

Chapter 14

Rear Axle and Suspension

Part 1. Rear Suspension

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Specifications

Type	Live axle with upper and lower control arms.
Shock absorber	Double acting gas pressurised
Coil springs	Variable rate

TORQUE WRENCH SETTINGS

Control arms:	
¹ Lower arm retaining nuts and bolts	145 Nm
¹ Upper arm retaining nuts and bolts	86 Nm
¹ Panhard rod retaining nuts and bolts	86 Nm
Proportioning valve adjusting nut	13 Nm
Shock absorber:	
¹ Lower mounting bolt	65 Nm
Upper mounting nut	20 Nm
Stabiliser bar:	
Link nut to vehicle body	20 Nm
Link nut to stabiliser bar	69 Nm
Mounting bracket bolts	19 Nm

¹ Tighten with the weight of the vehicle on the rear wheels.

Description

The conventional live rear axle is located by four trailing control arms and is sprung by variable rate coil springs.

Shock absorbers are mounted at the lower end to the rear axle housing and at the upper end to the vehicle chassis.

The coil springs are installed between the axle housing and the vehicle chassis. The upper ends of the springs are insulated from the chassis by rubber insulators. The insulators provide additional support and prevent metal to metal contact when maximum spring compression is reached while the vehicle is heavily loaded, or is travelling off road.

The upper and lower control arms control axle movement caused by acceleration and braking forces. The control arms are

mounted at one end to brackets welded to the rear axle housing and at the other end to brackets on the chassis. Rubber bushes are used at all mounting points.

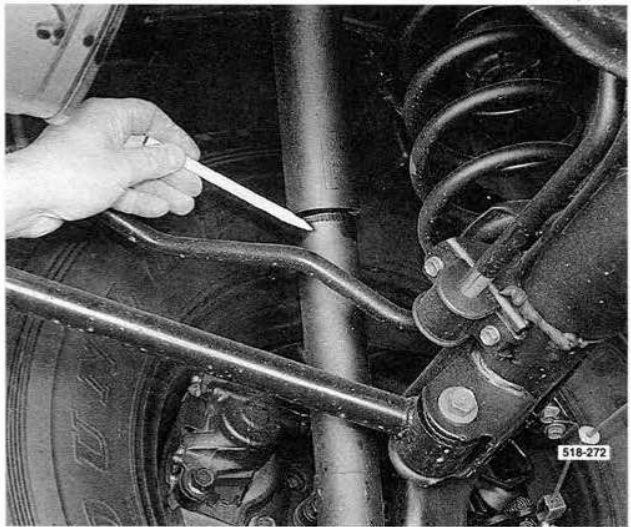
A stabiliser bar is attached to the axle housing and, through links and rubber insulators, is connected to the underbody. It reduces body roll and improves the handling characteristics of the vehicle.

The panhard rod mounted between the axle housing and the vehicle chassis prevents excessive sideways movement while the vehicle is cornering.

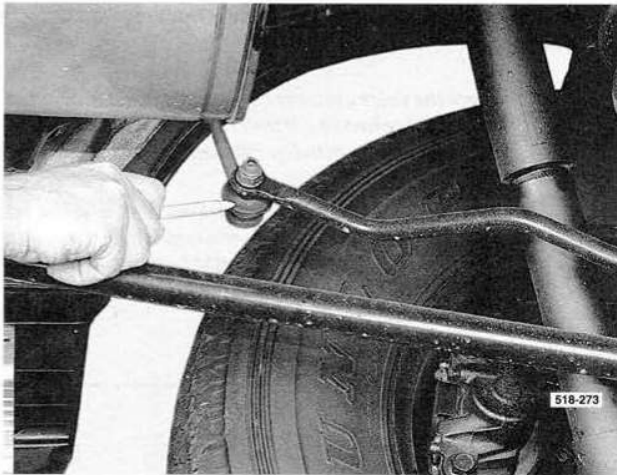
The rubber bushes in the control arms and the panhard rod require no maintenance but should be periodically checked for wear, damage and loose retaining bolts.

Routine Maintenance

- 1 Check the shock absorber condition by bouncing the rear of the vehicle up and down (one side at a time) and observe the vehicle. If the shock absorbers are serviceable the vehicle should come to rest in a single movement, if it bounces two or three times before stopping, the shock absorbers should be renewed. Check the shock absorber for fluid leakage which would indicate failure of the shock absorber shaft seals.
- 2 Check the rear suspension components for wear by raising the rear of the vehicle and supporting on chassis stands, leaving the wheels and suspension unsupported.



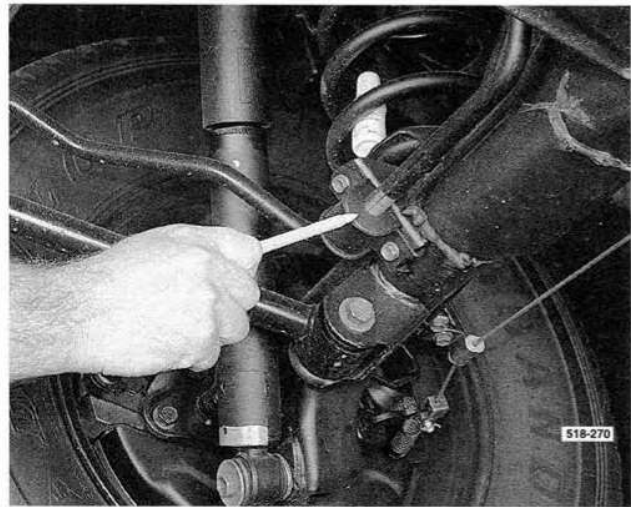
Check the shock absorbers for fluid leakage.



Check the stabiliser bar link joint for wear.

With an assistant pushing and pulling the rear wheel in and out, check for excessive looseness and wear in the wheel bearings and control arm bushes.

- 3 Inspect the stabiliser bar mounting rubbers and the link ball joints, the shock absorber bushes and the control arm bushes for wear, damage and deterioration.
- 4 With the vehicle unladen and tyres correctly inflated, inspect the vehicle ride height. If it is lower on one side, remove the coil spring and check its free length against a new spring. If the spring is found to be unserviceable, it is a good practice to install springs as a matching pair.



Check the stabiliser bar bushes for wear and deterioration.

- 2 Loose or worn control arm or panhard rod bushes or bolts: Tighten the bolts or renew the worn components.
- 3 Loose stabiliser bar mountings or worn bushes or link ball joints: Tighten or renew the worn components.
- 4 Broken coil spring: Renew the coil springs on both sides as a matched pair.



Check the panhard rod bushes for wear by looking for excessive movement at the bushes while an assistant shakes the rear of the vehicle from side to side.

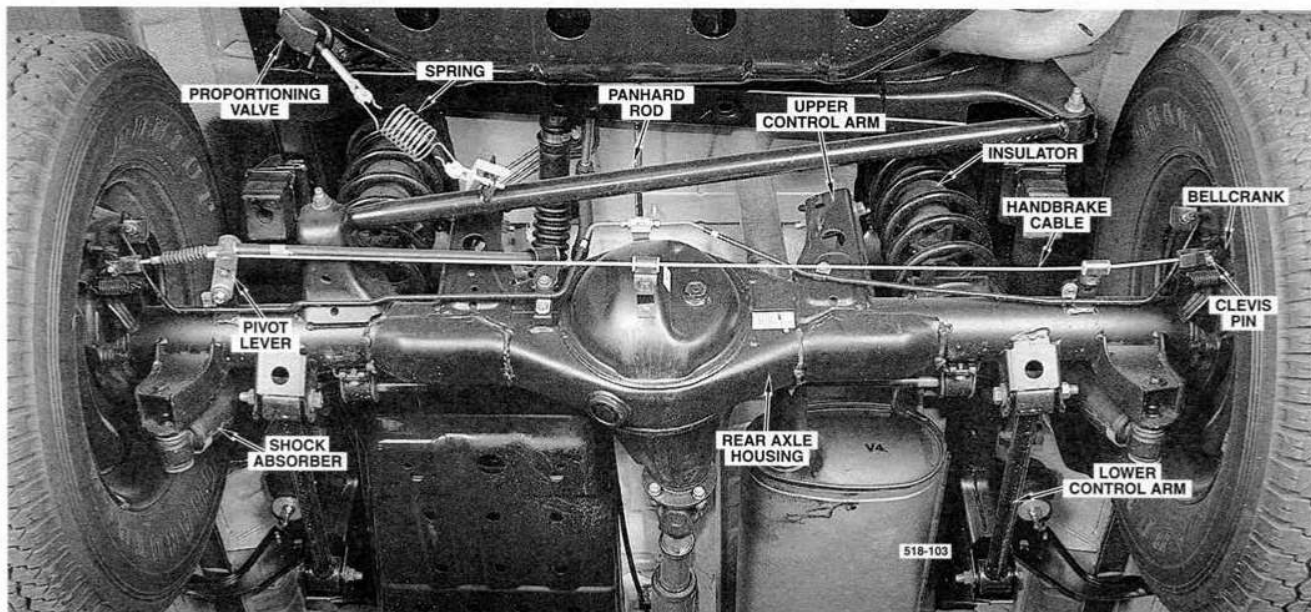
Trouble Shooting

NOISE IN SUSPENSION

- 1 Defective shock absorber and/or mountings: Renew the faulty components.

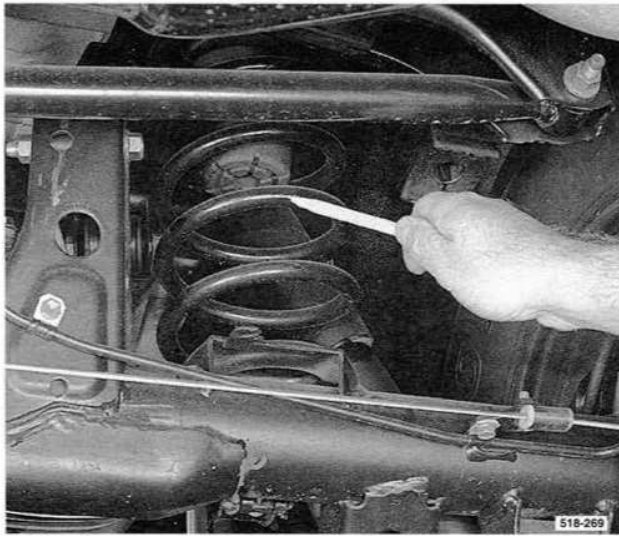
REAR WHEELS NOT IN ALIGNMENT WITH FRONT WHEELS

- 1 Loose or worn control arm bushes, bolts or nuts: Tighten or renew the worn components.
- 2 Damaged or bent control arms: Check and straighten or renew the control arm.



Rear suspension components.

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Check the coil springs for cracks or broken coils.

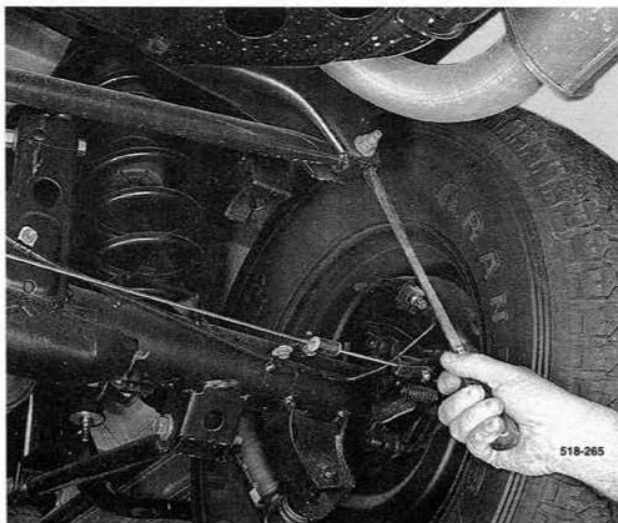
- 3 Damaged or bent panhard rod: Check and straighten or renew the panhard rod.
- 4 Spring badly sagging on one side: Renew both springs as a pair.
- 5 Bent axle housing: Renew the axle housing.



To check this condition, ensure that the axle is square to the chassis and the front wheels are pointing straight ahead. Measure from the centre of the front wheels to the centre of the rear wheels on both sides of the vehicle. Both measurements should be equal.

POOR OR ERRATIC ROAD HOLDING ABILITY

- 1 Low or uneven tyre pressures: Inflate tyres to correct pressures.
- 2 Defective shock absorber operation: Check and renew faulty unit, preferably in pairs.
- 3 Loose or worn control arm or panhard rod bushes or bolts: Tighten the bolts or renew the worn components.



Checking the panhard rod bushes for wear or deterioration.

- 4 Broken or sagging rear spring: Renew both rear springs as a pair.



Check the shock absorber as described under the Routine Maintenance heading. If their condition is doubtful, the shock absorbers should be removed and tested as described later.

If the rear of the vehicle is laying down further on one side than the other, remove the spring and compare it to a new spring. If the spring is found to be unserviceable, it is good practice to fit two new springs as a matching pair.

Shock Absorbers

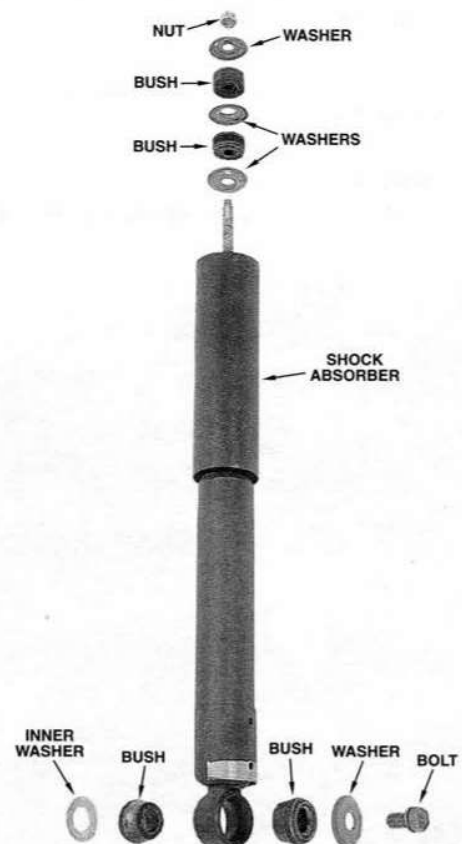
TO REMOVE AND INSTALL

- 1 Raise the rear of the vehicle and support on chassis stands, placed under the rear axle. Refer to General Information (chapter 1) for the positions of the jacking points.



The shock absorbers limit the rear suspension travel. Do not remove the shock absorbers if the vehicle is supported under the chassis as the rear springs may be expelled.

- 2 Remove the bolt and washer retaining the lower end of the shock absorber to the axle housing and disconnect the shock absorber from the stud. Withdraw the rubber bushes



Shock absorber and mounting components.

from the shock absorber, and remove the inner washer from the stud.

- 3 Working at the top of the shock absorber, remove the nut and separate the mounting components, noting the installed position of the washers and rubbers. Hold the body of the shock absorber, while removing the top nut to prevent it from turning. Withdraw the shock absorber from the vehicle.

Installation is a reversal of the removal procedure, with attention to the following points:

- 1 Place the washers and the bush on the stud of the shock absorber, in the position noted during removal.
- 2 Install the shock absorber with the stoneguard facing the front of the vehicle.
- 3 Install the lower bushes and place the inner washer on the shock absorber.
- 4 Ensure that the nut and bolt are tightened to the specified torque.

TO TEST

The extent to which a gas shock absorber can be tested without special equipment is limited to the following checks.

- 1 Check the body of the shock absorber for dents, damage or signs of leaks. The shock absorber cannot be repaired and should be renewed if defective.
- 2 Check the rubber bushes for wear and deterioration. Renew as necessary.
- 3 Mount the shock absorber upright in a vice by the lower mounting eye and operate the shock absorber manually. Renew the shock absorber if the operation is noisy.
- 4 Compress the shock absorber fully and check that it returns at a constant speed when released.



If a shock absorber is gas pressurised, the word GAS is usually stamped on the body of the shock absorber. Do not incinerate gas filled shock absorbers.



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Checking for defective shock absorber operation.

Springs

TO REMOVE AND INSTALL

- 1 Raise the rear of the vehicle and support on chassis stands, placed under the chassis rail. Refer to General Information (chapter 1) for the positions of the jacking points.
- 2 Position a floor jack under the centre of the axle housing and raise the jack slightly to take the weight of the rear axle.
- 3 Working at the rear of the backing plates, remove the clips and pins, and disconnect the handbrake cable from the bell-crank levers, using care not to misplace the retaining clips. Remove the bolts retaining the handbrake cable adjuster pivot and brackets and place the cable clear of the work area.
- 4 Remove the bolt retaining the lower end of the shock absorbers to the axle housing on both sides of the vehicle. Ensure that the bushes and inner washers are not misplaced.
- 5 Insert a 6 mm allen key into the hole in the stabiliser bar link stud and while retaining the stud, remove the nut retaining the stabiliser bar link. Separate the link from the stabiliser bar on both sides of the vehicle.
- 6 Remove the nut retaining the panhard rod to the axle housing, withdraw the through bolt and secure the panhard rod to the vehicle chassis, clear of the work area.
- 7 Carefully lower the floor jack under the rear axle housing. Ensure that the hydraulic brake hose is not stretched.
- 8 Noting their installed position, withdraw the coil spring and the insulator from the vehicle.



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Coil spring removed showing the insulator.

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- 9 Check the coil spring for cracks and distortion. If possible, compare the spring free length to a new spring.
- 10 Inspect the coil spring insulator for wear and deterioration. Renew if necessary.

Installation is a reversal of the removal procedure with attention to the following points:

- 1 Ensure that the insulator is correctly positioned on the top of the spring and that the end of the bottom coil is correctly seated on the axle housing bracket.
- 2 Install the shock absorbers, as previously described, and tighten the nuts and bolts to the specified torque.
- 3 Install the panhard rod to the axle housing and connect the stabiliser bar link to the stabiliser bar. Tighten the stabiliser bar link nuts to the specified torque.

i Lower the vehicles and bounce the rear of the vehicle several times to stabilise the suspension, prior to tightening the panhard rod nut to the specified torque.

Control Arms

The procedure to remove and install the upper and lower control arms is similar. The bushes in the upper control arm cannot be removed, and if worn or damaged, the control arm must be renewed.

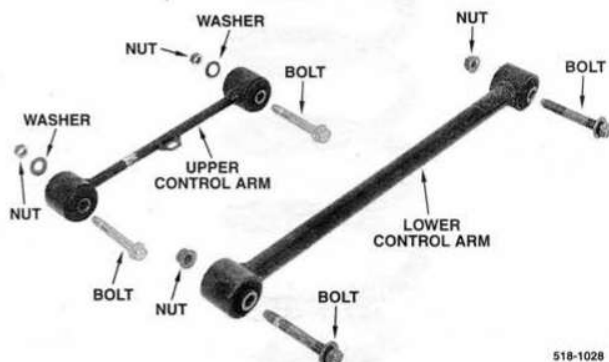
TO REMOVE AND INSTALL

- 1 Raise the rear of the vehicle and support on chassis stands, placed under the chassis rail. Refer to General Information (chapter 1) for the positions of the jacking points.
- 2 If removing the upper control arm on models with ABS, release the clip retaining the speed sensor wiring to the upper control arm.

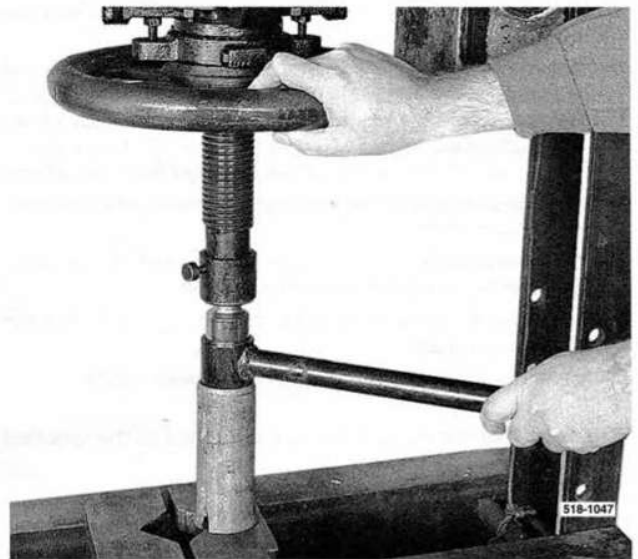
! Do not remove all the control arms at once. If all control arms are to be removed, remove the coil springs as previously described.

- 3 Remove the retaining nuts and washers and withdraw the through bolts from the relevant control arm. Noting its installed position, manoeuvre the arm from the vehicle.

TIP To ease removal of the bolts, support the weight of the rear axle assembly with a trolley jack. Alter the height of the jack until the through bolts can be removed.



Control arms dismantled.



Removing the lower control arm bush, using a press.

- 4 Inspect the control arms for cracks, damage and distortion. Inspect the bushes for wear.
- 5 If necessary, renew the lower control arm bushes, as described later in this heading.

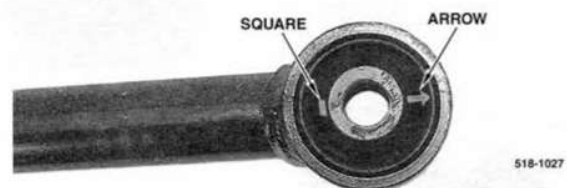
i Carefully inspect the through bolts and nuts, renew as necessary.

Installation is a reversal of the removal procedure with attention to the following points:

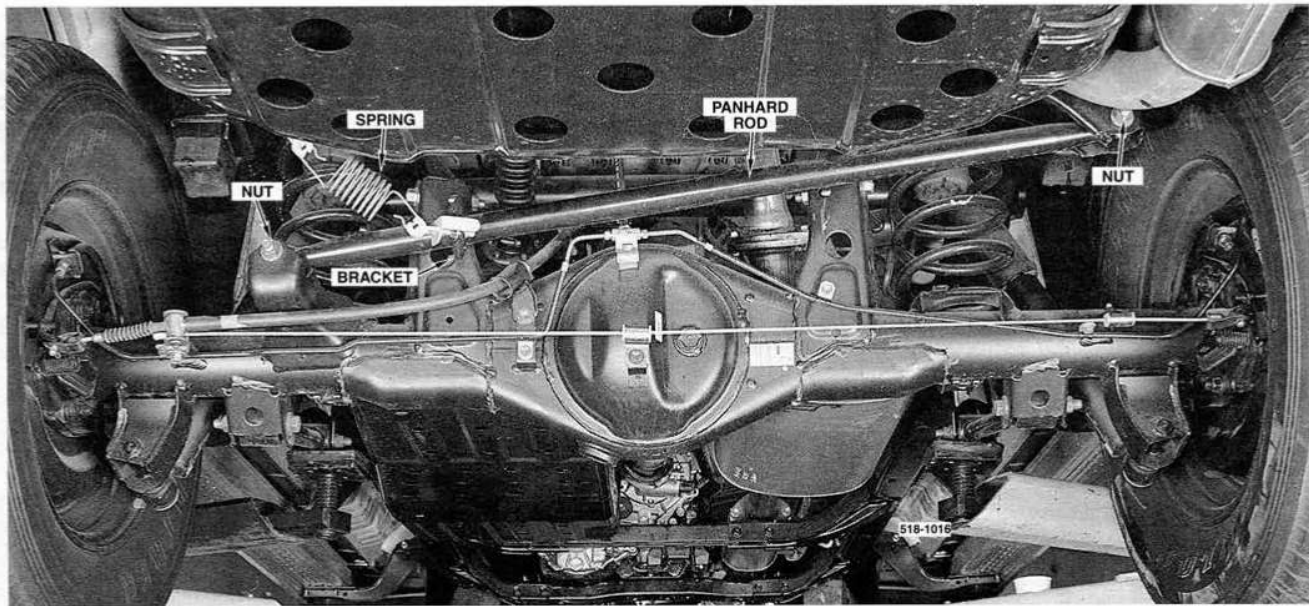
- 1 Install the control arm in the position noted during removal. Install the washers and nuts, but do not tighten at this stage.
- 2 On models with ABS, install the retaining clip to the upper control arm.
- 3 Lower the vehicle and bounce the rear of the vehicle several times to stabilise the suspension. Tighten the control arm retaining nuts and bolts to the specified torque.

TO RENEW LOWER CONTROL ARM BUSHES

- 1 Remove the relevant lower control arm from the vehicle, as previously described.
- 2 Noting the installed direction of the arrow and the square on the bush, remove the bush from the lower control arm, using a press and suitable sockets and tubes as mandrels.
- 3 Sparingly lubricate the outside of the new bush with light oil. Place the new bush in the control arm. Ensure that the arrow on the bush is facing away from the control arm, as noted



The arrow on the lower control arm bush must face away from the control arm.



Panhard rod installed.

during removal and press the bush in the control arm using a tube or socket that pushes on the outer edge of the bush only. The bush must be centrally seated in the control arm. Wipe the excess oil from the bush.

- 4 Install the lower control arm as previously described.

Panhard Rod

TO REMOVE AND INSTALL

- 1 Raise the rear of the vehicle and support on chassis stands. Refer to General Information (chapter 1) for the positions of the jacking points. Place the stands under the rear axle housing.
- 2 Release the proportioning valve spring from the adjusting stud on the panhard rod and position the spring clear of the work area.
- 3 Remove the nut and bolt retaining the panhard rod to the body bracket.
- 4 Remove the nut and bolt retaining the panhard rod to the axle housing and withdraw the panhard rod.
- 5 Inspect the panhard rod for cracks, damage and distortion. Inspect the bushes for wear.



If the bushes are worn, the panhard rod must be renewed as an assembly.

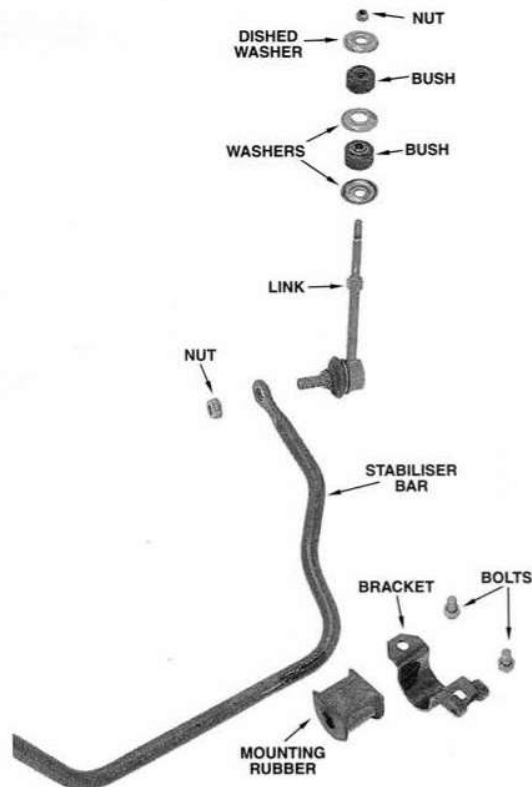
Installation is a reversal of the removal procedure with attention to the following points:

- 1 Install the panhard rod to the body bracket and to the axle housing, ensuring that the bolts are installed from the front of the bracket.
- 2 Tighten the retaining nuts to the specified torque.
- 3 Connect the end of the proportioning valve spring to the adjusting stud on the panhard rod.

Stabiliser Bar

TO REMOVE AND INSTALL

- 1 Raise the rear of the vehicle and support on chassis stands. Refer to General Information (chapter 1) for the positions of the jacking points.



Stabiliser bar components.

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- 2** Insert a 6 mm allen key into the hole in the stabiliser bar link stud and while retaining the stud, remove the retaining nut. Separate the stud from the stabiliser bar. Repeat this on the other side of the vehicle.

- 3** Mark the location of the mounting rubber in relation to the stabiliser bar on one side, so that it can be returned to its original position.



Use a daub of paint to mark the bar. Do not make a file mark or cut as this would create a fatigue point and can lead to failure of the stabiliser bar.

- 4** While supporting the stabiliser bar, remove the retaining bolts from the stabiliser bar mounting brackets. Remove the

brackets and withdraw the stabiliser bar from the vehicle.

- 5** If necessary, remove the nut retaining the stabiliser bar link to the chassis, and noting its installed position, withdraw the upper dished washer and bush from the link. Withdraw the link, and remove the remaining bush and washers, noting their installed position.

- 6** Examine the stabiliser bar and brackets for damage, cracks and bends.

- 7** Inspect the stabiliser bar rubber bushes and links for wear and deterioration. It is standard practice to renew the rubber bushes as a matter of course and renew other parts as necessary.

- 8** Inspect the link ball joint for wear and play between the joint stud and link body. Renew the link as an assembly if necessary.

Part 2. Rear Axle

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Specifications

Type	Semi floating axle shafts and hypoid final drive, limited slip differential (LSD)
Final drive ratio	4.300:1
Lubricant:	
Type	SAE 90 GL 5 for LSD
Capacity	2.6 litres
Axle shaft:	
Maximum bearing end float	0.7 mm
Maximum runout	2.0 mm
Flange maximum vertical and lateral runout	0.10 mm
Crownwheel:	
Maximum runout	0.07 mm
Maximum backlash	0.13 – 0.18 mm
Drive pinion:	
Height spacer thicknesses	1.70 – 2.33 mm in increments of 0.03 mm
Turning torque (bearing preload):	
New bearings	0.9 – 1.6 Nm
Original bearings	0.5 – 0.8 Nm
Flange maximum vertical and lateral runout	0.10 mm
Total differential turning torque (bearing preload)	Drive pinion turning torque plus 0.4 – 0.6 Nm
Side gear:	
Backlash	0.05 – 0.20 mm
Thrust washer thickness	1.77 – 1.86 mm
Clutch plate thickness	1.57 – 1.63 mm
Spring free length	22.35 mm
Adjusting shim thickness	0.15 – 0.35 mm in increments of 0.05 mm

TORQUE WRENCH SETTINGS

ABS sensor retaining bolt	8 Nm
Axle shaft retaining nuts	123 Nm
Bellcrank housing bolts	13 Nm
Brake caliper anchor plate bolts	103 Nm
Carrier bearing cap bolts	85 Nm
Crownwheel to differential case bolts	47 Nm
Drain plug	49 Nm
Drive pinion flange nut	Refer to text

Filler plug	49 Nm
Final drive assembly retaining nuts	25 Nm
Handbrake cable bracket retaining bolts	13 Nm
Lock tab retaining bolts	13 Nm
Propeller shaft nuts and bolts	74 Nm
Wheel nuts	113 Nm

Description

The rear axle assembly consists of a banjo type axle housing supporting semi floating axles and a hypoid final drive assembly with a limited slip differential (LSD).

The crownwheel and differential assembly is supported by two tapered roller bearings, called carrier bearings. The crownwheel backlash and carrier bearing preload are adjusted by means of threaded nuts.

The drive pinion is supported by two tapered roller bearings and the preload is adjusted by a collapsible spacer installed between the bearings. The depth of the drive pinion is adjusted by a shim installed between the bearing and pinion gear.

The limited slip differential directs the majority of the torque to the rear wheel with greater traction, but does not interfere with the differential action or steering characteristics.

The partial locking action resulting from the friction plates and discs is automatically increased by the inherent separating forces between the side gears and the pinion gears which progressively increases the resistance as torque increases.

Where there are extremely unequal traction conditions between the rear wheels, such as one wheel on a hard or dry surface and the other on slippery or soft material, a conventional differential will tend to transmit the bulk of the power to the wheel offering the least resistance if over acceleration is attempted, resulting in wheel spin and loss of vehicle motion.

In the event of continuing wheel spin on models equipped with limited slip differentials, a whirring sound is produced due to overrunning of the plates and discs. However, such a condition or sound does not indicate failure of the unit.

The rear axles are supported by a special double row bearing that are not adjustable or greasable.

Routine Maintenance

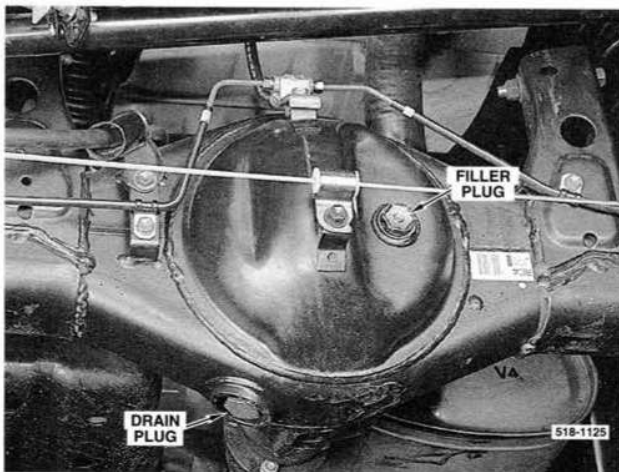
CHECKING REAR AXLE OIL

- 1
- Raise the front and rear of the vehicle and support on chassis stands. Refer to General Information (chapter 1) for the positions of the jacking points.



The vehicle must be level to obtain an accurate reading.

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Rear axle drain and filler plugs.

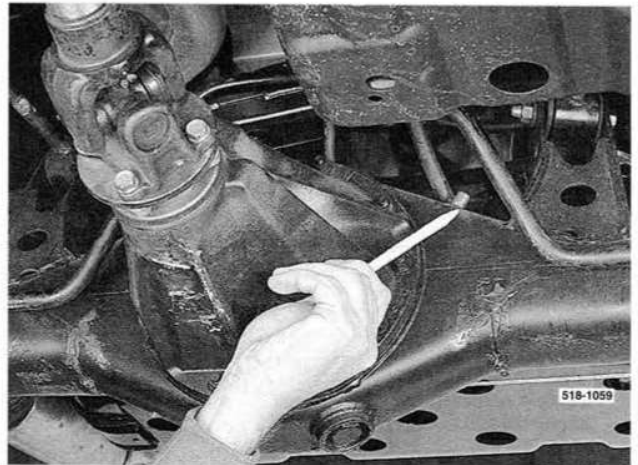
- 2 Remove the filler plug from the rear axle housing and discard the sealing washer. Using a finger or a bent piece of wire, check the oil level.
The oil should be level with or fractionally below the bottom of the filler plug hole. Overfilled units should be drained until the oil is level with the bottom of the plug hole.
- 3 If the oil is being renewed, place a suitable container beneath the drain plug and remove the plug from the bottom of the rear axle housing. Discard the sealing washer. Allow all of the oil to drain from the rear axle. Install a new sealing washer to the drain plug and tighten the plug to the specified torque.
- 4 If the oil level is low or is being renewed, use an oil gun to fill the rear axle to the correct level with the specified oil.
- 5 When the level is correct, install a new sealing washer to the filler plug and tighten the plug to the specified torque. Wipe around the plug/s with a cloth after installation.

Oil Leakage

- 1 Raise the rear of the vehicle and support on chassis stands. Refer to General Information (chapter 1) for the positions of the jacking points.



Filling the rear axle with an oil gun.



Check the rear axle breather for blockage.

- 2 Check around the drive pinion oil seal and the axle shaft oil seals for leakage. Oil seal renewal is covered later in this chapter.
- 3 Check for leakage from the final drive housing gasket. Check that the nuts are not loose. If necessary, renew the final drive housing gasket.
- 4 Check that the axle breather is not obstructed.



A restricted axle breather will pressurise the rear axle assembly when the oil warms up, and force the oil from the seals and/or gasket.

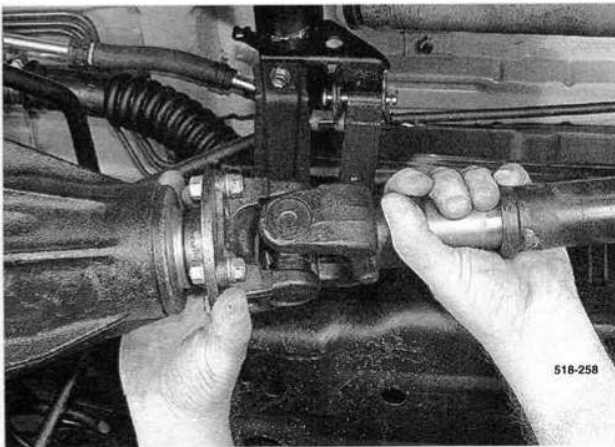
Trouble Shooting

REAR WHEEL NOISE

- 1 Tyre noise: Determine whether normal or excessive for the type of vehicle and tyre construction.
- 2 Wheel loose on the axle flange: Check the condition of the wheel rim, flange wheel studs and nuts, tighten securely or renew the damaged components.
- 3 Wheel out of balance or bent: Balance the wheel and tyre assembly or renew the wheel.
- 4 Defective brake components: Check the rear brakes as described in Brakes (chapter 15), and renew the faulty components as necessary.
- 5 Defective axle bearings: Renew the bearings.
- 6 Loose axle shaft (bearing housing) retaining nuts: Tighten or renew faulty components.
- 7 Bent axle shaft or housing: Check and renew faulty components as necessary.

FINAL DRIVE GEAR NOISE

- 1 Loose propeller shaft or worn universal joint: Tighten the retaining nuts and bolts or renew the universal joint.
- 2 Lack of lubricant: Check for oil leakage and rectify the cause. Top up with the correct grade of lubricant.
- 3 Loose drive pinion flange nut: Install a new nut, and adjust the bearing preload as described under the heading, To Renew Drive Pinion Oil Seal in this chapter.



Check the universal joint for wear.

- 4 Worn or damaged differential components: Overhaul the final drive assembly.

PINION SHAFT WILL ROTATE BUT NO REAR WHEEL DRIVE

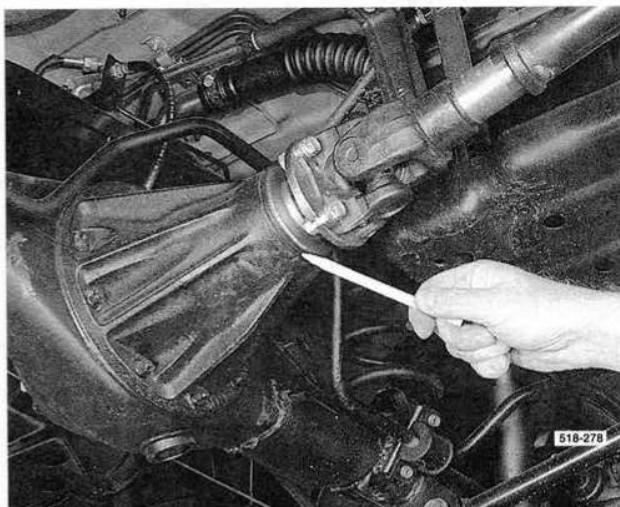
- 1 Broken axle shaft: Remove the axle shaft and renew as necessary.
- 2 Sheared crownwheel bolts: Remove the final drive assembly and renew the bolts.
- 3 Damaged differential gears: Overhaul the final drive assembly.



If an axle shaft is broken, remove the final drive assembly and ensure that all foreign metal particles and contaminated lubricant are removed from the axle housing.

REPEATED AXLE SHAFT BREAKAGE

- 1 Distorted axle housing: Renew the axle housing.
- 2 Severe clutch operation: Revise driving habits and check clutch operation.
- 3 Overloading: Revise the load capacity.



Check the propeller shaft pinion seal for leaks.

LOSS OF LUBRICANT

- 1 Leaking drive pinion oil seal: Renew the oil seal and inspect the flange running surface.
- 2 Leaking axle shaft oil seal or O ring: Remove the axle shaft and renew the oil seal and the O ring.
- 3 Leaking final drive housing gasket: Check that the retaining nuts are tight. If necessary, renew the gasket.
- 4 Porous or cracked final drive housing: Repair or renew the housing as necessary.

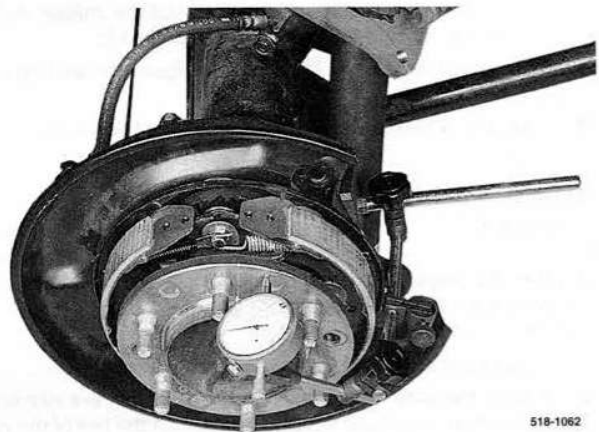


Check the breather for restriction prior to cleaning the final drive housing. If oil leakage is not apparent when the assembly is cold, drive the vehicle until the differential reaches operating temperature and thoroughly check the housing for small cracks.

Axle Shafts and Bearings

TO INSPECT BEARING END FLOAT

- 1 Raise the rear of the vehicle and support on chassis stands. Refer to General Information (chapter 1) for the positions of the jacking points. Remove the rear wheel.
- 2 Remove the brake caliper and the brake disc referring to Brakes (chapter 15). Suspend the caliper assembly from the vehicle body using wire or similar ensuring, that the weight of the caliper is not taken by the brake hose.



Checking the axle bearing end float using a dial gauge.

- 3 Mount a dial gauge to the axle housing, with the plunger resting against the axle flange face.
- 4 While pulling the axle away from the axle housing, zero the dial gauge.
- 5 Push the axle towards the axle housing, take a reading from the dial gauge. If the dial gauge moves more than 0.7 mm, renew the axle bearing.

TO REMOVE AND INSTALL

- 1 Raise the rear of the vehicle and support on chassis stands. Refer to General Information (chapter 1) for the positions of the jacking points. Remove the rear wheel from the relevant side of the vehicle.

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- 2 Remove the rear axle drain plug and drain the lubricant into a suitable container. Discard the sealing washer. When the lubricant is completely drained, replace the drain plug and tighten to the specified torque.
- 3 Remove the brake caliper, the brake disc and the handbrake shoes, referring to Brakes (chapter 15). Suspend the caliper assembly from the vehicle body using wire or similar, ensuring that the weight of the caliper is not taken by the brake hose.
- 4 Remove the clip retaining the brake pipe to the brake backing plate.
- 5 Remove the bellcrank housing bolts and withdraw the bellcrank. On models with ABS, remove the sensor retaining bolt and withdraw the sensor from the axle housing. Place the sensors clear of the work area.
- 6 Remove the four nuts retaining the axle shaft and backing plate assembly to the axle housing. Prise the backing plate from the axle housing and remove the axle shaft from the housing, ensuring not to damage the inner oil seal in the axle housing. Remove and discard the O ring from the axle housing.

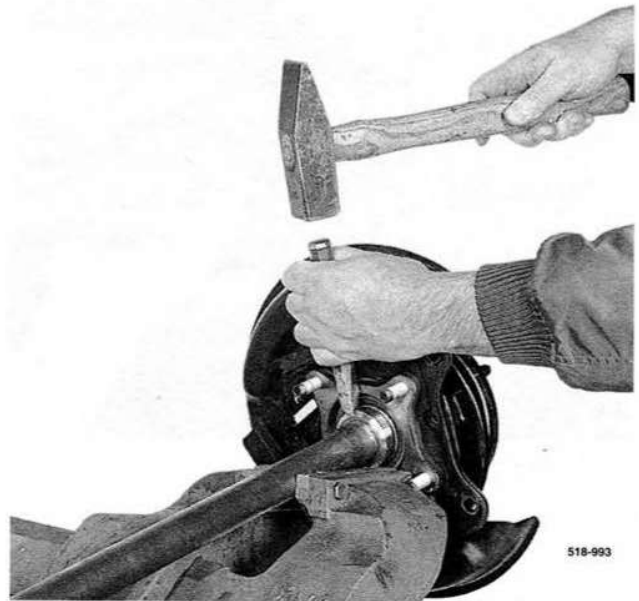
Installation is a reversal of the removal procedure with attention to the following points:

- 1 Install a new O ring to the axle housing.
- 2 Install the axle shaft assembly by rotating the shaft slowly until it engages with the differential side gears.
- 3 Ensure that the backing plate is seated against the axle housing. Install and tighten the retaining nuts to the specified torque.
- 4 Install the handbrake shoes, the disc and the caliper. Adjust the handbrake, referring to Brakes (chapter 15).
- 5 Fill the rear axle with the specified quantity and type of lubricant.
- 6 Install the wheels and lower the vehicle to the ground.

TO RENEW BEARING

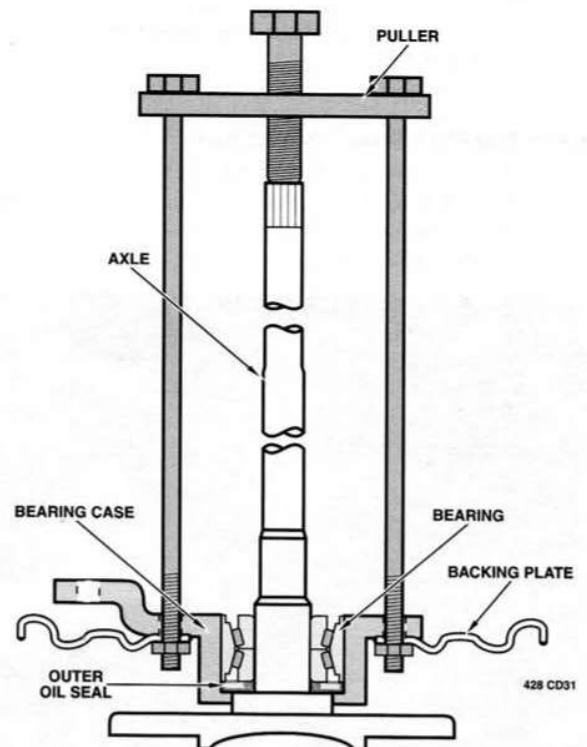
To renew the axle shaft bearing and outer seal using the following procedure, a suitable bearing puller and press plate adapters are required. If the equipment is not available, it is recommended that this procedure is carried out by an authorised dealer or specialist workshop.

- 1 Remove the axle shaft as previously described.
- 2 Remove the snap ring and secure the axle shaft in a vice fitted with soft jaws. Rest the bearing retainer on the jaw of the vice.
- 3 Drill a 6 mm hole into the bearing retainer at right angles to the axle shaft, using care not to drill completely through the retainer, as damage to the axle shaft will result.
- 4 Split the retainer across the hole previously drilled, using a cold chisel and withdraw the retainer and the washer from the axle.
- 5 On models with ABS proceed as follows:
 - a Using a brass drift, carefully tap the studs from the bearing case. Move the backing plate away from the bearing housing as far as possible, noting its installed position.
 - b Mark the installed position of the pulse ring in relation to the axle. Remove the pulse ring and the retainer, using the procedure described in steps 3 and 4.
 - c Install the studs to the backing plate and using the retaining nuts, pull the studs into the bearing housing, ensuring that the backing plate is correctly aligned as noted during removal.

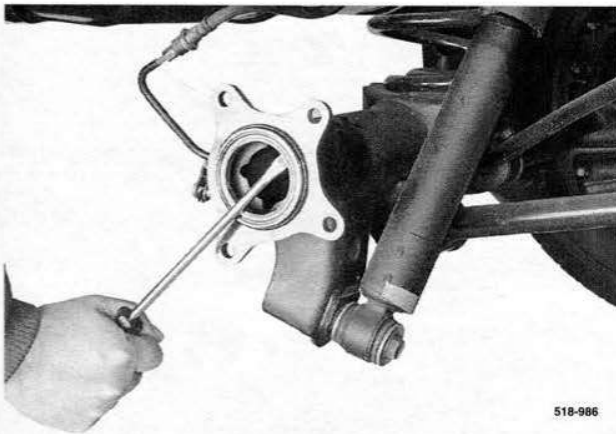


Splitting the bearing retainer.

- 6 Install a two bolt puller and adaptors to the axle shaft as shown on the illustration and remove the bearing assembly from the axle shaft.
- 7 Noting the installed position, separate the backing plate from the bearing housing.
- 8 Note the installed depth of the outer oil seal and using a flat bladed screwdriver, prise the seal from the bearing housing.



Method of removing the axle shaft from the bearing housing and backing plate.



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Removing the inner oil seal from the axle housing.

- 9 Place the bearing assembly in a press with the outer side facing upwards, supported on a suitable press plate or mandrel large enough to allow the bearing to pass through. Press the bearing from the housing.
- 10 Using a flat bladed screwdriver, remove the inner oil seal from the axle housing.
- 11 If necessary, tap the wheel studs from the axle flange, using a brass drift and, noting its installed position, separate the oil deflector plate and the gasket from the flange. Discard the gasket and the studs.
- 12 Thoroughly clean the bearing housing, the backing plate, the axle housing and the axle components using suitable solvent. Inspect the components for wear and damage.

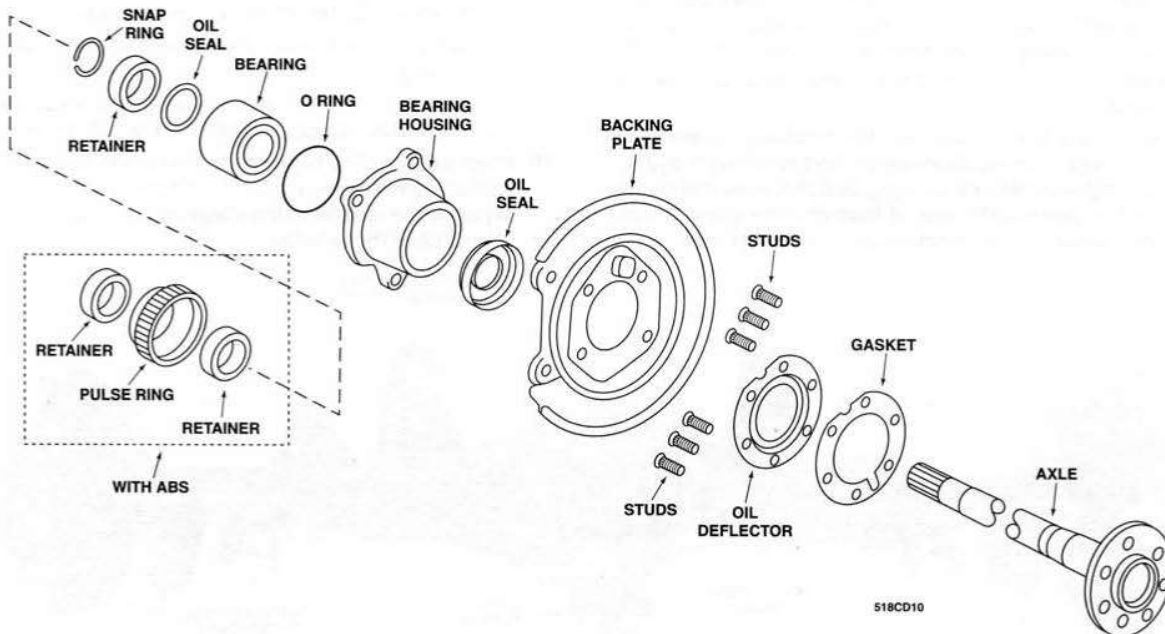
Assembly is a reversal of the removal procedure with attention to the following points:

- 1 If removed, install the oil deflector to the axle flange using a new gasket and new studs.

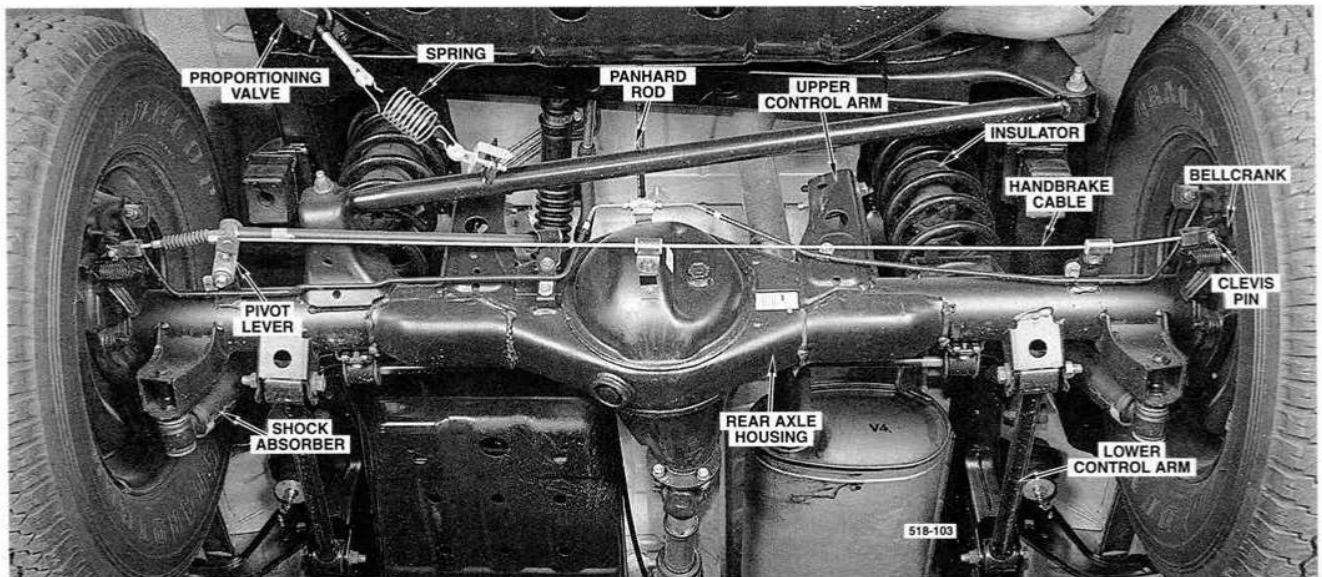


Use the wheel nut and place a spacer between the axle flange and the nut while turning the nut to pull the new wheel studs into the axle flange.

- 2 Using a suitable metal tube or mandrel that pushes on the outer race only, press the bearing in the housing until the bearing is fully seated.
- 3 Install a new outer oil seal to the depth noted during removal and apply a small amount of multipurpose grease to the lip of the seal. The oil seal lips must face toward the bearing.
- 4 Install the backing plate to shaft in the position noted during removal. Press the bearing assembly housing onto the axle shaft using a tube, that only presses on the inner race of the bearing.
- 5 Using a press, install a new bearing retainer, ensuring that the chamfered side of the retainer is facing towards the snap ring groove of the axle shaft. Install the snap ring, ensuring that the ring is fully seated in the groove.
- 6 If applicable, install the ABS pulse ring to the position noted during removal and press the pulse ring retainer to the axle shaft.
- 7 Install a new inner seal to the axle housing with the lip of the seal towards the differential, to the depth noted during removal. Install a new O ring to the axle housing. Apply a small amount of multipurpose grease to the lip of the seal and to the O ring.
- 8 Install the axle assembly to the axle housing and tighten the retaining nuts to the specified torque.
- 9 Install the brake components, referring to Brakes (chapter 15).

**Rear axle and bearing components.**

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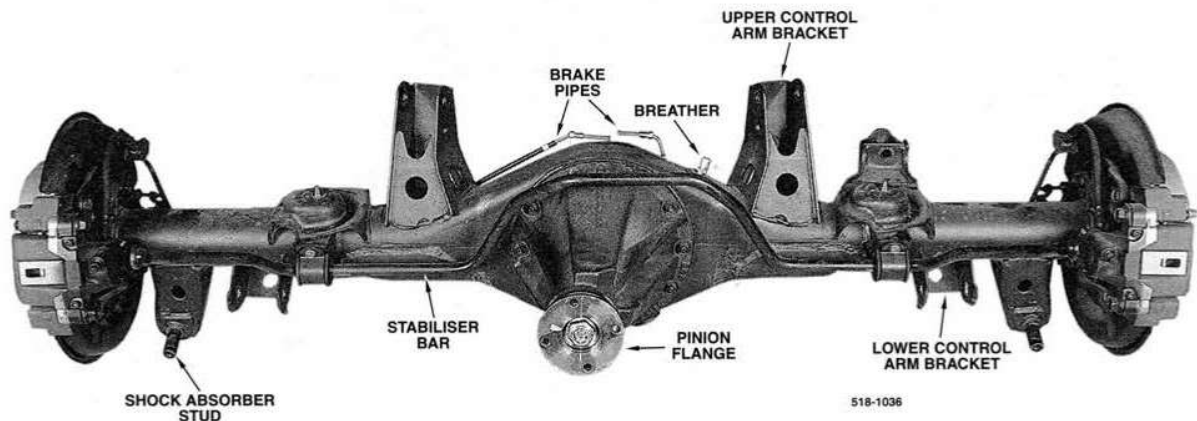


Rear suspension components.

Rear Axle Assembly

TO REMOVE AND INSTALL

- 1 Raise the rear of the vehicle and support on chasis stands. Refer to General Information (chapter 1) for the positions of the jacking points. Place the stands under the chassis rail. Remove the rear wheels.
- 2 If the rear axle is to be dismantled, remove the drain plug from the rear axle housing and allow the lubricant to drain into a container.
- 3 Mark the alignment between the rear propeller shaft and drive pinion flange to ensure correct installation, remove the nuts and bolts and disconnect the propeller shaft from the drive pinion flange. Secure the propeller shaft clear of the work area.
- 4 Disconnect the brake pipes from the junction connector on top of the axle housing. Remove the bolt retaining the junction connector to the axle housing. Seal the pipes and clamp the hose to prevent the loss of fluid and the entry of dirt. Position the junction connector clear of the work area.
- 5 Remove the nut and withdraw the through bolt retaining the panhard rod to the axle housing. Loosen the nut retaining the panhard rod to the chassis and secure the panhard rod to the chassis using a length of wire.
- 6 Release the handbrake and working at the rear of the backing plates, remove the handbrake cable clevis pin retaining clip and remove the clevis pin. Disconnect the handbrake cable from the bellcrank.
- 7 Remove the bolts retaining the handbrake inner cable mounting brackets from the rear axle housing and remove the brackets. Remove the bolt and remove the handbrake cable pivot lever from the rear axle housing. Remove the outer cable support bracket mounting bolt and move the handbrake cable clear of the rear axle housing.
- 8 Position a floor jack under the rear axle housing and support the housing.
- 9 Remove the bolts and washers and disconnect the lower shock absorber mountings from the rear axle housing.
- 10 Insert a 6 mm allen key into the hole in the stabiliser bar link stud and while retaining the stud, remove the retaining nut. Separate the stud from the stabiliser bar. Repeat this on the other side of the vehicle.



Rear axle removed.

- 11 On models with ABS, disconnect the wheel sensor wiring and unclip the wiring from the chassis and upper control arms.
- 12 Carefully lower the rear axle assembly and remove the coil springs.
- 13 Remove the nuts and bolts retaining the upper and lower control arms to the axle housing brackets.



Alter the height of the jack until the bolts can be easily removed.

- 14 While an assistant steadies the assembly, lower and withdraw the axle assembly from the vehicle.

Installation is a reversal of the removal procedure with attention to the following points:

- 1 Manoeuvre the rear axle assembly into position and install the upper and lower control arm bolts but do not tighten the retaining nuts at this stage.
- 2 Install the coil springs, panhard rod and the shock absorbers as described earlier in this chapter under the appropriate heading. Tighten only the shock absorber bolts at this stage.
- 3 Install the propeller shaft ensuring that the matchmarks are aligned, and tighten the bolts to the specified torque.
- 4 Connect the brake pipe and bleed the hydraulic system. Refer to Brakes (chapter 15).
- 5 Fill the rear axle assembly with the specified type and quantity of lubricant.
- 6 Connect the handbrake cables and where fitted, the ABS wheel sensor wiring. Refer to Brakes (chapter 15).

- 7 Lower the vehicle to the ground and bounce the rear of the vehicle to stabilise the suspension.
- 8 Tighten the panhard rod and the control arms nuts and bolts to the specified torque with the weight of the vehicle on the suspension.

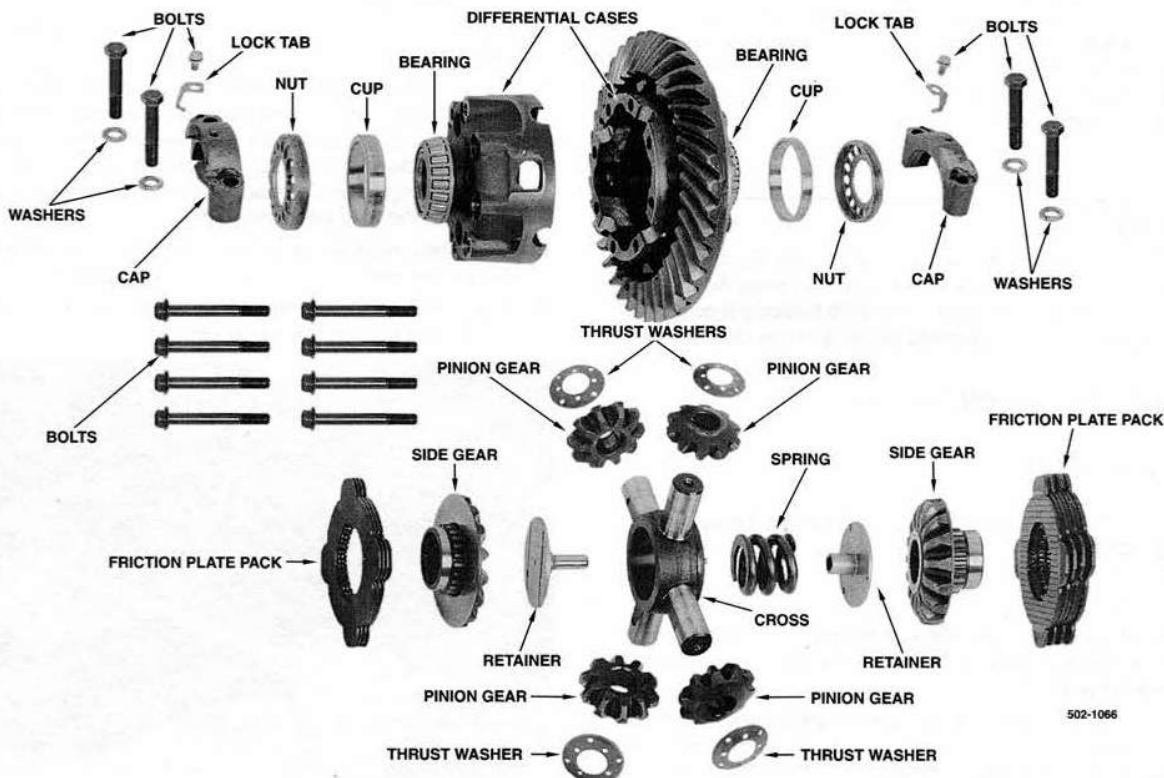
Differential and Final Drive Assembly

TO REMOVE AND INSTALL

- 1 Raise the rear of the vehicle and support on chassis stands. Refer to General Information (chapter 1) for the positions of the jacking points.
- 2 Drain the lubricant and remove the axle shafts from both sides of the rear axle, as previously described.
- 3 Mark the alignment between the propeller shaft and the drive pinion flange to ensure correct installation. Remove the nuts and bolts and disconnect the propeller shaft from the drive pinion flange. Secure the propeller shaft to one side, clear of the work area.
- 4 While supporting the final drive, remove the final drive assembly retaining nuts and washers. Using a rubber mallet, tap the final drive housing to break the seal. Remove the final drive assembly from the rear axle housing. Discard the gasket.

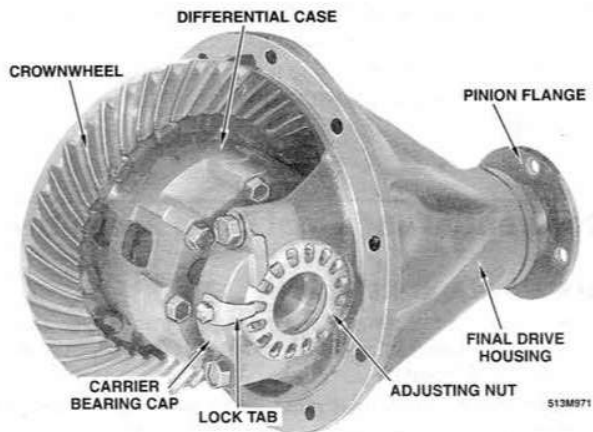
Installation is a reversal of the removal procedure with attention to the following points:

- 1 Ensure that the final drive housing and rear axle housing mating faces are clean and free of oil.



Limited slip differential components.

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Final drive assembly.

- 2 Tighten the final drive assembly retaining nuts to the specified torque.
- 3 Connect the propeller shaft ensuring that the marks made on removal are aligned, and tighten the nuts to the specified torque.
- 4 Install the axle shafts and connect the handbrake cables.
- 5 Fill the rear axle with the specified quantity and type of lubricant.

TO OVERHAUL

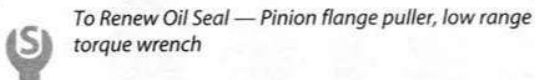
Specialised knowledge and equipment is required to overhaul the differential and final drive assembly. As the cost of the equipment required normally exceeds the cost of an exchange unit, or repair by a specialist, it is not a worthwhile proposition for the home mechanic to attempt the overhaul procedure. Specifications are included in the beginning of the chapter for those who feel competent and are sufficiently equipped to undertake the operation.

Oil Seals

The rear axle has oil seals at each end of the axle housing and in the final drive assembly, behind the propeller shaft flange. The procedure to renew the oil seals in the axle housing is described under the Axle Shafts and Bearings heading in this chapter.

TO RENEW DRIVE PINION OIL SEAL

Drive Pinion Oil Seal — To Renew



- 1 Raise the front of the vehicle and support on chassis stands. Refer to General Information (chapter 1) for the positions of the jacking points.
- 2 Mark the alignment between the propeller shaft and the drive pinion flange to ensure correct installation. Remove the nuts and bolts and disconnect the propeller shaft from the drive pinion flange. Place the propeller shaft on the stabiliser bar and secure it using a piece of wire.

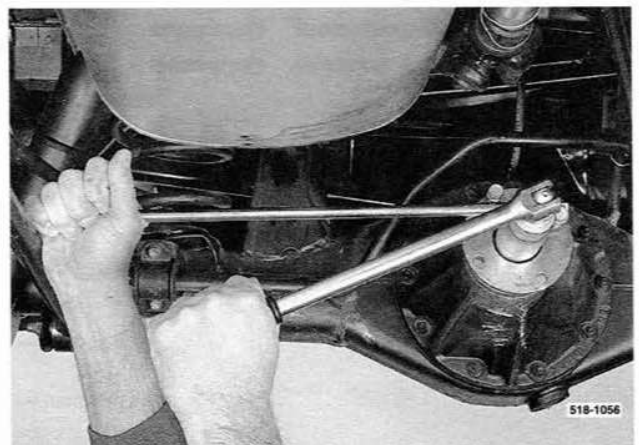


Mark the installed position of the pinion flange, the pinion nut and the shaft.

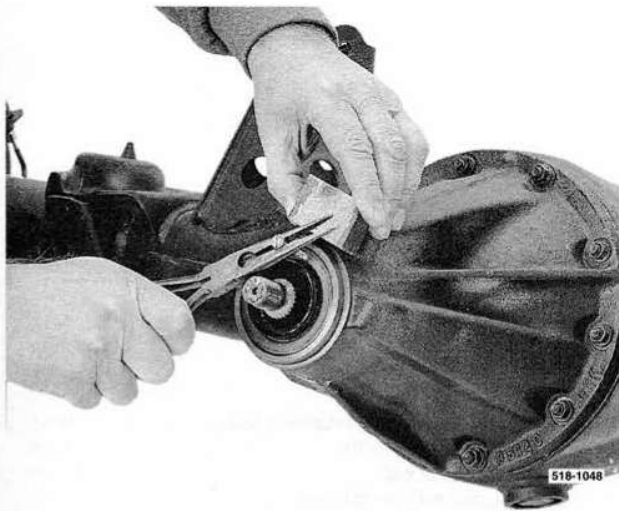
- 3 Carefully mark the alignment of the pinion shaft, pinion nut and the pinion flange to ensure correct assembly.
- 4 Using a hammer and punch, release the staking from the pinion flange nut.
- 5 Insert two suitable length bolts to the flange and secure them using retaining nuts. Insert a long bar between the bolts and rest the bar on the vehicle body or suspension arm.
- 6 Using a socket and a long breaker bar, remove the pinion retaining nut.
- 7 Position a container under the pinion flange. Using a puller or a lever, remove the pinion flange from the drive pinion.
- 8 Clean the pinion seal area. Prise the oil seal from the final drive housing, using care not to damage the oil seal housing.

Installation is a reversal of the removal procedure with attention to the following points:

- 1 Clean the recess where the oil seal is housed and check for burrs and damage.
- 2 Lubricate the lip of the new seal with the multipurpose grease. Install the seal squarely into the final drive housing using a suitable size tubular drift and hammer. Ensure that the lip of the seal is facing towards the pinion bearing and that the outer face of the seal is installed 1.0 mm below the surface of the final drive housing.
- 3 Install the pinion flange using a soft faced hammer, ensuring the mating marks made on removal are aligned.
- 4 Apply gear oil to the threads of the pinion nut, install the washer and tighten the nut to 196 Nm.



Method of removing the drive pinion retaining nut.

**Removing the oil seal from the final drive housing.**

- 5 Install a low range torque wrench to the pinion nut and measure the bearing preload of the backlash between the drive pinion and the crownwheel. If the preload is less than Specifications, tighten the pinion nut in increments of 13 Nm until the correct preload is achieved, ensuring that the maximum torque of 343 Nm is not exceeded.



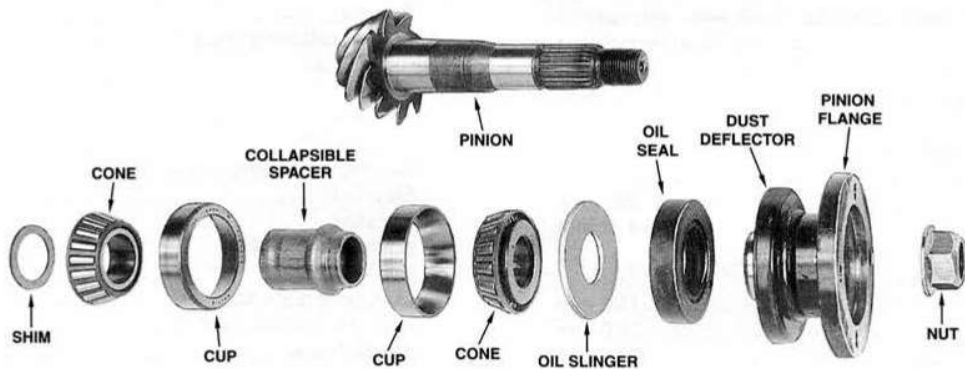
It is imperative that all marked components are assembled in the same position as they were prior to dismantling. If the pinion flange nut is tightened excessively, the collapsible preload spacer may collapse

**Installing the oil seal.**

causing excessive preload on the pinion bearings and necessitating renewal of the spacer.

Do not loosen the pinion nut to reduce the bearing preload.

- 6 Stake the pinion nut to the recess in the drive pinion.
7 Align the propeller shaft mark with the mark made on the pinion flange and install the propeller shaft nuts and bolts in the positions noted on removal. Tighten the retaining nuts and bolts to the specified torque.
8 Check and if necessary top up the rear axle oil with the specified lubricant.

**Drive pinion and associated components.**