

**TRANSFER CASE (BEVEL GEAR DIFFERENTIAL)**

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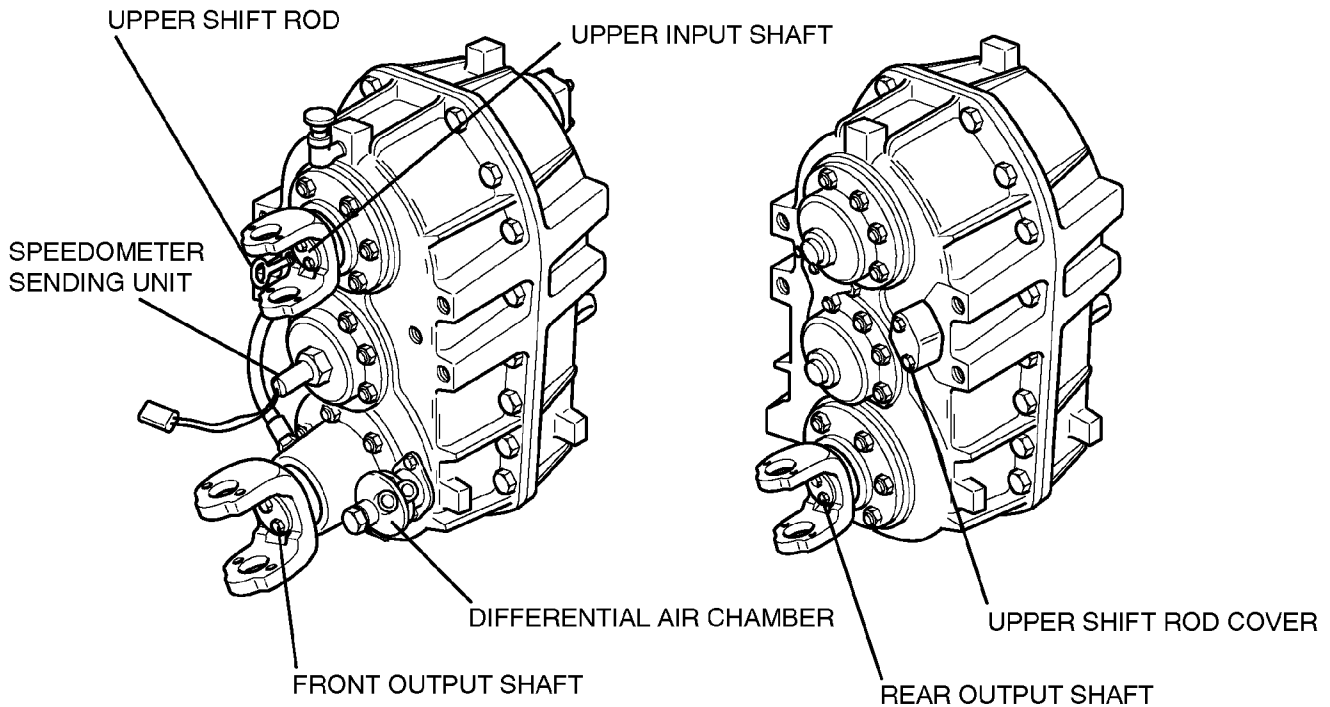


Figure 1. Transfer Case Components

## 1. INTRODUCTION.

The transfer case is mounted in the vehicle drive line. It transmits power vertically downward so that it may distribute to the front and rear axles.

It is a three shaft 2-speed unit. The top shaft receives engine power from the transmission through the use of a driven shaft. The power is then transferred to the center shaft and bottom shaft in turn. The bottom shaft provides power to the front and rear axles via drive shafts. Selection of either speed is accomplished by a shift lever and connecting rod to the transfer case shift rod.

A bevel gear type interaxle differential assembly is provided in the case to allow different front output and rear output shaft speeds encountered when turning a corner or due to tire characteristics. An air actuated, driver selected, differential locking mechanism is provided to lock differential action for positive transfer of power to the front and rear axles under wheel slip conditions. The case forms a sump for lubricating oil and a pump is provided for positive lubrication.

## 2. SPECIFICATIONS.

Make . . . Oshkosh  
 Model . . . 55000-Series  
 Speeds . . 2  
 Shafts . . 3  
 Type of Gear . . . Helical  
 Method of Speed Selection . . . . . Air Shift

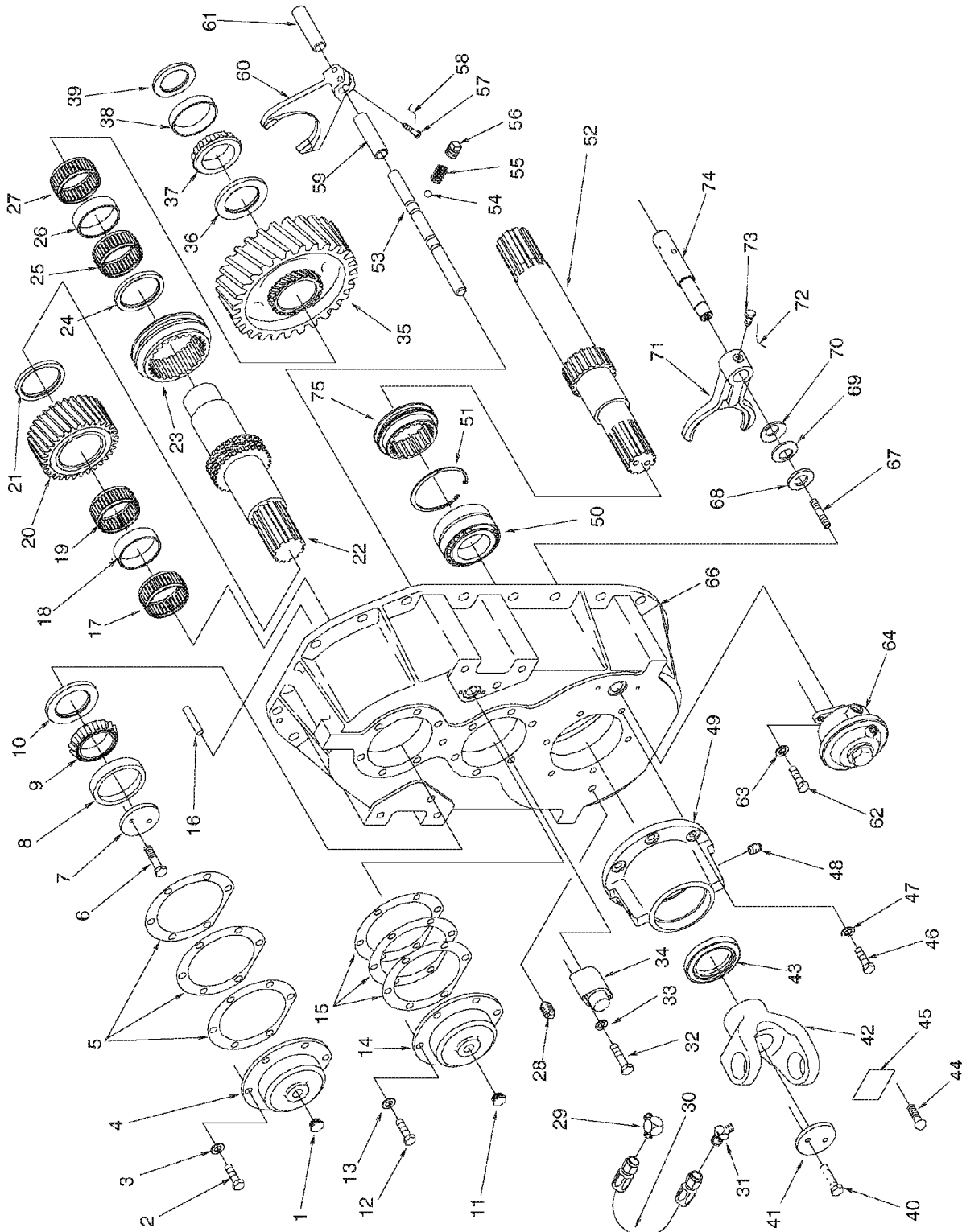


Figure 2. Transfer Case Assembly (Rear Housing).

## Legend for Figure 2.

1. Plug	2. Capscrew	3. Lockwasher	4. End cap
5. Shims	6. Capscrew	7. End plate	8. Bearing cup
9. Bearing cone	10. Spacer	11. Plug	12. Capscrew
13. Lockwasher	14. End cap	15. Shims	16. Dowel pin
17. Caged roller	18. Spacer	19. Caged roller	20. Gear, 32T
21. Spacer	22. Upper shaft	23. Clutch collar	24. Spacer
25. Caged roller	26. Spacer	27. Caged roller	28. Plug
29. Adapter	30. Hose	31. Adapter	32. Capscrew
33. Lockwasher	34. Upper shift cover	35. Gear, 55T	36. Spacer
37. Bearing cone	38. Bearing cup	39. Spacer	40. Capscrew
41. End plate	42. Yoke	43. Oil seal	44. Screw
45. Plate	46. Capscrew	47. Lockwasher	48. Plug
49. Bearing cap	50. Bearing assembly	51. Retaining ring	52. Shaft
53. Upper shift rod	54. Ball	55. Spring	56. Plug
57. Capscrew	58. Lockwire	59. Spacer	60. Shift fork
61. Spacer	62. Capscrew	63. Lockwasher	64. Air differential chamber
65. Flatwasher	66. Rear housing	67. Stud	68. Pilot ring
69. Spacer	70. Spacer	71. Fork	72. Wire
73. Capscrew	74. Shift rod	75. Clutch collar	

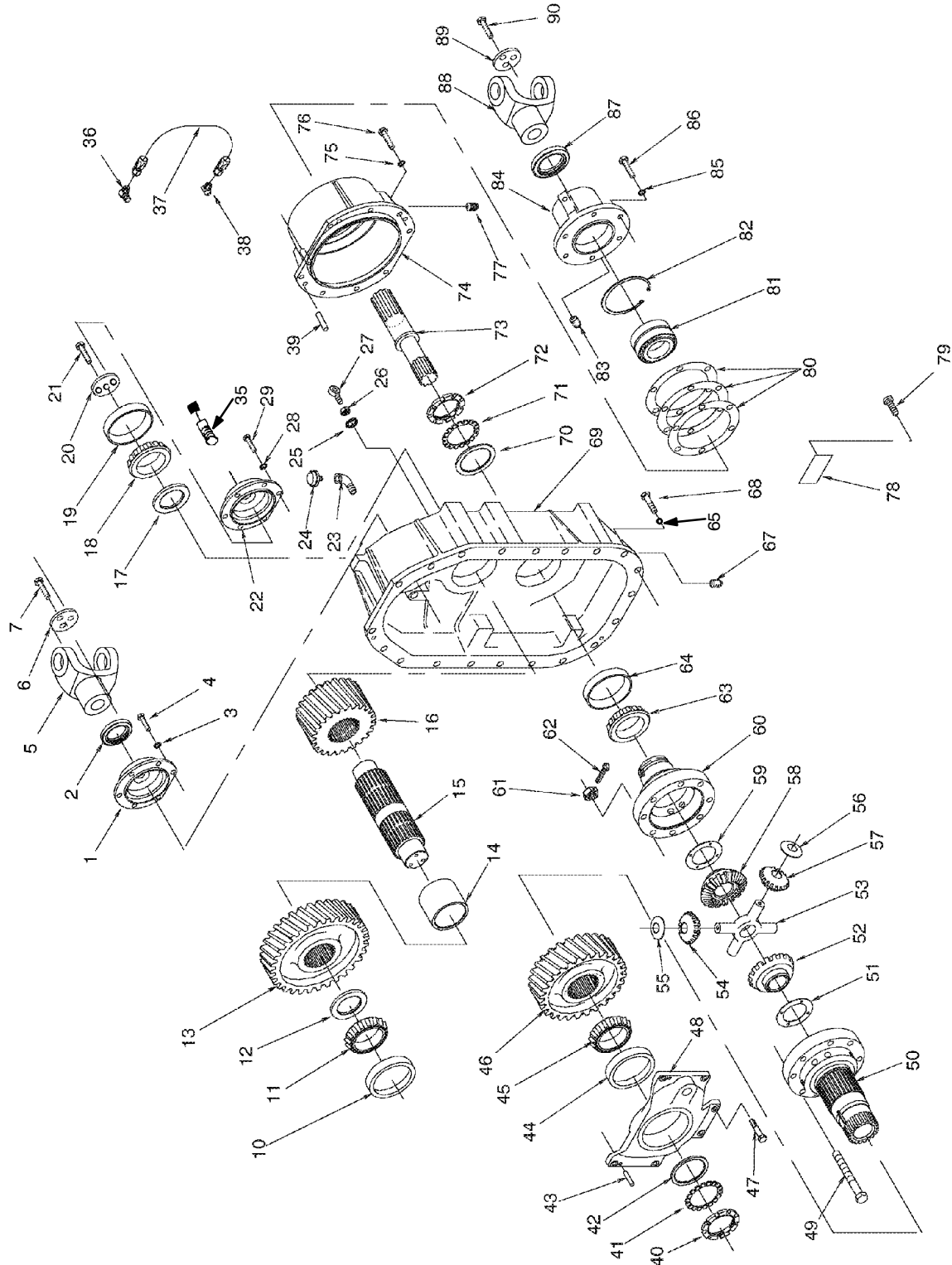


Figure 3. Transfer Case Assembly (Front Housing).

Legend for Figure 3.

1. End cap	2. Oil seal	3. Lockwasher	4. Capscrew
5. Yoke	6. End plate	7. Capscrew	8. Deleted
9. Deleted	10. Bearing cup	11. Bearing cone	12. Spacer
13. Gear, 63T	14. Spacer	15. Shaft	16. Gear 40T
17. Spacer	18. Bearing cone	19. Bearing cup	20. Pulse wheel
21. Capscrew	22. End cap	23. Elbow	24. Breather
25. Oil seal	26. Jam nut	27. Rod end	28. Lockwasher
29. Capscrew	30. Deleted	31. Deleted	32. Deleted
33. Deleted	34. Deleted	35. Sending unit	36. Adapter
37. Hose	38. Adapter	39. Dowel pin	40. Lock-bearing nut
41. Lockwasher	42. Spacer	43. Dowel pin	44. Bearing cup
45. Bearing cone	46. Gear, 54T	47. Capscrew	48. Bearing support
49. Capscrew	50. Case	51. Thrust washer	52. Side gear
53. Spider	54. Pinion	55. Thrust washer	56. Thrust washer
57. Pinion	58. Side gear	59. Thrust washer	60. Case
61. Nut	62. Cotter pin	63. Bearing cone	64. Bearing cup
65. Nut	66. Lockwasher	67. Plug	68. Capscrew
69. Front housing	70. Spacer	71. Lockwasher	72. Lock-bearing nut
73. Shaft	74. Enclosure	75. Lockwasher	76. Capscrew
77. Plug	78. Serial number plate	79. Screw	80. Shims
81. Bearing assembly	82. Retaining ring	83. Plug	84. Bearing cup
85. Lockwasher	86. Capscrew	87. Oil seal	88. Yoke
89. End plate	90. Capscrew		

### 3. TRANSFER CASE REMOVAL.

Remove drain at bottom of transfer case. Drain oil. Disconnect speedometer sending unit, air lines, shift linkage and bracket, and prop shafts. Unfasten mounting bolts and biscuits from mounting brackets. Using a suitable lifting device remove transfer case from vehicle and install it on a suitable maintenance stand.

### 4. TRANSFER CASE DISASSEMBLY.

Notes: Required tools and special tools for this maintenance action are:

1. Lifting device with minimum capacity of 1000 lbs. (454 Kg).
2. Torque wrench with minimum capacity of 350 ft. lbs. (475 N.m)
3. Dial indicator
4. Hydraulic press
5. Gear puller

- (1) Position transfer case in maintenance stand, with front housing (Figure 3, Item 69) facing up.
- (2) Remove two capscrews (Figure 3, Item 7) and end plate (6) from upper shaft (15).
- (3) Using a puller remove yoke (Figure 3, Item 5) from upper shaft (15).
- (4) Remove two capscrews (Figure 3, Item 90) and end plate (89) from shaft (73).
- (5) Using a puller remove yoke (Figure 3, Item 88) from shaft (73).

- (6) Tag and disconnect hose (Figure 3, Item 37) from adapters (36 and 38).
- (7) Remove six capscrews (Figure 3, Item 86), lockwashers (85), bearing cap (84), three shims (80) and lower front output shaft assembly from enclosure (74) and bevel gear differential.
- (8) Remove eight capscrews (Figure 3, Item 76) and lockwashers (75) from enclosure (74) and front housing (69).
- (9) Install jack bolts in holes on enclosure (Figure 3, Item 74), tighten alternately to separate enclosure from front housing (69) and dowel pin (39). Remove enclosure (74).

### WARNING

**Stay clear of bevel gear differential assembly when supported by lifting device. Bevel gear differential may fall and cause serious injury to personnel.**

- (10) Using a suitable lifting device, remove bevel gear differential assembly from transfer case.
- (11) Remove speedometer sending unit (Figure 3, Item 35) from end cap (22).
- (12) Remove six capscrews (Figure 3, Item 29), lockwashers (28), and end cap (22), from front housing (69).
- (13) Remove oil seal (Figure 3, Item 2), six capscrews (4), lockwasher (3), and end cap (1) from front housing (69).

- (14) Loosen jam nut (Figure 3, Item 26) and remove rod end (27) and oil seal (25) from upper shift rod (Figure 2, Item 53).
- (15) Remove breather (Figure 3, Item 24), elbow (23) and adapters (36 and 38) from front housing (69).
- (16) Position transfer case in maintenance stand with rear housing (Figure 2, Item 66) facing up.
- (17) Tag and disconnect hose (Figure 2, Item 30) from adapters (29 and 31)
- (18) Remove two capscrews (Figure 2, Item 32), lockwashers (33), and upper shift cover (34) from rear housing (66).

### CAUTION

**Diaphragm is spring loaded. Use caution when removing air chamber from transfer case. Failure to follow this procedure can result in serious injury.**

### NOTE

**Gently strike lockout air shift chamber with soft-faced mallet to unseat from transfer case.**

- (19) Remove two capscrews (Figure 2, Item 62), lockwashers (63), and air differential chamber (64) from rear housing (66).
- (20) Remove two adapters (Figure 2, Items 29 and 31) from rear housing (66) and bearing cap (49).
- (21) Remove two capscrews (Figure 2, Item 40) and end plate (41) from shaft (52).
- (22) Using a puller, remove yoke (Figure 2, Item 42) from shaft (52).
- (23) Remove six capscrews (Figure 2, Item 46), lockwashers (47), bearing cap (49), and lower rear shaft assembly from rear housing (66).
- (24) Remove six capscrews (Figure 2, Item 12), lockwashers (13), end cap (14) and shims (15) from rear housing (66).
- (25) Remove six capscrews (Figure 2, Item 2), lockwashers (3), end cap (4) and shims (5) from rear housing (66).
- (26) Remove plug (Figure 2, Item 56), outer detent spring (55) and outer detent ball (54) from rear housing (66).
- (27) Remove 20 capscrews (Figure 3, Item 68), and flatwashers (65) from rear housing (Figure 2, Item 66) and front housing (Figure 3, Item 69).

### WARNING

**Stay clear of rear housing when supported by lifting device. Rear housing may fall and cause serious injury to personnel.**

### NOTE

**Inner detent ball will fall out of rear housing case when separated from shift rod.**

- (28) Using a suitable lifting device separate transfer case halves using jack bolt locations provided at top and bottom. Remove rear housing (Figure 2, Item 66) from front housing (Figure 3, Item 69) keeping it parallel to prevent binding of the shift rod assembly and dowel pins in the transfer case halves.

### WARNING

**Stay clear of center shaft assembly and upper input shaft and shift rod assembly when supported by lifting device. The assemblies may fall and cause serious injury to personnel.**

- (29) Using a suitable lifting device, remove center shaft assembly from front housing (Figure 3, Item 69).
- (30) Using a suitable lifting device remove upper input shaft and shift rod assembly from front housing (Figure 3, Item 69)
- (31) Remove six capscrews (Figure 3, Item 47) and bearing support (48) from front housing (69).

### NOTE

**Do steps 32, 33, 34, and 35 if bearing cups or bearing cones fail inspection.**

- (32) Remove bearing cup (Figure 3, Item 64) from front housing (66).
- (33) Remove bearing cup (Figure 3, Item 44) from bearing support (48).
- (34) Remove bearing cup (Figure 3, Item 19 and Figure 2, Item 38) from front housing (69).

- (35) Remove bearing cup (Figure 2, Item 8) and Figure 3, Item 10) from rear housing (Figure 2, Item 66).

#### 4.1 Disassembly - Upper Input Shaft Assembly.

- (1) Remove spacer (Figure 2, Item 39) from upper shaft (22).
- (2) Using a puller, remove bearing cone (Figure 2, Item 37), spacer (36), and gear (35) from upper shaft (22).
- (3) Remove two caged rollers (Figure 2, Items 27 and 25), spacers (26 and 24), and clutch collar (23) from upper shaft (22).
- (4) Remove two capscrews (Figure 2, Item 6) and end plate (7) from upper shaft (22).
- (5) Using a puller, remove bearing cone (Figure 2, Item 9), spacer (10), and gear (20) from upper shaft (22).
- (6) Remove two caged rollers (Figure 2, Items 17 and 19) and spacers (18 and 21) from upper shaft (22).

##### 4.1.1 Cleaning and Inspection.

### WARNING

**Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.**

- (1) Clean all metal parts in dry cleaning solvent.
- (2) Inspect all parts for wear or damage.
- (3) Remove all nicks and burrs from machined surfaces.
- (4) Replace all worn or damaged parts.

#### 4.2 Disassembly - Lower Front Output Shaft.

- (1) Remove oil seal (Figure 3, Item 87) from bearing cap (84).

### WARNING

**When using a hydraulic press for removal or installation of bearings, bushings, and gears, wear a face shield to prevent possible injury to personnel.**

- (2) Position lower front output shaft assembly in a press supported by bearing cap (Figure 3, Item 84).

### CAUTION

**Properly support shaft during removal. Shaft may drop suddenly. Failure to comply may result in damage to equipment.**

- (3) Press output shaft (Figure 3, Item 73) from bearing assembly (81), retaining ring (82), and bearing cap (84).
- (4) Remove both bearing cones of bearing assembly (81) from bearing cap (84).

### WARNING

**Use care when removing snap and retaining rings. Snap and retaining rings are under spring tension and can act as projectiles when released and could cause severe eye injury.**

- (5) Using a puller, remove both bearing cups from bearing assembly (Figure 3, Item 81) and retaining ring (82) from bearing cap (84).

##### 4.2.1 Cleaning and Inspection.

### WARNING

**Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.**

- (1) Clean all metal parts in dry cleaning solvent.
- (2) Inspect all parts for wear or damage.
- (3) Remove all nicks and burrs from machined surfaces.
- (4) Replace all worn or damaged parts.

#### 4.3 Disassembly - Lower Rear Output Shaft.



- (1) Remove oil seal (Figure 2, Item 43) from bearing cap (49).
- (2) Remove clutch collar (Figure 2, Item 75) from shaft (52).

### WARNING

**When using a hydraulic press for removal or installation of bearings, bushings, and gears, wear a face shield to prevent possible injury to personnel.**

- (3) Position lower rear output assembly in a press, supported by bearing cap (Figure 2, Item 49).

### CAUTION

**Properly support shaft during removal. Shaft may drop suddenly. Failure to comply may result in damage to equipment.**

- (4) Press output shaft (Figure 2, Item 52) out of bearing assembly (50) retainer ring (51) and bearing cap (49).
- (5) Using a puller, remove both bearing cones of bearing assembly (Figure 2, Item 50) from bearing cap (49).

### WARNING

**Use care when removing snap and retaining rings. Snap and retaining rings are under spring tension and can act as projectiles when released and could cause severe eye injury.**

- (6) Using a puller, remove both bearing cups of bearing assembly (Figure 2, Item 50) and retainer ring (51) from bearing cap (49).

#### 4.3.1 Cleaning and Inspection.

### WARNING

**Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.**

- (1) Clean all metal parts in dry cleaning solvent.
- (2) Inspect all parts for wear or damage.
- (3) Remove all nicks and burrs from machined surfaces.
- (4) Replace all worn or damaged parts.

#### 4.4 Disassembly - Center Shaft Assembly.

- (1) Using a puller, remove bearing cone (Figure 3, Item 11), spacer (12), gear (13), and spacer (14) from shaft (15).
- (2) Remove two capscrews (Figure 3, Item 21) and pulse wheel (20) from shaft (15)
- (3) Using a puller, remove bearing cone (Figure 3, Item 18), spacer (17), and gear (16) from shaft (15).

#### 4.4.1 Cleaning and Inspection.

### WARNING

**Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.**

- (1) Clean all metal parts in dry cleaning solvent.
- (2) Inspect all parts for wear or damage.
- (3) Remove all nicks and burrs from machined surfaces.
- (4) Replace all worn or damaged parts.

#### 4.5 Disassembly - Upper Shift Rod.

- (1) Remove two spacers (Figure 2, Items 59 and 61) from shift rod (53).

- (2) Cut lockwire (Figure 2, Item 58) holding two capscrews (57).
- (3) Remove two capscrews (Figure 2, Item 57) from upper shift fork (60).
- (4) Remove shift rod (Figure 2, Item 53) from upper shift fork (60).

#### 4.5.1 Cleaning and Inspection.

### **⚠ WARNING**

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Clean all metal parts in dry cleaning solvent.
- (2) Inspect all parts for wear or damage.
- (3) Remove all nicks and burrs from machined surfaces.
- (4) Replace all worn or damaged parts.

#### 4.6 Disassembly - Lower Shift Rod.

- (1) Remove spacer (Figure 2, Item 68) and eight spring disks (69 and 70).
- (2) Cut lockwire (Figure 2, Item 72) from capscrew (73) and remove capscrew (73) from fork (71).
- (3) Slide shift rod (Figure 2, Item 74) from fork (71).

#### 4.6.1 Cleaning and Inspection.

### **⚠ WARNING**

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Clean all metal parts in dry cleaning solvent.
- (2) Inspect all parts for wear or damage.

- (3) Replace all worn or damaged parts.

#### 4.7 Disassembly - Bevel Gear Differential Assembly.

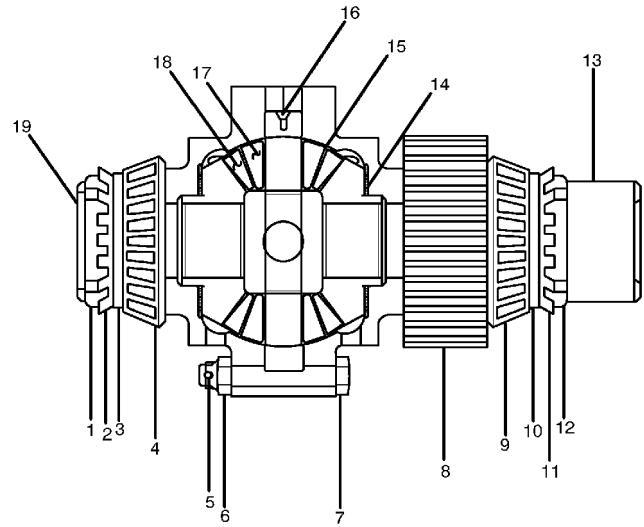


Figure 4. Bevel Gear Differential Assembly.

#### Legend for Figure 4.

1. Pat locknut	2. Locking washer
3. Spacer	4. Bearing cone
5. Cotter pin	6. Castle nut
7. Capscrew	8. Gear, 54T
9. Bearing cone	10. Spacer
11. Locking washer	12. Pat locknut
13. Bevel gear differential case	14. Thrust washer
15. Differential pinion thrust washer	16. Spider
17. Pinion	18. Side gear
19. Bevel gear differential case	

- (1) Straighten tangs of locking washers (Figure 4, Items 2 and 11), remove pat locknuts (1 and 12), locking washers (2 and 11), and spacers (3 and 10) from bevel gear differential case (13 and 19).
- (2) With the use of a puller, remove bearing cones (Figure 4, Items 4 and 9) and gear (8) from bevel gear differential case (13 and 19).

### **NOTE**

**Matchmark bevel gear differential case prior to disassembly.**

- (3) Remove eight cotter pins (Figure 4, Item 5), castle nuts (6) and capscrews (7) from bevel gear differential case (13 and 19).
- (4) Remove two thrust washers (Figure 4, Item 14), two side gears (18), four pinion thrust washers (15), four pinions (17), and spider (16) from bevel gear differential case (13 and 19).

#### 4.7.1 Cleaning and Inspection.

##### WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Clean all metal parts in dry cleaning solvent.
- (2) Inspect all parts for wear or damage.
- (3) Remove all nicks and burrs from machined surfaces.
- (4) Replace all worn or damaged parts.

### 5. CLEANING, INSPECTION & REPAIR.

##### CAUTION

Exercise care to avoid skin rashes, fire hazards, and inhalation of vapors when using solvent type cleaners.

##### WARNING

**GASOLINE SHOULD BE AVOIDED! DO NOT clean these parts in a hot solution tank or with water and alkaline solutions, such as sodium hydroxide, orthosilicates or phosphates.**

**5.1 Cleaning ground & polished surfaces.** Parts having ground and polished surfaces, such as gears, bearings, shafts, and collars, should be cleaned in a suitable solvent, such as kerosene, diesel fuel oil, or dry cleaning solvent.

**5.1.1 Gasket removal.** Clean all mating surfaces where fiber or liquid gasket material is used. It may be necessary to use a scraper to completely remove gasket materials. Be careful not to damage mating surfaces.

**5.1.2 Steam cleaning.** Steam cleaning is not recommended for assembled drive units after they have been removed from the housing. When this method of cleaning is used, water is trapped in cored passages of castings and in close clearances between parts, as well as on parts. This can lead to corrosion (rust) of critical parts of the assembly, and possibility of circulating rust

particles in the lubricant. Premature failure of bearings, gears, and other parts can be caused by this practice. Assembled drive units cannot be properly cleaned by steam cleaning, dipping, or slushing. Complete drive unit disassembly is a necessary prerequisite to thorough cleaning.

#### 5.2 Cleaning rough parts.

##### CAUTION

**Exercise care to avoid skin rashes and inhalation of vapors when using alkali cleaners.**

Rough parts, such as differential carrier castings, cast brackets, and some brake parts may be cleaned in hot solution tanks with mild alkali solutions providing these parts are not ground or polished. The parts should remain in the tank long enough to be thoroughly cleaned and heated through. This will aid the evaporation of the rinse water. The parts should be thoroughly rinsed after cleaning to remove all traces of alkali.

**5.2.1 Complete assemblies.** Completely assembled axles, torque dividers, and transfer cases may be steam cleaned on the outside only to facilitate initial removal and disassembly, providing all openings are closed. Breathers, vented shift units, and all other openings should be tightly covered or closed to prevent the possibility of water entering the assembly.

**5.2.2 Drying.** Parts should be completely dried immediately after cleaning. Use soft, clean, lintless absorbent paper towels, or cloth free of abrasive material such as lapping compound, metal fillings, or contaminated oil. Bearings should never be dried by spinning with compressed air.

**5.2.3 Corrosion prevention.** Parts that have been cleaned, dried, inspected, and are to be immediately reassembled should be coated with light oil to prevent corrosion. If these parts are to be stored for any length of time, they should be treated with a good rust preventive, and wrapped in special paper, or other material designed to prevent corrosion.

**5.3 Inspection.** Inspect all bearings, cups, and cones, including those not removed from parts of the drive unit, and replace if rollers or cups are worn, pitted, or damaged in any way. Remove parts needing replacement with a suitable puller or in a press with sleeves. Avoid use of drifts and hammers. They may easily mutilate or distort components parts.

If any of the following bearing conditions exist, bearings must be replaced:

- (1) Large ends of rollers worn flush to the recess, or the radii at the large ends of the rollers worn sharp. Refer to Figure 5.

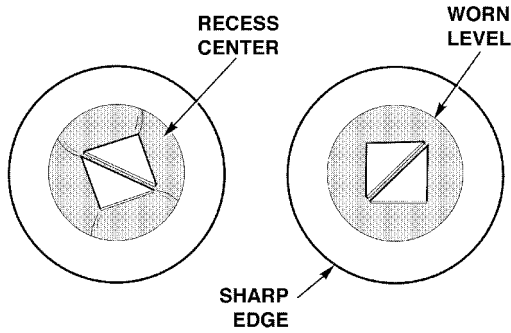


Figure 5.

- (2) Visible step wear, particularly at the small end of the roller track or deep indentations, cracks or breaks in the bearing cup and/or cone surfaces. Refer to Figure 6.

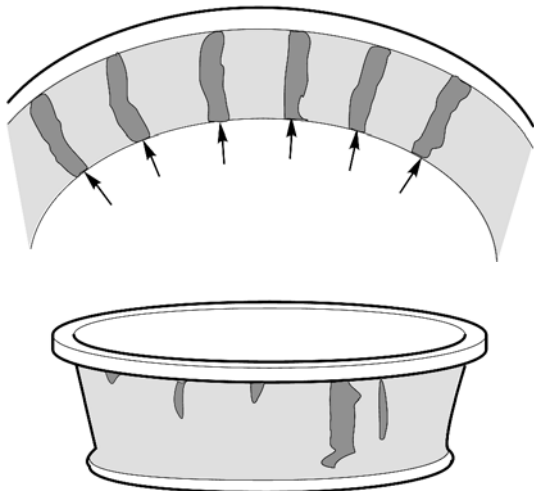


Figure 6.

- (3) Bright rubbing marks on the dark phosphate surface of the bearing cage. Refer to Figure 7.

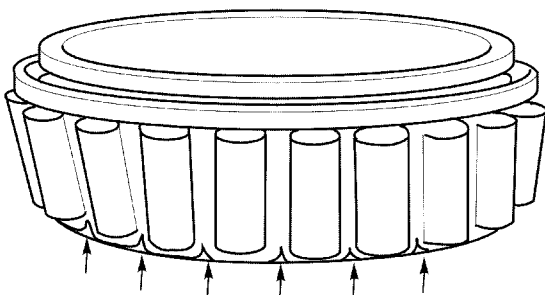


Figure 7.

- (4) Etching or pitting on functioning surface. Refer to Figure 8.

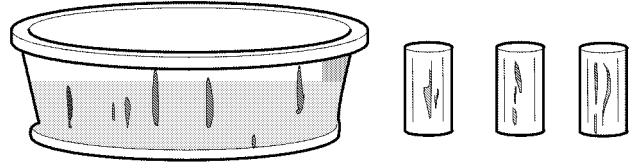


Figure 8.

- (5) Spalling or flaking on the bearing cup and/or cone surfaces. Refer to Figure 9.

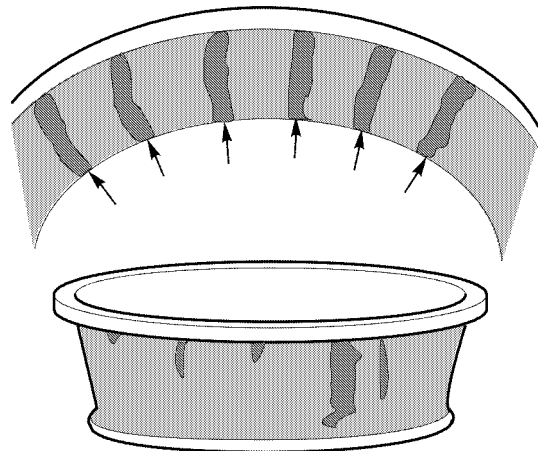


Figure 9.

- (6) Inspect hypoid/generoid gears for wear or damage. Gears which are worn, ridged, pitted or scared should be replaced. When it is necessary to replace either the pinion or gear of a set, the entire gear set must be replaced.

**5.4 Repair.**

- (1) Replace all worn or damaged parts. Hex nuts with rounded corners, all washers if damaged, oil seals, and gaskets, or silicone or Loctite 515 gasket material should be replaced at the time of overhaul.
- (2) Remove nicks and burrs from machined or ground surfaces. Threads must be clean and free to obtain accurate adjustment and correct torque. A fine mill file or India stone is suitable for this purpose. Studs must be tight prior to reassembling the parts.
- (3) When assembling component parts, use a press where possible.
- (4) Tighten all the nuts to specified torque.

- (5) DO NOT REPAIR WELD. In the interest of safety and preserving the service life of the transfer case assemblies, we recommend assemblies NOT be repair welded. Repair welding can detract from the structural integrity of a component, particularly as to heat-treated parts. The benefit of heat-treatment may be nullified by welding.

## 5.5 Silicone (RTV) 732 and Loctite 515.

**5.5.1 Service.** Removal of all gaskets including silicone RTV 732 and Loctite 515 is accomplished by peeling or scraping the used gasket off both mating surfaces.

**5.5.2 Application.** Application of silicone RTV 732 or Loctite 515 gasket material is as follows:

- (1) Remove dirt, grease or moisture from both mating surfaces.
- (2) Dry both surfaces.

### CAUTION

Minor concentration of acetic acid vapor may be produced during application. Adequate ventilation should be provided when silicone (RTV) is applied in confined areas.

Further, eye contact with silicone (RTV) gasket materials may cause irritation; if eye contact takes place, flush eyes with water for 15 minutes and have eyes examined by a doctor.

- (3) Apply a continuous thin bead, approximately 3/16" diameter completely around one mating surface and around the edge of all fastener holes to assure complete sealing and prevent leakage.
- (4) Assemble the components immediately to permit silicone (RTV) or Loctite 515 gasket material to spread evenly. Wait 20 minutes before refilling with lubricant.

### NOTE

Failure to use appropriate gasket material will cause leaks.

## 6. RE-ASSEMBLY PROCEDURES.

### 6.1 Assembly - Upper Input Shaft Assembly.

- (1) Coat caged rollers (Figure 2, Items 17, 19, 25, and 27) with Lubriplate.

### WARNING

When using a hydraulic press for removal or installation of bearings, bushings, and gears, wear a face shield to prevent possible injury to personnel.

- (2) Place input shaft (Figure 2, Item 22) in press so spline end is up.
- (3) Install spacer (Figure 2, Item 21), caged roller (19), spacer (18) and caged roller (17) on shaft (22).
- (4) Press gear (Figure 2, Item 20) on shaft (22).
- (5) Install spacer (Figure 2, Item 10) on shaft (22).
- (6) Press bearing cone (Figure 2, Item 9) on shaft (22). Seat against spacer (10).

### WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (7) Coat threads of two capscrews (Figure 2, Item 6) with Loctite 242.
- (8) Install end plate (Figure 2, Item 7) and two capscrews (6) on shaft (22). Tighten capscrews to 60 ft. lbs. (81 N·m).
- (9) Turn upper input shaft (Figure 2, Item 22) over in press.
- (10) Install spacer (Figure 2, Item 24), caged roller (25), spacer (26), and caged roller (27) on shaft (22).
- (11) Install clutch collar (Figure 2, Item 23) on shaft (22).
- (12) Press gear (Figure 2, Item 35) on shaft (22). Seat against spacer (24).
- (13) Install spacer (Figure 2, Item 36) on shaft (22).
- (14) Press bearing cone (Figure 2, Item 37) on shaft (22). Seat against spacer (36).
- (15) Install spacer (39) on shaft (22).

## 6.2 Assembly - Lower Front Output Shaft Assembly.

### NOTE

During assembly make sure the tapered bearing cones are properly seated.

### WARNING

Use care when installing snap and retaining rings. Snap and retaining rings are under spring tension and can act as projectiles when released and could cause severe eye injury.

- (1) Install retaining ring (Figure 3, Item 82) inside bearing cap (84).

### CAUTION

Bearing assemblies are a matched set. Caution should be taken when installing.

- (2) Press both bearing cups from bearing assembly (Figure 3, Item 81) in bearing cap (84).

### WARNING

When using a hydraulic press for removal or installation of bearings, bushings, and gears, wear a face shield to prevent possible injury to personnel.

- (3) Press one bearing cone of bearing assembly (Figure 3, Item 81) on shaft (73) until seated against shaft shoulder.
- (4) Install bearing cap (Figure 3, Item 84) on shaft (73) with bearing cone.
- (5) Press other bearing cone of bearing assembly (Figure 3, Item 81) on shaft (73), until seated against bearing cup.

### WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (6) Apply Loctite 515 to outer edge of oil seal (Figure 3, Item 87) and install oil seal in bearing cup (84).

## 6.3 Assembly - Lower Rear Output Shaft Assembly.

### NOTE

During assembly make sure the tapered bearing cones are properly seated.

### WARNING

Use care when installing snap and retaining rings. Snap and Retaining rings are under spring tension and can act as projectiles when released and could cause severe eye injury.

- (1) Install retaining ring (Figure 2, Item 51) inside bearing cap (49).

### WARNING

When using a hydraulic press for removal or installation of bearings, bushings, and gears, wear a face shield to prevent possible injury to personnel.

### CAUTION

Bearing assemblies are a matched set. Caution should be taken when installing.

- (2) Press both bearing cups from bearing assembly (Figure 2, Item 50) in bearing cap (49).
- (3) Press one bearing cone of bearing assembly (Figure 2, Item 50) on shaft (52) seated against shaft shoulder.
- (4) Install bearing cap (Figure 2, Item 49) on shaft (52) with bearing cone.

- (5) Press other bearing cone of bearing assembly (Figure 2, Item 50) on shaft (52), seated against bearing cup.
- (6) Install oil seal (Figure 2, Item 43) in bearing (49).
- (7) Install clutch collar (Figure 2, Item 75) on shaft (52).

#### 6.4 Assembly - Center Shaft Assembly.

##### WARNING

**When using a hydraulic press for removal or installation of bearings, bushings, and gears, wear a face shield to prevent possible injury to personnel.**

- (1) Press center shaft (Figure 3, Item 15) on gear (13) until shaft bearing shoulder is protruding through gear face.
- (2) Install spacer (Figure 3, Item 12) and press bearing cone (11) on center shaft (15).
- (3) Install spacer (Figure 3, Item 14) and press on gear (16) on center shaft (15)
- (4) Install spacer (Figure 3, Item 17) and press bearing cone (18) on center shaft (15).

##### WARNING

**Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.**

- (5) Coat threads of two capscrews (Figure 3, Item 21) with Loctite 242.
- (6) Install pulse wheel (Figure 3, Item 20) and two capscrews (21) on center shaft (15). Tighten capscrews to 40 ft. lbs. (54 N·m).

#### 6.5 Assembly - Upper Shift Rod.

- (1) Slide shift rod (Figure 2, Item 53) in fork (60).
- (2) Apply Loctite 242 to two capscrews (Figure 2, Item 57) and install. Tighten capscrews to 40 ft. lbs. (54 N·m).
- (3) Secure two capscrews (Figure 2, Item 57) together with lockwire (58).

- (4) Install two spacers (Figure 2, Items 59 and 61) on shift rod (53).

#### 6.6 Assembly - Lower Shift Rod Assembly.

- (1) Slide shift rod (Figure 2, Item 74) in fork (71).

##### WARNING

**Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.**

- (2) Apply Loctite 242 to capscrew (Figure 2, Item 73).
- (3) Align holes and install one capscrew (Figure 2, Item 73). Tighten capscrew to 40 ft. lbs. (54 N·m).
- (4) Secure capscrew (Figure 2, Item 73) with lockwire (72).
- (5) Install eight spring disks (Figure 2, Items 69 and 70), alternating concaved surfaces, in pairs.
- (6) Install spacer (Figure 2, Item 68).

#### 6.7 Re-assembly - Bevel Gear Differential Assembly.

##### NOTE

**Coat all parts with SAE 50 motor oil at assembly.**

- (1) Install spider (Figure 4, Item 16), four pinions (17), four pinion thrust washers (15), two side gears (18) and two thrust washers (14) in bevel gear differential case (13 and 19).
- (2) Align match marks on bevel gear differential case and install capscrews (Figure 4, Item 7), castle nut (6) on bevel gear differential case (13 and 19).

##### WARNING

**When using a hydraulic press for removal or installation of bearings, bushings, and gears, wear a face shield to prevent possible injury to personnel.**

- (3) Press gear (Figure 4, Item 8) on bevel gear differential case (13)

- (4) Press bearing cones (Figure 4, Items 4 and 8) on bevel gear differential case (13 and 19).
- (5) Install spacers (Figure 4, Items 3 and 10), locking washers (2 and 11) and pat locknuts (10 and 12) on bevel gear differential case (13 and 19).
- (6) Bend tangs on locking washers (Figure 4, Items 2 and 11) over.

## 7. TRANSFER CASE ASSEMBLY PROCEDURE.

- (1) With front housing (Figure 3, Item 69) installed on maintenance stand, install bearing cups (19) and Figure 2, Item 38) in front housing (Figure 3, Item 69).
- (2) Install bearing support (Figure 3, Item 48) with six capscrews (47) in front housing (Figure 3, Item 69).
- (3) Install bearing cup (Figure 3, Item 44) in bearing support (48).
- (4) With rear housing (Figure 2, Item 66) positioned on a work bench install bearing cups (Figure 2, Item 8 and Figure 3, Item 10).
- (5) Rotate front housing (Figure 3, Item 69) so the front is facing up.
- (6) Coat bearing cone (Figure 3, Items 45 and 63) on bevel gear differential assembly with Lubriplate.

### WARNING

**Stay clear of bevel gear differential assembly when supported by lifting device. Bevel gear differential assembly may fall and cause serious injury to personnel.**

### NOTE

**Make sure bearing cone is properly seated in bearing cup of support bracket.**

- (7) Using a suitable lifting device, install bevel gear differential assembly in front housing (Figure 3, Item 69) and support bracket (Figure 3, Item 48).

### WARNING

**Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.**

- (8) Apply Loctite 515 to the facing of enclosure (Figure 3, Item 74).
- (9) Install enclosure (Figure 3, Item 74) while aligning dowel pins (43) on front housing (69).
- (10) Coat threads of capscrews (Figure 3, Item 76) with Loctite 242.
- (11) Install eight lockwashers (Figure 3, Item 75) and capscrews (76) on enclosure (74) and front housing (69). Tighten capscrews to 60 ft. lbs. (81 N·m).
- (12) Position lower front output shaft assembly on enclosure (Figure 3, Item 74).
- (13) Install two lockwashers (Figure 3, Item 85) and capscrews (86) in bearing cap (84) and enclosure (74).
- (14) Rotate front housing (Figure 3, Item 69) over so bottom is facing up.
- (15) Position dial indicator on milled surface of front housing (Figure 3, Item 69).

### NOTE

**End play must be 0.003 - 0.006 in. (0.076 - 0.15 mm). If end play is less than 0.003 in. (0.075 mm), shims must be added. If end play is greater than 0.006 in. (0.15 mm), shims must be removed.**

- (16) Check and record end play measurements on dial indicator.
- (17) Remove dial indicator from front housing (Figure 3, Item 69).
- (18) Rotate front housing (Figure 3, Item 69) so the front is facing up.
- (19) Remove two capscrews (Figure 3, Item 86) and lockwashers (85) from enclosure (74) and bearing cap (84).



**⚠ WARNING**

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (20) Coat shims (Figure 3, Item 80) and six capscrews (86) with Loctite 242.

**NOTE**

**The number of shims installed is the amount required to obtain correct end play.**

- (21) Install three shims (Figure 3, Item 80) and lower front output assembly on enclosure (74).
- (22) Install six lockwashers (Figure 3, Item 85) and capscrews (86) in bearing cap (84) and enclosure (74). Tighten capscrews to 60 ft. lbs. (81 N.m).
- (23) Rotate front housing (Figure 3, Item 69) so bottom is facing up.
- (24) Coat bearing cone (Figure 2, Items 37 and 9) with Lubriplate.

**⚠ WARNING**

**Stay clear of upper shaft assembly when supported by lifting device. Upper shaft assembly may fall and cause serious injury to personnel.**

**NOTE**

**End fork shift rod assembly with threaded hole must be face up.**

**Fork shift rod assembly and upper shaft assembly must be installed simultaneously to prevent binding.**

- (25) With the use of suitable lifting device, install upper shaft assembly, and shift rod assembly in front housing (Figure 3, Item 69).
- (26) Coat bearing cone (Figure 3, Items 11 and 18) with Lubriplate.

**⚠ WARNING**

**Stay clear of center shaft assembly when supported by lifting device. Center shaft assembly may fall and cause serious injury to personnel.**

- (27) With the use of suitable lifting device, install center shaft assembly in front housing (Figure 3, Item 69). Keep parallel to the top input shaft assembly to allow proper meshing of gears.

**NOTE**

**Lip on collar should face top of case.**

- (28) Install clutch collar (Figure 2, Item 75) on lower shift rod assembly.
- (29) Coat hole in bearing support (Figure 3, Item 48) and shaft of lower shift rod assembly with Lubriplate.
- (30) Install lower shift rod assembly in bearing support (Figure 3, Item 48).
- (31) Coat shafts of upper shift rod assembly (Figure 2, Item 53) and lower shift rod assembly (Figure 2, Item 74) with Lubriplate.

**⚠ WARNING**

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- (32) Coat inner edge of flange on front housing (Figure 3, Item 69) just inside holes, with Loctite 515.

**NOTE**

**Do step (33) if two dowel pins were removed.**

- (33) Install two dowel pins (Figure 2, Item 16) on front housing (Figure 3, Item 69).

**⚠ CAUTION**

**Lower transfer case rear housing straight down to prevent possible damage to shift rod.**

- (34) With a suitable lifting device, lower rear housing (Figure 2, Item 66) onto shift rod

assembly to the point where the shift rod is positioned just below the detent passage.

- (35) Install inner detent spring (Figure 2, Item 55) and ball (54), then lower rear housing (66) to retain spring and ball, while aligning with two dowel pins (16) at each end.

### WARNING

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- (36) Coat the threads of 20 capscrews (Figure 3, Item 68) with Loctite 242.
- (37) Install 20 flatwashers (Figure 3, Item 65) and capscrews (68) in front housing (Figure 2, Item 66). Tighten capscrews to 88 ft. lbs. (119 N.m).
- (38) Rotate transfer case so the front housing (Figure 3, Item 69) is facing up.
- (39) Apply Loctite 515 to the flange end cap (Figure 3, Item 1).
- (40) Apply Loctite 242 to threads of six capscrews (Figure 3, Item 4).
- (41) Position end cap (Figure 3, Item 1) and install six lockwashers (3) and capscrews (4) on front housing (69). Tighten capscrews to 60 ft. lbs. (81 N.m).
- (42) Apply Loctite 515 to outside edge of oil seal (Figure 3, Item 2) and install in end cap (1).
- (43) Apply Loctite 515 to the flange of end cap (Figure 3, Item 22).
- (44) Apply Loctite 242 to threads of six capscrews (Figure 3, Item 29).
- (45) Position end cap (Figure 3, Item 22) and install lockwashers (28) and six capscrews (29) in front housing (69). Tighten capscrews to 60 ft. lbs. (81 N.m).

### CAUTION

**Do not overtighten the speedometer sending unit. Torques over 35 ft. lbs. (47 N.m) will damage the sending unit.**

- (46) Coat threads of speedometer sending unit (Figure 3, Item 35) with pipe thread sealant and install in end cap (22). Thread sending unit in until it bottoms out, then back the sending unit out one turn. Tighten jam nut to 25 to 35 ft. lbs. (34 to 47 N.m).
- (47) Install oil seal (Figure 3, Item 25), jam nut (26) and rod end (27) on upper shift rod (Figure 2, Item 53).

### WARNING

**Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.**

- (48) Coat the threads of elbow (Figure 3, Item 23), breather (24), and two adapters (36 and 38) with pipe thread sealant.
- (49) Install elbow (Figure 3, Item 23), breather (24) and two adapters (36 and 38) in front housing (69).
- (50) Rotate transfer case so that rear housing (Figure 2, Item 66) is facing up.
- (51) Install three shims (Figure 2, Item 5), end cap (4), six lockwashers (3) and capscrews (2) on rear housing (66). Tighten capscrews to 60 ft. lbs. (81 N.m).
- (52) Remove plug (Figure 2, Item 1) from end cap (4) and install dial indicator through hole in end cap (4).

### NOTE

**End play must be 0.003 - 0.006 in. (0.076 - 0.15 mm). If end play is less than 0.003 in. (0.075 mm), shims must be added. If end play is greater than 0.006 in. (0.15 mm), shims must be removed.**

- (53) Check and record end play measured on dial indicator.

- (54) Remove dial indicator from end cap (Figure 2, Item 4) and install plug (1).
- (55) Remove six capscrews (Figure 2, Item 2), lockwashers (3), end cap (4), and three shims (5) from rear housing (66).

**⚠ WARNING**

**Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.**

- (56) Coat shims (Figure 2, Item 5) and six capscrews (2) with Loctite 242.

**NOTE**

**The number of shims installed is amount required to obtain correct end play.**

- (57) Install shims (Figure 2, Item 5) and bearing cap (4) in rear housing (66) with six lockwashers (3) and capscrews (2). Tighten capscrews to 60 ft. lbs. (81 N.m).

**NOTE**

**Repeat steps (51) through (59) for end cap (Figure 2, Item 14) of rear housing.**

- (58) Coat the flange of upper shift cover (Figure 2, Item 34) with Loctite 515.
- (59) Install upper shift cover (Figure 2, Item 34), two lockwashers (3), and capscrews (32) in rear housing (66). Tighten capscrews to 14 ft. lbs. (19 N.m).
- (60) Coat threads of two adapters (Figure 2, Items 29 and 31) with pipe thread sealant.
- (61) Install two adapters (Figure 2, Items 29 and 31) on rear housing (66) and bearing cap (49).
- (62) Coat the yoke splines of lower output shaft (Figure 2, Item 52) and end plate (41) with RTV 732.
- (63) Coat threads of two capscrews (Figure 2, Item 40) with Loctite 271.

- (64) Install yoke (Figure 2, Item 42) end plate (41) and two capscrews (40) on lower rear output shaft (52). Tighten to 88 ft. lbs. (119 N·m).
- (65) Connect hose (Figure 2, Item 30) to two adapters (29 and 31).
- (66) Apply Loctite 515 to flange of air differential chamber (Figure 2, Item 64), and install with two lockwashers (63), and capscrews (62) on rear housing (66).
- (67) Rotate transfer case over so that the front housing (Figure 3, Item 69) is facing up.

**⚠ WARNING**

**Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.**

- (68) Coat the yoke splines of upper shaft (Figure 2, Item 22), lower front shaft (Figure 3, Item 73), and end plates (Figure 3, Items 6 and 89) with RTV 732.
- (69) Coat threads of two capscrews (Figure 3, Items 7 and 90) with Loctite 271.
- (70) Install yoke (Figure 3, Item 5), end plate (6), and two capscrews (7) on upper shaft (Figure 2, Item 22). Tighten capscrews to 88 ft. lbs. (119 N·m).
- (71) Install yoke (Figure 3, Item 88), end plate (89), and two capscrews (90) on lower front shaft (73). Tighten capscrews to 88 ft. lbs. (119 N·m).
- (72) Connect hose (Figure 3, Item 37) on adapters (36 and 38).

**8. INSTALLATION.**

- (1) Attach mounting brackets to transfer case. Fasten transfer case to vehicle frame with mounting bolts and biscuits. Connect prop shafts, air lines, electrical connectors and shift linkage.
- (2) Refill with motor oil conforming to API service SE-CC, SAE 50, (MIL-L-2104C). Do not use hypoid or E.P. gear lubricants. Avoid mixing different brands. For subzero arctic operation 0° to -65°F use arctic oil

MIL-L-46167. Check oil level every 2500 miles or 125 hours of operations. Every 5000 miles or 250 hours drain housing while hot. Refer to group 85.