DIFFERENTIAL AND DRIVELINE

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GENERAL INFORMATION

FRONT DRIVESHAFTS

Vehicles equipped with either an automatic or manual transmission uses an unequal length driveshaft system.

Vehicles equipped with automatic transaxles use a solid short interconnecting shaft on the left side. The right side of the vehicle uses a longer solid interconnecting shaft.

Driveshafts used on both the right and left sides of the vehicle use a tuned rubber damper weight. The damper weight on the right side is a single clamp style damper. The damper weight on the left side is a double clamp style damper. When replacing a driveshaft, be sure the replacement driveshaft has the same damper weight as the original.

Both driveshaft assemblies use the same type of inner and outer joints. The inner joint of both driveshaft assemblies is a tripod joint, and the outer joint of both driveshaft assemblies is a Rzeppa joint. Both tripod joints and Rzeppa joints are true constant velocity (C/V) joint assemblies. The inner tripod joint allows for the changes in driveshaft length through the jounce and rebound travel of the front suspension.

On vehicles equipped with ABS brakes, the outer C/V joint is equipped with a tone wheel used to determine vehicle speed for ABS brake operation.

The inner tripod joint of both driveshafts is splined into the transaxle side gears. The inner tripod joints are retained in the side gears of the transaxle using a snap ring located in the stub shaft of the tripod joint. The outer C/V joint has a stub shaft that is splined into the wheel hub and retained by a hub nut using a nut lock and cotter pin, hub nut retention system.

NOTE: This vehicle does not use a rubber lip bearing seal as on past front wheel drive cars, to prevent contamination of the front wheel bearing. On these vehicles, the face of the outer C/V joint has a metal bearing shield which is pressed onto the end of the outer C/V joint housing. This design deters direct water splash on bearing seal while allowing any water that gets in, to run out the bottom of the bearing shield. It is important though to thoroughly clean the outer C/V joint and the wheel bearing area in the steering knuckle before it is assembled after servicing.

GENERAL INFORMATION (Continued)

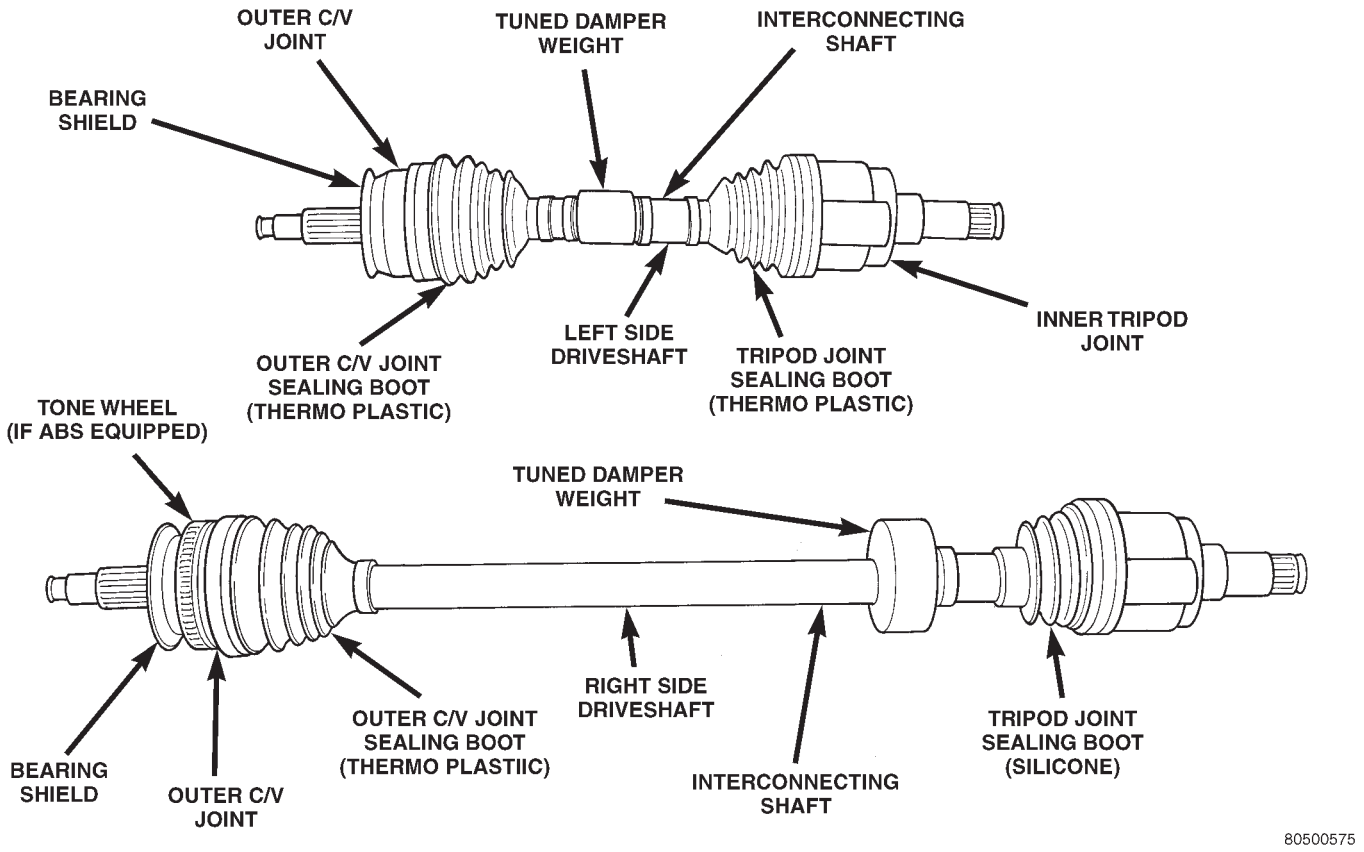


Fig. 1 Driveshaft Identification

FRONT DRIVESHAFT IDENTIFICATION

Driveshafts and driveshaft inner and outer boots can be identified as shown in (Fig. 1). Driveshaft boot location on the driveshaft assemblies, is determined by the number of convolutes used on the driveshaft boot. Refer to (Fig. 1) for the correct location of the sealing boots.

DESCRIPTION AND OPERATION

DRIVESHAFT SERVICE

CAUTION: The outer C/V joint used on this vehicle uses a new design for retaining the cross to the interconnecting shaft. These driveshafts incorporate a slight twist (helical) in the spline on the interconnecting shaft where the cross is installed. This twist causes a interference fit between the interconnecting shaft and the cross when the outer C/V joint is installed on the interconnecting shaft. This design eliminates the clearance between the cross and the interconnecting shaft resulting in quieter operation of the driveshaft assembly. This design though, eliminated the capability of removing the outer C/V joint from the interconnecting shaft. For this reason the driveshafts will be serviced as a quarter shaft (outer C/V joint/sealing boot, interconnecting shaft and vibration damper) in the event of a outer C/V joint boot failure. The inner joint sealing boot will be serviced, as on past applications, as a separate component of the driveshaft assembly.

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, or 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.

DIAGNOSIS AND TESTING

DRIVESHAFT DIAGNOSIS

VEHICLE INSPECTION

(1) Check for grease in the vicinity of the inboard tripod joint and outboard C/V joint; this is a sign of inner or outer joint seal boot or seal boot clamp damage.

(2) A light film of grease may appear on the right inner tripod joint seal boot; this is considered normal and should not require replacement of the seal boot.

DIAGNOSIS AND TESTING (Continued)

NOISE AND/OR VIBRATION IN TURNS

A clicking noise and/or a vibration in turns could be caused by one of the following conditions:

(1) Damaged outer C/V or inner tripod joint seal boot or seal boot clamps. This will result in the loss and/or contamination of the joint grease, resulting in inadequate lubrication of the joint.

(2) Noise may also be caused by another component of the vehicle coming in contact with the driveshafts.

CLUNKING NOISE DURING ACCELERATION

This noise may be a result of one of the following conditions:

(1) A torn seal boot on the inner or outer joint of the driveshaft assembly.

(2) A loose or missing clamp on the inner or outer joint of the driveshaft assembly.

(3) A damaged or worn driveshaft C/V joint.

SHUDDER OR VIBRATION DURING ACCELERATION

This problem could be a result of:

(1) A worn or damaged driveshaft inner tripod joint.

(2) A sticking tripod joint spider assembly (inner tripod joint only).

(3) Improper wheel alignment. See Wheel Alignment in this group for alignment checking and setting procedures and specifications.

VIBRATION AT HIGHWAY SPEEDS

This problem could be a result of:

(1) Foreign material (mud, etc.) packed on the backside of the wheel(s).

(2) Out of balance front tires or wheels. See Group 22, Wheels And Tires for the required balancing procedure.

(3) Improper tire and/or wheel runout. See Group 22, Wheels And Tires for the required runout checking procedure.

REMOVAL AND INSTALLATION

FRONT DRIVESHAFTS

REMOVAL

CAUTION: The driveshaft, when installed, acts as a bolt and secures the front hub/bearing assembly. If vehicle is to be supported or moved on its wheels with a driveshaft removed, install a PROPER–SIZED BOLT AND NUT through front hub. Tighten bolt and nut to 244 N·m (180 ft. lbs.). This will ensure that the hub bearing cannot loosen.

(1) Remove cotter pin, nut lock, and spring washer from the end of the outer C/V joint stub axle (Fig. 2).

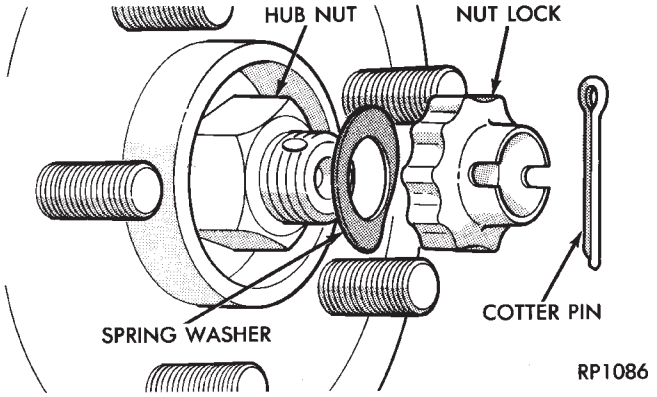


Fig. 2 Cotter Pin, Nut Lock and Spring Washer

(2) Loosen (but do not remove) stub axle to hub/bearing retaining nut. Loosen hub nut while vehicle is on the floor with the brakes applied (Fig. 3). The front hub and driveshaft are splined together and retained by the hub nut.

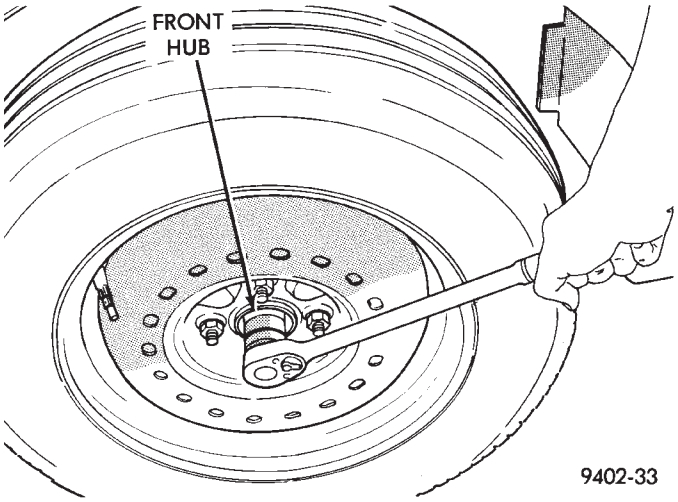


Fig. 3 Loosening Front Hub Retaining Nut

(3) Raise vehicle on jack stands or centered on a frame contact type hoist. See Hoisting, in the Lubrication and Maintenance section, for required lifting procedure to be used for this vehicle.

(4) Remove front tire and wheel assembly from the hub.

(5) Remove front disc brake caliper assembly to steering knuckle guide pin attaching bolts (Fig. 4).

(6) Remove disc brake caliper assembly from steering knuckle. Caliper is removed by first lifting bottom of caliper away from steering knuckle, and then removing top of caliper out from under steering knuckle (Fig. 5).

REMOVAL AND INSTALLATION (Continued)

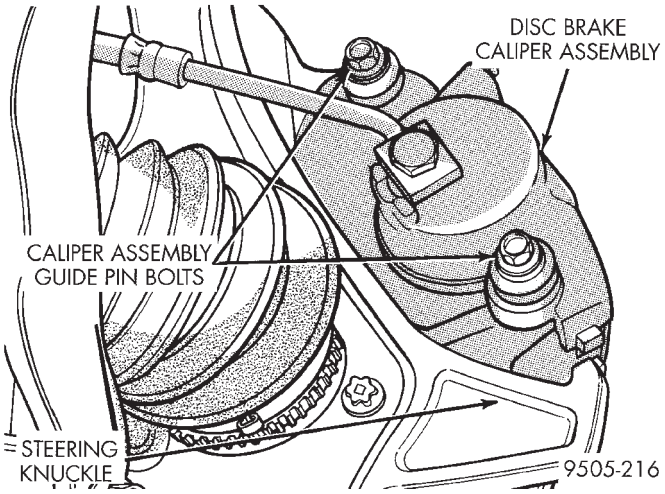


Fig. 4 Caliper Guide Pin Attaching Bolts

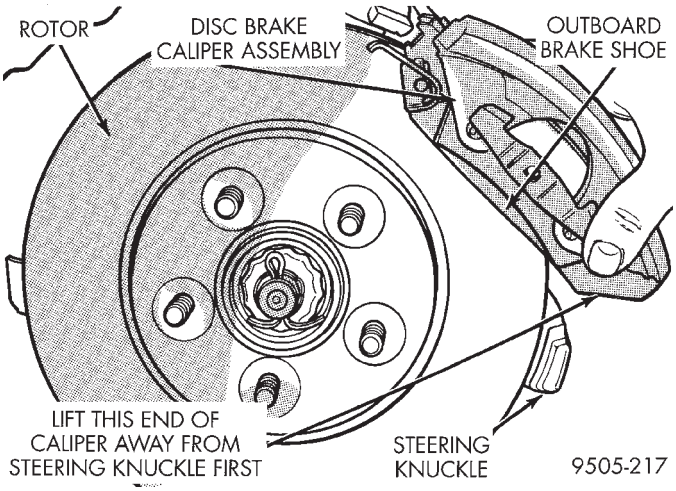


Fig. 5 Removing Disc Brake Caliper

(7) Support brake caliper/adapter assembly using a wire hook (Fig. 6). **Do not support assembly by the brake flex hose.**

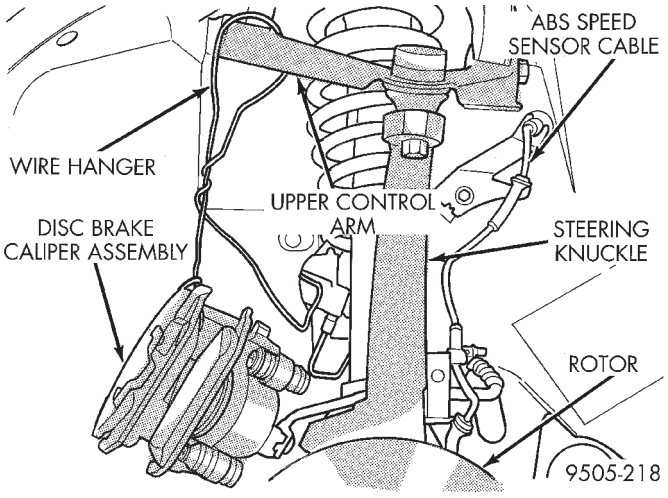


Fig. 6 Correctly Supported Brake Caliper

(8) Remove braking disc from front hub.

(9) Remove nut attaching outer tie rod end to steering knuckle. **Remove nut from tie rod end by holding tie rod end stud with a 11/32 socket and loosen and remove nut (Fig. 7).**

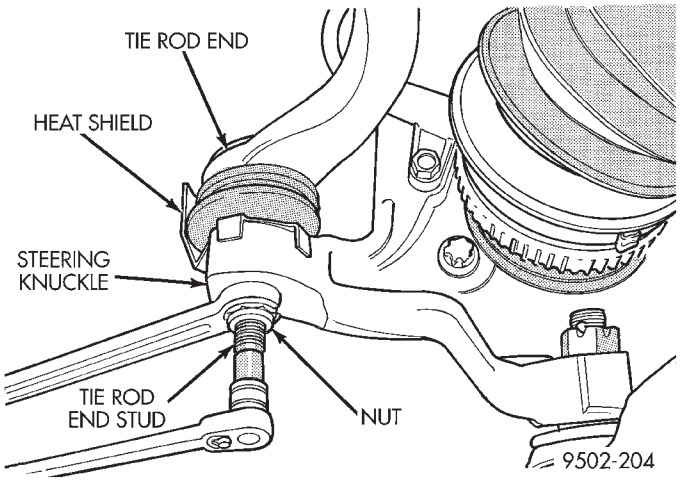


Fig. 7 Removing Tie Rod End Attaching Nut

(10) Remove the tie rod end stud from steering knuckle arm, using remover, Special Tool MB-991113 (Fig. 8).

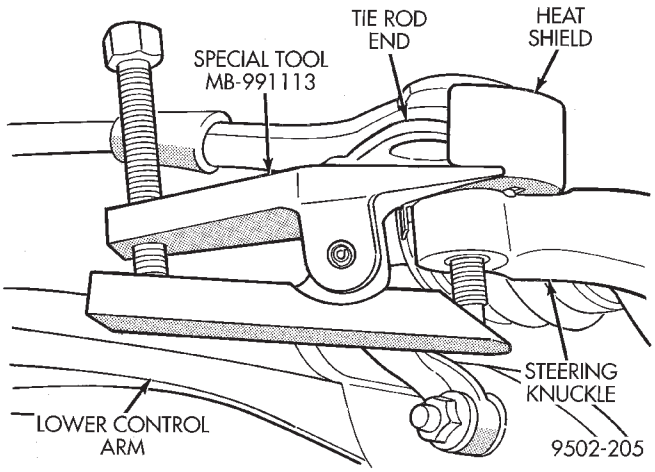


Fig. 8 Tie Rod End Removal from Steering Knuckle

(11) If equipped with antilock brakes, remove the speed sensor cable routing bracket from the steering knuckle (Fig. 9).

(12) Remove cotter pin and castle nut (Fig. 10) from stud of lower ball joint at the steering knuckle.

CAUTION: No tool is to be inserted between the steering knuckle and the lower ball joint to separate stud of lower ball joint from the steering knuckle. The steering knuckle is to be separated from the stud of the ball joint only using the procedure as described in Step 13.

REMOVAL AND INSTALLATION (Continued)

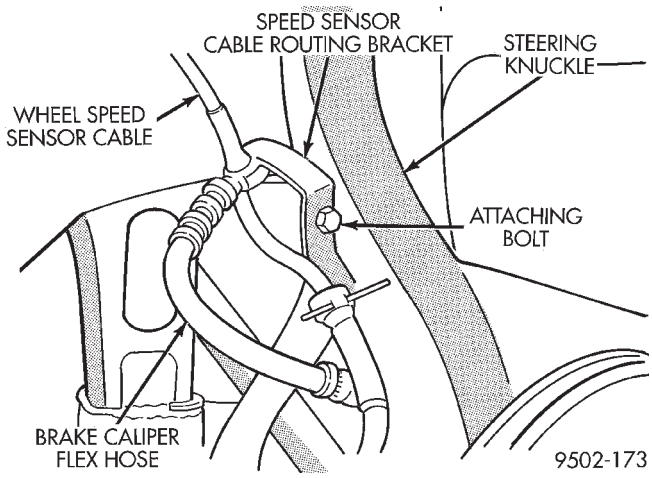


Fig. 9 Wheel Speed Sensor Cable Routing Bracket

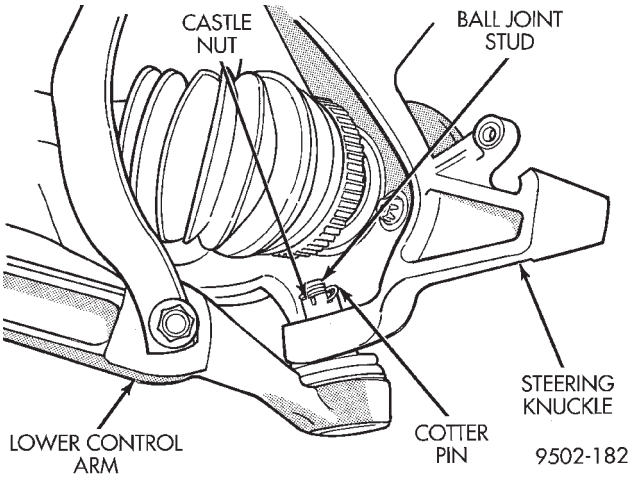


Fig. 10 Lower Ball Joint to Steering Knuckle Attachment

(13) Turn steering knuckle so the front of the steering knuckle is facing as far outboard in the wheel well as possible. Using a hammer strike steering knuckle boss until steering knuckle separates from stud of lower ball joint (Fig. 11). **When striking steering knuckle, care MUST be taken not to hit lower control arm or ball joint grease seal.**

NOTE: 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.

(14) Pull steering knuckle assembly out and away from outer C/V joint of the driveshaft assembly (Fig. 12).

CAUTION: When inserting pry bar between inner tripod joint and transaxle case, care must be used to ensure no damage occurs to oil seal in transaxle case.

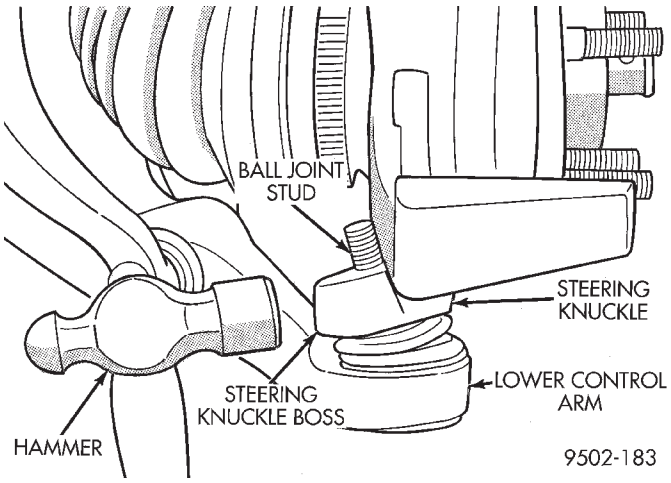


Fig. 11 Separating Ball Joint Stud from Steering Knuckle

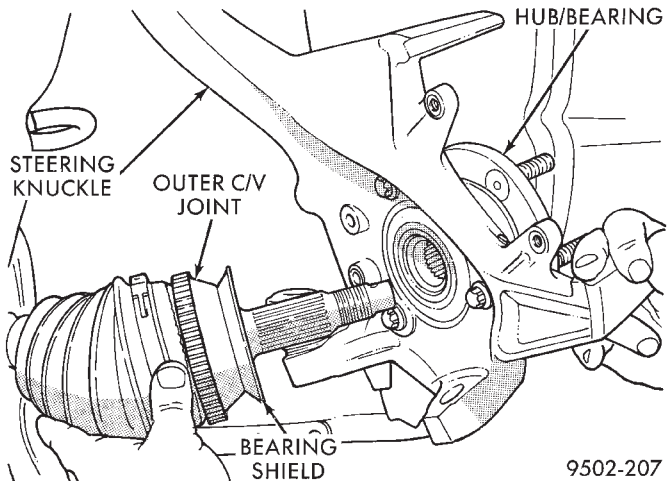


Fig. 12 Separating Steering Knuckle from Outer C/V Joint

(15) Support the outer end of the driveshaft assembly. Insert a pry bar between inner tripod joint and transaxle case (Fig. 13). Pry against inner tripod joint, until tripod joint retaining snap ring is disengaged from transaxle side gear.

(16) Hold inner tripod joint and interconnecting shaft of driveshaft assembly. Remove inner tripod joint from transaxle, by pulling it straight out of transaxle side gear and transaxle oil seal (Fig. 14). **When removing tripod joint, do not let spline or snap ring drag across sealing lip of the transaxle to tripod joint oil seal.**

CAUTION: The driveshaft, when installed, acts as a bolt and secures the front hub/bearing assembly. If vehicle is to be supported or moved on its wheels with a driveshaft removed, install a PROPER–SIZED BOLT AND NUT through front hub. Tighten bolt and nut to 183 N·m (135 ft. lbs.). This will ensure that the hub bearing cannot loosen.

REMOVAL AND INSTALLATION (Continued)

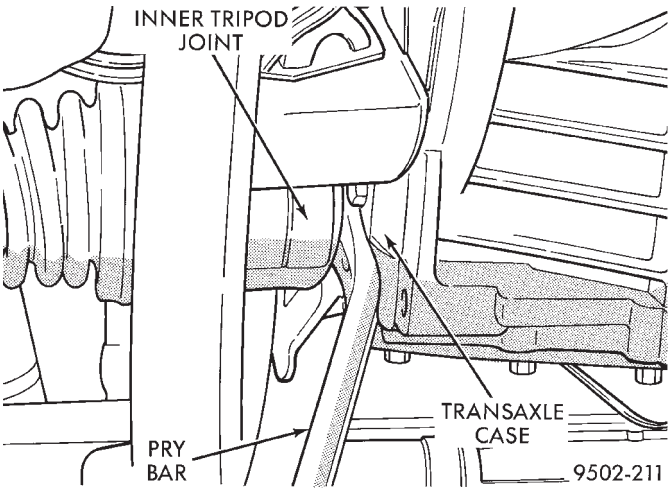


Fig. 13 Disengaging Inner Tripod Joint From Transaxle

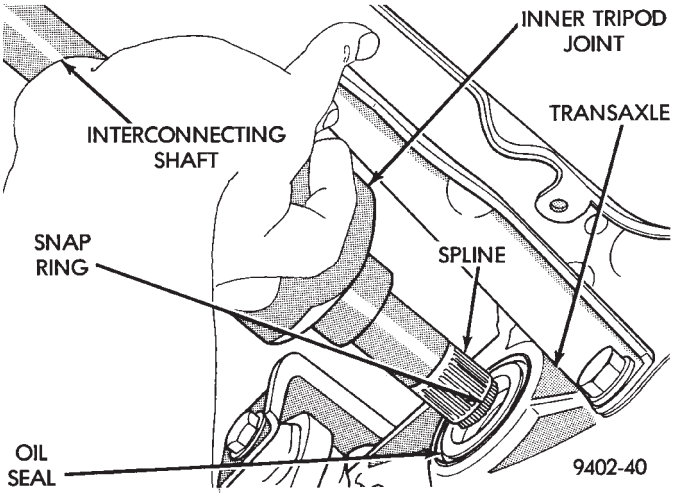


Fig. 14 Tripod Joint Removal from Transaxle

INSTALLATION

(1) Thoroughly clean spline and oil seal sealing surface, on tripod joint. Lightly lubricate oil seal sealing surface on tripod joint with fresh clean transmission lubricant.

(2) Holding driveshaft assembly by tripod joint and interconnecting shaft, install tripod joint into transaxle side gear as far as possible by hand (Fig. 14).

(3) Grasp inner tripod joint an interconnecting shaft. Forcefully push the tripod joint into side gear of transaxle, until snap ring is engaged with transaxle side gear. **Test that snap ring is fully engaged with side gear by attempting to remove tripod joint from transaxle by hand. If snap ring is fully engaged with side gear, tripod joint will not be removable by hand.**

(4) Clean all debris and moisture out of steering knuckle, in the area were outer C/V joint will be installed into steering knuckle.

(5) Ensure that front of outer C/V joint which fits against the face of the hub and bearing is free of debris and moisture before installing outer C/V joint into hub and bearing assembly (Fig. 15).

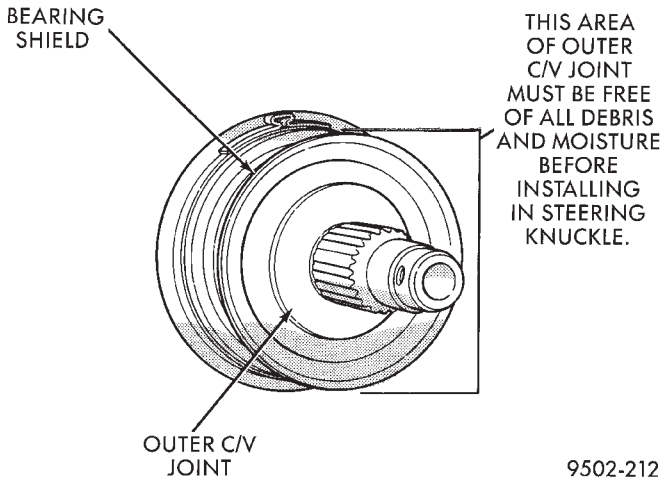


Fig. 15 Outer C/V Joint Inspection

(6) Slide driveshaft back into front hub (Fig. 16). Then install steering knuckle onto the lower control arm ball joint stud.

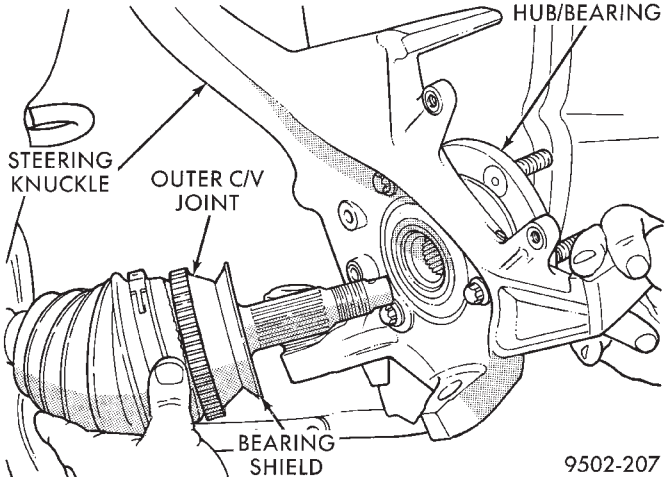


Fig. 16 Steering Knuckle Installation on Outer C/V Joint

(7) Install the steering knuckle to ball joint stud castle nut (Fig. 17). Tighten the castle nut to 95 N·m (70 ft. lbs.).

(8) If equipped with antilock brakes, install the speed sensor cable on the steering knuckle and securely tighten bolt (Fig. 18).

(9) Install tie rod end into the steering knuckle. Start tie rod end to steering knuckle nut onto stud of tie rod end. While holding stud of tie rod end stationary (Fig. 19), tighten tie rod end to steering knuckle nut. Using a crowfoot and 11/32 socket, tighten the nut to 61 N·m (45 ft. lbs.) (Fig. 20).

REMOVAL AND INSTALLATION (Continued)

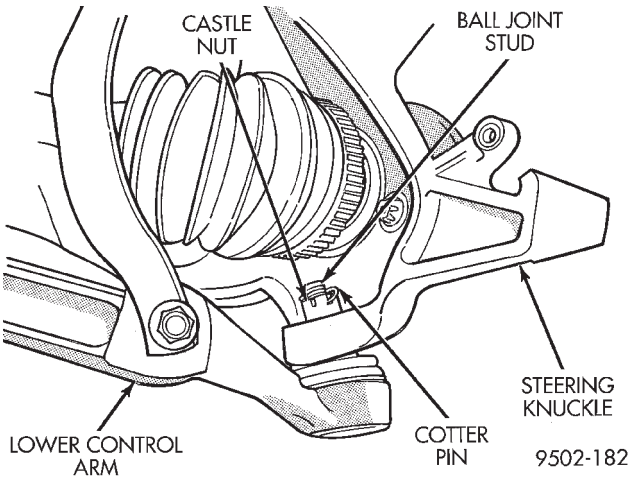


Fig. 17 Lower Ball Joint to Steering Knuckle Attachment

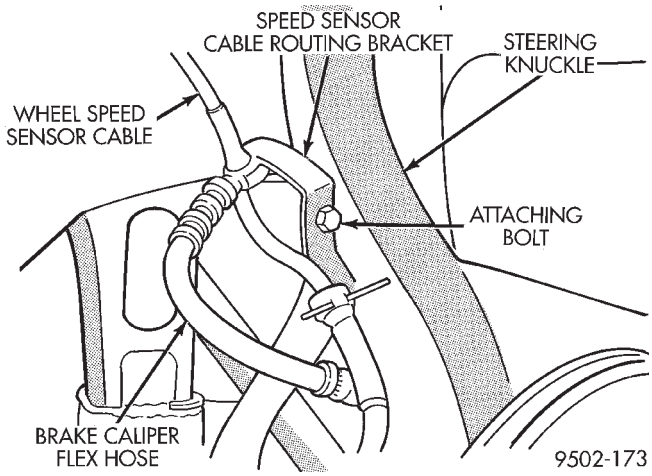


Fig. 18 Wheel Speed Sensor Cable Routing Bracket

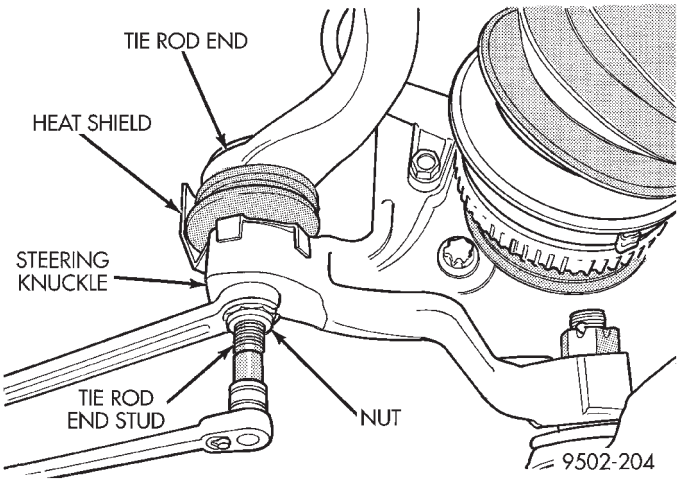


Fig. 19 Installing Tie Rod End Nut

(10) Install braking disc back on hub and bearing assembly.

(11) Install disc brake caliper assembly on steering knuckle. Caliper is installed by first sliding top of caliper under top abutment on steering knuckle. Then installing bottom of caliper against bottom abutment of steering knuckle (Fig. 21).

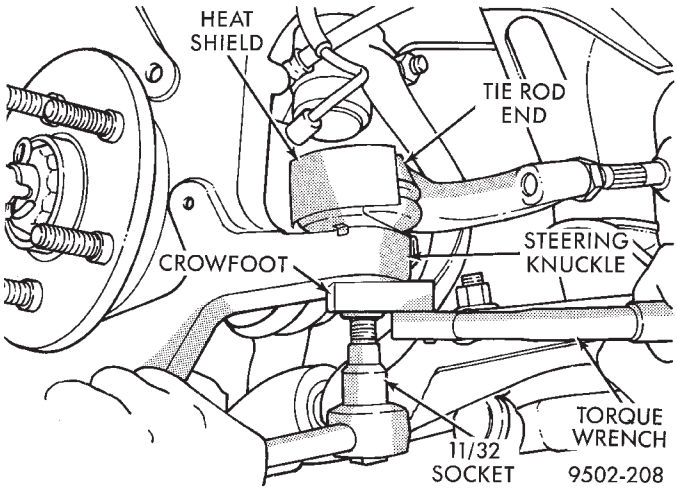


Fig. 20 Torquing Tie Rod End Nut

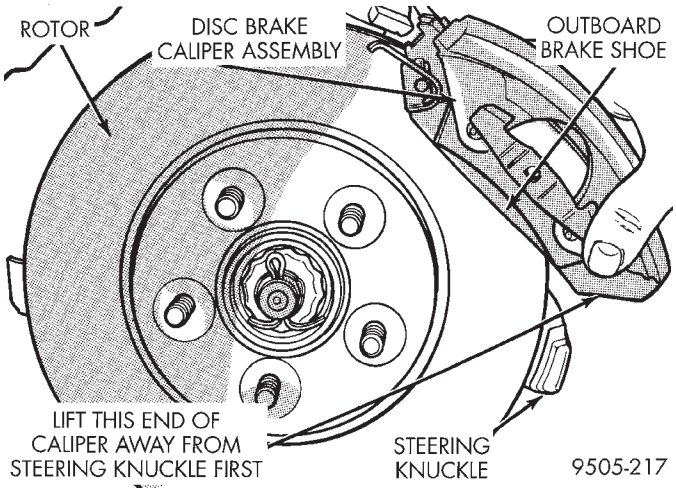


Fig. 21 Disc Brake Caliper Assembly Installation

(12) Install caliper assembly to steering knuckle guide pin bolts (Fig. 22). Tighten caliper assembly bolts to 31 N·m (23 ft. lbs.).

(13) Clean all foreign matter from the threads of the outer C/V joint stub axle. Install hub nut onto threads of stub axle and tighten nut. (Fig. 23).

(14) With vehicle brakes applied to keep braking disc from turning, tighten hub nut to 244 N·m (180 ft. lbs.) (Fig. 24).

(15) Install the spring washer, hub nut lock, and new cotter pin on end of stub axle. Wrap cotter pin prongs tightly around the hub nut lock (Fig. 25).

(16) Install front wheel and tire assembly. Install front wheel lug nuts and tighten in the correct sequence (Fig. 26). Tighten lug nuts to 135 N·m (100 ft. lbs.).

(17) Lower vehicle.

REMOVAL AND INSTALLATION (Continued)

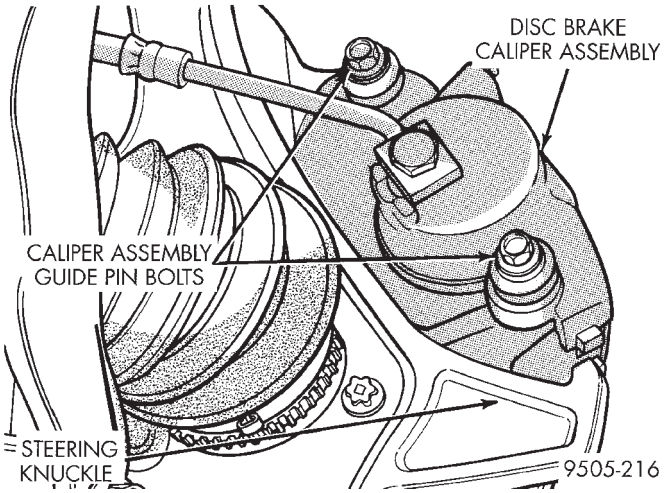


Fig. 22 Disc Brake Caliper Bolts

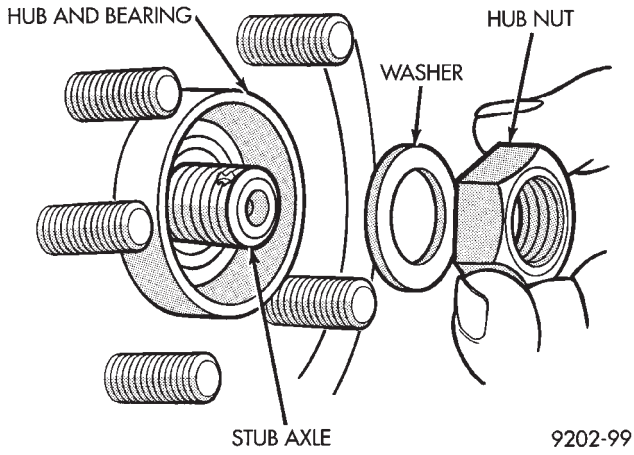


Fig. 23 Install Washer and Hub Nut

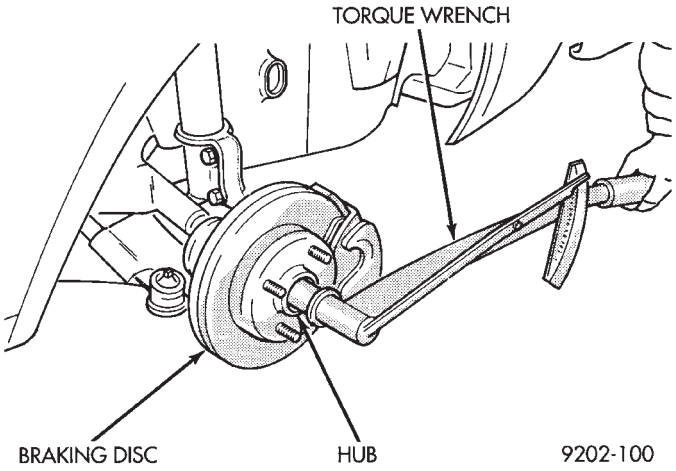


Fig. 24 Torquing Front Hub Nut

(18) Check for correct fluid level in transaxle assembly. Refer to Group 21, Transaxle for the correct fluid level checking procedure for the type of transaxle being checked.

(19) Set front toe on vehicle to required specification.

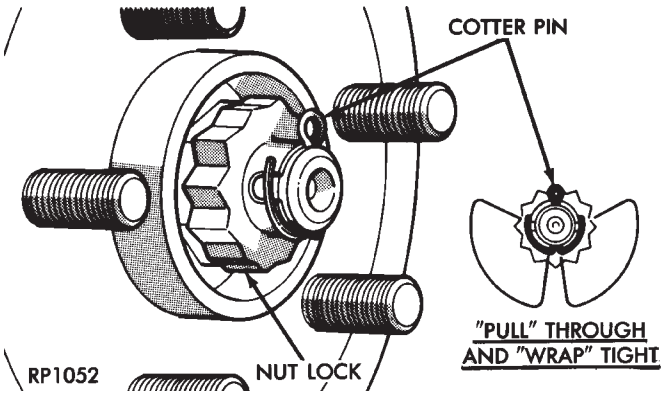


Fig. 25 Spring Washer, Nut Lock and Cotter Pin Installation

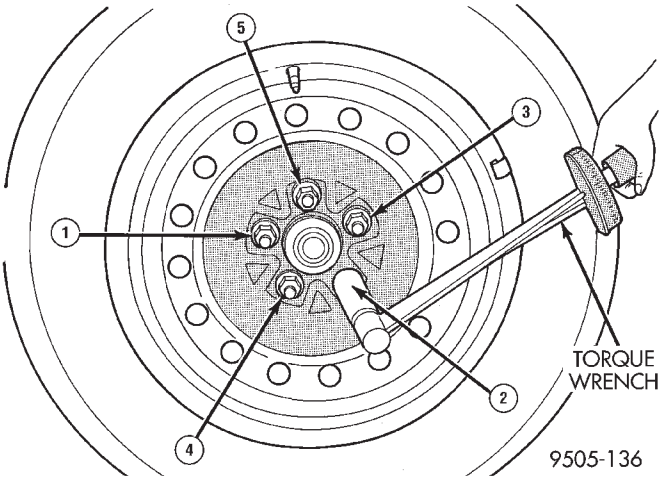


Fig. 26 Wheel Lug Torquing Sequence

DISASSEMBLY AND ASSEMBLY

DRIVESHAFT RECONDITIONING PROCEDURE

CAUTION: The outer C/V joint used on this vehicle uses a new design for retaining the cross to the interconnecting shaft. These driveshafts incorporate a slight twist (helical) in the spline on the interconnecting shaft where the cross is installed. This twist causes a interference fit between the interconnecting shaft and the cross when the outer C/V joint is installed on the interconnecting shaft. This design eliminates the clearance between the cross and the interconnecting shaft resulting in quieter operation of the driveshaft assembly. This design though eliminated the capability of removing the outer C/V joint from the interconnecting shaft. For this reason the driveshafts will be serviced as a quarter shaft (outer C/V joint/sealing boot, interconnecting shaft and vibration damper) in the event of a outer C/V joint boot failure.

DISASSEMBLY AND ASSEMBLY (Continued)

NOTE: The only service which is to be performed on the driveshaft assemblies is the replacement of the driveshaft seal boots on the inner tripod joints.

If any failure of internal driveshaft components is diagnosed during a vehicle road test or disassembly of the driveshaft, the driveshaft will need to be replaced as an assembly.

CAUTION: Lubricant requirements and quantities are different for inner joints than for outer joints. Use only the recommended lubricants in the required quantities when servicing driveshaft assemblies.

INNER TRIPOD JOINT SEAL BOOT

REMOVAL

To remove sealing boots from driveshafts, the driveshaft assemblies must be removed from the vehicle. See Servicing Driveshaft for the required driveshaft removal and replacement procedure.

The inner tripod joints use no internal retention in the tripod housing to keep the spider assembly in the housing. Therefore, do not pull on the interconnecting shaft to disengage tripod housing from transmission stub shaft. Removal in this manner will cause damage to the inboard joint sealing boots.

(1) Remove the driveshaft requiring boot replacement from the vehicle. See Servicing Driveshaft for the required driveshaft removal procedure.

(2) Remove large boot clamp which retains inner tripod joint sealing boot to tripod joint housing and discard. Remove small clamp which retains inner tripod joint sealing boot to interconnecting shaft and discard. Remove the sealing boot from the tripod housing and slide it down the interconnecting shaft.

CAUTION: When removing the tripod joint housing from the spider assembly, hold the bearings in place on the spider trunions to prevent the bearings from falling away.

(3) Slide the tripod joint housing off the spider assembly and the interconnecting shaft (Fig. 27).

(4) Remove snap ring which retains spider assembly to interconnecting shaft (Fig. 28). Remove the spider assembly from interconnecting shaft. If spider assembly will not come off interconnecting shaft by hand, it can be removed by tapping spider assembly with a brass drift (Fig. 29). **Do not hit the outer tripod bearings in an attempt to remove spider assembly from interconnecting shaft.**

(5) Slide sealing boot off interconnecting shaft.

(6) Thoroughly clean and inspect spider assembly, tripod joint housing, and interconnecting shaft for any signs of excessive wear. **If any parts show signs of excessive wear, the driveshaft assembly will require replacement. Component parts of these driveshaft assemblies are not serviceable.**

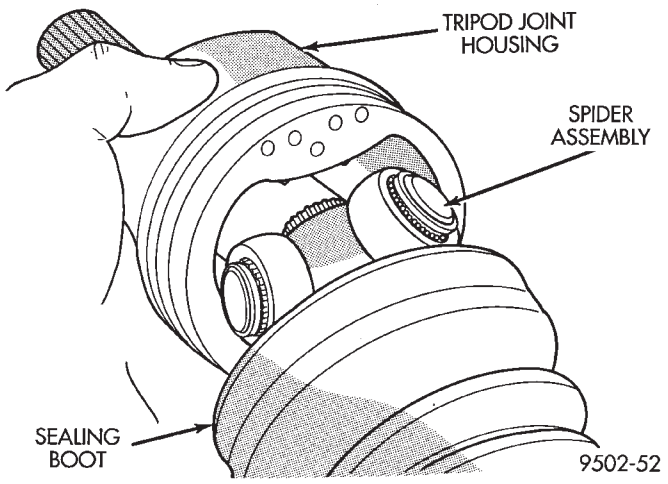


Fig. 27 Spider Assembly Removal from Tripod Joint Housing

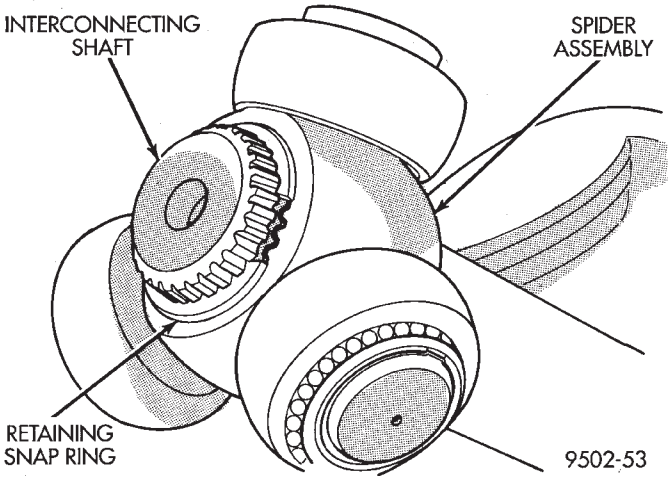


Fig. 28 Spider Assembly Retaining Snap Ring

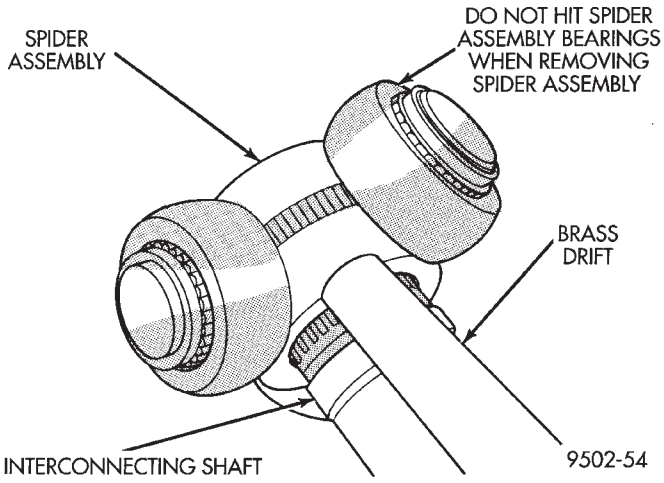


Fig. 29 Spider Assembly Removal from Interconnecting Shaft

DISASSEMBLY AND ASSEMBLY (Continued)

INSTALLATION

NOTE: The inner tripod joint sealing boots are made from two different types of material. High temperature applications use silicone rubber where as standard temperature applications use hytrel plastic. The silicone sealing boots are soft and pliable. The Hytrel sealing boots are stiff and rigid. The replacement sealing boot MUST BE the same type of material as the sealing boot which was removed.

(1) Slide inner tripod joint seal boot retaining clamp, onto interconnecting shaft. Then, slide the replacement inner tripod joint sealing boot onto the interconnecting shaft. **Inner tripod joint seal boot MUST be positioned on interconnecting shaft, so the raised bead on the inside of the seal boot is in groove on interconnecting shaft (Fig. 30).**

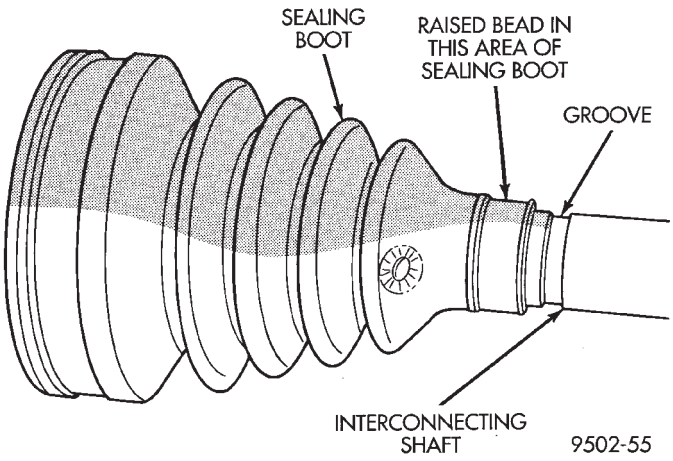


Fig. 30 Sealing Boot Installation on Interconnecting Shaft

(2) Install spider assembly onto interconnecting shaft (Fig. 31). Spider assembly must be installed on interconnecting shaft far enough to fully install spider retaining snap ring. If spider assembly will not fully install on interconnecting shaft by hand, it can be installed by tapping the spider body with a brass drift (Fig. 32). **Do not hit the outer tripod bearings in an attempt to install spider assembly on interconnecting shaft.**

(3) Install the spider assembly to interconnecting shaft retaining snap ring into groove on end of interconnecting shaft (Fig. 33). Be sure the snap ring is fully seated into groove on interconnecting shaft.

(4) Distribute 1/2 the amount of grease provided in the seal boot service package (DO NOT USE ANY OTHER TYPE OF GREASE) into tripod housing. Put the remaining amount into the sealing boot.

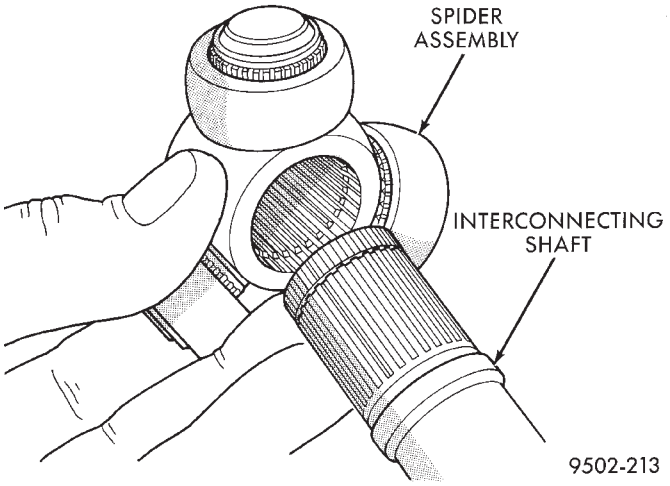


Fig. 31 Spider Assembly Installation on Interconnecting Shaft

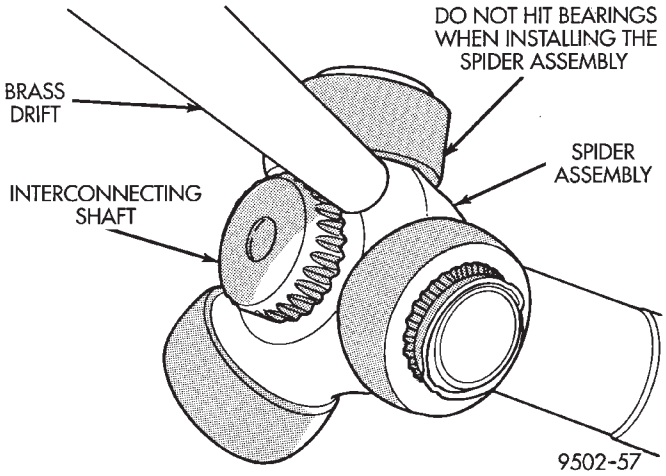


Fig. 32 Installing Spider Assembly on Interconnecting Shaft

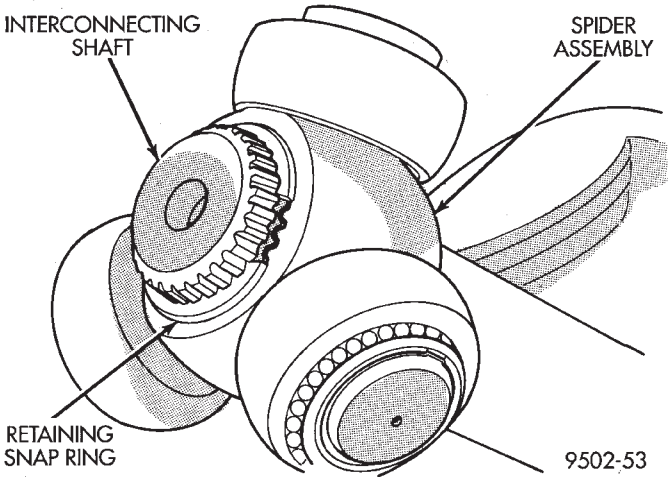


Fig. 33 Spider Assembly Retaining Snap Ring Installed

DISASSEMBLY AND ASSEMBLY (Continued)

(5) Align tripod housing with spider assembly and then slide tripod housing over spider assembly and interconnecting shaft (Fig. 34).

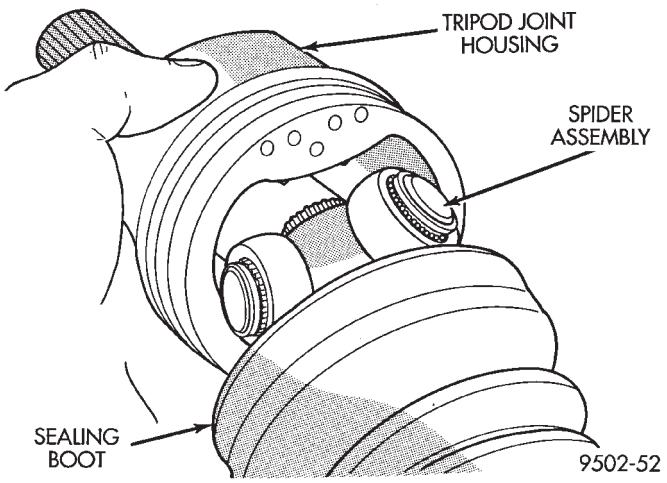


Fig. 34 Installing Tripod Housing on Spider Assembly

(6) Install inner tripod joint seal boot to interconnecting shaft clamp evenly on sealing boot.

(7) Clamp sealing boot onto interconnecting shaft using crimper, Special Tool C-4975-A and the following procedure. Place crimping tool C- 4975-A over bridge of clamp (Fig. 35). Tighten nut on crimping tool C- 4975-A until jaws on tool are closed completely together, face to face (Fig. 36).

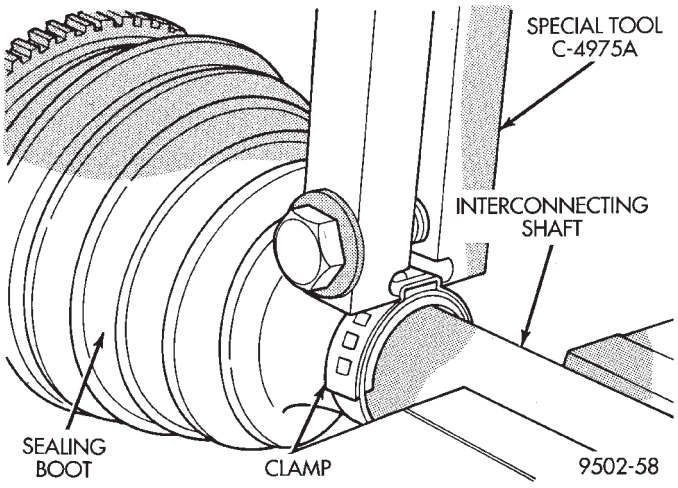


Fig. 35 Crimping Tool Installed on Sealing Boot Clamp

CAUTION: Seal must not be dimpled, stretched or out of shape in any way. If seal is NOT shaped correctly, equalize pressure in seal and shape it by hand.

(8) Position sealing boot into the tripod housing retaining groove. Install seal boot retaining clamp evenly on sealing boot.

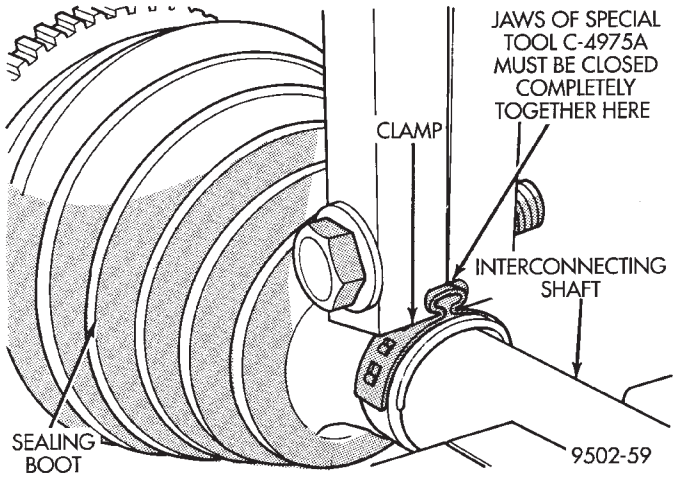


Fig. 36 Sealing Boot Retaining Clamp Installed

CAUTION: The following positioning procedure determines the correct air pressure inside the inner tripod joint assembly prior to clamping the sealing boot to inner tripod joint housing. If this procedure is not done prior to clamping sealing boot to tripod joint housing sealing boot durability can be adversely affected.

CAUTION: When venting the inner tripod joint assembly, use care so inner tripod sealing boot does not get punctured, or in any other way damaged. If sealing boot is punctured, or damaged in any way while being vented, the sealing boot can not be used.

(9) Insert a trim stick between the tripod joint and the sealing boot to vent inner tripod joint assembly (Fig. 37). **When inserting trim stick between tripod housing and sealing boot ensure trim stick is held flat and firmly against the tripod housing. If this is not done damage to the sealing boot can occur.** If inner tripod joint has a Hytrel (hard plastic) sealing boot, be sure trim stick is inserted between soft rubber insert and tripod housing not the hard plastic sealing boot and soft rubber insert.

(10) With trim stick inserted between sealing boot and tripod joint housing, position the interconnecting shaft so it is at the center of its travel in the tripod joint housing. Remove the trim stick from between the sealing boot and the tripod joint housing. **This procedure will equalize the air pressure in the tripod joint, preventing premature sealing boot failure.**

(11) Position trilobal boot to interface with the tripod housing. The lobes of the boot must be properly aligned with the recess's of the tripod housing.

DISASSEMBLY AND ASSEMBLY (Continued)

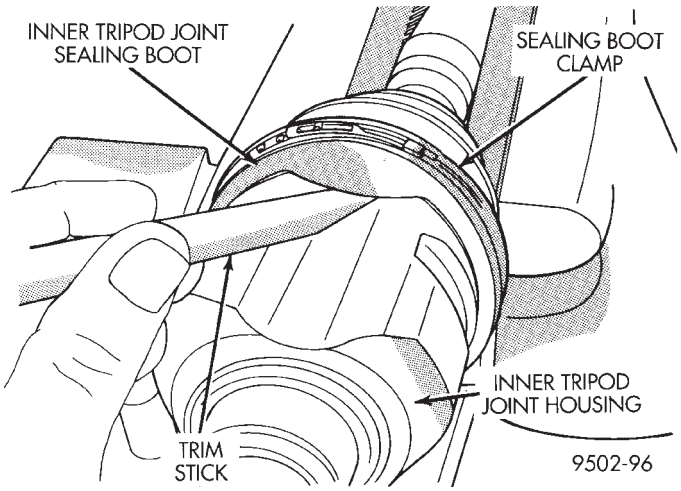


Fig. 37 Trim Stick Inserted for Venting Tripod Joint

(12) Clamp tripod joint sealing boot to tripod joint, using required procedure for type of boot clamp application.

CRIMP TYPE BOOT CLAMP

If seal boot uses crimp type boot clamp:

- Clamp sealing boot onto tripod housing using Crimper, Special Tool C-4975-A.
- Place crimping tool C- 4975-A over bridge of clamp (Fig. 38).
- Tighten nut on crimping tool C- 4975-A until jaws on tool are closed completely together, face to face (Fig. 39).

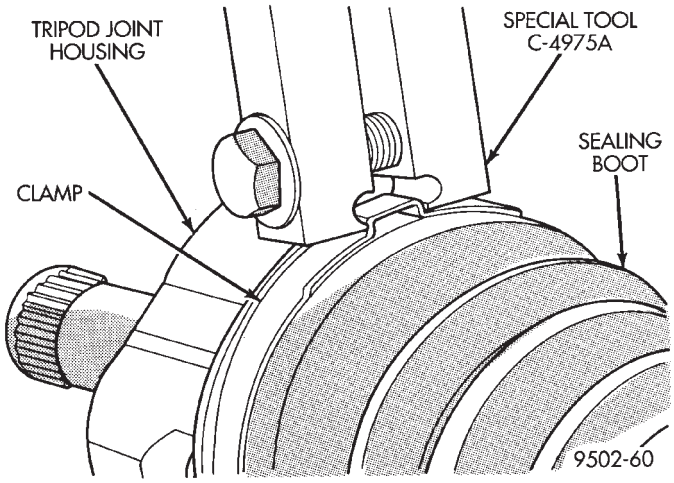


Fig. 38 Crimping Tool Installed on Sealing Boot Clamp

LATCHING TYPE BOOT CLAMP

If seal boot uses low profile latching type boot clamp:

- Clamp sealing boot onto tripod housing using clamp locking tool, Snap-On YA3050 or an equivalent.
- Place prongs of clamp locking tool in the holes of the clamp (Fig. 40).

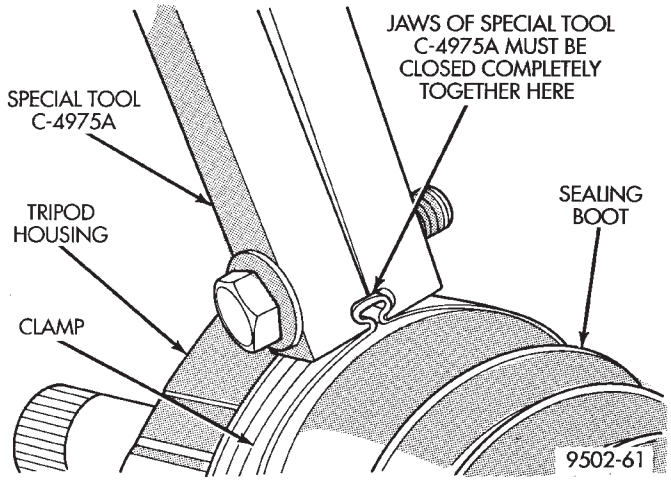


Fig. 39 Sealing Boot Retaining Clamp Installed

- Squeeze tool together until top band of clamp is latched behind the two tabs on lower band of clamp (Fig. 41).

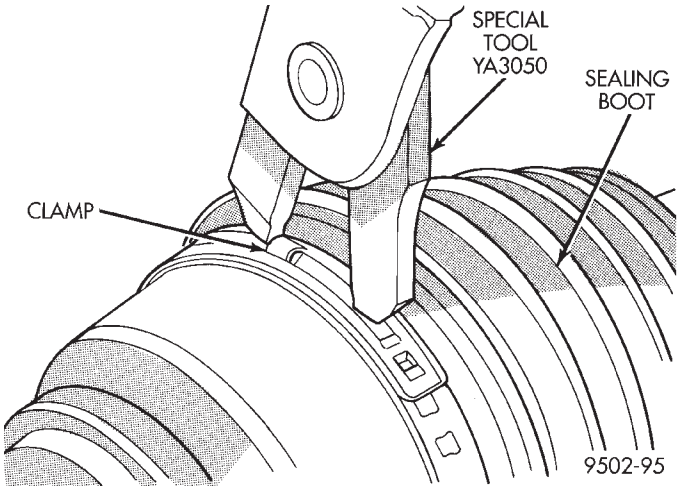


Fig. 40 Clamping Tool Installed on Sealing Boot Clamp

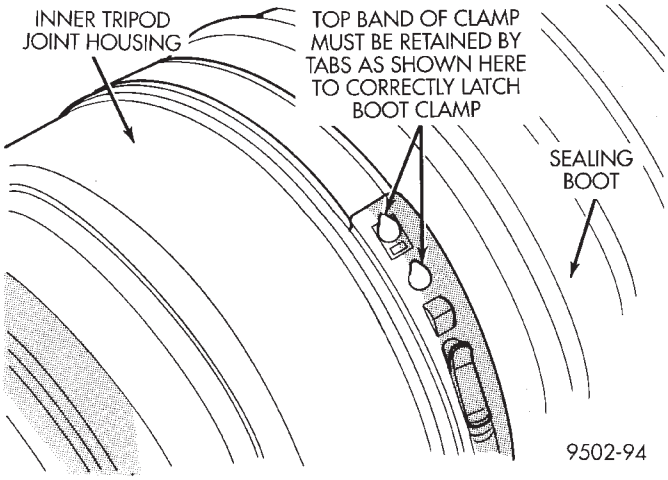


Fig. 41 Sealing Boot Clamp Correctly Installed

DISASSEMBLY AND ASSEMBLY (Continued)

(1) Install the driveshaft back on the vehicle. See Servicing Driveshaft, for the required driveshaft installation procedure.

OUTER C/V JOINT SEALING BOOT SERVICE

CAUTION: The outer C/V joint used on this vehicle is not a serviceable joint.

CAUTION: The outer C/V joint used on this vehicle uses a new design for retaining the cross to the interconnecting shaft. These driveshafts incorporate a slight twist (helical) in the spline on the interconnecting shaft where the cross is installed. This twist causes a interference fit between the interconnecting shaft and the cross when the outer C/V joint is installed on the interconnecting shaft. This design eliminates the clearance between the cross and the interconnecting shaft resulting in quieter operation of the driveshaft assembly. This design though eliminated the capability of removing the outer C/V joint from the interconnecting shaft. For this reason the driveshafts will be serviced as a quarter shaft (outer C/V joint/sealing boot, interconnecting shaft and vibration damper) in the event of a outer C/V joint boot failure.

OUTER C/V JOINT BEARING SHIELD SERVICE

The front hub/bearing shield on the outer C/V joint is a serviceable component of the outer C/V. If it is damaged in use on a vehicle or during servicing of a driveshaft it can be replaced using the following procedure.

To remove the bearing shield from the outer C/V joint, the driveshaft assemblies must be removed from the vehicle. See Servicing Driveshaft, for the required driveshaft removal and replacement procedure.

BEARING SHIELD REMOVAL FROM OUTER C/V JOINT

(1) Clamp driveshaft in a vise by the interconnecting shaft.

(2) Using a drift (Fig. 42) tap around the entire edge of the bearing shield until it is removed from the outer C/V Joint.

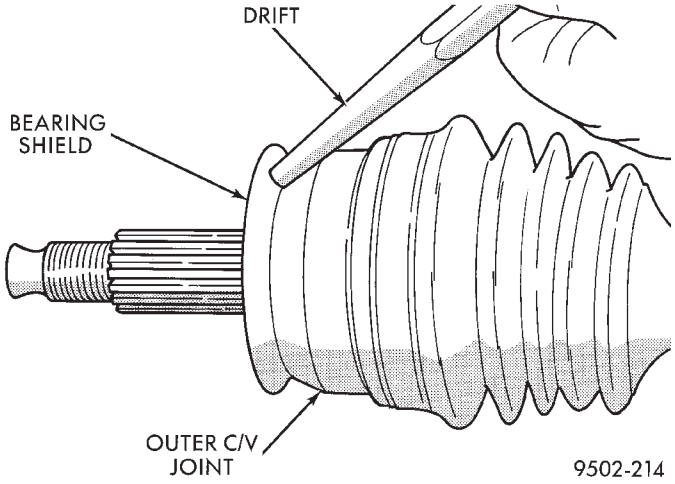


Fig. 42 Removing Bearing Shield from Outer C/V Joint

BEARING SHIELD INSTALLATION ON OUTER C/V JOINT

(1) Install bearing shield by hand on outer C/V Joint so that it is installed squarely on the C/V joint.

(2) Position installer, Special Tool, C-4698-2 and handle, Special Tool, C-4698-1 on face of bearing shield (Fig. 43).

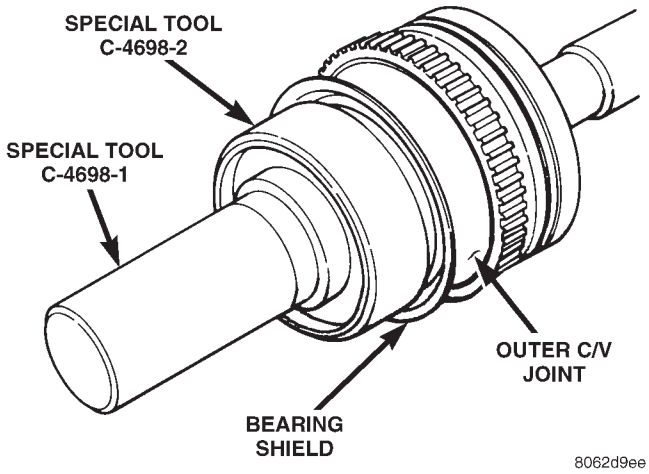


Fig. 43 Special Tools for Installing Bearing Shield

CAUTION: If bearing shield is not installed flush against the face of the outer C/V joint, interference with steering knuckle will occur when driveshaft is installed.

DISASSEMBLY AND ASSEMBLY (Continued)

(3) Using a hammer, drive the bearing shield on the outer C/V joint until it is flush against the front of the outer C/V joint (Fig. 44).

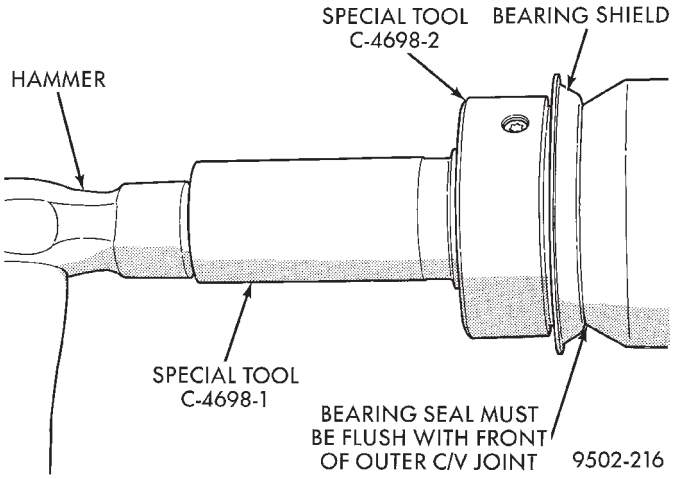


Fig. 44 Correctly Installed Bearing Shield

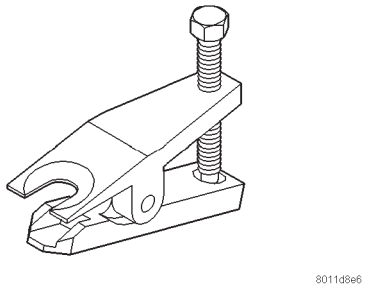
SPECIFICATIONS

TORQUE SPECIFICATIONS

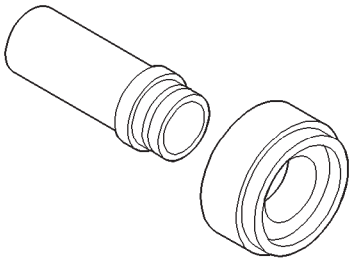
DESCRIPTION	TORQUE
Caliper To Knuckle Bolts	31 N·m (23 ft. lbs.)
Driveshaft Nut	244 N·m (180 ft. lbs.)
Front Wheel Lug Nuts	135 N·m (100 ft. lbs.)
Knuckle To Ball Stud Nut	95 N·m (70 ft. lbs.)
Tie Rod End To Knuckle	61 N·m (45 ft. lbs.)

SPECIAL TOOLS

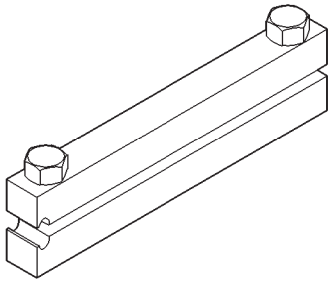
DRIVESHAFT



Tie Rod Remover MB-990635



Bearing Shield Installer C-4698



Boot Clamp Installer C-4975A

DRIVELINE MODULE AND REAR DRIVESHAFTS

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GENERAL INFORMATION

REAR DRIVELINE MODULE

The rear drive line module assembly consists of five main parts: the rear carrier, torque tube, overrunning clutch assembly, a vacuum operated dog clutch, and a viscous coupling.

The primary benefit of All Wheel Drive is:

- Superior straight line acceleration, and cornering on all surfaces
- Better traction and handling under adverse conditions, resulting in improved hill climbing ability and safer driving.

The heart of the system is an inter-axle viscous coupling. The vehicle retains predominantly front-wheel drive characteristics, but the All Wheel Drive capability takes effect when the front wheels start to slip. Under normal level road, straight line driving, 90% of the torque is allocated to the front wheels. The viscous coupling allows more torque to the rear wheels in accordance with the amount of the slippage at the front wheels. The variable torque distribution is automatic with no driver inputs required.

The rear carrier contains a conventional open differential with hypoid ring gear and pinion gear set. The hypoid gears are lubricated by SAE 80W-90 gear lubricant.

The torque tube assembly attaches to the overrunning clutch case. The front torque shaft bearing is located in the torque tube. The front torque shaft bearing is permanently sealed and does not require maintenance. The torque shaft is located within the torque tube assembly. The vacuum reservoir and solenoid assembly are attached to the top of the torque tube.

The overrunning clutch allows the rear wheels to overrun the front wheels during a rapid front wheel lock braking maneuver. The overrunning action prevents any feed-back of front wheel braking torque to the rear wheels. It also allows the braking system to control the braking behavior as a two wheel drive (2WD) vehicle.

The overrunning clutch has a separate oil sump and is filled independently from the differential. The fill plug is located on the side of the overrunning clutch case. When filling the overrunning clutch with lubricant use Mopar® Type 7176 Automatic Transmission fluid or equivalent.

The dog-clutch provides All Wheel Drive in reverse by bridging and locking out the overrunning clutch. The dog-clutch is operated by a double-acting servo

using intake manifold vacuum as its power source. Two vacuum solenoids, controlled by the back up light switch, engage and disengage the dog-clutch. A spring in the vacuum servo disengages the dog clutch if vacuum is lost.

Located in front of the torque tube is the viscous coupling. The viscous coupling controls and distributes torque/power to the rear wheels. The coupling is similar to a multi-plate clutch. It consists of a series of closely spaced discs. The discs are alternately connected to the front and rear drive units, which operate in silicone fluid. The unit is totally sealed and partially filled with silicone fluid. There is no adjustment, maintenance or fluid checks required during the life of the unit.

VISCOUS COUPLER

The heart of the all-wheel drive system is the inter-axle viscous coupler. Under normal driving the vehicle retains predominantly front wheel drive characteristics. The all-wheel drive takes effect when the front wheels start to slip. Under normal level road, straight line driving, 90% of the torque is allocated to the front wheels. The viscous coupler allows more torque to the rear wheels in accordance with the amount of slippage at the front wheels. The variable torque distribution is automatic with no driver inputs required.

PROPELLER SHAFT

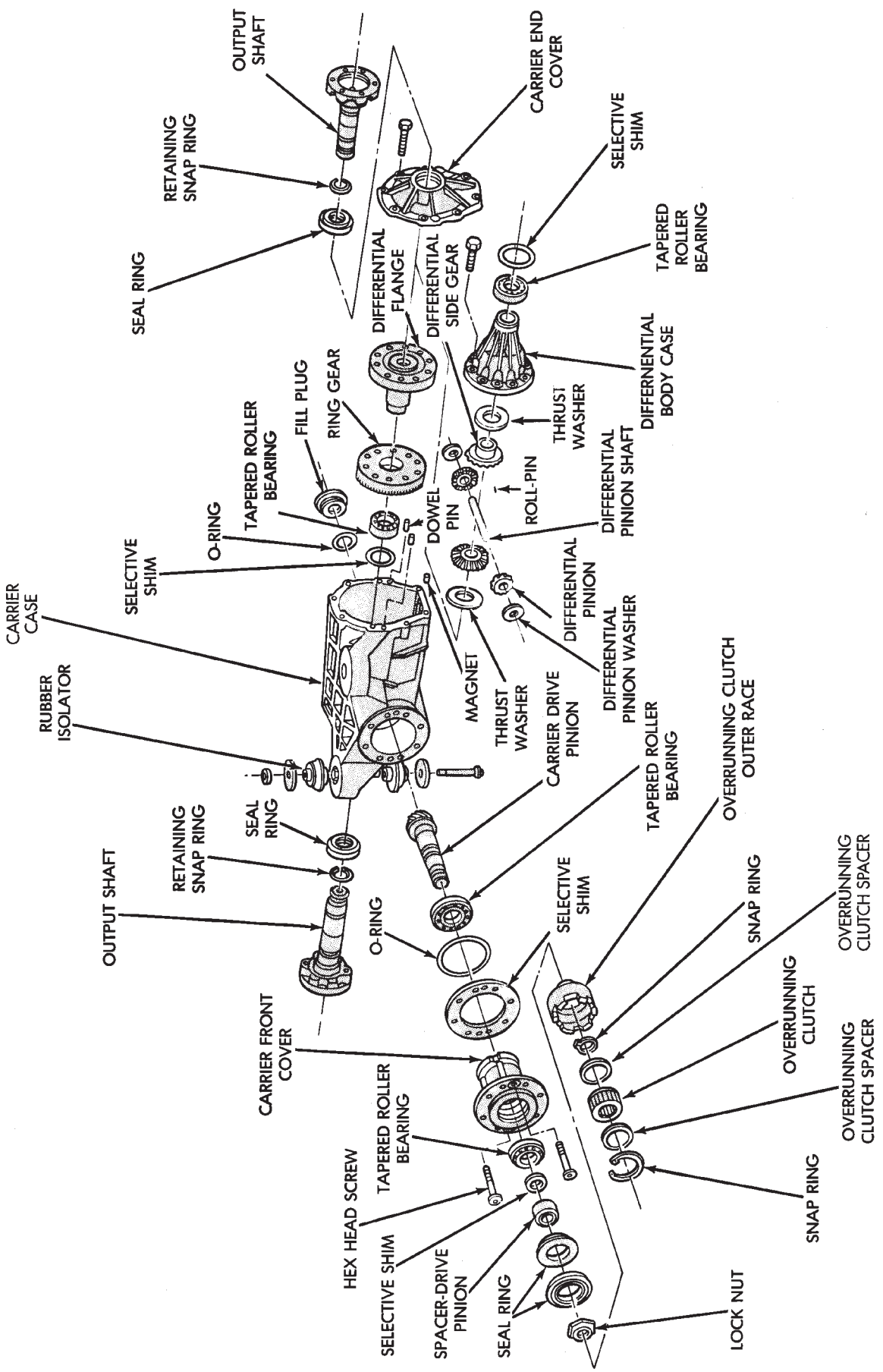
The propeller shaft is a hollow shaft. It has a plunging tripod joint on the front of the shaft and a fixed tripod joint on the rear of the shaft. There are no serviceable parts. The shaft is serviced as an assembly. The flange patterns are different at each end to prevent installing the shaft backwards.

HALF SHAFT

The half shaft assemblies are three piece units. Each half shaft has one tripod joint at each end and a solid interconnecting shaft. The procedure to recondition the inner or outer joint is identical.

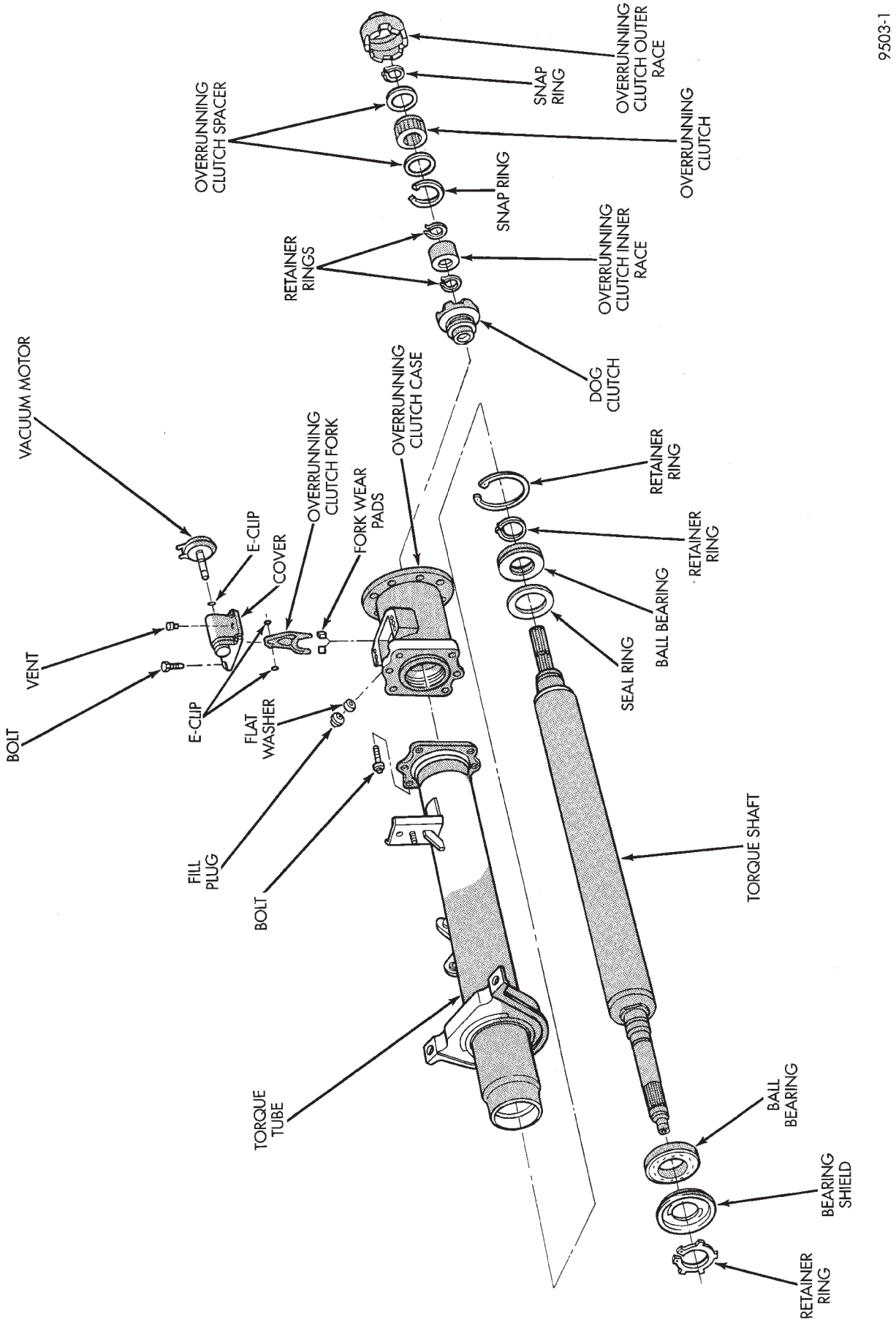
Note that lubricant requirements and quantities could be different than other axle shaft joints located on the vehicle. Only use the correct lubricant and amount supplied with the boot package or joint. Do not use standard wheel bearing grease or other lubricants, joint failure will result.

DESCRIPTION AND OPERATION



REAR CARRIER COMPONENT IDENTIFICATION

DESCRIPTION AND OPERATION (Continued)



TORQUE TUBE AND OVERRUNNING CLUTCH COMPONENTS IDENTIFICATION

DIAGNOSIS AND TESTING

REAR DRIVE LINE NOISE DIAGNOSIS

Different sources can be the cause of noise that the rear drive line module assembly is suspected of making. Refer to the following causes for noise diagnosis.

REAR CARRIER ASSEMBLY NOISE

The most important part of rear carrier service is correctly identifying the cause of failures and noise complaints. The cause of most rear carrier failures is relatively easy to identify. The cause of rear carrier noise is more difficult to identify.

If vehicle noise becomes intolerable, an effort should be made to isolate the noise. Many noises that are reported as coming from the rear carrier may actually originate at other sources. For example:

- Tires
- Road surfaces
- Wheel bearings
- Engine
- Transmission
- Exhaust
- Propeller shaft (vibration)
- Vehicle body (drumming)

Rear carrier noises are normally divided into two categories: gear noise or bearing noise. A thorough and careful inspection should be completed to determine the actual source of the noise before replacing the rear carrier.

The rear carrier assembly rubber mounting bushings help to dampen-out rear carrier noise when correctly installed. Inspect to confirm that no metal contact exists between the rear carrier case and the body. The complete isolation of noise to one area requires expertise and experience. Identifying certain types of vehicle noise baffles even the most capable technicians. Often such practices as:

- Increase tire inflation pressure to eliminate tire noise.
- Listen for noise at varying speeds with different driveline load conditions
- Swerving the vehicle from left to right to detect wheel bearing noise.

All rear carrier assemblies produce noise to a certain extent. Slight carrier noise that is noticeable only at certain speeds or isolated situations should be considered normal. Carrier noise tends to peak at a variety of vehicle speeds. Noise is **NOT ALWAYS** an indication of a problem within the carrier.

TIRE NOISE

Tire noise is often mistaken for rear carrier noise. Tires that are unbalanced, worn unevenly or are worn in a saw-tooth manner are usually noisy. They often produce a noise that appears to originate in the rear carrier.

Tire noise changes with different road surfaces, but rear carrier noise does not. Inflate all four tires with approximately 20 psi (138 kPa) more than the recommended inflation pressure (for test purposes only). This will alter noise caused by tires, but will not affect noise caused by the differential. Rear axle noise usually ceases when coasting at speeds less than 30 mph (48 km/h); however, tire noise continues, but at a lower frequency, as the speed is reduced.

After test has been completed lower tire pressure back to recommended pressure.

GEAR NOISE (DRIVE PINION AND RING GEAR)

Abnormal gear noise is rare and is usually caused by scoring on the ring gear and drive pinion. Scoring is the result of insufficient or incorrect lubricant in the carrier housing.

Abnormal gear noise can be easily recognized. It produces a cycling tone that will be very pronounced within a given speed range. The noise can occur during one or more of the following drive conditions:

- Drive
- Road load
- Float
- Coast

Abnormal gear noise usually tends to peak within a narrow vehicle speed range or ranges. It is usually more pronounced between 30 to 40 mph (48 to 64 km/h) and 50 to 60 mph (80 to 96 km/h). When objectionable gear noise occurs, note the driving conditions and the speed range.

BEARING NOISE (DRIVE PINION AND DIFFERENTIAL)

Defective bearings produce a rough growl that is constant in pitch and varies with the speed of vehicle. Being aware of this will enable a technician to separate bearing noise from gear noise.

Drive pinion bearing noise that results from defective or damaged bearings can usually be identified by its constant, rough sound. Drive pinion front bearing is usually more pronounced during a coast condition. Drive pinion rear bearing noise is more pronounced during a drive condition. The drive pinion bearings are rotating at a higher rate of speed than either the differential side bearings or the axle shaft bearing.

Differential side bearing noise will usually produce a constant, rough sound. The sound is much lower in frequency than the noise caused by drive pinion bearings.

Bearing noise can best be detected by road testing the vehicle on a smooth road (black top). However, it is easy to mistake tire noise for bearing noise. If a doubt exists, the tire treads should be examined for irregularities that often causes a noise that resembles bearing noise.

DIAGNOSIS AND TESTING (Continued)

ENGINE AND TRANSMISSION NOISE

Sometimes noise that appears to be in the rear carrier assembly is actually caused by the engine or the transmission. To identify the true source of the noise, note the approximate vehicle speed and/or RPM when the noise is most noticeable. Stop the vehicle next to a flat brick or cement wall (this will help reflect the sound). Place the transaxle in **NEUTRAL.** Accelerate the engine slowly up through the engine speed that matches the vehicle speed noted when the noise occurred. If the same noise is produced, it usually indicates that the noise is being caused by the engine or transaxle.

FLUID LEAK DIAGNOSIS

When diagnosing fluid leaks on the rear drive line module assembly two weep holes are provided to diagnose certain seal leaks. These holes are located on the bottom side of the assembly (Fig. 1).

If fluid leak is detected from either weep hole, seal replacement is necessary. **Do not attempt to repair the leak by sealing weep holes,** they must be kept clear of sealants for proper seal operation.

If fluid is leaking from weep hole “A” (Fig. 1) and it is automatic transmission fluid, the front overrunning clutch seal is leaking. For replacement of this seal, refer to Rear Drive Line Assembly Service Procedures.

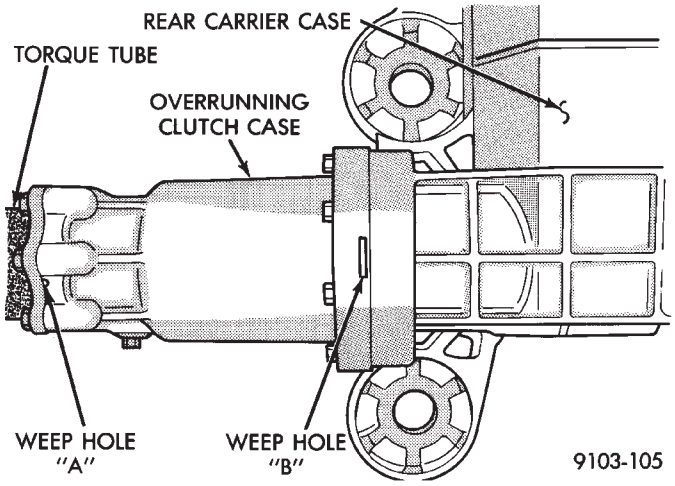
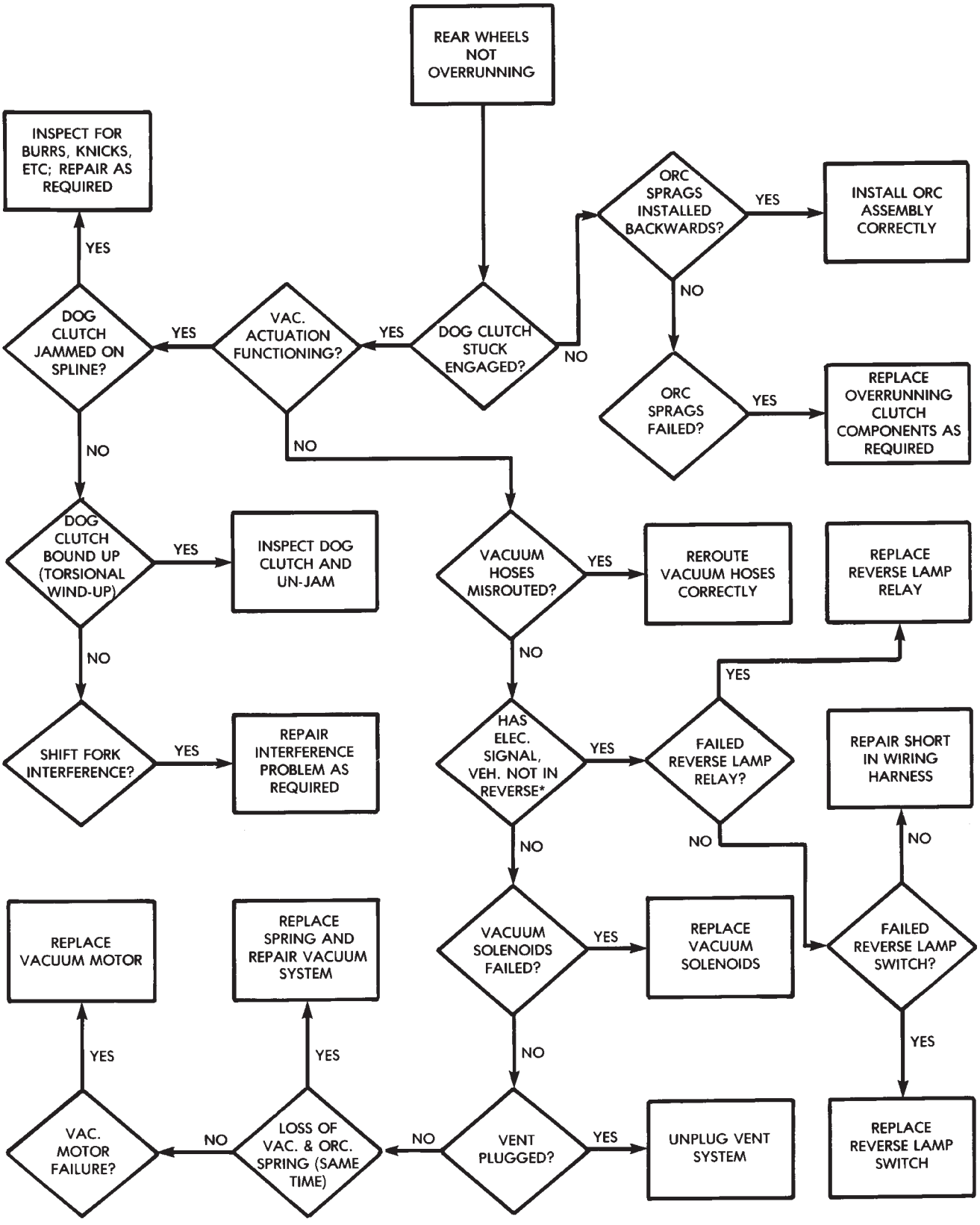


Fig. 1 Weep Hole Locations

If fluid is leaking from weep hole “B” (Fig. 1) the type of fluid leaking will determine which seal is leaking. If the fluid leaking is red in color (transmission fluid) this indicates that the rear overrunning clutch seal should be replaced. If the fluid leaking is light brown (hypoid gear lube) this indicates that the drive pinion seal should be replaced. For replacement of these seals refer to Rear Drive Line Assembly Service Procedures.

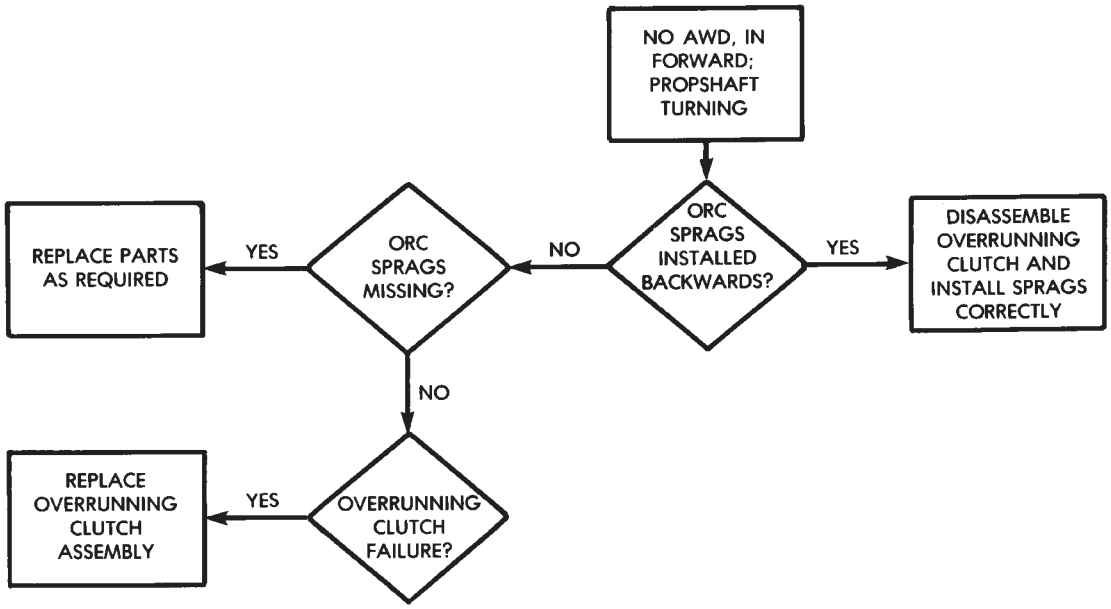
DIAGNOSIS AND TESTING (Continued)

REAR DRIVELINE MODULE VACUUM DIAGNOSIS

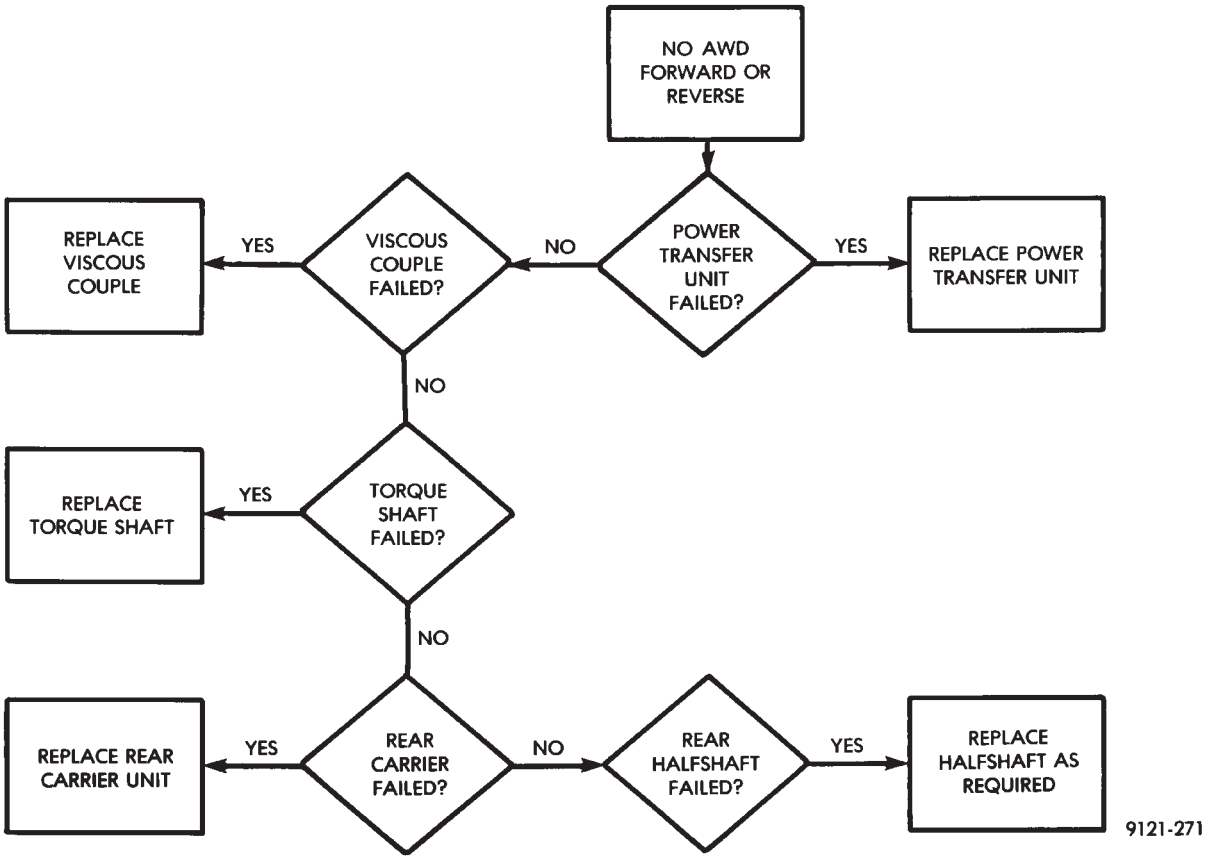


REAR WHEELS NOT OVERRUNNING

DIAGNOSIS AND TESTING (Continued)

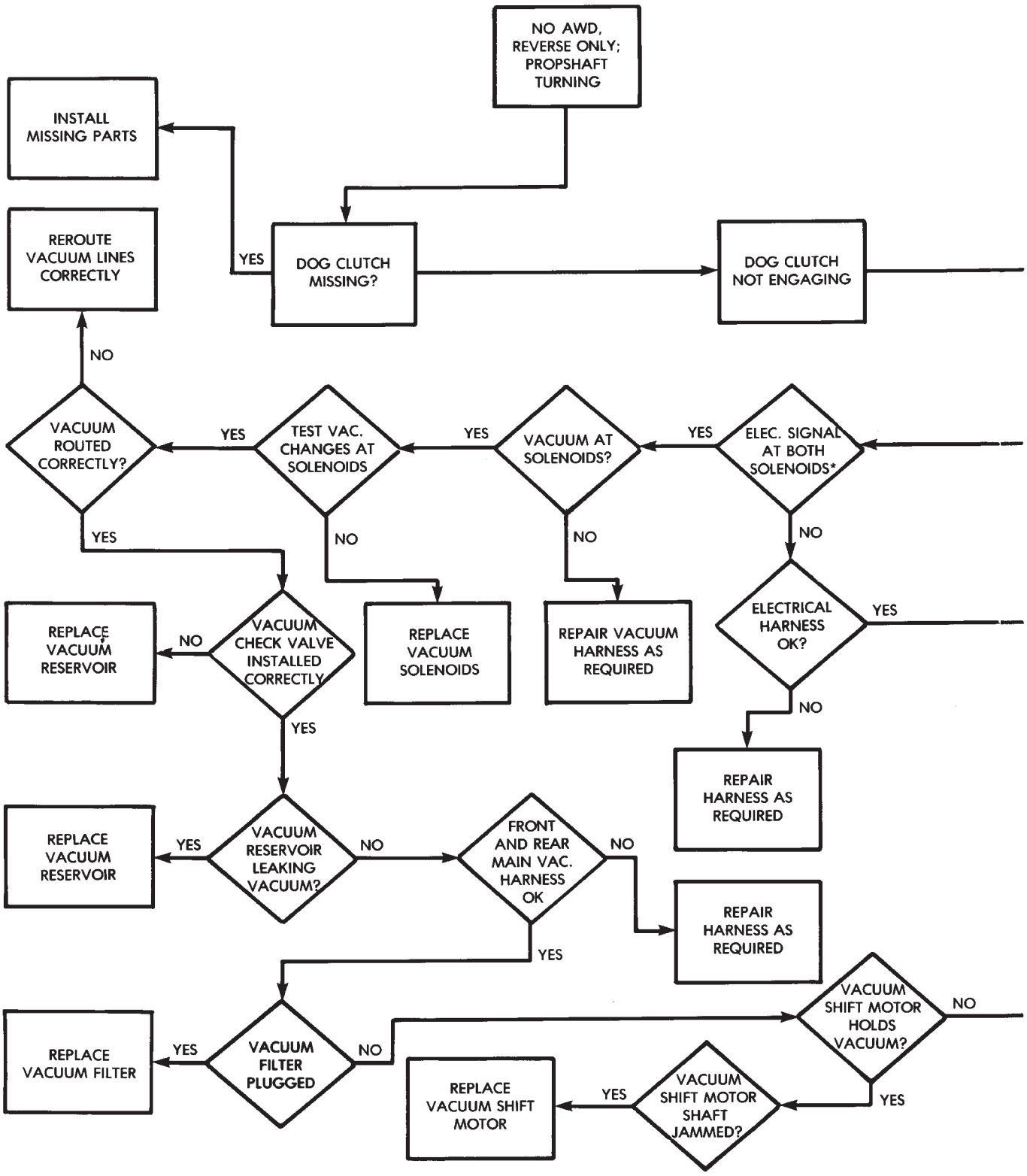


NO ALL WHEEL DRIVE IN FORWARD, PROPELLER SHAFT TURNING



NO ALL WHEEL DRIVE FORWARD OR REVERSE

DIAGNOSIS AND TESTING (Continued)

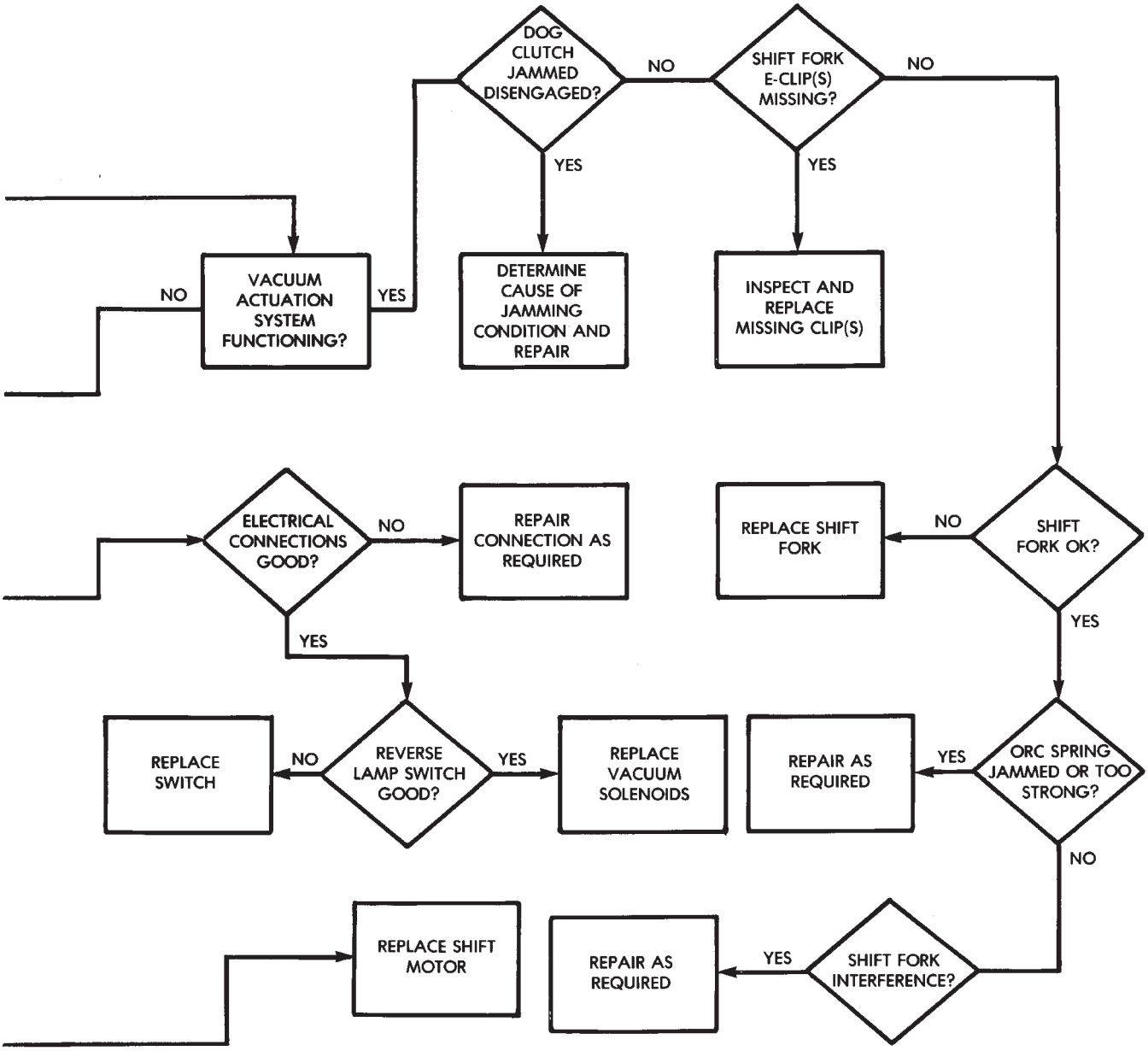


*VEHICLES IN REVERSE

9121-272

NO ALL WHEEL DRIVE, REVERSE ONLY; PROPELLER SHAFT TURNING

DIAGNOSIS AND TESTING (Continued)



9121-273

NO ALL WHEEL DRIVE, REVERSE ONLY; PROPELLER SHAFT TURNING (CONT.)

REMOVAL AND INSTALLATION

REAR DRIVE LINE MODULE ASSEMBLY

REMOVAL

(1) Raise vehicle on hoist.

(2) Remove right and left inner half shaft joint mounting bolts (Fig. 2).

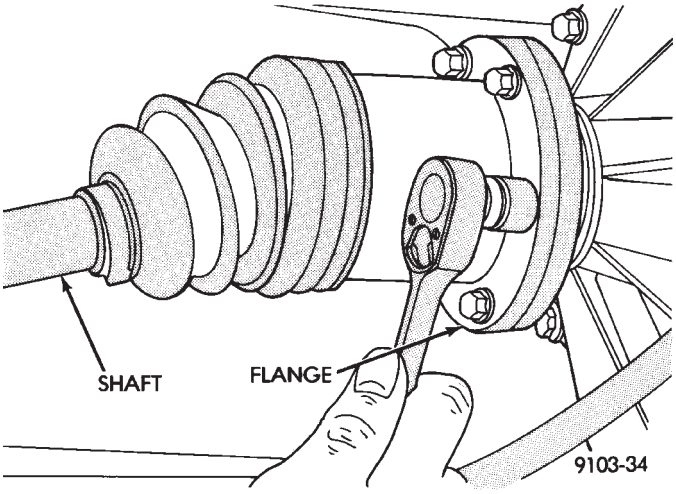


Fig. 2 Half Shaft Mounting Bolts

(3) Support inner side of half shaft with mechanics wire or equivalent. Do not allow half shafts to hang freely.

(4) Remove mounting bolts from the rear side of propeller shaft (Fig. 3).

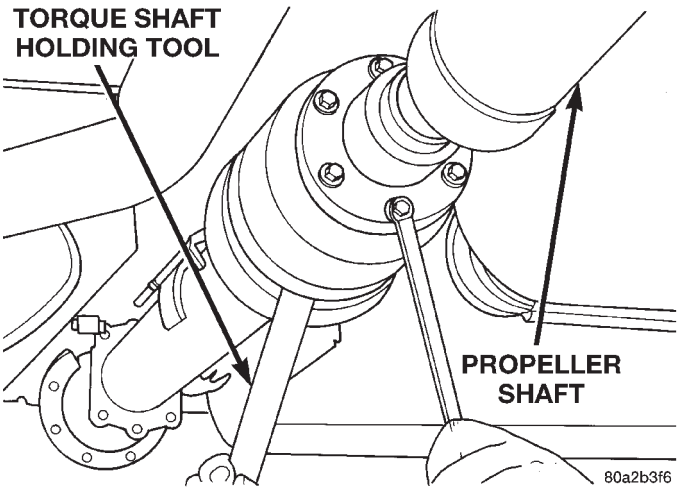


Fig. 3 Propeller Shaft Mounting Bolts

CAUTION: Do not allow propeller shaft to hang freely

(5) Support propeller shaft with mechanics wire and/or jack stand

(6) Disconnect main vacuum line for rear drive line module assembly. Also disconnect electrical connections at the front of the module.

(7) Support rear drive line module assembly with transmission jack or equivalent.

WARNING: BE SURE TO CHAIN REAR DRIVE LINE MODULE ASSEMBLY SECURELY TO THE JACK TO PREVENT IT FROM FALLING.

(8) Remove rear drive line module assembly rear mounting bolts (Fig. 4).

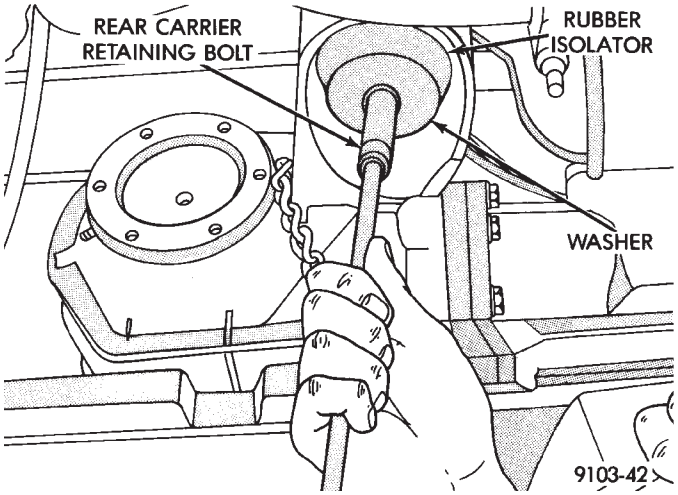


Fig. 4 Rear Drive Line Module Assembly Rear Mounting Bolts

(9) Remove rear drive line module assembly front mounting bolts (Fig. 5).

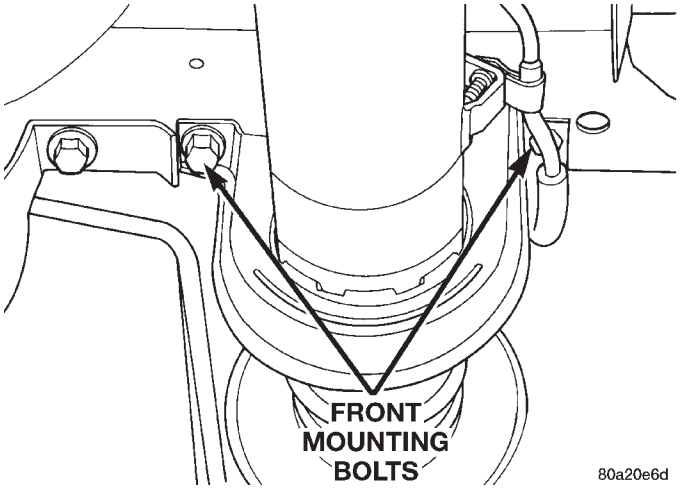


Fig. 5 Rear Drive Line Module Front Mounting Bolts

(10) Partially lower rear drive line module assembly and disconnect remote solenoid vent and remote carrier vent.

(11) Remove rear drive line module assembly.

INSTALLATION

(1) To install, reverse removal procedure. Refer to **TORQUE SPECIFICATION** in the rear of this section for tightening specifications.

REMOVAL AND INSTALLATION (Continued)

REAR CARRIER UNIT

REMOVAL

(1) Remove rear drive line module assembly from vehicle.

(2) Drain oil from overrunning clutch case.

(3) Remove overrunning clutch case to rear carrier case bolts (Fig. 6).

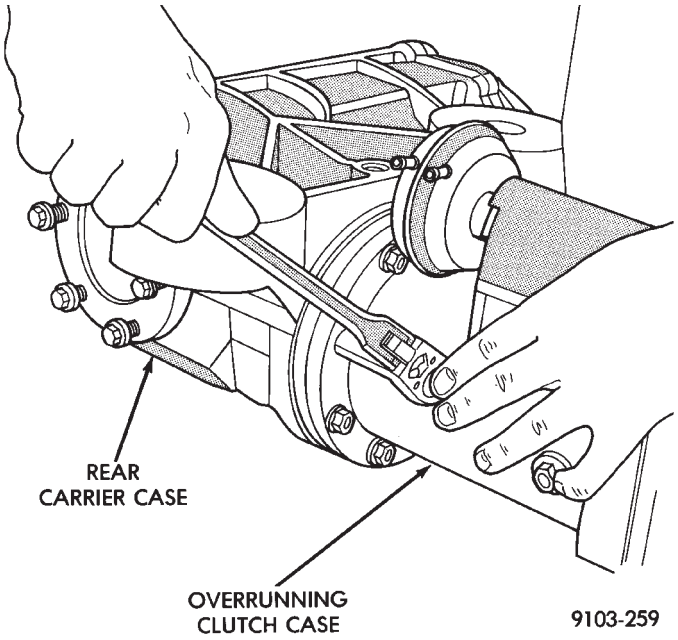


Fig. 6 Overrunning Clutch Case To Rear Carrier Case Bolts

(4) Separate rear carrier case from overrunning clutch case (Fig. 7).

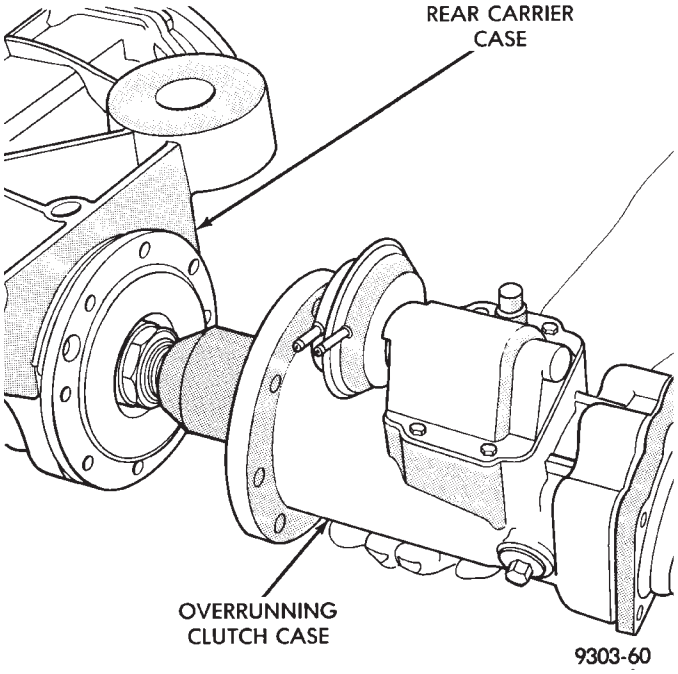


Fig. 7 Separate Rear Carrier Case From Overrunning Clutch Case

INSTALLATION

(1) For installation, reverse removal procedure.

REAR CARRIER OUTPUT SHAFT SEALS

The rear drive line module assembly does not have to be removed from vehicle to service the carrier output shaft seals.

The output flange seals are located on the rear carrier unit (Fig. 8).

REMOVAL AND INSTALLATION (Continued)

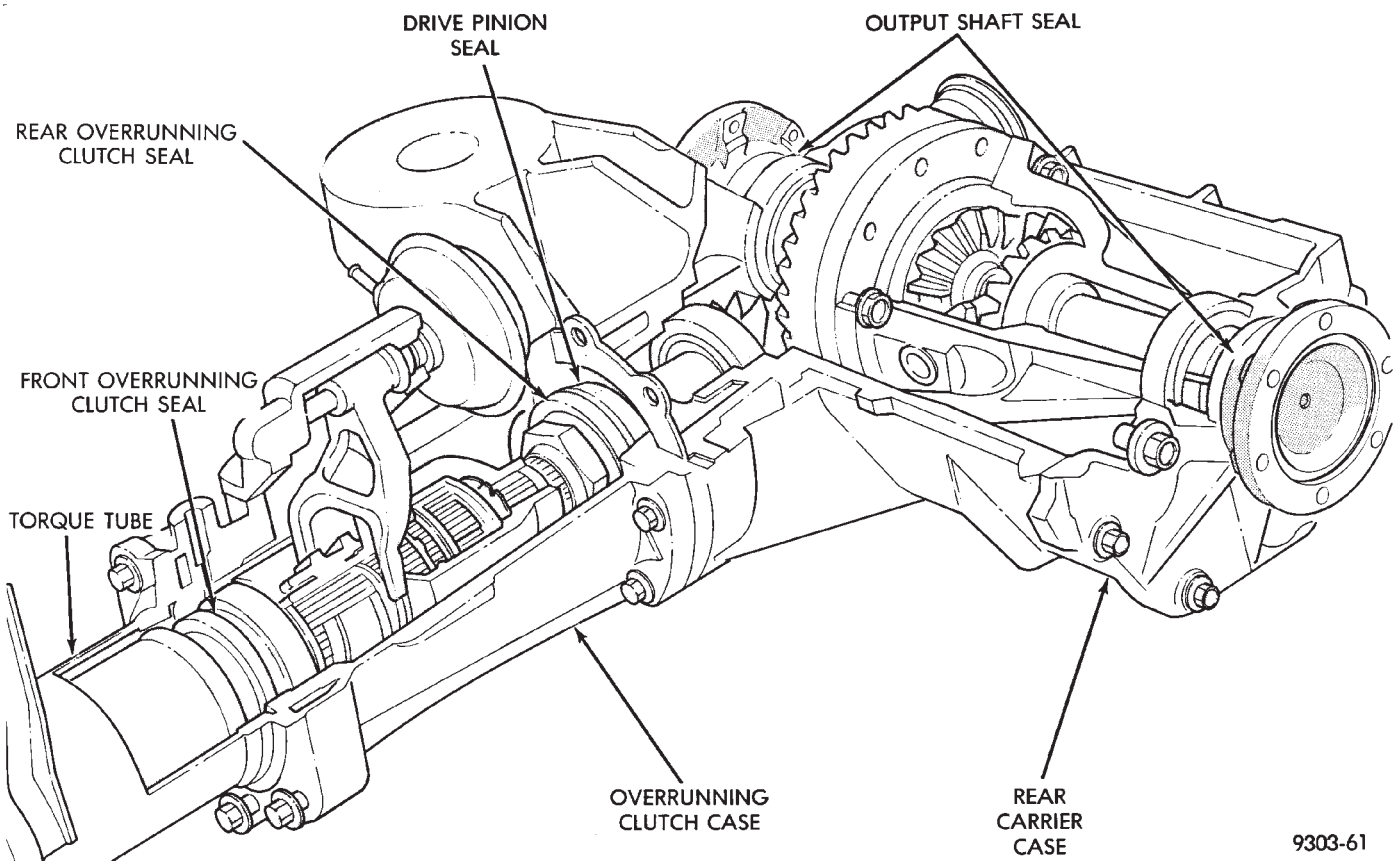


Fig. 8 Rear Drive Line Module Oil Seal Location

REMOVAL

(1) Remove inner half shaft retaining bolts (Fig. 9).

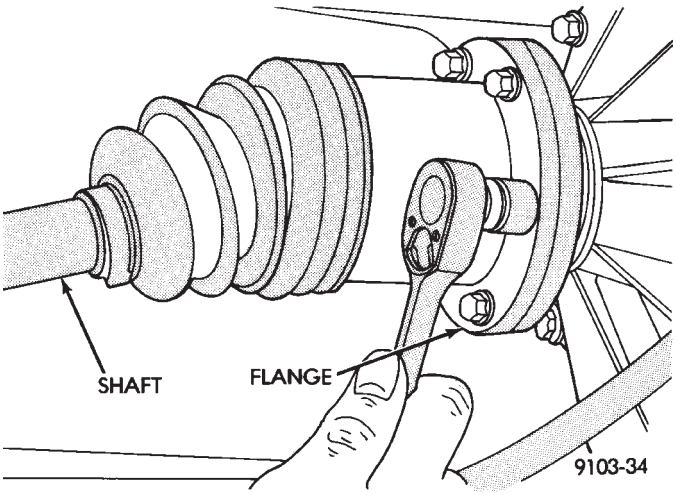


Fig. 9 Inner Half Shaft Bolts

CAUTION: Do not allow half shafts to hang freely

(2) Support inner side of half shaft with mechanics wire or equivalent.

(3) Using two pry bars and wooden support blocks, pop out output shaft (Fig. 10).

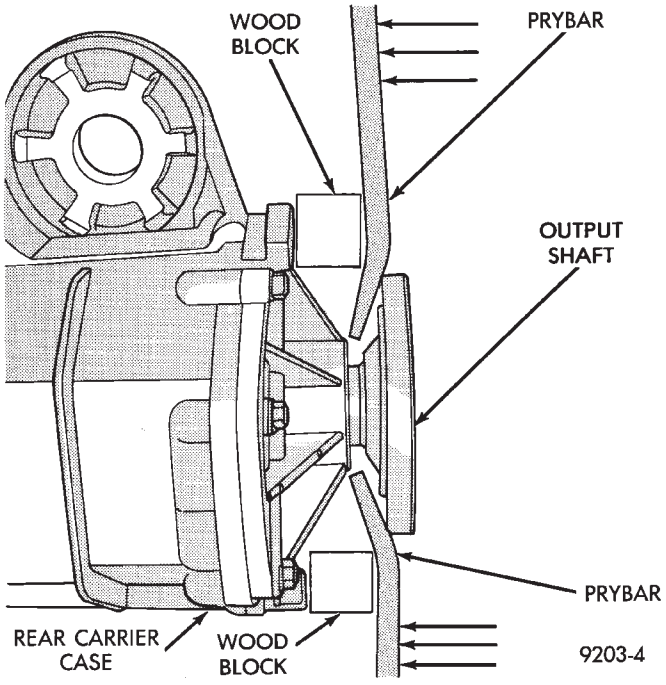


Fig. 10 Output Flange Removal

REMOVAL AND INSTALLATION (Continued)

(4) Using a pry bar, pry out oil seal (Fig. 11), being careful not to damage race.

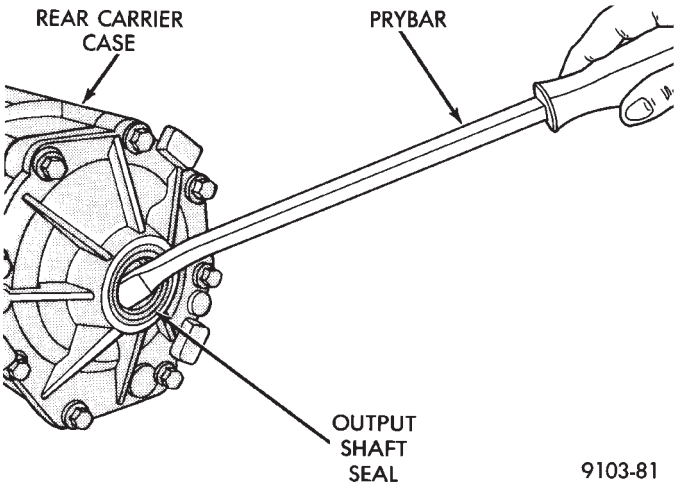


Fig. 11 Seal Removal

INSTALLATION

(1) Clean and inspect shaft and seal area.

(2) Install oil seal with special tool MD998334 (Fig. 12).

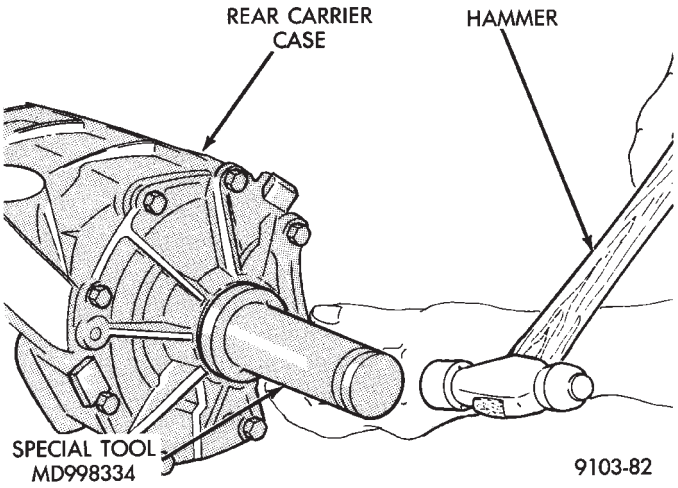


Fig. 12 Installing Oil Seal

(3) Install output shaft (Fig. 13). Lightly tap shaft to seat retainer ring into differential side gear.

(4) Check differential fluid level, fill as required.

FRONT OVERRUNNING CLUTCH SEAL

The rear drive line module must be removed to service this seal.

The front overrunning clutch seal is located in the overrunning clutch case.

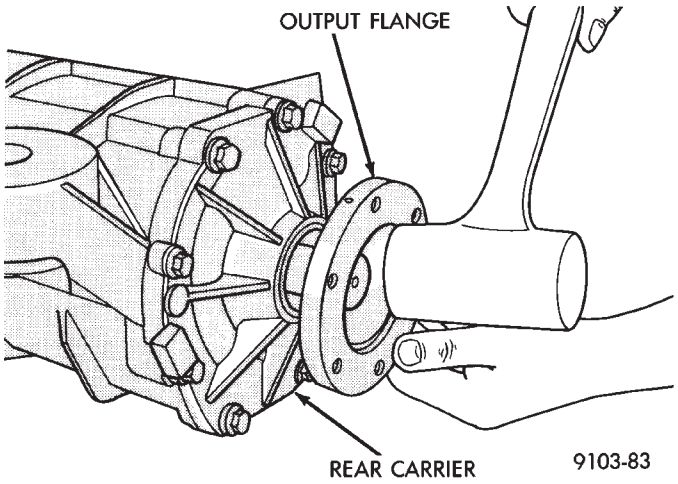


Fig. 13 Installing Output Shaft

REMOVAL

(1) Remove rear drive line module assembly from vehicle.

(2) Remove viscous coupling unit.

(3) Remove overrunning clutch cover assembly.

(4) Drain fluid from overrunning clutch case.

(5) Remove overrunning clutch case to rear carrier bolts (Fig. 14).

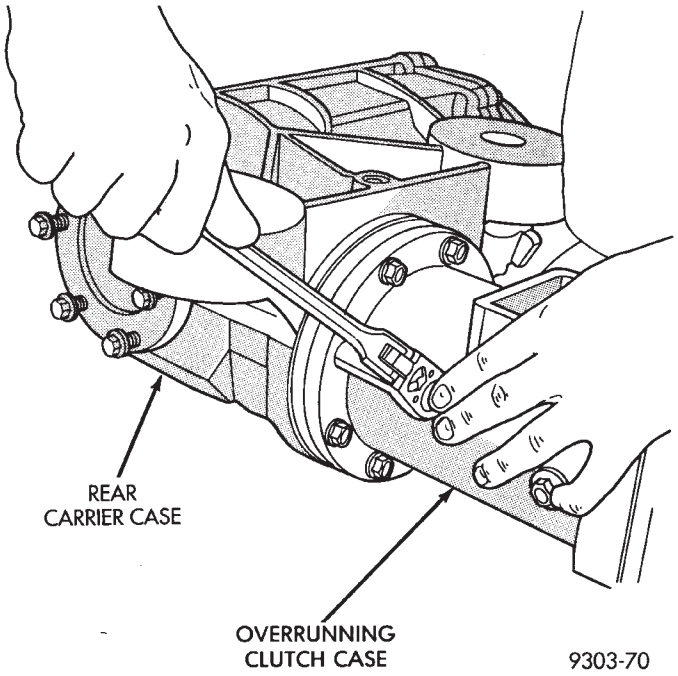


Fig. 14 Overrunning Clutch Case To Rear Carrier Bolts

REMOVAL AND INSTALLATION (Continued)

(6) Separate overrunning clutch case from rear carrier case (Fig. 15).

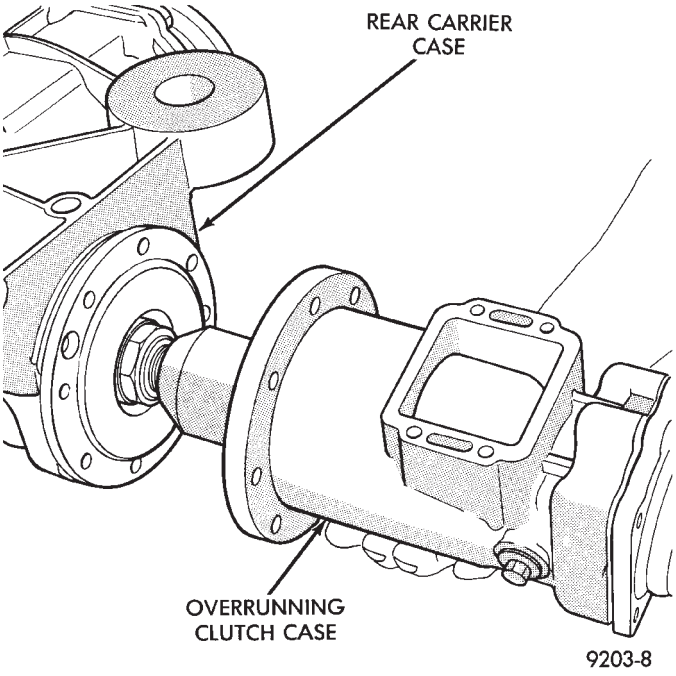


Fig. 15 Separate Housings

(7) Remove overrunning clutch inner race snap ring (Fig. 16).

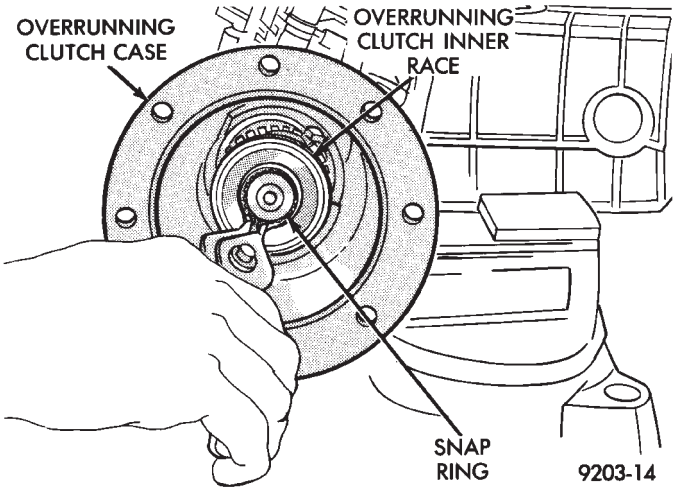


Fig. 16 Inner Race Snap Ring Removal

(8) Slide overrunning clutch inner race off of shaft (Fig. 17).

(9) Remove shaft snap ring and slide dog clutch off of the shaft (Fig. 18).

CAUTION: Note the position that the snap ring was removed. The snap ring can be accidentally installed backwards. The snap ring is concave and the fingers on the snap ring must angle towards the bearing shield.

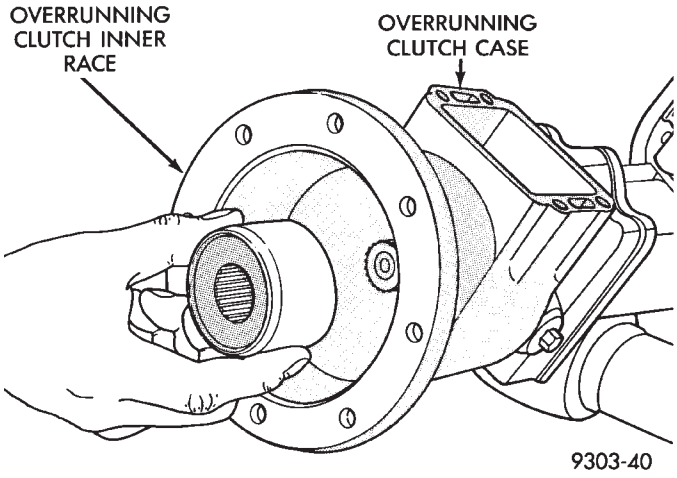


Fig. 17 Remove Overrunning Clutch Inner Race

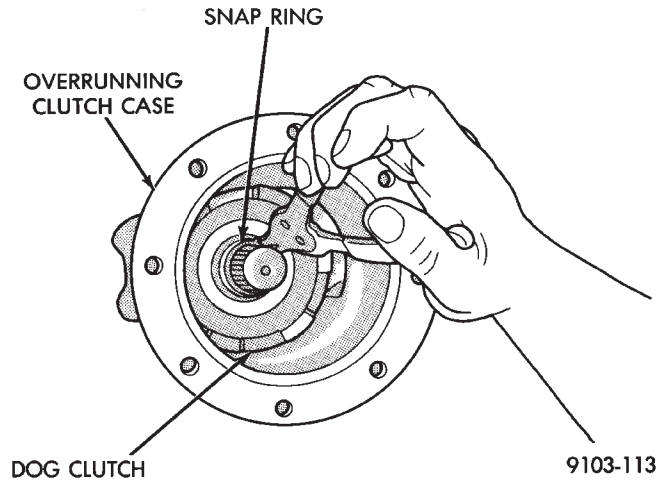


Fig. 18 Remove Snap Ring

(10) Remove torque shaft snap ring (Fig. 19) and torque tube bearing shield.

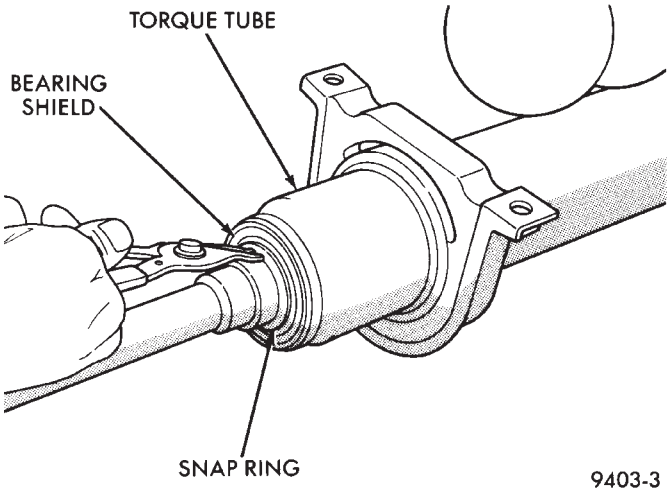


Fig. 19 Remove Torque Shaft Snap Ring And Torque Tube Bearing Shield

REMOVAL AND INSTALLATION (Continued)

(11) Remove torque tube retaining bolts (Fig. 20).

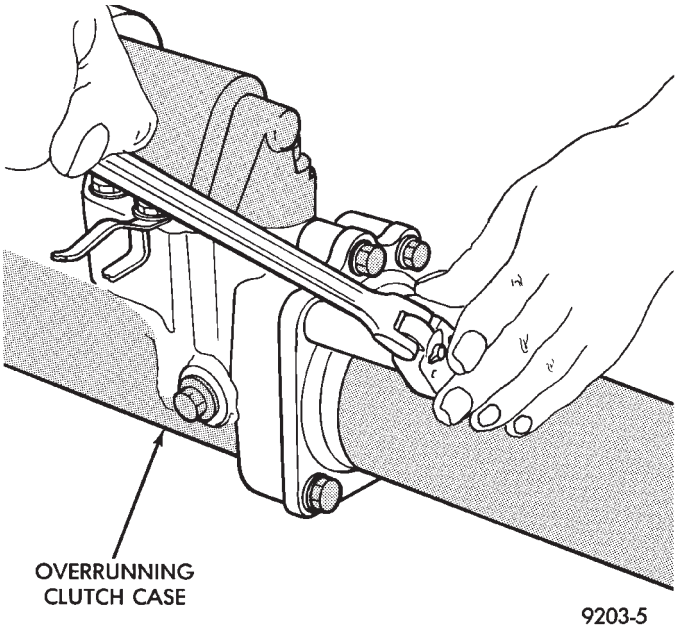


Fig. 20 Torque Tube Bolts

(12) Remove inner torque shaft bearing snap ring.

(13) Separate overrunning clutch case from torque tube.

(14) Remove rear torque shaft bearing retaining outer snap ring in overrunning clutch case (Fig. 21).

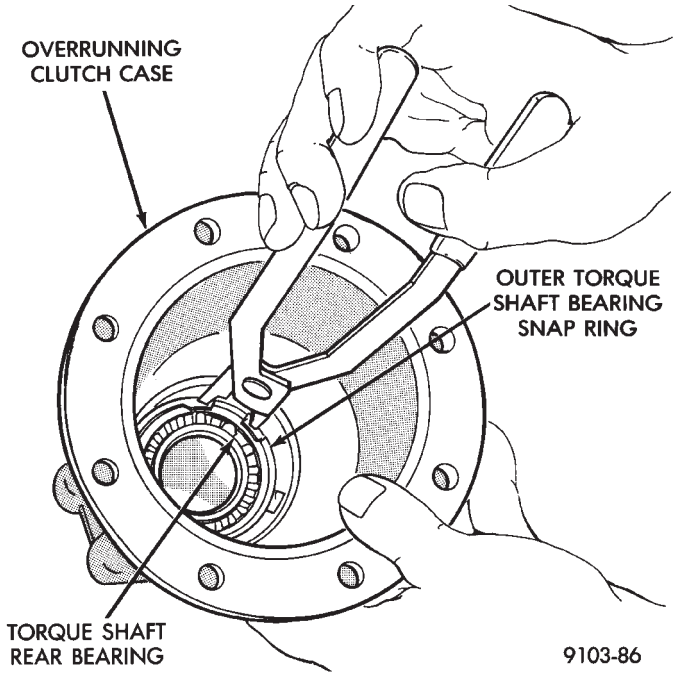


Fig. 21 Torque Shaft Rear Bearing Snap Ring

(15) Remove rear torque shaft bearing.

(16) Drive out seal with special tool C-4967 (Fig. 22).

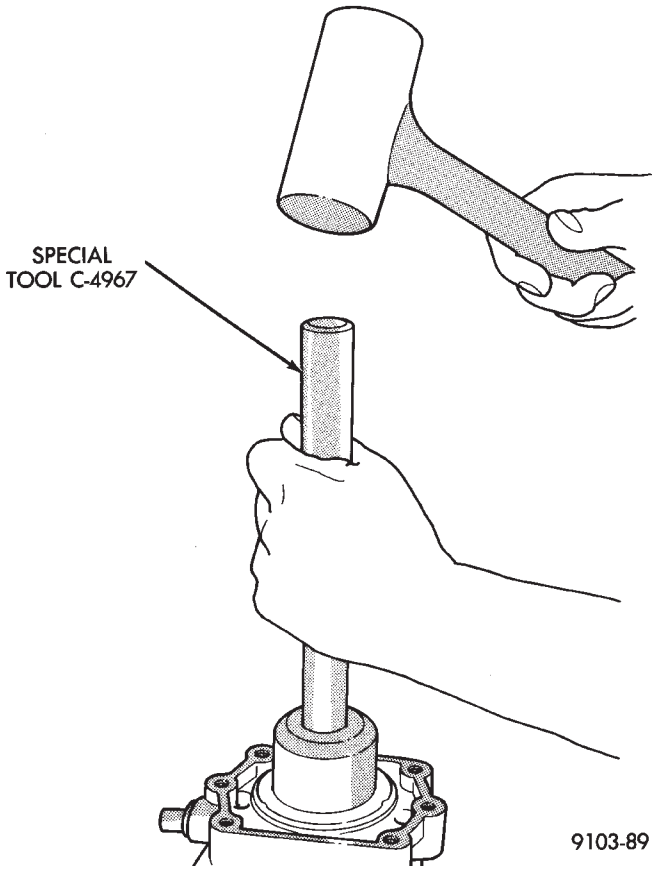


Fig. 22 Seal Removal

INSTALLATION

(1) Clean and inspect shaft sealing surface and case for nicks or grooves. Replace as required.

(2) Install new seal with special tool MD998334. Seal should be flush with outside edge of case (Fig. 23).

(3) Install rear torque shaft bearing and outer snap ring.

(4) Install overrunning clutch case onto torque tube. Tighten bolts to 28 N·m (250 in. lbs.).

(5) Install torque shaft inner snap ring.

(6) Slide dog clutch onto shaft and install snap ring.

(7) Slide overrunning clutch inner race onto shaft and install retaining snap ring (tapered end of inner race must face outward).

(8) Clean all sealing surfaces. Apply a bead of Mopar Gasket Maker or equivalent and reinstall the overrunning clutch housing to the rear carrier case. Install retaining bolts and tighten to 28 N·m (250 in. lbs.).

(9) Apply Mopar® Gasket Maker or equivalent and reinstall overrunning clutch cover. When installing cover be sure that the overrunning clutch fork engages into the overrunning clutch dog.

(10) Install rear drive line module assembly into vehicle.

REMOVAL AND INSTALLATION (Continued)

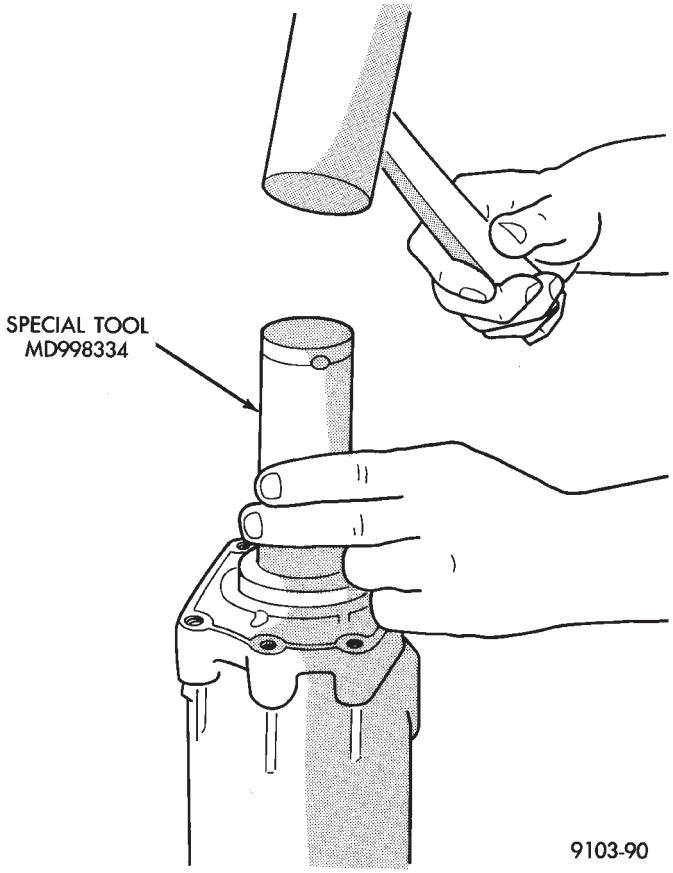


Fig. 23 Installing New Seal

(11) Check and fill fluid levels as required.

DRIVE PINION SEAL AND/OR REAR OVERRUNNING CLUTCH SEAL

The rear drive line module must be removed to service these seals. The drive pinion seal is located in the front carrier cover, behind the overrunning clutch rear seal. The overrunning clutch seal must be removed to gain access to the drive pinion seal. Do not reuse overrunning clutch seal.

REMOVAL

(1) Remove rear drive line module from vehicle.

(2) Remove overrunning clutch case to rear carrier bolts (Fig. 24).

(3) Separate overrunning clutch case from differential carrier case (Fig. 25).

(4) Remove overrunning clutch outer race snap ring (Fig. 26).

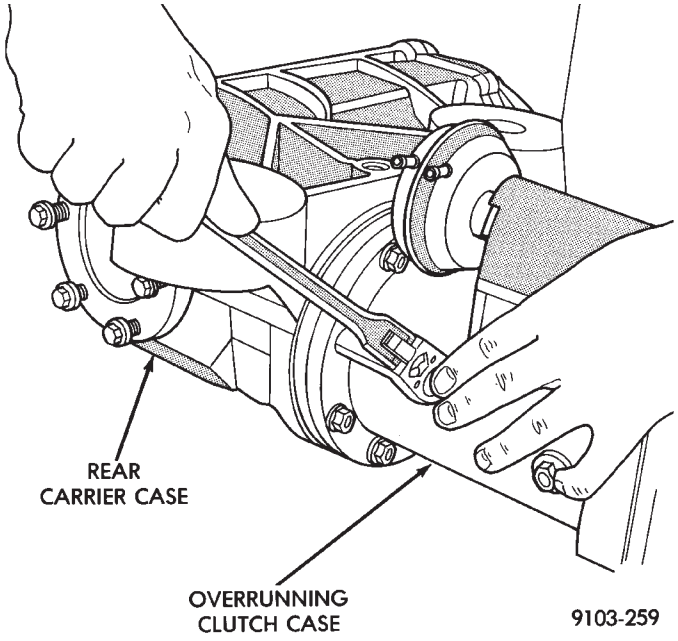


Fig. 24 Overrunning Clutch Case To Rear Carrier Bolts

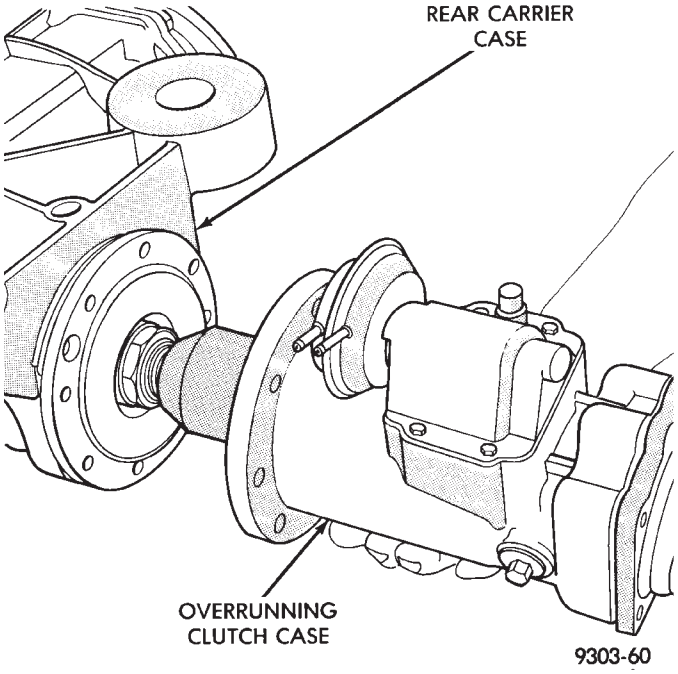


Fig. 25 Separate Cases

REMOVAL AND INSTALLATION (Continued)

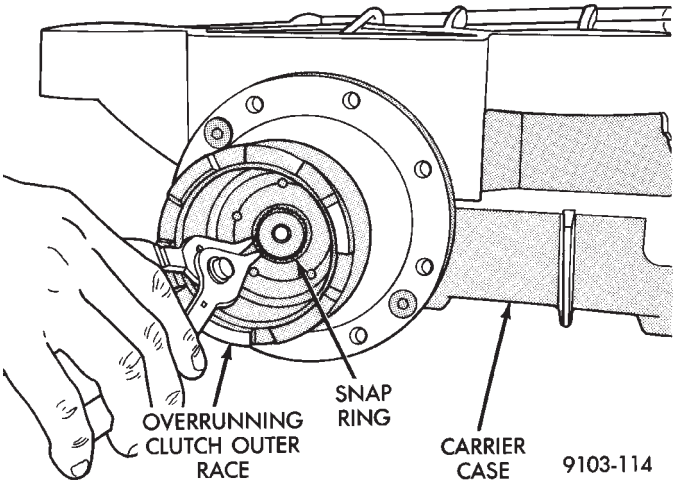


Fig. 26 Overrunning Clutch Snap Ring Removal

(5) Slide overrunning clutch outer race off of shaft (Fig. 27).

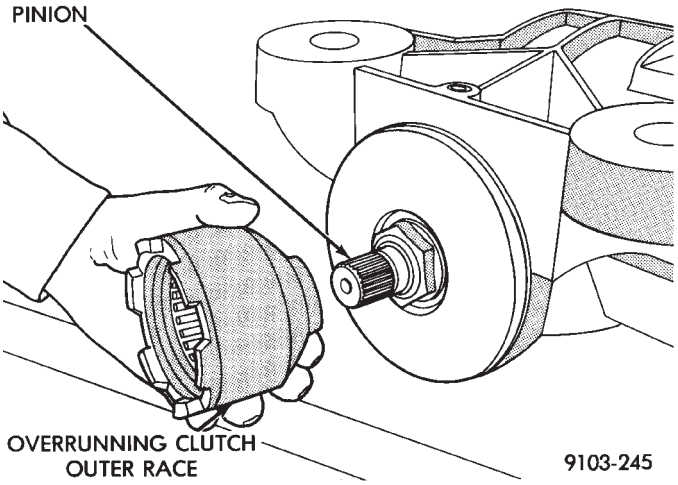


Fig. 27 Overrunning Clutch Outer Race Removal

(6) Using Spline Socket Tool 6534 and a wrench, remove pinion nut (Fig. 28).

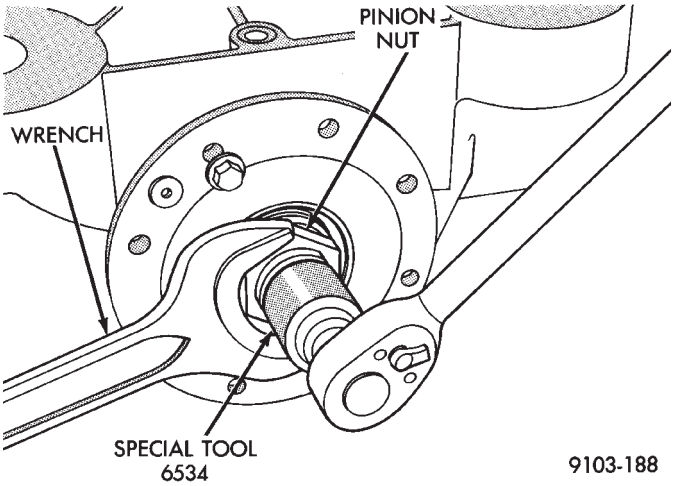


Fig. 28 Remove Pinion Nut

(7) Remove front carrier cover retaining screws (Fig. 29).

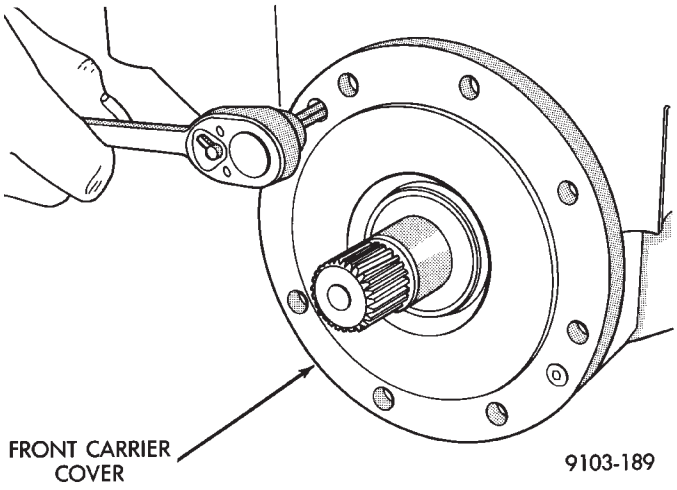


Fig. 29 Front Carrier Cover Retaining Screws

(8) Remove front carrier cover from carrier case (Fig. 30).

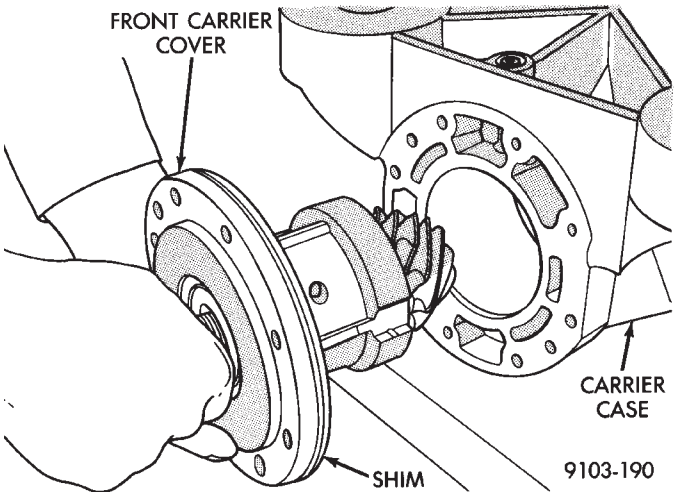


Fig. 30 Front Carrier Cover

(9) Place a block of wood under the end of the pinion shaft. Tap end of pinion against the wood to drive the pinion spacer off of the pinion shaft (Fig. 31).

CAUTION: Shim should be installed with front carrier cover. This will eliminate the potential of cutting the O-Ring with the shim.

(10) Reinstall front carrier cover into carrier case (Fig. 32). Install carrier retaining bolts and tighten to 12 N·m (105 in. lbs.).

(11) Use seal puller 7794-A (Fig. 33) to remove the overrunning clutch seal and drive pinion seal. The overrunning clutch seal must be removed first to gain access to the drive pinion seal. The overrunning clutch seal must be replaced after the drive pinion seal is installed, do not reuse old seal.

REMOVAL AND INSTALLATION (Continued)

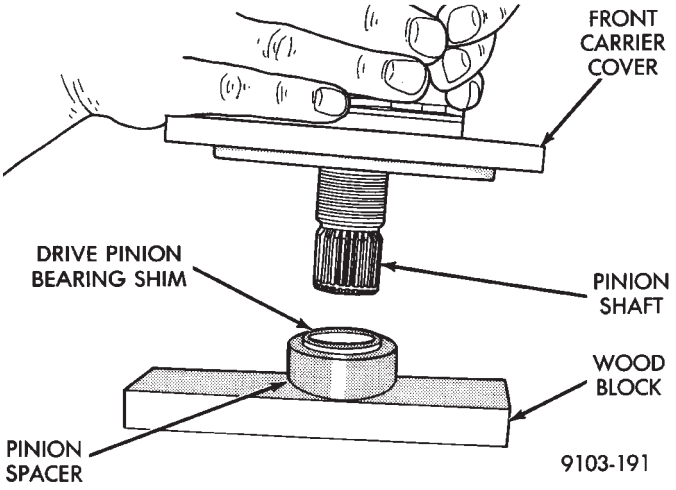


Fig. 31 Removing Drive Pinion Spacer

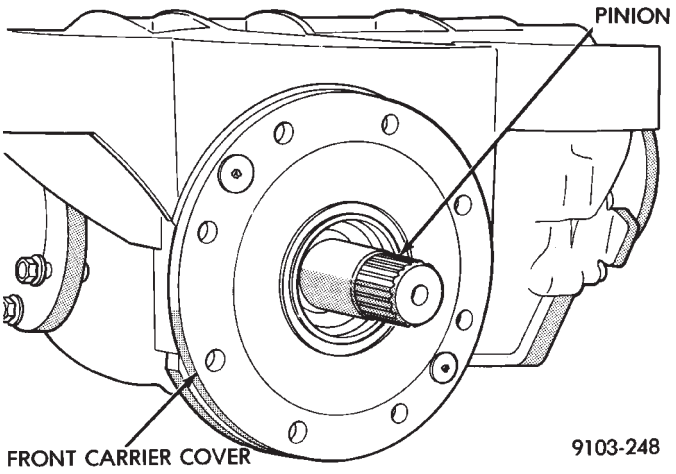


Fig. 32 Reinstalling Front Carrier Cover

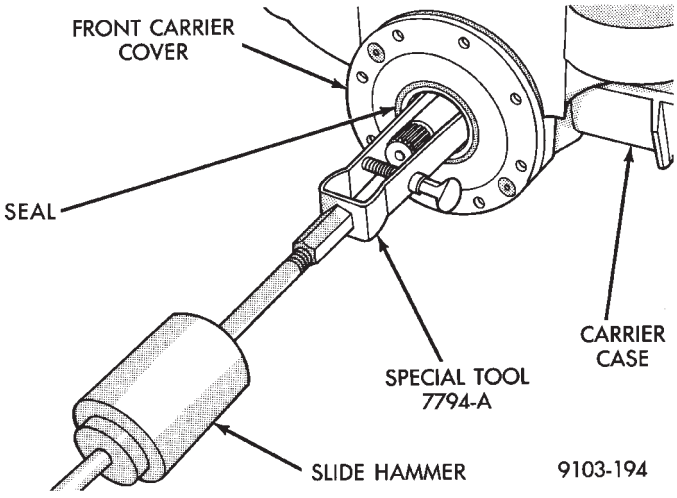


Fig. 33 Removing Seals

INSTALLATION

(1) Clean and inspect seal area.

(2) Apply a light coat of oil onto the drive pinion seal and install with Seal Installer 6507. Seal must be installed with the spring side in towards the rear carrier case (Fig. 34).

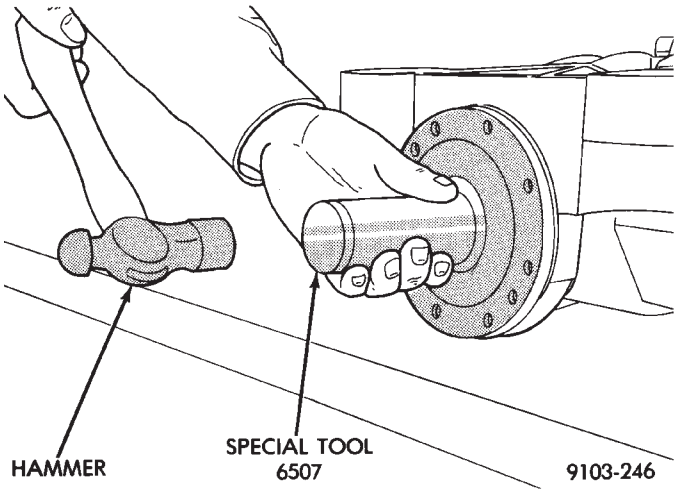


Fig. 34 Input Seal Installation

CAUTION: If the drive pinion spacer is grooved or damaged it must be replaced. A new drive pinion bearing shim may be required. Refer to Drive Pinion Bearing Shim Selection in this section before continuing with this procedure.

(3) Apply a light coat of oil onto the drive pinion spacer. Then slide onto the pinion shaft with the tapered side facing outward (Fig. 35).

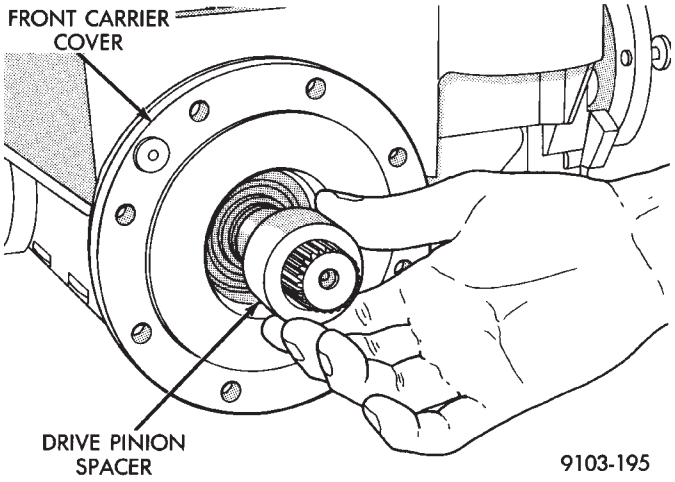


Fig. 35 Installing Drive Pinion Spacer Onto Pinion

(4) Apply a light coat of oil onto the overrunning clutch seal and install with Seal Installer 6508A. Seal must be installed with the spring side away from the rear carrier case (Fig. 36).

(5) Clean pinion nut and pinion shaft threads with Mopar® Brake and Parts Cleaner, Loctite Cleaning Primer or equivalent.

(6) Apply Mopar® Lock and Seal Adhesive to both the pinion nut and pinion shaft threads.

REMOVAL AND INSTALLATION (Continued)

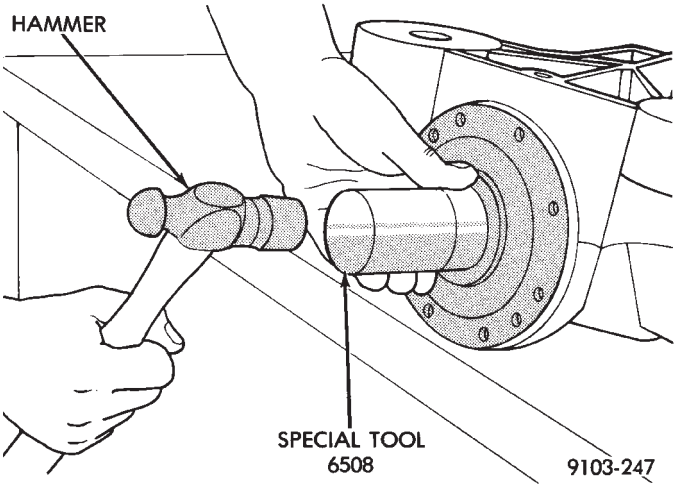


Fig. 36 Overrunning Clutch Seal Installation

(7) Install pinion and tighten nut to 380 N·m (280 ft. lbs.) torque.

(8) Wipe off all excess adhesive.

(9) Install overrunning clutch outer race and snap ring.

(10) Apply Loctite Sealer to overrunning clutch sealing surface and reinstall the overrunning clutch case to rear carrier case.

(11) Reinstall rear drive line module assembly into the vehicle.

(12) Check and fill all fluids as required.

DRIVE PINION BEARING SHIM SELECTION

This procedure must be performed whenever the drive pinion spacer has been replaced.

(1) Using a one inch micrometer, measure the thickness of the **original spacer** (Fig. 37).

(2) Measure the thickness of the **new spacer** the same way that the original spacer was measured.

(3) The difference in the measurements of the old spacer and the new spacer will determine which shim to use.

(4) If the new drive pinion spacer is the **same thickness** as the original, use the original shim.

(5) If the new drive pinion spacer is **thinner** than the original drive pinion spacer, a thicker shim must be used. This will compensate for the difference in size.

(a) Determine the difference in size between the new spacer and the original spacer. Record this dimension.

(b) Measure the thickness of the original shim. Record this dimension.

(c) Add together the two dimensions recorded in steps (a) and (b). Use a new shim that is equal to this size.

For Example: The new spacer is 0.010 thinner than the original spacer. The original shim measures 0.205. Adding 0.205 and 0.010 equals a new shim thickness of 0.215.

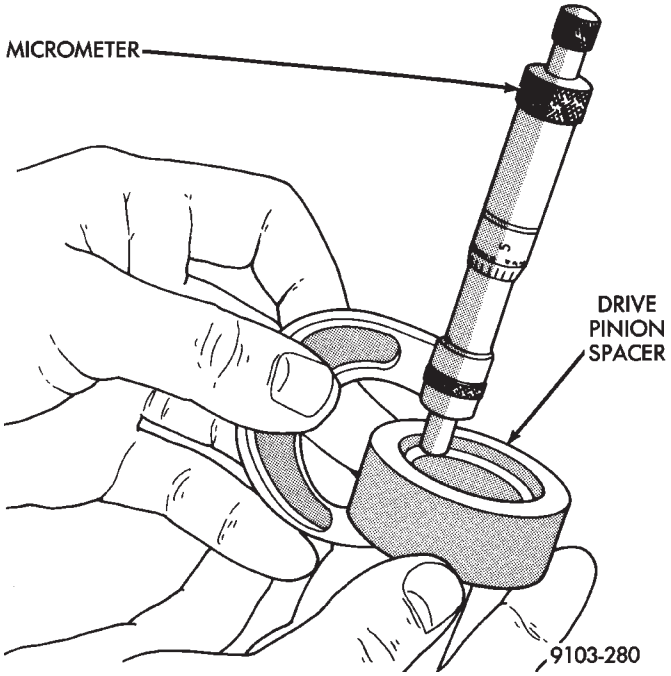


Fig. 37 Measuring Drive Pinion Spacer Thickness

(6) If the new drive pinion spacer is **thicker** than the original drive pinion spacer, a thinner shim must be used. This will compensate for the difference in size.

(a) Determine the difference in size between the new spacer and the original spacer. Record this dimension.

(b) Measure the thickness of the original shim. Record this dimension.

(c) Subtract the dimensions recorded in step (a) from the dimension recorded in step (b). Use a new shim that is equal to this size.

For Example: The new spacer is 0.010 thicker than the original spacer. The original shim measures 0.205. Subtracting 0.010 from 0.205 equals a new shim thickness of 0.195.

REAR DRIVELINE MODULE DIFFERENTIAL SIDE GEARS

(1) Disconnect both half shafts from rear driveline module.

(2) Using two pry bars, pop out output shaft (Fig. 38).

(3) Remove output shaft.

(4) Remove end cover retaining bolts (Fig. 39).

(5) Remove differential end cover.

(6) Remove differential assembly from rear driveline case.

(7) Remove ring gear bolts and separate differential case from differential body.

REMOVAL AND INSTALLATION (Continued)

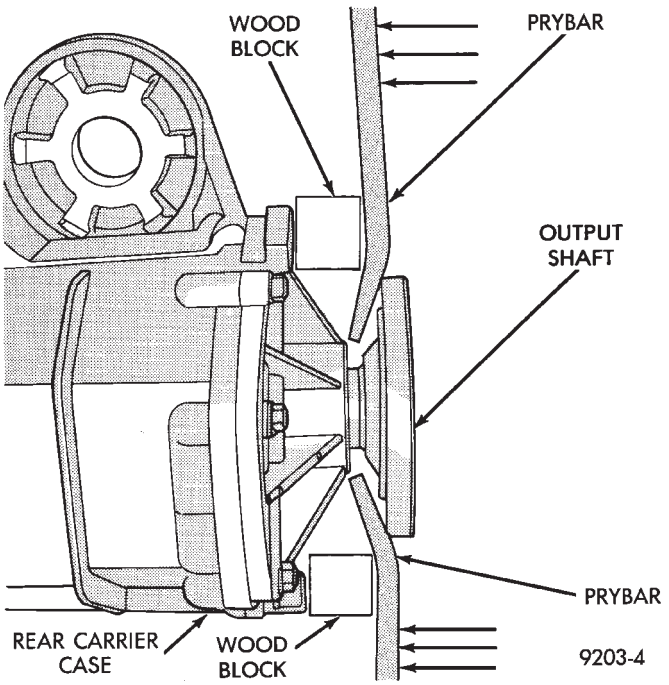


Fig. 38 Output Flange Removal

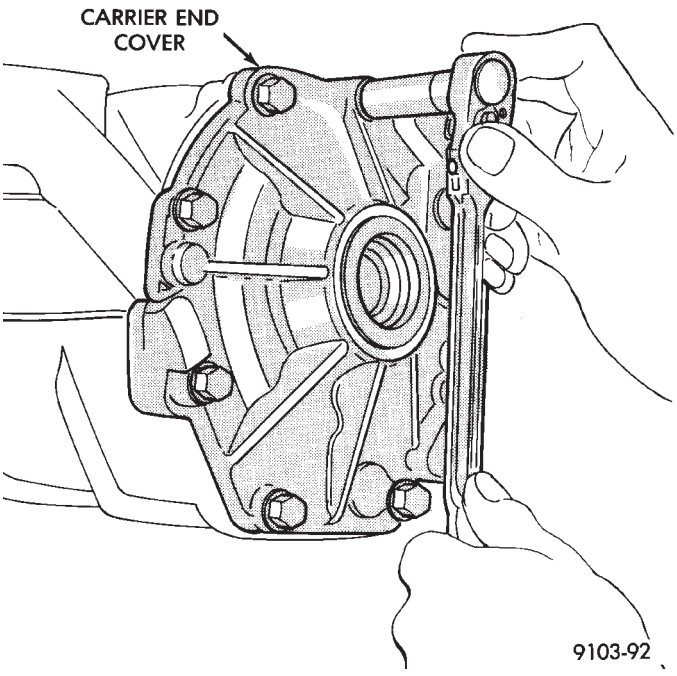


Fig. 39 Remove End Cover Bolts

(8) Using a punch and hammer remove the differential pinion shaft pin.

(9) Slide differential pinion shaft out of differential case.

(10) Inspect and replace pinion gears, pinion shaft or pinion washers as required.

(11) Reverse steps 7 through 10 to assemble differential. Torque the ring gear bolts to 95 N·m (70 ft. lbs.).

(12) Install differential assembly into driveline module case.

(13) Clean and inspect sealer surfaces.

(14) Apply Mopar® Gasket Maker or equivalent and install end cover. Tighten to 28 N·m (250 in. lbs.).

(15) Tighten bolts in proper sequence (Fig. 40). Retighten first bolt after all others are tight.

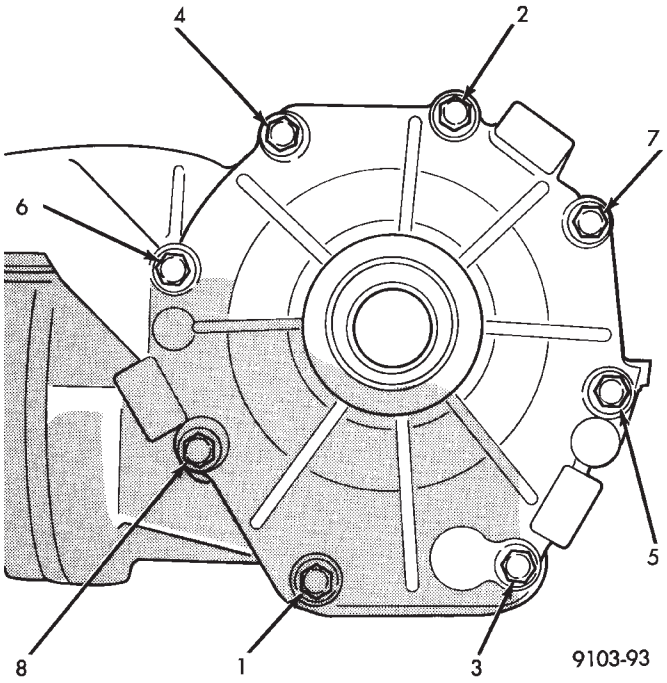


Fig. 40 Bolt Tightening Sequence

(16) Install output shafts

(17) Reconnect both half shafts.

(18) Fill differential to the bottom of the fill hole with proper lubricant.

CASE SEALS

DIFFERENTIAL CARRIER END COVER (RESEAL)

(1) Remove left half shaft.

(2) Using two pry bars, pop out output shaft (Fig. 41).

(3) Remove output shaft.

(4) Remove end cover retaining bolts (Fig. 42).

(5) Remove differential end cover.

(6) Clean and inspect sealer surfaces.

(7) Apply Mopar® Gasket Maker or equivalent and install end cover. Tighten to 28 N·m (250 in. lbs.).

(8) Tighten bolts in the sequence shown in (Fig. 43). Retighten first bolt after all others are tight.

(9) Fill differential to the bottom of the fill hole (level unit) with SAE 80W-90 gear lubricant.

REMOVAL AND INSTALLATION (Continued)

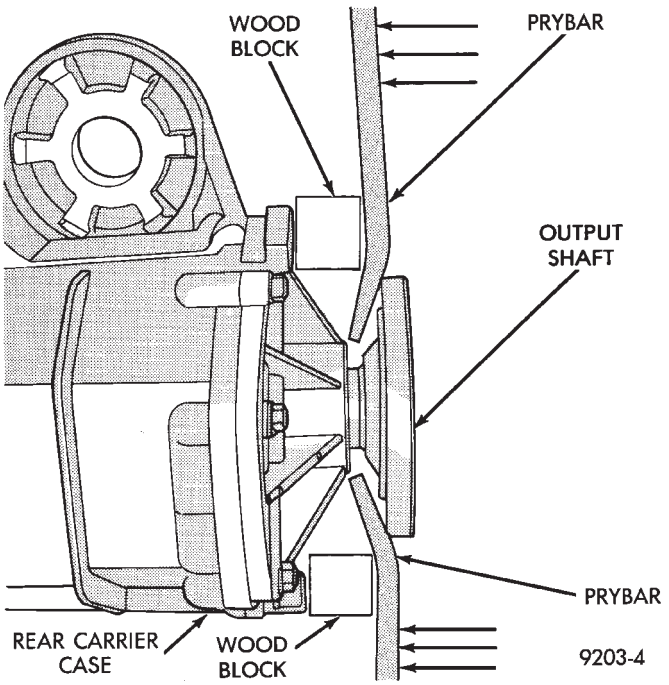


Fig. 41 Output Flange Removal

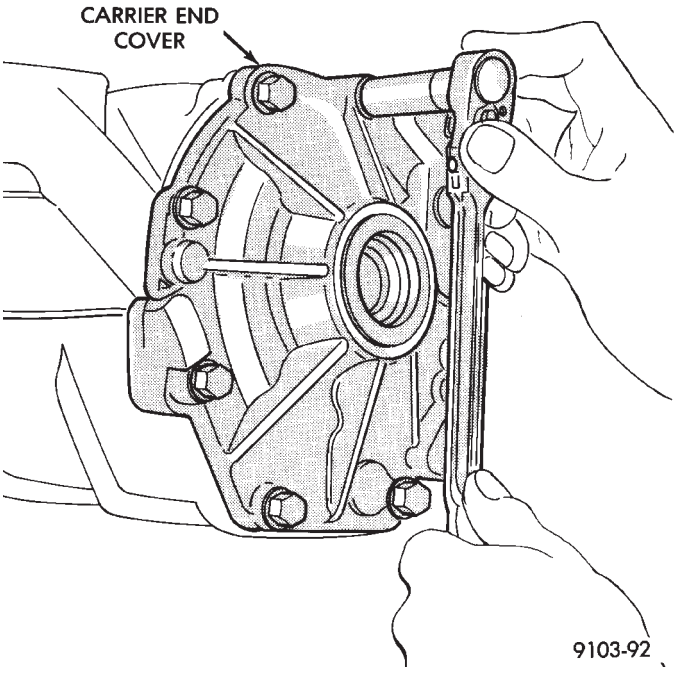


Fig. 42 Remove End Cover Bolts

OVERRUNNING CLUTCH COVER (RESEAL)

(1) Remove rear drive line module assembly from vehicle.

(2) Remove overrunning clutch cover assembly mounting bolts (Fig. 44).

(3) Lift overrunning clutch cover off of overrunning clutch housing.

(4) Clean and inspect sealing surfaces.

(5) Apply Mopar® Gasket Maker or equivalent and reinstall cover and vacuum hose clip. When installing cover be sure that the overrunning clutch fork engages into the overrunning clutch dog.

(6) Install overrunning clutch cover mounting bolts and tighten bolts to 28 N·m (250 in. lbs.).

(7) Reinstall rear drive line module assembly into vehicle.

(8) Check and fill fluid levels as required. Use only MOPAR® TYPE 7176 Automatic Transmission Fluid or equivalent in the overrunning clutch case.

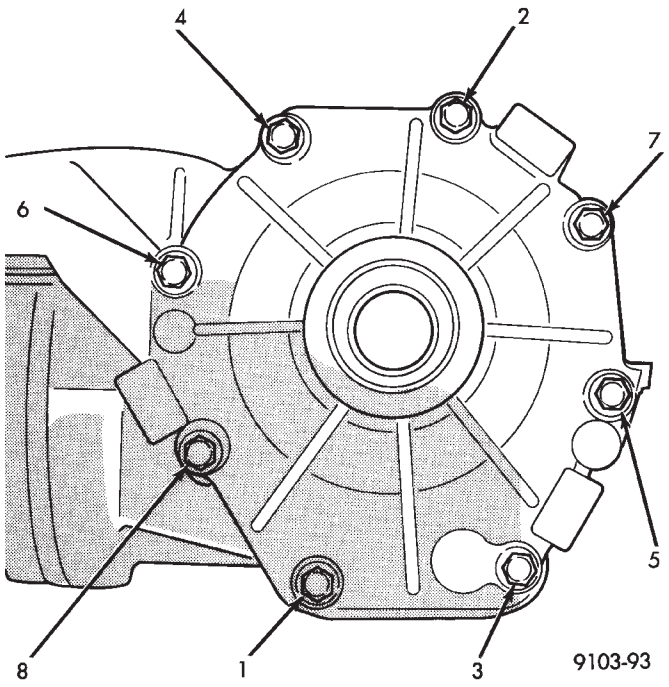


Fig. 43 Bolt Tightening Sequence

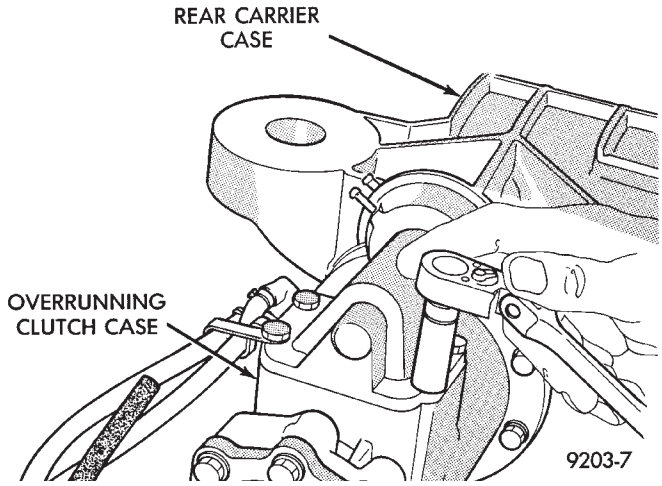


Fig. 44 Mounting Bolts

OVERRUNNING CLUTCH CASE TO REAR CARRIER CASE (RESEAL)

(1) Remove rear drive line module assembly from vehicle.

(2) Drain fluid from overrunning clutch case.

REMOVAL AND INSTALLATION (Continued)

(3) Remove overrunning clutch case to rear carrier bolts (Fig. 45).

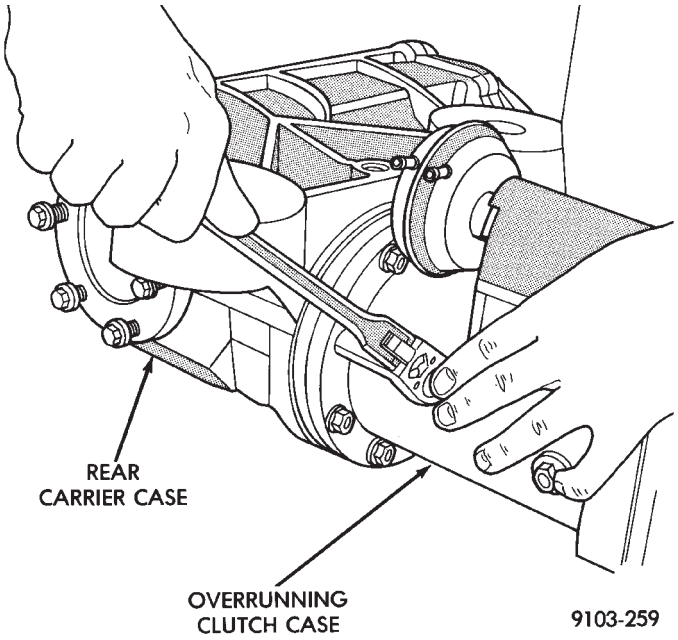


Fig. 45 Overrunning Clutch Case To Rear Carrier Bolts

(4) Separate overrunning clutch case from rear carrier unit (Fig. 46).

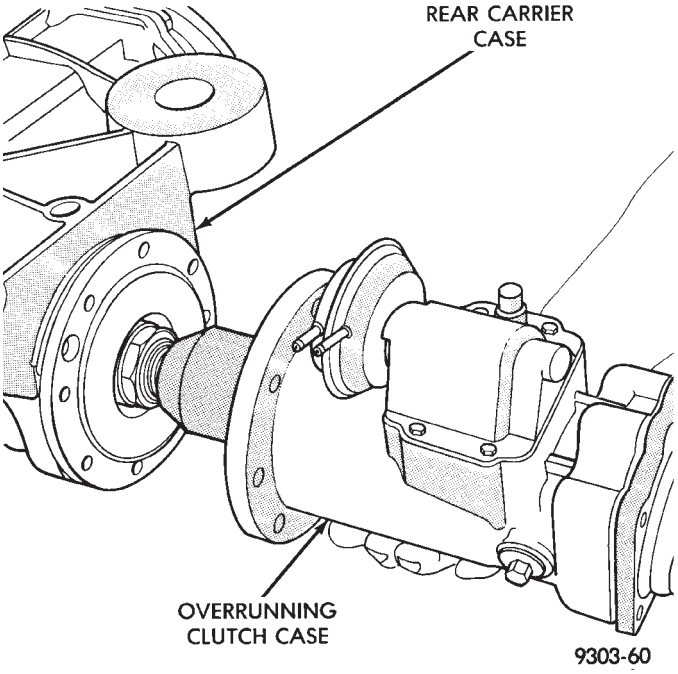


Fig. 46 Separate Rear Carrier Case From Overrunning Clutch Case

(5) Clean and inspect sealing surfaces.

(6) Apply a bead of Mopar® Gasket Maker, or equivalent to sealing surfaces and reassemble.

(7) Reinstall rear drive line module assembly.

(8) Check and fill fluid levels as required. Use only MOPAR® TYPE 7176 Automatic Transmission Fluid or equivalent in the overrunning clutch housing.

VISCOUS COUPLER

The heart of the all-wheel drive system is the inter-axle viscous coupler. Under normal driving the vehicle retains predominantly front wheel drive characteristics. The all-wheel drive takes effect when the front wheels start to slip. Under normal level road, straight line driving, 90% of the torque is allocated to the front wheels. The viscous coupler allows more torque to the rear wheels in accordance with the amount of slippage at the front wheels. The variable torque distribution is automatic with no driver inputs required.

REMOVAL

(1) Hoist vehicle, Refer to Group 2, Lubrication and Maintenance.

(2) Mark flange at propeller shaft and viscous coupler for reference.

(3) Install a thin 1-1/4 inch open-end (Snap-On LTA4042 or equivalent) wrench behind the viscous coupler. Slip the wrench onto the flats of the torque shaft.

(4) Remove bolts at propeller shaft flange (Fig. 47).

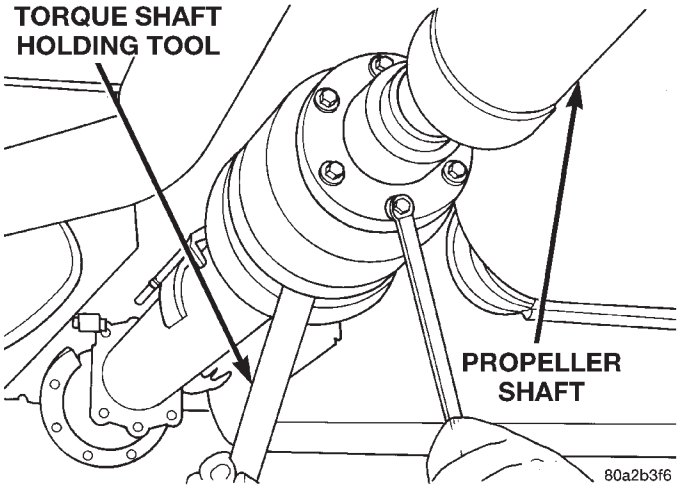


Fig. 47 Propeller Shaft Bolts

(5) Remove shaft from coupler and secure shaft to underbody (Fig. 48). Do not let the propeller shaft hang freely, damage may occur.

(6) Hold the torque shaft from turning. Remove viscous coupler retaining nut (Fig. 49).

(7) Slide coupler off torque shaft (Fig. 50).

INSTALLATION

(1) Slide viscous coupler onto torque shaft.

(2) Install a thin 1-1/4 inch open-end (Snap-On LTA4042 or equivalent) wrench onto the flats of the

REMOVAL AND INSTALLATION (Continued)

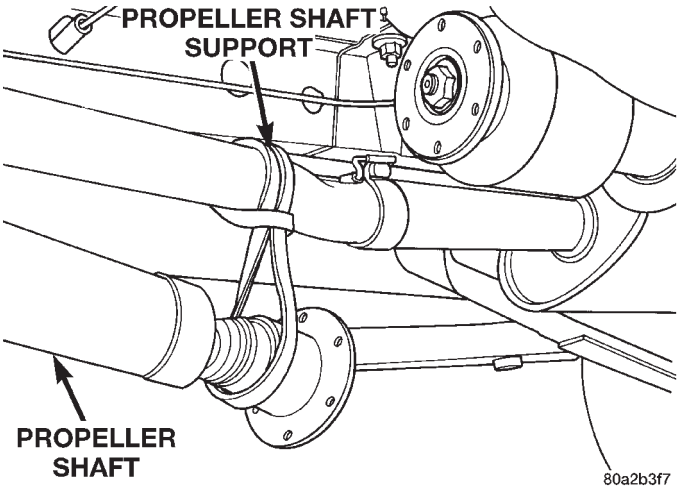


Fig. 48 Support Propeller Shaft

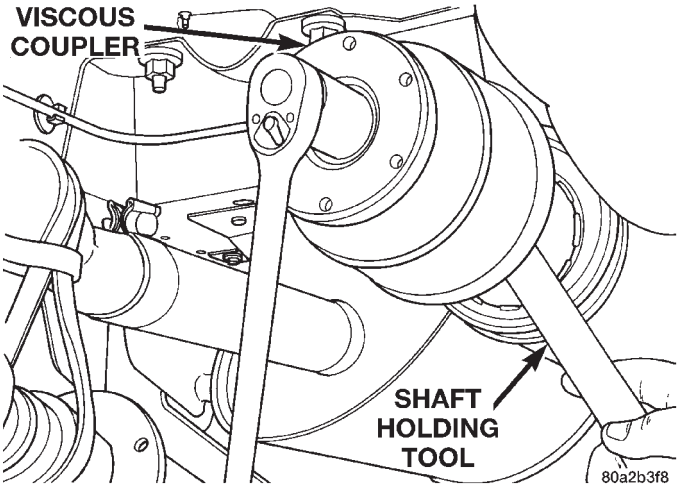


Fig. 49 Retaining Nut Removal

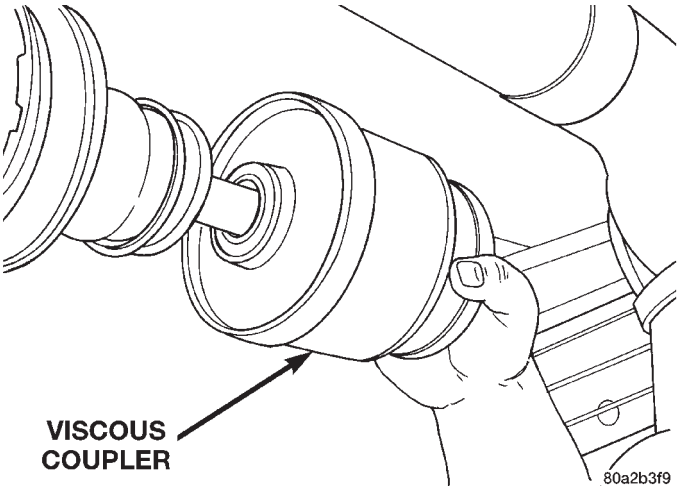


Fig. 50 Viscous Coupler Removal

torque shaft. Install NEW viscous coupler retaining nut. Tighten retaining nut to 244 N·m (180 ft. lbs.).

(3) Detach the propeller shaft from support strap.

(4) Position propeller shaft at the reference marks.

(5) Install propeller shaft bolts (Fig. 51). Tighten bolts to 28 N·m (250 in. lbs.).

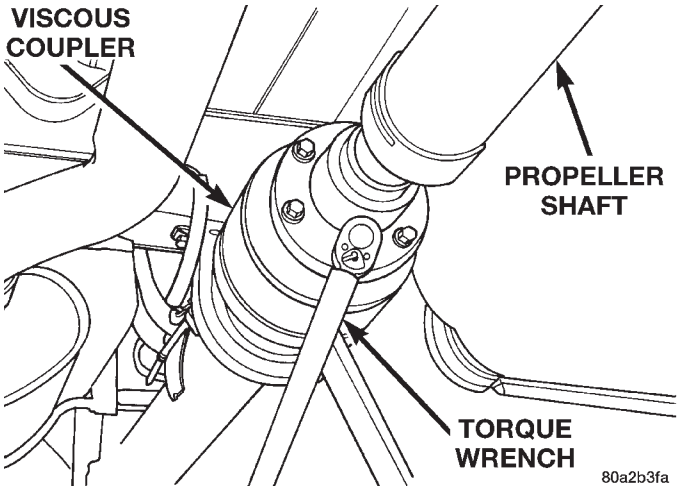


Fig. 51 Tighten Propeller Shaft Retaining Bolts

PROPELLER SHAFT

REMOVAL

(1) Place vehicle in neutral and lift vehicle on hoist.

(2) Mark orientation of propeller shaft rear flange.

CAUTION: Do not allow end of propeller shaft to hang free.

(3) Remove propeller shaft rear mounting bolts and support end of propeller shaft (Fig. 52).

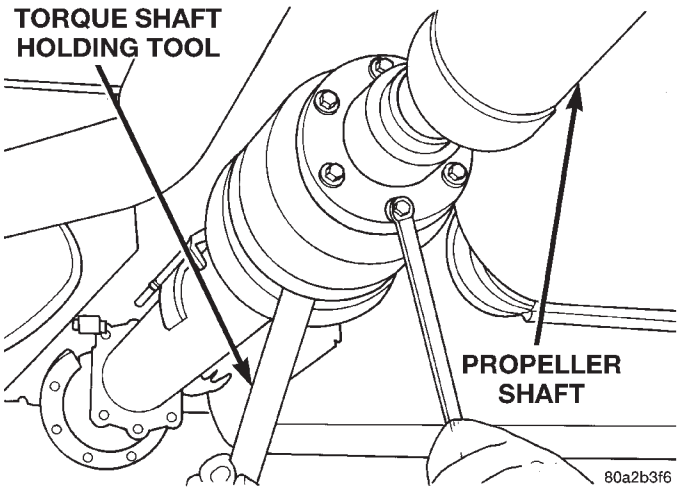


Fig. 52 Propeller Shaft Mounting Bolts (Rear)

(4) Mark orientation of propeller shaft front flange (Fig. 53).

(5) Remove propeller shaft front mounting bolts and remove propeller shaft assembly (Fig. 54).

CAUTION: Do not allow the propeller shaft to hang freely while installing.

REMOVAL AND INSTALLATION (Continued)

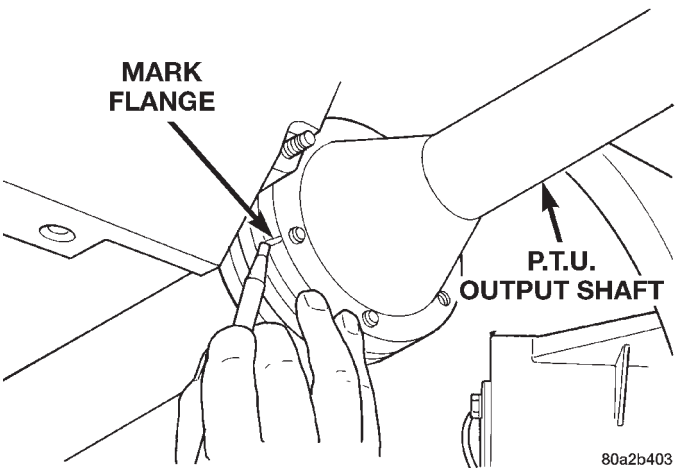


Fig. 53 Mark Propeller Shaft Front Flange

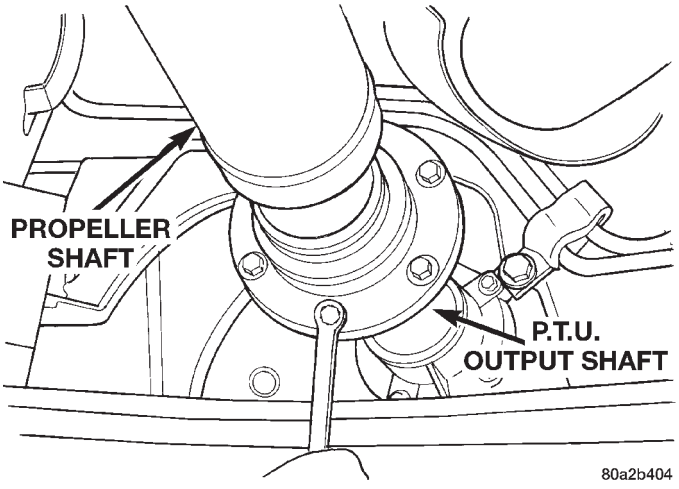


Fig. 54 Propeller Shaft Bolts (Front)

INSTALLATION

(1) Match up marks on front flange of the propeller shaft to the marks on the P.T.U. output shaft.

(2) Mate front flange of the propeller shaft to the P.T.U. output shaft.

(3) Support the rear of the propeller shaft.

(4) Install the front flange retaining bolts (Fig. 55). Tighten bolts to 28 N·m (250 in. lbs.).

(5) Match up marks on rear flange of the propeller shaft to the marks on the viscous coupler.

(6) Mate rear flange of the propeller shaft to the viscous coupler.

(7) Install the rear flange retaining bolts. Tighten bolts to 28 N·m (250 in. lbs.).

OVERRUNNING CLUTCH VACUUM MOTOR

REMOVAL

(1) Remove rear drive line module assembly from vehicle.

(2) Cut clamps and disconnect vacuum hose to vacuum motor.

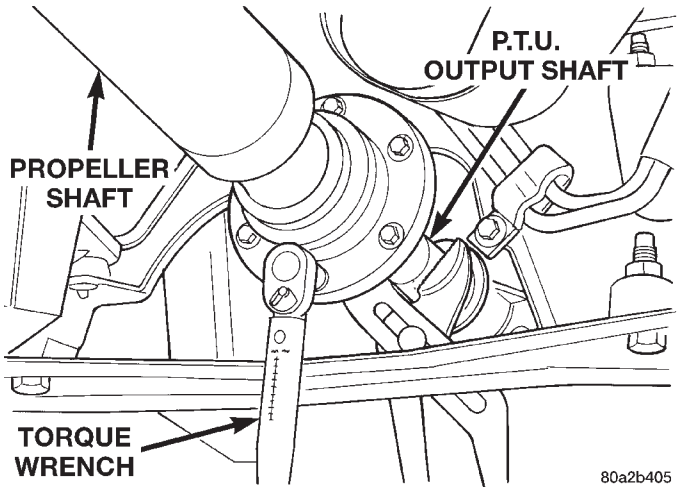


Fig. 55 Tighten Propshaft Front Flange Bolts

(3) Remove overrunning clutch cover assembly mounting bolts (Fig. 56).

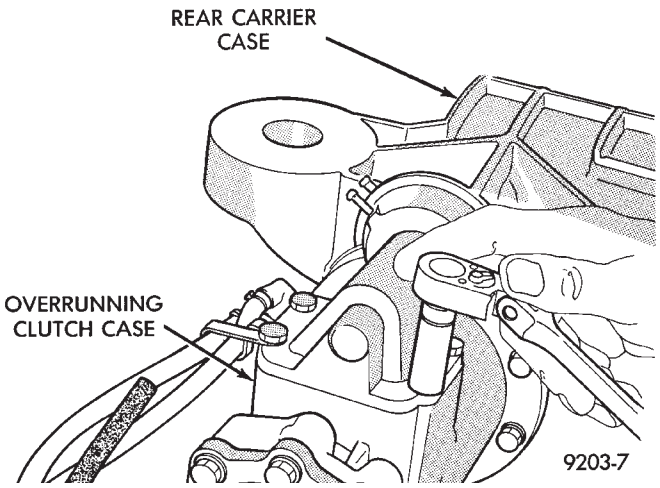


Fig. 56 Mounting Bolts

(4) Lift overrunning clutch cover assembly off of overrunning clutch case.

(5) Clamp assembly in soft jawed vise (Fig. 57).

(6) Remove three E-clips from vacuum motor shaft (Fig. 58).

(7) Holding the overrunning clutch shift fork, slide shift motor out of housing (Fig. 59).

CAUTION: Shift fork can be installed backwards. Note its position before removing.

(8) Clean and inspect all parts and sealing surfaces. Replace worn or damaged parts.

INSTALLATION

(1) Slide vacuum shift motor into housing and through shift fork. Shift fork offset must angle away from vacuum motor (Fig. 60).

(2) Install three E-clips. Two onto vacuum shift motor shaft and one on the vacuum motor bushing.

REMOVAL AND INSTALLATION (Continued)

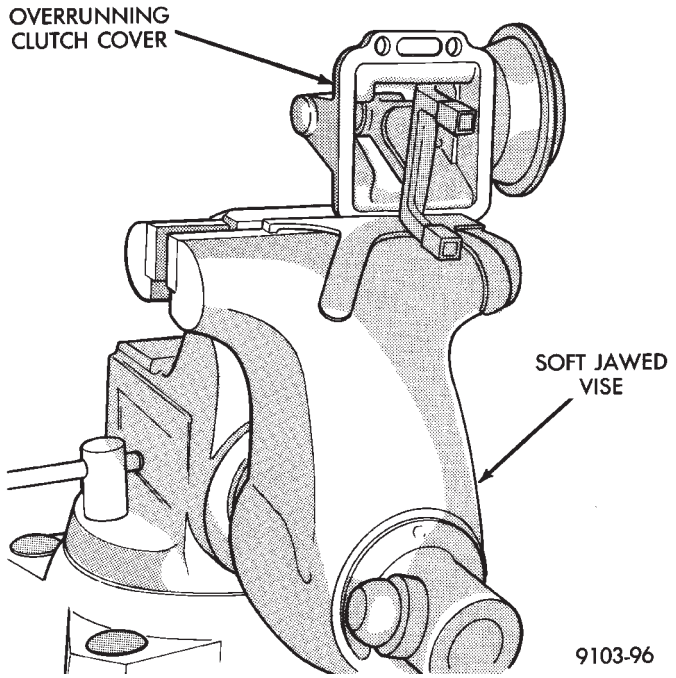


Fig. 57 Clamp Housing In Vise

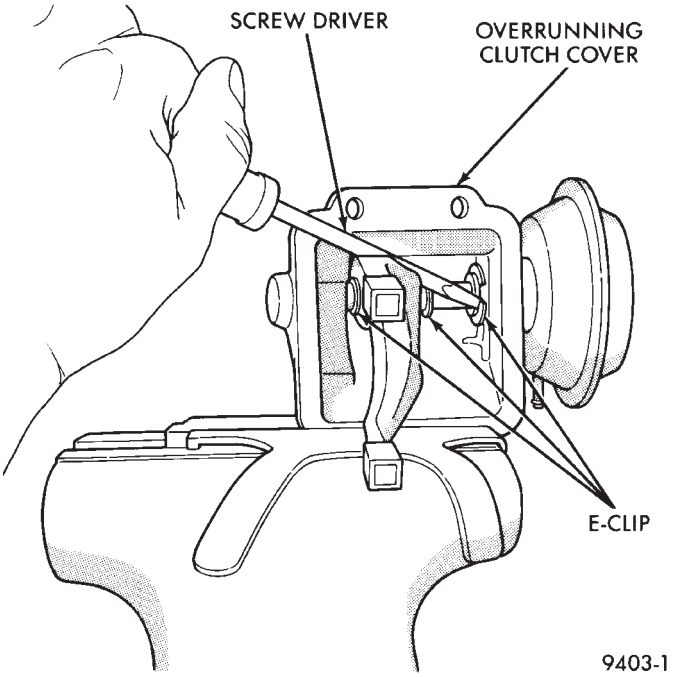


Fig. 58 Remove Three E-Clips

(3) Apply Mopar® Gasket Maker or equivalent and reinstall cover. When installing cover be sure that the overrunning clutch fork engages into the overrunning clutch dog.

(4) Install overrunning clutch cover assembly mounting bolts. Tighten bolts to 28 N·m (250 in. lbs.). Replace hose clamps.

(5) Reinstall rear drive line assembly into vehicle.

(6) Check and fill fluid levels as required.

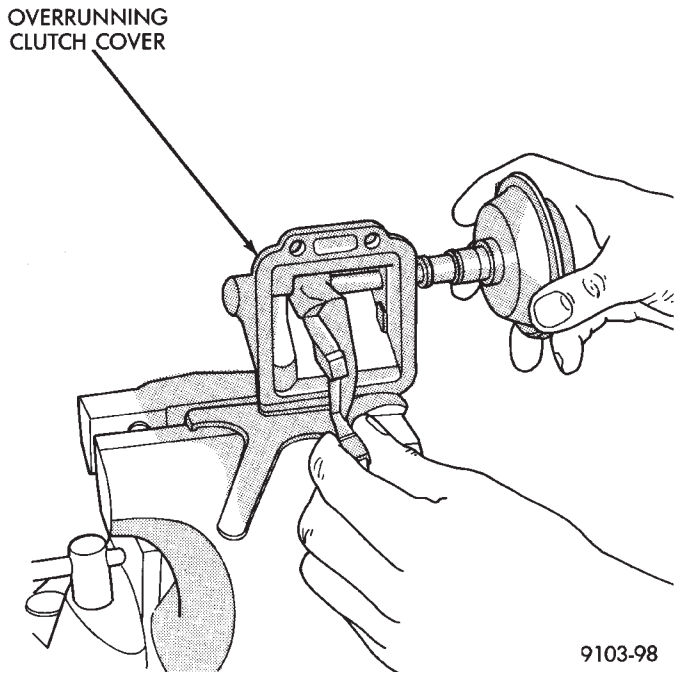


Fig. 59 Shift Fork Removal

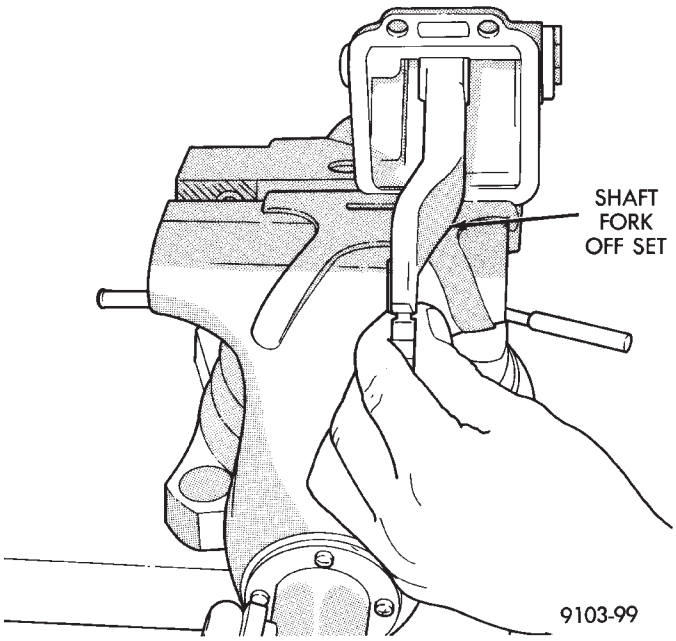


Fig. 60 Shift Fork Position

OVERRUNNING CLUTCH CASE

REMOVAL

(1) Remove rear drive line module assembly.

(2) Remove overrunning clutch cover assembly.

(3) Drain fluid from overrunning clutch case.

(4) Remove overrunning clutch case to rear carrier case bolts (Fig. 61).

(5) Separate the overrunning clutch housing from the rear carrier case.

REMOVAL AND INSTALLATION (Continued)

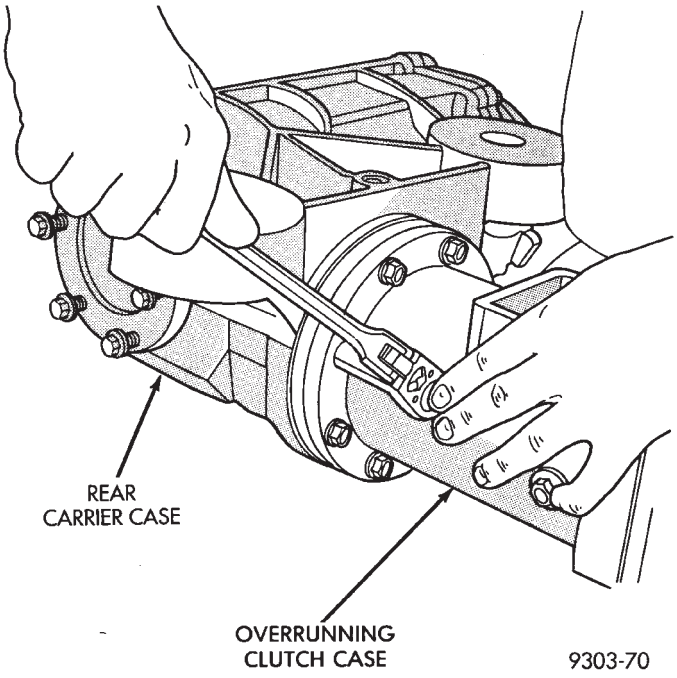


Fig. 61 Overrunning Clutch Case To Rear Carrier Bolts

(6) Remove overrunning clutch inner race snap ring (Fig. 62).

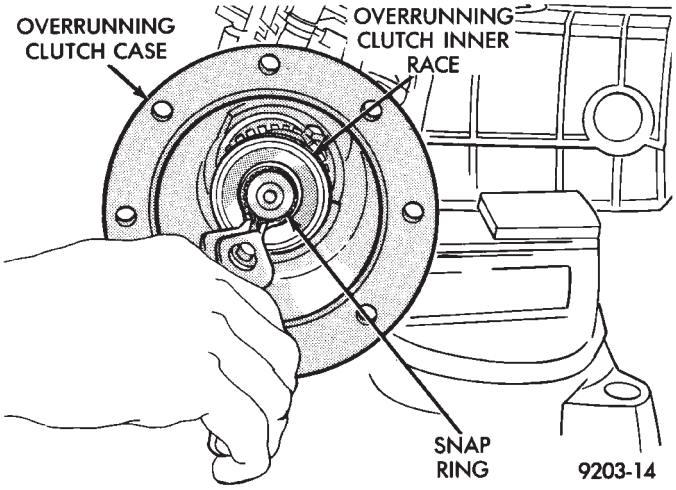


Fig. 62 Inner Race Snap Ring

(7) Slide overrunning clutch inner race off of the shaft.

(8) Remove dog-clutch snap ring and slide dog-clutch off of the shaft.

(9) Remove torque shaft rear bearing snap ring.

(10) Remove torque tube retaining bolts (Fig. 63).

(11) Separate overrunning clutch case from torque tube.

(12) Remove rear bearing retaining snap ring in overrunning clutch case (Fig. 64).

(13) Remove rear torque shaft bearing.

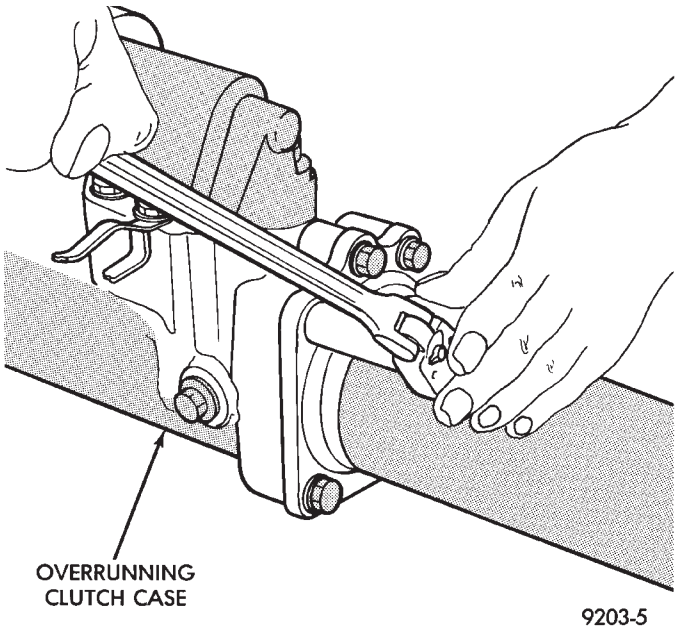


Fig. 63 Torque Tube Bolts

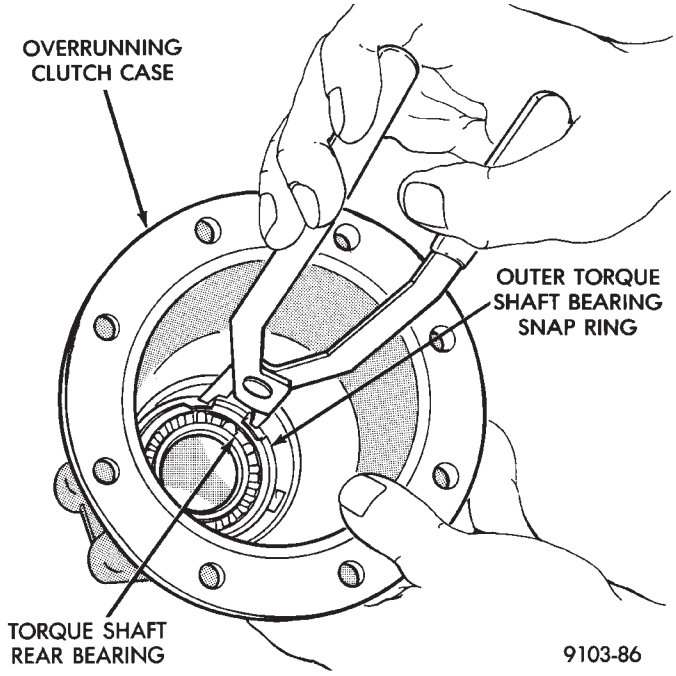


Fig. 64 Torque Shaft Rear Bearing Snap Ring

(14) Drive out front overrunning clutch seal with special tool C-4967 (Fig. 65).

INSTALLATION

(1) Install new seal with special tool MD998334. Seal should be flush with outside edge of housing (Fig. 66).

(2) Install rear torque shaft bearing and snap ring.

(3) Install overrunning clutch case onto torque tube. Tighten bolts to 28 N·m (250 in. lbs.).

(4) Install torque shaft snap ring.

REMOVAL AND INSTALLATION (Continued)

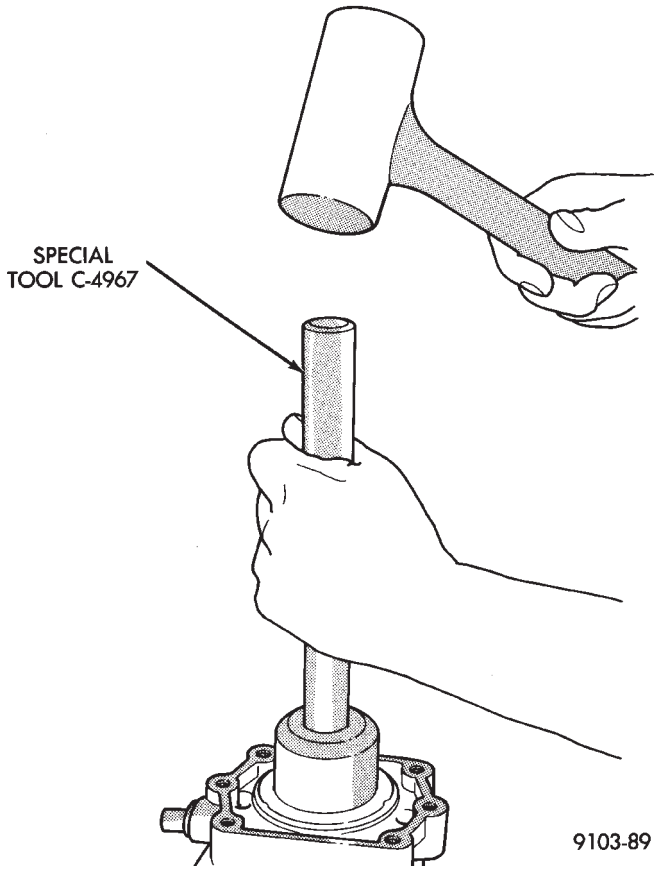


Fig. 65 Seal Removal

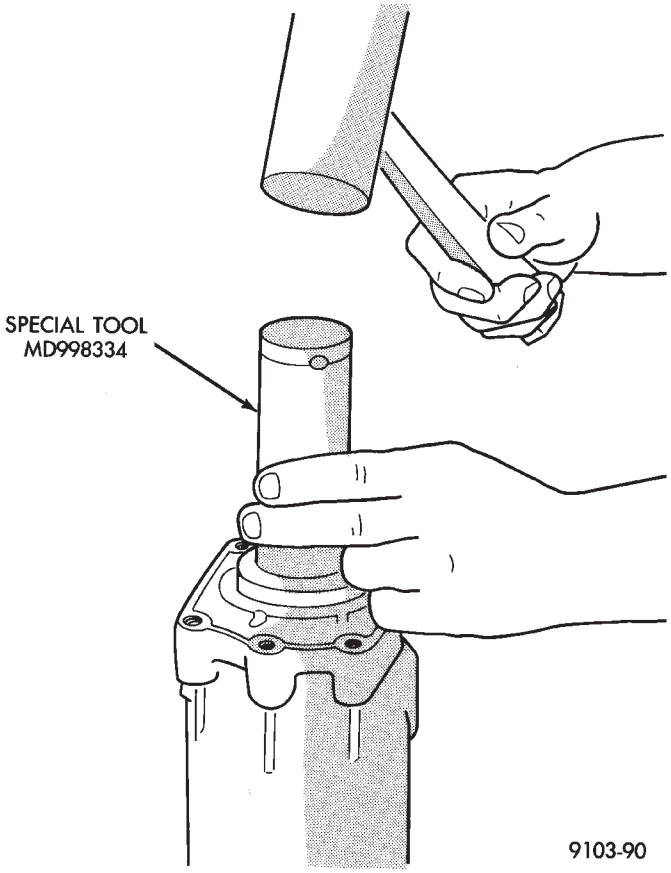


Fig. 66 Installing New Seal

(5) Slide dog clutch onto shaft and install snap ring.

(6) Slide overrunning clutch inner race onto shaft and install retaining snap ring.

(7) Clean all sealing surfaces. Then apply a bead of Mopar® Gasket Maker or equivalent. Then reinstall the overrunning clutch case to the rear carrier case. Install retaining bolts and tighten to 28 N·m (250 in. lbs.).

(8) Apply Mopar® Gasket Maker or equivalent and reinstall vacuum shift cover. When installing cover be sure that the overrunning clutch fork engages into the overrunning dog clutch.

(9) Install rear drive line module into vehicle.

(10) Check and fill all fluid levels as required.

OVERRUNNING CLUTCH

REMOVAL

(1) Remove rear drive line module assembly.

(2) Remove overrunning clutch cover assembly.

(3) Drain fluid from overrunning clutch case.

(4) Remove overrunning clutch case to rear carrier case bolts (Fig. 67).

(5) Separate the overrunning clutch case from the rear carrier case (Fig. 68).

(6) Remove overrunning clutch snap ring (Fig. 69).

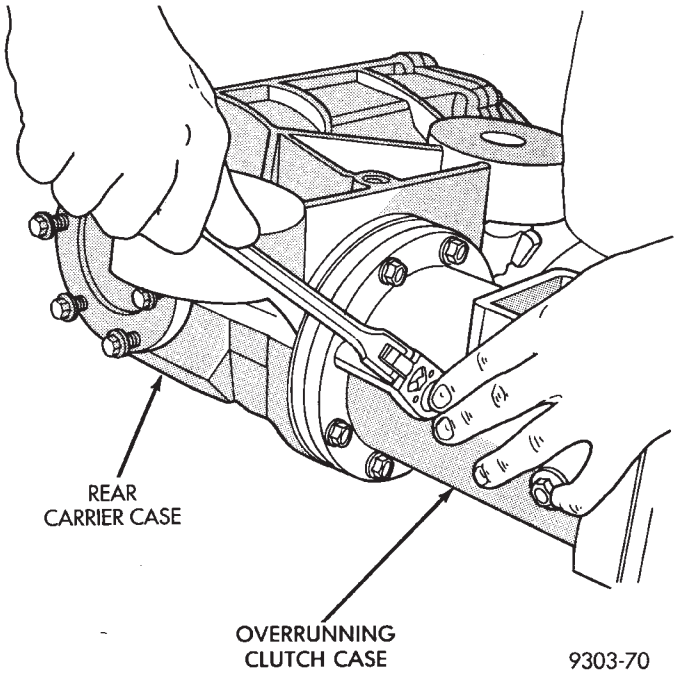


Fig. 67 Overrunning Clutch Case To Rear Carrier Bolts

(7) Remove spacers and overrunning clutch. Overrunning clutch can be installed backwards. Keep the

REMOVAL AND INSTALLATION (Continued)

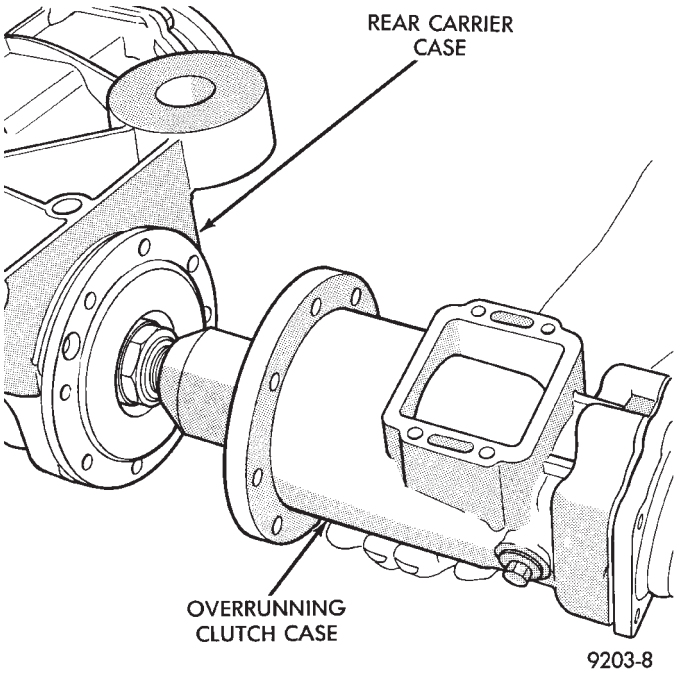


Fig. 68 Separate Rear Carrier Case From Overrunning Clutch Case

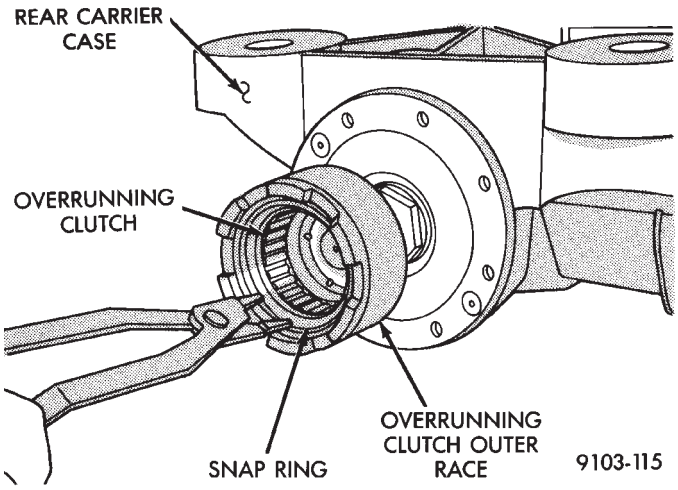


Fig. 69 Overrunning Clutch Snap Ring

spacers and overrunning clutch in order when taking the unit apart (Fig. 70).

(8) Remove overrunning clutch outer race snap ring (Fig. 71).

(9) Slide overrunning clutch outer race off of shaft (Fig. 72).

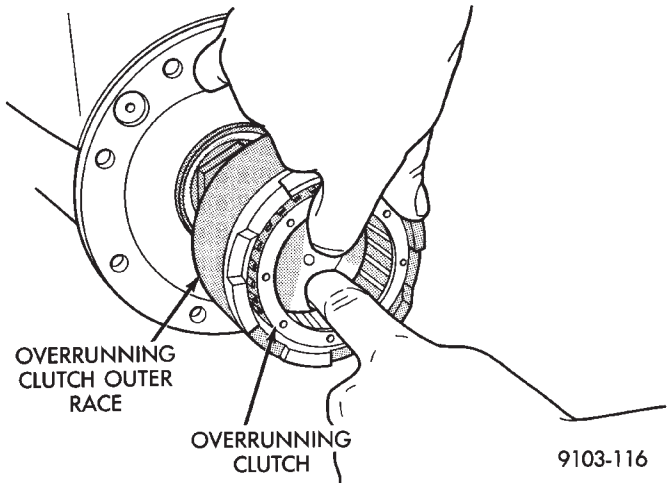


Fig. 70 Overrunning Clutch Removal

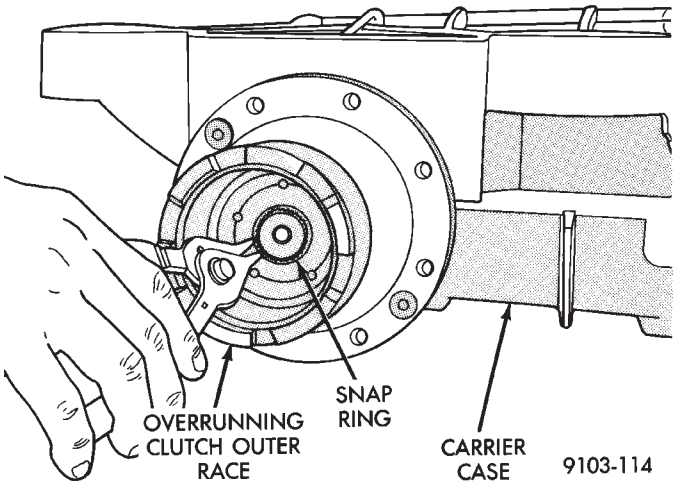


Fig. 71 Overrunning Clutch Snap Ring Removal

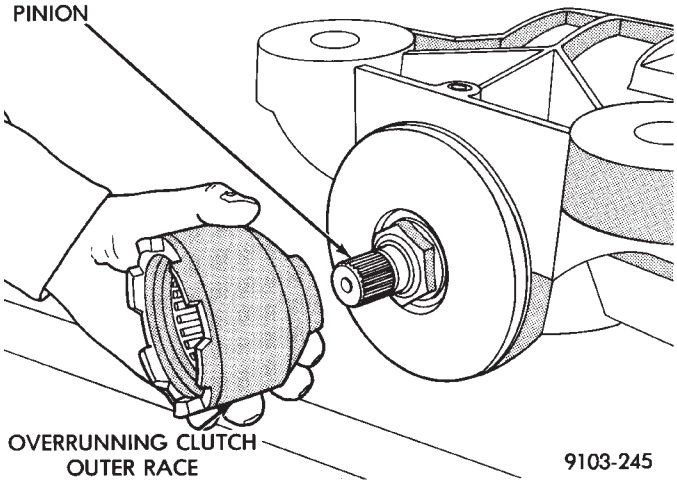


Fig. 72 Overrunning Clutch Outer Race Removal

REMOVAL AND INSTALLATION (Continued)

(10) Remove overrunning clutch inner race snap ring (Fig. 73).

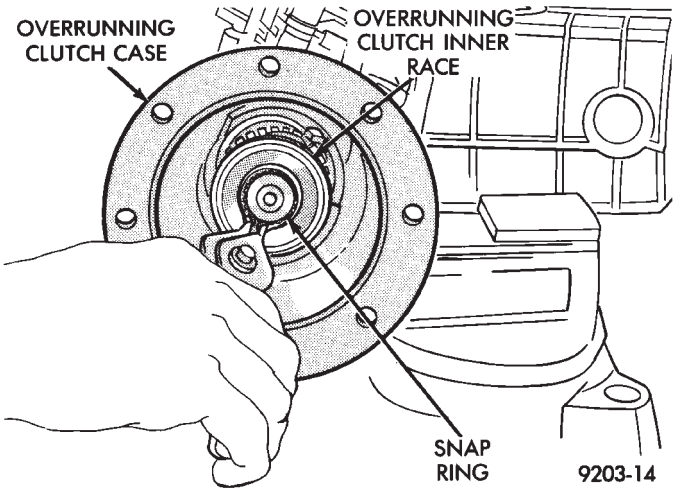


Fig. 73 Inner Race Snap Ring Removal

(11) Slide overrunning clutch inner race off of the shaft (Fig. 74).

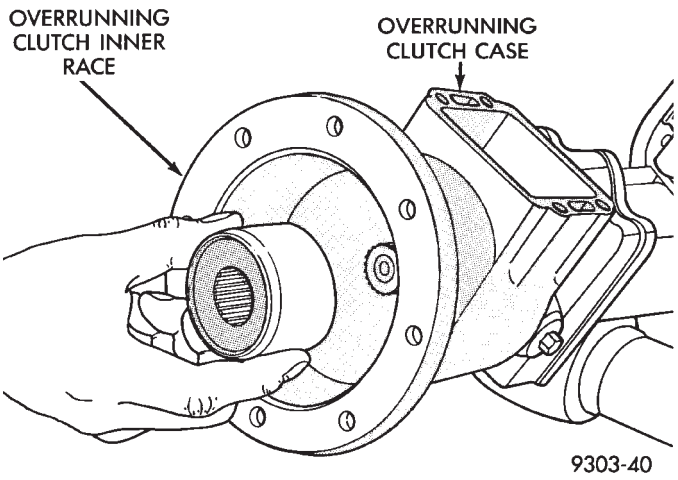


Fig. 74 Remove Overrunning Clutch Race

(12) Remove dog-clutch snap ring (Fig. 75).

(13) Slide dog-clutch off of the shaft (Fig. 76).

(14) Clean and inspect all parts. Replace worn or damaged parts.

INSTALLATION

(1) Install outer overrunning clutch race and retaining snap ring.

(2) Install overrunning clutch spacers and snap ring.

CAUTION: The overrunning clutch can be installed backwards.

(3) To check for proper installation of the overrunning clutch, temporarily install the inner race into the overrunning clutch. The tapered end must go in

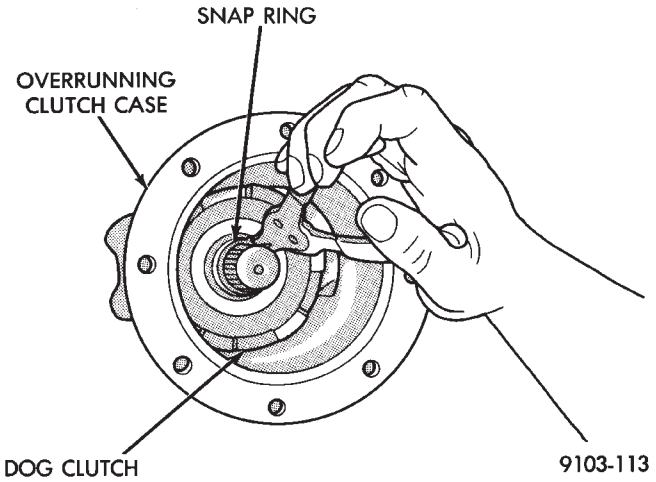


Fig. 75 Dog Clutch Snap Ring

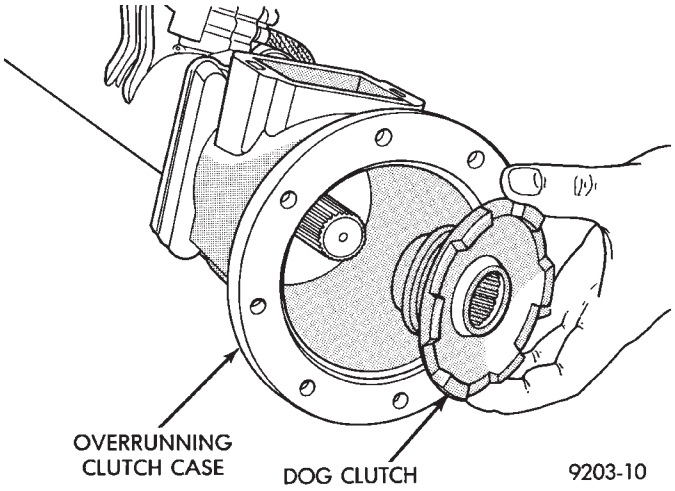


Fig. 76 Dog Clutch Removal

first (Fig. 77). The inner race should spin when turned counterclockwise (Fig. 78) and grab when turned clockwise (Fig. 79).

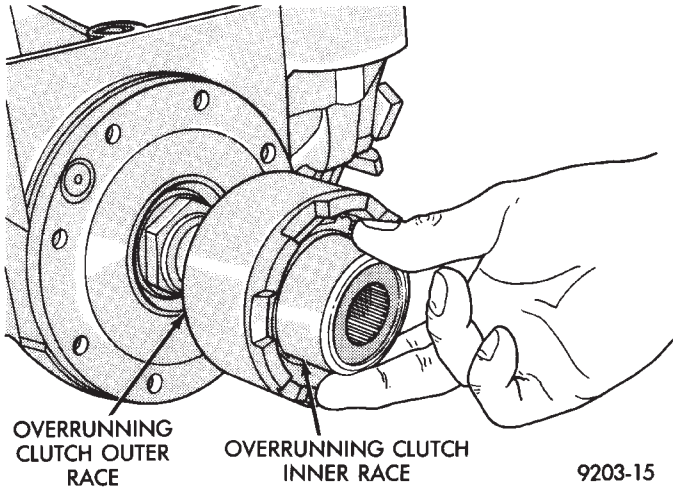


Fig. 77 Temporarily Install Inner Race

REMOVAL AND INSTALLATION (Continued)

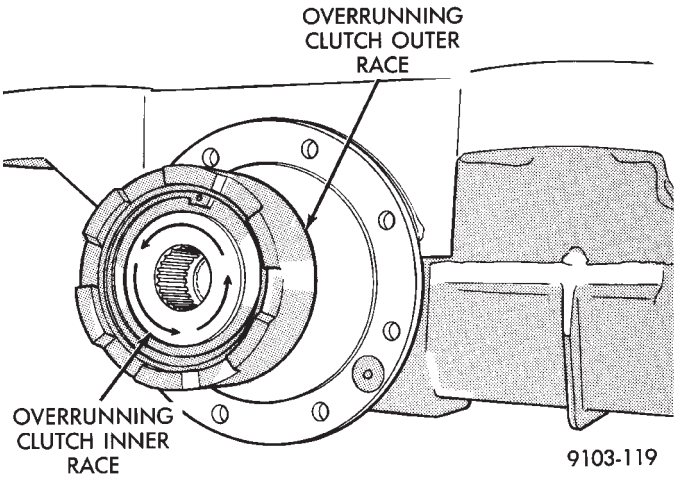


Fig. 78 Turn Inner Race Counterclockwise

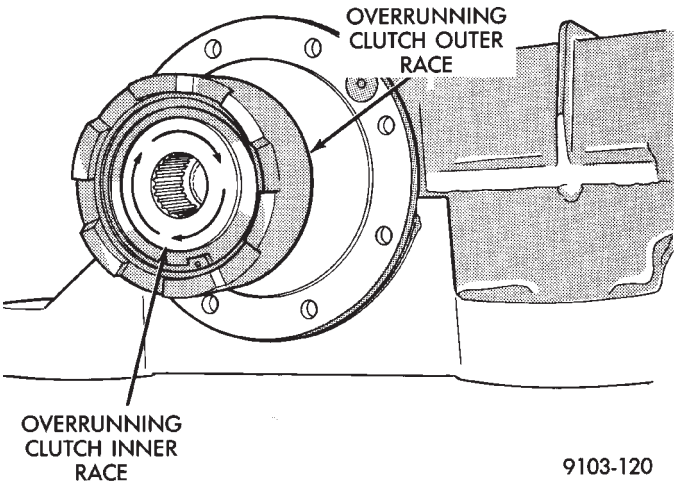


Fig. 79 Turn Inner Race Clockwise

(4) Install dog clutch onto shaft and reinstall snap ring.

(5) Install overrunning clutch on the shaft with the tapered end facing outward and install snap ring.

(6) Clean all sealing surfaces. Apply a bead of Mopar® Gasket Maker or equivalent. Then reinstall the overrunning clutch case to the rear carrier case. Install retaining bolts and tighten to 28 N·m (250 in. lbs.).

(7) Apply Mopar® Gasket Maker or equivalent and reinstall cover. When installing cover be sure that the overrunning clutch fork engages into the overrunning dog clutch.

(8) Install rear drive line module assembly into the vehicle.

(9) Check and fill fluid levels as required.

HALF SHAFT

REMOVAL

(1) Lift vehicle on hoist so that the wheels hang freely.

(2) Remove rear wheel.

(3) Remove cotter pin, nut lock and spring washer (Fig. 80).

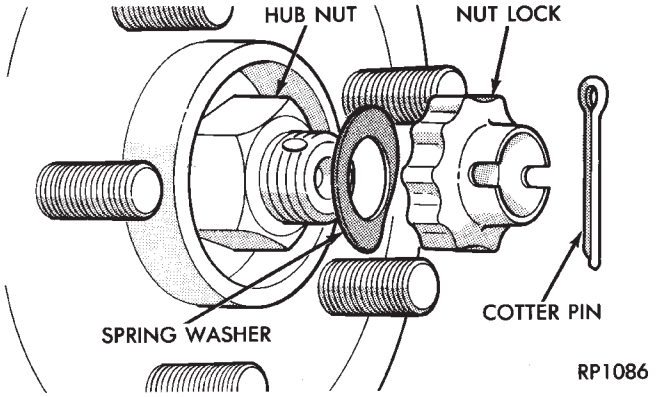


Fig. 80 Cotter Pin, Nut Lock, And Spring Washer

(4) Remove hub nut and washer.

CAUTION: The half shaft outer C.V. joint, 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 and torque a bolt through the hub. This will ensure that the hub/bearing assembly cannot loosen.

(5) Remove inner half shaft retaining bolts (Fig. 81).

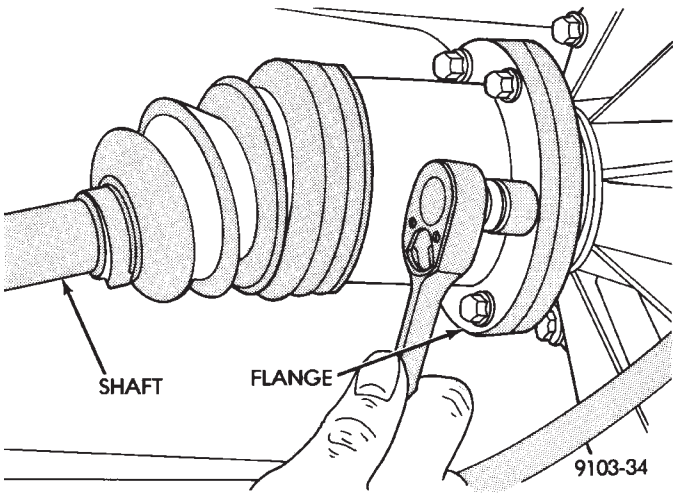


Fig. 81 Inner Half Shaft Bolts

(6) The half shaft is spring loaded. Compress inner half shaft joint slightly and pull downward to clear rear differential. Then pull half shaft assembly outward to remove (Fig. 82).

REMOVAL AND INSTALLATION (Continued)

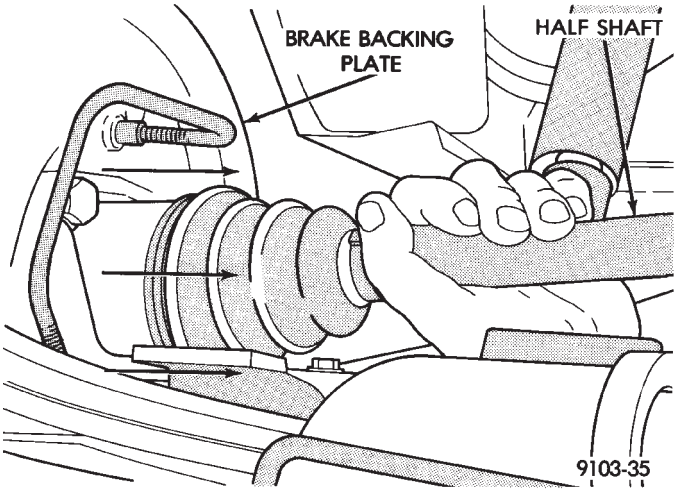


Fig. 82 Half Shaft Removal

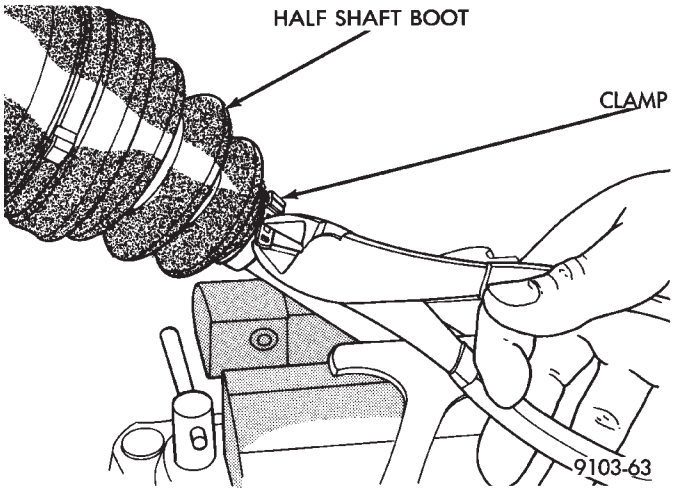


Fig. 84 Remove Boot Clamps

INSTALLATION

(1) For installation, reverse removal procedure.

DISASSEMBLY AND ASSEMBLY

HALF SHAFT RECONDITION

REAR HALF SHAFT JOINT/BOOT REPLACEMENT

(1) Remove half shaft from vehicle. Refer to Half Shaft Service in this section for removal procedure.

(2) Clean and inspect all parts for wear or damage, replace any worn or damaged parts.

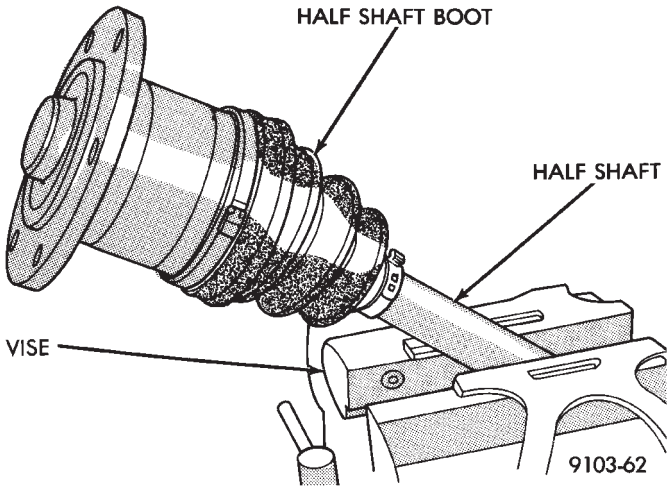


Fig. 83 Clamp Shaft In Soft Jawed Vice

(3) To install, reverse removal procedure.

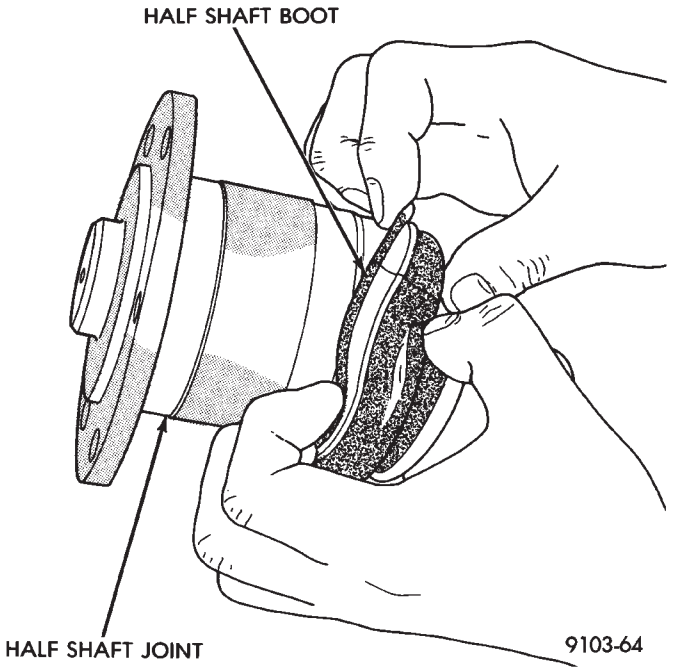


Fig. 85 Pull Back Boot

DISASSEMBLY AND ASSEMBLY (Continued)

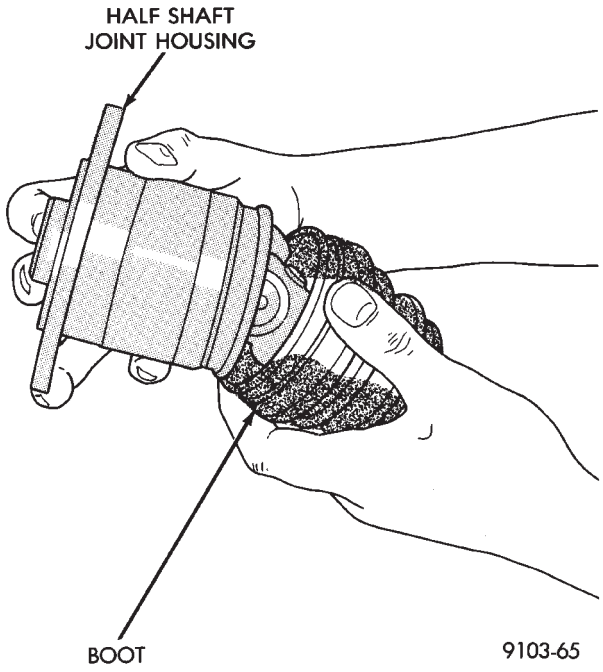


Fig. 86 Remove Housing

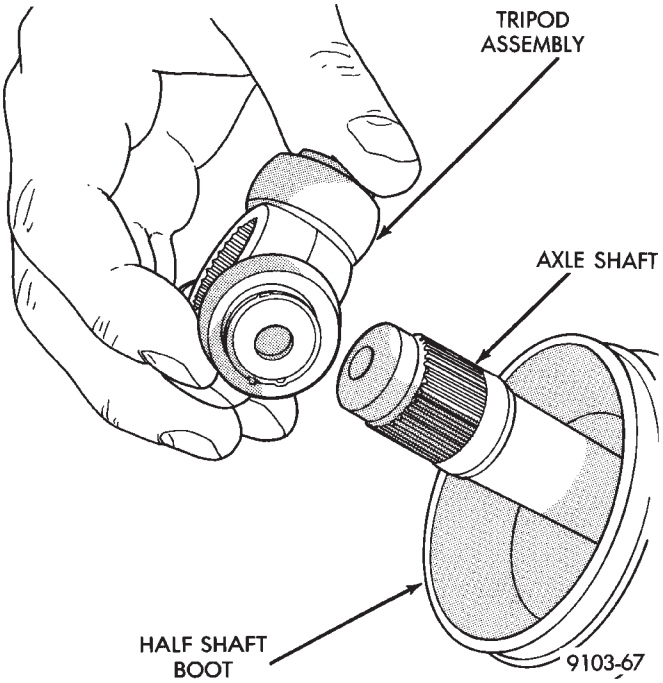


Fig. 88 Slide Tripod Off The Shaft

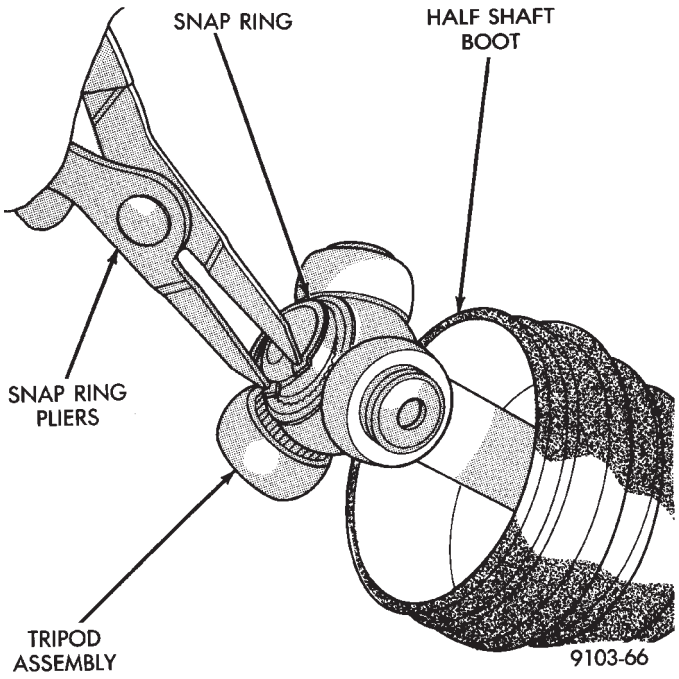


Fig. 87 Remove Snap Ring

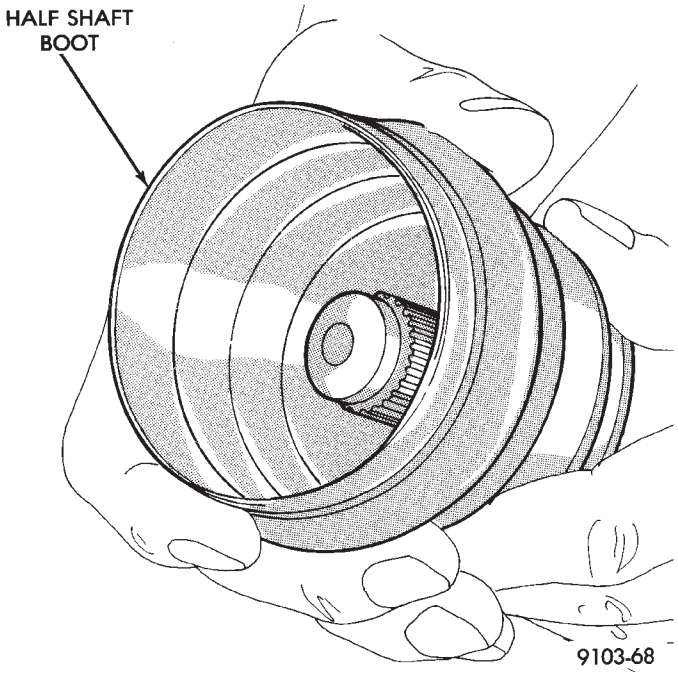


Fig. 89 Remove Boot

TORQUE TUBE

(1) Remove rear drive line module assembly from vehicle.

(2) Remove viscous coupling.

(3) Remove snap ring and torque tube bearing shield (Fig. 90).

CAUTION: Note the position that the snap ring was removed. The snap ring can be accidentally installed backwards. The snap ring is concave and the fingers on the snap ring must angle towards the bearing shield.

(4) Remove torque tube to overrunning clutch case bolts (Fig. 91).

(5) Slide torque tube off of torque shaft.

FRONT BEARING

The rear drive line module must be removed to service this bearing.

DISASSEMBLY AND ASSEMBLY (Continued)

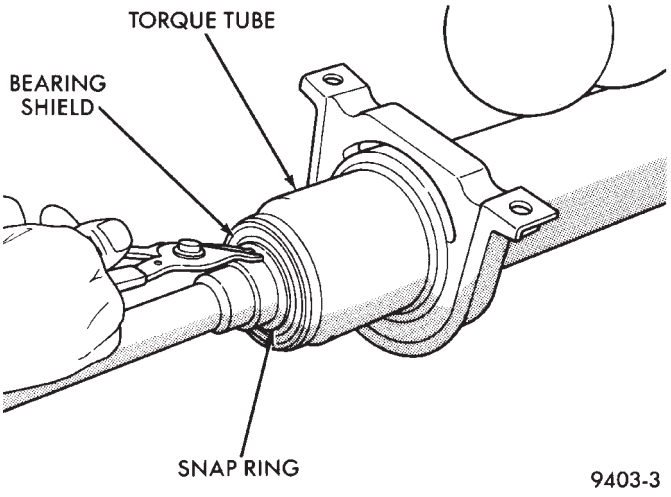


Fig. 90 Remove Torque Shaft Snap Ring And Bearing Shield

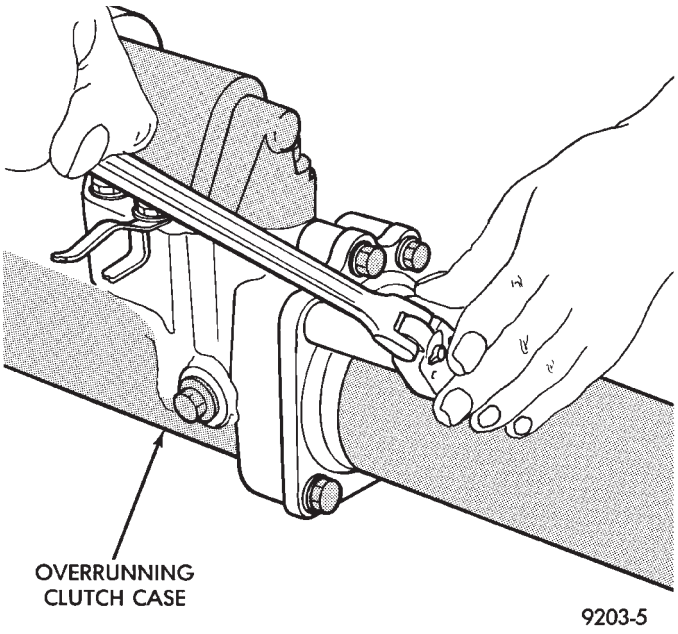


Fig. 91 Torque Tube Bolts

(1) Remove rear drive line module assembly from vehicle.

(2) Remove viscous coupling.

(3) Remove overrunning clutch cover assembly.

(4) Drain fluid from overrunning clutch case.

(5) Remove overrunning clutch case to rear carrier case bolts (Fig. 92).

(6) Separate overrunning clutch case from differential carrier case (Fig. 93).

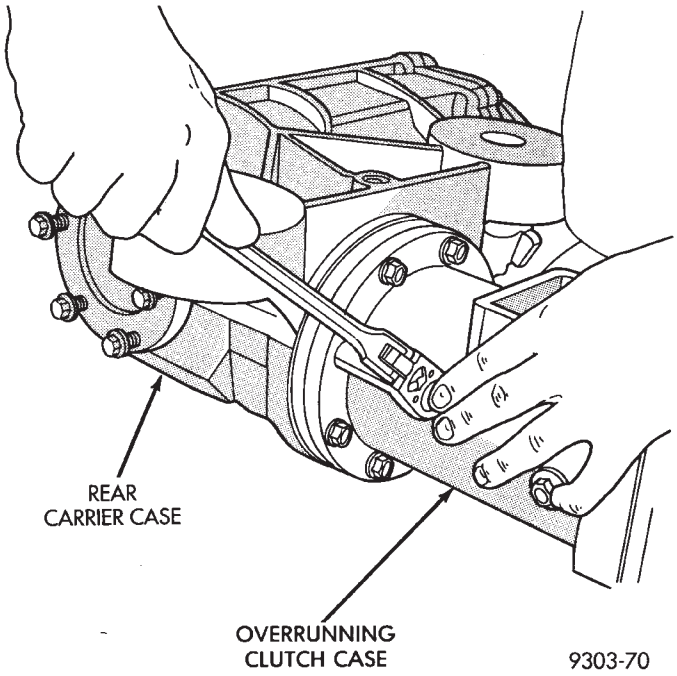


Fig. 92 Overrunning Clutch Housing To Rear Carrier Bolts

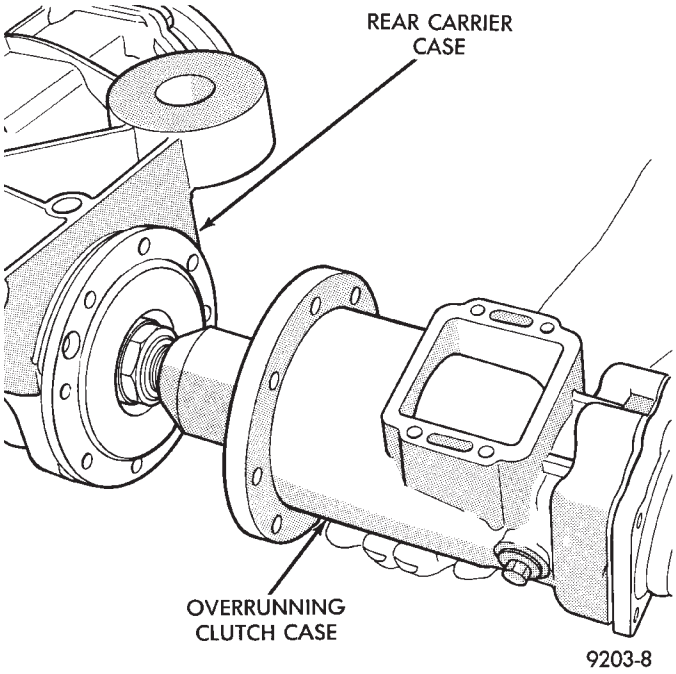


Fig. 93 Separate Rear Carrier Case From Overrunning Clutch Case

DISASSEMBLY AND ASSEMBLY (Continued)

(7) Remove overrunning clutch inner race snap ring (Fig. 94).

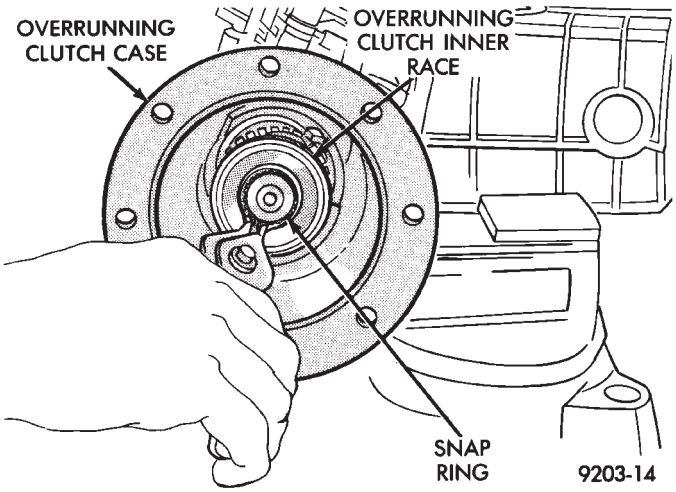


Fig. 94 Inner Race Snap Ring Removal

(8) Slide overrunning clutch inner race off of shaft (Fig. 95).

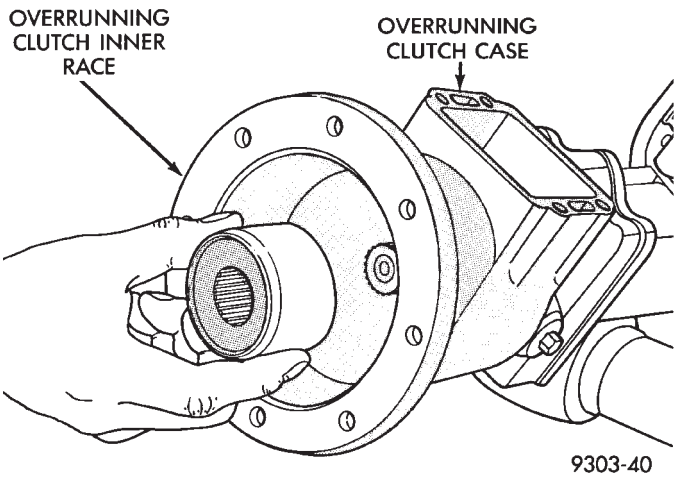


Fig. 95 Remove Overrunning Clutch Race

(9) Remove shaft snap ring and slide dog clutch off of the shaft.

(10) Remove torque shaft rear bearing snap ring.

(11) Remove overrunning case to torque tube bolts (Fig. 96).

(12) Separate torque tube from overrunning clutch housing.

CAUTION: Note the position that the snap ring was removed. The snap ring can be accidentally installed backwards. The snap ring is concave and the fingers on the snap ring must angle towards the bearing shield.

(13) Remove front snap ring and torque tube bearing shield (Fig. 97).

(14) Slide shaft out of torque tube.

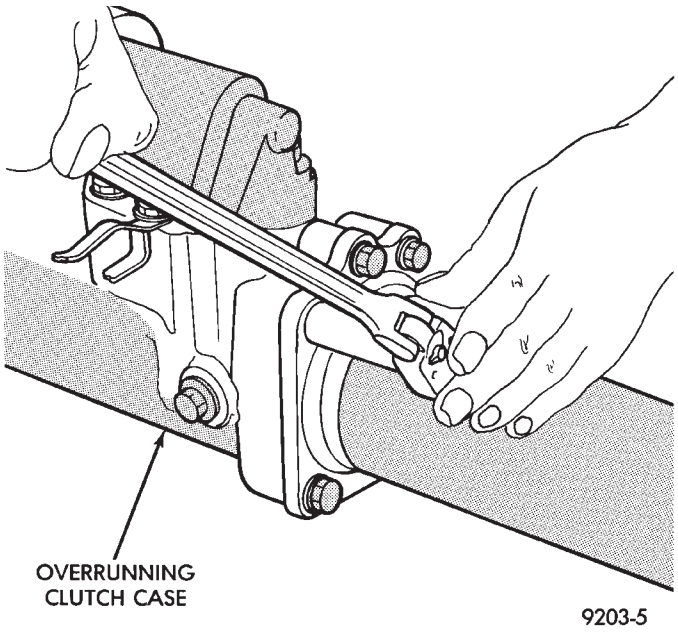


Fig. 96 Torque Tube Bolts

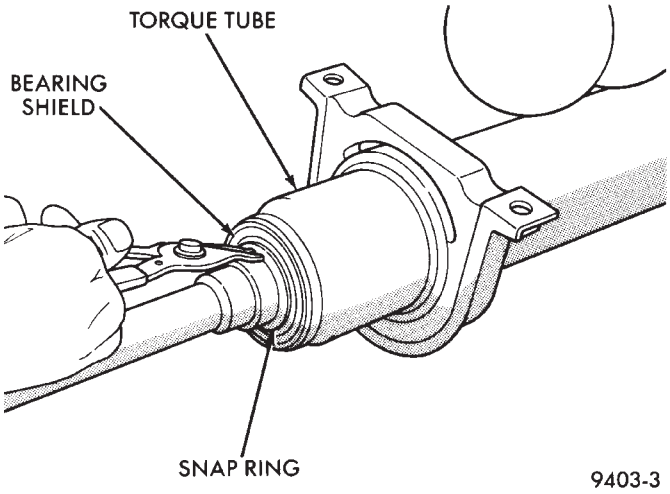


Fig. 97 Remove Torque Shaft Snap Ring And Shield

(15) Drive bearing out of housing.

(16) To install bearing, reverse removal procedure.

REAR BEARING

The rear drive line module assembly must be removed to service this bearing.

(1) Remove rear drive line module assembly from vehicle.

(2) Remove viscous coupling unit.

(3) Remove overrunning clutch cover assembly.

(4) Drain fluid from overrunning clutch case.

(5) Remove overrunning clutch case to differential carrier bolts.

(6) Separate overrunning clutch case from differential carrier case.

(7) Remove overrunning clutch inner race snap ring.

DISASSEMBLY AND ASSEMBLY (Continued)

(8) Slide overrunning clutch inner race off of shaft.
(9) Remove shaft snap ring and slide dog clutch off of the shaft.
(10) Remove torque shaft rear bearing inner snap ring.
(11) Remove torque tube retaining bolts.
(12) Separate overrunning clutch case from torque tube.
(13) Remove rear bearing retaining snap ring in overrunning clutch case (Fig. 98).
(14) Remove rear torque shaft bearing.
(15) To install, reverse removal procedure.

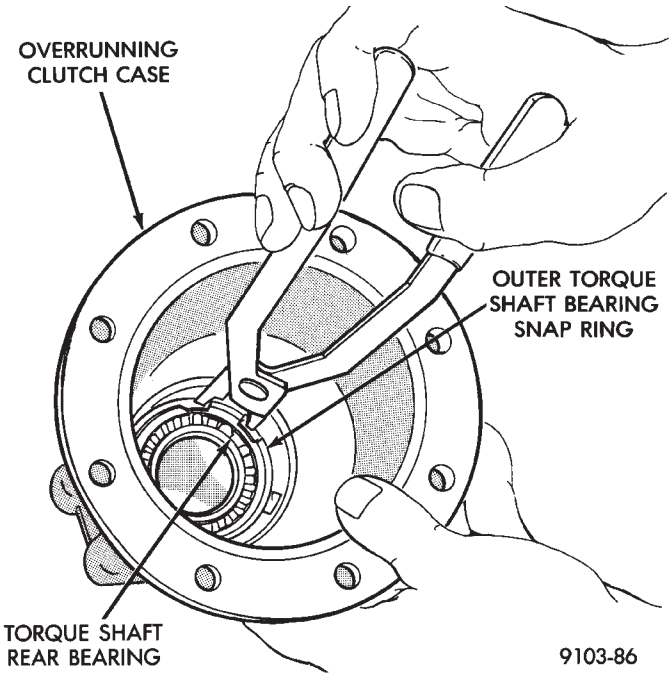
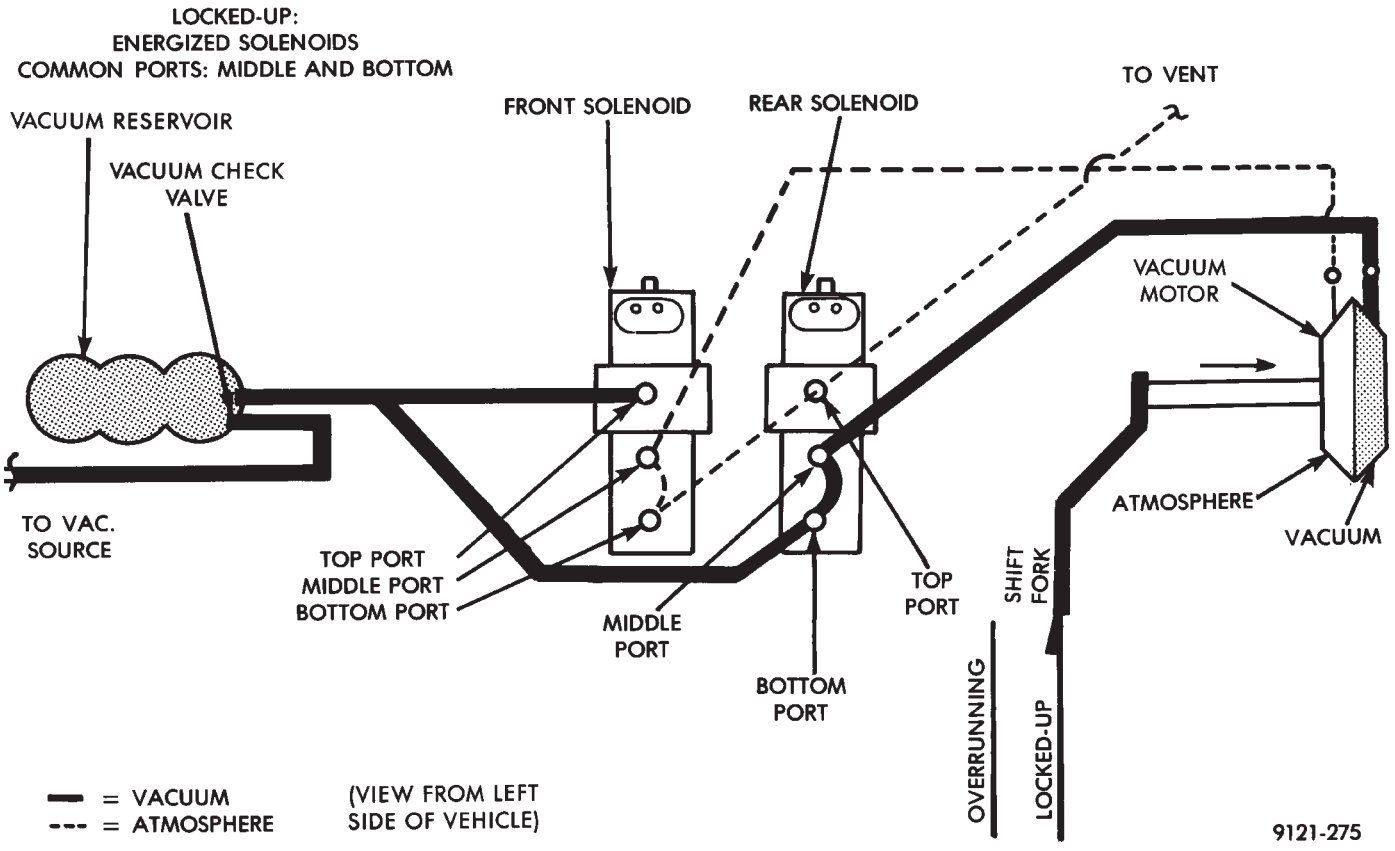


Fig. 98 Torque Shaft Rear Bearing Snap Ring

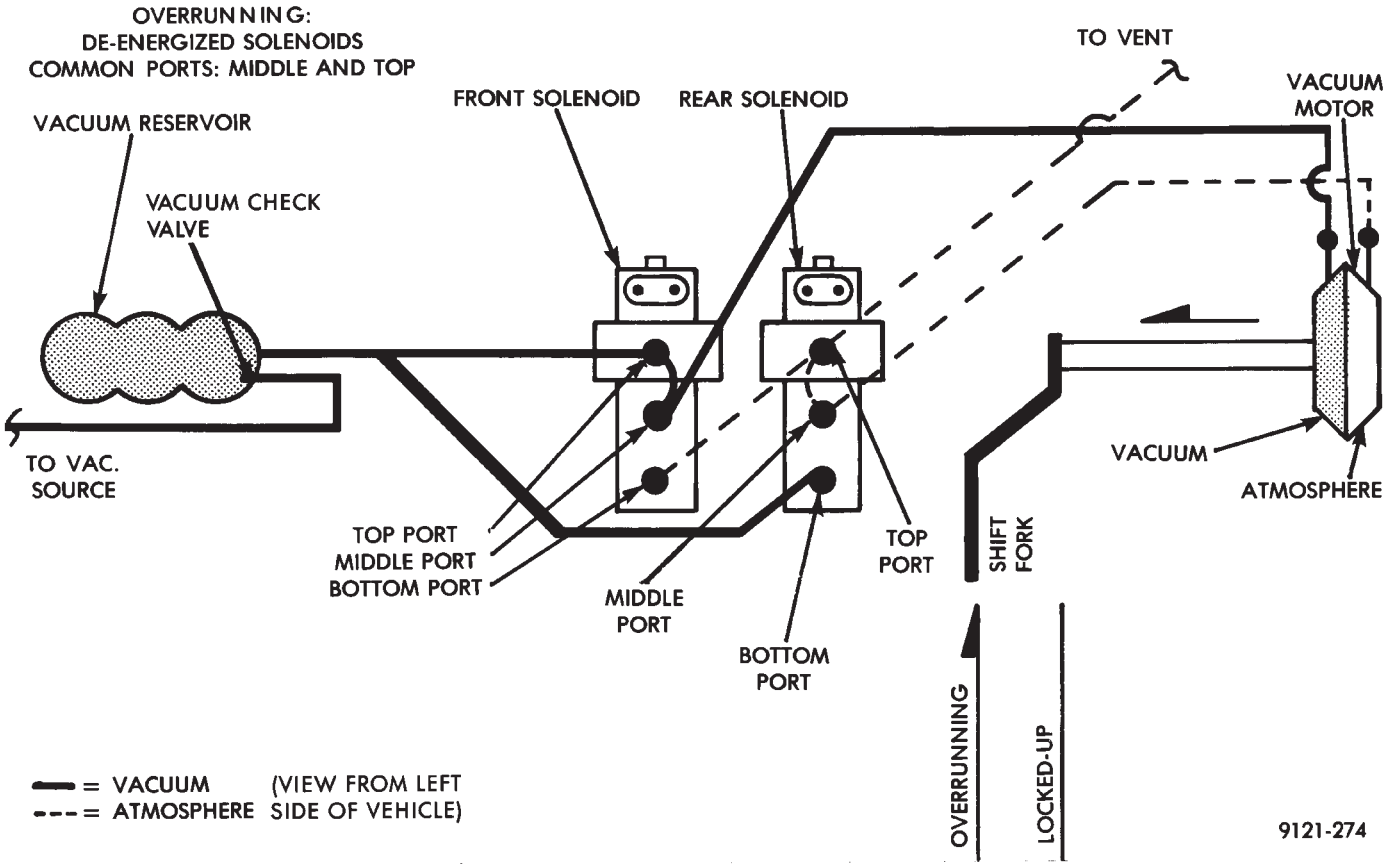
SCHEMATICS AND DIAGRAMS

VACUUM SCHEMATIC (SOLENOIDS ENERGIZED)



SCHEMATICS AND DIAGRAMS (Continued)

VACUUM SCHEMATIC (SOLENOIDS DE-ENERGIZED)



SPECIFICATIONS

TORQUE

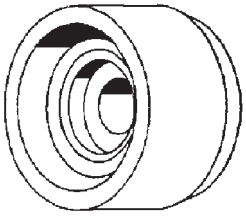
DESCRIPTION	TORQUE
Assy. Nut Torque Tube	28 N·m (250 in. lbs.)
Drive Pinion Nut	380 N·m (280 ft. lbs.)
End Cover	28 N·m (250 in. lbs.)
Fill Plug	27 N·m (240 in. lbs.)
Front Cover	12 N·m (105 in. lbs.)
Inspection Plug	20 N·m (180 in. lbs.)
O/Running Clutch to Carr.	28 N·m (250 in. lbs.)
O/Running Clutch Cover	28 N·m (250 in. lbs.)
Propshaft PTU & VCU	28 N·m (250 in. lbs.)
Ring Gear	95 N·m (70 ft. lbs.)
Rear Halfshafts	61 N·m (45 ft. lbs.)
Sol. to Bracket	7 N·m (65 in. lbs.)
Torque Tube Isolator	54 N·m (40 ft. lbs.)
Vacuum Harness Clip	12 N·m (105 in. lbs.)
Vacuum Reservoir	7 N·m (65 in. lbs.)
Viscous Clutch	244 N·m (180 ft. lbs.)

THREAD SIZE CHART

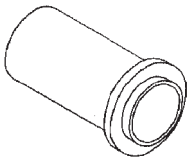
DESCRIPTION	THREAD SIZE
Assy. Nut Torque Tube	M8 x 1.25
Drive Pinion Nut	M30 x 1.5
End Cover	M8 x 1.25
Fill Plug	1/2 x 20
Front Cover	M6 x 1.00
Inspection Plug	M50 x 1.5
O/Running Clutch to Carr.	M8 x 1.25
O/Running Clutch Cover	M8 x 1.25
Propshaft PTU & VCU	M8 x 1.25 x 25
Ring Gear	M10 x 1.0
Rear Halfshafts	M10 x 1.5 x 25
Sol. to Bracket	M6 x 1.0
Torque Tube Isolator	M10 x 1.5 x 35
Vacuum Harness Clip	M6 x 1.0
Vacuum Reservoir	1/4 x 14
Viscous Clutch	M16 x 1.5

SPECIAL TOOLS

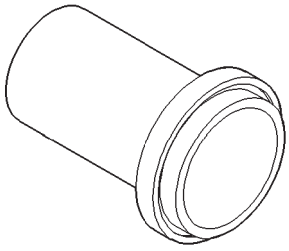
DIFFERENTIAL AND DRIVELINE



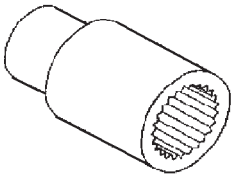
C-4967 Seal Remover



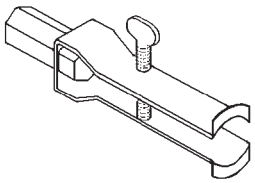
6507 Seal Installer



6508a Seal Installer



6534 Spline Tool



7794-a Seal Remover