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## Technical Service Information

# INTRODUCTION NEW PROCESS 231 - 241

With more 4 wheel drive vehicles coming into our shops, the need for information on transfer cases has increased. Mike Weinberg of Rockland Standard Gear has gathered information on various types and model transfer cases that are most common. This series of booklets cover the general information, operation, tear down, and assembly of these units. And in most cases a parts breakdown is shown which helps in ordering replacement parts.

*We thank New Process for the information and illustrations that made this booklet possible*

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# 231 - 241

## GENERAL INFORMATION

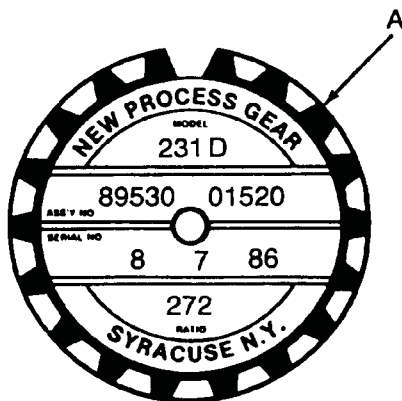
### DESCRIPTION

The NP231 and NP241 are part-time transfer cases with a built-in low range reduction gear system. They have three operating ranges plus a Neutral position. The low range system provides a low range reduction ratio for increased low speed torque capability.

### IDENTIFICATION

A circular ID tag is attached to the rear case of each transfer case. The ID tag (A) provides the transfer case model number, assembly number, serial number and low range ratio.

The transfer case serial number also represents the date of build. For example, a serial number of 8-7-86 would represent August 7, 1986.

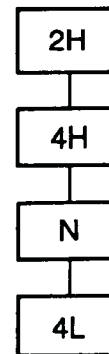


### OPERATING RANGES

The transfer cases have three operating ranges which are: two-wheel drive high, four-wheel drive high and four-wheel drive low. The four-wheel drive operating ranges are undifferentiated.

Two-wheel drive range is used for on-road, high-way operation. The four-wheel drive ranges are for off-road operation or when the vehicle is driven on paved road surfaces covered by snow, ice or similar low traction elements.

A synchronizer assembly in the transfer case allows the unit to be shifted between the two- and four-wheel high ranges while the vehicle is in motion.



### TWO-WHEEL DRIVE OPERATION

Two-wheel drive operation is provided by a disconnect mechanism in the front axle and a synchronizer assembly in the transfer case that disconnects the front output shaft. A vacuum operated shift motor on the axle disconnects an axle shaft when two-wheel drive range is selected. The axle shift motor is controlled by a vacuum switch that is actuated by the transfer case.

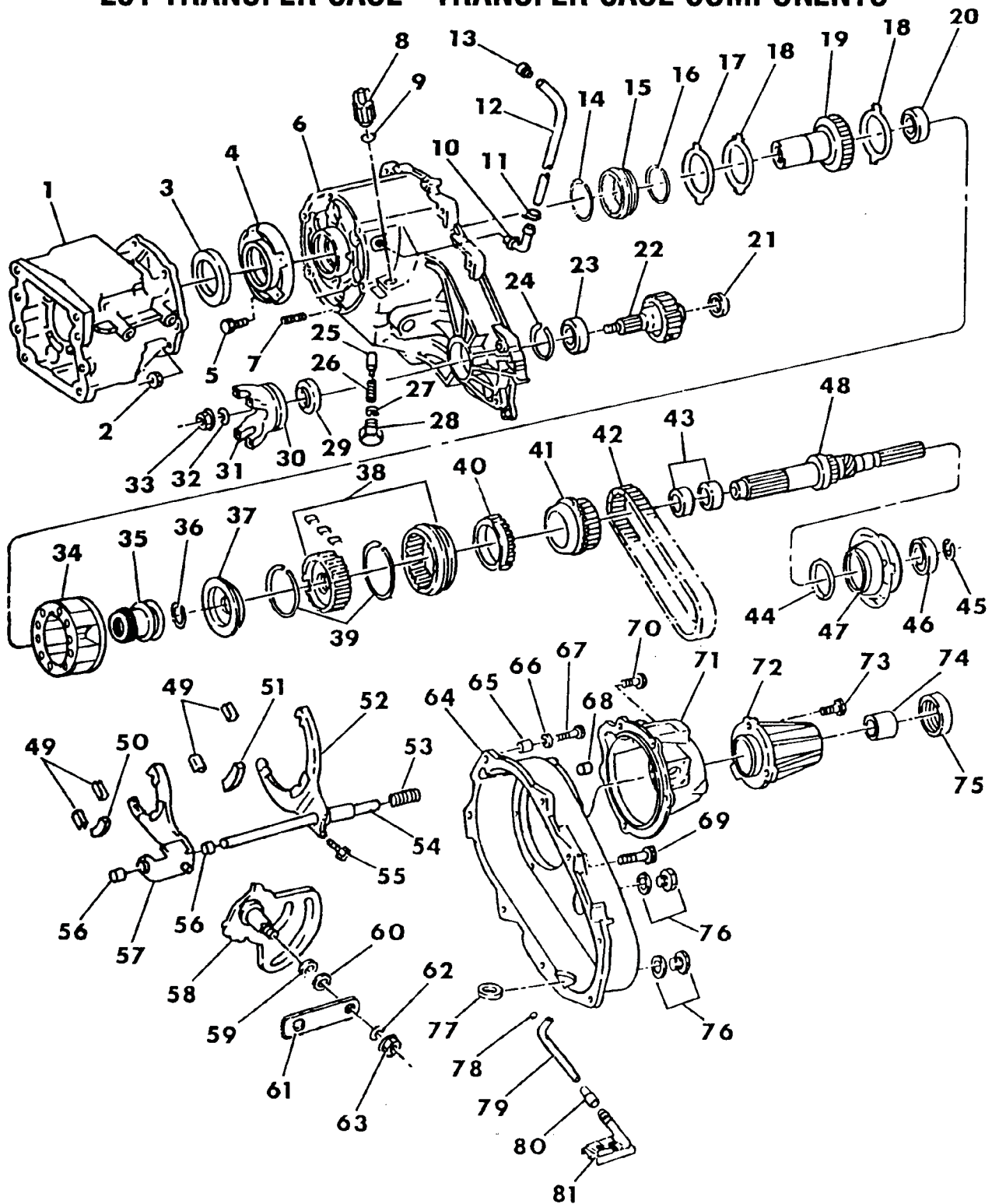
### FOUR-WHEEL DRIVE OPERATION

Two internal mechanisms provide four-wheel drive operation. A vacuum shift motor connects the front axle shaft and a synchronizer assembly engages the transfer case front output shaft. The shift motor is operated by a vacuum switch mounted on the transfer case. Vacuum switch location on 231/241 transfer cases vary with model application. This difference affects the sequence of operation of the Jeep Command Trac and Dodge Ram Trac axle disconnect vacuum systems.

The vacuum switch is front mounted and operated by the movement of the shift lever sector plate on YJ and D-Body.

The vacuum switch is rear mounted and operated by the movement of the shift rail on XJ/MJ and N-Body.

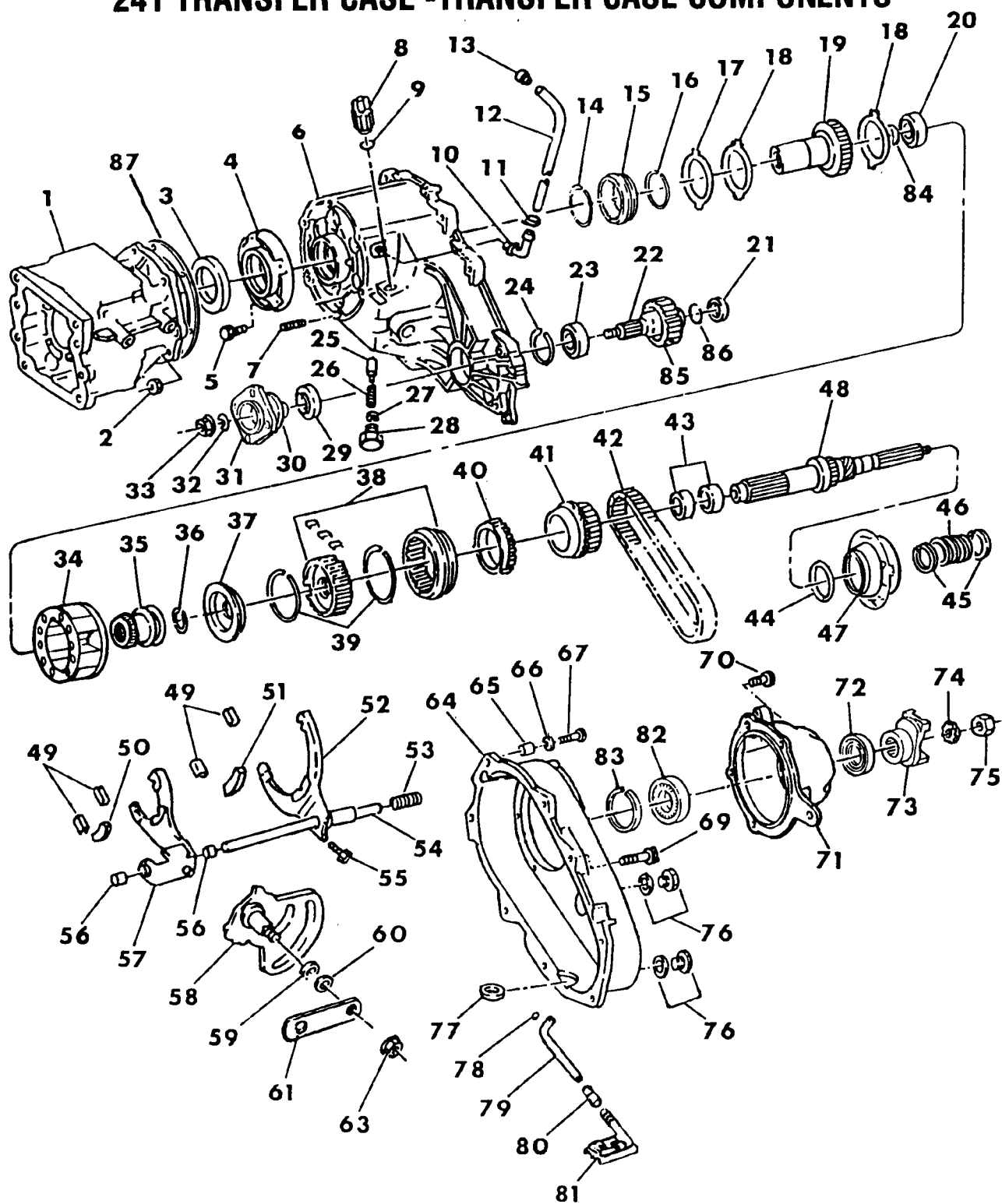
## 231 TRANSFER CASE - TRANSFER CASE COMPONENTS



## 231 TRANSFER CASE -TRANSFER CASE COMPONENTS

1. Adapter, with manual trans.
2. Lock nut
3. Front retainer seal
4. Front bearing retainer
5. Front bearing retainer screw
6. Front case assembly
7. Case stud
8. Vacuum switch
9. Vacuum switch O-ring
10. Vent
11. Vent hose clamp
12. Vent hose
13. Vent hose end cap
14. Input bearing snap ring
15. Input gear bearing
16. Input gear snap ring
17. Input gear retainer
18. Input gear thrust washer
19. Input gear
20. Input gear needle bearing
21. Front output shaft, rear bearing
22. Front output shaft
23. Front output shaft, front bearing
24. Front output shaft, front bearing snap ring
25. Shift detent plunger
26. Shift detent plunger, spring
27. O-ring seal
28. Shift detent plug
29. Yoke seal
30. Yoke oil slinger
31. Front output shaft yoke
32. Yoke washer
33. Yoke nut
34. Low range gear
35. Range fork shift hub
36. Synchronizer hub, snap ring
37. Strut spring retaining plate
38. Synchronizer assembly
39. Synchronizer springs, front and rear
40. Synchronizer stop ring
41. Drive chain sprocket
42. Drive chain
43. Drive sprocket bearing
44. Oil pump seal
45. Mainshaft bearing snap ring
46. Mainshaft, rear bearing
47. Oil pump assembly
48. Transfer case mainshaft
49. Shift fork pads
50. Range fork, center pad
51. Mode fork, center pad
52. Shift mode fork
53. Shift rail spring
54. Shift rail
55. Mode fork pin
56. Range fork bushings
57. Range fork assembly
58. Shift sector
59. Sector O-ring seal
60. Sector O-ring retainer
61. Shift lever, w/grommet
62. Range lever washer
63. Range lever, nut
64. Rear case
65. Case alignment dowels
66. Dowel bolt washer
67. Dowel bolt
68. Shift rail retainer bushing
69. Case bolt
70. Rear retainer screw
71. Rear retainer
72. Rear extension assembly
73. Extension screw
74. Rear extension bushing
75. Rear extension, oil seal
76. Plug and washer
77. Magnet
78. Pick-up tube, O-ring seal
79. Oil pick-up tube
80. Tube connector
81. Oil pick-up screen

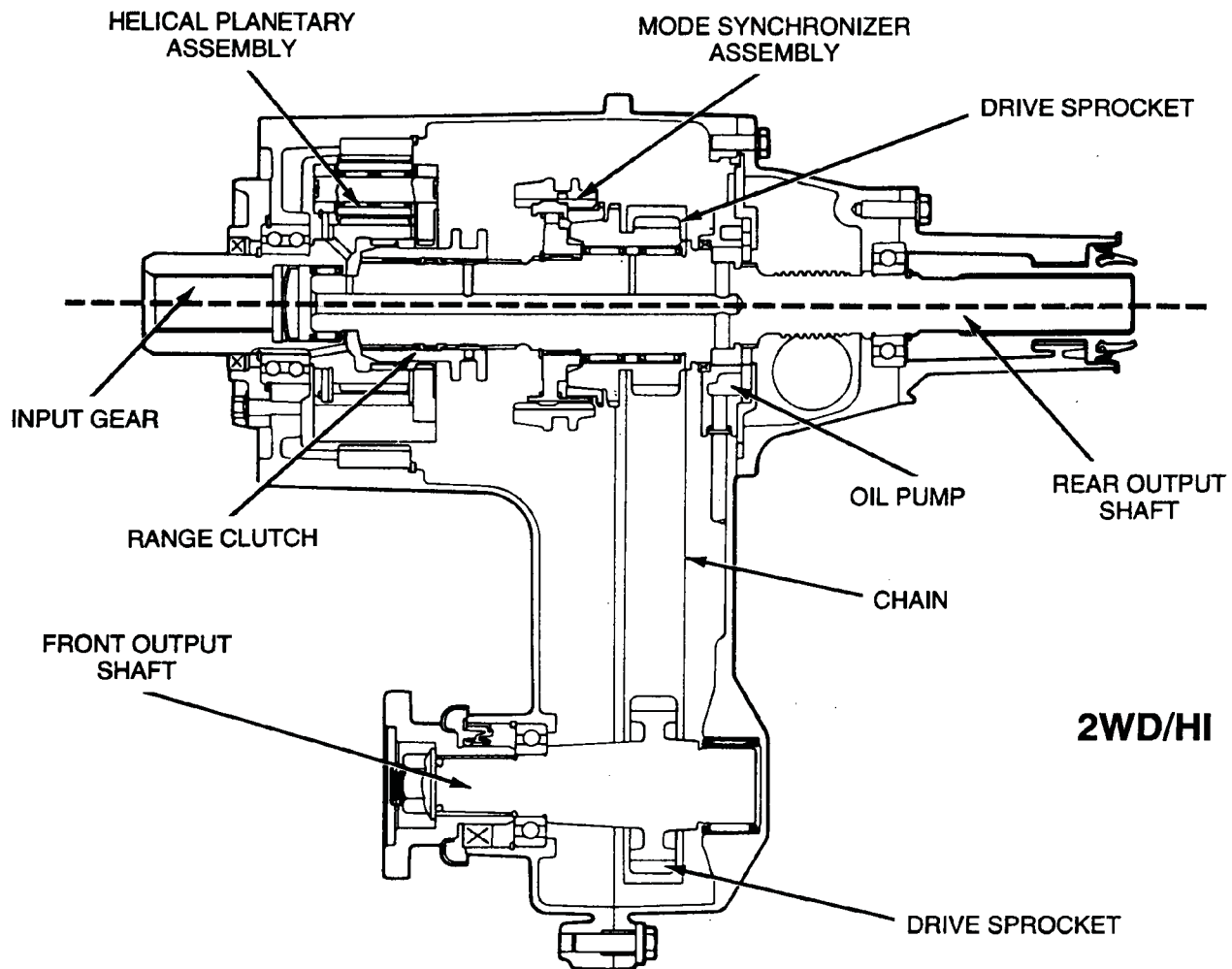
# 241 TRANSFER CASE -TRANSFER CASE COMPONENTS



## 241 TRANSFER CASE -TRANSFER CASE COMPONENTS

1. Adapter
2. Lock nut
3. Front retainer seal
4. Front bearing retainer
5. Retainer screw
6. Front case assembly
7. Case stud
8. Vacuum switch
9. Vacuum switch O-ring
10. Vent
11. Vent hose clamp
12. Vent hose
13. Vent hose end cap
14. Input bearing retainer snap ring
15. Input gear bearing
16. Input gear snap ring
17. Input gear retainer
18. Input gear thrust washer
19. Input gear
20. Input gear pilot bearing
21. Output shaft rear bearing
22. Output shaft
23. Output shaft front bearing
24. Front output shaft, front bearing snap ring
25. Shift detent plunger
26. Shift detent plunger spring
27. O-ring seal
28. Shift detent plug
29. Yoke oil seal
30. Yoke oil slinger
31. Front output shaft yoke
32. Yoke washer
33. Yoke nut
34. Low range gear
35. Range fork shift hub
36. Synchronizer hub snap ring
37. Strut spring plate
38. Synchronizer assembly
39. Synchronizer springs
40. Synchronizer stop ring
41. Drive chain sprocket
42. Drive chain
43. Drive sprocket bearing
44. Oil pump seal
45. Speedometer gear, snap ring
46. Speedometer gear
47. Oil pump assembly
48. Transfer case mainshaft
49. Shift fork pads
50. Range fork, center pad
51. Mode fork, center pad
52. Shift mode fork
53. Shift rail spring
54. Shift rail
55. Mode fork pin
56. Range fork bushings
57. Range fork assembly
58. Shift sector
59. Sector O-ring seal
60. Sector O-ring retainer
61. Range lever
63. Range lever, nut
64. Rear case
65. Case alignment dowels
66. Dowel bolt washer
67. Dowel bolt
69. Case bolt
70. Rear retainer screw
71. Rear retainer
72. Rear retainer seal
73. Rear yoke
74. Rear spline seal
75. Rear yoke nut
76. Plug and washer
77. Magnet
78. O-ring, tube seal
79. Oil pick-up tube
80. Tube connector
81. Oil pick-up screen
82. Rear output bearing
83. Snap ring, output bearing
84. Input gear plug
85. Front output shaft
86. Sprocket snap ring
87. Gasket

## 231/241 TRANSFER CASE - POWER FLOW



### TWO-WHEEL DRIVE HIGH RANGE

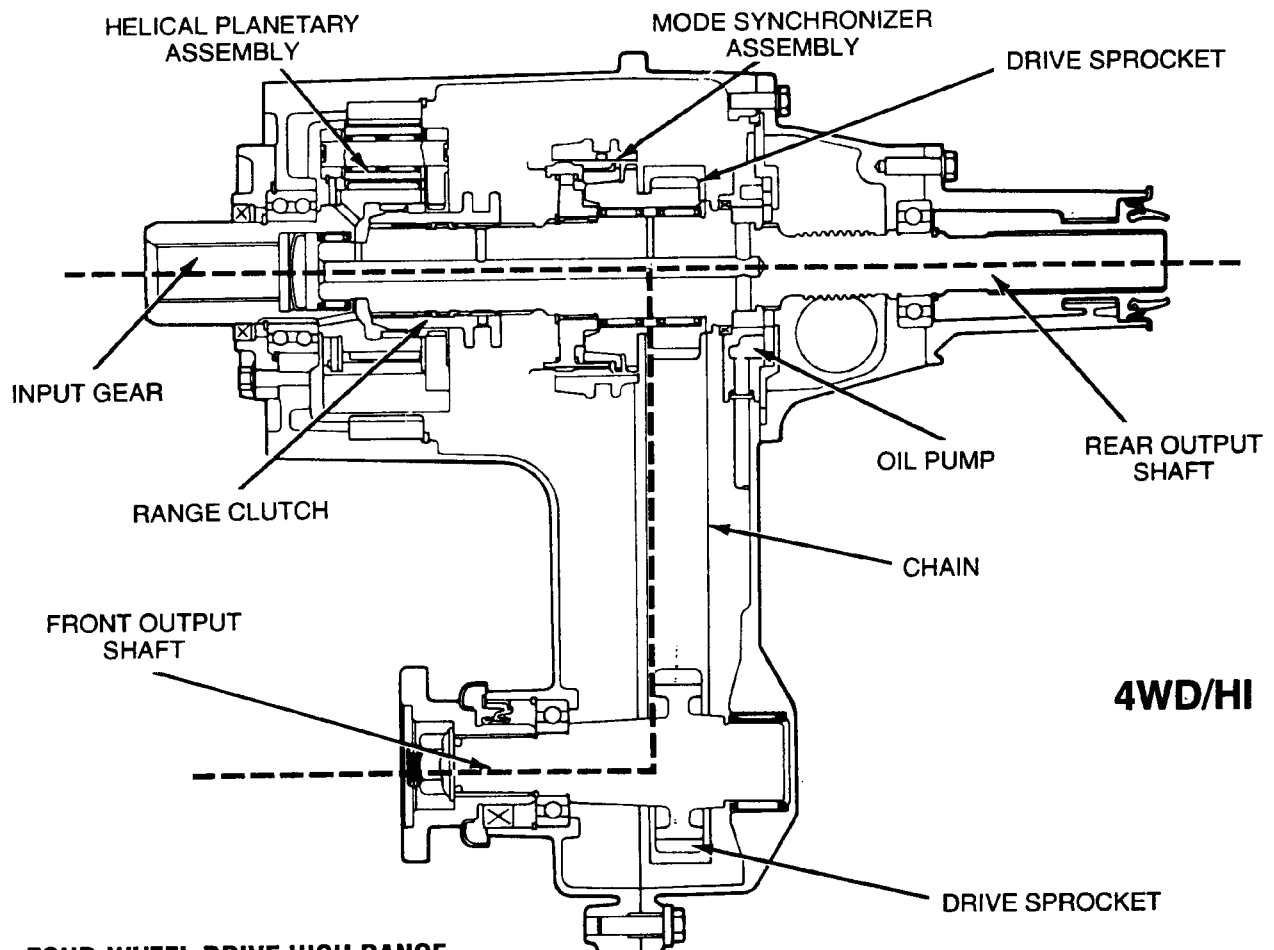
When the transfer case is in the 2WD/HI range, torque flows through the input gear, to the range clutch and rear output shaft of the transfer case and rear axle. These three elements are locked together by the sliding range clutch when it is shifted to a forward position by the range lever and range fork. In 2WD/HI range, the mode syn-

chronizer sleeve is moved out of engagement from the drive sprocket, therefore, torque is not supplied to the front axle.

Neutral is obtained by moving the range clutch back to a mid-position, so that the input gear is not engaged with the range clutch teeth.



## 231/241 TRANSFER CASE - POWER FLOW



### FOUR-WHEEL DRIVE HIGH RANGE

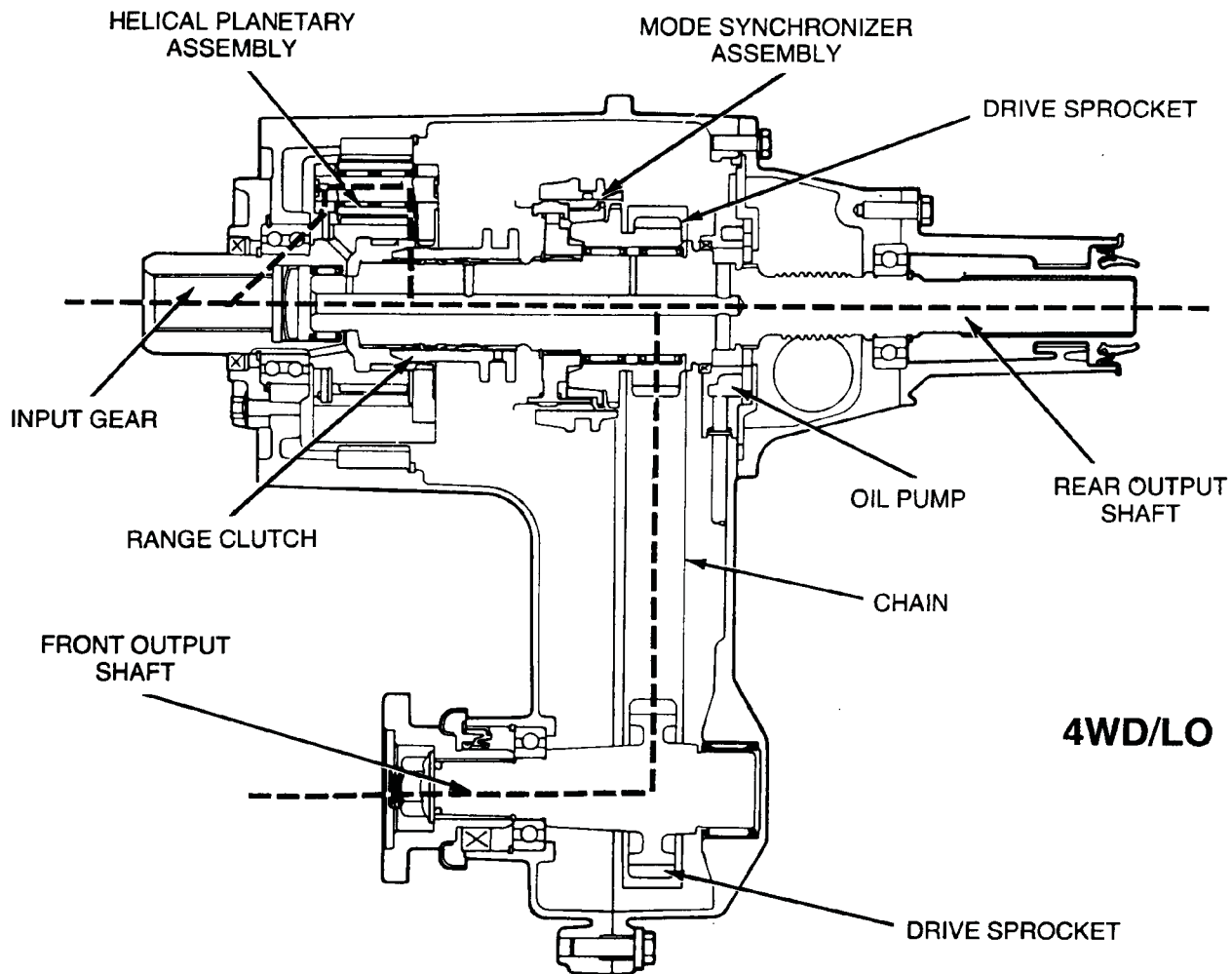
When the transfer case is shifted to 4WD/HI, torque from the input gear is transmitted through the range clutch to the rear output shaft in exactly the same fashion as in the 2WD/HI range. However, the mode synchronizer sleeve is moved rearward, into engagement with the drive sprocket clutch teeth, connecting the drive sprocket to the rear output shaft. This allows the torque to be split evenly between the front and rear output shafts.

**NOTE:** When shifting into 4WD the shift rail for the mode fork and sleeve are mechanically forced into position by the movement of the shift lever and sector plate. This provides a positive engagement of the 4WD mode inside the transfer case whenever the transfer case shift lever is moved to the

4WD position. The Part-time indicator light will not come on though until the axle disconnect vacuum shift motor has fully engaged.

When shifting out of 4WD the shift lever will move the shift sector plate immediately, but the rail, which is moved back by spring pressure will not move until the transfer case gear train torque load is reduced to the point where the shift rail spring pressure can move the mode fork and sleeve. This is called torque relief. A slight delay may occur between when the transfer case shift lever and sector plate is moved out of 4WD and when the transfer case shift rail, mode fork and sleeve actually move to the two-wheel drive position.

## 231/241 TRANSFER CASE - POWER FLOW



### FOUR-WHEEL DRIVE LOW RANGE

In 4WD/LO range, the path of the torque through the transfer case is similar to 4WD/HI range, with one major difference.

When the transfer case is shifted into 4WD/LO, the range clutch is moved to a rearward position, locking the planetary carrier gear teeth, range

clutch and rear output shaft together. The annulus gear is fixed to the case and remains stationary. The input gear drives the pinion gears which walk around the stationary annulus gear, causing the planetary carrier and output shafts to rotate at a reduced gear ratio, resulting in Low range four-wheel drive.

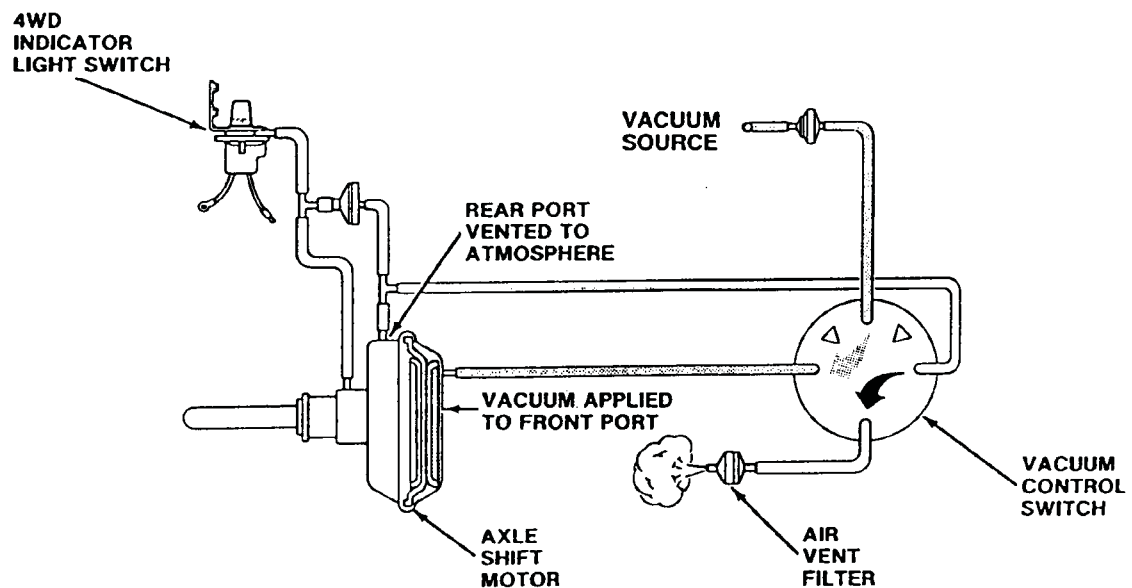
## JEEP COMMAND TRAC - OPERATION

### THEORY OF OPERATION

The components of the Command-Trac system include a Model 231 transfer case with a drive range shift lever; a Model 30 front axle with a two-wheel drive disconnect feature; a vacuum control system that consists of a vacuum source, a vacuum shift motor mounted on the axle, a vacuum control switch mounted in the transfer case, a four-wheel drive indicator lamp that's operated by a vacuum switch, a vacuum check valve, an air vent filter and an interconnecting vacuum harness.

In the two-wheel drive position, vacuum from the vacuum source is routed to the front port of the axle shift motor. At the same time, the vacuum control switch opens the line from the rear port of the axle shift motor, venting the rear port and the four-wheel drive indicator switch port to atmosphere through the air vent filter. Anytime vacuum is vented from the four-wheel drive indicator switch circuit, the four-wheel drive indicator light is off.

2WD

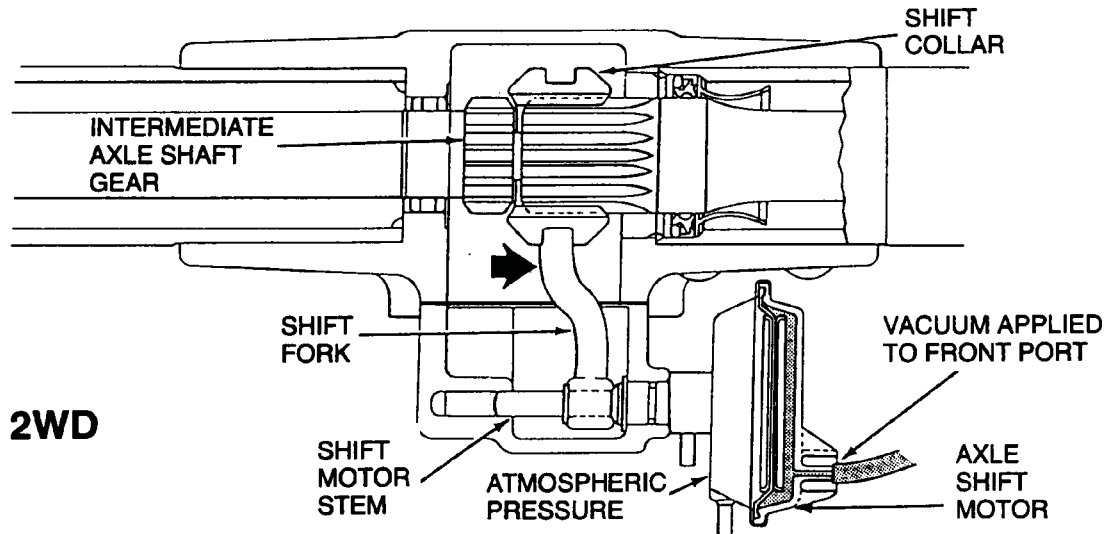


## JEEP COMMAND TRAC - OPERATION

### TWO-WHEEL DRIVE HIGH (cont'd.)

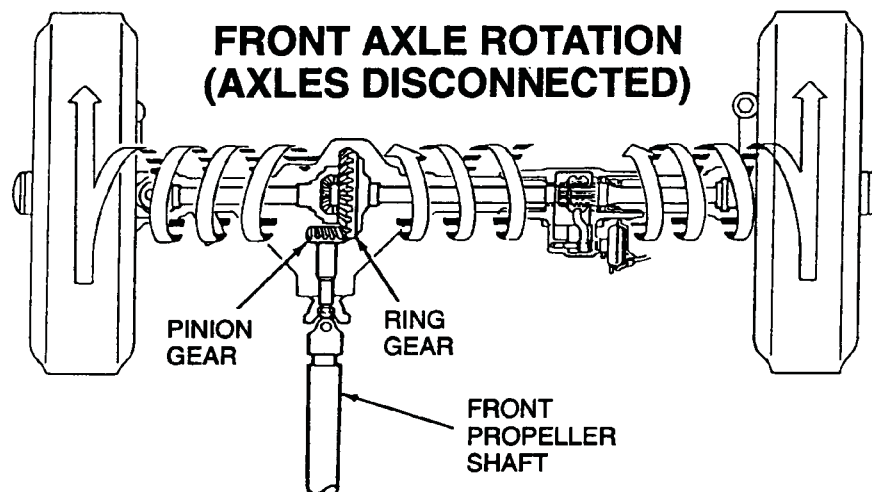
With vacuum applied to the front port of the axle shift motor, and atmospheric pressure acting on the opposite side of the diaphragm, the axle shift motor stem retracts.

This causes the shift fork and shift collar to move outward and out of engagement from the intermediate axle shaft gear.



Since the differential equalizes torque between the right and left axle shafts, the release of the right axle allows both front wheels to rotate freely. This also keeps the heavy ring and pinion gears

as well as the front propeller shaft from rotating. This contributes to an improvement in fuel economy, and also reduces unnecessary component wear.



Now let's take a look at what happens when the transfer case is shifted from two-wheel drive high

range to either of the four-wheel drive ranges.

# JEEP COMMAND TRAC - OPERATION

## FOUR-WHEEL DRIVE VACUUM SYSTEM OPERATION

System vacuum is routed the same in either of the four-wheel drive ranges.

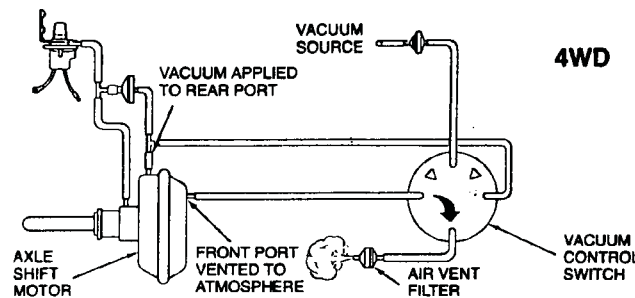
When the drive range shift lever is shifted to a four-wheel drive position, the transfer case delivers torque to the front and rear axles. At the same time, the range sector or shift rail moves the plunger of the vacuum control switch so that vacuum from the vacuum source is applied to the rear port of the axle shift motor. The front port of the axle shift motor is vented to atmosphere through the vacuum control switch and air vent filter.

**NOTE:** On Wrangler Command Trac with the 231 transfer case and a front mounted vacuum switch, the light is on when the transfer case is in four-

wheel drive high and low, and off in neutral and two-wheel drive.

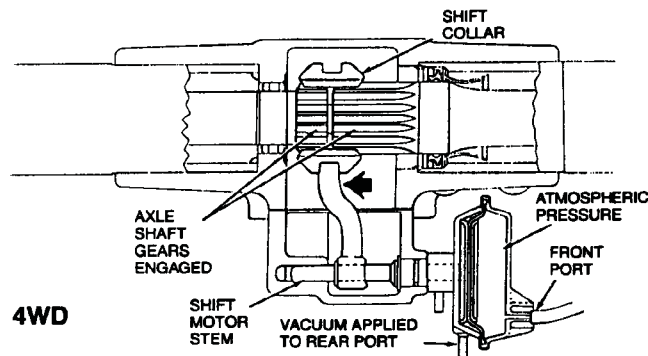
The four-wheel drive light immediately goes out when the shift lever is moved to 2WD, even though the transfer case does not shift from four-wheel drive to two-wheel drive and the axle does not disconnect until a torque relief occurs in the system.

On Cherokee and Comanche Command Trac with 231 transfer case and rear mounted vacuum switch the light is on when the transfer case is four-wheel drive high, low and neutral. The four-wheel drive light will not go out during a 4WD-2WD shift until torque relief allows the transfer case to shift to two-wheel drive.



With vacuum applied to the rear port of the axle shift motor, and atmospheric pressure on the opposite side of the diaphragm, the axle shift motor stem extends moving the shift fork and shift

collar into engagement with both axle shaft gears. This locks the axles together to resume front axle operation.



## **DODGE RAM TRAC - OPERATION**

### **THEORY OF OPERATION**

The components of the Ram Trac system include either the 231 transfer case with a 7 1/4 front axle or the 241 transfer case with a model 44F front axle. Both front axles have a two-wheel drive axle disconnect feature; a vacuum control system that consists of a vacuum source, a vacuum shift motor mounted on the axle, a vacuum control switch mounted in the transfer case, a four-wheel drive indicator lamp that is operated by a mechanical switch on the shift motor, a vacuum check valve, an air vent filter and an interconnecting vacuum harness.

### **TWO-WHEEL DRIVE**

In the two-wheel drive position, vacuum from the vacuum source is routed to the D port of the axle shift motor. At the same time, the vacuum control switch opens the line from port C of the axle shift

motor, venting port C to atmosphere. With vacuum applied to port D and port C open to atmospheric pressure, the axle shift motor stem retracts.

This causes the shift fork and shift collar to disengage the outboard axle from the inner axle.

Since the differential equalizes torque between the right and left axles shafts, the release of the outboard axle allows both front wheels to rotate freely. This also keeps the heavy ring and pinion gears as well as the front propeller shaft from rotating. This contributes to an improvement in fuel economy, and also reduces unnecessary component wear.

Now let's take a look at what happens when the transfer case is shifted from two-wheel drive high range to either of the four-wheel drive ranges.

## **DODGE RAM TRAC - OPERATION**

### **FOUR-WHEEL DRIVE OPERATION**

System vacuum is routed the same in either of the four-wheel drive ranges.

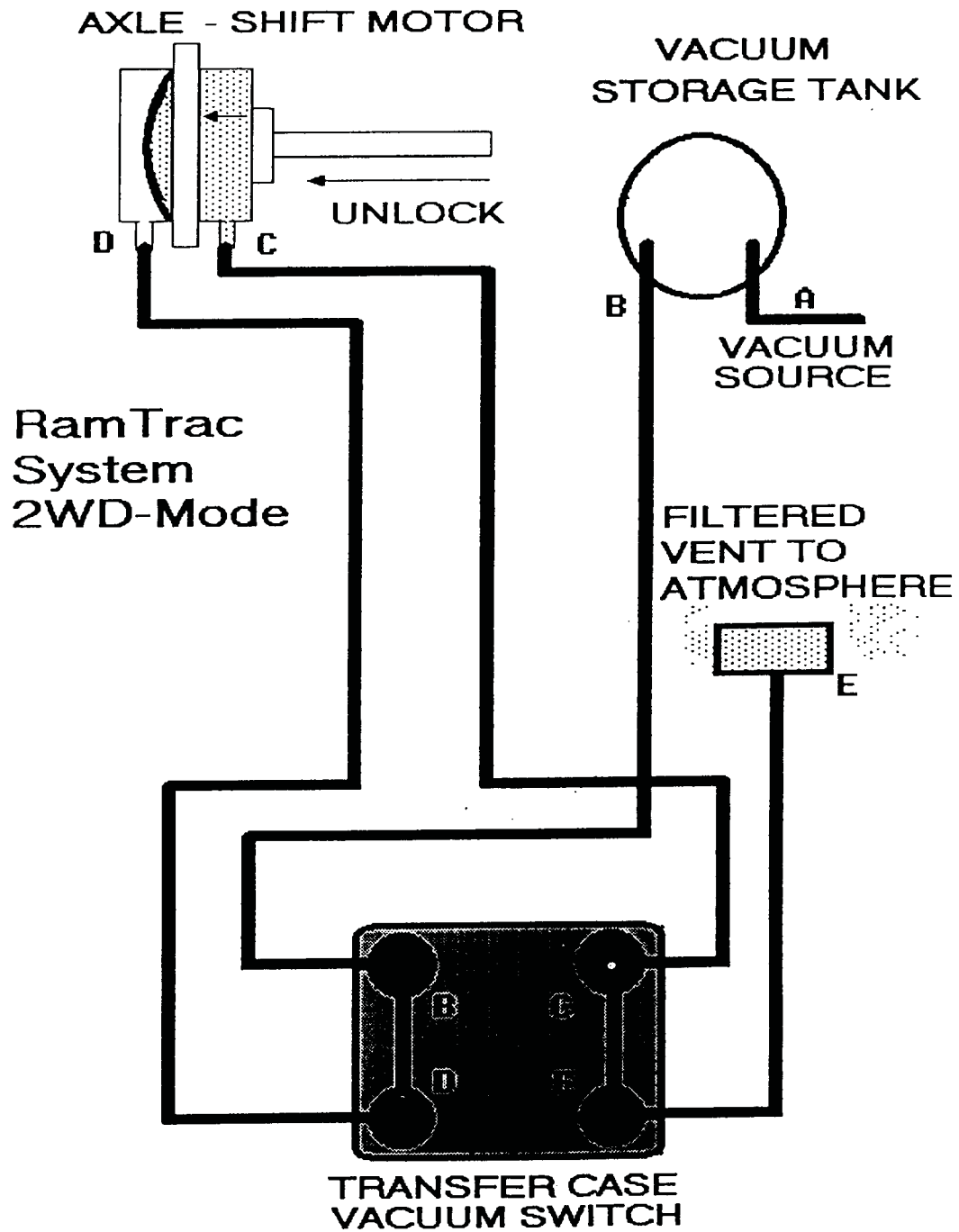
When the drive range shift lever is shifted to a four-wheel drive position, the transfer case delivers torque to the front and rear axles. At the same time, the range sector or rail moves the plunger of the vacuum control switch so that vacuum from the vacuum source is applied to port C of the axle shift motor. Port D of the axle shift motor is vented to atmosphere through the vacuum control switch and air vent filter.

With vacuum applied to port C of the axle shift motor, and atmospheric pressure on the opposite

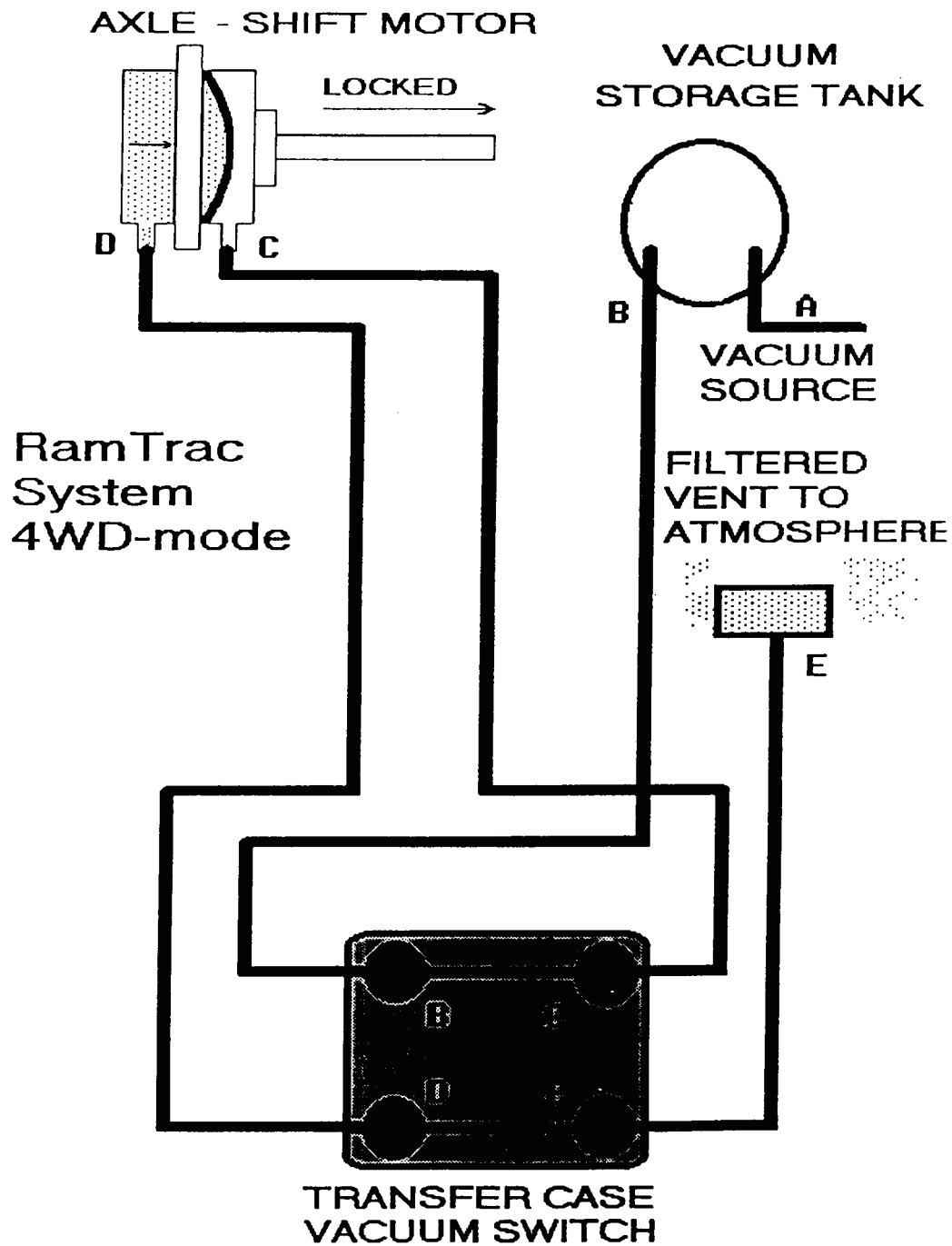
side of the diaphragm, the axle shift motor stem extends moving the shift fork and shift collar into engagement with both axle shaft gears. This locks the axles together to resume front axle operation.

Also, once the shift motor stem extends fully, the 4WD switch at the axle shift motor housing is closed, completing the 4WD indicator lamp electrical circuit to ground. The indicator lamp is lit when the system is in four wheel-drive range as a reminder not to operate the vehicle on dry pavement when two-wheel drive high range should be used.

## DODGE RAM TRAC - OPERATION

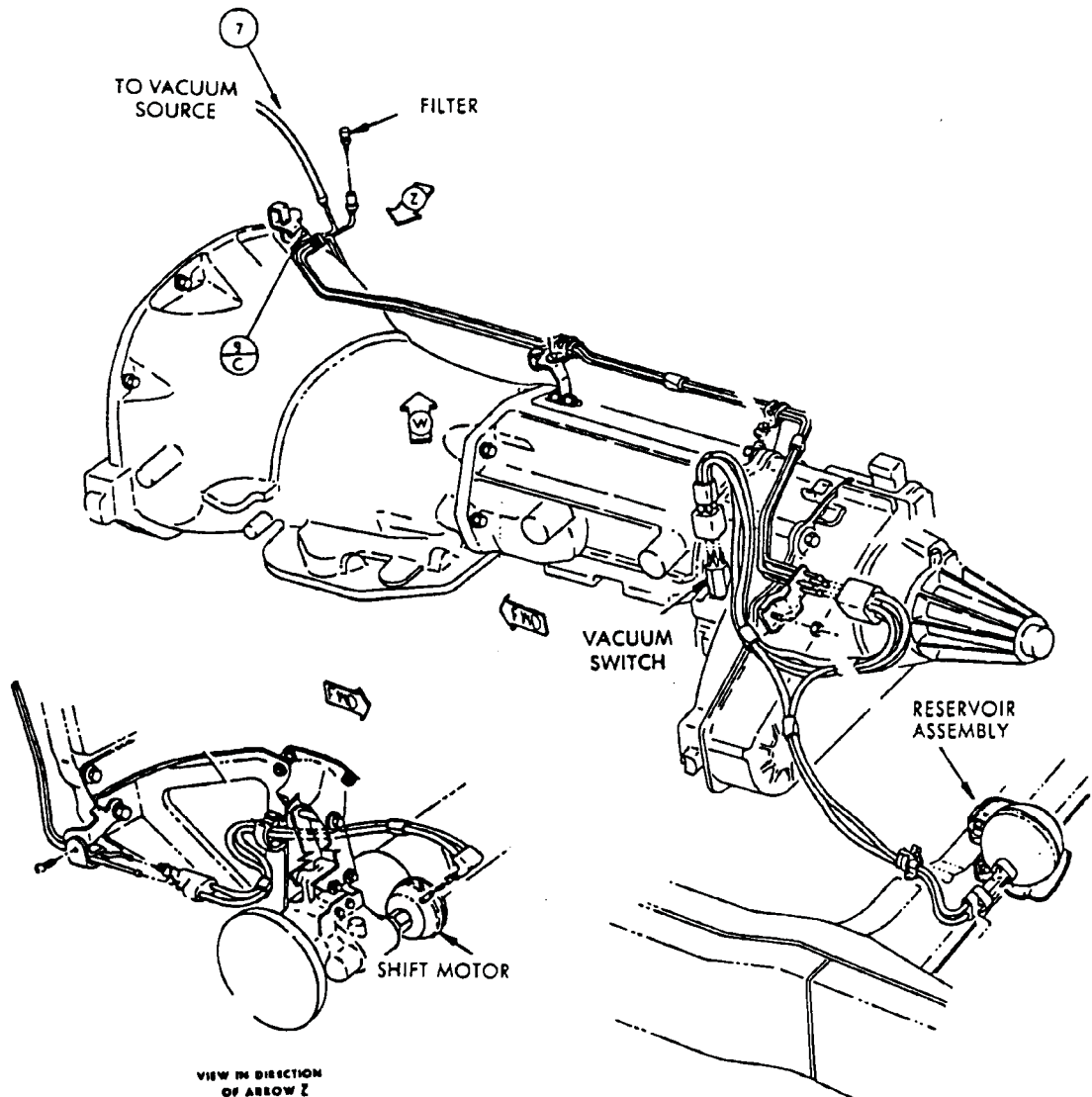


## DODGE RAM TRAC - OPERATION

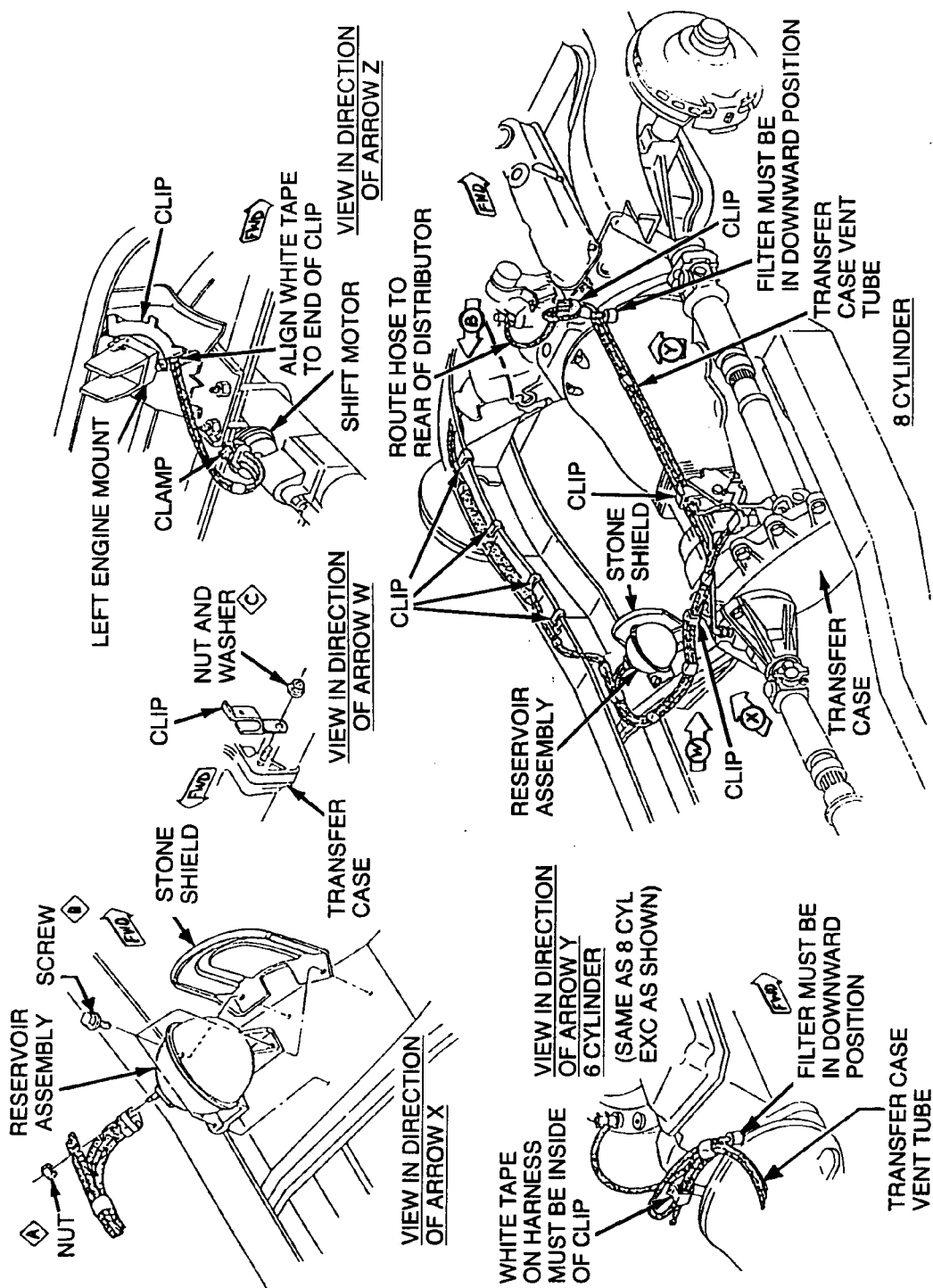




## DODGE RAM TRAC - OPERATION

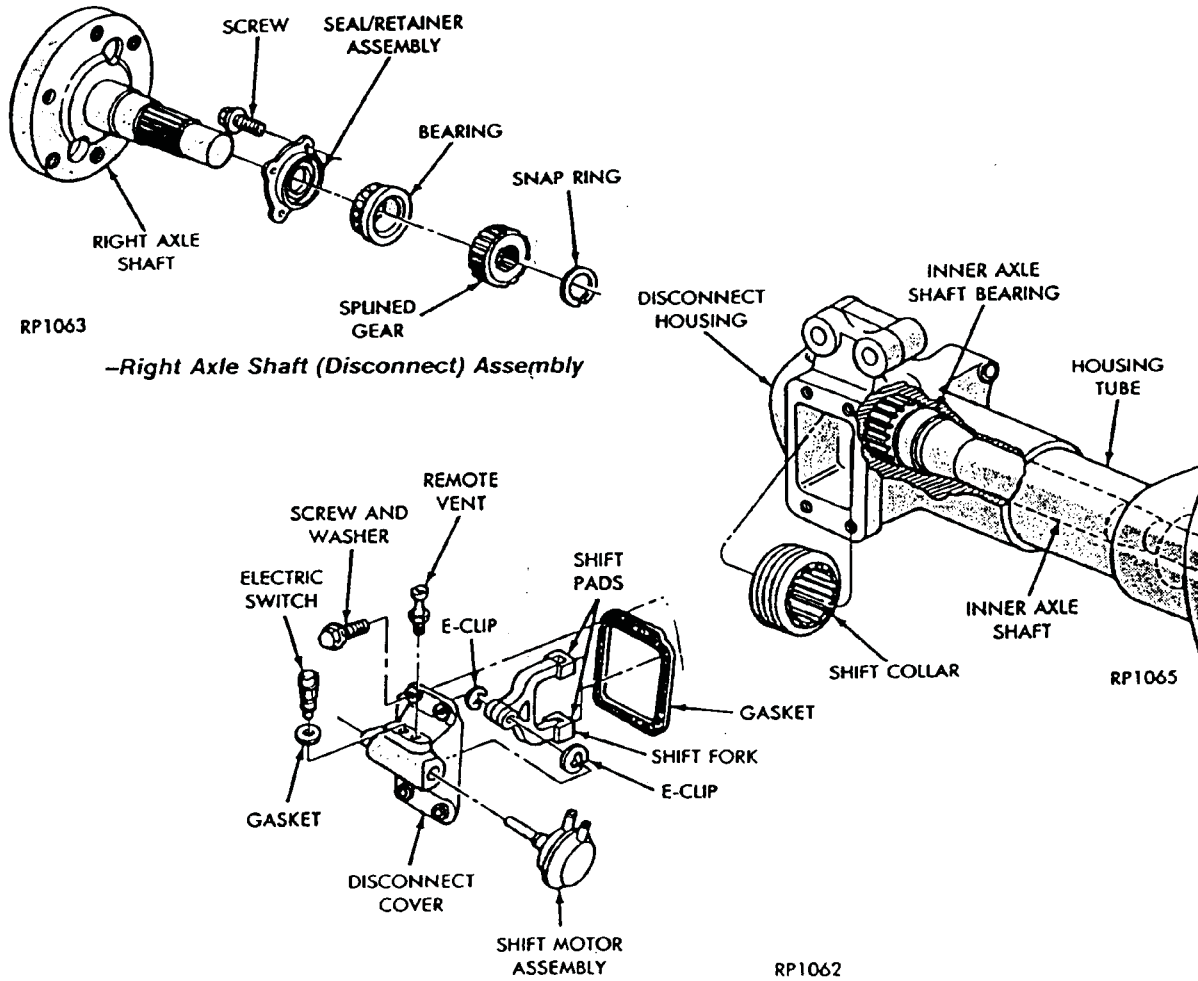


## DODGE RAM TRAC - OPERATION



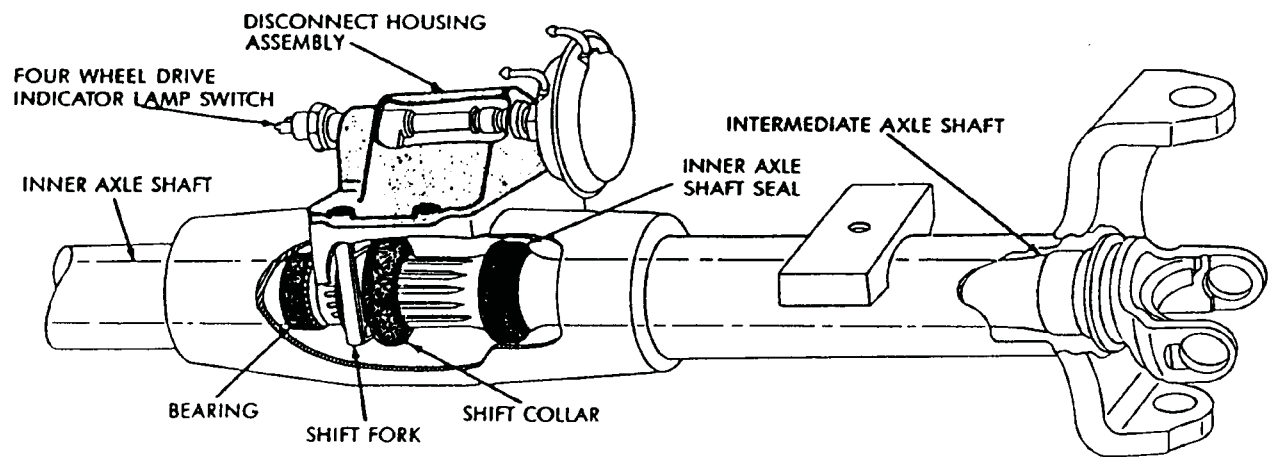
## Body Axle Disconnect Vacuum Hose Routing

## DODGE RAM TRAC - OPERATION



Body Axle Disconnect

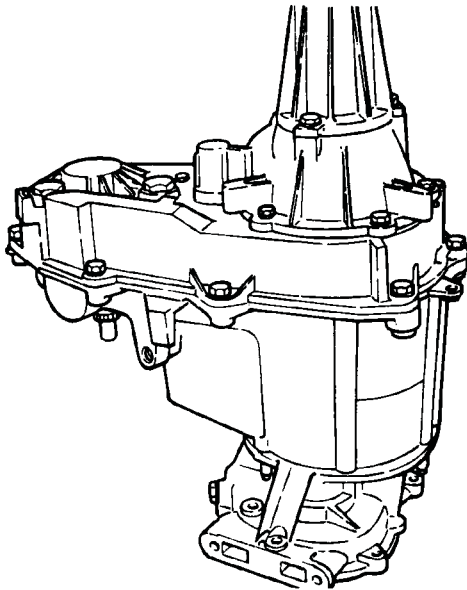
## DODGE RAM TRAC - OPERATION



**Body Axle Disconnect**

## 231/241 TRANSFER CASE - OVERHAUL

### TRANSFER CASE DISASSEMBLY



Remove the fill and drain plugs.

Remove the front yoke. Discard the yoke seal washer and nut. They are not reusable.

\*On the NP 241 also remove the rear yoke, again discarding the seal, washer, and nut.

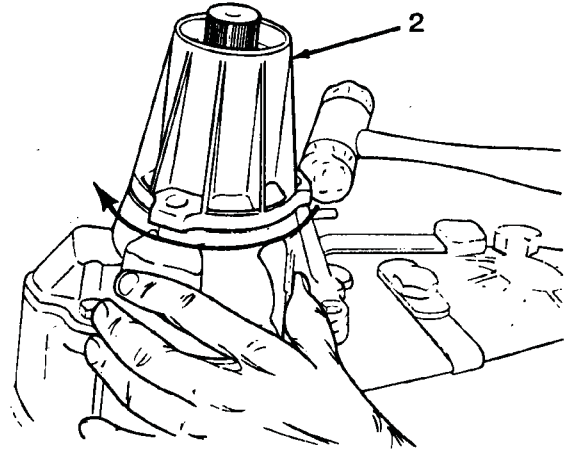
Move the transfer case range lever all the way rearward to the four-wheel low position.

Remove the extension housing attaching bolts.

\*Since the NP 241 does not have an extension disregard this step.

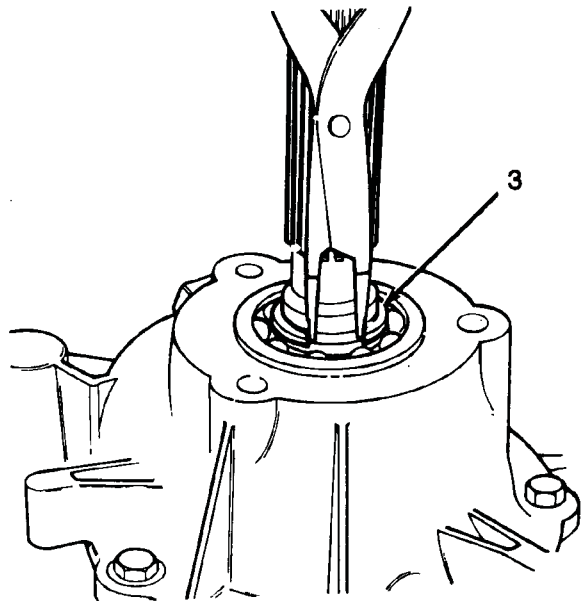
Tap the extension housing (2) in a clockwise direction with a rawhide mallet to break the sealer bead. Then remove the housing.

**CAUTION:** To avoid damaging the sealing surfaces of the extension housing and rear retainer, do not attempt to pry or wedge the housing off the retainer.



Remove the rear bearing snap ring (3) from the mainshaft. Discard the snap ring.

\*The NP241 does not use this snap/ring.

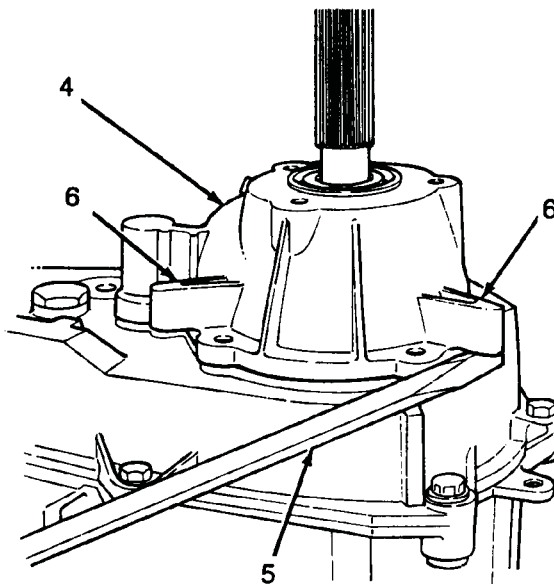


Remove the rear retainer attaching bolts.

## 231/241 TRANSFER CASE - OVERHAUL

Remove the rear retainer (4). Position a screwdriver (5) under each of the tabs (6) on the retainer housing. Then carefully pry the retainer upward and off the rear case.

**CAUTION:** Do not pry against the sealing surfaces of the retainer or rear case. The surfaces could be damaged.

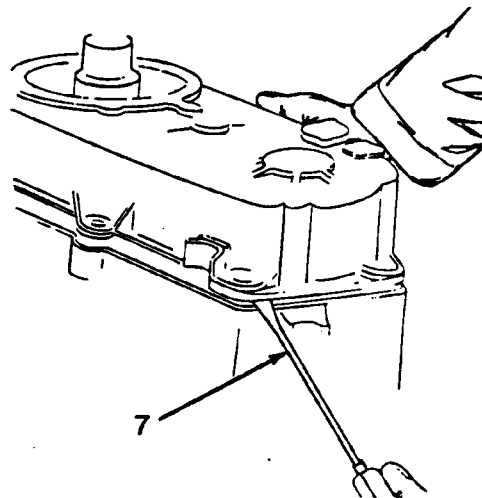


**\*NP241 ONLY** - Remove the two speedometer gear snap rings and the speedometer gear from the output shaft.

Remove the bolts attaching the rear case to the front case. Retain the bolts and the washers used at the dowel bolt locations.

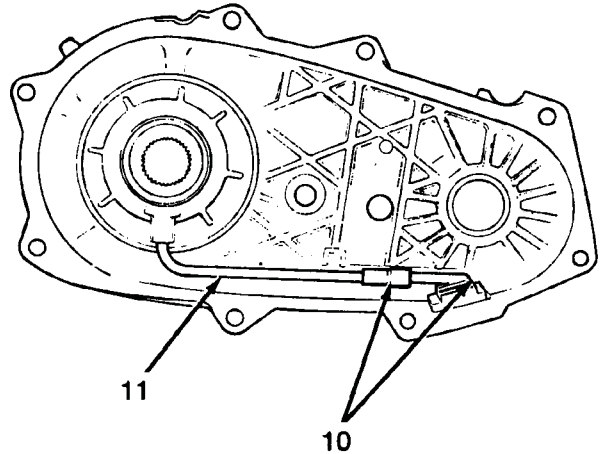
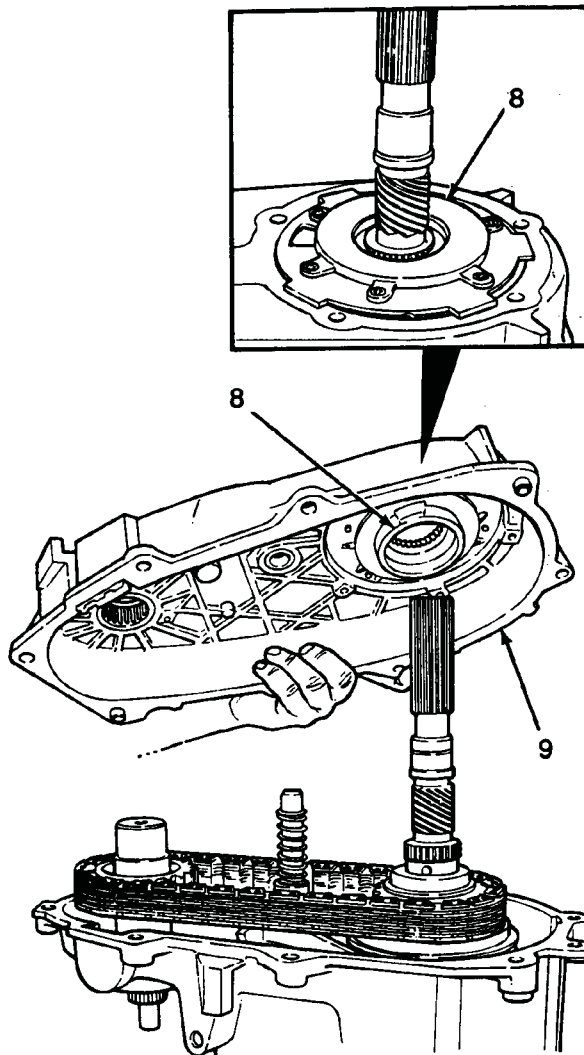
Separate the rear case from the front case using two screwdrivers (7). Insert the screwdrivers into the slots cast in the case ends. Then gently pry upward to break the sealer bead and separate the case halves.

**CAUTION:** Do not pry against the sealing surfaces of the retainer or rear case. The surfaces could be damaged.



## 231/241 TRANSFER CASE - OVERHAUL

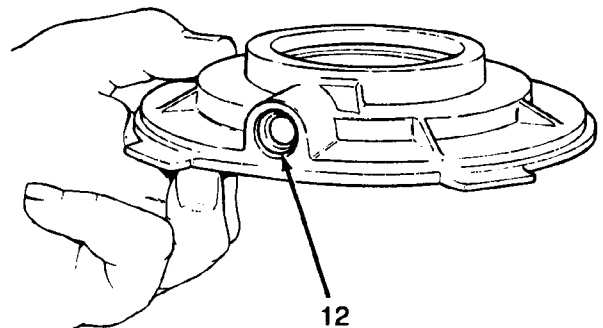
Remove the oil pump (8) and rear case (9) as an assembly.



Remove the pick-up tube (11 ) from the oil pump.

Remove the oil pump from the rear case.

Remove the pick-up tube O-ring (12) from the oil pump (10). Discard the O-ring.

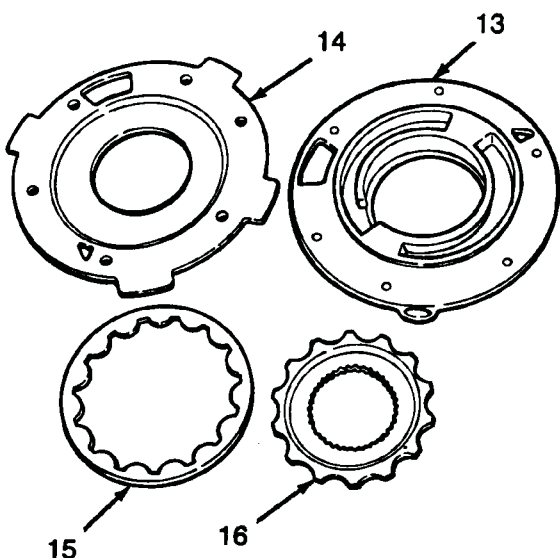


Slide the oil pick-up screen (10) out of the case pocket. Disconnect the screen from the pick-up tube (11).

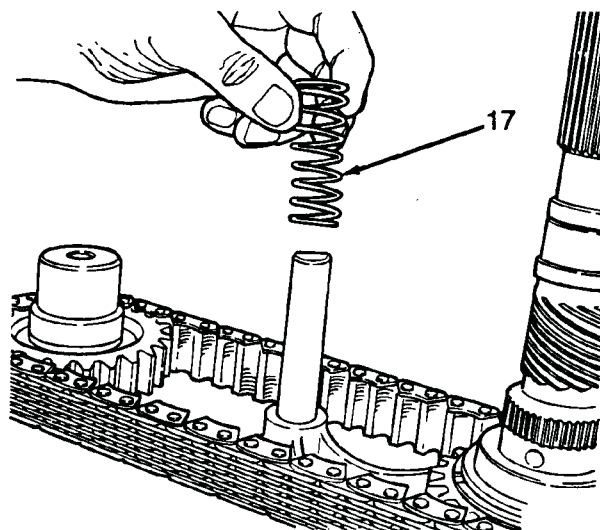
## 231/241 TRANSFER CASE - OVERHAUL

Disassemble the oil pump as follows:

- Mark position of the pump housings for assembly reference.
- Remove the screws that attach the two halves of the pump.
- Remove the feed housing (13) from the gear housing (14).
- Note position of the pump gears (15) and (16) in the gear housing and remove the gears.

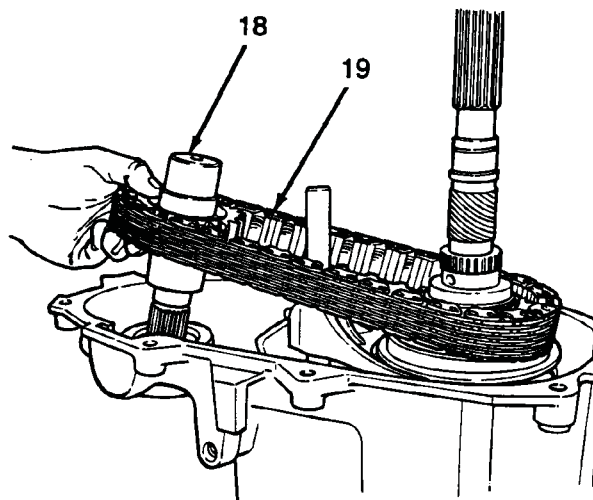


Remove the mode spring (17).



Tap the front output shaft (18) upward with a rawhide mallet to free it from the shaft bearing.

Remove the front output shaft (18) and drive chain (19) as an assembly. Raise the mainshaft slightly to ease chain removal if necessary.

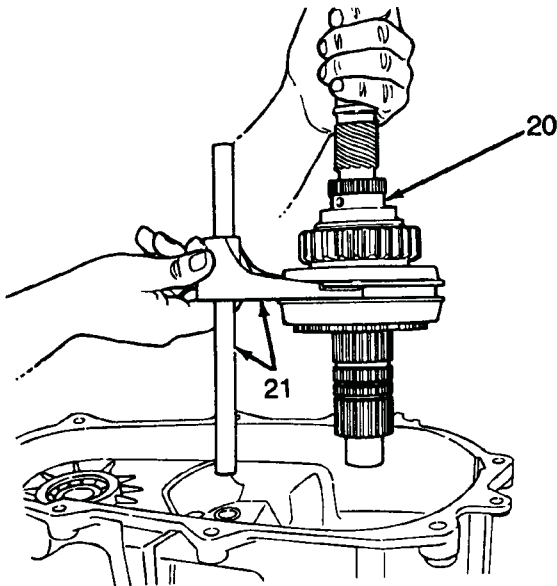


On the NP241, the sprocket can be removed from the front output shaft (18) by first removing the sprocket snap ring.

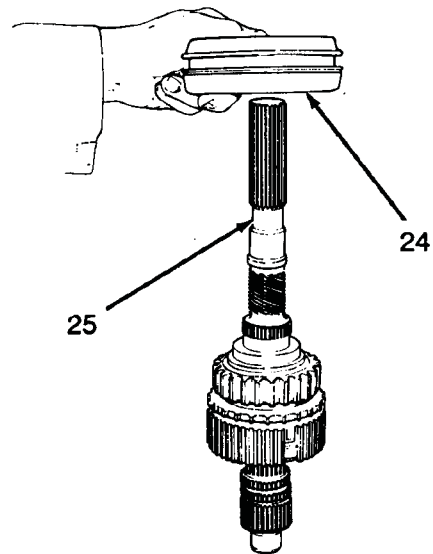


## 231/241 TRANSFER CASE - OVERHAUL

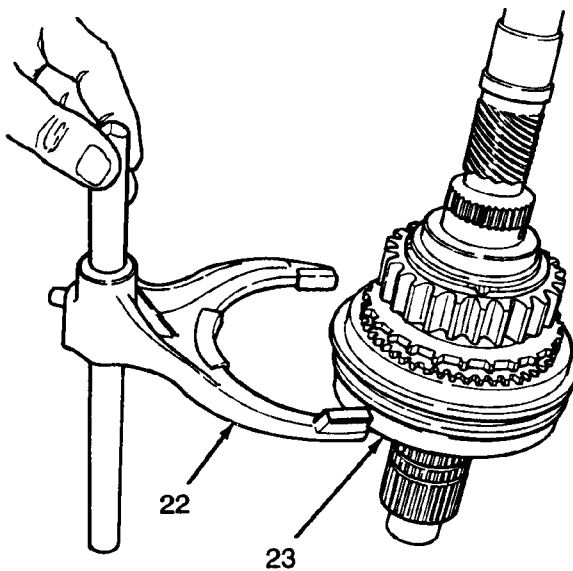
Remove the mainshaft (20) and mode fork and shift rail (21) from the front case as an assembly.



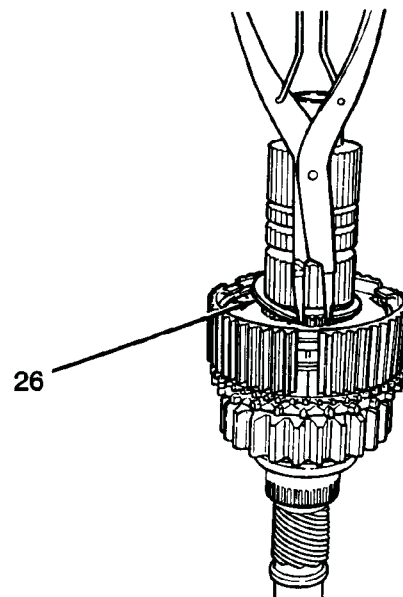
Remove the synchronizer sleeve (24) from the mainshaft (25).



Remove the mode fork and shift rail (22) from the synchronizer sleeve (23). Mark position of the sleeve (23) for assembly reference.

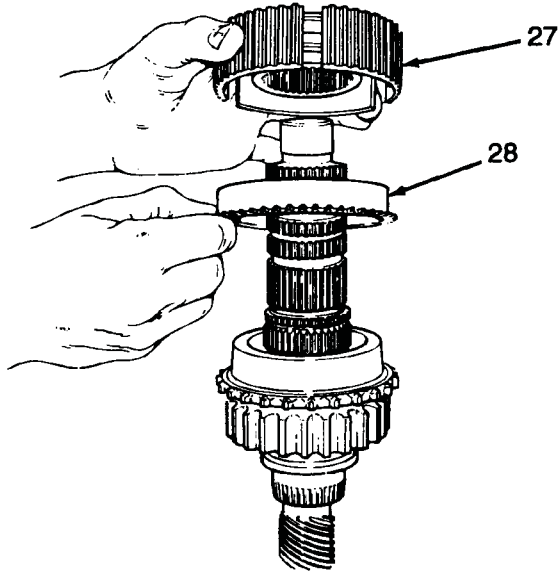


Remove the synchronizer hub snap ring (26). Discard the snap ring.

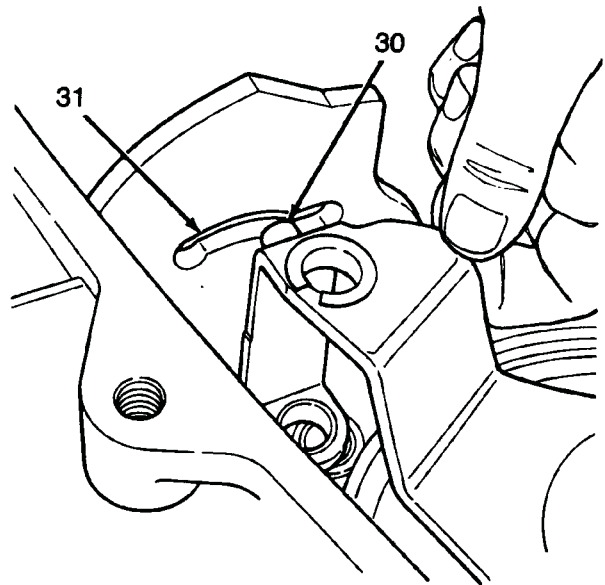


## 231/241 TRANSFER CASE - OVERHAUL

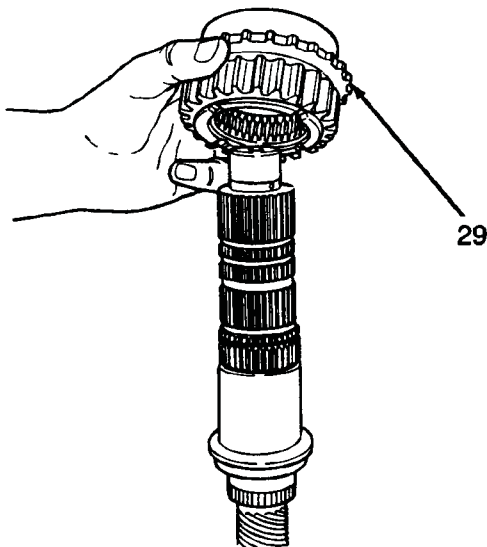
Remove the synchronizer hub (27) and stop ring (28) from the mainshaft.



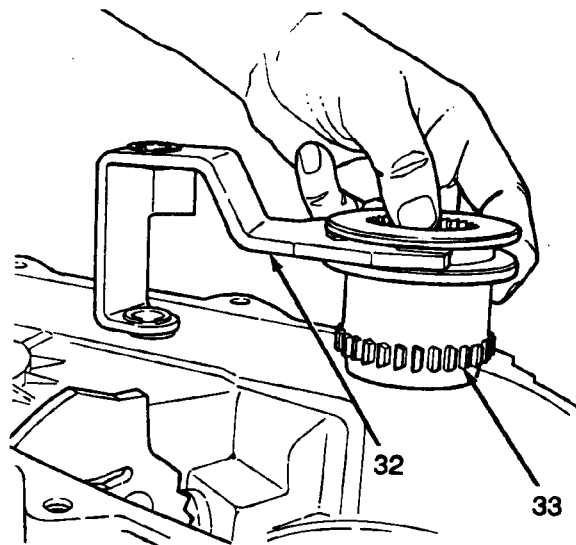
Slide the range fork pin (30) out of the slot in the sector (31).



Remove the drive sprocket (29) from the mainshaft.



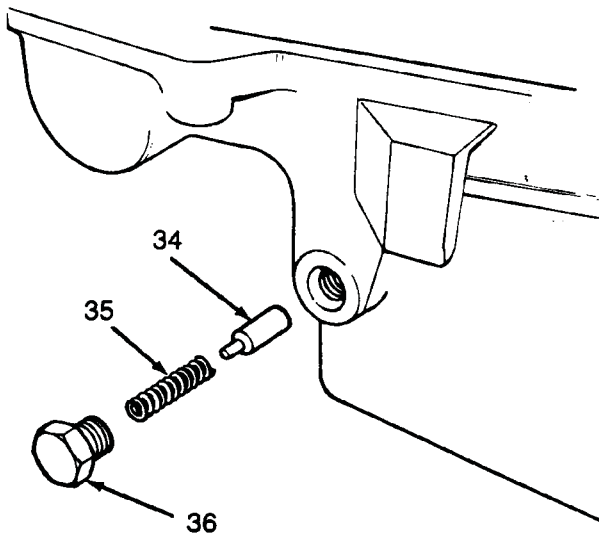
Remove the range fork (32) and shift hub (33) as an assembly. Note position of the fork and hub for assembly reference.



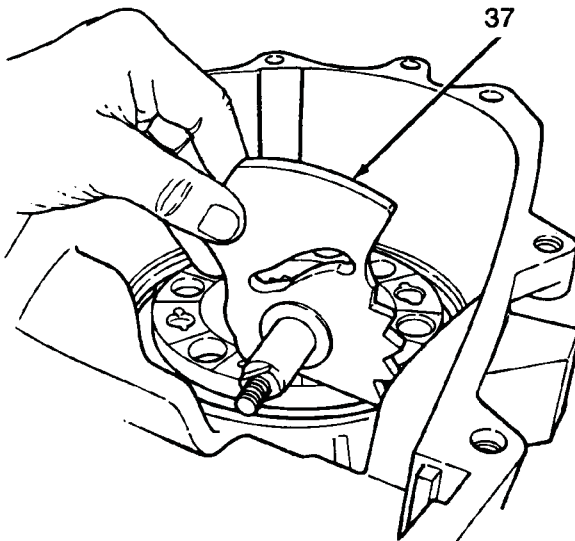
## 231/241 TRANSFER CASE - OVERHAUL

Remove the transfer case range lever from the sector shaft. Retain the lever attaching nut and washer.

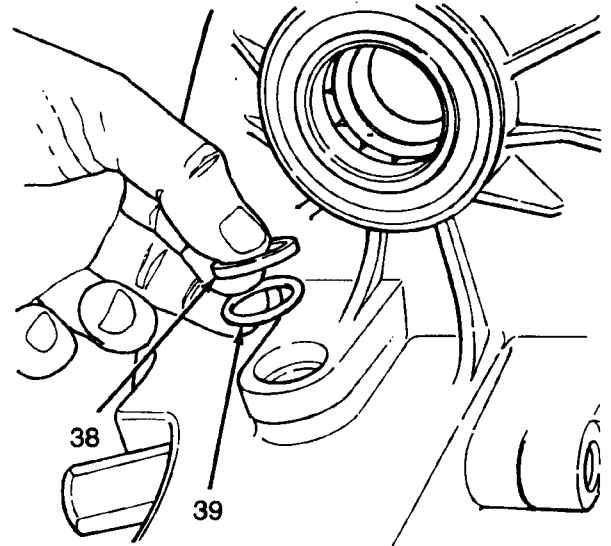
Remove the shift detent pin (34), spring (35) and plug (36).



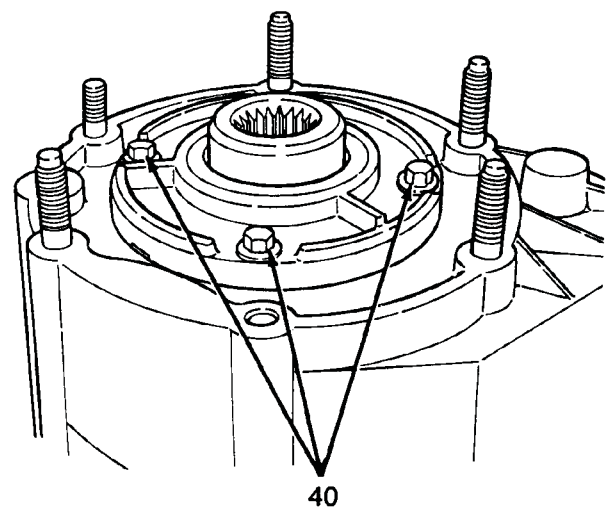
Remove the shift sector (37).



Remove the sector shaft bushing (38) and O-ring (39).

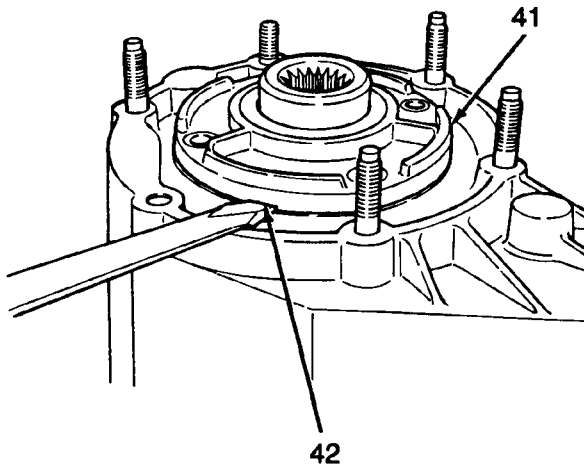


Turn the front case over and remove the front bearing retainer attaching bolts (40).

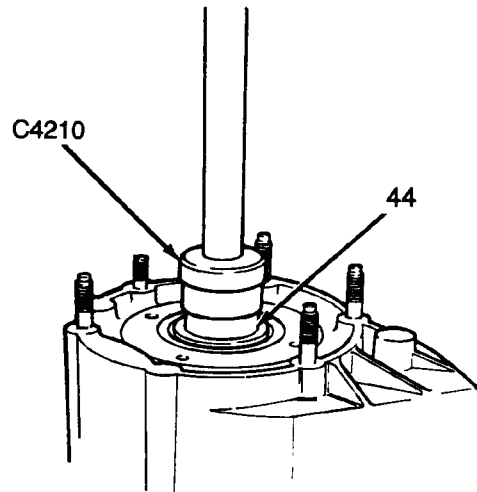


## 231/241 TRANSFER CASE - OVERHAUL

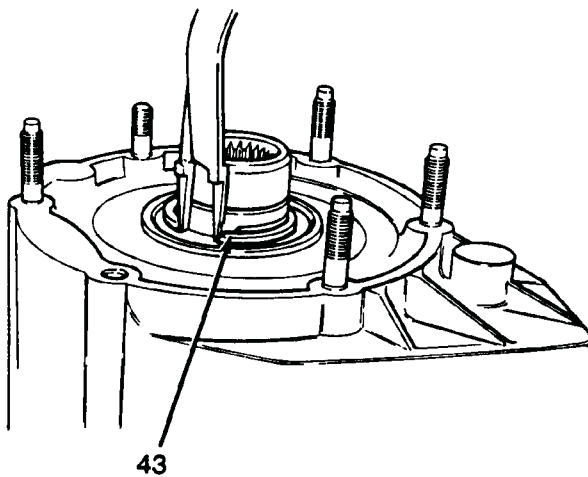
Remove the front bearing retainer (41). Carefully pry the retainer loose with a screwdriver. Position the screwdriver in the slots (42) cast into the retainer.



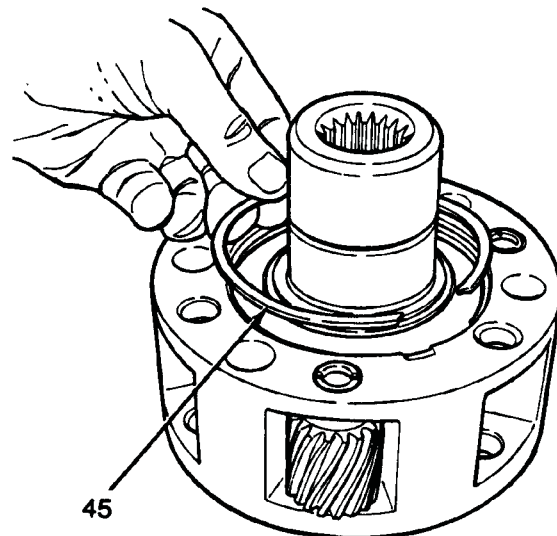
Press the input and low range gear assembly (44) out of the input gear bearing with tool C4 210 and an arbor press.



Remove the input gear snap ring (43).

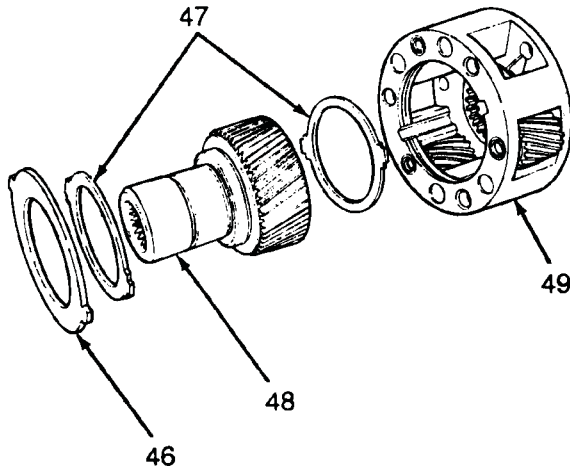


Remove the low range gear snap ring (45).

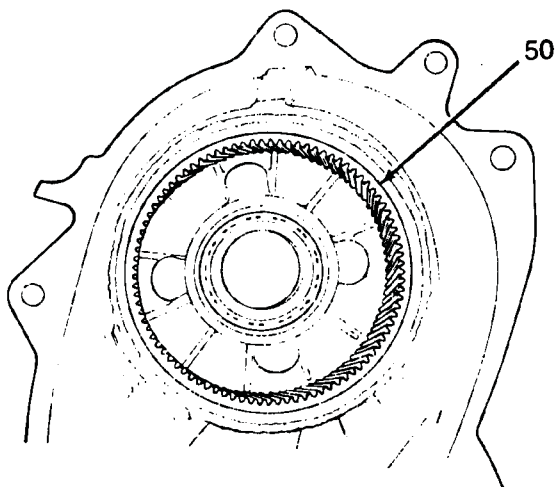


## 231/241 TRANSFER CASE - OVERHAUL

Remove the input gear retainer (46), thrust washers (47) and input gear (48) from the low range gear (49).



**NOTE:** The low range annulus gear (50) is not a serviceable component. If the gear is damaged, replace the gear and front case as an assembly.



Remove the oil seals from the rear retainer, rear extension housing, oil pump feed housing and case halves. Discard the seals.

Remove the magnet from the front case.

### CLEANING AND INSPECTION

Clean the transfer case components thoroughly with solvent. Remove all traces of sealer from the case and retainer seal surfaces.

Clean the oil pick-up screen with solvent and dry it with compressed air. Also use compressed air to remove solvent residue from all oil feed passages and channels.

Inspect the case halves, extension housing and retainers for cracks, porosity, or damaged sealing surfaces. Inspect the shafts, gears, chain and shift components for wear or damage.

Inspect all of the transfer case bearings for wear, roughness, pitting, or galling. Replace worn or damaged bearings as outlined in the assembly section.

### TRANSFER CASE ASSEMBLY

Lubricate the transfer case components with MOPAR ATF PLUS transmission fluid or an equivalent Dexron® II fluid before installation.

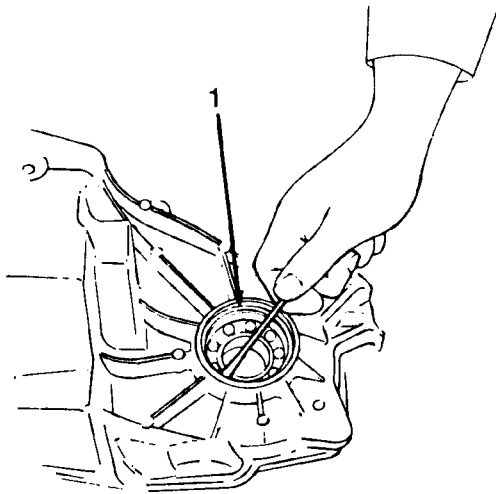
**CAUTION:** The bearing bores in various transfer case components contain oil feed holes. Be sure replacement bearings do not block the feed holes.

## 231/241 TRANSFER CASE - OVERHAUL

Replace the output shaft front bearing and seal as follows:

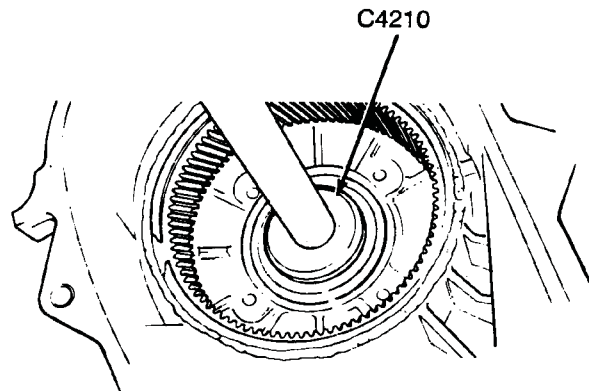
- Remove the shaft oil seal from the front case.

On the NP 241, this snap ring is located on the inside of the case.



Replace the input gear bearing as follows:

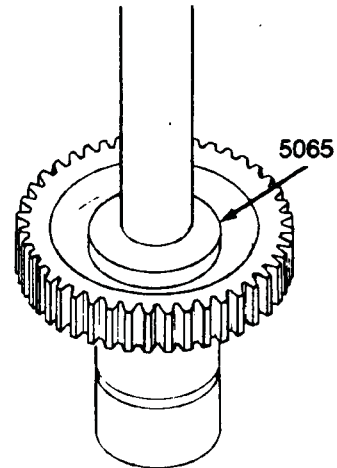
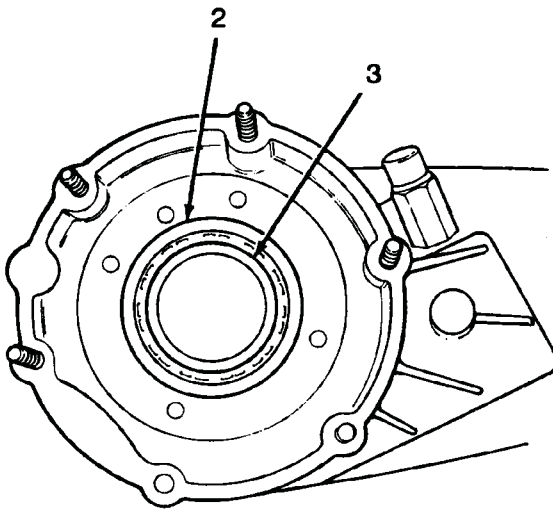
- Press the bearing out of the front case with tool C4210 and an arbor press.



- Tap the original bearing out of the case with a plastic mallet.
- Install the replacement bearing with driver 5064 on the NP231, and tool C4210 on the NP241.
- Install the bearing snap ring (1).
- Install the replacement shaft seal.

## 231/241 TRANSFER CASE - OVERHAUL

- Install the snap ring (2) on the replacement bearing.
- Install the bearing (3) into the case with tool C4210 and a wood block. Install the bearing far enough into the case to seat the snap ring (2) against the case.
- Install the replacement pilot bearing with tool 5065.

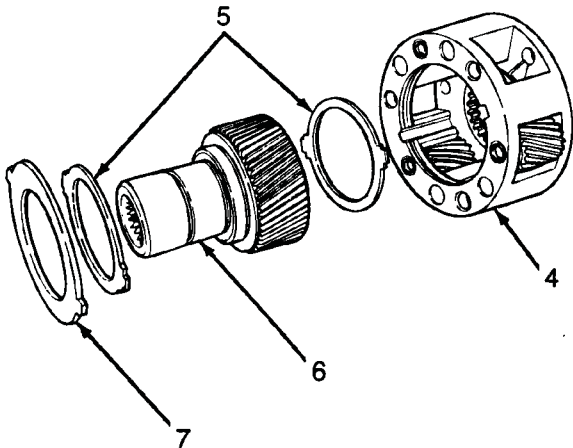


Replace the input gear pilot bearing as follows:

- Remove the pilot bearing with tool MD998346.

## 231/241 TRANSFER CASE - OVERHAUL

Assemble the low range gear (4), input gear thrust washers (5), input gear (6) and input gear retainer (7).

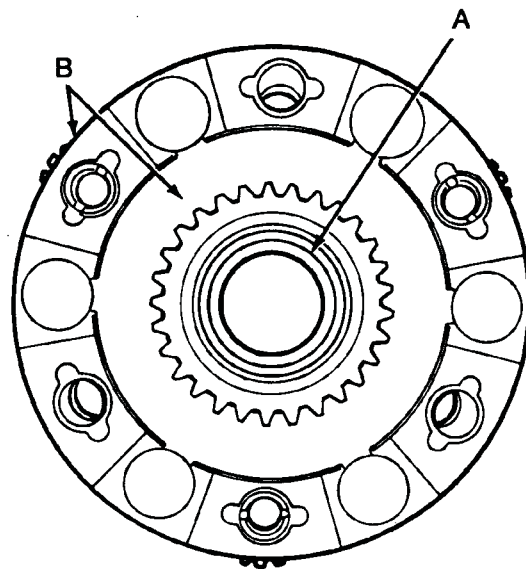
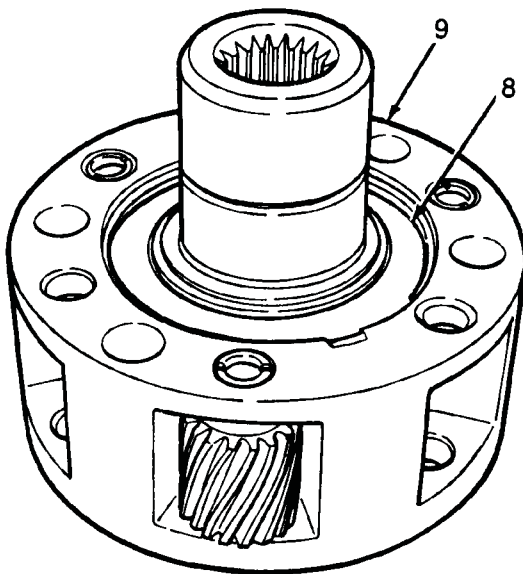


Install the assembled input and low range gears as follows:

- Lubricate the input gear shaft with automatic transmission fluid.
- Start the input gear shaft into the bearing in the front case.
- Press the input gear shaft into the front bearing with tool 5065 and an arbor press. Be sure the tool is seated in the input gear before applying any pressure.

**CAUTION:** Use tool 5065 only to press the input gear into the front bearing. An incorrect tool could push the input gear pilot bearing (A) too far into the gear bore. Also, do not press against the end surface (B) of the low range gear. The gear case and thrust washers could be damaged.

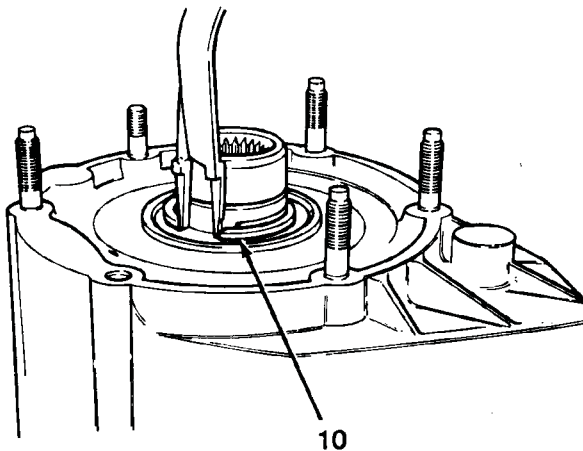
Install the input gear snap ring (8). Be sure the snap ring is seated in the snap ring groove of the low range gear (9).



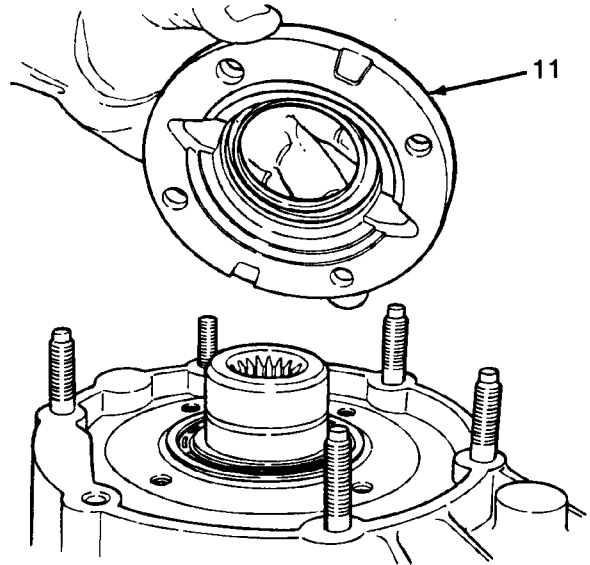


## 231/241 TRANSFER CASE - OVERHAUL

Install a replacement input gear snap ring (10).



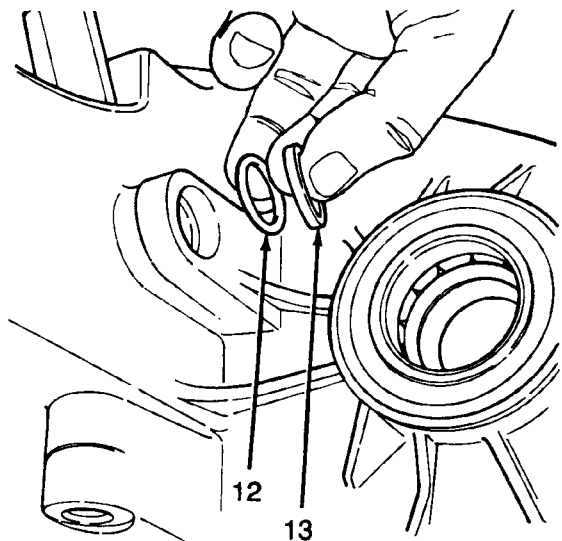
Install the front bearing retainer (11) on the front case. Tighten the retainer bolts to specified torque.



Install a replacement oil seal in the front bearing retainer.

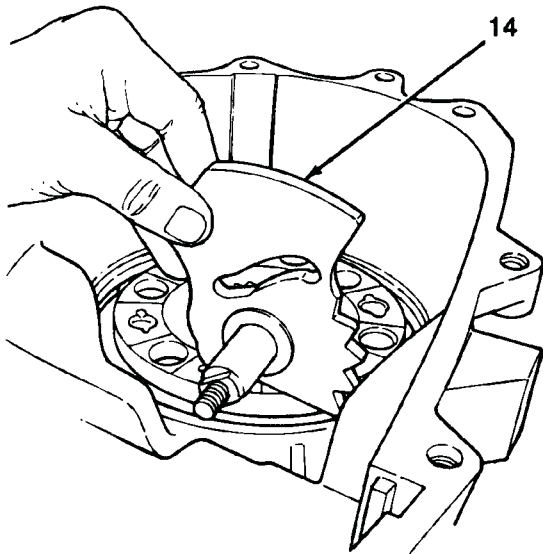
Apply a 3 mm (1/8 inch) wide bead of sealer to the seal surface of the front bearing retainer (11). Use RTV-type sealer.

Install a replacement sector shaft O-ring (12) and bushing (13) in the case bore.

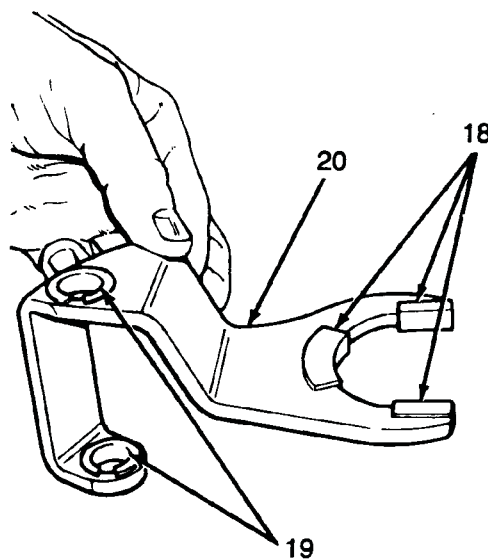


## 231/241 TRANSFER CASE - OVERHAUL

Install the range sector (14) in the case.

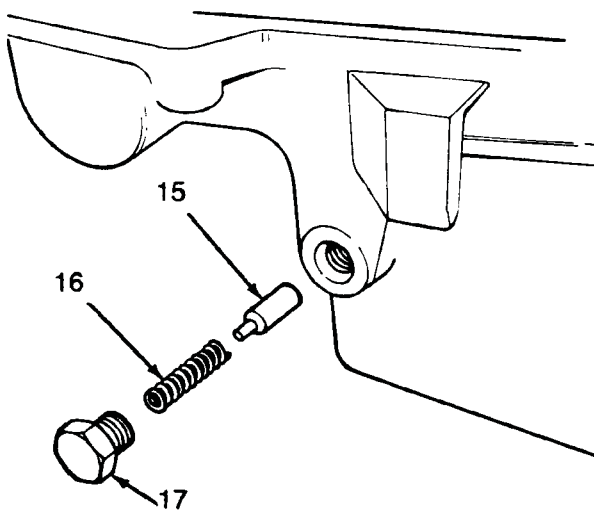


Install replacement pads (18) and shift rail bushings (19) in the range fork (20).

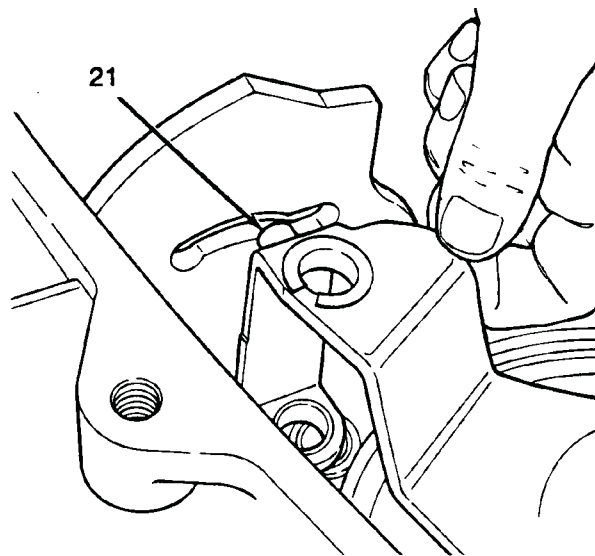


Install the range lever and lever attaching nut on the range sector shaft. Tighten the attaching nut to specified torque.

Install the detent (15), detent spring (16) and detent plug (17) in the case.



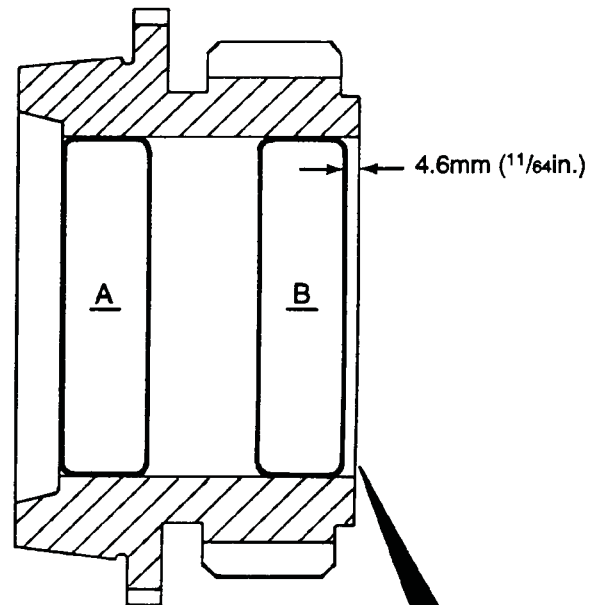
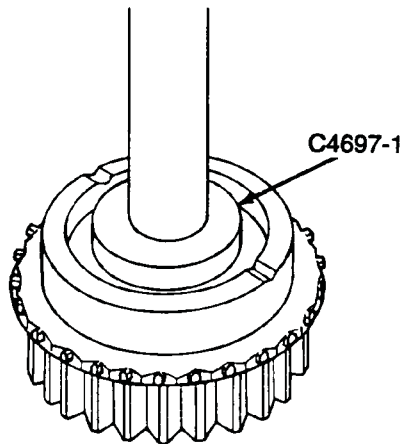
Assemble and install the range fork and shift hub. Be sure the range fork pin (21) is engaged in the sector slot.



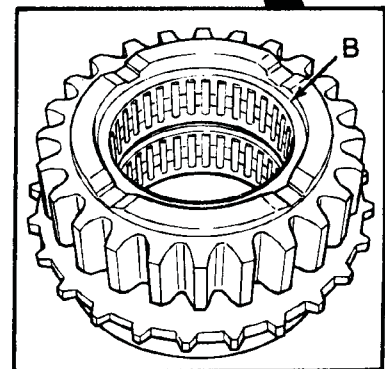
## 231/241 TRANSFER CASE - OVERHAUL

Install replacement bearings in the drive sprocket (22) as follows:

- Press both bearings out of the sprocket simultaneously with tool C4697-1 and an arbor press.



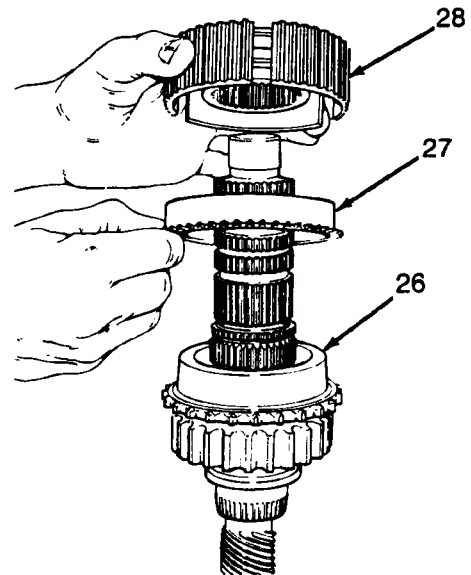
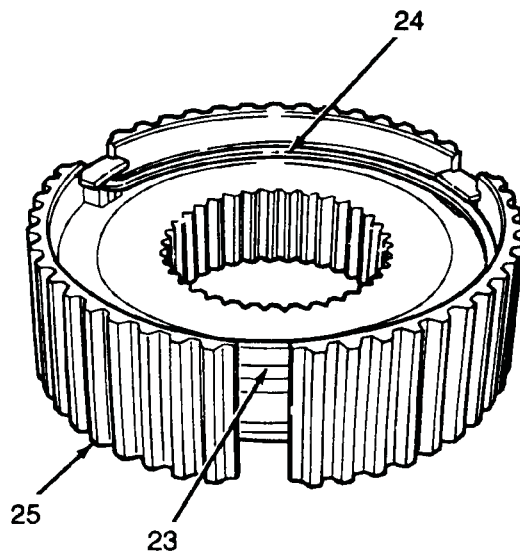
- Install the replacement front bearing (A) with an arbor press and tool C4697-1. Press the bearing in until flush with the edge of the bore as shown.
- Install the replacement rear bearing (B) with an arbor press and tool C4697-1. Press the bearing in until it is 4.6 mm (11/64 inch) below the edge of the bore as shown.



**CAUTION:** Do not press the bearings any farther into the sprocket than specified. The bearings could block the mainshaft oil feed hole if pressed too deeply into the sprocket.

## 231/241 TRANSFER CASE - OVERHAUL

Install the struts (23) and spring (24) in the synchronizer hub (25).

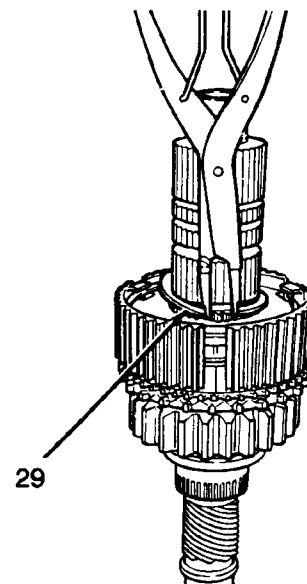


Install a replacement synchronizer hub snap ring (29).

Lubricate the drive sprocket bearings and install the sprocket (26) on the mainshaft.

Install the synchronizer stop ring (27) on the mainshaft. Seat the ring on the drive sprocket.

Install the synchronizer hub (28) on the mainshaft. Align and seat the hub struts on the stop ring lugs.



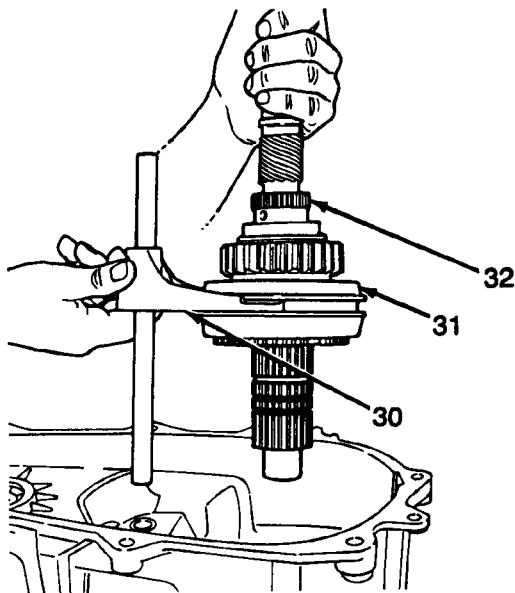
## 231/241 TRANSFER CASE - OVERHAUL

Install the synchronizer sleeve on the synchronizer hub. Be sure the sleeve is installed so the beveled spline ends face the stop ring.

Install replacement pads on the mode fork if necessary.

Engage the mode fork (30) in the synchronizer sleeve (31). Then install the fork, rail and mainshaft assembly (32) in the case.

**NOTE:** Be sure the mode fork shift rail is seated in both of the range fork bushings.

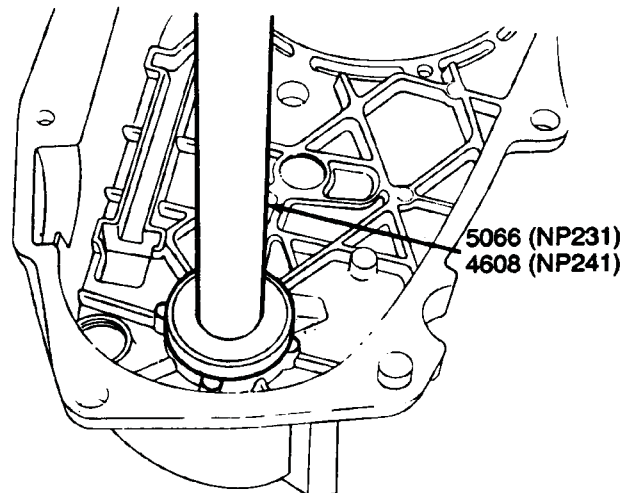


Assemble and install the output shaft and drive chain. Lift the mainshaft slightly to ease chain and shaft installation.

Install the mode spring on the shift rail.

Replace the output shaft rear bearing as follows:

- Remove the bearing with puller L-4518-1/4454-1
- Install the replacement bearing with tool 5066 (NP231) and 4608 on the NP241. Lubricate the bearing after installation.



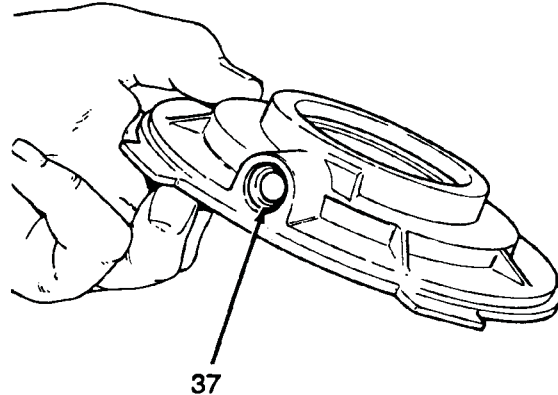
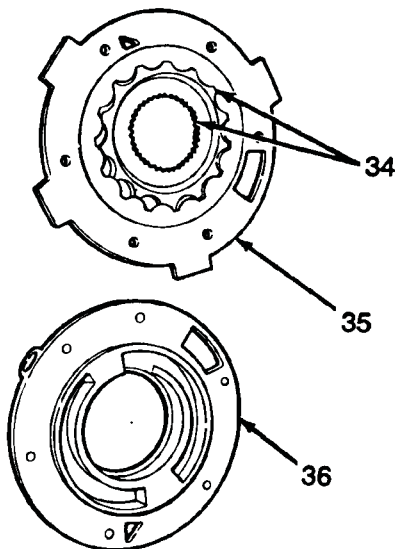
## 231/241 TRANSFER CASE - OVERHAUL

Install a replacement seal in the oil pump feed housing.

Install a replacement pickup tube O-ring (37) in the oil pump.

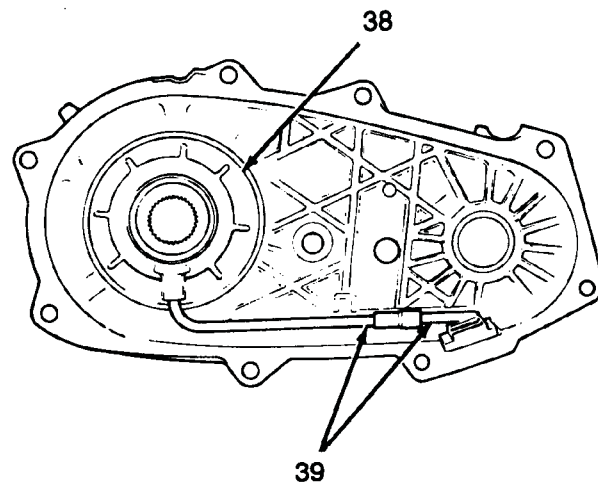
Assemble the oil pump.

- Lubricate and install the two gears (34) in the gear housing (35).
- Align and install the feed housing (36) on the gear housing.
- Install and tighten the pump screws to specified torque.



Insert the oil pick-up tube in the oil pump. Then attach the screen and connecting hose to the pick-up tube.

Install the assembled oil pump (38), pick-up tube and screen (39) in the rear case. Be sure the screen is seated in the case slot as shown.



## 231/241 TRANSFER CASE - OVERHAUL

Install the magnet in the front case.

Apply a 3 mm (1/8 inch) wide bead of sealer to the seal surface of the front case. Use RTV-type sealer.

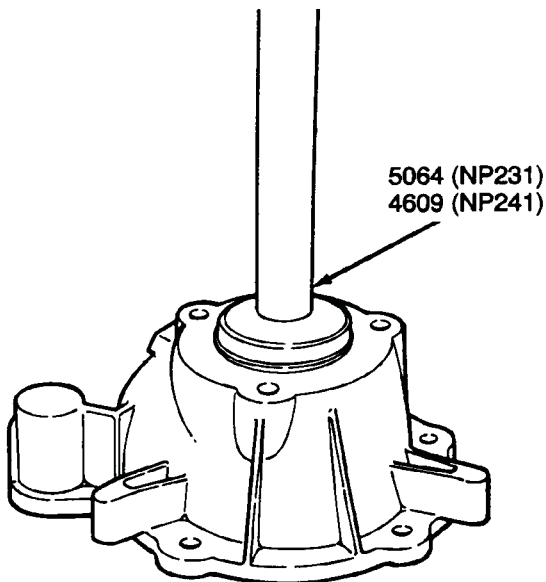
Align and install the rear case on the front case. Be sure the case locating dowels are in place and that the mainshaft splines are engaged in the oil pump inner gear.

Install and tighten the front case-to-rear case attaching bolts to specified torque.

NOTE: Be sure to install a washer under each of the bolts used at the case dowel locations.

Replace the rear bearing as follows:

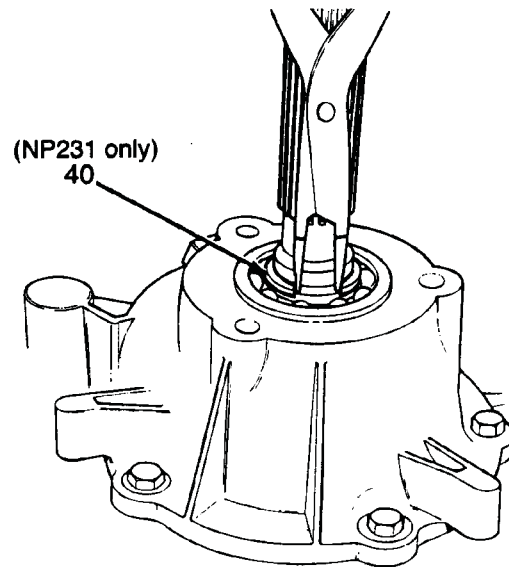
- Tap the original bearing out of the rear retainer with a hammer and brass drift on the NP231. The NP241 requires tool 4610 to remove the bearing from the retainer.
- Install the replacement bearing in the retainer with tool 5064 on the NP 231 and tool 4609 on the NP241.



Apply a 3 mm (1/8 inch) wide bead of sealer to the seal surface of the rear retainer. Use RTV-type sealer.

Install the locating dowel in the rear retainer if removed and install the rear retainer on the case. Tighten the retainer bolts to specified torque.

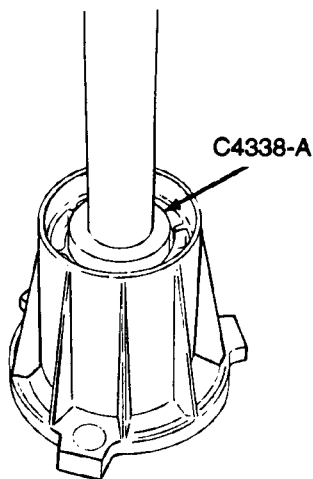
Install a replacement rear retainer snap ring (40). Lift the mainshaft slightly to seat the snap ring in the shaft groove.



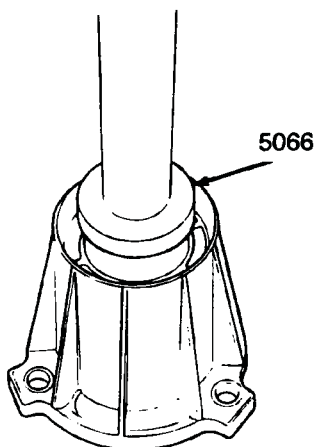
Replace the extension housing bushing as follows: This does not apply on the NP241.

- Remove the rear extension housing seal if not removed previously.
- Remove the bushing with tool C4338-A.

## 231/241 TRANSFER CASE - OVERHAUL



- Install the replacement bushing with tool 5066. The bushing is fully seated when the installer tool contacts the housing.



- Install a replacement seal in the extension housing of the NP231 and in the retainer of the NP241.

Apply a 3 mm (1/8 inch) wide bead of sealer to the seal surface of the extension housing. Use RTV-type sealer.

Install the extension housing on the case. Tighten the housing bolts to specified torque.

Install the front yoke. Secure the yoke with a replacement seal washer and nut. Tighten the nut to specified torque.

Install a replacement gasket on the vacuum switch and install the switch in the case.

Install and tighten the drain plug to specified torque.

Fill the transfer case with the required amount of MOPAR ATF PLUS automatic transmission fluid, or an equivalent Dexron® II fluid, after installation.

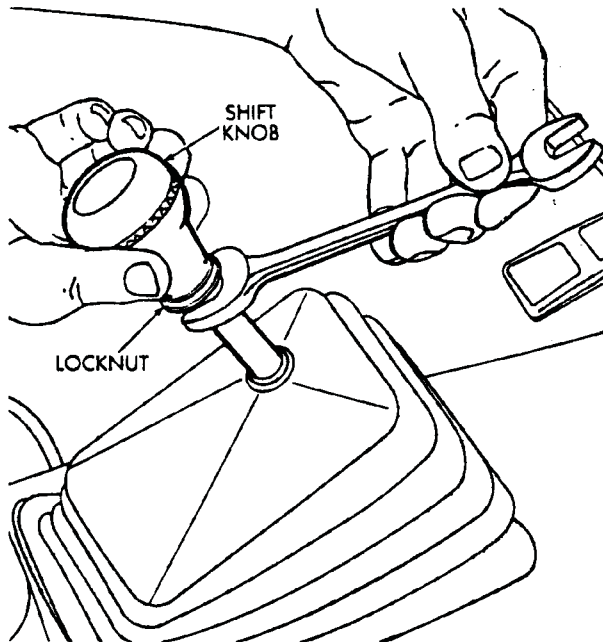
Install and tighten the fill plug to specified torque.



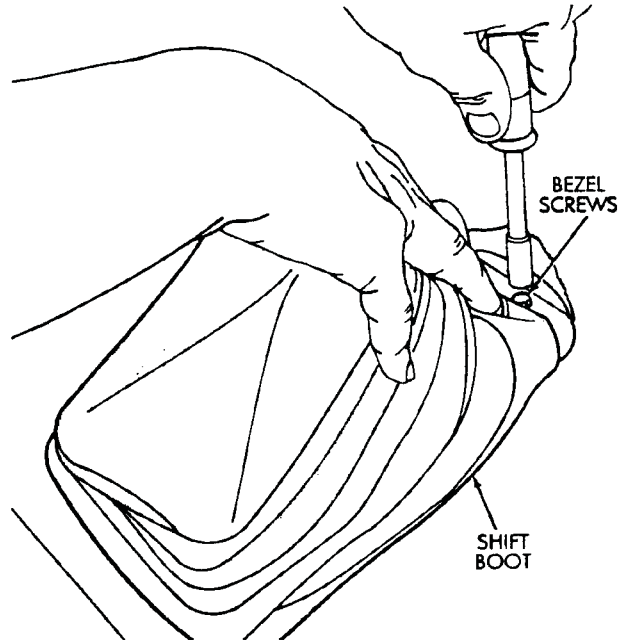
## LINKAGE ADJUSTMENT

### LINKAGE ADJUSTMENT-80 SERIES

1. Remove the transfer case shift knob locknut and remove the knob (Fig. 1-1).

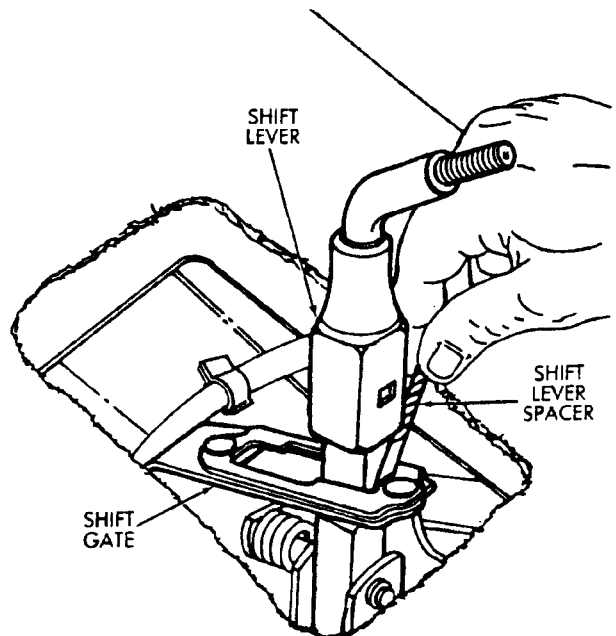


**Fig. 1-1 Removing Shift Knob**



**Fig. 1-2 Removing Shift Boot**

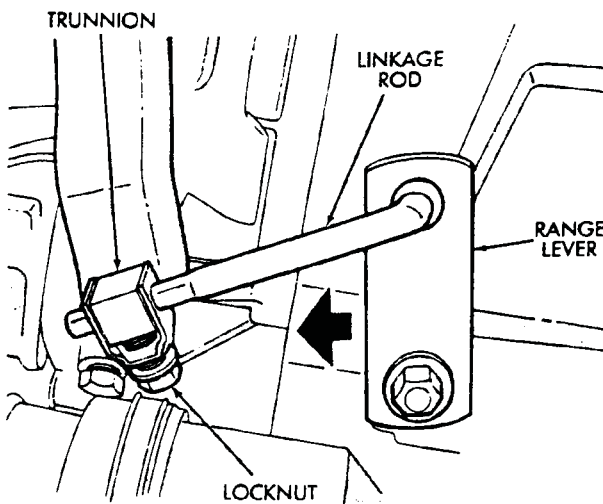
2. Remove the boot attaching screws and remove the boot (Fig. 1-2).
3. Move the shift lever into 4L position.
4. Insert a 3 mm (1/8) spacer between the shift lever and forward edge of the shift lever gate (Fig. 1-3). Secure the lever and spacer in place with tape or wire.
5. Secure the shift lever and spacer with tape or wire.
6. Raise the vehicle.



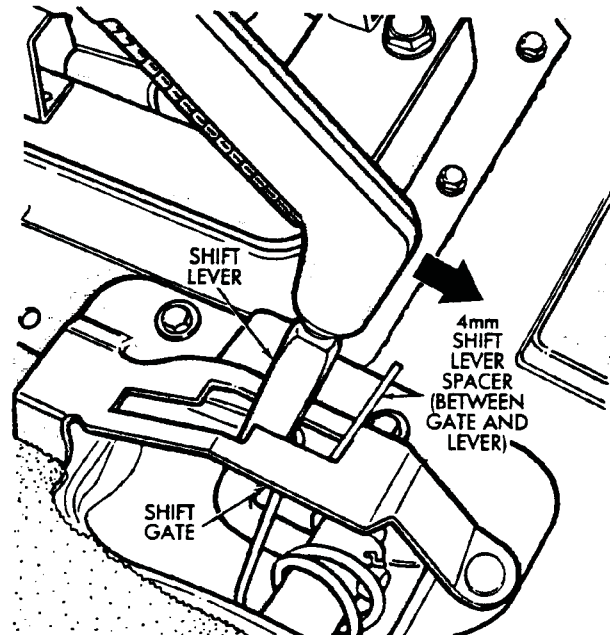
**Fig. 1-3 Installing Shift Lever Spacer-80 Series**

## LINKAGE ADJUSTMENT

7. Loosen the lock bolt on the adjusting trunnion (Fig. 1-4). The linkage rod should now slide freely in the trunnion.
8. Verify that range lever is in 4L position (Fig. 1-4).
9. Position linkage rod so it is a free fit in the range lever. Then tighten the trunnion locknut (Fig. 1-4).



**Fig. 1-4 Shift Linkage-80 Series**



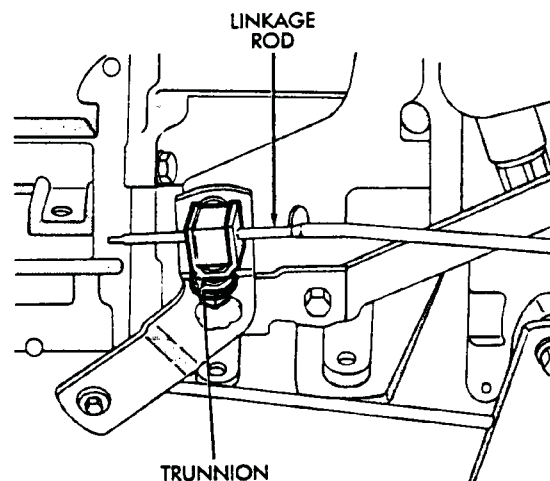
**Fig 1-5 Installing Shift Lever Spacer-60/70 Series**

5. Loosen the trunnion lock bolt (Fig. 1-6). Linkage rod should now slide freely in the trunnion.
6. Verify that transfer case range lever is in 4L position.

10. Lower the vehicle.
11. Remove the shift lever spacer and install the boot and shift knob.

### LINKAGE ADJUSTMENT-60/70 SERIES

1. Remove the shift lever boot.
2. Move the shift lever into 4L position.
3. Insert a 4 mm (.157 inch) spacer between the shift lever and forward edge of the shift lever gate (Fig. 1-5). Secure the lever and spacer in place with tape or wire.
4. Raise the vehicle.



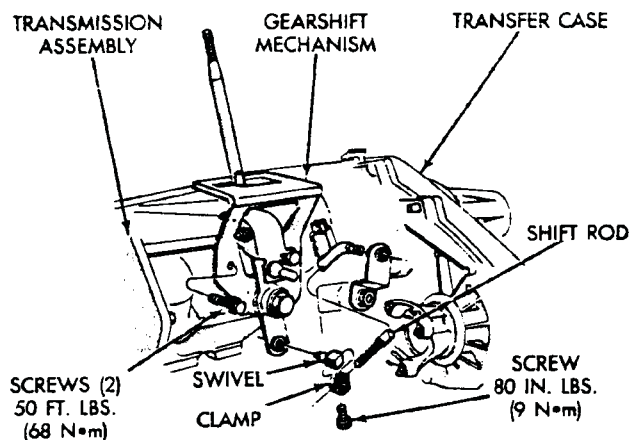
**Fig 1-6 Shift Linkage-60/70 Series**

## LINKAGE ADJUSTMENT

7. Position the linkage rod so it is a free fit in the range lever (Fig. 1-6). Then tighten the trunnion locknut.
8. Lower the vehicle.
9. Remove the shift lever spacer and install the boot and bezel.

### LINKAGE ADJUSTMENT — N-BODY

1. Place the shift lever in the 4H position.
2. Remove the screws attaching the shift lever boot to the floorpan. Slide the boot upward to provide access to the shift gate.
3. Insert a 3 mm (1/8 in.) spacer between the shift lever and the forward edge of the shift lever gate. Secure the lever and spacer in position.
4. Loosen adjusting link enough to allow linkage rod to slide freely in the link.
5. Move the transfer case range lever to the 4H position.
6. Position linkage rod so it is a "free" fit in range lever. Then tighten the setscrew, in adjusting link, securely.
7. Remove the spacer from the shift gate and install the shift lever boot.



**Fig. 1-7 Transfer Case Controls**

## LINKAGE ADJUSTMENT

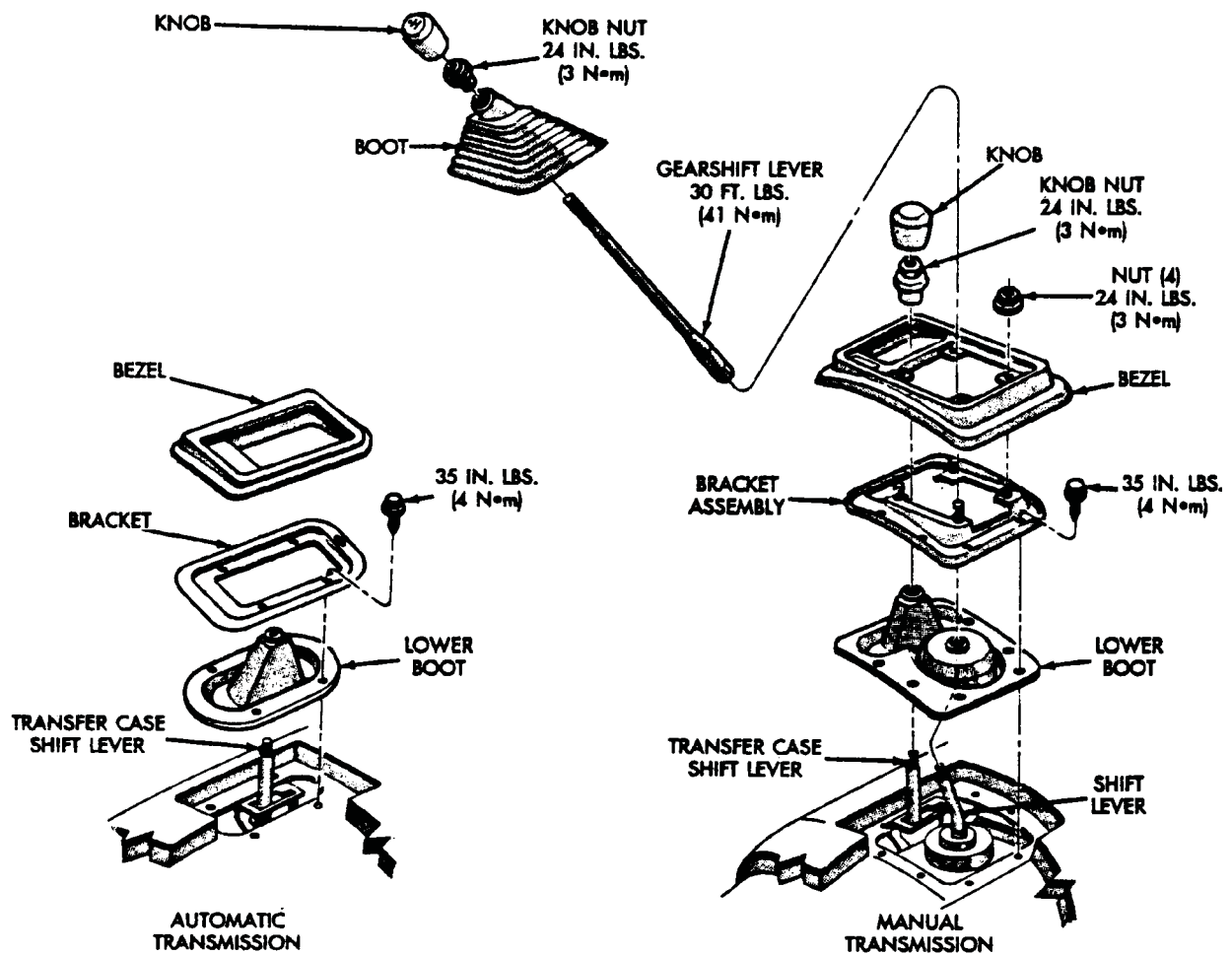


Fig. 1-8 Shift Linkage

# LINKAGE ADJUSTMENT

## LINKAGE ADJUSTMENT — D BODY

### SHIFT LINKAGE ADJUSTMENT PROCEDURE

1. POSITION SHIFT LEVER ① AGAINST 4H GATE.
2. PLACE SHIFT LEVER ② IN 4H POSITION—(VERTICAL).
3. INSTALL SHIFT ROD ④ AND TORQUE SCREW ③.
4. CYCLE SHIFT LEVER ① TO CHECK FOR PROPER FUNCTION.

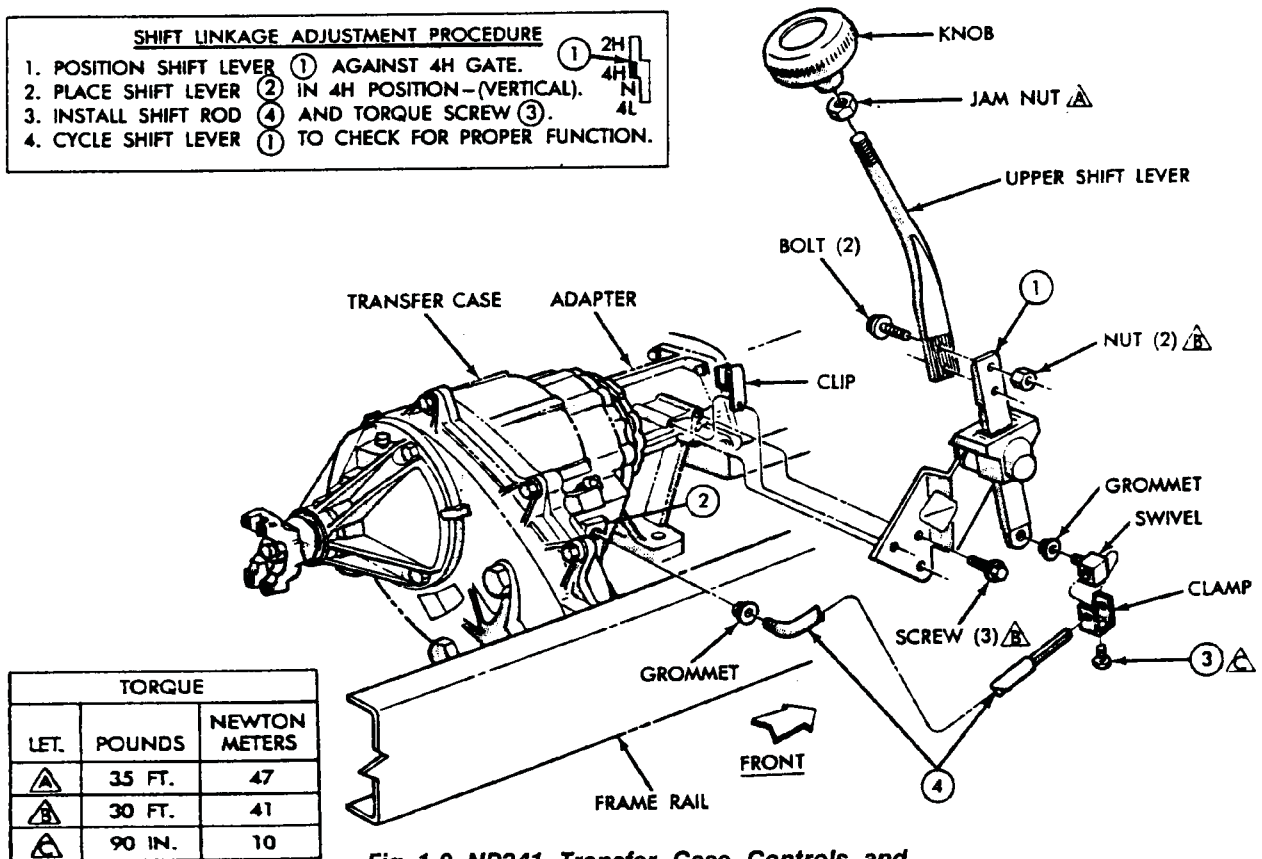


Fig. 1-9 NP241 Transfer Case Controls and Linkage Adjustment

## DIAGNOSIS - 231/241 TRANSFER CASE

Condition	Possible Cause	Correction
TRANSFER CASE DIFFICULT TO SHIFT OR WILL NOT SHIFT INTO DESIRED RANGE	<ul style="list-style-type: none"> <li>(1) Vehicle speed too great to permit shifting.</li> <li>(2) If vehicle was operated for extended period in 4H mode on dry paved surface, driveline torque load may cause difficulty.</li> <li>(3) Transfer case external shift linkage binding.</li> <li>(4) Insufficient or incorrect lubricant.</li> <li>(5) Internal components binding, worn or damaged.</li> </ul>	<ul style="list-style-type: none"> <li>(1) Stop vehicle and shift into desired range. Or reduce speed to 3-4 km/h (2-3 mph) before attempting to shift.</li> <li>(2) Stop vehicle, shift transmission to Neutral, shift transfer case to 2H mode and operate vehicle in 2H on dry paved surfaces.</li> <li>(3) Lubricate, repair or replace linkage, or tighten loose components as necessary.</li> <li>(4) Drain and refill to edge of fill hole with DEXRON II® or MOPAR-MERCON® Automatic Transmission Fluid.</li> <li>(5) Disassemble unit and replace worn or damaged components as necessary.</li> </ul>
TRANSFER CASE NOISY IN ALL DRIVE MODES	<ul style="list-style-type: none"> <li>(1) Insufficient or incorrect lubricant.</li> </ul>	<ul style="list-style-type: none"> <li>(1) Drain and refill to edge of fill hole with DEXRON II® or MOPAR-MERCON® Automatic Transmission Fluid. Check for leaks and repair if necessary. <b>Note: If unit is still noisy after drain and refill, disassembly and inspection may be required to locate source of noise.</b></li> </ul>
NOISY IN – OR JUMPS OUT OF – FOUR WHEEL DRIVE LOW RANGE	<ul style="list-style-type: none"> <li>(1) Transfer case not completely engaged in 4L position.</li> <li>(2) Shift linkage loose or binding.</li> <li>(3) Range fork damaged, inserts worn, or fork is binding on shift rail.</li> <li>(4) Low range gear worn or damaged.</li> </ul>	<ul style="list-style-type: none"> <li>(1) Stop vehicle, shift transfer case to Neutral, then shift back into 4L position.</li> <li>(2) Tighten, lubricate or repair linkage as necessary.</li> <li>(3) Disassemble unit and repair as necessary.</li> <li>(4) Disassemble and repair as necessary.</li> </ul>
LUBRICANT LEAKING FROM OUTPUT SHAFT SEALS OR FROM VENT	<ul style="list-style-type: none"> <li>(1) Transfer case overfilled.</li> <li>(2) Vent closed or restricted.</li> <li>(3) Output shaft seals damaged or installed incorrectly.</li> </ul>	<ul style="list-style-type: none"> <li>(1) Drain to correct level.</li> <li>(2) Clear or replace vent if necessary.</li> <li>(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 and nicks with fine sandpaper or replace yoke(s) if necessary.</li> </ul>
ABNORMAL TIRE WEAR	<ul style="list-style-type: none"> <li>(1) Extended operation on dry hard surface (paved) roads in 4H range.</li> </ul>	<ul style="list-style-type: none"> <li>(1) Operate in 2H on hard surface (paved) roads.</li> </ul>

## DIAGNOSIS - JEEP COMMAND TRAC

### AXLE SHIFT MOTOR FUNCTIONAL TEST

1. Raise the vehicle. Disconnect the vacuum harness from the axle shift motor and connect a vacuum pump to the vacuum shift motor front port (Fig. 1-10).
2. Apply 51 kPa (15 in. Hg) of vacuum to the front port and rotate the right front wheel to fully disengage the outer and intermediate axle shafts (i.e., into two-wheel drive operation).
3. The shift motor should maintain the vacuum applied to the front port for a minimum of 30 seconds. If the motor does not maintain the vacuum, replace it. If the motor does maintain vacuum, proceed to the next step.

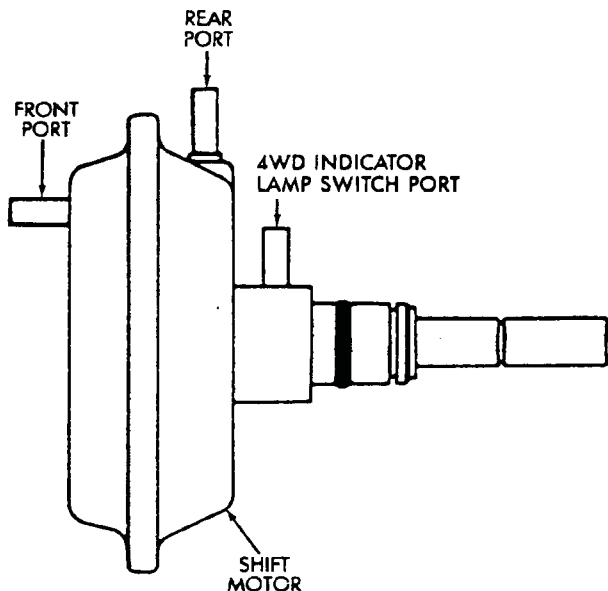


Fig. 1-10 Axle Vacuum Shift Motor

4. Disconnect the vacuum pump from the vacuum shift motor front port (Fig. 1-10). Connect the vacuum pump to the vacuum shift motor rear port, cap the port for the indicator lamp switch,

and apply 51 kPa (15 in. Hg) of vacuum to the rear port.

5. The shift motor should maintain the vacuum applied to the rear port for a minimum of 30 seconds. If the shift motor does not maintain the vacuum, replace it. If the motor does maintain vacuum, proceed to the next step.
6. Remove the cap from the port for the indicator lamp switch and determine if vacuum was present at this port. If vacuum was present, the shift motor functions normally. If vacuum was not present, proceed to the next step.
7. Apply 51 kPa (15 in. Hg) of vacuum to the shift motor rear port. Rotate the right front wheel as necessary and ensure that the outer and intermediate axle shafts are completely engaged. The axles must be completely engaged (i.e., into four-wheel drive operation) to open the port for the indicator lamp switch.
8. Determine if vacuum is present at the port for the indicator lamp switch again. If vacuum was present at the port, the shift motor functions normally. If vacuum was not present at the port, replace the shift motor.

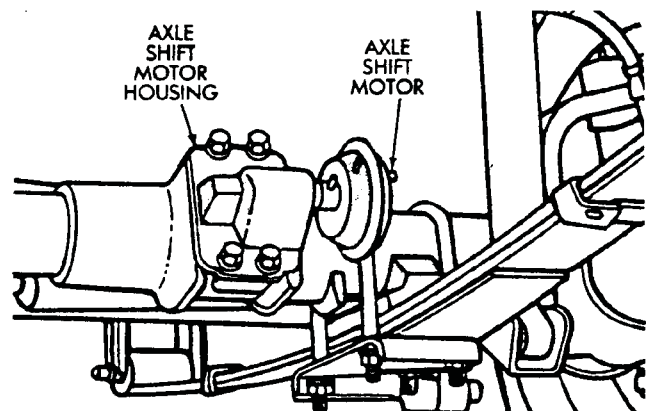


Fig. 1-11 Axle Vacuum Shift Motor and Housing

# DIAGNOSIS - DODGE RAM TRAC

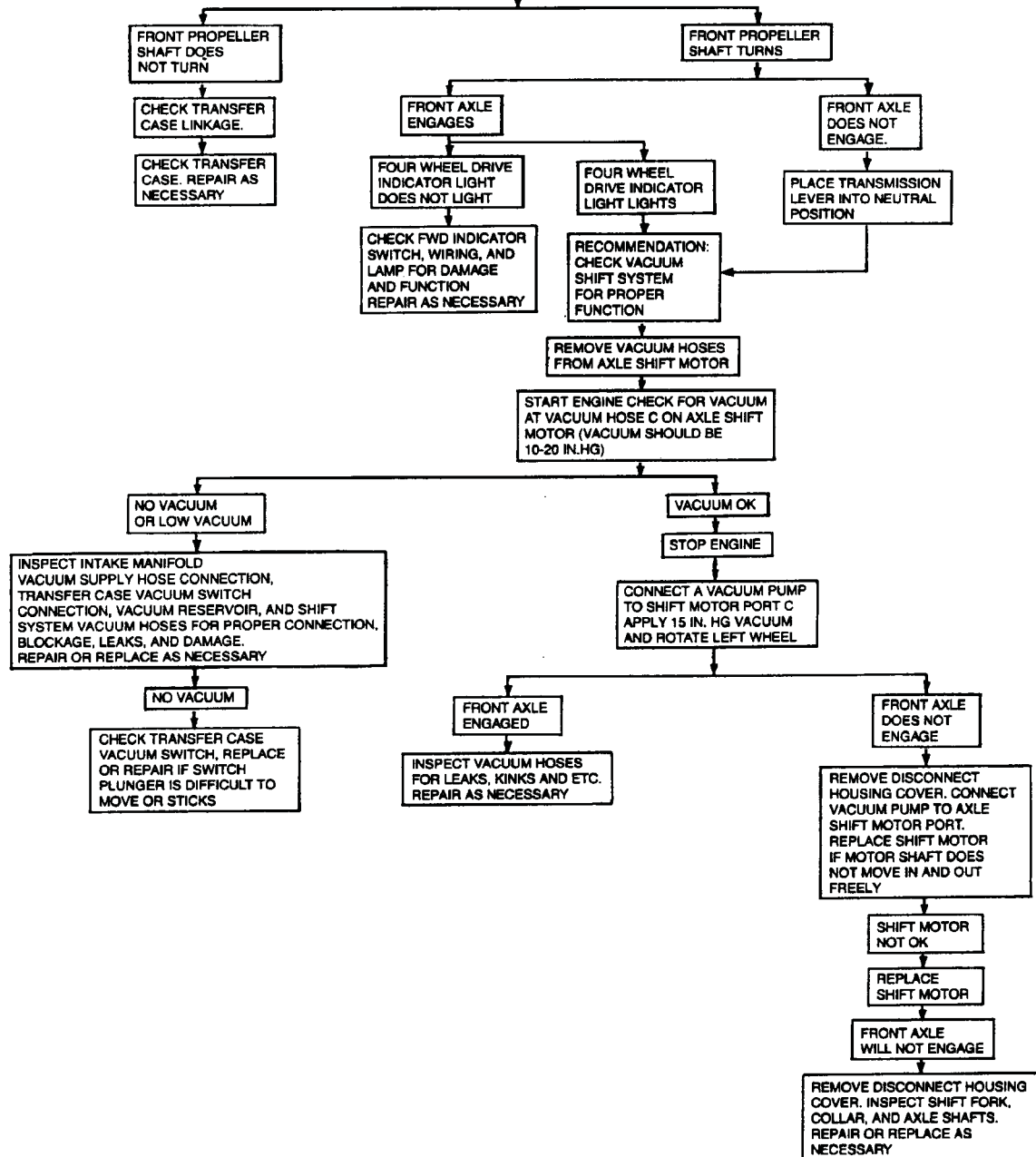
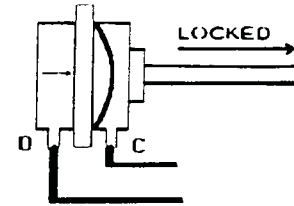
## DISCONNECT AXLE DIAGNOSIS CHART FOUR WHEEL DRIVE OPERATION

FOUR WHEEL DRIVE INDICATOR  
LIGHT DOES NOT LIGHT WHEN  
TRANSFER CASE LEVER IS IN  
4H OR 4L POSITION

RAISE VEHICLE SO ALL FOUR  
WHEELS ARE FREE TO ROTATE

START ENGINE. DEPRESS BRAKE PEDAL.  
PLACE TRANSFER CASE LEVER IN 4 H  
POSITION AND TRANSMISSION LEVER IN  
"DRIVE" (AUTOMATIC) OR IN FIRST GEAR  
(MANUAL) TO CONFIRM TRANSFER CASE  
ENGAGEMENT IN 4H. LET WHEELS  
ROTATE SLOWLY.

## AXLE - SHIFT MOTOR

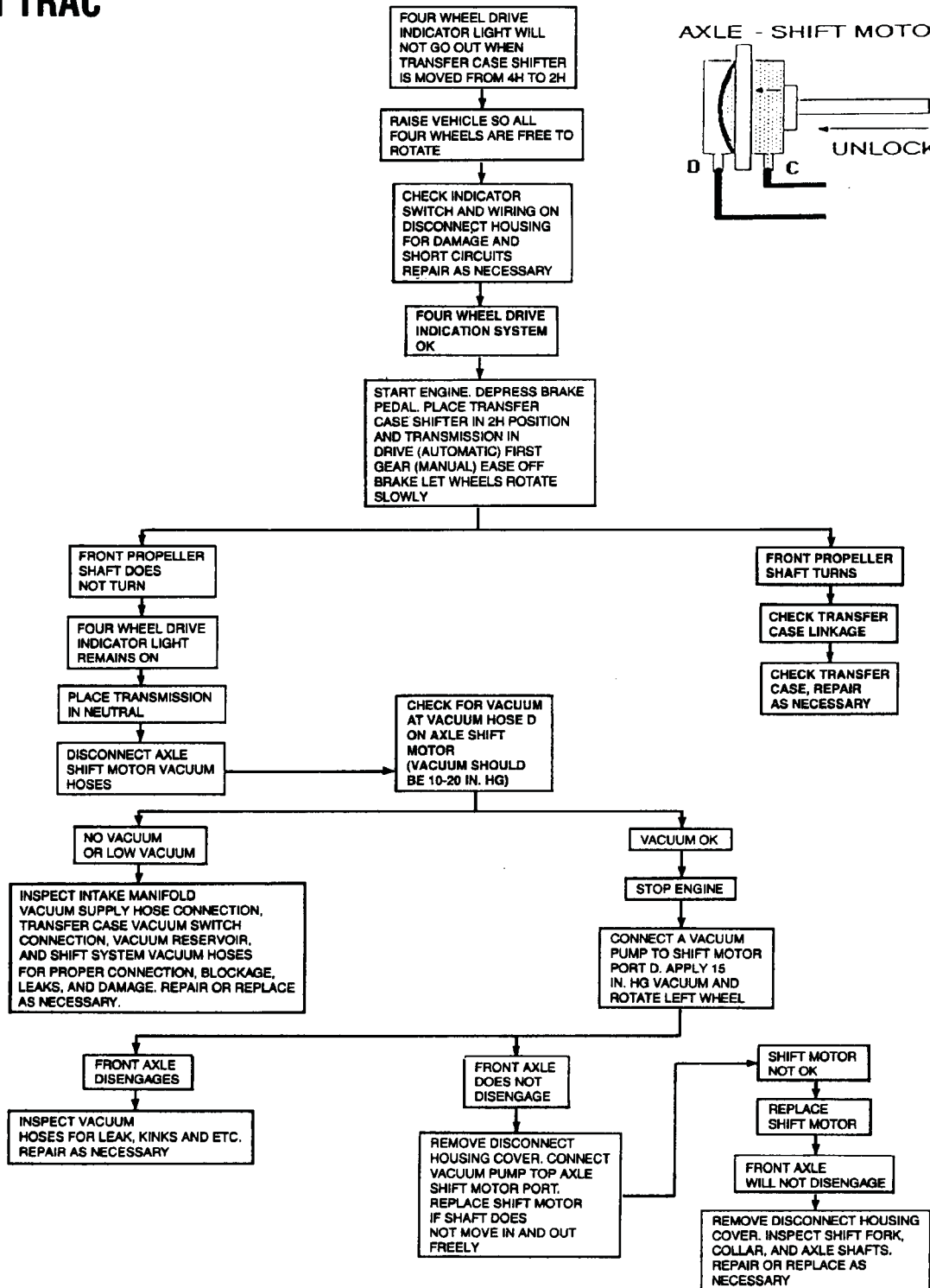
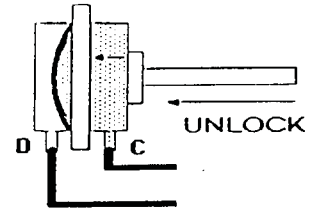




# DIAGNOSIS - DODGE RAM TRAC

## DISCONNECT AXLE DIAGNOSIS CHART TWO WHEEL DRIVE OPERATION

AXLE - SHIFT MOTOR



## 231 SPECIFICATIONS

### NP231 TRANSFER CASE

Transfer Case Type . . .	Dual-range, part-time 4-wheel-drive unit with integral low range	Drive positions and shift controls . . . . .	2H, 4H, 4L, Neutral—Ranges selected via floor-mounted shift lever.
Torque Transmittal Mode . . . . .	Drive sprocket and output shaft driven by interconnecting drive chain	Case Configuration . . .	Two-piece aluminum casting with removable extension and rear retainer.
Low Range and Reduction Ratio and Mode . . . . .	2.72:1 through annulus gear and planetary carrier - assembly	Dakota Capacity and Type . . . . .	2.5 pints (1.2 liters) MOPAR ATF PLUS (type 7176) or DEXRON II oil.
Jeep Capacity:			
60/70 Series . . . . .			
Model 81 . . . . .			

TIGHTENING REFERENCE	Ft. Lbs.	N·M
Bolt, Yoke to Front prop shaft . . . . .	25	34
Nut, Front Yoke . . . . .	110	149
Vacuum Switch . . . . .	20	27
Nut, Linkage adjusting . . . . .	7	9
Bolt, Front Case-to-Rear Case . . . . .	22	30
Bolt, Rear Retainer . . . . .	22	30
Bolt, Extension Housing . . . . .	22	30
Plug, Drain/Fill . . . . .	35	47
Nut, Transfer Case-to-Adapter . . . . .	35	47
Screw, Shift Popet . . . . .	15	20
Shift Sector Nut . . . . .	22	30
U-Joint Clamp Strap Bolts . . . . .	14	19

## 241 SPECIFICATIONS

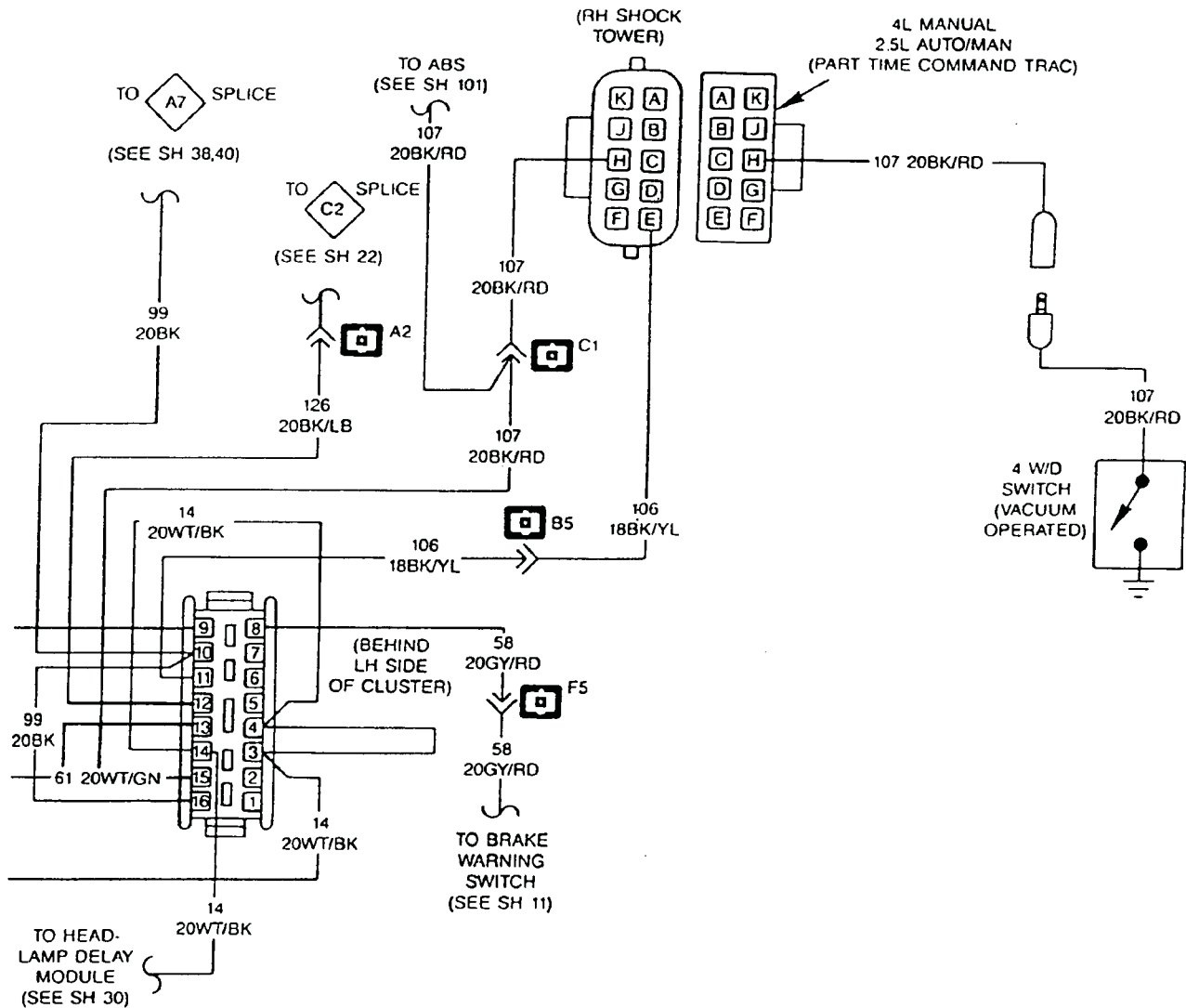
### NP241 TRANSFER CASE

Transfer Case Type . . .	4-position, dual-range, part-time 4-wheel-drive unit with integral low range	Drive positions and shift controls . . . . .	2H, 4H, 4L, Neutral—Ranges selected via floor-mounted shift lever
Torque Transmittal Mode . . . . .	Dual sprockets with interconnecting drive chain	Case Configuration . . .	Two-piece aluminum casting with removable rear retainer
Low Range Reduction Ratio and Mode . . . . .	2.6:1 through annulus gear and planetary carrier assembly	Lubricant Capacity and Type . . . . .	4.6 pints (2.1 liters) MOPAR ATF PLUS (Type 7176) or DEXRON II Oil

### TIGHTENING REFERENCE

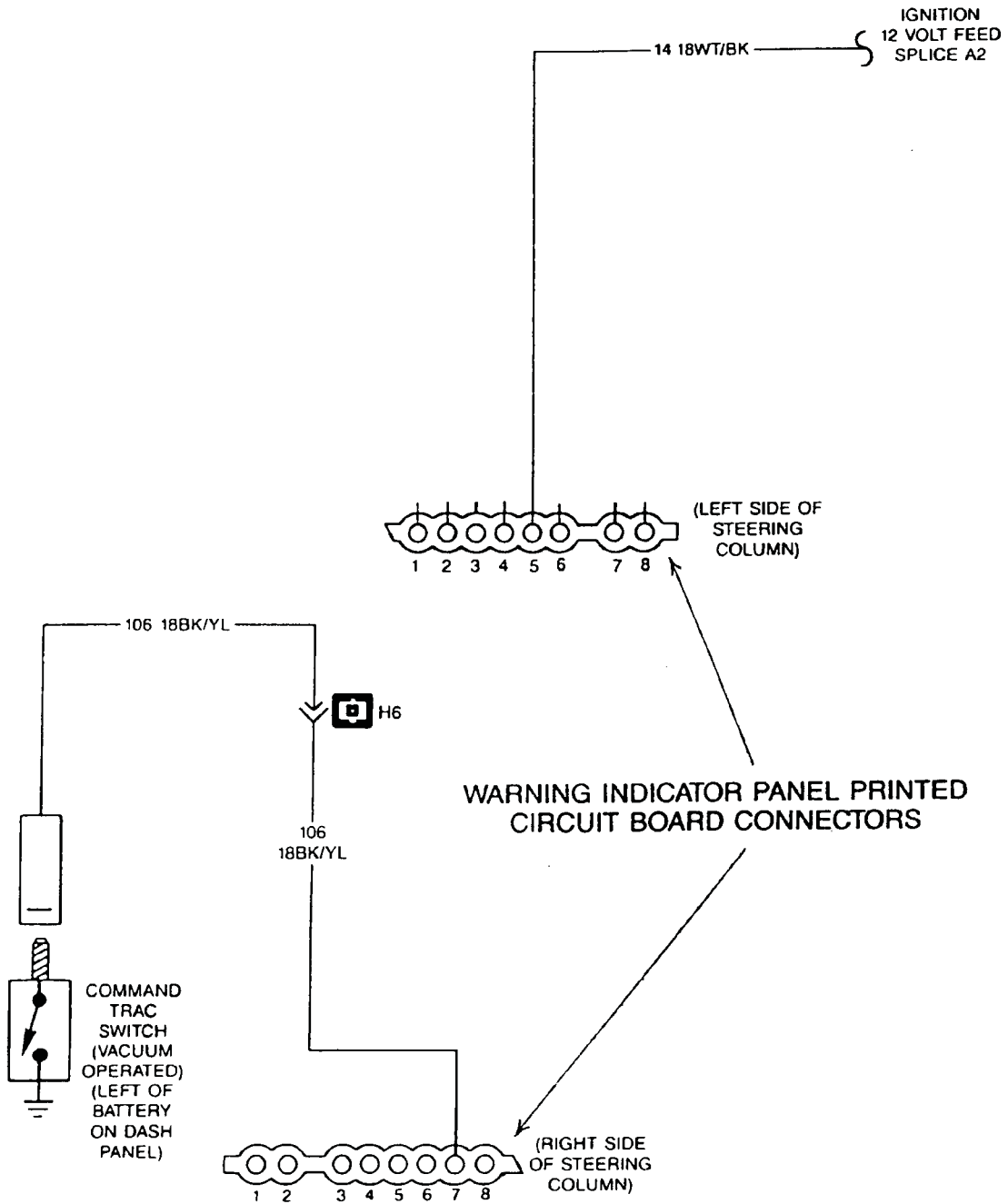
NP241 TRANSFER CASE	Ft. Lbs.	N•M		Ft. Lbs.	N•M
Detent Retainer Bolt . . . . .	23	31	Operating Lever Locknut . . . . .	90*	10
Drain and Fill Plugs . . . . .	40	54	Rear Case-to-Front Case Bolts (All)	23	31
Front and Rear Yoke Nuts . . . . .	120	163	Rear Retainer Bolts . . . . .	23	31
Indicator Switch . . . . .	18	24	Transfer Case to Extension . . . . .	40	54
*Inch Pounds					

## WIRING SCHEMATICS



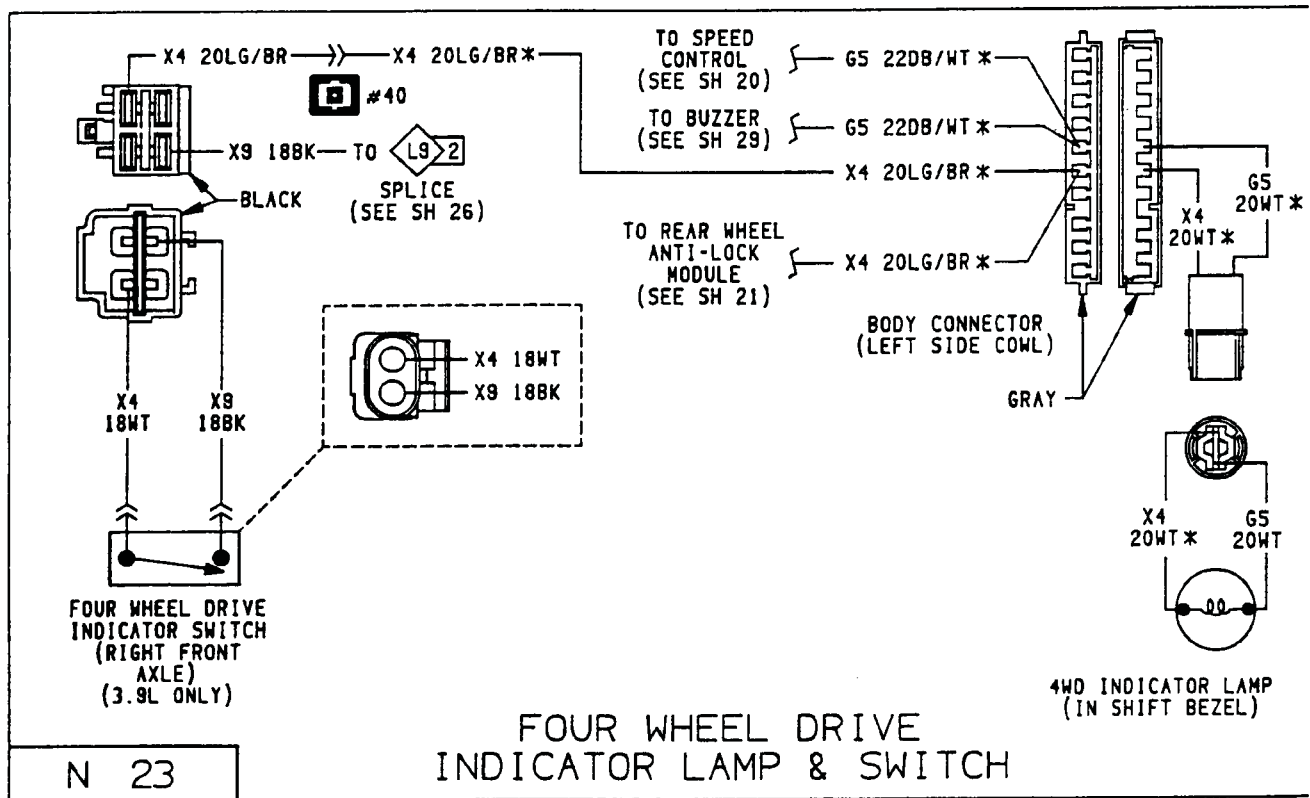
**4WD Command Trac Switch - 60/70 Series**

# WIRING SCHEMATICS

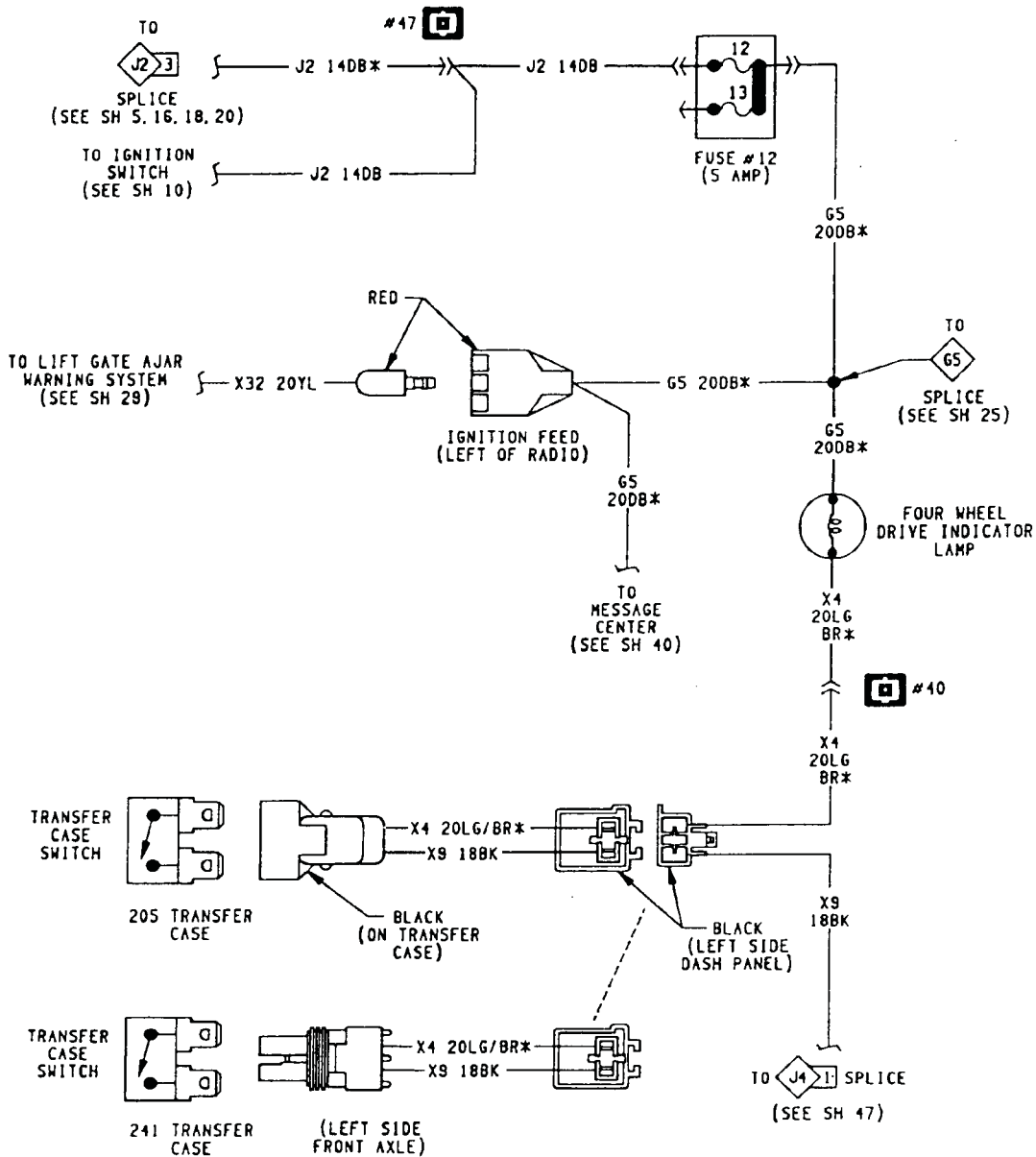


4WD Command Trac Switch - 80 Series

## WIRING SCHEMATICS



## WIRING SCHEMATICS



D 53

4 WHEEL DRIVE INDICATOR LAMP

## **TOWING PROCEDURES**

### **TOWING 4WD VEHICLES EQUIPPED WITH AUTOMATIC AXLE DISCONNECT KEY AVAILABLE - ENGINE OPERATIONAL**

With the engine running, shift the transfer case to 2H and assure that the 4WD/PART TIME reminder light is off. Drive vehicle forward then rearward approximately 10 ft. (3 m.) to make sure axle is disengaged. Shift transmission to NEUTRAL. Turn ignition key to the OFF position - NOT THE LOCK POSITION. Shift transfer case to NEUTRAL (N). Place manual transmission into gear or automatic transmission into park (P).

#### **CAUTION**

With the transfer case in the NEUTRAL (N) position, the vehicle could roll unexpectedly. The parking brake should always be applied when the driver is not in the vehicle.

### **EMERGENCY TOWING, TRANSFER CASE CANNOT BE SHIFTED TO NEUTRAL (N).**

If the engine is not operational or transfer case neutral is not obtainable, tow the vehicle with either the front or rear off the ground and the opposite end on a towing dolly to prevent the wheels from rotating their respective propeller shafts.