
GROUP 23Ad

SYMPTOM PROCEDURES

CONTENTS

SYMPTOM PROCEDURES <AUTOMATIC
TRANSMISSION> [23Ad-2](#)

SYMPTOM PROCEDURES <KEY INTERLOCK
AND SHIFT LOCK MECHANISMS>. . [23Ad-78](#)

SYMPTOM PROCEDURES <AUTOMATIC TRANSMISSION>

INSPECTION PROCEDURE 1: Engine does not Crank

COMMENT

If the engine does not crank when the selector lever is in "P" or "N" position, the cause is probably a malfunction of transmission range switch system, transmission control cable assembly, engine system, torque converter or oil pump.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the transmission range switch
- Malfunction of the transmission control cable assembly
- Malfunction of the engine system
- Malfunction of the torque converter
- Malfunction of the oil pump
- Malfunction of the PCM

DIAGNOSIS

Required Special Tool:

- MB991502: Scan Tool (MUT-II)

STEP 1. Using scan tool MB991502, read the A/T diagnostic trouble code.

CAUTION

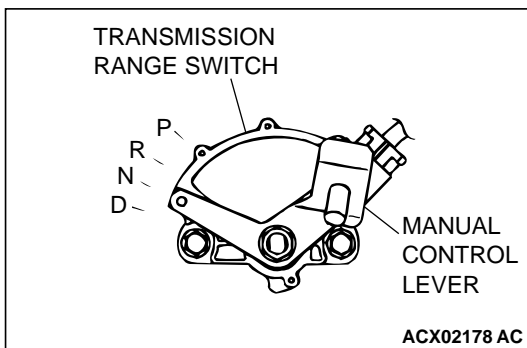
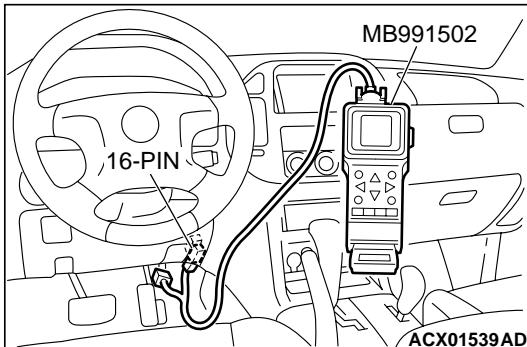
To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for A/T diagnostic trouble code.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is A/T DTCs 27 or 28 set?

YES : Refer to [P.23Ac-93](#), [P.23Ac-123](#), DTCs 27, 28: Park/Neutral Position Switch System.

NO : Go to Step 2.

**STEP 2. Check the transmission control cable assembly.**

Move the selector lever to each position. The manual control lever position of the transmission range switch should match the transmission range.

Q: Is the manual control lever position correct?

YES : Go to Step 3.

NO : Repair the transmission control cable. Refer to [P.23Aa-20](#), Transmission Range Switch and Control Cable Adjustment. Retest the system to verify the repair.

STEP 3. Check the engine.

Refer to GROUP 13A, Diagnosis – Trouble Symptom Chart – Starting [P.13Ab-26](#).

Q: Is the inspection result good?

YES : Go to Step 4.

NO : Repair or replace the appropriate engine components.

STEP 4. Check the torque converter.

(1) Remove the transmission.

(2) Turn the torque converter and check for a binding or sticking condition. Check the ring gear for damaged or missing teeth.

NOTE: Since the torque converter drives the oil pump, turning the torque converter also checks for a binding oil pump. If either of these components are damaged the Transmission will need to be removed for inspection.

Q: Does the torque converter turn freely without any missing or damaged teeth?

YES : Go to Step 5.

NO : Replace the torque converter.

STEP 5. Repair or replace the starter.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 6.

STEP 6. Replace the oil pump.

Replace the oil pump (Oil pump cannot be repaired). Refer to GROUP 23B, Transmission [P.23B-18](#). Confirm that the malfunction symptom is eliminated.

Q: Is the symptom eliminated?

YES : The procedure is complete.

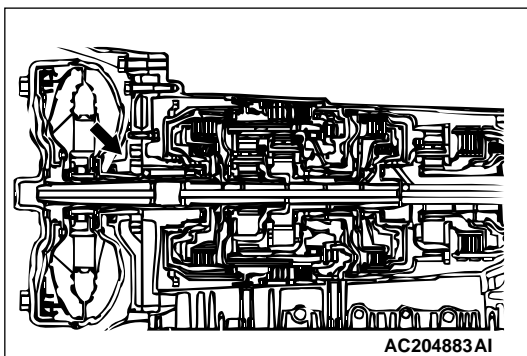
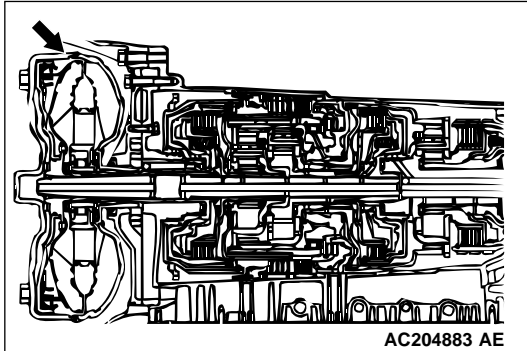
NO : Go to Step 7.

STEP 7. Replace the PCM.

Q: Does the engine crank when the selector lever is placed in the "P" or "N" position?

YES : The procedure is complete.

NO : Start over at Step 1.



INSPECTION PROCEDURE 2: Does not Move Forward

COMMENT

If the engine is idling and the selector lever is shifted from "N" to "D" range and the vehicle does not drive forward then the cause is due to line pressure defect, under drive clutch or valve body malfunction.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Abnormal line pressure
- Malfunction of the underdrive solenoid valve
- Malfunction of the underdrive clutch
- Malfunction of the valve body
- Malfunction of the PCM

DIAGNOSIS

Required Special Tool:

- MB991502: Scan Tool (MUT-II)

STEP 1. Using scan tool MB991502, check actuator test item 02: Underdrive Solenoid Valve.

⚠ CAUTION

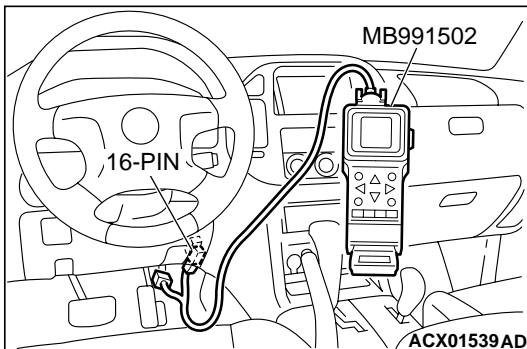
To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991502 to actuator test mode for item 02, Underdrive Solenoid Valve.
 - An audible clicking or buzzing should be heard when the underdrive solenoid valve is energized.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the solenoid valve operating properly?

YES : Go to Step 2.

NO : Repair or replace the underdrive solenoid valve. Refer to GROUP 23B, Valve Body P.23B-80. Then confirm that the symptom is eliminated.



STEP 2. Check the hydraulic pressure.

Shift the selector lever to the sport mode (1st gear) then measure the hydraulic pressure of each element in 1st speed to check and see if each respective hydraulic pressure is within the range of standard pressure. Refer to P.23Ab-15, Hydraulic Pressure Test.

Q: Is the hydraulic pressure within the standard value?

YES : Go to Step 3.

NO : Go to Step 4.

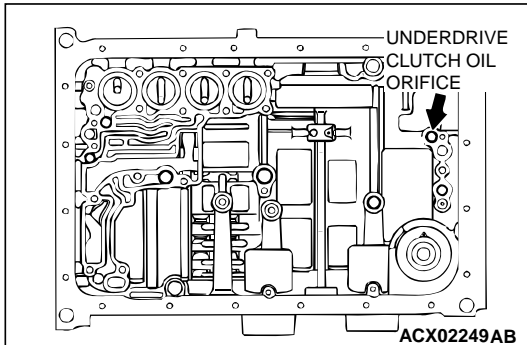
STEP 3. Check the underdrive clutch system.

- (1) Remove the valve body cover and valve body. Refer to [P.23Aa-37](#), Transmission and Transfer Assembly and refer to GROUP 23B, Transmission [P.23B-18](#).
- (2) Blow 108 kPa (15 psi) compressed air into the underdrive clutch oil orifice of the transmission case, and check if the underdrive clutch piston moves and air pressure is maintained in that condition.

Q: Is the air pressure maintained?

YES : Go to Step 4.

NO : Go to Step 5.



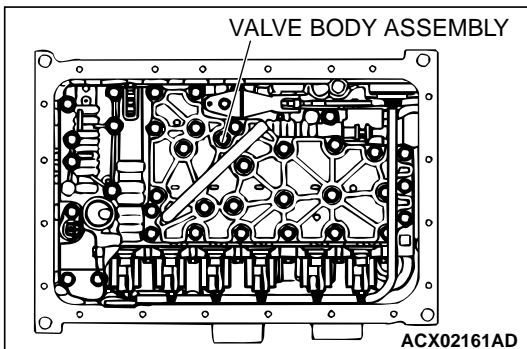
STEP 4. Disassemble and clean the valve body.

Check the O-ring installation bolts for looseness and valve body for damage. Repair or replace the faulty parts. Refer to GROUP 23B, Valve Body [P.23B-80](#). Replace the valve body assembly if the damages are thought to be irreparable. Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 6.



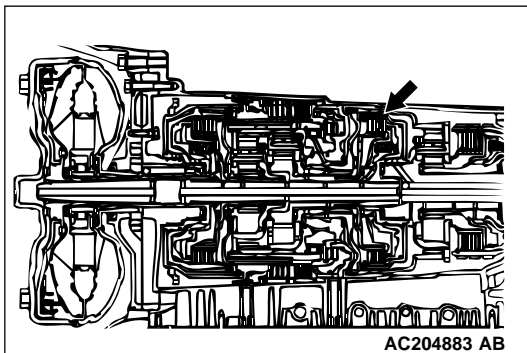
STEP 5. Check the underdrive clutch.

- (1) Remove the transmission assembly.
- (2) Check the facing for seizure and the piston seal ring for damage and interference with the retainer. Repair or replace the faulty parts. Refer to GROUP 23B, Underdrive Clutch and Input Shaft [P.23B-76](#). Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 6.



STEP 6. Replace the PCM.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Start over at Step 1.

INSPECTION PROCEDURE 3: Does not Move Backward

COMMENT

If the vehicle does not backward when the selector lever is shifted from "N" to "R" range while the engine is idling, the cause is probably abnormal pressure or a malfunction of the reverse clutch, low-reverse brake, or valve body.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Abnormal reverse clutch pressure
- Abnormal low-reverse brake pressure
- Malfunction of the low-reverse solenoid valve
- Malfunction of the reverse clutch
- Malfunction of the low-reverse brake
- Malfunction of the valve body
- Malfunction of the PCM

DIAGNOSIS

Required Special Tool:

- MB991502: Scan Tool (MUT-II)

STEP 1. Using scan tool MB991502, check actuator test item 01: Low-Reverse Solenoid Valve.

CAUTION

To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991502 to actuator test mode for item 01, Low-Reverse Solenoid Valve.
 - An audible clicking or buzzing should be heard when the low-reverse solenoid valve is energized.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the solenoid valve operating properly?

YES : Go to Step 2.

NO : Repair or replace the low-reverse solenoid valve. Refer to GROUP 23B, Valve Body P.23B-80. Then confirm that the symptom is eliminated.

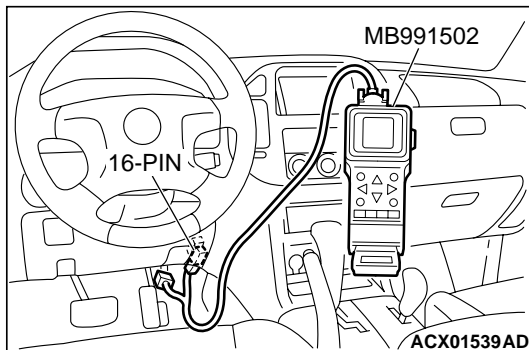
STEP 2. Check the hydraulic pressure (for reverse clutch).

Measure the hydraulic pressure for reverse clutch when the selector lever is at the "R" range, and check if the hydraulic pressure is within the standard value. Refer to P.23Ab-15, Hydraulic Pressure Test.

Q: Is the hydraulic pressure within the standard value?

YES : Go to Step 3.

NO : Go to Step 5.



STEP 3. Check the hydraulic pressure (for low-reverse brake).

Measure the hydraulic pressure for low-reverse brake when the selector lever is at the "R" range, and check if the hydraulic pressure is within the standard value. Refer to [P.23Ab-15](#), Hydraulic Pressure Test.

Q: Is the hydraulic pressure within the standard value?

YES : Go to Step 4.

NO : Go to Step 5.

STEP 4. Check the reverse clutch system and low-reverse brake system.

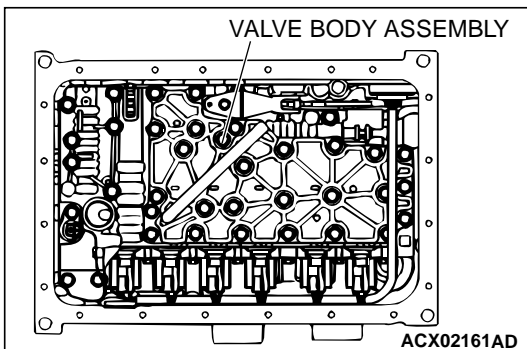
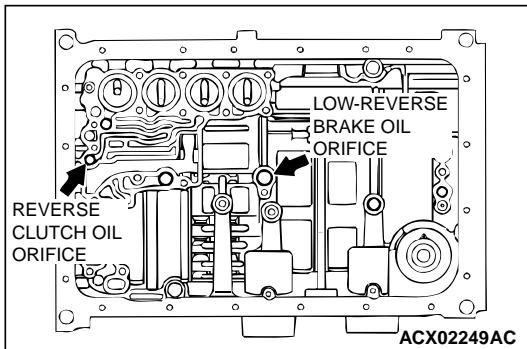
(1) Remove the valve body cover and valve body. Refer to [P.23Aa-37](#), Transmission and Transfer Assembly and refer to GROUP 23B, Transmission [P.23B-18](#).

(2) Blow 108 kPa (15psi) compressed air into the reverse clutch oil orifice of the Transmission case. Then check if the reverse clutch piston moves and air pressures are maintained in that condition. Repeat for the low-reverse brake.

Q: Are the reverse clutch, low-reverse brake or both air pressures maintained?

YES : Go to Step 5.

NO : Go to Step 6.



STEP 5. Disassemble and clean the valve body.

Check the O-ring installation bolts for looseness and valve body for damage. Repair or replace the faulty parts. Refer to GROUP 23B, Valve Body [P.23B-80](#).

Replace the bulb body assembly if the damages are thought to be irreparable. Then check the symptom.

Q: Is the repair possible and the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 7.

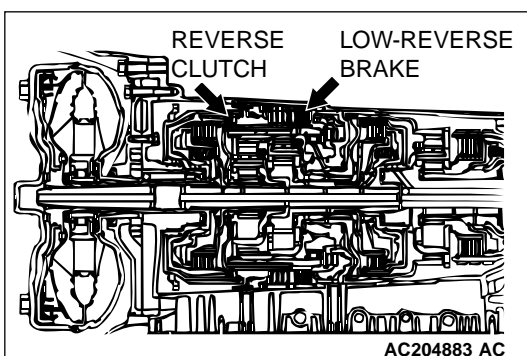
STEP 6. Check the reverse clutch, low-reverse brake or both. Remove the Transmission.

Check the facing for seizure and the piston seal ring for damage and interference with the retainer. Repair or replace the faulty parts. Refer to GROUP 23B, Transmission [P.23B-18](#), Reverse and Overdrive Clutch [P.23B-67](#). Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 7.



STEP 7. Replace the PCM.**Q: Is the symptom eliminated?****YES** : The procedure is complete.**NO** : Start over at Step 1.**INSPECTION PROCEDURE 4: Does not Move (Forward or Backward)****COMMENT**

If the vehicle does not move forward or backward when the selector lever is shifted to any position while the engine is idling, the cause is probably abnormal line pressure, or a malfunction of the power train, oil pump or valve body.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Abnormal line pressure
- Malfunction of the power train
- Malfunction of the oil pump
- Malfunction of the valve body
- Low A/T fluid level
- Malfunction of the PCM

DIAGNOSIS**STEP 1. Check the hydraulic pressure.**

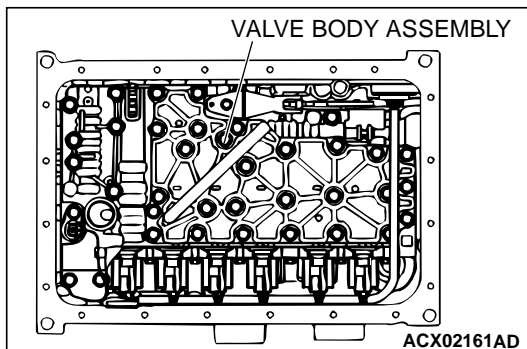
Measure the hydraulic pressure of each element when the transmission is in 1st, 2nd or reverse. Check if each hydraulic pressure is within the standard value. Refer to [P.23Ab-15](#), Hydraulic Pressure Test. If some elements are within the standard value and some are not, recheck the symptom.

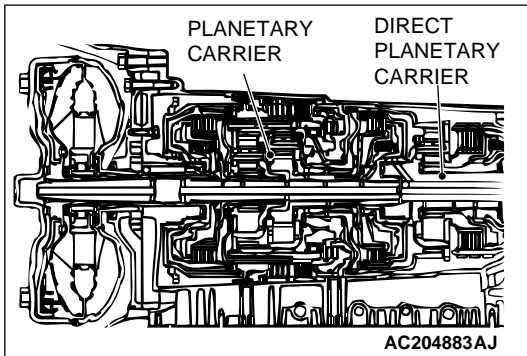
Q: Are all pressures within the standard value?

YES : Check transmission fluid level and condition. If not OK, repair or replace as necessary, then recheck symptom. If OK, go to Step 3.

NO : Go to Step 2.**STEP 2. Disassemble and clean the valve body.**

Check the O-ring installation bolts for looseness and valve body for damage. Repair or replace the faulty parts. Refer to GROUP 23B, Valve Body [P.23B-80](#). Replace the valve body assembly if the damages are thought to be irreparable. Then check the symptom.

Q: Is the repair possible and the symptom eliminated?**YES** : The procedure is complete.**NO** : Go to Step 4.



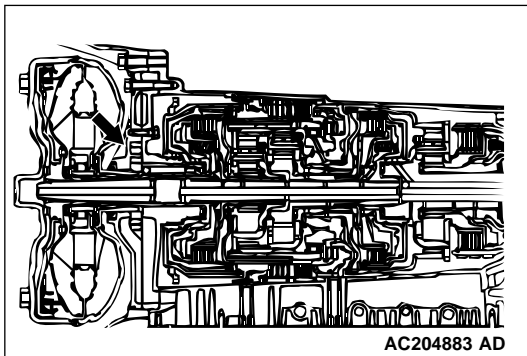
STEP 3. Check the transmission power train components.

Disassemble the transmission and check the planetary carrier and output shaft, etc. Repair or replace the damaged parts. Refer to GROUP 23B, Transmission P.23B-18, Low-Reverse Annulus Gear P.23B-72. Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 5.



STEP 4. Replace the oil pump.

(1) Remove the transmission.

(2) Replace the oil pump (Oil pump cannot be repaired). Refer to GROUP 23B, Transmission P.23B-18. Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 5.

STEP 5. Replace the PCM.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Start over at Step 1.

INSPECTION PROCEDURE 5: Engine Stalls when Moving Selector Lever from "N" to "D" or "N" to "R"

COMMENT

If the engine stalls when the selector lever is shifted from "N" to "D" or "R" range while the engine is idling, the cause is probably a malfunction of the engine system, torque converter clutch solenoid valve, valve body or torque converter (torque converter clutch malfunction).

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the engine system
- Malfunction of the torque converter clutch solenoid
- Malfunction of the valve body
- Malfunction of the torque converter (Malfunction of the torque converter clutch)
- Malfunction of the PCM

DIAGNOSIS

STEP 1. Check the engine system.

Refer to GROUP 13A, Diagnosis – Trouble Symptom Chart – When the engine is hot, it stalls at idle [P.13Ab-26](#).

Q: Is the inspection result good?

YES : Go to Step 2.

NO : Repair or replace the engine components.

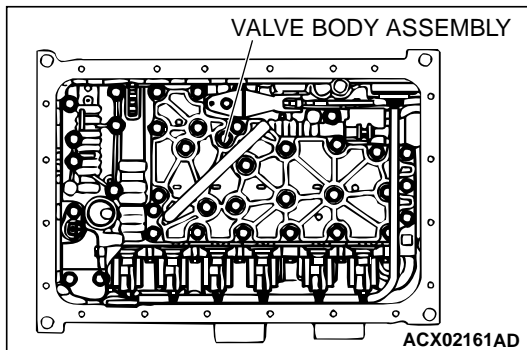
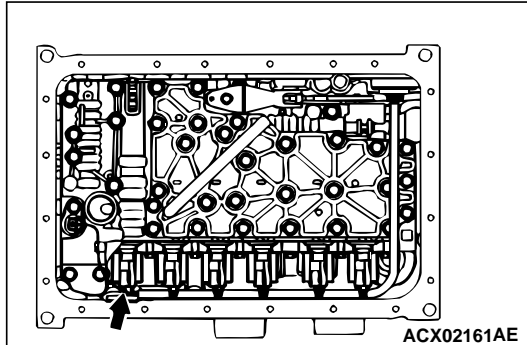
STEP 2. Replace the torque converter clutch solenoid valve.

Replace the torque converter clutch solenoid valve. Refer to GROUP 23B, Valve Body [P.23B-80](#). Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 3.



STEP 3. Disassemble and clean the valve body.

Check the O-ring installation bolts for looseness and valve body for damage. Repair or replace the faulty parts. Refer to GROUP 23B, Valve Body [P.23B-80](#).

Replace the valve body assembly if the damages are thought to be irreparable. Then check the symptom.

Q: Is the repair possible and the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 4.

STEP 4. Replace the torque converter assembly.

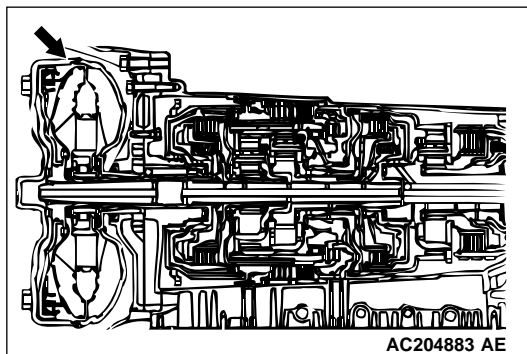
(1) Remove the transmission.

(2) Replace the torque converter assembly. Refer to GROUP 23B, Transmission [P.23B-18](#). Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 5.



STEP 5. Replace the PCM.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Start over at Step 1.

INSPECTION PROCEDURE 6: Shift Shock when Shifting from "N" to "D" and Long Delay

COMMENT

If abnormal shock or delay of two seconds or more occurs when the selector lever is shifted from "N" to "D" range while the engine is idling, the cause is probably abnormal underdrive clutch pressure or a malfunction of the underdrive clutch, valve body or APP sensor.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Abnormal underdrive clutch pressure
- Malfunction of the underdrive solenoid valve
- Malfunction of the underdrive clutch
- Malfunction of the valve body
- Malfunction of the APP sensor
- Malfunction of the PCM

DIAGNOSIS

Required Special Tool:

- MB991502: Scan Tool (MUT-II)

STEP 1. Using scan tool MB991502, check actuator test item 02: Underdrive Solenoid Valve.

⚠ CAUTION

To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991502 to actuator test mode for item 02, Underdrive Solenoid Valve.
 - An audible clicking or buzzing should be heard when the underdrive solenoid valve is energized.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the solenoid valve operating properly?

YES : Go to Step 2.

NO : Repair or replace the underdrive solenoid valve. Refer to GROUP 23B, Valve Body P.23B-80. Then confirm that the symptom is eliminated.

STEP 2. Check when shift shock occurs.

Q: When does the shift shock occur?

When engaging from N to D : Go to Step 3.

When the vehicle starts moving : Go to Step 6.

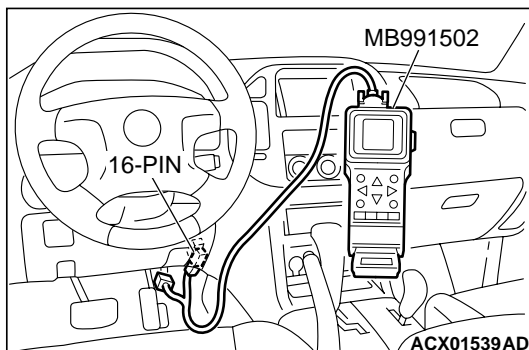
STEP 3. Check the hydraulic pressure (for underdrive clutch).

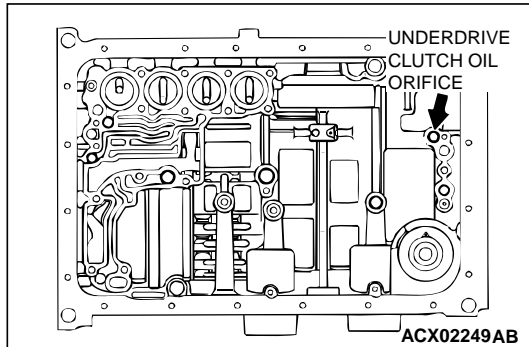
Measure the hydraulic pressure for underdrive clutch when the selector lever is shifted from "N" to "D" range. Check if the hydraulic pressure is within the standard value. Refer to P.23Ab-15, Hydraulic Pressure Test.

Q: Is the hydraulic pressure within the standard value?

YES : Go to Step 4.

NO : Go to Step 8.





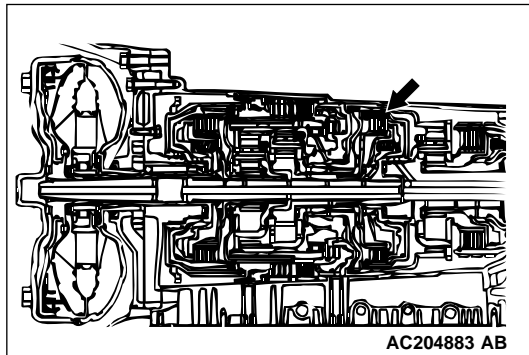
STEP 4. Check the underdrive clutch system.

- (1) Remove the valve body cover and valve body. Refer to [P.23Aa-37](#), Transmission and Transfer Assembly and refer to GROUP 23B, Transmission [P.23B-18](#).
- (2) Blow 108 kPa (15 psi) compressed air into the underdrive clutch oil orifice of the transmission case, and check if the underdrive clutch piston moves and air pressure is maintained in that condition.

Q: Is the air pressure maintained?

YES : Go to Step 8.

NO : Go to Step 5.



STEP 5. Check the underdrive clutch.

- (1) Remove the transmission assembly.
- (2) Check the facing for seizure and the piston seal ring for damage and interference with the retainer. Repair or replace the faulty parts. Refer to GROUP 23B [P.23B-76](#), Underdrive Clutch. Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 9.

STEP 6. Check shift shock.

Q: Does shift shock occur?

YES : Go to Step 7.

NO : Go to Step 8.

STEP 7. Using scan tool MB991502, check data list item 11: TP Sensor.

⚠ CAUTION

To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991502 to data reading mode for item 11, TP Sensor.

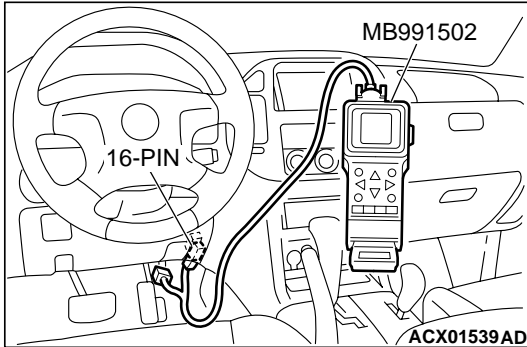
- With the throttle valve in the idle position, voltage should measure between 200 and 800 mV.
- With the throttle valve in the full-open position, voltage should measure between 3,800 and 4,900 mV.

- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage between 200 and 800 mV at idle, and between 3,800 and 4,900 mV in the full-open position?

YES : Go to Step 9.

NO : Go to Step 8.



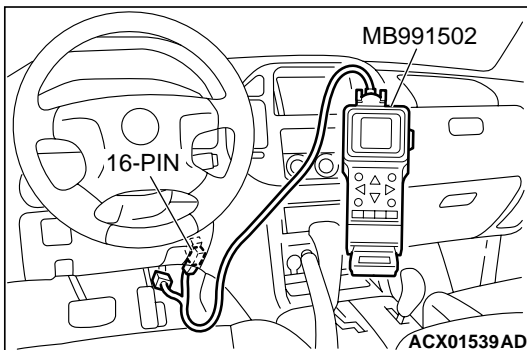
STEP 8. Using scan tool MB991502, read the MFI diagnostic trouble code.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for MFI diagnostic trouble code.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are MFI DTC Nos. of TP sensor system set?

YES : Refer to GROUP 13A, Diagnosis – Diagnostic Trouble Code Chart [P.13Ab-22](#).

NO : Go to Step 10.



STEP 9. Disassemble and clean the valve body.

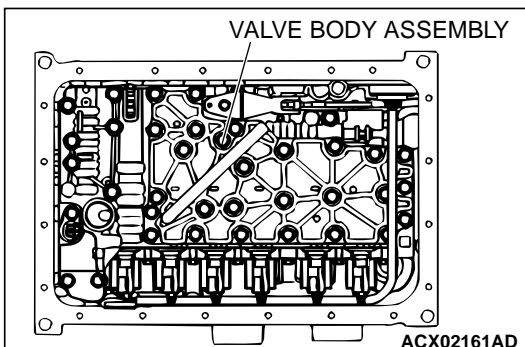
Check the O-ring installation bolts for looseness and the valve body for damage. Repair or replace the faulty parts. Refer to GROUP 23B, Valve Body [P.23B-80](#).

Replace the valve body assembly if the damages are thought to be irreparable. Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 10.



STEP 10. Replace the PCM.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Start over at Step 1.

INSPECTION PROCEDURE 7: Shift Shock when Shifting from "N" to "R" and Long Delay

COMMENT

If abnormal shock or delay of two seconds or more occurs when the selector lever is shifted from "N" to "R" range while the engine is idling, the cause is probably abnormal reverse clutch pressure or low-reverse brake pressure, or a malfunction of the reverse clutch, low-reverse brake, valve body or APP sensor.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Abnormal reverse clutch pressure
- Abnormal low-reverse brake pressure
- Malfunction of the low-reverse solenoid valve
- Malfunction of the reverse clutch
- Malfunction of the low-reverse brake
- Malfunction of the valve body
- Malfunction of the APP sensor
- Malfunction of the PCM

DIAGNOSIS

Required Special Tool:

- MB991502: Scan Tool (MUT-II)

STEP 1. Using scan tool MB991502, check actuator test item 01: Low-Reverse Solenoid Valve.

CAUTION

To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991502 to actuator test mode for item 01, Low-Reverse Solenoid Valve.
 - An audible clicking or buzzing should be heard when the low-reverse solenoid valve is energized.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the solenoid valve operating properly?

YES : Go to Step 2.

NO : Repair or replace the low-reverse solenoid valve. Refer to GROUP 23B, Valve Body P.23B-80. Then confirm that the symptom is eliminated.

STEP 2. Check when shift shock occurs.

Q: When does the shift shock occur?

When engaging from "N" to "R" : Go to Step 3.

When the vehicle starts moving : Go to Step 7.

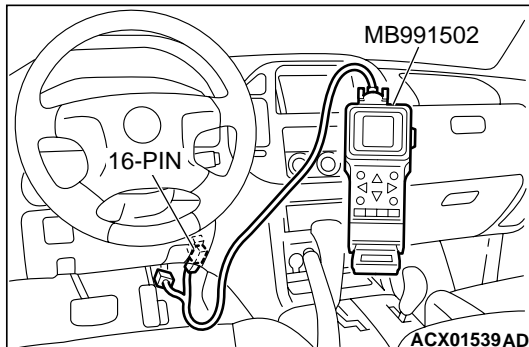
STEP 3. Check the hydraulic pressure (for reverse clutch).

Measure the hydraulic pressure for reverse clutch when the selector lever is at the "R" range. Check if the hydraulic pressure is within the standard value. Refer to P.23Ab-15, Hydraulic Pressure Test.

Q: Is the hydraulic pressure within the standard value?

YES : Go to Step 4.

NO : Go to Step 9.



STEP 4. Check the hydraulic pressure (for low-reverse brake).

Measure the hydraulic pressure for low-reverse brake when the selector lever is at the "R" range. Check if the hydraulic pressure is within the standard value. Refer to P.23Ab-15, Hydraulic Pressure Test.

Q: Is the hydraulic pressure within the standard value?

YES : Go to Step 5.

NO : Go to Step 9.

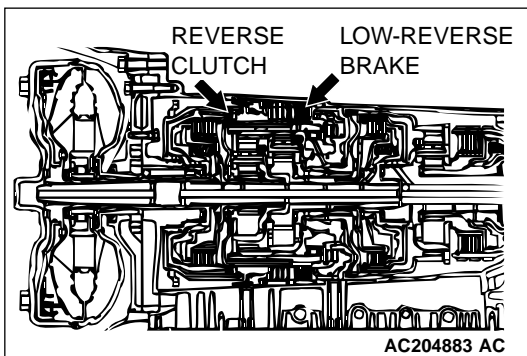
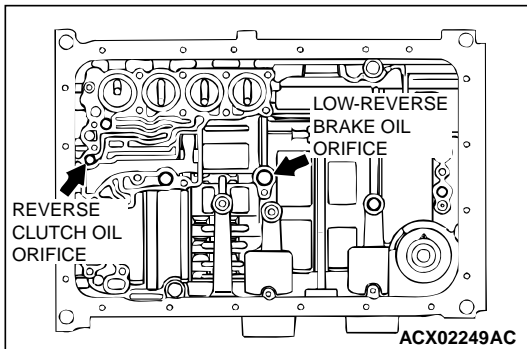
STEP 5. Check the reverse clutch system and low-reverse brake system.

- (1) Remove the valve body cover and valve body. Refer to P.23Aa-37, Transmission and Transfer Assembly and refer to GROUP 23B, Transmission P.23B-18.
- (2) Blow 108 kPa (15 psi) compressed air into the reverse clutch oil orifice of the transmission case, and check if the reverse clutch piston moves and air pressures are maintained in that condition. Repeat for the low-reverse brake.

Q: Are both air pressures maintained?

YES : Go to Step 6.

NO : Go to Step 9.



STEP 6. Check the reverse clutch and low-reverse brake.

- (1) Remove the transmission assembly.
- (2) Check the facing for seizure and the piston seal ring for damage and interference with the retainer. Repair or replace the faulty parts. Refer to GROUP 23B, Transmission P.23B-18, Reverse and Overdrive Clutch P.23B-67. Then check for the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 10.

STEP 7. Check shift shock.

Q: Does shift shock occur sometimes?

YES : Go to Step 8.

NO : Go to Step 9.

STEP 8. Using scan tool MB991502, check data list item 11: APP sensor.

⚠ CAUTION

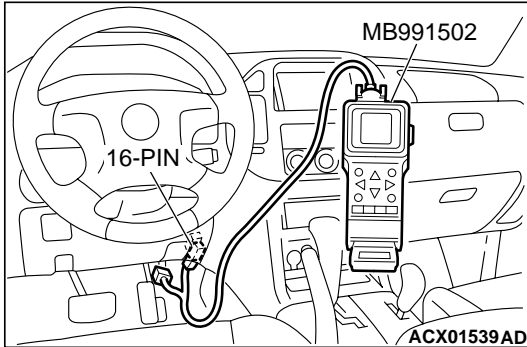
To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991502 to data reading mode for item 11, APP Sensor.
 - With the throttle valve in the idle position, voltage should measure between 535 and 735 mV.
 - With the throttle valve in the full-open position, voltage should measure between 4,500 and 5,500 mV.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage between 535 and 735mV at idle, and between 4,500 and 5,500 mV in the full-open position?

YES : Go to Step 10.

NO : Go to Step 9.



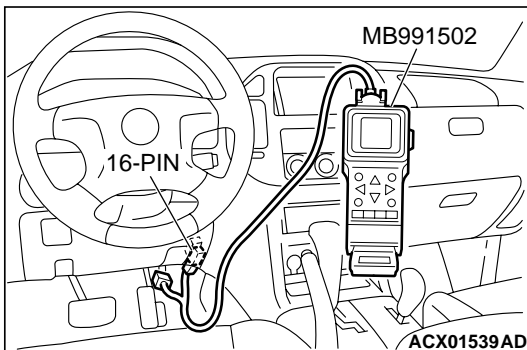
STEP 9. Using scan tool MB991502, read the MFI diagnostic trouble code.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for MFI diagnostic trouble code.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are MFI DTC Nos. of TP sensor system set?

YES : Refer to GROUP 13A, Diagnosis – Diagnostic Trouble Code Chart [P.13Ab-22](#).

NO : Go to Step 11.



STEP 10. Disassemble and clean the valve body.

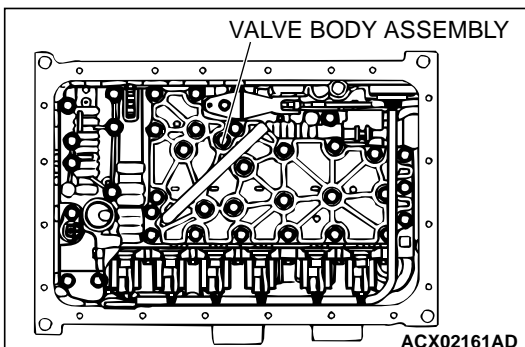
Check the O-ring installation bolts for looseness and the valve body for damage. Repair or replace the faulty parts. Refer to GROUP 23B, Valve Body [P.23B-80](#).

Replace the valve body assembly if the damages are thought to be irreparable. Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 11.



STEP 11. Replace the PCM.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Start over at Step 1.

INSPECTION PROCEDURE 8: Shift Shock when Shifting from "N" to "D," "N" to "R" and Long Delay

COMMENT

If abnormal shock or delay of two seconds or more occurs when the selector lever is moved from "N" to "D" range and from "N" to "R" range while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the oil pump or valve body.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Abnormal line pressure
- Malfunction of the oil pump
- Malfunction of the valve body
- Malfunction of the PCM

DIAGNOSIS

STEP 1. Check the hydraulic pressure.

- (1) Measure the hydraulic pressure of each element when the transmission is in 1st, 2nd or reverse. Check if each hydraulic pressure is within the standard value. Refer to [P.23Ab-15](#), Hydraulic Pressure Test.
- (2) If some elements are within the standard value and some are not, recheck the symptom.

Q: Are all hydraulic pressures within the standard value?

- YES :** Go to Step 3.
NO : Go to Step 2.

STEP 2. Adjust line pressure.

Adjust line pressure. Refer to [P.23Ab-31](#), Line Pressure Adjustment. Then check the symptom.

Q: Is the symptom eliminated?

- YES :** The procedure is complete.
NO : Go to Step 3.

STEP 3. Check when shift shock occurs.

Q: When does the shift shock occur?

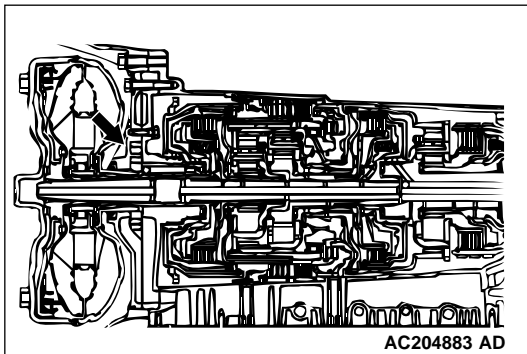
- When engaging from "N" to "D" and "N" to "R" :** Go to Step 4.
When the vehicle starts moving : Go to Step 5.

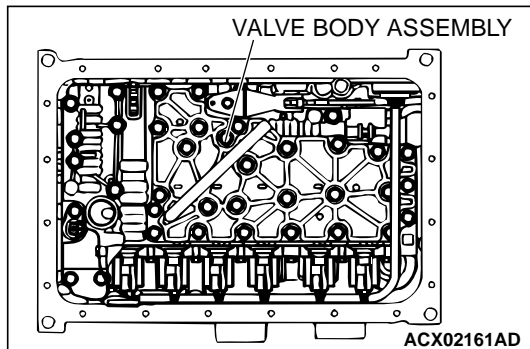
STEP 4. Replace the oil pump.

- (1) Remove the transmission.
- (2) Replace the oil pump. (Oil pump cannot be repaired). Refer to GROUP 23B, Transmission [P.23B-18](#). Then check the symptom.

Q: Is the symptom eliminated?

- YES :** The procedure is complete.
NO : Go to Step 6.





STEP 5. Disassemble and clean the valve body.

Check the installation bolts for looseness and the O-ring, valves and valve body for damage. Repair or replace the faulty parts. Refer to GROUP 23B, Valve Body P.23B-80.

Replace the valve body assembly if the damages are thought to be irreparable. Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 6.

STEP 6. Replace the PCM.
Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Start over at Step 1.

INSPECTION PROCEDURE 9: Shift Shock and Slipping

COMMENT

If shift shock when driving are due to upshifting or downshifting and the transmission speed become 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.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Abnormal line pressure
- Malfunction of each solenoid valve
- Malfunction of the oil pump
- Malfunction of the valve body
- Malfunction of each brake or each clutch
- Malfunction of the PCM

DIAGNOSIS

Required Special Tool:

- MB991502: Scan Tool (MUT-II)

STEP 1. Using scan tool MB991502, check actuator test.

⚠ CAUTION

To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991502 to actuator test mode for following items.
 - a. Item 01: Low-reverse solenoid valve
 - b. Item 02: Underdrive solenoid valve
 - c. Item 03: Second solenoid valve
 - d. Item 04: Overdrive solenoid valve
 - e. Item 05: Reduction solenoid valve
 - An audible clicking or buzzing should be heard when the solenoid valves are energized.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are the solenoid valves operating properly?

YES : Go to Step 2.

NO : Repair or replace the solenoid valves. Refer to GROUP 23B, Valve Body [P.23B-80](#). Then confirm that the symptom is eliminated.

STEP 2. Check the hydraulic pressure.

- (1) Measure the hydraulic pressure of each element. Check if each hydraulic pressure is within the standard value. Refer to [P.23Ab-15](#), Hydraulic Pressure Test.
- (2) If some elements are within the standard value and some are not, recheck the symptom.

Q: Are all hydraulic pressures within the standard value?

YES : Go to Step 6.

NO : Go to Step 3.

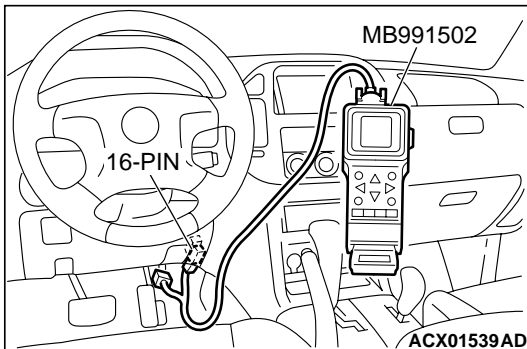
STEP 3. Adjust the line pressure.

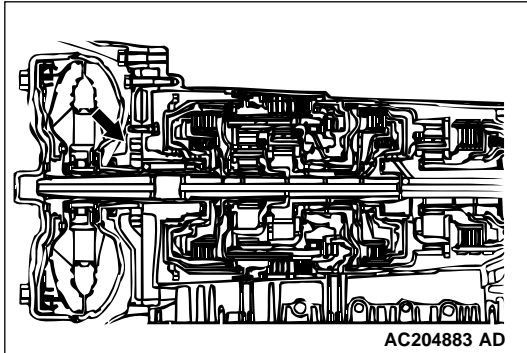
Adjust the line pressure. Refer to [P.23Ab-31](#), Line Pressure Adjustment. Then check the symptom.

Q: Is the symptom eliminated?

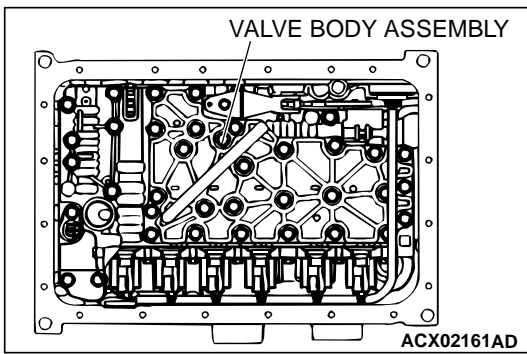
YES : The procedure is complete.

NO : Go to Step 4.



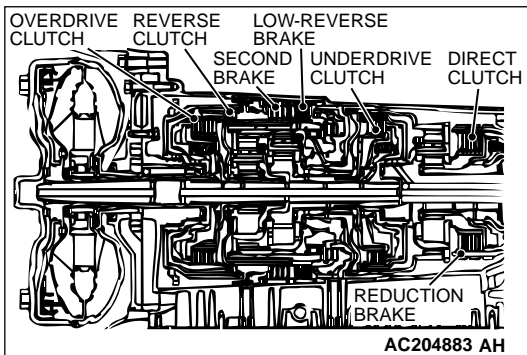
**STEP 4. Replace the oil pump.**

- (1) Remove the transmission.
- (2) Replace the oil pump. (Oil pump can not be repaired). Refer to GROUP 23B, Transmission [P.23B-18](#). Then check the symptom.

Q: Is the symptom eliminated?**YES :** The procedure is complete.**NO :** Go to Step 5.**STEP 5. Disassemble and clean the valve body.**

Check the O-ring installation bolts for looseness and the valve body for damage. Repair or replace the faulty parts. Refer to GROUP 23B, Valve Body [P.23B-80](#).

Replace the valve body assembly if the damages are thought to be irreparable. Then check the symptom.

Q: Is the symptom eliminated?**YES :** The procedure is complete.**NO :** Go to Step 7.**STEP 6. Check each brake and clutch.**

- (1) Remove the transmission.
- (2) Check the facing for seizure and piston seal ring for damage and interference with retainer. Repair or replace the faulty parts. Refer to GROUP 23B, Transmission [P.23B-18](#), Underdrive Clutch [P.23B-76](#), Reverse and Overdrive Clutches [P.23B-67](#), Direct Clutch [P.23B-91](#). Then check for the symptom.

Q: Is the symptom eliminated?**YES :** The procedure is complete.**NO :** Go to Step 7.**STEP 7. Replace the PCM.****Q: Is the symptom eliminated?****YES :** The procedure is complete.**NO :** Start over at Step 1.

INSPECTION PROCEDURE 10: Early or Late Shifting All Gears

COMMENT

If all shift points are early or late while driving, the cause is probably a malfunction of the output shaft speed sensor, APP sensor or a solenoid valve.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the output shaft speed sensor
- Malfunction of the APP sensor
- Malfunction of each solenoid valve
- Abnormal line pressure
- Malfunction of the valve body
- Malfunction of the PCM

DIAGNOSIS

Required Special Tool:

- MB991502: Scan Tool (MUT-II)

STEP 1. Using scan tool MB991502, check data list item 23: Output Shaft Speed Sensor.

⚠ CAUTION

To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Start the engine.
- (3) Set scan tool MB991502 to data reading mode for item 23, Output Shaft Speed Sensor.

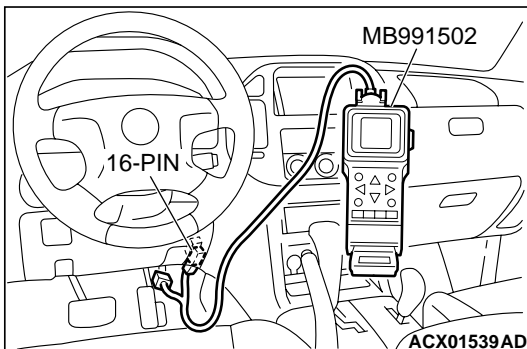
- When driving at constant speed of 50 km/h (31 mph), the display should be "1,400 – 1,700 r/min". (Gear range: 4th gear)

- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

YES : Go to Step 2.

NO : Refer to [P.23Ac-65](#), DTC 23: Output shaft speed sensor system.



STEP 2. Using scan tool MB991502, check data list item 11: TP Sensor.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991502 to data reading mode for item 11, TP Sensor.

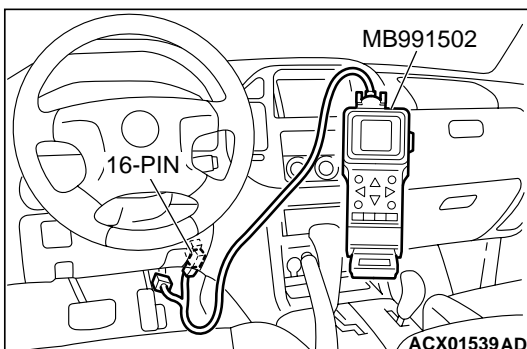
- With the throttle valve in the idle position, voltage should measure between 200 and 800 mV.
- With the throttle valve in the full-open position, voltage should measure between 3,800 and 4,900 mV.

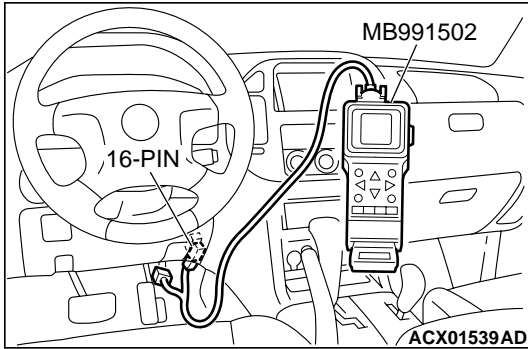
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage between 200 and 800 mV at idle, and between 3,800 and 4,900 mV in the full-open position?

YES : Go to Step 4.

NO : Go to Step 3.



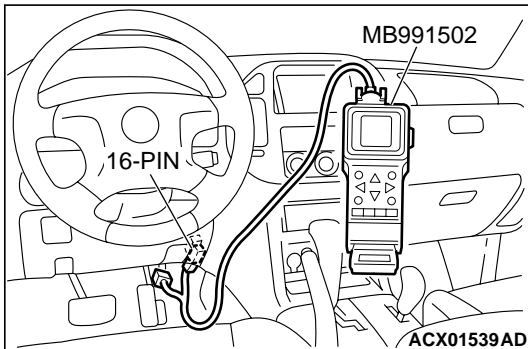


STEP 3. Using scan tool MB991502, read the MFI diagnostic trouble code.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for MFI diagnostic trouble code.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are MFI DTC Nos. of TP sensor system set?

- YES :** Refer to GROUP 13A, Diagnosis – Diagnostic Trouble Code Chart [P.13Ab-22](#).
- NO :** Go to Step 8.



STEP 4. Using scan tool MB991502, check data list.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Start the engine.
- (3) Set scan tool MB991502 to data reading mode for following items.
 - a. Item 31: Low-Reverse Solenoid Valve Duty Percent
 - b. Item 32: Underdrive Solenoid Valve Duty Percent
 - c. Item 33: Second Solenoid Valve Duty Percent
 - d. Item 34: Overdrive Solenoid Valve Duty Percent
 - e. Item 35: Reduction Solenoid Valve Duty Percent
 - Check that the values shown below are displayed when each data list item is entered.

DRIVING CONDITION	DATA LIST ITEM				
	31	32	33	34	35
Driving at constant speed of 10 km/h (6.2 mph) in 1st gear	0%	0%	100%	100%	0%
Driving at constant speed of 30 km/h (19 mph) in 2nd gear	100%	0%	0%	100%	0%
Driving at constant speed of 50 km/h (31 mph) in 3rd gear	100%	0%	100%	0%	0%
Driving at constant speed of 50 km/h (31 mph) in 4th gear	0%	0%	100%	0%	100%
Driving at constant speed of 70 km/h (44 mph) in 5th gear	100%	100%	0%	0%	100%

- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are the solenoid valves operating properly?

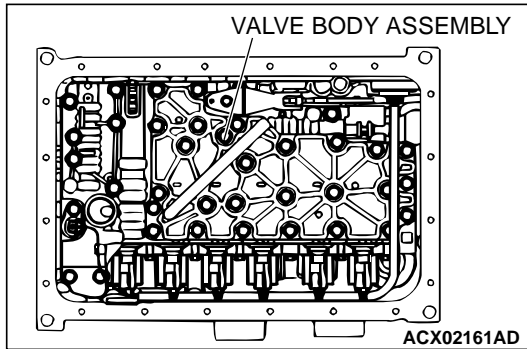
- YES :** Go to Step 5.
- NO :** Go to Step 7.

STEP 5. Adjust the line pressure.

Adjust the line pressure. Refer to [P.23Ab-31](#), Line Pressure Adjustment. Then check the symptom.

Q: Is the symptom eliminated?

- YES :** The procedure is complete.
- NO :** Go to Step 6.



STEP 6. Disassemble and clean the valve body.

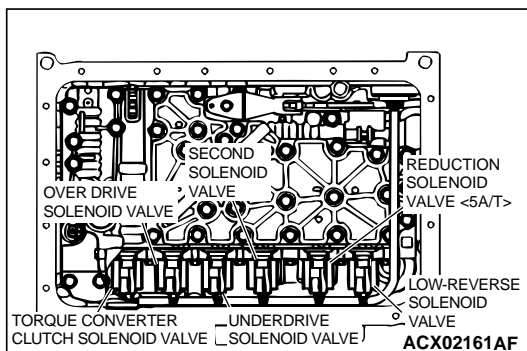
Check the O-ring installation bolts for looseness and the valve body for damage. Repair or replace the faulty parts. Refer to GROUP 23B, Valve Body P.23B-80.

Replace the valve body assembly if the damages are thought to be irreparable. Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 8.



STEP 7. Replace each solenoid valve.

Replace the faulty solenoid valve with a new one.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 8.

STEP 8. Replace the PCM.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Start over at Step 1.

INSPECTION PROCEDURE 11: Early or Late Shifting Some Gears

COMMENT

If some of the shift points are early or late when driving, the cause is probably a malfunction of the valve body, or it is due to the characteristics of the INVECS-II system but is not an abnormality.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the valve body
- Malfunction of the PCM

DIAGNOSIS

Required Special Tool:

- MB991502: Scan Tool (MUT-II)

STEP 1. Using scan tool MB991502, check actuator test item 14: INVECS-II Cancel Command.

⚠ CAUTION

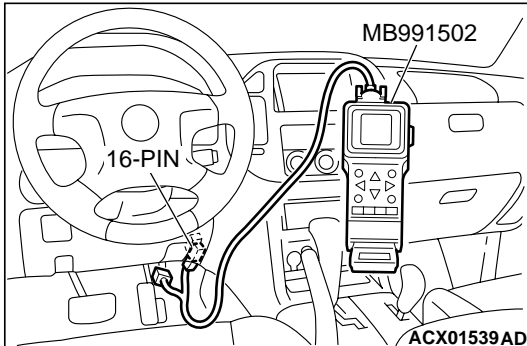
To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Start the engine.
- (3) Set scan tool MB991502 to actuator test mode for item 14, INVECS-II Cancel Command.
 - Drive the vehicle and confirm the gear shifting correspond to the standard shift line of the shift pattern diagram. Refer to [P.23Aa-3](#).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Does the gear shifting correspond to the standard shift line of the shift pattern diagram?

YES : The symptom is due to characteristics of the INVECS-II system, but is not abnormal.

NO : Go to Step 2.

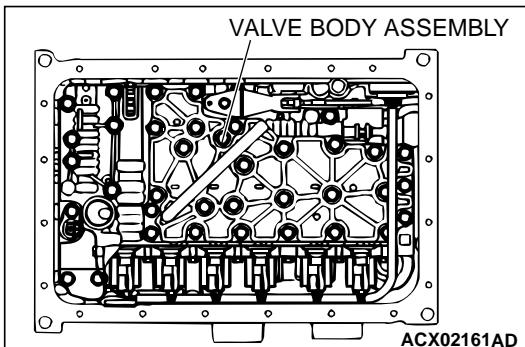


STEP 2. Check the shift points.

Q: Are the shift points early or late only when transmission fluid is -29°C (84°F) or less (early), or 125°C (257°F) or more (late)?

YES : The symptom is due to characteristics of the INVECS-II system, but is not abnormal.

NO : Go to Step 3.



STEP 3. Disassemble and clean the valve body.

Check the O-ring installation bolts for looseness and the valve body for damage. Repair or replace the faulty parts. Refer to GROUP 23B, Valve Body [P.23B-80](#).

Replace the valve body assembly if the damages are thought to be irreparable. Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 4.

STEP 4. Replace the PCM.

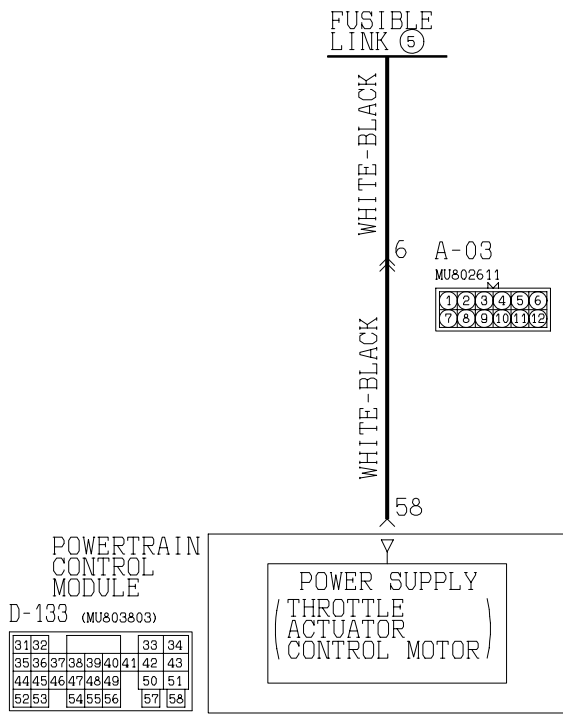
Q: Is the symptom eliminated?

YES : The procedure is complete.

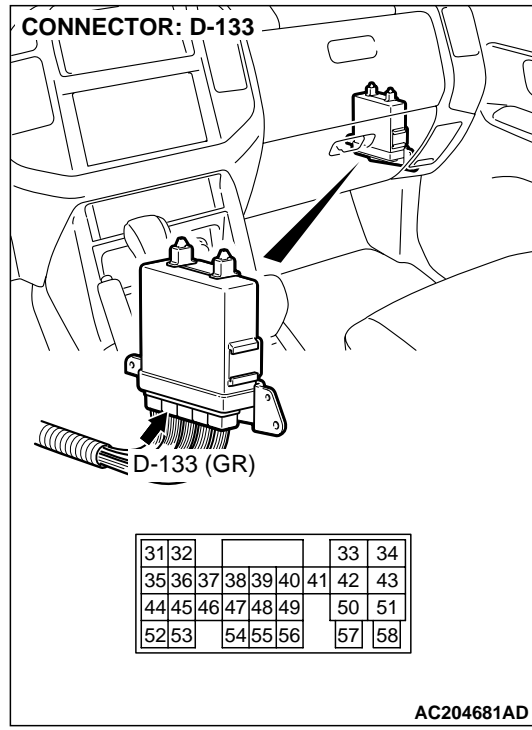
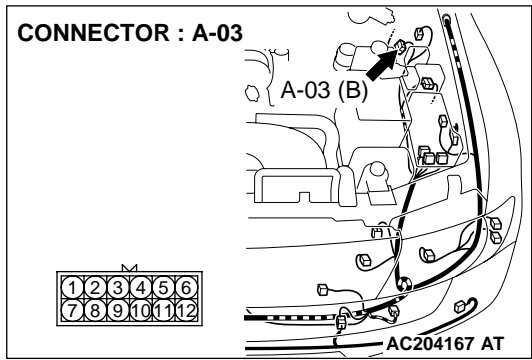
NO : Start over at Step 1.

INSPECTION PROCEDURE 12: No Diagnostic Trouble Codes (Does not Shift)

Backup Power Supply Circuit



W3Q20M01AA
AC205198 AB



CIRCUIT OPERATION

PCM (terminal 58) receives battery positive voltage from the battery.

COMMENT

If shifting does not occur while driving and no diagnostic trouble codes are set, a malfunction of the transmission range switch, or PCM may exist.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of transmission range switch
- Damaged harness, connector
- Malfunction of the PCM

DIAGNOSIS

Required Special Tool:

- MB991502: Scan Tool (MUT-II)

STEP 1. Check the vehicle acceleration.

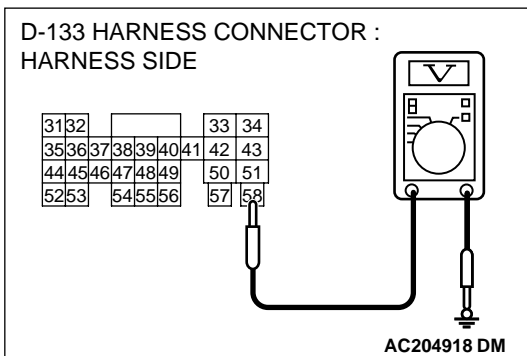
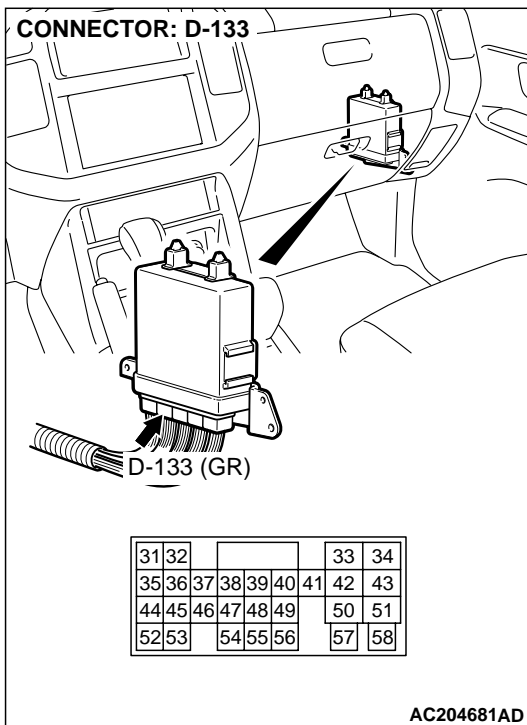
Q: Does the vehicle accelerate poorly (transmission stays in 3rd gear) when starting from a stop with the selector lever in "D" range?

YES : Go to Step 2.

NO : Go to Step 5.

STEP 2. Measure the backup power supply voltage at PCM connector D-133 by backprobing.

(1) Do not disconnect connector D-133.



(2) Measure the voltage between terminal 58 and ground by backprobing.

- The voltage should measure battery positive voltage.

Q: Is the measured voltage battery positive voltage?

YES : Go to Step 5.

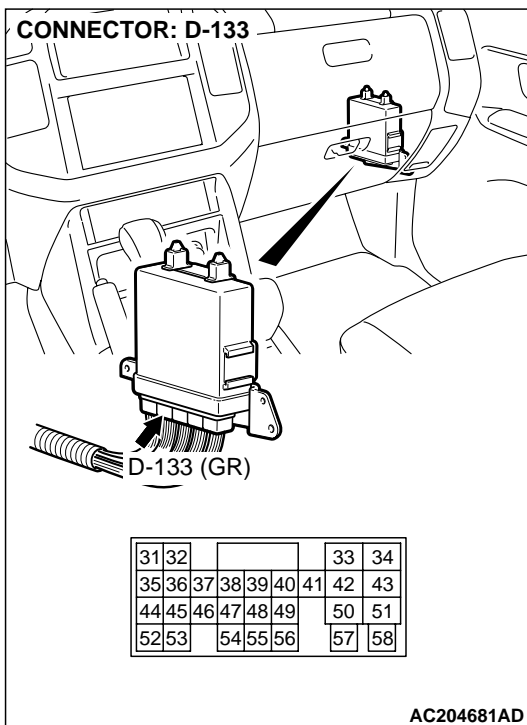
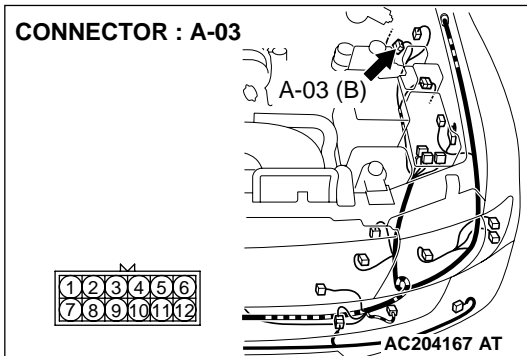
NO : Go to Step 3.

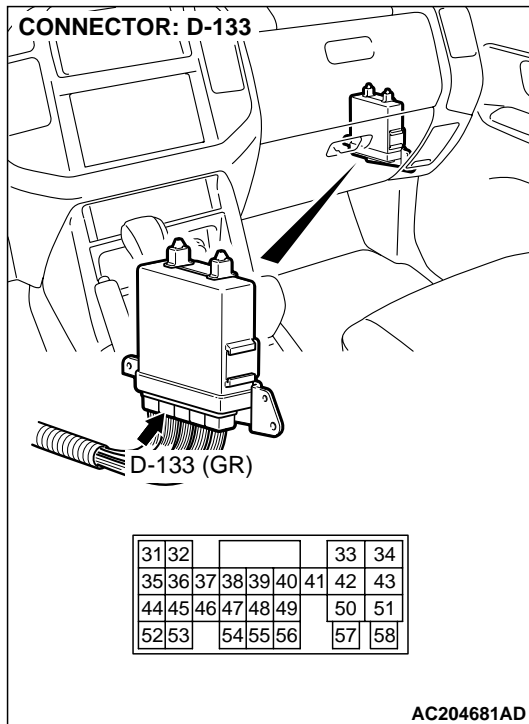
STEP 3. Check intermediate connector A-03 and PCM connector D-133 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 4.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then check for the symptom.





STEP 4. Check the harness for open circuit between PCM connector D-133 terminal 58 and fusible link.

Q: Is the harness wire in good condition?

YES : Go to Step 5.

NO : Repair or replace the harness wire.

STEP 5. Using scan tool MB991502, check data list item 61: Transmission Range Switch.

⚠ CAUTION

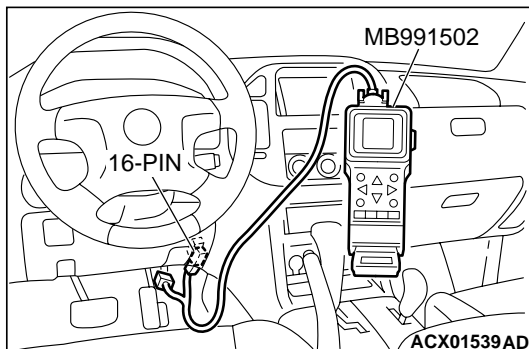
To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991502 to data reading mode for item 61, Transmission Range Switch.
 - Move the selector lever to "P," "R," "N," "D" and sport mode positions and confirm that the selected transmission ranges match the positions shown on scan tool MB991502. (Sport mode is indicated as "D" on scan tool MB991502.)
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the switch operating properly?

YES : Check for the symptom. If the symptom is not eliminated, replace the PCM.

NO : Refer to [P.23Ac-93](#), [P.23Ac-123](#), DTCs 27, 28: Transmission range switch system.



INSPECTION PROCEDURE 13: Poor Acceleration

COMMENT

If acceleration is poor when downshifting occurs while driving, a malfunction of the engine system or a brake or clutch may exist.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the engine system
- Malfunction of the clutch system and brake system
- Malfunction of the PCM

DIAGNOSIS

STEP 1. Check the engine system.

Refer to GROUP 13A, Diagnosis – Symptom Chart – Poor Acceleration [P.13Ad-54](#).

Q: Is the inspection result good?

- YES :** Go to Step 2.
NO : Repair or replace the engine component(s).

STEP 2. Check each brake and clutch.

Perform the torque converter stall test. Refer to [P.23Ab-14](#), Torque Converter Stall Test. Then check for the symptom.

Q: Is the symptom eliminated?

- YES :** The procedure is complete.
NO : Go to Step 3.

STEP 3. Perform the hydraulic pressure test.

Perform the hydraulic pressure test. Refer to [P.23Ab-15](#), Hydraulic Pressure Test. Then check for the symptom.

Q: Is the symptom eliminated?

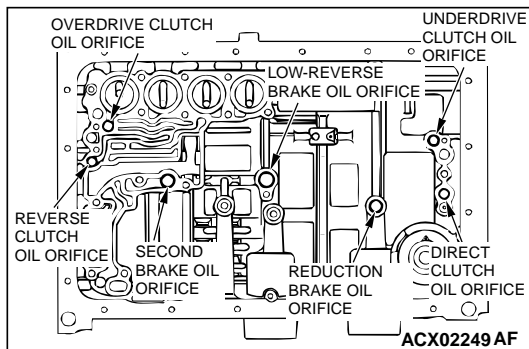
- YES :** The procedure is complete.
NO : Go to Step 4.

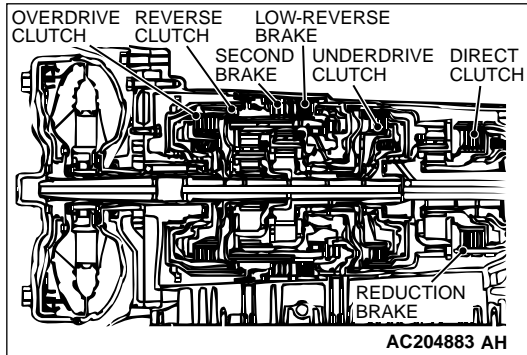
STEP 4. Check each brake system and clutch system.

- (1) Remove the valve body cover and valve body. Refer to GROUP 23B, Transmission [P.23B-18](#).
- (2) Blow 108 kPa (15 psi) compressed air into the each brake oil orifice and clutch oil orifice of the transmission case, and check if each brake and clutch piston move and air pressure is maintained.

Q: Is the air pressure maintained?

- YES :** The procedure is complete.
NO : Go to Step 5.





STEP 5. Check each brake system and clutch system.

- (1) Remove the transmission.
- (2) Check the facing for seizure and piston seal ring for damage and interference with retainer. Repair or replace the faulty parts. Refer to GROUP 23B, Transmission P.23B-18, Underdrive Clutch P.23B-76, Reverse and Overdrive Clutches P.23B-67, Direct Clutch P.23B-91. Then check for the symptom.

Q: Is the symptom eliminated?**YES :** The procedure is complete.**NO :** Go to Step 6.

STEP 6. Replace the PCM.
Q: Is the symptom eliminated?**YES :** The procedure is complete.**NO :** Start over at Step 1.

INSPECTION PROCEDURE 14: Vibration

COMMENT

If vibration occurs when driving at constant speed or when accelerating in 4th gear, abnormal torque converter clutch pressure or a malfunction of the engine system, torque converter clutch solenoid, torque converter or valve body may exist.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Abnormal torque converter clutch pressure
- Malfunction of the engine system
- Malfunction of the torque converter clutch solenoid
- Malfunction of the torque converter
- Malfunction of the valve body
- Malfunction of the PCM

DIAGNOSIS

Required Special Tool:

- MB991502: Scan Tool (MUT-II)

STEP 1. Using scan tool MB991502, check actuator test item 06: Torque Converter Clutch Solenoid Valve.

⚠ CAUTION

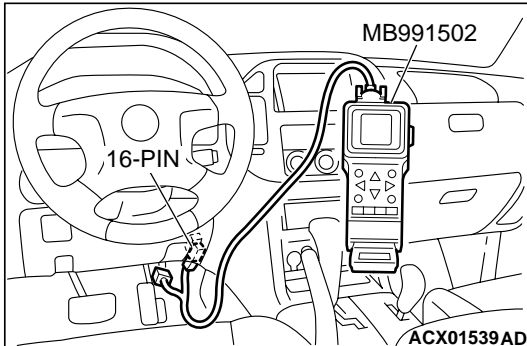
To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991502 to actuator test mode for item 06, Torque Converter Clutch Solenoid Valve.
 - An audible clicking or buzzing should be heard when the torque converter clutch solenoid valve is energized.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the solenoid valve operating properly?

YES : Go to Step 2.

NO : Repair or replace the torque converter clutch solenoid valve. Refer to GROUP 23B, Valve Body P.23B-80. Then confirm that the symptom is eliminated.



STEP 2. Check the vibration.

Q: Does the vibration occur when the transmission fluid temperature sensor connector has been disconnected?

YES : Check the engine system. Refer to GROUP 13A, Diagnosis – Symptom Chart – Driving P.13Ab-26. If the inspection result is not good, diagnose, repair, and/or replace the engine component(s).

NO : Go to Step 3.

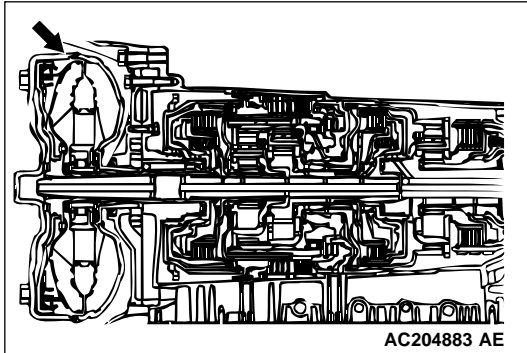
STEP 3. Check the torque converter hydraulic pressure.

Measure the torque converter hydraulic pressure. Then check if the torque converter hydraulic pressure is within the standard value. Refer to P.23Ab-15, Hydraulic Pressure Test.

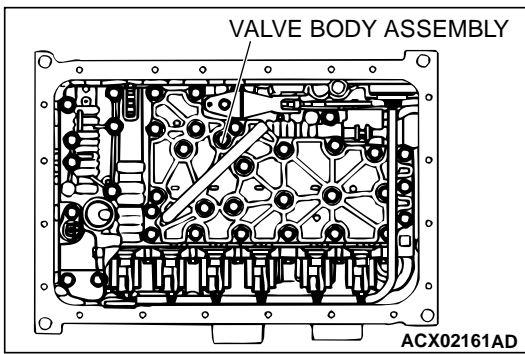
Q: Is the torque converter hydraulic pressure within the standard value?

YES : Go to Step 4.

NO : Go to Step 5.

**STEP 4. Replace the torque converter assembly.**

- (1) Remove the transmission.
- (2) Replace the torque converter assembly. Then check the symptom.

Q: Is the symptom eliminated?**YES** : The procedure is complete.**NO** : Go to Step 6.**STEP 5. Disassemble and clean the valve body.**

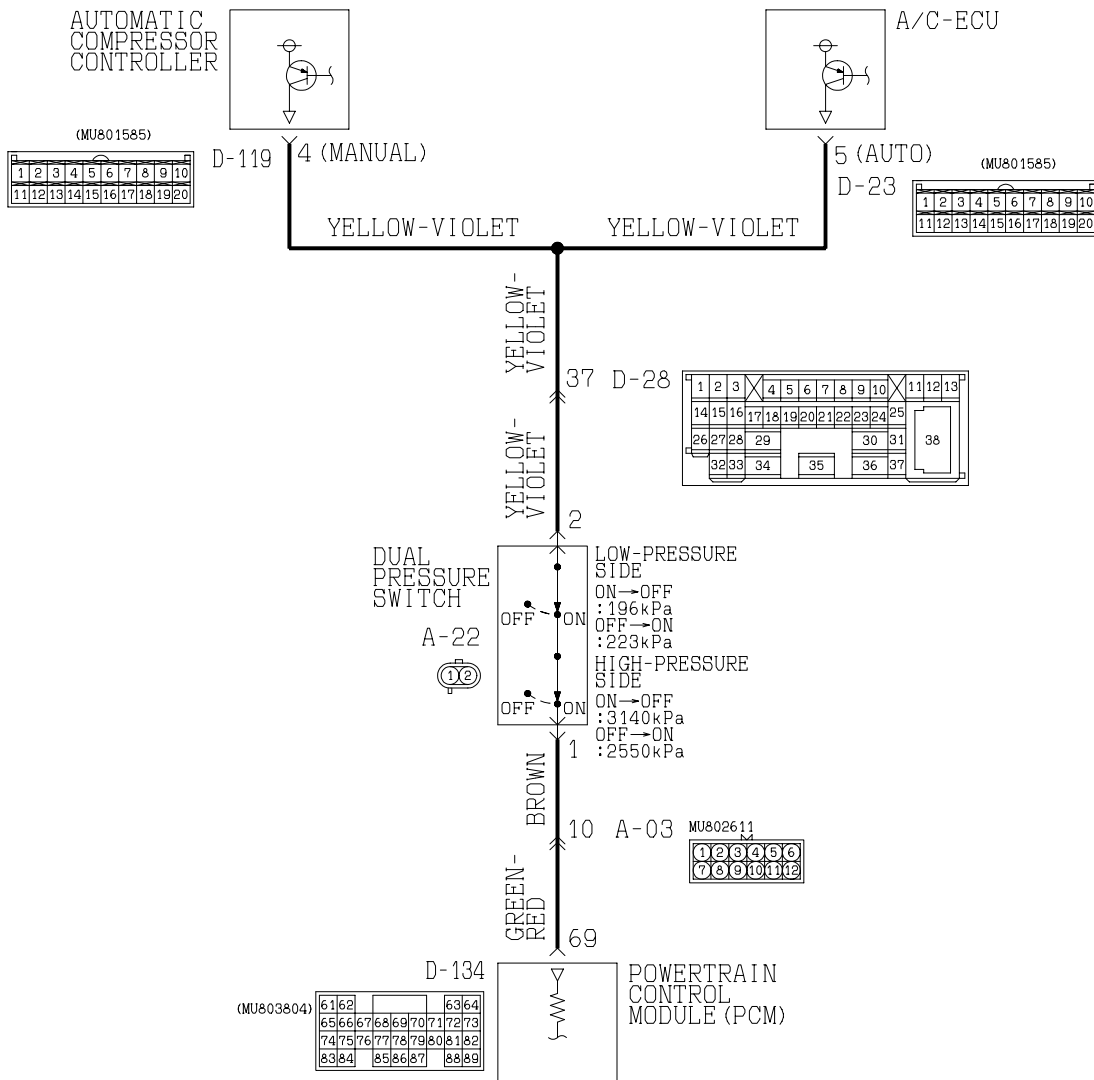
Check the O-ring installation bolts for looseness and the valve body for damage. Repair or replace the faulty parts. Refer to GROUP 23B, Valve Body [P.23B-80](#).

Replace the valve body assembly if the damages are thought to be irreparable. Then check the symptom.

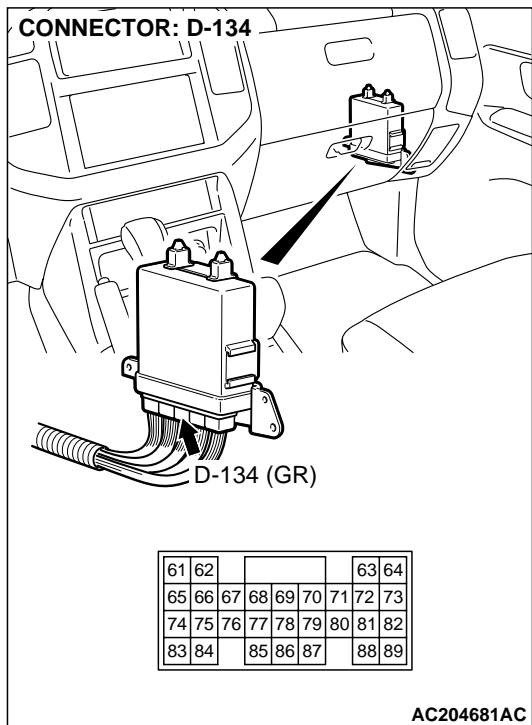
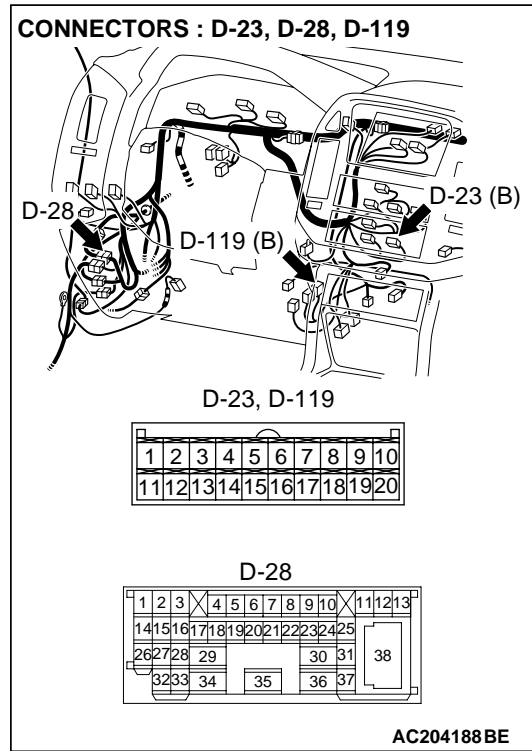
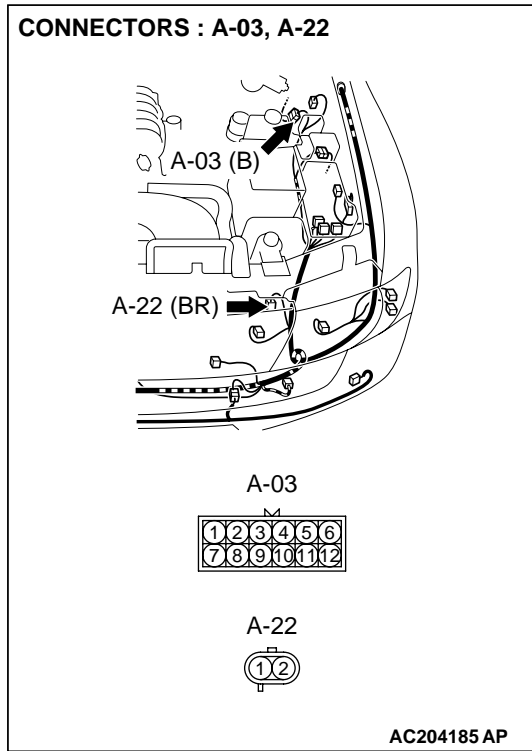
Q: Is the symptom eliminated?**YES** : The procedure is complete.**NO** : Go to Step 6.**STEP 6. Replace the PCM.****Q: Is the symptom eliminated?****YES** : The procedure is complete.**NO** : Start over at Step 1.

INSPECTION PROCEDURE 15: Vehicle Shifts Differently with A/C Engaged

Dual Pressure Switch System Circuit



W3Q20M02AA
AC205255 AB



CIRCUIT OPERATION

- When the A/C is turned ON and the dual pressure switch is closed, PCM (terminal 69) receives battery voltage and then determines the A/C compressor has been signaled to engage.
- When the A/C compressor is engaged, the PCM increases line pressure and briefly delays shift points to compensate for the additional engine load.

COMMENT

The cause is probably a faulty dual pressure switch circuit or a defective PCM.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the dual pressure switch
- Damaged harness, connector
- Malfunction of A/C system
- Malfunction of the PCM

DIAGNOSIS

Required Special Tool:

- MB991502: Scan Tool (MUT-II)

STEP 1. Using scan tool MB991502, check data list item 65: Dual Pressure Switch.

⚠ CAUTION

To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set scan tool MB991502 to data reading mode for item 65, Dual Pressure Switch.
 - When the A/C is in operation, scan tool MB991502 display should be "ON."
 - When the A/C is not in operation, scan tool MB991502 display should be "OFF."
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the switch operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-6](#).

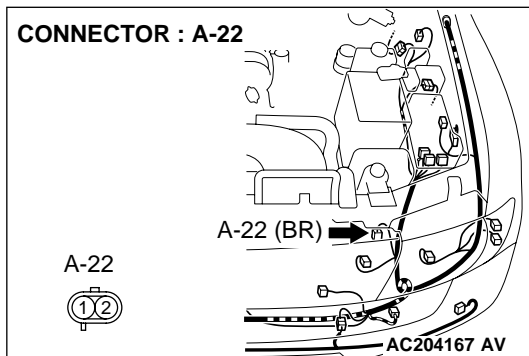
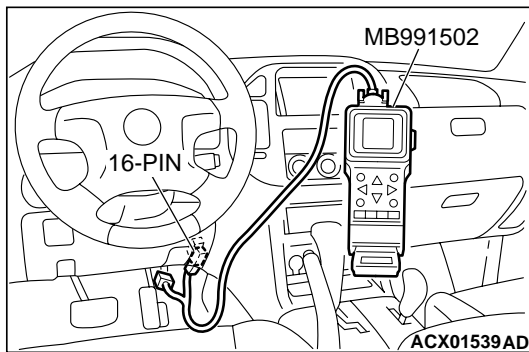
NO : Go to Step 2.

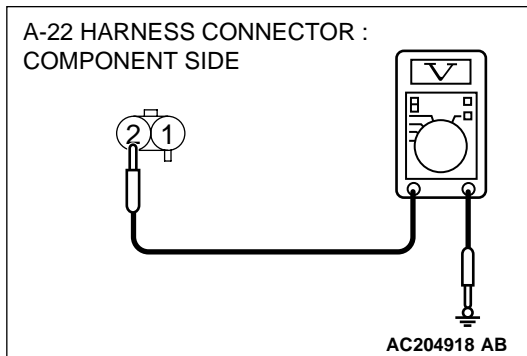
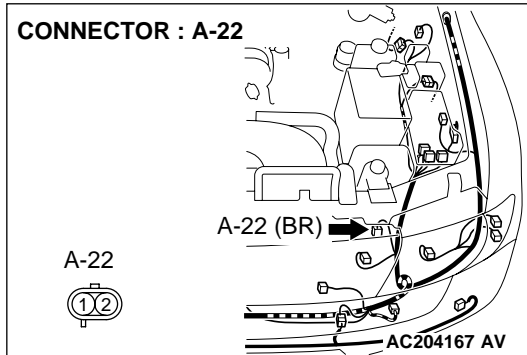
STEP 2. Check dual pressure switch connector A-22 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 3.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).





STEP 3. Measure the power supply voltage at dual pressure switch connector A-22.

- (1) Disconnect the connector A-22 and measure at the harness side.
- (2) Start the engine and run at idle.
- (3) Operate the A/C.

- (4) Measure the voltage between terminal 2 and ground.
 - The voltage should measure battery positive voltage.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

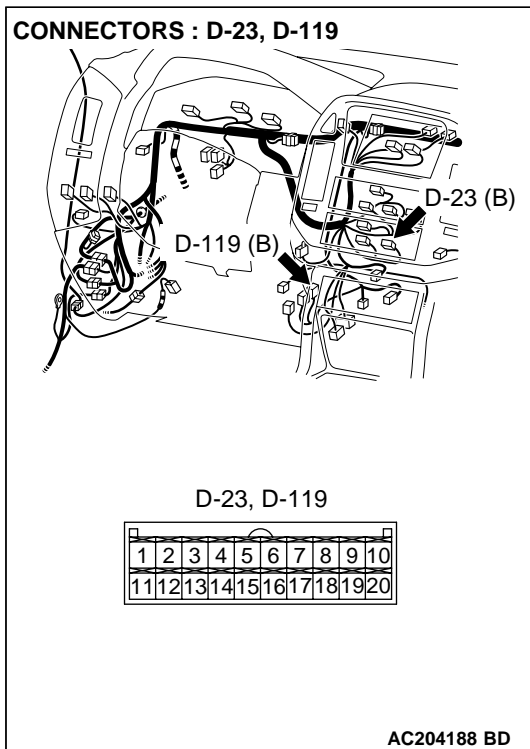
Q: Is the measured voltage battery positive voltage?

YES : Go to Step 10.

NO : Go to Step 4.

STEP 4. Measure the power supply voltage at A/C-ECU connector D-23 <Vehicles with full automatic A/C> or automatic compressor controller connector D-119 <Vehicles with manual A/C> by backprobing.

- (1) Do not disconnect connector D-23 <Vehicles with full automatic A/C> or D-119 <Vehicles with manual A/C>.
- (2) Start the engine and run at idle.
- (3) Operate the A/C.

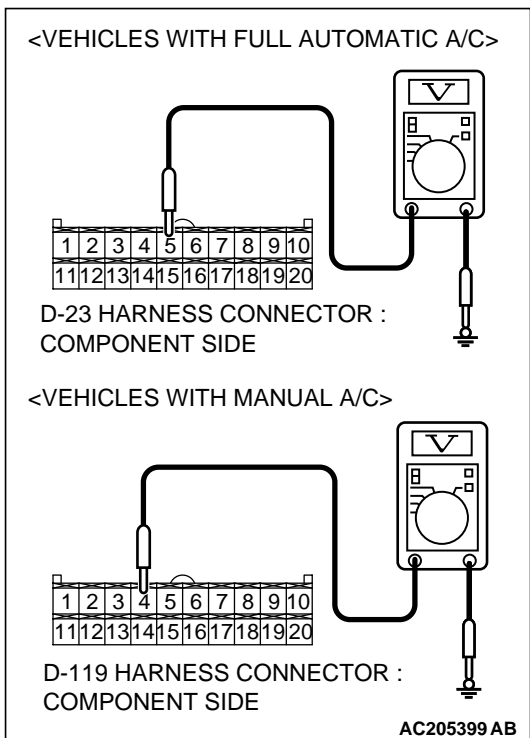


- (4) Measure the voltage between A/C-ECU connector D-23 terminal 5 and ground by backprobing. <Vehicles with full automatic A/C>
Measure the voltage between automatic compressor controller connector D-119 terminal 4 and ground by backprobing. <Vehicles with manual A/C>
 - The voltage should measure battery positive voltage.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

YES : Go to Step 8.

NO : Go to Step 5.

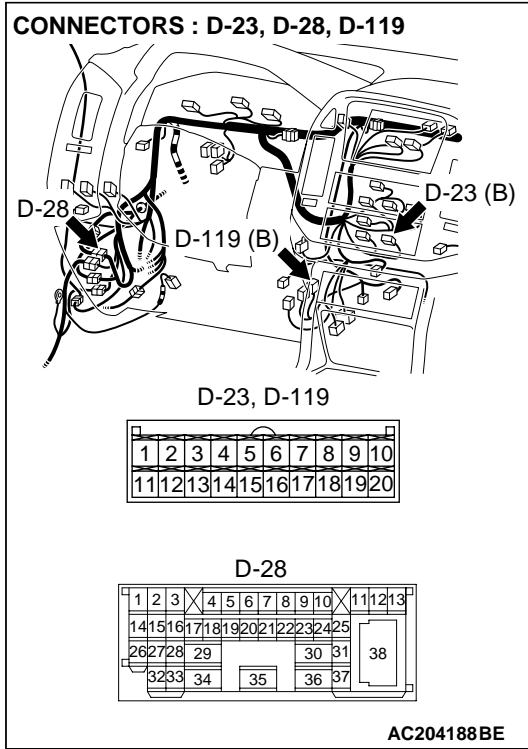


STEP 5. Check intermediate connector D-28, A/C-ECU connector D-23 <Vehicles with full automatic A/C> and automatic compressor controller connector D-119 <Vehicles with manual A/C> for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 6.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

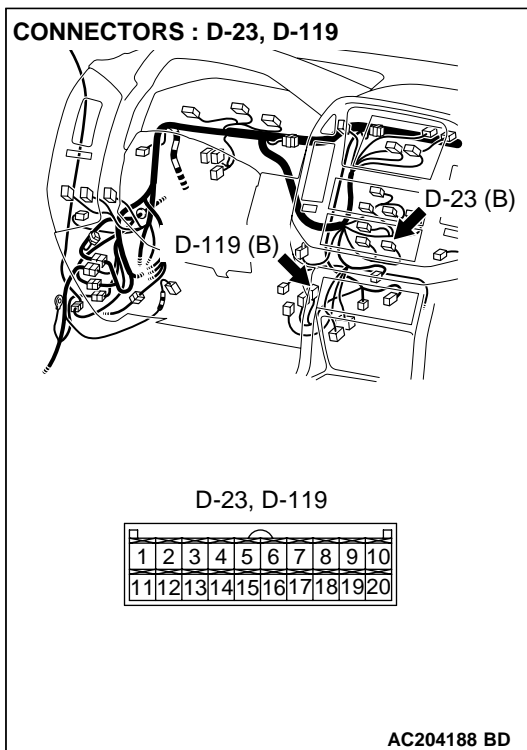
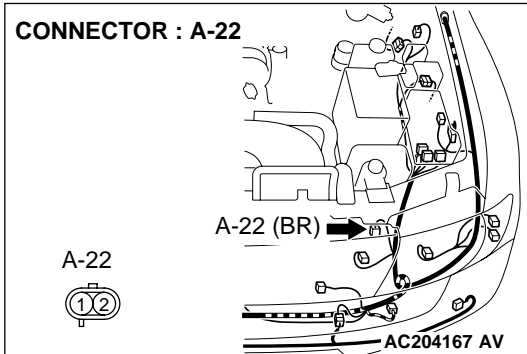


STEP 6. Check harness for short circuit to ground between dual pressure switch connector A-22 terminal 2 and A/C-ECU connector D-23 terminal 5 <Vehicles with full automatic A/C> or dual pressure switch connector A-22 terminal 2 and automatic compressor controller connector D-119 terminal 4 <Vehicles with manual A/C>.

Q: Is the harness wire in good condition?

YES : Go to Step 7.

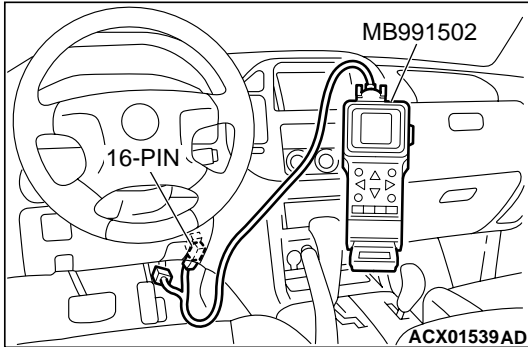
NO : Repair or replace the harness wire.



STEP 7. Using scan tool MB991502, check data list item 65: Dual Pressure Switch.

⚠ CAUTION

To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.



- (1) Connect scan tool MB991502 to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set scan tool MB991502 to data reading mode for item 65, Dual Pressure Switch.
 - When the A/C is in operation, scan tool MB991502 display should be "ON."
 - When the A/C is not in operation, scan tool MB991502 display should be "OFF."
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the switch operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-6](#).

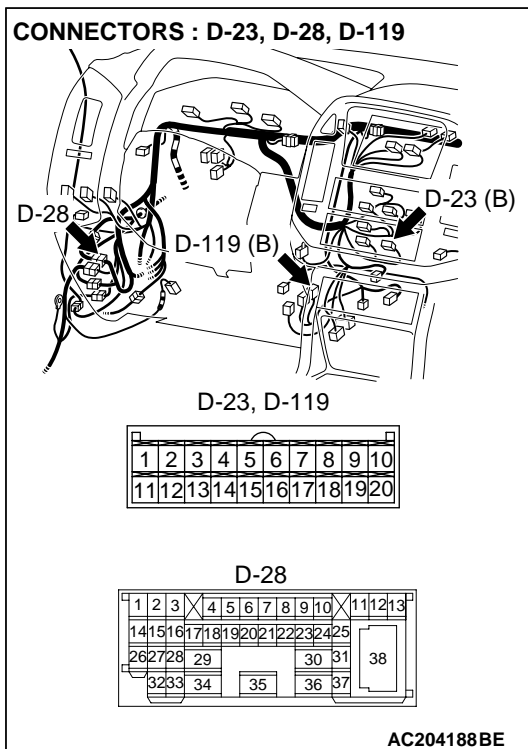
NO : Check the air conditioning system. Refer to GROUP 55, Troubleshooting Strategy [P.55A-5](#).

STEP 8. Check intermediate connector D-28, A/C-ECU connector D-23 <Vehicles with full automatic A/C> and automatic compressor controller connector D-119 <Vehicles with manual A/C> for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 9.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

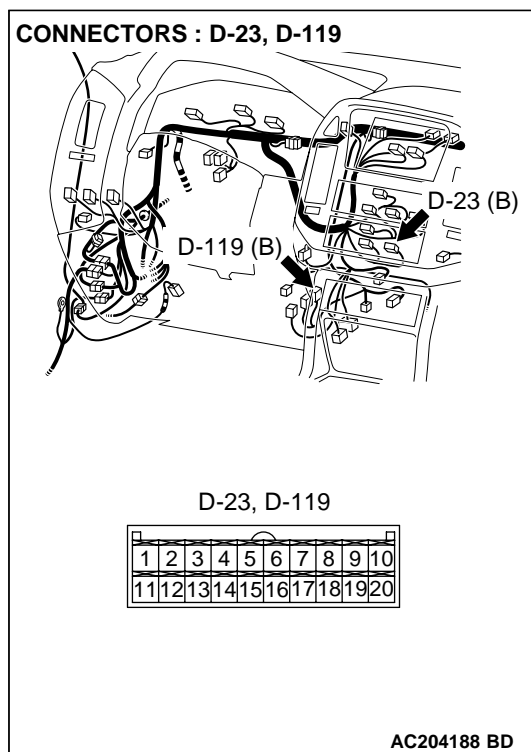
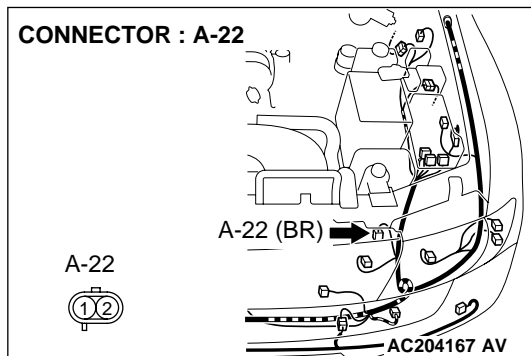


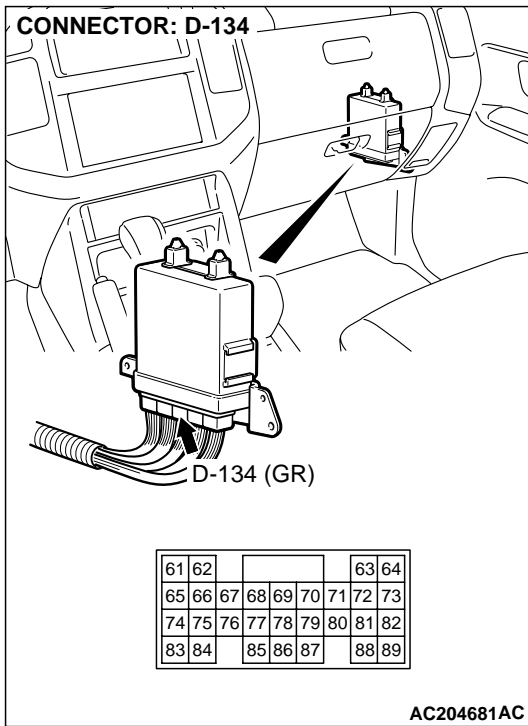
STEP 9. Check the harness for open circuit between dual pressure switch connector A-22 terminal 2 and A/C-ECU connector D-23 terminal 5 <Vehicles with full automatic A/C> or dual pressure switch connector A-22 terminal 2 and automatic compressor controller connector D-119 terminal 4 <Vehicles with manual A/C>.

Q: Is the harness wire in good condition?

YES : Go to Step 14.

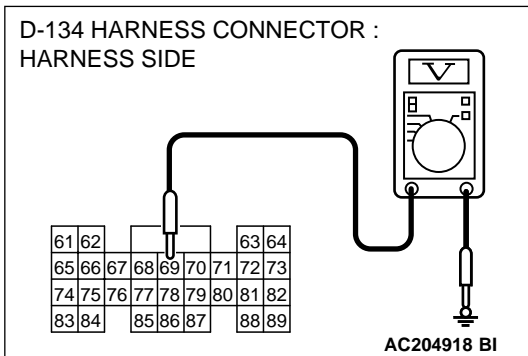
NO : Repair or replace the harness wire.





STEP 10. Measure the switch output voltage at PCM connector D-134 by backprobing.

- (1) Do not disconnect connector D-134.
- (2) Start the engine and run at idle.
- (3) Operate the A/C.



- (4) Measure the voltage between terminal 69 and ground by backprobing.
 - When the A/C is in operation, the voltage should measure battery positive voltage.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

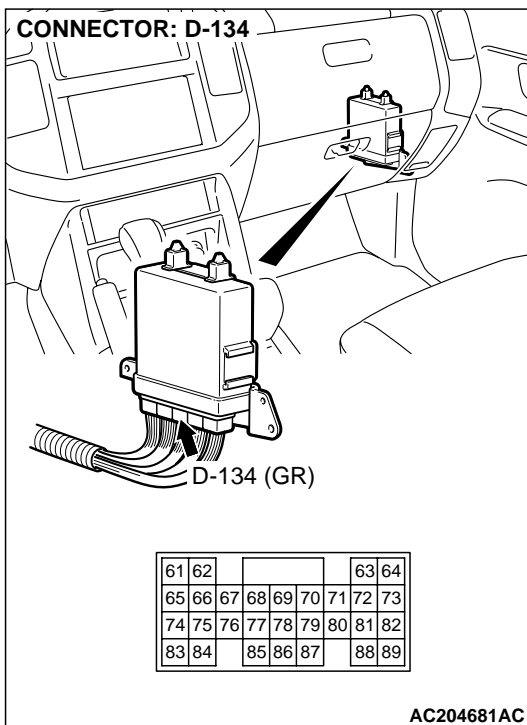
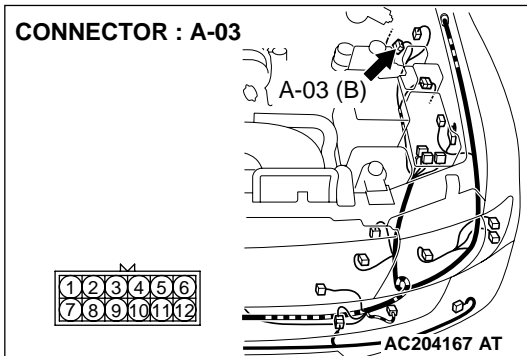
- YES :** Go to Step 15.
NO : Go to Step 11.

STEP 11. Check intermediate connector A-03 and PCM connector D-134 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 12.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

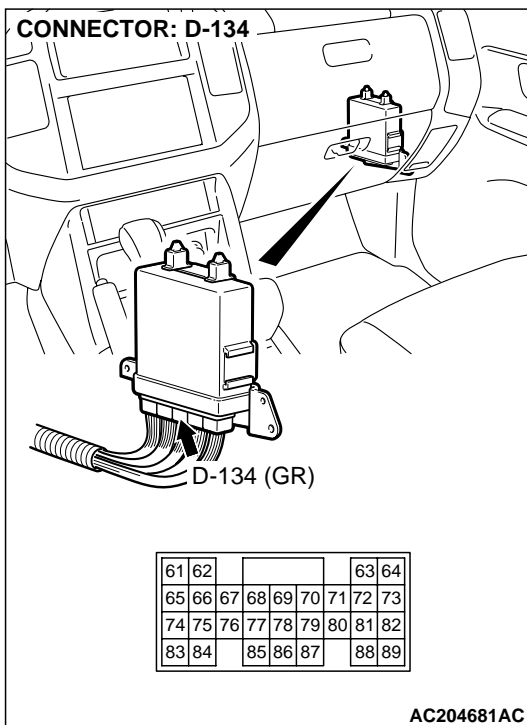
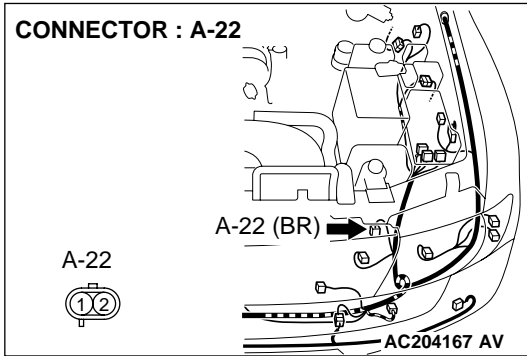


STEP 12. Check harness for open circuit or short circuit to ground between dual pressure switch connector A-22 terminal 1 and PCM connector D-134 terminal 69.

Q: Is the harness wire in good condition?

YES : Go to Step 13.

NO : Repair or replace the harness wire.



STEP 13. Check the dual pressure switch.

Refer to GROUP 55A, Dual Pressure Switch Check [P.55A-118](#).

Q: Is the switch operating properly?

YES : Go to Step 14.

NO : Replace the dual pressure switch. Refer to GROUP 55A, Refrigerant Line [P.55A-152](#).

STEP 14. Using scan tool MB991502, check data list item 65: Dual Pressure Switch.

⚠ CAUTION

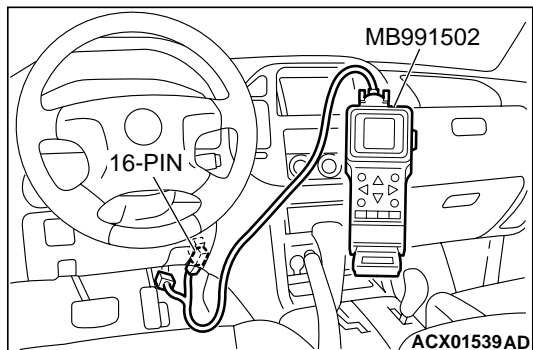
To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set scan tool MB991502 to data reading mode for item 65, Dual Pressure Switch.
 - When the A/C is in operation, scan tool MB991502 display should be "ON."
 - When the A/C is not in operation, scan tool MB991502 display should be "OFF."
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the switch operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction P.00-6.

NO : Replace the PCM.

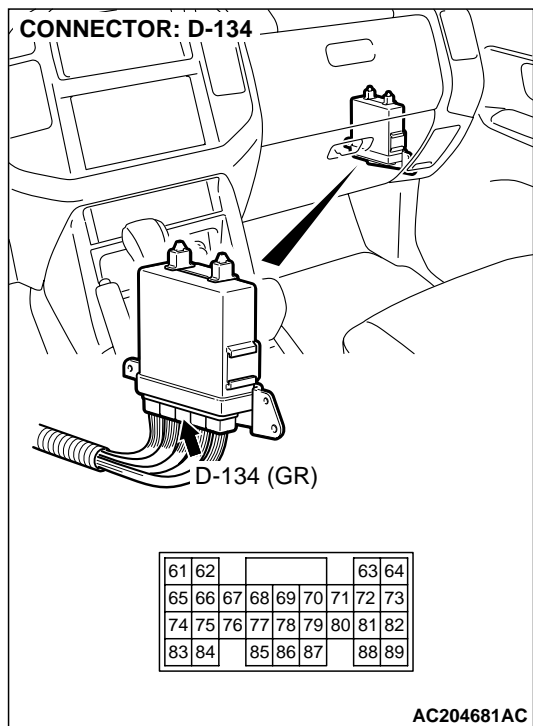


STEP 15. Check PCM connector D-134 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 14.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.



INSPECTION PROCEDURE 16: Transmission won't Downshift Under Load with Auto-cruise Engaged.

CIRCUIT OPERATION

The overdrive-off signals are created inside the PCM. When a malfunction of the auto-cruise control circuit occurs, the transmission may downshift harshly with the auto-cruise control engaged.

COMMENT

A malfunction may be present on the auto-cruise signal line or the PCM.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the PCM

DIAGNOSIS

Required Special Tool:

- MB991502: Scan Tool (MUT-II)

STEP 1. Using scan tool MB991502, check data list item 66: Overdrive Off Signal.

⚠ CAUTION

To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Start the engine and prepare to test drive the vehicle.
(Operate the auto-cruise)
- (3) Set scan tool MB991502 to data reading mode for item 66, Overdrive Off Signal.
 - When driving at level road, the display should be "OFF."
 - When driving at uphill road, the display should be "ON."
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the PCM operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-6](#).

NO : Go to Step 2.

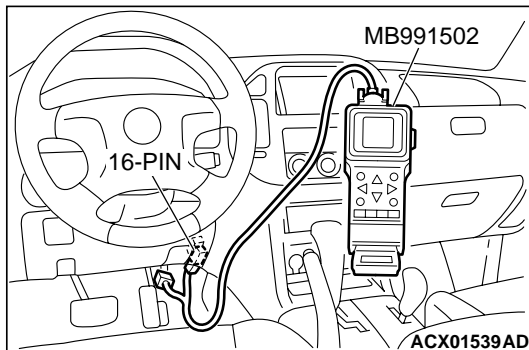
STEP 2. Check the auto-cruise system.

Check the auto-cruise system. Refer to GROUP 17, Auto-cruise Control System Diagnostic Troubleshooting Strategy [P.17-8](#).

Q: Is the auto-cruise system operating properly?

YES : Go to Step 3.

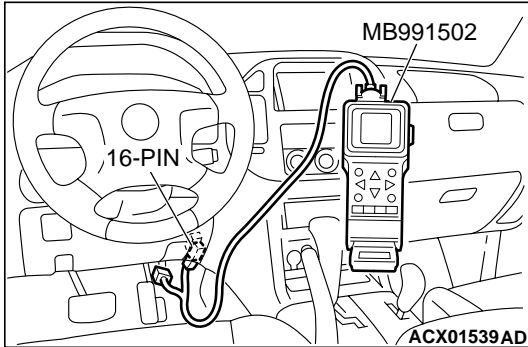
NO : Repair it, then check the symptom.



STEP 3. Using scan tool MB991502, check data list item 66: Overdrive Off Signal.

⚠ CAUTION

To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.



- (1) Connect scan tool MB991502 to the data link connector.
- (2) Start the engine and prepare to test drive the vehicle.
(Operate the auto-cruise)
- (3) Set scan tool MB991502 to data reading mode for item 66, Overdrive Off Signal.
 - When driving at level road, the display should be "OFF."
 - When driving at uphill road, the display should be "ON."
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

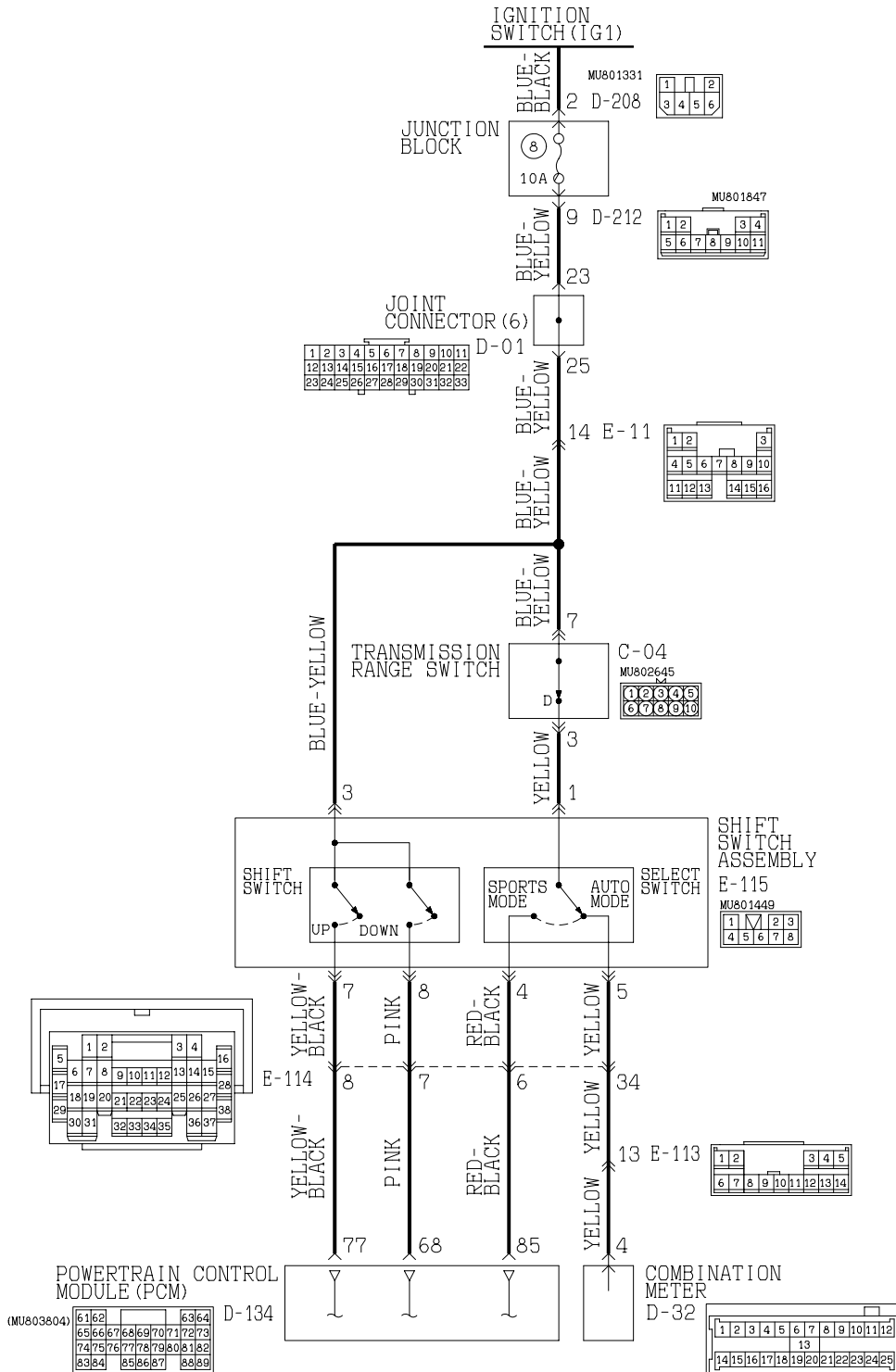
Q: Is the PCM operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-6](#).

NO : Replace the PCM.

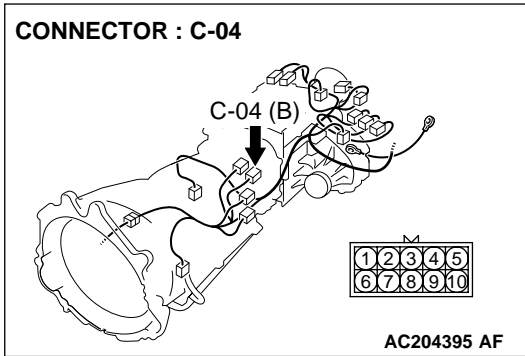
INSPECTION PROCEDURE 17: Shift Switch Assembly System

Shift Switch Assembly System Circuit

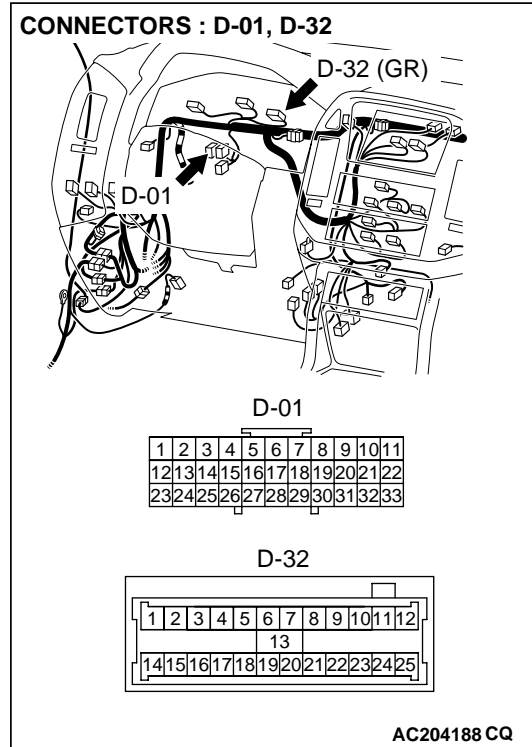


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AC205256AB

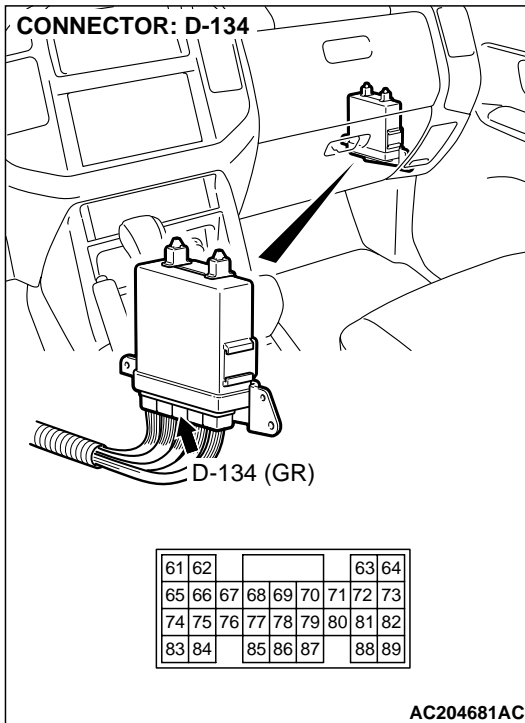
CONNECTOR : C-04



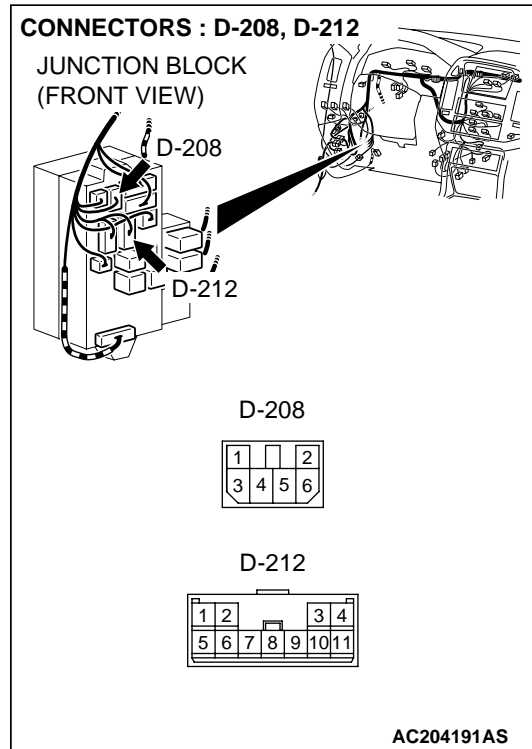
CONNECTORS : D-01, D-32

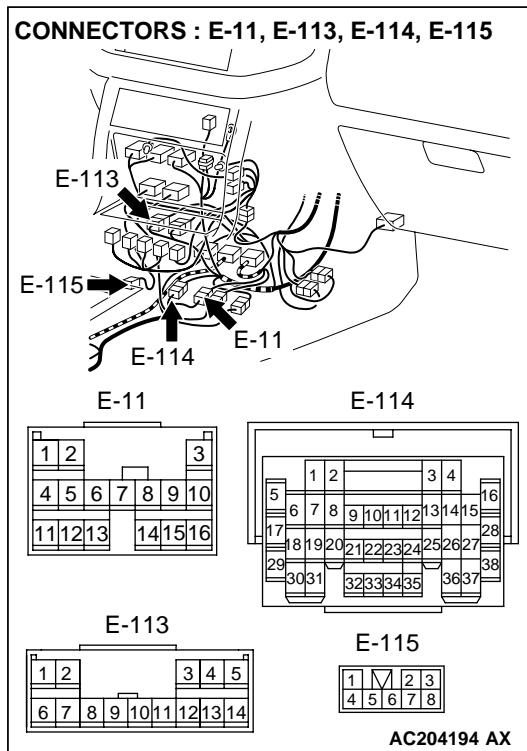


CONNECTOR: D-134



CONNECTORS : D-208, D-212



**CIRCUIT OPERATION**

If the select switch of the shift switch assembly is set to the sport mode, battery positive voltage will be applied to the PCM (terminal 85). If the shift switch of the shift switch assembly is set to "UP" or "DOWN" position, battery positive voltage will be applied to the PCM (terminals 68 or 77).

COMMENT

The cause is probably a malfunction of the transmission range switch circuit, shift switch assembly circuit or a defective PCM.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the transmission range switch
- Malfunction of the shift switch assembly select switch
- Malfunction of the shift switch assembly shift switch (Up)
- Malfunction of the shift switch assembly shift switch (Down)
- Damaged harness, connector
- Malfunction of the PCM

DIAGNOSIS

Required Special Tool:

- MB991502: Scan Tool (MUT-II)

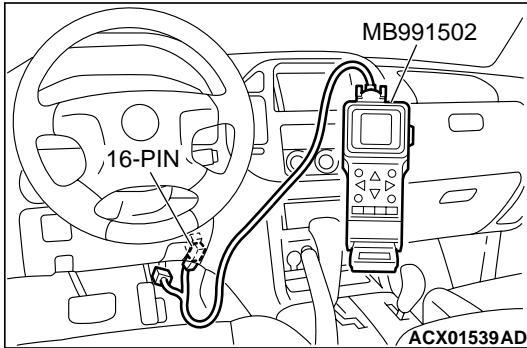
STEP 1. Using scan tool MB991502, check data list item 67: Select Switch, item 68: Shift Switch (Up), item 69: Shift Switch (Down).

⚠ CAUTION

To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991502 to data reading mode for following items.

- a. item 67: Select Switch
- b. item 68: Shift Switch (Up)
- c. item 69: Shift Switch (Down)
 - The switches above are displayed, depending on the selector lever condition as shown in the table.



SELECTOR LEVER OPERATION	DATA LIST ITEM		
	67	68	69
D range	OFF	OFF	OFF
Sport mode	ON	OFF	OFF
Upshift and hold the selector lever	ON	ON	OFF
Downshift and hold the selector lever	ON	OFF	ON

- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the switch operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction P.00-6.

NO : If item 68 and item 69 both are NG: Go to Step 2. If only item 67 is NG: Go to Step 5. If only item 68 is NG: Go to Step 15. If only item 69 is NG: Go to Step 20.

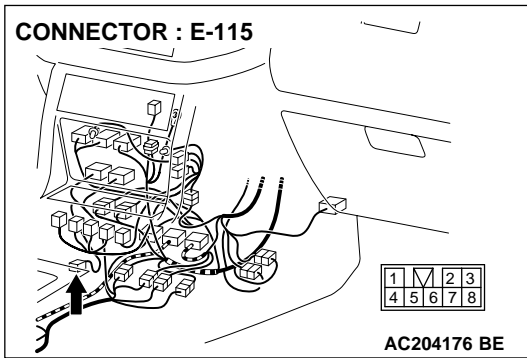
STEP 2. Check the shift switch assembly.

Refer to P.23Aa-32, Transmission Control.

Q: Is the switch operating properly?

YES : Go to Step 3.

NO : Replace the shift switch assembly. Refer to P.23Aa-33, Transmission Control.

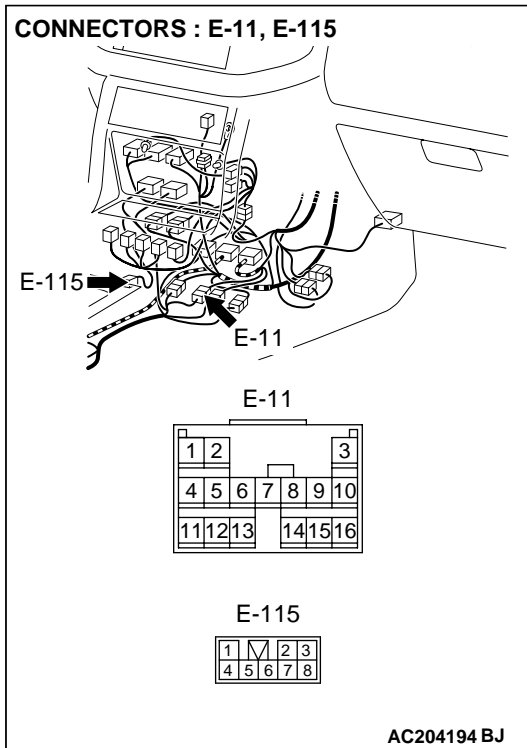


STEP 3. Check shift switch assembly connector E-115 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 4.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).



STEP 4. Check harness for open circuit between intermediate connector E-11 terminal 14 and shift switch assembly connector E-115 terminal 3.

Q: Is the harness wire in good condition?

YES : Go to Step 25.

NO : Repair or replace the harness wire.

STEP 5. Using scan tool MB991502, check data list item 61: Transmission Range Switch.

⚠ CAUTION

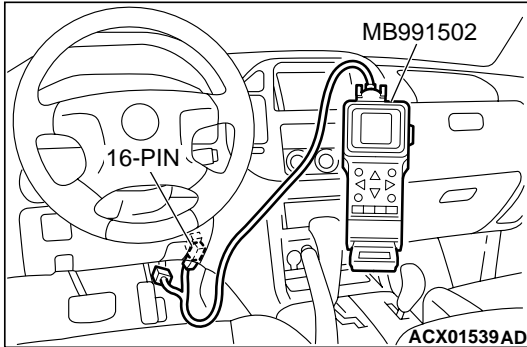
To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991502 to data reading mode for item 61, Transmission Range Switch.
 - Scan tool MB991502 should display "D" when the transmission range is "D" range.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the switch operating properly?

YES : Go to Step 6.

NO : Refer to [P.23Ac-93](#), [P.23Ac-123](#), DTCs 27, 28: Transmission range switch system.



STEP 6. Check the shift switch assembly.

Refer to [P.23Aa-32](#), Transmission Control.

Q: Is the switch operating properly?

YES : Go to Step 7.

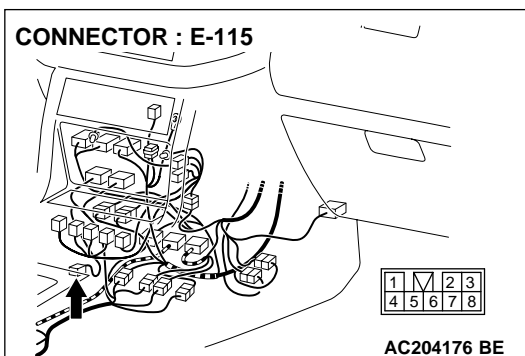
NO : Replace the shift switch assembly. Refer to [P.23Aa-33](#), Transmission Control.

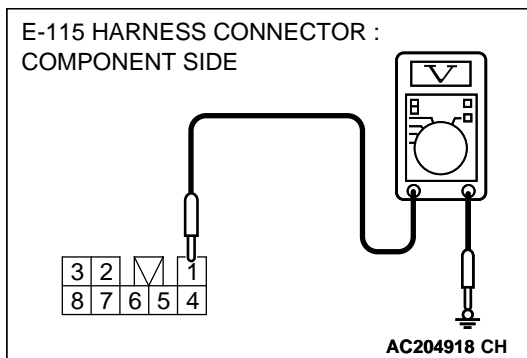
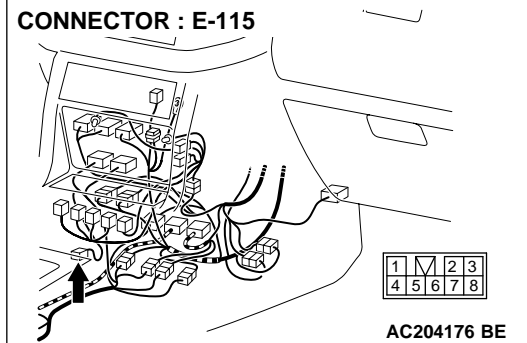
STEP 7. Check shift switch assembly connector E-115 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 8.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).





STEP 8. Measure the power supply voltage at shift switch assembly connector E-115.

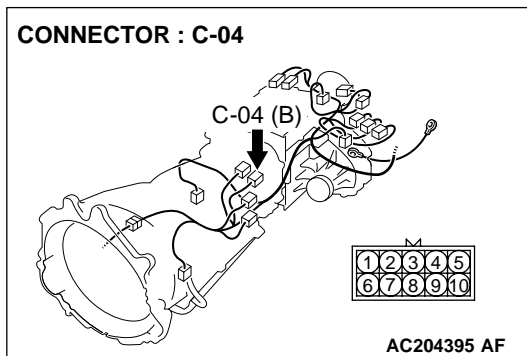
- (1) Disconnect connector E-115 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "D" range.

- (4) Measure the voltage between terminal 1 and ground.
 - The voltage should measure battery positive voltage.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

YES : Go to Step 11.

NO : Go to Step 9.



STEP 9. Check transmission range switch connector C-04 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 10.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

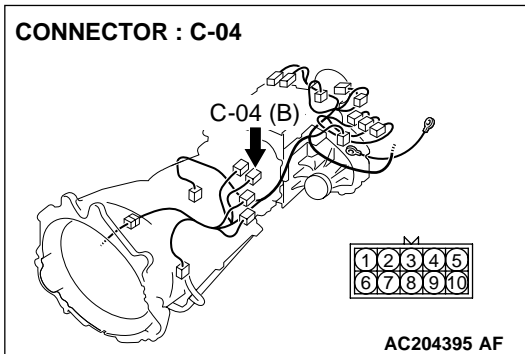
STEP 10. Check harness for open circuit between transmission range switch connector C-04 terminal 3 and shift switch assembly connector E-115 terminal 1.

Q: Is the harness wire in good condition?

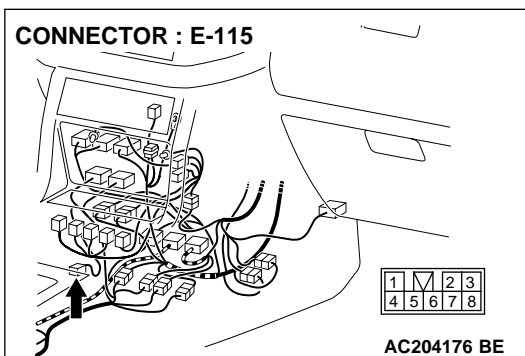
YES : Go to Step 25.

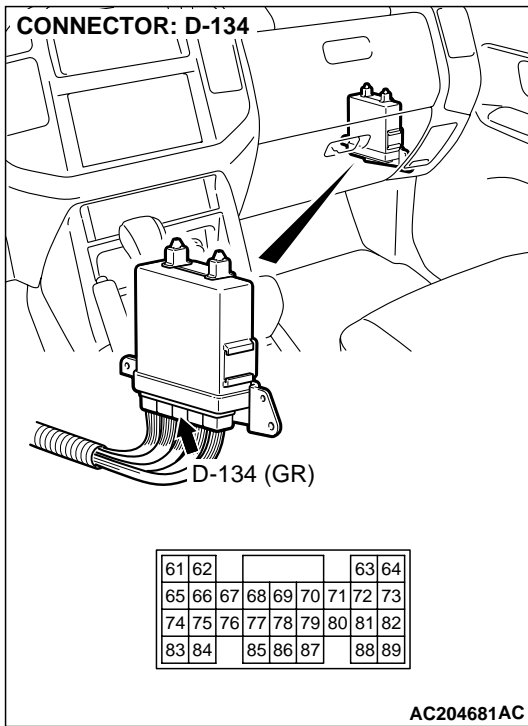
NO : Repair or replace the harness wire.

CONNECTOR : C-04



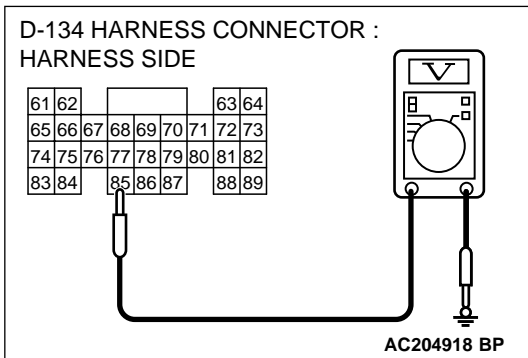
CONNECTOR : E-115





STEP 11. Measure the switch output voltage at PCM connector D-134 by backprobing.

- (1) Do not disconnect connector D-134.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be sport mode.



- (4) Measure the voltage between terminal 85 and ground by backprobing.
 - The voltage should measure battery positive voltage.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

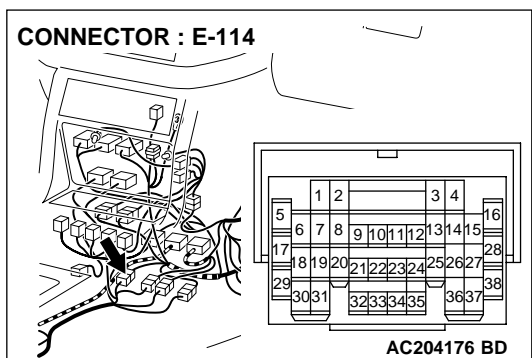
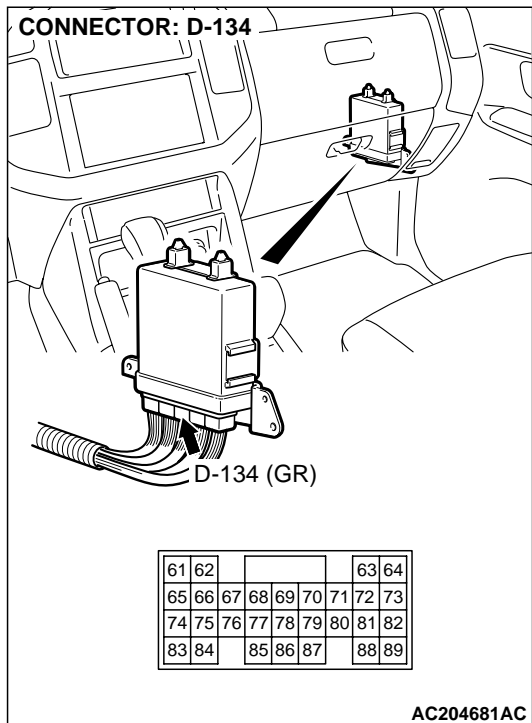
- YES :** Go to Step 14.
NO : Go to Step 12.

STEP 12. Check PCM connector D-134 and intermediate connector E-114 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 13.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

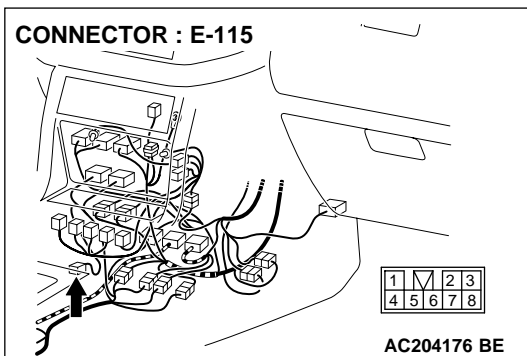
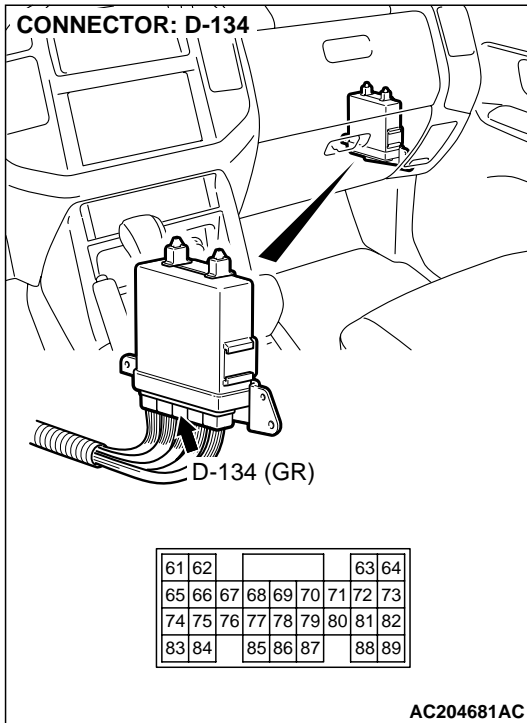


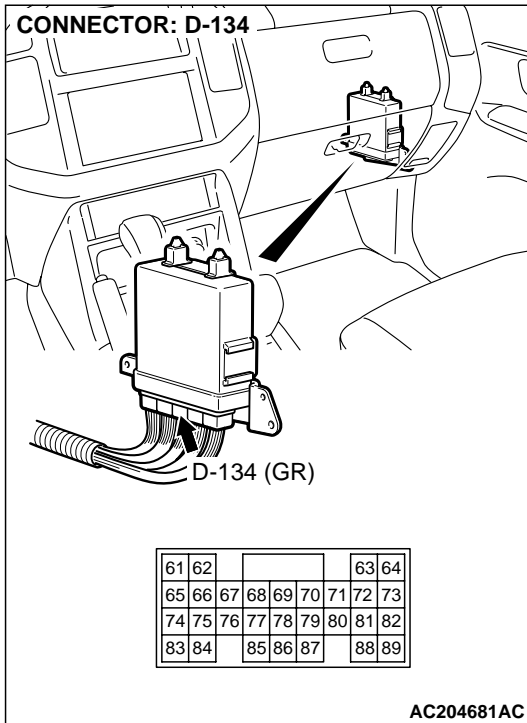
STEP 13. Check harness for open circuit or short circuit to ground between PCM connector D-134 terminal 85 and shift switch assembly connector E-115 terminal 4.

Q: Is the harness wire in good condition?

YES : Go to Step 25.

NO : Repair or replace the harness wire.





STEP 14. Check PCM connector D-134 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 25.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

STEP 15. Check the shift switch assembly.

Refer to [P.23Aa-32](#), Transmission Control.

Q: Is the switch operating properly?

YES : Go to Step 16.

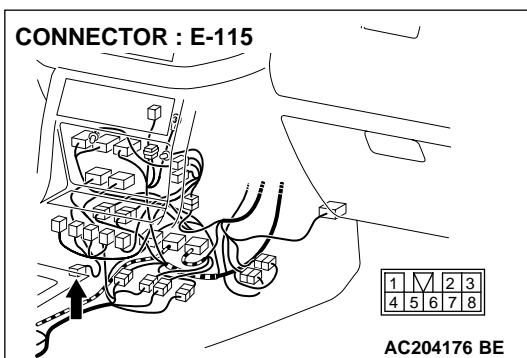
NO : Replace the shift switch assembly. Refer to [P.23Aa-33](#), Transmission Control.

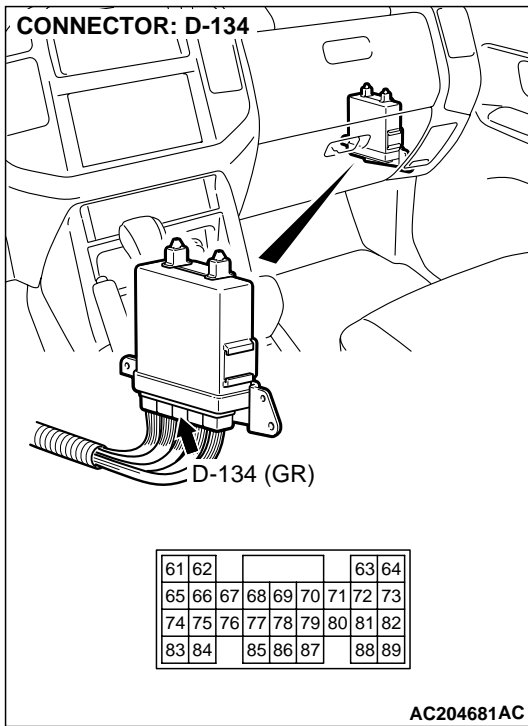
STEP 16. Check shift switch assembly connector E-115 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 17.

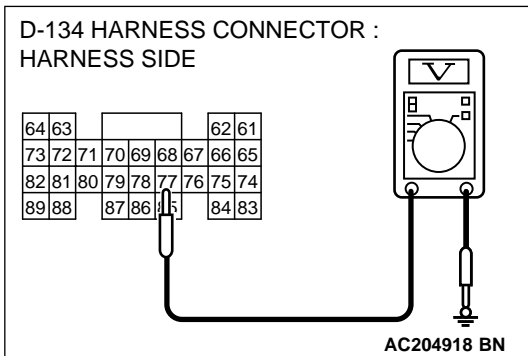
NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).





STEP 17. Measure the switch output voltage at PCM connector D-134.

- (1) Disconnect connector D-134 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.



- (3) Measure the voltage between terminal 77 and ground.
 - The voltage should measure battery positive voltage when the selector lever is upshift and hold.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

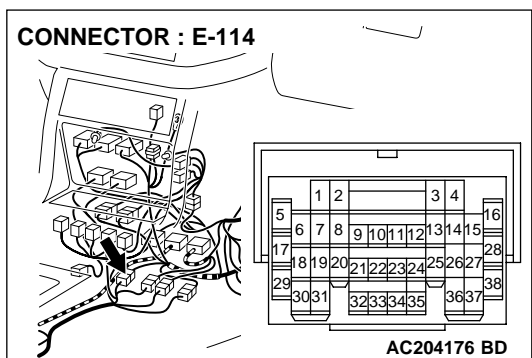
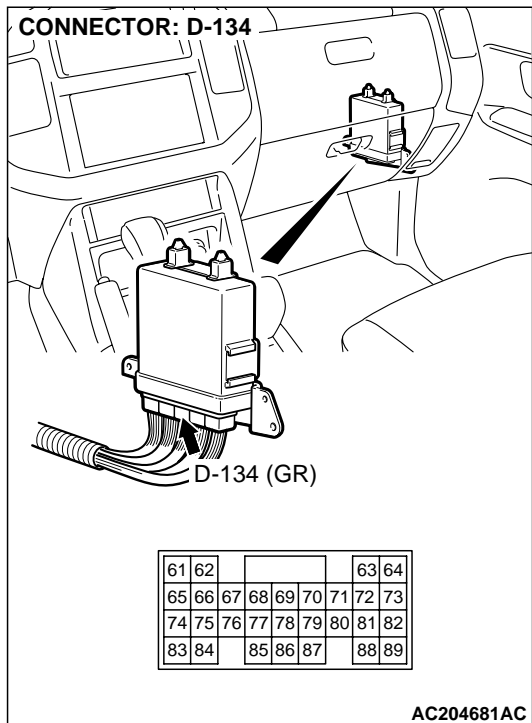
- YES :** Go to Step 14.
NO : Go to Step 18.

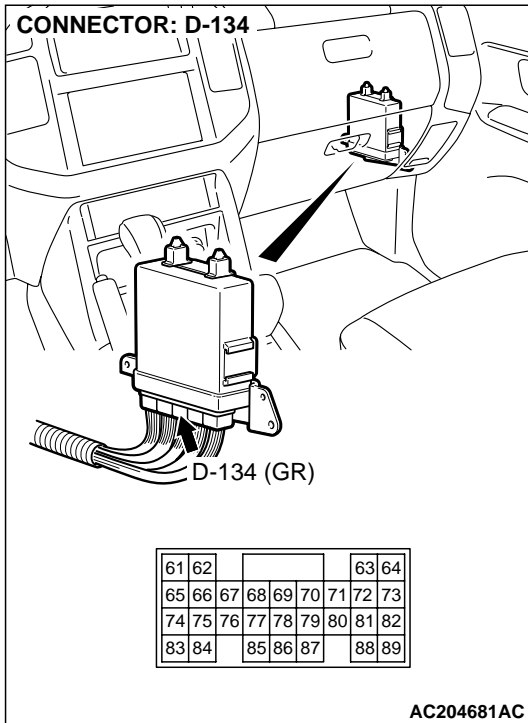
STEP 18. Check PCM connector D-134 and intermediate connector E-114 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 19.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).



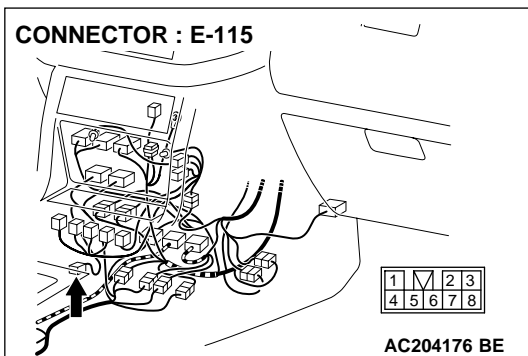


STEP 19. Check harness for open circuit or short circuit to ground between PCM connector D-134 terminal 77 and shift switch assembly connector E-115 terminal 7.

Q: Is the harness wire in good condition?

YES : Go to Step 25.

NO : Repair or replace the harness wire.



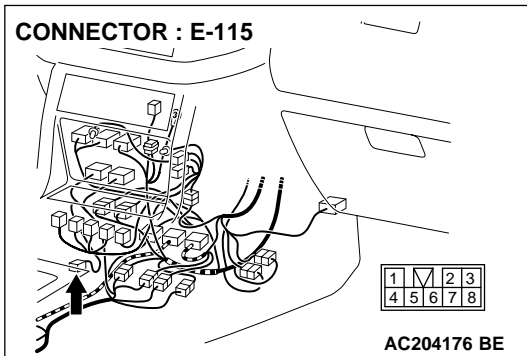
STEP 20. Check the shift switch assembly.

Refer to [P.23Aa-32](#), Transmission Control.

Q: Is the switch operating properly?

YES : Go to Step 21.

NO : Replace the shift switch assembly. Refer to [P.23Aa-33](#), Transmission Control.

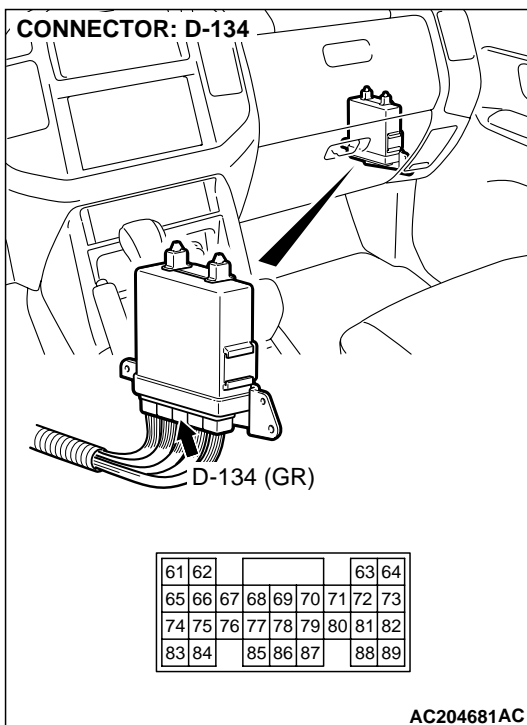


STEP 21. Check shift switch assembly connector E-115 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

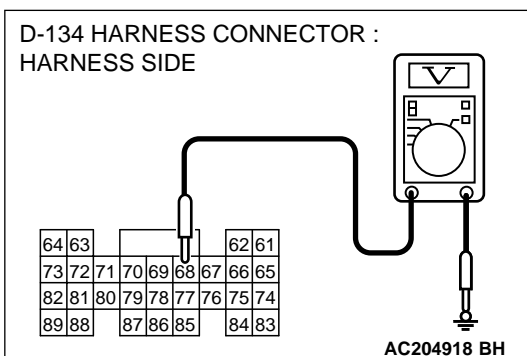
YES : Go to Step 22.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).



STEP 22. Measure the switch output voltage at PCM connector D-134.

- (1) Disconnect connector D-134 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.



- (3) Measure the voltage between terminal 68 and ground.
 - The voltage should measure battery positive voltage when the selector lever is downshift and hold.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

YES : Go to Step 14.

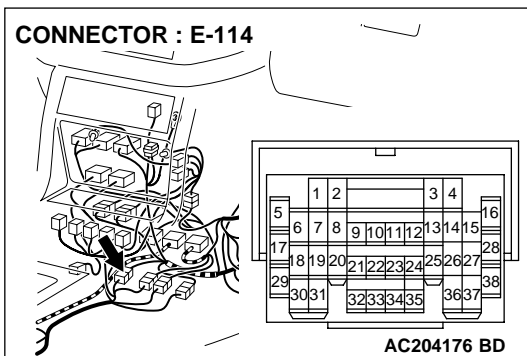
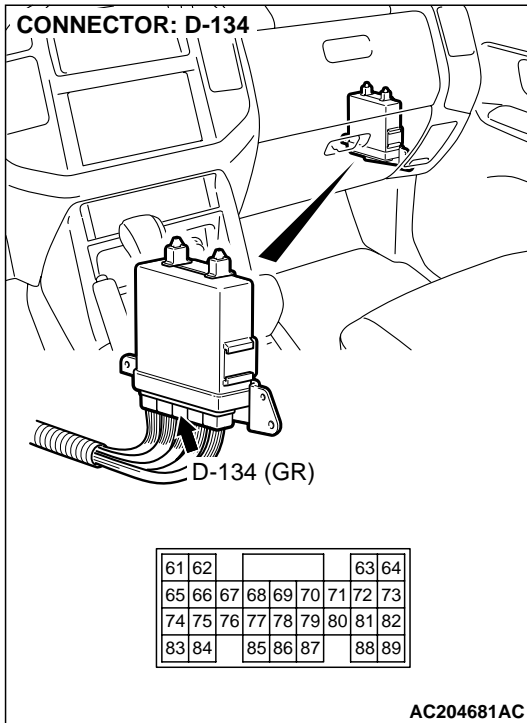
NO : Go to Step 23.

STEP 23. Check PCM connector D-134 and intermediate connector E-114 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 24.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

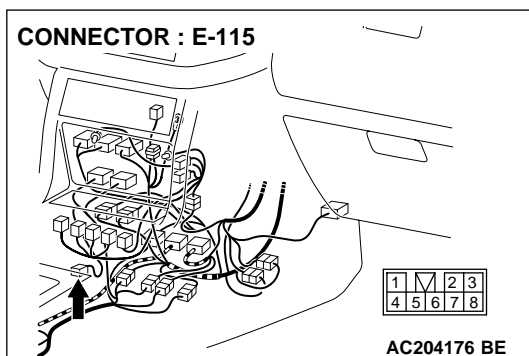
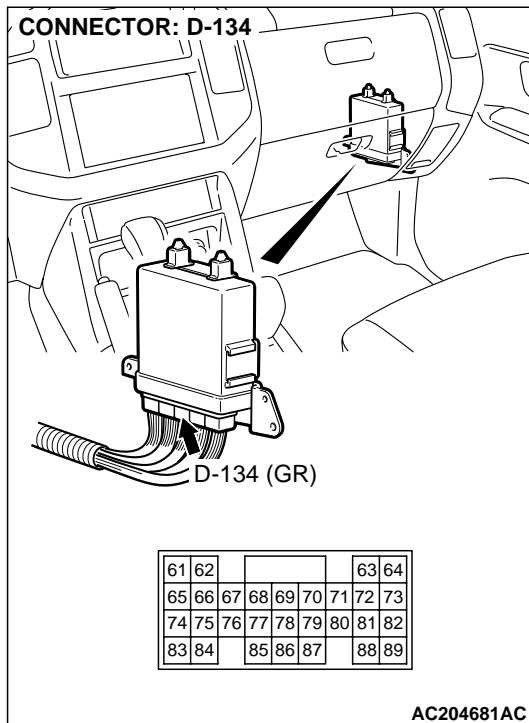


STEP 24. Check harness for open circuit or short circuit to ground between PCM connector D-134 terminal 68 and shift switch assembly connector E-115 terminal 8.

Q: Is the harness wire in good condition?

YES : Go to Step 25.

NO : Repair or replace the harness wire.



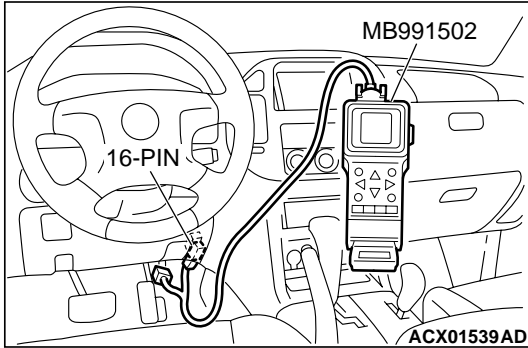
STEP 25. Using scan tool MB991502, check data list item 67: Select Switch, item 68: Shift Switch (Up), item 69: Shift Switch (Down).

⚠ CAUTION

To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check the following items in the data list.

- a. item 67: Select Switch
- b. item 68: Shift Switch (Up)
- c. item 69: Shift Switch (Down)
 - The switches above are displayed, depending on the selector lever condition as shown in the table.



SELECTOR LEVER OPERATION	DATA LIST ITEM		
	67	68	69
D range	OFF	OFF	OFF
Sport mode	ON	OFF	OFF
Upshift and hold the selector lever	ON	ON	OFF
Downshift and hold the selector lever	ON	OFF	ON

- (4) Turn the ignition switch to the "LOCK" (OFF) position.

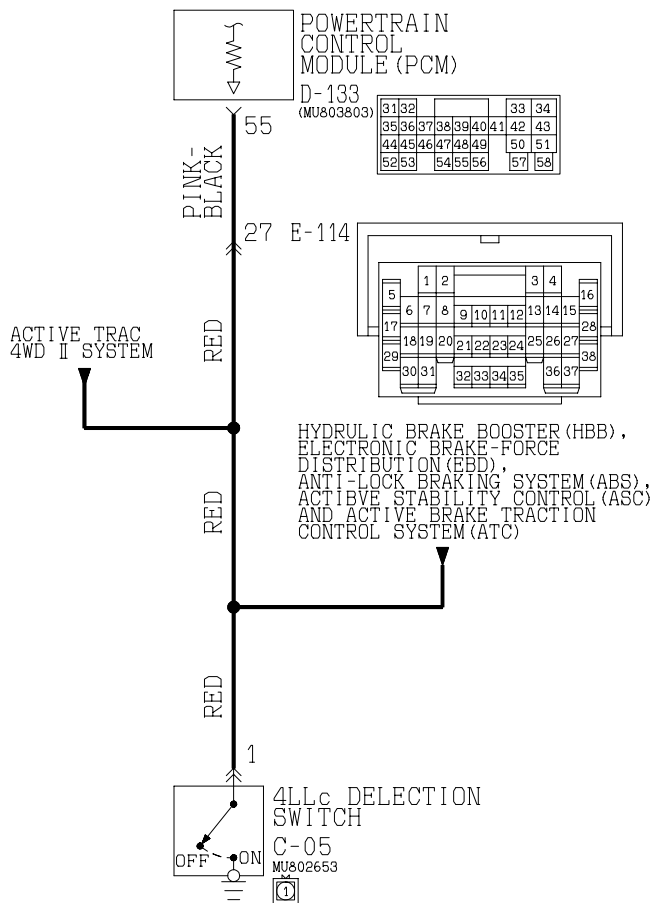
Q: Is the switch operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-6](#).

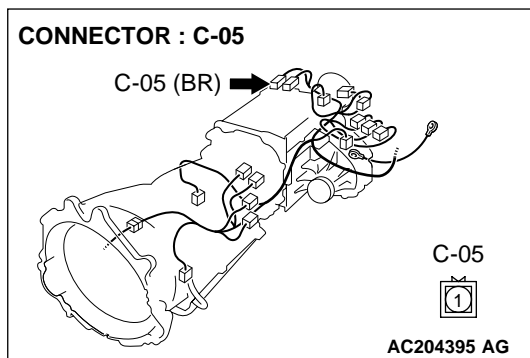
NO : Replace the PCM.

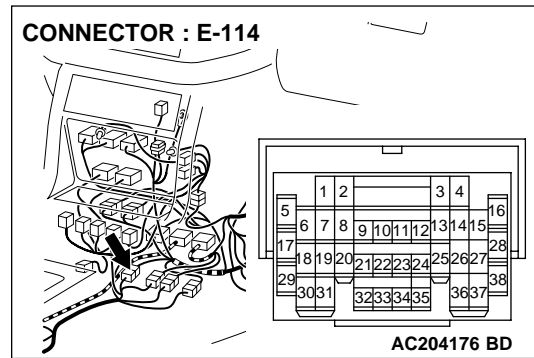
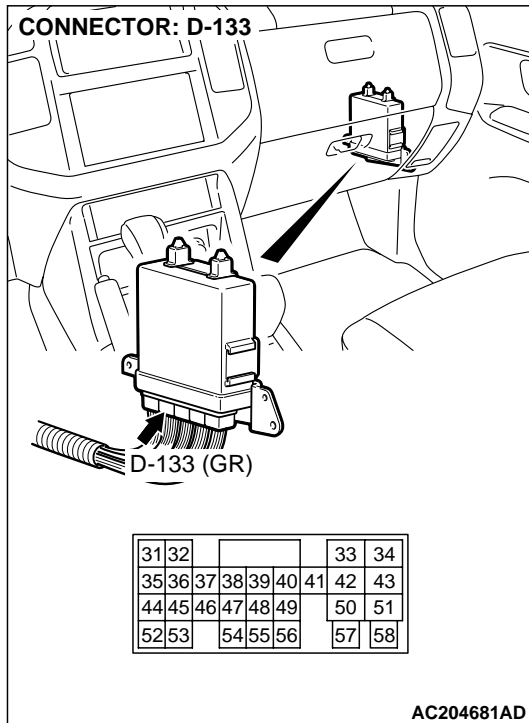
INSPECTION PROCEDURE 18: 4LLc Detection Switch System

4LLc Detection Switch System Circuit



W3Q20M04AA
AC205257AB





CIRCUIT OPERATION

- A battery positive voltage is applied to the 4LLc detection switch output terminal (terminal 1) from the PCM (terminal 55) via the resistance in the unit.
- The 4LLc detection switch is grounded through the transfer case to the vehicle body.

COMMENT

If the transmission will not shift to 4th gear, or if it shifts to 4th gear when the transfer lever is in the "4LLc" position, the cause is probably a malfunction of the 4LLc detection switch.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the 4LLc detection switch
- Damaged harness, connector
- Malfunction of the PCM

DIAGNOSIS

Required Special Tool:

- MB991502: Scan Tool (MUT-II)

STEP 1. Using scan tool MB991502, check data list item 75: 4LLc Detection Switch.

⚠ CAUTION

To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991502 to data reading mode for item 75, 4LLc Detection Switch.

- When the transfer shift lever position is 4LLc, scan tool MB991502 display should be "ON."
- When the transfer shift lever position is other than 4LLc, scan tool MB991502 display should be "OFF."

- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the switch operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-6](#).

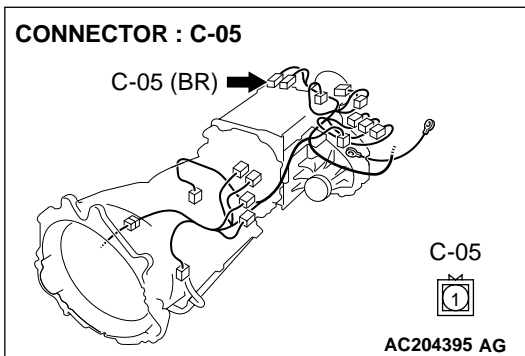
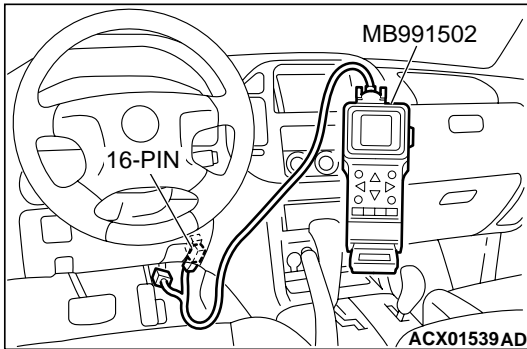
NO : Go to Step 2.

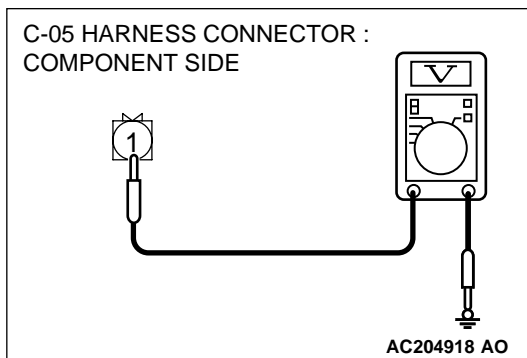
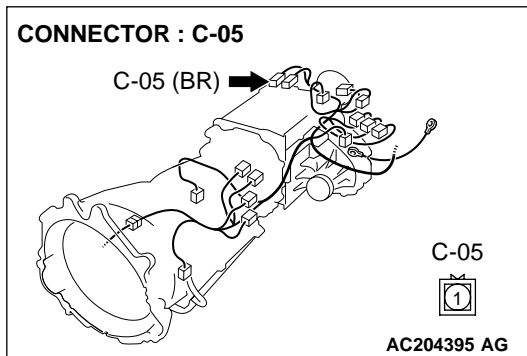
STEP 2. Check 4LLc detection switch connector C-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 3.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).





STEP 3. Measure the switch output voltage at 4LLc detection switch connector C-05.

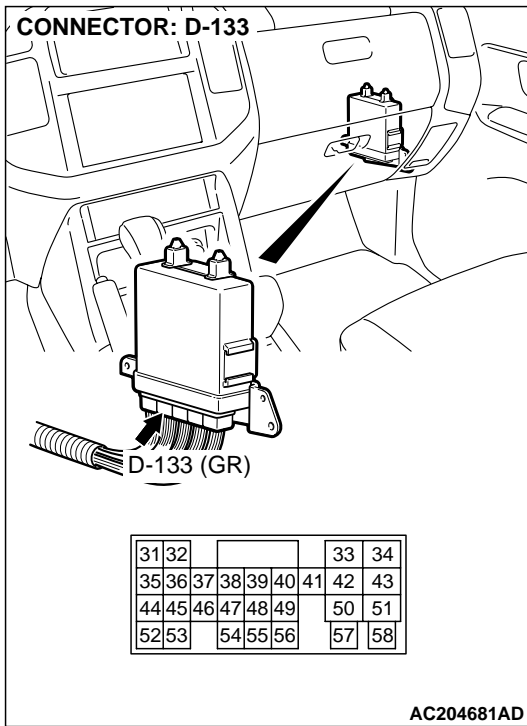
- (1) Disconnect connector C-05 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

- (3) Measure the voltage between terminal 1 and ground.
 - The voltage should measure battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

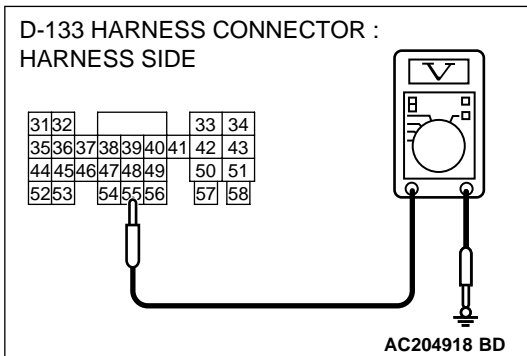
YES : Go to Step 10.

NO : Go to Step 4.



STEP 4. Measure the switch output voltage at PCM connector D-133 by backprobing.

- (1) Do not disconnect connector D-133.
- (2) Turn the ignition switch to the "ON" position.



- (3) Measure the voltage between terminal 55 and ground by backprobing.
 - The voltage should measure battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

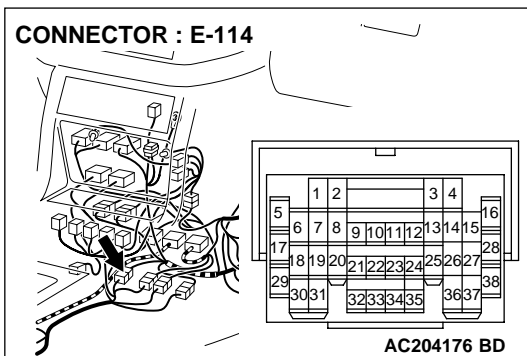
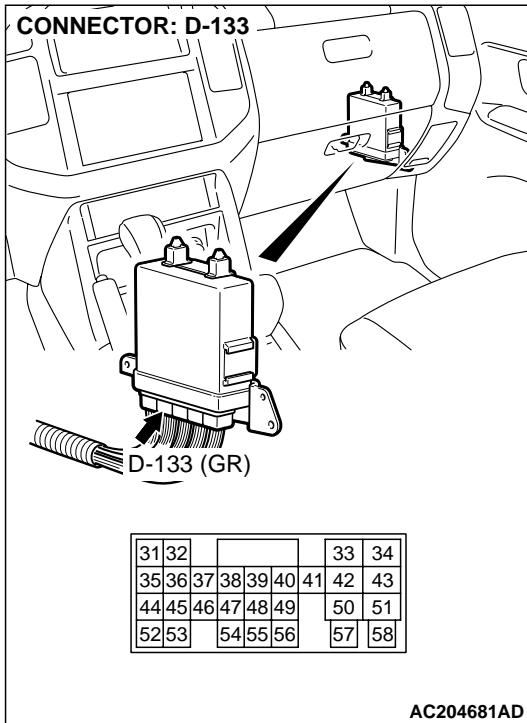
- YES :** Go to Step 5.
NO : Go to Step 7.

STEP 5. Check PCM connector D-133 and intermediate connector E-114 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 6.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

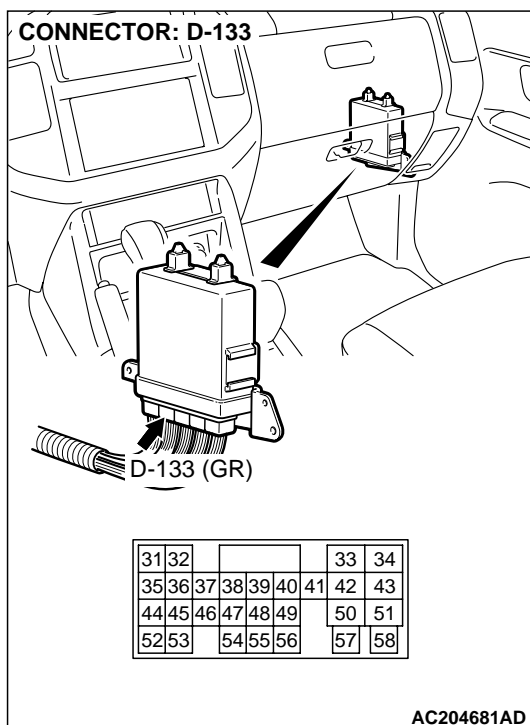
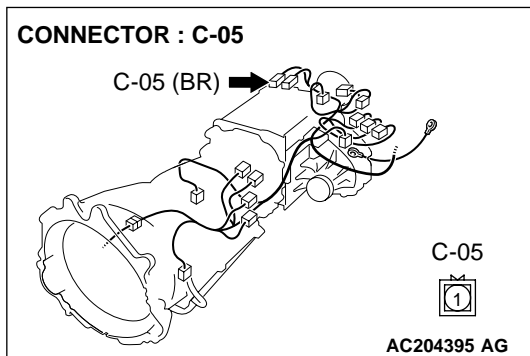


STEP 6. Check harness for open circuit between 4LLc detection switch connector C-05 terminal 1 and PCM connector D-133 terminal 55.

Q: Is the harness wire in good condition?

YES : Go to Step 9.

NO : Repair or replace the harness wire.

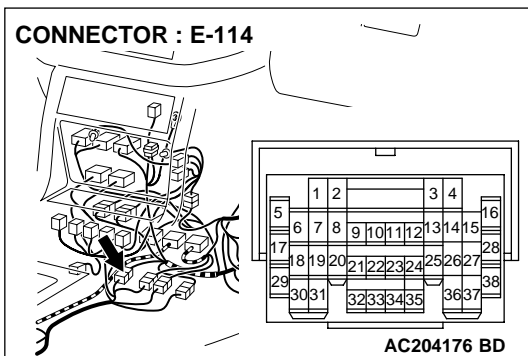
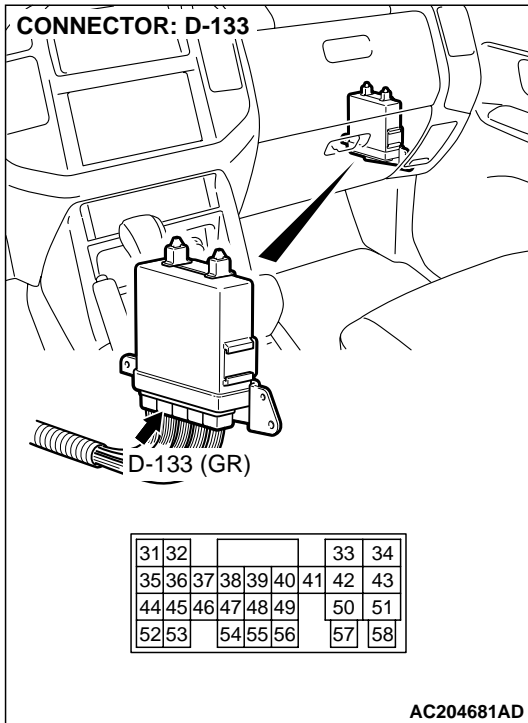


STEP 7. Check PCM connector D-133 and intermediate connector E-114 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 8.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

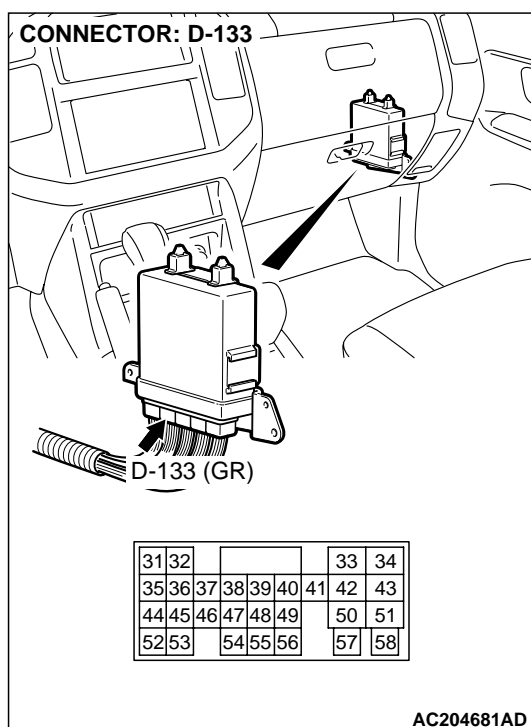
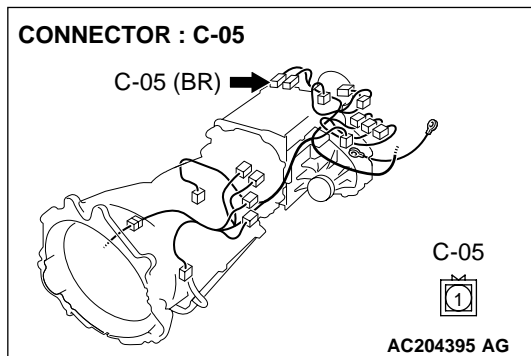


STEP 8. Check harness for short circuit to ground between 4LLc detection switch connector C-05 terminal 1 and PCM connector D-133 terminal 55.

Q: Is the harness wire in good condition?

YES : Go to Step 9.

NO : Repair or replace the harness wire.



STEP 9. Using scan tool MB991502, check data list item 75: 4LLc Detection Switch.

⚠ CAUTION

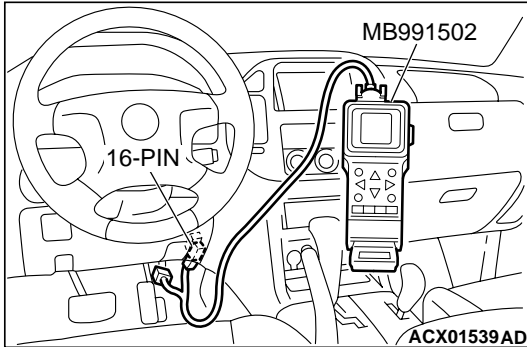
To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991502 to data reading mode for item 75, 4LLc Detection Switch.
 - When the transfer shift lever position is 4LLc, scan tool MB991502 display should be "ON."
 - When the transfer shift lever position is other than 4LLc, scan tool MB991502 display should be "OFF."
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the switch operating properly?

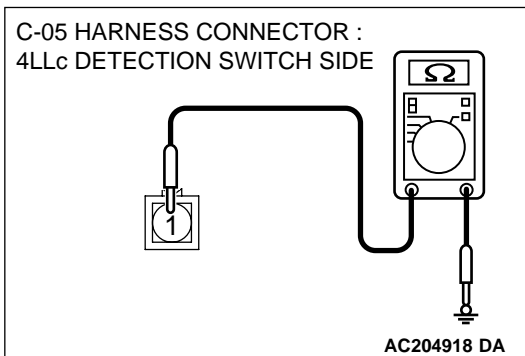
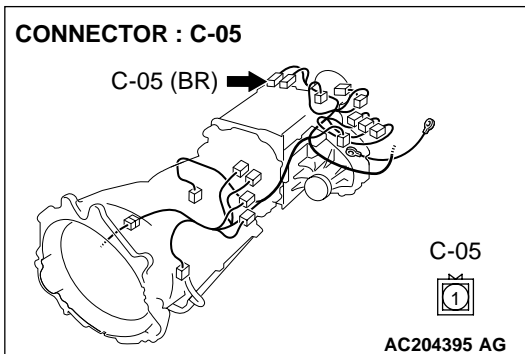
YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-6](#).

NO : Replace the PCM.



STEP 10. Measure the resistance at 4LLc detection switch connector C-05.

- (1) Disconnect connector C-05 and measure at the switch side.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.

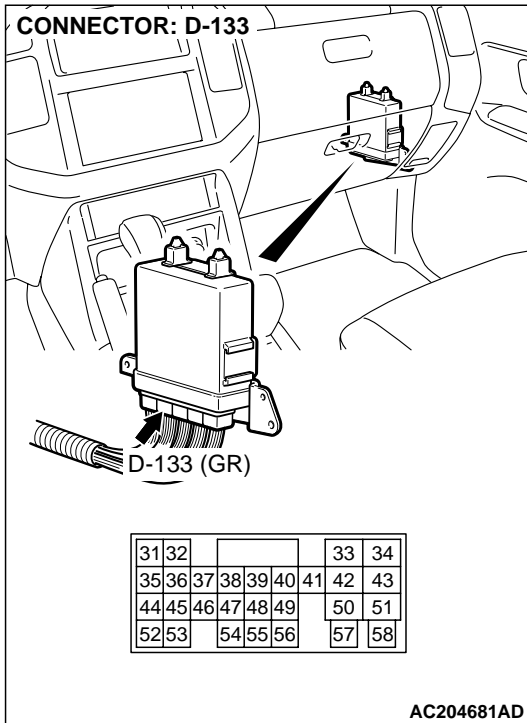


- (4) Check for the continuity between terminal 1 and ground.
 - When the transfer shift lever position is 4LLc there should measure less than 2 ohms.
 - When the transfer shift lever position is other than 4LLc there should be open circuit.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the resistance 2 ohms?

YES : Go to Step 11.

NO : Replace the 4LLc detection switch. Refer to GROUP 23B, Transfer [P.23B-103](#).



STEP 11. Check PCM connector D-133 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 9.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

SYMPTOM PROCEDURES

<KEY INTERLOCK AND SHIFT LOCK MECHANISMS>

INSPECTION PROCEDURE 1: Selector Lever can be Moved from "P" to "R" Position without Depressing Brake Pedal when Ignition Key is at Positions other than "LOCK" (OFF) Position.

TECHNICAL DESCRIPTION (COMMENT)

Lock cam or shift lock cable may be defective.

TROUBLESHOOTING HINTS

- Malfunction of lock cam
- Malfunction of shift lock cable

DIAGNOSIS

STEP 1. Check the fit of the lock cam.

Q: Is the lock cam installed correctly?

YES : Go to Step 2.

NO : Install the lock cam correctly. Refer to [P.23Aa-33](#). When the brake pedal is released with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 2. Check the lock cam.

Q: Is the lock cam in good condition?

YES : Go to Step 3.

NO : Replace the lock cam. Refer to [P.23Aa-33](#). When the brake pedal is released with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

INSPECTION PROCEDURE 2: Selector Lever cannot be Moved from "P" to "R" Position with Brake Pedal Depressed when Ignition Key is at Positions other than "LOCK" (OFF) Position.

TECHNICAL DESCRIPTION (COMMENT)

Selector lever assembly, shift lock cable, key interlock cable, transmission control cable, or lock cam may be defective.

STEP 3. Check the fit of the shift lock cable.

Q: Is the shift lock cable installed correctly?

YES : Go to Step 4.

NO : Install the shift lock cable correctly. Refer to [P.23Aa-35](#). When the brake pedal is released with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 4. Check the shift lock cable.

Q: Is the shift lock cable in good condition?

YES : No action to be taken.

NO : Replace the shift lock cable. Refer to [P.23Aa-35](#). When the brake pedal is released with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

TROUBLESHOOTING HINTS

- Malfunction of selector lever assembly
- Malfunction of shift lock cable
- Malfunction of key interlock cable
- Malfunction of transmission control cable
- Malfunction of lock cam

DIAGNOSIS

STEP 1. Check the connection of lock cam and key interlock cable.

Q: Is the connection of lock cam and key interlock cable in good condition?

YES : Go to Step 2.

NO : Repair the connection of lock cam and shift lock cable. When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 2. Check the connection of selector lever assembly and shift transmission control cable.

Q: Is the connection of selector lever assembly and shift transmission control cable in good condition?

YES : Go to Step 3.

NO : Repair the connection of selector lever assembly and shift transmission control cable. When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 3. Check the fit of the shift lock cable.

Q: Is the shift lock cable installed correctly?

YES : Go to Step 4.

NO : Install the shift lock cable correctly. Refer to [P.23Aa-35](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 4. Check the shift lock cable.

Q: Is the shift lock cable in good condition?

YES : Go to Step 5.

NO : Replace the shift lock cable. Refer to [P.23Aa-35](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 5. Check the fit of the key interlock cable.

Q: Is the key interlock cable installed correctly?

YES : Go to Step 6.

NO : Install the key interlock cable correctly. Refer to [P.23Aa-35](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 6. Check the key interlock cable.

Q: Is the key interlock cable in good condition?

YES : Go to Step 7.

NO : Replace the key interlock cable. Refer to [P.23Aa-35](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 7. Check the fit of the transmission control cable.

Q: Is the transmission control cable installed correctly?

YES : Go to Step 8.

NO : Install the transmission control cable correctly. Refer to [P.23Aa-30](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 8. Check the transmission control cable.

Q: Is the transmission control cable in good condition?

YES : Repair or replace the selector lever assembly. Refer to [P.23Aa-30](#) and [P.23Aa-33](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

NO : Replace the transmission control cable. Refer to [P.23Aa-30](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

INSPECTION PROCEDURE 3: Selector Lever can be Moved from "P" to "R" Position with Brake Pedal Depressed when Ignition Key is at "LOCK" (OFF) Position.**TECHNICAL DESCRIPTION (COMMENT)**

Key interlock cable or lock cam may be defective.

TROUBLESHOOTING HINTS

- Malfunction of lock cam
- Malfunction of key interlock cable

DIAGNOSIS**STEP 1. Check the connection of lock cam and key interlock cable.**

Q: Is the connection of lock cam and key interlock cable in good condition?

YES : Go to Step 2.

NO : Repair the connection of lock cam and shift lock cable. When the brake pedal is depressed with the ignition key at the "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 2. Check the fit of the lock cam.

Q: Is the lock cam installed correctly?

YES : Go to Step 3.

NO : Install the lock cam correctly. Refer to [P.23Aa-33](#). When the brake pedal is depressed with the ignition key at the "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 3. Check the lock cam.

Q: Is the lock cam in good condition?

YES : Go to Step 4.

NO : Replace the lock cam. Refer to [P.23Aa-33](#). When the brake pedal is depressed with the ignition key at the "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 4. Check the fit of the key interlock cable.

Q: Is the key interlock cable installed correctly?

YES : Go to Step 5.

NO : Install the key interlock cable correctly. Refer to [P.23Aa-35](#). When the brake pedal is depressed with the ignition key at the "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 5. Check the key interlock cable.

Q: Is the key interlock cable in good condition?

YES : No action to be taken.

NO : Replace the key interlock cable. Refer to [P.23Aa-35](#). When the brake pedal is depressed with the ignition key at the "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

INSPECTION PROCEDURE 4: Selector Lever cannot be Moved from "P" to "R" Position Smoothly.**TECHNICAL DESCRIPTION (COMMENT)**

Key interlock cable, shift lock cable, transmission control cable, lock cam, or selector lever assembly may be defective.

TROUBLESHOOTING HINTS

- Malfunction of key interlock cable
- Malfunction of shift lock cable
- Malfunction of transmission control cable
- Malfunction of lock cam
- Malfunction of selector lever assembly

DIAGNOSIS**STEP 1. Check the connection of lock cam and key interlock cable.**

Q: Is the connection of lock cam and key interlock cable in good condition?

YES : Go to Step 2.

NO : Repair the connection of lock cam and shift lock cable. Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 2. Check the connection of selector lever assembly and transmission control cable.

Q: Is the connection of selector lever assembly and transmission control cable in good condition?

YES : Go to Step 3.

NO : Repair the connection of selector lever assembly and transmission control cable. Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 3. Check the fit of the lock cam.

Q: Is the lock cam installed correctly?

YES : Go to Step 4.

NO : Install the lock cam correctly. Refer to [P.23Aa-33](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 4. Check the lock cam.

Q: Is the lock cam in good condition?

YES : Go to Step 5.

NO : Replace the lock cam. Refer to [P.23Aa-33](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 5. Check the fit of the shift lock cable.

Q: Is the shift lock cable installed correctly?

YES : Go to Step 6.

NO : Install the shift lock cable correctly. Refer to [P.23Aa-35](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 6. Check the shift lock cable.

Q: Is the shift lock cable in good condition?

YES : Go to Step 7.

NO : Replace the shift lock cable. Refer to [P.23Aa-35](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 7. Check the fit of the key interlock cable.

Q: Is the key interlock cable installed correctly?

YES : Go to Step 8.

NO : Install the key interlock cable correctly. Refer to [P.23Aa-35](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 8. Check the key interlock cable.

Q: Is the key interlock cable in good condition?

YES : Go to Step 9.

NO : Replace the key interlock cable. Refer to [P.23Aa-35](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 9. Check the fit of the transmission control cable.

Q: Is the transmission control cable installed correctly?

YES : Go to Step 10.

NO : Install the transmission control cable correctly. Refer to [P.23Aa-30](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 10. Check the transmission control cable.

Q: Is the transmission control cable in good condition?

YES : Repair or replace the selector lever assembly. Refer to [P.23Aa-30](#) and [P.23Aa-33](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

NO : Replace the transmission control cable. Refer to [P.23Aa-30](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

INSPECTION PROCEDURE 5: Selector Lever cannot be Moved from "R" Position to "P" Position.

TECHNICAL DESCRIPTION (COMMENT)

Selector lever assembly, transmission control cable, or lock cam may be defective.

TROUBLESHOOTING HINTS

- Malfunction of selector lever assembly
- Malfunction of transmission control cable
- Malfunction of lock cam

DIAGNOSIS**STEP 1. Check the connection of selector lever assembly and transmission control cable.**

Q: Is the connection of selector lever assembly and transmission control cable in good condition?

YES : Go to Step 2.

NO : Repair the connection of selector lever assembly and transmission control cable. Check that the selector lever can be moved from "R" position to "P" position.

STEP 2. Check the fit of the lock cam.

Q: Is the lock cam installed correctly?

YES : Go to Step 3.

NO : Install the lock cam correctly. Refer to [P.23Aa-33](#). Check that the selector lever can be moved from "R" position to "P" position.

STEP 3. Check the lock cam.

Q: Is the lock cam in good condition?

YES : Go to Step 4.

NO : Replace the lock cam. Refer to [P.23Aa-33](#). Check that the selector lever can be moved from "R" position to "P" position.

STEP 4. Check the fit of the transmission control cable.

Q: Is the transmission control cable installed correctly?

YES : Go to Step 5.

NO : Install the transmission control cable correctly. Refer to [P.23Aa-30](#). Check that the selector lever can be moved from "R" position to "P" position.

STEP 5. Check the transmission control cable.

Q: Is the transmission control cable in good condition?

YES : Repair or replace the selector lever assembly. Refer to [P.23Aa-30](#) and [P.23Aa-33](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

NO : Replace the transmission control cable. Refer to [P.23Aa-30](#). Check that the selector lever can be moved from "R" position to "P" position.

INSPECTION PROCEDURE 6: Ignition Key cannot be Turned to "LOCK" (OFF) Position when Selector Lever is at "P" Position.**TECHNICAL DESCRIPTION (COMMENT)**

Lock cam, steering lock cylinder assembly, transmission control cable, or key interlock cable may be defective.

TROUBLESHOOTING HINTS

- Malfunction of lock cam
- Malfunction of key interlock cable
- Malfunction of transmission control cable
- Malfunction of steering lock cylinder assembly

DIAGNOSIS**STEP 1. Check the connection of lock cam and key interlock cable.**

Q: Is the connection of lock cam and key interlock cable in good condition?

YES : Go to Step 2.

NO : Repair the connection of lock cam and shift lock cable. Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at "P" position.

STEP 2. Check the fit of the lock cam.

Q: Is the lock cam installed correctly?

YES : Go to Step 3.

NO : Install the lock cam correctly. Refer to [P.23Aa-33](#). Check that the selector lever can be moved from "R" position to "P" position.

STEP 3. Check the lock cam.

Q: Is the lock cam in good condition?

YES : Go to Step 4.

NO : Replace the lock cam. Refer to [P.23Aa-33](#).
Check that the selector lever can be moved from "R" position to "P" position.

STEP 4. Check the fit of the key interlock cable.

Q: Is the key interlock cable installed correctly?

YES : Go to Step 5.

NO : Install the key interlock cable correctly.
Refer to [P.23Aa-35](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at "P" position.

STEP 5. Check the key interlock cable.

Q: Is the key interlock cable in good condition?

YES : Go to Step 6.

NO : Replace the key interlock cable. Refer to [P.23Aa-35](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at "P" position.

STEP 6. Check the fit of the transmission control cable.

Q: Is the transmission control cable installed correctly?

YES : Replace the steering lock cylinder assembly. Refer to [P.37A-23](#) and [P.37A-25](#).
Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at "P" position.

NO : Install the transmission control cable correctly. Refer to [P.23Aa-33](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at "P" position.

INSPECTION PROCEDURE 7: Ignition Key can be Turned to "LOCK" (OFF) Position when Selector at Positions other than "P" Position.

TECHNICAL DESCRIPTION (COMMENT)

Lock cam, steering lock cylinder assembly, transmission control cable, or key interlock cable may be defective.

TROUBLESHOOTING HINTS

- Malfunction of lock cam
- Malfunction of steering lock cylinder assembly
- Malfunction of transmission control cable
- Malfunction of key interlock cable

DIAGNOSIS

STEP 1. Check the connection of lock cam and key interlock cable.

Q: Is the connection of lock cam and key interlock cable in good condition?

YES : Go to Step 2.

NO : Repair the connection of lock cam and shift lock cable. Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.

STEP 2. Check the fit of the lock cam.

Q: Is the lock cam installed correctly?

YES : Go to Step 3.

NO : Install the lock cam correctly. Refer to [P.23Aa-33](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.

STEP 3. Check the lock cam.

Q: Is the lock cam in good condition?

YES : Go to Step 4.

NO : Replace the lock cam. Refer to [P.23Aa-33](#).
Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.

STEP 4. Check the fit of the key interlock cable.

Q: Is the key interlock cable installed correctly?

YES : Go to Step 5.

NO : Install the key interlock cable correctly. Refer to [P.23Aa-35](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.

STEP 5. Check the key interlock cable.

Q: Is the key interlock cable in good condition?

YES : Go to Step 6.

NO : Replace the key interlock cable. Refer to [P.23Aa-35](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.

STEP 6. Check the fit of the transmission control cable.

Q: Is the transmission control cable installed correctly?

YES : Replace the steering lock cylinder assembly. Refer to [P.37A-23](#) and [P.37A-25](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.

NO : Install the transmission control cable correctly. Refer to [P.23Aa-33](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.