

SUSPENSION/DRIVESHAFTS

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GENERAL INFORMATION

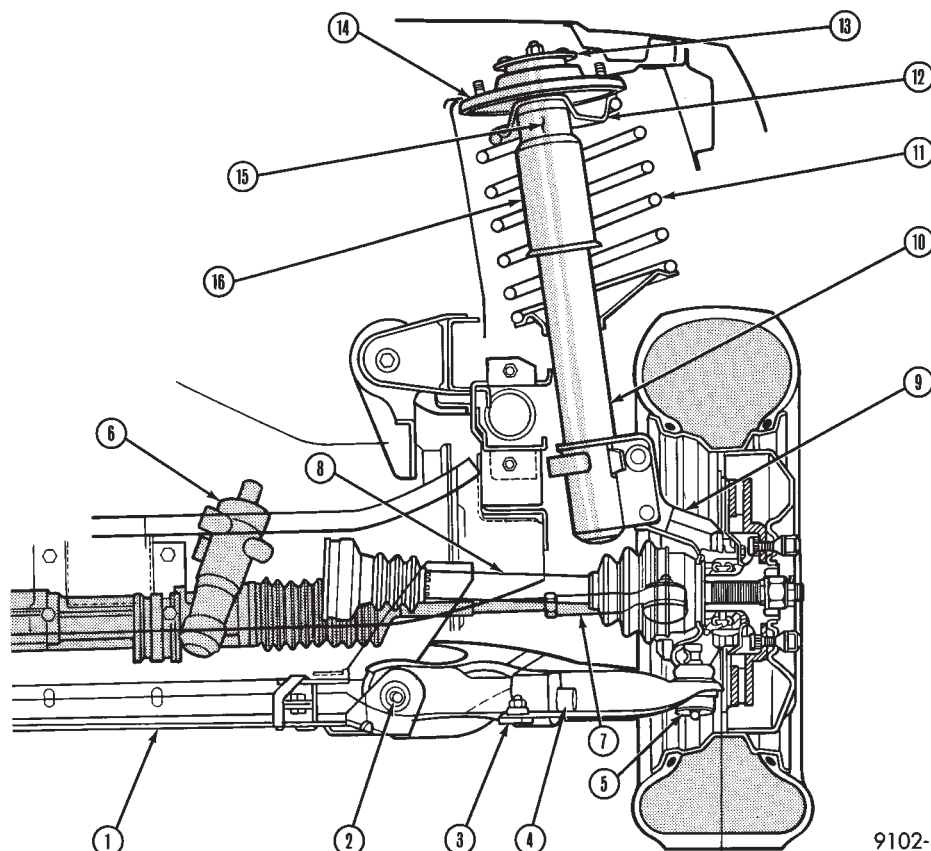
Throughout this group, references may be made to a particular vehicle by letter or number designation. A chart showing the breakdown of these designations is included in the Introduction section at the front of this Service Manual.

An independent MacPherson Type front suspension is used on these vehicles. Vertical shock absorbing struts attach to the upper fender reinforcement and

the steering knuckle to provide upper steering knuckle position. Lower control arms are attached inboard to a crossmember and outboard to the steering knuckle through a ball joint to provide lower steering knuckle position. During steering maneuvers, the strut (through a pivot bearing in the upper retainer) and the steering knuckle turn as an assembly (Fig. 1).

FRONT SUSPENSION

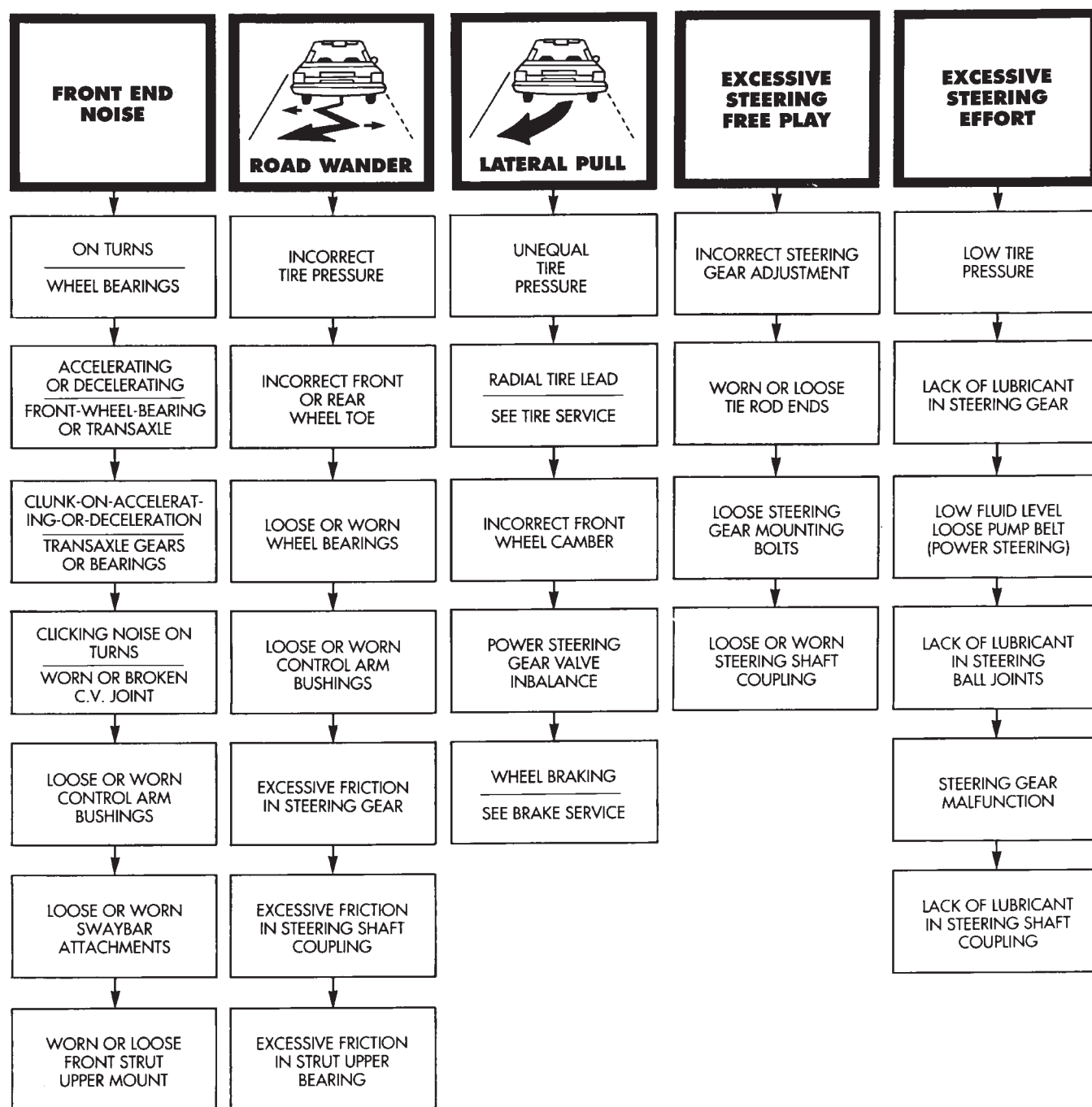
1. FRONT SUSPENSION CROSSMEMBER
2. FRONT PIVOT BOLT
3. LOWER CONTROL ARM
4. SWAY ELIMINATOR SHAFT ASSEMBLY
5. LOWER ARM BALL JOINT ASSEMBLY
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7. TIE ROD ASSEMBLY
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9. STEERING KNUCKLE
10. STRUT DAMPER ASSEMBLY
11. COIL SPRING
12. UPPER SPRING SEAT
13. REBOUND STOP
14. UPPER MOUNT ASSEMBLY
15. JOUNCE BUMPER
16. DUST SHIELD



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Fig. 1 Front Suspension (Typical)

SUSPENSION/STEERING/DIAGNOSIS FRONT WHEEL DRIVE



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FRONT SUSPENSION MAJOR COMPONENTS (FIG. 2)

STRUT SUPPORT

The system is supported by coil springs positioned offset around the struts. The springs are contained between an upper seat, located just below the top strut mount assembly (Fig. 2) and a lower spring seat on the strut lower housing.

The top of each strut assembly is bolted to the upper fender reinforcement (shock tower) through a rubber isolated mount.

The bottom attaches to the top of the steering knuckle with two through bolts. On some vehicles, one bolt has an eccentric cam located below the head of the bolt for camber adjustment. On the other vehicles the camber adjustment is done by manually

moving the steering knuckle within the strut assembly. Caster is a fixed setting on all vehicles and is not adjustable.

STEERING KNUCKLE

The steering knuckle is a single casting with legs machined for attachment to the strut damper, steering linkage, brake adaptor, and lower control arm ball joint. The knuckle also holds the front drive hub bearing. The hub is positioned through the bearing and knuckle, with the constant velocity stub shaft splined through the hub.

LOWER CONTROL ARM

The lower control arm is a steel casting with 2 large spool type rubber pivot bushings. The lower control arm is bolted to the crossmember with pivot bolts through the center of the rubber pivot bushings.

The ball joint is pressed into the control arm and has a non-tapered stud with a notch for clamp bolt clearance. The stud is clamped and locked into the steering knuckle leg with a clamp bolt.

The lower control arms are inter-connected through a rubber isolated sway bar (Fig. 2).

DRIVESHAFTS

A left and right driveshaft is attached inboard to the transaxle differential side gears, and outboard to the driven wheel hub.

To deliver driving force from the transaxle to the front wheels during turning maneuvers and suspension movement. Both shafts are constructed with constant velocity universal joints at both ends.

Both shafts have a Tripod (sliding) joint at the transaxle end and Rzeppa joints (with splined stub shafts) on the hub ends. Due to the transaxle location the connecting shafts between the C/V joints are of different length and construction. The right shaft is longer and of tubular construction. The left shaft is solid.



FRONT SUSPENSION SERVICE PROCEDURES

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WHEEL ALIGNMENT

Front wheel alignment is the proper adjustment of all the interrelated suspension angles affecting the running and steering of the front wheels of the vehicle.

The method of checking front alignment will vary depending on the type of equipment being used. The instructions furnished by the manufacturer of the equipment should always be followed. With the exception that the alignment specifications recommended by Chrysler Corporation be used.

There are six basic factors which are the foundation to front wheel alignment. These are height, caster, camber, toe-in, steering axis inclination and toe-out on turns. Of the six basic factors only camber and toe in are mechanically adjustable (Fig. 1)

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

Wheel alignment adjustments and checks should be made in the following sequence.

- (1) Camber
- (2) Toe

Camber is the number of degrees the top of the wheel is tilted inward or outward from true vertical. Inward tilt is negative camber. Outward tilt is positive camber.

Excessive camber is a tire wear factor: negative camber causes wear on the inside of the tire, while positive camber causes wear to the outside.

Toe is measured in degrees or inches and is the distance the front edges of the tires are closer (or farther apart) than the rear edges. See Front Wheel Drive Specifications for **Toe** settings.

PRE-ALIGNMENT

Before any attempt is made to change or correct the wheel alignment factors. The following inspection and necessary corrections must be made on those parts which influence the steering of the vehicle.

(1) Check and inflate tires to recommended pressure. All tires should be the same size and in good condition and have approximately the same wear. Note type of tread wear which will aid in diagnosing, see Wheels and Tires, Group 22.

(2) Check front wheel and tire assembly for radial runout.

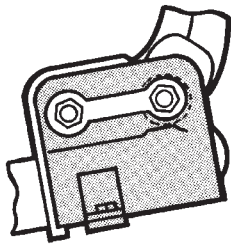
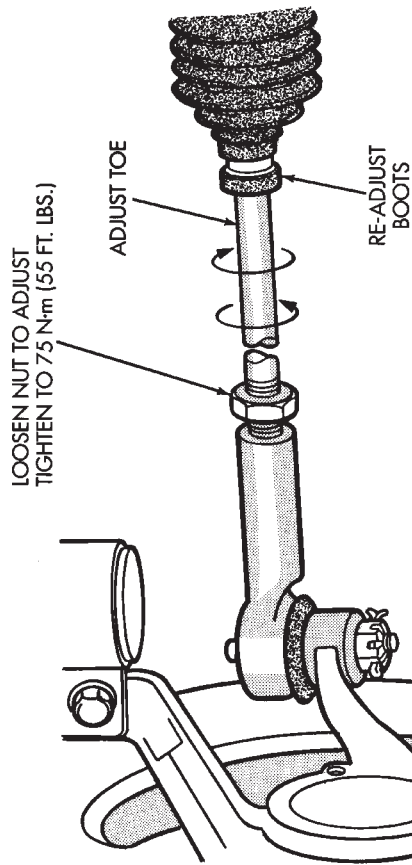
(3) Inspect lower ball joints and all steering linkage for looseness.

(4) Check for broken or sagged front and rear springs.

Front suspension must only be checked after the vehicle has had the following checked or adjusted. Tires set to recommended pressures, full tank of fuel, no passenger or luggage compartment load and is on a level floor or alignment rack.

Just prior to each alignment reading. The vehicle should be bounced (rear first, then front) by grasping bumper at center and jouncing each end an equal number of times. Always release bumpers at bottom of down cycle.

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TIGHTEN
NUTS TO
100 N·m
(75 FT. LBS.)
PLUS 1/4 TURN

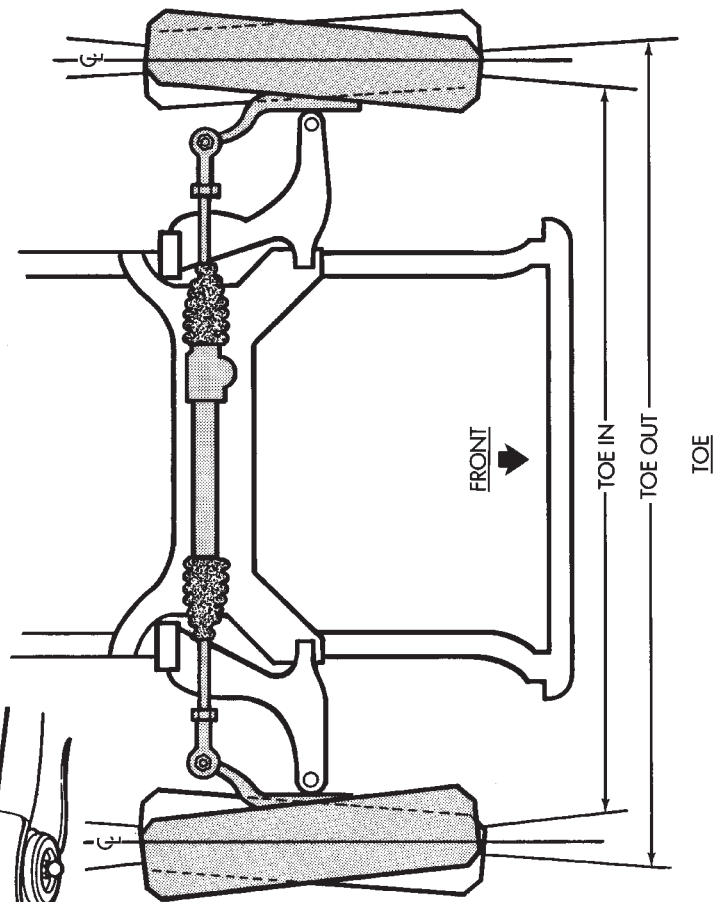
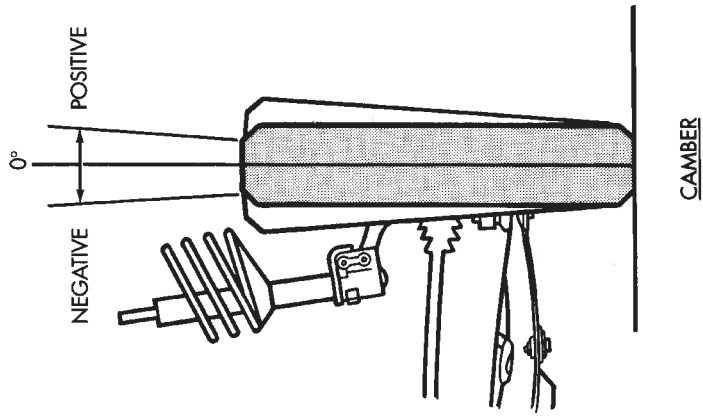


Fig. 1 Alignment Camber/Toe

WHEEL ALIGNMENT SERVICE PROCEDURE

CAMBER AA, AG, AJ BODIES

- (1) Prepare vehicle as described in the Pre-Alignment procedure.
- (2) Loosen cam and knuckle bolts (each side) (Fig. 2).
- (3) Rotate cam bolt (Fig. 2) to move top of wheel in or out to specified camber.
- (4) Tighten the cam bolts and nuts to 100 N•m (75 ft. lbs.) **plus** 1/4 turn beyond specified torque.

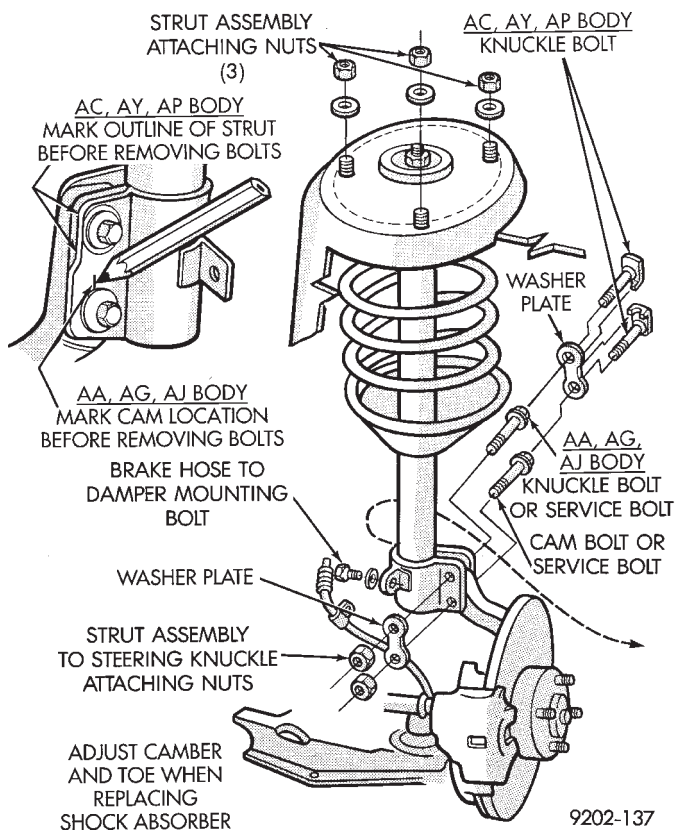


Fig. 2 Alignment Adjustment Locations

CAMBER AC, AY, AP BODIES

- (1) Prepare vehicle as described in the Pre-Alignment procedure.
- (2) Position the vehicle on the alignment equipment and read camber as instructed by equipment manufacturer's procedure.
- (3) Using extensions and appropriate tools. Remove the strut assembly to steering knuckle attaching bolts from vehicle (Fig. 2). Replace the original attaching bolts with the bolts provided in the alignment, Cam And Bolt Service Package.
- (4) Rotate the alignment adjusting cam bolt, (Fig. 2) to obtain the specified camber setting for the vehicle. See the Specifications Section at the end of this group for the camber setting for the vehicle being serviced.

- (5) Using the appropriate extensions and tools. Carefully reach around the tire and tighten the knuckle bolts enough to hold the camber setting. Finish by tightening the bolts to 100 N•m (75 ft.lbs.) **plus** 1/4 turn beyond specified torque.

TOE

- (1) Prepare vehicle as described in the Pre-Alignment procedure.
- (2) Center steering wheel and hold with steering wheel clamp.
- (3) Loosen tie rod locknuts. Rotate rods to align toe to specifications (Fig. 3).

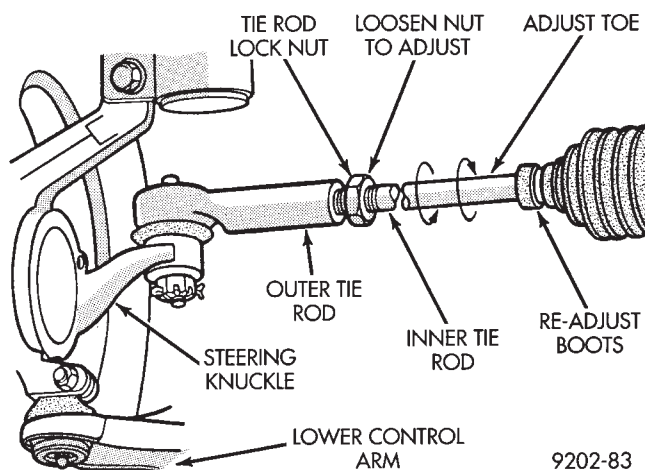


Fig. 3 Front Wheel Toe Adjustment

CAUTION: Do not twist tie rod to steering gear rubber boots during adjustment.

- (4) Tighten tie rod locknuts to 75 N•m (55 ft.lbs.) torque.
- (5) Adjust steering gear to tie rod boots at tie rod.
- (6) Remove steering wheel clamp.

STRUT DAMPER ASSEMBLY

REMOVAL

- (1) Loosen wheel nuts.
- (2) Raise vehicle, see Hoisting in Lubrication and Maintenance, Group 0.
- (3) Remove wheel and tire assembly.

Where service procedure includes assembly of original strut (shock absorber) to original knuckle. Mark cam adjusting bolt (Fig. 1), on AA, AG and AJ bodies only. Mark outline of strut on knuckle as shown in (Fig. 1). on AC, AY, and AP bodies.

- (4) Remove cam bolt, knuckle bolt(s), washer plate(s) and brake hose to damper bracket retaining screw (Fig. 1).
- (5) Remove strut damper to fender shield mounting nut washer assemblies.

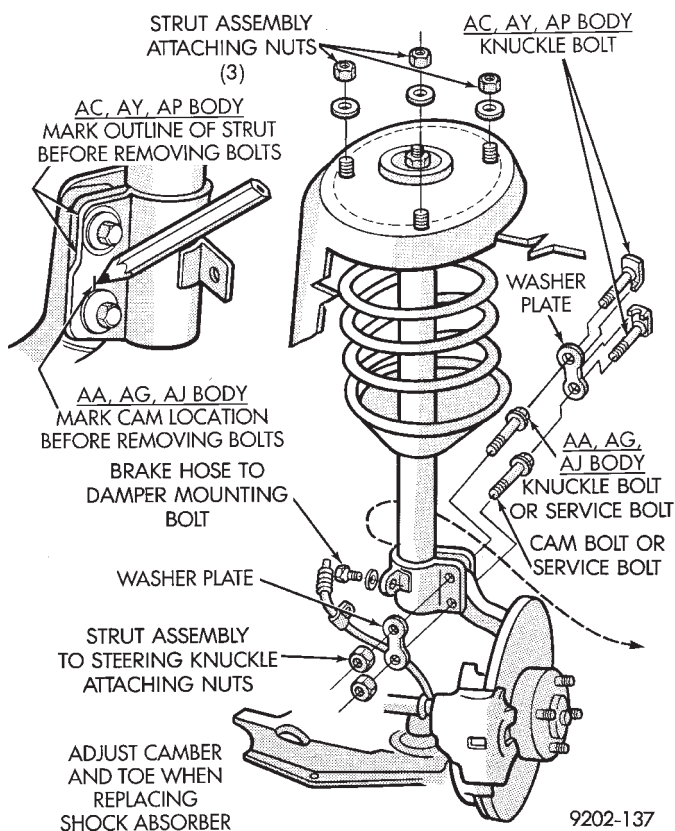


Fig. 1 Strut Damper Removal

INSPECTION

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

INSTALLATION

(1) Install unit into fender reinforcement and install retaining nuts and washer assemblies (Fig. 1). Tighten the 3 nuts to 27 N•m (20 ft. lbs.) torque.

(2) Position steering knuckle neck into strut assembly. Position washer plate and install cam and knuckle bolts (Fig. 1).

(3) Attach brake hose retainer to damper, tighten the screw to 13 N•m (10 ft. lbs.) torque (Fig. 1).

(4) Index strut to original outline on the knuckle neck, or align mark on cam bolt with the mark that was put on the strut to steering knuckle bracket (Fig. 1).

(5) Place a 4 inch (or larger) C clamp on the strut and knuckle as shown in (Fig. 2). Tighten the clamp just enough to eliminate any looseness between the knuckle and the strut. Check alignment of the index

marks and tighten the bolts to 100 N•m (75 ft. lbs.) **plus** 1/4 turn beyond specified torque. Remove the (C) clamp.

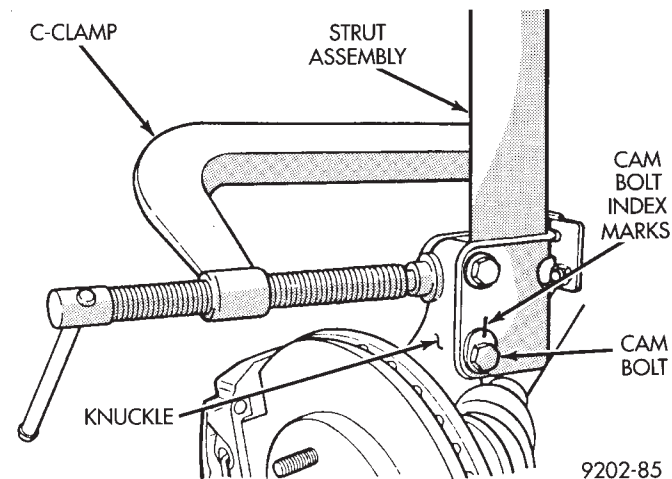


Fig. 2 Strut Damper Installation

(6) Install wheel and tire assembly. Tighten the wheel nuts to 129 N•m (95 ft. lbs.) torque.

DISASSEMBLY (STRUT DAMPER)

(1) Compress front coil spring with Spring Compressor, Special Tool C-4838 (Fig. 3).

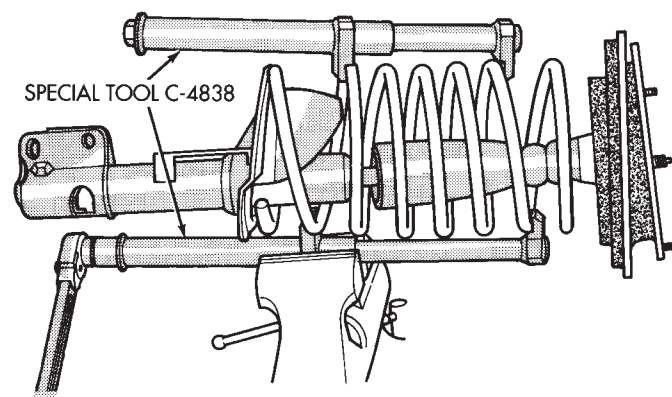


Fig. 3 Compressing Coil Spring

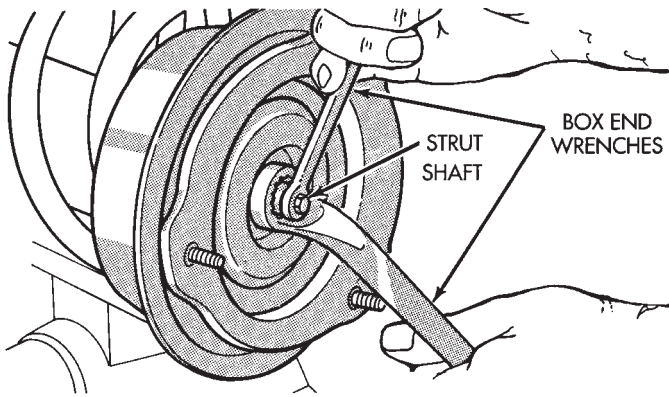
(2) Hold end of strut shaft from rotating with wrench, while loosening strut shaft nut. Remove nut from shaft (Fig. 4).

(3) Remove the upper strut mount from the strut assembly.

(4) Remove coil spring from the strut assembly. **Mark spring for installation back on the same side of the vehicle (Fig. 8).**

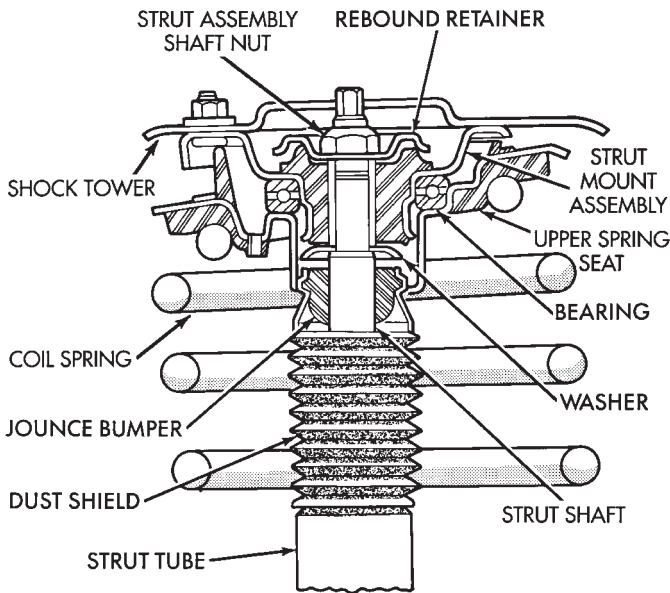
CAUTION: see Suspension Coil Springs before releasing coil from Tool C-4838.

(5) Inspect strut damper, mount assembly (Fig. 5) for:



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Fig. 4 Loosening Strut Assembly Shaft Nut



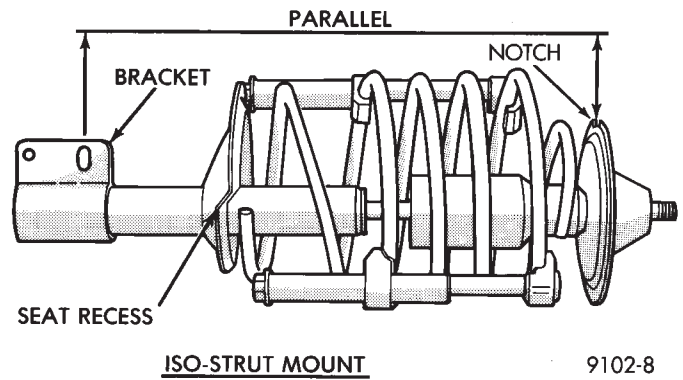
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Fig. 5 Mount Assembly

- (a) Severe deterioration of rubber isolator; retainers for cracks and distortion and bond failure of retainers and rubber isolators.
- (b) Bearings for binding.
- (c) Shock Absorber for flat spots over full stroke also see, Shock Absorbers, (strut damper).

ASSEMBLE (STRUT DAMPER)

- (1) Mount the strut assembly in a vertical position.
- (2) Place the compressed spring onto the strut assembly, so the end of the coil is seated in the seat recess in lower spring mount (Fig. 6).
- (3) Install the dust shield, isolator (if so equipped) jounce bumper, spacer (as required), and spring seat onto the top of the strut shaft (Fig. 5).
- (4) Position top spring seat alignment tab correctly with respect to bottom bracket (Fig. 6).
- (5) Install the rebound retainer and shaft nut (Fig. 5).

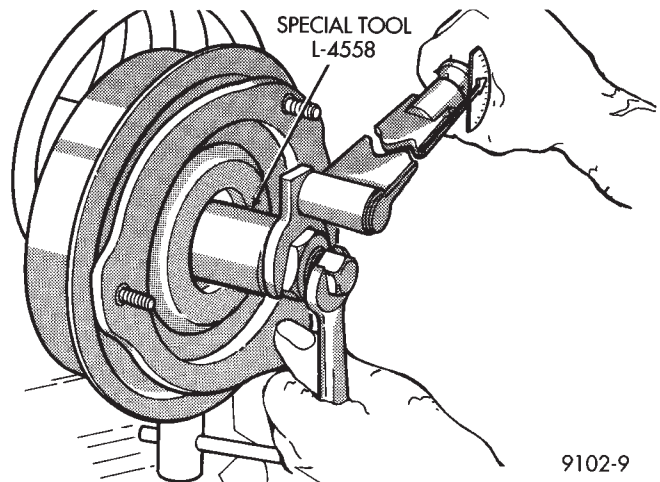


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Fig. 6 Spring Seat Alignment Notch Position to Bracket

(6) Tighten the strut shaft nut using, Strut Rod Socket And Holder, Special Tool L-4558. Torque strut shaft nut to 75 N•m (55 ft. lbs.) plus 1/4 turn (Fig. 7).

WARNING: THIS STEP MUST BE DONE BEFORE SPRING COMPRESSOR, SPECIAL TOOL C-4838 IS RELEASED FROM THE COIL SPRING.



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Fig. 7 Tighten Strut Rod Nut with Tool

- (7) Verify coil spring is aligned correctly with respect to bottom bracket (Fig. 6).
- (8) Release Spring Compressor Tool C-4838.

SUSPENSION COIL SPRINGS

Springs are rated separately for each side of vehicle depending on optional equipment and type of service. During service procedures where both springs are removed, mark springs (Chalk, Tape, etc.) (Fig. 8) to ensure installation in original position. If the coils springs require replacement. **Be sure that the springs needing replacement, are replaced with springs meeting the correct load rating for the vehicle and its specific options.**

During service procedures requiring the removal or installation of a coil spring with Spring

Compressor, Special Tool C-4838. It is required that five coils be captured within the jaws of the tool (Fig. 8).

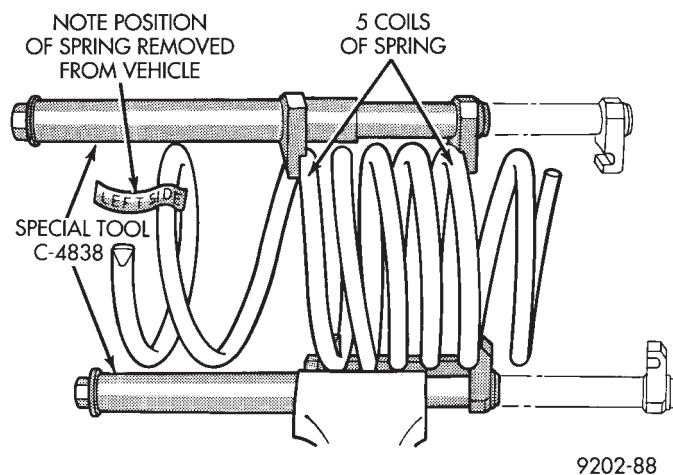


Fig. 8 Identifying Coil Springs

SPRING RETAINER UPPER

Ensure that upper spring retainer is positioned properly, see; step (5), Assemble (Strut Damper).

SPRING SEAT LOWER

During assembly of the coil spring to strut damper. Ensure that lower coil spring end is seated in strut damper spring seat recess refer to (Fig. 6) in assemble (Strut Damper) section.

SHOCK ABSORBERS (Strut Damper)

INSPECTION

Inspect for evidence of fluid leaking from around the strut assembly shaft seal at the upper end of the reservoir. (Actual leakage will be a stream of fluid running down the side and dripping off lower end of unit. A slight amount of seepage around the strut rod is not unusual and does not affect performance.

LOWER CONTROL ARM

The lower control arm if damaged, is serviced only as a complete component. Do not attempt to repair or straighten a broken or bent lower control arm.

The serviceable components of the lower control arm are, the ball joint assembly, and both pivot bushings. The service procedure to replace these components is detailed in the specific component sections of this group.

REMOVAL (ASSEMBLY)

(1) Raise vehicle. See Hoisting in Lubrication, Group 0 of this service manual.

(2) Remove the ball joint stud to steering knuckle clamp nut and bolt (Fig. 1).

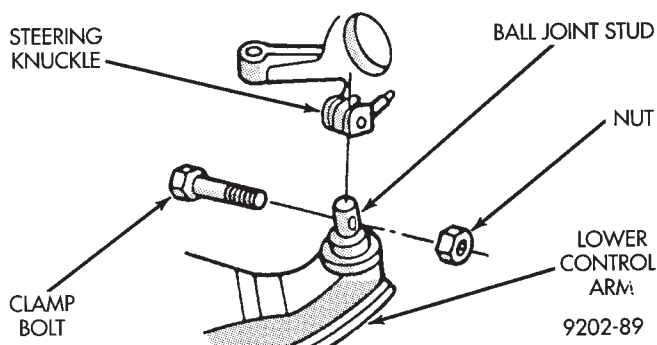


Fig. 1 Control Arm To Steering Knuckle Attachment

(3) Remove the sway bar to lower control arm retainer on both sides of the vehicle (Fig. 2). Then rotate the sway bar down away from the lower control arms.

(4) Separate the steering knuckle from the ball joint stud (Fig. 1).

(5) Remove the front and rear control arm pivot bushing to crossmember attaching nuts and bolts (Fig. 2). Then remove the lower control arm from the crossmember.

CAUTION: Pulling steering knuckle out from vehicle after releasing from ball joint can separate inner C/V joint. See Driveshafts.

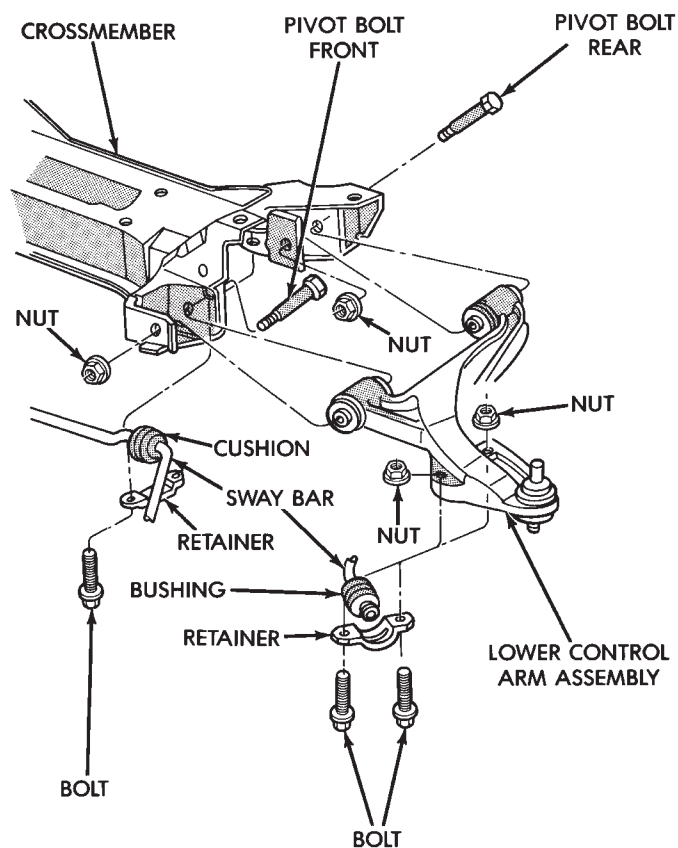


Fig. 2 Lower Control Arm Typical

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Inspect lower control arm for distortion. Check bushings for severe deterioration.

INSTALLATION (ASSEMBLY)

(1) Position the lower control arm into the cross-member. Install front and rear pivot bushing to cross-member attaching bolts. Then loosely assemble nuts to bolts (Fig. 2).

(2) Install ball joint stud into steering knuckle and install clamp bolt (Fig. 1). Tighten clamp bolt to 145 N•m (105 ft. lbs.).

(3) Position sway bar and bushings against the lower control arms. Install sway bar to control arm retainers. Install retainer bolts and tighten nuts to 70 N•m (50 ft. lbs.).

(4) Lower vehicle so the suspension is supporting vehicles weight (control arm at design height). Tighten the lower control arm to crossmember attaching bolts to 169 N•m (125 ft. lbs.) torque.

LOWER CONTROL ARM PIVOT BUSHINGS

When performing the replacement procedure on the lower control arm pivot bushings, the following sequence must be followed. When removing the pivot bushings from the lower control arm, the large bushing must be removed first then the small bushing. When installing the pivot bushings into the lower control arm, the small bushing must be installed first then the large bushing. This sequence must be used when removal and replacement of bushings is done using Bushing Remover/Installer, Special Tool 6602.

LARGE BUSHING

REMOVE

(1) Position and clamp lower control arm in a vise.
(2) Assemble the washer, thrust bearing and large bushing disk, Special tool 6602-5 onto the threaded rod from Bushing Remover/Installer, Special Tool 6602 (Fig. 3).

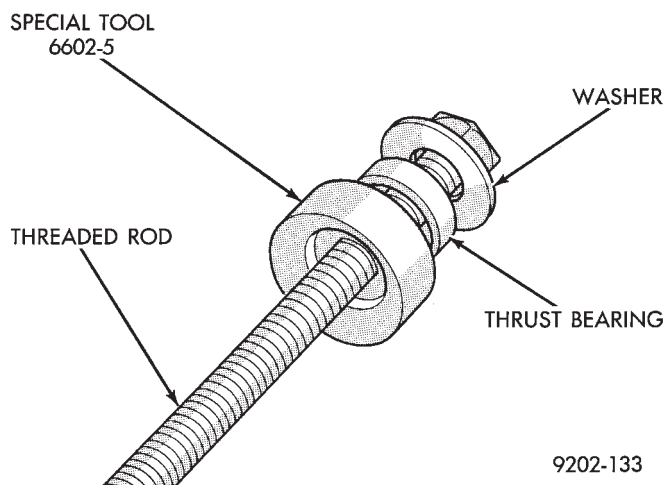


Fig. 3 Bushing Removal Tools

(3) Install the tools assembled in step 2 above into the large bushing of the lower control arm (Fig. 4). Then assemble the remaining Special Tools, Cup 6602-2, thrust bearing, washer and long nut onto the threaded rod (Fig. 4) from Bushing Remover/Installer, Special Tool 6602.

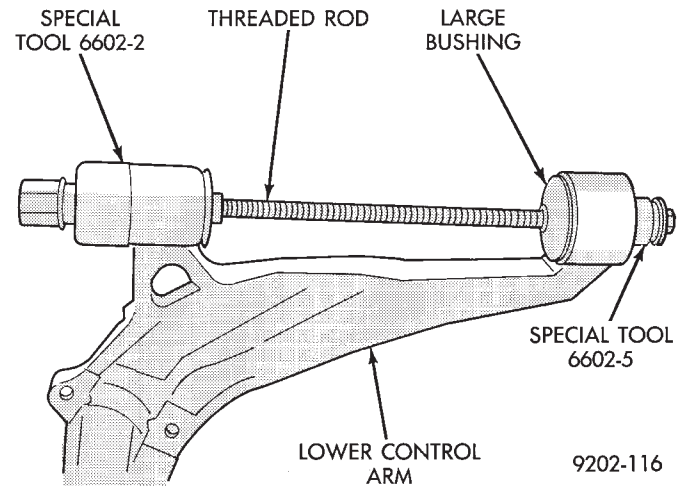


Fig. 4 Tool Assembled For Bushing Removal

(4) Hold the long nut stationary. Using a deep socket turn the long threaded rod until the large pivot bushing is pushed out of the lower control arm.

SMALL BUSHING

REMOVE

(1) Remove the special tools from the lower control arm that were used for the removal of the large pivot bushing.

(2) Remove the large Bushing Disc, Special Tool 6602-5 from the threaded rod. Leave the thrust bearing and washer on the threaded rod. Install the small Bushing Disc, Special Tool 6602-3 on the threaded rod and against thrust bearing (Fig. 5).

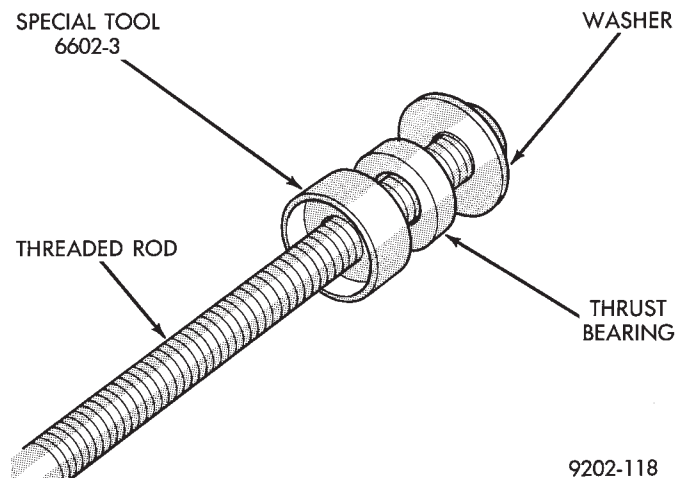


Fig. 5 Bushing Removal Tools

(3) Install the tools assembled in step 2 above through small lower control arm bushing and hole in lower control arm where large bushing was removed from (Fig. 6). Assemble the Cup, Special Tool 6602-2 thrust bearing, washer and long nut onto the threaded rod of Special Tool 6602 (Fig. 6). Cup, Special Tool 6602-2 is to be installed on threaded rod with cup facing out and undercut in large bushing hole of lower control arm (Fig. 6).

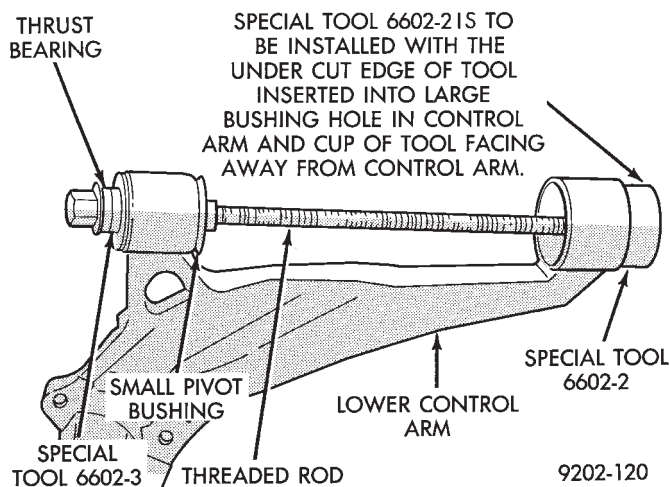


Fig. 6 Tool Assembled For Bushing Removal

(4) Hold the threaded rod stationary and turn the long nut until the small pivot bushing is pulled out of the lower control arm.

SMALL BUSHING

INSTALL

(1) Remove the special tools from the lower control arm that were used for the removal of the small pivot bushing.

(2) On the threaded rod from Remover/Installer, Special Tool 6602 assemble the following pieces. Washer, thrust bearing, small bushing disc Special Tool 6602-3, small lower control arm pivot bushing and small bushing sizer, Special Tool 6602 (Fig. 7).

(3) Install the pieces assembled in step 2 through the small and large pivot bushing holes in the lower control arm. At the large pivot bushing hole in the lower control arm, assemble Cup, Special Tool 6602-2, thrust bearing, washer and nut (Fig. 8). Cup, Special Tool 6602-2 is to be installed on threaded rod with cup facing out and undercut in large bushing hole of lower control arm (Fig. 8). Lubricate the installer cone and new bushing using Mopar®, Silicone Spray Lube or equivalent.

(4) Hold the threaded rod stationary and turn the long nut until the small pivot bushing is fully installed into the lower control arm. Be sure that the flanges of the bushing are fully expanded around the control arm bushing holes.

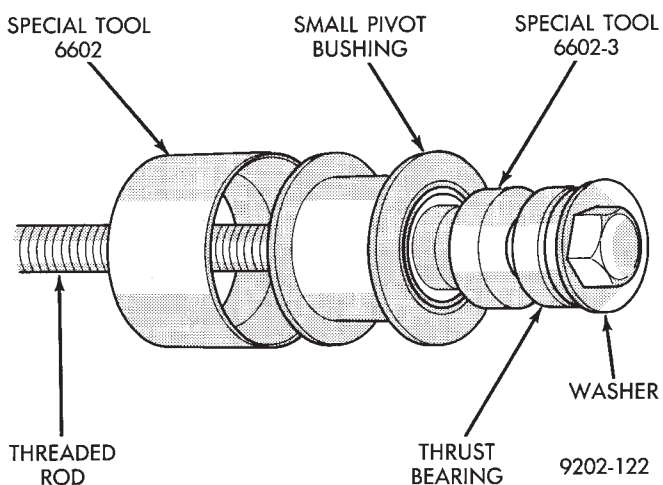


Fig. 7 Bushing Installing Tools Assembled

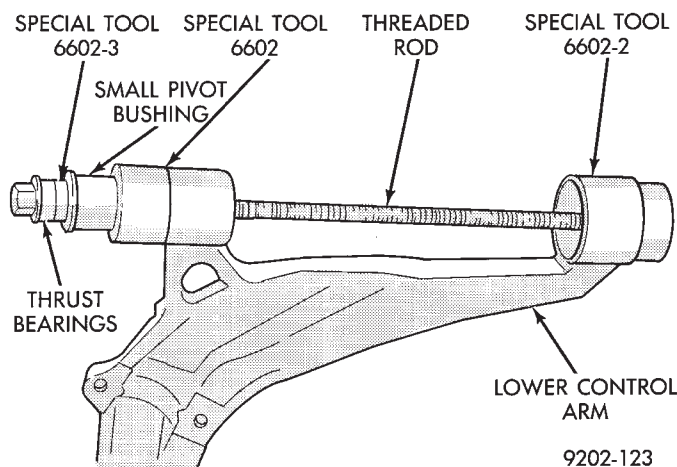


Fig. 8 Bushing And Tool Position For Installation In Control Arm

LARGE BUSHING

INSTALL

(1) Remove the special tools from the lower control arm that were used for installing the small pivot bushing.

(2) On the threaded rod from Remover/Installer, Special Tool 6602 assemble the following pieces. Washer, thrust bearing, Cup Special Tool 6602-2 (Fig. 9).

(3) Install the pieces assembled in step 2 through the hole in the small pivot bushing and the large pivot bushing hole in the lower control arm. At the large pivot bushing hole in the lower control arm assemble the following special tool pieces. Large Bushing Sizer, Special Tool 6602-4, large lower control arm pivot bushing, large bushing disc Special Tool 6602-5, thrust bearing, washer and nut (Fig. 10). Lubricate the installer cone and new bushing using Mopar® Silicone Spray Lube or equivalent.

(4) Hold the threaded rod stationary and turn the long nut until the bushing is fully installed into the

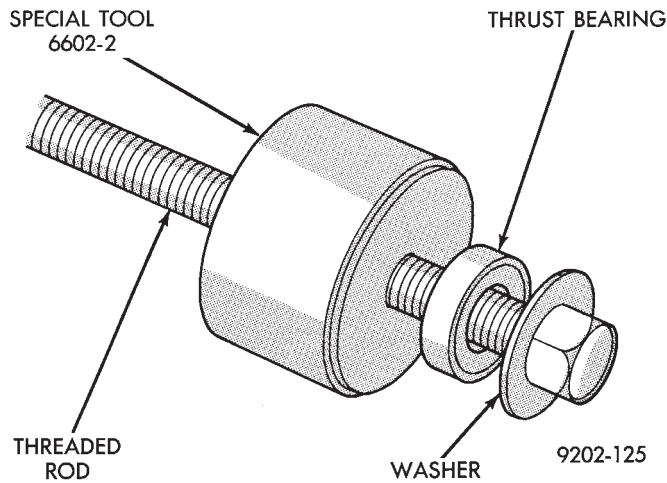


Fig. 9 Bushing Installer Tools

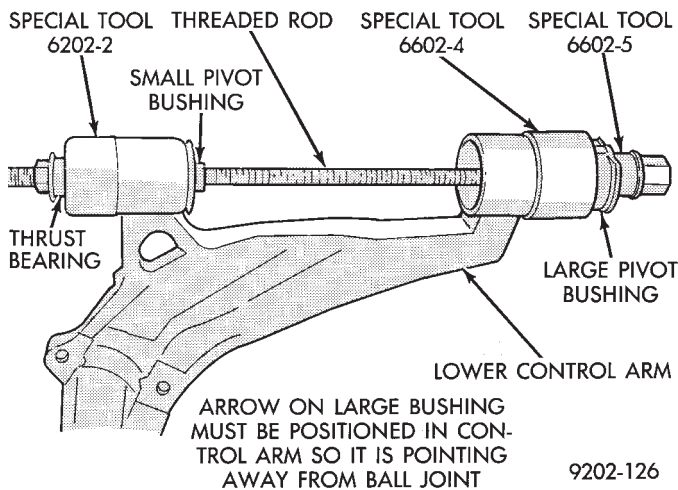


Fig. 10 Bushing And Tool Position For Installation In Control Arm

control arm. Be sure that the flanges of the bushing are fully expanded around the control arm bushing holes.

(5) If the position of the large lower control arm pivot bushing (Fig. 11) moved during bushing installation. Install a nut and bolt through the bushing sleeve and tighten it down (Fig. 11). Using a wrench rotate the bolt until the bushing is in the correct position (Fig. 10)

BALL JOINTS

The lower front suspension ball joints operate with no free play. See Inspection Ball Joint Wear to determine if the ball joint is worn and requires replacement.

The ball joints are replaceable as an assembly, do not attempt any type of repair on the ball joint assembly. The replacement procedure for the ball joint assembly is detailed in this section.

The ball joint housing is a pressed fit into the lower control arm with the joint stud retained in the steering knuckle by a (clamp) bolt.

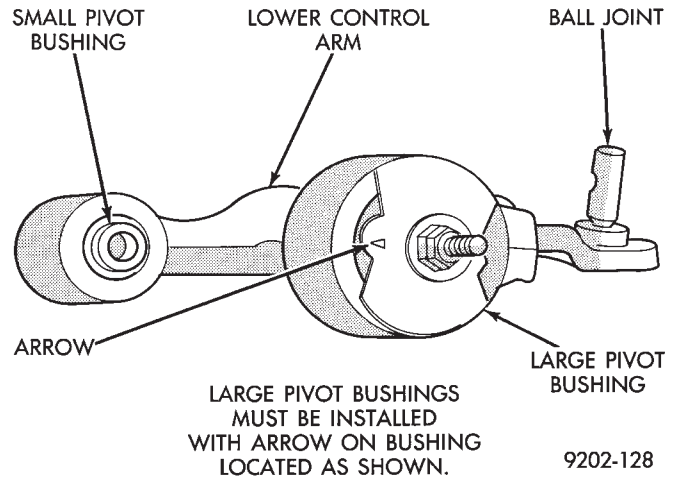


Fig. 11 Positioning Control Arm Bushing

INSPECTION BALL JOINT WEAR

With the weight of the vehicle resting on the road wheels. Grasp the grease fitting as shown in (Fig. 1) and with no mechanical assistance or added force attempt to move the grease fitting.

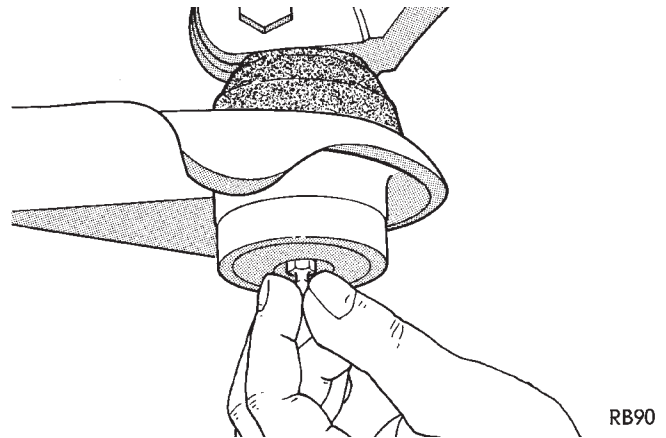


Fig. 1 Checking Ball Joint Wear

If the ball joint is worn the grease fitting will move easily. If movement is noted, replacement of the ball joint is recommended.

BALL JOINT REMOVAL

- (1) Pry off seal.
- (2) Position Receiving Cup Special Tool C-4699-2 to support lower control arm while receiving ball joint assembly (Fig. 2).
- (3) Install Remover/Installer Special Tool, C-4699-1 (Fig. 2) over ball joint stud and against the ball joint upper housing.
- (4) Press down against the ball joint upper housing, to remove ball joint assembly from lower control arm.

BALL JOINT INSTALLATION

- (1) By hand, position ball joint assembly into the ball joint bore of the lower control arm. Be sure the

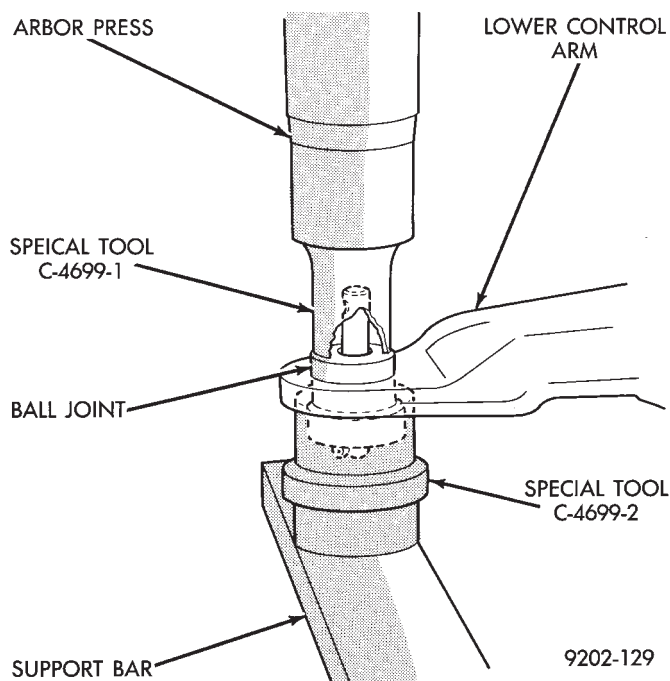


Fig. 2 Removing Ball Joint

ball joint assembly is not cocked in the bore of the control arm, this will cause binding of the ball joint assembly.

(2) Position assembly in press with Installer Tool C-4699-2 supporting control arm (Fig. 3).

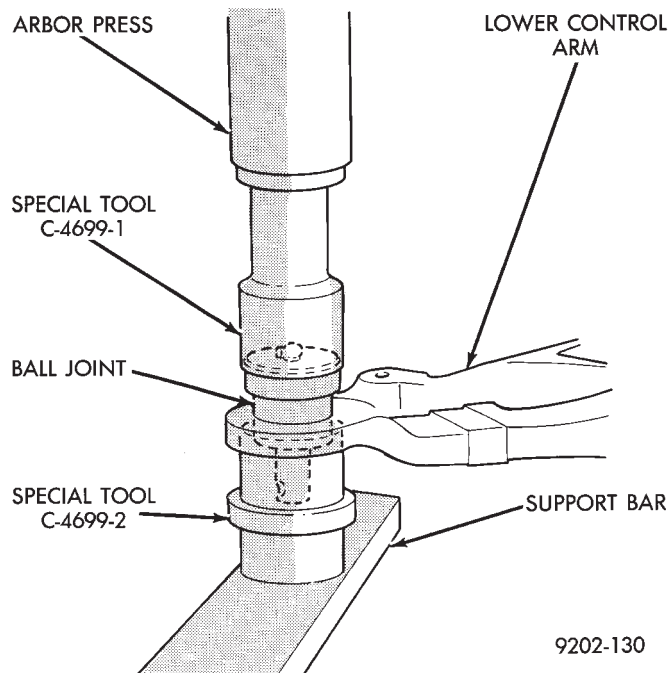


Fig. 3 Installing Ball Joint

(3) Install the Remover/Installer, Special Tool C-4699-1 over the ball joint stud and down on the lower body of the ball joint assembly (Fig. 3).

(4) Carefully align all pieces. Using an arbor press apply pressure against the ball joint assembly, until

ball joint is fully seated against bottom surface of control arm. Do not apply excessive pressure against the control arm.

BALL JOINT SEAL INSTALLATION

(1) Support ball joint housing with Installer, Special Tool C-4699-1 (Fig. 4). Position new seal over ball joint stud and against ball joint housing.

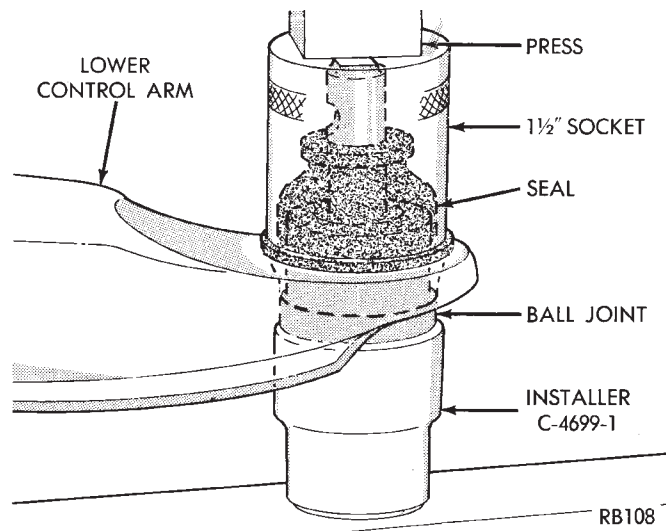


Fig. 4 Installing Ball Joint Seal

(2) With 1-1/2 inch socket, press seal onto ball joint housing until it is squarely seated against top surface of control arm as shown in (Fig. 4).

SWAY BAR

The sway bar interconnects the front lower control arms of the vehicle and attaches to the crossmember (Fig. 1).

Jounce and rebound movements affecting one wheel are partially transmitted to the opposite wheel to stabilize body roll.

Attachment to the crossmember, and front lower control arms is through rubber-isolated bushings. All parts are serviceable, and the sway bar to crossmember bushings are split for easy removal and installation. The split in the sway bar to crossmember bushing should be positioned toward the front of the vehicle.

REMOVAL

(1) Raise and support the vehicle. See Hoisting in Lubrication and Maintenance, Group 0.

(2) Remove the nuts, bolts, and sway bar retainers at the front lower control arms (Fig. 1).

(3) Remove the bolts at sway bar crossmember clamps, and remove clamps and sway bar from vehicle (Fig. 1).

INSPECTION

Inspect for broken or distorted clamps, retainers, and bushings. If bushing replacement is required, the

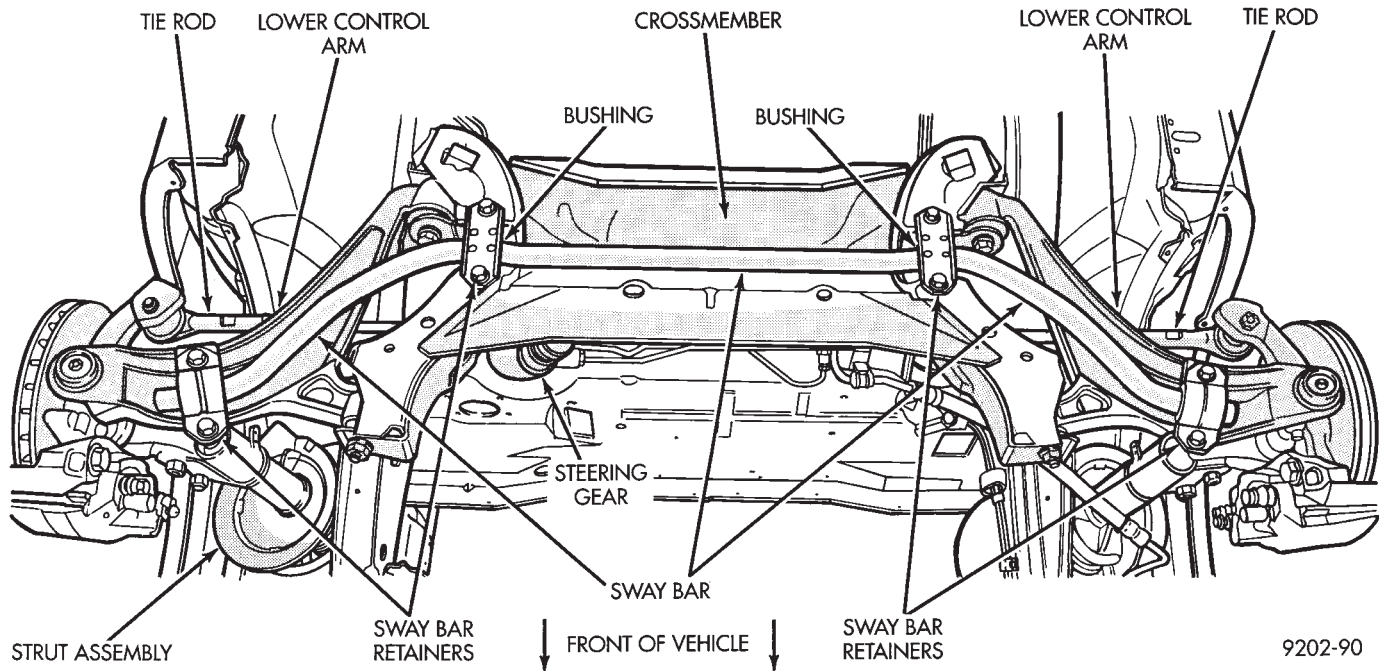


Fig. 1 Front Sway Bar

inner bushing can be removed by opening the split. The outer bushing must be cut or hammered off the bar. If replaced, the outer bushings should be forced on so that approximately 1/2 inch of the bar protrudes. The sway bar to crossmember bushings, should be positioned when installed, so the void on the bushing is positioned toward the rear of the vehicle (Fig. 2). Note that the control arm retainers are symmetric and bend slightly upon installation.

INSTALLATION

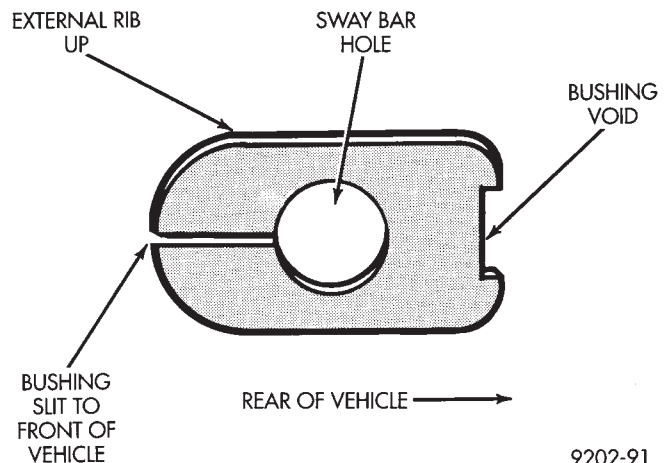
(1) If inspection of the sway bar assembly, determined that sway bar to lower control arm bushings require replacement. Install the new bushings, by forcing them onto sway bar using a rotating motion. Bushings should be installed on sway bar so that sway bar extends 1/2 inch out past the end of the bushing.

(2) If required position sway bar to crossmember bushings on sway bar with external rib up and void in the bushing facing the rear of vehicle (Fig. 2). Lift the bar assembly into the crossmember, and install the lower clamps and bolts. The center offset in the sway bar should be oriented toward the front of the vehicle (Fig. 1)

(3) Position bushing retainers on lower control arms, insert bolts, and install nuts. The bolts should be installed so that the threaded portion of the bolt is up, with the nut is against the lower control arm not the bushing retainer (Fig. 1).

(4) With lower control arms raised to design height, tighten all retainer attaching bolts to 70 N•m (50 ft. lbs.) torque.

(5) Lower vehicle.



**Fig. 2 Sway Bar To Crossmember Bushing Position
KNUCKLE (FRONT SUSPENSION)**

The front suspension knuckle (Fig. 1) provides for steering control of the vehicle. Supports the brake caliper and absorbs the loads exerted during vehicle braking. It also supports the front (driving) hub and bearing and stub axle assembly.

The front suspension knuckle also provides the ability to align the front wheels of the vehicle. This is done by allowing for front wheel camber adjustment and the ability for front tire Toe adjustments

The front suspension knuckle is not a serviceable component. Do not attempt to straighten or repair the front suspension knuckle in any way.

Service repair or replacement of the front (drive) hub and bearing, can be done with the front suspension knuckle remaining on the vehicle.

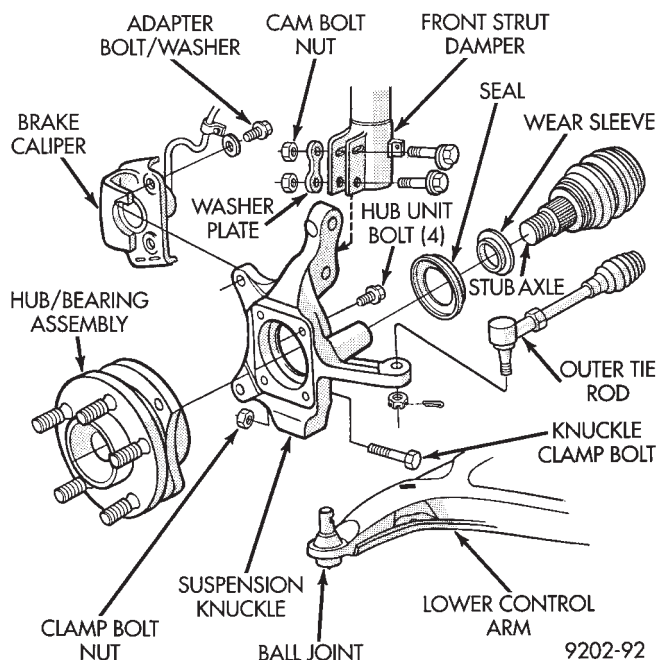


Fig. 1 Front Knuckle Assembly (Typical)

REMOVAL

(1) Remove the cotter pin, hub nut lock and spring washer from the front axle (Fig. 2).

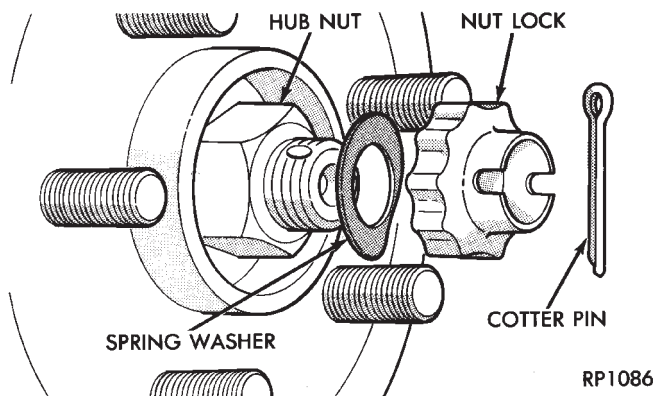


Fig. 2 Remove Cotter Pin, Hub Nut Lock, & Spring Washer

(2) Loosen hub nut while the vehicle is on the floor with the brakes applied (Fig. 3). **The hub and drive-shaft are splined together through the knuckle (bearing) and retained by the hub nut.**

(3) Raise and support the vehicle. See Hoisting in Lubrication and Maintenance, Group 0.

(4) Remove the wheel lug nuts, front tire and wheel assembly and hub nut and washer.

(5) Remove the brake caliper adapter to steering knuckle attaching bolts and washers (Fig. 1). Remove the brake caliper and adapter from the steering knuckle and braking disc. Support brake caliper/adapter assembly using a wire hook and not by hydraulic hose (Fig. 4).

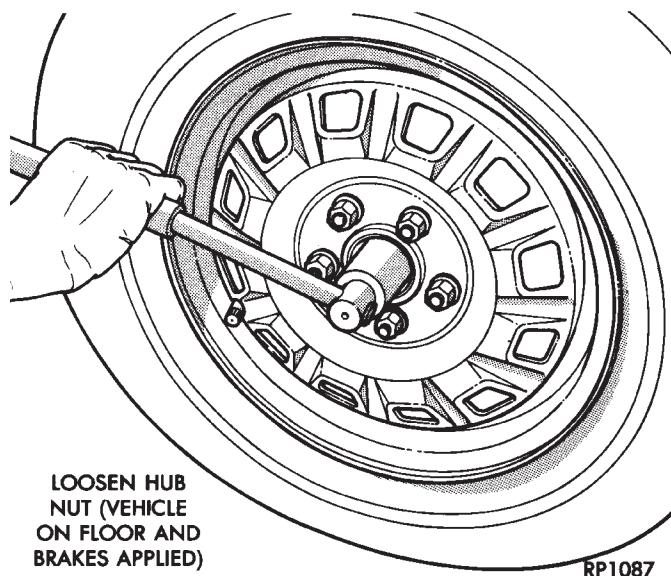


Fig. 3 Loosen Hub Nut

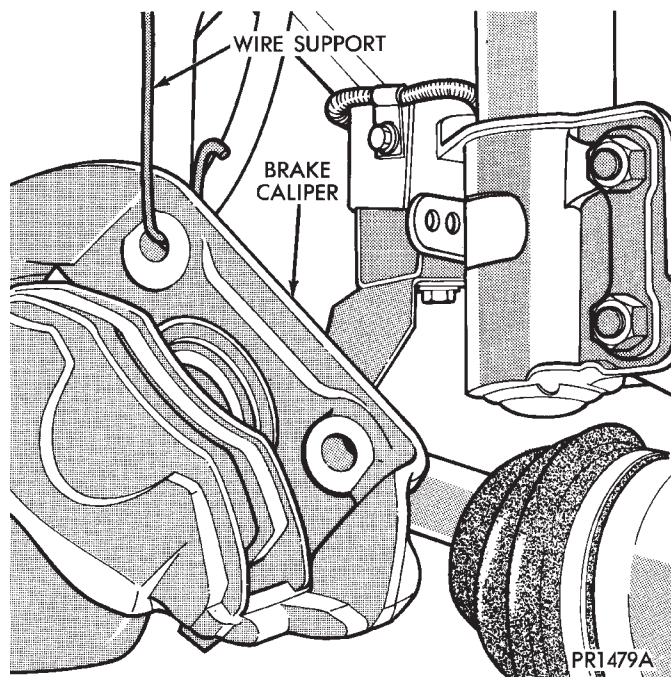


Fig. 4 Supporting Brake Caliper

(6) Remove the braking disc from the front hub/bearing assembly (Fig. 5).

(7) Remove the cotter pin and nut from the tie rod end. Remove the tie rod end from the steering knuckle arm using Puller, Special Tool C-3894-A (Fig. 6).

(8) Remove the clamp nut and bolt (Fig. 7) securing the ball joint stud into the steering knuckle.

(9) Separate ball joint stud from knuckle assembly by prying down on lower control arm. Pull knuckle assembly out and away from driveshaft (Fig. 8).

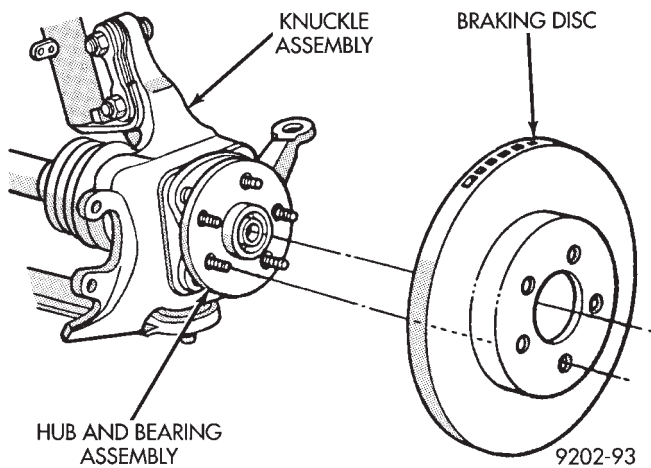


Fig. 5 Remove or Install Braking Disc

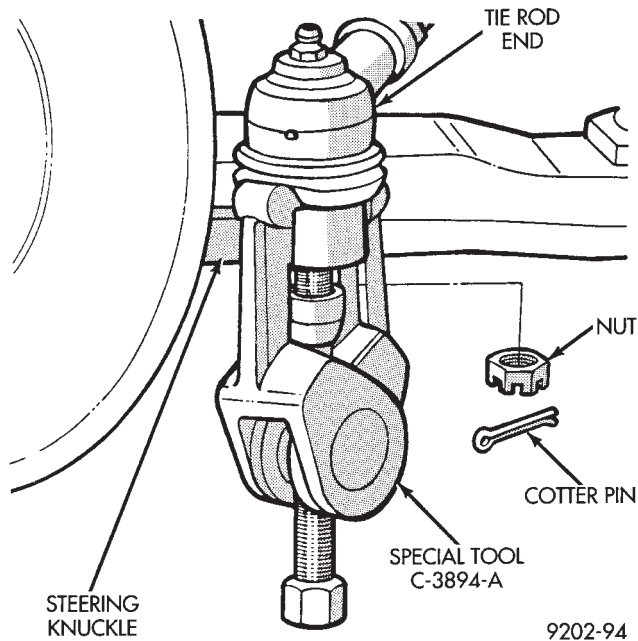


Fig. 6 Disconnect Tie Rod End

Care must be taken not to separate the inner C/V joint during this operation. Do not allow driveshaft to hang by inner C/V joint, driveshaft must be supported.

(10) Remove the steering knuckle to strut damper attaching bolt and cam bolt (Fig. 9). Note the location of the cam bolt, it must be installed in the same location when steering knuckle is installed back on strut damper.

(11) Mount the steering knuckle in a vise and remove the 4 bolts on back of steering knuckle, attaching the hub and bearing assembly. Remove the hub and bearing assembly from the steering knuckle (Fig. 10).

Remove outer C/V joint seal from the steering knuckle.

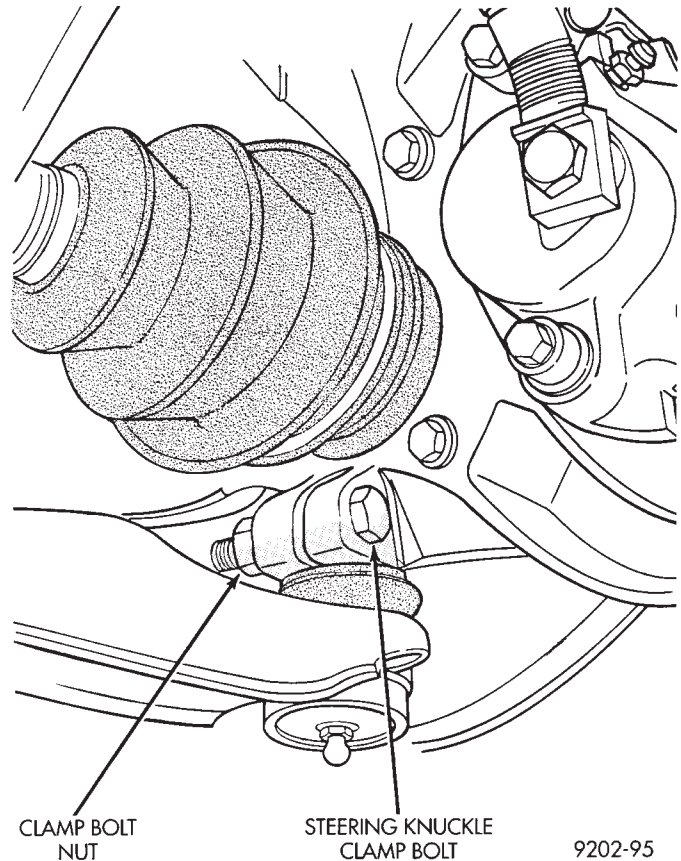


Fig. 7 Remove or Install Steering Knuckle Clamp Bolt

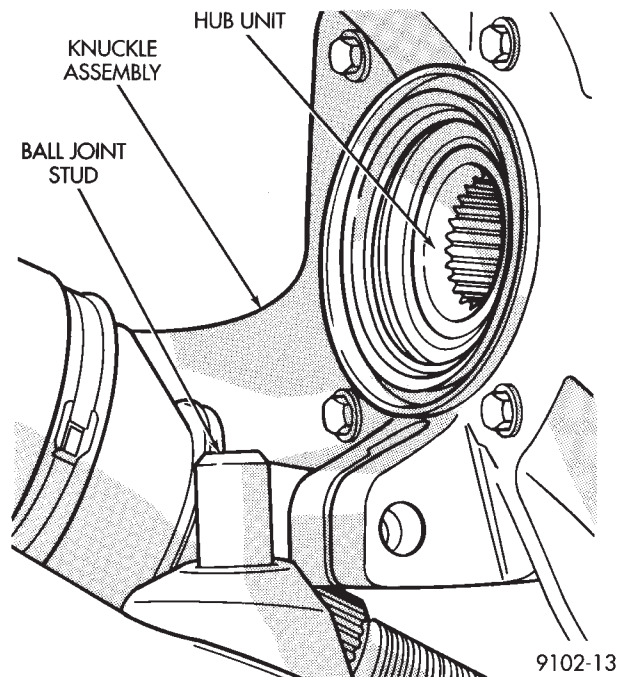


Fig. 8 Separate Ball Joint Stud from Knuckle Assembly

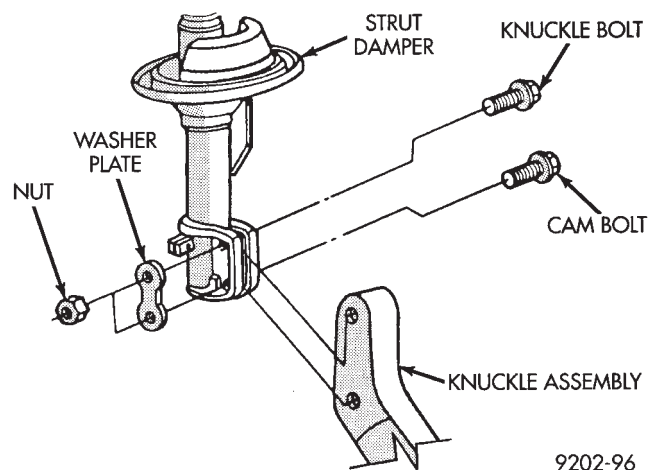


Fig. 9 Remove Or Install Steering Knuckle

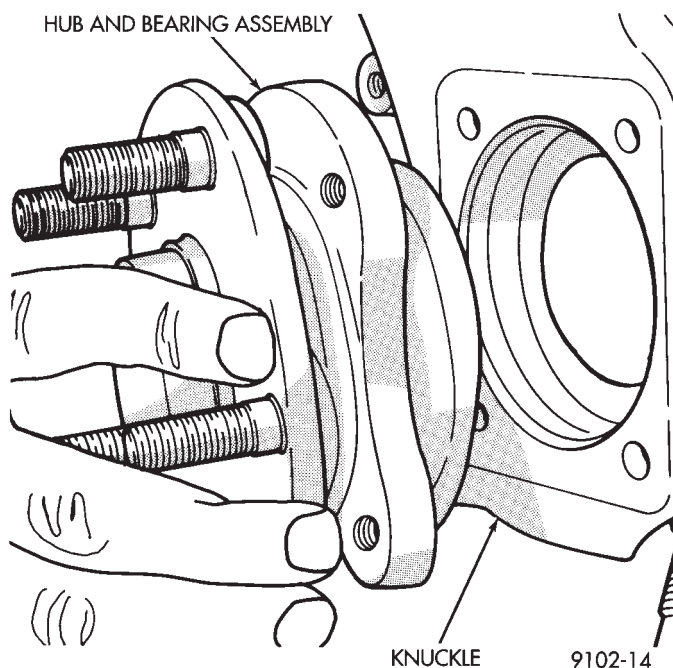


Fig. 10 Remove Or Install Hub and Bearing Assembly

INSTALL

CAUTION: Knuckle and bearing mounting surfaces must be smooth and completely free of foreign material or nicks.

(1) Install the hub and bearing assembly into the steering knuckle (Fig. 10). Install the 4 hub and bearing assembly to steering knuckle attaching bolts and torque in a criss-cross pattern to 65 N•m (45 ft.lbs.)

(2) Position new seal in recess on back of the steering knuckle. Assemble Installer, Special Tool C-4698. Then install seal into steering knuckle until it is fully seated into recess (Fig. 11). Inspect the wear sleeve on the C/V joint housing and replace if required.

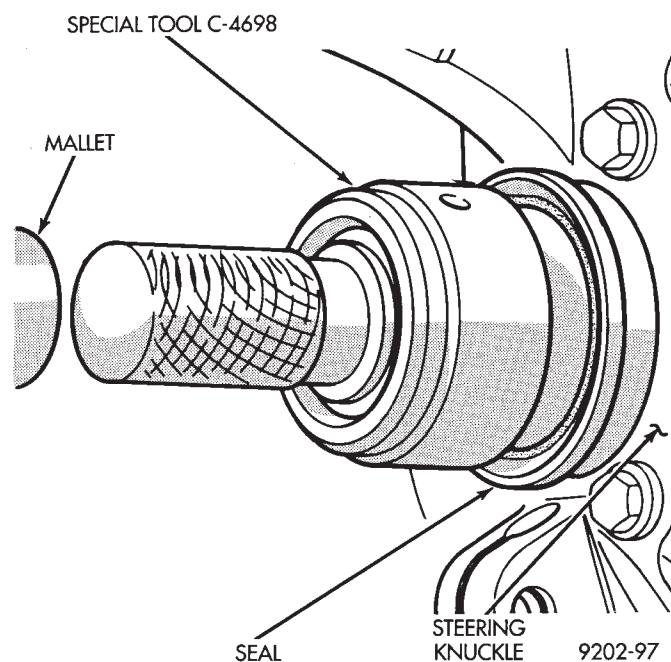


Fig. 11 Seal Installation In Steering Knuckle

(3) Install the steering knuckle back on the strut damper (Fig. 9). Install the strut damper to steering knuckle attaching bolt, cam bolt, washer plate and nuts. Torque bolts to 100 N•m (75 ft.lbs.) plus 1/4 turn. **Be sure the cam bolt is installed in same location it was removed from.**

(4) Lubricate the FULL circumference of the seal (and wear sleeve) with Mopar® Multi-Purpose Lubricant, or equivalent (Fig. 12).

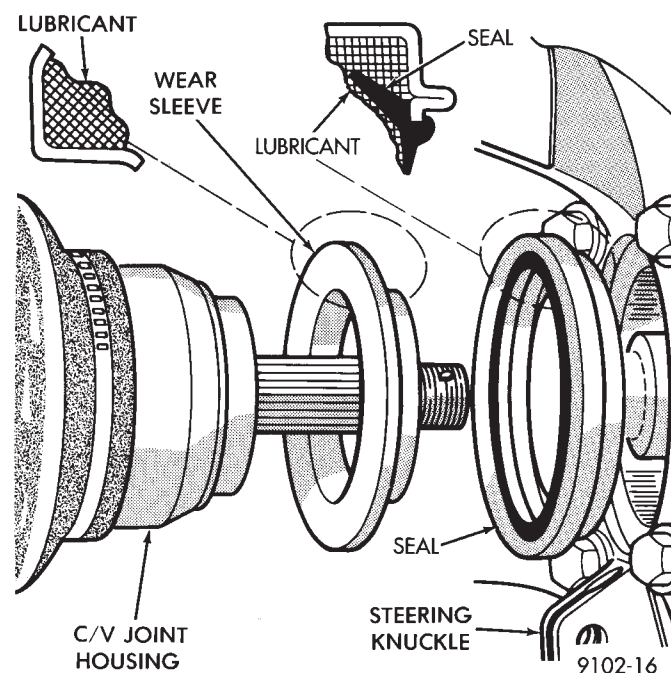


Fig. 12 Seal and Wear Sleeve Lubrication

(5) Slide the drive shaft back into the hub and bearing assembly and install the steering knuckle onto the ball joint stud (Fig. 13).

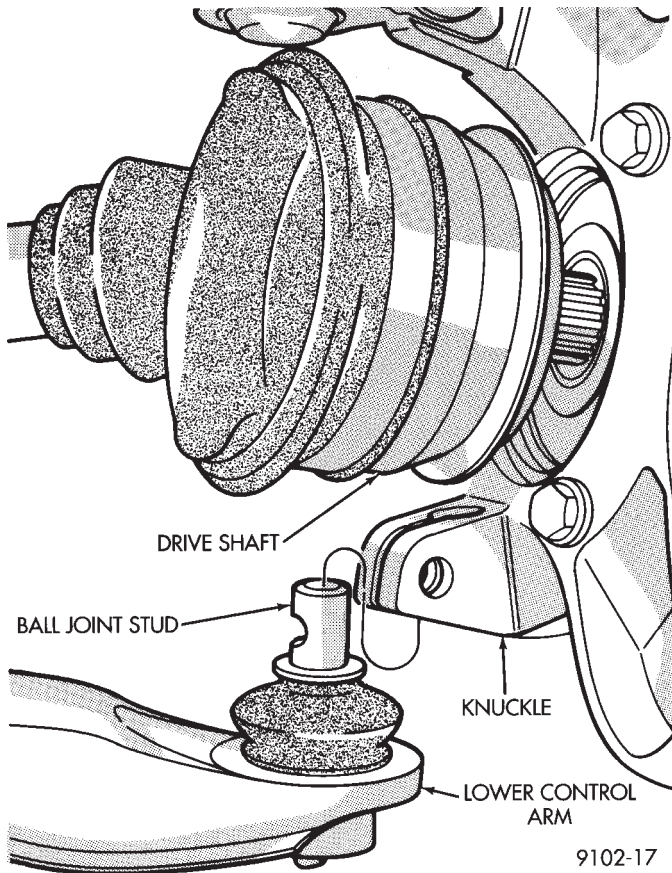


Fig. 13 Installing Knuckle Assembly

(6) Install the original (or equivalent) steering knuckle to ball joint stud, clamp bolt and nut (Fig. 14). Torque the clamp bolt to 145 N•m (105 ft. lbs.).

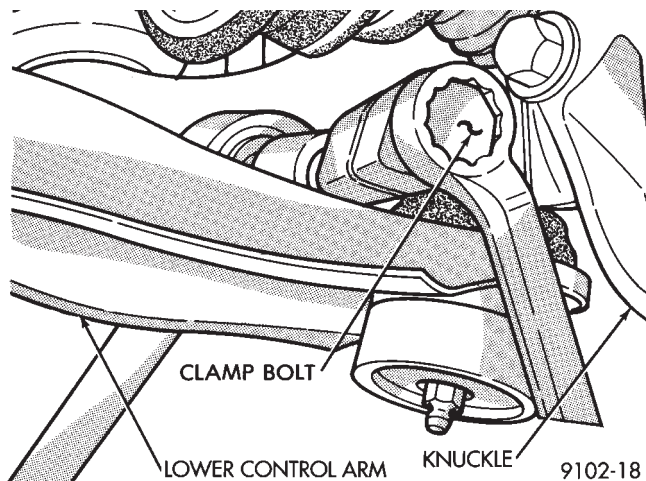


Fig. 14 Tighten Steering Knuckle Clamp Bolt

(7) Install the tie rod end into the arm of the steering knuckle. Install the tie rod end to steering knuckle attaching nut, and torque to

47 N•m (35 ft. lbs.). Install a new cotter pin into the tie rod end (Fig. 15).

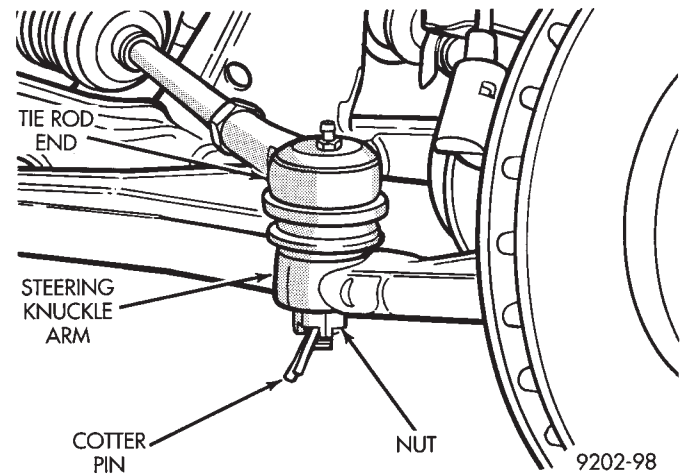


Fig. 15 Install Tie Rod End

(8) Install the braking disk back on the hub and bearing assembly (Fig. 5).

(9) Install the front brake caliper and adapter back over the braking disc and align with the adapter mounting holes on steering knuckle (Fig. 1). Install the caliper adapter to steering knuckle attaching bolts and torque to 217 N•m (160 ft. lbs.).

(10) Clean all foreign matter from the threads of the stub axle (Fig. 16). Install the washer and hub nut onto the threads of the stub axle and tighten nut.

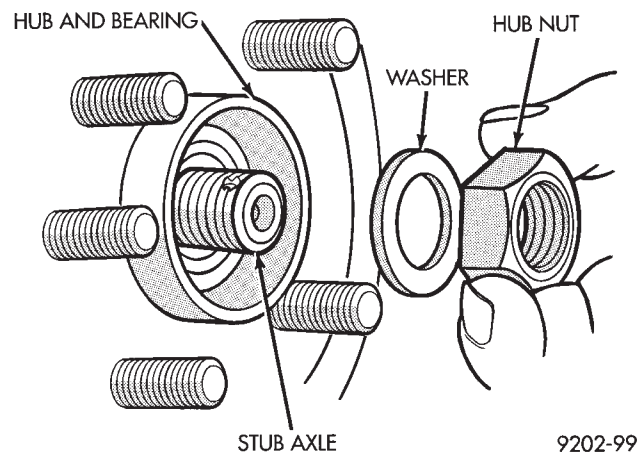


Fig. 16 Install Washer and Hub Nut

(11) With the vehicles brakes applied to keep front braking disc and hub from turning. Tighten the hub nut to a torque of 244 N•m (180 ft. lbs.) (Fig. 17).

(12) Install the spring washer, hub nut lock, and new cotter pin. Wrap the cotter pin prongs tightly around the hub nut lock (Fig. 18).

(13) Install the front wheel and tire assembly. Install the front wheel lug nuts and torque to 129 N•m (95 ft.lbs.).

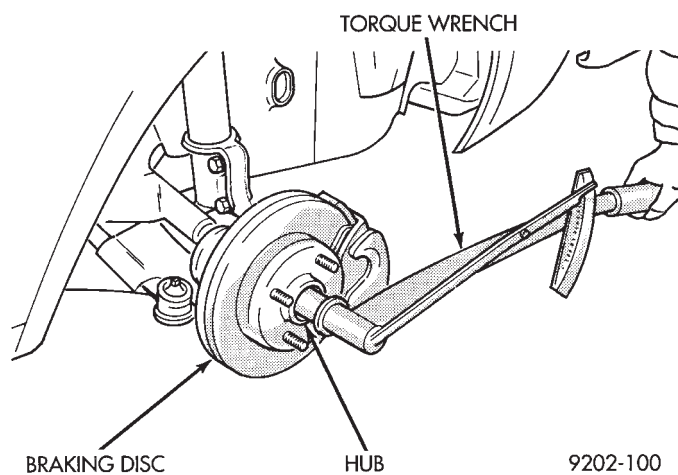


Fig. 17 Tighten Hub Nut

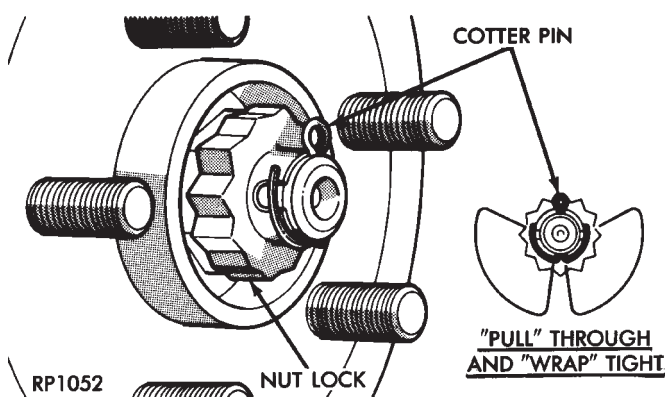


Fig. 18 Install Spring Washer, Nut Lock, & Cotter Pin

(14) Lower vehicle.

(15) Align the front wheels of the vehicle. Use the procedure listed under Wheel Alignment, in the Front Suspension Service Procedures section of this service manual.

HUB AND BEARING ASSEMBLY

The Unit III Front Hub and Bearing (Fig. 1) is used on all 1992 M.Y. Front Wheel Drive Applications.

All hub and bearing assemblies mount to the steering knuckle the same way, but vary by the wheel size on the vehicle. Vehicles equipped with 14 inch wheels have a 4 inch wheel mounting stud pattern. Vehicles equipped with 15 inch wheels have a 4 1/2 inch wheel mounting stud pattern. If a hub and bearing assembly needs to be replaced, be sure that the replacement assembly has the same size wheel mounting stud pattern as the original part.

This unit is serviced only as a complete assembly (Fig. 1). It is mounted to the steering knuckle by four mounting bolts that are removed from the rear of the steering knuckle (Fig. 2).

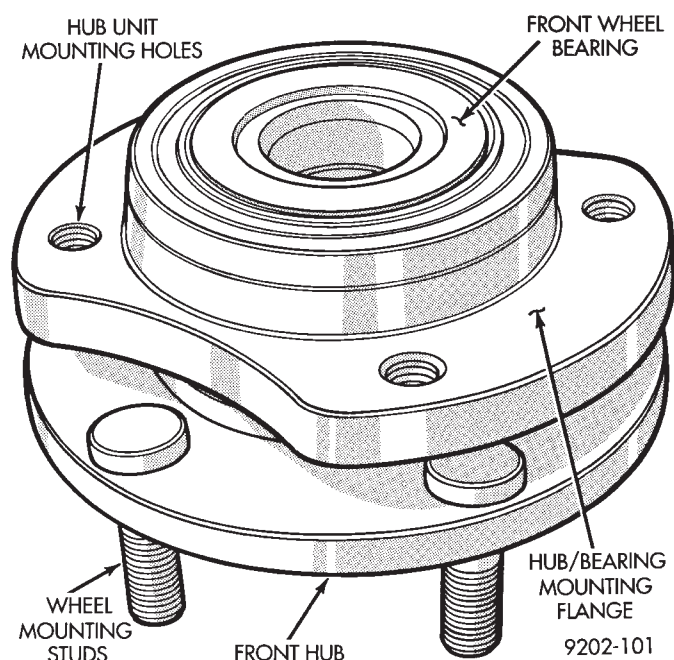


Fig. 1 Unit III Front Hub And Bearing Assembly

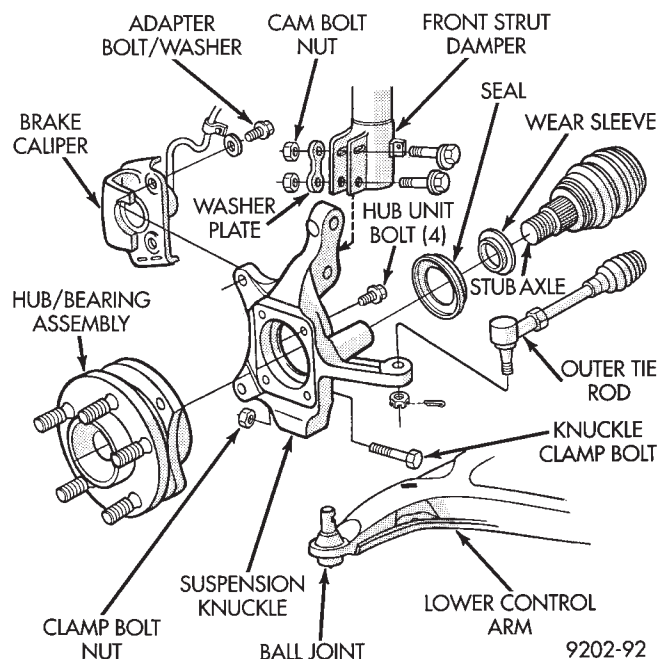


Fig. 2 Front Hub And Bearing Assembly Mounting

REMOVAL

Replacement of the front (drive) hub and bearing assembly can be done without having to remove the steering knuckle from the vehicle.

(1) Remove cotter pin, hub nut lock, and spring washer (Fig. 3).

(2) Loosen hub nut while the vehicle is on the floor with the brakes applied (Fig. 4). **The hub and drive-shaft are splined together through the knuckle (bearing assembly) and retained by the hub nut.**

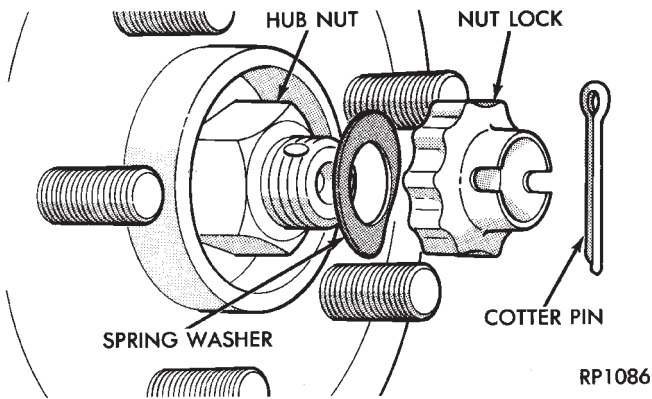


Fig. 3 Remove Cotter Pin, Nut Lock, & Spring Washer

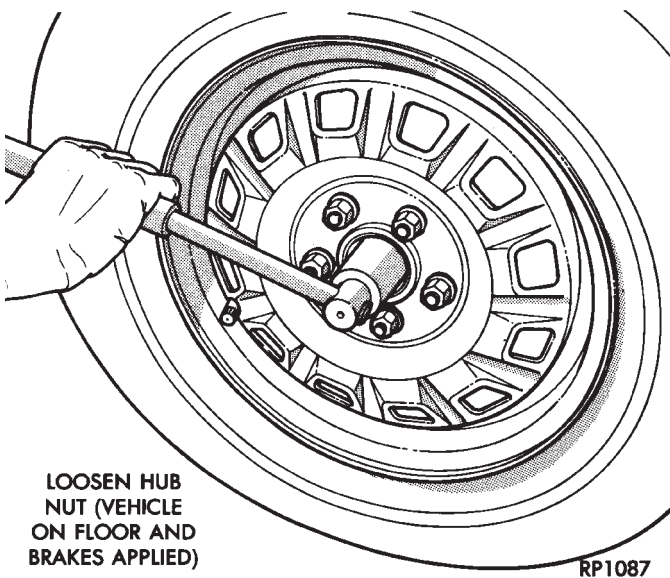


Fig. 4 Loosen Hub Nut

(3) Raise vehicle, see Hoisting Recommendations in Group 0 of this service manual.

(4) Remove the hub nut and the washer from the stub axle (Fig. 3).

(5) Remove the wheel lug nuts, and tire and wheel assembly from the vehicle.

(6) Disconnect tie rod end from steering arm with Puller Special, Tool C-3894-A (Fig. 5).

(7) Remove clamp bolt securing the ball joint stud into the steering knuckle (Fig. 6).

(8) Remove caliper guide pin bolts (Fig. 6) and separate caliper assembly from braking disc. **Support caliper with wire hook and not by hydraulic hose.** (Fig. 7) Remove braking disc from hub and bearing assembly (Fig. 8).

(9) Separate the steering knuckle assembly from the ball joint stud. Pull knuckle assembly out and away from driveshaft (Fig. 9).

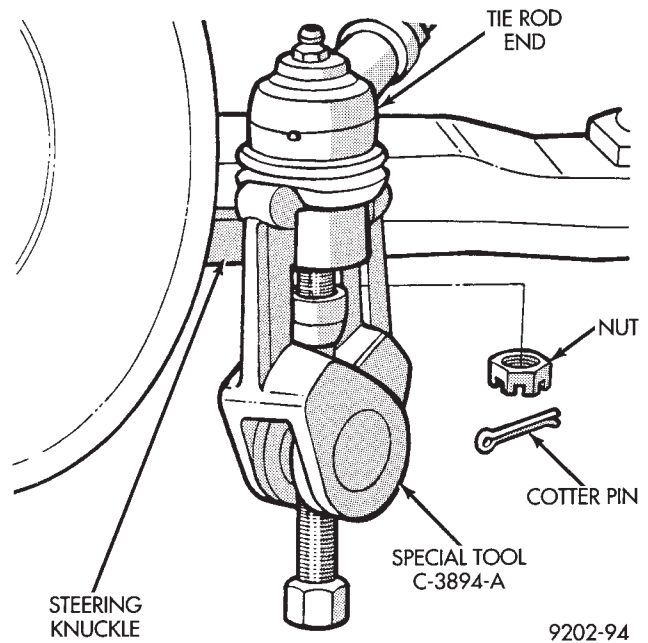


Fig. 5 Disconnect Tie Rod End

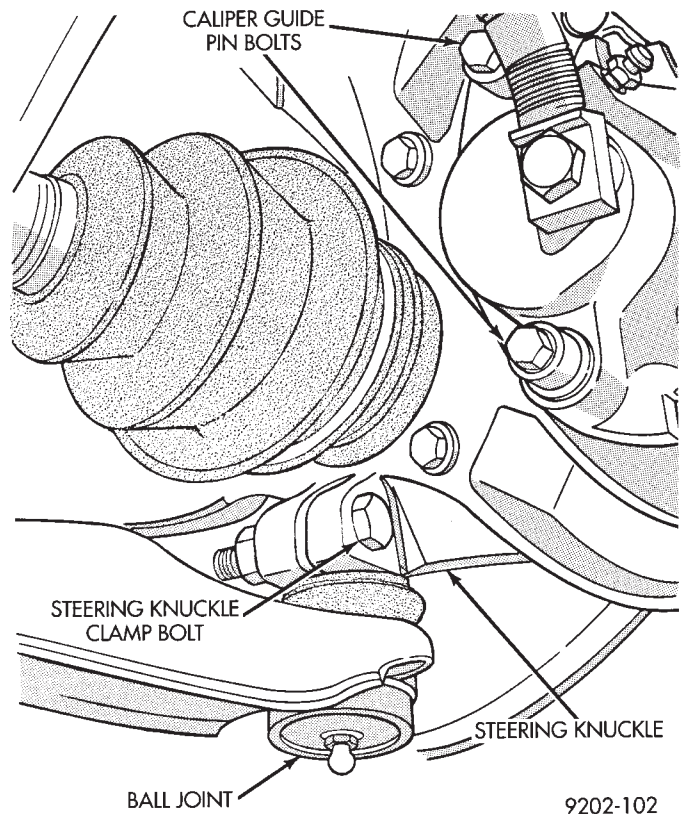


Fig. 6 Remove Clamp Bolt and Caliper Guide Pins

Care must be taken not to separate the inner C/V joint during this operation. Do not allow driveshaft to hang by inner C/V joint, driveshaft must be supported.

(10) Remove the four hub and bearing assembly mounting bolts from rear of steering knuckle (Fig. 9).

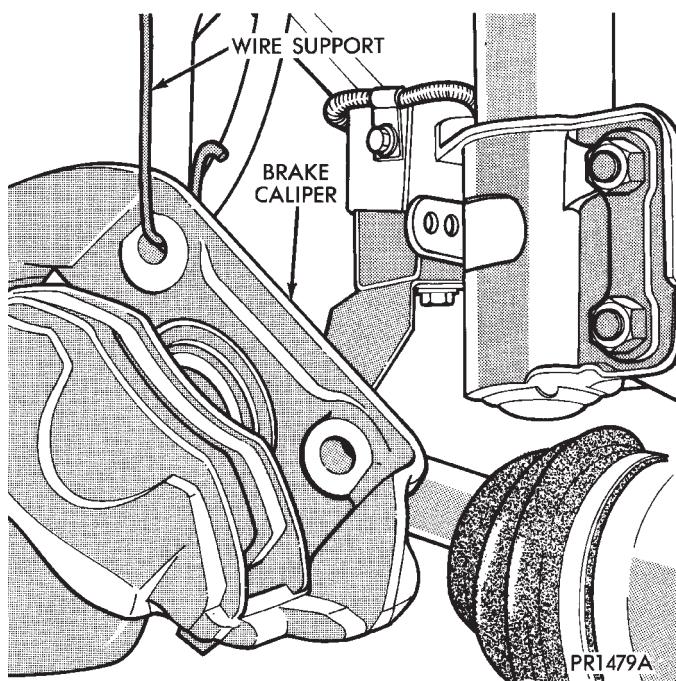


Fig. 7 Supporting Brake Caliper

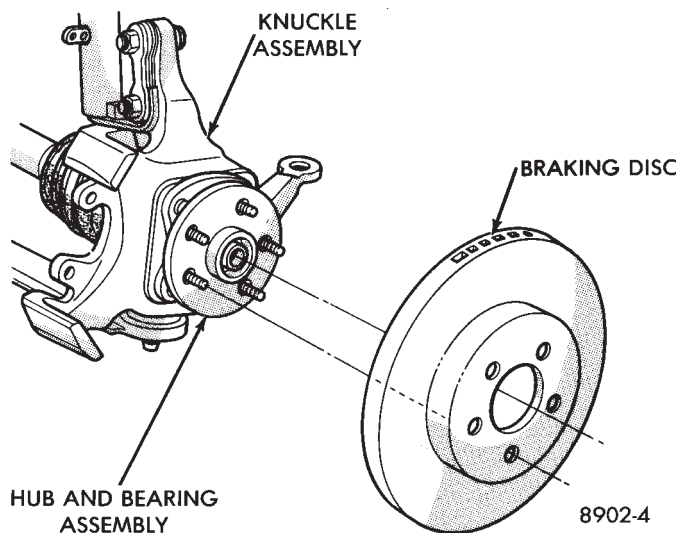


Fig. 8 Remove or Install Braking Disc

(11) Remove the hub and bearing assembly from the steering knuckle (Fig. 10). **Replacement of the grease seal is recommended whenever this service is performed.**

INSTALLATION

CAUTION: All steering knuckle and bearing mounting surfaces must be smooth and completely free of foreign material or nicks.

(1) Install new front hub and bearing assembly into the steering knuckle. Tighten the hub and bearing assembly to steering knuckle attaching bolts (Fig. 9), in a criss-cross pattern to 65 N•m (45 ft. lbs.) torque.

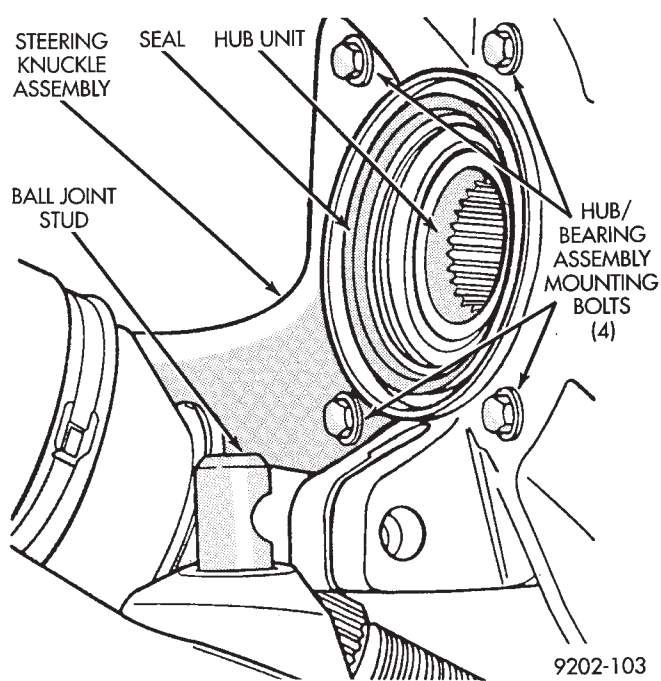


Fig. 9 Separate Ball Joint Stud from Steering Knuckle

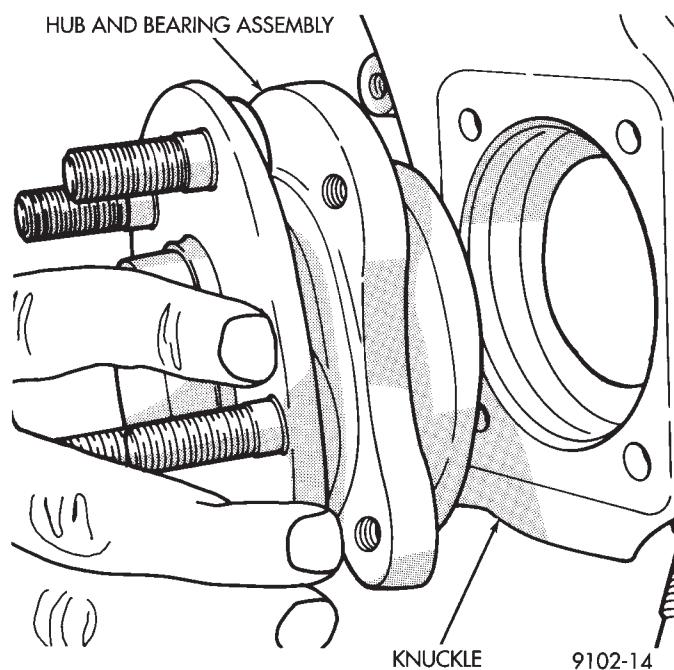


Fig. 10 Separate Hub and Bearing Assembly from Knuckle

(2) Position new hub and bearing assembly seal in recess of the steering knuckle (Fig. 11). Assemble Installer, Special Tool C-4698. Tool is provided with a handle and dual purpose drive head for installing seal into knuckle and (head reversed) for installing wear sleeve onto C/V joint housing.

(3) Using Special Tool C-4698 (Fig. 11) install the hub and bearing seal, until fully seated into the steering knuckle recess.

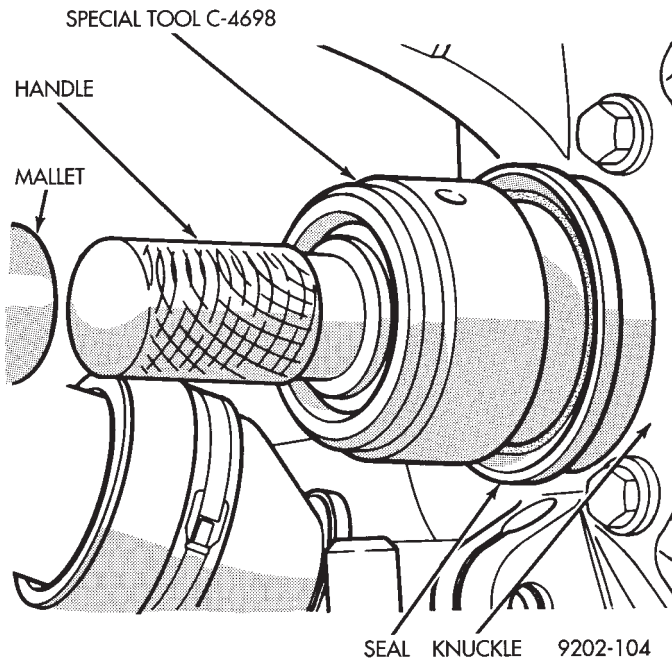


Fig. 11 Bearing Seal Installation

CAUTION: During any service procedures where knuckle and driveshaft are separated, thoroughly clean seal and wear sleeve and lubricate **BOTH** components.

(4) Lubricate the **FULL** circumference of the bearing seal (and wear sleeve) as shown in (Fig. 12). With Mopar® Multi-Purpose Lubricant, or equivalent.

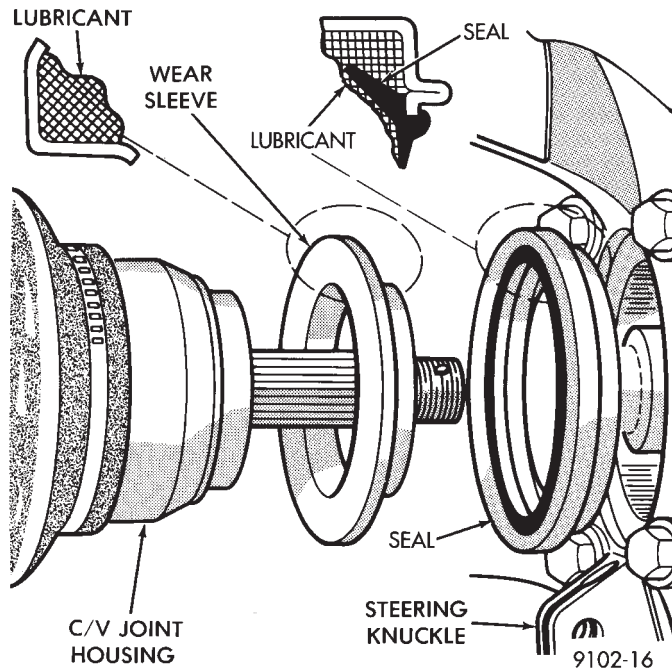


Fig. 12 Seal and Wear Sleeve Lubrication

(5) Insert driveshaft through hub and bearing assembly, while installing steering knuckle assembly on lower control arm ball joint stud (Fig. 13).

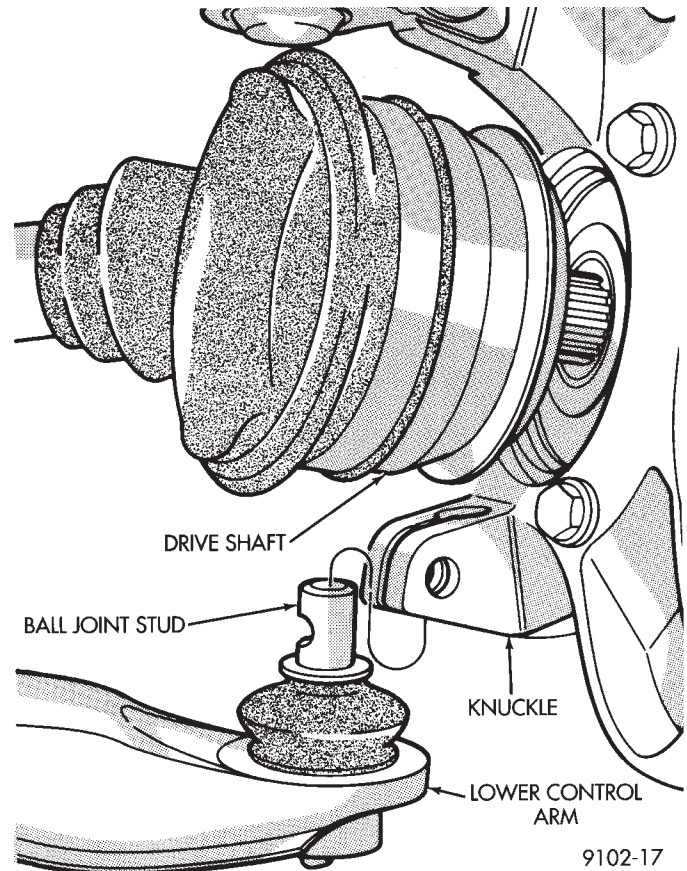


Fig. 13 Installing Knuckle Assembly

(6) Install original (or equivalent) ball joint to knuckle clamp bolt (Fig. 14) into steering knuckle. Tighten clamp bolt to 145 N•m (105 ft. lbs.) torque.

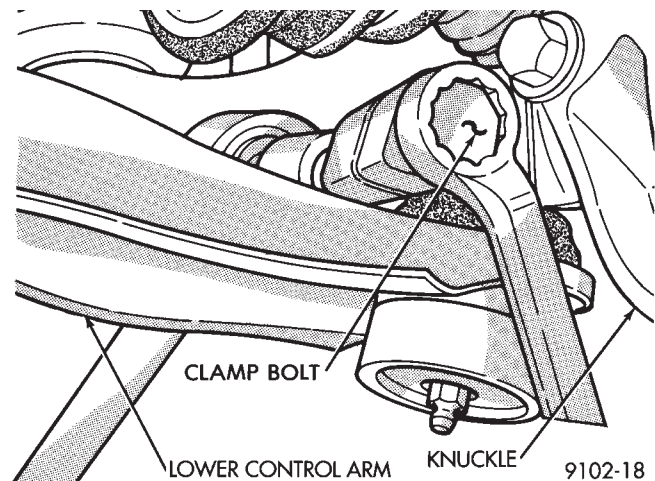


Fig. 14 Tighten Clamp Bolt

(7) Install tie rod end into steering knuckle arm (Fig. 15). Tighten tie rod to steering knuckle arm attaching nut to 47 N•m (35 ft. lbs.) torque and install cotter pin.

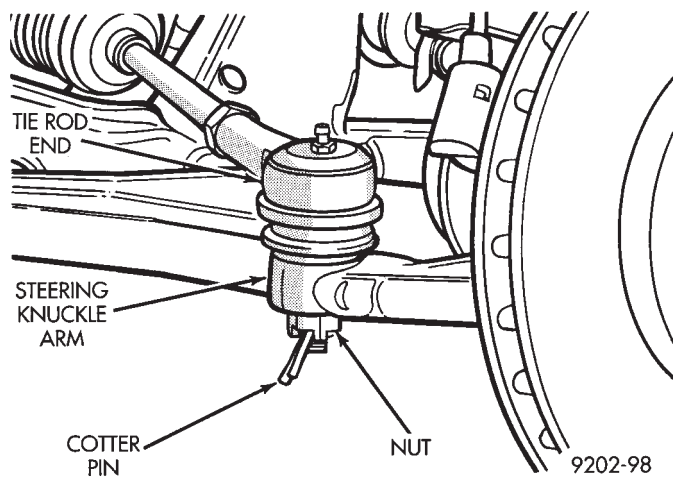


Fig. 15 Install Tie Rod End

- (8) Install braking disc (Fig. 8).
 (9) Carefully lower brake caliper assembly over braking disc (Fig. 16).

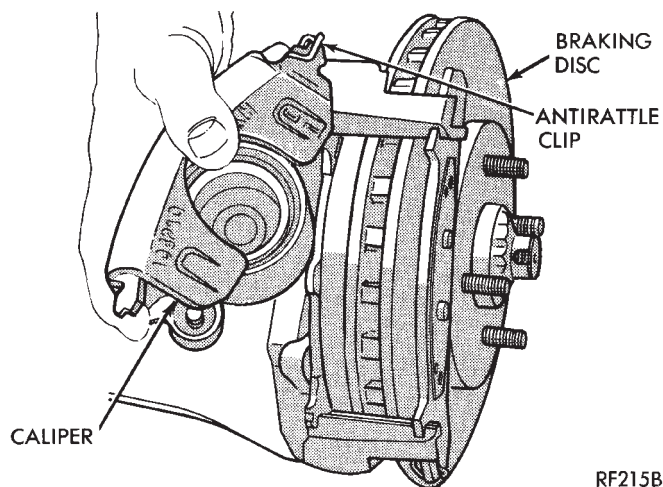


Fig. 16 Installing Family Caliper

- (10) Install brake caliper assembly guide pin bolts. Tighten guide pin bolts to 25-35 N•m (18-26 ft. lbs.) torque. **When installing guide pins, use extreme caution not to cross the threads.**

- (11) Clean all foreign matter from the threads of the stub axle (Fig. 17). Install the washer and hub nut (Fig. 17) onto the threads of the stub axle and tighten nut.

- (12) With brakes applied, tighten front hub nut to (244 N•m) 180 ft. lbs. torque (Fig. 18).

- (13) Install spring washer, nut lock, and new cotter pin. Wrap cotter pin prongs tightly around nut lock (Fig. 19).

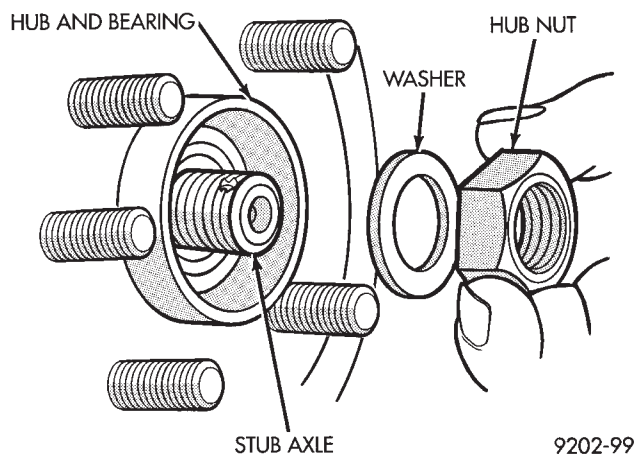


Fig. 17 Install Washer and Hub Nut

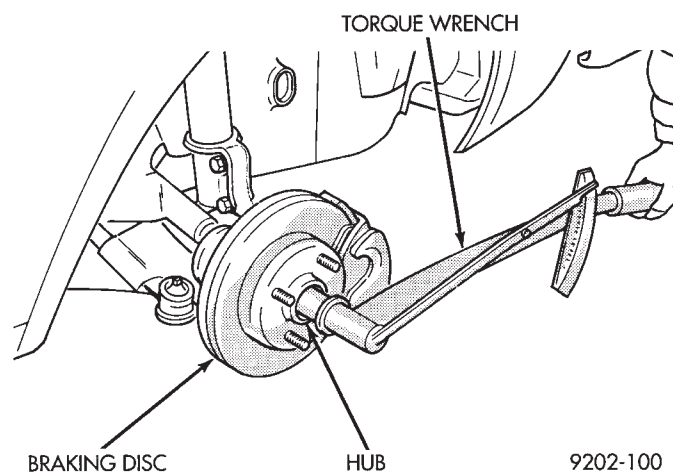


Fig. 18 Tighten Hub Nut

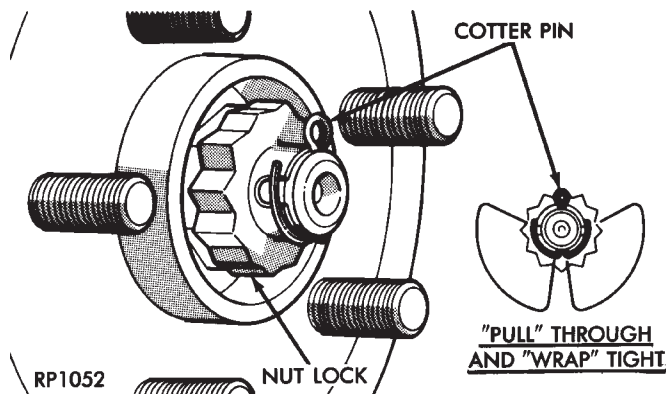


Fig. 19 Install Spring Washer, Nut Lock, & Cotter Pin

Install wheel and tire assembly. Tighten wheel nuts to 129 N•m (95 ft. lbs.) torque.

DRIVESHAFTS

INDEX

	page		page
C/V Joint Boots Handling and Cleaning	44	General Information	25
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Driveshaft Identification	25	Intermediate Shaft Assembly Recondition	41
Driveshaft Positioning Specifications	49	Outer C/V Joint	37
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GENERAL INFORMATION

Chrysler front wheel drive vehicles use two different driveshaft systems. Some vehicles use an equal length system while other vehicles use an unequal length system (Fig. 1).

The equal length system has short solid interconnecting shafts of equal length on the left and right sides. The unequal length system has a short solid interconnecting shaft on the left side with a longer tubular or solid interconnecting shaft on the right.

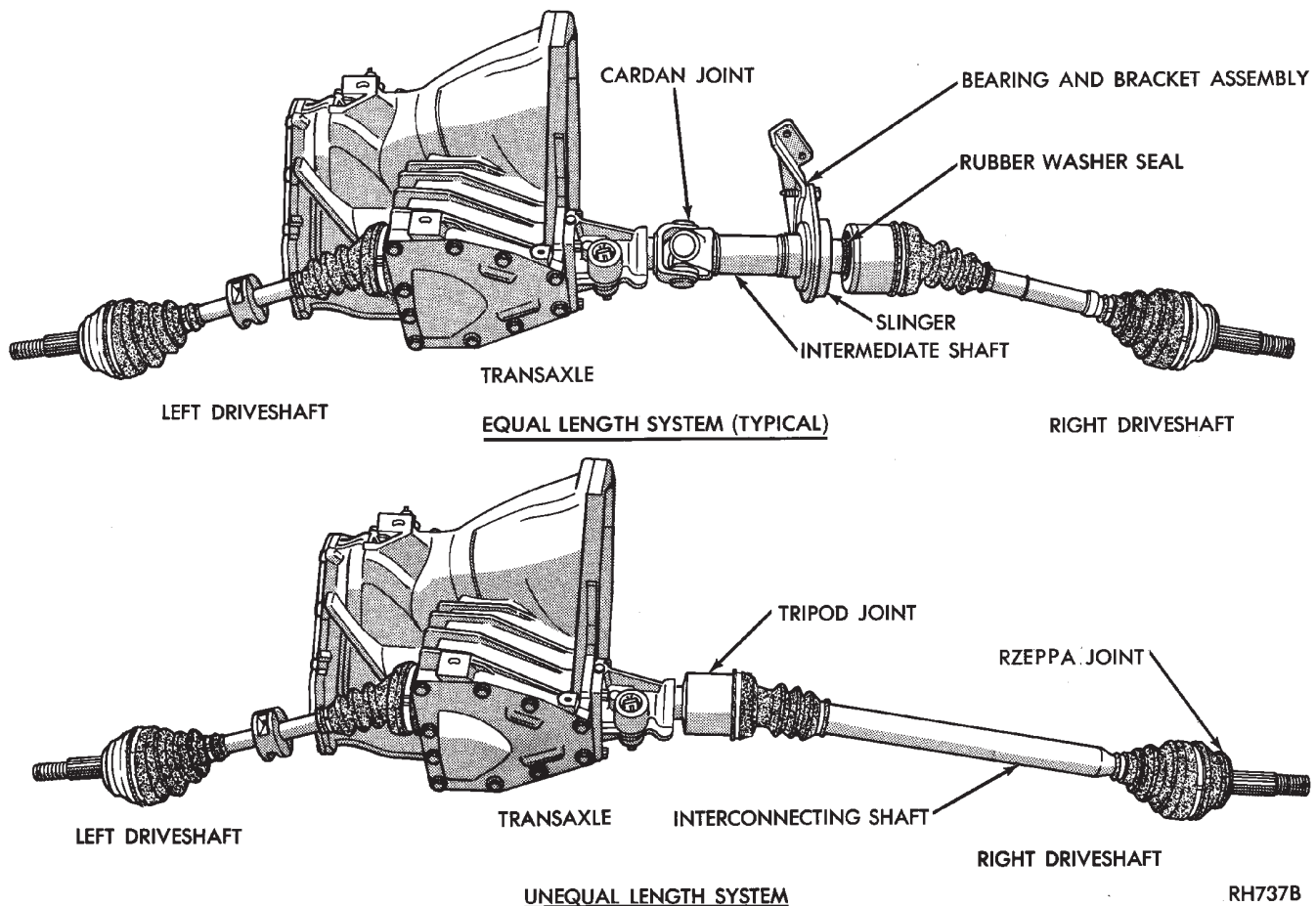
The driveshaft assemblies can be serviced in the same manner for both systems. With the exception of a rubber washer seal attached to the right inner (Constant Velocity) C/V joint, on an equal length installation. The equal length system also has an intermediate shaft attached to a cardan joint (U-joint).

With a stub shaft splined into the right side of the transaxle with a bearing and bracket assembly fastened to the right rear of the engine block.

The driveshaft assemblies are three piece units. Each driveshaft has a Tripod Joint, an Interconnecting Shaft and a Rzeppa joint. The Tripod Joint is splined into the transaxle side gear, or into the intermediate shaft on the right side of an equal length system. The Rzeppa joint has a stub shaft that is splined into the wheel hub.

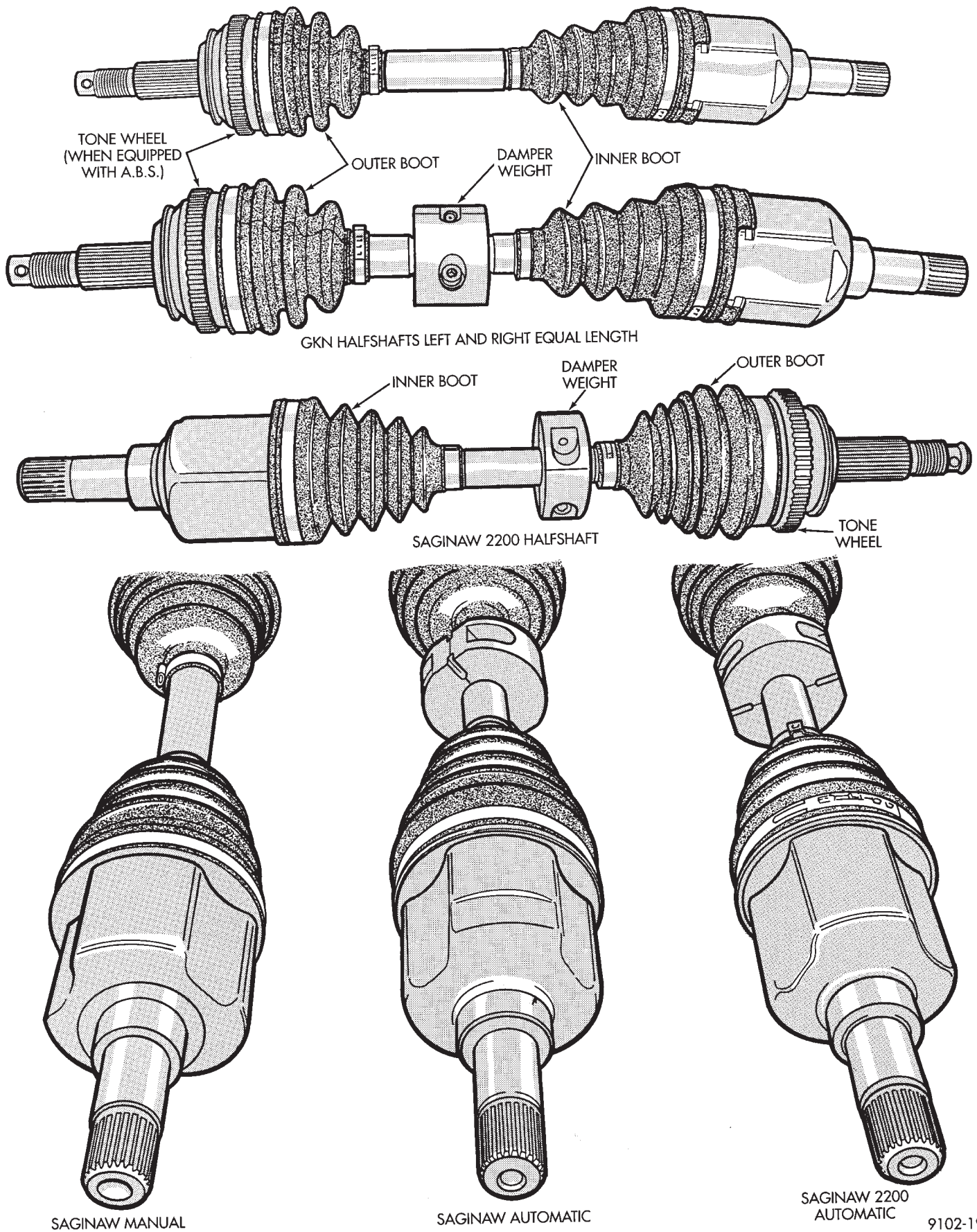
DRIVESHAFT IDENTIFICATION

Driveshafts are identified by the manufacturer. Vehicles can be equipped with any of these driveshaft assemblies. Each assembly can be identified as shown in (Fig. 2).



RH737B

Fig. 1 Front-Wheel-Drive Driveshaft Systems



9102-19

Fig. 2 Driveshafts Identification (Halfshafts)

SERVICE PROCEDURES

Procedures for the removal and installation of the driveshafts are essentially the same for all front wheel drive vehicles. Each driveshaft has a spring within the inboard Tripod C/V joint that maintains constant engagement with the transaxle. This allows the drive shaft to be removed without dismantling part of the transaxle.

CAUTION: Boot sealing is vital to retain special lubricants and to prevent foreign contaminants from entering the C/V joint. Mishandling, such as allowing the assemblies to dangle unsupported, pulling or pushing the ends can cut boots or damage C/V joints. During removal and installation procedures always support both ends of the driveshaft to prevent damage.

DRIVESHAFTS, REMOVE INSTALL

HUB NUT REMOVAL

Hub nut removal and installation is the same for all front wheel drive vehicles. For installation see **Hub Nut Assemblies Install**.

- (1) Remove cotter pin, lock and spring washer (Fig. 3).

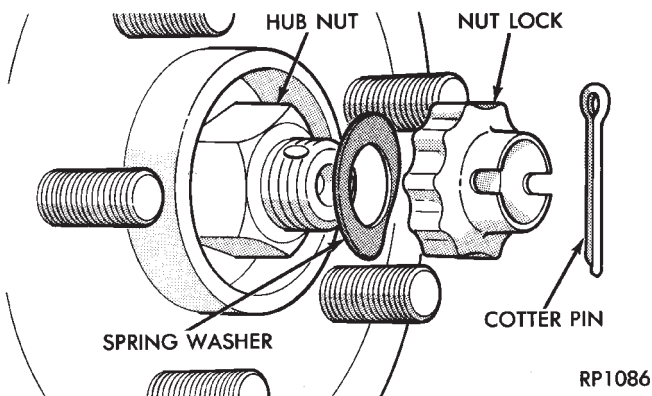


Fig. 3 Remove Cotter Pin, Nut Lock, & Spring Washer

- (2) Loosen hub nut and wheel nuts while vehicle is on floor and brakes applied (Fig. 4).
- (3) Raise vehicle, see Hoisting in Lubrication and Maintenance, Group 0 of this service manual.
- (4) Remove hub nut, washer, wheel and tire assembly (Fig. 5).

DRIVESHAFT ASSEMBLIES REMOVE

Inboard C/V joints have stub shafts splined into the differential side gears, or splined into the intermediate shaft on the right side of an equal length system.

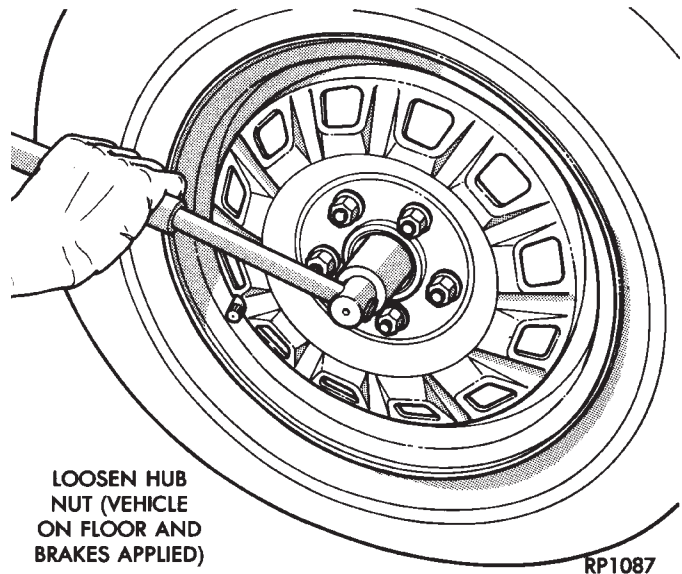


Fig. 4 Loosen Hub Nut & Wheel Nuts

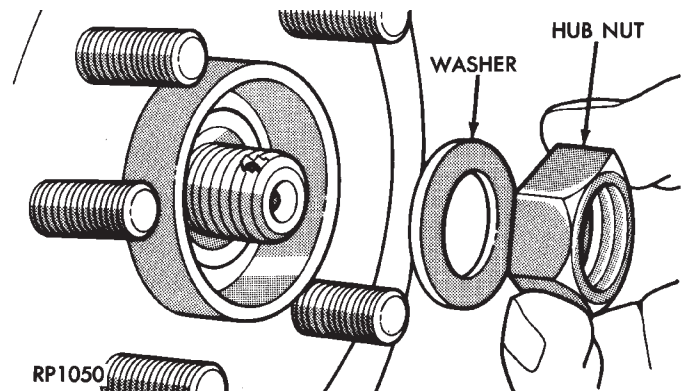


Fig. 5 Remove Hub Nut & Washer Loosen Shaft

Driveshafts are retained in the side gears by a constant spring force provided by a spring contained within the inboard C/V joints.

- (1) For removal of right driveshaft, the speedometer pinion must be removed BEFORE shaft removal (Fig. 6).
- (2) Remove clamp bolt securing ball joint stud into steering knuckle (Fig. 7).
- (3) Separate ball joint stud from steering knuckle by prying against knuckle leg and control arm (Fig. 8).

CAUTION: Do not damage ball joint or C/V joint boots (Fig. 8).

- (4) Separate outer C/V joint splined shaft from hub by holding C/V housing while moving knuckle(hub) assembly away (Fig. 9).

CAUTION: Do not pry on or otherwise damage wear sleeve on outer C/V joint.

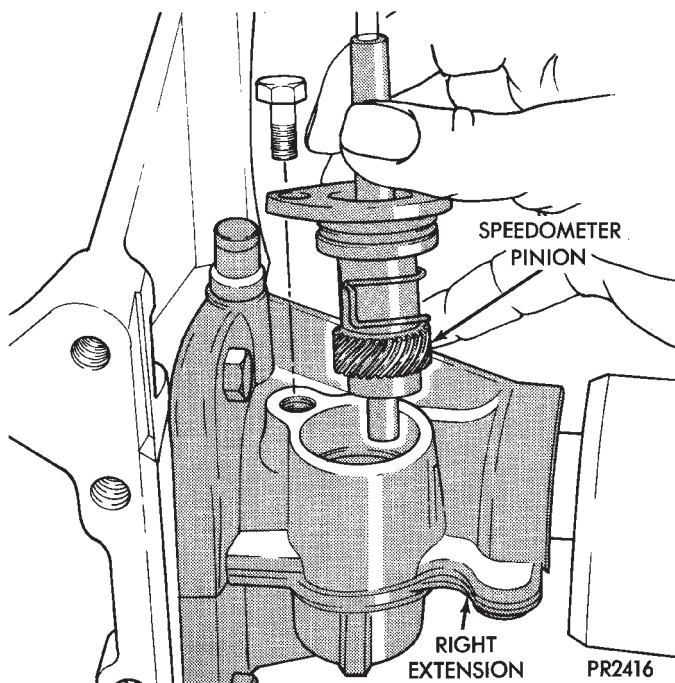


Fig. 6 Remove Speedometer Pinion Clamp (For Right Driveshaft).

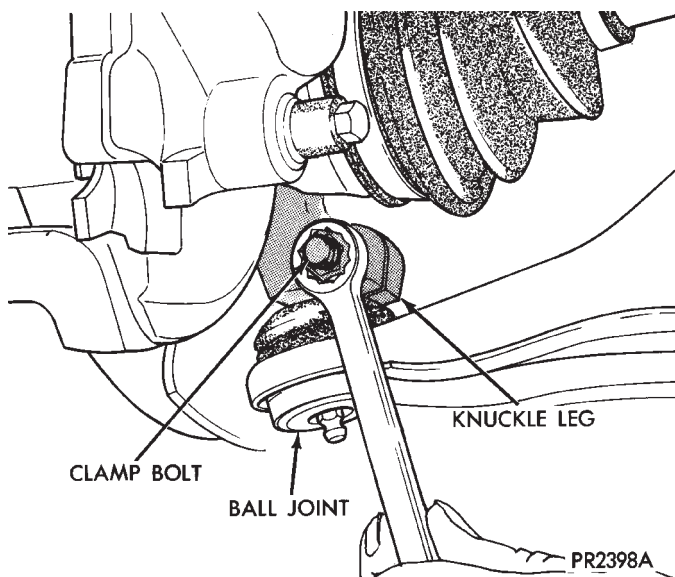


Fig. 7 Remove Ball Joint to Steering Knuckle Clamp Bolt

(5) Support assembly at C/V joint housings. Remove by pulling outward on the inner joint housing. **DO NOT PULL ON SHAFT (Figs. 10 and 11).**

The driveshaft, when installed, acts as a bolt and secures the hub/bearing assembly. If the vehicle is to be supported or moved on its wheels, install a bolt through the hub to ensure that the hub bearing assembly cannot loosen.

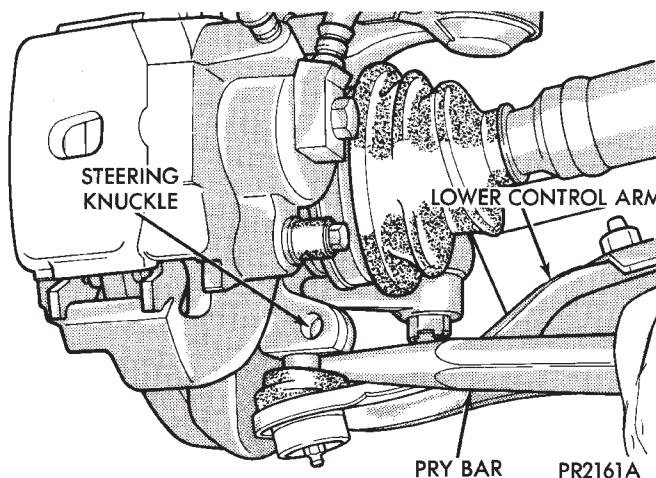


Fig. 8 Separate Ball Joint from Knuckle

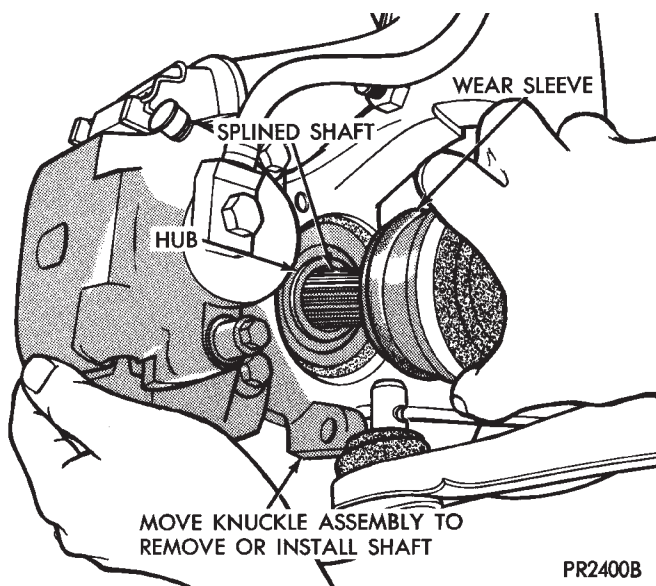


Fig. 9 Separate Outer C/V Joint Shaft from Hub

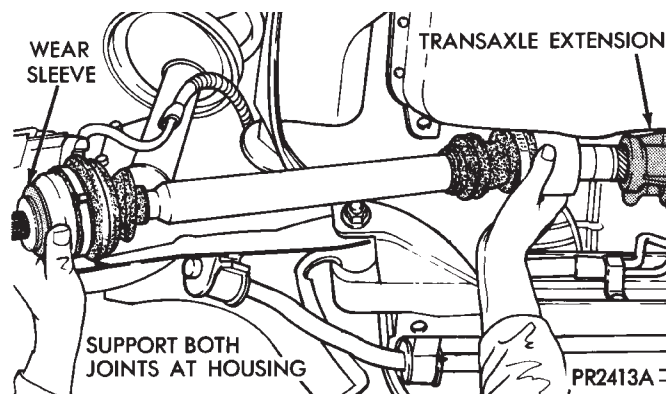


Fig. 10 Removing Driveshaft Assembly Unequal Length

DRIVESHAFT ASSEMBLIES INSTALL

CAUTION: See Wear Sleeve and Seal Lubrication in Front Suspension and at end of this Group BEFORE driveshaft installation.

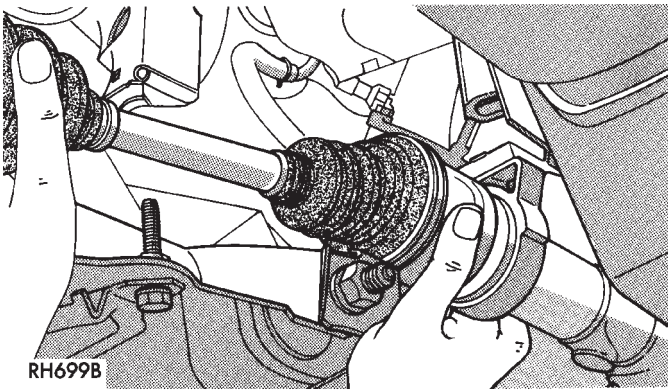


Fig. 11 Removing Driveshaft Assembly Equal Length

(1) Hold inner joint assembly at housing (Figs. 11 and 12) while aligning and guiding the inner joint spline into the transaxle or intermediate shaft assembly. **On Equal Length System vehicles only, be sure that the rubber washer seal is in place on the right inner C/V joint (Fig. 1).**

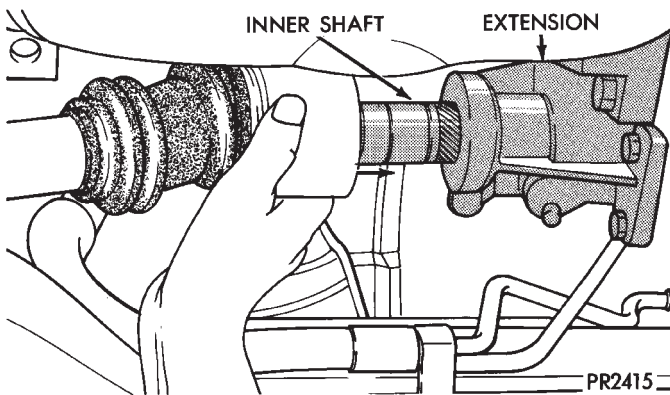


Fig. 12 Installing Inner Shaft into Transaxle

CAUTION: Seal/Wear Sleeve Lubrication During any service procedures where knuckle and driveshaft are separated. Thoroughly clean seal and wear sleeve with suitable solvent (solvent must not touch boot) and lubricate both components prior to installing driveshaft. Lubricate wear sleeve and seal with Mopar Multi-Purpose Lubricant, or equivalent.

Apply on the full circumference of the Wear Sleeve a bead of lubricant that is 6 mm (1/4 in.) wide to seal contact area (Fig. 13). Fill the seal lip to housing cavity on bearing seal with lubricant. Lubricant is to be applied around complete circumference of the seal, and seal lip should be wet with lubricant (Fig. 13). Use Mopar Multi-Purpose Lubricant or equivalent for lubrication of the Wear Sleeve and Bearing Seal.

(2) Push knuckle (hub) assembly out and install splined outer C/V joint shaft in hub (Fig. 14).

CAUTION: Steering knuckle clamp bolt shown in (Figs. 14 and 15) is Prevailing Torque Type, original

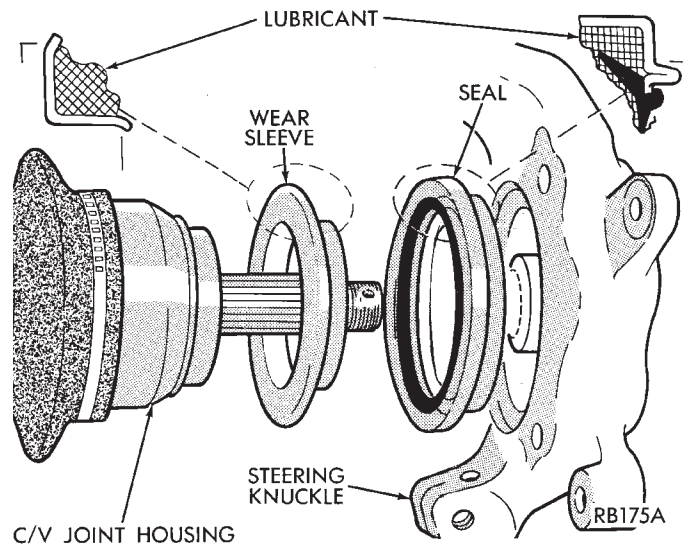


Fig. 13 Seal & Wear Sleeve Lubrication
or equivalent bolt must be installed during assembly.

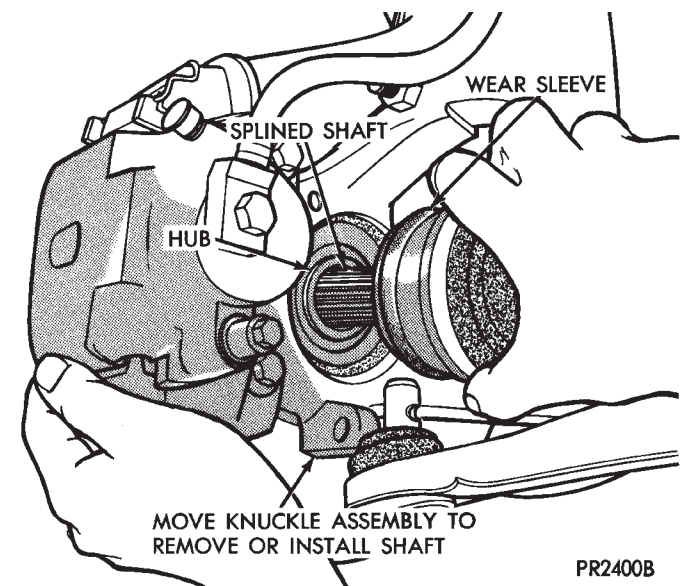


Fig. 14 Install Outer Shaft into Hub

(3) Install knuckle assembly on ball joint stud (Fig. 15).

(4) Install and tighten clamp bolt to 95 N•m (70 ft. lbs.) torque (Fig. 16).

(5) Install speedometer pinion (Fig. 17).

(6) Fill differential with proper lubricant (see Lubrication and Maintenance Group 0).

(7) Install hub nut assembly.

(8) If after installing the driveshaft assembly, the **inboard** boot appears collapsed or deformed. Vent the inner boot by inserting a round tipped small diameter rod between the boot and shaft. If necessary, massage the boot to remove all puckers being careful not to allow dirt to enter or grease to leave the boot cavity. The clamp must be removed and discarded be-

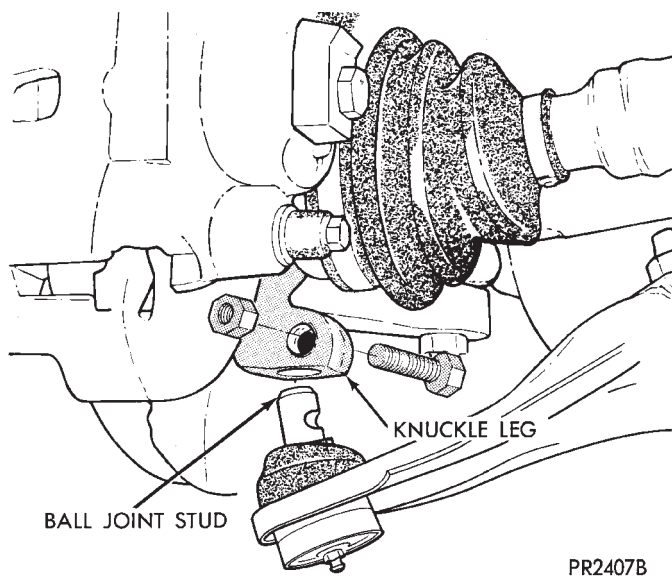


Fig. 15 Install Knuckle Assembly on Ball Joint Stud

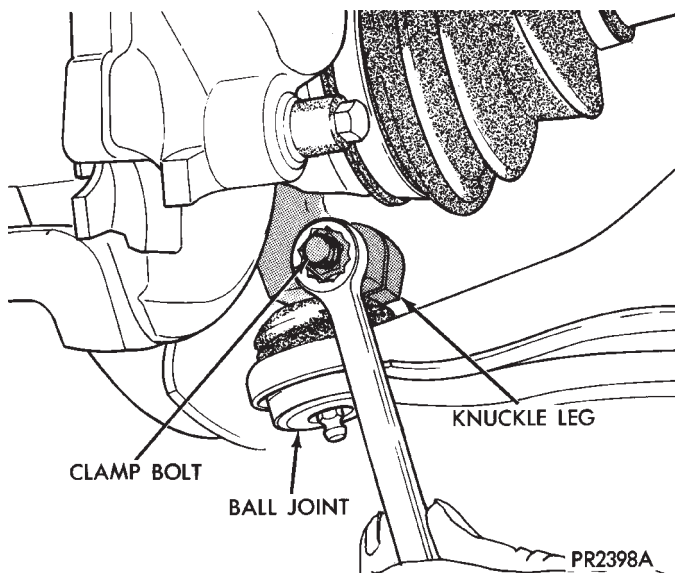


Fig. 16 Tighten Clamp Bolt

fore the rod can be inserted. After venting, install a **new** Service Clamp. (See Boots Install section at the end of this group for details).

HUB NUT INSTALL

The front wheel hub nuts use a lock and cotter pin to maintain proper wheel bearing preload and prevent the nut from backing off. Install the assembly as follows:

- (1) Install washer and hub nut after cleaning foreign matter from threads (Fig. 18).
- (2) With brakes applied, tighten hub nut to 245 N•m (180 ft. lbs.) torque (Fig. 19).
- (3) Install lock, spring washer and **new** cotter

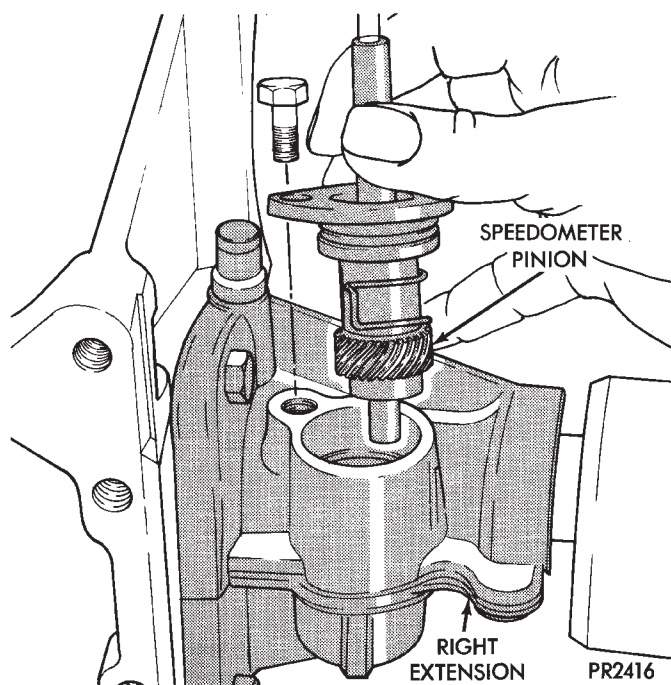


Fig. 17 Install Speedometer Pinion

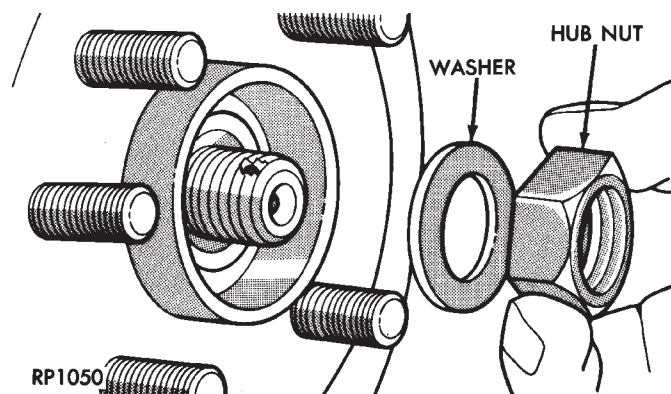


Fig. 18 Install Washer & Hub Nut

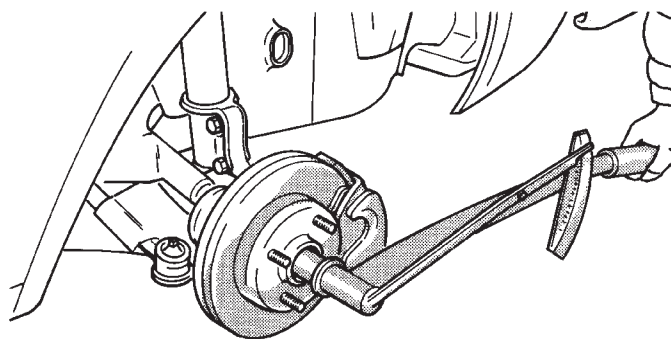


Fig. 19 Tighten Hub Nut

pin. Wrap cotter pin prongs tightly around nut lock (Fig. 20).

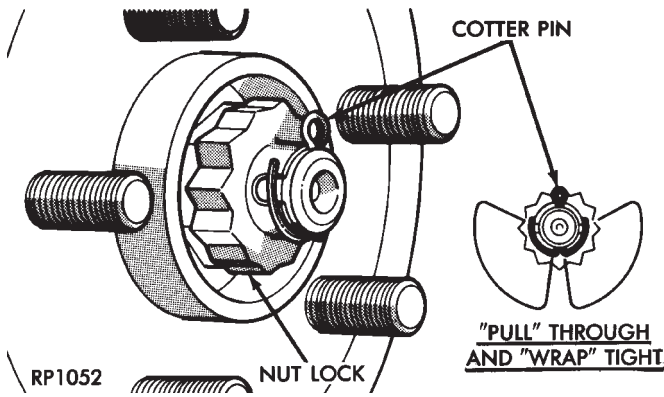


Fig. 20 Install Spring Washer, Nut Lock, & New Cotter Pin

(4) Install wheel and tire assembly. Tighten wheel nuts to 129 N•m (95 ft. lbs.) torque (Figs. 21).

DRIVESHAFT RECONDITIONING PROCEDURE

Driveshaft reconditioning and/or boot replacement for all front wheel drive vehicles is essentially the same per C/V joint.

Note: that lubricant requirements and quantities are different for Inner Joints than for Outer Joints, and type being serviced. Use only the recommended lubricants.

See (Fig. 1) for the exploded view of the front drive shaft components and there location in the assembly.

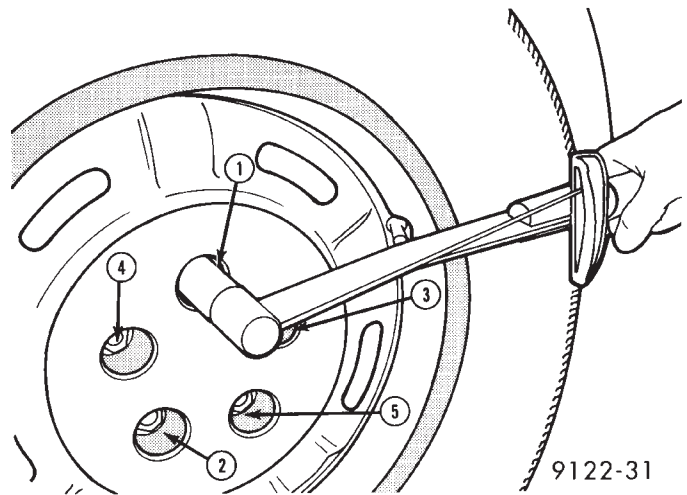


Fig. 21 Install Wheel And Tire Assembly

Driveshaft requirements are different for various vehicle models, engines, and transaxles, and often change from one model year to the next.

Driveshaft parts will be different to accommodate this. Therefore, when replacing parts, be sure to use only those specified in the service parts catalog. For the exact model year, model, engine, transaxle, and type being serviced.

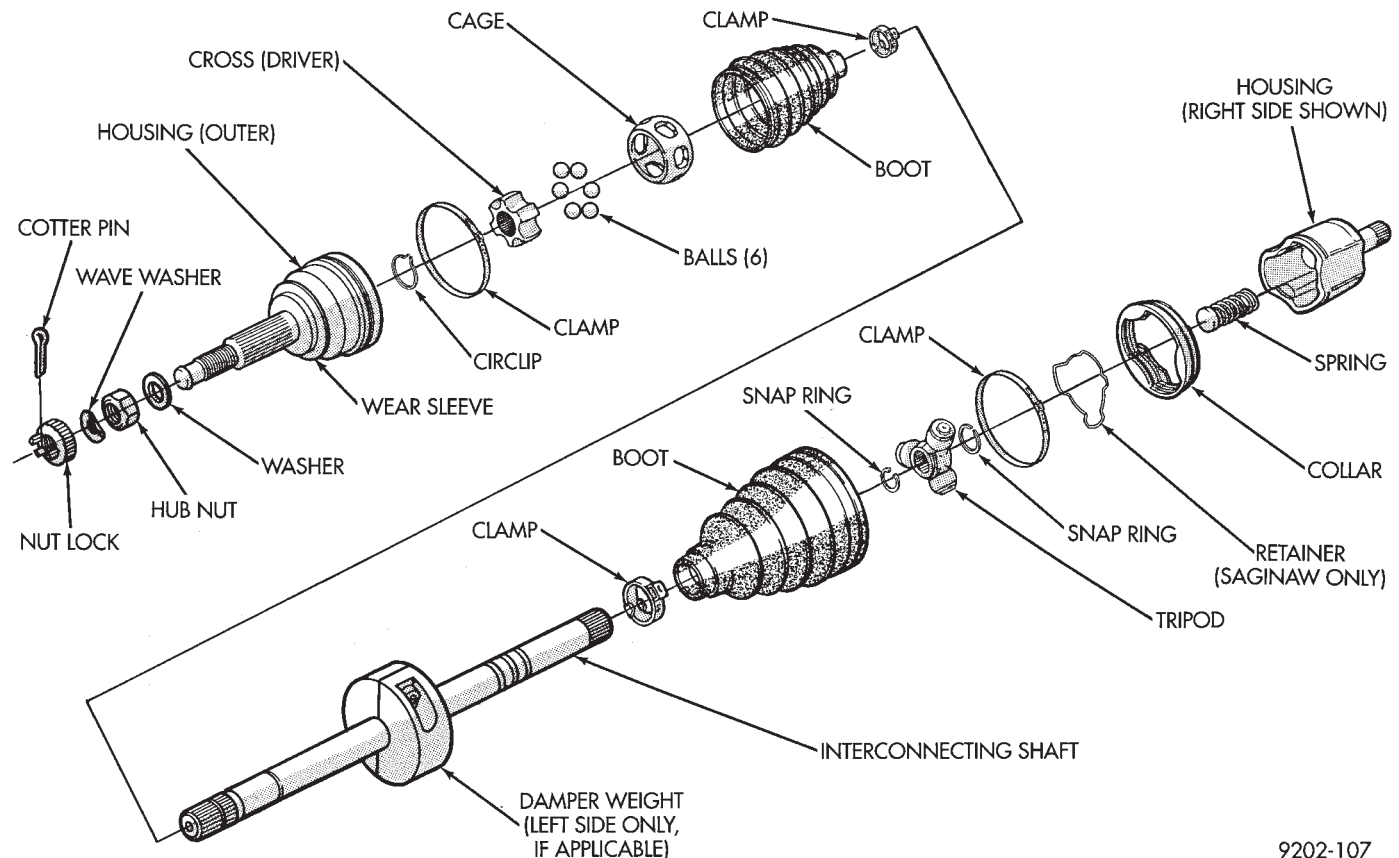


Fig. 1 Driveshaft Components

INNER C/V JOINT

DISASSEMBLE

With the driveshaft removed from the vehicle, identify the unit type (See Fig. 2 under Driveshafts Identification).

(1) Remove the boot clamps and pull back the boot to gain access to the tripod retention system, which prevents accidental separation from the C/V joint housing.

CAUTION: When removing the housing from the tripod, hold the rollers in place on the trunnion studs to prevent the rollers and needle bearings from falling away. After the tripod is out of the housing secure the rollers in place with tape (Fig. 4).

(2) Depending on the type of C/V joint assembly, separate the tripod from the housing as follows:

S.S.G. Utilizes a wire ring tripod retainer which expands into a groove around the top of the housing. Use a flathead screwdriver to pry the wire ring out of the groove and slide the tripod from the housing (Fig. 2). **Do not mangle or destroy retainer during disassembly.**

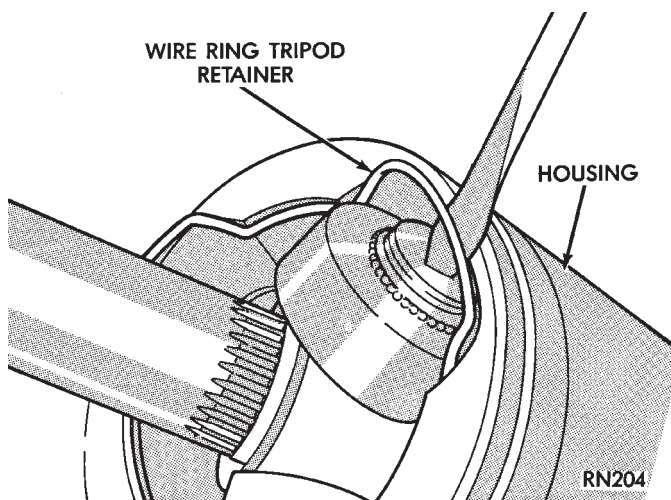


Fig. 2 Separate Tripod From Housing S.S.G.

G.K.N. The retention system on this assembly is an integral part of the plastic collar on the inside of the C/V joint housing. Clamp the stub shaft of the C/V joint housing in a vise, **use protective caps on jaws of vise to prevent damage to stub shaft.** Hold the interconnecting shaft on an angle, while gently pulling on the shaft until one of the tripod bearings is free of the retaining collar. Continue holding the interconnecting shaft on an angle and gently pull on the shaft until all rollers are free of the retaining collar. See (Fig. 3).

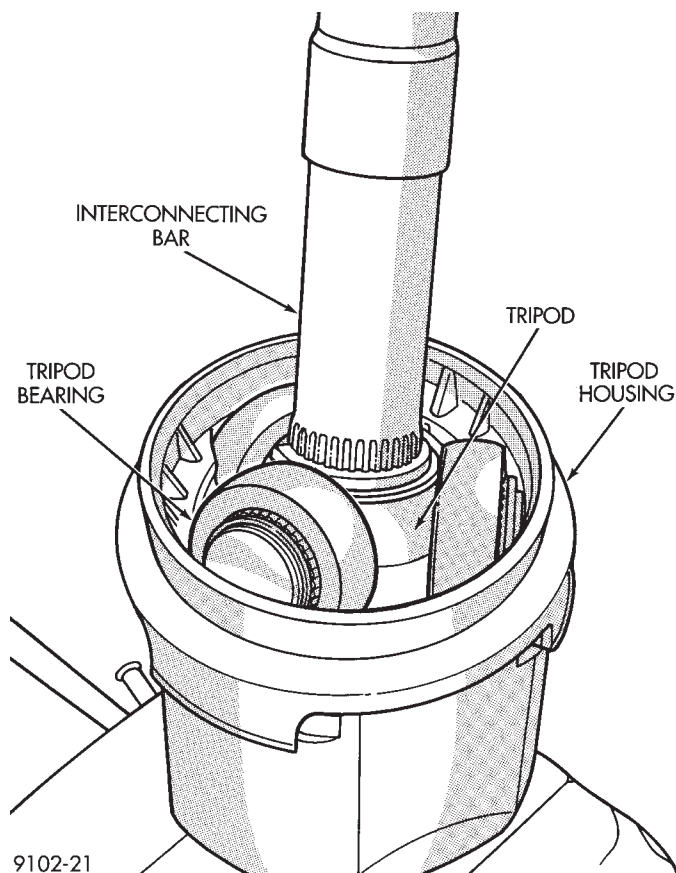


Fig. 3 Separate Tripod From Housing G.K.N.

TRIPOD REMOVAL FROM INTERCONNECTING BAR

S.S.G. Remove the snap ring from the shaft end groove. Remove the tripod by hand or by tapping the body with a brass punch (Fig. 4).

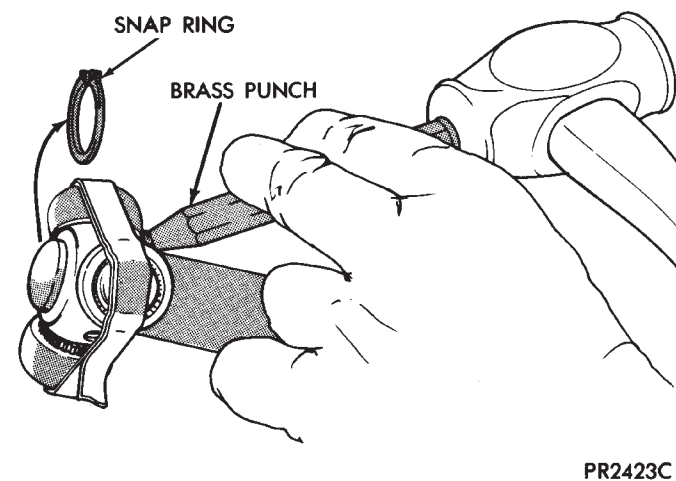


Fig. 4 Remove Snap Ring then Tripod

G.K.N. To remove the tripod from the interconnecting bar.

(1) Expand the stop ring behind the tripod and slide it back along the shaft (Fig. 5).

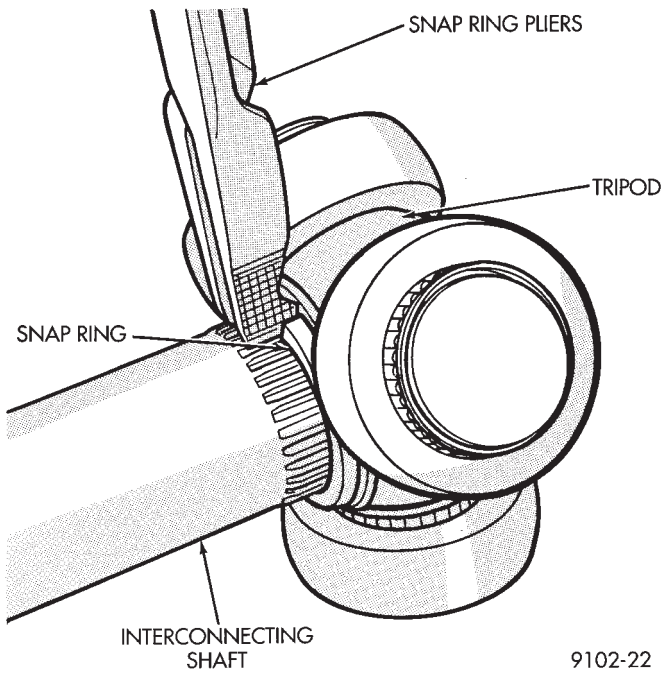


Fig. 5 Removing Stop Ring (G.K.N.)

(2) Slide the tripod back along the shaft, either by hand or by tapping the body with a brass drift. This will expose the circlip on the end of the interconnecting bar.

(3) Remove the circlip from the end of interconnecting bar (Fig. 6).

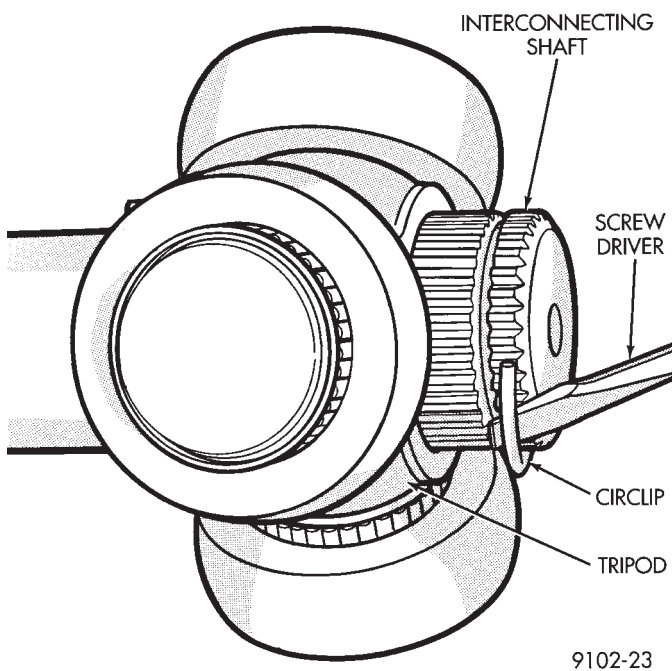


Fig. 6 Removing Circlip

(4) Remove the tripod from the interconnecting bar. It is not necessary to remove the stop ring from the interconnecting bar unless the bar is being replaced (Fig. 7).

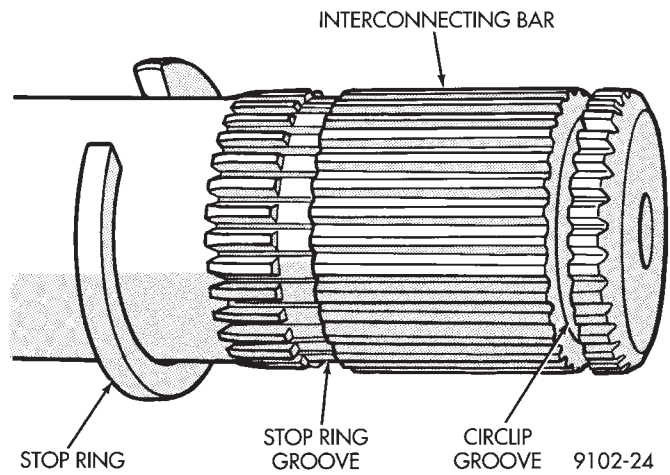


Fig. 7 Tripod Removed From The Interconnecting Bar

S.S.G. AND G.K.N. WITH SINGLE RING TRIPOD RETENTION.

Remove the tripod assembly to interconnecting shaft retaining snap ring from the interconnecting shaft end groove (Fig. 8). Remove the tripod assembly from the interconnecting shaft by hand or by tapping the body of the tripod assembly with a brass punch (Fig. 9).

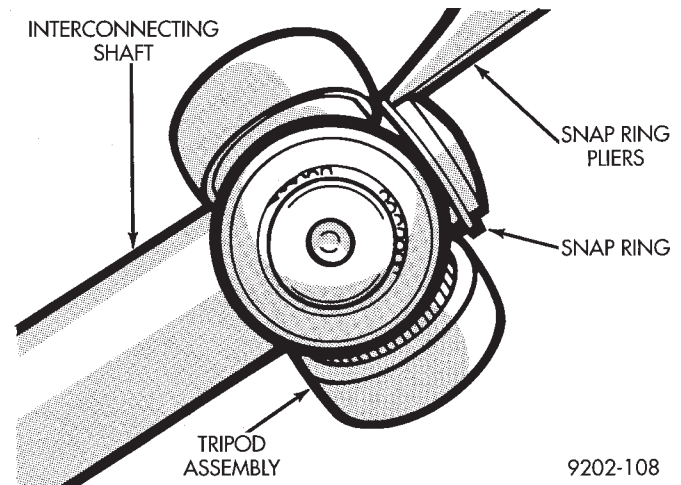


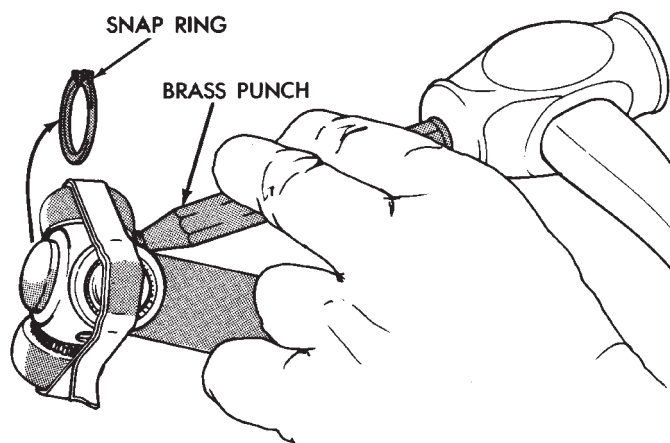
Fig. 8 Outer Tripod Retaining Snap Ring Removal

G.K.N. WITH DOUBLE RING TRIPOD RETENTION.

(1) Expand and remove the outer tripod assembly to interconnecting shaft, retaining snap ring (Fig. 10).

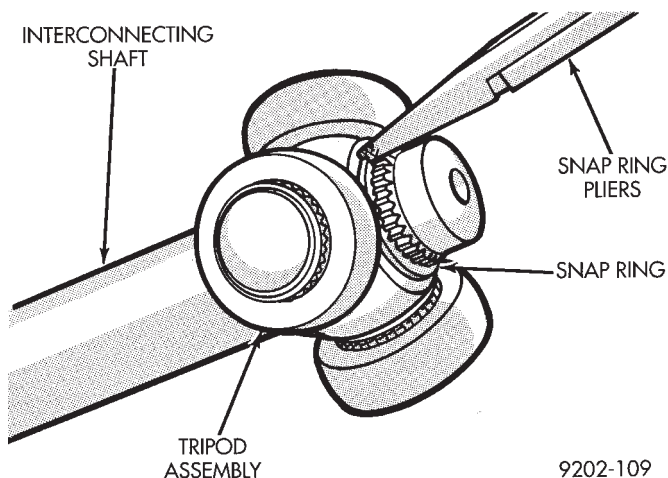
(2) Remove the tripod assembly from the interconnecting shaft. Tripod can be removed either by hand or by tapping the tripod body with a brass drift (Fig. 4). Do not hit the outer tripod bearings in an attempt to remove tripod assembly from interconnecting shaft.

(3) Remove the inner tripod assembly to interconnecting shaft, retaining snap ring from the of interconnecting shaft (Fig. 11).



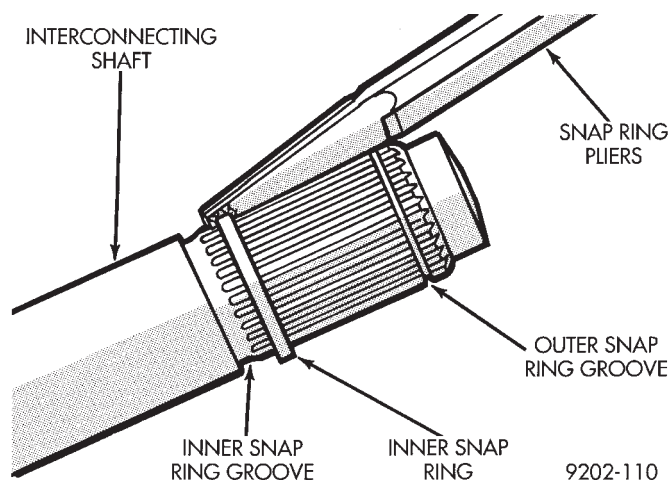
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Fig. 9 Tripod Assembly Removal From Interconnecting Shaft



9202-109

Fig. 10 Removing Outer Tripod Retaining Snap Ring (G.K.N.)



9202-110

Fig. 11 Removing Inner Tripod Retaining Snap Ring (G.K.N.)

INSPECT TRIPOD AND HOUSING

Remove as much grease as possible from assembly and inspect joint housing ball raceway and tripod

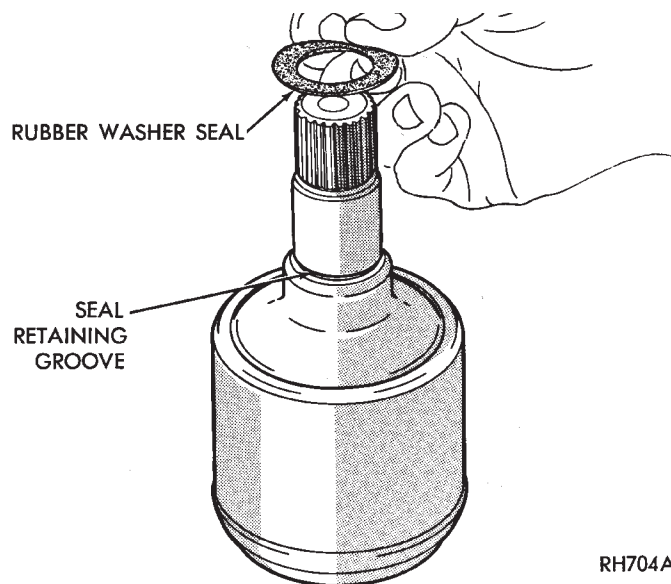
components for EXCESSIVE wear and replace if necessary.

Inspect the spring, spring cup, and the spherical end of the connecting shaft for EXCESSIVE wear or damage and replace, if necessary.

ASSEMBLE C/V JOINT

TRIPOD ASSEMBLY INSTALLATION G.K.N.

(1) Slide rubber washer seal over stub shaft and down into the groove provided (Fig. 12). **The rubber washer seal is used only on the right inner C/V joint on the Equal Length Drive Shaft Systems.**



RH704A

Fig. 12 Rubber Washer Seal Installation

(2) Fasten the (new) boot to the interconnecting shaft. See Boots Install.

(3) Slide the stop ring back into the stop ring groove on the interconnecting bar (Fig. 5).

(4) Install a new circlip in the circlip groove on the interconnecting bar (Fig. 6).

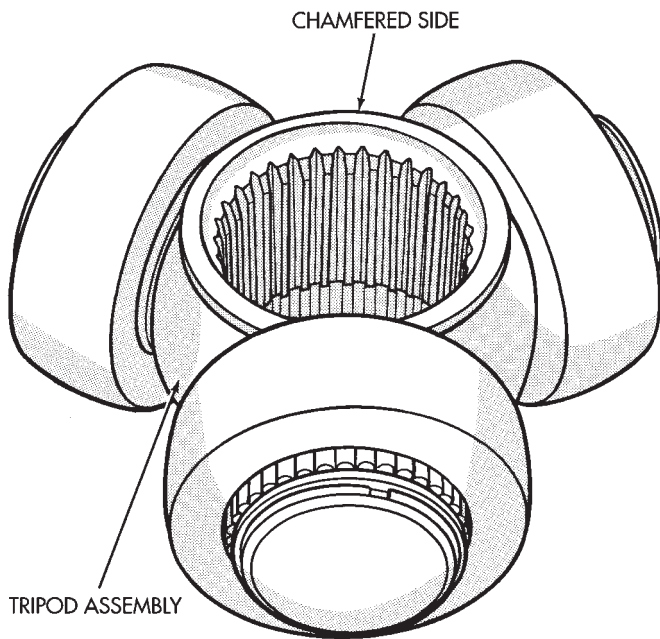
(5) With the chamfered end (Fig. 13 & 14) of the tripod facing the stop ring. Align the tripod splines and push or tap on the body of the tripod assembly with a SOFT drift, until tripod is seated on the shaft. **Check to make sure that the Tripod is Engaged by attempting to pull the tripod off of the shaft by hand.**

TRIPOD ASSEMBLY INSTALLATION S.S.G.

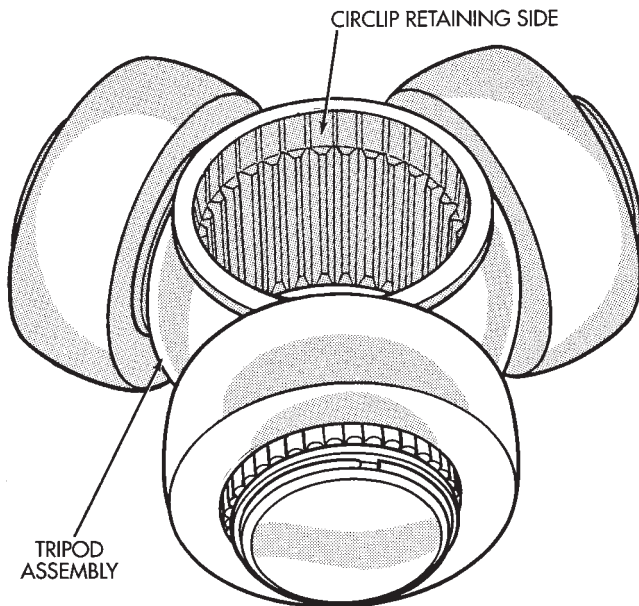
(1) Slide rubber washer seal over stub shaft and down into the groove provided (Fig. 12). **The rubber washer seal is used only on the right inner C/V joint on the Equal Length Drive Shaft Systems.**

(2) Fasten the (new) boot to the interconnecting shaft. See Boots Install.

(3) Install first wire ring tripod retainer over interconnecting shaft, slide tripod on the shaft, both ends are the same (Fig. 15).



9102-25

Fig. 13 G.K.N. Tripod Thick Ring Side

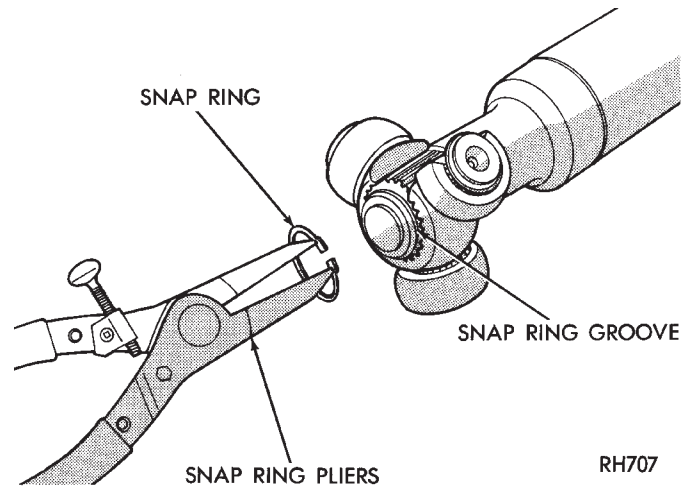
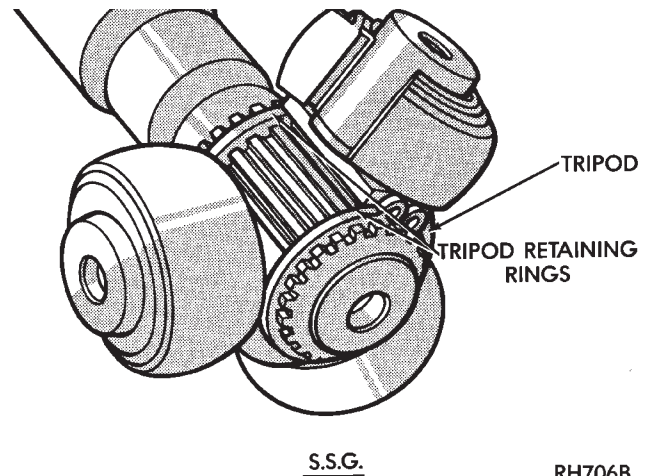
9102-26

Fig. 14 G.K.N. Tripod Circlip Side

(4) Install the snap ring into the groove on the interconnecting shaft to lock the tripod in position (Fig. 16)

Should the wire ring tripod retainer not be suitable for reuse or a new one is not available, the following procedure should be used:

- (1) Install tripod on the shaft.
- (2) Install spring and cup assembly into inner joint housing.
- (3) Position small end of boot in locating grooves on the interconnecting shaft.

**Fig. 15 Tripod Snap Ring Installation****Fig. 16 Tripod Installation**

(4) Clamp the small end boot clamp onto boot, retaining boot to the interconnecting shaft.

(5) Distribute 1/2 packet of grease into boot and 1/2 into housing.

(6) Install tripod into housing.

(7) Place large clamp over shaft.

(8) Install driveshaft into vehicle, see Driveshaft Install.

(9) Position large end of boot into locating groove.

(10) Slide large clamp into position.

(11) See Boot Install for clamping instructions.

TRIPOD ASSEMBLY INSTALLATION S.S.G. & G.K.N. WITH SINGLE RING RETENTION

(1) Fasten the (new) boot to the interconnecting shaft. See Boots Install.

(2) Install the tripod assembly onto the interconnecting shaft until it is past the snap ring groove on the shaft (Fig. 17). If required the tripod assembly can be tapped onto the interconnecting shaft using a brass drift, on the body of the tripod assembly (Fig. 4). Do not hit the outer tripod assembly bearings in an attempt to install tripod on interconnecting shaft.

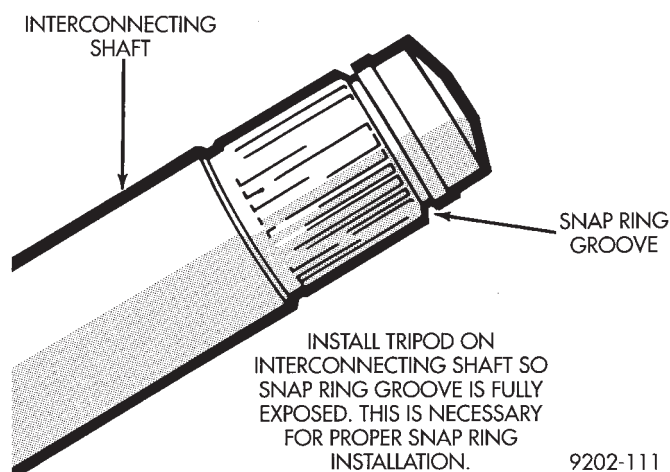


Fig. 17 Interconnecting Shaft Snap Ring Groove

(3) Install a **NEW** outer tripod assembly to interconnecting shaft retaining snap ring, into the interconnecting shaft snap ring groove (Fig. 18). Be sure that the snap ring is fully seated into the snap ring groove around the entire interconnecting shaft.

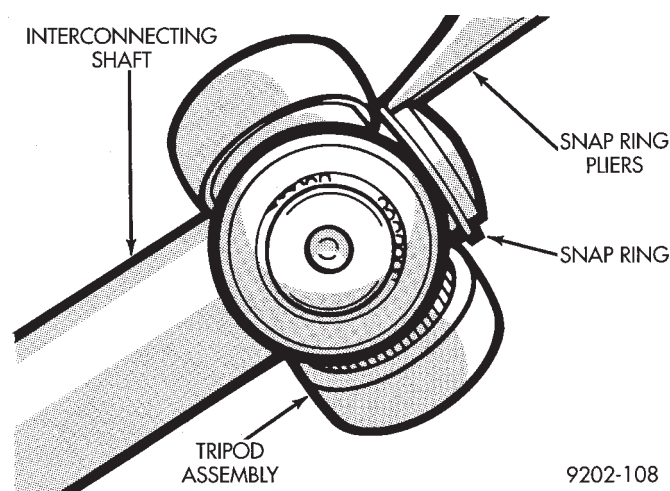


Fig. 18 Outer Tripod Retaining Snap Ring Installation

TRIPOD ASSEMBLY INSTALLATION G.K.N. WITH DOUBLE RING RETENTION

(1) Fasten the (new) boot to the interconnecting shaft. See Boots Install.

(2) Install the inner tripod assembly retaining snap ring into the retaining groove on the interconnecting shaft (Fig. 19).

(3) Install the tripod assembly onto the interconnecting shaft until it is past the outer snap ring groove on the shaft (Fig. 17). If required the tripod assembly can be tapped onto the interconnecting shaft using a brass drift, on the body of the tripod assembly (Fig. 4). Do not hit the outer tripod assembly bearings in an attempt to install tripod on interconnecting shaft.

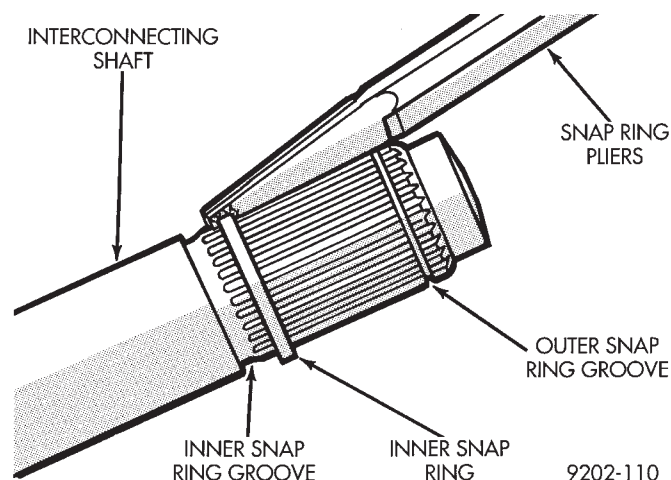


Fig. 19 Inner Snap Ring Installation

(4) Install the outer tripod assembly to intermediate shaft retaining snap ring into the snap ring groove on the intermediate shaft (Fig. 20).

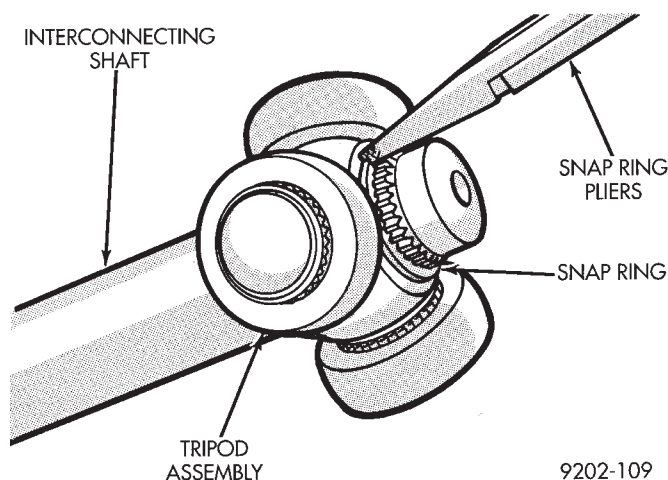


Fig. 20 Outer Snap Ring Installation

INNER C/V JOINT HOUSING INSTALLATION

G.K.N.

(1) Distribute 1/2 the amount of the grease provided into the housing and the remaining amount into the boot.

(2) Position the spring in the housing spring pocket with the spring cup attached to the exposed end of the spring (Fig. 21). Place a small amount of grease on the concave surface of the spring cup.

CAUTION: Care must be taken to ensure proper spring positioning. The spring must remain centered in the housing spring pocket when the tripod is installed and seated in the spring cup (Fig. 13).

(3) Clamp the stub shaft of the housing in a vise. Use **protective caps on jaws of vise so stub shaft does not get damaged by the vise**. Position the interconnecting shaft and the tripod assembly on top of

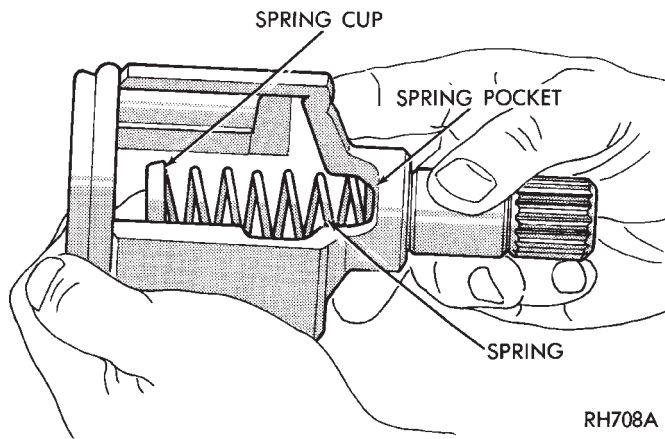


Fig. 21 Spring and Cup Installation

the plastic retaining collar. Carefully insert each of the tripod rollers into the retaining collar, one at a time while holding the interconnecting shaft on an angle. Carefully push down on the shaft until the rollers are locked into retaining collar in the housing.

(4) Position the boot over the boot retaining groove in the housing and clamp in place. See Boots Install.

S.S.G.

(1) Distribute 1/2 the amount of the grease provided into the housing and the remaining amount into the boot.

(2) Position the spring in the housing spring pocket with the spring cup attached to the exposed end of the spring (Fig. 21). Place a small amount of grease on the concave surface of the spring cup.

CAUTION: Care must be taken to ensure proper spring positioning. The spring must remain centered in the housing spring pocket when the tripod is installed and seated in the spring cup (Fig. 21).

(3) Slip tripod into housing and install the tripod wire retaining ring into position. Check for the ability of the retaining ring to hold the tripod in the housing.

(4) Position the boot over the boot retaining groove in the housing and clamp in place. See Boots Install.

OUTER C/V JOINT

DISASSEMBLE

(1) Remove boot clamps on boot and discard (Fig. 1).

(2) Wipe away grease to expose joint.

(3) G.K.N. Remove outer C/V Joint from shaft by supporting the interconnecting shaft in a vise. **Use protective caps on the jaws of the vise to prevent damage to the interconnecting shaft.** Give a sharp tap to the top of housing to dislodge joint from internal circlip installed in a groove at the outer end of the shaft (Fig. 2).

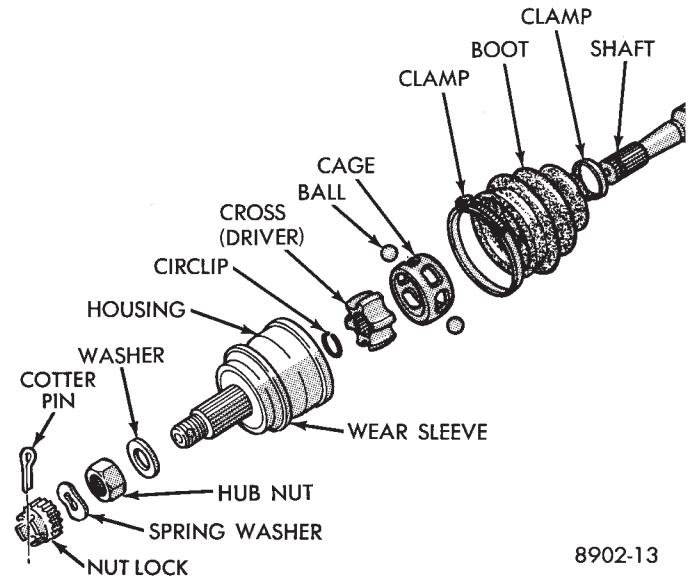


Fig. 1 Outer C/V Joint Components

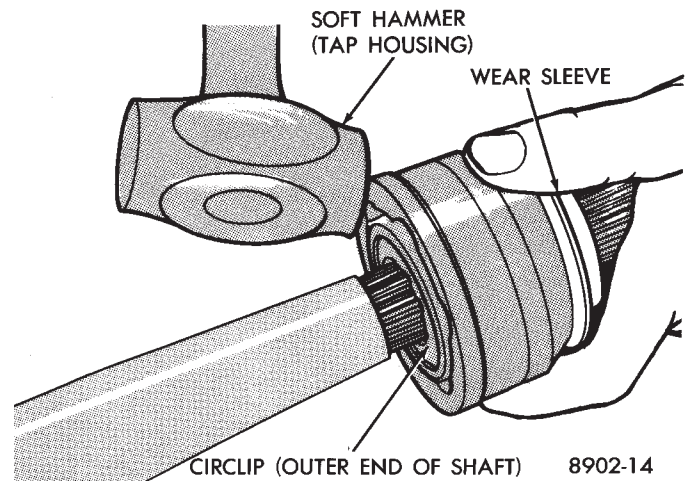


Fig. 2 Remove Joint from Shaft .

S.S.G. A single circlip located in a groove on the cross, is used to retain the cross to the shaft (Fig. 3). Loosen the damper weight bolts and slide it and the boot towards the inner joint. Expand the circlip with snap ring pliers and slide joint from shaft. Install damper weight, see Damper Weights.

WEAR SLEEVE

A wear sleeve installed on the outer C/V joint housing (Fig. 1) provides a wipe surface for the hub bearing seal (installed in the steering knuckle).

(4) If bent or damaged, carefully pry wear sleeve from C/V joint machined ledge.

(5) Remove circlip from shaft groove and discard (Fig. 4). A replacement boot package will include this circlip.

(6) Unless the shaft is damaged and needs replacing, **do not remove** the heavy spacer ring from the shaft, G.K.N. only (Fig. 4).

(7) With joint separated from the interconnecting shaft proceed as follows:

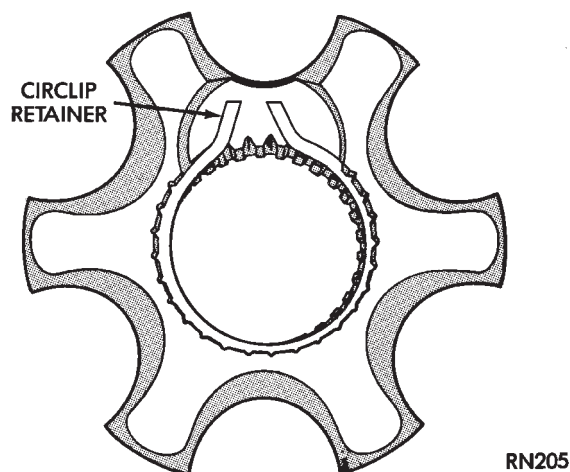


Fig. 3 Circlip Retainer in Cross S.S.G.

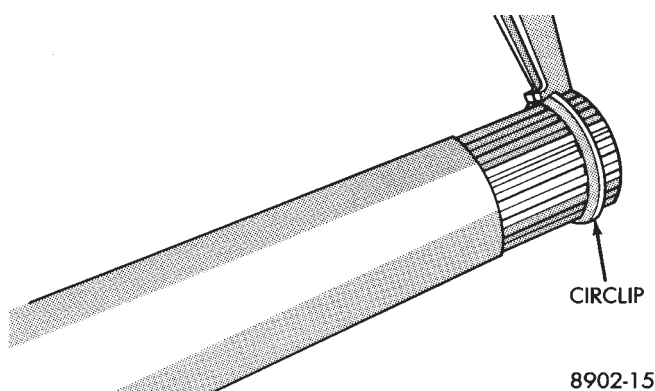


Fig. 4 Remove Circlip

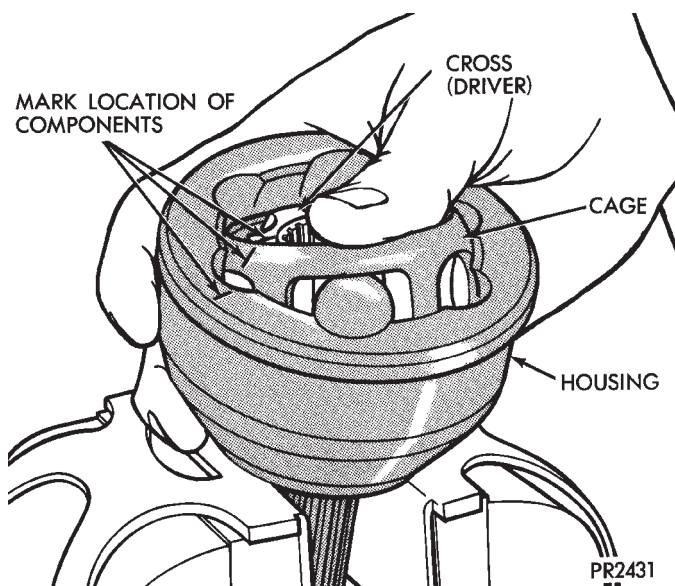


Fig. 5 Rotate Cage & Cross to Remove Balls

- If outer C/V joint was operating satisfactorily and grease does not appear to be contaminated, just replace boot. Bypass the following disassembly procedure for the C/V joint assembly, See Boots Install.
- If outer joint is noisy or **badly** worn. Bypass the following disassembly and replace entire unit. It is

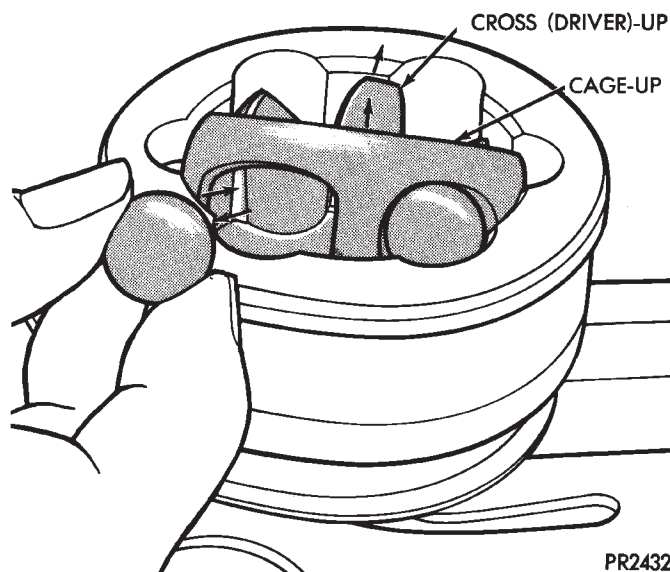


Fig. 6 Ball Released

also recommended that the boot be replaced. The Boot Package includes the boot, clamps, retaining ring (circlip), and lubricant. See boots install.

(8) Hold joint vertically in vise by clamping on splined shaft, using soft jaws to prevent damage.

(9) Wipe off surplus grease and mark relative position of inner cross, cage and housing with a dab of paint (Fig. 5).

(10) Press down on one side of inner race to tilt cage and remove ball from opposite side (Figs. 5 and 6). If joint is tight, use a hammer and brass drift to tap inner race. **Do not hit the cage.** Repeat this step until **all 6** balls are removed. A screwdriver may be used to pry balls loose.

(11) Tilt the cage and inner race assembly vertically and position two opposing cage windows in area between the ball grooves. Remove the cage and inner race assembly by pulling upward away from the housing (Fig. 7).

(12) Turn inner cross (driver) 90° to cage and align one of the race spherical lands with cage window. Raise land into cage window and remove inner race by swinging out (Fig. 8).

INSPECT

Check grease for contamination and all parts for defects as follows:

- (1) Wash all parts in suitable solvent and dry, preferably with compressed air.
- (2) Inspect housing ball races for excessive wear and scouring.
- (3) Check splined shaft and nut threads for damage.
- (4) Inspect all 6 balls for pitting, cracks, scouring and wear. Dulling of surface is normal.
- (5) Inspect cage for excessive wear on inside and outside spherical surfaces, surface ripples on cage window, cracks, and chipping.

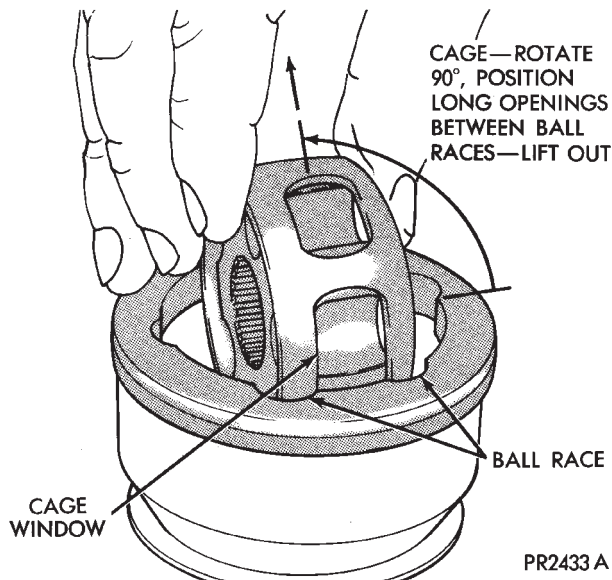


Fig. 7 Removing Cage & Cross Assembly from Housing

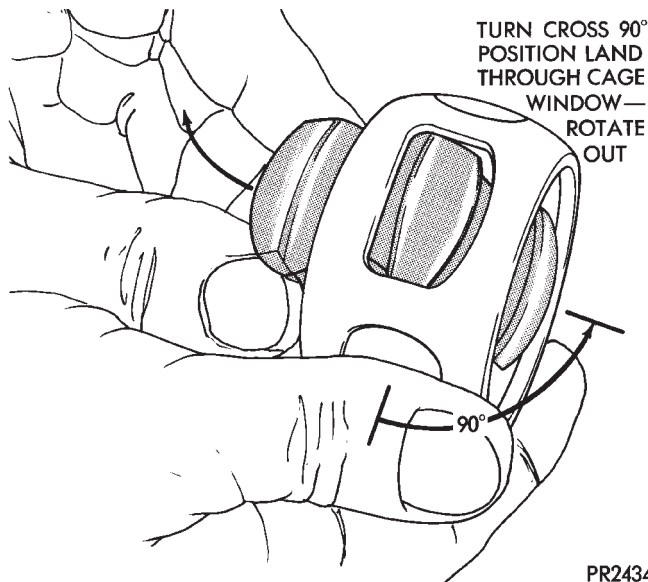


Fig. 8 Removing Cross from Cage

(6) Inspect inner race (cross) for **excessive** wear or scouring of ball races.

Any of the above defects will warrant replacing the C/V assembly as a unit.

Polished areas in races (cross and housing) and on cage spheres are normal and do not indicate need for joint replacement. Unless they are suspected of causing noise and vibration.

ASSEMBLE

If outer joint was not disassembled nor the wear sleeve damaged go to step 11.

(1) Position new wear sleeve on joint housing machined ledge (Fig. 1). Assemble Installer, Special Tool C-4698 (Tool is provided with handle and dual purpose drive head for installing wear sleeve onto C/V

joint housing and (head reversed) seal into knuckle). See KNUCKLE BEARING SEAL.

(2) See (Fig. 1). Assemble tool and install wear sleeve.

(3) Lightly oil all components before assembling outer joint.

(4) Align parts according to paint markings.

(5) Insert one of the inner race (cross) lands into cage window (Fig. 2) and feed race into cage. Pivot cross 90° to complete cage assembly (Fig. 3).

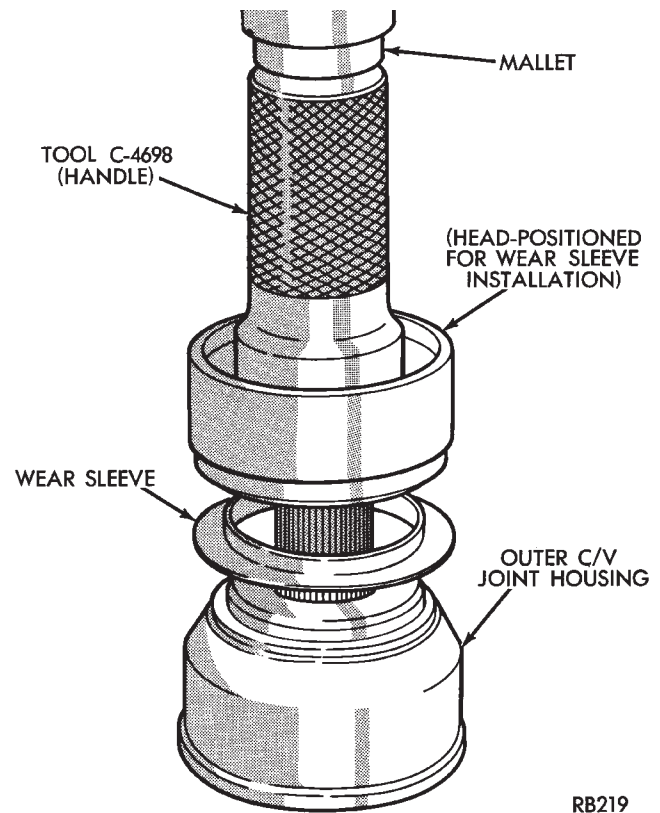


Fig. 1 Tool Set-Up for Wear Sleeve Installation

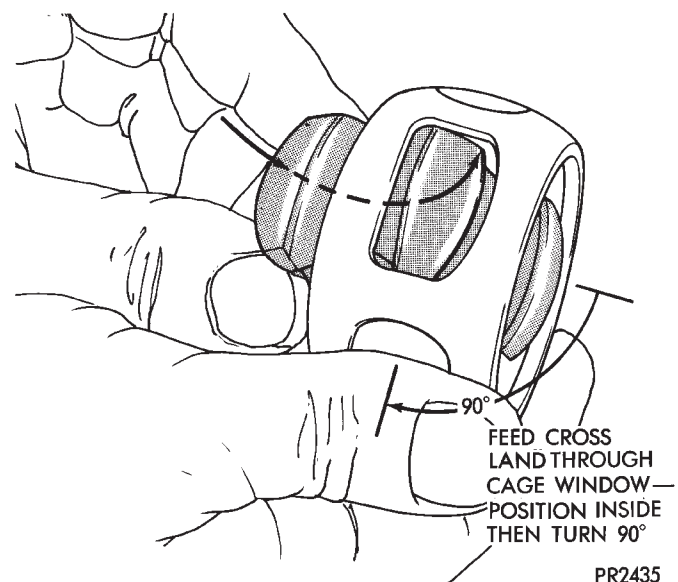


Fig. 2 Installing Cross into Cage

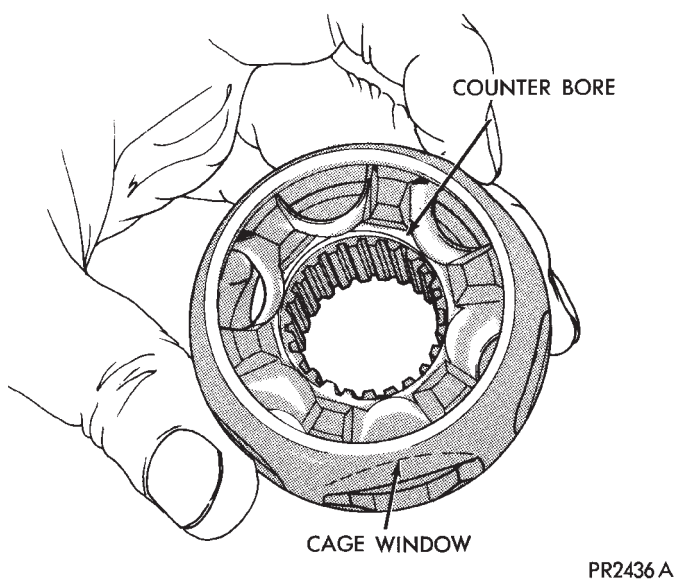


Fig. 3 Cage & Cross Assembled G.K.N.

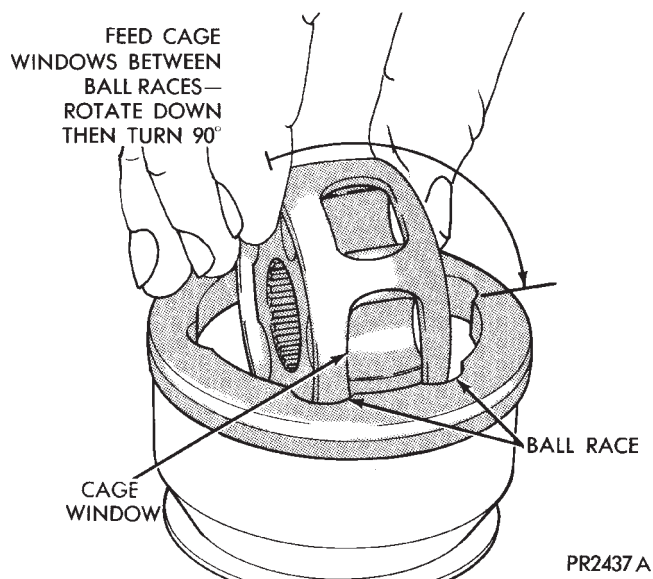


Fig. 4 Installing Cage & Cross into Housing

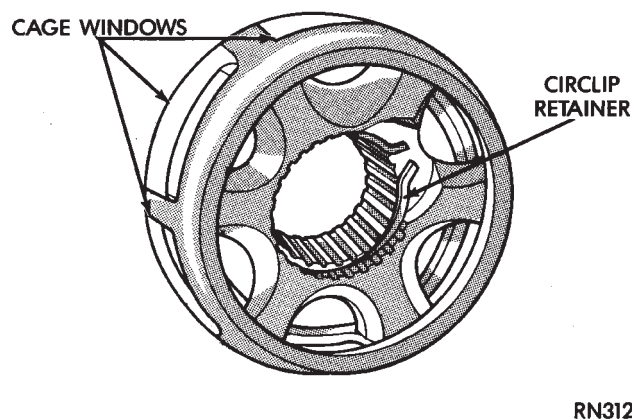


Fig. 5 Cage & Cross Assembled S.S.G.

(6) Align opposing cage windows with housing land and feed cage assembly into housing (Fig. 4).

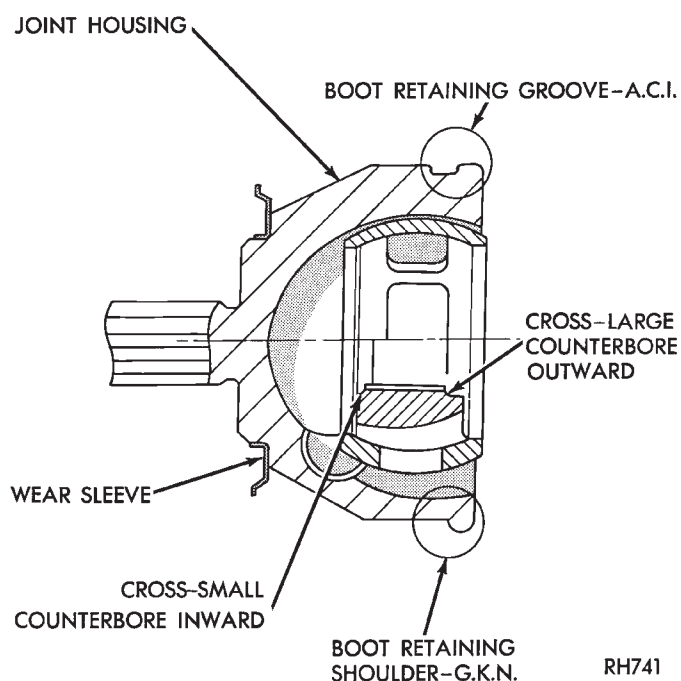


Fig. 6 Cage & Cross Installed in Housing G.K.N.

Pivot cage 90° to complete installation.

When properly assembled the large counterbore in the cross should be facing outward from the joint on G.K.N. units (Figs.3 and 6). On the S.S.G. joint the internal circlip in the cross will be facing outward from the housing (Fig. 5).

(7) Apply lubricant to ball races from packet provided in boot kit and distribute equally between all sides of ball grooves. One packet is sufficient to lubricate the joint.

(8) Insert balls into raceway by tilting cage and inner race assembly (Fig. 7).

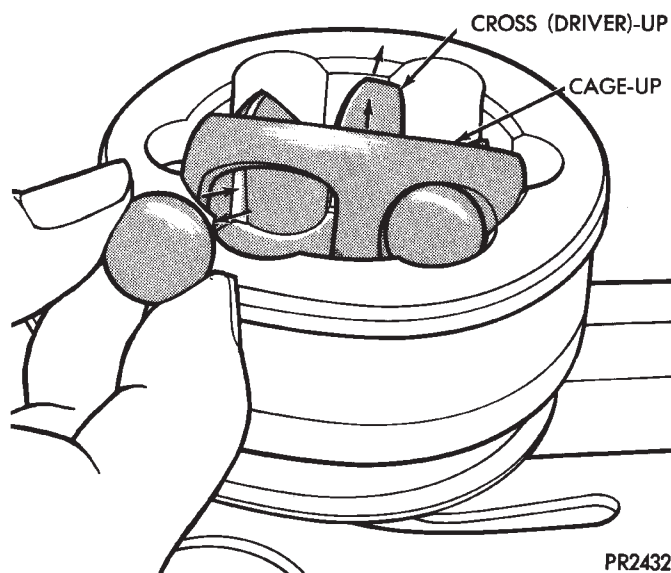


Fig. 7 Inserting Balls into Raceway

(9) Fasten boot to shaft. See **Boots Install.**

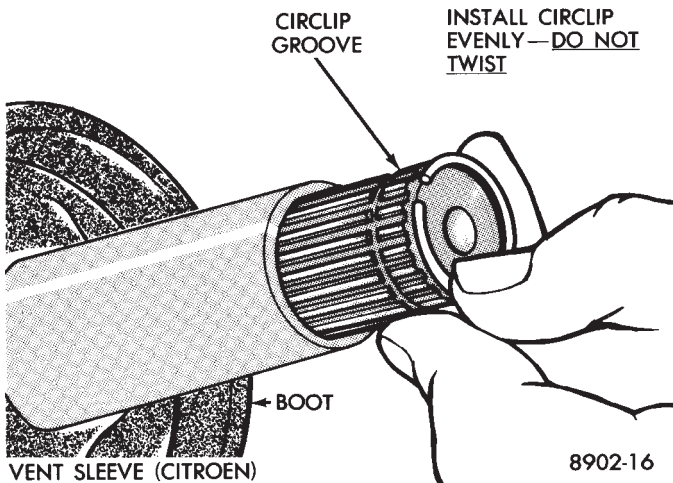


Fig. 8 Installing New Circlip

(10) On G.K.N. units insert the new circlip, provided with kit in shaft groove. **Do not over expand or twist** circlip during assembly (Fig. 8). The S.S.G. unit has a reusable circlip retainer that is an integral part of driver assembly.

(11) Position outer joint on splined end with hub nut on stub shaft. Engage splines, and tap sharply with mallet (Fig. 9).

(12) Check that circlip is properly seated by attempting to pull joint from the shaft.

(13) Locate large end of boot over joint housing checking that boot is not twisted.

(14) Fasten boot to housing. See **Boots Install**.

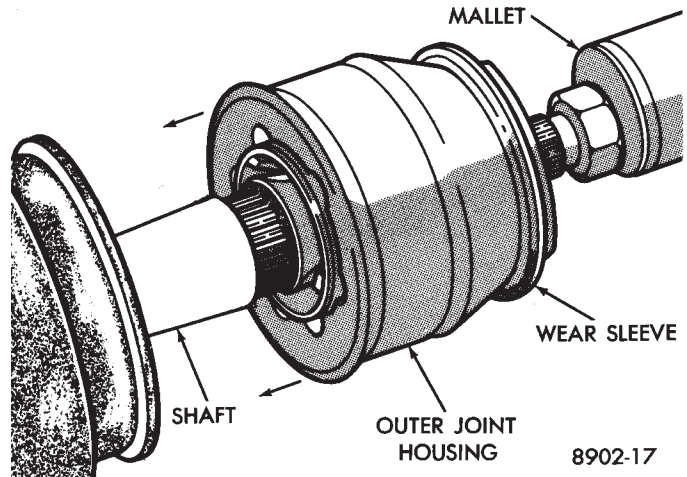


Fig. 9 Position Joint onto Shaft Splines

INTERMEDIATE SHAFT ASSEMBLY RECONDITION

Reconditioning of the Intermediate Shaft Assembly (Fig. 1) for the Equal Length Drive Shaft System vehicles is the same for the manual and automatic transaxles.

INTERMEDIATE SHAFT ASSEMBLY

Remove

- (1) Remove right driveshaft. See Driveshaft Assemblies Remove.
- (2) Remove speedometer pinion from the extension housing (Fig. 2).
- (3) Remove the two bolts which mount the bearing assembly bracket to the engine block (Fig. 1).

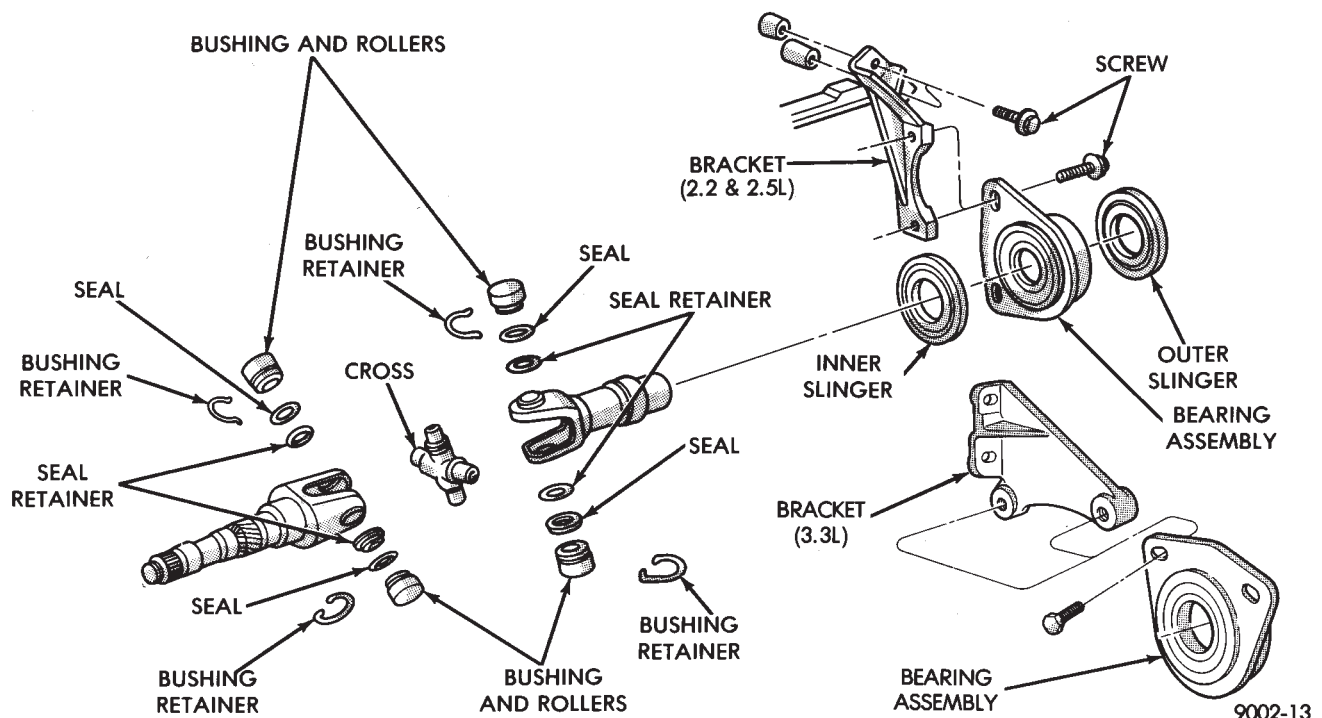


Fig. 1 Intermediate Shaft Assembly

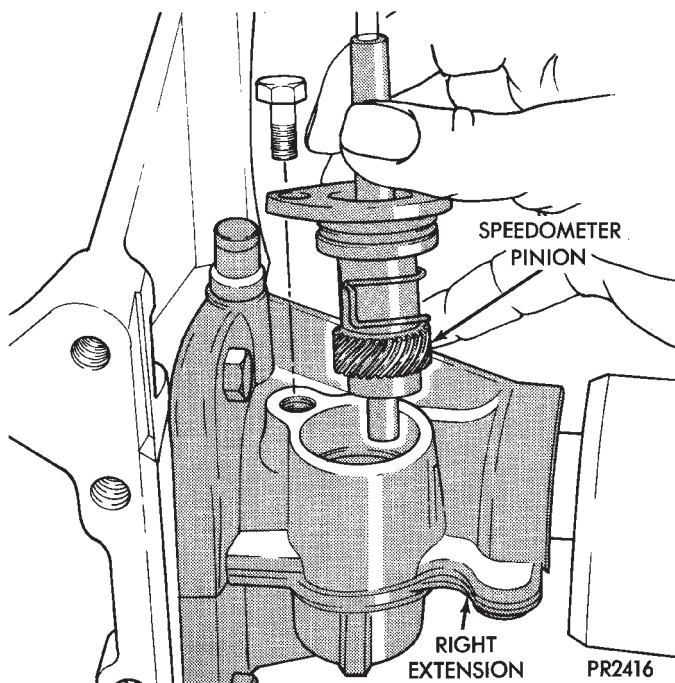


Fig. 2 Remove Speedometer Pinion

(4) Remove assembly from transaxle extension by pulling outward on the yoke (Fig. 3).

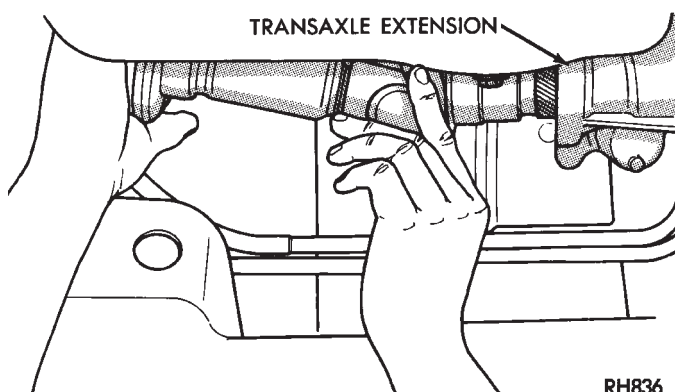


Fig. 3 Removing Intermediate Shaft Assembly

UNIVERSAL JOINT AND ROLLER

Disassemble

(1) Mark relationship of shaft to shaft to ensure proper alignment at assembly. Apply penetrating oil to bushings and remove snap rings.

(2) Support yoke in vise and place a socket large enough to receive bushing on top of yoke. A 1-1/8 inch socket is suitable (Fig. 4).

(3) Striking socket with hammer will cause yoke to move down and bushing to move up out of yoke into socket.

(4) After removing one bushing, turn parts in a vise and remove other bushing in same manner.

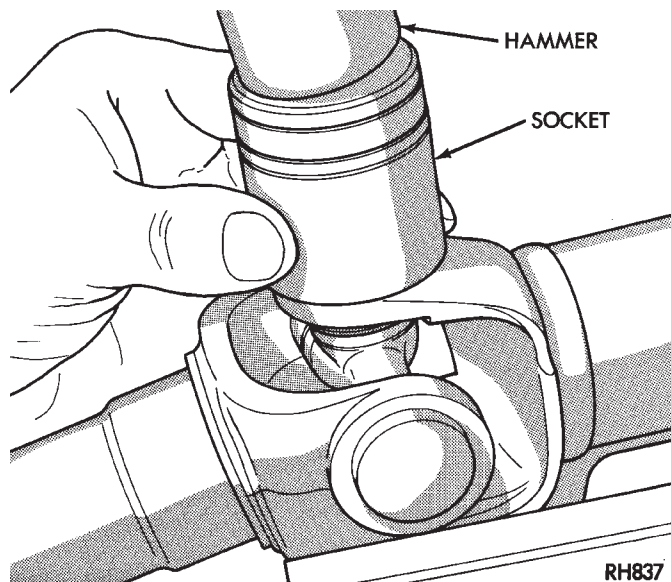


Fig. 4 Disassemble Universal Joint

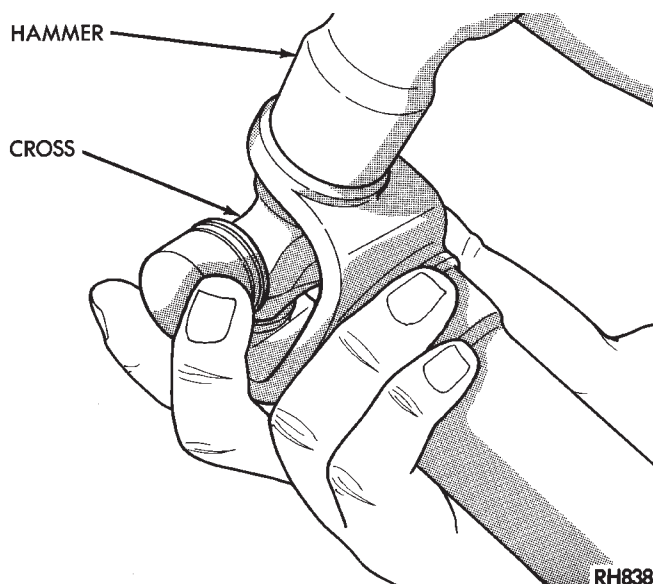


Fig. 5 Assemble Universal Joint

Assemble

(1) Hold cross in position between yoke ears with one hand and start one bushing assembly into yoke with other hand (Fig. 5).

(2) Continue to hold cross in position, then hammer bushing assembly into yoke and install snap ring.

(3) Install opposite bushing and snap ring in the same manner.

(4) Repeat process for stub shaft yoke after aligning marks on yoke and shaft.

BRACKET, BEARING, AND SLINGER ASSEMBLY

Disassemble

(1) Remove the two screws that hold the bearing assembly to the support bracket.

(2) Press the intermediate shaft out of the bearing assembly and outer slinger. Do not dent or damage the inner slinger. Also avoid damaging the end of the stub shaft, the rubber seal on the right driveshaft mates with this surface. Excessive wear to the rubber seal would result and allow moisture to enter, corroding the internal splines.

(3) If either slinger is damaged, it should be replaced. Carefully press the shaft through the slinger, discard the slinger.

The bearing assembly is not serviceable and must be replaced as an assembly.

Assemble

(1) Place new slinger on stub shaft and drive it on until it bottoms out on the shoulder of the shaft (Fig. 6). A tool for this purpose can be fabricated from a piece of pipe that has the dimensions noted in (Fig. 6).

CAUTION: Do not dent or bend the slinger during this installation, since it could prevent the bearing assembly from seating properly.

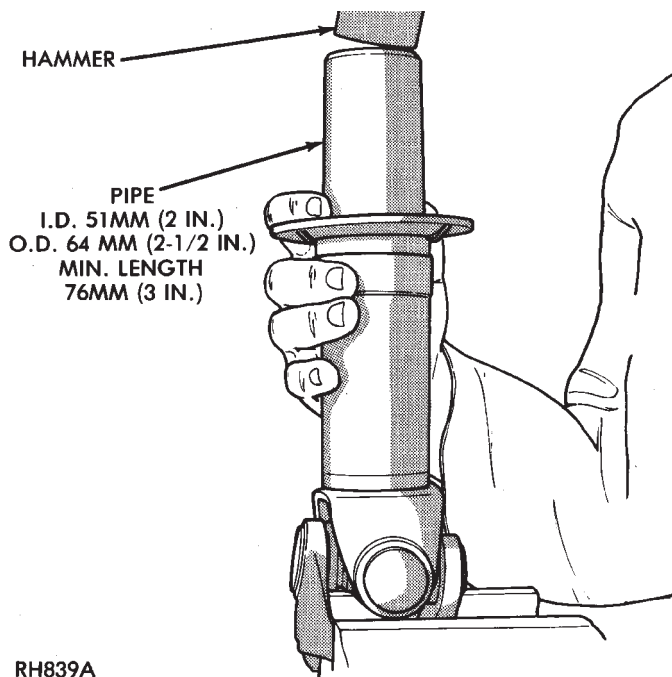


Fig. 6 Slinger Installation Intermediate Shaft

(2) Press bearing assembly into position on the shaft, there should be a minimum of 1 mm (1/32 in.) clearance between slinger and bearing assembly when properly installed.

CAUTION: Apply pressure only to the inner race of the bearing during this procedure. Or damage may result which could cause premature bearing failure.

(3) Press the outer slinger into place with the same tool used for bearing installation. The slinger must bottom out on the shoulder of the shaft.

INTERMEDIATE SHAFT ASSEMBLY

Install

(1) Securely fasten bracket to bearing assembly and tighten to 28 N•m (21 ft. lbs.) torque. Figs. 7 and 8 (Also see Fig. 1).

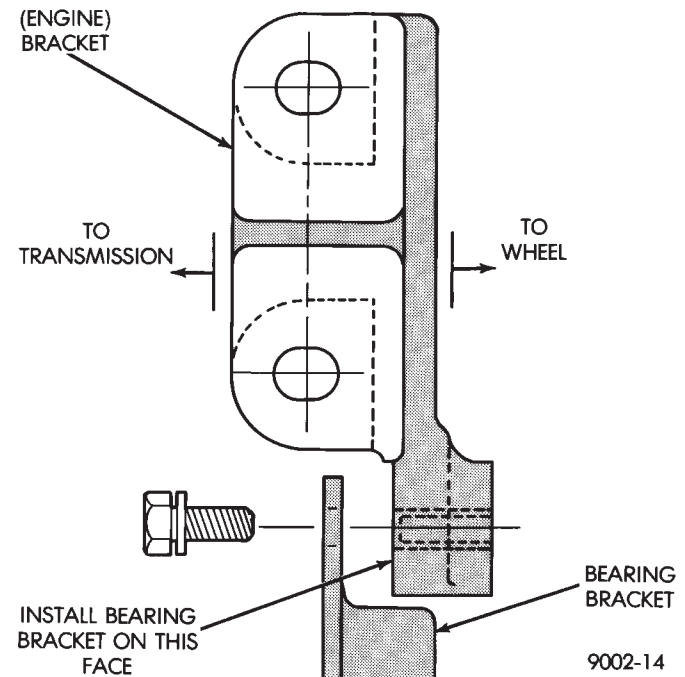


Fig. 7 3.3L Intermediate Driveshaft Bearing Brackets, Position

(2) Hold the stub yoke while aligning and guiding the splined end into the transaxle (Fig. 9).

(3) Swing the bracket into position on the engine and loosely install the screws through the slotted holes.

(4) Push the intermediate shaft assembly into the transaxle as far as it can travel. Hold the assembly in this position and tighten the screws (bracket to engine block) to 54 N•m (40 ft. lbs.) torque. **This will ensure full seal engagement between the journal on the intermediate shaft and the seal in the transaxle extension.**

(5) Distribute a liberal amount of grease in side spline and pilot bore on bearing end of intermediate shaft. Use MOPAR Multi-Purpose Lubricant, or equivalent.

(6) Install speedometer pinion (Fig. 10).

(7) Install right driveshaft. See Driveshaft Assemblies Install.

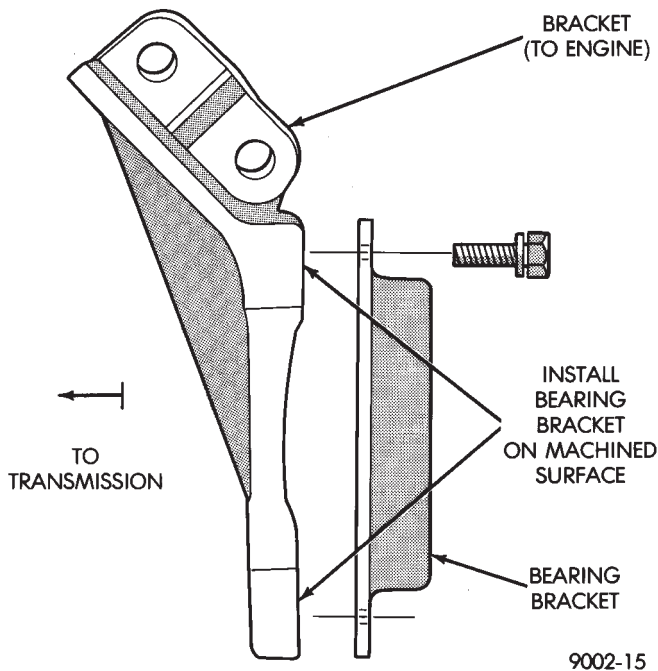


Fig. 8 2.5L Turbo and 3.0L Intermediate Driveshaft Bracket (Typical)

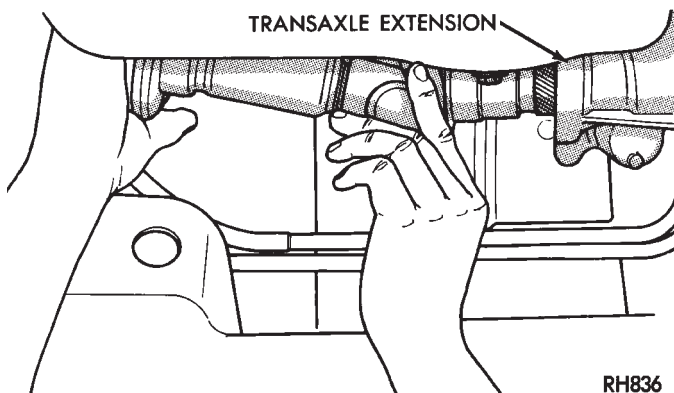


Fig. 9 Installing Intermediate Shaft Assembly

C/V JOINT BOOTS Handling and Cleaning

It is vitally important during **any** service procedures requiring boot handling. That care be taken not to puncture or tear the boot by over tightening clamps, misuse of tool(s) or pinching the boot. Pinching can occur by rotating the C/V joints (especially the tripod) beyond normal working angles.

The driveshaft boots are not compatible with oil, gasoline, or cleaning solvents. Care must be taken that boots never come in contact with any of these liquids. **The only acceptable cleaning agent for driveshaft boots is soap and water. After washing, boot must be thoroughly rinsed and dried before reusing.**

BOOTS INSPECT

Noticeable amounts of grease on areas adjacent to or on the exterior of the C/V joint boot. Is the first indication that a boot is punctured, torn or that a

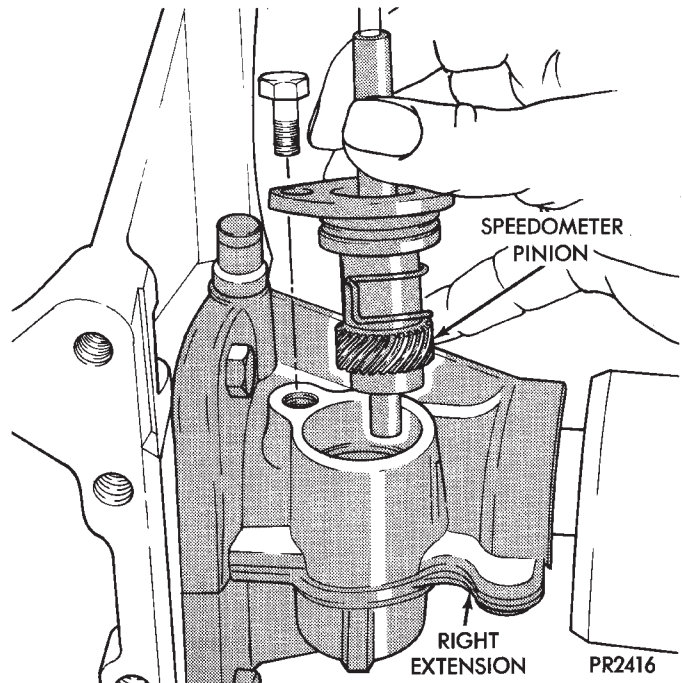


Fig. 10 Install Speedometer Pinion

clamp has loosened. When a C/V joint is removed for servicing of the joint. The boot should be properly cleaned and inspected for cracks, tears and scuffed areas on interior surfaces. If any of these conditions exist, boot replacement is recommended.

BOOTS INSTALL

THE HARD PLASTIC BOOTS REQUIRE APPROXIMATELY **100** TIMES THE CLAMPING FORCE OF THE RUBBER BOOT. THE CLAMPS USED ON THE RUBBER BOOTS DO NOT HAVE THE TYPE OF LOAD CAPACITY REQUIRED TO SEAL THE HARD PLASTIC BOOTS AND SHOULD NOT BE USED FOR THIS PURPOSE.

Rubber boots appear only on the inner joints of certain driveshafts.

Rubber boots must be serviced with the strap and buckle clamp. Use the Clamp Installer, Special Tool C-4653. Proceed with the boot installation as follows:

(1) Slide the small end of the boot over the shaft. Position the boot to the edge of the locating mark or groove, whichever is appropriate (Fig. 1).

(2) Install the C/V joint. See Inner or Outer C/V Joint Assemble.

(3) Slide the large diameter of the boot into the locating groove (Fig. 6).

(4) Wrap binding strap around boot **twice**, PLUS 63 mm (2-1/2 inches) (Fig. 2).

(5) Pass the strap through the buckle and fold it back about 29 mm (1-1/8 inches) on the inside of the buckle (Fig. 3).

(6) Put the strap around the boot with the eye of the buckle toward you (Fig. 4). Wrap the strap

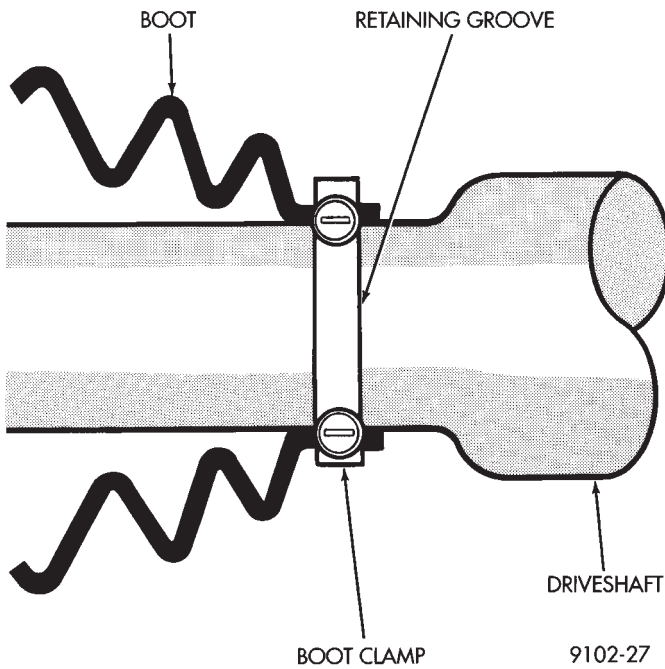


Fig. 1 C/V Joint Boot Positioning G.K.N.

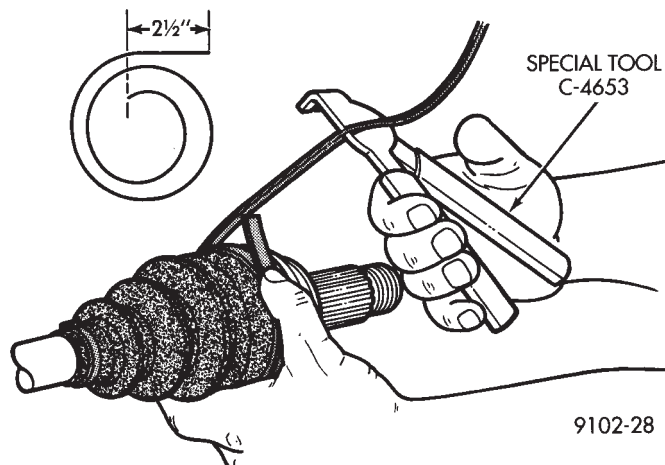


Fig. 2 Measure & Cut Binding Strap

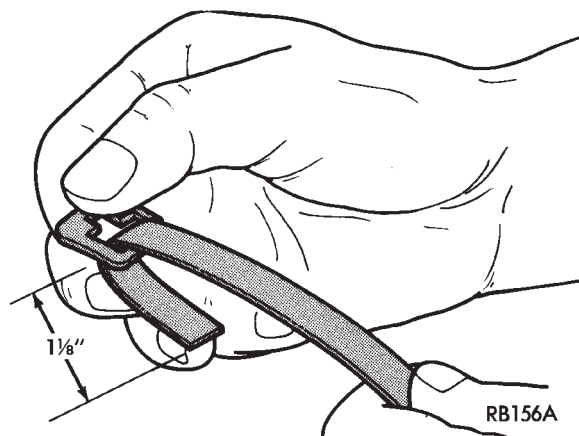


Fig. 3 Install Buckle on Strap

around the boot once and pass it through the buckle, then wrap it around a second time also passing it

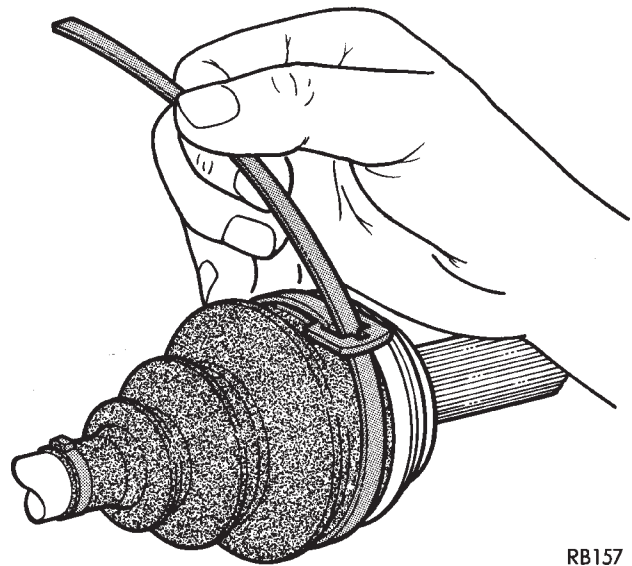


Fig. 4 Wrap Strap (through Buckle Eye) Twice

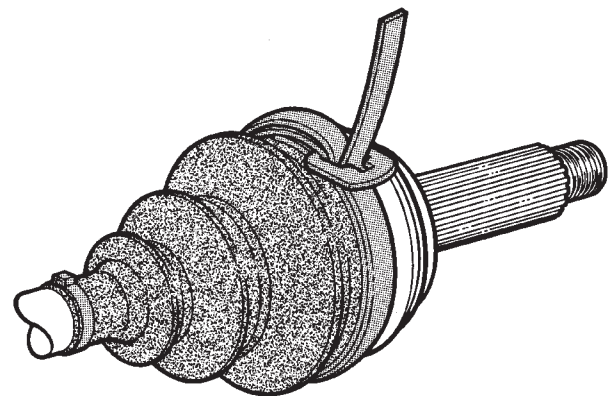


Fig. 5 Fold Strap Lightly to Keep Position

through the buckle.

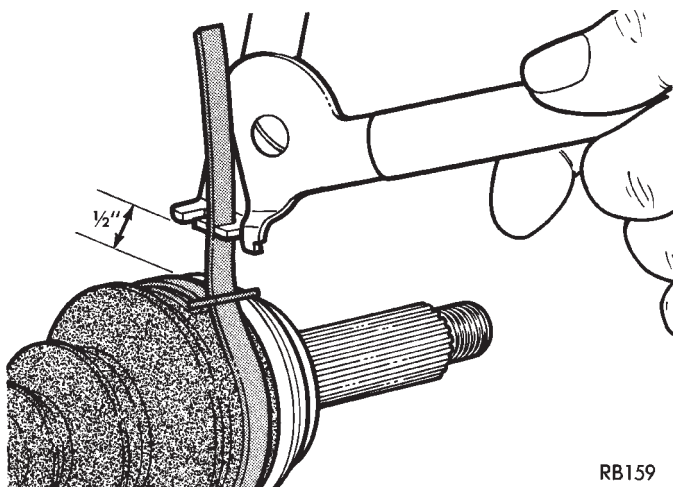
(7) Fold the strap back slightly to prevent it from slipping backwards (Fig. 5).

(8) Open the tool all the way and place strip in narrow slot approximately 13 mm (1/2 inch) from buckle (Fig. 6).

(9) Hold the binding strap with the left hand and push the Tool forward and slightly upward. Then fit the hook of the Tool into the eye of the buckle (Fig. 7).

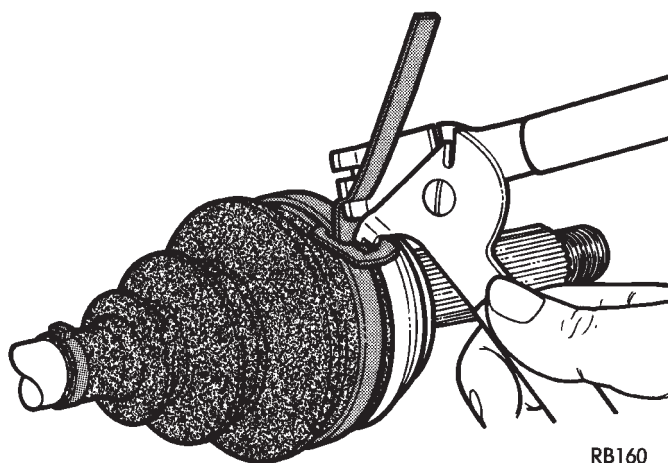
(10) Tighten the strip by closing the tool handles (Fig. 8). Then rotate the tool (handles) downward while slowly releasing the pressure on the tool handles. Allow the tool (handles) to open progressively. Then open the tool entirely and remove them sideways.

(11) If the strap is not tight enough, engage the tool a second or even a third time, always about 13 mm (1/2 inch) from the buckle (Fig. 9). When tightening always be careful to see that the strap slides in



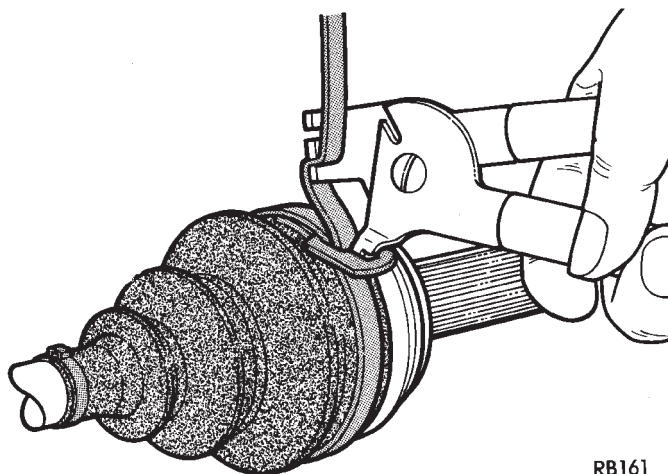
RB159

Fig. 6 Open Tool, Position Strap in Narrow Slot 1/2 Inch from Buckle



RB160

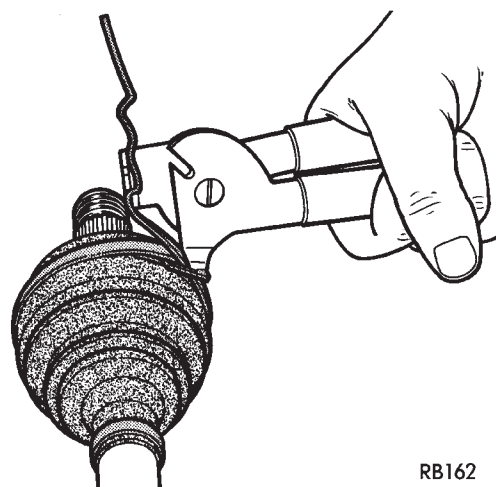
Fig. 7 Push Tool Forward & Fit into Buckle Eye



RB161

Fig. 8 Tighten Strap

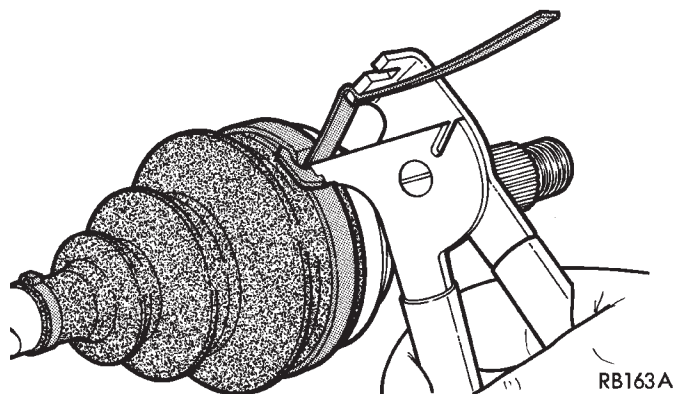
a straight line and without resistance in the buckle, that is without making a fold. An effective grip will be obtained only by following the above instructions.



RB162

Fig. 9 Tighten Strap (if Required)

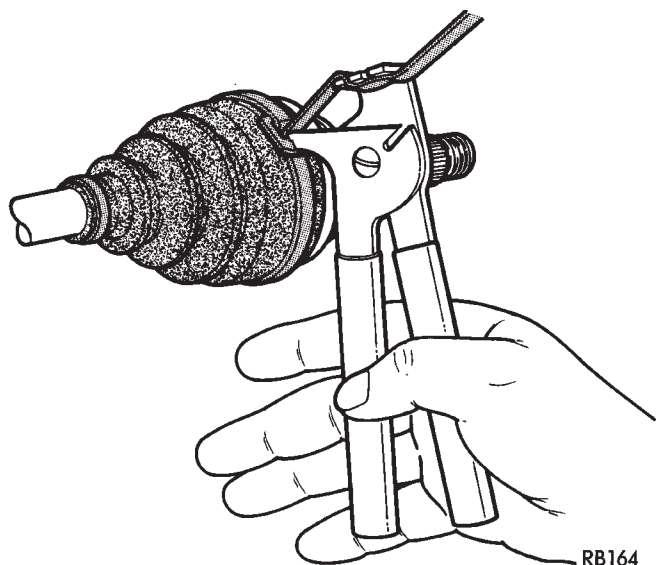
(12) Fig. 10 shows WHAT NOT TO DO, NEVER fold the strap back or bring the tool down while tightening, this action will break the strap.



RB163A

Fig. 10 What Not to Do

(13) Fig. 11 shows how to pull the tool down while releasing the pressure on the tool handle.



RB164

Fig. 11 Correct Tightening Procedure

(14) If the strip is tight enough. Remove the tool sideways and cut off the strap 3 mm (1/8 inch), so that it does not overlap the edge of the buckle. Complete job by folding the strip back neatly (Fig. 12).

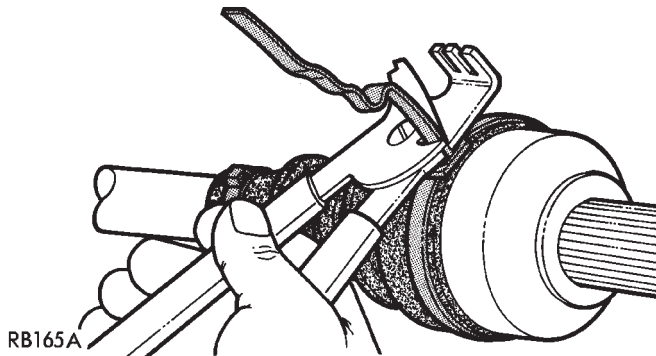


Fig. 12 Cut Strap 1/8 Inch from Buckle

(15) Fig. 13 shows the finished binding strap type clamp in position, correctly fitted and unable to come loose.

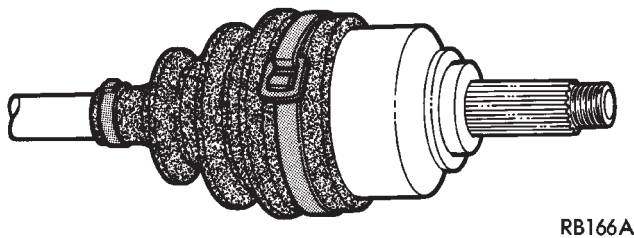


Fig. 13 Correctly Installed Clamp

(16) After attaching the C/V joint boot to the shaft. Install the inner or outer C/V joint following procedures under Inner C/V Joint Assemble or Outer C/V Joint Assemble.

(17) Slip the large end of the boot on the housing and align it in the boot groove.

(18) Repeat steps 2 - 13 for boot clamping.

S.S.G. C/V joints use two different type boots, one is made of plastic and the other of rubber. The plastic boot requires a heavy duty clamp and Installer, Special Tool C-4975. The soft boot requires a clamp with round edges that prevents the clamp from cutting the boot. Proceed with boot installation as follows.

The hard plastic boots used on the G.K.N. C/V Joints. Also use this procedure for installation of the boot clamp to C/V Joint.

LEFT INNER, LEFT AND RIGHT OUTER C/V JOINT WITH PLASTIC BOOTS

- (1) Slide small clamp onto shaft.
- (2) Position small end of boot over interconnecting shaft with lip of boot in third groove, towards center of interconnecting shaft (Fig. 14).
- (3) Position clamp evenly over boot. Place clamp installer Tool C-4975 over bridge of clamp and tighten

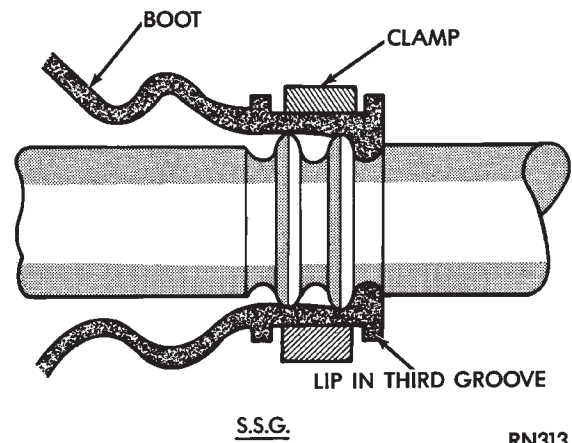


Fig. 14 Boot and Clamp Positioning S.S.G.

the nut until the jaws of the tool are closed completely, face to face (Fig. 15).

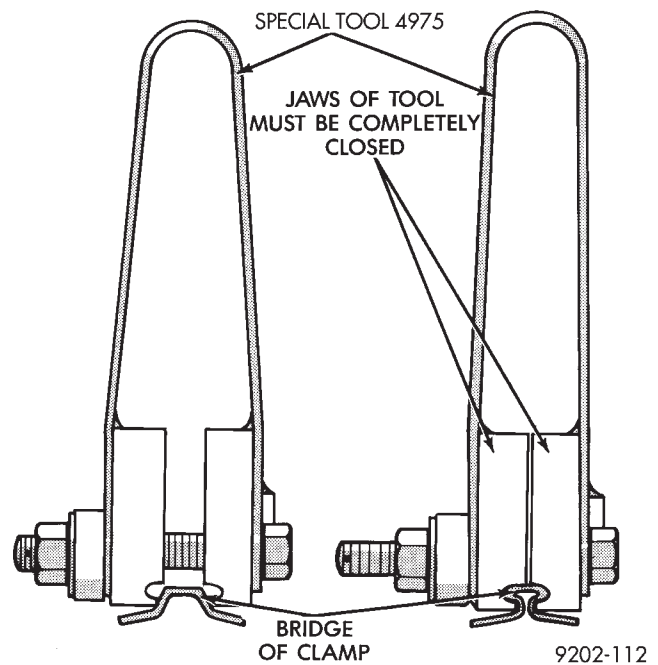


Fig. 15 Closing Clamp Bridge

(4) After attaching the boot to the shaft. Install the C/V joint following the procedure outlined under **Inner C/V Joint Assemble** or **Outer C/V Joint Assemble**.

(5) Position the large end of boot on housing and install clamp, crimp bridge of clamp with Crimper, Special Tool C-4975.

CAUTION: Use only the clamps provided in the boot package for this application, otherwise damage to the boot or C/V joint may occur.

RIGHT INNER C/V JOINT WITH RUBBER BOOT

- (1) Slide small boot clamp onto interconnecting shaft.

(2) Install boot onto interconnecting shaft, position boot on the flat between the locating shoulders (Fig. 16).

(3) Position clamp on boot and crimp bridge of clamp with Crimper Special Tool C-4124.

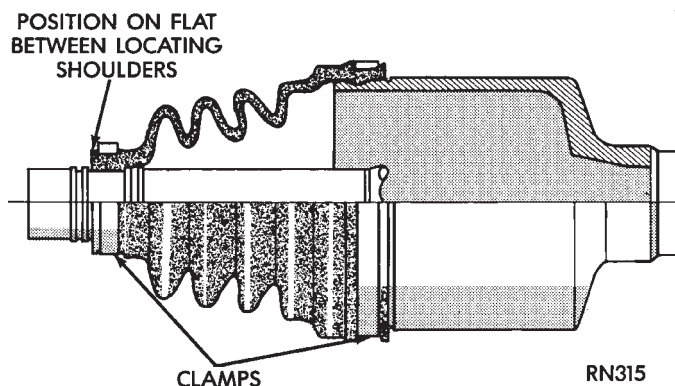


Fig. 16 Right Inner C/V Joint S.S.G.

(4) Install the C/V Joint following the procedure outlined under **Inner C/V Joint Assemble**.

(5) Position the large end of boot on housing and install clamp, crimp bridge of clamp with Crimper, Special Tool C-4124.

CAUTION: During any service procedures where knuckle and driveshaft are separated, thoroughly clean seal and wear sleeve with suitable solvent and lubricate **BOTH** components at assembly. Do not allow solvent to contact boot.

Lubricate wear sleeve (and seal) with Mopar Multi-Purpose Lubricant, or equivalent, as follows:

Wear Sleeve: Apply a full circumference 6 mm (1/4 inch) bead of lubricant to seal contact area. See (Fig. 11), Driveshaft Assemblies Install.

Seal: Fill lip to housing cavity (full circumference) and wet seal lip with lubricant.

S.S.G INNER C/V JOINT LARGE CLAMP (MANUAL TRANS ONLY)

(1) Install small clamp and inner C/V joint housing according to the procedures outlined in this manual.

(2) Position the boot over the outer C/V joint.

(3) Slide the large band clamp over the boot and position it evenly in the groove on the inner C/V joint boot. (Fig. 1).

(4) Use Clamp Locking Tool Snap-On YA3050 or equivalent shown in (Fig. 2) to install the clamp on the boot.

(5) Place the prongs of the clamp locking tool in the holes on the clamp and squeeze together until the two ends meet (Fig. 2).

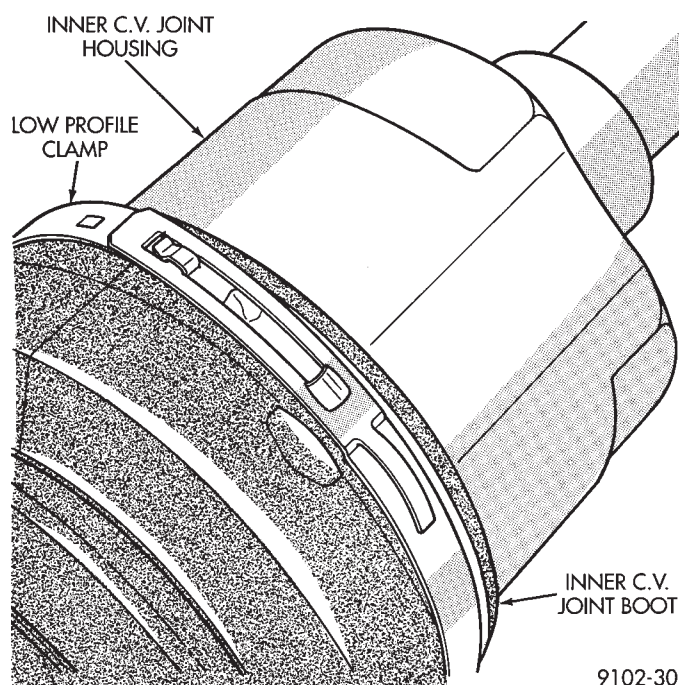


Fig. 1 Boot Clamp Installed

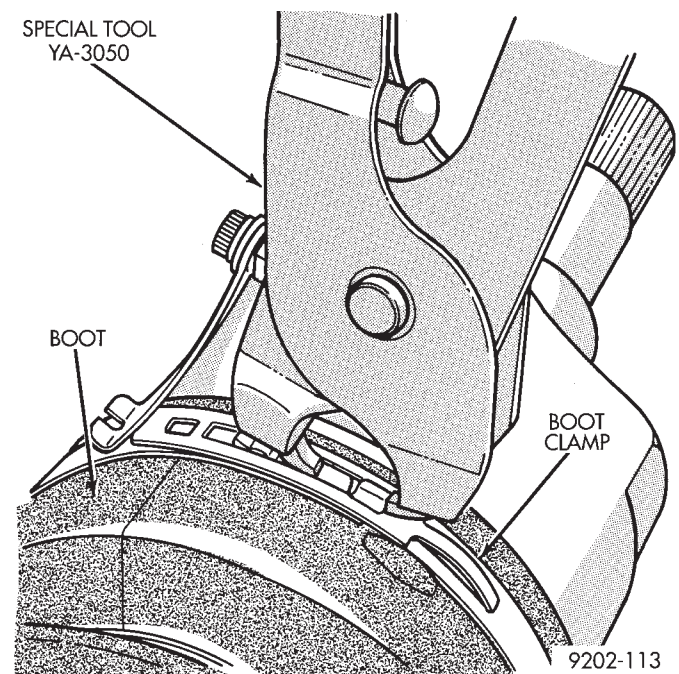


Fig. 2 Locking Boot Clamp

DAMPER WEIGHTS

Damper weights are used on the left driveshaft assemblies of all front wheel drive vehicles (Fig. 1). These weights are attached to the interconnecting shaft and are available as a separate service part. They should be removed from the driveshaft assembly during driveshaft positioning specification procedures. When the weights are attached between the locating shoulders, tighten the fasteners to the following specifications:

- S.S.G. — 28 N•m (21 ft. lbs.)
- G.K.N. — 30 N•m (23 ft. lbs.)

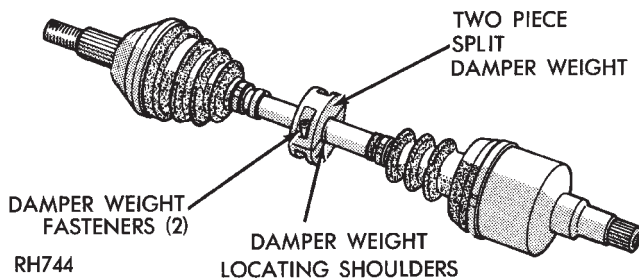


Fig. 1 Left Driveshaft with Damper Weight

DRIVESHAFT POSITIONING SPECIFICATIONS

Front wheel drive vehicles have engine mounts with slotted holes allowing for side to side positioning of the engine. If the vertical bolts on the right or left upper engine mount have been loosened (e.g., engine removal and installation) for any reason, or if the vehicle has experienced front structural damage, driveshaft lengths must be checked and corrected, if required. A shorter than required driveshaft length can result in objectionable noise. A longer than required driveshaft length may result in potential damage.

Use of the following procedure will ensure satisfactory driveshaft engagement under all normal vehicle operating conditions.

(1) The vehicle must be completely assembled. Front wheels must be properly aligned and in the straight ahead position. The vehicle must be in a position so that the full weight of the body is distributed to all four tires. A platform hoist, or front end alignment rack, is recommended.

(2) Using a tape measure or other suitable measuring device. Measure the direct distance from the inner edge of the outboard boot to the inner edge of the inboard boot on both driveshafts. This measurement must be taken at the bottom (six o'clock position) of the driveshafts (Fig. 1).

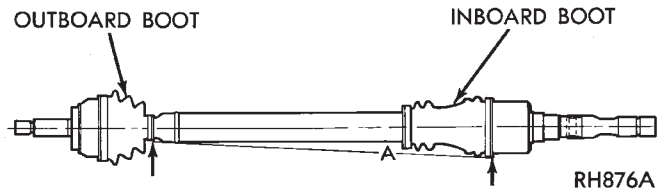


Fig. 1 Driveshaft Positioning

Note that the required dimension varies with carline, engine, transaxle, and driveshaft manufacturer (Fig. 2).

(3) If the lengths of both shafts are within the range specified, no further action is required.

If either the left or right shaft length is not within the specified range. Refer to Engine, Group 09, Engine Removal and Installation to properly position the engine according to the driveshaft lengths specified.

(4) If proper driveshaft lengths cannot be achieved within the travel limits available in the slotted engine mounts. Check for any condition that could effect the side to side position of the measurement locations (e.g., engine support brackets, siderail alignment, etc.).

(5) After ensuring proper driveshaft lengths the transmission shift linkage must be adjusted to ensure proper operation. Refer to Transaxle, Group 21.

BODY	ENGINE	SIDE	TRANSAXLE	MILLIMETERS	INCHES
AC	2.2-L/2.5-L	RIGHT	AUTOMATIC	452-460	17.8-18.1
AG		LEFT	AUTOMATIC	188-196	7.4-7.7
AJ					
AP		RIGHT	MANUAL	453-461	17.8-18.1
		LEFT	MANUAL	196-204	7.7-8.0
AC	3.0-L	RIGHT	AUTOMATIC	453-461	17.8-18.1
AG		LEFT	AUTOMATIC	189-197	7.4-7.7
AJ					
AP					
AG	2.5-L TURBO	RIGHT	AUTOMATIC	453-461	17.8-18.1
		LEFT	AUTOMATIC	189-197	7.4-7.7
AJ					
AP		RIGHT	MANUAL	189-197	7.4-7.7
		LEFT	MANUAL	196-204	7.7-8.0
AC	3.3-L/3.8-L	RIGHT	AUTOMATIC	189-197	7.4-7.7
AY		LEFT	AUTOMATIC	189-197	7.4-7.7
AA	2.5-L/3.0-L	RIGHT	AUTOMATIC	434-444	17.0-17.5
	2.5-L TURBO	LEFT	AUTOMATIC	176-186	6.9-7.3
	2.5-L	RIGHT	MANUAL	434-444	17.0-17.5
		LEFT	MANUAL	165-175	6.5-6.9
AG	3.0-L	RIGHT	MANUAL	453-461	17.8-18.1
AJ		LEFT	MANUAL	196-204	7.7-8.0
AA	2.5-L TURBO	RIGHT	MANUAL	165-175	6.5-6.9
		LEFT	MANUAL	165-175	6.5-6.9
	2.2-L TURBO III	RIGHT	MANUAL	194-204	7.6-8.0
		LEFT	MANUAL	194-204	7.6-8.0

9102-32

Fig. 2 Driveshaft Identification and Dimensions

REAR SUSPENSION

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Pivot Bushing AC and AY Body	53		

GENERAL INFORMATION

All front wheel drive passenger cars. Utilize a Trailing Arm Twist Beam type rear axle in conjunction with coil (or air) springs (Fig. 1). The blade type Trailing Arms, attached to body mounted pivots, pro-

vide fore and aft location of the suspension while a Track Bar provides lateral location.

Located in line with the spindles. An open channel section beam axle assures that the rear tires remain parallel to each other, and essentially perpendicular

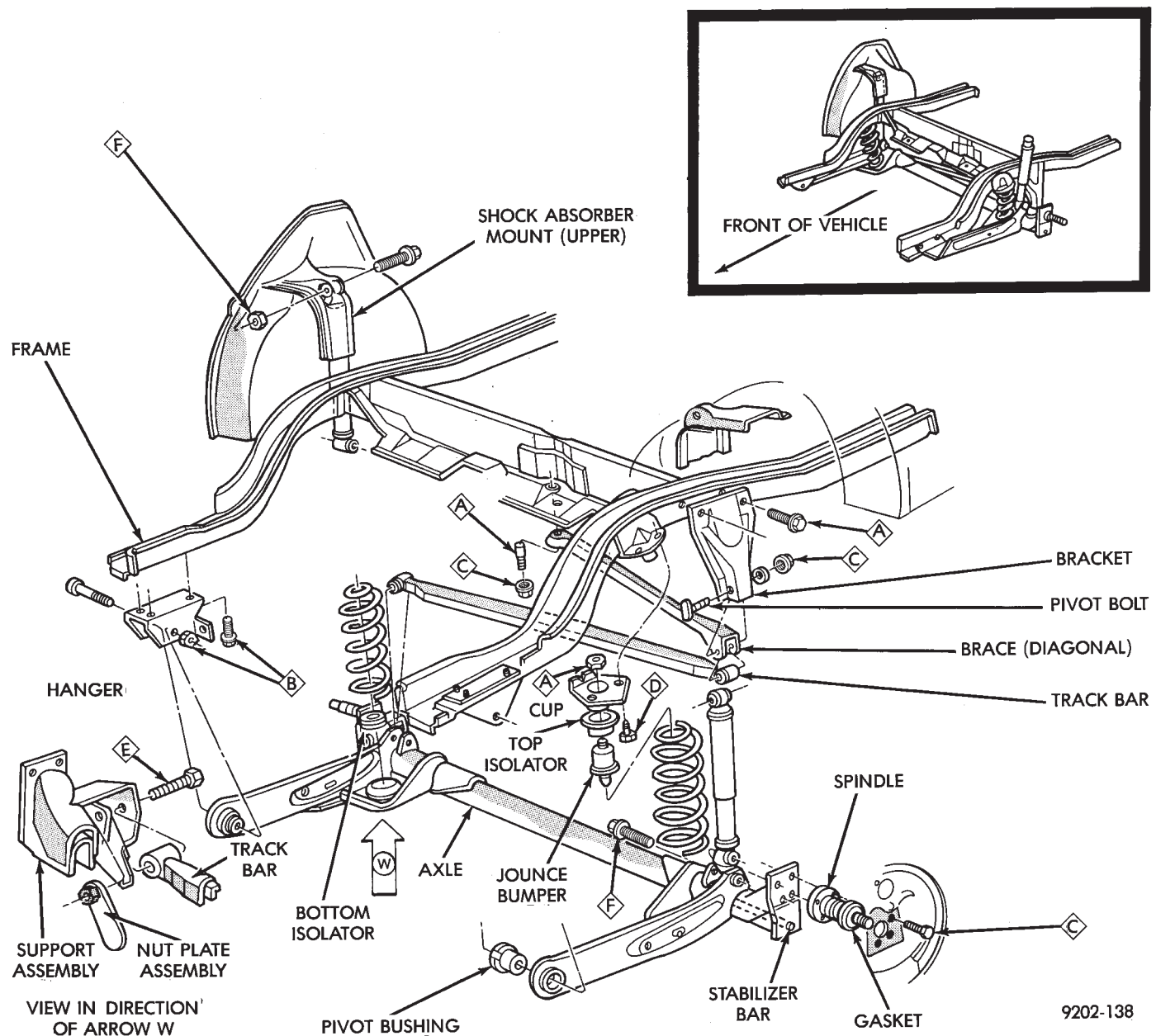


Fig. 1 Trailing Arm Rear Suspension

to the road surface. While being able to twist as one wheel moves vertically with respect to the other.

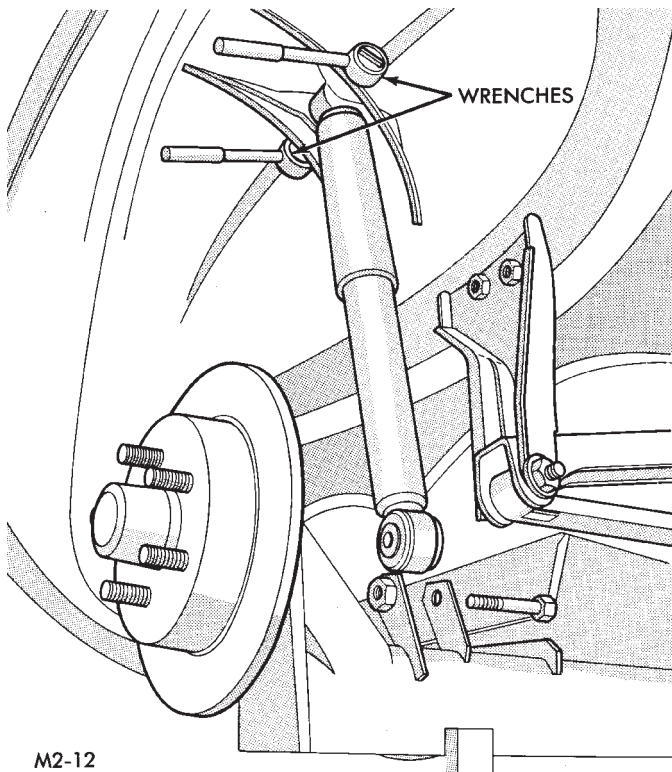
Roll resistance is provided partly by the axle's resistance to twist. But primarily by a torque tube or rod (depending on the suspension option called for) running through the channel and attached rigidly to its end plates by welding. Because the torque tube/rod is an integral part of the axle assembly, it cannot be individually replaced.

The spindles are bolted to the axle end (spindle mounting) plates and can be individually replaced if required. Rear wheel alignment changes require the use of shims between the spindle and axle end plates.

SHOCK ABSORBERS

REMOVAL

- (1) Raise vehicle, see Hoisting, Group 0.
- (2) Support axle and remove wheel and tire assembly.
- (3) If equipped with air shocks, disconnect air lines.
- (4) Remove upper and lower shock absorber fasteners, remove shock absorbers (Fig. 2).



M2-12

Fig. 2 Remove/Install Shock Absorber Fasteners

INSPECTION

Inspect for evidence of fluid leakage from upper end of reservoir. (Actual leakage will be a stream of fluid running down and leaking off lower end). Slight seepage is not unusual and will not effect performance.

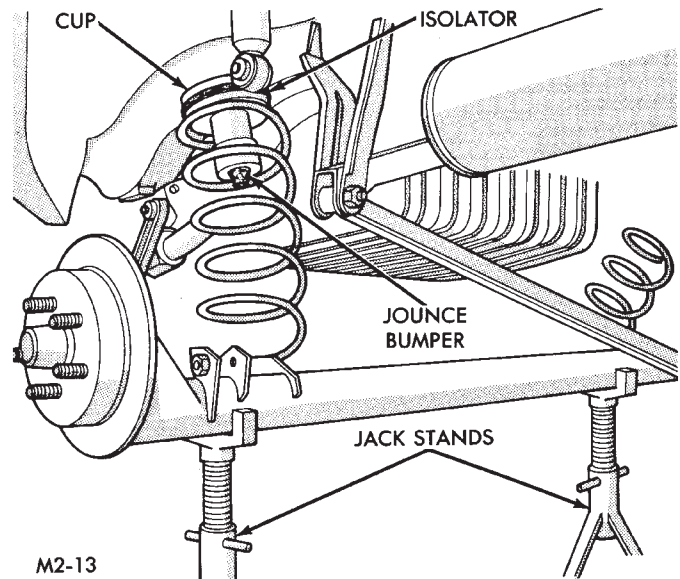
INSTALLATION

- (1) Position shock absorber on car. Install upper and lower fasteners loosely to hold shock absorber in place.
- (2) Tighten upper fastener to 61 N•m (45 ft. lbs.) torque. Connect air line, if so equipped.
- (3) Install wheel and tire assembly, tighten wheel stud nuts to 129 N•m (95 ft. lbs.) torque. Lower vehicle to ground.
- (4) With suspension supporting the weight of the vehicle. Tighten lower shock absorber fastener to 54 N•m (40 ft. lbs.) torque.

COIL SPRINGS AND JOUNCE BUMPER

REMOVAL

- (1) Lift vehicle see hoisting Group 0.
- (2) Support axle assembly and remove both lower shock absorber attaching bolts.
- (3) Lower axle assembly until spring and spring upper isolator can be removed (Fig. 3). **Do not stretch brake hose.**
- (4) Remove two screws holding cup to rail (Fig. 1). Remove assembly.



M2-13

Fig. 3 Coil Spring & Jounce Bumper

INSTALLATION

- (1) Position cup to rail. Install and tighten attaching bolts to 8 N•m (70 in. lbs.) torque.
- (2) Install isolator over jounce bumper and install spring.
- (3) Raise axle and loosely assemble both shock absorber to axle mounting bolts. Remove axle support and lower vehicle.
- (4) With suspension supporting the weight of the vehicle. Tighten both shock absorber attaching bolts to 61 N•m (45 ft. lbs.) torque.

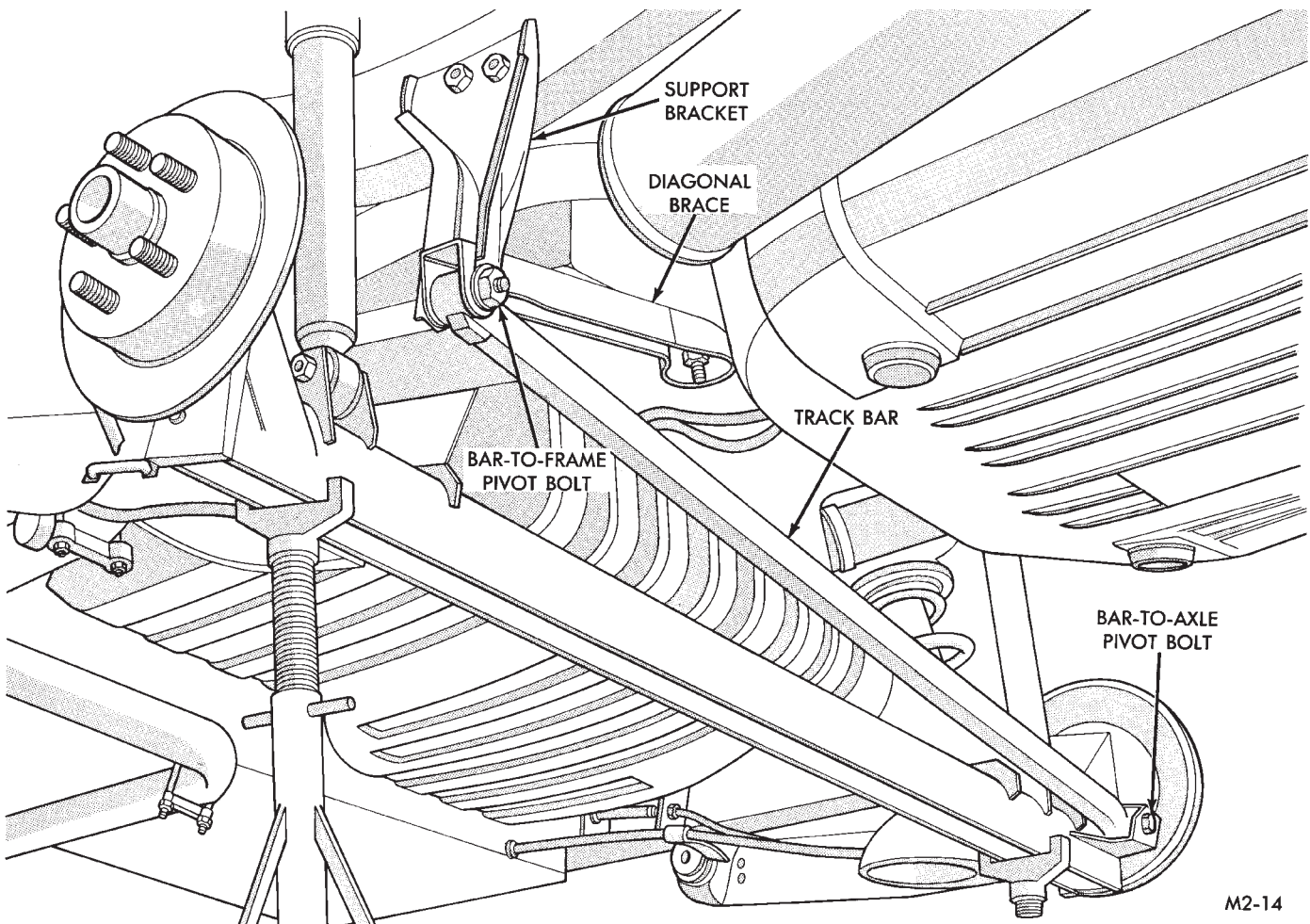


Fig. 4 Track Bar Brace Bracket

TRACK BAR-BRACE-BRACKET (FIG. 4)

REMOVAL

- (1) Raise vehicle, see Hoisting, Group 0.
- (2) Raise rear axle to curb height, with jack stands (Fig. 5).
- (3) Remove track bar-to-axle pivot bolt. And remove track bar-to-frame pivot bolt. Remove track bar.
- (4) Remove diagonal brace-to-underbody stud nut. Remove diagonal brace.
- (5) Remove two track bar bracket-to-frame rail bolts. Remove bracket.

INSTALLATION

- (1) Position support bracket on frame rail, install and tighten (2) bolts to 54 N•m (40 ft. lbs.) torque.
- (2) Fit diagonal brace into support bracket and over underbody stud, tighten stud nut to 75 N•m (55 ft. lbs.) torque.
- (3) Fit track bar to diagonal brace, loose assemble pivot bolt with nut and washer on rear side. Attach the other end of track bar to bracket on axle and tighten to 95 N•m (70 ft. lbs.) torque. Tighten nut on track bar-to-frame bolt to 75 N•m (55 ft. lbs.) torque.

PIVOT BUSHING AC AND AY BODY

REMOVE FROM VEHICLE

- (1) Raise vehicle (see Hoisting, Group 0). Remove brake hose mounting bracket screw (Fig. 5).
- (2) Detach park brake cable at connector and from hanger bracket (Fig. 5).

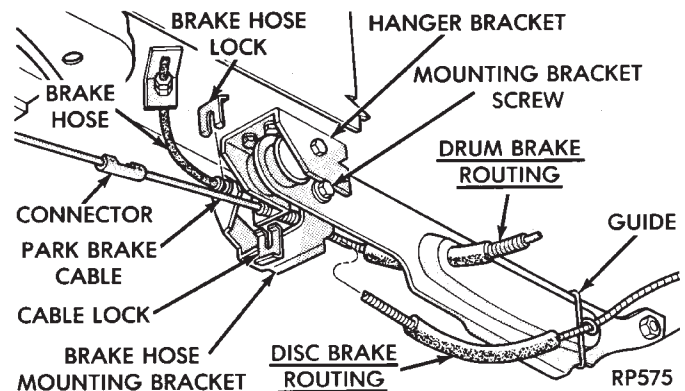


Fig. 5 Remove Brake Hose Mounting Bracket Screw and Park Brake Cable

WARNING: WHEN REMOVING THE REAR AXLE PIVOT BUSHING ON VEHICLES EQUIPPED WITH EITHER REAR COIL SPRINGS OR AIR SUSPENSION. THE REAR AXLE MUST BE SUPPORTED BY THE AXLE AND TRAILING ARM TO ENSURE ADEQUATE SUPPORT OF REAR AXLE.

(3) Support the rear axle assembly at both the axle channel and the trailing arm (Fig. 6). Then remove lower shock absorber to rear axle mounting bolt (Fig. 6).

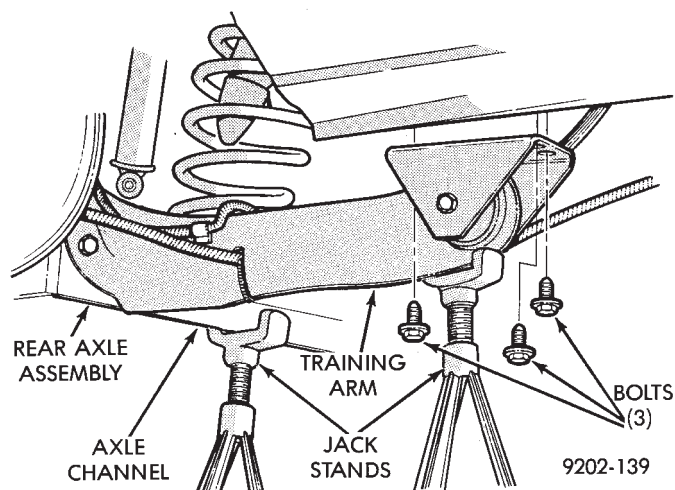


Fig. 6 Remove Pivot Bushing Hanger Bracket Bolts

(4) Remove hanger bracket to frame rail bolts (Fig. 7).

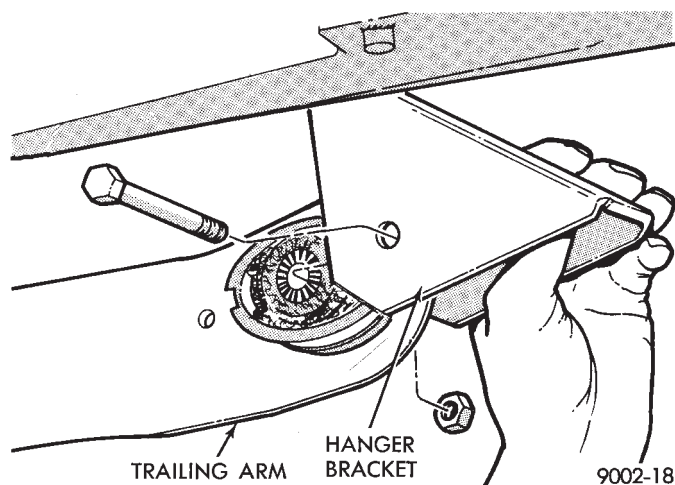


Fig. 7 Remove Hanger Bracket

(5) Lower axle assembly down enough to remove pivot bolt and hanger bracket (Fig. 7). Right side trailing arm shown.

PIVOT BUSHING REMOVAL FROM AXLE ASSEMBLY

Remove bushing with Remover/Installer Special Tool C-4212-L (Press) and 3 piece set, Special Tool 6122 (Receiver Support Bridge, Bushing Remover/Installer and Bushing Remover).

cial Tool 6122 (Receiver Support Bridge, Bushing Remover/Installer and Bushing Remover).

(1) Install receiver (support) bridge into base of press C-4212-L and bushing Remover/Installer disc onto screw.

(2) Position assembly with receiver bridge supporting trailing arm while turning screw to begin bushing removal.

(3) After bushing has begun to move replace bushing remover/installer (round disc) with bushing remover (oval shaped disc). Use this assembly to finish pressing bushing out of trailing arm (Fig. 8).

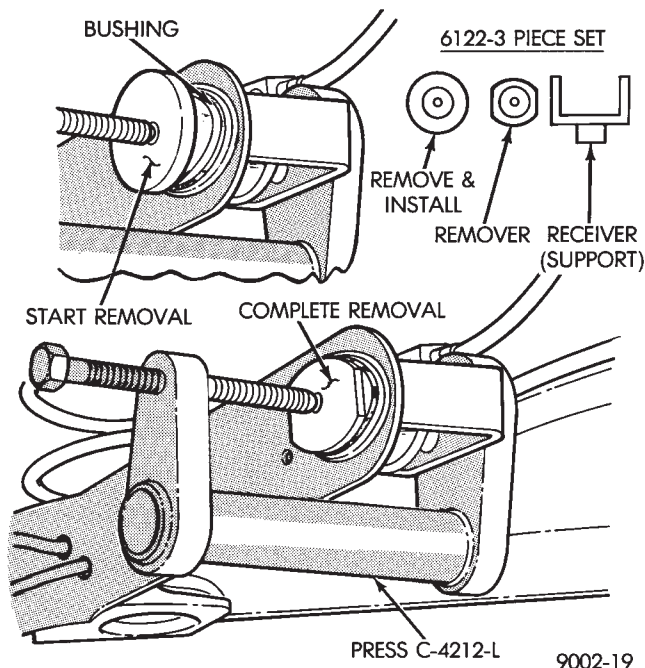


Fig. 8 Tools Installed To Remove Bushing

PIVOT BUSHING INSTALLATION

(1) Align the bushing with the bushing mounting hole in the trailing arm bracket (Fig. 9). Tap bushing in slightly to hold position.

(2) Assemble bushing installer Tool onto press screw and support bridge into press base. **Position assembly as shown in (Fig. 10) and press bushing into arm to depth shown in (Fig. 9).**

(3) Position hanger bracket on pivot bushing, and install through bolt, loose assemble nut (Fig. 11). Right side trailing arm shown.

(4) Position hanger to frame rail (a suitable drift will aid in guiding hanger bracket into position). Install and tighten screws to 75 N•m (55 ft. lbs.) torque (Fig. 12). Install lower shock absorber mounting bolt, **but do not tighten.**

(5) Position brake hose mounting bracket to trailing arm, install and tighten retaining screw to 11 N•m (95 in. lbs.) torque (Fig. 13).

(6) Attach park brake cable housing to hanger bracket and cable to connector.

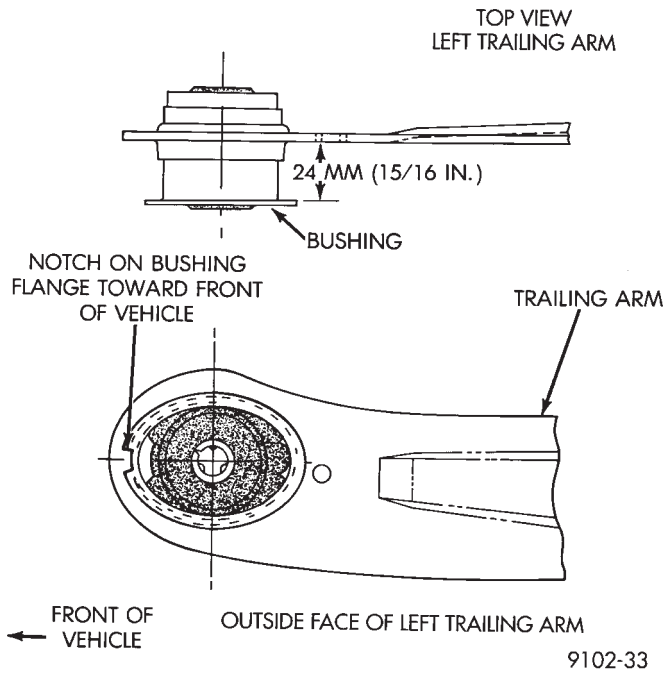


Fig. 9 Proper Position of Pivot Bushing

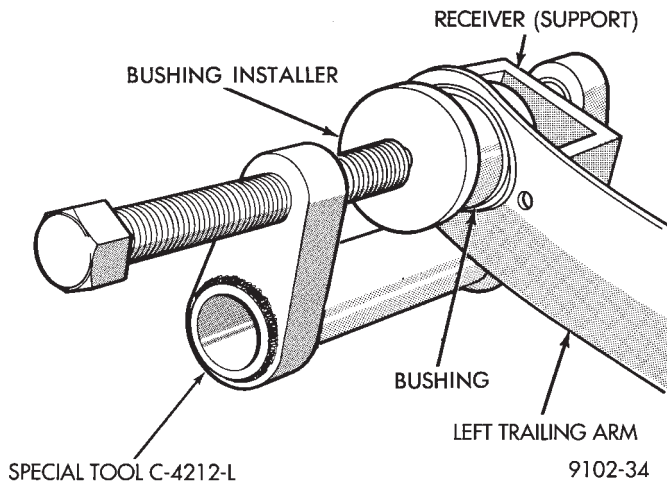


Fig. 10 Tools Assembled for Bushing Installation

(7) Lower vehicle with suspension supporting vehicle weight, trailing arm at design height. Tighten pivot bolt nut and lower shock absorber mounting bolt to 61 N•m (45 ft. lbs.) torque.

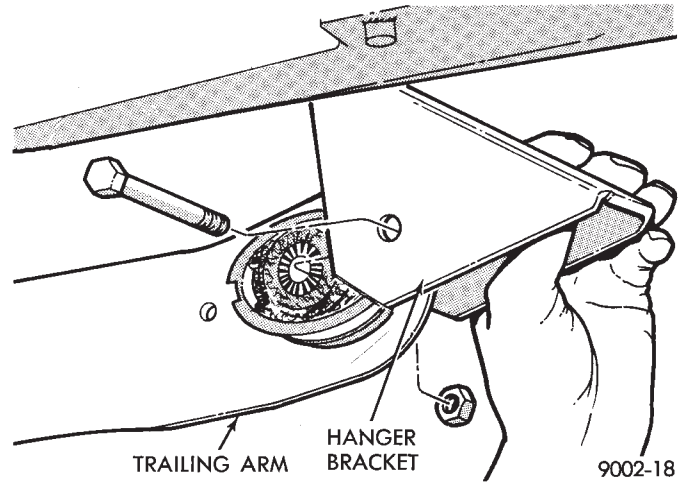


Fig. 11 Install Hanger Bracket to Pivot Bushing

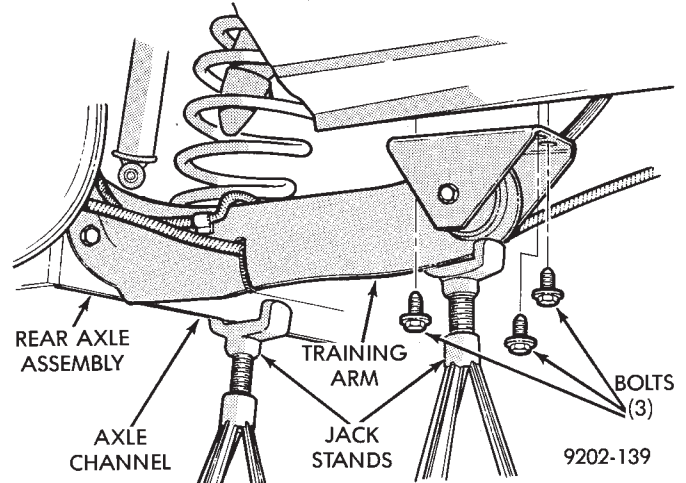


Fig. 12 Install Hanger Bracket on Frame

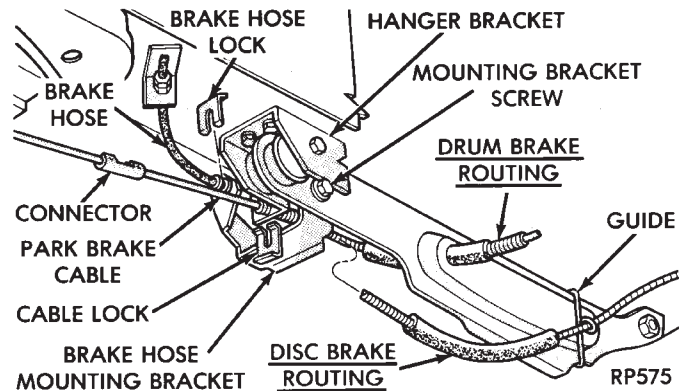


Fig. 13 Brake Hose Bracket & Park Brake Cable

PIVOT BUSHING AC AG AJ AP BODY

REMOVE FROM VEHICLE

(1) Raise vehicle (see Hoisting, Group 0). Remove brake hose mounting bracket screw (Fig. 1).

(2) Detach park brake cable at connector and from hanger bracket (Fig. 1).

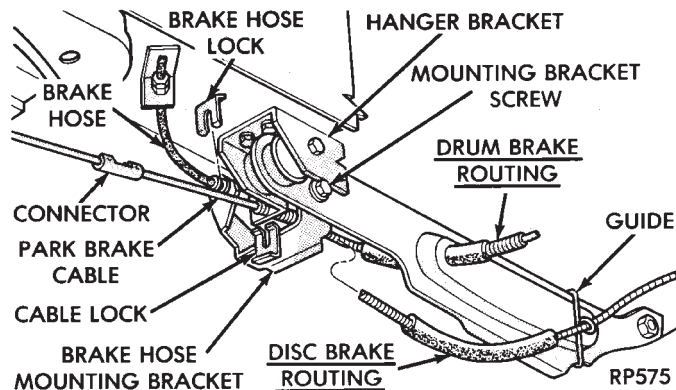


Fig. 1 Remove Brake Hose Mounting Bracket Screw and Park Brake Cable

WARNING: WHEN REMOVING THE REAR AXLE PIVOT BUSHING ON VEHICLES EQUIPPED WITH EITHER REAR COIL SPRINGS OR AIR SUSPENSION. THE REAR AXLE MUST BE SUPPORTED BY THE AXLE AND TRAILING ARM TO ENSURE ADEQUATE SUPPORT OF REAR AXLE.

(3) Support the rear axle assembly at both the axle channel and the trailing arm with jack stands (Fig. 2). Then remove lower shock absorber to rear axle mounting bolt (Fig. 2).

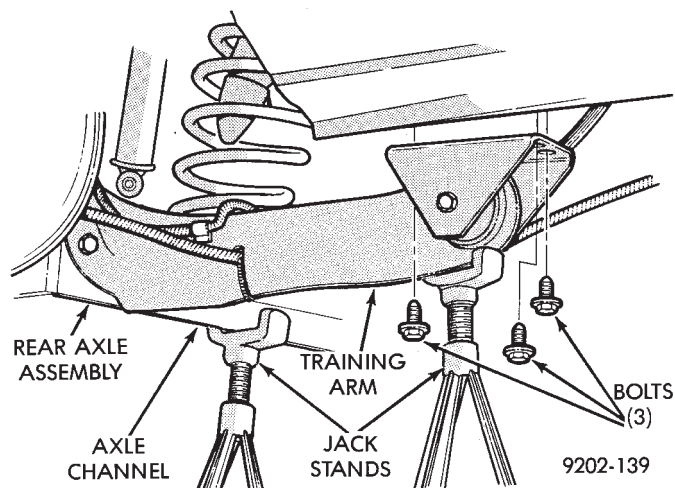


Fig. 2 Remove Pivot Bushing Hanger Bracket Bolts

(4) Remove hanger bracket to frame rail bolts (Fig. 3).

(5) Lower axle assembly down enough to remove pivot bolt and hanger bracket (Fig. 3). Right side trailing arm shown.

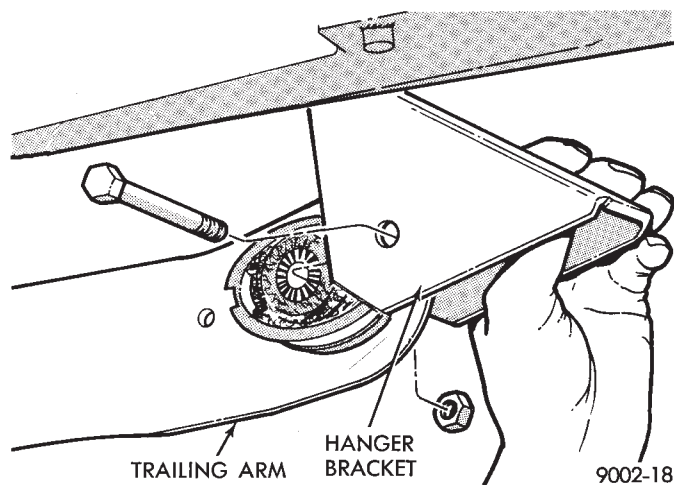


Fig. 3 Remove Hanger Bracket

PIVOT BUSHING REMOVAL FROM AXLE ASSEMBLY

Remove bushing with Remover/Installer Special Tool C-4702-7 Press. And 3 piece set, Special Tool C-4212 and C-4366-1 (Receiver Support Bridge, Bushing Remover/Installer and Bushing Remover).

(1) Install receiver (support) cup C-4366-1 into base of press C-4212 and Bushing Remover Cup C-4702-7 onto screw.

(2) Position assembly with receiver bridge supporting trailing arm while turning screw to begin bushing removal.

(3) After bushing has begun to move replace bushing remover/installer (round disc) with bushing remover (oval shaped disc). Use this assembly to finish pressing bushing out of trailing arm (Fig. 4).

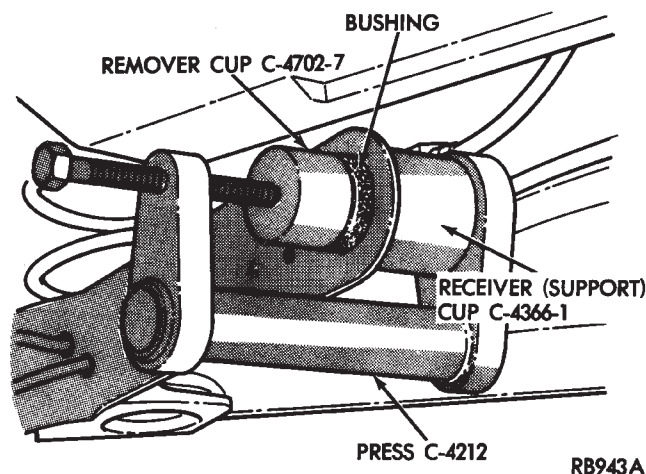


Fig. 4 Tools Installed To Remove Bushing

PIVOT BUSHING INSTALLATION

(1) Align the bushing with the bushing mounting hole in the trailing arm bracket (Fig. 5). Tap bushing in slightly to hold it in position on trailing arm.

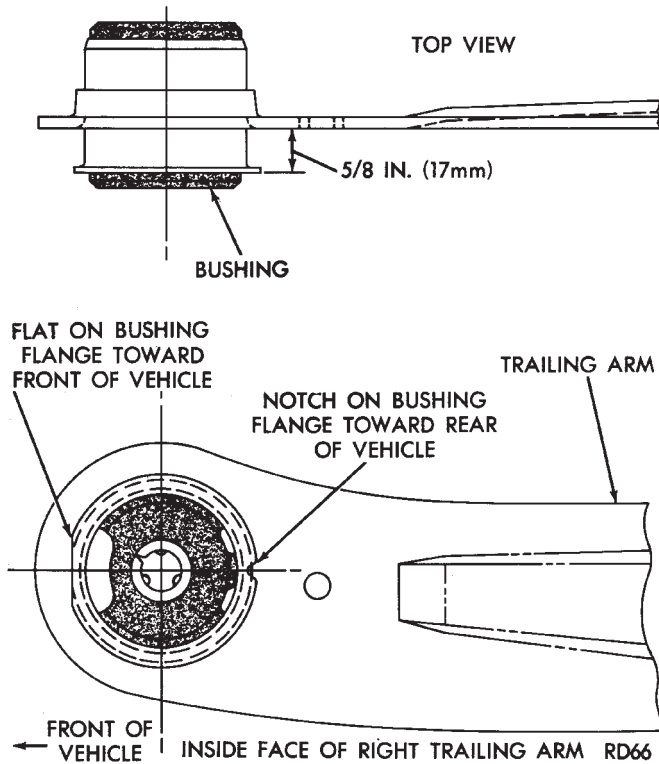


Fig. 5 Proper Position of Pivot Bushing

(2) Assemble Bushing Installer Special Tool C-4702-2 onto press screw and Support Cup Special Tool C-4366-1 into press base. **Position assembly as shown in (Fig. 6) and press bushing into arm to depth shown in (Fig. 5).**

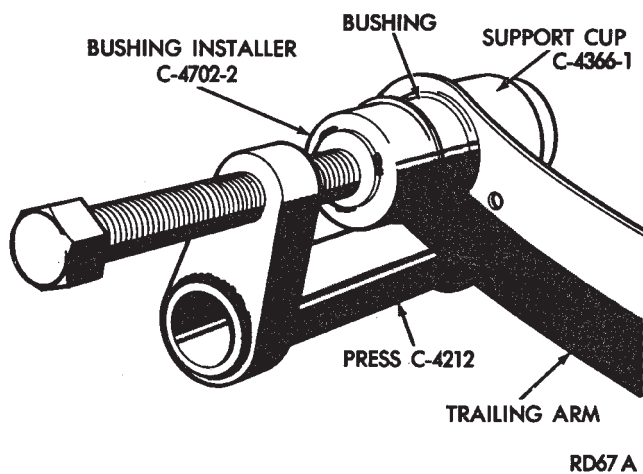


Fig. 6 Tools Assembled for Bushing Installation

(3) Position hanger bracket on pivot bushing, and install through bolt, loose assemble nut (Fig. 7). Right side trailing arm shown.

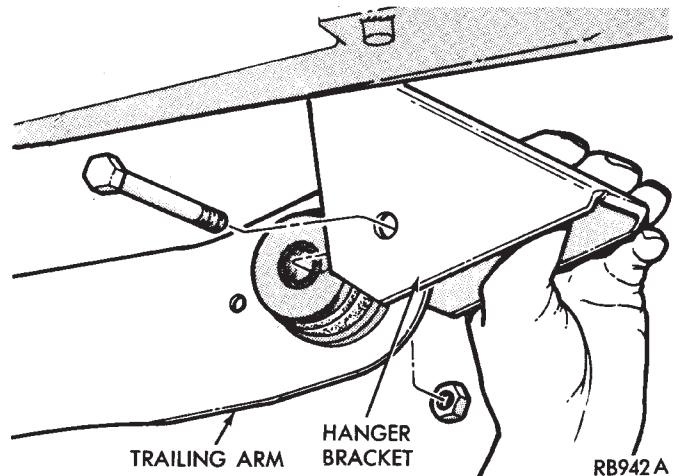


Fig. 7 Install Hanger Bracket to Pivot Bushing

(4) Position hanger to frame rail (a suitable drift will aid in guiding hanger bracket into position). Install and tighten screws to 75 N•m (55 ft. lbs.) torque (Fig. 8). Install lower shock absorber mounting bolt, **but do not tighten.**

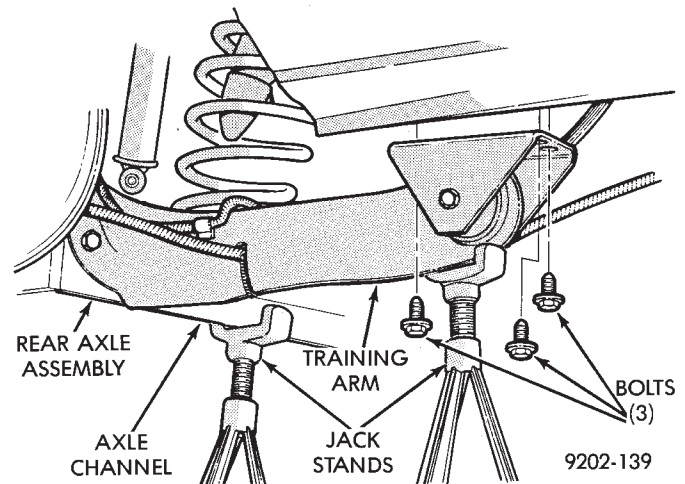


Fig. 8 Install Hanger Bracket on Frame

(5) Position brake hose mounting bracket to trailing arm, install and tighten retaining screw to 11 N•m (95 in. lbs.) torque (Fig. 9).

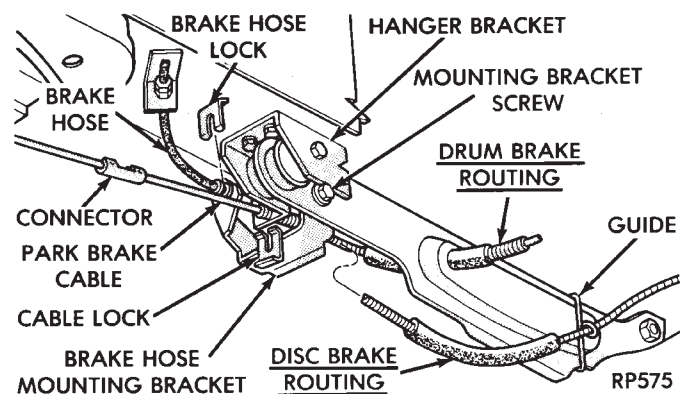


Fig. 9 Brake Hose Bracket & Park Brake Cable

(6) Attach park brake cable housing to hanger bracket and cable to connector.

(7) Lower vehicle with suspension supporting vehicle weight, trailing arm at design height. Tighten pivot bolt nut and lower shock absorber mounting bolt to 61 N•m (45 ft. lbs.) torque.

REAR AXLE ASSEMBLY

REMOVE

(1) Raise vehicle (see Hoisting, Group 0). Support axle with jack stands and remove wheel and tire assembly.

(2) Separate park brake cable at connector. Detach cable housing from hanger bracket (Fig. 1).

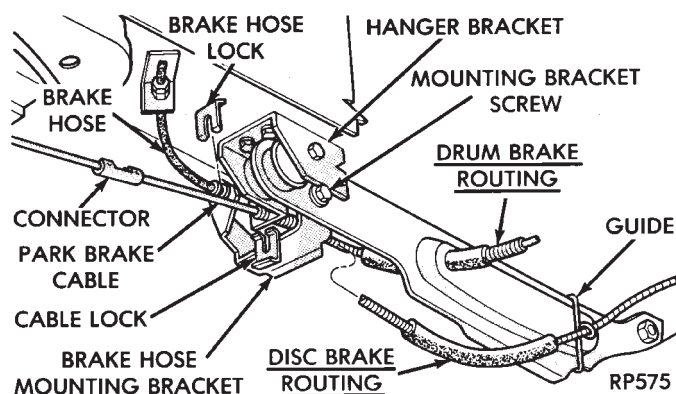


Fig. 1 Remove Brake Hose Mounting Bracket Screw and Park Brake Cable

(3) Remove lock and separate brake tube assembly from brake hose mounting bracket (Fig. 1).

(4) Remove lower shock absorber through bolts and track bar to axle pivot bolt. Support track bar end with wire (Fig. 2).

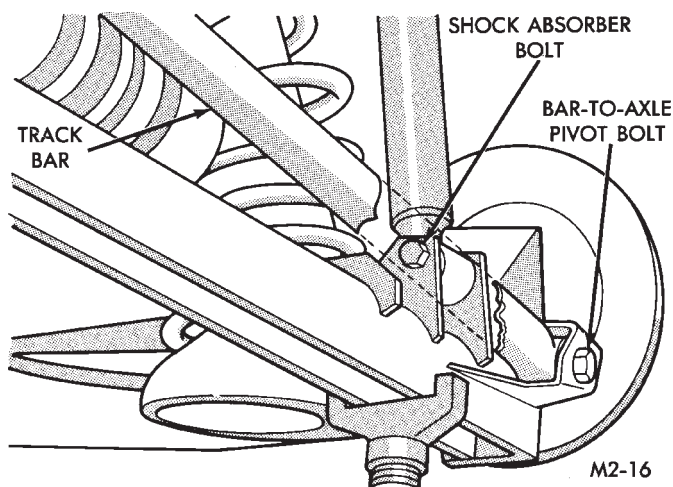


Fig. 2 Remove Shock Absorber and Track Bar Bolts

(5) Lower axle until spring and isolator assemblies can be removed. Remove spring and isolator assemblies (Fig. 3).

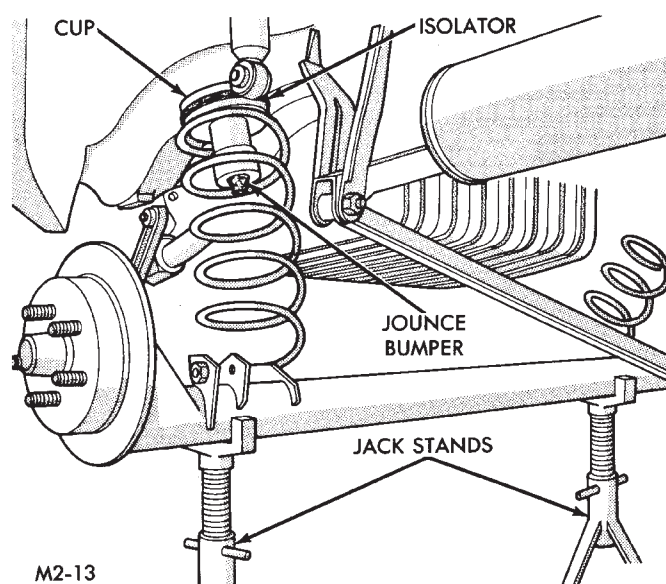


Fig. 3 Remove/Install Coil Spring and Isolator Assembly

(6) Support pivot bushing end of the trailing arms (as well as axle beam with jack stands). Remove pivot bushing hanger bracket to frame screws. Lower and remove axle assembly from vehicle.

(7) Remove rear brake assemblies, see Group 5 for proper procedure.

(8) For pivot bushing removal and installation see PIVOT BUSHING this group.

INSTALLATION

(1) Raise and support axle on jack stands.

(2) Attach pivot bushing hanger brackets to frame rail (Fig. 4). Tighten screws to 61 N•m (45 ft. lbs.) torque.

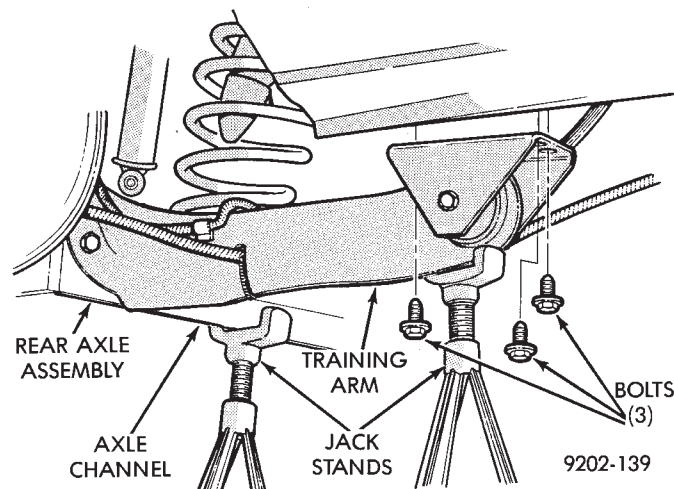


Fig. 4 Attach Hanger Brackets to Frame

(3) Install springs and isolators (Fig. 5).

(4) Raise axle and install shock absorber and track bar through bolts **loose assemble only** (Fig. 6).

(5) Install brake assembly as follows:

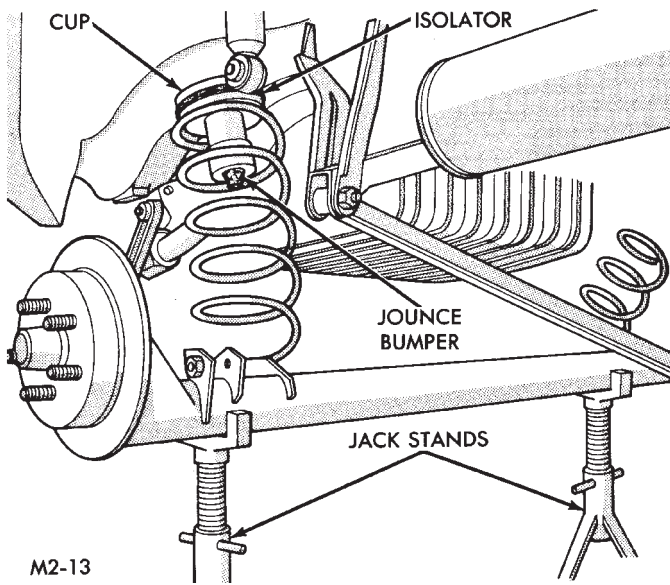


Fig. 5 Install Springs and Isolators

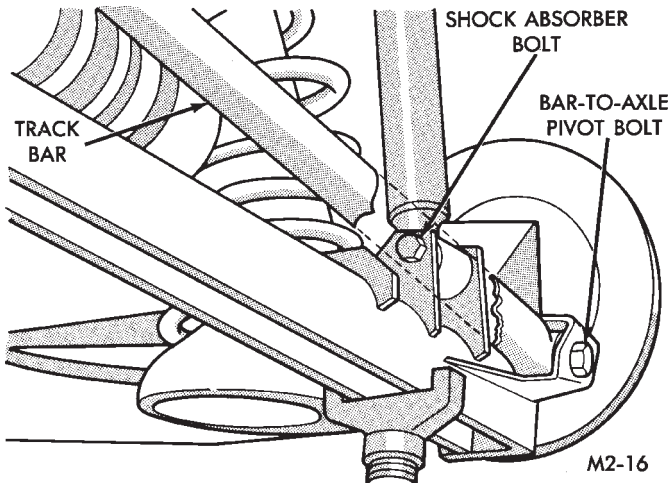


Fig. 6 Install Shock Absorber and Track Bar Fasteners (Bolts)

DRUM BRAKE ASSEMBLY

(1) Position spindle, seal, and brake support to axle after routing park brake cable through trailing arm opening and brake tube over arm (Figs. 1). Install the 4 spindle mounting bolts finger tight. Then torque the 4 spindle mounting bolts to 75 N•m (55 ft. lbs.) torque.

(2) Install brake drum and bearings.

(3) Install washer and nut. Tighten nut to 27-34 N•m (240-300 in. lbs.) torque while rotating brake drum. Then back off nut to completely release preload. Finger tighten nut.

(4) Position nut lock with one pair of slots in-line with cotter pin hole. Install cotter pin. Clean and install grease cap.

DISC BRAKE ASSEMBLY

(1) Position caliper support and spindle to axle. Install the 4 spindle mounting bolts finger tight. Then torque the 4 spindle mounting bolts to 75 N•m (55 ft. lbs.) torque.

(2) Install hub and bearings.

(3) Install washer and nut. Tighten to 27-34 N•m (240-300 in. lbs.) torque while rotating hub. Then back off nut to completely release preload. Finger tighten nut.

(4) Position nut lock with one pair of slots in-line with cotter pin hole. Install cotter pin. Clean and install grease cap.

(5) Install braking disc and adapter. Install caliper assembly (see Rear Disc Brake) in Brakes Section, Group 5.

(6) Attach brake hose and parking brake cable to caliper and suspension arm (Fig. 7). Install brake hose mounting bracket to caliper support.

(7) Route park brake cable through hanger bracket and lock housing end into bracket. Install cable end into (intermediate) connector (Fig. 7).

(8) Install brake hose and fitting into bracket and install lock. Attach brake tube assembly to hose fitting and tighten to 16 N•m (140 in. lbs.) torque (Fig. 7).

(9) Install wheel and tire assemblies and tighten wheel stud nuts to 129 N•m (95 ft. lbs.) torque. Remove jacks and lower vehicle.

(10) With suspension supporting vehicle tighten lower shock absorber bolts to 61 N•m (45 ft. lbs.) torque and track bar bolt to 95 N•m (70 ft. lbs.) torque.

(11) Bleed brake system. See BRAKES, Group 5.

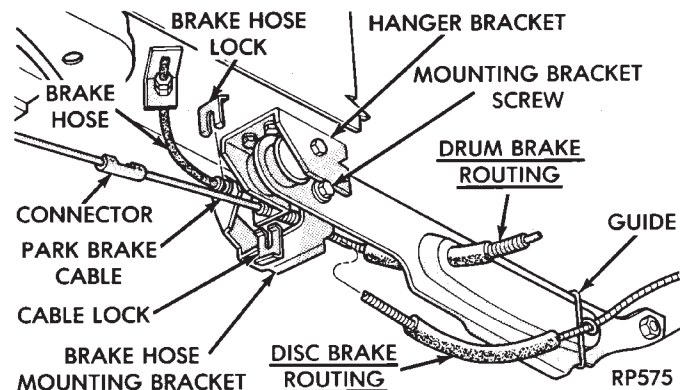


Fig. 7 Reconnect Brake Tube and Park Brake Cable

AUTOMATIC AIR LOAD LEVELING SYSTEM

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GENERAL INFORMATION

The automatic air load leveling system includes the following (Fig. 1):

- Compressor Assembly
- Control Module Wiring Harness
- Air Lines
- Compressor Relay
- Air Shock Absorbers
- Air Dryer

This system is used to supplement standard suspension systems on vehicles so equipped.

MAJOR COMPONENTS

COMPRESSOR ASSEMBLY

The compressor assembly is driven by an electric motor and supplies air pressure between 1172 to 1516 kPa (170 to 220 psi) (Fig. 2). A solenoid operated exhaust valve, located in the compressor head assembly, releases air when energized.

CONTROL MODULE

The Control Module (CM) is a device that controls the ground circuits for the compressor relay and the exhaust valve solenoid. A microprocessor within the module limits the compressor pump operation time to 140 to 160 seconds. To prevent damage to the compressor motor.

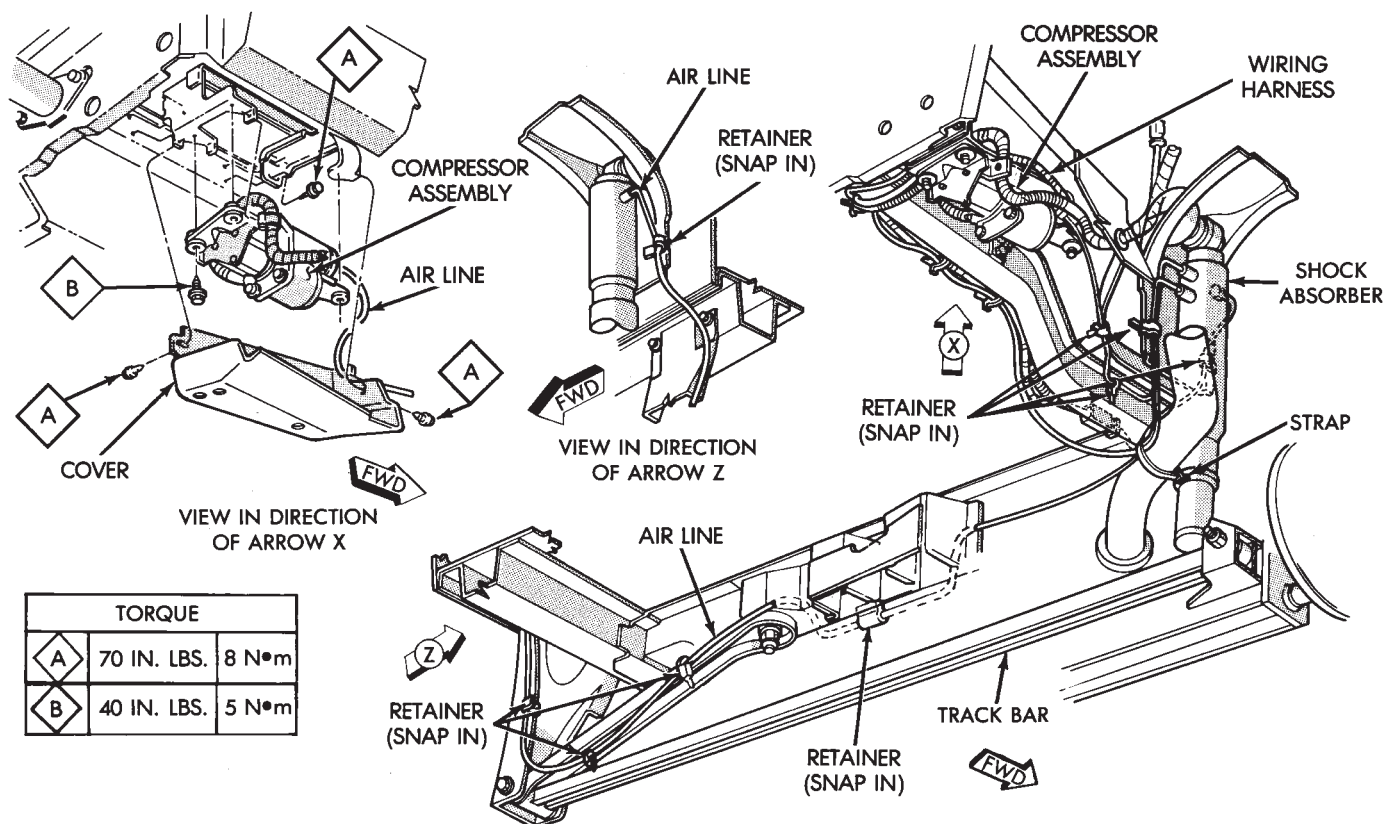


Fig. 1 Automatic Air Load Leveling System

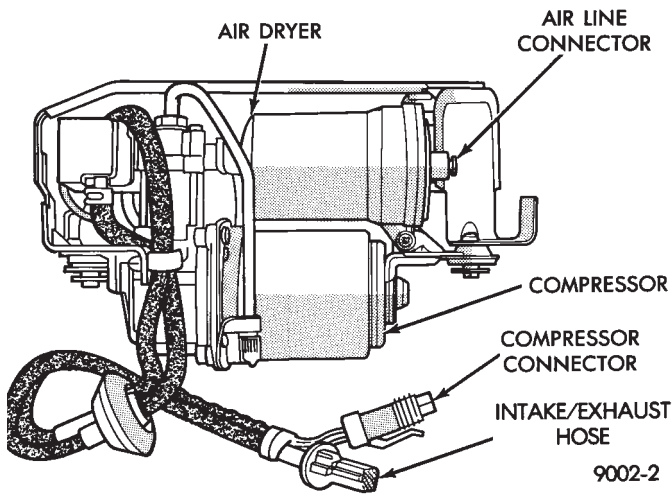


Fig. 2 Compressor Assembly

In addition, there is an air regeneration cycle that is controlled by the Control Module (CM). If the height sensor signal is in the neutral or high position. When the ignition switch is turned to the ON position, after a 22 to 28 second delay, the compressor will run from 2 to 6 seconds.

To prevent excessive cycling between the compressor and the exhaust solenoid circuits during normal ride conditions. A 12 to 18 second delay is incorporated in the microprocessor.

HEIGHT SENSOR

A magnetic switch type sensor, located in the right air shock absorber, monitors rear vehicle height. The sensor sends signals to the (CM) relating to vehicle rear suspension status (low, trim, high).

AIR LINES AND FITTINGS

To release an air supply line from a rear shock absorber assembly. Push in (toward shock absorber) on the plastic ring of the shock absorber air line fitting. Then while holding in the plastic ring on shock absorber fitting pull the air supply line straight out of fitting (Fig. 3).

The fitting has a unique push-in feature. A brass type collet locks the air line in place. One rubber O-ring seals the air line to prevent air leakage. To attach air line, push into fitting (Fig. 4).

COMPRESSOR RELAY

The relay is mounted to a bracket on the Control Module (CM). When the relay is energized, it allows the compressor to operate. This unit is controlled by the CM.

AIR ADJUSTABLE SHOCK ABSORBERS

Air shock absorbers are essentially hydraulic shock absorbers with a neoprene bladder sealing the upper and lower sections together, forming an air cylinder.

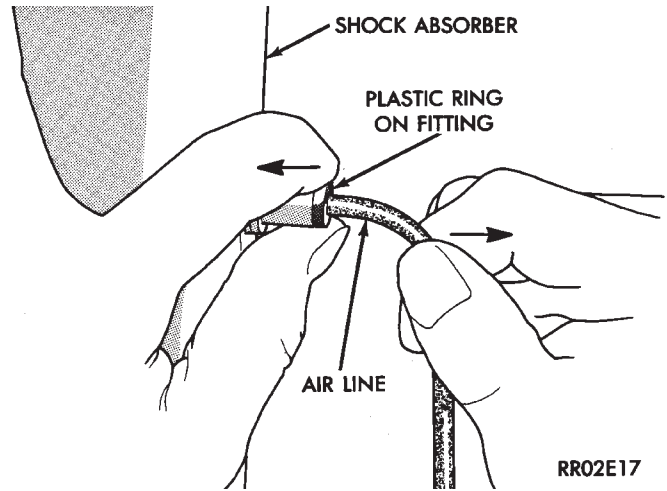


Fig. 3 Release Air Line from Fitting

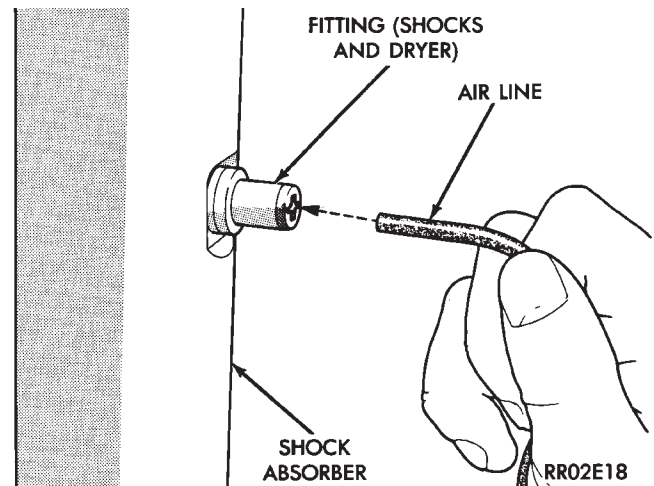


Fig. 4 Push Air Line into Fitting

AIR DRYER

The air dryer is attached to the compressor. This component serves two purposes; it absorbs moisture from the atmosphere before it enters the system. And with the internal valves maintains a residual system pressure of 69 to 152 kPa (10 to 22 psi).

AIR CHECK, RESIDUAL (FIG. 5).

The air dryer has a valves arrangement that maintains 69 to 152 kPa (10 to 22 psi) in the air shocks. This is to improve the ride characteristics of the vehicle under light load conditions. To test this function, perform the following procedure:

(1) Remove the air line from the dryer and right shock absorber. Attach a piece of bulk nylon tubing to one side of a Pressure Gauge (0-300 psi), and to the right shock absorber (Fig. 5).

(2) Attach another piece of nylon tubing from the dryer (compressor) to other side of the pressure gauge.

A compression ball sleeve nut and sleeve for 3/16 inch tubing with ball sleeve connector and an internal pipe T-fitting. Can be used to attach the tubing to the pressure gauge.

(3) Cycle ignition from OFF to ON.

(4) Apply a load to the rear of the vehicle (two assistants or approximately 300-325 lbs.) to run compressor and raise the vehicle.

(5) Remove the load applied in Step 4. Allow the system to exhaust and lower the vehicle.

(6) When no more air can be exhausted, the gauge should indicate 69 to 152 kPa (10 to 22 psi).

(7) Remove the pressure gauge and nylon tubing. Attach the air line between the dryer and shock absorber. Repeat Steps 3, 4, and 5 to ensure system air pressure is in the shocks.

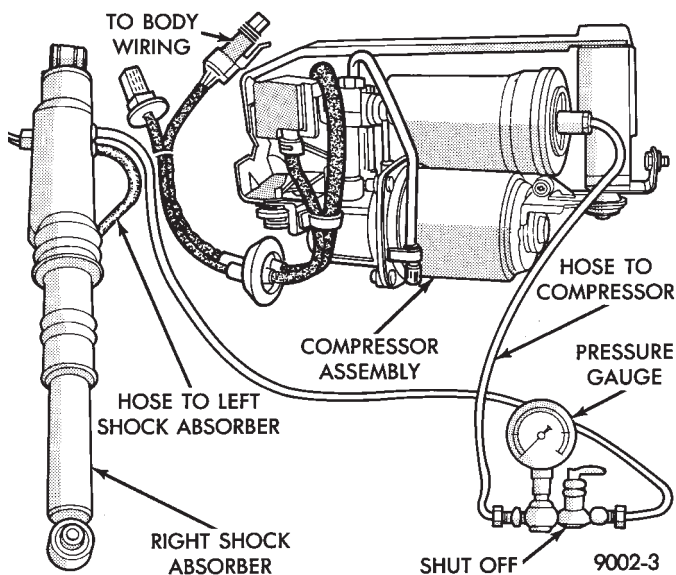


Fig. 5 Pressure Gauge Installed in System

LEAK CHECKS

(1) Repeat Residual Air Check Steps 1, 2, 3, and 4. Allow the system to fill until gauge reads 483 to 621 kPa (70 to 90 psi).

If compressor is permitted to run until it reaches its maximum output pressure, the vent solenoid valve will function as a relief valve. The resulting leak down, when compressor shuts off, will indicate a false air leak.

(2) With load still applied, disconnect wire harness connector from the control module, then remove applied load. Vehicle should rise. Cycle ignition switch to OFF.

(3) Observe if pressure leaks down or holds steady (wait approximately 15 minutes).

(A) If system will not inflate beyond 345 kPa (50 psi). A severe leak may be indicated. Check for a pinched pressure line between compressor and shocks.

(B) The standard soap solution check procedure is acceptable.

(C) If pressure holds steady, perform the diagnosis procedures.

SYSTEM OPERATION

RAISING VEHICLE HEIGHT

When weight is added to the rear suspension. The body of the vehicle is lowered, moving the height sensor down.

This action will activate the internal time delay circuit. After a time delay of 12 to 18 seconds. The control module (CM) activates the ground circuit to the compressor relay.

With the relay energized, the compressor motor runs and air is sent through the system. As the shock absorbers inflate, the body moves upward to a corrected position. When the body reaches the correct height, the control module (CM) stops the compressor operation.

LOWERING VEHICLE HEIGHT

When the weight is removed from the vehicle. The body moves upward, which allows the height sensor to move upward and activate the internal time delay circuit.

After a time delay of 12 to 18 seconds. The (CM) activates the exhaust solenoid circuit. Air is exhausted from the shock absorbers through the air dryer and exhaust solenoid to the atmosphere.

As the body lowers, the height sensor is lowered toward its original position. When the body reaches the original vehicle height, the (CM) opens the exhaust solenoid valve circuit.

COMPRESSOR PERFORMANCE TEST

This test can be performed on the vehicle. It is used to evaluate compressor current draw, pressure output, and leak down.

(1) Disconnect the compressor motor wiring harness connector.

(2) Disconnect air line between dryer and right shock absorber.

(3) Connect an air pressure gauge into the system (Fig. 5).

(4) Connect an ammeter in series between the red wire terminal on compressor connector and a 12 volt power source. Also, connect a ground wire from the black wire terminal on the compressor connector to a good ground on the frame (Fig. 6).

(5) If the current draw to the compressor motor exceeds 21 amperes, replace the compressor assembly.

(6) When the air pressure stabilizes at 827 kPa (120 psi), disconnect the (+) wire lead from the connector. Replace the compressor assembly if any of the following conditions exists:

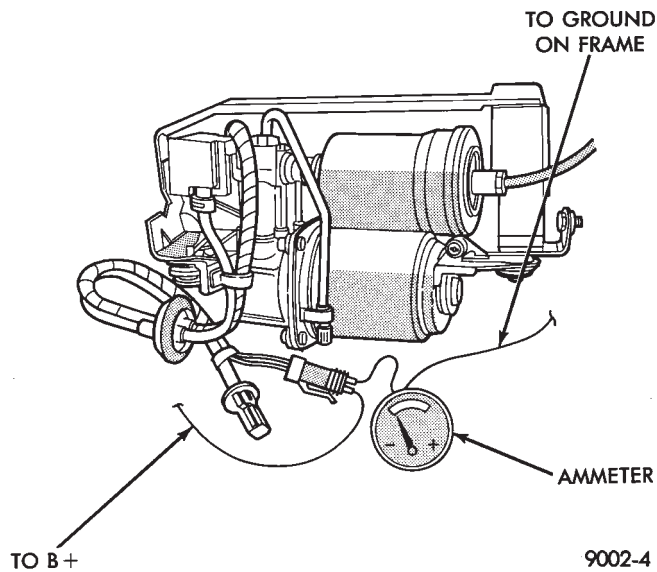


Fig. 6 Compressor Current Draw Test

- Air pressure leaks down below 621 kPa (90 psi), before it remains steady.
- Output pressure builds up to less than 758 kPa (110 psi) when it stabilizes.

If the compressor is allowed to run during this test until it reaches its maximum output pressure of 1516 kPa (220 psi). The solenoid exhaust valve will act as a pressure relief valve. The resulting leak-down, after the compressor is shut off, will indicate a false leak.

SERVICE PROCEDURES

COMPRESSOR ASSEMBLY

REMOVAL

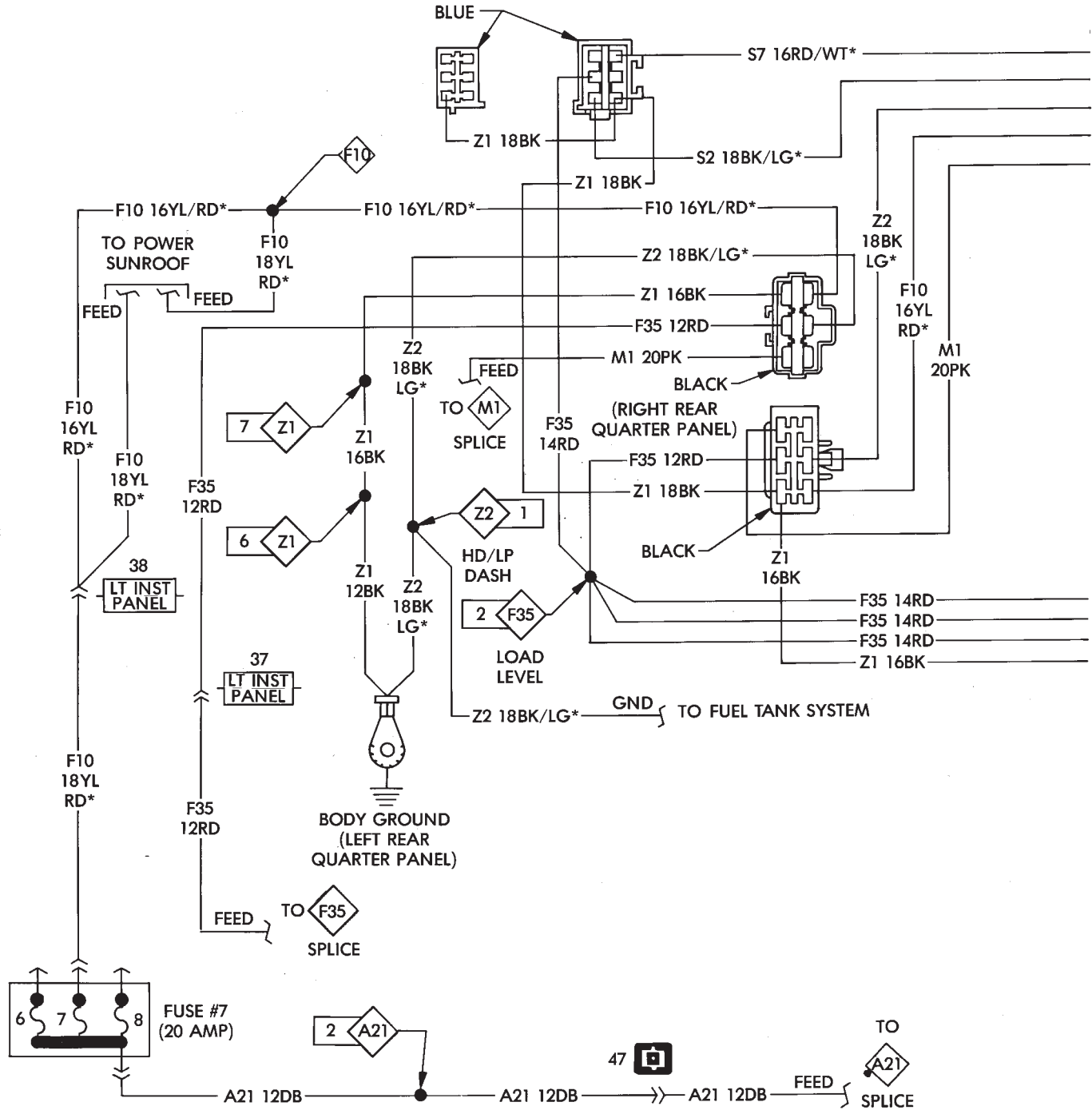
- (1) Disconnect negative battery cable.
- (2) Raise vehicle, see Hoisting, Group 0.
- (3) Remove cover from compressor assembly. Remove air hose and electrical connectors (Figs. 1 and 2).
- (4) Remove compressor assembly mounting bolts and lower assembly from vehicle.
- (5) Remove mounting bracket bolts and slide mounting bracket away from compressor.

INSTALLATION

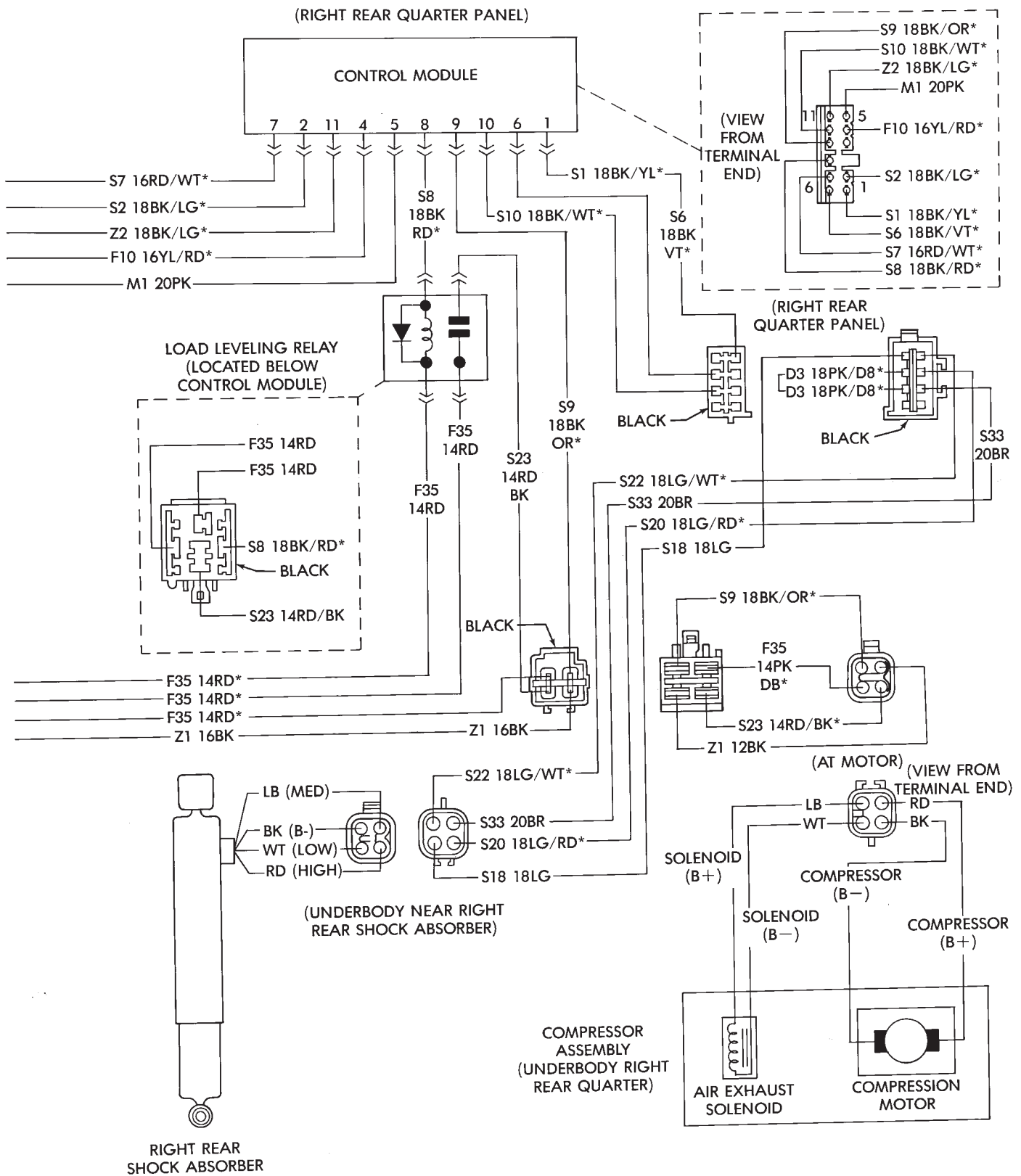
- (1) Slide mounting bracket on compressor and install bolts and tighten to 8 N•m (70 in. lbs.) torque.
- (2) Install compressor assembly to frame rail and tighten bolts to 8 N•m (70 in. lbs.) torque.
- (3) Connect air hose and electrical connector to compressor assembly.
- (4) Install cover on compressor assembly and tighten bolts to 8 N•m (70 in. lbs.) torque.
- (5) Lower vehicle and connect negative battery cable.
- (6) Check operation of the system.

AUTOMATIC AIR LOAD LEVELING SYSTEM WIRING SCHEMATIC

SYSTEM DIAGNOSTIC CONNECTORS
(RIGHT REAR QUARTER PANEL)
CONNECTORS ARE CONNECTED TO EACH OTHER
FOR SAFETY REASONS
THE 18BK WIRE BETWEEN THE TWO CONNECTORS
SERVES AS A TETHER ONLY!!



AUTOMATIC AIR LOAD LEVELING SYSTEM WIRING SCHEMATIC



REAR LEVELING DIAGNOSTIC PROCEDURES

PIN NO.	DESCRIPTION
LL1	SENSOR HIGH
LL2	SELF-DIAGNOSIS SW.
OPEN	NC
W40	AL-G-L
W5	MOD POWER
LL6	SENSOR LOW
LL7	MONITOR LAMP
LL8	COMP. RELAY
LL9	EXH. SOLENOID
LL10	SENSOR GND.
X20	MOD GND.

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Fig. 7 Control Module Connector

SELF-DIAGNOSTICS

A self-diagnostic procedure is available for the service technician to use to detect system malfunctions.

BEFORE DIAGNOSTICS TEST

Check the 20 amp fuse (position W40) and the 30 amp circuit breaker (position W5) to be assured they are functional components.

Check all connectors that link the system into the main body wiring harness. These include the (compressor, height sensor, control module, (Fig. 7) relay, underbody to in trunk and leveling harness to main body harness connectors). Also, check all air lines, connectors, and other components for correct installation.

TEST LAMP PIN OPERATION

The monitor lamp pin output will be activated (test lamp on) if the detection of abnormal system operation is determined by the CM.

AFTER COMPLETION OF REPAIRS

To initiate diagnostics, disconnect the test ground wire then reconnect for repair verification.

TERMINATION OF SELF-DIAGNOSTICS

The self-diagnostic operation is terminated when any of the following takes place:

- Disconnecting the diagnostic input from the ground circuit.
- Turn the ignition switch to the off position.

When the self-diagnostic operation is terminated. The control module resumes normal operation unless it ceases operation. Due to it detecting a system malfunction.

TEST WEIGHT

Weight between 275-300 lbs. must be added to rear of vehicle before diagnostic testing begins.

DIAGNOSTICS (TO START PROCESS)

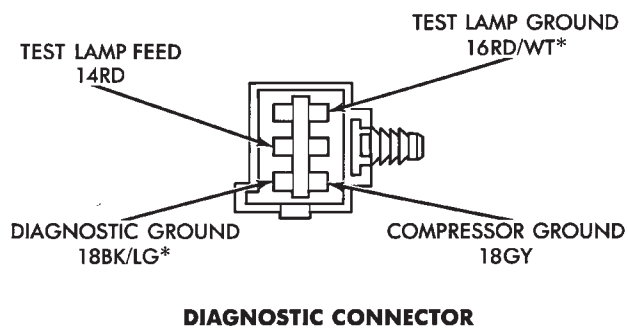
(1) Remove protective connector cover from diagnostic connector.

(2) Insert wire into diagnostic ground pin. Then

attach to compressor ground pin, or as an alternate, insert wire into diagnostic ground pin. Then ground other end of test wire to body structure or a control module fastener.

IGNITION

The following self-diagnostic operation is initiated only by connecting the diagnostic ground pin to ground after the ignition switch is turned ON. A monitor lamp must be connected between the Test Lamp Ground Pin and the Test Lamp Feed Pin to display the control module diagnostics status. See (Fig. 8) for diagnostic test pin locations.



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Fig. 8 Diagnostic Test Pin Location

OPERATION

(1) The compressor relay output. From the control module (CM), is activated until the vehicle is in the high position. The maximum relay output operation time is 150 ± 10 seconds. If the expected position is not obtained, the CM ceases self-diagnostics and any further operation. (I.e. neither operates the compressor relay or exhaust outputs). The monitor lamp output is continuously activated until the ignition is cycled from OFF to ON or 60 ± 1 minutes has elapsed after ignition was turned off. See Diagnostics Chart 1.

(2) The monitor lamp output should flash to indicate the position of the height sensor. The sensor should be in the high position. A continuously lighted monitor lamp will indicate a system failure. Such as the compressor relay output has operated for 150 ± 10 seconds but the height sensor did not move to the high position within the right shock absorber). See Diagnostic Chart 1.

(3) Next the exhaust solenoid output is activated until the vehicle is in the low position. The maximum exhaust solenoid operation time is 120 ± 10 seconds. If the expected position is not obtained, the module ceases self-diagnostics and any further operation. The monitor lamp output is lighted continuously until ignition is cycled from OFF to ON or 60 ± 1 minutes has elapsed after ignition is turned off. See Diagnostic Chart 4.

(4) The monitor lamp should flash to indicate the height sensor is in the low position. A continuously

lighted monitor lamp will indicate a system failure. Such as the exhaust solenoid operated for 120 ± 10 seconds but the height sensor did not move to the low position. See Diagnostic Chart 4.

(5) The compressor relay output is activated to return the vehicle to the neutral (leveled) position. The maximum operation time of the relay output is 150 ± 10 seconds. If the expected position is not obtained. The control module ceases self-diagnostics and any further operation. The monitor lamp is continuously lighted until the ignition is cycled from OFF to ON or 60 ± 1 minutes has elapsed after ignition is turned off.

The sensor will move to the neutral position. If not, a continuously lighted monitor lamp will indicate a

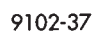
system failure. Such as the compressor relay output operated for 150 ± 10 seconds but the sensor did not move to or sense the neutral position. See Diagnostic Chart 1.

(6) Completion of Diagnostics When the self diagnostic procedure is successfully completed, the control module resumes normal operation. The diagnostic test is now complete. Throughout the testing the vehicle load must be maintained at a specific level. No loads are allowed to be added/removed to/from the vehicle once the self diagnosis tests have been initiated.

The Diagnostic connector cover must be installed after completion of the test.

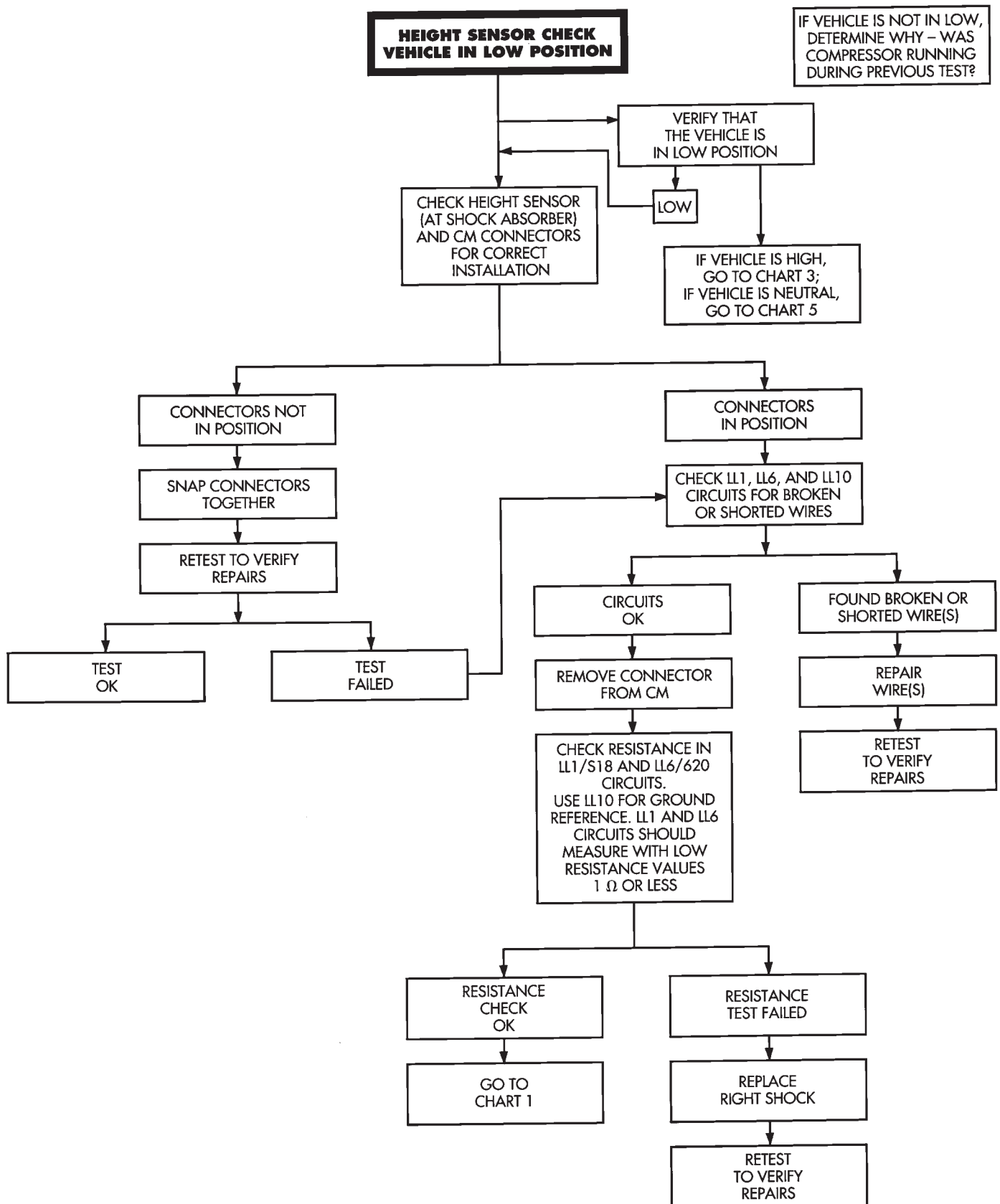
AUTOMATIC AIR LOAD LEVELING DIAGNOSTICS

CHART 1



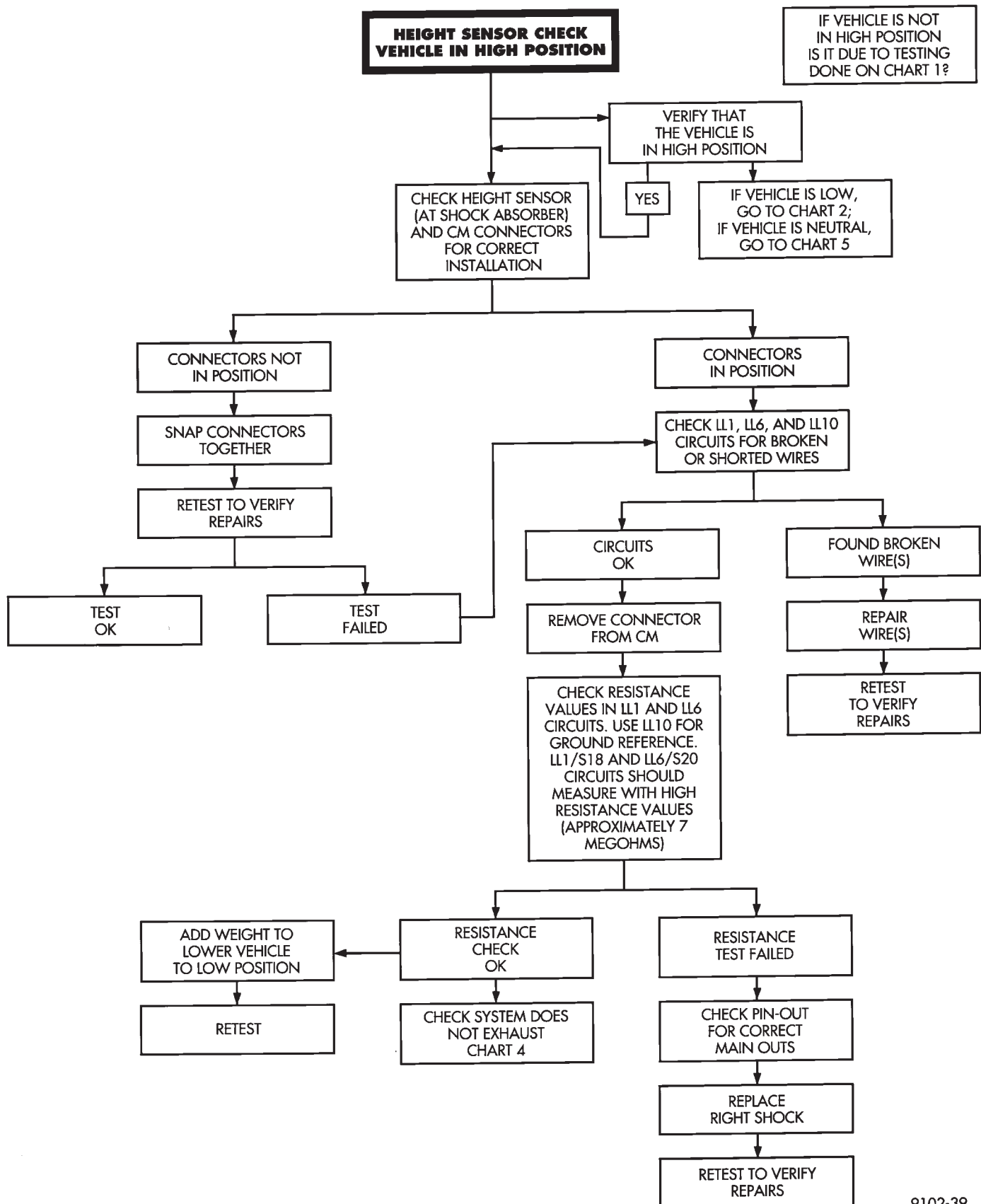
AUTOMATIC AIR LOAD LEVELING DIAGNOSTICS

CHART 2



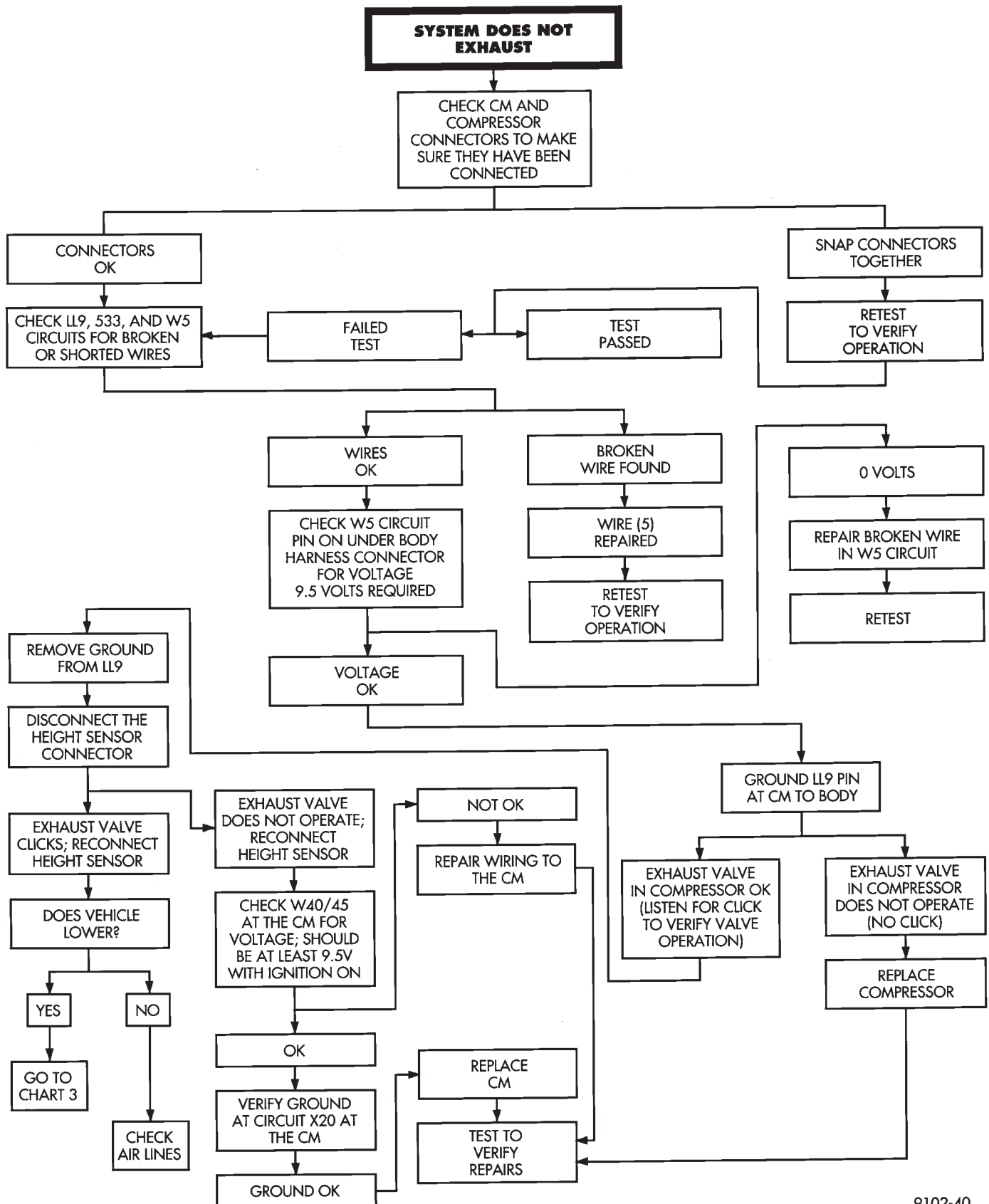
AUTOMATIC AIR LOAD LEVELING DIAGNOSTICS

CHART 3



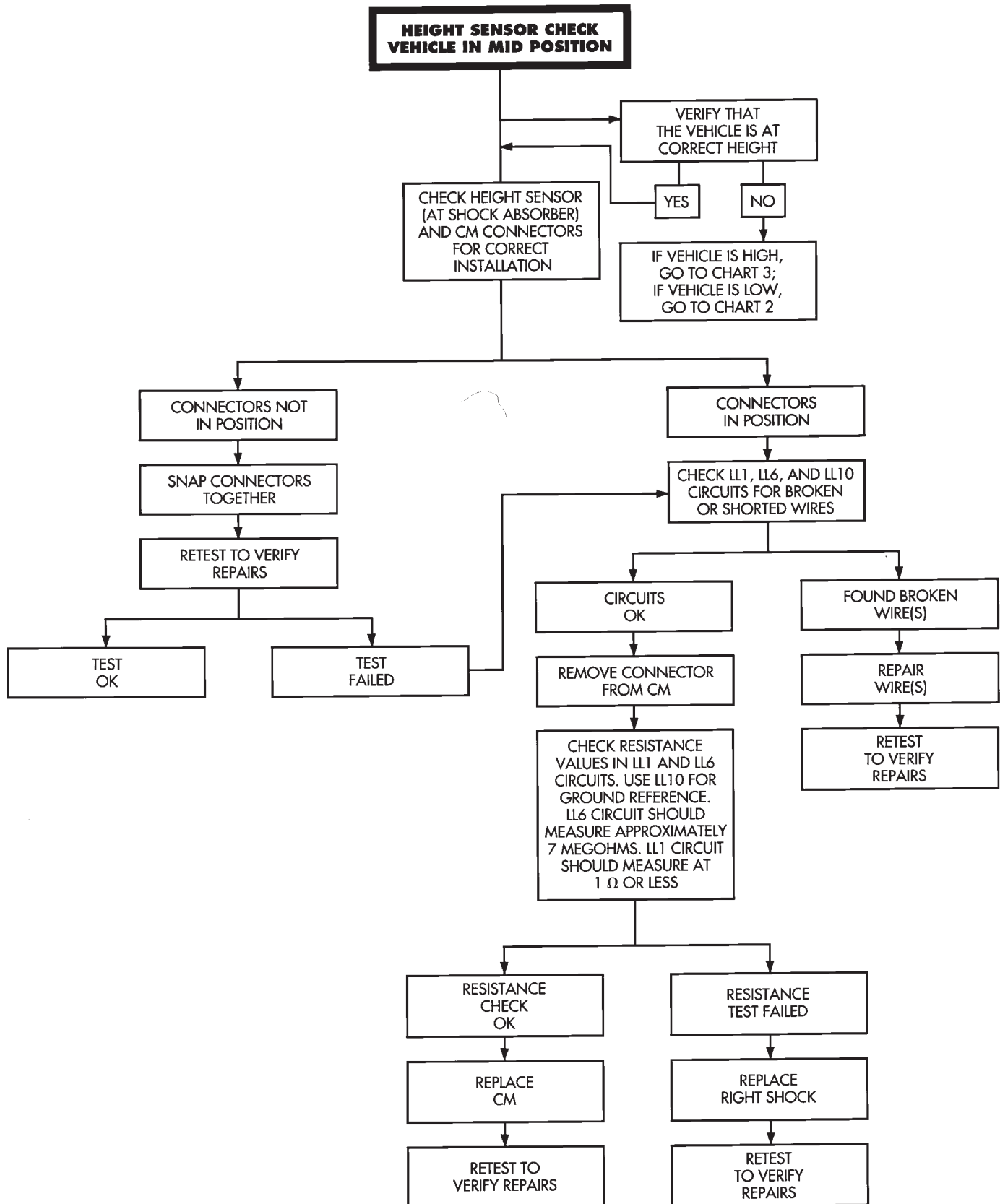
AUTOMATIC AIR LOAD LEVELING DIAGNOSTICS

CHART 4



AUTOMATIC AIR LOAD LEVELING DIAGNOSTICS

CHART 5



CONTROL MODULE

REMOVAL

- (1) Disconnect negative battery cable.
- (2) Remove right side trunk trim panel.
- (3) Remove electrical connectors from control module and relay (Fig. 7).
- (4) Remove control module mounting screws and remove assembly.

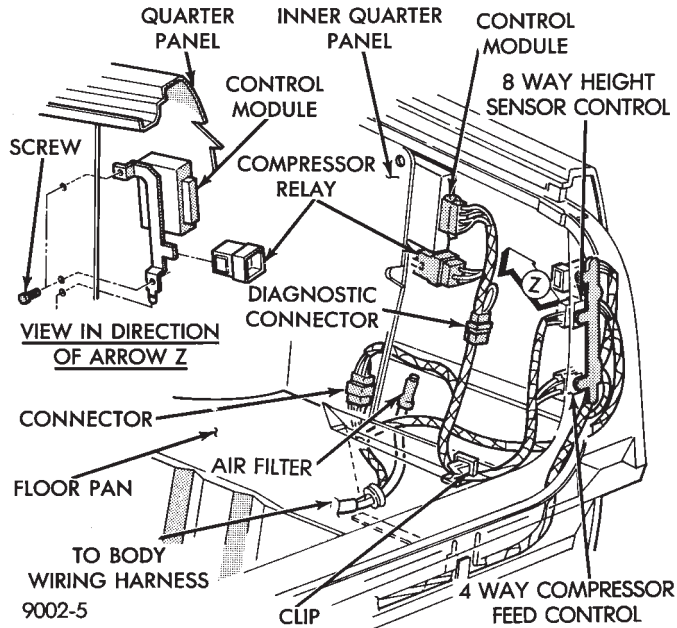


Fig. 7 Control Module and Relay Wiring

INSTALLATION

- (1) Install relay on the control module mounting bracket (if required).
- (2) Place control module in mounting position.
- (3) Install mounting screws and tighten to 2-3 N•m (19-29 in. lbs.).
- (4) Install control module and relay wiring connectors (Fig. 7).
- (5) Install right side trunk trim panel.
- (6) Connect negative battery cable.

COMPRESSOR RELAY

REMOVAL

- (1) Remove right side trunk trim panel.
- (2) Remove electrical connector from relay.
- (3) Remove relay from control module mounting bracket by prying out on locating clip (Fig. 8).

INSTALLATION

- (1) Push relay onto bracket (relay will Lock into position).
- (2) Install electrical connector.
- (3) Install trim panel.

RIGHT SHOCK ABSORBER (WITH HEIGHT SENSOR)

REMOVAL

- (1) Disconnect negative battery cable.
- (2) Raise vehicle, see Hoisting, Group 0.
- (3) Remove tire assembly.
- (4) Disconnect height sensor connector, located on right rear frame rail.
- (5) Remove both air lines connected to shock absorber ports.
- (6) Remove shock, see Shock Absorbers, Removal.

INSTALLATION

- (1) Install shock assembly, see Shock Absorbers, Installation.
- (2) Route height sensor wire through clip on shock bracket, then tie strap to fuel filler tube.
- (3) Snap height sensor connector into underbody harness connector.
- (4) Insert air lines.
- (5) Install wheel/tire assembly.

PIN NO.	DESCRIPTION
LL1	SENSOR HIGH
LL2	SELF-DIAGNOSIS SW.
OPEN	NC
W40	AL-G-L
W5	MOD POWER
LL6	SENSOR LOW
LL7	MONITOR LAMP
LL8	COMP. RELAY
LL9	EXH. SOLENOID
LL10	SENSOR GND.
X20	MOD GND.

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Fig. 8 Control Module Connector

AUTOMATIC AIR SUSPENSION

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Compressor Performance Test	78	Service Procedures	86
Diagnosis	80	Shipping Mode	79
General Information	74	Solenoids (Struts and Air Springs)	87
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GENERAL INFORMATION

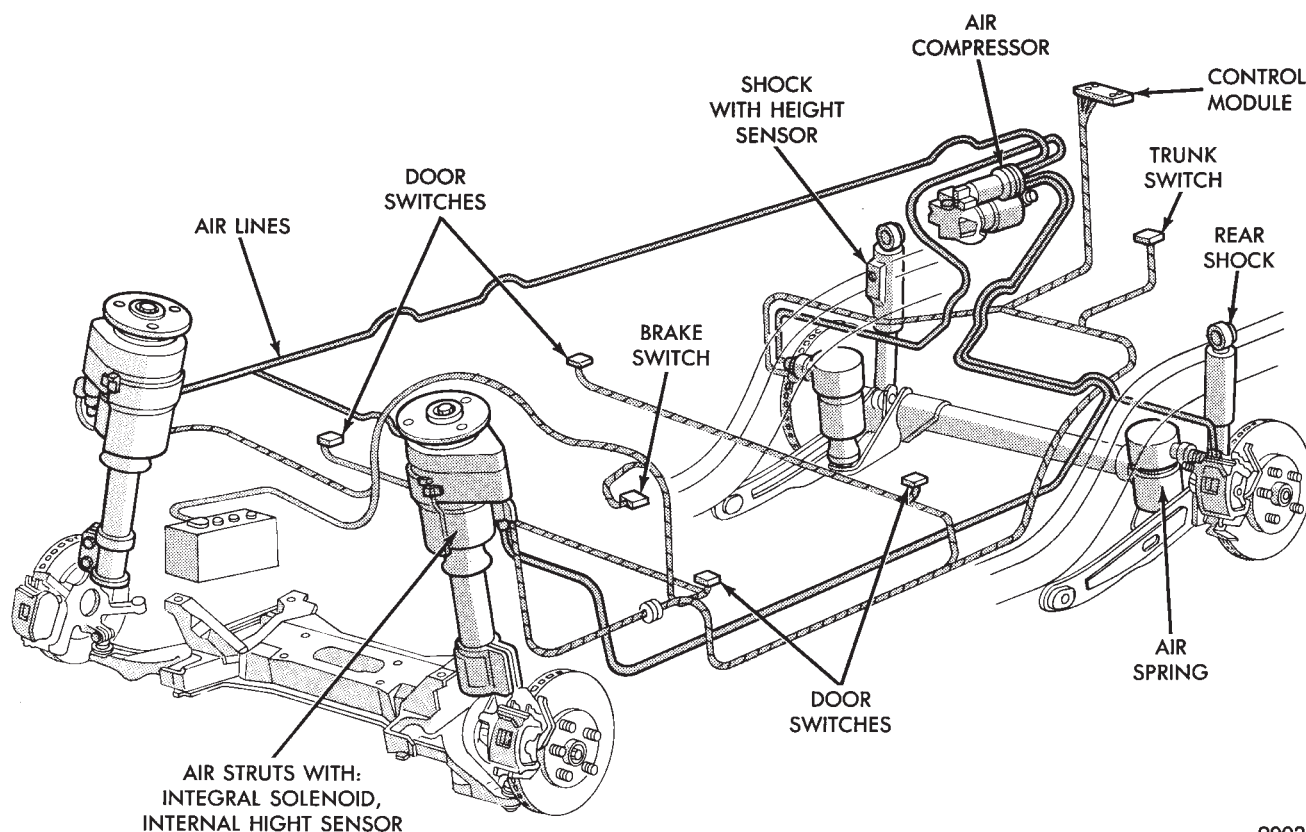
This system provides automatic height control and low spring rates to improve suspension characteristics of the vehicle. And it will automatically level the front and rear of the vehicle. It will also maintain the optimum vehicle attitude from one passenger through full vehicle load.

The automatic air suspension system includes the following components:

- Compressor/air dryer assembly
- Compressor relay
- Front struts
- Rear springs
- Rear shocks
- Control module
- Air lines

- Compressor
- Rear height sensor
- Wiring harness assembly
- Compressor cover

Front springs (and height sensors) are integral with the shock absorber strut assemblies. While rear air springs replace conventional steel units. Rear height is controlled via a height sensor contained within the right rear shock absorber. Solenoids (integral with each air spring) control air volume/pressure requirements. Pressurized air is distributed from the air compressor/dryer assembly and routed to each air spring by four separate air lines. The air lines start at the dryer and terminate at the individual air springs. The system is monitored and controlled by the Air Suspension Control Module (ASCM) (Fig. 1).



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Fig. 1 Automatic Air Suspension

FRONT AND REAR AIR SPRINGS

The front and rear air springs are essentially pneumatic cylinders that replace the steel coil springs. The air filled springs allow the vehicle suspension height to be adjusted for all weight conditions.

The air springs allow for the reduction of spring rates to improve vehicle ride characteristics.

FRONT/REAR SPRING SOLENOIDS

The front and rear solenoids control air flow in and out of the front and rear springs. The Air Suspension Control Module (ASCM) opens the solenoids when the system requires air to be added to or exhausted from the air springs. The solenoids operate at a current draw range of 0.6 to 1.5 amps.

HEIGHT SENSOR

A magnetic switch type sensor. Located in the right rear shock absorber and left and right front struts, (Fig. 2) monitors vehicle height. The sensors transmit signals to the (ASCM) relating to vehicle height status (low, trim, medium, high).

CONTROL MODULE

The Air Suspension Control Module (ASCM). Is a device that controls the ground circuits for the Compressor Relay, Compressor Exhaust Solenoid Valve and Front and Rear Solenoid Valves. The (ASCM) limits the compressor pump operation time to 170 to

190 seconds. This controlled operation time is to prevent damage to the compressor motor.

To prevent excessive cycling between the compressor and the exhaust solenoid circuits during normal ride conditions. A 14 to 16 second delay is incorporated in the microprocessor logic.

The system is non-operation when one of the following conditions exists. A door(s) is/are open, the trunk is open, the service brake is applied or the throttle position sensor is 65% to 100% open. System operation is inhibited during high speed cornering activities or if there is a charging system failure. **The control module is on the CCD bus system.**

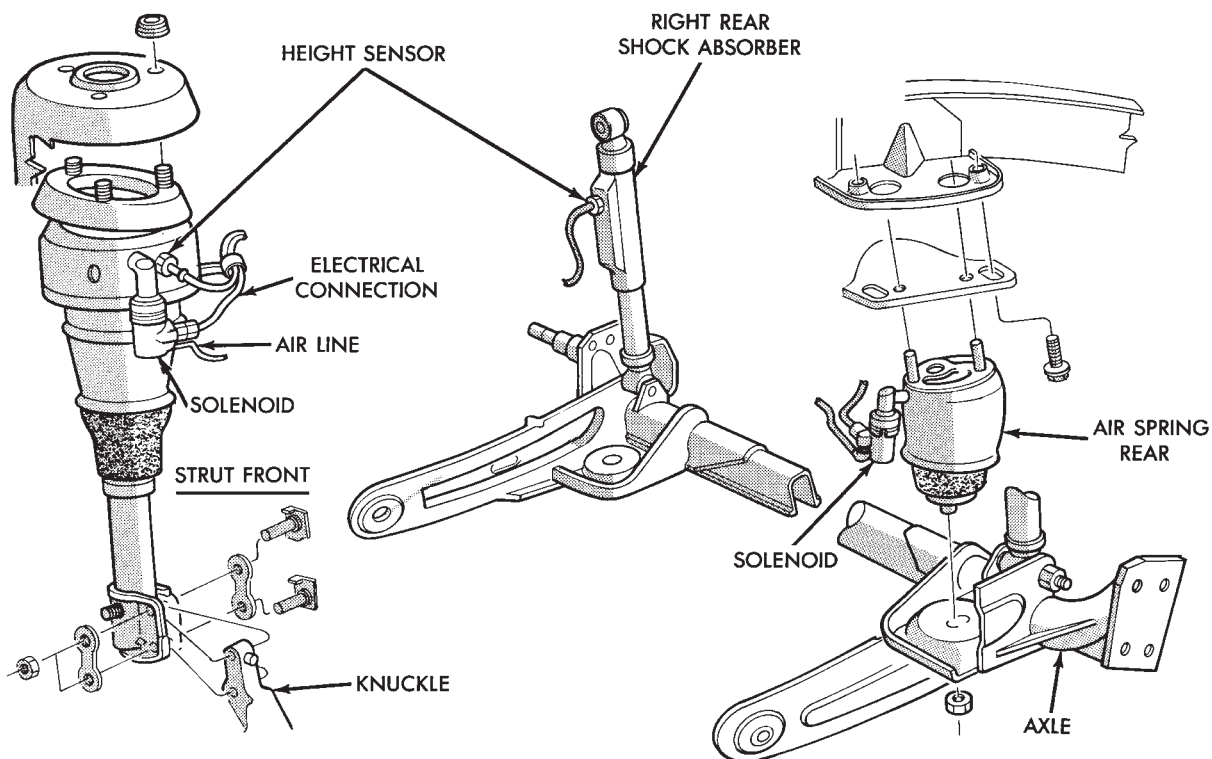
COMPRESSOR ASSEMBLY

The compressor assembly is driven by an electric motor and supplies air pressure between 930 to 1241 kPa (135 to 180 psi) (Fig. 3). A solenoid operated exhaust valve. Located in the compressor head assembly, releases air when energized.

A heat actuated circuit breaker. Located inside the compressor motor housing. Is used to prevent damage to the compressor motor in case of control module failure.

COMPRESSOR AIR DRYER

The air dryer is attached to the compressor (Fig. 3). This component serves two purposes. It absorbs mois-



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Fig. 2 Front and Rear Air Springs

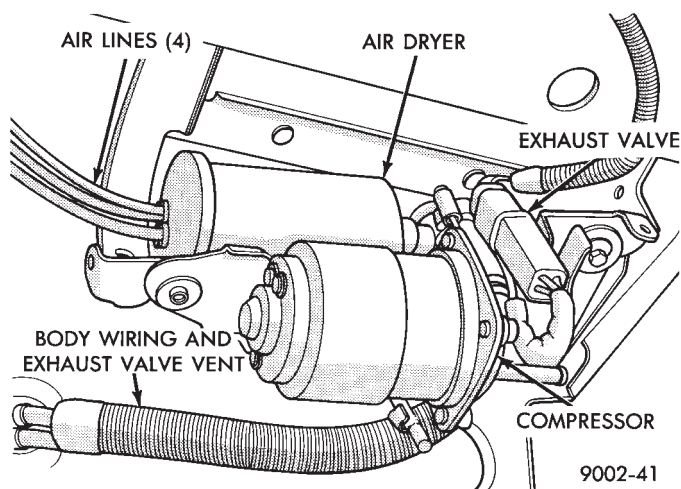


Fig. 3 Air Compressor/Dryer Assembly

ture from the atmosphere before it enters the system and with internal valving maintains a residual pressure of 172 to 276 kPa (25 to 40 psi).

AIR LINES

Nylon air lines (4) are routed from the compressor (air dryer) to each strut/spring assembly. **Right** side strut and air spring air lines are routed with the fuel lines. **Left** side strut and air spring air lines are routed across the vehicle (forward of the fuel tank). And to the front of the vehicle with the brake lines (Figs. 4 and 5).

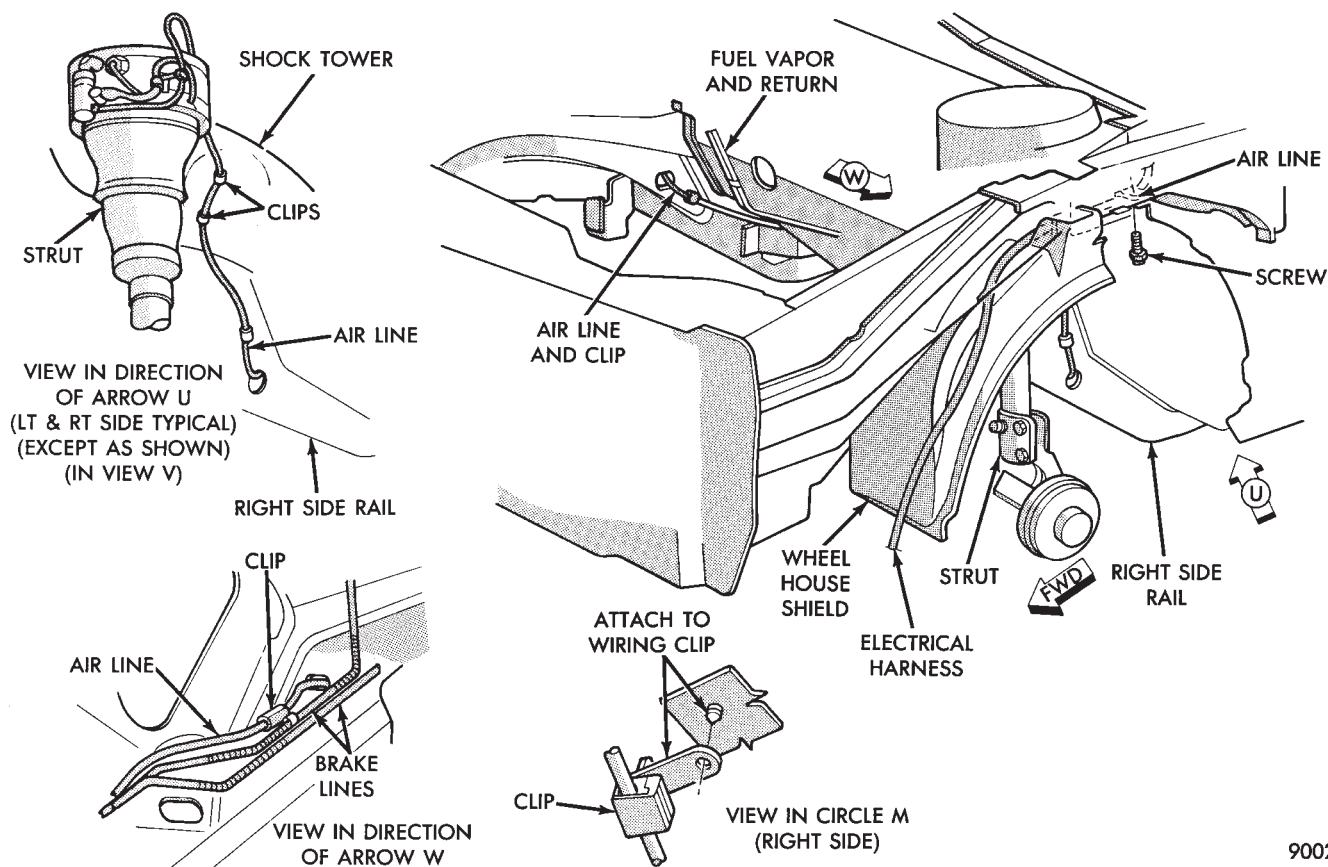


Fig. 4 Air Lines Front

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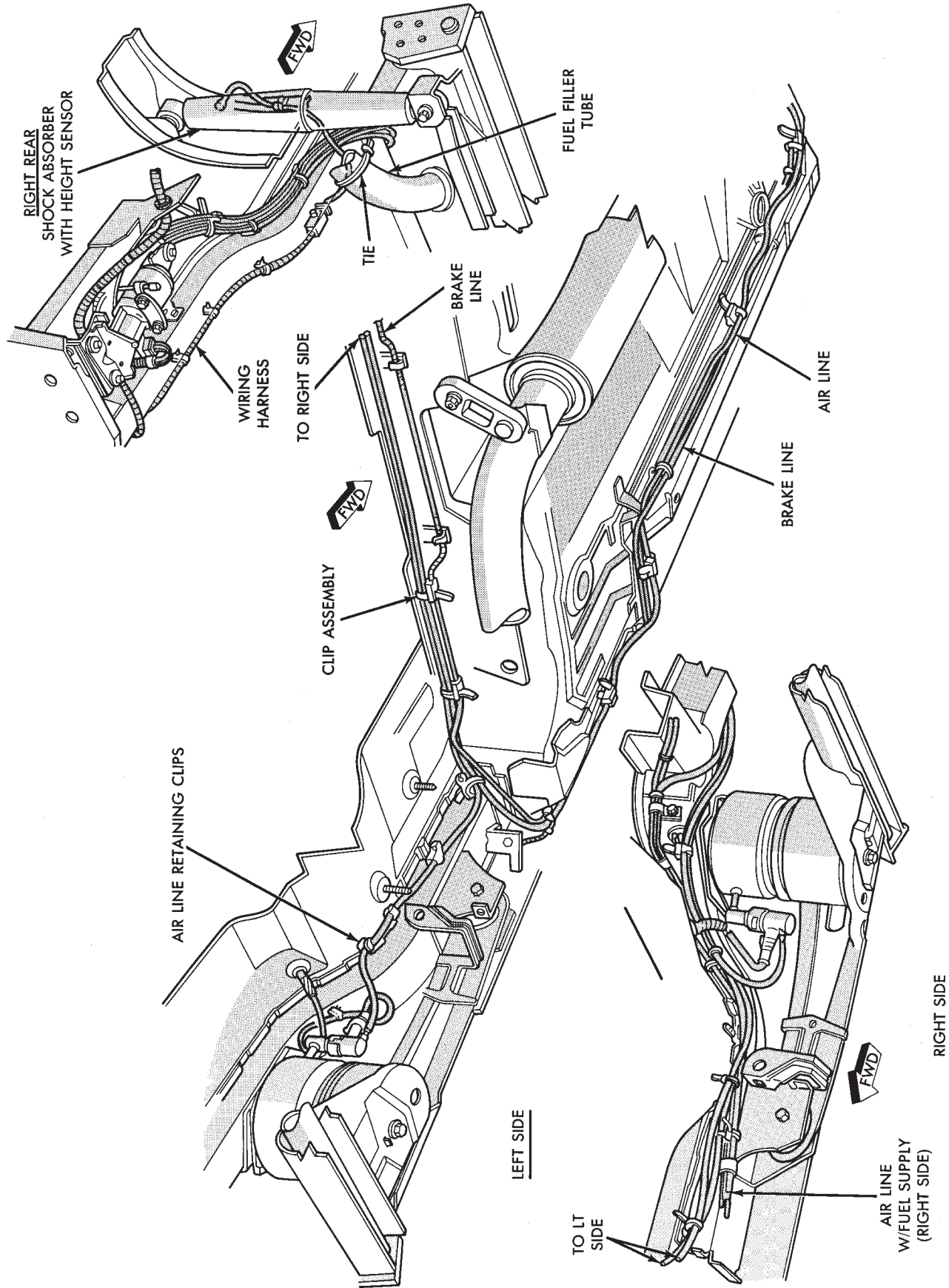


Fig. 5 Air Lines Rear, and Rear Height Sensor

AIR LINE FITTINGS

To remove an air supply line from an air compressor assembly air line fitting. Push in (toward receiver dryer) on the plastic ring of the receiver dryer air supply air line fitting. While holding in the air line fitting on the receiver dryer pull the air supply line straight out of the fitting (Fig. 6).

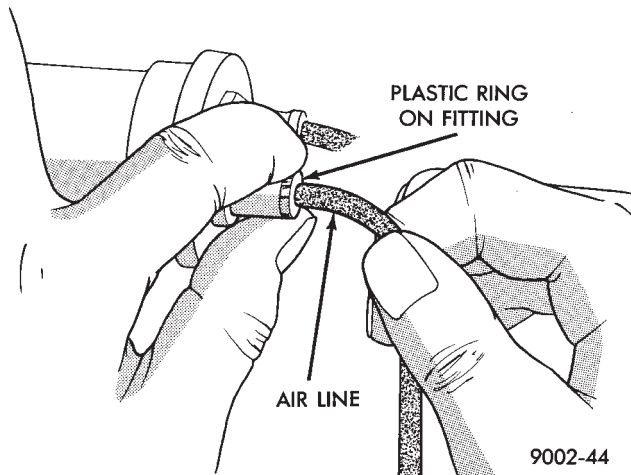


Fig. 6 Release Air Line from Fitting

The fitting has a unique push-in feature. A brass type collet locks the air line in place. One rubber O-Ring seals the air line to prevent air leakage. To attach air line, just push into fitting (Fig. 7).

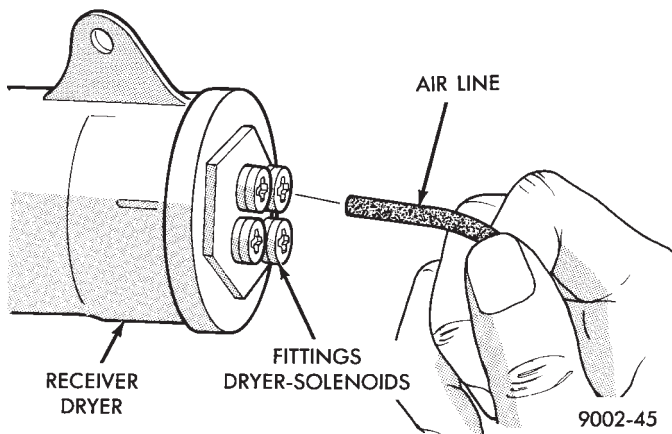


Fig. 7 Push Air Line into Fitting

AIR CHECK, RESIDUAL

The air dryer has a valving arrangement that maintains 172 to 276 kPa (25 to 40 psi).

To test this function, perform the following procedure:

(1) Remove the air line from the dryer and strut or spring. Attach a piece of bulk nylon tubing to one side of a Pressure Gauge (0-300 psi), and to the strut/spring solenoid (Fig. 8).

(2) Attach another piece of nylon tubing from the dryer (compressor) to other side of the pressure gauge.

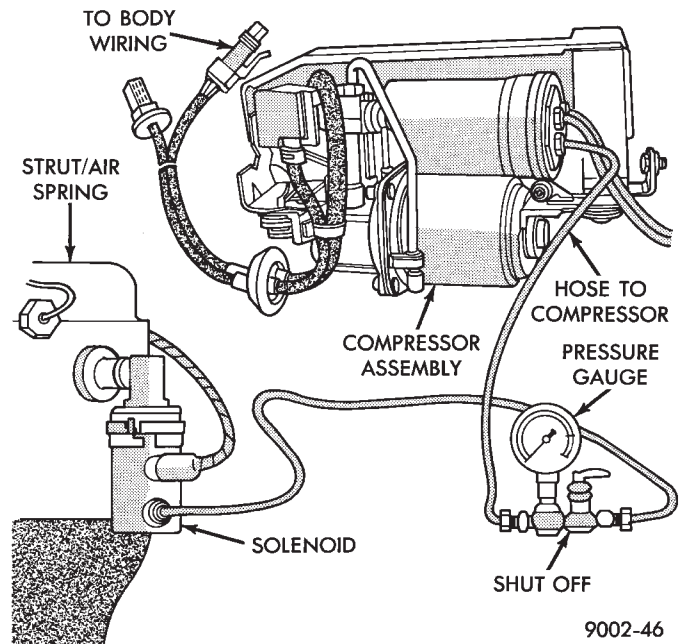


Fig. 8 Pressure Gauge Installed in System

A compression ball sleeve nut and sleeve for 3/16 inch tubing with ball sleeve connector and an internal pipe T-fitting. Can be used to attach the tubing to the pressure gauge.

(3) Activate compressor by grounding pin 508 to pin x 20 (See Control Module Connector), cycle unit and read actual air pressure. Pressure of 172 to 276 kPa (25 to 40 psi) indicates that the system and compressor is acceptable.

COMPRESSOR PERFORMANCE TEST

This test can be performed on the vehicle to evaluate compressor current draw, pressure output, and leak down.

(1) Disconnect the compressor motor wiring harness connector.

(2) Disconnect air line between dryer and strut or spring solenoid.

(3) Connect an air pressure gauge into the system (Fig. 8).

(4) Connect an ammeter in series between the red wire terminal on compressor connector and a 12 volt power source. Also, connect a ground wire from the black wire terminal on the compressor connector to a good ground on the frame (Fig. 9)

(5) If the current draw to the compressor motor exceeds 30 amperes, replace the compressor assembly.

AIR LEAK CHECK

(1) Check all air line to connector joints.

- Air line to compressor connectors.
- Air line to solenoid.
- (2) Check the rubber membranes.
- Front struts.
- Rear springs.

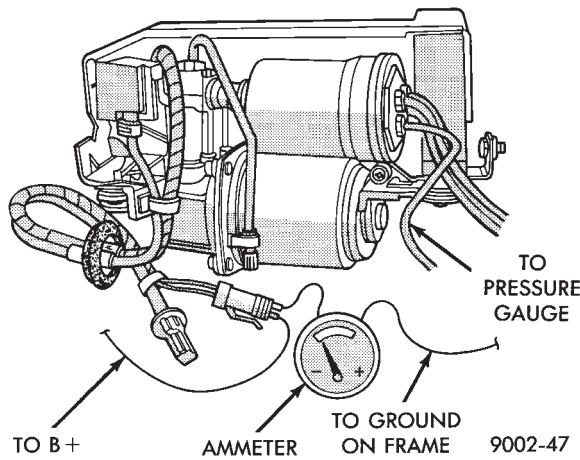


Fig. 9 Compressor Current Draw Test

- (3) Check solenoid to volume canister joint.
 - Front strut to solenoid valve connection.
 - Rear spring to solenoid valve connection.
- (4) Check air line for ruptures, cuts, splits or heat damage.

Use a soap and water solution or a liquid developed for leak detection.

SYSTEM OPERATION

ENGINE RUN OPERATION

The system will compensate for load addition/removal when.

- The trunk and all doors are closed.
- The engine speed exceeds 600 R.P.M.
- Throttle angle is less than 65 degrees.
- The brake is not applied.
- You are not cornering above 10 mph.
- There is not a charging system problem with the vehicle.

ENGINE OFF OPERATION

After passengers/load is removed from the vehicle the system will correct the vehicle attitude after:

- The trunk and all doors are closed.
- The ignition switch is in the OFF position.

Opening the a door or trunk wakes up the body computer and the air suspension module. The air suspension system is now capable of leveling, if required.

LONG TERM IGNITION OFF OPERATION

The system is capable of one an additional leveling cycle. After 2 continuous hours of ignition key off and no door open or trunk open activities. This feature is implemented to eliminate possible ice freeze-up between the tire and the inner fender shield.

SYSTEM OPERATION INHIBITORS

The air suspension system is inhibited when:

- The trunk is open.
- A door(s) is/are open.
- The brake pedal is engaged.
- The throttle is at the wide open position.
- The charging system fails.

The maximum compressor pump or exhaust time is 3 minutes.

SYSTEM FAILURES

Vehicles equipped with air suspension and overhead console. Will alert the driver of an air suspension system malfunction. A warning Check Air Suspension will appear on the overhead console screen.

SAFETY CONCERNS

WARNING: REAR AIR SPRINGS MUST BE DEFLATED BEFORE BEING REMOVED FROM THE VEHICLE.

WARNING: OPEN TRUNK, OR DOOR(S) OR REMOVE GROUND STRAP FROM BATTERY BEFORE HOISTING OR JACKING A VEHICLE DURING MECHANICAL REPAIRS.

WARNING: IF THE VEHICLE NEEDS SERVICE OR REPAIR OF THE REAR SHOCK ABSORBERS OR REAR AXLE PIVOT BUSHINGS. THE REAR AIR SPRINGS MUST HAVE THE AIR PRESSURE REMOVED BEFORE THE VEHICLE CAN BE SERVICED SAFELY.

SHIPPING MODE

(1) Removing shipping height signal for customer use.

- Use DRB II tester and 1991 Chassis (Air Suspension) service cartridge.
- Follow DRB II requirements to cancel shipping height message in the body computer.
- Connect the Ignition Off Draw (I.O.D.) circuit.

The connection of the IOD circuit will cancel the Shipping height signal.

(2) Return to shipping height.

- Set shipping command in the body computer using the DRB II and the 1991 Chassis (Air suspension) service cartridge.
- Disconnect the I.O.D. connector.

DIAGNOSIS

INITIAL DIAGNOSTIC CHECK

- (1) Check for blown or missing fuses.
- (2) Check all connectors for correct assembly.
- Check all connectors for incorrectly installed terminals.**
- (3) Check pin #21 for minimum of 9.5 volts.
- (4) Check pin #20 for minimum of 9.5 volts (with ignition key on).
- (5) Check voltage at pins #5 and #16. The measurement should exceed 0 volts.
- (6) Check pin #19 for continuity.
- (7) The engine speed should exceed 680 rpm during idle.

All doors and trunk must be closed for the system to function.

DIAGNOSTICS PROCEDURES

- (1) Use the D.R.B. II tester and the 1991 air suspension diagnostic service cartridge to begin the troubleshooting process.
- (2) Use the D.R.B. mating connector under the dash (drivers side) to plug-in the D.R.B. II test connector (Fig. 10).
- (3) The tester will conduct a complete check of the suspension system status.

(4) The tester will list the steps to follow to access and diagnose the failure.

(5) A Volt/Ohm meter can be used for some diagnostic testing.

HEIGHT SENSOR CHECK

If a sensor signal/signals are missing. Follow the repair procedure listed below.

- (1) Check ground circuit continuity. (Remember front and rear grounds are on different circuits.
- (2) For front ground circuit continuity check circuit S 33.
- (3) For rear ground circuit continuity check circuit X20.
- (4) Refer to control module pin out chart and wiring diagram (see wiring diagram, Group 8F in wiring diagram manual) for individual circuit details.
- (5) If open circuits are not found replace the component.

Complete circuit testing and connector assemblies before replacing a strut or right rear shock.

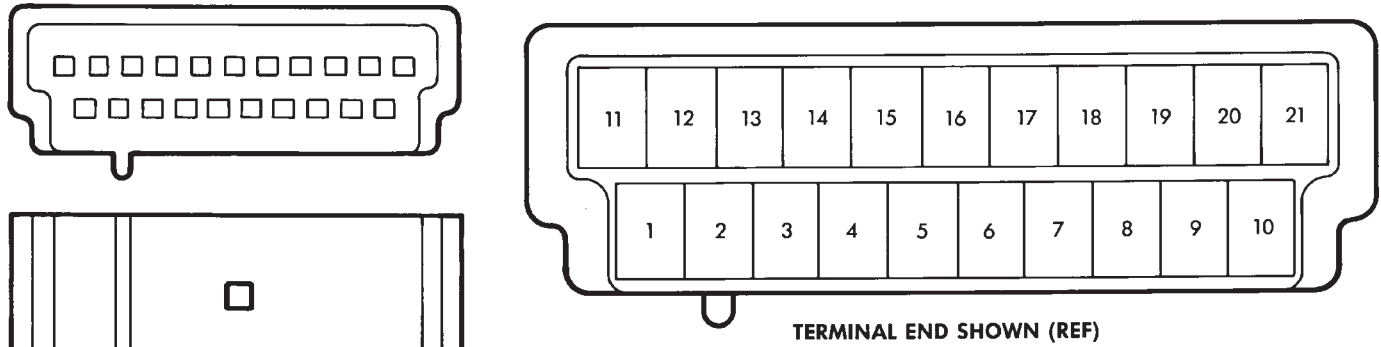
(6) To measure resistance values, see Height Sensor Logic Chart and Initial Diagnostic Check in System Operation.

HEIGHT SENSOR LOGIC CHART

<u>Fender Heights</u>	<u>Front</u>	<u>Rear</u>	<u>Customer Mode Sensor Position</u>	<u>A</u>	<u>Sensor Signals B</u>	<u>C</u>
28.5 to 29.9 in.	26.4 ± 0.1	2.61 ± 0.1	High	OPEN	CLOSED	OPEN
			Trim 2	CLOSED	OPEN	CLOSED
24.0 to 24.5 in.			LOW	CLOSED	OPEN	OPEN
<u>Fender Heights</u>			<u>Shipping Mode Sensor Position</u>	<u>A</u>	<u>Sensor Signals B</u>	<u>C</u>
28.5 to 29.9 in.	27.3 ± 0.1	27.4 ± 0.1	High	OPEN	CLOSED	OPEN
			Trim 1	OPEN	CLOSED	CLOSED
24.0 to 24.5 in.			LOW	CLOSED	OPEN	OPEN

- The height sensor signals must be verified by using a volt/ohm meter to measure resistance.
- Refer to the “Height Sensor Logic Chart” for sensor signal information.
- Measure resistance values by completing the circuit between the appropriate sensor pin and the appropriate ground pin. See the control module terminal chart.

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CONTROL MODULE CONNECTOR

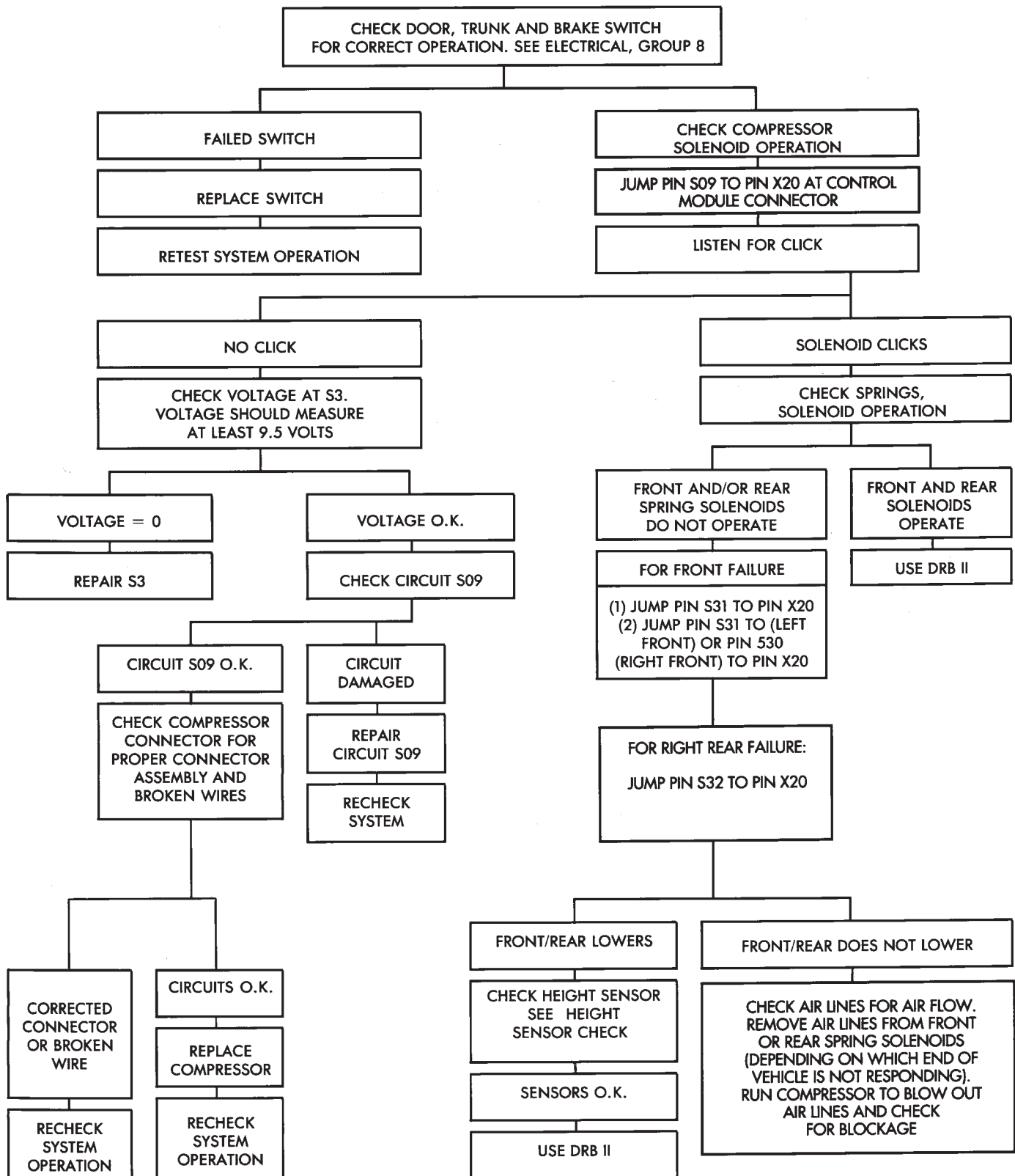
CAVITY	CIR	COLOR	GA	DESCRIPTION
1	S14	DB/RD*	20a	FR HEIGHT SENSOR SIG-B
2	S11	DG	20a	FL HEIGHT SENSOR SIG-A
3	S15	DG/WT*	20a	FL HEIGHT SENSOR SIG-C
4	S20	LG/RD*	18	RR HEIGHT SENSOR SIG-B
5	MX1	BK	20	CCD BUS (+)
6	S30	DB/OR*	20a	FR HEIGHT CONTROL SOL (B -)
7	S31	DG/OR*	20a	FL HEIGHT CONTROL SOL (B -)
8	S09	BK/OR*	20a	COMPRESSOR EXHAUST SOL (B -)
9	S08	BK/RD*	20a	COMPRESSOR RELAY (B -)
10	S32	LG/CR*	18	RR HEIGHT CONTROL SOL (B -)
11	S12	DB	20a	FR HEIGHT SENSOR SIG-A
12	S16	DB/WT*	20a	FR HEIGHT SENSOR SIG-C
13	S13	DG/RD*	20a	FL HEIGHT SENSOR SIG-B
14	S18	LG	18	RR HEIGHT SENSOR SIG-A
15	S22	LG/WT*	18	RR HEIGHT SENSOR SIG-C
16	MX2	WT/BK*	20	CCD BUS (-)
17	S33	BR	18	FRT HEIGHT SENSOR COMMON (B -)
18	—	—	—	OPEN CAVITY
19	X20	GY*	20	MODULE GROUND (B -) RR HEIGHT SENSOR COMMON (B -)
20	W40	YL/RD*	18	IGNITION
21	S3	PK/WT*	18	MODULE POWER (B +)

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Fig. 10 Control Module Connector

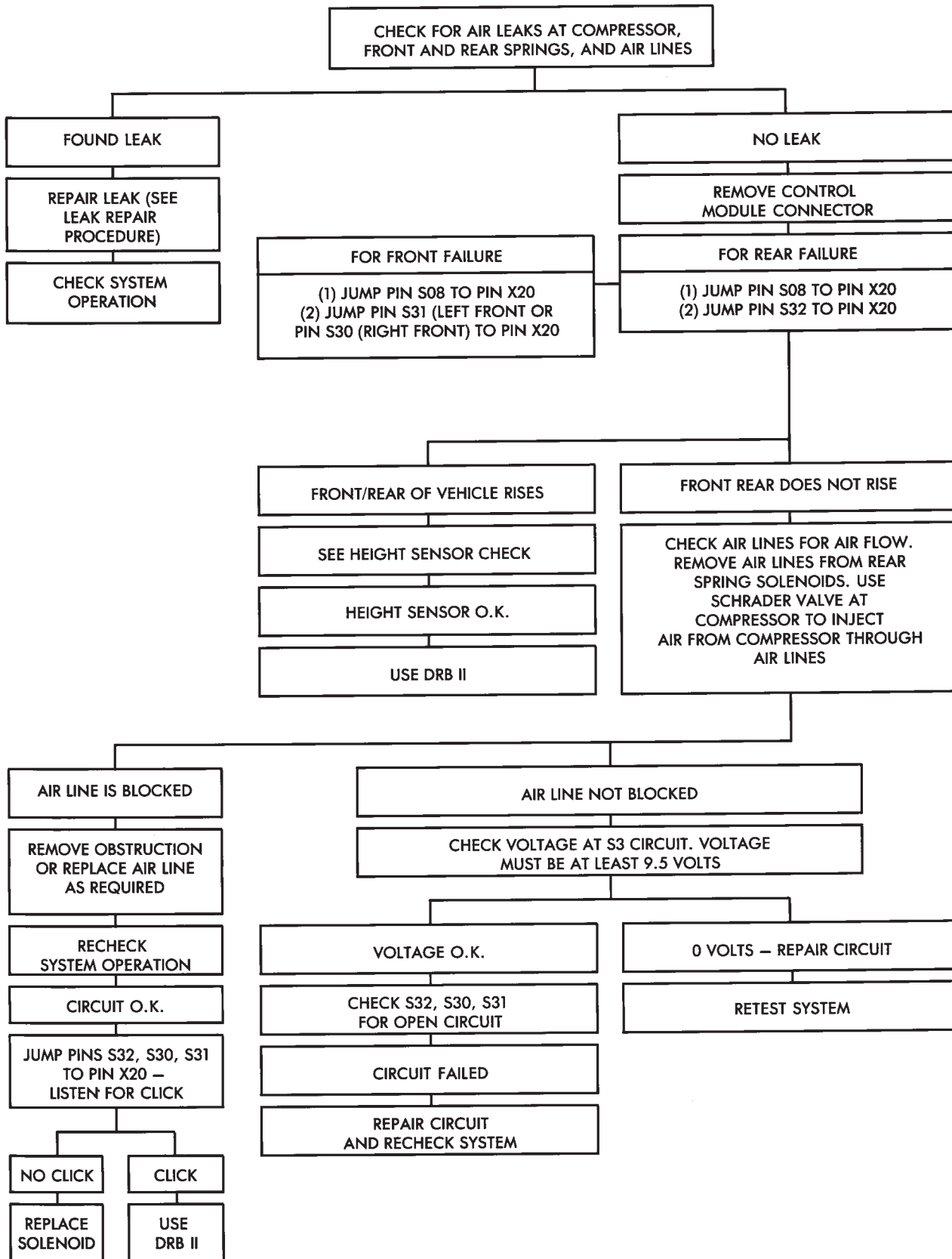
AUTOMATIC AIR SUSPENSION DIAGNOSTICS

VEHICLE REMAINS IN HIGH POSITION



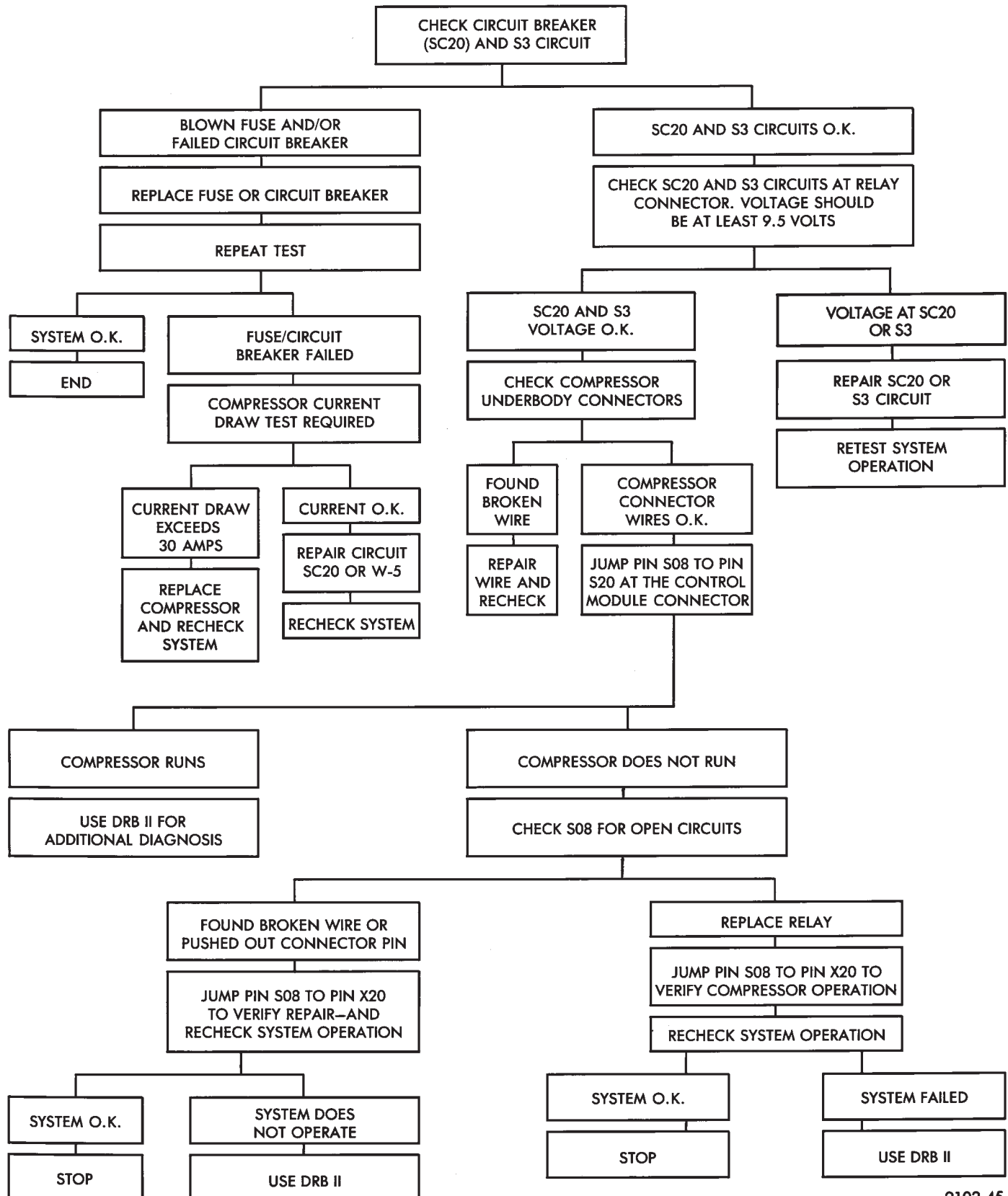
AUTOMATIC AIR SUSPENSION DIAGNOSTICS

**VEHICLE REMAINS LOW AT FRONT OR REAR
— COMPRESSOR OPERATES —**



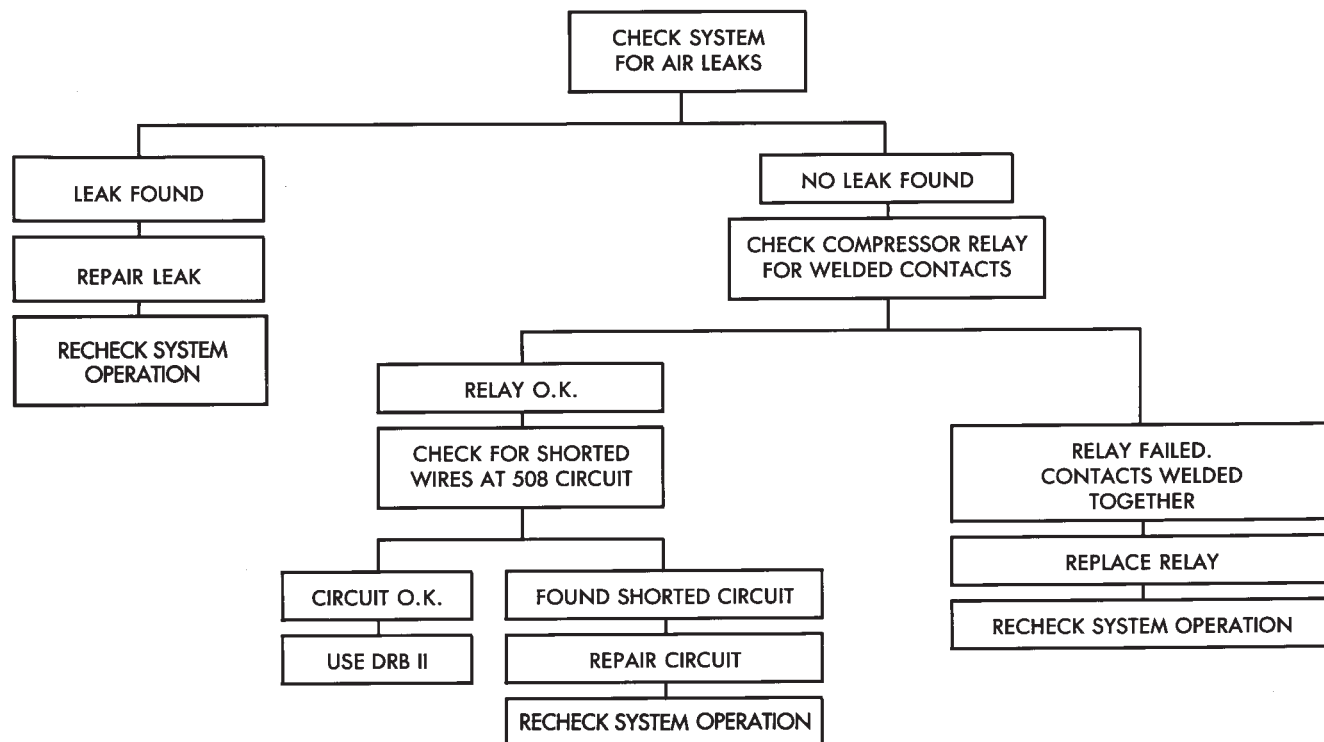
AUTOMATIC AIR SUSPENSION DIAGNOSTICS

**VEHICLE REMAINS LOW
— COMPRESSOR DOES NOT PUMP —**



AUTOMATIC AIR SUSPENSION DIAGNOSTICS

COMPRESSOR OVERRUN



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SERVICE PROCEDURES

CONTROL MODULE (ASCM)

REMOVAL

- (1) Disconnect negative battery cable.
- (2) Remove right side trunk trim panel.
- (3) Remove electrical connectors from control module and relay (Fig. 11).
- (4) Remove control module mounting screws and remove assembly.

INSTALLATION

- (1) Install relay on the control module mounting bracket (if required).
- (2) Place control module in mounting position.
- (3) Install mounting screws and tighten to 2-3 N•m (19-29 in. lbs.) torque.
- (4) Install control module and relay wiring connectors (Fig. 11).
- (5) Install right side trunk trim panel.
- (6) Connect negative battery cable.

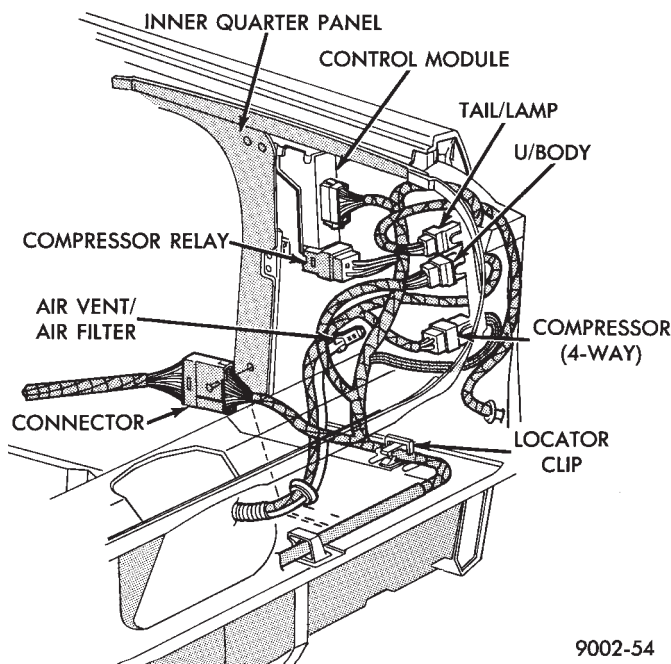


Fig. 11 Control Module and Relay Wiring

COMPRESSOR RELAY

REMOVAL

- (1) Remove right side trunk trim panel.
- (2) Remove electrical connector from relay.
- (3) Remove relay from control module mounting bracket by prying out on locating clip (Fig. 11)

INSTALLATION

- (1) Push relay onto bracket (relay will Lock into position.)
- (2) Install electrical connector.

- (3) Install trim panel.

COMPRESSOR ASSEMBLY

REMOVAL

- (1) Disconnect battery negative cable.
- (2) Raise vehicle, see Hoisting, Group 0.
- (3) Remove cover from compressor assembly. Remove air hose (see AIR LINES) and electrical connectors (Fig. 12)
- (4) Remove compressor assembly mounting screws and lower assembly from vehicle.
- (5) Remove mounting bracket screws and slide mounting bracket away from compressor.

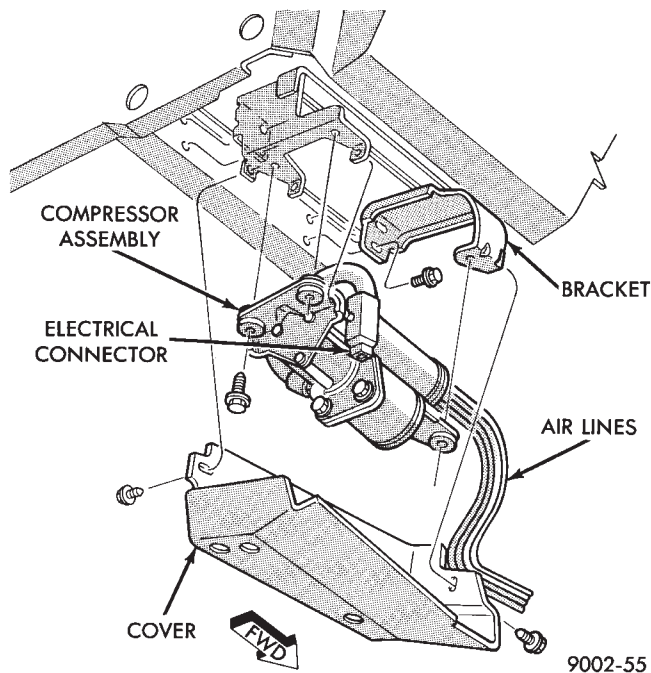


Fig. 12 Compressor Assembly

INSTALLATION

- (1) Slide mounting bracket on compressor and install screws and tighten to 8 N•m (70 in. lbs.) torque. **DO NOT OVER TORQUE THESE SCREWS.**
- (2) Install compressor assembly to frame rail and tighten screws to 8 N•m (70 in. lbs.) torque. **DO NOT OVER TORQUE THESE SCREWS.**
- (3) Connect air hose and electrical connector to compressor assembly.
- (4) Install cover on compressor assembly and tighten screws to 6 N•m (40 in. lbs.) torque.
- (5) Lower vehicle and connect battery negative cable.
- (6) Check operation of the system.

AIR DRYER

REMOVAL

Remove compressor assembly. See COMPRESSOR ASSEMBLY.

(1) Remove dryer-to-compressor retaining screw (Fig. 13).

(2) Rotate dryer assembly 90° to release retaining tangs from exhaust solenoid housing and withdraw unit.

INSTALLATION

Inspect O-Ring for damage and location on dryer assembly.

(1) Insert and index air dryer locking tangs into exhaust solenoid outlet.

(2) Rotate air dryer assembly to lock position and install air dryer-to-compressor retaining screw (Fig. 13).

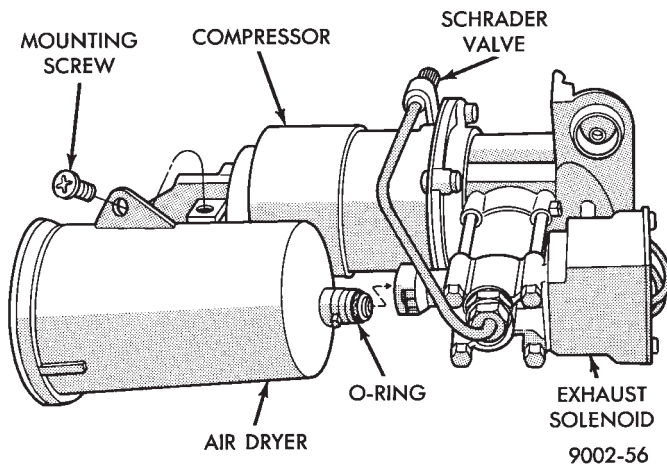


Fig. 13 Air Dryer Remove/Install

SOLENOIDS (STRUTS AND AIR SPRINGS)

Front struts and rear springs are equipped with solenoids that control air pressure and volume within the assemblies. The solenoids are electrically operated to allow air input, contain air, or release of air pressure, dependent on control module commands.

REMOVAL

WARNING: DO NOT ATTEMPT TO REMOVE OR INSTALL SOLENOIDS WHILE AIR SUSPENSION (FRONT STRUTS AND REAR AIR SPRINGS) ARE SUPPORTING VEHICLE.

Disconnect negative battery cable. Raise vehicle and remove wheel and tire assembly then remove solenoid(s) as follows:

(1) Separate electrical connection to solenoid.
 (2) Disconnect air line, see Air Lines and Fittings. Solenoids have molded square tangs to fit into stepped notches of the air spring housing. The notches provide an air relief position and a retaining position. The retaining position is locked with a retaining clip.

(3) Remove retaining clip (Fig. 14).

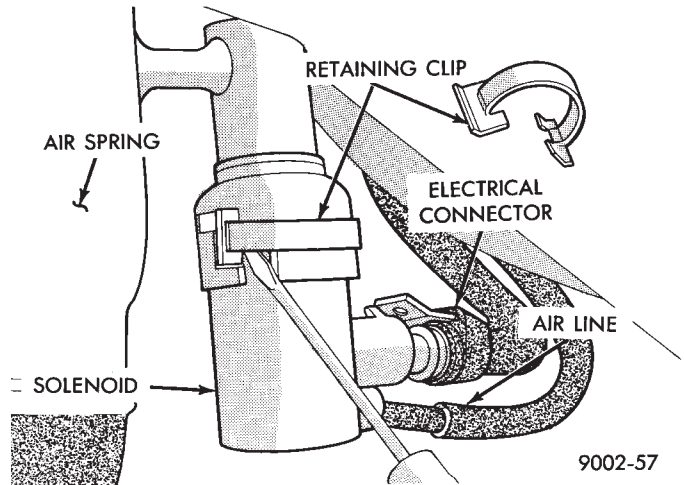


Fig. 14 Remove Retaining Clips

(4) Rotate solenoid to first step in housing and allow air pressure to vent (Fig. 15).

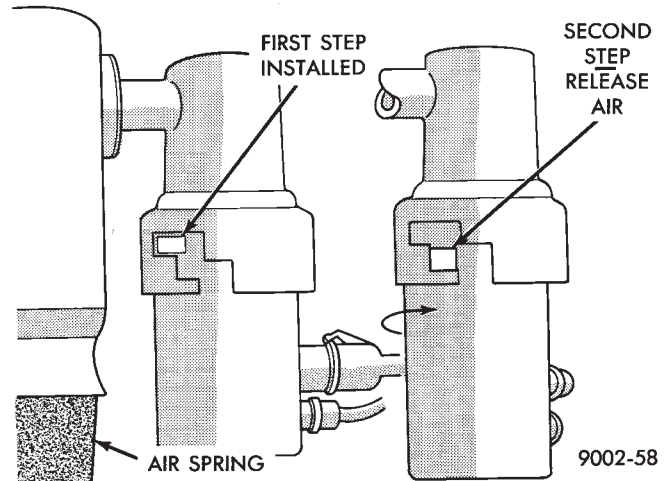


Fig. 15 Release Air Pressure

(5) Rotate solenoid to release slot and remove (Fig. 16).

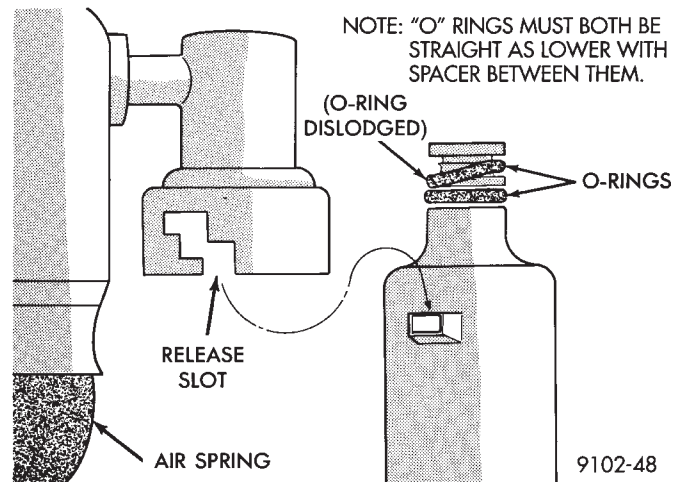


Fig. 16 Remove Solenoid (Inspect O Ring)

INSTALL

(1) Inspect O-Ring condition and position on solenoid stem. (O-Ring can become dislodged during removal (Fig. 16).

(2) Install solenoid with tangs to top ledge of housing and install retaining clip.

(3) Reconnect air line and electrical connection.

STRUT (AIR SUSPENSION) DAMPER ASSEMBLY

Service procedures for removal and installation for (air or steel spring) assemblies are essentially the same. Except for air venting/recharging and disconnecting/connecting air lines and electrical connection.

REMOVAL

- (1) Disconnect battery negative cable.
- (2) Hoist vehicle and remove wheel and tire assembly.
- (3) See AIR LINES AND FITTINGS and disconnect air line.
- (4) Disconnect electrical leads, solenoid and height sensors.
- (5) See SOLENOIDS (STRUT AND AIR SPRING) and vent air spring and remove solenoids.
- (6) See STRUT DAMPER ASSEMBLY in FRONT SUSPENSION and remove strut.

DISASSEMBLY/ASSEMBLE

Disassembly is restricted to upper mount and bearing housing. The strut shock absorber, air spring with integral height sensor, solenoid and wiring harness are serviced as an assembly.

- (1) Hold retaining plate locking washer and remove strut rod nut.
- (2) Remove locking washer, retainer plate, spacer, flat washer and mount/bearing housing assembly (Fig. 17).
- (3) Assemble in reverse order. Hold retainer plate locking washer with suitable tool and tighten strut rod nut to 75 N•m (55 ft. lbs.) torque.

INSTALLATION

- (1) See STRUT DAMPER ASSEMBLY in FRONT SUSPENSION and install strut.
- (2) Install solenoid, see: SOLENOIDS (STRUT AND AIR SPRINGS).
- (3) Connect electrical leads, solenoid and height sensor.
- (4) Charge (inflate) air spring. See RECHARGE-AIR SPRING to activate spring solenoid and air compressor. Add air for 60 seconds.

RECHARGE AIR SPRING

To activate compressor; Ground Pin S08 to Pin X20.

To Activate Spring Solenoid:

- LF: Ground Pin S31 to X20

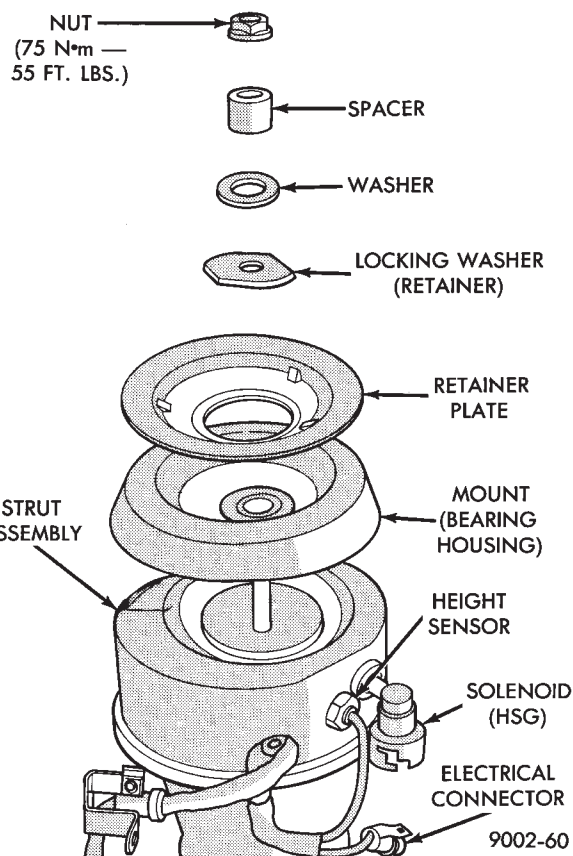


Fig. 17 Air Strut Upper Mount Assembly

- RF: Ground Pin S30 to X20
- RR: Ground Pin S32 to X20

AIR SPRINGS REAR**REMOVAL**

- (1) Disconnect battery negative cable, hoist vehicle and remove wheel and tire assembly.
- (2) See AIR LINES AND FITTINGS and disconnect air line and electrical connector from solenoid.
- (3) See SOLENOIDS (STRUT AND AIR SPRINGS) and vent air from spring. Remove solenoid.
- (4) Release upper air spring alignment/retainer clips. (Fig. 18)
- (5) Remove lower spring to axle nut (Fig. 19).
- (6) Pry assembly down to pull alignment studs through retaining clips (Fig. 20). Remove assembly.

INSTALLATION

- (1) Position assembly lower stud into axle seat and upper alignment pins through frame rail adaptor.
- (2) Install upper retaining clips.
- (3) Install lower spring to axle nut: LOOSE ASSEMBLE.
- (4) Install solenoid and connect air line and electrical connector.
- (5) Charge (inflate) air spring. See RECHARGING AIR SPRING and add air for 60 seconds.

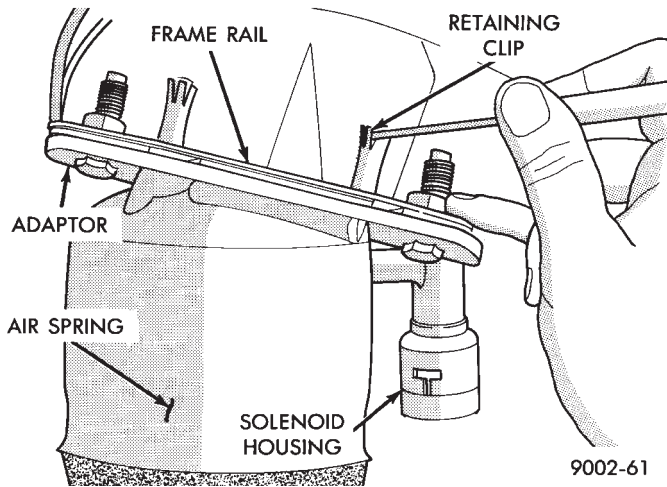


Fig. 18 Release Retaining Clips

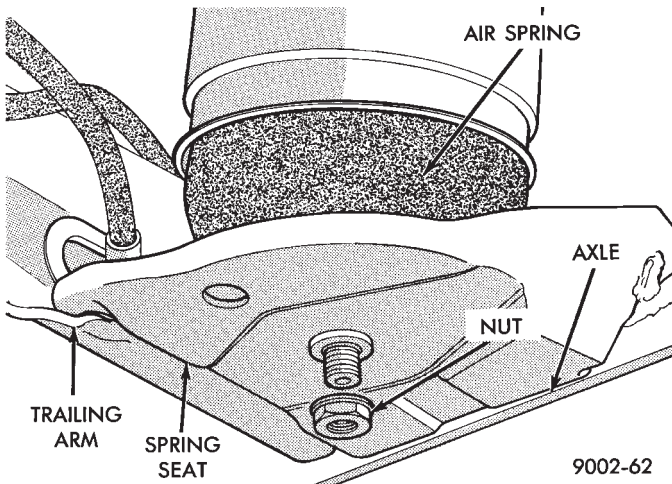


Fig. 19 Remove/Install Lower Spring to Axle Nut

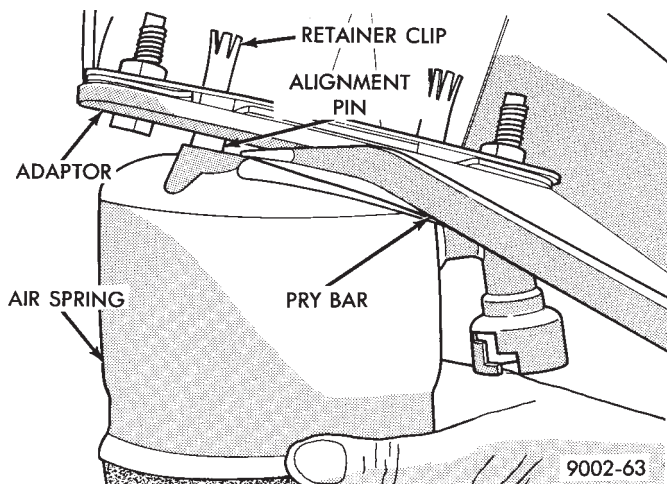


Fig. 20 Pry Assembly Out of Retaining Clips

(6) AFTER partial air recharge tighten lower nut to 68 N•m (50 ft. lbs.) torque.

(7) Install wheel and tire assembly. Lower vehicle, install wheel and tire assembly and connect battery negative cable.

RIGHT SHOCK ABSORBER (WITH HEIGHT SENSOR)

REMOVAL

- (1) Disconnect battery negative cable.
- (2) Raise vehicle, see Hoisting, Group 0.
- (3) Remove tire assembly.
- (4) Disconnect height sensor connector located on right rear frame rail.
- (5) Remove shock, see Shock Absorbers, Removal.

INSTALLATION

- (1) Install shock assembly, see Shock Absorbers, Installation.
- (2) Route height sensor wire through retaining clips and then tie strap to fuel filler tube.
- (3) Snap height sensor connector into underbody harness connector.
- (4) Install wheel/tire assembly.
- (5) Height sensor wiring harness and white paint mark on bottom shock eye must face to the front of the vehicle (Fig. 1).

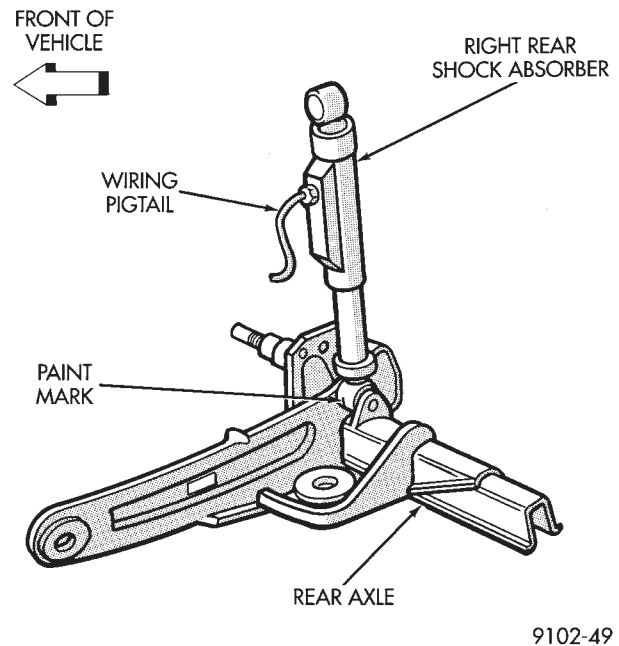


Fig. 1 Right Rear Shock Absorber Installation

REAR (STUB) AXLE ALIGNMENT ALL MODELS

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General Information	90	Rear Wheel Alignment	90

GENERAL INFORMATION

Because front wheel drive vehicles are equipped with rear suspension incorporating stub axles (or wheel spindles). It is possible to align both the camber and toe of the rear wheels.

REAR WHEEL ALIGNMENT

Alignment adjustment if required. Is made by adding 0.010 inch shims (from the service package kit) between the spindle mounting surface and axle mounting plate. Each shim equals wheel change by $.3^\circ$ as shown (for all car lines) in (Figs. 3 to 6).

If rear wheel alignment is required, place vehicle on alignment rack and check alignment specifications. **When recording rear toe-in (vehicle backed onto alignment rack) REMEMBER to reverse sign convention; a total toe-in on direct reading charts is actually toe-out while driving.** Maintain rear alignment within Chrysler Motors recommendations, found in Specifications.

INSTALLATION OF REAR ALIGNMENT SHIMS

- (1) Block front tires so vehicle will not move.
- (2) Release parking brake.
- (3) Hoist vehicle so that rear suspension is in full rebound and tires are off the ground. See Hoisting in Lubrication and Maintenance, Group 0.
- (4) Remove wheel and tire assembly.
- (5) Pry off grease cap.
- (6) Remove cotter pin and castle lock.
- (7) Remove adjusting nut.
- (8) Remove brake drum (Fig. 1).

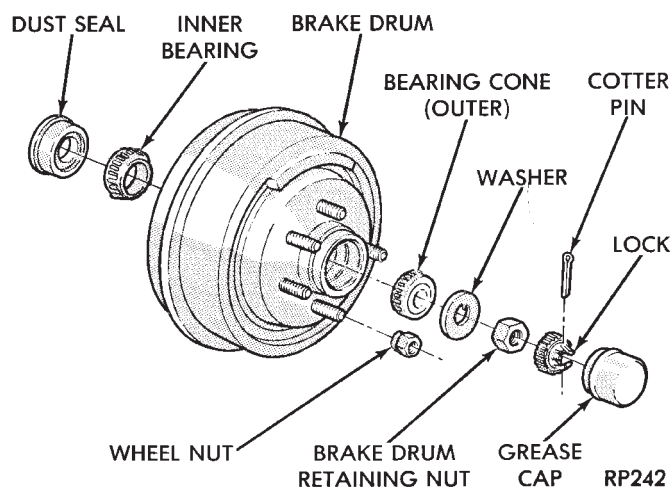
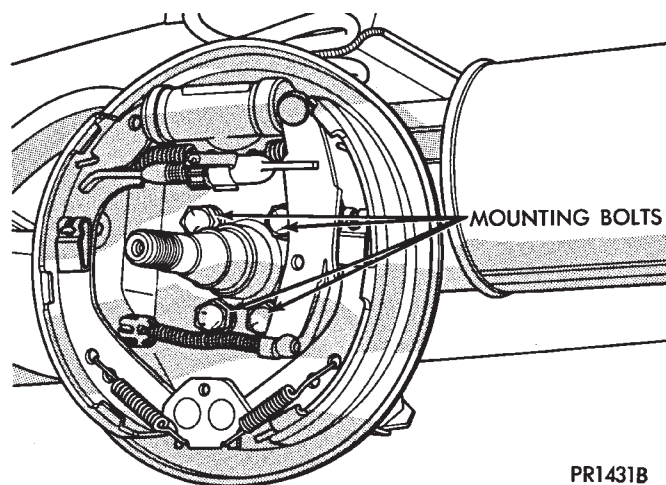
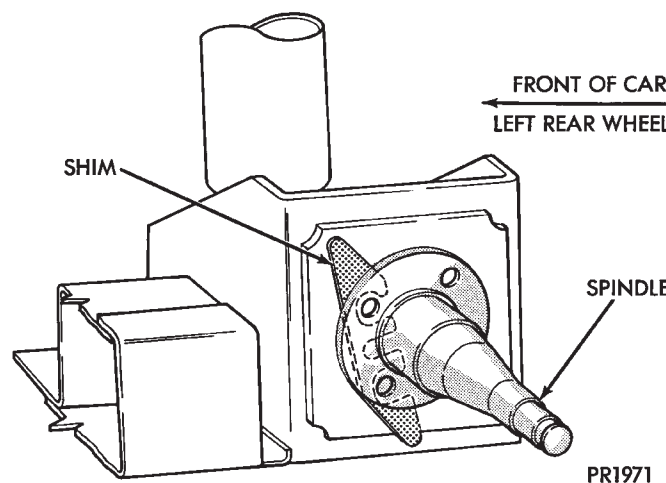


Fig. 1 Remove Brake Drum



PR1431B

Fig. 2 Loosen Mounting Bolts



PR1971

Fig. 3 Shim Installation for Toe-Out

- (10) Install shims as shown in Figs. 3, 4, 5 and 6 for desired wheel change. No more than two shims on each spindle should be used to bring alignment within acceptable range.

Wheel change by $.3^\circ$ per shim.

- (11) Tighten down the 4 brake support plate and spindle to axle mounting bolts until they are snug. Then tighten the 4 bolts to the torque values listed for the vehicle line which is being serviced.

- AA, AG, AJ, AP Bodies 75 N•m (55 ft. lbs.)

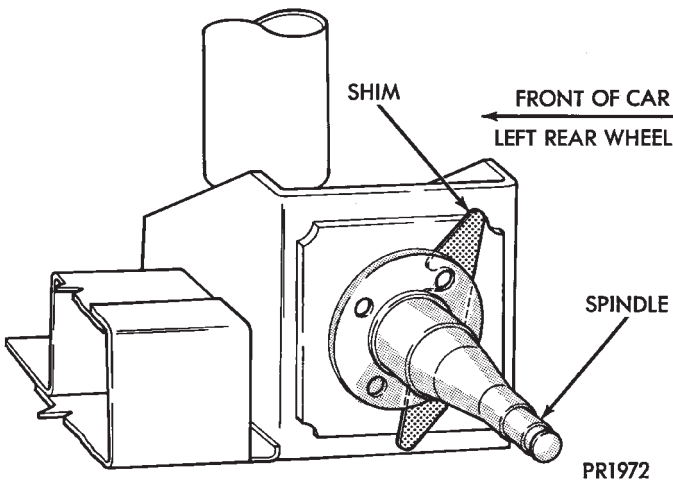


Fig. 4 Shim Installation for Toe-In

- AC, AY Bodies 108 N•m (80 ft. lbs.)
- (12) Install brake drum (Fig. 1).
- (13) Install washer and nut. Tighten adjusting nut to 27-34 N•m (240-300 in. lbs.) torque while rotating wheel. Back off adjusting nut with wrench to completely release bearing preload. Finger tighten adjusting nut.
- (14) Position nut lock with one pair of slots in-line with cotter pin hole. Install cotter pin. The end play should be 0.025-0.076 mm (0.001-0.003 inch). Clean and install grease cap.
- (15) Install wheel and tire assembly. Tighten wheel nut to 129 N•m (95 ft. lbs.) torque.
- (16) Lower vehicle.
- (17) Check alignment specifications.

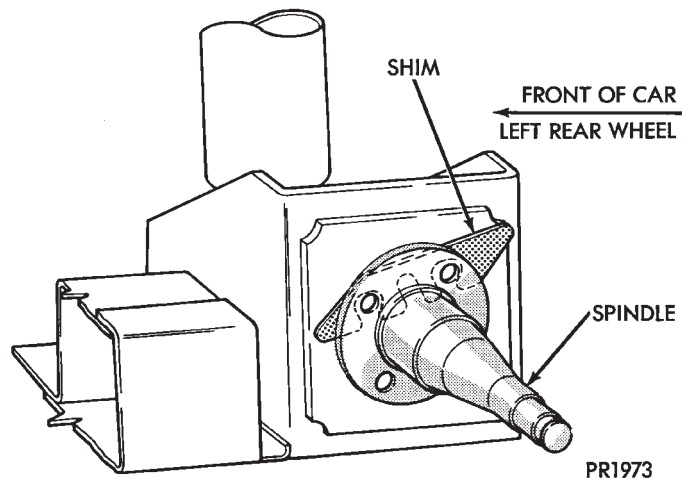


Fig. 5 Shim Installation for Positive Camber

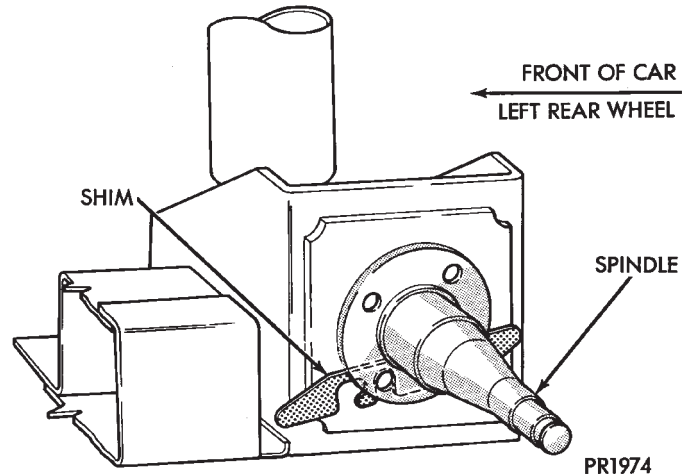


Fig. 6 Shim Installation for Negative Camber

SPECIFICATIONS

ALIGNMENT SPECIFICATIONS AT CURB HEIGHT

FRONT WHEEL ALIGNMENT	ACCEPTABLE ALIGNMENT RANGE AT CURB HEIGHT	PREFERRED SETTING
Camber – All (Except AY with Air Suspension) AY with Air Suspension	-0.2° to +0.8° -0.3 to +0.5	+0.3°
TOE – All models Specified in inches Specified in degrees	7/32" in to 1/8" out 0.4° in to 0.2° out	1/16" in ± 1/16" 0.1° in ± 0.1°
CASTER*	REFERENCE ANGLE	
AA AG AJ AP AC AY without Air Suspension AY with Air Suspension *Side to side caster should not exceed 1.5 degrees	2.8° 2.7° 3.0°	
REAR WHEEL ALIGNMENT	ACCEPTABLE ALIGNMENT RANGE AT CURB HEIGHT	PREFERRED SETTING
CAMBER – All models TOE* – All models Specified in inches Specified in degrees Thrust Angle *TOE OUT when backed on alignment rack is TOE IN when driving.	-1.3° to -0.2° 5/16" out to 5/16" in 0.60° out to 0.60° in -0.40° to +0.40°	-0.5 ± 0.5 0" ± 1/8" 0 ± 0.25 -0.40° to +0.40°

9202-140

REAR SUSPENSION TORQUE SPECIFICATIONS

DESCRIPTION	TORQUE
Leaf Spring To Hanger Mounting Bolts	142 N•m (105 ft. lbs.)
Upper Shock Absorber Mounting Bolt	115 N•m (85 ft. lbs.)
Lower Shock Absorber Mounting Bolt	108 N•m (80 ft. lbs.)
Brake Support Plate And Spindle Mounting Bolts	108 N•m (80 ft. lbs.)
Rear Spring U-Bolts	88 N•m (65 ft. lbs.)
Rear Spring Shackle Nuts Front Wheel Drive	47 N•m (35 ft. lbs.)
Rear Spring Shackle Nuts All Wheel Drive	61 N•m (45 ft. lbs.)
Jounce Bumper To Frame Rail.....	33 N•m (290 in. lbs.)
Front and Rear Spring Hanger To Frame Rail	61 N•m (45 ft. lbs.)
Sway Bar Bushing To Axle Bracket Bolt.....	61 N•m (45 ft. lbs.)
Sway Bar To Link Arm Nut.....	61 N•m (45 ft. lbs.)
Link Arm To Frame Rail Attaching Bracket.....	61 N•m (45 ft. lbs.)
Sway Bar Frame Rail Bracket To Frame Rail.....	33 N•m (290 in. lbs.)

9202-141

FRONT SUSPENSION TORQUE SPECIFICATIONS

DESCRIPTION	TORQUE
Wheel Stud Lug Nut (All).....	110 - 135 N•m (85 - 115 ft. lbs.)
Strut Damper To Steering Knuckle Leg	*100 N•m (75 ft. lbs.)
Lower Control Arm Pivot Nut And Bolt	129 N•m (95 ft. lbs.)
Sway Bar Cushion Bracket Attaching Bolts	70 N•m (50 ft. lbs.)
Sway Bar End Bushing Bracket Attaching Bolts	70 N•m (50 ft. lbs.)
Ball Joint Stud To Steering Knuckle Attaching Bolt.....	145 N•m (105 ft. lbs.)
Strut Damper Rod To Upper Strut Mount Attaching Nut.....	75 N•m (55 ft. lbs.)
Upper Strut Mount To Shock Tower Attaching Nuts.....	28 N•m (250 in. lbs.)
Front Crossmember To Frame Rail Attaching Bolts	122 N•m (90 ft. lbs.)
Crossmember To Frame Rail Attaching Studs	54 N•m (40 ft. lbs.)
Crossmember Attaching Nut To Frame Rail Stud	122 N•m (90 ft. lbs.)

*Plus 1/4 90° Turn.

9202-142