CONE BRAKE TYPE — BORG-WARNER DESIGN

American Motors
Chrysler Corp.
Ford Motor Co.
General Motors

DESCRIPTION

Positive traction type differential which directs major driving force to wheel with greatest amount of traction. This is accomplished by 2 spring loaded thrust plates bearing against the differential side gears which are seated into tapered clutch cones. The clutch cones fit into a tapered recess in each end of the differential case where the outward pressure of the thrust plate assembly forces the cones against the recesses providing resistance to normal differential action. The thrust plate spring load is calibrated to permit some slippage under variable torque conditions. The differential is a 2 pinion, 2 piece case design.

IDENTIFICATION

Differential can be identified as a positive traction unit by raising vehicle and turning one of the rear wheels. With transmission in neutral, if both rear wheels rotate in the same direction the vehicle is equipped with a positive traction differential. Identification of axle ratio, ring gear size and type of differential is contained in the axle code. *See Fig. 2 for axle code locations.*

Axle Ratio Identification

Ratio	Code	Ring Gear Dia.
American Motors		
2.21:1	MM	7 9/16"
2.35:1	LL	7 9/16"

Axle Ratio Identification (Cont.)

Ratio	Code	Ring Gear Dia.
2.73:1	JJ, U	7 9/16"
3.08:1	FF, T	7 9/16"
3.54:1	EE	7 9/16"
Chrysler Corp.		
2.24:1	47/21①	8 1/4"
2.45:1	49/20①	8 1/4"
2.71:1	46/17①	8 1/4"
2.94:1	47/16①	8 1/4"
2.94:1	47/16①	9 1/4"
3.21:1	45/14①	9 1/4"
Ford Motor Co.		
2.73:1	WFC-D, WFC-E	7 1/2"
3.08:1	WFC-A, WFC-B	7 1/2"
3.45:1	WFC-C	7 1/2"
General Motors		
2.14:1	BK, BR, CO, CS	7 1/2"
2.29:1	BH, BN, BP, BT, CP, CT, HB	7 1/2"
2.39:1	AP	7 1/2"
2.41:1	BJ, BM, BZ, CQ, CU, JB	7 1/2"
2.56:1	AB, BA, BY, CN, CV, CY	7 1/2"
2.73:1	BB, BL, BX, CR, CW, CZ, JW, PW, RX	7 1/2"
2.93:1	BG, BW, JX, PX	7 1/2"
3.08:1	BC, BV, JY, PY	7 1/2"
3.23:1	BD, BE, BU, JZ, PZ	7 1/2"
3.42:1	JR	7 1/2"

① — Number of ring/pinion teeth. Chrysler Corp. does not list any codes.

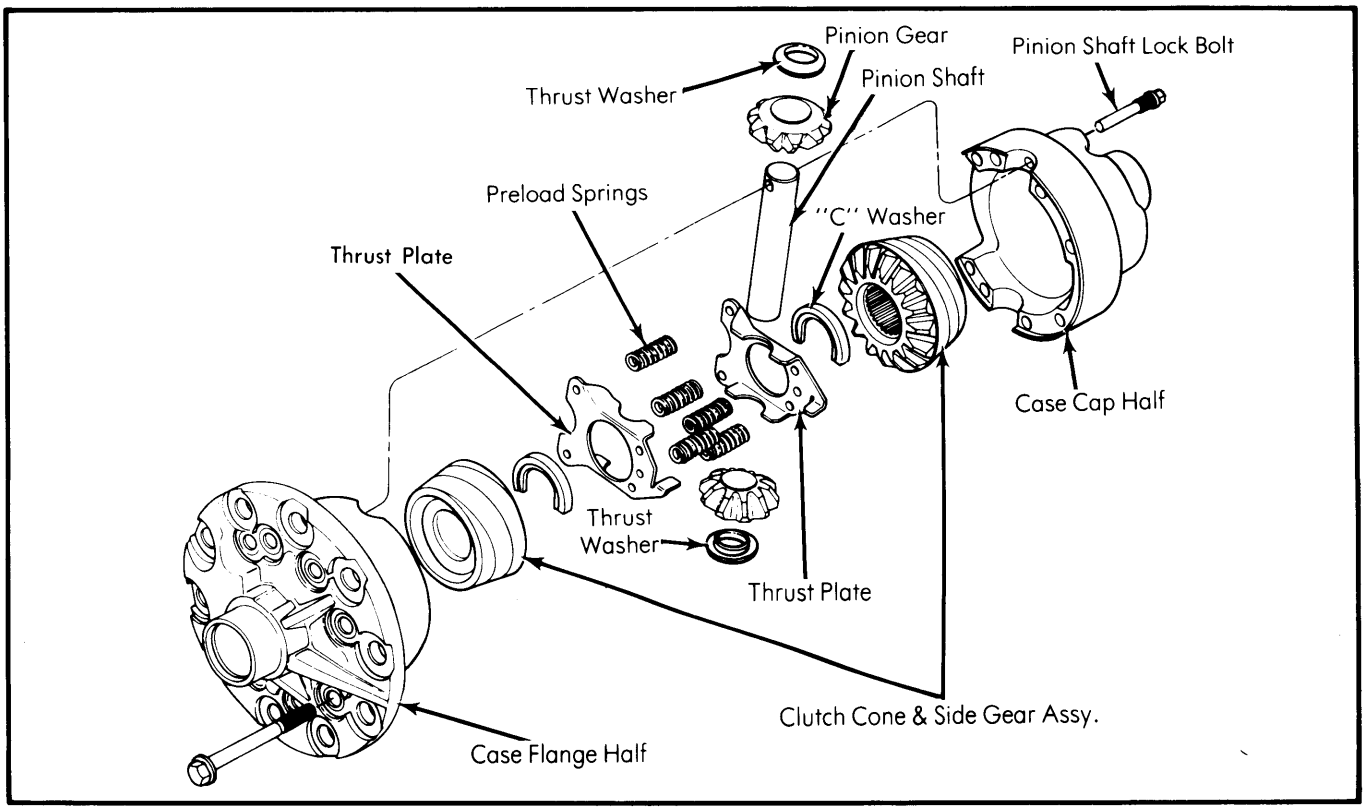

Fig. 1 Exploded View of Borg-Warner Cone Brake Differential

CONE BRAKE TYPE — BORG-WARNER DESIGN (Cont.)

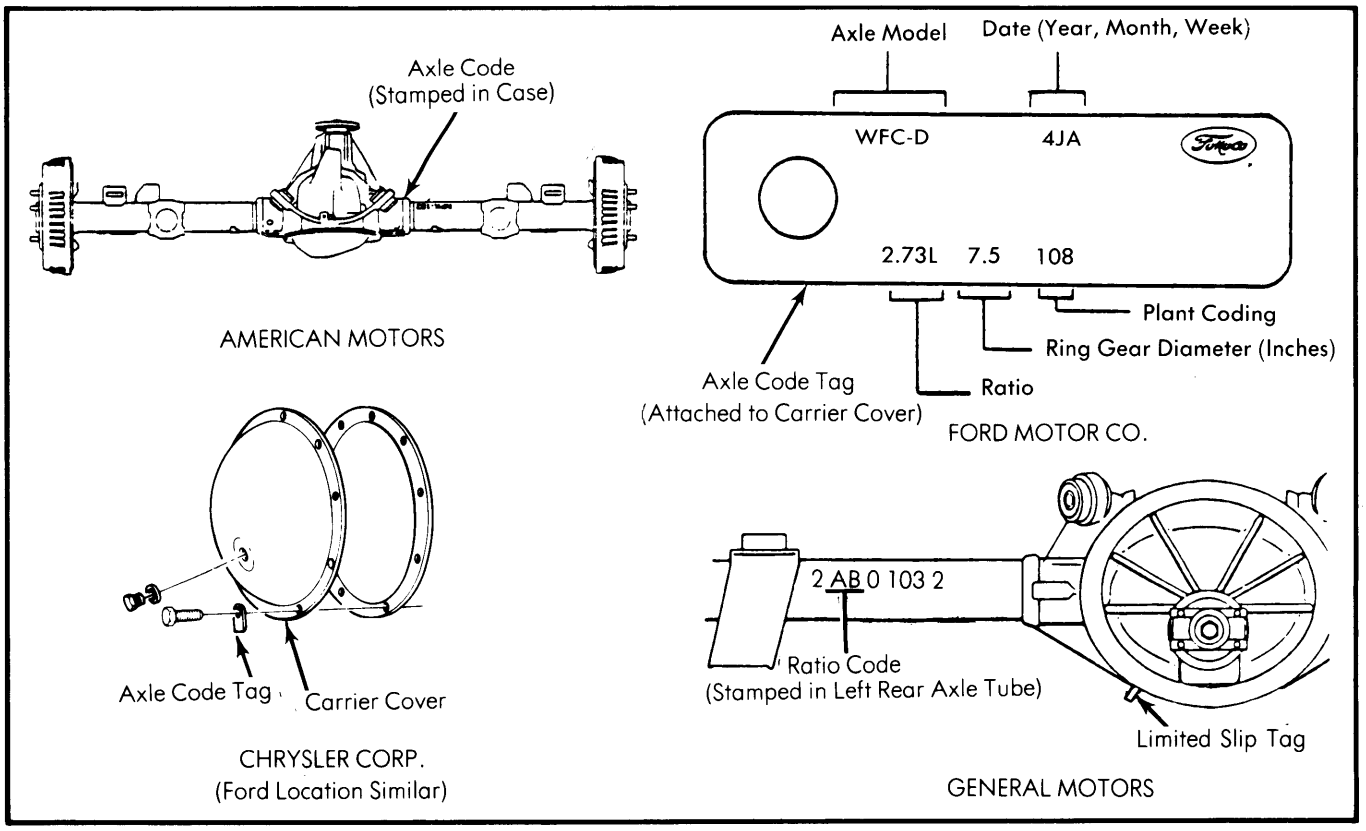

Fig. 2 Axle Code Locations

LUBRICATION

American Motors — Fill to just below filler plug with AMC Rear Axle Lubricant or equivalent marked SAE 85W-90 (API-GL5) only. Do not use lubricants containing sulfur at any time. Check level after first 5,000 miles and every 10,000 miles afterwards.

Chrysler Corp. — Approximately 4.5 pints of API-GL5 or Mopar Hypoid Lubricant (3744994). With either lubricant, 4 ounces of Mopar Hypoid Gear Oil Additive Friction Modifier or equivalent must be included. Check level periodically.

Ford Motor Co. — Approximately 3.5 pints of Ford Hypoid Gear Lubricant (EOAZ-19580-D) or equivalent. Check level periodically.

General Motors — Approximately 3.5 pints of GM Gear Lubricant (1052271) or equivalent with GM Limited Slip Additive (1050428) or equivalent added. Check level every 12 months or 7,500 miles.

TESTING

CAUTION – *Do not spin test axle unless both wheels are off ground.*

Positive traction differentials can be tested externally by raising 1 rear wheel with transmission in neutral and attempting to rotate wheel by hand. If wheel can be turned, differential should be replaced. Differential can also be tested by attaching a torque wrench to axle shaft (differential in vehicle)/side gear and cone assembly (differential on bench). Turning axle shaft/cone assembly while holding driveshaft or opposite axle shaft/cone assembly should require 80-120 ft. lbs. for initial breakaway and 30-40 ft. lbs. to maintain rotation.

REMOVAL & INSTALLATION

See appropriate Rear Axle article for individual manufacturer's removal and installation procedures.

NOTE — *Once differential and first axle shaft have been installed in housing, first axle must not be rotated to prevent misalignment of splines in opposite cone and gear assembly.*

OVERHAUL

NOTE — *American Motors and Chrysler Corp. service this differential as a complete assembly only and do not recommend disassembly. Ford Motor Co. services this unit as a complete assembly only and recommends disassembly only if necessary for cleaning purposes. General Motors does not service the case, cones or gears and recommends replacement of the entire unit if any of these parts are damaged or worn excessively.*

Disassembly — Place differential case into a press or large vise to contain expansion of case caused by preload springs and loosen 8 case bolts. Loosen grip of press or vise and tap case with soft hammer to unseat case halves. Remove case from press or vise and remove 8 case bolts. Separate case halves and remove internal parts. Make note of which cone and gear assembly comes from which case half for reassembly.

Inspection — Wipe all parts clean with a shop towel. Do not use solvents or cleaners. Inspect all mating parts for scoring or excessive wear. Check springs for broken or collapsed coils.

CONE BRAKE TYPE — BORG-WARNER DESIGN (Cont.)

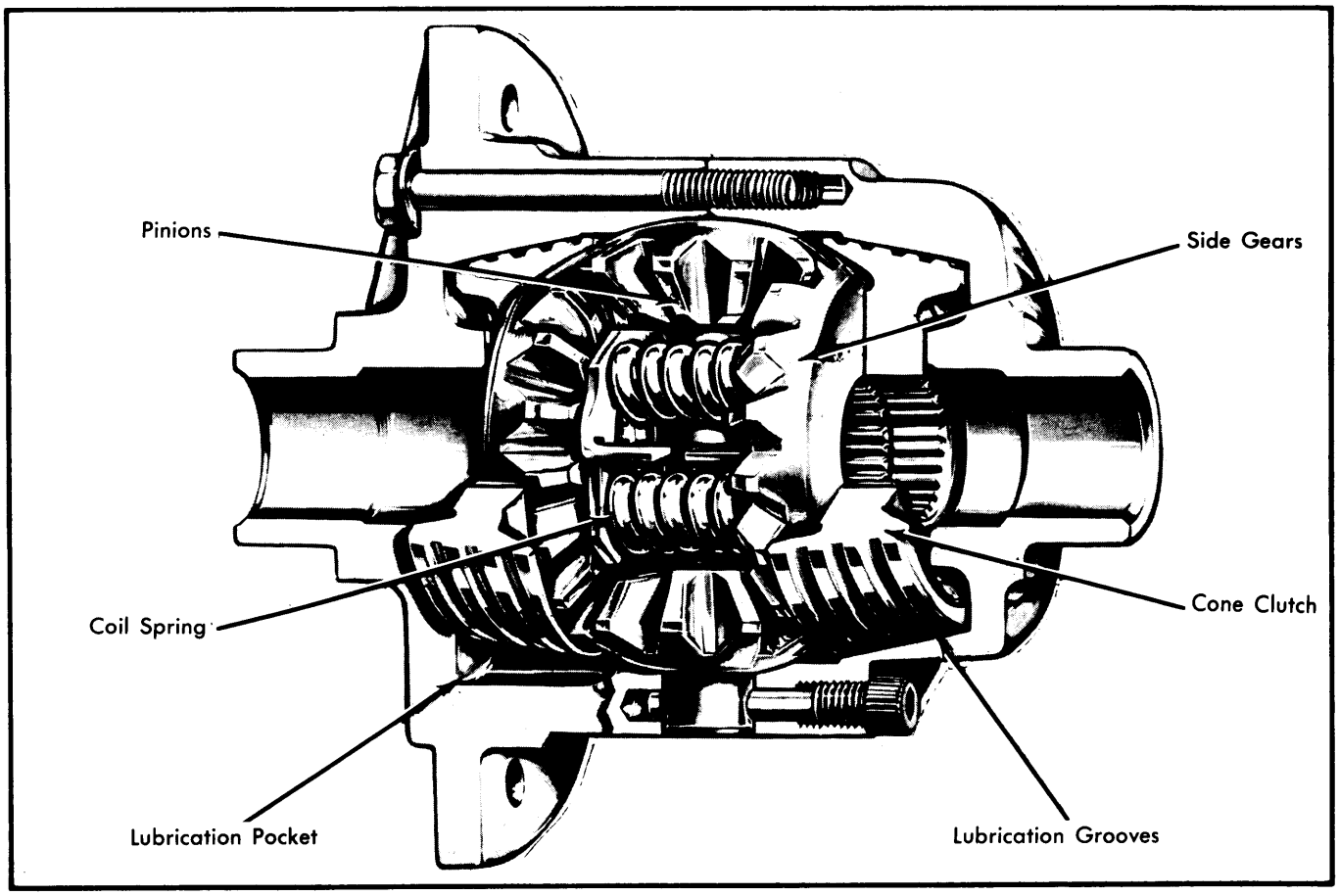

Fig. 3 Cutaway View of Borg-Warner Design Cone Brake Differential

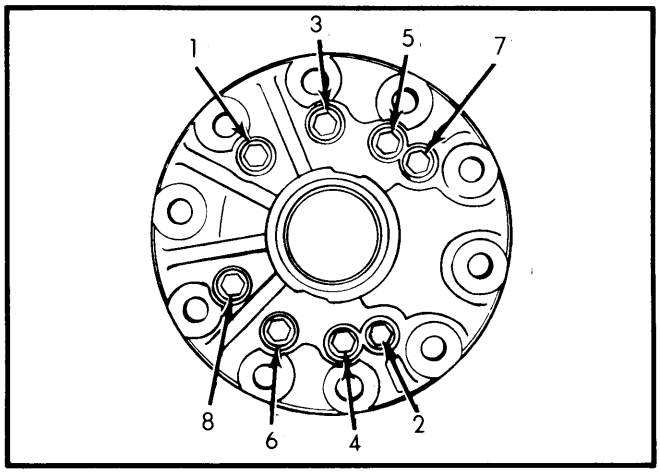

Fig. 4 Case Bolt Tightening Sequence

Reassembly – 1) Make sure all parts are clean and free of burrs. Oil all parts with approved axle lubricant. Place cap half of differential into vise. Install internal parts in reverse order of removal. Make sure correct cone and gear assembly are mated with each end of case. Install flange half of case onto assembly and secure with 2 finger-tight bolts at opposite sides of case.

2) Remove all oil from bolts and their mating surfaces to ensure correct torque readings. Install 6 remaining case bolts and pinion shaft lock bolt using thread locking compound. Tighten all bolts in sequence. Bench test differential before installation.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N·m)
Case Bolts	30-40 (40-54)
Pinion Shaft Lock Bolt	15-30 (20-40)