SUSPENSION

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ALIGNMENT

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DESCRIPTION AND OPERATION

WHEEL ALIGNMENT

DESCRIPTION

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 position (Fig. 1).

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

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.

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.

OPERATION

- **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. 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. The angle is not adjustable, damaged component(s) must be replaced to correct the camber angle.
- **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.
- **STEERING AXIS INCLINATION ANGLE** is measured in degrees and is the angle that the steering knuckles are tilted. The inclination angle has a fixed relationship with the camber angle. It will not change except when a spindle or ball stud is damaged or bent. The angle is not adjustable, damaged

DESCRIPTION AND OPERATION (Continued)

component(s) must be replaced to correct the steering axis inclination angle.

- **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.

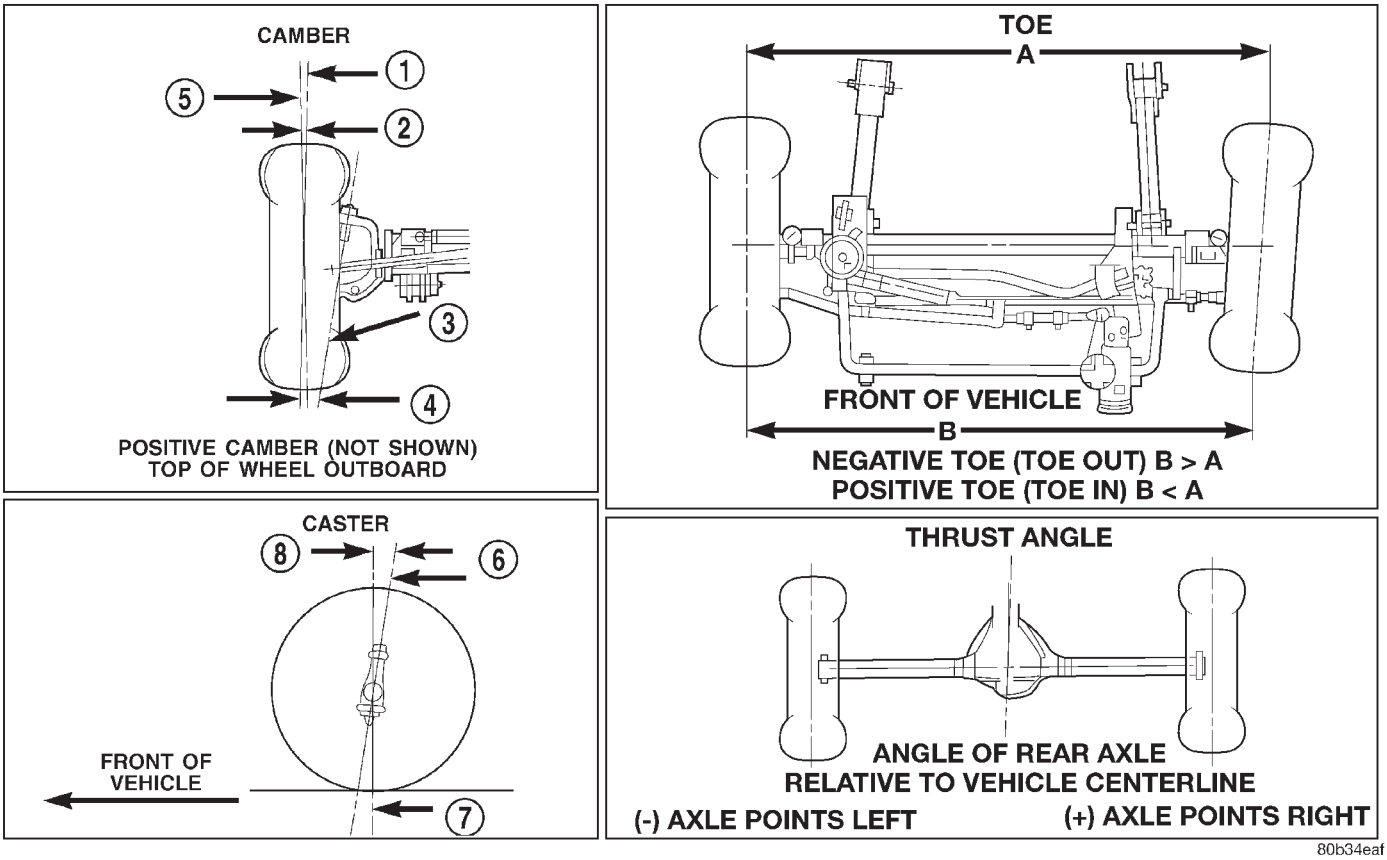

Fig. 1 Wheel Alignment Measurements

1 – WHEEL CENTERLINE
2 – NEGATIVE CAMBER ANGLE
3 – PIVOT CENTERLINE
4 – SCRUB RADIUS
5 – TRUE VERTICAL
6 – KING PIN
7 – VERTICAL
8 – POSITIVE CASTER

DIAGNOSIS AND TESTING

SUSPENSION AND STEERING SYSTEM

CONDITION	POSSIBLE CAUSES	CORRECTION
FRONT END NOISE	1. Loose or worn wheel bearings. 2. Loose or worn steering or suspension components.	1. Adjust or replace wheel bearings. 2. Tighten or replace components as necessary.
EXCESSIVE PLAY IN STEERING	1. Loose or worn wheel bearings. 2. Loose or worn steering or suspension components. 3. Loose or worn steering gear.	1. Adjust or replace wheel bearings. 2. Tighten or replace components as necessary. 3. Adjust or replace steering gear.
FRONT WHEELS SHIMMY	1. Loose or worn wheel bearings. 2. Loose or worn steering or suspension components. 3. Tires worn or out of balance. 4. Alignment. 5. Leaking steering dampener.	1. Adjust or replace wheel bearings. 2. Tighten or replace components as necessary. 3. Replace or balance tires. 4. Align vehicle to specifications. 5. Replace steering dampener.
VEHICLE INSTABILITY	1. Loose or worn wheel bearings. 2. Loose or worn steering or suspension components. 3. Tire pressure. 4. Alignment.	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	1. Loose or worn steering gear. 2. Power steering fluid low. 3. Column coupler binding. 4. Tire pressure. 5. Alignment.	1. Adjust or replace steering gear. 2. Add fluid and repair leak. 3. Replace coupler. 4. Adjust tire pressure. 5. Align vehicle to specifications.
VEHICLE PULLS TO ONE SIDE DURING BRAKING	1. Uneven tire pressure. 2. Worn brake components. 3. Air in brake line.	1. Adjust tire pressure. 2. Repair brakes as necessary. 3. Repair as necessary.
VEHICLE LEADS OR DRIFTS FROM STRAIGHT AHEAD DIRECTION ON UNCROWNED ROAD	1. Radial tire lead. 2. Brakes dragging. 3. Weak or broken spring. 4. Uneven tire pressure. 5. Wheel Alignment. 6. Loose or worn steering or suspension components. 7. Cross caster out of spec.	1. Cross front tires. 2. Repair brake as necessary. 3. Replace spring. 4. Adjust tire pressure. 5. Align vehicle. 6. Repair as necessary. 7. Align vehicle.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
KNOCKING, RATTLING OR SQUEAKING	1. Worn shock bushings.	1. Replace shock.
	2. Loose, worn or bent steering/ suspension components.	2. Inspect, tighten or replace components as necessary.
	3. Shock valve.	3. Replace shock.
IMPROPER TRACKING	1. Loose, worn or bent track bar.	1. Inspect, tighten or replace component as necessary.
	2. Loose, worn or bent steering/ suspension components.	2. Inspect, tighten or replace components as necessary.

SERVICE PROCEDURES

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 and tread wear.
(2) Set tire air pressure.
(3) Inspect front wheel bearings for wear.
(4) Inspect front wheels for excessive radial or lateral runout and balance.
(5) Inspect ball studs, linkage pivot points and steering gear for looseness, roughness or binding.
(6) Inspect suspension components for wear and noise.
(7) Road test the vehicle.

WHEEL ALIGNMENT

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 three times. Always release the bumper in the down position.

To obtain an accurate alignment, a 4 wheel alignment machine must be used and the equipment calibration verified.

CAMBER

The wheel camber angle is preset. This angle is not adjustable and cannot be altered.

CASTER

The wheel caster angle is preset. This angle is not adjustable and cannot be altered.

TOE POSITION

NOTE: For an accurate wheel toe position adjustment the engine must be engine running.

(1) Apply parking brakes.
(2) Start the engine and turn wheels both ways before straightening the steering wheel. Center and secure the steering wheel.
(3) Loosen the tie rod adjustment sleeve clamp bolts (Fig. 2).
(4) Turn the sleeve to obtain the preferred positive TOE-IN specification. Position the clamp bolts as shown (Fig. 2) for proper clearance.
(5) Tighten the clamp bolts to 68 N·m (50 ft. lbs.).

NOTE: Make sure the toe setting does not change during clamp tightening.

(6) Verify alignment specifications, then turn the engine off.

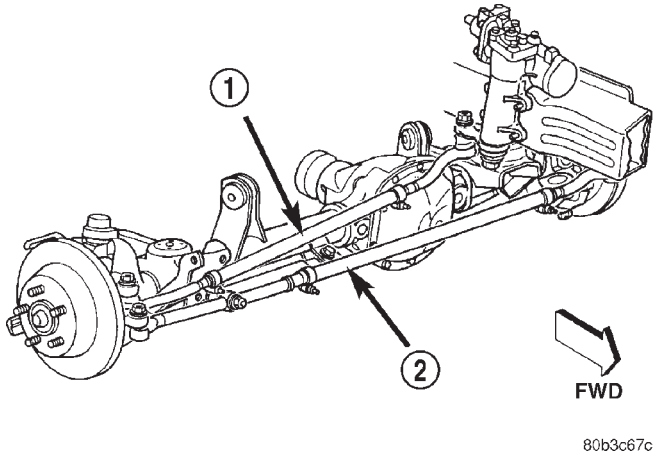

Fig. 2 Steering Linkage

1 – DRAG LINK ADJUSTMENT SLEEVE
2 – TIE ROD ADJUSTMENT SLEEVE

STEERING WHEEL CENTERING

NOTE: The steering wheel can be centered without affecting the toe position.

(1) Loosen the drag link adjustment sleeve clamp bolts.

SERVICE PROCEDURES (Continued)

(2) Turn the adjustment sleeve to center the wheel.
(3) Position the clamp bolts as shown (Fig. 2) for proper clearance.
(4) Tighten the clamp bolts to 68 N·m (50 ft. lbs.).
(5) Road test the vehicle to verify the wheel is centered.

SPECIFICATIONS

ALIGNMENT

NOTE: Specifications are in degrees.

FRONT WHEELS - STANDARD SUSPENSION

ANGLE	PREFERRED	RANGE	MAX. RT to LT Difference
CASTER	+6.75°	+6.0° to +7.5°	0.5°
CAMBER	−0.37°	−0.75° to 0°	0.5°
TOTAL TOE	+0.20°	NA	0.05°

FRONT WHEELS - UP-COUNTRY SUSPENSION

ANGLE	PREFERRED	RANGE	MAX. RT to LT Difference
CASTER	+6.5°	+5.7° to +7.2°	0.5°
CAMBER	−0.37°	−0.75° to 0°	0.5°
TOTAL TOE	+0.20°	NA	0.05°

REAR AXLE

ANGLE	RANGE
CASTER	0° to −0.5
THRUST ANGLE	± 0.25°
TOTAL TOE-IN	0° to +0.5°

FRONT SUSPENSION

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DESCRIPTION AND OPERATION

FRONT SUSPENSION

The front suspension (Fig. 1) is a link/coil design comprised of :

- Drive axle
- Shock absorbers
- Coil springs
- Upper and lower suspension arms
- Stabilizer bar
- Track bar
- Jounce bumpers

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 bushings must 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 will be affected and cause premature bushing wear.

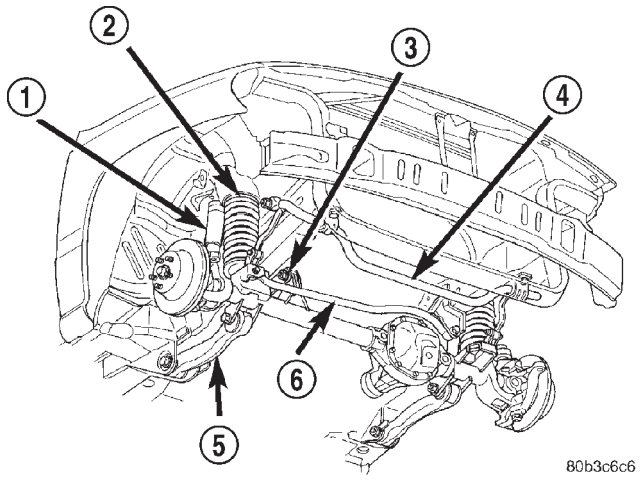


Fig. 1 Front Suspension

1 – SHOCK
2 – COIL SPRING
3 – UPPER SUSPENSION ARM
4 – STABILIZER BAR
5 – LOWER SUSPENSION ARM
6 – TRACK BAR

DESCRIPTION AND OPERATION (Continued)

SHOCK ABSORBERS

DESCRIPTION

The top of the shock absorbers are bolted to the body. The bottom of the shocks are bolted to the axle brackets. The standard shocks have conventional twin tube construction and are low pressure gas charged. Gas charging prevents cavitation during rough road operation. Up-Country shocks are mono tube design and are high pressure gas charged.

OPERATION

The shock absorbers dampen jounce and rebound motion of the vehicle over various road conditions and limit suspension rebound travel.

JOUNCE BUMPER

DESCRIPTION

They are mounted under the unibody rails to minimize transmission of noise to the passenger compartment.

OPERATION

The jounce bumpers are used to limit suspension travel in compression.

COIL SPRINGS AND ISOLATORS

DESCRIPTION

The coil springs mount up in the wheelhouse which is part of the unitized body bracket. A rubber doughnut isolator is located between the top of the spring and the body. The bottom of the spring seats on a axle isolator made of rubber with a steel insert.

OPERATION

The coil springs control ride quality and maintain proper ride height. The isolators provide road noise isolation.

STEERING KNUCKLE

DESCRIPTION

The knuckle is a single casting with legs machined for the upper and lower ball joints. The knuckle also has machined mounting locations for the front brake calipers and hub bearing.

OPERATION

The steering knuckle pivot between the upper and lower ball joint. Steering linkage attached to the knuckle allows the vehicle to be steered.

LOWER SUSPENSION ARMS AND BUSHINGS

DESCRIPTION

The lower suspension arms are hydroformed steel and use voided oval bushings at one end of the arm.

OPERATION

The bushings provide isolation from the axle. The arms mount to the unibody frame rail bracket and the axle brackets. The arm and bushings provide location and react to loads from the axle.

UPPER SUSPENSION ARMS AND BUSHINGS

DESCRIPTION

The upper suspension arms are hydroformed steel and use rubber bushings at each end of the arm.

OPERATION

The arms mount to the unibody frame rail bracket and the axle brackets. The arm and bushings provide location and react to loads from the axle. The bushings provide isolation from the axle.

STABILIZER BAR

DESCRIPTION

The bar extends across the front underside of the chassis and is mounted to the frame rails. Links are connected from the bar to the axle brackets. The stabilizer bar and links are isolated by rubber bushings.

OPERATION

The stabilizer bar is used to control vehicle body roll during turns. The spring steel bar helps to control the vehicle body in relationship to the suspension.

TRACK BAR

DESCRIPTION

The bar is attached to a frame rail bracket and axle bracket. The bar is forged and has non replaceable isolator bushings at both ends.

OPERATION

The track bar is used to control front axle lateral movement and provides cross car location of the axle assembly.

DESCRIPTION AND OPERATION (Continued)

HUB/BEARING

DESCRIPTION

The bearing used on the front hub of this vehicle is the combined hub and bearing unit type assembly. This unit assembly combines the front wheel mounting hub (flange) and the front wheel bearing into a one piece unit. The wheel mounting studs are the only replaceable component of the hub/bearing assembly.

OPERATION

The hub/bearing assembly is mounted to the steering knuckle and is retained by three mounting bolts accessible from the back of the steering knuckle. The hub/bearing unit is not serviceable and must be replaced as an assembly if the bearing or the hub is determined to be defective.

DIAGNOSIS AND TESTING

SUSPENSION AND STEERING SYSTEM

CONDITION	POSSIBLE CAUSES	CORRECTION
FRONT END NOISE	1. Loose or worn wheel bearings. 2. Loose or worn steering or suspension components.	1. Adjust or replace wheel bearings. 2. Tighten or replace components as necessary.
EXCESSIVE PLAY IN STEERING	1. Loose or worn wheel bearings. 2. Loose or worn steering or suspension components. 3. Loose or worn steering gear.	1. Adjust or replace wheel bearings. 2. Tighten or replace components as necessary. 3. Adjust or replace steering gear.
FRONT WHEELS SHIMMY	1. Loose or worn wheel bearings. 2. Loose or worn steering or suspension components. 3. Tires worn or out of balance. 4. Alignment. 5. Leaking steering dampener.	1. Adjust or replace wheel bearings. 2. Tighten or replace components as necessary. 3. Replace or balance tires. 4. Align vehicle to specifications. 5. Replace steering dampener.
VEHICLE INSTABILITY	1. Loose or worn wheel bearings. 2. Loose or worn steering or suspension components. 3. Tire pressure. 4. Alignment.	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	1. Loose or worn steering gear. 2. Power steering fluid low. 3. Column coupler binding. 4. Tire pressure. 5. Alignment.	1. Adjust or replace steering gear. 2. Add fluid and repair leak. 3. Replace coupler. 4. Adjust tire pressure. 5. Align vehicle to specifications.
VEHICLE PULLS TO ONE SIDE DURING BRAKING	1. Uneven tire pressure. 2. Worn brake components. 3. Air in brake line.	1. Adjust tire pressure. 2. Repair brakes as necessary. 3. Repair as necessary.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
VEHICLE LEADS OR DRIFTS FROM STRAIGHT AHEAD DIRECTION ON UNCROWNED ROAD	1. Radial tire lead. 2. Brakes dragging. 3. Weak or broken spring. 4. Uneven tire pressure. 5. Wheel Alignment. 6. Loose or worn steering or suspension components. 7. Cross caster out of spec.	1. Cross front tires. 2. Repair brake as necessary. 3. Replace spring. 4. Adjust tire pressure. 5. Align vehicle. 6. Repair as necessary. 7. Align vehicle.
KNOCKING, RATTLING OR SQUEAKING	1. Worn shock bushings. 2. Loose, worn or bent steering/ suspension components. 3. Shock valve.	1. Replace shock. 2. Inspect, tighten or replace components as necessary. 3. Replace shock.
IMPROPER TRACKING	1. Loose, worn or bent track bar. 2. Loose, worn or bent steering/ suspension components.	1. Inspect, tighten or replace component as necessary. 2. Inspect, tighten or replace components as necessary.

SERVICE PROCEDURES

SERVICE WARNINGS AND CAUTIONS

CAUTION: Suspension components with rubber bushings must 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 will be affected and cause premature bushing wear.

REMOVAL AND INSTALLATION

SHOCK ABSORBER

REMOVAL

(1) Remove the nut, retainer and grommet from the shock stud in the engine compartment (Fig. 2).

(2) Raise and support the front axle.

(3) Remove the lower mounting nuts from the axle bracket (Fig. 3). Remove the shock absorber.

INSTALLATION

(1) Position the lower retainer and grommet on the shock stud. Insert the shock absorber through the shock tower hole.

(2) Install the lower shock studs into the axle bracket.

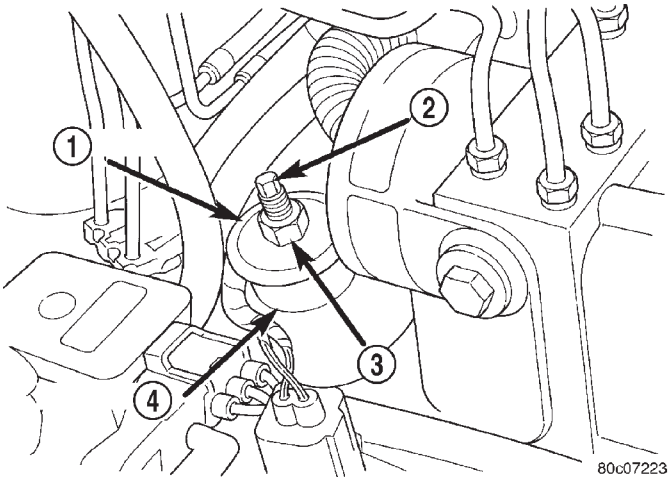


Fig. 2 Upper Shock Mounting

1 – RETAINER
2 – STUD
3 – NUT
4 – GROMMET

(3) Install the mounting nuts and tighten to 28 N·m (250 in. lbs.).

(4) Remove support and lower the vehicle.

(5) Install the upper grommet, retainer and nut on the stud in the engine compartment. Hold the shock stud with a 8 mm wrench and tighten the nut to 35 N·m (26 ft. lbs.).

REMOVAL AND INSTALLATION (Continued)

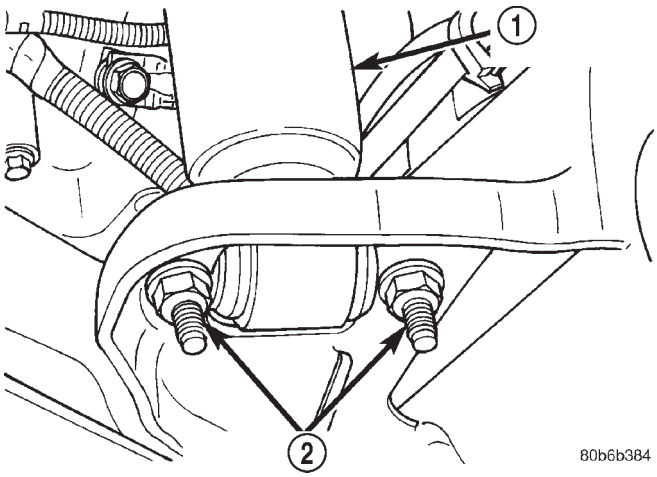


Fig. 3 Lower Shock Mounting

1 – SHOCK ABSORBER
2 – MOUNTING NUTS

COIL SPRINGS

REMOVAL

(1) Raise and support the vehicle. Position a hydraulic jack under the axle to support it.
(2) Remove the wheel and tire assemblies.
(3) Remove stabilizer bar links mounting nuts and bolts from the axle brackets.
(4) Remove shock absorbers lower mounting nuts from the axle brackets.
(5) Remove the track bar mounting bolt from the axle bracket.
(6) Lower the axle until the spring is free from the upper mount and isolator (Fig. 4).
(7) Remove the spring from the vehicle.
(8) Remove and inspect the upper and lower spring isolators.

INSTALLATION

(1) Install the upper isolator.
(2) Install the lower isolator with the isolator locator nub in the axle pad hole (Fig. 5).
(3) Position the coil spring on the axle spring pad.

CAUTION: Ensure the spring is positioned on the lower isolator with the end of the spring coil against the isolator spring locator (Fig. 6).

(4) Raise the axle and guide the springs onto the spring upper mounts and lower shock studs into the axle brackets.
(5) Install the shock absorbers lower mounting nuts.
(6) Install the stabilizer bar link to the axle bracket and install the mounting bolts and nuts.
(7) Install the track bar to the axle bracket and install the mounting bolt.

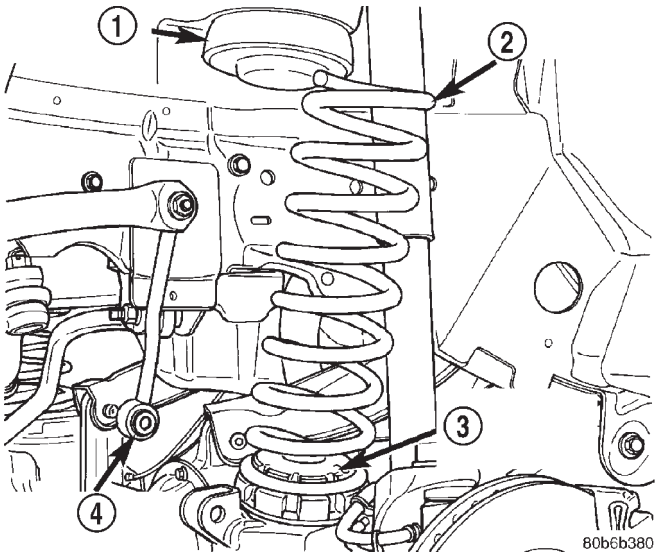


Fig. 4 Front Coil Spring

1 – UPPER ISOLATOR
2 – COIL SPRING
3 – LOWER ISOLATOR
4 – STABILIZER LINK

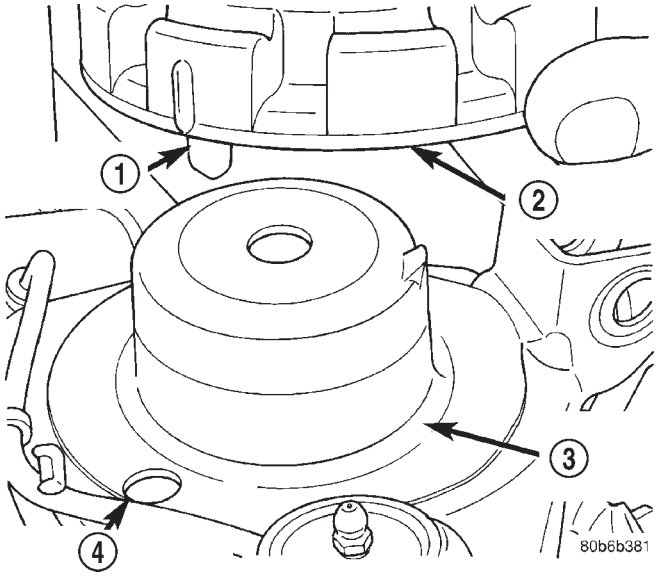


Fig. 5 Lower Isolator

1 – LOCATING NUB
2 – LOWER ISOLATOR
3 – AXLE SPRING PAD
4 – LOCATING HOLE

NOTE: It may be necessary to pry the axle assembly over to install the track bar bolt.

(8) Tighten all suspension components to proper torque.
(9) Install the wheel and tire assemblies.
(10) Remove support and lower vehicle.

REMOVAL AND INSTALLATION (Continued)

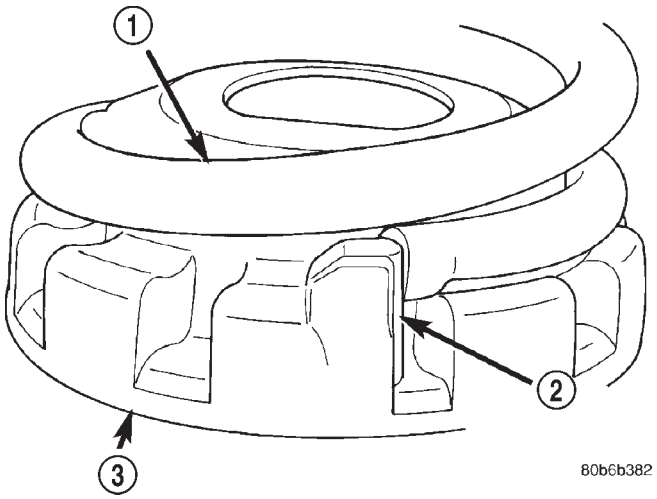


Fig. 6 Isolator Spring Locator

1 – COIL SPRING
2 – SPRING LOCATOR
3 – LOWER ISOLATOR

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 the vehicle and support the front axle.
(2) Remove the lower suspension arm nut and bolt from the axle bracket (Fig. 7).
(3) Remove the nut and bolt from the frame rail bracket and remove the lower suspension arm (Fig. 7).

INSTALLATION

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

NOTE: The end of the arm with the oval bushing attaches to the axle bracket.

(2) Install the axle bracket bolt and nut finger tight.
(3) Install the frame rail bracket bolt and nut finger tight.
(4) Remove support and lower the vehicle.
(5) With the vehicle on the ground tighten the frame bracket bolt to 156 N·m (115 ft. lbs.). Tighten the axle bracket nut to 163 N·m (120 ft. lbs.).
(6) Check the alignment if new parts were installed.

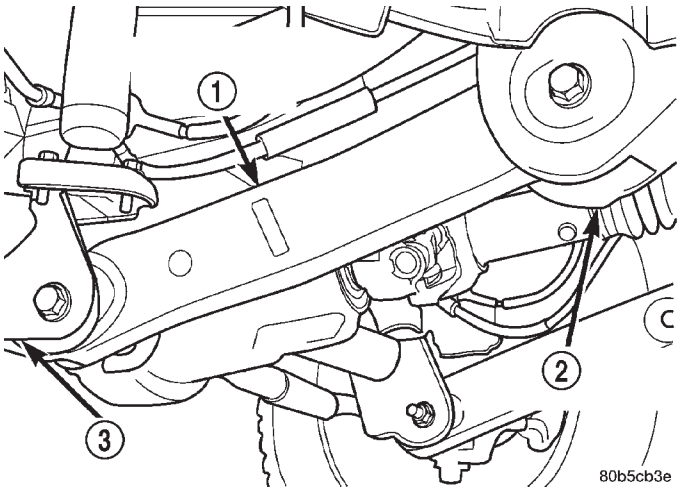


Fig. 7 Lower Suspension Arm

1 – LOWER SUSPENSION ARM
2 – FRAME RAIL BRACKET
3 – AXLE BRACKET

UPPER SUSPENSION ARM

REMOVAL

(1) Raise vehicle and support the axle.
(2) Remove the upper suspension arm mounting nut and bolt (Fig. 8) from the axle bracket.

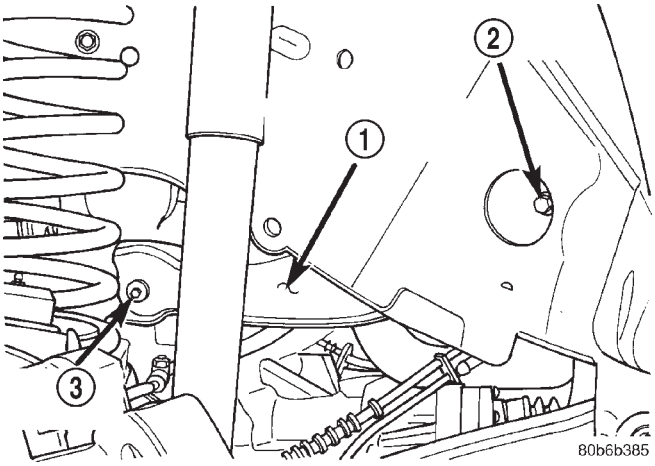


Fig. 8 Upper Suspension Arm

1 – UPPER SUSPENSION ARM
2 – FRAME BOLT
3 – AXLE BOLT

(3) Remove the nut and bolt (Fig. 8) at the frame rail and remove the upper 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.

REMOVAL AND INSTALLATION (Continued)

(4) With the vehicle on the ground tighten the axle bracket nut and the frame bracket bolt to 61 N·m (45 ft. lbs.).

(5) Check the alignment if new parts were installed.

FRONT AXLE BUSHING

REMOVAL

(1) Remove the upper suspension arm from axle.

(2) Position Spacer 8279 over the axle bushing on a 4x2 vehicle and right side on a 4x4 vehicle.

(3) Place Receiver 7932-1 over flanged end of the bushing. (Fig. 9).

(4) Place small end of Remover/Install 7932-2 against other side of the bushing.

(5) Install bolt 7604 through remover, bushing and receiver.

(6) Install Long Nut 7603 and tighten nut too pull bushing out of the axle bracket.

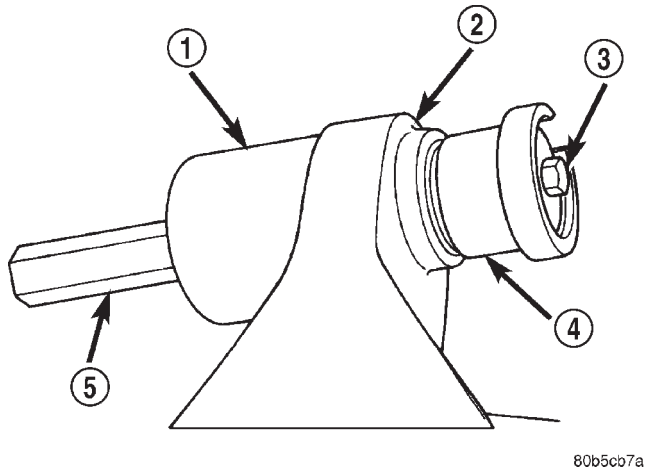


Fig. 9 Bushing Removal

1 – RECEIVER
2 – AXLE BRACKET
3 – BOLT
4 – REMOVER/INSTALLER
5 – LONG NUT

(7) Remove nut, bolt, receiver, remover and bushing.

NOTE: On 4x2 vehicle and right side of 4x4 vehicle, leave Spacer 8279 in position for bushing installation.

INSTALLATION

(1) Place Receiver 7932-1on the other side of the axle bracket.

(2) Position new bushing up to the axle bracket., and large end of Remover/Install 7932-2 against the bushing (Fig. 10).

(3) Install bolt 7604 through receiver, bushing and installer.

(4) Install Long Nut 7603 and tighten nut to draw the bushing into the axle bracket.

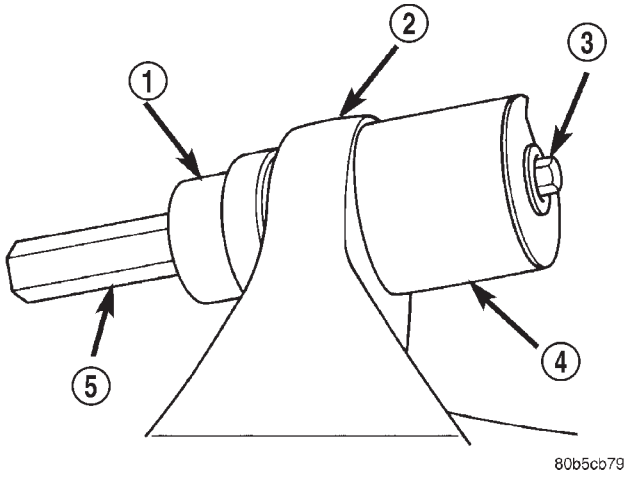


Fig. 10 Bushing Installation

1 – REMOVER/INSTALLER
2 – AXLE BRACKET
3 – BOLT
4 – RECEIVER
5 – LONG NUT

(5) Remove tools and install the upper suspension arm.

STABILIZER BAR

REMOVAL

(1) Raise and support the vehicle.

(2) Remove link nuts and bolts (Fig. 11) and remove the links.

(3) Remove the stabilizer bar retainer bolts (Fig. 11) from the frame rails and remove the stabilizer bar.

INSTALLATION

(1) Position the stabilizer bar on the frame rail and install the retainers and bolts. Ensure the bar is centered with equal spacing on both sides. Tighten the bolts to 92 N·m (68 ft. lbs.).

(2) Install the links onto the stabilizer bar and axle brackets and install the bolts and nuts finger tight.

(3) Remove the supports and lower the vehicle.

(4) With the vehicle on the ground tighten the stabilizer bar link nuts to 106 N·m (78 ft. lbs.).

TRACK BAR

REMOVAL

(1) Raise and support the vehicle.

REMOVAL AND INSTALLATION (Continued)

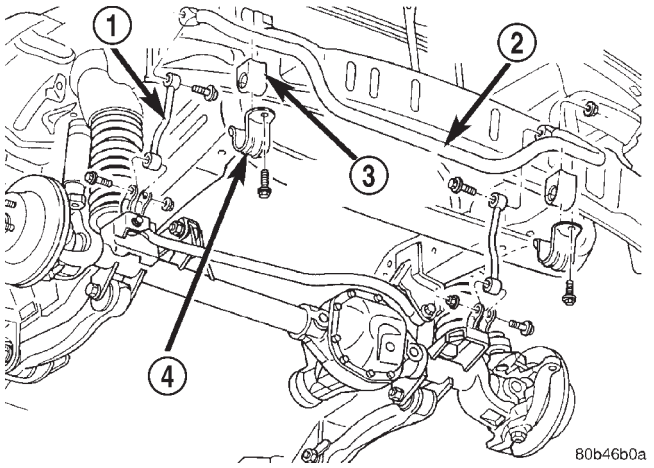


Fig. 11 Stabilizer Bar

1 – LINK
2 – STABILIZER BAR
3 – BUSHING
4 – RETAINER

(2) Remove the nut and bolt from the frame rail bracket (Fig. 12).

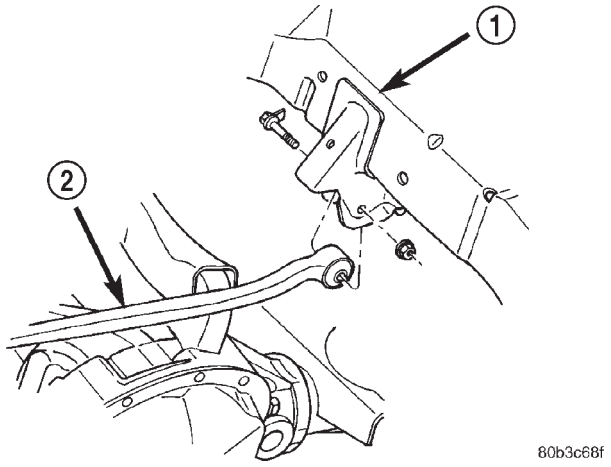


Fig. 12 Track Bar Frame Rail Bracket

1 – FRAME RAIL
2 – TRACK BAR

(3) Remove the bolt from the axle shaft tube bracket (Fig. 13). Remove the track bar.

INSTALLATION

(1) Install the track bar to the axle tube bracket. Install the retaining bolt finger tight.

(2) Install track bar to the frame rail bracket. Install the bolt and nut finger tight.

NOTE: It may be necessary to pry the axle assembly over to install the track bar to the frame rail bracket.

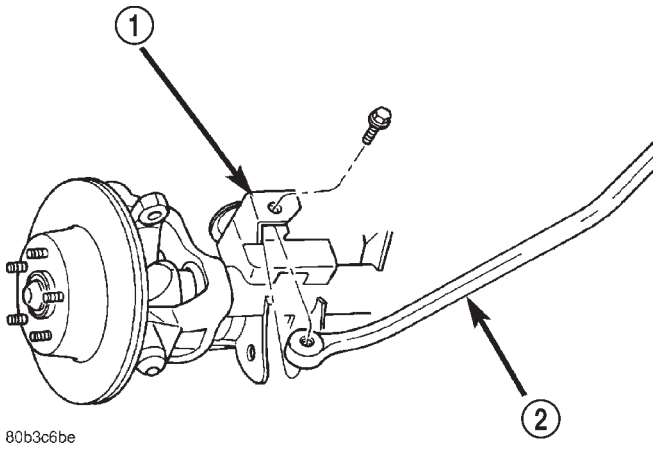


Fig. 13 Track Bar Axle Bracket

1 – AXLE BRACKET
2 – TRACK BAR

(3) Remove the supports and lower the vehicle.

(4) With the vehicle on the ground tighten the nut at the frame rail bracket and to the bolt at the axle bracket to 100 N·m (74 ft. lbs.).

(5) Check alignment specifications if a new track bar was installed.

HUB BEARING

REMOVAL

(1) Raise and support the vehicle.

(2) Remove the wheel and tire assembly.

(3) Remove the brake caliper, caliper anchor, rotor and ABS wheel speed sensor, refer to Group 5 Brakes.

(4) Remove the cotter pin, nut retainer and axle hub nut.

(5) Remove the hub bearing mounting bolts from the back of the steering knuckle. Remove hub bearing (Fig. 14) from the steering knuckle and off the axle shaft.

INSTALLATION

(1) Install the hub bearing to the knuckle.

(2) Install the hub bearing to knuckle bolts and tighten to 102 N·m (75 ft. lbs.).

(3) Install the hub washer and nut. Tighten the hub nut to 237 N·m (175 ft. lbs.). Install the nut retainer and a new cotter pin.

(4) Install the brake rotor, caliper anchor, caliper and ABS wheel speed sensor, refer to Group 5 Brakes.

(5) Install the wheel and tire assembly.

(6) Remove support and lower the vehicle.

REMOVAL AND INSTALLATION (Continued)

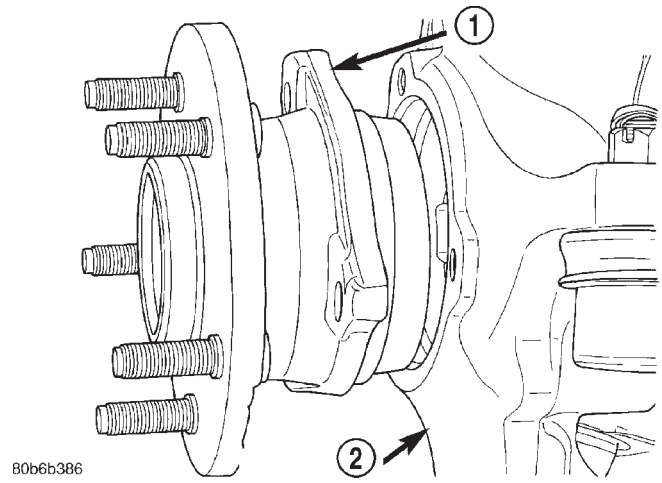


Fig. 14 Hub Bearing & Knuckle

1 – HUB BEARING
2 – KNUCKLE

WHEEL MOUNTING STUDS

CAUTION: Do not use a hammer to remove wheel studs.

REMOVAL

(1) Raise and support vehicle.
(2) Remove wheel and tire assembly.
(3) Remove brake caliper, caliper adapter and rotor, refer to Group 5 Brakes for procedure.
(4) Remove stud from hub with Remover C-4150A (Fig. 15).

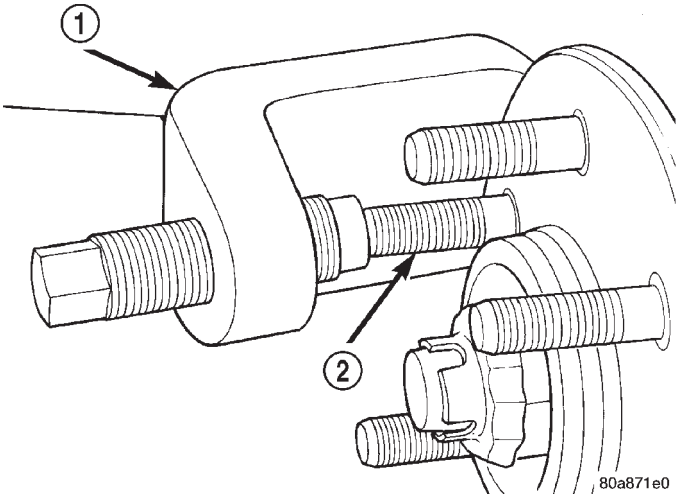


Fig. 15 Wheel Stud Removal

1 – REMOVER
2 – WHEEL STUD

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, caliper adapter, 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.

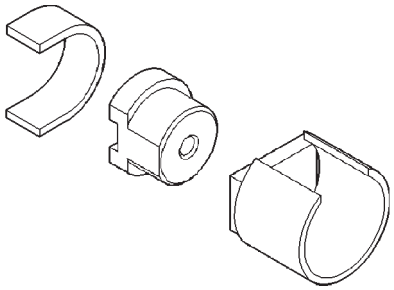
SPECIFICATIONS

TORQUE CHART

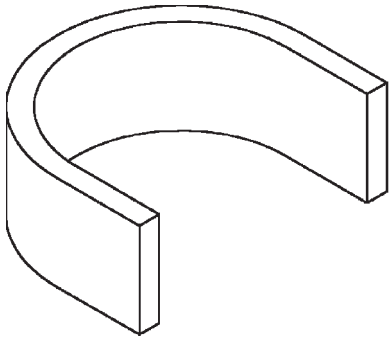
DESCRIPTION	TORQUE
Shock Absorber	
Upper Nut	35 N·m (26 ft. lbs.)
Lower Nuts	28 N·m (250 in. lbs.)
Suspension Arm Upper	
Axle Bracket Nut	61 N·m (45 ft. lbs.)
Frame Bracket Bolt	61 N·m (45 ft. lbs.)
Suspension Arm Lower	
Axle Bracket Nut	163 N·m (120 ft. lbs.)
Frame Bracket Bolt	156 N·m (115 ft. lbs.)
Stabilizer Bar	
Retainer Bolts	92 N·m (68 ft. lbs.)
Link Upper Nut	106 N·m (78 ft. lbs.)
Link Lower Nut	106 N·m (78 ft. lbs.)
Track Bar	
Frame Bracket Nut	108 N·m (80 ft. lbs.)
Axle Bracket Bolt	100 N·m (74 ft. lbs.)
Hub Bearing	
Knuckle Bolts	102 N·m (75 ft. lbs.)

SPECIAL TOOLS

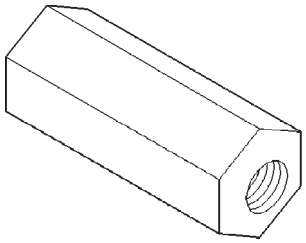
FRONT SUSPENSION



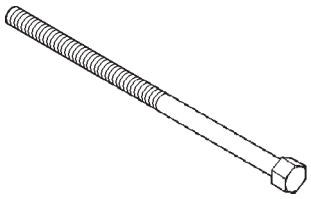
Remover/Installer Suspension Bushing 7932



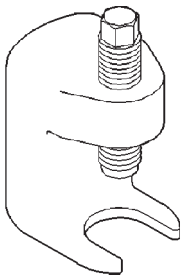
Spacer 8279



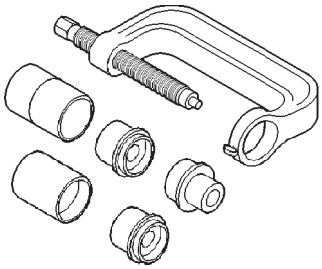
Nut, Long 7603



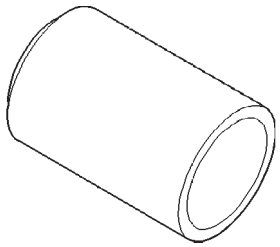
Bolt, Special 7604



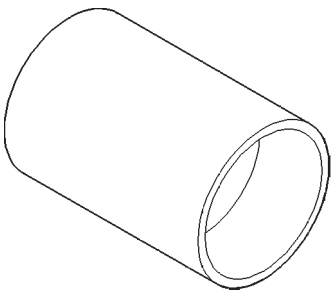
Remover C-4150A



Remover/Installer 6289



Reciever 6761



Installer 6752

REAR SUSPENSION

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DESCRIPTION AND OPERATION

REAR SUSPENSION

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

- Drive axle
- Shock absorbers
- Coil springs
- Lower suspension arms
- Upper suspension arm
- Stabilizer bar

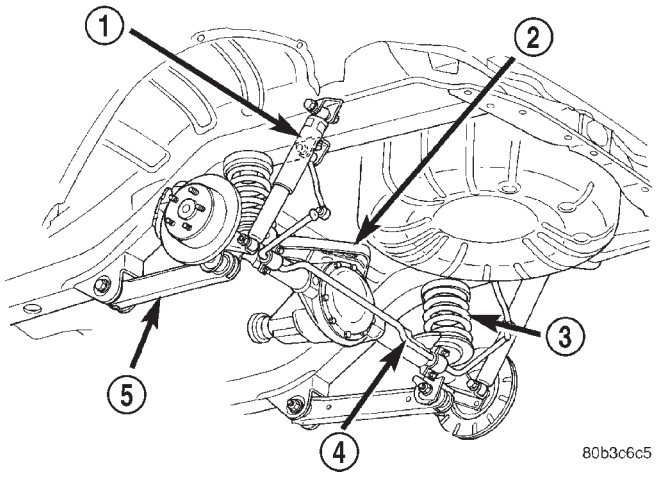


Fig. 1 Rear Suspension

1 – SHOCK
2 – UPPER SUSPENSION ARM
3 – COIL SPRING
4 – STABILIZER BAR
5 – LOWER SUSPENSION ARM

CAUTION: Suspension components with rubber/ urethane bushings 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.

SHOCK ABSORBERS

DESCRIPTION

The top of the shock absorbers are bolted to the body. The bottom of the shocks are bolted to the axle brackets. The standard shocks have conventional twin tube construction and are low pressure gas charged. Gas charging prevents cavitation during rough road operation. Up-Country shocks are mono tube design and are high pressure gas charged.

OPERATION

The shock absorbers dampen jounce and rebound motion of the vehicle over various road conditions and limit suspension rebound travel.

JOUNCE BUMPERS

DESCRIPTION

The jounce bumpers are mounted inside the coil spring, between the axle and the frame rail, to minimize transmission of noise to the passenger compartment.

DESCRIPTION AND OPERATION (Continued)

OPERATION

The jounce bumpers are used to limit suspension travel in compression.

COIL SPRINGS AND ISOLATORS

DESCRIPTION

The coil springs mount up in the wheelhouse which is part of the unitized body bracket. A rubber doughnut isolator is located between the top of the spring and the body. The bottom of the spring seats on a axle isolator made of rubber with a steel insert. The isolators provide road noise isolation

OPERATION

The coil springs control ride quality and maintain proper ride height.

LOWER SUSPENSION ARMS AND BUSHINGS

DESCRIPTION

The lower suspension arms are hydroformed steel and use voided oval bushings at each end of the arm.

OPERATION

The bushings provide isolation from the axle. The arms mount to the unibody frame rail bracket and the axle brackets. The arm and bushings provide location and react to loads.

UPPER SUSPENSION ARM, BUSHINGS, AND BALL JOINT

DESCRIPTION

The suspension arm uses vertical spool bushings to isolate road noise. The suspension arm is bolted through bushings to cage nuts in the body and a ball joint plate to the top of the differential housing.

OPERATION

The upper suspension arm provides fore/aft and lateral location of the rear axle. The suspension arm travel is limited through the use of jounce bumpers in compression and shock absorbers in rebound.

STABILIZER BAR

DESCRIPTION

The stabilizer bar extends across the back side of the rear axle. Links are connected between the bar and frame rail brackets. The stabilizer bar and links are isolated by rubber bushings.

OPERATION

The stabilizer bar is used to control vehicle body roll, during turns. The bar helps control the vehicle body in relationship to the suspension.

DIAGNOSIS AND TESTING

REAR SUSPENSION

CONDITION	POSSIBLE CAUSES	CORRECTION
VEHICLE INSTABILITY	1. Loose or worn wheel bearings. 2. Loose, worn or bent suspension components. 3. Tire pressure.	1. Replace wheel bearings. 2. Inspect, tighten or replace components as necessary. 3. Adjust tire pressure.
VEHICLE PULLS TO ONE SIDE	1. Weak or broken spring. 2. Alignment. 3. Tires. 4. Brakes.	1. Replace spring. 2. Align vehicle to specifications. 3. Replace tires. 4. Repair as necassary.
KNOCKING, RATTLING OR SQUEAKING	1. Worn shock bushings. 2. Loose shock mounting. 3. Shock valve. 4. Loose upper ball joint. 5. Loose, worn or bent suspension components.	1. Replace shock. 2. Tighten to specifications. 3. Replace shock. 4. Replace ball joint. 5. Inspect, tighten or replace components as necessary.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
IMPROPER TRACKING	1. Loose, worn or bent suspension components. 2. Bent axle.	1. Inspect, tighten or replace components as necessary. 2. Replace axle.

SERVICE PROCEDURES

SERVICE WARNINGS AND CAUTIONS

CAUTION: Suspension components with rubber bushings must 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 will be affected and cause premature bushing wear.

REMOVAL AND INSTALLATION

SHOCK ABSORBER

REMOVAL

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

CAUTION: Do not allow the axle to hang from the upper suspension arm ball joint.

(2) Remove the upper nut and bolt from the frame bracket (Fig. 2).

(3) Remove the lower nut and bolt from the axle bracket. Remove the shock absorber.

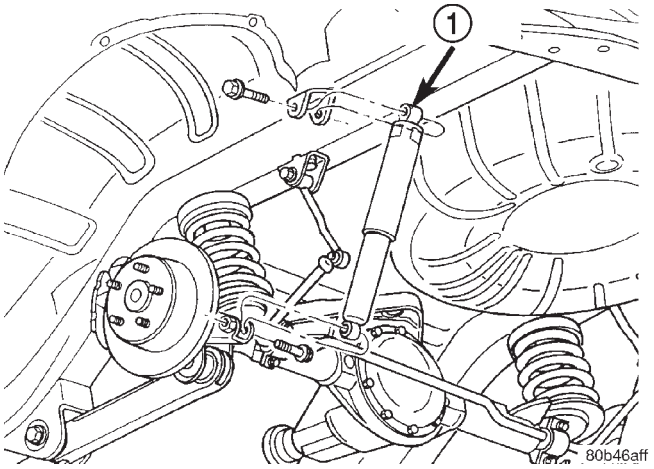


Fig. 2 Shock Absorber

1 – SHOCK

INSTALLATION

(1) Install the shock absorber in the frame bracket and install the bolt and nut.

(2) Install the shock absorber in the axle bracket and install the bolt and nut.

(3) Tighten the upper mounting nuts to 108 N·m (80 ft. lbs.). Tighten the lower mounting nuts to 115 N·m (85 ft. lbs.).

(4) Remove the supports and lower the vehicle.

COIL SPRING

REMOVAL

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

(2) Remove the wheel and tire assemblies.

(3) Remove the stabilizer bar link from the stabilizer bar (Fig. 3).

(4) Remove the shock absorber lower bolt from the axle bracket.

(5) Lower the hydraulic jack and tilt the axle and remove the coil spring (Fig. 3).

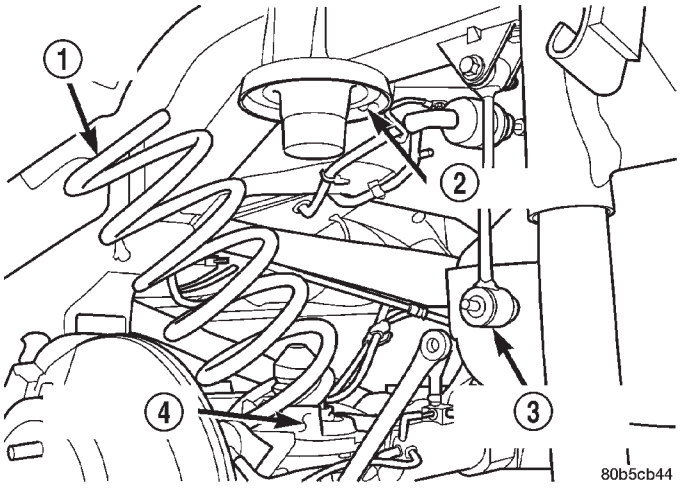


Fig. 3 Coil Spring

1 – COIL SPRING
2 – ISOLATOR
3 – STABILIZER LINK
4 – ISOLATOR

(6) Remove and inspect the upper and lower spring isolators (Fig. 3).

INSTALLATION

(1) Install the upper isolator.

REMOVAL AND INSTALLATION (Continued)

(2) Install the lower isolator with the isolator locator nub in the axle pad hole (Fig. 4).

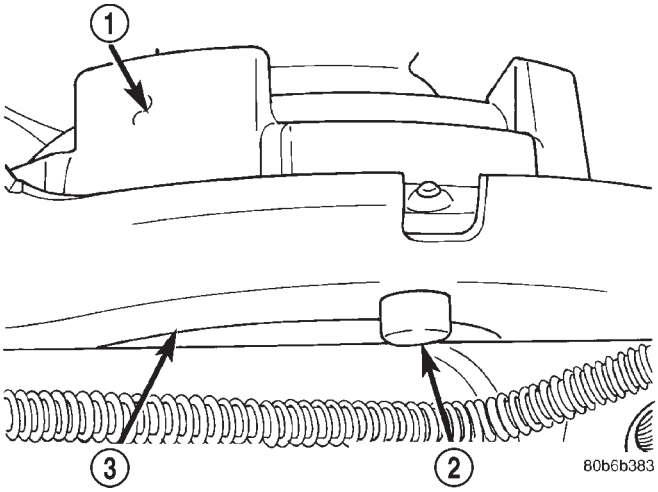


Fig. 4 Isolator Locator Nub

1 – LOWER ISOLATOR
2 – LOCATOR NUB
3 – AXLE SPRING PAD

(3) Pull down on the axle and position the coil spring in the lower isolator.

CAUTION: Ensure the spring is positioned on the lower isolator with the end of the spring coil against the isolator spring locator (Fig. 5).

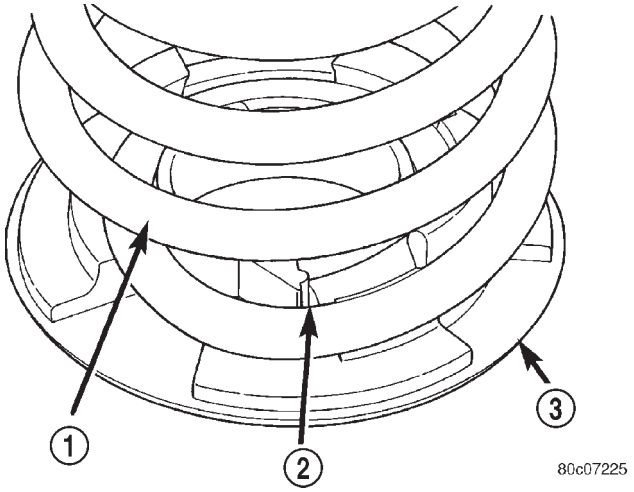


Fig. 5 Isolator Spring Locator - Typical

1 – LOWER ISOLATOR
2 – SPRING LOCATOR
3 – COIL SPRING

(4) Raise the axle with the hydraulic jack.
(5) Install the shock absorber to the axle bracket and tighten to specification.
(6) Install the stabilizer bar link to the stabilizer bar.
(7) Install the wheel and tire assemblies.
(8) Remove the supports and lower the vehicle.
(9) Tighten the stabilizer bar links to specification.

LOWER SUSPENSION ARM

REMOVAL

(1) Raise the vehicle and support the rear axle.
(2) Remove the lower suspension arm nut and bolt from the axle bracket (Fig. 6).
(3) Remove the nut and bolt (Fig. 6) from the frame rail and remove the lower suspension arm.

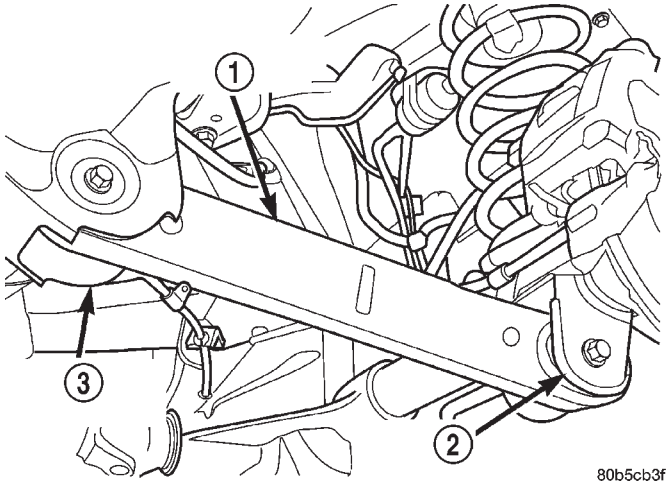


Fig. 6 Lower Suspension Arm

1 – LOWER SUSPENSION ARM
2 – AXLE BRACKET
3 – FRAME BRACKET

INSTALLATION

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

NOTE: The end of the arm with the oval bushing attaches to the axle bracket.

(2) Install the axle bracket bolt and nut finger tight.
(3) Install the frame rail bracket bolt and nut finger tight.
(4) Remove the supports and lower the vehicle.
(5) With the vehicle on the ground tighten the nut at the frame to 156 N·m (115 ft. lbs.). Tighten the nut at the axle bracket to 163 N·m (120 ft. lbs.).

UPPER SUSPENSION ARM

REMOVAL

(1) Raise and support the vehicle.
(2) Support the rear axle with a hydraulic jack.
(3) Remove the park brake cables and brake hose from the arm (Fig. 7).

REMOVAL AND INSTALLATION (Continued)

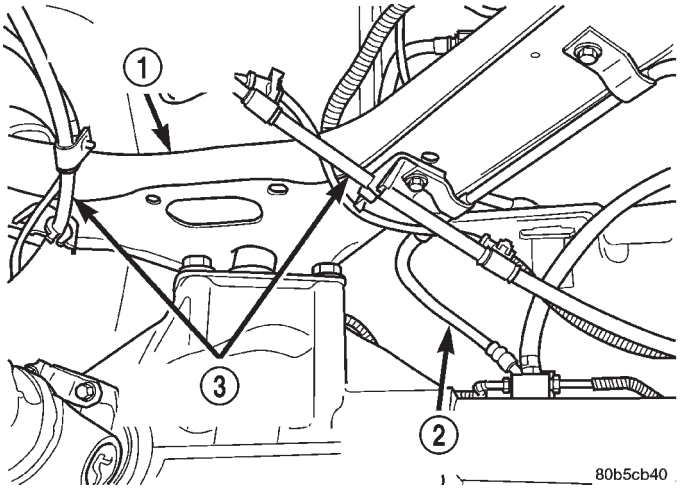


Fig. 7 Park Brake Cables And Brake Hose

1 – UPPER SUSPENSION ARM
2 – REAR BRAKE HOSE
3 – PARK BRAKE CABLES

(4) Remove the ball joint nut from the top of the upper suspension arm (Fig. 8).

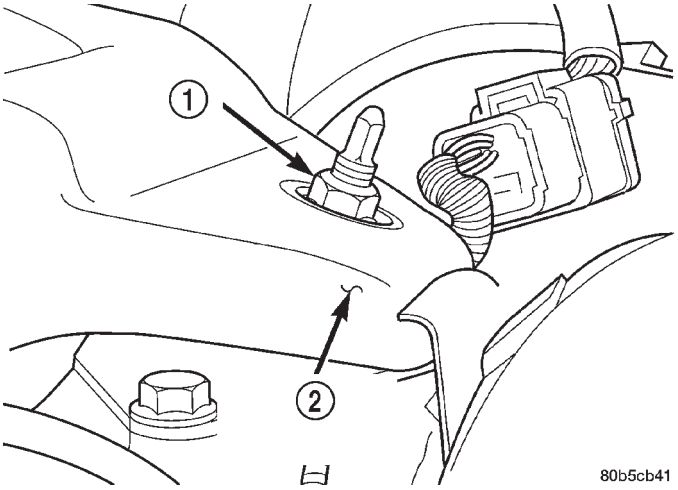


Fig. 8 Ball Joint Nut

1 – BALL JOINT NUT
2 – UPPER SUSPENSION ARM

(5) Separate ball joint from the arm with Remover 8278 (Fig. 9).

NOTE: It may be necessary to strike the upper control arm with a hammer to separate the ball joint from the arm.

(6) Remove the upper suspension arm mounting bolts and remove the arm (Fig. 10).

INSTALLATION

(1) Position the upper suspension arm in the frame rail brackets.

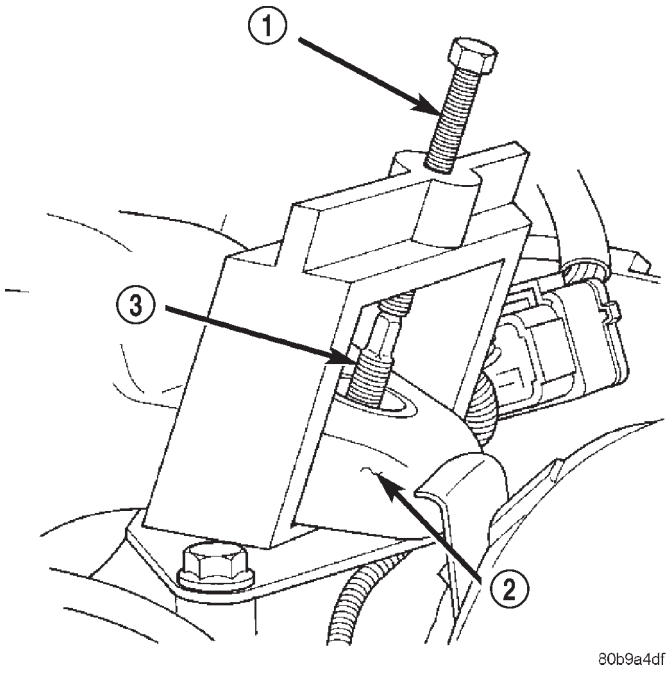


Fig. 9 Separate Ball Joint

1 – REMOVER
2 – UPPER SUSPENSION ARM
3 – BALL JOINT STUD

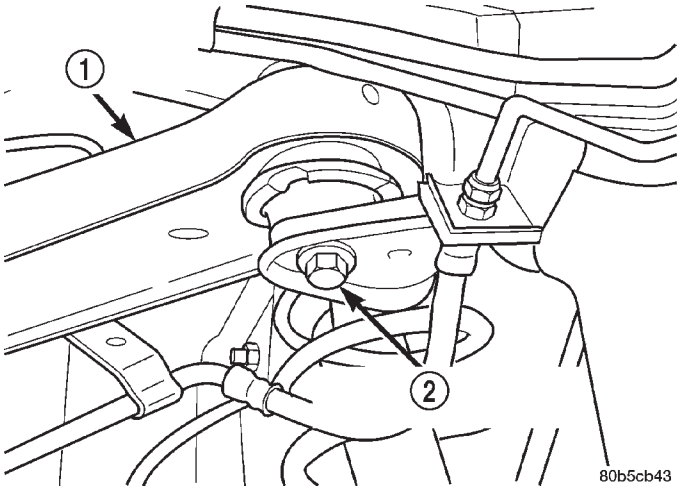


Fig. 10 Upper Suspension Arm Mounting Bolt

1 – UPPER SUSPENSION ARM
2 – MOUNTING BOLT

(2) Install the mounting bolts and tighten to 100 N·m (74 ft. lbs.).

(3) Pull the arm down on the ball joint stud and install a **new** nut. Tighten the nut to 142 N·m (105 ft. lbs.).

(4) Install the park brake cables and brake hose to the arm.

(5) Remove the supports and lower the vehicle.

REMOVAL AND INSTALLATION (Continued)

BALL JOINT

REMOVAL

(1) Raise and support the vehicle.
(2) Support the rear axle with a hydraulic jack.
(3) Remove the ball joint nut from the top of the upper suspension arm (Fig. 11).

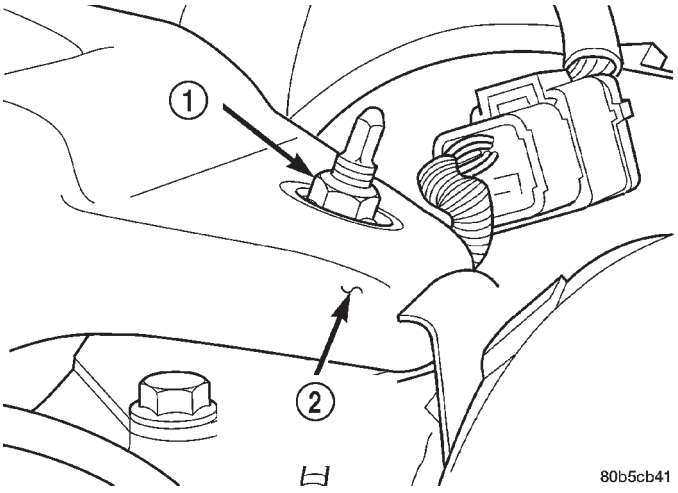


Fig. 11 Ball Joint Nut

1 – BALL JOINT NUT
2 – UPPER SUSPENSION ARM

(4) Separate ball joint from the arm with Remover 8278 (Fig. 12).

NOTE: It may be necessary to strike the upper control arm with a hammer to separate the ball joint from the arm.

(5) Remove the ball joint mounting bolts (Fig. 13) from the differential housing.
(6) Remove the ball joint from the differential housing.

INSTALLATION

(1) Install the ball joint on the differential housing.
(2) Install the ball joint mounting bolts and tighten to 136 N·m (100 ft. lbs.).
(3) Raise the rear axle with a hydraulic jack to align the upper arm with the ball joint.
(4) Pull the arm down on the ball joint stud and install a **new** nut. Tighten the nut to 142 N·m (105 ft. lbs.).
(5) Remove the supports and lower the vehicle.

STABILIZER BAR

REMOVAL

(1) Raise and support the vehicle.

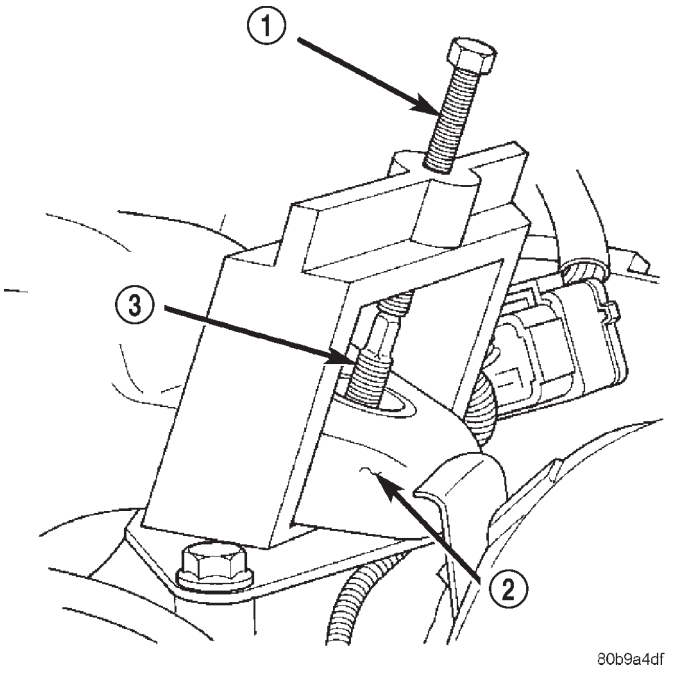


Fig. 12 Separate Ball Joint

1 – REMOVER
2 – UPPER SUSPENSION ARM
3 – BALL JOINT STUD

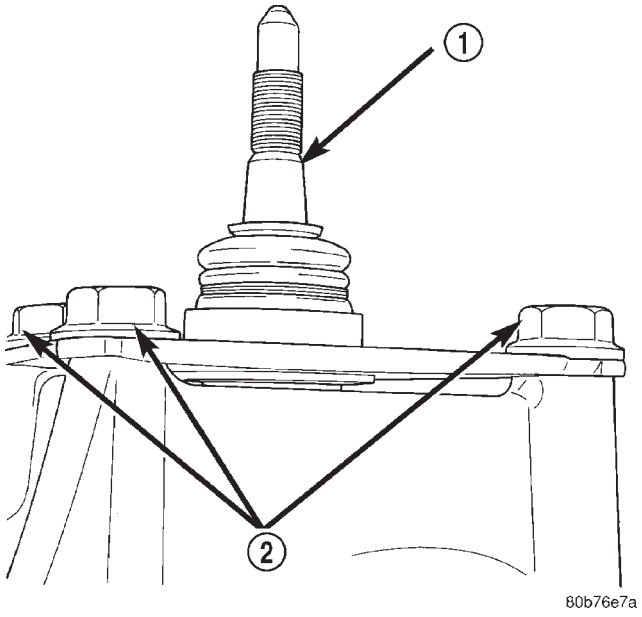


Fig. 13 Ball Joint Mounting Bolts

1 – BALL JOINT
2 – MOUNTING BOLTS

(2) Remove the stabilizer bar links from stabilizer bar and frame mount. (Fig. 14).
(3) Remove the stabilizer bar retainer bolts.
(4) Remove the stabilizer bar.

REMOVAL AND INSTALLATION (Continued)

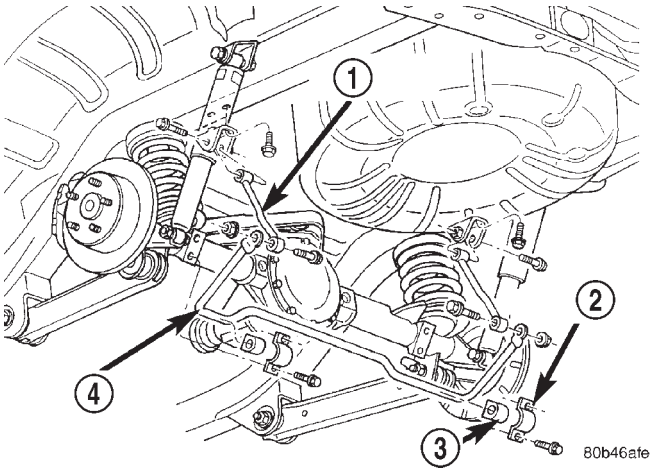


Fig. 14 Rear Stabilizer Bar

1 – LINK
2 – RETAINER
3 – BUSHING
4 – STABILIZER BAR

INSTALLATION

(1) Position the stabilizer bar on the axle and install the retainers 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 the links to the stabilizer bar and frame brackets.

(3) Tighten the nuts at the stabilizer bar to 54 N·m (40 ft. lbs.).

(4) Tighten the nuts at the frame brackets to 92 N·m (68 ft. lbs.).

(5) Remove support and lower the vehicle.

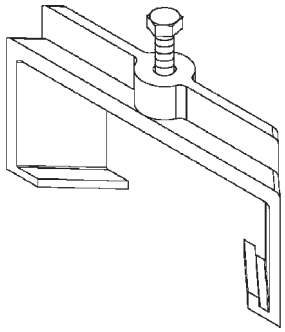
SPECIFICATIONS

TORQUE CHART

DESCRIPTION	TORQUE
Shock Absorber	
Upper Nut	108 N·m (80 ft. lbs.)
Lower Nut	115 N·m (85 ft. lbs.)
Suspension Arm Upper	
Ball Joint Nut	142 N·m (105 ft. lbs.)
Frame Bolts	100 N·m (74 ft. lbs.)
Ball Joint	
Plate Bolts	136 N·m (100 ft. lbs.)
Suspension Arms Lower	
Axle Bracket Nut	163 N·m (120 ft. lbs.)
Frame Bracket Nut	156 N·m (115 ft. lbs.)
Stabilizer Bar	
Retainer Bolts	54 N·m (40 ft. lbs.)
Bar Link Nut	54 N·m (40 ft. lbs.)
Bracket Link Nut	92 N·m (68 ft. lbs.)

SPECIAL TOOLS

REAR SUSPENSION



Remover 8278