# REAR AXLE

## CONTENTS

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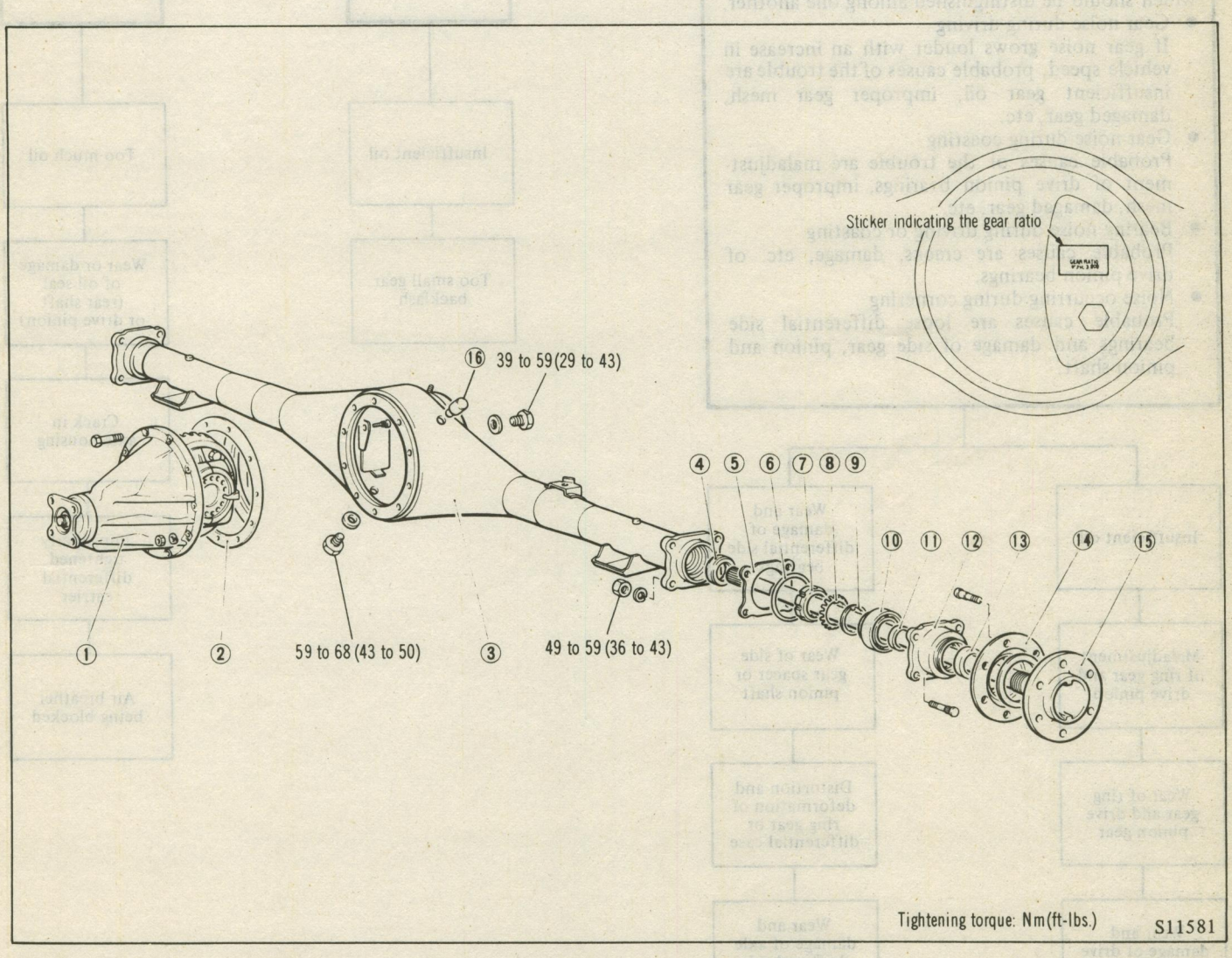
## CONTENTS

## GENERAL INFORMATION

Only one kind of final gear is used for all 1980 models.

The sticker indicating the gear ratio is attached to the axle housing.




(1) Differential carrier assembly
(2) Packing
(3) Rear axle housing
(4) Rear axle shaft oil seal (Inner)
(5) Shim
(6) O Ring
(7) Lock nut
(8) Lock washer
(9) Washer
(10) Rear axle shaft bearing
(11) Collar
(12) Bearing case
(13) Rear axle shaft oil seal (Outer)
(14) Dust cover
(15) Rear axle shaft
(16) Air breather

**Fig. 1 Rear Axle and Differential Construction**

## TROUBLE SHOOTING

Rear axle noisy, but not vibrating
Noise may be roughly classified into four types, which should be distinguished among one another.

- Gear noise during driving
  If gear noise grows louder with an increase in vehicle speed, probable causes of the trouble are insufficient gear oil, improper gear mesh, damaged gear, etc.
- Gear noise during coasting
  Probable causes of the trouble are maladjustment of drive pinion bearings, improper gear mesh, damaged gear, etc.
- Bearing noise during driving or coasting
  Probable causes are cracks, damage, etc. of drive pinion bearings.
- Noise occurring during cornering
  Probable causes are loose differential side bearings and damage of side gear, pinion and pinion shaft.

- Insufficient oil
  - Maladjustment of ring gear and drive pinion
    - Wear of ring gear and drive pinion gear
      - Wear and damage of drive pinion bearings
        - Excessive axle shaft end play
          - Wear and damage of axle shaft bearing
          - Loose lock nut
          - Improper adjustment of bearing shim
- Wear and damage of differential side bearings
  - Wear of side gear spacer or pinion shaft
    - Distortion and deformation of ring gear or differential case
      - Wear and damage of axle shaft and side gear splines
        - Premature wear of axle shaft bearings
          - Axle shaft bend
          - Axle housing bend
          - Improper adjustment of bearing shim

- Differential overheating
  - Insufficient oil
    - Too small gear backlash

- Oil leaks
  - Too much oil
    - Wear or damage of oil seal (rear shaft or drive pinion)
      - Crack in axle housing
        - Improperly tightened differential carrier
          - Air breather being blocked

# REAR AXLE ASSEMBLY

## REMOVAL

(1) Loosen the rear wheel hub nuts and jack up the truck applying the jack saddle to the differential case.

(2) Remove rear wheels. Support the truck on axle stands placed forward of the rear spring front bracket. The jack should be left holding the axle assembly slightly up.

(3) Remove the propeller shaft. (Refer to Group 16)

(4) Loosen the joint between the brake hose and brake line and pull out the stops to disconnect the brake hose.

(5) Disconect the rear cable of the parking brake at the balancer. (Refer to Group 5)

(6) Remove the shock absorbers, and the spring seats after removing spring U-bolts.

(7) Remove the spring shackle pin nuts, and then the shackle plate. Since the rear axle housing is still resting on the jack alone, use care not to drop the axle housing from the jack.

Slowly lower the jack with the axle housing on the jack saddle while a helper holds the axle housing until it is safely removed.

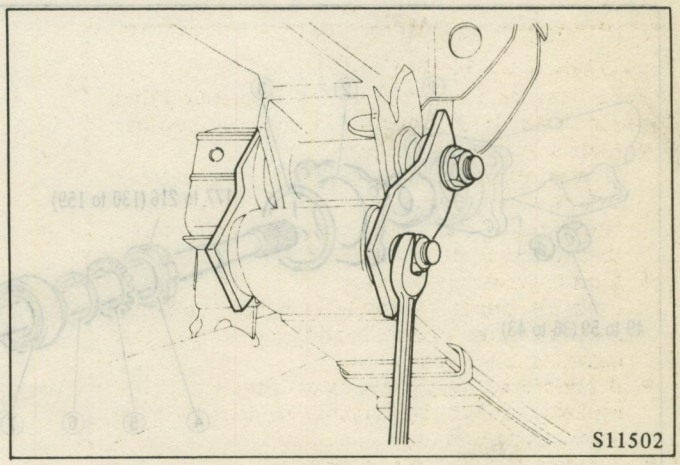


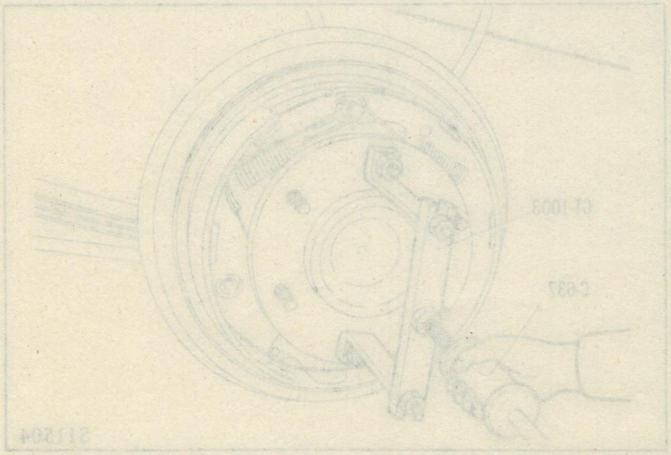

**Fig. 2 Removing the Spring Shackle**

## INSTALLATION

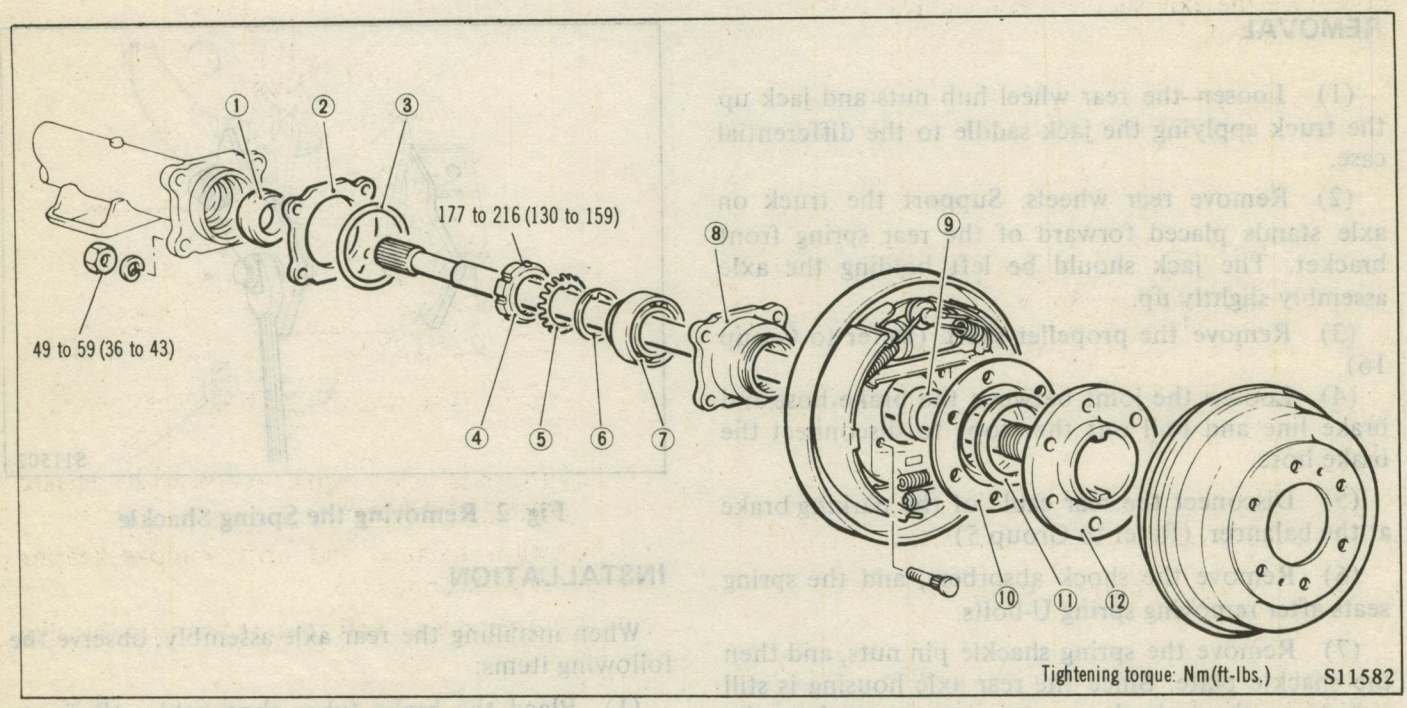
When installing the rear axle assembly, observe the following items:

(1) Bleed the brake tubes thoroughly. (Refer to Group 5.)

(2) For the installation of the rear suspension, refer to Group 17.



## REAR AXLE SHAFT




(1) Rear axle shaft oil seal (Inner)
(2) Shim
(3) O Ring
(4) Lock nut
(5) Lock washer
(6) Washer
(7) Rear axle shaft bearing
(8) Bearing case
(9) Rear axle shaft oil seal (Outer)
(10) Dust cover
(11) Packing
(12) Rear axle shaft

**Fig. 3 Exploded View of Rear Axle Shaft**

### REMOVAL

(1) Jack up the rear axle housing so that the rear wheel clears the floor. Remove the rear wheel and the brake drum. Then disconnect the brake tube from the wheel cylinder.

(2) Disconnect the bearing case from the axle housing end.

(3) Remove the brake backing plate, bearing case, and axle shaft as an assembly.

(4) Use special tools (C-637 and CT-1003) to withdraw the axle shaft, if binding.

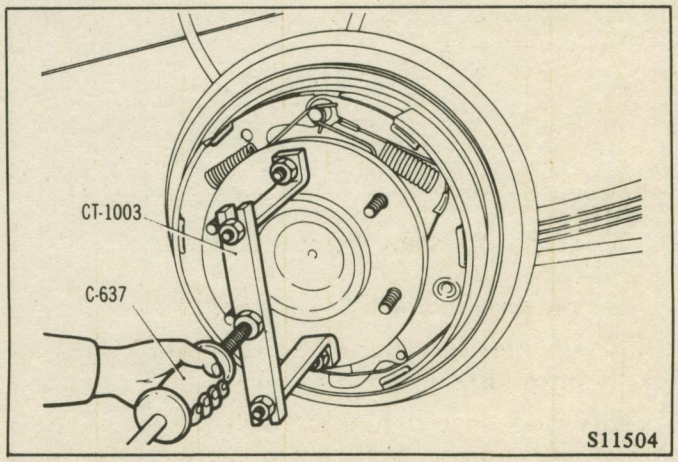



**Fig. 4 Pulling out Axle Shaft**

(5) Remove O ring and the shims for preloading the bearing. Retain the shims for reassembly.

(6) Use special tool (C-637) with hook attached to remove the axle shaft oil seal (inner). Discard and replace oil seal.

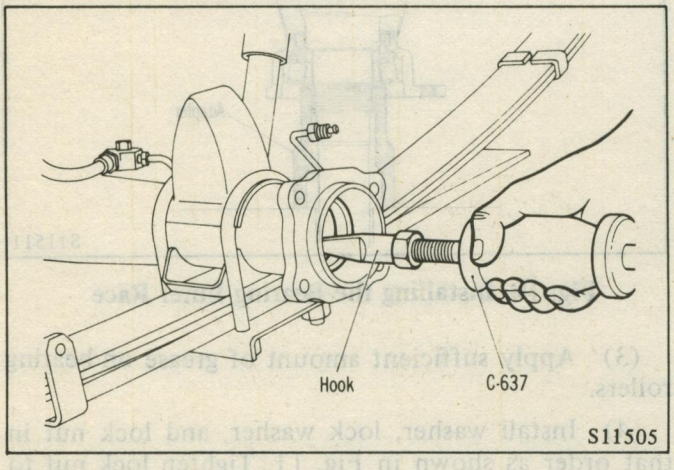



**Fig. 5 Pulling out Oil Seal**

(7) To remove the axle shaft bearing, disengage lock washer. Remove lock nut (Fig. 6), using special tool (MB990785).

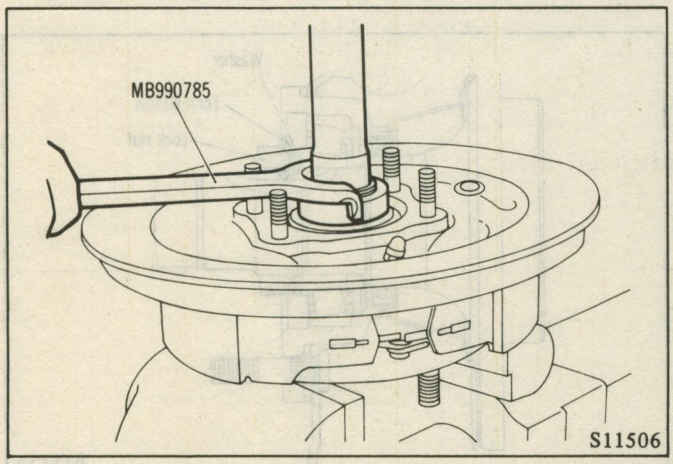



**Fig. 6 Removing the Lock Nut**

(8) Remove lock washer and plane washer.

(9) Reinsert lock nut on the axle shaft approximately three turns.

(10) Install special tool (MB990787-A) as shown in Fig. 7 to remove bearing case from the rear axle shaft. Be sure to install nuts and washers diagonally.

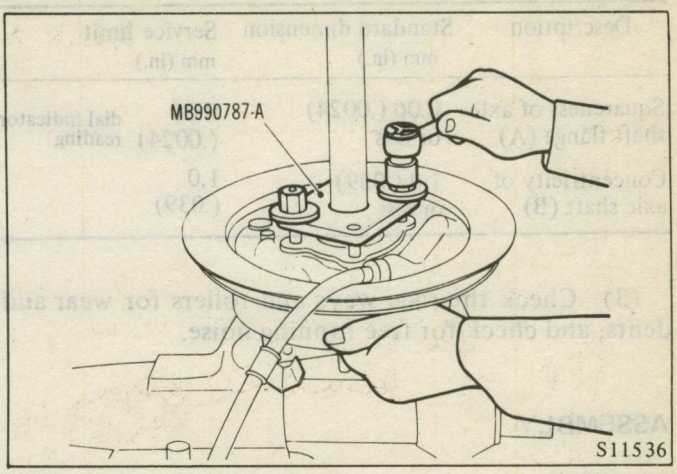



**Fig. 7 Removing the Bearing Case**

(11) Turn nuts with equal pressure to ensure smooth removal of the bearing.

(12) Using a hammer and drift, remove bearing outer race from bearing case.

(13) Remove the oil seal (outer) from the bearing case.

## INSPECTION

(1) Check axle shaft for runout, and check the splined part and the oil seal lip sliding area for wear and cracks. Replace the shaft if defective.

(2) To check axle shaft for runout, hold the axle shaft between lathe centers and measure the amount of deflection using a dial indicator at shaft center and flange end.

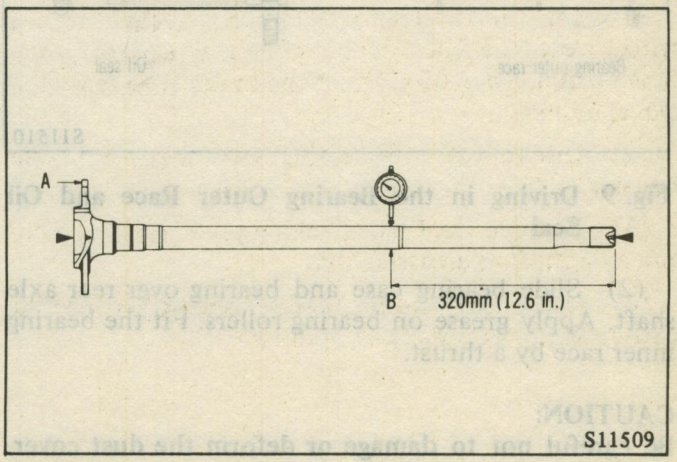



**Fig. 8 Checking the Axle Shaft for Runout**

| Description | Standard dimension mm (in.) | Service limit mm (in.) |
|---|---|---|
| Squareness of axle shaft flange (A) | 0.06 (.0024) or less | 0.06 (.0024) dial indicator reading |
| Concentricity of axle shaft (B) | 1.0 (.039) or less | 1.0 (.039) |

(3) Check the race ways and rollers for wear and dents, and check for free running noise.

## ASSEMBLY

**CAUTION:**
**Use a new oil seal.**

(1) Apply grease to outer surface of bearing outer race and to lip of oil seal (outer). Drive them into bearing case as shown. (Fig. 9)

| Specified grease | Quantity |
|---|---|
| MOPAR Front Wheel Bearing Grease (High Temp.) Part Number 3837794 or equivalent | As required |

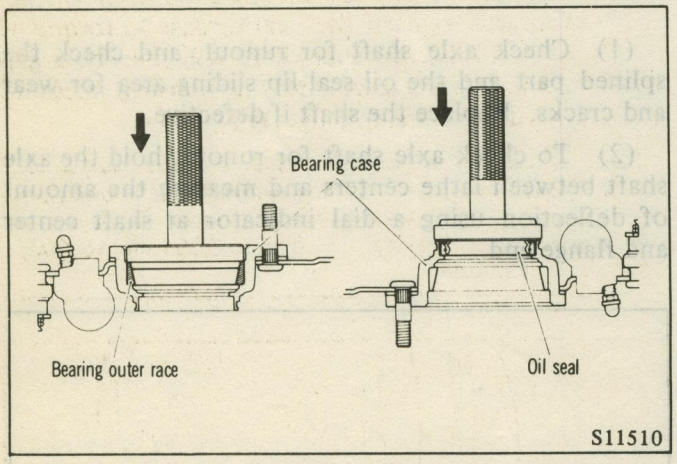



**Fig. 9 Driving in the Bearing Outer Race and Oil Seal**

(2) Slide bearing case and bearing over rear axle shaft. Apply grease on bearing rollers. Fit the bearing inner race by a thrust.

**CAUTION:**
**Be careful not to damage or deform the dust cover.**

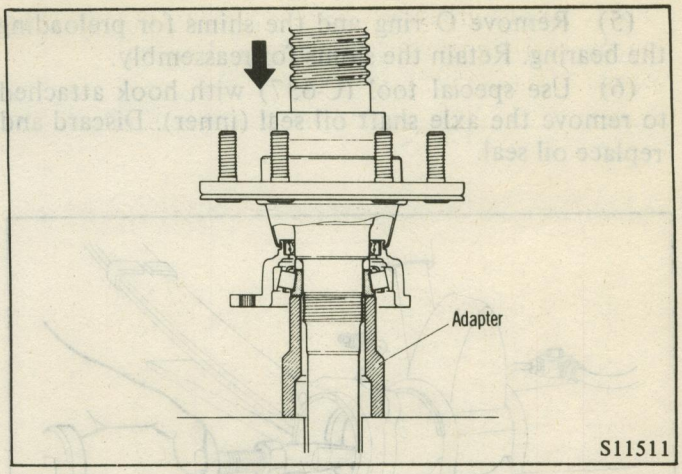



**Fig. 10 Installing the Bearing Inner Race**

(3) Apply sufficient amount of grease on bearing rollers.

(4) Install washer, lock washer, and lock nut in that order as shown in Fig. 11. Tighten lock nut to the specified torque using special tool (MB990785).

| Part to be tightened | Torque Nm (ft-lbs.) |
|---|---|
| Lock nut | 177 to 216 (130 to 159) |

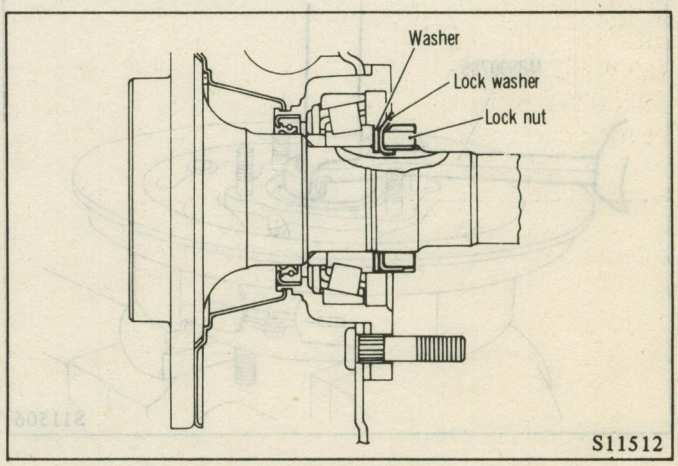



**Fig. 11 Installing the Washer, Lock Washer and Lock Nut**

(5) Bend tab on lock washer into groove on lock nut.

**CAUTION:**
**If lock washer does not engage with lock nut, slightly retighten lock nut. Do not damage the lock washer to engage it with the lock nut.**

(6) Apply grease to lip of oil seal (inner). Drive the oil seal (inner) into rear axle housing end using special tool (C-4572). (Fig. 12)

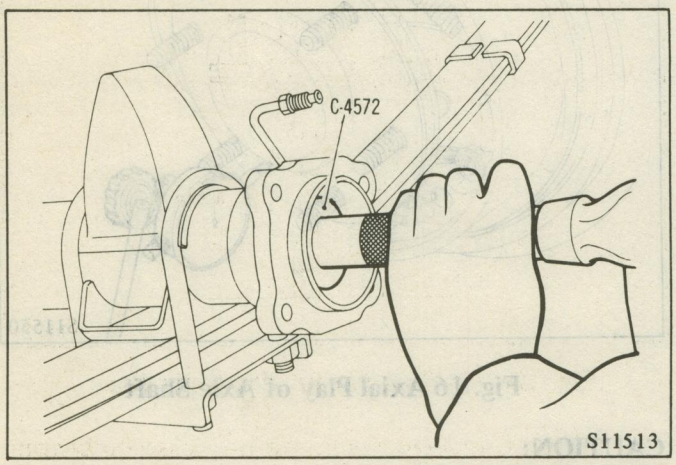



Fig. 12 Driving in the Oil Seal

## ADJUSTMENT (AXIAL PLAY OF REAR AXLE SHAFT)

(1) Before beginning assembly operations, remove the old sealer and any rust from the mating face of the bearing case and housing.

(2) Insert a 1 mm (.04 in.) shim and an O ring into the left side of the housing, and apply sealer [MOPAR Silicone Rubber Sealant (Part Number 4026070) or equivalent] to the mating face of the bearing case.

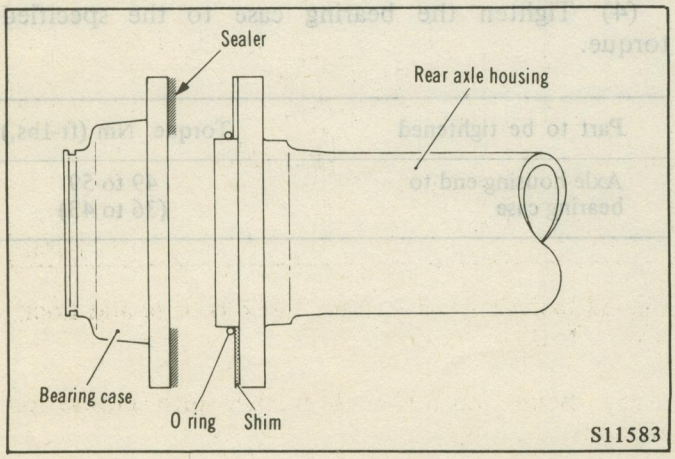



Fig. 13 Applying Sealer for O Ring and Shim

(3) Fit the left side axle shaft assembly into the left side of the housing, and tighten the bearing case and bearing to the specified torque. (Fig. 14)

| Part to be tightened | Torque Nm (ft-lbs) |
|---|---|
| Axle bearing case to bearing | 49 to 59 (36 to 43) |

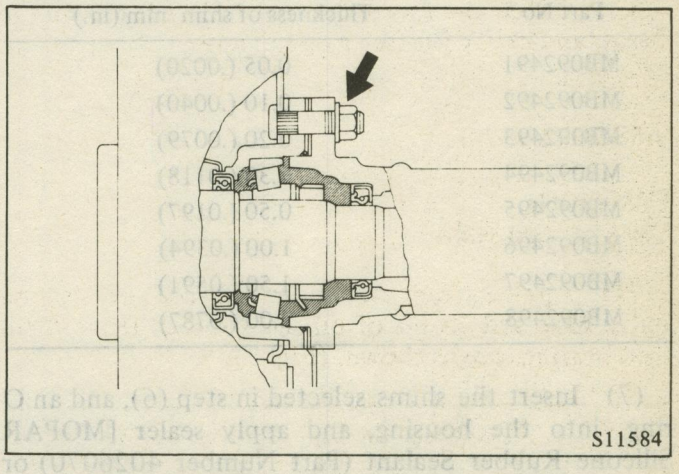



Fig. 14 Tightening of Axle Bearing Case and Bearing

(4) Fit the right side axle shaft assembly into the right side housing, without using a shim or an O ring, and temporarily tighten the bearing case to torque of 0.6 Nm (.4 ft-lbs.). Because there will then be a gap between the bearing case and the housing, measure this gap by using a feeler gauge. (Fig. 15)

| Description | Standard value mm (in.) |
|---|---|
| Clearance between bearing case and axle housing | 0.05 to 0.20 (.002 to .008) |

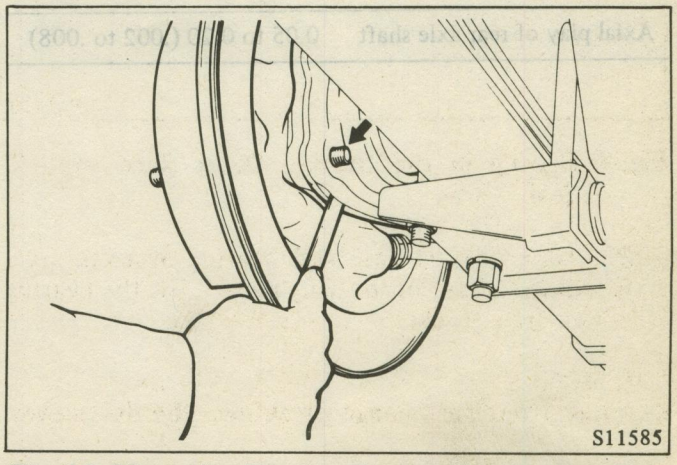



Fig. 15 Measuring Bearing Case to Housing End Face Clearance

(5) Loosen the temporarily tightened nut, and separate the axle shaft assembly from the housing.

(6) Select a shim with a thickness equivalent to the gap measured in step (4), and a shim with a thickness of from 0.05 to 0.20 mm (.0020 to .0079 in.) from the following table.

**Range of Preload Adjusting Shims**

| Part No. | Thickness of shim mm (in.) |
|---|---|
| MB092491 | 0.05 (.0020) |
| MB092492 | 0.10 (.0040) |
| MB092493 | 0.20 (.0079) |
| MB092494 | 0.30 (.0118) |
| MB092495 | 0.50 (.0197) |
| MB092496 | 1.00 (.0394) |
| MB092497 | 1.50 (.0591) |
| MB092498 | 2.00 (.0787) |

(7) Insert the shims selected in step (6), and an O ring, into the housing, and apply sealer [MOPAR Silicone Rubber Sealant (Part Number 4026070) or equivalent] to the mating face of the bearing case.

(8) Fit the right side axle shaft assembly into the right side housing and tighten the bearing case and bearing to the specified torque.

| Part to be tightened | Torque Nm (ft-lbs) |
|---|---|
| Axle bearing case to bearing | 49 to 59 (36 to 43) |

(9) Using a dial gauge, check the axial play of the axle shaft. (Fig. 16)

| Description | Standard value mm (in.) |
|---|---|
| Axial play of rear axle shaft | 0.05 to 0.20 (.002 to .008) |

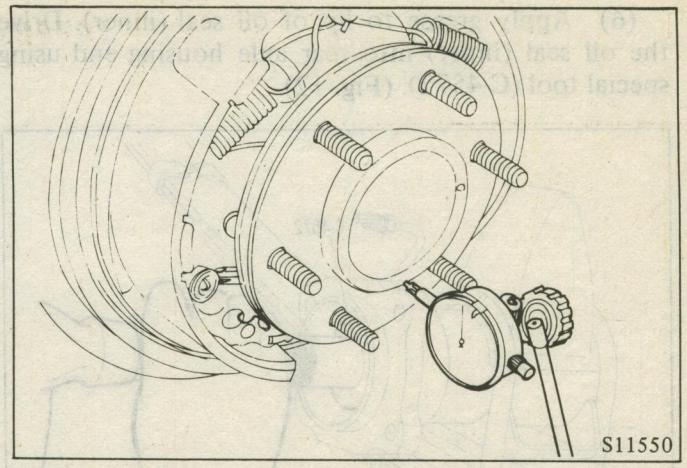



Fig. 16 Axial Play of Axle Shaft

**CAUTION:**
**If the specified axial play is not obtained, change the thickness of the shims selected in step (6) and reassemble.**

## INSTALLATION

During installation , observe the following items:

(1) Pack bearing case and axle housing end with grease in sufficient quantity.

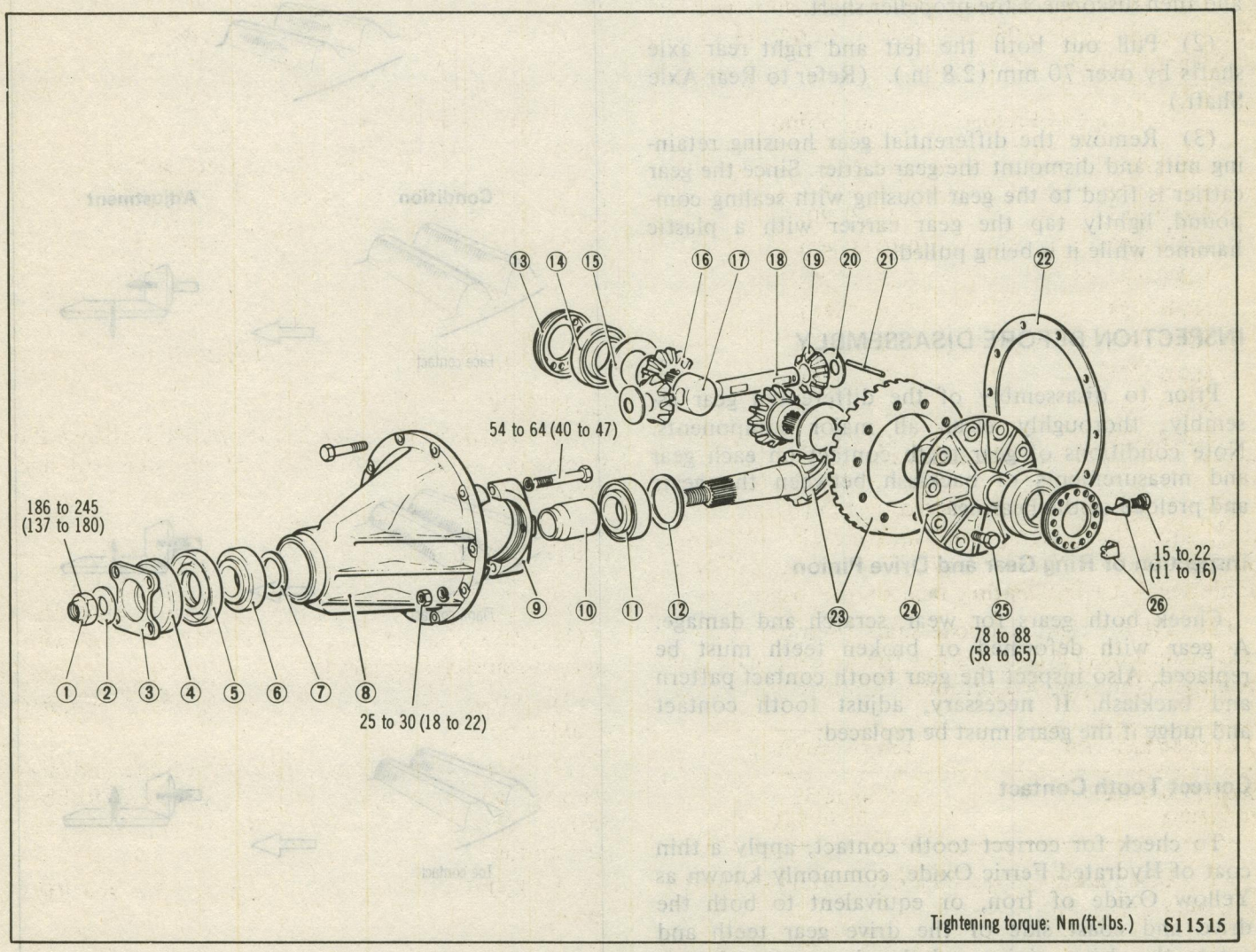
(2) Attach brake assembly with wheel cylinder to axle housing.

(3) Insert O ring between axle housing end and bearing case, and apply MOPAR Silicone Rubber Sealant (Part Number 4026070) or equivalent to bearing case.

(4) Tighten the bearing case to the specified torque.

| Part to be tightened | Torque Nm (ft-lbs.) |
|---|---|
| Axle housing end to bearing case | 49 to 59 (36 to 43) |

## DIFFERENTIAL




(1) Self-locking nut
(2) Washer
(3) End yoke (companion flange)
(4) Dust cover
(5) Oil seal
(6) Drive pinion bearing, front
(7) Preload adjusting shim
(8) Gear carrier
(9) Carrier cap
(10) Drive pinion spacer
(11) Drive pinion bearing, rear
(12) Drive pinion height adjusting shim
(13) Side bearing nut
(14) Side bearing
(15) Side gear thrust spacer
(16) Side gear
(17) Center block
(18) Pinion shaft
(19) Pinion gear
(20) Pinion washer
(21) Lock pin
(22) Packing
(23) Final gear set
(24) Differential case
(25) Lock bolt
(26) Lock plate

**Fig. 17 Exploded View of Differential**

## REMOVAL

(1) Drain oil from the differential gear housing and then disconnect the propeller shaft.

(2) Pull out both the left and right rear axle shafts by over 70 mm (2.8 in.). (Refer to Rear Axle Shaft.)

(3) Remove the differential gear housing retaining nuts and dismount the gear carrier. Since the gear carrier is fixed to the gear housing with sealing compound, lightly tap the gear carrier with a plastic hammer while it is being pulled.

## INSPECTION BEFORE DISASSEMBLY

Prior to disassembly of the differential gear assembly, thoroughly clean all major components. Note conditions of gear teeth contact on each gear and measurements of backlash between the gears and preload of the bearings.

### Inspection of Ring Gear and Drive Pinion

Check both gears for wear, scratch and damage. A gear with deformed or broken teeth must be replaced. Also inspect the gear tooth contact pattern and backlash. If necessary, adjust tooth contact and judge if the gears must be replaced.

### Correct Tooth Contact

To check for correct tooth contact, apply a thin coat of Hydrated Ferric Oxide, commonly known as Yellow Oxide of Iron, or equivalent to both the drive and coast side of the drive gear teeth and rotate the drive pinion and the ring gear under no load condition. Correct tooth contact will be indicated by a pattern of about 60 to 80% contact on the drive side of the teeth, starting at the center and progressing toward the toe end, and a pattern of 40 to 60% on the coast side of the teeth toward the toe end.

Where the tooth contact may be adjusted without replacing any one of the gears, carry out the adjustment by increasing or reducing the number of shims to obtain a correct tooth contact pattern.

If the correct tooth contact cannot be obtained by adjustment, it means gear teeth are excessively worn. Replace both of the gears.

CAUTION:
**When either the ring or drive pinion gear is worn, replace both gears as a set.**

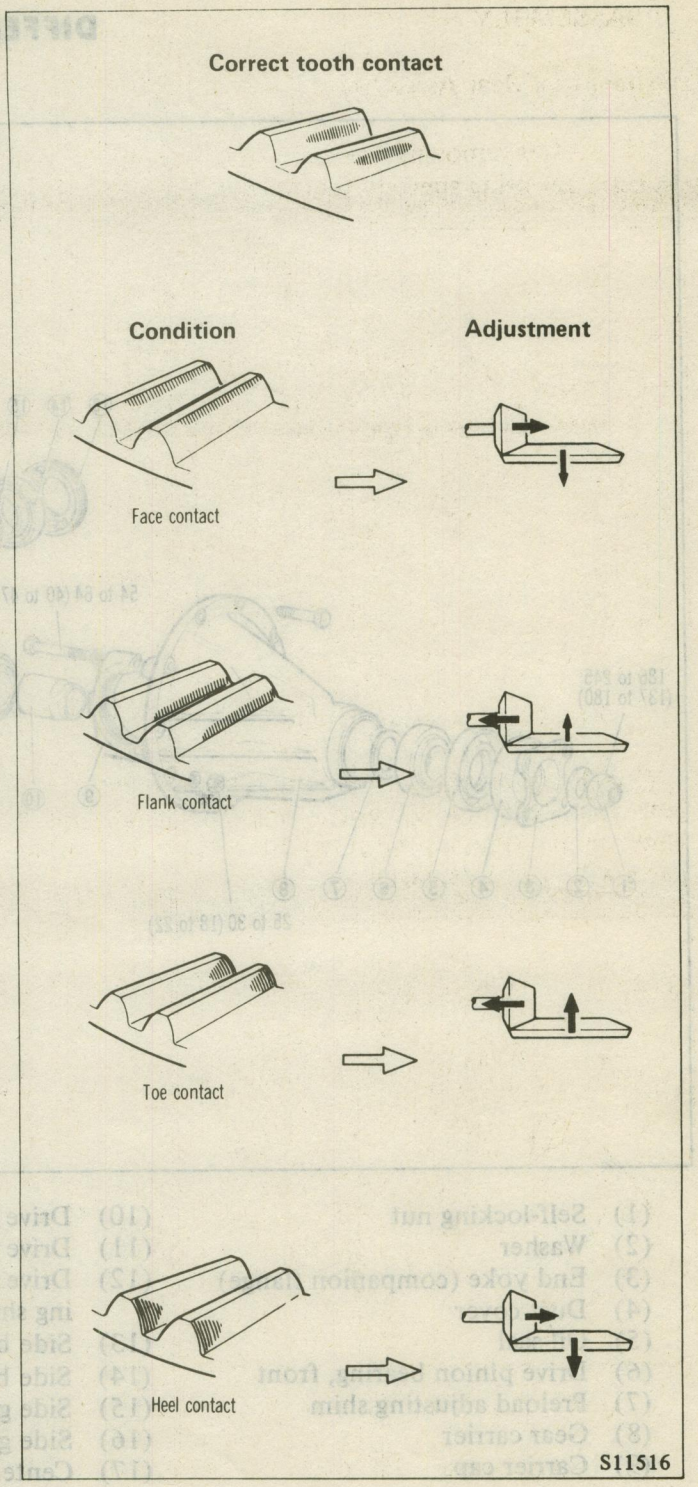



**Fig. 18 Adjustment of Tooth Contact**

## DISASSEMBLY

### Differential Gear Assembly

(1) After removing the lock plate, remove the side bearing nut using special tool (MB990201).

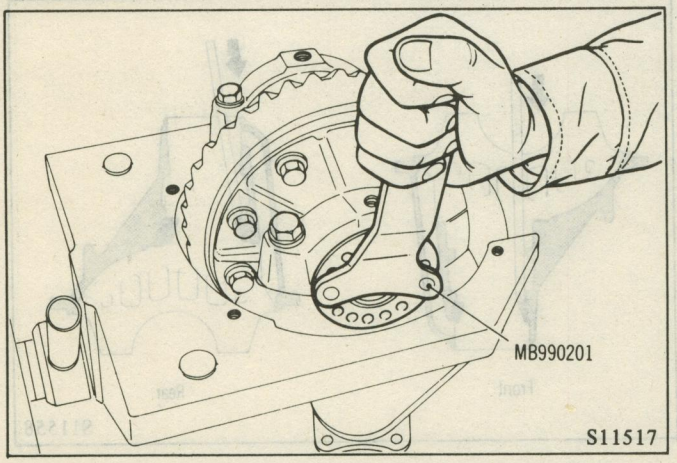



Fig. 19 Removing the Side Bearing Nut

(2) Remove the carrier cap. Then remove the gear case assmbly using the wooden handle of a hammer or similar object so that gears and other parts will not be damaged.

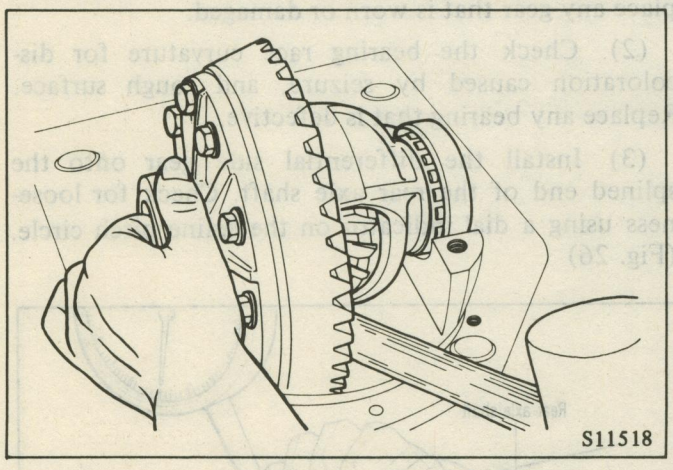



Fig. 20 Removing the Differential Gear Case

(3) Using the special tools (C-293-PA, C-4570 and MB990723), pull off the differential side bearing.

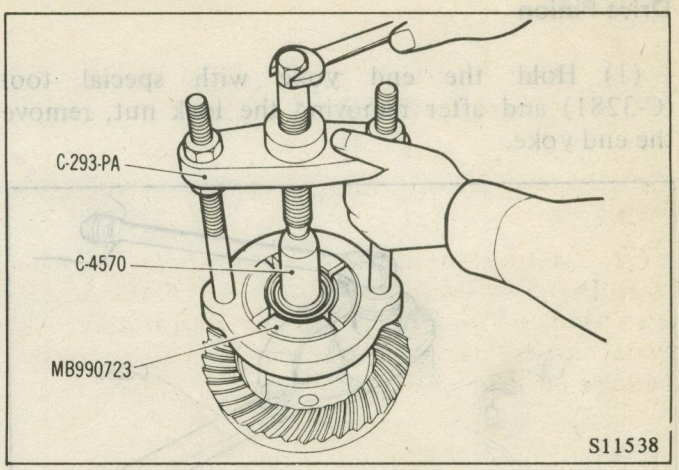



Fig. 21 Removing the Side Bearing

NOTE: The removed left and right bearings and shims should be retained for reassembly.

(4) Loosen the ring gear mounting bolts in diagonal sequence, and then remove.

(5) Drive out the pinion shaft lock pin from the ring gear back side using a long punch. Then pull out the pinion shaft and the pinion. The side gears with the spacers can then be removed. (Fig. 22)

NOTE: The removed side gears and spacers, left and right, should be retained for reassembly.

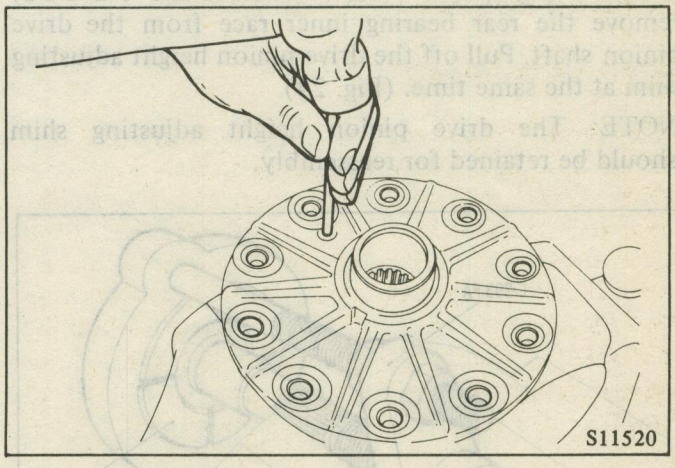



Fig. 22 Driving Out the Pinion Shaft Lock Pin

### Drive Pinion

(1) Hold the end yoke with special tool (C-3281) and after removing the lock nut, remove the end yoke.

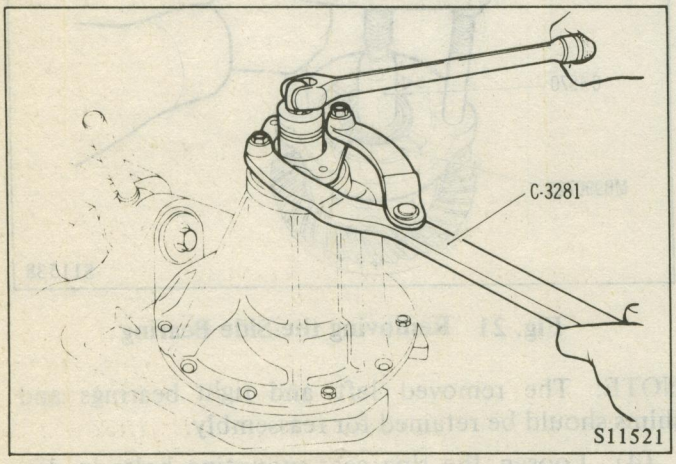



Fig. 23 Removing the End Yoke

(2) Tap the drive pinion shaft end with a plastic hammer or a wheel puller and force out the drive pinion with the adjusting shim, drive pinion bearing (rear) inner race, drive pinion spacer and the preload adjusting shim still installed on the drive pinion shaft.

(3) Using special tools (C-293-PA and C-293-36) remove the rear bearing inner race from the drive pinion shaft. Pull off the drive pinion height adjusting shim at the same time. (Fig. 24)

NOTE: The drive pinion height adjusting shim should be retained for reassembly.

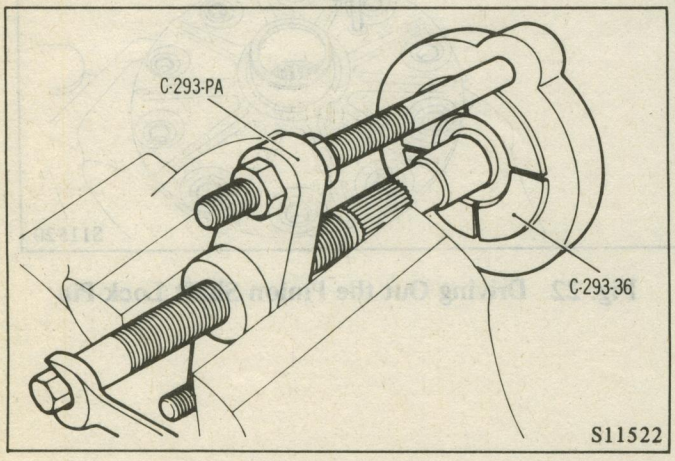



Fig. 24 Removing the Drive Pinion Bearing (Rear)

(4) Remove the drive pinion bearing (front and rear) outer race. In case of drive pinion bearing (front) outer race, remove oil seal at the same time. (Fig. 25)

NOTE: The removed oil seal should not be reused.

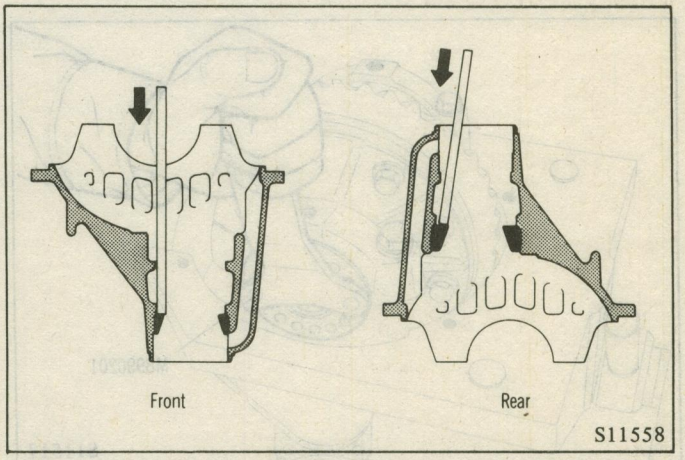



Fig. 25 Removing the Outer Race of Drive Pinion Bearing (Front and Rear)

## INSPECTION

(1) Check differential gear tooth contact. Replace any gear that is worn or damaged.

(2) Check the bearing race curvature for discoloration caused by seizure, and rough surface. Replace any bearing that is defective.

(3) Install the differential side gear onto the splined end of the rear axle shaft. Check for looseness using a dial indicator on the spline pitch circle. (Fig. 26)

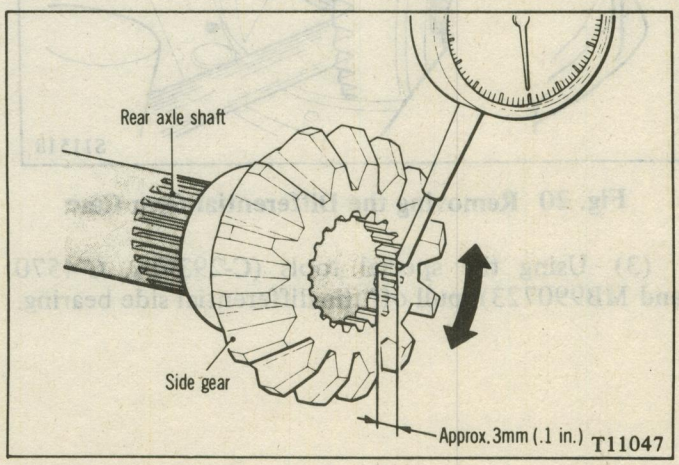



Fig. 26 Checking the Axle Shaft Spline for Looseness

| Description | Standard value mm (in.) | Service limit mm (in.) |
|---|---|---|
| Side gear-to-rear axle shaft clearance (on pitch circle) | 0.054 to 0.171 (.0021 to .0067) | 0.25 (.0098) |

(4) Check the differential pinion-to-pinion shaft clearance. Replace any part that is worn or seized.

| Description | Standard value mm (in.) |
|---|---|
| Pinion gear-to-pinion shaft clearance | 0 to 0.063 (0 to .0025) |

## ASSEMBLY AND ADJUSTMENT

### Differential Assembly

(1) Install the thrust spacers in the same positions behind the side gears as before disassembly. Then assemble the side gears (left and right) in the differential case.

(2) With pinion washers attached to the pinion gears, insert the both pinion gears at the same time and mesh with the side gears by rotating the pinions.

(3) Complete the temporary assembly of the differential gears by inserting the drive pinion shaft.

(4) Check the pinion and side gear backlash. If the backlash is out of the standard value, adjust it by selecting a side gear thrust spacer of proper thickness. The backlash, left and right, should be adjusted to an equal value. (Fig. 27)

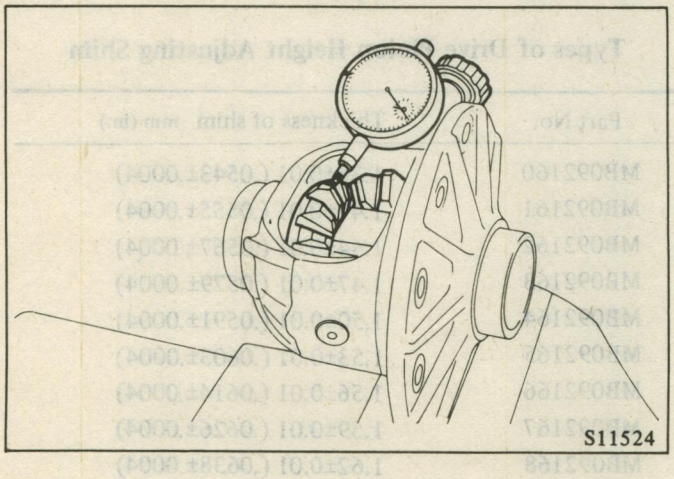



**Fig. 27 Checking the Pinion and Side Gear Backlash**

| Description | Standard dimension mm (in.) |
|---|---|
| Differential pinion and side gear backlash | 0.051 to 0.127 (.002 to .005) |

**Range of Side Gear Spacer**

| Part No. | Thickness of spacer mm (in.) |
|---|---|
| MB092034 | $0.8^{-0.08}_{-0.17}$ $(.0315^{-.0031}_{-.0067})$ |
| MB092035 | $0.8^{-0.18}_{-0.27}$ $(.0315^{-.0071}_{-.0106})$ |
| MB092036 | $0.8^{0}_{-0.07}$ $(.0315^{0}_{-.0028})$ |

(5) Align the drive pinion shaft with the drive pinion shaft lock pin hole in the differential case, and drive the lock pin into the hole from the back side of the ring gear. Securely stake the lock pin at two places with a punch to prevent it from moving. (Fig. 28)

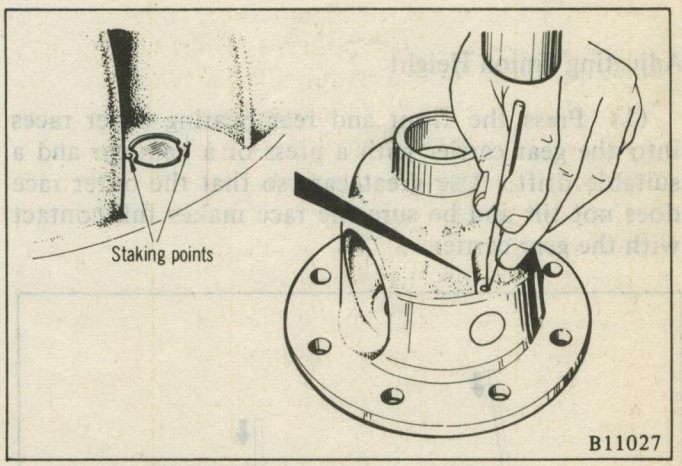



**Fig. 28 Staking the Lock Pin**

(6) Remove old adhesive from the ring gear mounting bolts using a wire brush and from the internal thread using hand tap. Apply "LOCTITE 271" supplied by LOCTITE Corp, or equivalent anaerobic adhesive. (Fig. 29) Temporarily tighten each bolt evenly, and then tighten to the standard torque in a criss-cross fashion.

NOTE: Keep the differential stationary to harden the anaerobic adhesive for half an hour to one hour.

| Part to be tightened | Torque Nm (ft-lbs.) |
|---|---|
| Ring gear to differential case | 78 to 88 (58 to 65) |

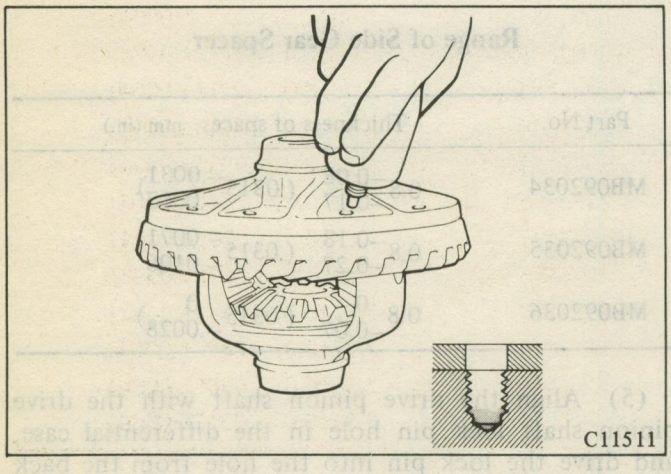



**Fig. 29 Applying the Anaerobic Adhesive**

## Drive Pinion

Adjusting Pinion Height

(1) Press the front and rear bearing outer races into the gear carrier with a press or a hammer and a suitable drift. Use great care so that the outer race does not tilt and be sure the race makes full contact with the gear carrier.

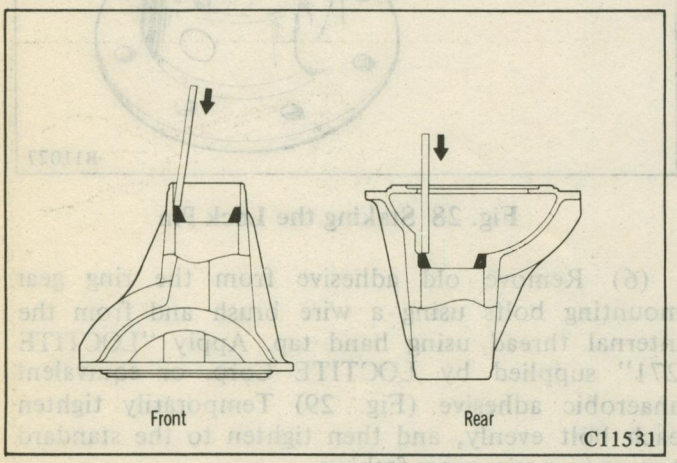



**Fig. 30 Driving in the Bearing Outer Race**

(2) Install the parts ①, ⑥, ②, ⑦, ③, ④ and ⑤ as assembled in this order with special tool (MB990819) into the gear carrier, (Fig. 31)
Gradually tighten nut to produce 0.7 to 1.0 Nm (6 to 9 in-lbs.) without oil seal.

CAUTION:
**When installing the washer, apply a thin coat of grease on the washer (yoke side only).**

(3) Attach special tool (MB990552) to the gear carrier, at side bearing seats and measure the clearance between the two special tools (MB990552 and MB990819).

| Pinion height mm (in.) | Drive pinion setting gauges | |
|---|---|---|
| 100 ± 0.03 (3.937 ± .0012) | Cylinder gauge<br>Pinion gauge | MB990552<br>MB990819 |

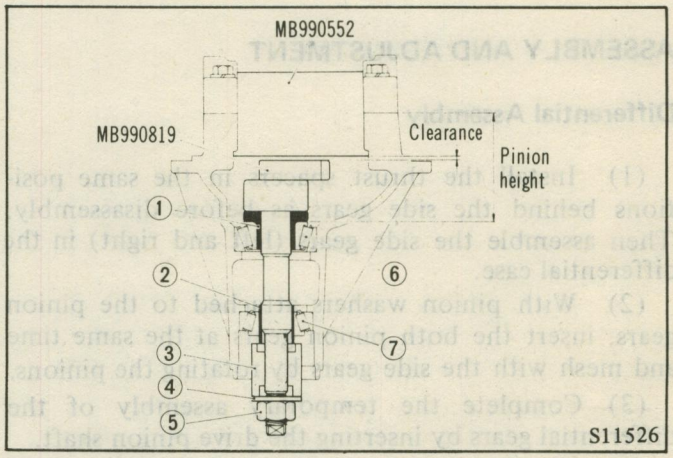



**Fig. 31 Measuring Pinion Height (Clearance)**

(4) Select a shim of a thickness equivalent to the clearance to make the pinion height within tolerance of ±0.03 mm (± .0012 in.).

**Types of Drive Pinion Height Adjusting Shim**

| Part No. | Thickness of shim mm (in.) |
|---|---|
| MB092160 | 1.38±0.01 (.0543±.0004) |
| MB092161 | 1.41±0.01 (.0555±.0004) |
| MB092162 | 1.44±0.01 (.0567±.0004) |
| MB092163 | 1.47±0.01 (.0579±.0004) |
| MB092164 | 1.50±0.01 (.0591±.0004) |
| MB092165 | 1.53±0.01 (.0603±.0004) |
| MB092166 | 1.56±0.01 (.0614±.0004) |
| MB092167 | 1.59±0.01 (.0626±.0004) |
| MB092168 | 1.62±0.01 (.0638±.0004) |
| MB092169 | 1.65±0.01 (.0650±.0004) |
| MB092170 | 0.30±0.013 (.0118±.0005) |

NOTE: If pinion height has to be adjusted by more than 1.65 mm (.0650 in.) use two shims including one 0.3 mm (.0118 in.) thick.

(5) Install the selected shim between the drive pinion and the rear bearing. Using special tool (MB990802), press the bearing onto the drive pinion shaft.

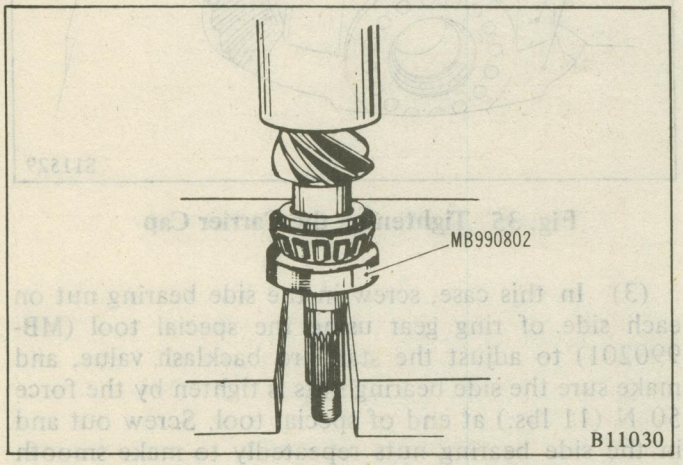



Fig. 32 Installing the Drive Pinion Rear Bearing

(6) If the gear set is to be replaced, install new shims of the same thickness as the shims previously used on the drive pinion.

**CAUTION:**
**In determining the thickness of the shim pack, the amount of compression of the shim pack and wear of the bearing (when the old bearing is reused) should be taken into account.**

Adjusting Pinion Bearing Preload

(1) Insert preload adjusting shim between pinion spacer and front bearing. Tighten end yoke to specified torque, to obtain standard preload.

| Description | Standard value Nm (in-lbs.) | Remarks |
|---|---|---|
| Drive pinion bearing preload | 1.0 to 1.2 (9 to 11) | With oil seal |
| | 0.7 to 1.0 (6 to 9) | Without oil seal |

**Types of Preload Adjusting Shims**

| Part No. | Thickness of shim mm (in.) |
|---|---|
| MB092130 | 0.30±0.01 (.0118±.0004) |
| MB092131 | 2.00±0.01 (.0787±.0004) |
| MB092132 | 2.03±0.01 (.0799±.0004) |
| MB092133 | 2.06±0.01 (.0811±.0004) |
| MB092134 | 2.09±0.01 (.0823±.0004) |
| MB092135 | 2.12±0.01 (.0835±.0004) |
| MB092136 | 2.15±0.01 (.0846±.0004) |
| MB092137 | 2.18±0.01 (.0858±.0004) |
| MB092138 | 2.21±0.01 (.0870±.0004) |
| MB092139 | 2.24±0.01 (.0882±.0004) |
| MB092140 | 2.27±0.01 (.0894±.0004) |
| MB092141 | 2.30±0.01 (.0906±.0004) |
| MB092142 | 2.33±0.01 (.0917±.0004) |

NOTE: Beside the preload adjusting shims, the pinion spacers may be used for adjustment.

**Pinion Spacer**

| Part No. | Length mm (in.) | Color code |
|---|---|---|
| MB092346 | $56.67^{0}_{-0.14}$ ($2.2311^{0}_{-.0016}$) | – |
| MB092347 | $57.01^{0}_{-0.04}$ ($2.2445^{0}_{-.0016}$) | White |

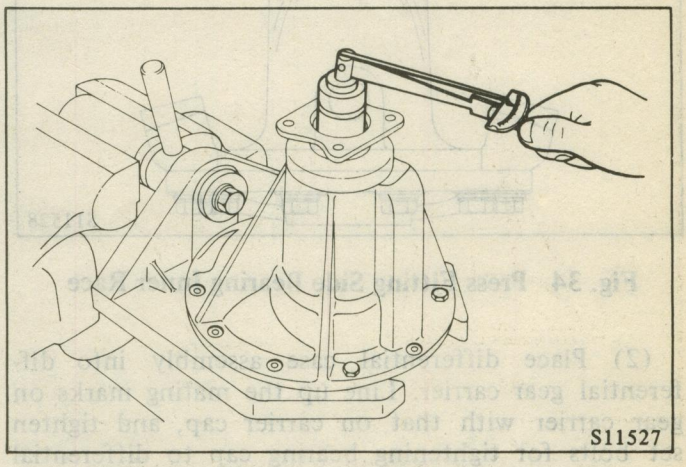



Fig. 33 Measuring the Drive Pinion Bearing Preload

(2) After completion of the drive pinion bearing preload adjustment, remove the end yoke. Apply a thin coat of grease to the periphery of the oil seal, and drive it into the gear carrier. Subsequently apply grease (containing 50% or more of molybdenum disulfide) to the oil seal lip contact surface of the end yoke shaft, insert the end yoke, and tighten the self-locking nut to the specified torque.

| Specified grease | Quantity |
|---|---|
| MOPAR Multi-Mileage Lubricant Part Number 2525035 or equivalent | As required |

| Part to be tightened | Torque Nm (ft-lbs.) |
|---|---|
| Self-locking nut (final tighteness) | 186 to 245 (137 to 180) |

**Side Bearing**

(1) Press in the side bearing inner race to the differential case using special tool (MB990802).

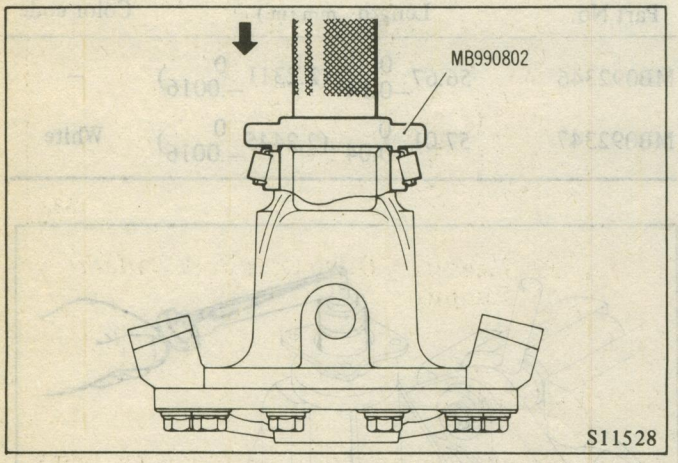



**Fig. 34 Press Fitting Side Bearing Inner Race**

(2) Place differential case assembly into differential gear carrier. Line up the mating marks on gear carrier with that on carrier cap, and tighten set bolts for tightening bearing cap to differential carrier with fingers. Then install side bearing nut, and tighten it on carrier cap to the specified torque.

| Part to be tightened | Torque Nm (ft-lbs.) |
|---|---|
| Carrier cap | 54 to 64 (40 to 47) |

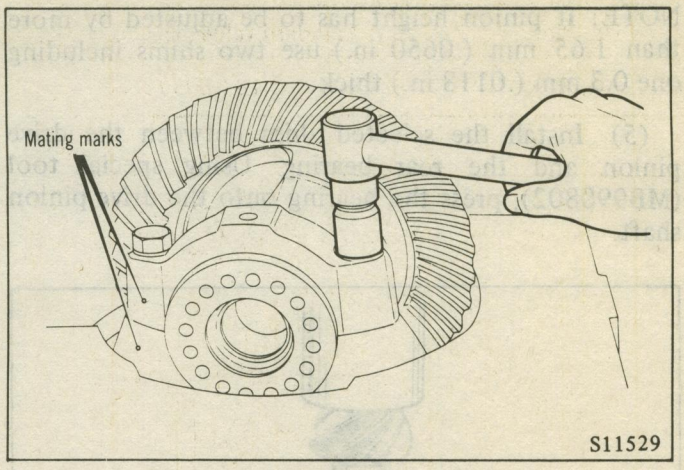



**Fig. 35 Tightening the Carrier Cap**

(3) In this case, screw in the side bearing nut on each side of ring gear using the special tool (MB-990201) to adjust the standard backlash value, and make sure the side bearing nuts is tighten by the force 50 N (11 lbs.) at end of special tool. Screw out and in the side bearing nuts repeatedly to make smooth fastening and screw the side bearing nuts up to its tightening effort rises steeply.

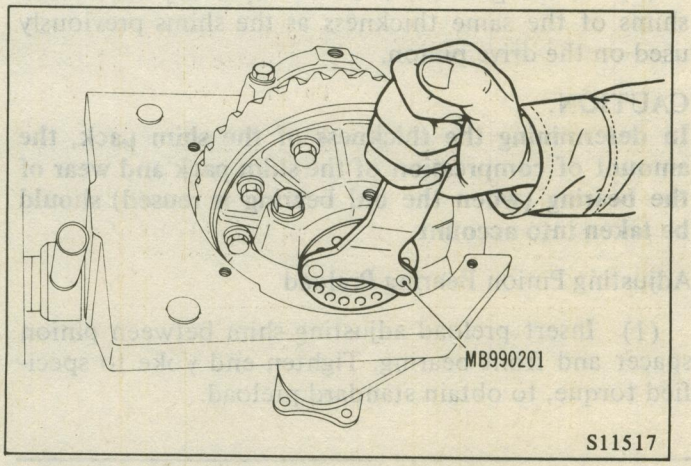



**Fig. 36 Tightening Side Bearing Nut**

(4) Apply a dial indicator to the ring gear tooth, and make certain that backlash is within the standard value.

NOTE: If the backlash is smaller than the standard value, loosen the bearing nut on the back side of the ring gear and tighten the bearing nut on the teeth side by the same amount.

| Description | Standard value mm (in.) |
|---|---|
| Backlash | 0.13 to 0.18 (.005 to .007) |

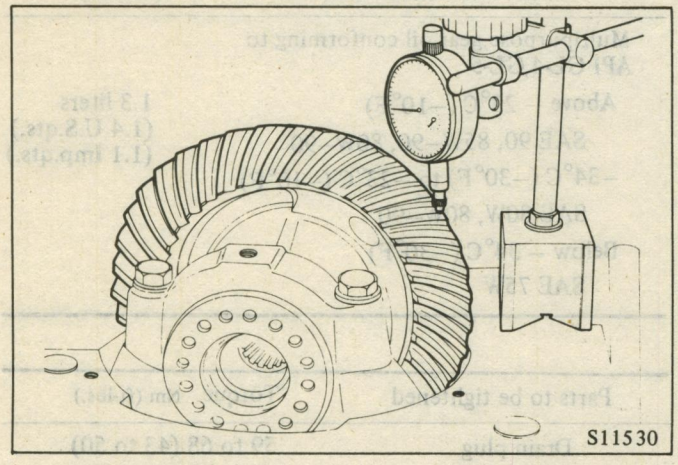



**Fig. 37 Backlash Adjustment**

(5) After adjustment, tighten bearing nut on both sides by a half pitch to give preload on side bearings. One pitch means space between two adjacent holes on the side of the bearing nuts.

(6) Measure the backlash again to ensure that it is within the standard value. Choose a lock plate of proper type, and tighten it to the specified torque.

| Part to be tightened | Torque Nm (ft-lbs.) |
|---|---|
| Lock plate | 15 to 22 (11 to 16) |

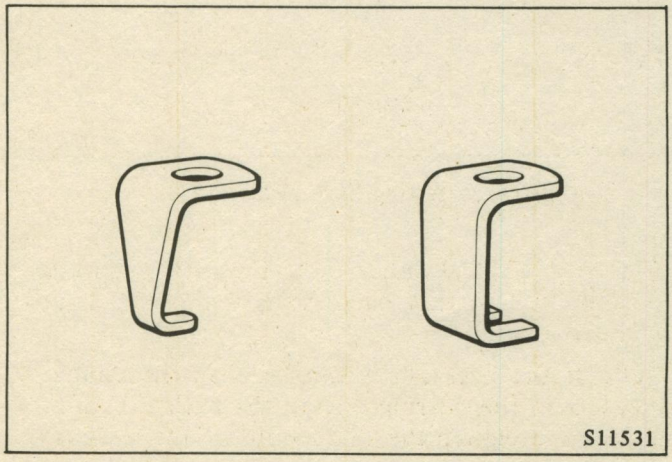



**Fig. 38 Lock Plate**

### Ring Gear

(1) Apply a dial indicator to the back of the ring gear and measure the amount of runout. (Fig. 39)

(2) If the runout exceeds the standard dimension, change the mounting position of ring gear to differential case and measure the runout again. If the runout is still excessive, replace ring gear or the differential case as necessary.

| Description | Standard dimension mm (in.) |
|---|---|
| Ring gear back surface runout | 0.05 (.002) or less |

CAUTION:
**Measure the runout at 4 or more points.**

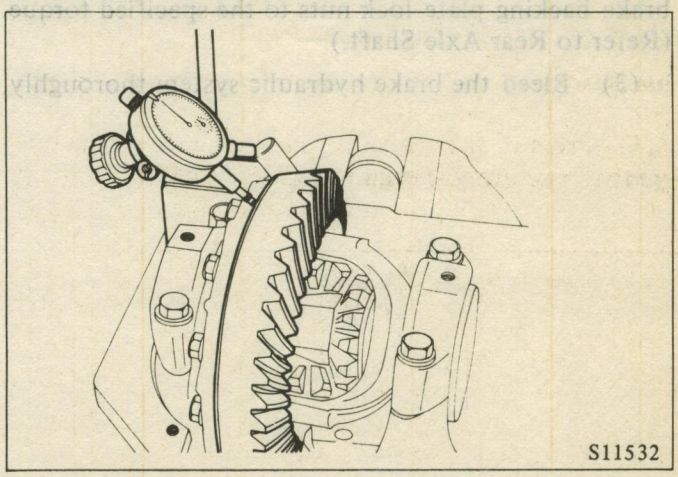



**Fig. 39 Measuring Drive Gear Back Surface Runout**

## INSTALLATION

During installation, observe the following items:

(1) After applying gear oil to the bearing and gear sliding surfaces, apply a sealer to the axle housing and packing. Install packing, positioning the embossed portion as shown in Fig. 40. Then install the differential assembly to the rear axle housing. Tighten the fasteners to the specified torque.

| Parts to be tightened | Torque Nm (ft-lbs.) |
|---|---|
| Differential assembly to axle housing mounting fasteners | 25 to 30 (18 to 22) |

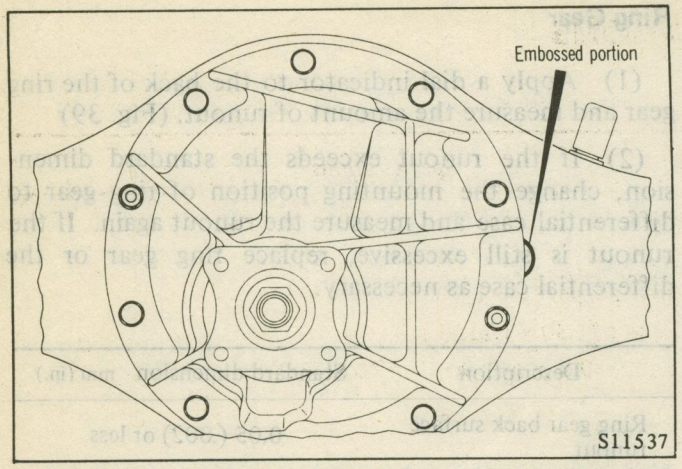



**Fig. 40 Installing the Packing**

(2) After insertion of the rear axle shafts, tighten brake backing plate lock nuts to the specified torque. (Refer to Rear Axle Shaft.)

(3) Bleed the brake hydraulic system thoroughly.

(4) After completing assembly of each part, apply gear oil to the axle housing and tighten the plug to the specified torque.

| Gear oil recommended | Quantity |
|---|---|
| Multipurpose gear oil conforming to API GL-4,GL-5 | |
| Above – 23°C (–10°F) SAE 90, 85W–90, 80W–90 | 1.3 liters (1.4 U.S.qts.) (1.1 Imp.qts.) |
| –34°C (–30°F) to –23°C (–10°F) SAE 80W, 80W–90 | |
| Below – 34°C (–30°F) SAE 75W | |

| Parts to be tightened | Torque Nm (ft-lbs.) |
|---|---|
| Drain plug | 59 to 68 (43 to 50) |
| Filler plug | 39 to 59 (29 to 43) |

## SPECIFICATIONS

| Description | Specifications |
|---|---|
| Rear axle housing type | Banjo-type |
| Rear axle shaft | |
| Support system | Semi-floating type |
| Shaft dia. (central part x serration) | 33 x 30.7 mm (1.30 x 1.21 in.) |
| Bearing (O.D. x I.D. x W) | 73.8 x 40.0 x 19.8 mm (2.90 x 1.57 x .78 in.) |
| Differential | |
| Reduction gear type | Hypoid gear |
| Reduction ratio | 3.909 |
| Differential gear type | Straight bevel gears |
| No. of teeth | |
| Ring gear | 43 |
| Drive pinion | 11 |
| Side gears | 14 |
| Pinion gears | 10 |
| Bearing (O.D. x I.D. x W) | |
| Side | 80.0 x 45.2 x 19.8 mm (3.15 x 1.78 x .78 in.) |
| Front | 68.3 x 30.2 x 22.2 mm (2.69 x 1.19 x .87 in.) |
| Rear | 76.2 x 36.5 x 29.4 mm (3.00 x 1.44 x 1.16 in.) |

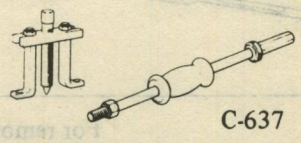
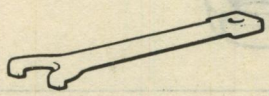
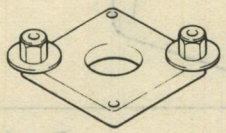
## SERVICING STANDARD

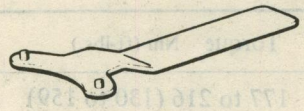
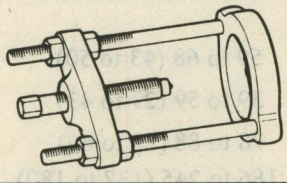
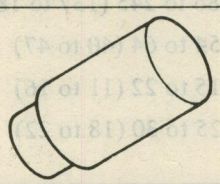
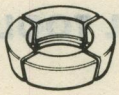
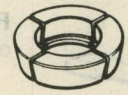
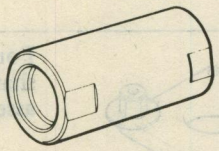
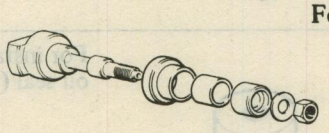
| Description | Standard dimension | Repair limit | Service limit | Remarks |
|---|---|---|---|---|
| Eccentricity of axle shaft | | | | |
| Squareness of axle shaft flange end | Less than 0.06 mm (.0024 in.) | | 0.06 mm (.0024 in.) | |
| Concentricity of axle shaft center | Less than 1.0 mm (.039 in.) | | 1.0 mm (.039 in.) | |
| Clearance between bearing case and axle housing | 0.05 to 0.20 mm (.002 to .008 in.) | | | |
| Axial play of rear axle shaft | 0.05 to 0.20 mm (.002 to .008 in.) | | | |
| Clearance between side gear and axle shaft | 0.054 to 0.171 mm (.0021 to .0067 in.) | | 0.25 mm (.0098 in.) | On pitch circle |
| Clearance between differential pinion and pinion shaft | 0 to 0.063 mm (0 to .0025 in.) | | | |
| Backlash between differential pinion and side gear | 0.051 to 0.127 mm (.002 to .005 in.) | | | |
| Preload of drive pinion | 1.0 to 1.2 Nm (9 to 11 in-lbs.) | | | With oil seal |
| | 0.7 to 1.0 Nm (6 to 9 in-lbs.) | | | Without oil seal |
| Preload of differential side bearing | Tighten side bearing nuts on both sides by a half pitch, after adjusting backlash between the ring gear and drive pinion. | | | One pitch means the space between two adjacent hole on the side of the side bearing nut. |
| Eccentricity of back side of ring gear | Less than 0.05 mm (.002 in.) | | | |
| Backlash between drive pinion and ring gear | 0.13 to 0.18 mm (.005 to .007 in.) | | | |

## TIGHTENING TORQUE

| Description | Torque Nm (ft-lbs.) | Remarks |
|---|---|---|
| Rear axle shaft bearing lock nut | 177 to 216 (130 to 159) | |
| Bearing retainer outer, brake backing plate and axle housing installation | 49 to 59 (36 to 43) | |
| Drain plug | 59 to 68 (43 to 50) | |
| Filler plug | 39 to 59 (29 to 43) | |
| Ring gear to differential case | 78 to 88 (58 to 65) | |
| Final drive locking nut final tightening | 186 to 245 (137 to 180) | |
| Differential carrier cap tightening | 54 to 64 (40 to 47) | Align mating marks |
| Lock plate tightening | 15 to 22 (11 to 16) | |
| Differential gear carrier assembly and axle housing installation | 25 to 30 (18 to 22) | |

## SPECIAL TOOLS

| Tool No. | Name of tool | Illustration | Use | Remarks |
|---|---|---|---|---|
| C-637<br>CT-1003 | Slide hammer<br>Puller | CT-1003<br>  <br>C-637 | For pulling off rear axle shaft and front hub | |
| MB990785 | Lock nut special spanner |  | For removal and installation of rear axle bearing lock nut | |
| MB990787-A | Puller |  | For removal of rear axle shaft from backing plate assembly and bearing | |
| C-4572 | Axle shaft oil seal (inner) installer |  | For installation of axle shaft oil seal (inner) | |

| Tool No. | Name of tool | Illustration | Use | Remarks |
|---|---|---|---|---|
| MB990201 | Side bearing adjusting special spanner |  | For removal and installation of differential side bearing nut | |
| C-293-PA | Puller |  | For removal of side bearing and pinion rear bearing | |
| C-4570 | Extension |  | For removal of side bearing | |
| MB990723 | Differential side bearing remover |  | For removal of differential side bearing | |
| C-3281 | End yoke holder |  | For holding end yoke | |
| C-293-36 | Pinion rear bearing remover |  | For removing of pinion rear bearing | Use with C-293-PA |
| MB990552 | Cylinder gauge |  | For checking pinion height | Use with feeler gauge |
| MB990819 | Pinion gauge |  | For checking pinion height | Use with feeler gauge |
| MB990802 | Pinion rear bearing and side bearing installer |  | For installation of pinion rear bearing and side bearing | |