Four-Wheel Drive Systems—Electronic Shift

Refer to Wiring Diagrams Section 308-07A, Four Wheel Drive Systems for schematic and connector information.

Principles of Operation

Transfer Case — Electronic Shift

The four-wheel drive electronic shift-on-the-fly feature electrically shifts the vehicle transfer case between 2WD, 4WD HIGH, and 4WD LOW. The system mode is selected by the operator through the mode select switch (MSS) on the instrument panel. The operator is informed which mode the system is in by two instrument cluster indicators: one for 4WD HIGH which appears as 4WD HIGH, and one for 4WD LOW, which appears as 4WD LOW. Shifts into 4WD HIGH can be made at any speed. When shifting into 4WD HIGH with the vehicle stationary, tooth blockage may occur preventing shift completion. When the vehicle is driven above 8 km/h (5 mph) the shift will complete. When shifting in or out of 4WD LOW, the four-wheel drive (4WD) control module requires that the vehicle speed be less than 5 km/h (3 mph), the brake pedal be applied, and the transmission be in NEUTRAL (automatic transmission) or the clutch pedal be depressed (manual transmission).

The transfer case shift motor is mounted externally on the transfer case. It drives a rotary cam which moves the mode fork and range fork within the transfer case between the 4WD HIGH, 4WD LOW, and 2WD modes.

The four-wheel drive (4WD) control module controls the transfer case shift motor that shifts between 4WD HIGH, 4WD LOW, and 2WD modes.

The 4WD control module accomplishes shifts by interpreting inputs from the following:

- mode select switch (MSS)
- vehicle speed signal
- encoder plate position
- brake pedal switch
- digital transmission range (TR) sensor
- ignition switch
- transfer case shift motor

Based on these inputs, the 4WD control module controls the shifts into 2WD, 4WD HIGH or 4WD LOW with the following outputs:

- shift motor (clockwise)
- shift motor (counterclockwise)

Inspection and Verification — Electronic Shift

1. Visually inspect the following for obvious signs of mechanical and electrical damage.

Visual Inspection Chart

<table>
<thead>
<tr>
<th>Mechanical</th>
<th>Electrical</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Axle shafts and universal joints</td>
<td>● Battery junction box (BJB) fuse:</td>
</tr>
<tr>
<td>● Driveshaft and universal joints</td>
<td>1 (50A)</td>
</tr>
<tr>
<td>● Fluid leaks</td>
<td>3 (50A)</td>
</tr>
<tr>
<td>● Matching tire size</td>
<td>13 (20A)</td>
</tr>
<tr>
<td>● Battery junction box (BJB) fuse:</td>
<td>30 (10A)</td>
</tr>
<tr>
<td>● Central junction box (CJB) fuse:</td>
<td>● 28 (7.5A) (manual transmission)</td>
</tr>
<tr>
<td>● 4WD control module</td>
<td>● 10 (7.5A)</td>
</tr>
<tr>
<td>● Wiring harness</td>
<td>● 11 (7.5A)</td>
</tr>
<tr>
<td>● Mode select switch (MSS)</td>
<td>● 5 (15A)</td>
</tr>
<tr>
<td>● Transfer case shift motor</td>
<td>● Connector(s)</td>
</tr>
<tr>
<td>● Connector(s)</td>
<td>● Circuitry</td>
</tr>
</tbody>
</table>

2. If the concern remains after the inspection, connect the diagnostic tool to the data link connector (DLC) located beneath the instrument panel and select the vehicle to be tested from the diagnostic tool menu. If the diagnostic tool does not communicate with the vehicle:
● check that the program card is correctly installed.
● check the connections to the vehicle.
● check the ignition switch position.

3. If the diagnostic tool still does not communicate with the vehicle, refer to the diagnostic tool manual.

4. Carry out the DATA LINK DIAGNOSTICS test. If the diagnostic tool responds with:
   ● CTK914, CTK915 or CTK70 = ALL ECU'S NO RESP/NOT EQUIP, refer to Section 418-00.
   ● NO RESP/NOT EQUIP for 4WD control module, go to Pinpoint Test B.
   ● SYSTEM PASSED, retrieve and record the continuous diagnostic trouble codes (DTCs), erase the continuous DTCs and carry out the 4WD control module self test.

5. If the DTCs retrieved are related to the concern, go to the 4WD Control Module Diagnostic Trouble Code (DTC) Index to continue diagnostics.

6. If no DTCs related to the concern are retrieved, carry out the Electronic Shift Function Test. Refer to Functional Test—Electronic Shift (Pinpoint Test A) in this section.

<table>
<thead>
<tr>
<th>DTC</th>
<th>Description</th>
<th>Source</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1342</td>
<td>ECU is Defective</td>
<td>4WD control module</td>
<td>CLEAR the DTCs. REPEAT the 4WD control module self-test. If DTC B1342 is retrieved, INSTALL a new 4WD control module. REFER to Four Wheel Drive (4WD) Control Module in this section. CLEAR the DTCs. REPEAT the self-test.</td>
</tr>
<tr>
<td>B1355</td>
<td>Ignition Run Circuit Failure</td>
<td>4WD control module</td>
<td>GO to Pinpoint Test C.</td>
</tr>
<tr>
<td>B1483</td>
<td>Brake Pedal Input Circuit Failure</td>
<td>4WD control module</td>
<td>GO to Pinpoint Test D.</td>
</tr>
<tr>
<td>B1485</td>
<td>Brake Pedal Input Battery Short</td>
<td>4WD control module</td>
<td>GO to Pinpoint Test D.</td>
</tr>
<tr>
<td>B1555</td>
<td>Ignition Run/Start Circuit Failure</td>
<td>4WD control module</td>
<td>GO to Pinpoint Test C.</td>
</tr>
<tr>
<td>C1728</td>
<td>Transfer Case Unable to Transition Between 2WD HIGH and 4WD HIGH</td>
<td>4WD control module</td>
<td>CARRY OUT the electronic shift function test. REFER to Function Test — Electronic Shift (Pinpoint Test A) in this section.</td>
</tr>
<tr>
<td>C1729</td>
<td>Transfer Case Unable to Transition Between 4WD HIGH and 4WD LOW</td>
<td>4WD control module</td>
<td>CARRY OUT the electronic shift function test. REFER to Function Test — Electronic Shift (Pinpoint Test A) in this section.</td>
</tr>
<tr>
<td>P0500</td>
<td>Vehicle Speed Sensor (VSS) Malfunction</td>
<td>4WD control module</td>
<td>GO to Pinpoint Test D.</td>
</tr>
<tr>
<td>P1812</td>
<td>Transmission 4WD Mode Select Circuit Failure</td>
<td>4WD control module</td>
<td>GO to Pinpoint Test C.</td>
</tr>
<tr>
<td>P1815</td>
<td>Transmission 4WD Mode Select Short Circuit to Ground</td>
<td>4WD control module</td>
<td>GO to Pinpoint Test C.</td>
</tr>
<tr>
<td>P1816</td>
<td>Transmission Neutral Safety Switch Circuit Failure</td>
<td>4WD control module</td>
<td>GO to Pinpoint Test D.</td>
</tr>
<tr>
<td>P1819</td>
<td>Transmission Neutral Safety Switch Short Circuit to Ground</td>
<td>4WD control module</td>
<td>GO to Pinpoint Test D.</td>
</tr>
<tr>
<td>P1849</td>
<td>Transmission Transfer Case Contact Plate A Short Circuit to Ground</td>
<td>4WD control module</td>
<td>GO to Pinpoint Test C.</td>
</tr>
<tr>
<td>P1853</td>
<td>Transmission Transfer Case Contact Plate B Short Circuit to Ground</td>
<td>4WD control module</td>
<td>GO to Pinpoint Test C.</td>
</tr>
<tr>
<td>P1857</td>
<td>Transmission Transfer Case Contact Plate C Short Circuit to Ground</td>
<td>4WD control module</td>
<td>GO to Pinpoint Test C.</td>
</tr>
<tr>
<td>P1861</td>
<td>Transmission Transfer Case Contact Plate D Short Circuit to Ground</td>
<td>4WD control module</td>
<td>GO to Pinpoint Test C.</td>
</tr>
<tr>
<td>P1867</td>
<td>Transmission Transfer Case Contact Plate General Circuit Failure</td>
<td>4WD control module</td>
<td>GO to Pinpoint Test C.</td>
</tr>
<tr>
<td>P1891</td>
<td>Transmission Transfer Case Contact Plate Ground Return Open Circuit</td>
<td>4WD control module</td>
<td>GO to Pinpoint Test C.</td>
</tr>
<tr>
<td>—</td>
<td>For All Other DTCs</td>
<td>4WD control module</td>
<td>GO to Section 419-01.</td>
</tr>
</tbody>
</table>

Functional Test — Electronic Shift

**PINPOINT TEST A: ELECTRONIC SHIFT FUNCTIONAL TEST**

⚠️ CAUTION: The function test must be carried out on a hard surface in a vacant area without traffic.

<table>
<thead>
<tr>
<th>CONDITIONS</th>
<th>DETAILS/RESULTS/ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 CHECK INDICATOR PROVE-OUT</td>
<td>[1] Start the vehicle while observing the four-wheel drive (4WD) indicators for prove-out.</td>
</tr>
</tbody>
</table>
Did the indicators prove out?

| Yes | GO to A3 |
| No  | GO to A2 |

### A2 CHECK FOUR-WHEEL DRIVE (4WD) CONTROL MODULE COMMUNICATION

1. Retrieve 4WD control module self-test DTCs.

### A3 CHECK FOR TWO-WHEEL DRIVE (2WD) INDICATED

1. Start the vehicle and allow to idle.
2. Apply the brake pedal and hold.
3. Shift the transmission to NEUTRAL.
4. Turn the mode select switch (MSS) to 2WD while holding the shift conditions.
5. Observe the 4WD HIGH and 4WD LOW indicators.
   - Are both indicators off?
     - Yes
       - GO to A5
     - No
       - GO to A4

### A4 CHECK FOR THE PRESENCE OF FOUR-WHEEL DRIVE (4WD)

1. Shift the transmission to REVERSE and back the vehicle up 3.0 meters (10 feet) to relieve driveline windup.
2. Drive the vehicle forward for 3.0 meters (10 feet) and stop.
3. Press the brake pedal and hold.
4. Shift the transmission to NEUTRAL. Hold the shift conditions for 20 seconds.
5. Execute tight turns on a hard surface.
   - Is driveline windup and tire scuff present?
     - Yes
       - RETRIEVE 4WD control module self-test DTCs. If a self-test DTC related to the concern is retrieved, REFER to the 4WD Control Module Diagnostic Trouble Code (DTC) Index. If no DTC is retrieved, REFER to Section 308-07B and REPAIR the transfer case as necessary.
     - No
       - If the 4WD HIGH indicator is ON, REFER to the symptom chart in Section 413-01 to continue diagnosis. If the 4WD LOW indicator is ON, REFER to the symptom chart in Section 413-01 to continue diagnosis.

### A5 VERIFY SHIFT TO 4WD HIGH

1. Turn the mode select switch (MSS) to 4X4 HIGH.
2. Listen for shift motor operation.
3. Wait for 20 seconds after MSS is turned to 4X4 HIGH. (The system will use up to five cycles of shift attempts trying to engage 4WD HIGH.)
   - Is the 4WD HIGH indicator ON?
     - Yes
       - GO to A7
     - No
       - GO to A6

### A6 ATTEMPT MECHANICAL ASSIST ENGAGEMENT

1. Drive the vehicle above 8 km/h (5 mph) for at least 20 seconds.
2. Stop the vehicle.
3. Observe the 4WD HIGH indicator.
   - Is the 4WD HIGH indicator ON?
--- Yes
GO to A7.

--- No
RETRIEVE 4WD control module self-test DTCs. If a self-test DTC related to the concern is retrieved, REFER to the 4WD Control Module Diagnostic Trouble Code (DTC) Index. If no DTC related to the concern is retrieved, GO to Pinpoint Test C.

--- A7 CHECK FOR MECHANICAL ENGAGEMENT OF 4WD HIGH

1. Drive the vehicle for two minutes above 16 km/h (10 mph).
2. Execute tight turns on a hard surface.
3. Check for the presence of driveline windup and tire scuff.

   --- Yes
   GO to A8.

   --- No
   4WD HIGH did not mechanically engage. RETRIEVE 4WD control module self-test DTCs. If a self-test DTC related to the concern is retrieved, REFER to the 4WD Control Module Diagnostic Trouble Code (DTC) Index. If no DTC related to the concern is retrieved, GO to Pinpoint Test C.

--- A8 CHECK FOR CORRECT INDICATOR OPERATION ON 4WD LOW ENGAGEMENT

1. While driving the vehicle forward above 8 km/h (5 mph), turn the MSS to 4X4 LOW while observing the indicators for five seconds.
2. Turn the MSS to 4X4 HIGH.
3. Stop the vehicle and apply the parking brake.
4. Shift the transmission to PARK and release the brake pedal.

   --- Yes
   GO to A9.

   --- No
   RETRIEVE 4WD control module self-test DTCs. If a self-test DTC related to the concern is retrieved, REFER to the 4WD Control Module Diagnostic Trouble Code (DTC) Index. If no DTC related to the concern is retrieved, GO to Pinpoint Test D.

--- A9 CHECK THE LOW RANGE INDICATOR ON IN ERROR

1. Turn the MSS to 4X4 LOW.
2. Apply and hold the brake pedal.

   --- Yes
   GO to A10.

   --- No
   RETRIEVE 4WD control module self-test DTCs. If a self-test DTC related to the concern is retrieved, REFER to the 4WD Control Module Diagnostic Trouble Code (DTC) Index. If no DTC related to the concern is retrieved, GO to Pinpoint Test D.

--- A10 CHECK THE LOW RANGE INDICATOR FOR ON IN 4X4 LOW

1. Apply and hold the brake pedal.
2. Shift the transmission to NEUTRAL.
3. Listen for shift motor operation.
4. Hold the shift conditions for 20 seconds. (The system will use up to five cycles of shift attempts trying to engage 4X4 LOW.)

   --- Yes
   GO to A12.

   --- No
   GO to A11.

--- A11 ATTEMPT MECHANICAL ASSIST OF 4WD LOW ENGAGEMENT

1. CAUTION: Make sure there is a clear area behind the vehicle before backing up.
   Shift the transmission to REVERSE and back the vehicle up 3.0 meters (10 feet) to relieve driveline windup and stop.
2. Drive the vehicle forward for 3.0 meters (10 feet) and stop.
3. Apply the brake pedal and hold.
4. Shift the transmission to NEUTRAL.
5. Observe the 4WD LOW indicator.

   --- Yes
   GO to A12.

   --- No
   RETRIEVE 4WD control module self-test DTCs. If a self-test DTC related to the concern is retrieved, REFER to the 4WD Control Module Diagnostic Trouble Code (DTC) Index. If no DTC related to the concern is retrieved, GO to Pinpoint Test D.

--- A12 CHECK FOR MECHANICAL ENGAGEMENT OF 4WD LOW

1. Drive the vehicle for two minutes above 16 km/h (10 mph).
2. Execute tight turns on a hard surface.
3. Check for the presence of driveline windup and tire scuff.

   --- Yes
   GO to A7.

   --- No
   RETRIEVE 4WD control module self-test DTCs. If a self-test DTC related to the concern is retrieved, REFER to the 4WD Control Module Diagnostic Trouble Code (DTC) Index. If no DTC related to the concern is retrieved, GO to Pinpoint Test C.
NOTE: Driveline windup and tire scuff is present in both 4WD HIGH and 4WD LOW. However, vehicle speed is severely limited in 4WD LOW.

Execute tight turns on a hard surface.

Check for the presence of driveline windup, tire scuff and reduced vehicle speed.

- Is driveline windup, tire scuff and reduced speed present?
  - Yes
    - Go to A13.
  - No
    - 4X4 LOW did not mechanically engage. RETRIEVE 4WD control module self-test DTCs. If a self-test DTC related to the concern is retrieved, REFER to the 4WD Control Module Diagnostic Trouble Code (DTC) Index. If no DTC related to the concern is retrieved, GO to Pinpoint Test D.

A13 CHECK FOR CORRECT INDICATOR OPERATION ON 4WD LOW DISENGAGEMENT

- While driving the vehicle forward above 8 km/h (5 mph), turn the MSS to 4X4 HIGH while observing the indicators.
- Turn the MSS to 4X4 LOW.
- Stop the vehicle and apply the parking brake.
- Shift the transmission to PARK and release the brake pedal.
  - Is the 4WD LOW indicator ON?
    - Yes
      - Go to A14.
    - No
      - RETRIEVE 4WD control module self-test DTCs. If a self-test DTC related to the concern is retrieved, REFER to the 4WD Control Module Diagnostic Trouble Code (DTC) Index. If no DTC related to the concern is retrieved, GO to Pinpoint Test D.

A14 CHECK THE 4WD LOW INDICATOR

- Turn the MSS to 4X4 HIGH.
- Apply and hold the brake pedal.
  - Is the 4WD LOW indicator ON?
    - Yes
      - Go to A15.
    - No
      - RETRIEVE 4WD control module self-test DTCs. If a self-test DTC related to the concern is retrieved, REFER to the 4WD Control Module Diagnostic Trouble Code (DTC) Index. If no DTC related to the concern is retrieved, GO to Pinpoint Test D.

A15 CHECK FOR 4WD LOW INDICATOR OFF IN 4WD HIGH

- Press and hold the brake pedal.
- Shift the transmission to NEUTRAL.
- Listen for shift motor operation.
- Hold the shift conditions for 20 seconds. (The system will use up to five cycles of shift attempts trying to engage 4WD HIGH.)
  - Is the 4WD LOW indicator OFF?
    - Yes
      - Go to A17.
    - No
      - Go to A16.

A16 ATTEMPT MECHANICAL ASSIST OF 4WD LOW DISENGAGEMENT

- Drive the vehicle forward above 8 km/h (5 mph) for at least five seconds.
- Stop the vehicle.
- Apply the brake pedal and hold.
- Shift the transmission to NEUTRAL.
- Observe the 4WD LOW indicator.
  - Is the 4WD LOW indicator OFF?
    - Yes
      - Go to A17.
    - No
      - RETRIEVE 4WD control module self-test DTCs. If a self-test DTC related to the concern is retrieved, REFER to the 4WD Control Module Diagnostic Trouble Code (DTC) Index. If no DTC related to the concern is retrieved, GO to Pinpoint Test D.

A17 CHECK FOR MECHANICAL 4WD LOW DISENGAGEMENT AND 4WD HIGH ENGAGEMENT

- Apply the brake.
  - CAUTION: Make sure there is a clear area behind the vehicle before backing up.
    - Shift the transmission to REVERSE and back the vehicle up 3.0 meters (10 feet) to relieve driveline windup.
    - Stop the vehicle.
    - Drive the vehicle forward and execute tight turns on a hard surface.

NOTE: Driveline windup and tire scuff is present in both 4WD HIGH and 4WD LOW. However, vehicle speed is severely limited in 4WD LOW.
Verify the presence of driveline windup and tire scuff. Also verify the increased vehicle speed from when 4WD LOW was engaged.

- Did 4WD HIGH engage and the vehicle speed increase?
  - Yes
    \[\text{GO to A18}\]
  - No
    4WD LOW is mechanically bound or locked. REPAIR the transfer case as necessary. REFER to Section 308-07B.

A18 CHECK THE 4WD HIGH TO 2WD SHIFT

1. Stop the vehicle.
2. Turn the MSS to 2WD and wait 20 seconds.
3. Listen for shift motor operation.

- Is the 4WD HIGH indicator OFF?
  - Yes
    \[\text{GO to A20}\]
  - No
    \[\text{GO to A19}\]

A19 ATTEMPT MECHANICAL ASSIST OF 4WD HIGH DISENGAGEMENT

1. Drive the vehicle forward above 8 km/h (5 mph) for at least 20 seconds.
2. Stop the vehicle.
3. Observe the 4WD HIGH indicator.

- Is the 4WD HIGH indicator OFF?
  - Yes
    \[\text{GO to A20}\]
  - No
    RETRIEVE 4WD control module self-test DTCs. If a self-test DTC related to the concern is retrieved, REFER to the 4WD Control Module Diagnostic Trouble Code (DTC) Index. If no DTC related to the concern is retrieved, \[\text{GO to Pinpoint Test C}\].

A20 VERIFY THE TRANSFER CASE MECHANICALLY DISENGAGED

1. Apply the parking brake.
2. Rotate the front driveshaft.

- Does the front driveshaft turn?
  - Yes
    The transfer case is operating correctly. INSTRUCT the customer on correct system operation.
  - No
    The transfer case did not disengage from 4WD HIGH. REPAIR the transfer case as necessary. REFER to Section 308-07B.

Symptom Chart — Electronic Shift

<table>
<thead>
<tr>
<th>Condition</th>
<th>Possible Sources</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>● No communication with the four-wheel drive (4WD) control module</td>
<td>● 4WD control module. ● Central junction box (CJB). ● CJB fuse: 35 (15A), 10 (7.5A). ● Circuity.</td>
<td>● GO to Pinpoint Test B.</td>
</tr>
<tr>
<td>● The vehicle does not shift between 2WD and 4WD modes correctly</td>
<td>● Battery junction box (BJB) fuse 13 (20A). ● Mode select switch (MSS). ● Contact plate A, B, C, or D. ● transfer case shift motor. ● Circuity. ● 4WD control module. ● Transfer case mechanism.</td>
<td>● GO to Pinpoint Test C.</td>
</tr>
<tr>
<td>● The vehicle does not shift between 4WD HIGH and 4WD LOW modes correctly</td>
<td>● BJB fuse 13 (20A). ● Mode select switch (MSS). ● Neutral safety switch. ● Brake pedal position (BPP) switch. ● 4WD control module. ● Transfer case. ● Digital transmission range (TR) sensor. ● Circuity.</td>
<td>● GO to Pinpoint Test D.</td>
</tr>
<tr>
<td>● The 4WD HIGH indicator is always on—4WD system operates correctly</td>
<td>● Circuity. ● Instrument cluster. ● 4WD control module.</td>
<td>● REFER to the symptom chart in Section 413-01 to continue diagnosis.</td>
</tr>
<tr>
<td>● The 4WD LOW indicator is always on</td>
<td>● Powertrain control module (PCM). ● Circuity. ● Instrument cluster. ● 4WD control module.</td>
<td>● REFER to the symptom chart in Section 413-01 to continue diagnosis.</td>
</tr>
</tbody>
</table>
Pinpoint Tests — Electronic Shift

PINPOINT TEST B: NO COMMUNICATION WITH THE FOUR-WHEEL DRIVE (4WD) CONTROL MODULE

<table>
<thead>
<tr>
<th>CONDITIONS</th>
<th>DETAILS/RESULTS/ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1 CHECK POWER TO 4WD CONTROL MODULE</td>
<td></td>
</tr>
<tr>
<td>![Image 1]</td>
<td>CHECK POWER TO 4WD CONTROL MODULE</td>
</tr>
<tr>
<td>![Image 2]</td>
<td>4WD Control Module C281a</td>
</tr>
<tr>
<td>![Image 3]</td>
<td>4WD Control Module C281b</td>
</tr>
<tr>
<td>![Image 4]</td>
<td><strong>Measure the voltage between 4WD control module C281a, pin 1, circuit 931 (OG) and ground; and between 4WD control module C281a, pin 2, circuit 704 (DG/LG) and ground.</strong></td>
</tr>
<tr>
<td>![Image 5]</td>
<td><strong>Are both voltage measurements greater than 10 volts?</strong></td>
</tr>
<tr>
<td>![Image 6]</td>
<td><strong>Yes</strong></td>
</tr>
<tr>
<td>![Image 7]</td>
<td><strong>GO to B2.</strong></td>
</tr>
<tr>
<td>![Image 8]</td>
<td><strong>No</strong></td>
</tr>
<tr>
<td>![Image 9]</td>
<td><strong>REPAIR the power supply as necessary. TEST the system for normal operation.</strong></td>
</tr>
</tbody>
</table>

| B2 CHECK 4WD CONTROL MODULE GROUND CIRCUIT |
| ![Image 10] | CHECK 4WD CONTROL MODULE GROUND CIRCUIT |
| ![Image 11] | **Measure the resistance between 4WD control module C281a pin 7, circuit 57 (BK), harness side and ground; and between 4WD control module C281b pin 2, circuit 570 (BK/WH), harness side and ground.** |
| ![Image 12] | **Are both resistances less than 5 ohms?** |
| ![Image 13] | **Yes** |
| ![Image 14] | **CARRY OUT the module self-test. If any DTCs are recorded, REFER to the 4WD Module Diagnostic Trouble Code (DTC) Index in this section.** |
| ![Image 15] | If the module still does not communicate with the diagnostic tool, REFER to Section 418-00. |
| ![Image 16] | **No** |
| ![Image 17] | **REPAIR the circuit. TEST the system for normal operation.** |

PINPOINT TEST C: THE VEHICLE DOES NOT SHIFT BETWEEN 2WD AND 4WD MODES CORRECTLY

<table>
<thead>
<tr>
<th>CONDITIONS</th>
<th>DETAILS/RESULTS/ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 REVIEW THE DIAGNOSTIC TROUBLE CODES (DTCs)</td>
<td></td>
</tr>
</tbody>
</table>
Using the recorded results from the 4WD control module self-test:

- Are any DTCs retrieved?

→ **Yes**
  - If DTC B1355 or DTC B1555 is retrieved, GO to C15.
  - If DTC P1812 or DTC P1815 is retrieved, GO to C2.
  - If DTC P1849, DTC P1853, DTC P1857, DTC P1861, DTC P1867 or DTC P1891 is retrieved, GO to C9.

→ **No**
  - GO to C2.

### C2 CHECK THE MODE SELECT SWITCH (MSS) — MONITOR THE 4WD CONTROL MODULE PID 4WD_SW

- Monitor the 4WD control module PID 4WD_SW while cycling the MSS through 2WD, 4WD HIGH and 4WD LOW.

- Do the 4WD control module PID values agree with the MSS positions?

→ **Yes**
  - GO to C4.

→ **No**
  - GO to C3.

### C3 CHECK THE MSS — ALL POSITIONS

- Measure the resistance between MSS C284 pin 2, component side and pin 3, component side. Refer to the following chart:

<table>
<thead>
<tr>
<th>MSS Position</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2WD</td>
<td>3,705-4,095 Ohms</td>
</tr>
<tr>
<td>4WD HIGH</td>
<td>1,045-1,155 Ohms</td>
</tr>
<tr>
<td>4X4 LOW</td>
<td>342-378 Ohms</td>
</tr>
</tbody>
</table>

- Are the resistances within the specified values?

→ **Yes**
  - GO to C4.

→ **No**
  - INSTALL a new MSS. REFER to Mode Select Switch (MSS) in this section. CLEAR the DTCs. REPEAT the self-test.

### C4 CHECK CIRCUIT 435 (YE/BK) FOR A SHORT TO VOLTAGE

- Measure the voltage between 4WD control module C281b pin 1, circuit 435 (YE/BK), harness side and ground.
Is any voltage present?

→ Yes
   REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

→ No
   GO to C6.

C5 CHECK CIRCUIT 435 (YE/BK) FOR AN OPEN

[Image]

Measure the resistance between MSS C284 pin 3, circuit 435 (YE/BK), harness side and 4WD control module C281b, pin 1, circuit 435 (YE/BK), harness side.

→ Is the resistance less than 5 ohms?

→ Yes
   GO to C6.

→ No
   REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

C6 CHECK CIRCUIT 465 (WH/LB) FOR A SHORT TO VOLTAGE

[Image]

Measure the voltage between 4WD control module C281a pin 5, circuit 465 (WH/LB), harness side and ground.

→ Is any voltage present?

→ Yes
   REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

→ No
   GO to C7.

C7 CHECK CIRCUIT 465 (WH/LB) FOR A SHORT TO GROUND

[Image]

Measure the resistance between 4WD control module C281a pin 5, circuit 465 (WH/LB), harness side and ground.
Is the resistance greater than 10,000 ohms?

→ Yes
   GO to C8.

→ No
   REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

C8 CHECK CIRCUIT 465 (WH/LB) FOR AN OPEN

Measure the resistance between MSS C284 pin 2, circuit 465 (WH/LB), harness side and 4WD control module C281a pin 5, circuit 465 (WH/LB), harness side.

Is the resistance less than 5 ohms?

→ Yes
   GO to C9.

→ No
   REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

C9 CHECK CIRCUIT 762 (YE/WH), CIRCUIT 763 (OG/WH), CIRCUIT 764 (BN/WH), CIRCUIT 770 (WH), AND CIRCUIT 771 (VT/YE) FOR A SHORT TO VOLTAGE

Measure the voltage between the following circuits at the 4WD control module connector pins and ground.

<table>
<thead>
<tr>
<th>Circuit</th>
<th>4WD Control Module Connector and Pins</th>
</tr>
</thead>
<tbody>
<tr>
<td>762 (YE/WH)</td>
<td>C281b pin 4</td>
</tr>
<tr>
<td>763 (OG/WH)</td>
<td>C281b pin 13</td>
</tr>
<tr>
<td>764 (BN/WH)</td>
<td>C281b pin 7</td>
</tr>
<tr>
<td>770 (WH)</td>
<td>C281a pin 15</td>
</tr>
<tr>
<td>771 (VT/YE)</td>
<td>C281a pin 11</td>
</tr>
</tbody>
</table>

→ Is any voltage present?

→ Yes
   REPAIR the circuit(s) in question. CLEAR the DTCs. REPEAT the self-test.

→ No
   GO to C10.

C10 CHECK CIRCUIT 762 (YE/WH), CIRCUIT 763 (OG/WH), CIRCUIT 764 (BN/WH), CIRCUIT 770 (WH), AND CIRCUIT 771 (VT/YE) FOR A SHORT TO GROUND

Measure the resistance between the following circuits at the 4WD control module connector pins and ground.

<table>
<thead>
<tr>
<th>Circuit</th>
<th>4WD Control Module Connector and Pins</th>
</tr>
</thead>
<tbody>
<tr>
<td>762 (YE/WH)</td>
<td>C281b pin 4</td>
</tr>
<tr>
<td>763 (OG/WH)</td>
<td>C281b pin 13</td>
</tr>
<tr>
<td>764 (BN/WH)</td>
<td>C281b pin 7</td>
</tr>
<tr>
<td>770 (WH)</td>
<td>C281a pin 15</td>
</tr>
<tr>
<td>771 (VT/YE)</td>
<td>C281a pin 11</td>
</tr>
</tbody>
</table>
Are the resistances all over 10,000 ohms?

Yes
  GO to C11.

No
  REPAIR the circuit(s) in question. CLEAR the DTCs. REPEAT the self-test.

C11 CHECK CIRCUIT 762 (YE/WH) FOR OPEN

Measure the resistance between shift motor encoder C350 pin 6, circuit 762 (YE/WH), harness side and 4WD control module C281b pin 4, circuit 762 (YE/WH), harness side.

Is the resistance less than 5 ohms?

Yes
  GO to C12.

No
  REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

C12 CHECK CIRCUIT 763 (OG/WH), 764 (BN/WH), CIRCUIT 770 (WH), AND CIRCUIT 771 (VT/YE) FOR AN OPEN

Measure the resistance of the following circuits at the 4WD control module connector pins and shift motor encoder connector pins shown.

<table>
<thead>
<tr>
<th>Circuit</th>
<th>4WD Control Module Connector and Pins</th>
<th>Shift Motor Encoder Connector and Pins</th>
</tr>
</thead>
<tbody>
<tr>
<td>763 (OG/WH)</td>
<td>C281b pin 13</td>
<td>C350 pin 3</td>
</tr>
<tr>
<td>764 (BN/WH)</td>
<td>C281b pin 7</td>
<td>C350 pin 2</td>
</tr>
<tr>
<td>770 (WH)</td>
<td>C281a pin 15</td>
<td>C350 pin 1</td>
</tr>
<tr>
<td>771 (VT/YE)</td>
<td>C281a pin 11</td>
<td>C350 pin 5</td>
</tr>
</tbody>
</table>

Are all the resistances less than 5 ohms?

Yes
  GO to C13.

No
  REPAIR the circuit or circuit(s) in question. CLEAR the DTCs. REPEAT the self-test.

C13 CHECK CIRCUIT 777 (YE) AND CIRCUIT 778 (OG) FOR A SHORT TO VOLTAGE

Measure the voltage between 4WD control module C281a pin 17, circuit 777 (YE), harness side and ground; and between 4WD control module C281a pin 8, circuit 778 (OG), harness side and ground.

Is any voltage present?

Yes
  REPAIR the circuit(s). CLEAR the DTCs. REPEAT the self-test.

No
  GO to C14.

C14 CHECK CIRCUIT 777 (YE) AND CIRCUIT 778 (OG) FOR AN OPEN
Measure the resistance between 4WD control module C281a pin 17, circuit 777 (YE), harness side and shift motor encoder C350, pin 4, circuit 777 (YE), harness side; and measure the resistance between 4WD control module C281a pin 8, circuit 778 (OG), harness side and shift motor encoder C350 pin 7, circuit 778 (OG), harness side.

- Are the resistances less than 5 ohms?
  
  → Yes
  GO to C15.
  
  → No
  REPAIR the suspect circuit. CLEAR the DTCs. REPEAT the self-test.

C15 CHECK CIRCUIT 777 (YE) AND CIRCUIT 778 (OG) FOR A SHORT TO GROUND

Measure the resistance between 4WD control module C281a pin 17, circuit 777 (YE), harness side and ground and between 4WD control module C281a pin 8, circuit 778 (OG), harness side and ground.

- Are the resistances more than 10,000 ohms?
  
  → Yes
  GO to C16.
  
  → No
  REPAIR the suspect circuit. CLEAR the DTCs. REPEAT the self-test.

C16 CHECK CIRCUIT 640 (RD/YE), CIRCUIT 1003 (GY/YE) AND CIRCUIT 704 (DG/LG) FOR VOLTAGE

Measure the voltage between 4WD control module C281b pin 6, circuit 783 (GY), harness side and ground; and between 4WD control module C281a pin 9, circuit 1003 (GY/YE), harness side and ground; and between 4WD control module C281a pin 2, circuit 704 (DG/LG), harness side and ground.
Are the voltages all over 10 volts?

→ Yes
  GO to C17.

→ No
  REPAIR the supply circuit. CLEAR the DTCs. REPEAT the self-test.

C17 CHECK CIRCUIT 931 (OG) FOR VOLTAGE

Measure the voltage between 4WD control module C281 pin 1, circuit 931 (OG), harness side and ground.

Are the voltages between 9 and 16 volts?

→ Yes
  GO to C18.

→ No
  TEST the charging system. REFER to Section 414-00.

C18 CHECK FOR CORRECT 4WD CONTROL MODULE OPERATION

Disconnect all 4WD control module connectors (C281a, C281b) and the shift motor encoder connector (C350).

Check for:

- corrosion
- pushed-out pins

Connect all 4WD control module connectors and the shift motor encoder connector making sure they seat correctly.

Operate the system and verify the concern is still present.

Is the concern still present?

→ Yes
  GO to C19.

→ No
  The system is operating correctly at this time. Concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.

C19 CHECK THE CONTACT PLATE ENCODER SWITCH

Monitor mode select switch (MSS) PIDs 2WD and 4WD HIGH.

Monitor contact plate PIDs PLATE_A, PLATE_B, PLATE_C and PLATE_D.

Cycle the MSS to 2WD and 4WD HIGH two times.

NOTE: Contact plate PIDs can only be read for approximately two seconds. To continue reading PIDs, cycle the MSS again.

Compare the contact plate PID values for each shift position selected by the MSS.

<table>
<thead>
<tr>
<th>Plate PID</th>
<th>MSS PID 2WD</th>
<th>MSS PID 4HIGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLATE_A</td>
<td>CLOSED</td>
<td>OPEN</td>
</tr>
<tr>
<td>PLATE_B</td>
<td>OPEN</td>
<td>CLOSED</td>
</tr>
<tr>
<td>PLATE_C</td>
<td>CLOSED</td>
<td>CLOSED</td>
</tr>
<tr>
<td>PLATE_D</td>
<td>CLOSED</td>
<td>OPEN</td>
</tr>
</tbody>
</table>

Do the contact plate PID values agree with the MSS switch PIDs?

→ Yes
  GO to C20.
PINPOINT TEST D: THE VEHICLE DOES NOT SHIFT BETWEEN 4WD HIGH AND 4WD LOW MODES CORRECTLY

C20 CHECK THE TRANSFER CASE

1. Release the parking brake.
2. Using a wrench, manually shift the transfer case sector shaft to the full clockwise (2WD) direction while turning the rear driveshaft.
3. Engage the parking brake.
4. Rotate the front driveshaft.
   - Does the front driveshaft turn?
     → Yes
     GO to C21.
     → No
     REPAIR the transfer case. REFER to Section 308-07B. TEST the system for normal operation.

C21 CHECK THE SECTOR SHAFT TURNING EFFORT

NOTE: The transfer case has three detented shift positions. The full clockwise position is 2WD, the next position is 4WD HIGH, and the full counterclockwise position is 4WD LOW. Normal operation should not take more than 45 Nm (33 lb-ft) to manually shift the transfer case.

1. Release the parking brake.
2. Using a torque wrench, manually shift the transfer case sector shaft in a counterclockwise direction to the 4WD HIGH detent position while rotating the rear driveshaft.
   - Did the torque required to shift exceed 45 Nm (33 lb-ft)?
     → Yes
     REPAIR the transfer case as necessary. REFER to Section 308-07B. TEST the system for normal operation.
     → No
     GO to C22.

C22 CHECK THE TRANSFER CASE SHIFT TO 4WD HIGH AND 4WD LOW

1. Apply the parking brake.
2. Rotate the front driveshaft.
   - Does the front driveshaft rotate?
     → Yes
     REPAIR the transfer case as necessary. REFER to Section 308-07B.
     → No
     INSTALL a new transfer case shift motor. REFER to Transfer Case Shift Motor in this section. CLEAR the DTCs. REPEAT the self-test. If still inoperative, INSTALL a new 4WD control module. REFER to Four Wheel Drive (4WD) Control Module in this section.

PINPOINT TEST D: THE VEHICLE DOES NOT SHIFT BETWEEN 4WD HIGH AND 4WD LOW MODES CORRECTLY

<table>
<thead>
<tr>
<th>CONDITIONS</th>
<th>DETAILS/RESULTS/ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1 REVIEW THE FOUR-WHEEL DRIVE (4WD) CONTROL MODULE DIAGNOSTIC TROUBLE CODES (DTCs)</td>
<td></td>
</tr>
<tr>
<td>1. Using the recorded results from the 4WD control module self-test:</td>
<td></td>
</tr>
<tr>
<td>- Are any DTCs retrieved?</td>
<td></td>
</tr>
<tr>
<td>→ Yes</td>
<td>Go to D3</td>
</tr>
<tr>
<td>→ If DTC P1816 is retrieved, Go to D3</td>
<td></td>
</tr>
<tr>
<td>→ If DTC P1819 is retrieved, Go to D4</td>
<td></td>
</tr>
<tr>
<td>→ If DTC B1483 or DTC B1485 is retrieved, Go to D8</td>
<td></td>
</tr>
<tr>
<td>→ If DTC P0500 is retrieved, Go to D13</td>
<td></td>
</tr>
<tr>
<td>→ No</td>
<td>Go to D2</td>
</tr>
</tbody>
</table>

D2 VERIFY THE FUNCTION TEST HAS BEEN CARRIED OUT

1. Check the previous diagnostic procedure.
   - Was the electronic shift function test carried out?
     → Yes | Go to D3 |
     → No |
CARRY OUT the electronic shift function test. REFER to Functional Test — Electronic Shift (Pinpoint Test A) in this section.

**D3 CHECK THE DIGITAL TRANSMISSION RANGE SENSOR PID NTRL_SW**

1. Monitor 4WD control module PID NTRL_SW.
2. Place the gearshift lever in NEUTRAL.
3. Verify 4WD control module PID reads NTRL.
4. Shift the gear lever through all positions while monitoring 4WD control module PID NTRL_SW.
   - Does the 4WD control module PID NTRL_SW read NTRL only for the neutral position?
     - Yes
       - GO to D8.
     - No
       - GO to D4.

**D4 CHECK CIRCUIT 463 (RD/WH) FOR A SHORT TO GROUND**

1. Place the gearshift lever in any position except neutral.
2. Measure the resistance between 4WD control module C281a pin 16, circuit 463 (RD/WH), harness side and ground.
   - Is the resistance more than 10,000 ohms?
     - Yes
       - GO to D5.
     - No
       - REPAIR the circuit. SHIFT the gear lever between NEUTRAL and PARK twice. CLEAR the DTCs. REPEAT the self-test.

**D5 CHECK CIRCUIT 463 (RD/WH) FOR A SHORT TO VOLTAGE**

1. Measure the voltage between 4WD control module C281a pin 16, circuit 463 (RD/WH), harness side and ground.
   - Is any voltage present?
     - Yes
       - GO to D7.
     - No
       - GO to D6.
Measure the resistance between 4WD control module C281a pin 16, circuit 463 (RD/WH), harness side and TR sensor C167 pin 8, circuit 463 (RD/WH), harness side.

- Is the resistance less than 5 ohms?
  - Yes
    - GO to D8.
  - No
    - REPAIR the circuit. SHIFT the gear lever between NEUTRAL and PARK twice. CLEAR the DTCs. REPEAT the self-test.

D7 CHECK CIRCUIT 463 (RD/WH) FOR A SHORT TO VOLTAGE

Measure the voltage between 4WD control module C281a pin 16, circuit 463 (RD/WH), harness side and ground.

- Is there voltage present?
  - Yes
    - REPAIR the circuit. SHIFT the gear lever between NEUTRAL and PARK twice. CLEAR the DTCs. REPEAT the self-test.
  - No
    - INSTALL a new TR sensor. REFER to Section 307-01A or Section 307-01B. SHIFT the gear lever between NEUTRAL and PARK twice. CLEAR the DTCs. REPEAT the self-test.

D8 CHECK BRAKE PEDAL POSITION (BPP) SWITCH 4WD CONTROL MODULE PID

Apply the parking brake.

Press the brake pedal.

Monitor 4WD control module PID BOO.

- Does the PID value reflect the vehicle condition?
  - Yes
    - GO to D13.
  - No
    - GO to D9.

D9 CHECK CIRCUIT 810 (RD/LG) FOR A SHORT TO VOLTAGE
Measure the voltage between 4WD control module C281a pin 12, circuit 810 (RD/LG), harness side and ground.

Is there any voltage present?

→ Yes
   REPAIR the circuit. PRESS the brake pedal twice. CLEAR the DTCs. REPEAT the self-test.

→ No
   GO to D10.

**D10 CHECK CIRCUIT 810 (RD/LG) FOR A SHORT TO GROUND**

Measure the resistance between 4WD control module C281a pin 12, circuit 810 (RD/LG), harness side and ground.

Is the resistance more than 10,000 ohms?

→ Yes
   GO to D11.

→ No
   REPAIR the circuit. PRESS the brake pedal twice. CLEAR the DTCs. REPEAT the self-test.

**D11 CHECK CIRCUIT 810 (RD/LG) FOR VOLTAGE**

Press and hold the brake pedal.

Measure the voltage between 4WD control module C281a pin 12, circuit 810 (RD/LG), harness side and ground.

Is the voltage at least 10 volts?

→ Yes
   GO to D12.

→ No
   REPAIR the circuit. PRESS the brake pedal twice. CLEAR the DTCs. REPEAT the self-test.

**D12 CHECK CIRCUIT 810 (RD/LG) FOR AN OPEN**
Measure the resistance between 4WD control module C281a pin 12, circuit 810 (RD/LG), harness side and BPP switch C278 pin 2, circuit 810 (RD/LG), harness side.

- Is the resistance less than 5 ohms?
  → Yes
  GO to D13.
  → No
  REPAIR the circuit. PRESS the brake pedal twice. CLEAR the DTCs. REPEAT the self-test.

D13 CHECK THE SPEEDOMETER

Monitor the speedometer.
Monitor 4WD control module PID VSS2 while driving the vehicle 0 to 88.5 km/h (55 mph) at a steady rate.

- Does the 4WD control module PID VSS2 agree with the speedometer?
  → Yes
  GO to D15.
  → No
  GO to D14.

D14 CHECK POWERTRAIN CONTROL MODULE (PCM) CIRCUIT 679 (GY/BK) FOR AN OPEN

Measure the resistance between 4WD control module 281b pin 12, circuit 679 (GY/BK), harness side and PCM C175, pin 68, circuit 679 (GY/BK), harness side.
Is the resistance less than 5 ohms?

→ Yes
GO to D15.

→ No
REPAIR the circuit. DRIVE the vehicle to a speed of 40 mph (64 km/h). CLEAR the DTCs. REPEAT the self-test.

D15 CHECK THE MODE SELECT SWITCH (MSS) — MONITOR THE 4WD CONTROL MODULE PID 4WD_SW

Monitor the 4WD control module PID 4WD_SW while cycling the MSS through 2WD, 4WD HIGH and 4WD LOW.

Do the 4WD control module PID values agree with the MSS positions?

→ Yes
GO to D17.

→ No
GO to D16.

D16 CHECK THE MSS — ALL POSITIONS

Measure the resistance between MSS C284, pin 2, component side and pin 3, component side. Refer to the following chart:

<table>
<thead>
<tr>
<th>MSS Position</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2WD</td>
<td>3.705-4.095 Ohms</td>
</tr>
<tr>
<td>4WD HIGH</td>
<td>1.045-1.155 Ohms</td>
</tr>
<tr>
<td>4WD LOW</td>
<td>342-378 Ohms</td>
</tr>
</tbody>
</table>

Are the resistances within the specified values?

→ Yes
GO to D17.

→ No
INSTALL a new MSS. REFER to Mode Select Switch (MSS) in this section. CLEAR the DTCs. REPEAT the self-test.

D17 CHECK FOR CORRECT 4WD CONTROL MODULE OPERATION

Disconnect all 4WD control module connectors (C281a, C281b) and the shift motor encoder connector (C350).
Check for:
- corrosion
- pushed-out pins

Connect all 4WD control module connectors and the shift motor encoder connector making sure they seat correctly.

Operate the system and verify the concern is still present.

- Is the concern still present?
  - Yes
    - Go to D18.
  - No
    - The system is operating correctly at this time. Concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.

D18 CHECK THE CONTACT PLATE ENCODER SWITCH

Monitor mode select switch (MSS) PIDs 2WD and 4WD LOW.

Monitor contact plate PIDs PLATE_A, PLATE_B, PLATE_C and PLATE_D.

NOTE: The contact plate PIDs can only be read for approximately two seconds. To continue reading, cycle the MSS again.

Cycle the MSS to 2WD and 4X4 LOW two times.

Compare the contact plate PID values for each shift position selected by the MSS.

<table>
<thead>
<tr>
<th>Plate PID</th>
<th>MSS PID 2WD</th>
<th>MSS PID 4LOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLATE_A</td>
<td>CLOSED</td>
<td>OPEN</td>
</tr>
<tr>
<td>PLATE_B</td>
<td>OPEN</td>
<td>CLOSED</td>
</tr>
<tr>
<td>PLATE_C</td>
<td>CLOSED</td>
<td>OPEN</td>
</tr>
<tr>
<td>PLATE_D</td>
<td>CLOSED</td>
<td>CLOSED</td>
</tr>
</tbody>
</table>

- Do the contact plate PID values agree with the MSS PIDs?
  - Yes
    - Go to D25.
  - No
    - Go to D19.

D19 CHECK CIRCUIT 762 (YE/WH), CIRCUIT 763 (OG/WH), CIRCUIT 764 (BN/WH), CIRCUIT 770 (WH), AND CIRCUIT 771 (VT/YE) FOR A SHORT TO VOLTAGE

Measure the voltage between the following circuits at the 4WD control module connector pins and ground.

<table>
<thead>
<tr>
<th>Circuit</th>
<th>4WD Control Module Connector and Pins</th>
</tr>
</thead>
<tbody>
<tr>
<td>762 (YE/WH)</td>
<td>C281b pin 4</td>
</tr>
<tr>
<td>763 (OG/WH)</td>
<td>C281b pin 13</td>
</tr>
<tr>
<td>764 (BN/WH)</td>
<td>C281b pin 7</td>
</tr>
<tr>
<td>770 (WH)</td>
<td>C281a pin 15</td>
</tr>
<tr>
<td>771 (VT/YE)</td>
<td>C281a pin 11</td>
</tr>
</tbody>
</table>

- Is any voltage present?
  - Yes
    - REPAIR the circuit(s) in question. CLEAR the DTCs. REPEAT the self-test.
  - No
    - Go to D20.

D20 CHECK CIRCUIT 762 (YE/WH), CIRCUIT 763 (OG/WH), CIRCUIT 764 (BN/WH), CIRCUIT 770 (WH), AND CIRCUIT 771 (VT/YE) FOR A SHORT TO GROUND
Measure the resistance between the following circuits at the 4WD control module connector pins and ground.

<table>
<thead>
<tr>
<th>Circuit</th>
<th>4WD Control Module Connector and Pins</th>
<th>Shift Motor Encoder Connector and Pins</th>
</tr>
</thead>
<tbody>
<tr>
<td>762 (YE/WH)</td>
<td>C281b pin 4</td>
<td>C350 pin 6</td>
</tr>
<tr>
<td>763 (OG/WH)</td>
<td>C281b pin 13</td>
<td>C350 pin 3</td>
</tr>
<tr>
<td>764 (BN/WH)</td>
<td>C281b pin 7</td>
<td>C350 pin 2</td>
</tr>
<tr>
<td>770 (WH)</td>
<td>C281a pin 15</td>
<td>C350 pin 1</td>
</tr>
<tr>
<td>771 (VT/YE)</td>
<td>C281a pin 11</td>
<td>C350 pin 5</td>
</tr>
</tbody>
</table>

Are the resistances all over 10,000 ohms?

→ Yes  GO to D21.
→ No  REPAIR the circuit(s) in question. CLEAR the DTCs. REPEAT the self-test.

D21 CHECK CIRCUIT 762 (YE/WH) FOR AN OPEN

Measure the resistance between shift motor encoder C350 pin 6, circuit 762 (YE/WH), harness side and 4WD control module C281b pin 4, circuit 762 (YE/WH), harness side.

Is the resistance less than 5 ohms?

→ Yes  GO to D22.
→ No  REPAIR the suspect circuit. CLEAR the DTCs. REPEAT the self-test.

D22 CHECK CIRCUIT 763 (OG/WH), 764 (BN/WH), CIRCUIT 770 (WH), AND CIRCUIT 771 (VT/YE) FOR AN OPEN

Measure the resistance of the following circuits at the 4WD control module connector pins and shift motor encoder connector pins shown.

<table>
<thead>
<tr>
<th>Circuit</th>
<th>4WD Control Module Connector and Pins</th>
<th>Shift Motor Encoder Connector and Pins</th>
</tr>
</thead>
<tbody>
<tr>
<td>763 (OG/WH)</td>
<td>C281b pin 13</td>
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</tr>
<tr>
<td>771 (VT/YE)</td>
<td>C281a pin 11</td>
<td>C350 pin 5</td>
</tr>
</tbody>
</table>

Are all the resistances less than 5 ohms?

→ Yes  GO to D23.
→ No  REPAIR the circuit or circuit(s) in question. CLEAR the DTCs. REPEAT the self-test.

D23 CHECK CIRCUIT 777 (YE) AND CIRCUIT 778 (OG) FOR A SHORT TO VOLTAGE
Measure the voltage between 4WD control module C281a pin 17, circuit 777 (YE), harness side and ground; and between 4WD control module C281a pin 8, circuit 778 (OG), harness side and ground.

- Is any voltage present?
  - Yes
    - REPAIR the circuit(s). CLEAR the DTCs. REPEAT the self-test.
  - No
    - GO to D24.

**D24 CHECK CIRCUIT 777 (YE) AND CIRCUIT 778 (OG) FOR AN OPEN**

Measure the resistance between 4WD control module C281a pin 17, circuit 777 (YE), harness side and shift motor encoder C350 pin 4, circuit 777 (YE), harness side; and between 4WD control module C281a pin 8, circuit 778 (OG), harness side and shift motor encoder C350 pin 7, circuit 778 (OG), harness side.

- Are the resistances less than 5 ohms?
  - Yes
    - GO to D25.
  - No
    - REPAIR the suspect circuit. CLEAR the DTCs. REPEAT the self-test.

**D25 CHECK CIRCUIT 777 (YE) AND CIRCUIT 778 (OG) FOR A SHORT TO GROUND**

Measure the resistance between 4WD control module C281a pin 17, circuit 777 (YE), harness side and ground and between 4WD control module C281a pin 8, circuit 778 (OG), harness side and ground.

- Are the resistances more than 10,000 ohms?
  - Yes
    - GO to D26.
  - No
    - REPAIR the suspect circuit. CLEAR the DTCs. REPEAT the self-test.

**D26 CHECK THE TRANSFER CASE**

Release the parking brake.

Using a wrench, manually shift the transfer case sector shaft to the full clockwise (2WD) direction while turning the rear driveshaft.

Engage the parking brake.

Rotate the front driveshaft.

- Does the front driveshaft turn?
  - Yes
    - GO to D27.
  - No
    - REPAIR the transfer case as necessary. REFER to Section 308-07B. TEST the system for normal operation.

**D27 CHECK THE SECTOR SHAFT TURNING EFFORT**

NOTE: The transfer case has three detented shift positions. The full clockwise position is 2WD, the next position is 4WD HIGH, and the full counterclockwise position is 4WD LOW. Normal operation should not take more than 45 Nm (33 lb-ft) to manually shift the transfer case.

Release the parking brake.
Using a torque wrench, manually shift the transfer case sector shaft in a counterclockwise direction to the 4WD HIGH detent position while rotating the rear driveshaft.

- Did the torque required to shift exceed 45 Nm (33 lb-ft)?
  
  → **Yes**  
  REPAIR the transfer case as necessary. REFER to Section 308-07B. TEST the system for normal operation.

  → **No**  
  GO to D28.

**D28** CHECK THE TRANSFER CASE SHIFT TO 4WD HIGH AND 4WD LOW

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<tbody>
<tr>
<td>1</td>
<td>Apply the parking brake.</td>
</tr>
<tr>
<td>2</td>
<td>Rotate the front driveshaft.</td>
</tr>
</tbody>
</table>

- Does the front driveshaft rotate?

  → **Yes**  
  REPAIR the transfer case as necessary. REFER to Section 308-07B.

  → **No**  
  INSTALL a new transfer case shift motor. REFER to Transfer Case Shift Motor in this section. CLEAR the DTCs. REPEAT the self-test. If still inoperative, INSTALL a new 4WD control module. REFER to Four-Wheel Drive (4WD) Control Module in this section. CLEAR the DTCs. REPEAT the self-test.