AUTOMATIC TRANSMISSION

Click on the applicable bookmark to selected the required model year.
WARNING REGARDING SERVICING OF SUPPLEMENTAL RESTRAINT SYSTEM (SRS) EQUIPPED VEHICLES

WARNING!
(1) Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to driver and passenger (from rendering the SRS inoperative).
(2) Service or maintenance of any SRS component or SRS-related component must be performed only at an authorized MITSUBISHI dealer.
(3) MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP 52B - Supplemental Restraint System (SRS) before beginning any service or maintenance of any component of the SRS or any SRS-related component.

NOTE
The SRS includes the following components: SRS-ECU, SRS warning lamp, air bag module, clock spring, and interconnecting wiring. Other SRS-related components (that may have to be removed/installed in connection with SRS service or maintenance) are indicated in the table of contents by an asterisk (*).
### SERVICE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/T fluid temperature sensor resistance kΩ</td>
<td></td>
</tr>
<tr>
<td>At 0°C</td>
<td>16.7 - 20.5</td>
</tr>
<tr>
<td>At 20°C</td>
<td>7.3 - 8.9</td>
</tr>
<tr>
<td>At 40°C</td>
<td>3.4 - 4.2</td>
</tr>
<tr>
<td>At 60°C</td>
<td>1.9 - 2.2</td>
</tr>
<tr>
<td>At 80°C</td>
<td>1.0 - 1.2</td>
</tr>
<tr>
<td>At 100°C</td>
<td>0.57 - 0.69</td>
</tr>
<tr>
<td>Damper clutch control (DCC) solenoid valve coil resistance (at 20°C) Ω</td>
<td>2.7 - 3.4</td>
</tr>
<tr>
<td>Low &amp; reverse (LR) solenoid valve coil resistance (at 20°C) Ω</td>
<td>2.7 - 3.4</td>
</tr>
<tr>
<td>Second (2ND) solenoid valve coil resistance (at 20°C) Ω</td>
<td>2.7 - 3.4</td>
</tr>
<tr>
<td>Underdrive solenoid valve (UD solenoid valve) coil resistance (at 20°C) Ω</td>
<td>2.7 - 3.4</td>
</tr>
<tr>
<td>Overdrive solenoid valve (OD solenoid valve) coil resistance (at 20°C) Ω</td>
<td>2.7 - 3.4</td>
</tr>
<tr>
<td>Resistance of reduction (RED) solenoid valve coil at (20°C) Ω</td>
<td>2.7 - 3.4</td>
</tr>
<tr>
<td>Stall speed r/min</td>
<td></td>
</tr>
<tr>
<td>6G7</td>
<td>2,200 - 2,700</td>
</tr>
<tr>
<td>4M4</td>
<td>2,400 - 2,900</td>
</tr>
<tr>
<td>Line pressure adjustment value kPa</td>
<td>1,010 - 1,050</td>
</tr>
</tbody>
</table>

### LUBRICANTS

<table>
<thead>
<tr>
<th>Item</th>
<th>Brand</th>
<th>Quantity L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission fluid</td>
<td>DIA QUEEN ATF SP II M, ATF SP III or equivalent</td>
<td>9.3</td>
</tr>
<tr>
<td>Transfer oil</td>
<td>Hypoid gear oil SAE 75W-90 or 75W-85W conforming to API GL-4</td>
<td>2.8</td>
</tr>
</tbody>
</table>

### SPECIAL TOOLS

<table>
<thead>
<tr>
<th>Tools</th>
<th>No.</th>
<th>Name</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Image] MB991502</td>
<td>MUT-II Sub assembly</td>
<td>Diagnosis code checking</td>
<td></td>
</tr>
<tr>
<td>[Image] MB991529</td>
<td>Diagnosis code checking harness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Image] MB991658</td>
<td>Test harness</td>
<td>Voltage measurement of APS</td>
<td></td>
</tr>
<tr>
<td>[Image] MD998478</td>
<td>Test harness (3P, triangle)</td>
<td>Voltage measurement of crank angle sensor</td>
<td></td>
</tr>
</tbody>
</table>
**AUTOMATIC TRANSMISSION - Special Tools/Troubleshooting <A/T>**

**Tools Application Name No.**

<table>
<thead>
<tr>
<th>Tools</th>
<th>No.</th>
<th>Name</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Oil pressure gauge</td>
<td>Hydraulic pressure measurement</td>
</tr>
<tr>
<td>MD998330 (including MD998331)</td>
<td>MD998330</td>
<td>Oil pressure gauge (2,942 kPa)</td>
<td></td>
</tr>
<tr>
<td>MD998332</td>
<td>MD998332</td>
<td>Adapter</td>
<td>Oil pressure gauge connection</td>
</tr>
<tr>
<td>MD998900</td>
<td>MD998900</td>
<td>Adapter</td>
<td></td>
</tr>
</tbody>
</table>

**TROUBLESHOOTING <A/T>**

**BASIC FLOW OF PROBLEM DIAGNOSIS**

1. Ask about trouble symptoms.
2. Check the A/T fluid.  
   - NG: Replace the A/T fluid.  
   - OK: Check the trouble symptoms.
3. Communication with the MUT-II is not possible.
   - Inspection procedure check by trouble symptom Procedure 1 (Refer to P.23-48.)
4. Reading of a diagnosis code (Refer to P.23-4.)
   - Diagnosis code output exists:
     - Erase of a diagnosis code (Refer to P.23-4.)
     - Inhibitor switch and APS check (Refer to P.23-97.)
     - OK: Road test (Refer to P.23-5.)
       - Diagnosis code output exists:
         - Go to Diagnosis Code List (Refer to P.23-12.)
         - No diagnosis code output (abnormality exists)
1. No diagnosis code output (no abnormality)
   - Transient malfunction (Refer to GROUP 00 - Points to Note for Transient Malfunctions.)
   - OK:
     - Verification test (road test)
     - OK: END
# DIAGNOSIS FUNCTION

## N RANGE LAMP

If there is a problem with any of the following items which are related to the A/T system, the N range lamp will flash at a rate of approximately 1 Hz.

If the N range lamp is flashing at a rate of approximately 1 Hz, check the diagnosis output.

- **N range lamp flashing item**
  - Input shaft speed sensor system
  - Output shaft sensor system
  - Solenoid valve system
  - Non-synchronization at various shift ranges
  - A/T control relay system

## READING DIAGNOSIS CODES

Use the MUT-II or the warning lamp (N range indicator lamp) to take a reading of the diagnosis codes. (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Procedures.)

## A/T FLUID TEMPERATURE WARNING LAMP

**Caution**

If the N range lamp illuminates, this serves as an A/T fluid temperature warning. Stop the vehicle in a safe place and let the engine run at idle until the N range lamp switches off.
### ROAD TEST

<table>
<thead>
<tr>
<th>No.</th>
<th>Pre-test/operation conditions</th>
<th>Test/operation</th>
<th>Judgment value</th>
<th>Check item</th>
<th>Diagnosis code No.</th>
<th>Inspection procedure if there is an abnormality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ignition switch: OFF</td>
<td>Ignition switch (1) ON</td>
<td>Data List No. 54 (1) 10 - 12 V</td>
<td>A/T control relay</td>
<td>54</td>
<td>A/T control relay system</td>
</tr>
<tr>
<td>2</td>
<td>Ignition switch: ON Engine: Stop Selector lever position: P</td>
<td>Selector lever position (1) P (2) R (3) N (4) D</td>
<td>Data List No. 61 (1) P (2) R (3) N (4) D</td>
<td>Inhibitor switch</td>
<td>-</td>
<td>Inhibitor switch system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selector lever operation (1) D (1st) (2) Sports mode selected (1st) (3) Lever moved to upshift position and held (2nd) (4) Lever moved to downshift position and held (1st)</td>
<td>Data List No.67 No.68 No.69</td>
<td>Select switch Upshift switch Downshift switch</td>
<td>-</td>
<td>Sports mode switch system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accelerator pedal (1) Fully closed (2) Depressed (3) Fully opened</td>
<td>Data List No. 11 (1) 985 - 1,085 mV (2) Gradually increases from (1) 4,000 mV or more</td>
<td>APS</td>
<td>11 12 14</td>
<td>APS system</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Data List No.25 (1) OFF (2) ON</td>
<td>Wide open throttle switch</td>
<td>25</td>
<td>Wide open throttle switch system</td>
</tr>
<tr>
<td>2</td>
<td>Ignition switch: ON Engine: Stop Selector lever position: P</td>
<td>Brake pedal (1) Depressed (2) Released</td>
<td>Data List No. 26 (1) ON (2) OFF</td>
<td>Stop lamp switch</td>
<td>26</td>
<td>Stop lamp switch system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer shift lever position (1) Except for 4LLc (2) 4LLc</td>
<td>Data List No. 75 (1) OFF (2) ON</td>
<td>4LLc switch</td>
<td>-</td>
<td>4LLc switch system</td>
</tr>
<tr>
<td>No.</td>
<td>Pre-test/operation conditions</td>
<td>Test/operation</td>
<td>Judgment value</td>
<td>Check item</td>
<td>Diagnosis code No.</td>
<td>Inspection procedure if there is an abnormality</td>
</tr>
<tr>
<td>-----</td>
<td>--------------------------------</td>
<td>---------------</td>
<td>----------------</td>
<td>------------</td>
<td>-------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>3</td>
<td>Ignition switch: START Engine: Stopped</td>
<td>Starting test at P or N position</td>
<td>Starting should be possible</td>
<td>-</td>
<td>Starting not possible</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Driving after engine has warmed up</td>
<td>Drive for 15 minutes or more until the A/T fluid temperature rises to 70 - 80°C.</td>
<td>Data list No.15 Gradually rises to 70 - 80°C</td>
<td>A/T fluid temperature sensor</td>
<td>15</td>
<td>A/T fluid temperature sensor system</td>
</tr>
<tr>
<td>5</td>
<td>Engine: Idling Selector lever position: N</td>
<td>Brake pedal (re-test) (1) Depressed (2) Released</td>
<td>Data List No. 26 (1) ON (2) OFF</td>
<td>Stop lamp switch</td>
<td>26</td>
<td>Stop lamp switch system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A/C switch (1) ON (2) OFF</td>
<td>Data List No. 65 (1) ON (2) OFF</td>
<td>Dual pressure switch</td>
<td>-</td>
<td>Dual pressure switch system</td>
</tr>
<tr>
<td></td>
<td>Accelerator pedal (1) Fully closed (2) Apply</td>
<td>Data List No. 21 (1) The engine speed displayed on the tachometer is identical to the engine speed displayed on MUT-II. (2) Gradually increases from (1)</td>
<td>Data List No.73 &lt;6G7&gt; No.76 &lt;4M4&gt; (2) Data changes.</td>
<td>Crank angle sensor &lt;6G7&gt; Engine speed sensor &lt;4M4&gt;</td>
<td>21</td>
<td>Crank angle sensor system &lt;6G7&gt; Engine speed sensor system &lt;4M4&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Communication with engine-ECU</td>
<td>51</td>
<td>Serial communication system</td>
</tr>
<tr>
<td></td>
<td>Selector lever position (1) N to D (2) N to R</td>
<td>No abnormal shock during shifting Within 2 seconds of time lag</td>
<td>Malfunction when starting off</td>
<td>-</td>
<td>Engine stalls during shifting</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>N-to-D shocks, large time lag</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>N-to-R shocks, large time lag</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>N-to-D, N-to-R shocks, large time lag</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Driving not possible</td>
<td>-</td>
<td>Does not move forward</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>Does not reverse</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>Does not move (forward or reverse)</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Pre-test/operation conditions</td>
<td>Test/operation</td>
<td>Judgment value</td>
<td>Check item</td>
<td>Diagnosis code No.</td>
<td>Inspection procedure if there is an abnormality</td>
</tr>
<tr>
<td>-----</td>
<td>-------------------------------</td>
<td>---------------</td>
<td>----------------</td>
<td>------------</td>
<td>-------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>6</td>
<td>Selector lever position: Sports mode (Must be done on a level and straight road.)</td>
<td>Selector lever position and engine</td>
<td>Data List No. 63&lt;br&gt;(2) 1st&lt;br&gt;(3) 2nd&lt;br&gt;(4) 3rd&lt;br&gt;(5) 4th&lt;br&gt;(6) 5th</td>
<td>Shift condition</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Data List No. 31&lt;br&gt;(2) 0%&lt;br&gt;(3) 100%&lt;br&gt;(4) 100%&lt;br&gt;(5) 100%&lt;br&gt;(6) 100%</td>
<td>Low &amp; reverse solenoid valve (LR solenoid valve)</td>
<td>31</td>
<td>LR solenoid valve system</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Data List No. 32&lt;br&gt;(2) 0%&lt;br&gt;(3) 0%&lt;br&gt;(4) 0%&lt;br&gt;(5) 0%&lt;br&gt;(6) 100%</td>
<td>Underdrive solenoid valve (UD solenoid valve)</td>
<td>32</td>
<td>UD solenoid valve system</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Data List No. 33&lt;br&gt;(2) 100%&lt;br&gt;(3) 0%&lt;br&gt;(4) 100%&lt;br&gt;(5) 100%&lt;br&gt;(6) 0%</td>
<td>Second solenoid valve (2ND solenoid valve)</td>
<td>33</td>
<td>2nd solenoid valve system</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Data List No. 34&lt;br&gt;(2) 100%&lt;br&gt;(5) 0%&lt;br&gt;(3) 100%&lt;br&gt;(6) 0%&lt;br&gt;(4) 0%</td>
<td>Overdrive solenoid valve (OD solenoid valve)</td>
<td>34</td>
<td>OD solenoid valve system</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Data List No. 35&lt;br&gt;(2) 0%&lt;br&gt;(5) 100%&lt;br&gt;(3) 0%&lt;br&gt;(6) 100%&lt;br&gt;(4) 0%</td>
<td>Reduction solenoid valve (RED solenoid valve)</td>
<td>35</td>
<td>RED solenoid valve system</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Data List No. 29&lt;br&gt;(1) 0 km/h&lt;br&gt;(5) 50 km/h</td>
<td>Vehicle speed sensor</td>
<td>-</td>
<td>Vehicle speed sensor system</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Data List No. 22&lt;br&gt;(5) 1,300 - 1,600 r/min</td>
<td>Input shaft speed sensor</td>
<td>22</td>
<td>Input shaft speed sensor system</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Data List No. 23&lt;br&gt;(5) 1,300 - 1,600 r/min</td>
<td>Output shaft speed sensor</td>
<td>23</td>
<td>Output shaft sensor system</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Data List No. 36&lt;br&gt;(1) 70% - 90% to 0%&lt;br&gt;(2) 70% - 90%</td>
<td>Damper clutch control solenoid valve (DCC solenoid valve)</td>
<td>36 52</td>
<td>DCC solenoid valve system</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Data List No. 52&lt;br&gt;(1) -300 - -100 r/min or 100 - 300 r/min&lt;br&gt;(2) -10 - 10 r/min</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>No.</td>
<td>Pre-test/opera-</td>
<td>Test/operation</td>
<td>Judgment value</td>
<td>Check item</td>
<td>Diagnosis code No.</td>
<td>Inspection procedure if there is an abnormality</td>
</tr>
<tr>
<td>-----</td>
<td>----------------</td>
<td>-----------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>------------</td>
<td>--------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>7</td>
<td>Suspend the INVECS-II function using MUT-II</td>
<td>Use the MUT-II to monitor data list Nos. 11, 23 and 63.</td>
<td>For (1), (2) and (3), the output shaft speed (vehicle speed) should be</td>
<td>Problem during shifting</td>
<td>-</td>
<td>Shocks, engine racing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1) Accelerate to 5th gear at an APS output of 1.5 V</td>
<td>identical, and there should be no abnormal shocks. For (4), (5) and (6),</td>
<td>Incorrect shift points</td>
<td>-</td>
<td>All points</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(opening angle 30%).</td>
<td>downshifting should occur immediately after the operation is carried out.</td>
<td>-</td>
<td>-</td>
<td>Some points</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2) Slowly decelera-</td>
<td></td>
<td>No shifting</td>
<td>-</td>
<td>No diagnosis codes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>te and stop.</td>
<td></td>
<td></td>
<td>22</td>
<td>Input shaft speed sensor system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3) Accelerate to 5th gear at an APS output of 2.5 V</td>
<td></td>
<td></td>
<td>23</td>
<td>Output shaft sensor system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(opening angle 50%).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4) At 60 km/h in 5th, select Sports mode and shift down to</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4th.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5) At 40 km/h in 4th, select Sports mode and shift down to</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3rd.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(6) At 20 km/h in 3rd, shift down to 2nd.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(7) At 20 km/h in 2nd, shift down to 1st.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Pre-test/operation conditions</td>
<td>Test/operation</td>
<td>Judgment value</td>
<td>Check item</td>
<td>Diagnosis code No.</td>
<td>Inspection procedure if there is an abnormality</td>
</tr>
<tr>
<td>-----</td>
<td>-------------------------------</td>
<td>----------------</td>
<td>----------------</td>
<td>------------</td>
<td>-------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>8</td>
<td>Selector lever position: N</td>
<td>Use the MUT-II to monitor data list Nos. 22 and 23. (1) Select R and drive at 10 km/h.</td>
<td>The ratio of data list No. 22 and No. 23 should be the same as the transmission ratio when reversing.</td>
<td>No shifting</td>
<td>22</td>
<td>Input shaft speed sensor system</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>23</td>
<td>Output shaft sensor system</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>46</td>
<td>Reverse without completion of shifting</td>
</tr>
</tbody>
</table>

**SHIFT PATTERN**

*<4M4>*

**Upshift pattern**

Throttle opening %

![Throttle opening graph](image)

Thick line: Standard shift pattern

Output shaft speed r/min

Vehicle speed km/h

X16130A
Downshift pattern

Throttle opening %

<table>
<thead>
<tr>
<th>Output shaft speed r/min</th>
<th>Vehicle speed km/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 1,000 2,000 3,000 4,000 5,000 6,000 7,000</td>
<td>0 50 100 150 200 250</td>
</tr>
</tbody>
</table>

Thick line: Standard shift pattern

(Sports mode)

(4→5 movement range)

<6G7>

Upshift pattern

Throttle opening %

<table>
<thead>
<tr>
<th>Output shaft speed r/min</th>
<th>Vehicle speed km/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 1,000 2,000 3,000 4,000 5,000 6,000 7,000</td>
<td>0 100 200</td>
</tr>
</tbody>
</table>

Thick line: Standard shift pattern

(Sports mode)

(3→4 movement range)

(2→3 movement range)
Downshift pattern

Throttle opening %

Output shaft speed r/min

Vehicle speed km/h

Thick line: Standard shift pattern

(Sports mode)
<table>
<thead>
<tr>
<th>Diagnosis code</th>
<th>Diagnosis item</th>
<th>Reference page</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Accelerator pedal position sensor (APS) system</td>
<td>23-13</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>23-14</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>23-15</td>
</tr>
<tr>
<td>15</td>
<td>A/T fluid temperature sensor system</td>
<td>23-17</td>
</tr>
<tr>
<td>21</td>
<td>Crank angle sensor system &lt;6G7&gt; or engine speed sensor system &lt;4M4&gt;</td>
<td>23-18</td>
</tr>
<tr>
<td>22</td>
<td>Input shaft speed sensor system</td>
<td>23-20</td>
</tr>
<tr>
<td>23</td>
<td>Output shaft speed sensor system</td>
<td>23-22</td>
</tr>
<tr>
<td>25</td>
<td>Wide open throttle switch system</td>
<td>23-24</td>
</tr>
<tr>
<td>26</td>
<td>Stop lamp switch system</td>
<td>23-25</td>
</tr>
<tr>
<td>31</td>
<td>LR solenoid valve system</td>
<td>23-26</td>
</tr>
<tr>
<td>32</td>
<td>UD solenoid valve system</td>
<td>23-27</td>
</tr>
<tr>
<td>33</td>
<td>2nd solenoid valve system</td>
<td>23-28</td>
</tr>
<tr>
<td>34</td>
<td>OD solenoid valve system</td>
<td>23-29</td>
</tr>
<tr>
<td>35</td>
<td>RED solenoid valve system</td>
<td>23-30</td>
</tr>
<tr>
<td>36</td>
<td>DCC solenoid valve system</td>
<td>23-31</td>
</tr>
<tr>
<td>41</td>
<td>1st without completion of shifting</td>
<td>23-32</td>
</tr>
<tr>
<td>42</td>
<td>2nd without completion of shifting</td>
<td>23-34</td>
</tr>
<tr>
<td>43</td>
<td>3rd without completion of shifting</td>
<td>23-36</td>
</tr>
<tr>
<td>44</td>
<td>4th without completion of shifting</td>
<td>23-38</td>
</tr>
<tr>
<td>45</td>
<td>5th without completion of shifting</td>
<td>23-40</td>
</tr>
<tr>
<td>46</td>
<td>Reverse without completion of shifting</td>
<td>23-42</td>
</tr>
<tr>
<td>51</td>
<td>Problem communicating with engine-ECU</td>
<td>23-43</td>
</tr>
<tr>
<td>52</td>
<td>Damper clutch control system</td>
<td>23-44</td>
</tr>
<tr>
<td>54</td>
<td>A/T control relay system</td>
<td>23-45</td>
</tr>
<tr>
<td>56</td>
<td>N range lamp system</td>
<td>23-46</td>
</tr>
</tbody>
</table>
**Code No. 11 Accelerator pedal position sensor (APS) short-circuit system**

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfunction of APS</td>
</tr>
<tr>
<td>Malfunction of harness or connector</td>
</tr>
<tr>
<td>Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
<tr>
<td>Malfunction of engine-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

If the APS output during idling is 4.8 V or higher, it is judged that there is excessive output, and code No. 11 is output.

---

**MUT-II Data List**
- No.11 APS
  - OK: Refer to P.23-61 (Data List Chart).

**APS single part check**
- (Refer to GROUP 13 - On-vehicle Service.)
- Replace

**Check the following connector: D-135**
- OK
- NG

**Measure at APS connector D-135**
- Disconnect the connector and measure at the harness side.
  1. <6G7> Resistance between terminal 1 and earth
     - OK: 2 Ω or less
  2. <4M4> Voltage between terminal 2 and earth
     - OK: 4.8 - 5.2 V

**Check the following connectors: <6G7> D-120, <4M4> D-112**
- NG
- OK

**Check the trouble symptoms.**
- Replace the engine-A/T-ECU or engine-ECU.

**Check the following connectors: <6G7> D-121, <4M4> D-107**
- NG
- OK

**APS adjustment**
- (Refer to GROUP 13 - On-vehicle Service.)

**Check the following connectors: <6G7> D-121, <4M4> D-108**
- NG
- OK

**Check the trouble symptoms.**
- Replace the engine-A/T-ECU or A/T-ECU.
### Code No. 12 Accelerator pedal position sensor (APS) open circuit system

When the APS output is 0.2 V or less while the engine is idling, it is judged that output is too low and code No. 12 is output.

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Malfunction of APS</td>
</tr>
<tr>
<td>• Malfunction of harness or connector</td>
</tr>
<tr>
<td>• Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>• Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
<tr>
<td>• Malfunction of engine-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

#### MUT-II Data List

- **No.11 APS**
  - **OK**: Refer to P.23-61 (Data List Chart).

#### Replace

- **NG**: Replace

#### Repair

- **OK**: Repair

#### Check the following connectors: D-135

- **NG**: Repair

#### Measure at APS connector D-135

- **OK**: Measure at engine-A/T-ECU connector D-120 <6G7>, or at engine-ECU connector D-112 <4M4>.
  - **OK**: Measure at the ECU terminals
    - Ignition switch: ON
    - <6G7> Voltage between terminal 2 and earth
    - <4M4> Voltage between terminal 8 and earth
    - OK: 4.8 - 5.2 V

#### NG

- **NG**: Check the problem.

#### To the next page
Find the previous page

- Measure at the ECU terminals
- Ignition switch: ON
- <6G7> Voltage between terminal 95 and earth
- <4M4> Voltage between terminal 45 and earth
OK: Fully close the accelerator 985 - 1,085 mV
fully open the accelerator 4,000 mV or more

Check the following connectors:
<6G7> D-121, <4M4> D-108
OK
NG
Repair

Check the following connectors:
<6G7> D-121, <4M4> D-108
OK
NG
Repair

Check the trouble symptoms.

Check the harness between the APS and the engine-A/T-ECU, and repair if necessary. <6G7>
Check the harness between the APS and the A/T-ECU, and repair if necessary. <4M4>

Replace the engine-A/T-ECU or A/T-ECU.

---

**Code No. 14 Accelerator pedal position sensor (APS) incorrect adjustment system**

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfunction of APS</td>
</tr>
<tr>
<td>Malfunction of harness or connector</td>
</tr>
<tr>
<td>Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
<tr>
<td>Malfunction of engine-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

If the APS output is 0.2 V or less or 1.2 V or higher while the engine is idling, it is judged that the APS is incorrectly adjusted, and code No. 14 is output.

**MUT-II Self-Diag Code**
- Is code No. 11 output?
  - YES Code No. 11 Accelerator pedal position sensor (APS) short-circuit system check (Refer to P.23-13.)
  - NO

**MUT-II Self-Diag Code**
- Is code No. 12 output?
  - YES Code No. 12 Accelerator pedal position sensor (APS) short-circuit system check (Refer to P.23-14.)
  - NO

**MUT-II Data List**
- No.11 APS
  - OK: Refer to P.23-61 (Data List Chart).
  - NG

APS single part check (Refer to GROUP 13 - On-vehicle Service.)

**MUT-II Self-Diag Code**
- Is code No. 14 output?
  - YES Transient malfunction (Refer to GROUP 00 - Points to Note for Transient Malfunctions.)
  - NO

**MUT-II Self-Diag Code**
- Is code No. 12 output?
  - YES Code No. 12 Accelerator pedal position sensor (APS) short-circuit system check (Refer to P.23-14.)
  - NO

**MUT-II Data List**
- No.11 APS
  - OK: Refer to P.23-61 (Data List Chart).
  - NG

Replace

Check the following connector:
D-135

OK

To the next page
Measure at APS connector D-135.
- Use the test harness (MB991658) to connect only terminals 1, 2 and 3 <6G7>, or only terminals 6, 7 and 8 <4M4>, and then measure at the pickup harness.
- Ignition switch: ON
  (1) <6G7> Voltage between terminal 1 and earth
  <4M4> Voltage between terminal 7 and earth
  OK: 0.5 V or less
  (2) <6G7> Voltage between terminal 2 and earth
  <4M4> Voltage between terminal 8 and earth
  (Ignition switch: ON)
  OK: 4.8 - 5.2 V
  (3) <6G7> Voltage between terminal 3 and earth
  <4M4> Voltage between terminal 6 and earth
  OK: Fully close the accelerator 985 - 1,085 mV
  fully open the accelerator 4,000 mV or more

Check the following connectors:
<6G7> D-120, <4M4> D-112
- Check the harness between the APS and the engine-A/T-ECU.
- Check the harness between the APS and the engine-ECU.

OK

OK

OK

OK

OK

OK

OK

OK

OK

OK

OK

OK

OK

OK

OK

OK

OK

OK

OK

OK

OK

OK

OK

OK

OK
**Code No. 15 A/T fluid temperature sensor system**

If the A/T fluid temperature sensor output is 4.5 V or higher even after driving for 10 minutes or more (fluid temperature does not rise), it is judged that there is an open circuit in the A/T fluid temperature sensor and code No. 15 is output.

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Malfunction of A/T fluid temperature sensor</td>
</tr>
<tr>
<td>● Malfunction of harness or connector</td>
</tr>
<tr>
<td>● Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>● Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

★ Refer to the Transmission Workshop Manual.

**MUT-II Data List**

- No.15 A/T fluid temperature sensor
  - **OK:** When the engine is cold, the temperature is about the same as the atmospheric temperature (air temperature). When the engine is hot, the temperature is 70 - 80°C.

**OK**

Transient malfunction (Refer to GROUP 00 - Points to Note for Transient Malfunctions.)

**NG**

Check the following connectors: <6G7> D-121, <4M4> D-108

- **OK**
  - Check the trouble symptoms.
  - NG
  - Repair

- **NG**
  - Replace the engine-A/T-ECU or A/T-ECU.

Check the following connectors: <6G7> D-122, <4M4> D-108

- **OK**
  - Check the trouble symptoms.
  - NG
  - Revision

- **NG**
  - Replace the engine-A/T-ECU or A/T-ECU.

Check the following connectors: <6G7> C-04, D-122, D-121, <4M4> D-108, C-04

**OK**

Replace the A/T fluid temperature sensor. ★

**OK**

To the next page
Code No. 21 Crank angle sensor <6G7> or engine speed sensor <4M4> system

If no output pulse from the crank angle sensor or engine speed sensor is detected for 5 seconds or more when the vehicle speed is 25 km/h or more, it is judged that there is an open circuit in the crank angle sensor or an open circuit in the engine speed sensor, and code No. 21 is output.

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfunction of crankshaft sensing blade &lt;6G7&gt;</td>
</tr>
<tr>
<td>Malfunction of crank angle sensor &lt;6G7&gt;</td>
</tr>
<tr>
<td>Malfunction of engine speed sensor &lt;4M4&gt;</td>
</tr>
<tr>
<td>Malfunction of harness or connector</td>
</tr>
<tr>
<td>Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

MUT-II Data List

- No. 21 Crank angle sensor <6G7>
  - No. 21 Engine speed sensor <4M4>
  - OK: Refer to P.23-61 (Data List Chart).

To the next page
AUTOMATIC TRANSMISSION - Troubleshooting <A/T>

1. Measure at crank angle sensor connector B-52 <6G7>, or at injection pump assembly connector B-36 <4M4>.
   - Disconnect the connector and measure at the harness side.
   - (1) Resistance between terminal 1 and earth: <6G7> 2 Ω or less
   - Resistance between terminal 4 and earth: <4M4> 4.8 - 5.2 V
   - Voltage between terminal 3 and earth: <6G7> 4.8 - 5.2 V

   - Measure at the ECU terminals.
   - Ignition switch: ON
   - (1) Voltage between terminal 45 and earth: <6G7> 4.8 - 5.2 V
   - Voltage between terminals 33 and earth: <4M4> 4.8 - 5.2 V

3. Measure the output wave pattern at crank angle sensor connector B-52 <6G7>, or at injection pump assembly connector B-36 <4M4>.
   - Use the test harness to connect the terminals, and then measure at the pickup harness.
   - Engine: Idling
   - Selector lever position: P
   - Voltage between terminal 2 and earth: A wave pattern such as the one shown on P.23-69
   - There should be no noise in the output wave pattern.

   From the previous page

   - OK
   - NG
   - Repair

Check the following connectors:
- <6G7> B-52, <4M4> B-36

Check the trouble symptoms.
Replace the engine-A/T-ECU or A/T-ECU.

Check the harness between the crank angle sensor and body earth, and repair if necessary. <6G7>
Check the harness between the injection pump assembly and body earth, and repair if necessary. <4M4>
Check the harness between the crank angle sensor and the engine-A/T-ECU. <6G7>
Check the harness between the injection pump assembly and the A/T-ECU. <4M4>
Check the harness between the crank angle sensor and the engine control relay. <6G7>
Check the harness between the engine speed sensor and the engine control relay. <4M4>
Check the harness between the crank angle sensor and body earth, and repair if necessary. <6G7>
Check the harness between the engine speed sensor and body earth, and repair if necessary. <4M4>
Check the harness between the crank angle sensor and body earth, and repair if necessary. <6G7>
Replace the crankshaft sensing blade. <6G7>

Replace the engine-A/T-ECU or A/T-ECU.

Check the trouble symptoms.
Replace the engine-A/T-ECU or A/T-ECU.

Check the trouble symptoms.
Replace the engine-A/T-ECU or A/T-ECU.

Check the trouble symptoms.
Replace the engine-A/T-ECU or A/T-ECU.
**Code No. 22 Input shaft speed sensor system**

If no output pulse from the input shaft speed sensor is detected for 1 second or more while the vehicle is driving at 30 km/h or more in 4th, it is judged that there is a short-circuit or open circuit in the input shaft speed sensor, and code No. 22 is output. If code No. 22 is output 4 times, the transmission is locked at 3rd gear (D) or 2nd gear (downshift operation in Sports mode) as a fail-safe measure, and the N range indicator lamp flashes at 1 Hz.

**Probable cause**
- Malfunction of input shaft speed sensor
- Malfunction of reverse clutch retainer
- Malfunction of harness or connector
- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of A/T-ECU <4M4>

★ Refer to the Transmission Workshop Manual.

**MUT-II Data List**
- No. 22 Input shaft speed sensor
  - OK: Refer to P.23-61 (Data List Chart).

**NG**

  - Measure at the ECU terminals
  - Ignition switch: ON
  - <6G7> Voltage between terminal 81 and earth
  - <4M4> Voltage between terminal 43 and earth
  - OK: 0.5 V or less

**OK**

  - Measure at the ECU terminals
  - Disconnect C-23
  - Ignition switch: ON
  - <6G7> Voltage between terminal 103 and earth
  - <4M4> Voltage between terminal 31 and earth
  - OK: 4.8 - 5.2 V

**NG**

- Measure the output wave pattern of the input shaft speed sensor at engine-A/T-ECU connectors D-121 and D-122 <6G7>, or at A/T-ECU connector D-108 <4M4> (using an oscilloscope).
  - Vehicle speed: approx. 50 km/h
  - Shift range: 4th
  - <6G7> Voltage between terminal 81 of D-121 and terminal 103 of D-122
  - <4M4> Voltage between terminal 31 of D-108 and terminal 43 of D-108
  - OK: A wave pattern such as the one shown on P.23-69 (Check Procedure Using an Oscilloscope) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

**To the next page**
Check the following connectors:
- D-121, D-122, C-23, <4M4>
- D-108, C-23

Measure at input shaft speed sensor connector C-23.
- Disconnect the connector and measure at the harness side.
  1. Resistance between terminal 1 and earth
     OK: 2 Ω or less
  2. Voltage between terminal 2 and earth
     (Ignition switch: ON)
     OK: 4.8 - 5.2 V
  3. Voltage between terminal 3 and earth
     (Ignition switch: ON)
     OK: System voltage

Replace the input shaft speed sensor. ★

Check the trouble symptoms.

Check the following connector:
- E-113

Check the following connectors:
- D-208, D-213, D-32, E-115

- Check the harness between the input shaft speed sensor and the engine-A/T-ECU (earth line), and repair if necessary. <6G7>
- Check the harness between the input shaft speed sensor and the A/T-ECU (earth line), and repair if necessary. <4M4>
- Check the harness between the input shaft speed sensor and the A/T-ECU (sensor line), and repair if necessary. <6G7>
- Check the harness between the input shaft speed sensor and the A/T-ECU (sensor line), and repair if necessary. <4M4>
- Check the harness between the input shaft speed sensor and the ignition switch.

Overhaul the A/T. ★
- Replace the reverse clutch retainer.

Eliminate the cause of the noise.
**Code No. 23 Output shaft speed sensor system**

If the output from the output shaft speed sensor is 50% or less continuously for 1 second or more while the vehicle is driving at 30 km/h or more in 4th, it is judged that there is a short-circuit or open circuit in the output shaft speed sensor, and code No. 23 is output. If code No. 23 is output 4 times, the transmission is locked at 3rd gear (D) or 2nd gear (downshift operation in Sports mode) as a fail-safe measure, and the N range indicator lamp flashes at 1 Hz.

**Probable cause**
- Malfunction of output shaft speed sensor
- Malfunction of direct planetary carrier
- Malfunction of harness or connector
- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of A/T-ECU <4M4>

* Refer to the Transmission Workshop Manual.

---

**MUT-II Data List**
- No. 23 Output shaft speed sensor system
  - **OK:** Refer to P.23-61 (Data List Chart).

**Check the following connectors:**
- <6G7> D-122, <4M4> D-108
  - Measure at the ECU terminals
  - Ignition switch: ON
  - <6G7>-Voltage between terminals 81 and earth
  - <4M4>-Voltage between terminal 43 and earth
  - **OK:** 0.5 V or less

**Check the trouble symptoms.**

---

- Measure at the ECU terminals
- Ignition switch: ON
- <6G7>-Voltage between terminals 104 and earth
- <4M4>-Voltage between terminal 32 and earth
- **OK:** 4.8 - 5.2 V

**Check the trouble symptoms.**

---

**Measure the output wave pattern of the output shaft speed sensor at engine-A/T-ECU connectors D-121 and D-122 <6G7>, or at A/T-ECU connector D-108 <4M4> (using an oscilloscope).
- Vehicle speed: approx. 50 km/h
- Shift range: 4th
- <6G7>-Voltage between terminal 81 of D-121 and terminal 104 of D-122
- <4M4>-Voltage between terminal 32 of D-108 and terminal 43 of D-108
- **OK:** A wave pattern such as the one shown on P.23-69 (Check Procedure Using an Oscilloscope) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

**Check the trouble symptoms.**

---

**To the next page**
Check the following connectors:
<6G7> D-121, D-122, C-24, <4M4> 
D-108, C-24

NG

Repair

OK

Measure at output shaft speed 
sensor connector C-23.
• Disconnect the connector and 
measure at the harness side.
(1) Resistance between terminal 1 
and earth
OK: 2 \( \Omega \) or less
(2) Voltage between terminal 2 and 
earth (Ignition switch: ON)
OK: 4.8 - 5.2 V
(3) Voltage between terminal 3 and 
earth (Ignition switch: ON)
OK: System voltage

OK

NG

Repair

OK

Check the following connector: E-113

NG

Repair

OK

Check the harness between the 
output shaft speed sensor and 
The engine-A/T-ECU (earth line), 
and repair if necessary. <6G7>
Check the harness between the 
output shaft speed sensor and 
The A/T-ECU (sensor line), and 
repair if necessary. <4M4>

OK

Check the following connectors:
D-208, D-213, D-32, E-115

NG

Repair

OK

Check the harness between the 
output shaft speed sensor and the 
ignition switch, and repair if 
necessary.

NG

Check the following connectors:
D-208, D-213, D-32, E-115

NG

Repair

OK

Check the harness between the 
output shaft speed sensor and 
The engine-A/T-ECU (earth line), 
and repair if necessary. <6G7>
Check the harness between the 
output shaft speed sensor and 
The A/T-ECU (sensor line), and 
repair if necessary. <4M4>

OK

Overhaul the A/T.
• Replace the direct planetary 
carrier.

NG

Check the trouble symptoms.

NG

Eliminate the cause of the noise.
### Code No.25 Wide open throttle switch system

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Malfunction of wide open throttle switch</td>
</tr>
<tr>
<td>- Malfunction of harness and connectors</td>
</tr>
<tr>
<td>- Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>- Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

If the wide open throttle switch does not turn OFF when the accelerator pedal is not depressed, there is a short circuit in the wide open throttle switch and diagnosis code No. 25 is output.

**MUT-II Data list**

- **No.25 Wide open throttle switch**
  - **OK:** The switch turns ON when fully open the accelerator the switch turns OFF when fully close the accelerator.

**Check the trouble symptoms.**

**Replace the engine-A/T-ECU or A/T-ECU.**

---

**Measure at Wide open throttle switch connector D-134**

- Disconnect the connector and measure at the harness side.
- Ignition switch: ON
- Voltage between terminal 1 and earth
  - **OK:** System voltage

**OK**

**Check the following connector:** <L.H. drive vehicles> D-14

**OK**

**NG**

**Check the following connectors:** <6G7-L.H. drive vehicles> D-122, D-134, <6G7-R.H. drive vehicles> D-122, E-11, D-124, D-134, <4M4-L.H. drive vehicles> D-109, D-134, <4M4-R.H. drive vehicles> D-109, E-11, D-124, D-134

**OK**

**NG**

**Repair**

**Replace**

**Transient malfunction**

(Refer to GROUP 00 - Points to Note for Transient Malfunctions.)
Code No. 26 Stop lamp switch system

If the stop lamp switch is continuously on for 5 minutes or more while the vehicle is being driven, it is judged that there is a short-circuit in the stop lamp switch and code No. 26 is output.

Probable cause:
- Malfunction of brake pedal
- Malfunction of stop lamp switch
- Malfunction of harness or connector
- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of A/T-ECU <4M4>

**MUT-II Data List**
- No. 26 Stop lamp switch system
  - OK: The switch turns ON when brake pedal is depressed, the switch turns OFF when the brake pedal is released.

**Brake pedal height check**
(Refer to GROUP 35A - On-vehicle Service.)
- NG Adjust
- OK

**Stop lamp switch check**
(Refer to GROUP 35A - On-vehicle Service.)
- NG Replace
- OK

**Check the following connector:**
D-136
- NG Repair
- OK

Measure at stop lamp switch connector D-136.
- OK: System voltage
- NG
  - Disconnect the connector and measure at the harness side.
  - Voltage between terminals 2 and earth

- Measure at the ECU terminals
- <6G7> Voltage between terminals 123 and earth
- <4M4> Voltage between terminal 59 and earth
- OK: System voltage when brake pedal is depressed 1 V or less when the brake pedal is released
- NG
  - Measure at stop lamp switch connector D-136.
  - Disconnect the connector and measure at the harness side.
  - OK: System voltage
  - NG

Check the following connectors:
- <6G7-L.H. drive vehicles> D-26, D-27
- <R.H. drive vehicles> D-124, D-27
- OK
- NG Repair

Check the following connectors:
- <6G7-L.H. drive vehicles> D-27, D-26, D-33, E-13, D-128, D-122
- <4M4-L.H. drive vehicles> D-27, D-26, D-33, E-13, D-128, D-109
- <4M4-R.H. drive vehicles> D-27, D-124, E-13, D-128, D-109
- OK
- NG
  - Measure at stop lamp switch connector D-136.
  - Disconnect the connector and measure at the harness side.
  - OK: System voltage
  - NG

Check the trouble symptoms.
- NG
  - Replace the engine-A/T-ECU or A/T-ECU.

 transient malfunction
(Refer to GROUP 00 - Points to Note for Transient Malfunctions.)
Code No. 31 LR solenoid valve system

If the drive terminal voltage of the LR solenoid valve is 3.0 V or less, it is judged that there is a short-circuit or open circuit in the LR solenoid valve, and the corresponding code is output. The transmission will be fixed in 3rd as a fail-safe measure, and the N range indicator will flash at a rate of 1 Hz.

Probable cause
- Malfunction of LR solenoid valve
- Malfunction of harness or connector
- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of A/T-ECU <4M4>

☆ Refer to the Transmission Workshop Manual.

**MUT-II Self-Diag Code**
- Is code No. 54 output?

**YES**

**NO**

**NG**

**OK**

**Code No. 54 - A/T control relay system check**
(Refer to P.23-103.)

**Transient malfunction**
(Refer to GROUP 00 - Points to Note for Transient Malfunctions.)

**MUT-II Actuator Test**
- No. 1 LR solenoid valve
  - OK: Sound of operation can be heard

**NG**

**OK**

**Measure at engine-A/T-ECU connector D-122 <6G7>, or at A/T-ECU connector D-109 <4M4>**
- Measure at the ECU terminals
- Ignition switch: ON
- <6G7> Voltage between terminal 129 and earth
- <4M4> Voltage between terminal 62 and earth
  - OK: System voltage

**NG**

**OK**

**Check the following connectors: <6G7> D-122, <4M4> D-109**

**OK**

**NG**

**Repair**

Check the trouble symptoms.

Replace the engine-A/T-ECU or A/T-ECU.

**Check the following connector: C-04**

**OK**

**NG**

**Repair**

Replace the LR solenoid valve ☆

**Measure at solenoid valve assembly connector C-04**
- Disconnect the connector and measure at the solenoid valve side.
- Resistance between terminals 6 and 10
  - OK: 2.7 - 3.4 Ω

**NG**

**OK**

**NG**

**Repair**

Check the harness between the solenoid valve assembly and the engine-A/T-ECU, and repair if necessary. <6G7>

**Check the harness between the solenoid valve assembly and the A/T control relay, and repair if necessary. <4M4>**

**Check the following connectors: <6G7> D-122, E-113, D-12**

**<4M4> D-109, E-113, D-12**

**OK**

**NG**

**Repair**

Check the harness between the solenoid valve assembly and the A/T control relay, and repair if necessary.

**Check the following connectors: E-113, D-12**

**OK**

**NG**

**Repair**

Check the harness between the solenoid valve assembly and the A/T control relay, and repair if necessary.

**Measure at solenoid valve assembly connector C-04**
- Disconnect the connector and measure at the harness side.
- Ignition switch: ON
- Voltage between terminal 10 and earth
  - OK: System voltage

**NG**

**OK**

**NG**

**Repair**

Check the harness between the solenoid valve assembly and the engine-A/T-ECU, and repair if necessary. <6G7>

**Check the harness between the solenoid valve assembly and the A/T-ECU, and repair if necessary. <4M4>**

**Check the harness between the solenoid valve assembly and the A/T control relay, and repair if necessary.**
**Code No. 32 UD solenoid valve system**

If the drive terminal voltage of the UD solenoid valve is 3.0 V or less, it is judged that there is a short-circuit or open circuit in the UD solenoid valve, and the corresponding code is output. The transmission will be fixed in 3rd as a fail-safe measure, and the N range indicator will flash at a rate of 1 Hz.

*Refer to the Transmission Workshop Manual.*

**Probable cause**

- Malfunction of UD solenoid valve
- Malfunction of harness or connector
- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of A/T-ECU <4M4>

**MUT-II Self-Diag Code**

- Is code No. 54 output?
  - YES: Code No. 54 - A/T control relay system check (Refer to P.23-103.)
  - NO: Transient malfunction (Refer to GROUP 00 - Points to Note for Transient Malfunctions.)

**MUT-II Actuator Test**

- No 2 UD solenoid valve
  - OK: Sound of operation can be heard
    - Measure at ECU terminals
    - Ignition switch: ON
    - Voltage between terminal 120 and earth
    - Voltage between terminal 1 and earth
    - OK: System voltage
  - NG: Replace the engine-A/T-ECU or A/T-ECU.

**Check the following connectors: <6G7> D-122, <4M4> D-107**

- OK: Check the trouble symptoms.
- NG: Replace the engine-A/T-ECU or A/T-ECU.

**Check the following connectors: C-04**

- OK: Measure at solenoid valve assembly connector C-04.
  - OK: 2.7 - 3.4 Ω
  - NG: Replace the UD solenoid valve.

**Check the harness between the solenoid valve assembly and the engine-A/T-ECU, and repair if necessary. <6G7>**

**Check the following connectors: E-113, D-12**

- OK: Check the harness between the solenoid valve assembly and the A/T control relay, and repair if necessary.
- NG: Repair

**Check the harness between the solenoid valve assembly and the A/T control relay, and repair if necessary. <4M4>**
### Code No. 33 2nd solenoid valve system

<table>
<thead>
<tr>
<th>Probable cause</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfunction of 2nd solenoid valve</td>
<td></td>
</tr>
<tr>
<td>Malfunction of harness or connector</td>
<td></td>
</tr>
<tr>
<td>Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
<td></td>
</tr>
<tr>
<td>Malfunction of A/T-ECU &lt;4M4&gt;</td>
<td></td>
</tr>
</tbody>
</table>

If the drive terminal voltage of the 2nd solenoid valve is 3.0 V or less, it is judged that there is a short-circuit or open circuit in the 2nd solenoid valve, and the corresponding code is output. The transmission will be fixed in 3rd as a fail-safe measure, and the N range indicator will flash at a rate of 1 Hz.

Refer to the Transmission Workshop Manual.

#### MUT-II Self-Diag Code

<table>
<thead>
<tr>
<th>YES</th>
<th>Code No. 54 - A/T control relay system check (Refer to P.23-103.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>Transient malfunction (Refer to GROUP 00 - Points to Note for Transient Malfunctions.)</td>
</tr>
</tbody>
</table>

#### MUT-II Actuator Test

- **No. 3 2nd solenoid valve</A/T>**
  - Sound of operation can be heard

<table>
<thead>
<tr>
<th>OK</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td></td>
</tr>
</tbody>
</table>

  - Measure at the ECU terminals
  - Ignition switch: ON
  - <6G7> Voltage between terminal 106 and earth
  - <4M4> Voltage between terminal 16 and earth

<table>
<thead>
<tr>
<th>OK</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td></td>
</tr>
</tbody>
</table>

- Check the following connectors: <6G7> D-122, <4M4> D-107

<table>
<thead>
<tr>
<th>OK</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td></td>
</tr>
</tbody>
</table>

- Check the trouble symptoms.

<table>
<thead>
<tr>
<th>OK</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td></td>
</tr>
</tbody>
</table>

- Replace the engine-A/T-ECU or A/T-ECU.

- Check the following connector: C-04

<table>
<thead>
<tr>
<th>OK</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td></td>
</tr>
</tbody>
</table>

- Measure at solenoid valve assembly connector C-04.
  - Disconnect the connector and measure at the solenoid valve side.
  - Resistance between terminals 4 and 9

<table>
<thead>
<tr>
<th>OK</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td></td>
</tr>
</tbody>
</table>

- Replace the 2nd solenoid valve.

- Measure at solenoid valve assembly connector C-04.
  - Disconnect the connector and measure at the harness side.
  - Ignition switch: ON
  - Voltage between terminals 9 and earth

<table>
<thead>
<tr>
<th>OK</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td></td>
</tr>
</tbody>
</table>

- Check the harness between the solenoid valve assembly and the A/T control relay, and repair if necessary.

- Measure at solenoid valve assembly connector C-04.
  - Disconnect the connector and measure at the harness side.
  - Ignition switch: ON
  - Voltage between terminals 9 and earth

<table>
<thead>
<tr>
<th>OK</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td></td>
</tr>
</tbody>
</table>

- Check the harness between the solenoid valve assembly and the A/T control relay, and repair if necessary.

- Check the harness between the solenoid valve assembly and the engine-A/T-ECU, and repair if necessary.

- Check the harness between the solenoid valve assembly and the A/T-ECU, and repair if necessary.

- Check the harness between the solenoid valve assembly and the A/T control relay, and repair if necessary.
Code No. 34 OD solenoid valve system

If the drive terminal voltage of the OD solenoid valve is 3.0 V or less, it is
judged that there is a short-circuit or open circuit in the OD solenoid valve, and
the corresponding code is output.
The transmission will be fixed in 3rd as a fail-safe measure, and the N range
indicator will flash at a rate of 1 Hz.

Probable cause
- Malfunction of OD solenoid valve
- Malfunction of harness or connector
- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of A/T-ECU <4M4>

Refer to the Transmission Workshop Manual.

MUT-II Self-Diag Code
- Is code No. 54 output?

YES

Code No. 54 - A/T control relay system check
(Refer to P.23-103.)

NO

MUT-II Actuator Test
- No.4 OD solenoid valve
  OK: Sound of operation can be heard

OK

Deferred malfunction
(Refer to GROUP 00 - Points to Note for Deferred Malfunctions.)

NG

Measure at engine-A/T-ECU connector D-122 <6G7>, or at
A/T-ECU connector D-107 <4M4>.
  - Measure at the ECU terminals
  - Ignition switch: ON
  - <6G7> Voltage between terminal 130 and earth
  - <4M4> Voltage between terminal 14 and earth
  OK: System voltage

OK

Check the following connector: C-04

NG

OK

Measure at solenoid valve assembly connector C-04.
  - Disconnect the connector and measure at the solenoid
valve side.
  - Resistance between terminals 5 and 9
  OK: 2.7 - 3.4 Ω

NG

OK

Measure at solenoid valve assembly connector C-04.
  - Disconnect the connector and measure at the harness
side.
  - Ignition switch: ON
  - Voltage between terminals 9 and earth
  OK: System voltage

OK

Check the following connectors: E-113, D-12

NG

OK

Check the harness between the solenoid valve assembly and
the A/T control relay, and repair if necessary.

Repair

NG

Check the following connectors: <6G7> D-122, E-113, D-12,
<4M4> D-107, E-113, D-12

OK

Repair

OK

Check the harness between the solenoid valve assembly
and the engine-A/T-ECU, and repair if necessary. <6G7>
Check the harness between the solenoid valve assembly
and the A/T-ECU, and repair if necessary. <4M4>
Check the harness between the solenoid valve assembly
and the A/T control relay, and repair if necessary.
Code No. 35 RED solenoid valve system

If the drive terminal voltage of the RED solenoid valve is 3.0 V or less, it is judged that there is a short-circuit or open circuit in the RED solenoid valve, and the corresponding code is output. The transmission will be fixed in 3rd as a fail-safe measure, and the N range indicator will flash at a rate of 1 Hz.

Probable cause

- Malfunction of RED solenoid valve
- Malfunction of harness or connector
- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of A/T-ECU <4M4>

Refer to the Transmission Workshop Manual.

MUT-II Self-Diag Code

- Is code No. 54 output?

Yes

Code No. 54 - A/T control relay system check
(Refer to P.23-103.)

No

MUT-II Actuator Test

- No.5 RED solenoid valve
  - OK: Sound of operation can be heard

OK

Check the following connectors: <6G7> D-122, <4M4> D-109

NG

- Measure at the ECU terminals
- Ignition switch: ON
- <6G7> Voltage between terminal 119 and earth
- <4M4> Voltage between terminal 51 and earth
  - OK: System voltage

NG

Check the following connectors: C-04

OK

Check the trouble symptoms.

NG

Replace the engine-A/T-ECU or A/T-ECU.

Repair

NG

Measure at solenoid valve assembly connector C-04.
- Disconnect the connector and measure at the solenoid valve side.
- Resistance between terminals 8 and 10
  - OK: 2.7 - 3.4 Ω

OK

Repair

NG

Check the following connector: E-113, D-12

OK

Check the harness between the solenoid valve assembly and the A/T control relay, and repair if necessary.

NG

Repair

Check the following connectors: <6G7> D-122, E-113, D-12, <4M4> D-109, E-113, D-12

OK

Check the harness between the solenoid valve assembly and the engine-A/T-ECU, and repair if necessary. <6G7>

Check the harness between the solenoid valve assembly and the A/T-ECU, and repair if necessary. <4M4>

Check the harness between the solenoid valve assembly and the A/T control relay, and repair if necessary.
Code No. 36 DCC solenoid valve system

If the drive terminal voltage of the DCC solenoid valve is 3.0 V or less, it is judged that there is a short-circuit or open circuit in the DCC solenoid valve, and code No. 36 is output. The transmission will be fixed in 3rd as a fail-safe measure, and the N range indicator will flash at a rate of 1 Hz.

Probable cause
- Malfunction of DCC solenoid valve
- Malfunction of harness or connector
- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of A/T-ECU <4M4>

Refer to the Transmission Workshop Manual.

MUT-II Self-Diag Code

<table>
<thead>
<tr>
<th>YES</th>
<th>Code No. 54 - A/T control relay system check (Refer to P.23-103.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>Transient malfunction (Refer to GROUP 00 - Points to Note for Transient Malfunctions.)</td>
</tr>
</tbody>
</table>

MUT-II Actuator Test

<table>
<thead>
<tr>
<th>OK</th>
<th>Check the following connectors: &lt;6G7&gt; D-122, &lt;4M4&gt; D-107</th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td>Repair</td>
</tr>
</tbody>
</table>

- Measure at the ECU terminals.
- Ignition switch: ON
- <6G7> Voltage between terminal 107 and earth
- <4M4> Voltage between terminal 15 and earth
  OK: System voltage

Check the trouble symptoms.

NG

Repair

Replace the engine-A/T-ECU or A/T-ECU.

Check the following connector: C-04

<table>
<thead>
<tr>
<th>OK</th>
<th>Repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td>Replace the DCC solenoid valve. ★</td>
</tr>
</tbody>
</table>

Measure at solenoid valve assembly connector C-04.
- Disconnect the connector and measure at the solenoid valve side.
- <4M4> Resistance between terminal 7 and 10
  OK: 2.7 - 3.4 Ω

OK

Check the following connectors: E-113, D-12

<table>
<thead>
<tr>
<th>OK</th>
<th>Repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td>Check the harness between the solenoid valve assembly and the A/T control relay, and repair if necessary.</td>
</tr>
</tbody>
</table>

Measure at solenoid valve assembly connector C-04.
- Disconnect the connector and measure at the harness side.
- Ignition switch: ON
- Voltage between terminal 10 and earth
  OK: System voltage

OK

Check the following connectors: <6G7> D-122, E-113, D-12, <4M4> D-107, E-113, D-12

<table>
<thead>
<tr>
<th>OK</th>
<th>Repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td>Check the harness between the solenoid valve assembly and the engine-A/T-ECU, and repair if necessary. &lt;6G7&gt;</td>
</tr>
<tr>
<td></td>
<td>Check the harness between the solenoid valve assembly and the A/T-ECU, and repair if necessary. &lt;4M4&gt;</td>
</tr>
<tr>
<td></td>
<td>Check the harness between the solenoid valve assembly and the A/T control relay, and repair if necessary.</td>
</tr>
</tbody>
</table>
**Probable cause**
- Malfunction of input shaft speed sensor
- Malfunction of output shaft speed sensor
- Malfunction of harness or connector
- Malfunction of solenoid valve
- Malfunction of reverse clutch retainer
- Malfunction of direct planetary carrier
- Malfunction of LR brake system
- Malfunction of UD clutch system
- Malfunction of RED brake system
- Malfunction of one-way clutch system
- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of A/T-ECU <4M4>
- Noise is generated.

**Refer to the Transmission Workshop Manual.**

<table>
<thead>
<tr>
<th>MUT-II Self-Diag Code</th>
<th>YES</th>
<th>Code No. 22 Input shaft speed sensor system check (Refer to P.23-20.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is code No. 22 output?</td>
<td>NO</td>
<td>Code No. 23 Input shaft speed sensor system check (Refer to P.23-22.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MUT-II Actuator Test</th>
<th>YES</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is code No. 23 output?</td>
<td>NO</td>
<td>Replace the appropriate solenoid valve. ⚫</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MUT-II Actuator Test</th>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.1 LR solenoid valve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.2 UD solenoid valve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.3 2ND solenoid valve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.4 OD solenoid valve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.5 RED solenoid valve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OK: The sound of operation should be heard.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Measure the output wave pattern of the input shaft speed sensor at engine-A/T-ECU connectors D-121 and D-122 <6G7>, or at A/T-ECU connector D-108 <4M4> (using an oscilloscope).
- Vehicle speed: approx. 50 km/h
- Shift range: 4th
  <6G7> Voltage between No.81 (D-121) and No.103 (D-122)
  <4M4> Voltage between No.31 (D-108) and No.43 (D-108)
OK: A wave pattern such as the one shown on P.23-69 (Check Procedure Using an Oscilloscope) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

OK | NG
---|---

Replace the input shaft speed sensor. ⚫

Check the trouble symptoms.

OK | NG
---|---

Overhaul the A/T. ⚫

Replace the reverse clutch retainer.

Check the trouble symptoms.

NG | OK
---|---

Eliminate the cause of the noise.
OK

Measure the output wave pattern of the output shaft speed sensor at engine-A/T-ECU connectors D-121 and D-122 <6G7>, or at A/T-ECU connector D-108 <4M4> (using an oscilloscope).

- Vehicle speed: approx. 50 km/h
- Shift range: 4th
  - <6G7> Voltage between No.81 (D-121) and No.104 (D-122)
  - <4M4> Voltage between No.32 (D-108) and No.43 (D-108)

OK: A wave pattern such as the one shown on P.23-69 (Check Procedure Using an Oscilloscope) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

OK

Replace the valve body assembly. ★

NG

Check the trouble symptoms.

NG

Replace the engine-A/T-ECU or A/T-ECU.

Check the trouble symptoms.

Overhaul the A/T. ★
- Replace the UD clutch. (Code No. 42, 43 or No. 44 is output, or no other codes are output.)
- Replace the LR brake. (Code No. 46 is output, or no other codes are output.)
- Replace the RED brake. (Code No. 42, 43 or No. 46 is output, or no other codes are output.)
- Replace the one-way clutch (OWC-L). (No other codes are output.)
- Replace the one-way clutch (OWC-D). (Code No. 42 or No. 43 is output, or no other codes are output.)
### Code No. 42 2nd without completion of shifting

<table>
<thead>
<tr>
<th>Probable cause</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfunction of input shaft speed sensor</td>
<td></td>
</tr>
<tr>
<td>Malfunction of output shaft speed sensor</td>
<td></td>
</tr>
<tr>
<td>Malfunction of harness or connector</td>
<td></td>
</tr>
<tr>
<td>Malfunction of solenoid valve</td>
<td></td>
</tr>
<tr>
<td>Malfunction of reverse clutch retainer</td>
<td></td>
</tr>
<tr>
<td>Malfunction of direct planetary carrier</td>
<td></td>
</tr>
<tr>
<td>Malfunction of 2ND brake system</td>
<td></td>
</tr>
<tr>
<td>Malfunction of UD clutch system</td>
<td></td>
</tr>
<tr>
<td>Malfunction of RED brake system</td>
<td></td>
</tr>
<tr>
<td>Malfunction of one-way clutch system</td>
<td></td>
</tr>
<tr>
<td>Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
<td></td>
</tr>
<tr>
<td>Malfunction of A/T-ECU &lt;4M4&gt;</td>
<td></td>
</tr>
<tr>
<td>Noise is generated.</td>
<td></td>
</tr>
</tbody>
</table>

* Refer to the Transmission Workshop Manual.

#### MUT-II Self-Diag Code

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Is code No. 22 output?</strong></td>
<td>Code No. 22 Input shaft speed sensor system check (Refer to P.23-20.)</td>
<td></td>
</tr>
</tbody>
</table>

#### MUT-II Actuator Test

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Is code No. 23 output?</strong></td>
<td>Code No. 23 Output shaft speed sensor system check (Refer to P.23-22.)</td>
<td></td>
</tr>
</tbody>
</table>

#### MUT-II Actuator Test

- No.1 LR solenoid valve
- No.2 UD solenoid valve
- No.3 2ND solenoid valve
- No.4 OD solenoid valve
- No.5 RED solenoid valve

**OK:** The sound of operation should be heard.

**NG:** Replace the appropriate solenoid valve. ★

#### Measure the output wave pattern of the input shaft speed sensor at engine-A/T-ECU connectors D-121 and D-122 <6G7>, or at A/T-ECU connector D-108 <4M4> (using an oscilloscope).

- Vehicle speed: approx. 50 km/h
- Shift range: 4th
- **<6G7>** Voltage between No.81 (D-121) and No.103 (D-122)
- **<4M4>** Voltage between No.31 (D-108) and No.43 (D-108)

**OK:** A wave pattern such as the one shown on P.23-69 (Check Procedure Using an Oscilloscope) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

**NG:** Check the harness between the input shaft speed sensor and the engine-A/T-ECU. <6G7>

**OK**

**NG**

**Repair**

**Check the trouble symptoms.**

**OK**

**NG**

**Overhaul the A/T. ★**

**Check the trouble symptoms.**

**OK**

**NG**

Eliminate the cause of the noise.

To the next page
From the previous page

OK

NG

Measure the output wave pattern of the output shaft speed sensor at engine-A/T-ECU connectors D-121 and D-122 <6G7>, or at A/T-ECU connector D-108 <4M4> (using an oscilloscope).
- Vehicle speed: approx. 50 km/h
- Shift range: 4th
  - <6G7> Voltage between No.81 (D-121) and No.104 (D-122)
  - <4M4> Voltage between No.32 (D-108) and No.43 (D-108)
OK: A wave pattern such as the one shown on P.23-69 (Check Procedure Using an Oscilloscope) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

Replace the valve body assembly.  ⭐

OK

NG

Check the trouble symptoms.

Replace the engine-A/T-ECU or A/T-ECU.

Check the trouble symptoms.

Overhaul the A/T.  ⭐
- Replace the UD clutch. (Code No. 41, 43 or No. 44 is output, or no other codes are output.)
- Replace the 2ND brake. (Code No. 44 or No. 45 is output, or no other codes are output.)
- Replace the RED brake. (Code No. 41, 43 or No. 46 is output, or no other codes are output.)
- Replace the one-way clutch (OWC-D). (Code No. 41 or No. 43 is output, or no other codes are output.)

NG

OK

NG

Repair

Replace the output shaft speed sensor.  ⭐

Check the trouble symptoms.

Overhaul the A/T.  ⭐
- Replace the direct planetary carrier.

Check the trouble symptoms.

Eliminate the cause of the noise.
**Code No.43 3rd without completion of shifting**

If the output shaft speed sensor output multiplied by the 3rd gear ratio is not identical to the input shaft speed sensor output after shifting to 3rd, code No. 43 is output.

If code No. 43 is output 4 times, the transmission is fixed in 3rd and the N range lamp flashes at a rate of 1 Hz.

**Probable cause**
- Malfunction of input shaft speed sensor
- Malfunction of output shaft speed sensor
- Malfunction of harness or connector
- Malfunction of solenoid valve
- Malfunction of reverse clutch retainer
- Malfunction of direct planetary carrier
- Malfunction of UD clutch system
- Malfunction of OD clutch system
- Malfunction of RED brake system
- Malfunction of one-way clutch system
- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of A/T-ECU <4M4>
- Noise is generated.

★★ Refer to the Transmission Workshop Manual.

**MUT-II Self-Diag Code**
- Is code No. 22 output?
  - YES Code No. 22 Input shaft speed sensor system check (Refer to P.23-20.)
  - NO

**MUT-II Actuator Test**
- Is code No. 23 output?
  - YES Code No. 23 Output shaft speed sensor system check (Refer to P.23-22.)
  - NO

**MUT-II Actuator Test**
- No.1 LR solenoid valve
- No.2 UD solenoid valve
- No.3 2ND solenoid valve
- No.4 OD solenoid valve
- No.5 RED solenoid valve

**OK:** The sound of operation should be heard.

**NG** Replace the appropriate solenoid valve.

Measure the output wave pattern of the input shaft speed sensor at engine-A/T-ECU connectors D-121 and D-122 <6G7>, or at A/T-ECU connector D-108 <4M4> (using an oscilloscope).
- Vehicle speed: approx. 50 km/h
- Shift range: 4th

**OK:** A wave pattern such as the one shown on P.23-69 (Check Procedure Using an Oscilloscope) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

**NG** Replace the input shaft speed sensor.

Check the trouble symptoms.

Overhaul the A/T.

Check the trouble symptoms.

Eliminate the cause of the noise.
Measure the output wave pattern of the output shaft speed sensor at engine-A/T-ECU connectors D-121 and D-122 <6G7>, or at A/T-ECU connector D-108 <4M4> (using an oscilloscope).

- Vehicle speed: approx. 50 km/h
- Shift range: 4th

<6G7>Voltage between No.81 (D-121) and No.104 (D-122)
<4M4>Voltage between No.32 (D-108) and No.43 (D-108)

OK: A wave pattern such as the one shown on P.23-69 (Check Procedure Using an Oscilloscope) should be output, and with the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

Replace the output shaft speed sensor.

OK

Check the trouble symptoms.

Replace the valve body assembly.

Check the trouble symptoms.

Replace the engine-A/T-ECU or A/T-ECU.

Check the trouble symptoms.

Overhaul the A/T.

- Replace the UD clutch. (Code No. 41, 42 or No. 44 is output, or no other codes are output.)
- Replace the OD clutch. (Code No. 44 or No. 45 is output, or no other codes are output.)
- Replace the RED brake. (Code No. 41, 42 or No. 46 is output, or no other codes are output.)
- Replace the one-way clutch (OWC-D). (Code No. 41 or No. 42 is output, or no other codes are output.)
## Code No. 44 4th without completion of shifting

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Malfunction of input shaft speed sensor</td>
</tr>
<tr>
<td>- Malfunction of output shaft speed sensor</td>
</tr>
<tr>
<td>- Malfunction of harness or connector</td>
</tr>
<tr>
<td>- Malfunction of solenoid valve</td>
</tr>
<tr>
<td>- Malfunction of reverse clutch retainer</td>
</tr>
<tr>
<td>- Malfunction of direct planetary carrier</td>
</tr>
<tr>
<td>- Malfunction of UD clutch system</td>
</tr>
<tr>
<td>- Malfunction of 2ND brake system</td>
</tr>
<tr>
<td>- Malfunction of OD clutch system</td>
</tr>
<tr>
<td>- Malfunction of DIR clutch system</td>
</tr>
<tr>
<td>- Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>- Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
<tr>
<td>- Noise is generated.</td>
</tr>
</tbody>
</table>

- Refer to the Transmission Workshop Manual.

### MUT-II Self-Diag Code

- Is code No. 22 output?

  **YES** Code No. 22 Input shaft speed sensor system check (Refer to P.23-20.)

  **NO** MUT-II Actuator Test

  - Is code No. 23 output?

    **YES** Code No. 23 Output shaft speed sensor system check (Refer to P.23-22.)

    **NO** MUT-II Actuator Test

    - No.1 LR solenoid valve
    - No.2 UD solenoid valve
    - No.3 2ND solenoid valve
    - No.4 OD solenoid valve
    - No.5 RED solenoid valve

    **OK**: The sound of operation should be heard.

    **NG** Replace the appropriate solenoid valve.

### Measure the output wave pattern of the input shaft speed sensor


  - Vehicle speed: approx. 50 km/h
  - Shift range: 4th

  **OK**: A wave pattern such as the one shown on P.23-69 (Check Procedure Using an Oscilloscope) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

  **NG** Replace the input shaft speed sensor.

### Check the trouble symptoms.

- Overhaul the A/T.

  **NG** Eliminate the cause of the noise.

To the next page
Measure the output wave pattern of the output shaft speed sensor at engine-A/T-ECU connectors D-121 and D-122 <6G7>, or at A/T-ECU connector D-108 <4M4> (using an oscilloscope).

- Vehicle speed: approx. 50 km/h
- Shift range: 4th
  - <6G7> Voltage between No.81 (D-121) and No.104 (D-122)
  - <4M4> Voltage between No.32 (D-108) and No.43 (D-108)

OK: A wave pattern such as the one shown on P.23-69 (Check Procedure Using an Oscilloscope) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

OK

Check the trouble symptoms.

NG

Replace the valve body assembly. *

Check the trouble symptoms.

NG

Replace the engine-A/T-ECU or A/T-ECU.

Check the trouble symptoms.

NG

Overhaul the A/T. *

- Replace the UD clutch. (Code No. 41, 42 or No. 43 is output, or no other codes are output.)
- Replace the OD clutch. (Code No. 43 or No. 45 is output, or no other codes are output.)
- Replace the DIR clutch. (Code No. 45 is output, or no other codes are output.)

NG

Check the trouble symptoms.

NG

Overhaul the A/T.

- Check the harness between the output shaft speed sensor and the engine-A/T-ECU. <6G7>
- Check the harness between the output shaft speed sensor and the A/T-ECU. <4M4>

OK

Replace the output shaft speed sensor. *

Check the trouble symptoms.

NG

Overhaul the A/T. *

- Replace the direct planetary carrier.

Check the trouble symptoms.

NG

Eliminate the cause of the noise.
Code No. 45 5th without completion of shifting

If the output shaft speed sensor output multiplied by the 5th gear ratio is not identical to the input shaft speed sensor output after shifting to 5th, code No. 45 is output.

If code No. 45 is output 4 times, the transmission is fixed in 3rd and the N range lamp flashes at a rate of 1 Hz.

Probable cause

- Malfunction of input shaft speed sensor
- Malfunction of output shaft speed sensor
- Malfunction of harness or connector
- Malfunction of solenoid valve
- Malfunction of reverse clutch retainer
- Malfunction of direct planetary carrier
- Malfunction of 2ND brake system
- Malfunction of OD clutch system
- Malfunction of DIR clutch system
- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of A/T-ECU. <4M4>
- Noise is generated.

Refer to the Transmission Workshop Manual.

MUT-II Self-Diag Code

- Is code No. 22 output? YES

Code No. 22 Input shaft speed sensor system check (Refer to P.23-20.)

NO

MUT-II Actuator Test

- Is code No. 23 output? YES

Code No. 23 Output shaft speed sensor system check (Refer to P.23-22.)

NO

MUT-II Actuator Test

- No.1 LR solenoid valve
- No.2 UD solenoid valve
- No.3 2ND solenoid valve
- No.4 OD solenoid valve
- No.5 RED solenoid valve

OK: The sound of operation should be heard.

NG

Replace the appropriate solenoid valve.*

Measure the output wave pattern of the input shaft speed sensor at engine-A/T-ECU connectors D-121 and D-122 <6G7>, or at A/T-ECU connector D-108 <4M4> (using an oscilloscope).

- Vehicle speed: approx. 50 km/h
- Shift range: 4th
  <6G7> Voltage between No.81 (D-121) and No.103 (D-122)
  <4M4> Voltage between No.31 (D-108) and No.43 (D-108)

OK: A wave pattern such as the one shown on P.23-69 (Check Procedure Using an Oscilloscope) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

NG

- Check the harness between the input shaft speed sensor and the engine-A/T-ECU. <6G7>
- Check the harness between the input shaft speed sensor and the A/T-ECU. <4M4>

OK

Replace the input shaft speed sensor.*

NG

Repair

Check the trouble symptoms.

Replace the reverse clutch retainer.

Check the trouble symptoms.

NG

Eliminate the cause of the noise.
**AUTOMATIC TRANSMISSION - Troubleshooting <A/T>**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
<td>Replace the valve body assembly.</td>
</tr>
<tr>
<td>NG</td>
<td>Check the trouble symptoms.</td>
</tr>
<tr>
<td>OK</td>
<td>Replace the engine-A/T-ECU or A/T-ECU.</td>
</tr>
<tr>
<td>NG</td>
<td>Check the trouble symptoms.</td>
</tr>
<tr>
<td>NG</td>
<td>Overhaul the A/T.</td>
</tr>
<tr>
<td>OK</td>
<td>Check the harness between the output shaft speed sensor and the engine-A/T-ECU.</td>
</tr>
<tr>
<td>NG</td>
<td>Replace the output shaft speed sensor.</td>
</tr>
<tr>
<td>NG</td>
<td>Check the trouble symptoms.</td>
</tr>
<tr>
<td>NG</td>
<td>Overhaul the A/T.</td>
</tr>
<tr>
<td>OK</td>
<td>Check the harness between the output shaft speed sensor and the A/T-ECU.</td>
</tr>
<tr>
<td>NG</td>
<td>Repair</td>
</tr>
<tr>
<td>OK</td>
<td>Overhaul the A/T.</td>
</tr>
<tr>
<td>NG</td>
<td>Replace the OD clutch. (Code No. 43 or No. 44 is output, or no other codes are output.)</td>
</tr>
<tr>
<td>NG</td>
<td>Replace the 2ND brake. (Code No. 42 is output, or no other codes are output.)</td>
</tr>
<tr>
<td>NG</td>
<td>Replace the DIR clutch. (Code No. 44 is output, or no other codes are output.)</td>
</tr>
</tbody>
</table>

---

From the previous page

Measure the output wave pattern of the output shaft speed sensor at engine-A/T-ECU connectors D-121 and D-122 <6G7>, or at A/T-ECU connector D-108 <4M4> (using an oscilloscope).
- Vehicle speed: approx. 50 km/h
- Shift range: 4th
  - <6G7> Voltage between No.81 (D-121) and No.104 (D-122)
  - <4M4> Voltage between No.32 (D-108) and No.43 (D-108)
- OK: A wave pattern such as the one shown on P.23-69 (Check Procedure Using an Oscilloscope) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
<td>Replace the valve body assembly.</td>
</tr>
<tr>
<td>NG</td>
<td>Check the trouble symptoms.</td>
</tr>
<tr>
<td>OK</td>
<td>Replace the engine-A/T-ECU or A/T-ECU.</td>
</tr>
<tr>
<td>NG</td>
<td>Check the trouble symptoms.</td>
</tr>
<tr>
<td>NG</td>
<td>Overhaul the A/T.</td>
</tr>
<tr>
<td>OK</td>
<td>Check the harness between the output shaft speed sensor and the engine-A/T-ECU.</td>
</tr>
<tr>
<td>NG</td>
<td>Replace the output shaft speed sensor.</td>
</tr>
<tr>
<td>NG</td>
<td>Check the trouble symptoms.</td>
</tr>
<tr>
<td>NG</td>
<td>Overhaul the A/T.</td>
</tr>
<tr>
<td>OK</td>
<td>Check the harness between the output shaft speed sensor and the A/T-ECU.</td>
</tr>
<tr>
<td>NG</td>
<td>Repair</td>
</tr>
<tr>
<td>OK</td>
<td>Overhaul the A/T.</td>
</tr>
<tr>
<td>NG</td>
<td>Replace the OD clutch. (Code No. 43 or No. 44 is output, or no other codes are output.)</td>
</tr>
<tr>
<td>NG</td>
<td>Replace the 2ND brake. (Code No. 42 is output, or no other codes are output.)</td>
</tr>
<tr>
<td>NG</td>
<td>Replace the DIR clutch. (Code No. 44 is output, or no other codes are output.)</td>
</tr>
</tbody>
</table>
Code No. 46 Reverse without completion of shifting

If the output shaft speed sensor output multiplied by the reverse gear ratio is not identical to the input shaft speed sensor output after shifting to reverse, code No. 46 is output. If code No. 46 is output 4 times, the transmission is fixed in 3rd and the N range lamp flashes at a rate of 1 Hz.

Probable cause
- Malfunction of input shaft speed sensor
- Malfunction of output shaft speed sensor
- Malfunction of harness or connector
- Malfunction of solenoid valve
- Malfunction of reverse clutch retainer
- Malfunction of direct planetary carrier
- Malfunction of LR brake system
- Malfunction of REV clutch system
- Malfunction of RED clutch system
- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of A/T-ECU <4M4>
- Noise is generated.

Refer to the Transmission Workshop Manual.

MUT-II Self-Diag Code
- Is code No. 22 output?
  YES → Code No. 22 Input shaft speed sensor system check (Refer to P.23-20.)
  NO

MUT-II Actuator Test
- Is code No. 23 output?
  YES → Code No. 23 Output shaft speed sensor system check (Refer to P.23-22.)
  NO

MUT-II Actuator Test
  - No.1 LR solenoid valve
  - No.2 UD solenoid valve
  - No.3 2ND solenoid valve
  - No.4 OD solenoid valve
  - No.5 RED solenoid valve

OK: The sound of operation should be heard.

NG → Replace the appropriate solenoid valve.

Measure the output wave pattern of the input shaft speed sensor at engine-A/T-ECU connectors D-121 and D-122 <6G7>, or at A/T-ECU connector D-108 <4M4> (using an oscilloscope).
- Vehicle speed: approx. 50 km/h
- Shift range: 4th
  <6G7> Voltage between No.81 (D-121) and No.103 (D-122)
  <4M4> Voltage between No.31 (D-108) and No.43 (D-108)

OK: A wave pattern such as the one shown on P.23-69 (Check Procedure Using an Oscilloscope) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

NG →

Check the harness between the input shaft speed sensor and the engine-A/T-ECU. <6G7>
Check the harness between the input shaft speed sensor and the A/T-ECU. <4M4>

OK → Replace the input shaft speed sensor.

NG → Repair

Check the trouble symptoms.

OK → Overhaul the A/T.

NG → Replace the reverse clutch retainer.

Check the trouble symptoms.

Eliminate the cause of the noise.
Measure the output wave pattern of the output shaft speed sensor at engine-A/T-ECU connectors D-121 and D-122 <6G7>, or at A/T-ECU connector D-108 <4M4> (using an oscilloscope).
- Vehicle speed: approx. 50 km/h
- Shift range: 4th
- Voltage between No.81 (D-121) and No.104 (D-122) <6G7>
- Voltage between No.32 (D-108) and No.43 (D-108) <4M4>

OK: A wave pattern such as the one shown on P.23-69 (Check Procedure Using an Oscilloscope) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

Replace the valve body assembly. ★
Check the trouble symptoms.
Replace the engine-A/T-ECU or A/T-ECU.
Check the trouble symptoms.
Overhaul the A/T. ★
- Replace the LR brake. (Code No. 41 is output, or no other codes are output.)
- Replace the REV clutch. (No other codes are output.)
- Replace the RED brake. (Code No. 41, 42 or No. 43 is output, or no other codes are output.)

Code No. 51 Communication problem with engine-ECU

Probable cause

- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of engine-ECU <4M4>
- Malfunction of A/T-ECU <4M4>
- Malfunction of harness or connector <4M4>

If normal communication cannot be carried out successfully for 1 second or more when the ignition switch is at the ON position, the system voltage is 10 V or higher and the engine speed is 450 r/min or higher, code No. 51 is output. Furthermore, code No. 51 is also output if a communication problem with receiving data continues for 4 seconds or more under the same conditions.

<6G7>
Malfunction of engine-A/T-ECU

<4M4>

Check the following connectors: D-112, D-109
Check the harness between the engine-ECU and the A/T-ECU.
Check the trouble symptoms.
Malfunction of A/T-ECU
Check the trouble symptoms.
Replace the engine-ECU.
## Code No. 52 Damper clutch control system

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Malfunction of input shaft speed sensor</td>
</tr>
<tr>
<td>- Malfunction of DCC solenoid valve</td>
</tr>
<tr>
<td>- Malfunction of harness or connector</td>
</tr>
<tr>
<td>- Malfunction of reverse clutch retainer</td>
</tr>
<tr>
<td>- Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>- Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
<tr>
<td>- Malfunction of torque converter</td>
</tr>
</tbody>
</table>

If the DCC solenoid valve drive duty ratio is 100% for a continuous period of 4 seconds or more when the damper clutch starts operating, it is judged that there is a problem with the damper clutch control system, and code No. 52 is output.

### Code No. 22 Input shaft speed sensor system check (Refer to P.23-20.)

- **YES**
  - Code No. 22 Input shaft speed sensor system check (Refer to P.23-20.)

- **NO**
  - **NG**
    - Check the trouble symptoms.

### MUT-II Self-Diag Code

**Is code No. 22 output?**

**YES**

- **NG**
  - **No**
    - **OK**
      - Sound of operation can be heard

- **NG**
  - **OK**
    - **Replace the DCC solenoid valve.**

### MUT-II Actuator Test

**OK:** Sound of operation can be heard

**NG:**

- **Check the trouble symptoms.**

### Measure the output wave pattern of the output shaft speed sensor

**OK:** A wave pattern such as the one shown on P.23-69 (Check Procedure Using an Oscilloscope) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

**NG:**

- **OK**
  - **Replace the valve body assembly.**

- **NG**
  - **Replace the engine-A/T-ECU or A/T-ECU.**

### Repair

- **Check the trouble symptoms.**

### Overhaul the A/T.

- **Replace the reverse clutch retainer.**

- **Check the trouble symptoms.**

- **OK**
  - **Replace the torque converter.**

- **NG**
  - **Eliminate the cause of the noise.**
Code No. 54 A/T control relay system

If the A/T control relay voltage is less than 7 V after the ignition switch is turned to the ON position, it is judged that there is a short-circuit to earth or open circuit in the A/T control relay, and code No. 54 is output. The transmission will be fixed in 3rd as a fail-safe measure, and the N range indicator will flash at a rate of 1 Hz.

Probable cause
- Malfunction of A/T control relay
- Malfunction of harness or connector
- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of A/T-ECU <4M4>

MUT-II Service Data
- No. 54 A/T control relay
  - OK: System voltage
  - NG: Transient malfunction (Refer to GROUP 00 - Points to Note for Transient Malfunctions.)

A/T control relay check (Refer to P.23-103.)
- OK
- NG: Replace

Check the following connector: D-12
- OK
- NG: Replace

Measure at A/T control relay connector D-12.
- Disconnect the relay and measure at the connector side.
  - (1) Voltage between terminal 1 and earth
    - OK: System voltage
    - NG: Repair
  - (2) Resistance between terminal 2 and earth
    - OK: 2 Ω or less
    - NG: Replace
  - (3) Voltage between terminal 4 and earth
    - (Ignition switch: ON)
    - OK: System voltage
    - NG: Repair

Check the following connector: <L.H. drive vehicles> A-04, <R.H. drive vehicles> D-145
- OK
- NG: Repair

Check the harness between the A/T control relay and the battery.
- OK
- NG: Repair

Check the following connector: D-14
- OK
- NG: Repair

Check the harness between the A/T control relay and body earth.
- OK
- NG: Repair

Check the following connectors: <6G7> D-120, <4M4> D-109
- OK
- NG: Repair

Check the harness between the A/T control relay and the engine-A/T-ECU. <6G7>
- Check the harness between the A/T control relay and the A/T-ECU. <4M4>

Check the harness between the A/T control relay and the engine-A/T-ECU. <6G7>
- Check the harness between the A/T control relay and the A/T-ECU. <4M4>

Check the harness between the A/T control relay and the battery.
- Check the harness between the A/T control relay and the engine-A/T-ECU. <6G7>
- Check the harness between the A/T control relay and the A/T-ECU, and repair if necessary. <4M4>

Check the trouble symptoms.
- OK
- NG: Replace the engine-A/T-ECU or A/T-ECU.

OK
- NG: Repair

Check the following connectors: <6G7> D-121, <4M4> D-107
### Code No. 56 N range lamp system

If the N range signal is OFF after the N range lamp illuminates (ON), it is judged that there is a short-circuit to earth in the N range lamp, and code No. 56 is output.

<table>
<thead>
<tr>
<th>Probable cause</th>
<th>N range indicator valve check (Refer to GROUP 52A - Instrument Panel.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfunction of Combination meter</td>
<td>Replacement</td>
</tr>
<tr>
<td>Malfunction of harness or connector</td>
<td></td>
</tr>
<tr>
<td>Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
<td></td>
</tr>
<tr>
<td>Malfunction of A/T-ECU &lt;4M4&gt;</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Check the following connectors:</th>
<th>OK</th>
<th>NG</th>
<th>Repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-01, D-03</td>
<td></td>
<td>NG</td>
<td>Repair</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measure at combination meter connector D-01.</th>
<th>OK</th>
<th>NG</th>
<th>Repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disconnect the connector and measure at the harness side.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistance between terminal 57 and earth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OK:</strong> 2 Ω or less</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measure at combination meter connector D-03.</th>
<th>OK</th>
<th>NG</th>
<th>Repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disconnect the connector and measure at the harness side.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistance between terminal 3 and earth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OK:</strong> No continuity</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Check the following connectors:</th>
<th>OK</th>
<th>NG</th>
<th>Repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;6G7&gt; D-30, D-122, E-11, &lt;4M4&gt; E-11, E-113, D-109</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Check the trouble symptoms.</th>
<th>OK</th>
<th>NG</th>
<th>Repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the engine-A/T-ECU or A/T-ECU.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## CHART CLASSIFIED BY TROUBLE SYMPTOMS

<table>
<thead>
<tr>
<th>Trouble Symptom</th>
<th>Inspection procedure No.</th>
<th>Reference page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication with the MUT-II is not possible.</td>
<td>1</td>
<td>23-48</td>
</tr>
<tr>
<td>Driving not possible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starting not possible</td>
<td>2</td>
<td>23-49</td>
</tr>
<tr>
<td>Does not move forward</td>
<td>3</td>
<td>23-49</td>
</tr>
<tr>
<td>Does not reverse</td>
<td>4</td>
<td>23-50</td>
</tr>
<tr>
<td>Does not move (forward or reverse)</td>
<td>5</td>
<td>23-51</td>
</tr>
<tr>
<td>Malfunction when starting off</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine stalls during shifting</td>
<td>6</td>
<td>23-51</td>
</tr>
<tr>
<td>N-to-D shocks, large time lag</td>
<td>7</td>
<td>23-52</td>
</tr>
<tr>
<td>N-to-R shocks, large time lag</td>
<td>8</td>
<td>23-53</td>
</tr>
<tr>
<td>N-to-D, N-to-R shocks, large time lag</td>
<td>9</td>
<td>23-54</td>
</tr>
<tr>
<td>Problem during shifting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shocks, engine racing</td>
<td>10</td>
<td>23-54</td>
</tr>
<tr>
<td>Incorrect shift points</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All points</td>
<td>11</td>
<td>23-55</td>
</tr>
<tr>
<td>Some points</td>
<td>12</td>
<td>23-56</td>
</tr>
<tr>
<td>No shifting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No diagnosis code</td>
<td>13</td>
<td>23-56</td>
</tr>
<tr>
<td>Problem during driving</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor acceleration</td>
<td>14</td>
<td>23-57</td>
</tr>
<tr>
<td>Vibration</td>
<td>15</td>
<td>23-57</td>
</tr>
<tr>
<td>Inhibitor switch system</td>
<td>16</td>
<td>23-58</td>
</tr>
<tr>
<td>Shift switch assembly system</td>
<td>17</td>
<td>23-58</td>
</tr>
<tr>
<td>Dual pressure switch system</td>
<td>18</td>
<td>23-59</td>
</tr>
<tr>
<td>Vehicle speed sensor system</td>
<td>19</td>
<td>23-59</td>
</tr>
<tr>
<td>4LLc switch system</td>
<td>20</td>
<td>23-60</td>
</tr>
</tbody>
</table>
INSPECTION PROCEDURES CLASSIFIED BY TROUBLE SYMPTOM

Inspection procedure 1

Communication with the MUT-II is not possible.

If communication with the MUT-II is not possible, the cause is probably a malfunction of the diagnosis line or the A/T-ECU is not functioning.

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Malfunction of diagnosis line</td>
</tr>
<tr>
<td>• Malfunction of harness or connector</td>
</tr>
<tr>
<td>• Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>• Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

Is communication with other systems possible using the MUT-II?

YES

- Disconnect the connector and measure at the harness side.
- Ignition switch: ON
  - <6G7> Voltage between terminals 41, 47 and earth
  - <4M4> Voltage between terminals 11, 24 and earth
  - OK System voltage
  - <6G7> Continuity between terminals 76, 97, 88 and earth
  - <4M4> Continuity between terminals 13, 25, 26, 12, 72 and earth
  - OK Continuity

NO

Check the MUT-II diagnosis line, and repair if necessary.

Check the following connectors: <6G7> D-120, D-121, <4M4> D-107, D-109

OK

Check the trouble symptoms.

NG

Replace the engine-A/T-ECU or A/T-ECU.

Check the following connectors: <6G7> A-04, B-25X, D-128, D-120, D-121, D-14, <4M4> D-208, D-213, D-32, E-13, D-107, D-109, D-14

OK

NG

Repair

Check the trouble symptoms.

NG

Repair

- Check the harness between the engine-A/T-ECU and the ignition switch, and repair if necessary. <6G7>
- Check the harness between the A/T-ECU and the ignition switch, and repair if necessary. <4M4>
- Check the harness between the engine-A/T-ECU and earth, and repair if necessary. <6G7>
- Check the harness between the A/T-ECU and earth, and repair if necessary. <4M4>
Starting not possible

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Malfunction of inhibitor switch system</td>
</tr>
<tr>
<td>• Malfunction of transmission control cable assembly</td>
</tr>
<tr>
<td>• Malfunction of engine system</td>
</tr>
<tr>
<td>• Malfunction of torque converter</td>
</tr>
<tr>
<td>• Malfunction of oil pump</td>
</tr>
<tr>
<td>• Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>• Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

If the engine will not start when the selector lever is at the P or N position, the cause is probably a malfunction of the inhibitor switch system, the transmission control cable assembly, the engine system, the torque converter or the oil pump.

Refer to the Transmission Workshop Manual.

Inspection Procedure 16: Inhibitor switch system check (Refer to P.23-58.)

- OK: Repair or replace
- NG: Repair

Transmission control cable assembly check

- OK: Repair
- NG: Repair

Engine system check
- OK: Control system, ignition system, fuel system, vehicle body
- NG: Repair

Torque converter check
- OK: Check for incorrect installation (inserted at an angle, etc.) or damaged splines.
- NG: If repair is possible, repair the damaged part. If repair is not possible because the splines are damaged, replace the torque converter assembly.

Replace the oil pump assembly. (The oil pump cannot be disassembled.)

Check the trouble symptoms.

Replace the engine-A/T-ECU or A/T-ECU.

Does not move forward

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Abnormal line pressure</td>
</tr>
<tr>
<td>• Malfunction of UD solenoid valve</td>
</tr>
<tr>
<td>• Malfunction of UD clutch system</td>
</tr>
<tr>
<td>• Malfunction of valve body</td>
</tr>
<tr>
<td>• Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>• Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

If the vehicle does not move forward when the engine is idling and the selector lever is moved from N to D, 3, 2 or L, or if it is shifted to 1st or 2nd in Sports mode, the cause is probably a problem with line pressure, or a malfunction of the UD clutch or valve body.

Refer to the Transmission Workshop Manual.

MUT-II Actuator Test
- OK: Sound of operation can be heard
- NG: Replace the solenoid valve.

Fluid pressure test (Refer to P.23-106.)
- OK: Measure the fluid pressure at each element in 1st in Sports mode
- NG: Disassemble, clean and re-assemble the valve body.

UD clutch system check
- OK: Remove the transmission assembly, the valve body cover and the valve body.
- NG: Check the trouble symptoms.

UD clutch check
- OK: Check for a problem such as burnt facing, poor piston sealing or interference with the retainer.
- NG: Replace the engine-A/T-ECU or A/T-ECU.
## Inspection procedure 4

<table>
<thead>
<tr>
<th>Does not reverse</th>
<th>Probable cause</th>
</tr>
</thead>
</table>
| If the vehicle does not reverse when the engine is idling and the selector lever is moved from N to R, the cause is probably a problem with reverse clutch pressure or LR brake pressure, or a malfunction of the reverse clutch, LD clutch or valve body. | - Abnormal reverse clutch pressure  
- Abnormal LR brake pressure  
- Malfunction of LR solenoid valve  
- Malfunction of reverse clutch  
- Malfunction of LR brake  
- Malfunction of valve body  
- Replacement of engine-A/T-ECU <6G7>  
- Replacement of A/T-ECU. <4M4> |

* Refer to the Transmission Workshop Manual.

### MUT-II Actuator Test

<table>
<thead>
<tr>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1 LR solenoid valve</td>
<td>Replace the solenoid valve. ★</td>
</tr>
</tbody>
</table>

### Fluid pressure test (Refer to P.23-106.)

<table>
<thead>
<tr>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure the reverse clutch fluid pressure in R range.</td>
<td>Disassemble, clean and re-assemble the valve body. ★</td>
</tr>
</tbody>
</table>

### Fluid pressure test (Refer to P.23-106.)

<table>
<thead>
<tr>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure the LR brake fluid pressure in R range.</td>
<td>Disassemble, clean and re-assemble the valve body. ★</td>
</tr>
</tbody>
</table>

### Reverse clutch system and LR brake system check

<table>
<thead>
<tr>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
</table>
| Remove the transmission assembly, the valve body cover and the valve body.  
Blow air through the reverse clutch oil hole or LR brake air hole in the transmission case, and check that the piston operates to maintain pressure. | Check the trouble symptoms. |

### Check the reverse clutch and LR brake.

<table>
<thead>
<tr>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check for a problem such as burnt facing, poor piston sealing or interference with the retainer.</td>
<td>Replace the engine-A/T-ECU or A/T-ECU.</td>
</tr>
</tbody>
</table>
Inspection procedure 5

**Does not move (forward or reverse)**

<table>
<thead>
<tr>
<th>Does not move (forward or reverse)</th>
<th>Probable cause</th>
</tr>
</thead>
</table>
| If the vehicle does not move forward or reverse when the selector lever is moved to any position while the engine is idling, the cause is probably a problem with line pressure or a malfunction of the oil pumps and valve bodies in the power train. | • Abnormal line pressure  
• Malfunction of power train components  
• Malfunction of oil pump  
• Malfunction of valve body  
• Malfunction of engine-A/T-ECU <6G7>  
• Malfunction of A/T-ECU <4M4> |

* Refer to the Transmission Workshop Manual.

<table>
<thead>
<tr>
<th>Fluid pressure test (Refer to P.23-106.)</th>
<th>OK</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Measure the fluid pressure at each element in 1st, 2nd and reverse.</td>
<td></td>
</tr>
<tr>
<td><strong>Standard value:</strong> Refer to P.23-106.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Replace the oil pump assembly.</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(The oil pump cannot be disassembled.)</em></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Replace the oil pump assembly.</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(The oil pump cannot be disassembled.)</em></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disassemble, clean and re-assemble the valve body.</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Make sure that the mounting bolts are not loose and that the O-ring and valve body are not damaged or positioned incorrectly.</td>
<td></td>
</tr>
<tr>
<td>• If the extent of the damage looks too bad for repairs to be carried out, replace the valve body assembly.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Check the power train components</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Disassemble the transmission and check the condition of components such as the planetary carrier, output shaft and differential.</td>
<td></td>
</tr>
</tbody>
</table>

**Engine stalls during shifting**

<table>
<thead>
<tr>
<th>Engine stalls during shifting</th>
<th>Probable cause</th>
</tr>
</thead>
</table>
| If the engine stalls when the selector lever is moved from N to D or R while the engine is idling, the cause is probably a malfunction of the engine system, DCC solenoid valve, valve body, or torque converter (damper clutch). | • Malfunction of engine system  
• Malfunction of DCC solenoid valve  
• Malfunction of valve body  
• Malfunction of torque converter (malfunction of damper clutch)  
• Malfunction of engine-A/T-ECU <6G7>  
• Malfunction of A/T-ECU <4M4> |

* Refer to the Transmission Workshop Manual.

<table>
<thead>
<tr>
<th>Engine system check</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Control system, ignition system, fuel system, vehicle body</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Replace the DCC solenoid valve.</th>
<th>OK</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Replace the DCC solenoid valve.</th>
<th>OK</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Disassemble, clean and re-assemble the valve body.</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Make sure that the mounting bolts are not loose and that the O-ring and valve body are not damaged or positioned incorrectly.</td>
<td></td>
</tr>
<tr>
<td>• If the extent of the damage looks too bad for repairs to be carried out, replace the valve body assembly.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Replace the torque converter assembly.</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Replace the torque converter assembly.</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Check the trouble symptoms.</th>
<th>NG</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Replace the engine-A/T-ECU or A/T-ECU.</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Replace the engine-A/T-ECU or A/T-ECU.</th>
<th></th>
</tr>
</thead>
</table>
Inspection procedure 7

<table>
<thead>
<tr>
<th>N-to-D shocks, large time lag</th>
<th>Probable cause</th>
</tr>
</thead>
</table>
| If abnormal shocks or a time lag of 2 seconds or more occurs when the selector lever is moved from N to D while the engine is idling, the cause is probably abnormal UD clutch pressure, or a malfunction of the UD clutch, valve body or APS. | - Abnormal UD clutch pressure  
- Malfunction of UD solenoid valve  
- Malfunction of UD clutch system  
- Malfunction of valve body  
- Malfunction of APS  
- Malfunction of engine-A/T-ECU <6G7>  
- Malfunction of A/T-ECU <4M4> |

Refer to the Transmission Workshop Manual.

**MUT-II Actuator Test**
- No.2 UD solenoid valve
  - OK: Sound of operation can be heard
  - NG: Replace the solenoid valve.

When are shocks generated?
- OK
- NG

When starting off
- NO
- YES

- Fluid pressure test (Refer to P.23-106.)
  - Measure the UD clutch fluid pressure when shifting from N to D.
  - Standard value: Refer to P.23-106.
  - OK
  - NG

- UD clutch system check ★
  - Remove the transmission assembly, the valve body cover and the valve body.
  - Blow air through the UD clutch oil hole in the transmission case, and check that the piston operates to maintain pressure.
  - OK
  - NG

- UD clutch check ★
  - Check for a problem such as burnt facing, poor piston sealing or interference with the retainer.
  - OK
  - NG

- MUT-II Data List
  - No.11 APS
    - OK: Increases in proportion to the accelerator pedal opening angle.
  - NG

- Code No. 11, 12, 14 APS system check (Refer to P.23-13, 14 and 15.)
  - OK
  - NG

Disassemble, clean and re-assemble the valve body. ★
- Make sure that the mounting bolts are not loose and that the O-ring and valve body are not damaged or positioned incorrectly.
- If the extent of the damage looks too bad for repairs to be carried out, replace the valve body assembly.

Check the trouble symptoms.
- OK
- NG

Replace the engine-A/T-ECU or A/T-ECU.
## Inspection procedure 8

### N to R shocks, large time lag

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abnormal reverse clutch pressure</td>
</tr>
<tr>
<td>Abnormal LR brake pressure</td>
</tr>
<tr>
<td>Malfunction of LR solenoid valve</td>
</tr>
<tr>
<td>Malfunction of reverse clutch</td>
</tr>
<tr>
<td>Malfunction of LR brake</td>
</tr>
<tr>
<td>Malfunction of valve body</td>
</tr>
<tr>
<td>Malfunction of APS</td>
</tr>
<tr>
<td>Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

If abnormal shocks or a time lag of 2 seconds or more occurs when the selector lever is moved from N to R while the engine is idling, the cause is probably abnormal reverse clutch pressure or LD brake pressure, or a malfunction of the reverse clutch, LR brake, valve body or APS.

- Abnormal reverse clutch pressure
- Abnormal LR brake pressure
- Malfunction of LR solenoid valve
- Malfunction of reverse clutch
- Malfunction of LR brake
- Malfunction of valve body
- Malfunction of APS
- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of A/T-ECU <4M4>

Refer to the Transmission Workshop Manual.

### MUT-II Actuator Test

**OK:** Sound of operation can be heard

- **No. 1 LR solenoid valve**

- **Replace the solenoid valve.**

**NG:**

- Replace the solenoid valve.

### Fluid pressure test (Refer to P.23-106.)

**Standard value:** Refer to P.23-106.

- **OK:**
  - Reverse clutch system and LR brake system check
    - Remove the transmission assembly, the valve body cover and the valve body.
    - Blow air through the reverse clutch oil hole or LR brake air hole in the transmission case, and check that the piston operates to maintain pressure.

- **NG:**
  - Replace the engine-A/T-ECU or A/T-ECU.

### Reverse clutch system and LR brake system check

- Check for a problem such as burnt facing, poor piston sealing or interference with the retainer.

**NG:**

- Replace the engine-A/T-ECU or A/T-ECU.

### Code No. 11, 12, 14 APS system check (Refer to P.23-13, 14 and 15.)

**OK:**

- Increases in proportion to the accelerator pedal opening angle.

**NG:**

- Disassemble, clean and re-assemble the valve body.
  - Make sure that the mounting bolts are not loose and that the O-ring and valve body are not damaged or positioned incorrectly.
  - If the extent of the damage looks too bad for repairs to be carried out, replace the valve body assembly.

- Check the trouble symptoms.

- Replace the engine-A/T-ECU or A/T-ECU.
Inspection procedure 9

**N-to-D and N-to-R shocks, large time lag**

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Abnormal line pressure</td>
</tr>
<tr>
<td>- Malfunction of oil pump</td>
</tr>
<tr>
<td>- Malfunction of valve body</td>
</tr>
<tr>
<td>- Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>- Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

If abnormal shocks or a time lag of 2 seconds or more occurs when the selector lever is moved from N to both D and R while the engine is idling, the cause is probably abnormal line pressure, or a malfunction of the oil pump or valve body.

Refer to the Transmission Workshop Manual.

**Fluid pressure test (Refer to P.23-106.)**
- Measure the fluid pressure at each element in 1st, 2nd and reverse.

<table>
<thead>
<tr>
<th>Standard value: Refer to P.23-106.</th>
</tr>
</thead>
</table>

When starting off

- Disassemble, clean and re-assemble the valve body. ★
  - Make sure that the mounting bolts are not loose and that the O-ring and valve body are not damaged or positioned incorrectly.
  - If the extent of the damage looks too bad for repairs to be carried out, replace the valve body assembly.

Replace the oil pump assembly. ★
(The oil pump cannot be disassembled.)

Check the trouble symptoms.

Replace the engine-A/T-ECU or A/T-ECU.

Inspection procedure 10

**Shocks, engine racing**

If shocks occur when driving due to upshifting or downshifting, or the transmission speed becomes higher than the engine speed, the cause is probably abnormal line pressure or a malfunction of a solenoid valve, oil pump, valve body or of a brake or clutch.

Refer to the Transmission Workshop Manual.

**MUT-II Actuator Test**
- No.1 LR solenoid valve
- No.2 UD solenoid valve
- No.3 2ND solenoid valve
- No.4 OD solenoid valve
- No.5 RED solenoid valve

| OK: Sound of operation can be heard |

Replace the solenoid valve. ★

Adjust the line pressure. (Refer to P.23-111.)
(The oil pump cannot be disassembled.)

Replace the oil pump assembly. ★
Disassemble, clean and re-assemble the valve body. ★
- Make sure that the mounting bolts are not loose and that the O-ring and valve body are not damaged or positioned incorrectly.
- If the extent of the damage looks too bad for repairs to be carried out, replace the valve body assembly.

Check the trouble symptoms.

Replace the engine-A/T-ECU or A/T-ECU.
**Inspection procedure 11**

<table>
<thead>
<tr>
<th>All points (incorrect shift points)</th>
<th>Probable cause</th>
</tr>
</thead>
</table>
| If all shift points are incorrect during driving, the cause is probably a malfunction of the output speed sensor, APS or solenoid valve. | - Malfunction of output shaft speed sensor
- Malfunction of APS
- Malfunction of solenoid valve
- Abnormal line pressure
- Malfunction of valve body
- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of A/T-ECU <4M4> |

★ Refer to the Transmission Workshop Manual.

**MUT-II Data List**

- No. 23 Output shaft speed sensor system
  
  **OK:** Increases in proportion to vehicle speed.

  **NG**
  
  Code No. 23 Output shaft speed sensor system (Refer to P.23-22.)

- No. 11 APS
  
  **OK:** Increases in proportion to the accelerator pedal opening angle.

  **NG**
  
  Code No. 11, 12, 14 APS system check (Refer to P.23-13, 14 and 15.)

- No. 31 RED solenoid valve duty ratio
- No. 32 UD solenoid valve duty ratio
- No. 33 2ND solenoid valve duty ratio
- No. 34 OD solenoid valve duty ratio
- No. 35 RED solenoid valve duty ratio

  **OK:**
  
  \[
  \begin{array}{cccc}
  \text{No.31} & \text{No.32} & \text{No.33} & \text{No.34} & \text{No.35} \\
  0\% & 0\% & 100\% & 100\% & 0\% \\
  100\% & 0\% & 0\% & 100\% & 0\% \\
  100\% & 0\% & 100\% & 0\% & 0\% \\
  0\% & 0\% & 100\% & 0\% & 0\% \\
  0\% & 100\% & 0\% & 0\% & 100\%
  \end{array}
  \]

  **NG**
  
  Replace the solenoid valve. ★

  Adjust the line pressure. (Refer to P.23-111.)

  NG

  Check the trouble symptoms.

  NG

  Replace the engine-A/T-ECU or A/T-ECU.

★ Make sure that the mounting bolts are not loose and that the O-ring and valve body are not damaged or positioned incorrectly.

★ If the extent of the damage looks too bad for repairs to be carried out, replace the valve body assembly.
### Inspection procedure 12

**Some points (incorrect shift points)**

- If some of the shift points are incorrect while driving, the cause is probably a malfunction of the valve body, or it is a characteristic of control and is not a malfunction.

**Probable cause**

- Malfunction of valve body
- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of A/T-ECU <4M4>

* Refer to the Transmission Workshop Manual.

<table>
<thead>
<tr>
<th>INVECS-II cancel command</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Cancels INVECS-II using MUT-II.</td>
<td>Disassemble, clean and re-assemble the valve body. *</td>
</tr>
</tbody>
</table>

**Inspection Procedure**

- **Is standard shifting normal?**
  - **NO**: Does the problem occur when the ATF temperature is less than 35°C or higher than 120°C?
    - **NO**: Disassemble, clean and re-assemble the valve body. *
    - **YES**: Problem is a characteristic of control and is not a malfunction.
  - **YES**: Refer to the Transmission Workshop Manual.

### Inspection procedure 13

**No diagnosis code (no shifting)**

- No shifting during driving. However, if a diagnosis code is not output, the cause is probably malfunction of the inhibitor switch system, the shift switch assembly, the engine A/T-ECU or the A/T-ECU.

**Probable cause**

- Malfunction of Inhibitor switch
- Malfunction of shift switch assembly system
- Malfunction of engine-A/T-ECU <6G7>
- Malfunction of A/T-ECU <4M4>

**Inspection Procedure 16: Inhibitor switch system check (Refer to P.23-58.)**

**MUT-II Data List**

- **OK**: The ECU input signal and the selector lever position should correspond.

**Inspection Procedure 17: Shift switch assembly system check (Refer to P.23-58.)**

**MUT-II Data List**

- **OK**: The ECU input signal and the selector lever position should correspond.

**Check the trouble symptoms.**

**Replace the engine-A/T-ECU or A/T-ECU.**
Inspection procedure 14

**Poor acceleration**

If the vehicle does not accelerate after downshifting, the cause is probably a malfunction of the engine system or of a brake or clutch.

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Malfunction of engine system</td>
</tr>
<tr>
<td>- Malfunction of brake or clutch</td>
</tr>
<tr>
<td>- Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>- Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

Refer to the Transmission Workshop Manual.

**Engine system check**
- Control system, ignition system, fuel system, vehicle body

**Brake and clutch check**
- Check for a problem such as burnt facing, poor piston sealing or interference with the retainer.

NG: Repair or replace
OK: Check the trouble symptoms.

Replace the engine-A/T-ECU or A/T-ECU.

Inspection procedure 15

**Vibration**

If vibration occurs when accelerating or decelerating while driving at a constant speed or driving in top range, the cause is probably abnormal damper clutch pressure, or a malfunction of the engine system, DCC solenoid valve, torque converter or valve body.

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Abnormal damper clutch pressure</td>
</tr>
<tr>
<td>- Malfunction of engine system</td>
</tr>
<tr>
<td>- Malfunction of DCC solenoid valve</td>
</tr>
<tr>
<td>- Malfunction of torque converter</td>
</tr>
<tr>
<td>- Malfunction of valve body</td>
</tr>
<tr>
<td>- Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>- Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

Refer to the Transmission Workshop Manual.

**MUT-II Actuator Test**
- No. 6 DCC solenoid valve
  OK: Sound of operation can be heard

NG: Replace the DCC solenoid valve.
OK: Engine system check

Does the problem still occur when the engine coolant temperature sensor is disconnected?

YES: Engine system check

- Control system, ignition system, fuel system, vehicle body

NG: Disassemble, clean and re-assemble the valve body.
OK: Check the trouble symptoms.

Replace the engine-A/T-ECU or A/T-ECU.

NO: Fluid pressure test (Refer to P.23-106.)
- Measure the damper clutch fluid pressure.
  **Standard value:** Refer to P.23-106.

NG: Disassemble, clean and re-assemble the valve body.
OK: Replace the torque converter assembly.

Replace the engine-A/T-ECU or A/T-ECU.
## Inspection procedure 16

### Inhibitor switch system

The cause is probably a malfunction of the inhibitor switch circuit or the ignition switch circuit.

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Malfunction of inhibitor switch</td>
</tr>
<tr>
<td>• Malfunction of ignition switch</td>
</tr>
<tr>
<td>• Malfunction of harness or connector</td>
</tr>
<tr>
<td>• Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>• Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

### Probable cause

1. Inhibitor switch check (Refer to P.23-98.)

   - **OK**
     - NG: Replace

2. Inhibitor switch connector C-05 voltage check

   - **OK**
     - NG: Check the following connectors: D-208, D-213, D-32, E-115, C-05
       - **OK**
         - NG: Check the harness between the inhibitor switch and the ignition switch.
         - **OK**
           - NG: Check the trouble symptoms.
           - NG: Replace the engine-A/T-ECU or A/T-ECU.
         - NG: Repair

   - **NG**
     - NG: Repair

3. Check the following connectors: <6G7> C-05, E-113, D-128, D-122, <4M4> C-05, E-115, D-128, B-109

   - **OK**
     - NG: Repair

   - **NG**
     - NG: Repair

   - **OK**

   - NG: Replace the engine-A/T-ECU or A/T-ECU.

### Inspection procedure 17

### Shift switch assembly system

The cause is probably a malfunction of the inhibitor switch circuit, shift switch assembly circuit, or of the engine-A/T-ECU or A/T-ECU.

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Malfunction of inhibitor switch</td>
</tr>
<tr>
<td>• Malfunction of select switch</td>
</tr>
<tr>
<td>• Malfunction of shift switch (UP)</td>
</tr>
<tr>
<td>• Malfunction of shift switch (DOWN)</td>
</tr>
<tr>
<td>• Malfunction of harness or connector</td>
</tr>
<tr>
<td>• Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>• Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

### Probable cause

1. Inhibitor switch check (Refer to P.23-98.)

   - **OK**

2. Shift switch assembly check (Refer to P.23-117.)

   - **NG**
     - NG: Replace


   - **OK**
     - NG: Repair

   - **NG**
     - NG: Repair

   - **OK**

   - NG: Replace the engine-A/T-ECU or A/T-ECU.
## Inspection procedure 18

### Dual pressure switch system

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Malfunction of dual pressure switch</td>
</tr>
<tr>
<td>• Malfunction of harness or connector</td>
</tr>
<tr>
<td>• Malfunction of A/C system</td>
</tr>
<tr>
<td>• Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>• Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

The cause is probably a malfunction of the dual pressure switch circuit, or of the engine-A/T-ECU or A/T-ECU.

### Dual pressure switch check

(Refer to GROUP 55 – On-Vehicle Service.)

<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Disconnect the connector and measure at the harness side.</td>
</tr>
<tr>
<td>• Ignition switch: ON</td>
</tr>
<tr>
<td>• A/C switch: ON</td>
</tr>
<tr>
<td>• &lt;6G7&gt; Voltage between terminal 83 and earth</td>
</tr>
<tr>
<td>• &lt;4M4&gt; Voltage between terminal 10 and earth</td>
</tr>
</tbody>
</table>

OK: System voltage

NG: Replace

### Inspection procedure 19

### Vehicle speed sensor system

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Malfunction of vehicle speed sensor</td>
</tr>
<tr>
<td>• Malfunction of connector</td>
</tr>
<tr>
<td>• Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>• Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

The cause is probably a malfunction of the vehicle speed sensor circuit, or of the A/T-ECU or the engine-A/T-ECU.

<table>
<thead>
<tr>
<th>Is the speedometer correct?</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
</tr>
<tr>
<td>YES</td>
</tr>
</tbody>
</table>

NO: Replace

YES: Transient malfunction (Refer to GROUP 00 - Points to Note for Transient Malfunctions.)

### MUT-II Data List

- No.29 Vehicle speed sensor
  - OK: Refer to P.23-61 (Data List Chart).

NG: Replace

OK: Repair

### Check the following connectors:

- <6G7> C-09, E-113, E-13, D-121
- <4M4> C-09, E-113, E-13, D-109

OK: Repair

NG: Repair

OK: Check the trouble symptoms.

NG: Replace the engine-A/T-ECU or A/T-ECU.
Inspection procedure 20

**4LLc switch system**

The cause is probably a malfunction of the 4LLc switch circuit, or of the
e-engine-A/T-ECU or A/T-ECU.

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Malfunction of 4LLc switch</td>
</tr>
<tr>
<td>- Malfunction of harness or connector</td>
</tr>
<tr>
<td>- Malfunction of engine-A/T-ECU &lt;6G7&gt;</td>
</tr>
<tr>
<td>- Malfunction of A/T-ECU &lt;4M4&gt;</td>
</tr>
</tbody>
</table>

**4LLc switch check (Refer to P.23-99.)**

OK

**4LLc switch connector C-06 voltage check**

- Disconnect the connector and measure at the harness side.
- Ignition switch: ON
- Voltage between terminal 1 and earth

OKF System voltage

NG

**Check the following connector:** C-06

OK

NG

Check the trouble symptoms.

NG

NG

Replace the engine-A/T-ECU or A/T-ECU.
## DATA LIST REFERENCE TABLE

<table>
<thead>
<tr>
<th>Data list No.</th>
<th>Check item</th>
<th>Inspection conditions</th>
<th>Normal condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>APS</td>
<td>Ignition switch: ON</td>
<td>Accelerator pedal: Fully closed</td>
</tr>
<tr>
<td></td>
<td>Engine: Stopped</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Selector lever position: P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>A/T fluid temperature sensor</td>
<td>Driving after engine has warmed up</td>
<td>Drive for 15 minutes or more until the ATF temperature reaches 70 - 80°C.</td>
</tr>
<tr>
<td>21</td>
<td>Crank angle sensor &lt;6G7&gt; Engine speed sensor &lt;4M4&gt;</td>
<td>Engine: Idling Selector lever position: P</td>
<td>Compare the engine speeds displayed on the tachometer and the MUT-II.</td>
</tr>
<tr>
<td>22</td>
<td>Input shaft speed sensor</td>
<td>Shift range: 4th</td>
<td>Driving at a constant speed of 50 km/h in 4th</td>
</tr>
<tr>
<td>23</td>
<td>Output shaft speed sensor</td>
<td>Shift range: 4th</td>
<td>Driving at a constant speed of 50 km/h in 4th</td>
</tr>
<tr>
<td>25</td>
<td>Wide open throttle switch</td>
<td>Accelerator pedal position</td>
<td>Released</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Depressed</td>
</tr>
<tr>
<td>26</td>
<td>Stop lamp switch</td>
<td>Ignition switch: ON</td>
<td>Brake pedal: Depressed</td>
</tr>
<tr>
<td></td>
<td>Engine: Stopped</td>
<td></td>
<td>Brake pedal: Released</td>
</tr>
<tr>
<td>29</td>
<td>Vehicle speed sensor</td>
<td>Selector lever position: Sports mode</td>
<td>Idling in 1st (Vehicle stopped)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Driving at a constant speed of 50 km/h in 3rd</td>
</tr>
<tr>
<td>31</td>
<td>LR solenoid valve duty ratio</td>
<td>Selector lever position: Sports mode</td>
<td>Data List No.</td>
</tr>
<tr>
<td>32</td>
<td>UD solenoid valve duty ratio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>2nd solenoid valve duty ratio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>OD solenoid valve duty ratio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>RED solenoid valve duty ratio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data list No.</td>
<td>Check item</td>
<td>Inspection conditions</td>
<td>Normal condition</td>
</tr>
<tr>
<td>--------------</td>
<td>------------</td>
<td>-----------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>36</td>
<td>DCC solenoid valve duty ratio</td>
<td>Shift range: 2nd Driving at 30 km/h in 2 range, then fully close accelerator. Driving at 50 km/h in 4th</td>
<td>70% - 90% -to- 0% 70% - 90%</td>
</tr>
<tr>
<td>52</td>
<td>Damper clutch slip amount</td>
<td>Shift range: 2nd Driving at 30 km/h in 2 range, then fully close accelerator. Driving at a constant speed of 50 km/h in 4th</td>
<td>-300 - 100 r/min or 100 - 300 r/min -10 - 10 r/min</td>
</tr>
<tr>
<td>54</td>
<td>Control relay output voltage</td>
<td>Ignition switch: OFF Ignition switch: ON</td>
<td>10 - 12 V</td>
</tr>
<tr>
<td>61</td>
<td>Inhibitor switch</td>
<td>Ignition switch: ON Engine: Stopped Selector lever position: P Selector lever position: R Selector lever position: N Selector lever position: D</td>
<td></td>
</tr>
<tr>
<td>63</td>
<td>Shift position</td>
<td>Selector lever position: Sports mode Driving at a constant speed of 10 km/h in 1st Driving at a constant speed of 30 km/h in 2nd Driving at a constant speed of 50 km/h in 3rd Driving at a constant speed of 50 km/h in 4th Driving at a constant speed of 70 km/h in 5th</td>
<td>1st 2nd 3rd 4th 5th</td>
</tr>
<tr>
<td>65</td>
<td>Dual pressure switch</td>
<td>Engine: Idling A/C switch: ON A/C switch: OFF</td>
<td>ON OFF</td>
</tr>
<tr>
<td>66</td>
<td>OD-OFF signal</td>
<td>While auto-cruise control is operating While driving on a level road While climbing an incline</td>
<td>OFF ON</td>
</tr>
<tr>
<td>Data list No.</td>
<td>Check item</td>
<td>Inspection conditions</td>
<td>Normal condition</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------</td>
<td>----------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>67</td>
<td>Select switch</td>
<td>Ignition switch: ON</td>
<td>No. 67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine: Stopped</td>
<td>No. 68</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Data List No.)</td>
<td>No. 69</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selector lever position: D OFF OFF OFF</td>
<td></td>
</tr>
<tr>
<td>68</td>
<td>Upshift switch</td>
<td>Selector lever operation: Sports mode selected ON OFF OFF</td>
<td></td>
</tr>
<tr>
<td>69</td>
<td>Downshift switch</td>
<td>Selector lever operation: Lever moved to upshift position and held ON ON OFF</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selector lever operation: Lever moved to downshift position and held ON OFF ON</td>
<td></td>
</tr>
<tr>
<td>73</td>
<td>Target effective engine pressure &lt;6G7&gt;</td>
<td>Engine: Idling Selector lever position: N</td>
<td>Data changes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accelerator pedal: fully closed to depressed</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td>4LLc switch</td>
<td>Ignition switch: ON</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine: Stopped</td>
<td>Transfer lever position: 4LLc OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer lever position: Other than the above</td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>Theoretical effective engine pressure &lt;4M4&gt;</td>
<td>Engine: Idling Selector lever position: N</td>
<td>Data changes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accelerator pedal: fully closed to depressed</td>
<td></td>
</tr>
</tbody>
</table>

**ACTUATOR TEST TABLE**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Check item</th>
<th>Test contents</th>
<th>Inspection conditions</th>
<th>Normal condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LR solenoid valve</td>
<td>The solenoid valve specified by the MUT-II is driven at 50% duty for 5 seconds. No other solenoid valves are energised.</td>
<td>Ignition switch: ON Selector lever position: P Engine: Stopped Throttle (accelerator) Opening angle voltage: Less than 1 V &lt;6G7&gt;, less than 1.2 V &lt;4M4&gt; The fail-safe function should not be operating.</td>
<td>The sound of operation should be heard when the solenoid valve is driven.</td>
</tr>
<tr>
<td>2</td>
<td>UD solenoid valve</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2nd solenoid valve</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>OD solenoid valve</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>RED solenoid valve</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>DCC solenoid valve</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>1st shift indicator lamp</td>
<td>The indicator lamp for the shift stage specified by the MUT-II illuminates for 3 seconds.</td>
<td>Ignition switch: ON Selector lever position: P Engine: Stopped Throttle (accelerator) Opening angle voltage: Less than 1 V &lt;6G7&gt;, less than 1.2 V &lt;4M4&gt; The fail-safe function should not be operating.</td>
<td>The shift indicator lamp illuminates.</td>
</tr>
<tr>
<td>8</td>
<td>2nd shift indicator lamp</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>3rd shift indicator lamp</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>4th shift indicator lamp</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>5th shift indicator lamp</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>A/T control relay</td>
<td>The A/T control relay turns off for 3 seconds.</td>
<td></td>
<td>Data List No. 54 (1) During test: 0 V (2) Normal: System voltage (V)</td>
</tr>
</tbody>
</table>
## INVECS-II CANCEL COMMAND

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Item</th>
<th>Contents</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>INVECS-II</td>
<td>Stops the INVECS-II control and changes gear according to the standard shift pattern.</td>
<td>Use this procedure when carrying out road test procedure 7. This function cancels the stopping of INVECS-II control when the ignition switch is turned OFF and then back ON.</td>
</tr>
</tbody>
</table>

## A/T-ECU TERMINAL VOLTAGE TABLE

### <6G7>

<table>
<thead>
<tr>
<th>Terminal No.</th>
<th>Check item</th>
<th>Inspection conditions</th>
<th>Standard value</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>A/T control relay</td>
<td>Ignition switch: OFF</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON</td>
<td>10 - 12 V</td>
</tr>
<tr>
<td>76</td>
<td>Earth</td>
<td>At all times</td>
<td>0 V</td>
</tr>
<tr>
<td>77</td>
<td>Solenoid valve power supply</td>
<td>Ignition switch: OFF</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON</td>
<td>System voltage</td>
</tr>
<tr>
<td>81</td>
<td>Sensor earth</td>
<td>At all times</td>
<td>0 V</td>
</tr>
<tr>
<td>88</td>
<td>Earth</td>
<td>At all times</td>
<td>0 V</td>
</tr>
<tr>
<td>89</td>
<td>Solenoid valve power supply</td>
<td>Ignition switch: OFF</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON</td>
<td>System voltage</td>
</tr>
<tr>
<td>97</td>
<td>Earth</td>
<td>At all times</td>
<td>0 V</td>
</tr>
<tr>
<td>101</td>
<td>Inhibitor switch P</td>
<td>Ignition switch: ON</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selector lever position: P</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selector lever position: Other than the above</td>
<td>System voltage</td>
</tr>
<tr>
<td>102</td>
<td>Inhibitor switch D</td>
<td>Ignition switch: ON</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selector lever: D</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selector lever position: Other than the above</td>
<td></td>
</tr>
<tr>
<td>103</td>
<td>Input shaft speed sensor</td>
<td>Measure between terminals (57) and (103) using an oscilloscope.</td>
<td>Check Procedure Using an Oscilloscope (Refer to P.23-69.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine: 2 000 r/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: 4th</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>Output shaft speed sensor</td>
<td>Measure between terminals (57) and (104) using an oscilloscope.</td>
<td>Check Procedure Using an Oscilloscope (Refer to P.23-69.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine: 2 000 r/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: 4th</td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>1st shift indicator lamp</td>
<td>Shift range: 1st</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>Terminal No.</td>
<td>Check item</td>
<td>Inspection conditions</td>
<td>Standard value</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------------</td>
<td>---------------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>106</td>
<td>2nd solenoid valve</td>
<td>Engine: Idling Shift range: 2nd</td>
<td>System voltage</td>
</tr>
<tr>
<td>106</td>
<td></td>
<td>Engine: Idling Shift range: Park</td>
<td>7–9 V</td>
</tr>
<tr>
<td>107</td>
<td>DCC solenoid valve</td>
<td>Engine: Idling Shift range: 1st</td>
<td>System voltage</td>
</tr>
<tr>
<td>108</td>
<td>Inhibitor switch R</td>
<td>Engine: Idling Selector lever position: R</td>
<td>System voltage</td>
</tr>
<tr>
<td>108</td>
<td></td>
<td>Engine: Idling Selector lever position: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>109</td>
<td>Select switch</td>
<td>Ignition switch: ON Selector lever operation: Sports mode</td>
<td>System voltage</td>
</tr>
<tr>
<td>109</td>
<td></td>
<td>Ignition switch: ON Selector lever operation: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>110</td>
<td>Downshift switch</td>
<td>Ignition switch: ON Selector lever operation: Downshifted in Sports mode and lever held</td>
<td>System voltage</td>
</tr>
<tr>
<td>110</td>
<td></td>
<td>Ignition switch: ON Selector lever operation: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>112</td>
<td>4LLc switch</td>
<td>Ignition switch: ON Transfer lever position: 4LLc</td>
<td>System voltage</td>
</tr>
<tr>
<td>112</td>
<td></td>
<td>Ignition switch: ON Transfer lever position: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>115</td>
<td>Wide open throttle switch</td>
<td>Accelerator pedal: Released</td>
<td>System voltage</td>
</tr>
<tr>
<td>115</td>
<td></td>
<td>Accelerator pedal: Depressed</td>
<td>0 V</td>
</tr>
<tr>
<td>117</td>
<td>3rd shift indicator lamp</td>
<td>Shift range: 3rd</td>
<td>System voltage</td>
</tr>
<tr>
<td>117</td>
<td></td>
<td>Shift range: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>118</td>
<td>2nd shift indicator lamp</td>
<td>Shift range: 2nd</td>
<td>System voltage</td>
</tr>
<tr>
<td>118</td>
<td></td>
<td>Shift range: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>119</td>
<td>RED solenoid valve</td>
<td>Engine: Idling Shift range: 5th</td>
<td>System voltage</td>
</tr>
<tr>
<td>119</td>
<td></td>
<td>Engine: Idling Shift range: Park</td>
<td>7–9 V</td>
</tr>
<tr>
<td>120</td>
<td>UD solenoid valve</td>
<td>Engine: Idling Shift range: 1st</td>
<td>System voltage</td>
</tr>
<tr>
<td>120</td>
<td></td>
<td>Engine: Idling Shift range: Park</td>
<td>7–9 V</td>
</tr>
<tr>
<td>121</td>
<td>Inhibitor switch N</td>
<td>Ignition switch: ON Selector lever position: N</td>
<td>System voltage</td>
</tr>
<tr>
<td>121</td>
<td></td>
<td>Ignition switch: ON Selector lever position: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>122</td>
<td>Upshift switch</td>
<td>Ignition switch: ON Selector lever operation: Upshifted in Sports mode and lever held</td>
<td>System voltage</td>
</tr>
<tr>
<td>122</td>
<td></td>
<td>Ignition switch: ON Selector lever operation: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>123</td>
<td>Stop lamp switch</td>
<td>Ignition switch: ON Brake pedal Depressed</td>
<td>System voltage</td>
</tr>
<tr>
<td>123</td>
<td></td>
<td>Ignition switch: ON Brake pedal Released</td>
<td>0 V</td>
</tr>
<tr>
<td>Terminal No.</td>
<td>Check item</td>
<td>Inspection conditions</td>
<td>Standard value</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------</td>
<td>------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>124</td>
<td>A/T fluid temperature sensor</td>
<td>ATF temperature: 20°C</td>
<td>3.8 - 4.0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ATF temperature: 40°C</td>
<td>3.2 - 3.4 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ATF temperature: 80°C</td>
<td>1.7 - 1.9 V</td>
</tr>
<tr>
<td>127</td>
<td>5th shift indicator lamp</td>
<td>Shift range: 5th</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>128</td>
<td>4th shift indicator lamp</td>
<td>Shift range: 4th</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>129</td>
<td>LR solenoid valve</td>
<td>Engine: Idling</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: Park</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine: Idling</td>
<td>7 - 9 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: 2nd</td>
<td></td>
</tr>
<tr>
<td>130</td>
<td>OD solenoid valve</td>
<td>Engine: Idling</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: 3rd</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine: Idling</td>
<td>7 - 9 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: Park</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>UD solenoid valve</td>
<td>Engine: Idling</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: 1st</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine: Idling</td>
<td>7 - 9 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: Park</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Solenoid valve power supply</td>
<td>Ignition switch: OFF</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON</td>
<td>System voltage</td>
</tr>
<tr>
<td>3</td>
<td>Solenoid valve power supply</td>
<td>Ignition switch: OFF</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON</td>
<td>System voltage</td>
</tr>
<tr>
<td>4</td>
<td>1st shift indicator lamp</td>
<td>Shift range: 1st</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>5</td>
<td>3rd shift indicator lamp</td>
<td>Shift range: 3rd</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>6</td>
<td>5th shift indicator lamp</td>
<td>Shift range: 5th</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>9</td>
<td>4LLc switch</td>
<td>Transfer lever: 4LLc</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer lever: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>Terminal No.</td>
<td>Check item</td>
<td>Inspection conditions</td>
<td>Standard value</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------</td>
<td>--------------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>10</td>
<td>A/C compressor load signal</td>
<td>A/C switch: OFF</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A/C switch: ON</td>
<td>System voltage</td>
</tr>
<tr>
<td>11</td>
<td>Power supply</td>
<td>Ignition switch: OFF</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON</td>
<td>System voltage</td>
</tr>
<tr>
<td>12</td>
<td>Earth</td>
<td>At all times</td>
<td>0 V</td>
</tr>
<tr>
<td>13</td>
<td>Earth</td>
<td>At all times</td>
<td>0 V</td>
</tr>
<tr>
<td>14</td>
<td>OD solenoid valve</td>
<td>Engine: Idling</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: 3rd</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine: Idling</td>
<td>7 - 9 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: Park</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>DCC solenoid valve</td>
<td>Engine: Idling</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: 1st</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>2nd solenoid valve</td>
<td>Engine: Idling</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: 2nd</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine: Idling</td>
<td>7 - 9 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: 2nd</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>2nd shift indicator lamp</td>
<td>Shift range: 2nd</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>18</td>
<td>4th shift indicator lamp</td>
<td>Shift range: 4th</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>24</td>
<td>Power supply</td>
<td>Ignition switch: OFF</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON</td>
<td>System voltage</td>
</tr>
<tr>
<td>25</td>
<td>Earth</td>
<td>At all times</td>
<td>0 V</td>
</tr>
<tr>
<td>26</td>
<td>Earth</td>
<td>At all times</td>
<td>0 V</td>
</tr>
<tr>
<td>31</td>
<td>Input shaft speed sensor</td>
<td>Measure between terminals (31) and (43) using an oscilloscope.</td>
<td>Check Procedure using an Oscilloscope (Refer to P.23-69.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine: 2,000 r/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: 4th</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Output shaft speed sensor</td>
<td>Measure between terminals (32) and (43) using an oscilloscope.</td>
<td>Check Procedure using an Oscilloscope (Refer to P.23-69.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine: 2,000 r/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: 4th</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Engine speed sensor</td>
<td>Engine: Idling</td>
<td>2.0 - 2.4 V</td>
</tr>
<tr>
<td>38</td>
<td>Backup power supply</td>
<td>At all times</td>
<td>System voltage</td>
</tr>
<tr>
<td>43</td>
<td>Sensor earth</td>
<td>At all times</td>
<td>0 V</td>
</tr>
<tr>
<td>44</td>
<td>A/T fluid temperature sensor</td>
<td>A/T fluid temperature 20°C</td>
<td>3.8 - 4.0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A/T fluid temperature 40°C</td>
<td>3.2 - 3.4 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A/T fluid temperature 80°C</td>
<td>1.7 - 1.9 V</td>
</tr>
<tr>
<td>45</td>
<td>Accelerator pedal position sensor (APS)</td>
<td>Accelerator pedal: Fully closed (engine stopped)</td>
<td>0.985 - 1.085 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accelerator pedal: Fully open (engine stopped)</td>
<td>4.0 V or higher</td>
</tr>
<tr>
<td>51</td>
<td>RED solenoid valve</td>
<td>Engine: Idling</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: 5th</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine: Idling</td>
<td>7 - 9 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift range: Park</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>Output communication with engine-ECU</td>
<td>Engine: Idling</td>
<td>Other than 0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selector lever position: D</td>
<td></td>
</tr>
<tr>
<td>Terminal No.</td>
<td>Check item</td>
<td>Inspection conditions</td>
<td>Standard value</td>
</tr>
<tr>
<td>-------------</td>
<td>------------</td>
<td>-----------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>54</td>
<td>Input communication with engine-ECU</td>
<td>Engine: Idling, Selector lever position: D</td>
<td>Other than 0 V</td>
</tr>
<tr>
<td>55</td>
<td>Inhibitor switch P</td>
<td>Ignition switch: ON, Selector lever position: P</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON, Selector lever position: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>56</td>
<td>Inhibitor switch N</td>
<td>Ignition switch: ON, Selector lever position: N</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON, Selector lever position: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>57</td>
<td>Select switch</td>
<td>Ignition switch: ON, Selector lever operation: Sports mode</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON, Selector lever operation: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>58</td>
<td>Downshift switch</td>
<td>Ignition switch: ON, Selector lever position: Downshifted in Sports mode and lever held</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON, Selector lever operation: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>59</td>
<td>Stop lamp switch</td>
<td>Ignition switch: ON, Brake pedal Depressed</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON, Brake pedal Released</td>
<td>0 V</td>
</tr>
<tr>
<td>62</td>
<td>DIR solenoid valve</td>
<td>Engine: Idling, Shift range: Park</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine: Idling, Shift range: 2nd</td>
<td>7 - 9 V</td>
</tr>
<tr>
<td>65</td>
<td>Wide open throttle switch</td>
<td>Accelerator pedal: Released</td>
<td>4.5 - 5.5 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accelerator pedal: Depressed</td>
<td>Less than 0.4 V</td>
</tr>
<tr>
<td>66</td>
<td>Inhibitor switch R</td>
<td>Ignition switch: ON, Selector lever position: R</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON, Selector lever position: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>67</td>
<td>Inhibitor switch D</td>
<td>Ignition switch: ON, Selector lever position: D</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON, Selector lever position: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>68</td>
<td>Upshift switch</td>
<td>Ignition switch: ON, Selector lever position: Upshifted in Sports mode and lever held</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON, Selector lever position: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>69</td>
<td>Vehicle speed sensor</td>
<td>When stopped</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When starting to drive forward slowly.</td>
<td>0 V and 5 V alternates</td>
</tr>
<tr>
<td>71</td>
<td>A/T control relay</td>
<td>Ignition switch: OFF</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON</td>
<td>10 - 12 V</td>
</tr>
<tr>
<td>72</td>
<td>Earth</td>
<td>Ignition switch: ON</td>
<td>0 V</td>
</tr>
</tbody>
</table>
# CHECK PROCEDURE USING AN OSCILLOSCOPE

<table>
<thead>
<tr>
<th>Check item</th>
<th>Inspection conditions</th>
<th>Normal condition (Wave pattern sample)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crank angle sensor</td>
<td>Selector lever position: N</td>
<td>Idling (vehicle stopped)</td>
</tr>
<tr>
<td></td>
<td>Idling (vehicle stopped)</td>
<td>Wave pattern A</td>
</tr>
<tr>
<td>Input shaft speed sen-</td>
<td>Shift range: 4th</td>
<td>Driving at a constant speed of 50</td>
</tr>
<tr>
<td>sor</td>
<td></td>
<td>km/h in 4th (Engine: 1 800 - 2 100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>r/min)</td>
</tr>
<tr>
<td>Output shaft speed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sensor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle speed sensor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LR solenoid valve</td>
<td>Ignition switch: ON</td>
<td></td>
</tr>
<tr>
<td>UD solenoid valve</td>
<td>Engine: Stopped</td>
<td></td>
</tr>
<tr>
<td>2nd solenoid valve</td>
<td>Selector lever position: P</td>
<td></td>
</tr>
<tr>
<td>OD solenoid valve</td>
<td>Throttle (accelerator) opening</td>
<td>Force-drive the solenoid valves</td>
</tr>
<tr>
<td>RED solenoid valve</td>
<td>angle voltage:</td>
<td>(actuator test).</td>
</tr>
<tr>
<td>DCC solenoid valve</td>
<td>Less than 1 V &lt;6G7&gt;, less than 1.2 V &lt;4M4&gt;</td>
<td></td>
</tr>
</tbody>
</table>

## Wave pattern sample

- **Wave pattern A**
  - (V)
  - (ms)

- **Wave pattern B**
  - (V)
  - (ms)

- **Wave pattern C**
  - (V)
  - (ms)
TROUBLESHOOTING <SS4 II>

DIAGNOSIS FUNCTION

CENTER DIFFERENTIAL LOCK LAMP

When a problem occurs in the transfer system, the center differential lock lamp flashes at a rate of 1 Hz.
When the center differential lock lamp is flashing at a rate of 1 Hz, check the diagnosis output.

READING DIAGNOSIS CODES

Use the MUT-II or the center differential lock lamp to read the diagnosis codes. (Refer to GROUP 00 - Guide to Troubleshooting and Inspection Procedures.)

CHART CLASSIFIED BY DIAGNOSIS CODE

<table>
<thead>
<tr>
<th>Diagnosis code</th>
<th>Diagnosis item</th>
<th>Reference page</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Power supply voltage system</td>
<td>23-72</td>
</tr>
<tr>
<td>12</td>
<td>Overvoltage</td>
<td>23-72</td>
</tr>
<tr>
<td>13</td>
<td>Main relay system (inside ECU)</td>
<td>23-72</td>
</tr>
<tr>
<td>21</td>
<td>Accelerator pedal position sensor (APS) system</td>
<td>23-72</td>
</tr>
<tr>
<td>22</td>
<td>Front propeller shaft speed sensor system</td>
<td>23-75</td>
</tr>
<tr>
<td>23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Rear propeller shaft speed sensor system</td>
<td>23-77</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Stop lamp switch system</td>
<td>23-79</td>
</tr>
<tr>
<td>31</td>
<td>Transfer shift lever switch system</td>
<td>23-80</td>
</tr>
<tr>
<td>32</td>
<td>Transfer position switch system</td>
<td>23-81</td>
</tr>
<tr>
<td>33</td>
<td>Transfer position switch system</td>
<td>23-81</td>
</tr>
<tr>
<td>34</td>
<td>Freewheel engage solenoid valve system</td>
<td>23-82</td>
</tr>
<tr>
<td>Diagnosis code</td>
<td>Diagnosis item</td>
<td>Reference page</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>35</td>
<td>Freewheel engage switch system</td>
<td>23-83</td>
</tr>
<tr>
<td>41</td>
<td>Shift actuator (short-circuit/open circuit) system</td>
<td>23-84</td>
</tr>
<tr>
<td>42</td>
<td>Shift actuator (short-circuit) system</td>
<td>23-85</td>
</tr>
<tr>
<td>43</td>
<td>Shift actuator (open circuit) system</td>
<td>23-86</td>
</tr>
<tr>
<td>44</td>
<td>Shift actuator (overload) system</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Tyre problem</td>
<td>23-86</td>
</tr>
<tr>
<td>51</td>
<td>Malfunction of transfer-ECU</td>
<td>23-86</td>
</tr>
</tbody>
</table>
### Code No. 11, 12 Power supply voltage system

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Malfunction of ignition switch</td>
</tr>
<tr>
<td>• Malfunction of harness or connector</td>
</tr>
<tr>
<td>• Malfunction of transfer-ECU</td>
</tr>
</tbody>
</table>

- **Code No. 11** is output to indicate a drop in voltage if the power supply voltage drops below 9.5 V.
- **Code No. 12** is output to indicate overvoltage if the power supply voltage rises above 18 V.

#### MUT-II Data List
- **No. 9 Ignition voltage**
  - **OK:** Refer to P.23-87 (Data List Chart).

#### Inspection Procedures

- **Ignition switch single part check**
  - (Refer to GROUP 54 - Ignition Switch.)

- **Measure at transfer-ECU connector E-105**
  - Measure at ECU terminals.
  - Ignition switch: ON
  - Voltage between terminal 13 and earth
  - **OK:** System voltage

- **Check the following connectors:**
  - <L.H. drive vehicles> D-208, D-210, D-32, E-115, E-105,
  - <R.H. drive vehicles> D-208, D-210, E-115, E-105

- **OK**
- **NG**
- **Replace**
- **NG**
- **Repair**
- **OK**
- **NG**
- **Replace the transfer-ECU.**

#### Code No. 13 Main relay (inside ECU) system

- **Probable cause**
  - • Malfunction of transfer-ECU

- **Replace the transfer-ECU.**
<table>
<thead>
<tr>
<th>Code No. 21 Accelerator pedal position sensor (APS) system</th>
<th>Probable cause</th>
</tr>
</thead>
</table>
| Code No. 21 is output to indicate an open circuit in the APS or an incorrect adjustment when the APS output voltage drops below 0.2 V while the engine is idling. | - Malfunction of APS  
- Malfunction of harness or connector  
- Malfunction of transfer-ECU  
- Malfunction of throttle valve controller <6G7>  
- Malfunction of engine-ECU <4M4> |

### MUT-II Data List
- No. 1 APS
  - OK: Refer to P.23-87 (Data List Chart).

### APS single part check
(Refer to GROUP 13 - On-vehicle Service.)

### Check the following connector:
D-135

### Measure at APS connector D-135
- Disconnect the connector and measure at the harness side.
- Voltage between terminal 8 and earth
  - OK: 4.8 - 5.2 V

### NG

### NG

### NG

### OK

### NG

### OK

### To the next page

### Transient malfunction
(Refer to GROUP 00 - Points to Note for Transient Malfunctions.)

### NG

### NG

### OK

### NG

### NG

### OK

### NG

### OK

### NG

### OK

### NG

### Check the following connectors:
<6G7> D-11, <4M4> D-112

### OK

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG

### NG

### NG

### NG

### OK

### NG
Measure at APS connector D-135.
- Use the test harness (MB991658) to connect only terminals 6, 7 and 8, and measure at the pickup harness.
- Ignition switch: ON
(1) Voltage between terminal 7 and earth
OK: 0.5 V or less
(2) Voltage between terminal 8 and earth
OK: 4.8 - 5.2 V
(3) Voltage between terminal 6 and earth
OK: Fully close the accelerator 985 - 1,085 mV
fully open the accelerator 4,000 mV or more

Check the following connectors:
<6G7> D-11, <4M4> D-112
NG → Repair

OK

Check the harness between the APS and the throttle valve controller, and repair if necessary. <6G7>
Check the harness between the APS and the engine-ECU, and repair if necessary. <4M4>

NG

APS adjustment
(Refer to GROUP 13 - On-vehicle Service.)

Check the following connectors:
E-113, E-105
OK

Check the harness between the APS and the transfer-ECU, and repair if necessary.

NG → Repair

OK

Check the following connectors:
E-105, E-113
OK

Check the harness between the APS and the transfer-ECU, and repair if necessary.

NG → Repair

OK

Check the following connector: E-105
NG → Repair

OK

Check the trouble symptoms.
NG

Replace the transfer-ECU.
# Code No. 22, 23 Front propeller shaft speed sensor system

**Probable cause**

- Malfunction of front propeller shaft speed sensor
- Malfunction of harness or connector
- Malfunction of transfer-ECU

---

## MUT-II Data List

- **No. 2 Front propeller shaft speed sensor**
  - **OK**: Refer to P.23-87 (Data List Chart).

---

### NG

**Check the following connector**: E-105

- **OK**: Repair
- **NG**: Repair

**Check the trouble symptoms**.

**Replace the transfer-ECU**.

---

**OK**

**Check the following connector**: C-17

- **OK**: Repair
- **NG**: Repair

**Check the trouble symptoms**.

**Replace the transfer-ECU**.

---

**NG**

**Measure at transfer-ECU connector E-105**

- **OK**: 0.5 V or less
- **NG**: Check the trouble symptoms.

**Replace the transfer-ECU**.

---

**OK**

**Check the following connector**: C-17

- **OK**: Repair
- **NG**: Repair

**Check the trouble symptoms**.

**Replace the transfer-ECU**.

---

**OK**

**Check the following connector**: E-105

- **OK**: Repair
- **NG**: Repair

**Check the trouble symptoms**.

**Replace the transfer-ECU**.

---

**OK**

**Check the front propeller shaft speed sensor output wave pattern at transfer-ECU connector E-105 (using an oscilloscope)**.

- **Vehicle speed**: approx. 50 km/h
- **Shift range**: 3rd
- **Voltage between terminals 1 - 18**
  - **OK**: A wave pattern such as the one shown on P.23-69 (Check Procedure Using an Oscilloscope<Wave pattern B>) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

**OK**

**Check the following connectors**: C-17, E-105

**OK**

**NG**: Repair

To the next page
From the previous page

OK

Measure at front propeller shaft speed sensor connector C-17.
- Disconnect the connector and measure at the harness side.
  1. Resistance between terminal 1 and earth
     OK: 2 Ω or less
  2. Voltage between terminal 2 and earth
     (Ignition switch: ON)
     OK: 4.8 - 5.2 V
  3. Voltage between terminal 3 and earth
     (Ignition switch: ON)
     OK: System voltage

OK

Replace the front propeller shaft speed sensor

Check the trouble symptoms.

NG

Check the following connectors: D-208, D-213, D-32, E-115, E-105

NG

Repair

OK

Check the trouble symptoms.

NG

Eliminate the cause of the noise.
### Code No. 24, 25 Rear propeller shaft speed sensor system

**Probable cause**
- No. 3 Rear propeller shaft speed sensor
- Malfunction of harness or connector
- Malfunction of transfer-ECU

**Code No. 24** is output to indicate an open circuit or short-circuit in the rear propeller shaft speed sensor if the signal input from the rear propeller shaft speed sensor is unstable when the APS voltage is 1.5 V or higher.

**Code No. 25** is output to indicate an open circuit or short-circuit in the rear propeller shaft speed sensor if the signal input from the rear propeller shaft speed sensor is unstable when the freewheel engage switch is on.

### MUT-II Data List

- **OK**: Refer to P.23-87 (Data List Chart).
- **NG**: Refer to TRANSIENT MALFUNCTIONS (GROUP 00).

#### Measure at transfer-ECU connector E-105
- **OK**: 0.5 V or less
- **NG**: Refer to TRANSIENT MALFUNCTIONS (GROUP 00).

#### Measure at transfer-ECU connector E-105
- **OK**: 4.8 - 5.2 V
- **NG**: Replace the transfer-ECU.

#### Measure the rear propeller shaft speed sensor output wave pattern at transfer-ECU connector E-105 (using an oscilloscope).
- **OK**: A wave pattern such as the one shown on P.23-69 (Check Procedure Using an Oscilloscope) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.
- **NG**: Replace the transfer-ECU.

### Check the trouble symptoms.

- **OK**: Refer to TRANSIENT MALFUNCTIONS (GROUP 00).
- **NG**: Repair

To the next page
From the previous page

(1) NG

OK

Measure at rear propeller shaft speed sensor connector C-08.
- Disconnect the connector and measure at the harness side.
  (1) Resistance between terminal 1 and earth
    OK: 2 Ω or less
  (2) Voltage between terminal 2 and earth
    (Ignition switch: ON)
    OK: 4.8 - 5.2 V
  (3) Voltage between terminal 3 and earth
    (Ignition switch: ON)
    OK: System voltage

OK

(2) NG

Check the harness between the rear propeller shaft speed sensor and the transfer-ECU, and repair if necessary. (Earth line)

OK

NG

Repair

Check the following connectors:
D-208, D-213, D-32, E-115, E-105

(3) NG

Check the following connectors: D-208, D-213, D-32, E-115

OK

NG

Repair

Check the harness between the rear propeller shaft speed sensor and the transfer-ECU, and repair if necessary. (Sensor line)

OK

NG

Repair

Replace the rear propeller shaft speed sensor

Check the trouble symptoms.

NG

Check the following connectors: D-208, D-213, D-32, E-115, E-105

OK

Check the harness between the rear propeller shaft speed sensor and the transfer-ECU.
Check the harness between the rear propeller shaft speed sensor and the ignition switch.

NG

Repair

Check the trouble symptoms.

OK

Check the harness between the rear propeller shaft speed sensor and the ignition switch, and repair if necessary.

NG

Repair

Eliminate the cause of the noise.
**Code No. 26 Stop lamp switch system**

Code No. 26 is output to indicate a short-circuit in the stop lamp switch when the stop lamp switch is continuously on for 15 minutes or more when the vehicle speed is 15 km/h or higher.

**Probable cause**
- Malfunction of brake pedal
- Malfunction of stop lamp switch
- Malfunction of harness or connector
- Malfunction of transfer-ECU

**MUT-II Data List**

<table>
<thead>
<tr>
<th>Check</th>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 23 Stop lamp switch system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OK: ON when brake pedal is depressed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OFF when the brake pedal is released</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Stop lamp switch check**
(Refer to GROUP 35 - Brake Pedal.)

<table>
<thead>
<tr>
<th>Check</th>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Check the following connector:**

D-136

<table>
<thead>
<tr>
<th>Check</th>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Measure at stop lamp switch connector D-136.**
- Disconnect the connector and measure at the harness side.
- Voltage between terminals 2 and earth
  - OK: System voltage

<table>
<thead>
<tr>
<th>Check</th>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Measure at transfer-ECU connector E-108**
- Measure at ECU terminals.
- Voltage between terminals 34 and earth
  - OK: System voltage when brake pedal is depressed
  - 1 V or less when brake pedal is released

<table>
<thead>
<tr>
<th>Check</th>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Check the trouble symptoms.**

| | | |

**Transient malfunction**
(Refer to GROUP 00 - Points to Note for Transient Malfunctions.)

**Check the following connectors:**

<**L.H. drive vehicles**> D-27, D-26, <**R.H. drive vehicles**> D-27, D-124

<table>
<thead>
<tr>
<th>Check</th>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Check the following connectors:**


<table>
<thead>
<tr>
<th>Check</th>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Check the following connectors:**

<**L.H. drive vehicles**> D-27, D-26, D-124

<table>
<thead>
<tr>
<th>Check</th>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Check the following connectors:**

**Repair**

**Replace the transfer-ECU.**
### Code No. 31 Transfer lever switch system

Code No. 31 is output to indicate an open circuit or short-circuit in the transfer lever switch if the input signal from the transfer lever switch is unstable.

<table>
<thead>
<tr>
<th>MUT-II Data List</th>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No. 6 Transfer lever position</strong>&lt;br&gt;OK: Refer to P.23-67 (Data List Chart).</td>
<td>• Malfunction of transfer lever switch&lt;br&gt;• Malfunction of harness or connector&lt;br&gt;• Malfunction of transfer-ECU</td>
</tr>
<tr>
<td>NG</td>
<td>Transient malfunction (Refer to GROUP 00 - Points to Note for Transient Malfunctions.)</td>
</tr>
<tr>
<td><strong>Transfer lever switch check</strong> (Refer to P.23-117.)</td>
<td><strong>Check the following connector: E-19</strong></td>
</tr>
<tr>
<td>OK</td>
<td><strong>Check the following connectors:</strong> D-208, D-213, D-32, E-115</td>
</tr>
<tr>
<td>NG</td>
<td>Report</td>
</tr>
<tr>
<td><strong>Check the following connector: E-19</strong></td>
<td><strong>Check the following connectors:</strong> D-208, D-213, D-32, E-115, E-105</td>
</tr>
<tr>
<td>OK</td>
<td><strong>Check the following connectors:</strong> D-208, D-213, D-32, E-115, E-105</td>
</tr>
<tr>
<td>NG</td>
<td><strong>Check the following connectors:</strong> D-208, D-213, D-32, E-115, E-105</td>
</tr>
<tr>
<td><strong>Check the following connector: E-105</strong></td>
<td><strong>Check the following connectors:</strong> D-208, D-213, D-32, E-115, E-105</td>
</tr>
<tr>
<td>OK</td>
<td><strong>Check the following connectors:</strong> D-208, D-213, D-32, E-115, E-105</td>
</tr>
<tr>
<td>NG</td>
<td><strong>Check the following connectors:</strong> D-208, D-213, D-32, E-115, E-105</td>
</tr>
<tr>
<td>NG</td>
<td><strong>Check the following connections:</strong> E-208, D-213, D-32, E-115, E-105</td>
</tr>
<tr>
<td>OK</td>
<td><strong>Check the following connections:</strong> E-208, D-213, D-32, E-115, E-105</td>
</tr>
<tr>
<td>NG</td>
<td><strong>Check the following connections:</strong> E-208, D-213, D-32, E-115, E-105</td>
</tr>
<tr>
<td>NG</td>
<td>Replace the transfer-ECU.</td>
</tr>
</tbody>
</table>

**Probable cause**

- Malfunction of transfer lever switch
- Malfunction of harness or connector
- Malfunction of transfer-ECU

---

**MUT-II Data List**

- **No. 6 Transfer lever position**
  - OK: Refer to P.23-67 (Data List Chart).

**Probable cause**

- Transient malfunction (Refer to GROUP 00 - Points to Note for Transient Malfunctions.)

**Check the following connector: E-19**

- **Check the following connectors:** D-208, D-213, D-32, E-115
  - OK
  - NG

**Check the following connectors:** D-208, D-213, D-32, E-115, E-105

- OK
- NG

**Check the following connectors:** D-208, D-213, D-32, E-115, E-105

- OK
- NG

**Check the following connections:** E-208, D-213, D-32, E-115, E-105

- OK
- NG

**Check the following connections:** E-208, D-213, D-32, E-115, E-105

- OK
- NG

**Check the following connections:** E-208, D-213, D-32, E-115, E-105

- OK
- NG

**Check the following connections:** E-208, D-213, D-32, E-115, E-105

- OK
- NG

**Check the following connections:** E-208, D-213, D-32, E-115, E-105

- OK
- NG

**Check the following connections:** E-208, D-213, D-32, E-115, E-105

- OK
- NG

**Check the following connections:** E-208, D-213, D-32, E-115, E-105

- OK
- NG

**Check the following connections:** E-208, D-213, D-32, E-115, E-105

- OK
- NG

**Check the following connections:** E-208, D-213, D-32, E-115, E-105

- OK
- NG
Code No. 32, 33 Transfer position switch system

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfunction of transfer position switch</td>
</tr>
<tr>
<td>Malfunction of harness or connector</td>
</tr>
<tr>
<td>Malfunction of transfer-ECU</td>
</tr>
<tr>
<td>Malfunction of shift actuator</td>
</tr>
<tr>
<td>Malfunction of transfer shift mechanism</td>
</tr>
</tbody>
</table>

Code No. 32 is output to indicate an open circuit or short-circuit in a transfer position switch, a malfunction of the shift actuator or a malfunction of the transfer shift mechanism when transfer selection does not complete while driving. Code No. 33 is output to indicate an open circuit or short-circuit in a transfer position switch if the input signal from the transfer position switch is unstable.

Refer to the Transmission Workshop Manual.

Actuator test
(Only No.32)
- No. 2, No. 3 Shift actuator
  OK: Refer to P.23-89 (Actuator Test).

MUT-II Data List
- No. 7 Transfer position
  OK: Refer to P.23-87 (Data List Chart).

Transfer lever switch check (Refer to P.23-117.)

Measure at transfer-ECU connector E-108
- Measure at ECU terminals.
- Voltage between terminals 43, 44, 45, 46, 47 and earth
  OK: System voltage

Check the following connectors: C-06, C-07, C-14, C-15, C-16

Check the harnesses between the transfer position switches and the transfer-ECU, and repair if necessary.
<table>
<thead>
<tr>
<th>Code No. 34 Freewheel engage solenoid valve system</th>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code No. 34 is output to indicate an open circuit or short-circuit in the freewheel engage solenoid valve when the transfer-ECU terminal voltages are not the same while current is being supplied to the freewheel engage solenoid valve.</td>
<td>- Malfunction of freewheel engage solenoid valve - Malfunction of harness or connector - Malfunction of transfer-ECU</td>
</tr>
</tbody>
</table>

**MUT-II Actuator Test**
- **OK:** No. 1 Freewheel engage solenoid valve
  - The solenoid valve operates for 5 seconds.

**Freewheel engage solenoid valve check**
(Refer to GROUP 26 - On-Vehicle Service.)

**Check the following connectors:** A-40, A-41

**Measure at freewheel engage solenoid valve connectors A-40 and A-41.**
- Disconnect the connector and measure at the harness side.
- Ignition switch: ON
- Voltage between terminal 1 and earth
  - **OK:** System voltage

**Measure at transfer-ECU connector E-108**
- **OK:** Measure at ECU terminals.
- Transfer: 4WD
- Ignition switch: ON
- Voltage between terminals 41 and earth
  - **OK:** System voltage

**Check the following connector:** E-108

**Check the trouble symptoms.**

Replace the transfer-ECU.
### Code No. 35 Freewheel engage switch system

<table>
<thead>
<tr>
<th>Problem</th>
<th>Probable cause</th>
</tr>
</thead>
</table>
| Code No. 35 is output to indicate an open circuit or short-circuit in the freewheel engage switch when the freewheel engage switch condition does not correspond to the fact that current is being supplied to the freewheel engage solenoid valve. | - Malfunction of freewheel engage switch  
- Malfunction of harness or connector  
- Malfunction of transfer-ECU |

#### MUT-II Self-Diag Code

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>Code No. 34 Freewheel engage solenoid valve system check (Refer to P.23-82.)</td>
</tr>
<tr>
<td>NO</td>
<td>Transient malfunction (Refer to GROUP 00 - Points to Note for Transient Malfunctions.)</td>
</tr>
</tbody>
</table>

#### MUT-II Data List

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
<td>Freewheel engage switch check (Refer to GROUP 26 - Freewheel Clutch.)</td>
</tr>
<tr>
<td>NG</td>
<td>Replace</td>
</tr>
</tbody>
</table>

#### Check the following connector: B-54

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
<td>Check the following connector: B-40</td>
</tr>
<tr>
<td>NG</td>
<td>Repair</td>
</tr>
</tbody>
</table>

##### Measure at freewheel engage switch connector B-54.

- Disconnect the connector and measure at the harness side.
- (1) Resistance between terminal 1 and earth  
  - OK: 2 Ω or less  
- (2) Voltage between terminal 2 and earth (Ignition switch: ON)  
  - OK: System voltage

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
<td>Check the following connectors: E-108, E-113, B-40</td>
</tr>
<tr>
<td>NG</td>
<td>Repair</td>
</tr>
</tbody>
</table>

#### Check the trouble symptoms.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td>Replace the transfer-ECU.</td>
</tr>
</tbody>
</table>
**Code No. 41 Shift actuator system (open circuit or short-circuit)**

Code No. 41 is output to indicate an open circuit or short-circuit in the shift actuator if the transfer-ECU terminal voltage is higher than the main relay voltage (90% of the rated voltage), or lower than the main relay voltage (10% of the rated voltage) when shift operation is not being carried out.

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Malfunction of shift actuator</td>
</tr>
<tr>
<td>● Malfunction of harness or connector</td>
</tr>
<tr>
<td>● Malfunction of transfer-ECU</td>
</tr>
</tbody>
</table>

★ Refer to the Transmission Workshop Manual.

### MUT-II Data List
- No. 12 Shift actuator voltage
  - **OK**: Refer to P.23-87 (Data List Chart).

#### NG

**Check the following connector: E-105**
- **OK**
  - **NG**
  - Replace the transfer-ECU.

**Check the following connectors: C-11, E-105**
- **OK**
  - **NG**
  - Check the harness between the shift actuator and the transfer-ECU, and repair if necessary.

**Check the trouble symptoms.**
- **NG**
  - Replace the shift actuator. ✱
Code No. 42 Shift actuator system (short-circuit)  

Code No. 42 is output to indicate a short-circuit in the shift actuator if the shift actuator current is +1 A greater than the target value while the actuator is being driven.  

Code No. 43 is output to indicate an open circuit in the shift actuator if the main relay voltage is lower than 6 V, or the shift actuator current is 0.1 A lower than the actual value while the actuator is being driven.

Probable cause

- Malfunction of shift actuator  
- Malfunction of harness or connector  
- Malfunction of transfer-ECU

Refer to the Transmission Workshop Manual.

MUT-II Data List

- No. 10 Shift actuator voltage
  OK: Refer to P.23-87 (Data List Chart).

NG

Measure at transfer-ECU connector E-105

- Measure at ECU terminals.
- Drive the shift actuator in accordance with MUT-II actuator test No. 2.
  OK: System voltage
- Voltage between terminal 3 and earth
  OK: System voltage
- Drive the shift actuator in accordance with MUT-II actuator test No. 3.
  OK: System voltage

NG

Check the following connector: E-105

NG

OK

NG

Repair

Replace the transfer-ECU.

Check the following connectors: C-11, E-105

OK

NG

Repair

Check the harness between the shift actuator and the transfer-ECU, and repair if necessary.

Check the trouble symptoms.

NG

Replace the shift actuator. ★
## Code No. 44 Shift actuator system (overload)

**Probable cause**
- Malfunction of shift actuator
- Malfunction of harness or connector
- Malfunction of transfer-ECU
- Malfunction of transfer shift mechanism

### Refer to the Transmission Workshop Manual.

**MUT-II Actuator test**
- **OK** Refer to P.23-89 (Actuator Test).

**MUT-II Data List**
- **OK** Refer to P.23-87 (Data List Chart).

### Measure at transfer-ECU connector E-105
- Measure at ECU terminals.
- Drive the shift actuator in accordance with MUT-II actuator test No. 2.
- Voltage between terminal 1 and earth
  - **OK** System voltage
- Drive the shift actuator in accordance with MUT-II actuator test No. 3.
- Voltage between terminals 3 and earth
  - **OK** System voltage

### Measure at shift actuator connector C-11.
- Disconnect the connector and measure at the harness side.
- Drive the shift actuator in accordance with MUT-II actuator test No. 2.
- Voltage between terminals 2 and earth
  - **OK** System voltage
- Drive the shift actuator in accordance with MUT-II actuator test No. 3.
- Voltage between terminal 1 and earth
  - **OK** System voltage

### Code No. 45 Incorrect tyre diameters

**Probable cause**
- Malfunction of tyre
- Malfunction of transfer-ECU

### Tyre Check
- **OK**
- **NG** Replace

### Code No. 51 Malfunction of transfer-ECU

**Probable cause**
- Malfunction of transfer-ECU

Replace the transfer-ECU.
## DATA LIST REFERENCE TABLE

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Check item</th>
<th>Inspection conditions</th>
<th>Normal condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Accelerator pedal position sensor (APS)</td>
<td>Engine: Stopped Selector lever position: P</td>
<td>Accelerator pedal: Fully closed, 985 - 1,085 mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Accelerator pedal: Depressed, Gradually increases from the above value.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Accelerator pedal: Fully open, 4000 mV or higher</td>
</tr>
<tr>
<td>2</td>
<td>Front propeller shaft speed sensor</td>
<td>Transfer position: 4WD Driving at a constant speed of 30 km/h</td>
<td>30 km/h</td>
</tr>
<tr>
<td>3</td>
<td>Rear propeller shaft speed sensor</td>
<td>Transfer position: 4WD Driving at a constant speed of 30 km/h</td>
<td>30 km/h</td>
</tr>
<tr>
<td>4</td>
<td>Difference between front and rear propeller shaft speeds</td>
<td>Transfer position: 4WD Driving at a constant speed of 30 km/h</td>
<td>Within 5 km/h</td>
</tr>
<tr>
<td>5</td>
<td>Vehicle speed</td>
<td>Idling in 1st (Vehicle stopped)</td>
<td>0 km/h</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Driving at a constant speed of 50 km/h in 3rd</td>
<td>50 km/h</td>
</tr>
<tr>
<td>6</td>
<td>Transfer lever position</td>
<td>Ignition switch: ON Engine: Stopped</td>
<td>Transfer shift lever position: 2H 2H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Transfer shift lever position: 4H 4H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Transfer shift lever position: 4HLc 4HLc</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Transfer shift lever position: 4LLc 4LLc</td>
</tr>
<tr>
<td>7</td>
<td>Transfer position</td>
<td>Driving at a constant speed of 10 km/h</td>
<td>Transfer shift lever position: 2H - 4H → 4H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Transfer shift lever position: 4H - 4HL → 4HL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine: Stopped Selector lever position: N</td>
<td>Transfer shift lever position: 4HLc → 4LLc 4HL - 4LL → 4LL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Transfer shift lever position: 4LLc → 4H 4HL - 4HL → 4H</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Driving at a constant speed of 10 km/h</td>
<td>Transfer shift lever position: 4HLc → 4H 4H → 2H</td>
</tr>
<tr>
<td>8</td>
<td>Main relay voltage</td>
<td>Ignition switch: ON</td>
<td>System voltage (V)</td>
</tr>
<tr>
<td>9</td>
<td>Ignition voltage</td>
<td>Ignition switch: ON</td>
<td>System voltage (V)</td>
</tr>
<tr>
<td>10</td>
<td>Shift actuator current</td>
<td>During transfer selection (while motor is running)</td>
<td>0 A → 0.2 A → 0 A</td>
</tr>
<tr>
<td>11</td>
<td>Target current</td>
<td>During transfer selection (while motor is running)</td>
<td>0 A → 1.5 A → 0 A</td>
</tr>
<tr>
<td>12</td>
<td>Shift actuator voltage</td>
<td>Ignition switch: ON Selector lever position: N Transfer shift lever position: 2H → 4H (or 4H → 4HLc, 4HLc → 4LLc)</td>
<td>System voltage (V)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ignition switch: ON Selector lever position: N Transfer shift lever position: 4LLc → 4HLc (or 4HLc → 4H, 4H → 2H)</td>
</tr>
<tr>
<td>Item No.</td>
<td>Check item</td>
<td>Inspection conditions</td>
<td>Normal condition</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------------</td>
<td>----------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>21</td>
<td>Ignition switch</td>
<td>Ignition switch: ON</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>22</td>
<td>Transmission identification</td>
<td>Vehicles with A/T</td>
<td>A/T</td>
</tr>
<tr>
<td>23</td>
<td>Stop lamp switch</td>
<td>Ignition switch: ON</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine: Stopped</td>
<td>Brake pedal: Depressed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Brake pedal: Released</td>
</tr>
<tr>
<td>24</td>
<td>Transfer lever switch 2H</td>
<td>Transfer shift lever position: 2H</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer shift lever position: Other than the above</td>
<td>OFF</td>
</tr>
<tr>
<td>25</td>
<td>Transfer lever switch 4H</td>
<td>Transfer shift lever position: 4H</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer shift lever position: Other than the above</td>
<td>OFF</td>
</tr>
<tr>
<td>26</td>
<td>Transfer lever switch 4HLc</td>
<td>Transfer shift lever position: 4HLc</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer shift lever position: Other than the above</td>
<td>OFF</td>
</tr>
<tr>
<td>27</td>
<td>Transfer lever switch 4LLc</td>
<td>Transfer shift lever position: 4LLc</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer shift lever position: Other than the above</td>
<td>OFF</td>
</tr>
<tr>
<td>28</td>
<td>Engine identification</td>
<td>Petrol vehicles</td>
<td>PETROL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Diesel vehicles</td>
<td>DIESEL</td>
</tr>
<tr>
<td>30</td>
<td>Freewheel engage solenoid valve</td>
<td>During 2WD</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>During 4WD</td>
<td>OFF</td>
</tr>
<tr>
<td>31</td>
<td>Inhibitor switch N</td>
<td>Selector lever position: N</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selector lever position: Other than the above</td>
<td>OFF</td>
</tr>
<tr>
<td>32</td>
<td>Inhibitor switch P</td>
<td>Selector lever position: P</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selector lever position: Other than the above</td>
<td>OFF</td>
</tr>
<tr>
<td>33</td>
<td>2WD switch</td>
<td>Driving conditions: 2WD (2H)</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Driving conditions: Other than the above</td>
<td>OFF</td>
</tr>
<tr>
<td>34</td>
<td>2WD/4WD switch</td>
<td>Driving conditions: 2WD (2H), 4WD (4H)</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Driving conditions: Other than the above</td>
<td>OFF</td>
</tr>
<tr>
<td>35</td>
<td>4H switch</td>
<td>Driving conditions: 4WD (4H), 4WD (4HLc)</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Driving conditions: Other than the above</td>
<td>OFF</td>
</tr>
<tr>
<td>36</td>
<td>Center differential lock switch</td>
<td>Driving conditions: 4WD (4HLc), 4WD (4LLc)</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Driving conditions: Other than the above</td>
<td>OFF</td>
</tr>
<tr>
<td>37</td>
<td>4LLc switch</td>
<td>Driving conditions: 4WD (4LLc)</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Driving conditions: Other than the above</td>
<td>OFF</td>
</tr>
<tr>
<td>38</td>
<td>Freewheel engage switch</td>
<td>During 2WD</td>
<td>OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>During 4WD</td>
<td>ON</td>
</tr>
</tbody>
</table>
**ACTUATOR TEST TABLE**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Check item</th>
<th>Test contents</th>
<th>Inspection conditions</th>
<th>Normal condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Freewheel engage solenoid valve</td>
<td>The freewheel engage solenoid valve is driven.</td>
<td>Ignition switch: ON Selector lever position: P</td>
<td>If the freewheel engage solenoid valve is on, it is turned off, and if it is off, it is turned on.</td>
</tr>
<tr>
<td>2</td>
<td>Shift actuator</td>
<td>The motor inside the shift actuator is run in the forward direction.</td>
<td>Engine: 0 r/min Vehicle speed: 0 km/h (vehicle stopped)</td>
<td>If the transfer is at the 2H, 4H or 4HLc position, it shifts from that position to the 2H, 4H, 4HLc, 4LLc positions in that order, and then returns to the original position. If it is at the 4LLc position, no shifting is carried out.</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>The motor inside the shift actuator is run in the reverse direction.</td>
<td></td>
<td>If the transfer is at the 4H, 4HLc or 4LLc position, it shifts from that position to the 4LLc, 4HLc, 4H, 2H positions in that order, and then returns to the original position. If it is at the 2H position, no shifting is carried out.</td>
</tr>
</tbody>
</table>

**TRANSFER-ECU TERMINAL VOLTAGE TABLE**

**NOTE**
There are two ECUs with the same shape inside the floor console, one above the other. The top ECU is the ABS-ECU, and it has a blue connector. The bottom ECU is the transfer-ECU, and it has a green connector.
<table>
<thead>
<tr>
<th>Terminal No.</th>
<th>Check item</th>
<th>Inspection conditions</th>
<th>Standard value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shift actuator</td>
<td>Transfer shift lever position: 2H → 4H</td>
<td>5.6 V → 11.0 V → 5.6 V</td>
</tr>
<tr>
<td>3</td>
<td>Shift actuator</td>
<td>Transfer shift lever position: 4H → 2H</td>
<td>5.6 V → 11.0 V → 5.6 V</td>
</tr>
<tr>
<td>5</td>
<td>Accelerator pedal position sensor (APS)</td>
<td>Accelerator pedal: Fully closed (engine stopped)</td>
<td>0.985 - 1.085 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accelerator pedal: Fully open (engine stopped)</td>
<td>4.0 V or higher</td>
</tr>
<tr>
<td>7</td>
<td>Front propeller shaft speed sensor</td>
<td>Measure the voltage between terminals 7 and 18 using an oscilloscope. Engine: 2 000 r/min Shift range: 4th</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Rear propeller shaft speed sensor</td>
<td>Measure the voltage between terminals 9 and 18 using an oscilloscope. Engine: 2 000 r/min Shift range: 4th</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Diagnosis output</td>
<td>When normal (no diagnosis codes are output)</td>
<td>0 V and 5 V alternates</td>
</tr>
<tr>
<td>13</td>
<td>Power supply</td>
<td>Ignition switch: OFF</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON</td>
<td>System voltage</td>
</tr>
<tr>
<td>18</td>
<td>Sensor earth</td>
<td>At all times</td>
<td>0.5 V or less</td>
</tr>
<tr>
<td>20</td>
<td>Transfer lever switch 2H</td>
<td>Transfer shift lever position: 2H</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer shift lever position: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>21</td>
<td>Transfer lever switch 4H</td>
<td>Transfer shift lever position: 4H</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer shift lever position: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>22</td>
<td>Transfer lever switch 4HLc</td>
<td>Transfer shift lever position: 4HLc</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer shift lever position: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>23</td>
<td>Transfer lever switch 4LLc</td>
<td>Transfer shift lever position: 4LLc</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer shift lever position: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>24</td>
<td>Diagnosis control</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>25</td>
<td>Earth</td>
<td>At all times</td>
<td>0 V</td>
</tr>
<tr>
<td>26</td>
<td>Earth</td>
<td>At all times</td>
<td>0 V</td>
</tr>
<tr>
<td>31</td>
<td>Backup power supply</td>
<td>At all times</td>
<td>System voltage</td>
</tr>
<tr>
<td>32</td>
<td>Inhibitor switch N</td>
<td>Selector lever position: N</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selector lever position: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>33</td>
<td>Inhibitor switch P</td>
<td>Selector lever position: P</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selector lever position: Other than the above</td>
<td>0 V</td>
</tr>
<tr>
<td>34</td>
<td>Stop lamp switch</td>
<td>Brake pedal: Depressed</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brake pedal: Released</td>
<td>0 V</td>
</tr>
<tr>
<td>35</td>
<td>Earth</td>
<td>At all times</td>
<td>0 V</td>
</tr>
<tr>
<td>37</td>
<td>Rear wheel indicator lamp</td>
<td>Other than during transfer selection</td>
<td>System voltage</td>
</tr>
<tr>
<td>38</td>
<td>Front wheel indicator lamp</td>
<td>During 4WD</td>
<td>System voltage</td>
</tr>
<tr>
<td>39</td>
<td>Earth &lt;6G7&gt;</td>
<td>At all times</td>
<td>0 V</td>
</tr>
<tr>
<td>Terminal No.</td>
<td>Check item</td>
<td>Inspection conditions</td>
<td>Standard value</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------</td>
<td>------------------------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>40</td>
<td>Center differential lock lamp</td>
<td>During 4WD (4HLc or 4LLc)</td>
<td>System voltage</td>
</tr>
<tr>
<td>41</td>
<td>Solenoid valve A, B</td>
<td>Transfer shift lever position: 2H</td>
<td>1 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer shift lever position: Other than 2H</td>
<td>System voltage</td>
</tr>
<tr>
<td>42</td>
<td>Earth</td>
<td>At all times</td>
<td>0 V</td>
</tr>
<tr>
<td>43</td>
<td>2WD switch</td>
<td>Transfer shift lever position: 2H</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer shift lever position: Other than 2H</td>
<td>10.5 V</td>
</tr>
<tr>
<td>44</td>
<td>2WD/4WD switch</td>
<td>Transfer shift lever position: 2H or 4H</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer shift lever position: 4HLc or 4LLc</td>
<td>10.5 V</td>
</tr>
<tr>
<td>45</td>
<td>4H switch</td>
<td>Transfer shift lever position: 4H or 4HLc</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer shift lever position: 2H or 4LLc</td>
<td>10.5 V</td>
</tr>
<tr>
<td>46</td>
<td>Center differential lock switch</td>
<td>Transfer shift lever position: 4HLc or 4LLc</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer shift lever position: 2H or 4H</td>
<td>10.5 V</td>
</tr>
<tr>
<td>47</td>
<td>4HLc switch</td>
<td>Transfer shift lever position: 4LLc</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer shift lever position: Other than 4LLc</td>
<td>10.5 V</td>
</tr>
<tr>
<td>50</td>
<td>Freewheel engage switch</td>
<td>Transfer position: 2WD</td>
<td>10.5 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfer position: 4WD</td>
<td>0 V</td>
</tr>
</tbody>
</table>
TROUBLESHOOTING <SHIFT LOCK AND KEY INTERLOCK MECHANISMS>

DIAGNOSIS FUNCTION

Input signal check procedure
Connect the MUT-II or a voltage meter to the diagnosis connector, and check the inhibitor switch (reverse) input signal.
(Refer to GROUP 00 - Guide to Troubleshooting and Inspection Procedures.)

<table>
<thead>
<tr>
<th>Trouble Symptom</th>
<th>Inspection procedure No.</th>
<th>Reference page</th>
</tr>
</thead>
<tbody>
<tr>
<td>When the ignition switch is at a position other than the LOCK position, the selector lever can be moved from the P to the R position even though the brake pedal is not depressed.</td>
<td>1</td>
<td>23-92</td>
</tr>
<tr>
<td>When the ignition switch is at a position other than the LOCK position, the selector lever cannot be moved from the P to the R position even though the brake pedal is being depressed.</td>
<td>2</td>
<td>23-92</td>
</tr>
<tr>
<td>The ignition switch is at the LOCK position, but the selector lever can be moved from the P to the R position when the brake pedal is depressed.</td>
<td>3</td>
<td>23-93</td>
</tr>
<tr>
<td>The selector lever cannot be easily moved from the P to the R position.</td>
<td>4</td>
<td>23-93</td>
</tr>
<tr>
<td>The selector lever cannot be moved from the R to the P position.</td>
<td>5</td>
<td>23-93</td>
</tr>
<tr>
<td>The ignition key cannot be turned to the LOCK position when the selector lever is at the P position.</td>
<td>6</td>
<td>23-93</td>
</tr>
<tr>
<td>The ignition key can be turned to the LOCK position even when the selector lever is at a position other than the P position.</td>
<td>7</td>
<td>23-93</td>
</tr>
</tbody>
</table>

INSPECTION PROCEDURES FOR TROUBLE SYMPTOM

Inspection procedure 1

When the ignition switch is at a position other than the LOCK position, the selector lever can be moved from the P to the R position even though the brake pedal is not depressed.

- Probable cause
  - Malfunction of lock cam
  - Malfunction of shift lock cable unit

Check by referring to the probable causes.

Inspection procedure 2

When the ignition switch is at a position other than the LOCK position, the selector lever cannot be moved from the P to the R position even though the brake pedal is being depressed.

- Probable cause
  - Malfunction of selector lever assembly
  - Malfunction of transmission control cable
  - Malfunction of shift lock cable unit
  - Malfunction of lock bar

Check by referring to the probable causes.
Inspection procedure 3

<table>
<thead>
<tr>
<th>The ignition switch is at the LOCK position, but the selector lever can be moved from the P to the R position when the brake pedal is depressed.</th>
<th>Probable cause</th>
</tr>
</thead>
</table>
| The cause is probably a malfunction of the shift lock cable unit or of the ignition key cylinder lock bar. | ● Malfunction of shift lock cable unit  
● Malfunction of lock bar |

Check by referring to the probable causes.

Inspection procedure 4

<table>
<thead>
<tr>
<th>The selector lever cannot be easily moved from the P to the R position.</th>
<th>Probable cause</th>
</tr>
</thead>
</table>
| The cause is probably a malfunction of the selector lever assembly, transmission control cable, shift lock cable unit or the ignition key cylinder lock bar. | ● Malfunction of selector lever assembly  
● Malfunction of transmission control cable  
● Malfunction of shift lock cable unit  
● Malfunction of lock bar |

Check by referring to the probable causes.

Inspection procedure 5

<table>
<thead>
<tr>
<th>The selector lever cannot be moved from the R to the P position.</th>
<th>Probable cause</th>
</tr>
</thead>
</table>
| The cause is probably a malfunction of the selector lever assembly or of the transmission control cable. | ● Malfunction of selector lever assembly  
● Malfunction of transmission control cable |

Check by referring to the probable causes.

Inspection procedure 6

<table>
<thead>
<tr>
<th>The ignition key cannot be turned to the LOCK position when the selector lever is at the P position.</th>
<th>Probable cause</th>
</tr>
</thead>
</table>
| The cause is probably a malfunction of the selector lever assembly, shift lock cable unit or the ignition key cylinder lock bar. | ● Malfunction of selector lever assembly  
● Malfunction of shift lock cable unit  
● Malfunction of lock bar |

Check by referring to the probable causes.

Inspection procedure 7

<table>
<thead>
<tr>
<th>The ignition key can be turned to the LOCK position even when the selector lever is at a position other than the P position.</th>
<th>Probable cause</th>
</tr>
</thead>
</table>
| The cause is probably a malfunction of the shift lock cable unit or of the ignition key cylinder lock bar. | ● Malfunction of shift lock cable unit  
● Malfunction of lock bar |

Check by referring to the probable causes.
ON-VEHICLE SERVICE

BASIC ADJUSTMENT PROCEDURES

AUTOMATIC TRANSMISSION FLUID (ATF) CHECK

NOTE
When replacing the transmission with a new one, overhauling the existing transmission, or driving in a harsh condition, the ATF cooler line should always be flushed out and ATF should be replaced with a new one.

1. Drive the vehicle until the ATF temperature reaches the normal temperature (70 - 80°C).

   NOTE
   1) Measure ATF temperature using MUT-II.
   2) Check the oil level referring to the characteristics chart shown at left if it takes some time to reach the normal operation temperature of ATF (70 - 80°C.)

2. Park the vehicle on a level surface.

3. Move the selector lever to all positions to fully charge the torque converter and the fluid lines with ATF, and then move the selector lever to the “N” position.

4. After wiping away any dirt from around the oil level gauge, pull out the oil level gauge and check the level of ATF.

   NOTE
   If the ATF has a burnt smell, or if it has become very contaminated or dirty, it means that the ATF has become contaminated by minute particles from bushings (metal) or worn parts. In such a case, the transmission needs to be overhauled and the ATF cooler line needs to be flushed out.

5. Check that the ATF level is between the “HOT” marks on the oil level gauge. If the ATF level is too low, add more ATF until the level reaches between the “HOT” marks.

   Automatic transmission fluid:
   DIA QUEEN ATF SP II M, SP III or equivalent

   NOTE
   If the ATF level is too low, the oil pump draws air into the system along with the ATF, and air bubbles will thus form in the fluid circuit. This will cause a drop in fluid pressure and cause the shift points to change and the clutches and brakes to slip.
   If the ATF level is too high, the gear will churn the ATF and cause bubbles to develop, which can then cause the same problems as when the ATF fluid is too low. In either case, the air bubbles can cause overheating and oxidation of the ATF, and also prevent the valves, clutches and brakes from operating normally. In addition, if bubbles develop in the ATF, the ATF can overflow from the transmission vent holes and be mistaken for leaks.

6. Securely re-insert the oil level gauge.
AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT

NOTE
Before replacing the transmission with a new one, overhauling the existing transmission, or connecting the cooler pipe to the transmission, the ATF cooler line should always be flushed out.

If you have an ATF changer, use the ATF changer to flush the ATF. If you do not have an ATF changer, follow the procedure given below.

1. Remove the hose shown in the illustration which allows the ATF to flow from the ATF cooler (built into the radiator) to the transmission.
2. Start the engine and discharge the ATF.
   Driving conditions: N range, idling
   NOTE
   The engine should be stopped within one minute of it being started. If the ATF has all been discharged before this, stop the engine at that point.
   Discharge amount: Approx. 4.0 L

3. Remove the drain plug at the bottom of the transmission case to drain out the remaining ATF.
   Discharge amount: Approx. 2.0 L
4. Install the drain plug with a gasket in between, and tighten it to the specified torque.
   Tightening torque: 32 ± 2 N·m
5. Pour in new ATF through the oil filler tube.
   Amount to add: Approx. 6.0 L
   NOTE
   Stop pouring in the ATF once 6.0 litre has been poured in.
6. Repeat the operation in step 2.
   NOTE
   Carry out steps 2 and 6 so that at least 8.0 litre has been discharged from the cooler hose. After this, discharge a small quantity of ATF and check for contamination. If the ATF is contaminated, repeat steps 5 and 6.
7. Pour in new ATF through the oil filler tube.
   Amount to add: Approx. 4.0 L
8. Connect the hose which was disconnected in step 1, and then securely re-insert the oil level gauge.
9. Start the engine, and let it run at idle for 1 - 2 minutes.
10. Move the selector lever to all positions once, and then return it to the N position.
11. Check that the ATF level on the oil level gauge is at the “COLD” mark. If it is not up to this mark, add more ATF.

12. Drive the vehicle until the ATF temperature reaches the normal temperature (70 - 80°C), and then re-check the ATF level. The ATF level must be between the HOT marks.

NOTE
(1) The “COLD” mark is for reference only; the “HOT” marks should be used as the standard for judgment.
(2) Measure ATF temperature using MUT-II.
(3) Check the oil level referring to the characteristics chart shown at left if it takes some time until reaching the normal operation temperature of ATF (70 - 80°C.)

13. Securely insert the oil level gauge into the oil filler tube.

ATF COOLER LINE FLUSHING PROCEDURE

NOTE
If replacing the transmission with a new one, if overhauling the existing transmission, or if the ATF has deteriorated or is contaminated, the ATF cooler line must always be flushed out.

1. Remove the hose shown in the illustration which allows the ATF to flow from the ATF cooler (built into the radiator) to the transmission.
2. Start the engine and discharge the ATF.
   Driving conditions: N range, idling
   NOTE
   The engine should be stopped within one minute of it being started. If the ATF has all been discharged before this, stop the engine at that point.
   Discharge amount: Approx. 4.0 L
3. Pour in new ATF through the oil filler tube.
   Amount to add: Approx. 4.0 L
NOTE
Stop pouring in the ATF once 4.0 litre has been poured in.
4. Repeat the operation in step 2.
NOTE
Carry out steps 2 and 6 so that at least 8.0 L has been discharged from the cooler hose. After this, discharge a small quantity of ATF and check for contamination. If the ATF is contaminated, repeat steps 3 and 4.
5. Carry out the procedure in “Automatic Transmission Fluid (ATF) Replacement” from step 3 onwards.

ACCELERATOR PEDAL POSITION SENSOR (APS) ADJUSTMENT
Refer to GROUP 13 - On-vehicle Service.

INHIBITOR SWITCH CONTINUITY CHECK

<table>
<thead>
<tr>
<th>Item</th>
<th>Terminal No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 7 8 9 10</td>
</tr>
<tr>
<td>P</td>
<td>O O O O O O</td>
</tr>
<tr>
<td>R</td>
<td>O O O O O O</td>
</tr>
<tr>
<td>N</td>
<td>O O O O O O</td>
</tr>
<tr>
<td>D</td>
<td>O O O O O O</td>
</tr>
</tbody>
</table>

NOTE
The inhibitor switch has 7 positions, but only four positions (P, R, N and D) are used.
INHIBITOR SWITCH AND CONTROL CABLE ADJUSTMENT

1. Move the selector lever to the N position.
2. Loosen the adjusting nut, and set the manual control lever upper and lower to the free condition.
3. Move the manual control lever lower to the neutral position.
4. Loosen the inhibitor switch body mounting bolt, and then turn the inhibitor switch to adjust so that the hole at the end of the manual control lever lower and the hole in the inhibitor switch body flange (section A - A in the illustration at left) are aligned.
5. Tighten the inhibitor switch body mounting bolt to the specified torque.

**Tightening torque: 11 ± 1 N·m**

**NOTE**
Be careful not to let the inhibitor switch body slip out of place.

6. Gently push the transmission control cable in the direction of B as shown in the illustration at left, and tighten the adjusting nut to the specified torque.

**Tightening torque: 24 ± 4 N·m**

7. Check that the selector lever is at the “N” position.
8. Check that the transmission shifts to the correct range corresponding to the position of the selector lever, and that it functions correctly in that range.

---

2WD/4WD SWITCH CONTINUITY CHECK

Check the continuity between the terminals of the black connector shown in the illustration at left and the transfer case.

<table>
<thead>
<tr>
<th>Transfer lever position</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2H, 4H</td>
<td>Continuity</td>
</tr>
<tr>
<td>4HLc, 4LLc</td>
<td>No continuity</td>
</tr>
</tbody>
</table>

4H SWITCH CONTINUITY CHECK

Check the continuity between the milky-white connector terminals shown in the illustration at left and the transfer case.

<table>
<thead>
<tr>
<th>Transfer lever position</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2H, 4LLc</td>
<td>No continuity</td>
</tr>
<tr>
<td>4H, 4HLc</td>
<td>Continuity</td>
</tr>
</tbody>
</table>
CENTER DIFFERENTIAL LOCK SWITCH CONTINUITY CHECK
Check the continuity between the terminals of the brown connector shown in the illustration at left and the transfer case.

<table>
<thead>
<tr>
<th>Transfer lever position</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2H, 4H</td>
<td>No continuity</td>
</tr>
<tr>
<td>4HLc, 4LLc</td>
<td>Continuity</td>
</tr>
</tbody>
</table>

2WD SWITCH CONTINUITY CHECK
Check the continuity between the terminals of the black connector shown in the illustration at left and the transfer case.

<table>
<thead>
<tr>
<th>Transfer lever position</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2H</td>
<td>Continuity</td>
</tr>
<tr>
<td>4H, 4HLc, 4LLc</td>
<td>No continuity</td>
</tr>
</tbody>
</table>

4LLc SWITCH CONTINUITY CHECK
Check the continuity between the terminals of the brown connector shown in the illustration at left and the transfer case.

<table>
<thead>
<tr>
<th>Transfer lever position</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>4LLc</td>
<td>Continuity</td>
</tr>
<tr>
<td>2H, 4H, 4HLc</td>
<td>No continuity</td>
</tr>
</tbody>
</table>

TRANSFER OIL CHECK
1. Remove the oil filler plug.
2. Check that the oil reaches the hole at the bottom of the oil filler plug.
3. Check that the oil is not severely contaminated, and that it has an appropriate level of viscosity.
4. Install the oil filler plug, and tighten it to the specified torque.
   
   **Tightening torque: 32 ± 2 N·m**

TRANSFER OIL CHANGE
1. Remove the oil drain plug and drain the oil.
2. Install the oil filler plug, and tighten it to the specified torque.
   
   **Tightening torque: 32 ± 2 N·m**
3. Remove the oil filler plug, and pour in oil until it reaches the bottom of the oil filler plug.
Specified lubricant: Hypoid gear oil SAE 75W-90 or 75W-85W conforming to API GL-4

Oil level: 2.8 L

4. Install the oil filler plug, and tighten it to the specified torque.

Tightening torque: $32 \pm 2 \text{ N} \cdot \text{m}$
## LOCATION OF CONTROL COMPONENTS

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input shaft speed sensor</td>
<td>O</td>
<td>Freewheel engage switch</td>
<td>N</td>
</tr>
<tr>
<td>Output shaft speed sensor</td>
<td>V</td>
<td>Vehicle speed sensor</td>
<td>T</td>
</tr>
<tr>
<td>Crank angle sensor &lt;6G7&gt;</td>
<td>B</td>
<td>Stop lamp switch</td>
<td>F</td>
</tr>
<tr>
<td>Engine speed sensor &lt;4M4&gt;</td>
<td>D</td>
<td>Shift actuator</td>
<td>S</td>
</tr>
<tr>
<td>A/T fluid temperature sensor</td>
<td>U</td>
<td>A/T control solenoid valve assembly</td>
<td>U</td>
</tr>
<tr>
<td>Inhibitor switch</td>
<td>P</td>
<td>Diagnosis connector</td>
<td>I</td>
</tr>
<tr>
<td>Wide open throttle switch</td>
<td>H</td>
<td>Engine-ECU &lt;4M4&gt;</td>
<td>L</td>
</tr>
<tr>
<td>Shift switch (UP, DOWN)</td>
<td>J</td>
<td>A/T-ECU &lt;4M4&gt;</td>
<td>L</td>
</tr>
<tr>
<td>Select switch</td>
<td>J</td>
<td>Engine-A/T-ECU &lt;6G7&gt;</td>
<td>L</td>
</tr>
<tr>
<td>Dual pressure switch</td>
<td>C</td>
<td>Transfer-ECU</td>
<td>E</td>
</tr>
<tr>
<td>Accelerator pedal position sensor (APS)</td>
<td>G</td>
<td>A/T control relay</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Center differential lock switch</td>
<td>R</td>
</tr>
<tr>
<td>Solenoid valve A, B</td>
<td>A</td>
<td>2WD/4WD switch</td>
<td>R</td>
</tr>
<tr>
<td>Transfer lever switch</td>
<td>K</td>
<td>2WD switch</td>
<td>R</td>
</tr>
<tr>
<td>Front propeller shaft speed sensor</td>
<td>Q</td>
<td>4H switch</td>
<td>R</td>
</tr>
<tr>
<td>Rear propeller shaft speed sensor</td>
<td>W</td>
<td>4LLc switch</td>
<td>R</td>
</tr>
</tbody>
</table>

**<6G7>**

**<4M4>**
CONTROL COMPONENT CHECKS

CRANK ANGLE SENSOR CHECK <6G7>
Refer to GROUP 13A - Troubleshooting.

ENGINE SPEED SENSOR CHECK <4M4>
Refer to GROUP 13B - Troubleshooting.

ACCELERATOR PEDAL POSITION SENSOR (APS) CHECK
Refer to GROUP 13A - On-vehicle Service.

INHIBITOR SWITCH CONTINUITY CHECK
Refer to P.23-98.

STOP LAMP SWITCH CHECK
Refer to 35A - Brake Pedal.

VEHICLE SPEED SENSOR CHECK
Refer to GROUP 54 - Combination Meter.

DUAL PRESSURE SWITCH CHECK
Refer to GROUP 55A - On-vehicle Service.

A/T FLUID TEMPERATURE SENSOR CHECK
1. Remove the A/T fluid temperature sensor.

2. Measure the resistance between terminals (1) and (2) of the A/T fluid temperature sensor.

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>Resistance [kΩ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>16.7 - 20.5</td>
</tr>
<tr>
<td>20</td>
<td>7.3 - 8.9</td>
</tr>
<tr>
<td>40</td>
<td>3.4 - 4.2</td>
</tr>
<tr>
<td>60</td>
<td>1.9 - 2.2</td>
</tr>
<tr>
<td>80</td>
<td>1.0 - 1.2</td>
</tr>
<tr>
<td>100</td>
<td>0.57 - 0.69</td>
</tr>
</tbody>
</table>
NOTE
The N range indicator lamp on the combination meter flashes when the temperature reaches approximately 125°C or higher, and then stops flashing when the temperature drops below approximately 115°C.

3. If the A/T fluid temperature sensor resistance and the temperature when the N range indicator lamp is flashing or switched off are outside the standard value ranges, replace the A/T fluid temperature sensor.

A/T CONTROL RELAY CHECK
1. Remove the A/T control relay.

2. Use jumper leads to connect terminal (2) of the A/T control relay to the battery (–) terminal, and terminal (4) to the battery (+) terminal.

3. Check the continuity between terminals (1) and (3) of the A/T control relay while alternately connecting and disconnecting the jumper leads from the battery terminals.

<table>
<thead>
<tr>
<th>Jumper leads</th>
<th>Continuity between terminals (1) and (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connected</td>
<td>Continuity</td>
</tr>
<tr>
<td>Disconnected</td>
<td>No continuity</td>
</tr>
</tbody>
</table>

4. If there is a malfunction, replace the A/T control relay.

A/T CONTROL SOLENOID VALVE ASSEMBLY CHECK
1. Remove the valve body cover.
2. Disconnect the connectors for each solenoid valve.
3. Measure the resistances between terminals (1) and (2) of each solenoid valve.

**Standard value:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Resistance value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damper clutch control (DCC) solenoid valve</td>
<td>2.7 - 3.4 kΩ at 20°C</td>
</tr>
<tr>
<td>Low &amp; reverse solenoid valve (LR solenoid valve)</td>
<td></td>
</tr>
<tr>
<td>Second solenoid valve (2ND solenoid valve)</td>
<td></td>
</tr>
<tr>
<td>Underdrive solenoid valve (UD solenoid valve)</td>
<td></td>
</tr>
<tr>
<td>Overdrive solenoid valve (OD solenoid valve)</td>
<td></td>
</tr>
<tr>
<td>Reduction (RED) solenoid valve</td>
<td></td>
</tr>
</tbody>
</table>

4. If a measurement value is outside the standard value range, replace the solenoid valve.

**SELECT SWITCH CHECK**

Refer to P.23-119.

**SHIFT SWITCH ASSEMBLY CHECK**

Refer to P.23-119.
TORQUE CONVERTER STALL TEST

The purpose of this test is to measure the maximum engine speed when the torque converter stalls in D or R ranges in order to check the torque converter operation and the holding performance of the clutches and brakes which are built into the transmission.

NOTE
For safety, the front and rear of the vehicle should be kept clear of other people while this test is being carried out.

1. Check the ATF level, the ATF temperature and the engine coolant temperature.
   - ATF level: “HOT” position on oil level gauge
   - ATF temperature: 70 - 80°C
   - Engine coolant temperature: 80 - 100°C
2. Place wheel locks on both the left and right front wheels.
3. Pull the parking brake lever to apply the parking brake and depress the brake pedal fully.
4. Start the engine.
5. Move the selector lever to the D position, fully depress the accelerator pedal and quickly take a reading of the maximum engine speed at this time.

Caution
(1) Do not keep the throttle fully open for any longer than 8 seconds.
(2) If carrying out the stall test two or more times, move the selector lever to the N position and run the engine at a speed of 1000 r/min to let the ATF cool down before the next test is carried out.

Standard value - Stalling speed:
2,200 - 2,700 r/min <6G7>
2,400 - 2,900 r/min <4M4>

6. Move the selector lever to the R position and repeat the test described above.

Standard value - Stalling speed:
2,200 - 2,700 r/min <6G7>
2,400 - 2,900 r/min <4M4>

Torque converter stall test judgment
1. High stalling speed in both D and R ranges
   - Low line pressure
   - Low & reverse brake slipping
2. High stalling speed in D range only
   - Underdrive clutch slipping
3. High stalling speed in D range only
   - Reverse clutch slipping
   - Reduction brake slipping
4. High stalling speed in both D and R ranges
   - Malfunction of torque converter
   - Poor engine output
**FLUID PRESSURE TEST**

1. Let the engine warm up until the ATF temperature is 70 - 80°C.
2. Jack up the vehicle so that the tires can spin freely.
3. Install the special tool (MD998330: 2,992 kPa oil pressure gauge) and the adapters (MD998332, MD998900) to each hydraulic pressure outlet port.
4. Measure the various hydraulic pressures under the conditions given in the standard hydraulic pressure table, and check that the measurements are within the standard value ranges.
5. If the measurements are outside the standard value range, remedy the problem while referring to the hydraulic pressure test diagnosis table.

**NOTE**

- RC : Reverse clutch pressure port
- TR : Torque converter pressure port
- TA : Damper clutch pressure port
- OC : Overdrive clutch pressure port
- 2B : Second brake pressure port
- LB : Low & brake pressure port
- UC : Underdrive clutch pressure port
- RB : Reduction brake pressure port
- DC : Direct clutch pressure port

**STANDARD HYDRAULIC PRESSURE TABLE**

<table>
<thead>
<tr>
<th>Measurement conditions</th>
<th>Standard hydraulic pressure kPa</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>-</td>
</tr>
<tr>
<td>R</td>
<td>Reverse</td>
</tr>
<tr>
<td>N</td>
<td>-</td>
</tr>
<tr>
<td>Sports mode</td>
<td>1st</td>
</tr>
<tr>
<td></td>
<td>2nd</td>
</tr>
<tr>
<td></td>
<td>3rd</td>
</tr>
<tr>
<td></td>
<td>4th</td>
</tr>
<tr>
<td></td>
<td>5th</td>
</tr>
</tbody>
</table>
## HYDRAULIC PRESSURE TEST DIAGNOSIS TABLE

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Problem location</th>
</tr>
</thead>
<tbody>
<tr>
<td>All hydraulic pressures are too high</td>
<td>Malfunction of regulator valve</td>
</tr>
<tr>
<td>All hydraulic pressures are too low</td>
<td>Malfunction of oil pump&lt;br&gt;Blocked oil filter&lt;br&gt;Blocked oil cooler&lt;br&gt;Malfunction of regulator valve&lt;br&gt;Malfunction of relief valve&lt;br&gt;Incorrect valve body installation</td>
</tr>
<tr>
<td>Abnormal hydraulic pressure in R range only</td>
<td>Malfunction of regulator valve</td>
</tr>
<tr>
<td>Abnormal hydraulic pressure in 3rd or 4th only</td>
<td>Malfunction of regulator valve&lt;br&gt;Malfunction of switch bulb</td>
</tr>
<tr>
<td>Abnormal UD pressure only</td>
<td>Malfunction of oil seal K, L, M or Q&lt;br&gt;Malfunction of underdrive solenoid valve&lt;br&gt;Malfunction of underdrive pressure control valve&lt;br&gt;Abnormality with check ball&lt;br&gt;Blocked orifices&lt;br&gt;Incorrect valve body installation</td>
</tr>
<tr>
<td>Abnormal REV pressure only</td>
<td>Malfunction of oil seal A, B or C&lt;br&gt;Abnormality with check ball&lt;br&gt;Blocked orifices&lt;br&gt;Incorrect valve body installation</td>
</tr>
<tr>
<td>Abnormal OD pressure only</td>
<td>Malfunction of oil seal D, E or F&lt;br&gt;Malfunction of overdrive solenoid valve&lt;br&gt;Malfunction of overdrive pressure control valve&lt;br&gt;Abnormality with check ball&lt;br&gt;Blocked orifices&lt;br&gt;Incorrect valve body installation</td>
</tr>
<tr>
<td>Abnormal DIR pressure only</td>
<td>Malfunction of oil seal R, S or T&lt;br&gt;Malfunction of low &amp; reverse solenoid valve&lt;br&gt;Malfunction of low &amp; reverse pressure control valve&lt;br&gt;Malfunction of switch bulb&lt;br&gt;Malfunction of fail-safe valve C&lt;br&gt;Blocked orifices&lt;br&gt;Incorrect valve body installation</td>
</tr>
<tr>
<td>Abnormal LR pressure only</td>
<td>Malfunction of oil seal I, J or P&lt;br&gt;Malfunction of low &amp; reverse solenoid valve&lt;br&gt;Malfunction of low &amp; reverse pressure control valve&lt;br&gt;Malfunction of switch bulb&lt;br&gt;Malfunction of fail-safe valve A&lt;br&gt;Abnormality with check ball&lt;br&gt;Blocked orifices&lt;br&gt;Incorrect valve body installation</td>
</tr>
<tr>
<td>Abnormal 2ND pressure only</td>
<td>Malfunction of oil seal G, H or O&lt;br&gt;Malfunction of second solenoid valve&lt;br&gt;Malfunction of second pressure control valve&lt;br&gt;Malfunction of fail-safe valve B&lt;br&gt;Blocked orifices&lt;br&gt;Incorrect valve body installation</td>
</tr>
<tr>
<td>Symptom</td>
<td>Problem location</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>Abnormal RED pressure only</td>
<td>Malfunction of oil seal U or V</td>
</tr>
<tr>
<td></td>
<td>Malfunction of reaction solenoid valve</td>
</tr>
<tr>
<td></td>
<td>Malfunction of reduction pressure control valve</td>
</tr>
<tr>
<td></td>
<td>Blocked orifices</td>
</tr>
<tr>
<td></td>
<td>Incorrect valve body installation</td>
</tr>
<tr>
<td>Abnormal DR pressure only</td>
<td>Blocked oil cooler</td>
</tr>
<tr>
<td></td>
<td>Malfunction of oil seal N</td>
</tr>
<tr>
<td></td>
<td>Malfunction of damper clutch control solenoid valve</td>
</tr>
<tr>
<td></td>
<td>Malfunction of damper clutch control solenoid valve</td>
</tr>
<tr>
<td></td>
<td>Malfunction of torque converter pressure control valve</td>
</tr>
<tr>
<td></td>
<td>Blocked orifices</td>
</tr>
<tr>
<td></td>
<td>Incorrect valve body installation</td>
</tr>
<tr>
<td>Pressure applied to non-operating element</td>
<td>Incorrect transmission control cable adjustment</td>
</tr>
<tr>
<td></td>
<td>Malfunction of manual valve</td>
</tr>
<tr>
<td></td>
<td>Incorrect valve body installation</td>
</tr>
</tbody>
</table>
1. Reverse clutch
2. LR brake
3. 2nd brake
4. UD clutch
5. OD clutch
6. RED clutch
7. DIR clutch
8. Accumulator
9. Check ball
10. Damper clutch
11. Fail-safe valve A
12. Fail-safe valve B
13. Fail-safe valve C
14. Damper clutch control solenoid valve
15. Switch bulb
16. Oil cooler
17. LR pressure control valve
18. 2nd pressure control valve
19. UD pressure control valve
20. OD pressure control valve
21. RED pressure control valve
22. DCC solenoid valve
23. LR solenoid valve
24. 2ND solenoid valve
25. UD solenoid valve
26. OD solenoid valve
27. RED solenoid valve
28. Torque converter pressure control valve
29. Regulator valve
30. Manual valve
31. Oil filter
32. Oil pump
33. Relief valve
34. Oil strainer
35. Oil pan
LINE PRESSURE ADJUSTMENT
1. Discharge the ATF, and then remove the valve body cover.
2. Turn the adjusting screw shown in the illustration at left to adjust the UD pressure until it is at the standard value. The pressure increases when the screw is turned anti-clockwise.

   NOTE
   Adjust to the middle of the standard range when the transmission is at the 1st or 2nd gear.

   Standard value: 1,010 - 1,050 kPa

   Change in pressure for a single full turn of the adjusting screw: 35 kPa

3. Install the valve body cover, and then pour in the specified amount of ATF.
4. Carry out a fluid pressure test. (Refer to P.23-106.) Readjust if necessary.

SELECTOR LEVER OPERATION CHECK
1. Apply the parking brake, and check that the selector lever moves smoothly and accurately to each range position.
2. Check that the engine starts when the selector lever is at the N or P position, and that it does not start when the selector lever is in any other position.
3. Start the engine, release the parking brake, and check that the vehicle moves forward when the selector lever is moved from N range to 1st or 2nd gear, and that the vehicle reverses when the selector lever is moved to R range.
4. Stop the engine.
5. Turn the ignition switch to the ON position, and check that the backup lamp illuminates and the buzzer sounds when the selector lever is shifted from P to R range.

   NOTE
   The A/T mis-operation prevention mechanism is provided so that the selector lever cannot be moved from the P position if the ignition switch is at a position other than the LOCK (OFF) position and the brake pedal is not depressed.
KEY INTERLOCK MECHANISM CHECK

1. Carry out the following check.

<table>
<thead>
<tr>
<th>Inspection procedure</th>
<th>Inspection conditions</th>
<th>Check details (Normal condition)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brake pedal: Depressed</td>
<td>Ignition switch position: LOCK (OFF) or pulled out</td>
</tr>
<tr>
<td>2</td>
<td>Ignition switch position: Other than “LOCK (OFF) or pulled out”</td>
<td>The selector lever can easily be moved from the P position to some other position when the pushbutton on the selector lever is being pressed.</td>
</tr>
<tr>
<td>3</td>
<td>Brake pedal: Released</td>
<td>Selector lever position: Other than “P”</td>
</tr>
<tr>
<td>4</td>
<td>Selector lever position: “P”</td>
<td>The ignition switch can turn smoothly to the LOCK (OFF) position.</td>
</tr>
</tbody>
</table>

2. If the above operations do not occur correctly, adjust the shift lock cable unit by the following procedure.
   (1) Remove the front floor console, and then provisionally install the selector lever knob. (Refer to GROUP 52A.)
   (2) Move the selector lever to the P position and turn the ignition switch to the LOCK (OFF) position.
   (3) Loosen the shift lock cable unit fixing bolt, and then while pushing the lever in the direction of B and the unit in direction of C, tighten the bolt to the specified torque of $5.0 \pm 1.0$ N-m.
   (4) Lift the lock guide to unlock the key interlock cable.
   (5) While pushing the cap of the key interlock cable in the direction of B, lower the lock guide to lock the cable.

**NOTE**
The lock position at this time (the amount by which the cap is pushed) represents the amount of adjustment for the key interlock cable. If the key interlock cable does not operate correctly, adjust the lock position.

3. After adjusting, check the operation once more. If the operation is still incorrect, replace the shift lock cable unit. (Refer to P.23-120)

![View A](AX0624CA)

![View B](AX0625CA)
SHIFT LOCK MECHANISM CHECK

1. Carry out the following check.

<table>
<thead>
<tr>
<th>Inspection procedure</th>
<th>Inspection conditions</th>
<th>Check details (Normal condition)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brake pedal: Depressed Ignition switch position: “ACC”</td>
<td>The selector lever cannot be moved from the P position to any other position when the pushbutton on the selector lever is not being pressed.</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>The selector lever can easily be moved from the P position to some other position when the pushbutton on the selector lever is being pressed.</td>
</tr>
<tr>
<td>3</td>
<td>Brake pedal: Released</td>
<td>The selector lever can easily be moved from the R position to the P position when the pushbutton on the selector lever is being pressed.</td>
</tr>
</tbody>
</table>

2. If the above operations do not occur correctly, adjust the shift lock cable unit by the following procedure.

   (1) Remove the front floor console, and then provisionally install the selector lever knob. (Refer to GROUP 52A.)
   (2) Move the selector lever to the P position and turn the ignition switch to the LOCK (OFF) position.
   (3) Loosen the shift lock cable unit fixing bolt, and then while pushing the lever in the direction of B and the unit in direction of C, tighten the bolt to the specified torque of $5.0 \pm 1.0\ N\cdot m$.
   (4) Lift the lock guide to unlock the key interlock cable.
   (5) While pushing the cap of the key interlock cable in the direction of B, lower the lock guide to lock the cable.

   **NOTE**
   The lock position at this time (the amount by which the cap is pushed) represents the amount of adjustment for the key interlock cable. If the key interlock cable does not operate correctly, adjust the lock position.

3. After adjusting, check the operation once more. If the operation is still incorrect, replace the shift lock cable unit. (Refer to P.23-120)
TRANSFER SHIFT LEVER OPERATION CHECK

1. Check that the transfer shift lever moves smoothly and correctly to each transfer position when the lever is pushed downwards and moved.

2. Apply the parking brake, turn the ignition switch to the ON position and move the selector lever to N range.

3. Check that the 4WD indicator lamp illuminates, flashes or switches off according to the pattern shown in the illustration when the transfer shift lever is moved to each transfer position.

4. If the selection is not completed even after 5 seconds or more have passed, carry out the following procedure.
   (1) Return the transfer shift lever to the position it was at before selection.
   (2) Start the engine, drive the vehicle straight forward, and then stop the engine.
   (3) Apply the parking brake, and then move the selector lever to the N position.
   (4) Operate the transfer shift lever once more.

   NOTE
   If the vehicle is not fully stopped or if the selector lever is at a position other than N when selecting 4HLc or 4LLc, the 4WD indicator lamp will flash more quickly than normal, and the 4WD range will not be selected. This is a normal phenomenon which serves to control the smooth selection of 4HLc and 4LLc.

TRANSMISSION CONTROL CABLE ADJUSTMENT

1. Move the selector lever to the N position.
2. Loosen the upper control lever adjusting nut.
3. Check that the inhibitor switch is at N range.
4. Adjust the upper control lever so that there is no slackness or excessive tightness in the transmission control cable, and then tighten the adjusting nut to the specified torque.

   Tightening torque: 24 ± 4 N-m

5. Check that the transmission shifts to the correct range corresponding to the position of the selector lever, and that it functions correctly in that range.
TRANSFER-ECU CHECK
1. Remove the indicator panel and the floor console front panel. (Refer to GROUP 52A - Floor Console.)
2. Measure the transfer-ECU terminal voltage. (Refer to P.23-89.)

POSITION INDICATOR LAMP CHECK
1. Remove the indicator panel. (Refer to GROUP 52A - Floor Console.)
2. Check that there is continuity between terminals (1) and (2) and between terminals (3) and (4).
TRANSMISSION CONTROL

REMOVAL AND INSTALLATION

NOTE
When removing and installing the transmission control cable and shift lock cable unit, be careful not to hit them against the SRS-ECU.

Selector lever assembly and transmission control cable assembly removal steps
- Front floor console (Refer to GROUP 52A.)
  1. Transfer shift lever and bracket assembly
  2. Shift lock cable unit connection
  3. Transmission control harness connection
  4. Transmission control cable connection
  5. Selector lever assembly
- Front exhaust pipe (Refer to GROUP 15.)

Transfer shift lever removal steps
- Indicator panel (Refer to GROUP 52A - Floor Console.)
  6. Transmission control cable assembly

Wide open throttle switch removal step
  7. Transfer shift lever
  8. Bracket
  9. Wide open throttle switch
REMOVAL SERVICE POINT

A TRANSMISSION CONTROL CABLE ASSEMBLY REMOVAL
1. Support the transmission mount center member with a transmission jack, and then remove the transmission mount center member mounting bolts.
2. Lower the transmission so that there is enough room available to remove the transmission control cable assembly mounting nuts, and then remove the transmission control cable assembly mounting nuts.

INSTALLATION SERVICE POINTS

A TRANSMISSION CONTROL CABLE ASSEMBLY INSTALLATION
After installing the transmission control cable assembly, install the transmission mount center member mounting bolts and tighten them to the specified torque of 44 ± 10 N·m.

B SHIFT LOCK CABLE UNIT INSTALLATION
1. Provisionally install the selector lever knob, and then move the selector lever to the P position and turn the ignition switch to the LOCK (OFF) position.
2. After installing the rod of the shift lock cable unit to the lock cam of the selector lever assembly, install the bolts of the shift lock cable unit.
3. Check the operation of the selector lever assembly. (Refer to P.23-111.)

INSPECTION
TRANSFER SHIFT LEVER SWITCH CONTINUITY CHECK

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Terminal No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>2H</td>
<td>〇</td>
</tr>
<tr>
<td>4H</td>
<td>〇</td>
</tr>
<tr>
<td>4HLC</td>
<td>〇</td>
</tr>
<tr>
<td>4LLC</td>
<td>〇</td>
</tr>
</tbody>
</table>
SELECTOR LEVER ASSEMBLY
DISASSEMBLY AND REASSEMBLY

Disassembly steps
1. Knob cover B
2. Knob cover A
3. Shift knob
4. Sleeve
5. Pushbutton
6. Detent spring
7. Snap ring
8. Shaft
9. Arm assembly
10. Bushing
11. Arm cover
12. Bolt
13. Universal joint
14. Lever assembly
15. Stay cover
16. Shift switch assembly
17. Snap ring
18. Malfunction of lock cam
19. Detent plate assembly
20. Collar
21. Base bracket
## INSPECTION

### SHIFT SWITCH ASSEMBLY CONTINUITY CHECK

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Terminal No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Select switch</td>
<td>ON</td>
</tr>
<tr>
<td>Select switch</td>
<td>OFF</td>
</tr>
<tr>
<td>Shift switch</td>
<td>ON</td>
</tr>
<tr>
<td>Shift switch</td>
<td>OFF</td>
</tr>
<tr>
<td>Shift switch</td>
<td>ON</td>
</tr>
<tr>
<td>Shift switch</td>
<td>OFF</td>
</tr>
</tbody>
</table>
SHIFT LOCK AND KEY INTERLOCK MECHANISMS

REMOVAL AND INSTALLATION

NOTE
When removing and installing the transmission control cable and shift lock cable unit, be careful not to hit them against the SRS-ECU.

Removal steps
- Front floor console (Refer to GROUP 52A.)
- Switch panel and lower column cover (Refer to GROUP 52A - Instrument Panel.)

1. Shift lock cable unit connection
2. Key interlock cable connection
3. Cover
4. Lock bar
5. Shift lock cable connection
6. Shift lock cable unit
REMOVAL SERVICE POINT

◆ KEY INTERLOCK CABLE REMOVAL
Turn the ignition switch to the ACC position, and then pull the key interlock cable out from the ignition key cylinder.

INSTALLATION SERVICE POINT

◆ SHIFT LOCK CABLE UNIT INSTALLATION
1. Provisionally install the selector lever knob, and then move the selector lever to the P position and turn the ignition switch to the LOCK (OFF) position.
2. After installing the rod of the shift lock cable unit to the lock cam of the selector lever assembly, install the bolts of the shift lock cable unit.
3. Check the operation of the selector lever assembly.(Refer to P.23-111.)
NOTE
The rear propeller shaft incorporates a carbon fibre-reinforced plastic tube, so be sure to refer to GROUP 25 during removal.

<6G7>

### Pre-removal and Post-installation Operations
- Skid Plate And Under Cover Removal and Installation
- Transmission Fluid and Transfer Oil Draining and Filling (Refer to P.23-95 and P.23-99.)
- Front and Rear Propeller Shaft Removal and Installation (Refer to GROUP 25.)
- Front Exhaust Pipe Removal and Installation (Refer to GROUP 15.)
- Radiator Shroud Lower Cover Removal and Installation (Refer to GROUP 14.)

### Removal steps
1. Oil level gauge assembly
2. Transmission control cable connection
3. Drive plate connection bolts
4. Heater hose connection
5. Cover
6. Starter motor
7. Starter cover
8. Oil pan connection bolts
9. Battery cable connection
10. Oil cooler tube connection
11. Dynamic damper
12. Tension wire bracket
   • Support the transmission with a transmission jack
13. Transmission mount center member assembly

14. Transmission mount insulator assembly
15. Transmission harness connector connection
16. Transmission assembly
17. Tension wire
Pre-removal and Post-installation Operations

- Skid Plate and Under Cover Removal and Installation
- Transmission Fluid and Transfer Oil Draining and Filling (Refer to P.23-95 and P.23-99.)
- Front and Rear Propeller Shaft Removal and Installation (Refer to GROUP 25.)
- Front Exhaust Pipe and Catalytic Converter Removal and Installation (Refer to GROUP 15.)

- Radiator Shroud Lower Cover Removal and Installation (Refer to GROUP 14.)
- Intercooler Assembly Removal and Installation (Refer to GROUP 15.)

Removal steps
1. Oil level gauge assembly
2. Transmission control cable connection
3. Exhaust support bracket
4. Battery cable connection
5. Spacing rubber
6. Dust cover
7. Drive plate connection bolts
8. Heater hose connection
9. Starter motor
10. Oil cooler tube connection  
11. Dynamic damper  
12. Tension wire bracket  
   • Support the transmission with a transmission jack  
13. Transmission mount center member assembly  
14. Transmission mount insulator assembly  
15. Transmission harness connector connection  
16. Transmission assembly  
17. Tension wire  

**REMOVAL SERVICE POINTS**

**A** DRIVE PLATE CONNECTION BOLT REMOVAL

1. While turning the crankshaft, remove the six connection bolts.  
2. Push the torque converter towards the transmission so that none of it is near the engine.
TRANSMISSION HARNESS CONNECTOR DISCONNECTION

1. Lower the transmission to a position where the transmission harness connector can be disconnected, and then disconnect the connector.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Connector name</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Transmission wiring harness and battery wiring harness combination</td>
</tr>
<tr>
<td>B</td>
<td>Output shaft speed sensor</td>
</tr>
<tr>
<td>C</td>
<td>A/T control solenoid valve assembly</td>
</tr>
<tr>
<td>D</td>
<td>4LLc (Direct low range 4WD) switch</td>
</tr>
<tr>
<td>E</td>
<td>2WHEY operation detection switch</td>
</tr>
<tr>
<td>F</td>
<td>Rear propeller shaft speed sensor</td>
</tr>
<tr>
<td>G</td>
<td>Vehicle speed sensor</td>
</tr>
<tr>
<td>H</td>
<td>Shift actuator</td>
</tr>
<tr>
<td>I</td>
<td>2WHEY/4WD detection switch</td>
</tr>
<tr>
<td>J</td>
<td>4H (Full time 4WD) detection switch</td>
</tr>
<tr>
<td>K</td>
<td>Center differential lock detection switch</td>
</tr>
<tr>
<td>L</td>
<td>Front propeller shaft speed sensor</td>
</tr>
<tr>
<td>M</td>
<td>Oxygen sensor (Rear)</td>
</tr>
<tr>
<td>N</td>
<td>Inhibitor switch</td>
</tr>
<tr>
<td>O</td>
<td>Oxygen sensor (Front)</td>
</tr>
<tr>
<td>P</td>
<td>Input shaft speed sensor</td>
</tr>
</tbody>
</table>

2. Place the disconnected transmission harness so that it stays on the vehicle body.

INSTALLATION SERVICE POINTS

TRANSMISSION ASSEMBLY INSTALLATION

The bolt lengths differ according to where they are to be installed, so do not install them in the wrong place.

<table>
<thead>
<tr>
<th>&lt;6G7&gt;</th>
<th>Bolts</th>
<th>d × l mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>12 × 40</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>12 × 55</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>&lt;4M4&gt;</th>
<th>Bolts</th>
<th>d × l mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>10 × 25</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>10 × 45</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>10 × 50</td>
<td></td>
</tr>
</tbody>
</table>
Transmission Oil Cooler Removal and Installation

Pre-removal and Post-installation Operations

- Transmission Fluid Draining and Filling (Refer to P.23-95 and P.23-99.)
- Skid Plate and Under Cover Removal and Installation

<6G7>

Transmission oil cooler removal steps

1. Hose
2. Distance piece
3. Bushing
4. Transmission oil return tube
5. Hose
6. Distance piece
   - Headlight assembly
     (Refer to GROUP 54A.)
7. Bushing
8. Transmission oil cooler bracket
9. Distance piece
10. Bushing
11. Transmission oil cooler bracket
12. Transmission oil cooler

Transmission oil cooler tube assembly removal steps

- B 13. Eye bolt
- B 14. Gasket
- B 15. Transmission oil cooler tube bracket
- B 16. Transmission oil cooler tube assembly
- A 17. Return hose
- A 18. Feed hose
19. Hose
20. Hose
21. Transmission oil cooler tube assembly

Transmission Oil Cooler

Transmission Oil Cooler Diagram
Transmission oil cooler removal steps
1. Hose
2. Distance piece
3. Bushing
4. Transmission oil return tube
5. Hose
6. Distance piece
   ● Headlight assembly
      (Refer to GROUP 54A.)
7. Bushing
8. Transmission oil cooler bracket
9. Distance piece
10. Bushing
11. Transmission oil cooler bracket
12. Transmission oil cooler

Transmission oil cooler tube assembly removal steps

- B 13. Eye bolt
- B 14. Gasket
- B 15. Transmission oil cooler tube bracket
- B 16. Transmission oil cooler tube assembly
- A 17. Return hose
- A 18. Feed hose
19. Hose
20. Hose
21. Transmission oil cooler tube assembly
**INSTALLATION SERVICE POINTS**

**A FEED HOSE/RETURN HOSE INSTALLATION**

Install the feed hose and return hose so that the markings are positioned as shown in the illustration.

**B TRANSMISSION OIL COOLER TUBE ASSEMBLY/GASKET/EYE BOLT INSTALLATION**

Provisionally tighten the eye bolts onto the transmission and provisionally secure the pipes with the clamps, and then fully tighten the eye bolts. Furthermore, tighten the clamps in order starting from the one closest to the transmission.

---

**A/T-ECU**

**REMOVAL AND INSTALLATION**

<6G7> Refer to GROUP 13A - Engine-A/T-ECU; <4M4> Refer to GROUP 13C - Engine-ECU.

**INSPECTION**

**ECU TERMINAL VOLTAGE MEASUREMENT**

<6G7> Refer to P.23-64; <4M4> Refer to P.23-66.
TRANSFER-ECU
REMOVAL AND INSTALLATION

**Pre-removal and Post-installation Operations**
Indicator Panel and Floor Console Front Panel Removal and Installation (Refer to GROUP 52A - Floor Console.)

**INSPECTION**
ECU TERMINAL VOLTAGE MEASUREMENT
Refer to P.23-89.
Service Bulletins

Click on the applicable bookmark to select the Service Bulletin.
1. Description:
   On the 6G7 engine equipped vehicle, correction has been made to the transmission removal steps.

2. Applicable Manuals:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2001 PAJERO Workshop Manual VOL.1</td>
<td>PWJE0001 (1/2) (English)</td>
<td>23-122</td>
</tr>
<tr>
<td>2001 MONTERO Workshop Manual VOL.1</td>
<td>PWJS0002 (1/2) (Spanish)</td>
<td>23-122</td>
</tr>
<tr>
<td>2001 PAJERO/MONTERO CD-ROM</td>
<td>PWJT0008R-A (English) (Spanish) (French) (Dutch)</td>
<td>-</td>
</tr>
</tbody>
</table>
3. Details:

23-122  AUTOMATIC TRANSMISSION - Transmission Assembly

TRANSMISSION ASSEMBLY
REMOVAL AND INSTALLATION

NOTE
The rear propeller shaft incorporates a carbon fibre-reinforced plastic tube, so be sure to refer to GROUP 25 during removal.

<6G7>

Pre-removal and Post-installation Operations
- Shift Plate And Under Cover Removal and Installation
- Transmission Fluid and Transfer Oil Draining and Filling (Refer to P23-95 and P23-95)
- Front and Rear Propeller Shaft Removal and Installation (Refer to GROUP 25)
- Front Exhaust Pipe Removal and Installation (Refer to GROUP 15)
- Radiator Shroud Lower Cover Removal and Installation (Refer to GROUP 14)

<Correct>

Drive plate connection bolts <Correct>

Removal steps
1. Oil level gauge assembly 6. Starter motor
2. Transmission control cable connection 7. Starter cover
3. Drive plate connection bolts 8. Oil pan connection bolts
5. Delete <Incorrect>

Drive plate connection bolts <Correct>
GROUP 23
AUTOMATIC TRANSMISSION

GENERAL

OUTLINE OF CHANGE
When the inhibitor switch is at the “P” position, it does not send a signal to the transfer-ECU any longer. Due to this change, data list item No.32 has been deleted from the section “Troubleshooting - SS4 II” and transfer-ECU terminal No.33 has been discontinued.

SEALANT

<table>
<thead>
<tr>
<th>Item</th>
<th>Specified sealant</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil pan</td>
<td>MITSUBISHI genuine sealant part No. MD166584 or equivalent</td>
<td>Semi-drying sealant</td>
</tr>
</tbody>
</table>

SPECIAL TOOL

<table>
<thead>
<tr>
<th>Tool No.</th>
<th>Name</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD998727</td>
<td>Oil pan remover</td>
<td>Oil pan removal</td>
</tr>
<tr>
<td>D998727</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
OIL PAN

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operations
- Transmission Fluid Draining and Filling
- Under Cover Removal and Installation

Removal steps
1. Oil level gauge assembly
   - Support the transmission with a transmission jack
2. Transmission mount center member assembly
3. Oil pan

REMOVAL SERVICE POINT

OIL PAN REMOVAL
After removing the oil pan mounting bolts, remove the oil pan with special tool MD998727 and a brass bar.
INSTALLATION SERVICE POINT

OIL PAN INSTALLATION

1. Remove sealant from the oil pan and transmission case mating surfaces.
2. Degrease the sealant-coated surface and the transmission mating surface.
3. Clean the magnet and install it in the hollow of the oil pan base.

NOTE
If the oil pan is replaced, reuse the cleaned magnet.

4. Apply MITSUBISHI genuine sealant part No. MD166584 or equivalent around the gasket surface of the oil pan as specified in the illustration.

NOTE
The sealant should be applied in a continuous bead approximately 3 mm in diameter.

5. Tighten the mounting bolts to the specified torque.

Tightening torque: 11 ± 1 N·m