DELCO-MORAINE FOUR PISTON DISC

Corvette

DESCRIPTION

Four wheel disc brakes are standard equipment on Corvette. Brake consists of caliper, splash shield, mounting bracket, and rotating disc. Caliper assembly contains 4 pistons and 2 shoe and lining assemblies. A seal and dust boot are installed on each piston, with a piston spring in caliper cylinder bore beneath each piston. A retaining pin extends through each caliper half and both shoes, to hold shoes and lining in position in caliper.

Machined surfaces within caliper prevents shoe and lining assembly from rotating with brake disc when pressure is applied. Brake discs, have a series of air vent louvers to provide cooling. Caliper straddles disc and mounts on bracket attached to steering knuckle or rear axle flange.

PARKING BRAKE

Conventional type shoe brake is mounted on a backing plate attached to rear wheel spindle support. Cable operated shoes expand against a small drum which is behind the disc.

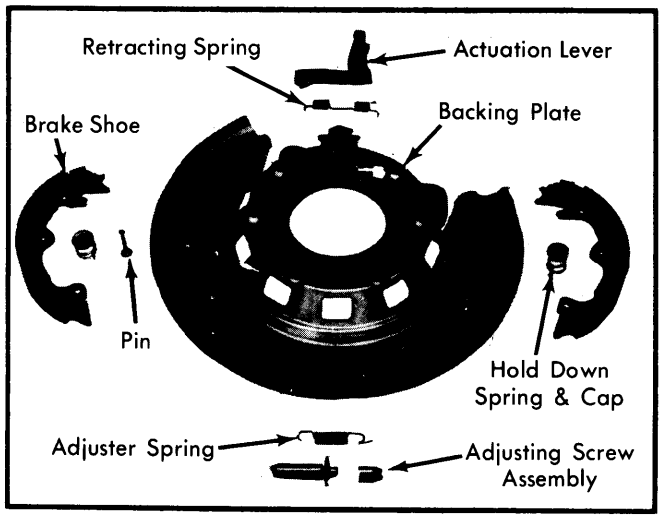

Fig. 1 Corvette Parking Brake Assembly

ADJUSTMENT

SERVICE BRAKES

Disc brakes are self-adjusting. Caliper piston seals are designed to retract pistons just enough to allow brake lining to lightly brush disc without any drag.

PARKING BRAKE

Shoe Adjustment – Raise vehicle on hoist and remove rear wheels. Loosen brake cables at equalizer until parking brake levers move freely to "Off" position, with slack in cables. Turn disc until adjusting screw can be seen through hole in disc. Insert adjusting tool and tighten screw until disc will not move, then back off 6 to 8 notches. Install rear wheels.

Cable Adjustment – With vehicle still on hoist, loosen equalizer rear check nut and forward check nut. Place brake handle in applied position (13 notches). Tighten check nuts until an 80 lb. pull is obtained when lever is moved into 14th notch. Tighten cable check nuts to 70 INCH lbs.

NOTE – *With parking brake mechanism fully released, rear wheels should turn freely in either direction with no brake drag.*

SERVICING

BLEEDING SYSTEM

See Hydraulic Brake Bleeding in this section.

SHOE & LINING REPLACEMENT

NOTE – *Shoes should be replaced when lining is worn to approximately 1/32" thickness.*

Removal – Siphon two-thirds of brake fluid from master cylinder to prevent overflow. Raise vehicle and remove wheels. Remove and discard cotter pin from inboard end of shoe retaining pin and slide retaining pin out. Remove shoes by pulling up. If brake shoes are to be reused, mark for reassembly in original location.

Installation – Use 2 screwdrivers as levers to push pistons back as shoes are inserted. When both shoes are in place, insert retaining pin and install new cotter pin. Repeat procedure at each wheel where shoes are to be replaced. Refill master cylinder, bleed system if necessary and check for firm brake pedal before moving vehicle.

PARKING BRAKE SHOES

Removal – 1) Raise and support vehicle and remove rear wheels. Remove caliper assembly and support out of the way to prevent damage to brake hose.

2) Mark rotor-to-spindle relationship for installation in same position. Drill out rivet heads attaching brake disc to axle hub and remove disc.

3) Rotate adjuster screw several turns to expand parking brake shoes. Push shoes forward until front shoe hold down spring retainer is visible from the side.

4) Rotate axle shaft flange until access hole lines up with head of hold down spring pin. Reach through access hole with needle nose pliers and grasp head of pin. While depressing spring and retainer with small screwdriver, rotate pin 90° to release spring and retainer. Remove spring and retainer. Repeat procedure to remove rear shoe hold down spring.

5) Rotate adjuster to retract shoes. Separate shoes from adjuster and remove adjuster and spring. Separate shoes at anchor pin and lift shoes up and out, allowing shoe return spring (straight section) to pass between outer end of anchor pin and axle flange plate. Separate shoes and return spring.

Installation – Reverse removal procedure and note the following:

- Apply a thin coat of brake lube to shoe contacting surfaces on flange plate, anchor pin and adjuster screw threads.
- When installing rear hold down spring and retainer, the head of spring pin is not accessible. Hold pin in position with one pair of needle nose pliers while attempting to grasp pin end with another pair of needle nose pliers.

DELCO-MORAINE FOUR PISTON DISC (Cont.)

- Align marks on hub and disc made at removal. Also it is not necessary to rivet the 2 assemblies; wheel nuts supply ample retention.
- Adjust parking brake.

ROTOR SERVICING

Lateral Runout (Front) – Adjust wheel bearings until all end play is eliminated. Attach dial indicator to caliper so that pointer contacts disc at a point about 1" from outer edge. Turn disc one complete revolution and read runout on dial indicator. See *Rotor Specifications for maximum allowable runout.* If runout exceeds specifications, refinish or replace disc as necessary.

Lateral Runout (Rear) – Check rear wheel bearing end play. See *Wheel Bearing Adjustment in Suspension Section.* Mount dial indicator so that pointer contacts disc at a point about 1" from outer edge. Check disc lateral runout. If runout exceeds bearing end play by .005", disc should be refinished or replaced as necessary.

Parallelism – Check thickness of rotor at 4 or more points around circumference. Make all measurements at same distance from edge of rotor. If thickness varies more than specified, refinish or replace rotor, as necessary.

REMOVAL & INSTALLATION

BRAKE CALIPER

Removal – **1)** Raise and support vehicle. Remove wheels. Clean dirt from around brake hose and line connections. On front caliper, disconnect brake hose at support bracket. On rear caliper, disconnect brake tubing from inboard caliper.

2) Plug open hose or line to prevent foreign material from entering system. Remove 2 hex bolts and lift caliper assembly from mounting bracket.

Installation – **1)** Use 2 screwdrivers to depress pistons while caliper is slipped over disc. Secure caliper assembly with 2 mounting bolts. Place new copper gasket on front brake hose, and install hose to caliper. Clean rear brake tubing seat, and fasten tube securely to caliper.

2) Ensure front brake hose is not twisted, insert hex of hose fitting into support bracket hole, and secure it with "U" shaped retainer. Turn wheel from side to side and observe that hose does not contact other parts. Readjust hose as necessary. Bleed system. Install wheels and lower vehicle.

CAUTION – *Do not move vehicle until a firm brake pedal is obtained.*

BRAKE HUB & ROTOR

Removal (Front Rotor) – Raise and support vehicle. Remove wheels and caliper assembly. Wire caliper up out of way without disconnecting or stressing brake hose. Insert wood block in caliper to prevent extension of caliper pistons. Remove hub grease cap, spindle nut, washer and hub/rotor assembly. DO NOT separate hub and rotor as they are serviced as an assembly.

Installation – Reverse removal procedure, bleed system, and install wheels.

Removal & Installation (Rear) – See *Parking Brake Shoe Replacement for rotor removal and installation.*

OVERHAUL

BRAKE CALIPER

Disassembly – **1)** Remove brake shoes by pulling cotter pin from end of retaining pin, then withdraw retaining pin and remove shoes. Separate caliper halves by removing 2 large bolts. Extract 2 small "O" ring seals from cavities around fluid transfer holes.

2) Push piston to bottom of caliper, insert screwdriver under inner edge of steel ring in boot and pry boot out of seat. Be careful not to puncture seal during piston removal. Remove pistons, springs, boots and seals from caliper.

Cleaning and Inspection – Clean all metal parts in brake fluid or alcohol only. Blow out passages with compressed air. Discard all rubber parts and replace with new parts. Inspect piston bores for scoring or pits. If bore cannot be cleaned with fine crocus cloth caliper half must be replaced. Check clearance of piston in bore with feeler gauge. Clearance for 1⅞" bore should be .0045-.010" and, for 1⅜" bore, .0035-.009". If bore is not damaged and clearance is excessive, replace piston.

Reassembly – **1)** Install seal into groove in piston which is closest to flat end of piston. Lip on seal must face toward large end of piston. Be sure lips are in groove and do not extend over step in end of groove.

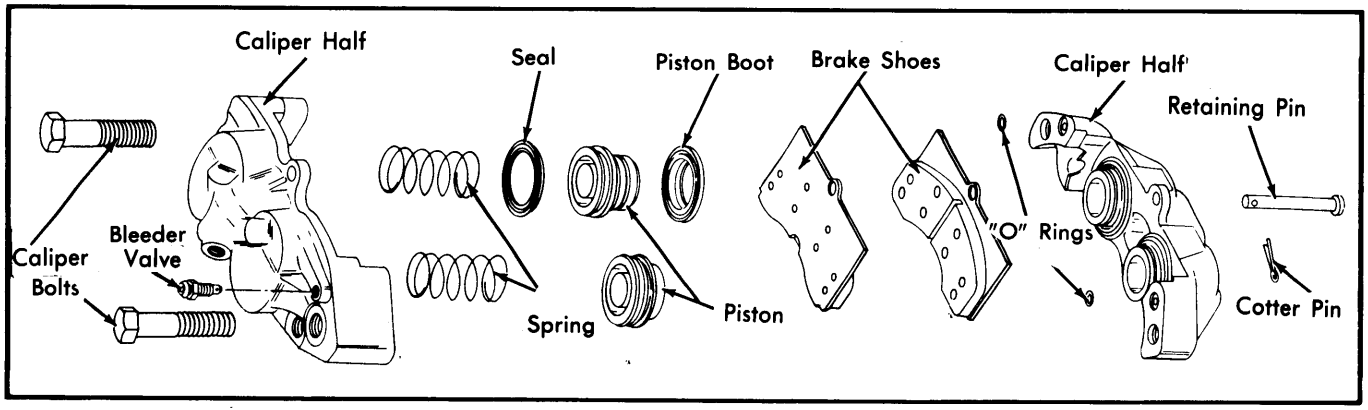

Fig. 2 Exploded View of Corvette Four Piston Disc Brake Caliper Assembly

DELCO-MORAINE FOUR PISTON DISC (Cont.)

2) Place spring in bottom of piston bore. Lubricate piston seal with clean brake fluid then install piston into bore using suitable piston ring compressor tool (J-22629 or J-22639). Use care not to damage seal lip as piston is pressed past edge of bore.

3) Insert a bead of RTV sealant into boot groove (groove closest to concave end of piston) in piston. Assemble boot in groove, with fold in boot facing toward end of piston with seal on it.

4) Depress pistons and check that they slide smoothly into bore until end of piston is flush with end of bore. If not, recheck piston assembly and location of piston spring and seal.

5) Seat boot retaining ring evenly in counterbore using suitable boot seal installer tool (J-22628 or J-22638). Retaining ring must be flush or below machined face of caliper.

6) Depress pistons and while holding in a depressed position place a bead of RTV sealant on outer diameter of boot retaining ring, forming a seal between ring and housing.

7) Position "O" rings in small cavities around brake fluid transfer hole in both ends of outboard caliper halves. Lubricate hex head bolts with brake lube or clean brake fluid, then fit caliper halves together and secure with bolts.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N·m)
Caliper-to-Mounting Bracket	70 (95)
Caliper Assembly Bolts	
Front	130 (177)
Rear	60 (82)
Brake Hose-to-Caliper	22 (30)
Wheel Lug Nuts	
Aluminum Wheels	90 (122)
Standard Wheels	80 (109)

DISC BRAKE ROTOR SPECIFICATIONS

Application	Disc Diameter	Lateral Runout	Parallelism	Original Thickness	Minimum Refinish Thickness	Discard Thickness
Corvette						
Front	11.75"	.005"	.0005"	1.250"	1.230"	1.215"
Rear	11.75"	①	.0005"	1.250"	1.230"	1.215"

① — Runout should not exceed rear wheel bearing end play by more than .005". See *Wheel Bearing Adjustment in SUSPENSION Secton* for rear wheel bearing adjustment specifications.