

REAR AXLE

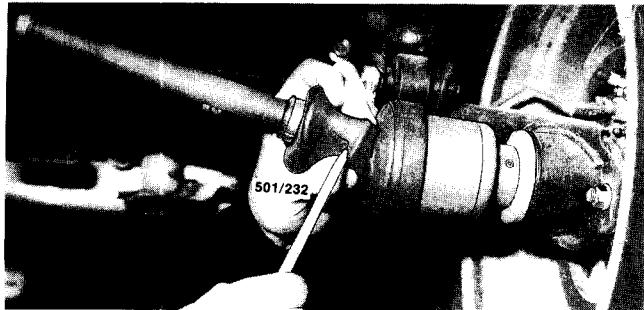
For later models
refer to supplement.

SPECIFICATIONS

Type	Salisbury type, semi floating axle shafts with hypoid final drive
Carrier bearing preload adjustment	Shims
Pinion and carrier bearing types	Tapered roller
Pinion preload without oil seal:	
New bearing	19.6–28.4 N
Used bearing	8.34–16.67 N
Side gear rear face clearance	0.1–0.2 mm
Drive pinion to crownwheel backlash	0.1–0.2 mm
Crownwheel maximum runout	0.05 mm
Distance between axle shaft rubber boot inner retaining clips:	
1979–1984 and all Utility models	181 mm
1985–1986 Sedan and	
Station Wagon models	201 mm
1987 Sedan and	
Station Wagon models	223.5 mm

TORQUE WRENCH SETTINGS

Propeller shaft flange to drive pinion flange:	
1979–1984 and Utility models	25 Nm
1985–1987 Sedan and	
Station Wagon models	32 Nm
Drive pinion nut	167–196 Nm
Differential side bearing retainer	12 Nm
Crownwheel to differential carrier bolt	113 Nm
Differential drive shaft to side gear	36 Nm
Rear cover to differential	25 Nm
Differential mounting crossmember to chassis	78 Nm
Mounting crossmember to rear cover	78 Nm
Differential mounting bracket to body	78 Nm
Mounting bracket to differential:	
1979–1984 models	78 Nm
1985–1987 Sedan and Station Wagon models	54 Nm
Suspension unit to trailing arm	118 Nm
Trailing link to trailing arm:	
1979 models	137 Nm
1980–1985 and Utility models	147 Nm
1986–1987 Sedan and	
Station Wagon models	177 Nm



Check the axle shaft double offset joint rubber boot for signs of leakage, damage and deterioration.

Trailing arm to crossmember:

1979–1984 and Utility models	93 Nm
1985 Sedan and	
Station Wagon models	127 Nm
1986–1987 Sedan and	
Station Wagon models	137 Nm

Trailing link bush to crossmember:

1985–1987 Sedan and	
Station Wagon models	177 Nm

1. REAR AXLE 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 hub: Check condition of hub and wheel rim and tighten or renew faulty components.
- (3) Defective brake components: Overhaul brakes, refer to the Brakes section.
- (4) Defective or incorrectly adjusted hub drive shaft or bearings: Adjust or renew faulty components, refer to the Rear Suspension section.
- (5) Bent axle shaft: Renew axle shaft.
- (6) Damaged axle shaft outer double offset joint: Renew double offset joint.
- (7) Lack of lubricant in axle shaft outer double offset joint: Check and renew double offset joint rubber boot and lubricant.
- (8) Wheel bent or out of balance: Renew wheel or balance wheel and tyre assembly.

NOTE: Raise and support the rear of the vehicle. Check the road wheel nuts for tightness and spin the wheels to check for runout. Axle shaft or hub bearing noises can be diagnosed by spinning one wheel at a time and listening for a rumble. When carrying out the bearing test, place the transmission in neutral and stop the other side wheel from turning. If the axle shaft is suspected of being bent remove the axle shaft and check for runout between centres.

FINAL DRIVE GEAR NOISE

- (1) Loose propeller shaft(s) or universal joints: Tighten the retaining bolts or renew the components.
- (2) Lack of lubricant: Rectify oil leak and top up with the correct grade of oil.
- (3) Loose drive pinion flange retaining nut: Tighten or renew and tighten the retaining nut, check pinion preload.
- (4) Loose differential carrier side bearing retainer retaining bolts: Tighten and check noise or refer to a suitable specialised workshop.

NOTE: Check the possible causes in the order given. Final drive gear noise can also

be caused by internal damage and wear, in which case the differential assembly will have to be removed for overhaul.

Due to the design of the differential assembly it is recommended that it be referred to a suitable specialised workshop for repair.

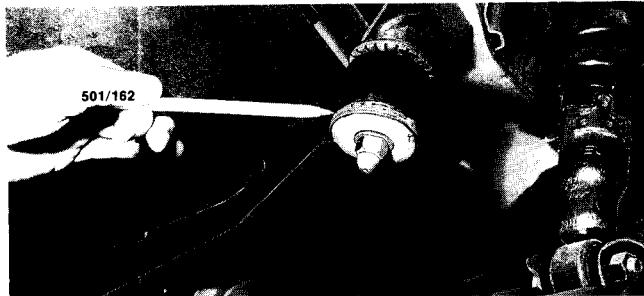
REPEATED AXLE SHAFT OR DOUBLE OFFSET JOINT BREAKAGE

- (1) Repeated overloading: Revise load capacity.
- (2) Abnormal clutch operation: Revise driving habits or check condition.

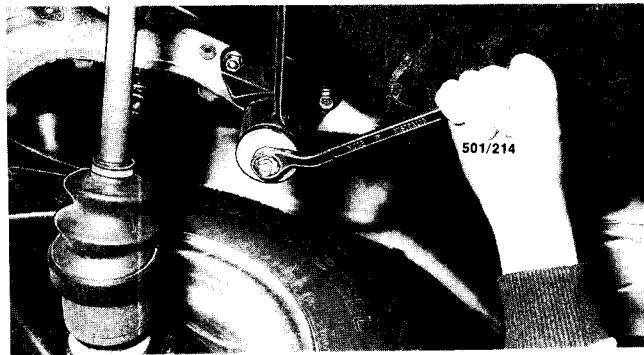
NOTE: If the clutch is operating correctly and overloading is not the cause check the axle shafts for bend and misalignment.

NOISE DURING VEHICLE INITIAL MOVEMENT

- (1) Differential rear crossmember mounting rubber bushes worn or damaged: Renew rubber bushes.
- (2) Differential front mounting rubber bushes worn or damaged: Renew rubber bushes.
- (3) Differential rear crossmember mounting retaining nuts loose: Check and tighten retaining nuts.
- (4) Damaged axle shaft inner double offset joint: Renew double offset joint.
- (5) Excessive differential drive pinion to crown-wheel backlash: Overhaul differential assembly.



Check the differential rear mounting crossmember rubber bushes for wear and deterioration.



Check the differential rear mounting crossmember nuts for tightness.

- (6) Propeller shaft(s) universal joints worn and damaged: Renew propeller shaft(s) or universal joint.

(7) Propeller shafts centre bearing loose on chassis and shaft: Retighten the centre bearing and propeller flange retaining bolts and nuts.

(8) Propeller shaft(s) flanges loose: Retighten the flange retaining bolts and nuts.

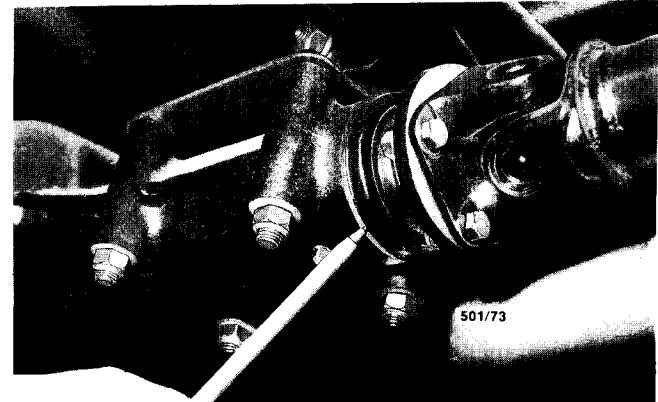
PINION SHAFT WILL ROTATE BUT NOT DRIVE VEHICLE

- (1) Broken axle shaft: Check and renew axle shaft.
- (2) Internal differential damage: Remove differential assembly rear cover, check and if necessary refer the problem to a suitable specialised workshop.

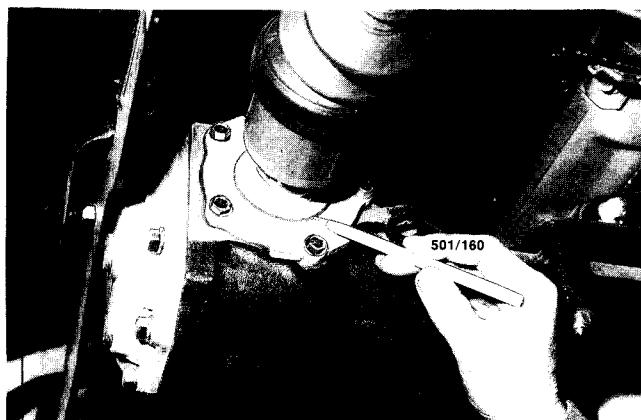
NOTE: The axle shaft inner and outer offset joints are of different spline numbers and diameters and if installed incorrectly will cause damage to the components.

LOSS OF LUBRICANT

- (1) Damaged or obstructed air breather: Clear or replace.
- (2) Leaking pinion oil seal: Renew oil seal and check flange contact surface.
- (3) Leaking differential drive shaft oil seal: Renew oil seal and check drive shaft running surface.
- (4) Leaking differential bearing retainer and rear cover gaskets: Renew gaskets and check mating contact surfaces.
- (5) Loose oil filler or drain plug: Tighten plugs securely.
- (6) Incorrect oil seals installed: Renew oil seals.
- (7) Incorrect or blocked axle shaft double offset joint outer race inner sealing plug: Check and clear or renew sealing plug.
- (8) Damaged axle shaft double offset joint rubber boot: Renew rubber boot.
- (9) Porous or cracked differential assembly case: Remove, check and if necessary refer the problem to a suitable specialised workshop.



If the rear axle differential is losing oil, check the drive pinion oil seal as a likely leakage source.



If the rear axle differential is losing oil, check the drive shaft oil seals as a likely leakage source.

NOTE: Check the breather for damage and obstruction before cleaning the differential assembly and checking for leaks.

If the oil leakage is not apparent when the differential is cold, run the vehicle on the road until the differential reaches operating temperature. Check thoroughly for small cracks in the differential case.

Normally small cracks do not open up and leak oil until the differential reaches operating temperature.

2. DESCRIPTION

The four wheel drive rear axle assembly consists of three sub assemblies, the differential, axle shafts and hub drive shafts, of which the axle shafts and differential assembly can be removed separately. The removal of the brake drum hub and the hub drive shaft requires the disconnection of the outer double offset joint and the trailing arm.

The brake drum hub and its drive shaft are located on the trailing arm, the axle shafts with their double offset joints at each end are located between the hub drive shafts and the differential drive shafts. The differential assembly is located in the centre and secured to the body and rear mounting crossmember by retaining bolts and nuts.

The hypoid differential assembly drive pinion shaft is supported by three bearings located in the differential case. The pinion height is controlled by selective fit washer shims located between the inner bearing and the pinion gear on the drive pinion.

The drive pinion preload is controlled by selective fit shims and spacers located between the inner bearing and the centre bearing. The differential carrier is supported by an outer bearing on each side and the drive pinion to crownwheel backlash and tooth contact is controlled by selective fit shims located between the bearing retainers and the differential case.

The pinion to side gear backlash is controlled by selective fit thrust washers located between the side gears and the interior of the differential carrier.

The differential drive shafts are splined and located in the side gear splined interior at one end and exit through an oil seal located in the differential carrier bearing retainers at the other and are secured externally to the side gears by a special Torx retaining bolt.

The drive shafts are externally splined and locate in the splined interior of the axle shaft inner double offset joints and are secured by a retaining pin.

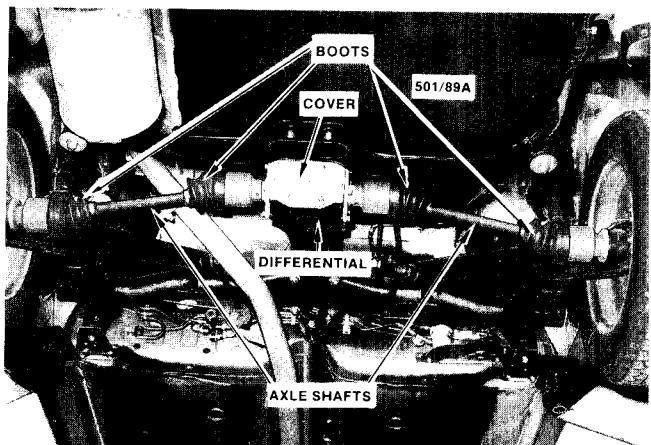
The axle shaft outer double offset joint interior is also splined and locates on the splined exterior of the hub drive shaft and is secured by a retaining pin.

The drive shaft and the splined components diameters and splines must correspond with each other and care should be taken to ensure that any new components installed are correct otherwise damage will occur.

The axle shaft double offset joints allow for the flexing of the rear suspension and are protected by rubber boots from the loss or contamination of its lubricant. The axle shaft double offset joints are similar in removal and installation to the front axle offset joints but may differ in their diameters and applications. The hub drive shafts supported by two roller bearings in the trailing arms are secured in the arm by a ring nut and protrude through to the outside of the trailing arm.

The brake drum hub interior is splined and is located on the exterior splines of the hub drive shaft and is secured by a shaped washer, special spacer, retaining nut and split pin. The differential rear cover and gasket can be renewed by removing the differential rear crossmember, the drive pinion and differential oil seals can also be renewed with the differential in position.

The design of the differential necessitates fine tolerances, checks and adjustments during overhaul. The use of specialised equipment is essential and it is recommended that any differential repairs other than



Underbody view of rear axle

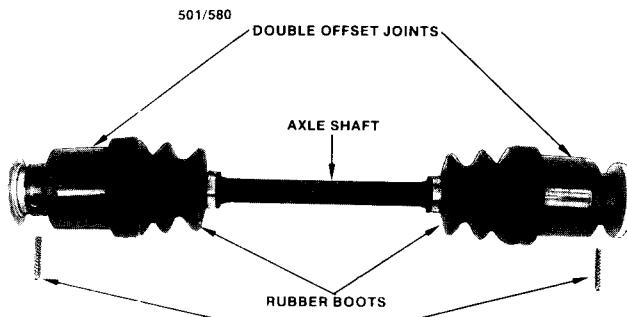
previously mentioned should be referred to a suitable specialised workshop.

Specifications and a tooth marking chart are included in this section for those who may feel competent and sufficiently equipped to undertake the operation.

3. AXLE SHAFTS

TO REMOVE

- (1) Ensure the handbrake is fully applied.
- (2) Raise the vehicle to a suitable working height and support it on chassis stands.
- (3) Remove the suspension unit to trailing arm retaining bolt and disconnect the suspension unit.
- (4) On 1979-1984 and all Utility models, remove the trailing link to trailing arm retaining bolts and lower the trailing arm.
- (5) On 1985-1987 Sedan and Station Wagon models, loosen the trailing link bush to crossmember retaining bolt and lower the trailing arm.
- (6) Working under the vehicle and using a suitable drift, drive the axle shaft to rear hub drive shaft retaining pins from the axle and drive shafts. Discard the retaining pins.
- (7) Using a suitable drift, drive the axle shaft to differential drive shaft retaining pins from the axle and drive shafts. Discard the retaining pins.
- (8) Lower the trailing arms and manoeuvre the axle shafts from the vehicle. Mark or tag the inner and outer ends of the axle shafts in order to instal them to their original positions during installation.
- (9) Remove the rubber dust rings from the hub and differential drive shafts.



View of rear drive shaft assembly removed from the vehicle.

TO DISMANTLE AND ASSEMBLE

The dismantling and assembling procedure of the axle shaft is similar to the procedure for the double offset joints on the front axle shafts and is fully covered in the Manual Transaxle section.

NOTE: The axle shaft inner and outer offset joints are of different spline numbers and diameters and if installed incorrectly will cause damage to the components.

TO INSTAL

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

- (1) Instal the rubber dust rings and the axle shafts to the differential drive shafts and the hub drive shafts ensuring the retaining pin holes are aligned as during removal.
- (2) Instal the new retaining steel roll pins to the axle shafts and drive shafts.
- (3) Instal the suspension unit to the trailing arm and instal the retaining bolt and tighten it to the Specifications.
- (4) On 1979-1984 and all Utility models, instal the trailing link to the trailing arm and instal the retaining bolts and tighten them to Specifications.
- (5) On 1985-1987 Sedan and Station Wagon models, tighten the trailing link bush to crossmember retaining bolt to Specifications.
- (6) Lower the vehicle to the ground.

4. DIFFERENTIAL ASSEMBLY

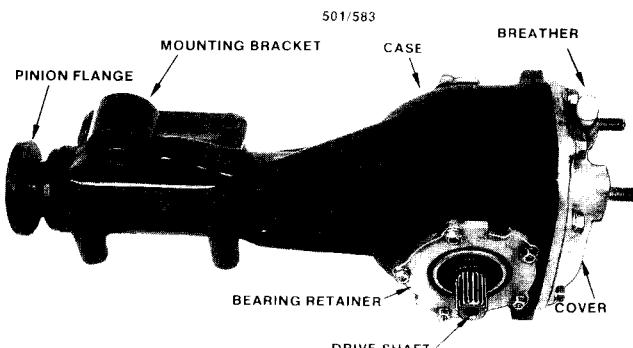
Special Equipment Required:

To Renew Differential Drive Shaft Oil Seal —
Torx socket

To Renew Differential Drive Pinion Oil Seal —
Spring balance, suitable puller

TO REMOVE AND INSTAL

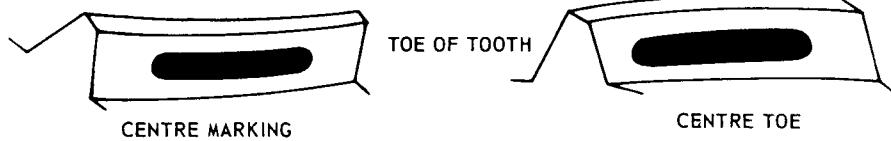
- (1) Remove the rear axle shafts as previously described in this section.
- (2) Remove the propeller shaft and instal a plug in the transaxle aperture to prevent the loss of lubricant and the entry of dirt. Refer to the Manual Transaxle section.
- (3) Using a trolley jack support the differential assembly and remove the differential to rear mounting member retaining nuts.
- (4) Remove the differential front support bracket to the body retaining bolt and nut and lower the differential and remove it from the vehicle.



View of rear axle differential assembly removed from the vehicle.

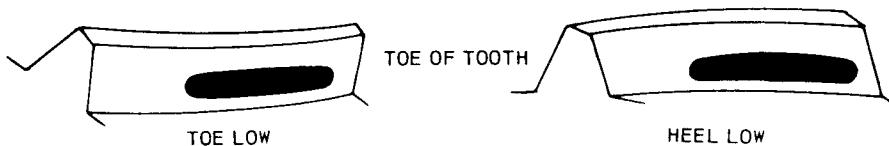
DRIVE

OVERDRIVE

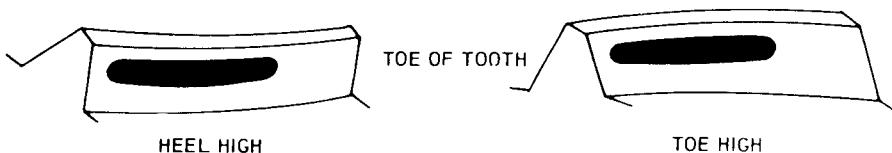


Crownwheel Tooth Marking for Correctly Adjusted Crownwheel and Pinion. Marking will be slightly Closer to Toe of Tooth on Overdrive or Concave Side. Changes in Thickness of Pinion Positioning Shims will Affect Tooth Marking on Overdrive to Greater Extent than on Drive or Convex Side of Tooth. Changes in Backlash have a more Pronounced Effect on Drive Side Markings (All models.)

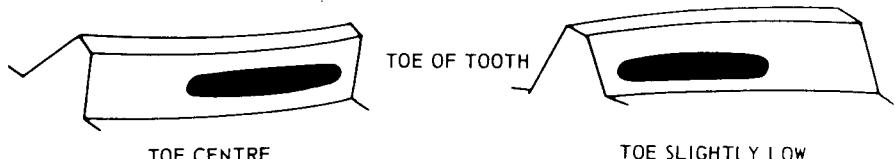
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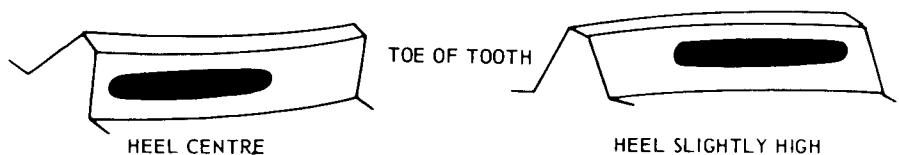
Low Profile Marking on Both Sides of Tooth. Rectify by Reducing Thickness of Pinion Positioning Shims and Reset Backlash (All models.)



High Profile Marking on Both Sides of Crownwheel Tooth. Rectify by Increasing of Pinion Positioning Shims and Reset Backlash (All models.)



Toe Marking on Drive Side and Low Profile Marking on Overdrive Side of Crownwheel Tooth. To Rectify, Increase Backlash. It may be Necessary to Increase Thickness of Pinion Positioning Shims to Maintain Backlash within Specified Limits (All models.)



Heel Marking on Drive Side and High Profile Marking on Overdrive Side of Crownwheel Tooth. To Rectify, Reduce Backlash. It may be Necessary to Decrease Thickness of Pinion Positioning Shims to Maintain Backlash within Specified Limits (All models.)

(5) Thoroughly clean the exterior of the differential assembly and check for cracks, leakage and damage, renew as necessary. Refer all serious problems to a suitable specialised workshop.

(6) Check the differential front mounting rubber bush for wear and deterioration, renew as necessary.

NOTE: The design of the differential necessitates fine tolerances, checks and adjustments during overhaul. The use of specialised equipment is essential and it is recommended that any differential repair other than the oil seals and the rear cover and gasket be referred to a suitable specialised workshop.

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

(1) Using a trolley jack, position the differential assembly under the vehicle and instal the differential front support bracket to the body retaining bolt.

(2) Instal the differential to the rear mounting nuts and tighten to Specifications.

(3) Tighten the differential front support to body bracket retaining bolts to the Specifications.

(4) Remove the plug and instal the propeller shaft.

(5) Instal the axle shafts as previously described in this section.

(6) Check the oil level and top up as necessary.

TO RENEW DIFFERENTIAL DRIVE SHAFT OIL SEAL

(1) Remove the relevant rear axle shaft as previously described in this section.

(2) Using the special Torx socket, remove the retaining bolt from the centre of the differential drive shaft and remove the drive shaft from the differential.

(3) Using a suitable screwdriver prise the oil seal from the differential side housing.

(4) Apply grease to the lips of the new oil seal and using a suitable drift instal the oil seal to the differential side housing.

(5) Instal the differential drive shaft and retaining bolt, using the special Torx socket tighten the retaining bolt to Specifications.

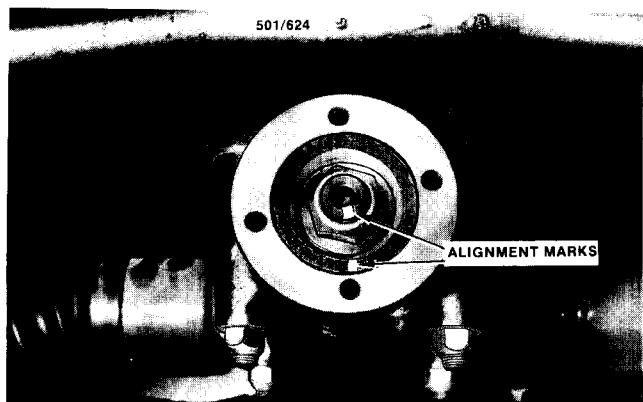
(6) Instal the rear axle shaft as previously described in this section.

NOTE: The axle shaft inner and outer offset joints are of different spline numbers and diameters and if installed incorrectly will cause damage to the components.

(7) Lower the vehicle to the ground.

TO RENEW DIFFERENTIAL DRIVE PINION OIL SEAL

(1) Raise the vehicle to a suitable working height and support it on chassis stands.



Mark the installed position of the differential drive pinion flange to ensure the correct installation.

(2) Remove the propeller shaft flange to drive pinion retaining bolts and nuts and separate the flanges. Secure the propeller shaft away from the work area with tying wire.

(3) Secure a force gauge to a bolt hole on the drive pinion flange and measure and record the force required to turn the drive pinion.

This is specified as the drive pinion turning force and can be affected by the drive pinion oil seal, the reading should be noted for use during the installation procedure.

(4) Using a suitable Stillson wrench, secure the drive pinion flange and remove the flange retaining nut. Note the installed position of the flange to the drive pinion and mark accordingly. Discard the retaining nut.

(5) Using a suitable puller, remove the flange from the drive pinion.

(6) Using a suitable screwdriver, prise the oil seal from the differential housing.

(7) Check the drive pinion flange oil seal contact surface for wear and damage, renew as necessary.

(8) Apply grease to the lips of the new oil seal and using a suitable drift instal the oil seal to the differential housing.

(9) Instal the drive pinion flange with a new retaining nut to the pinion and tighten it within Specifications. Using the same procedure as during its removal, use a force gauge to measure the drive pinion turning force. Tighten the flange retaining nut within Specifications to achieve the same drive pinion turning force as recorded during dismantling. When correct stake the retaining nut.

(10) Instal the propeller shaft to the drive pinion flange and instal the retaining bolts and nuts and tighten them to Specifications.

(11) Lower the vehicle to the ground.

TO REMOVE AND INSTAL DIFFERENTIAL REAR COVER

(1) Raise the vehicle to a suitable working height and support it on chassis stands.

(2) Using a suitable drain tin positioned under the rear axle differential, remove the drain plug and drain the oil.

(3) Supporting the weight of the differential remove the differential to the rear crossmember retaining nuts.

(4) Remove the rear crossmember to chassis retaining nuts and stopper washers and remove the crossmember.

(5) Remove the rear cover to differential retaining bolts and remove the cover and gasket.

(6) Thoroughly clean the cover in a suitable solvent and check for cracks and damage, renew as necessary.

(7) Clean the cover mating face on the differential and check for cracks and damage. Refer all serious problems to a suitable specialised workshop as necessary.

(8) Check the differential rear crossmember rubber bushes for wear and deterioration, renew as necessary.

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

(1) Instal the rear cover and gasket to the differential, instal the retaining bolts and tighten them to Specifications.

(2) Instal the rear crossmember to the differential, instal the retaining bolts and tighten them to Specifications.

(3) Position the rear crossmember and stopper washers to the chassis and instal the stopper washers and nuts, tighten them to Specifications.

(4) Instal the drain plug with a new washer to the differential and tighten it securely.

(5) Fill the differential with the correct quantity and grade of oil, instal the filler plug and tighten it securely.

(6) Lower the vehicle to the ground.

8. DIFFERENTIAL MOUNTING RUBBER BUSHES

Special Equipment Required:

To Renew Bushes — Suitable press and press plates

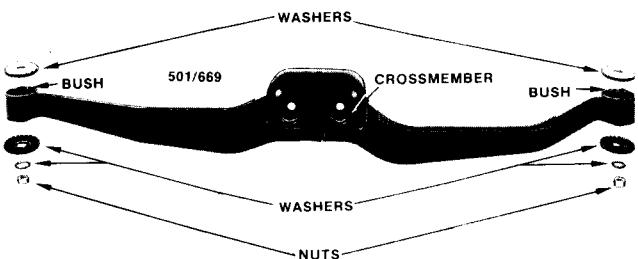
TO RENEW REAR CROSSMEMBER BUSHES

(1) Raise the rear of the vehicle to a suitable working height and support it on chassis stands.

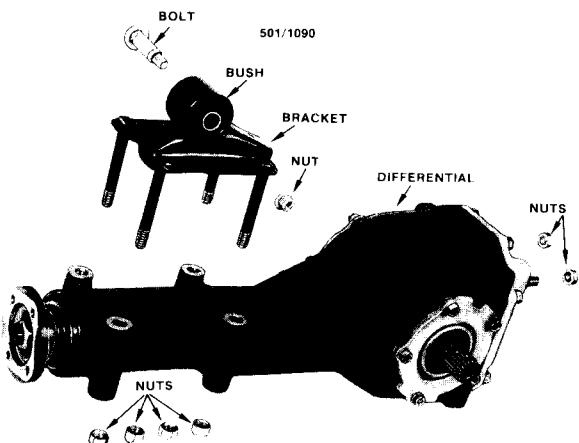
(2) Support the weight of the differential and remove the differential to the rear crossmember retaining nuts.

(3) Remove the rear crossmember to chassis retaining nuts and stopper washers and remove the crossmember from the vehicle.

(4) Using a suitable press and press plates, support the crossmember on the outer edge of the bush aperture in order to allow the bush to exit when



View of rear crossmember and components removed from the vehicle.



Dismantled view of differential front mounting bracket and components.

pressed. Using a suitable drift, press the bush from the crossmember.

(5) Turning the crossmember to the other end and using the press and press plates, remove the other bush from the crossmember.

(6) Clean the crossmember thoroughly in a suitable solvent and check for cracks and damage, renew as necessary.

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

(1) Ensure that the crossmember mounting bush aperture is clean and free from burrs.

(2) Using the press and press plates, support the crossmember on the end face of the bush aperture. Position the new bush on the crossmember and using the drift press the bush fully home ensuring that it is central relative to the crossmember bush aperture end faces.

(3) Turning the crossmember to the other end and using the press and press plates, in a similar manner, instal the other new bush to the crossmember.

(4) Instal the crossmember to the vehicle as previously described.

TO RENEW DIFFERENTIAL MOUNTING BRACKET BUSH

(1) Raise the rear of the vehicle to a suitable working height and support it on chassis stands.

(2) Using a trolley jack support the weight of the differential assembly.

(3) Remove the differential mounting bracket to body retaining bolt and nut and lower the bracket clear.

(4) Remove the mounting bracket to differential retaining nuts and remove the mounting bracket.

(5) Using a suitable press and press plates support the bracket on the outer edge of the bush aperture in order to allow the bush to exit when pressed. Using a suitable drift, press the bush from the bracket.

(6) Clean the mounting bracket thoroughly in a suitable solvent and check it for cracks and damage, renew as necessary.

Installation is a reversal of the removal procedure

with attention to the following points:

(1) Ensure that the mounting bracket bush aperture is clean and free from burrs.

(2) Using the press and press plates, support the bracket on the end face of the bush aperture. Position the new bush on the bracket and using the drift, press the bush fully home ensuring that it is central relative to the crossmember bush aperture end faces.

(3) Position the mounting bracket on the differential assembly, instal the retaining nuts and tighten them to Specifications.

(4) Position the differential mounting bracket to the body, instal and tighten the retaining bolt and nut to Specifications.

(5) Lower the vehicle to the ground.