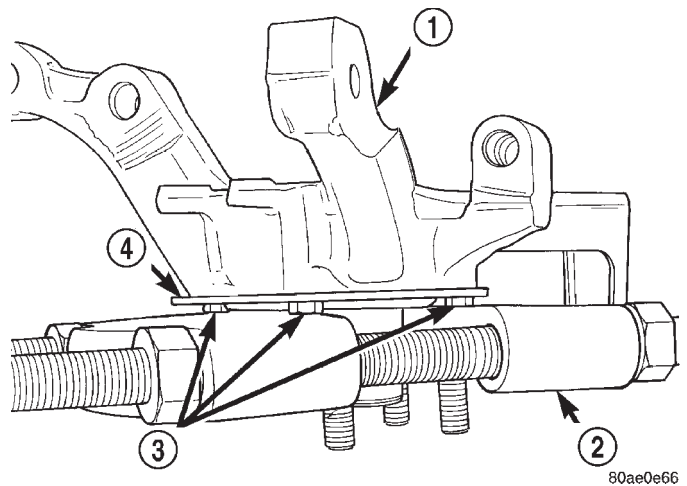


Fig. 33 Correct Installation Of Bearing Splitter

- 1 - STEERING KNUCKLE
- 2 - SPECIAL TOOL 1130
- 3 - BEARING RETAINER PLATE MOUNTING BOLTS
- 4 - BEARING RETAINER PLATE

DISASSEMBLY AND ASSEMBLY (Continued)

(6) Place the steering knuckle in an arbor press supported by the bearing splitter as shown (Fig. 34).

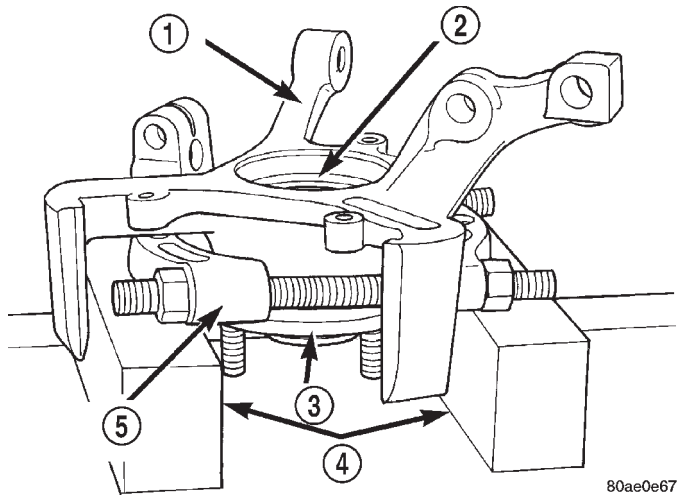


Fig. 34 Steering Knuckle Supporting For Hub Removal

- 1 - STEERING KNUCKLE
- 2 - WHEEL BEARING
- 3 - HUB
- 4 - ARBOR PRESS BLOCKS
- 5 - SPECIAL TOOL 1130

(7) Position Driver, Special Tool 6644-2, on the small end of the hub (Fig. 35). Using the arbor press, remove the hub from the wheel bearing. The outer bearing race will normally come out of the wheel bearing when the hub is pressed out of the bearing.

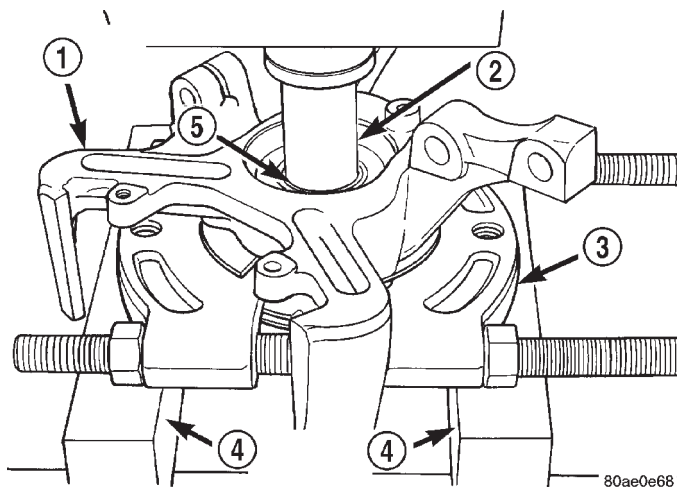


Fig. 35 Pressing Hub Out Of Wheel Bearing

- 1 - STEERING KNUCKLE
- 2 - SPECIAL TOOL 6644-2
- 3 - SPECIAL TOOL 1130
- 4 - ARBOR PRESS BLOCKS
- 5 - HUB

(8) Remove the bearing splitter from the steering knuckle.

(9) Remove the three bolts mounting the bearing retainer plate to the steering knuckle (Fig. 36). Remove the bearing retainer plate from the steering knuckle.

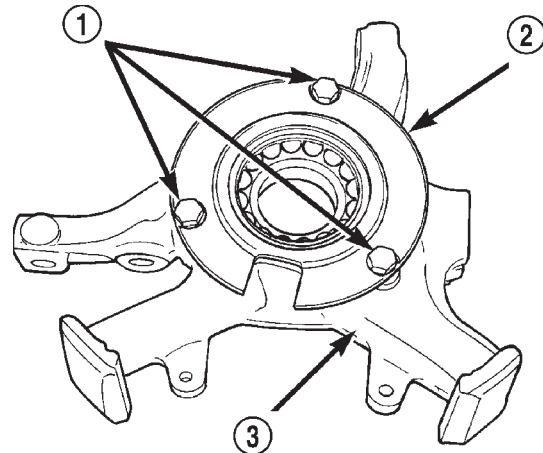


Fig. 36 Wheel Bearing Retainer Plate

- 1 - MOUNTING BOLTS
- 2 - BEARING RETAINER PLATE
- 3 - STEERING KNUCKLE

(10) Place the steering knuckle back in the arbor press supported by press blocks as shown (Fig. 37). The press blocks must not obstruct the bore in the steering knuckle so the wheel bearing can be pressed out of the steering knuckle. Place Bearing Driver, Special Tool MB-990799 on the outer race of wheel bearing (Fig. 37). Press the wheel bearing out of the steering knuckle.

(11) Install Bearing Splitter, Special Tool 1130, on the hub. The bearing splitter is to be installed on the hub so it is between the flange of the hub and the outer bearing race on the hub (Fig. 38). Place the hub, bearing race and bearing splitter in an arbor press as shown (Fig. 38). Place Driver, Special Tool 6644-2 on end of hub. Press the hub out of the outer bearing race.

DISASSEMBLY AND ASSEMBLY (Continued)

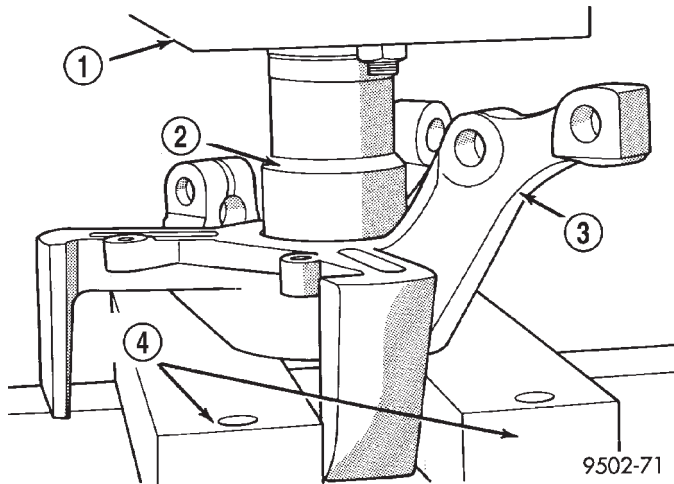


Fig. 37 Wheel Bearing Removal From Steering Knuckle

- 1 - ARBOR PRESS
- 2 - SPECIAL TOOL MB-990799
- 3 - STEERING KNUCKLE
- 4 - PRESS BLOCKS

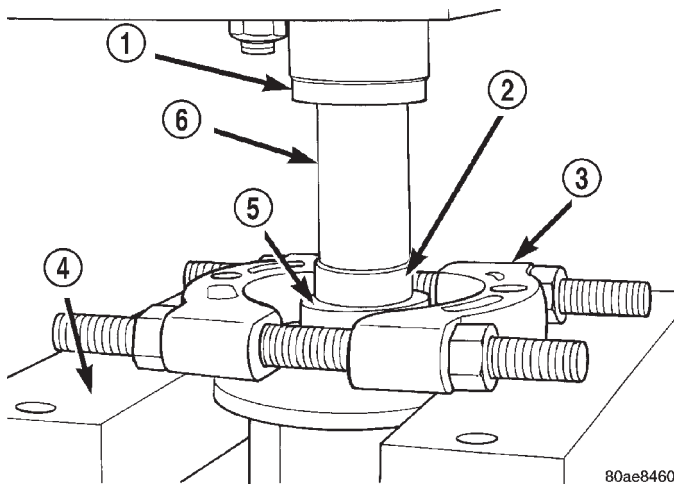


Fig. 38 Removing Bearing Race From Hub

- 1 - ARBOR PRESS
- 2 - HUB
- 3 - SPECIAL TOOL 1130
- 4 - PRESS BLOCKS (2)
- 5 - BEARING RACE
- 6 - SPECIAL TOOL 6644-2

ASSEMBLY

(1) Wipe the bore of the steering knuckle clean of any grease or dirt with a clean, dry shop towel.

(2) Place the new wheel bearing into the bore of the steering knuckle. Be sure the wheel bearing is placed squarely into the bore. Place the steering knuckle in an arbor press with Receiver, Special Tool C-4698-2, supporting the steering knuckle (Fig. 39). Place Driver, Special Tool 5052, on the outer race of the wheel bearing. Press the wheel bearing into the steering knuckle until it is fully bottomed in the bore of the steering knuckle. Remove the knuckle from the press.

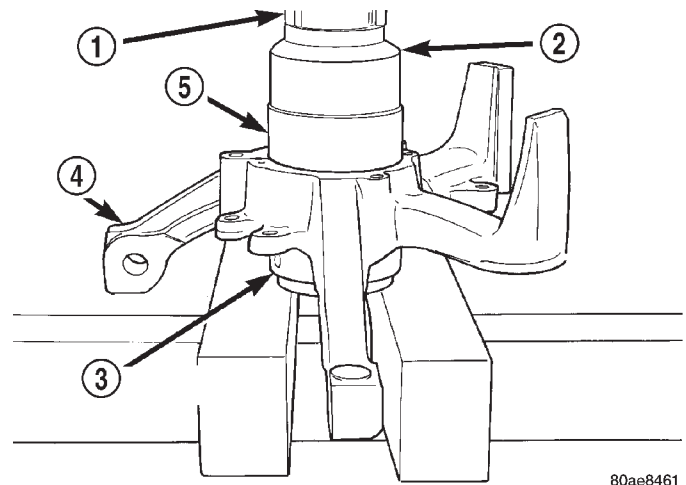


Fig. 39 Pressing Wheel Bearing Into Steering Knuckle

- 1 - ARBOR PRESS
- 2 - SPECIAL TOOL 5052
- 3 - SPECIAL TOOL C-4698-2
- 4 - STEERING KNUCKLE
- 5 - WHEEL BEARING

NOTE: Only the original or identical replacement bolts are to be used to mount the bearing retainer plate to the steering knuckle.

(3) Install the bearing retainer plate on the steering knuckle (Fig. 40). Install the three bearing retainer mounting bolts. Tighten the bearing retainer plate mounting bolts to a torque of 28 N·m (250 in. lbs.).

DISASSEMBLY AND ASSEMBLY (Continued)

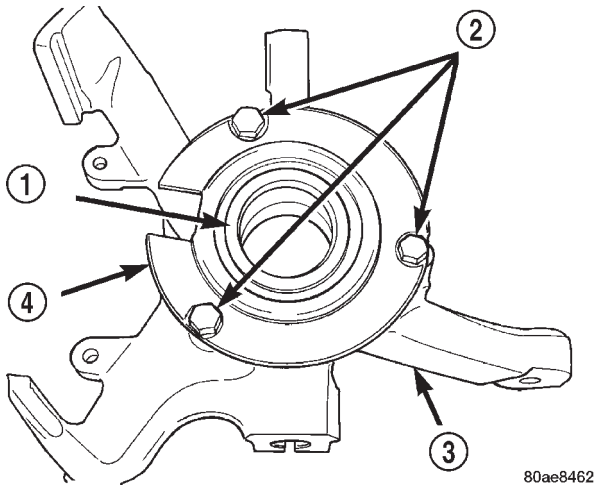


Fig. 40 Wheel Bearing Retainer Plate

- 1 - WHEEL BEARINGS
- 2 - MOUNTING BOLTS
- 3 - STEERING KNUCKLE
- 4 - BEARING RETAINER PLATE

(4) Place the previously removed wheel mounting stud back into the hub flange. Place the hub in the arbor press supported by Special Tool C-4698-1 (Fig. 41). Press wheel mounting stud into hub flange until it is fully seated against the back side on the hub flange. Remove the hub from the press.

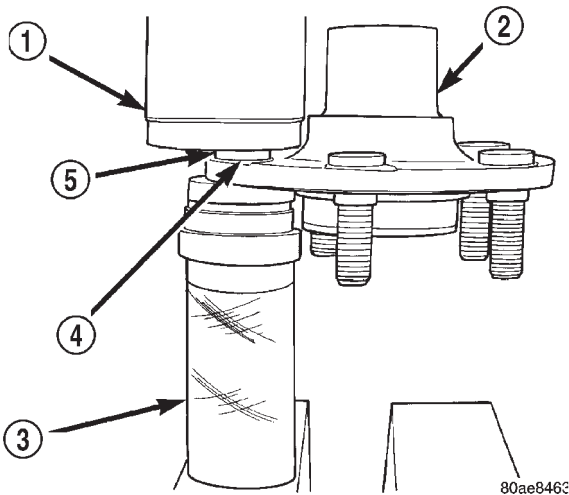


Fig. 41 Wheel Mounting Stud Installation

- 1 - ARBOR PRESS RAM
- 2 - HUB
- 3 - SPECIAL TOOL C-4698-1
- 4 - NO GAP IS ALLOWED BETWEEN STUD FLANGE AND HUB HERE
- 5 - WHEEL MOUNTING STUD

(5) Place the steering knuckle with the wheel bearing installed back in the arbor press with Receiver, Special Tool MB-990799 supporting the inner race of the wheel bearing as shown (Fig. 42). Place the hub in wheel bearing making sure it is square with the bearing inner race. Press the hub into the wheel bearing until it is fully bottomed in the wheel bearing. Remove the knuckle from the press.

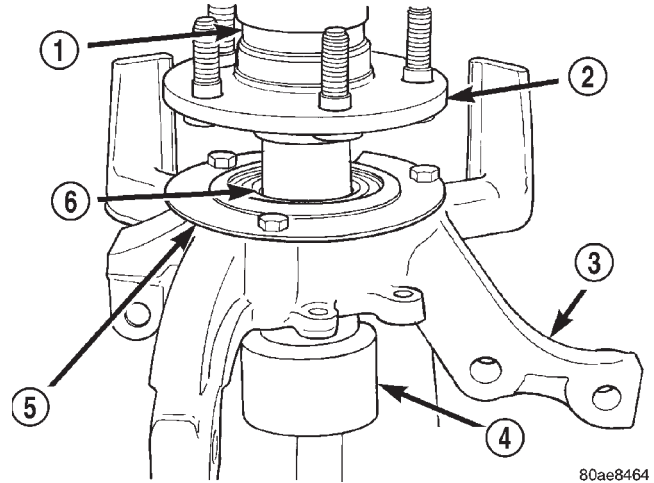


Fig. 42 Pressing Hub Into Wheel Bearing

- 1 - ARBOR PRESS RAM
- 2 - HUB
- 3 - STEERING KNUCKLE
- 4 - SPECIAL TOOL MB-990799
- 5 - BEARING RETAINER PLATE
- 6 - WHEEL BEARING

(6) Install the steering knuckle assembly on the vehicle.

LOWER CONTROL ARM (BALL JOINT)

NOTE: The removal and installation of the lower ball joint from the lower control arm is to be done with the lower control arm removed from the vehicle. Refer to LOWER CONTROL ARM in the REMOVAL AND INSTALLATION section.

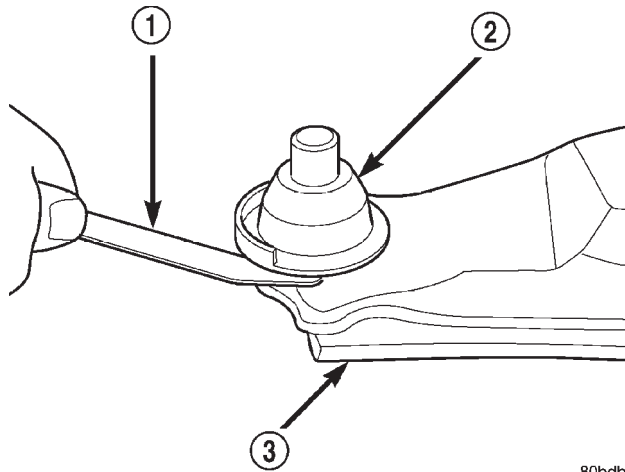
DISASSEMBLY

(1) Using a screwdriver or other suitable tool, pry the seal boot off of the ball joint (Fig. 43).

(2) Position the Receiver, Special Tool 6908-2, on a hydraulic press to support the lower control arm (Fig. 44). Place the control arm on top of Tool 6908-2 so that the bottom of the ball joint sets into the Receiver cup.

(3) Place the larger end of the Adapter, Special Tool 6804, on top of the ball joint as shown (Fig. 44).

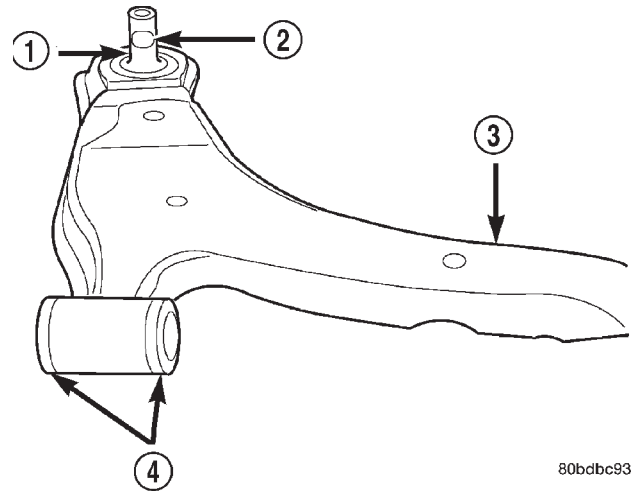
DISASSEMBLY AND ASSEMBLY (Continued)



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Fig. 43 Seal Boot Removal

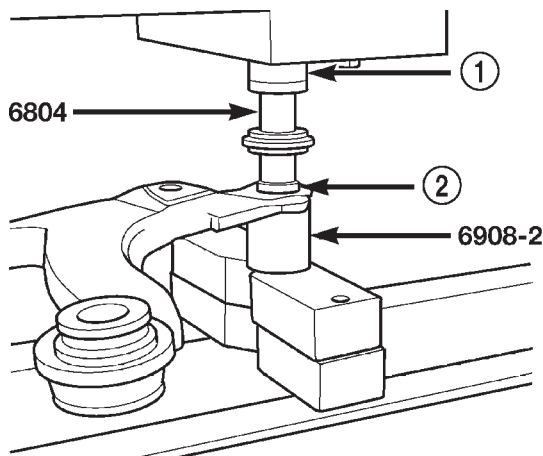
- 1 - TOOL
- 2 - SEAL BOOT
- 3 - LOWER CONTROL ARM



80dbc93

Fig. 45 Ball Joint Alignment

- 1 - BALL JOINT STUD
- 2 - NOTCH
- 3 - LOWER CONTROL ARM
- 4 - FRONT ISOLATOR BUSHING



80dbc92

Fig. 44 Ball Joint Removal

- 1 - PRESS
- 2 - BALL JOINT

(4) Using the hydraulic press, press the ball joint completely out of the lower control arm, into the receiver.

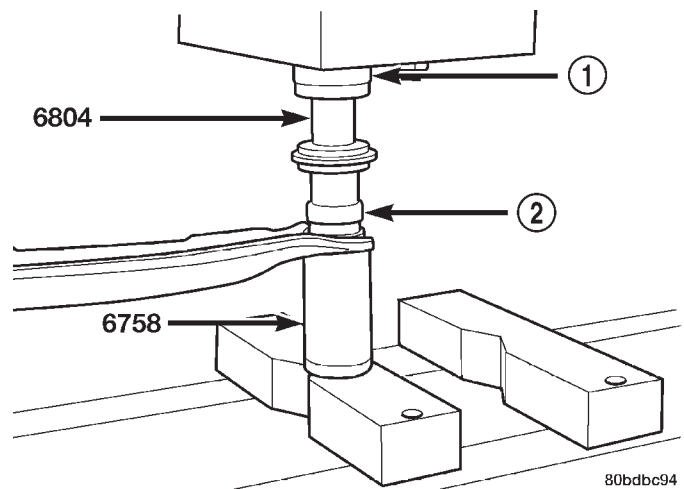
(5) Remove the tools, ball joint and arm from the hydraulic press.

ASSEMBLY

CAUTION: When installing a ball joint in its mounting hole in the lower control arm, position the ball joint so the notch in the ball joint stud is facing the lower control arm front isolator bushing (Fig. 45). This will ease assembly of the ball joint to the steering knuckle when the installation of the pinch bolt is attempted.

(1) By hand, position ball joint into it's bore on the lower control arm (Fig. 45). To avoid binding upon installation, be sure the ball joint is not cocked in the bore.

(2) Position the Installer, Special Tool 6758, on a hydraulic press to support the lower control arm (Fig. 46). Place the control arm on top of Tool 6758 in the upside-down position, aligning the ball joint stud squarely with the Installer's cup.



80dbc94

Fig. 46 Ball Joint Installation

- 1 - PRESS
- 2 - BALL JOINT

(3) Place the larger end of the Adapter, Special Tool 6804, on top of the ball joint as shown (Fig. 46).

(4) Using the hydraulic press, press the ball joint into the lower control arm until the shoulder on the

DISASSEMBLY AND ASSEMBLY (Continued)

ball joint bottoms against the lower control arm ball joint bore. Do not apply excessive pressure against ball joint and lower control arm once the ball joint bottoms.

(5) Remove the tools and arm from the hydraulic press.

CAUTION: When installing the sealing boot on the ball joint, position the upward lip on the outside perimeter of the seal boot outward, away from the control arm once installed (Fig. 47). It is there to help shield heat from the sealing boot.

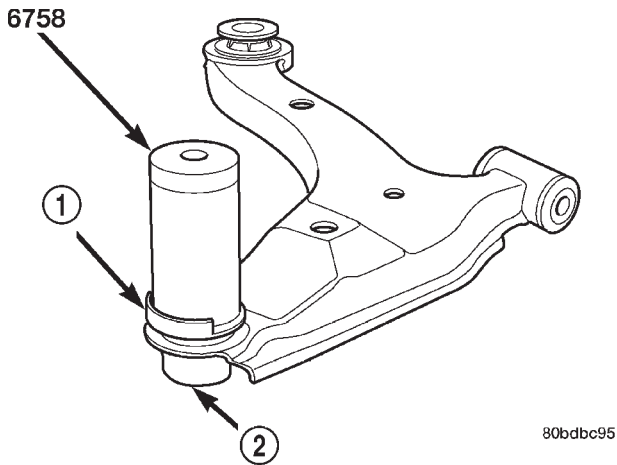


Fig. 47 Seal Boot Installation

- 1 - SEAL BOOT UPWARD LIP
- 2 - BALL JOINT

(6) Place a new ball joint seal boot over the ball joint stud. The upward lip located on the outside perimeter of the seal boot must point outward away from the control arm once installed (Fig. 47). Start the sealing boot over the sides of the ball joint by hand.

(7) Position the Installer, Special Tool 6758, over the sealing boot outer diameter as shown (Fig. 47). By hand, apply pressure to the top of the Installer until the seal boot is pressed squarely down against the top surface of lower control arm.

(8) Remove the tool.

(9) Install the lower control arm on the vehicle. Refer to LOWER CONTROL ARM in the REMOVAL AND INSTALLATION section.

NOTE: If the ball joint is equipped with a lubeable grease fitting, the joint will need to be lubricated once the lower control arm installation is complete.

LOWER CONTROL ARM (REAR ISOLATOR BUSHING)

NOTE: The removal and installation of the rear isolator bushing from the lower control arm is only to be done with the lower control arm removed from the vehicle. Refer to LOWER CONTROL ARM in the REMOVAL AND INSTALLATION section. The front isolator bushing is not serviceable.

DISASSEMBLY

(1) Install the Remover Receiver, Special Tool 8373-1, into the cup of the Ball Joint Press, Special Tool C-4212F, and tighten the set screw. Install the Remover Driver, Special Tool 8373-2, on the tip of the Ball Joint Press screw-drive.

(2) Place the lower control arm outer flange against the Receiver as shown (Fig. 48). Tighten the screw-drive until the Driver contacts the outer circumference of the bushing evenly (Fig. 48). Continue to tighten the screw-drive until the bushing is pressed completely out of the lower control arm.

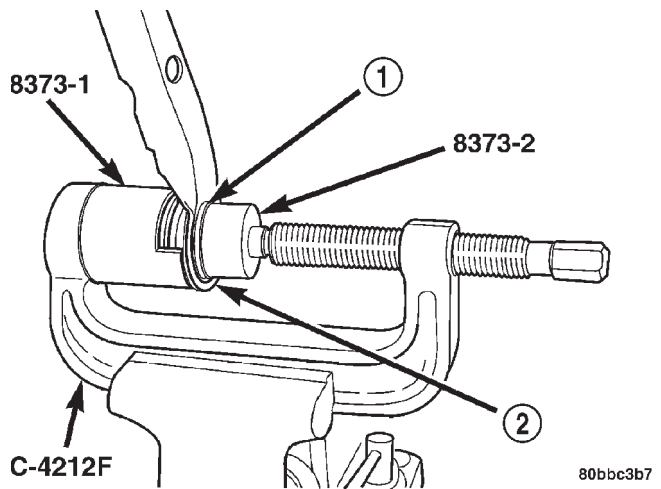


Fig. 48 Removing Bushing

- 1 - CONTROL ARM ISOLATOR BUSHING
- 2 - FLANGE

(3) Back off the screw-drive and remove the lower control arm and isolator bushing from the Receiver.

(4) Remove the driver 8373-2 and receiver 8373-1 from the ball joint press C-4212F.

DISASSEMBLY AND ASSEMBLY (Continued)

ASSEMBLY

(1) Back the ball joint press C-4212F set screw outward so it does not extend into the cup area (Fig. 49).

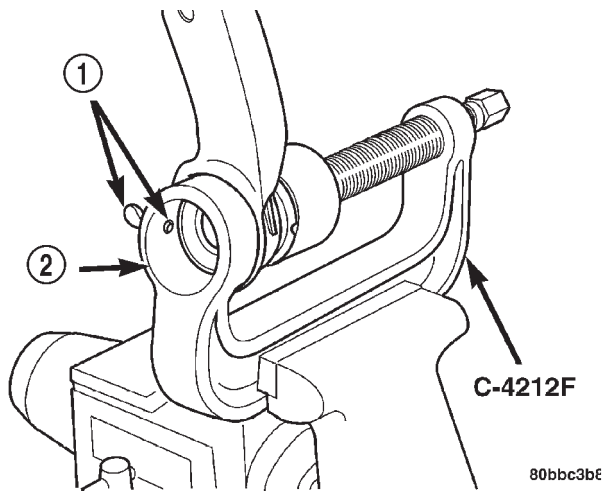


Fig. 49 Set Screw Backed Outward

- 1 - SET SCREW
- 2 - CUP AREA

drive until the Receiver contacts the outer circumference of the bushing (Fig. 51). Slowly tighten the screw-drive until the bushing bottoms in the lower control arm bushing bore.

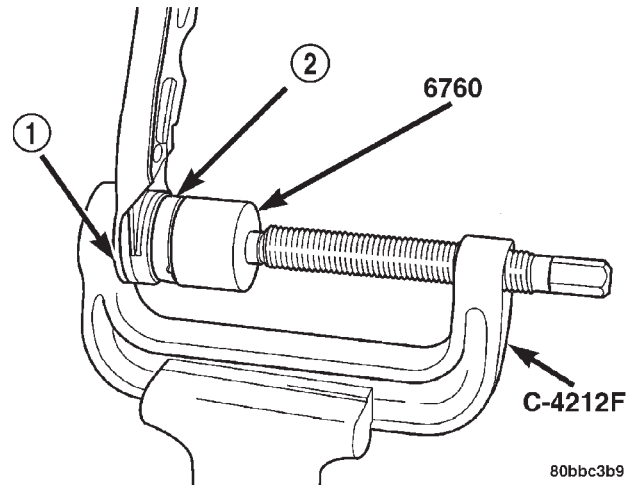


Fig. 51 Installing Bushing

- 1 - LOWER CONTROL ARM FLANGE
- 2 - ISOLATOR BUSHING

(2) Start the bushing in the lower control arm bushing bore by hand. Position the bushing so the voids in the rubber are aligned in relationship to the ball joint as shown (Fig. 50).

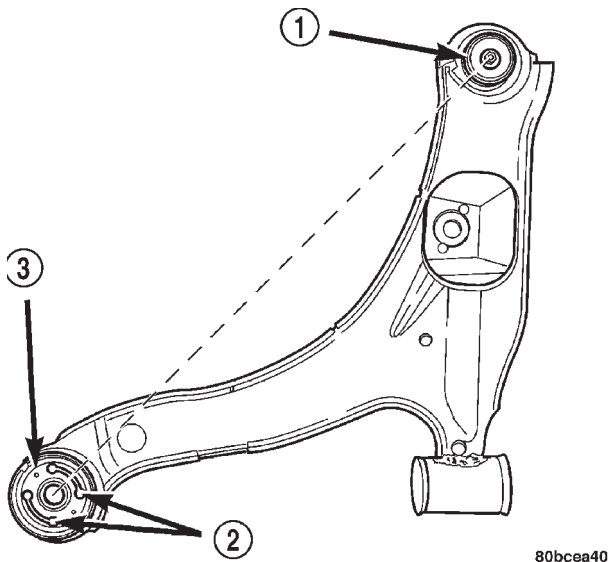


Fig. 50 Aligning Bushing With Ball Joint

- 1 - BALL JOINT
- 2 - VOIDS
- 3 - REAR ISOLATOR BUSHING

(5) Back off the Ball Joint Press screw-drive and remove the power steering gear from the press.

(6) Install the lower control arm on the vehicle.

(3) Install the Receiver, Special Tool 6760, on the tip of the Ball Joint Press screw drive.

(4) Place the lower control arm flange against the cup area of the ball joint press and tighten the screw-

SPECIFICATIONS

FRONT SUSPENSION FASTENER TORQUE SPECIFICATIONS

DESCRIPTION **TORQUE**

STRUT ASSEMBLY:

- Tower Nuts 34 N·m (300 in. lbs.)
- Steering Knuckle Nuts 54 N·m (40 ft. lbs.) + 90° Turn
- Strut Shaft Nut 75 N·m (55 ft. lbs.)

STEERING KNUCKLE:

- Ball Joint Stud Pinch Bolt 95 N·m (70 ft. lbs.)
- Disc Brake Caliper Guide Bolts 22 N·m (192 in. lbs.)

WHEEL BEARING AND HUB:

- Bearing Retainer Plate Bolts 28 N·m (250 in. lbs.)
- Driveshaft Hub Nut 244 N·m (180 ft. lbs.)
- Wheel Mounting Nuts 109-150 N·m (80-110 ft. lbs.)

STEERING GEAR:

- Crossmember Bolts 68 N·m (50 ft. lbs.)
- Tie Rod Adjusting Jam Nut . . 75 N·m (55 ft. lbs.)
- Tie Rod End Steering Knuckle Nut 54 N·m (40 ft. lbs.)

LOWER CONTROL ARM:

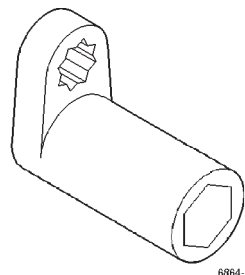
- Front Pivot Bolt 163 N·m (120 ft. lbs.)
- Rear Pivot Bolt 203 N·m (150 ft. lbs.)

STABILIZER BAR:

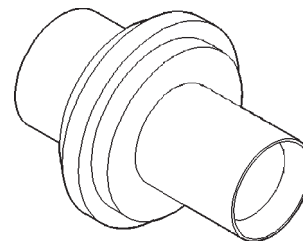
- Cushion Retainer Bolts 28 N·m (250 in. lbs.)
- Link Nut 23 N·m (200 in. lbs.)

SPECIAL TOOLS

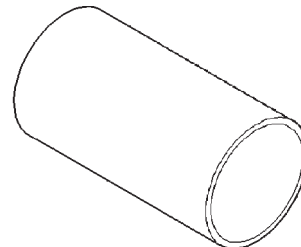
FRONT SUSPENSION



Socket/Wrench Strut Nut 6864

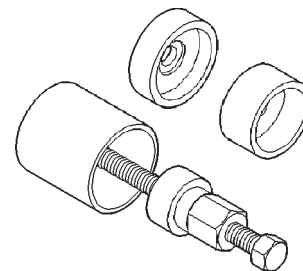


Remover 6804



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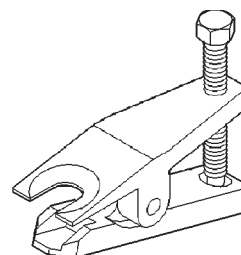
Installer 6758



Remover/Installer 6908 (-2)



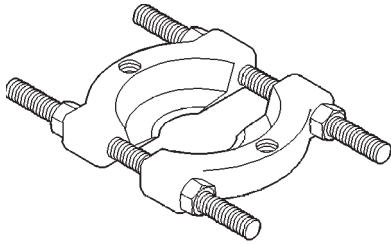
Installer 6760



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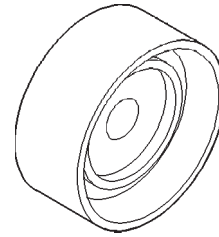
Remover MB991113

SPECIAL TOOLS (Continued)

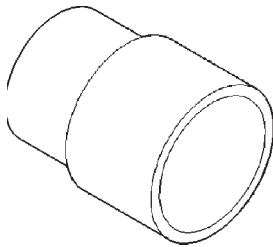


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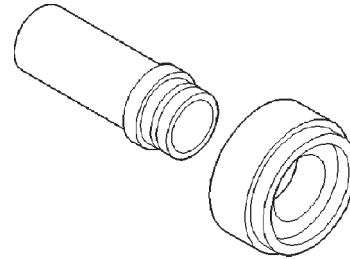
Splitter Bearing 1130



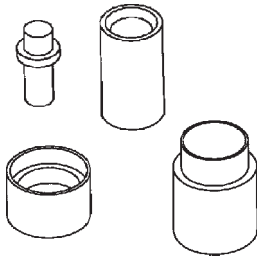
Installer Bearing 5052



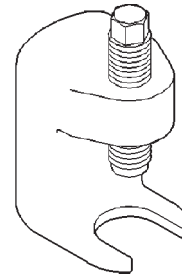
Remover MB-990799



Installer Adapter C-4698-2



Remover/Installer 6644 (-2)



Remover C-4150A

REAR SUSPENSION

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DESCRIPTION AND OPERATION

REAR SUSPENSION SYSTEM

The rear suspension system used on this vehicle is a fully independent type rear suspension system (Fig. 1). This means that each side of the rear suspension acts independently from the other.

The rear suspension is supported by a strut assembly. The strut assembly also controls ride quality.

When the vehicle strikes a bump, the force is transferred through the hub, bearing, and knuckle, into the strut assembly to absorb the force and dampen it.

Lateral movement of the rear knuckle is controlled by lateral arms going from the front and rear of the knuckle to the rear crossmember. Fore and aft movement of the knuckle is controlled by a tension strut.

DESCRIPTION AND OPERATION (Continued)

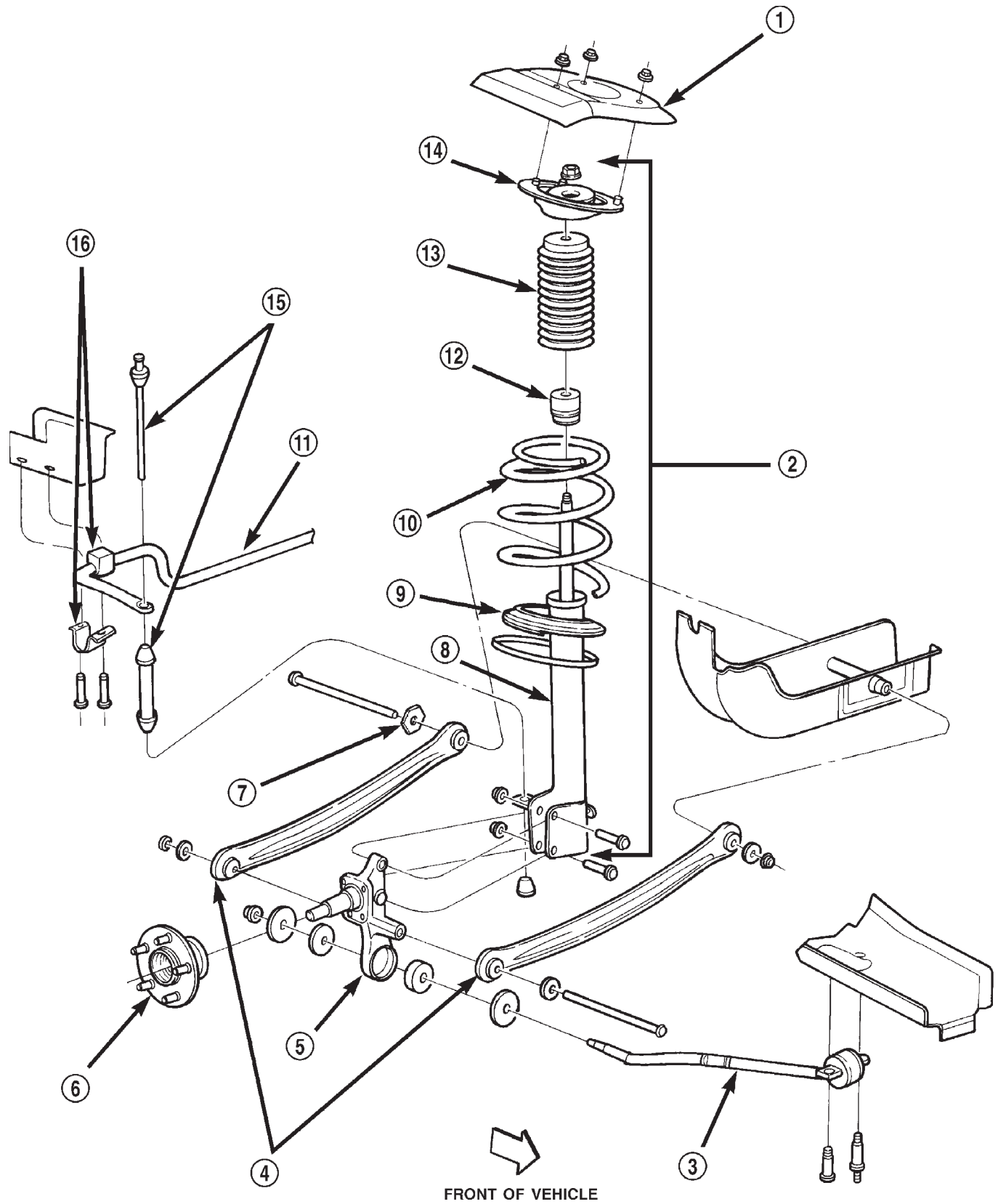


Fig. 1 Rear Suspension System

DESCRIPTION AND OPERATION (Continued)

1 – VEHICLE STRUT TOWER	9 – LOWER SPRING ISOLATOR
2 – STRUT ASSEMBLY	10 – COIL SPRING
3 – TENSION STRUT	11 – STABILIZER BAR
4 – LATERAL ARMS	12 – JOUNCE BUMPER
5 – KNUCKLE	13 – DUST SHIELD
6 – HUB AND BEARING	14 – UPPER MOUNT
7 – WHEEL ALIGNMENT ADJUSTMENT CAM	15 – STABILIZER BAR LINK
8 – STRUT	16 – STABILIZER BAR CUSHION AND RETAINER

For more information on the description and operation of an individual component, refer to the applicable component heading in this section.

STRUT ASSEMBLY (REAR)

The rear strut assemblies support the weight of the vehicle using coil springs positioned around struts. The coil springs are contained between the upper mount of the strut assembly and a lower spring seat on the body of the strut.

The top of each strut assembly is bolted to the top of the inner fender through a rubber isolated mount. The bottom of the strut assembly attaches to the rear knuckle using 2 thru-bolts with prevailing torque nuts.

The rear strut assembly includes the following components (Fig. 1): A rubber isolated upper mount, a dust shield, a jounce bumper, a coil spring, a lower spring isolator, and a strut. Any component in need of service requires removal of the strut assembly from the vehicle and disassembly of it.

COIL SPRING

Rear coil springs are rated separately for each corner or side of the vehicle depending on optional equipment and type of vehicle service. If a coil spring requires replacement, be sure the spring needing replacement is replaced with a spring meeting the correct load rating for the vehicle with its specific options.

KNUCKLE (REAR)

A forged rear knuckle bolts to each rear strut assembly (Fig. 1). The rear knuckle's spindle supports the rear hub and bearing. Together they support the rear tire and wheel. The movement of the rear knuckle is controlled laterally using two lateral arms attached to the knuckle. Fore and aft movement of the knuckle is controlled by using a tension strut.

HUB AND BEARING (REAR)

The hub and bearing is mounted on the rear knuckle's spindle (Fig. 1). The hub and bearing adapts the tire and wheel assembly to the knuckle. Its bearing allows the tire and wheel assembly to rotate freely on the vehicle.

All vehicles are equipped with permanently lubricated and sealed for life rear wheel bearings. There is no periodic lubrication or maintenance recommended for these units.

The only serviceable components of the hub and bearing are the wheel mounting studs.

If a vehicle is equipped with antilock brakes, the tone wheels for the rear wheel speed sensors are pressed onto the hub.

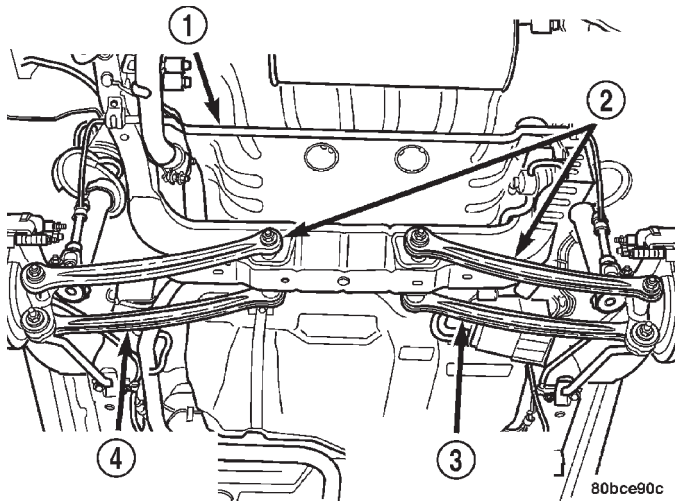
LATERAL ARMS

The lateral arms control the lateral movement of the rear suspension, specifically the knuckle (Fig. 1). There are two lateral arms per side of the rear suspension. One arm is attached to the front end of the knuckle and the other is attached to the rear of the knuckle. The other end of each lateral arm attaches to the rear crossmember.

Visually it appears that the left rear arm is mounted backwards in relation to the other arms (Fig. 2). Although the left rear arm looks like it is same as the right rear arm, just reversed, it is not the same; the arms are not interchangeable.

The front arms are interchangeable, but should be mounted with the side displaying the word "FORWARD" stamped into it toward the front of the vehicle. The trimmed outer edge of the arms will then be facing the rear of the vehicle.

DESCRIPTION AND OPERATION (Continued)

**Fig. 2 Lateral Arms**

- 1 - REAR STABILIZER BAR
- 2 - REAR LATERAL ARMS
- 3 - RIGHT FRONT LATERAL ARM
- 4 - LEFT FRONT LATERAL ARM

The lateral arms are made of stamped steel and have rubber isolator bushings at each end. The lateral arms are attached to the rear crossmember and knuckle using a unique bolt and nut assembly at each end. The lateral arm-to-rear crossmember attaching bolts are longer than the lateral arm-to-knuckle attaching bolts. Each lateral arm to knuckle attaching bolt and nut assembly uses two flat washers. Each lateral arm to rear crossmember attaching bolt uses one flat washer and one adjustment cam to provide a means for rear wheel alignment toe adjustment.

TENSION STRUT

The tension strut controls the fore-and-aft movement of the rear knuckle (Fig. 1).

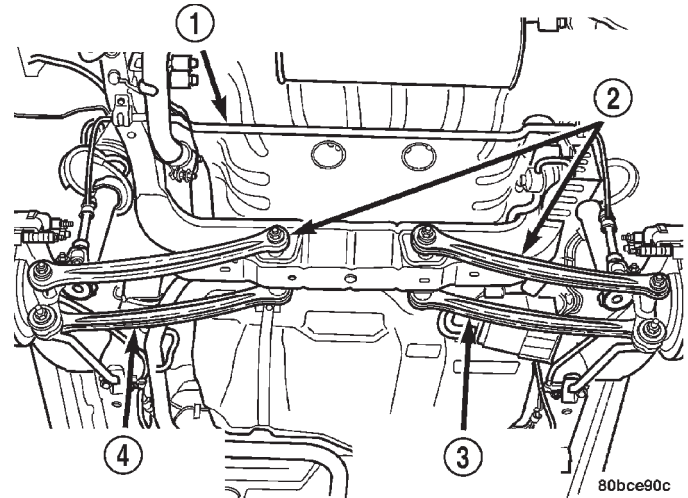
There is one tension strut per side of the rear suspension. The leading end of the tension strut attaches to the frame rail while the trailing end of the strut attaches to the lower end of the rear knuckle. The tension strut is isolated from the rest of the rear suspension through the use of rubber bushings located at each end. The rear bushings (bayonet type) can be serviced separately, the front bushings (spool type) cannot.

STABILIZER BAR (REAR)

The stabilizer bar interconnects both rear strut assemblies and is attached to the rear frame rails of the vehicle (Fig. 3).

The rear stabilizer bar allows jounce and rebound movements affecting one wheel to be partially transmitted to the opposite wheel of the vehicle to stabilize body roll.

Attachment of the stabilizer bar to the rear frame rails of the vehicle is through two rubber-isolator cushions and retainers (Fig. 1). The stabilizer bar attachment to each strut assembly is done utilizing a rubber isolated stabilizer bar link. All parts of the stabilizer bar are serviceable, and the stabilizer bar to frame rail isolator cushions are split for easy removal and installation.

**Fig. 3 Rear Stabilizer Bar**

- 1 - REAR STABILIZER BAR
- 2 - REAR LATERAL ARMS
- 3 - RIGHT FRONT LATERAL ARM
- 4 - LEFT FRONT LATERAL ARM

DIAGNOSIS AND TESTING**STRUT ASSEMBLY (REAR)**

Inspect the strut assembly for the following conditions (Fig. 4):

- Inspect for a damaged or broken coil spring.
- Inspect for a torn or damaged strut assembly dust shield.
- Lift the dust shield and inspect the strut assembly for evidence of fluid running from the upper end of the strut fluid reservoir. (Actual leakage will be a stream of fluid running down the side and dripping off lower end of unit.) A slight amount of seepage between the strut shaft and strut shaft seal is not unusual and does not affect performance of the strut assembly.
- Lift the dust shield and inspect the jounce bumper for signs of damage or deterioration.

DIAGNOSIS AND TESTING (Continued)

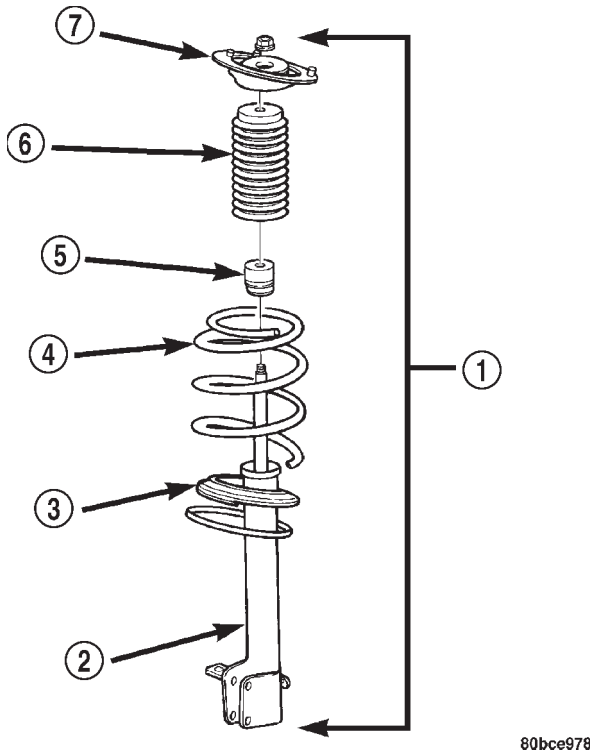


Fig. 4 Strut Assembly

- 1 - STRUT ASSEMBLY
- 2 - STRUT
- 3 - LOWER SPRING ISOLATOR
- 4 - COIL SPRING
- 5 - JOUNCE BUMPER
- 6 - DUST SHIELD
- 7 - UPPER MOUNT

KNUCKLE (REAR)

The rear knuckle is not a repairable component of the rear suspension. Upon visual inspection, if it is determined that the knuckle is cracked, bent or broken, no attempt is to be made to repair or to straighten the knuckle. The knuckle must be replaced if found to be damaged in any way.

HUB AND BEARING (REAR)

The hub and bearing is designed for the life of the vehicle and requires no type of periodic maintenance (Fig. 1). The following procedure may be used for diagnosing the condition of the hub and bearing.

With the wheel, disc brake rotor or brake drum removed, rotate the hub. Any roughness or resistance to rotation may indicate dirt intrusion or a failed hub bearing. If the bearing exhibits any of these conditions during diagnosis, the hub and bearing will require replacement. The bearing is not serviceable alone.

Damaged bearing seals and the resulting excessive grease loss may also require hub and bearing replacement. Moderate grease weepage from the

bearing is considered normal and should not require replacement of the wheel bearing.

To diagnose a bent hub, refer to BRAKE ROTOR in the DIAGNOSIS AND TESTING section in the BRAKES service manual group for the procedure on measuring hub runout.

LATERAL ARMS

Inspect each lateral arm (Fig. 1). Look for signs of contact with an object that has caused damage to the lateral arm. If the lateral arm is bent or damaged, the lateral arm will require replacement. Do not attempt to repair or straighten a lateral arm.

Inspect the lateral arm isolator bushings and their sleeves for signs of damage or deterioration. If damage or deterioration is present, replacement of the entire lateral arm will be required. The isolator bushings cannot be serviced separately from the lateral arms.

TENSION STRUT

Inspect the tension strut (Fig. 1). Look for signs of contact with any object that has bent or caused other damage to the tension strut. If the tension strut is bent or damaged, the tension strut will require replacement. Do not attempt to repair or straighten a tension strut.

Inspect the tension strut front (spool type) bushing, and rear (bayonet type) bushings and retainers for signs of deterioration or damage. If the front bushing is damaged or shows signs of deterioration, the tension strut must be replaced. The front bushing cannot be replaced separately. If the rear bushings are deteriorated or damaged, or the retainers are damaged, replacement is necessary. The bushings and retainers can be replaced separately from the tension strut.

STABILIZER BAR (REAR)

Inspect the stabilizer bar (Fig. 1). Look for damage or bending. If damage is evident, the bar must be replaced.

Inspect for broken, cracked or distorted stabilizer bar cushions and cushion retainers. The horizontal slit at the front of each cushion is supposed to be there. If damage is evident, the cushions can be replaced separately from the stabilizer bar utilizing the horizontal slit.

Inspect the stabilizer bar links that attach the stabilizer bar to each rear strut. Look for damage or deterioration of the bushings on the ends of each link. Inspect the stabilizer bar link to ensure it is not bent or broken. If any of these conditions are present, the stabilizer bar link must be replaced. The links can be replaced separately from the stabilizer bar.

REMOVAL AND INSTALLATION

SERVICE WARNINGS AND CAUTIONS

WARNING: DO NOT REMOVE THE STRUT SHAFT NUT WHILE STRUT ASSEMBLY IS INSTALLED IN VEHICLE, OR BEFORE THE COIL SPRING IS COMPRESSED WITH A COMPRESSION TOOL. THE SPRING IS HELD UNDER HIGH PRESSURE.

CAUTION: Only frame contact or wheel lift hoisting equipment can be used on vehicles having a fully independent rear suspension. Vehicles with independent rear suspension can not be hoisted using equipment designed to lift a vehicle by the rear axle. If this type of hoisting equipment is used damage to rear suspension components will occur.

NOTE: If a rear suspension component becomes bent, damaged or fails, no attempt should be made to straighten or repair it. Always replace it with a new component.

STRUT ASSEMBLY (REAR)

NOTE: Before proceeding with this procedure, review **SERVICE WARNINGS AND CAUTIONS** at the beginning of **REMOVAL AND INSTALLATION** in this section.

REMOVAL

(1) Raise the vehicle. Refer to **HOISTING** in the **LUBRICATION AND MAINTENANCE** group for the proper lifting procedure.

(2) Remove the rear wheel and tire assembly from the vehicle.

(3) If the vehicle is equipped with rear drum brakes, remove the screw securing the brake hose bracket to the rear of the strut assembly (Fig. 5).

(4) If the vehicle is equipped with the antilock brake system (ABS), remove the screw securing the ABS wheel speed sensor bracket to the rear of the strut assembly (Fig. 6).

(5) Remove the nut from the end of the rear stabilizer bar link bolt (Fig. 5). Pull the bolt out through the top of the link and remove the link.

(6) If the vehicle is equipped with rear disc brakes (Fig. 7), perform the following:

- Remove the two guide pin bolts securing the front disc brake caliper to the steering knuckle.
- Remove the disc brake caliper from the knuckle and brake rotor.

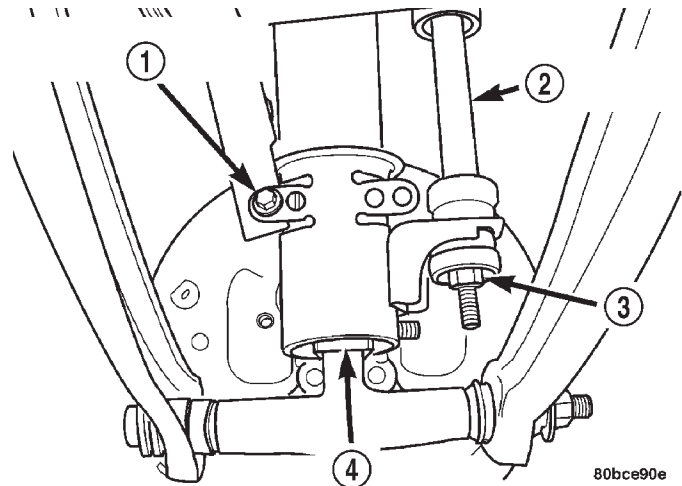


Fig. 5 Rear of Strut Assembly

- 1 - BRAKE HOSE BRACKET SCREW
- 2 - STABILIZER BAR LINK
- 3 - NUT
- 4 - STRUT ASSEMBLY

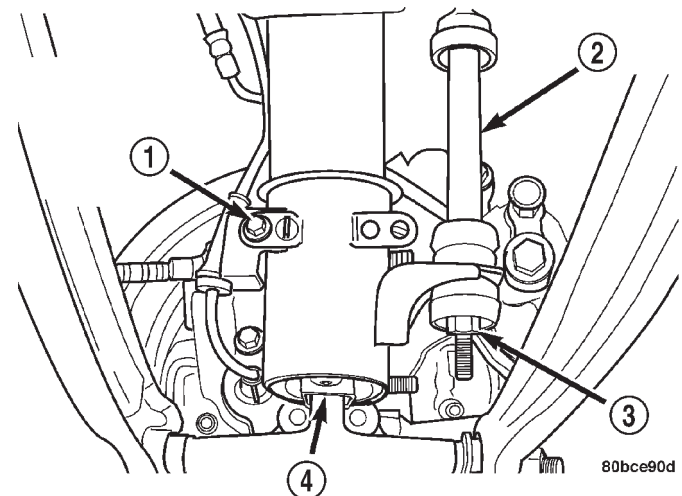
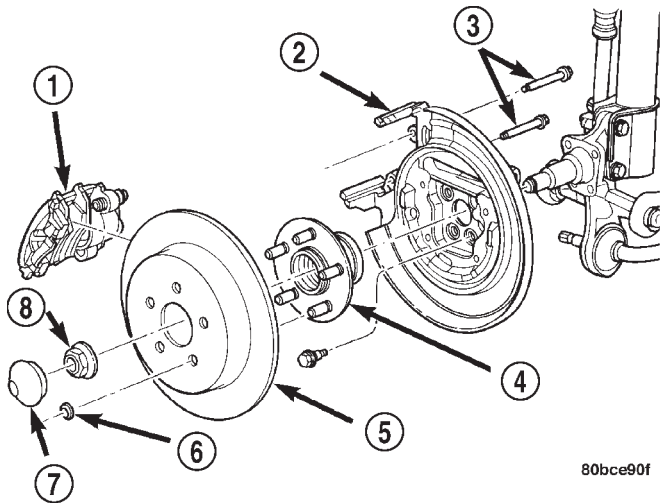


Fig. 6 Rear of Strut Assembly with ABS

- 1 - ABS WHEEL SPEED SENSOR BRACKET SCREW
- 2 - STABILIZER BAR LINK
- 3 - NUT
- 4 - STRUT ASSEMBLY

- Hang the caliper out of the way using a wire hanger or cord. Do not support the caliper by letting it hang by the hydraulic hose.

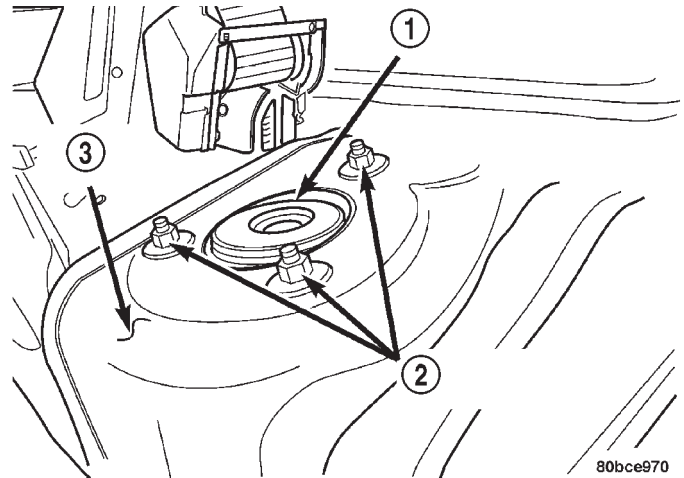
REMOVAL AND INSTALLATION (Continued)



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Fig. 7 Rear Disc Brakes

- 1 - DISC BRAKE CALIPER
- 2 - DISC BRAKE ADAPTER
- 3 - GUIDE PIN BOLTS
- 4 - HUB AND BEARING
- 5 - BRAKE ROTOR
- 6 - RETAINER CLIP
- 7 - DUST CAP
- 8 - NUT



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Fig. 8 Mounting At Strut Tower

- 1 - UPPER MOUNT
- 2 - MOUNTING NUTS
- 3 - STRUT TOWER

CAUTION: The strut-to-knuckle attaching bolts are serrated and must not be turned during removal. Hold the bolts stationary in the steering knuckle while removing the nuts, then tap the bolts out using a pin punch.

- (7) Remove the two nuts and bolts attaching the strut to the rear knuckle (Fig. 1).
- (8) Lower the vehicle just enough to access the luggage compartment without letting the tires touch the floor. Access to rear upper strut mount attaching bolts is through the luggage compartment.
- (9) Open the deck lid.
- (10) If equipped, remove the carpet from the top of the strut tower.
- (11) Loosen, but do not completely remove the 3 nuts securing the strut assembly to the strut tower (Fig. 8).

Grasp the strut assembly to keep it from moving, then remove the 3 mounting nuts at the strut tower.

(12) Remove the strut assembly from the knuckle by sliding it away from the knuckle, lowering it between the two lateral arms, then tipping the top outward and removing it out through the well opening.

(13) For disassembly and assembly procedures of the strut assembly, refer to STRUT ASSEMBLY in the DISASSEMBLY AND ASSEMBLY section in this section of this service manual group.

INSTALLATION

- (1) To place the strut assembly into mounting position, start the lower end of the strut over the top of the knuckle and down the back between the two lateral arms. Next, lift the top of the strut assembly up into the strut tower aligning the studs on top of the upper mount with the three mounting holes in the strut tower. While holding the strut assembly in place, install the three mounting nuts on the upper mount studs inside the luggage compartment (Fig. 8). Tighten the 3 mounting nuts to a torque of 34 N·m (300 in. lbs.).
- (2) Install the carpeting back on top of the rear strut tower.
- (3) Close the deck lid.
- (4) Raise the vehicle.

CAUTION: The strut-to-knuckle attaching bolts are serrated and must not be turned during installation. Once installed, hold the bolts stationary in the steering knuckle while installing and tightening the nuts.

(5) Align the holes in the strut clevis bracket on the lower end of the strut with the mounting holes in the knuckle. Install the two bolts attaching the strut to the rear knuckle (Fig. 1). Install the nuts. Tighten the two nuts to 88 N·m (65 ft. lbs.).

(6) If the vehicle is equipped with disc brakes (Fig. 7), install the brake rotor and disc brake caliper on the knuckle. Install the two guide pin bolts securing the front disc brake caliper to the steering knuckle. Tighten the guide pin bolts to a torque of 22 N·m (192 in. lbs.).

(7) Reinstall the stabilizer bar link (Fig. 1):

REMOVAL AND INSTALLATION (Continued)

- Place the link center sleeve and bushings between the eye in the end of the stabilizer bar and the link mounting bracket on the strut.

- Start the stabilizer bar link bolt with bushing from the top, down through the stabilizer bar, inner link bushings and sleeve, and strut link mounting bracket.

- Install a lower bushing, then the nut. Do not tighten the nut at this time.

(8) If the vehicle is equipped with the antilock brake system (ABS), install the screw securing the ABS wheel speed sensor bracket to the rear of the strut assembly (Fig. 6). Tighten the mounting screw to a torque of 13 N·m (120 in. lbs.).

(9) If the vehicle is equipped with rear drum brakes, install the screw securing the brake hose bracket to the rear of the strut assembly (Fig. 5). Tighten the screw to a torque of 31 N·m (275 in. lbs.).

(10) Install the tire and wheel assembly on vehicle. Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Repeat the tightening sequence, this time, to full specified torque of 135 N·m (100 ft. lbs.).

(11) Lower the vehicle to ground level.

(12) Tighten the stabilizer bar link nut to a torque of 23 N·m (200 in. lbs.).

(13) Set the rear toe on the vehicle to the required specification if necessary. Refer to WHEEL ALIGNMENT in this service manual group.

KNUCKLE (REAR)

NOTE: Before proceeding with this procedure, review **SERVICE WARNINGS AND CAUTIONS** at the beginning of **REMOVAL AND INSTALLATION** in this section.

REMOVAL

(1) Raise the vehicle. Refer to **HOISTING** in the **LUBRICATION AND MAINTENANCE** group for the proper lifting procedure.

(2) Remove the rear wheel and tire assembly from the vehicle.

(3) If the vehicle is equipped with rear drum brakes, remove the screw securing the brake hose bracket to the rear of the strut assembly (Fig. 5).

(4) If the vehicle is equipped with the antilock brake system (ABS), remove the screw securing the ABS wheel speed sensor bracket to the rear of the strut assembly (Fig. 6).

(5) If the vehicle is equipped with rear drum brakes, remove any retainer clips from the wheel mounting studs, then pull the brake drum off the hub and bearing.

(6) If the vehicle is equipped with rear disc brakes (Fig. 7), perform the following:

- Remove the two guide pin bolts securing the front disc brake caliper to the steering knuckle.

- Remove the disc brake caliper from the knuckle and brake rotor.

- Hang the caliper out of the way using a wire hanger or cord. Do not support the caliper by letting it hang by the hydraulic hose.

- Remove any retainer clips from the wheel mounting studs, then pull the brake rotor off the hub and bearing.

(7) Remove the dust cap from the hub and bearing assembly (Fig. 7).

(8) Remove the retaining nut, then the hub and bearing from the knuckle's spindle (Fig. 7).

(9) If vehicle is equipped with rear drum brakes, remove the four bolts attaching the rear brake support plate to the knuckle (Fig. 9). Next, remove the brake support plate, brake shoes and wheel cylinder as an assembly from the rear knuckle, then hang it out of the way using a wire hanger or cord. Do not overextend the brake hose when being hung. It is not necessary to remove the brake hose from the wheel cylinder when removing the support plate.

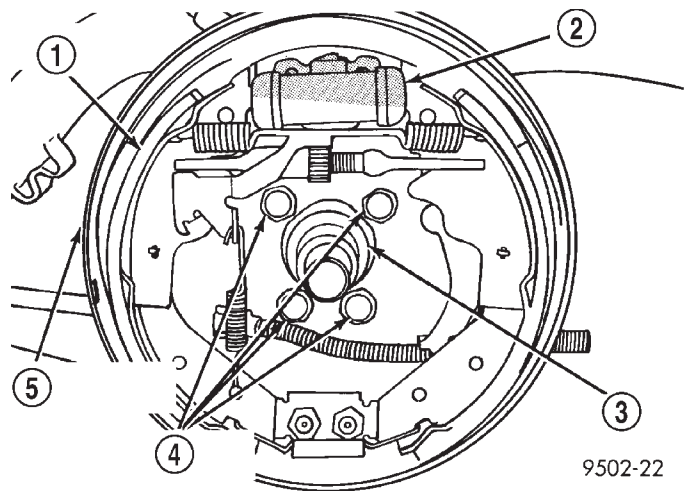
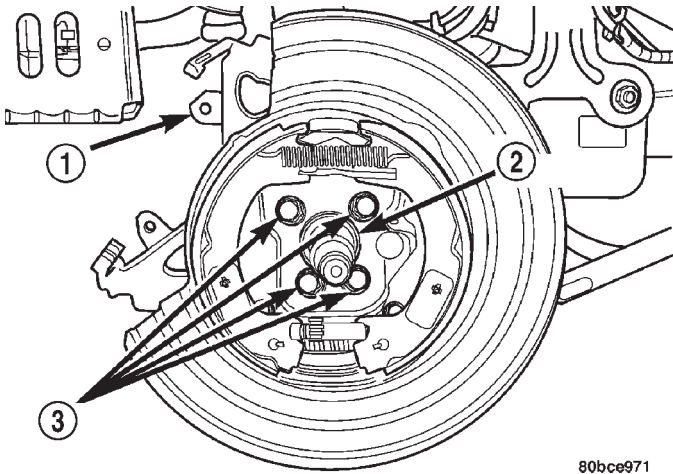


Fig. 9 Support Plate Mounting

- 1 - BRAKE SHOES
- 2 - WHEEL CYLINDER
- 3 - KNUCKLE
- 4 - BRAKE SUPPORT PLATE MOUNTING BOLTS
- 5 - BRAKE SUPPORT PLATE

(10) If the vehicle is equipped with rear disc brakes, remove the four bolts mounting the disc brake adapter to the rear knuckle (Fig. 10). Next, remove the adapter, rotor shield, parking brake shoes and parking brake cable as an assembly from the knuckle, then hang it out of the way using a wire hanger or cord.

REMOVAL AND INSTALLATION (Continued)



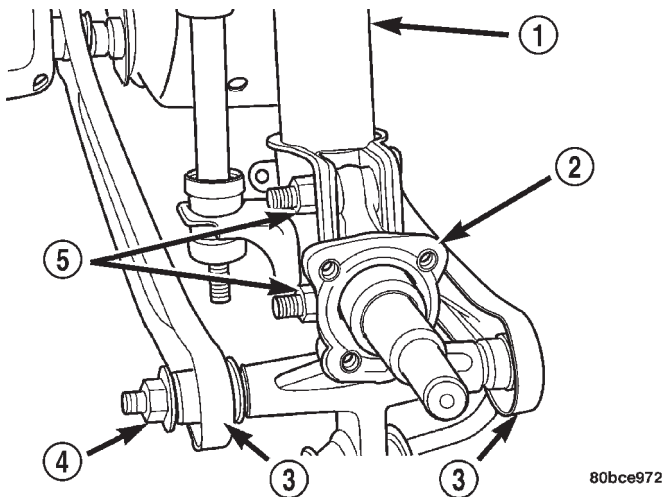
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Fig. 10 Disc Brake Adapter Mounting

- 1 - DISC BRAKE ADAPTER
- 2 - KNUCKLE
- 3 - MOUNTING BOLTS

CAUTION: The strut-to-knuckle attaching bolts are serrated and must not be turned during removal. Hold the bolts stationary in the steering knuckle while removing the nuts, then tap the bolts out using a pin punch.

(11) Loosen, but do not completely remove the two nuts and bolts attaching the rear knuckle to the strut (Fig. 11).



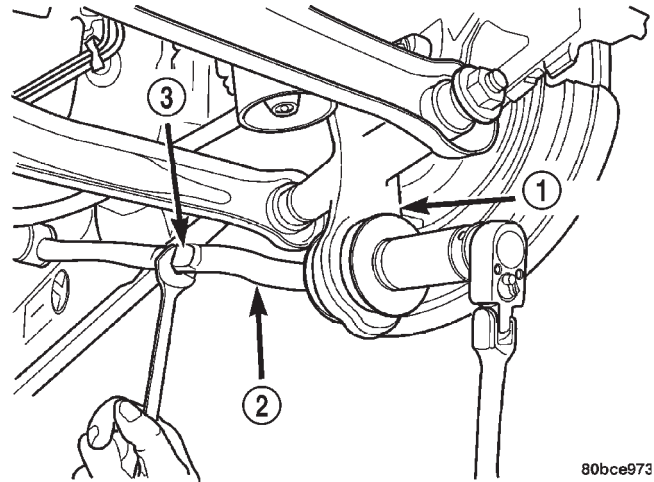
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Fig. 11 Rear Knuckle Mounting

- 1 - STRUT ASSEMBLY
- 2 - KNUCKLE
- 3 - LATERAL ARMS
- 4 - NUT
- 5 - NUTS

(12) Remove the nuts and bolt attaching the rear knuckle to the lateral arms (Fig. 11).

(13) Disconnect the tension strut from the knuckle. To do this, first hold the tension strut from turning by using a wrench on the flat on the tension strut and then remove the nut from the rear of the tension strut (Fig. 12). Next, remove the tension strut retainer, then the rear tension strut bayonet bushing from the tension strut.



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Fig. 12 Tension Strut Nut Removal/Installation

- 1 - KNUCKLE
- 2 - TENSION STRUT
- 3 - FLAT

(14) Remove the two nuts and bolts attaching the rear knuckle to the strut (Fig. 11). Tap the bolts from the knuckle using a pin punch.

(15) Remove the knuckle.

INSTALLATION

(1) To install the knuckle on the vehicle, first align the hole in the lower end of the rear knuckle with the forward bayonet bushing on the tension strut. Be sure the stepped area of the bushing is squarely seated into the hole in the knuckle. Next, Rotate the knuckle until the upper mounting holes in the knuckle is aligned with the holes in the strut's clevis bracket.

CAUTION: The strut-to-knuckle attaching bolts are serrated and must not be turned during installation. Once installed, hold the bolts stationary in the steering knuckle while installing and tightening the nuts.

(2) Install the two bolts attaching the strut to the rear knuckle from the front side. Install the nuts on the bolts (Fig. 11). Tighten the two nuts to a torque of 88 N·m (65 ft. lbs.).

(3) Align the lateral arms with the hole in the center of the knuckle. Install the bolt attaching the arms to the knuckle. When installing the bolt, start it from

REMOVAL AND INSTALLATION (Continued)

the front side. Install the nut, but do not completely tighten it at this time. The nut will need to be tightened when the vehicle is at curb height.

(4) Install the rear bayonet bushing on the tension strut. Be sure the stepped area of the bushing is squarely seated into the hole in the knuckle.

(5) Install the rear tension strut retainer, then the nut. To completely install the nut, place a wrench on the flat formed into the tension strut and tighten the nut (Fig. 12). Tighten the nut to a torque of 95 N·m (70 ft. lbs.).

(6) If vehicle is equipped with rear drum brakes, install the brake support plate on the knuckle and attach it using its four mounting bolts (Fig. 9). Tighten the mounting bolts to a torque of 75 N·m (55 ft. lbs.).

(7) If the vehicle is equipped with rear disc brakes, install the disc brake adapter on the knuckle and attach it using its four mounting bolts (Fig. 10). Tighten the mounting bolts to a torque of 75 N·m (55 ft. lbs.).

(8) Install the hub and bearing on the knuckle's spindle, then install a new retaining nut (Fig. 7). Do not reuse the original nut. Tighten the nut to a torque of 217 N·m (160 ft. lbs.).

(9) Install the dust cap on the end of the hub and bearing (Fig. 7).

(10) If the vehicle is equipped with rear disc brakes (Fig. 7), install the brake rotor and disc brake caliper on the knuckle. Install the two guide pin bolts securing the front disc brake caliper to the steering knuckle. Tighten the guide pin bolts to a torque of 22 N·m (192 in. lbs.).

(11) If the vehicle is equipped with rear drum brakes, install the screw securing the brake hose bracket to the rear of the strut assembly (Fig. 5). Tighten the screw to a torque of 31 N·m (275 in. lbs.).

(12) If the vehicle is equipped with the antilock brake system (ABS), install the screw securing the ABS wheel speed sensor bracket to the rear of the strut assembly (Fig. 6). Tighten the mounting screw to a torque of 13 N·m (120 in. lbs.).

(13) Install the tire and wheel assembly. Tighten the wheel mounting nuts in proper sequence until all nuts are torqued to half specification. Repeat the tightening sequence, this time, to full specified torque of 135 N·m (100 ft. lbs.).

(14) Lower the vehicle to ground level.

(15) Tighten the lateral arm-to-knuckle mounting bolt nut to a torque of 95 N·m (70 ft. lbs.).

(16) Set the rear toe on the vehicle to the required specification if necessary. Refer to WHEEL ALIGNMENT in this service manual group.

HUB AND BEARING (REAR)

NOTE: Before proceeding with this procedure, review **SERVICE WARNINGS AND CAUTIONS** at the beginning of **REMOVAL AND INSTALLATION** in this section.

REMOVAL

(1) Raise the vehicle. Refer to **HOISTING** in the **LUBRICATION AND MAINTENANCE** group for the proper lifting procedure.

(2) Remove the rear wheel and tire assembly from the vehicle.

(3) If the vehicle is equipped with rear drum brakes, remove any retainer clips from the wheel mounting studs, then pull the brake drum off the hub and bearing.

(4) If the vehicle is equipped with rear disc brakes (Fig. 7), perform the following:

- Remove the two guide pin bolts securing the front disc brake caliper to the steering knuckle.

- Remove the disc brake caliper from the knuckle and brake rotor.

- Hang the caliper out of the way using a wire hanger or cord. Do not support the caliper by letting it hang by the hydraulic hose.

- Remove any retainer clips from the wheel mounting studs, then pull the brake rotor off the hub and bearing.

(5) Remove the dust cap from the hub and bearing assembly (Fig. 7).

(6) Remove the retaining nut, then the hub and bearing from the knuckle's spindle (Fig. 7).

INSTALLATION

(1) Install the hub and bearing on the knuckle's spindle, then install a new retaining nut (Fig. 7). Do not reuse the original nut. Tighten the nut to a torque of 217 N·m (160 ft. lbs.).

(2) Install the dust cap on the end of the hub and bearing (Fig. 7).

(3) If the vehicle is equipped with rear disc brakes (Fig. 7), install the brake rotor and disc brake caliper on the knuckle. Install the two guide pin bolts securing the front disc brake caliper to the steering knuckle. Tighten the guide pin bolts to a torque of 22 N·m (192 in. lbs.).

(4) Install the tire and wheel assembly. Tighten the wheel mounting nuts in proper sequence until all nuts are torqued to half specification. Repeat the tightening sequence, this time, to full specified torque of 135 N·m (100 ft. lbs.).

(5) Lower the vehicle to ground level.

REMOVAL AND INSTALLATION (Continued)

LATERAL ARMS

NOTE: Before proceeding with this procedure, review **SERVICE WARNINGS AND CAUTIONS** at the beginning of **REMOVAL AND INSTALLATION** in this section.

Use the following procedure for removal and installation of one or both lateral arms on one side of the vehicle's rear suspension.

REMOVAL

- (1) Raise the vehicle. Refer to **HOISTING** in the **LUBRICATION AND MAINTENANCE** group for the proper lifting procedure.
- (2) Remove the rear tire and wheel assembly.
- (3) Remove the nut, bolt and washers attaching both lateral arms to the knuckle (Fig. 1).
- (4) Remove nut, washer, bolt and wheel alignment cam attaching the lateral arms to the rear crossmember (Fig. 1).
- (5) Remove the lateral arms from vehicle.

INSTALLATION

NOTE: Both lateral arms when being installed, must be specifically positioned and orientated on the vehicle. The lateral arm that has the same size bushing sleeves on both ends must be mounted on the forward side of the crossmember and knuckle with the trimmed outer edge facing rearward. This front arm is also marked with the word "FORWARD". The side of the arm displaying this must face forward.

The lateral arm with two different size bushing sleeves must be mounted on the rearward side of the crossmember and knuckle. Position the smaller bushing sleeve end at the knuckle and the larger bushing sleeve end at the rear crossmember (the larger bushing sleeve is necessary to accommodate the rear wheel alignment adjustment cam). If the rear arm is to be mounted on the right side, the trimmed outer edge must face rearward. If the rear arm is to be mounted on the left side, the trimmed outer edge must face forward.

- (1) Following the note above, place the forward lateral arm against the leading end of the knuckle, and then install the short lateral arm mounting bolt with a washer through the lateral arm and knuckle and out the trailing end of the knuckle (Fig. 1).
- (2) Following the note above, install the small bushing sleeved end of the rear lateral arm onto the end of the bolt just installed through the knuckle (Fig. 1). Install a washer and nut onto the end of the mounting bolt, but do not completely tighten the bolt at this time.

- (3) Install a wheel alignment adjustment cam on the long arm mounting bolt.
- (4) Hold the rear lateral arm up against the crossmember and install the long mounting bolt with the adjustment cam through the lateral arm bushing and rear crossmember (Fig. 1). The bolt must be installed with the notch in the adjustment cam pointing straight up.
- (5) Position the forward lateral arm against the rear crossmember hole. Pass the long mounting bolt through the lateral arm bushing sleeve.
- (6) Install a washer and nut onto the end of lateral arm mounting bolt at the rear crossmember, but do not completely tighten the bolt at this time.

NOTE: Once installed, each lateral arm should have the bow in its length facing downward. Both right side arms should have the trimmed outer edge facing toward the rear of the car. Left side arms should have the trimmed outer edge facing each other. The mounting bolt at the knuckle should have the nut at the rear and the mounting bolt at the crossmember should have the nut at the front (Fig. 13).

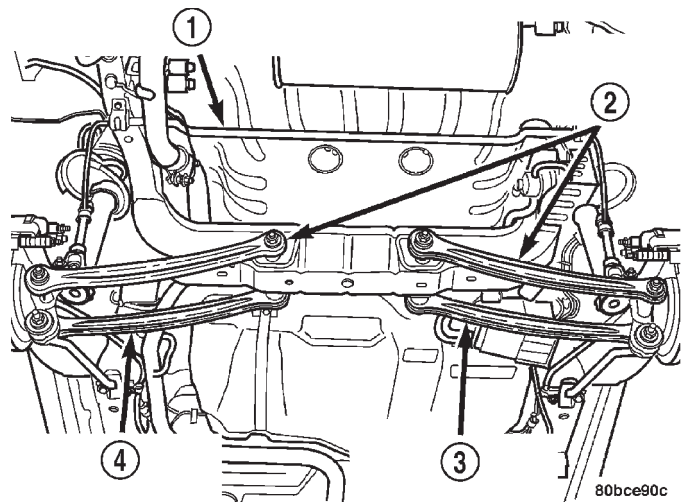


Fig. 13 Lateral Arms

- 1 - REAR STABILIZER BAR
- 2 - REAR LATERAL ARMS
- 3 - RIGHT FRONT LATERAL ARM
- 4 - LEFT FRONT LATERAL ARM

- (7) Install tire and wheel assembly on the vehicle. Tighten the wheel mounting nuts in proper sequence until all nuts are torqued to half specification. Repeat the tightening sequence to the full specified torque of 135 N·m (100 ft. lbs.).
- (8) Lower the vehicle to the ground.
- (9) With suspension at curb height, tighten the lateral arm mounting bolt nut at the knuckle to 95 N·m (70 ft. lbs.).

REMOVAL AND INSTALLATION (Continued)

(10) With suspension at curb height, tighten the lateral arm mounting bolt nut at the crossmember to 88 N·m (65 ft. lbs.).

(11) Set the rear toe on the vehicle to the required specification as necessary. Refer to WHEEL ALIGNMENT in this service manual group.

TENSION STRUT

NOTE: Before proceeding with this procedure, review **SERVICE WARNINGS AND CAUTIONS** at the beginning of **REMOVAL AND INSTALLATION** in this section.

REMOVAL

(1) Raise the vehicle. Refer to **HOISTING** in the **LUBRICATION AND MAINTENANCE** group for the proper lifting procedure.

(2) Remove the rear wheel and tire assembly from the vehicle.

(3) Disconnect the tension strut from the knuckle. To do this, first hold the tension strut from turning by using a wrench on the flat on the tension strut and then remove the nut from the rear of the tension strut (Fig. 14). Next, remove the tension strut retainer, then the rear tension strut bayonet bushing from the tension strut.

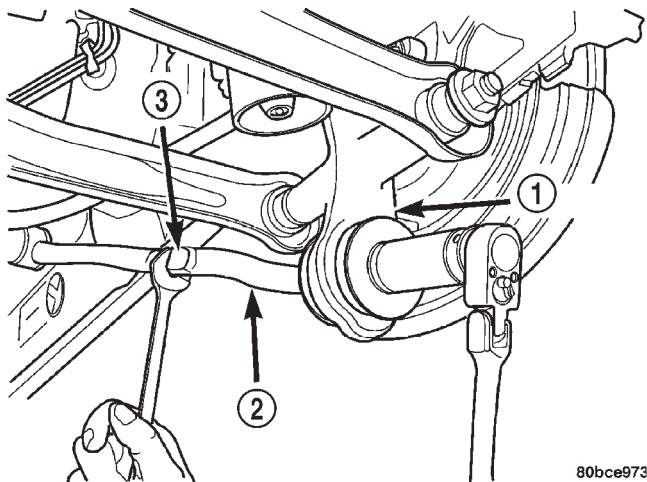


Fig. 14 Tension Strut Nut Removal/Installation

- 1 - KNUCKLE
- 2 - TENSION STRUT
- 3 - FLAT

(4) Remove the nut attaching the parking brake cable to the stud on the inboard tension strut mounting bolt at the frame (Fig. 15). Remove the parking brake cable from the stud.

(5) Remove the two mounting bolts holding the tension bolts to the frame, then remove the tension strut from the vehicle.

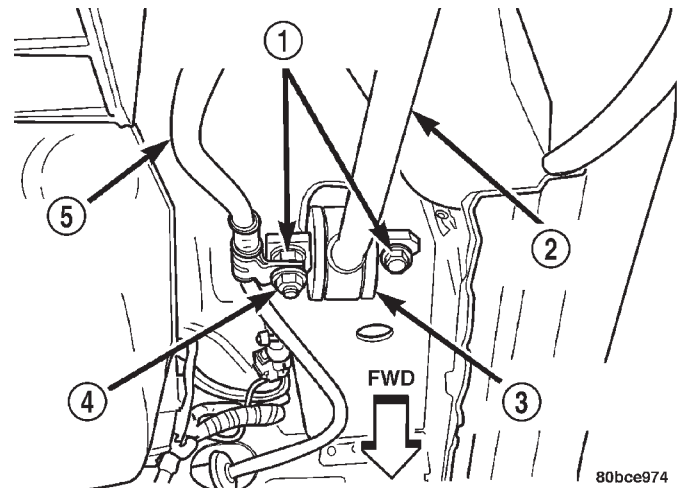


Fig. 15 Tension Strut Mounting At Frame

- 1 - TENSION STRUT MOUNTING BOLTS
- 2 - TENSION STRUT
- 3 - SPOOL BUSHING
- 4 - NUT
- 5 - PARKING BRAKE CABLE

(6) Remove the forward bayonet bushing and retainer from the tension strut.

INSTALLATION

(1) Install the forward retainer and a bayonet bushing on the tension strut trailing end. Be sure the stepped area of the bushing is installed to face the knuckle.

(2) To install the knuckle on the tension, first stick the trailing end through the hole in the lower end of the knuckle, seating the bayonet bushing squarely against the hole. Next, raise the end of the tension strut with the spool bushing into its mounting position on the frame (Fig. 15). Install the mounting bolts securing the tension strut to the frame. Remember, the mounting bolt with the stud on the head is installed on the inboard side.

(3) Tighten the two mounting bolts at the frame to a torque of 95 N·m (70 ft. lbs.).

(4) Place the parking brake cable routing bracket on the stud of the inboard mounting bolt and install the nut securing it in place (Fig. 15). Tighten the nut to a torque of 28 N·m (250 in. lbs.).

(5) Install the rear bayonet bushing on the tension strut. Be sure the stepped area of the bushing is squarely seated into the hole in the knuckle.

(6) Install the rear tension strut retainer, then the nut. To completely install the nut, place a wrench on the flat formed into the tension strut and tighten the nut (Fig. 14). Tighten the nut to a torque of 95 N·m (70 ft. lbs.).

(7) Install the tire and wheel assembly. Tighten the wheel mounting nuts in proper sequence until all

REMOVAL AND INSTALLATION (Continued)

nuts are torqued to half specification. Repeat the tightening sequence, this time, to full specified torque of 135 N·m (100 ft. lbs.).

- (8) Lower the vehicle to ground level.
- (9) Set the rear toe on the vehicle to the required specification if necessary. Refer to WHEEL ALIGNMENT in this service manual group.

STABILIZER BAR (REAR)

NOTE: Before proceeding with this procedure, review **SERVICE WARNINGS AND CAUTIONS** at the beginning of **REMOVAL AND INSTALLATION** in this section.

REMOVAL

- (1) Raise the vehicle. Refer to **HOISTING** in the **LUBRICATION AND MAINTENANCE** group for the proper lifting procedure.
- (2) Remove both rear wheel and tire assemblies from the vehicle.
- (3) Remove the nut from the end of each rear stabilizer bar link bolt (Fig. 16). Pull the bolt out through the top of the link and remove the link from each end of the stabilizer bar.

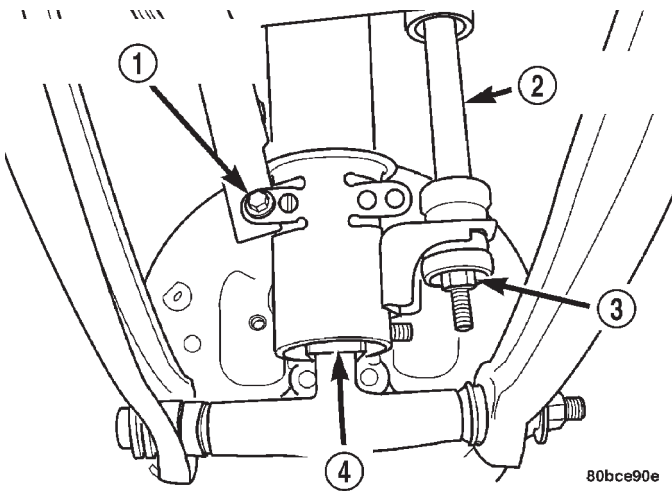


Fig. 16 Stabilizer Bar Link

- 1 - BRAKE HOSE BRACKET SCREW
- 2 - STABILIZER BAR LINK
- 3 - NUT
- 4 - STRUT ASSEMBLY

- (4) Remove the two bolts securing each of the two cushion retainers to the frame rails (Fig. 1), then remove the cushion retainers, cushions and stabilizer bar from the vehicle as an assembly.
- (5) Pull the cushion retainers off the cushions.
- (6) The cushions can be removed from the bar by utilizing the pre-formed slit in each cushion and peeling it off the bar.

INSTALLATION

- (1) Install the cushions on the stabilizer bar by opening the slit in the cushion and wrapping the cushion around the bar. When installed properly, the slit in the cushion should face in the same direction as the ends of the stabilizer bar, or toward the front of the car once the bar is installed. The flat side of each cushion should face upward.
- (2) Install the retainers on the cushions, matching the contour of each retainer with its cushion.
- (3) Install the stabilizer bar, cushions and retainers on the car as an assembly. The dipped area in the center of the bar must face down to clear the well in the luggage compartment.
- (4) Install two bolts in each cushion retainer and secure the stabilizer bar to the frame of the vehicle (Fig. 1). Do not completely install the bolts at this time.
- (5) Reinstall each stabilizer bar link (Fig. 1):
 - Place the link center sleeve and bushings between the eye in the end of the stabilizer bar and the link mounting bracket on the strut.
 - Start the stabilizer bar link bolt with bushing from the top, down through the stabilizer bar, inner link bushings and sleeve, and strut link mounting bracket.
 - Install a lower bushing, then the nut. Do not tighten the nut at this time.
- (6) Install both tire and wheel assemblies on the vehicle. Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Repeat the tightening sequence, this time, to full specified torque of 135 N·m (100 ft. lbs.).
- (7) Lower the vehicle to ground level or curb height.
- (8) Tighten the rear stabilizer bar cushion retainer bolts to a torque of 34 N·m (300 in. lbs.).
- (9) Tighten the stabilizer bar link nuts to a torque of 23 N·m (200 in. lbs.).
- (10) Set the rear toe on the vehicle to the required specification if necessary. Refer to **WHEEL ALIGNMENT** in this service manual group.

DISASSEMBLY AND ASSEMBLY

STRUT ASSEMBLY (REAR)

The strut assembly must be removed from the vehicle for it to be disassembled and assembled. Refer to **REMOVAL AND INSTALLATION** in this section for the required procedure.

For the disassembly and assembly of the strut assembly, use strut spring compressor, Pentastar Service Equipment (PSE) tool W-7200, or the equivalent, to compress the coil spring. Follow the manufacturer's instructions closely.

DISASSEMBLY AND ASSEMBLY (Continued)

DISASSEMBLY

(1) If both struts are being serviced at the same time, mark the coil spring and strut assembly according to which side of the vehicle the strut was removed from, and which strut the coil spring was removed from.

(2) Position the strut assembly in the strut coil spring compressor following the manufacturers instructions. Set the lower, then upper hooks on the coil spring (Fig. 17). Position the strut clevis bracket straight inward toward the compressor. Place a clamp on the lower end of the coil spring, so the strut is held in place once the strut shaft nut is removed.

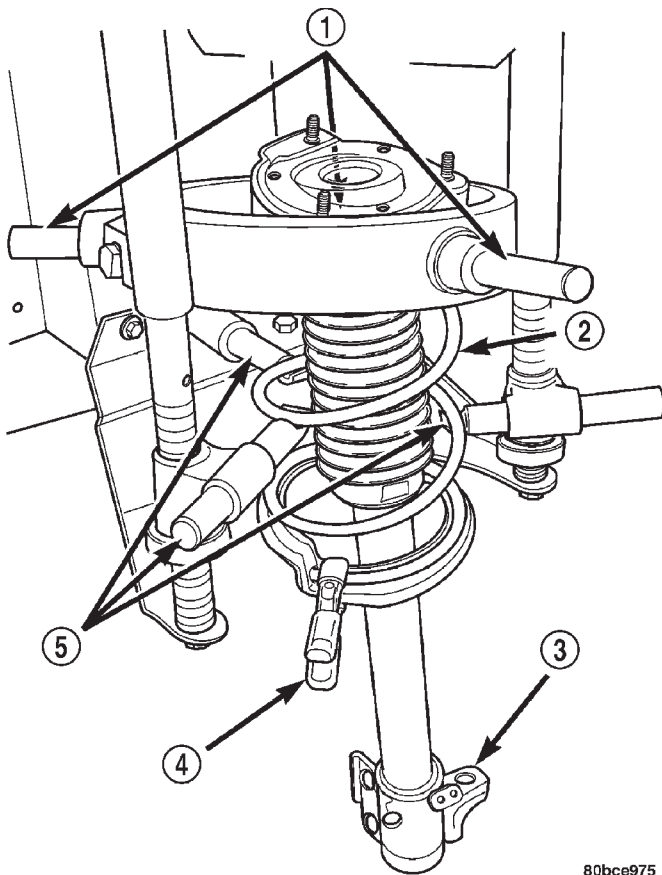


Fig. 17 Strut Assembly In Compressor

- 1 - UPPER HOOKS
- 2 - COIL SPRING
- 3 - CLEVIS BRACKET
- 4 - CLAMP
- 5 - LOWER HOOKS

WARNING: DO NOT REMOVE THE STRUT SHAFT NUT BEFORE THE COIL SPRING IS COMPRESSED. THE COIL SPRING IS HELD UNDER PRESSURE AND MUST BE COMPRESSED, REMOVING SPRING TENSION FROM THE UPPER MOUNT AND PIVOT BEARING, BEFORE THE SHAFT NUT IS REMOVED.

(3) Compress the coil spring until all coil spring tension is removed from the upper mount.

(4) Once the spring is sufficiently compressed, install Strut Nut Socket, Special Tool 6864, on the strut shaft retaining nut (Fig. 18). Next, install a socket on the hex on the end of the strut shaft. While holding the strut shaft from turning, remove the nut from the strut shaft.

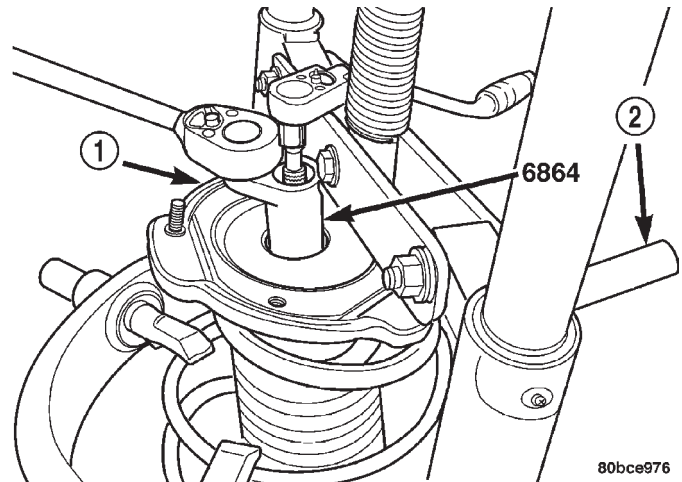


Fig. 18 Shaft Nut Removal/Installation

- 1 - UPPER MOUNT
- 2 - FRONT HOOK

(5) Remove the upper mount from the strut shaft (Fig. 19).

(6) Remove the clamp from the bottom of the coil spring and remove the strut out through the bottom of the coil spring.

(7) Remove the dust shield, then the jounce bumper from the strut shaft by pulling each straight up (Fig. 19).

(8) Remove the lower spring isolator from the lower spring seat located on the strut.

NOTE: If the coil spring needs to be serviced, proceed with the next step, otherwise, proceed with step 10.

NOTE: Before removing the coil spring from the compressor, make note of its position in the compressor, for easy reassembly.

(9) Release the tension from the coil spring by backing off the compressor drive completely. Push back the compressor hooks and remove the coil spring.

(10) Inspect the strut assembly components for the following and replace as necessary:

- Inspect the strut for any condition of shaft binding over the full stroke of the shaft.
- Inspect the jounce bumper for cracks and signs of deterioration.

DISASSEMBLY AND ASSEMBLY (Continued)

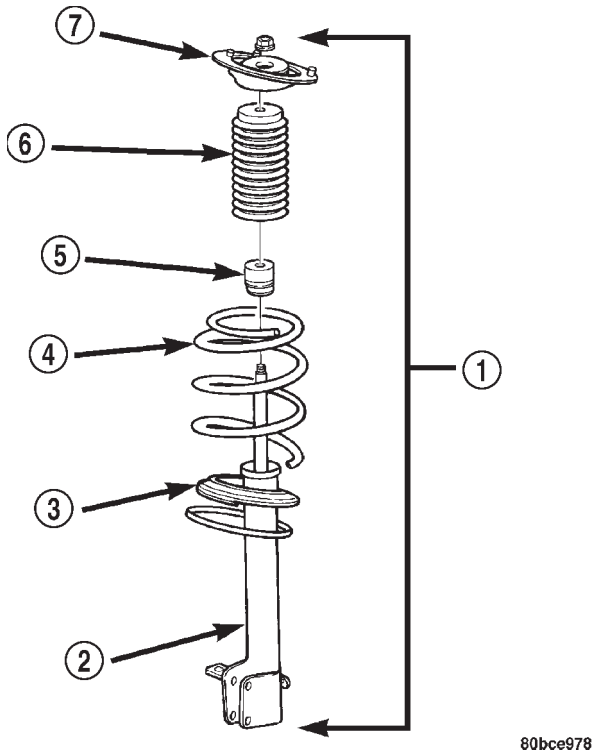


Fig. 19 Strut Assembly Components

- 1 - STRUT ASSEMBLY
- 2 - STRUT
- 3 - LOWER SPRING ISOLATOR
- 4 - COIL SPRING
- 5 - JOUNCE BUMPER
- 6 - DUST SHIELD
- 7 - UPPER MOUNT

- Check the upper mount for cracks and distortion and its retaining studs for any sign of damage.
- Inspect the dust shield for rips and deterioration.
- Inspect the upper and lower spring isolators for material deterioration and distortion.
- Inspect the coil spring for any sign of damage to the coating.

ASSEMBLY

NOTE: If the coil spring has been removed from the spring compressor, proceed with the next step, otherwise, proceed with step 3.

- (1) Place the coil spring in the compressor following the manufacturers instructions. Before compressing the spring, rotate the spring to the position determined in the note prior to step 9 in disassembly.
- (2) Slowly compress the coil spring until enough room is available for strut assembly reassembly.
- (3) Install the lower spring isolator on the lower spring seat of the strut matching the step built into

the isolator with the step in the lower spring seat on the strut (Fig. 19).

(4) Install the jounce bumper on the strut shaft. The jounce bumper is to be installed with the pointed end pointing downward toward the lower seat.

(5) Install the dust shield on the strut shaft (Fig. 19). The bottom of the dust shield will snap past the retainer on top of the strut housing.

(6) Install the strut through the bottom of the coil spring until the lower spring seat contacts the lower end of the coil spring. Rotate the strut until the end of the coil spring fits against the step in the lower spring seat (Fig. 17). If done correctly, the clevis on the bottom of the strut should face toward the compressor.

(7) Install the clamp on the lower end of the coil spring and strut, so the strut is held in place with the coil spring.

NOTE: Before installing the upper mount, check to make sure the correct side mount is being installed. Left and right upper mounts are different. A left mount will be marked with the letter "L" while a right mount will be marked with the letter "R" (Fig. 20).

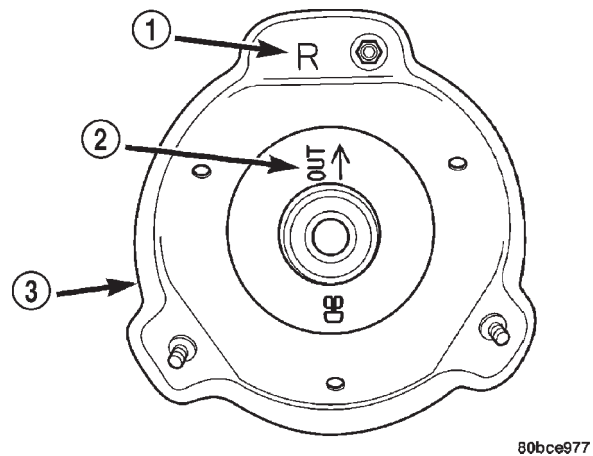


Fig. 20 Upper Mount Markings

- 1 - SIDE INDICATING LETTER
- 2 - DIRECTIONAL INDICATOR
- 3 - UPPER MOUNT

(8) Install the upper mount over the strut shaft and onto the top of the upper spring. Near the center on the top of the mount is the word "OUT" and an arrow (Fig. 20). Point the arrow on the mount in the same direction that the clevis bracket on the lower end of the strut is pointed in. This direction should be straight toward the compressor.

(9) Loosely install the retaining nut on the strut shaft. Install Strut Nut Socket (on the end of a torque wrench), Special Tool 6864, on the strut shaft retaining nut (Fig. 18). Next, install a socket on the

DISASSEMBLY AND ASSEMBLY (Continued)

hex on the end of the strut shaft. While holding the strut shaft from turning, tighten the strut shaft retaining nut to a torque of 75 N·m (55 ft. lbs.).

(10) Slowly release the tension from the coil spring by backing off the compressor drive completely. As the tension is relieved, make sure the upper mount's seat aligns properly with the coil spring.

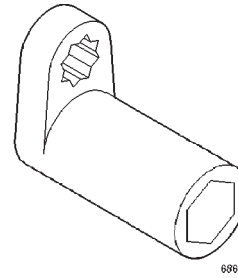
(11) Verify the arrow on the upper mount is pointing in the same direction as the strut clevis bracket as mentioned in step 9.

(12) Remove the clamp from the lower end of the coil spring and strut. Push back the spring compressor upper and lower hooks, then remove the strut assembly from the spring compressor.

(13) Install the strut assembly on the vehicle. Refer to REMOVAL AND INSTALLATION in this section for the required procedure.

SPECIAL TOOLS

REAR SUSPENSION



Socket/Wrench Strut Rod Nut 6864

SPECIFICATIONS

REAR SUSPENSION FASTENER TORQUE SPECIFICATIONS

DESCRIPTION	TORQUE
STRUT ASSEMBLY:	
Tower Attaching Nuts	34 N·m (300 in. lbs.)
Knuckle Attaching Bolts	88 N·m (65 ft. lbs.)
Strut Assembly Shaft Nut	75 N·m (55 ft. lbs.)
Brake Hose Bracket Mounting Bolt	31 N·m (275 in. lbs.)
KNUCKLE:	
Brake Support Plate Mounting Bolts	75 N·m (55 ft. lbs.)
Disc Brake Adapter Mounting Bolts	75 N·m (55 ft. lbs.)
HUB AND BEARING:	
To Knuckle Retaining Nut	217 N·m (160 ft. lbs.)
Wheel Mounting Nuts	109-150 N·m (80-110 ft. lbs.)
LATERAL ARM:	
Nut At Crossmember	88 N·m (65 ft. lbs.)
Nut At Knuckle	95 N·m (70 ft. lbs.)
TENSION STRUT:	
Rear Nut	95 N·m (70 ft. lbs.)
Frame Rail Bolts	95 N·m (70 ft. lbs.)
Parking Brake Cable Nut	28 N·m (250 in. lbs.)
STABILIZER BAR:	
Cushion Retainer Bolts	34 N·m (300 in. lbs.)
Link Bolt Nut	23 N·m (200 in. lbs.)