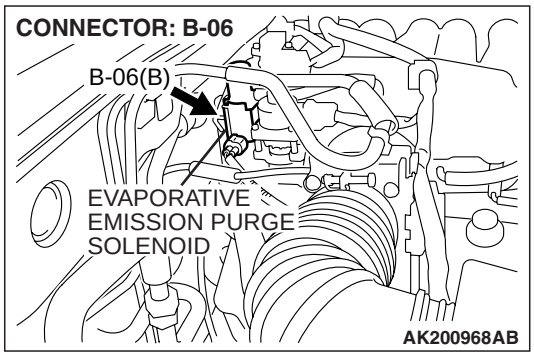
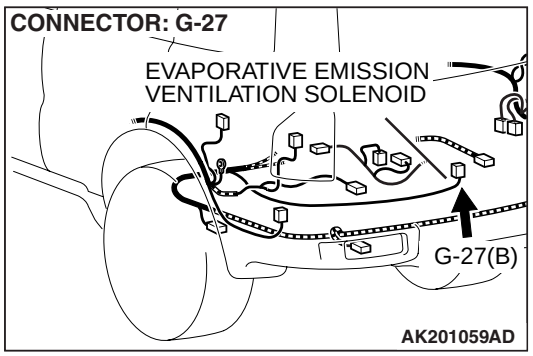
DTC P0441: Evaporative Emission Control System Incorrect Purge Flow





TECHNICAL DESCRIPTION

- PCM detects stuck open condition of evaporative emission purge solenoid and stuck closed condition of evaporative emission ventilation solenoid by pressure change in fuel tank.
- Stuck open evaporative emission purge solenoid is judged through monitoring leak of evaporative emission system.
- Stuck closed evaporative emission ventilation solenoid is judged after 20 seconds from end of monitoring leak of evaporative emission system, or of usual operation of evaporative emission purge solenoid from ON to OFF.

DESCRIPTIONS OF MONITOR METHODS

Fuel tank pressure decreases largely during purge-cut.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

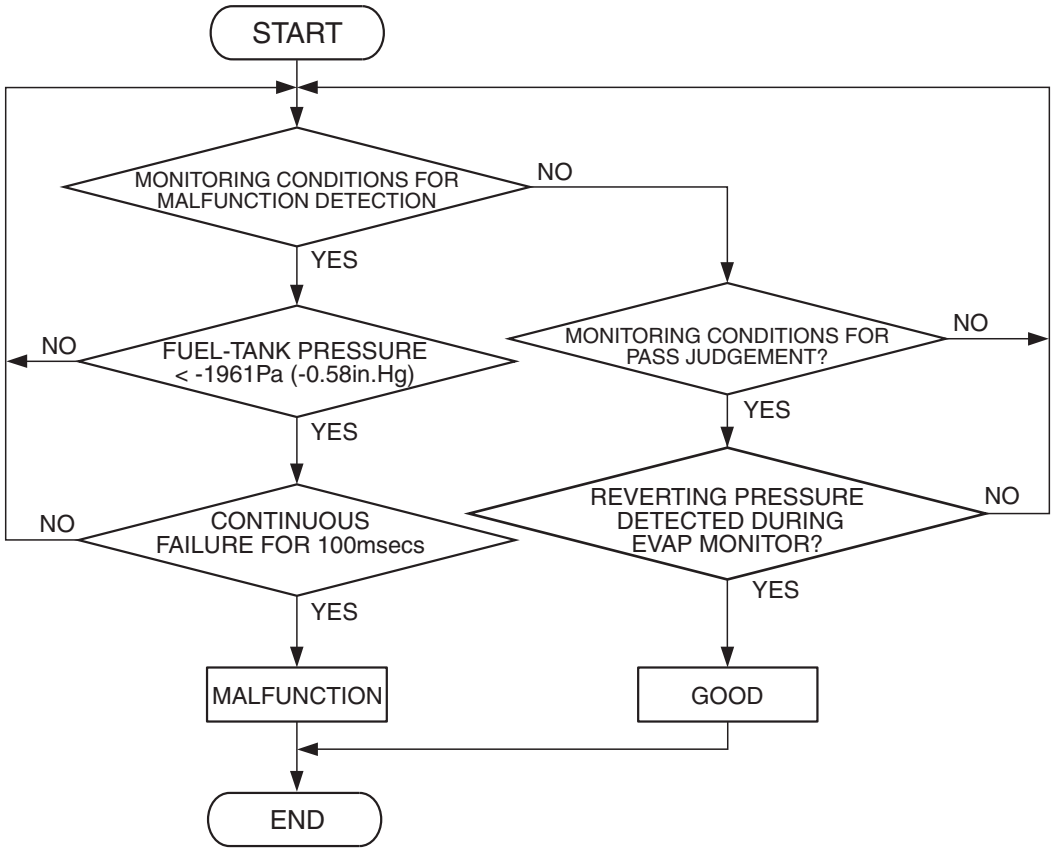
- Fuel tank pressure sensor monitor

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



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Check Conditions

- ON duty cycle of the evaporative emission purge solenoid is 0 percent.
- Engine is running.
- 20 seconds have elapsed since the duty cycle of the evaporative emission purge solenoid has turned to 0 percent.

Judgement Criterion

- The pressure in the fuel tank is −1961 Pa (−0.58 in.Hg) or less for 0.1 second.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function − OBD-II Drive Cycle − Pattern 6 P.13A-4.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Evaporative emission purge solenoid failed.
- Evaporative emission ventilation solenoid failed.
- Fuel tank differential pressure sensor circuit related part failed.

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DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

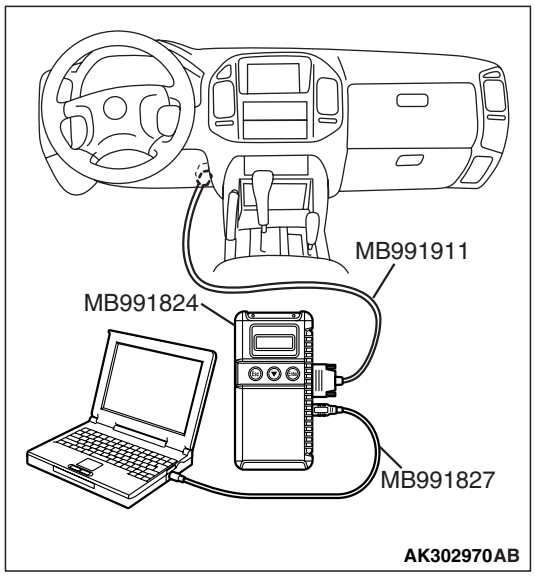
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P0451 set?

YES : Refer to DTC P0451 - Evaporative Emission Control System Pressure Sensor Range/Performance P.13A-596.

NO : Go to Step 2.



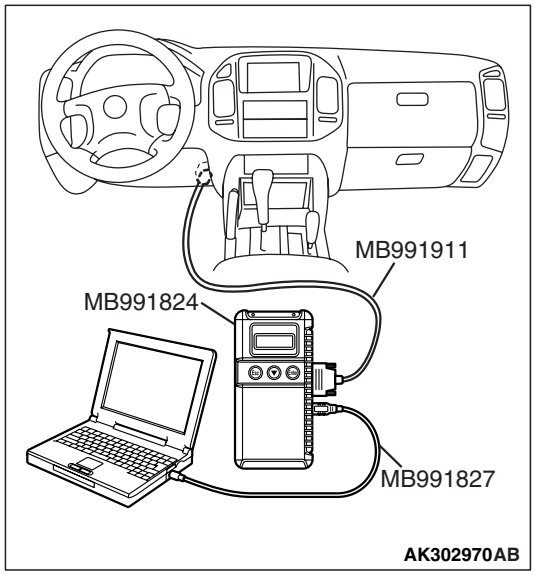
STEP 2. Using scan tool MB991958, check data list item 73: Fuel Tank Differential Pressure Sensor.

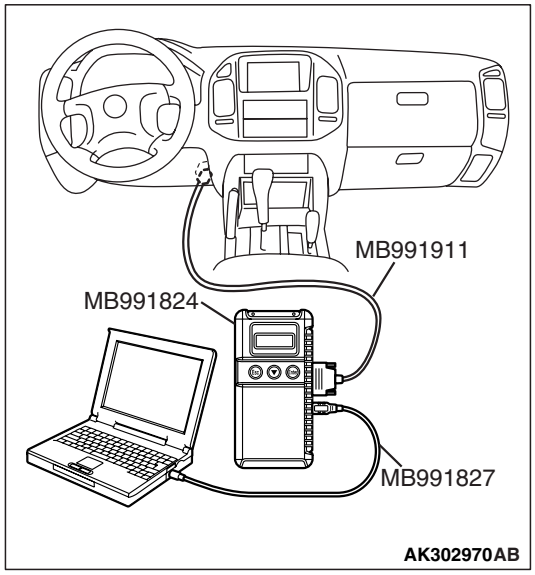
(1) Turn the ignition switch to the "ON" position.
(2) Remove the fuel cap.
(3) Set scan tool MB991958 to the data reading mode for item 73, Fuel Tank Differential Pressure Sensor.
  - The fuel tank differential pressures should be –3.3 to 3.3 kPa (–0.97 to 0.97 in.Hg).
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the fuel tank pressure –3.3 to 3.3 kPa (–0.97 to 0.97 in.Hg)?

YES : Go to Step 3.

NO : Refer to DTC P0451 - Evaporative Emission Control System Pressure Sensor Range/Performance P.13A-596.





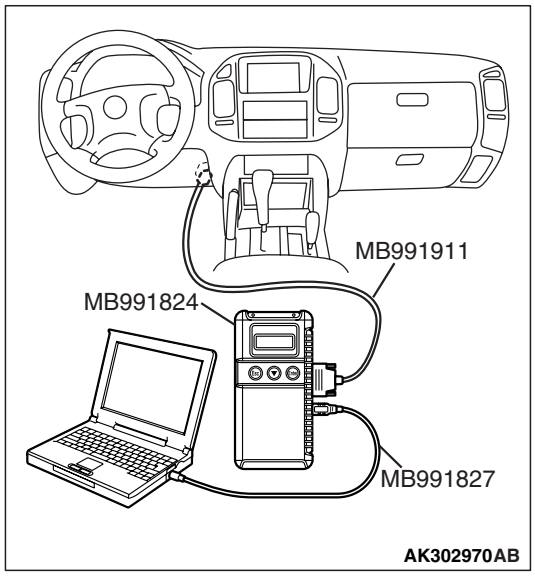
STEP 3. Using scan tool MB991958, check actuator test item 08: Evaporative Emission Purge Solenoid.

(1) Turn the ignition switch to the "ON" position.
(2) Set scan tool MB991958 to the actuator test mode for item 08, Evaporative emission purge solenoid.
- An operation sound should be heard and vibration should be felt when the evaporative emission purge solenoid is operated.

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

Q: Is the solenoid operating properly?

YES : Go to Step 4.
NO : Replace the evaporative emission purge solenoid. Then go to Step 5.



STEP 4. Using scan tool MB991958, check actuator test item 29: Evaporative Emission Ventilation Solenoid.

(1) Turn the ignition switch to the "ON" position.
(2) Set scan tool MB991958 to the actuator test mode for item 29, Evaporative emission ventilation solenoid.
- An operation sound should be heard and vibration should be felt when the evaporative emission ventilation solenoid is operated.

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

Q: Is the solenoid operating properly?

YES : Repair or replace the vent hose and air filter. Then go to Step 5.
NO : Replace the evaporative emission ventilation solenoid. Then go to Step 5.

STEP 5 Test the OBD-II drive cycle.

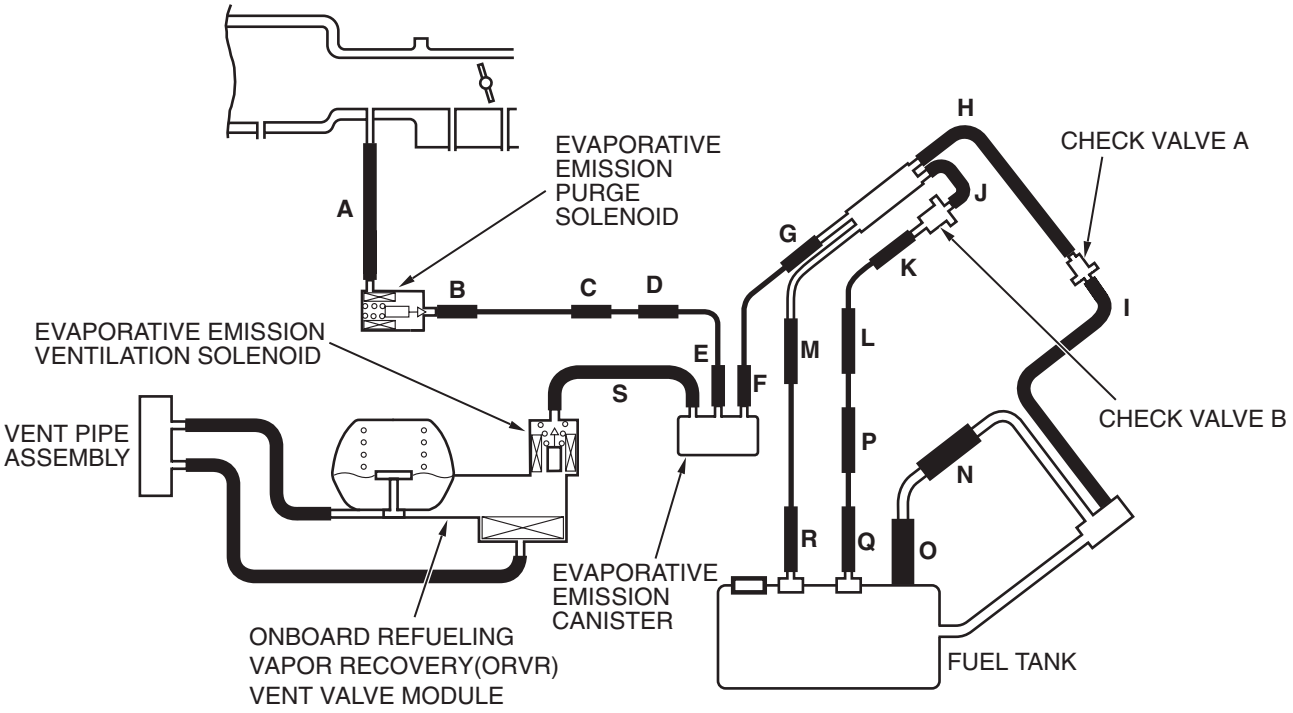
(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 6 P.13A-4.
(2) Check the diagnostic trouble code.

Q: Is DTC P0441 set?

YES : Retry the troubleshooting.
NO : The inspection is complete.

DTC P0442: Evaporative Emission System Leak Detected (Small Leak)

SYSTEM DIAGRAM



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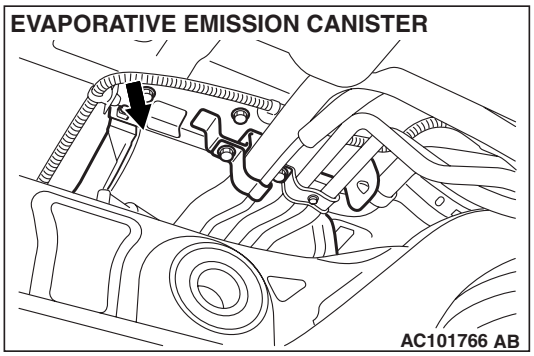

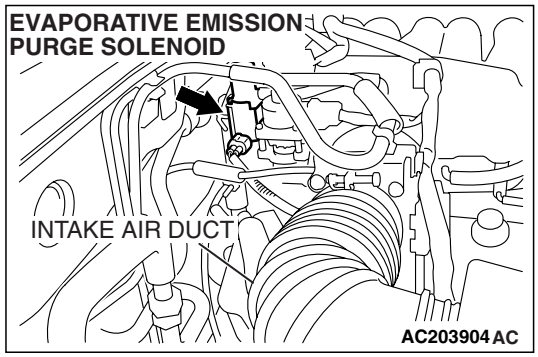

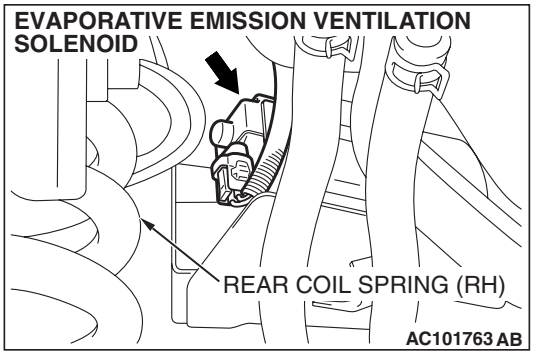

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TECHNICAL DESCRIPTION

- The PCM monitors the Evaporative Emission (EVAP) System pressure.
- The PCM controls the evaporative emission ventilation solenoid. It closes the evaporative emission ventilation solenoid to seal the evaporative emission canister side of the system.
- The evaporative emission purge solenoid is opened to allow manifold vacuum to create low pressure (vacuum) in the EVAP system.
- When the EVAP system develops a vacuum of 2 kPa (0.29 psi), the evaporative emission purge solenoid is closed and the fuel system vacuum is maintained at 2 kPa. (0.29 psi).
- The PCM determines whether there is a leak in the EVAP system by monitoring the vacuum inside the fuel tank.
- The test is stopped when fuel vapor pressure exceeds predetermined limits.

DESCRIPTIONS OF MONITOR METHODS

- Measure reverting pressure after depressurizing by intake manifold negative pressure and detect malfunction if reverting pressure rises largely.

MONITOR EXECUTION

- Once per driving cycle.

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

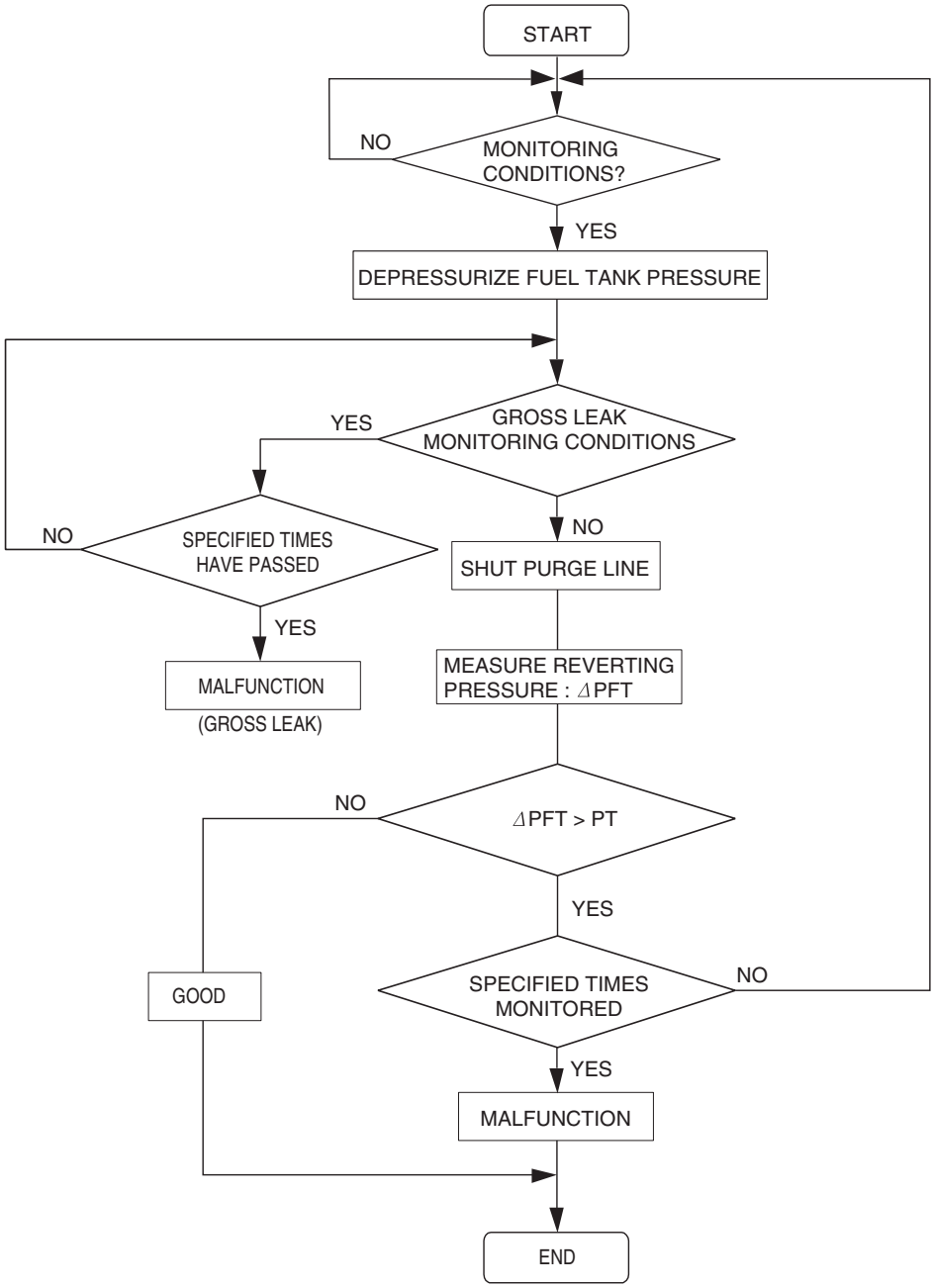
- Evaporative emission purge solenoid monitor
- Evaporative emission purge system monitor
- Fuel tank differential pressure sensor monitor
- Evaporative emission ventilation solenoid monitor
- Fuel level sensor monitor
- Fuel temperature sensor monitor

Sensor (The sensors below are determined to be normal)

- Volume airflow sensor
- Barometric pressure sensor
- Intake air temperature sensor
- Engine coolant temperature sensor

LOGIC FLOW CHARTS (Monitor Sequence)

0.04in, 0.02in GROSS LEAK MONITOR



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DTC SET CONDITIONS

Remaining fuel amount is 15 – 40 percent of capacity (fuel level sensor output signal voltage is 1.4 – 2.4 volts).

Check Conditions A: At Start up

- Intake air temperature is 36°C (97°F) or less when the engine is started.
- The engine coolant temperature is 36 °C (97 °F) or less when the engine is started.

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Check Conditions B: For Test to Run
- Fuel temperature is less than 36 °C (97 °F), and less than 13 minutes have elapsed since the engine was started.
- Engine coolant temperature is greater than 54°C (129°F).
- Power steering pressure switch: "OFF"
- Barometric pressure is greater than 76 kPa (11 psi).
- Fuel tank differential pressure sensor output voltage is 1 to 4 volts.
- Vehicle speed is greater than or equal to 20 km/h (12.4 mph).

Check Conditions C: For Test to Stop
- Intake air temperature is greater than −10°C (14°F).
- When the evaporative emission purge solenoid and evaporative emission ventilation solenoid are closed, the pressure in the fuel tank is less than 451 Pa (0.065 psi).
- The pressure fluctuation is less than 647 Pa (0.094 psi).
- 10 seconds have elapsed since the start of the previous monitoring.
- Monitoring time: 75 – 125 seconds.

Judgment Criterion
- Internal pressure of the fuel tank has changed more than 785 Pa (0.114 psi) in 20 seconds after the tank and vapor line were closed.

  NOTE: The monitoring time (75 – 125 seconds) depends on the fuel level and the temperature in the fuel tank.
  The next monitoring occurs at least 10 seconds later.

DTC SET CONDITIONS
Remaining fuel amount is 40 – 85 percent of capacity (fuel level sensor output voltage is 2.4 – 3.7 volts).

Check Conditions A: At Start up
- Intake air temperature is less than 36 °C (97 °F) when the engine is started.
- The engine coolant temperature is less than 36 °C (97 °F) when the engine is started.

Check Conditions B: For Test to Run
- The fuel temperature is less than 36 °C (97 °F).
- Barometric pressure is greater than 76 kPa (11 psi).
- Fuel tank differential pressure sensor output voltage is 1 to 4 volts.

Check Conditions C: For Test to Stop
- Intake air temperature is greater than −10 °C (14°F).
- Engine coolant temperature is greater than 20 °C (68 °F).
- When the evaporative emission purge solenoid and evaporative emission ventilation solenoid are closed, the pressure in the fuel tank is less than 324 Pa (0.047 psi).
- 10 seconds have elapsed since the start of the previous monitoring.
- Monitoring time: 10 – 14 minutes.

Judgment Criterion
- Internal pressure of the fuel tank has changed more than 2 kPa (0.29 psi) in 128 seconds after the tank and vapor line were closed.

  NOTE: The monitoring time (10 – 14 minutes) depends on the fuel level and the temperature in the fuel tank.
  The next monitoring occurs at least 10 seconds later.

OBD-II DRIVE CYCLE PATTERN
Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 5 P.13A-4.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)
- Loose fuel cap.
- Fuel cap relief pressure is incorrect.
- Evaporative emission canister seal is leaking.
- Fuel tank, purge line or vapor line seal is leaking.
- Evaporative emission ventilation solenoid does not seal.

DIAGNOSIS

Required Special Tools:

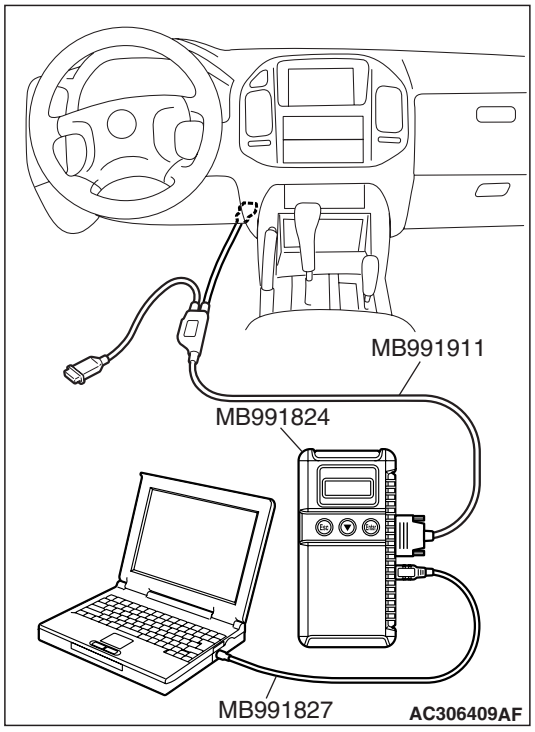
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness B

STEP 1. Using scan tool MB991958, check evaporative emission system monitor test.

⚠ CAUTION

- **To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.**
- **During this test, the PCM automatically increases the engine speed to 1,600 r/min or greater. Check that the transmission is set to "P" position.**

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Erase the DTCs using scan tool MB991958.
(4) Check that the fuel cap is securely closed (Tighten until three clicks are heard).
(5) Start the engine.
(6) Select "System Test."
(7) Select "Evap Leak Mon."
(8) During this test, keep the accelerator pedal at the idling position.
(9) Keep the engine speed and engine load within the specified range. When the monitor test starts, the "In Progress" item on scan tool MB991958 will change from "NO" to "YES."
(10) Turn the ignition switch to the "LOCK" (OFF) position and disconnect scan tool MB991958.

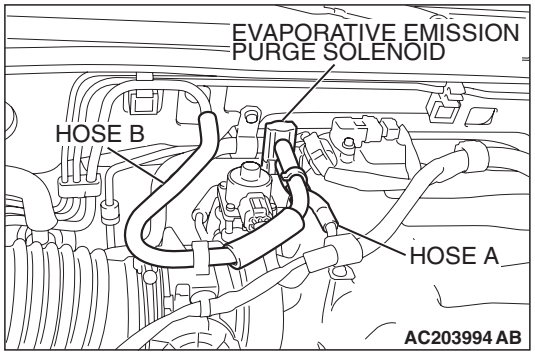


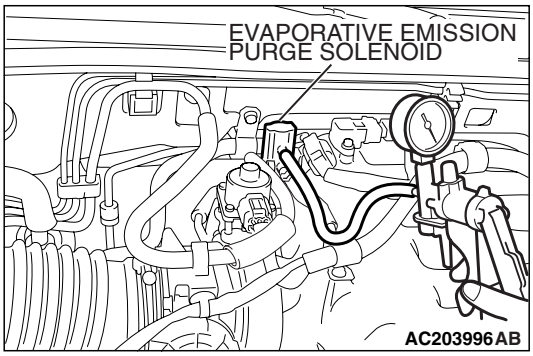
Q: Is "Evap Leak Mon. Completed. Test Failed and DTCs Set" displayed on scan tool MB991958?

YES : A malfunction has been detected during the monitor test (Refer to the Diagnostic Trouble Code Chart and diagnose any other DTCs that are set P.13A-33). If no other DTC's have been set, then go to Step 2.

NO <"Evap Leak Mon. Completed. Test Passed" is displayed on scan tool MB991958.> : The evaporative emission system is working properly at this time. Explain to the customer that an improperly tightened fuel cap can cause the MIL to illuminate. Return the vehicle to the customer.

NO <"Evap Leak Mon. Discontinued. Retest again from the first" is displayed on scan tool MB991958.> : The EVAP monitor has been interrupted during the test. Turn the ignition switch to the "LOCK" (OFF) position once, and repeat the monitoring from Step 1.



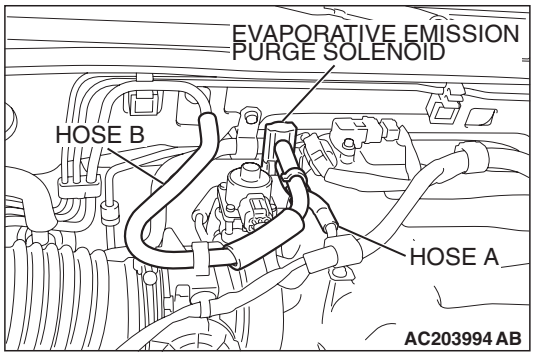


STEP 2. Check for leaks in the evaporative emission purge solenoid.

(1) Disconnect hose B from the evaporative emission purge solenoid and connect a hand vacuum pump to the nipple of the evaporative emission purge solenoid.
(2) Use the hand vacuum pump to confirm that the evaporative emission purge solenoid holds vacuum.
(3) Disconnect the hand vacuum pump and connect hose B to the evaporative emission purge solenoid.

Q: Does the evaporative emission purge solenoid hold vacuum?

YES : Go to Step 3.
NO : Replace the evaporative emission purge solenoid. Go to Step 18.



STEP 3. Check for leaks in the evaporative emission system hose A and hose B.

Perform a leakage test with a hand vacuum pump on each hose A and B.

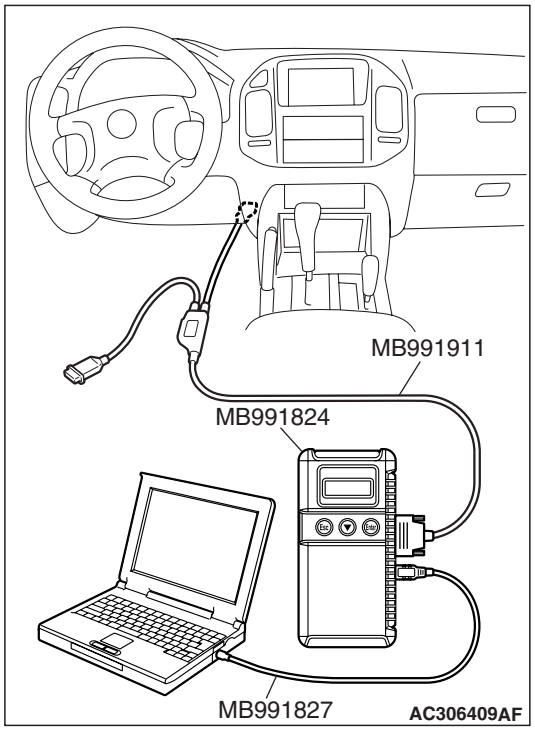
Q: Does the hoses hold vacuum?

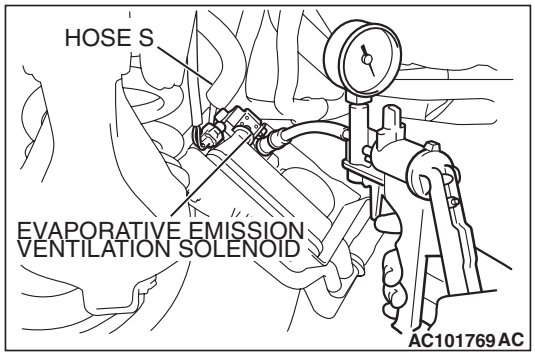
YES : Go to Step 4.
NO : Replace any damaged hose. Go to Step 18.

STEP 4. Using scan tool MB991958, check actuator test item 29: Evaporative Emission Ventilation Solenoid.

⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.



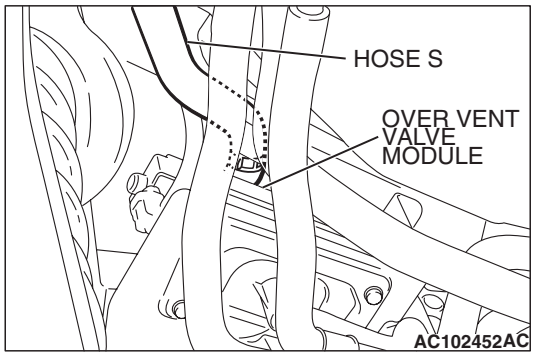


(2) Disconnect hose S from the evaporative emission ventilation solenoid and connect a hand vacuum pump.
(3) Turn the ignition switch to the "ON" position.
(4) Set scan tool MB991958 to actuator test mode for item 29, evaporative emission ventilation solenoid.
- While the evaporative emission ventilation solenoid is energized, operate the hand vacuum pump and confirm that solenoid holds vacuum.

(5) Turn the ignition switch to the "LOCK" (OFF) position and disconnect scan tool MB991958.
(6) Disconnect the hand vacuum pump and connect hose S to the evaporative emission ventilation solenoid.

Q: Does the evaporative emission ventilation solenoid hold vacuum?

YES : Go to Step 5.
NO : Replace the evaporative emission ventilation solenoid (Refer to GROUP 17, Evaporative Emission Canister and Fuel Tank Pressure Relief Valve P.17-72). Go to Step 18.



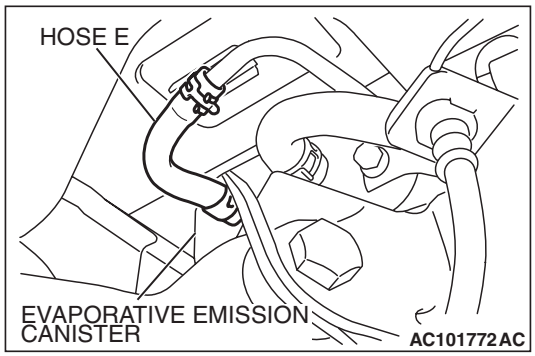
STEP 5. Check for leaks in the evaporative emission system hose S.

Perform a leakage test with a hand vacuum pump on hose S.

Q: Does hose S hold vacuum?

YES : Go to Step 6.

NO : Replace hose S. Go to Step 18.



STEP 6. Check for leaks in the evaporative emission system hose E.

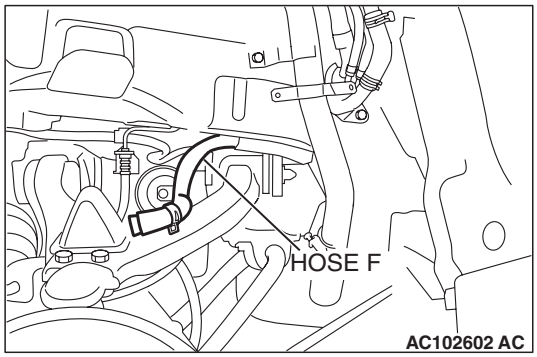
Perform a leakage test with a hand vacuum pump on hose E.

Q: Does hose E hold vacuum?

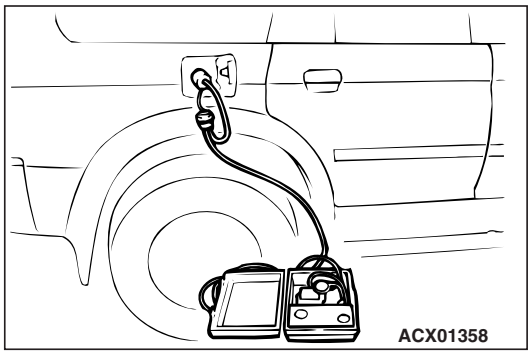
YES : Go to Step 7.

NO : Replace hose E. Go to Step 18.

STEP 7. Pressure test the evaporative emission system lines between hose F and R.



(1) Disconnect hose F from the evaporative emission canister and plug hose F securely.
(2) Confirm that the evaporative emission system pressure pump (Miller number 6872A) is operating properly. Perform the self-test as described in the manufacturer's instructions.
(3) Remove the fuel cap.



(4) Connect the evaporative emission system pressure pump to the fuel tank filler tube.
(5) Pressure test the system to determine whether any leaks are present.

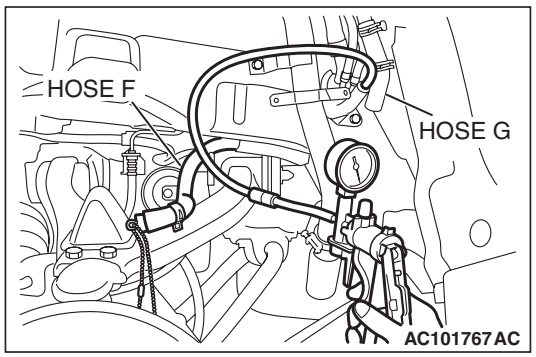
NOTE: The "Pressure test" in this procedure refers to the I/M240 Simulation Test. The eight steps of this test are described in the manufacturer's instructions for the evaporative emission system pressure pump, Miller number 6872A.

(6) Disconnect the evaporative emission system pressure pump and reinstall the fuel cap.
(7) Connect hose F to the evaporative emission canister.

Q: Is the evaporative emission system line free of leaks?

YES : Go to Step 15.
NO : Go to Step 8.

STEP 8. Check for leaks in the evaporator line hose F.



(1) Remove the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8).
(2) Disconnect hose F from the evaporative emission canister and plug hose F securely.
(3) Disconnect hose G from the evaporative emission canister side, and connect a hand vacuum pump.
(4) Apply vacuum with the hand vacuum pump and confirm that the vacuum holds.
(5) Disconnect the hand vacuum pump and connect hose F and G.

Q: Does hose F hold vacuum?

YES : Go to Step 9.
NO : Replace hose F and reinstall the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 18.

STEP 9. Check for leaks in the evaporative emission system hoses G through N.

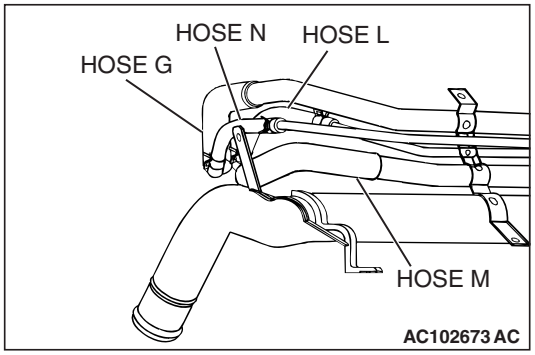
(1) Remove the fuel tank filler tube (Refer to GROUP 13B, Fuel Tank P.13B-8).

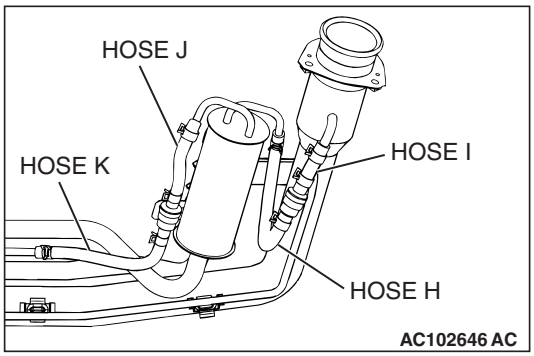
(2) Perform a leakage test with a hand vacuum pump on each hose from hose G to N.

Q: Does the hoses hold vacuum?

YES : Go to Step 10.

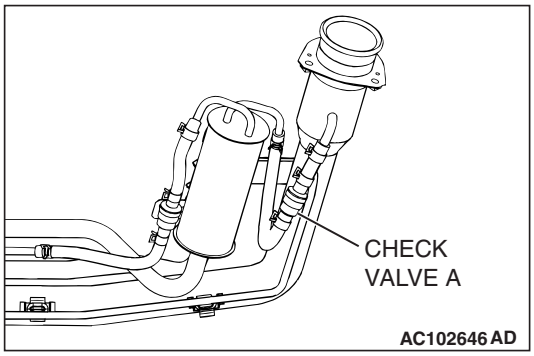
NO : Replace any damaged hose, and reinstall the fuel tank filler tube and the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 18.





STEP 10. Check the check valve A.

(1) Check valve A is a one-way check valve.

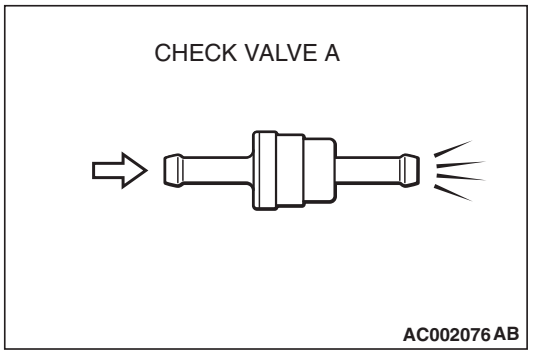


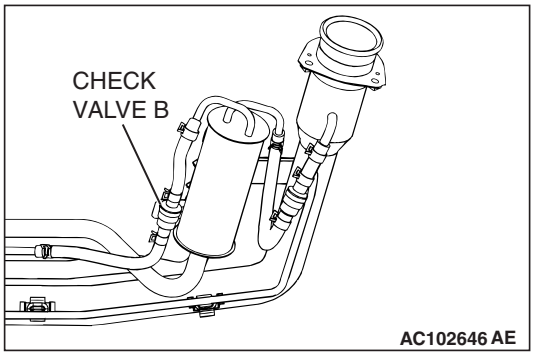
(2) Check valve A should allow air to flow in only one direction.

Q: Does check valve A allow air to press in one direction only?

YES : Go to Step 11.

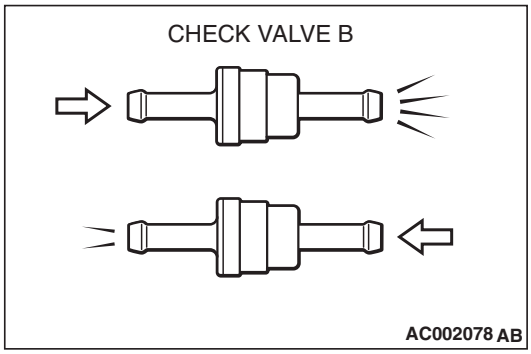
NO : Replace check valve A, and reinstall the fuel tank filler tube and the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 18.





STEP 11. Check the check valve B.

(1) Check valve B is a one-way check valve.



(2) Check valve B should allow air to flow in only one direction.

Q: Does check valve B allow air to press in one direction only?

YES : Go to Step 12.

NO : Replace check valve B, and reinstall the fuel tank filler tube and the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 18.

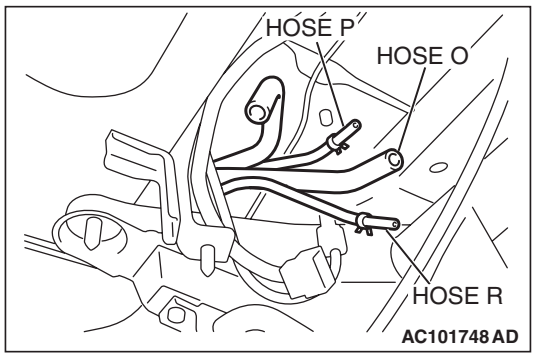
STEP 12. Check for cracks in the fuel tank filler tube assembly.

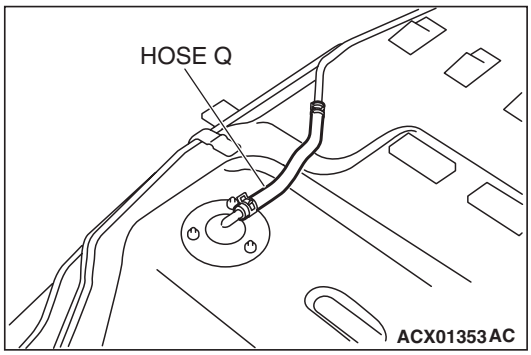
Visually check for cracks in the fuel tank filler tube assembly.

Q: Is the fuel tank filler tube assembly in good condition?

YES : Go to Step 13.

NO : Replace the fuel tank filler tube assembly and reinstall the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 18 .





STEP 13. Check for leaks in the evaporative emission system hoses O through R.

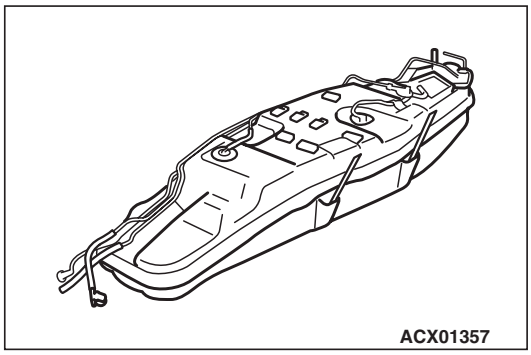
(1) Remove the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8).

(2) Perform a leakage test with a hand vacuum pump on each hose from hose O to R.

Q: Does the hoses hold vacuum?

YES : Go to Step 14.

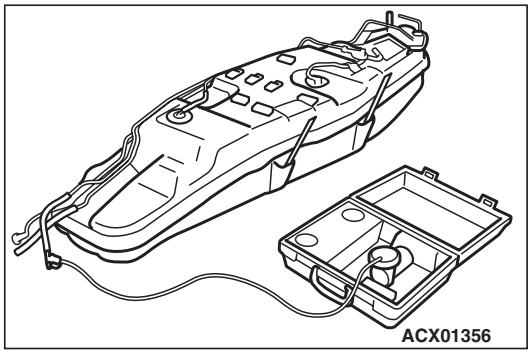
NO : Replace any damaged hose, and reinstall the fuel tank, the fuel tank filler tube and the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 18.



STEP 14. Check for leaks in the fuel tank.

(1) Visually check for cracks and leaks, etc.

NOTE: Carefully check the fuel pump assembly, the fuel level sensor, the fuel tank rollover valve and fuel tank leveling valve installation section in the fuel tank.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(2) Connect the evaporative emission system pressure pump to the filler hose.
(3) Plug the filler hose, feed pipe, return pipe and rollover valve nipple that are connected to the fuel tank.

NOTE: If these items are not securely plugged at this time, the fuel could leak from the tank.

(4) Pressurize the fuel tank with the evaporative emission system pressure pump.
(5) In the pressurized state, check for the leaks by applying soapy water solution to each section and look for bubbles.

Q: Is any leaks found?

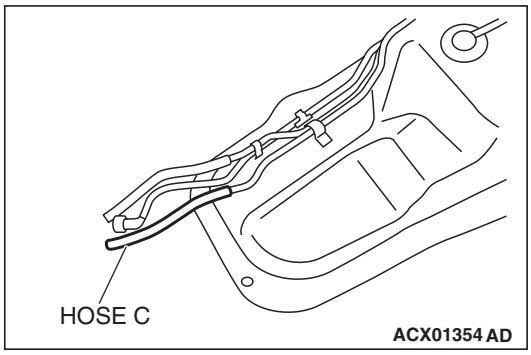
YES <When there is a leak from the attachment points of the fuel pump assembly, fuel tank differential pressure sensor, leveling valve or fuel tank rollover valve.> : Reassemble the leaked parts and check again that there are no leaks. Then reinstall the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8). Then go to Step 18 .

YES <When there is a leak from the fuel tank.> : Replace the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8). Then go to Step 18.

NO : When there is no leak, reinstall the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8). Then go to Step 15.

STEP 15. Check for leaks in evaporative emission system hose C and hose D.

(1) Remove the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8).
(2) Perform a leakage test with a hand vacuum pump on each hose C and D.



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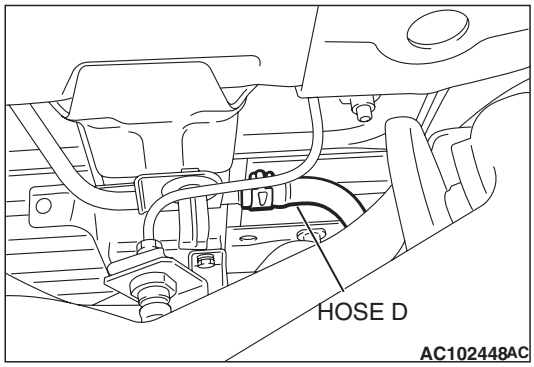

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Q: Does the hoses hold vacuum?

YES : Reinstall the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 16.

NO : Replace any damaged hose and reinstall the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 18.

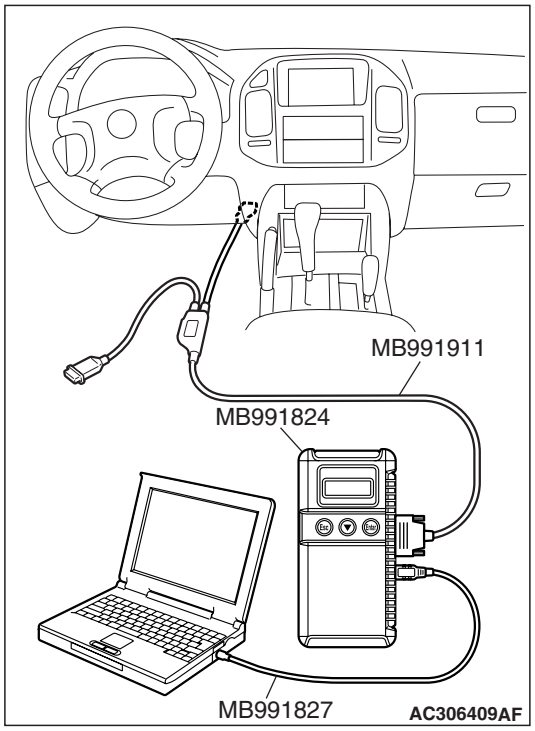
STEP 16. Check for leaks in the evaporative emission canister.

(1) Remove the evaporative emission canister (Refer to GROUP 17, Evaporative Emission Canister and Fuel Tank Pressure Relief Valve P.17-72).
(2) Connect a hand vacuum pump to the vent nipple of the evaporative emission canister.
(3) Plug the other two nipples or loop a hose between them.
(4) Apply vacuum with the hand vacuum pump and confirm that the canister holds vacuum.

Q: Does the evaporative emission canister hold vacuum?

YES : Reinstall the evaporative emission canister (Refer to GROUP 17, Evaporative Emission Canister and Fuel Tank Pressure Relief Valve P.17-72). Go to Step 17 .

NO : Replace the evaporative emission canister (Refer to GROUP 17, Evaporative Emission Canister and Fuel Tank Pressure Relief Valve P.17-72). Go to Step 18 .



STEP 17. Using scan tool MB991958, check evaporative emission system monitor test.

⚠ CAUTION

- **To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.**
- **During this test, the PCM automatically increases the engine speed to 1,600 r/min or greater. Check that the transmission is set to "P" position.**

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Erase the DTCs using scan tool MB991958.
(4) Check that the fuel cap is securely closed (Tighten until three clicks are heard).
(5) Start the engine.
(6) Select "System Test."
(7) Select "Evap Leak Mon."
(8) During this test, keep the accelerator pedal at the idling position.
(9) Keep the engine speed and engine load within the specified range. When the monitor test starts, the "In Progress" item on scan tool MB991958 will change from "NO" to "YES."
(10) Turn the ignition switch to the "LOCK" (OFF) position and disconnect scan tool MB991958.

Q: Is "Evap Leak Mon. Completed. Test Failed and DTCs Set" displayed on scan tool MB991958?

YES : Replace the PCM (Refer to P.13A-1066). Then go to Step 18 .

NO <"Evap Leak Mon. Completed. Test Passed" is displayed on scan tool MB991958.> : The evaporative emission system is working properly at this time. Then go to Step 18 .

NO <"Evap Leak Mon. Discontinued. Retest again from the first" is displayed on scan tool MB991958.> : The EVAP monitor has been interrupted during the test. Turn the ignition switch to the "LOCK" (OFF) position once, and repeat the monitoring from Step 17.

STEP 18. Perform the OBD-II drive cycle.

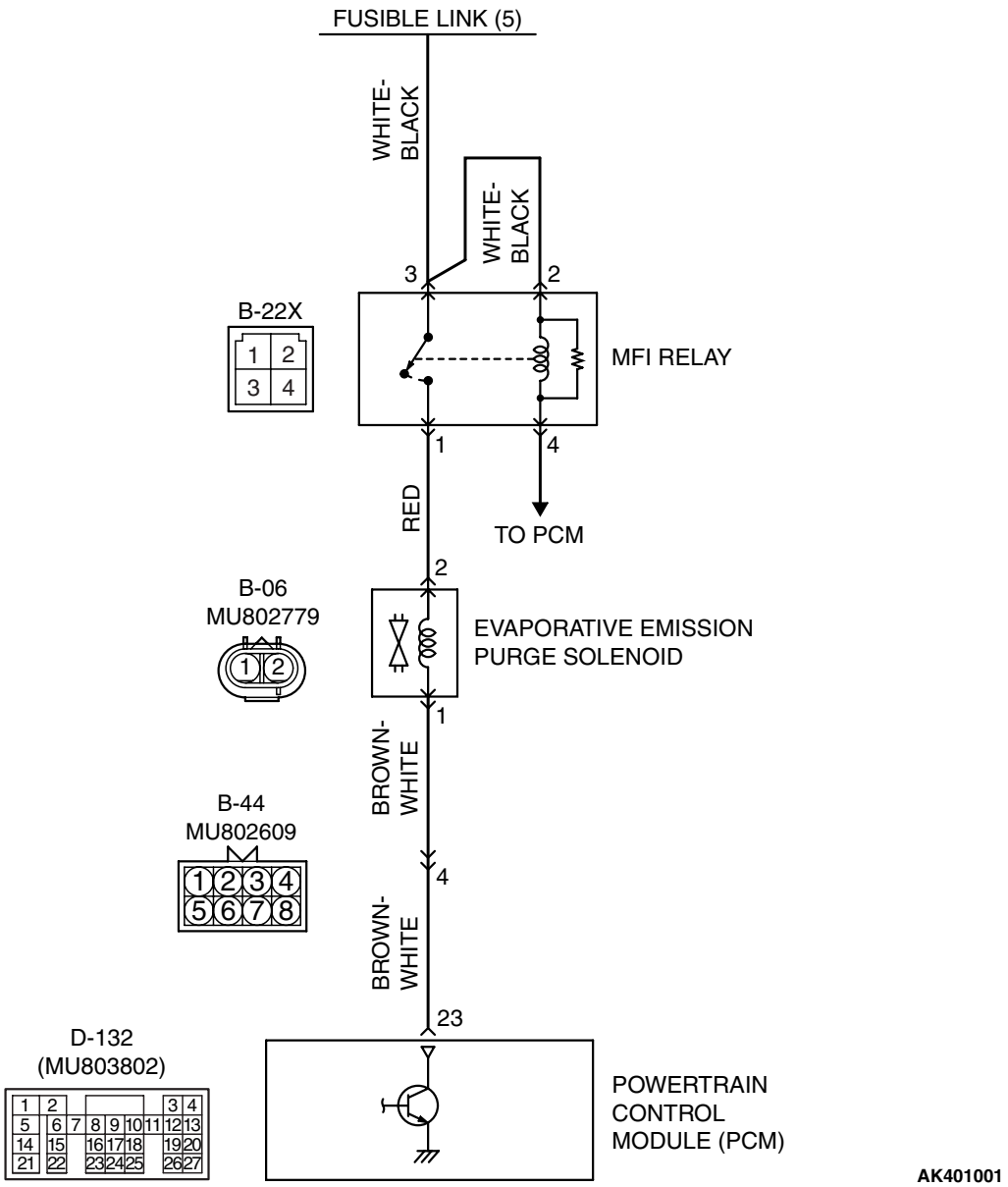
(1) Confirm the repair by performing the appropriate drive cycle (Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 5 P.13A-4).
(2) Read the diagnostic trouble code (DTC).

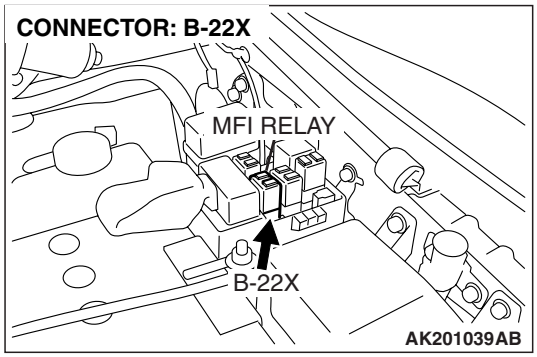
Q: Is DTC P0442 set?

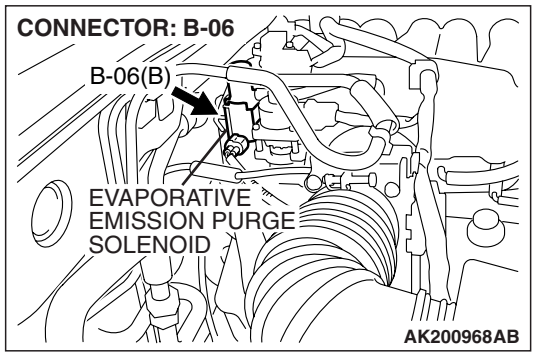
YES : Repeat the troubleshooting from Step 1.
NO : The procedure is complete.

DTC P0443: Evaporative Emission Control System Purge Control Valve Circuit

Evaporative Emission Purge Solenoid Circuit







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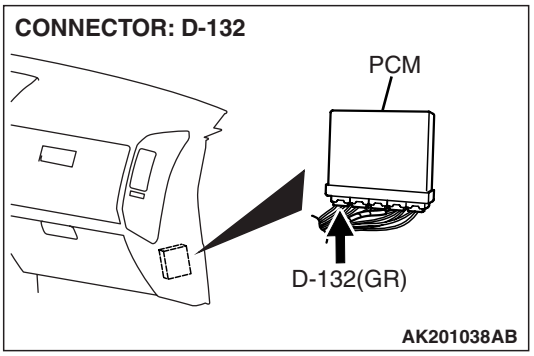

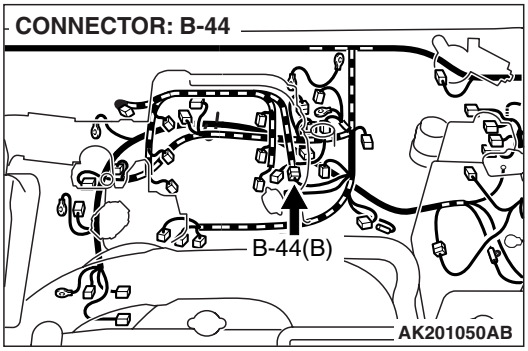

CIRCUIT OPERATION

- The evaporative emission purge solenoid power is supplied from the MFI relay (terminal No. 1).
- The PCM controls ground evaporative emission purge solenoid by turning the power transistor in the PCM ON and OFF.

TECHNICAL DESCRIPTION

- To judge if there is open circuit in the evaporative emission purge solenoid drive circuit, the PCM measures the surge voltage of the evaporative emission ventilation solenoid coil.

DESCRIPTIONS OF MONITOR METHODS

Off-surge does not occur after solenoid is operated from on to off.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

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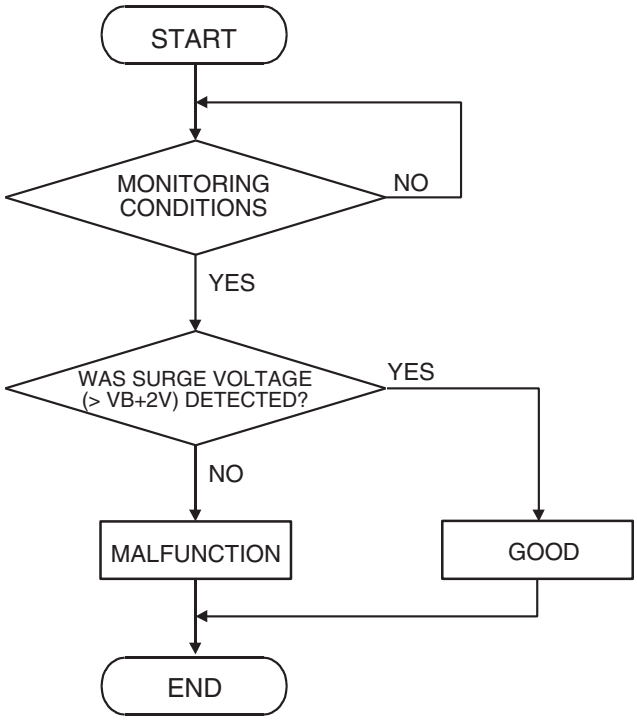
DTC SET CONDITIONS

Logic Flow Chart



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Check Conditions
- Engine is being cranked.
- Battery positive voltage is between 10 and 16.5 volts.

Judgement Criteria
- The evaporative emission purge solenoid coil surge voltage (battery positive voltage + 2 volts) is not detected for 0.2 second.
- The PCM monitors for this condition once during the drive cycle.

Check Conditions
- Battery positive voltage is between 10 and 16.5 volts.
- ON duty cycle of the evaporative emission purge solenoid is between 10 and 90 percent.
- Evaporative emission ventilation solenoid is OFF.
- More than 1 second has elapsed after the above mentioned conditions have been met.

Judgement Criterion
- The evaporative emission purge solenoid coil surge voltage (battery positive voltage + 2 volts) is not detected for 1 second after the evaporative emission purge solenoid is turned OFF.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 20 P.13A-4.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)
- Evaporative emission purge solenoid failed.
- Open or shorted evaporative emission purge solenoid circuit, harness damage, or connector damage.
- PCM failed.

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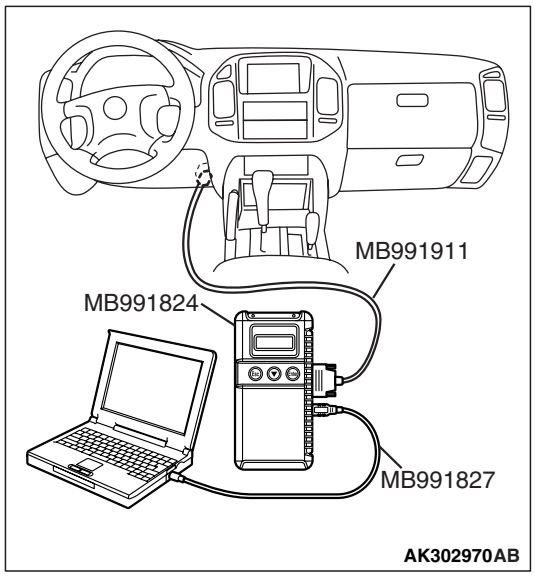
DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991958, check actuator test item 08: Evaporative Emission Purge Solenoid.



⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

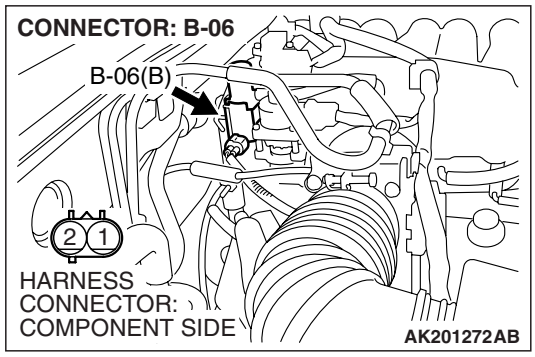
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to the actuator test mode for item 08, Evaporative emission purge solenoid.
  - An operation sound should be heard and vibration should be felt when the evaporative emission purge solenoid is operated.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the solenoid 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 Malfunctions P.00-13.

NO : Go to Step 2.

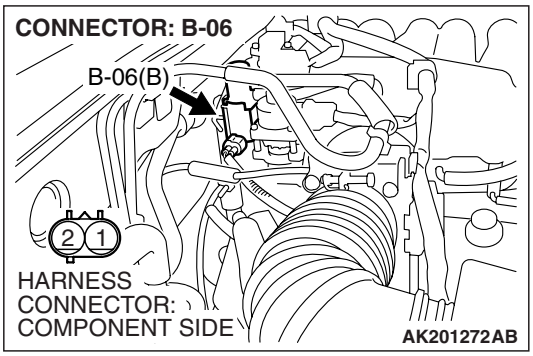
STEP 2 Check harness connector B-06 at the evaporative emission purge solenoid for damage.



Q: Is the harness connector in good condition?

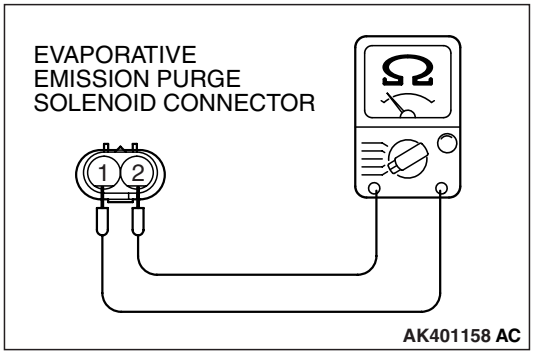
YES : Go to Step 3.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.



STEP 3 Check the evaporative emission purge solenoid.

(1) Disconnect the evaporative emission purge solenoid connector B-06.



(2) Measure the resistance between evaporative emission purge solenoid side connector terminal No. 1 and No. 2.

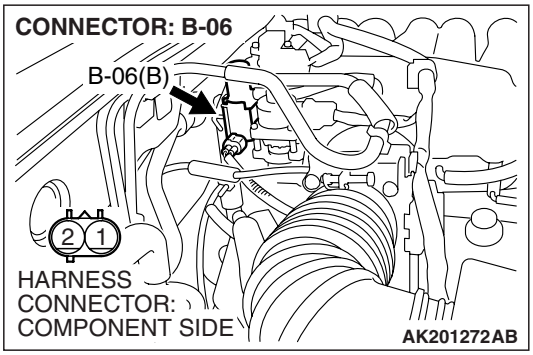
Standard value: 30 – 34 ohms [at 20°C (68°F)]

Q: Is the resistance between 30 and 34 ohms [at 20°C (68°F)]?

YES : Go to Step 4

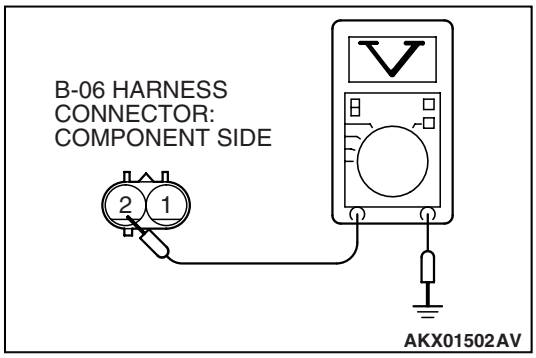
NO : Replace the evaporative emission purge solenoid. Then go to Step 12.

STEP 4. Measure the power supply voltage at evaporative emission purge solenoid harness side connector B-06.



(1) Disconnect the connector B-06 and measure at the harness side.

(2) Turn the ignition switch to the "ON" position.



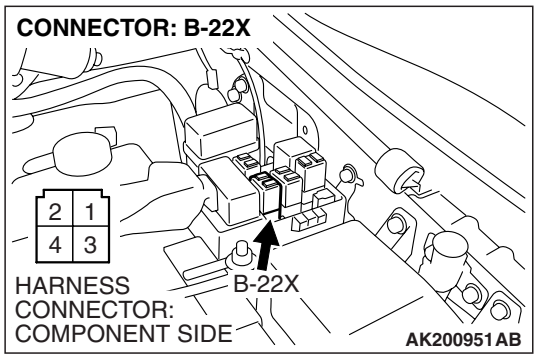
(3) Measure the voltage between terminal No. 2 and ground.
- Voltage should be battery positive voltage.

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

Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 6.

NO : Go to Step 5.

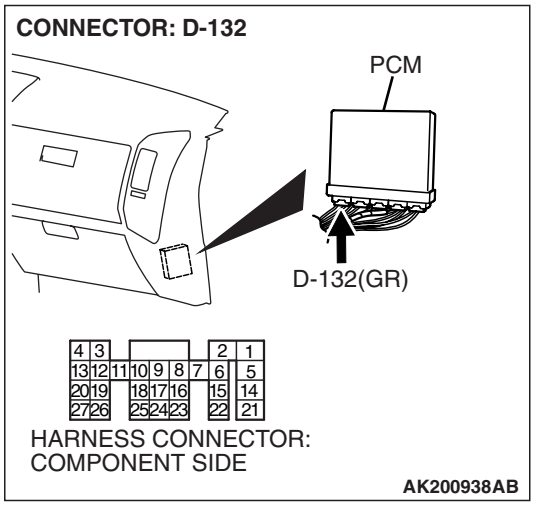


STEP 5. Check harness connector B-22X at MFI relay for damage.

Q: Is the harness connector in good condition?

YES : Repair harness wire between MFI relay connector B-22X (terminal No. 1) and evaporative emission purge solenoid connector B-06 (terminal No. 2) because of open circuit or short circuit to ground. Then go to Step 12.

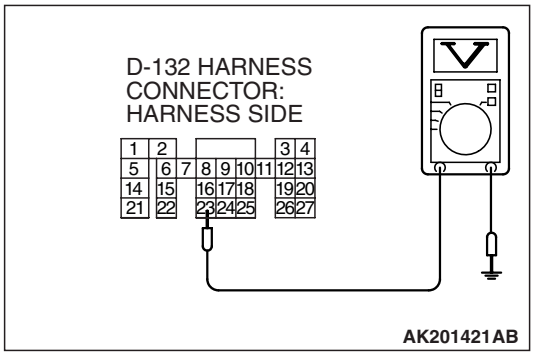
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.



STEP 6. Measure the power supply voltage at PCM connector D-132 by backprobing.

(1) Do not disconnect the connector D-132.

(2) Turn the ignition switch to the "ON" position.



(3) Measure the voltage between terminal No. 23 and ground by backprobing.
- Voltage should be battery positive voltage.

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

Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 9.

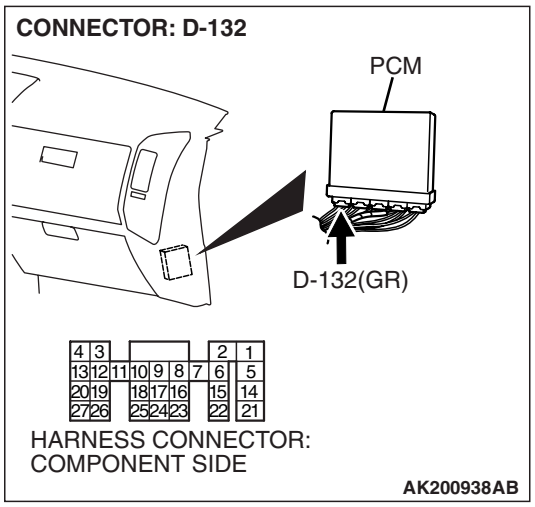
NO : Go to Step 7.

STEP 7. Check harness connector D-132 at PCM for damage.

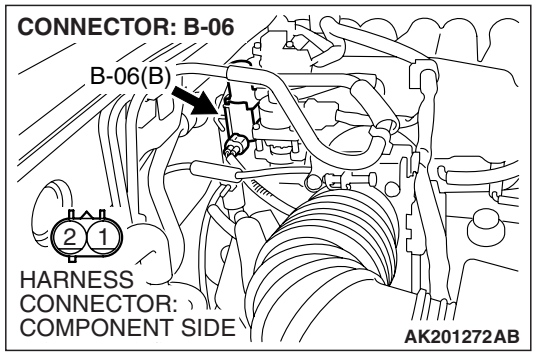
Q: Is the harness connector in good condition?

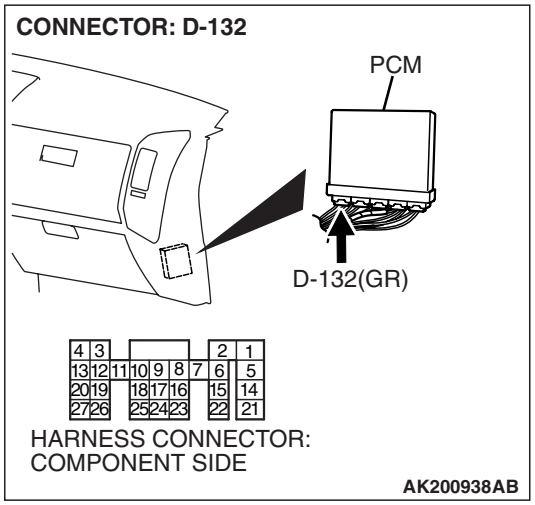
YES : Go to Step 8.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.



STEP 8. Check for open circuit and short circuit to ground between evaporative emission purge solenoid connector B-06 (terminal No. 1) and PCM connector D-132 (terminal No. 23).





NOTE: Check harness after checking intermediate connector B-44. If intermediate connector B-44 is damaged, repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

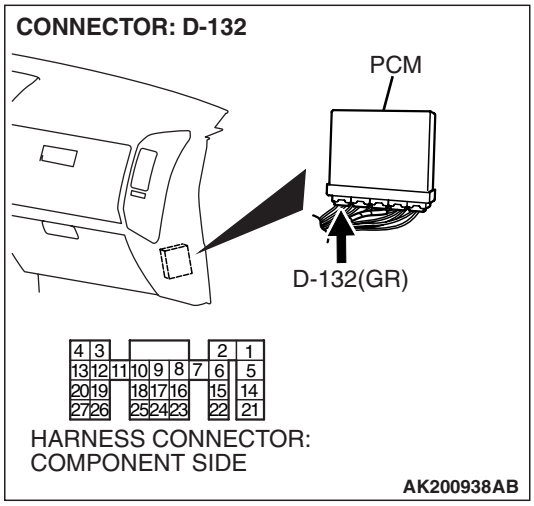
Q: Is the harness wire in good condition?

YES : Replace the PCM. Then go to Step 12.
NO : Repair it. Then go to Step 12.

STEP 9. Check harness connector D-132 at PCM for damage.

Q: Is the harness connector in good condition?

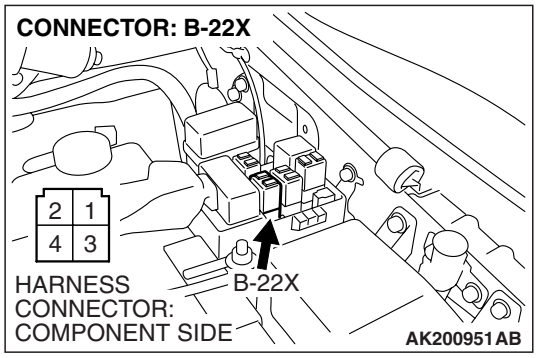
YES : Go to Step 10.
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.

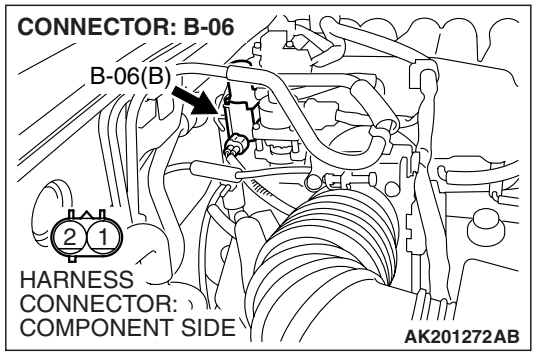


STEP 10. Check for harness damage between MFI relay connector B-22X (terminal No. 1) and evaporative emission purge solenoid connector B-06 (terminal No. 2).

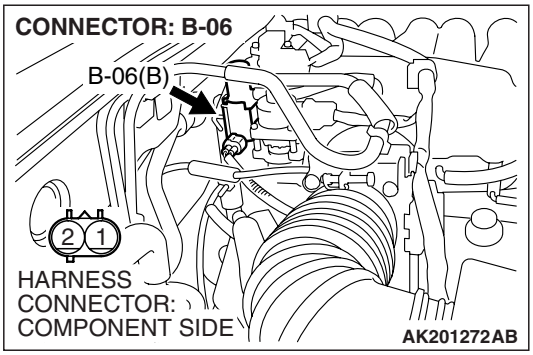
Q: Is the harness wire in good condition?

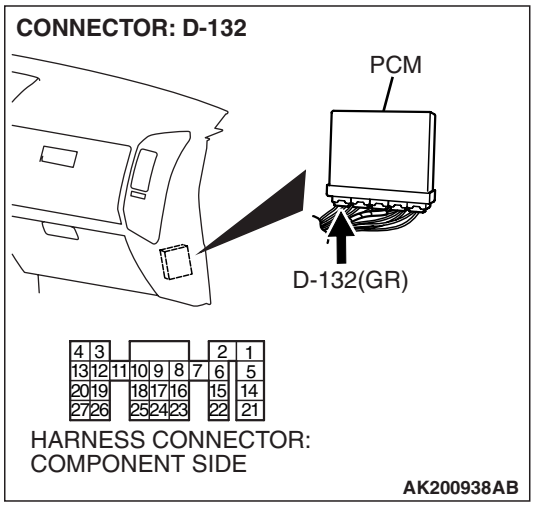
YES : Go to Step 11.
NO : Repair it. Then go to Step 12.





STEP 11. Check for harness damage between evaporative emission purge solenoid connector B-06 (terminal No. 1) and PCM connector D-132 (terminal No. 23).





NOTE: Check harness after checking intermediate connector B-44. If intermediate connector B-44 is damaged, repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.

Q: Is the harness wire in good condition?

YES : Replace the PCM. Then go to Step 12.
NO : Repair it. Then go to Step 12.

STEP 12. Test the OBD-II drive cycle.

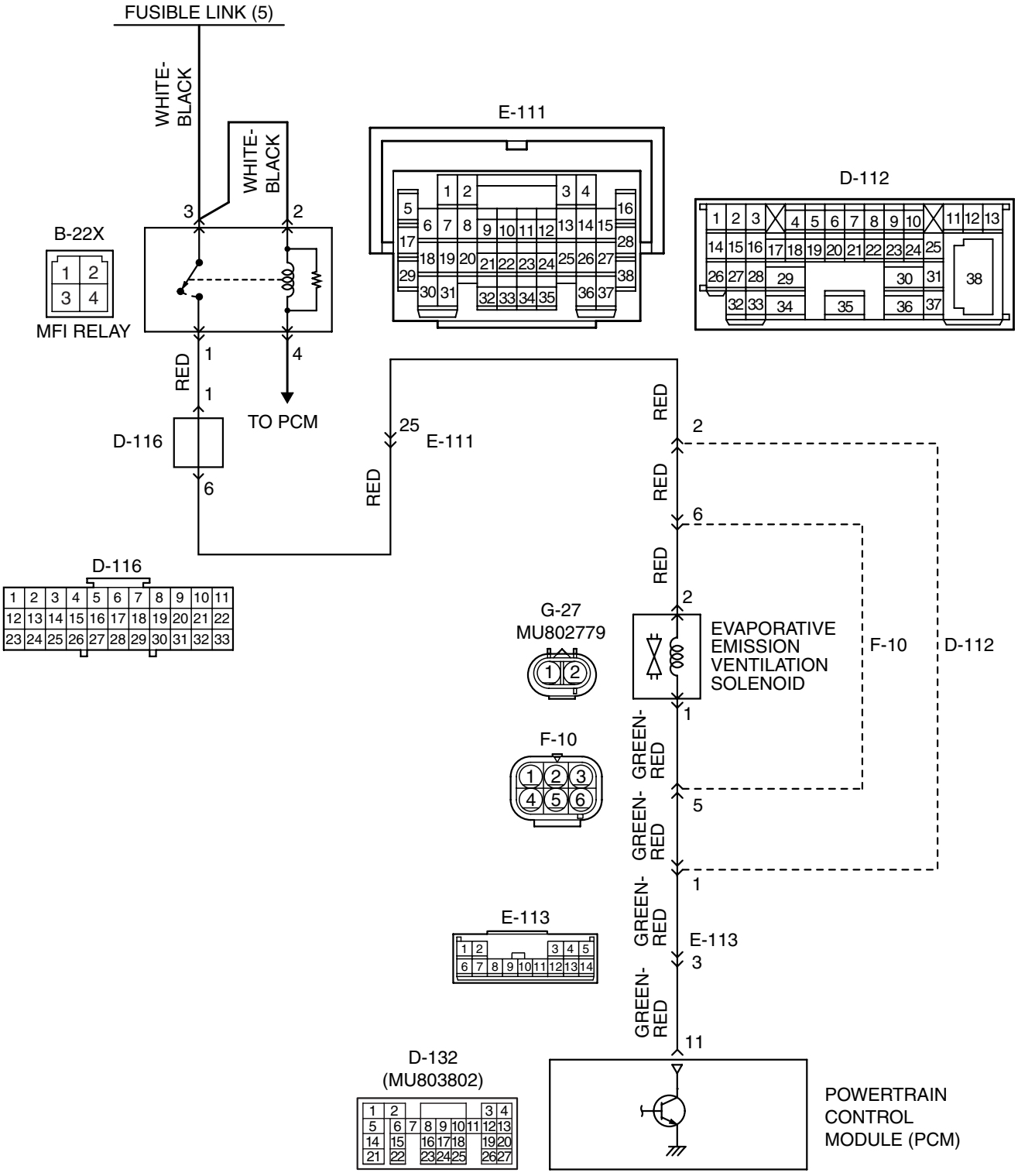
(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 20 P.13A-4.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0443 set?

YES : Retry the troubleshooting.
NO : The inspection is complete.

DTC P0446: Evaporative Emission Control System Vent Control Circuit

Evaporative Emission Ventilation Solenoid Circuit



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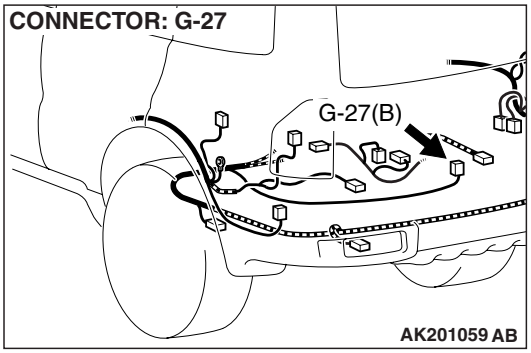

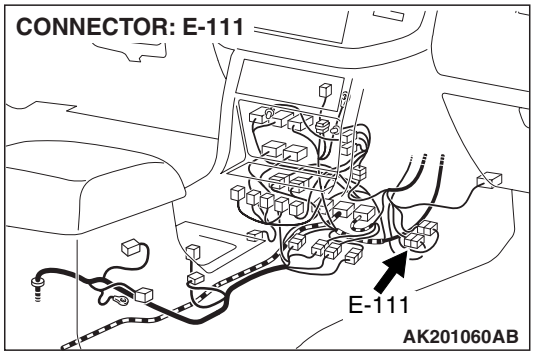

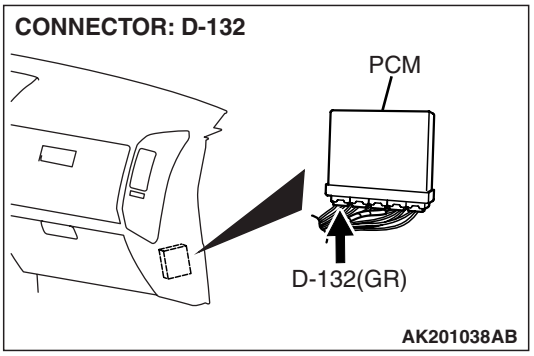

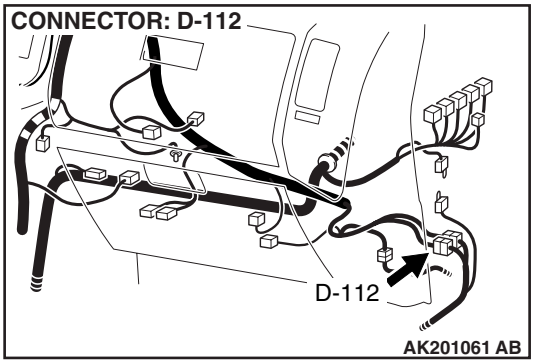

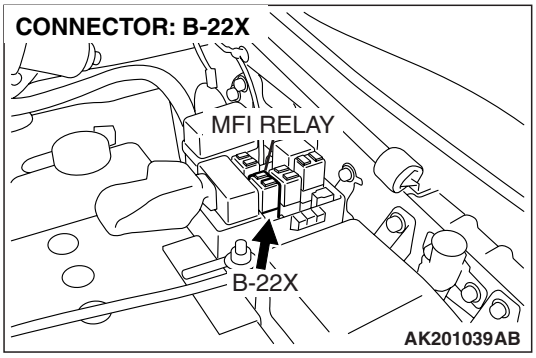

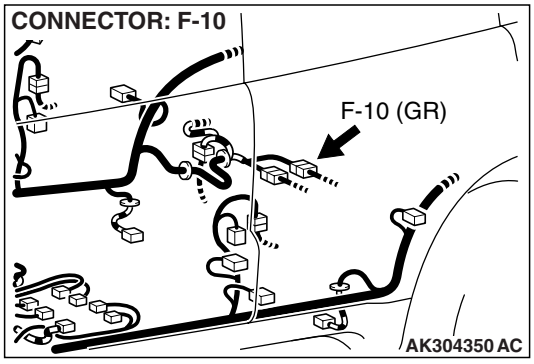

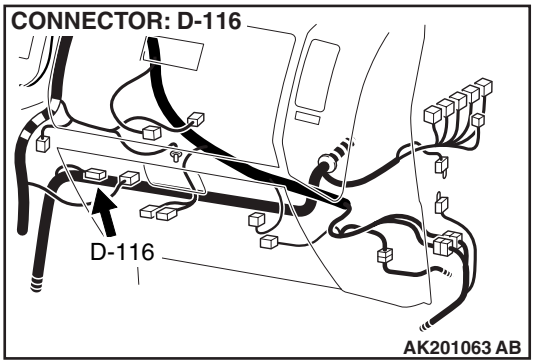

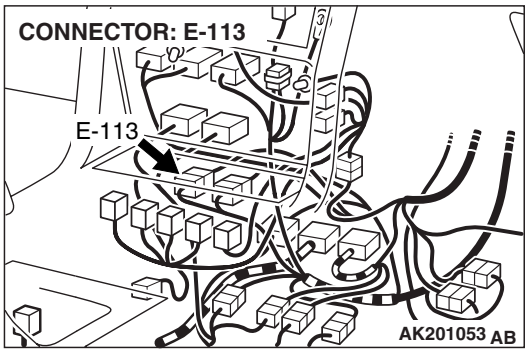

CIRCUIT OPERATION

- The evaporative emission ventilation solenoid power is supplied from the MFI relay (terminal No. 1).
- The PCM controls the evaporative emission ventilation solenoid ground by turning the power transistor in the PCM ON and OFF.

TECHNICAL DESCRIPTION

- To judge if there is open circuit in the evaporative emission ventilation solenoid drive circuit, PCM measures the surge voltage of the evaporative emission ventilation solenoid coil.
- The PCM drives the evaporative emission ventilation solenoid. After the solenoid is turned OFF, the PCM will check if the solenoid coil produces a surge voltage (battery positive voltage +2 volts).

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DESCRIPTIONS OF MONITOR METHODS

Off-surge does not occur after solenoid is operated on to off.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

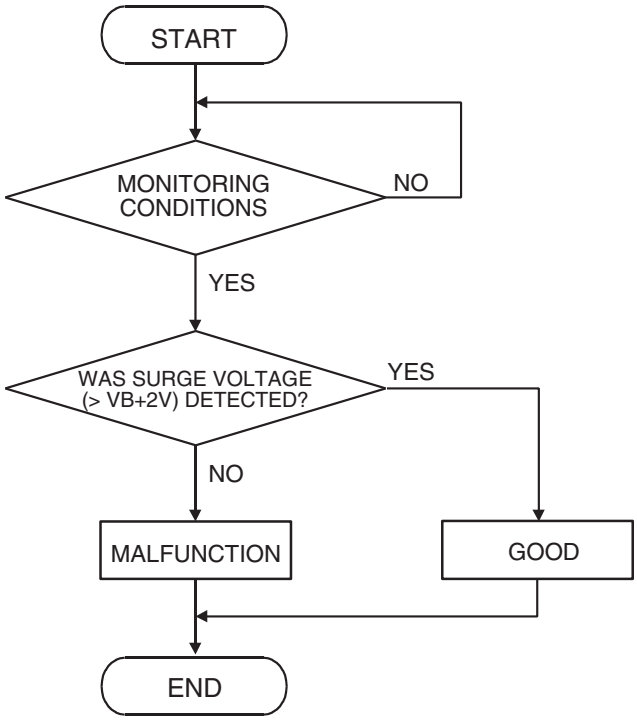
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



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Check Conditions

- Engine is being cranked.
- Battery positive voltage is between 10 and 16.5 volts.

Judgement Criteria

- The evaporative emission ventilation solenoid coil surge voltage (battery positive voltage + 2 volts) is not detected for 0.2 second.
- The PCM monitors for this condition once during the drive cycle.

Check Conditions

- Battery positive voltage is at between 10 and 16.5 volts.
- ON duty cycle of the evaporative emission purge solenoid is 0 percent.
- Evaporative emission ventilation solenoid is ON.
- More than 1 second has elapsed after the above mentioned conditions have been met.

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Judgement Criterion

- The evaporative emission ventilation solenoid coil surge voltage (battery positive voltage + 2 volts) is not detected for 1 second after the evaporative emission ventilation solenoid is turned OFF.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 20 P.13A-4.

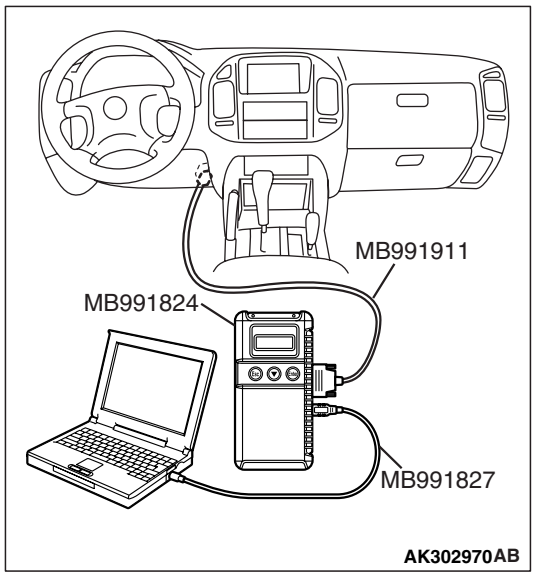
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Evaporative emission ventilation solenoid failed.
- Open or shorted evaporative emission ventilation solenoid circuit, harness damage, or connector damage.
- PCM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B



STEP 1. Using scan tool MB991958, check actuator test item 29: Evaporative Emission Ventilation Solenoid.

⚠ CAUTION

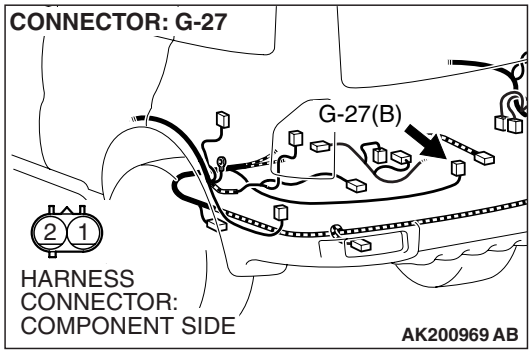
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to the actuator test mode for item 29, Evaporative emission ventilation solenoid.
  - An operation sound should be heard and vibration should be felt when the evaporative emission ventilation solenoid is operated.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the solenoid 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 Malfunctions P.00-13.

NO : Go to Step 2.



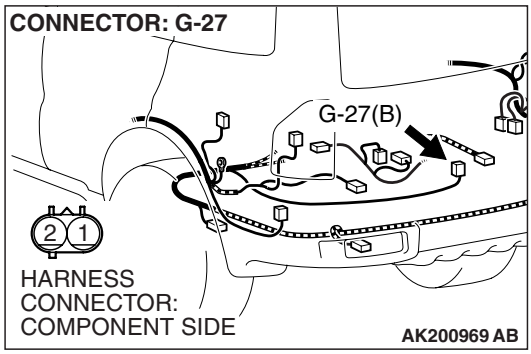
STEP 2. Check harness connector G-27 at the evaporative emission ventilation solenoid for damage.

Q: Is the harness connector in good condition?

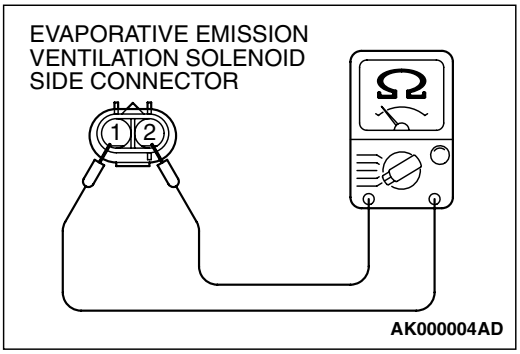
YES : Go to Step 3.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.

STEP 3. Check the evaporative emission ventilation solenoid.



(1) Disconnect the evaporative emission ventilation solenoid connector G-27.



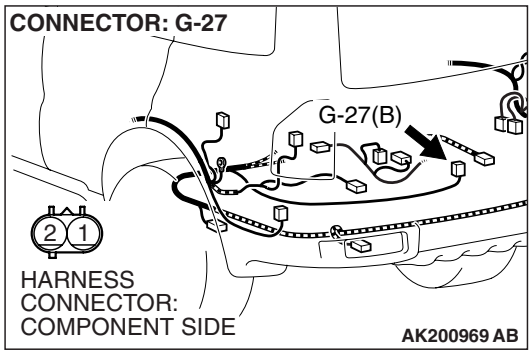
(2) Measure the resistance between evaporative emission ventilation solenoid side connector terminal No. 1 and No. 2.

Standard value: 17 – 21 ohms [at 20°C (68°F)]

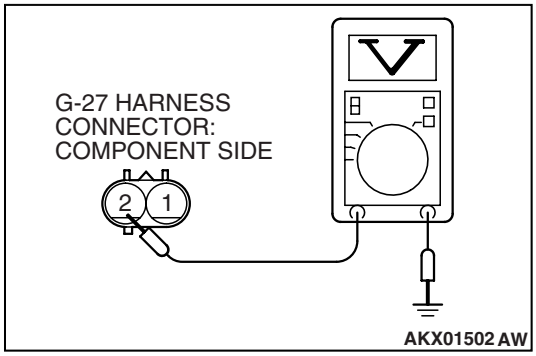
Q: Is the resistance between 17 and 21 ohms [at 20°C (68°F)]?

YES : Go to Step 4.
NO : Replace it. Then go to Step 12.

STEP 4. Measure the power supply voltage at evaporative emission ventilation solenoid harness side connector G-27.



(1) Disconnect the connector G-27 and measure at the harness side.
(2) Turn the ignition switch to the "ON" position.

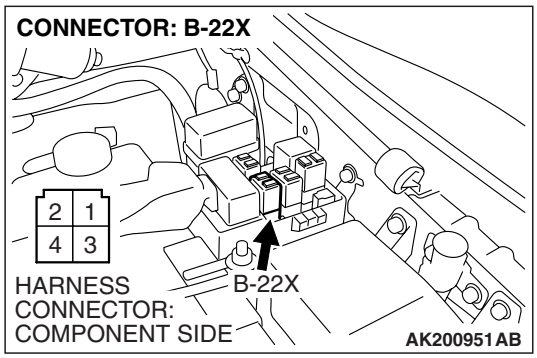


(3) Measure the voltage between terminal No. 2 and ground.
- Voltage should be battery positive voltage.

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

Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 6.
NO : Go to Step 5.



STEP 5. Check harness connector B-22X at MFI relay for damage.

Q: Is the harness connector in good condition?

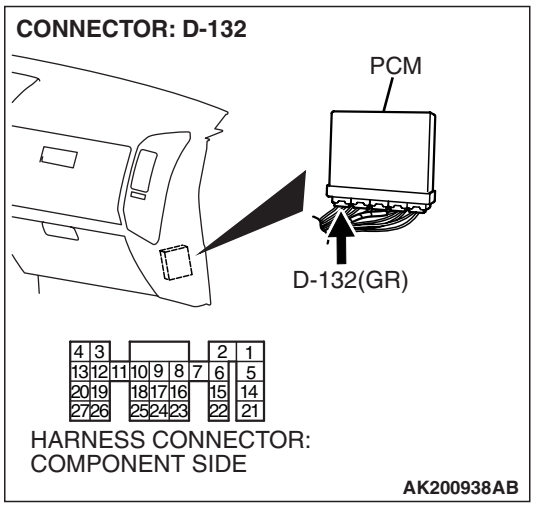
YES : Check harness connectors D-116, E-111, D-112 and F-10 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. If intermediate connectors are in good condition, repair harness wire between MFI relay connector B-22X (terminal No. 1) and evaporative emission ventilation solenoid connector G-27 (terminal No. 2) because of open circuit or short circuit to ground. Then go to Step 12.

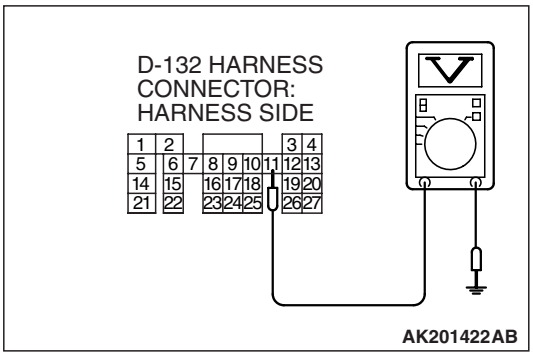
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.

STEP 6. Measure the power supply voltage at PCM connector D-132 by backprobing.

(1) Do not disconnect the connector D-132.

(2) Turn the ignition switch to the "ON" position.





(3) Measure the voltage between terminal No. 11 and ground by backprobing.
- Voltage should be battery positive voltage.

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

Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 9.

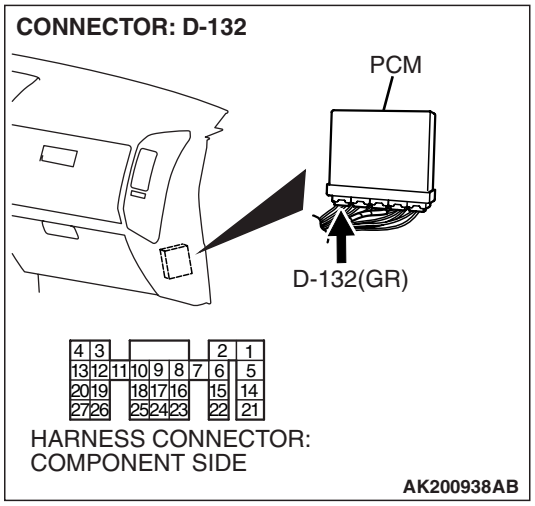
NO : Go to Step 7.

STEP 7. Check harness connector D-132 at PCM for damage.

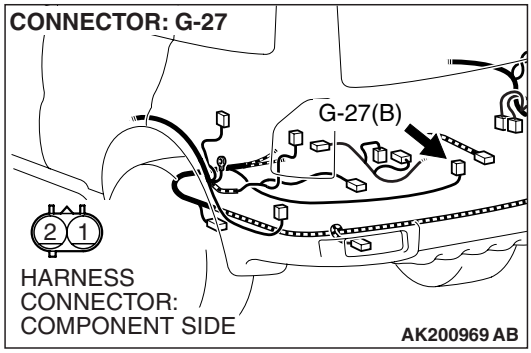
Q: Is the harness connector in good condition?

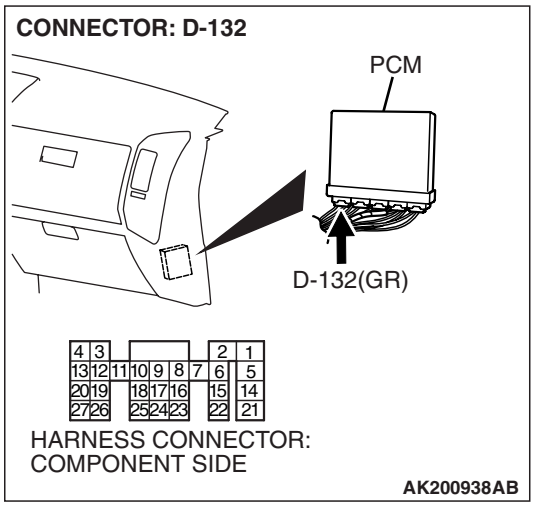
YES : Go to Step 8.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.



STEP 8. Check for open circuit and short circuit to ground between evaporative emission ventilation solenoid connector G-27 (terminal No. 1) and PCM connector D-132 (terminal No. 11).





NOTE: Check harness after checking intermediate connectors F-10, D-112 and E-113. If intermediate connectors are damaged, repair or replace them. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.

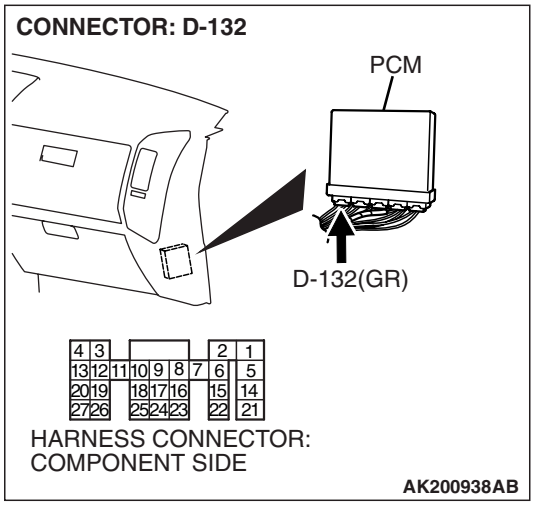
Q: Is the harness wire in good condition?

YES : Replace the PCM. Then go to Step 12.
NO : Repair it. Then go to Step 12.

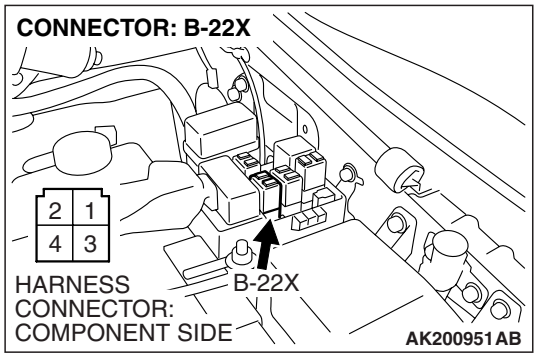
STEP 9. Check harness connector D-132 at PCM for damage.

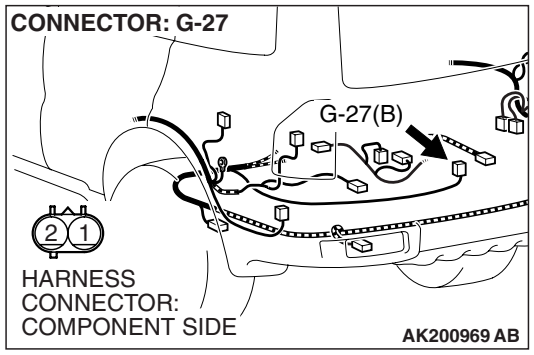
Q: Is the harness connector in good condition?

YES : Go to Step 10.
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.



STEP 10. Check for harness damage between MFI relay connector B-22X (terminal No. 1) and evaporative emission ventilation solenoid connector G-27 (terminal No. 2).



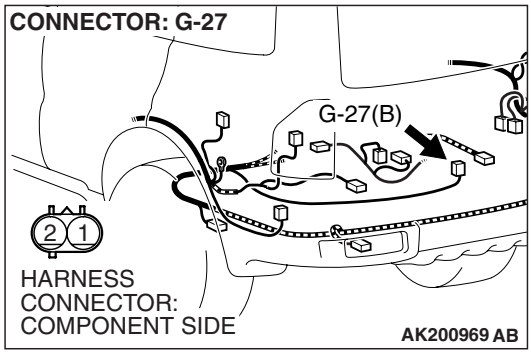


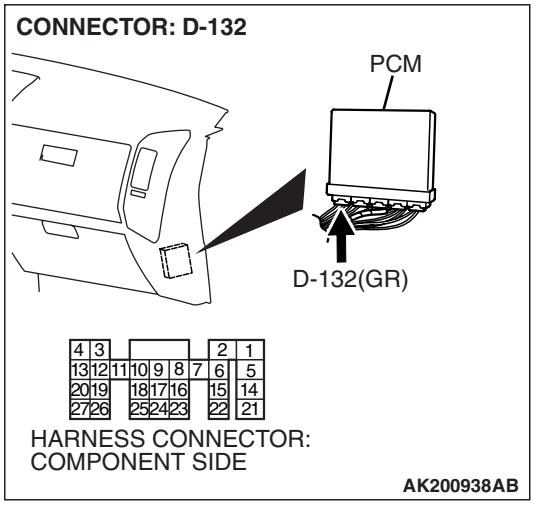
NOTE: Check harness after checking intermediate connectors D-116, E-111, D-112 and F-10. If intermediate connectors are damaged, repair or replace them. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.

Q: Is the harness wire in good condition?

YES : Go to Step 11.
NO : Repair it. Then go to Step 12.

STEP 11. Check for harness damage between evaporative emission ventilation solenoid connector G-27 (terminal No. 1) and PCM connector D-132 (terminal No. 11).





NOTE: Check harness after checking intermediate connectors F-10, D-112 and E-113. If intermediate connectors are damaged, repair or replace them. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.

Q: Is the harness wire in good condition?

YES : Replace the PCM. Then go to Step 12.
NO : Repair it. Then go to Step 12.

STEP 12. Test the OBD-II drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 20 P.13A-4.

(2) Check the diagnostic trouble code (DTC).

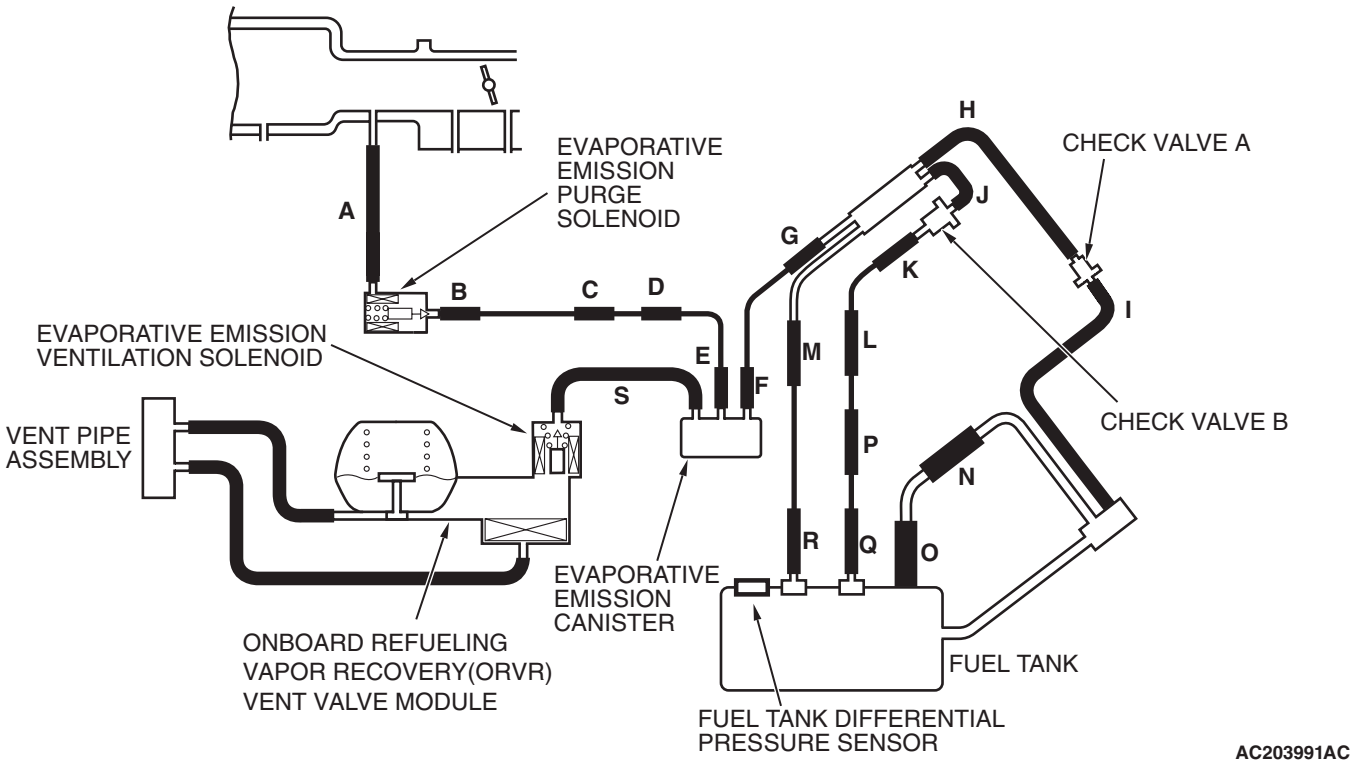
Q: Is DTC P0446 set?

YES : Retry the troubleshooting.

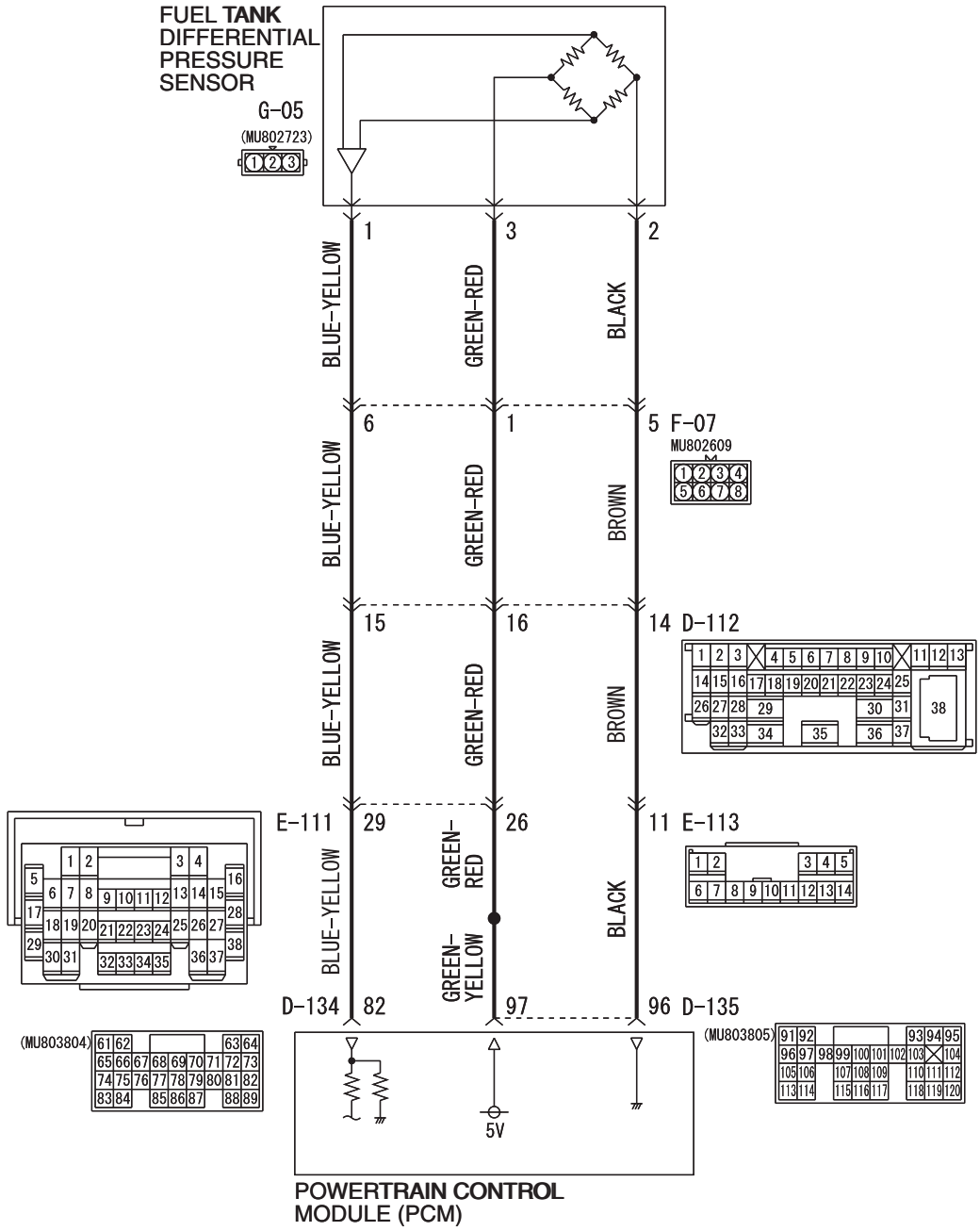
NO : The inspection is complete.

DTC P0450: Evaporative Emission System Pressure Sensor malfunction

SYSTEM DIAGRAM



Fuel Tank Differential Pressure Sensor Circuit



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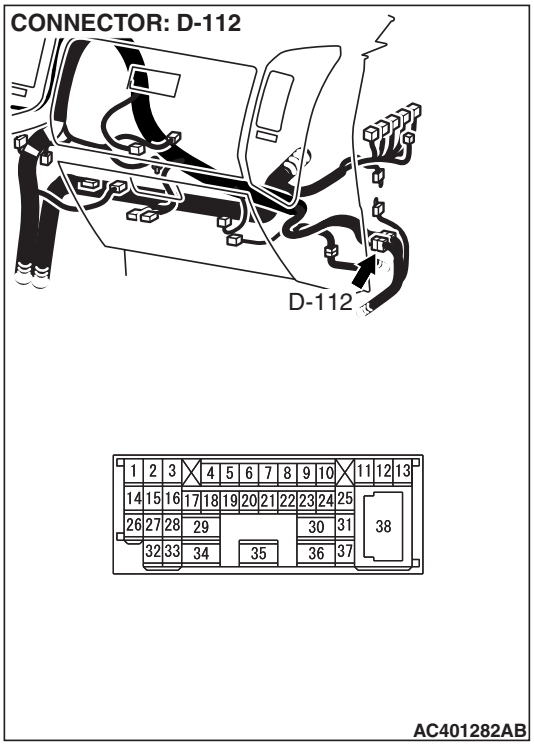
CONNECTOR: D-112



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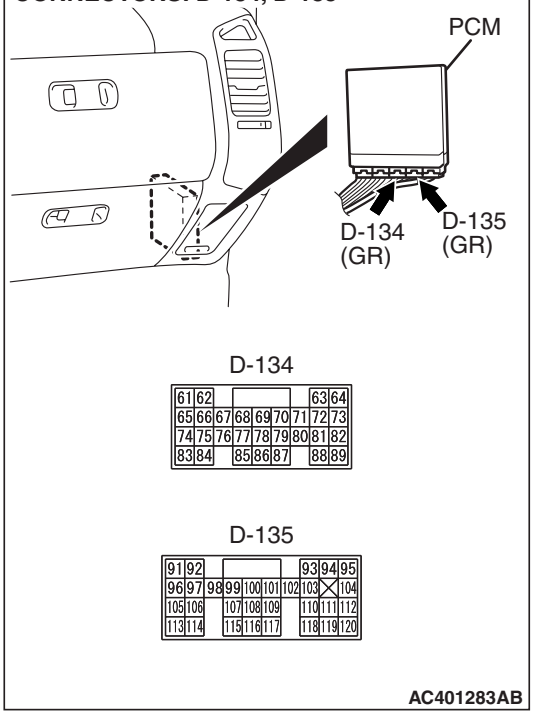
CONNECTORS: D-134, D-135



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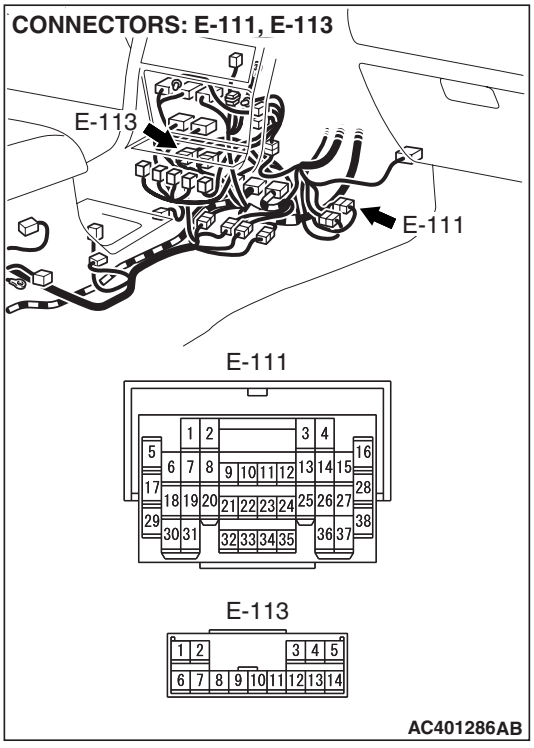
CONNECTORS: E-111, E-113



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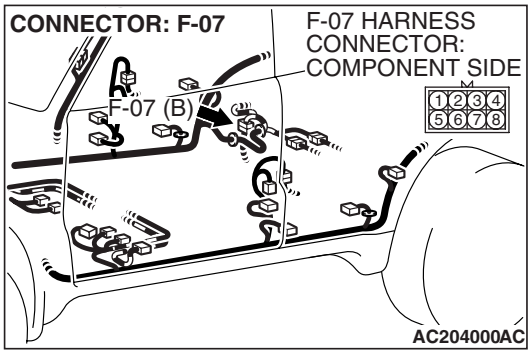
CONNECTOR: F-07



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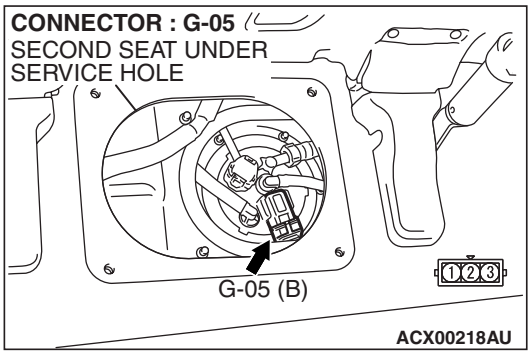


CIRCUIT OPERATION

- The PCM (terminal 97) supplies a 5-volt reference signal to the fuel tank differential pressure sensor (terminal 3). The fuel tank differential pressure sensor (terminal 2) is grounded through the PCM (terminal 96).
- The fuel tank differential pressure sensor (terminal 1) returns a voltage signal to the PCM (terminal 82) that is proportional to the pressure in the fuel tank.

TECHNICAL DESCRIPTION

- The PCM monitors the fuel tank differential pressure sensor output voltage.
- The PCM determines whether the fuel tank differential pressure sensor signal voltage is within normal operating parameters.

DESCRIPTIONS OF MONITOR METHODS

- Compare purge solenoid status with fuel tank differential pressure sensor output voltage.

MONITOR EXECUTION

- Continuous.

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

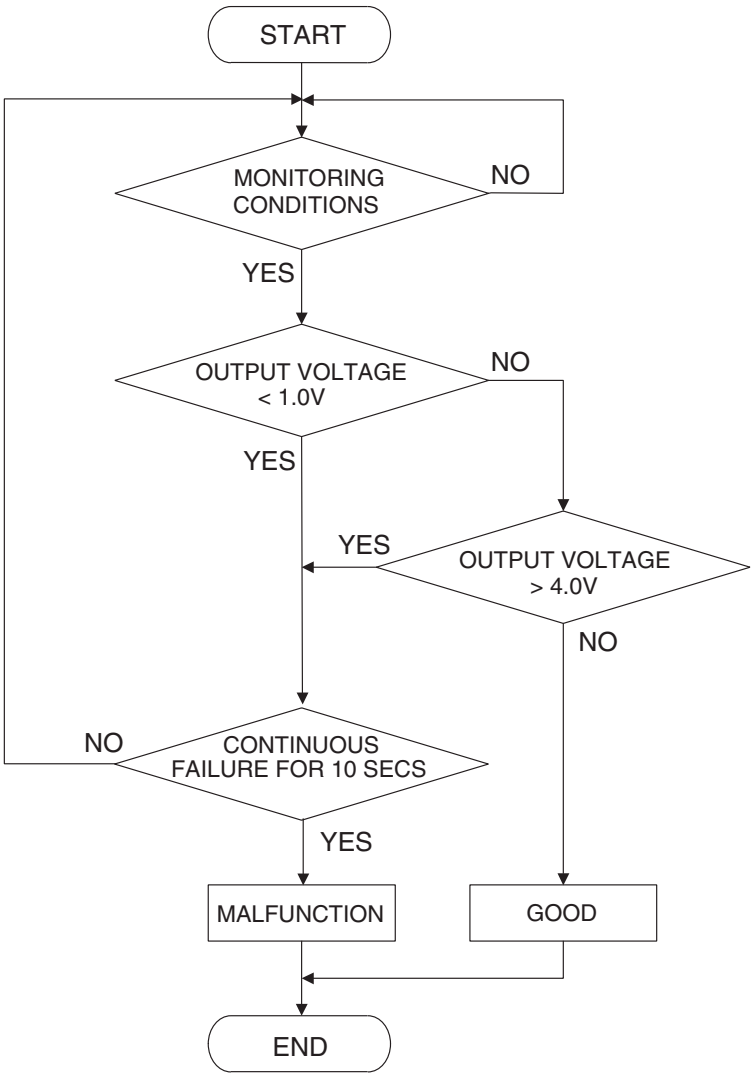
- Evaporative emission purge solenoid monitor
- Evaporative emission ventilation solenoid monitor
- Fuel level sensor monitor
- Fuel temperature sensor monitor

Sensor (The sensors below are determined to be normal)

- Volume airflow sensor
- Barometric pressure sensor
- Intake air temperature sensor
- Engine coolant temperature sensor
- Accelerator pedal position sensor

LOGIC FLOW CHARTS (Monitor Sequence)

RATIONALITY - HIGH/LOW



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DTC SET CONDITIONS

Check Conditions

- Intake air temperature is greater than 5°C (41°F).
- Engine speed is 1,600 r/min or greater.
- Volumetric efficiency is between 20 and 70 percent.

Judgment Criterion

- When the evaporative emission purge solenoid is off, the fuel differential pressure sensor output voltage remains 1.0 volt or less for ten seconds.

Check Conditions

- Intake air temperature is between 5°C (41°F) and 45°C (113°F) or greater.
- Engine speed is 1,600 r/min or greater.
- Volumetric efficiency is between 20 and 70 percent.

Judgment Criterion

- When the evaporative emission purge solenoid valve is fully operational (100 percent ratio), the fuel differential pressure sensor output voltage remains at 4.0 volts or greater for ten seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 5 P.13A-4.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)

- Malfunction of the fuel tank differential pressure sensor.
- A damaged harness in the fuel tank differential pressure sensor circuit.
- Malfunction of the PCM.

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OVERVIEW OF TROUBLESHOOTING

- DTC P0450 can be set by a faulty fuel tank differential pressure sensor or related circuit, or PCM failure.
- To check for system blockage, do a performance test which uses a mechanical vacuum gauge and scan tool MB991958 set on the fuel tank differential pressure sensor (TANK PRS SNSR 73). The mechanical gauge reading is used to verify scan tool MB991958 reading. A comparison of the mechanical gauge with the reading on scan tool MB991958 will locate a problem in the system.

DIAGNOSIS

Required Special Tools:

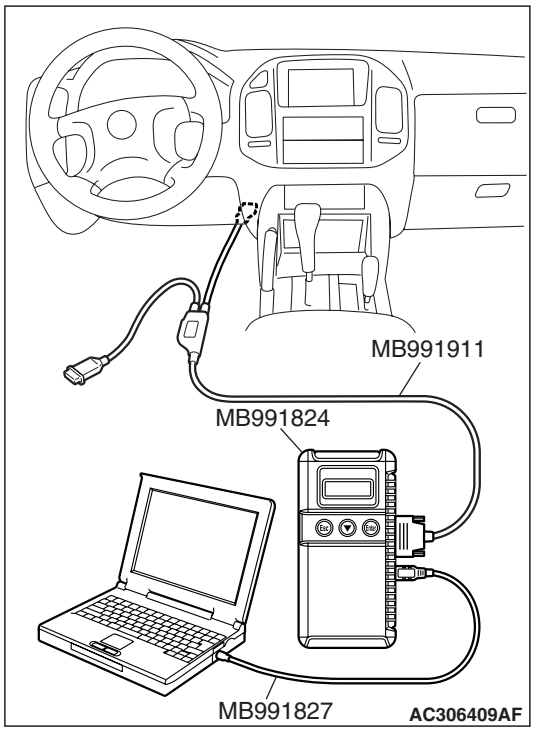
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness B
- MB991658: Test Harness Set
- MB992006: Extra Fine Probe

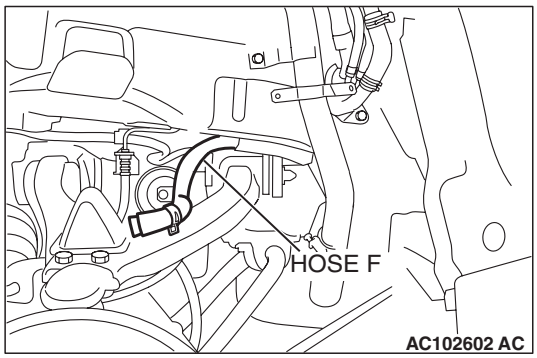
STEP 1. Using scan tool MB991958, check data list item 73: Fuel Tank Differential Pressure Sensor.

⚠ CAUTION

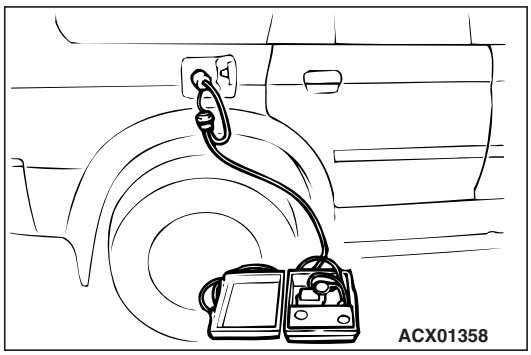
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.





(2) Disconnect hose F from the evaporative emission canister side, and plug the hose.
(3) Turn the ignition switch to the "ON" position.
(4) Remove the fuel cap.
(5) Set scan tool MB991958 to the data reading mode.
Item 73, Fuel Tank Differential Pressure Sensor.
- The fuel tank pressures reading on the scan tool should be −1.5 to 1.5 kPa (−0.443 to 0.443 inHg).



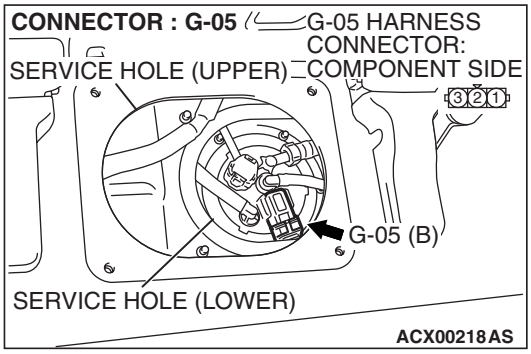
(6) Connect an evaporative emission system pressure pump to the fuel tank filler tube and pressurize the fuel tank.
- The fuel tank pressure reading should increase.

(7) Disconnect an evaporative emission system pressure pump and connect hose F.
(8) Turn the ignition switch to the "LOCK" (OFF) position and disconnect scan tool MB991958.

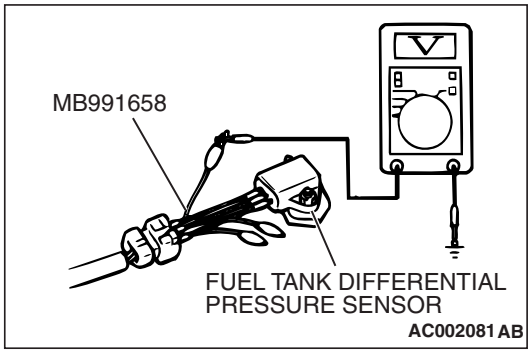
Q: Is the fuel tank pressure between −1.5 and 1.5 kPa (−0.443 and 0.443 inHg)?

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 Malfunctions P.00-13). Go to Step 15.
NO : Go to Step 2.

STEP 2. Measure the signal voltage at fuel tank differential pressure sensor connector G-05.



(1) Tumble the second seat.
(2) Remove the service hole cover (upper) and packing.
(3) Remove the service hole cover (lower) and packing.
(4) Disconnect fuel tank differential pressure sensor connector G-05.

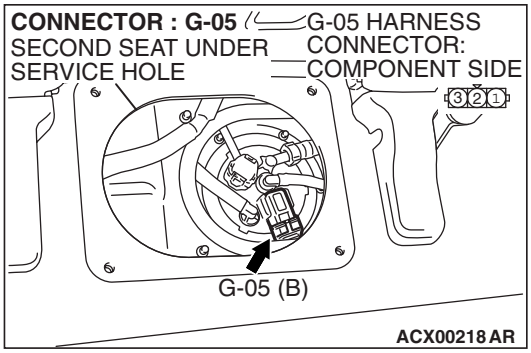


(5) Connect special tool MB991658 between fuel tank differential pressure sensor connector G-05 terminals 1, 2 and 3.
(6) Turn the ignition switch to the "ON" position.
(7) Remove the fuel cap.
(8) Measure the voltage between fuel tank differential pressure sensor connector G-05 terminal 1 and ground.
- The voltage should measure between 2.0 and 3.0 volts.

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

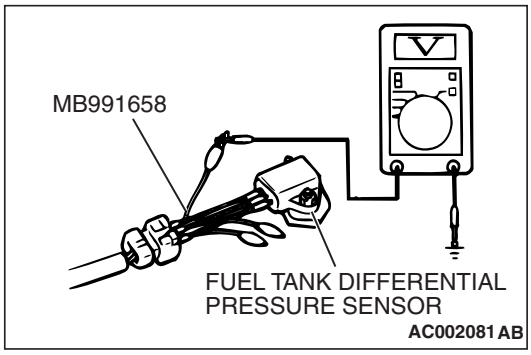
Q: Is the measured voltage between 2.0 and 3.0 volts?

YES : Go to Step 10.
NO : Go to Step 3.



STEP 3. Measure the 5-volt reference signal at fuel tank differential pressure sensor connector G-05.

(1) Disconnect fuel tank differential pressure sensor connector G-05.



(2) Connect special tool MB991658 between fuel tank differential pressure sensor connector G-05 terminals 1, 2 and 3.
(3) Turn the ignition switch to the "ON" position.
(4) Measure the voltage between fuel tank differential pressure sensor connector G-05 terminal 3 and ground.
- The voltage should measure between 4.9 and 5.1 volts.

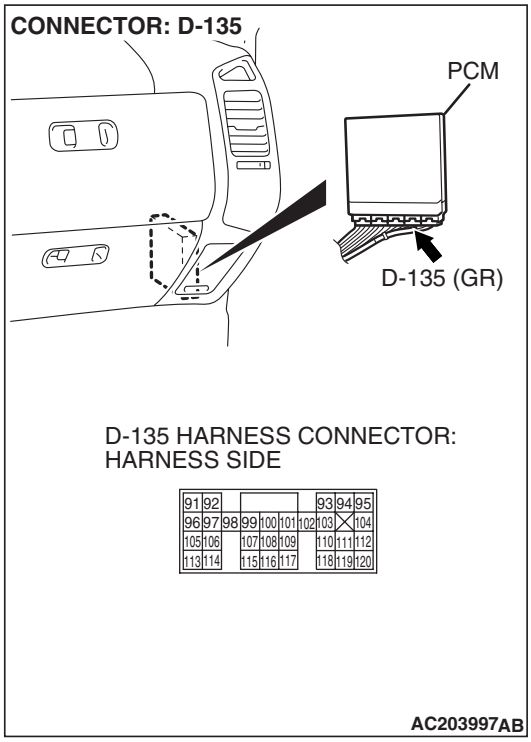
(5) Turn the ignition switch to the "LOCK" (OFF) position.

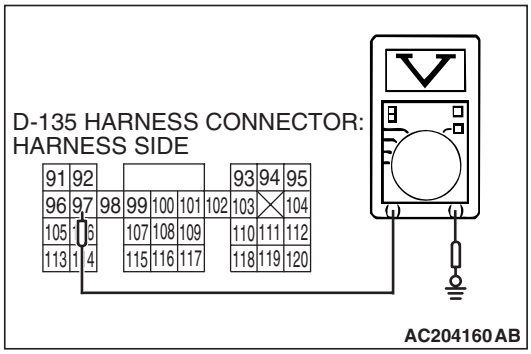
Q: Is the measured voltage between 4.9 and 5.1 volts?

YES : Go to Step 8.
NO : Go to Step 4.

STEP 4. Measure the 5-volt reference signal at PCM connector D-135 by backprobing.

(1) Do not disconnect PCM connector D-135.
(2) Turn the ignition switch to the "ON" position.



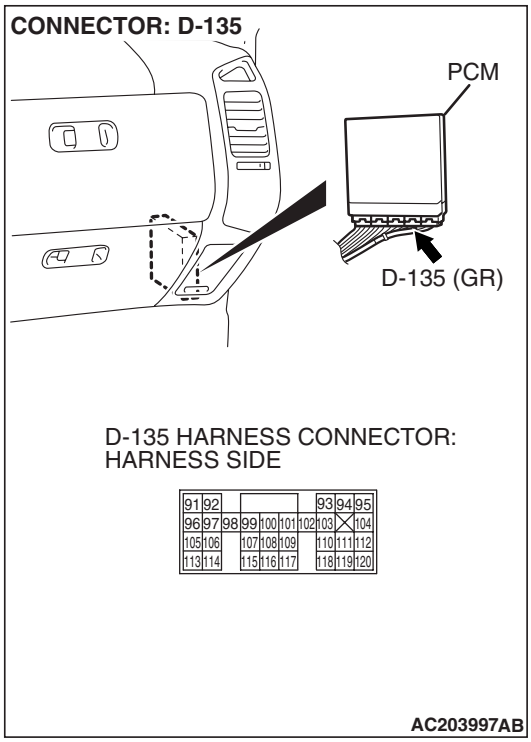


(3) Measure the voltage between PCM connector D-135 terminal 97 and ground by backprobing.
- The voltage should measure between 4.9 and 5.1 volts.

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

Q: Is the measured voltage between 4.9 and 5.1 volts?

YES : Go to Step 6.
NO : Go to Step 5.



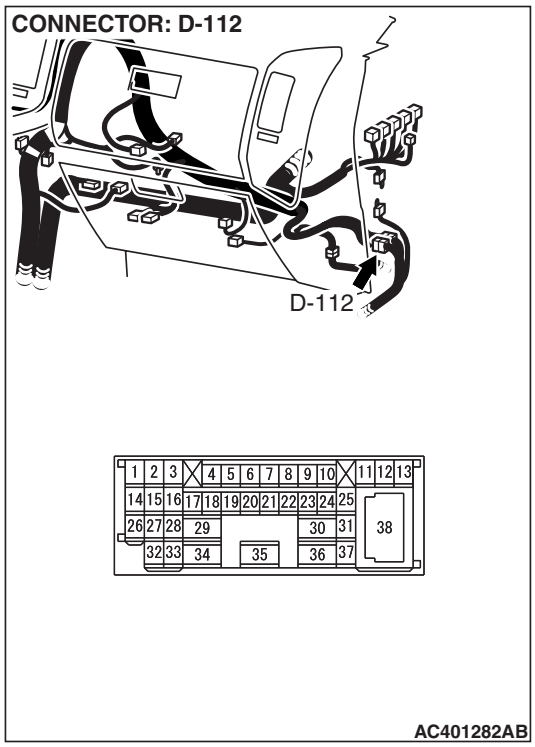
STEP 5. Check PCM connector D-135 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

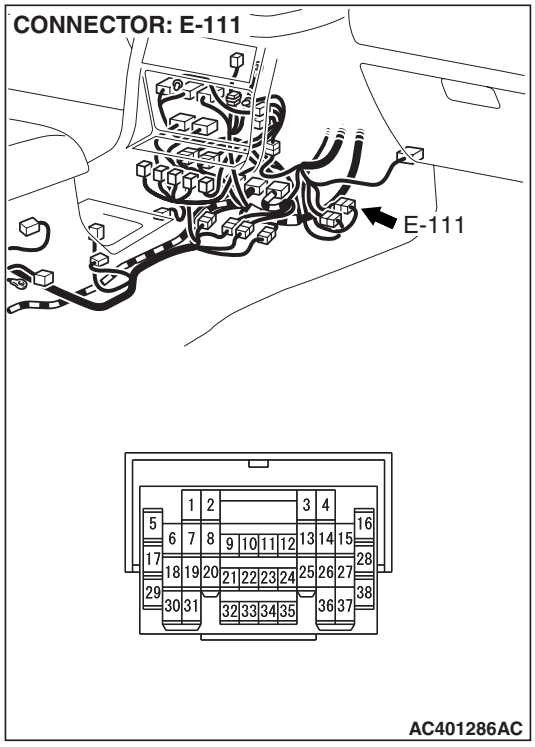
Q: Are the connector and terminals in good condition?

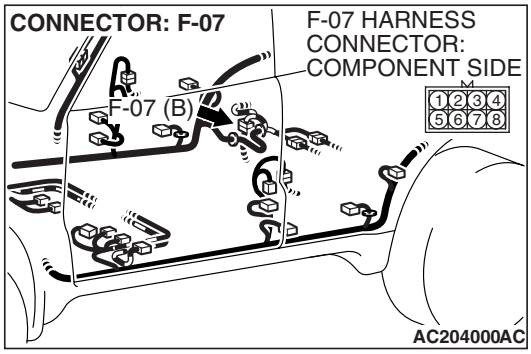
YES : Go to Step 14.

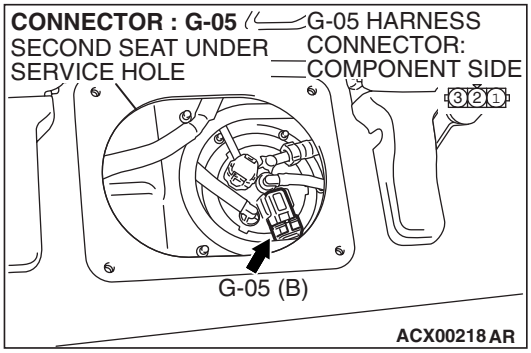
NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.

STEP 6. Check intermediate connectors D-112, E-111 and F-07, and fuel tank differential pressure sensor connector G-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.





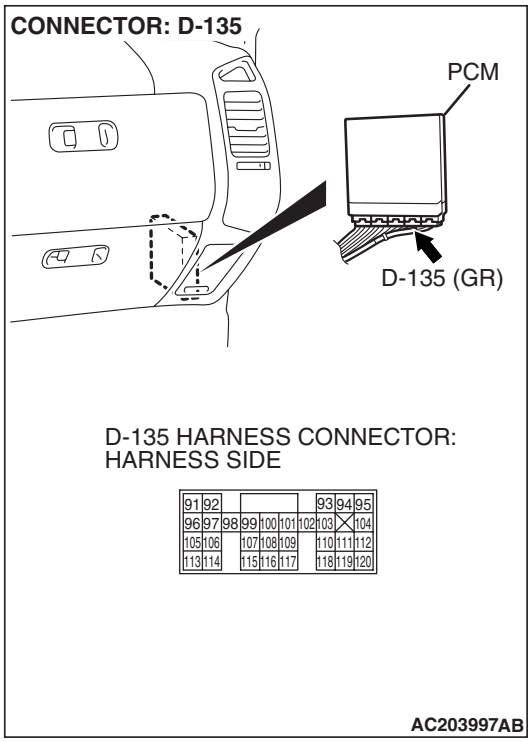


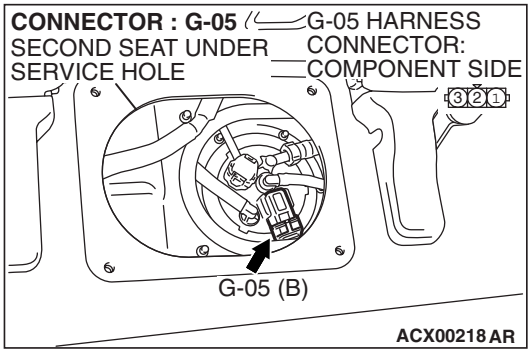


Q: Are the connectors and terminals in good condition?

YES : Go to Step 7.

NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.



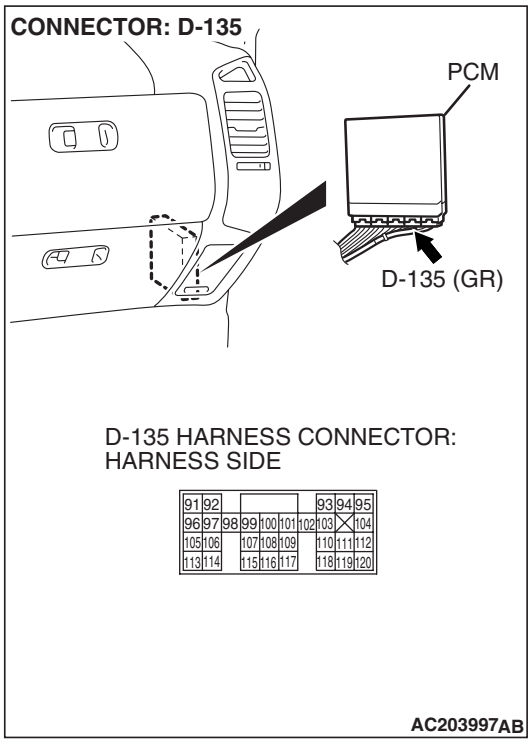


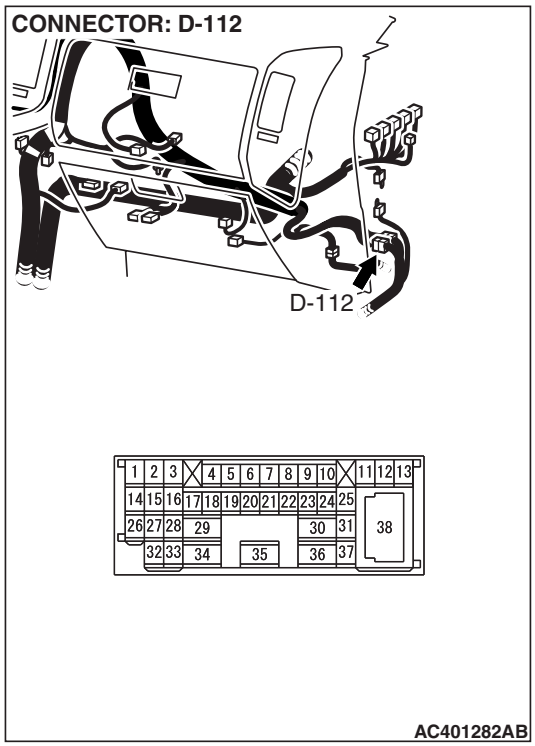
STEP 7. Check the harness wires between PCM connector D-135 terminal 97 and fuel tank differential pressure sensor connector G-05 terminal 3 for damage.
Q: Are the harness wires in good condition?

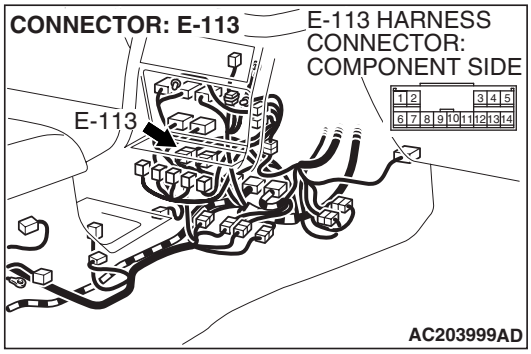
YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-13). Go to Step 15.

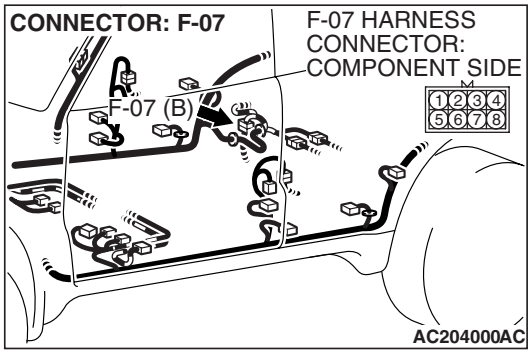
NO : Repair the damaged harness wires. Go to Step 15.

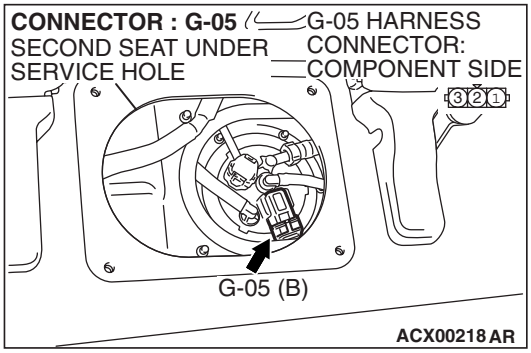
STEP 8. Check PCM connector D-135, intermediate connectors D-112, E-113 and F-07, and fuel tank differential pressure sensor connector G-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.







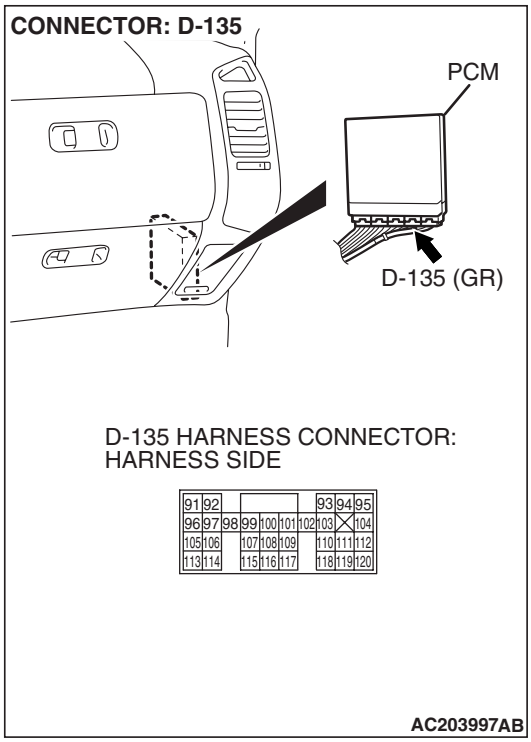


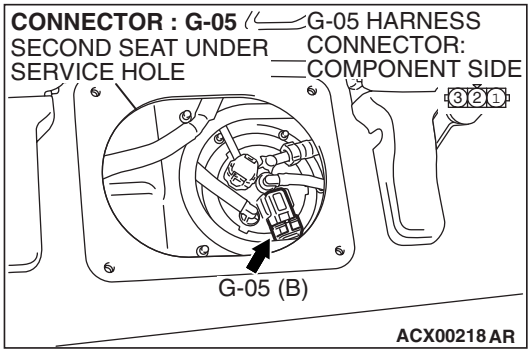


Q: Are the connectors and terminals in good condition?

YES : Go to Step 9.

NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.





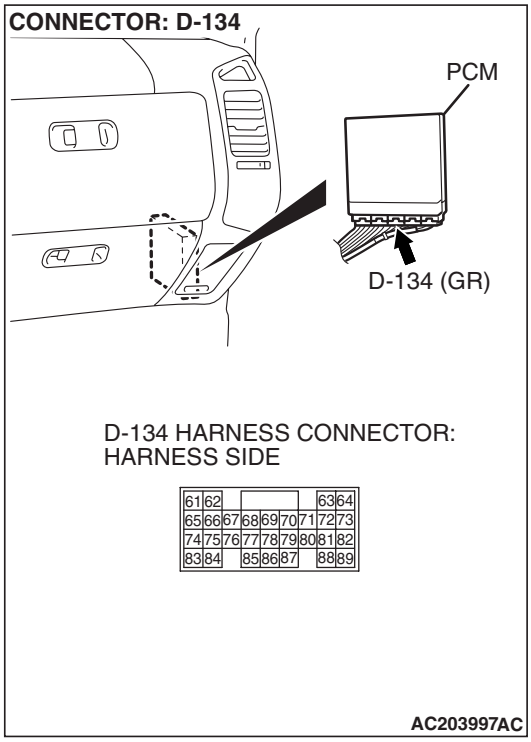
STEP 9. Check the harness wires between PCM connector D-135 terminal 96 and fuel tank differential pressure sensor connector G-05 terminal 2 for damage.
Q: Are the harness wires in good condition?

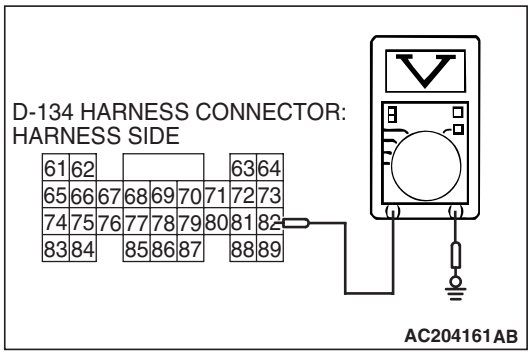
YES : Replace the fuel tank differential pressure sensor (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 14.

NO : Repair the damaged harness wires. Go to Step 15.

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

(1) Do not disconnect PCM connector D-134.
(2) Turn the ignition switch to the "ON" position.
(3) Remove the fuel cap.



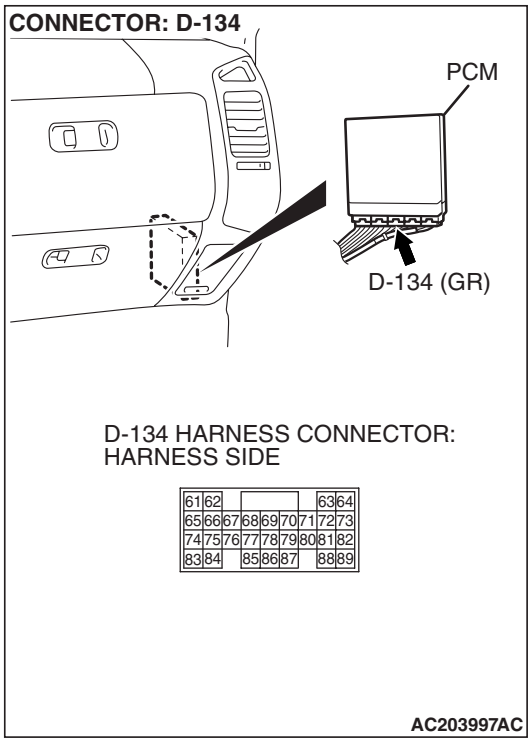


(4) Measure the voltage between PCM connector D-134 terminal 82 and ground by backprobing.
- The voltage should measure between 2.0 and 3.0 volts.

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

Q: Is the measured voltage between 2.0 and 3.0 volts?

YES : Go to Step 14.
NO : Go to Step 11.



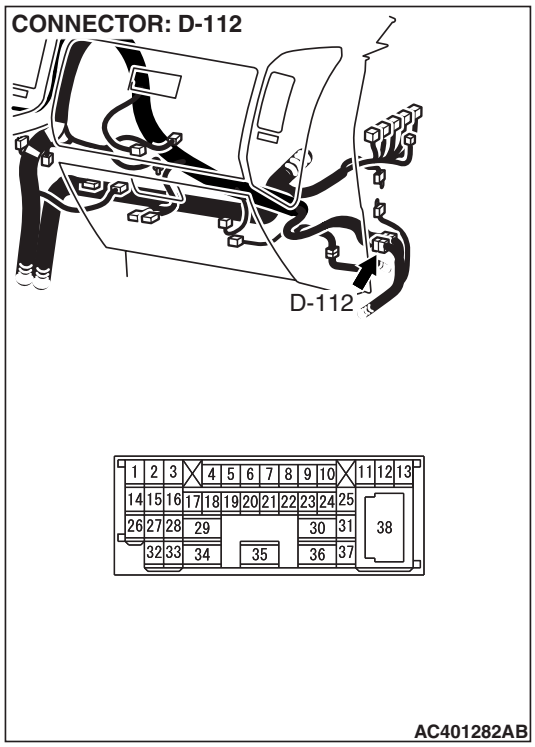
STEP 11. Check PCM connector D-134 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

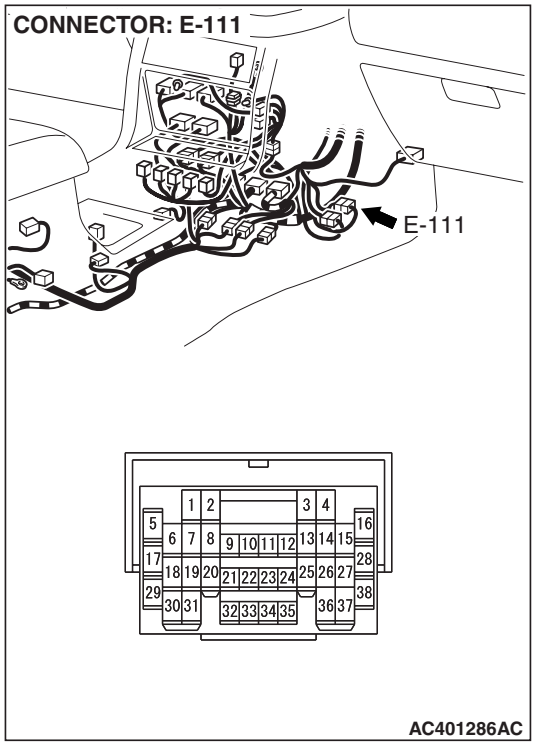
Q: Are the connector and terminals in good condition?

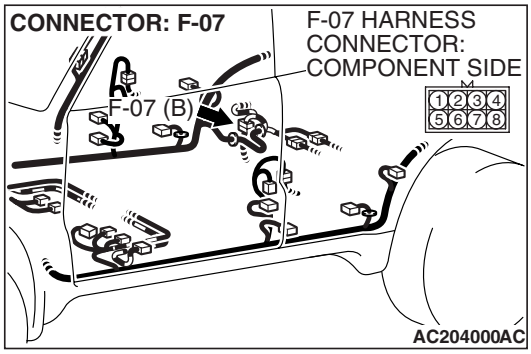
YES : Go to Step 12.

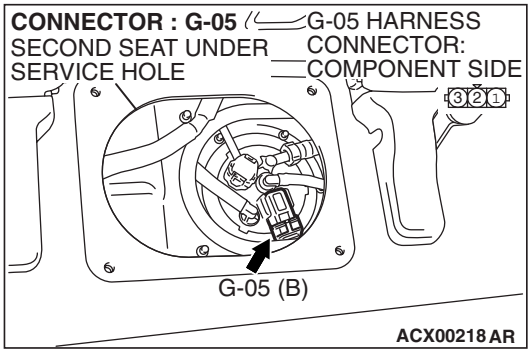
NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.

STEP 12. Check intermediate connectors D-112, E-111 and F-07, and fuel tank differential pressure sensor connector G-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.





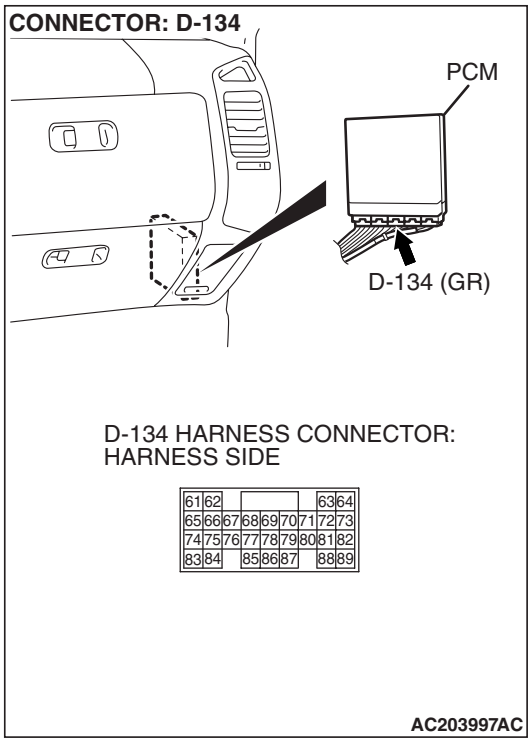


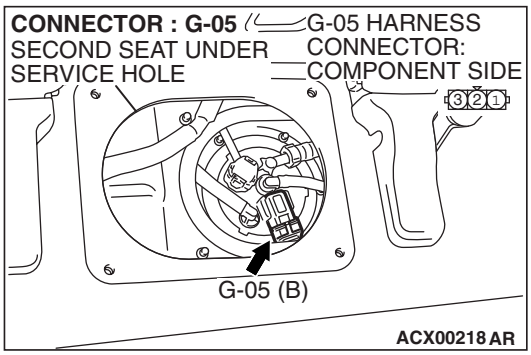


Q: Are the connectors and terminals in good condition?

YES : Go to Step 13.

NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.





STEP 13. Check the harness wires between PCM connector D-134 terminal 82 and fuel tank differential pressure sensor connector G-05 terminal 1 for damage.
Q: Are the harness wires in good condition?

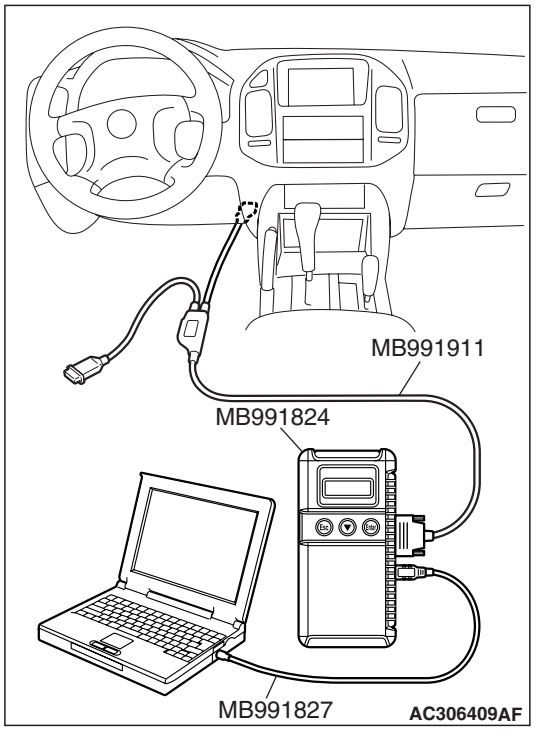
YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-13). Go to Step 15.

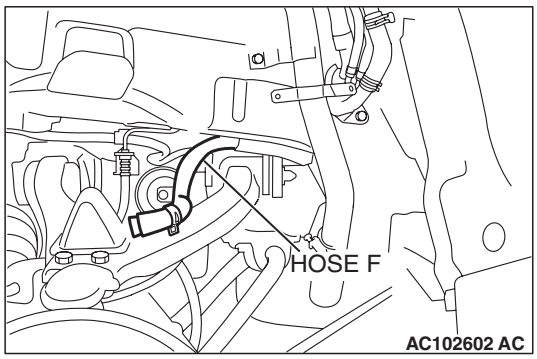
NO : Repair the damaged harness wires. Go to Step 15.

STEP 14. Using scan tool MB991958, check data list item 73: Fuel Tank Differential Pressure Sensor.

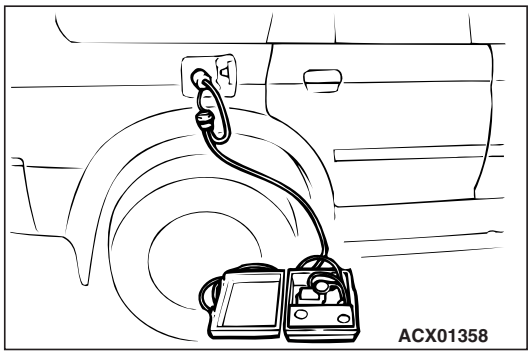
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.





(2) Disconnect hose F from the evaporative emission canister side, and plug the hose.
(3) Turn the ignition switch to the "ON" position.
(4) Remove the fuel cap.
(5) Set scan tool MB991958 to the data reading mode.
Item 73, Fuel Tank Differential Pressure Sensor.
- The fuel tank pressures reading on the scan tool should be −1.5 to 1.5 kPa (−0.443 to 0.443 inHg).



(6) Connect an evaporative emission system pressure pump to the fuel tank filler tube and pressurize the fuel tank.
- The fuel tank pressure reading should increase.

(7) Disconnect an evaporative emission system pressure pump and connect hose F.
(8) Turn the ignition switch to the "LOCK" (OFF) position and disconnect scan tool MB991958.

Q: Is the fuel tank pressure between −1.5 and 1.5 kPa (−0.443 and 0.443 inHg)?

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 Malfunctions P.00-13). Go to Step 15.

NO : Replace the PCM (Refer to P.13A-1066). Go to Step 15.

TSB Revision

STEP 15. Perform the OBD-II drive cycle.

(1) Carry out a test drive with the drive cycle pattern (Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 5 P.13A-4).

(2) Read the diagnostic trouble code (DTC).

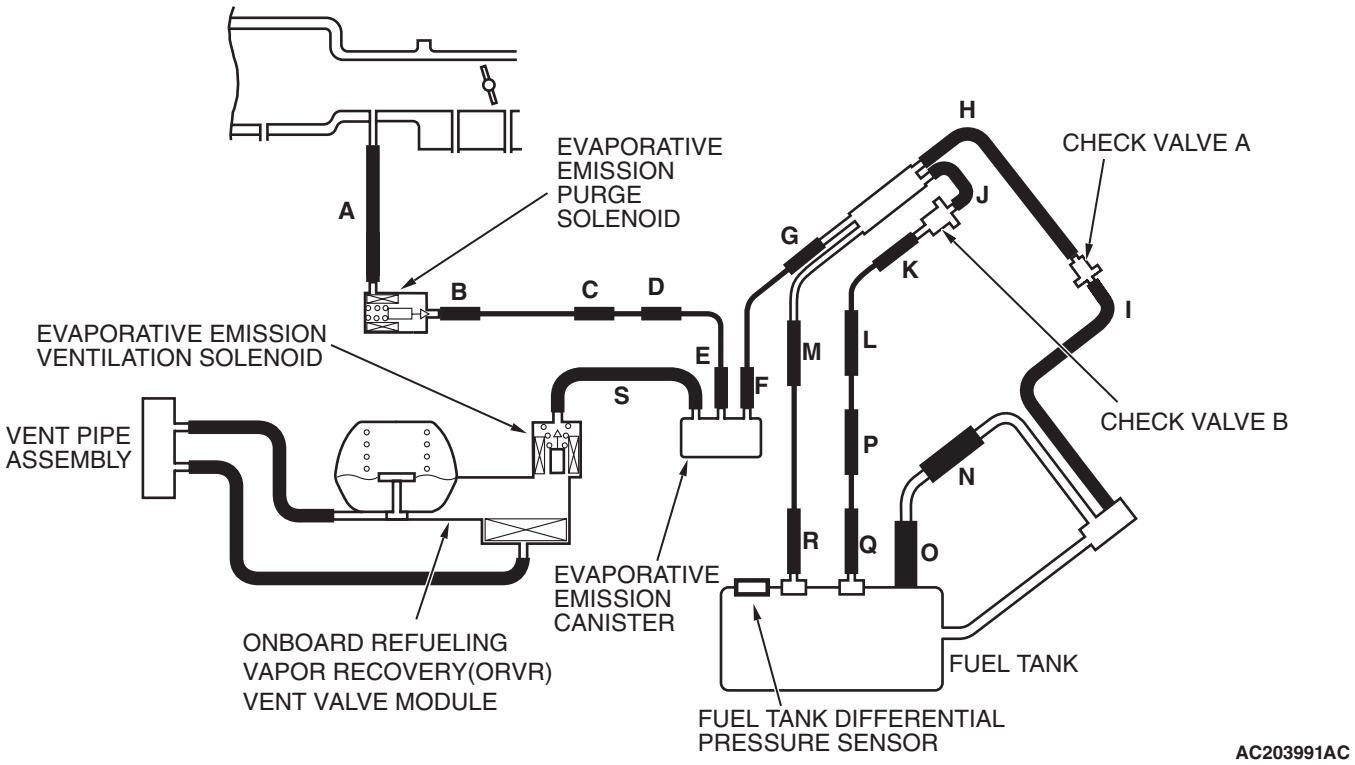
Q: Is DTC P0450 set?

YES : Repeat the troubleshooting from Step 2.

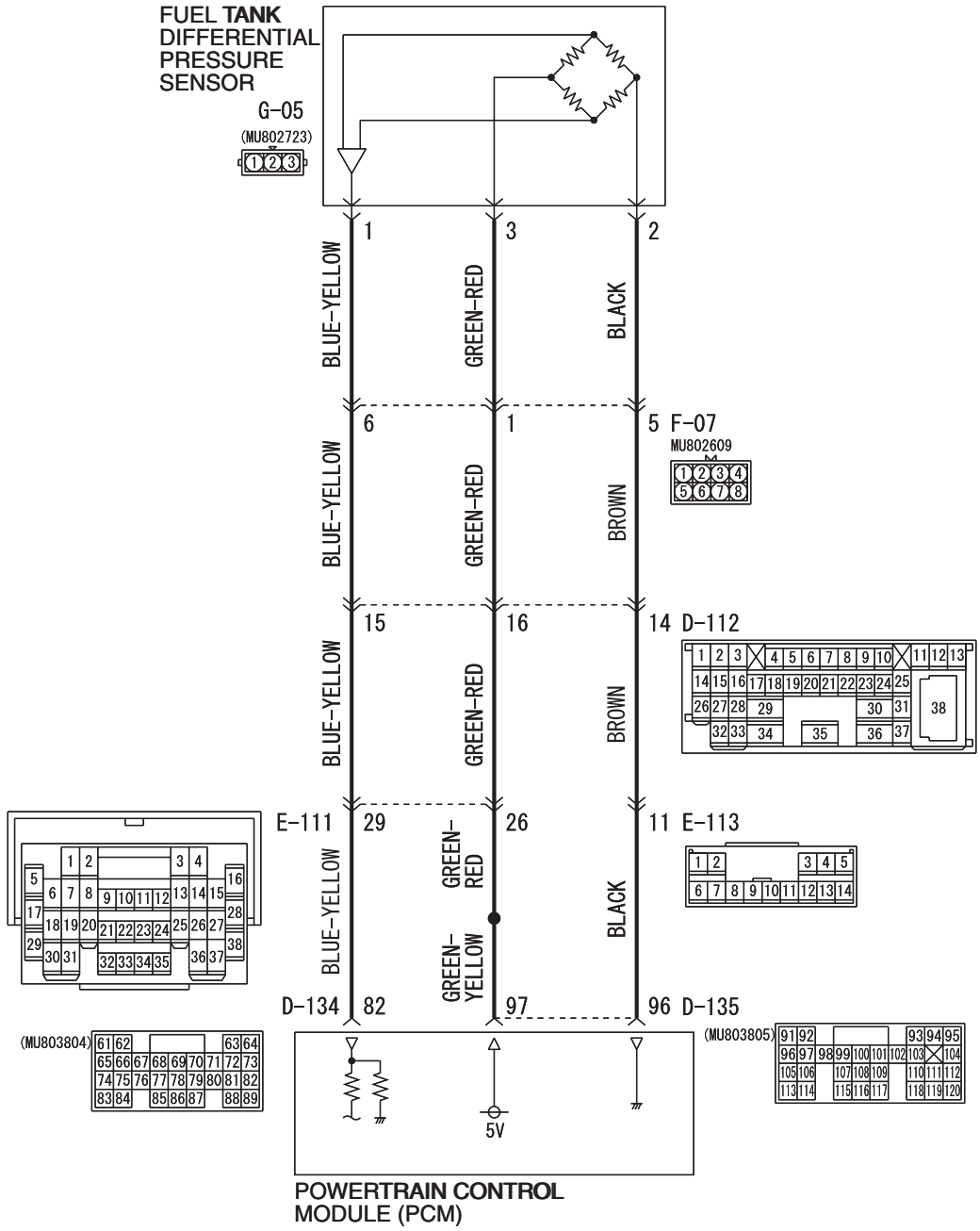
NO : The procedure is complete.

DTC P0451: Evaporative Emission System Pressure Sensor Range/Performance

SYSTEM DIAGRAM



Fuel Tank Differential Pressure Sensor Circuit



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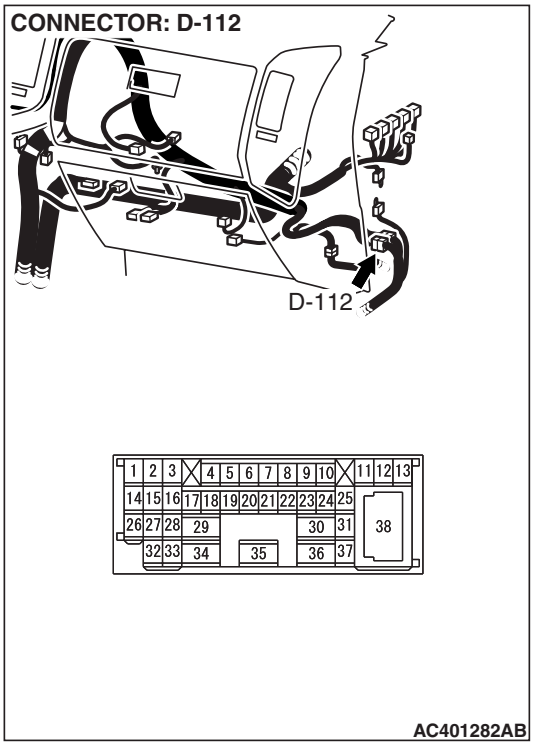
TSB Revision

CONNECTOR: D-112



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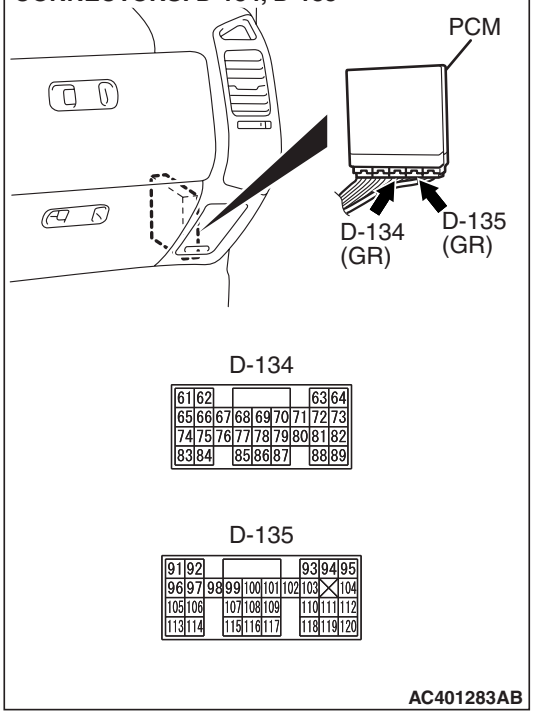
CONNECTORS: D-134, D-135



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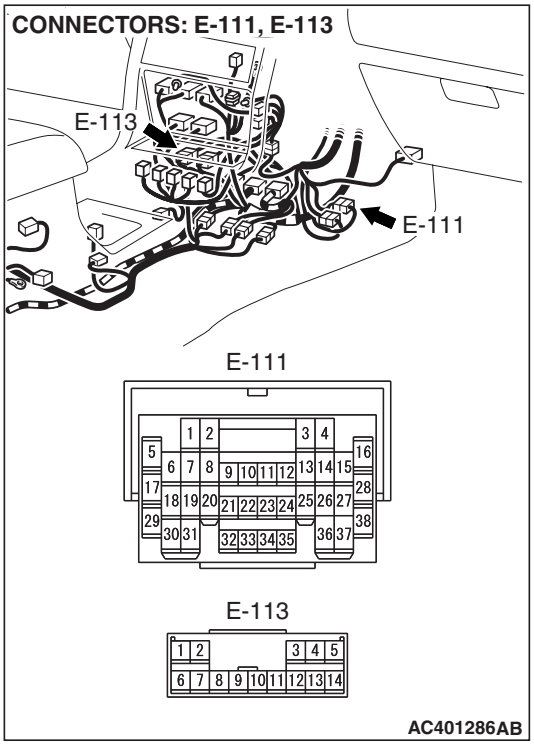
CONNECTORS: E-111, E-113



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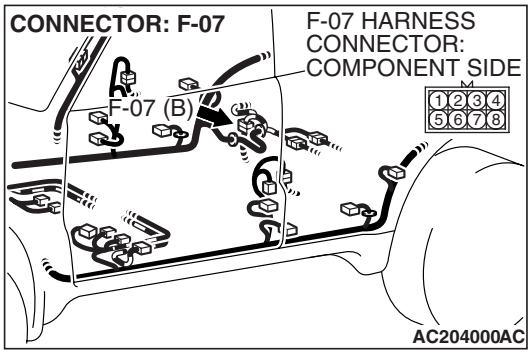
CONNECTOR: F-07



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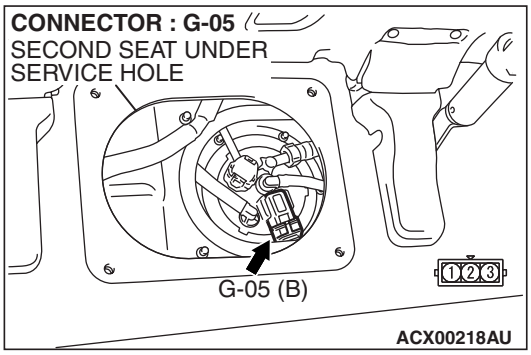
TSB Revision



CIRCUIT OPERATION

- The PCM (terminal 97) supplies a 5-volt reference signal to the fuel tank differential pressure sensor (terminal 3). The fuel tank differential pressure sensor (terminal 2) is grounded through the PCM (terminal 96).
- The fuel tank differential pressure sensor (terminal 1) returns a voltage signal to the PCM (terminal 82) that is proportional to the pressure in the fuel tank.

TECHNICAL DESCRIPTION

- The PCM monitors the fuel tank differential pressure sensor output voltage.
- The PCM determines whether the fuel tank differential pressure sensor signal voltage is within normal operating parameters.

DESCRIPTIONS OF MONITOR METHODS

- Detect malfunction if change of fuel tank differential pressure sensor output voltage during idling stays large during specified go/stop operations.

MONITOR EXECUTION

- Continuous.

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

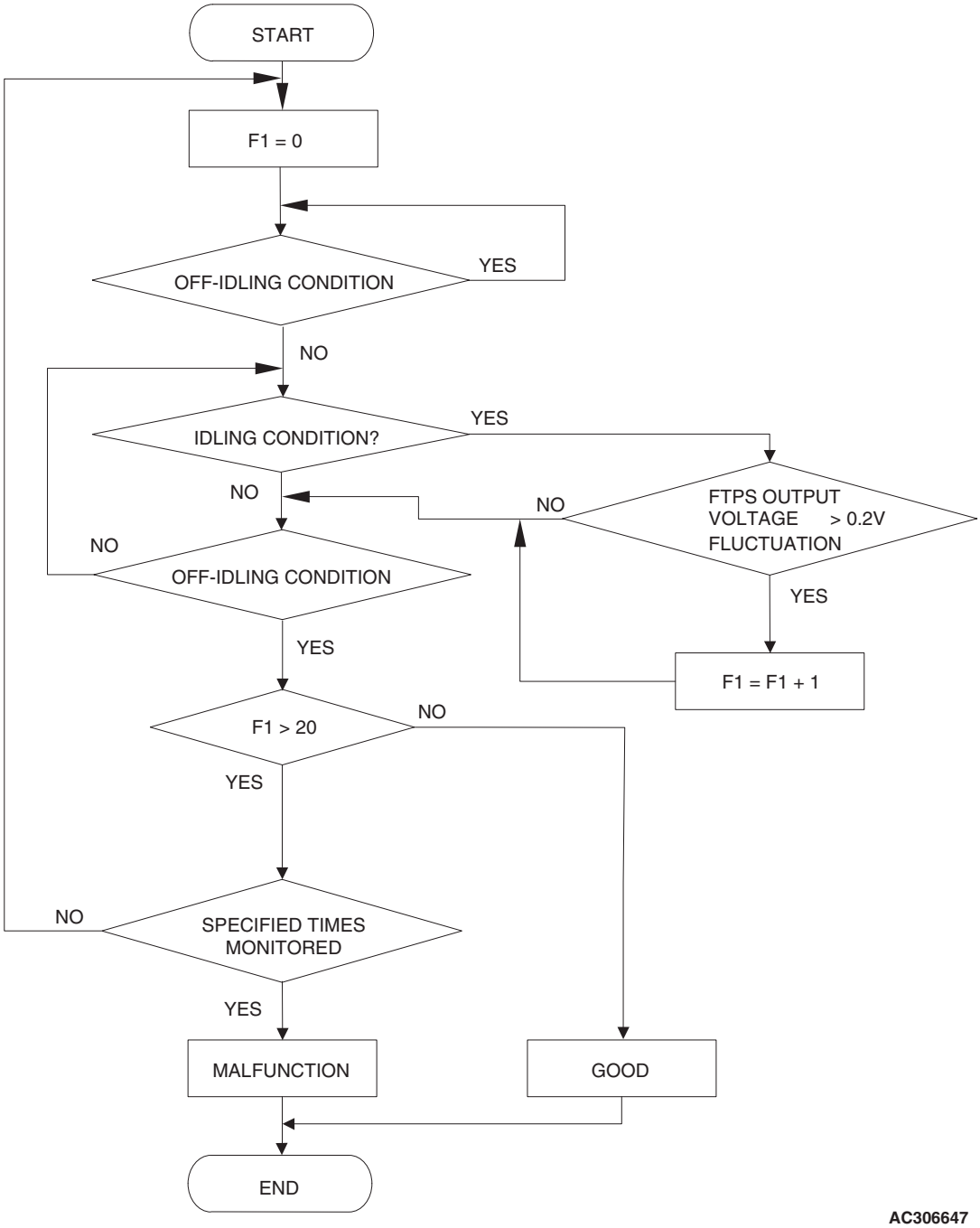
- Evaporative emission purge solenoid monitor
- Evaporative emission ventilation solenoid monitor
- Fuel level sensor monitor
- Fuel temperature sensor monitor

Sensor (The sensors below are determined to be normal)

- Volume airflow sensor
- Barometric pressure sensor
- Intake air temperature sensor
- Engine coolant temperature sensor
- Accelerator pedal position sensor

LOGIC FLOW CHARTS (Monitor Sequence)

RATIONALITY - NOISE



DTC SET CONDITIONS

Check Conditions

- Throttle valve is closed.
- Vehicle speed is 1.5 km/h (0.93 mph) or less.

TSB Revision

Judgment Criteria

- If the voltage signal from the fuel tank differential pressure sensor changes by 0.2 volt or more, DTC P0451 will set. The code may also set if a sudden pressure fluctuation occurs twenty times while the engine is idling, and then four consecutive times during normal driving.

  NOTE: If the number of sudden pressure fluctuations does not reach twenty during any one period of engine idling, or if the ignition switch is turned OFF, the counter will reset to zero.

  NOTE: The conditions for deviating from idling operation are as follows:

  - *Vehicle speed is 50 km/h (31 mph) or greater.*

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 15 P.13A-4.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)

- Malfunction of the fuel tank differential pressure sensor.
- A damaged harness in the fuel tank differential pressure sensor circuit.
- Malfunction of the PCM.

OVERVIEW OF TROUBLESHOOTING

- DTC P0451 can be set by a faulty fuel tank differential pressure sensor or related circuit, or PCM failure.
- To check for system blockage, do a performance test which uses a mechanical vacuum gauge and scan tool MB991958 set on the fuel tank differential pressure sensor (TANK PRS SNSR 73). The mechanical gauge reading is used to verify scan tool MB991958 reading. A comparison of the mechanical gauge with the reading on scan tool MB991958 will locate a problem in the system.

DIAGNOSIS

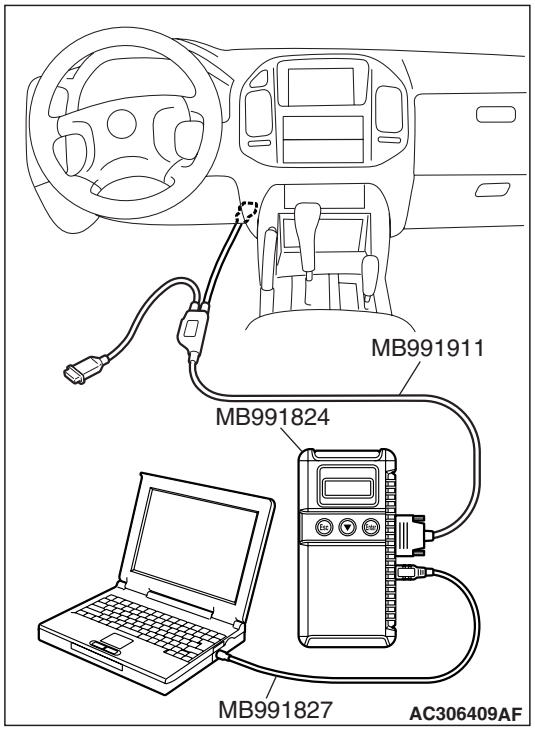
Required Special Tools:

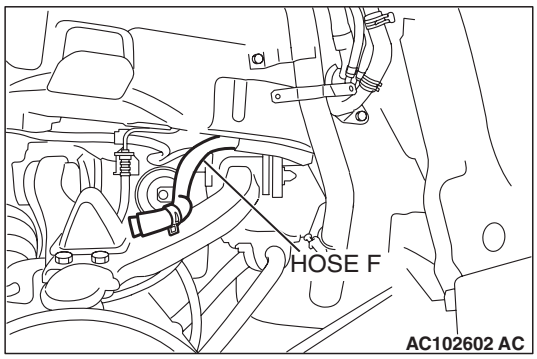
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness B
- MB991658: Test Harness Set
- MB992006: Extra Fine Probe

STEP 1. Using scan tool MB991958, check data list item 73: Fuel Tank Differential Pressure Sensor.

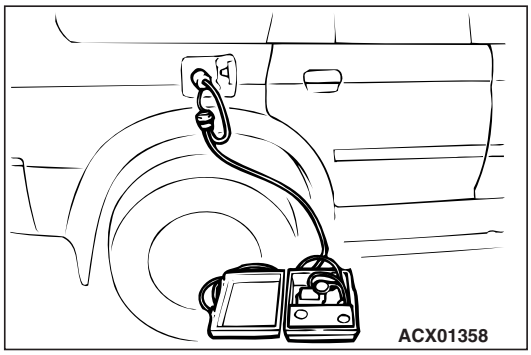
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.





(2) Disconnect hose F from the evaporative emission canister side, and plug the hose.
(3) Turn the ignition switch to the "ON" position.
(4) Remove the fuel cap.
(5) Set scan tool MB991958 to the data reading mode.
Item 73, Fuel Tank Differential Pressure Sensor.
- The fuel tank pressures reading on the scan tool should be −1.5 to 1.5 kPa (−0.443 to 0.443 inHg).



(6) Connect an evaporative emission system pressure pump to the fuel tank filler tube and pressurize the fuel tank.
- The fuel tank pressure reading should increase.

(7) Disconnect an evaporative emission system pressure pump and connect hose F.
(8) Turn the ignition switch to the "LOCK" (OFF) position and disconnect scan tool MB991958.

Q: Is the fuel tank pressure between −1.5 and 1.5 kPa (−0.443 and 0.443 inHg)?

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 Malfunctions P.00-13). Go to Step 15.

NO : Go to Step 2.

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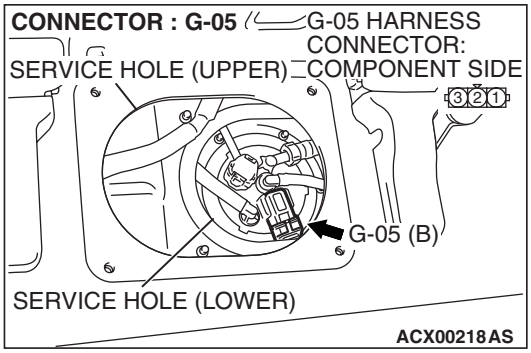
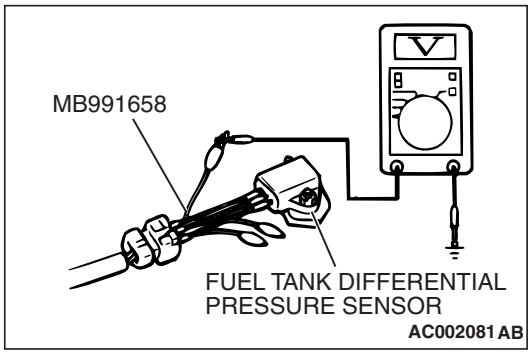
STEP 2. Measure the signal voltage at fuel tank differential pressure sensor connector G-05.



(1) Tumble the second seat.
(2) Remove the service hole cover (upper) and packing.
(3) Remove the service hole cover (lower) and packing.
(4) Disconnect fuel tank differential pressure sensor connector G-05.



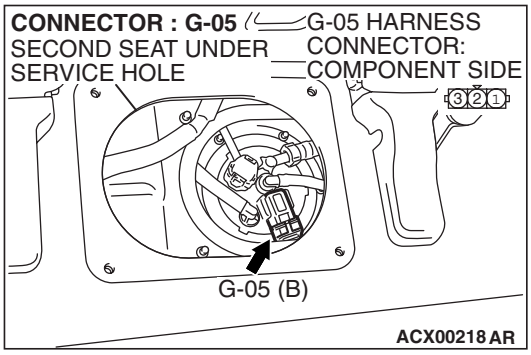
(5) Connect special tool MB991658 between fuel tank differential pressure sensor connector G-05 terminals 1, 2 and 3.
(6) Turn the ignition switch to the "ON" position.
(7) Remove the fuel cap.
(8) Measure the voltage between fuel tank differential pressure sensor connector G-05 terminal 1 and ground.
- The voltage should measure between 2.0 and 3.0 volts.

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

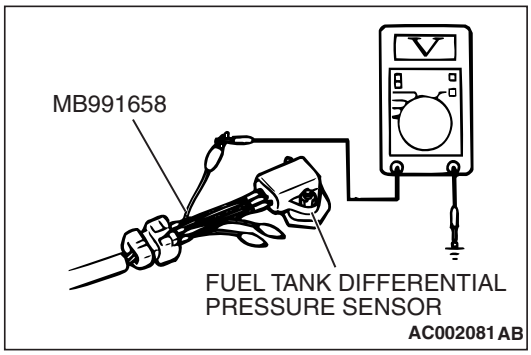
Q: Is the measured voltage between 2.0 and 3.0 volts?

YES : Go to Step 10.
NO : Go to Step 3.

STEP 3. Measure the 5-volt reference signal at fuel tank differential pressure sensor connector G-05.



(1) Disconnect fuel tank differential pressure sensor connector G-05.



(2) Connect special tool MB991658 between fuel tank differential pressure sensor connector G-05 terminals 1, 2 and 3.
(3) Turn the ignition switch to the "ON" position.
(4) Measure the voltage between fuel tank differential pressure sensor connector G-05 terminal 3 and ground.
- The voltage should measure between 4.9 and 5.1 volts.

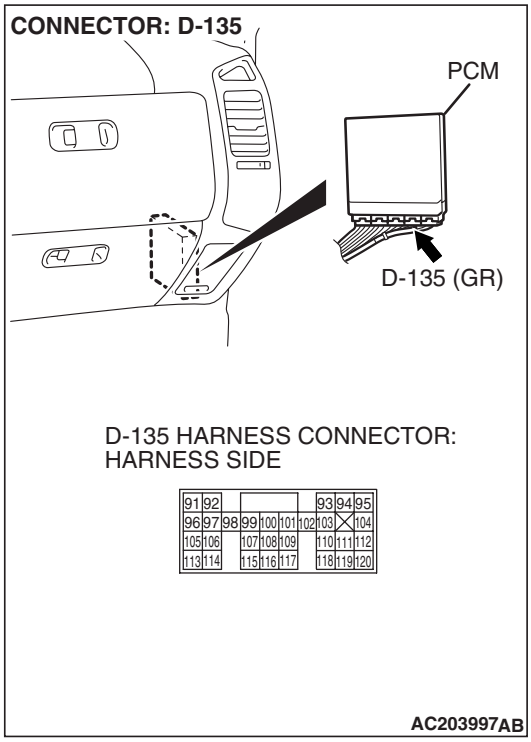
(5) Turn the ignition switch to the "LOCK" (OFF) position.

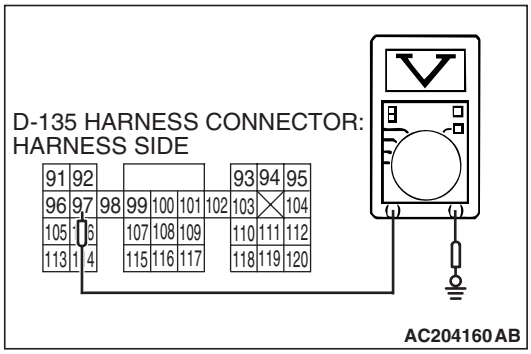
Q: Is the measured voltage between 4.9 and 5.1 volts?

YES : Go to Step 8.
NO : Go to Step 4.

STEP 4. Measure the 5-volt reference signal at PCM connector D-135 by backprobing.

(1) Do not disconnect PCM connector D-135.
(2) Turn the ignition switch to the "ON" position.



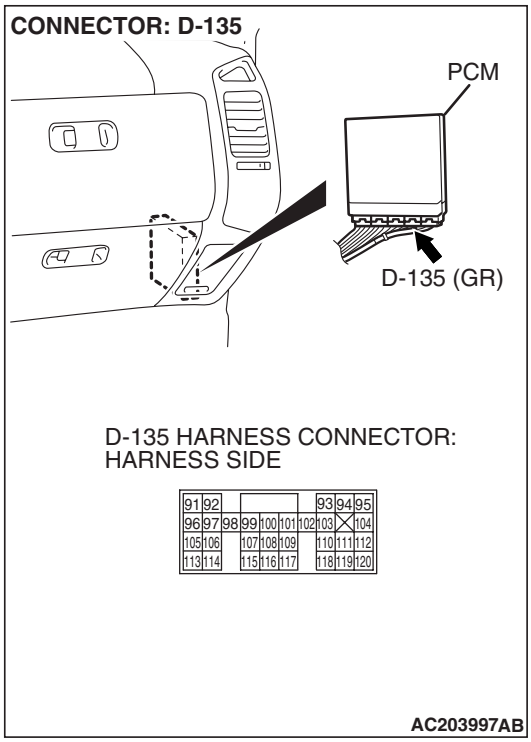


(3) Measure the voltage between PCM connector D-135 terminal 97 and ground by backprobing.
- The voltage should measure between 4.9 and 5.1 volts.

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

Q: Is the measured voltage between 4.9 and 5.1 volts?

YES : Go to Step 6.
NO : Go to Step 5.



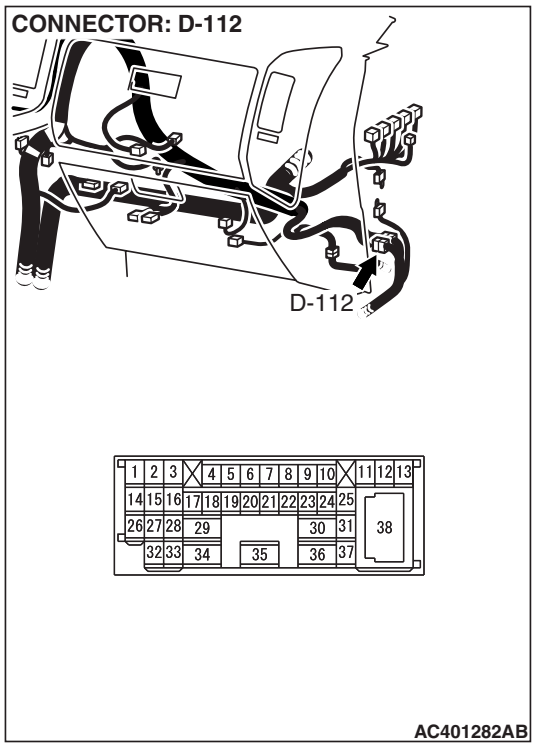
STEP 5. Check PCM connector D-135 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

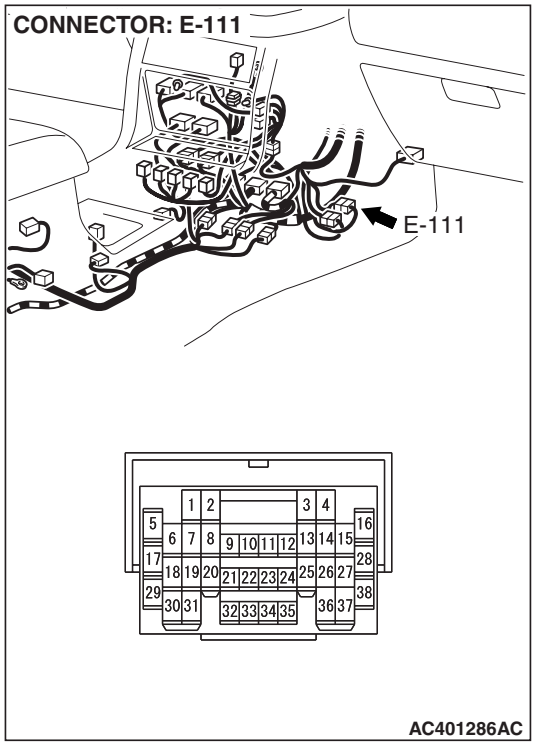
Q: Are the connector and terminals in good condition?

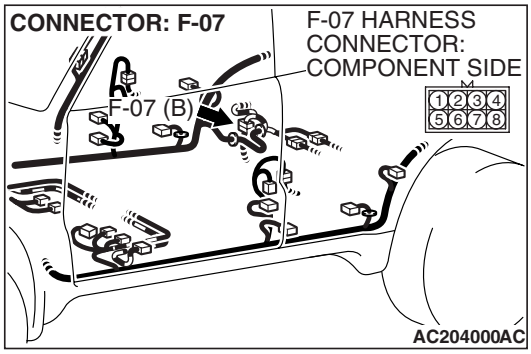
YES : Go to Step 14.

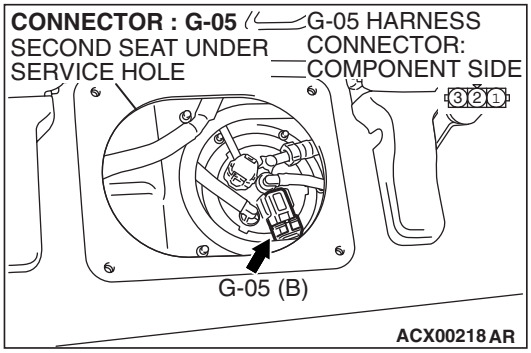
NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.

STEP 6. Check intermediate connectors D-112, E-111 and F-07, and fuel tank differential pressure sensor connector G-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.





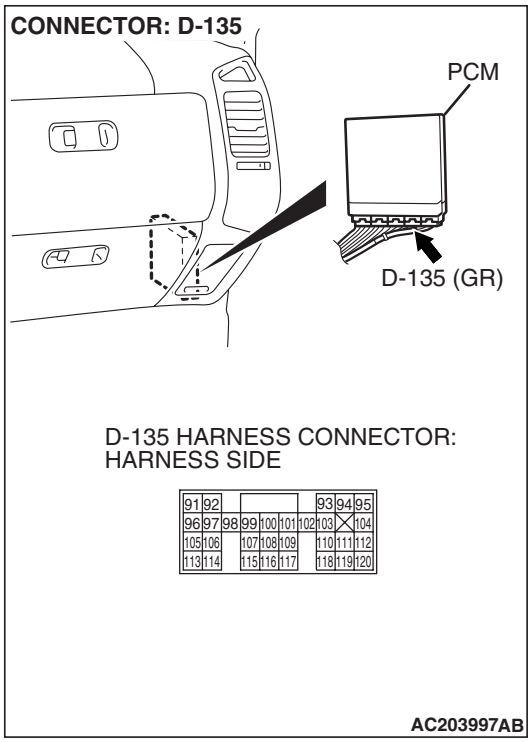


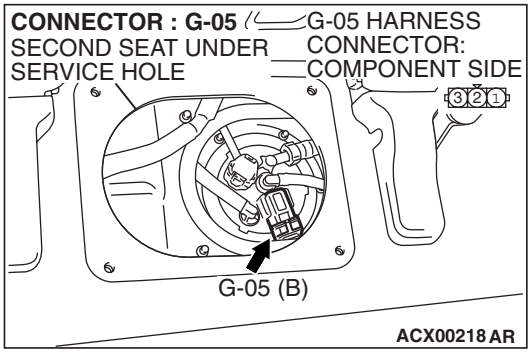


Q: Are the connectors and terminals in good condition?

YES : Go to Step 7.

NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.



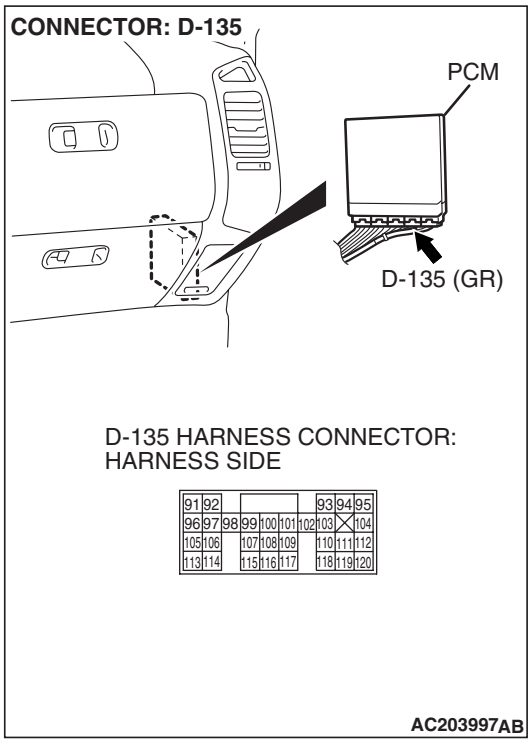


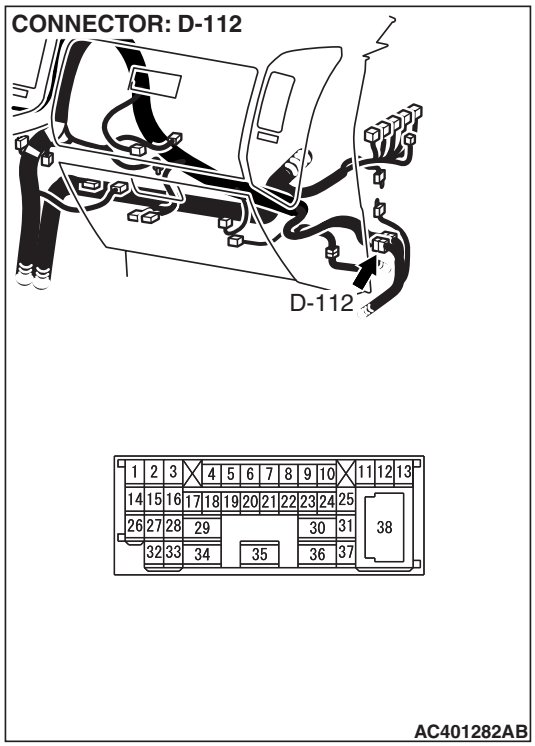
STEP 7. Check the harness wires between PCM connector D-135 terminal 97 and fuel tank differential pressure sensor connector G-05 terminal 3 for damage.
Q: Are the harness wires in good condition?

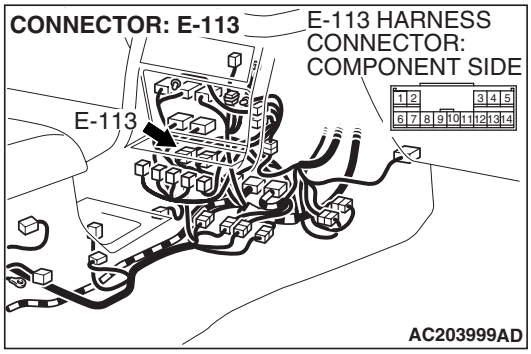
YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-13). Go to Step 15.

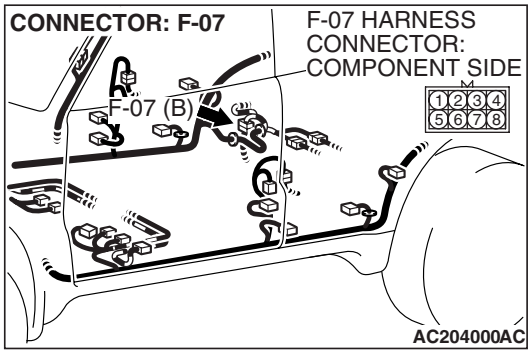
NO : Repair the damaged harness wires. Go to Step 15.

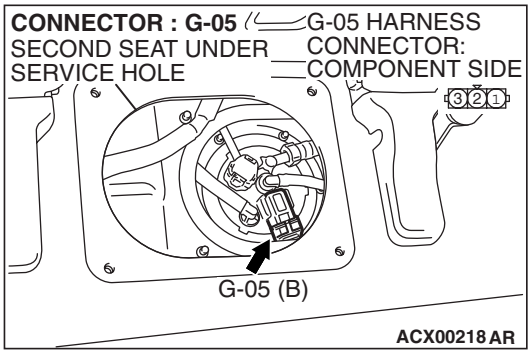
STEP 8. Check PCM connector D-135, intermediate connectors D-112, E-113 and F-07, and fuel tank differential pressure sensor connector G-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.







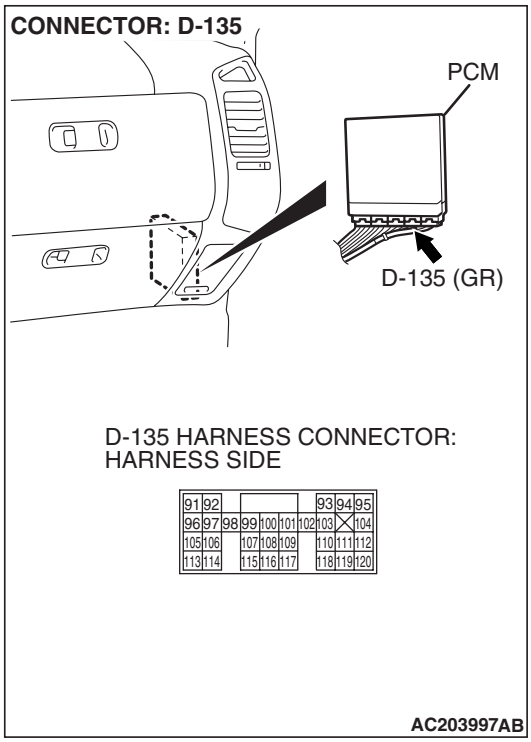


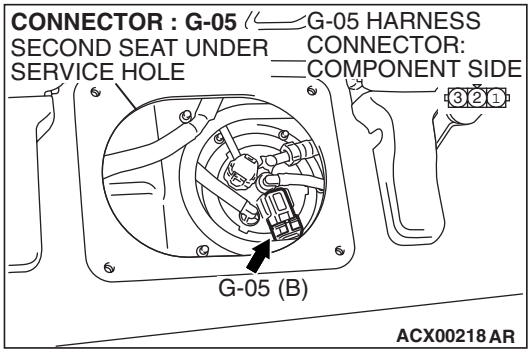


Q: Are the connectors and terminals in good condition?

YES : Go to Step 9.

NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.





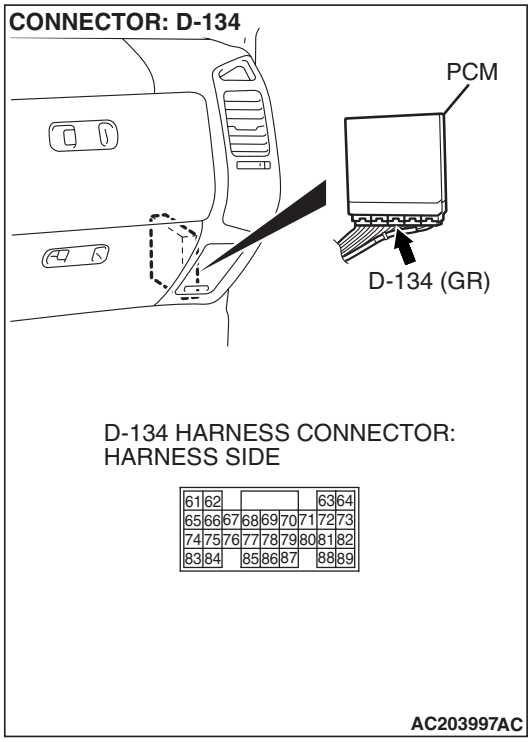
STEP 9. Check the harness wires between PCM connector D-135 terminal 96 and fuel tank differential pressure sensor connector G-05 terminal 2 for damage.
Q: Are the harness wires in good condition?

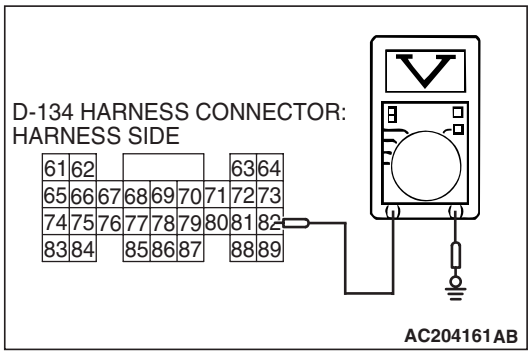
YES : Replace the fuel tank differential pressure sensor (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 14.

NO : Repair the damaged harness wires. Go to Step 15.

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

(1) Do not disconnect PCM connector D-134.
(2) Turn the ignition switch to the "ON" position.
(3) Remove the fuel cap.



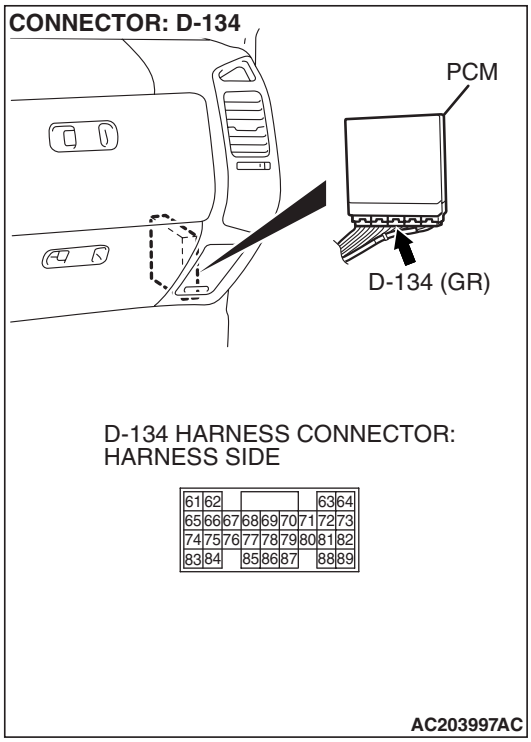


(4) Measure the voltage between PCM connector D-134 terminal 82 and ground by backprobing.
- The voltage should measure between 2.0 and 3.0 volts.

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

Q: Is the measured voltage between 2.0 and 3.0 volts?

YES : Go to Step 14.
NO : Go to Step 11.



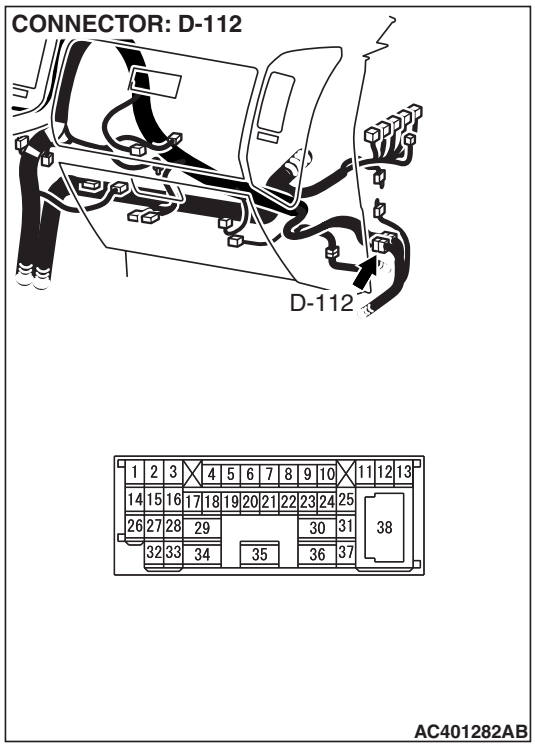
STEP 11. Check PCM connector D-134 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

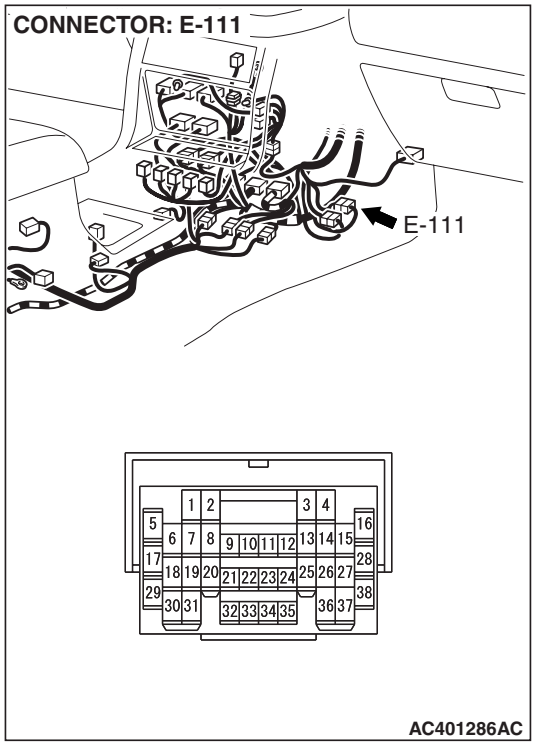
Q: Are the connector and terminals in good condition?

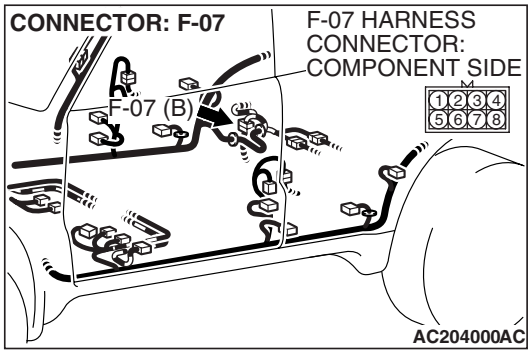
YES : Go to Step 12.

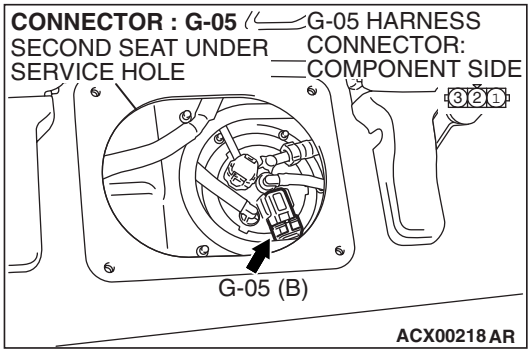
NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.

STEP 12. Check intermediate connectors D-112, E-111 and F-07, and fuel tank differential pressure sensor connector G-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.





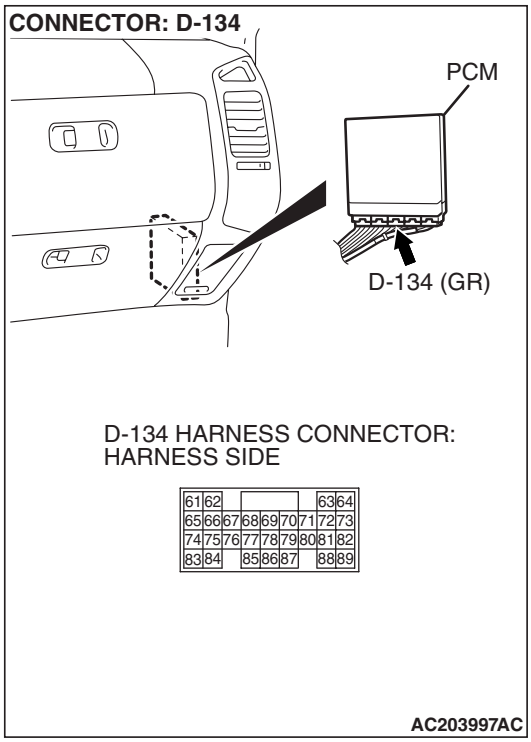


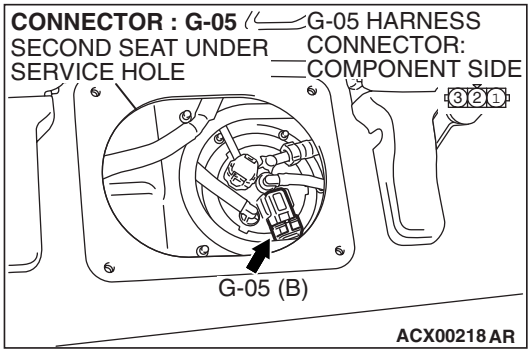


Q: Are the connectors and terminals in good condition?

YES : Go to Step 13.

NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.





STEP 13. Check the harness wires between PCM connector D-134 terminal 82 and fuel tank differential pressure sensor connector G-05 terminal 1 for damage.
Q: Are the harness wires in good condition?

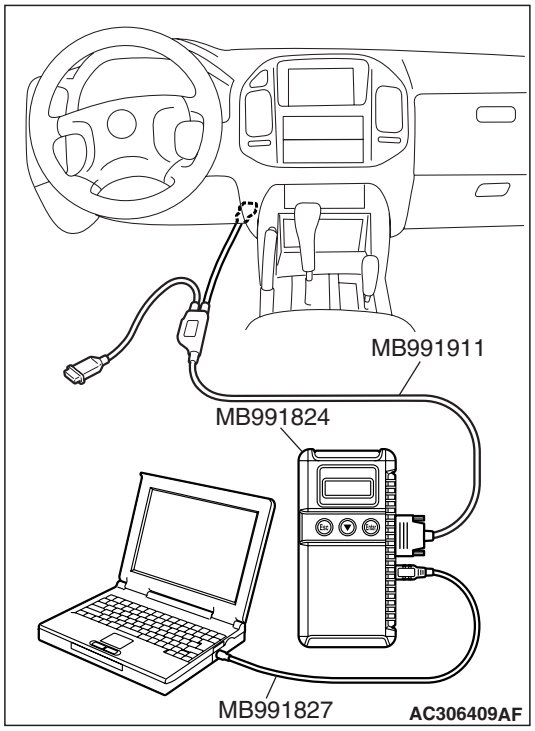
YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-13). Go to Step 15.

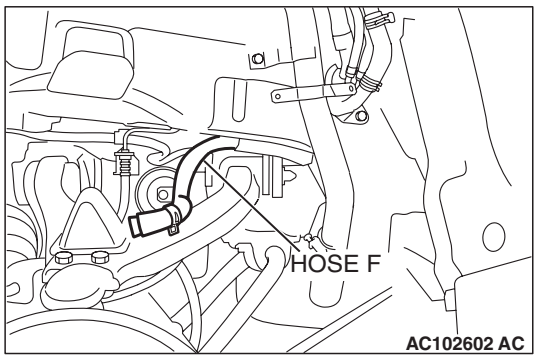
NO : Repair the damaged harness wires. Go to Step 15.

STEP 14. Using scan tool MB991958, check data list item 73: Fuel Tank Differential Pressure Sensor.

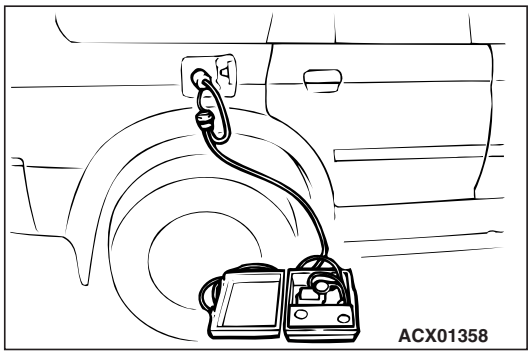
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.





(2) Disconnect hose F from the evaporative emission canister side, and plug the hose.
(3) Turn the ignition switch to the "ON" position.
(4) Remove the fuel cap.
(5) Set scan tool MB991958 to the data reading mode.
Item 73, Fuel Tank Differential Pressure Sensor.
- The fuel tank pressures reading on the scan tool should be −1.5 to 1.5 kPa (−0.443 to 0.443 inHg).



(6) Connect an evaporative emission system pressure pump to the fuel tank filler tube and pressurize the fuel tank.
- The fuel tank pressure reading should increase.

(7) Disconnect an evaporative emission system pressure pump and connect hose F.
(8) Turn the ignition switch to the "LOCK" (OFF) position and disconnect scan tool MB991958.

Q: Is the fuel tank pressure between −1.5 and 1.5 kPa (−0.443 and 0.443 inHg)?

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 Malfunctions P.00-13). Go to Step 15.

NO : Replace the PCM (Refer to P.13A-1066). Go to Step 15.

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STEP 15. Perform the OBD-II drive cycle.

(1) Carry out a test drive with the drive cycle pattern (Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 15 P.13A-4).

(2) Read the diagnostic trouble code (DTC).

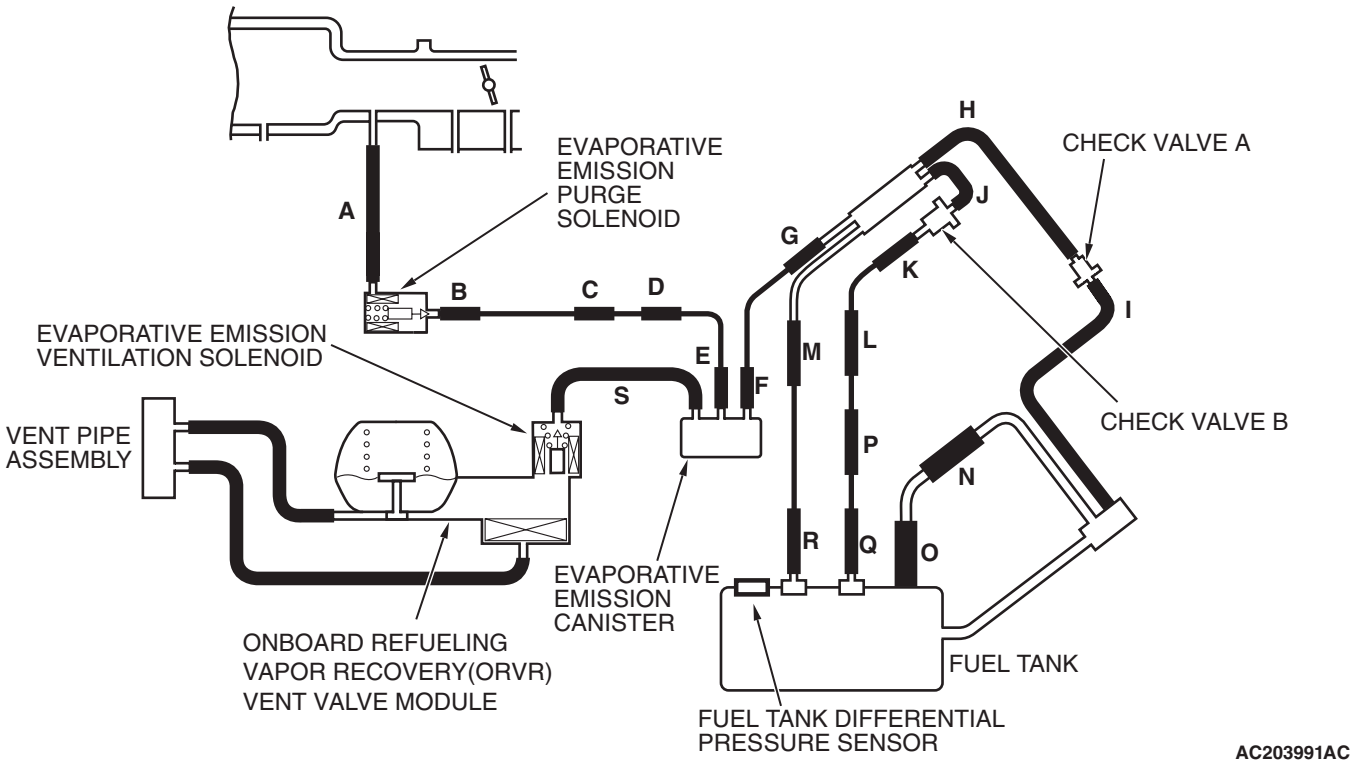
Q: Is DTC P0451 set?

YES : Repeat the troubleshooting from Step 2.

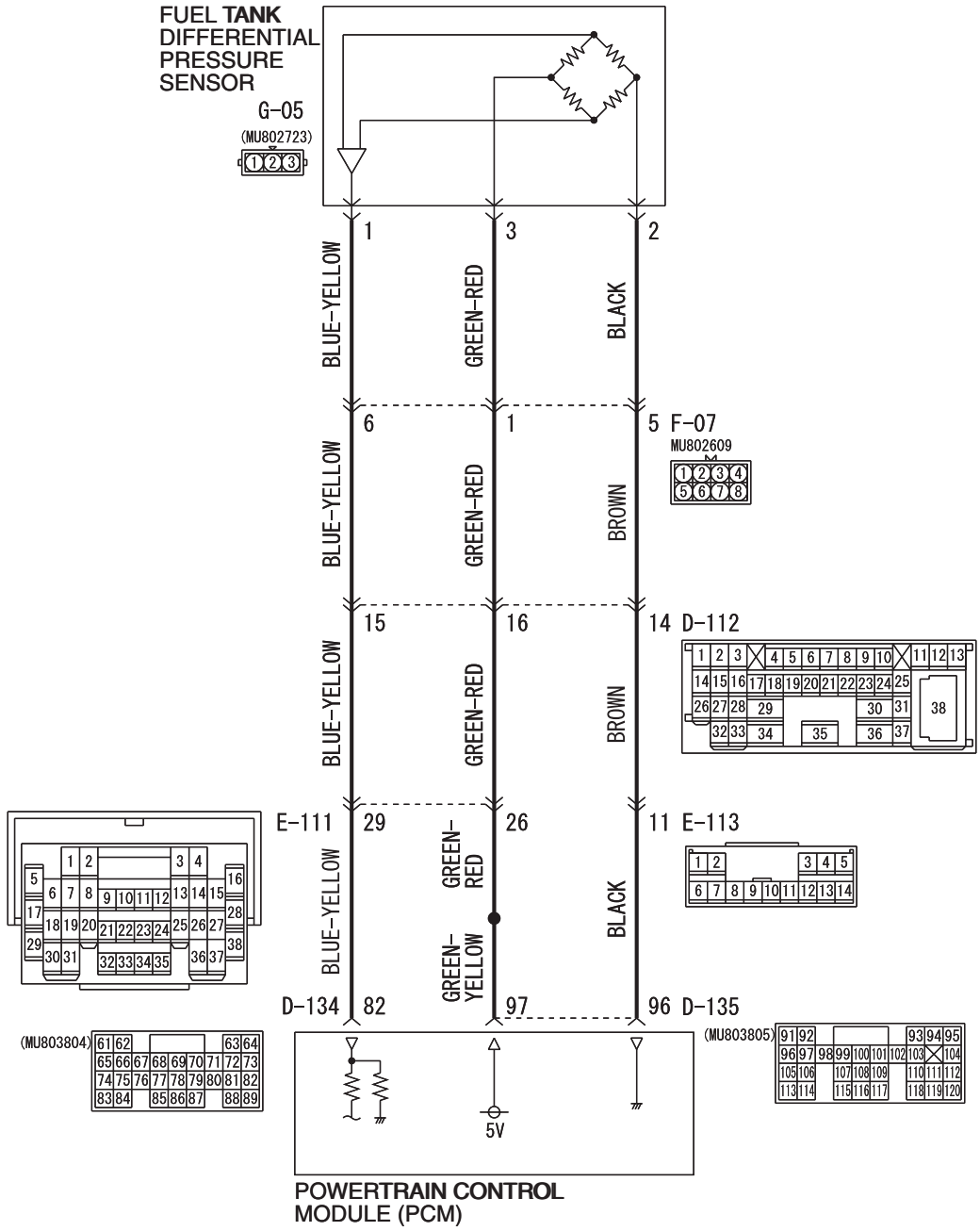
NO : The procedure is complete.

DTC P0452: Evaporative Emission System Pressure Sensor Low Input

SYSTEM DIAGRAM



Fuel Tank Differential Pressure Sensor Circuit



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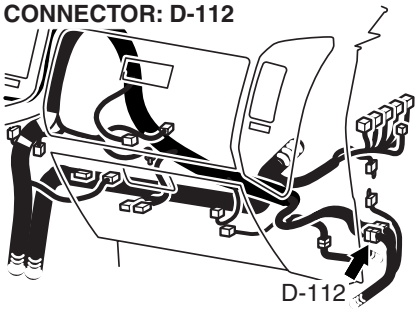
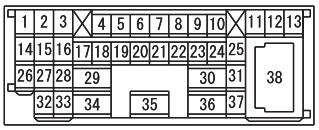
CONNECTOR: D-112





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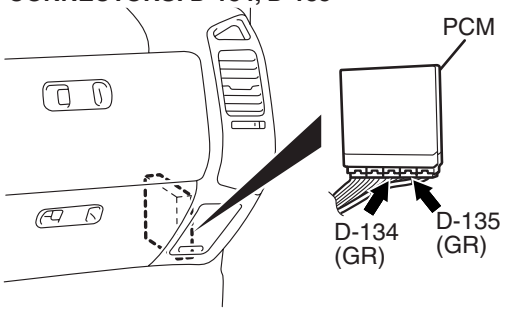
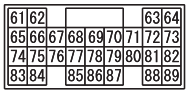
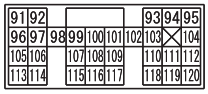
CONNECTORS: D-134, D-135



D-134



D-135



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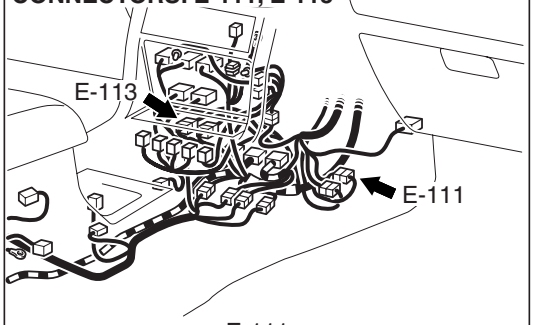
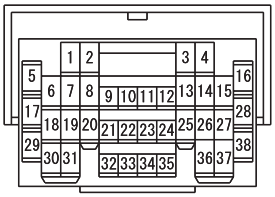
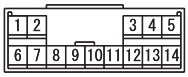
CONNECTORS: E-111, E-113



E-111

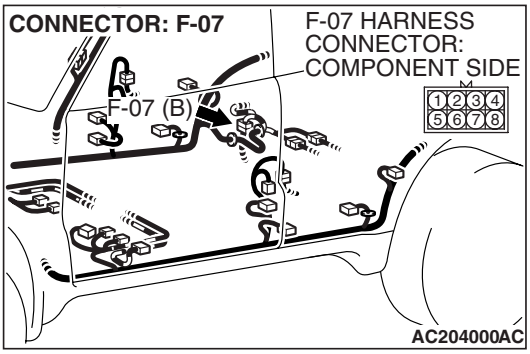


E-113



AC401286AB

CONNECTOR: F-07



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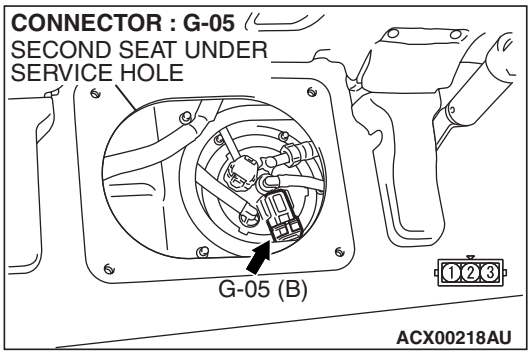
TSB Revision



CIRCUIT OPERATION

- The PCM (terminal 97) supplies a 5-volt reference signal to the fuel tank differential pressure sensor (terminal 3). The fuel tank differential pressure sensor (terminal 2) is grounded through the PCM (terminal 96).
- The fuel tank differential pressure sensor (terminal 1) returns a voltage signal to the PCM (terminal 82) that is proportional to the pressure in the fuel tank.

TECHNICAL DESCRIPTION

- The PCM monitors the fuel tank differential pressure sensor output voltage.
- The PCM determines whether the fuel tank differential pressure sensor signal voltage is within normal operating parameters.

DESCRIPTIONS OF MONITOR METHODS

- Compare purge solenoid status with fuel tank differential pressure sensor output voltage.

MONITOR EXECUTION

- Continuous.

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

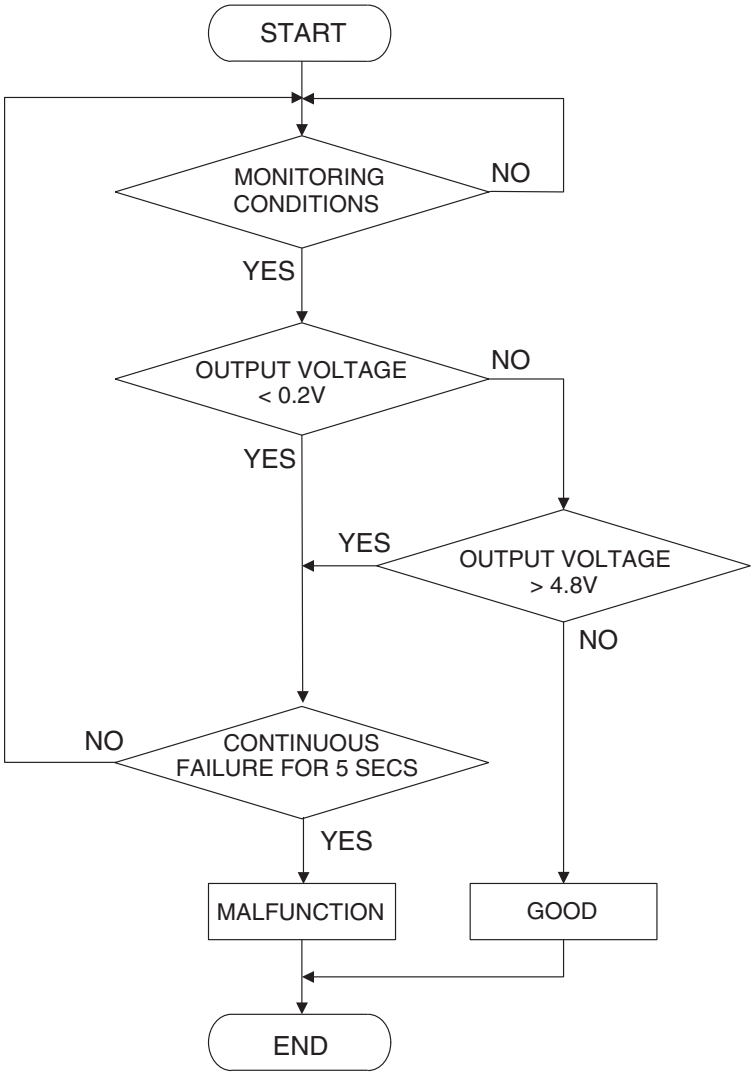
- Evaporative emission purge solenoid monitor
- Evaporative emission ventilation solenoid monitor
- Fuel level sensor monitor
- Fuel temperature sensor monitor

Sensor (The sensors below are determined to be normal)

- Volume airflow sensor
- Barometric pressure sensor
- Intake air temperature sensor
- Engine coolant temperature sensor
- Accelerator pedal position sensor

LOGIC FLOW CHARTS (Monitor Sequence)

RANGE CHECK - MIN. / MAX.



DTC SET CONDITIONS

Check Condition

- 2 seconds or more have passed since the starting sequence was completed.

Judgment Criterion

- The fuel tank differential pressure sensor output voltage remains 0.2 volt or less for 5 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 19 P.13A-4.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)

- Malfunction of the fuel tank differential pressure sensor.
- A damaged harness in the fuel tank differential pressure sensor circuit.
- Malfunction of the PCM.

OVERVIEW OF TROUBLESHOOTING

- DTC P0452 can be set by a faulty fuel tank differential pressure sensor or related circuit, or PCM failure.
- To check for system blockage, do a performance test which uses a mechanical vacuum gauge and scan tool MB991958 set on the fuel tank differential pressure sensor (TANK PRS SNSR 73). The mechanical gauge reading is used to verify scan tool MB991958 reading. A comparison of the mechanical gauge with the reading on scan tool MB991958 will locate a problem in the system.

DIAGNOSIS

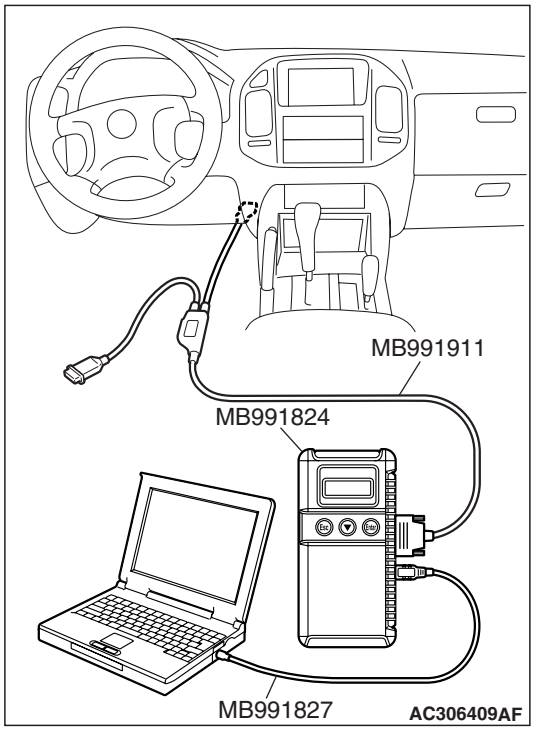
Required Special Tools:

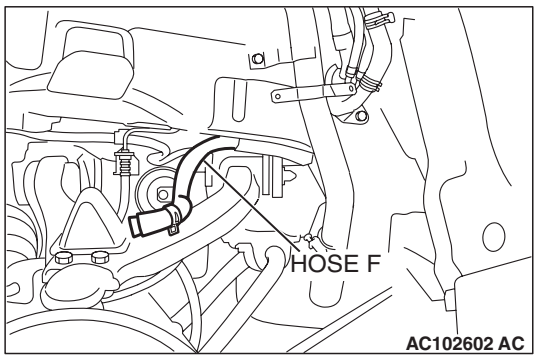
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness B
- MB991658: Test Harness Set
- MB992006: Extra Fine Probe

STEP 1. Using scan tool MB991958, check data list item 73: Fuel Tank Differential Pressure Sensor.

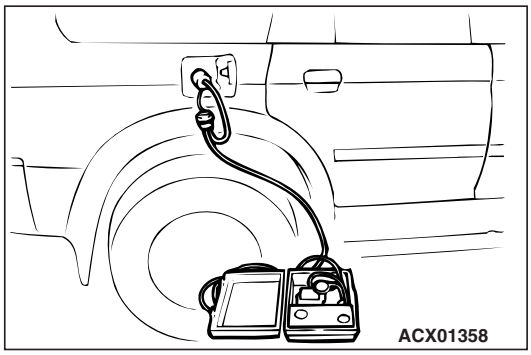
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.





(2) Disconnect hose F from the evaporative emission canister side, and plug the hose.
(3) Turn the ignition switch to the "ON" position.
(4) Remove the fuel cap.
(5) Set scan tool MB991958 to the data reading mode.
Item 73, Fuel Tank Differential Pressure Sensor.
- The fuel tank pressures reading on the scan tool should be −1.5 to 1.5 kPa (−0.443 to 0.443 inHg).



(6) Connect an evaporative emission system pressure pump to the fuel tank filler tube and pressurize the fuel tank.
- The fuel tank pressure reading should increase.

(7) Disconnect an evaporative emission system pressure pump and connect hose F.
(8) Turn the ignition switch to the "LOCK" (OFF) position and disconnect scan tool MB991958.

Q: Is the fuel tank pressure between −1.5 and 1.5 kPa (−0.443 and 0.443 inHg)?

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 Malfunctions P.00-13). Go to Step 15.

NO : Go to Step 2.

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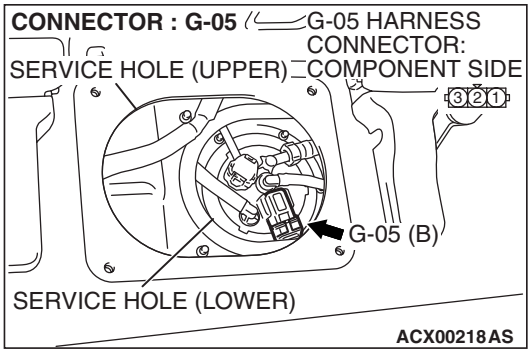
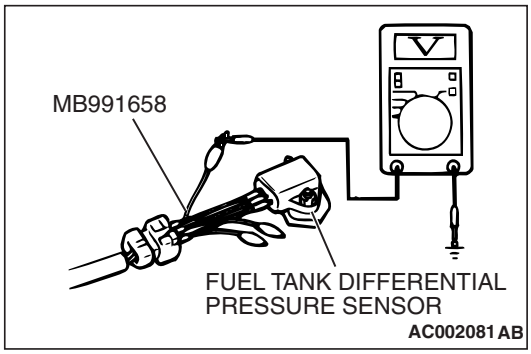
STEP 2. Measure the signal voltage at fuel tank differential pressure sensor connector G-05.



(1) Tumble the second seat.
(2) Remove the service hole cover (upper) and packing.
(3) Remove the service hole cover (lower) and packing.
(4) Disconnect fuel tank differential pressure sensor connector G-05.



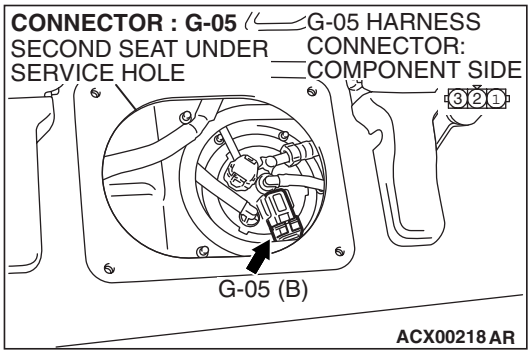
(5) Connect special tool MB991658 between fuel tank differential pressure sensor connector G-05 terminals 1, 2 and 3.
(6) Turn the ignition switch to the "ON" position.
(7) Remove the fuel cap.
(8) Measure the voltage between fuel tank differential pressure sensor connector G-05 terminal 1 and ground.
- The voltage should measure between 2.0 and 3.0 volts.

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

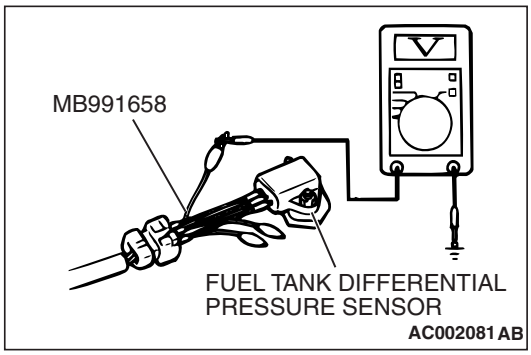
Q: Is the measured voltage between 2.0 and 3.0 volts?

YES : Go to Step 10.
NO : Go to Step 3.

STEP 3. Measure the 5-volt reference signal at fuel tank differential pressure sensor connector G-05.



(1) Disconnect fuel tank differential pressure sensor connector G-05.



(2) Connect special tool MB991658 between fuel tank differential pressure sensor connector G-05 terminals 1, 2 and 3.
(3) Turn the ignition switch to the "ON" position.
(4) Measure the voltage between fuel tank differential pressure sensor connector G-05 terminal 3 and ground.
- The voltage should measure between 4.9 and 5.1 volts.

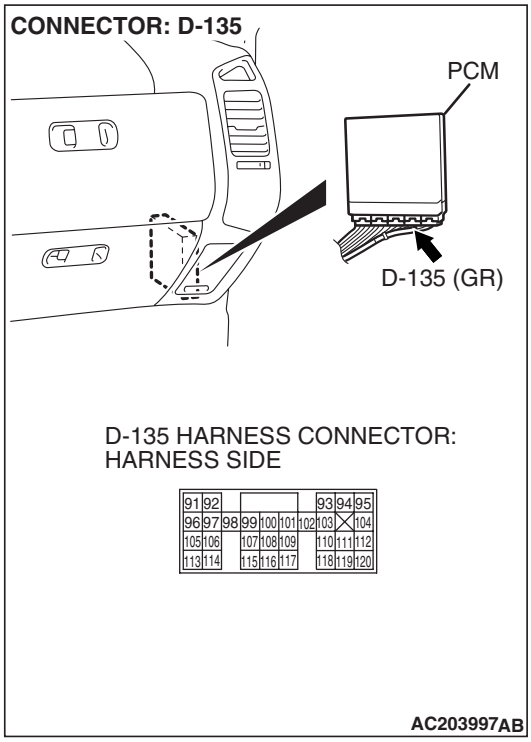
(5) Turn the ignition switch to the "LOCK" (OFF) position.

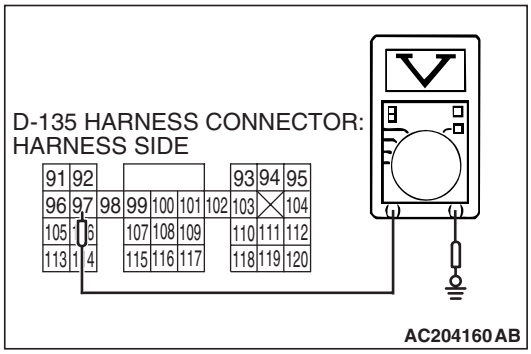
Q: Is the measured voltage between 4.9 and 5.1 volts?

YES : Go to Step 8.
NO : Go to Step 4.

STEP 4. Measure the 5-volt reference signal at PCM connector D-135 by backprobing.

(1) Do not disconnect PCM connector D-135.
(2) Turn the ignition switch to the "ON" position.



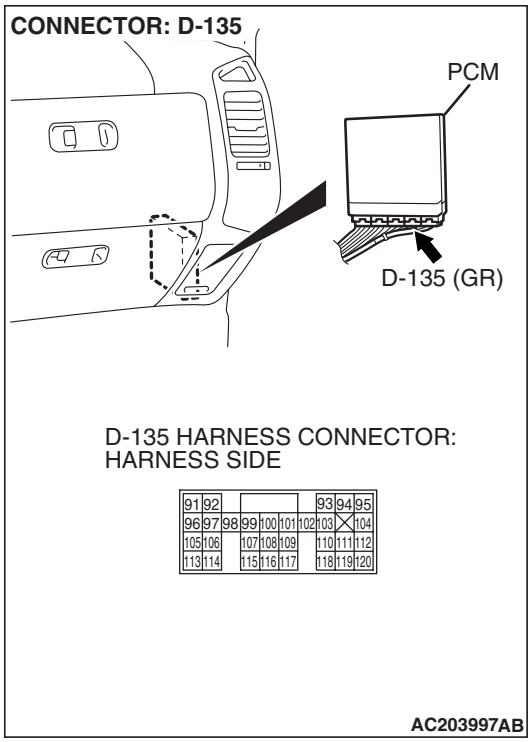


(3) Measure the voltage between PCM connector D-135 terminal 97 and ground by backprobing.
- The voltage should measure between 4.9 and 5.1 volts.

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

Q: Is the measured voltage between 4.9 and 5.1 volts?

YES : Go to Step 6.
NO : Go to Step 5.



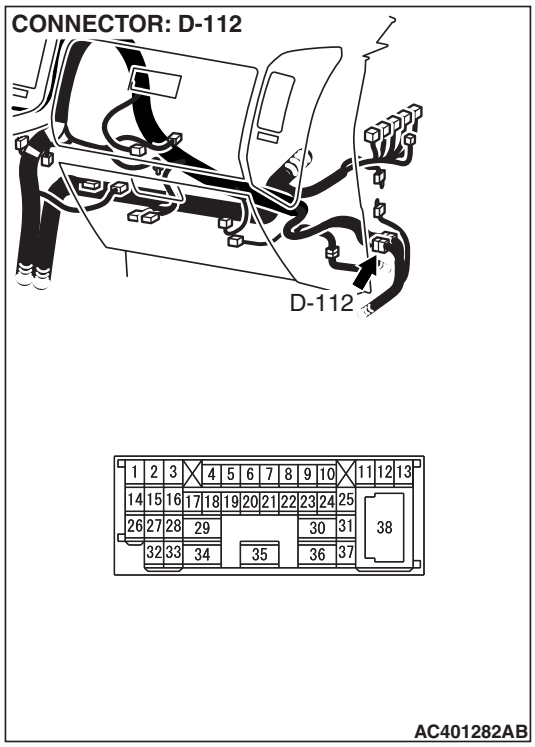
STEP 5. Check PCM connector D-135 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

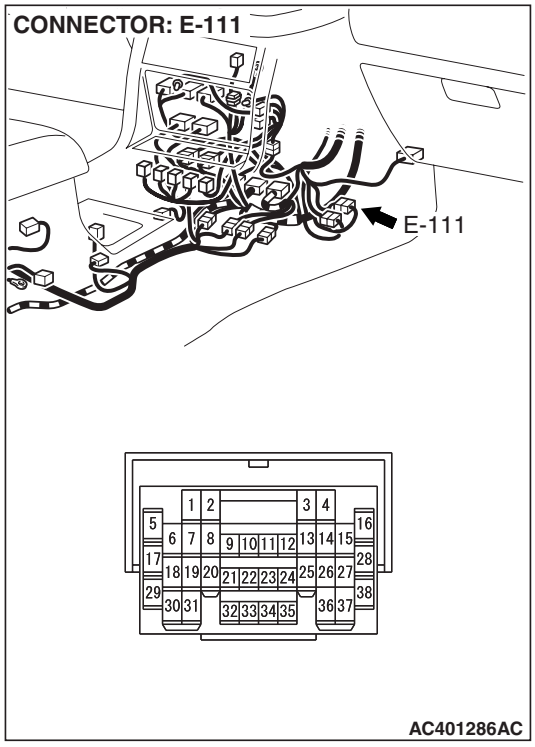
Q: Are the connector and terminals in good condition?

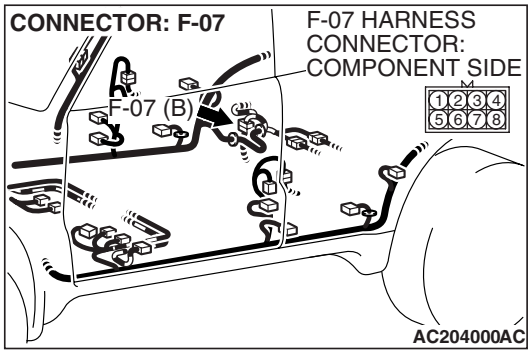
YES : Go to Step 14.

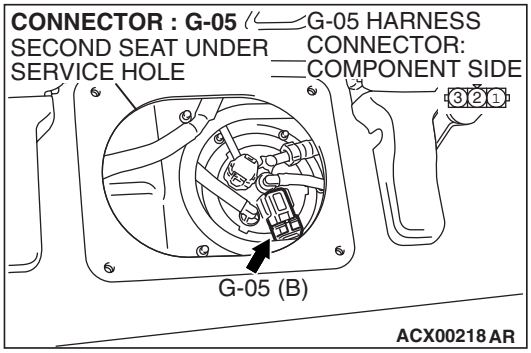
NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.

STEP 6. Check intermediate connectors D-112, E-111 and F-07, and fuel tank differential pressure sensor connector G-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.





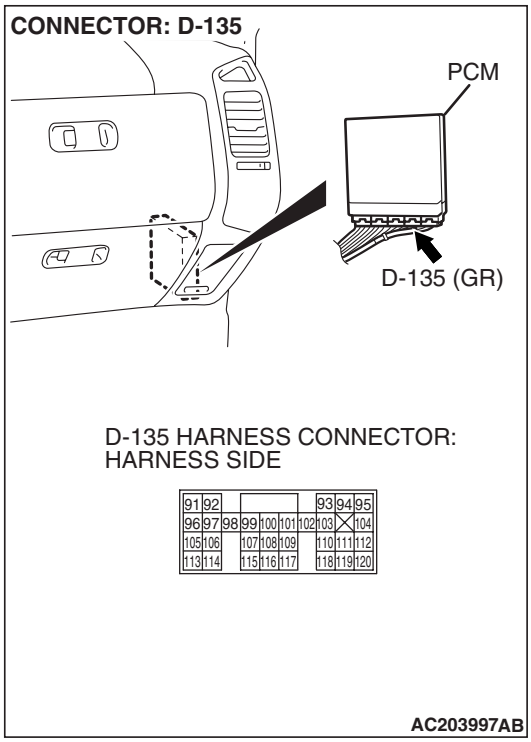


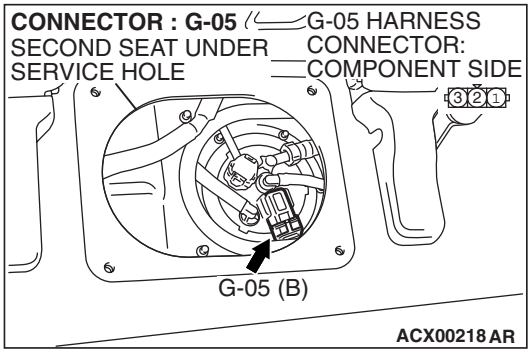


Q: Are the connectors and terminals in good condition?

YES : Go to Step 7.

NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.



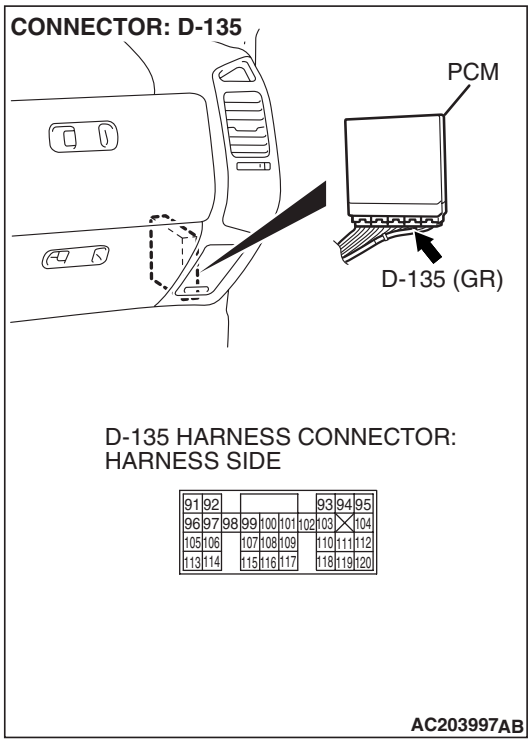


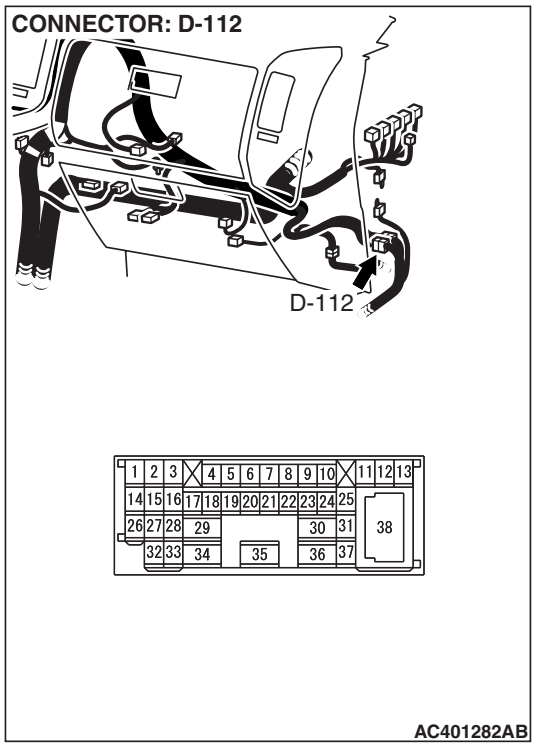
STEP 7. Check the harness wires between PCM connector D-135 terminal 97 and fuel tank differential pressure sensor connector G-05 terminal 3 for damage.
Q: Are the harness wires in good condition?

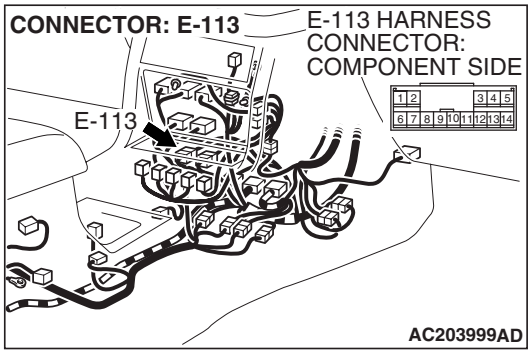
YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-13). Go to Step 15.

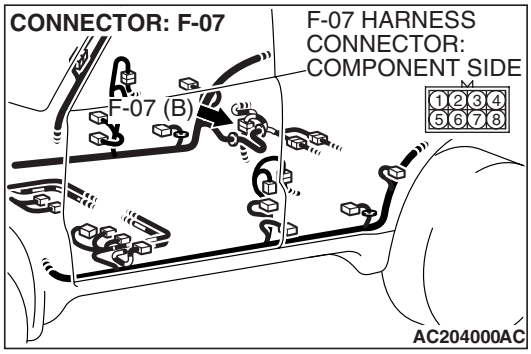
NO : Repair the damaged harness wires. Go to Step 15.

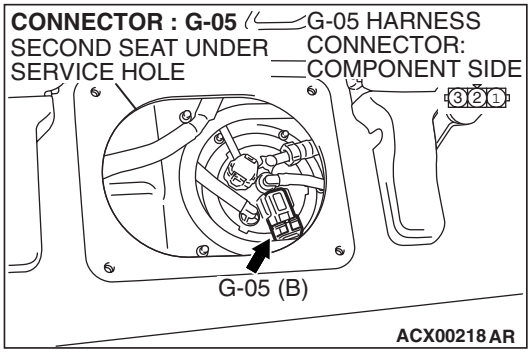
STEP 8. Check PCM connector D-135, intermediate connectors D-112, E-113 and F-07, and fuel tank differential pressure sensor connector G-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.







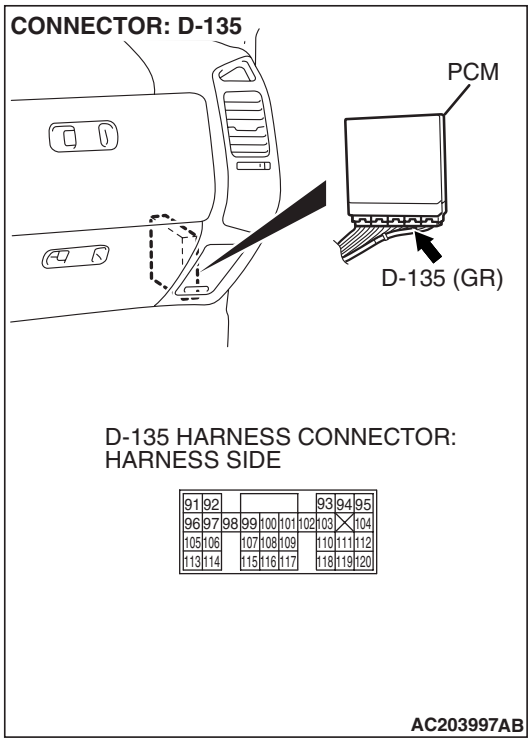


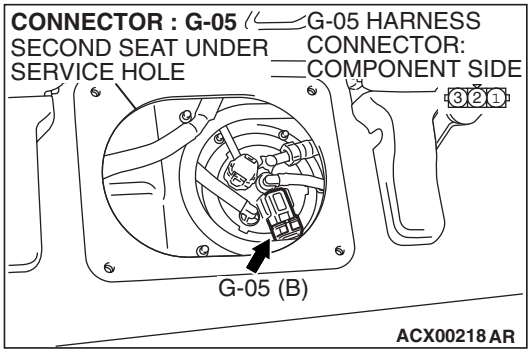


Q: Are the connectors and terminals in good condition?

YES : Go to Step 9.

NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.





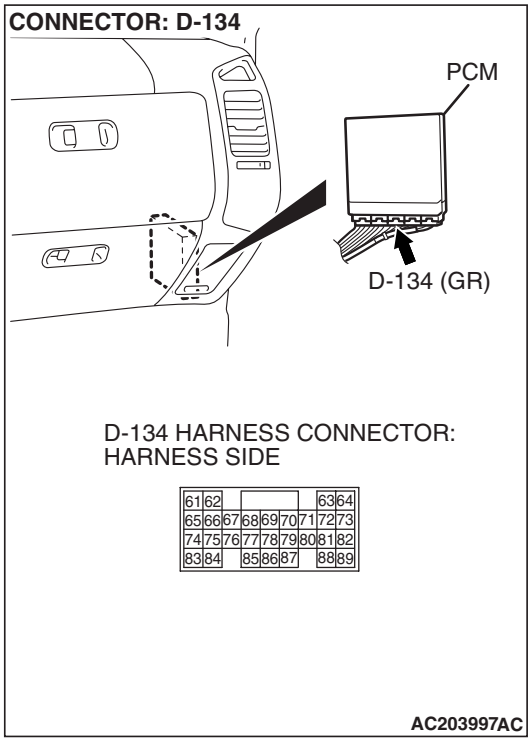
STEP 9. Check the harness wires between PCM connector D-135 terminal 96 and fuel tank differential pressure sensor connector G-05 terminal 2 for damage.
Q: Are the harness wires in good condition?

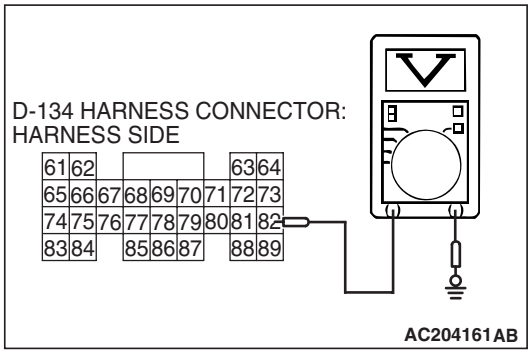
YES : Replace the fuel tank differential pressure sensor (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 14.

NO : Repair the damaged harness wires. Go to Step 15.

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

(1) Do not disconnect PCM connector D-134.
(2) Turn the ignition switch to the "ON" position.
(3) Remove the fuel cap.



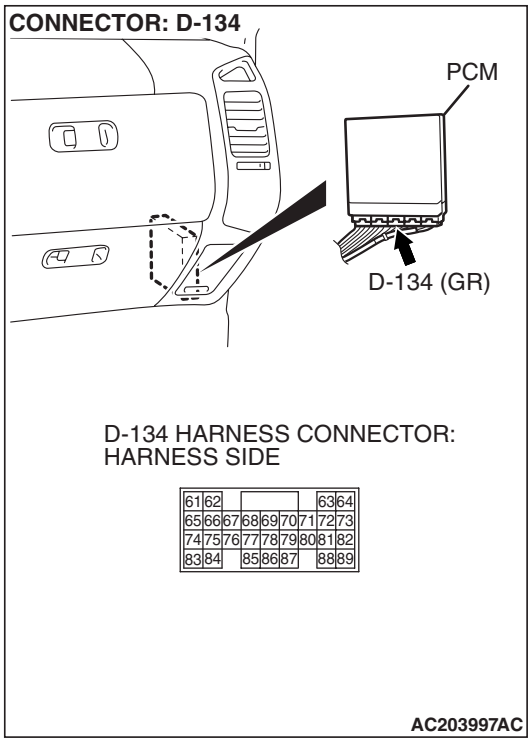


(4) Measure the voltage between PCM connector D-134 terminal 82 and ground by backprobing.
- The voltage should measure between 2.0 and 3.0 volts.

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

Q: Is the measured voltage between 2.0 and 3.0 volts?

YES : Go to Step 14.
NO : Go to Step 11.



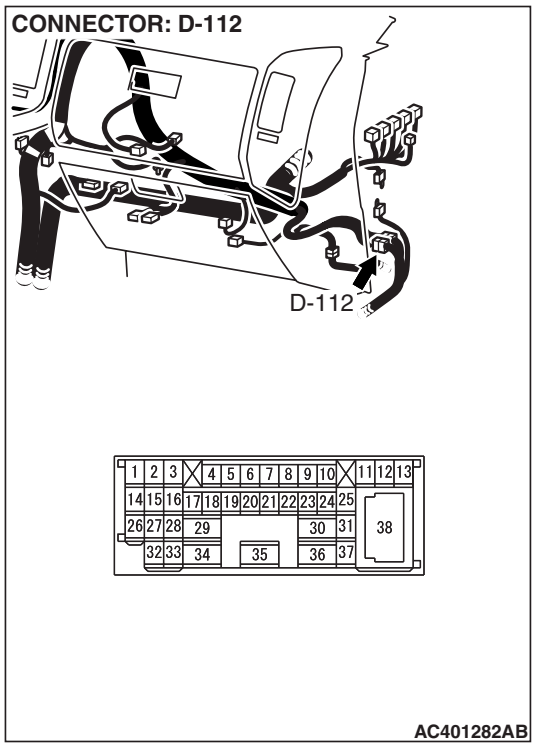
STEP 11. Check PCM connector D-134 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

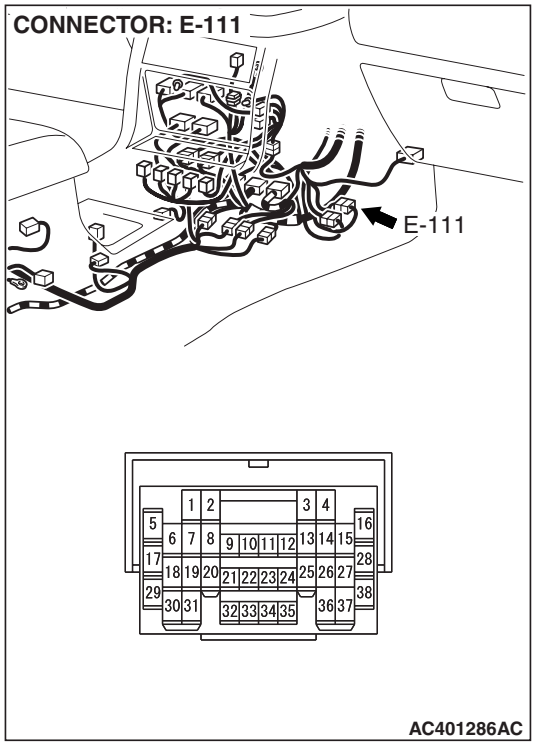
Q: Are the connector and terminals in good condition?

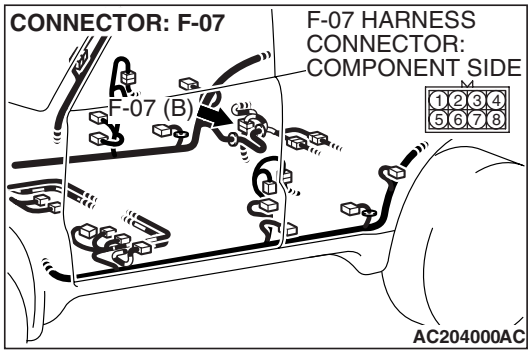
YES : Go to Step 12.

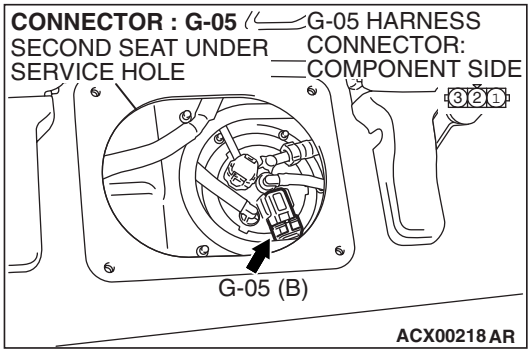
NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.

STEP 12. Check intermediate connectors D-112, E-111 and F-07, and fuel tank differential pressure sensor connector G-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.





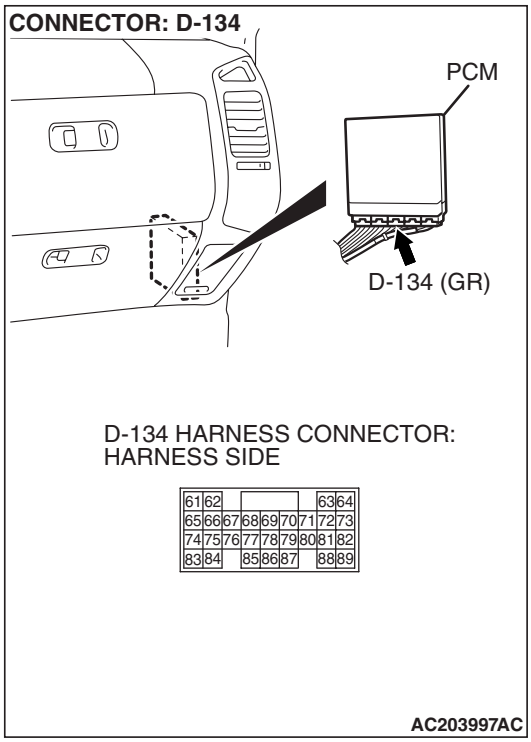


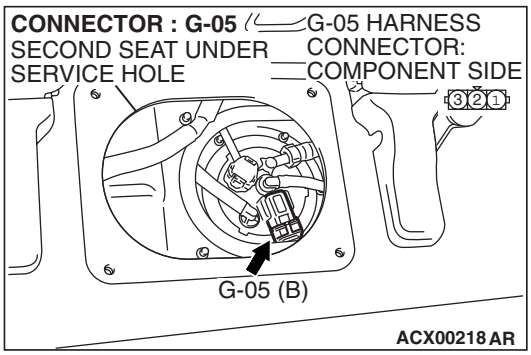


Q: Are the connectors and terminals in good condition?

YES : Go to Step 13.

NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.





STEP 13. Check the harness wires between PCM connector D-134 terminal 82 and fuel tank differential pressure sensor connector G-05 terminal 1 for damage.
Q: Are the harness wires in good condition?

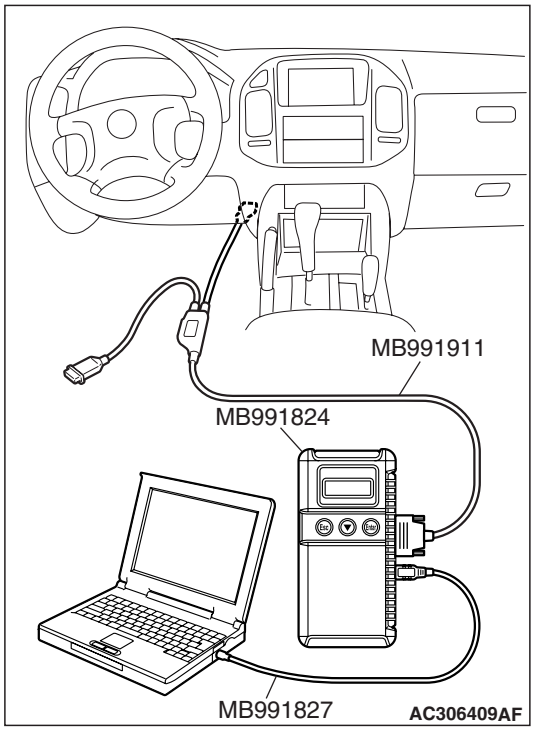
YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-13). Go to Step 15.

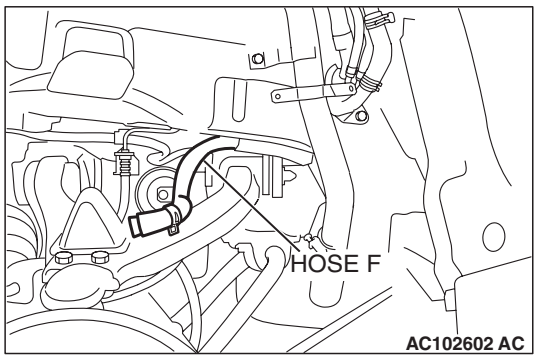
NO : Repair the damaged harness wires. Go to Step 15.

STEP 14. Using scan tool MB991958, check data list item 73: Fuel Tank Differential Pressure Sensor.

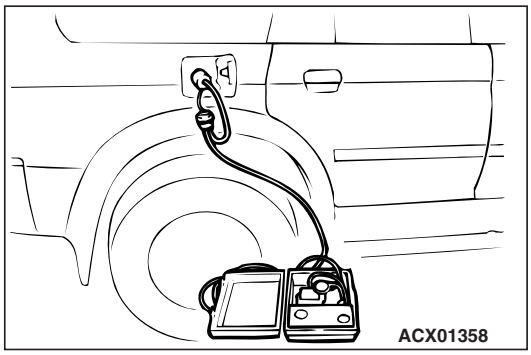
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.





(2) Disconnect hose F from the evaporative emission canister side, and plug the hose.
(3) Turn the ignition switch to the "ON" position.
(4) Remove the fuel cap.
(5) Set scan tool MB991958 to the data reading mode.
Item 73, Fuel Tank Differential Pressure Sensor.
- The fuel tank pressures reading on the scan tool should be −1.5 to 1.5 kPa (−0.443 to 0.443 inHg).



(6) Connect an evaporative emission system pressure pump to the fuel tank filler tube and pressurize the fuel tank.
- The fuel tank pressure reading should increase.

(7) Disconnect an evaporative emission system pressure pump and connect hose F.
(8) Turn the ignition switch to the "LOCK" (OFF) position and disconnect scan tool MB991958.

Q: Is the fuel tank pressure between −1.5 and 1.5 kPa (−0.443 and 0.443 inHg)?

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 Malfunctions P.00-13). Go to Step 15.

NO : Replace the PCM (Refer to P.13A-1066). Go to Step 15.

TSB Revision

STEP 15. Perform the OBD-II drive cycle.

(1) Carry out a test drive with the drive cycle pattern (Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 19 P.13A-4).

(2) Read the diagnostic trouble code (DTC).

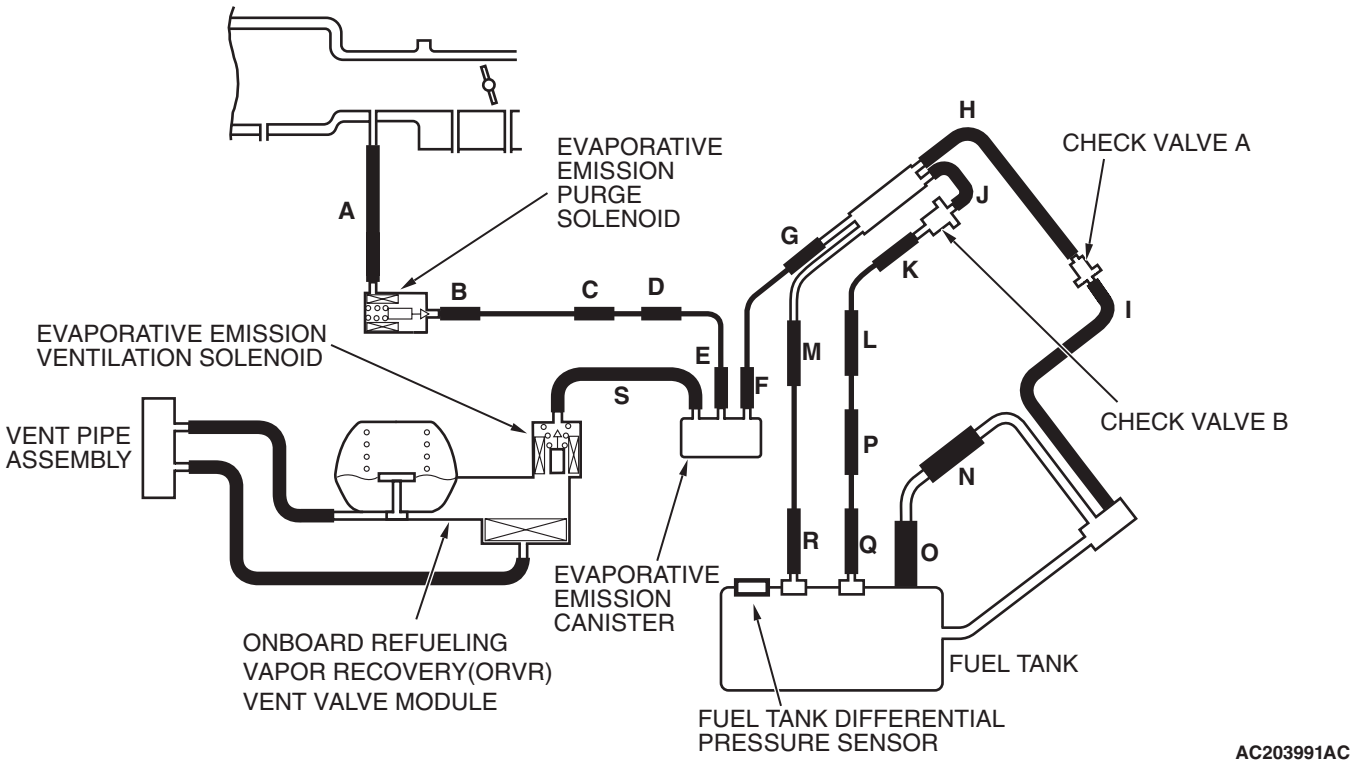
Q: Is DTC P0452 set?

YES : Repeat the troubleshooting from Step 2.

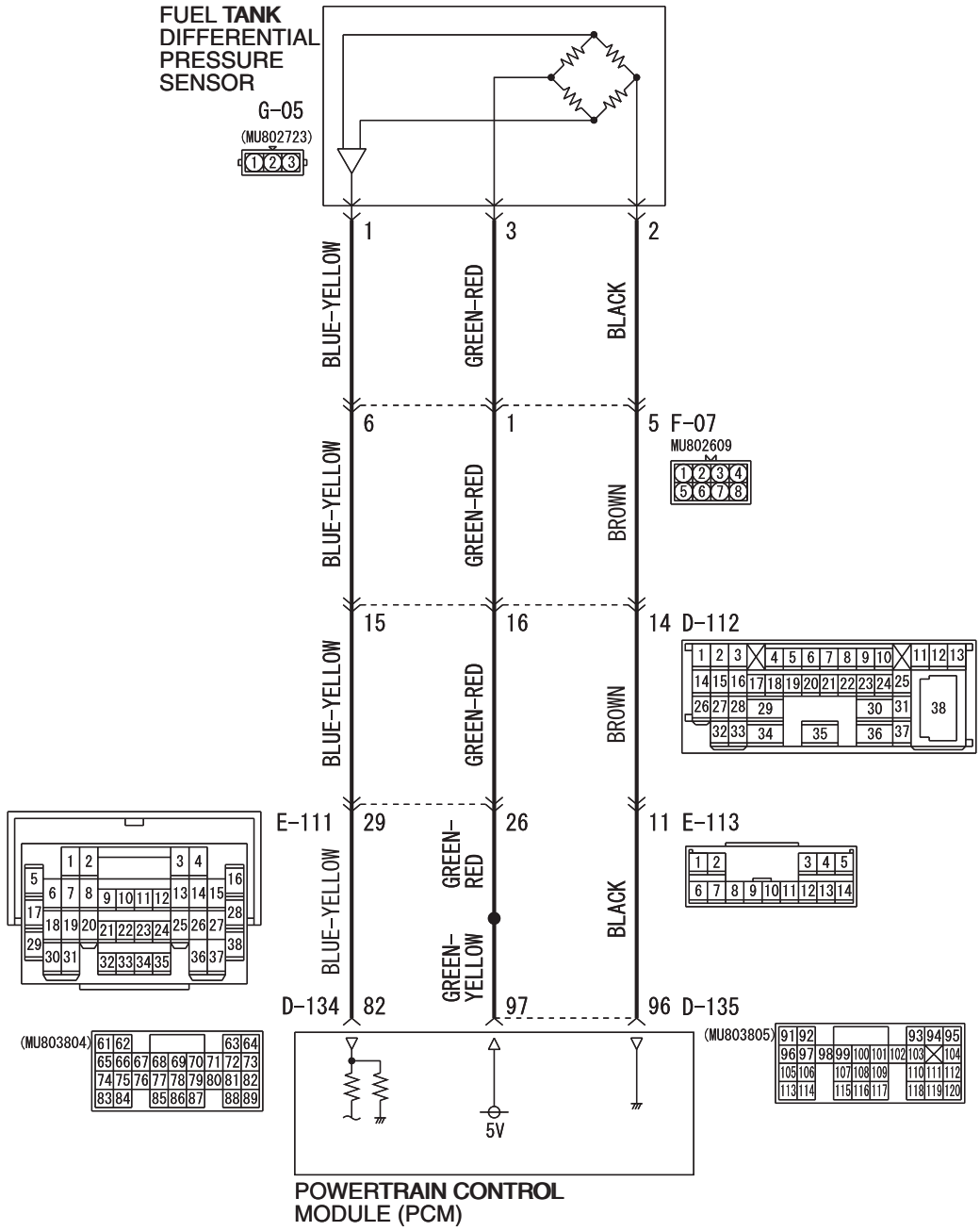
NO : The procedure is complete.

DTC P0453: Evaporative Emission System Pressure Sensor High Input

SYSTEM DIAGRAM



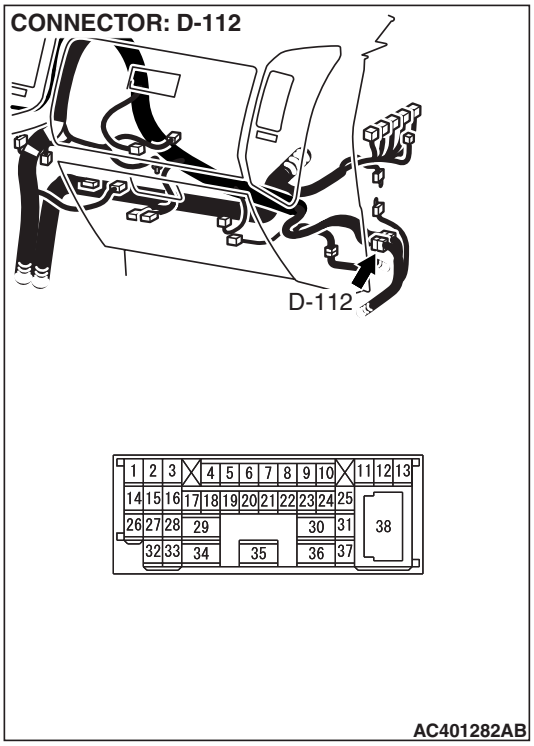
Fuel Tank Differential Pressure Sensor Circuit



AC309251AC
W4Q13M00AA

TSB Revision

CONNECTOR: D-112



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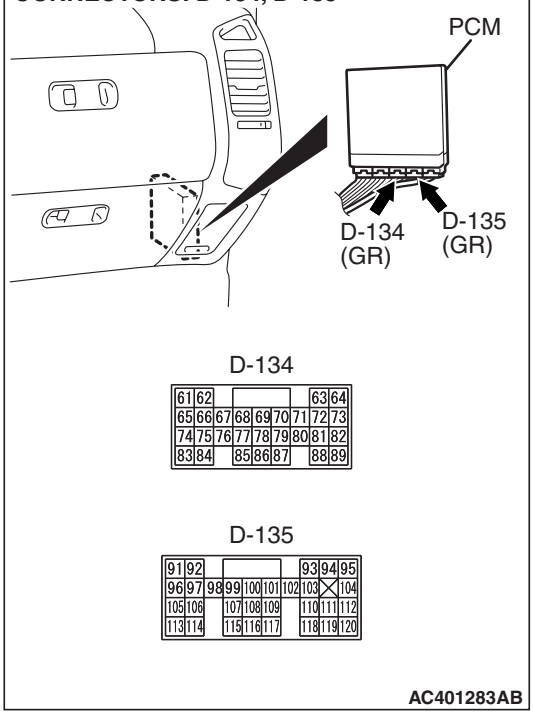
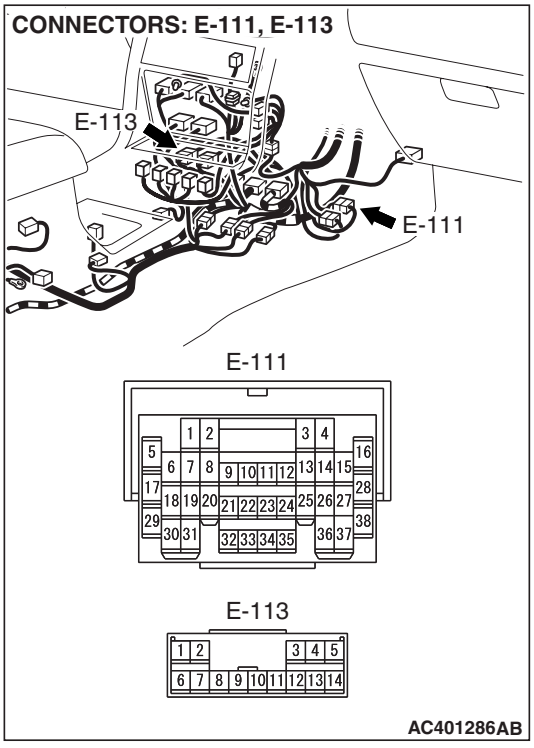
CONNECTORS: D-134, D-135



AC401283AB

CONNECTORS: E-111, E-113



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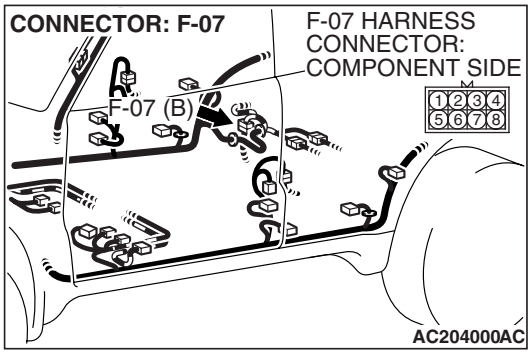
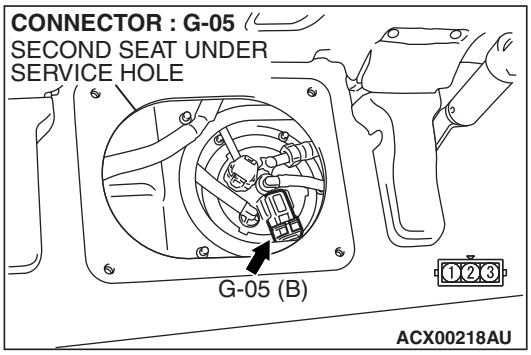
CONNECTOR: F-07



AC204000AC

TSB Revision



CIRCUIT OPERATION

- The PCM (terminal 97) supplies a 5-volt reference signal to the fuel tank differential pressure sensor (terminal 3). The fuel tank differential pressure sensor (terminal 2) is grounded through the PCM (terminal 96).
- The fuel tank differential pressure sensor (terminal 1) returns a voltage signal to the PCM (terminal 82) that is proportional to the pressure in the fuel tank.

TECHNICAL DESCRIPTION

- The PCM monitors the fuel tank differential pressure sensor output voltage.
- The PCM determines whether the fuel tank differential pressure sensor signal voltage is within normal operating parameters.

DESCRIPTIONS OF MONITOR METHODS

- Compare purge solenoid status with fuel tank differential pressure sensor output voltage.

MONITOR EXECUTION

- Continuous.

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

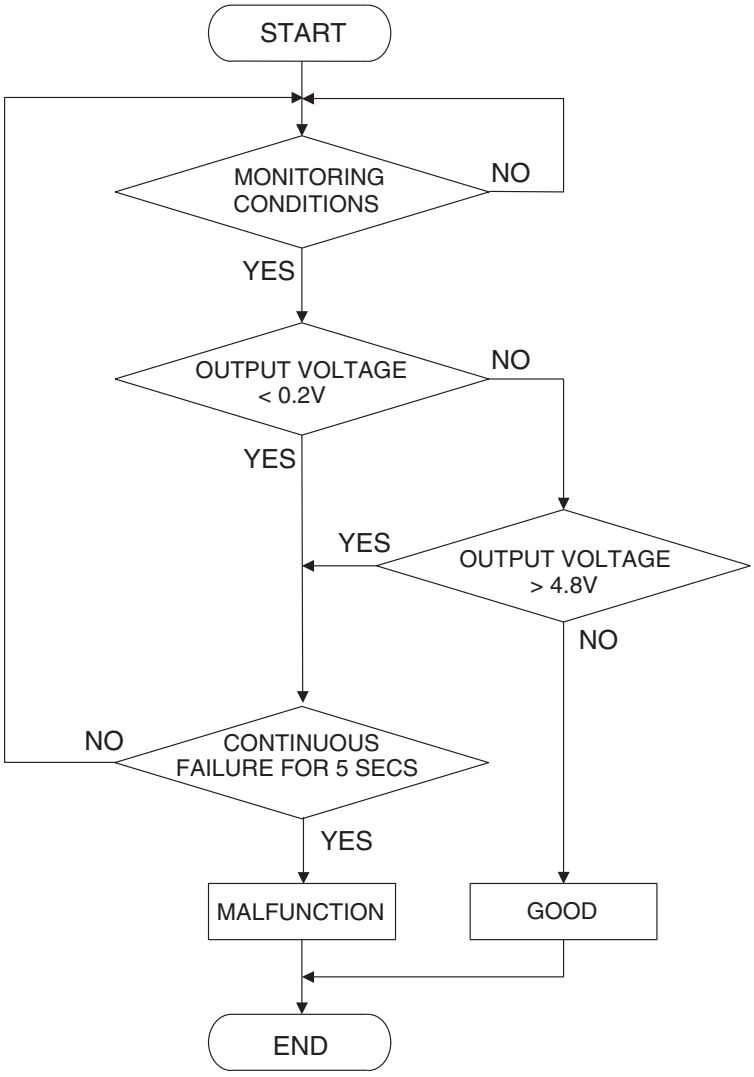
- Evaporative emission purge solenoid monitor
- Evaporative emission ventilation solenoid monitor
- Fuel level sensor monitor
- Fuel temperature sensor monitor

Sensor (The sensors below are determined to be normal)

- Volume airflow sensor
- Barometric pressure sensor
- Intake air temperature sensor
- Engine coolant temperature sensor
- Accelerator pedal position sensor

LOGIC FLOW CHARTS (Monitor Sequence)

RANGE CHECK - MIN. / MAX.



DTC SET CONDITIONS

Check Conditions

- 2 seconds or more have passed since the starting sequence was completed.
- The fuel temperature is 36°C (97°F) or less.
- Remaining fuel level is 85% or less when the engine is started.

Judgment Criterion

- The fuel tank differential pressure sensor output voltage remains 4.8 volt or greater for 5 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 19 P.13A-4.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)

- Malfunction of the fuel tank differential pressure sensor.
- Open or shorted fuel tank differential pressure sensor circuit.
- Malfunction of the PCM.

OVERVIEW OF TROUBLESHOOTING

- DTC P0453 can be set by a faulty fuel tank differential pressure sensor or related circuit, or PCM failure.
- To check for system blockage, do a performance test which uses a mechanical vacuum gauge and scan tool MB991958 set on the fuel tank differential pressure sensor (TANK PRS SNSR 73). The mechanical gauge reading is used to verify scan tool reading. A comparison of the mechanical gauge with the reading on scan tool MB991958 will locate a problem in the system.

DIAGNOSIS

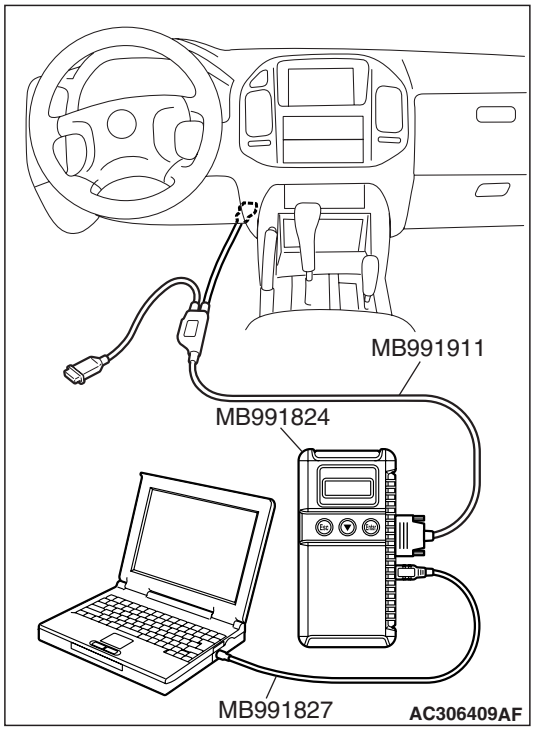
Required Special Tools:

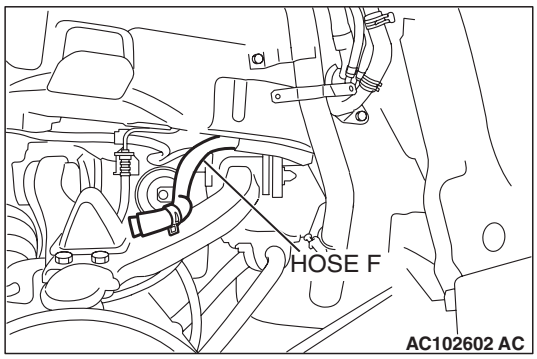
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness B
- MB991658: Test Harness Set
- MB992006: Extra Fine Probe

STEP 1. Using scan tool MB991958, check data list item 73: Fuel Tank Differential Pressure Sensor.

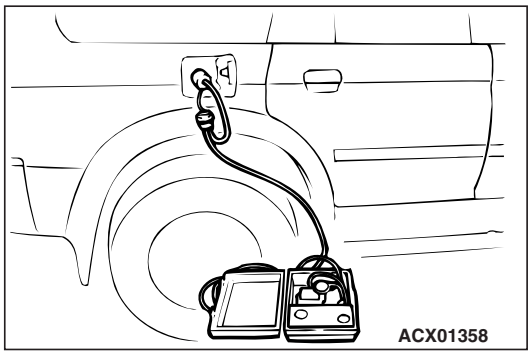
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.





(2) Disconnect hose F from the evaporative emission canister side, and plug the hose.
(3) Turn the ignition switch to the "ON" position.
(4) Remove the fuel cap.
(5) Set scan tool MB991958 to the data reading mode.
Item 73, Fuel Tank Differential Pressure Sensor.
- The fuel tank pressures reading on the scan tool should be −1.5 to 1.5 kPa (−0.443 to 0.443 inHg).



(6) Connect an evaporative emission system pressure pump to the fuel tank filler tube and pressurize the fuel tank.
- The fuel tank pressure reading should increase.

(7) Disconnect an evaporative emission system pressure pump and connect hose F.
(8) Turn the ignition switch to the "LOCK" (OFF) position and disconnect scan tool MB991958.

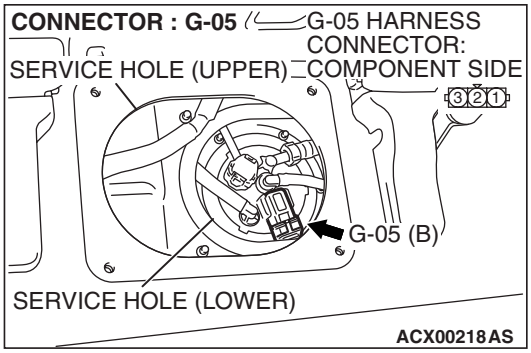
Q: Is the fuel tank pressure between −1.5 and 1.5 kPa (−0.443 and 0.443 inHg)?

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 Malfunctions P.00-13). Go to Step 15.

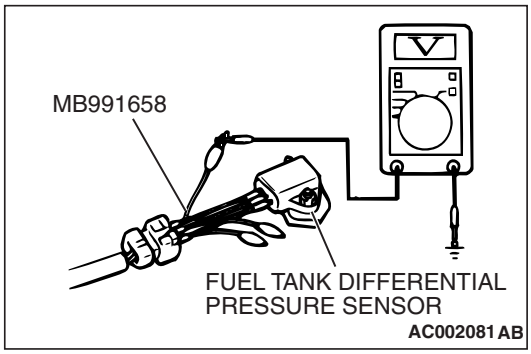
NO : Go to Step 2.

TSB Revision

STEP 2. Measure the signal voltage at fuel tank differential pressure sensor connector G-05.



(1) Tumble the second seat.
(2) Remove the service hole cover (upper) and packing.
(3) Remove the service hole cover (lower) and packing.
(4) Disconnect fuel tank differential pressure sensor connector G-05.



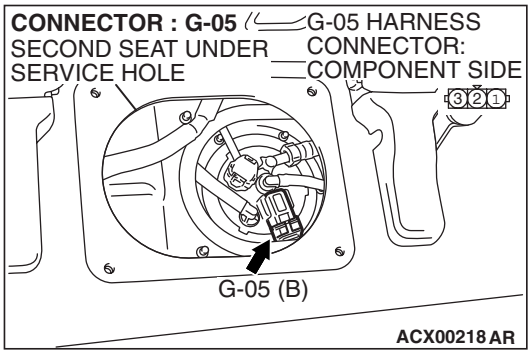
(5) Connect special tool MB991658 between fuel tank differential pressure sensor connector G-05 terminals 1, 2 and 3.
(6) Turn the ignition switch to the "ON" position.
(7) Remove the fuel cap.
(8) Measure the voltage between fuel tank differential pressure sensor connector G-05 terminal 1 and ground.
- The voltage should measure between 2.0 and 3.0 volts.

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

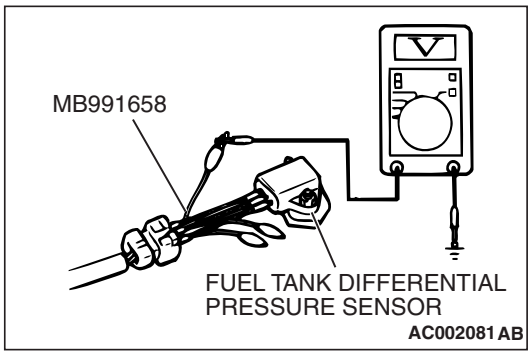
Q: Is the measured voltage between 2.0 and 3.0 volts?

YES : Go to Step 10.
NO : Go to Step 3.

STEP 3. Measure the 5-volt reference signal at fuel tank differential pressure sensor connector G-05.



(1) Disconnect fuel tank differential pressure sensor connector G-05.



(2) Connect special tool MB991658 between fuel tank differential pressure sensor connector G-05 terminals 1, 2 and 3.
(3) Turn the ignition switch to the "ON" position.
(4) Measure the voltage between fuel tank differential pressure sensor connector G-05 terminal 3 and ground.
- The voltage should measure between 4.9 and 5.1 volts.

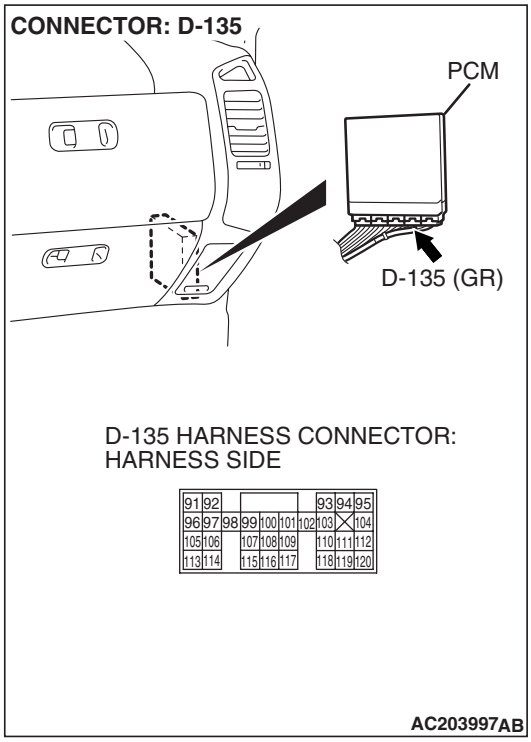
(5) Turn the ignition switch to the "LOCK" (OFF) position.

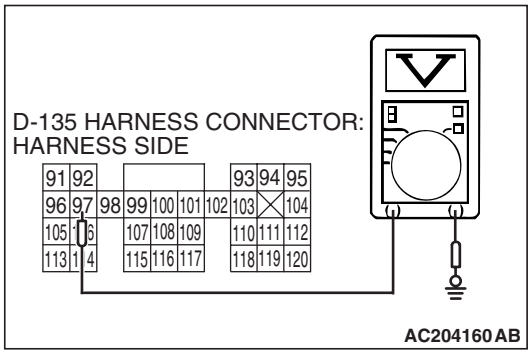
Q: Is the measured voltage between 4.9 and 5.1 volts?

YES : Go to Step 8.
NO : Go to Step 4.

STEP 4. Measure the 5-volt reference signal at PCM connector D-135 by backprobing.

(1) Do not disconnect PCM connector D-135.
(2) Turn the ignition switch to the "ON" position.



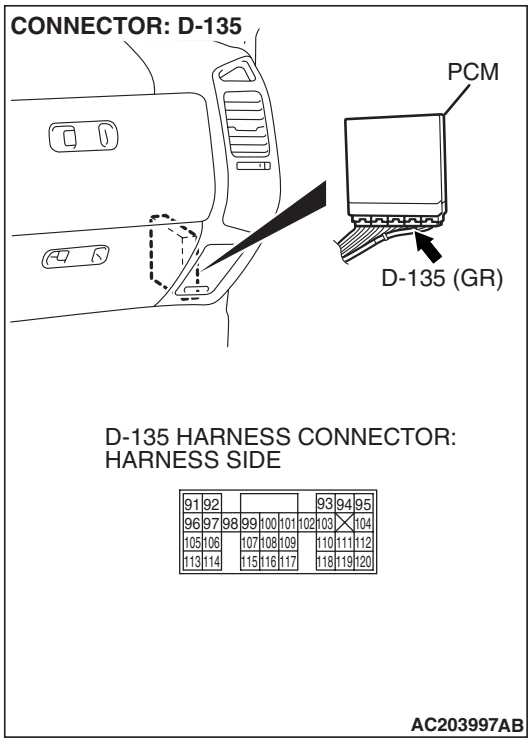


(3) Measure the voltage between PCM connector D-135 terminal 97 and ground by backprobing.
- The voltage should measure between 4.9 and 5.1 volts.

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

Q: Is the measured voltage between 4.9 and 5.1 volts?

YES : Go to Step 6.
NO : Go to Step 5.



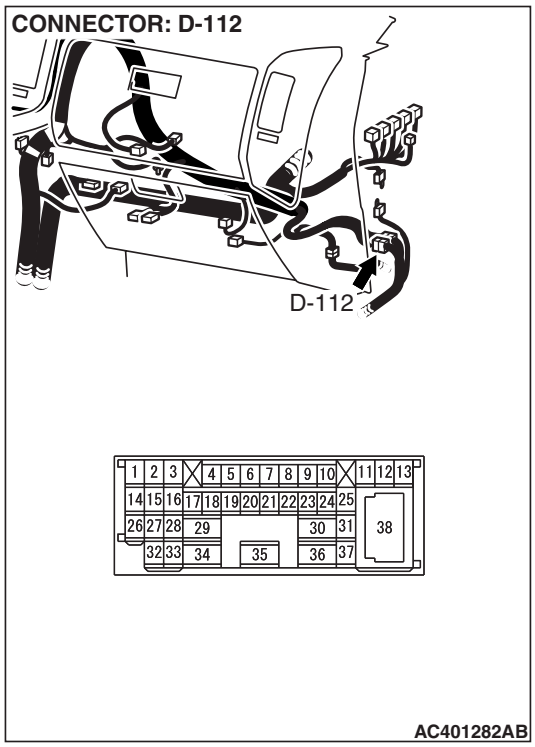
STEP 5. Check PCM connector D-135 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

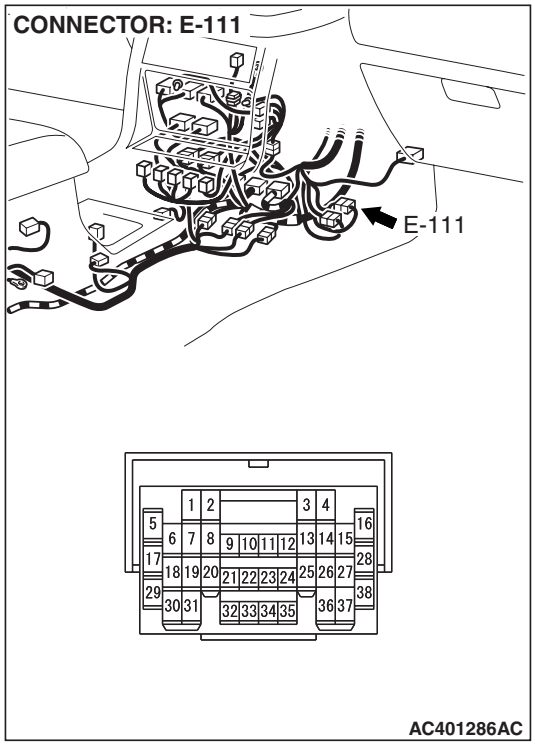
Q: Are the connector and terminals in good condition?

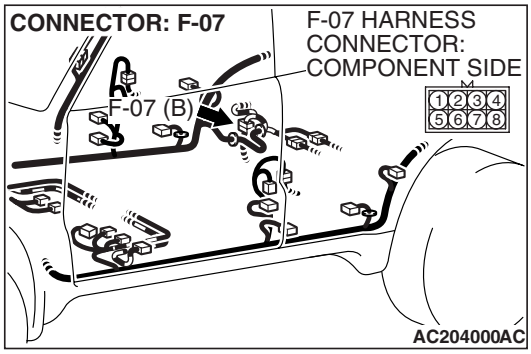
YES : Go to Step 14.

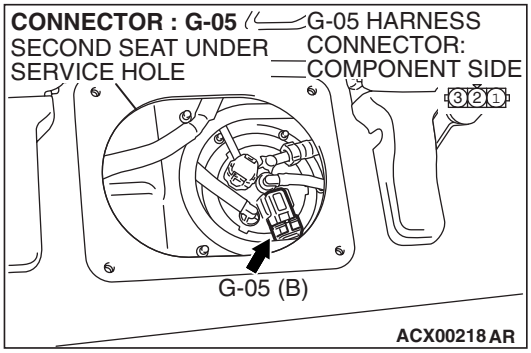
NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.

STEP 6. Check intermediate connectors D-112, E-111 and F-07, and fuel tank differential pressure sensor connector G-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.





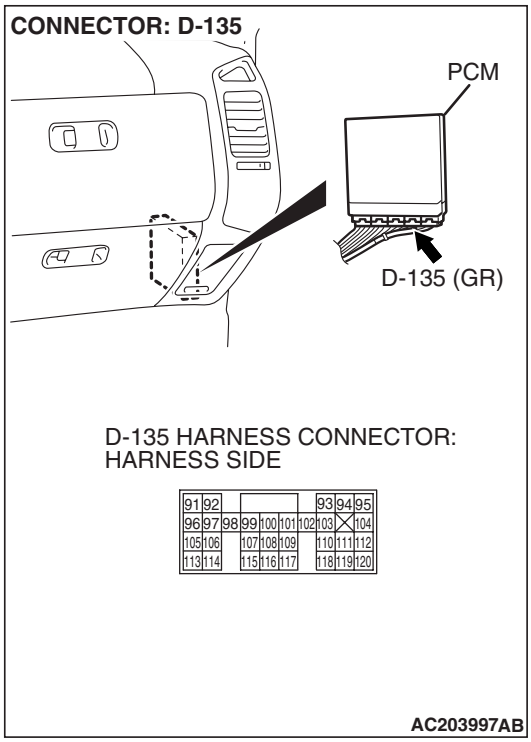


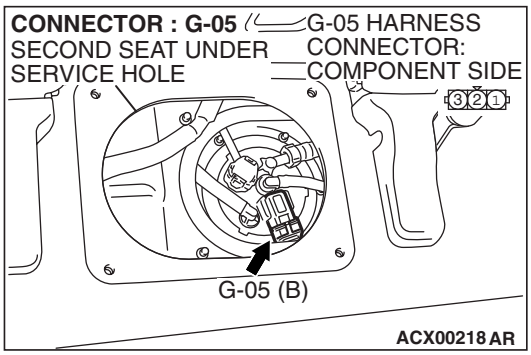


Q: Are the connectors and terminals in good condition?

YES : Go to Step 7.

NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.



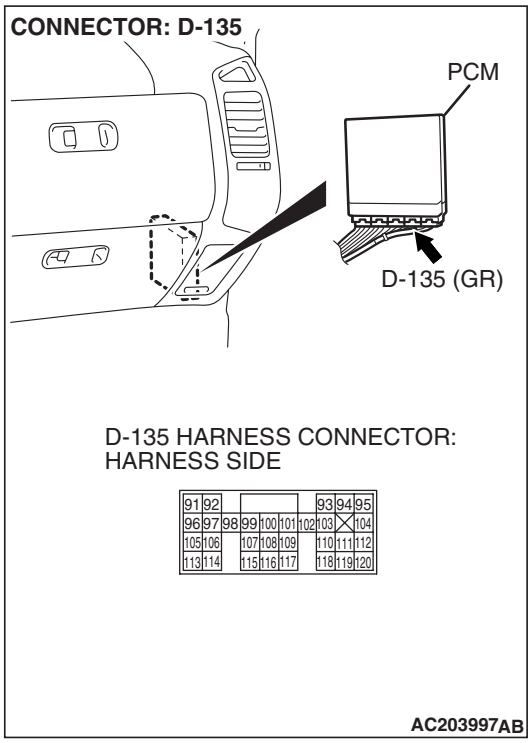


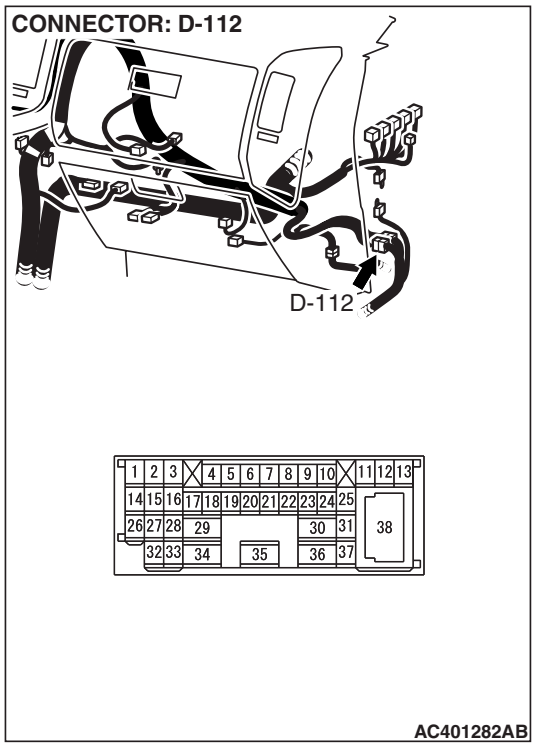
STEP 7. Check the harness wires between PCM connector D-135 terminal 97 and fuel tank differential pressure sensor connector G-05 terminal 3 for damage.
Q: Are the harness wires in good condition?

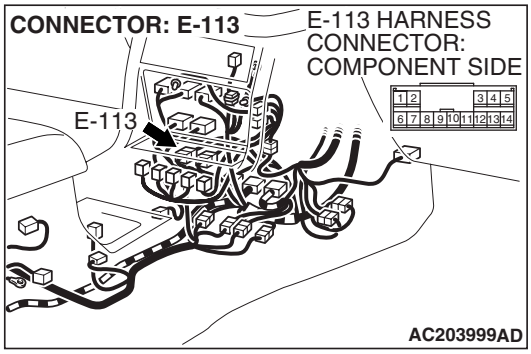
YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-13). Go to Step 15.

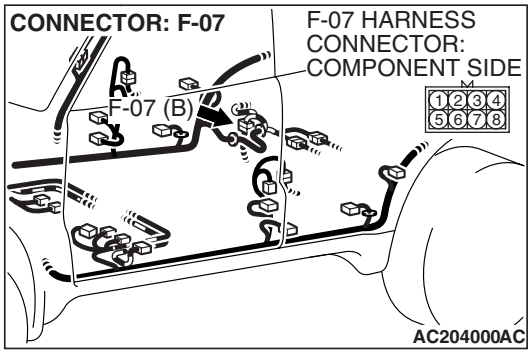
NO : Repair the damaged harness wires. Go to Step 15.

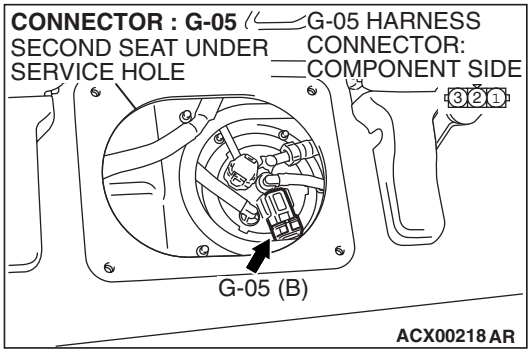
STEP 8. Check PCM connector D-135, intermediate connectors D-112, E-113 and F-07, and fuel tank differential pressure sensor connector G-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.







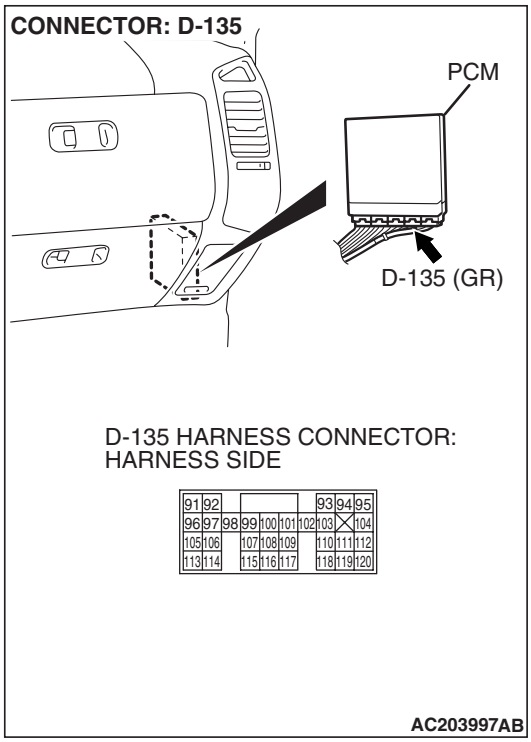


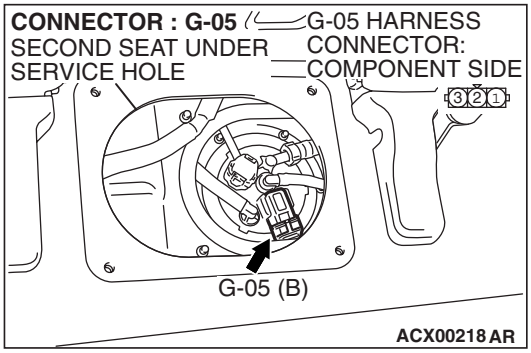


Q: Are the connectors and terminals in good condition?

YES : Go to Step 9.

NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.





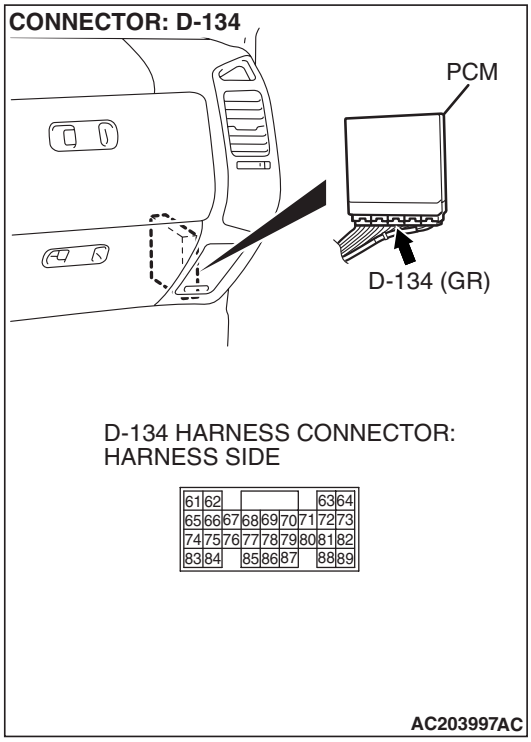
STEP 9. Check the harness wires between PCM connector D-135 terminal 96 and fuel tank differential pressure sensor connector G-05 terminal 2 for damage.
Q: Are the harness wires in good condition?

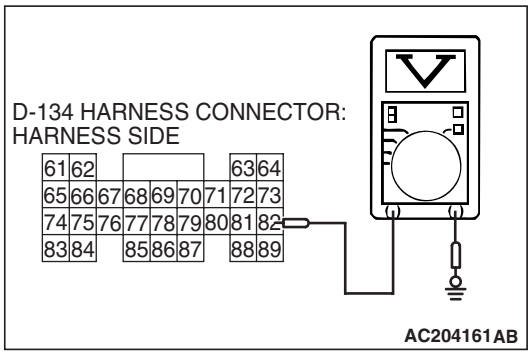
YES : Replace the fuel tank differential pressure sensor (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 14.

NO : Repair the damaged harness wires. Go to Step 15.

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

(1) Do not disconnect PCM connector D-134.
(2) Turn the ignition switch to the "ON" position.
(3) Remove the fuel cap.



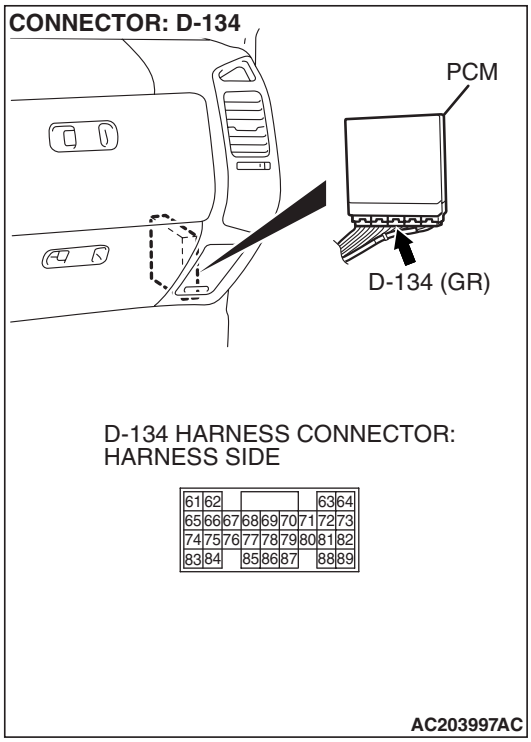


(4) Measure the voltage between PCM connector D-134 terminal 82 and ground by backprobing.
- The voltage should measure between 2.0 and 3.0 volts.

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

Q: Is the measured voltage between 2.0 and 3.0 volts?

YES : Go to Step 14.
NO : Go to Step 11.



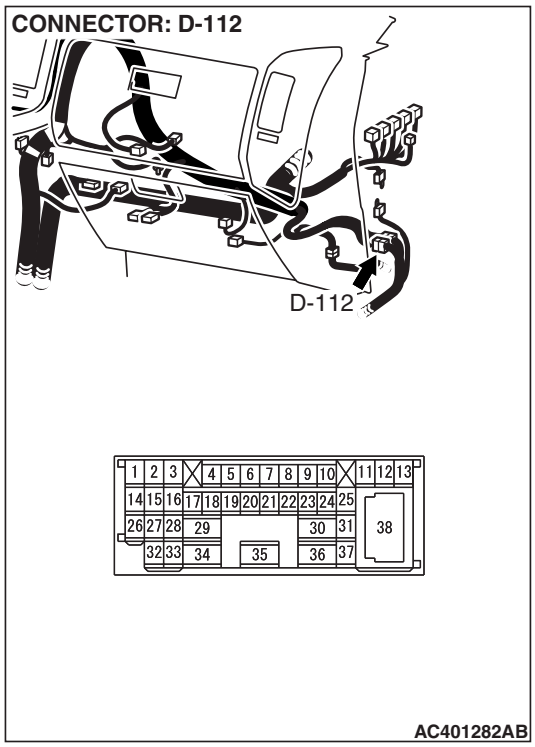
STEP 11. Check PCM connector D-134 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

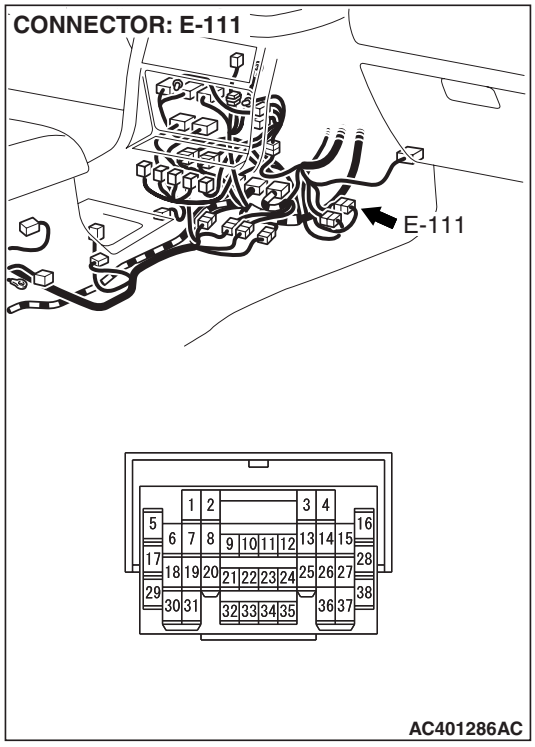
Q: Are the connector and terminals in good condition?

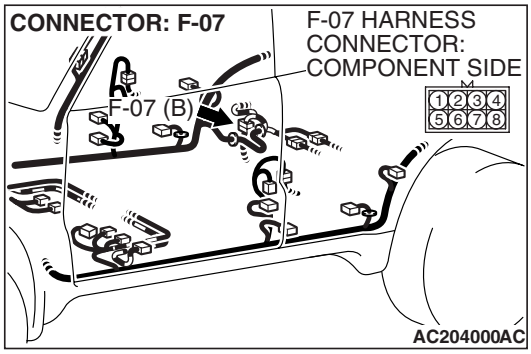
YES : Go to Step 12.

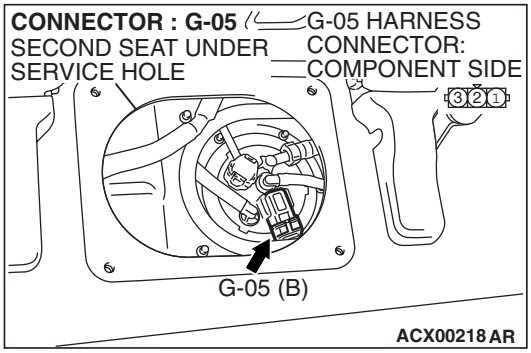
NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.

STEP 12. Check intermediate connectors D-112, E-111 and F-07, and fuel tank differential pressure sensor connector G-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.





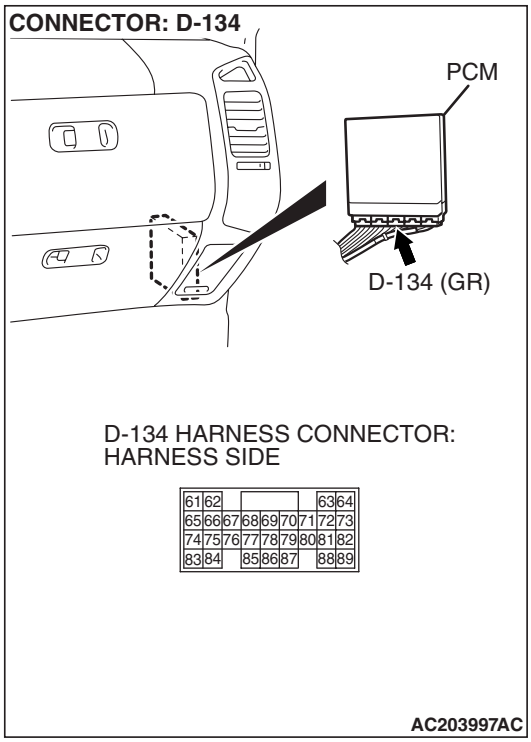


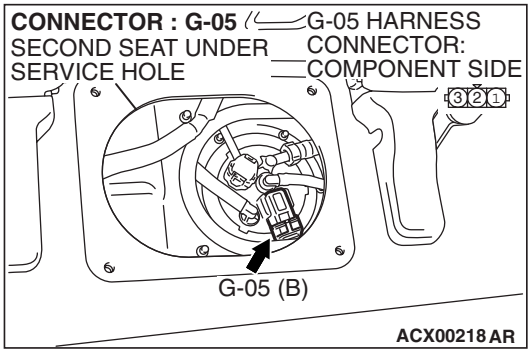


Q: Are the connectors and terminals in good condition?

YES : Go to Step 13.

NO : Repair or replace the faulty component (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Go to Step 15.





STEP 13. Check the harness wires between PCM connector D-134 terminal 82 and fuel tank differential pressure sensor connector G-05 terminal 1 for damage.
Q: Are the harness wires in good condition?

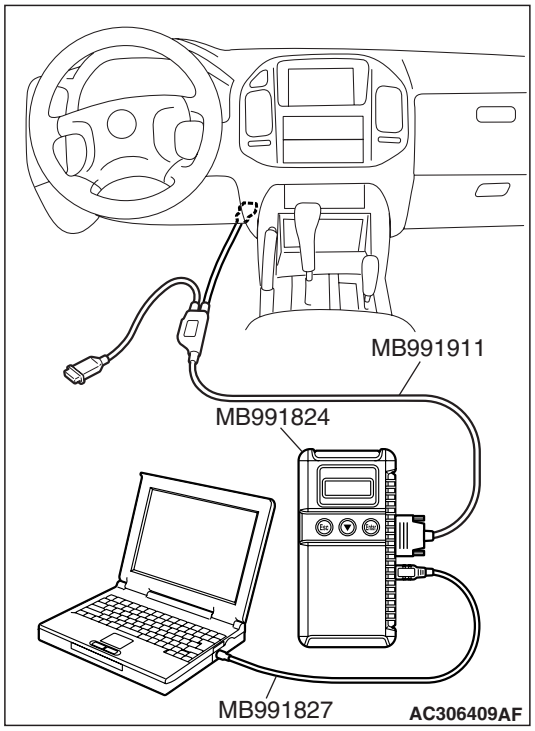
YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-13). Go to Step 15.

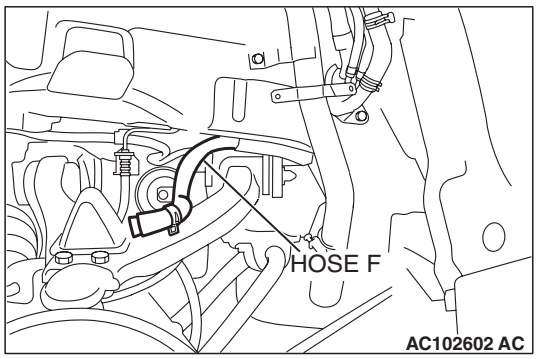
NO : Repair the damaged harness wires. Go to Step 15.

STEP 14. Using scan tool MB991958, check data list item 73: Fuel Tank Differential Pressure Sensor.

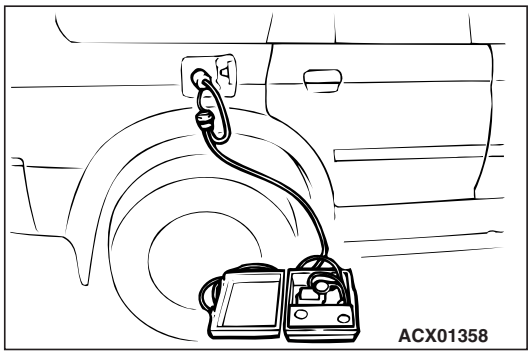
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.





(2) Disconnect hose F from the evaporative emission canister side, and plug the hose.
(3) Turn the ignition switch to the "ON" position.
(4) Remove the fuel cap.
(5) Set scan tool MB991958 to the data reading mode.
Item 73, Fuel Tank Differential Pressure Sensor.
- The fuel tank pressures reading on the scan tool should be −1.5 to 1.5 kPa (−0.443 to 0.443 inHg).



(6) Connect an evaporative emission system pressure pump to the fuel tank filler tube and pressurize the fuel tank.
- The fuel tank pressure reading should increase.

(7) Disconnect an evaporative emission system pressure pump and connect hose F.
(8) Turn the ignition switch to the "LOCK" (OFF) position and disconnect scan tool MB991958.

Q: Is the fuel tank pressure between −1.5 and 1.5 kPa (−0.443 and 0.443 inHg)?

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 Malfunctions P.00-13). Go to Step 15.

NO : Replace the PCM (Refer to P.13A-1066). Go to Step 15.

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STEP 15. Perform the OBD-II drive cycle.

(1) Carry out a test drive with the drive cycle pattern (Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 19 P.13A-4).

(2) Read the diagnostic trouble code (DTC).

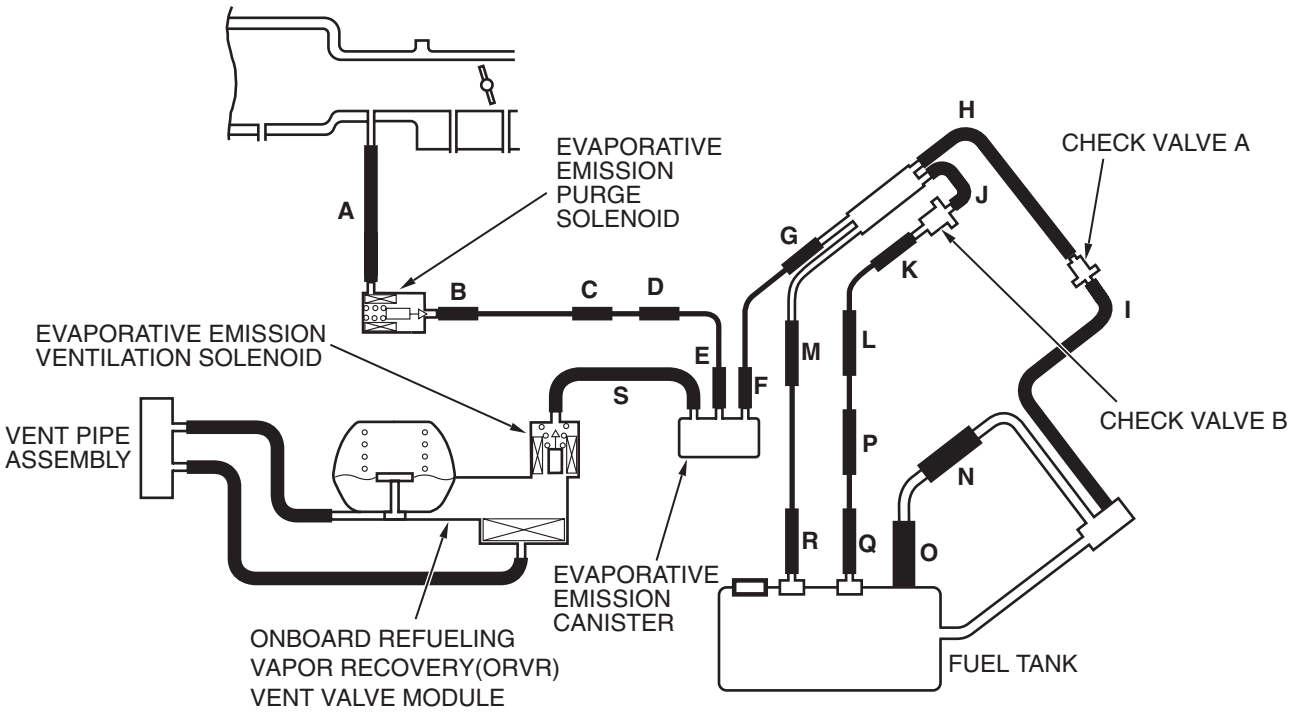
Q: Is DTC P0453 set?

YES : Repeat the troubleshooting from Step 2.

NO : The procedure is complete.

DTC P0455: Evaporative Emission System Leak Detected (Gross Leak)

SYSTEM DIAGRAM



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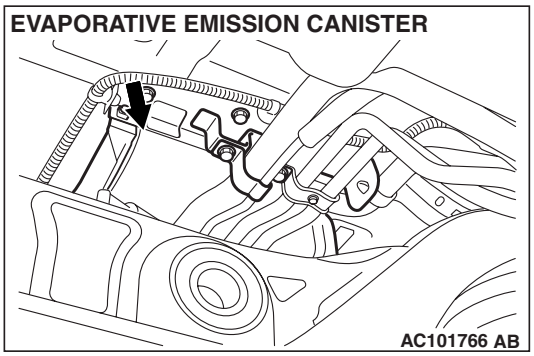
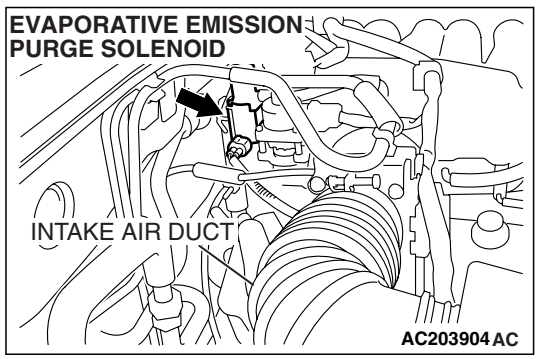
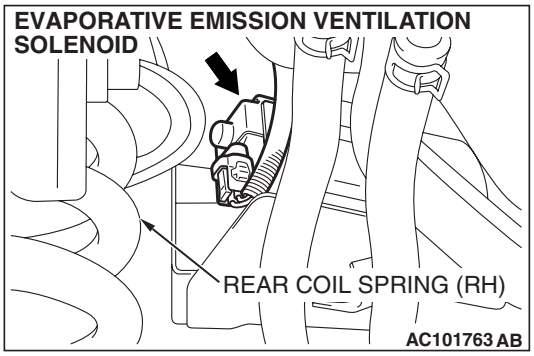




TSB Revision



TECHNICAL DESCRIPTION

- The fuel tank may be under a slight positive and negative pressure depending on the state of the evaporative emission system. The PCM monitors and responds to these pressure changes. If the pressure varies from the specified range, the PCM will set DTC P0455.
- The PCM energizes the evaporative emission ventilation solenoid to shut off the evaporative emission canister outlet port.
- The evaporative emission purge solenoid is to apply engine manifold vacuum to the evaporative emission system.
- When the fuel system develops a vacuum of 2 kPa (0.29 psi), the evaporative emission purge solenoid is turned "OFF" and the fuel system vacuum is maintained at 2 kPa (0.29 psi).
- The PCM determines if there is a leak or clog in the fuel system by measuring the change of vacuum inside the fuel tank.
- The test is stopped when fuel vapor pressure is determined to be too high.

DESCRIPTIONS OF MONITOR METHODS

- Depressurizing EVAP system by intake manifold negative pressure is impossible within specified period.

MONITOR EXECUTION

- Once per driving cycle.

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

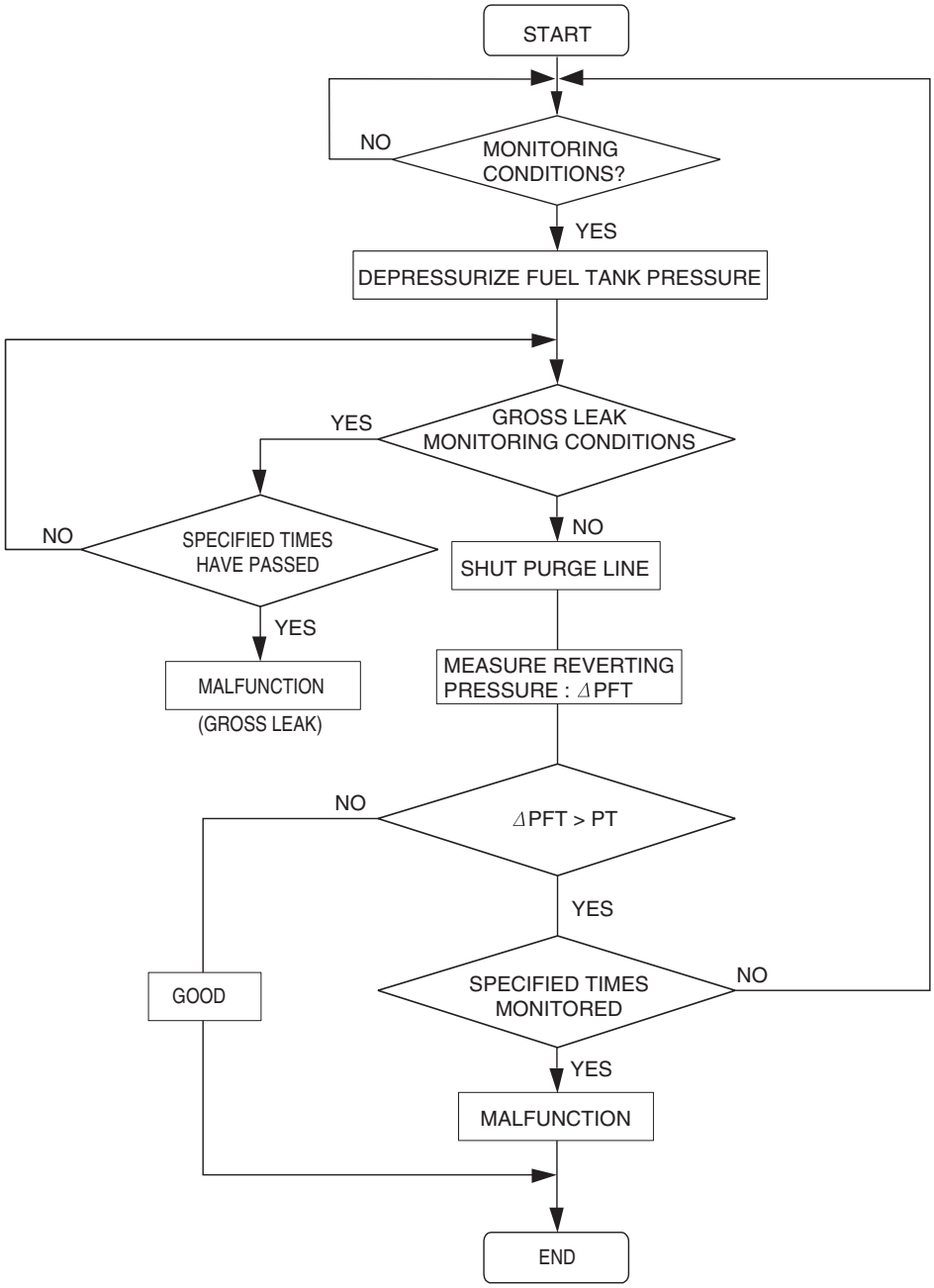
- Evaporative emission purge solenoid monitor
- Evaporative emission purge system monitor
- Fuel tank differential pressure sensor monitor
- Evaporative emission ventilation solenoid monitor
- Fuel level sensor monitor
- Fuel temperature sensor monitor

Sensor (The sensors below are determined to be normal)

- Volume airflow sensor
- Barometric pressure sensor
- Intake air temperature sensor
- Engine coolant temperature sensor

LOGIC FLOW CHARTS (Monitor Sequence)

0.04in, 0.02in GROSS LEAK MONITOR



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DTC SET CONDITIONS

Check Conditions A: At Start up

- Intake air temperature is 36°C (97°F) or less upon engine start up.
- The engine coolant temperature is 36°C (97°F) or less upon engine start up.

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Check Conditions B: For Test to Run
- The engine coolant temperature is 54°C (129°F) or greater and the fuel tank is 15 – 40 percent full.
- The engine coolant temperature is 20°C (68°F) or greater and the fuel tank is 40 – 85 percent full.
- The engine speed is greater than or equal to 1,600 r/min.
- Barometric pressure is greater than 76 kPa (11 psi).
- Volumetric efficiency is between 20 and 70 percent.
- The fuel temperature is 36°C (97°F) or less.
- The fuel tank differential pressure sensor output voltage is 1 – 4 volts.

Check Conditions C: For Test to Stop
- The intake air temperature is greater than 5°C (41°F).
- When the evaporative emission purge solenoid and evaporative emission ventilation solenoid are closed, the pressure in the fuel tank rises to 451 Pa (0.065 psi) or less and the amount of remaining fuel is 15 – 40 percent of capacity upon engine start-up.
- When the evaporative emission purge solenoid and evaporative emission ventilation solenoid are closed, the pressure in the fuel tank rises to 324 Pa (0.047 psi) or less and the amount of remaining fuel is 40 – 85 percent of capacity upon engine start-up.
- 10 seconds have elapsed from the start of the previous monitoring.
- Monitoring time: 150 seconds.

Judgment Criterion
- The fuel tank internal pressure is 2 kPa (0.29 psi) or more after the evaporative emission purge solenoid valve has been driven when the fuel tank and vapor line were closed.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 5 P.13A-4.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)
- Loose fuel cap.
- Fuel cap relief pressure is incorrect.
- Fuel overflow limiter valve failed.
- Purge line or vapor line is clogged.
- Fuel tank, purge line or vapor line seal failed.
- Evaporative emission purge solenoid valve failed.
- Evaporative emission ventilation solenoid valve failed.
- Fuel tank differential pressure sensor failed.
- Evaporative emission canister seal is faulty.
- Evaporative emission canister is clogged.

DIAGNOSIS

Required Special Tools:

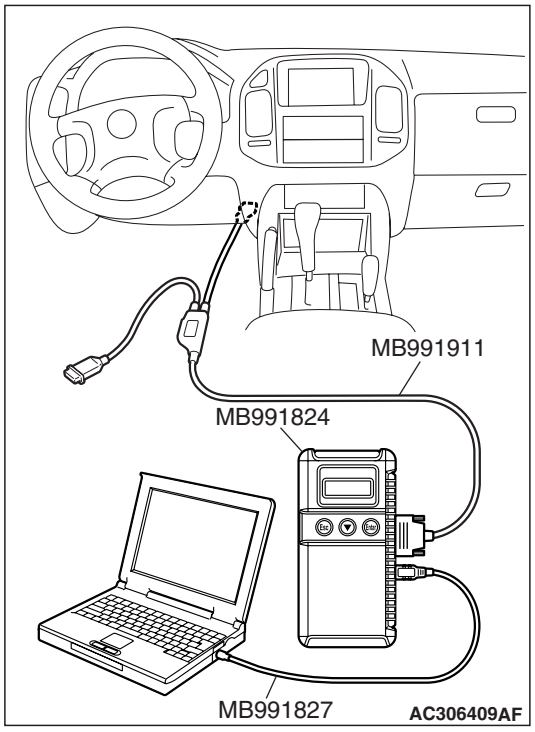
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness B

STEP 1. Using scan tool MB991958, check evaporative emission system monitor test.

⚠ CAUTION

- **To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.**
- **During this test, the PCM automatically increases the engine speed to 1,600 r/min or greater. Check that the transmission is set to "P" position.**

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Erase the DTCs using scan tool MB991958.
(4) Check that the fuel cap is securely closed (Tighten until three clicks are heard).
(5) Start the engine.
(6) Select "System Test."
(7) Select "Evap Leak Mon."
(8) During this test, keep the accelerator pedal at the idling position.
(9) Keep the engine speed and engine load within the specified range. When the monitor test starts, the "In Progress" item on scan tool MB991958 will change from "NO" to "YES."
(10) Turn the ignition switch to the "LOCK" (OFF) position and disconnect scan tool MB991958.



Q: Is "Evap Leak Mon. Completed. Test Failed and DTCs Set" displayed on scan tool MB991958?

YES : A malfunction has been detected during the monitor test (Refer to the Diagnostic Trouble Code Chart and diagnose any other DTCs that are set P.13A-33). If no other DTC's have been set, go to Step 2.

NO <"Evap Leak Mon. Completed. Test Passed" is displayed on scan tool MB991958.> : The evaporative emission system is working properly at this time. Explain to the customer that an improperly tightened fuel cap can cause the MIL to illuminate. Return the vehicle to the customer.

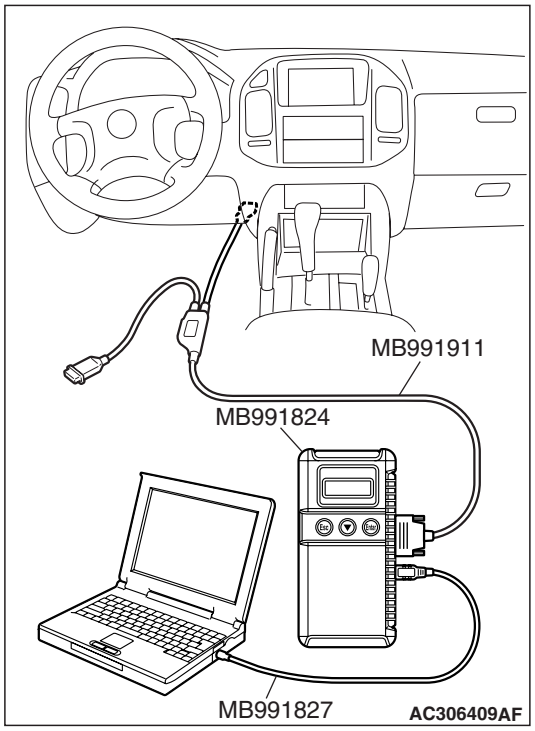
NO <"Evap Leak Mon. Discontinued. Retest again from the first" is displayed on scan tool MB991958.> : The EVAP monitor has been interrupted during the test. Turn the ignition switch to the "LOCK" (OFF) position once, and repeat the monitoring from Step 1.

STEP 2. Using scan tool MB991958, check actuator test item 08: Evaporative Emission Purge Solenoid.

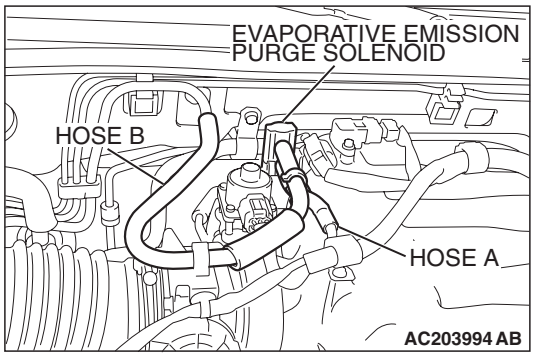
⚠ CAUTION

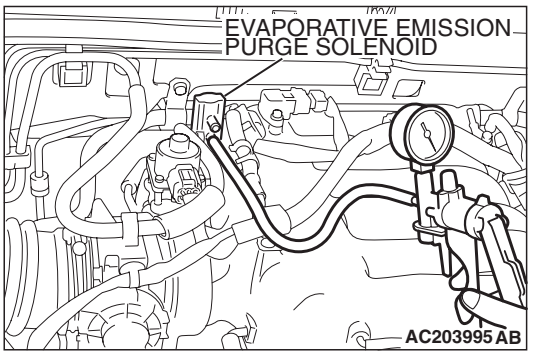
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.



(2) Disconnect hoses A and B from the evaporative emission purge solenoid.





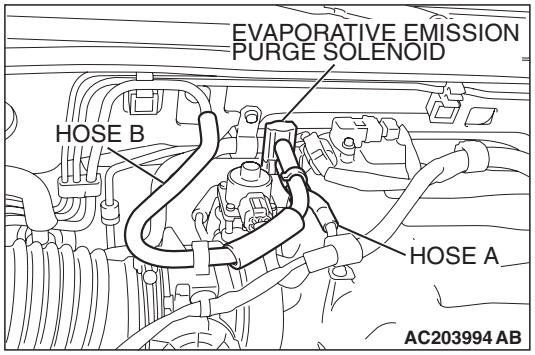
(3) Connect the hand vacuum pump to the evaporative emission purge solenoid instead of hose A.
(4) Turn the ignition switch to the "ON" position.
(5) Set scan tool MB991958 to actuator test mode for item 08, evaporative emission purge solenoid.
- When the evaporative emission purge solenoid is operated, apply a pressure on the hand vacuum pump and confirm that air is blown from the other side nipple.

(6) Turn the ignition switch to the "LOCK" (OFF) position.
(7) Disconnect the hand vacuum pump and connect hoses A and B to the evaporative emission purge solenoid.

Q: Does the evaporative emission purge solenoid nipple blow the air?

YES : Go to Step 3.
NO : Replace the evaporative emission purge solenoid. Go to Step 26.

TSB Revision



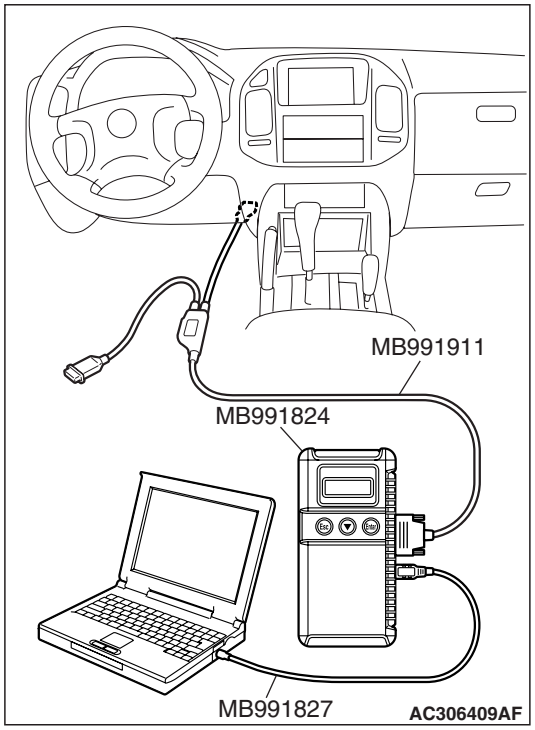
STEP 3. Check for leaks and clogging in the evaporative emission system hoses A and hose B.

Using a hand vacuum pump, do leakage test and clogging test on each hose A and B.

Q: Are the hoses in good condition?

YES : Go to Step 4.

NO : Replace any damaged hose. Go to Step 26.

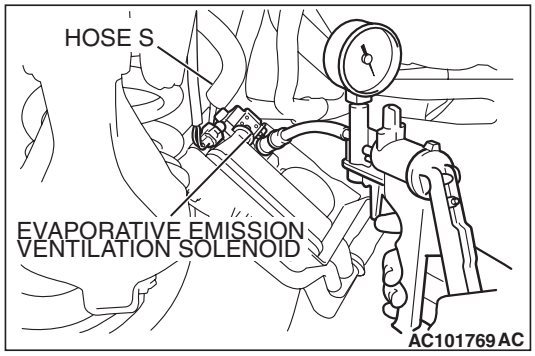


STEP 4. Using scan tool MB991958, check actuator test item 29: Evaporative Emission Ventilation Solenoid.

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.



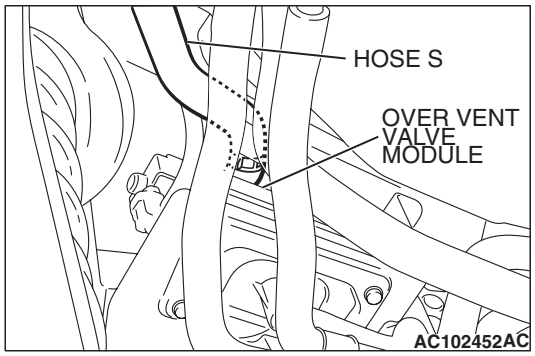
(2) Disconnect hose S from the evaporative emission ventilation solenoid and connect a hand vacuum pump.
(3) Turn the ignition switch to the "ON" position.
(4) Set scan tool MB991958 to actuator test mode for item 29, evaporative emission ventilation solenoid.
- While the evaporative emission ventilation solenoid is energized, operate the hand vacuum pump and confirm that solenoid holds vacuum.

(5) Turn the ignition switch to the "LOCK" (OFF) position and disconnect scan tool MB991958.
(6) Disconnect the hand vacuum pump and connect hose S to the evaporative emission ventilation solenoid.

Q: Does the evaporative emission ventilation solenoid hold vacuum?

YES : Go to Step 5.
NO : Replace the evaporative emission ventilation solenoid (Refer to GROUP 17, Evaporative Emission Canister and Fuel Tank Pressure Relief Valve P.17-72). Go to Step 26.

STEP 5. Check for leaks and clogging in the evaporative emission system hose S.

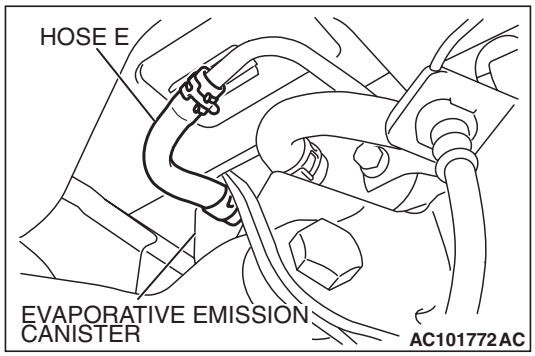


Using a hand vacuum pump, do leakage test and clogging test on hose S.

Q: Does hose S in good condition?

YES : Go to Step 6.
NO : Replace hose S. Go to Step 26.

STEP 6. Check for leaks and clogging in evaporative emission system hose E

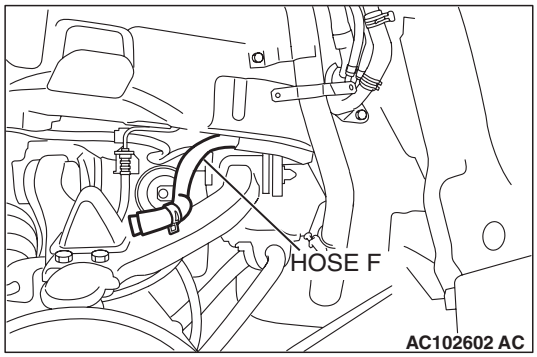


Using a hand vacuum pump, do leakage test and clogging test on hose E.

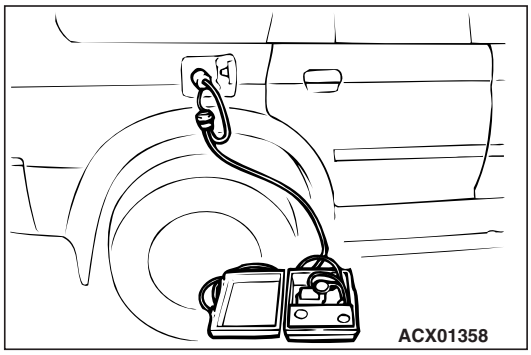
Q: Does hose E in good condition?

YES : Go to Step 7.
NO : Replace hose E. Go to Step 26.

STEP 7. Pressure test the evaporative emission system lines between hose F and R.



(1) Disconnect hose F from the evaporative emission canister and plug hose F securely.
(2) Confirm that the evaporative emission system pressure pump (Miller number 6872A) is operating properly. Perform the self-test as described in the manufacturer's instructions.
(3) Remove the fuel cap.



(4) Connect the evaporative emission system pressure pump to the fuel tank filler tube.
(5) Pressure test the system to determine whether any leaks are present.

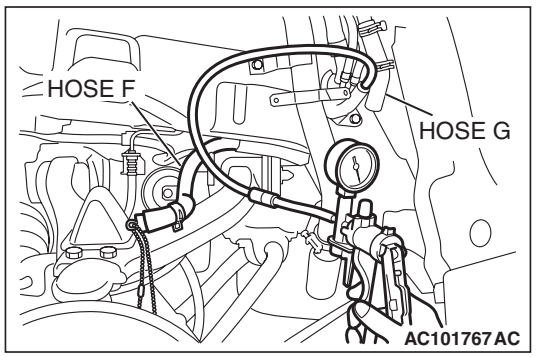
NOTE: The "Pressure test" in this procedure refers to the I/M240 Simulation Test. The eight steps of this test are described in the manufacturer's instructions for the evaporative emission system pressure pump, Miller number 6872A.

(6) Disconnect the evaporative emission system pressure pump and reinstall the fuel cap.
(7) Connect hose F to the evaporative emission canister.

Q: Is the evaporative emission system line free of leaks?

YES : Go to Step 15.
NO : Go to Step 8.

STEP 8. Check for leaks in the evaporator line hose F.



(1) Remove the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8).
(2) Disconnect hose F from the evaporative emission canister and plug hose F securely.
(3) Disconnect hose G from the evaporative emission canister side, and connect a hand vacuum pump.
(4) Apply vacuum with the hand vacuum pump and confirm that the vacuum holds.
(5) Disconnect the hand vacuum pump and connect hose F and G.

Q: Does hose F hold vacuum?

YES : Go to Step 9.
NO : Replace hose F and reinstall the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 26.

STEP 9. Check for leaks in the evaporative emission system hoses G through N.

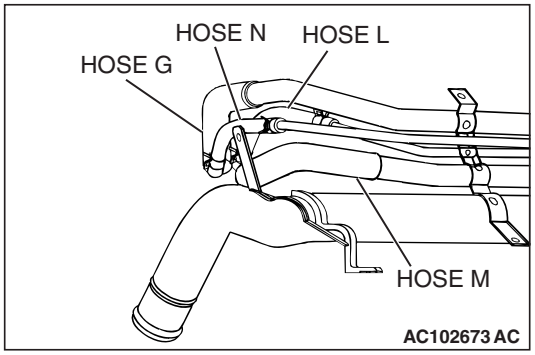
(1) Remove the fuel tank filler tube (Refer to GROUP 13B, Fuel Tank P.13B-8).

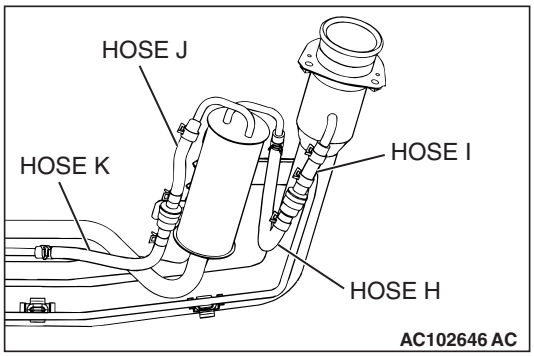
(2) Perform a leakage test with a hand vacuum pump on each hose from hose G to N.

Q: Does the hoses hold vacuum?

YES : Go to Step 10.

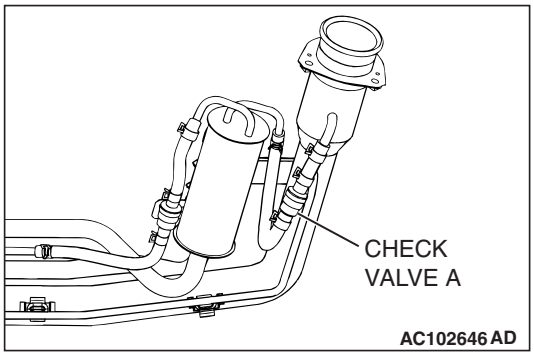
NO : Replace any damaged hose, and reinstall the fuel tank filler tube and the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 26.





STEP 10. Check the check valve A.

(1) Check valve A is a one-way check valve.

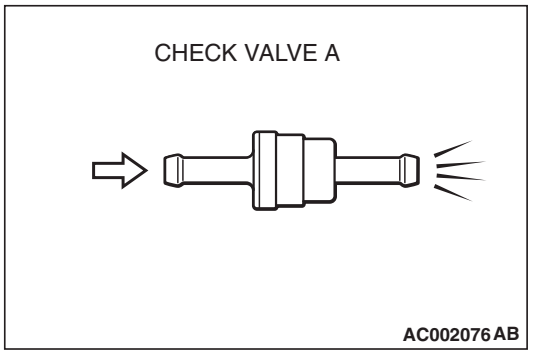


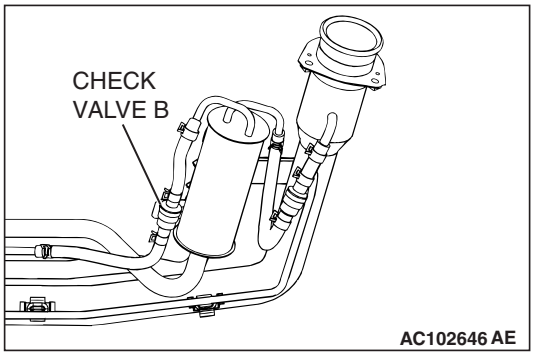
(2) Check valve A should allow air to flow in only one direction.

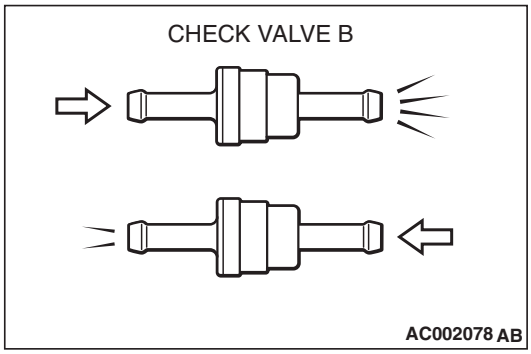
Q: Does check valve A allow air to press in one direction only?

YES : Go to Step 11.

NO : Replace check valve A, and reinstall the fuel tank filler tube and the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 26.







STEP 11. Check the check valve B.

(1) Check valve B is a one-way check valve.

(2) Check valve B should allow air to flow in only one direction.

Q: Does check valve B allow air to press in one direction only?

YES : Go to Step 12.

NO : Replace check valve B, and reinstall the fuel tank filler tube and the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 26.

STEP 12.Check for cracks in the fuel tank filler tube assembly.

Visually check for cracks in the fuel tank filler tube assembly.

Q: Is the fuel tank filler tube assembly in good condition?

YES : Go to Step 13.

NO : Replace the fuel tank filler tube assembly and reinstall the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 26 .

STEP 13. Check for leaks in the evaporative emission system hoses O through R.

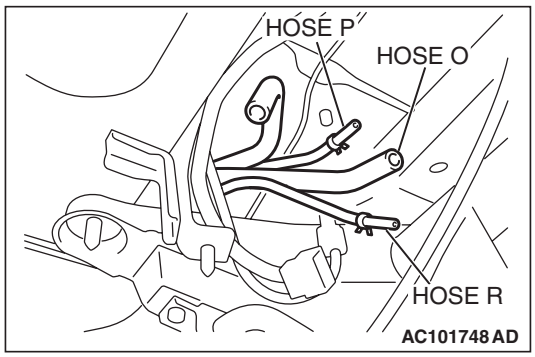
(1) Remove the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8).

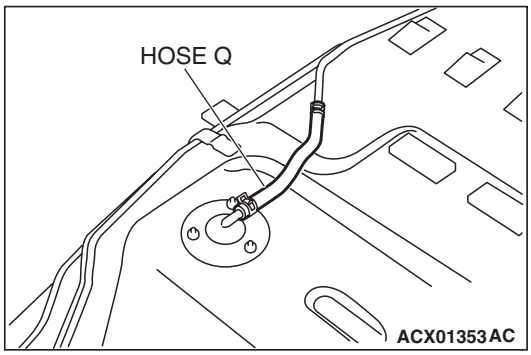
(2) Perform a leakage test with a hand vacuum pump on each hose from hose O to R.

Q: Does the hoses hold vacuum?

YES : Go to Step 14.

NO : Replace any damaged hose, and reinstall the fuel tank, the fuel tank filler tube and the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 26.

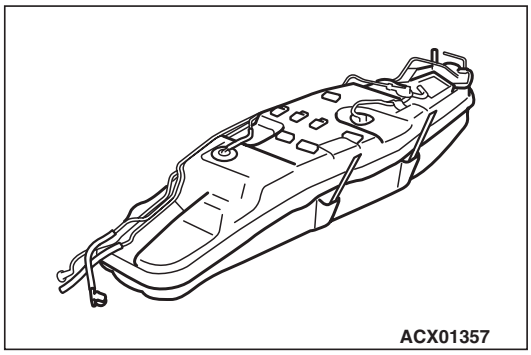


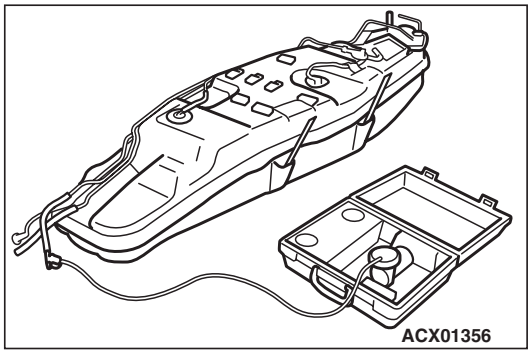


STEP 14. Check for leaks in the fuel tank.

(1) Visually check for cracks and leaks, etc.

NOTE: Carefully check the fuel pump assembly, the fuel level sensor, the fuel tank rollover valve and fuel tank leveling valve installation section in the fuel tank.





(2) Connect the evaporative emission system pressure pump to the filler hose.
(3) Plug the filler hose, feed pipe, return pipe and rollover valve nipple that are connected to the fuel tank.

NOTE: If these items are not securely plugged at this time, the fuel could leak from the tank.

(4) Pressurize the fuel tank with the evaporative emission system pressure pump.
(5) In the pressurized state, check for the leaks by applying soapy water solution to each section and look for bubbles.

Q: Is any leaks found?

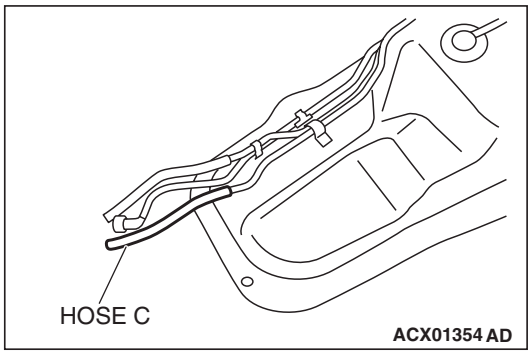
YES <When there is a leak from the attachment points of the fuel pump assembly, fuel tank differential pressure sensor, leveling valve or fuel tank rollover valve.> : Reassemble the leaked parts and check again that there are no leaks. Then reinstall the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8). Then go to Step 18 .

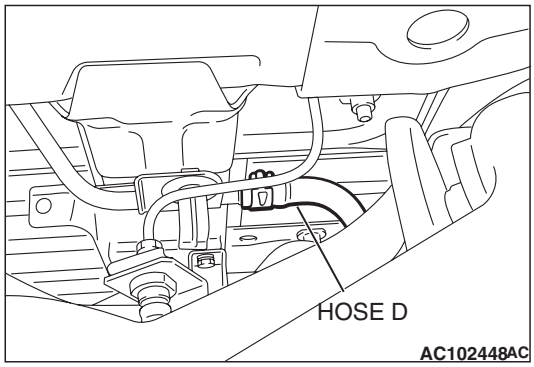
YES <When there is a leak from the fuel tank.> : Replace the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8). Then go to Step 18.

NO : When there is no leak, reinstall the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8). Then go to Step 15.

STEP 15. Check for leaks in the evaporative emission system hose C and hose D.

(1) Remove the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8).
(2) Perform a leakage test with a hand vacuum pump on each hose C and D.





Q: Does the hoses hold vacuum?

YES : Reinstall the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 16.

NO : Replace any damaged hose and reinstall the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 26.

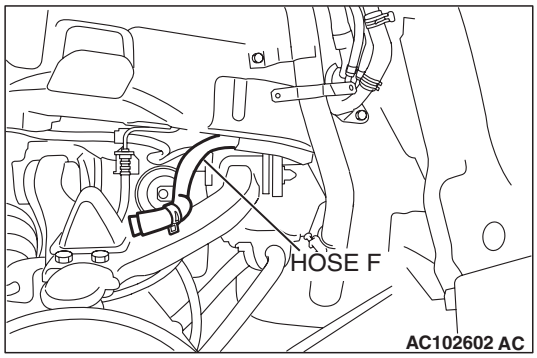
STEP 16. Check for leaks in the evaporative emission canister.

(1) Remove the evaporative emission canister (Refer to GROUP 17, Evaporative Emission Canister and Fuel Tank Pressure Relief Valve P.17-72).
(2) Connect a hand vacuum pump to the vent nipple of the evaporative emission canister.
(3) Plug the other two nipples or loop a hose between them.
(4) Apply vacuum with the hand vacuum pump and confirm that the canister holds vacuum.

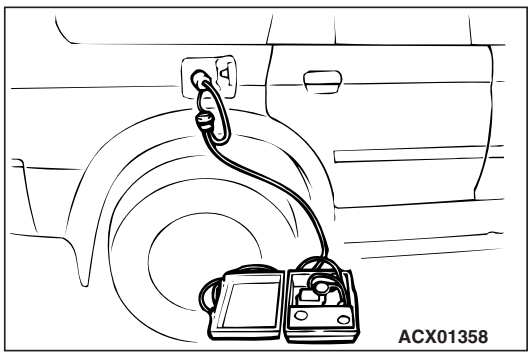
Q: Does the evaporative emission canister hold vacuum?

YES : Reinstall the evaporative emission canister (Refer to GROUP 17, Evaporative Emission Canister and Fuel Tank Pressure Relief Valve P.17-72). Go to Step 17 .
NO : Replace the evaporative emission canister (Refer to GROUP 17, Evaporative Emission Canister and Fuel Tank Pressure Relief Valve P.17-72). Go to Step 26 .

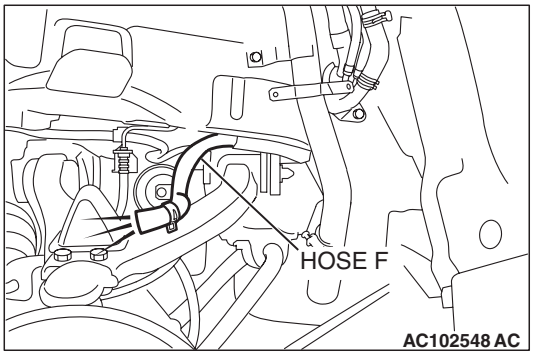
STEP 17. Pressure test for clogging in evaporative emission system lines between hose F and R.



(1) Disconnect hose F from the evaporative emission canister and plug hose F securely.
(2) Confirm that the evaporative emission system pressure pump (Miller number 6872A) is operating properly. Perform the self-test as described in the manufacturer's instructions.
(3) Remove the fuel cap.



(4) Connect the evaporative emission system pressure pump to the fuel tank filler tube.



(5) After it is confirmed that pressure maintained, unplug hose F.
(6) Disconnect the evaporative emission system pressure pump and reinstall the fuel cap.
(7) Connect hose F to the evaporative emission canister.

Q: Does hose F blow the air?

YES : Go to Step 23.
NO : Go to Step 18.

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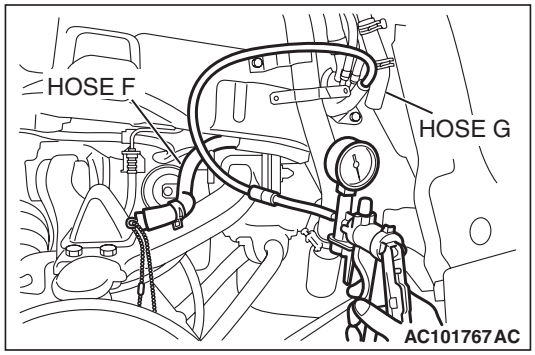
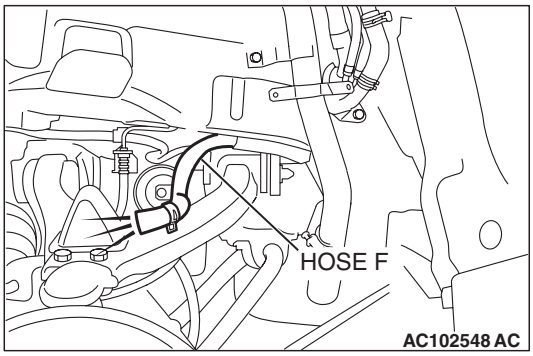
STEP 18. Check for clogging in the evaporator line hose F.

(1) Remove the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8).
(2) Disconnect hose F from the evaporative emission canister and plug hose F securely.
(3) Disconnect hose G from the evaporative emission canister side, and connect a hand vacuum pump.





(4) Apply vacuum with the hand vacuum pump, unplug hose F.
(5) Disconnect the hand vacuum pump and connect hose F and G.

Q: Does hose F blow the air?

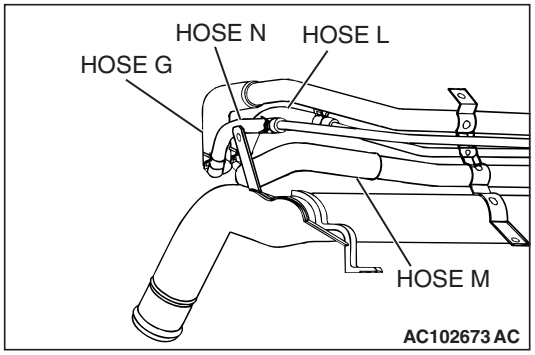
YES : Go to Step 19.
NO : Replace hose F and reinstall the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 26.

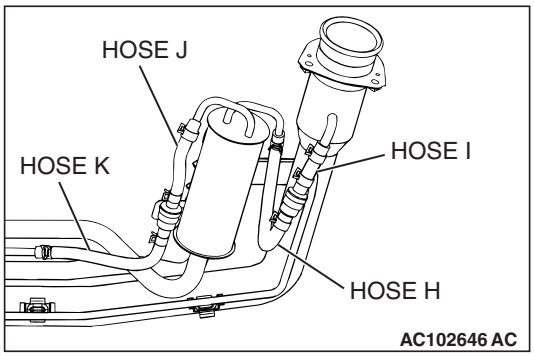
STEP 19. Check for clogging in the evaporative emission system hoses G through N.

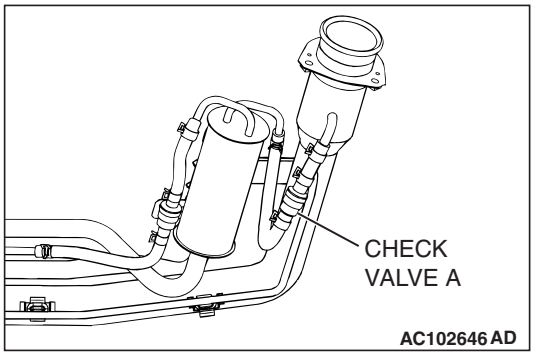
(1) Remove the fuel tank filler tube (Refer to GROUP 13B, Fuel Tank P.13B-8).
(2) Use a hand vacuum pump to clogging test on each hose from hose G to hose N.

Q: Are the hoses in good condition?

YES : Go to Step 20.
NO : Replace any damaged hose, and reinstall the fuel tank filler tube and the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 26.

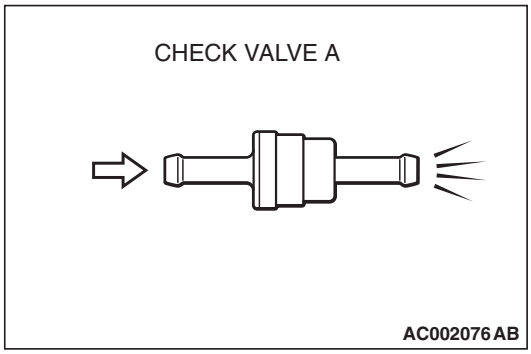






STEP 20. Check the check valve A.

(1) Check valve A is a one-way check valve.

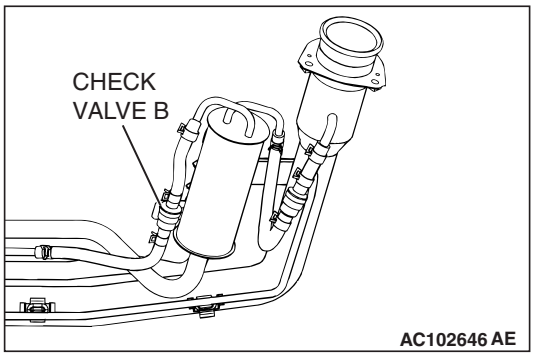


(2) Check valve A should allow air to flow in only one direction.

Q: Does check valve A allow air to press in one direction only?

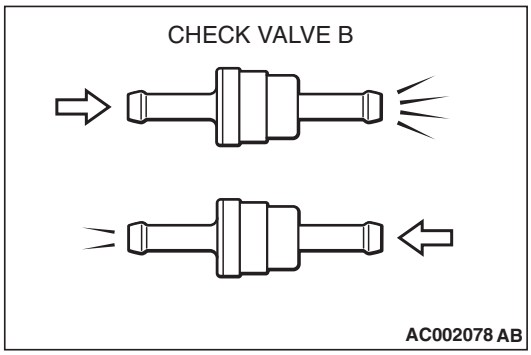
YES : Go to Step 21.

NO : Replace check valve A, and reinstall the fuel tank filler tube and the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 26.



STEP 21. Check the check valve B.

(1) Check valve B is a one-way check valve.

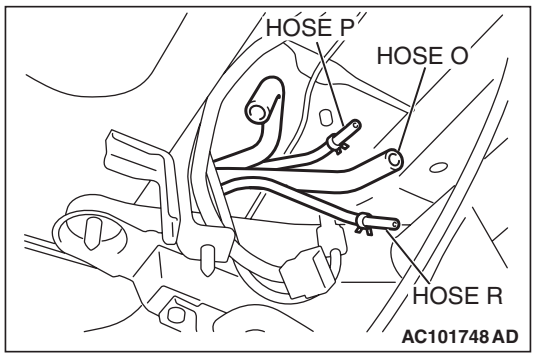


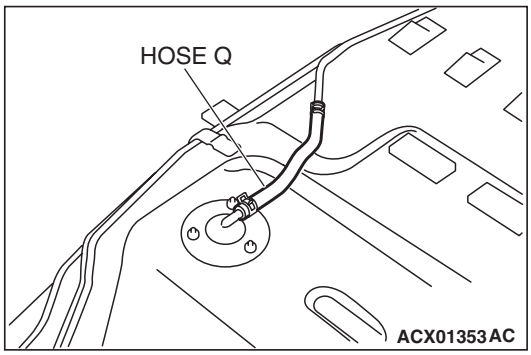
(2) Check valve B should allow air to flow in only one direction.

Q: Does check valve B allow air to press in one direction only?

YES : Go to Step 22.

NO : Replace check valve B, and reinstall the fuel tank filler tube and the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 26.





STEP 22. Check for clogging in the evaporative emission system hoses O through R.

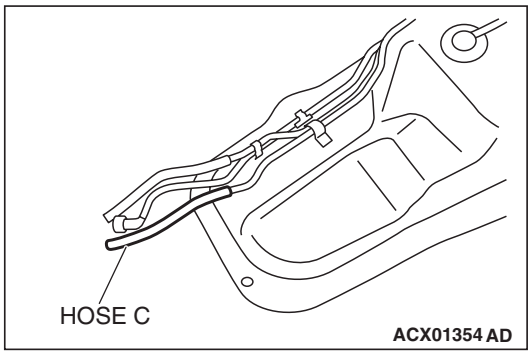
(1) Remove the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8).

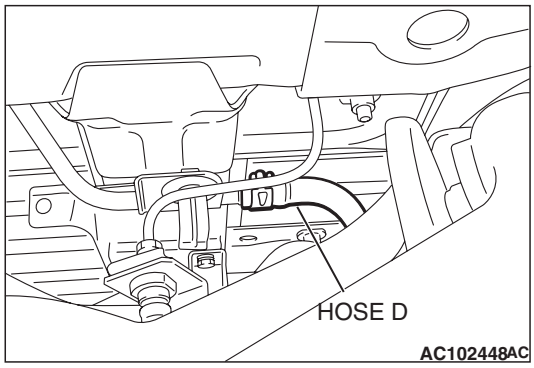
(2) Use a hand vacuum pump to clogging test on each hose from hose O to hose R.

Q: Are the hoses in good condition?

YES : Go to Step 25.

NO : Replace any damaged hose, and reinstall the fuel tank, the fuel tank filler tube and the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 26.





STEP 23. Check for clogging in the evaporative emission system hose C and hose D.

(1) Remove the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8).

(2) Use a hand vacuum pump to clogging test on each hose C and hose D.

Q: Are the hoses in good condition?

YES : Reinstall the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 24.

NO : Replace any damaged hose and reinstall the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 26.

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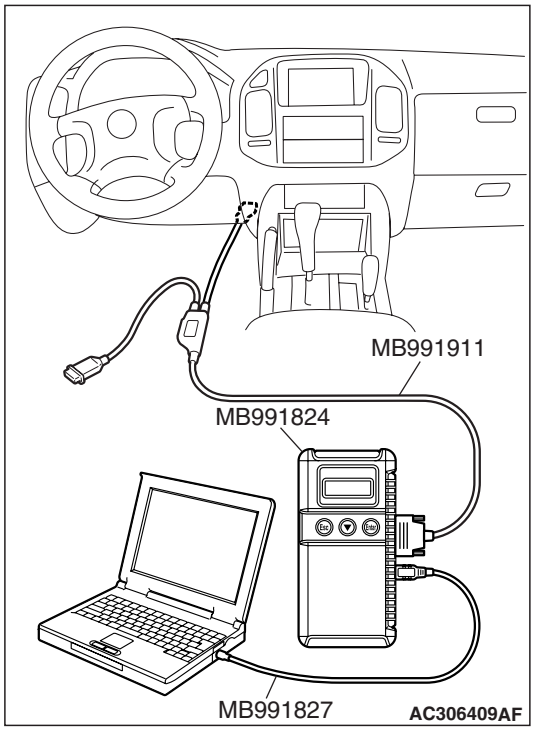
STEP 24. Check for clogging in the evaporative emission canister.

(1) Remove the evaporative emission canister (Refer to GROUP 17, Evaporative Emission Canister and Fuel Tank Pressure Relief Valve P.17-72).
(2) Connect a hand vacuum pump to the vent nipple of the evaporative emission canister.
(3) Plug the other two nipples or loop a hose between the other nipples.
(4) Apply a pressure on the vacuum pump.
(5) When each nipple is unplugged, air should pass through the unplugged nipple.

Q: Is the evaporative emission canister in good condition?

YES : Reinstall the evaporative emission canister (Refer to GROUP 17, Evaporative Emission Canister and Fuel Tank Pressure Relief Valve P.17-72). Go to Step 25 .

NO : Replace the evaporative emission canister (Refer to GROUP 17, Evaporative Emission Canister and Fuel Tank Pressure Relief Valve P.17-72). Go to Step 26 .



STEP 25. Using scan tool MB991958, check evaporative emission system monitor test.

⚠ CAUTION

- **To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.**
- **During this test, the PCM automatically increases the engine speed to 1,600 r/min or greater. Check that the transmission is set to "P" position.**

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Erase the DTCs using scan tool MB991958.
(4) Check that the fuel cap is securely closed (Tighten until three clicks are heard).
(5) Start the engine.
(6) Select "System Test."
(7) Select "Evap Leak Mon."
(8) During this test, keep the accelerator pedal at the idling position.
(9) Keep the engine speed and engine load within the specified range. When the monitor test starts, the "In Progress" item on scan tool MB991958 will change from "NO" to "YES."
(10) Turn the ignition switch to the "LOCK" (OFF) position and disconnect scan tool MB991958.

Q: Is "Evap Leak Mon. Completed. Test Failed and DTCs Set" displayed on scan tool MB991958?

YES : Replace the PCM (Refer to P.13A-1066). Then go to Step 26 .

NO <"Evap Leak Mon. Completed. Test Passed" is displayed on scan tool MB991958.> : The evaporative emission system is working properly at this time. Go to Step 26 .

NO <"Evap Leak Mon. Discontinued. Retest again from the first" is displayed on scan tool MB991958.> : The EVAP monitor has been interrupted during the test. Turn the ignition switch to the "LOCK" (OFF) position once, and repeat the monitoring from Step 25.

STEP 26. Perform the OBD-II drive cycle.

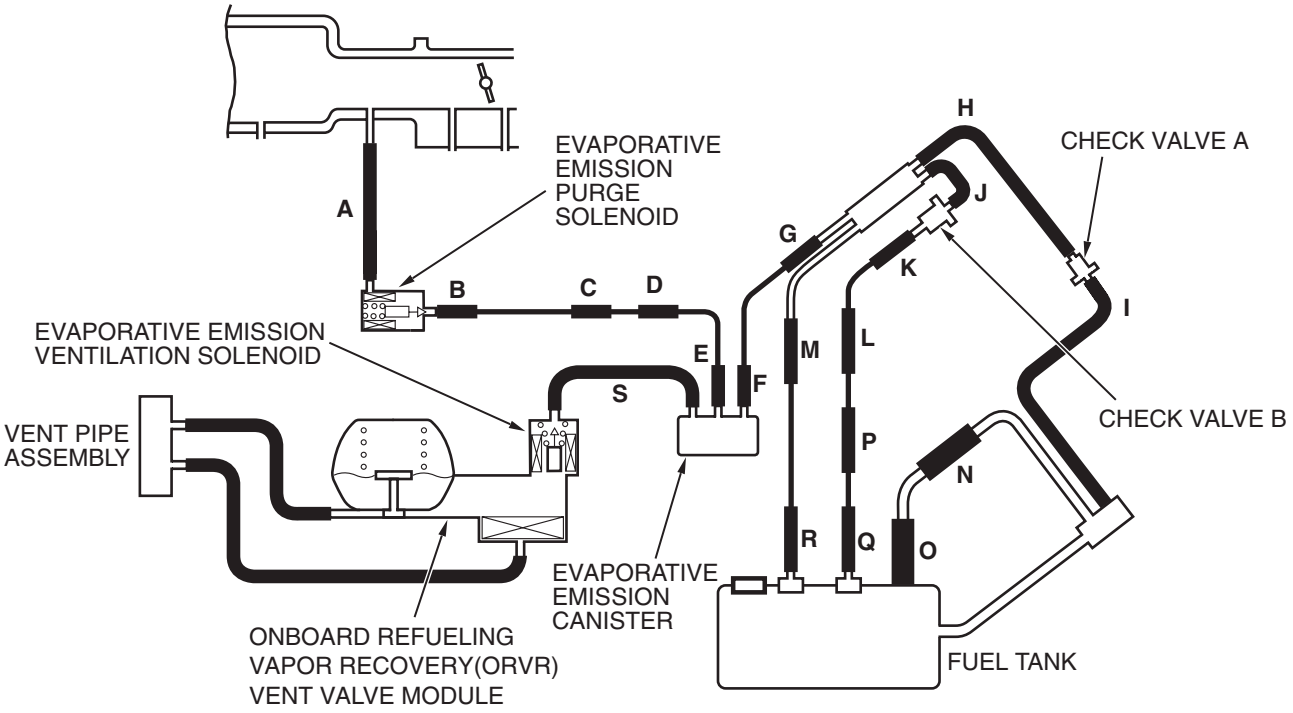
(1) Confirm the repair by performing the appropriate drive cycle (Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 5 P.13A-4).
(2) Read the diagnostic trouble code (DTC).

Q: Is DTC P0455 set?

YES : Repeat the troubleshooting from Step 1.
NO : The procedure is complete.

DTC P0456: Evaporative Emission System Leak Detected (Very Small Leak)

SYSTEM DIAGRAM



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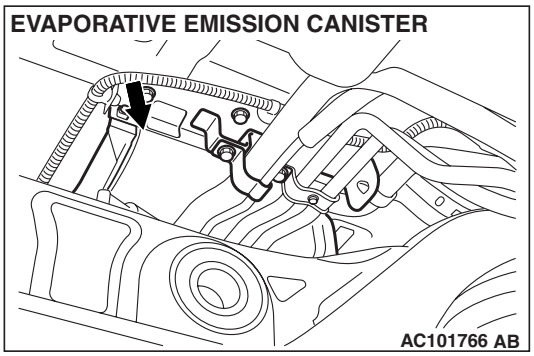
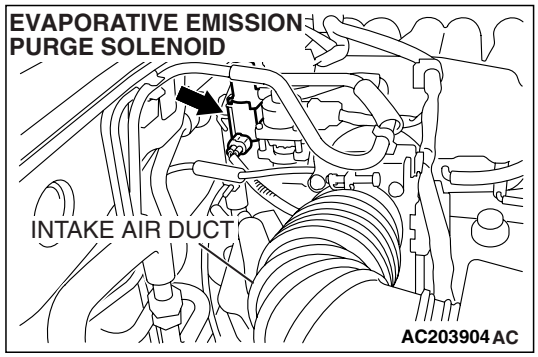
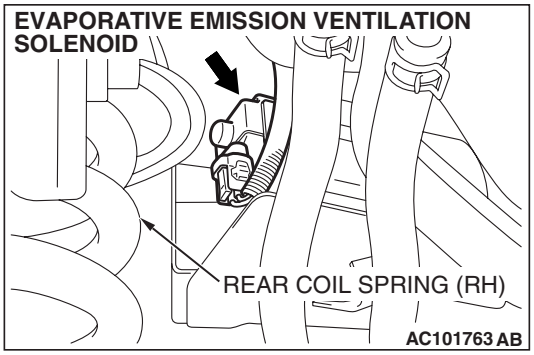






TSB Revision

TECHNICAL DESCRIPTION

- The PCM monitors the Evaporative Emission (EVAP) System pressure.
- The PCM controls the evaporative emission ventilation solenoid. It closes the evaporative emission ventilation solenoid to seal the evaporative emission canister side of the system.
- The evaporative emission purge solenoid is opened to allow manifold vacuum to create low pressure (vacuum) in the EVAP system.
- When the EVAP system develops a vacuum of 2 kPa (0.29 psi), the evaporative emission purge solenoid is closed and the fuel system vacuum is maintained at 2 kPa (0.29 psi).
- The PCM determines whether there is a leak in the EVAP system by monitoring the vacuum inside the fuel tank.
- The test is stopped when fuel vapor pressure exceeds predetermined limits.

DESCRIPTIONS OF MONITOR METHODS

- Measure reverting pressure after depressurizing by intake manifold negative pressure and detect malfunction if reverting pressure rises largely.

MONITOR EXECUTION

- Once per driving cycle.

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

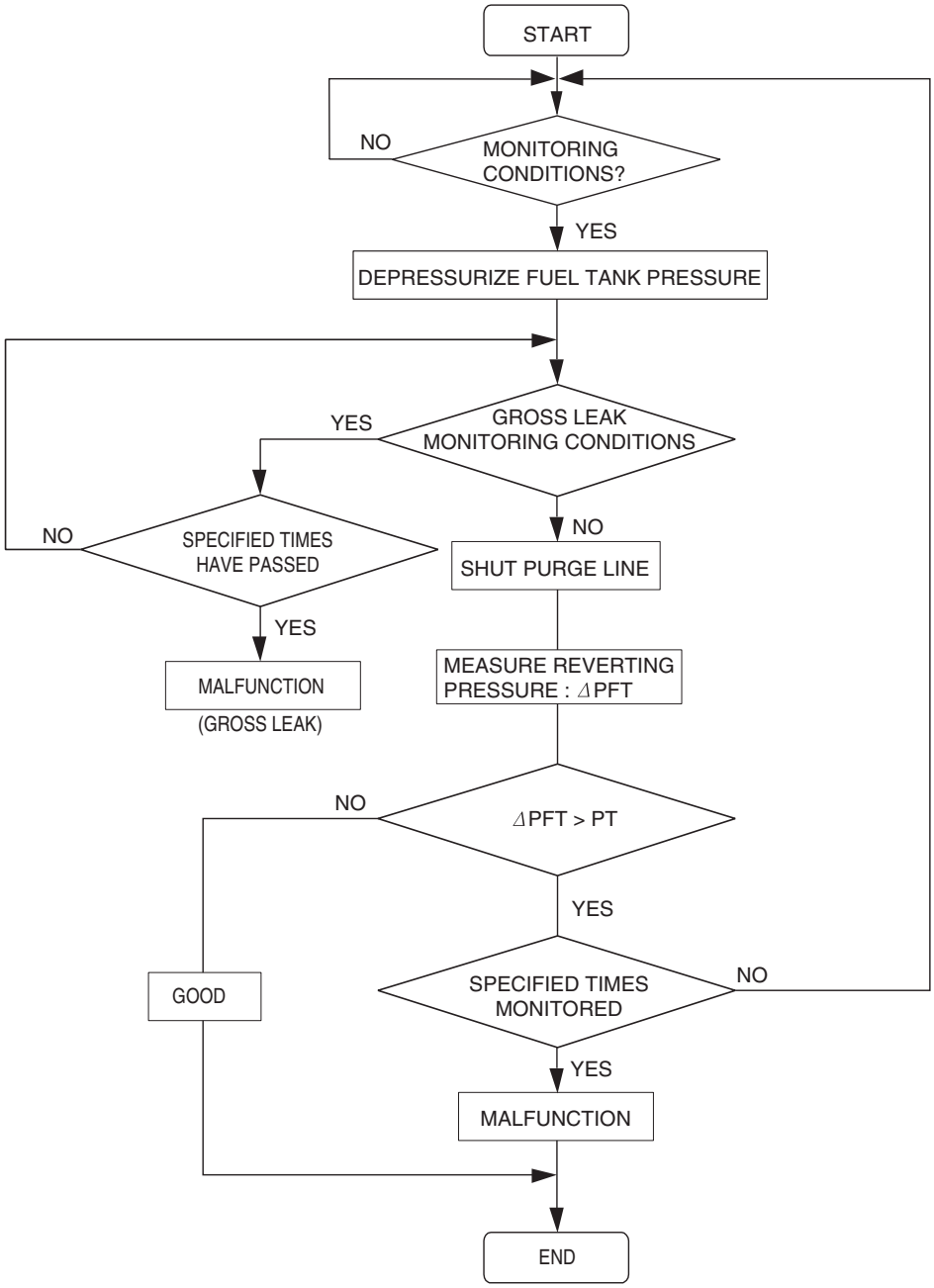
- Evaporative emission purge solenoid monitor
- Evaporative emission purge system monitor
- Fuel tank differential pressure sensor monitor
- Evaporative emission ventilation solenoid monitor
- Fuel level sensor monitor
- Fuel temperature sensor monitor

Sensor (The sensors below are determined to be normal)

- Volume airflow sensor
- Barometric pressure sensor
- Intake air temperature sensor
- Engine coolant temperature sensor

LOGIC FLOW CHARTS (Monitor Sequence)

0.04in, 0.02in GROSS LEAK MONITOR



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DTC SET CONDITIONS

Check Conditions A: At Start up

- Intake air temperature is 36°C (97°F) or less when the engine is started.
- The engine coolant temperature is 36°C (97°F) or less when the engine is started.
- The fuel level sensor output voltage is 2.4 – 3.7 volts when the engine starts and the amount of remaining fuel is 40 – 85 percent of capacity.

Check Conditions B: For Test to Run
- Barometric pressure is greater than 76 kPa (11 psi).
- The fuel temperature is 33°C (91°F) or less.
- Fuel tank differential pressure sensor output voltage is 1 to 4 volts.

Check Conditions C: For Test to Stop
- Engine coolant temperature is greater than 20 °C (68 °F).
- Intake air temperature is greater than -10 °C (14 °F).
- When the evaporative emission purge solenoid and evaporative emission ventilation solenoid are closed, the pressure rises in the fuel tank is less than 324 Pa (0.047 psi).
- 10 seconds have elapsed from the start of the previous monitoring.
- Monitoring time: 10 – 14 minutes.

Judgment Criterion
- Internal pressure of the fuel tank has changed more than 1,177 – 1,373 Pa (0.177 – 0.199 psi) in 128 seconds after the tank and vapor line were closed.

OBD-II DRIVE CYCLE PATTERN
Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 6 P.13A-4.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)
- Loose fuel cap.
- Fuel cap relief pressure is incorrect.
- Malfunction of the evaporative emission canister seal.
- Malfunction of the fuel tank, purge line or vapor line seal.
- Malfunction of the evaporative emission ventilation solenoid.

DIAGNOSIS

Required Special Tools:

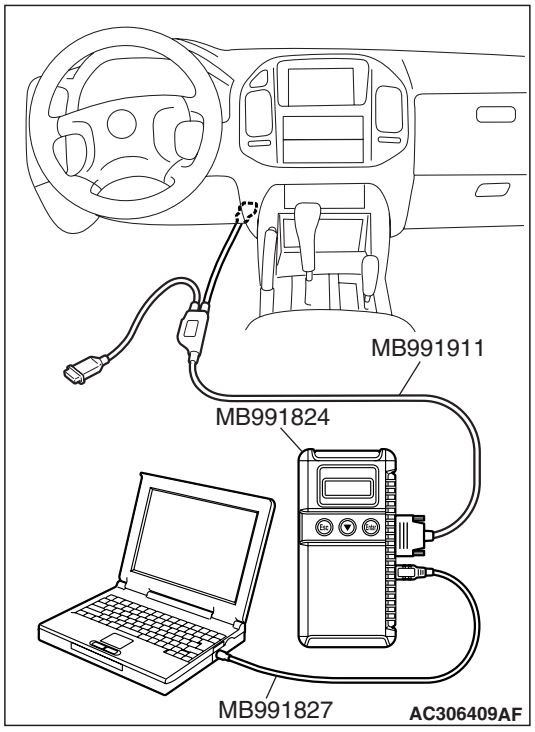
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness B

STEP 1. Using scan tool MB991958, check evaporative emission system monitor test.

⚠ CAUTION

- **To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.**
- **During this test, the PCM automatically increases the engine speed to 1,600 r/min or greater. Check that the transmission is set to "P" position.**

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Erase the DTCs using scan tool MB991958.
(4) Check that the fuel cap is securely closed (Tighten until three clicks are heard).
(5) Start the engine.
(6) Select "System Test."
(7) Select "Evap Leak Mon."
(8) During this test, keep the accelerator pedal at the idling position.
(9) Keep the engine speed and engine load within the specified range. When the monitor test starts, the "In Progress" item on scan tool MB991958 will change from "NO" to "YES."
(10) Turn the ignition switch to the "LOCK" (OFF) position and disconnect scan tool MB991958.

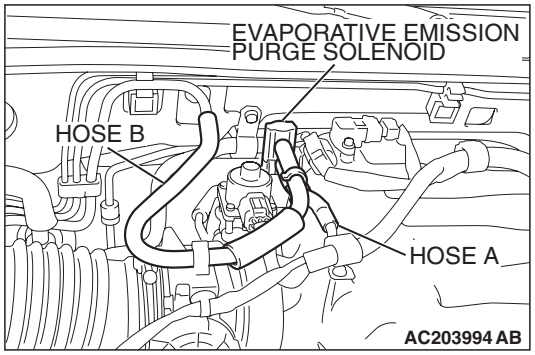


Q: Is "Evap Leak Mon. Completed. Test Failed and DTCs Set" displayed on scan tool MB991958?

YES : A malfunction has been detected during the monitor test (Refer to the Diagnostic Trouble Code Chart and diagnose any other DTCs that are set P.13A-33). If no other DTC's have been set, then go to Step 2.

NO <"Evap Leak Mon. Completed. Test Passed" is displayed on scan tool MB991958.> : The evaporative emission system is working properly at this time. Explain to the customer that an improperly tightened fuel cap can cause the MIL to illuminate. Return the vehicle to the customer.

NO <"Evap Leak Mon. Discontinued. Retest again from the first" is displayed on scan tool MB991958.> : The EVAP monitor has been interrupted during the test. Turn the ignition switch to the "LOCK" (OFF) position once, and repeat the monitoring from Step 1.

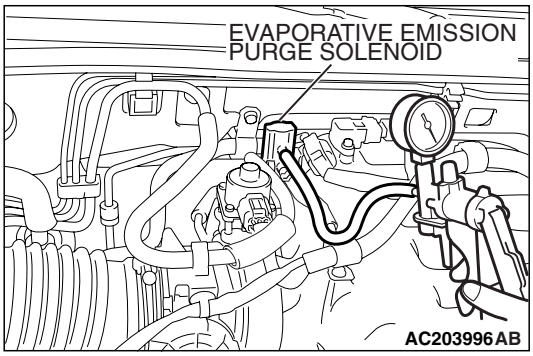


STEP 2. Check for leaks in the evaporative emission purge solenoid.

(1) Disconnect hose B from the evaporative emission purge solenoid and connect a hand vacuum pump to the nipple of the evaporative emission purge solenoid.
(2) Use the hand vacuum pump to confirm that the evaporative emission purge solenoid holds vacuum.
(3) Disconnect the hand vacuum pump and connect hose B to the evaporative emission purge solenoid.

Q: Does the evaporative emission purge solenoid hold vacuum?

YES : Go to Step 3.
NO : Replace the evaporative emission purge solenoid. Go to Step 18.

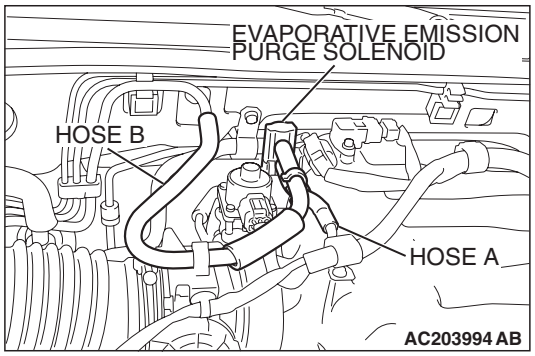


STEP 3. Check for leaks in the evaporative emission system hose A and hose B.

Perform a leakage test with a hand vacuum pump on each hose A and B.

Q: Does the hoses hold vacuum?

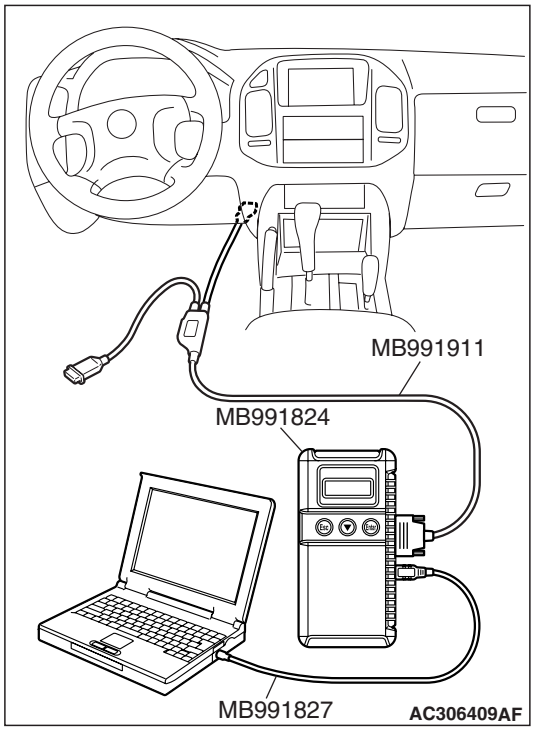
YES : Go to Step 4.
NO : Replace any damaged hose. Go to Step 18.

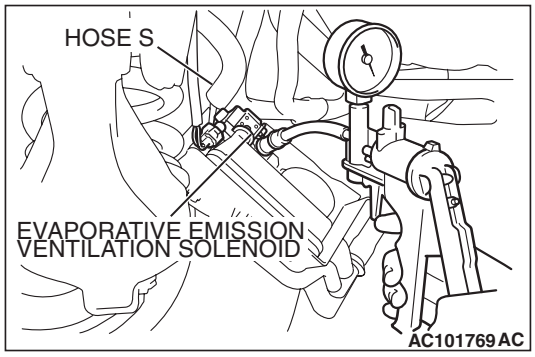


STEP 4. Using scan tool MB991958, check actuator test item 29: Evaporative Emission Ventilation Solenoid.

⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.



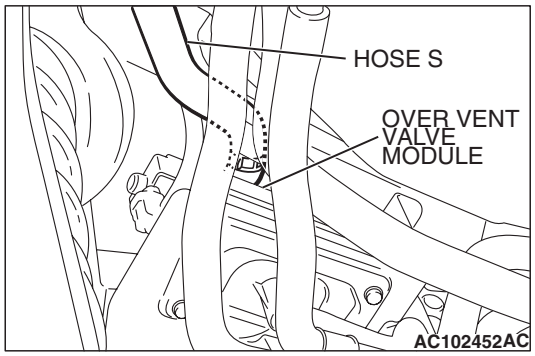


(2) Disconnect hose S from the evaporative emission ventilation solenoid and connect a hand vacuum pump.
(3) Turn the ignition switch to the "ON" position.
(4) Set scan tool MB991958 to actuator test mode for item 29, evaporative emission ventilation solenoid.
- While the evaporative emission ventilation solenoid is energized, operate the hand vacuum pump and confirm that solenoid holds vacuum.

(5) Turn the ignition switch to the "LOCK" (OFF) position and disconnect scan tool MB991958.
(6) Disconnect the hand vacuum pump and connect hose S to the evaporative emission ventilation solenoid.

Q: Does the evaporative emission ventilation solenoid hold vacuum?

YES : Go to Step 5.
NO : Replace the evaporative emission ventilation solenoid (Refer to GROUP 17, Evaporative Emission Canister and Fuel Tank Pressure Relief Valve P.17-72). Go to Step 18.



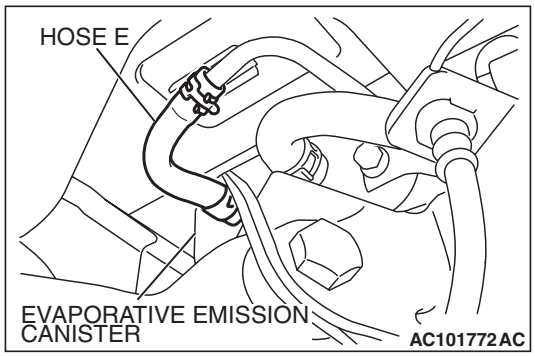
STEP 5. Check for leaks in the evaporative emission system hose S.

Perform a leakage test with a hand vacuum pump on hose S.

Q: Does hose S hold vacuum?

YES : Go to Step 6.

NO : Replace hose S. Go to Step 18.



STEP 6. Check for leaks in the evaporative emission system hose E.

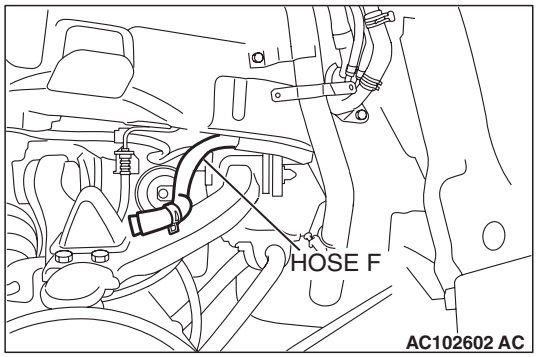
Perform a leakage test with a hand vacuum pump on hose E.

Q: Does hose E hold vacuum?

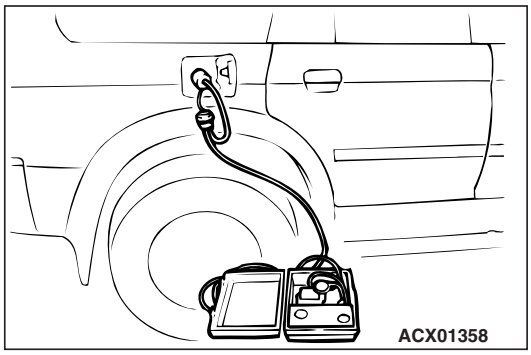
YES : Go to Step 7.

NO : Replace hose E. Go to Step 18.

STEP 7. Pressure test the evaporative emission system lines between hose F and R.



(1) Disconnect hose F from the evaporative emission canister and plug hose F securely.
(2) Confirm that the evaporative emission system pressure pump (Miller number 6872A) is operating properly. Perform the self-test as described in the manufacturer's instructions.
(3) Remove the fuel cap.



(4) Connect the evaporative emission system pressure pump to the fuel tank filler tube.
(5) Pressure test the system to determine whether any leaks are present.

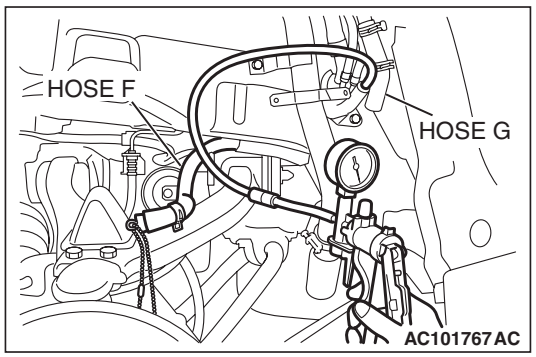
NOTE: The "Pressure test" in this procedure refers to the I/M240 Simulation Test. The eight steps of this test are described in the manufacturer's instructions for the evaporative emission system pressure pump, Miller number 6872A.

(6) Disconnect the evaporative emission system pressure pump and reinstall the fuel cap.
(7) Connect hose F to the evaporative emission canister.

Q: Is the evaporative emission system line free of leaks?

YES : Go to Step 15.
NO : Go to Step 8.

STEP 8. Check for leaks in the evaporator line hose F.



(1) Remove the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8).
(2) Disconnect hose F from the evaporative emission canister and plug hose F securely.
(3) Disconnect hose G from the evaporative emission canister side, and connect a hand vacuum pump.
(4) Apply vacuum with the hand vacuum pump and confirm that the vacuum holds.
(5) Disconnect the hand vacuum pump and connect hose F and G.

Q: Does hose F hold vacuum?

YES : Go to Step 9.
NO : Replace hose F and reinstall the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 18.

STEP 9. Check for leaks in the evaporative emission system hoses G through N.

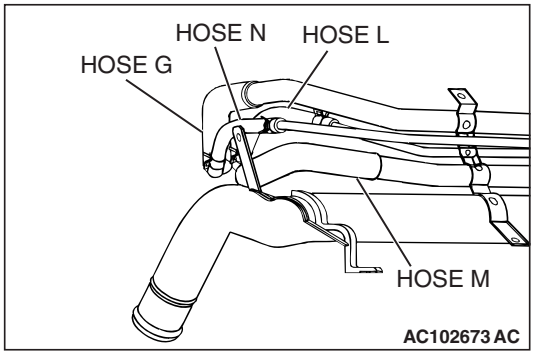
(1) Remove the fuel tank filler tube (Refer to GROUP 13B, Fuel Tank P.13B-8).

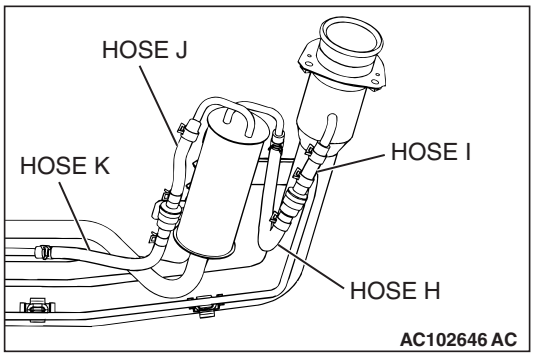
(2) Perform a leakage test with a hand vacuum pump on each hose from hose G to N.

Q: Does the hoses hold vacuum?

YES : Go to Step 10.

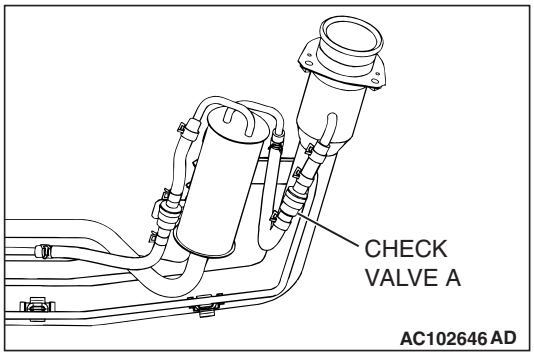
NO : Replace any damaged hose, and reinstall the fuel tank filler tube and the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 18.





STEP 10. Check the check valve A.

(1) Check valve A is a one-way check valve.

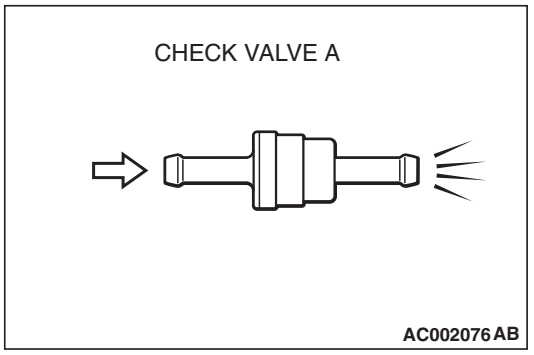


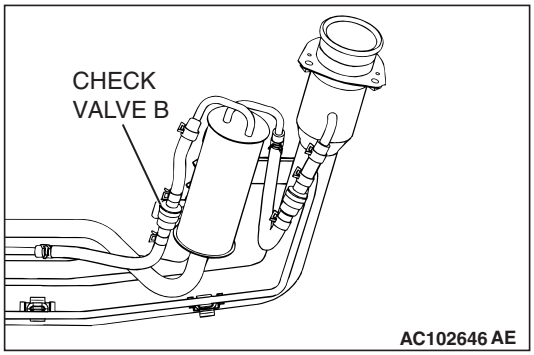
(2) Check valve A should allow air to flow in only one direction.

Q: Does check valve A allow air to press in one direction only?

YES : Go to Step 11.

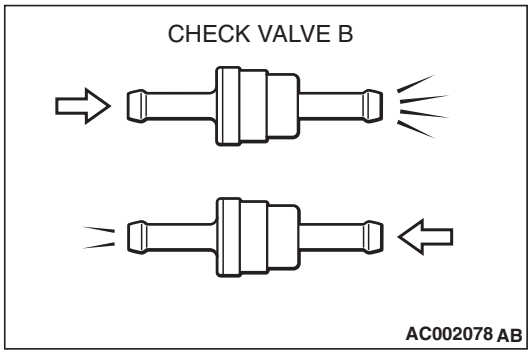
NO : Replace check valve A, and reinstall the fuel tank filler tube and the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 18.





STEP 11. Check the check valve B.

(1) Check valve B is a one-way check valve.



(2) Check valve B should allow air to flow in only one direction.

Q: Does check valve B allow air to press in one direction only?

YES : Go to Step 12.

NO : Replace check valve B, and reinstall the fuel tank filler tube and the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 18.

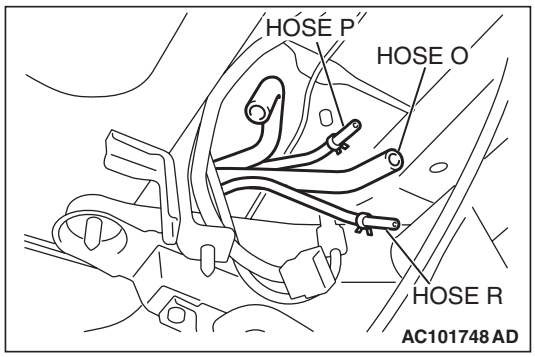
STEP 12. Check for cracks in the fuel tank filler tube assembly.

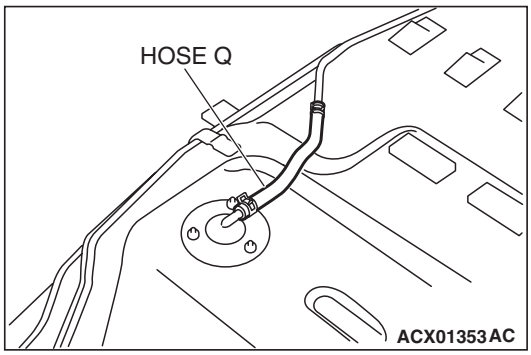
Visually check for cracks in the fuel tank filler tube assembly.

Q: Is the fuel tank filler tube assembly in good condition?

YES : Go to Step 13.

NO : Replace the fuel tank filler tube assembly and reinstall the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 18 .





STEP 13. Check for leaks in the evaporative emission system hoses O through R.

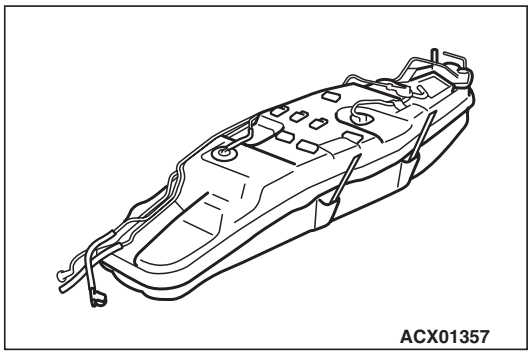
(1) Remove the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8).

(2) Perform a leakage test with a hand vacuum pump on each hose from hose O to R.

Q: Does the hoses hold vacuum?

YES : Go to Step 14.

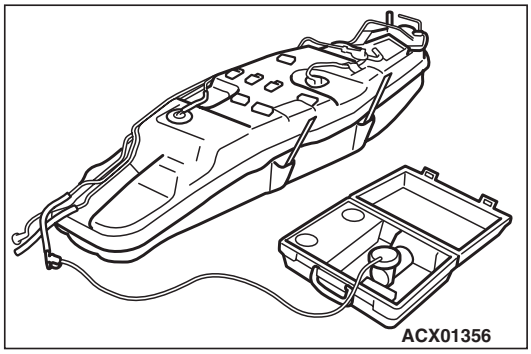
NO : Replace any damaged hose, and reinstall the fuel tank, the fuel tank filler tube and the fuel tank filler tube protector (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 18.



STEP 14. Check for leaks in the fuel tank.

(1) Visually check for cracks and leaks, etc.

NOTE: Carefully check the fuel pump assembly, the fuel level sensor, the fuel tank rollover valve and fuel tank leveling valve installation section in the fuel tank.



(2) Connect the evaporative emission system pressure pump to the filler hose.
(3) Plug the filler hose, feed pipe, return pipe and rollover valve nipple that are connected to the fuel tank.

NOTE: If these items are not securely plugged at this time, the fuel could leak from the tank.

(4) Pressurize the fuel tank with the evaporative emission system pressure pump.
(5) In the pressurized state, check for the leaks by applying soapy water solution to each section and look for bubbles.

Q: Is any leaks found?

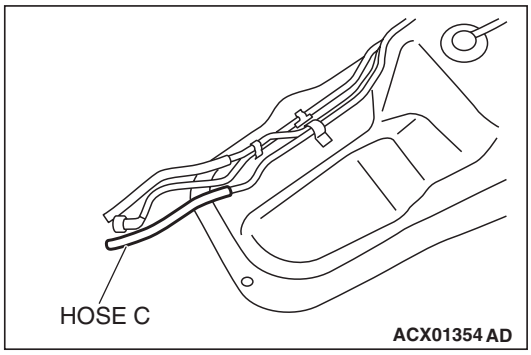
YES <When there is a leak from the attachment points of the fuel pump assembly, fuel tank differential pressure sensor, leveling valve or fuel tank rollover valve.> : Reassemble the leaked parts and check again that there are no leaks. Then reinstall the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8). Then go to Step 18 .

YES <When there is a leak from the fuel tank.> : Replace the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8). Then go to Step 18.

NO : When there is no leak, reinstall the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8). Then go to Step 15.

STEP 15. Check for leaks in evaporative emission system hose C and hose D.

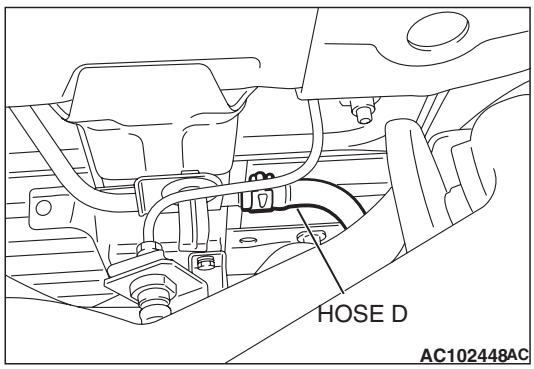
(1) Remove the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8).
(2) Perform a leakage test with a hand vacuum pump on each hose C and D.



Q: Does the hoses hold vacuum?

YES : Reinstall the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 16.

NO : Replace any damaged hose and reinstall the fuel tank (Refer to GROUP 13B, Fuel Tank P.13B-8). Go to Step 18.



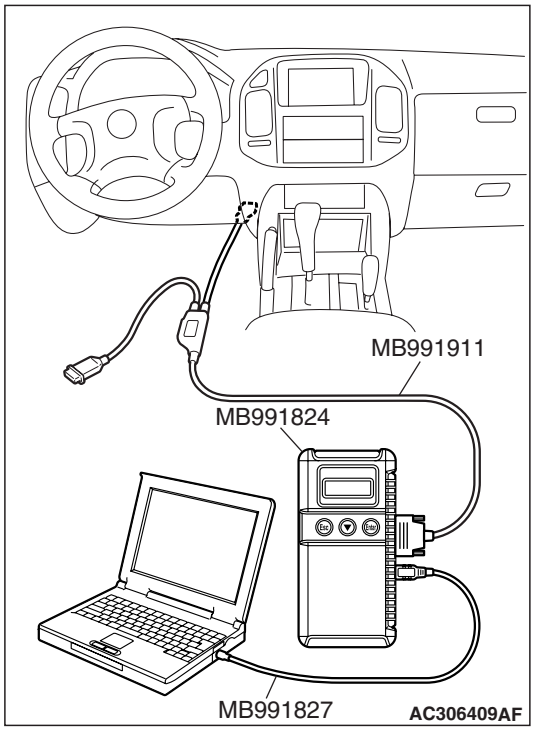
STEP 16. Check for leaks in the evaporative emission canister.

(1) Remove the evaporative emission canister (Refer to GROUP 17, Evaporative Emission Canister and Fuel Tank Pressure Relief Valve P.17-72).
(2) Connect a hand vacuum pump to the vent nipple of the evaporative emission canister.
(3) Plug the other two nipples or loop a hose between them.
(4) Apply vacuum with the hand vacuum pump and confirm that the canister holds vacuum.

Q: Does the evaporative emission canister hold vacuum?

YES : Reinstall the evaporative emission canister (Refer to GROUP 17, Evaporative Emission Canister and Fuel Tank Pressure Relief Valve P.17-72). Go to Step 17 .

NO : Replace the evaporative emission canister (Refer to GROUP 17, Evaporative Emission Canister and Fuel Tank Pressure Relief Valve P.17-72). Go to Step 18 .



STEP 17. Using scan tool MB991958, check evaporative emission system monitor test.

⚠ CAUTION

- **To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.**
- **During this test, the PCM automatically increases the engine speed to 1,600 r/min or greater. Check that the transmission is set to "P" position.**

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Erase the DTCs using scan tool MB991958.
(4) Check that the fuel cap is securely closed (Tighten until three clicks are heard).
(5) Start the engine.
(6) Select "System Test."
(7) Select "Evap Leak Mon."
(8) During this test, keep the accelerator pedal at the idling position.
(9) Keep the engine speed and engine load within the specified range. When the monitor test starts, the "In Progress" item on scan tool MB991958 will change from "NO" to "YES."
(10) Turn the ignition switch to the "LOCK" (OFF) position and disconnect scan tool MB991958.

Q: Is "Evap Leak Mon. Completed. Test Failed and DTCs Set" displayed on scan tool MB991958?

YES : Replace the PCM (Refer to P.13A-1066). Then go to Step 18 .

NO <"Evap Leak Mon. Completed. Test Passed" is displayed on scan tool MB991958.> : The evaporative emission system is working properly at this time. Then go to Step 18 .

NO <"Evap Leak Mon. Discontinued. Retest again from the first" is displayed on scan tool MB991958.> : The EVAP monitor has been interrupted during the test. Turn the ignition switch to the "LOCK" (OFF) position once, and repeat the monitoring from Step 17.

STEP 18. Perform the OBD-II drive cycle.

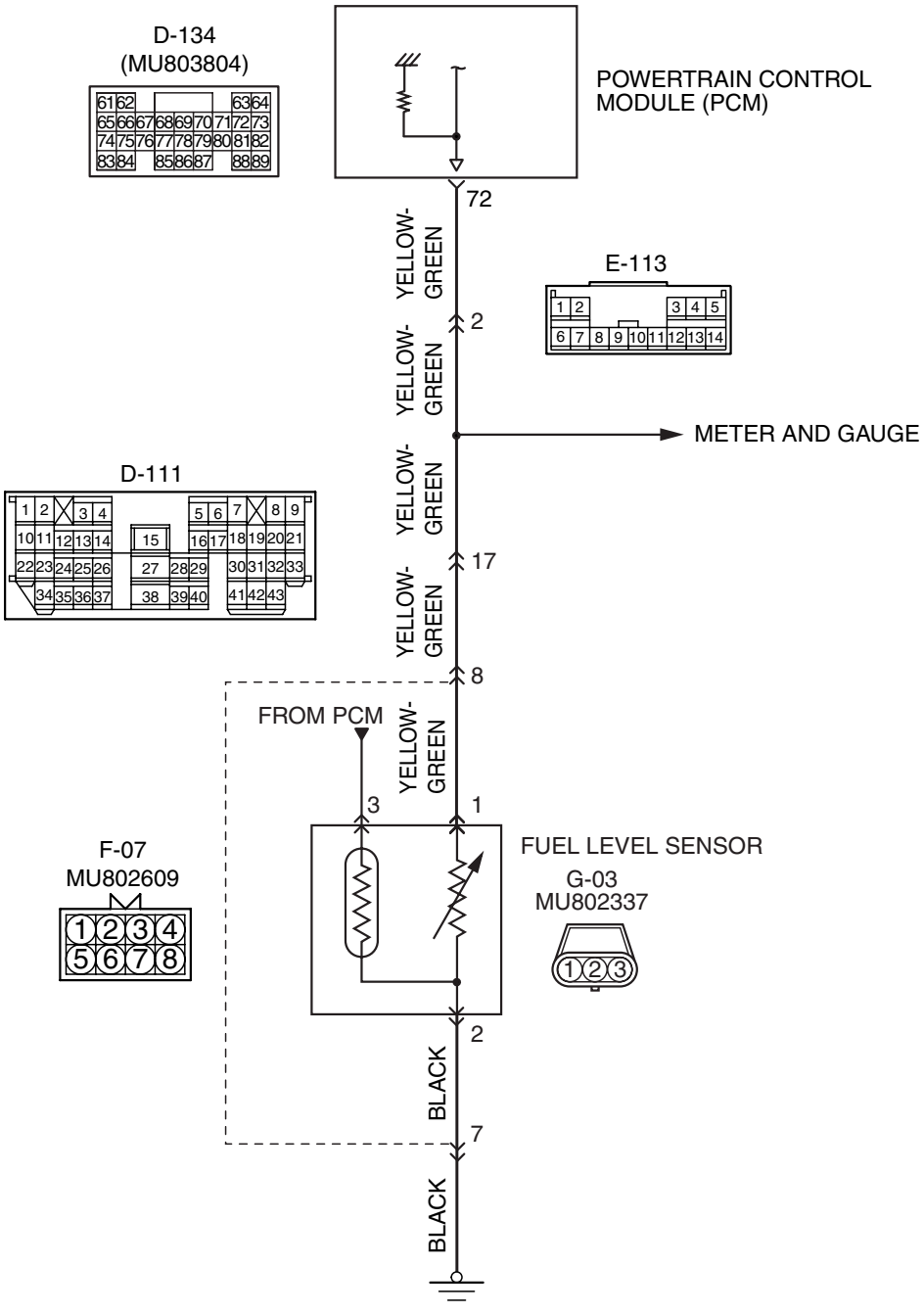
(1) Confirm the repair by performing the appropriate drive cycle (Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 6 P.13A-4).
(2) Read the diagnostic trouble code (DTC).

Q: Is DTC P0456 set?

YES : Repeat the troubleshooting from Step 1.
NO : The procedure is complete.

DTC P0461: Fuel Level Sensor Circuit Range/Performance

Fuel Level Sensor Circuit



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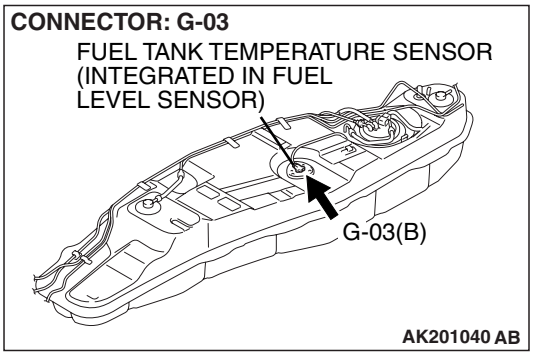

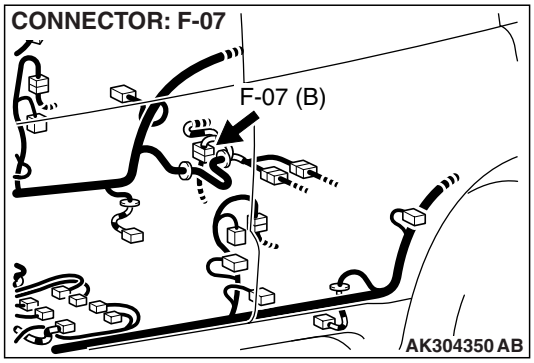

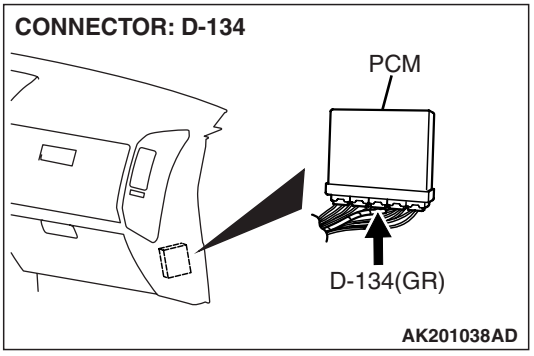

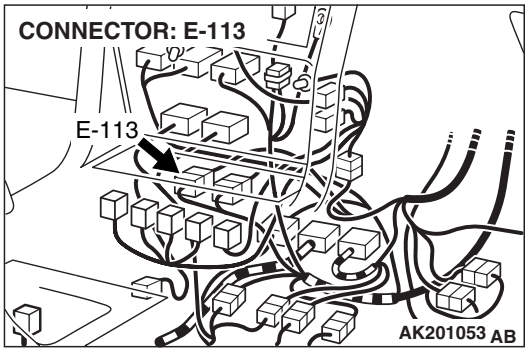

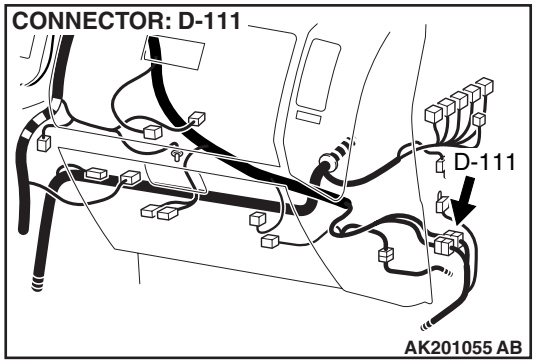

CIRCUIT OPERATION

- The fuel level sensor output voltage is input in PCM (terminal No. 72).

TECHNICAL DESCRIPTION

- Branch the output voltage from the fuel level sensor circuit, and input it into PCM.
- The PCM detects the amount of fuel left in the fuel tank with this signal, and also controls the fuel level warning light.

DESCRIPTIONS OF MONITOR METHODS

- If the change in the fuel level sensor output is found to be small through a comparison of the fuel consumption volume (obtained from the injector actuation duration) and the fuel volume in the fuel tank (obtained from the fuel level sensor), a malfunction is determined to have occurred.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

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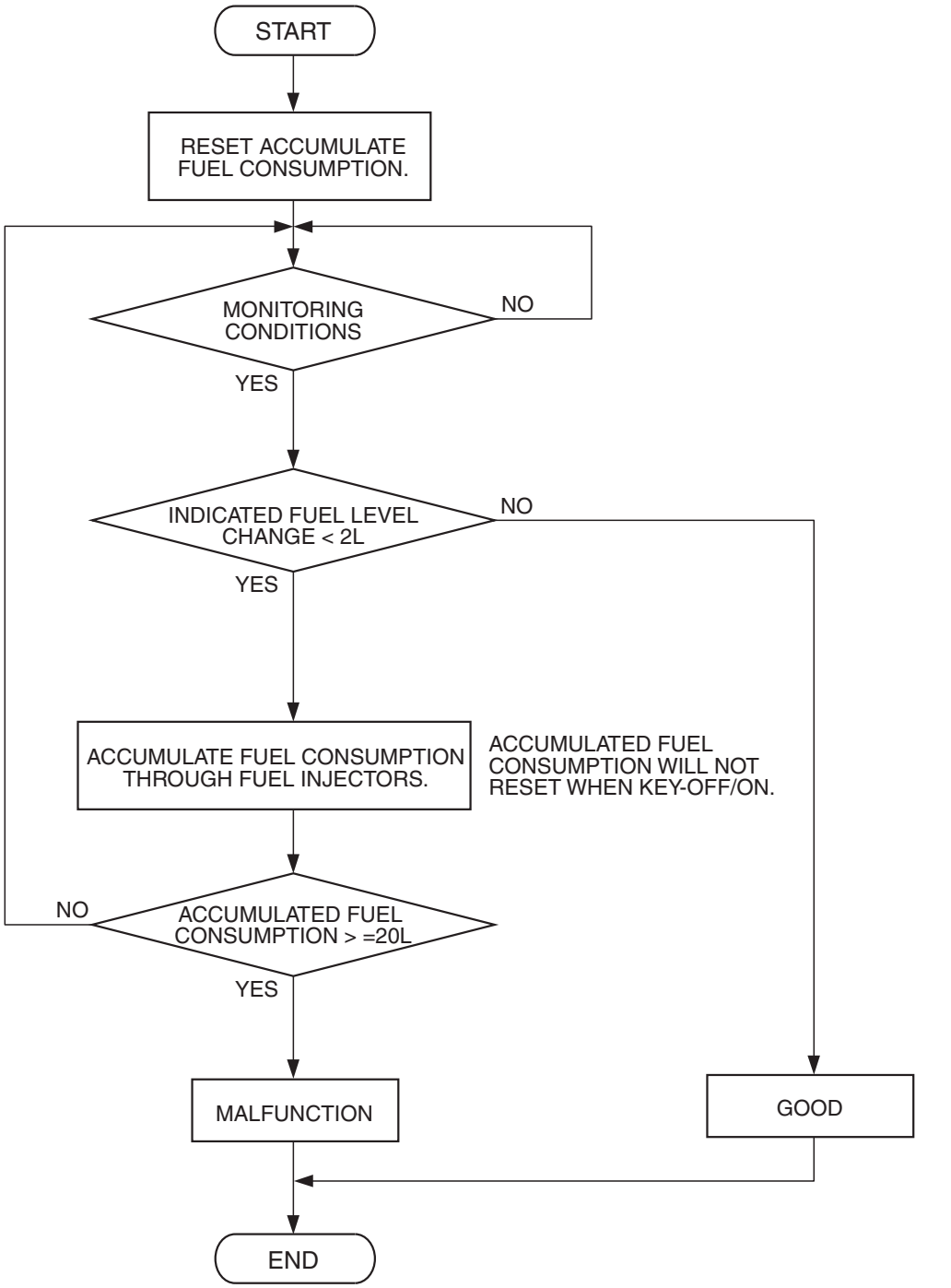
DTC SET CONDITIONS

Logic Flow Chart



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Check Condition, Judgement Criterion

- When the fuel consumption calculated from the operation time of the injector amounts to 20 liters (7.9 gal), the diversity of the amount of fuel in tank calculated from the fuel level sensor is 2 liters (0.5 gal) or less.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Fuel pump module or fuel level sensor failed.
- Harness damage or connector damage in fuel level sensor circuit.
- PCM failed.

OBD-II DRIVE CYCLE PATTERN

None.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

STEP 1. Check fuel gauge.

Q: Is the fuel gauge functioning?

YES : Go to Step 2.

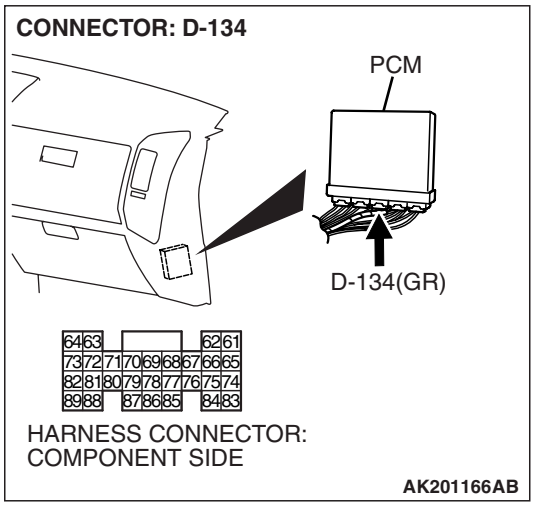
NO : Refer to GROUP 54A, Chassis Electrical – Combination Meters Assembly and Vehicle Speed Sensor – Symptom Chart P.54A-41.

STEP 2. Check harness connector D-134 at PCM for damage.

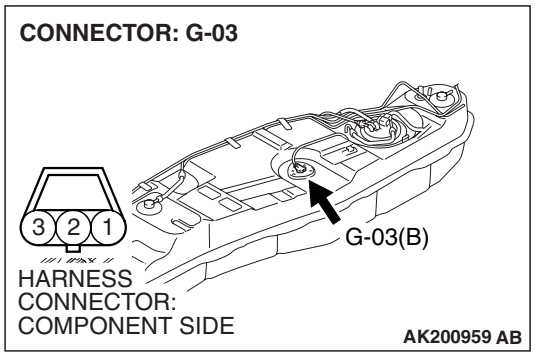
Q: Is the harness connector in good condition?

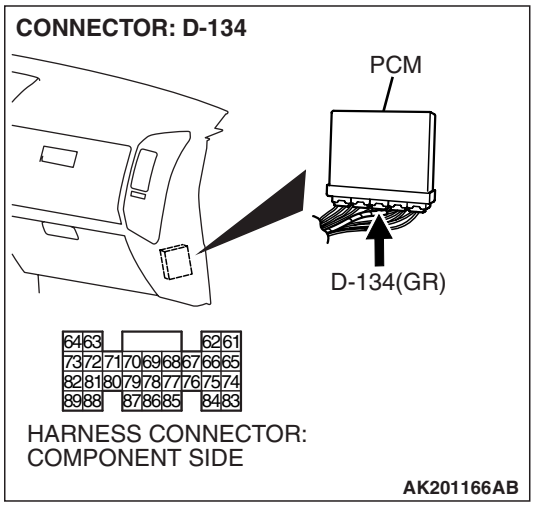
YES : Go to Step 3.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 5.



STEP 3. Check for harness damage between fuel level sensor connector G-03 (terminal No. 1) and PCM connector D-134 (terminal No. 72).





NOTE: Check harness after checking intermediate connectors E-113, D-111 and F-07. If intermediate connectors are damaged, repair or replace them. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 5.

Q: Is the harness wire in good condition?

YES : Go to Step 4.
NO : Repair it. Then go to Step 5.

STEP 4. Check the trouble symptoms.
Check that the fuel gauge operates correctly.

Q: Does the fuel gauge operate correctly?

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 Malfunctions P.00-13.
NO : Replace the PCM. Then go to Step 5.

STEP 5. Check the trouble symptoms.
Check that the fuel gauge operates correctly.

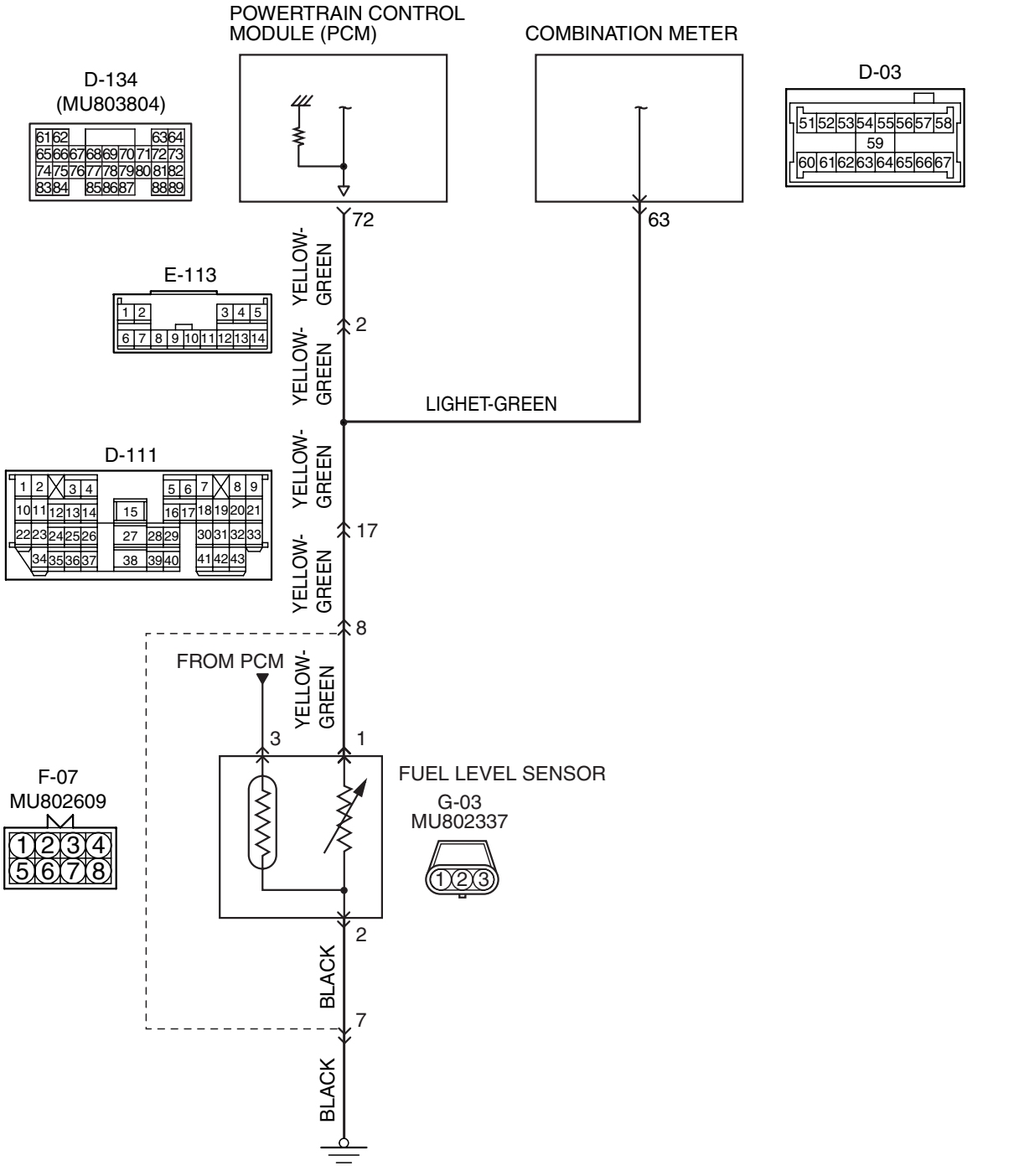
Q: Does the fuel gauge operate correctly?

YES : The inspection is complete.
NO : Retry the troubleshooting.

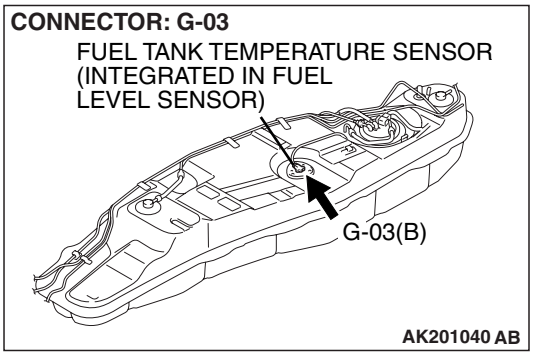
TSB Revision

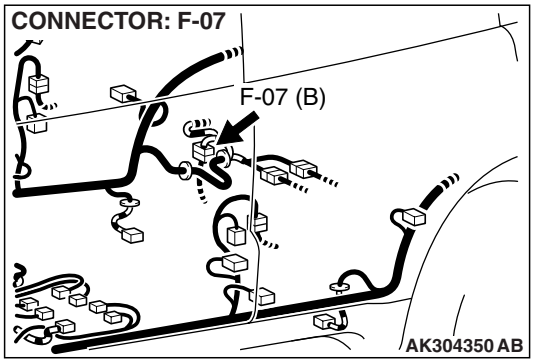
DTC P0462: Fuel Level Sensor Circuit Low Input

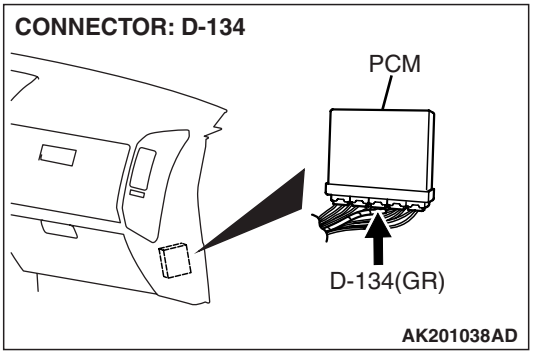
Fuel Level Sensor Circuit

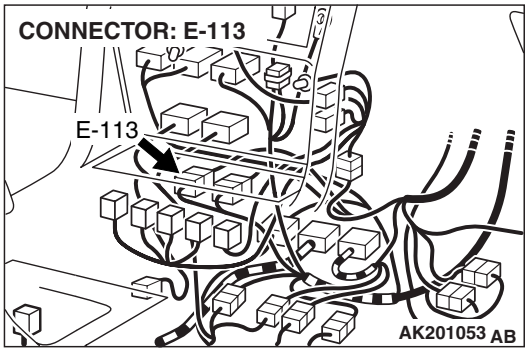


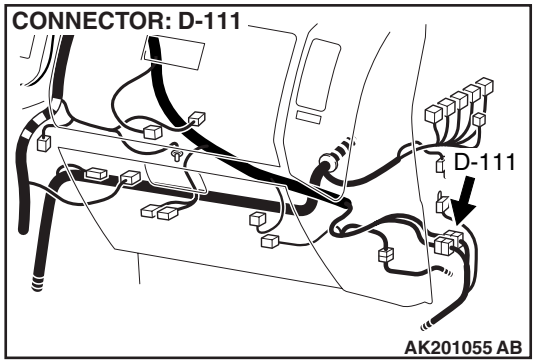
TSB Revision

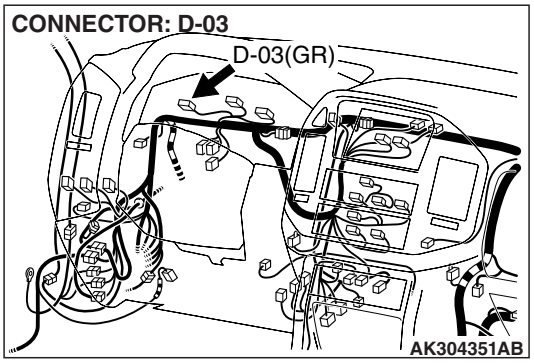












CIRCUIT OPERATION
- The fuel level sensor output voltage is input in PCM (terminal No. 72).

TECHNICAL DESCRIPTION
- Branch the output voltage from the fuel level sensor circuit, and input it into PCM.
- The PCM checks whether this voltage is within a specified range.

DESCRIPTIONS OF MONITOR METHODS
A short circuit is detected while monitoring the fuel level sensor output.

MONITOR EXECUTION
Continuous

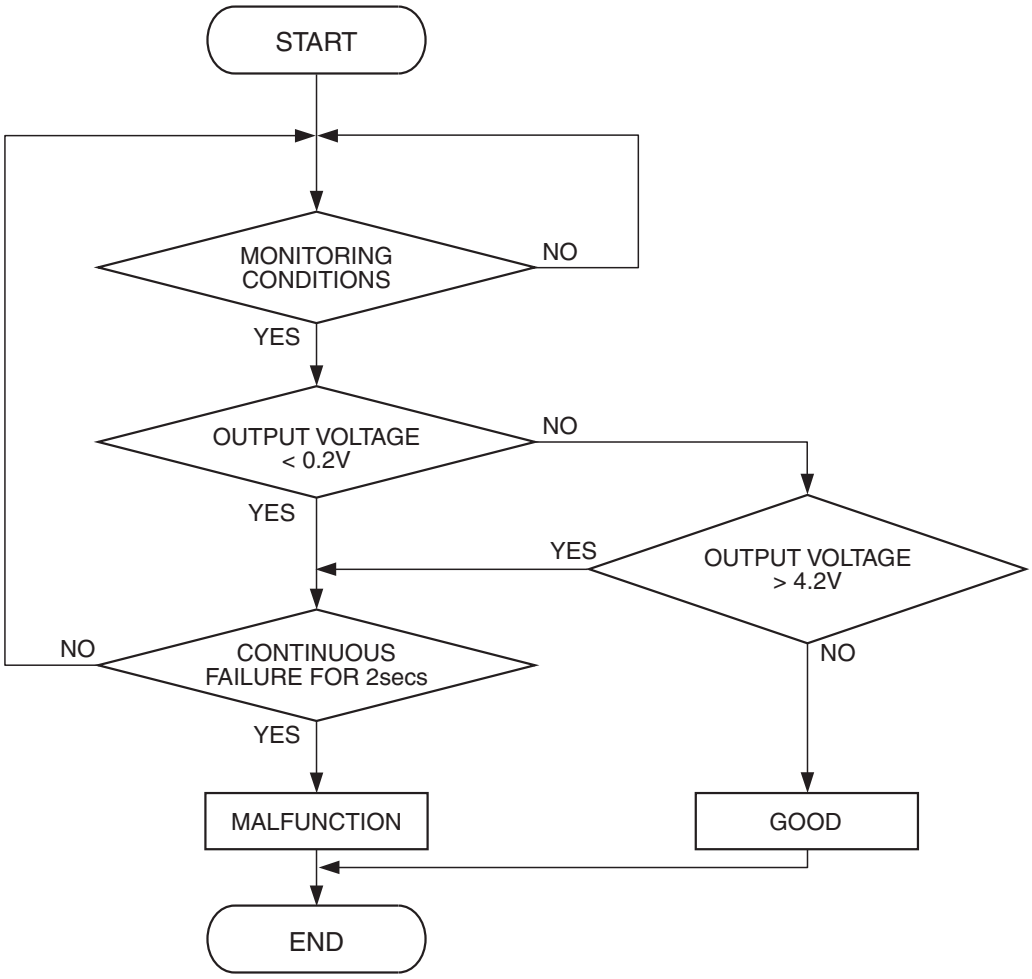
MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)
- Not applicable

Sensor (The sensor below is determined to be normal)
- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK401549

Check Conditions

- Battery positive voltage is between 11 and 16.5 volts.
- 2 seconds or more have passed since the engine staring sequence was completed.

Judgement Criterion

- Fuel level sensor output voltage has continued to be lower than 0.2 volt for 2 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 20 P.13A-4.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Fuel level sensor failed.
- Shorted fuel level sensor circuit or connector damage.
- PCM failed.

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DIAGNOSIS

STEP 1. Check fuel gauge.

Q: Is the fuel gauge functioning?

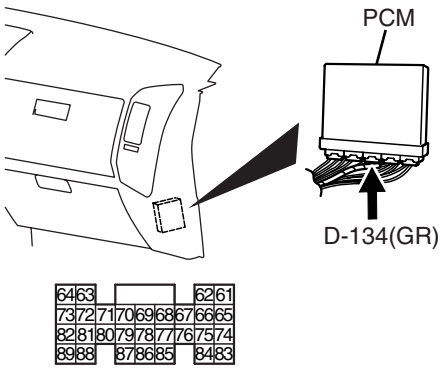
YES : Go to Step 4.
NO : Go to Step 2.

STEP 2. Check harness connector D-134 at PCM and harness connector G-03 at fuel level sensor for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 3.
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2 Then go to Step 7.

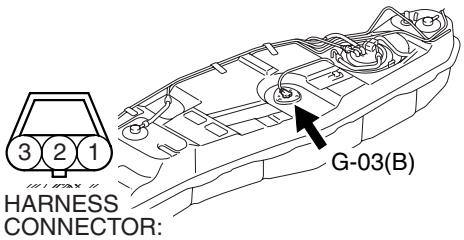
CONNECTOR: D-134



HARNESS CONNECTOR: COMPONENT SIDE

AK201166AB

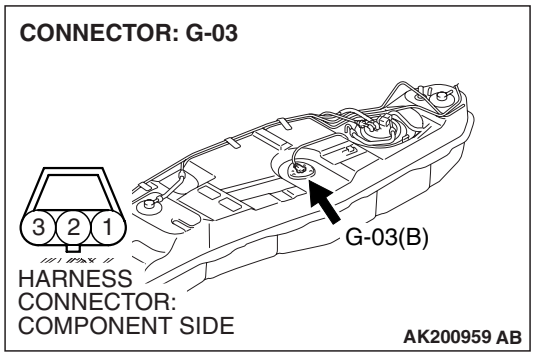
CONNECTOR: G-03

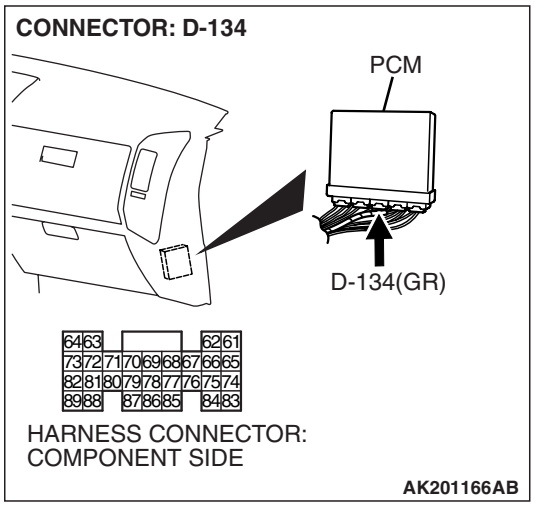


HARNESS CONNECTOR: COMPONENT SIDE

AK200959 AB

STEP 3. Check for short circuit to ground between fuel level sensor connector G-03 (terminal No. 1) and PCM connector D-134 (terminal No. 72).



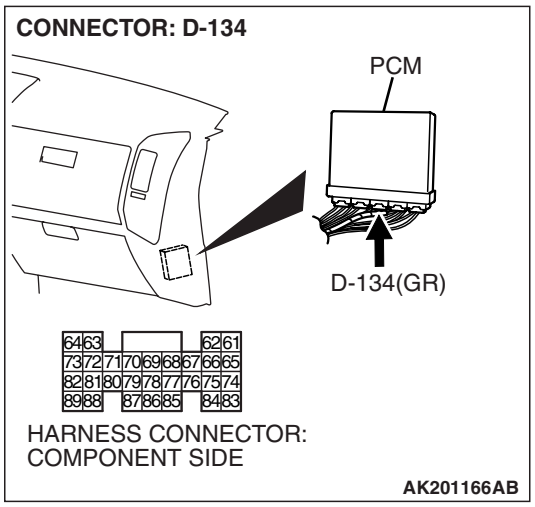


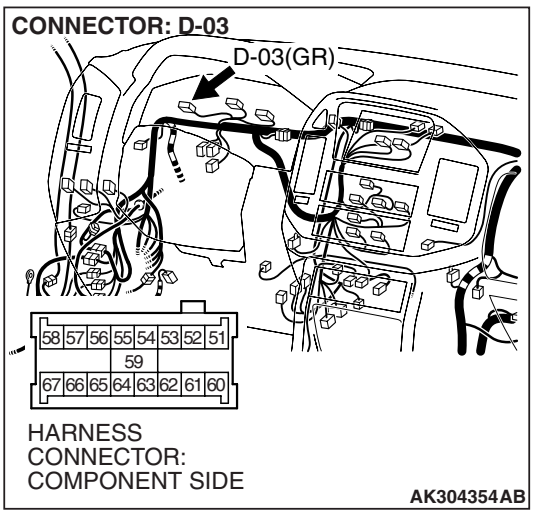
NOTE: Check harness after checking intermediate connectors E-113, D-111 and F-07. If intermediate connectors are damaged, repair or replace them. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 7.

Q: Is the harness wire in good condition?

YES : Refer to GROUP 54A, Chassis Electrical – Combination Meters Assembly and Vehicle Speed Sensor – Equipment Diagnosis – Symptom Chart P.54A-41.

NO : Repair it. Then go to Step 7.





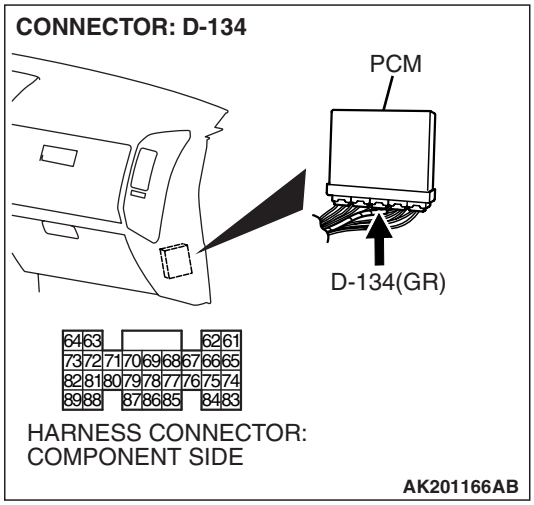
STEP 4. Check harness connector D-134 at PCM and harness connector D-03 at combination meter for damage

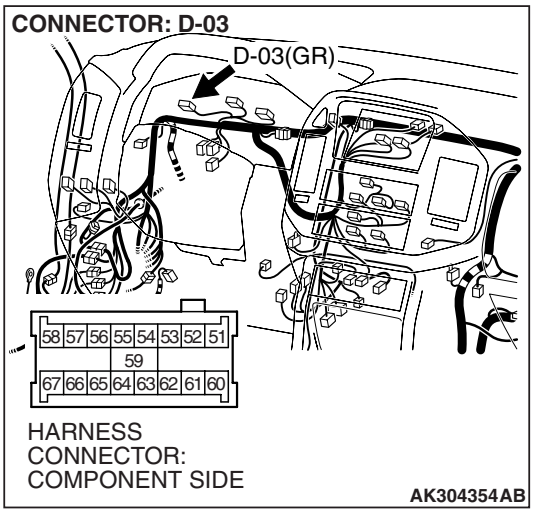
Q: Is the harness connector in good condition?

YES : Go to Step 5.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2 Then go to Step 7.

STEP 5. Check for open circuit between PCM connector D-134 (terminal No. 72) and combination meter connector D-03 (terminal No. 63).





NOTE: Check harness after checking intermediate connector E-113. If intermediate connector is damaged, repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 7.

Q: Is the harness wire in good condition?

YES : Go to Step 6.
NO : Repair it. Then go to Step 7.

STEP 6. Check the trouble symptoms.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 20 P.13A-4.

(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0462 set?

YES : Replace the PCM. Then go to Step 7.

NO : 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 MalfunctionsP.00-13.

STEP 7. Test the OBD-II drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 20 P.13A-4.

(2) Check the diagnostic trouble code (DTC).

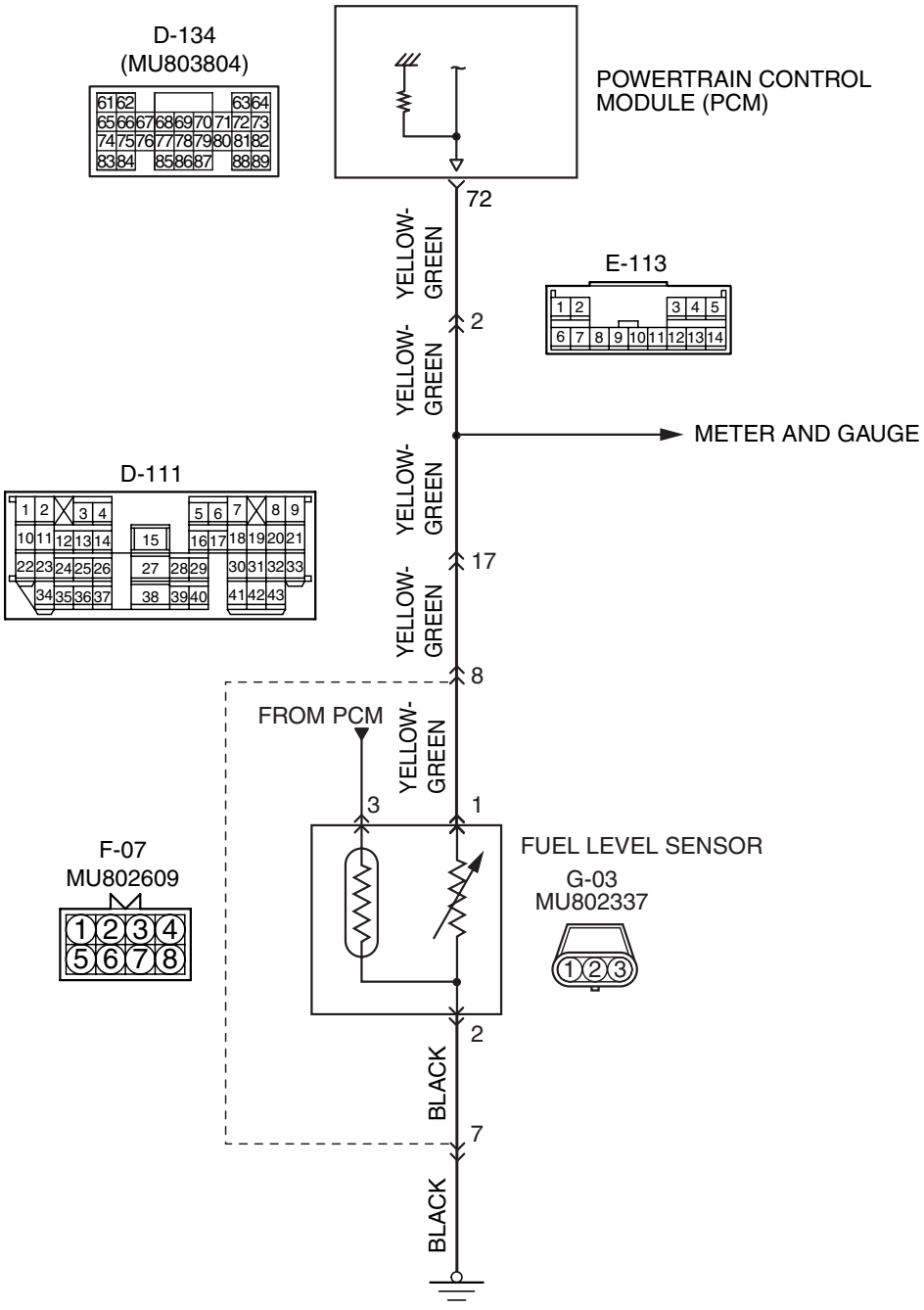
Q: Is DTC P0462 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0463: Fuel Level Sensor Circuit High Input

Fuel Level Sensor Circuit



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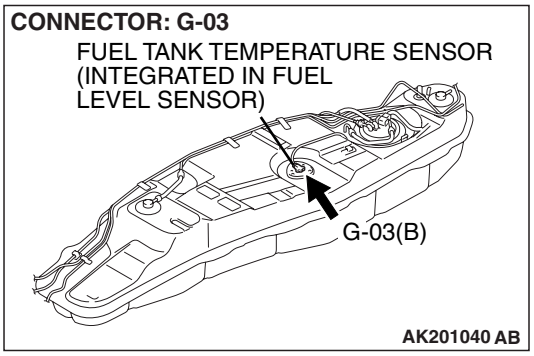

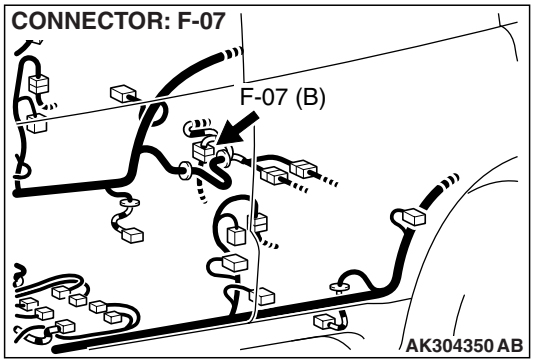

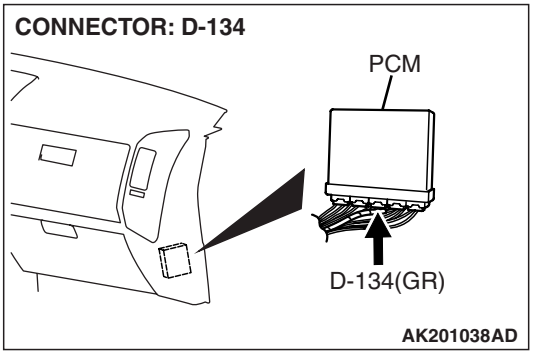

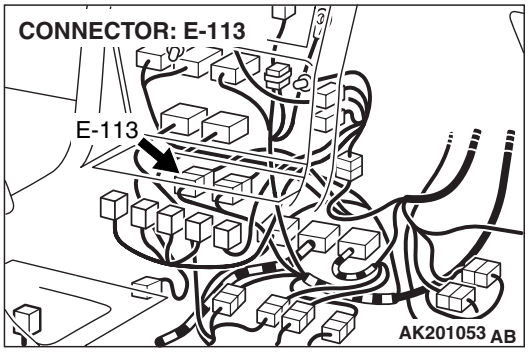

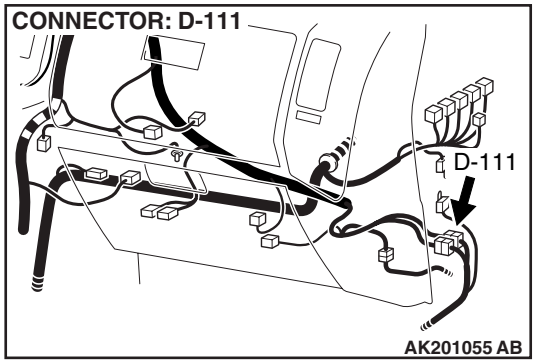

CIRCUIT OPERATION

- The fuel level sensor output voltage is input in PCM (terminal No. 72).

TECHNICAL DESCRIPTION

- Branch the output voltage from the fuel level sensor circuit, and input it into PCM.
- The PCM checks whether this voltage is within a specified range.

DESCRIPTIONS OF MONITOR METHODS

An open circuit is detected while monitoring the fuel level sensor output.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

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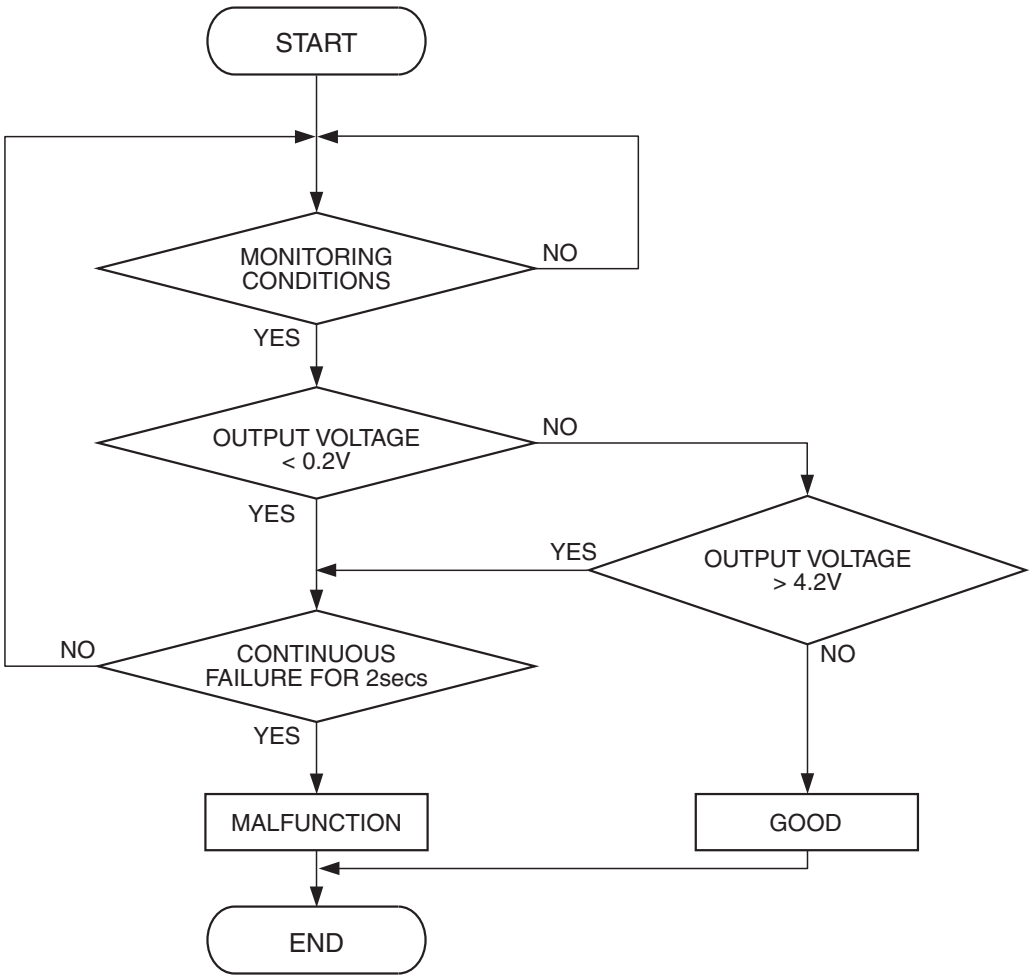
DTC SET CONDITIONS

Logic Flow Chart



AK401549

Check Conditions

- Battery positive voltage is between 11 and 16.5 volts.
- 2 seconds or more have passed since the engine staring sequence was completed.

Judgement Criterion

- Fuel level sensor output voltage has continued to be higher than 4.2 volt for 2 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 20 P.13A-4.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Fuel level sensor failed.
- Open or shorted fuel level sensor circuit, or connector damage.
- PCM failed.

TSB Revision

DIAGNOSIS

STEP 1. Check fuel gauge.

Q: Is the fuel gauge functioning?

YES : Go to Step 2.
NO : Refer to GROUP 54A, Chassis Electrical – Combination Meters Assembly and Vehicle Speed Sensor – Equipment Diagnosis – Symptom Chart P.54A-41.

STEP 2. Check the trouble symptoms.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 20 P.13A-4.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0463 set?

YES : Replace the PCM. Then go to Step 3.
NO : 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 Malfunctions P.00-13.

STEP 3. Test the OBD-II drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 20 P.13A-4.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0463 set?

YES : Retry the troubleshooting.
NO : The inspection is complete.

DTC P0506: Idle Control System RPM Lower Than Expected

TECHNICAL DESCRIPTION

- The amount of air taken in during idling is regulated by the opening and closing of the throttle valve.
- The PCM checks the difference between the actual engine speed and the target engine speed.

DESCRIPTIONS OF MONITOR METHODS

Difference between actual and target idle speed is over the specified value.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

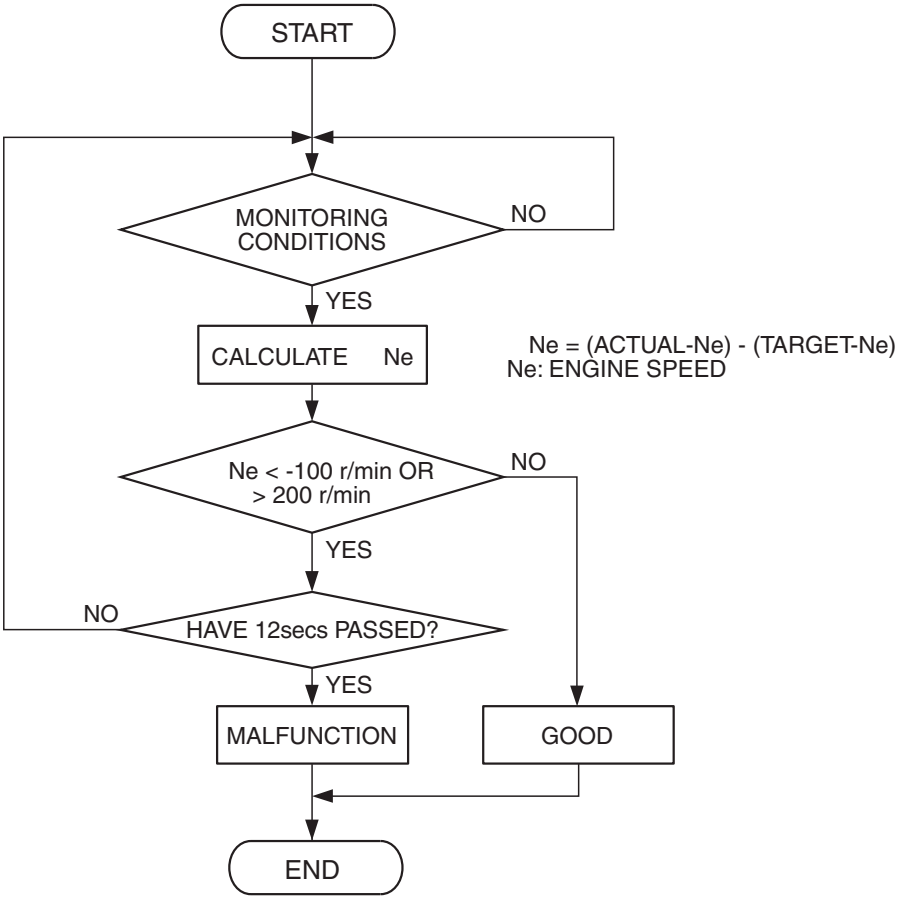
- Misfire monitor
- Exhaust gas recirculation (EGR) system monitor
- Fuel system monitor

Sensor (The sensor below is determined to be normal)

- Volume airflow sensor
- Engine coolant temperature sensor
- Intake air temperature sensor
- Barometric pressure sensor
- Throttle position sensor

DTC SET CONDITIONS

Logic Flow Chart



AK501066

Check Conditions

- Under the closed loop idle speed control.
- Engine coolant temperature is more than 77°C (171°F).
- Battery positive voltage is higher than 10 volts.
- Power steering pressure switch: OFF.
- Volumetric efficiency is lower than 40 percent.
- Barometric pressure is higher than 76 kPa (22.4 in.Hg).
- Intake air temperature is higher than −10°C (14°F).
- 3 seconds have elapsed from the start of the previous monitoring.
- Target throttle actuator control motor position is more than 255 steps.

Judgement Criterion

- The actual idle speed is more than 100 r/min lower than the target idle speed for 12 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 18 P.13A-4.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Throttle valve area is dirty.
- PCM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991958, read the diagnostic trouble code (DTC).

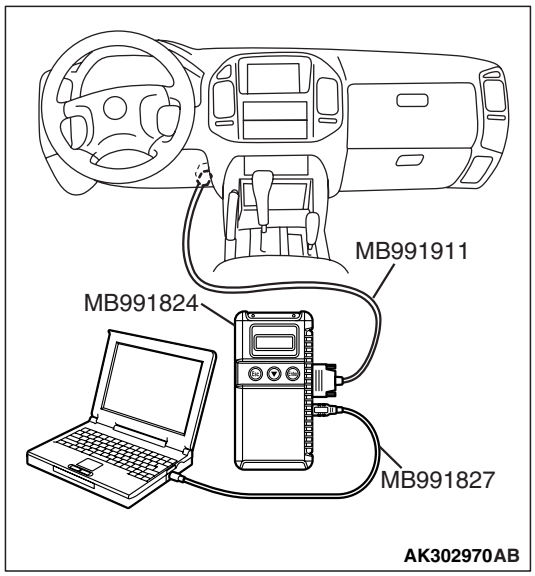
⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958, read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the diagnostic trouble code other than P0506 set?

YES : Refer to Diagnostic Trouble Code Chart P.13A-33.
NO : Go to Step 2.



STEP 2. Check the throttle body. (throttle valve area)

Q: Is the throttle valve area dirty?

YES : Perform cleaning. Refer to On-vehicle Service – Throttle Body (Throttle Valve Area) Cleaning P.13A-1047. Then go to Step 4.
NO : Go to Step 3.

STEP 3. Check the trouble symptoms.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 18 P.13A-4.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0506 set?

YES : Replace the PCM. Then go to Step 4.
NO : 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 Malfunctions P.00-13.

STEP 4. Test the OBD-II drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 18 P.13A-4.

(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0506 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0507: Idle Control System RPM Higher Than Expected

TECHNICAL DESCRIPTION

- The amount of air taken in during idling is regulated by the opening and closing of the throttle valve.
- The PCM checks the difference between the actual engine speed and the target engine speed.

DESCRIPTIONS OF MONITOR METHODS

Difference between actual and target idle speed is over the specified value.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

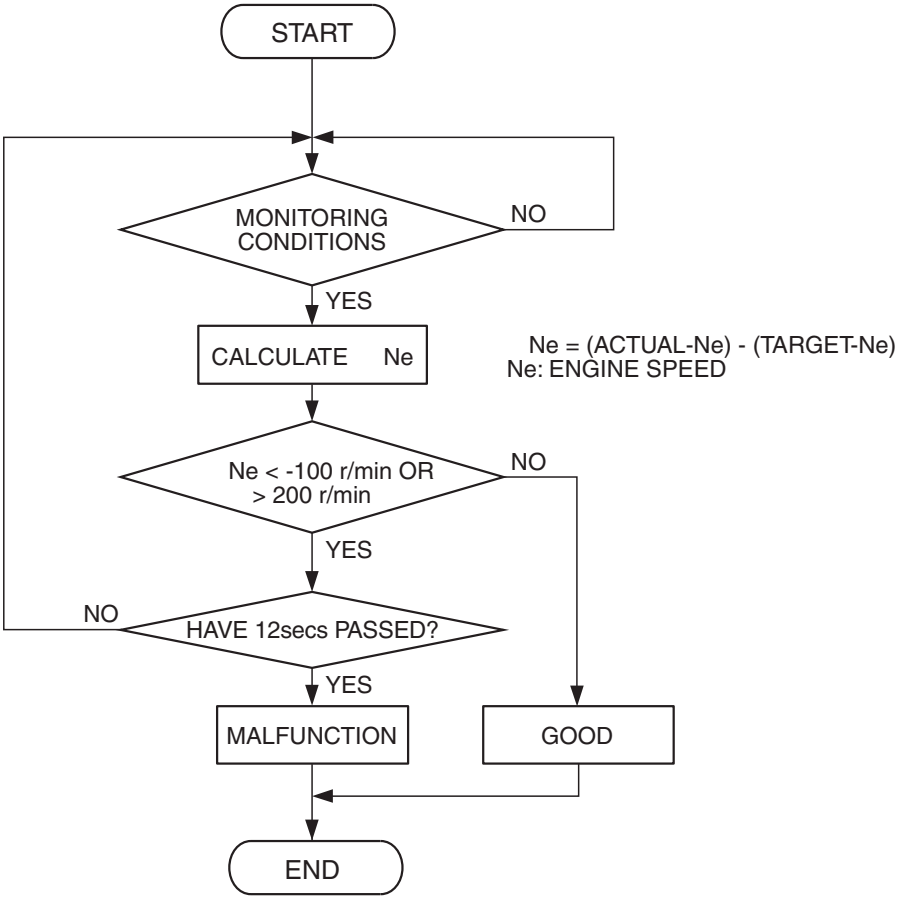
- Misfire monitor
- Exhaust gas recirculation (EGR) system monitor
- Fuel system monitor

Sensor (The sensor below is determined to be normal)

- Volume airflow sensor
- Engine coolant temperature sensor
- Intake air temperature sensor
- Barometric pressure sensor
- Throttle position sensor

DTC SET CONDITIONS

Logic Flow Chart



AK501066

Check Conditions

- Vehicle speed has reached 1.5 km/h (1 mph) or more at least once.
- Under the closed loop idle speed control.
- Engine coolant temperature is higher than 77°C (171°F).
- Battery positive voltage is higher than 10 volts.
- Barometric pressure is higher than 76 kPa (22.4 in.Hg).
- Intake air temperature is higher than −10°C (14°F).
- 3 seconds have elapsed from the start of the previous monitoring.
- Target throttle actuator control motor position is 0 steps.

Judgement Criterion

- Actual idle speed has continued to be higher than the target idle speed by 200 r/min (300 r/min*) or more for 12 seconds.
  *: Specs in parentheses are applicable if the maximum air temperature during the previous operation was higher than 45°C (113°F).

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function − OBD-II Drive Cycle − Pattern 18 P.13A-4.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Intake system vacuum leak.
- PCM failed.

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DIAGNOSIS

Required Special Tools:

- MB991958: Scan tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991958, read the diagnostic trouble code (DTC).

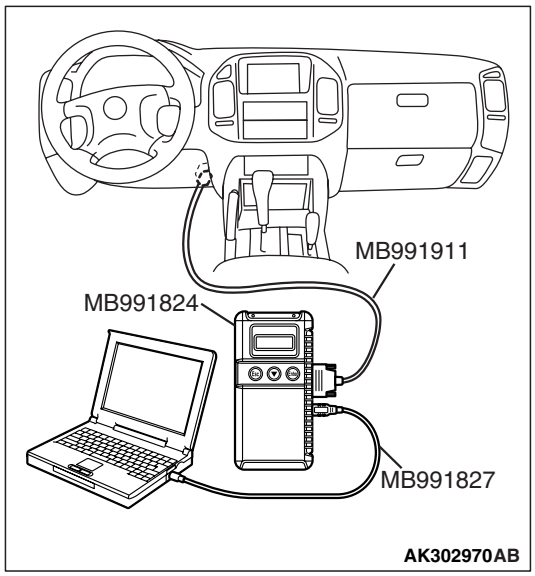
⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958, read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the diagnostic trouble code other than P0507 set?

YES : Refer to Diagnostic Trouble Code Chart P.13A-33.
NO : Go to Step 2.



STEP 2. Check the intake system vacuum leak.

Q: Are there any abnormalities?

YES : Repair or replace it. Then go to Step 4.
NO : Go to Step 3.

STEP 3. Check the trouble symptoms.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 18 P.13A-4.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0507 set?

YES : Replace the PCM. Then go to Step 4.
NO : 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 Malfunctions P.00-13.

STEP 4. Test the OBD-II drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 18 P.13A-4.

(2) Check the diagnostic trouble code (DTC).

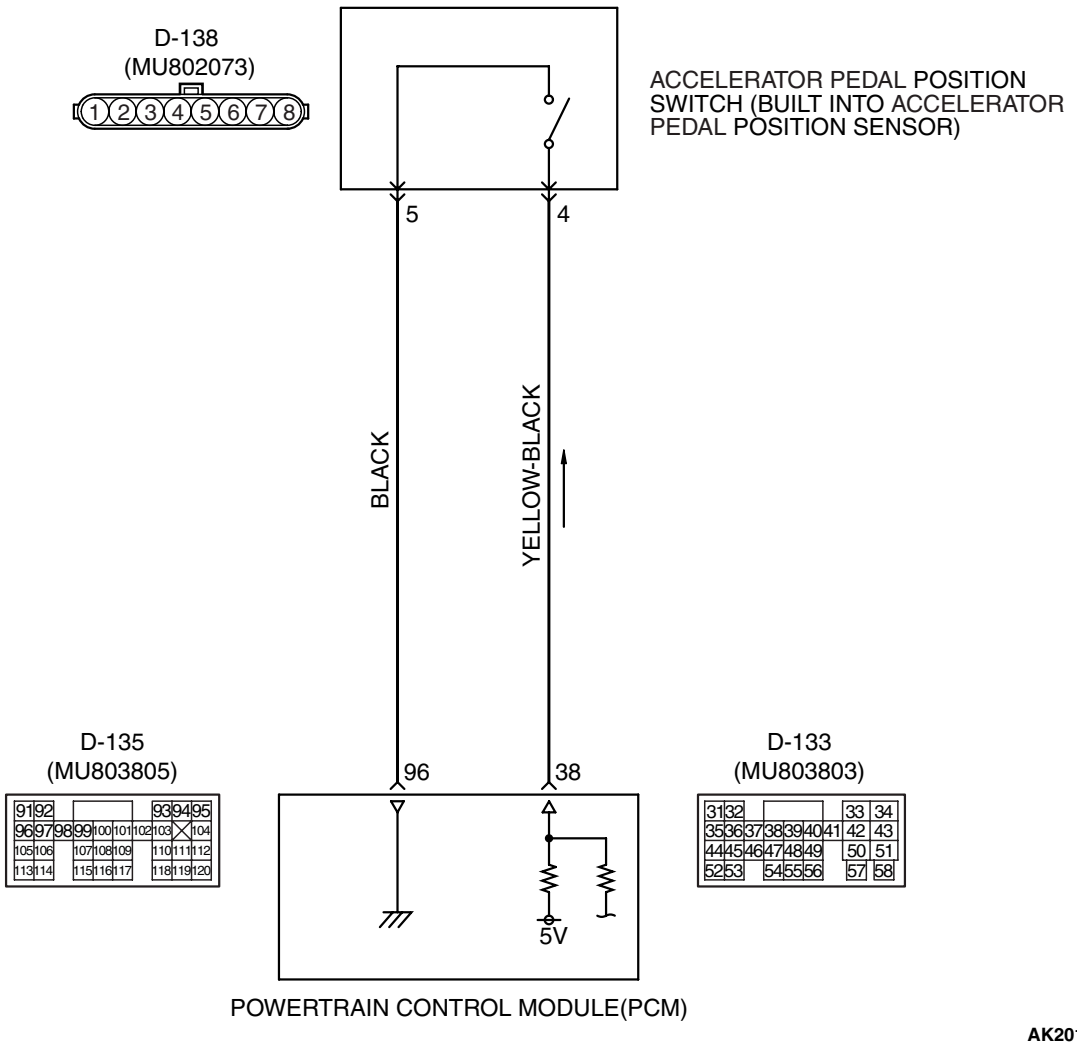
Q: Is DTC P0507 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0510: Accelerator Pedal Position Switch Circuit

Accelerator Pedal Position Switch Circuit



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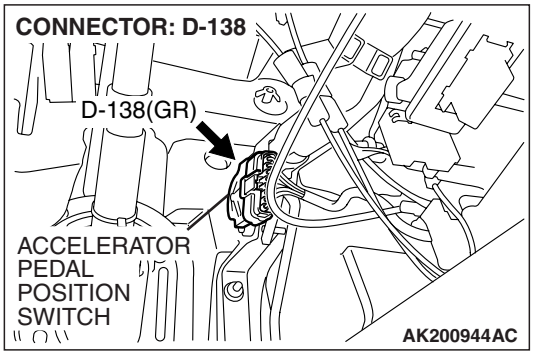
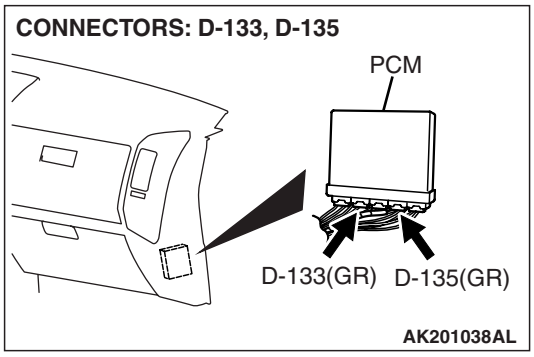




CIRCUIT OPERATION

- 5-volt voltage is applied on the accelerator pedal position switch output terminal (terminal No. 4) from the PCM (terminal No. 38) via the resistor in the PCM.
- The ground terminal (terminal No.5) is grounded to the PCM (terminal No.96).

TECHNICAL DESCRIPTION

- Accelerator pedal position switch turns OFF when the amount of travel of the accelerator pedal exceeds the prescribed value.
- PCM uses the signal that is input by the accelerator pedal position switch for determining the abnormal characteristics of the accelerator pedal position sensor (sub).

DESCRIPTIONS OF MONITOR METHODS

Accelerator pedal position switch stays off during specified go/stop operations.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

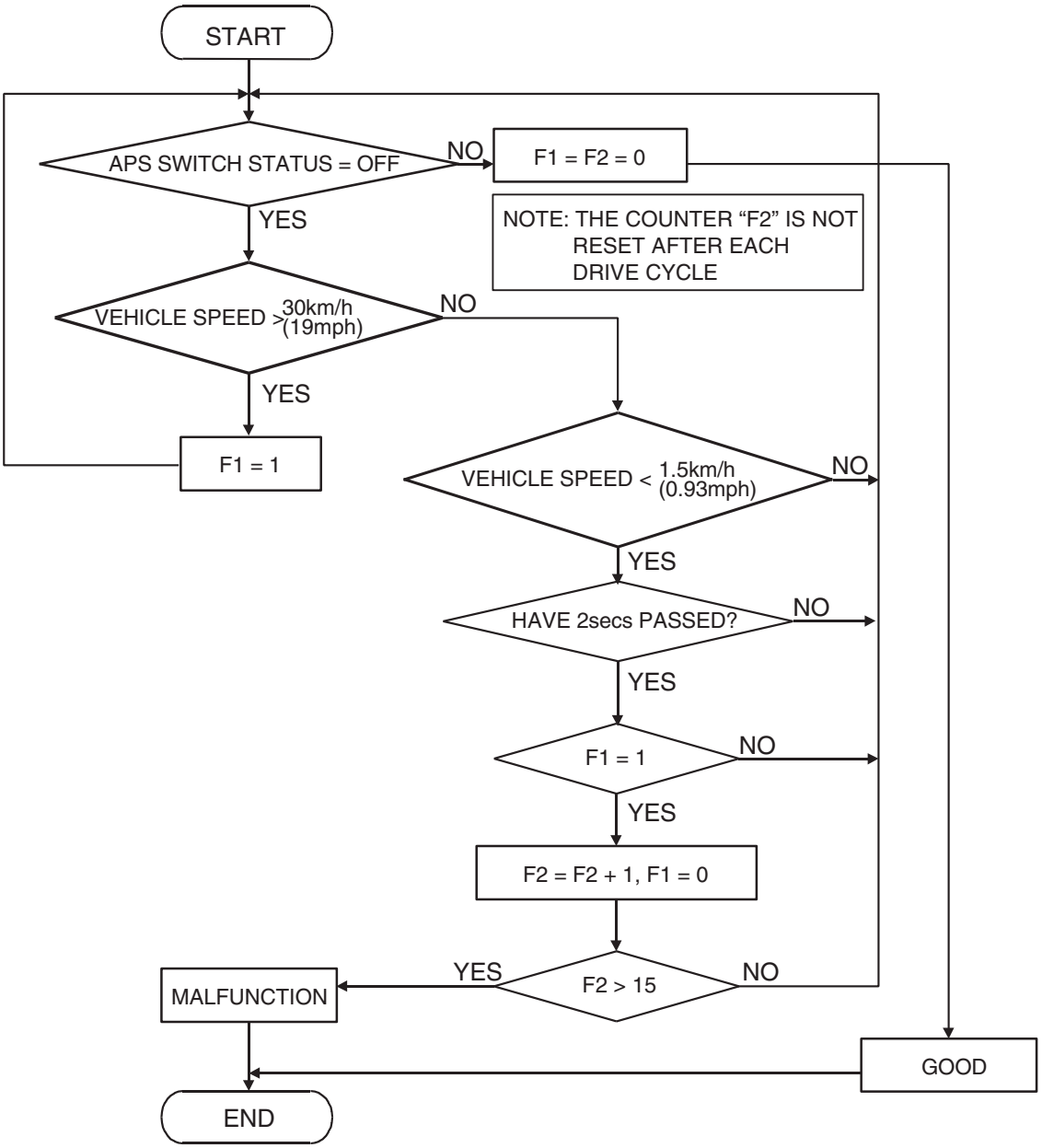
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



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Check Condition

- Drive for 2 seconds or more with the vehicle speed is 30 km/h (19 mph) or more. Stop the vehicle [vehicle speed is 1.5 km/h (1 mph) or less]. Repeat 15 times or more.

Judgement Criterion

- Accelerator pedal position switch continuous to be OFF.

OBD-II DRIVE CYCLE PATTERN

None.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Accelerator pedal position switch failed.
- Open or shorted accelerator pedal position switch circuit, or loose connector.
- PCM failed.

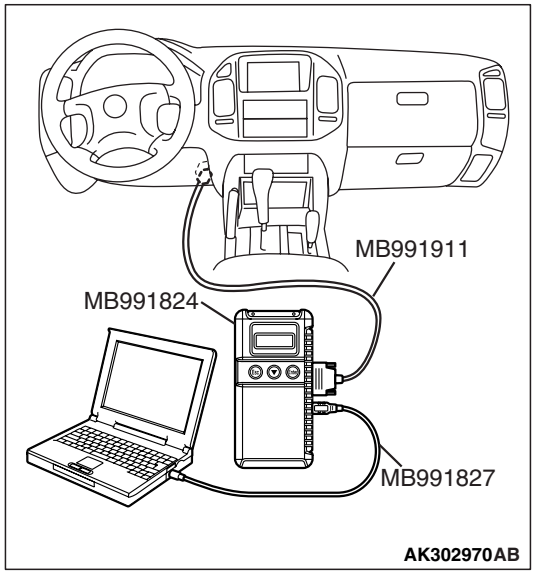
TSB Revision

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991958, check data list item 26: Accelerator Pedal Position Switch.



⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to the data reading mode for item 26, Accelerator Pedal Position Switch.
  - When accelerator pedal is depressed slightly, OFF will be displayed.
  - When foot is released from accelerator pedal, ON will be displayed.

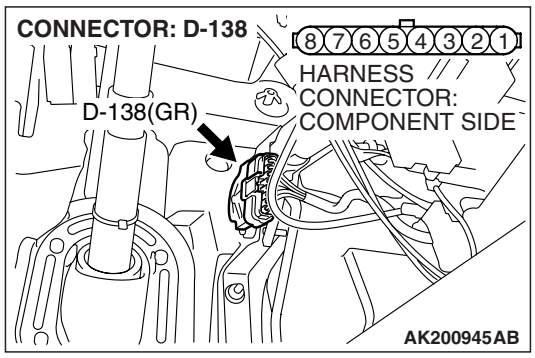
(4) Turn the ignition switch to the "LOCK" (OFF) position.

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 Malfunctions P.00-13.

NO : Go to Step 2.

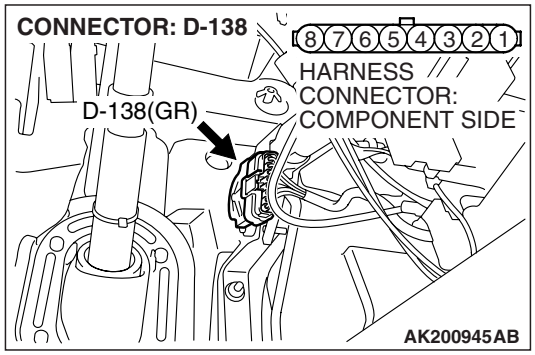
STEP 2. Check harness connector D-138 at accelerator pedal position switch for damage.



Q: Is the harness connector in good condition?

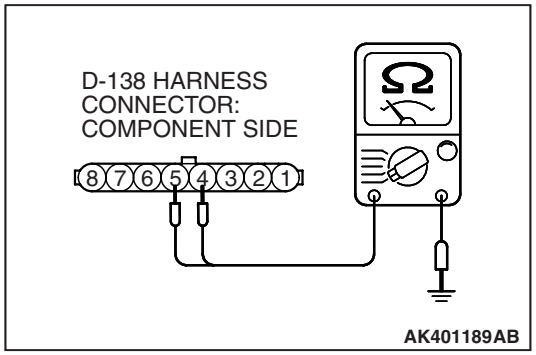
YES : Go to Step 3.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then confirm that the malfunction symptom is eliminated.



STEP 3. Check the accelerator pedal position switch.

(1) Disconnect the accelerator pedal position switch connector D-138.



(2) Check for continuity between the accelerator pedal position switch side connector terminal No. 4 and No. 5.

Standard value:
Continuity (foot released from accelerator pedal)
Non-continuity (accelerator pedal depressed)

Q: Does continuity exist?

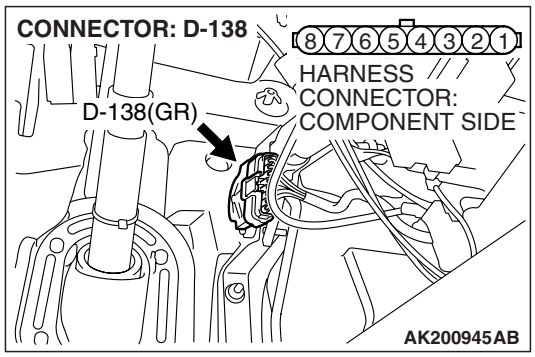
YES : Go to Step 4.

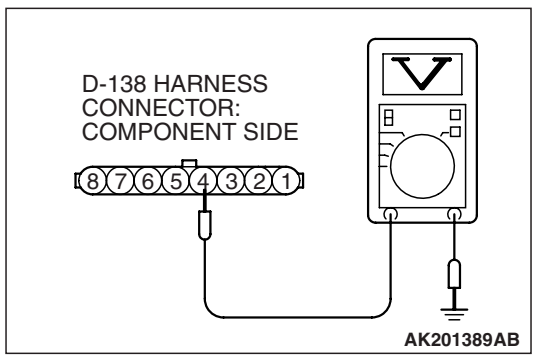
NO : Replace the accelerator pedal position sensor. Refer to GROUP 17, Engine control – On-vehicle Service – Removal and Installation P.17-7. Adjust the accelerator pedal position sensor. Refer to On-vehicle Service – Accelerator Pedal Position Sensor Adjustment P.13A-1047. Then confirm that the malfunction symptom is eliminated.

STEP 4. Measure the switch supply voltage at accelerator pedal position switch connector D-138.

(1) Disconnect the accelerator pedal position switch connector D-138 and measure at the harness side.

(2) Turn the ignition switch to the "ON" position.



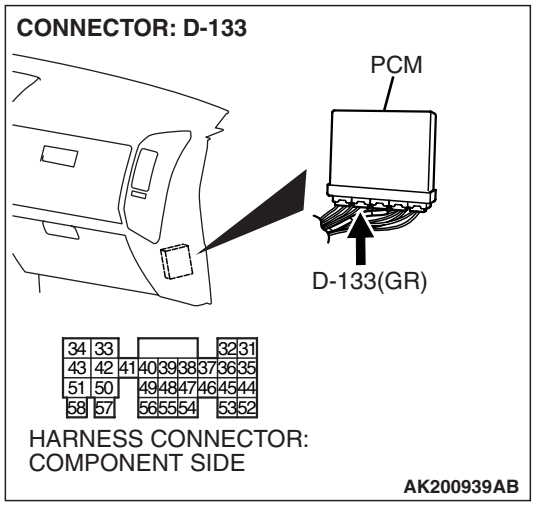


(3) Measure the voltage between terminal No. 4 and ground.
- Voltage should be 4 volts or more.

Q: Is the voltage normal?

YES : Go to Step 7.

NO : Go to Step 5.

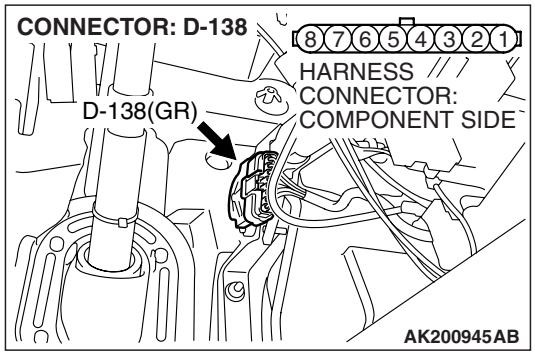


STEP 5. Check harness connector D-133 at PCM for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 6.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then confirm that the malfunction system is eliminated.

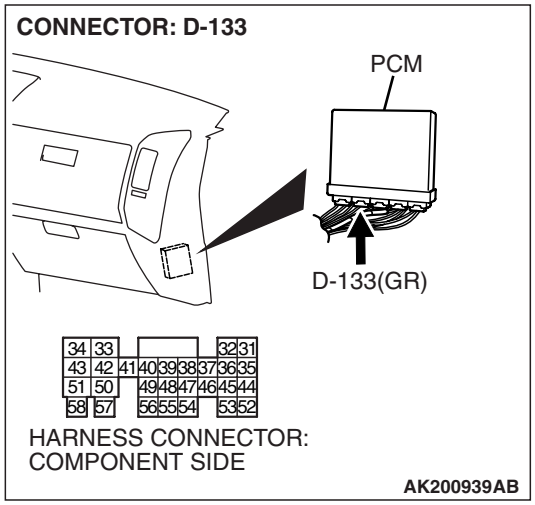


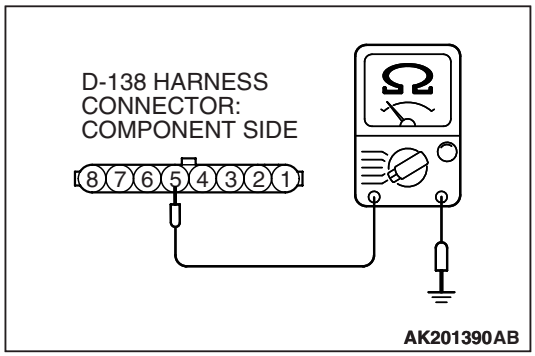
STEP 6. Check for open circuit and short circuit to ground between accelerator pedal position switch connector D-138 (terminal No.4) and PCM connector D-133 (terminal No.38).

Q: Is the harness wire in good condition?

YES : Replace the PCM. Then confirm that the malfunction system is eliminated.

NO : Repair it. Then confirm that the malfunction system is eliminated.



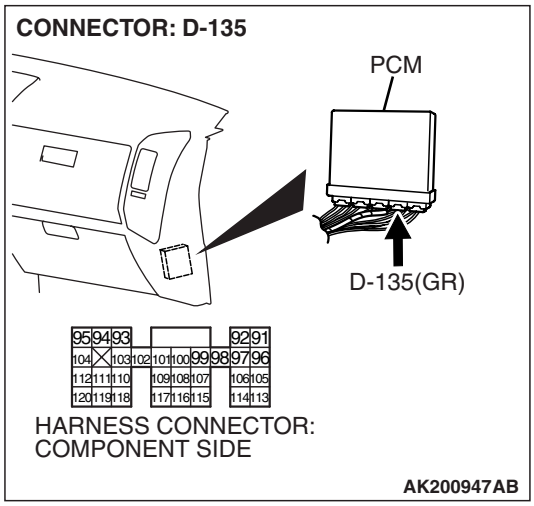


STEP 7. Check the continuity at accelerator pedal position switch harness side connector D-138.

(1) Disconnect the connector D-138 and measure at the harness side.
(2) Check for the continuity between terminal No. 5 and ground.
- Should be less than 2 ohms.

Q: Does continuity exist?

YES : Go to Step 10.
NO : Go to Step 8.



STEP 8. Check harness connector D-135 at PCM for damage.

Q: Is the harness connector in good condition?

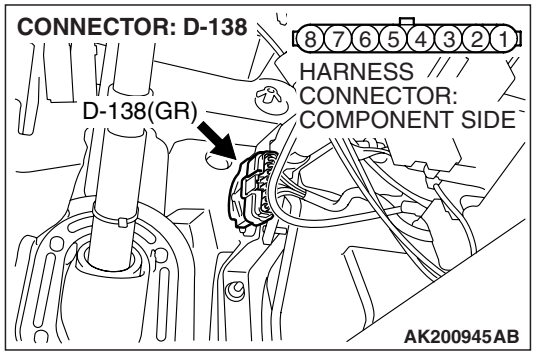
YES : Go to Step 9.
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then confirm that the malfunction system is eliminated.

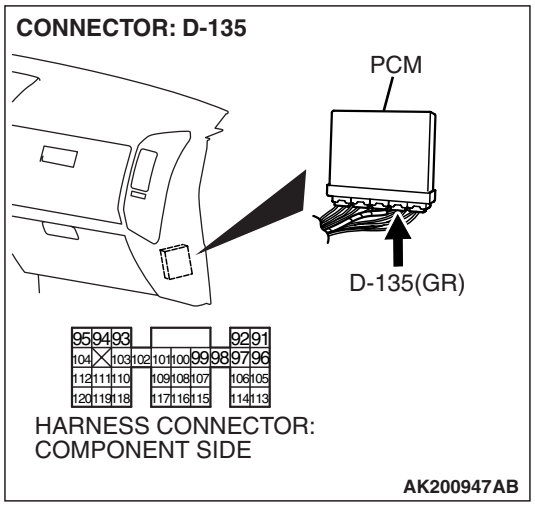
STEP 9. Check for open circuit and harness damage between accelerator pedal position switch connector D-138 (terminal No. 5) and PCM connector D-135 (terminal No. 96).

Q: Is the harness wire in good condition?

YES : Replace the PCM. Then confirm that the malfunction system is eliminated.

NO : Repair it. Then confirm that the malfunction system is eliminated.



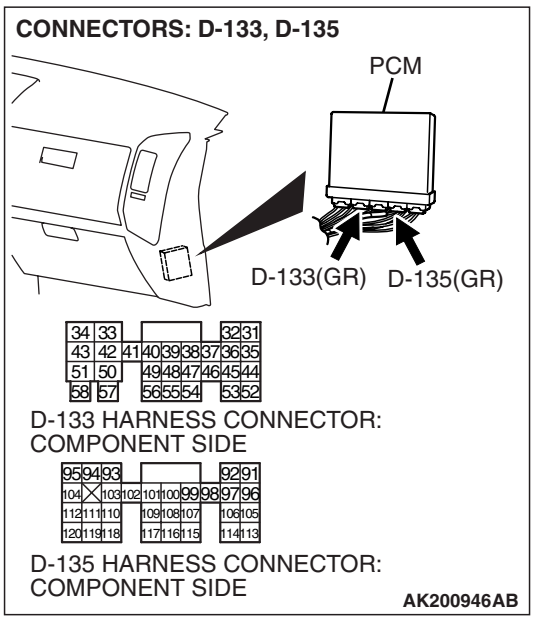


STEP 10. Check harness connector D-133, D-135 at PCM for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 11.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then confirm that the malfunction system is eliminated.

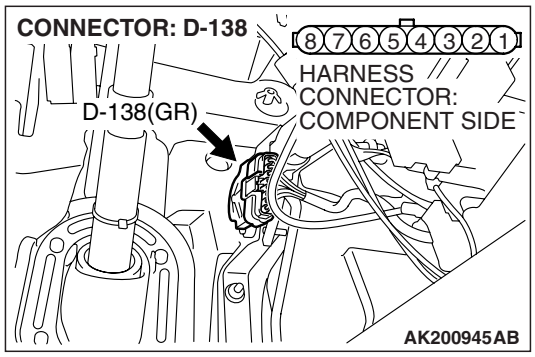


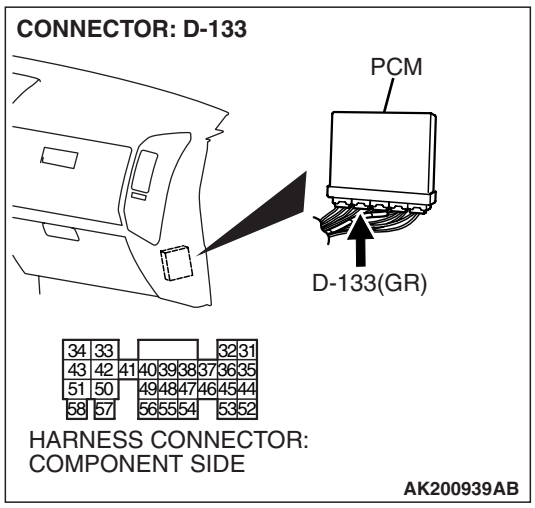
STEP 11. Check for harness damage between accelerator pedal position switch connector D-138 (terminal No. 4) and PCM connector D-133 (terminal No. 38).

Q: Is the harness wire in good condition?

YES : Replace the PCM. Then Go to Step 12.

NO : Repair it. Then Go to Step 12.





STEP 12. Using scan tool MB991958, check data list item 26: Accelerator Pedal Position Switch.

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

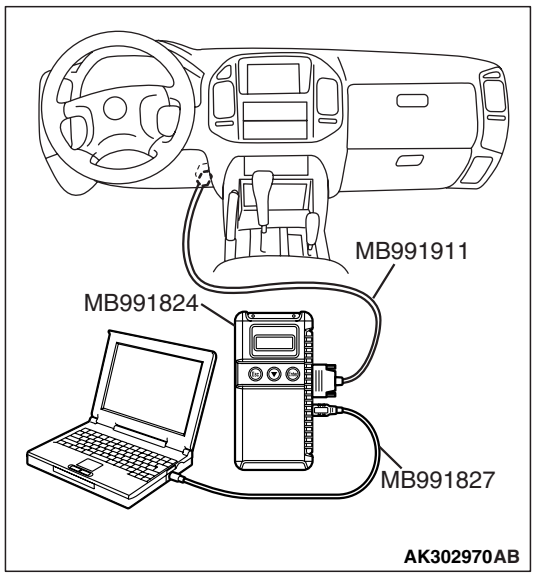
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to the data reading mode for item 26, Accelerator Pedal Position Switch.
- When accelerator pedal is depressed slightly, "OFF" will be displayed.
- When foot is released from accelerator pedal, "ON" will be displayed.

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

Q: Is the switch operating properly?

YES : The inspection is complete.

NO : Retry the troubleshooting.



DTC P0513: Immobilizer Malfunction

TECHNICAL DESCRIPTION

- PCM monitors the communication condition with the immobilizer-ECU and the message from the immobilizer-ECU, and when the abnormality is found, PCM makes the engine not to start.

DTC SET CONDITIONS

Check Condition

- Ignition switch: ON

Judgement Criterion

- When the communication error between PCM and the immobilizer-ECU continues for 2 seconds or more.

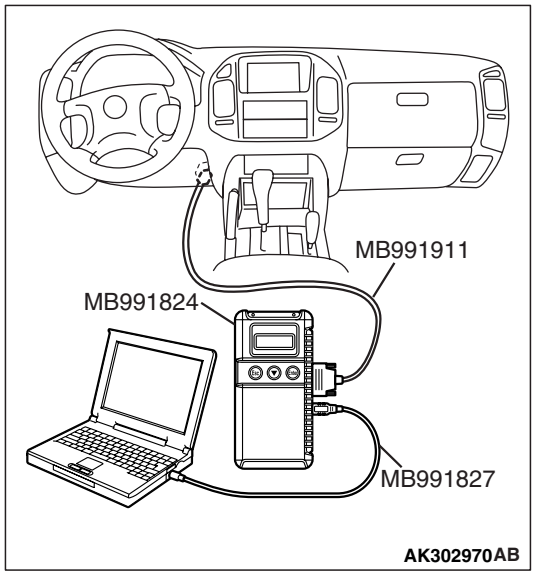
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Malfunction of harness or connector.
- Malfunction of immobilizer-ECU.
- Malfunction of PCM.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B



STEP 1. Using scan tool MB991958, read the immobilizer diagnostic trouble code (DTC).

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Read the immobilizer system-DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

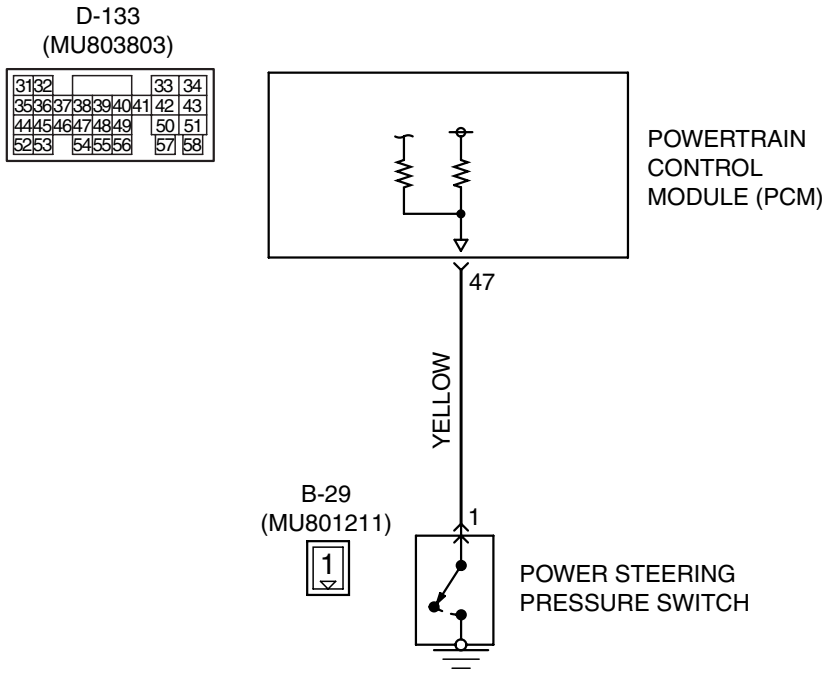
Q: Is the immobilizer – DTC set?

YES : Refer to GROUP 54A, Ignition Switch and Immobilizer System – Diagnostic Trouble Code Chart P.54A-11.

NO : If DTC P0513 is output again after the MFI – DTC has been erased, replace the PCM. Then check that the DTC P0513 does not reset.

DTC P0551: Power Steering Pressure Switch Circuit Range/Performance

Power Steering Pressure Switch Circuit



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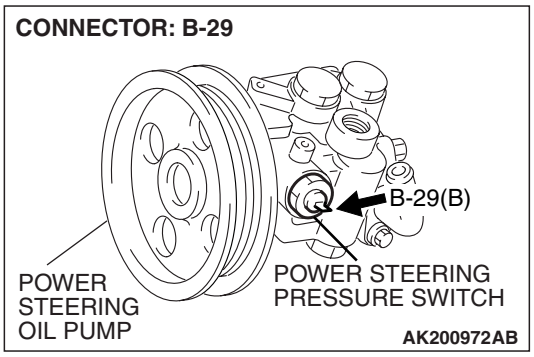

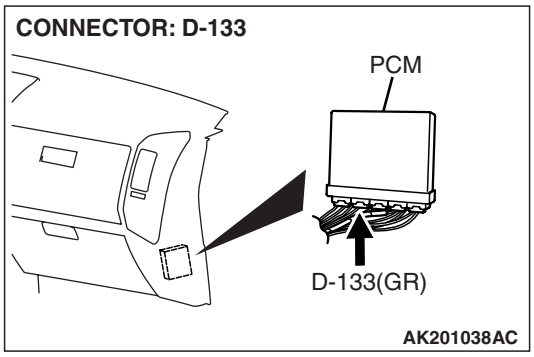

CIRCUIT OPERATION

- A battery positive voltage is applied to the power steering pressure switch output terminal (terminal No. 1) from the PCM (terminal No. 47) via the resistor in the PCM.

TECHNICAL DESCRIPTION

- The power steering pressure switch converts the existence of a power steering load into a high/low voltage, and inputs it into the PCM.
- When the steering wheel is turned, hydraulic pressure rises. The power steering pressure switch closes, and the applied battery positive voltage will be grounded. With this, the power steering pressure switch output voltage will fluctuate between 12 volts and 0 volt.
- While driving with the steering wheel held straight, the power steering pressure switch turns OFF.
- The PCM checks whether the power steering pressure switch turns OFF or ON during driving.

DESCRIPTIONS OF MONITOR METHODS

Power steering pressure switch stays on during specified go/stop operations.

MONITOR EXECUTION

Continuous

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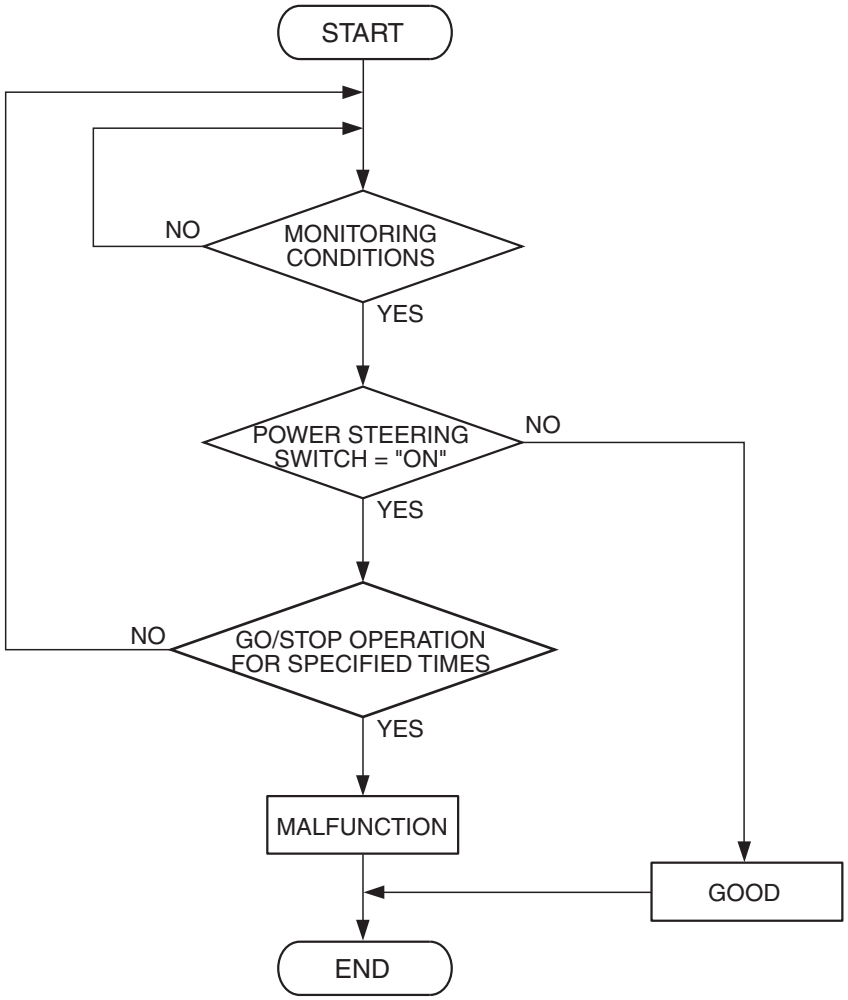
MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)
- Not applicable

Sensor (The sensor below is determined to be normal)
- Engine coolant temperature sensor

DTC SET CONDITIONS

Logic Flow Chart



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Check Conditions
- Engine coolant temperature is higher than 10°C (50°F).
- Drive for 4 seconds or more with the vehicle speed is 50 km/h (31 mph) or more. Stop the vehicle [vehicle speed is 1.5 km/h (1 mph) or less]. Repeat 10 times or more.

Judgement Criterion
- Power steering pressure switch continues to be ON.

OBD-II DRIVE CYCLE PATTERN
None.

TSB Revision

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Power steering pressure switch failed.
- Open or shorted power steering pressure switch circuit, harness damage, or connector damage.
- PCM failed.

DIAGNOSIS

Required Special Tools:

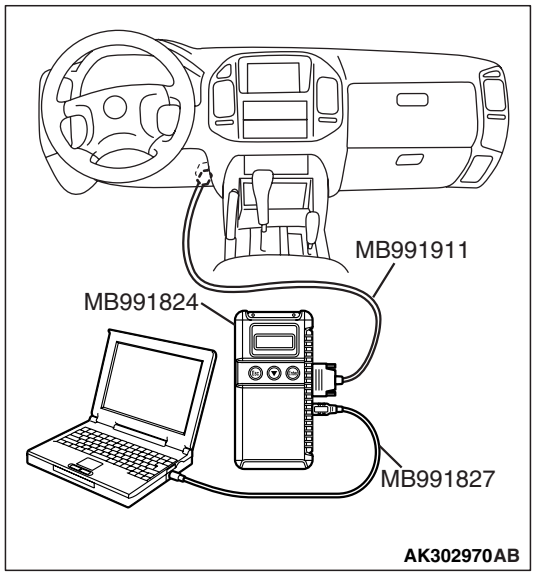
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991958, check data list item 27: Power Steering Pressure Switch.

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

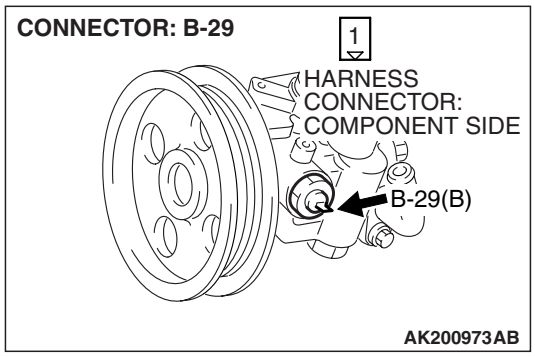
(1) Connect scan tool MB991958 to the data link connector.
(2) Start the engine and run at idle.
(3) Set scan tool MB991958 to the data reading mode for item 27, Power Steering Pressure Switch.
  - If the steering wheel is not turned while idling, OFF will be displayed.
  - If the steering wheel is turned while idling, ON will be displayed.
(4) Turn the ignition switch to the "LOCK" (OFF) position.



Q: Is the switch operating properly?

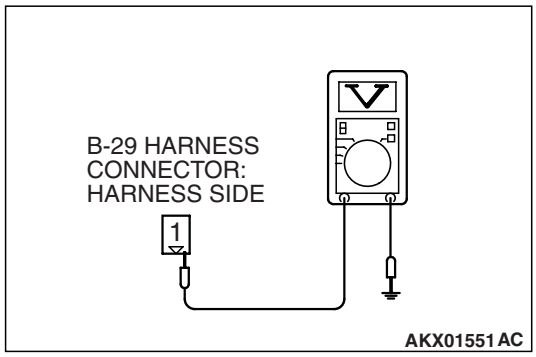
YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-13.

NO : Go to Step 2.



STEP 2. Measure the power supply voltage at power steering pressure switch connector B-29 by backprobing.

(1) Do not disconnect the connector B-29.
(2) Start the engine and run at idle.



(3) Measure the voltage between terminal No. 1 and ground by backprobing.
- When steering wheel is not turned, voltage should be battery positive voltage.
- When steering wheel is turned, voltage should be 1 volt or less.

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

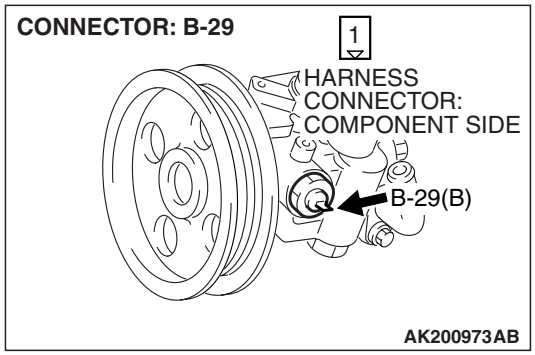
Q: Is the voltage normal?

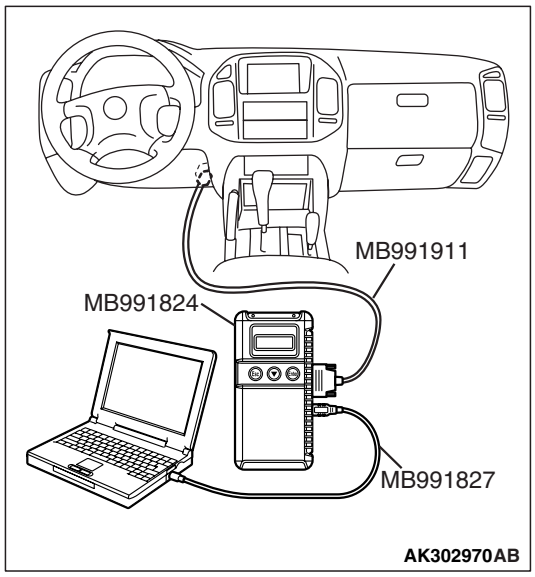
YES : Go to Step 3.
NO : Go to Step 5.

STEP 3. Check harness connector B-29 at power steering pressure switch for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 4.
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 14.





STEP 4. Using scan tool MB991958, check data list item 27: Power Steering Pressure Switch.

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

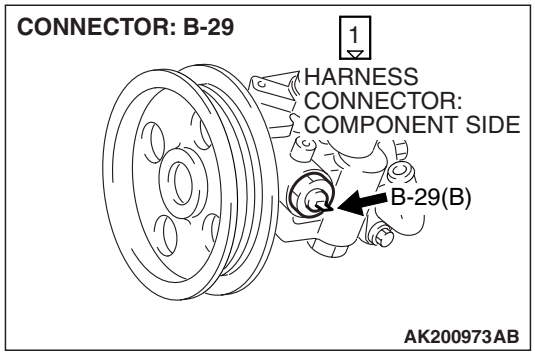
(1) Connect scan tool MB991958 to the data link connector.
(2) Start the engine and run at idle.
(3) Set scan tool MB991958 to the data reading mode for item 27, Power Steering Pressure Switch.
- If the steering wheel is not turned while idling, OFF will be displayed.
- If the steering wheel is turned while idling, ON will be displayed.

(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 Malfunctions P.00-13.

NO : Replace the PCM. Then go to Step 14.

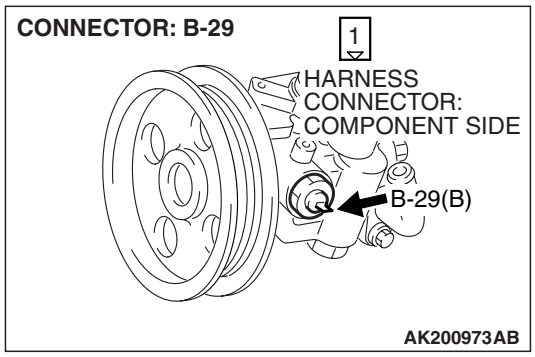


STEP 5. Check harness connector B-29 at power steering pressure switch for damage.

Q: Is the harness connector in good condition?

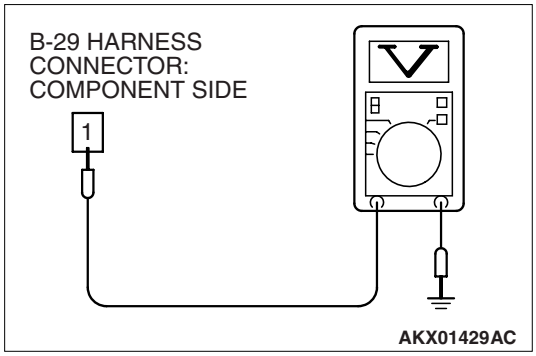
YES : Go to Step 6.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 14.



STEP 6. Measure the power supply voltage at power steering pressure switch harness side connector B-29.

(1) Disconnect the connector B-29 and measure at the harness side.
(2) Turn the ignition switch to the ON position.



(3) Measure the voltage between terminal No. 1 and ground.
- Voltage should be battery positive voltage.

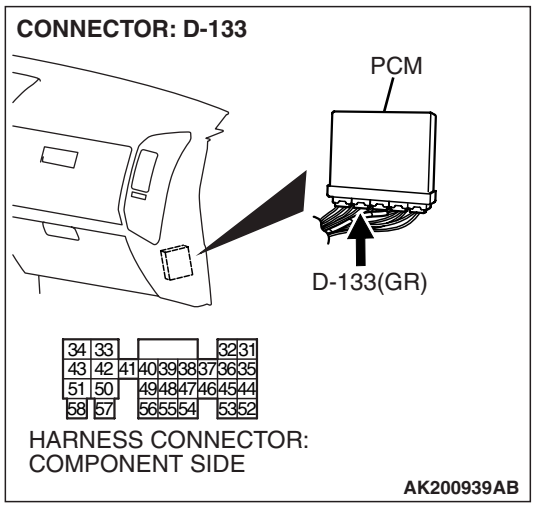
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 11.
NO : Go to Step 7.

STEP 7. Measure the power supply voltage at PCM connector D-133 by backprobing.

(1) Do not disconnect the PCM connector D-133.
(2) Disconnect the power steering pressure switch connector B-29.
(3) Turn the ignition switch to the ON position.

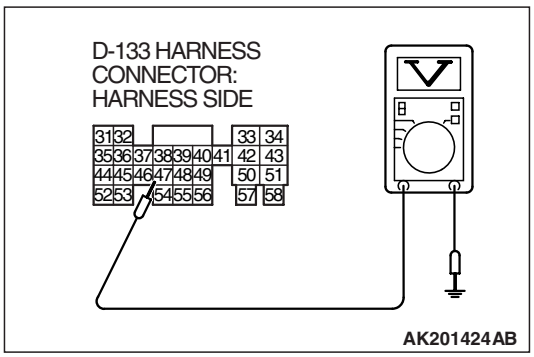


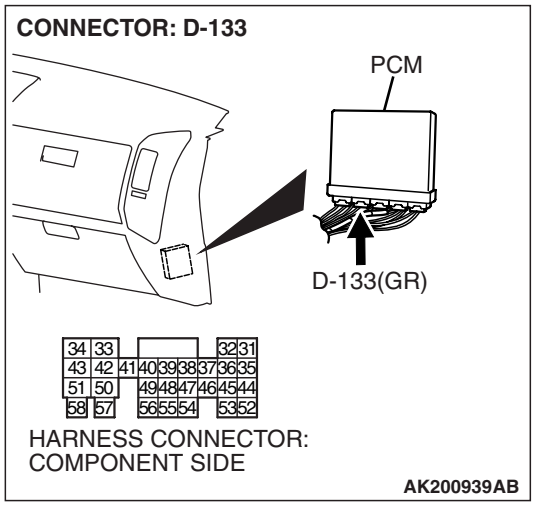
(4) Measure the voltage between terminal No. 47 and ground by backprobing.
- Voltage should be between battery positive voltage.

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

Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 8.
NO : Go to Step 9.



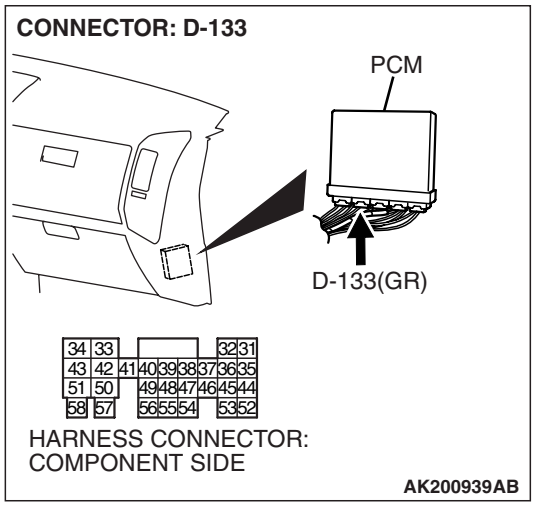


STEP 8. Check harness connector D-133 at PCM for damage.

Q: Is the harness connector in good condition?

YES : Repair harness wire between power steering pressure switch connector B-29 (terminal No. 1) and PCM connector D-133 (terminal No. 47) because of open circuit. Then go to Step 14.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 14.



STEP 9. Check harness connector D-133 at PCM for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 10.

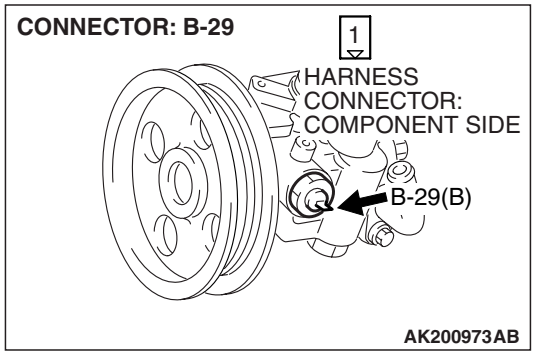
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 14.

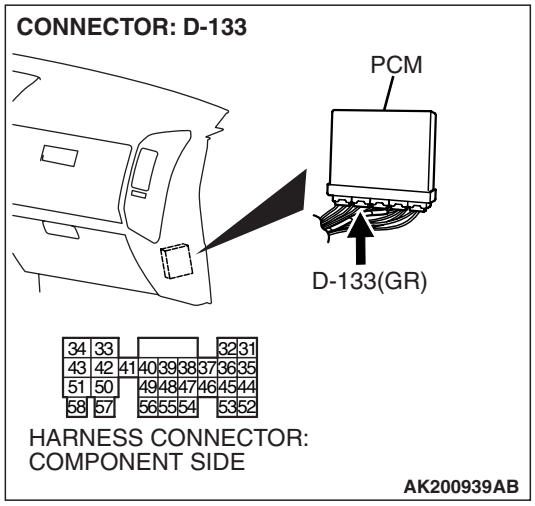
STEP 10. Check for short circuit to ground between power steering pressure switch connector B-29 (terminal No. 1) and PCM connector D-133 (terminal No. 47).

Q: Is the harness wire in good condition?

YES : Replace the PCM. Then go to Step 14.

NO : Repair it. Then go to Step 14.





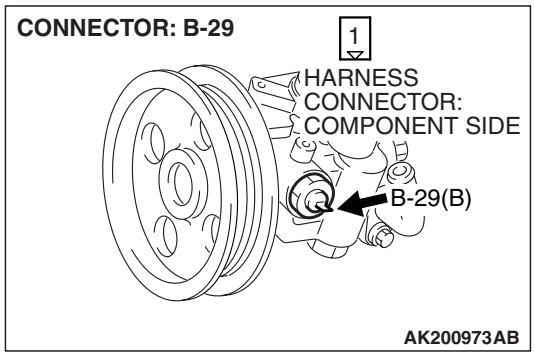
STEP 11. Replace the power steering pressure switch.

(1) Replace the power steering pressure switch.
(2) Check the trouble symptoms.
(3) Read in the diagnostic trouble code (DTC).

Q: Is DTC P0551 set?

YES : Go to Step 12.

NO : Go to Step 14.

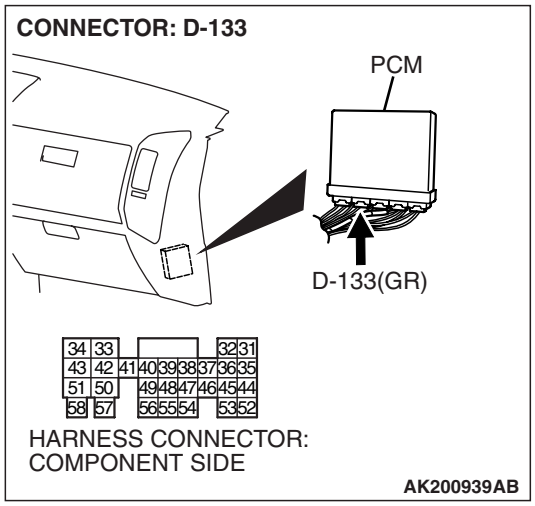


STEP 12. Check harness connector D-133 at PCM for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 13.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 14.

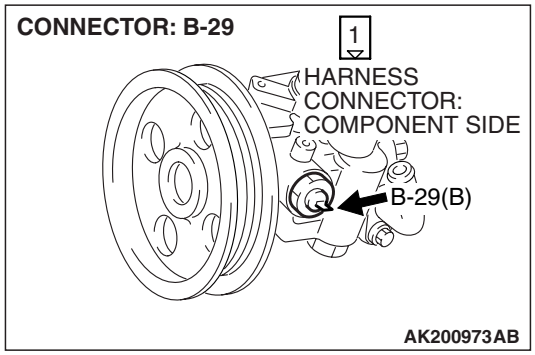


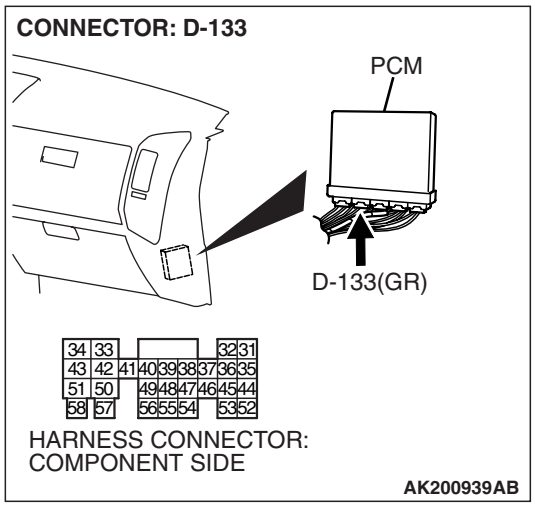
STEP 13. Check for harness damage between power steering pressure switch connector B-29 (terminal No. 1) and PCM connector D-133 (terminal No. 47).

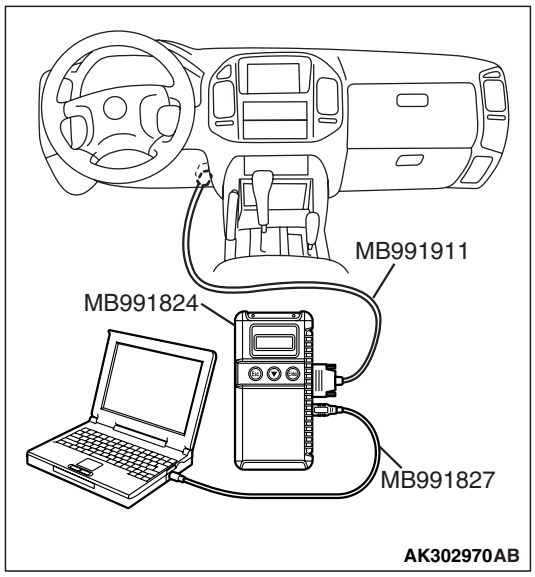
Q: Is the harness wire in good condition?

YES : Replace the PCM. Then go to Step 14.

NO : Repair it. Then go to Step 14.







STEP 14. Using scan tool MB991958, check data list item 27: Power Steering Pressure Switch.

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Start the engine and run at idle.
(3) Set scan tool MB991958 to the data reading mode for item 27, Power Steering Pressure Switch.
- If the steering wheel is not turned while idling, OFF will be displayed.
- If the steering wheel is turned while idling, ON will be displayed.

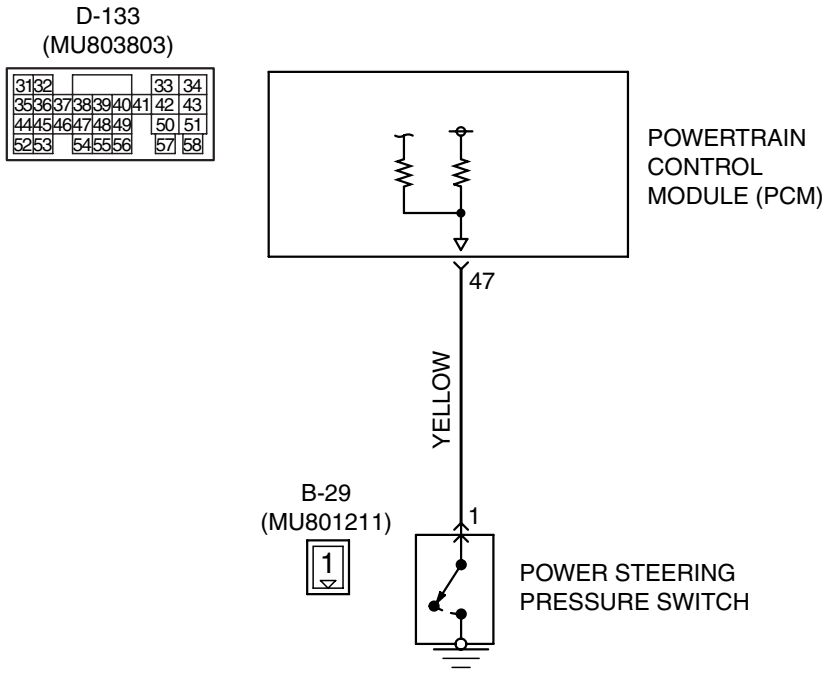
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the switch operating properly?

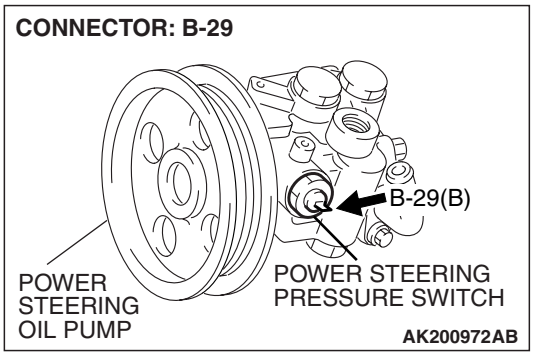
YES : The inspection is complete.
NO : Retry the troubleshooting.

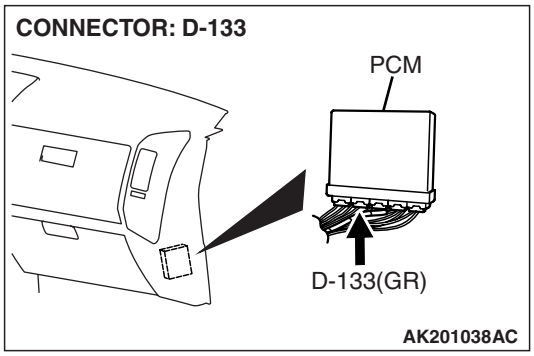
DTC P0554: Power Steering Pressure Switch Circuit Intermittent

Power Steering Pressure Switch Circuit



TSB Revision





CIRCUIT OPERATION

- A battery positive voltage is applied to the power steering pressure switch output terminal (terminal No. 1) from the PCM (terminal No. 47) via the resistor in the PCM.

TECHNICAL DESCRIPTION

- The power steering pressure switch converts the existence of a power steering load into a high/low voltage, and inputs it into the PCM.
- When the steering wheel is turned, hydraulic pressure rises. The power steering pressure switch closes, and the applied battery positive voltage will be grounded. With this, the power steering pressure switch output voltage will fluctuate between 12 volts and 0 volt.
- While driving with the steering wheel held straight, the power steering pressure switch turns OFF.
- The PCM checks whether the power steering pressure switch turns OFF or ON during driving.

DESCRIPTIONS OF MONITOR METHODS

Power steering pressure switch changes from off to on more than 10 times for 1 second.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

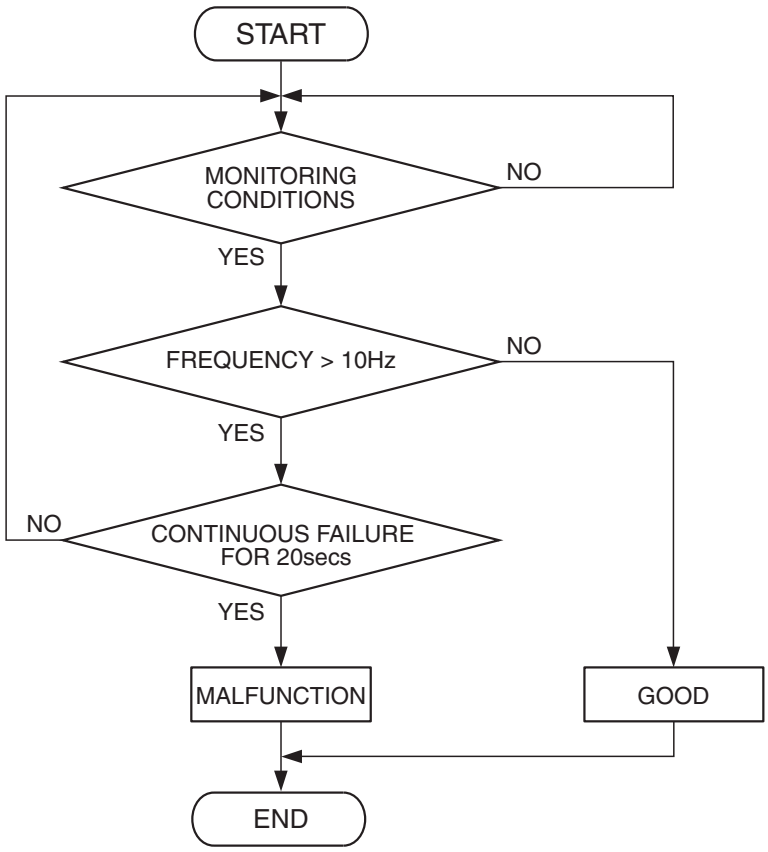
- Not applicable

Sensor (The sensor below is determined to be normal)

- Engine coolant temperature sensor

DTC SET CONDITIONS

Logic Flow Chart



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Check Conditions

- Engine coolant temperature is higher than 10°C (50°F).
- Vehicle speed is higher than 50 km/h (31 mph).

Judgement Criterion

- The ON/OFF frequency of a power steering pressure switch is 10 Hz or more for 20 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 17 P.13A-4.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Power steering pressure switch failed.
- Incorrect power steering fluid level.
- Incorrect oil pump pressure.
- Harness damage in power steering pressure switch circuit, or connector damage.
- PCM failed.

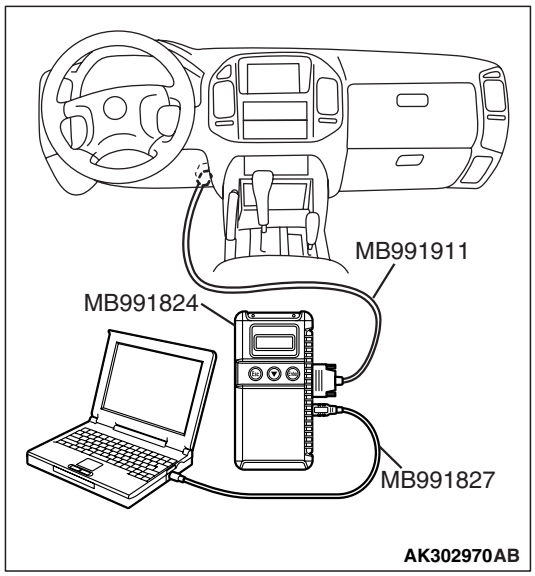
TSB Revision

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991958, check data list item 27: Power Steering Pressure Switch.



⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Start the engine and run at idle.
(3) Set scan tool MB991958 to the data reading mode for item 27, Power Steering Pressure Switch.
  - If the steering wheel is not turned while idling, OFF will be displayed.
  - If the steering wheel is turned while idling, ON will be displayed.

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

Q: Is the sensor 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 Malfunctions P.00-13.
NO : Go to Step 2.

STEP 2. Check the power steering fluid level.

Refer to GROUP 37A, On-Vehicle Service – Fluid Level Check P.37-17.

Q: Are there any abnormalities?

YES : Repair it. Then go to Step 7.
NO : Go to Step 3.

STEP 3. Check the power steering pressure switch.

Refer to GROUP 37A, On-Vehicle Service – Power Steering Pressure Switch CheckP.37-20.

Q: Are there any abnormalities?

YES : Replace the power steering pressure switch. Then go to Step 7.
NO : Go to Step 4.

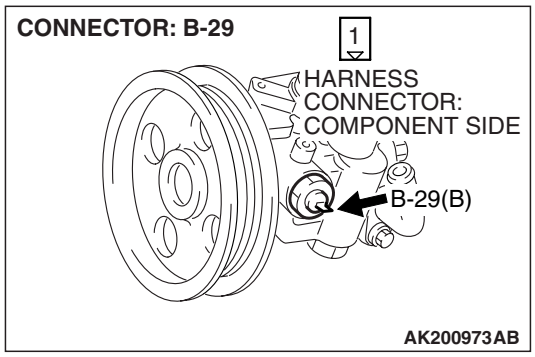
STEP 4. Check the oil pump pressure.

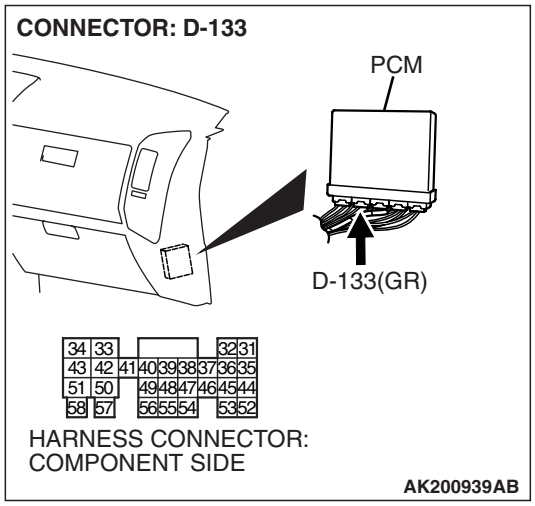
Refer to GROUP 37A, On-Vehicle Service – Oil Pump Pressure Test P.37-19.

Q: Are there any abnormalities?

YES : Repair it. Then go to Step 7.
NO : Go to Step 5.

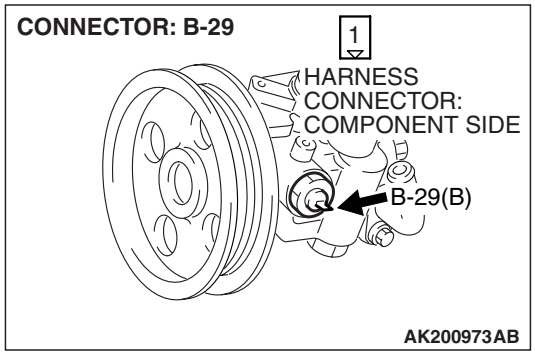
TSB Revision

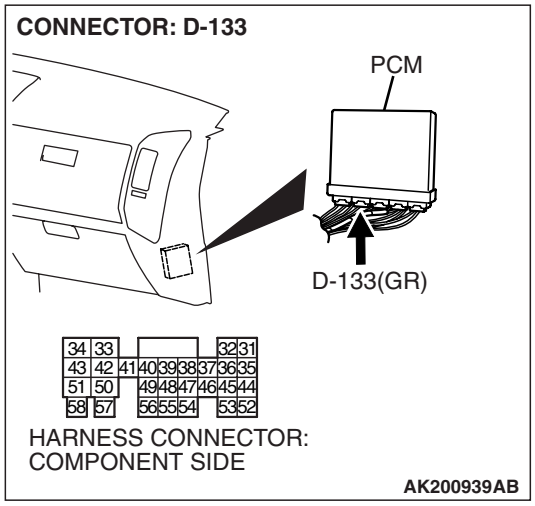




STEP 5. Check connector B-29 at the power steering pressure switch and connector D-133 at PCM for damage.
Q: Is the connector in good condition?

YES : Go to Step 6.
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 7.





STEP 6. Check for harness damage between power steering pressure switch connector B-29 (terminal No. 1) and PCM connector D-133 (terminal No. 47).

Q: Is the harness wire in good condition?

YES : Replace the PCM. Then go to Step 7.

NO : Repair it. Then go to Step 7.

STEP 7. Test the OBD-II drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 17 P.13A-4.

(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0554 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0603: EEPROM Malfunction

TECHNICAL DESCRIPTION

- PCM stored the information such as the idle learned value and so on in the memory of PCM.

DESCRIPTIONS OF MONITOR METHODS

To check whether the information such as the idle learned value and so on is stored in the memory of PCM.

MONITOR EXECUTION

Once per driving cycle

TSB Revision

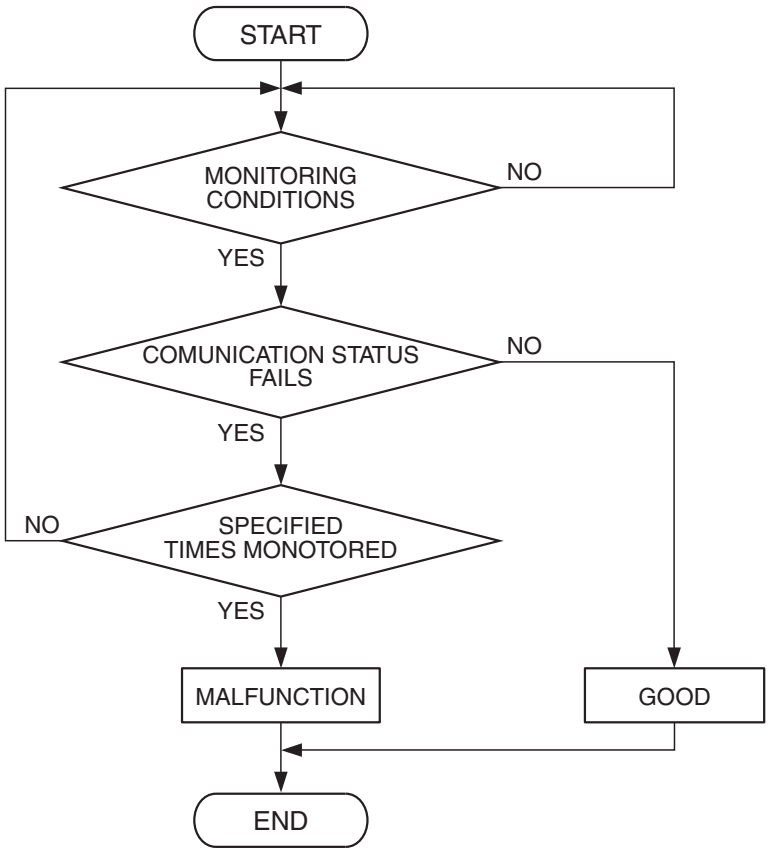
MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)
- Not applicable

Sensor (The sensor below is determined to be normal)
- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK401535

Check Condition
- Ignition switch is in "ON" position.

Judgement Criterion
- The latest data that was flashed while the ignition switch was in "LOCK" (OFF) position are not stored correctly.

OBD-II DRIVE CYCLE PATTERN
None.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)
- PCM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991958, read the diagnostic trouble code (DTC)

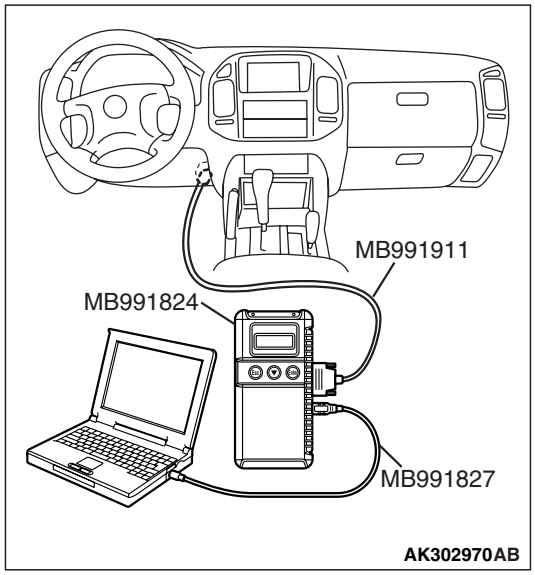
⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is DTC P0603 set?

YES : Replace the PCM.
NO : 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 Malfunctions P.00-13.



DTC P0606: Powertrain Control Module Main Processor Malfunction

TECHNICAL DESCRIPTION

- Throttle actuator control module processor checks the PCM for abnormal conditions.

DESCRIPTIONS OF MONITOR METHODS

No watch dog pulse is detected.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Check Condition

- Ignition switch is "ON" position.

Judgement Criterion

- No surveillance pulse signals should be input for 0.5 second.

OBD-II DRIVE CYCLE PATTERN

None.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- PCM failed.

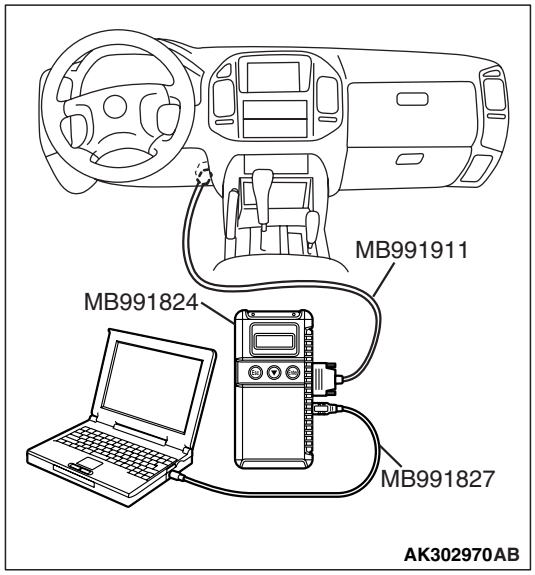
TSB Revision

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991958, read the diagnostic trouble code (DTC)



⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P0606 set?

YES : Replace the PCM.
NO : 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 Malfunctions P.00-13.

DTC P0630: Vehicle Identification Number (VIN) Malfunction

TECHNICAL DESCRIPTION

- The Vehicle Identification Number (VIN) is stored in the PCM by the vehicle manufacture.

DESCRIPTIONS OF MONITOR METHODS

The PCM checks whether the VIN is being entered or not.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

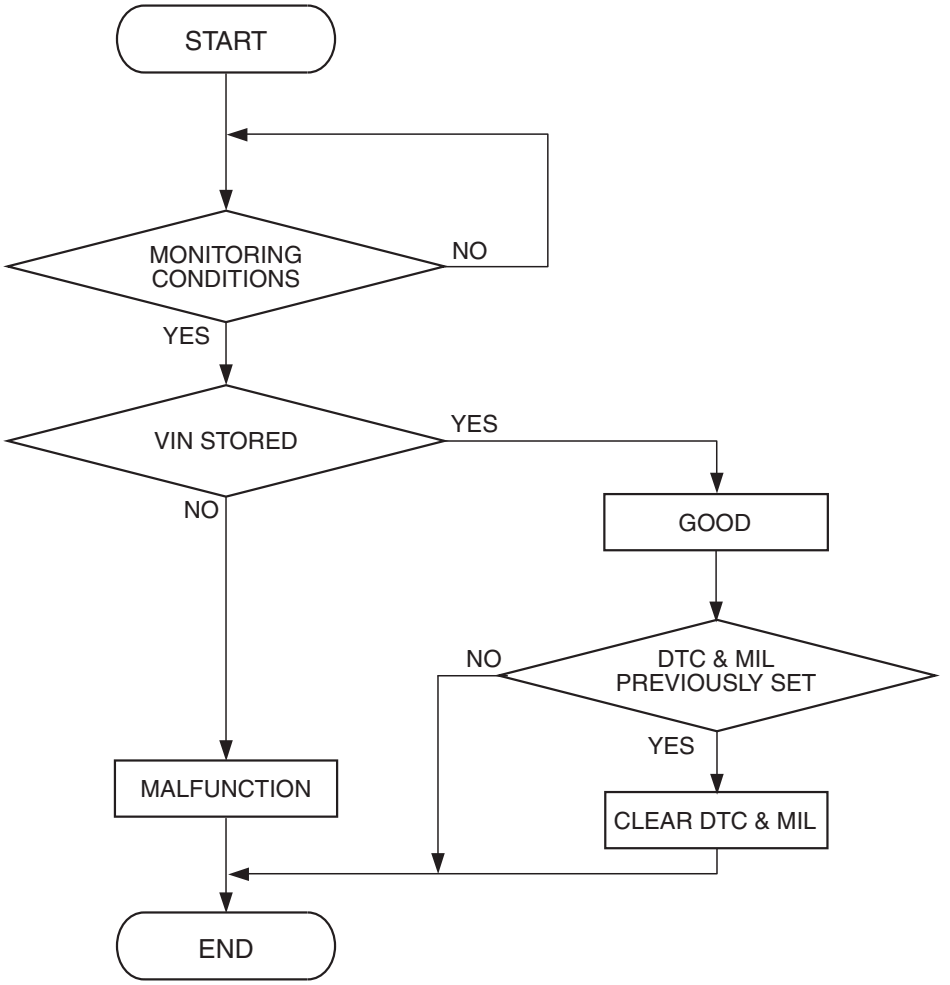
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK401536

Check Conditions
- Ignition switch is in "ON" position.
- EEPROM is normal.

Judgement Criterion
- VIN (current) has not been written.

OBD-II DRIVE CYCLE PATTERN
None.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)
- PCM failed.

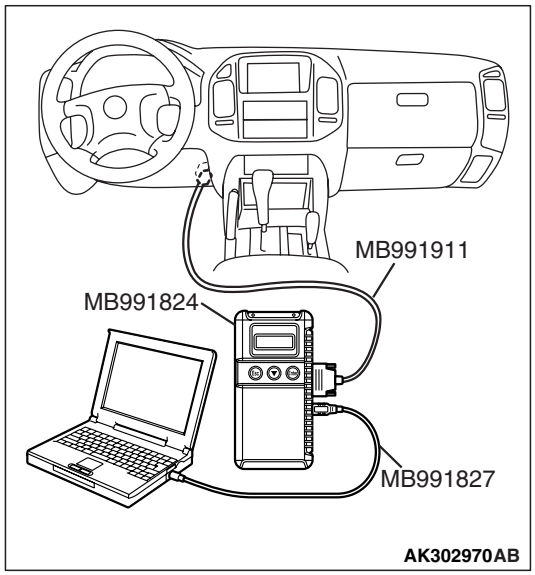
TSB Revision

DIAGNOSIS

Required Special Tools:

- MB991958: Scan tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991958, check VIN Information.



⚠ CAUTION

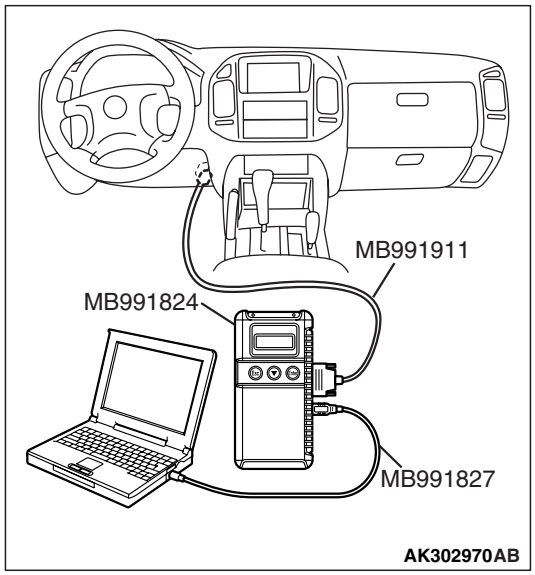
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to the coding mode for VIN Information.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Has VIN (current) been written?

YES : Go to Step 2.
NO : Write VIN. Then go to Step 3.

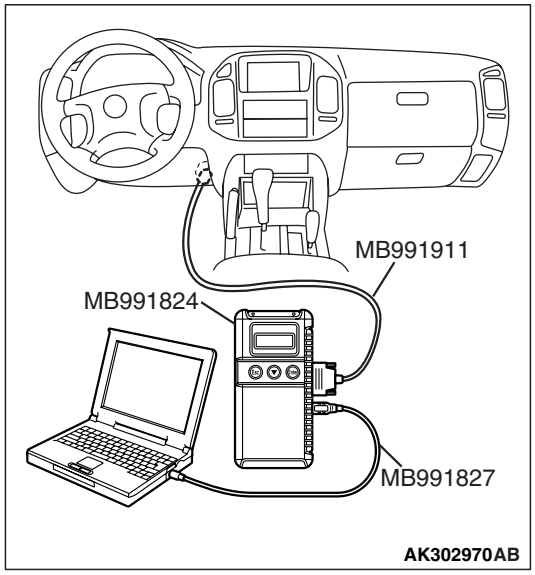
STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC)



(1) Turn the ignition switch to the "ON" position.
(2) Check the diagnostic trouble code (DTC).
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P0630 set?

YES : Replace the PCM.
NO : 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 Malfunctions P.00-13.



STEP 3. Using scan tool MB991958, read the diagnostic trouble code (DTC)

(1) Turn the ignition switch to the "ON" position.
(2) Check the diagnostic trouble code (DTC).
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P0630 set?

YES : Replace the PCM.
NO : The inspection is complete.

DTC P0638: Throttle Actuator Control Motor Circuit Range/Performance Problem

Throttle Actuator Control Motor Circuit

- Refer to, DTC P0657 – Throttle Actuator Control Motor Relay Circuit P.13A-761.
- Refer to, DTC P2101 – Throttle Actuator Control Motor Magneto Malfunction P.13A-794.

CIRCUIT OPERATION

- Refer to, DTC P0657 – Throttle Actuator Control Motor Relay Circuit P.13A-761.
- Refer to, DTC P2101 – Throttle Actuator Control Motor Magneto Malfunction P.13A-794.

TECHNICAL DESCRIPTION

- PCM checks the electronic controlled throttle system for abnormal conditions.

DESCRIPTIONS OF MONITOR METHODS

Difference between throttle position sensor (main) output and target opening is greater than the specified value.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Check Conditions

- Battery positive voltage is higher than 8.3 volts.
- Throttle position sensor (main) output voltage is between 0.35 and 4.8 volts.
- Drop of throttle position sensor (main) output voltage per 100 milliseconds is more than 0.04 volt.

Judgement Criterion

- Throttle position sensor (main) output voltage has continued to be higher than the target throttle position sensor (main) voltage by 0.5 volt or more for 0.5 second.

Check Conditions

- Battery positive voltage is higher than 8.3 volts.
- Throttle position sensor (main) output voltage is between 0.35 and 4.8 volts.

Judgement Criterion
- Difference between throttle position sensor (main) output voltage and target throttle position sensor (main) voltage is 1 volt or higher for 1 seconds.

OBD-II DRIVE CYCLE PATTERN
None.

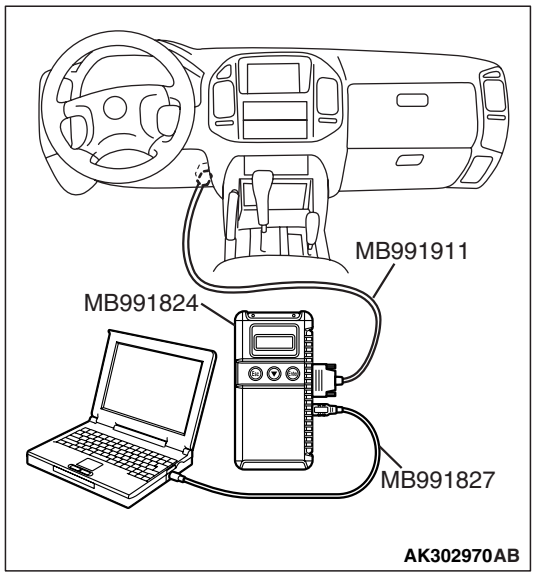
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)
- Throttle valve return spring failed.
- Throttle actuator control motor relay failed or maladjusted.
- Open or shorted throttle actuator control motor relay circuit, harness damage, or connector damage.
- Throttle valve operation failed.
- Throttle actuator control motor failed.
- Harness damage in throttle actuator control motor circuit, or connector damage.
- PCM failed.

DIAGNOSIS

Required Special Tools:
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991958, check data list item 9A: Throttle Position Sensor (main) Mid Opening Learning Value.

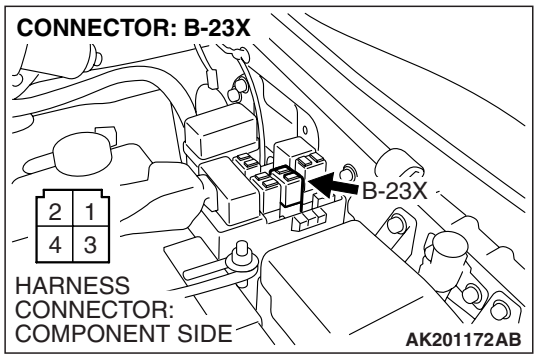
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.



(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to the data reading mode for item 9A, Throttle position sensor (main) mid opening learning value.
  - Check that it is 4 volts or less.
(4) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is voltage 4 volts or less?

YES : Go to Step 2.
NO : Replace the throttle body assembly. Then go to Step 17.

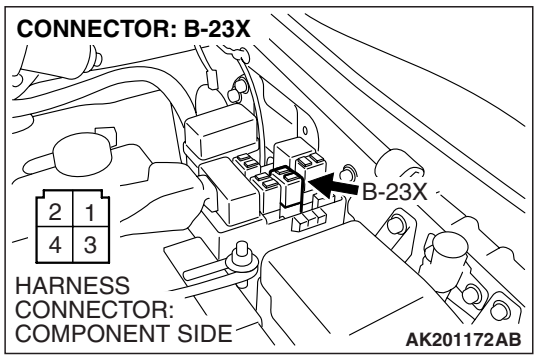


STEP 2. Check harness connector B-23X at throttle actuator control motor relay for damage.

Q: Is the harness connector in good condition?

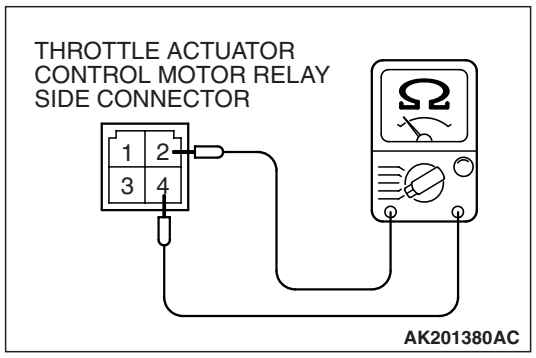
YES : Go to Step 3.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 17.

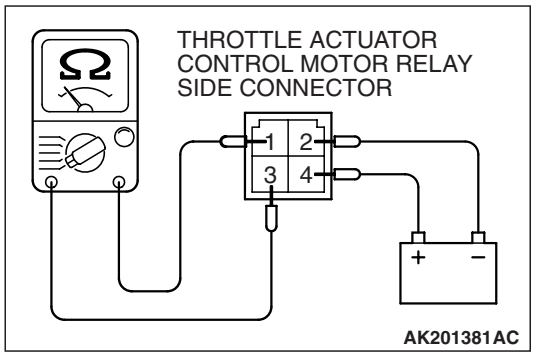


STEP 3. Check the throttle actuator control motor relay.

(1) Remove the throttle actuator control motor relay.



(2) Check for continuity between the throttle actuator control motor relay side connector terminal No. 2 and No. 4.
- There should be continuity (approximately 70 ohms).



(3) Use jumper wires to connect throttle actuator control motor relay side connector terminal No. 4 to the positive battery terminal and terminal No. 2 to the negative battery terminal.

(4) Check the continuity between the throttle actuator control motor relay side connector terminal No. 1 and No. 3 while connecting and disconnecting the jumper wire at the negative battery terminal.
- Should be less than 2 ohms. (Negative battery terminal connected.)
- Should be open loop. (Negative battery terminal disconnected.)

(5) Install the throttle actuator control motor relay.

Q: Is the resistance normal?

YES : Go to Step 4.

NO : Replace the throttle actuator control motor relay. Then go to Step 17.

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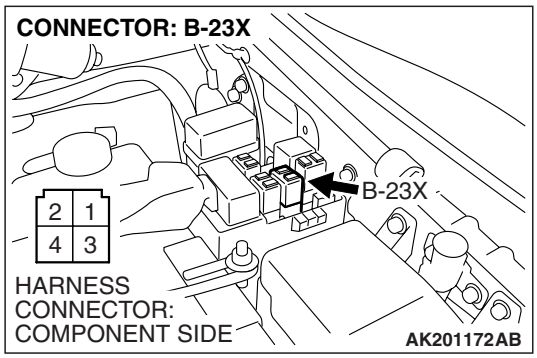
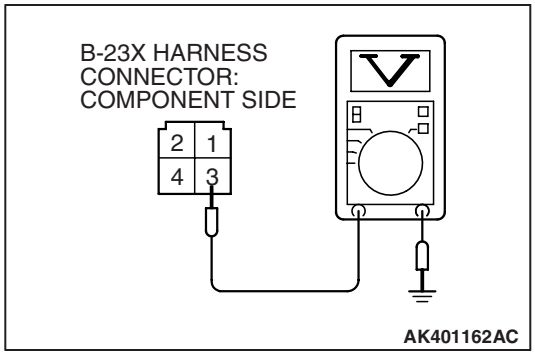
STEP 4. Measure the power supply voltage at throttle actuator control motor relay harness side connector B-23X



(1) Disconnect the connector B-23X and measure at the harness side.



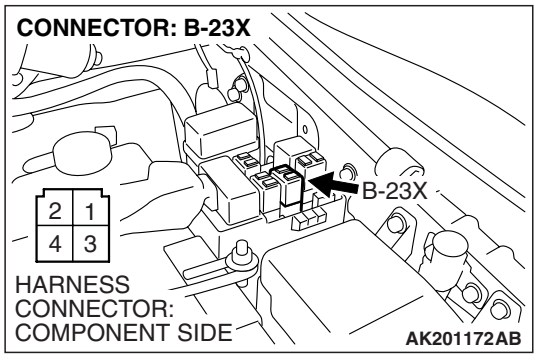
(2) Measure the voltage between terminal No. 3 and ground.
- Voltage should be battery positive voltage.

Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 5.

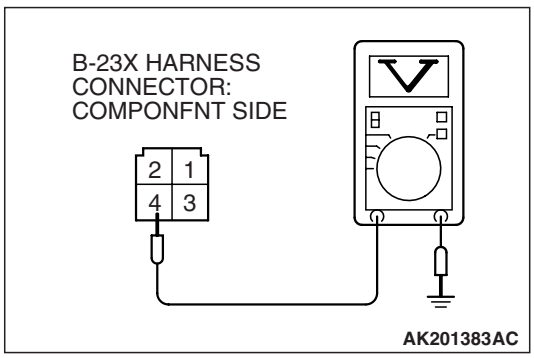
NO : Check harness connector A-03 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. If intermediate connector A-03 is in good condition, repair it because of open circuit or short circuit to ground between fusible link (5) and throttle actuator control motor relay connector B-23X (terminal No. 3). Then go to Step 17.

STEP 5. Measure the power supply voltage at throttle actuator control motor relay harness side connector B-23X.



(1) Disconnect the connector B-23X and measure at the harness side.

(2) Turn the ignition switch to the "ON" position.



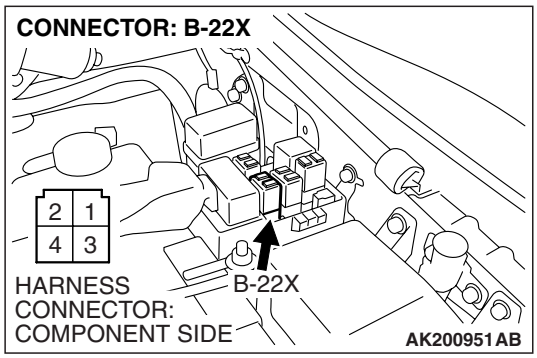
(3) Measure the voltage between terminal No. 4 and ground.
- Voltage should be battery positive voltage.

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

Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 7.

NO : Go to Step 6.

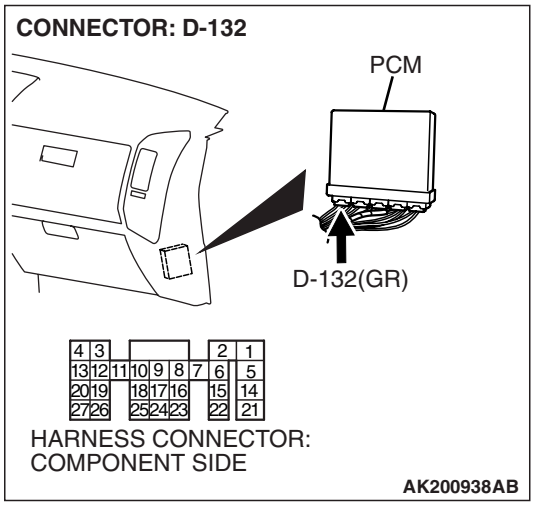


STEP 6. Check harness connector B-22X at MFI relay for damage.

Q: Is the harness connector in good condition?

YES : Repair harness wire between MFI relay connector B-22X (terminal No. 1) and throttle actuator control motor relay connector B-23X (terminal No. 4) because of open circuit or short circuit to ground. Then go to Step 17.

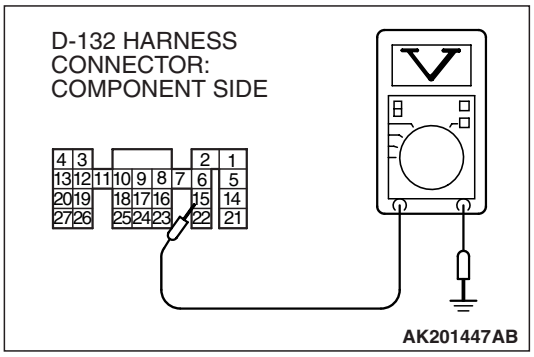
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 17.



STEP 7. Measure the power supply voltage at PCM harness side connector D-132.

(1) Disconnect the connector D-132 and measure at the harness side.

(2) Turn the ignition switch to the "ON" position.



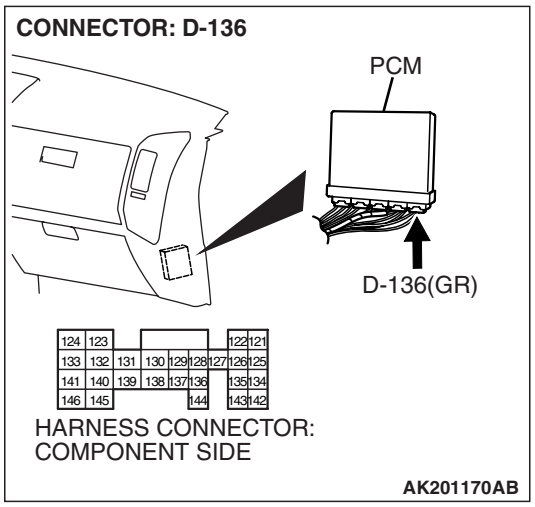
(3) Measure the voltage between terminal No. 15 and ground.
- Voltage should be battery positive voltage.

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

Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 8.

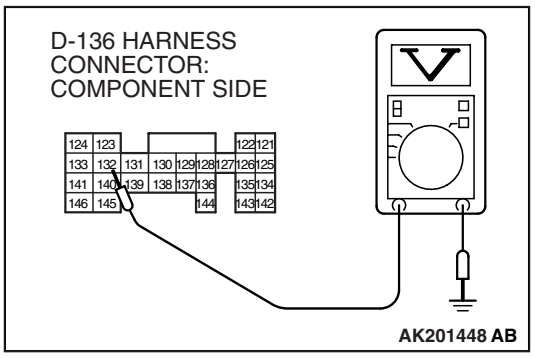
NO : Repair harness wire between throttle actuator control motor relay connector B-23X (terminal No. 2) and PCM connector D-132 (terminal No. 15) because of open circuit or short circuit to ground. Then go to Step 17.



STEP 8. Measure the power supply voltage at PCM harness side connector D-136.

(1) Disconnect the connector D-136 and measure at the harness side.

(2) Turn the ignition switch to the "ON" position.



(3) Measure the voltage between terminal No. 132 and ground.
- Voltage should be battery positive voltage.

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

Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 11.

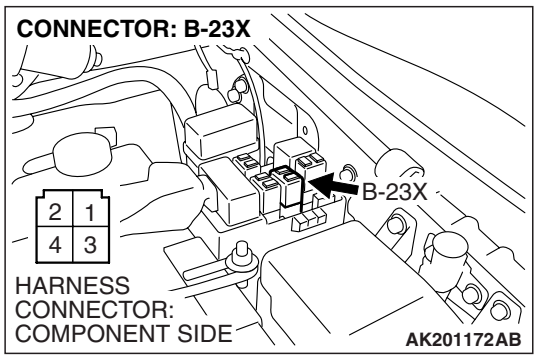
NO : Go to Step 9.

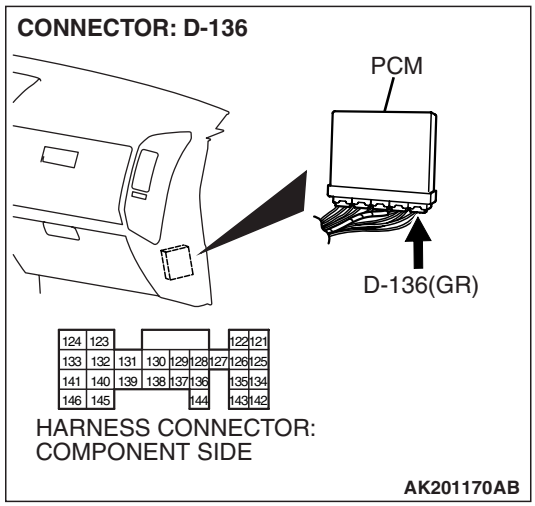
STEP 9. Check for open circuit and short circuit to ground between throttle actuator control motor relay connector B-23X (terminal No. 1) and PCM connector D-136 (terminal No. 132).

Q: Is the harness wire in good condition?

YES : Go to Step 10.

NO : Repair it. Then go to Step 17.



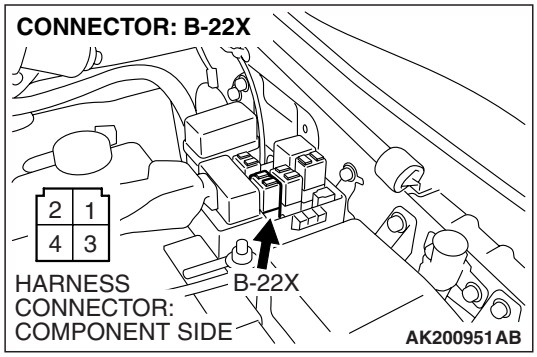


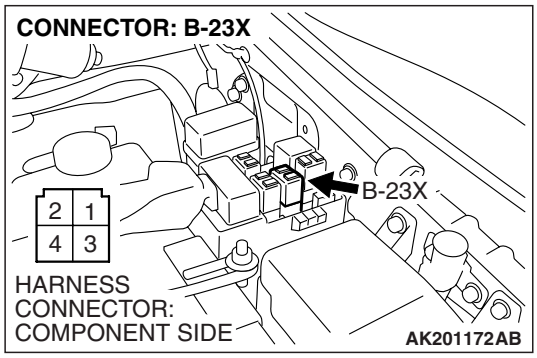
STEP 10. Check for harness damage between MFI relay connector B-22X (terminal No. 1) and throttle actuator control motor relay connector B-23X (terminal No. 4).

Q: Is the harness wire in good condition?

YES : Repair harness wire between throttle actuator control motor relay connector B-23X (terminal No. 2) and PCM connector D-132 (terminal No. 15) because of harness damage. Then go to Step 17.

NO : Repair it. Then go to Step 17.



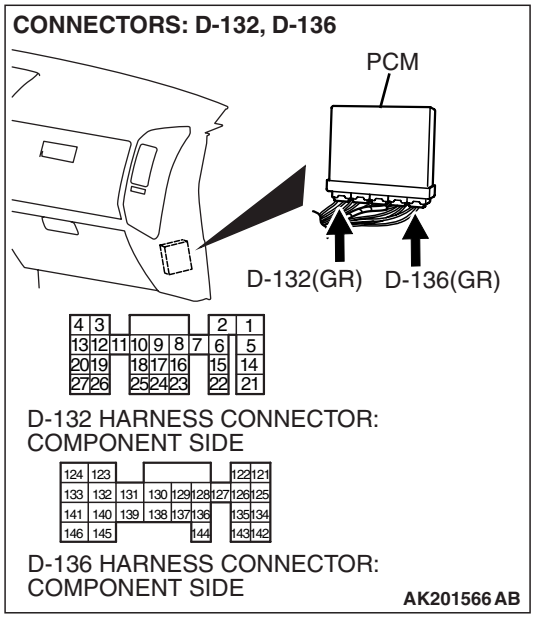


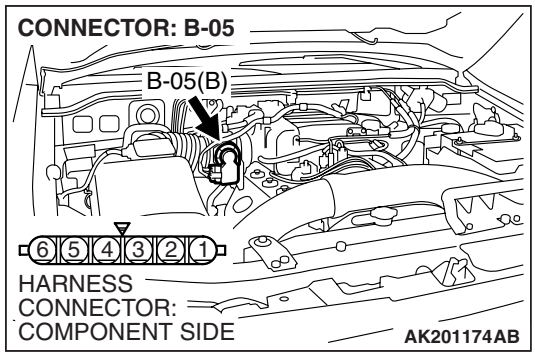
STEP 11. Check harness connectors D-132 and D-136 at PCM for damage.

Q: Are the harness connectors in good condition?

YES : Go to Step 12.

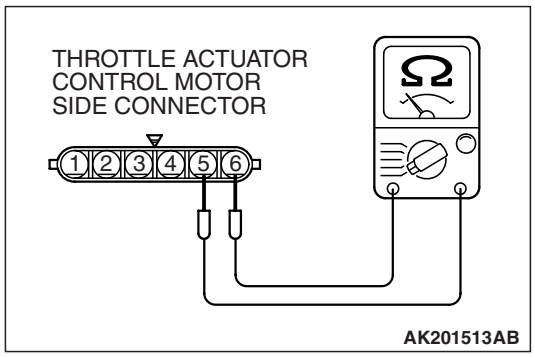
NO : Repair or replace them. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 17.





STEP 12. Check the throttle actuator control motor.

(1) Disconnect the connector B-05.



(2) Measure the resistance between throttle actuator control motor side connector terminal No. 5 and No. 6.

Standard value: 0.3 – 100 ohms

Q: Is the measured resistance between 0.3 and 100 ohms?

YES : Go to Step 13.

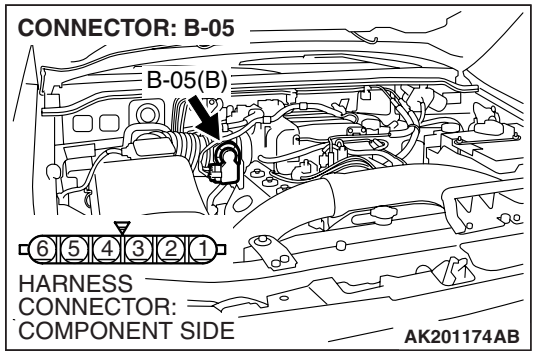
NO : Replace the throttle body assembly. Then go to Step 17.

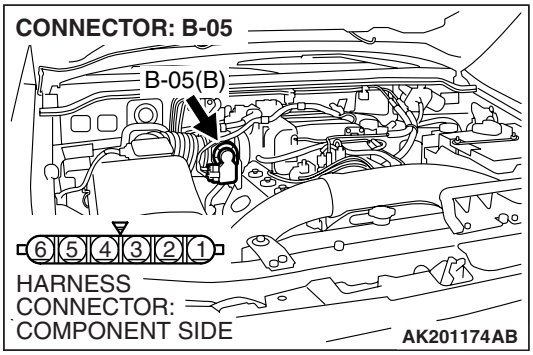
STEP 13. Check harness connector B-05 at throttle actuator control motor for damage.

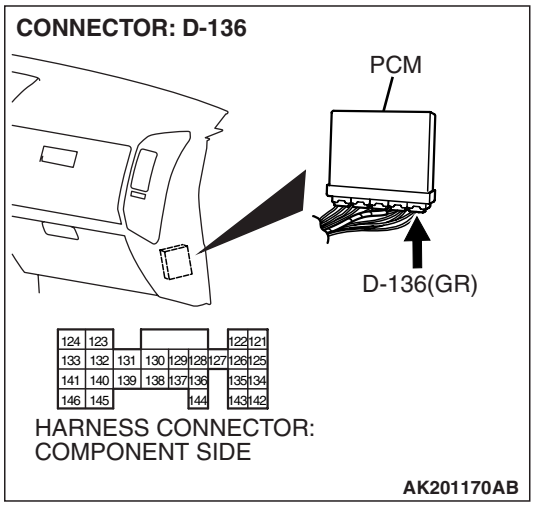
Q: Is the harness connector in good condition?

YES : Go to Step 14.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 17.







STEP 14. Check for harness damage between throttle actuator control motor connector B-05 (terminal No. 6) and PCM connector D-136 (terminal No. 133).

Q: Is the harness wire in good condition?

YES : Go to Step 15.

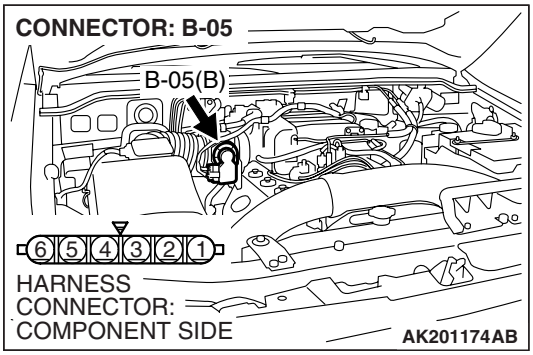
NO : Repair it. Then go to Step 17.

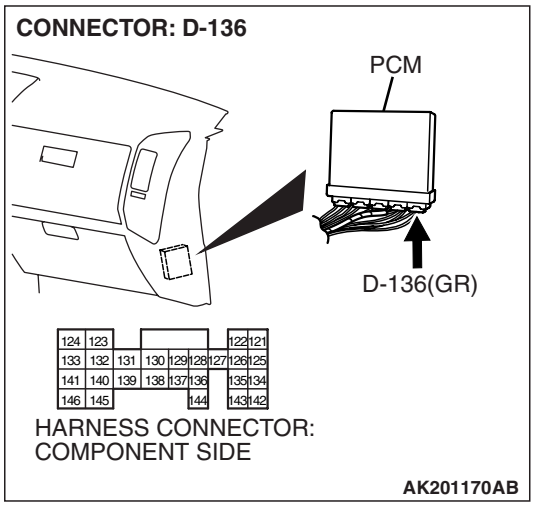
STEP 15. Check for harness damage between throttle actuator control motor connector B-05 (terminal No. 5) and PCM connector D-136 (terminal No. 141).

Q: Is the harness wire in good condition?

YES : Go to Step 16.

NO : Repair it. Then go to Step 17.





STEP 16. Using scan tool MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

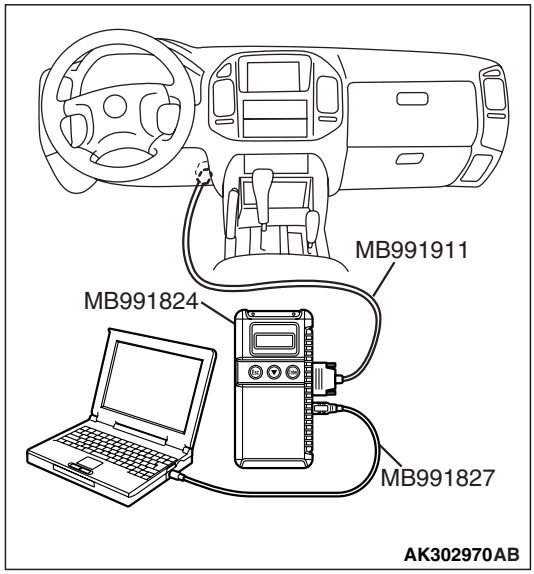
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

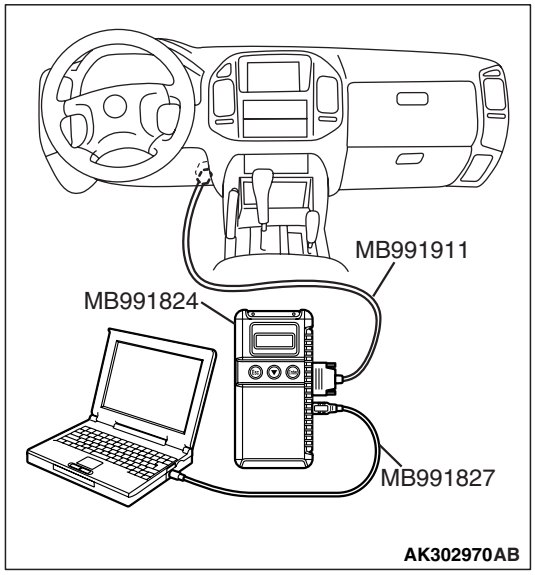
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is DTC P0638 set?

YES : Replace the PCM. Then go to Step 17.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points.





STEP 17. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is DTC P0638 set?

YES : Retry the troubleshooting.
NO : The inspection is complete.

DTC P0642: Throttle Position Sensor Power Supply

TECHNICAL DESCRIPTION

- PCM checks the throttle position sensor power voltage for abnormal conditions.

DESCRIPTIONS OF MONITOR METHODS

Throttle position sensor source voltage is smaller than the specified value.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Check Condition

- Battery positive voltage is higher than 6.3 volts.

Judgement Criterion

- Throttle position sensor power voltage should be 4.1 volts or lower for 0.5 second.

OBD-II DRIVE CYCLE PATTERN

None.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- PCM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991958, read the diagnostic trouble code (DTC).

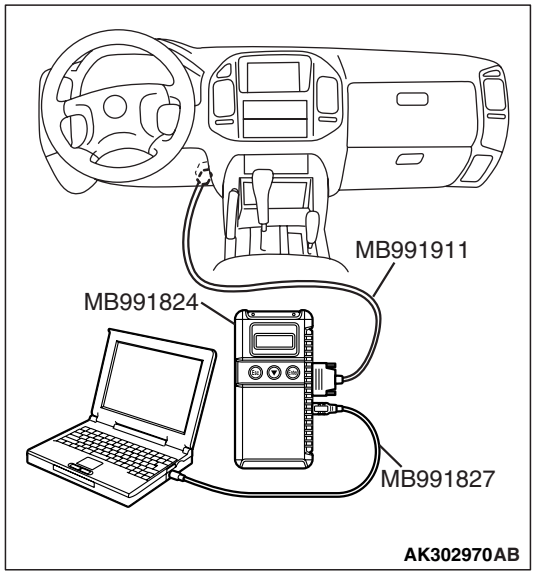
⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

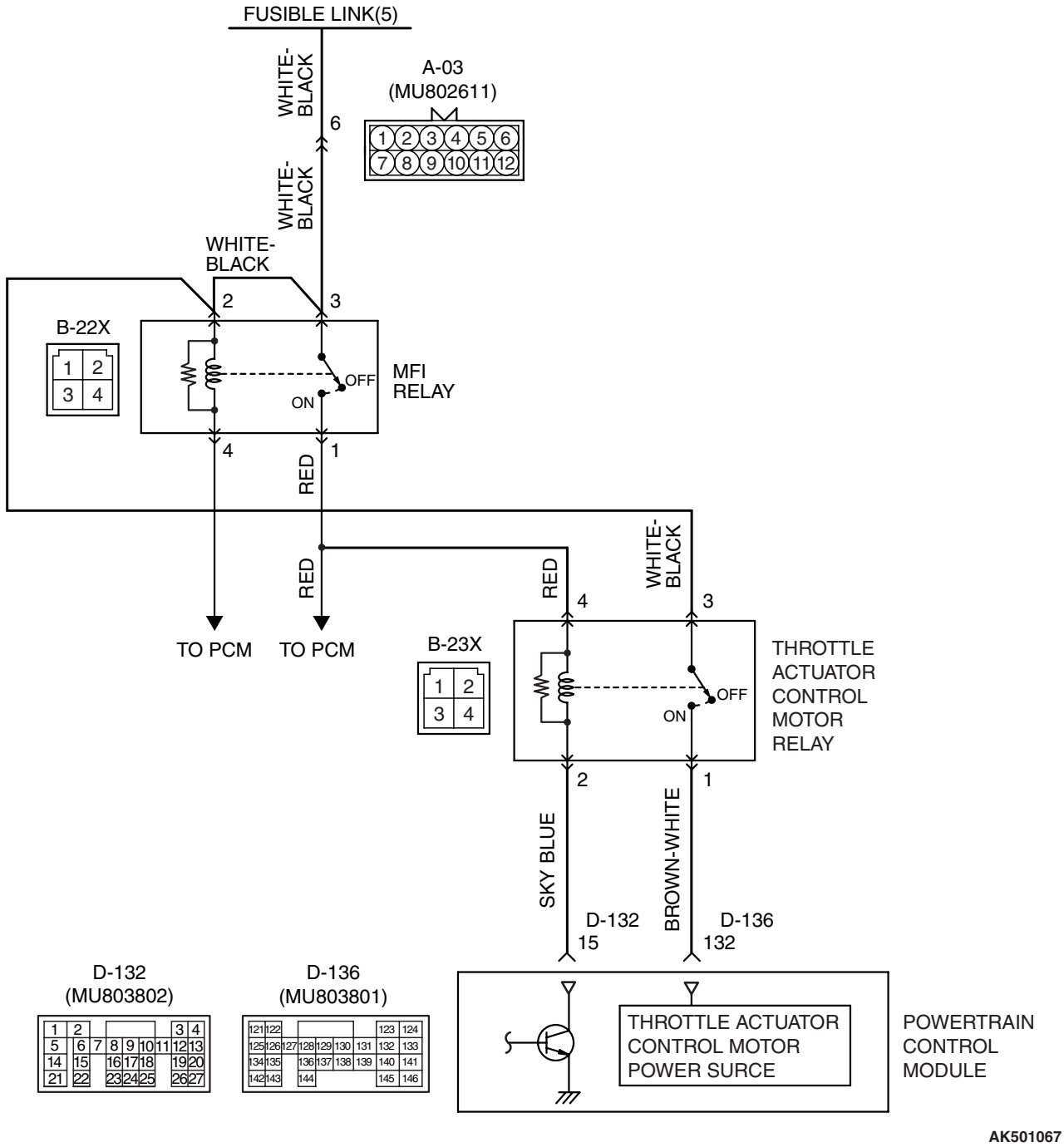
Q: Is DTC P0642 set?

YES : Replace the PCM.
NO : 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 Malfunctions P.00-13.



DTC P0657: Throttle Actuator Control Motor Relay Circuit Malfunction

Throttle Actuator Control Motor Relay Circuit



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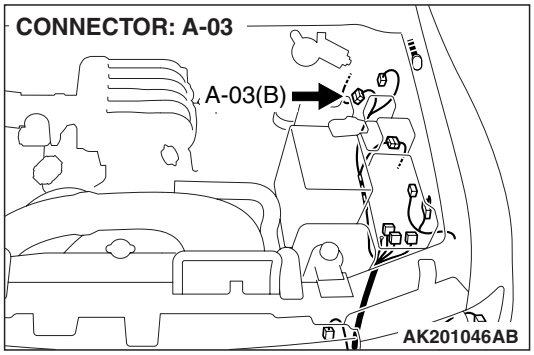
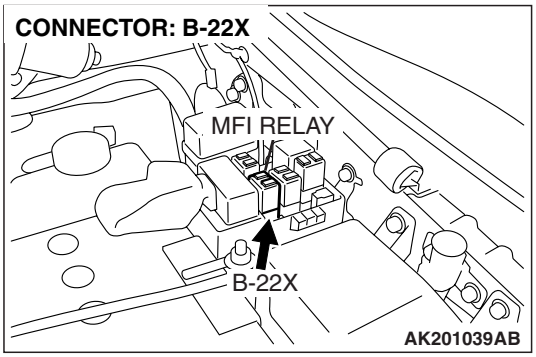
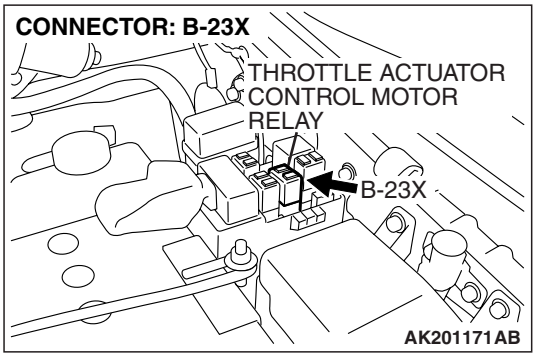
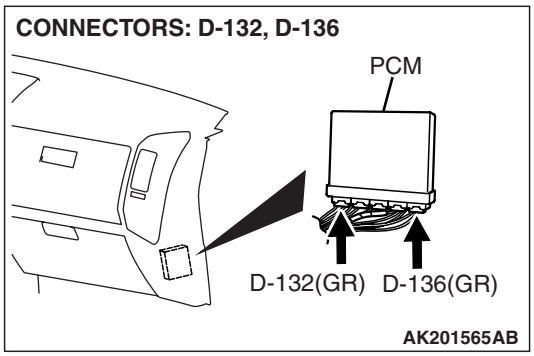








CIRCUIT OPERATION
- Battery positive voltage is applied to the throttle actuator control motor relay terminal (terminal No. 3).
- Battery positive voltage is applied to the throttle actuator control motor relay terminal (terminal No. 4) from the MFI relay (terminal No. 1).
- PCM (terminal No. 15) applies current to the throttle actuator control motor relay coil by turning ON the power transistor in the unit in order to turn the relay ON.
- When the throttle actuator control motor relay turns ON, battery positive voltage is supplied by the throttle actuator control motor relay (terminal No. 1) to the PCM (terminal No. 132).

TECHNICAL DESCRIPTION
- When the ignition switch ON signal is input into the PCM, the PCM turns ON the throttle actuator control motor relay.

DESCRIPTIONS OF MONITOR METHODS
Throttle actuator control motor relay circuit voltage is smaller than the specified value.

MONITOR EXECUTION
Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)
- Not applicable

Sensor (The sensor below is determined to be normal)
- Not applicable

DTC SET CONDITIONS

Check Condition
- Battery positive voltage is higher than 8.3 volts.

Judgement Criterion
- The power line voltage of the electronic controlled throttle valve system should be 6.0 volts or less for 0.35 second.

OBD-II DRIVE CYCLE PATTERN
None.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)
- Throttle actuator control motor relay failed.
- Open or shorted throttle actuator control motor relay circuit, harness damage, or connector damage.
- PCM failed.

DIAGNOSIS

Required Special Tools:

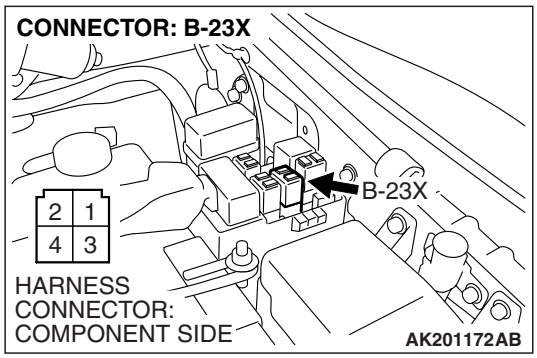
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Check harness connector B-23X at throttle actuator control motor relay for damage.

Q: Is the harness connector in good condition?

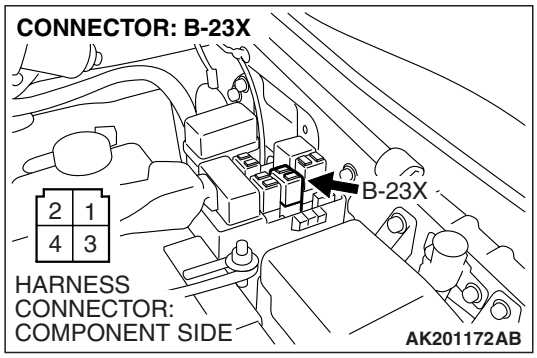
YES : Go to Step 2.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 14.



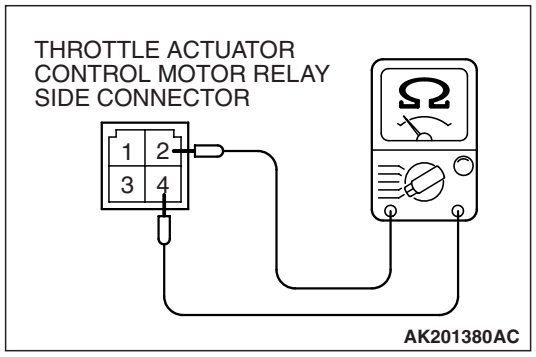
STEP 2. Check the throttle actuator control motor relay.

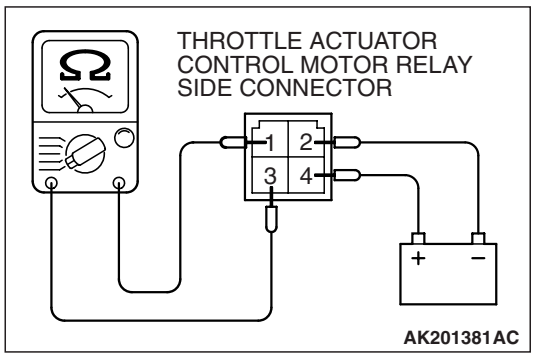
(1) Remove the throttle actuator control motor relay.



(2) Check for continuity between the throttle actuator control motor relay side connector terminal No. 2 and No. 4.

- There should be continuity (approximately 70 ohms).





(3) Use jumper wires to connect throttle actuator control motor relay side connector terminal No. 4 to the positive battery terminal and terminal No. 2 to the negative battery terminal.
(4) Check the continuity between the throttle actuator control motor relay side connector terminal No. 1 and No. 3 while connecting and disconnecting the jumper wire at the negative battery terminal.
- Should be less than 2 ohms. (Negative battery terminal connected.)
- Should be open loop. (Negative battery terminal disconnected.)

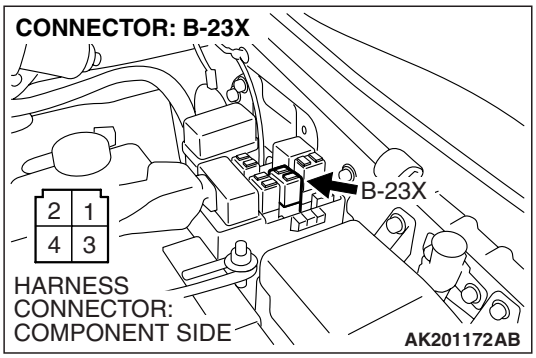
(5) Install the throttle actuator control motor relay.

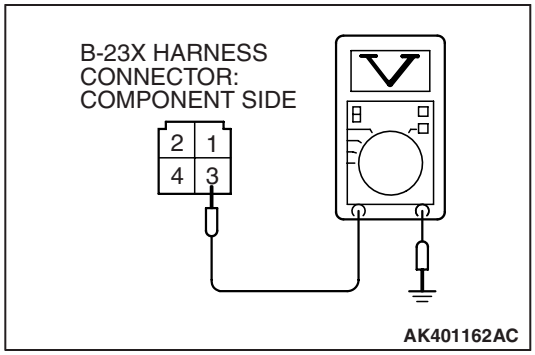
Q: Is the resistance normal?

YES : Go to Step 3.
NO : Replace the throttle actuator control motor relay. Then go to Step 14.

STEP 3. Measure the power supply voltage at throttle actuator control motor relay harness side connector B-23X

(1) Disconnect the connector B-23X and measure at the harness side.



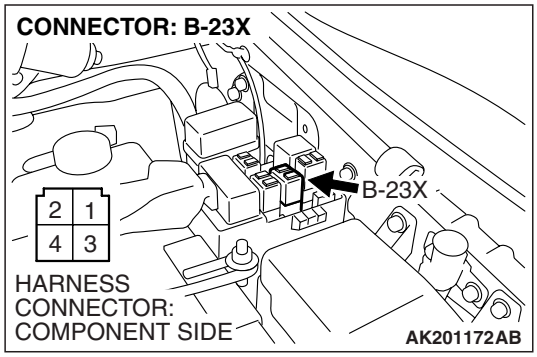


(2) Measure the voltage between terminal No. 3 and ground.
- Voltage should be battery positive voltage.

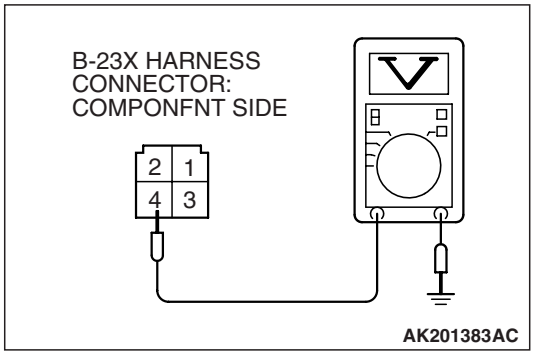
Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 4.
NO : Check harness connector A-03 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. If intermediate connector A-03 is in good condition, repair it because of open circuit or short circuit to ground between fusible link (5) and throttle actuator control motor relay connector B-23X (terminal No. 3). Then go to Step 14.

STEP 4. Measure the power supply voltage at throttle actuator control motor relay harness side connector B-23X.



(1) Disconnect the connector B-23X and measure at the harness side.
(2) Turn the ignition switch to the "ON" position.



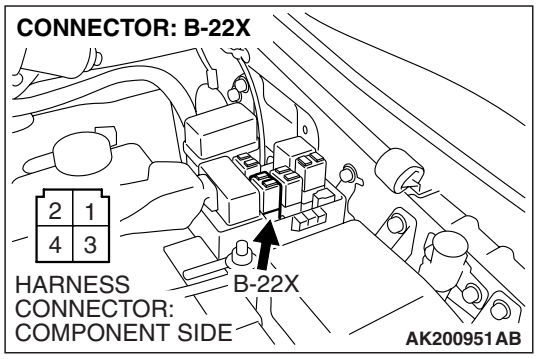
(3) Measure the voltage between terminal No. 4 and ground.
- Voltage should be battery positive voltage.

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

Q: Is battery positive voltage (approximately 12 volts) present?

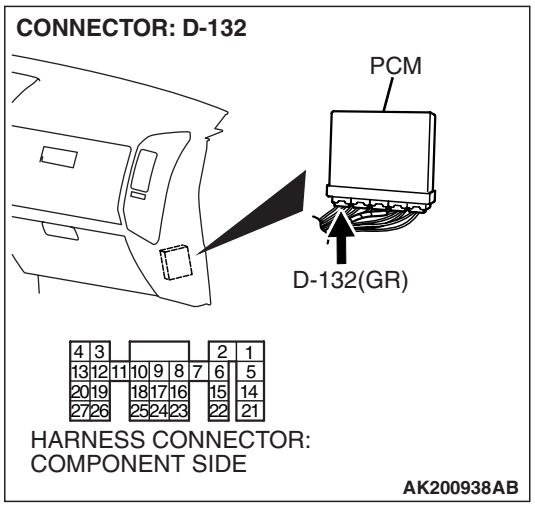
YES : Go to Step 6.
NO : Go to Step 5.

STEP 5. Check harness connector B-22X at MFI relay for damage.



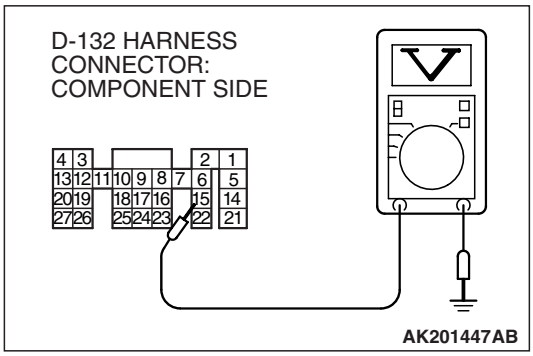
Q: Is the harness connector in good condition?

YES : Repair harness wire between MFI relay connector B-22X (terminal No. 1) and throttle actuator control motor relay connector B-23X (terminal No. 4) because of open circuit or short circuit to ground. Then go to Step 14.
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 14.



STEP 6. Measure the power supply voltage at PCM harness side connector D-132.

(1) Disconnect the connector D-132 and measure at the harness side.
(2) Turn the ignition switch to the "ON" position.



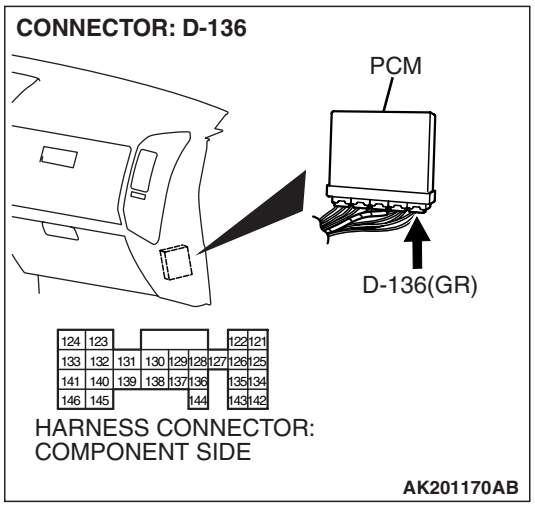
(3) Measure the voltage between terminal No. 15 and ground.
- Voltage should be battery positive voltage.

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

Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 7.

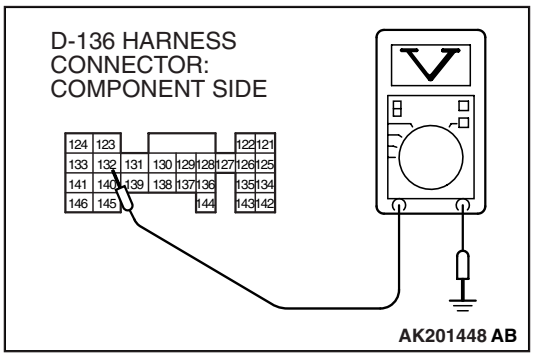
NO : Repair harness wire between throttle actuator control motor relay connector B-23X (terminal No. 2) and PCM connector D-132 (terminal No. 15) because of open circuit or short circuit to ground. Then go to Step 14.



STEP 7. Measure the power supply voltage at PCM harness side connector D-136.

(1) Disconnect the connector D-136 and measure at the harness side.

(2) Turn the ignition switch to the "ON" position.



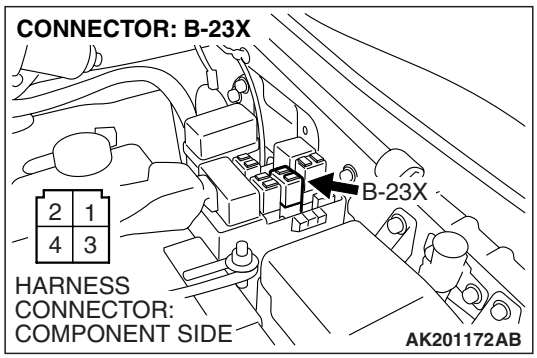
(3) Measure the voltage between terminal No. 132 and ground.
- Voltage should be battery positive voltage.

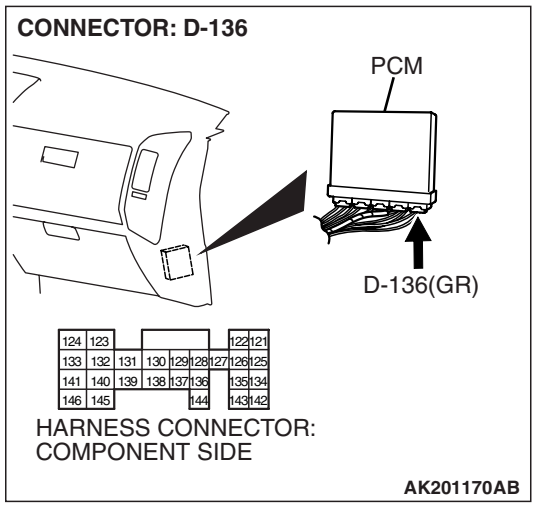
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 10.

NO : Go to Step 8.





STEP 8. Check for open circuit and short circuit to ground between throttle actuator control motor relay connector B-23X (terminal No. 1) and PCM connector D-136 (terminal No. 132).

Q: Is the harness wire in good condition?

YES : Go to Step 9.

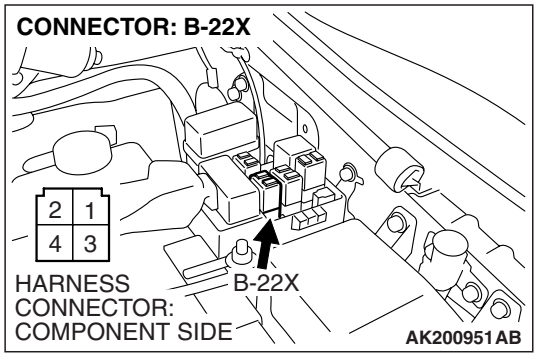
NO : Repair it. Then go to Step 14.

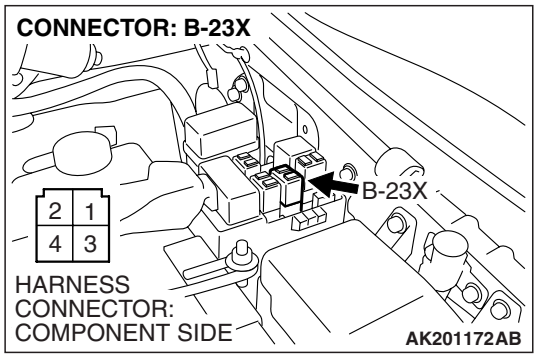
STEP 9. Check for harness damage between MFI relay connector B-22X (terminal No. 1) and throttle actuator control motor relay connector B-23X (terminal No. 4).

Q: Is the harness wire in good condition?

YES : Repair harness wire between throttle actuator control motor relay connector B-23X (terminal No. 2) and PCM connector D-132 (terminal No. 15) because of harness damage. Then go to Step 14.

NO : Repair it. Then go to Step 14.



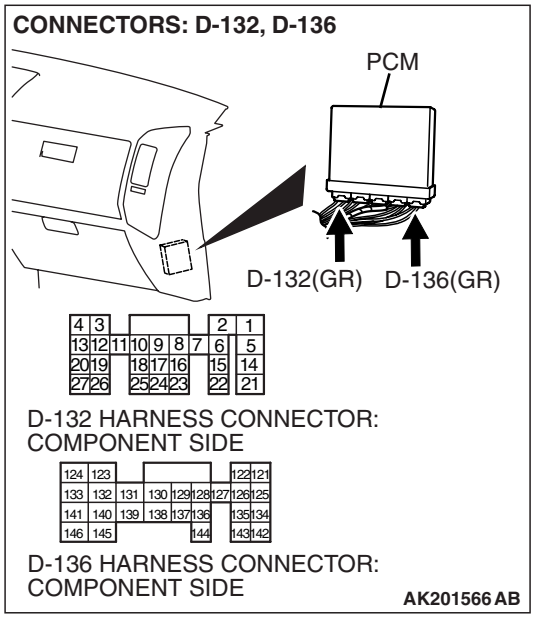


STEP 10. Check harness connectors D-132 and D-136 at PCM for damage.

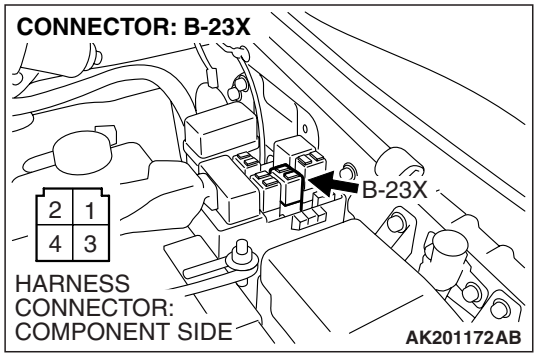
Q: Are the harness connectors in good condition?

YES : Go to Step 11.

NO : Repair or replace them. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 14.



STEP 11. Check for harness damage between fusible link (5) and throttle actuator control motor relay connector B-23X (terminal No. 3).



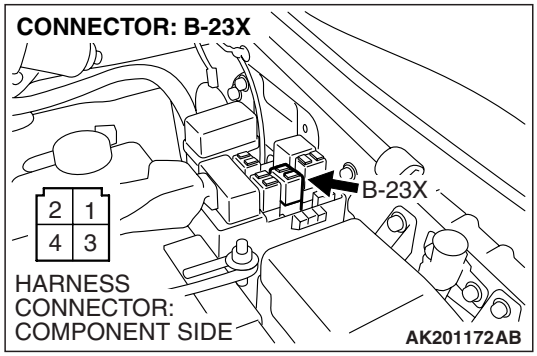
NOTE: Check harness after checking intermediate connector A-03. If intermediate connector is damaged, repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 14.

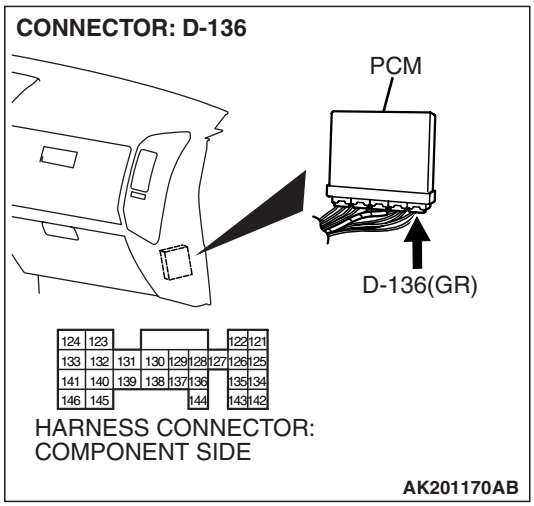
Q: Is the harness wire in good condition?

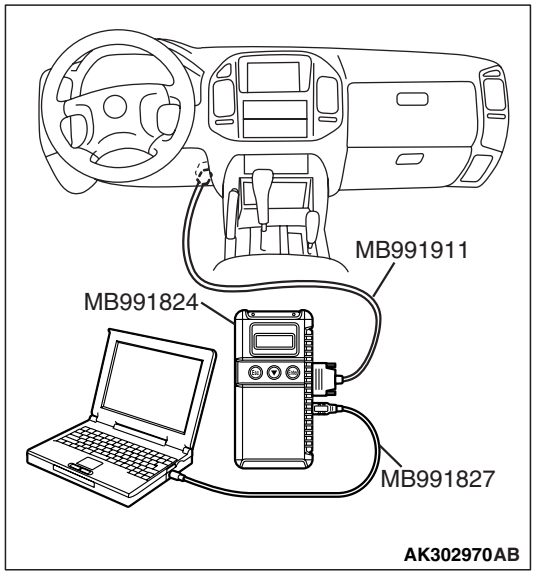
YES : Go to Step 12.
NO : Repair it. Then go to Step 14.

STEP 12. Check for harness damage between throttle actuator control motor relay connector B-23X (terminal No. 1) and PCM connector D-136 (terminal No. 132).
Q: Is the harness wire in good condition?

YES : Go to Step 13.
NO : Repair it. Then go to Step 14.







STEP 13. Using scan tool MB991958, read the diagnostic trouble code (DTC).

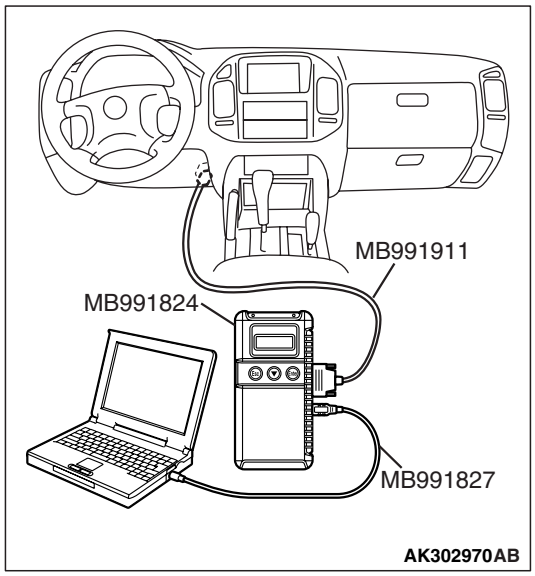
⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P0657 set?

YES : Replace the PCM. Then go to Step 14.
NO : 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 Malfunctions P.00-13.



STEP 14. Using scan tool MB991958, read the diagnostic trouble code (DTC).

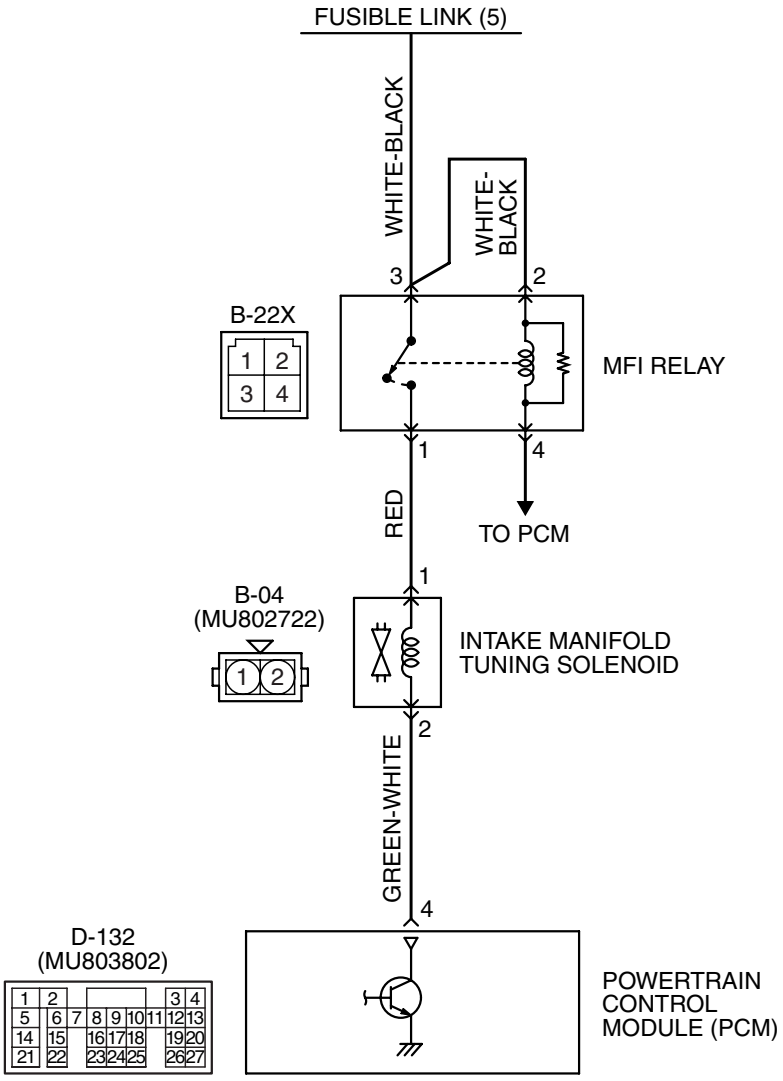
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P0657 set?

YES : Retry the troubleshooting.
NO : The inspection is complete.

DTC P0660: Intake Manifold Tuning Solenoid Circuit Malfunction

Intake Manifold Tuning Solenoid Circuit



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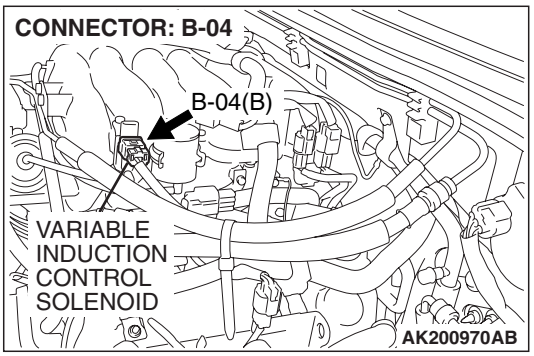
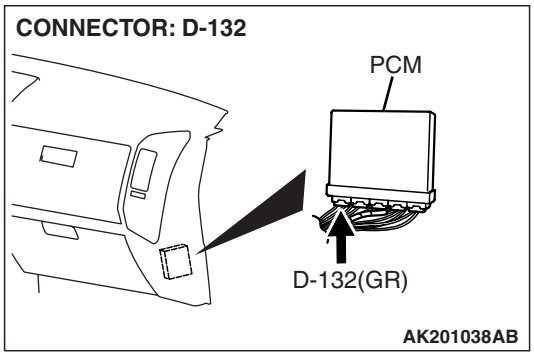
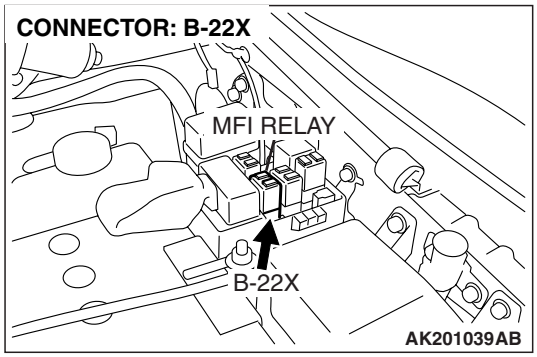




TSB Revision



CIRCUIT OPERATION

- The intake manifold tuning solenoid power is supplied from the MFI relay (terminal No. 1).
- The PCM controls the intake manifold tuning solenoid ground by turning the power transistor in the PCM ON and OFF.

TECHNICAL DESCRIPTION

- To judge if there is open circuit in the intake manifold tuning solenoid drive circuit, PCM measures the surge voltage of the intake manifold tuning solenoid coil.
- The PCM drives the intake manifold tuning solenoid. After the solenoid is turned off, the PCM will check if the solenoid coil produces a surge voltage (battery positive voltage +2 volts).

DTC SET CONDITIONS

Check Conditions

- Engine is being cranked.
- Battery positive voltage is between 10 and 16 volts.

Judgement Criterion

- The intake manifold tuning solenoid coil surge voltage (battery positive voltage + 2 volts) is not detected for 0.2 second.

Check Conditions

- Battery positive voltage is between 10 and 16 volts.
- Intake manifold tuning solenoid is ON.
- More than 1 second has elapsed after the above mentioned conditions have been met.

Judgement Criterion

- The intake manifold tuning solenoid coil surge voltage (battery positive voltage + 2 volts) is not detected for 1 second after the intake manifold tuning solenoid is turned OFF.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

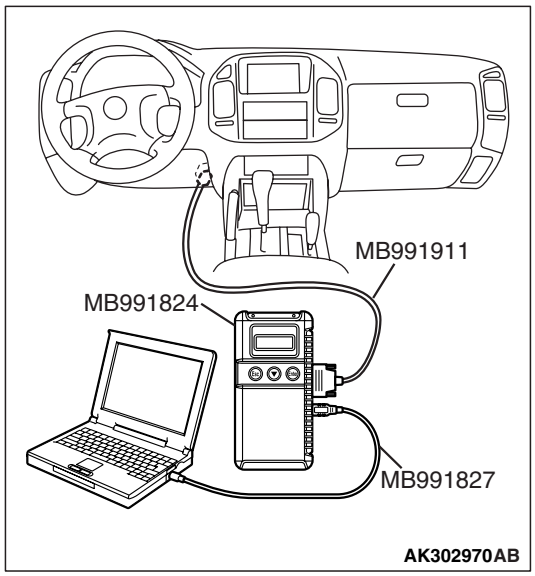
- Intake manifold tuning solenoid failed.
- Open or shorted intake manifold tuning solenoid circuit, harness damage, or connector damage.
- PCM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991958, check actuator test item 11: Intake Manifold Tuning Solenoid.



⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to the actuator test mode for item 11, Intake manifold tuning solenoid.
  - An operation sound should be heard and vibration should be felt when the intake manifold tuning solenoid is operated.

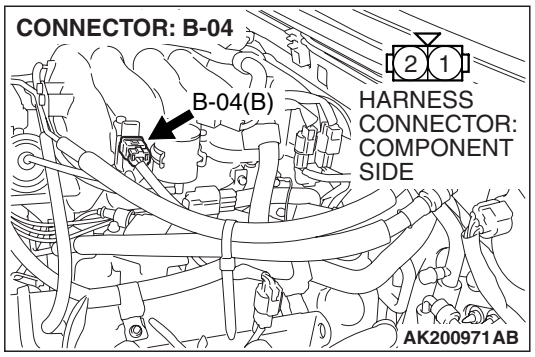
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the solenoid 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 Malfunctions P.00-13.

NO : Go to Step 2.

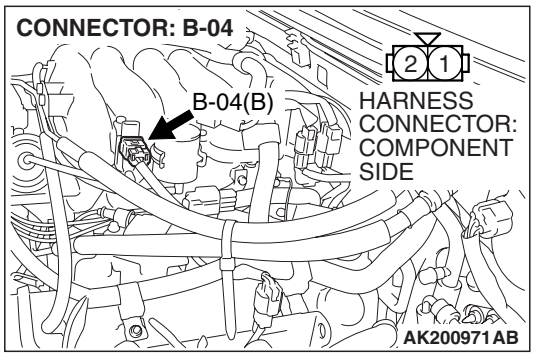
STEP 2. Check harness connector B-04 at the intake manifold tuning solenoid for damage.



Q: Is the harness connector in good condition?

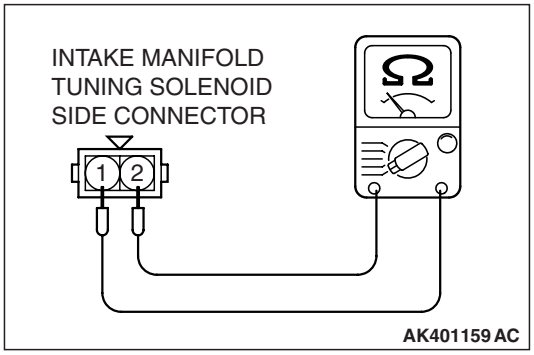
YES : Go to Step 3.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.



STEP 3. Check the intake manifold tuning solenoid.

(1) Disconnect the intake manifold tuning solenoid connector B-04.



(2) Measure the resistance between intake manifold tuning solenoid side connector terminal No. 1 and No. 2.

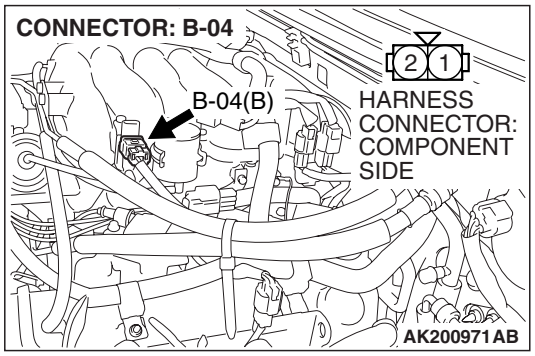
Standard value: 29 – 35 ohms [at 20°C (68°F)]

Q: Is the resistance between 29 and 35 ohms [at 20°C (68°F)]?

YES : Go to Step 4.

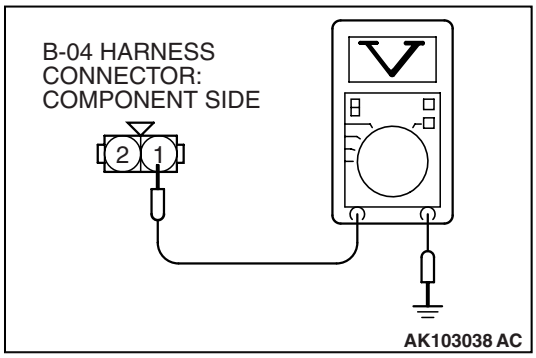
NO : Replace the intake manifold tuning solenoid. Then go to Step 12.

STEP 4. Measure the power supply voltage at intake manifold tuning solenoid harness side connector B-04.



(1) Disconnect the connector B-04 and measure at the harness side.

(2) Turn the ignition switch to the "ON" position.



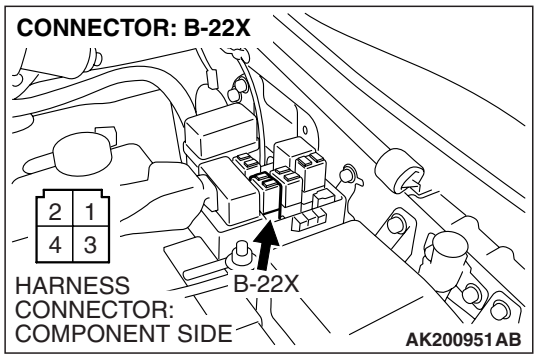
(3) Measure the voltage between terminal No. 1 and ground.
- Voltage should be battery positive voltage.

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

Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 6.

NO : Go to Step 5.

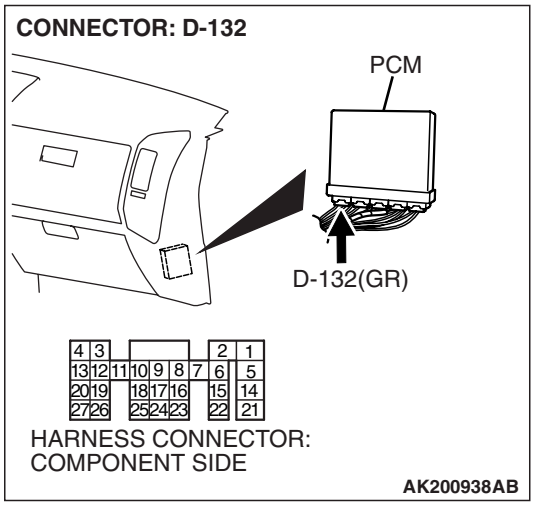


STEP 5. Check harness connector B-22X at MFI relay for damage.

Q: Is the harness connector in good condition?

YES : Repair harness wire between MFI relay connector B-22X terminal No. 1 and intake manifold tuning solenoid connector B-04 terminal No. 1 because of open circuit or short circuit to ground. Then go to Step 12.

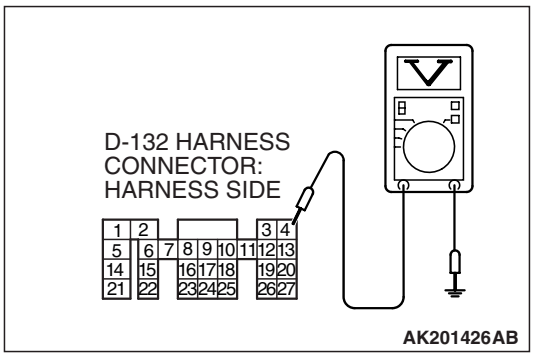
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.



STEP 6. Measure the power supply voltage at PCM connector D-132 by backprobing.

(1) Do not disconnect the connector D-132.

(2) Turn the ignition switch to the "ON" position.



(3) Measure the voltage between terminal No. 4 and ground by backprobing.
- Voltage should be battery positive voltage.

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

Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 9.

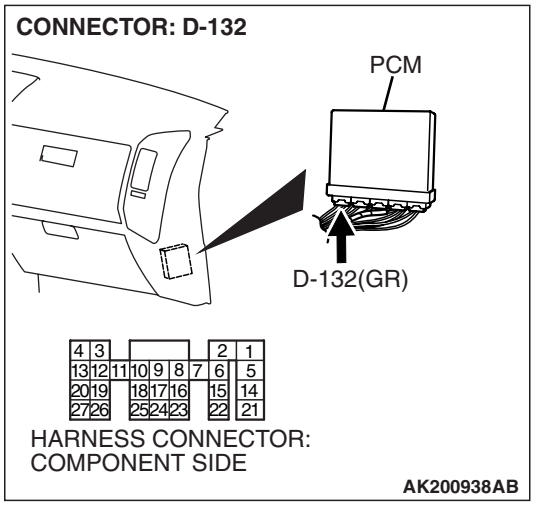
NO : Go to Step 7.

STEP 7. Check harness connector D-132 at PCM for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 8.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.

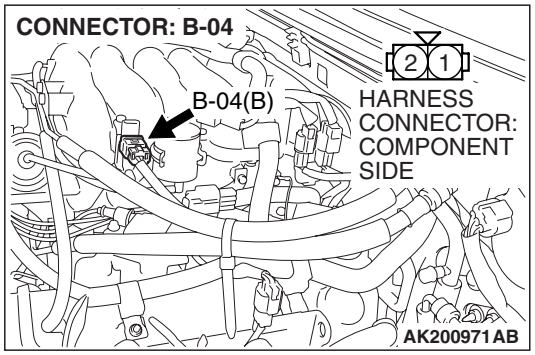


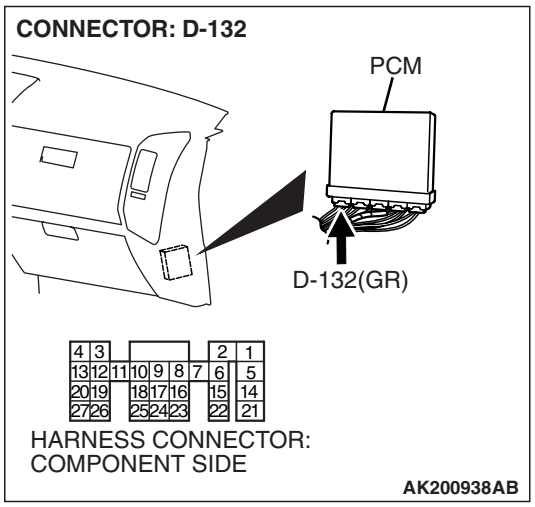
STEP 8. Check for open circuit and short circuit to ground between intake manifold tuning solenoid connector B-04 (terminal No. 2) and PCM connector D-132 (terminal No. 4).

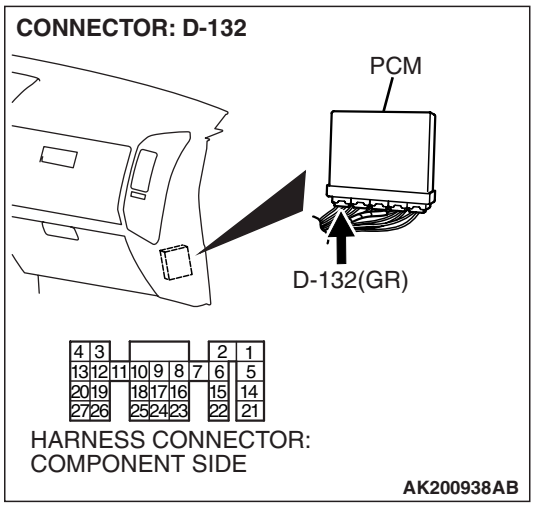
Q: Is the harness wire in good condition?

YES : Replace the PCM. Then go to Step 12.

NO : Repair it. Then go to Step 12.





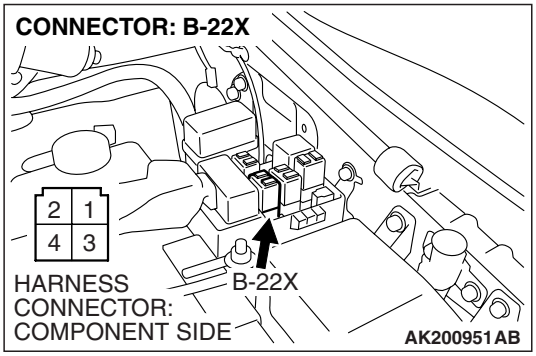


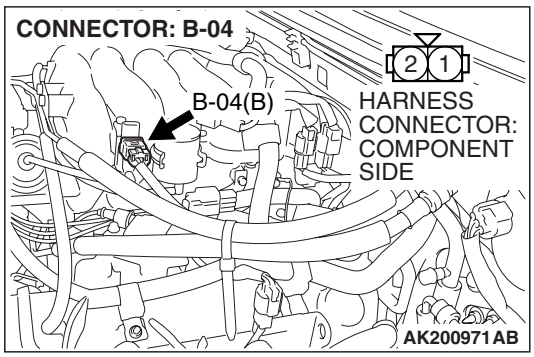
STEP 9. Check harness connector D-132 at PCM for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 10.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.



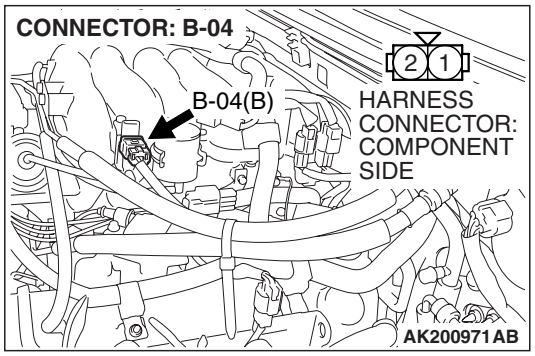


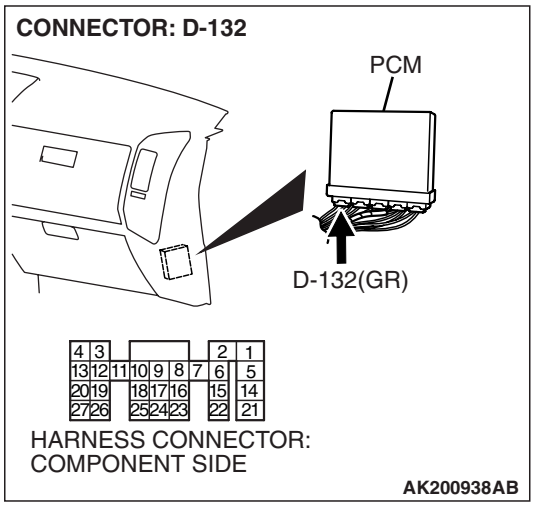
STEP 10. Check for harness damage between MFI relay connector B-22X (terminal No. 1) and intake manifold tuning solenoid connector B-04 (terminal No. 1).

Q: Is the harness wire in good condition?

YES : Go to Step 11.

NO : Repair it. Then go to Step 12.



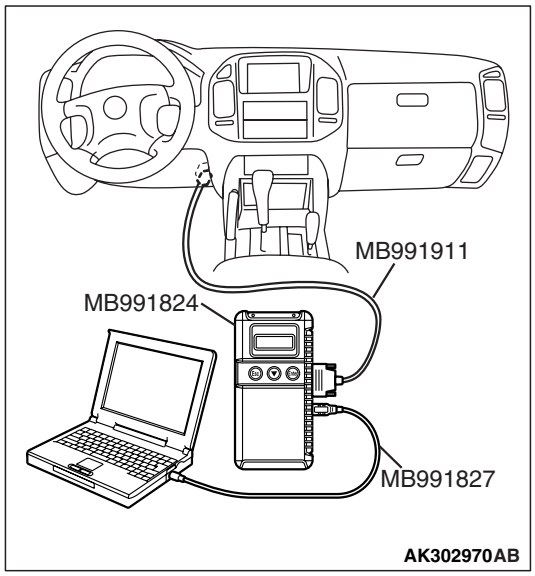


STEP 11. Check for harness damage between intake manifold tuning solenoid connector B-04 (terminal No. 2) and PCM connector D-132 (terminal No. 4).

Q: Is the harness wire in good condition?

YES : Replace the PCM. Then go to Step 12.

NO : Repair it. Then go to Step 12.



STEP 12. Using scan tool MB991958, check actuator test item 11: Intake Manifold Tuning Solenoid.

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.

(2) Turn the ignition switch to the "ON" position.

(3) Set scan tool MB991958 to the actuator test mode for item 11, Intake manifold tuning solenoid.

- An operation sound should be heard and vibration should be felt when the intake manifold tuning solenoid is operated.

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

Q: Is the solenoid operating properly?

YES : The inspection is complete.

NO : Retry the troubleshooting.

DTC P1530: A/C1 Switch Circuit Intermittent

TECHNICAL DESCRIPTION

- The A/C controller <Manual A/C system> or the A/C-ECU <Automatic A/C system> sends the "ON" signal of the A/C to the PCM.
- The A/C controller <Manual A/C system> or the A/C-ECU <Automatic A/C system> turns the A/C relay to "ON" position.

DTC SET CONDITIONS

Check Condition

- Engine is running.

Judgement Criterion

- The A/C switch repeats on-off switches 255 times per second.

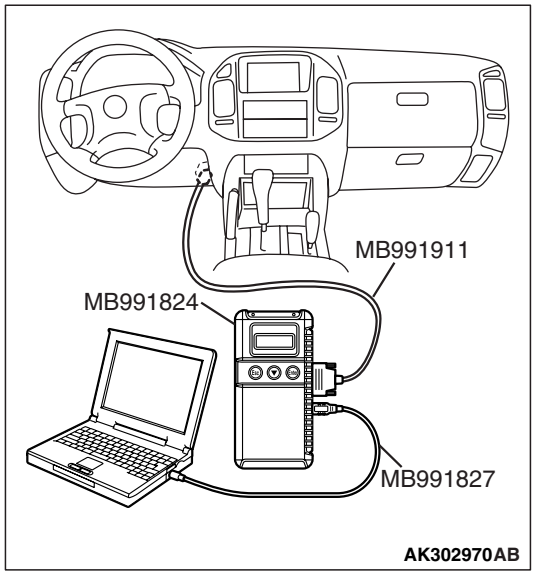
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- The A/C controller <Manual A/C system>
- The A/C-ECU <Automatic A/C system>

DIAGNOSIS

Required Special Tools:

- MB991958: Scan tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B



STEP 1. Using scan tool MB991958, read the diagnostic trouble code (DTC)

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is DTC P1530 set?

YES : Replace the A/C controller <Manual A/C system> or the A/C-ECU <Automatic A/C system>.

NO : 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 Malfunctions P.00-13.

DTC P1602: Communication Malfunction (between PCM Main Processor and System LSI)

TECHNICAL DESCRIPTION
- PCM checks the communication lines for abnormal conditions.

DESCRIPTIONS OF MONITOR METHODS
Communication between PCM main processor and system LSI.

MONITOR EXECUTION
Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)
- Not applicable

Sensor (The sensor below is determined to be normal)
- Not applicable

DTC SET CONDITIONS

Check Condition
- Ignition switch is "ON" position.

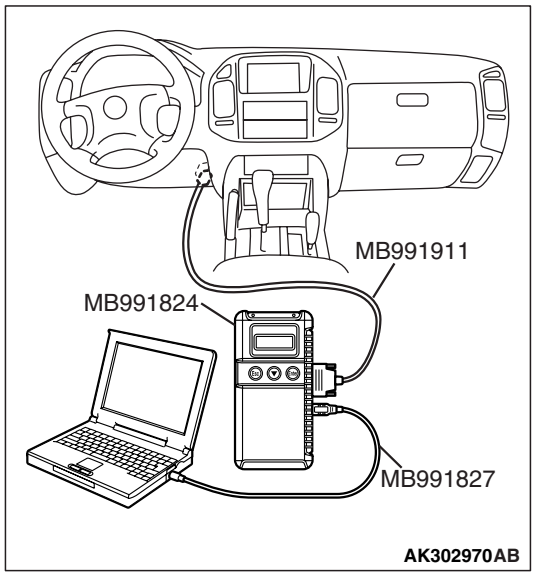
Judgement Criterion
- PCM detects an error in communication between PCM main processor and system LSI for 0.07 second.

OBD-II DRIVE CYCLE PATTERN
None.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)
- PCM failed.

DIAGNOSIS

Required Special Tools:
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B



STEP 1. Using scan tool MB991958, read the diagnostic trouble code (DTC)

⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

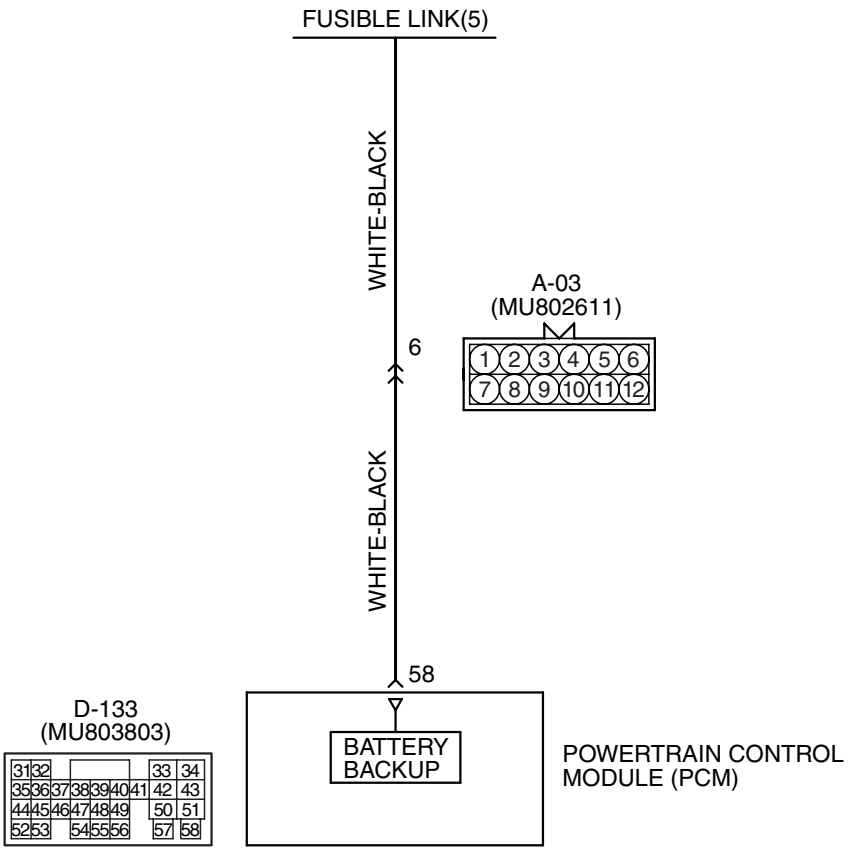
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P01602 set?

YES : Replace the PCM.
NO : 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 Malfunctions P.00-13.

DTC P1603: Battery Backup Line Malfunction

Battery Backup Circuit



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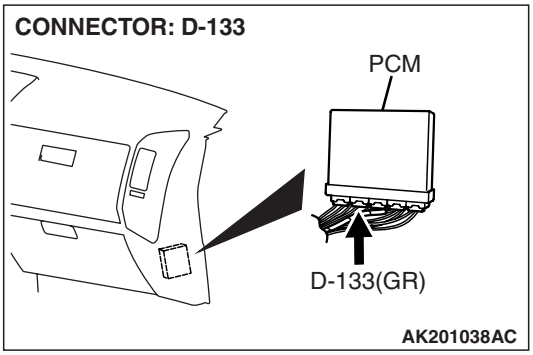
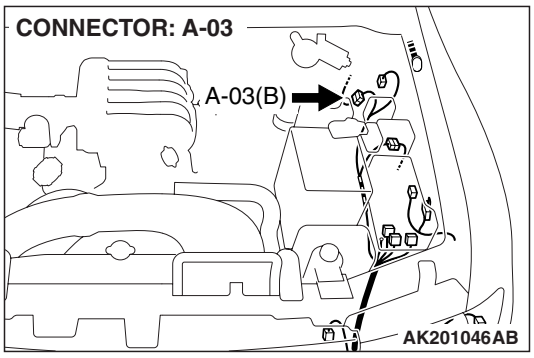




TECHNICAL DESCRIPTION

- The PCM checks the open circuit of battery backup line.

NOTE: When the system detects an open circuit in the battery backup line, it makes 1 failure judgment of other diagnostic trouble codes (DTCs).

DESCRIPTIONS OF MONITOR METHODS

Battery backup line voltage is under specified value.

MONITOR EXECUTION

Continuous

TSB Revision

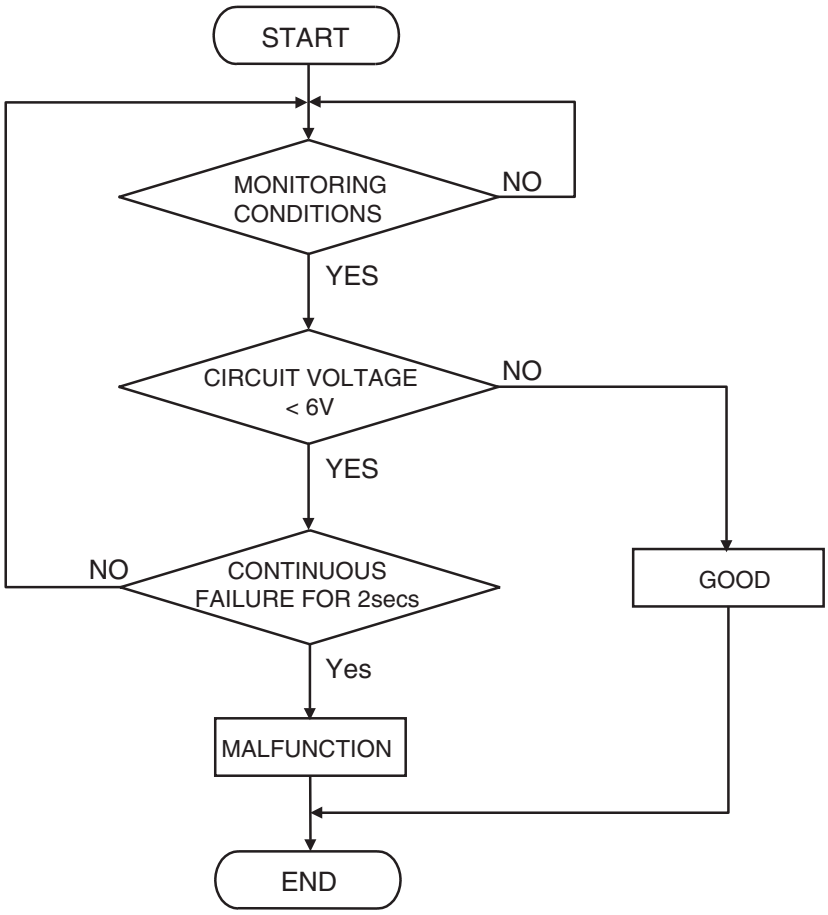
MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)
- Not applicable

Sensor (The sensor below is determined to be normal)
- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



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Check Conditions
- Engine starting sequence was completed.
- Battery positive voltage is higher than 10 volts.

Judgement Criterion
- Battery backup line voltage has continued to be lower than 6 volts for 2 seconds.

OBD-II DRIVE CYCLE PATTERN
None.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)
- Open or shorted battery backup line, harness damage, or connector damage.
- PCM failed.

TSB Revision

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991958, read the diagnostic trouble code (DTC).

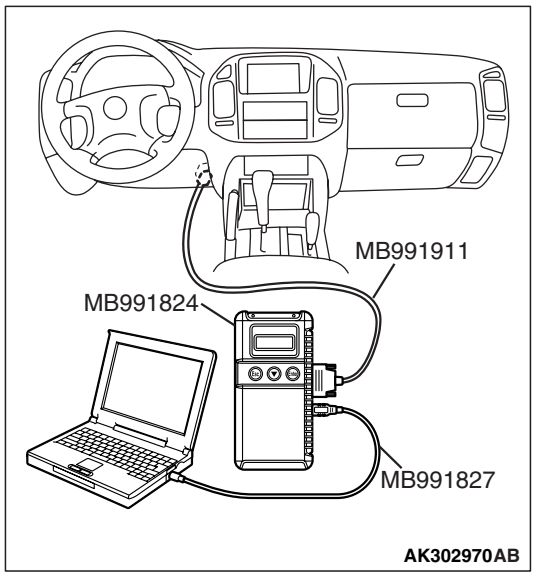
⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Erase the DTC.
(4) Start the engine and run it at idle.
(5) Read the DTC.
(6) Turn the ignition switch to the "LOCK" (OFF) position.

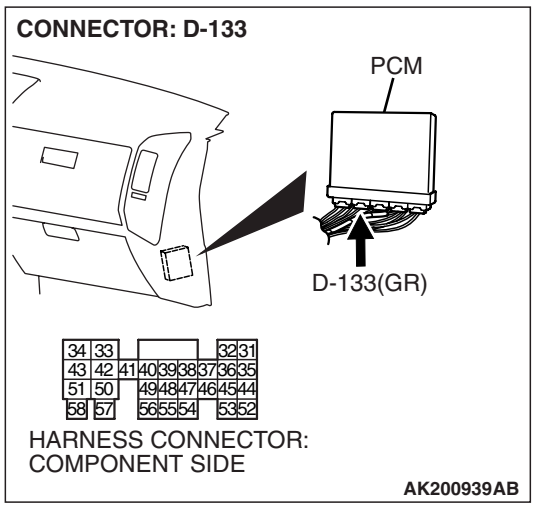
Q: Is DTC P1603 set?

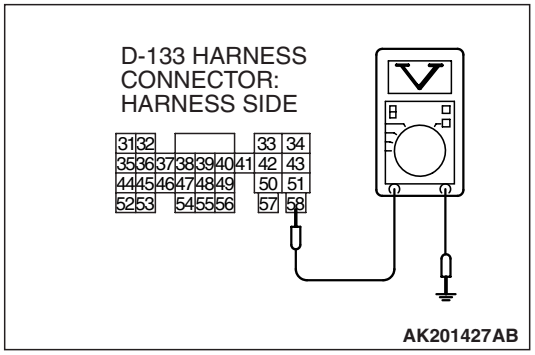
YES : Go to Step 2.
NO : The inspection is complete.



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

(1) Do not disconnect the PCM connector D-133.





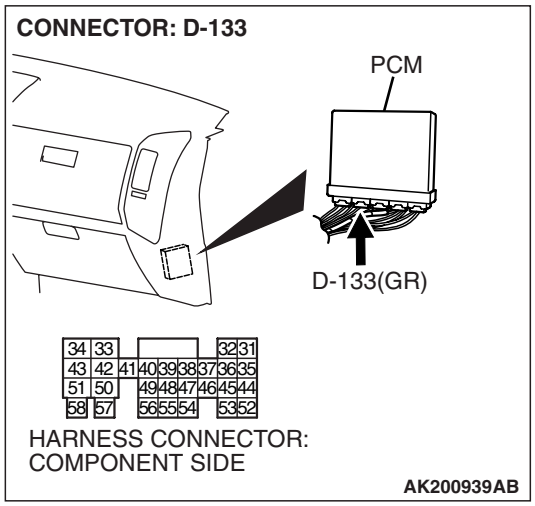
(2) Measure the voltage between terminal No. 58 and ground by backprobing.
- Voltage should be battery positive voltage.

Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 5.
NO : Go to Step 3.

STEP 3. Measure the backup power supply voltage at PCM harness side connector D-133.

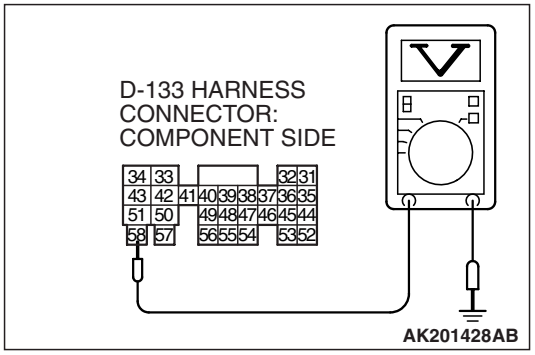
(1) Disconnect the PCM connector D-133 and measure at the harness side.

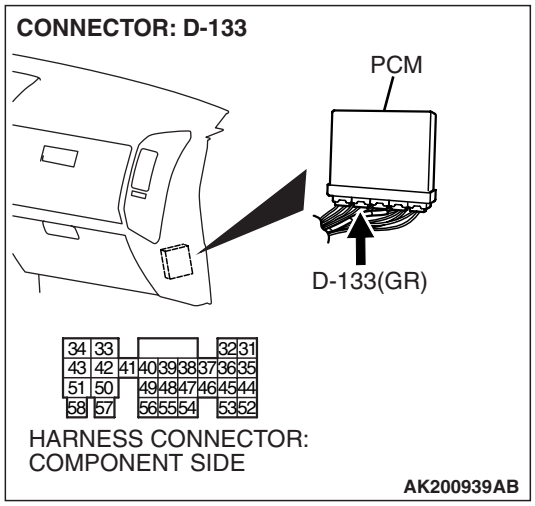


(2) Measure the voltage between terminal No. 58 and ground.
- Voltage should be battery positive voltage.

Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 4.
NO : Check connector A-03 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. If intermediate connector is in good condition, repair harness wire between fusible link (5) and PCM connector D-133 (terminal No. 58) because of open circuit or short circuit to ground. Then go to Step 6.



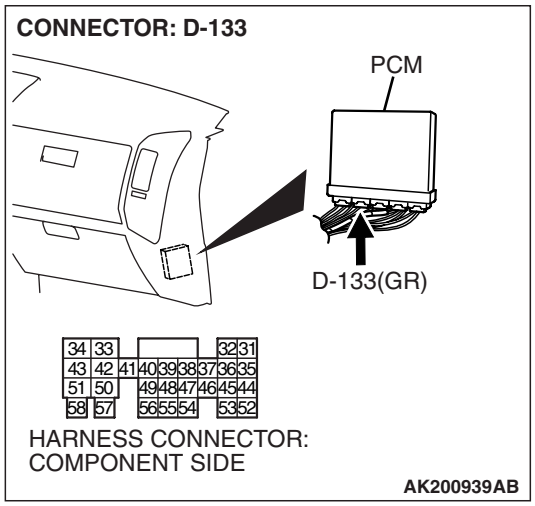


STEP 4. Check harness connector D-133 at PCM for damage.

Q: Is the harness connector in good condition?

YES : Check connector A-03 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. If intermediate connector is in good condition, repair harness wire between fusible link (5) and PCM connector D-133 (terminal No. 58) because of harness damage. Then go to Step 6.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 6.

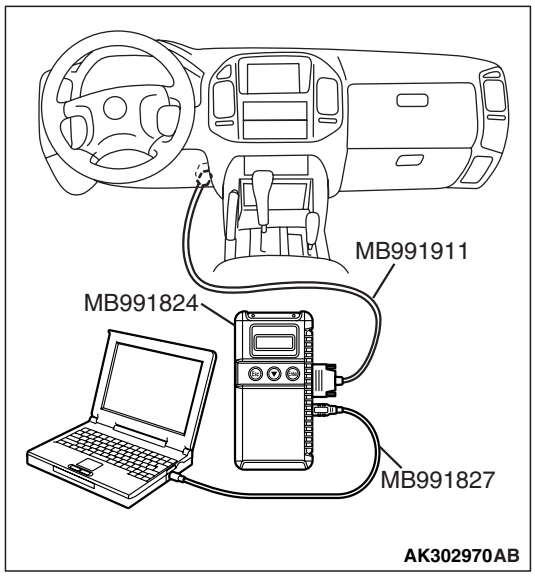


STEP 5. Check harness connector D-133 at PCM for damage.

Q: Is the harness connector in good condition?

YES : Replace the PCM. Then go to Step 6.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 6.



STEP 6. Using scan tool MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P1603 set?

YES : Retry the troubleshooting.
NO : The inspection is complete.

NEXT>>