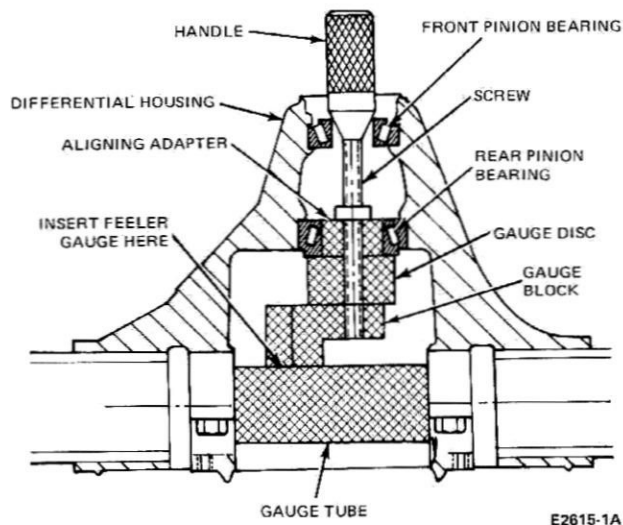




E2615-1A

FIG. 27 Using Pinion Depth Gauge Tool T75P-4020-A

exceed specifications, install a new ring gear. If the runout still exceeds specifications, the ring gear is true and the trouble is due to either a damaged casting or worn bearings.

7. Remove the differential case from the carrier and remove the side bearings from the case.
8. Install new bearings on the case hubs, and again install the differential assembly in the carrier without the ring gear.
9. Check the case runout again with the new bearings. If the runout is now within limits, the old bearings were excessively worn. Use the new bearings for assembly. If the runout is still excessive, the case is damaged and should be replaced.

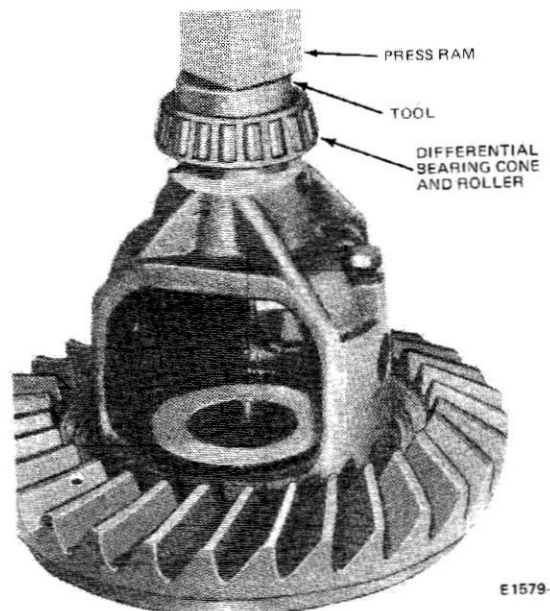
ASSEMBLY OF AXLE

Refer to Part 15-01 of this manual for Cleaning and Inspection procedures before starting assembly operations.

ASSEMBLY OF DIFFERENTIAL CASE

Carefully clean the tapped holes in the ring gear in a suitable solvent. Dry thoroughly.

1. Place the ring gear in the differential case. If the new bolts to be used show a green coating over approximately 1/2-inch of the threaded area, install as is. If not coated, apply a small amount of Loctite (Part Number C3AZ-19554-A) or equivalent. Torque to specification. **It is mandatory that bolts used once, should not be used again.**
2. If the differential bearings were removed, press them on as shown in Fig. 28.



E1579-1B

FIG. 28 Differential Bearing Installation

3. Insert the pinion gear shaft lock bolt into the case (loosely).

INSTALLATION OF DRIVE PINION AND DIFFERENTIAL CASE

1. Place the shim(s) and pinion rear bearing cone on the pinion shaft. Press the bearing and shim(s) firmly against the pinion shaft shoulder (Fig. 29).
2. Place a new pinion bearing preload (collapsible) spacer on the pinion shaft.

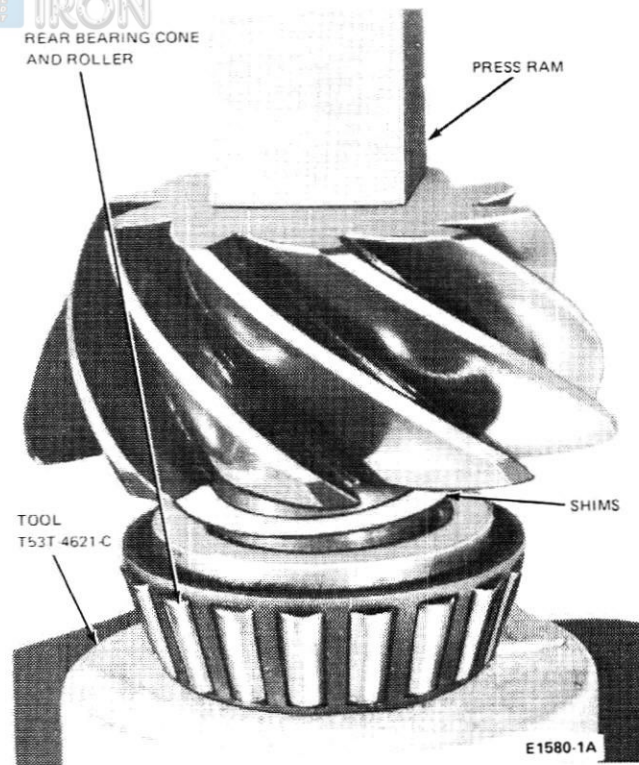


FIG. 29 Drive Pinion Bearing Installation

3. Lubricate the pinion rear bearing with axle lubricant.
4. Lubricate the pinion front bearing with axle lubricant. Lubricate the pinion front bearing cone, and place it in the carrier housing.
5. Install a new pinion oil seal in the carrier casting (Fig. 30).

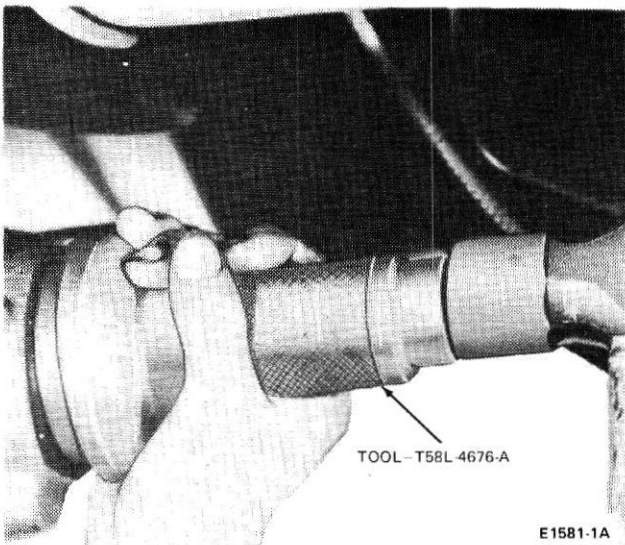


FIG. 30 Installing Pinion Seal

6. Insert the drive pinion shaft (U-joint) flange into the pinion seal and hold it firmly against the pinion front bearing cone. From the rear of the carrier casting, insert the pinion shaft into the flange.
7. Apply a small amount of lubricant to the washer side of the flange nut and start the nut. **Use a new**

nut. Hold the flange with the tool shown in Fig. 20 and tighten the pinion shaft nut. As the pinion shaft nut is tightened, the pinion shaft is pulled into the front bearing cone and into the flange.

As the pinion shaft is pulled into the front bearing cone, pinion shaft end play is reduced. While there is still end play in the pinion shaft, the flange and bearing cone will be felt to bottom on the collapsible spacer.

From this point, a much greater torque must be applied to turn the pinion shaft nut, since the spacer must be collapsed. Very slowly, tighten the nut and check often to see that the pinion bearing preload does not exceed the specified limits.

If the pinion shaft nut is tightened to the point that pinion bearing preload exceeds the limits, the pinion shaft must be removed and a new collapsible spacer installed. Do not decrease the preload by loosening the pinion shaft nut. This will remove the compression between the pinion front and rear bearing cones and the collapsible spacer, and result in the front bearing cone turning on the pinion shaft.

8. As soon as there is preload on the bearings, **turn the pinion shaft in both directions several times to seat the bearing rollers.**
9. Adjust the bearing preload to specification. Measure the preload with the tool shown in Fig. 31.

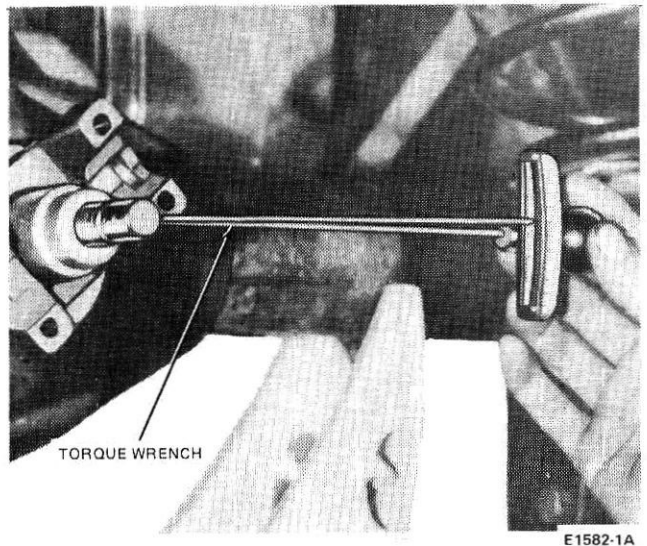


FIG. 31 Checking Pinion Bearing Preload

10. Apply a thin coating of lubricant on the bearing bores so that the differential bearing cups will move easily.
11. Place the cups on the bearings and set the differential case assembly in the carrier casting.

If the gear set is of the **nonhunting or partial nonhunting type**, assemble the differential case and ring gear assembly in the carrier so that the marked tooth on the pinion indexes between the marked teeth on the ring gear as shown in Fig. 32.

Be sure to match gears as indicated. When assembled out of time, noise, excessive wear, and possible failure may result.

When installing the hunting-type gear set (no timing marks), place the differential case and ring gear assembly in the carrier without regard to the matching of any particular gear teeth.



FIG. 32 Typical Gear Set Timing Marks

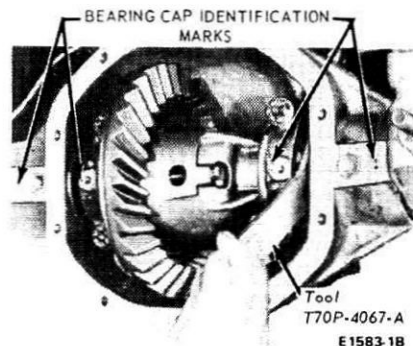


FIG. 33 Bearing Cap Installation

12. Slide the case assembly along the bores until a slight amount of backlash is felt between the gear teeth. Hold the differential case in place.
13. Set the adjusting nuts in the bores so that they just contact the bearing cups.
14. Carefully position the bearing caps on the carrier casting. Match the marks made when the caps were removed (Fig. 33).
15. Install the bearing cap bolts and lockwashers. As the bolts are tightened, turn the adjusting nut with the tool shown in Fig. 33.
16. If the adjusting nuts do not turn freely as the cap bolts are tightened, remove the bearing caps and inspect for damaged threads or incorrectly positioned caps. Tighten the bolts to the specified torque to be sure that the cups and adjusting nuts are seated. Loosen the cap bolts, and torque them to only 5 ft-lbs before making adjustments. Refer to Part 15-01, for backlash and bearing preload adjustment procedures.
17. Clean the marking compound from the gear teeth.
18. Install both side bearing adjusting nut locks (bolts) and torque to specification.
19. Install the differential side gears and thrust washers.
20. Install the rear wheel bearings, seals, rear axle shafts, wheels and tires, and the axle carrier cover as outlined under Rear Axle Shaft, Wheel Bearing and Oil Seal Replacement.
21. Raise the axle all the way up. Remove the safety support stands.
22. Connect the track bar to the mounting stud, if so equipped. Install the washer and retaining nut, and torque the nut to specification.
23. Remove the oil seal replacer tool from the transmission extension housing. Install the front end of the drive shaft on the transmission output shaft. Align the scribe marks on the cups, flange and drive shaft, and connect the rear end of the drive shaft to the axle U-joint flange. Torque the retaining bolts to specification.
24. Refill the axle with the specified lubricant. Vehicle must be level.
25. Lower the vehicle.

SPECIFICATIONS

DRIVING AXLE IDENTIFICATION (INTEGRAL CARRIER) – WER

Ident. Tag	Ratio	Ring Gear Dia. (Inches)	Diff. Type ①
WER-AA	2.47:1	8.7	C2
WER-AB	2.47:1	8.7	C2
WER-AC	2.47:1	8.7	C2

① Type: C2 – Conventional Differential – 2 Pinion

ADJUSTMENT TORQUE SPECIFICATIONS (INTEGRAL CARRIER) –WER

Description	Torque	Torque
	In. Lb.	Ft. Lb.
Minimum torque required to tighten pinion flange nut to obtain correct pinion bearing preload		140 ①
Pinion Bearing Preload – (Collapsible spacer) ② Original Bearings – 8.7 inch New Bearings – 8.7 inch	8-14	
	17-27	

① If pinion bearing preload exceeds specification before this torque is obtained, install a new spacer.
② With Oil Seal.

CLEARANCE, TOLERANCE AND ADJUSTMENTS (INTEGRAL CARRIER) – WER

Description	Inches	Description	Inches
Maximum Runout of Backface of Ring Gear	0.003	Nominal Pinion Locating Shim	0.030
Differential Side Gear Thrust Washer Thickness	0.030-0.032	Available Pinion Gear Shims in Steps of 0.001 – 8.7 inch	0.022-0.038
Differential Pinion Gear Thrust Washer Thickness	0.030-0.032		
Differential Bearing Preload (Case Spread Across Differential) New Bearings – 8.7 inch Original Bearings – 8.7 inch	0.008-0.012	Backlash between ring gear and pinion teeth	0.008-0.012
		Maximum backlash variation between teeth	0.003
		Maximum radial runout of U-joint flange in Assembly	0.010 – T.I.R.

ATTACHING TORQUE SPECIFICATIONS (INTEGRAL CARRIER) – WER

Description	Torque Ft. Lb.	Description	Torque Ft. Lb.
Differential Bearing Cup Bolt 8.7 inch	70-85	Rear Cover Screw and Washer Assemblies	25-35
		Oil Filler Plug	25-50
Differential Bearing Adjustment Nut Lock Bolts	12-25	Rear Axle Shaft Bearing Retainer Bolt Nuts	20-40
Ring Gear Attaching Bolts 8.7 inch ①	70-85		

① Using Loctite

LUBRICANT CAPACITIES AND CHECKING PROCEDURES (INTEGRAL CARRIER) – WER

Vehicle	Engine (C.I.D.)	Axle	U.S. Measure Capacity (Pints) ①	Imperial Capacity (Pints) ①
Ford, Mercury, Granada, Monarch	351, 400	8.7 Inch Ring Gear	4.0 ②	3-3/8 ②

① All conventional axles use ESW-M2C-105-A lubricant.
② Approximate refill capacity – actual lubricant capacities are determined by filling to 1/2 inch below bottom of filler plug hole.

SPECIAL TOOLS

Tool Number	Description
T50T-100-A	Impact Slide Hammer
TOOL-1175-AC or TOOL-1175-AE	Grease Seal Remover (Use with Slide Hammer T50T-100-A)
T78P-1177-A	Axle Shaft Oil Seal Replacer
T60K-1177-B	Rear Wheel Bearing Oil Seal Replacer
T70P-4020-A	Pinion Depth Gauge Set
T75P-4020-A	Pinion Depth Gauge Set
T70P-4067-A	Differential Bearing Adjuster Wrench
TOOL-4201-C -4201-D	Differential Backlash and Runout Gauge, with Universal Bracket Dial Indicator and Bracket
T57L-4220-A	Differential Bearing Assembly Remover
T57L-4221-A	Differential Side Bearing Cone Replacer
TOOL-4221-C	Differential Side Bearings Remover
T70P-4221-A	Differential Side Bearings Remover
TOOL-4222-L	Differential Bearing Cones Replacer
TOOL-4222-H	Differential Bearing Cones Replacer
T66L-4234-A T71P-4234-A	Rear Axle Shaft Assembly Remover Adapter (Use with T50T-100-A)
TOOL-OTC-951	Pinion Rear Bearing Remover
T68P-4602-A	Pinion Angle Level Gauge
T68P-4602-AA	Frame

Tool Number	Description
T70P-4067-A	Differential Bearing Adjuster Nut Wrench
T68P-4602-AB	Vial
T68P-4602-AC	Magnet
TOOL-4615-G	Drive Pinion Front Bearing Cup Remover
T60K-4616-A	Pinion Bearing Cups Replacer (Inner and Outer)
T67P-4616-A	Pinion Bearing Cups Replacer
T53T-4621-C	Drive Pinion Bearing Installer
T62F-4621-A	Rear Wheel Bearing
T71P-4621-B	Remover and Installer
T77P-4676-B	Drive Pinion Oil Seal Replacers
T58L-4676-A	
T71P-4676-A	
T65L-4851-A	Flange (Universal Joint) Axle End Remover
TOOL-4851-K	Universal Joint Flange Holder
T68P-4946-A	Locking Differential Gauge (Traction-Lok Clutch Pack)
TOOL T78P-1225-A	Rear Axle Shaft Bearing Installer
TOOL T66L-12132-B	Thread Reducing Adapter

CE2321-2C

Integral Carrier Axle—Ford—(WGX)

PART
15-06

Applies To Fairmont/Zephyr

SUBJECT	PAGE	SUBJECT	PAGE
CLEANING AND INSPECTION	06-3	MAJOR REPAIR OPERATIONS (Cont'd.)	
DESCRIPTION	06-1	Pinion Bearing Cups	06-10
MAJOR REPAIR OPERATIONS		Lubricant Checking Procedure	06-16
Differential Case and Drive Pinion	06-8	REMOVAL AND INSTALLATION	
Differential Bearing Preload		Axle Housing	06-7
and Ring Gear Backlash		Axle Shaft	06-3
Adjustment	06-11	Axle Shaft Seal and/or Bearing	06-4
Differential Case Bearings		Companion Flange	06-7
and Ring Gear	06-10	Drive Pinion Oil Seal	06-5
Drive Pinion and Gear Set	06-14	SPECIFICATIONS	06-17
		SPECIAL SERVICE TOOLS	06-18

CF2697-2A

DESCRIPTION

The rear axle assembly (Fig. 1) is an integral type housing, hypoid gear design with the centerline of the pinion set below the centerline of the ring gear.

The hypoid gear set consists of a 7.5 inch diameter ring gear and an overhung drive pinion which is supported by two opposed tapered roller bearings. Pinion bearing preload is maintained by a collapsible spacer on the pinion shaft and adjusted by the pinion nut.

The housing assembly consists of a cast center section with integral cast suspension attaching 'ears', two steel tube assemblies and a stamped rear cover. The cover uses a silicone sealant rather than a gasket.

The differential case is a one-piece design with two openings to allow for assembly of the internal components and lubricant flow. The differential pinion shaft is retained with a threaded bolt assembled to the case. The differential case assembly is mounted in the carrier between two opposed tapered roller bearings. The bearings are retained in the carrier by removable bearing caps.

- **Differential Bearing Preload and Ring Gear Backlash are adjusted by the use of shims located between the Differential Bearing Cup/Races and the Carrier Housing.**
- **The use of a Hypoid Shim Gage in conjunction with a Differential Shim Gage is required for proper gear set adjustment.**
- **The Semi-Floating Axle Shafts are held in the Housing by C - washer locks positioned in a slot on the Axle Shaft Splined End. These C - washers also fit into a machined recess in the differential side gears within the differential case.**

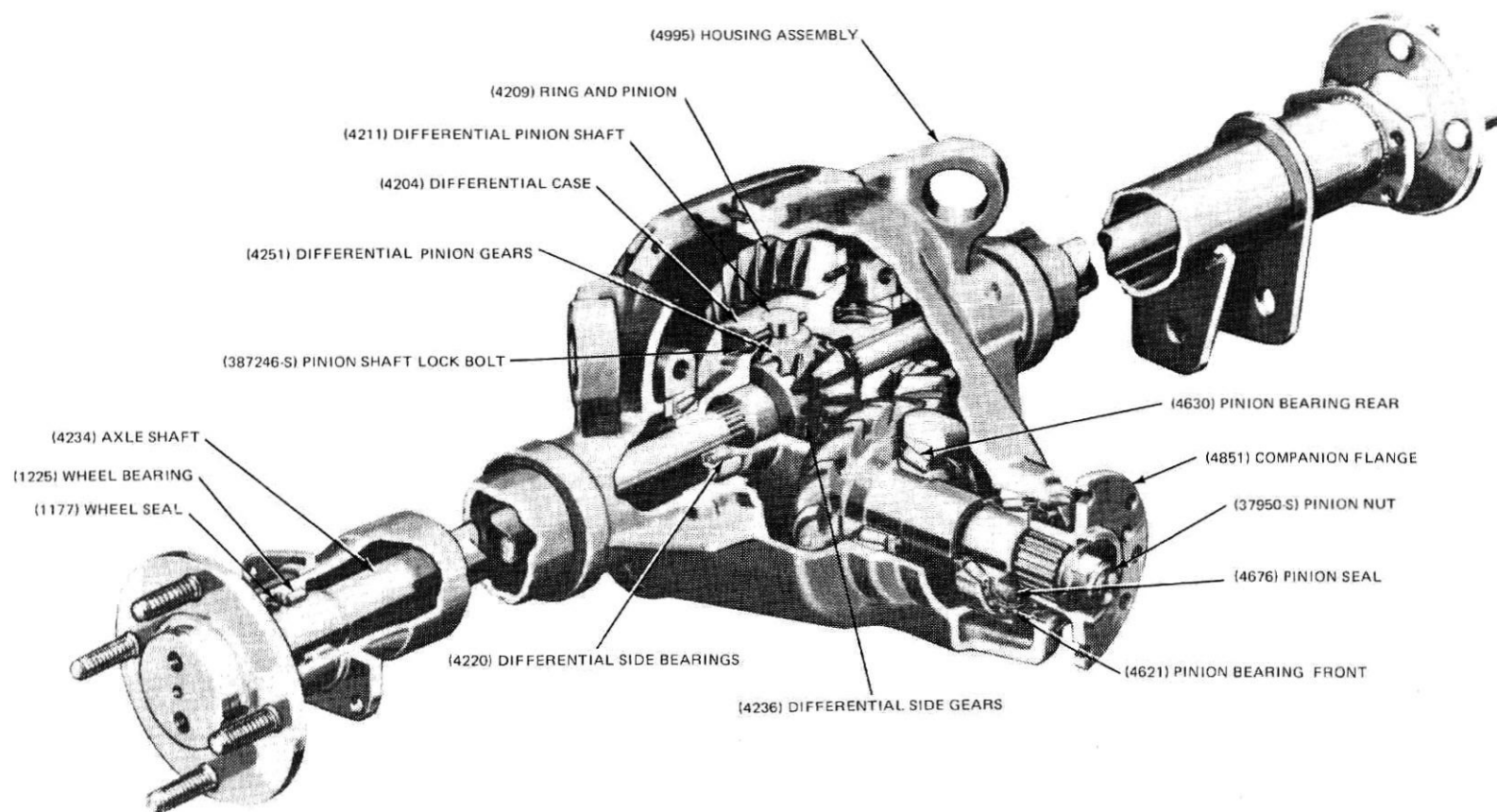


FIG. 1 Axle Assembly—WGX

F2660-2A

CLEANING AND INSPECTION

INSPECTION BEFORE DISASSEMBLY OF CARRIER

The differential case assembly and drive pinion should be inspected before they are removed from the carrier casting. These inspections can find the cause of the complaint and determine the resolution needed.

1. Wipe the lubricant from the internal working parts and visually inspect the parts for wear and/or damage.
2. Rotate the gears to see if there is any roughness which would indicate defective bearings or gears.
3. Check the ring gear teeth for signs of scoring, abnormal wear or nicks/chips.
4. Set up a dial indicator as shown in Figs. 31 and 32, and check ring gear backlash and ring gear backface runout. Refer to the specification section for allowable conditions.
5. Do not check for gear tooth contact pattern. A contact pattern is not an acceptable guide to check for noise. Proper gear set assembly must be checked using the pinion depth gage tool T76P-4020-A which shows correct pinion shim required to assure acceptable running condition. See section on Drive Pinion and Gear Set.

INSPECTION AFTER DISASSEMBLY

Thoroughly clean all parts. Always use new solvent when cleaning bearings. Do not spin dry bearing with compressed air. Oil the bearings immediately to prevent rusting. Inspect the parts for any major defects. Clean the inside of the housing before rebuilding. When a scored or chipped gear set is replaced, (4209), the axle housing must be washed thoroughly. Inspections of individual parts are outlined below.

GEARS

Examine the pinion and ring gear teeth for scoring, excessive wear, nicks and chipping. Worn, scored and

damaged gears cannot be rebuilt to correct a noisy condition.

BEARING CUPS

Check bearing cups for deep scores, galling, or spalling. If a .0015" feeler gage can be inserted between a cup and the bottom of its bore at any point around the cup, the cup must be re-seated.

CONE & ROLLER ASSEMBLIES

When operated in the cups, bearing rollers must turn without roughness. Examine the roller ends for step wear. If inspection reveals either a damaged cup or a damaged cone and roller assembly, both parts should be replaced.

DRIVE PINION FLANGE

Be sure that the surfaces of the flange have not been damaged in removing the driveshaft or in removing the flange from the pinion. The end of the flange that contacts the bearing cone as well as the nut counterbore and seal surface must be smooth and free of nicks.

CARRIER HOUSING

Make sure that the differential bearing bores are smooth. Remove any nicks or burrs from the mounting surfaces of the carrier housing.

DIFFERENTIAL CASE

Make sure that the hubs where the bearings mount are smooth. Carefully examine the differential case bearing shoulders, which may have been damaged when the bearings were removed. The bearing assemblies will fail if they do not seat firmly against the shoulders. Check the fit (free rotation) of the differential side gears in their counterbores.

REMOVAL AND INSTALLATION

AXLE SHAFT REMOVAL

1. Raise vehicle to the desired working height, and remove the rear wheel and tire assembly. Remove the brake drums.
2. Clean all dirt from area of carrier cover with a wire brush and/or cloth.
3. Drain rear axle lubricant by **REMOVING THE HOUSING COVER**.
4. Remove differential pinion shaft lock screw and differential pinion shaft. (Fig. 2)

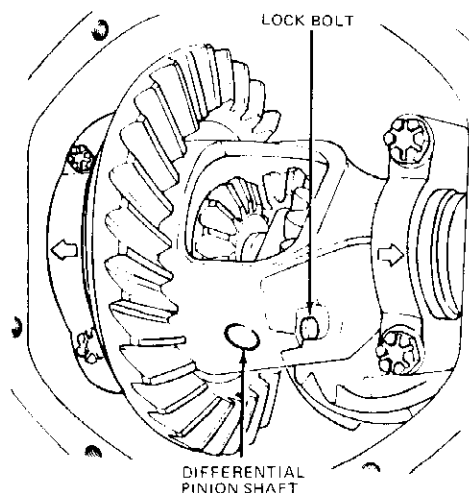


FIG. 2 Differential Pinion Shaft and Lock Bolt