

GMC MOTOR HOME FRONT WHEEL FINAL DRIVE

DESCRIPTION

The final drive assembly is mounted and splined directly to the automatic transmission and consists of a pinion drive gear, ring gear, and differential assembly. The drive shaft assemblies are flexible units consisting of axle shaft, inner and outer constant velocity joints and the drive spindle. The adjustment of the pinion depth, pinion bearing preload, and side bearing preload is made by shims.

Remove inner joint attaching bolts, push inner joint outward enough to disengage from final drive output shaft and move rearward. Remove output shaft support bolts to engine and final drive. Remove output shaft and drive axle assembly.

Installation (Right Side Axle) – Lubricate final drive output shaft seal with special seal lubricant and reverse removal procedure. With all parts in proper alignment, tighten all nuts and bolts.

AXLE RATIO & IDENTIFICATION

All GMC Motor Home Chassis are equipped with 3.07-1 axle ratio which is identified by letter "T" stamped on metal identification plate.

Removal (Left Side Axle) – Raise vehicle under lower control arms and remove drive axle cotter pin, nut and washer. Remove tie rod end cotter pin and nut, and remove tie rod end from spindle. Remove bolts attaching drive axle assembly to output shaft. Remove upper ball joint cotter pin and nut, and remove brake hose clip from ball joint stud. Drive against knuckle until upper ball joint stud is free, then remove lower ball joint from knuckle. Remove knuckle and drive axle assembly, using care not to damage seals or turn constant velocity joints to full extremes.

REMOVAL & INSTALLATION

DRIVE AXLES

Removal (Right Side Axle) – Raise vehicle under lower control arms and remove drive axle cotter pin, nut and washer.

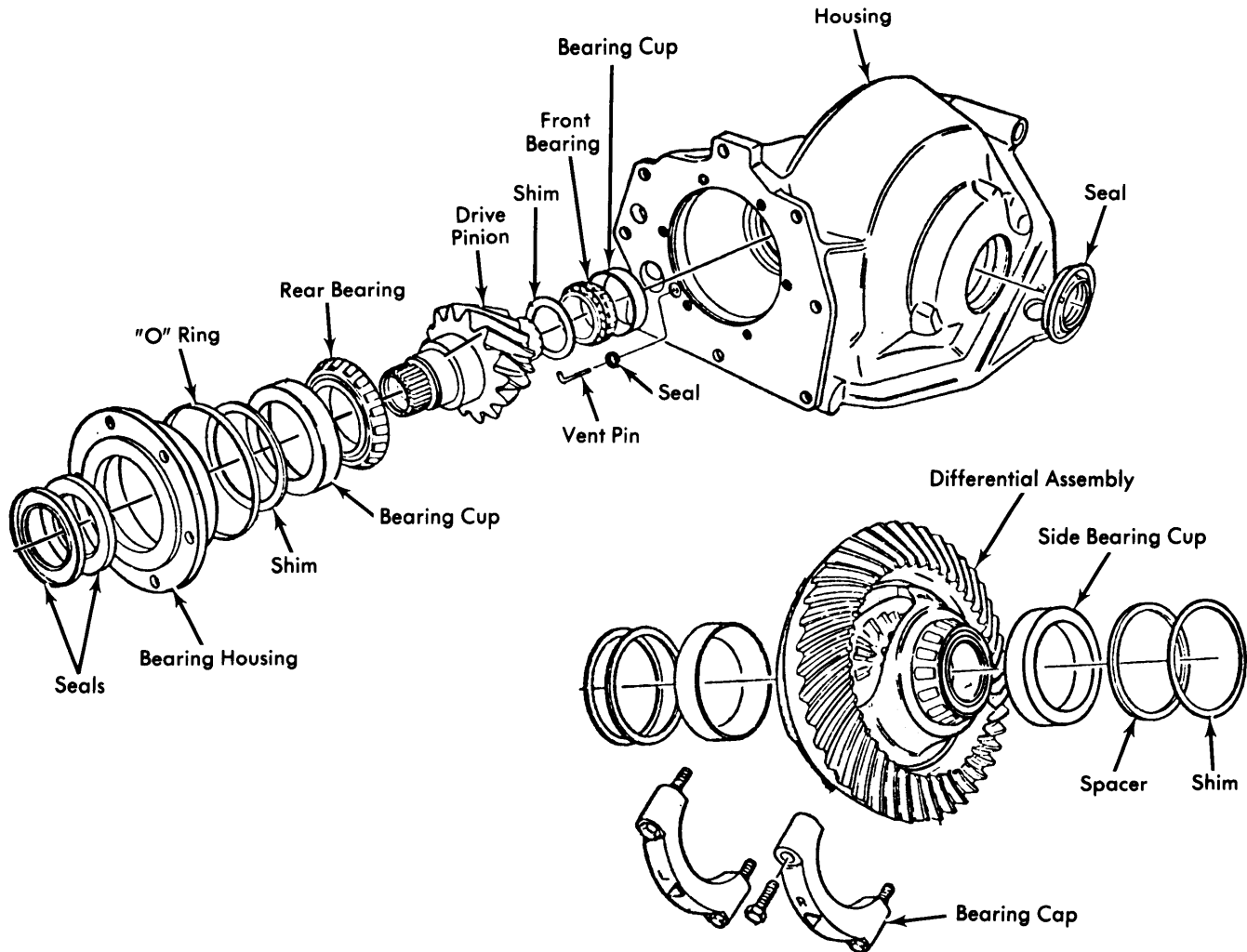


Fig. 1 Exploded View of GMC Motor Home Front Wheel Drive Assembly

Drive Axles

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Installation (Left Side Axle) — To install drive axle assembly, reverse removal procedure using NEW drive axle-to-output shaft bolts. With all parts in proper alignment, tighten all nuts and bolts.

OUTPUT SHAFTS

Removal (Right Side Output Shaft) — Disconnect battery, then raise vehicle and disconnect drive axle. See *Drive Axles*. Disconnect support from engine and remove output shaft assembly. If seal is to be replaced, install suitable tool (J-23129) into seal and remove seal. Output shaft bearing can be removed using an arbor press and suitable support.

Installation (Right Side Output Shaft) — Lubricate output shaft seal using special seal lubricant and pack bearing with suitable high temperature wheel bearing grease. With bearing and seal in position, install output shaft assembly in reverse order of removal and tighten all nuts and bolts.

Removal & Installation (Left Side Output Shaft) — Remove left drive axle. See *Drive Axles*. Remove

output shaft attaching bolts and remove output shaft. If seal is to be replaced, install suitable tool (J-23129) into seal and remove seal. To install, reverse removal procedure being careful to lubricate seal and to keep vent hole in seal at top of housing.

FINAL DRIVE UNIT

Removal — 1) Disconnect battery cables, then raise vehicle under lower control arms. Remove bolts "A", "B", and "C", securing upper part of final drive housing to transmission housing. Disconnect right and left axle shafts from output shafts and move right side shaft back out of way. Remove final drive support brace from engine mount bracket.

2) Remove right side output shaft support from engine and final drive. Remove final drive cover and allow lubricant to drain. Position suitable lifting device and adapter on final drive unit. Remove remaining drive unit attaching bolts, move lifting device forward to disengage final drive splines from transmission and lower drive unit from vehicle. Remove left output shaft retainer bolt, then pull output shaft from final drive.

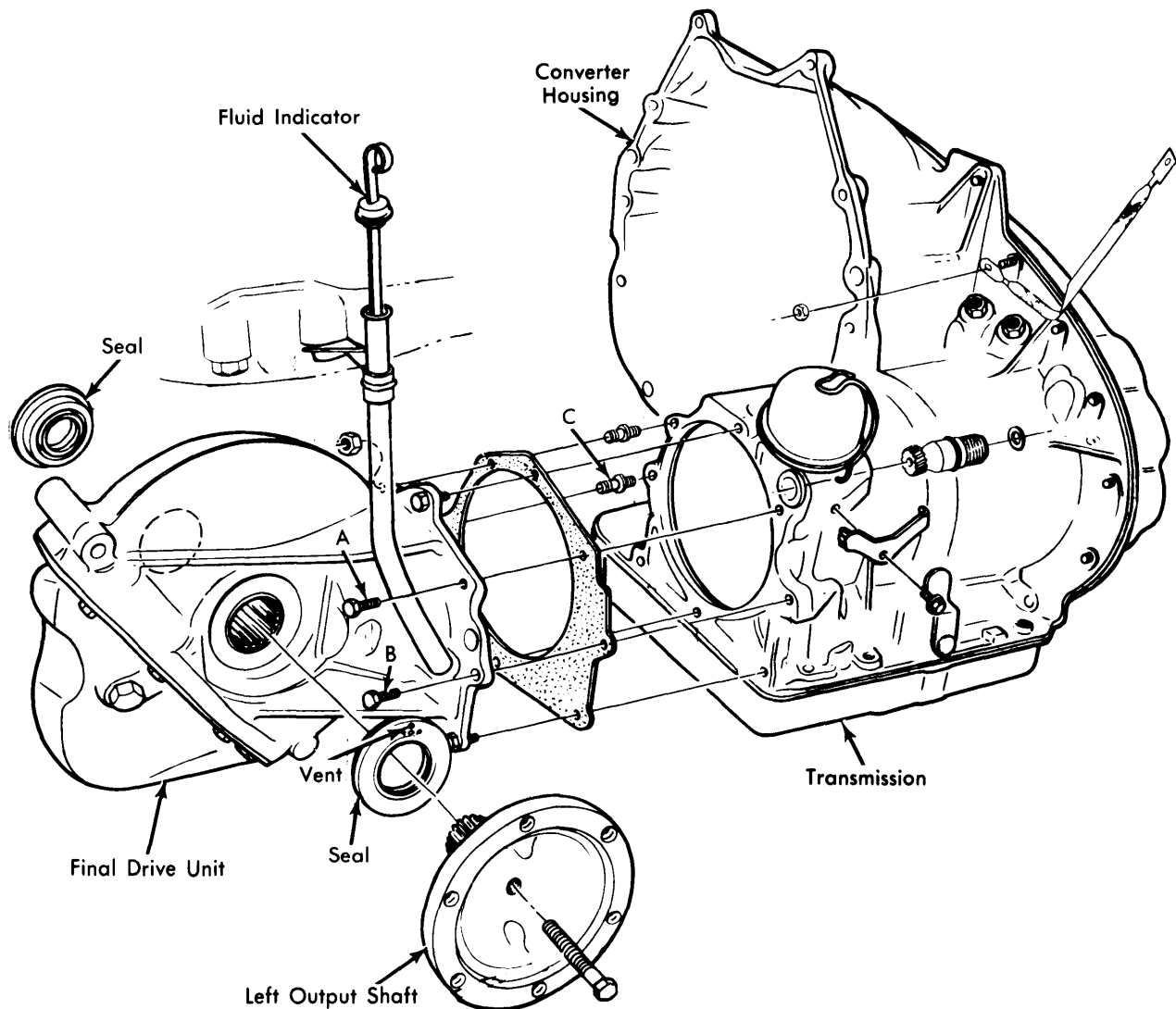


Fig. 2 Final Drive Installation on Transmission Housing

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Installation — 1) Install left output shaft, if removed, into final drive unit, then place unit on suitable lifting device. Apply a thin film of transmission fluid on new final drive transmission gasket and place gasket on transmission. Move final drive into position on transmission. *NOTE* — It may be necessary to rotate left output shaft to align final drive splines with transmission splines.

2) Install final drive assembly attaching bolts, then install final drive support brace to engine mount bracket. Remove lifting device and install final drive cover. Install right side output shaft and both drive axles. Lower vehicle, connect battery cables and refill unit with suitable transmission fluid.

Disassembly (Outer Joint) — Clamp mid-part of axle shaft in a vise, then remove inner and outer seal clamps and slide seal down shaft. Use suitable tool and spread retaining ring until joint can be removed from axle spline. Remove retaining ring and slide seal from axle shaft. Remove all excess grease from joint. Place joint in a vise and clamp on shank of joint. Place a brass drift against one lobe of inner race and tap gently. Tip race far enough to remove first ball. Remove remainder of balls one at a time while tipping cage. It may be necessary to pry last ball out of cage. Turn cage 90°, with slot in cage aligned with land in outer race lift out inner race and cage. While holding cage and inner race, turn inner race 90°. Line up short land of inner race with slot in cage. Move short land through cage and turn inner race up and out of cage.

OVERHAUL

CONSTANT VELOCITY JOINT

NOTE — Constant velocity joints are to be replaced as a unit and are only disassembled for replacing and repacking of damaged seals.

Disassembly (Inner Joint) — 1) With axle shaft assembly on a bench, pry up staked areas of seal retainer and drive seal off housing with a hammer and chisel. Stand axle assembly and joint housing vertically on bench, then carefully withdraw axle from housing. *NOTE* — Place a rubber band over ends of spider to retain balls and needle bearings. Clamp mid-part

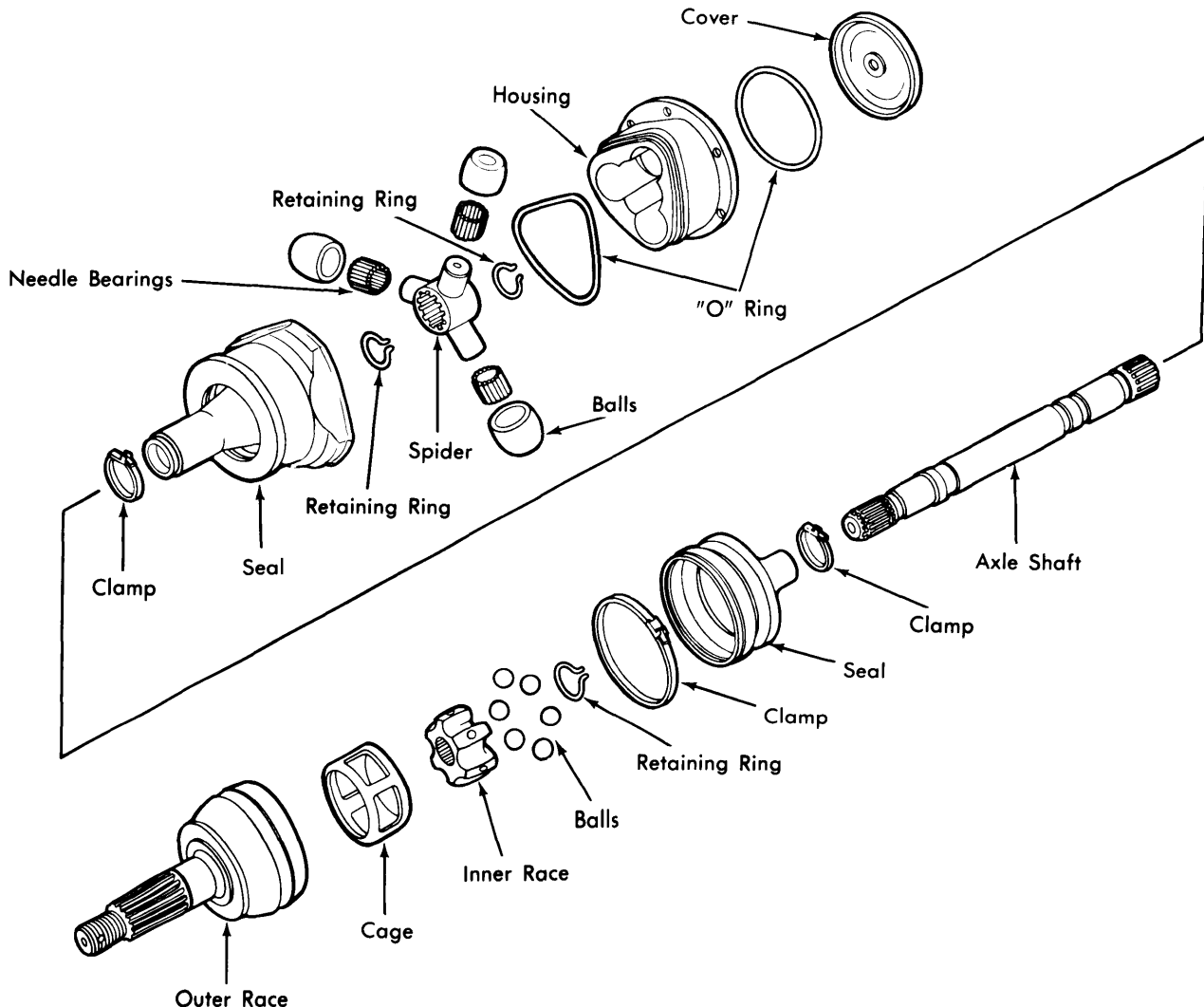


Fig. 3 Exploded View of Drive Axle Assembly

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of axle shaft in a vise, taking care not to damage axle. Remove snap ring from end of axle shaft, then slide spider assembly from shaft.

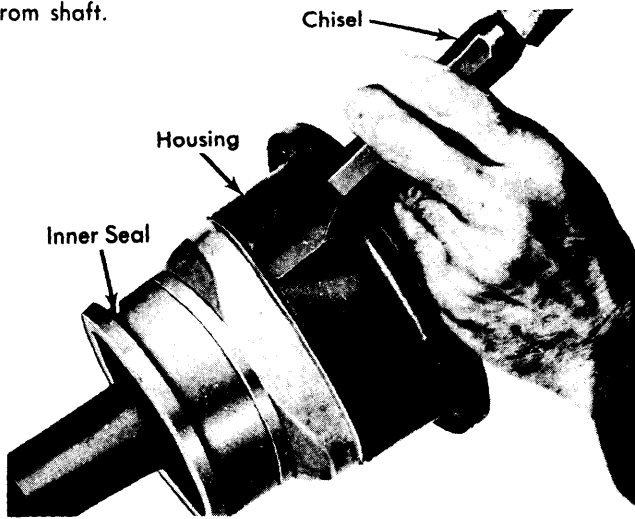


Fig. 4 Removal Procedure for Inner Seal of Constant Velocity Joint

2) Remove inner snap ring from axle shaft, then remove seal clamp and slide boot off shaft. Remove balls from spider, taking care not to lose any of the 53 needle bearings in each ball. If necessary to remove cover, place a wood block approximately 2"x2"x8" in housing, then drive block with a hammer to remove cover from housing. Remove and discard "O" ring.

Inspection — Wash all metal parts in solvent and blow dry with air. Inspect race for scoring or wear in ball splines. Inspect shaft splines and threads for damage. Inspect balls for nicks, cracks, breaks or scores. Inspect cage for cracks or breaks. Inspect retaining ring. **NOTE** — If any defects are found, the complete joint assembly must be replaced as a unit.

Reassembly (Outer Joint) — Insert land of inner race into large hole in cage and pivot to install in cage. Align inner race and cage with lands of outer race, then pivot assembly into outer race. Insert balls into outer race, one at a time, tilting inner race and cage so that each ball can be installed.

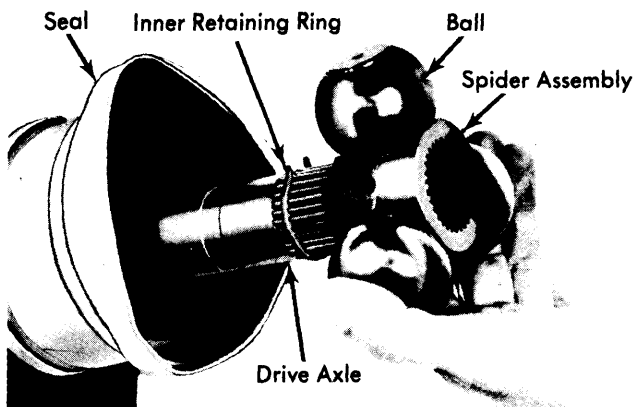


Fig. 5 Procedure for Installing Spider Assembly

Pack joint with suitable lubricant, then use same lubricant to pack inside of seal until folds of seal are full. Place small service clamp on axle shaft, install seal on shaft, then install retaining ring into inner race. Insert axle shaft into splines of outer joint until retaining ring secures shaft. Position seal in slot of outer race and install large seal clamp. Install small clamp and secure in place.

Reassembly (Inner Joint) — Reverse disassembly procedures, lubricating all shaft and bearing surfaces with suitable lubricant. **NOTE** — Mating area of seal adapter and joint housing must be free of lubricant to insure proper sealing.

FINAL DRIVE UNIT DISASSEMBLY

1) Mount final drive assembly in a holding fixture. Install an INCH Lb. torque wrench on end of pinion. Rotate several times. Measure and record reading on torque wrench. This is combined side and pinion bearing preload. Rotate differential several times to seat bearings. Using a dial indicator mounted on housing and with pinion pointed downward, check and record ring gear backlash. If backlash varies more than .002", check for burrs, uneven bolting condition or distorted case. Make corrections as necessary.

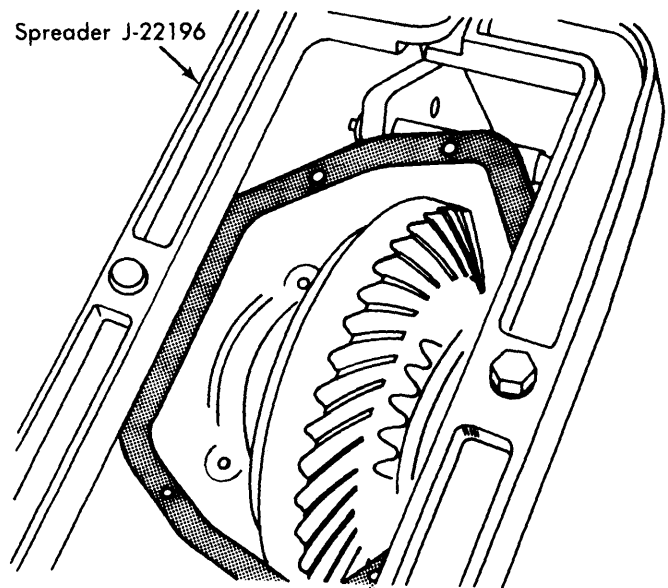


Fig. 6 Correct Procedure to Spread Carrier Housing

2) Remove side bearing cap bolts. Mark or identify bearing caps and outer races to ensure that they are installed in original position. Install a suitable spreader (J-22196) on final drive (see illustration). Turn screw on spreader until unit is expanded enough to remove spacer and shims from between right side bearing and housing. Retain spacers and shims for reassembly. Remove spreader.

3) Remove other spacers and shims, then slide case assembly to left, away from pinion gear, and remove from housing. With pinion stem pointed upward, check and record pinion bearing preload. Remove pinion bearing housing bolts, then remove drive pinion and housing using a slide hammer and suitable adapter. Remove pinion from housing, then remove "O" ring from housing.

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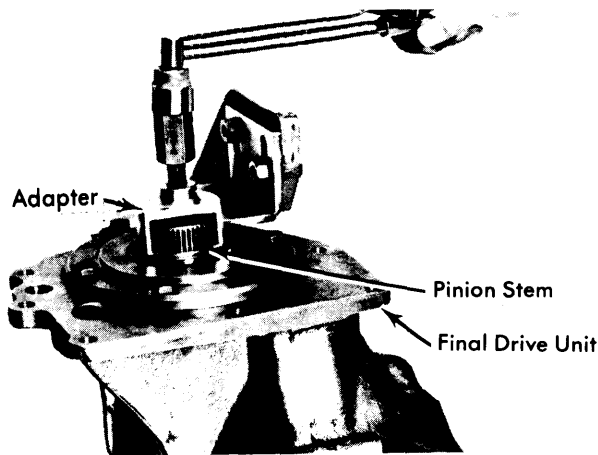


Fig. 7 Measuring Pinion Bearing Preload

4) Remove seal and vent pin from housing. Using a slide hammer and suitable adapters, remove pinion front bearing outer race, then remove output shaft oil seals using suitable puller. Remove oil seals from pinion bearing housing using suitable driver. If necessary, remove rear pinion bearing outer race using suitable tools (BT-6702-3&4, BT-6708-1, BT-6708-2).

PINION DISASSEMBLY

Remove pinion front bearing using suitable puller or press, then remove rear bearing using suitable puller (J-9746).

DIFFERENTIAL CASE DISASSEMBLY

If necessary, remove side bearings using suitable puller or press. Mark ring gear and case for reassembly reference, then remove all but two ring gear-to-case bolts, leaving the two bolts loosely installed 180° apart. Position case on bench with ring gear down, tap lightly with soft-faced hammer to separate, then remove remaining bolts and ring gear. Drive out pinion shaft lock pin and remove pinion shaft. Remove pinion gears, one at a time, through access hole in case, being sure to keep corresponding shims and pinion gears together. Remove side gears and thrust washers, keeping corresponding parts together. **NOTE** — Left side gear has threaded retainer which holds left output shaft in place. If necessary, remove output shaft retainer using a brass drift and hammer.

PINION DEPTH ADJUSTMENT

1) Install front outer race in housing and, using suitable tool, drive race into place until it bottoms. Lubricate front bearing with final drive lubricant and install into race.

2) Place Tool J-21777-10 on front bearing, then install Tool J-21579 on final drive housing and retain with two bolts. Thread Tool J-21777-13 into J-21579 until tip of screw engages Tool J-21777-10. Tighten screw to 20 INCH lbs. to preload bearing.

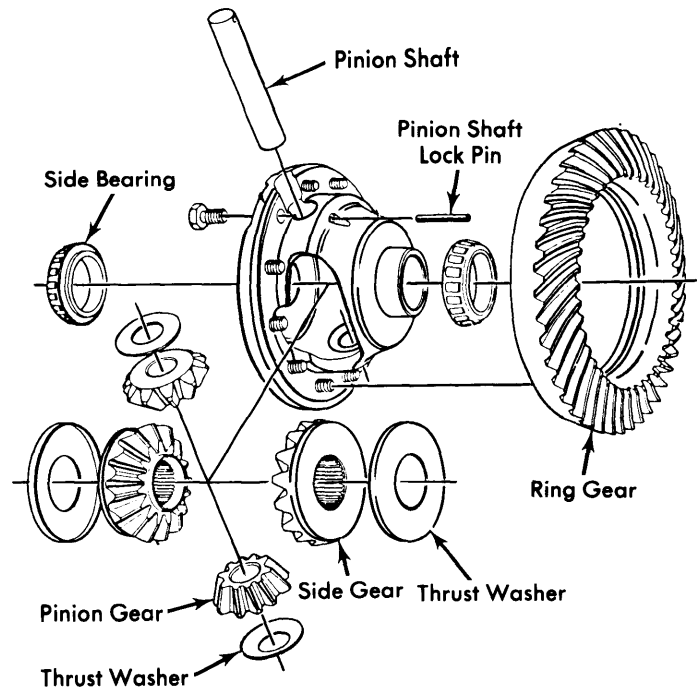


Fig. 8 Exploded View of Differential Case Assembly

3) Remove dial indicator post from Tool J-21777-1 and install discs J-21777-22. Replace post in tool and install assembly in side bearing bores. Install bearing caps and tighten to 75 ft. lbs. Position dial indicator on mounting post of gauge shaft with contact tip off gauging area. Set dial indicator to zero, depress dial indicator until needle rotates ¼ turn clockwise and tighten in this position. Reset indicator to zero.

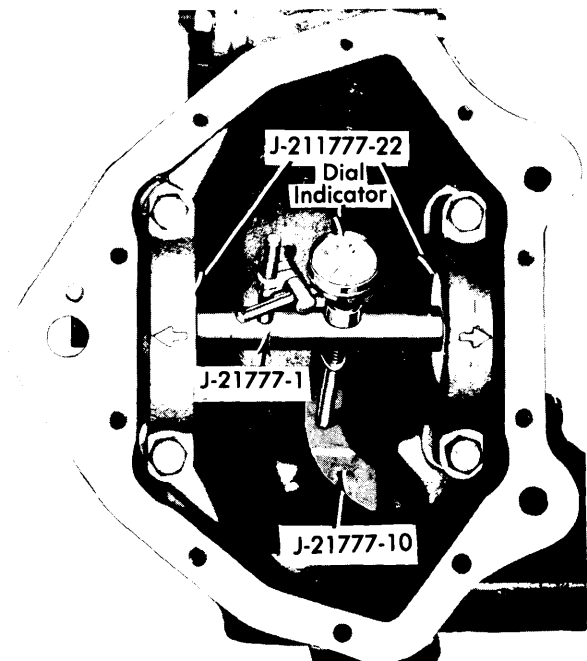


Fig. 9 Pinion Depth Gauge Tool Installation

Drive Axles

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4) Place gauge shaft assembly into carrier so dial indicator rod is in line with, BUT NOT ON gauging area and discs are fully seated. Rotate gauge assembly so that indicator rod sweeps gauging area. Note greatest deflection. At point of greatest deflection, pinion depth may be read directly from dial.

5) If a service gear set, or a production gear set with no marking is being used, shim thickness should be equal to dial indicator reading. If ring gear is marked "+", increase shim thickness indicated on dial indicator by number painted on ring gear. If ring gear is marked "-", decrease indicated thickness. Remove pinion depth tools and front bearing from carrier.

PINION REASSEMBLY

Press rear pinion bearing on shaft using an arbor press and suitable adapters. Place selected shim pack on drive pinion and press front pinion bearing on shaft using an arbor press. Lubricate bearings with final drive lubricant.

FINAL DRIVE REASSEMBLY

Pinion Bearing Preload Adjustment — Position pinion bearing race on pinion bearing and install Tool J-22587-1 or equivalent. Check clearance between race and tool using a feeler gauge. Shims are available from .036-.070" in increments of .002". Add shims to obtain proper preload. Record shim thickness used. Using a dial indicator and Tool J-22587-2, determine the difference between inner and outer flange of bearing housing. Add this difference to shim thickness and subtract .025" to compensate for tool used and variance caused by installation. Final result is actual pinion bearing preload shim required.

Pinion Shaft Assembly — Position selected shim in bearing housing, then install rear bearing outer race. Install bearing housing oil seals, "O" ring seal, vent pin and seal on housing face. Install bearing housing to final drive housing, install mounting bolts and tighten. Recheck pinion bearing preload.

Differential Case Assembly — Install side bearings onto case. Place side gear thrust washers over hubs and install side gears. If original parts are used, install in original position. *NOTE* — Side gear with threaded retainer must be installed on left side of case. Place pinion gears in case so that holes in gears line up with holes in case. When in line, rotate pinions just enough to install shims. Install pinion shaft and lock pin.

Ring Gear Assembly — Install positioning studs in three ring gear bolt holes equally spaced around case. Install case holding tool and place assembly in a vise. Install NEW ring gear attaching bolts in remaining holes. Remove alignment studs, install remaining bolts, then tighten in progressive stages.

Side Bearing Preload Adjustment — 1) Place case and side bearing assemblies in position in housing. Install original spacers (.140±.005") on left and right sides. If preload was correct at time of disassembly, original shims may be used.

Shims are available in increments of .002" from .038-.074". Install spreader (J-22196) on housing and spread housing just enough to install shims.

2) Release tension on spreader tool, install side bearing caps and tighten cap bolts. Using an INCH lb. torque wrench, measure bearing preload. If preload not correct, adjust by adding or removing side bearing shims. *CAUTION* — Preload reading must be taken with spreader tension released. When changing shims to adjust bearing preload, add or remove the same thickness to each side to prevent changing ring gear backlash.

Backlash Adjustment — 1) Rotate differential case a few turns to seat bearings, then mount a dial indicator with contact tip against tooth face of ring gear. Check backlash at four points around ring gear. Backlash must not vary more than .002" around ring gear. Recheck backlash at point where minimum backlash reading was found. Adjust backlash at this point. *NOTE* — If original gears are reinstalled, backlash must be set to same reading obtained at disassembly, providing reading was within specifications.

2) To adjust backlash, increase thickness of differential shim on one side and decrease thickness on opposite side. *NOTE* — This will maintain side bearing preload. When backlash is properly adjusted, remove spreader tool and install bearing caps. Install new output shaft seals, making sure vent hole in left seal is at top of housing. Install cover and new gasket. *NOTE* — If final drive was removed without transmission, do not install cover, gasket or lubricant at this time.

TIGHTENING SPECIFICATIONS	
Application	Torque (Ft. Lbs.)
Front Wheel Nut.....	110
Upper Ball Joint Stud.....	50
Lower Ball Joint Stud.....	100
Tie Rod End Nut.....	40
Final Drive Cover.....	30
Side Bearing Cap Bolts.....	75
Ring Gear Bolts.....	85
Bearing Housing Bolts.....	45
Drive Axle to Output Shaft.....	75
Final Drive to Transmission.....	30

AXLE ASSEMBLY SPECIFICATIONS	
Pinion Bearing Preload	
New Bearings.....	2-15 INCH lbs.
Used Bearings.....	2-5 INCH lbs.
Side Bearing Preload	
New Bearings.....	10-15 INCH lbs.
Used Bearings.....	5-7 INCH lbs.
Ring Gear Backlash.....	.005-.009"