

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.

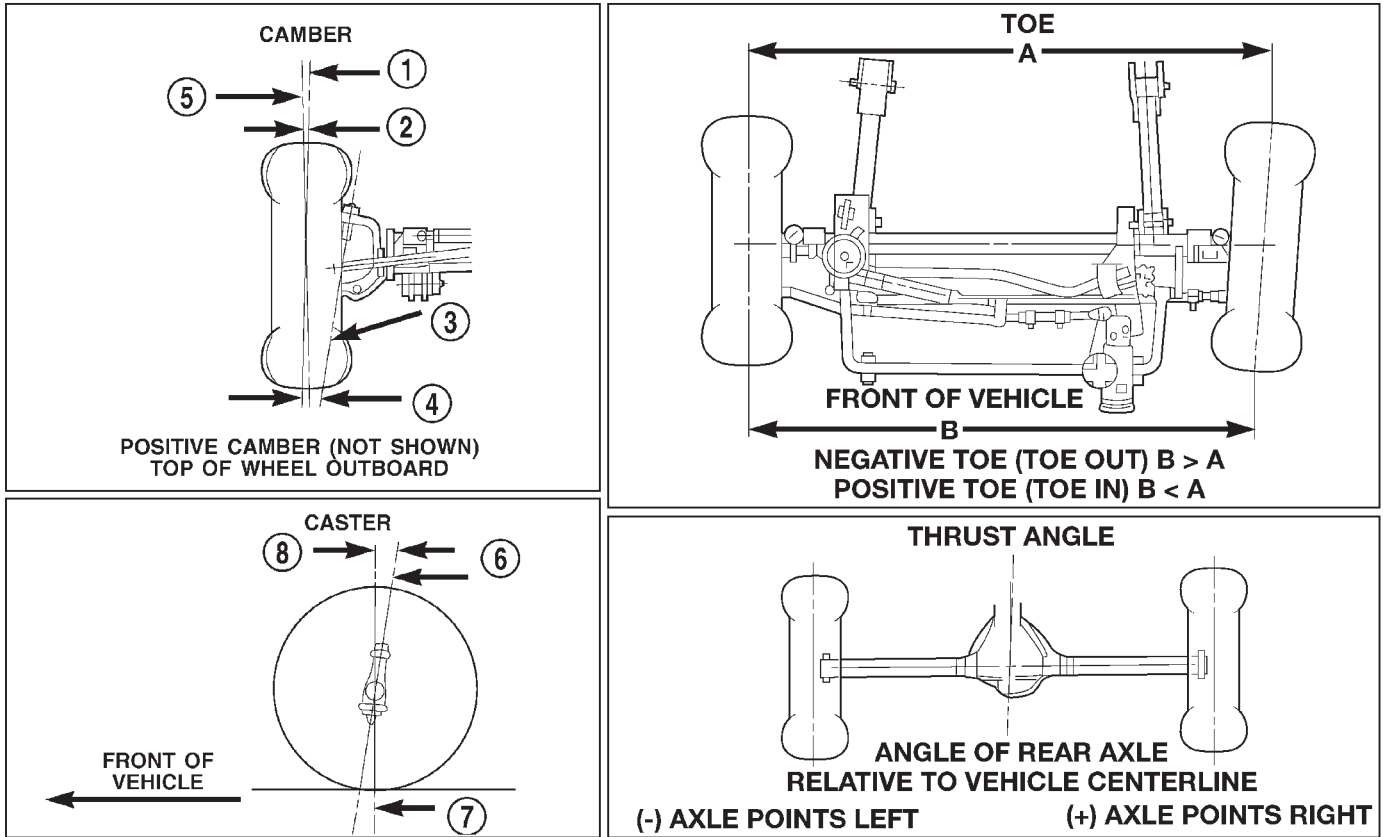
- **CAMBER** is the inward or outward tilt of the wheel relative to the center of the vehicle. Tilting the top of the wheel inward provides negative camber. Tilting the top of the wheel outward provides positive camber. Incorrect camber will cause wear on the inside or outside edge of the tire. The angle 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 component(s) must be replaced to correct the steering axis inclination angle.

DESCRIPTION AND OPERATION (Continued)

• **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.



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Fig. 1 Wheel Alignment Measurements

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

DIAGNOSIS AND TESTING

SUSPENSION AND STEERING SYSTEM

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. 5. Leaking steering dampener. 	<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. 5. Replace steering dampener.
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. Power steering fluid low. 3. Column coupler binding. 4. Tire pressure. 5. Alignment. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Uneven tire pressure. 2. Worn brake components. 3. Air in brake line. 	<ol style="list-style-type: none"> 1. Adjust tire pressure. 2. Repair brakes as necessary. 3. Repair as necessary.
VEHICLE LEADS OR DRIFTS FROM STRAIGHT AHEAD DIRECTION ON UNCROWNED ROAD	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Worn shock bushings. 2. Loose, worn or bent steering/suspension components. 3. Shock valve. 	<ol style="list-style-type: none"> 1. Replace shock. 2. Inspect, tighten or replace components as necessary. 3. Replace shock.
IMPROPER TRACKING	<ol style="list-style-type: none"> 1. Loose, worn or bent track bar. 2. Loose, worn or bent steering/suspension components. 	<ol style="list-style-type: none"> 1. Inspect, tighten or replace component as necessary. 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.

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 several times. Always release the bumper in the down position. Set the front end alignment to specifications with the vehicle at its NORMAL RIDE HEIGHT.

CAMBER

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

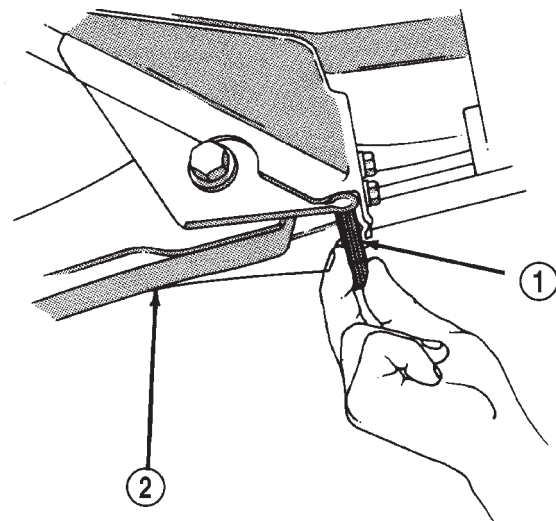
CASTER

Before checking the caster of the front axle for correct angle, be sure the axle is not bent or twisted.

Road test the vehicle, make left and right turns. If the steering wheel returns to the center position unassisted, the caster angle is correct. If steering wheel does not return toward the center position unassisted, an incorrect caster angle is probable.

Caster can be adjusted by installing the appropriate size shims (Fig. 2).

NOTE: Changing caster angle will also change the front propeller shaft angle. The propeller shaft angle has priority over caster. Refer to Group 3 Differential & Driveline for additional information.



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Fig. 2 Caster Adjustment

- 1 - SHIM
2 - SUSPENSION ARM

TOE POSITION (LHD)

NOTE: The wheel toe position adjustment is the final adjustment. The engine must remain running during the entire toe position adjustment.

- (1) Start the engine and turn wheels both ways before straightening the wheels. Secure the steering wheel with the front wheels in the straight-ahead position.
- (2) Loosen the adjustment sleeve clamp bolts (Fig. 3).
- (3) Adjust the right wheel toe position with the drag link. Turn the sleeve until the right wheel is at correct TOE-IN specifications. Position the clamp

SERVICE PROCEDURES (Continued)

bolts as shown (Fig. 4) and tighten to 49 N·m (36 ft. lbs.).

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

(4) Adjust the left wheel toe position with the tie rod. Turn the sleeve until the left wheel is at specifications. Position the clamp bolts as shown (Fig. 4) and tighten to 27 N·m (20 ft. lbs.).

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

(5) Verify the right toe setting and turn off engine.

(6) Road test the vehicle on a flat level road to verify the steering wheel is centered.

NOTE: Once the toe setting is correct, the steering wheel can be re-centered by adjusting only the drag link.

TOE POSITION (RHD)

NOTE: The wheel toe position adjustment is the final adjustment. The engine must remain running during the entire toe position adjustment.

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

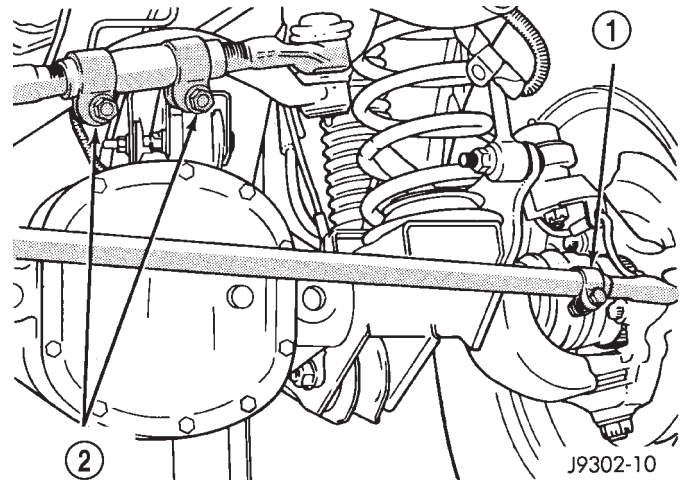


Fig. 4 Drag Link and Tie Rod Clamp (LHD)

- 1 - TIE ROD CLAMP
- 2 - DRAG LINK CLAMPS

wheel with the front wheels in the straight-ahead position.

(2) Loosen the adjustment sleeve clamp bolts (Fig. 5).

(3) Adjust the left wheel toe position with the drag link. Turn the sleeve until the left wheel is at the correct TOE-IN specifications. Position the clamp bolts to their original position and tighten to 49 N·m (36 ft. lbs.).

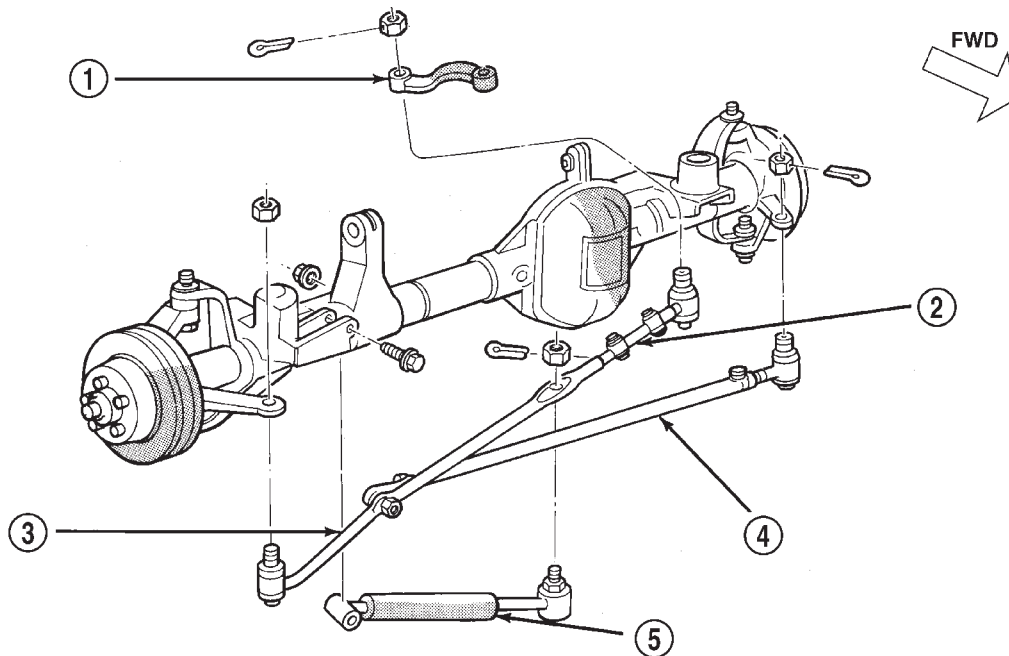
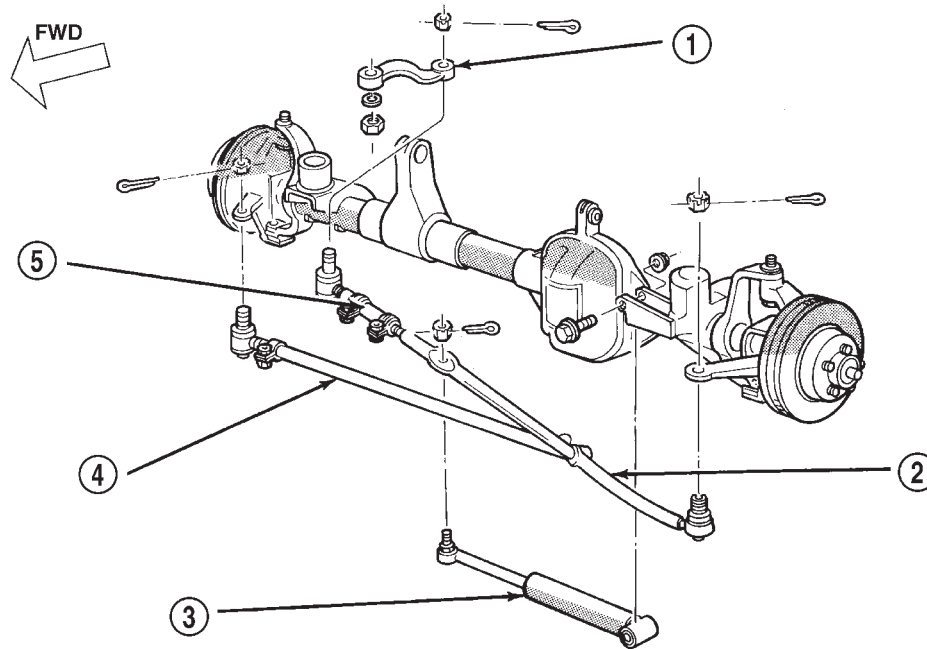


Fig. 3 Steering Linkage (LHD)

- 1 - PITMAN ARM
- 2 - ADJUSTMENT SLEEVE
- 3 - DRAG LINK
- 4 - TIE ROD
- 5 - STEERING DAMPENER

SERVICE PROCEDURES (Continued)



J9502-6

Fig. 5 Steering Linkage (RHD)

- 1 - PITMAN ARM
- 2 - DRAG LINK
- 3 - STEERING DAMPNER
- 4 - TIE ROD
- 5 - ADJUSTMENT SLEEVE

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

(4) Adjust the right wheel toe position with the tie rod. Turn the sleeve until the right wheel is at correct TOE-IN specifications. Position the clamp bolts to their original position and tighten to 27 N·m (20 ft. lbs.).

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

(5) Verify the right toe setting and turn off engine.
 (6) Road test the vehicle on a flat level road to verify the steering wheel is centered.

NOTE: Once the toe setting is correct, the steering wheel can be re-centered by adjusting only the drag link.

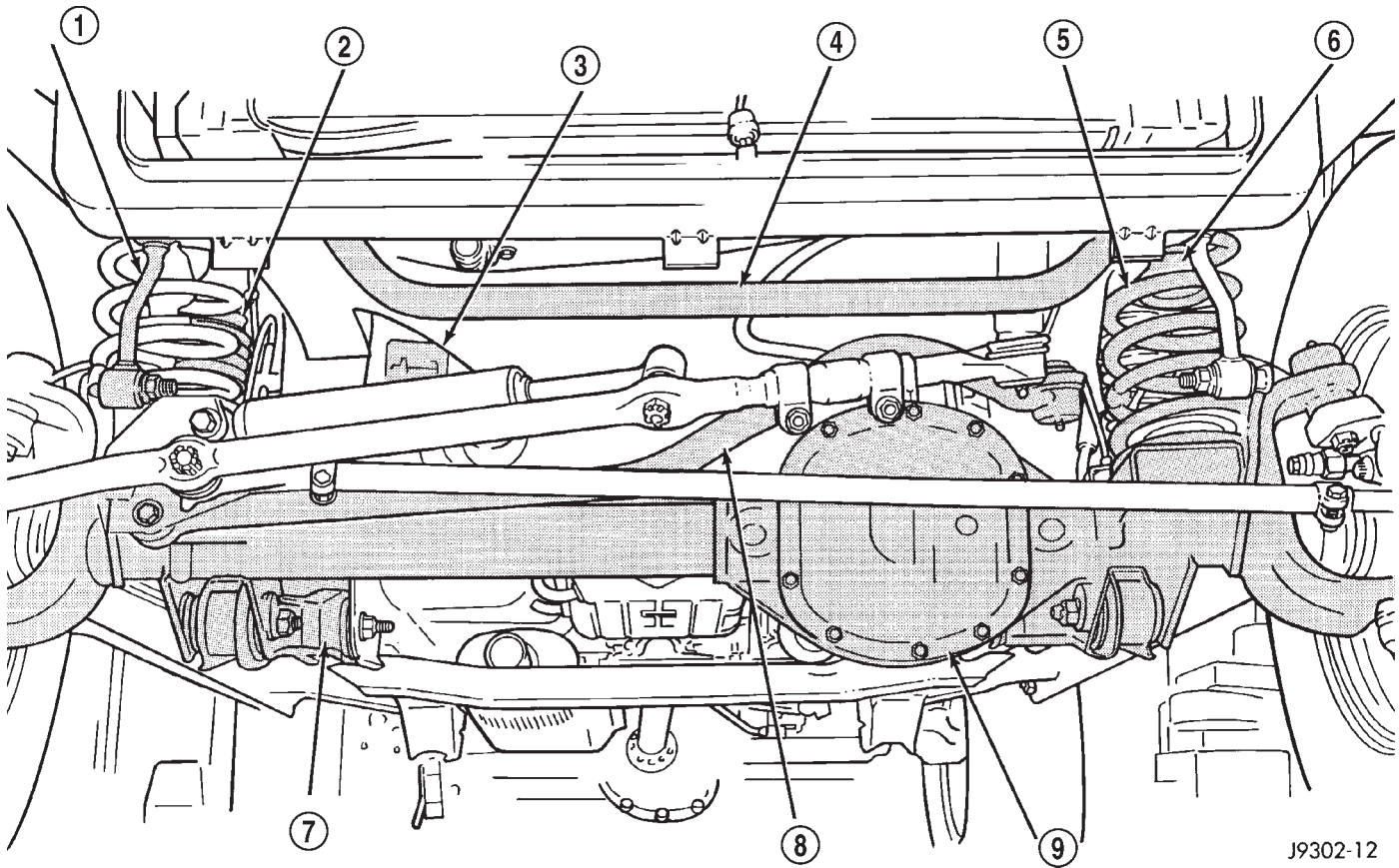
SPECIFICATIONS

ALIGNMENT

NOTE: All alignment specifications are in degrees.

ANGLE	PREFERRED	RANGE	MAX RT/LT DIFFERENCE
CASTER	+ 7.0°	+ 5.25° to + 8.5°	1.25°
CAMBER (fixed angle)	- 0.25°	- 0.75° to + 0.5°	1.0°
TOTAL TOE-IN	+ 0.25°	0° to + 0.45°	.05°
THRUST ANGLE 0° ± 0.15°			

DESCRIPTION AND OPERATION (Continued)



J9302-12

Fig. 1 Suspension Components (LHD)

- | | |
|--------------------------|--------------------------|
| 1 - LINKS | 6 - JOUNCE BUMPER |
| 2 - SHOCK ABSORBER | 7 - LOWER SUSPENSION ARM |
| 3 - UPPER SUSPENSION ARM | 8 - TRACK BAR |
| 4 - STABILIZER BAR | 9 - AXLE |
| 5 - COIL SPRING | |

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 bracket. The bottom of the spring seats on a axle pad and retained with a clip.

OPERATION

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

LOWER SUSPENSION ARMS AND BUSHINGS**DESCRIPTION**

The lower suspension arms are steel and use bushings at one end of the arm. The arms mount to the frame rail bracket and the axle brackets.

OPERATION

The arm and bushings provide location and react to loads from the axle. The bushings provide isolation from the axle. The lower suspension arms can be used to adjust caster and pinion angle, through the use of shims at the frame rail bracket.

UPPER SUSPENSION ARMS AND BUSHINGS**DESCRIPTION**

The upper suspension arms are steel and use rubber bushings at each end of the arm. The arms mount to the frame rail bracket and the axle brackets.

OPERATION

The arm and bushings provide location and react to loads from the axle. The bushings provide isolation from the axle.

DESCRIPTION AND OPERATION (Continued)

STABILIZER BAR**DESCRIPTION**

The spring steel bar extends across the underside of the chassis 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 bar helps to control the vehicle body in relationship to the suspension.

TRACK BAR**DESCRIPTION**

The bar is attached to a frame rail bracket with a ball stud and an axle bracket with a bushing. The bar is forged and has non replaceable isolator bushing and ball stud.

OPERATION

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

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**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 attach-

ing 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) Remove the nut, retainer and grommet from the upper stud in the engine compartment (Fig. 2).
- (2) Remove the lower nuts and bolts from the axle bracket.
- (3) Remove the shock absorber.

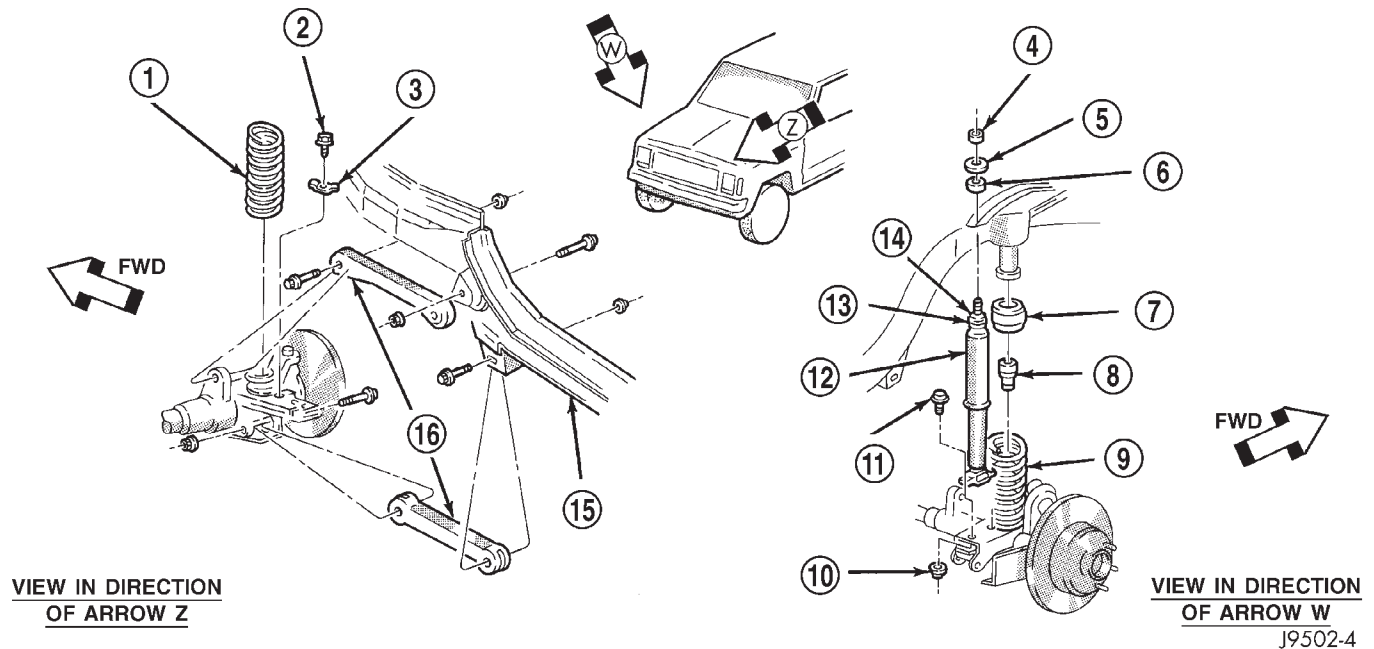
INSTALLATION

- (1) Position the lower retainer and grommet on the shock stud. Insert the shock absorber through the shock tower hole.
- (2) Install the lower bolts and nuts. Tighten nuts to 23 N·m (17 ft. lbs.).
- (3) Install the upper grommet and retainer on the stud. Install the nut and tighten to 22 N·m (16 ft. lbs.).

COIL SPRING/JOUNCE BUMPER**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) Mark and disconnect the front propeller shaft from the axle.
- (4) Remove lower suspension arms mounting nuts and bolts from the axle (Fig. 2).
- (5) Remove the stabilizer bar link and shock absorber from the axle.
- (6) Remove the track bar from the body rail bracket.
- (7) Remove the drag link from the pitman arm.

REMOVAL AND INSTALLATION (Continued)

**Fig. 2 Coil Spring & Shock Absorber**

- 1 - SPRING
- 2 - SCREW
- 3 - SPRING RETAINER
- 4 - NUT
- 5 - RETAINER
- 6 - GROMMET
- 7 - ISOLATOR
- 8 - BUMPER

- 9 - SPRING
- 10 - NUT
- 11 - SCREW
- 12 - SHOCK ABSORBER
- 13 - RETAINER
- 14 - GROMMET
- 15 - FRAME
- 16 - CONTROL ARM

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

(9) Pull jounce bumper out of mount.

INSTALLATION

- (1) Install jounce bumper into mount.
- (2) Position the coil spring on the axle pad. Install the spring clip and bolt. Tighten bolt to 21 N·m (16 ft. lbs.).
- (3) Raise the axle into position until the spring seats in the upper mount.
- (4) Install the stabilizer bar links and shock absorbers to the axle bracket.
- (5) Install the track bar to the body rail bracket.
- (6) Install the lower suspension arms to the axle. Install mounting bolts and nuts finger tight.
- (7) Install the front propeller shaft to the axle.
- (8) Install the wheel and tire assemblies.
- (9) Remove the supports and lower the vehicle.
- (10) Tighten lower suspension arms nuts to 115 N·m (85 ft. lbs.).

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) Remove the lower suspension arm nut and bolt from the axle bracket.
- (3) Remove the nut and bolt from the rear bracket and remove the lower suspension arm (Fig. 3).

INSTALLATION

- (1) Position the lower suspension arm at the axle bracket and rear bracket.
- (2) Install the bolts and finger tighten the nuts.
- (3) Remove support and lower the vehicle.
- (4) Tighten the front and rear nuts to 115 N·m (85 ft. lbs.).

REMOVAL AND INSTALLATION (Continued)

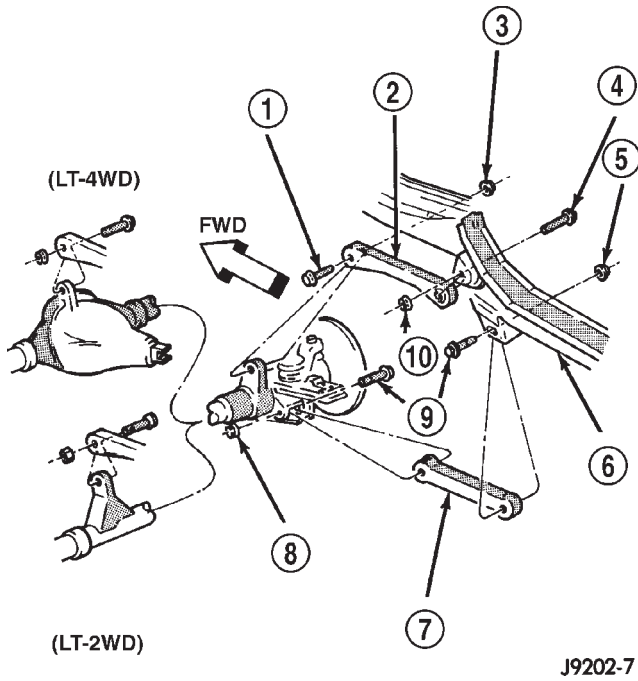


Fig. 3 Upper and Lower Suspension Arms

- 1 - BOLT
- 2 - UPPER ARM
- 3 - NUT
- 4 - BOLT
- 5 - NUT
- 6 - FRAME RAIL
- 7 - LOWER ARM
- 8 - NUT
- 9 - BOLT
- 10 - NUT

UPPER SUSPENSION ARM

REMOVAL

- (1) Raise and support the vehicle.
- (2) Remove the upper suspension arm nut and bolt at the axle bracket.
- (3) Remove the nut and bolt at the frame rail and remove the upper suspension arm (Fig. 3).

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 the nut at the axle to 75 N·m (55 ft. lbs.). Tighten the nut at the frame bracket to 90 N·m (66 ft. lbs.).

FRONT AXLE BUSHING

REMOVAL

- (1) Remove the upper suspension arm from axle.

- (2) Position Spacer 7932-3 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. 4).
- (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.

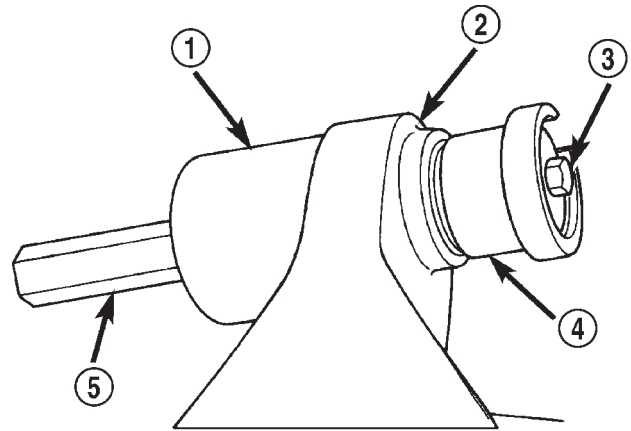


Fig. 4 Bushing Removal

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

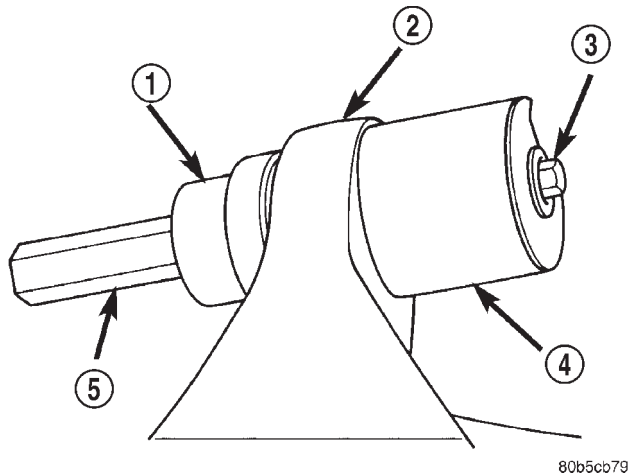
- (7) Remove nut, bolt, receiver, remover and bushing.

NOTE: On 4x2 vehicle and right side of 4x4 vehicle, leave Spacer 7932-3 in position for bushing installation.

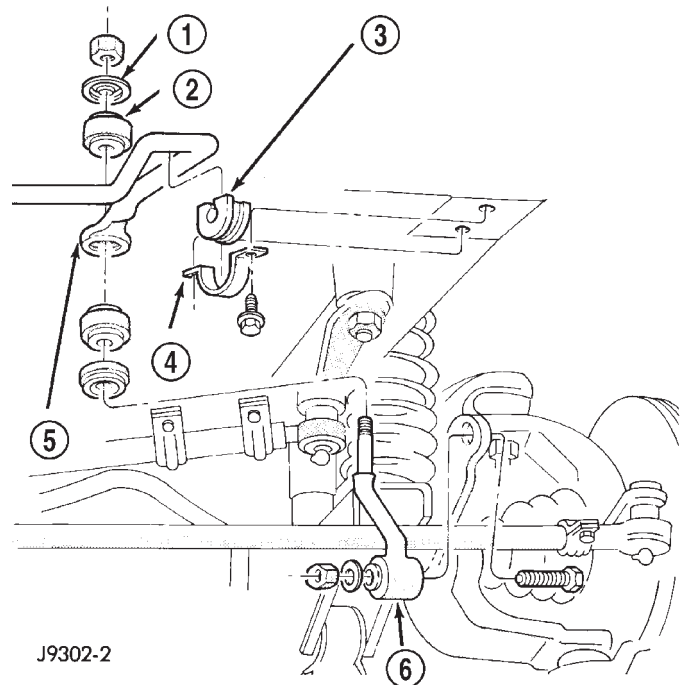
INSTALLATION

- (1) Place Receiver 7932-1 on 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. 5).
- (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.
- (5) Remove tools and install the upper suspension arm.

REMOVAL AND INSTALLATION (Continued)

**Fig. 5 Bushing Installation**

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

**Fig. 6 Stabilizer Bar (LHD)**

- 1 - RETAINER
- 2 - GROMMET
- 3 - BUSHING
- 4 - CLAMP
- 5 - STABILIZER BAR
- 6 - LINK

STABILIZER BAR**REMOVAL**

- (1) Raise and support the vehicle.
- (2) Remove nuts, retainers and grommets from the links at the stabilizer bar (Fig. 6).
- (3) Remove the links mounting nuts and bolts from the axle brackets.
- (4) Remove the stabilizer bar clamps from the body rails. Remove the stabilizer bar.

INSTALLATION

- (1) Inspect stabilizer bar bushings. Replace bushings if cracked, cut, distorted, or worn.
- (2) Position the stabilizer bar on the body rail and install the bushings and clamps. Ensure the bar is centered with equal spacing on both sides. Tighten the bolts to 75 N·m (40 ft. lbs.).
- (3) Install the links and grommets onto the stabilizer bar and axle brackets.
- (4) Tighten the link nuts at the axle bracket to 95 N·m (70 ft. lbs.).
- (5) Tighten the link nuts at the stabilizer bar to 36 N·m (27 ft. lbs.).
- (6) Remove the supports and lower the vehicle.

TRACK BAR**REMOVAL**

- (1) Raise and support the vehicle.
- (2) Remove the cotter pin and nut from the ball stud end at the body rail bracket.
- (3) Use a universal puller tool to separate the ball stud from the frame rail bracket.

- (4) Remove the bolt and flag nut from the axle shaft tube bracket (Fig. 7).
- (5) Remove the track bar.

INSTALLATION

- (1) Install the track bar at axle tube bracket. Loosely install the retaining bolt and flag nut.
- (2) It may be necessary to pry the axle assembly over to install the track bar at the body rail. Install track bar at the body rail bracket. Install the retaining nut on the stud.
- (3) Remove the supports and lower the vehicle.
- (4) Tighten the retaining bolt at the axle shaft tube bracket to 54 N·m (40 ft. lbs.).
- (5) Tighten the ball stud nut to 81 N·m (60 ft. lbs.). Install a new cotter pin.

HUB BEARING**REMOVAL**

- (1) Raise and support the vehicle.
- (2) Remove the wheel and tire assembly.
- (3) Remove the brake caliper, rotor and ABS wheel speed sensor, refer to Group 5 Brakes.
- (4) Remove the cotter pin, nut retainer and axle hub nut (Fig. 8).

REMOVAL AND INSTALLATION (Continued)

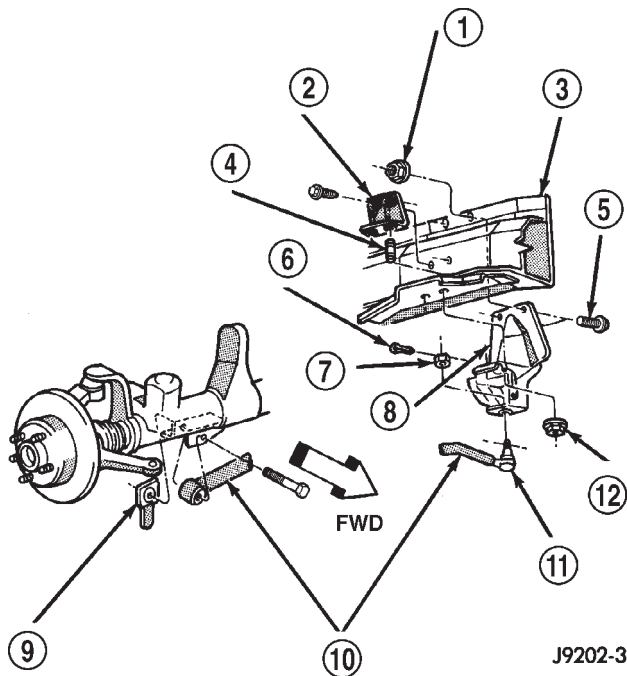


Fig. 7 Track Bar (LHD)

- 1 - NUT
- 2 - SUPPORT BRACKET
- 3 - LEFT FRAME RAIL
- 4 - STUD
- 5 - SCREW
- 6 - COTTER PIN
- 7 - NUT
- 8 - FRAME BRACKET
- 9 - NUT PLATE
- 10 - TRACK BAR
- 11 - BALL STUD END
- 12 - NUT

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

INSTALLATION

(1) Install the hub bearing and brake dust shield 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 and ABS wheel speed sensor, refer to Group 5 Brakes.

(5) Install the wheel and tire assembly.

(6) Remove support and lower the vehicle.

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. 9).

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.

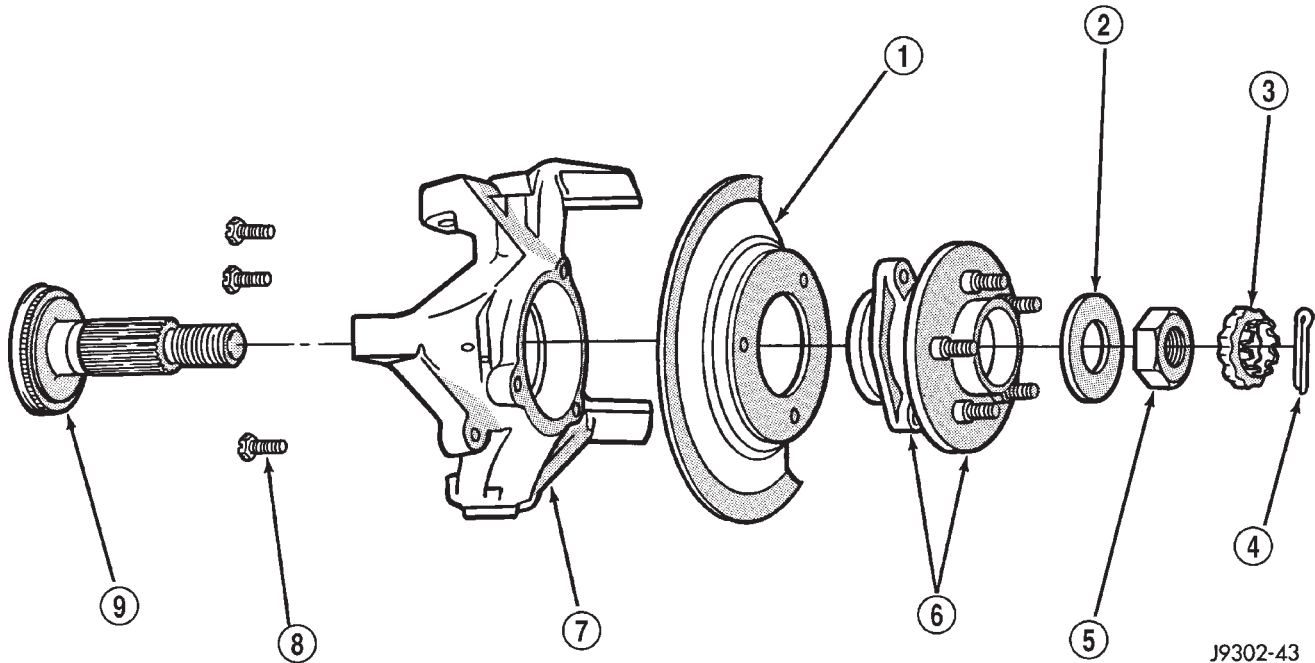
(4) Remove lug nut and washers.

(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.

REMOVAL AND INSTALLATION (Continued)



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Fig. 8 Hub Bearing & Knuckle

- 1 - BRAKE SHIELD
- 2 - WASHER
- 3 - RETAINER
- 4 - COTTER PIN
- 5 - NUT
- 6 - HUB AND BEARING ASSEMBLY
- 7 - STEERING KNUCKLE
- 8 - BOLT
- 9 - TONE WHEEL (ABS)

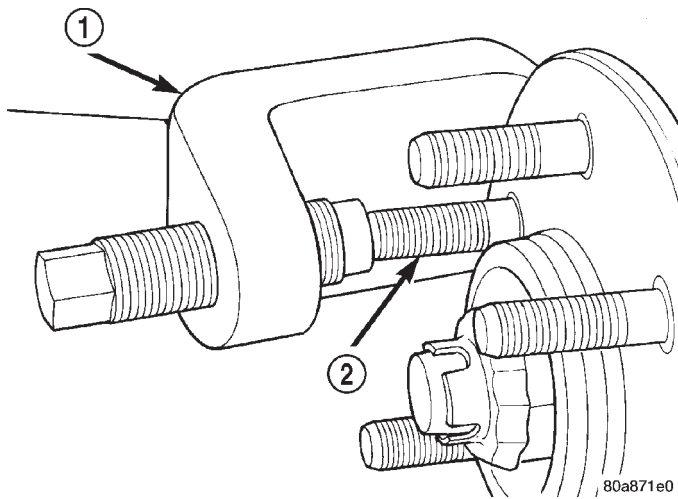


Fig. 9 Wheel Stud Removal

- 1 - REMOVER
- 2 - WHEEL STUD

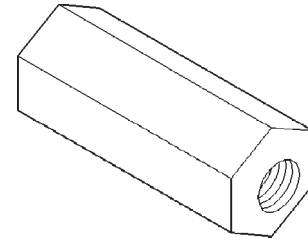
SPECIFICATIONS

TORQUE CHART

DESCRIPTION	TORQUE
Shock Absorber	
Upper Nut	22 N·m (16 ft. lbs.)
Lower Nut	23 N·m (17 ft. lbs.)
Suspension Arm Upper	
Front Nut	74 N·m (55 ft. lbs.)
Rear Nut	89 N·m (66 ft. lbs.)
Suspension Arm Lower	
Front Nut	115 N·m (85 ft. lbs.)
Rear Nut	115 N·m (85 ft. lbs.)
Stabilizer Bar	
Clamp Bolt	54 N·m (40 ft. lbs.)
Link Upper Nut	36 N·m (27 ft. lbs.)
Link Lower Nut	95 N·m (70 ft. lbs.)
Track Bar	
Ball Stud Nut	81 N·m (60 ft. lbs.)
Axle Bracket Bolt	54 N·m (40 ft. lbs.)

SPECIFICATIONS (Continued)

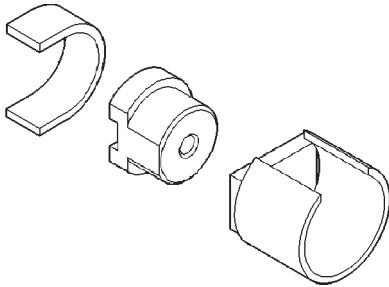
DESCRIPTION	TORQUE
Track Bar Bracket	
Bolts	125 N·m (92 ft. lbs.)
Nut	100 N·m (74 ft. lbs.)
Support Bolts	42 N·m (31 ft. lbs.)
Hub/Bearing	
Bolts	102 N·m (75 ft. lbs.)
Axle Nut	237 N·m (175 ft. lbs.)



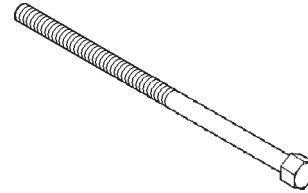
Nut, Long 7603

SPECIAL TOOLS

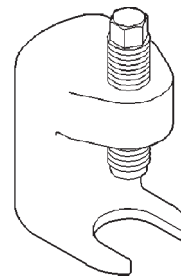
FRONT SUSPENSION



Remover/Installer Suspension Bushing 7932



Bolt, Special 7604



Remover C-4150A

REAR SUSPENSION

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DESCRIPTION AND OPERATION

SUSPENSION COMPONENT

The rear suspension is comprised of:

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

CAUTION: 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.

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.

SHOCK ABSORBERS

DESCRIPTION

The top of the shock absorbers are bolted to the body crossmember. The bottom of the shocks are bolted to the axle brackets.

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 bolted to the bottom of the frame rail.

OPERATION

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

STABILIZER BAR

DESCRIPTION

The spring steel bar extends across the axle and mounts to leaf spring brackets. Links are connected from the bar to the underside of the frame rail. 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 to control the vehicle body in relationship to the suspension.

COIL SPRINGS AND ISOLATORS

DESCRIPTION

The front of the multi-leaf springs mount to frame rail brackets. The rear of the spring mounts to shackles which mount the frame. The springs and shackles have bushing at the mounting points.

DESCRIPTION AND OPERATION (Continued)

OPERATION

The leaf springs control ride quality and maintain proper ride height. The shackles allow the springs to change their length as the vehicle moves over various road conditions. The bushings are used to isolate axle/road noise.

tent. 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 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.

DIAGNOSIS AND TESTING

SPRING AND SHOCK

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 intermit-

SPRING AND SHOCK ABSORBER

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) Remove the shock absorber upper bolts from the body bracket (Fig. 1).
- (2) Remove lower attaching nut and washer from the bracket stud. Remove the shock absorber.

INSTALLATION

- (1) Install the shock absorber lower eye on the spring bracket stud. Install the shock absorber and upper bolts on the body bracket.
- (2) Tighten the lower nut to 62 N·m (46 ft. lbs.).
- (3) Tighten the upper bolts to 23 N·m (17 ft. lbs.).

STABILIZER BAR

REMOVAL

- (1) Raise and support the vehicle.
- (2) Disconnect stabilizer bar links from spring brackets (Fig. 2).
- (3) Disconnect the stabilizer bar brackets from the body rails. Remove the stabilizer bar and links.

INSTALLATION

- (1) Position the stabilizer bar links at the spring brackets. Install the attaching bolts and nuts and tighten to 74 N·m (55 ft. lbs.).
- (2) Attach the stabilizer bar to the body rail brackets with the bolts. Tighten to 54 N·m (40 ft. lbs.).
- (3) Remove the supports and lower the vehicle.

REMOVAL AND INSTALLATION (Continued)

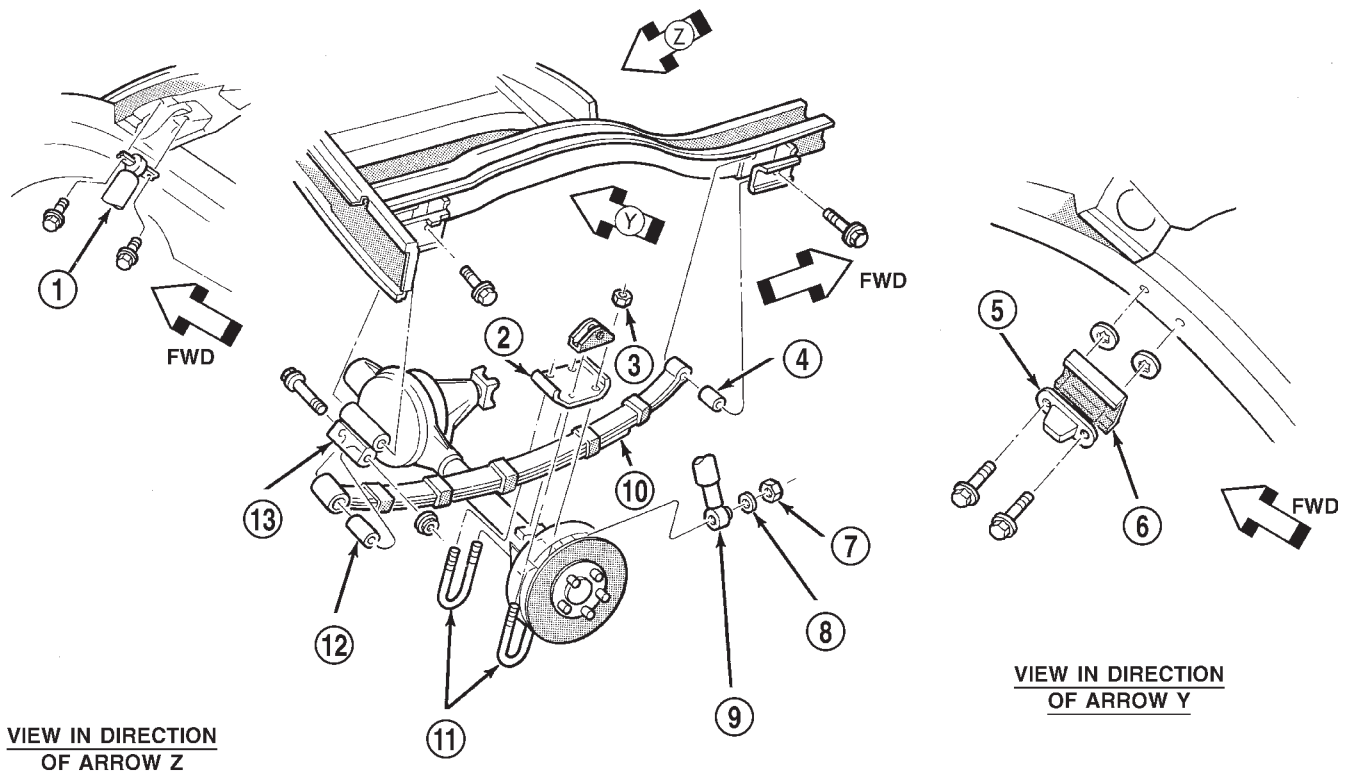


Fig. 1 Rear Suspension Components

- | | |
|--------------------|--------------------|
| 1 - SHOCK ABSORBER | 8 - RETAINER |
| 2 - SPRING BRACKET | 9 - SHOCK ABSORBER |
| 3 - NUT | 10 - SPRING |
| 4 - BUSHING | 11 - U-BOLTS |
| 5 - BUMPER | 12 - BUSHING |
| 6 - BRACKET | 13 - SHACKLE |
| 7 - NUT | |

J9503-6

LEAF SPRING

REMOVAL

- (1) Raise vehicle at body rails.
- (2) Remove the wheel and tire assemblies.
- (3) Support axle with hydraulic jack to relieve axle weight.
- (4) Disconnect the stabilizer bar link from the spring bracket stud.
- (5) Remove nuts, U-bolts and spring bracket from axle.
- (6) Remove nut and bolt attaching spring front eye to shackle.
- (7) Remove nut and bolt from spring rear eye.
- (8) Remove spring from vehicle.

INSTALLATION

- (1) Position the spring front eye in the bracket. Loosely install the attaching bolt and nut. Do not tighten at this time.

- (2) Position the rear eye in the shackle bracket. Loosely install the attaching bolt and nut. Do not tighten at this time.

- (3) Position the axle. Install the spring bracket, U-bolts and nuts. Tighten the nuts to 70 N·m (52 ft. lbs.).

- (4) Connect the stabilizer bar link to the spring bracket.

- (5) Remove the hydraulic jack.

- (6) Lower the vehicle.

- (7) Tighten the spring front eye attaching bolts to 156 N·m (115 ft. lbs.).

- (8) Tighten the spring rear eye attaching bolts to 108 N·m (80 ft. lbs.).

- (9) Tighten the stabilizer bar link to 74 N·m (55 ft. lbs.).

LEAF SPRING AND SHACKLE BUSHING

For front bushings bend tabs **DOWN** before removal. Use an appropriate driver tool and force the original bushing out of the spring eye.

REMOVAL AND INSTALLATION (Continued)

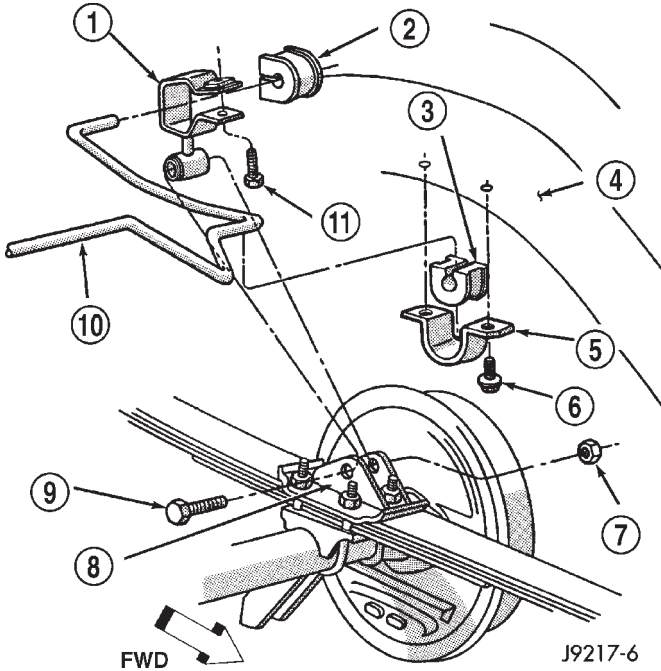


Fig. 2 Stabilizer Bar

- 1 - LINK
- 2 - BUSHING
- 3 - GROMMET
- 4 - FRAME RAIL
- 5 - CLAMP
- 6 - SCREW
- 7 - NUT
- 8 - SPRING BRACKET
- 9 - BOLT
- 10 - SWAY BAR
- 11 - SCREW

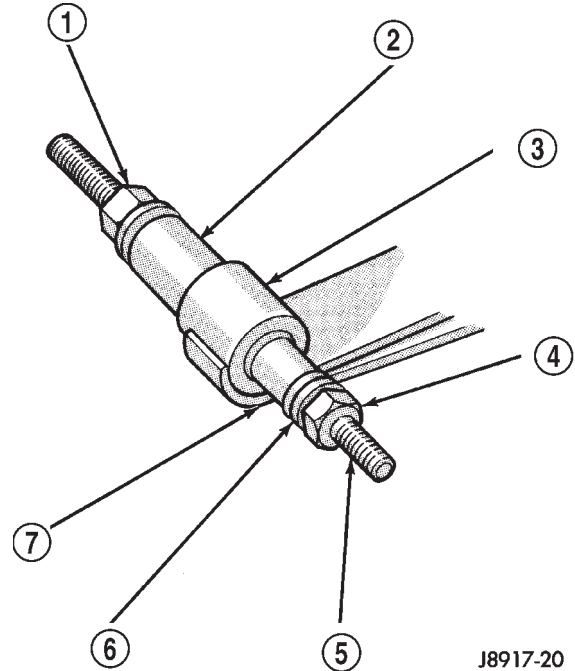


Fig. 3 Spring Eye Bushing Removal

- 1 - NUT
- 2 - PIPE (RECEIVER)
- 3 - SPRING EYE
- 4 - NUT
- 5 - THREADED ROD
- 6 - FLAT WASHER
- 7 - SOCKET WRENCH (DRIVER)

(1) Assemble tools shown (Fig. 3). Tighten nut at the socket wrench end of the threaded rod until the bushing is forced out.

(2) Assemble and align the bushing installation tools.

(3) Align the bushing with the spring eye or shackle eye and tighten the nut at the socket wrench end of the threaded rod. Tighten until the bushing is forced into the spring eye.

NOTE: The bushing must be centered in the spring eye. The ends of the bushing must be flush or slightly recessed within the end surfaces of the spring eye.

(4) For front bushings bend tabs up after installation.

SPECIFICATIONS

TORQUE CHART

DESCRIPTION	TORQUE
Shock Absorber	
Upper Bolt	23 N·m (17 ft. lbs.)
Lower Nut	62 N·m (46 ft. lbs.)
Stabilizer Bar	
Clamp Bolt	54 N·m (40 ft. lbs.)
Link Upper Bolt	12 N·m (9 ft. lbs.)
Link Lower Nut	74 N·m (55 ft. lbs.)
Spring	
U-Bolt Nut	70 N·m (52 ft. lbs.)
Front Pivot Bolt	156 N·m (115 ft. lbs.)
Upper Shackle Bolt	156 N·m (115 ft. lbs.)
Lower Shackle Bolt	108 N·m (80 ft. lbs.)

