FORD MOTOR CO. — 7½" & 8½" RING GEAR

All Rear Wheel Drive Models

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.

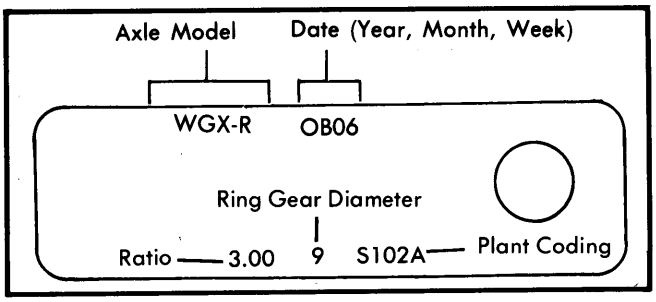

Fig. 1 Rear Axle Identification Tag

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"
WGZ-C	2.73:1	7.5"
WGZ-F	3.08:1	7.5"

REMOVAL & INSTALLATION

AXLE SHAFTS & BEARINGS

NOTE — *When removing axle shafts, make sure that shaft and splines do not scrape or cut axle seal.*

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).

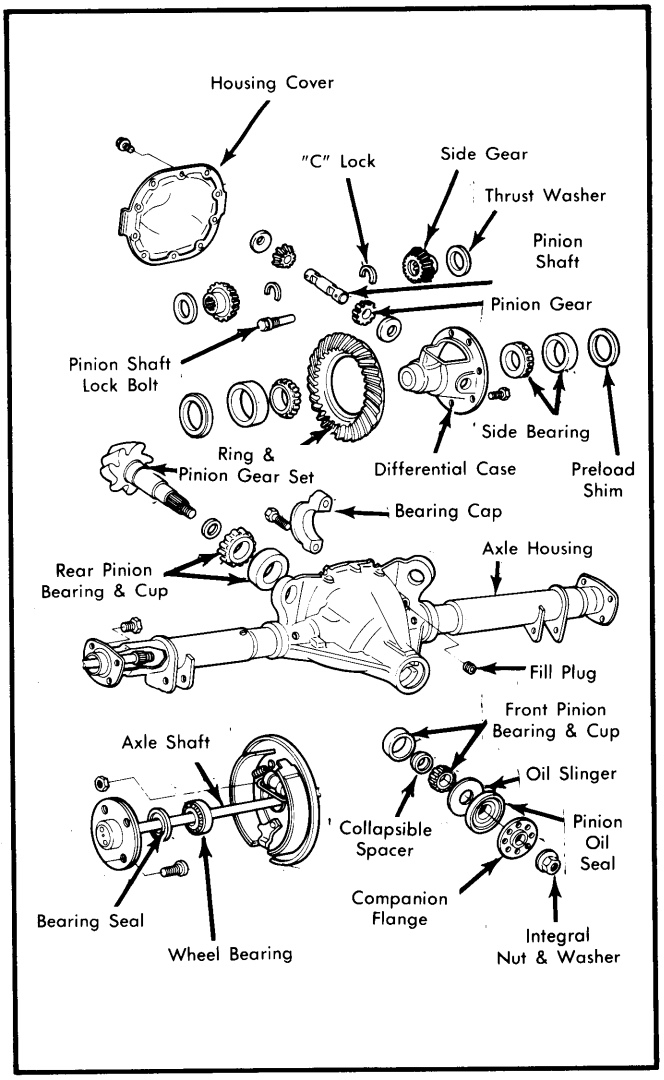

Fig. 2 Exploded View of Ford Motor Co. 7½" & 8½" Integral Housing Axle Assembly

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 ⅛" 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 crossmember. Remove housing cover and drain lubricant. Remove axle shafts 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 ½" 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 7½" ring gear; .254" thick for 8½" 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) Make sure pinion depth measuring tool is properly installed and tightened. Apply a light film of oil to pinion bearings. Rotate gauge block several times to seat bearings. Rotational torque on gauge block assembly should be 20 INCH Lbs. with new bearings. Final position of gauge block should be 45° above axle shaft centerline.

3) Clean differential bearing bores thoroughly and install gauge tube. Tighten bearing cap bolts. Using flat pinion shims as a gauge for shim selection, hold gauge block in proper position and measure clearance between gauge block and tube. Correct shim selection is accomplished when a slight drag is felt as shim is drawn between gauge block and tube.

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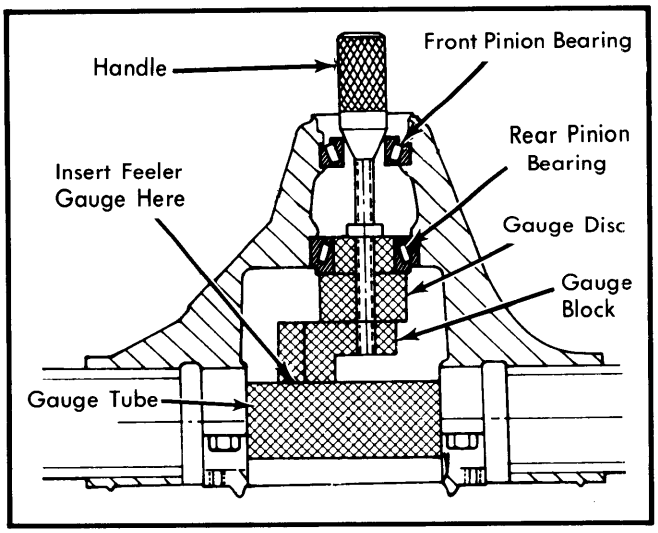

Fig. 3 Sectional View Showing Installation of Pinion Depth Measuring Tools

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 & Ring Gear Backlash — 1) With pinion depth set and pinion installed, place differential case and gear assembly with bearings and cups into carrier. Install a .265" shim on left (ring gear side) side of differential. Install left bearing cap finger tight.

2) Choose largest shim that will fit with a slight drag and install it on right (pinion gear side) side of differential. Install right bearing cap and tighten all cap bolts to specification. Rotate gear assembly to insure free operation.

3) Check ring and pinion backlash. If backlash is less than specified, add .020" to shim size on right side and subtract .020" from shim size on left side. If backlash is still not within specifications, increase or decrease shim size where necessary to correct reading. *See Fig. 4*. Retorque bearing cap bolts and rotate gear assembly several times. Recheck backlash and correct as necessary.

4) Increase both left and right shim sizes .006" and reinstall for correct preload. Make sure shims are seated and gear assembly turns freely. Using marking compound, check gear tooth contact pattern.

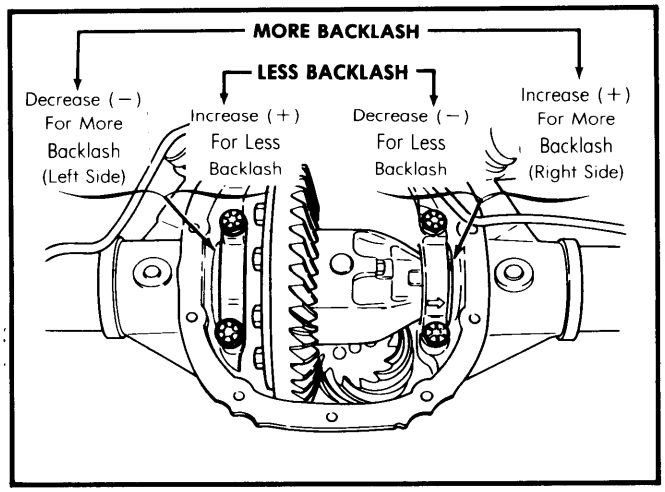

Fig. 4 Backlash Adjustment

Backlash-to-Shim Thickness Conversion

Required Change In Backlash	Change In Shim Thickness
.001"	.002"
.002"	.002"
.003"	.004"
.004"	.006"
.005"	.006"
.006"	.008"
.007"	.010"
.008"	.010"
.009"	.012"
.010"	.014"
.011"	.014"
.012"	.016"
.013"	.018"
.014"	.018"
.015"	.020"

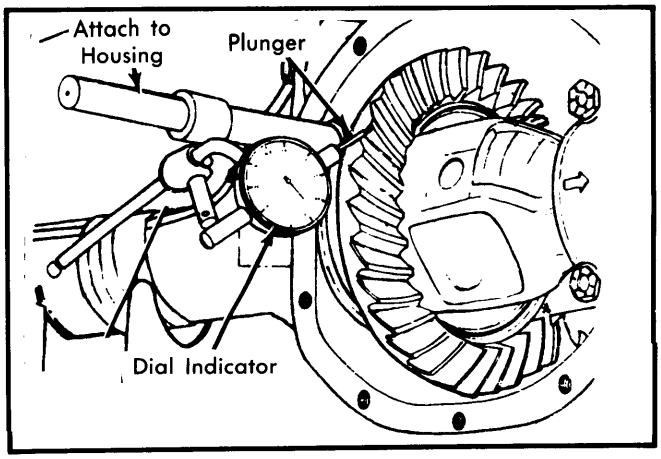

Fig. 5 Measuring Ring Gear Backlash

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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.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N·m)
Bearing Cap Bolts	70-85 (95-115)
Pinion Shaft Lock Bolt	15-30 (20-40)
Ring Gear Attaching Bolts	70-85 (95-115)
Rear Cover Bolts	25-35 (34-47)
Pinion Nut	
7½" Ring Gear	170 (230)
8½" Ring Gear	140 (190)

AXLE ASSEMBLY SPECIFICATIONS

Application	Specifications
Capacity	
7½" Gear	3.5 Pts.
8½" Gear	4.0 Pts.
Ring Gear Backface Runout	
7½" Ring Gear	.003"
8½" Ring Gear	.004"
Side Gear Thrust Washer Thickness	.030-.032"
Pinion Gear Thrust Washer Thickness	.030-.032"
Nominal Pinion Shim Thickness	.030"
Ring Gear Backlash	.008-.015"
Maximum Backlash Variation Between Teeth	.004"
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.