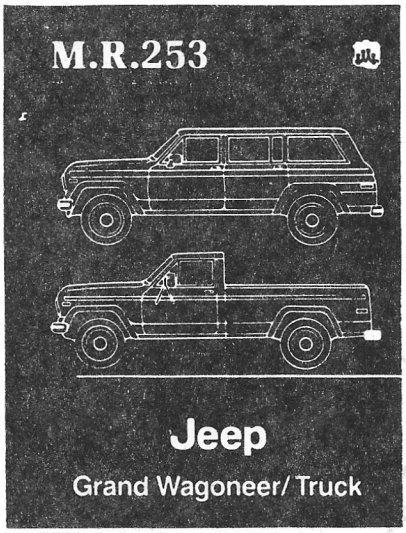



# I.S.

INFORMATIONS SERVICE
SERVICE INFORMATION
SERVICE INFORMATIONEN
SERVICE INFORMATION
INFORMACIONES SERVICIO
INFORMAZIONI SERVIZIO
SERVICEINFORMASJONER
SERVICE INFORMATIE
SERVICEINFORMATION
INFORMAÇAO SERVIÇO

**5E**

**AUGUST 1985**
**ENGLISH EDITION**

**1986 GRAND WAGONEER/ TRUCK MODELS**

R 0000
000
0000 000

## GENERAL

**Attention: Workshop, Parts Department**

### UPDATE AND REVISIONS TO WORKSHOP MANUAL

This I.S. Note contains service information unique to **1986 Grand Wagoneer/Truck models**. Only those items that apply to 1986 Grand Wagoneer/Truck models are outlined in this I.S. Note. All other service information in the M.R. 253 remains unchanged. Service information in the M.R. 253 affected by these updates/revisions include:

- General
- Electrical
- Gearboxes
- Steering and Front Axle
- Heating and Air Conditioning
- Accessories
- Special Tools

### Filing Instructions

File this I.S. Note in the M.R. 253 Manual.



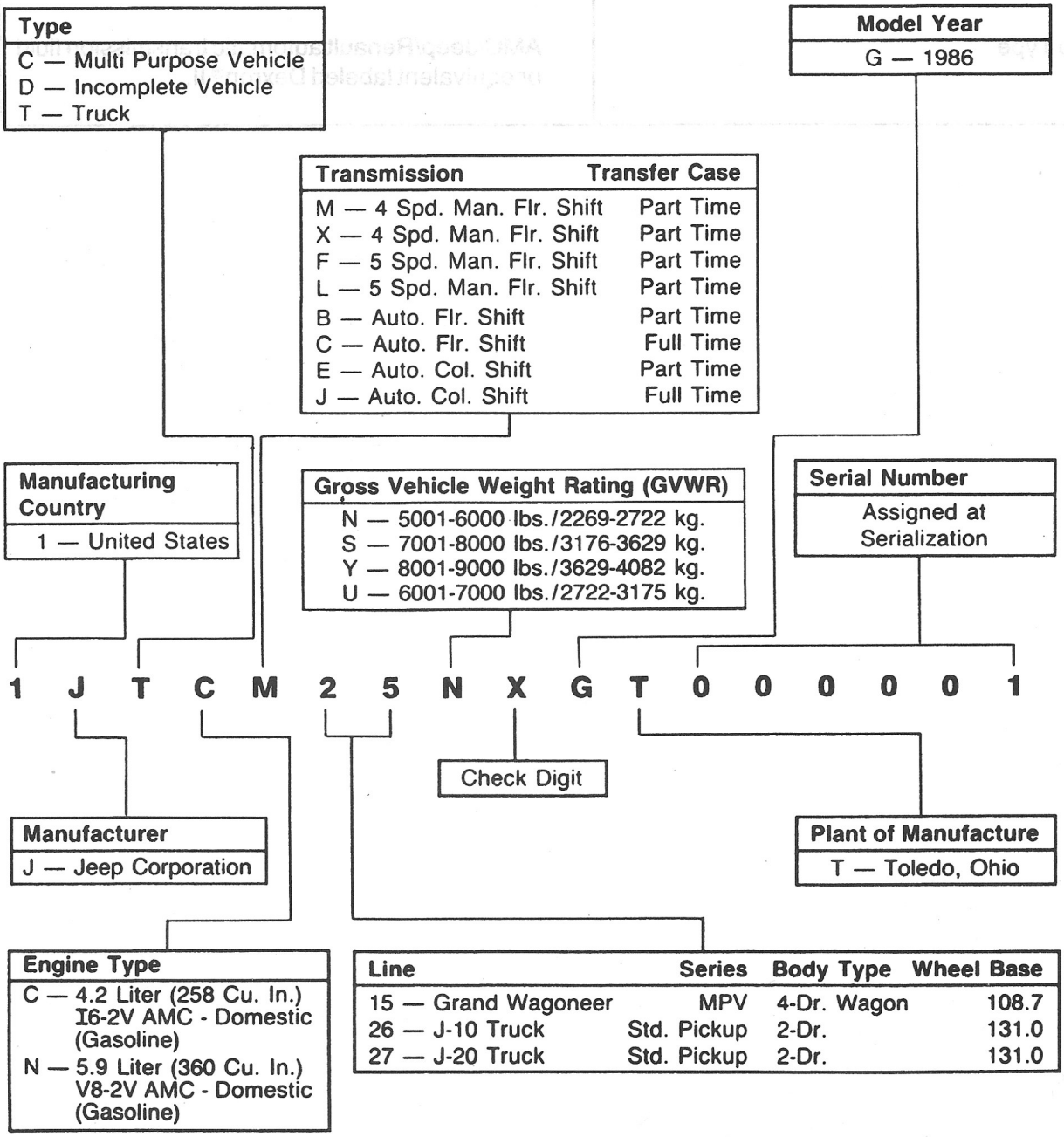
8980 000 765

# CONTENTS

## VEHICLE IDENTIFICATION NUMBER (VIN)

The vehicle identification number is embossed on a metal plate riveted to the left, front corner of the instrument panel. The plate is visible through the driver's side of the windshield base.

The 17-digit, alpha-numeric VIN is decoded as follows:




100804

## FLUIDS — LUBRICANTS — CAPACITIES

| MODEL 228 TRANSFER CASE | |
|---|---|
| Fluid Capacity | 7.0 U.S. Pints<br>5.8 Imp. Pints<br>3.3 Liters |
| Fluid Type | AMC/Jeep/Renault automatic transmission fluid or equivalent labeled Dexron® II. |

## INSTRUMENT CLUSTER GAUGE SPECIFICATIONS

### Oil Pressure Gauge Resistance (Ohms)

| | |
|---|---|
| 0 psi | 1 ohm |
| 40 psi | 46 ohm |
| 80 psi | 87 ohm |

### Temperature Gauge Resistance (Ohms)

| | |
|---|---|
| 100°F | 1365 ohm |
| 220° | 93.5 ohm |
| 260° | 55.1 ohm |

### Fuel Gauge Resistance (Ohms)

| | |
|---|---|
| Empty | 1 ohm |
| 1/2 full | 44 ohm |
| Full | 88 ohm |

### Voltmeter Calibration

| VOLTAGE INPUT | POINTER ANGLE FROM VERTICAL | TOLERANCE |
|---|---|---|
| 8V | −30.0° | ±0.6V |
| 10V | −19.1° | |
| 12V | −6.6° | |
| 14V | +6.6° | ±0.5V |
| 16V | +19.1° | |
| 18V | +30.0° | +0.6V |

## INSTRUMENT CLUSTER REMOVAL

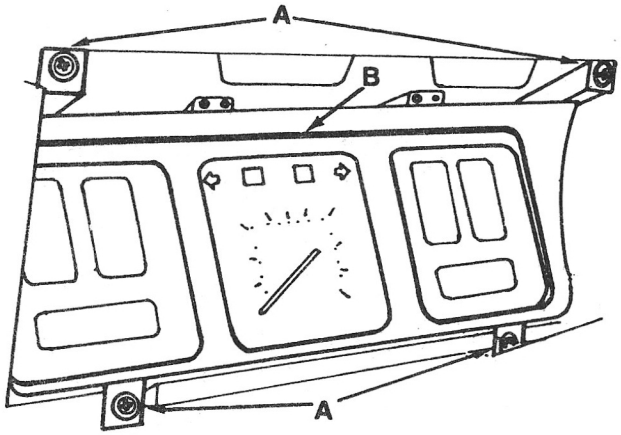
Disconnect the battery negative cable.

Remove the instrument panel bezel. Unsnap the tabs that retain the bezel in the panel and remove the bezel.

Remove the screws (A) that attach the instrument cluster (B) to the panel.

Pull the instrument cluster (B) outward and disconnect the speedometer and the cluster wire harness connectors.

Remove the instrument cluster.




100808

## INSTRUMENT CLUSTER INSTALLATION

Connect the speedometer and the cluster wire harness connectors.

Position the instrument cluster (B) in the instrument panel.

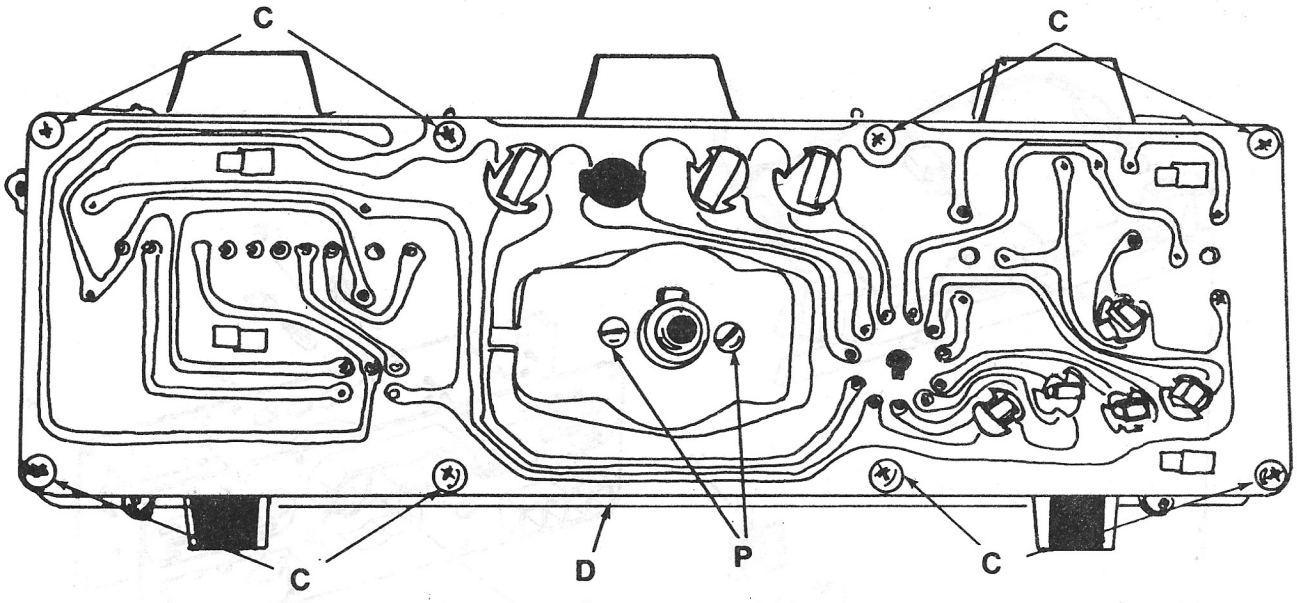
Install the screws (A) that attach the cluster (B) to the instrument panel.

Align and snap the instrument panel bezel into place in the panel. Be sure the bezel retaining tabs are all properly seated.

Connect the battery negative cable.

## DISASSEMBLY — INSTRUMENT CLUSTER

Remove the screws (C) that attach the printed circuit board (D) and cluster connector panel (E) to the cluster housing (F).




100809

Separate the housing (F) and lens (G) as an assembly from the connector panel (E).

If the lens (G) is to be replaced, remove the screws that attach the lens to the housing (F) and remove the lens.

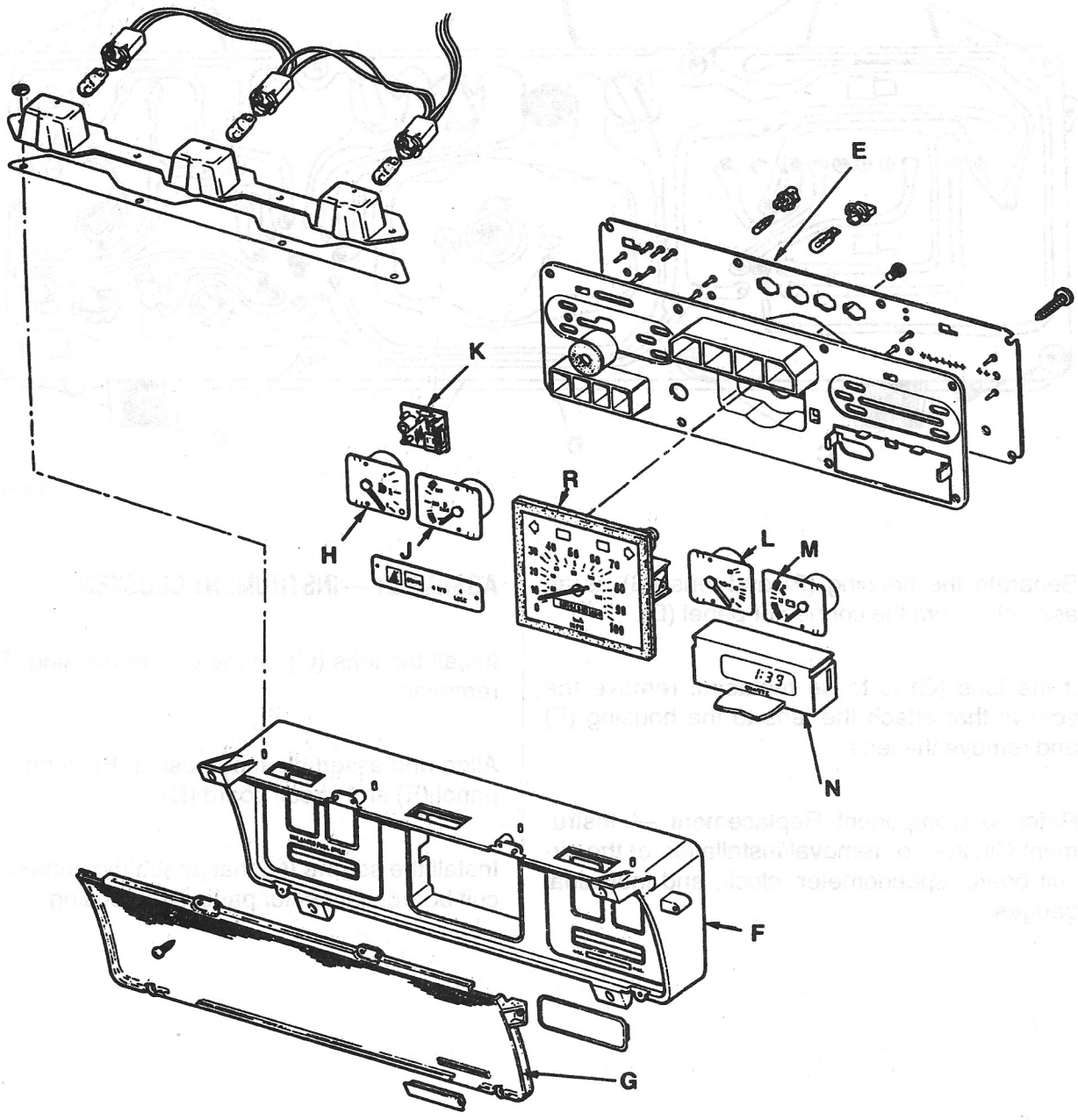
Refer to Component Replacement — Instrument Cluster, for removal/installation of the circuit board, speedometer, clock, and individual gauges.

## ASSEMBLY — INSTRUMENT CLUSTER

Install the lens (G) on the cluster housing (F) if removed.

Align and assemble the housing (F), connector panel (E) and circuit board (D).

Install the screws (C) that attach the printed circuit board, connector panel and housing.




100810

## COMPONENT REPLACEMENT — INSTRUMENT CLUSTER

### Removal — Printed Circuit Board

Remove and disassemble the instrument cluster.

Unplug and remove the following:

- fuel guage (H)
- temperature gauge (J)
- low fuel warning module (K)
- oil pressure gauge (L)
- voltmeter (M)
- clock (N)
- cluster lamp bulbs and sockets (L1, L2, L3).

Slide the printed circuit board (D) to the left to disengage it from the L-shaped tabs on the connector panel (E). Then lift and remove the circuit board.

### Installation — Printed Circuit Board

Position the printed circuit board (D) on the connector panel (E). Be sure the board is properly engaged with the tabs on the connector board.

Install the gauges, clock, and fuel warning module on the connector panel (E). Be sure all components are firmly plugged into the panel.

Install the cluster lamp bulbs and sockets (L1, L2, L3).

Assemble and install the instrument cluster.

### Removal — Gauges/Clock/ Low Fuel Warning Module

Remove and disassemble the instrument cluster.

Unplug and remove the component being replaced from the connector panel (E).

**NOTE:** The fuel gauge (H) and temperature gauge (J) must both be removed before the low fuel warning module (K) can be removed.

### Installation — Gauges/Clock/ Low Fuel Warning Module

Install the replacement gauge/clock/fuel module. Be sure the replacement component is securely plugged into the connector panel and circuit board.

Assemble and install the instrument cluster.

### Removal — Speedometer

Remove and disassemble the instrument cluster.

Remove the two speedometer attaching screws (P).

Remove the speedometer (R) from the connector panel (E).

**NOTE:** If a replacement speedometer is being installed, remove and reset the odometer. Refer to Odometer Setting — Replacement Speedometer.

### Installation — Speedometer

Position the speedometer (R) in the connector panel (E) and circuit board (D).

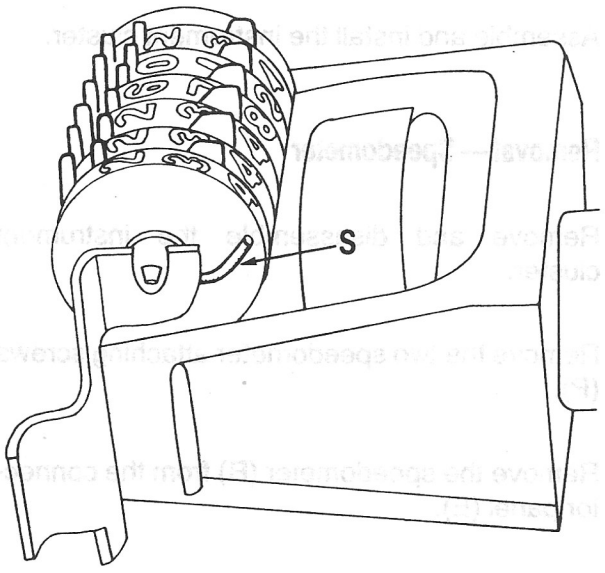
Align the speedometer attaching screw holes and install the two attaching screws (P).

Assemble and install the instrument cluster.

### Odometer Setting — Replacement Speedometer

Disengage the odometer retaining clip (S). Twist the clip and push it downward to unhook it from the odometer and odometer mounting bracket.

Lift and remove the odometer from the mounting bracket.

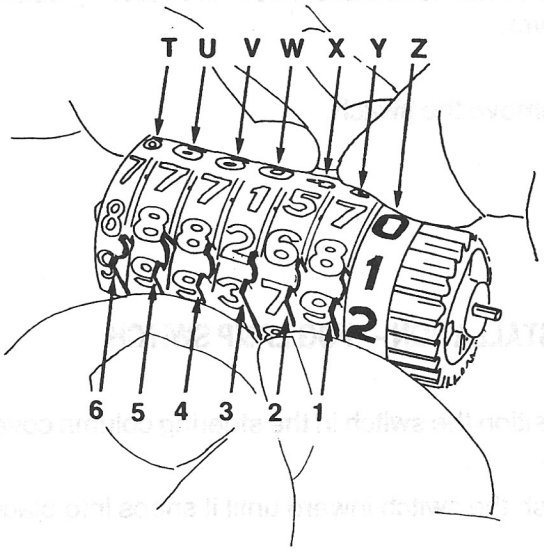



100811

Set odometer number wheels (T) through (Y) to required mileage in a left-to-right sequence as follows:

- Hold separator (6) from turning. Then rotate number wheels (H) through (Y) in normal direction until desired number on wheel (T) is obtained.
- Align separator (5) with separator (6).
- Hold separator (5) from turning. Then rotate number wheels (V) through (Y) in normal direction until desired number on wheel (U) is obtained.
- Align separator (4) with separators (5) and (6).
- Hold separator (4) from turning. Then rotate number wheels (W) through (Y) in normal direction until desired number on wheel (V) is obtained.

  Align separator (3) with separators (4), (5), and (6).
- Hold separator (3) from turning. Then rotate number wheels (X) and (Y) in normal direction until desired number on wheel (W) is obtained.
- Align separator (2) with separators (3), (4), (5) and (6).
- Hold separator (2) from turning. Then rotate number wheel (Y) in normal direction until desired number on wheel (X) is obtained.
- Align separator (1) with separators (2) through (6).
- Hold separator (1) from turning. Then rotate wheel (Y) in normal direction until desired number on wheel (Y) is obtained.




100812

Align separators (1) through (6) with the cross bar on the back of the speedometer face. Then carefully insert the odometer in the mounting bracket.

Reengage the odometer retaining clip (S) in the odometer and mounting bracket.

## REMOVAL — HEADLIGHT, DOME/ CLUSTER LIGHTS, TAILGATE AND REAR DEFOGGER CONTROL SWITCHES

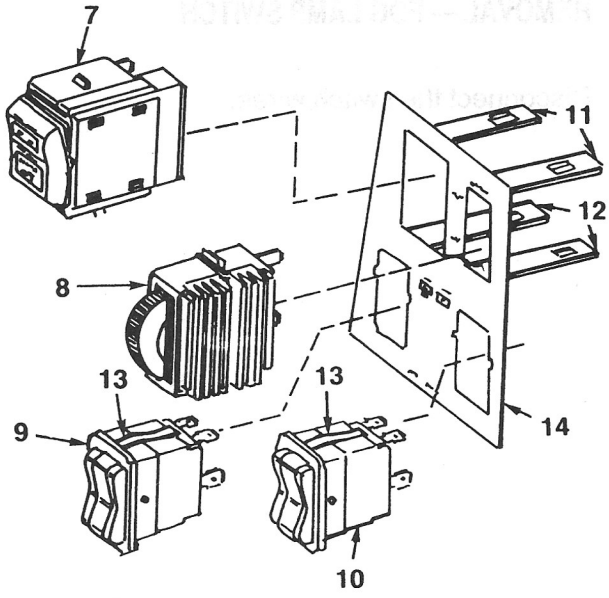
**NOTE:** The control switches for the headlights (7), dome/cluster lights (8), rear defogger (9), and tailgate (10) are all located at the left side of the instrument panel.

Remove the instrument cluster.

Disconnect the wires from the switch to be removed.

Remove the headlight switch (7) and/or dome/ cluster light switch (8). Pry switch retaining tangs (1) upward and tangs (12) downward to release the switch. Use a small, thin-blade screwdriver to move the retaining tangs.

Remove the rear defogger switch (9) and/or the tailgate switch (10). Compress the top and bottom spring clips (13) to release the switch from the panel (14).




100813

### INSTALLATION — HEADLIGHT, DOME/ CLUSTER LIGHTS, TAILGATE AND REAR DEFOGGER CONTROL SWITCHES

Position the switch in the panel opening.

Press the switch into position in the panel (14) until the switch locks into place.

Connect the switch wires.

Install the instrument cluster.

### REMOVAL — FOG LAMP SWITCH

Disconnect the switch wires.

Compress the spring clips at top and bottom of the switch to release it from the steering column cover.

Remove the switch.

### INSTALLATION — FOG LAMP SWITCH

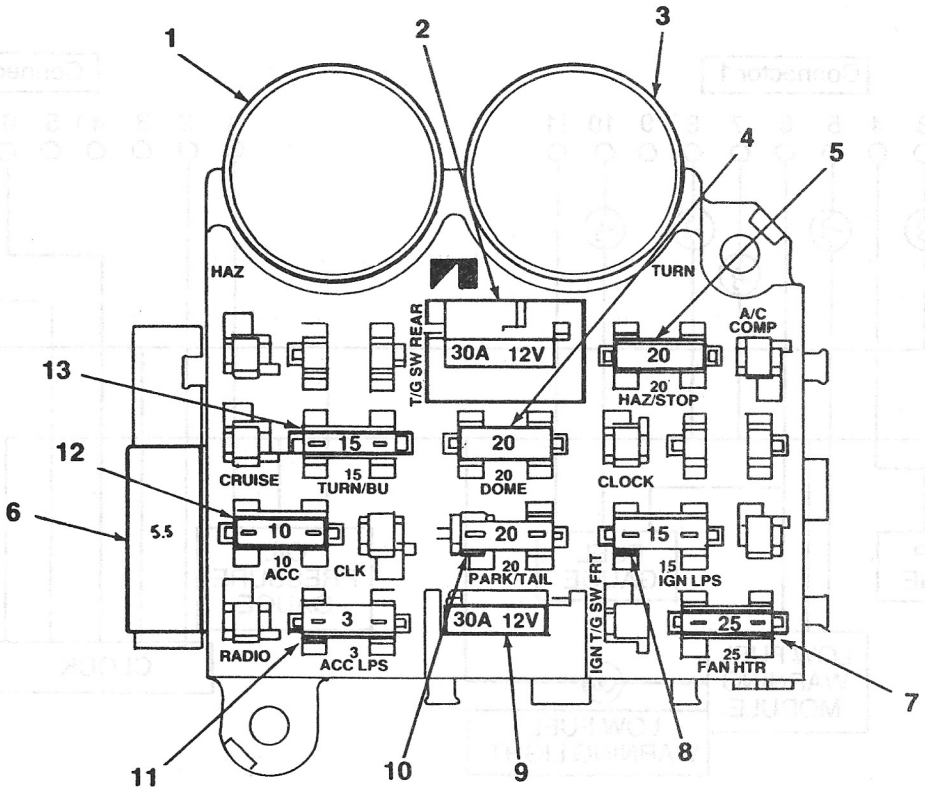
Position the switch in the steering column cover.

Push the switch inward until it snaps into place.

Connect the switch wires.

## Fuel Panel

The fuse panel on 1986 Grand Wagoneer/Truck Models, is located under the drivers side of the instrument panel. It is attached to the dash panel with two screws. Refer to the following diagram for fuse panel circuitry.




1. Hazard (Emergency) Warning Flasher

2. 30 Amp Circuit Breaker (Battery)
   - Tailgate Window — Rear Switch
   - Power Door Locks
   - Power Seats

3. Turn Signal Flasher

4. 20 Amp Fuse (Battery)
   - Dome Lamps
   - Courtesy Lamps
   - Underhood Lamp
   - Horn Relay
   - Clock (Memory)

5. 20 Amp Fuse (Battery)
   - Hazard Lamps
   - Glove Box Light
   - Chime Feed
   - Stop Lamps

6. 5.5 Amp Circuit Breaker (Ignition)
   - Wipers
   - Washer Pump

7. 25 Amp Fuse (Ignition)
   - Blower Motor Fan

8. 15 Amp Fuse (Ignition)
   - Four Wheel Drive Lamp
   - Instrument Cluster Feed
   - Rear Window Defogger
   - Seat Belt Timer

9. 30 Amp Circuit Breaker (Ignition)
   - Tailgate Window — Front Switch
   - A/C
   - Power Windows

10. 20 Amp Fuse (Battery)
    - Park/Tail Lamps
    - Cigarette Lighter
    - Headlight Buzzer

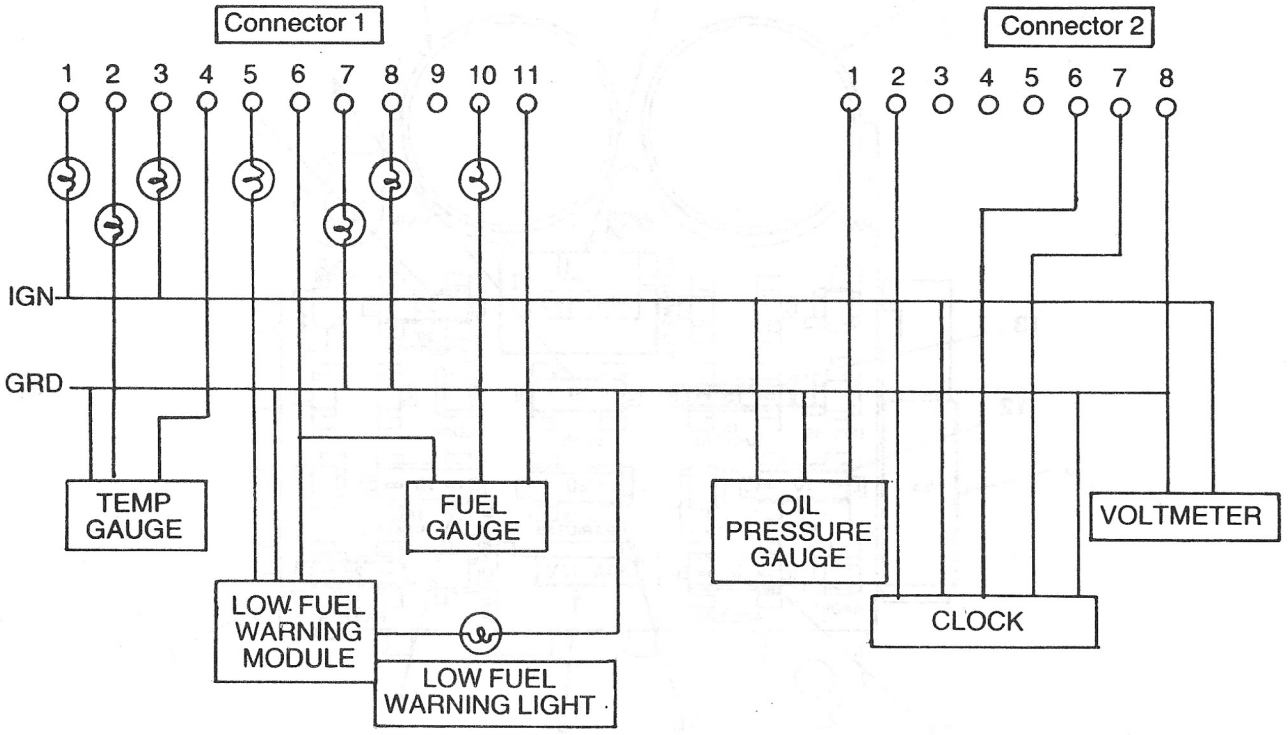
11. 3 Amp Fuse (Headlamp SW Battery)
    - Headlamp Switch Rheostat (Dimmer) for Accessory Display Lamps
    - Clock (Dimmer)

12. 10 Amp Fuse (Ignition)
    - Clock (Display)
    - Cruise Command (Plus 4 Amp Fuse)
    - Radio

13. 15 Amp Fuse (Ignition)
    - Turn Signal Lamps/Backup Lamps

100814

## Instrument Cluster Wiring Connector Circuitry




| Connector 1 | |
|---|---|
| **Term** | **Circuit Function** |
| 1 | 4 LOCK |
| 2 | FOUR WHEEL DRIVE |
| 3 | BRAKE |
| 4 | TEMPERATURE GAUGE (FROM SENDER) |
| 5 | SEAT BELT |
| 6 | FUEL GAUGE (FROM SENDER) |
| 7 | LEFT HAND TURN SIGNAL |
| 8 | HIGH BEAM |
| 9 | NO CONNECTION |
| 10 | RIGHT HAND TURN SIGNAL |
| 11 | IGNITION |

| Connector 2 | |
|---|---|
| **Term** | **Circuit Function** |
| 1 | OIL PRESSURE GAUGE (FROM SENDER) |
| 2 | BATTERY |
| 3 | NO CONNECTION |
| 4 | NO CONNECTION |
| 5 | NO CONNECTION |
| 6 | PANEL LAMP DIMMER |
| 7 | HEAD LAMP ON |
| 8 | GROUND |

100815

## GENERAL DESCRIPTION

For 1986, the Selec-Trac system features a new Model 228 transfer case.

The Model 228 provides both two-wheel drive and fully differentiated four-wheel drive operation. Torque distribution in the Model 228 is through a four pinion, open-type differential instead of the viscous coupling used in prior transfer case models.

## TRANSFER CASE INDENTIFICATION

An identification tag is attached to the rear half of the transfer case. This tag provides the transfer case model and serial numbers. The information on this tag is necessary for parts/service requirements. If the tag is removed or dislodged during service operations, it should be reattached with Loctite 312 or a similar adhesive.

## GENERAL SPECIFICATIONS — MODEL 228

Model 228 . . . . . 3 position, dual range, full-time/part-time unit, with integral low range, and a neutral position.

Torque Transmittal Mode . . . . Dual sprockets with connecting drive chain and an interaxle diffential.

Low Range Reduction Ratio and Mode . . . . . 2.60:1 through annulus gear and planetary carrier assembly.

Drive Positions and Shift Controls . . . . . 4H, 4L, Neutral. Ranges selected via floor mounted shift lever (4H range is fully differentiated. 4L range is undifferentiated.)

Lubricant Capacity and Type . . . . (3.3 liters) 7 pints AMC/Jeep Automatic Transmission Fluid or equivalent labeled Dextron® II.

100779

## MODEL 228 — TORQUE SPECIFICATIONS

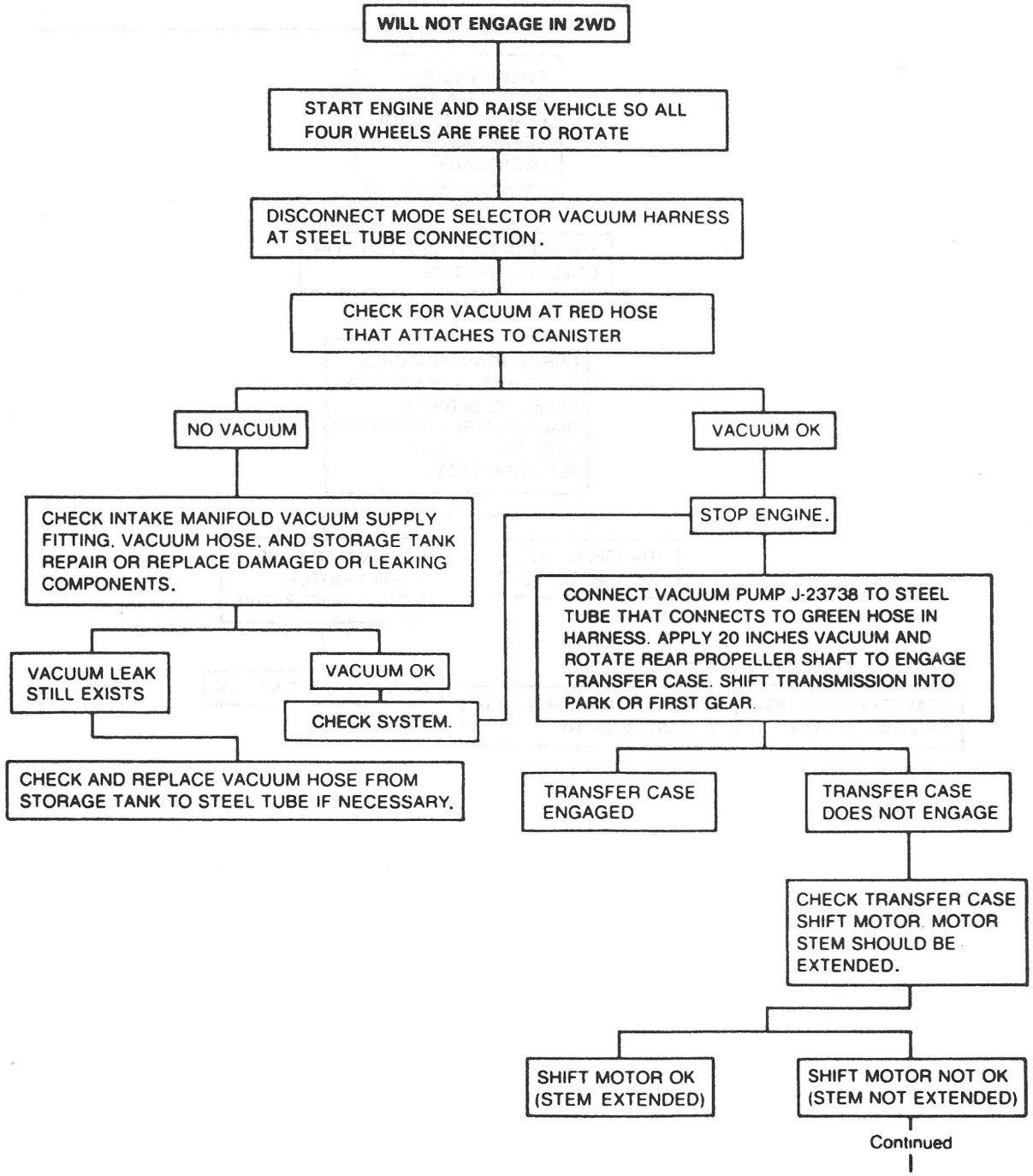
| Component | Service Set-To Torque | Service Recheck Torque |
|---|---|---|
| Detent Retainer Bolt | 31 N·m (23 ft-lbs) | 27-34 N·m (20-25 ft-lbs) |
| Drain and Fill Plugs | 24 N·m (18 ft-lbs) | 20-34 N·m (15-20 ft-lbs) |
| Front/Rear Yoke Nuts | 163 N·m (120 ft-lbs) | 122-176 N·m (90-130 ft-lbs) |
| Operating Lever Locknut | 24 N·m (18 ft-lbs) | 19-27 N·m (14-20 ft-lbs) |
| Rear Case-to-Front Case Bolts (All) | 31 N·m (23 ft-lbs) | 27-34 N·m (20-25 ft-lbs) |
| Rear Retainer Bolts | 31 N·m (23 ft-lbs) | 27-34 N·m (20-25 ft-lbs) |
| Transfer Case-to-Transmission Adapter Nuts | 35 N·m (26 ft-lbs) | 38-41 N·m (22-30 ft-lbs) |
| Universal Joint Strap Bolt-to-Transfer Case | 19 N·m (170 in-lbs) | 16-23 N·m (140-200 in-lbs) |

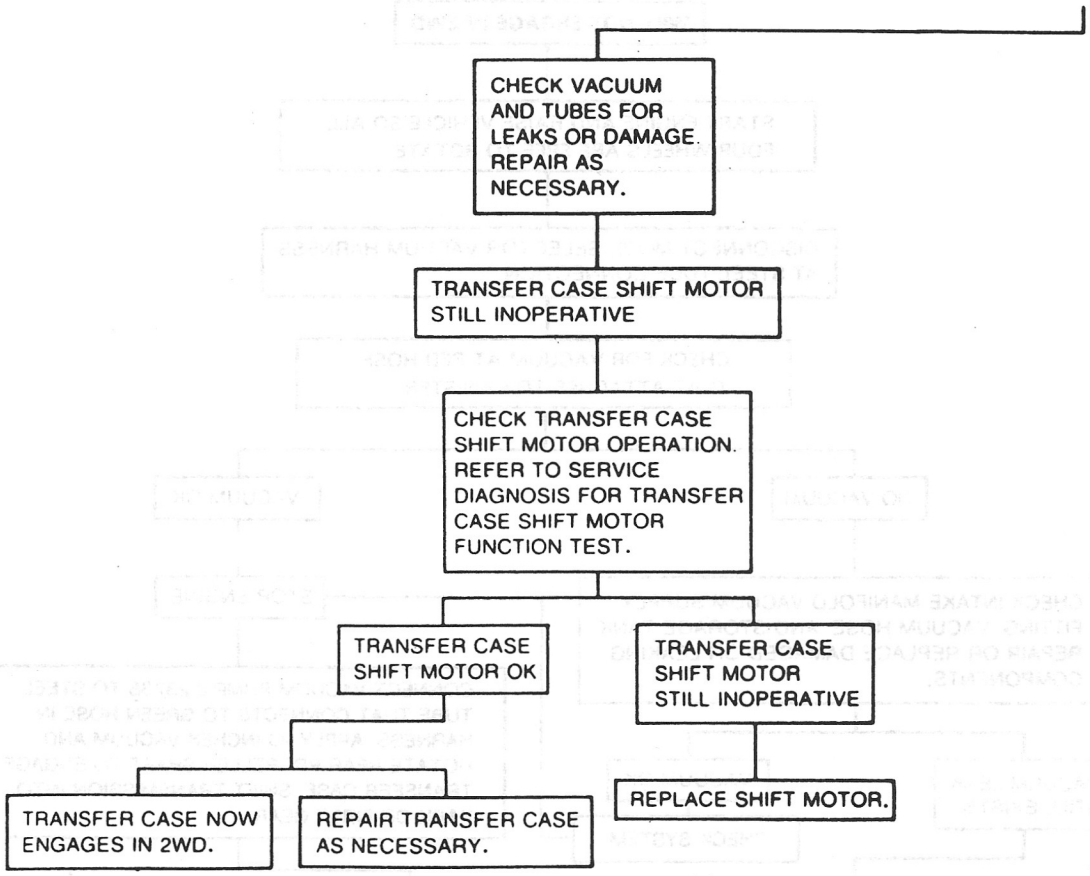
100779A

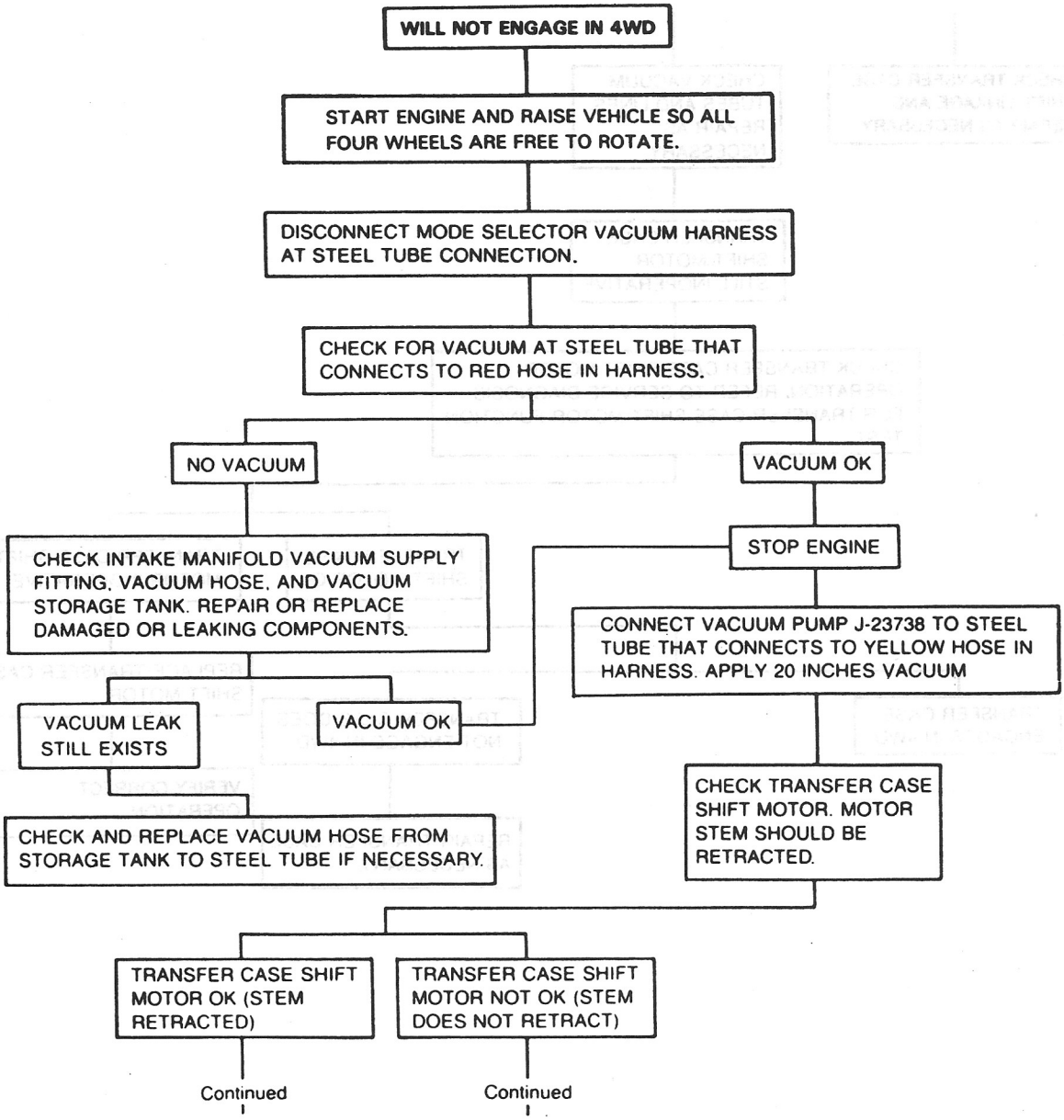
## SERVICE DIAGNOSIS — MODEL 228

When diagnosing Selec-Trac system malfunctions, refer to the shift motor function tests and service diagnosis charts provided in this section. The charts provide the procedures necessary to diagnose both mechanical and vacuum control system component malfunctions.

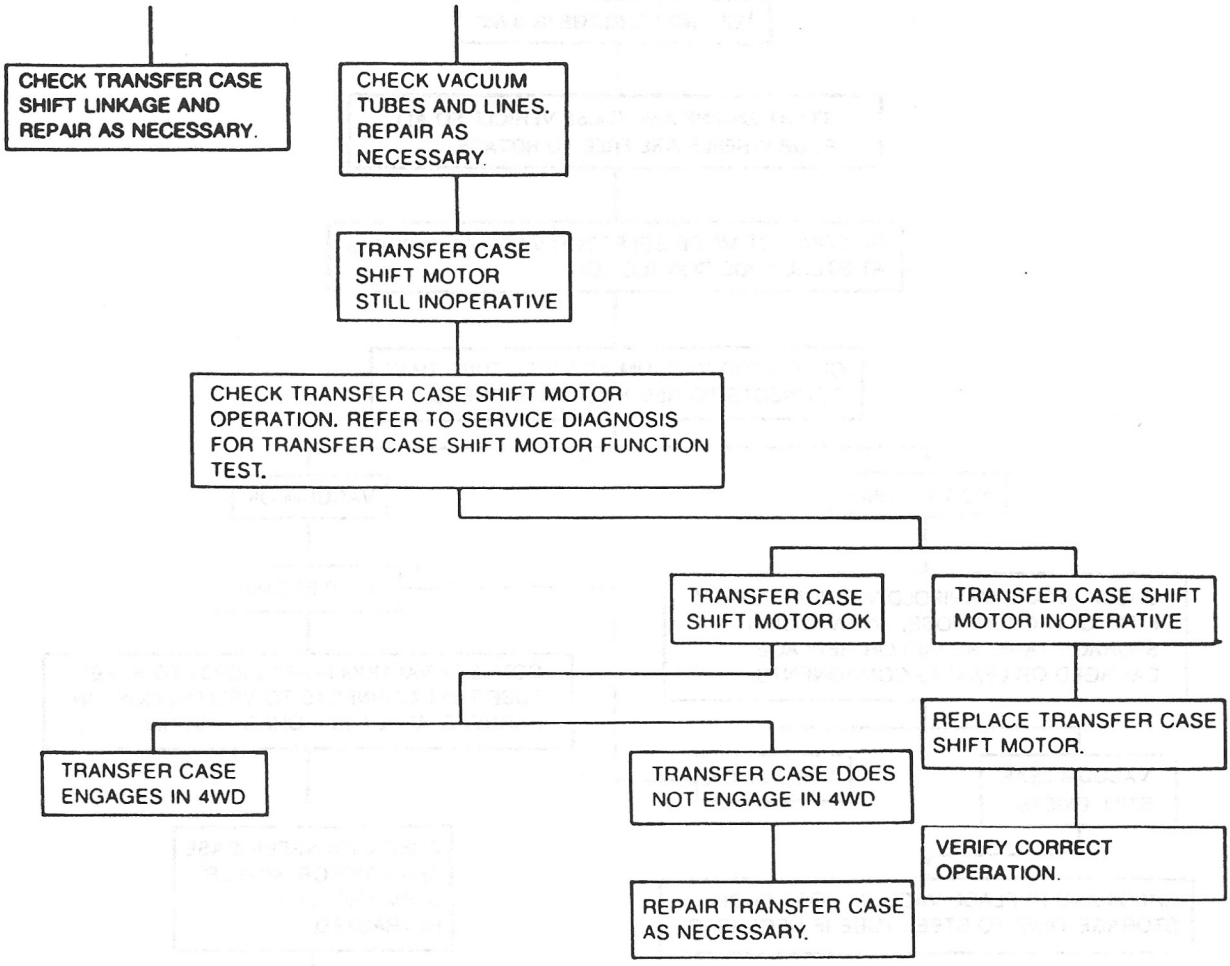
Before attempting to repair a suspected transfer case malfunction, check all other driveline components. The actual cause of a problem may instead be related to such items as the axles, propeller shafts, wheels and tires or transmission. If all the other driveline components are in good condition and operating properly, refer to the following Service Diagnosis Charts for further information.


WILL NOT ENGAGE IN 2WD
START ENGINE AND RAISE VEHICLE SO ALL FOUR WHEELS ARE FREE TO ROTATE
DISCONNECT MODE SELECTOR VACUUM HARNESS AT STEEL TUBE CONNECTION.
CHECK FOR VACUUM AT RED HOSE THAT ATTACHES TO CANISTER
NO VACUUM
VACUUM OK
CHECK INTAKE MANIFOLD VACUUM SUPPLY FITTING, VACUUM HOSE, AND STORAGE TANK REPAIR OR REPLACE DAMAGED OR LEAKING COMPONENTS.
STOP ENGINE.
VACUUM LEAK STILL EXISTS
VACUUM OK
CHECK SYSTEM.
CONNECT VACUUM PUMP J-23738 TO STEEL TUBE THAT CONNECTS TO GREEN HOSE IN HARNESS. APPLY 20 INCHES VACUUM AND ROTATE REAR PROPELLER SHAFT TO ENGAGE TRANSFER CASE. SHIFT TRANSMISSION INTO PARK OR FIRST GEAR.
CHECK AND REPLACE VACUUM HOSE FROM STORAGE TANK TO STEEL TUBE IF NECESSARY.
TRANSFER CASE ENGAGED
TRANSFER CASE DOES NOT ENGAGE
CHECK TRANSFER CASE SHIFT MOTOR. MOTOR STEM SHOULD BE EXTENDED.
SHIFT MOTOR OK (STEM EXTENDED)
SHIFT MOTOR NOT OK (STEM NOT EXTENDED)
Continued


CHECK VACUUM AND TUBES FOR LEAKS OR DAMAGE. REPAIR AS NECESSARY.
TRANSFER CASE SHIFT MOTOR STILL INOPERATIVE
CHECK TRANSFER CASE SHIFT MOTOR OPERATION. REFER TO SERVICE DIAGNOSIS FOR TRANSFER CASE SHIFT MOTOR FUNCTION TEST.
TRANSFER CASE SHIFT MOTOR OK
TRANSFER CASE SHIFT MOTOR STILL INOPERATIVE
TRANSFER CASE NOW ENGAGES IN 2WD.
REPAIR TRANSFER CASE AS NECESSARY.
REPLACE SHIFT MOTOR.


WILL NOT ENGAGE IN 4WD
START ENGINE AND RAISE VEHICLE SO ALL FOUR WHEELS ARE FREE TO ROTATE.
DISCONNECT MODE SELECTOR VACUUM HARNESS AT STEEL TUBE CONNECTION.
CHECK FOR VACUUM AT STEEL TUBE THAT CONNECTS TO RED HOSE IN HARNESS.
NO VACUUM
VACUUM OK
CHECK INTAKE MANIFOLD VACUUM SUPPLY FITTING, VACUUM HOSE, AND VACUUM STORAGE TANK. REPAIR OR REPLACE DAMAGED OR LEAKING COMPONENTS.
STOP ENGINE
CONNECT VACUUM PUMP J-23738 TO STEEL TUBE THAT CONNECTS TO YELLOW HOSE IN HARNESS. APPLY 20 INCHES VACUUM
VACUUM LEAK STILL EXISTS
VACUUM OK
CHECK AND REPLACE VACUUM HOSE FROM STORAGE TANK TO STEEL TUBE IF NECESSARY.
CHECK TRANSFER CASE SHIFT MOTOR. MOTOR STEM SHOULD BE RETRACTED.
TRANSFER CASE SHIFT MOTOR OK (STEM RETRACTED)
TRANSFER CASE SHIFT MOTOR NOT OK (STEM DOES NOT RETRACT)
Continued
Continued

84327A


CHECK TRANSFER CASE SHIFT LINKAGE AND REPAIR AS NECESSARY.
CHECK VACUUM TUBES AND LINES. REPAIR AS NECESSARY.
TRANSFER CASE SHIFT MOTOR STILL INOPERATIVE
CHECK TRANSFER CASE SHIFT MOTOR OPERATION. REFER TO SERVICE DIAGNOSIS FOR TRANSFER CASE SHIFT MOTOR FUNCTION TEST.
TRANSFER CASE SHIFT MOTOR OK
TRANSFER CASE SHIFT MOTOR INOPERATIVE
TRANSFER CASE ENGAGES IN 4WD
TRANSFER CASE DOES NOT ENGAGE IN 4WD
REPLACE TRANSFER CASE SHIFT MOTOR.
VERIFY CORRECT OPERATION.
REPAIR TRANSFER CASE AS NECESSARY.

84328A

## RANGE CONTROL LINKAGE ADJUSTMENT

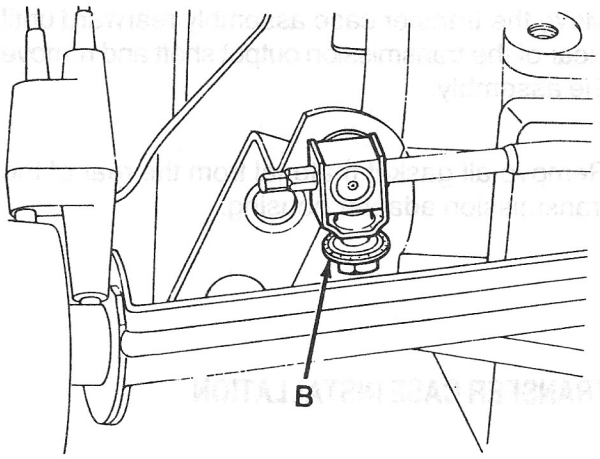
Place the range control lever in the high range position.

Insert a 3 mm (1/8-inch) spacer between the gate and lever.

Hold the lever in this position.

Place the transfer case lever in the high range position.

Adjust the link at (B) to provide a free pin fit at the transfer case outer lever.




84278

## SHIFT MOTOR FUNCTION TEST

Disconnect the vacuum hoses from the transfer case shift motor.

Connect Vacuum Pump J-23738 to the shift motor front port.

Apply 0.51 bars (15 in) of vacuum to the shift motor and rotate the rear propeller shaft to fully engage the transfer case in the four-wheel drive mode.

The shift motor should maintain the vacuum applied to the front port for a minimum of 30 seconds. If the shift motor does not maintain the vacuum, replace the motor. If the motor does maintain the vacuum, proceed to the next step.

Disconnect the vacuum pump from the shift motor front port.

Connect the pump to the shift motor rear port, plug the front axle connecting port, and apply 0.51 bars (15 in) of vacuum to the motor.

Shift automatic transmission into park. Shift manual transmission into first gear.

The shift motor should maintain vacuum applied to the rear port for a minimum of 30 seconds. If the shift motor does not maintain vacuum, replace the motor. If the motor does maintain vacuum, proceed to the next step.

Remove the cap from the shift motor axle connecting the port and check for vacuum at the port. If there is no vacuum at the port, rotate the rear propeller shaft as necessary to ensure a complete transfer case engagement.

**NOTE:** The transfer case must be completely engaged before the shift motor stem will extend fully and open the axle interconnecting port.

If vacuum is now present at the shift motor axle connecting port after fully engaging the transfer case, refer to the Service Diagnosis charts.

If vacuum is still not present at the shift motor axle connecting port, slide the boot away from the shift motor stem and measure the distance the stem has extended. The stem should extend a distance of 5/8-inch as measured from the edge of the shift motor housing to the E-ring on the stem.

If the shift motor stem does not extend the specified distance, refer to the Service Diagnosis charts.

If the shift motor stem does extend the specified distance but vacuum is still not present at the axle connecting port, replace the motor.

## SHIFT MOTOR REMOVAL

Disconnect the shift motor link from the range lever. Remove and discard the lever grommet.

Remove the nut and bolt that attach the shift motor bracket to the transfer case and remove the bracket and motor as an assembly.

Slide the shift motor boot inside and remove the E-ring that retains the motor in the bracket. Remove the motor.

## SHIFT MOTOR INSTALLATION

Position the motor in the bracket and install the E-ring.

Install the boot if removed.

Position the motor and bracket assembly on the transfer case and install the bracket attaching nut and bolt.

Install a replacement grommet in the range lever and connect the shift motor link to the transfer case range lever.

## TRANSFER CASE REMOVAL

Raise and support the vehicle.

Drain the lubricant from the transfer case.

Disconnect the speedometer cable and vent hose. Disconnect the transfer case shift lever link at the operating lever.

Place a support stand under the transmission and remove the rear crossmember.

Mark the transfer case front and rear output shafts at the transfer case yokes and propeller shafts for installation alignment reference.

Disconnect the front and rear propeller shafts at the transfer case yokes. Secure the shafts.

Disconnect the shift motor vacuum hoses.

Disconnect the transfer case shift linkage.

Remove the transfer case-to-transmission bolts.

Move the transfer case assembly rearward until clear of the transmission output shaft and remove the assembly.

Remove all gasket material from the rear of the transmission adapter housing.

## TRANSFER CASE INSTALLATION

Align and attach the transfer case assembly to the transmission. Ensure the transfer case input gear splines are aligned with the transmission output shaft. Align the splines by rotating the transfer case rear output shaft yoke, if necessary.

**NOTE:** Do not install any transfer case attaching bolts until the transfer case is completely seated with the transmission.

Align and install the transfer case attaching bolts. Tighten the bolts with a torque of 54 N•m (40 ft-lbs).

Align the reference marks and connect the propeller shafts.

Connect the speedometer cable and vent hose. Connect the transfer case shift lever link to the operating lever.

Install the rear crossmember and remove the transmission support stand.

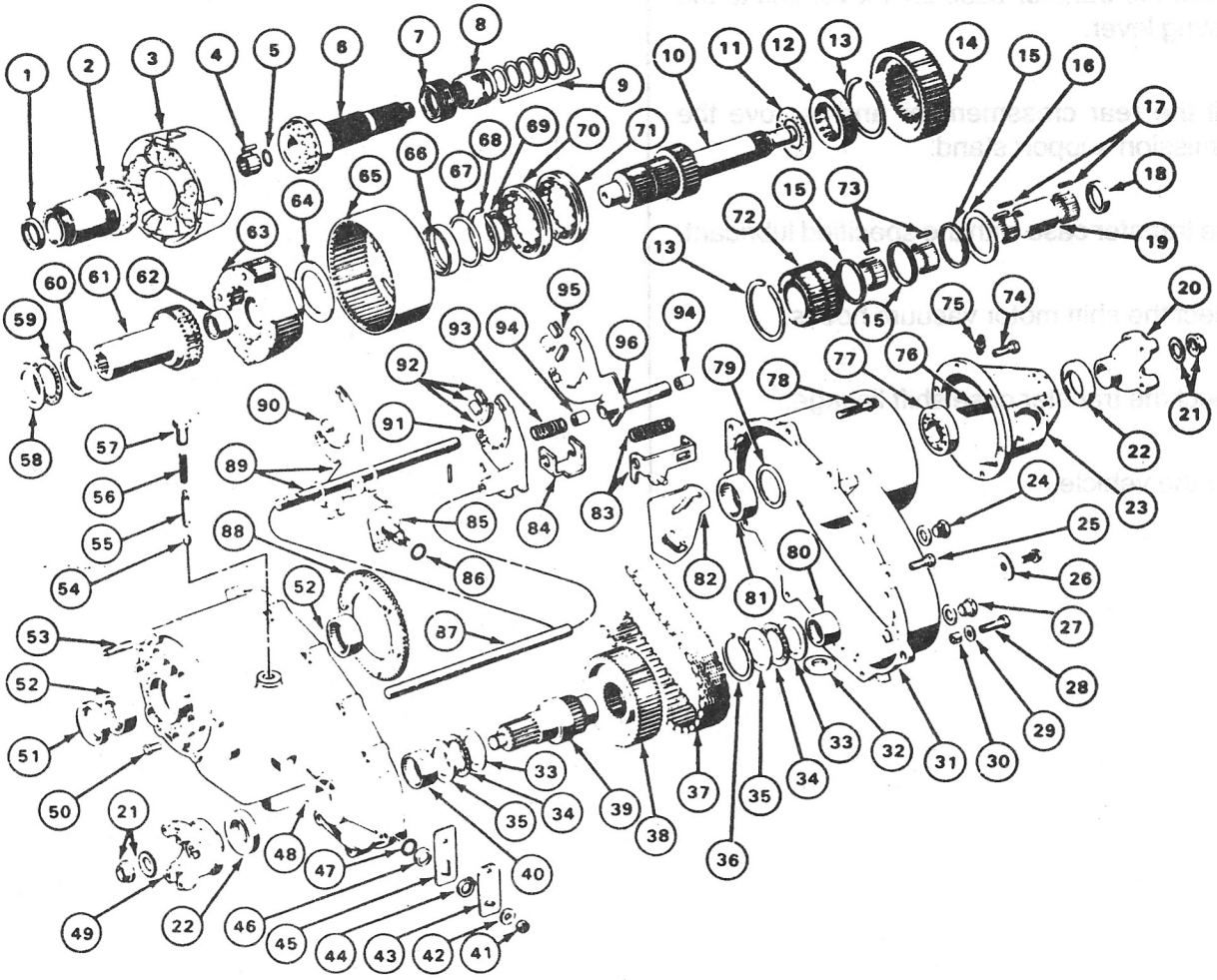
Fill the transfer case with the specified lubricant.

Connect the shift motor vacuum hoses.

Connect the transfer case shift linkage.

Lower the vehicle.

## MODEL 228 TRANSFER CASE



1. Spacer
2. Side Gear
3. Differential
4. Pilot Bearing Rollers (15)
5. O-Ring Seal
6. Rear Output Shaft
7. Oil Pump
8. Speedometer Drive Gear
9. Shim Kit
10. Mainshaft
11. Mainshaft Thrust Washer
12. Spline Gear
13. Retaining Ring
14. Drive Sprocket
15. Drive Spacer
16. Sprocket Thrust Washer
17. Side Gear Roller (82)
18. Spacer (Short)
19. Spacer (Long)
20. Rear Yoke
21. Nut and Seal Washer
22. Seal
23. Rear Retainer
24. Plug Assembly
25. Bolt
26. Identification Tag
27. Plug Assembly
28. Dowel Bolt
29. Dowel Bolt Washer
30. Case Half Dowel
31. Rear Case
32. Magnet
33. Front Output Shaft Bearing Race (Thick)
34. Front Output Shaft Thrust Bearing
35. Front Output Shaft Bearing Race (Thin)
36. Retaining Ring
37. Chain
38. Driven Sprocket
39. Front Output Shaft
40. Front Output Front Bearing
41. Nut
42. Washer
43. Mode Lever
44. Snap Ring
45. Range Lever
46. O-Ring Retainer
47. O-Ring Seal
48. Front Case
49. Front Output Yoke
50. Low Range Plate Bolt
51. Input Shaft Oil Seal
52. Input Shaft Bearing
53. Stud
54. Detent Ball
55. Detent Plunger
56. Detent Spring
57. Detent Bolt
58. Input Race
59. Input Thrust Bearing
60. Input Race (Thick)
61. Input Shaft
62. Input Bearing
63. Planetary Gear Assembly
64. Input Gear Thrust Washer
65. Annulus Gear Assembly
66. Annulus Bushing
67. Thrust Washer
68. Retaining Ring
69. Thrust Bearing
70. High Range Sliding Clutch Sleeve
71. Mode Sliding Clutch Sleeve
72. Sprocket Carrier
73. Sprocket Carrier Bearings (120)
74. Rear Retainer Bolt
75. Vent
76. Vent Seal
77. Output Bearing
78. Bolt
79. Seal
80. Front Output Rear Bearing
81. Output Shaft inner Bearing
82. Range Sector
83. Range Bracket (Outer) and Spring
84. Range Bracket (Inner)
85. Mode Sector
86. O-Ring Seal
87. Range Rail
88. Low Range Lockout Plate
89. Mode Fork, Rail and Pin
90. Mode Fork Pad
91. Range Fork
92. Range Fork Pads
93. Range Bracket Spring (Inner)
94. Locking Fork Bushing
95. Locking Fork Pads
96. Locking Fork

100894

## TRANSFER CASE DISASSEMBLY

Remove the drain plug and drain the lubricant from the transfer case.

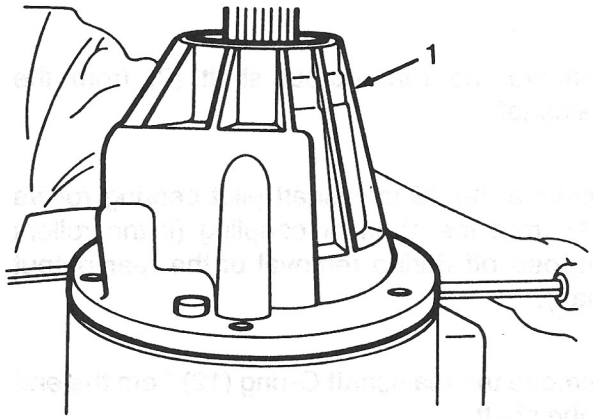
Remove the front and rear yoke nuts and seal washers. Discard the washers.

Mark the front and rear yokes for installation alignment reference.

Remove the front and rear yokes. Use Tool J-8614-01 to remove the yokes if necessary.

Place the transfer case on wooden blocks. Cut V-notches in the blocks for clearance for the front case mounting studs.

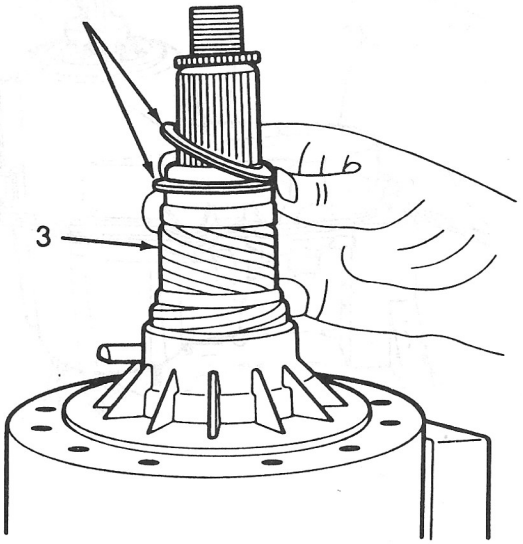
Mark the rear retainer (1) and rear case for assembly reference.




84333

Remove the rear retainer bolts and remove the retainer. Use two screwdrivers to pry the retainer off the transfer case. Position the screwdrivers in slots in the retainer and case to pry the retainer loose.

Remove the differential shim(s) (2) and speedometer drive gear (3) from the rear output shaft.

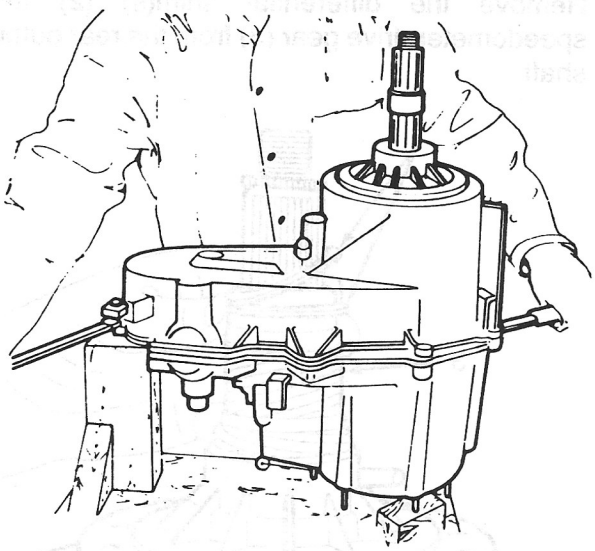



84334

Remove the bolts attaching the rear case to the front case. Note that the bolts used at each end of the transfer case require flat washers.

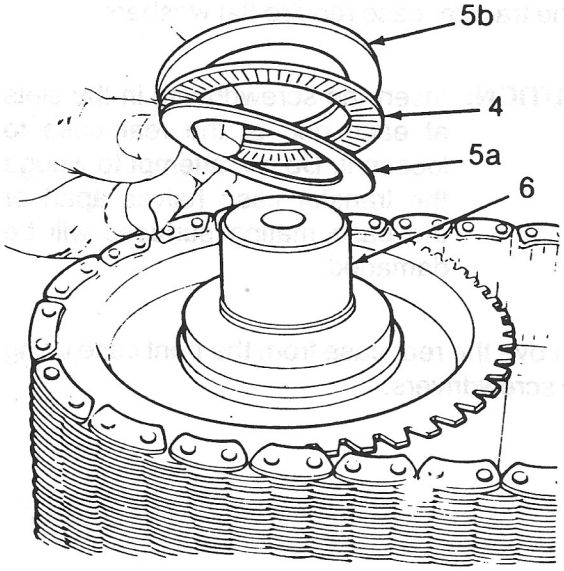
**CAUTION:** Insert the screwdrivers in the slots at each end of the rear case to loosen it. Do not attempt to wedge the transfer case halves apart or the case mating surfaces will be damaged.

Remove the rear case from the front case using two screwdrivers.



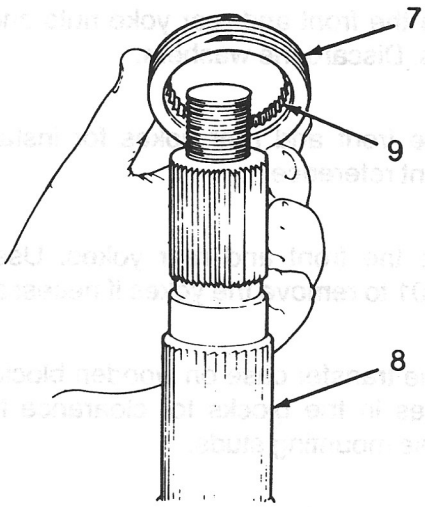
84335

Remove the thrust bearing (4) and races (5a, 5b) from the front output shaft (6). Note the position of the bearing and races for assembly reference.




84336

Remove the oil pump (7) from the rear output shaft (8). Note the position of the pump for assembly reference. The recessed side of the pump (9) faces the case interior.

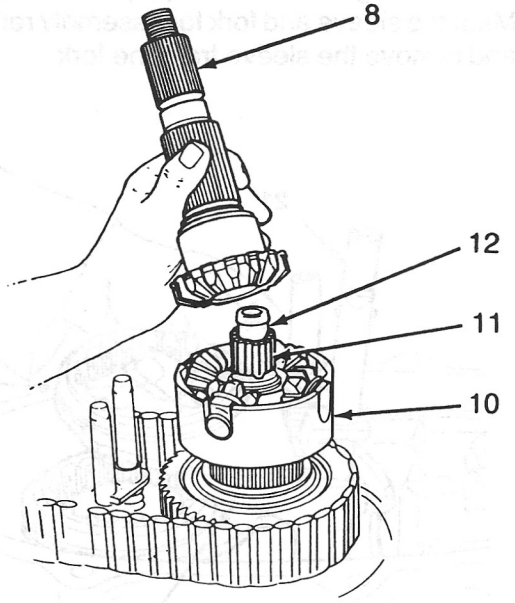



84337

Remove the rear output shaft (8) from the mainshaft.

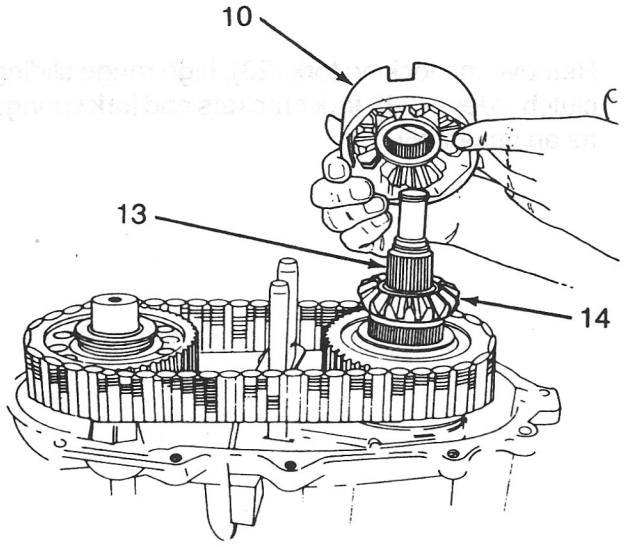
Remove the 15 mainshaft pilot bearing rollers (11) from the shaft or coupling (if the rollers dropped off during removal of the rear output shaft).

Remove the mainshaft O-ring (12) from the end of the shaft.



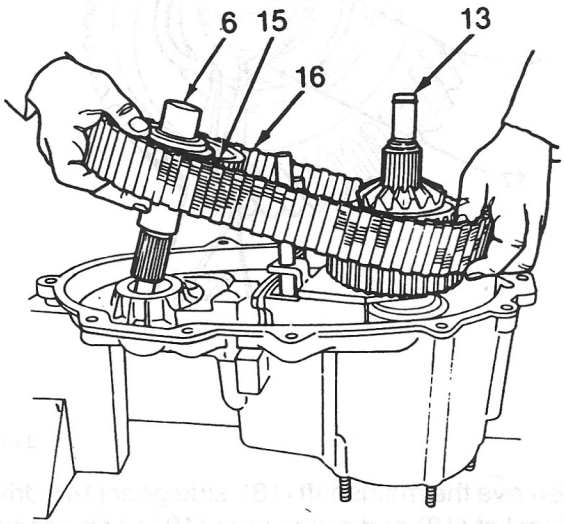

100895

Remove the differential (10) from the mainshaft (13) and side gear (14).




100896

Remove the front output shaft (6), driven sprocket (15) and drive chain assembly (16). Lift the front shaft, sprocket and chain upward. Tilt the front shaft toward the mainshaft (13). Slide the chain off the drive sprocket and remove the assembly.

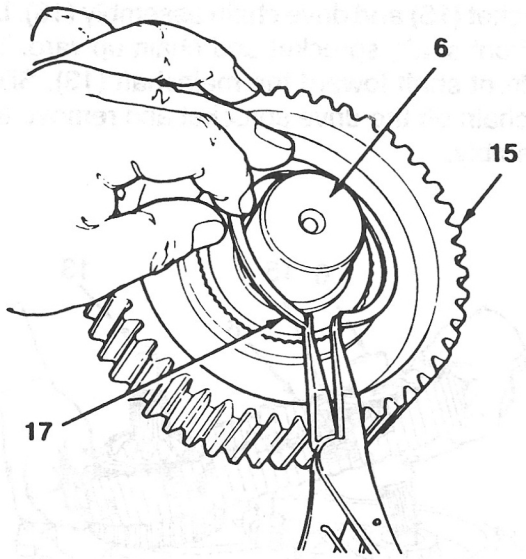



84340

Remove the front output shaft front thrust bearing assembly from the front case (or from the shaft if the bearing and races remained on the shaft during removal).

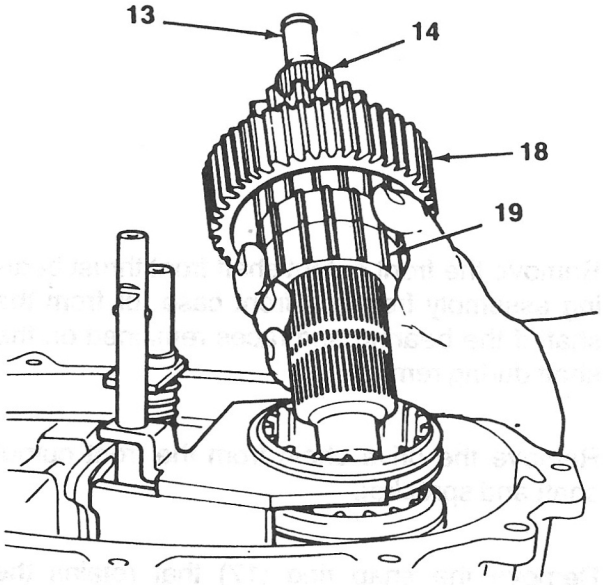
Remove the drive chain from the front output shaft and sprocket.

Remove the snap ring (17) that retains the driven sprocket (15) on the front output shaft (6). Mark the sprocket and shaft for assembly reference and remove the sprocket from the shaft.



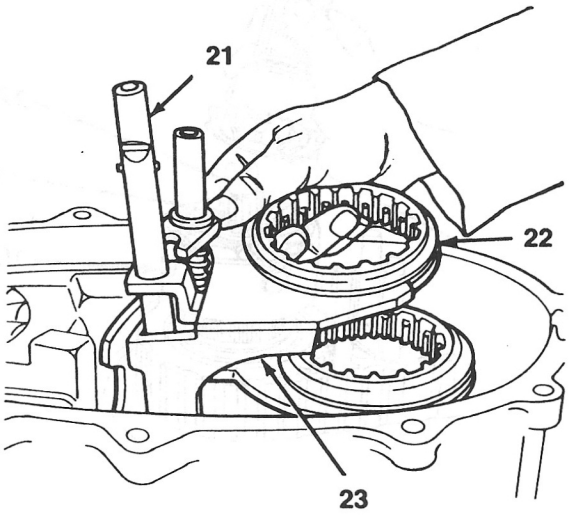

84341

Remove the mainshaft (13), side gear (14), drive sprocket (18) and spline gear (19) as an assembly. Place the assembly on a clean shop towel and set aside until front case disassembly is completed.




84342

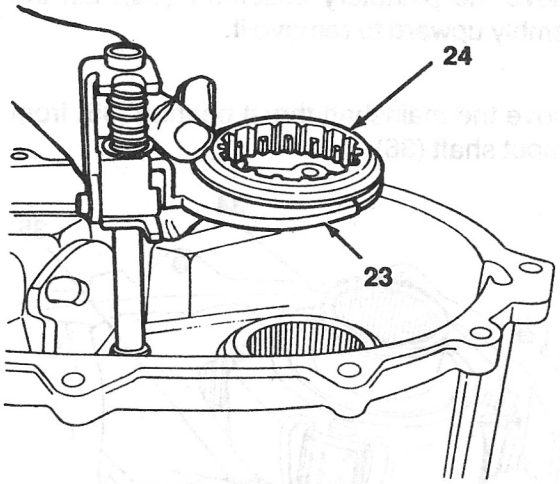
Remove the mode fork (20), shift rail (21) and mode sliding clutch sleeve (22) as an assembly. Mark the sleeve and fork for assembly reference and remove the sleeve from the fork.




84343

**NOTE:** The mode fork and rail are pinned together so that they will operate as a unit. Remove the pin to separate the two components if necessary.

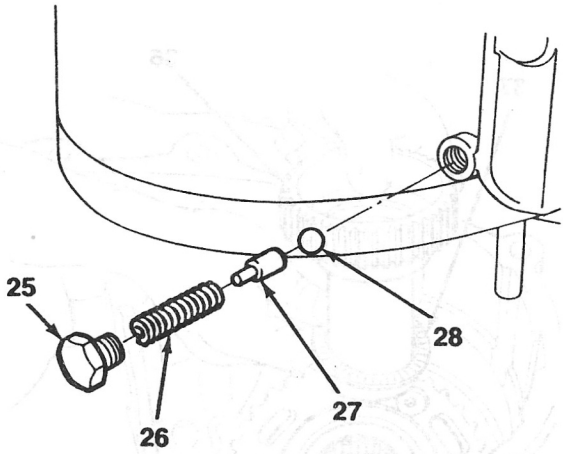
Remove the locking fork (23), high range sliding clutch sleeve (24), fork brackets and fork springs as an assembly.




84344

Note the position of the components for assembly reference and disassemble the components for cleaning and inspection.

Remove the range sector detent screw (25) and remove the detent spring (26), plunger (27) and ball (28).

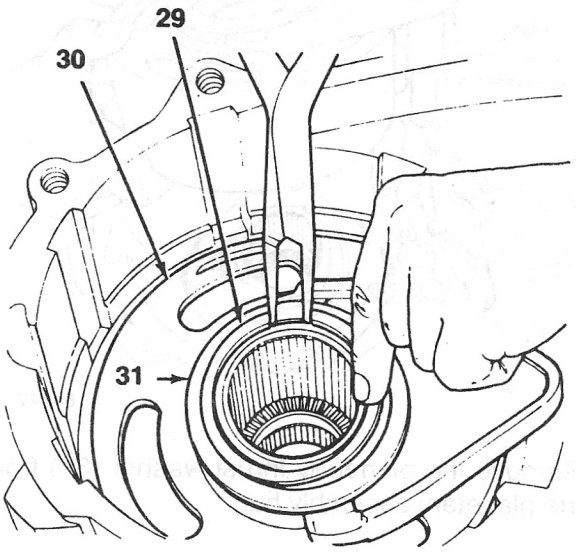



84345

Move the range operating lever downward to the last detent position.

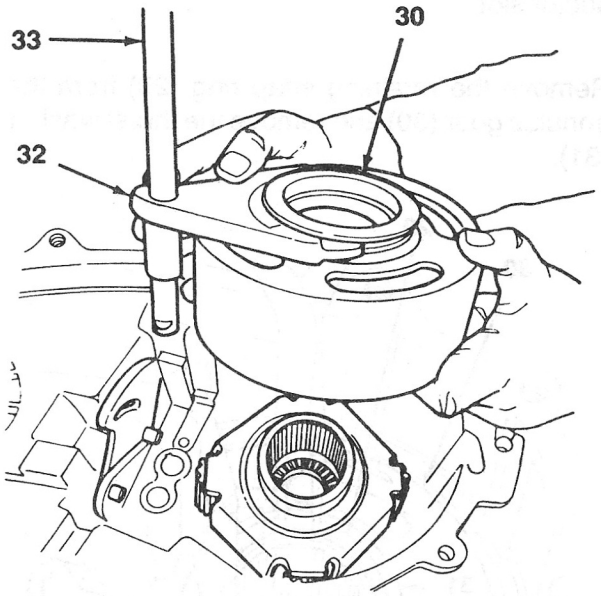
Disengage the low range fork lug from the range sector slot.

Remove the retaining snap ring (29) from the annulus gear (30) and remove the thrust washer (31).



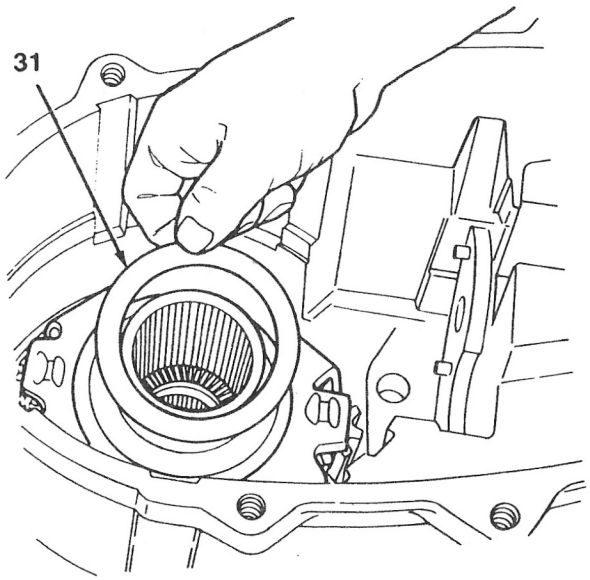

84346

Remove the annulus gear (30), range fork (32) and rail (33) as an assembly. Separate the components for cleaning and inspection.




84347

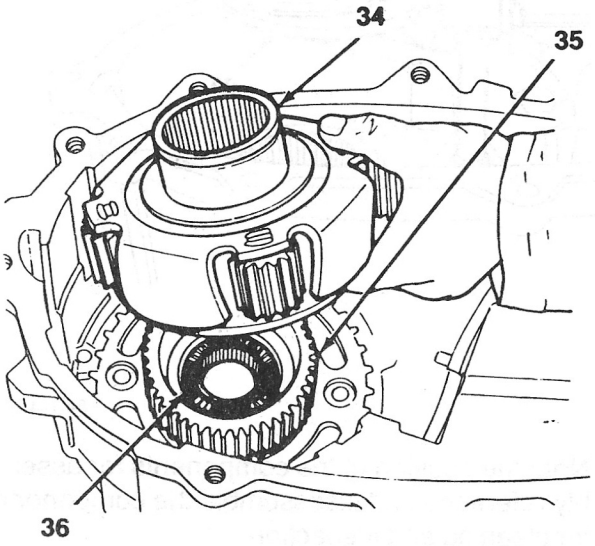
Remove the planetary thrust washer (31) from the planetary assembly hub.




84348

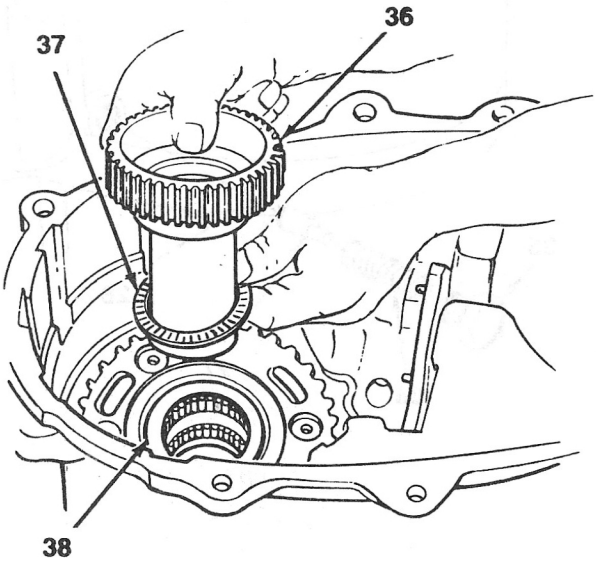
Remove the planetary assembly (34). Lift the assembly upward to remove it.

Remove the mainshaft thrust bearing (35) from the input shaft (36).




84349

Remove the input shaft (36). Remove the thick thrust bearing race and the thrust bearing (37) from the shaft. Then remove the thin thrust bearing race (38) from the case.




84350

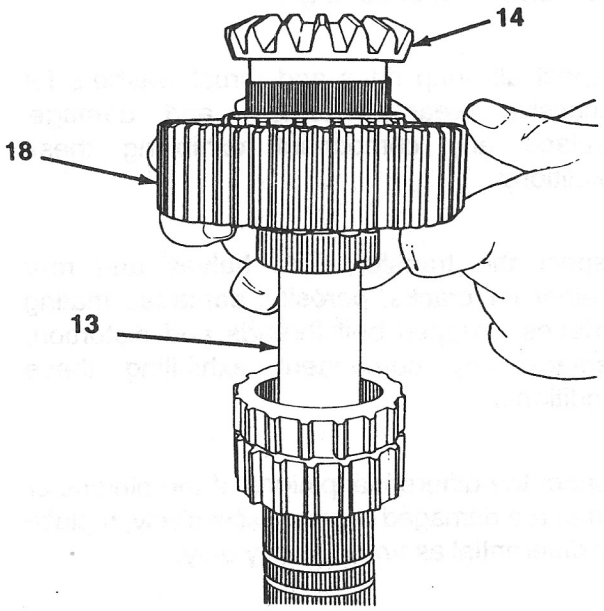
Remove the range sector and operating lever attaching nut and lockwasher. Remove the lever.

Remove the range sector and shaft from the front case.

Remove the range sector O-ring and retainer.

## MAIN SHAFT AND GEAR DISASSEMBLY

Grasp the drive sprocket (18) and lift the side gear (14) upward and off the mainshaft (13).

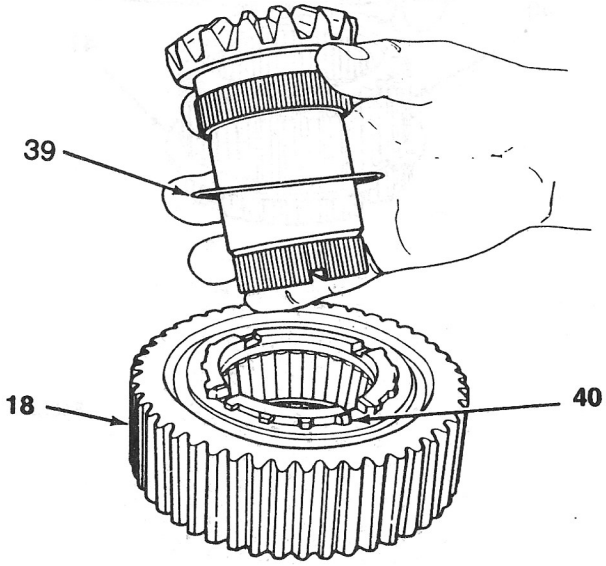



84351A

Remove the mainshaft needle bearings and two bearing spacers from the mainshaft; a total of 82 bearings are used. Note spacer position for assembly reference.

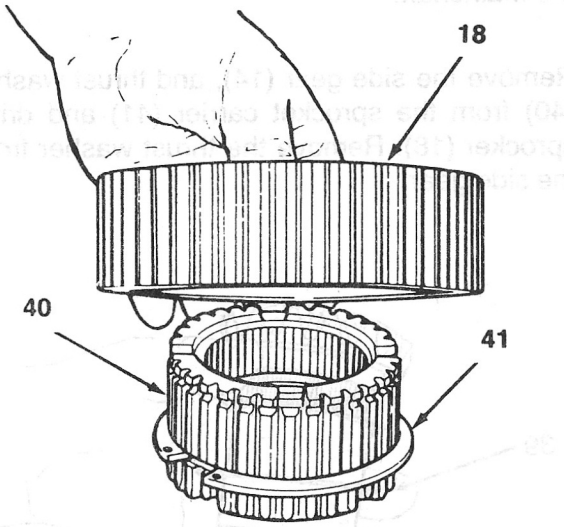
Remove the spline gear and thrust washer from the mainshaft.

Remove the side gear (14), and thrust washer (40) from the sprocket carrier (41) and drive sprocket (18). Remove the thrust washer from the side gear.




84352

Remove one sprocket carrier snap ring (41) and remove the drive sprocket (18) from the carrier (40); mark the sprocket and carrier for assembly reference.




84353

**CAUTION:** The sprocket carrier and mainshaft needle bearings are different sizes. Do not intermix them.

Remove the three bearing spacers and the sprocket carrier needle bearings from the carrier. A total of 120 needle bearings are used.

Remove the rear output bearing and rear yoke seal from the rear retainer. The bearing is shielded on one side. Note the bearing position for assembly reference.

Remove the input gear and front yoke seals from the front case. Use a screwdriver to pry the seals out of the case.

## CLEANING AND INSPECTION

Wash all components thoroughly in clean solvent. Ensure that all lubricant, metallic particles, dirt, and foreign material are removed from the surfaces of every component.

Apply compressed air to each oil supply port and channel in each transfer case half to remove any obstructions or cleaning solvent residue.

Inspect all gear teeth for excessive wear or damage. Inspect all gear splines for burrs, nicks, wear or damage.

Remove minor nicks or scratches using an oilstone. Replace any component exhibiting excessive wear or damage.

Inspect all snap rings and thrust washers for excessive wear, distortion, and damage. Replace any component exhibiting these conditions.

Inspect the transfer case halves and rear retainer for cracks, porosity, damaged mating surfaces, stripped bolt threads and distortion. Replace any component exhibiting these conditions.

Inspect the differential pinions. If the pinions or carrier are damaged or worn excessively, replace the differential as an assembly only.

Inspect the condition of all needle, roller, ball and thrust bearings in the front and rear transfer case halves. Also inspect the condition of the bearing bores in both transfer case halves and in the input gear, rear output shaft, side gear, and rear retainer.

Replace any component that is excessively worn or damaged. If any shaft, case half or input gear bearing requires replacement, refer to Bushing/Bearing Replacement.

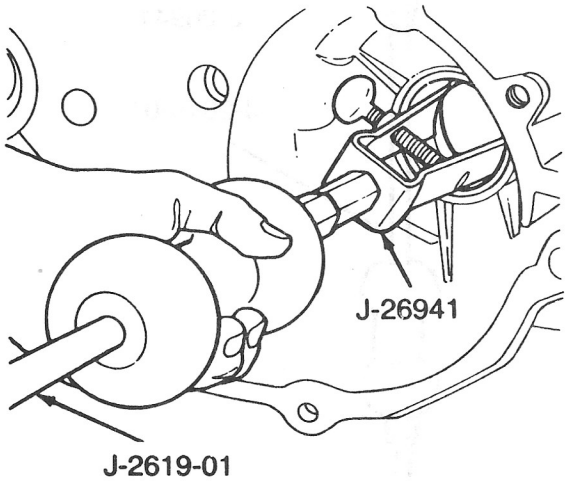
**NOTE:** The front output shaft thrust bearing race surfaces are heat treated during manufacture. Heat treatment causes a brown or blue discoloration of these surfaces. Do not replace the front output shaft because of this type of discoloration.

## BEARING/BUSHING REPLACEMENT

**CAUTION:** All of the bearings or bushings used in the transfer case must be correctly positioned to avoid blocking the bearing oil supply holes. After replacement, check bearing/bushing position to be sure the supply hole is not blocked.

### Rear Output Shaft Bearing Removal

Remove the bearing using Remover Tool J-26941 and Slide Hammer J-2619-01.



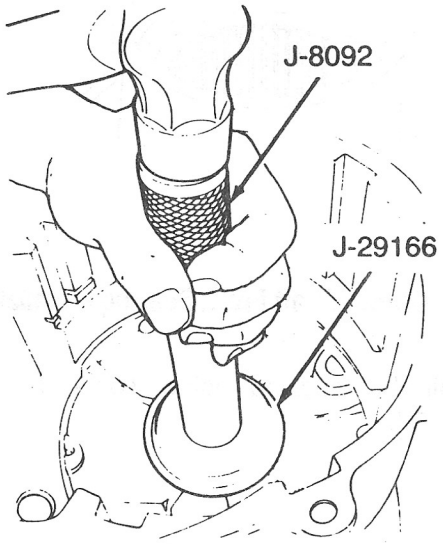

84354

Remove the rear output bearing lip seal using a small screwdriver.

### Rear Output Shaft Bearing Installation

Install replacement rear output bearing seal.

Install the replacement bearing using Driver Handle J-8092 and Installer Tool J-29166.

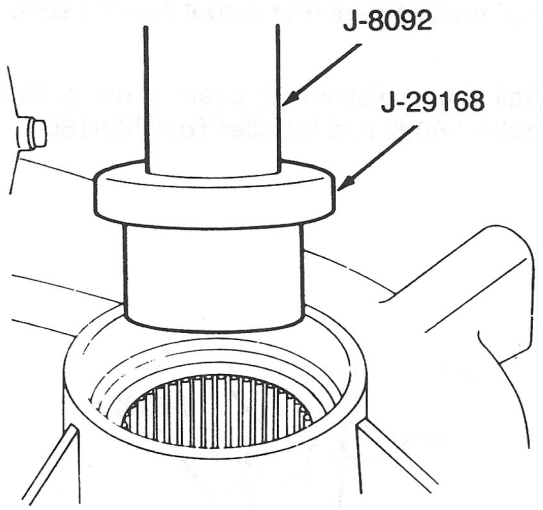



84355

Remove the tools and inspect the oil supply hole. The bearing must not block the supply hole.

### Front Output Shaft Front Bearing Removal

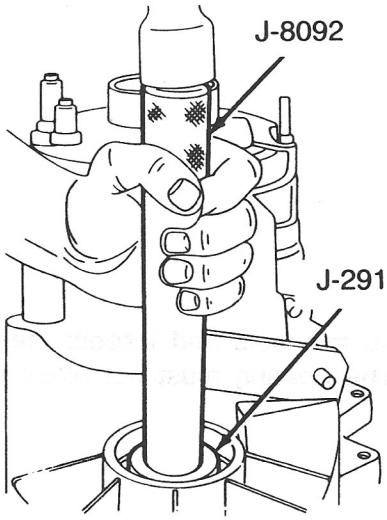
Remove the bearing using Tools J-8092 and J-29168.




84356

### Front Output Shaft Front Bearing Installation

Install the bearing using Tools J-8092 and J-29167.

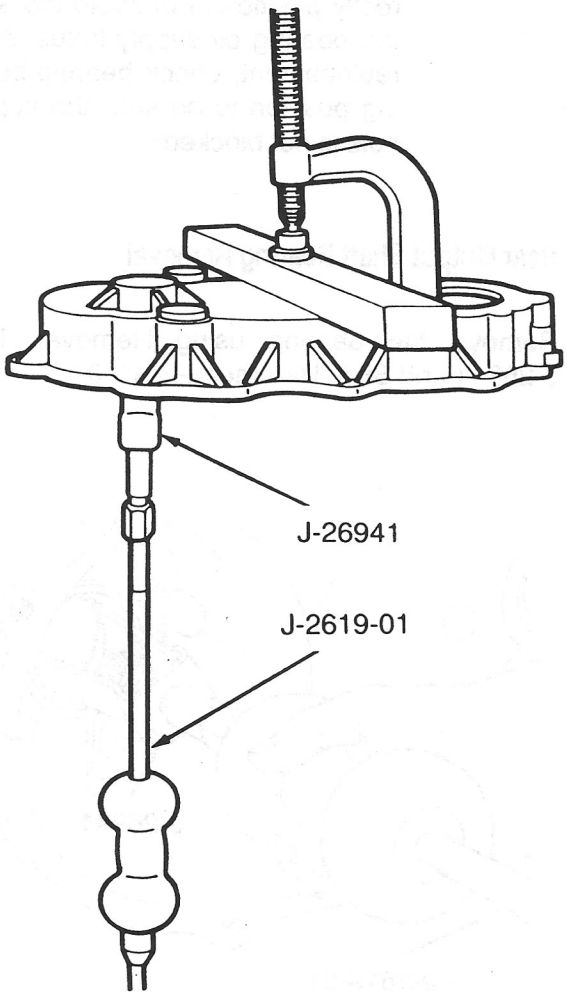



84357

Remove the tools and inspect the oil supply hole. The bearing must not block the supply hole.

### Front Output Shaft Rear Bearing Removal

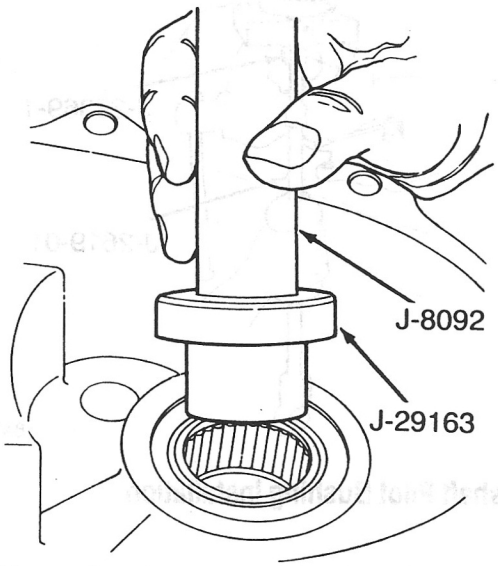
Remove the bearing using Remover Tool J-26941 and Slide Hammer J-2619-01.




84358

### Front Output Shaft Rear Bearing Installation

Install the replacement bearing using Driver Handle J-8092 and Installer Tool J-29163.

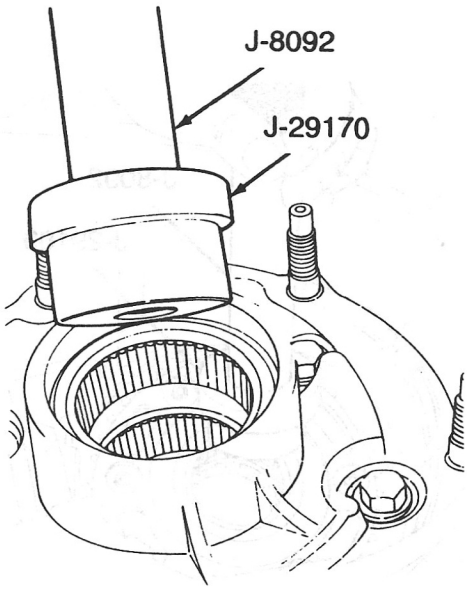



84359

Remove the installer tools and inspect bearing position. Be sure the oil supply hole is not blocked. Also ensure that the bearing is seated flush with the edge of the bore in the case to allow clearance for the thrust bearing assembly.

### Input Gear Front/Rear Bearing Removal

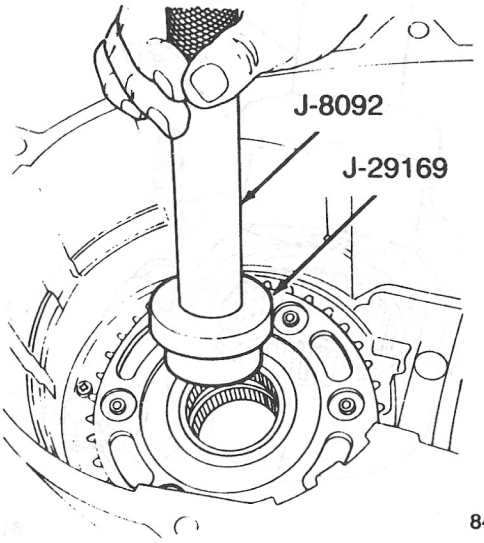
Remove both bearings simultaneously using Driver Handle J-8092 and Remover Tool J-29170.




84360

### Input Gear Front/Rear Bearing Installation

Install the replacement bearings one at a time. Install the rear bearing first; then install the front bearing. Use Driver Handle J-8092 and Installer Tool J-29169.



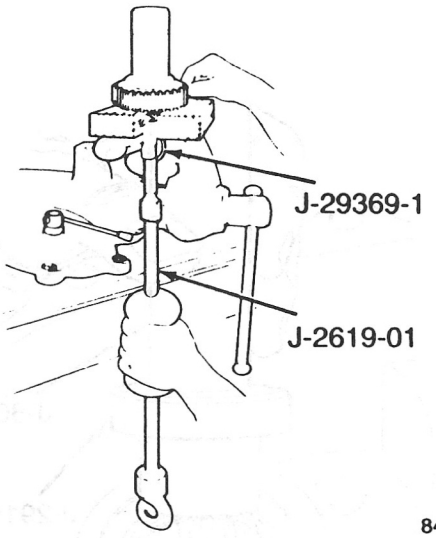

84361

Remove the installer tools and inspect bearing position. Be sure the oil supply holes are not blocked. Also ensure that the bearings are flush with the transfer case bore surfaces.

Install a replacement oil seal using seal Installer Tool J-29162.

### Mainshaft Pilot Bushing Removal

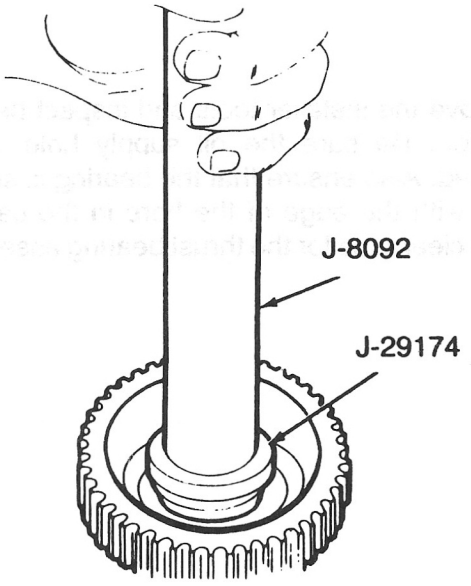
Remove the bushing using Slide Hammer J-2619-01 and Remover Tool J-29369-1.




84362

### Mainshaft Pilot Bushing Installation

Install a replacement bearing using Driver Handle J-8092 and Installer Tool J-29174.

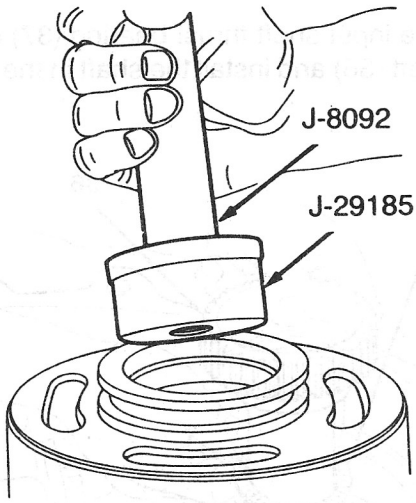



Inspect bushing position. Be sure the oil supply hole is not blocked.

84363

### Annulus Gear Bushing Removal

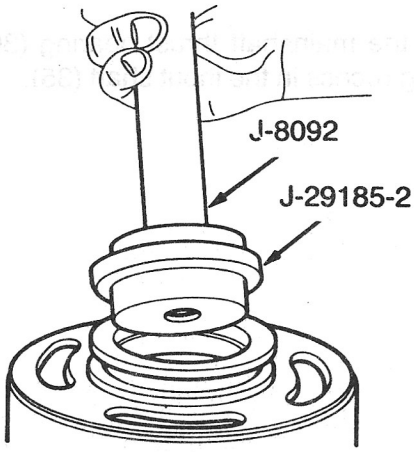
Remove the bushing using Driver Handle J-8092 and Remover/Installer Tool J-29185.




84364

### Annulus Gear Bushing Installation

Install a replacement bushing using Tools J-8092 and J-29185-2.




84365

Remove all chips generated by bushing removal/installation.

### Rear Output Bearing and Rear Yoke Seal Removal

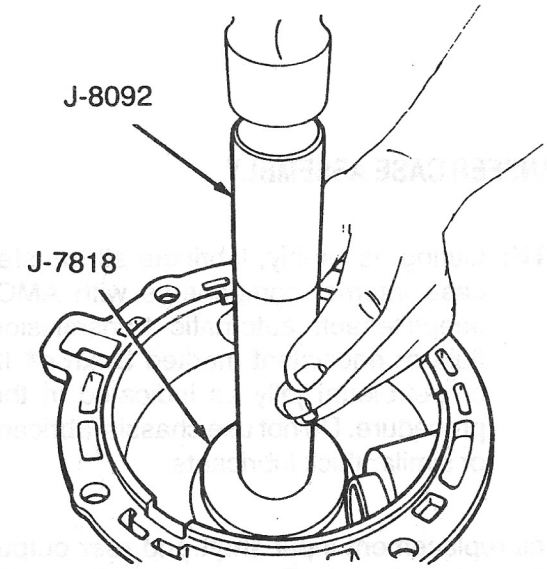
Remove the bearing using a brass drift and hammer.

Remove the seal from the retainer using a brass drift and hammer.

### Rear Output Bearing and Rear Yoke Seal Installation

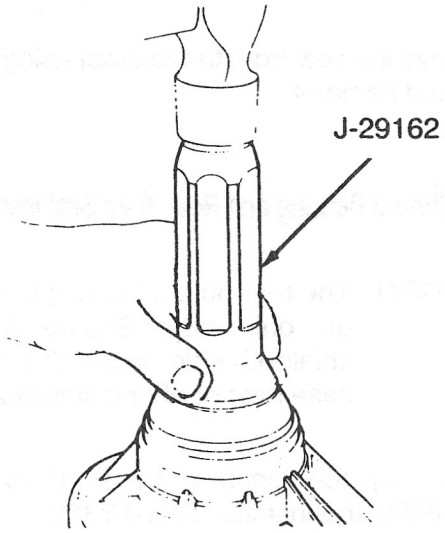
**CAUTION:** The rear output bearing is shielded on one side. Ensure that the shielded side faces the transfer case interior after installation.

Install a replacement bearing using Driver Handle J-8092 and Installer Tool J-7818.




84366

Install a replacement seal in the retainer using Tool J-29162.




84367

## TRANSFER CASE ASSEMBLY

**NOTE:** During assembly, lubricate all transfer case internal components with AMC/ Jeep/Renault automatic transmission fluid or equivalent marked Dexron® II, or petroleum jelly as indicated in the procedure. Do not use chassis lubricant or similar thick lubricants.

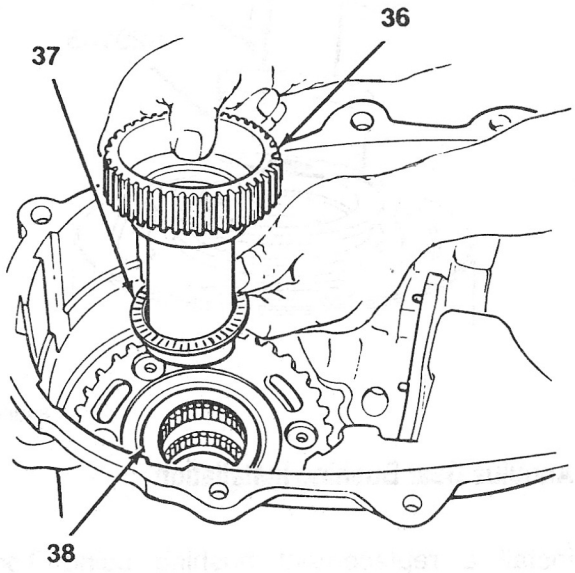
Install replacement input shaft and rear output shaft bearing oil seals. Seat the seals flush with the edge of the seal bore or in the seal groove in the transfer case. Coat the seal lips with petroleum jelly after installation.

Install the input shaft thrust bearing race (39) in the transfer case counterbore.

Install the thin input shaft thrust bearing race (38) in the case.

Install the thick input shaft thrust bearing race on the input shaft (36).

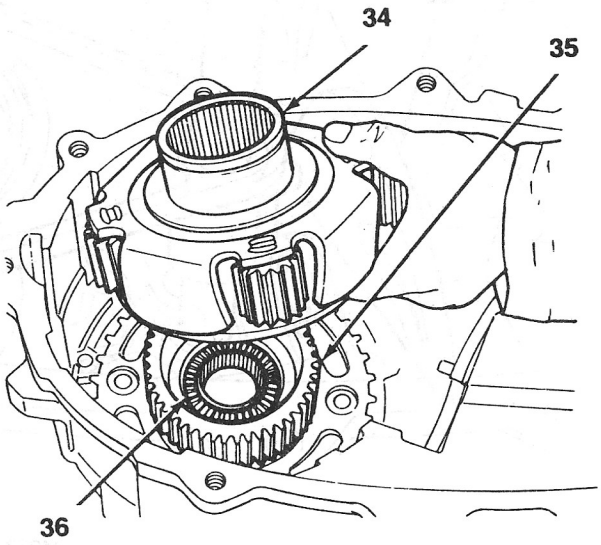
Install the input shaft thrust bearing (37) on the input shaft (36) and install the shaft in the case.




84368

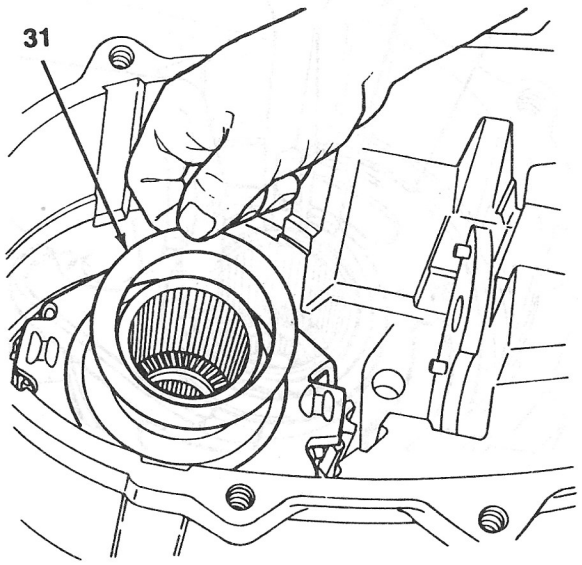
Install the mainshaft thrust bearing (36) in the bearing recess in the input shaft (35).

Install the planetary assembly (34) on the input shaft. The planetary pinion teeth must mesh fully with the input shaft.




84369

Install the planetary thrust washer (31) on the planetary hub.

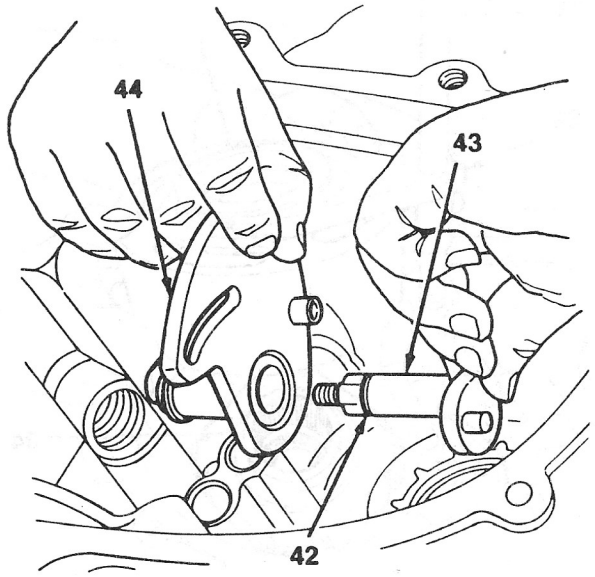



84370

Install a replacement O-ring in the mode sector shaft bore in the front case. Then install the O-ring retainer in the shaft bore.

Install a replacement O-ring (42) on the mode sector shaft (43) and insert the mode sector shaft through the range sector (44).

Install the assembled mode sector and range sector in the front case. Install the range lever and the snap ring on the range sector shaft.

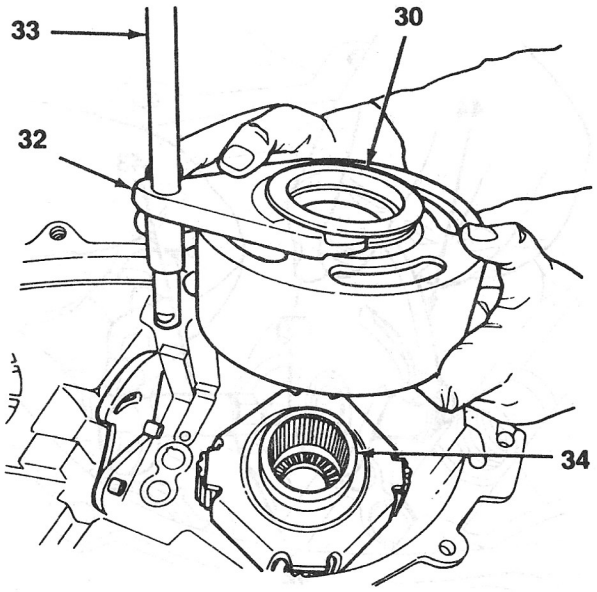



84371

Install the mode lever, attaching washer, and locknut on the mode sector shaft. Tighten the locknut to 23 N•m (17 ft-lbs) torque.

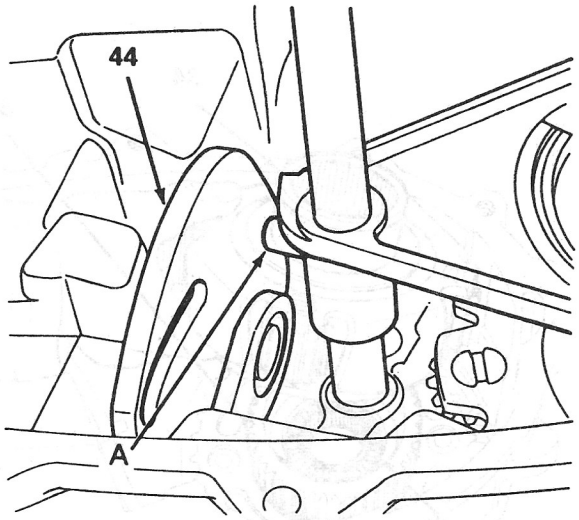
Assemble the annulus gear (30), range fork (32) and rail (33).

Install the assembled range fork on and over the planetary assembly (34). The annulus gear must be fully meshed with the planetary pinions.



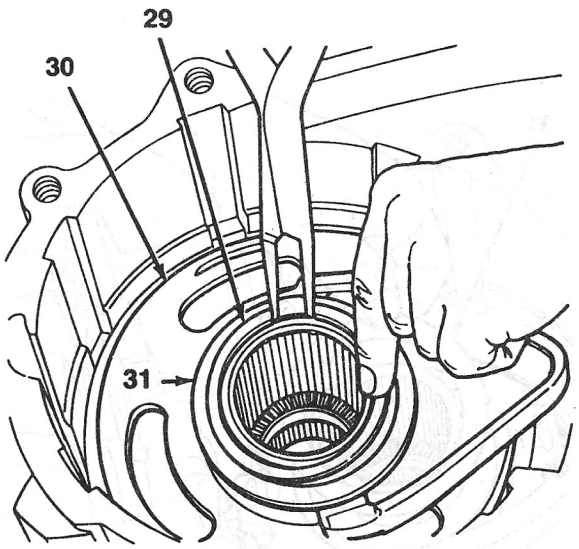

84372

Insert the range sector lug (A) in the range sector (44) detent slot.



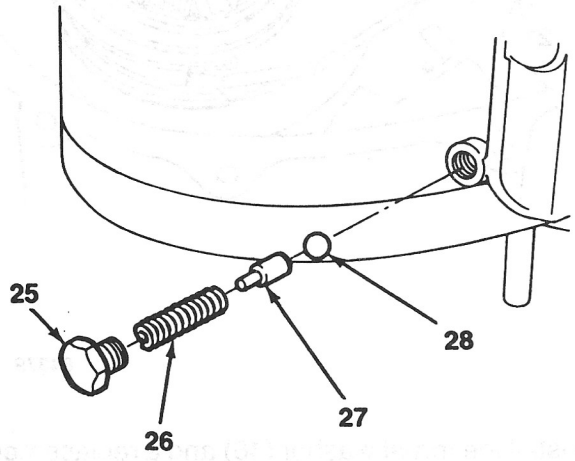

84373

Install the annulus thrust washer (31) and the annulus retaining ring (29) on the annulus gear hub (30).



Install the detent ball (28), plunger (27), spring (26) and retaining screw (25) in the front case detent bore.

Tighten the detent retaining screw to 30 N•m (22 ft-lbs) torque.

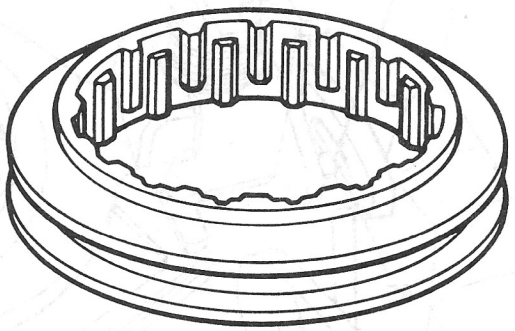



84375

**CAUTION:** The locking mode clutch sleeve (22) and the high range clutch sleeve (24) are not interchangeable. The sleeve splines are different. Ensure that the correct sleeve is installed in the corresponding shift fork.

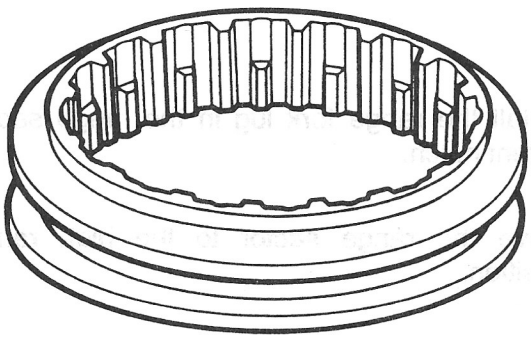
**NOTE:** Clutch sleeves must be replaced as a set.

22



84376

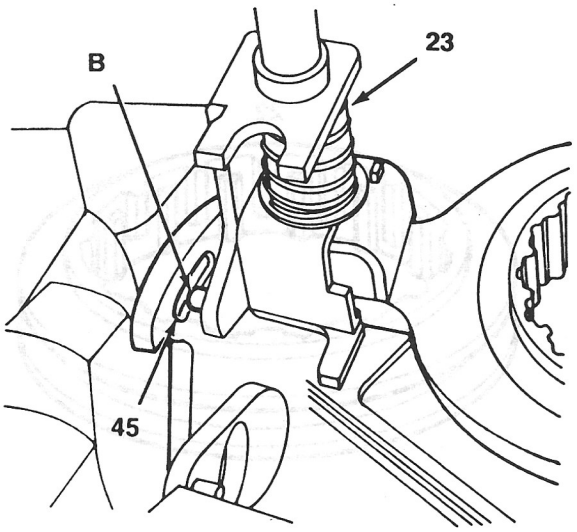
24



84377

Assemble and install the locking fork (23), fork bracket, fork springs, and high range clutch sleeve (24).

The lug (B) on the locking fork must be seated in the range sector detent slot (45).

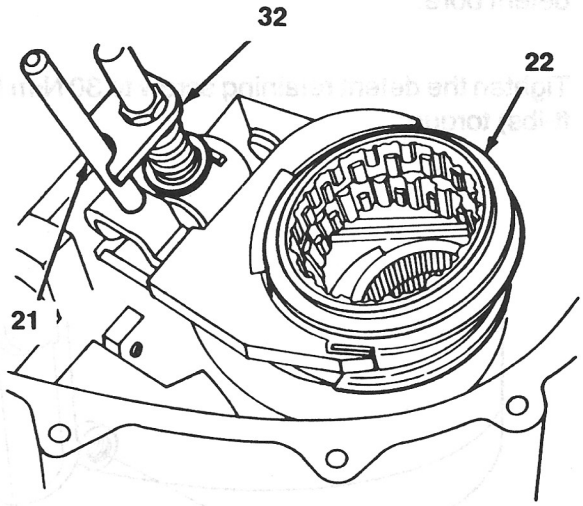



84378

Install the range fork lug in the range sector detent notch.

Move the range sector to the high range position.

Assemble and install the range fork (32), shift rail (21) and mode clutch sleeve (22).




84379

Install the thrust washer (46) and a replacement O-ring (12) on the mainshaft.

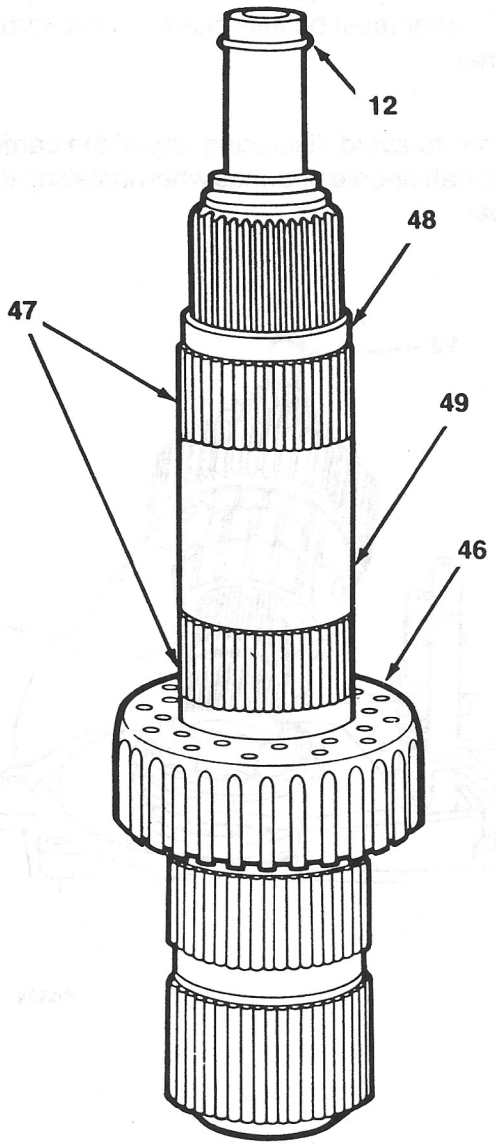
Coat the mainshaft needle bearing surfaces and the mainshaft needle bearings with a liberal quantity of petroleum jelly.

Install the first 41 needle bearings (47) on the mainshaft followed by the long bearing spacer (49).

Install the remaining 41 needle bearings on the mainshaft.

Install the short bearing spacer (48) on the mainshaft.

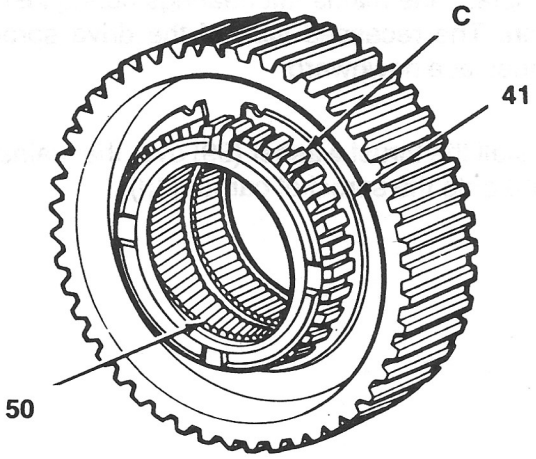
**NOTE:** Use additional petroleum jelly to hold the needle bearings in place if necessary.




84380

Install the spline gear on the mainshaft. Take care to avoid displacing any needle bearings while installing the gear.

Install the sprocket carrier in the drive sprocket and install the sprocket carrier snap rings (41). Align the carrier and sprocket according to the reference marks made during disassembly.




84381

**NOTE:** The sprocket carrier teeth (C) are tapered on one side and the drive sprocket has a deep recess on one side. Assemble these components so that the carrier tapered teeth and sprocket recess are on the same side.

Coat the sprocket carrier bore and the 120 carrier needle bearings with a liberal quantity of petroleum jelly.

Install the first bearing spacer in the sprocket carrier. Then install the first 60 needle bearings (50).

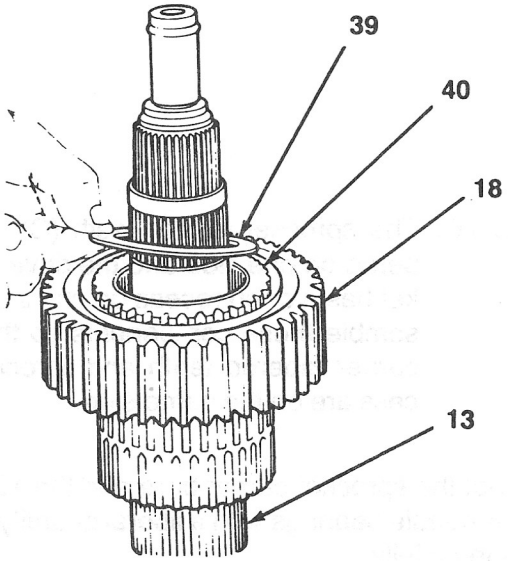
Install the second (center) needle bearing spacer in the sprocket carrier. Then install the remaining 60 needle bearings.

Install the third needle bearing spacer in the sprocket carrier.

Use additional petroleum jelly to hold the bearings in place if necessary.

Install the assembled sprocket carrier (40) and drive sprocket (18) on the mainshaft (13). Do not displace the mainshaft bearings during installation. The recessed side of the drive sprocket must face downward.

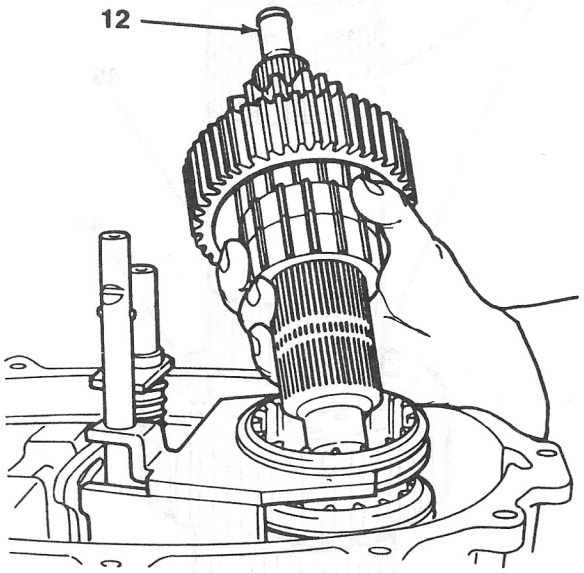
Install the thrust washer (39) over the mainshaft and onto the sprocket carrier (40).




84382

Install the side gear (52) on the mainshaft (12). The side gear must be fully seated in the sprocket carrier.

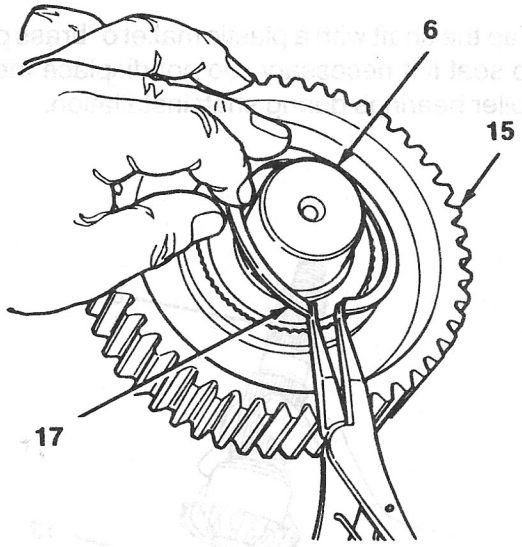
Take care to avoid displacing any of the carrier or mainshaft needle bearings when installing the side gear.




84384

Install the mainshaft and gear assembly in the case. Fully seat the mainshaft in the input gear.

Install the driven sprocket (15) on the front output shaft (6) and install the sprocket retaining snap ring (17). Install the sprocket according to reference marks made during disassembly.




84385

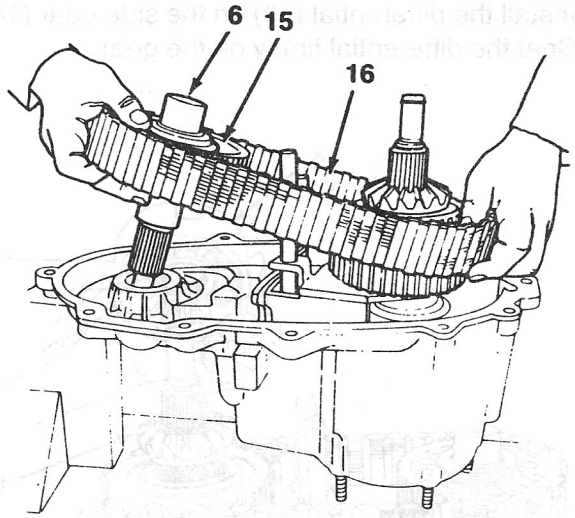
Install the front output shaft front thrust bearing assembly in the front case. Install the thick race then install the bearing and the thin race.

Install the drive chain (16), front output shaft (6) and driven sprocket (15).

Raise and tilt the driven sprocket and chain and install the opposite end of the chain on the drive sprocket.

Align the front output shaft with the shaft bore in the front case, and install the shaft in the case.

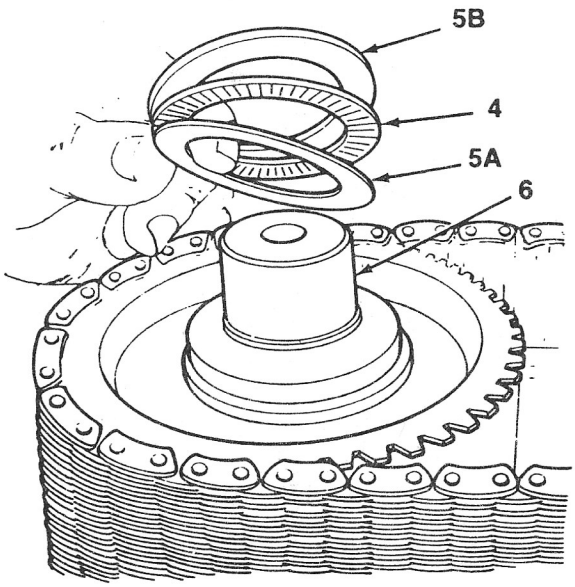
Be sure the front shaft thrust bearing assembly is seated in the case.




84386

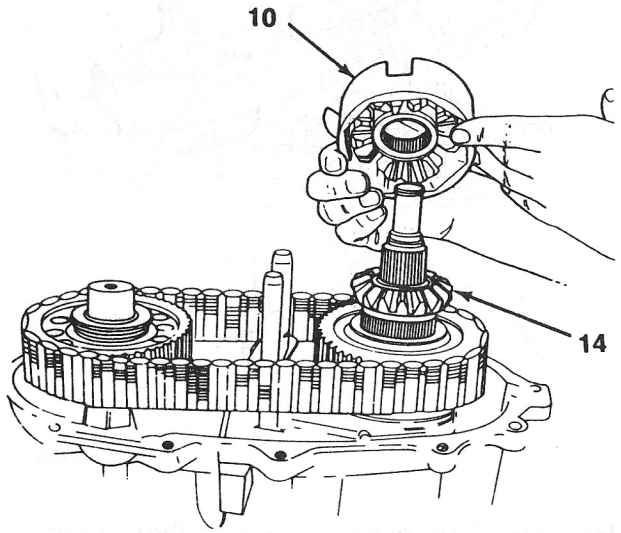
Install the front output shaft rear thrust bearing assembly on the front output shaft (6).

Install the thin race first (5a), then install the bearing (4) and thick race (5b).




84387

Install the differential (10) on the side gear (14). Seat the differential firmly on the gear.

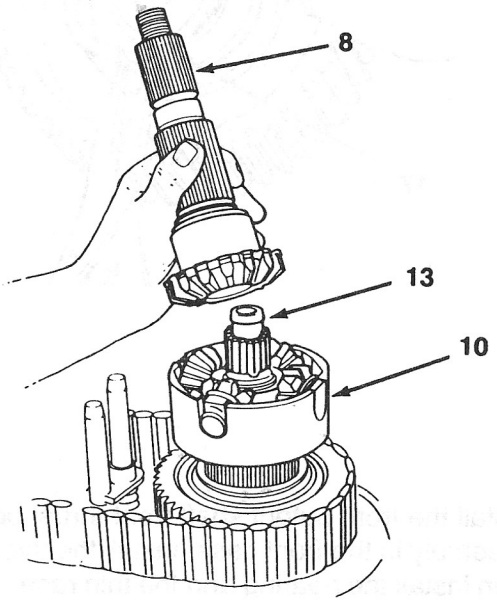



84339A

Coat the mainshaft pilot bearing surface and the 15 pilot roller bearings with petroleum jelly. Install the roller bearings (13) on the shaft. Use additional petroleum jelly to hold the bearings in place if necessary.

Install the rear output shaft (8) on the mainshaft (12) and into the differential (10). Ensure that the shaft is completely seated.

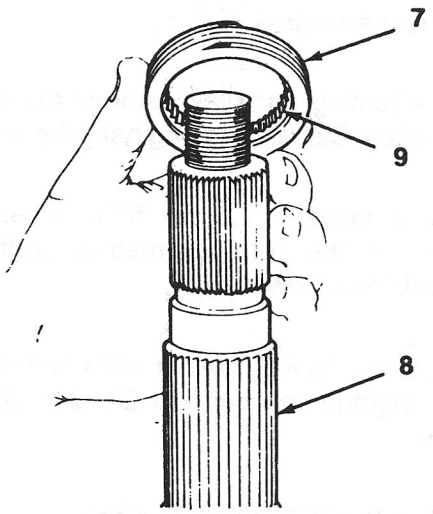
Tap the shaft with a plastic mallet or brass punch to seat it if necessary. Do not displace the pilot roller bearings during shaft installation.




89338A

Install the oil pump (7) on the rear output shaft (8).

**NOTE:** The recessed side of the pump (9) faces down.




84390

Install a replacement rear output shaft bearing seal in the rear case.

Apply a bead of Loctite 515, or equivalent sealer, to the mating surface of the rear case.

Install the magnet in the case, if removed.

Attach the rear case to the front case.

The alignment dowels at the front case ends must be aligned with the bolt holes in the rear case.

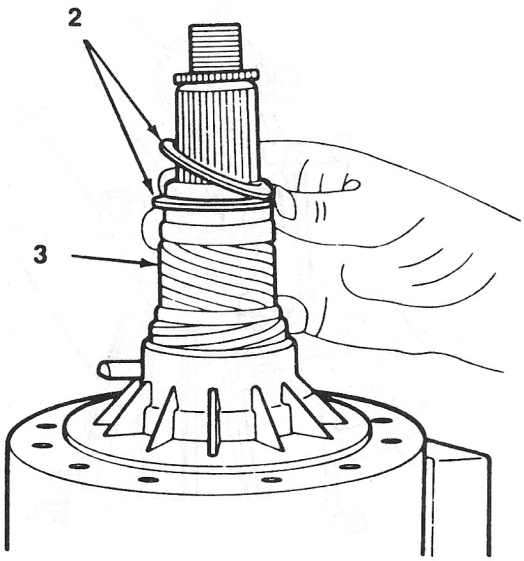
**NOTE:** Flat washers must be used on the bolts at the case ends where the alignment dowels are located.

Install the rear case-to-front case attaching bolts. Tighten the bolts to 31 N•m (23 ft-lbs) torque.

**NOTE:** If the rear transfer case will not mate completely with the front case, inspect for the following: oil in the range fork rail bore, the front output shaft rear thrust bearing assembly is not aligned with the rear case, the mainshaft is not completely seated, or the rear case is not aligned with the oil pump.

Install the speedometer drive gear (3) on the rear output shaft.

Measure and record the thickness of the shim pack (2).




84391

Install a 0.762 mm (0.030-in) shim on the rear output shaft.

Align the rear retainer on the rear case and install the retainer.

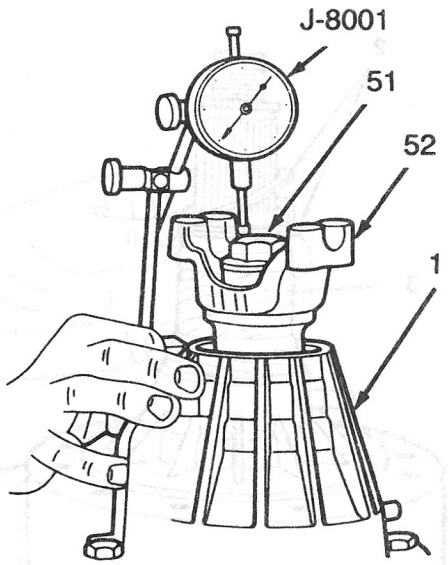
Install and tighten the retainer bolts securely but not completely at this time.

Install the front and rear output shaft yokes and the original yoke nuts. Tighten the nuts finger tight only.

Check differential end play as follows.

Set the shift lever in the 4-High range position.

Position Dial Indicator J-8001 on the rear retainer (1) and position the indicator stylus so it contacts the rear yoke nut (51).




84392

Pull upward on the rear output shaft yoke (52). Note dial indicator pointer position and record it.

End play should be between 0.05 and 0.25 mm (0.002 to 0.010 in). Recommended end play is 0.15 mm (0.006 in).

Remove the rear yoke and retainer.

Add or subtract differential shims as necessary to correct end play.

After adjusting end play, remove the front and rear yokes. Discard the original yoke nuts.

Apply a bead of Loctite 515, or equivalent sealer, to the retainer mating surface and reinstall the retainer.

Apply sealer to the retainer bolts and install the bolts. Tighten the bolts to 21 N•m (23 ft-lbs) torque.

Reinstall the front and rear yokes.

Install replacement yoke seal washers and nuts.

Tighten the yoke nuts to 163 N•m (120 ft-lbs) torque. Use Tool J-8614-01 to hold the yokes in place while tightening the nuts.

Install the detent ball, plunger, spring and bolt if not installed previously. Apply sealer to the bolt before installing it. Tighten the bolt to 31 N•m (23 ft-lbs) torque. Install the drain plug and washer.

Fill the transfer case with 3.3 liters (7 pints) of AMC/Jeep/Renault or equivalent Dexron® II automatic transmission fluid and install the fill plug and washer.

Tighten the drain and fill plugs to 24 N•m (18 ft-lbs) torque.

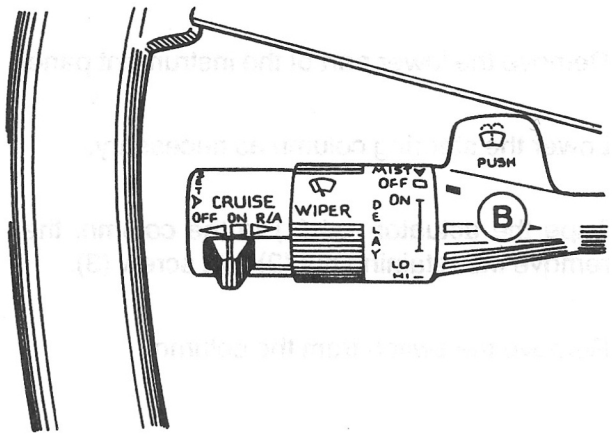
Install the plug and washer in the front case if removed. Tighten the plug to 24 N•m (18 ft-lbs) torque.

## GENERAL

The steering column in 1986 Grand Wagoneer and Truck models is equipped with a new multi-function control stalk (B). The stalk controls operation of the headlights, turn signals, windshield wipers, and cruise control.

The ignition lock cylinder used in the 1986 steering column is also new. The cylinder is serviced as an assembly only. Replacement procedures for the new lock cylinder are outlined in this section.

Although the 1986 steering column features the new multi-function control stalk and new lock cylinder, the basic column is the same as used in prior models. Only those service procedures unique to the 1986 steering column are outlined in this section. Refer to the M.R. 253 for all other service procedures.




100781

## STEERING COLUMN TORQUE SPECIFICATIONS

| COMPONENT | SERVICE SET-TO TORQUE | SERVICE RECHECK TORQUE |
|---|---|---|
| Dimmer switch to column screw | 4 N•m (35 in-lbs) | 3.4-4.6 N•m (30-40 in-lbs) |
| Dimmer switch to column nut | 2.5 N•m (22 in-lbs) | 2.0-2.9 N•m (18-26 in-lbs) |
| Lock cylinder retaining screw (tilt column) | 2.5 N•m (22 in-lbs) | 2-3 N•m (18-26 in-lbs) |
| Lock cylinder retaining screw (non-tilt column) | 4.5 N•m (40 in-lbs) | 3.5-5.5 N•m (31-49 in-lbs) |
| Turn signal actuator arm | 2 N•m (20 in-lbs) | 1.7-2.8 N•m (15-25 in-lbs) |
| Turn signal mounting screws | 3 N•m (27 in-lbs) | 2.3-4.0 N•m (20-35 in-lbs) |

100780

## DIMMER SWITCH REMOVAL

Disconnect the negative cable from the battery.

Remove the lower part of the instrument panel.

Lower the steering column as necessary.

Tape the actuator rod (1) to the column, then remove the retaining nut (2) and screw (3).

Remove the switch from the column.

## DIMMER SWITCH INSTALLATION

Push the switch (4) into the actuator rod (1).

Loosely install the retaining nut (2) and screw (3).

Remove the tape previously applied, holding the actuator rod to the column.

Adjust the switch (4). Depress the switch slightly and insert a 2.34 mm diameter pin or a 3/32-inch drill into the hole (5), to temporarily prevent switch movement.

Move the switch toward the steering wheel to remove lash from the actuator rod.

Tighten the retaining nut (2) to 2.5 N•m (22 in-lbs.) and the screw to 4 N•m (35 in-lbs.) torque.

Raise the steering column if necessary.

Install the lower part of the instrument panel.

Connect the battery negative cable.

## DIMMER SWITCH ADJUSTMENT

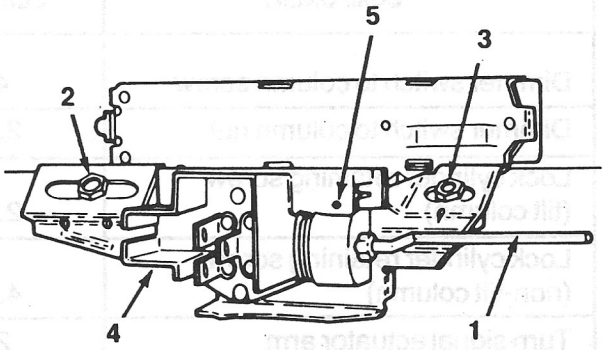
Loosen the retaining nut (2) and screw (3).

Depress the switch (4) slightly and insert a 2.34 mm diameter pin or a 3/32-inch drill into the hole (5), to temporarily prevent switch movement.

Move the switch toward the steering wheel to remove the lash from the actuator rod.

Tighten the retaining nut (2) to 2.5 N•m (22 in-lbs) and the screw to 4 N•m (35 in-lbs) torque.

Remove the pin or drill and check the dimmer switch function by operating the dimmer actuating lever. If a tilt column is being serviced, check switch operation in the full up, down and center tilt positions.




84714

## LOCK CYLINDER REMOVAL

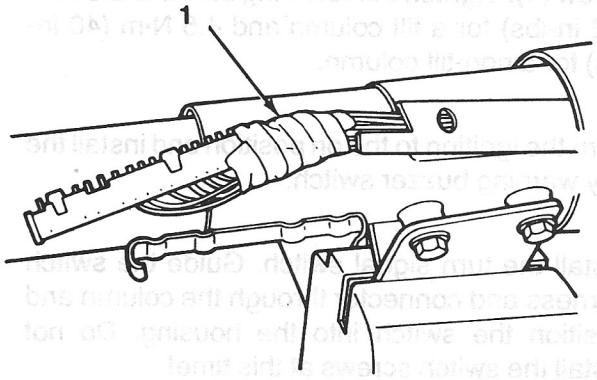
**NOTE:** The lock cylinder is serviced by replacement only.

Remove the steering wheel, lockplate cover, lockplate, and cancelling cam as outlined on pages G-17 and G-23 through G-24 or G-36 through G-37 of M.R. 253.

Disengage the multi-function control stalk by pulling it straight out.

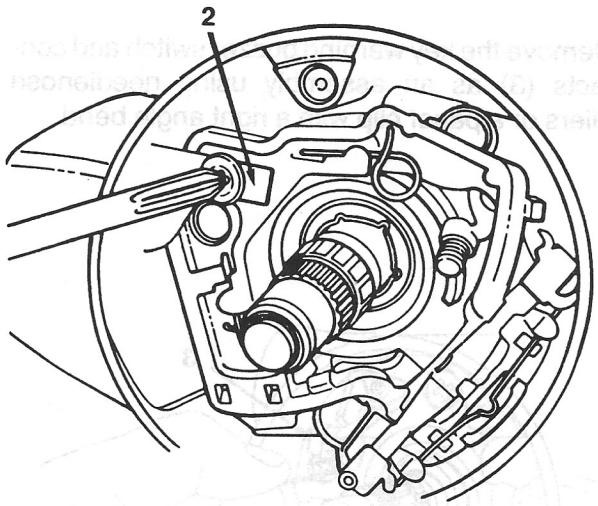
Disconnect the turn signal switch wire harness connector (1) from the bracket at the lower end of the steering column.

**CAUTION:** Wrap tape around the turn signal switch harness connector (1) to prevent snagging during removal.




84694

Remove the turn signal switch attaching screws and actuator arm (2) and then remove the switch. Pull the switch and wire harness straight up and out of the housing. Remove the wiper switch harness and any additional harnesses from the column.

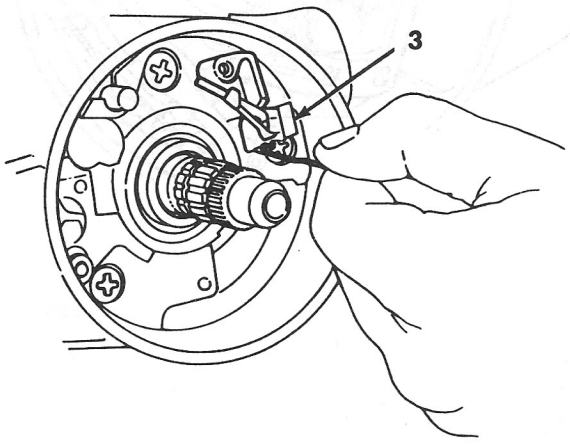



84695

Insert the ignition key into the lock cylinder and turn the key to ON position.

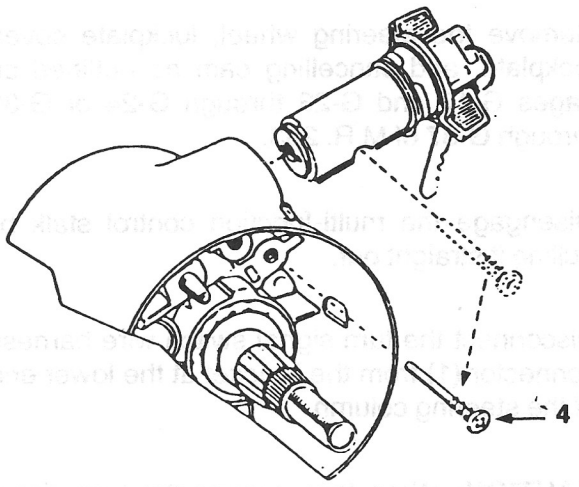
**CAUTION:** Do not attempt to remove the switch and buzzer contacts separately, because the contacts can fall into the column assembly.

Remove the key warning buzzer switch and contacts (3) as an assembly using needlenose pliers or a paper clip with a right angle bend.




84696

With the ignition lock cylinder in the on position remove the lock retaining screw (4) and pull the lock cylinder out of the column.




100476

## LOCK CYLINDER INSTALLATION

Insert the lock into the column. Rotate the cylinder until the cylinder key is aligned with the keyway in the housing.

Push the lock cylinder in and install the retaining screw (4). Tighten the retaining screw to 2.5 N•m (22 in-lbs) for a tilt column and 4.5 N•m (40 in-lbs) for a non-tilt column.

Turn the ignition to the on position and install the key warning buzzer switch.

Install the turn signal switch. Guide the switch harness and connector through the column and position the switch into the housing. Do not install the switch screws at this time!

Insert the hazard warning knob into the hazard warning switch. Press the knob inward. Align and install the signal switch attaching screws. Tighten the screws with 3 N•m (27 in-lbs) torque. Be sure that the signal switch is properly seated before tightening the screws.

Install the turn signal actuator arm, tighten retaining screw to 2 N•m (20 in-lbs) torque.

Install the multi-function control stalk.

Connect the turn signal switch wire harness.

Install the cancelling cam, lockplate, lockplate cover and steering wheel as outlined on pages G-33 through G-34 or G-47 through G-48 of M.R. 253.

## MULTI-FUNCTION CONTROL STALK

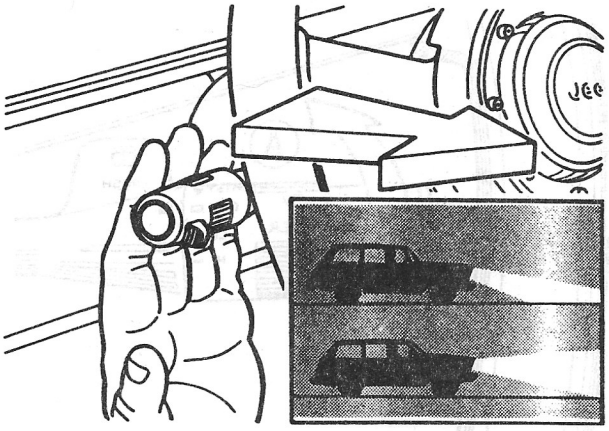
The control stalk is located on the left side of the column in the position formerly occupied by the turn signal lever. Stalk removal/installation procedures are similar to those outlined in the M.R. 253 for the signal lever/cruise control lever.

### Control Stalk Function

This section outlines mechanical operation of the control stalk only. Refer to the 1986 Electrical Troubleshooting Manual and the 1986 wiring diagrams for electrical circuitry and diagnosis of the stalk and related electrical components.

### Headlight Beam Switch

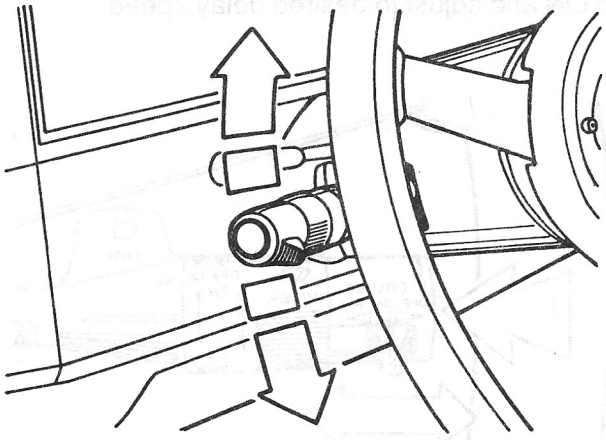
When the left side of the headlight switch is depressed, pull the multi-function stalk toward you to change headlights from high-beam to low-beam, or from low-beam to high-beam. A high-beam indicator light is located near the center of the instrument cluster.



100782

### Turn Signals

Move the multi-function stalk up or down, depending on the turn. **Up:** right hand turn signal. **Down:** left hand turn signal. **Lane Change:** hold the stalk temporarily upward or downward.



100783

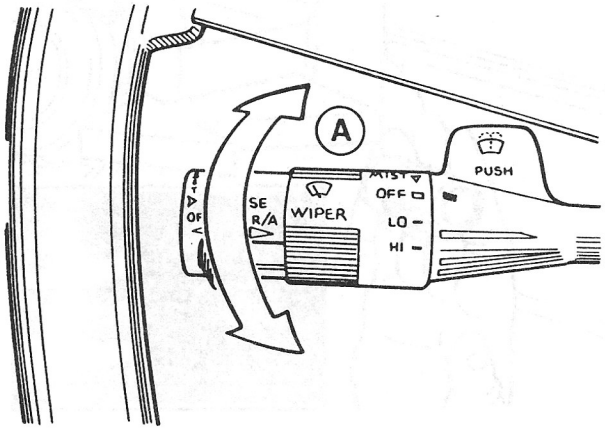
### Windshield Wiper

**Mist**—for a single wiper cycle, rotate the WIPER band (A) toward you and release it. Hold the control in the mist position for several wiper cycles, if desired.

**Low Speed**—turn WIPER band away from you to stop.

**High Speed**—turn band to next stop.

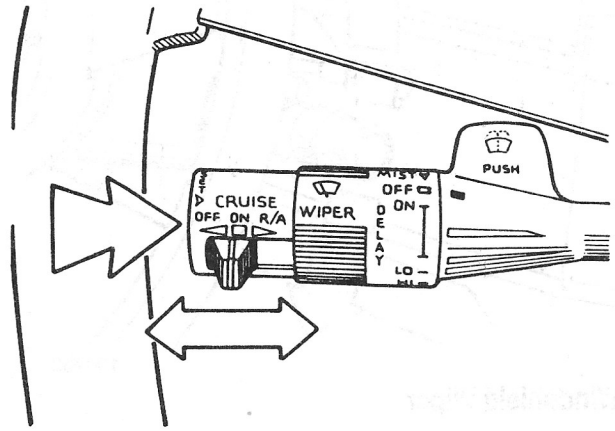
**Off**—turn band to OFF




100784

## Intermittent Wipers

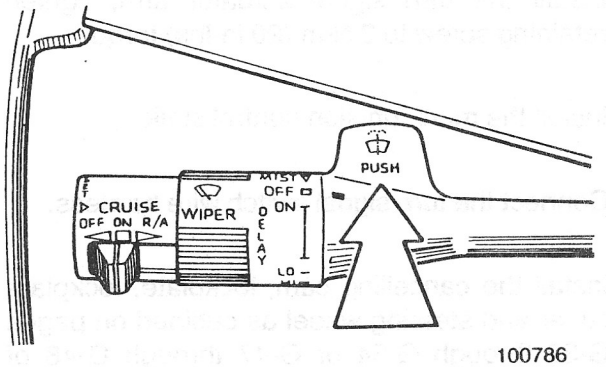
The DELAY band (B) varies wiper speed from 1/2 second to 20 second delay. To operate, turn to ON and adjust to desired delay speed.




100785

## Windshield Washer

To spray washer fluid on windshield, push the "paddle" on top of the stalk. This will also turn on the low speed wipers. Spray continues until you release paddle. To stop the wipers, turn the WIPER band to the OFF position. If you are spraying the windshield while using the Intermittent function, the wipers will resume the Intermittent function a few cycles after the paddle is released.




100786

## CRUISE CONTROL

### To Set Cruise Control

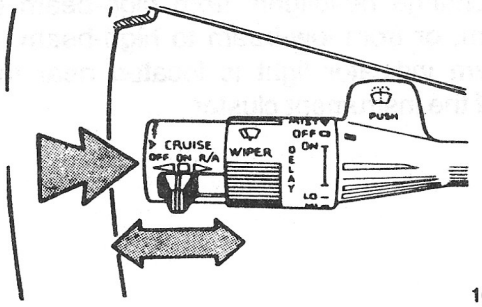
Accelerate to desired speed, turn the CRUISE switch to ON, push in the engagement button, then release it. Release the accelerator pedal and set speed will be maintained.

To reset Cruise Control to a faster speed, accelerate to faster speed using the accelerator pedal or R/A button, then push in the engagement button and release it. To reset to a slower speed, push in the button all the way and hold it there until your Jeep vehicle shows to the desired speed, then release the button.

To disengage Cruise Control, apply the brakes, turn the control to OFF, or push in the clutch on vehicles with a manual transmission. When the ignition switch is OFF, the Cruise Control is also disengaged.

### To Resume a Pre-Set Speed

To resume the last-set cruising speed after braking, depressing the clutch, or stopping, first accelerate to a speed close to the last-set cruising speed, slide the CRUISE switch to R/A (Resume/Accelerate), then release both the switch and the accelerator pedal.

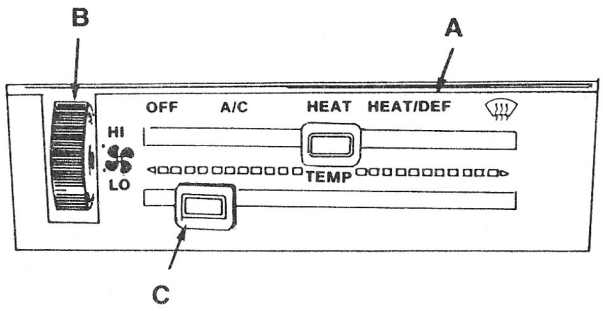



100787

## NEW COMPONENTS

### Control Panel

For 1986, Grand Wagoneer/Truck models are equipped with a new heater — A/C control panel (A). On models not equipped with air conditioning, the A/C detent position is deleted. Otherwise, the panel is the same for all models.




100788

### Blower Motor

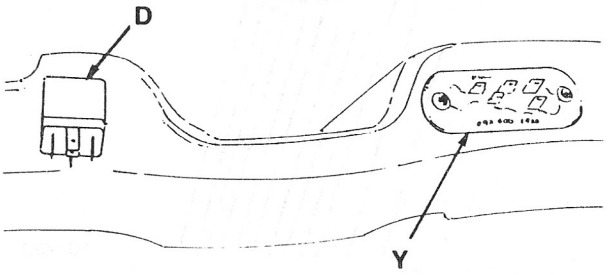
A four-speed blower motor is used in all Grand Wagoneer/Truck models for 1986. Blower speeds are selected with the control wheel (B) located at the left side of the panel (A). Blower speeds are controlled by a new resistor that provides the four separate speeds.

### Temperature Control Lever

The temperature control lever (C) has two functions. In heat or defrost mode, the lever operates the blend air door in the heater core housing to regulate heat. In A/C mode, the lever activates a potentiometer in the control panel to regulate compressor cycling and A/C output temperatures.

### Heater — A/C Relay

On models with air conditioning, a heater — A/C relay (D) is used to activate the blower motor in the heat/defrost or A/C modes. The relay is located behind the A/C housing and adjacent to the compressor electronic control module.

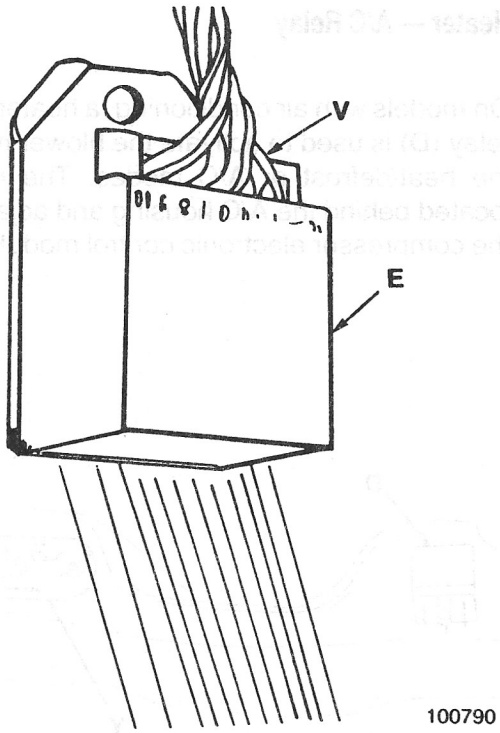



100789

### A/C Compressor Controls

On models with air conditioning, an electronic control module (E) is used to control compressor operation.

Input signals to the control module are from a thermistor located in the evaporator housing, and a potentiometer actuated by the temperature control lever (C). The control module energizes the compressor clutch while the potentiometer regulates A/C output. The thermistor monitors evaporator temperatures. Thermistor signals are relayed to the module which energizes or deenergizes the compressor clutch as needed.



100790

The electronic control module (E) is located under the instrument panel above the accelerator pedal.

## A/C COMPRESSOR TORQUE SPECIFICATIONS

| COMPONENTS | SERVICE SET-TO TORQUE | SERVICE RECHECK TORQUE |
|---|---|---|
| A/C clutch spindle nut | 27 N•m (37 ft-lbs) | 34-39 N•m (25-30 ft-lbs) |
| A/C cylinder head bolts | 24 N•m (34 ft-lbs) | 30-34 N•m (25-30 ft-lbs) |
| A/C drain/fill plug | 8-12 N•m (6-9 ft-lbs) | |

## BLOWER SWITCH OPERATING CHART

### HEATER ONLY

| Terminal Number | Terminal Usage | POSITION | | | |
|---|---|---|---|---|---|
| | | LO | M1 | M2 | HI |
| 1 | 12v | Open | Connected to Pin 2 | Connected to Pin 3 | Connected to Pin 4 |
| 2 | M1 | Open | Connected to Pin 1 | Open | Open |
| 3 | M2 | Open | Open | Connected to Pin 1 | Open |
| 4 | HI | Open | Open | Open | Connected to Pin 1 |
| 5 | Not Used | — | — | — | — |

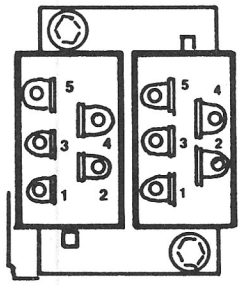
100791

### HEATER/AIR CONDITIONING

| Switch | Terminal Number | Terminal Usage | POSITION | | | |
|---|---|---|---|---|---|---|
| | | | LO | M1 | M2 | HI |
| A/C Motor | 1 | 12v | Open | Connected to Pin 2 | Connected to Pin 3 | Connected to Pin 4 |
| | 2 | M1 | Open | Connected to Pin 1 | Open | Open |
| | 3 | M2 | Open | Open | Connected to Pin 1 | Open |
| | 4 | HI | Open | Open | Open | Connected to Pin 1 |
| | 5 | Not Used | — | — | — | — |
| Heater Motor | 1 | 12v | Open | Connected to Pin 2 | Connected to Pin 3 | Connected To Pin 4 |
| | 2 | M1 | Open | Connected to Pin 1 | Open | Open |
| | 3 | M2 | Open | Open | Connected to Pin 1 | Open |
| | 4 | HI | Open | Open | Open | Connected to Pin 1 |
| | 5 | Not Used | — | — | — | — |

100792

BLOWER SWITCH TERMINALS




100793

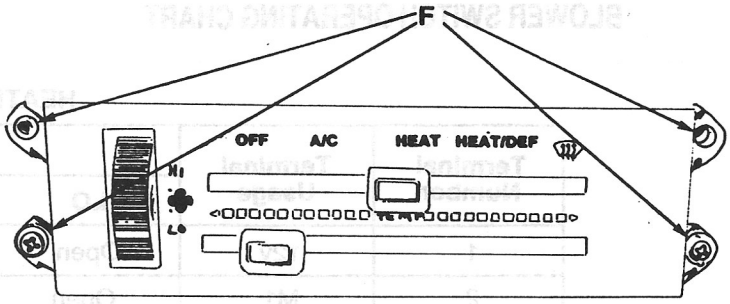
## HEATER — A/C CONTROL PANEL REMOVAL

Remove the instrument panel bezel.

Remove the control panel retaining screws (F).

Remove the control panel (G) and disconnect all electrical and vacuum connections.

Remove the control cable from the control panel by pressing in the retaining tab and removing the cable.




100794

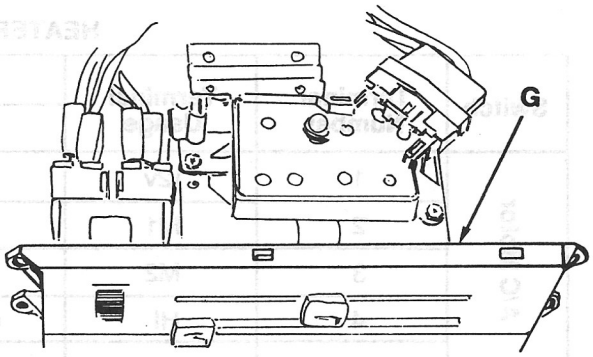
## HEATER — A/C CONTROL PANEL INSTALLATION

Connect all vacuum and electrical connections and install the control panel.

Connect the heater control cable to the control panel (G) by pushing the square tab into the slot in the control panel until it locks.

Install the control panel retaining screws (F).

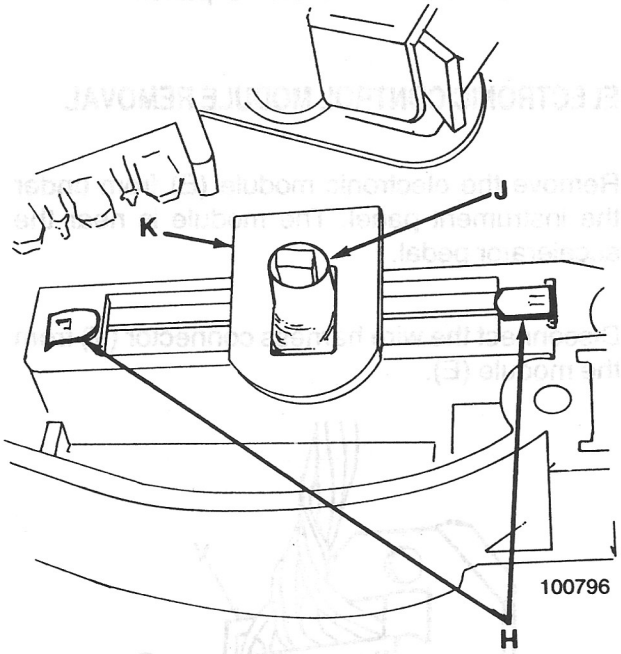
Install the instrument panel Bezel.




100795

## POTENTIOMETER REMOVAL

Remove the heater — A/C control panel.

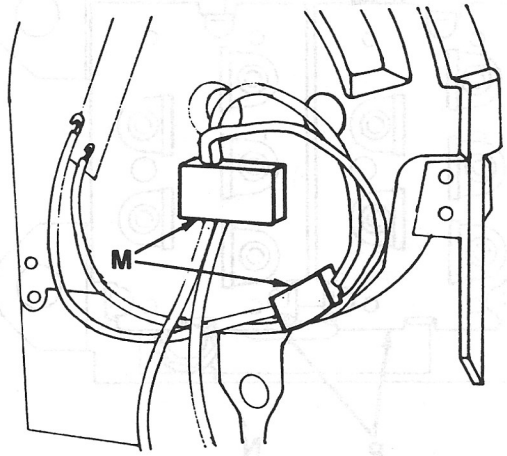



Bend the potentiometer retaining tabs (H) upward and remove the potentiometer assembly from the control panel.

## POTENTIOMETER INSTALLATION

Position the replacement potentiometer in the control panel. Make sure the potentiometer pin (J) engages with the temperature lever actuator (K).

Bend the potentiometer retaining tabs (H) downward to retain the potentiometer.



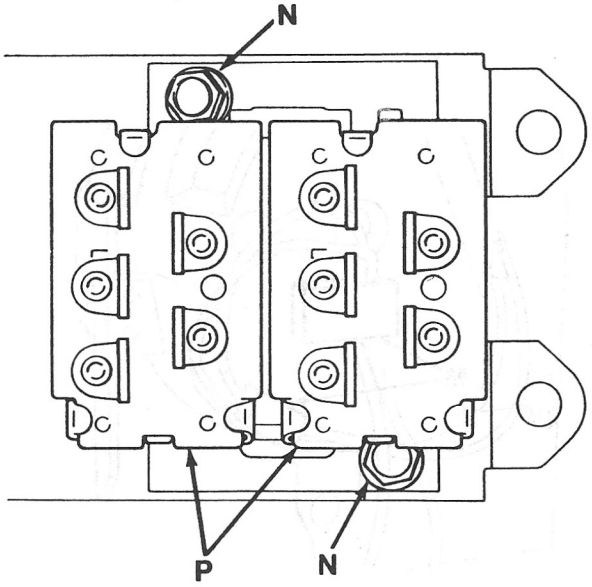

Wrap the potentiometer wires around the bottom of the control panel and lock them in the retaining tabs (M).

Install the heater — A/C control panel.

## HEATER — A/C BLOWER SWITCH REMOVAL

Remove the heater — A/C control panel.

Remove the blower switch retaining screws (N) and remove the switches (P).

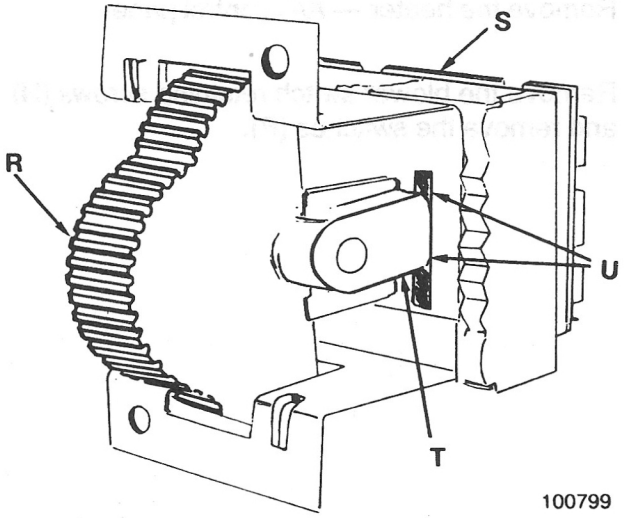



100798

Remove the control wheel (R) from the switch assembly (S).

## HEATER — A/C BLOWER SWITCH INSTALLATION

Position the control wheel (R) in the replacement switch assembly. Make sure the control wheel tabs (T) engage between the centering blocks (U) inside the switch assembly.




100799

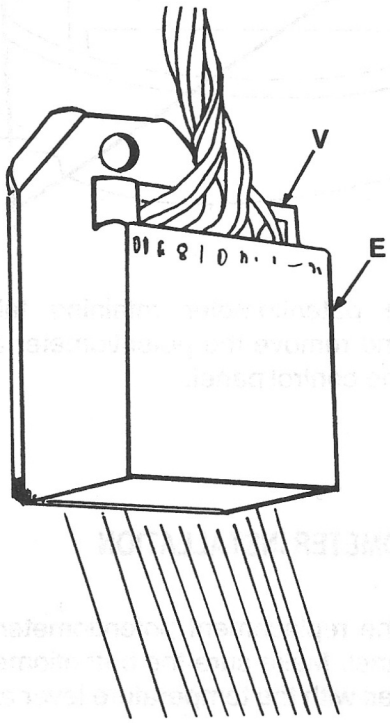
Install the switch assembly in the control panel and attach retaining screws (N).

Install the heater — A/C control panel.

## ELECTRONIC CONTROL MODULE REMOVAL

Remove the electronic module (E) from under the instrument panel. The module is near the accelerator pedal.

Disconnect the wire harness connector (V) from the module (E).




100790

Remove the module.

## ELECTRONIC CONTROL MODULE INSTALLATION

Attach the wire harness connector (V) to the module (E).

Position the module under the instrument panel and away from the accelerator pedal.

## THERMISTOR REMOVAL

Remove the evaporator housing from under the instrument panel.

Remove the evaporator housing cover.

Remove the evaporator core from the evaporator housing.

Remove the thermistor from the evaporator core and disconnect the thermistor wire connection.

## THERMISTOR INSTALLATION

Position the thermistor in the evaporator housing and connect the thermistor wire connection.

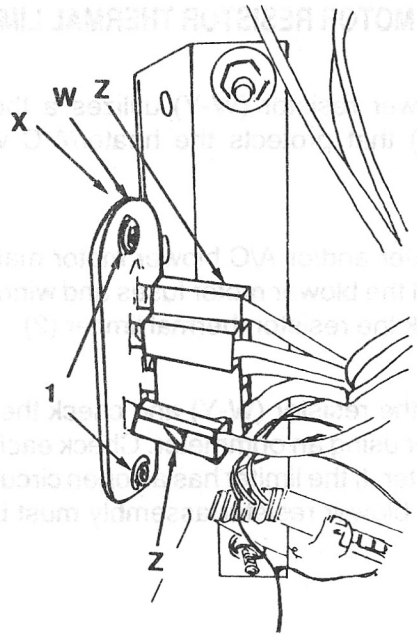
Install the evaporator core into the evaporator housing.

Install the evaporator housing cover.

Install the evaporator housing under the instrument panel and install the housing retaining screws.

## BLOWER MOTOR RESISTOR REPLACEMENT

There are separate blower motor resistors for the heater and A/C systems. They are identical but are located in different positions. The heater blower resistor (W) is located on the heater core housing (X) in the engine compartment. The A/C blower resistor (Y) is located on the reverse side of the A/C evaporator housing (to the left of the steering column). Removal/installation procedures are the same for both resistors.




100801

### Resistor Removal

Disconnect the resistor wire connectors (Z).

Remove the retaining screws (1).

Remove the resistor (W).

### Resistor Installation

Install the resistor (W).

Install the resistor retaining screws (1).

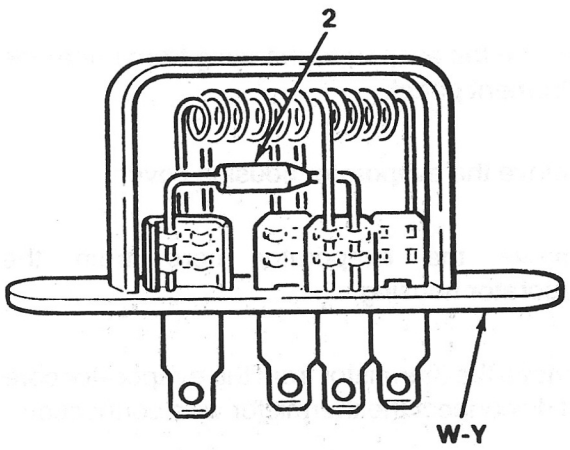
Connect the resistor wire connectors (Z).

## BLOWER MOTOR RESISTOR THERMAL LIMITER

Each blower resistor (W-Y) utilizes a thermal limiter (2) that protects the heater/A/C wiring circuit.

If the heater and/or A/C blower motor malfunctions, and the blower motor fuses and wiring are OK, check the resistor thermal limiter (2).

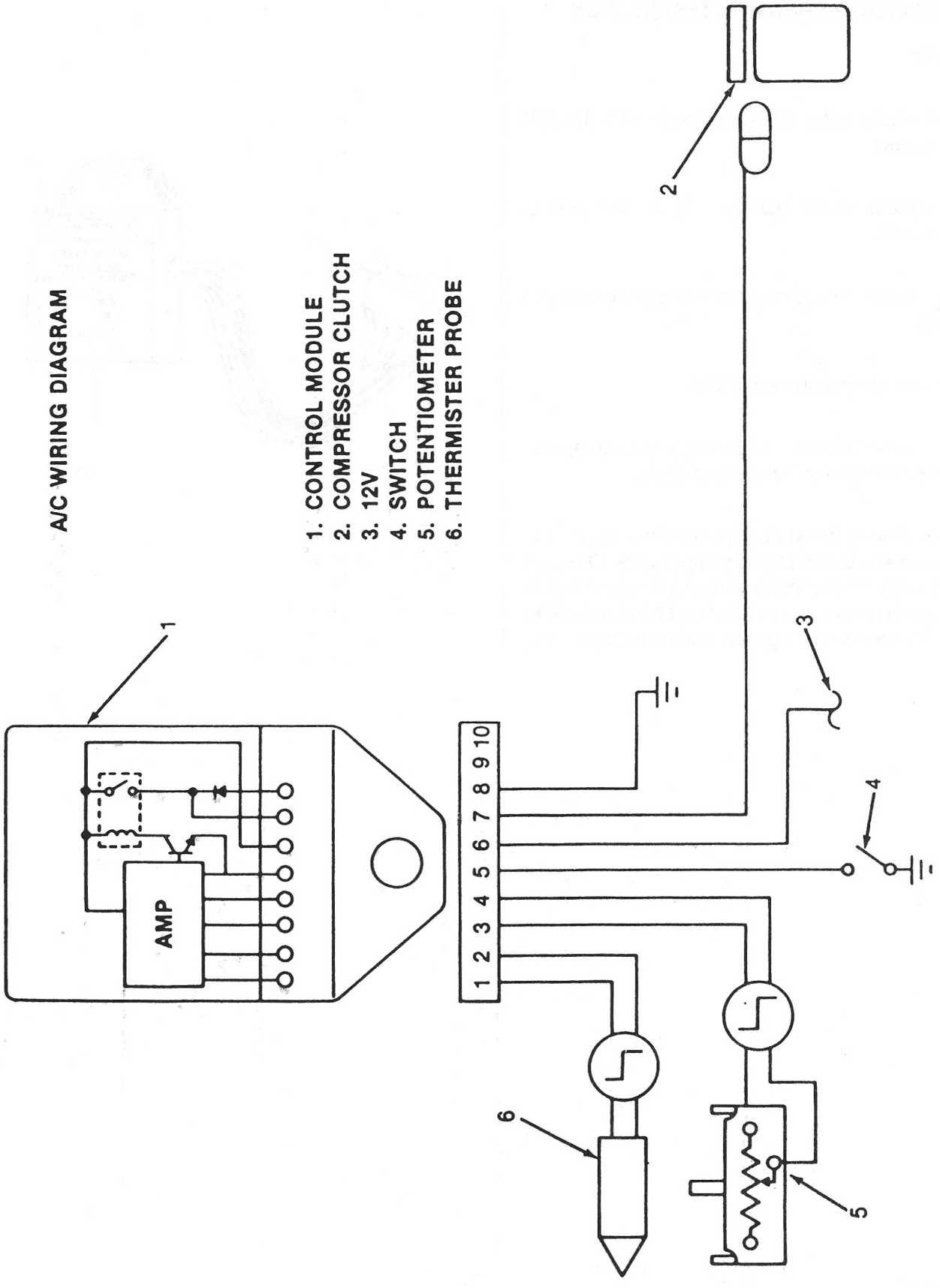
Remove the resistor (W-Y) and check the thermal limiter using an ohmmeter. Check each side of the limiter. If the limiter has an open circuit, the complete blower resistor assembly must be replaced.




100800

A/C WIRING DIAGRAM

1. CONTROL MODULE
2. COMPRESSOR CLUTCH
3. 12V
4. SWITCH
5. POTENTIOMETER
6. THERMISTER PROBE

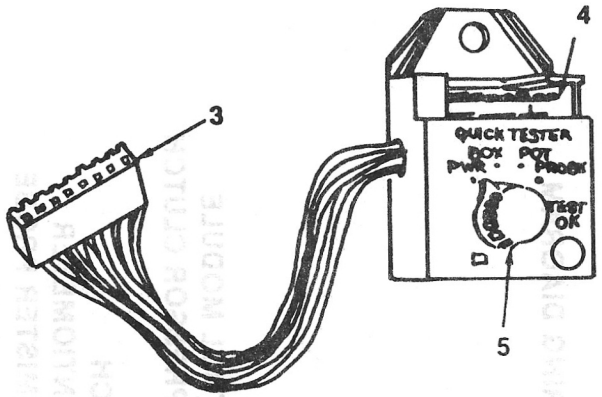



85748

## A/C CIRCUIT TESTING WITH TESTER AMGN

**19-010**

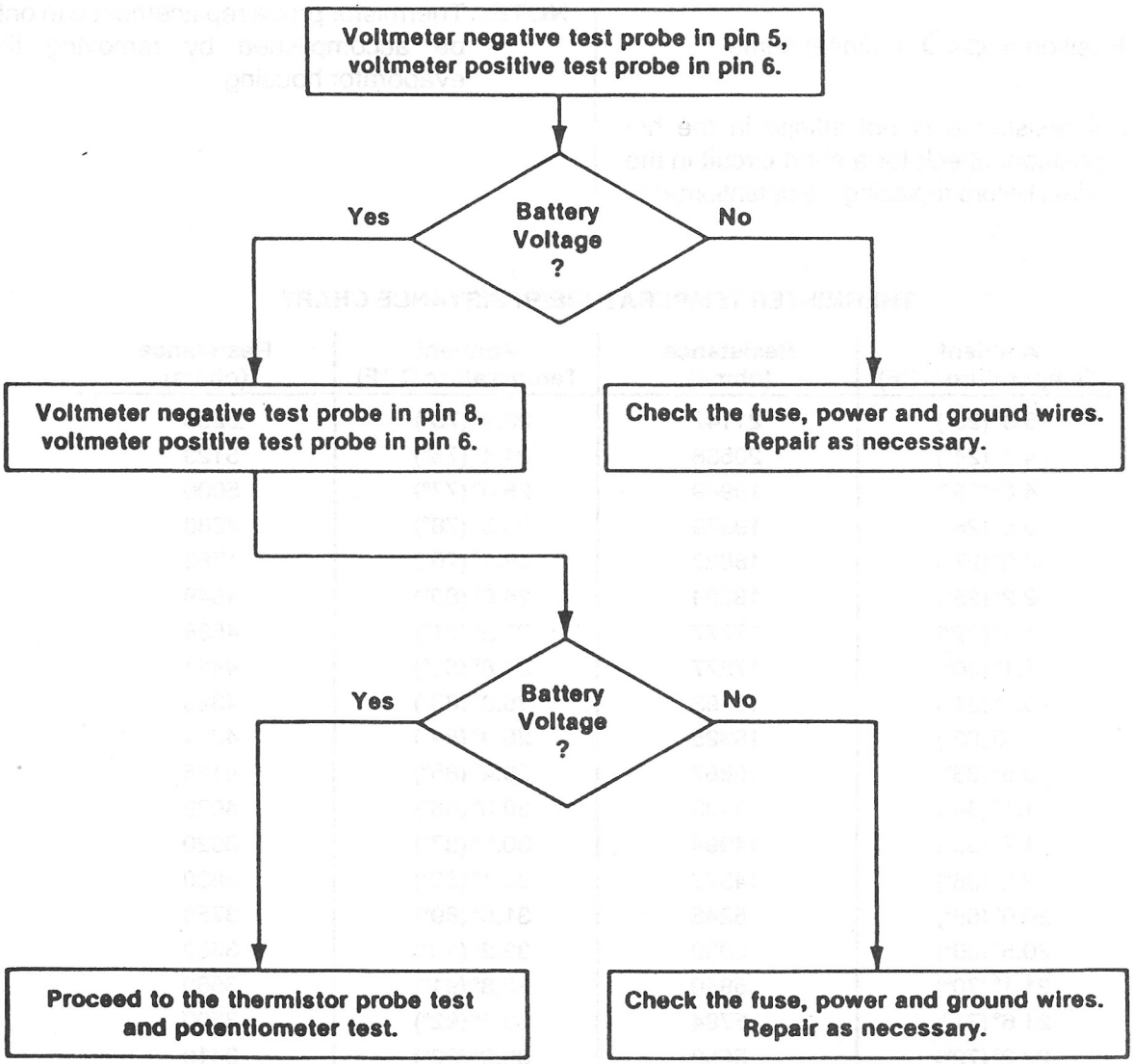
- Disconnect the control module from the A/C harness.
- Connect tester harness (3) to the control module.
- Connect the A/C harness to tester connection (4).
- Turn the ignition switch ON.
- Turn the A/C system ON and set the temperature control lever at cold position.
- Turn the tester knob (5) to desired position to test the A/C circuit and components. Observe the light on the tester. If the light fails to illuminate in one or more of the test positions, refer to the following diagnosis and test procedures.



100802

**Note:** Before performing the power failure check, be sure the module wiring connector is firmly seated. Disconnect and reconnect the wiring harness connector at the module and recheck system operation.

## A/C POWER FAILURE DIAGNOSIS



## POTENTIOMETER TEST

Place the ohmmeter test probes across pin 3 and pin 4 of the control module wire harness connector.

Check resistance with temperature control lever in:

- Cold Position = 0 to 100 ohms
- Warm Position = Approx. 10,000 ohms
- Hot Position = $\infty$ (infinite) ohms

**NOTE:** If resistance is not infinite in the hot position, check for a short circuit in the wires before replacing the potentiometer.

## THERMISTOR PROBE TEST

Place the ohmmeter test probes across the control module wire harness connector pins 1 and 2.

Refer to the resistance chart below.

Example: If the ambient temperature is 26.6°C (80°F), probe resistance should be approximately 4,649 ohms ± 550 ohms.

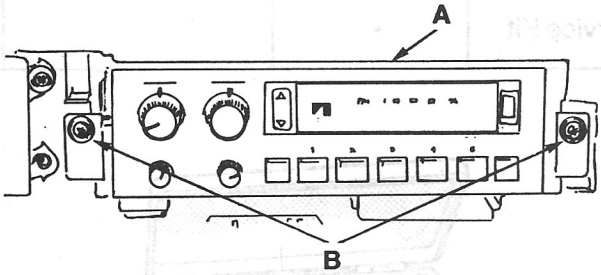
**NOTE:** Thermistor probe replacement can only be accomplished by removing the evaporator housing.

**THERMISTER TEMPERATURE/RESISTANCE CHART**

| Ambient Temperature C (°F) | Resistance (ohms) | Ambient Temperature C (°F) | Resistance (ohms) |
|---|---|---|---|
| –5.0° (23°) | 21147 | 23.9° (75°) | 5250 |
| –4.5° (24°) | 20538 | 24.4° (76°) | 5123 |
| –4.0° (25°) | 19949 | 25.0° (77°) | 5000 |
| –3.5° (26°) | 19379 | 25.5° (78°) | 4880 |
| –3.0° (27°) | 18827 | 26.1° (79°) | 4763 |
| –2.2° (28°) | 18294 | 26.6° (80°) | 4649 |
| –1.5° (29°) | 17777 | 27.2° (81°) | 4538 |
| –1.1° (30°) | 17277 | 27.8° (81°) | 4431 |
| –0.5° (31°) | 16793 | 28.3° (83°) | 4326 |
| 0 (32°) | 16325 | 28.9° (84°) | 4224 |
| 0.5° (33°) | 15867 | 29.4° (85°) | 4125 |
| 1.1° (34°) | 15423 | 30.0° (86°) | 4029 |
| 1.7° (35°) | 14994 | 30.5° (87°) | 3920 |
| 2.2° (36°) | 14578 | 31.1° (88°) | 3830 |
| 20.0° (68°) | 6245 | 31.6° (89°) | 3750 |
| 20.5° (69°) | 6090 | 32.2° (90°) | 3650 |
| 21.1° (70°) | 5940 | 32.8° (91°) | 3560 |
| 21.6° (71°) | 5794 | 33.3° (92°) | 3500 |
| 22.2° (72°) | 5652 | 33.9° (93°) | 3410 |
| 22.7° (73°) | 5514 | 34.4° (94°) | 3325 |
| 23.3° (74°) | 5380 | 35.0° (95°) | 3265 |

## GENERAL INFORMATION

1986 Grand Wagoneer/Truck truck models are equipped with front mount, slide-in type radios (A). Removal/installation procedure is basically the same for all 1986 radio models as outlined in the following procedures.




100816

## RADIO REMOVAL

Disconnect the battery negative cable.

Remove the instrument panel bezel. Unsnap the tabs that retain the bezel in the panel and remove the bezel.

Remove the radio retaining screws (B).

Slide the radio out of the panel only enough for access to the antenna and wiring harness connections.

Disconnect the radio wiring harness connectors and antenna cable and remove the radio.

## RADIO INSTALLATION

Connect the antenna cable and wiring harness connectors to the radio.

Slide the radio into the instrument panel and install the radio attaching screws (B).

Align and snap the instrument panel bezel into place in the panel. Be sure the bezel retaining tabs are all properly seated.

Connect the battery negative cable.

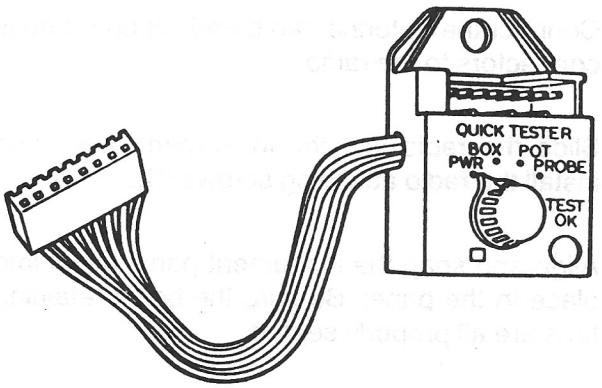
# SPECIAL TOOLS

## HEATING/AIR CONDITIONING

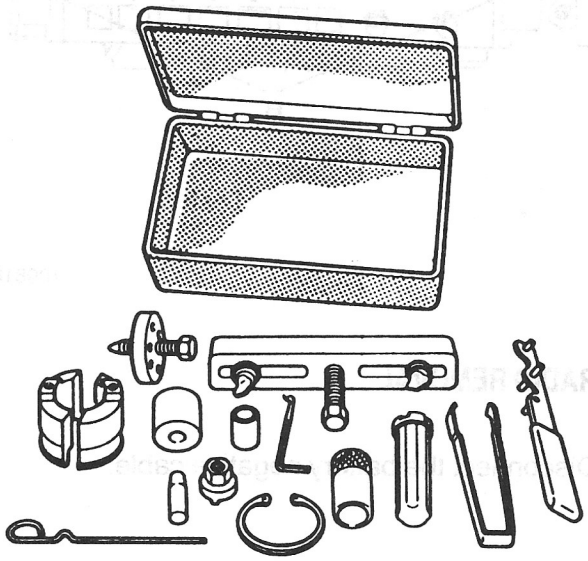
### TOOL NOTES

The following service tools are either required or recommended for servicing 1986 Grand Wagoneer/Truck models.

| TOOL REF. | DESCRIPTION | REQUIRED | RECOMMENDED |
|---|---|---|---|
| J-25499 or J-25498 | High Pressure Service Valve Adapter | | • |
| AMGN 19-010 | Quick Tester | | • |
| J-29642-A | Air Conditioner Compressor Service Kit | • | |




AMGN 19-010

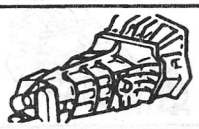


J-29642-A

J-25498

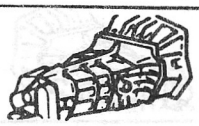
J-25499

85583A



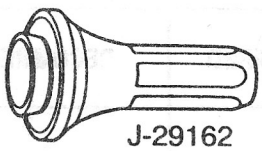
# SPECIAL TOOLS

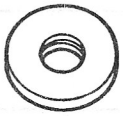
## TRANSFER CASE — MODEL 228

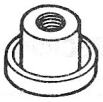


| TOOL REF. | DESCRIPTION | REQUIRED | RECOMMENDED |
|---|---|---|---|
| J-2619-01 | Slide Hammer | | ▪ |
| J-7818 | Rear Retainer Bearing Installer | ▪ | |
| J-8001 | Dial Indicator Set | | ▪ |
| J-8092 | Driver Handle | | ▪ |
| J-8614-01 | Front/Rear Yoke Remover | | ▪ |
| J-23738 | Hand Operated Vacuum Pump | | ▪ |
| J-26941 | Needle Bearing Puller | | ▪ |
| J-29162 | Rear Retainer Oil Seal Installer | ▪ | |
| J-29163 | Front Output Shaft Rear Bearing Installer | ▪ | |
| J-29166 | Rear 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-29170 | Input Gear Bearing Remover | ▪ | |
| J-29174 | Mainshaft Bearing Installer | ▪ | |
| J-29185 | Annulus Bushing Remover and Installer | | ▪ |
| J-29185-2 | Annulus Bushing Installer | | ▪ |
| J-29369-1 | Needle Bearing Puller | | ▪ |

100817


J-29162

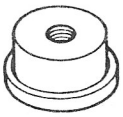

J-7818


J-29163


J-29166

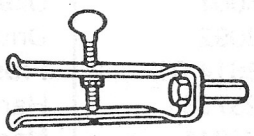

J-29167

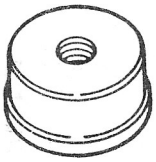

J-29168

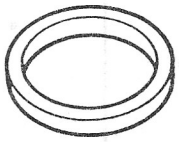

J-29169

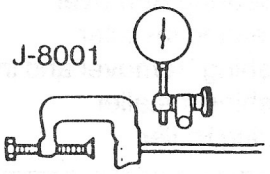

J-29170

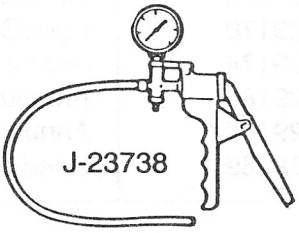

J-29174

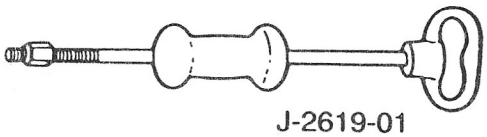

J-26941

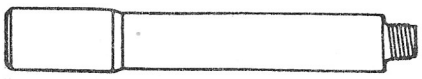

J-29185

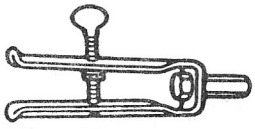

J-29185-2

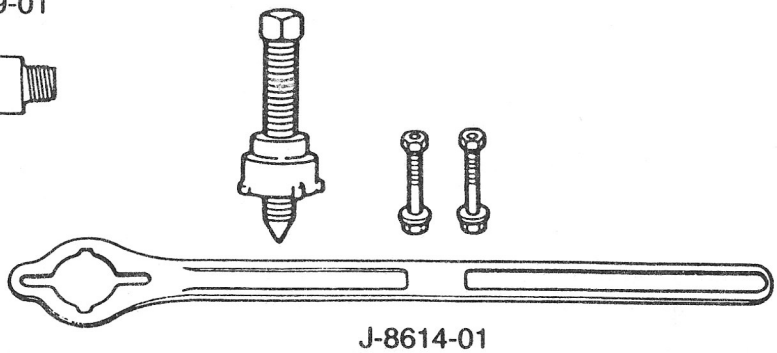

J-8001


J-23738


J-2619-01


J-8092


J-29369-1


J-8614-01

84280