

SERVICE MANUAL

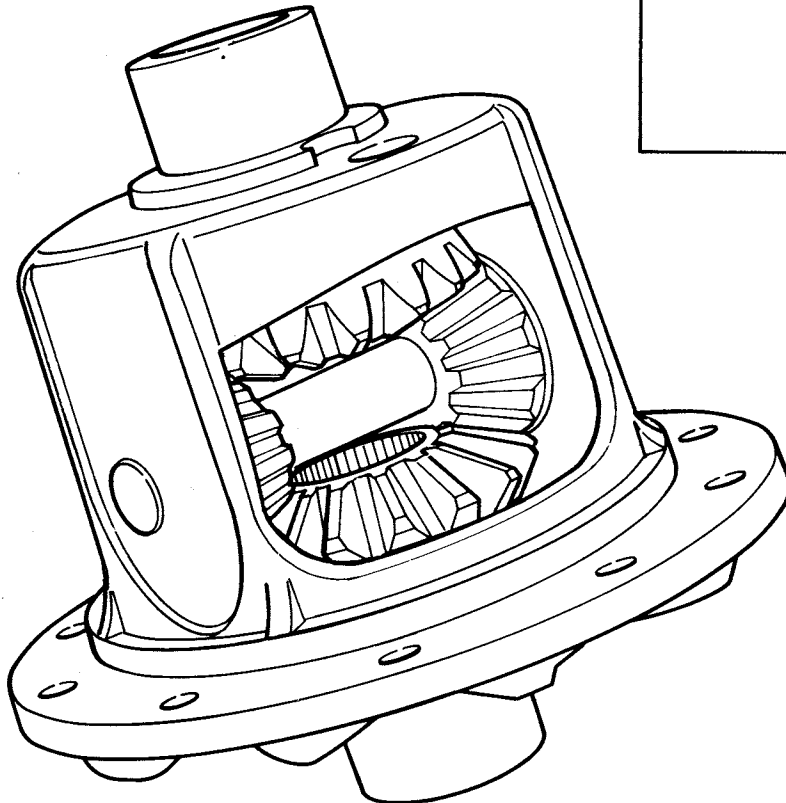
SPICER®

MODEL **44**

TRAC-LOK™

LIMITED SLIP

DIFFERENTIAL



SPICER AXLE DIVISION

DANA

DANA CORPORATION

FORT WAYNE, INDIANA

GENERAL INFORMATION

IMPORTANT SAFETY NOTICE

Should an axle assembly require component parts replacement, it is recommended that "Original Equipment" replacement parts be used. They may be obtained through your local service dealer or other original equipment manufacturer parts supplier. **CAUTION: THE USE OF NON-ORIGINAL EQUIPMENT REPLACEMENT PARTS IS NOT RECOMMENDED AS THEIR USE MAY CAUSE UNIT FAILURE AND/OR AFFECT VEHICLE SAFETY.**

Proper service and repair is important to the safe, reliable operation of all motor vehicles or driving axles whether they be front or rear. The service procedures recommended and described in this service manual are effective methods for performing service operations. Some of these service operations require the use of tools specially designed for the purpose. The special tool should be used when and as recommended.

CAUTION

EXTREME CARE SHOULD BE EXERCISED WHEN WORKING ON COMPONENTS UTILIZING SNAP RINGS OR SPRING LOADED RETENTION DEVICES.

WARNING

Some vehicle manufacturers may require the assembly of brake components on Dana axles that utilize materials containing asbestos fibers.

BREATHING ASBESTOS DUST MAY BE HAZARDOUS TO YOUR HEALTH AND MAY CAUSE SERIOUS RESPIRATORY OR OTHER BODILY HARM.

Follow O.S.H.A. standards for proper protective devices to be used when working with asbestos materials.

SILICONE RUBBER SEALANT (RTV) AND LUBRICATING GREASE AND OILS

Silicone rubber sealant is used as a gasket material on Dana axles, as well as various lubricants for lubricating purposes. Before using any of these materials, one should become familiar with and follow all safety precautions as recommended by the product manufacturer/supplier. All personnel involved with these materials should follow good industrial hygiene practices (e.g. before eating, hands and face should be thoroughly washed. Eating, drinking and smoking should be prohibited in areas where there is potential for significant exposure to these materials).

When discarding any of the materials, observe all local, state, and federal laws and regulations for proper disposal procedures.

SAFETY PRECAUTIONS



This symbol warns of possible personal injury.



SAFETY GLASSES SHOULD BE WORN AT ALL TIMES WHEN WORKING ON VEHICLES OR VEHICLE COMPONENTS.



A serious or fatal injury can occur . . .

- if you lack proper training
- if you fail to follow proper procedures
- if you do not use proper tools and safety equipment
- if you assemble components improperly
- if you use incompatible components
- if you use worn-out or damaged components
- if you use components in a non-approved application

GENERAL INFORMATION

RTV SILICONE RUBBER SEALER SPECIFICATION

Sealant material must meet specification of *A.S.T.M. 1, GE 503, Z1, Z2, Z3.

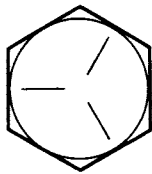
FASTENER STRENGTH IDENTIFICATION

IMPORTANT

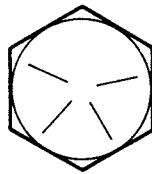
WHENEVER FASTENERS ARE REPLACED, IT IS VERY IMPORTANT THAT THE FASTENER BE REPLACED WITH ONE OF EQUAL OR HIGHER GRADE AND QUALITY. FASTENERS SHOULD BE TORQUED AS RECOMMENDED OR SPECIFIED FOR THE APPLICATION.

WARNING

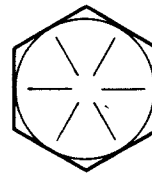
IF FASTENERS OF A LOWER GRADE OR CLASS ARE TORQUED TO THE REQUIREMENTS OF A HIGHER GRADE OR CLASS FASTENER, IT MAY RESULT IN COMPONENT FAILURE. (E.G. GRADE 5 FASTENER TORQUED TO THE REQUIREMENTS OF A GRADE 8 FASTENER.)



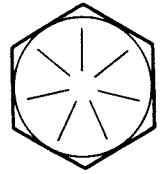
GRADE 5



GRADE 7

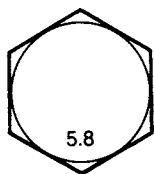


GRADE 8

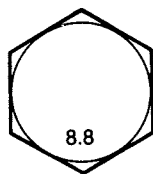


SPECIAL GRADE
(High Strength Applications)

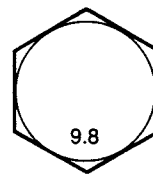
Customary (Inch) Bolts - Identification marks correspond to bolt strength - increasing numbers represent increasing strength.



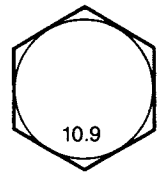
5.8



8.8



9.8



10.9

Metric Bolts - Identification class numbers correspond to bolt strength - increasing numbers represent increasing strength.

Inch grade fasteners can be identified by the radial lines embossed upon the head of the fastener and will correspond to the fastener strength by two-lines less than actual grade (i.e. grade 8 fastener will display 6 radial lines on the head).

Metric fastener strength can be identified with the class identification embossed on the head of each fastener. Increasing numbers represent increasing strength.

*A.S.T.M. - American Society for Testing and Material

MODEL 44 TRAC-LOK

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NOTE

Throughout this manual, reference is made to certain tool numbers whenever special tools are required. These numbers are numbers of Triangle Special Products, 32615 Park Lane, Garden City, Michigan 48135. They are used herein for customer convenience only. Dana Corporation makes no warranty or representation with respect to these tools.

MODEL 44 TRAC-LOK

OPERATION

A conventional differential transmits all of the ring gear torque through the differential side gears to the axle shafts. Torque is at all times equal on the axle shafts, and if one wheel slips, the other wheel can only put out as much torque as the slipping wheel.

The Trac-Lok differential is similar, except that part of the torque from the ring gear is transmitted through clutch packs between the side gears and differential case. The multiple disc clutches with radial grooves on the plates and concentric grooves on the disc are engaged by a preload from Belleville Springs, plus separating forces from the side gears, as torque is applied through the ring gear.

The Trac-Lok construction permits differential action when required for turning corners and transmits equal torque to both wheels when driving straight ahead. However, when one wheel tries to spin due to leaving the ground, a patch of ice, etc., the clutch packs automatically provide more torque to the wheel which is not trying to spin.

The Trac-Lok differential resists wheel spin on bumpy roads and provides more pulling power when one wheel tries to slip. In many cases of differences in traction, pulling power will be automatically provided until both wheels start to slip.

In diagnosis of vehicle operators' complaints, it is important to recognize two things:

1. If, with unequal traction, both wheels slip, the Trac-Lok has done all it can possibly do.
2. In extreme cases of differences in traction, the wheel with the least traction may spin after the Trac-Lok has transferred as much torque as possible to the non-slipping wheel.

LUBRICATION

It is not our intent to recommend any particular brand or make of lubricant for Spicer axles. However, a S.A.E. 90 weight multipurpose gear lubricant meeting Mil. Spec. L-2105-D, or 80 W 90 multipurpose gear lubricant meeting Mil. Spec. L-2105-D, and suitable for A.P.I. Service Classification GL-5, is suggested as a minimum requirement.

IMPORTANT

Limited Slip Differentials impose additional requirements on lubricants which cannot be covered by the above specifications. Some otherwise good lubricants produce "chatter" or "bumping" in turning corners with Limited Slip Differentials. Many vehicle manufacturers require a special lubricant or lubricant additive for use with Limited Slip Differentials. Check the vehicle manufacturer's lubricant recommendations.

COLD WEATHER OPERATION

If the vehicle is operated below 0°F (-18°C), it is advisable to use S.A.E. 80 multipurpose gear lubricant meeting Mil. Spec. L-2105-D and suitable for A.P.I. Service Classification GL-5.

TROUBLE SYMPTOMS AND POSSIBLE CAUSES

If noises or roughness, such as chatter, are present in turning corners, the probable cause is incorrect or contaminated lubricant. (See Lubrication)

Before any differential is removed and disassembled for chatter complaints, the correctness of lubricant can and should be determined.

If the vehicle manufacturer recommends a lubricant additive for chatter complaints, add the specified type and amount of additive and recheck for chatter by warming the axle up, and then making a minimum of ten (10) figure eight turns.

If this is unsuccessful, or no lubricant additive is specified, a complete lubricant drain, flush, and refill with the specified Limited Slip Differential lubricant will usually correct chatter.

The following procedure is recommended to ensure flushing the system of old lubricant.

1. Warm the lubricant by vehicle road operation or five (5) minutes of operation in gear at 30 m.p.h. with both rear wheels off the ground on a hoist.

CAUTION

NEVER PLACE THE TRANSMISSION IN GEAR WITH THE ENGINE RUNNING WHEN ONLY ONE WHEEL OF A LIMITED SLIP DIFFERENTIAL EQUIPPED VEHICLE IS RAISED. THE VEHICLE MIGHT DRIVE ITSELF OFF THE JACK AND CAUSE DAMAGE OR INJURY.

2. Drain lubricant while warm. Remove drain plug or cover plate to drain completely. If cover plate is removed it may be necessary to replace gasket at this time.
3. Refill axle with specified Limited Slip Differential lubricant.
4. Operate the vehicle for approximately ten (10) miles, making at least ten (10) figure 8 turns to flush the old lubricant out of the clutch packs.
5. Repeat Steps 2, 3, and 4, making sure to replace the cover gasket, if required, in Step 2.

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6. It is possible that slight chatter, requiring additional vehicle operation may remain after Step 5. If chatter still persists after one hundred (100) miles of vehicle operation, or remains severe after Step 5 above, disassembly and repair will be necessary. Follow procedures for disassembly and assembly as illustrated in the manual.

UNIT INOPERATIVE

Proper performance and capabilities of Limited Slip Differentials are often misunderstood. If in doubt, read "Operation" above.

No precise methods of measuring Limited Slip Differential performance are generally available in the field. A functioning unit can be determined by these relatively simple vehicle operational tests.

1. Place one wheel on good dry pavement, and the other on ice, mud, snow, etc.
2. Gradually open the throttle to obtain maximum traction prior to "break-away". The ability to move the vehicle effectively will demonstrate proper performance.
3. If extremely slick surfaces, such as ice are used, some question may exist as to proper performance at Step 2. In these extreme cases, a properly performing Limited Slip Differential will provide greater "pulling power" by lightly applying the parking brake.

DISASSEMBLY REMOVAL, INSPECTION AND REPAIR OF TRAC-LOK

On Dana Spicer axles it is recommended that the complete axle assembly be removed from the vehicle when it becomes necessary to remove the Trac-Lok from the housing.

Remove wheels, brake drums, brake backing plate screws and axle shafts. Brake backing plates can normally be wired to frame without loosening the hydraulic brake line connection at the wheel cylinder if desired. Use caution to avoid damage to brake line.

Remove axle assembly and place in rack or stand to serve as a holding device.

Remove cover plate screws, cover plate. If cover gasket is used discard gasket and replace with new one at time of assembly.

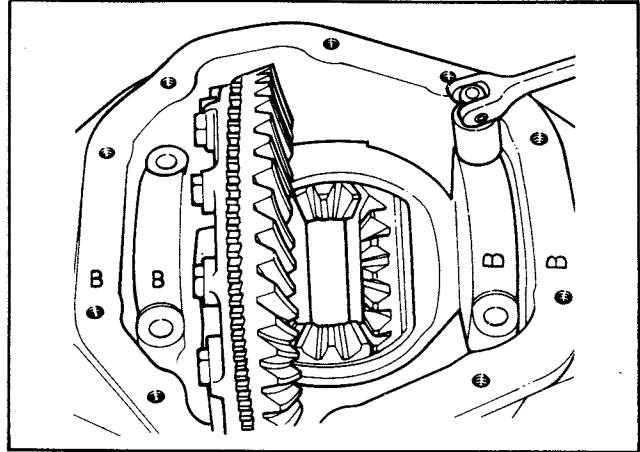


FIGURE #1

Remove differential bearing caps. Note letters stamped on the bearing caps and the cover face of the housing. Letters are to correspond in horizontal and vertical positions. This is very important at time of assembly.

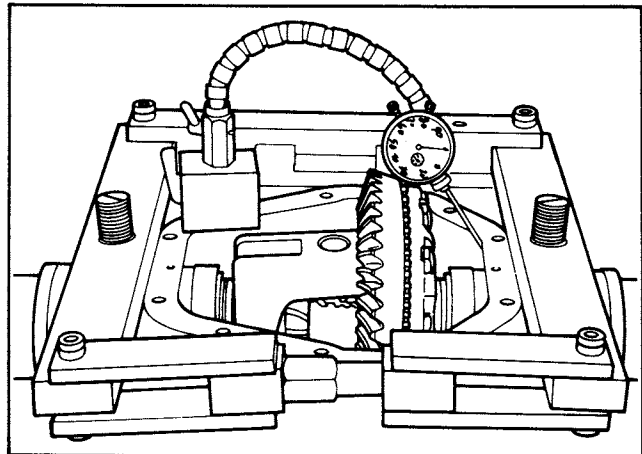


FIGURE #2

Mount spreader to housing. Locate a dial indicator with a magnetic base on cover face as shown. Locate tip of indicator on housing as shown.

Set dial indicator at zero ("0"). Turn forcing screw of spreader until indicator records .015" (.38 mm).

CAUTION

DO NOT SPREAD CARRIER IN EXCESS OF
.015" (.38 mm).

Remove Indicator

Tools: D-113 Spreader
D-128. Indicator Set or Equivalent

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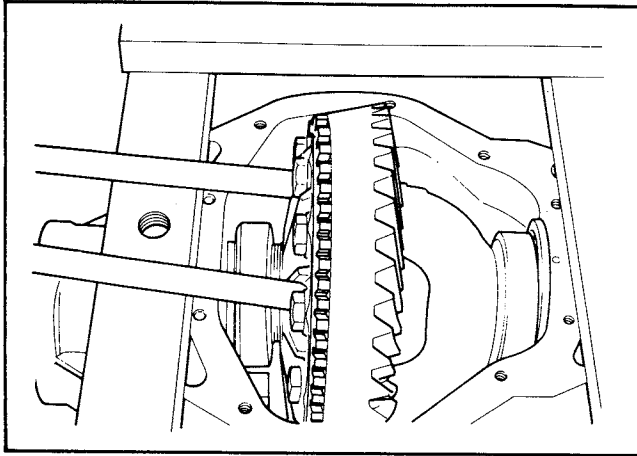


FIGURE #3

Remove differential using two pry bars as shown. Use caution to avoid damage to ring and pinion. It will not be necessary to remove the differential bearings at this time, however, the bearing cups should be marked or tagged to indicate from which side of the case they were removed. After differential case has been removed, remove spreader.

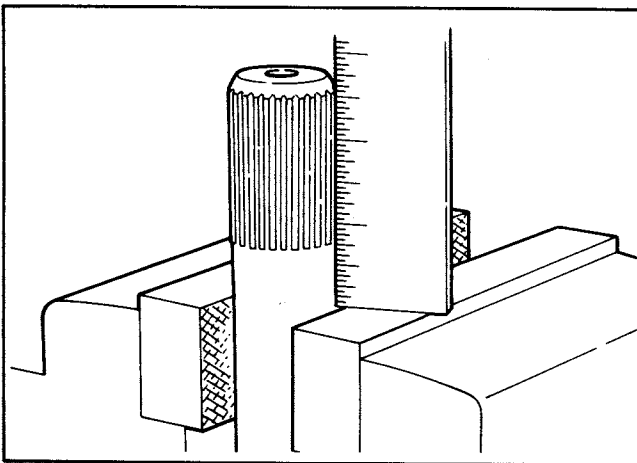


FIGURE #4

Place one of the axle shafts, which was removed from the assembly, into a vise. Tighten shaft in vise firmly. The spline end of the shaft is not to exceed 2.750" (69.85 mm) above the top of the vise. This will prevent the shaft from fully entering into the side gear and causing interference with the spacer block* and step plate during disassembly of the pinion mate gears, etc. Caution should be used that the vise jaws do not locate on axle splines or any machined surfaces.

NOTE*

SOME SEMI-FLOAT AXLES REQUIRE SPACER BLOCKS BETWEEN THE AXLE SHAFTS FOR BEARING END PLAY ADJUSTMENT. THE SPACER BLOCK IS NOT USED ON FULL-FLOAT OR SEMI-FLOAT AXLES WITH NON-ADJUSTABLE WHEEL BEARINGS.

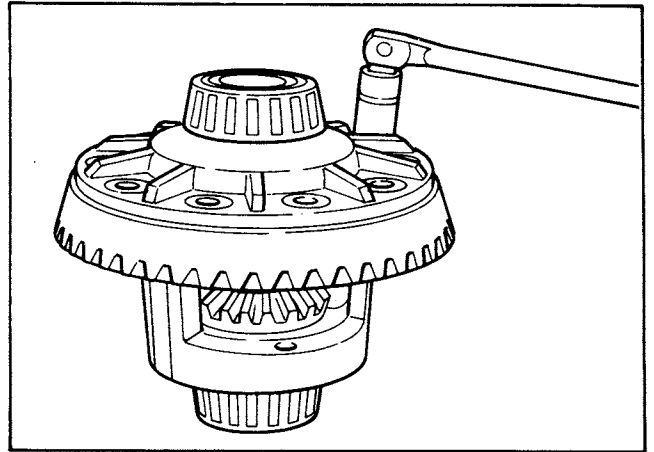


FIGURE #5

Place a few shop towels over vise to prevent any damage during disassembly of ring gear. Assemble the differential on the axle shaft with the ring gear screw heads up. Assembling the differential onto the shaft will serve as a holding device to remove the ring gear and to disassemble the internal parts of the case. Remove the ring gear screws.

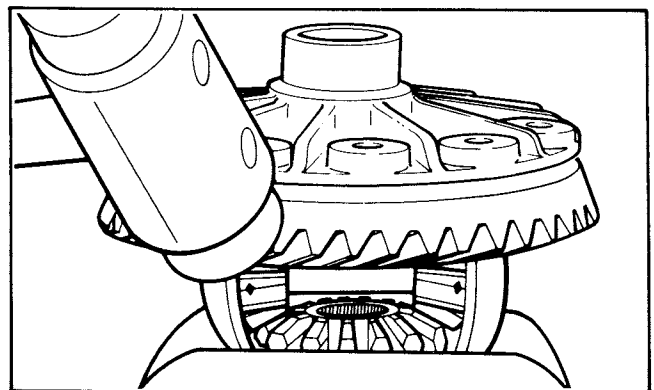


FIGURE #6

Remove ring gear. It will be necessary to remove the ring gear to allow clearance for the removal of the cross pin. Tap ring gear with rawhide hammer to free it from case.

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NOTE

IT IS RECOMMENDED THAT ON SPICER AXLES WHENEVER THE RING GEAR SCREWS ARE REMOVED THEY ARE TO BE REPLACED WITH NEW ONES.

Remove differential case from the axle shaft and remove ring gear.

All Spicer Trac-Loks are identified with a manufacturing date and the complete part number stamped on the barrel of the case. If the axle assembly is equipped with a Trac-Lok Limited Slip Differential a special tag will be located on the bottom right hand side of the cover plate specifying the use of limited slip lubricant.

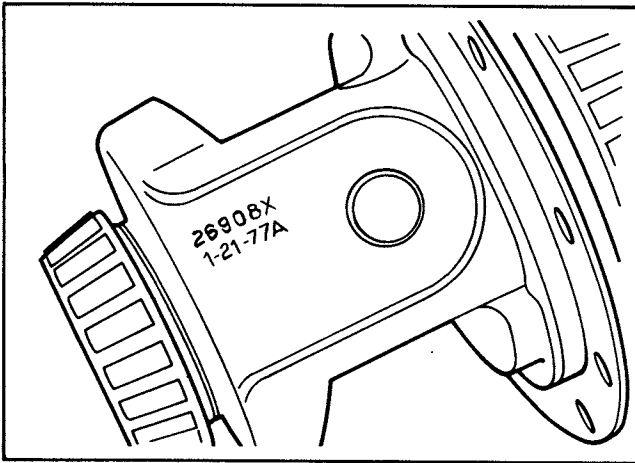


FIGURE #7

In this figure the Trac-Lok is identified with .125" (3.17 mm) high numbers stamped on the case. For example:

The number 1-21-77A is the manufacturing or build date of the Trac-Lok and is interpreted as follows. The first number is the month, second number is the day of the month, third number is the year, the letter is the shift. For example: Jan. 21, 1977 first shift. The number stamped above the manufacturing date is the complete Trac-Lok assembly part number.

It is recommended that when referring to the Trac-Lok, obtain the complete part number and build date. To do this it will be necessary to wipe off the lubricant from the case.

SNAP RING RETAINED VERSION

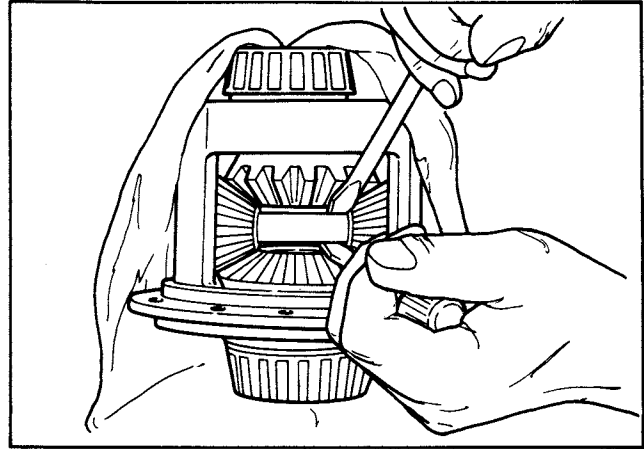


FIGURE #8

Reposition differential case onto axle shaft as shown. Remove the two snap rings from the cross pin. Use two screwdrivers and push the rings free from the cross pin. Place a shop towel behind the case to prevent the snap rings from flying out of the case.

ROLL PIN RETAINED VERSION

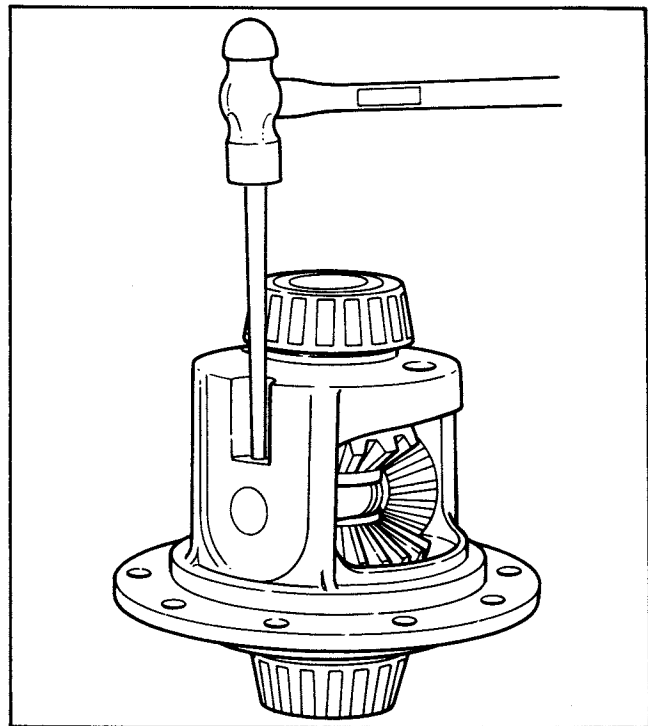


FIGURE #9

For roll pin retainer version, use a small drift to remove the roll pin retaining the cross shaft.

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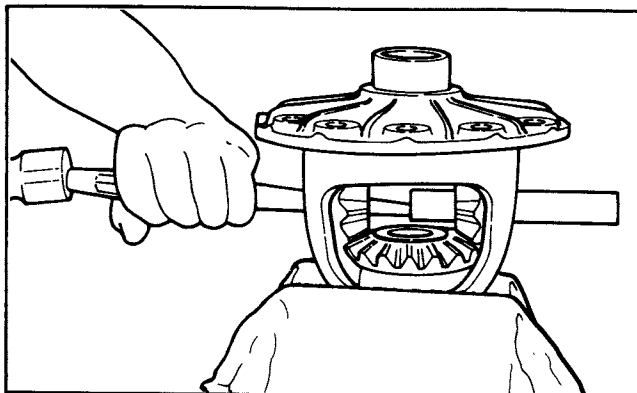


FIGURE #10

Remove the cross pin and spacer block* (if so equipped). Use a hammer and punch as shown to remove the cross pin from the case.

NOTE*

AXLE SHAFTS WHICH REQUIRE END PLAY ADJUSTMENT HAVE A SPACER BLOCK IN THE DIFFERENTIAL CASE. THE SPACER BLOCK CONTROLS THE END THRUST OF THE AXLE SHAFTS. SPACER BLOCK MUST NOT BE USED WITH BALL OR UNITIZED WHEEL BEARINGS.

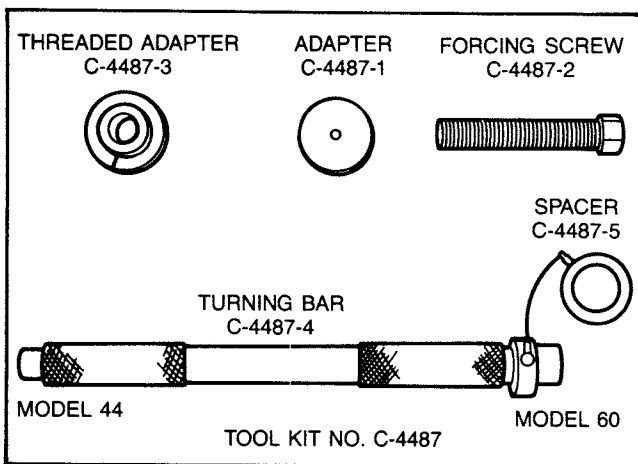


FIGURE #11

Trac-Lok Tools:

- | | |
|---------------------------|----------------------|
| C-4487-1 Adapter | C-4487-4 Turning Bar |
| C-4487-2 Forcing Screw | C-4487-5 Spacer |
| C-4487-3 Threaded Adapter | Tool Kit #C-4487 |

NOTE

THE TRAC-LOK TOOL CAN BE USED ON THE MODEL 44, MODEL 60 AND MODEL 60 WITH SHALLOW WALL. THE TURNING BAR HAS TWO SIZES. SMALL O.D. IS USED ON THE REGULAR MODEL 44. LARGE O.D. IS USED ON THE REGULAR MODEL 60.

THE SPACER IS TO BE USED ON LARGE O.D. ON TRAC-LOKS WITH SHALLOW WALL. THE SPACER PREVENTS THE TURNING BAR FROM ENTERING INTO PINION MATE GEAR.

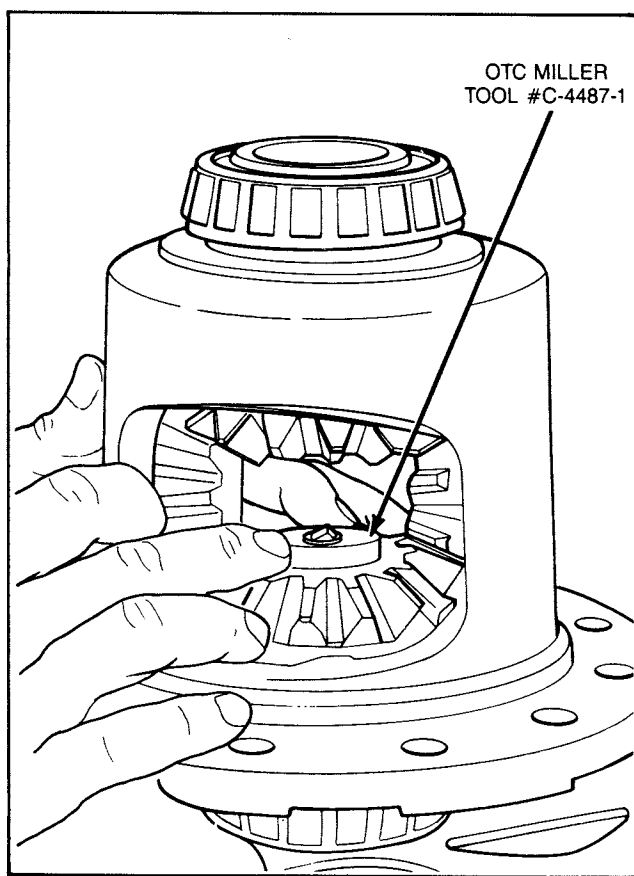


FIGURE #12

Assemble the adapter plate into the bottom side gear. Apply a small amount of grease to the centering hole of the adapter plate. Tool #C-4487-1 (adapter plate).

Lubricate threads of threaded adapter and forcing screw.

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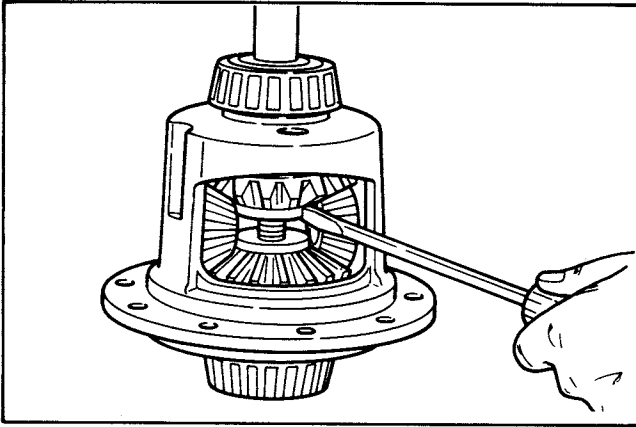


FIGURE #13

Assemble threaded adapter into top side gear. Thread forcing screws into threaded adapter until it becomes centered into adapter plate.

Use a small screwdriver, position it in slot of threaded adapter. This will prevent the adapter from turning. Tools #C-4487-3 (threaded adapter), C-4487-2 (forcing screw).

Relieve the tension of the Belleville springs by loosening the forcing screw.

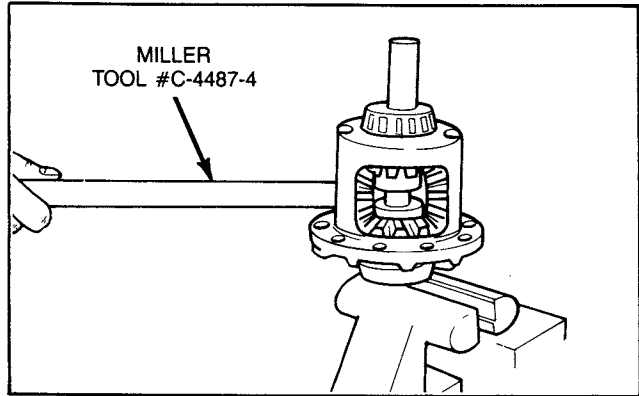


FIGURE #15

Insert small O.D. end of turning bar into cross pin hole of case. Pull on bar and the case will rotate until the pinion mate gears can be removed from opening.

It might be necessary to adjust the forcing screw slightly to allow the case to rotate. Tool #C-4487-4 (turning bar).

Hold top clutch pack with one hand and remove tools. It might be necessary to hold threaded adapter with screwdriver as shown in Figure 13.

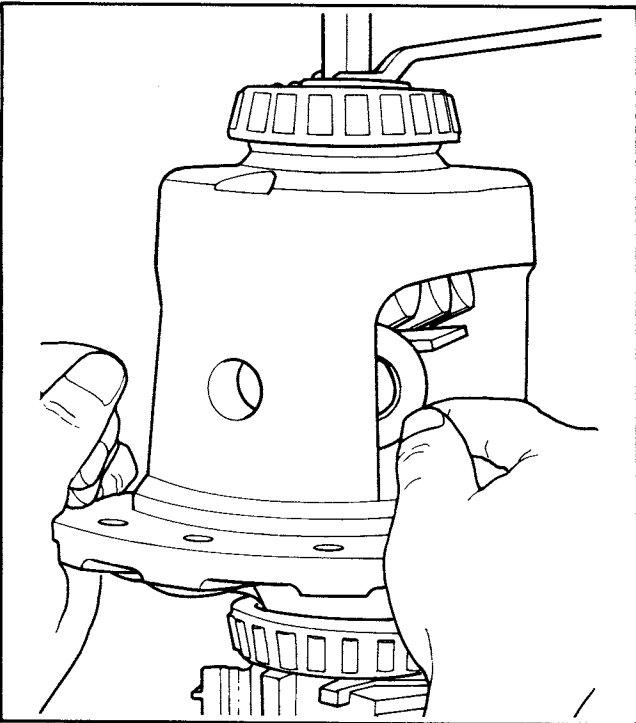


FIGURE #14

Torque forcing screw until it becomes slightly tight. This will collapse the Belleville plates and allow a loose condition between the side gears and pinion mate gears.

Remove both pinion mate spherical washers. Use a shim stock of .030" (.76 mm) thickness or an equivalent tool to push out the spherical washers.

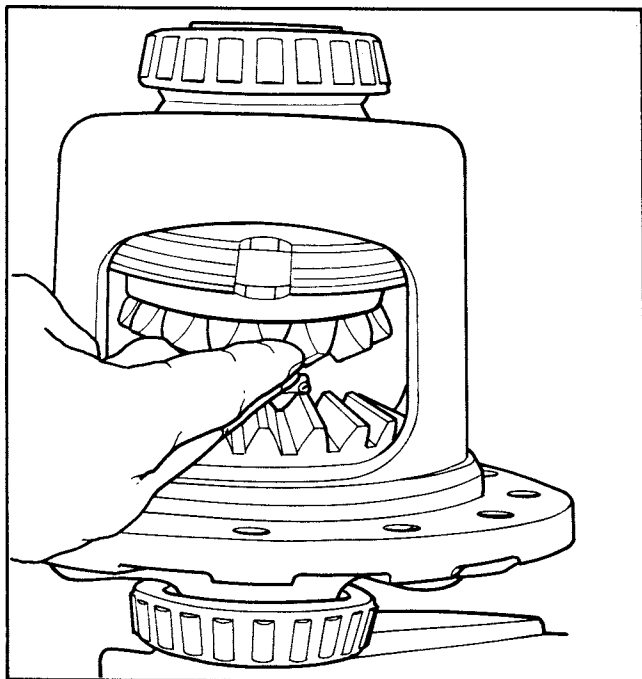


FIGURE #16

Remove top side gear and clutch pack. Keep the stack of plates and discs intact in exactly the same position while they are being removed.

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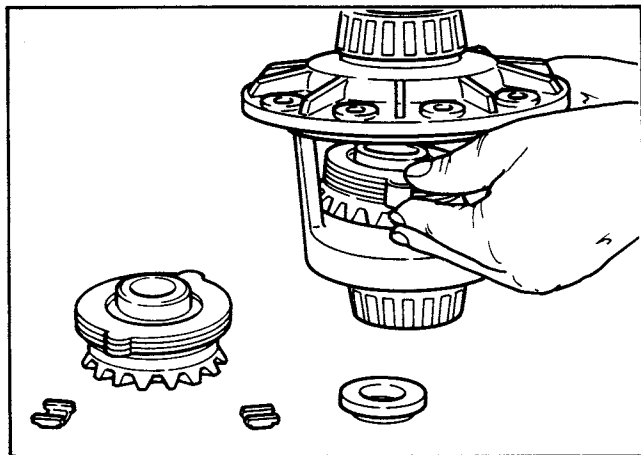


FIGURE #17

Remove the case from the axle shaft. Turn case with the flange or ring gear side up and allow the step plate, side gear and clutch pack to be removed from the case. Remove the retainer clips from both clutch packs to allow separation of the plates and discs. Keep the stack of plates and discs exactly as they were removed.

INSPECTION OF ALL PARTS FOR WEAR, SCORE, ETC.

Plates and discs — If any one member of either stack shows evidence of excessive wear or scoring, the complete stack is to be replaced *on both sides*.

Side gears and pinion mate gears — The gear teeth of these parts should be checked for extreme wear and possible cracks. The external teeth of the side gear, which retain the concentric groove discs, should also be checked for wear or cracks.

If replacement of one gear is required due to wear, etc., then both side gears, pinion mate gears, and washers are to be replaced.

Cross Pin — If excessive wear is evident, the cross pin should be replaced.

Axle Shafts Spacer — If excessive wear is evident on the ends of the spacer block, it should be replaced and axle shaft end play should be adjusted. (Refer to vehicle service manual).

Clutch Retainer Clips — If wear is evident on any one of the retainer clips, all four clips must be replaced.

Differential Case — If scoring, wear or metal pick-up is evident on the machined surfaces, then replacement of the case is necessary.

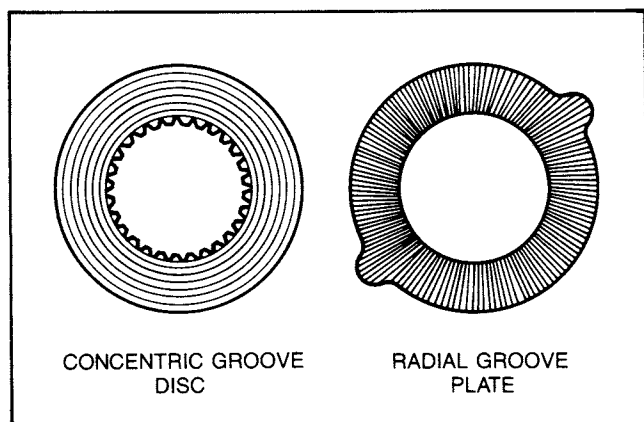


FIGURE #18

Example of radial groove plate and the concentric groove disc.

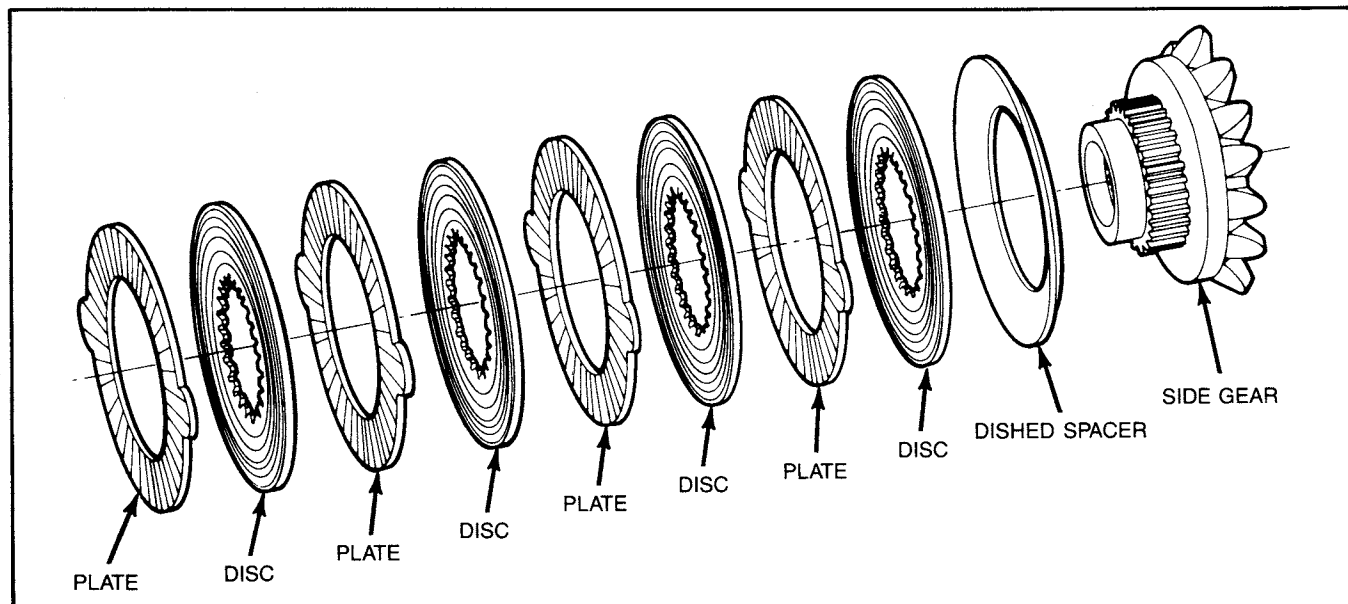


FIGURE #19

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REASSEMBLY

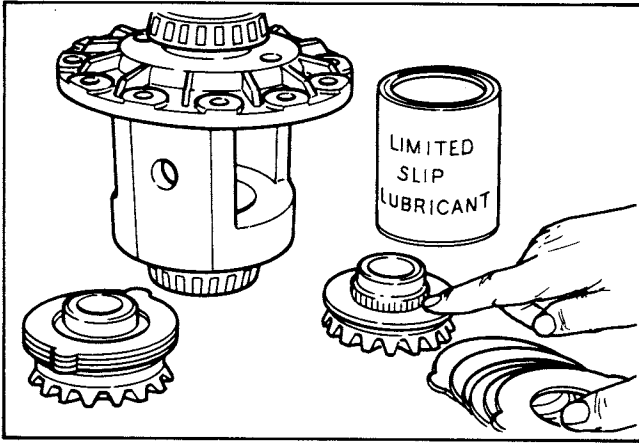


FIGURE #20

Prelubricate the thrust face of the side gears and the plates and discs.

Assemble plates and discs in exactly the same position as they were removed, regardless of whether they are new parts or the original parts. Be sure lubricant that is used is of the specified lubricant.

NOTE

YOUR UNIT MAY BE EQUIPPED WITH THE NEW DESIGN LIMITED SLIP DISC AND PLATES OR YOUR REPLACEMENT UNIT MAY CONTAIN THEM. IF SO FOLLOW DIRECTIONS BELOW. THE NEW DESIGN CAN BE IDENTIFIED BY A SMOOTH SURFACE. OLDER DESIGNS HAVE RADIAL GROOVES IN PLATES AND DISCS.

IMPORTANT SERVICE INFORMATION

SERVICE INSTRUCTION

Limited-Slip Disc & Plate Kit

Step 1 Prior to assembly, prelubricate each disc and plate with Friction Modifier by presoaking for a minimum of 20 minutes.

Step 2 After assembly into carrier housing, fill axle assembly with the proper amount and specified lubricant.

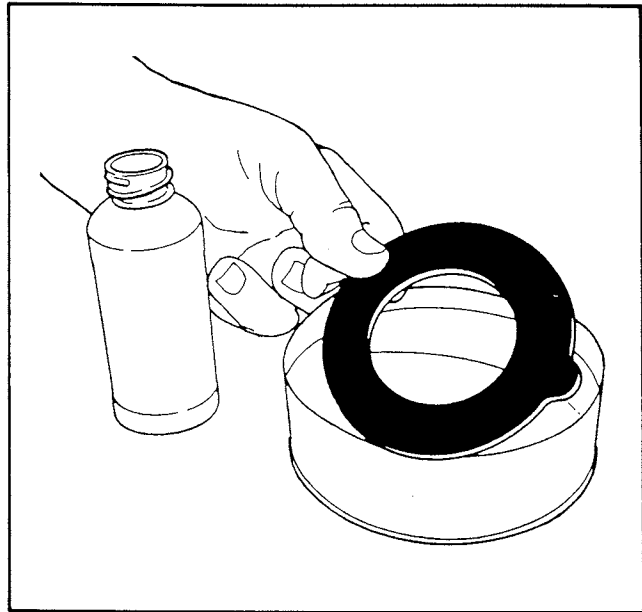


FIGURE #21

NOTE

IT IS NOT OUR INTENT TO RECOMMEND ANY PARTICULAR BRAND OR MAKE OF LUBRICANT. HOWEVER, THE LUBRICANT SHOULD BE AN S.A.E. 80W-90 PER MIL. SPEC. L-2105-D, UNLESS OTHERWISE RECOMMENDED BY THE VEHICLE MANUFACTURER. MOTOR VEHICLES ARE OPERATED UNDER VARIOUS REQUIREMENTS, CONDITIONS, AND ENVIRONMENTS. IT IS RECOMMENDED THAT THE LUBRICANTS SPECIFIED BY THE VEHICLE MANUFACTURER BE USED. THEY MAY PROVIDE ADDITIONAL LUBRICATING CHARACTERISTICS WHICH MAY BE REQUIRED FOR YOUR VEHICLE'S OPERATION. CONTACT YOUR LOCAL SERVICE DEALER OR REFER TO YOUR OWNER'S MANUAL FOR OBTAINING THE PROPER LUBRICANT SPECIFICATION.

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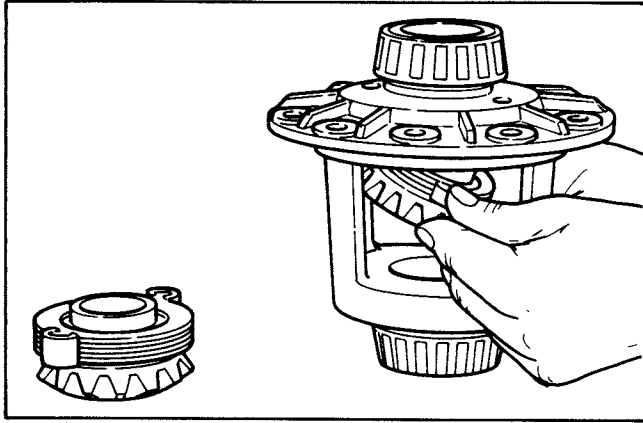


FIGURE #22

Assemble the retainer clips to the ears of the plates. Make sure both clips are completely assembled or seated onto the ears of the plates.

With the differential case positioned as shown, assemble the clutch pack and side gear into the case. Make sure the clutch pack stays assembled to the side gear splines, and that the retainer clips are completely seated into the pockets of the case. To prevent pack from falling out of the case, it will be necessary to hold them in place by hand while repositioning case on bench.

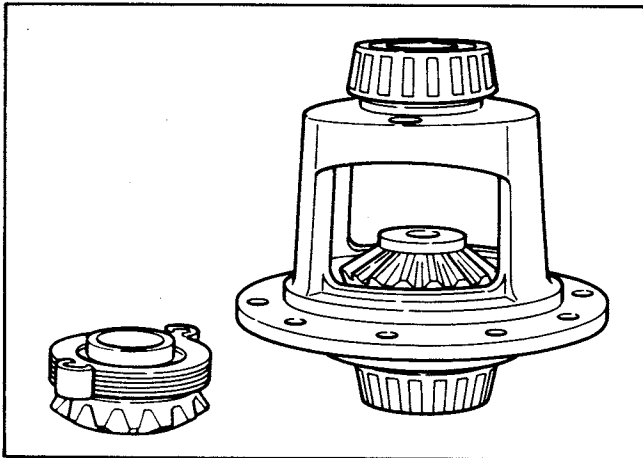


FIGURE #23

Reposition case on bench as shown. Assemble the adapter plate into the side gear. Apply a small amount of grease into the centering hole of the step plate.

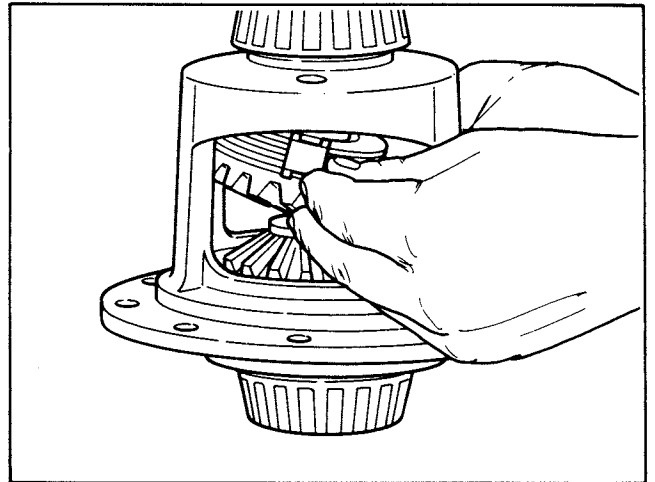


FIGURE #24

Assemble the other clutch pack and side gear as shown. Make sure the clutch pack stays assembled to the side gear splines, and that the retainer clips are completely seated into the pockets of the case.

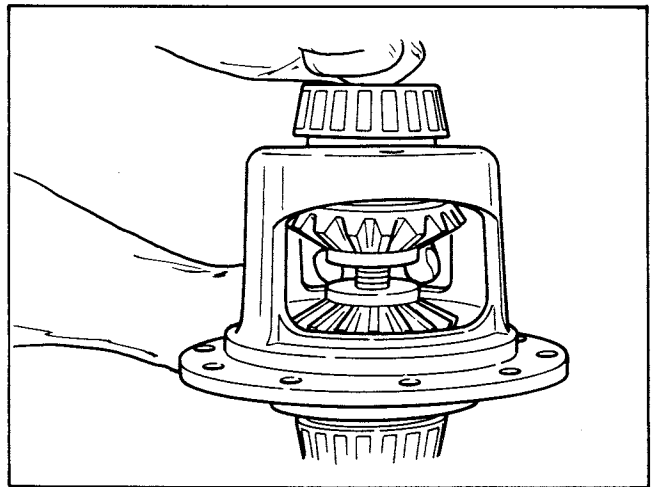


FIGURE #25

Hold the clutch pack in position and insert the threaded adapter into top side gear, insert forcing screw. Tighten forcing screw into bottom plate. This will hold both clutch packs in position.

With tools assembled into the case, position case onto the axle shaft by aligning the splines of the side gear with those of the shaft.

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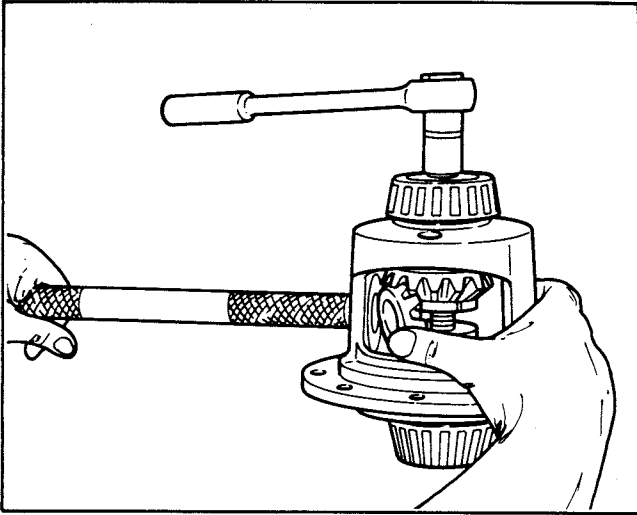


FIGURE #26

Loosen forcing screw slightly. Assemble both pinion mate gears as shown. Hold gears in position by hand. While holding gears in place, insert turning bar into case. Pull on bar to rotate case allowing gears to turn. Make absolutely sure that the holes of the pinion mate gears are in alignment with holes of the case.

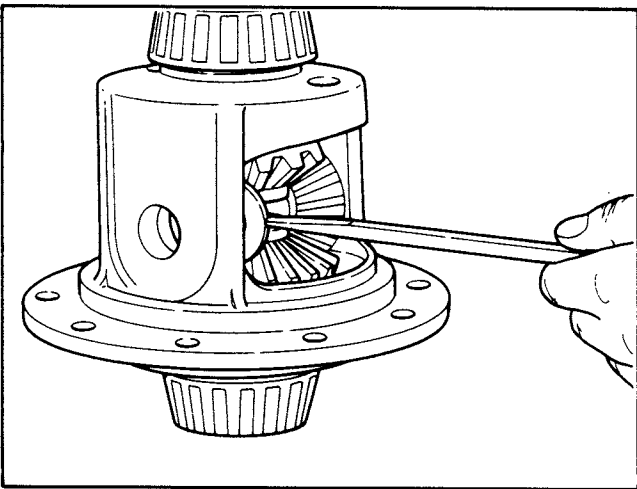


FIGURE #27

Prelubricate spherical washers. Torque forcing screw until it is tight. This will collapse the Belleville plates and allow clearance between gears. Assemble spherical washers into case. Use a small screwdriver to push washers into place.

CAUTION

BE SURE THE HOLES OF THE WASHERS AND GEARS ARE LINED UP EXACTLY WITH THOSE OF THE CASE.

Remove tools.

For snap ring retained versions, be sure the snap ring grooves of the cross pin shaft are exposed to allow assembly of the snap rings. Assemble snap rings.

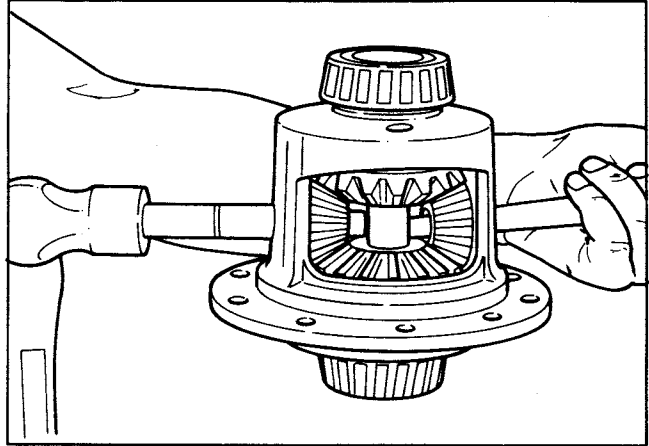


FIGURE #28

If spacer block* is used, assemble as shown. Use a drift to hold spacer block in position. Assemble cross pin shaft, drive in shaft with hammer.

NOTE*

SPACER BLOCK SHOWN IS USED ONLY WITH ADJUSTABLE SEMI-FLOAT WHEEL BEARINGS.

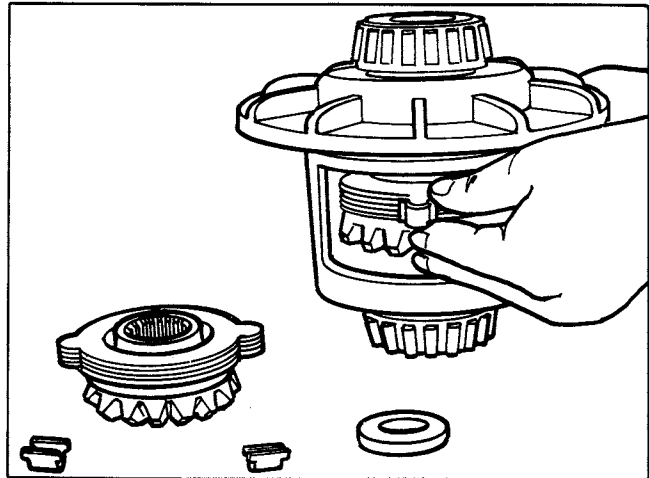


FIGURE #29

Remove case from axle shaft. Assemble ring gear to case. Line up the ring gear screw holes with those of the case.

USE NEW RING GEAR SCREWS. ASSEMBLE NEW RING GEAR SCREWS FINGER TIGHT.

MODEL 44 TRAC-LOK

ROLL PIN RETAINED VERSION

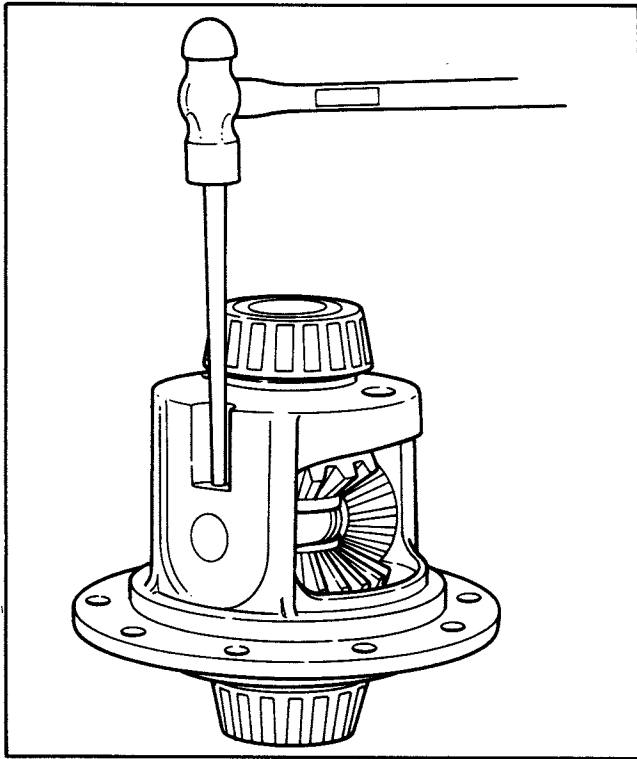


FIGURE #30

For roll pin retainer version, use a small drift to replace the roll pin that retains the cross shaft.

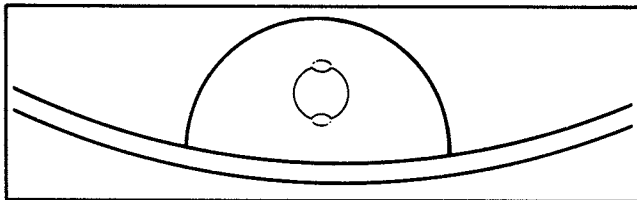


FIGURE #31

When roll pin bottoms out, stake (peen) a little metal over the edges in two places 180° degrees apart.

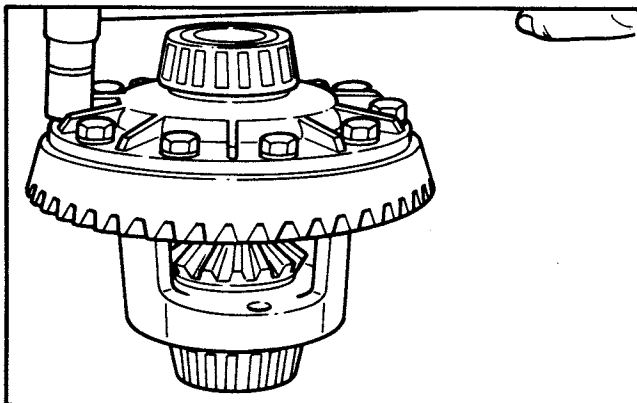


FIGURE #32

Reposition case onto axle shaft as shown. Torque screws alternately and evenly. Torque grade 8 screws to 45-65 lb. ft. (61-88 N·m).

NOTE

IF GRADE 9 SCREWS ARE USED (SPECIAL FOR HIGH STRENGTH), TORQUE 75-85 LB. FT. (102-115 N·M). REFER TO ILLUSTRATION ON PROPER FASTENER STRENGTH IDENTIFICATION ON PAGE 2 OF THIS MANUAL.

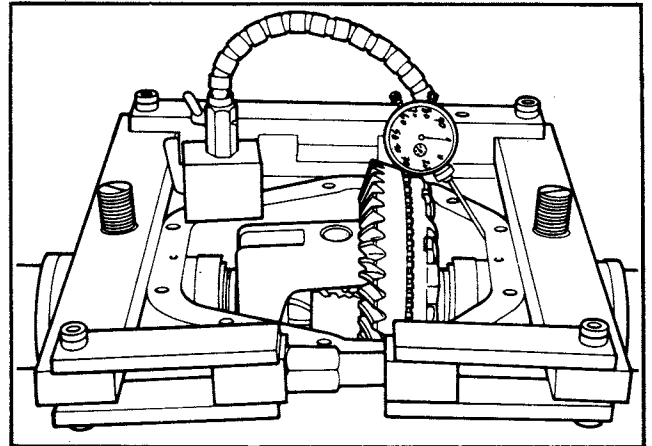


FIGURE #33

Mount spreader onto housing. Locate a dial indicator with a magnetic base on cover face as shown. Locate tip of indicator on housing as shown. Set dial indicator at zero. Turn forcing screw of spreader until indicator records .015" (.38 mm).

CAUTION

DO NOT SPREAD HOUSING OVER .015" (.38 mm).

Remove dial indicator.

Tools: D-113 Spreader
D-128 Indicator Set or Equivalent

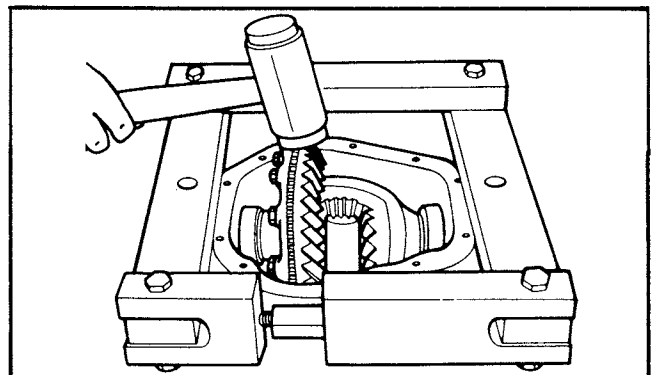


FIGURE #34

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Prelubricate differential bearings with the specified lubricant. Assemble differential bearing cups to differential cones.

Install differential assembly into housing. Make sure teeth of ring gear are meshed with those of pinion.

Use a rawhide hammer to seat differential assembly into cross bore of housing. Care should be taken to avoid nicking the teeth of the ring gear and pinion during assembly.

Remove spreader.

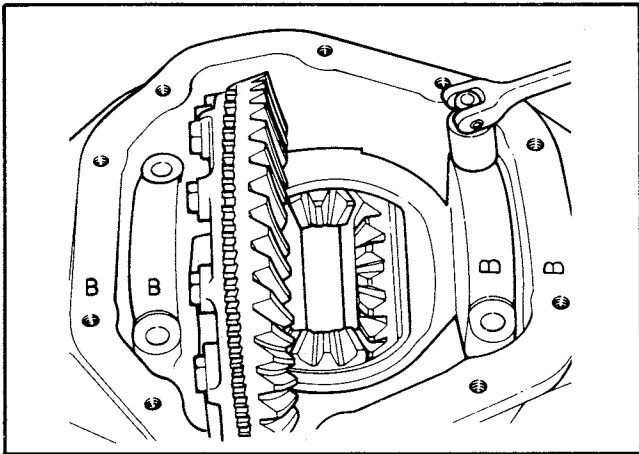


FIGURE #35

Install bearing caps. Make sure the letters stamped on the caps correspond with those stamped on the housing in horizontal and vertical position.

TORQUE CAP SCREWS TO 70-90 LB. FT. (96-122 N·m).

NOTE

THERE ARE TWO DIFFERENT DESIGN COVER PLATES. ONE COVER IS OF THE FLAT MOUNTING SURFACE, AND THE OTHER DESIGN IS OF THE RIBS BETWEEN SCREW HOLES.

Figure 36 shows the flat mounting surface cover plate on Dana design axles. This cover plate requires the use of a silicone rubber sealer material rather than a gasket.

The cover face of the carrier and the flat surface of the cover plate must be free of any oil film or foreign material.

Sealant material must meet specifications of *A.S.T.M. 1, GE503, 21, 22, 23 sealant.

Apply sealer to cover plate surface. Ensure that the sealer bead is laid on the inside of the cover screw holes. The bead is not to pass through the holes or outside of the holes.

The bead is to be 1/8" to 1/4" high and 1/8" to 1/4" wide.

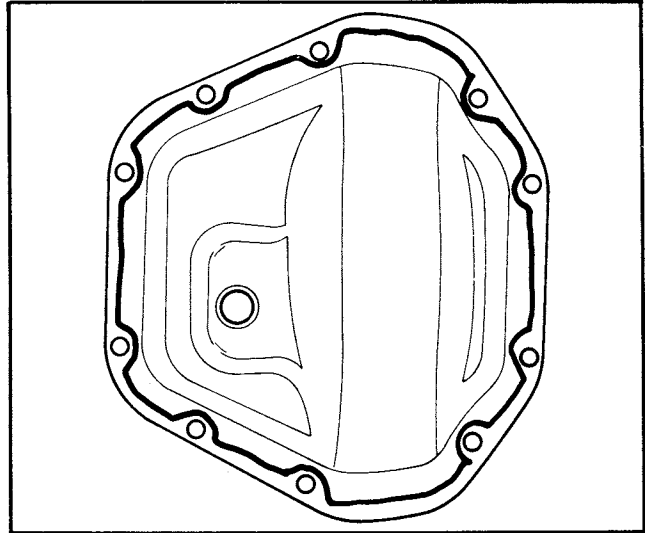


FIGURE #36

Assemble two cover screws into cover at 8 o'clock and 2 o'clock position. Use these two holes to guide cover plate into position on the carrier.

Install remaining screws. Tighten alternately and evenly. Torque screws to 30-40 lbs. ft. (41-54 N·m). Allow one hour cure time before vehicle operation.

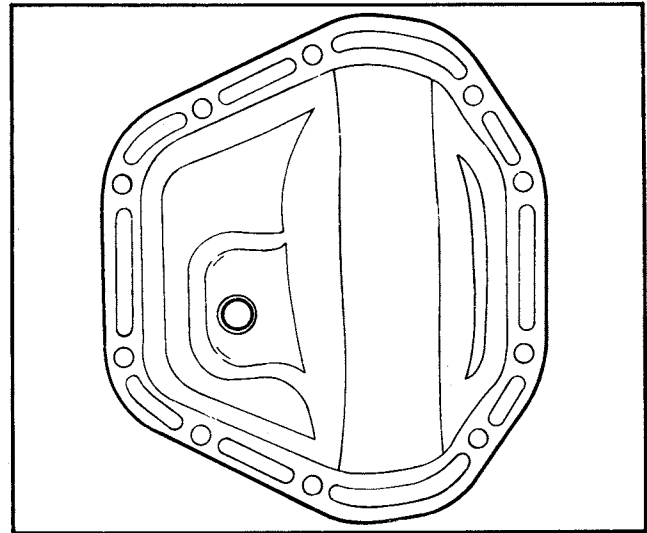


FIGURE #37

On cover plate of the rib design a gasket must be used. Do not use silicone sealer. Torque screws to 30-40 lbs. ft. (41-54 N·m).

MODEL 44 TRAC-LOK

Assemble axle in vehicle. Fill axle with the specified lubricant. Refer to vehicle manufacturer's lubricant recommendations.

*A.S.T.M. — American Society for Testing and Material

Assemble brake backing plates, etc. and axle shafts into housing. Refer to vehicle service manual for the specified torques of wheel end components.

Assemble brake drums and wheel.

COMPLETE ASSEMBLY REPLACEMENT

If inspection reveals that the replacement of the Trac-Lok as a unit is required, the following steps should be followed.

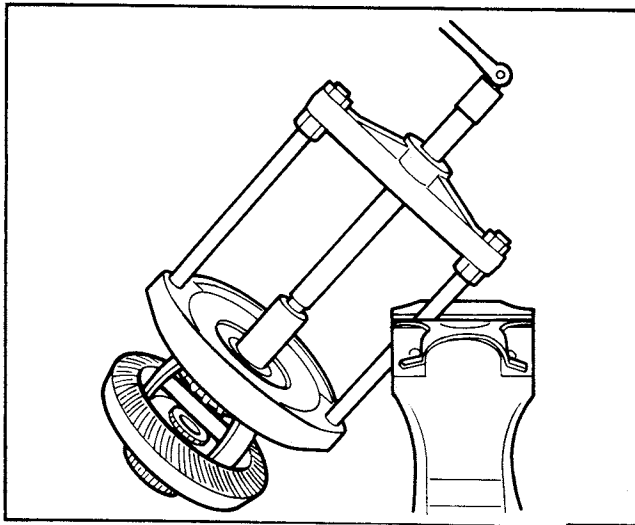


FIGURE #38

Remove both differential bearing cones with a puller as shown. Wire shims, bearing cup and bearing cone together. Identify from which side they were removed (ring gear side or opposite side). Reposition case in puller and remove other bearing cone as described above. If shims are mutilated, replace with new ones at time of assembly. Shims are available in thicknesses of .003", .005", .010", and .030" (.08, .13, .25, and .76 mm).

Tools: DD-914-9P Press and Adapter Ring
C-293-3 Adapter Ring
C-293-18 Adapter Set

To remove ring gear from case, follow steps as illustrated in Figures #5 and #6.

Assemble ring gear to new Trac-Lok case. Follow the same steps as illustrated in Figure #32. Make sure the gear flange on the differential case is free of nicks, burrs, etc.

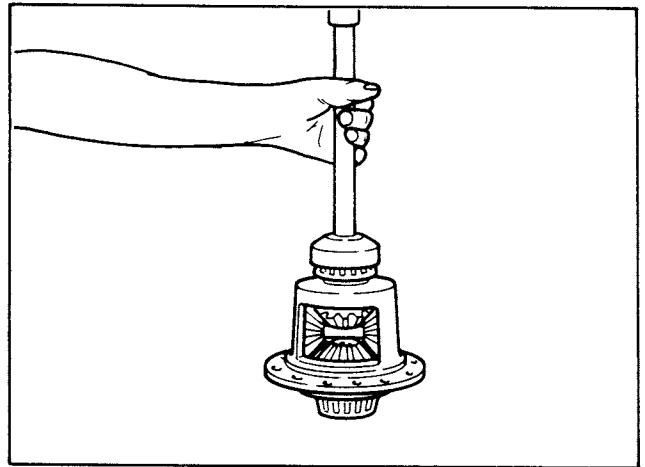


FIGURE #39

Inspect shims and bearings which were removed from the old case. If shims or bearings show excessive wear or damage, they should be replaced. Make sure they are used on exactly the same sides of the new case as they were removed from the old case. Assemble shims and differential bearing cones. Use step plate on bottom bearing as shown to protect the bearing from becoming damaged during assembly of top bearing.

Tools: D-156 Installer
C-4171 Handle
C-4487-1 Adapter

Prelubricate differential bearing cones with the specified lubricant.

Assemble case into housing.

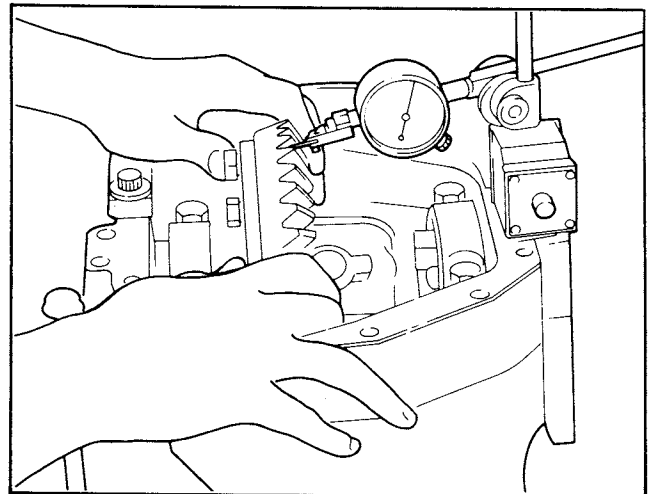


FIGURE #40

Check ring gear and pinion backlash in three equally spaced points with dial indicator, as shown.

If Spicer axle, backlash tolerance is .005" to .008" (.13 to .21 mm) and cannot vary more than .002" (.051 mm) between points checked.

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High backlash is corrected by moving the ring gear closer to the pinion. Low backlash is corrected by moving the ring gear away from the pinion. These corrections are made by switching shims from one side of the differential case to the other.

RING GEAR & PINION TOOTH PATTERN INTERPRETATION

When setting the pinion position, service tools will be used to establish the proper amount of shims required prior to installing the pinion gear. The final pinion position will be verified by using the GEAR CONTACT PATTERN METHOD, as described.

RING GEAR AND PINION TOOTH CONTACT PATTERN

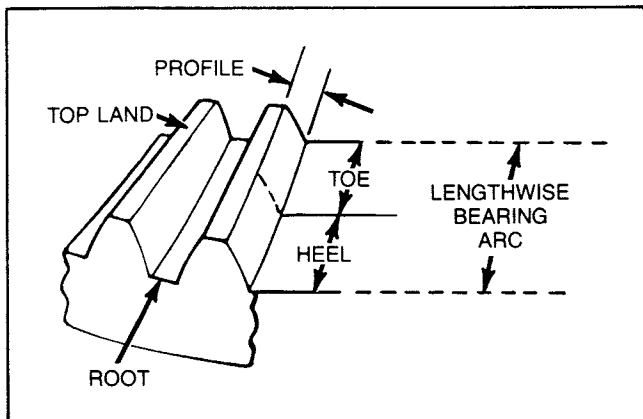


FIGURE #41

The TOE of the gear tooth is the portion of the tooth surface at the end towards the center. The HEEL of the gear tooth is the portion of the tooth surface at the outer end. The TOP LAND of a gear tooth is the surface of the top of the tooth. Every gear has a characteristic pattern. The illustrations show typical patterns only, and explains how patterns shift as gear location is changed. When making pinion position changes, shims should be changed in the range of .002 inch (.05 mm) to .004 inch (.10 mm) until correct pattern has been obtained.

When a change in backlash is required, backlash shims should be changed in the range of 1-1/2 times the amount of backlash required to bring the gears into specification. For example, if the backlash needed to be changed by .004 inch (.10 mm), the shim pack should be changed by .006 inch (.15 mm) as a starting point. The actual amount of backlash change obtained will vary depending upon the ratio and gear size.

High backlash is corrected by moving the ring gear closer to the pinion. Low backlash is corrected by moving the ring gear away from the pinion. These corrections are made by switching shims from one side of the differential case to the other.

NOTE

WHEN MAKING CHANGES, NOTE THAT TWO VARIABLES ARE INVOLVED. EXAMPLE: IF YOU HAVE THE BACKLASH SET CORRECTLY TO SPECIFICATIONS AND YOU CHANGE THE PINION POSITION SHIM, YOU MAY HAVE TO READJUST THE BACKLASH TO THE CORRECT SPECIFICATION BEFORE CHECKING THE PATTERN. REFER TO PATTERN INTERPRETATION.

WARNING



GEAR TEETH MAY HAVE SHARP EDGES. WHEN HANDLING GEARS, USE CARE TO AVOID PERSONAL INJURY.

STEPS

- (1) Paint ring gear teeth with a marking compound to both the drive and coast side.
- (2) Rotate ring gear one complete revolution in both directions while load is being applied with a large screwdriver or similar tool between the carrier casting and differential case flange.

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PATTERN INTERPRETATION (RING GEAR)

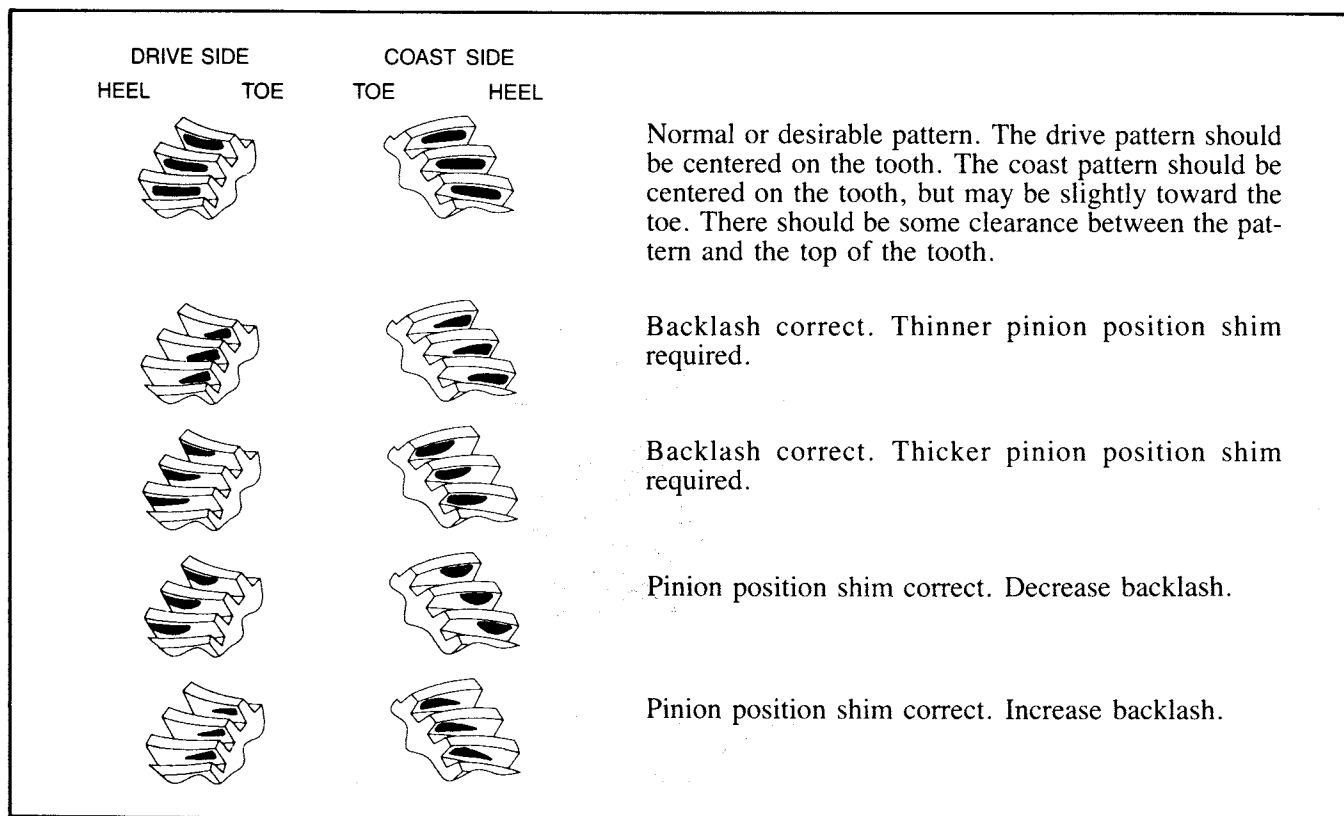


FIGURE #42

PATTERN MOVEMENTS SUMMARIZED

- (1) Decreasing backlash moves the ring gear closer to the pinion.

Drive pattern (convex side of gear) moves slightly lower and toward the toe.

Coast pattern (concave side of gear) moves lower and toward the toe.

- (2) Increasing backlash moves the ring gear away from the pinion.

Drive pattern moves slightly higher and toward the heel.

Coast pattern moves higher and toward the heel.

- (3) Thicker pinion position shim with the backlash constant moves the pinion closer to the ring gear.

Drive pattern moves deeper on the tooth (flank contact) and slightly toward the toe.

Coast pattern moves deeper on the tooth and toward the heel.

- (4) Thinner pinion position shim with the backlash constant moves the pinion further from the ring gear.

Drive pattern moves toward the top of the tooth (face contact) and toward the heel.

Coast pattern moves toward the top of the tooth and slightly toward the toe.

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