

SUSPENSION

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ALIGNMENT

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GENERAL INFORMATION

WHEEL ALIGNMENT

Wheel alignment involves the correct positioning of the wheels in relation to the vehicle. The positioning is accomplished through suspension and steering linkage adjustments. An alignment is considered essential for efficient steering, good directional stability and to minimize tire wear. The most important measurements of an alignment are caster, camber and toe (Fig. 1).

- **CASTER** is the forward or rearward tilt of the steering knuckle from vertical. Tilting the top of the knuckle forward provides negative caster. Tilting the top of the knuckle rearward provides positive caster. Positive caster promotes directional stability. This angle enables the front wheels to return to a straight ahead position after turns.

- **CAMBER** is the inward or outward tilt of the wheel relative to the center of the vehicle. Tilting the top of the wheel inward provides negative camber. Tilting the top of the wheel outward provides positive camber. Incorrect camber will cause wear on the inside or outside edge of the tire.

- **TOE** is the difference between the leading inside edges and trailing inside edges of the front tires. Wheel toe position out of specification cause's unstable steering, uneven tire wear and steering wheel off-center. The wheel toe position is the **final** front wheel alignment adjustment.

- **THRUST ANGLE** is the angle of the rear axle relative to the centerline of the vehicle. Incorrect thrust angle can cause off-center steering and excessive tire wear. This angle is not adjustable, damaged component(s) must be replaced to correct the thrust angle.

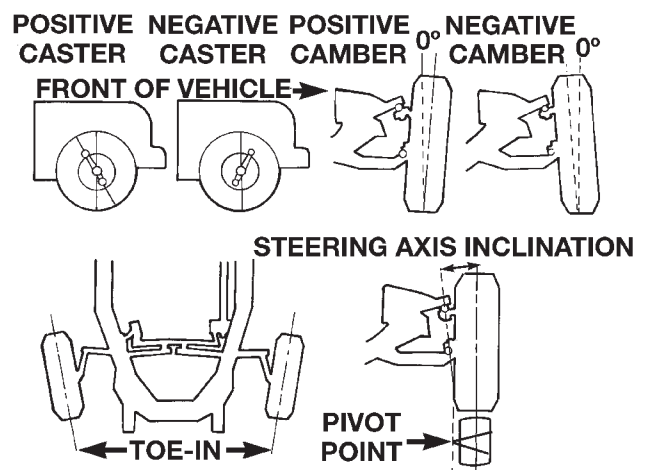


Fig. 1 Wheel Alignment Measurements

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GENERAL INFORMATION (Continued)

CAUTION: Never attempt to modify suspension or steering components by heating or bending.

NOTE: Periodic lubrication of the front suspension/steering system components may be required. Rubber bushings must never be lubricated. Refer to Group 0, Lubrication And Maintenance for the recommended maintenance schedule.

DIAGNOSIS AND TESTING

PRE-ALIGNMENT INSPECTION

Before starting wheel alignment, the following inspection and necessary corrections must be completed. Refer to Suspension and Steering System Diagnosis Chart for additional information.

(1) Inspect tires for size, air pressure and tread wear.

SUSPENSION AND STEERING SYSTEM DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
FRONT END NOISE	<ol style="list-style-type: none"> 1. Loose or worn wheel bearing. 2. Loose or worn steering or suspension components. 3. Lower ball joint (4WD). 	<ol style="list-style-type: none"> 1. Replace wheel bearing. 2. Tighten or replace components as necessary. 3. Gease joint (under 500 miles). Replace joint (over 500 miles).
EXCESSIVE PLAY IN STEERING	<ol style="list-style-type: none"> 1. Loose or worn wheel bearing. 2. Loose or worn steering or suspension components. 3. Loose or worn steering gear. 	<ol style="list-style-type: none"> 1. Replace wheel bearing. 2. Tighten or replace components as necessary. 3. Adjust or replace steering gear.
FRONT WHEELS SHIMMY	<ol style="list-style-type: none"> 1. Loose or worn wheel bearing. 2. Loose or worn steering or suspension components. 3. Tires worn or out of balance. 4. Alignment. 	<ol style="list-style-type: none"> 1. Replace wheel bearing. 2. Tighten or replace components as necessary. 3. Replace or balance tires. 4. Align vehicle to specifications.
VEHICLE INSTABILITY	<ol style="list-style-type: none"> 1. Loose or worn wheel bearing. 2. Loose or worn steering or suspension components. 3. Tire pressure. 4. Alignment. 	<ol style="list-style-type: none"> 1. Replace wheel bearing. 2. Tighten or replace components as necessary. 3. Adjust tire pressure. 4. Align vehicle to specifications.
EXCESSIVE STEERING EFFORT	<ol style="list-style-type: none"> 1. Loose or worn steering gear. 2. Column coupler binding. 3. Tire pressure. 4. Alignment. 	<ol style="list-style-type: none"> 1. Adjust or replace steering gear. 2. Replace coupler. 3. Adjust tire pressure. 4. Align vehicle to specifications.
VEHICLE PULLS TO ONE SIDE	<ol style="list-style-type: none"> 1. Tire pressure. 2. Alignment. 3. Loose or worn steering or suspension components. 4. Radial tire lead. 5. Brake pull. 6. Weak or broken spring. 7. Ride height 4WD only. 	<ol style="list-style-type: none"> 1. Adjust tire pressure. 2. Align vehicle to specifications. 3. Tighten or replace components as necessary. 4. Rotate or replace tire as necessary. 5. Repair brake as necessary. 6. Replace spring. 7. Measure and adjust ride height.

DIAGNOSIS AND TESTING (Continued)

- (2) Inspect front wheel bearings for wear.
- (3) Inspect front wheels for excessive radial or lateral runout and balance.
- (4) Inspect ball studs, linkage pivot points and steering gear for looseness, roughness or binding.
- (5) Inspect suspension components for wear and noise.
- (6) On 4WD vehicles check suspension height.

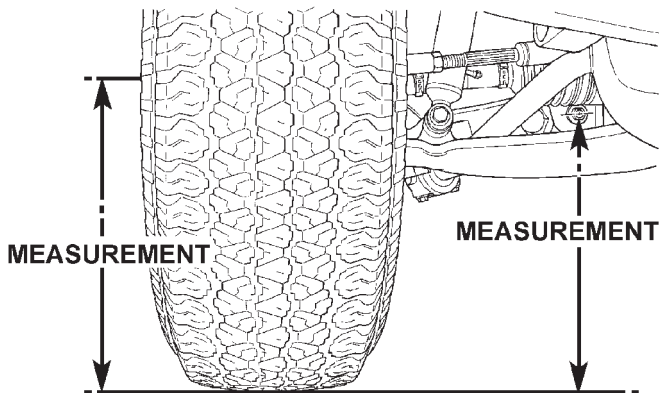
SERVICE PROCEDURES

SUSPENSION HEIGHT

The vehicle suspension height should be measured and adjusted if necessary before performing wheel alignment procedure. Also when front suspension components have be replaced. This measure must be performed with the vehicle supporting it's own weight and taken on both sides of the vehicle.

HEIGHT MEASUREMENT

- (1) Jounce the front of the vehicle.
- (2) Measure and record the distance between the ground and the center of the lower suspension arm rear mounting bolt head (Fig. 2).
- (3) Measure and record the distance between the ground and the center of the front wheel (Fig. 2).
- (4) Subtract the first measurement from the second measurement. The difference between the two measurement should be 73 mm (2.9 inches) ± 3 mm (0.12 inches).



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Fig. 2 Height Measurement

HEIGHT ADJUSTMENT

To adjust the vehicle height turn the torsion bar adjustment bolt **CLOCKWISE** to raise the vehicle and **COUNTER CLOCKWISE** to lower the vehicle.

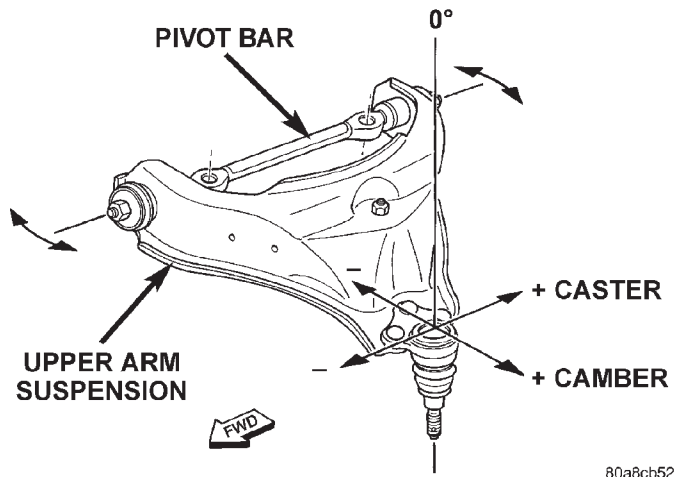
CAUTION: ALWAYS raise the vehicle to the correct suspension height, **NEVER** lower the vehicle to obtain the correct suspension height. If the vehicle suspension height is too high, lower the vehicle below the height specification. Then raise the vehicle to the correct suspension height specification. This will insure the vehicle maintains the proper suspension height.

NOTE: If a height adjustment has been made, perform height measurement again on both sides of the vehicle.

WHEEL ALIGNMENT

CAMBER AND CASTER ADJUSTMENT

Camber and caster angle adjustments involve changing the position of the upper suspension arm pivot bar (Fig. 3).



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Fig. 3 Caster & Camber Adjustment-Typical

CASTER

Moving the rear position of the pivot bar in or out, will change the caster angle significantly and camber angle only slightly. To maintain the camber angle while adjusting caster, move the rear of the pivot bar in or out. Then move the front of the pivot bar

SERVICE PROCEDURES (Continued)

slightly in the opposite direction. The caster angle should be adjusted to **preferred specification**.

NOTE: For example, to increase a positive caster angle, move the rear position of the pivot bar inward (toward the engine). Move the front of pivot bar outward (away from the engine) slightly until the original camber angle is obtained.

CAMBER

Move the front of the pivot bar in or out. This will change the camber angle significantly and caster angle slightly. The camber angle should be adjusted to **preferred specification**.

After adjustment is made tighten the pivot bar nuts to proper torque specification.

TOE ADJUSTMENT

The wheel toe position adjustment is the final adjustment.

(1) Start the engine and turn wheels both ways before straightening the wheels. Secure the steering wheel with the front wheels in the straight-ahead position.

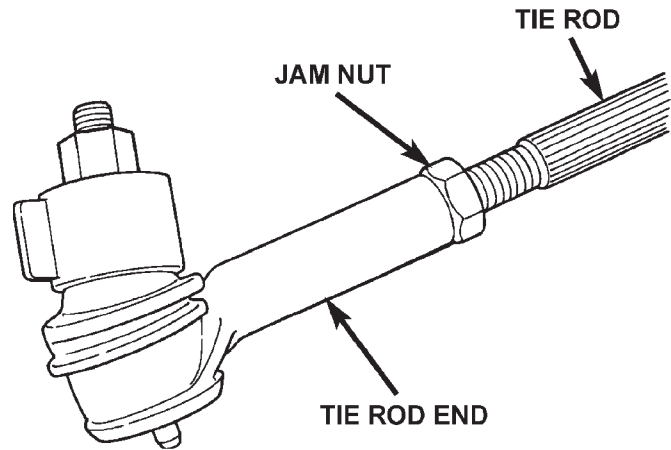
(2) Loosen the tie rod jam nuts.

NOTE: Each front wheel should be adjusted for one-half of the total toe position specification. This will ensure the steering wheel will be centered when the wheels are positioned straight-ahead.

(3) Adjust the wheel toe position by turning the tie rod as necessary (Fig. 4).

(4) Tighten the tie rod jam nut to 75 N·m (55 ft. lbs.).

(5) Verify the specifications.



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Fig. 4 Toe Adjustment

(6) Turn off engine.

SPECIFICATIONS

ALIGNMENT

WHEEL BASE 115.9 in.	CASTER ± 0.50°	CAMBER ± 0.50°	TOTAL TOE ± 0.10°
	3.31°	0.38°	0.15°
MAX RT to LT DIFF- ERENCE	0.50°	0.50°	0.07°
THRUST ANGLE 0° ± 0.4°			

NOTE: All alignment specifications are in degrees.

FRONT SUSPENSION

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DESCRIPTION AND OPERATION

SUSPENSION COMPONENTS

The front suspension is designed to allow each wheel to adapt to different road surfaces independently. The wheels are mounted to hub/bearings units bolted to cast steering knuckle. The double-row hub bearings are sealed and lubricated for life. The steering knuckles turn (pivot) on ball joints. The upper ball joint is riveted to the outboard portion of the suspension arm and lubricated for life. The lower ball joint is pressed into the lower suspension arm and requires lubrication.

The front suspension is comprised of (Fig. 1):

- Shock absorbers
- Torsion-bar springs
- Suspension arms
- Steering knuckles
- Stabilizer bar
- Jounce/Rebound bumpers

Shock Absorbers: Ride control is accomplished through the use of low-pressure gas charge shock absorbers. The shocks dampen the jounce and rebound as the vehicle travels over various road conditions. The top of the shock absorbers are bolted to the frame. The bottom of the shocks are bolted to the lower suspension arm.

Torsion Bars: The torsion bars are used to control ride height and ride quality. The front of the bar mounts to the back side of the lower suspension arm. The rear end of the bar is mounted in an anchor that rests in the frame crossmember. The vehicle height is adjusted through an anchor adjustment bolt that increases or decreases the angle of the torsion bar. Increasing or decreasing the bar angle changes the angle of the suspension arms.

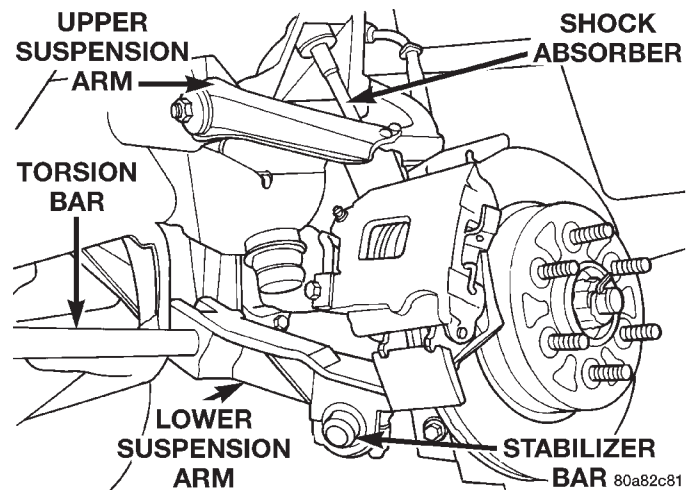


Fig. 1 Front Suspension

Suspension Arms: The upper suspension arms use a pivot shaft bolted to the frame rail brackets. The pivot shaft isolates road noise by the use of bushings in the suspension arms. The upper suspension arm pivot shaft also allows for caster and camber adjustment. The lower suspension arms use bushings to isolate road noise. The suspension arms are bolted to the frame and pivot through bushings. The suspension arm travel (jounce or rebound) is limited through the use of jounce or rebound bumpers.

Stabilizer Bar: The stabilizer bar is used to minimize vehicle front sway during turns. The bar helps to maintain a flat attitude to the road surface. The bar extends across the front underside of the chassis and connects to the frame crossmember. The ends of the bar mount to the lower suspension arm. All

DESCRIPTION AND OPERATION (Continued)

mounting points of the stabilizer bar are isolated by bushings.

CAUTION: Components attached with a nut and cotter pin must be torqued to specification. Then if the slot in the nut does not line up with the cotter pin hole, tighten nut until it is aligned. Never loosen the nut to align the cotter pin hole.

CAUTION: Suspension components with rubber/urethane bushings (except stabilizer bar) should be tightened with the vehicle at normal ride height. It is important to have the springs supporting the weight of the vehicle when the fasteners are torqued. If springs are not at their normal ride position, vehicle ride comfort could be affected and premature bushing wear may occur.

NOTE: Periodic lubrication of the front suspension/steering system components may be required. Rubber bushings must never be lubricated. Refer to Group 0, Lubrication And Maintenance for the recommended maintenance schedule.

DIAGNOSIS AND TESTING

LOWER BALL JOINT

NOTE: If the ball joint is equipped with a lubrication fitting, grease the joint then road test the vehicle before performing test.

(1) Raise the front of the vehicle. Place safety floor stands under both lower suspension arms as far outboard as possible. Lower the vehicle to allow the stands to support some or all of the vehicle weight.

NOTE: The upper suspension arms must not contact the rebound bumpers.

(2) Remove the tire and wheel assemblies.
(3) Mount a dial indicator solidly under the lower suspension arm.
(4) Position indicator plunger against the bottom surface of the steering knuckle lower ball joint boss.

NOTE: The dial indicator plunger must be perpendicular to the machined surface of the steering knuckle lower ball joint boss.

(5) Position a pry bar over the top of the upper suspension arm and under the pivot bar of the upper suspension arm. Pry down on the upper suspension arm and then zero the dial indicator.

(6) Reposition the pry bar under the upper suspension arm and on top of the jounce/rebound bracket. Pry up on the upper suspension arm and record the dial indicator reading.

(7) If the travel exceeds 1.52 mm (0.060 in.), replace the lower control arm.

UPPER BALL JOINT

(1) Position a floor jack under the lower suspension arm. Raise the wheel and allow the tire to lightly contact the floor (vehicle weight relieved from the tire).

(2) Mount a dial indicator solidly on the upper suspension arm.

(3) Position the indicator plunger against the upper ball joint boss of the steering knuckle.

(4) Grasp the top of the tire and apply force in and out. Look for movement at the ball joint between the upper suspension arm and steering knuckle.

(5) If lateral movement is greater than 1.52 mm (0.060 in.), replace upper suspension arm.

SHOCK DIAGNOSIS

A knocking or rattling noise from a shock absorber may be caused by movement between mounting bushings and metal brackets or attaching components. These noises can usually be stopped by tightening the attaching nuts. If the noise persists, inspect for damaged and worn bushings, and attaching components. Repair as necessary if any of these conditions exist.

A squeaking noise from the shock absorber may be caused by the hydraulic valving and may be intermittent. This condition is not repairable and the shock absorber must be replaced.

The shock absorbers are not refillable or adjustable. If a malfunction occurs, the shock absorber must be replaced. To test a shock absorber, hold it in an upright position and force the piston in and out of the cylinder four or five times. The action throughout each stroke should be smooth and even.

The shock absorber bushings do not require any type of lubrication. Do not attempt to stop bushing noise by lubricating them. Grease and mineral oil-base lubricants will deteriorate the bushing.

REMOVAL AND INSTALLATION

SHOCK ABSORBER

REMOVAL

(1) Raise and support vehicle.
(2) Remove the upper shock absorber nut, retainer and grommet (Fig. 2).
(3) Remove the lower bolt and remove the shock absorber.

REMOVAL AND INSTALLATION (Continued)

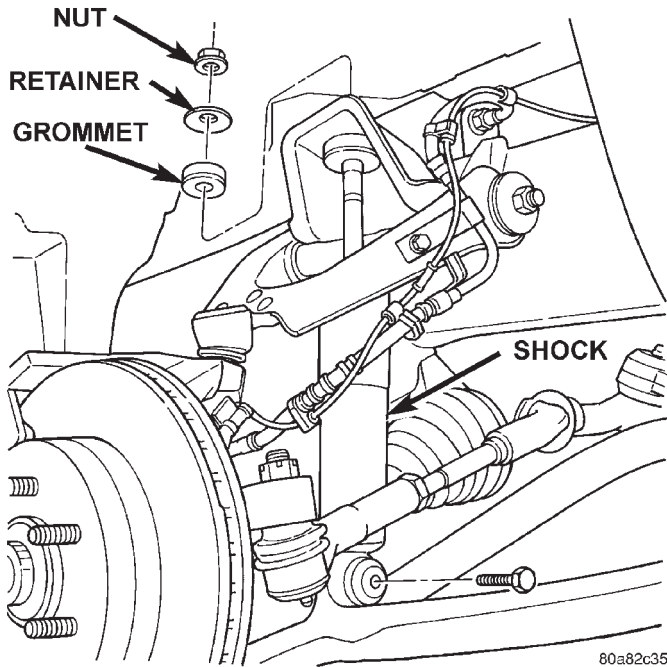


Fig. 2 Shock Absorber

INSTALLATION

NOTE: Upper shock nut must be replaced or use Mopar Lock 'N Seal or Loctite® 242 on existing nut.

(1) Install the lower retainer (**lower retainer is stamped with a L**) and grommet on the shock absorber stud. Insert the shock absorber through the frame bracket hole.

(2) Install the lower bolt and tighten the bolt to 108 N·m (80 ft. lbs.).

(3) Install the upper grommet, retainer (**upper retainer is stamped with a U**) and new nut or use Mopar Lock 'N Seal or Loctite® 242 on existing nut, on the shock absorber stud. Tighten nut to 26 N·m (19 ft. lbs.).

TORSION BAR

CAUTION: The left and right side torsion bars are NOT interchangeable. The bars are identified and stamped R or L, for right or left. The bars do not have a front or rear end and can be installed with either end facing forward.

REMOVAL

(1) Raise and support the vehicle with the front suspension hanging.

(2) Turn the adjustment bolt counterclockwise to release spring load (Fig. 3).

NOTE: Count and record the number of turns for installation reference.

- (3) Remove the adjustment bolt from swivel.
- (4) Remove torsion bar and anchor. Remove anchor from torsion bar.
- (5) Remove all foreign material from torsion bar mounting in anchor and suspension arm.
- (6) Inspect adjustment bolt, bearing and swivel for damage.

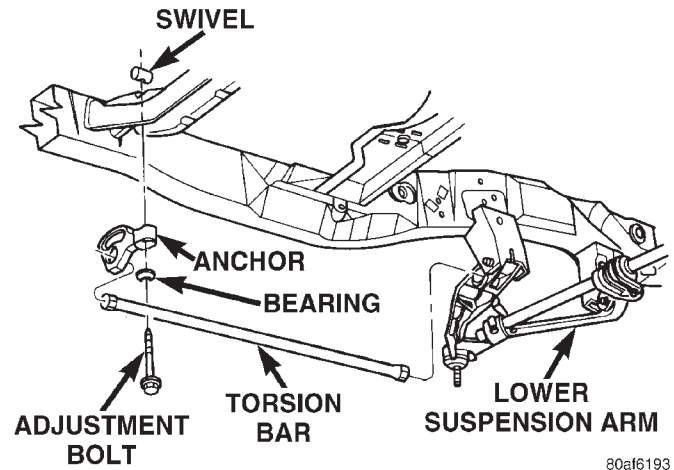


Fig. 3 Torsion Bar

INSTALLATION

(1) Insert torsion bar ends into anchor and suspension arm.

(2) Position anchor and bearing in frame cross-member. Install adjustment bolt through bearing, anchor and into the swivel.

(3) Turn adjustment bolt clockwise the recorded amount of turns.

(4) Lower vehicle and adjust the front suspension height. Refer to Suspension Height service procedure.

STEERING KNUCKLE

REMOVAL

- (1) Raise and support vehicle.
- (2) Remove wheel and tire assembly.
- (3) Remove brake caliper, rotor, shield and ABS wheel speed sensor if equipped. Refer to Group 5 Brakes.
- (4) Remove front driveshaft, refer to Group 3 Differential and Driveline.
- (5) Remove tie rod end cotter pin and nut. Separate the tie rod from the knuckle with Remover MB-991113 (Fig. 4).
- (6) Support the lower suspension arm with a hydraulic jack and raise the jack to unload the rebound bumper.

REMOVAL AND INSTALLATION (Continued)

(7) Remove the upper ball joint cotter pin and nut. Separate the ball joint from the knuckle with Remover MB-991113 (Fig. 5).

CAUTION: When installing Remover MB-991113 to separate the ball joint, be careful not to damage the ball joint seal.

(8) Remove the lower ball joint cotter pin and nut. Separate the ball joint from the knuckle with Remover C-4150A (Fig. 6) and remove the knuckle.

(9) Remove the hub/bearing from the steering knuckle.

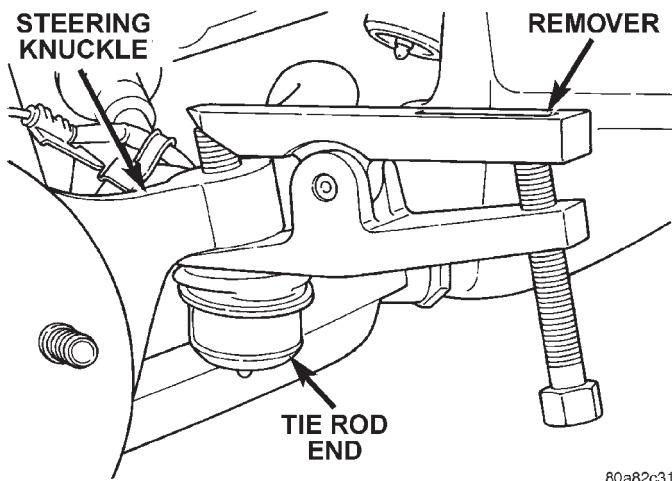


Fig. 4 Tie Rod End

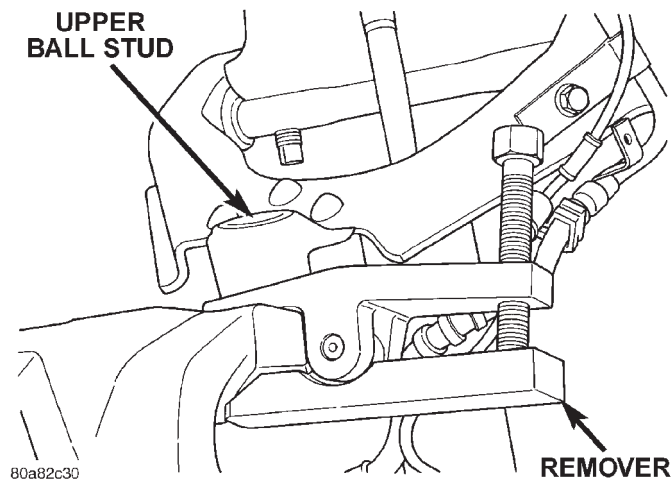


Fig. 5 Upper Ball Joint

INSTALLATION

(1) Install the hub/bearing to the steering knuckle and tighten the bolts to 166 N·m (123 ft. lbs.).

NOTE: When installing hub/bearing with ABS brakes, position the speed sensor opening towards the front of the vehicle.

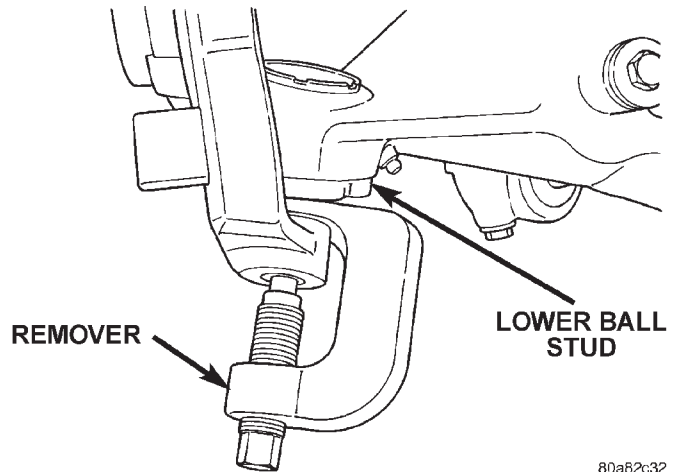


Fig. 6 Lower Ball Joint

CAUTION: The ball joint stud tapers must be **CLEAN** and **DRY** before installing the knuckle. Clean the stud tapers with mineral spirits to remove dirt and grease. Install the knuckle onto the upper and lower ball joint.

(2) Install the upper and lower ball joint nuts. Tighten the upper ball joint nut to 81 N·m (60 ft. lbs.) and the lower ball joint nut to 183 N·m (135 ft. lbs.) then install cotter pins. Grease the lower ball joint.

(3) Remove the hydraulic jack from the lower suspension arm.

(4) Install the tie rod end and tighten the nut to 88 N·m (65 ft. lbs.). Install the cotter pin.

(5) Install the front driveshaft, refer to Group 3 Differential and Driveline.

(6) Install the ABS wheel speed sensor if equipped and brake shield, rotor and caliper. Refer to Group 5 Brakes.

(7) Install the wheel and tire assembly.

(8) Remove support and lower the vehicle.

LOWER SUSPENSION ARM

REMOVAL

(1) Raise and support the vehicle.

(2) Remove the wheel and tire assembly.

(3) Remove front driveshaft, refer to Group 3 Differential & Driveline.

(4) Remove torsion bar.

(5) Remove shock absorber lower bolt.

(6) Remove stabilizer bar.

(7) Remove the cotter pin and nut from lower ball joint. Separate ball joint from the steering knuckle with Remover C-4150A (Fig. 7).

(8) Remove suspension arm pivot bolts and suspension arm from frame rail brackets (Fig. 8).

REMOVAL AND INSTALLATION (Continued)

(9) Inspect lower ball joint seal and replace if damaged. Pry off old seal with screw driver if necessary.

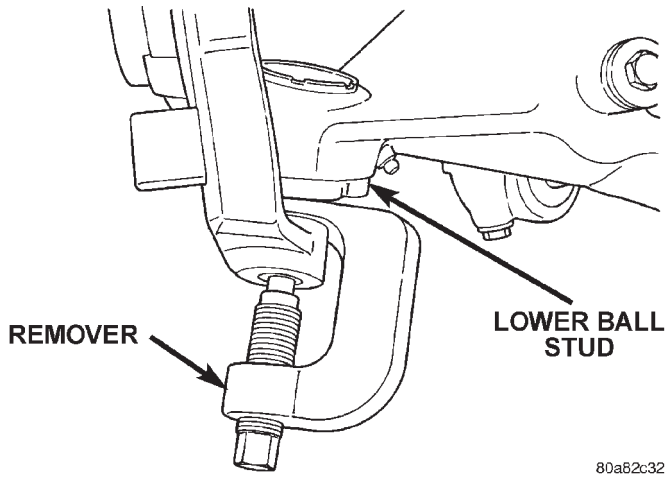


Fig. 7 Lower Ball Joint

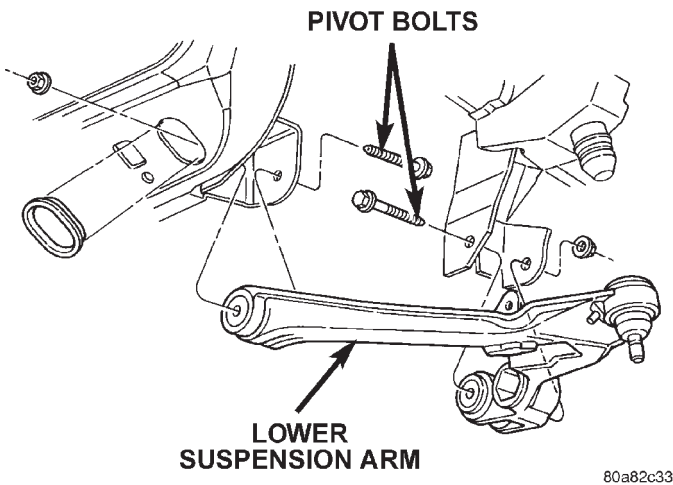


Fig. 8 Lower Suspension Arm

INSTALLATION

- (1) Install new lower ball joint seal by tapping on around the seal flange lightly with a hammer.
- (2) Position the lower suspension arm at the frame rail brackets. Install the pivot bolts and nuts. Tighten the nuts finger-tight.

CAUTION: The ball joint stud taper must be **CLEAN** and **DRY** before installing the knuckle. Clean the stud taper with mineral spirits to remove dirt and grease. Insert the ball joint into steering knuckle. Install and tighten the retaining nut to 183 N·m (135 ft. lbs.) and install a new cotter pin.

- (3) Install the torsion bar.
- (4) Install shock absorber lower bolt and tighten to 108 N·m (80 ft. lbs.).
- (5) Install the front driveshaft. Refer to Group 3 Differential & Driveline.
- (6) Install the wheel and tire assembly.

- (7) Remove support and lower the vehicle.
- (8) Install the stabilizer bar.
- (9) Tighten the lower suspension front pivot nut to 108 N·m (80 ft. lbs.). Tighten rear pivot bolt to 190 N·m (140 ft. lbs.).
- (10) Lubricate lower ball joint.
- (11) Adjust the front suspension height.

UPPER SUSPENSION ARM

REMOVAL

- (1) Raise and support vehicle.
- (2) Remove wheel and tire assembly.
- (3) Remove brake hose brackets from suspension arm, refer to Group 5 Brakes.
- (4) Position hydraulic jack under lower suspension arm and raise jack to unload rebound bumper.
- (5) Remove shock absorber.
- (6) Remove the cotter pin and nut from upper ball joint.
- (7) Separate upper ball joint from the steering knuckle with Remover MB-991113 (Fig. 9).

CAUTION: When installing Remover MB-991113 to separate the ball joint, be careful not to damage the ball joint seal.

- (8) Remove suspension arm pivot bar bolts and remove suspension arm (Fig. 10).

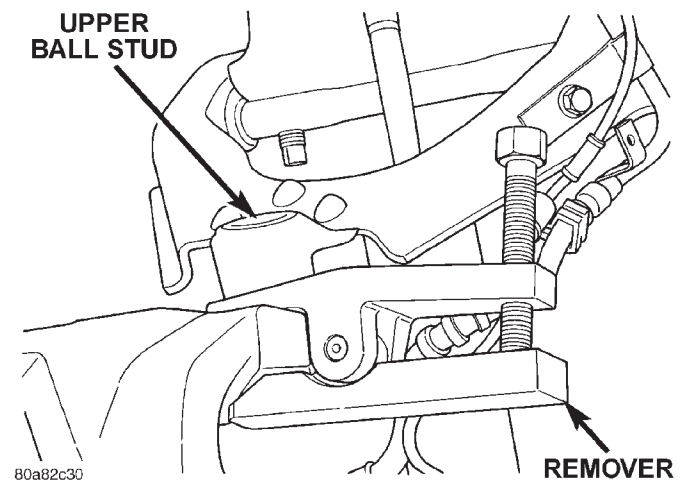
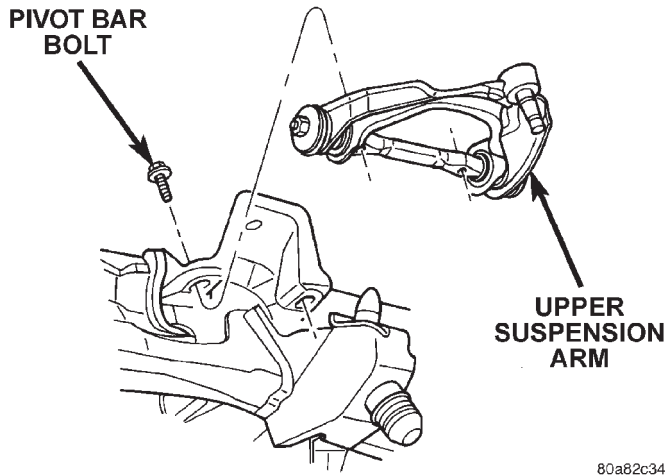


Fig. 9 Separate Upper Ball Joint

INSTALLATION

- (1) Position suspension arm pivot bar on mounting bracket. Install bolts and tighten (temporarily) to 136 N·m (100 ft. lbs.).
- (2) Insert ball joint in steering knuckle and tighten ball joint nut to 81 N·m (60 ft. lbs.) then install a new cotter pin.

REMOVAL AND INSTALLATION (Continued)

**Fig. 10 Upper Suspension Arm**

- (3) Install shock absorber.

NOTE: Upper shock nut must be replaced or use Mopar Lock 'N Seal or Loctite® 242 on existing nut.

- (4) Remove hydraulic jack.
- (5) Attach brake hose brackets to suspension arm, refer to Group 5 Brakes.
- (6) Tighten upper suspension arm pivot bolts to 224 N·m (165 ft. lbs.).
- (7) Install the wheel and tire assembly.
- (8) Remove support and lower vehicle.
- (9) Align front suspension.

STABILIZER BAR

NOTE: To service the stabilizer bar the vehicle must be on a drive on hoist. The vehicle suspension must be at curb height for stabilizer bar installation.

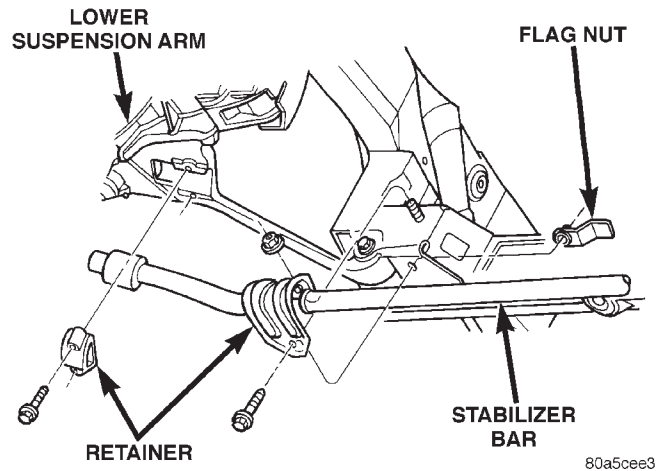
REMOVAL

- (1) Remove the stabilizer bar retainer bolts from the lower suspension arms (Fig. 11) and remove the retainers.
- (2) Remove the stabilizer bar retainer nuts, bolts and retainers from the frame crossmember (Fig. 11) and remove the bar.
- (3) If necessary, remove the bushings from the stabilizer bar.

INSTALLATION

- (1) If removed, install the bushings on the stabilizer bar.
- (2) Position the stabilizer bar on the frame crossmember brackets and install the retainers and nuts and bolts finger-tight (Fig. 11).

NOTE: Check the alignment of the bar to ensure there is no interference with the either frame rail or

**Fig. 11 Stabilizer Bar**

chassis component. Spacing should be equal on both sides.

- (3) Install the stabilizer bar to the lower suspension arm.
- (4) Install the retainers and bolts to the lower suspension arm and tighten to 34 N·m (25 ft. lbs.).
- (5) Tighten the frame retainer nuts to 190 N·m (140 ft. lbs.).
- (6) Tighten the frame retainer bolts to 108 N·m (80 ft. lbs.).

HUB/BEARING**REMOVAL**

- (1) Raise and support vehicle.
- (2) Remove wheel and tire assembly.
- (3) Remove axle nut.
- (4) Remove ABS wheel speed sensor if equipped, refer to Group 5 Brakes.
- (5) Remove the brake caliper and rotor, refer to Group 5 Brakes.
- (6) Remove hub/bearing mounting bolts from the steering knuckle (Fig. 12).
- (7) Slid hub/bearing out of the steering knuckle and off the axle.

INSTALLATION

- (1) Install the hub/bearing into the steering knuckle and tighten the bolts to 166 N·m (123 ft. lbs.).
- (2) Install the brake rotor and caliper.
- (3) Install ABS wheel speed sensor if equipped.
- (4) Install axle nut and tighten to 235 N·m (173 ft. lbs.) and install cotter pin.
- (5) Install wheel and tire assembly.
- (6) Remove support and lower vehicle.

REMOVAL AND INSTALLATION (Continued)

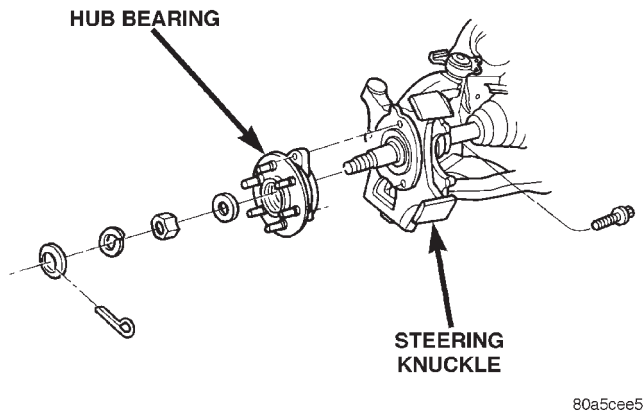


Fig. 12 Hub/Bearing

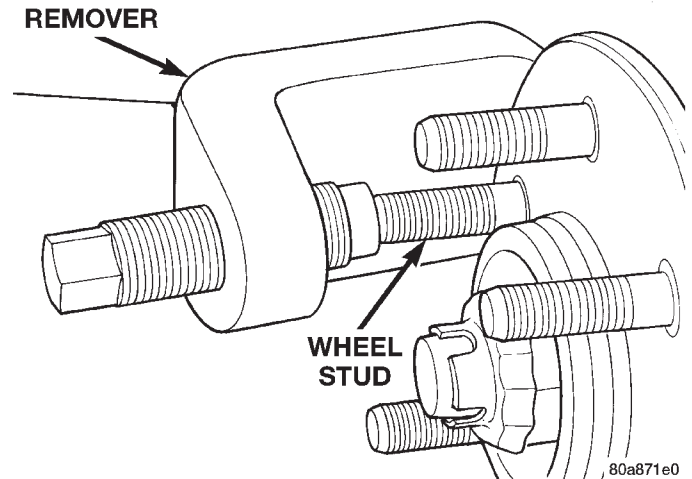


Fig. 13 Wheel Stud Removal

WHEEL MOUNTING STUDS

REMOVAL

- (1) Raise and support vehicle.
- (2) Remove wheel and tire assembly.
- (3) Remove brake caliper and rotor, refer to Group 5 Brakes for procedure.
- (4) Remove stud from hub with Remover C-4150A (Fig. 13).

INSTALLATION

- (1) Install new stud into hub flange.
- (2) Install three washers onto stud, then install lug nut with the flat side of the nut against the washers.

- (3) Tighten lug nut until the stud is pulled into the hub flange. Verify that the stud is properly seated into the flange.
- (4) Remove lug nut and washers.
- (5) Install the brake rotor and caliper, refer to Group 5 Brakes for procedure.
- (6) Install wheel and tire assembly, use new lug nut on stud or studs that were replaced.
- (7) Remove support and lower vehicle.

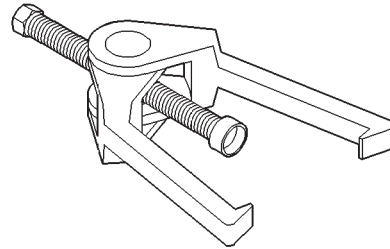
SPECIFICATIONS

TORQUE CHART

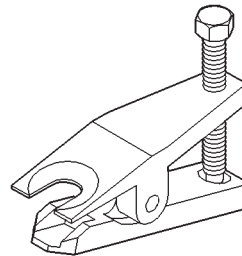
DESCRIPTION	TORQUE
Shock Absorber	
Upper Nut	26 N·m (19 ft. lbs.)
Lower Bolt	108 N·m (80 ft. lbs.)
Lower Suspension Arm	
Front Bolt	108 N·m (80 ft. lbs.)
Rear Bolt	190 N·m (140 ft. lbs.)
Ball Joint Nut	183 N·m (135 ft. lbs.)
Upper Suspension Arm	
Pivot Shaft Nuts	129 N·m (95 ft. lbs.)
Pivot Shaft to Frame Bolts	224 N·m (165 ft. lbs.)
Ball Joint Nut	81 N·m (60 ft. lbs.)
Stabilizer Bar	
Frame Retainer Bolt	108 N·m (80 ft. lbs.)
Frame Retainer Nut	190 N·m (140 ft. lbs.)
Control Arm Retainer Bolts	34 N·m (25 ft. lbs.)
Hub/Bearing	
Bolts	166 N·m (123 ft. lbs.)

SPECIAL TOOLS

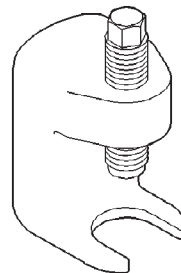
FRONT SUSPENSION



Puller Tie Rod C-3894-A



Remover MB-991113



Remover C-4150A

REAR SUSPENSION

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SHOCK ABSORBER	14	REAR SUSPENSION	16

DESCRIPTION AND OPERATION

SUSPENSION COMPONENT

The rear suspension is comprised of (Fig. 1):

- Drive Axle
- Leaf Springs
- Shock Absorbers
- Stabilizer Bar
- Jounce Bumpers

Leaf Springs: The rear suspension system uses multi-leaf single stage springs and a solid drive axle. The front of the springs are mounted to frame rail brackets. The rear of the springs are attached to frame brackets by the use of shackles. The springs and shackles use rubber bushings to isolate road noise. The shackles allow the springs to change their length as the vehicle moves over various road conditions.

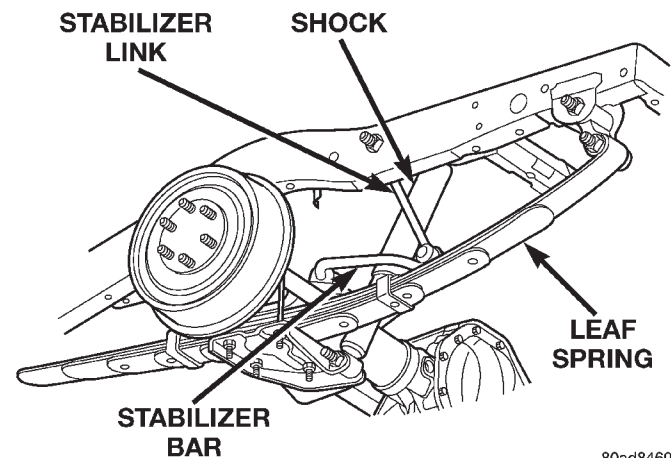
Shock Absorbers: Ride control is accomplished through the use of low pressure gas charged shock absorbers. The shocks dampen jounce and rebound as the vehicle travels over various road conditions. The shock absorbers are mounted to the frame crossmember at the top and the spring plate at the bottom, behind the rear axle.

Stabilizer Bar: The stabilizer bar is used to minimize vehicle body roll. The spring steel bar helps to control the vehicle body in relationship to the suspension. The bar extends across the underside of the vehicle and mounts to the top of the axle with bushings. Links attached to the end of the bar are bolted to frame rails.

Jounce Bumpers: The urethane jounce bumpers are used to limit the spring and axle travel. They are bolted to the frame rail above the axle.

CAUTION: Suspension components with rubber/urethane bushings (except stabilizer bar) should be tightened with the vehicle at normal ride height. It is important to have the springs supporting the weight of the vehicle when the fasteners are torqued. This

will maintain vehicle ride comfort and prevent premature bushing wear.



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Fig. 1 Rear Suspension

DIAGNOSIS AND TESTING

SPRING AND SHOCK DIAGNOSIS

A knocking or rattling noise from a shock absorber may be caused by movement between mounting bushings and metal brackets or attaching components. These noises can usually be stopped by tightening the attaching nuts. If the noise persists, inspect for damaged and worn bushings, and attaching components. Repair as necessary if any of these conditions exist.

A squeaking noise from the shock absorber may be caused by the hydraulic valving and may be intermittent. This condition is not repairable and the shock absorber must be replaced.

The shock absorbers are not refillable or adjustable. If a malfunction occurs, the shock absorber must be replaced. To test a shock absorber, hold it in an upright position and force the piston in and out of the cylinder four or five times. The action throughout each stroke should be smooth and even.

DIAGNOSIS AND TESTING (Continued)

SPRING AND SHOCK ABSORBER DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
SPRING SAGS	<ol style="list-style-type: none"> 1. Broken leaf. 2. Spring fatigue. 	<ol style="list-style-type: none"> 1. Replace spring. 2. Replace spring.
SPRING NOISE	<ol style="list-style-type: none"> 1. Loose spring clamp bolts. 2. Worn bushings. 3. Worn or missing spring tip inserts. 	<ol style="list-style-type: none"> 1. Tighten to specification. 2. Replace bushings. 3. Replace spring tip inserts.
SHOCK NOISE	<ol style="list-style-type: none"> 1. Loose mounting fastener. 2. Worn bushings. 3. Leaking shock. 	<ol style="list-style-type: none"> 1. Tighten to specification. 2. Replace shock. 3. Replace shock.

The spring eye and shock absorber bushings do not require any type of lubrication. Do not attempt to stop spring bushing noise by lubricating them. Grease and mineral oil-base lubricants will deteriorate the bushing rubber.

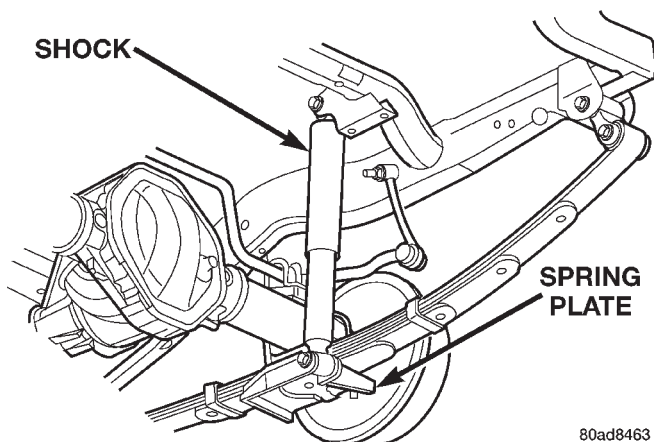
If the vehicle is used for severe, off-road operation, the springs should be examined periodically. Check for broken and shifted leaves, loose and missing clips, and broken center bolts. Refer to Spring and Shock Absorber Diagnosis chart for additional information.

REMOVAL AND INSTALLATION

SHOCK ABSORBER

REMOVAL

- (1) Raise vehicle and support rear axle.
- (2) Remove shock absorber lower nut and bolt from the spring plate (Fig. 2).
- (3) Remove shock absorber upper nut and bolt from the frame bracket and remove the shock absorber.



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Fig. 2 Shock Absorber

INSTALLATION

(1) Install shock absorber into upper frame bracket. Install bolt and nut and tighten nut to 95 N·m (70 ft. lbs.).

(2) Install shock absorber into the spring plate. Install the bolt and nut and tighten nut to 95 N·m (70 ft. lbs.).

(3) Remove axle support and lower vehicle.

STABILIZER BAR

REMOVAL

- (1) Raise and support vehicle.
- (2) Remove links upper mounting nuts and bolts.
- (3) Remove the cotter pins and nuts from the links at the stabilizer bar.
- (4) Separate the links from the stabilizer bar with Puller C-3894-A and remove the links.
- (5) Remove stabilizer bar retainer bolts and retainers (Fig. 3).
- (6) Remove stabilizer bar and remove bushings.

INSTALLATION

- (1) Install stabilizer bar bushings.
- (2) Install the stabilizer bar and center it with equal spacing on both sides.
- (3) Install stabilizer bar retainers and tighten bolts to 54 N·m (40 ft. lbs.).
- (4) Install link on the frame and the stabilizer bar. Install mounting bolts and nuts.
- (5) Remove support and lower vehicle.
- (6) Tighten stabilizer link upper nuts to 95 N·m (70 ft. lbs.).
- (7) Tighten stabilizer link lower nuts to 68 N·m (50 ft. lbs.) and install a new cotter pins.

REMOVAL AND INSTALLATION (Continued)

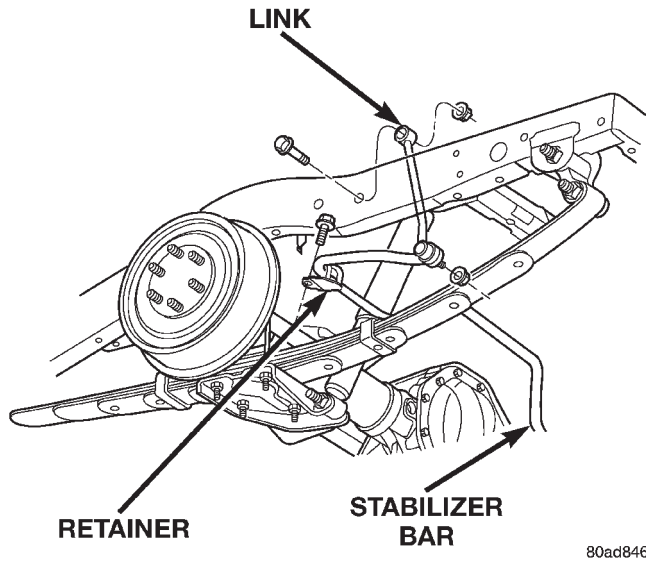


Fig. 3 Stabilizer Bar Mounting

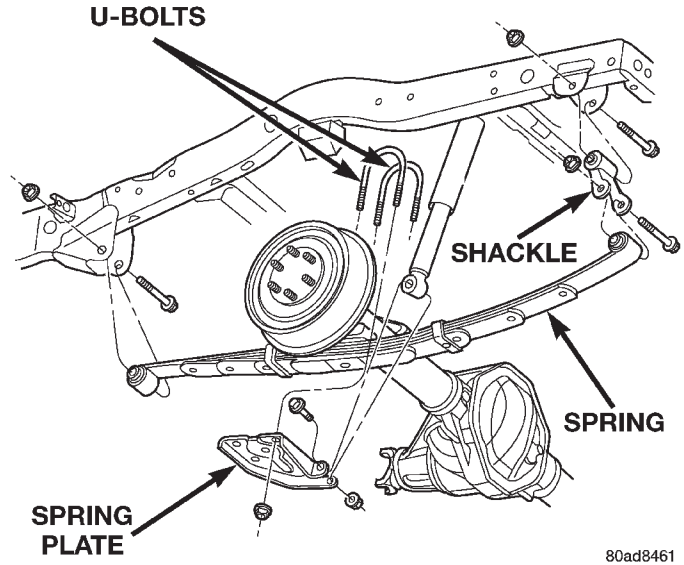


Fig. 4 Leaf Spring

LEAF SPRINGS

CAUTION: The rear of the vehicle must be lifted only with a jack or hoist. The lift must be placed under the frame rail crossmember located aft of the rear axle. Use care to avoid bending the side rail flange.

REMOVAL

- (1) Raise the vehicle at the frame.
- (2) Support the axle to relieve the weight of the axle from the springs.
- (3) Remove the wheel and tire assemblies.
- (4) Remove shocks from the spring plates.
- (5) Remove the nuts, the U-bolts and spring plate from the axle (Fig. 4).
- (6) Remove the nut and bolt from the front spring eye.
- (7) Remove the nut and bolt from the rear spring eye.
- (8) Remove the spring from the vehicle.
- (9) Remove the shackle from the frame bracket.

INSTALLATION

- (1) Install shackle on the frame bracket and install the nut and bolt finger tight.
- (2) Position the spring under the rear axle pad. Make sure the spring center bolt is inserted in the pad locating hole.
- (3) Align front spring eye with the bolt hole in the front frame bracket. Install the spring eye bolt and nut and tighten the spring eye nut finger-tight.

- (4) Align spring shackle eye with the bolt hole in the rear frame bracket. Install the bolt and nut and tighten the spring shackle eye nut finger-tight.

- (5) Install the spring seat, U-bolts, spring plate, and nuts.
- (6) Tighten the U-bolt nuts to 122 N·m (90 ft. lbs.).
- (7) Install the shocks to the spring plates.
- (8) Install the wheel and tire assemblies.
- (9) Remove the support stands from under the frame rails. Lower the vehicle until the springs are supporting the weight of the vehicle.
- (10) Tighten the spring eye pivot bolt nut and all shackle nuts to 102 N·m (75 ft. lbs.).

DISASSEMBLY AND ASSEMBLY

SPRING EYE BUSHINGS

DISASSEMBLE

- (1) Remove the spring from the vehicle.
- (2) Position the spring eye in a press.
- (3) Press the bushing out with an appropriate size driver.

ASSEMBLE

- (1) Press new bushing into the spring eye with an appropriate size driver. The bushing should be centered in the spring eye.
- (2) Install the spring on the vehicle.

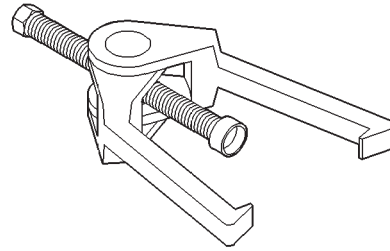
SPECIFICATIONS

TORQUE CHART

DESCRIPTION	TORQUE
Shock Absorber	
Lower Nut	95 N·m (70 ft. lbs.)
Upper Nut	95 N·m (70 ft. lbs.)
Stabilizer Bar	
Link Upper Nut	95 N·m (70 ft. lbs.)
Link Lower Nut	68 N·m (50 ft. lbs.)
Retainer Bolts	54 N·m (40 ft. lbs.)
Spring	
U-Bolt Nuts	122 N·m (90 ft. lbs.)
Spring Eye Nut	102 N·m (75 ft. lbs.)
Spring Shackle Nuts	102 N·m (75 ft. lbs.)
Jounce Bumper	
Bolts	61 N·m (45 ft. lbs.)

SPECIAL TOOLS

REAR SUSPENSION



Puller C-3894-A