Positive Traction Differentials

SPICER (DANA) TRAC-LOK

Jeep

DESCRIPTION

The Trac-Lok differential uses clutch packs which are preloaded by Belleville spring plates to provide limited slip action. Multiple disc clutches permit differential action when required for turning corners and transmit equal torque to both wheels when driving straight ahead.

When 1 wheel tries to spin because of reduced traction, clutch packs automatically provide more torque to wheel with greater traction. Trac-Lok is used on Spicer (Dana) axles with a 1-piece differential case and 2 differential pinion gears.

AXLE RATIO & IDENTIFICATION

To determine axle ratio, *refer to Drive Axle Ratio Identification in this Section.*

TESTING ON VEHICLE

1) With engine off and transmission in Neutral, raise 1 wheel off ground and block both front and rear wheels of opposite side. Install adapter tool across 2 wheel studs and attach torque wrench to center of tool.

2) Observe torque required to continuously turn wheel smoothly through several revolutions. Repeat test for opposite side. If differential is operating properly, torque should be 40-200 ft. lbs. (54-272 N.m).

NOTE: Disregard breakaway torque. Use rotating torque only.

REMOVAL & INSTALLATION

See Spicer (Dana) Semi-Floating or Full-Floating Axle article in this Section.

OVERHAUL

DISASSEMBLY

During disassembly, note and record relationship of all parts to each other (especially clutch disc and plates). Mark case halves, pinion mate shafts and their corresponding ramps and differential spiders for reassembly reference.

NOTE: For front axle shaft and bearing removal, see articles on Spicer (Dana) Full-Floating Axles or 4-Wheel Drive Steering Knuckles, in this Section.

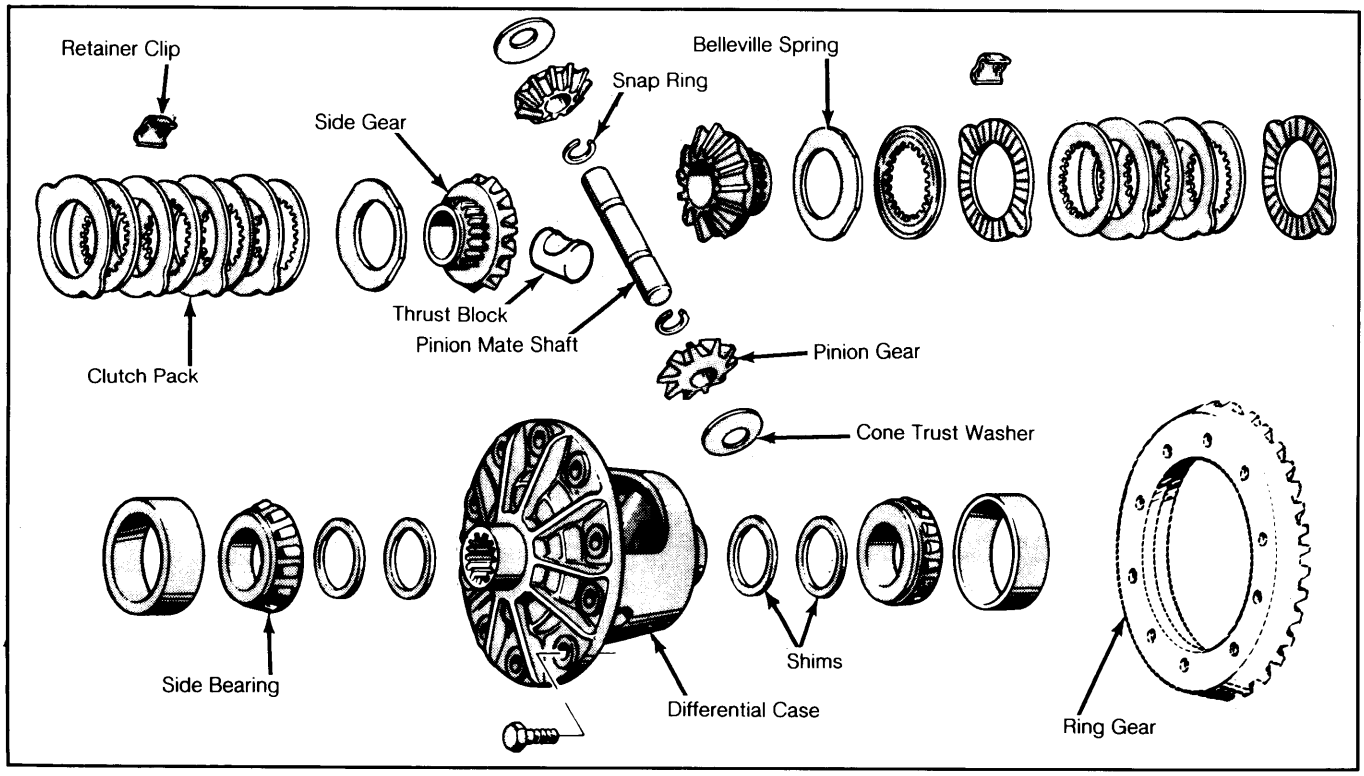
1) With axle assembly removed from vehicle and axles pulled out from housing, remove cover plate screws and cover. Remove differential bearing caps.

2) Note letters stamped on bearing caps for reassembly in proper location. Mount speader and dial indicator to housing. Spread housing to .020" (.51 mm). DO NOT spread any wider.

3) Remove differential using 2 pry bars. Mark differential bearing cups for reassembly. Place axle in a vise, with splined end pointing up 3" (76 mm) above vise. Assemble differential to axle shaft with ring gear screws facing up.

4) Remove ring gear and disassemble internal parts of case. Drive out lock pin using a long drift. With differential on axle shaft, remove cross pin and spacer block (if equipped). Use a hammer and drift.

Fig. 1: Exploded View of Spicer (Dana) Trac-Lok Differential Assembly



Positive Traction Differentials

SPICER (DANA) TRAC-LOK (Cont.)

5) Place shop towels over vise jaws to protect gear teeth from becoming nicked after it is free from case. On model 60 Track-Lok, pinion mate shaft is retained by a single lock pin which should be driven from case at this time, using a 3/12" drift.

6) Gear Rotating Tool (J-23781) is required to perform the following steps. The tool consists of 3 parts; gear rotating tool, forcing screw and stop plate. Install stop plate in lower differential side gear.

7) Position pawl end of gear rotating tool on step plate. Lubricate forcing screw and center hole in stop plate before using. Insert forcing screw through top of case and thread into gear rotating tool.

8) Thread forcing screw so that it becomes centered in stop plate. Tighten screw until differential side gears move away from pinion gears. This relieves load between gears allowing pinions some freedom of movement.

9) Use shim stock of .030" (.76 mm) thickness to remove spherical washers. Loosen forcing screw and retighten until a very slight movement of pinions is detected. Insert gear rotating pawl between 2 differential side gear teeth and roll pinion gears out of case.

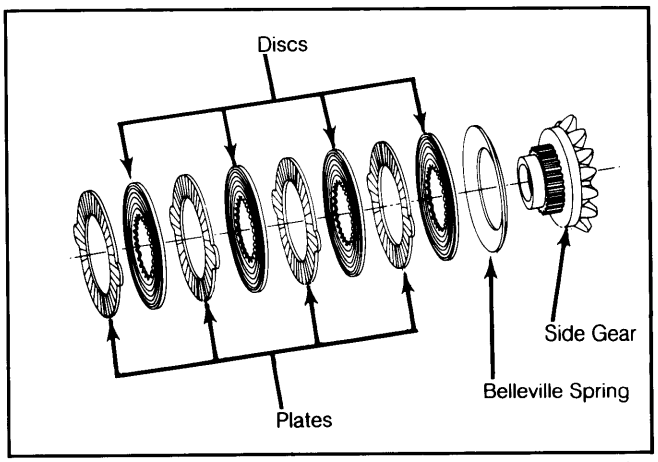
NOTE: When rotating differential gear, adjust forcing screw until required load is applied to allow differential gears to rotate freely.

10) Retain top differential side gear and clutch pack in case by holding bottom of rotating tool while removing forcing screw. Remove rotating tool, stop plate, top differential gear and clutch pack from case.

11) Remove case from axle shaft. Invert case and remove remaining side gear and clutch pack. Remove retaining clips from both clutch packs and separate clutch plates and discs.

NOTE: During disassembly, keep parts in same order as they were removed, so they can be installed in their original positions.

Fig. 2: View Showing Typical Clutch Pack Arrangement



Not all combinations shown.

INSPECTION

Clean and dry all parts. Inspect plates, discs and clips for excessive wear or scoring. Inspect gears for extreme wear, cracks or chips. Inspect case for scoring, wear or metal pickup on machined surfaces.

NOTE: If any 1 member of either clutch pack should be replaced, complete clutch pack for both sides should be replaced. If any 1 gear requires replacement, all differential gears and thrust washers should be replaced.

REASSEMBLY

NOTE: Lubricate all parts with positive traction lubricant prior to reassembly.

1) Reassemble Belleville spring plate, disc and plates to differential side gears in same position as originally assembled. Install retaining clips to ears of plates, making sure clips are fully seated.

2) Install clutch packs and differential side gears into case. Mount case assembly onto axle shaft, held in vise. While holding gears in place by hand, assemble gear rotating tool the same way as during disassembly.

3) Position differential pinion gears in place so that holes in gears align with holes in case. Tighten forcing screws slightly.

NOTE: On models with single lock pin through case, make sure hole in shaft is aligned with hole in case.

4) Install pinion gear thrust washers using small screwdriver to guide washers into position. Remove forcing screw, rotating tool and stop plate. Position thrust block between side gears and install differential pinion mate shaft.

5) Be sure snap ring grooves of shaft are exposed enough to install snap rings. On model 60 Trac-Lok, align shaft, shaft retaining pin bore and case pin bore. Tap shaft into position and install retaining pin.

6) If case is mounted in a vise with machined side of ring gear flange facing upward, use a 5/16" diameter punch to install retaining pin. Seat pin until punch bottoms in case bore.

7) If case is mounted in a vise, place machined side of ring gear flange downward. Wrap a length of tape around a 5/16" diameter punch approximately 1 3/4" from end of punch. Install retaining pin until edge of tape is flush with pin bore.

8) Remove case from axle shaft. Install ring gear on case, using all new ring gear bolts. Align ring gear and case bolt holes. Install ring gear bolts finger tight only.

9) Remount case on axle shaft, and tighten bolts evenly to specified torque. Install Trac-Loc differential assembly in axle housing. To complete differential and axle assembly, follow service procedures previously outlined for conventional axles.