

CORVETTE

DESCRIPTION

The Corvette rear axle uses an independent suspension type differential housing. The differential housing forms a large part of the rear frame structure. The forward end of the carrier is attached to the number 3 crossmember. The carrier cover is cast as an integral part of the number 4 crossmember. The drive pinion and ring gear are hypoid gears. The differential is a positive traction unit. Gear positioning and preloading is accomplished by the use of shims in each adjustment location.

AXLE RATIO & IDENTIFICATION

The only axle ratio available is 2.87:1. There is an axle identification number stamped on the bottom of the carrier, near the cover mounting flange.

REMOVAL & INSTALLATION

AXLE SHAFTS

Removal — Raise and support vehicle. Disconnect inboard driveshaft "U" joint from side yoke. Remove splash shields from outboard "U" joint. Remove outboard "U" joint retainers. See Fig. 2. Scribe an alignment mark on camber adjusting cam and mounting bracket. Rotate cam to move control arm outward and remove driveshaft.

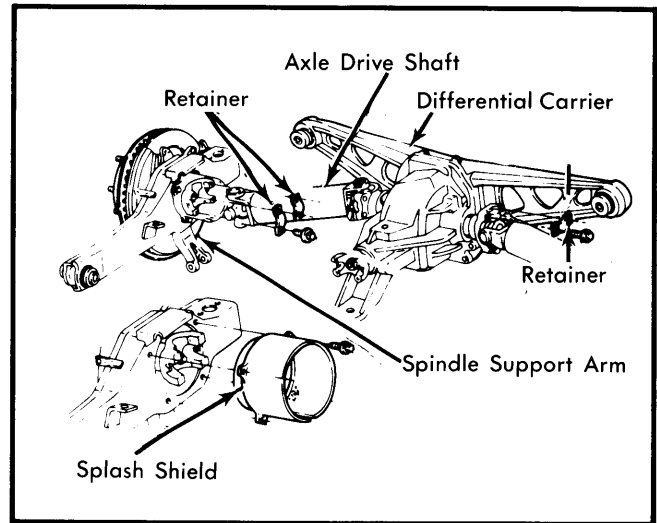


Fig. 2 Drive Axle Shaft Removal. Spindle Support Arm Must Be Pushed Outward To Release Shaft.

Installation — Place inboard "U" joint into side yoke and secure with retainers. Rotate side yokes so that "U" joint seats are 90° apart. Install outboard "U" joint into spindle and secure with retainers and bolts. Realign scribe mark on camber adjusting cam with mark on mounting bracket and tighten adjusting bolts.

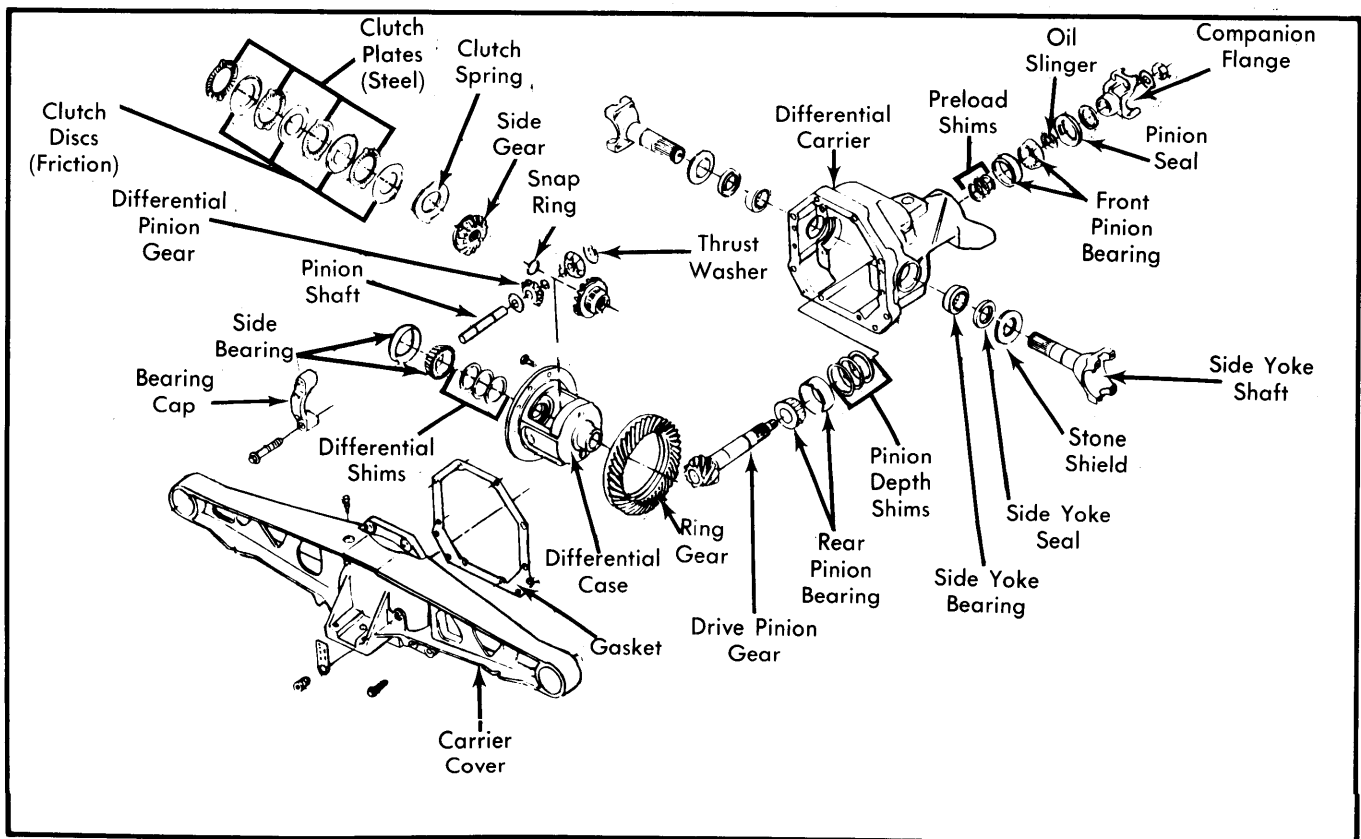


Fig. 1 Exploded View of Corvette Rear Axle Showing Location of Shim Packs and Bearings.

CORVETTE (Cont.)

REAR AXLE ASSEMBLY

Removal — 1) Raise and support vehicle. Remove spare tire and spare tire cover. Remove any exhaust system components and shields or guards that may interfere with axle removal.

NOTE — Make sure that front of vehicle is adequately supported while removing rear axle. Improper placement of supports could lead to major vehicle damage or bodily injury.

2) Using a suitable jack, "C" clamp and 2 blocks of wood, lift up on each end of spring. See Fig. 3. Disconnect spring from both control arms. Remove spring assembly from axle housing.

3) Scribe an alignment mark on camber adjusting cam and mounting bracket. Disconnect strut rods from strut bracket. Remove strut bracket from carrier housing.

4) Scribe an alignment mark on propeller shaft and companion flange. Remove propeller shaft and carrier front

mounting bolt. Support axle with a suitable jack and remove carrier cover-to-frame bolts.

5) Lower axle assembly and remove drive shafts from spindle as previously outlined. Remove axle from vehicle. Remove drive shafts from side yokes.

Installation — To install, reverse removal procedure. Position side yokes 90° out of phase with each other. Realign marks made on camber adjusting cams and brackets at disassembly. Refill carrier with lubricant.

OVERHAUL

DISASSEMBLY

1) Remove carrier cover and drain lubricant. Support carrier in a holding fixture (J-3289 & J-3289-25 or equivalent). Remove side yoke retaining rings and side yokes. Remove bearing caps, noting assembly reference marks.

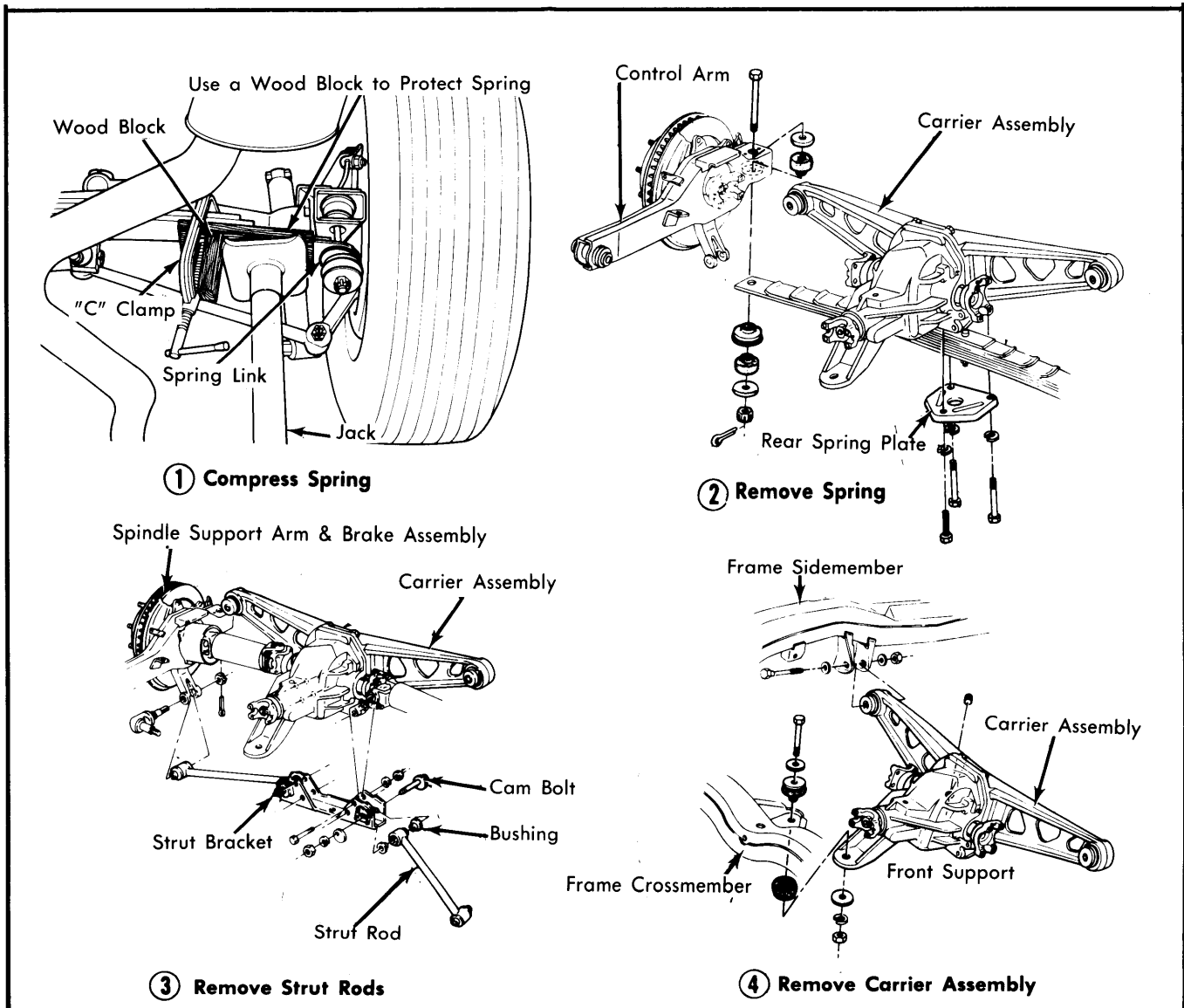


Fig. 3 Rear Axle Removal Procedure. Spring and Strut Bracket Must Be Removed Before Removing Rear Axle.

CORVETTE (Cont.)

2) Mount a carrier spreading tool (J-24385-01 & J-24385-15 or equivalent) onto carrier. Position a dial indicator onto tool to measure case spread. See Fig. 4. Spread carrier to a maximum of .010". Remove dial indicator from tool and pry differential from carrier. Note location of bearing cups for reassembly.

3) Using a seal driver (J-22761, J-8092 & J-21465-13 or equivalent), remove side yoke seal and bearing. Mount a companion flange holding tool (J-8614-01 or equivalent) onto companion flange. Remove pinion washer and nut. Using a puller, remove companion flange. Remove drive pinion (gentle tapping may be necessary). Collect all pinion preload shims from housing and set aside for future use.

4) Remove pinion seal with a puller (J-23129 & J-6125 or equivalent). Remove outer pinion bearing cone and oil slinger. Using a bearing driver (J-29358), drive inner pinion bearing cup out of housing. Collect all pinion depth shims from rear of housing and set aside for future use. Using a bearing driver (J-29359), drive outer pinion bearing cup out of housing.

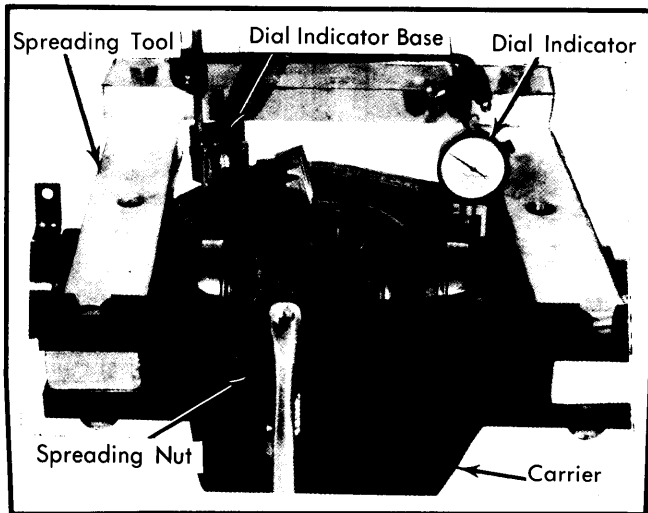


Fig. 4 Spreading Differential Carrier. Mount Spreading Tool and Dial Indicator. Turn Spreading Nut Until Carrier Spread Reaches Maximum of .010".

5) Position drive pinion gear in a press with a bearing separator and remove inner pinion bearing cone. Remove differential side bearing cones and shims with a puller and set aside with proper bearing cup and cap. Remove ring gear from differential case.

NOTE — For overhaul and testing of differential see *Clutch Pack Type Positive Traction Differential* article in this section.

REASSEMBLY

Differential Shim Selection — Assemble master bearings (J-29538) or original bearings onto differential case. Install differential case, less ring gear, into carrier. Mount a dial indicator on carrier to read differential side play at ring gear

flange. See Fig. 5. Force differential toward indicator. Set dial indicator at zero. Force differential in opposite direction and check indicator reading. Repeat procedure until consistent reading is obtained and record final reading for future use. Remove dial indicator and differential case from carrier.

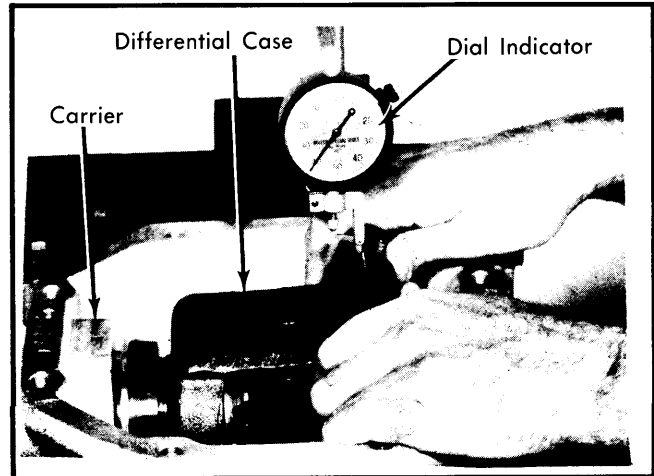


Fig. 5 Differential Side Play Measurement. Make Measurement At Ring Gear Flange To Obtain Total Thickness of Shim Pack.

Pinion Depth & Preload — 1) Observe and record pinion depth variance marked on end of pinion gear. This number shows how much to add or subtract (in thousandths) from nominal pinion depth setting. Install inner pinion bearing cone onto pinion gear.

2) If new gear set is being installed, note difference between pinion depth variance markings on old and new gear sets. Change pinion depth shim pack thickness by amount of difference between old and new gear markings.

3) Install pinion depth shim pack and inner pinion bearing cup into rear of housing. Install pinion gear and depth checking tool into carrier. See Fig. 6. Position blank end of gauge block on pinion gear and plunger end under arbor. Tighten clamp bolt onto gauge block until tight enough to prevent movement of gauge block. Loosen thumbscrew on gauge block to release plunger into arbor. Retighten thumbscrew, remove clamp bolt and gauge block from housing.

4) Measure and record dimension of gauge block at plunger. This dimension is measured pinion depth. Change nominal pinion depth of 2.625" by amount shown on pinion gear (in thousandths; for example, a marking of + 2 on gear would indicate that nominal pinion depth should be increased by .002") to obtain desired pinion depth.

5) Remove pinion gear, inner pinion bearing cup and pinion depth shims from housing. Measure shim pack thickness. Add thickness of shim pack to measured pinion depth. Subtract desired pinion depth from total of measured pinion depth and shim pack thickness. Result is correct shim pack thickness.

CORVETTE (Cont.)

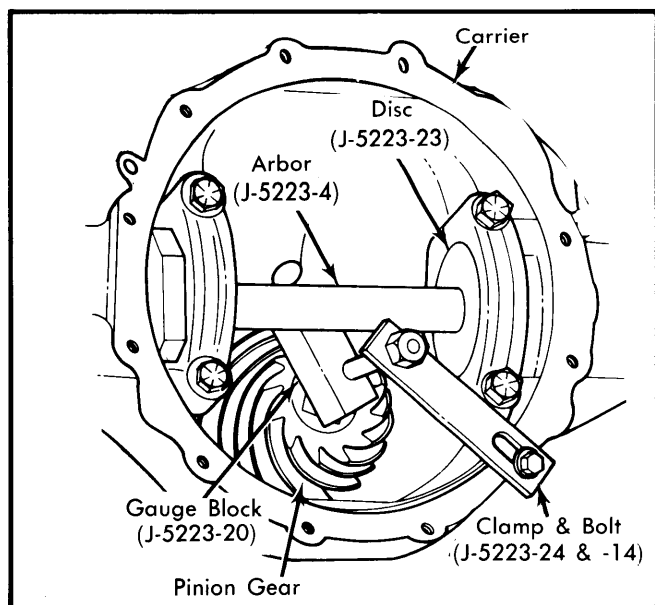


Fig. 6 Measuring Pinion Depth. Make Measurement With Gauge Block Inserted Between Pinion Gear and Arbor.

6) Install shim pack, selected in previous step, into rear of housing. Install inner and outer pinion bearing cups into pinion bore. Install pinion gear into carrier. Assemble outer pinion bearing cone, oil slinger and companion flange, WITHOUT oil seal or preload shims, onto front of pinion gear. Install pinion washer and nut. Tighten nut until rotation of pinion requires 10 INCH Lbs. of force. Rotate pinion several times to seat bearings.

7) Recheck pinion depth as previously outlined. If actual pinion depth is not within $\pm .002''$ of desired pinion depth obtained earlier, add or subtract shims as necessary to correct depth. Recheck pinion depth to confirm correct adjustment.

8) Remove pinion and outer pinion bearing cone. Apply a light film of axle lubricant to bearing cone rollers and inside of pinion seal. Install outer pinion bearing cone and oil slinger. Coat outside of pinion seal with bearing sealer and install into carrier. Install a preload shim pack, equal in thickness to original shim pack, onto front of pinion gear.

9) Install pinion gear into carrier. Install companion flange, washer and new pinion nut. Tighten pinion nut to specifications and check preload. To increase preload, remove shims. To decrease preload, add shims.

Differential Preload & Backlash – 1) Install ring gear using new bolts. Install master bearings (J-29538) or original bearings, without shims, onto differential case. Place differential case into carrier and assemble dial indicator to read differential side play at back side of ring gear flange.

2) Force differential away from pinion gear and zero dial indicator. Force differential into pinion gear, rocking gear to make sure teeth are meshed. Read dial indicator and repeat procedure to obtain a consistent reading. Make sure dial in-

dicator reads zero each time differential is pressed away from pinion gear. This reading, minus .005", will be the amount of shims to be installed on ring gear side of differential.

3) Remove dial indicator and differential case from carrier. Remove bearings from differential. From shim pack selected in Differential Shim Selection procedure, assemble amount of shims selected in step 2). Install shim pack from step 2) and bearing cone onto ring gear side of differential. Add .004" of shims, for preload, to remaining shim pack and install onto differential with bearing.

EXAMPLE – Shim selection procedure result is .050". Step 2) indicator reading is .025", minus .005" for adjustment, resulting in a .020" shim pack for ring gear side of differential. Add .004", for preload, to remaining .030" of original shim pack for a total shim pack size of .034" on pinion side of differential.

Differential Case & Carrier Assembly – 1) Install carrier spreading tool and dial indicator as previously outlined. Spread carrier to a maximum of .010" and remove dial indicator. Assemble differential bearing cups onto differential. Install differential case into housing (gentle tapping may be necessary). Take care to avoid nicking gear teeth when installing differential.

2) Install bearing caps and bolts, aligning assembly reference marks. Check backlash at 3 equally spaced points around the ring gear. To decrease backlash, move shims from ring gear side to pinion gear side of differential. To increase backlash, move shims from pinion gear side of differential to ring gear side. Install side yoke bearings, seals and shafts. Retain side yoke shafts with snap rings.

AXLE ASSEMBLY SPECIFICATIONS

| Application | Specification |
|------------------------------------|-----------------|
| Capacity | 4.0 Pts. |
| Pinion Bearing Preload | 15-35 INCH Lbs. |
| Differential Bearing Preload | Slip Fit .004" |
| Ring & Pinion Gear Backlash | .005-.009" |
| Maximum Backlash Variation | .003" |

TIGHTENING SPECIFICATIONS

| Application | Ft. Lbs. (N·m) |
|---|-------------------|
| Differential Bearing Cap Bolts | 60-70 (81-95) |
| Pinion Nut | 200-220 (271-298) |
| Ring Gear Bolts | 45-60 (61-81) |
| "U" Joint Retainer Bolts | 15-25 (20-34) |
| Carrier Cover-to-Frame Bolts | 90-100 (112-136) |
| Carrier Front Mount-to-Frame Bolt | 60-70 (81-95) |
| Spring Plate-to-Carrier Bolts | 40-50 (54-68) |
| Strut Bracket-to-Carrier Bolts | 25-35 (34-47) |
| Camber Adjusting Cam Bolts | 125-135 (169-183) |