

SUSPENSION

CONTENTS

	page		page
FRONT SUSPENSION (IFS)	7	REAR SUSPENSION	23
FRONT SUSPENSION LINK/COIL	14	WHEEL ALIGNMENT	1

WHEEL ALIGNMENT

INDEX

	page		page
DESCRIPTION AND OPERATION		ALIGNMENT LINK/COIL SUSPENSION	4
WHEEL ALIGNMENT	1	CAB-CHASSIS CASTER CORRECTION	
DIAGNOSIS AND TESTING		MEASUREMENT	5
PRE-ALIGNMENT	3	SPECIFICATIONS	
SERVICE PROCEDURES		ALIGNMENT	6
ALIGNMENT IFS SUSPENSION	3		

DESCRIPTION AND OPERATION

WHEEL ALIGNMENT

Wheel alignment involves the correct positioning of the wheel 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 position (Fig. 1) and (Fig. 2).

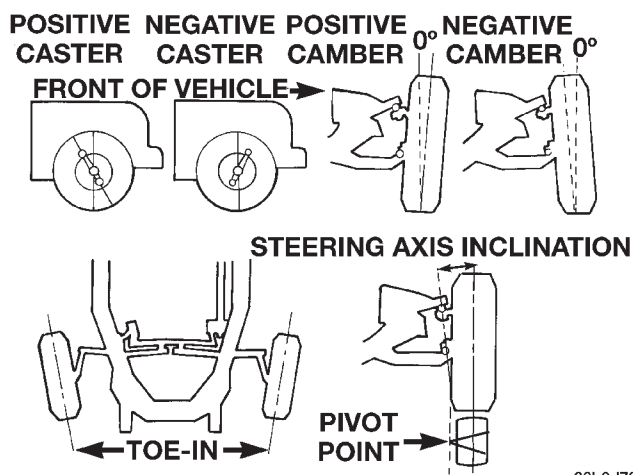
- **CASTER** is the forward or rearward tilt of the steering knuckle from vertical. Tilting the top of the knuckle rearward provides positive caster. Tilting the top of the knuckle forward provides negative caster. Caster is a directional stability angle which enables the front wheels to return to a 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.

- **WHEEL TOE POSITION** is the difference between the leading inside edges and trailing inside

edges of the front tires. Incorrect wheel toe position is the most common cause of unstable steering and uneven tire wear. The wheel toe position is the **final** front wheel alignment adjustment.

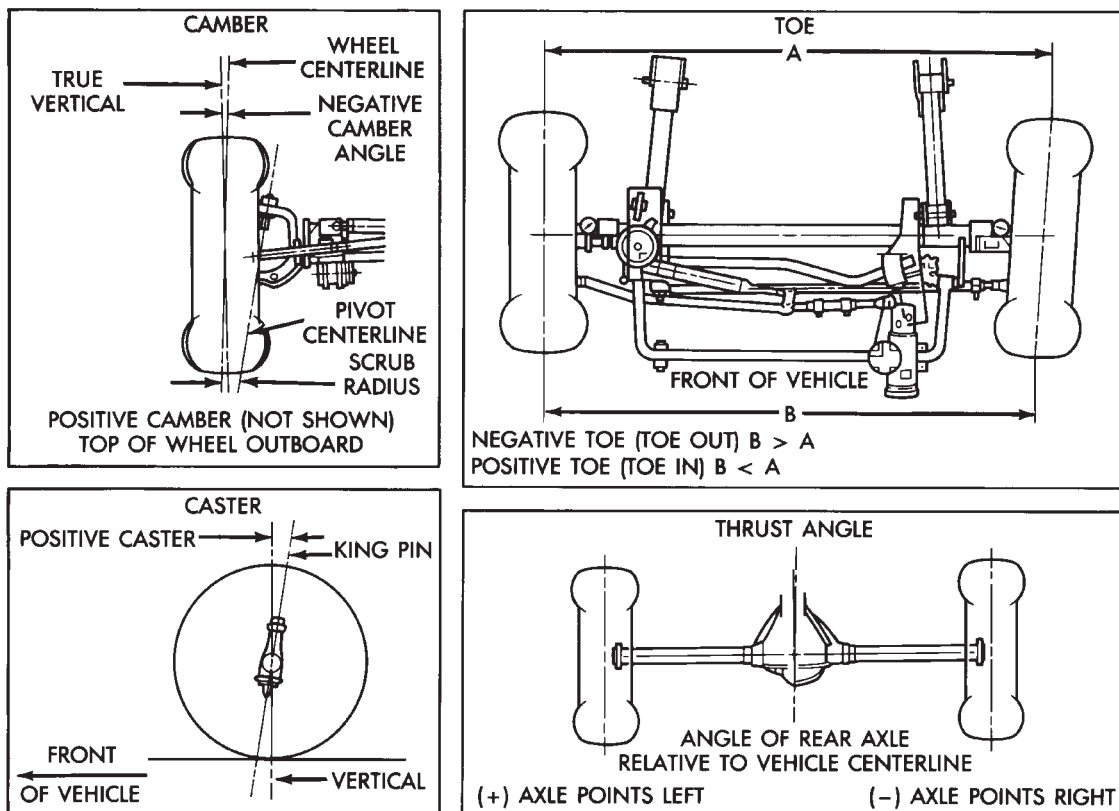
CAUTION: Do not attempt to modify any suspension or steering components by heating and bending.



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Fig. 1 Alignment Angles IFS

DESCRIPTION AND OPERATION (Continued)



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Fig. 2 Alignment Angles Link/Coil

DIAGNOSIS AND TESTING

PRE-ALIGNMENT

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.
- (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.

SERVICE PROCEDURES

ALIGNMENT IFS SUSPENSION

Before each alignment reading the vehicle should be jounced (rear first, then front). Grasp each

bumper at the center and jounce the vehicle up and down several times. Always release the bumper in the down position. **Set the front end alignment to specifications while the vehicle is in its NORMALLY LOADED CONDITION.**

Camber and caster angle adjustments involve changing the position of the upper suspension arm pivot bar (Fig. 3). Refer to the Alignment Specification Chart for the correct setting.

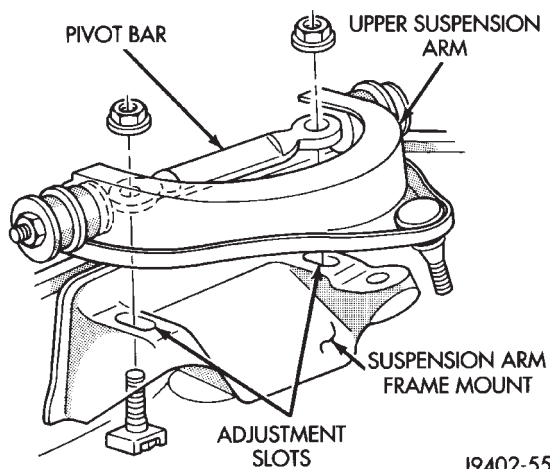
CASTER: Move the rear position of the pivot bar in or out. This will change the caster angle significantly and camber angle only slightly. To retain camber move the forward pivot very slightly in the opposite direction.

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.

SUSPENSION AND STEERING SYSTEM DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
FRONT END NOISE	<ol style="list-style-type: none"> 1. Loose or worn wheel bearings. 2. Loose or worn steering or suspension components. 	<ol style="list-style-type: none"> 1. Adjust or replace wheel bearings. 2. Tighten or replace components as necessary.
EXCESSIVE PLAY IN STEERING	<ol style="list-style-type: none"> 1. Loose or worn wheel bearings. 2. Loose or worn steering or suspension components. 3. Loose or worn steering gear. 	<ol style="list-style-type: none"> 1. Adjust or replace wheel bearings. 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 bearings. 2. Loose or worn steering or suspension components. 3. Tires worn or out of balance. 4. Alignment. 	<ol style="list-style-type: none"> 1. Adjust or replace wheel bearings. 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 bearings. 2. Loose or worn steering or suspension components. 3. Tire pressure. 4. Alignment. 	<ol style="list-style-type: none"> 1. Adjust or replace wheel bearings. 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. 	<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.

SERVICE PROCEDURES (Continued)



J9402-55

Fig. 3 Caster Camber Adjustment Location

CAMBER: Move the forward position of the pivot bar in or out. This will change the camber angle significantly and caster angle only slightly. The camber angle should be adjusted as close as possible to the **preferred service specification**. After adjustment is made tighten pivot bar nuts to specifications.

TOE POSITION: The wheel toe position adjustment should be the final adjustment.

(1) Start the engine and turn wheels both ways before straightening the wheels. Center and secure the steering wheel and turn off engine.

(2) Loosen the tie rod adjustment sleeve clamp bolts/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 adjustment sleeves as necessary.

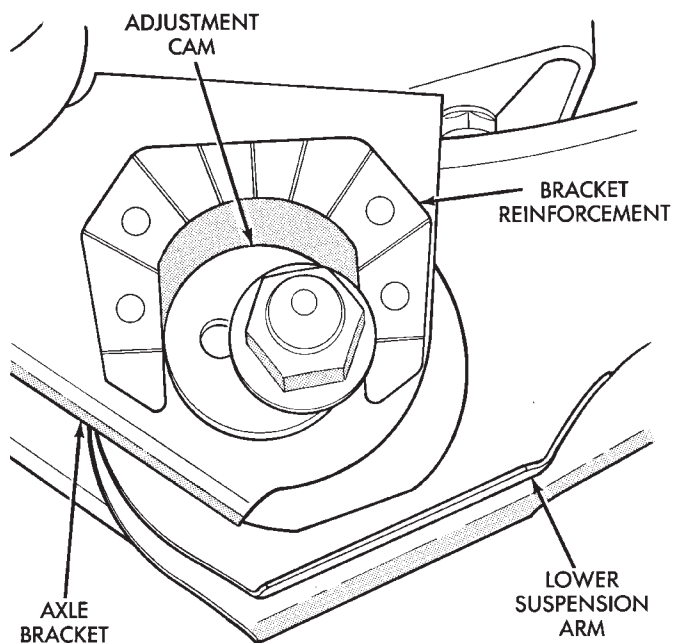
ALIGNMENT LINK/COIL SUSPENSION

Before each alignment reading the vehicle should be jounced (rear first, then front). Grasp each bumper at the center and jounce the vehicle up and down several times. Always release the bumper in the down position. **Set the front end alignment to specifications while the vehicle is in its NORMALLY LOADED CONDITION.**

CAMBER: The wheel camber angle is preset and is not adjustable.

CASTER: Check the caster of the front axle for correct angle. Be sure the axle is not bent or twisted. Road test the vehicle and make left and right turn. Observe the steering wheel return-to-center position. Low caster will cause poor steering wheel returnability.

Caster can be adjusted by rotating the cams on the lower suspension arm (Fig. 4). Refer to the Alignment Specification for the correct setting.



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Fig. 4 Cam Adjuster

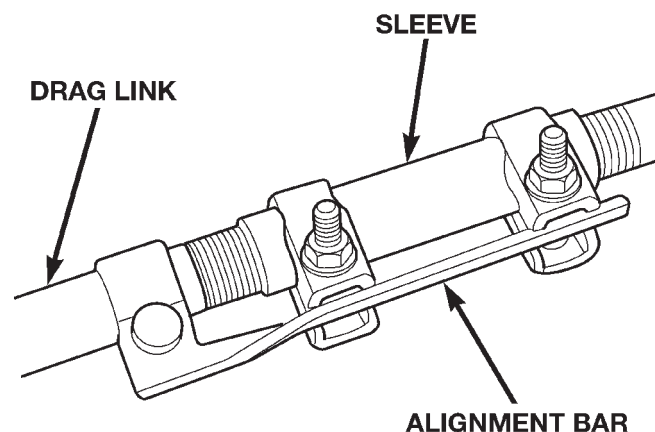
TOE POSITION: The wheel toe position adjustment should be the final adjustment.

(1) Start the engine and turn wheels both ways before straightening the wheels. Center and Secure the steering wheel and turn off engine.

(2) Loosen the adjustment sleeve clamp bolts.

CAUTION: Do not loosen/move alignment bar or alignment bar clamp (Fig. 5). The bar is used as a locator for the adjuster clamps.

(3) Adjust the right wheel toe position with the drag link (Fig. 5). Turn the sleeve until the right wheel is at the correct TOE-IN position. Position clamp bolts to their original position and tighten to specifications. **Make sure the toe setting does not change during clamp tightening.**



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Fig. 5 Alignment Bar/Drag Link Adjustment

SERVICE PROCEDURES (Continued)

- (4) Adjust left wheel toe position with tie rod at left knuckle. Turn the sleeve until the left wheel is at the correct TOE-IN position. Position clamp bolts to their original position and tighten to specifications. **Make sure the toe setting does not change during clamp tightening.**
- (5) Verify the right toe setting.

CAB-CHASSIS CASTER CORRECTION MEASUREMENT

NOTE: To determine the correct caster alignment angle for Cab-Chassis vehicles the following procedure must be performed.

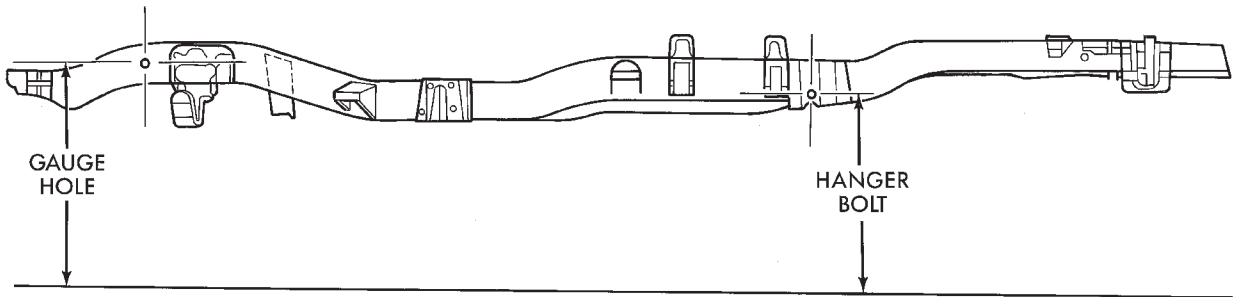
NOTE: 4x2 11000 GVW has a solid front axle and uses a 4x4 frame.

- (1) Take a height measurement to the center of the front gauge hole in the frame. Take another measurement to the center of the rear spring hanger bolt (Fig. 6). Take these measurements on both sides of the vehicle.
- (2) Subtract the front measurement from the rear measurement and use the average between the right and left side. Use this number (caster correlation valve) with the Corrected Caster Chart to obtain the preferred caster angle.

CORRECTED CASTER CHART-CAB CHASSIS

Caster Correlation Value (inches)	4x2 8800 lb. GVW 134.7 in. wheel base	4x4 8800 lb. GVW 4x2 & 4x4 11000 lb. GVW 134.7 & 138.7 in. wheel base	4x2 & 4x4 11000 lb. GVW 162.7 in. wheel base
	Caster ± 1 deg.	Caster ± 1 deg.	Caster ± 1 deg.
-5.00	4.27°	3.77°	3.81°
-4.75	4.39°	3.89°	3.91°
-4.50	4.51°	4.01°	4.01°
-4.25	4.64°	4.14°	4.11°
-4.00	4.76°	4.26°	4.21°
-3.75	4.88°	4.38°	4.31°
-3.50	5.00°	4.50°	4.41°
-3.25	5.12°	4.62°	4.51°
-3.00	5.25°	4.75°	4.61°
-2.75	5.37°	4.87°	4.71°
-2.50	5.49°	4.99°	4.81°
-2.25	5.61°	5.11°	4.91°
-2.00	5.74°	5.24°	5.01°
-1.75	5.86°	5.36°	5.11°
-1.50	5.98°	5.48°	5.21°
-1.25	6.10°	5.60°	5.31°
-1.00	6.23°	5.73°	5.41°
-0.75	6.33°	5.83°	5.51°
-0.50	6.47°	5.97°	5.61°
-0.25	6.59°	6.09°	5.71°
0.00	6.71°	6.21°	5.81°

4x2



4x4

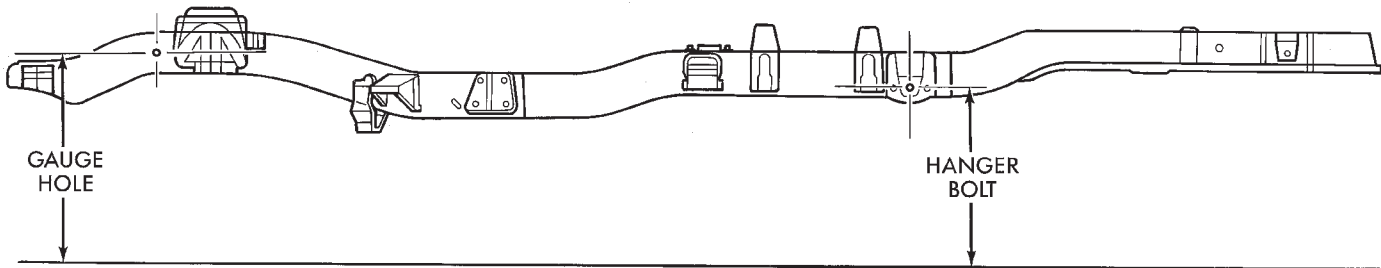


Fig. 6 Chassis Measurement

SPECIFICATIONS

ALIGNMENT

4 x 2 & 4 x 4	GROSS VEHICLE WEIGHT lbs.	WHEEL BASE inches	PREFERRED CASTER $\pm 1.00^\circ$	PREFERRED CAM- BER $\pm 0.50^\circ$
4 x 2	6,010	118.7	3.40°	0.50°
4 x 2	6,400	118.7	3.40°	0.50°
4 x 2	6,010	134.7	3.60°	0.50°
4 x 2	6,400	134.7	3.60°	0.50°
4 x 2	6,400	138.7	3.70°	0.50°
4 x 2	6,400	154.7	3.85°	0.50°
4 x 2	7,500	134.7	3.55°	0.50°
4 x 2	8,800	134.7	3.45°	0.50°
4 x 2	8,800	138.7	3.50°	0.50°
4 x 2	8,800	154.7	3.65°	0.50°
4 x 2	10,500	134.7	3.25°	0.50°
4 x 2	10,500	154.7	3.45°	0.50°
4 x 4	6,400	118.7	3.10	Not Set
4 x 4	6,400	134.7	3.25	Not Set
4 x 4	6,400/6,600	138.7	3.40	Not Set
4 x 4	6,400/6,600	154.7	3.55	Not Set
4 x 4	7,500	134.7	3.00	Not Set
4 x 4	8,800	134.7	3.10	Not Set
4 x 4	8,800	138.7	3.15	Not Set
4 x 4	8,800	154.7	3.25	Not Set
4 x 4	10,500	134.7	2.90	Not Set
4 x 4	10,500	154.7	3.00	Not Set
CAB-CHASSIS VEHICLES				
4 x 2 / 4 x 4	8,800	134.7	Caster	Not Set
*4 x 2 / 4 x 4	11,000	138.7	Correction	Not Set
*4 x 2 / 4 x 4	11,000	162.7	Measurement	Not Set
Preferred Total Toe-In $0.10^\circ (\pm 0.10^\circ)$ Preferred Cross Caster $0^\circ (\pm 0.5^\circ)$ Preferred Cross Camber $0^\circ (\pm 0.5^\circ)$ Thrust Angle $0^\circ (\pm 0.4^\circ)$				

NOTE: *4 x 2 11,000 GVW has a solid front axle with link/coil suspension system.

FRONT SUSPENSION (IFS)

INDEX

	page		page
DESCRIPTION AND OPERATION		UPPER SUSPENSION ARM	10
INDEPENDENT FRONT SUSPENSION (IFS)	7	WHEEL BEARINGS	11
DIAGNOSIS AND TESTING		WHEEL STUDS	11
LOWER BALL JOINT	8	DISASSEMBLY AND ASSEMBLY	
SHOCK DIAGNOSIS	8	LOWER BALL JOINT	11
UPPER BALL JOINT	8	UPPER BALL JOINT	11
REMOVAL AND INSTALLATION		CLEANING AND INSPECTION	
COIL SPRINGS	9	WHEEL BEARINGS	12
LOWER SUSPENSION ARM	10	SPECIFICATIONS	
SHOCK ABSORBER	8	TORQUE CHART	12
STABILIZER BAR	10	SPECIAL TOOLS	
STEERING KNUCKLE	9	IFS FRONT SUSPENSION	13

DESCRIPTION AND OPERATION

INDEPENDENT FRONT SUSPENSION (IFS)

The IFS suspension is comprised of (Fig. 1) and (Fig. 2);

- Shock absorbers
- Coil springs
- Upper and lower suspension arms
- Stabilizer bar

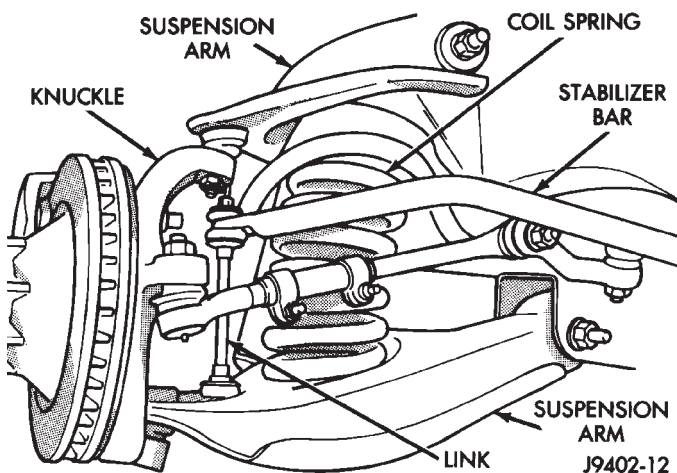


Fig. 1 Independent Front Suspension

Shock Absorbers: The shock absorbers dampen jounce and rebound of the vehicle over various road conditions. Shocks are mounted on the bottom to the lower suspension arms. The top of the shock mounts on frame brackets using grommets.

Coil Springs: The coil springs control ride quality and maintain proper ride height. The springs mount

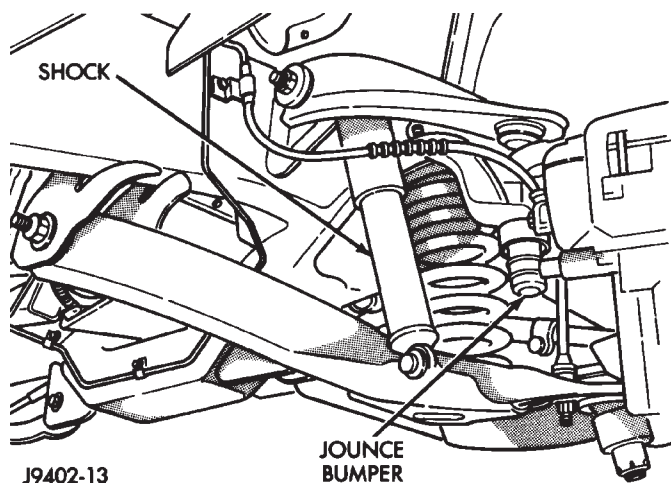


Fig. 2 Independent Front Suspension

between the lower suspension arm and the front cross member spring seat. A rubber isolator seats on top off the spring to help prevent noise.

Suspension Arms: The suspension arms have replaceable ball studs which are pressed into the arms. Bushings located inboard are not replaceable. The upper arm has a pivot bar which mounts on a frame bracket. The bracket has slotted holes this allows the arm to be adjusted for caster and camber. The suspension arm travel (jounce or rebound) is limited through the use of urethane bumpers.

Stabilizer Bar: The stabilizer bar is used to minimize vehicle front sway during turns. The spring steel bar helps to control the vehicle body in relationship to the suspension. The bar extends across the front underside of the chassis and mounts on the frame rails. Links connected the bar to the lower suspension arms. Stabilizer bar mounts are isolated by

DESCRIPTION AND OPERATION (Continued)

rubber bushings. Links are isolated with rubber grommet.

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

(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 assembly.

(3) Mount a dial indicator solidly under the lower suspension arm.

(4) Position indicator plunger against the bottom 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 frame rail. Pry up on the upper suspension arm and record the dial indicator reading.

(7) If the travel exceeds 0.8 mm (0.030 in.) replace the ball joint.

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 stud 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 0.8 mm (0.030 in.), replace the ball joint.

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

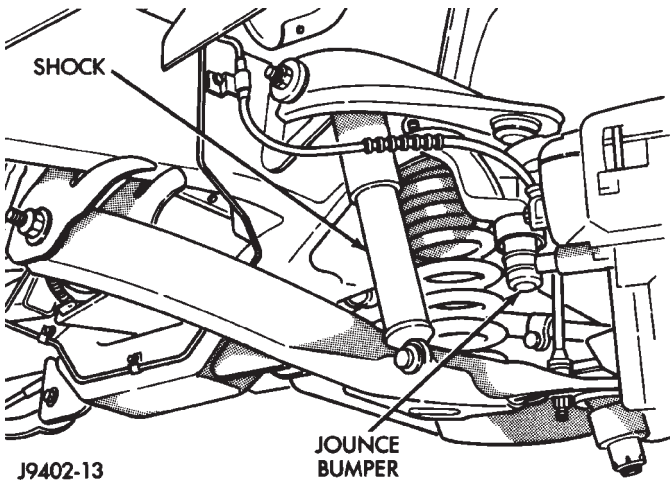
REMOVAL

(1) Raise and support vehicle.

(2) Remove shock upper nut and remove retainer and grommet.

(3) Remove lower mounting bolt from suspension arm and remove shock (Fig. 3).

REMOVAL AND INSTALLATION (Continued)

**Fig. 3 Shock Absorber****INSTALLATION**

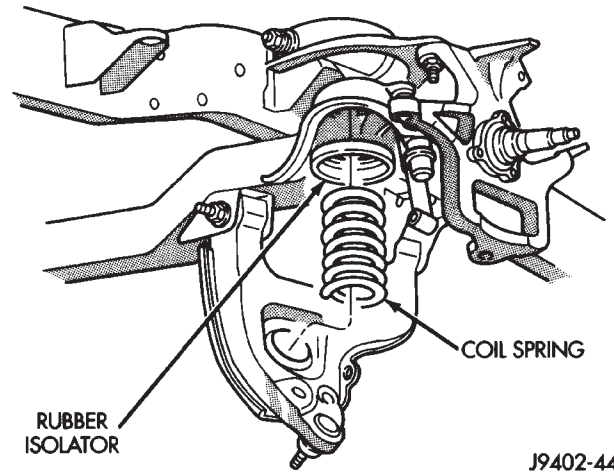
- (1) Extend shock fully, install retainer and grommet on top of shock absorber. Check grommets and retainer for wear.
- (2) Guide shock up through upper suspension arm bracket. Install top grommet, retainer and nut. Tighten nut to 47 N·m (35 ft. lbs.).
- (3) Align bottom end of shock into lower suspension arm and install mounting bolt. Tighten bolt to 142 N·m (105 ft. lbs.).
- (4) Remove support and lower vehicle.

COIL SPRINGS**REMOVAL**

- (1) Raise and support vehicle.
- (2) Remove tire and wheel assembly.
- (3) Remove brake caliper assembly and rotor refer to Group 5 Brakes.
- (4) Disconnect tie rod from steering knuckle.
- (5) Disconnect stabilizer bar link from lower suspension arm.
- (6) Support lower suspension arm outboard end with jack. Place jack under arm in front of shock mount.
- (7) Remove cotter pin and nut from lower ball joint. Separate ball joint with remover C-4150A.
- (8) Remove lower shock bolt from suspension arm.
- (9) Lower jack and suspension arm until spring tension is relieved. Remove spring and rubber isolator (Fig. 4).

INSTALLATION

- (1) Install rubber isolator on top of spring. Position spring into upper spring seat and lower suspension arm.
- (2) Raise suspension arm with jack and position shock into suspension arm mount. Install shock bolt and tighten to 135 N·m (100 ft. lbs.).

**Fig. 4 Coil Spring**

- (3) Install steering knuckle on lower ball joint. Install lower ball joint nut and tighten to:
 - LD: 129 N·m (95 ft. lbs.)
 - HD: 136 N·m (110 ft. lbs.)
- (4) Replace cotter pin and remove jack.
- (5) Install stabilizer bar link on lower suspension arm. Install grommet, retainer and nut and tighten to 37 N·m (27 ft. lbs.).
- (6) Install tie rod on steering knuckle and tighten nut to 88 N·m (65 ft. lbs.).
- (7) Install brake caliper assembly and rotor, refer to Group 5 Brakes.
- (8) Install tire and wheel assembly.
- (9) Remove support and lower vehicle.

STEERING KNUCKLE**REMOVAL**

- (1) Raise and support vehicle.
- (2) Remove wheel and tire assembly. Remove the brake caliper, refer to Group 5 Brakes.
- (3) Remove the wheel hub and bearing assembly from the spindle. Refer to Wheel Hub and Bearings service removal.
- (4) Remove the cotter pin and nut from the tie-rod end and disconnect tie rod.
- (5) Remove the cotter pins and nuts from the upper and lower ball joints. Separate upper ball joint from knuckle with remover MD-990635. Separate lower ball joint with remover C-4150A and remove knuckle.

INSTALLATION

- (1) Position knuckle on ball joints and install ball joint nuts.
- (2) Tighten upper ball joint nut to 81 N·m (60 ft. lbs.) and install cotter pin.
- (3) Tighten lower ball joint nut to:
 - LD: 129 N·m (95 ft. lbs.)

REMOVAL AND INSTALLATION (Continued)

- HD: 149 N·m (110 ft. lbs.)
- (4) Install cotter pin.
- (5) Install the brake rotor hub and bearing assembly on spindle. Refer to Wheel Hub and Bearings service installation.
- (6) Install the brake caliper, refer to Group 5 Brakes.
- (7) Install wheel and tire assembly.
- (8) Remove support and lower vehicle.

LOWER SUSPENSION ARM

REMOVAL

- (1) Raise and support vehicle.
- (2) Follow procedure under Coil Spring Removal.
- (3) Remove bolts mounting suspension arm to crossmember and remove arm.

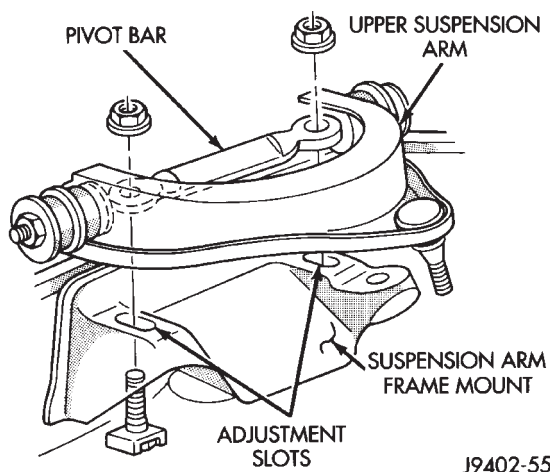
INSTALLATION

- (1) Position suspension arm on crossmember and install bolts and nuts snug.
- (2) Follow procedure under Coil Spring Installation.
- (3) Remove support and lower vehicle.
- (4) Tighten suspension arm crossmember nuts to 196 N·m (145 ft. lbs.).

UPPER SUSPENSION ARM

REMOVAL

- (1) Raise and support vehicle.
- (2) Remove tire and wheel assembly.
- (3) Support lower suspension arm at outboard end with jack stand.
- (4) Remove upper ball joint cotter pin and nut.
- (5) Separate ball joint from knuckle with remover MB-990635.
- (6) Remove pivot bar bolts from upper suspension arm bracket and remove arm from vehicle (Fig. 5).



J9402-55

Fig. 5 Upper Suspension Arm

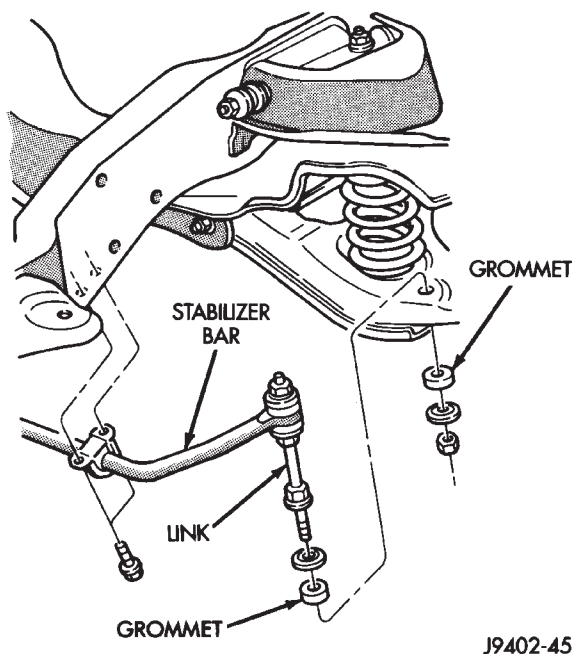
INSTALLATION

- (1) Position upper suspension arm on bracket and install pivot bar bolts. Tighten to 203 N·m (150 ft. lbs.).
- (2) Install ball joint in knuckle. Install nut and tighten to 81 N·m (60 ft. lbs.) and replacement cotter pin.
- (3) Remove jack from lower suspension arm.
- (4) Install tire and wheel assembly.
- (5) Remove support and lower vehicle.
- (6) Align front suspension.

STABILIZER BAR

REMOVAL

- (1) Raise and support the vehicle.
- (2) Disconnect the link from lower suspension arm and stabilizer bar (Fig. 6).
- (3) Disconnect the stabilizer bar clamps from the frame rails. Remove the stabilizer bar.



J9402-45

Fig. 6 STABILIZER BAR

INSTALLATION

- (1) Position the stabilizer bar on the frame rail and install the clamps and bolts. Ensure the bar is centered with equal spacing on both sides. Tighten the bolts to 54 N·m (40 ft. lbs.).
- (2) Install links on stabilizer bar and lower suspension arm. Install grommets, retainers and nuts. Tighten nuts to 37 N·m (27 ft. lbs.).
- (3) Remove the supports and lower the vehicle.

REMOVAL AND INSTALLATION (Continued)

WHEEL BEARINGS

REMOVAL

- (1) Raise and support the vehicle.
- (2) Remove the wheel and tire assembly.
- (3) Remove disc brake caliper from steering knuckle. Refer to Group 5 Brakes.
- (4) Remove the dust cap, cotter pin, and hub nut from spindle.
- (5) Carefully slide the hub/rotor from spindle.
- (6) Remove the seal and inner wheel bearing from the hub/rotor.
- (7) Remove inner bearing races from hub/rotor with a pin punch if bearings are going to be replaced.

INSTALLATION

- (1) Install the new bearing cup(s) with an appropriate installation tool.
- (2) Apply a coating of MOPAR Wheel Bearing Grease or equivalent lubricant to inner surface area of hub/rotor. Install inner wheel bearing and seal in the hub/rotor.
- (3) Inspect bearing and seal contact surfaces on spindle for burrs and/or roughness.
- (4) Remove all rough contact surfaces from spindle. Apply a coating of lubricant.
- (5) Carefully slide the hub/rotor onto spindle. Install outer wheel bearing, washer and retaining nut.

NOTE: Use care to prevent inner wheel bearing and seal from contacting spindle threads during installation.

- (6) Tighten the nut to 41-54 N·m (30-40 ft. lbs.) torque to preload bearing while rotating the hub/rotor. Stop hub/rotor and loosen nut to completely release bearing preload torque. Tighten the nut finger-tight and install the nut lock. Install a new cotter pin.
- (7) The adjustment (above) should have 0.001 to 0.003 inch (0.254 to 0.0762 mm) end play.
- (8) Clean the dust cap and apply a coating lubricant to the internal surface. **Do not fill the dust cap with lubricant.** Install the cap.
- (9) Install disc brake caliper, refer to Group 5 Brakes.
- (10) Install the wheel and tire assembly.

WHEEL STUDS

REMOVAL

- (1) Remove wheel and tire assembly.
- (2) Remove disc brake rotor, refer Group 5 Brakes.
- (3) Place rotor on flat surface and drive studs out of the with a hammer and punch.

INSTALLATION

- (1) Turn the rotor over and place in a vise.

- (2) Drive new studs into the rotor with hammer and punch.
- (3) Install rotor, refer to Group 5 Brakes.
- (4) Install wheel and tire assembly.

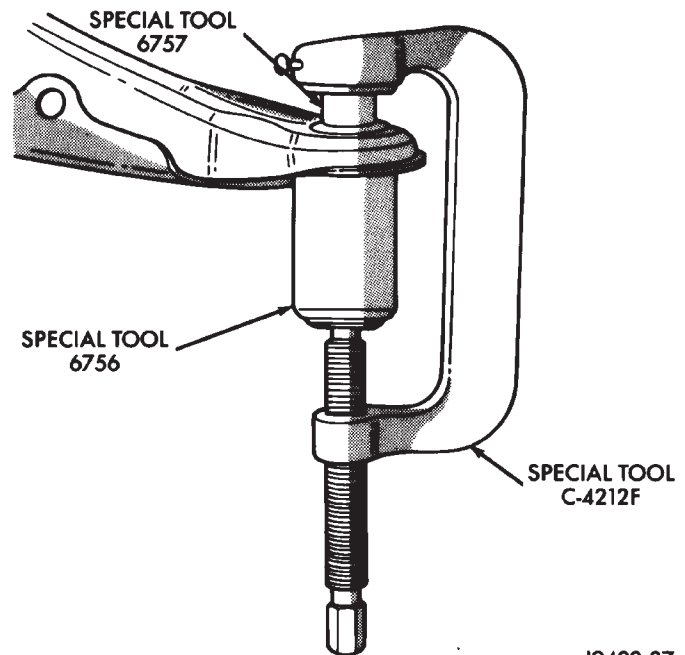
DISASSEMBLY AND ASSEMBLY

LOWER BALL JOINT

NOTE: If the ball joint is tack welded to the suspension arm, the suspension arm must be replaced.

DISASSEMBLY

- (1) Remove lower suspension arm.
- (2) Position special tool on lower suspension arm and press out ball joint (Fig. 7).



J9402-37

Fig. 7 Lower Ball Joint Removal

ASSEMBLY

- (1) Press replacement ball joint into the lower suspension arm bore with special tools (Fig. 8).
- (2) Install lower suspension arm.

UPPER BALL JOINT

DISASSEMBLY

- (1) Remove the upper suspension arm.
- (2) Position special tools on upper suspension arm and press ball joint out of arm (Fig. 9).

ASSEMBLY

- (1) Press ball joint into upper suspension arm with special tools (Fig. 10).
- (2) Install the upper suspension arm.

DISASSEMBLY AND ASSEMBLY (Continued)

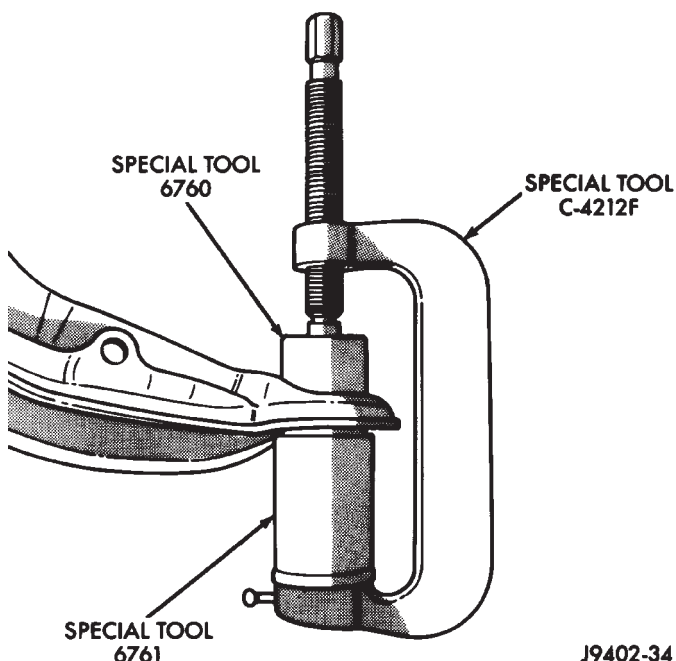


Fig. 8 Lower Ball Joint Installation

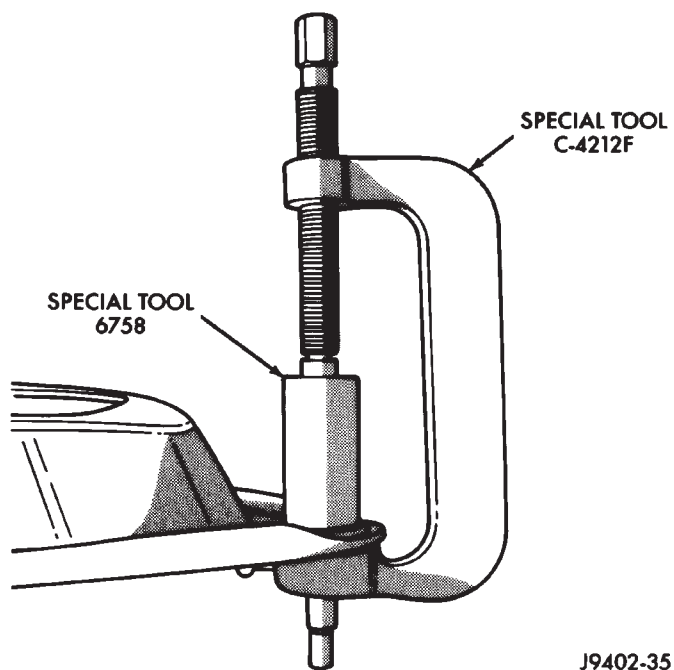


Fig. 10 Upper Ball Joint Installation

- (1) Thoroughly clean the interior of hub/rotor.
- (2) Clean the bearings with solvent and towel dry.
- (3) After cleaning, apply engine oil to each bearing.
- (4) Rotate each bearing slowly while applying downward force. Examine the rollers for pitting and roughness, replace bearing if worn or defective.
- (5) Remove the engine oil from each bearing. Pack each bearing with multi-purpose NLGI, grade 2, EP-type lubricant (or an equivalent lubricant).

NOTE: Ensure that lubricant is forced into all the cavities between the bearing cage and rollers.

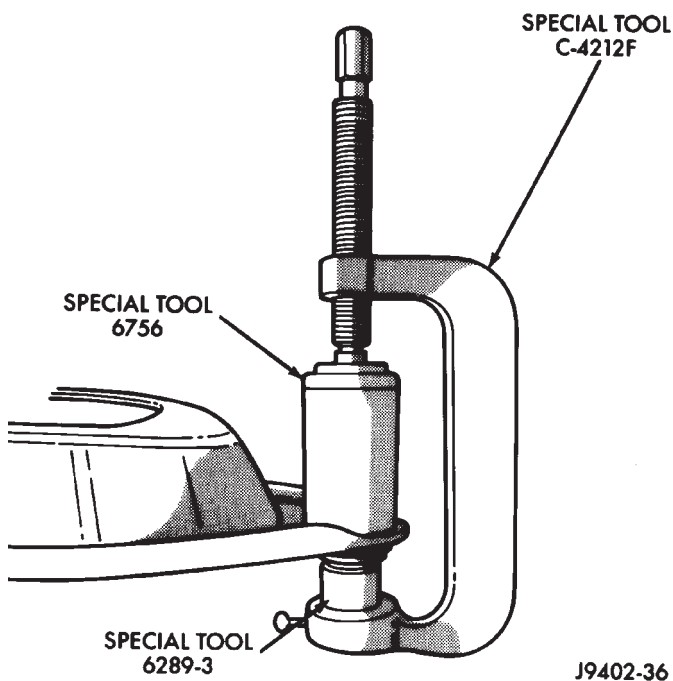


Fig. 9 Upper Ball Joint Removal

SPECIFICATIONS

TORQUE CHART

DESCRIPTION	TORQUE
Shock Absorber	
Upper Nut . . . . .	.47 N·m (35 ft. lbs.)
Lower Bolt . . . . .	.142 N·m (105 ft. lbs.)
Lower Suspension Arm	
Frame Nuts . . . . .	.197 N·m (145 ft. lbs.)
LD Ball Joint Nut . . . . .	.129 N·m (95 ft. lbs.)
HD Ball Joint Nut . . . . .	.149 N·m (110 ft. lbs.)
Upper Suspension Arm	
Pivot Bar Nuts . . . . .	.203 N·m (150 ft. lbs.)
Ball Joint Nut . . . . .	.81 N·m (60 ft. lbs.)
Stabilizer Bar	
Clamp Bolt . . . . .	.54 N·m (40 ft. lbs.)
Link Nuts . . . . .	.37 N·m (27 ft. lbs.)

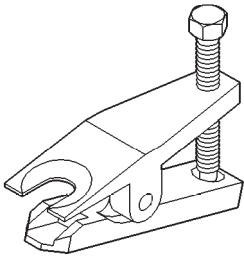
CLEANING AND INSPECTION

WHEEL BEARINGS

NOTE: Bearing and races must be replaced as a set if worn or damaged.

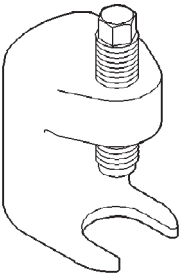
SPECIAL TOOLS

IFS FRONT SUSPENSION

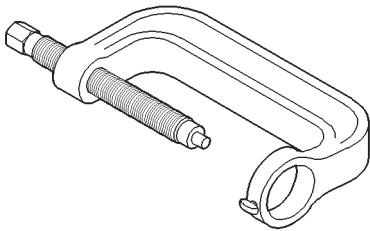


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Remover, Tie Rod End MB-990635

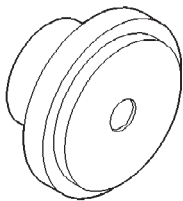


Remover, Lower Ball Joint C-4150A

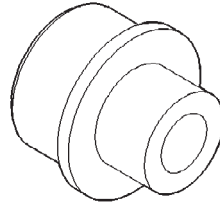


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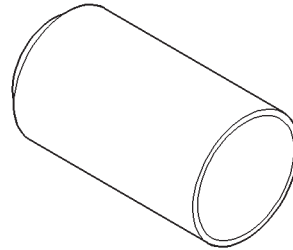
Press Ball Joint Remover/Installer C-4212F



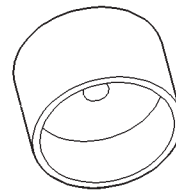
Remover, Ball Joint 6757



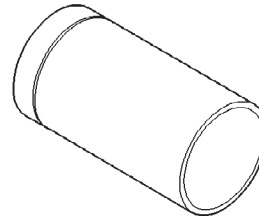
Remover, Ball Joint 6289-3



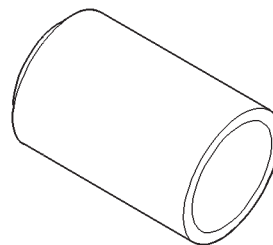
Receiver, Ball Joint 6756



Receiver, Ball Joint 6760



Installer, Ball Joint 6758



Installer, Ball Joint 6761

FRONT SUSPENSION LINK/COIL

INDEX

	page	page
DESCRIPTION AND OPERATION		
FRONT SUSPENSION LINK/COIL	14	
DIAGNOSIS AND TESTING		
SHOCK DIAGNOSIS	15	
TRACK BAR	15	
REMOVAL AND INSTALLATION		
COIL SPRING	16	
HUB/BEARING WITH 5 STUDS	18	
HUB/BEARING WITH 8 STUDS	19	
LOWER SUSPENSION ARM	16	
SHOCK ABSORBER	15	
STABILIZER BAR	17	
STEERING KNUCKLE	16	
TRACK BAR	18	
UPPER SUSPENSION ARM	16	
WHEEL MOUNTING STUDS	21	
SPECIFICATIONS		
TORQUE CHART	22	
SPECIAL TOOLS		
LINK/COIL SUSPENSION	22	

DESCRIPTION AND OPERATION

FRONT SUSPENSION LINK/COIL

The Ram Truck Link/coil suspension allows each wheel to adapt to different road surfaces. The suspension is comprised of (Fig. 1):

- Shock absorbers
- Coil springs
- Upper and lower suspension arms
- Stabilizer bar
- Track bar

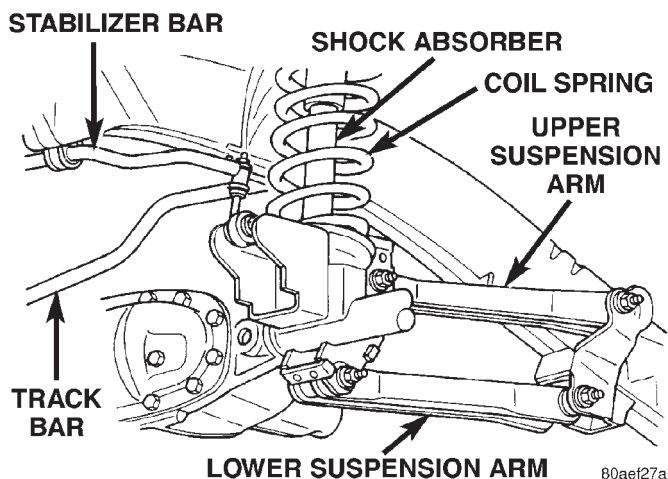


Fig. 1 Link/Coil Suspension

Shock Absorbers: The shock absorbers dampen the jounce and rebound of the vehicle over various road conditions. Shocks are mounted inside the springs and attached at the top to brackets with grommets. These brackets are bolted on the frame with three studs on a ring. The shock is mounted at the bottom of the axle below the spring seat.

Coil Springs: The coil springs control ride quality and maintain proper ride height. The springs use a

rubber isolators between the frame bracket and spring. The isolators help prevent road noise. The bottom of the spring sits on a seat mounted to the axle.

Suspension Arms: The upper and lower suspension arms use bushings to isolate road noise. The suspension arms are bolted to the frame and axle through the rubber bushings. The lower suspension arm uses cam bolts at the axle to allow for caster and pinion angle adjustment. The suspension arm travel (jounce or rebound) is limited through the use of urethane bumpers.

Stabilizer Bar: The stabilizer bar is used to minimize vehicle front sway during turns. The spring steel bar helps to control the vehicle body in relationship to the suspension. The bar extends across the front underside of the chassis and connects to the frame rails. Links are connected from the bar to the axle brackets. Stabilizer bar mounts are isolated by teflon lined rubber bushings.

Track Bar: The track bar is used to control front axle side-to-side movement. The bar is attached to a frame rail bracket with a ball stud and is isolated with a bushing at the axle bracket.

Steering Knuckles: The steering knuckles pivot on replaceable ball studs attached to the axle tube yokes.

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.

DESCRIPTION AND OPERATION (Continued)

CAUTION: Suspension components with rubber bushings (except stabilizer bar) should be tightened with the vehicle at normal 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 is required. Rubber bushings must never be lubricated. Refer to Group 0, Lubrication And Maintenance for the recommended maintenance schedule.

DIAGNOSIS AND TESTING

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.

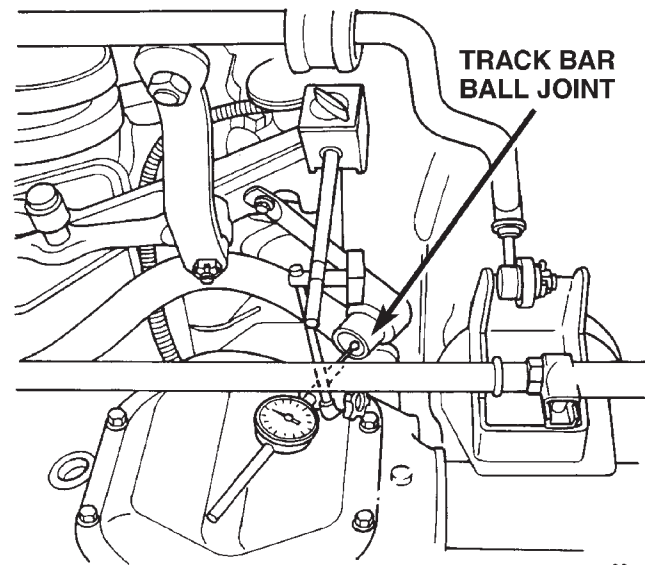
TRACK BAR

- (1) Turn the front wheel 90° to the left of center.
- (2) Mount a dial indicator to the left frame rail in front of the track bar ball joint (Fig. 2).
- (3) Position the dial indicator plunger on the ball joint end cap next to the grease fitting and zero the indicator.

NOTE: Dial indicator plunger must be perpendicular to the ball joint end cap.

- (4) Turn the front wheel 180° to the right and record the dial indicator reading. Repeat this step three times and record all readings.

- (5) If any of the readings exceed 2.03 mm (0.080 in) replace the track bar.



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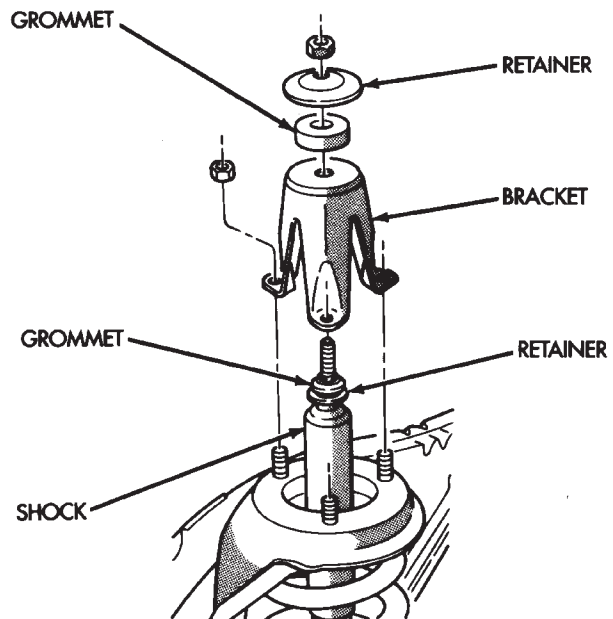
Fig. 2 Dial Indicator Location

REMOVAL AND INSTALLATION

SHOCK ABSORBER

REMOVAL

- (1) Remove the nut, retainer and grommet from the upper stud in the engine compartment.
- (2) Remove three nuts from the upper shock bracket (Fig. 3).

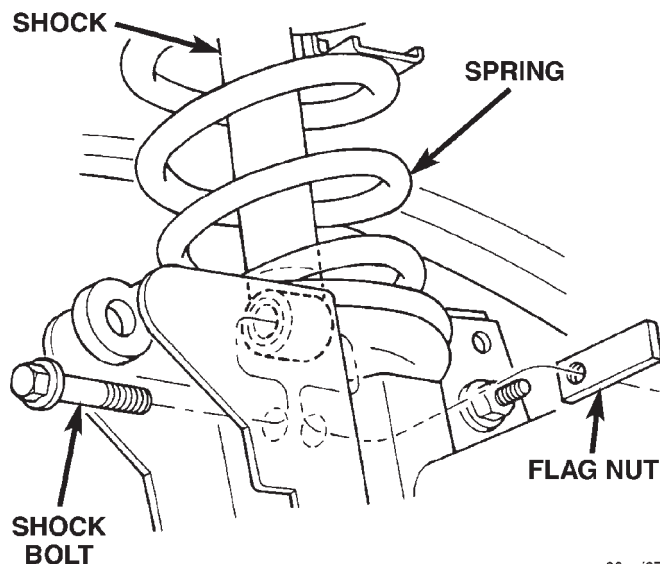


J9402-46

Fig. 3 Shock Absorber and Bracket

REMOVAL AND INSTALLATION (Continued)

(3) Remove the lower bolt from the axle bracket (Fig. 4). Remove the shock absorber from engine compartment.



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Fig. 4 Shock Absorber Axle Mount

INSTALLATION

(1) Position the lower retainer and grommet on the upper stud. Insert the shock absorber through the spring from engine compartment.

(2) Install the lower bolt and tighten to 135 N·m (100 ft. lbs.).

(3) Install the upper shock bracket and three nuts. Tighten nuts to 75 N·m (55 ft. lbs.).

(4) Install upper grommet and retainer. Install upper shock nut and tighten to 47 N·m (35 ft. lbs.).

COIL SPRING

REMOVAL

(1) Raise and support the vehicle. Position a hydraulic jack under the axle to support it.

(2) Paint or scribe alignment marks on lower suspension arm cam adjusters and axle bracket for installation reference.

(3) Remove the upper suspension arm and loosen lower suspension arm bolts.

(4) Mark and disconnect the front propeller shaft from the axle 4x4 models.

(5) Disconnect the track bar from the frame rail bracket.

(6) Disconnect the drag link from pitman arm.

(7) Disconnect the stabilizer bar link and shock absorber from the axle.

(8) Lower the axle until the spring is free from the upper mount. Remove the coil spring.

INSTALLATION

(1) Position the coil spring on the axle pad.

(2) Raise the axle into position until the spring seats in the upper mount.

(3) Connect the stabilizer bar links and shock absorbers to the axle bracket. Connect the track bar to the frame rail bracket.

(4) Install the upper suspension arm.

(5) Install the front propeller shaft to the axle 4x4 model.

(6) Install drag link to pitman arm and tighten nut to specifications. Install new cotter pin.

(7) Remove the supports and lower the vehicle.

(8) Tighten the following suspension components to specifications:

- Link to stabilizer bar nut.
- Lower shock bolt.
- Track bar bolt at axle shaft tube bracket.
- Upper suspension arm nut at axle bracket.
- Upper suspension nut at frame bracket.
- Align lower suspension arm reference marks and tighten cam nut.
- Lower suspension nut at frame bracket.

STEERING KNUCKLE

For service procedures on the steering knuckle and ball joints refer to Group 3 Differentials And Driveline.

LOWER SUSPENSION ARM

REMOVAL

(1) Raise and support the vehicle.

(2) Paint or scribe alignment marks on the cam adjusters and suspension arm for installation reference (Fig. 5).

(3) Remove the lower suspension arm nut, cam and cam bolt from the axle.

(4) Remove the nut and bolt from the frame rail bracket and remove the lower suspension arm (Fig. 6).

INSTALLATION

(1) Position the lower suspension arm at the axle bracket and frame rail bracket.

(2) Install the rear bolt and finger tighten the nut.

(3) Install the cam bolt, cam and nut in the axle and align the reference marks.

(4) Remove support and lower the vehicle.

(5) Tighten cam nut at the axle bracket to 129 N·m (95 ft. lbs.). Tighten rear nut at the frame bracket to 176 N·m (130 ft. lbs.).

UPPER SUSPENSION ARM

REMOVAL

(1) Raise and support the vehicle.

(2) Remove the upper suspension arm nut and bolt at the axle bracket (Fig. 6).

REMOVAL AND INSTALLATION (Continued)

1998 Ram Truck
Publication No. 81-370-8108
TSB 26-02-98 February, 1998

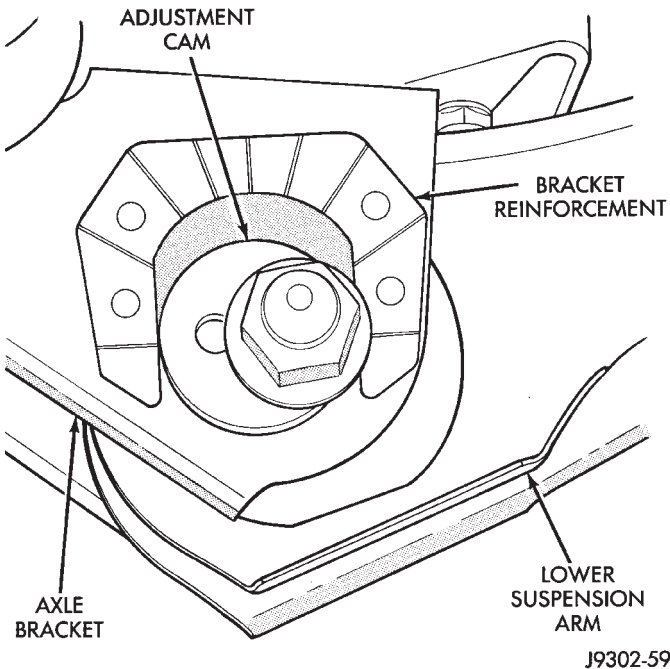


Fig. 5 Cam Adjuster

(3) Remove the nut and bolt at the frame rail and remove the upper suspension arm.

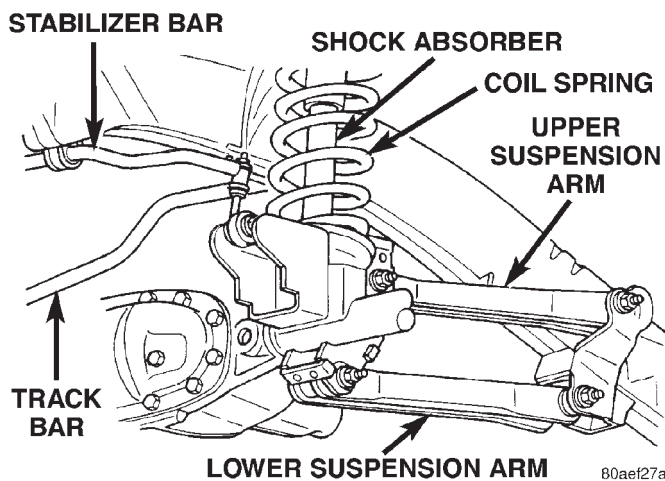


Fig. 6 Upper and Lower Suspension Arm

INSTALLATION

- (1) Position the upper suspension arm at the axle and frame rail.
- (2) Install the bolts and finger tighten the nuts.
- (3) Remove the supports and lower the vehicle.
- (4) Tighten nut at the axle bracket to 121 N·m (89 ft. lbs.). Tighten nut at frame bracket to 115 N·m (85 ft. lbs.).

STABILIZER BAR

REMOVAL

- (1) Raise and support the vehicle.

(2) Hold the link shafts with a wrench and remove the nuts (Fig. 7).

(3) Remove the retainers and grommets from the stabilizer bar links.

(4) Remove the stabilizer bar link cotter pins and nuts from the axle brackets.

(5) Remove the links from the axle brackets with Puller C-3894-A (Fig. 8).

(6) Remove the stabilizer bar clamps from the frame rails and remove the stabilizer bar.

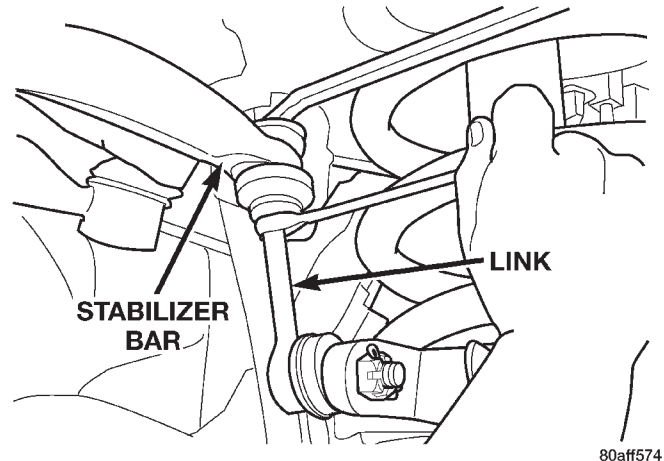


Fig. 7 Stabilizer Bar

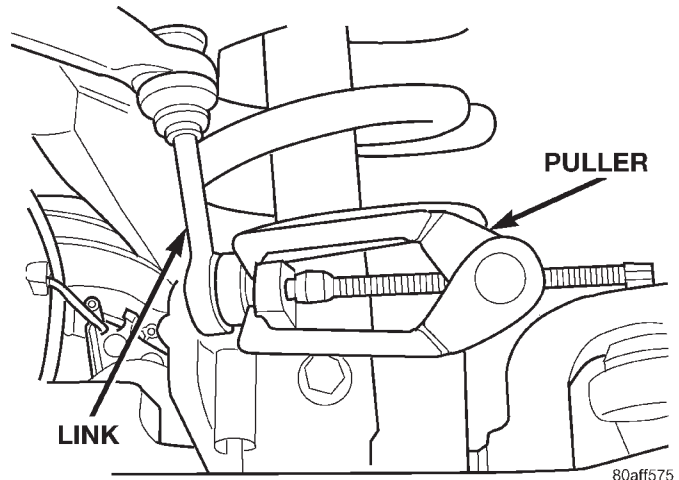


Fig. 8 Stabilizer Link

INSTALLATION

(1) Position the stabilizer bar on the frame rail and install the clamps and bolts. Ensure the bar is centered with equal spacing on both sides. Tighten the bolts to 54 N·m (40 ft. lbs.).

(2) Install links to the axle bracket and tighten nut to 47 N·m (35 ft. lbs.).

(3) Install links, retainers, grommets and nuts to the stabilizer bar (Fig. 7). Hold the link shaft with a wrench and tighten the nuts to 37 N·m (27 ft. lbs.).

(4) Remove the supports and lower the vehicle.

REMOVAL AND INSTALLATION (Continued)

TRACK BAR

REMOVAL

- (1) Raise and support the vehicle.
- (2) Remove the cotter pin and nut from the ball stud end at the frame rail bracket (Fig. 9).
- (3) Remove ball stud from bracket with Puller C-4150A (Fig. 10).
- (4) Remove the bolt and flag nut from the axle bracket and remove the track bar (Fig. 9).

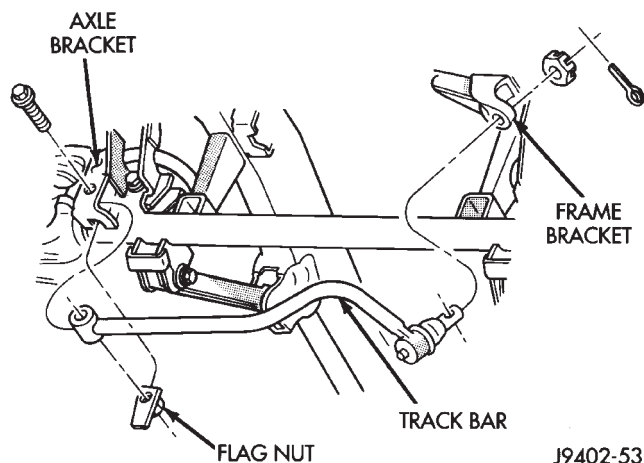


Fig. 9 Track Bar

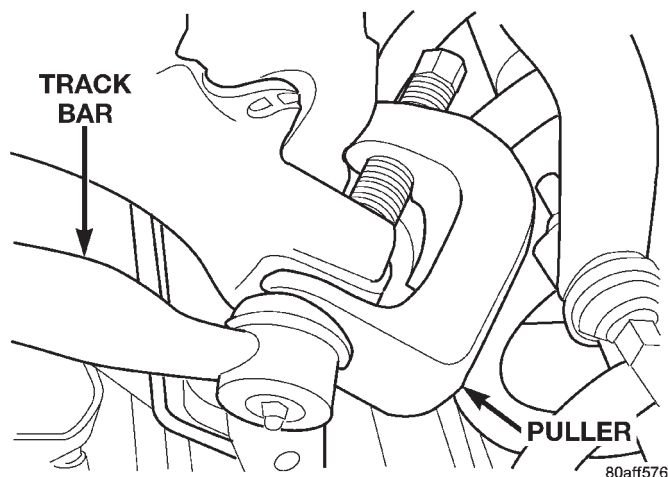


Fig. 10 Track Bar Puller

INSTALLATION

- (1) Install the track bar at axle tube bracket. Loosely install the retaining bolt and flag nut.
- (2) Pry the axle assembly over to install the track bar at the frame rail bracket.
- (3) Install the retaining nut on the stud. Tighten the ball stud nut to 95 N·m (70 ft. lbs.). Install a new cotter pin.
- (4) Remove the supports and lower the vehicle.
- (5) Tighten the bolt at the axle tube bracket to 176 N·m (130 ft. lbs.).

HUB/BEARING WITH 5 STUDS

REMOVAL

- (1) Raise and support the vehicle.
- (2) Remove wheel and tire assembly.
- (3) Remove brake caliper and rotor, refer to Group 5 Brakes.
- (4) Remove ABS sensor if equipped, refer to Group 5 Brakes.
- (5) Remove cotter pin and axle hub nut.
- (6) Remove hub/bearing mounting bolts (Fig. 11).
- (7) Remove hub/bearing, brake shield and spacer from steering knuckle.

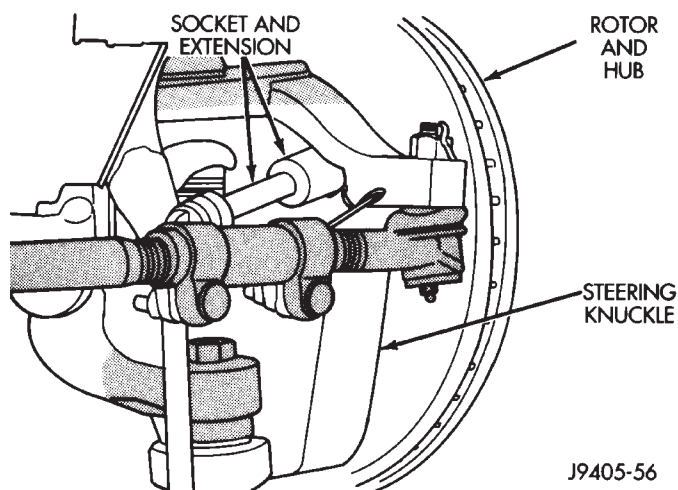
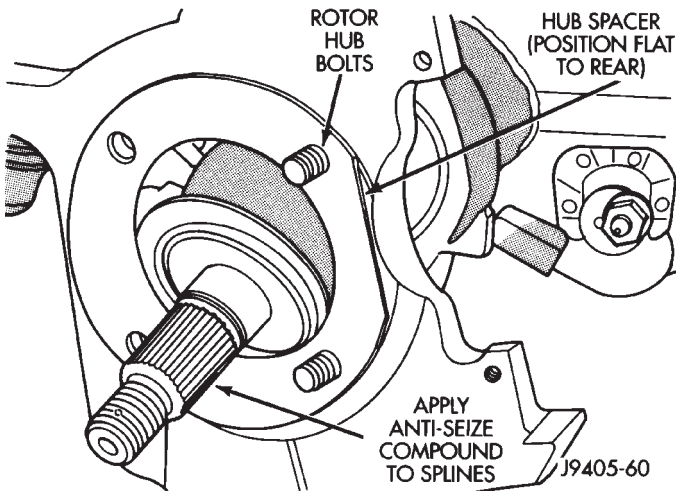
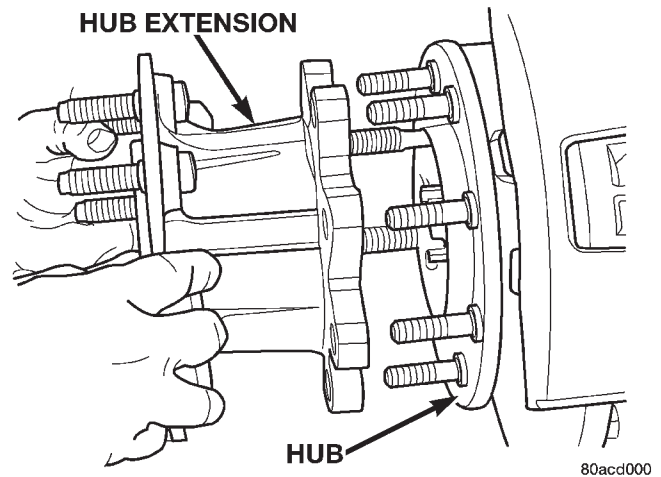
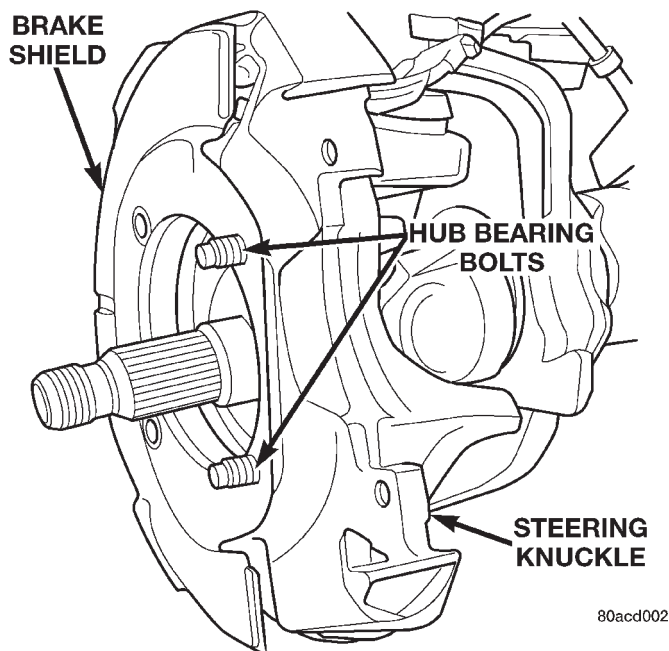


Fig. 11 Hub/Bearing Mounting Bolts

INSTALLATION

- (1) Apply liberal quantity of anti-seize compound to splines of front drive shaft.
- (2) Insert two rearmost, top and bottom rotor hub bolts in steering knuckle. Insert bolts through back side of knuckle so they extend out front face as shown.
- (3) Position hub spacer (Fig. 12) and brake shield (Fig. 13) on bolts just installed in knuckle.
- (4) Align rotor hub with drive shaft and start shaft into rotor hub splines.
- (5) Align bolt holes in hub bearing flange with bolts installed in knuckle. Then thread bolts into bearing flange far enough to hold assembly in place.
- (6) Install remaining bolts. Tighten hub bearing bolts to 170 N·m (125 ft. lbs.).
- (7) Install washer and hub nut and tighten to 237 N·m (175 ft. lbs.).
- (8) Install new cotter pin in hub nut. Tighten nut as needed to align cotter pin hole in shaft with opening in nut.
- (9) Install brake caliper and ABS wheel speed sensor if equipped.
- (10) Install wheel and tire assemblies.
- (11) Remove support and lower the vehicle.

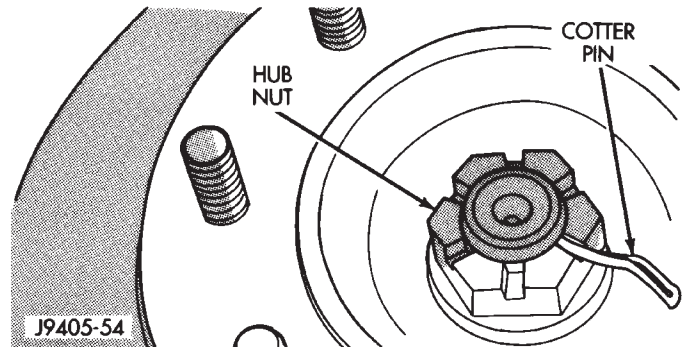
REMOVAL AND INSTALLATION (Continued)

**Fig. 12 Hub Spacer****Fig. 14 Hub Extension****Fig. 13 Brake Shield**

(12) Apply brakes several times to seat brake shoes and caliper piston. Do not move vehicle until firm brake pedal is obtained.

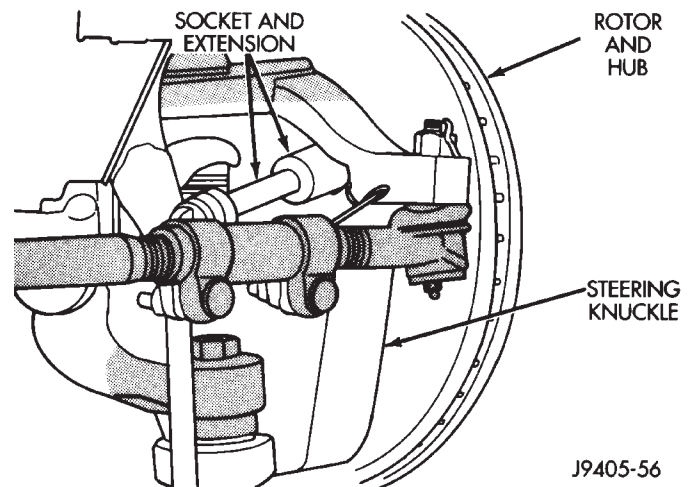
HUB/BEARING WITH 8 STUDS**REMOVAL**

- (1) Raise and support vehicle.
- (2) Remove wheel and tire assembly.
- (3) Remove hub extension mounting nuts and remove the extension from the rotor if equipped (Fig. 14).
- (4) Remove brake caliper.
- (5) Remove the cotter pin and hub nut from the axle shaft (Fig. 15).

**Fig. 15 Hub Nut Cotter Pin**

(6) Disconnect the ABS wheel speed sensor wire from under the hood. Remove sensor wire from the frame and steering knuckle if equipped.

(7) Remove hub/bearing mounting bolts from inboard side of steering knuckle (Fig. 16).

**Fig. 16 Hub/Bearing Mounting Bolts**

(8) Remove rotor hub/bearing assembly (Fig. 17), brake shield and spacer from the steering knuckle.

REMOVAL AND INSTALLATION (Continued)

NOTE: If rotor hub assembly will not come out of the knuckle, use Puller C-844 with extra Puller Leg C-844-1 (Fig. 18) to remove the assembly.

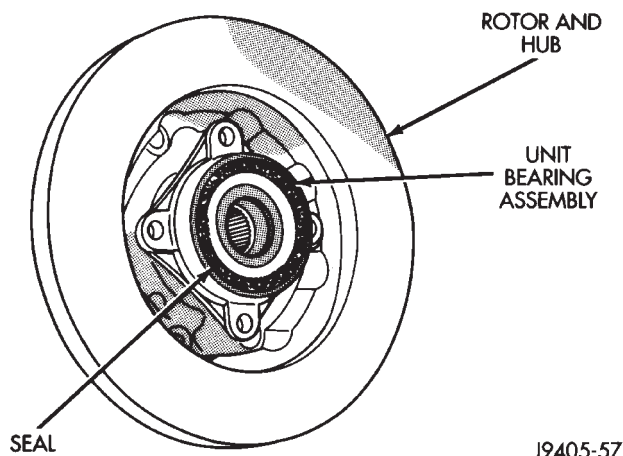


Fig. 17 Rotor Hub/Bearing Assembly

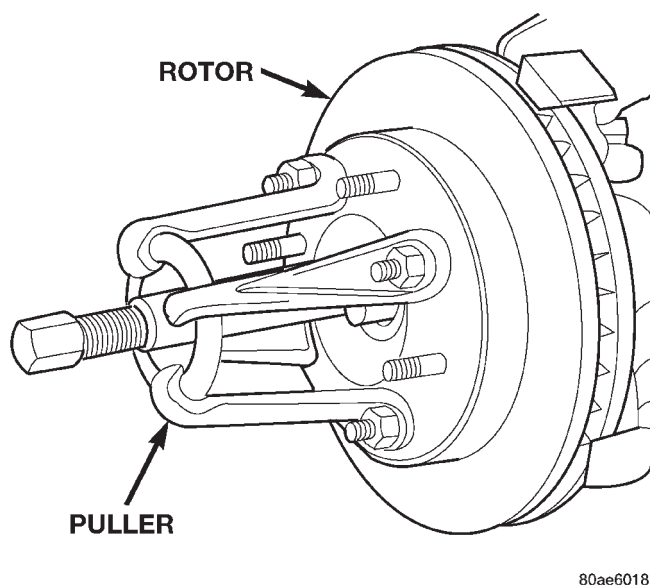


Fig. 18 Rotor Hub/Bearing Removal

(9) Press out the wheel studs/hub extension studs and separate the rotor from the hub (Fig. 19).

(10) Remove the wheel speed sensor (Fig. 20) from the hub bearing if equipped.

INSTALLATION

(1) Install the wheel speed sensor in the hub bearing if equipped.

(2) Position rotor on the hub/bearing.

(3) Press wheel studs/hub extension studs through the back side of the rotor and through the hub bearing flange (Fig. 21).

(4) Apply liberal quantity of anti-seize compound to splines of front drive shaft.

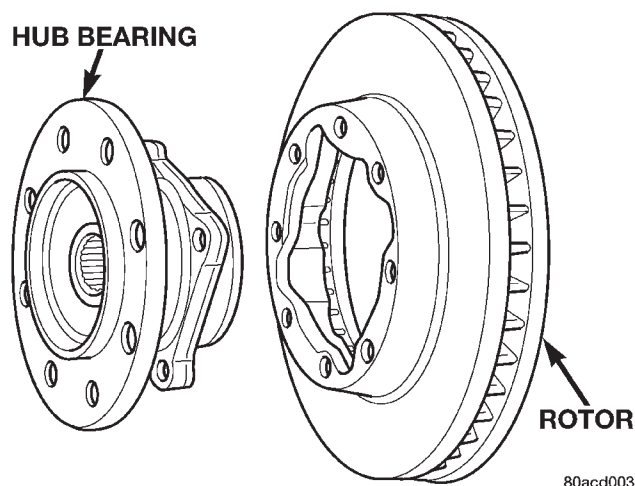


Fig. 19 Rotor And Hub/Bearing

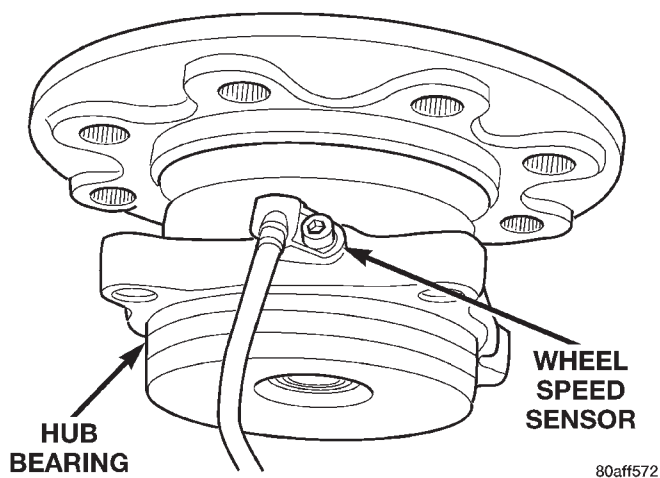


Fig. 20 Wheel Speed Sensor

(5) Insert two rearmost, top and bottom rotor hub bolts in steering knuckle. Insert bolts through back side of knuckle so they extend out front face as shown.

(6) Position hub spacer (Fig. 22) and brake shield (Fig. 23) on bolts just installed in knuckle.

NOTE: If the vehicle is equipped with a wheel speed sensor the brake shield must be positioned on the hub bearing (Fig. 24).

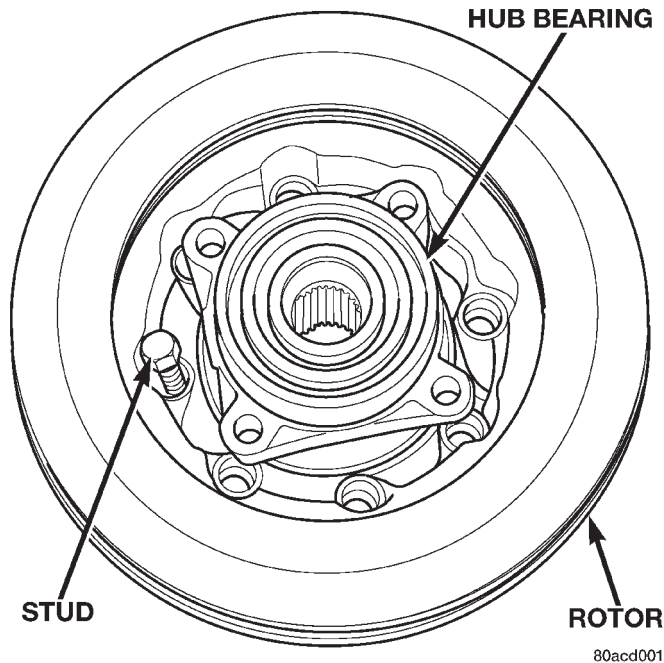
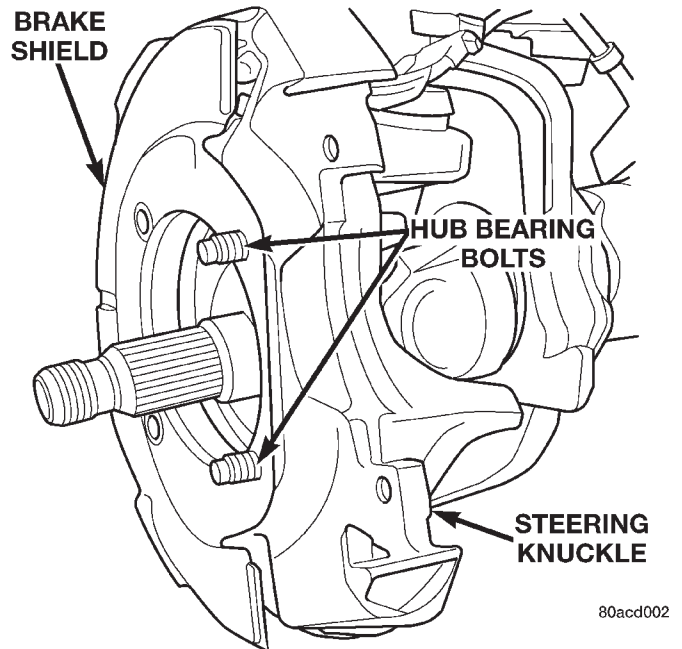
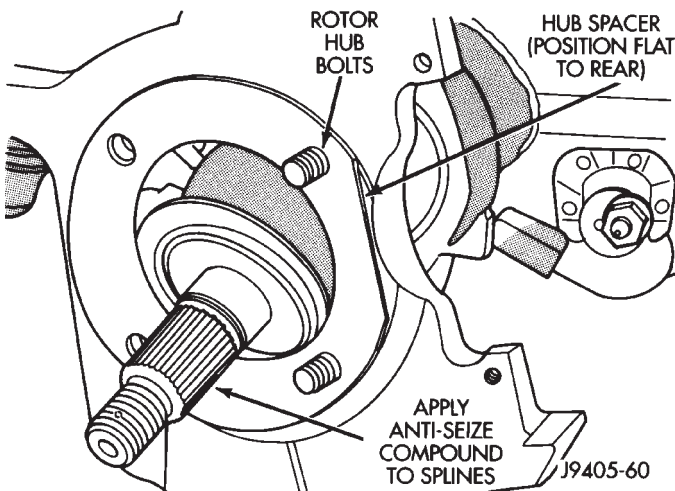
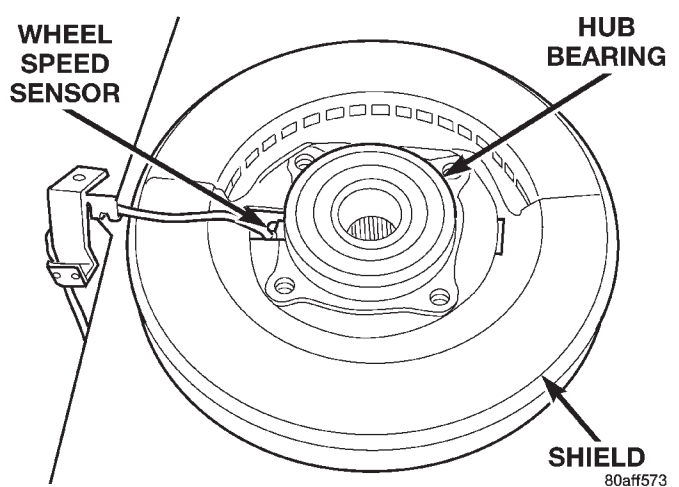
(7) Align rotor hub with drive shaft and start shaft into rotor hub splines.

NOTE: Position wheel speed sensor wire at the top of the knuckle if equipped.

(8) Align bolt holes in hub bearing flange with bolts installed in knuckle. Then thread bolts into bearing flange far enough to hold assembly in place.

(9) Install remaining bolts. Tighten hub/bearing bolts to 170 N·m (125 ft. lbs).

REMOVAL AND INSTALLATION (Continued)

**Fig. 21 Rotor, Hub/Bearing And Stud****Fig. 23 Brake Shield****Fig. 22 Hub Spacer****Fig. 24 Brake Shield With Wheel Speed Sensor**

(10) Install washer and hub nut and tighten to 237 N·m (175 ft. lbs.).

(11) Install new cotter pin in hub nut. Tighten nut as needed to align cotter pin hole in shaft with opening in nut.

(12) Install brake caliper.

(13) Install sensor wire to the steering knuckle and frame and if equipped. Connect the wheel speed sensor wire under the hood.

(14) Install wheel and tire assemblies.

(15) Remove support and lower the vehicle.

(16) Apply brakes several times to seat brake shoes and caliper piston. Do not move vehicle until firm brake pedal is obtained.

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. 25).

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.

REMOVAL AND INSTALLATION (Continued)

1998 Ram Truck
 Publication No. 81-370-8108
 TSB 26-02-98 February, 1998

SPECIAL TOOLS

LINK/COIL SUSPENSION

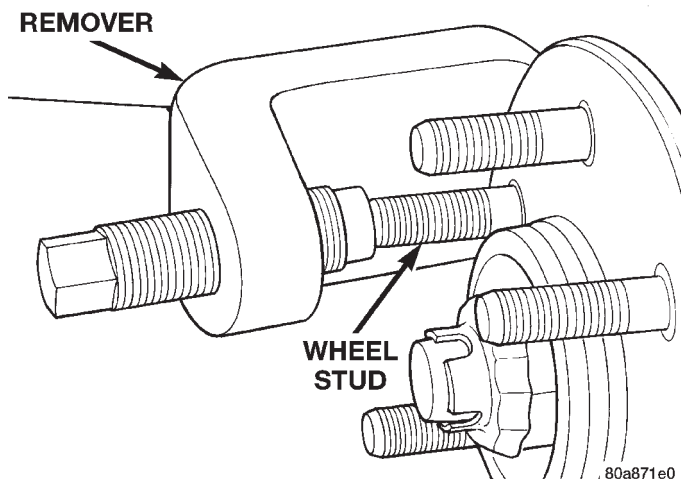


Fig. 25 Wheel Stud Removal

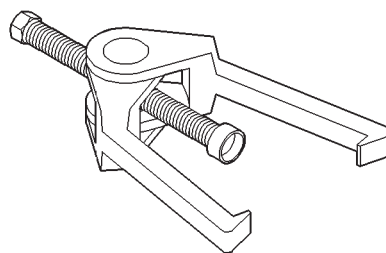
(3) Tighten lug nut until the stud is pulled into the hub flange. Verify that the stud is properly seated into the flange.

(4) Remove lug nut and washers.

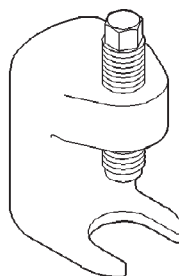
(5) Install the brake rotor and caliper, refer to Group 5 Brakes for procedure.

(6) Install wheel and tire assembly, use new lug nut on stud or studs that were replaced.

(7) Remove support and lower vehicle.



Puller C-3894-A

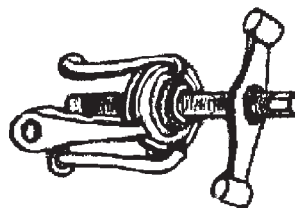


Remover, Wheel Stud C-4150A

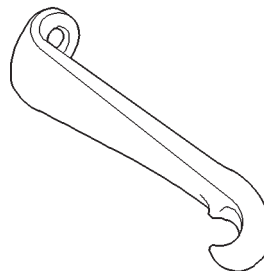
SPECIFICATIONS

TORQUE CHART

DESCRIPTION	TORQUE
Shock Absorber	
Upper Nut	47 N·m (35 ft. lbs.)
Lower Bolt	135 N·m (100 ft. lbs.)
Bracket	75 N·m (55 ft. lbs.)
Suspension Arm Lower	
Axle Nut	129 N·m (95 ft. lbs.)
Frame Nut	176 N·m (130 ft. lbs.)
Suspension Arm Upper	
Axle Nut	121 N·m (89 ft. lbs.)
Frame Nut	115 N·m (85 ft. lbs.)
Stabilizer Bar	
Clamp Bolt	54 N·m (40 ft. lbs.)
Link Upper Nut	37 N·m (27 ft. lbs.)
Link Lower Nut	47 N·m (35 ft. lbs.)
Track Bar	
Ball Stud Nut	95 N·m (70 ft. lbs.)
Axle Bracket Bolt	176 N·m (130 ft. lbs.)



Puller, Hub/Bearing C-844



Puller Leg C-844-1

REAR SUSPENSION

INDEX

	page		page
GENERAL INFORMATION		SHOCK ABSORBER	24
WEIGHT DISTRIBUTION	23	STABILIZER BAR	24
DESCRIPTION AND OPERATION		DISASSEMBLY AND ASSEMBLY	
SUSPENSION COMPONENT	23	SPRING EYE BUSHINGS	26
DIAGNOSIS AND TESTING		SPECIFICATIONS	
SPRING AND SHOCK DIAGNOSIS	23	TORQUE CHART	26
REMOVAL AND INSTALLATION		SPECIAL TOOLS	
LEAF SPRING	25	REAR SUSPENSION	26

GENERAL INFORMATION

WEIGHT DISTRIBUTION

A vehicle should always be loaded so the vehicle weight center-line is located immediately forward of the rear axle. Correct vehicle loading provides proper front tire-to-road contact. This results in maximum vehicle handling stability and safety. Incorrect vehicle weight distribution can cause excessive tire tread wear, spring fatigue or failure, and erratic steering.

DESCRIPTION AND OPERATION

SUSPENSION COMPONENT

The rear suspension is comprised of:

- Drive Axle
- Leaf Springs
- Dual-Action Shock Absorbers
- Stabilizer Bar (optional)
- Jounce Bumpers

Leaf Springs: The rear suspension system uses a multi-leaf springs and a solid drive axle. The forward end of the springs are mounted to the body rail hangers through rubber bushings. The rearward end of the springs are attached to the body by the use of shackles. The spring and shackles use rubber bushings. The bushing help 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 dual-action 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 body crossmember. The bottom of the shocks are bolted to the axle bracket.

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 sus-

pension. The bar extends across the underside of the vehicle and is bolted to the axle. Links at the end of the bar are bolted to the frame.

Jounce Bumpers: The 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. If springs are not at their normal ride position, vehicle ride comfort could be affected and premature bushing wear may occur.

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)

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.

SPRING AND SHOCK ABSORBER DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
SPRING SAGS	1. Broken leaf. 2. Spring fatigue.	1. Replace spring. 2. Replace spring.
SPRING NOISE	1. Loose spring clamp bolts. 2. Worn bushings. 3. Worn or missing spring tip inserts.	1. Tighten to specification. 2. Replace bushings. 3. Replace spring tip inserts.
SHOCK NOISE	1. Loose mounting fastener. 2. Worn bushings. 3. Leaking shock.	1. Tighten to specification. 2. Replace shock. 3. Replace shock.

REMOVAL AND INSTALLATION

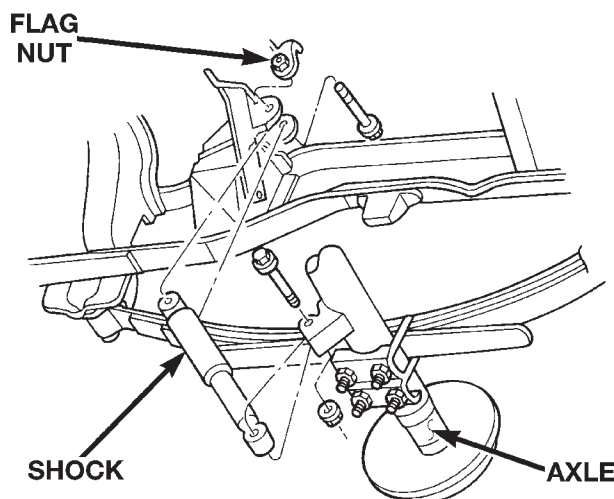
SHOCK ABSORBER

REMOVAL

- (1) Raise vehicle and support axle.
- (2) Remove the bolt and flag nut from the frame crossmember bracket (Fig. 1).
- (3) Remove the bolt and nut from the axle bracket.
- (4) Remove the rear shock absorber from the vehicle.

INSTALLATION

- (1) Position shock absorber in brackets.
- (2) Install bolts through the brackets and shock. Install flag nut on top bolt and nut on lower bolt.
- (3) Tighten upper and lower bolts to specifications.
- (4) Remove the support and lower vehicle.



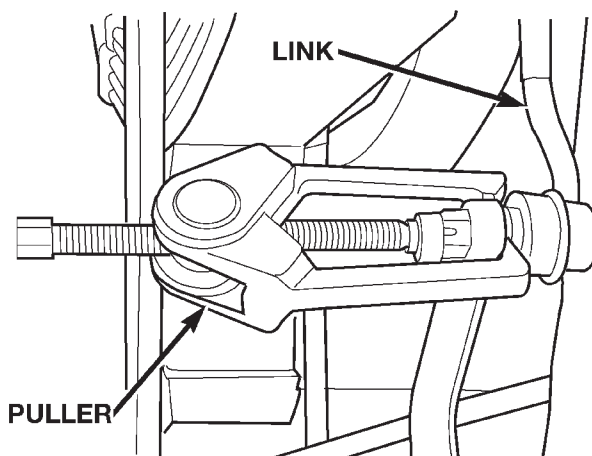
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Fig. 1 Shock Absorber

STABILIZER BAR

REMOVAL

- (1) Raise and support vehicle.
- (2) Remove nuts from the links at the stabilizer bar and separate the links with Puller C-3894-A (Fig. 2).
- (3) Remove stabilizer bar retainer nuts and retainers (Fig. 3).
- (4) Remove stabilizer bar and replace worn, cracked or distorted bushings.
- (5) Remove links upper mounting nuts and bolts and remove links.



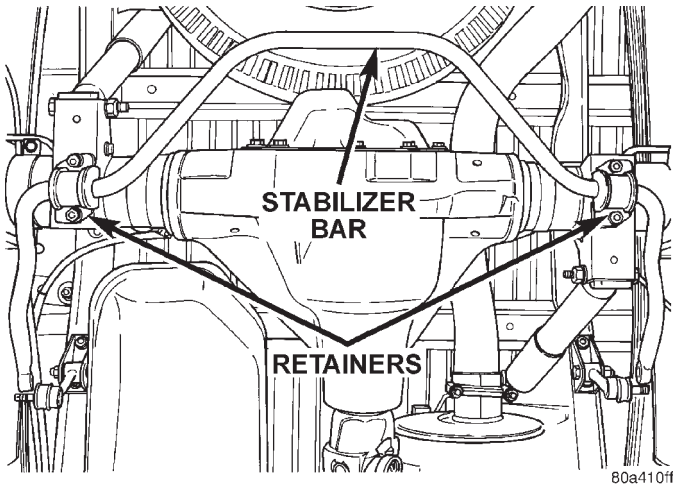
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Fig. 2 Stabilizer Link

INSTALLATION

- (1) Install link into frame brackets and install mounting nuts and bolts.
- (2) Install the stabilizer bar and center it with equal spacing on both sides. Install stabilizer bar retainers and tighten nuts to 54 N·m (40 ft. lbs.).

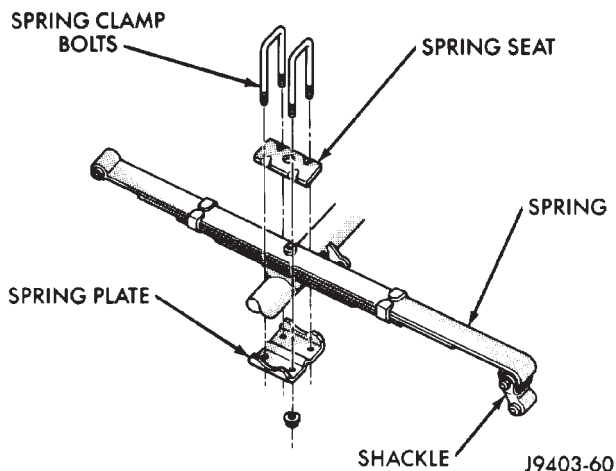
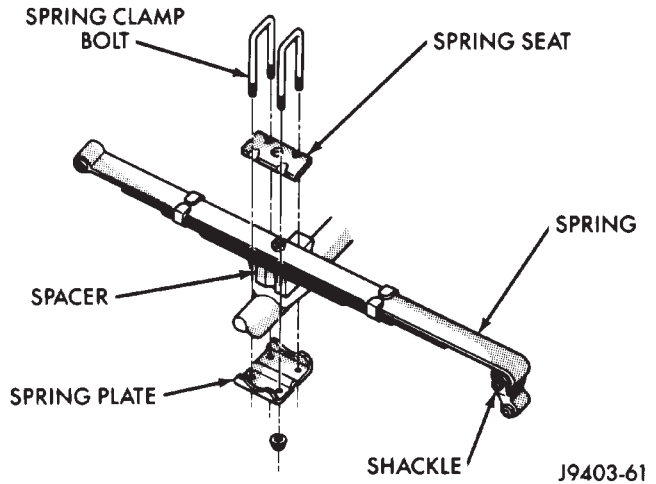
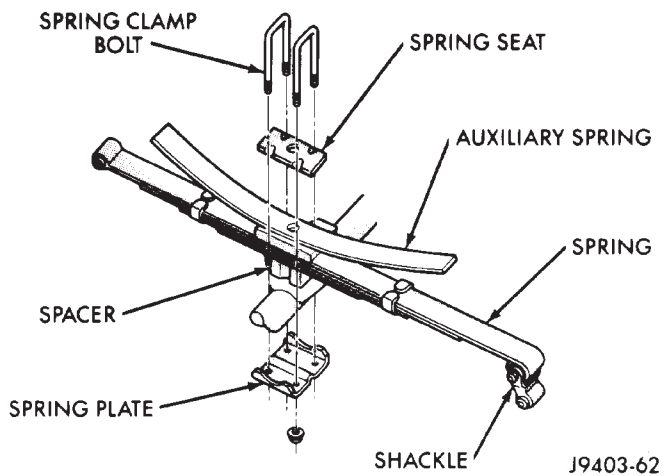
REMOVAL AND INSTALLATION (Continued)

**Fig. 3 Stabilizer Bar Mounting Bolts And Retainers**

- (3) Install stabilizer link ball studs into the bar and tighten nuts to 68 N-m (50 ft. lbs.).
- (4) Remove support and lower vehicle.
- (5) Tighten upper link mounting nuts to 68 N-m (50 ft. lbs.).

LEAF SPRING**REMOVAL**

- (1) Raise vehicle and support axle to remove all weight from springs.
- (2) Remove the nuts and spring clamp bolts that attach the spring to the axle (Fig. 4) and (Fig. 5) and (Fig. 6).
- (3) Remove the nuts and bolts from the spring front and rear shackle eyes. **Note: To remove front eye bolt on left side spring fuel tank must be removed, refer to Group 14 for fuel tank procedure.**
- (4) Remove spring from vehicle.
- (5) Remove shackle from spring.

**Fig. 4 Rear Spring—4X2****Fig. 5 Rear Spring—4X4****Fig. 6 Rear Spring—Cab-Chassis 11000 GVW****INSTALLATION**

- (1) Install shackle on rear spring eye and install bolt and nut.
- (2) Position spring on axle shaft tube so spring center bolt is inserted into the locating hole in the axle tube spring pad or spacer.
- (3) Align spring front eye with bolt hole in the front bracket. Install the eye pivot bolt and nut.
- (4) Align shackle eye with bolt hole in rear bracket. Install bolt and nut.
- (5) Tighten the spring front and rear eye pivot bolt snug do not torque.
- (6) Install spring clamp bolts and the retaining nuts.
- (7) Align the auxiliary spring with the primary spring if equipped. Tighten the nuts until they force the plate flush against the axle tube.
- (8) Remove the supports and lower the vehicle so that the weight is being supported by the tires.
- (9) Tighten the spring clamp retaining nuts to specifications

REMOVAL AND INSTALLATION (Continued)

(10) Tighten spring front and rear eye pivot bolt nuts and shackle eye to specifications.

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.

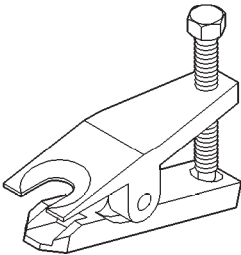
SPECIFICATIONS

TORQUE CHART

DESCRIPTION	TORQUE
Shock Absorber	
Lower Nut . . . . .	.136 N·m (100 ft. lbs.)
Upper Nut . . . . .	.136 N·m (100 ft. lbs.)
Spring Clamp Nuts	
6,010-10,500 GVW . . . . .	.149 N·m (110 ft. lbs.)
11,000 GVW Cab-Chassis . . .	.163 N·m (120 ft. lbs.)
Spring Front and Rear Eye and Shackle	
Bolt/Nut 6,010-7,500 GVW. . .	.149 N·m (110 ft. lbs.)
Bolt/Nut 8,800-11,000 GVW. .	.163 N·m (120 ft. lbs.)
Stabilizer Bar	
Retainer Nuts . . . . .	.54 N·m (40 ft. lbs.)
Link Ball Stud Nut . . . . .	.68 N·m (50 ft. lbs.)
Link Upper Nut. . . . .	.68 N·m (50 ft. lbs.)
Frame Bracket Nuts54 N·m (40 ft. lbs.)
Jounce Bumper	
Bolts54 N·m (40 ft. lbs.)

SPECIAL TOOLS

REAR SUSPENSION



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Remover MB-990635