

Positive Traction Differentials

FORD MOTOR CO. TRACTION-LOK DIFFERENTIAL

Ford Motor Co.

DESCRIPTION

The Traction-Lok differential employs 2 sets of multiple disc clutches to control differential action. The side gear mounting distance is controlled by 9 plates; 5 steel, 4 friction, and 1 steel shim by select size to control side gear position. These plates are stacked on the side gear hub housed in the differential case. Located in the differential case, between the side gears, is a 1 piece pre-load spring, which applies an initial force to the clutch packs. Additional clutch capacity is delivered from side gear thrust loads. The 4 friction plates are splined to the side gear hub which, in turn, is splined to the left and right axle shafts. The 4 friction plates are dogged to the case, thus, the clutch packs are always engaged.

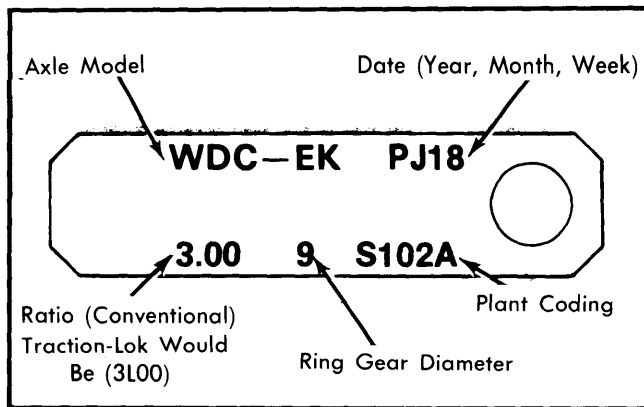


Fig. 1 Ford Motor Co. Rear Axle Identification Tag

AXLE RATIO & IDENTIFICATION

A metal tag stamped with model designation and gear ratio is secured to one of the rear cover-to-housing bolts.

Axle Ratio Identification

Code	Axle Ratio	Ring Gear Diameter
WFZ-B	3.08:1	8½"

TESTING ON CAR

Raise one wheel (other wheel must be on floor) and install a suitable tool and torque wrench on wheel mounting studs. With transmission in neutral, note torque required to keep wheel rotating through several revolutions. Breakaway torque may initially exceed 30 ft. lbs. An even pressure of at least 30 ft. lbs. should be required to turn axle shaft without slipping or binding.

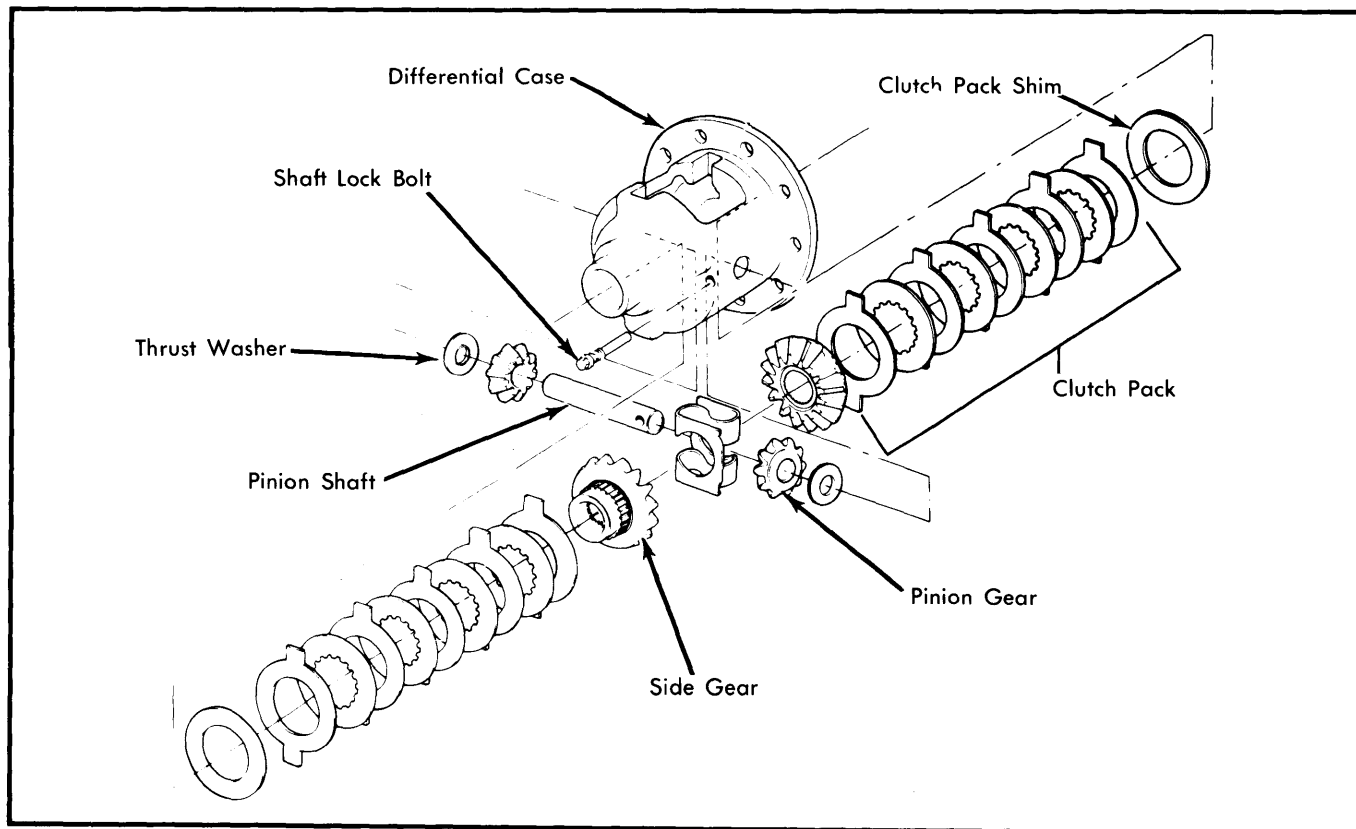


Fig. 2 Exploded View of Ford Motor Co. Traction-Lok Differential

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REMOVAL & INSTALLATION

AXLE SHAFTS & BEARINGS

Removal – 1) Raise vehicle. Remove rear wheels and brake drums. Remove the rear cover from the differential and drain the lubricant.

2) Working through the cover opening, remove the pinion shaft lock and remove the pinion shaft. Push the axles inward until the "C" locks at the bottom end of the shafts are clear of the side gear recess.

3) Remove the "C" locks and pull the axle shafts out of the housing. See *Ford Motor Co. Integral Housing for wheel bearing replacement*.

Installation – To install, reverse removal procedure.

REAR AXLE ASSEMBLY

Removal – 1) Raise vehicle and position safety stands under rear frame crossmember. Place adjustable hydraulic jack under rear axle assembly. Mark and disconnect driveshaft at companion flange.

2) Disconnect vent and hydraulic brake line from axle housing at brake junction block. Disconnect upper control arms and shock absorbers from axle housing. Lower axle assembly and remove springs. Disconnect lower control arms from axle assembly and lower assembly.

Installation – To install, reverse removal procedure. Use Loctite (or equivalent) on threads holding axle vent and brake block to axle assembly.

OVERHAUL

NOTE – Procedures given are for Traction-Lok differential assembly only. For other axle components and specifications, see *Ford Motor Co. Integral Housing* in this section.

DISASSEMBLY

1) Remove differential case from carrier and remove bearings from differential case in same manner as for conventional case. Remove and discard ring gear bolts and washers. Tap ring gear off case using a soft hammer.

2) Remove the differential pinion shaft lock bolt and remove the pinion shaft. With suitable tool, drive out the "S" shaped preload spring. See Fig. 3.

NOTE – Care must be taken when removing preload spring due to spring tension.

3) Using suitable tool (T80P-4205-A) rotate pinion gears until gears and thrust washers can be removed. Clean and inspect all parts and replace as necessary.

REASSEMBLY

1) Use new attaching bolts with Loctite and install ring gear on differential case. Press new bearing on case.

2) Lubricate and place front bearing, oil slinger, and pinion oil seal in housing. Place new preload spacer on pinion shaft and insert from rear of carrier. Install companion flange and new integral nut and washer.

3) Hold companion flange and tighten nut gradually, rotating pinion occasionally to seat bearings. Use INCH lb. torque wrench to check bearing preload.

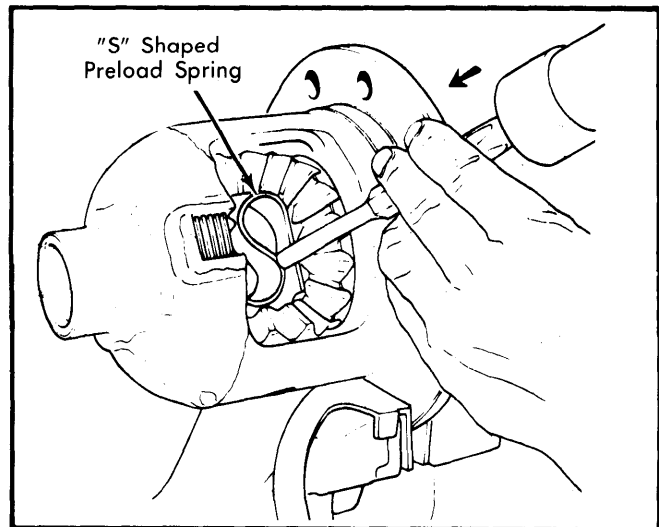


Fig. 3 "S" Shaped Preload Spring Removal

4) Pre-lubricate all plates with hypoid gear lubricant and assemble the side gear as shown in Fig. 4. Install suitable tool (T80P-4946-A) or equivalent on side gear clutch pack. Using a feeler gauge, select the thickest feeler blade that will enter between the tool and the clutch pack. See Fig. 4.

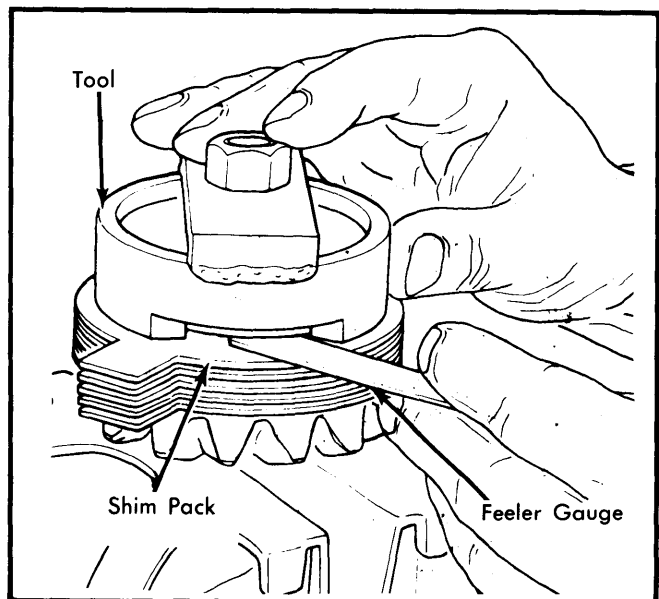


Fig. 4 Clutch Pack Installation

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5) Note the thickness; this will be the shim required for the clutch pack. Repeat steps 1 & 2 for opposite clutch pack.

6) Mount the differential case in a soft-jaw vise and place the clutch packs and side gears in their proper cavities in the differential case. Place pinion gears and thrust washers on the side gears, install suitable tool (T80P-4205-A) or equivalent in the differential case. See Fig. 5.

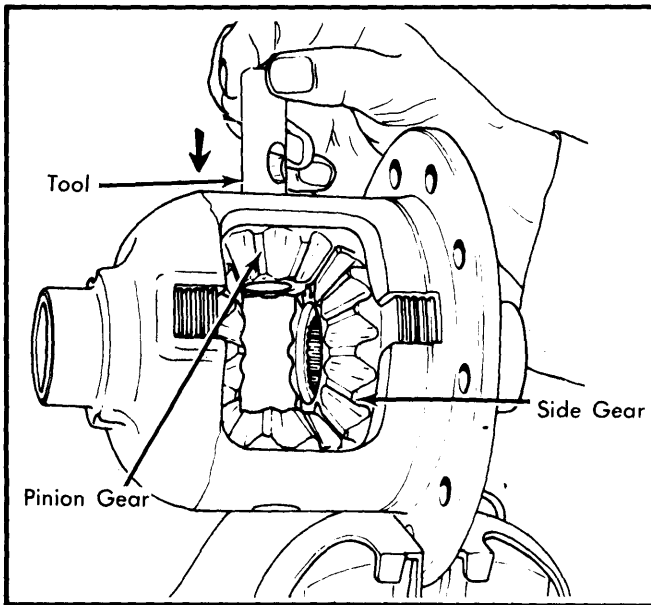


Fig. 5 Pinion and Side Gear Installation

7) Rotate the pinion gears until the bores in the gears are aligned with the pinion shaft holes in the differential case. Remove the tool from the differential case.

8) With a soft faced hammer, install the "S" shaped preload spring. Install the pinion shaft and lock bolt.

9) Before installing differential in case, a bench torque check must be made. Install suitable tools (T59L-4204-A) or equivalent. See Fig. 6. Check the torque required to rotate 1 side gear while the other side is held stationary. The initial break-away torque, if original clutch plates are used, should be no less than 30 ft. lbs. If new clutch plates are used, break-away should be 150-250 ft. lbs. The rotating torque required to keep the side gear turning with new clutch plates may fluctuate.

SIDE BEARING PRELOAD & BACKLASH

1) Place differential assembly into carrier bores with a .222" gauge disc spacer in ring gear (left) side between bearing cup and case. Install .300" gauge disc spacer on pinion gear (right) side and tighten bearing caps to 30 INCH lbs.

2) Attach adjuster rod (T78P-4136-AB) to left side of axle tube and torque adjusting rod to 40 INCH lbs. while rotating ring gear several times.

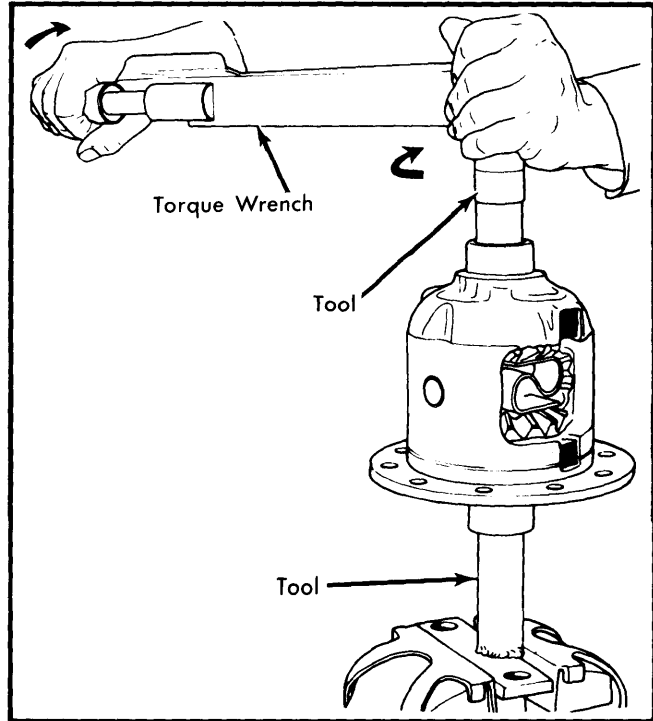


Fig. 6 Bench Torque Check

3) Select the thickest feeler gauge that will fit with a slight drag between gauge disc and carrier bore on ring gear (left) side. Add this thickness to .500" and record for TOTAL clearance.

4) Back out adjuster rod to allow .300" (right) gauge disc spacer to be removed after removing right bearing cap. Install bearing preload spacer disc (T79P-4135-A1) and tighten cap bolts to 30 INCH lbs.

5) Rock ring gear back and forth while tightening adjuster rod until zero backlash is obtained. Determine gap between gauge disc and LEFT carrier bore with feeler gauge (drag fit).

6) Select the proper left shim thickness by adding feeler gauge reading to .200" and subtracting .008" for preload. See example.

7) Right (pinion gear) side shim thickness may be determined by subtracting thickness of feeler gauge plus .200" found in step 3 from TOTAL clearance in step 2. Add .016" for preload to obtain shim thickness.

EXAMPLE: Feeler gauge reading of .40" in step 3) added to .500" gives a TOTAL clearance of .540".

Step 5) Feeler Gauge Reading086"
Plus Gauge Disc Spacer Thickness200"
Total286"
Subtract008"
CORRECT RING GEAR (Left Side) Shim size278"

Total Clearance (Step 3)540"
Subtract Step 5) Clearance286"
Remainder254"
Add (Preload)016"
CORRECT SHIM SIZE PINION GEAR (Right Side)270"

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FINAL ASSEMBLY

1) Carrier spreader tool (T78P-4000-A) and adapters are required to install differential assembly and shims.

2) Attach dial indicator and spread housing .016". Do NOT exceed this dimension. Install proper shim as determined in Step 3 on ring gear (left) side and push differential case and cups as far to left as possible.

3) Install right side shim using plastic hammer to tap in until seated. Remove spreader and adapters and install bearing caps with arrows pointed outboard. Marks made during disassembly should be aligned.

4) With a dial indicator, determine backlash and variance around ring gear. Install pinion side gears and thrust washers, axle shafts and "C" locks. Align differential pinion gears and thrust washers and install pinion shaft and lock bolt.

5) Apply a bead of silicone seal and install housing cover. Fill with lubricant as specified. Normal level is 1 1/4" below filler hole with axle in normal curb attitude.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs.
Bearing Cap Bolts	70-85
Pinion Shaft Lock Bolts	15-22
Ring Gear Attaching Bolts	70-85
Rear Cover Screws	25-35
Pinion Flange Nut (Minimum)	①140

① — Pinion bearing preload 8-14 INCH lbs. for used bearings or 17.27 INCH lbs. for new bearings (oil seal installed). If preload is exceeded before this torque is obtained, a new collapsible spacer must be installed.