

FORD MOTOR CO. - 7 1/2" & 8 1/2" RING GEAR

All Models
(Except Escort & Lynx)

DESCRIPTION

Hypoid design ring and pinion gear is encased in the integral cast iron housing. A one piece differential case contains a conventional two pinion differential assembly. Semi-floating axle shafts are retained by "C" washer locks at splined end of shafts.

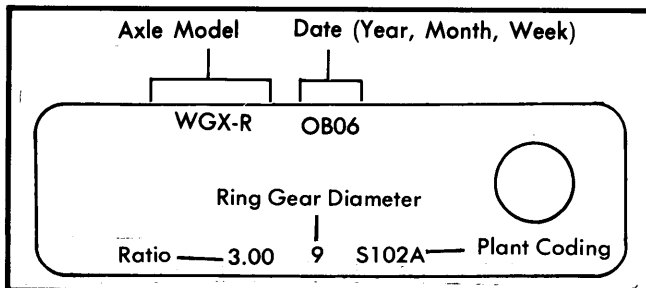


Fig. 1 Rear Axle Identification Tag

AXLE RATIO & IDENTIFICATION

A metal tag stamped with axle model, date of manufacture, ratio, ring gear diameter and assembly plant is attached to rear cover.

Axle Ratio Identification

Code	Axle Ratio	Ring Gear Diameter
WGX-R	3.08:1	7.5"
WGX-S	2.73:1	7.5"
WGX-T	3.45:1	7.5"
WGX-U	2.26:1	7.5"
WGY-C	2.73:1	8.5"
WGY-A	3.08:1	8.5"

REMOVAL & INSTALLATION

AXLE SHAFTS & BEARINGS

Removal - 1) Raise and support vehicle. Remove wheels and brake drums. Remove housing cover and drain lubricant. Remove lock bolt from carrier and push out differential pinion shaft. Push axle toward center and remove "C" locks.

2) Carefully remove axles. Using a slide hammer and suitable puller, remove bearing and seal as a unit.

NOTE - Proper tools must be used for bearing and seal assembly to avoid cocking and premature failure. If seal becomes cocked during installation, remove it and replace with a new one.

Installation - 1) Lubricate bearing with rear axle lubricant and install with driver (T78P-1225-A). Install seal with driver (T78P-1177-A).

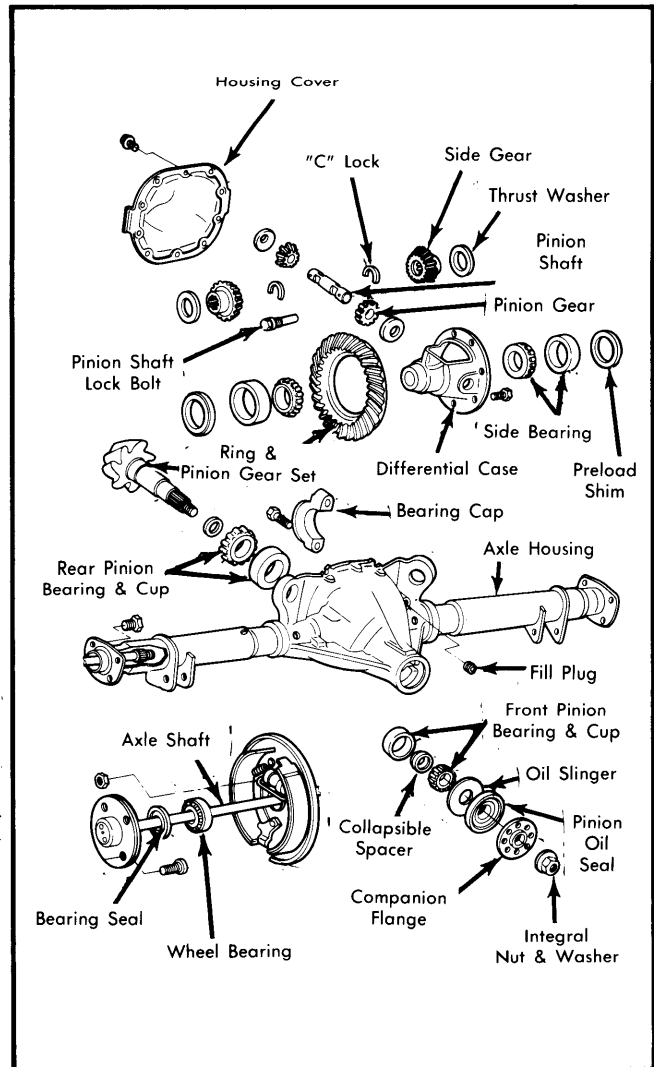


Fig. 2 Exploded View of Ford Motor Co. 7 1/2" & 8 1/2" Integral Housing Axle Assembly

2) Insert axle in housing with care to avoid damage to oil seal. Install "C" locks and push shafts outboard to seat locks in counterbore of differential side gears.

3) Replace pinion gears and washers (if removed) and install pinion shaft and lock bolt. Apply silicone sealant in a 1/8" to 3/16" bead on face of carrier housing and install housing cover.

NOTE - No gasket other than the silicone seal is used. Cover assembly must be installed within 15 minutes of application or new sealant must be applied.

PINION FLANGE & OIL SEAL

NOTE - Although the pinion oil seal and flange replacement involves only removal of pinion shaft nut and flange, this operation disturbs pinion bearing preload and must be carefully reset during assembly.

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Removal — 1) Raise and support vehicle. Remove wheels and brake drums. Scribe alignment marks on companion flange and propeller shaft for installation reference, then remove propeller shaft. Using an INCH lb. torque wrench, measure and record torque required to rotate pinion through several revolutions.

2) Mark companion flange in relation to pinion shaft. Hold companion flange and remove pinion nut. Remove companion flange and seal with suitable puller.

Installation — Install seal using installer (T79P-4676-A). Align marks on flange and pinion. Install flange and new integral nut and washer. Hold companion flange and gradually tighten nut. Rotate pinion occasionally and check pinion bearing preload often, until original preload is obtained.

NOTE — Pinion nut should not be backed off to lessen preload. If this is done, a new pinion bearing collapsible spacer must be installed and new pinion nut tightened until proper preload is obtained.

REAR AXLE ASSEMBLY

Removal — 1) Raise vehicle and support under rear frame crossmember. Remove housing cover and drain lubricant. Remove axle as previously described. Remove brake backing plates and wire plates to frame. Mark and disconnect propeller shaft at companion flange.

2) Disconnect axle vent from housing (at brake junction block on some models). Disconnect brake line from housing clips. Disconnect upper arms and shock absorbers from housing. Lower housing on jack until coil springs can be removed. Disconnect lower arms from housing and remove axle housing.

Installation — To install, reverse removal procedure and note the following: Apply Loctite to threads holding axle vent and brake block (if used) to axle housing.

OVERHAUL

DISASSEMBLY

NOTE — Differential case and drive pinion may be serviced with axle housing installed in vehicle. However, underbody should be cleaned to prevent dirt contamination.

1) Raise vehicle and support under rear frame crossmember. Lower hoist until axle drops down far enough for working ease. Remove housing cover and drain lubricant. Mount a dial indicator and measure and record ring gear backlash and runout. Remove rear wheels and brake drums. Remove "C" locks and axle shafts as previously described.

2) Place alignment marks on propeller shaft, yoke and companion flange for reassembly reference. Remove propeller shaft. Mark 1 differential bearing cap for reassembly reference and note arrow position. Loosen bearing cap bolts and bearing caps. Pry differential case, bearing cups and shims out until loose in bearing caps. Remove bearing caps and differential.

NOTE — Bearing cups and caps must be installed in original positions.

3) Remove pinion nut and companion flange. Drive pinion out of front bearing with soft-faced hammer, then remove pinion

from rear of housing. Remove seal with slide hammer and puller (1175-AC). Remove front bearing. Mount bearing puller (T71P-4621-B) on pinion shaft and press shaft out of bearing. Remove, measure and record thickness of shim located behind bearing.

NOTE — Do not remove pinion bearing cups unless damaged. If cups are replaced, bearings must also be replaced.

4) Remove differential side bearings with a puller. Mark differential case and ring gear for reassembly reference. Remove and discard ring gear mounting bolts. Press or tap off ring gear. Drive out pinion shaft lock pin and shaft with a punch. Remove pinion gears, side gears and thrust washers.

CLEANING & INSPECTION

Clean all parts thoroughly in cleaning solvent. When replacing ring gear and pinion, note original factory shim thickness to adjust for variations in both carrier casting and original gear set dimension. Variations are marked on pinion gear head and ring gear.

NOTE — Ring and pinion gear set must be replaced in matched sets.

REASSEMBLY

1) Lubricate all parts with rear axle lubricant. Place side gears and thrust washers into case. Place pinion gears and thrust washers exactly opposite each other in case openings and in mesh with side gears.

2) Install ring gear with new mounting bolts. If bolts are covered with green coating over 1/2" of threaded area, install and tighten bolts. If new bolts do not have green coating, apply small amount of Loctite to bolt threads and tighten bolts.

NOTE — Ring gear bolts should not be reused.

ADJUSTMENT

NOTE — If new components have been installed, proper gear set assembly must be checked using a Rear Axle Pinion Depth Gauge tool (T79P-4020-A) to determine correct pinion shim. If bearing cups have been replaced, new cone and roller assemblies should also be installed. Cups must be seated in bores so that a .0015" feeler gauge will not fit between cup and bottom of bore. Rear pinion bearing must be pressed on so that it is firmly seated against spacer shim and pinion gear.

Pinion Depth — 1) Assemble depth gauge tool (T79P-4020-A) and install aligning adapter, gauge disc (.894" thick for 7 1/2" ring gear; .254" thick for 8 1/2" ring gear) and gauge block screw. Place rear pinion bearing over aligning disc and into bearing cup of carrier housing. Install front pinion bearing into front bearing cup. Place tool handle onto screw and hand tighten. See Fig. 3.

2) Center gauge tube in differential bearing bore. Install and tighten bearing caps. Bearing caps must be installed in original positions. Using a feeler gauge, select thickest blade that will enter between (slight drag) gauge block and gauge tube. Insert feeler gauge directly along gauge block. When fit is correct, check thickness of blade used; this is required shim thickness (if pinion has no variations stamped on it). Remove tools and bearings.

NOTE — Gauge block must be 45° off centerline of gauge tube.

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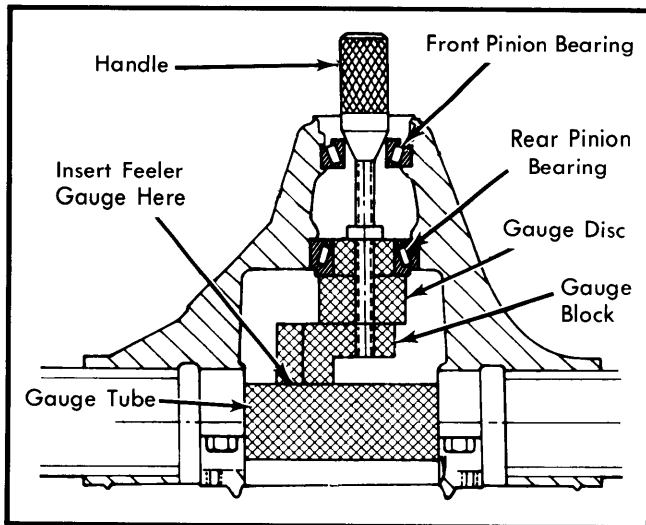


Fig. 3 Sectional View Showing Installation of Pinion Depth Measuring Tools

Pinion Bearing Preload - 1) Place preselected shim on pinion shaft, then press bearing onto shaft until bearing and shim are firmly seated against shoulder of shaft. Install new collapsible spacer on pinion shaft. Lubricate bearings with axle lubricant. Install front pinion bearing in housing, then install new pinion oil seal.

2) Insert companion flange into seal and hold firmly in place. From rear of carrier housing, insert pinion shaft into flange. Start a new pinion nut on pinion shaft and gradually tighten pinion nut (hold flange), checking bearing preload often. As soon as preload is measured, turn pinion shaft in both directions several times to seat bearings.

3) Tighten pinion nut and continue to measure pinion bearing preload until specified pinion torque is obtained. If bearing preload is exceeded before torque specification is reached, replace collapsible spacer, install new pinion nut and repeat procedure. Do not loosen pinion nut to reduce pinion bearing preload.

Differential Bearing Preload - 1) Apply thin coating of axle lubricant to bearing bores. Place bearing cups over side bearings and place differential case in housing. Install a .200" gauge disc spacer on ring gear side (left) of case between bearing cup and case. Install a .300" gauge disc spacer on pinion gear side (right) of case between bearing and case. Install bearing caps in original positions and tighten bolts to 30 INCH lbs.

2) Install adjuster rod (T78P-4136-A) into ring gear side (left) of axle tube and retain in position with existing brake backing plate bolts and nuts. Tighten adjuster rod nut to 40 INCH lbs. to move differential case to right side of housing. Rotate differential case several times to seat bearings and recheck adjuster rod nut torque (maintain 40 INCH lbs.).

3) Using a feeler gauge, select thickest blade that will enter between gauge disc and carrier bore on ring gear side of case. Feeler gauge should fit with slight drag. Remove and record feeler gauge thickness. Then add .500" to recorded feeler gauge thickness for total shim thickness. See Fig. 4.

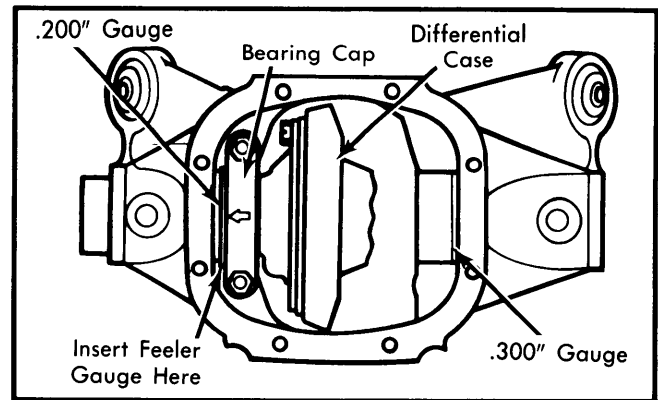


Fig. 4 Measuring for Side Bearing Shim Thickness

4) Release adjuster rod enough to remove .300" gauge. Remove right bearing cap and gauge. Install bearing preload spacer (T78-4135-B for 7 1/2" ring gear; T79P-4135-A1 for 8 1/2" ring gear) between bearing cup and carrier bore with rubber "O" ring facing outboard. Reinstall bearing cap and tighten to 30 INCH lbs.

5) Rock ring gear back and forth, while tightening adjuster rod until zero backlash is obtained. Using a feeler gauge, repeat step 3). Add .200" to feeler gauge thickness.

6) Left shim thickness is total thickness recorded in step 5) MINUS .008". Right shim thickness is total shim thickness obtained in step 3) MINUS total obtained in step 5) PLUS .016". See Sample Calculation.

NOTE - Side bearing shims are available in various thicknesses. If shim size required is not listed, round DOWN to nearest size available.

SAMPLE CALCULATION

Feeler Gauge Reading (Step 5)	.086"
PLUS Spacer Thickness	.200"
Total	.286"
MINUS	.008"
EQUALS LEFT Shim Thickness	.278"

Feeler Gauge Reading (Step 3)	.040"
PLUS Spacer Thickness	.500"
Total	.540"
MINUS Total (Step 5)	.286"
EQUALS	.254"
PLUS Preload Constant	.016"
EQUALS RIGHT Shim Thickness	.270"

7) Remove adjuster tool from axle housing. Remove bearing caps, disc spacer and preload spacer from carrier housing. Install carrier spreader and dial indicator. Spread carrier housing .016" (measured at top of housing). Remove dial indicator. Install left shim, push differential case and bearing cap to left and install right shim (tapping with plastic hammer if required). Release spreader and remove from housing.

NOTE - Do not exceed differential case spread of .016".

Ring Gear Backlash - 1) Install bearing caps in original positions and tighten to 70-85 ft. lbs. Install dial indicator so

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plunger contacts ring gear teeth. Measure backlash at 4 locations around ring gear. Backlash should be .008-.015". Readings should not vary more than .004" between any of the 4 readings.

2) To decrease backlash, subtract from right shim thickness and add to left shim thickness. To increase backlash, add to right shim thickness and subtract from left shim thickness. Do not change total shim thickness, simply alter position of shims.

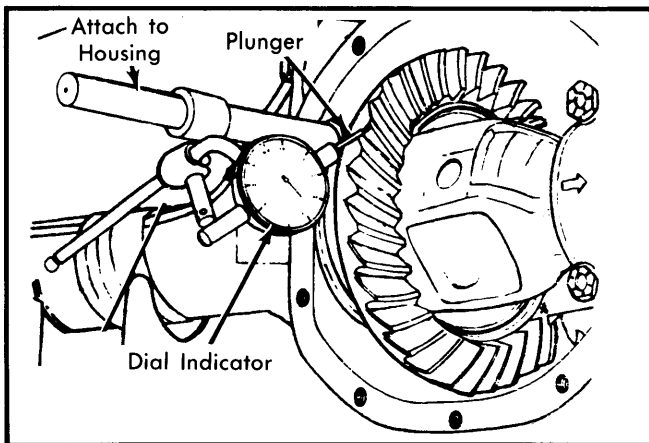


Fig. 5 Measuring Ring Gear Backlash

FINAL ASSEMBLY

1) Clean differential case housing lip and apply a continuous bead of silicone sealant. Install cover and tighten bolts. Install axle shafts with "O" rings in place (8½" ring gear). Install backing plates and propeller shaft, then tighten bolts.

2) Install wheel bearings, seals, brake drums and wheels. Fill axle with lubricant. Adjust brakes if required.

AXLE ASSEMBLY SPECIFICATIONS

Application	Specifications
Ring Gear Backface Runout	
7½" Ring Gear003"
8½" Ring Gear004"
Side Gear Thrust Washer Thickness030-.032"
Pinion Gear Thrust Washer Thickness030-.032"
Nominal Pinion Shim Thickness030"
Ring Gear Backlash008-.015"
Maximum Backlash Variation Between Teeth004"
Pinion Bearing Preload	
7½" Ring Gear (With Oil Seal)	
Original Bearings	16-29 INCH Lbs.
New Bearings	16-29 INCH Lbs.
8½" Ring Gear	
Original Bearings (With Oil Seal)	8-14 INCH Lbs.
New Bearings	16-29 INCH Lbs.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs.
Bearing Cap Bolts	70-85
Pinion Shaft Lock Bolt	15-30
Ring Gear Attaching Bolts	70-85
Rear Cover	25-35
Pinion Nut	
7½" Ring Gear	170
8½" Ring Gear	140