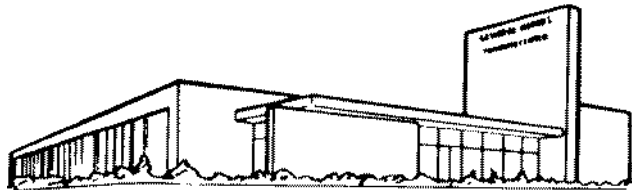


# 208 TRANSFER CASE AND AUTOMATIC LOCKING HUBS



*Light Truck*



Product  
Service  
Training



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NP 208 TRANSFER CASE

GM CORP AUTO HUB

# FORWARD

This booklet is supplied by GM School of Product Service Training to GM dealer service personnel upon the completion of the subject course conducted at the GM Training Centers. While this booklet will serve as an excellent review of the extensive program presented in the training centers session it is not intended to substitute for the various service manuals normally used on the job. The range of specifications and variation and procedures

between divisions and models require that the division and service publications be referred to, as necessary, when performing these operations.

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## INTRODUCTION

The 1981 model year will see the introduction of a new 4 wheel drive transfer case designated the 208. The new 208 features an all aluminum case, part-time 4 wheel drive, simple construction and light weight, 80 pound (36 kg).

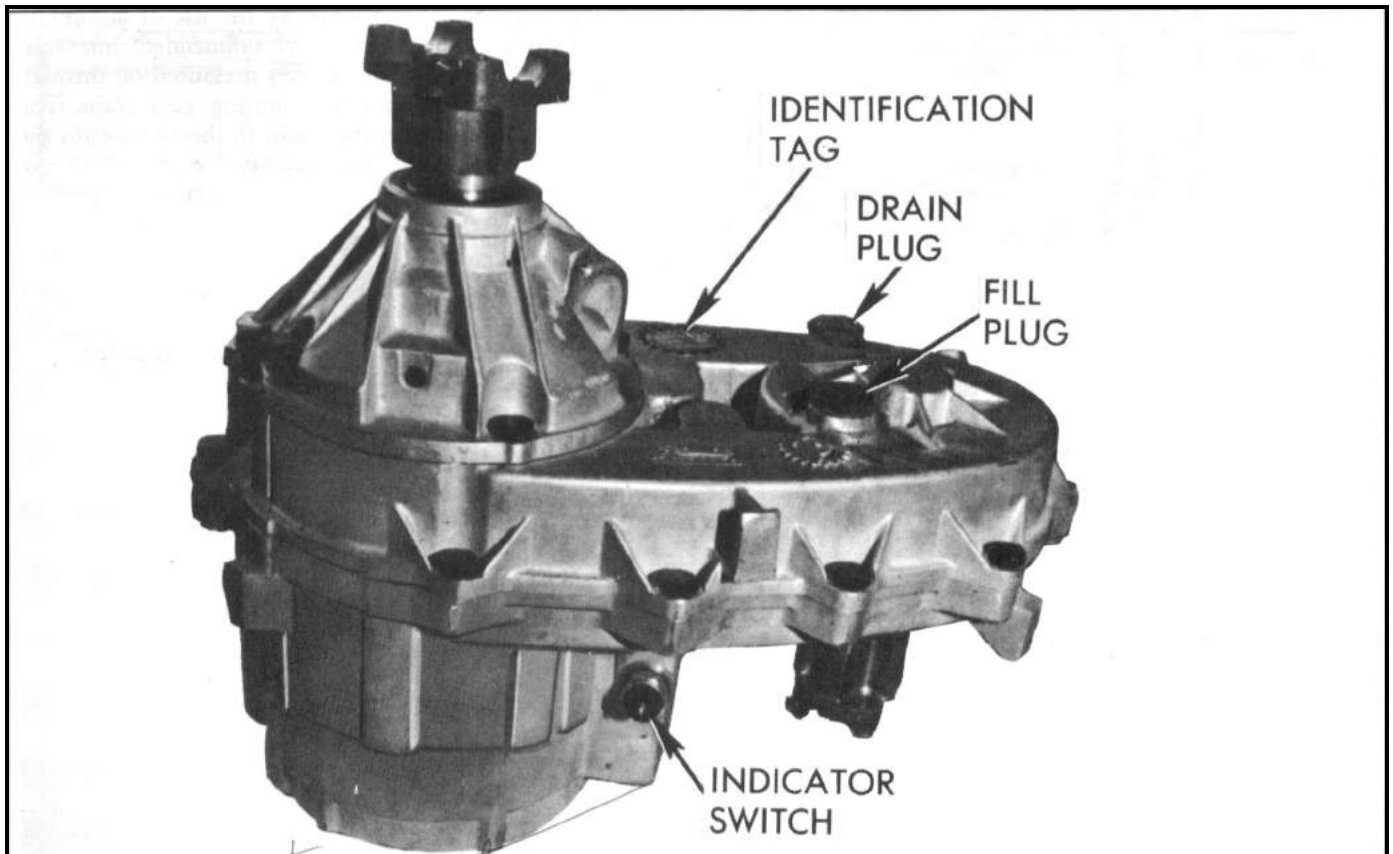


Figure 1 208 Transfer Case

This new transfer case will be used on all 10 and 20 series 4 wheel drive models replacing both the 203 and the 205. In conjunction with this new transfer case but not part of it will be the use of automatic locking hubs allowing the driver the ability to obtain 4 wheel operation without exiting the vehicle to manually lock the hubs.

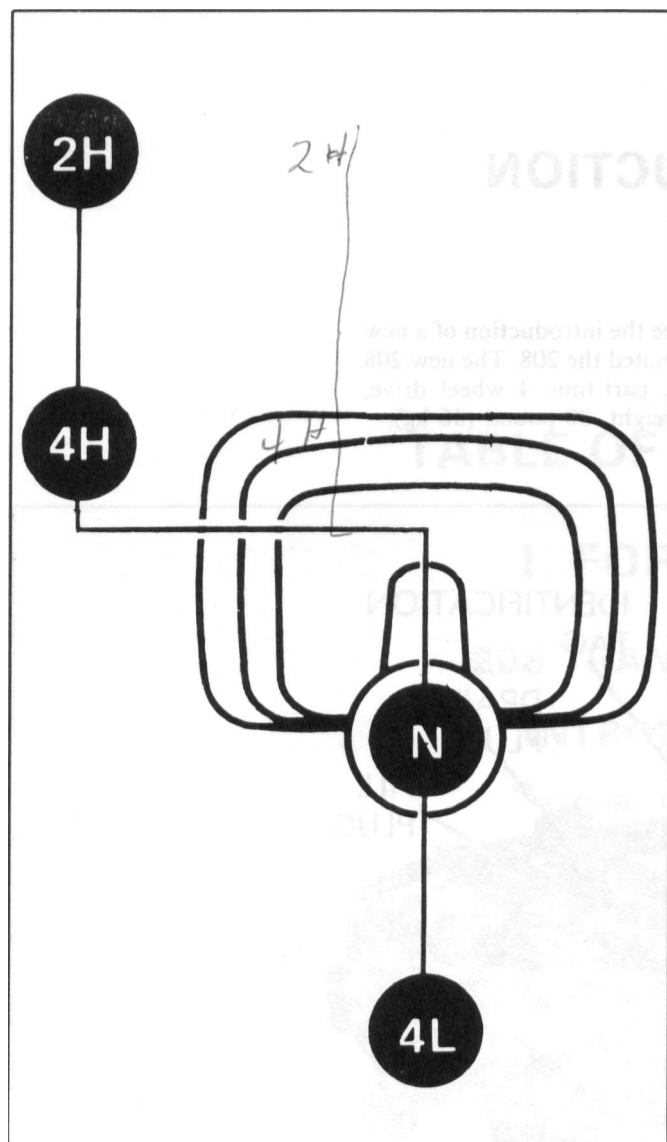


Figure 2 Shift Pattern

N - Neutral-Shifting into and out of Neutral must be done with the vehicle stopped and the clutch disengaged.

4L - low range-all four wheels driving (hubs lock automatically do not exceed 40 mph (64.5 kilometers per hour kph)

**NOTICE:** 4 low and 4 high are for low traction conditions only (mud, snow or sand). Do not use 4 wheel drive on dry pavement as it will result in increased wear on tires and driveline.

The ratio change from high to low in this transfer case is a reduction of 2.6 to 1. The range shift from 2 to 4 wheel drive is synchronized allowing it to be done at low speeds with care.

Lubrication is accomplished by the use of automatic transmission fluid changed at recommended intervals. There is an oil pump which supplies pressured oil through the mainshaft to the input and shifting gear train. The balance of the system uses the chain to throw oil onto the other moving parts. Lubricant capacity is 6 pints (3 liters).

*mi change 3000<sup>10</sup> mi  
kind of usage - change more  
often - if in mud & water*

There are four ranges which can be selected in this transfer case. They are two high, four high, neutral and four low.

2H-high range-normal two wheel drive maximum fuel economy with hubs unlocked (see automatic hub lock section).

4H-high range-all four wheels driving (hubs locked automatically)

**NOTICE:** Shifting from 2H to 4H at speeds above 25 mph may damage the transfer case.

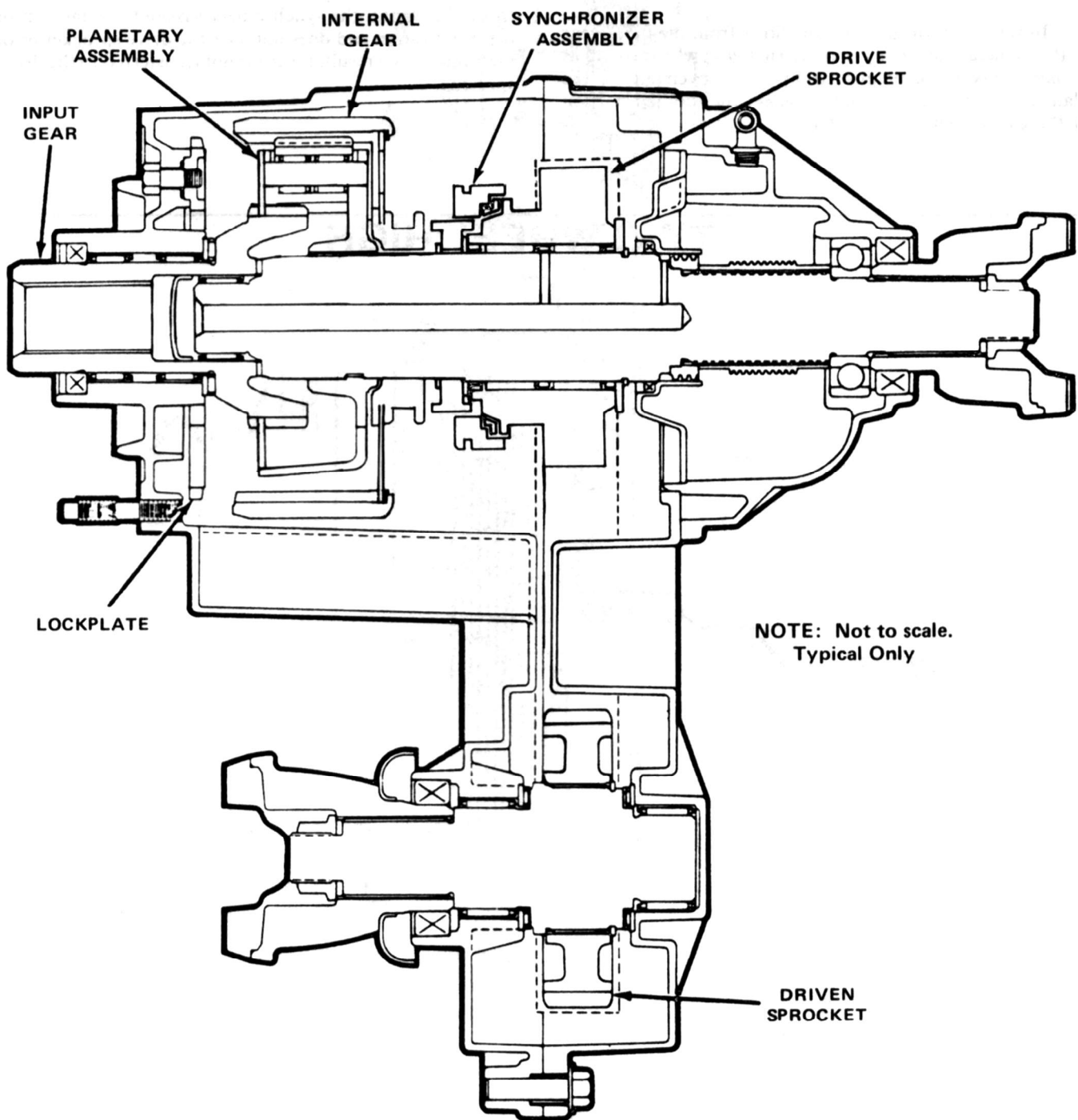


Figure 3 208 Transfer Case Cutaway

# POWER FLOW

In all drive range positions input torque is transmitted to the transfer case gear train through the transfer case input gear.

In the two high range torque flows from the input gear to the planetary assembly and internal gear which rotate as a unit. This is accomplished by the movement of the planetary unit forward which engages the toothed portion of the carrier with the input gear.

Torque flow continues through the mainshaft and rear yoke which is splined to the mainshaft, and finally to the rear propeller shaft and axle. In the 2H range, the synchronizer assembly remains in the neutral position and does not lock the drive sprocket to the mainshaft. As a result, torque is not transferred to the driven sprocket.

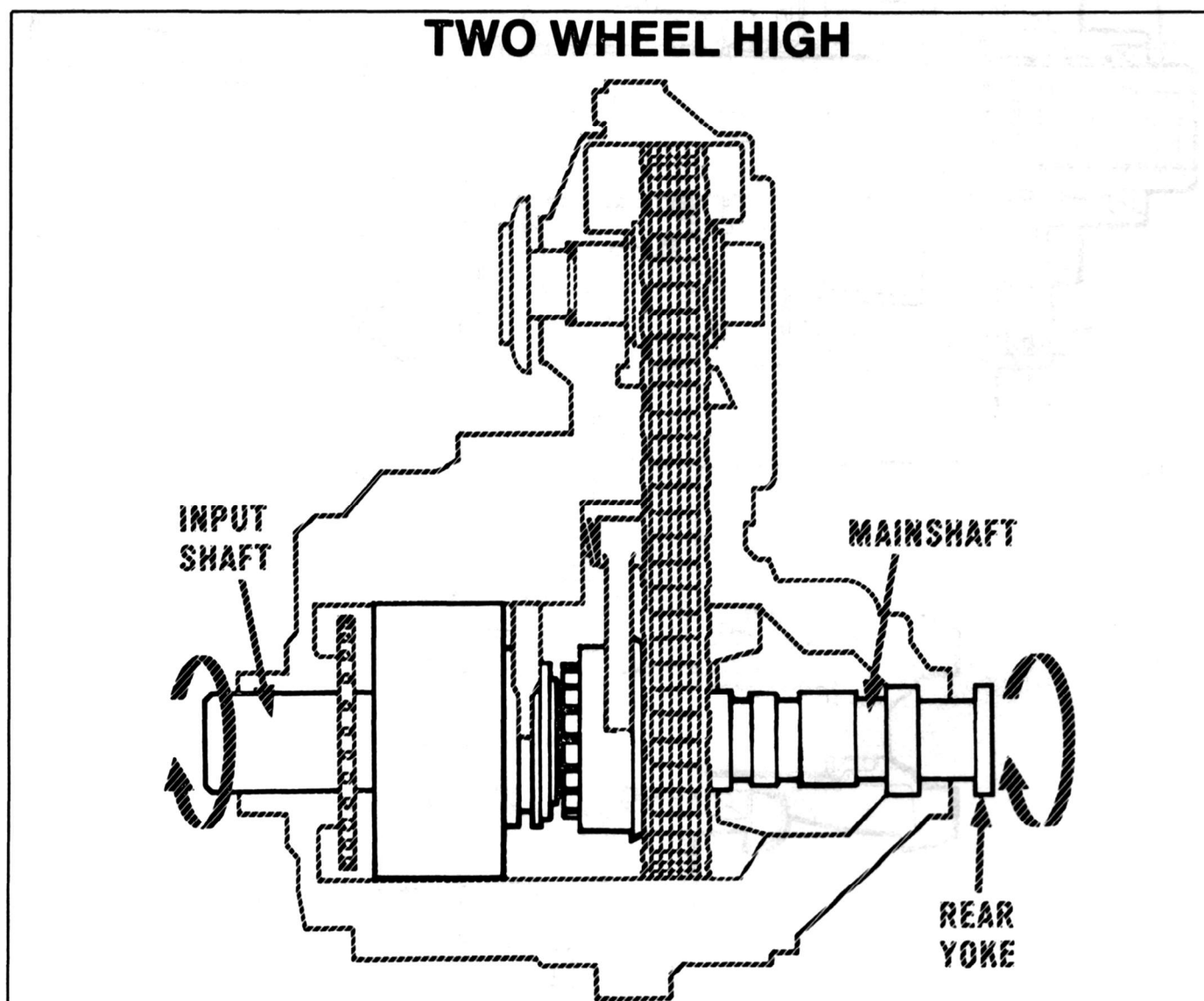


Figure 4 2W High Power-Flow



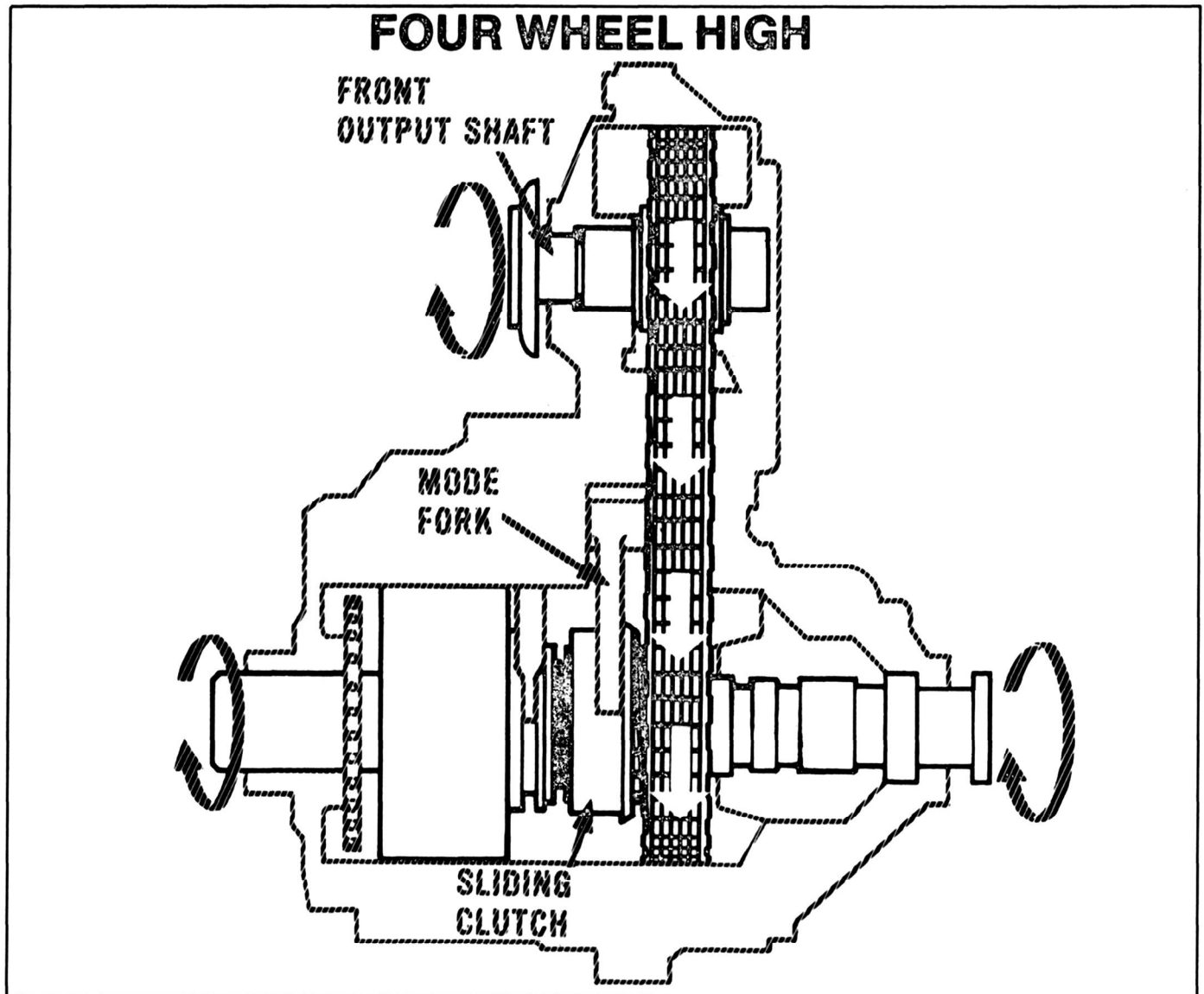


Figure 5 4W High Power-Flow

In 4H range input torque from the input gear is transmitted through the planetary assembly and internal gear and through the mainshaft. However, in the 4H position the synchronizing assembly is shifted into engagement with the mainshaft dutch gear. This locks the drive sprocket to the mainshaft through the synchronizing assembly. Torque is now transmitted through the drive

sprocket to the driven sprocket by the connecting drive chain. Since the front output shaft is splined to the drive sprocket torque now flows through the front output shaft to the front propeller shaft and axle resulting in high range 4 wheel drive. (Figure 6 4W Low Powerflow)

In 4L range the path of torque through the transfer case is exactly the same as the 4H range with one change. In 4L range, the internal gear and planetary assembly is shifted forward engaging the internal gear with the lock plate. Since the lock

plate is fixed to the case the internal gear is held stationary and does not rotate. This causes the planetary pinions to rotate inside the internal gear producing a gear reduction ratio of 2.61 to 1.

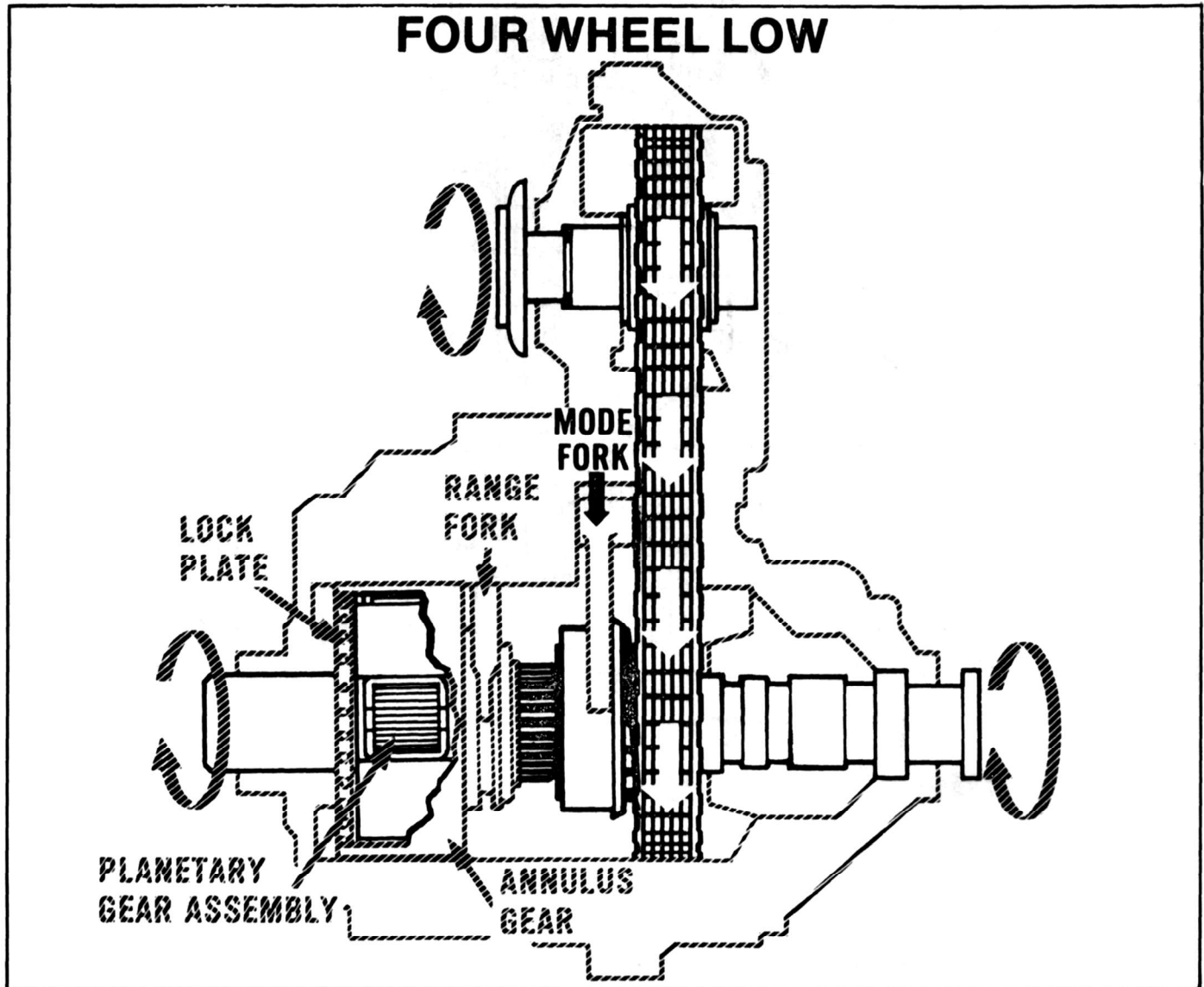


Figure 6 4W Low Powerflow

*Low Vehicle In 2H Position Only  
With Rear Axle Lifting Off Ground*

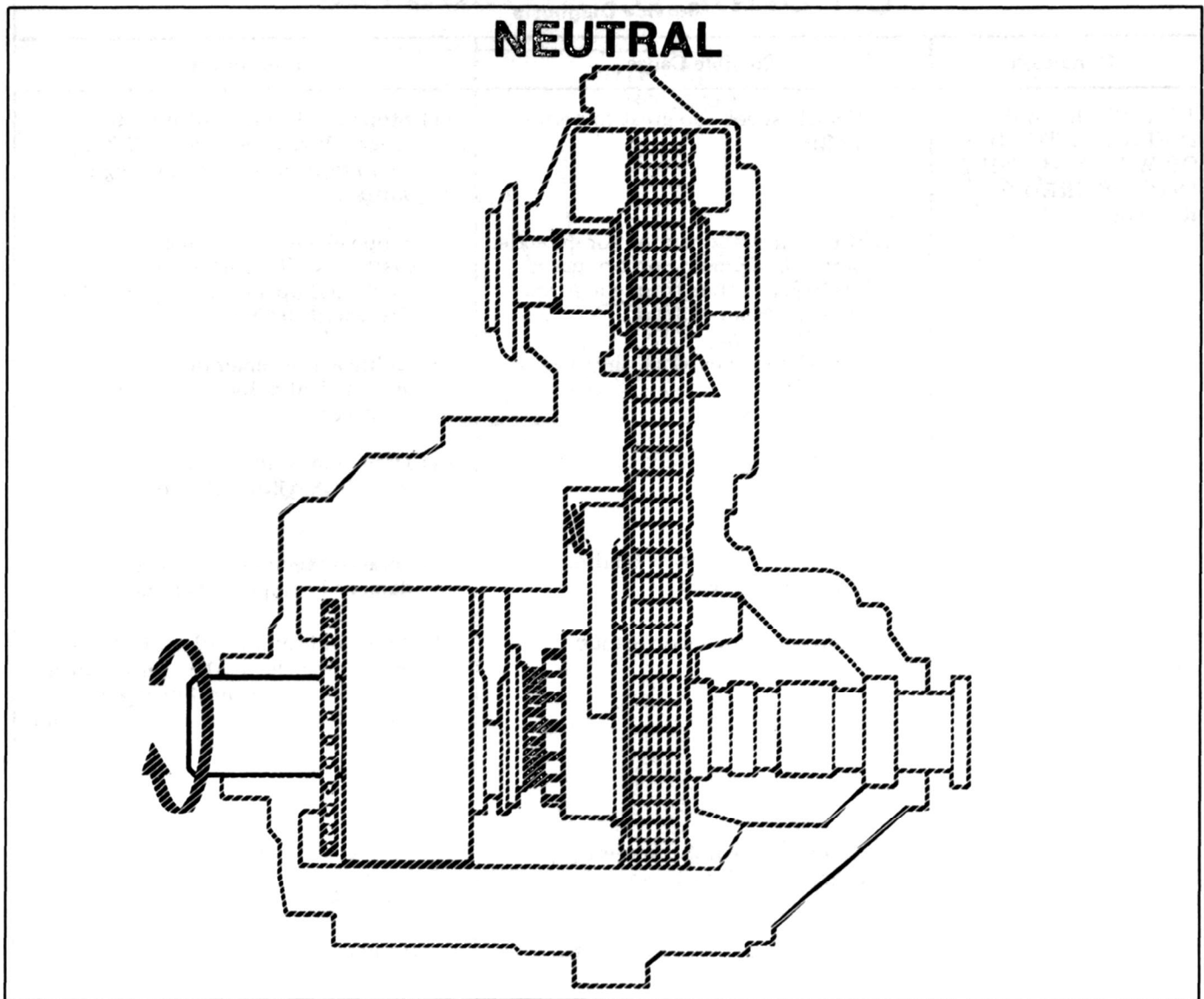


Figure 7 Neutral Power-Flow

In Neutral the planetary assembly is disengaged from the input gear and blocker plate. Therefore, the input gear is the only rotating member.

## SERVICE DIAGNOSIS

Before attempting to repair a suspected transfer case malfunction, check all other driveline components before hand. The actual cause of a problem may be related to such items as the front hubs, axles, propeller shafts, wheels and tires, transmission, or clutch instead.

If all other driveline components are in good condition and operate properly, refer to the service diagnosis chart for further information.

Service Diagnosis		
Condition	Possible Cause	Correction
TRANSFER CASE DIFFICULT TO SHIFT OR WILL NOT SHIFT INTO DESIRED RANGE	(1) Vehicle speed too great to permit shifting.	(1) Stop vehicle and shift into desired range. Or reduce speed to 2-3 mph (3.4 km/h) before attempting to shift.
	(2) If vehicle was operated for extended period in 4H mode on dry paved surface, driveline torque load may cause difficult shifting.	(2) Stop vehicle, shift transmission to neutral, shift transfer case to 2H mode and operate vehicle in 2H on dry paved surfaces.
	(3) Transfer case external shift linkage binding.	(3) Lubricate or repair or replace linkage, or tighten loose components as necessary.
	(4) Insufficient or incorrect lubricant.	(4) Drain and refill to edge of fill hole with DEXRON II ATF only.
	(5) Internal components binding, worn, or damaged.	(5) Disassemble unit and replace worn or damaged components as necessary.
TRANSFER CASE NOISY IN ALL DRIVE MODES	(1) Insufficient or incorrect lubricant.	(1) Drain and refill to edge of fill hole with DEXRON II ATF only. Check for leaks and repair if necessary. Note: If unit is still noisy after drain and refill, disassembly and inspection may be required to locate source of noise.
NOISY IN — OR JUMPS OUT OF FOUR WHEEL DRIVE LOW RANGE	(1) Transfer case not completely engaged in 4L position.	(1) Stop vehicle, shift transfer case in Neutral, then shift back into 4L position.
	(2) Shift linkage loose or binding.	(2) Tighten, lubricate, or repair linkage as necessary.
	(3) Range fork cracked, inserts worn, or fork is binding-on-shift	(3) Disassemble unit and repair as necessary.
	(4) Annulus gear or lockplate worn or damaged.	(4) Disassemble unit and repair as necessary.
LUBRICANT LEAKING FROM OUTPUT SHAFT SEALS OR FROM VENT	(1) Transfer case overfilled.	(1) Drain to correct level.
	(2) Vent closed or restricted.	(2) Clear or replace vent if necessary.
	(3) Output shaft seals damaged or installed incorrectly.	(3) Replace seals. Be sure seal lip faces interior of case when installed. Also be sure yoke seal surfaces are not scored or nicked. Remove scores, nicks with fine sandpaper or replace yoke(s) if necessary.
ABNORMAL TIRE WEAR	(1) Extended operation on dry hard surface (paved) roads in 4H range.	(1) Operate in 2H on hard surface (paved) roads.

# NEW PROCESS 208 TRANSFER CASE

## DESCRIPTION

The Model 208 transfer case is an aluminum case, chain drive, four position unit providing four-wheel drive high and low ranges, a two-wheel high range, and a neutral position. The model 208 is a part-time four-wheel drive unit. Torque input in four-wheel high and low ranges is undifferentiated. The range positions on the Model 208 are selected by a floor mounted gearshift lever.

The model 208 case is a two-piece aluminum case containing front and rear output shaft, two drive sprockets, a shift mechanism and a planetary gear assembly. The drive sprockets are connected and operated by the drive chain. The planetary assembly which consists of a four pinion carrier and an annulus gear provide the four-wheel drive low range when engaged. Reduction ratio is 2.61:1 in this range.

## IDENTIFICATION

An identification tag is attached to the rear half of the transfer case. This tag provides the transfer case model number, low range reduction ratio, and assembly number. The information on this tag is necessary for servicing information. If the tag is removed or becomes dislodged during service operations, it should be reattached using an adhesive sealant such as Loctite 312, or equivalent.

## POWER FLOW

In all drive range positions input torque is transmitted to the transfer case gear train through the transfer case input gear.

In 2H range, torque flows from the input gear to the planetary assembly and annulus gear which rotates as a unit. Torque is transferred to the mainshaft through the planetary carrier which is splined to the mainshaft. Torque flow continues through the mainshaft and rear yoke which is splined to the mainshaft, and finally to the rear propeller shaft and axle. In 2H range, the sliding clutch remains in a neutral position and does not lock the drive sprocket to the mainshaft. As a result, torque is not transferred to the driven sprocket.

In 4H range, input torque from the input gear is transmitted through the planetary and annulus gear and through the mainshaft in exactly the same fashion as in 2H range. However, in 4H position, the sliding clutch is shifted forward and into engagement with the mainshaft clutch gear. This locks the drive sprocket to the mainshaft through the sliding clutch. Torque is not transmitted through the drive sprocket to the driven sprocket by the connecting drive chain. Since the front output shaft is splined to the driven sprocket, torque now flows through the front output shaft to the front propeller shaft and axle resulting in high range four-wheel drive.

In 4L range, the path of torque through the transfer case is exactly the same as in 4H range but with one major difference. In 4L range, the annulus gear is shifted forward and into engagement with the lock plate. Since the lock plate is fixed in the case, the annulus gear is held stationary and does not rotate. This causes the planetary pinions to rotate about the annulus gear internal teeth producing a gear reduction ratio of 2.61:1.

## DISASSEMBLY

### EXTERNAL COMPONENTS



#### Clean

- The transfer case exterior using a solvent and a stiff brush.



#### Remove or Disconnect (Figures 47, 48, 49, 50, 51, 52 and 53)

Tools Required:

J-2619-01

J-8092 Driver Handle

J-26941 Front Output Shaft Rear Bearing Remover

J-29168 Front Output Shaft Front Bearing Remover

J-29170 Input Gear Front and Rear Bearing Remover

J-29369-1 Input Drive Gear Pilot Bearing Remover

1. Fill plug (15).

2. Drain plug.

3. Front yoke nut (61). Discard.

4. Front yoke (63).

5. Yoke seal washer (62).

- Turn the transfer case on end. Position the front case on wood blocks. Cut "V" notches in the wood blocks to clear the mounting studs in the front case.

6. Indicator lamp switch (53) and washer.

7. Poppet screw (60).

8. Poppet screw spring (59).

9. Range section plunger (58).

## Tighten

- Bolts to 35 Nm (25 ft. lbs.).
3. Input gear roller bearings (45) into the transfer case, using J-33830 and J-8092. Press the bearings until the tool bottoms in the bore.
  4. Front output shaft rear bearing (20), using J-33832 and J-8092. Press the bearing until the tool bottoms in the case.
  5. Front output shaft front bearing (54), using J-33833 and J-8092. Press the bearing until the tool bottoms in the bore.
  6. Front output shaft bearing retaining snap ring (53) in the case.
  7. Front output shaft seal (52), using J-33834.
  8. Input main drive gear seal (46), using J-33831.
  9. Spacer (75) on the shift sector shaft.
  10. Shift sector (74) in the transfer case.
  11. Oil seal (57).
  12. Retainer (58).
  13. Shifter lever (59).
  14. Nut (60).

## Tighten

- Nut to 24 Nm (18 ft. lbs.).
13. Shift sector detent spring (61).
  14. Spring retaining screw (55).
  15. Pilot bearing (35) into the input gear (37), using J-33829 and J-8092. Press the bearing until the tool bottoms out.
  16. Input gear front thrust bearing (38 and 39) in the transfer case.
  17. Input gear (37) in the transfer case.
  18. Planetary gear thrust washer (34) on the input gear (37).
  19. Range fork (66) on the planetary assembly.
  20. Planetary assembly into the transfer case.
  21. Mainshaft (1) into the transfer case.
    - Make sure the thrust washer is aligned with the input gear and planetary assembly before installing the mainshaft.
  22. Mode fork (69) on the synchronizer sleeve (27). Rotate until the mode fork is aligned with the range fork.
  23. Shift fork shaft (73). Slide the mode fork rail down through the range fork until the shaft is seated in the bore of the transfer case.
  24. Drive chain (76) on the front output shaft (21) and the drive sprocket (32).
  25. Front output shaft (21) in the transfer case. Slightly raise the mainshaft to seat the output shaft in the case.
  26. Magnet into the pocket in the transfer case.
  27. Rear case (2) on the front case (44).
    - Apply a 3 mm (1/8-inch) bead of Loctite 515 or equivalent to the mating surface of the front case.
    - Align the rear case to the front case aligning dowel pins.
  28. Case bolts (17).

- Install the two bolts with washers into the dowel pin holes.

## Tighten

- Bolts to 31 Nm (23 ft. lbs.).
29. Output bearing (10) into the rear retainer (7), using J-33833 and J-8092. Press the bearing until its seated in the bore.
  30. Pump seal (3) in the pump housing (4), using J-33835.
  31. Pump housing (4) in the rear retainer (7).
    - Apply petroleum jelly to the pump housing tabs before installation.
  32. 3 mm (1/8-inch) of Loctite 515 or equivalent to the mating surface of the rear retainer.
  33. Retainer (7) to the case.
  34. Retainer bolts (9).

## Tighten

- Bolts to 24 Nm (18 ft. lbs.).
35. New snap ring (11) on the main shaft.
    - Pull up on the main shaft and seat the snap ring in its groove.
  36. Bushing (14) in the extension housing (12), using J-33826 and J-8092. Press the bushing in until the tool bottoms in the bore.
  37. New seal (15) in the extension housing (12), using J-33843.
  38. 3 mm (1/8-inch) of Loctite 515 or equivalent to the mating surface of the extension housing (12).
  39. Extension housing (12) to the rear retainer (7).
  40. Extension housing retaining bolts (13).

## Tighten

- Bolts to 31 Nm (23 ft. lbs.).
41. New front yoke seal washer (50) in the yoke (48).
  42. Front yoke (48).
  43. New yoke nut (49).

## Tighten

- Nut to 150 Nm (110 ft. lbs.).
44. Drain plug (16) and fill plug (16).

## Tighten

- Plugs to 47 Nm (35 ft. lbs.).

- |                                     |                         |
|-------------------------------------|-------------------------|
| 1. Main Driveshaft                  | 62. Front Output Yoke   |
| 2. Speedometer Drive Gear           | Seal Washer             |
| 3. Rear Housing                     | 63. Yoke                |
| 4. Bolt                             | 64. Yoke Deflector      |
| 5. Oil Pump Seal                    | 65. Front Output Shaft  |
| 6. Oil Pump Housing                 | Seal                    |
| 7. Oil Pump Gear                    | 66. Front Output Shaft  |
| 8. Main Shaft Rear Bearing          | Bearing                 |
| 9. Main Shaft Extension             | 67. Range Sector Shaft  |
| 10. Vent Pipe                       | Oil Seal                |
| 11. Main Shaft Extension            | 68. Sector and Shaft    |
| Bushing                             | Retainer                |
| 12. Main Shaft Extension            | 69. Outer Thrust Washer |
| Seal                                | 70. Thrust Bearing      |
| 13. Indicator Switch Wire           | 71. Inner Thrust Washer |
| Clip                                | 72. Front Output Shaft  |
| 14. Bolt                            | 73. Sprocket            |
| 15. Oil Fill Plug                   | 74. Driven Sprocket     |
| 16. Alignment Dowel                 | Retainer Ring           |
| 17. Dowel Washer                    | 75. Drive Chain         |
| 18. Bolt                            | 76. Front Output Shaft  |
| 19. Low Range Lock Plate            | Pilot Bearing           |
| 20. Planetary Gears Carrier         | 77. Annulus Gear Hub    |
| 21. Planetary Gear Thrust           | Bushing                 |
| Washer                              | 78. Dowel Pin           |
| 22. Annulus Gear                    | 79. Lever               |
| 23. Annulus Gear Thrust             | 80. Washer              |
| Washer                              | 81. Nut                 |
| 24. Range Fork Center Pad           |                         |
| 25. Annulus Gear Retainer           |                         |
| Ring                                |                         |
| 26. Synchronizer Retainer           |                         |
| Ring                                |                         |
| 27. Synchronizer                    |                         |
| 28. Synchronizer Strut Spring       |                         |
| 29. Synchronizer Shift Strut        |                         |
| 30. Synchronizer Stop Ring          |                         |
| 31. Sprocket Roller Spacer          |                         |
| 32. Sprocket Roller                 |                         |
| 33. Sprocket                        |                         |
| 34. Drive Sprocket Thrust Washer    |                         |
| 35. Drive Sprocket Retainer Ring    |                         |
| 36. Range Fork                      |                         |
| 37. Range Fork Shift Pin            |                         |
| 38. Mode Fork and Spring Retainer   |                         |
| 39. Mode Fork Shifter Spring        |                         |
| 40. Mode Fork Spring Cup            |                         |
| 41. Shifter Fork Shaft              |                         |
| 42. Fork End Pad                    |                         |
| 43. Mode Fork Center Pad            |                         |
| 44. Mode Fork                       |                         |
| 45. Mode Fork Shifter Pin           |                         |
| 46. Input Drive Gear Thrust Bearing |                         |
| 47. Input Drive Gear Pilot Bearing  |                         |
| 48. Input Drive Gear Plug           |                         |
| 49. Input Drive Gear                |                         |
| 50. Input Drive Gear Thrust Bearing |                         |
| 51. Input Drive Gear Thrust Washer  |                         |
| 52. Range Sector, with Shaft        |                         |
| 53. Indicator Lamp Switch           |                         |
| 54. Front Housing                   |                         |
| 55. Bolt                            |                         |
| 56. Input Drive Gear Seal           |                         |
| 57. Input Drive Gear Bearing        |                         |
| 58. Range Sector Plunger            |                         |
| 59. Poppet Screw Spring             |                         |
| 60. Poppet Screw                    |                         |
| 61. Front Output Yoke Nut           |                         |

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Figure 48—New Process 208 Transfer Case

## MAINSHAFT EXTENSION

1. Extension bolts (14).
2. Mainshaft extension (9) and pump housing (6) as an assembly.
  - Tap the retainer from the case using a plastic mallet. Do not pry.
3. Pump housing (6) from the retainer (9).
4. Pump seal (5) from the housing. Discard the seal.
5. Speedometer drive gear (2) from the mainshaft (1).
6. Oil pump (7) from the mainshaft (1).
  - Note the position of the pump for assembly reference. The side facing the case interior has a recess in it.

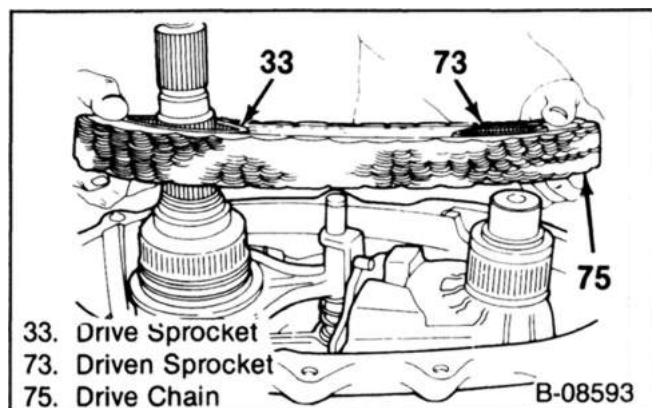
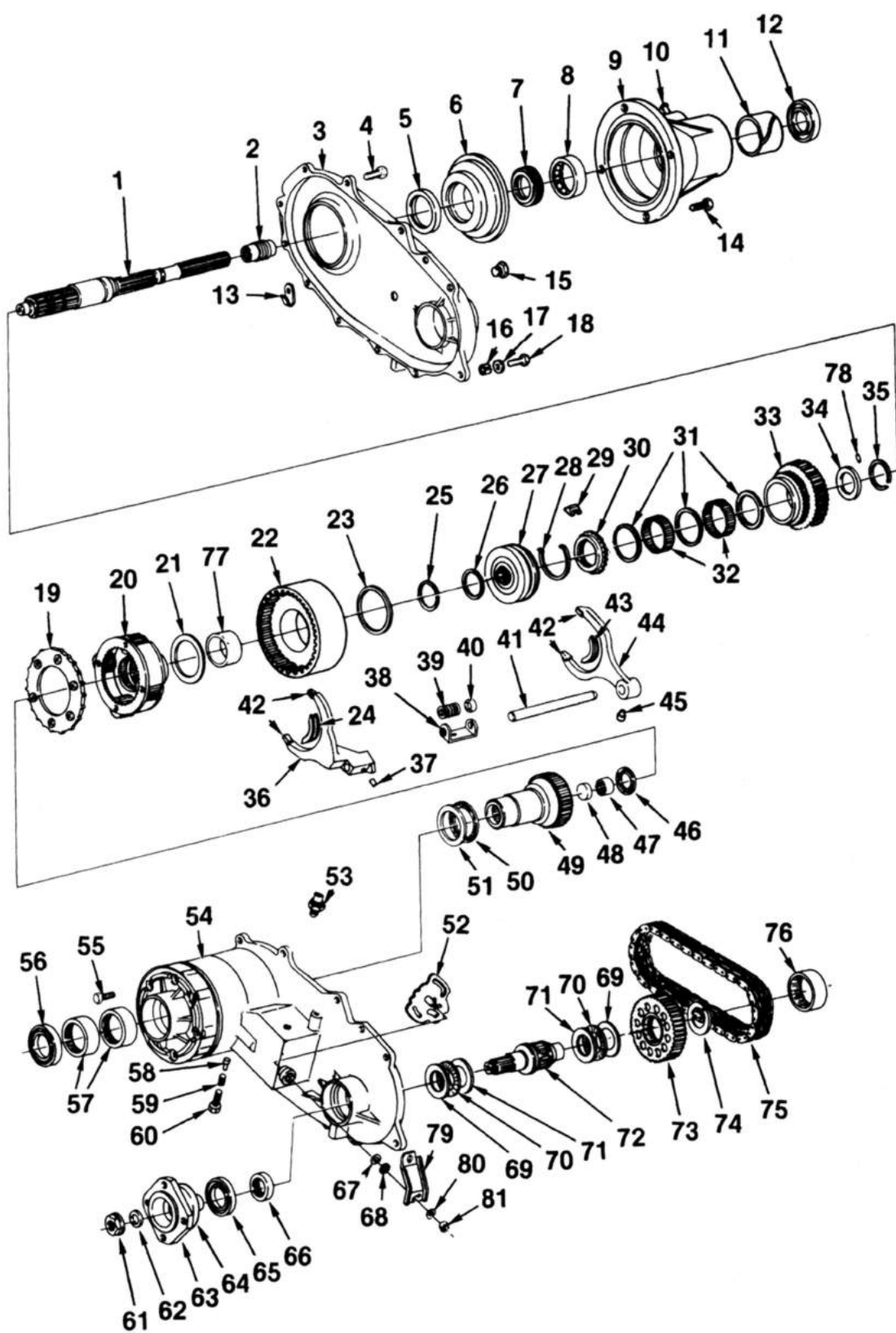


Figure 49—Sprocket and Chain Removal

## INTERNAL COMPONENTS

1. Case bolts (4).
2. Rear case (3) from the front case (54).
  - Insert screwdrivers into the slots cast in the case ends and gently pry upward. Do not attempt to wedge the case halves apart at any point on the mating surfaces.
3. Front output shaft rear thrust bearing assembly (71, 70 and 69).
  - Note the position of the bearing and races for assembly reference.
4. Driven sprocket retainer ring (74).
5. Drive sprocket retainer ring (35).
6. Thrust washer (34).
7. Driver sprocket (33), driven sprocket (73) and drive chain (75) as an assembly.
  - Lift evenly on both sprockets to remove the assembly. The mainshaft roller bearings may drop out of the drive sprocket.
8. Front output shaft (72) and front thrust bearing assembly (69, 70, and 71).
9. Synchronizer stop ring (30).

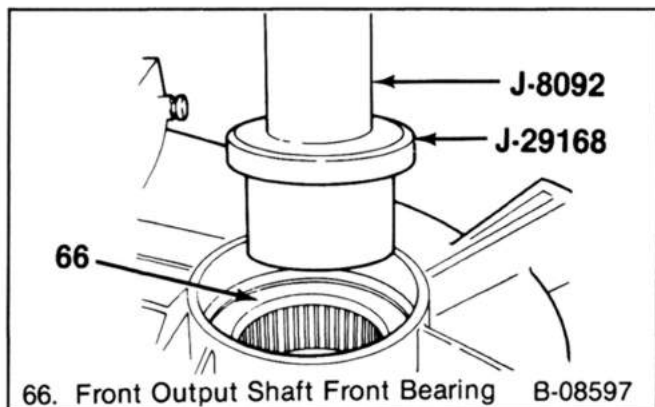


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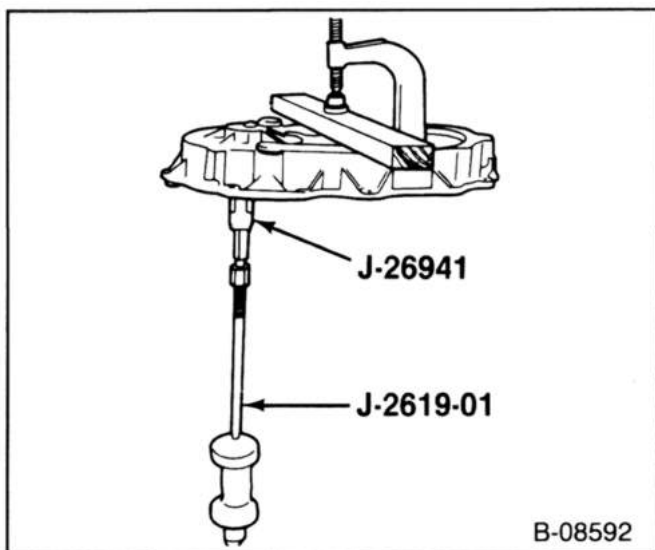
Figure 47—New Process 208 Transfer Case



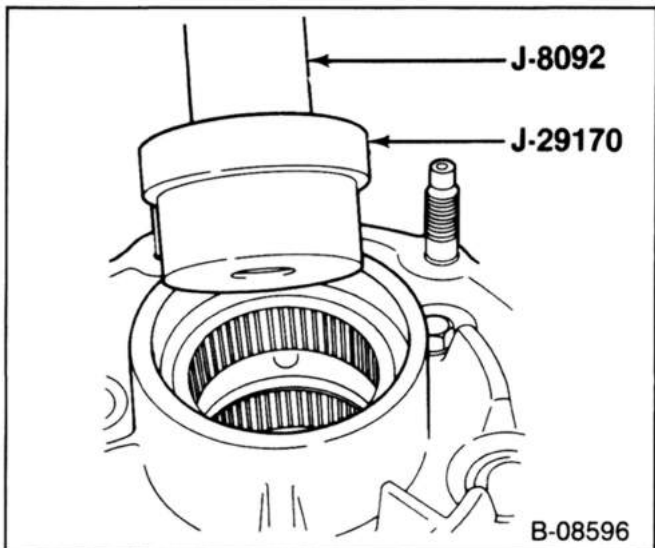
10. Synchronizer (27), mode fork bushings (43 and 4), mode fork (44) and bracket (38) as an assembly. The synchronizer keys may fall free from the hub.



**Figure 50—Front Output Shaft Front Bearing Removal**

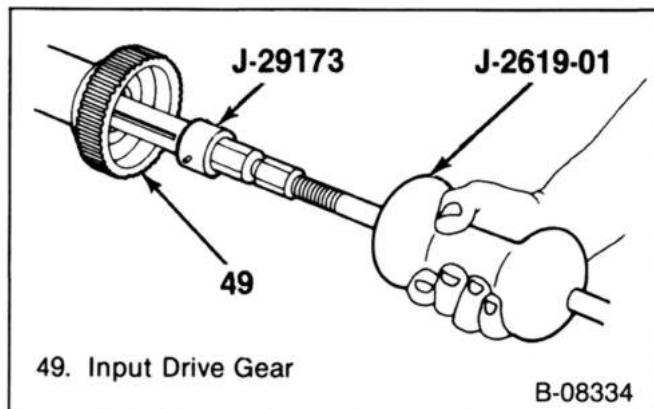


**Figure 51—Front Output Shaft Rear Bearing Removal**



**Figure 52—Input Gear Bearing Removal**

11. Shifter fork shaft (41).
12. Mainshaft (1) with the synchronizer hub and retainer ring (26) attached.
13. Annulus gear snap ring (25).
14. Thrust washer (23).



**Figure 53—Mainshaft Pilot Bearing Removal**

15. Annulus gear (22) and range fork (36) as an assembly.
  - Turn the fork to the left in order to disengage the fork lug from the range sector and lift the assembly out of the case.
16. Planetary thrust washer (21).
17. Planetary assembly (20).
18. Mainshaft thrust bearing (46) from the input gear (49).
19. Input gear (49).
  - Lift the gear straight up and out of the case.
20. Input gear thrust bearing (50) and race (51).
  - Note the position of the bearing and the race for assembly reference.
21. Range sector operating lever attaching nut (81) and washer (80).
22. Lever (79).
23. Sector shaft seal (68).
24. Seal retainer (67).
25. Range sector (52).
26. Front output shaft seal (65).
27. Input gear seal (56).
28. Lock plate attaching bolts.
29. Lock plate (19) from the case.

## FRONT AND REAR BEARINGS

1. Mainshaft rear bearing (8) from mainshaft extension (9). Use a brass drift and mallet.
2. Rear seal (12). Use a brass drift.
3. Front output shaft front bearing (66), using J-8092 and J-29168.
4. Front output shaft rear bearing (76), using J-26941 and J-2619-01.
5. Input gear front/rear bearing (57), using J-8092 and J-29170.
6. Input drive gear pilot bearing, using J-2619-01 and J-29369-1.

# CLEANING AND INSPECTION



## Clean

1. Bearings.
  - Remove all old lubricant and dirt.
2. Shafts.
3. Sprockets.
4. Chain.
5. Oil feed ports and channels in each case half. Apply compressed air to each oil feed port and channel in order to remove any obstructions or cleaning solvent residue.



## Inspect

1. Bearings and thrust washers for wear, spalling, brinelling, or corrosion.
2. Gear teeth for excessive wear or damage, spalling, cracks, or corrosion.
3. Gear splines for excessive wear, spalling, cracks, twist or corrosion.
4. Shaft splines for excessive wear, spalling, cracks, distortion or corrosion.
5. Retainer rings for excessive wear, distortion or damage.
6. Case halves for damaged or warped mating surfaces, cracks, porosity, or damaged threaded holes.
7. Lock plate teeth for cracks, chips, spalling, or excessive wear.
8. Lock plate hub for cracks or distortion.

# ASSEMBLY

## FRONT AND REAR BEARINGS



### Install or Connect (Figures 47, 48, 54, 55, 56, 57, 58, 59 and 60)

#### Tools Required:

- J-8092 Driver Handle
- J-29174 Mainshaft Bearing Installer
- J-29169 Input Gear Bearing Installer
- J-29163 Front Output Shaft Rear Bearing Installer
- J-29167 Front Output Shaft Front Bearing Installer
- J-29162 Extension Oil Sealer Installer

1. Input drive gear pilot bearing (47), using J-8092 and J-29174.
  - Check that the oil feed hole is not covered.
  - The bearing is seated flush with the edge of the oil hole.
2. Input gear rear bearing (57), using J-8092 and J-29169.
3. Input gear front bearing (57), using J-8092 and J-29169.
4. Front output shaft pilot bearing (76), using J-8092 and J-29163.
  - Check that the oil feed hole is not covered.
  - The bearing is seated flush with the edge of the case bore to allow room for the thrust bearing assembly.
5. Front output shaft front bearing (66), using J-8092 and J-29167
6. Mainshaft rear bearing (8), using J-7818.
  - The shielded side of the bearing faces the interior of the case.

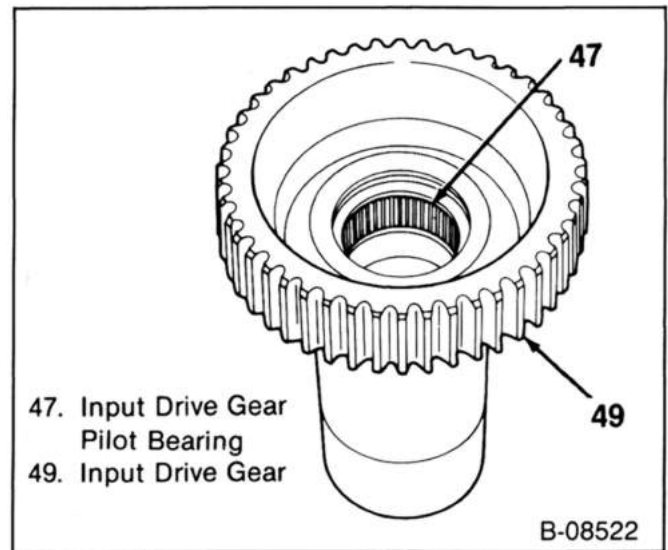


Figure 54—Mainshaft Pilot Bearing Installation

## INTERNAL COMPONENTS

1. Lock plate (19).
  - Coat the case and the lock plate surfaces around the bolt holes with Loctite 515 sealant, or equivalent.
  - Position the new lock plate in the case.
  - Align the bolt holes.
2. Lock plate attaching bolts.
  - Coat the new lock plate attaching bolts with Loctite 271 sealant, or equivalent.



## Tighten

- Bolts to 41 N-m (30 ft. lbs.).
3. Input gear race (51) in the front case.
  4. Thrust bearing (50).
  5. Input gear (49).
  6. Mainshaft thrust bearing (46) in the input gear (49).

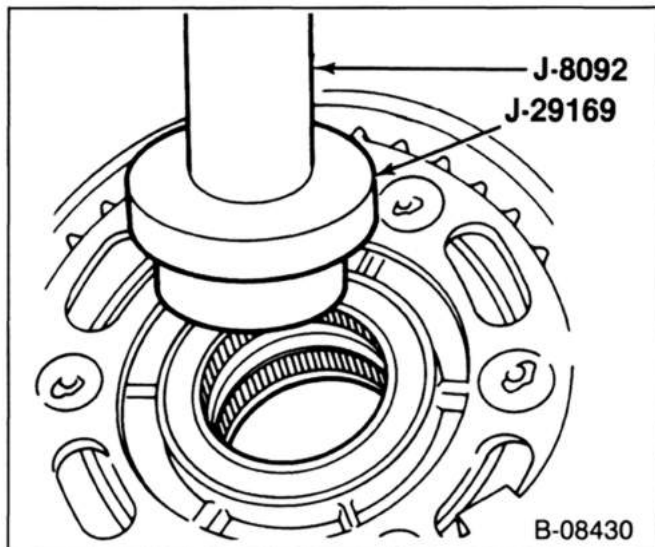


Figure 55—Input Gear Bearing Installation

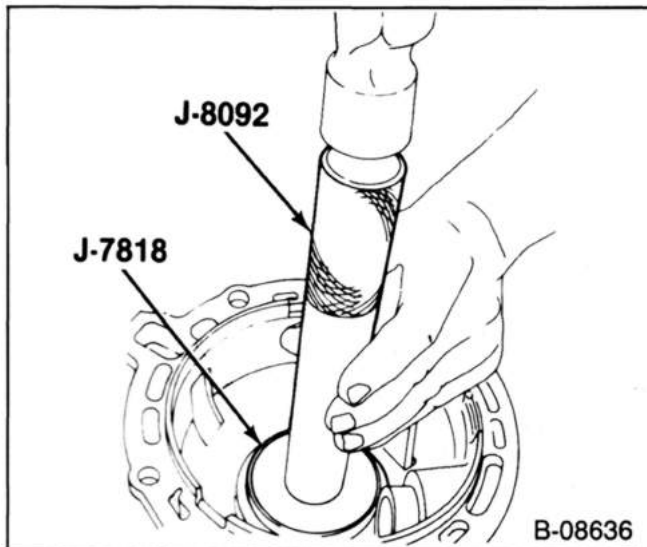


Figure 58—Rear Output Bearing Installation

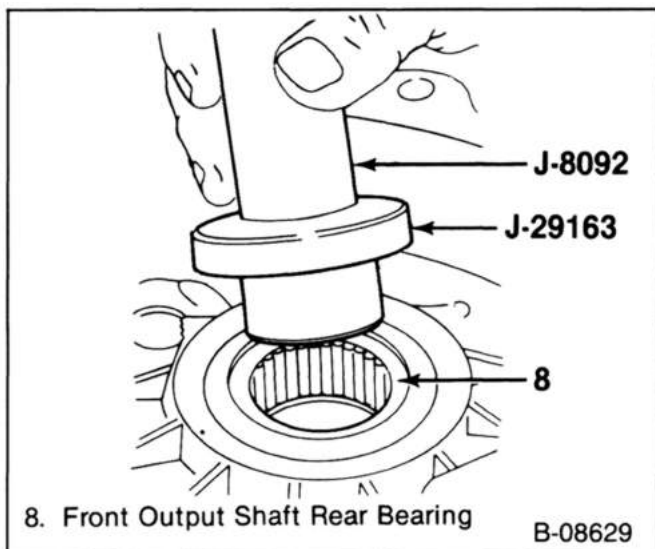


Figure 56—Front Output Shaft Rear Bearing Installation

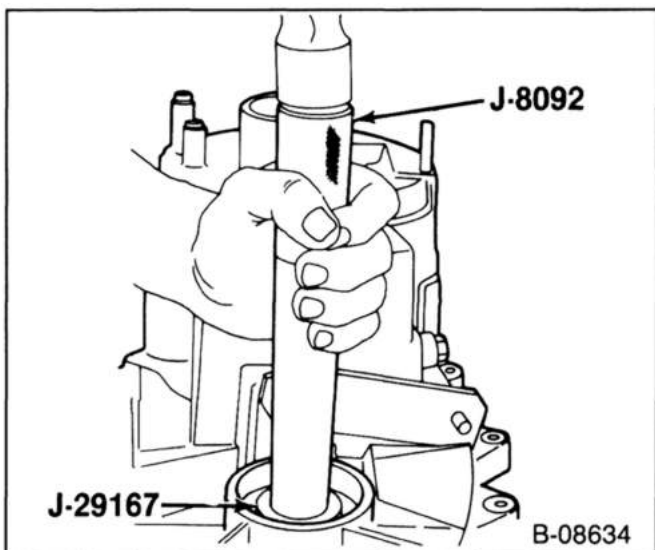


Figure 57—Front Output Shaft Front Bearing Installation

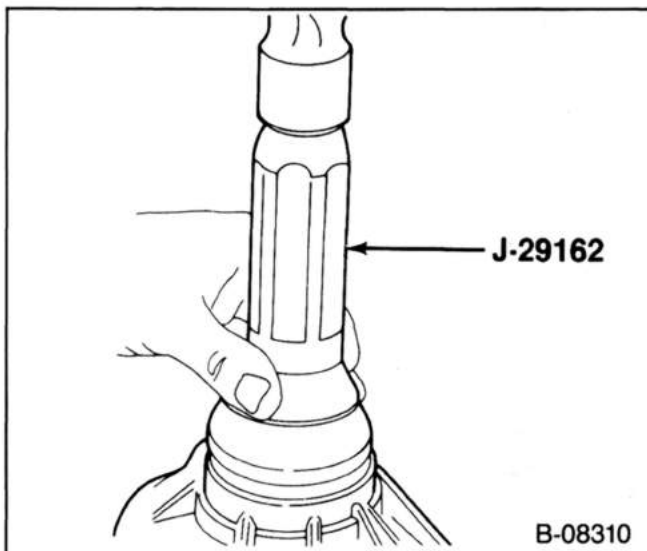


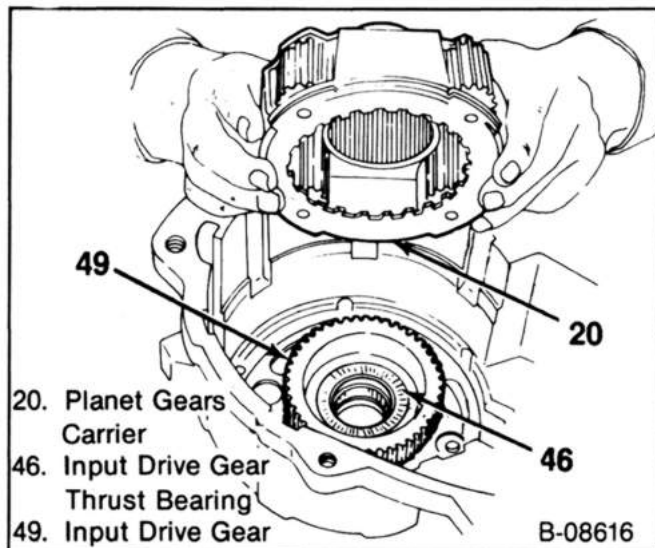
Figure 59—Rear Output Bearing Seal Installation

7. Range sector (52).
8. Range sector shaft oil seal (67).
9. Range sector shaft retainer (68).
10. Operating lever (79) on the range sector shaft.
11. Shaft washer (80).
12. Lock nut (81).



#### Tighten

- Nut to 24 N-m (18 ft. lbs.).
13. Planetary assembly (20) over the input gear (49). Be sure the planetary is fully seated and meshed with the gear.
  14. Planetary thrust washer (21) on the planetary hub (20).
  15. Pads (42, 24) in the range fork (36).
  16. Range fork (36) in the annulus gear (22).
  17. Annulus gear (22) over the planetary assembly (20). The range fork lug should be fully inserted in the range sector slot.



**Figure 60—Input Gear, Mainshaft Thrust Bearing, and Planetary Gear Installation**

18. Annulus gear retainer ring (25).
19. Shift shaft (41).
  - Align the shaft bores in the case and range fork.
  - Install the shift shaft.
20. Mainshaft (1). The mainshaft thrust bearing (46) must be properly seated in the input gear before installing the mainshaft.
21. Synchronizer (27) and the mode fork (44) as an assembly. Position the synchronizer keys before installing the synchronizer.
22. Synchronizer stop ring (30).
23. Sprocket roller spacer (31).
  - Coat the mainshaft with petroleum jelly.
24. First row of bearing rollers (32), 60 rollers in the row.
25. Sprocket roller spacer (31).
26. Second row of bearing rollers (32), 60 rollers in the row.
27. Sprocket roller spacer (31).
28. Front output shaft front thrust bearing assembly (69, 70, 71) in the front case.
  - The installation sequence is: thick race, thrust bearing, and thin race. The thick race is next to the case.
29. Front output shaft (72).
30. Sprockets (73, 33) and the drive chain as an assembly.
  - Position the sprockets in the chain.
  - Align the sprockets with the shafts.
  - Install the assembly. The drive sprocket is installed with the tooth side of the sprocket facing the case interior.
31. Drive sprocket thrust washer (34).
32. Sprocket retainer ring (35).
33. Driven sprocket retainer ring (74).
34. Front output shaft rear thrust bearing assembly (69, 70, 71) on the front output shaft.

- The sequence is thin race, thrust bearing, thick race. The thick race is next to the housing.
35. Oil pump gear (7) on the mainshaft. Be sure the recessed side of the pump faces downward toward the case interior.
  36. Speedometer drive gear (2) on the mainshaft.
  37. Magnet in the front case.
  38. Spring (39) on the shift shaft (41).
  39. Retainer (38) on the shaft shaft (41).
  40. Loctite 515 sealant, or equivalent, to the mating surface of the front case,
  41. Rear case (3) on the front case (54). The front output shaft rear thrust bearing assembly should be seated in the rear case.
  42. Case bolts (4).
    - Align the case bolt holes and alignment dowels before installing the bolts.
    - Install flat washers (17) on the two bolts (18) installed at the opposite ends of the case.



#### **Tighten**

- The bolts alternately and evenly to 31 Nm (23 ft. lbs.).

## **MAINSHAFT EXTENSION**

1. Pump seal (5).
2. Petroleum jelly to the pump housing tabs.
3. Pump housing (6) in the main shaft extension (9).
4. Loctite 515 sealant, or equivalent, to the mating surface of the main shaft extension (9).
5. Main shaft extension (9).
  - Align the extension and case index marks before installing the extension.
6. Extension bolts (14).



#### **Tighten**

- Bolts to 31 Nm (23 ft. lbs.).
7. Extension oil seal (12) in the extension bore using J-29162.
    - Coat the seal lip with petroleum jelly before installing the seal.

## **EXTERNAL COMPONENTS**

1. Washer on the indicator switch (53).
2. Indicator switch (53).



#### **Tighten**

- Switch to 24 Nm (18 ft. lbs.).
3. Loctite 515 sealant to the poppet screw (60).
  4. Range sector plunger (58), spring (59), and screw (60).



#### **Tighten**

- Screw to 31 Nm (23 ft. lbs.).
5. Drain plug and gasket.



### Tighten

- Plug to 24 Nm (18 ft. lbs.).
6. Front case output shaft oil seal (65) in the shaft bore.
  7. Front yoke seal washer (62).
  8. Front yoke (63).
  9. Yoke nut (61).



### Tighten

- Nut to 163 Nm (120 ft. lbs.).
10. 10 pints of Dexron II into the transfer case.
  11. Fill plug (15).



### Tighten

- Plug to 24 Nm (18 ft. lbs.).

## SPECIFICATIONS

### NEW PROCESS 208 TRANSFER CASE

	Nm	FT. LBS.
Lock Plate Retaining Bolt . . . . .	41	30
Range Sector Shaft Retaining Nut . . . . .	24	18
Transfer Case Bolts. . . . .	31	23
Extension Bolts. . . . .	31	23
Indicator Switch. . . . .	24	18
Poppet Screw. . . . .	31	23
Drain Plug. . . . .	24	18
Front Yoke Nut . . . . .	163	120
Fill Plug. . . . .	24	18

# SPECIAL TOOLS

J-2919-01	Slide Hammer
J-8092	Driver Handle
J-9276-2	Intermediate Gear Bearing Cup Installer
J-21359	Rear Output Shaft Bearing Retainer Seal Installer
J-22836	Front Output Shaft Bearing Retainer Seal Installer
J-22875	Rear Output Shaft Rear Bearing Installer
J-26941	Front Output Shaft Rear Bearing Remover
J-23429	Intermediate Shaft Remover and Installer
J-23431	Rear Output Shaft Housing Bearing Remover and Installer
J-23432	Snap Ring Pliers
J-29162	Extension Oil Sealer Installer
J-29163	Front Output Shaft Rear Bearing Installer
J-29167	Front Output Shaft Front Bearing Installer
J-29168	Front Output Shaft Front Bearing Remover
J-29169	Input Gear Bearing Installer
J-26170	Input Gear Front and Rear Bearing Remover
J-29369-1	Input Gear Pilot Bearing Remover
J-29369-2	Front Output Shaft Rear Bearing Remover
J-29174	Mainshaft Bearing Installer
J-33367	Bearing Cup Puller Bridge
J-33826	Rear Output Bushing Installer and Mainshaft Sprocket Bearing Remover
J-33828	Front Drive Sprocket Bearing Installer
J-33829	Pilot Bearing Installer
J-33830	Front Input Bearing Installer
J-33831	Input Seal Installer
J-33832	Front Output Rear Bearing Installer
J-33833	Output Main Bearing Installer
J-33835	Pump Housing Seal Installer
J-33839	Rear Output Bushing Remover
J-33841	Input Drive Gear Roller Bearing Remover
J-33843	Extension Housing Seal Installer

# AUTOMATIC LOCKING HUB

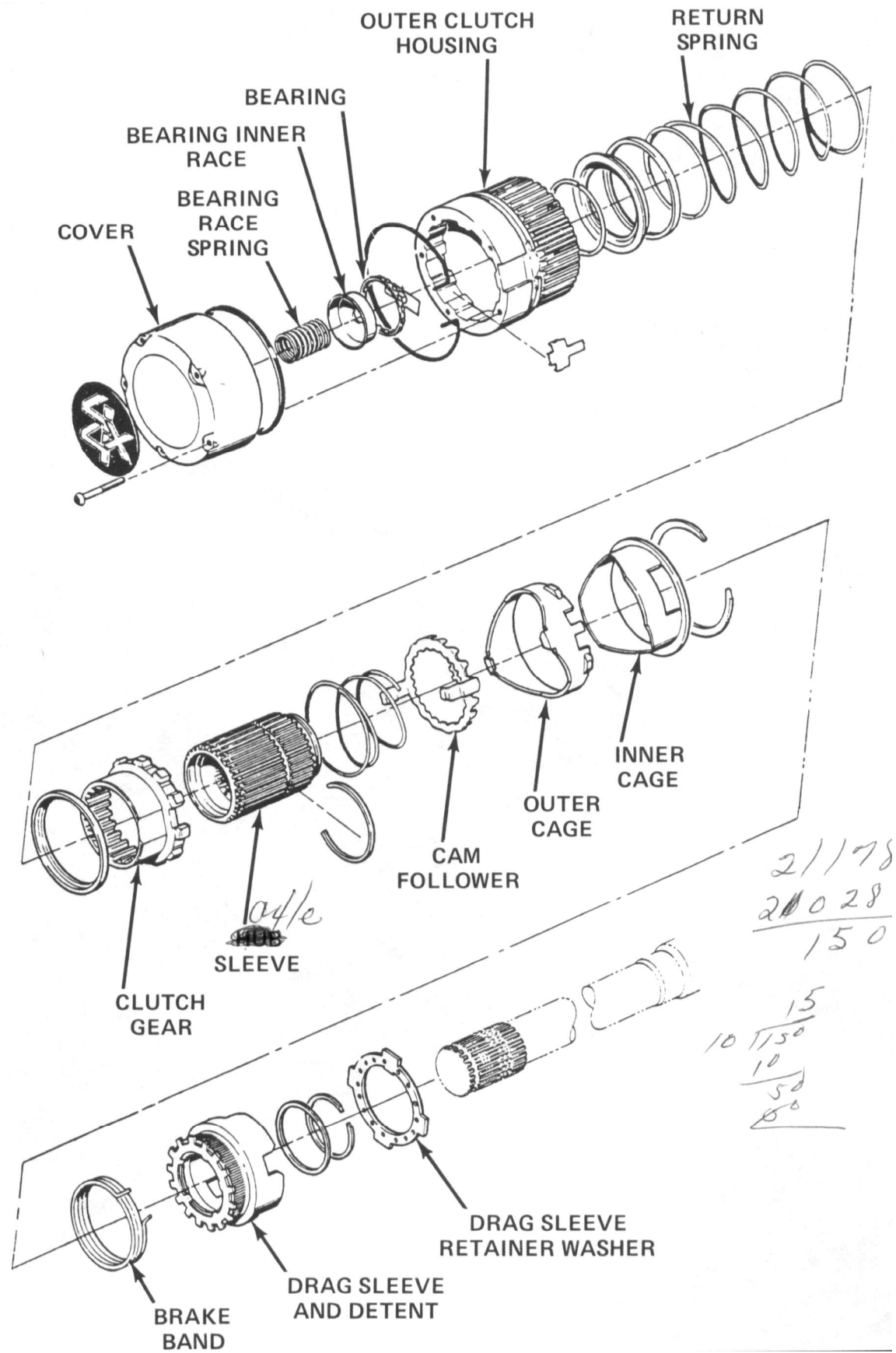


Figure 9 Automatic Locking Hub Exploded View

### DESCRIPTION

The automatic locking hub engages or disengages to lock the front axle shaft to the hub of the front wheel. Engagement occurs whenever the vehicle is operating in 4 wheel drive. engagement occurs whenever the vehicle is moved in the direction opposite and 2-wheel drive has been selected. This engagement will not occur when the vehicle is moved rearward if 4-wheel drive is selected and the hub has already been engaged.

### OPERATION

The outer clutch housing of the automatic locking hub is splined to the wheel. The hub sleeve is splined to the front axle shaft. The clutch gear is splined to the hub sleeve. Engagement occurs when the clutch gear is moved on the splines of the hub sleeve to engage the internal teeth of the outer clutch housing.

The cam surface of the steel inner cage forces the cam follower around the clutch gear to move outward toward the cover and into engagement with the clutch teeth of the outer clutch housing. A lug on the inside of the drag sleeve retainer washer keys the washer to the axle and two lock nuts retain this washer in position on the axle.

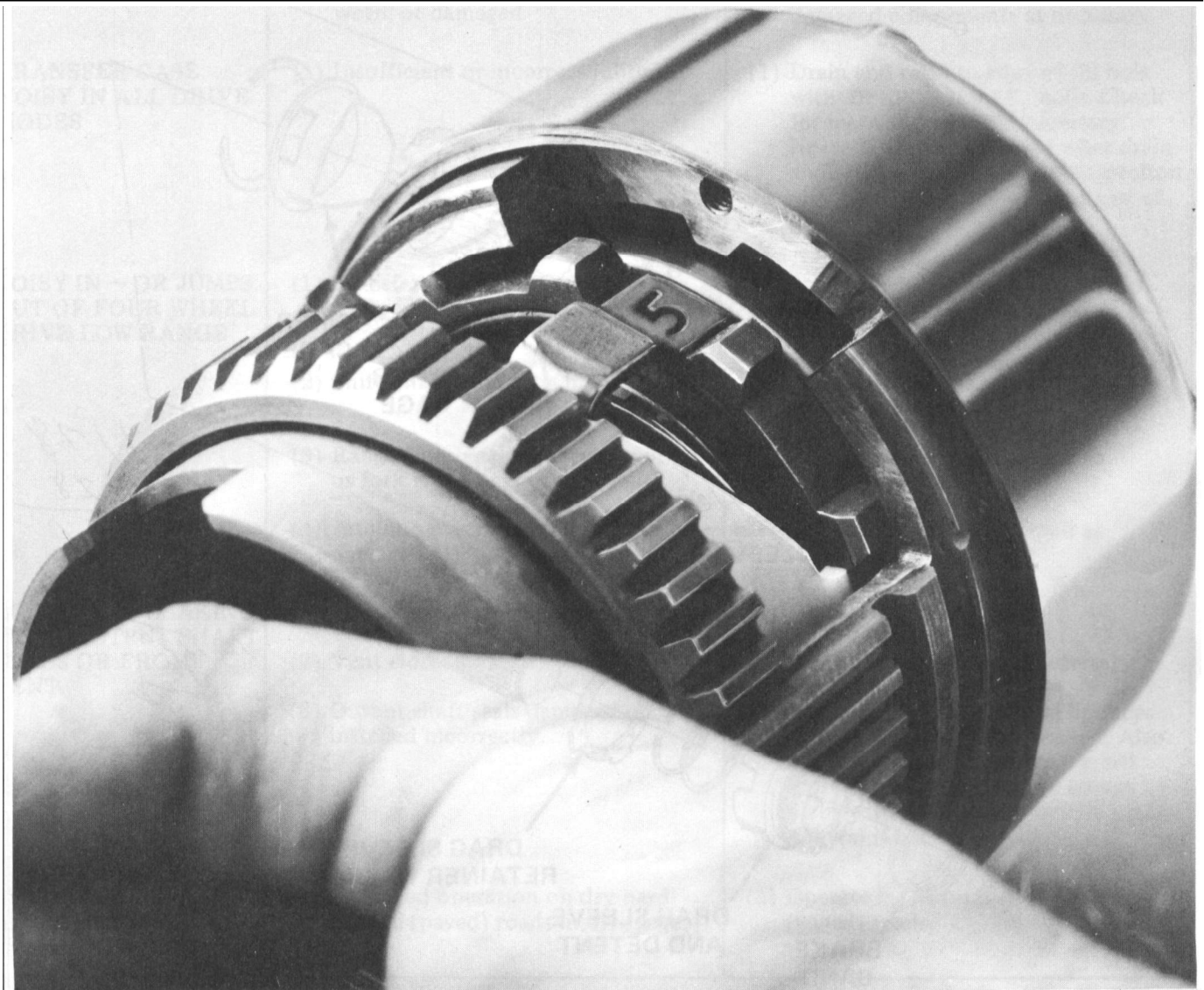


Figure 10 Hub-Free Position



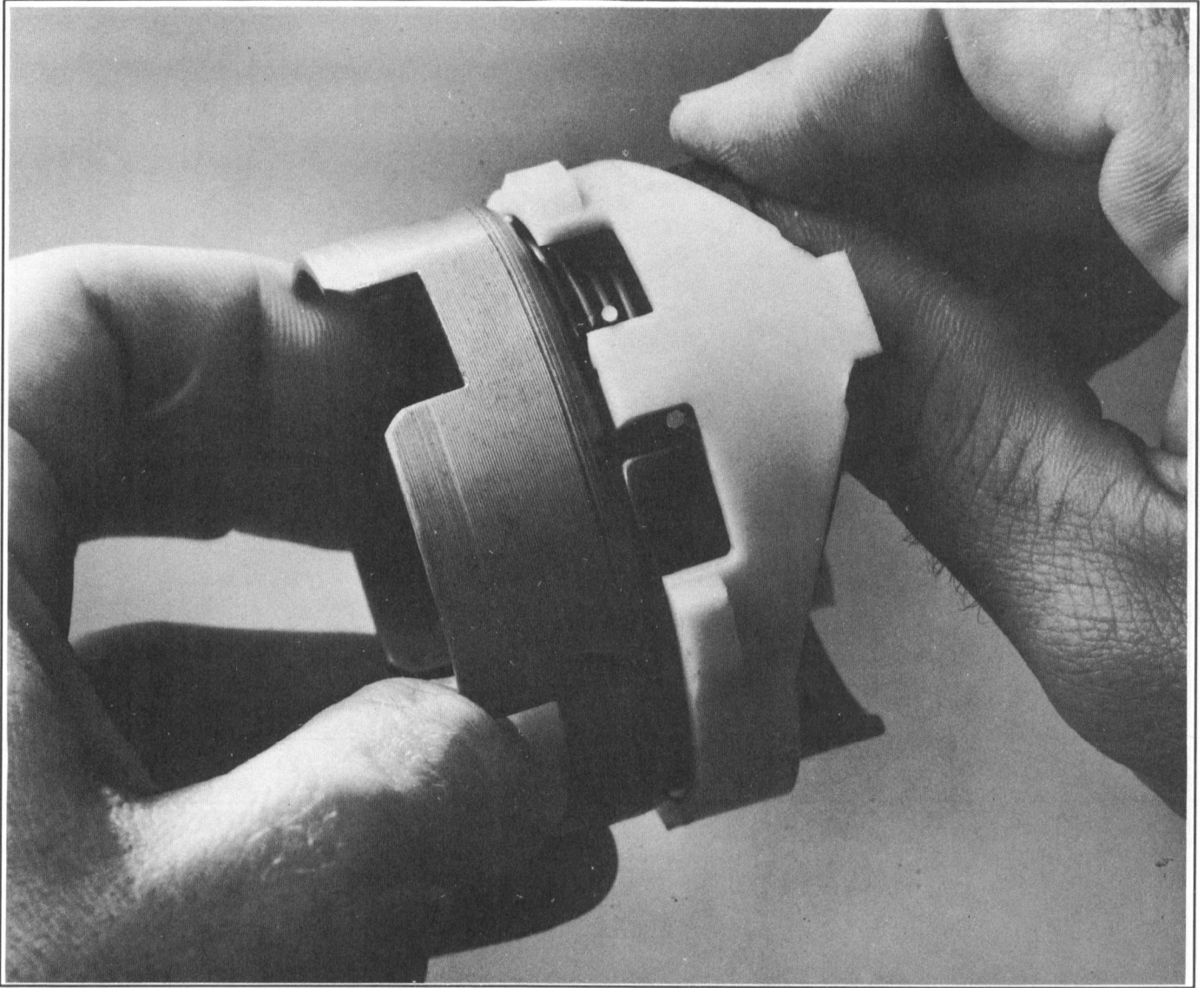


Figure 11 Hub Brake-Locking

Cut-outs in the drag sleeve engage the four tabs on the drag sleeve retainer washer to hold the drag sleeve in a fixed position with respect to the spindle. A one-way clutch spring called the brake band is positioned over the serrated portion of the drag sleeve.

Engagement is accomplished when 4-wheel drive is selected. The movement of the drag sleeve causing one of the tangs of the brake band to engage the steel outer cage and rotate the cam will cause the cam ramp to move the clutch gear into mesh with the outer clutch housing. Illus. # 12 & # 13. One of the tangs of the brake band is used to engage forward when the vehicle is moving forward the other tang is used to engage reverse when the vehicle is moving rearward.

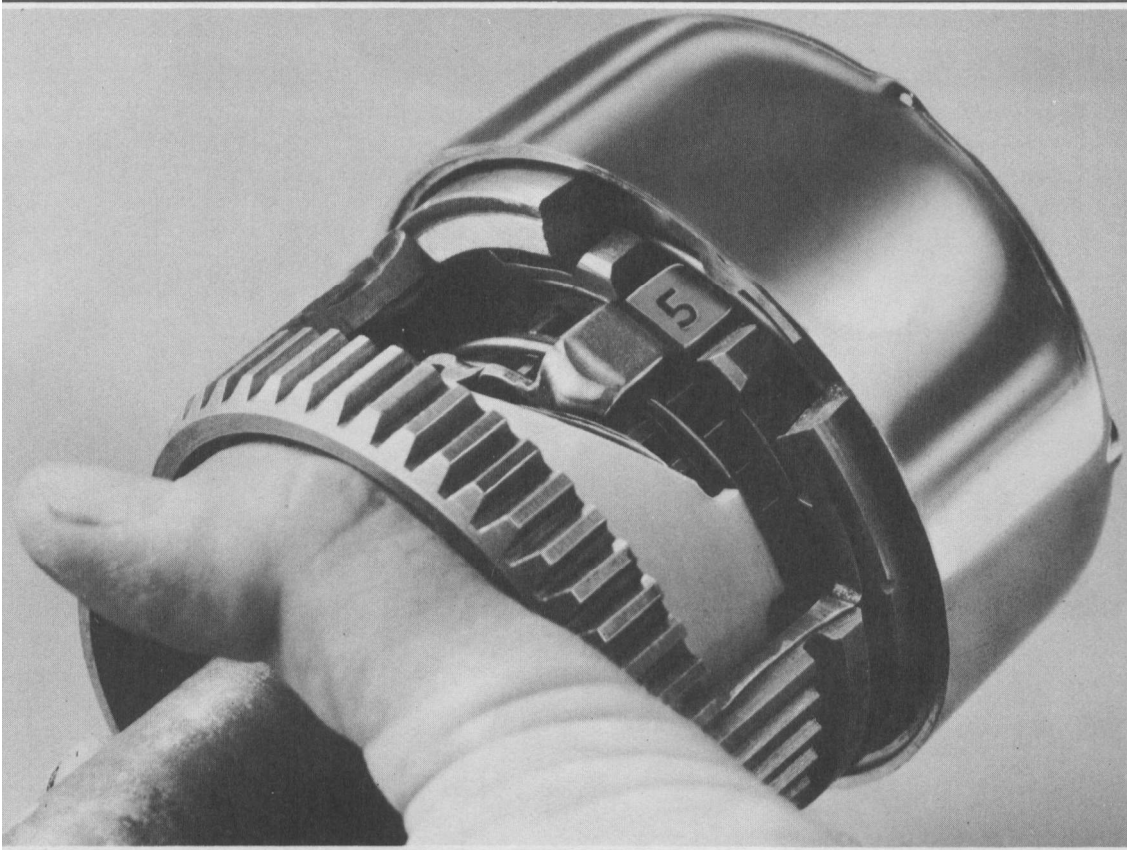


Figure 12 Hub Engaging

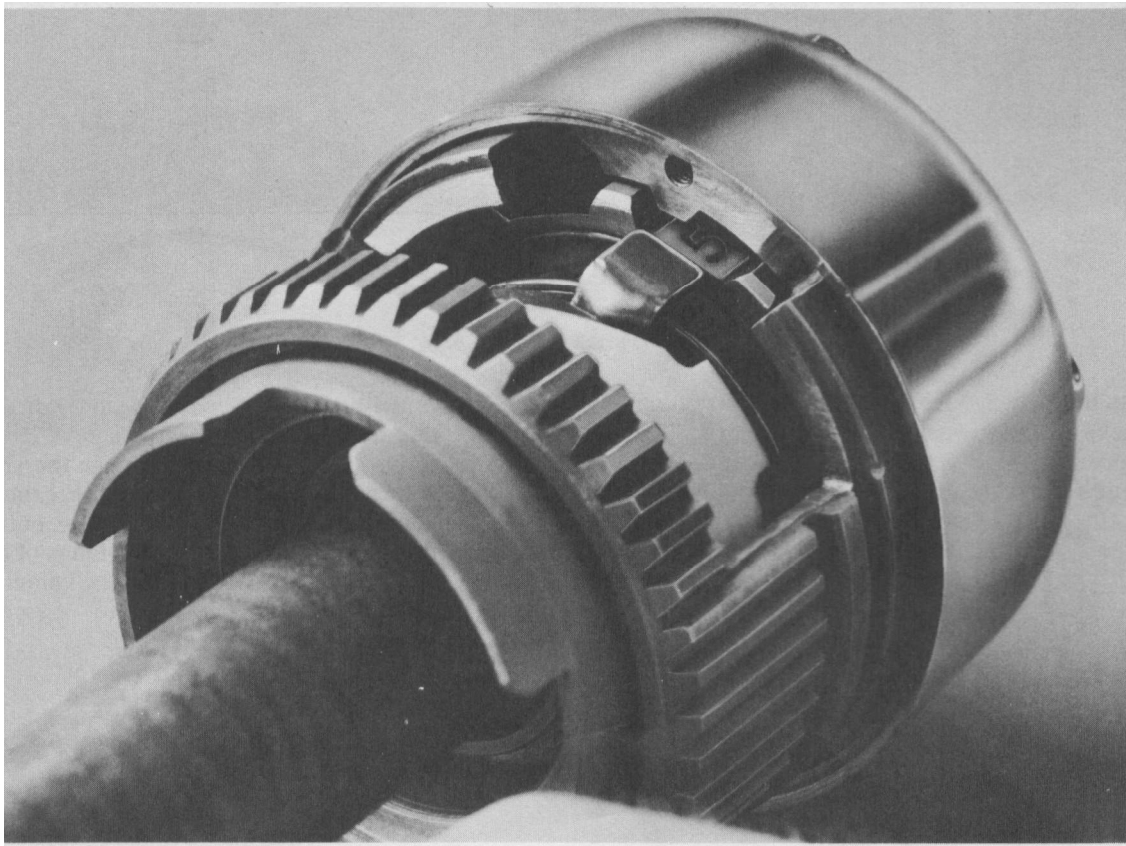


Figure 13 Hub Locked

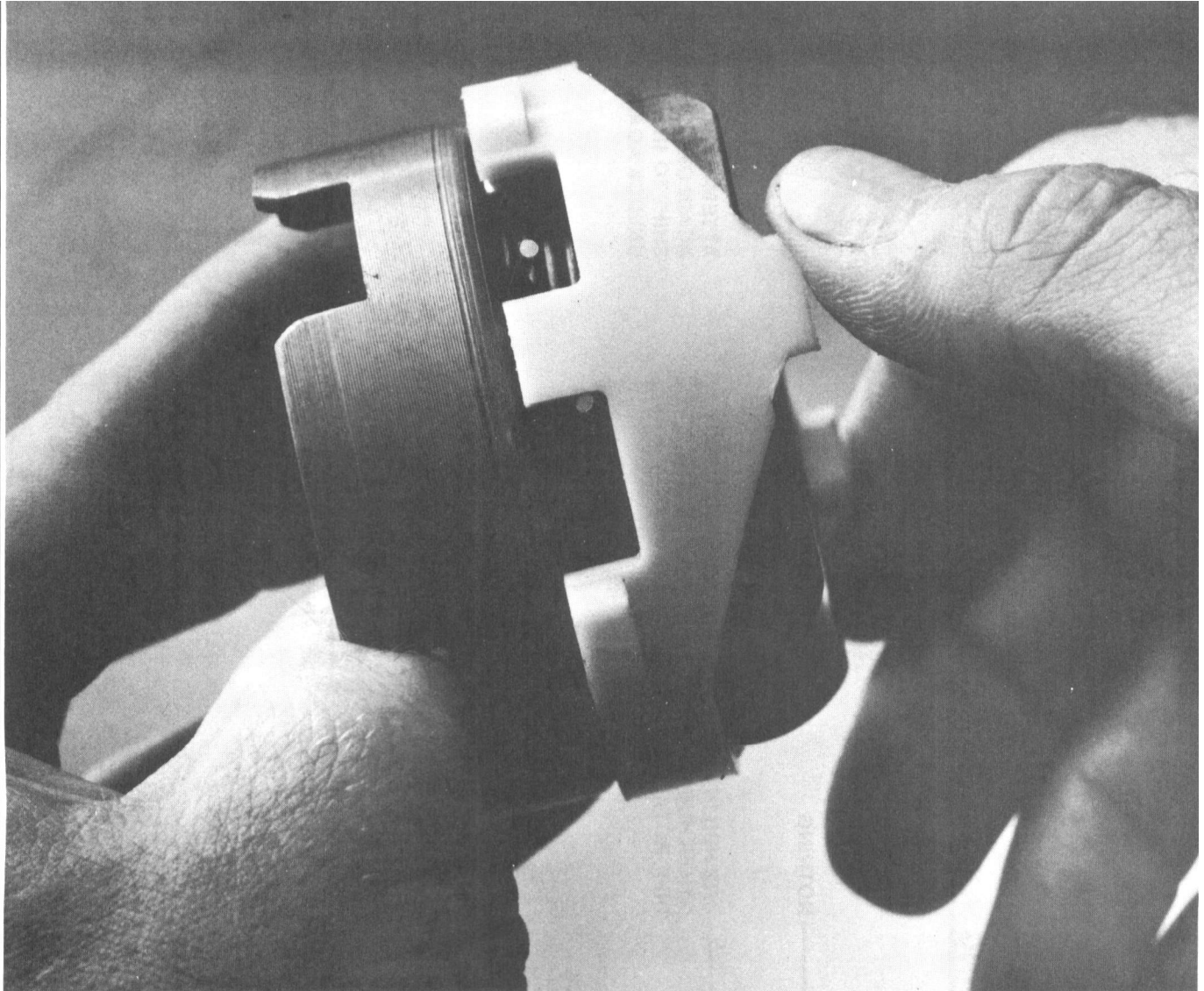


Figure 1 Brake Spring Unlocking

Disengagement is accomplished when 2-wheel drive has been selected by the reverse movement of the wheel causing the clutch gear, hub sleeve, and cam follower to rotate. The cam follower moves against the lugs of the plastic outer cage, causing the cage to rotate and move to the disengaged condition. The release spring then moves the clutch gear out of mesh with the outer clutch housing to disengage the wheel from the axle shaft.

**TROUBLESHOOTING GM AUTO-LOCKING HUB DISENGAGEMENT**

<u>ACTION</u>	<u>CAUSE</u>	<u>EFFECT</u>	<u>RESULT</u>	<u>CURE</u>
<u>BOTH HUBS UNLOCK</u>	NORMAL	NO MALFUNCTION		
<u>ONE HUB UNLOCKS</u>	<u>MALFUNCTION</u>	ONE HUB IN DETENT, OTHER HUB ENGAGED, DIFF. ROTATES 1/2 SPEED	NOTHING OBVIOUS, POSSIBLE DIFF. DAMAGE (?)	ATTEMPT UNLOCK AGAIN OR SHIFT TO 4H UNLOCK AGAIN
<u>ONE HUB UNLOCKS</u>	<u>IN TIGHT TURN</u> STOP VEHICLE BEFORE SUFFICIENT TRAVEL TO UNLOCK BOTH			
	VERY HIGH VISCOUS DRAG IN DIFF. BACKWARDS THRU DIFF.	ONE HUB ENGAGED OTHER HUB DRIVEN	REPEATED THUMPING AT LOW SPEED, POSS. HUB DAMAGE	THIN AXLE OIL, TOO LOW PINION PRELOAD
<u>NEITHER HUB UNLOCKS-</u>	<u>COLD AXLE OIL</u> WILL UNLOCK ON WARMUP	AXLE (DIFF) ROTATES	INCREASED FUEL CONSUMPTION WHILE HUBS LOCKED	THIN AXLE OIL, TOO LOW PINION PRELOAD

Figure 15 Hub Diagnosis



1981-83 PART TIME TRANSFER CASE (NEW PROCESS 208)

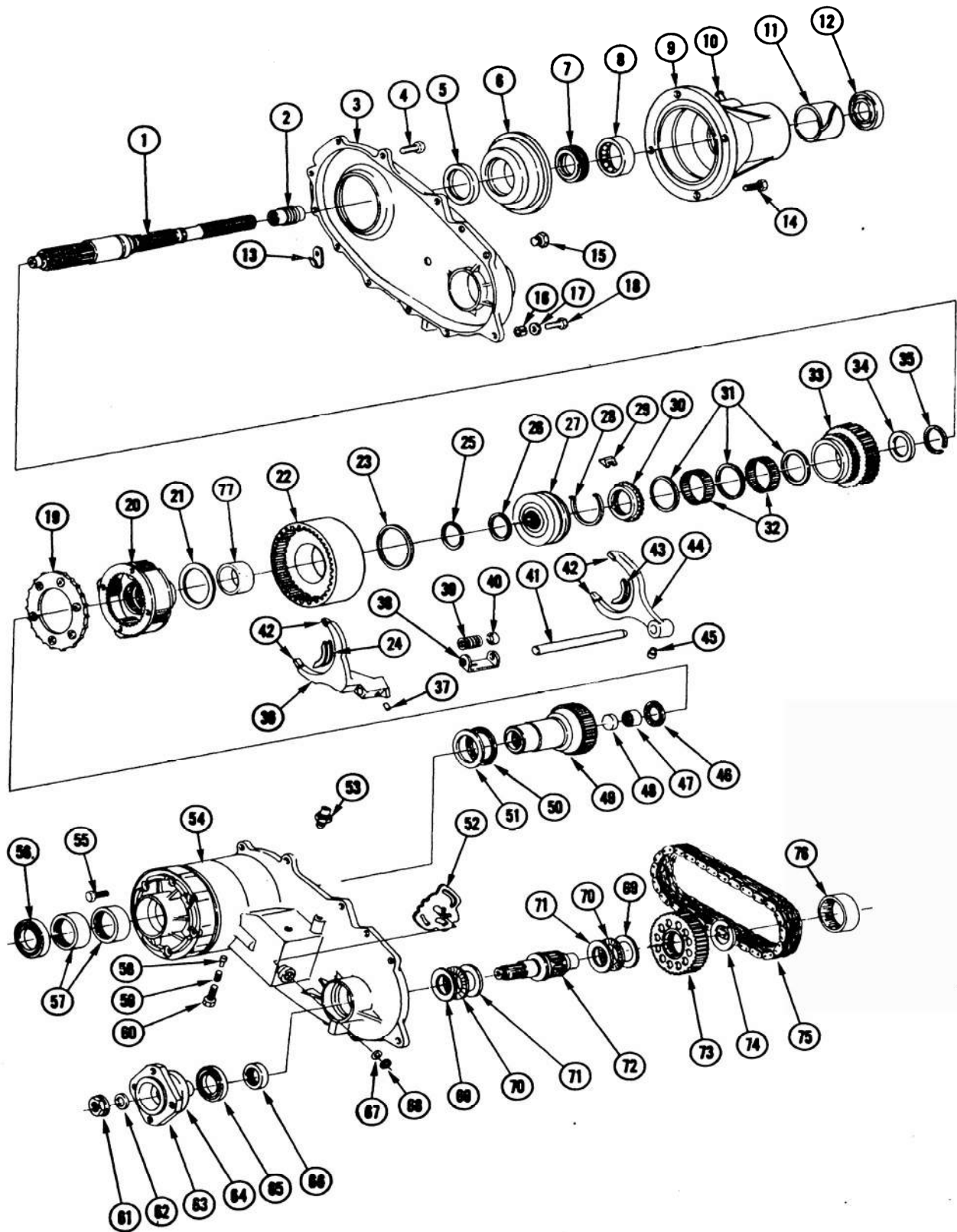


Figure 16 Parts Blowup

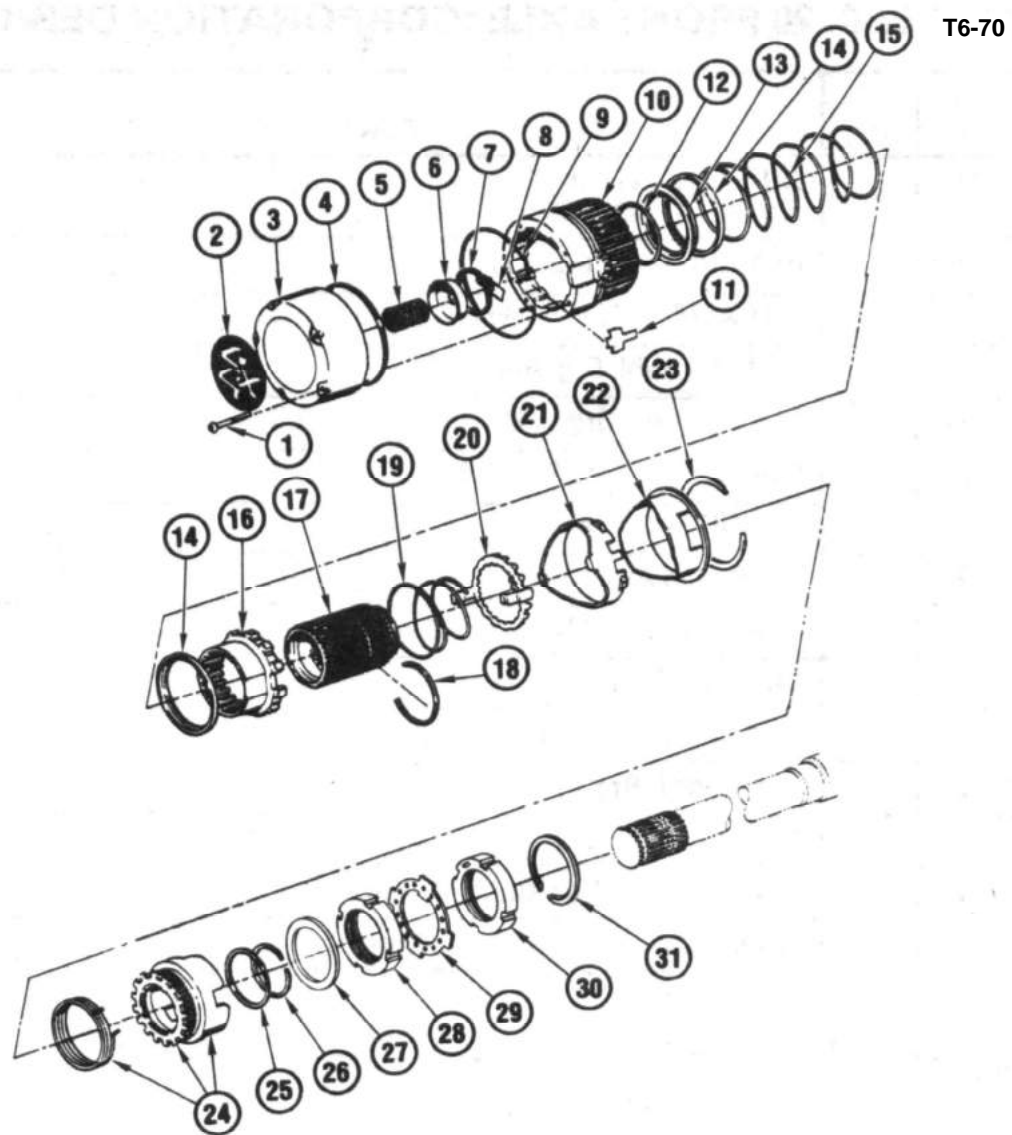
### 1981-83 PART TIME TRANSFER CASE (NEW PROCESS 208)

ILL. No.	Group No.	Part No.	Per Car	Qty.	Description	Price Each	Price Ext.
1	4.530	14037969	1		SHAFT, Main Drive		
2	4.343 4.343	14037996 14037997	1 1		GEAR, Speedo Drive (18 Teeth) (Blue) GEAR, Speedo Drive (15 Teeth) (Gray)		
3	4.510	14037983	1		HOUSING (Rear Half) (Includes #76)		
4	8.900	11500930	9		BOLT, Hex (M10 x 1.5 x 30)		
5	4.512	14095611	1		SEAL, Oil Pump Housing Seal (Included w/Item 6)		
6	4.512	14037989	1		HOUSING, Oil Pump (Includes #5)		
7	4.530	376176	1		GEAR, Oil Pump		
8	4.520	9439608	1		BEARING, Main Shaft		
9	4.530	14037990	1		EXTENSION, Main Shaft (Includes #11)		
10	4.510	360824	1		CONNECTOR, Vent Hose		
11	4.520	3978765	1		BUSHING, Main Shaft Ext (Included w/Item 9)(4.319)		
12	4.515	8625893	1		SEAL, Main Shaft Ext. (4.318)		
13	4.563	14037985	1		CLIP, Indicator Switch Wire		
14	8.900	11503428	4		BOLT, Hex (M10 x 1.5 x 27)		
15	4.510	14037987	2		PLUG, Oil Fill & Drain		
16	4.510	14037948	2		DOWEL, Alignment		
17	4.510	14037984	2		WASHER, Housing Alignment Dowel		
18	4.510	14060030	2		BOLT, Housing Alignment Dowel (0.0291)		
19	4.555	14037949	1		PLATE, Low Range Lock		
20	4.532	14037950	1		CARRIER, W/Planet Gears		
21	4.520	14095678	1		WASHER, Planet Gear Thrust		
22	4.535	14095676	1		GEAR ASM, Planet Carrier Annulus		
23	4.535	14095677	1		WASHER, Annulus Gear Thrust		
24	4.555	14095680	1		PAD, Range Fork Center (Included w/Item 36)		
25	4.525	335069	1		RING, Annulus Gear Asm Retaining		
26	4.538	14037974	1		RING, Syn Retaining		
27	4.538	14037970	1		SYNCHRONIZER, Main Shaft (Includes #28 & 29)		
28	4.538	14037973	2		SPRING, Syn Strut (Included w/Item 27)		
29	4.538	14037972	3		STRUT, Syn Shift (Included w/Item 27)		
30	4.538	14037971	1		RING, Syn Stop		
31	4.535	14037976	3		SPACER, Sprocket Roller		
32	4.535	9434069	120		ROLLER, Sprocket		
33	4.535	14095623	1		SPROCKET, Chain Drive		
34	4.535	14037977	1		WASHER, Drive Sprocket Thrust		
35	4.535	14037978	1		RING, Drive Sprocket Retaining		
36	4.555	14095679	1		FORK, Range (Includes #24, 37 & 42)		
37	4.555	14037961	1		PIN, Range Fork Shift		
38	4.555	14037962	1		RETAINER, Mode Fork & Spring		
39	4.555	14037968	1		SPRING, Mode Fork Shifter		
40	4.555	14037967	1		CUP, Mode Fork Spring		
41	4.555	14037959	1		SHAFT, Shifter Fork		
42	4.555	14037966	4		PAD, Fork End (Included w/Items 36 & 44)		

### 1981-83 PART TIME TRANSFER CASE (NEW PROCESS 208)

ILL. No.	Group No.	Part No.	Per Car	Qty.	Description	Price Each	Price Ext.
43	4.555	14037965	1		PAD, Mode Fork Center (Included w/Item 44)		
44	4.555	14037963	1		FORK, Mode (Includes #42, 43 & 45)		
45	4.555	14037964	1		PIN, Mode Fork Shifter (Included w/Item 44)		
46	4.520	9424093	1		BEARING, Input Drive Gear Thrust		
47	4.520	9421004	1		BEARING, Input Drive Gear Pilot		
48	8.970	25513256	1		PLUG, Cup Blk. Holes		
49	4.535	14037994	1		GEAR, Input Drive (27 Teeth) (w/A.T. MV4)		
	4.535	14037995	1		GEAR, Input Drive (32 Teeth) (Exc. A.T. MV4)		
50	4.520	9439594	1		BEARING, Input Drive Gear Thrust		
51	4.520	9439592	1		WASHER, Input Drive Gear Thrust		
52	4.555	14037957	1		SECTOR, w/Shaft, Range		
53	4.563	14037986	1		SWITCH, Indicator Lite		
54	4.510	14037947	1		HOUSING (Front Half) (Includes #56, 57, 65 & 66)		
55	4.555	14015306	6		BOLT, Low Range Lk Plt		
56	4.515	14095609	1		SEAL, Input Drive Gear (Included w/Item 54)		
57	4.520	9439593	2		BEARING, Input Drive Gear (Included w/Item 54)		
58	4.555	14037956	1		PLUNGER, Range Sector		
59	4.557	3967886	1		SPRING, Poppet Screw		
60	4.557	14095597	1		SCREW, Range Sector Poppet		
61	4.530	14037991	1		NUT, Front Output Yoke		
62	4.525	6259149	1		WASHER, Front Output Yoke (4.176)		
63	5.555	14037992	1		YOKE, Front Output (Includes #641)		
64	5.555	14037993	1		DEFLECTOR, Front Output Yoke (Included w/Item 63)		
65	4.515	14095610	1		SEAL, Front Output Shaft (Included w/Item 54)		
66	4.520	189825	1		BEARING, Front Output Shaft (Included w/Item 54)		
67	4.555	14095598	1		SEAL, Range Sector Shaft Oil		
68	4.555	14037958	1		RETAINER, Sector & Shaft		
69	4.520	9439591	2		WASHER, Front Output Shaft Thrust Outer		
70	4.520	9421006	2		BEARING, Front Output Shaft Thrust		
71	4.520	9436055	2		WASHER, Front Output Shaft Thrust Inner		
72	4.530	14037979	1		SHAFT, Front Output		
73	4.535	14037980	1		SPROCKET, Chain Driven		
74	4.535	14037981	1		RING, Driven Sprocket Retaining		
75	4.535	14037982	1		CHAIN, Drive		
76	4.520	189824	1		BEARING, Front Output Shaft Pilot (Included w/Item 3)		
77	4.520	14044937	1		BUSHING, Annulus Gear Hub		

1981-83 K10, K20 1982-83 K30 AUTO-LOCKING HUB





## 1981-83 K10, K20/ 1982-83 K30 AUTO-LOCKING HUB

ILL No	Group No.	Part No.	Per Car	Description	Price Each	Price Ext.
1	6.310	14050624	10	SCREW, Housing Mounting		
2	6.310	14039200	2	INSERT, Housing		
3	6.310	14038037	2	HOUSING, Lock (Incl. #2) (K10,K20)		
	6.310	14038038	2	HOUSING, Lock (Incl. #2) (K30)		
4	6.310	14038036	2	SEAL, Lock Housing Ring (K10,K20)		
	6.310	14038039	2	SEAL, Lock Housing Ring (K30)		
5	6.310	14038041	2	SPRING, Shaft Bearing Race		
6	NS	-	2	RACE, Shaft Sleeve Bearing (Incl. w/#7)		
7	6.310	14095595	2	BEARING, Shaft Sleeve (Incl. #7 & 8)		
8	NS	-	2	RETAINER, Shaft Sleeve Bearing (Incl. w/#7)		
9	6.310	14038033	2	RING, Clutch Gear Retaining (K10,K20)		
	6.310	14058969	2	RING, Clutch Gear Retaining (K30)		
10	6.310	14038031	2	GEAR, Clutch (K10,K20)		
	6.310	14038032	2	GEAR, Clutch (K30)		
11	6.310	14038034	2	KEEPER, Clutch Gear Retaining Ring (K10,K20)		
	6.310	14038035	2	KEEPER, Clutch Gear Retaining Ring (K30)		
12	6.310	14038029	2	RING, Return Spring Plate Retaining		
13	6.310	14038028	2	PLATE, Return Spring Retaining		
14	6.310	14038027	2	RETAINER, Clutch Gear Return Spring		
15	6.310	14038026	2	SPRING, Clutch Gear Return		
16	6.310	14038022	2	GEAR, Sliding Clutch		
17	6.310	14038024	2	SLEEVE, Axle Shaft (K10,K20)		
	6.310	14038025	2	SLEEVE, Axle Shaft (K30)		
18	6.310	14038030	2	RING, Clutch Gear Stop		
19	6.310	14038023	2	SPRING, Slidign Clutch Gear Engaging		
20	6.310	14038021	2	CAM, Lock Actuating		
21	6.310	14038042	2	CAGE, Cam Outer		
22	6.310	14038043	2	CAGE, Cam Inner		
23	6.310	14038044	2	RING, Cam Cage Retaining		
24	6.310	14067637	2	SLEEVE ASM., Drag, w/Brake Band (K10,K20)		
	6.310	14067638	2	SLEEVE ASM., Drag, w/Brake Band (K30)		
25	6.310	14038047	2	SPACER, Drag Sleeve		
26	6.310	14095596	2	RING, Drag Sleeve Retaining		
27	6.022	14026798	2	WASHER, Outer Shaft Thrust (K10,K20)		
	6.022	14050680	2	RETAINER, Shaft Thrust Washer (K30)		
28	6.022	14034413	2	NUT, Front Wheel Bearing Adjust (K10,K20)		
	6.022	14050679	2	NUT, Front Wheel Bearing Adjust (K30)		
29	6.022	14026772	2	LOCK, Wheel Bearing Adjust Nut (K10,K20)		
	6.022	14038051	2	LOCK, Wheel Bearing Adjust Nut (K30)		
30	6.022	14034410	2	NUT, w/Pin, Front Wheel Bearing Adjust (K10,K20)		
	6.022	14050681	2	NUT, w/Pin, Front Wheel Bearing Adj. (K30)		
31	8.934	274932	2	RING, Ext. Ret. Type T (1 1/4" Dia. Shaft) (K10,K20)		
	6.308	464141	2	RING, Drive Gear Retaining (K30)		



