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 ECM 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)

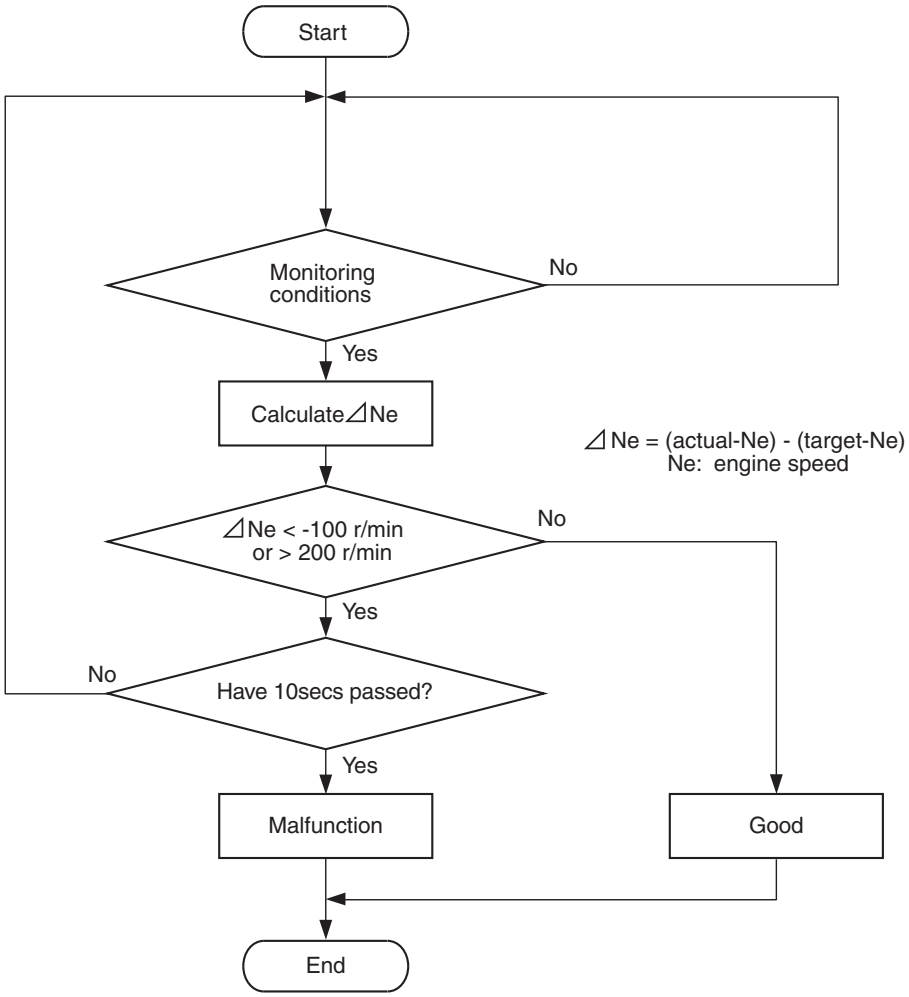
- Misfire monitor
- Exhaust gas recirculation (EGR) system monitor
- Fuel system monitor
- Vehicle speed sensor monitor <M/T>

Sensor (The sensor below is determined to be normal)

- Mass airflow sensor
- Engine coolant temperature sensor
- Intake air temperature sensor
- Barometric pressure sensor
- Throttle position sensor

DTC SET CONDITIONS

Logic Flow Chart



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TSB Revision

Check Conditions

- Under the closed loop idle speed control.
- The engine coolant temperature is more than 41°C (105°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 airflow rate is more than 12 L/sec when engine coolant temperature is higher than 77°C (171°F). <M/T>
- Target airflow rate is more than 19 L/sec when engine coolant temperature is higher than 77°C (171°F). <CVT>
- Target airflow rate is more than 30 L/sec when engine coolant temperature is lower than 77°C (171°F).

Judgement Criterion

- The actual idle speed is more than 100 r/min lower than the target idle speed for 10 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 18 P.13C-11.

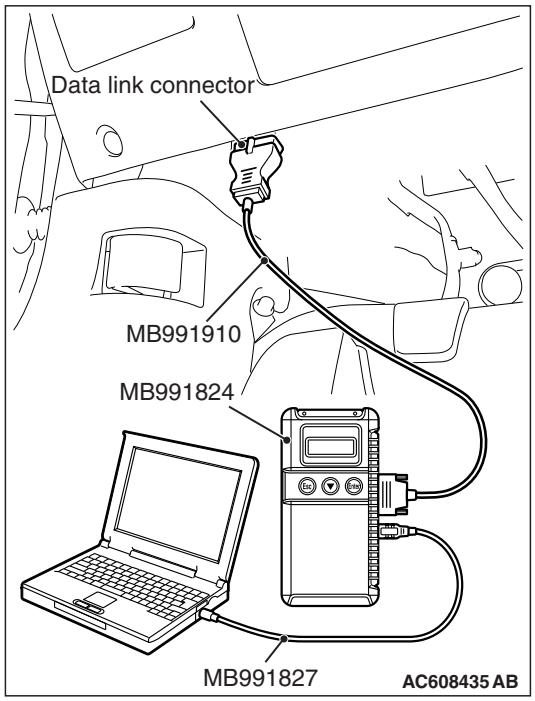
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Throttle valve area is dirty.
- ECM failed.

DIAGNOSIS

Required Special Tools

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



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.13C-48.
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 Throttle body cleaning P.13A-961. Then go to Step 4.

NO : Go to Step 3.

STEP 3. Replace the throttle body assembly.

(1) Replace the throttle body assembly

(2) Carry out test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 18 P.13C-11.

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

Q: Is DTC P0506 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 4.

NO : The inspection is complete.

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.13C-11.

(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 ECM 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
- Vehicle speed sensor monitor <M/T>

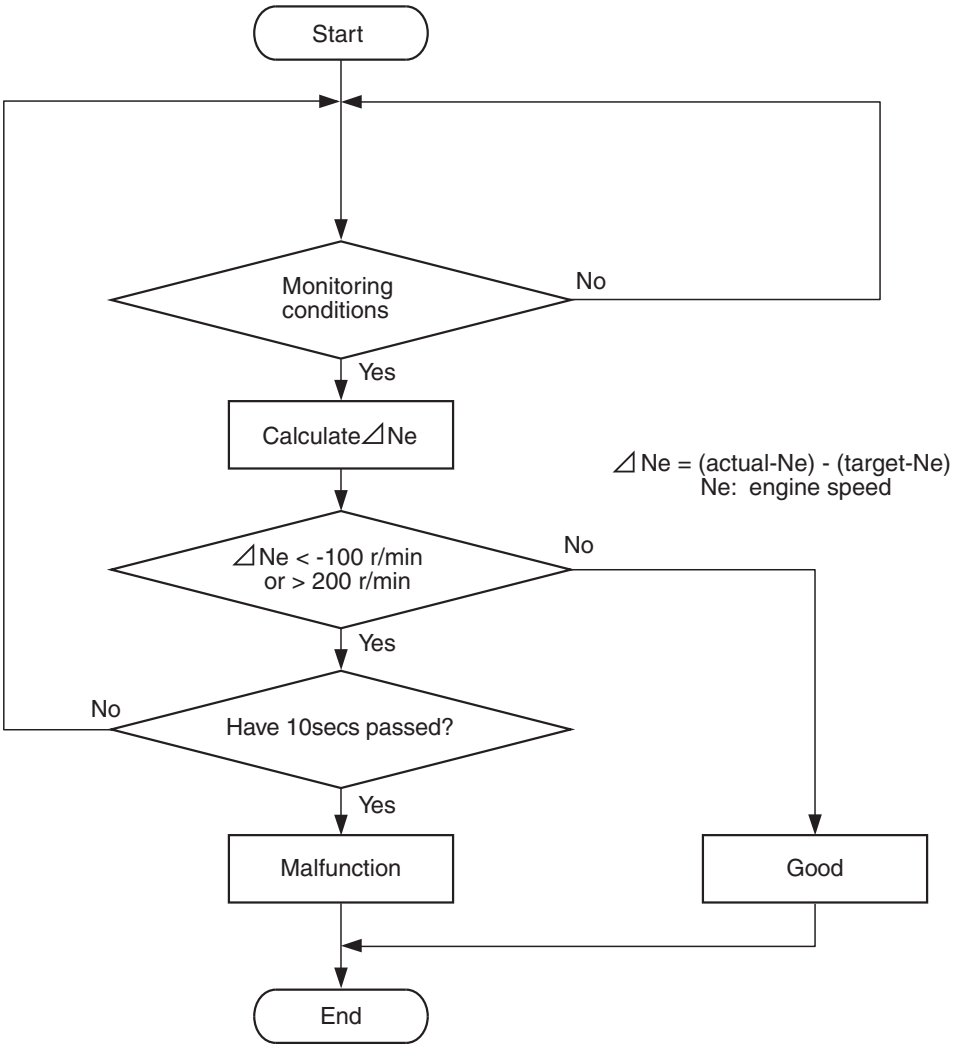
Sensor (The sensor below is determined to be normal)

- Mass airflow sensor
- Engine coolant temperature sensor
- Intake air temperature sensor
- Barometric pressure sensor
- Throttle position sensor

TSB Revision

DTC SET CONDITIONS

Logic Flow Chart



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Check Conditions

- Under the closed loop idle speed control.
- Engine coolant temperature is higher than 41°C (105°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 airflow rate is 0 L/sec.

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 10 seconds.

*: Specs in parentheses are applicable if the maximum air temperature during the previous operation was more than 45°C (113°F).

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 18 P.13C-11.

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

- Intake system vacuum leak.
- ECM failed.

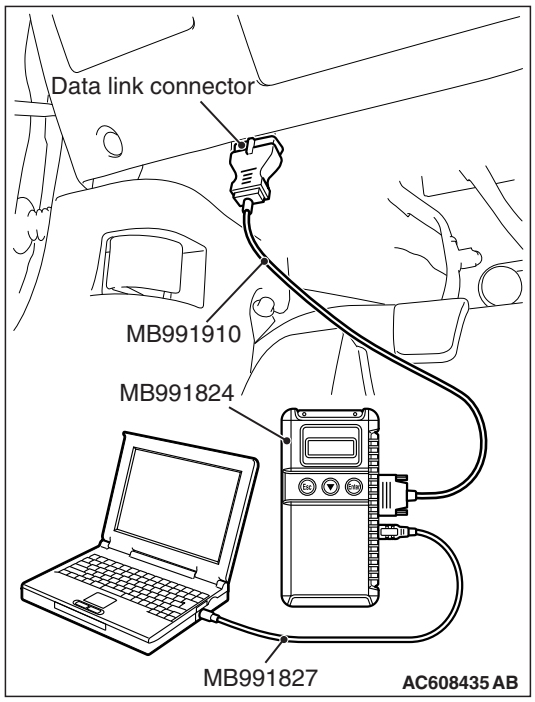
TSB Revision

DIAGNOSIS

Required Special Tools

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

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.13C-48.
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. Replace the throttle body assembly.

(1) Replace the throttle body assembly
(2) Carry out test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 18 P.13C-11.
(3) Check the diagnostic trouble code (DTC).

Q: Is DTC P0507 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis –ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis –ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 4.
NO : The inspection is complete.

TSB Revision

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.13C-11.

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

Q: Is DTC P0507 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P050B: Ignition Timing Retard Insufficient

TECHNICAL DESCRIPTION

- After starting the engine in the cold state, the ECM retards the ignition timing to early activate the catalyst by letting out the high temperature exhaust gases.
- The ECM monitors whether the retard ignition timing control is normal or not.

DESCRIPTIONS OF MONITOR METHODS

After starting the engine in the cold state, the retard ignition timing control is abnormal, which is caused by a decrease in idle speed and so on.

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)

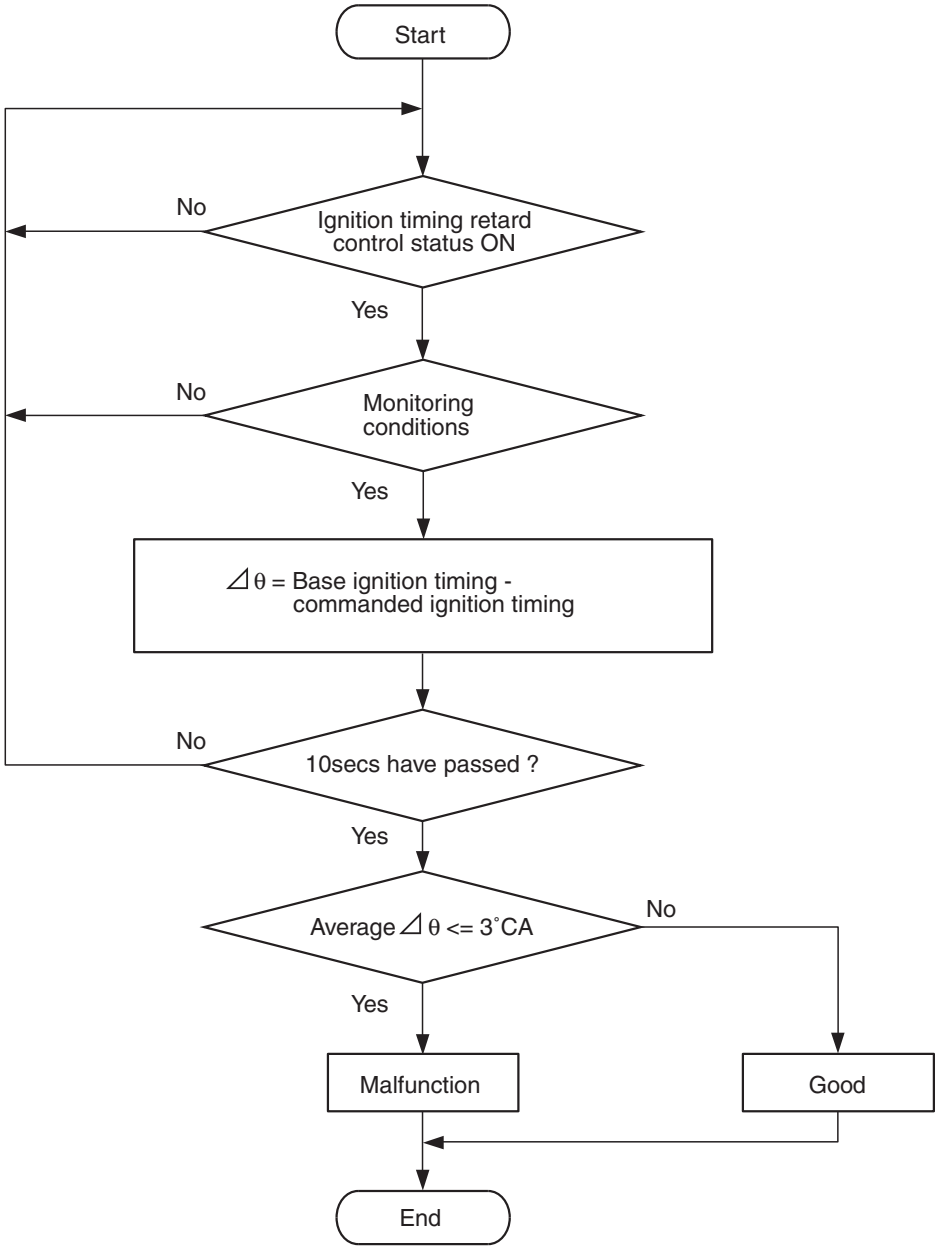
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



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Check Conditions

- Under the ignition timing retard control.
- Engine coolant temperature is between 7°C (45°F) and 41°C (106°F).

Judgement Criteria

- For 10 seconds, the difference between the basic ignition timing and the target/specified ignition timing is 3°CA or less on average during the retard control.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 19 P.13C-11.

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

- Throttle valve area is dirty.
- ECM failed.

TSB Revision

DIAGNOSIS

Required Special Tools

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

STEP 1. Check the throttle body. (throttle valve area)

Q: Is the throttle valve area dirty?

YES : Perform cleaning. Refer to Throttle body (throttle valve area) cleaning P.13A-961. Then go to Step 3.

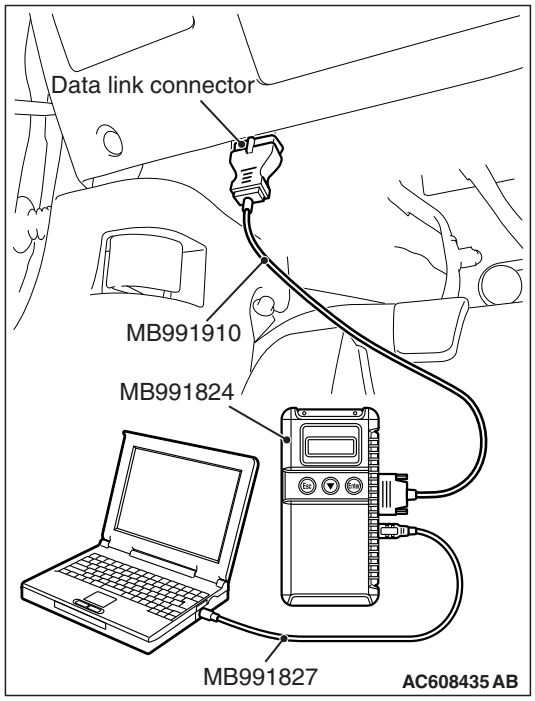
NO : Repair it. Then go to Step 2.

STEP 2. 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 P050B set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. 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.00-14.

STEP 3. Test the OBD-II drive cycle.

(1) Carry out test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 19 P.13C-11.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P050B set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

TSB Revision

DTC P0513: Immobilizer Malfunction

TECHNICAL DESCRIPTION

- ECM monitors the communication condition with the immobilizer-ECU. When an abnormality in communication is found, ECM prevents engine start.

DTC SET CONDITIONS

Check Condition

- Ignition switch is "ON" position.

Judgment Criterion

- When it was different in the encrypted code sent from immobilizer-ECU and operation result by ECM.

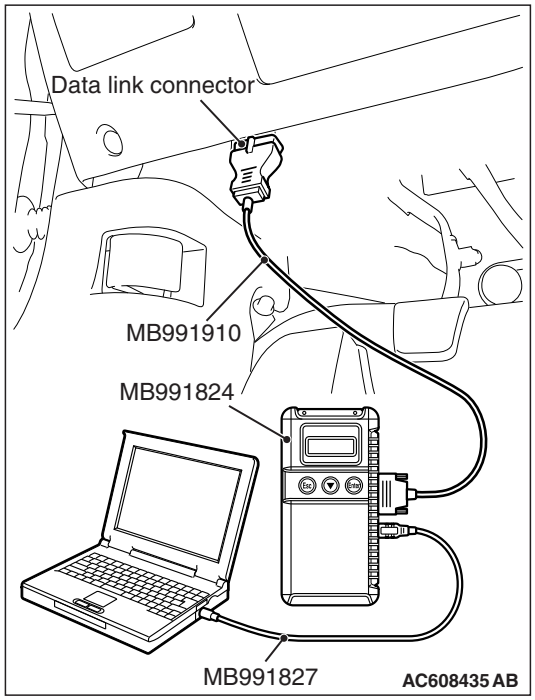
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- CAN system failed.
- Immobilizer system failed.
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A



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 2.

STEP 2. Using scan tool MB991958, read the immobilizer diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) Read the immobilizer-DTC.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the immobilizer-DTC set?

YES : Refer to GROUP 42B, Diagnosis – Diagnostic Trouble Code Chart <Vehicles with KOS> P.42B-28 or GROUP 42C, diagnosis – Diagnostic Trouble Code Chart <Vehicles with WCM> P.42C-17.

NO : Go to Step 3.

STEP 3. Using scan tool MB991958, read the diagnostic trouble code (DTC)

(1) Turn the ignition switch to the "ON" position.
(2) After the DTC has been deleted, read the DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

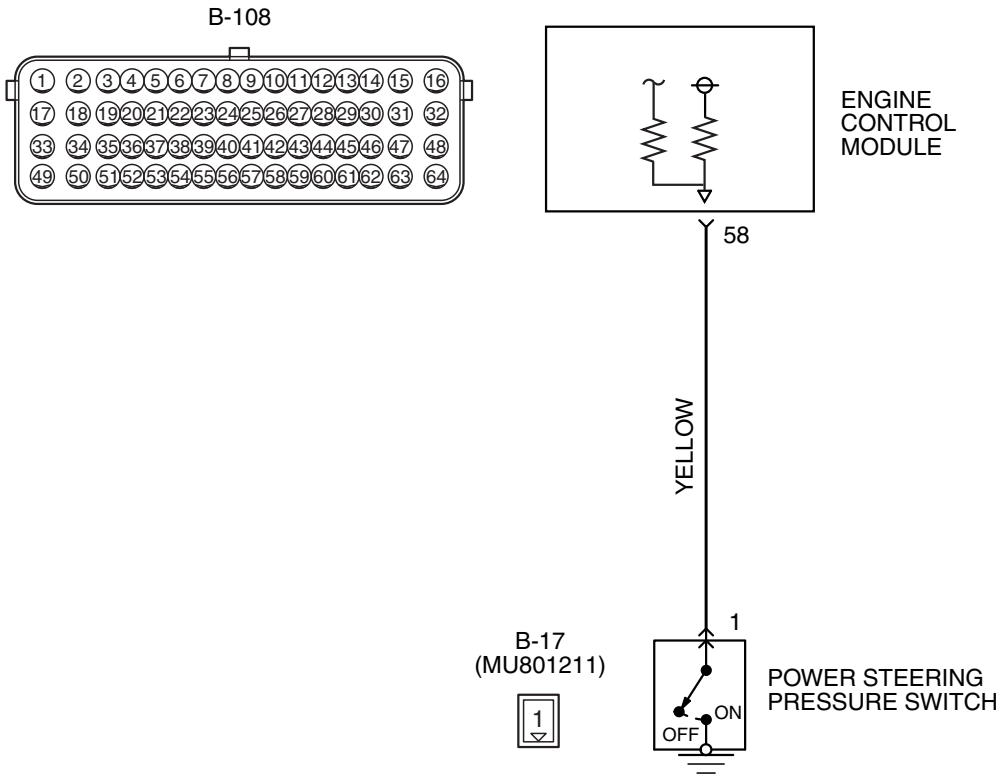
Q: Is DTC P0513 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.

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.00-14.

DTC P0551: Power Steering Pressure Switch Circuit Range/Performance

POWER STEERING PRESSURE SWITCH CIRCUIT



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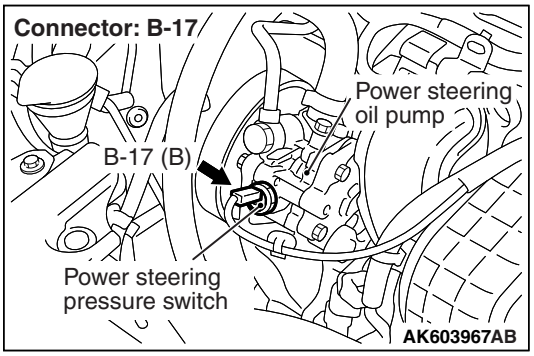
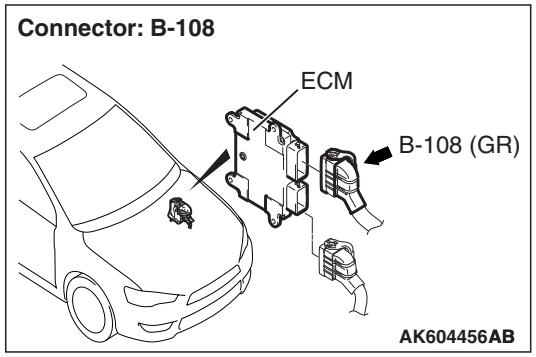




CIRCUIT OPERATION

- A battery positive voltage is applied to the power steering pressure switch output terminal (terminal No. 1) from the ECM (terminal No. 58) via the resistor in the ECM.

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 ECM.

TSB Revision

- 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 0 and 12 volts.
- While driving with the steering wheel held straight, the power steering pressure switch turns "OFF".
- The ECM 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

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

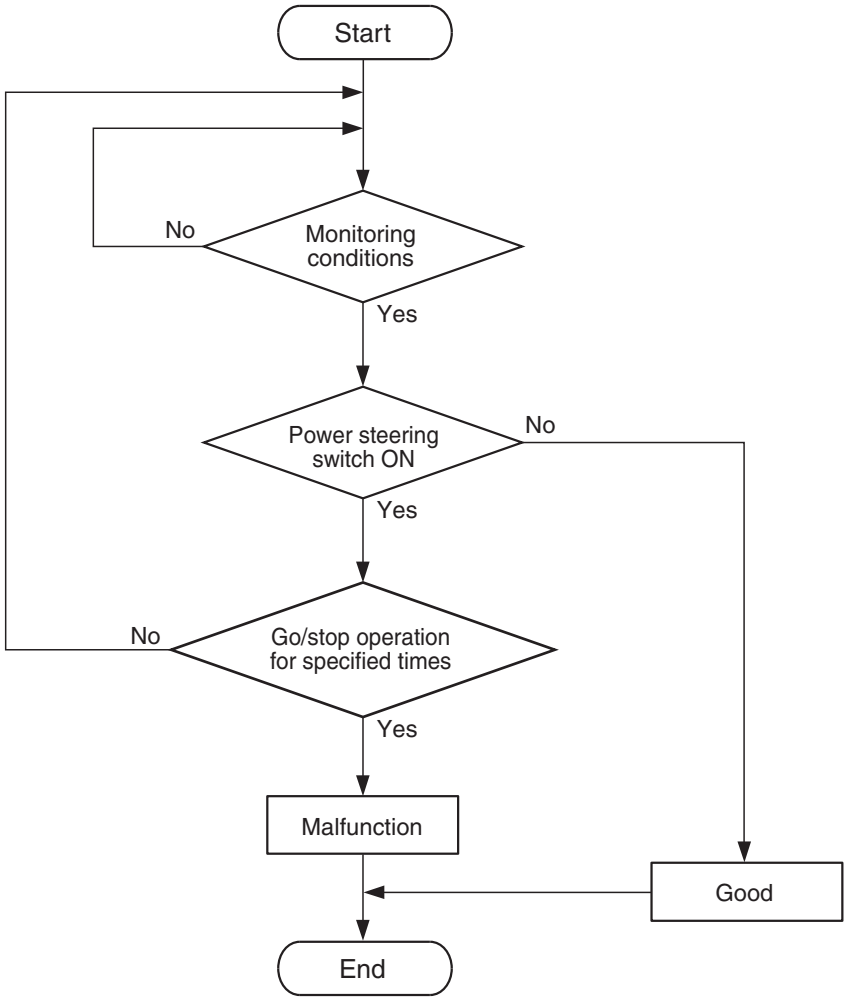
- Not applicable

Sensor (The sensor below is determined to be normal)

- Engine coolant temperature sensor

DTC SET CONDITIONS

Logic Flow Chart



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TSB Revision

Check Conditions

- Engine coolant temperature is higher than 20°C (68°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 (1.0 mph) or less]. Repeat 10 times or more.

Judgement Criterion

- Power steering pressure switch continues to be "ON".

OBD-II DRIVE CYCLE PATTERN

None.

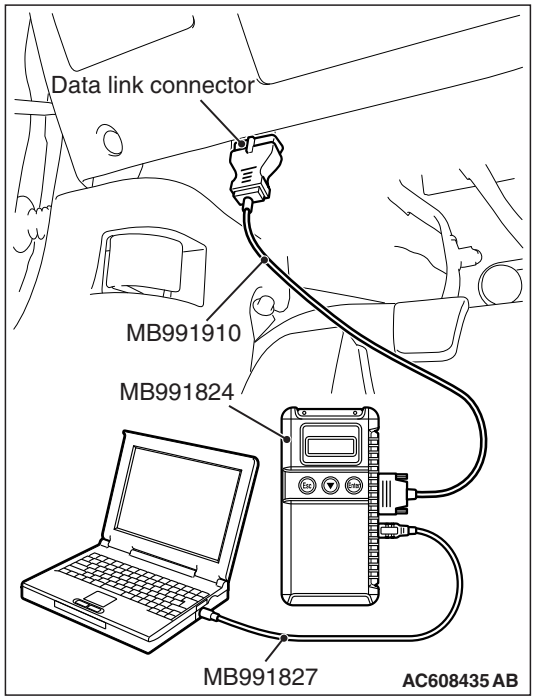
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Power steering pressure switch failed.
- Open or shorted power steering pressure switch circuit, harness damage, or connector damage.
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MB992110: Power Plant ECU Check Harness



STEP 1. Using scan tool MB991958, check data list item 83: Power Steering Pressure Switch.

⚠ CAUTION

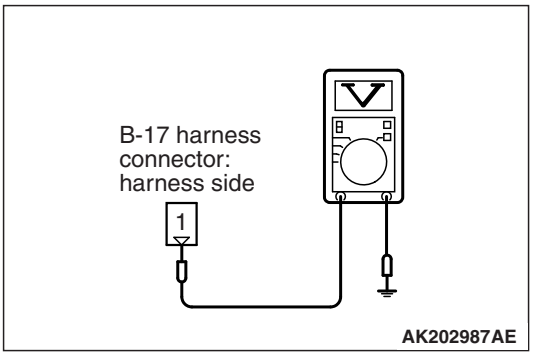
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(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 83, 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.00-14.

NO : Go to Step 2.



STEP 2. Measure the power supply voltage at power steering pressure switch connector B-17 by backprobing.

(1) Do not disconnect the connector B-17.
(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 measured voltage within the specified range?

YES : Go to Step 3.
NO : Go to Step 5.

STEP 3. Check harness connector B-17 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 13.

STEP 4. Using scan tool MB991958, check data list item 83: Power Steering Pressure Switch.

(1) Start the engine and run at idle.
(2) Set scan tool MB991958 to the data reading mode for item 83, 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.

(3) 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.00-14.
NO : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 13.

STEP 5. Check harness connector B-17 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 13.

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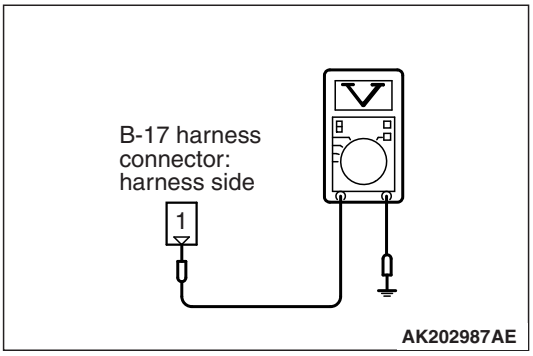


STEP 6. Measure the power supply voltage at power steering pressure switch harness side connector B-17.

(1) Disconnect the connector B-17 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.

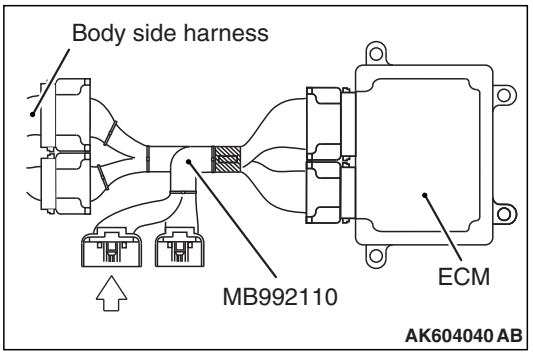
Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 10.
NO : Go to Step 7.

STEP 7. Check harness connector B-108 at ECM for damage.

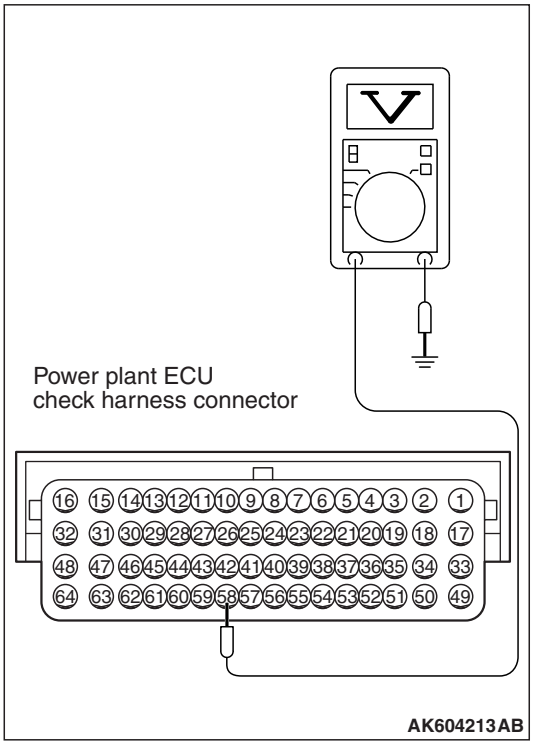
Q: Is the harness connector in good condition?

YES : Go to Step 8.
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 13.



STEP 8. Measure the power supply voltage at ECM connector B-108 by using power plant ECU check harness special tool MB992110.

(1) Disconnect all ECM connectors. Connect the power plant ECU check harness special tool MB992110 between the separated connectors.
(2) Disconnect the power steering pressure switch connector B-17.
(3) Turn the ignition switch to the "ON" position.



(4) Measure the voltage between terminal No. 58 and ground.
- 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 : Repair harness wire between power steering pressure switch connector B-17 (terminal No. 1) and ECM connector B-108 (terminal No. 58) because of open circuit. Then go to Step 13.

NO : Go to Step 9.

STEP 9. Check for short circuit to ground between power steering pressure switch connector B-17 (terminal No. 1) and ECM connector B-108 (terminal No. 58).

Q: Is the harness wire in good condition?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 13.

NO : Repair it. Then go to Step 13.

STEP 10. Check harness connector B-108 at ECM 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 go to Step 13.

STEP 11. Check for harness damage between power steering pressure switch connector B-17 (terminal No. 1) and ECM connector B-108 (terminal No. 58).

Q: Is the harness wire in good condition?

YES : Go to Step 12.
NO : Repair it. Then go to Step 13.

STEP 12. 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 : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 13.
NO : The inspection is complete.

STEP 13. Using scan tool MB991958, check data list item 83: Power Steering Pressure Switch.

(1) Start the engine and run at idle.
(2) Set scan tool MB991958 to the data reading mode for item 83, 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.

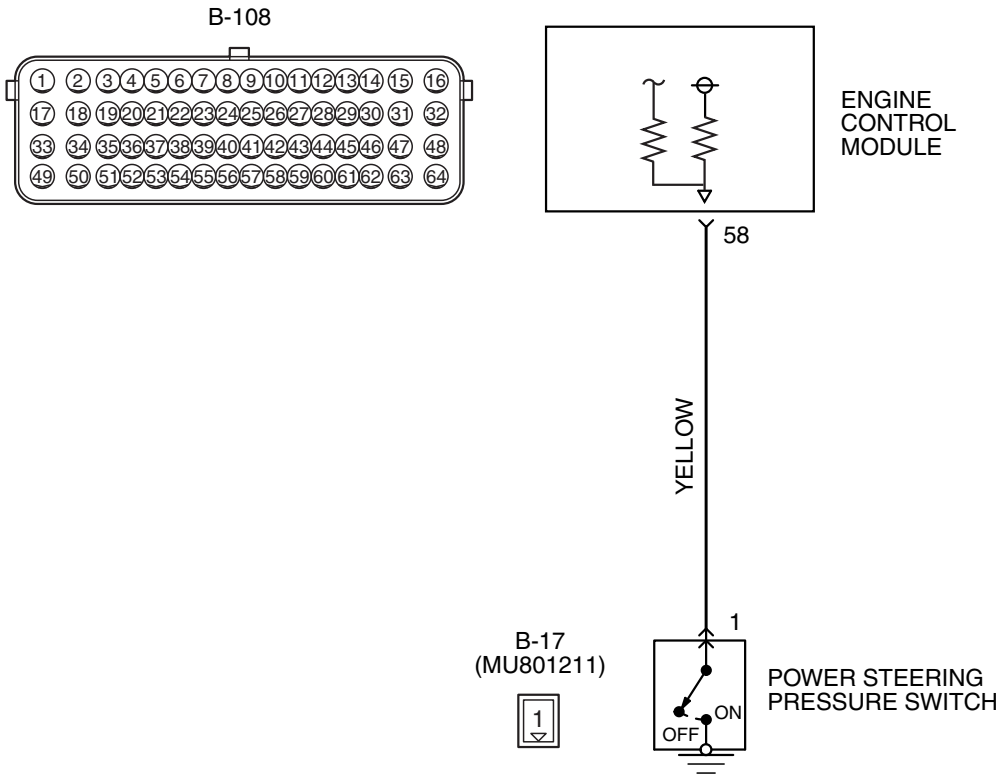
(3) Turn the ignition switch to the "LOCK" (OFF) position.

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



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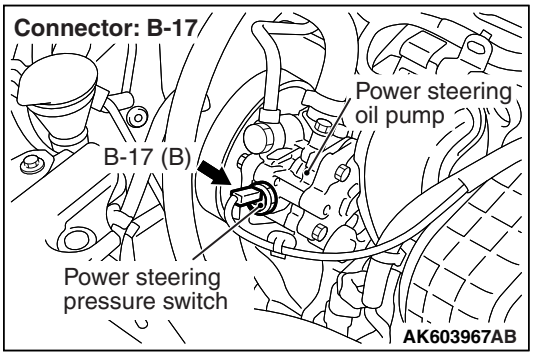
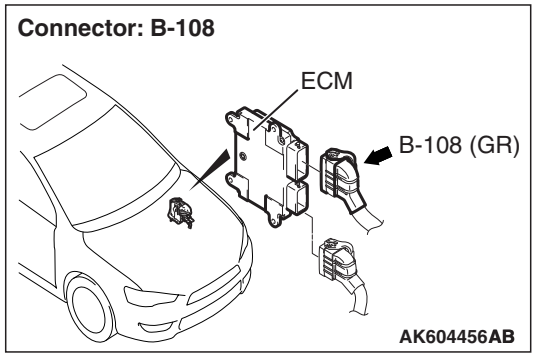




CIRCUIT OPERATION

- A battery positive voltage is applied to the power steering pressure switch output terminal (terminal No. 1) from the ECM (terminal No. 58) via the resistor in the ECM.

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 ECM.

TSB Revision

- 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 0 and 12 volts.
- While driving with the steering wheel held straight, the power steering pressure switch turns "OFF".
- The ECM 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)

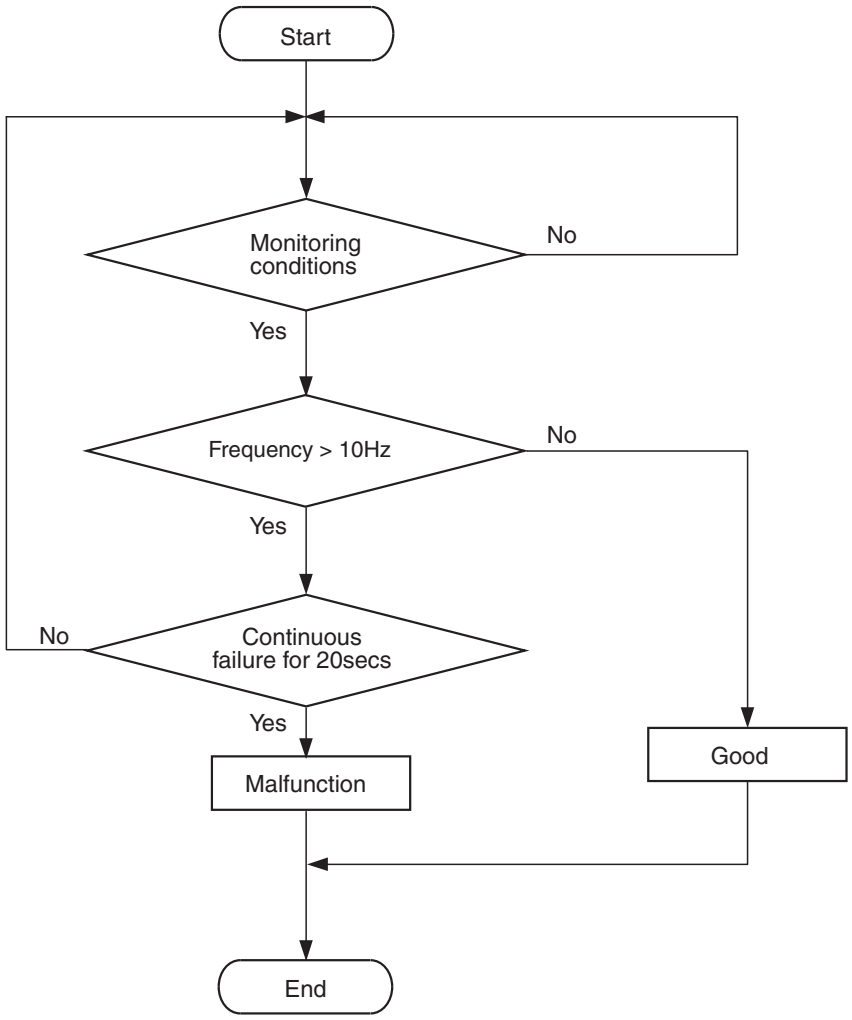
- Not applicable

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 20°C (68°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.13C-11

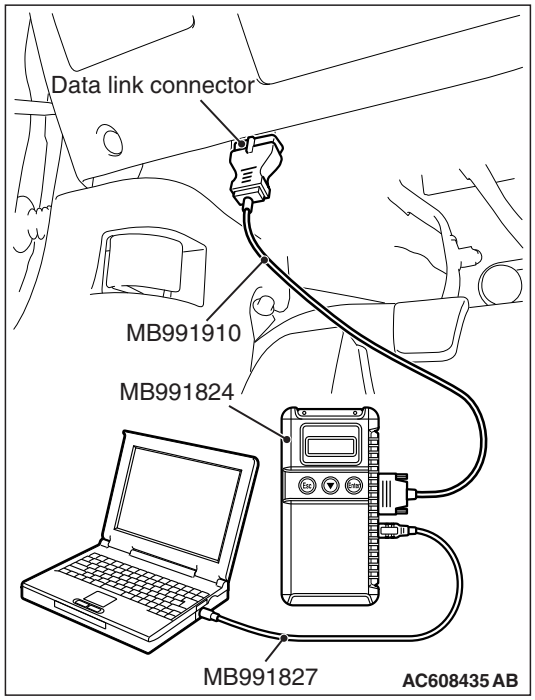
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- 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.
- ECM failed.

DIAGNOSIS

Required Special Tools:

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



STEP 1. Using scan tool MB991958, check data list item 83: 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 83, 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.00-14.
NO : Go to Step 2.

STEP 2. Check the power steering fluid level.

Refer to GROUP 37, On-vehicle Service – Fluid Level Check P.37-24.

Q: Are there any abnormalities?

YES : Repair it. Then go to Step 7.
NO : Go to Step 3.

TSB Revision

STEP 3. Check the power steering pressure switch.
Refer to GROUP 37, On-vehicle Service – Power Steering Pressure Switch CheckP.37-29.

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 37, On-vehicle Service – Oil Pump Pressure Test P.37-28.

Q: Are there any abnormalities?

YES : Repair it. Then go to Step 7.
NO : Go to Step 5.

STEP 5. Check harness connector B-17 at the power steering pressure switch and harness connector B-108 at ECM 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 7.

STEP 6. Check for harness damage between power steering pressure switch connector B-17 (terminal No. 1) and ECM connector B-108 (terminal No. 58).

Q: Is the harness wire in good condition?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. 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.13C-11.
(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

- ECM stored the information such as the idle learned value and so on in the memory of ECM.

DESCRIPTIONS OF MONITOR METHODS

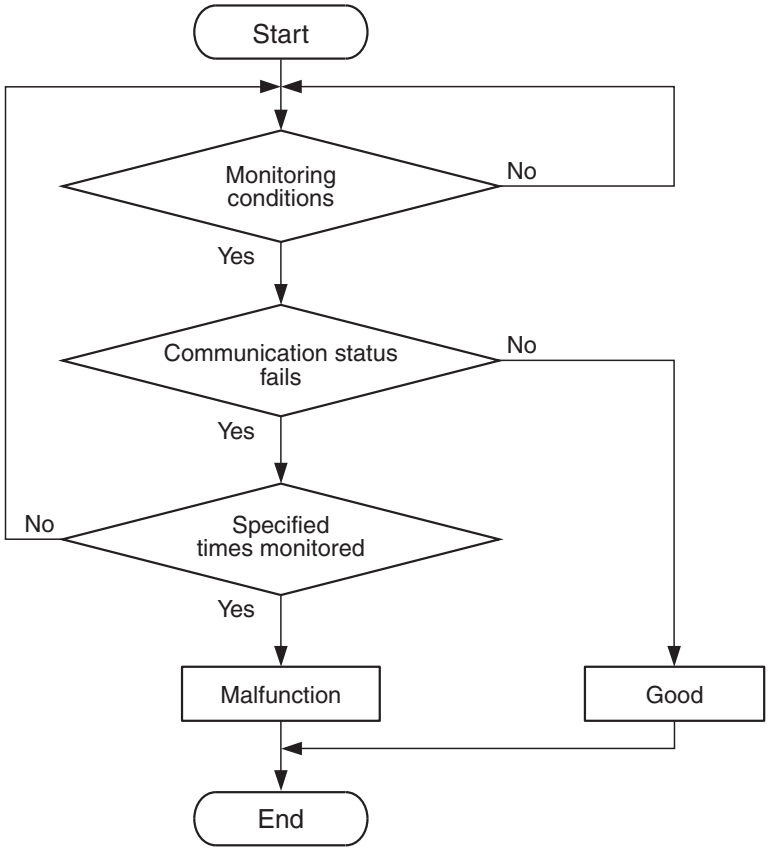
To check whether the information such as the idle learned value and so on is stored in the memory of ECM.

MONITOR EXECUTION

Once per driving cycle

DTC SET CONDITIONS

Logic Flow Chart



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Check Condition

- Ignition switch is "ON" position.

Judgement Criterion

- The latest data that was flashed while the ignition switch was in "LOCK" (OFF) position are not stored correctly.

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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OBD-II DRIVE CYCLE PATTERN

None.

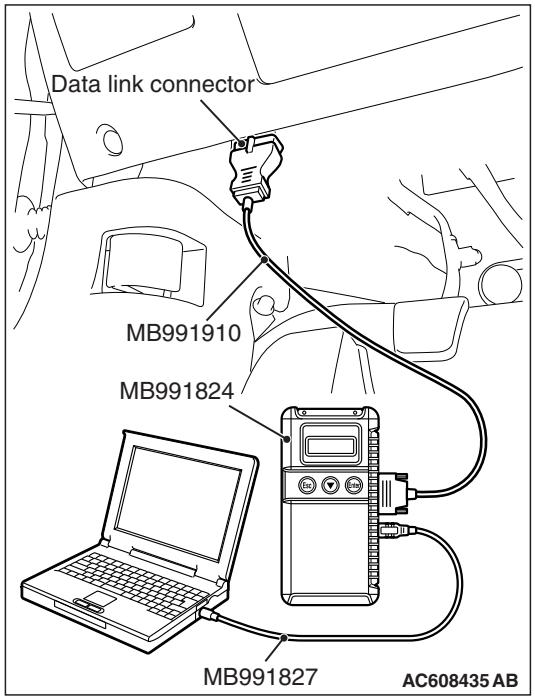
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- ECM failed.

DIAGNOSIS

Required Special Tools:

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



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.

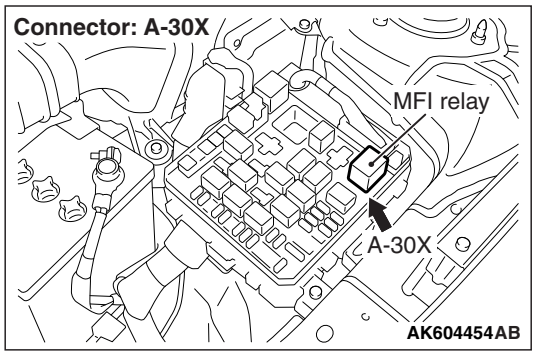
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

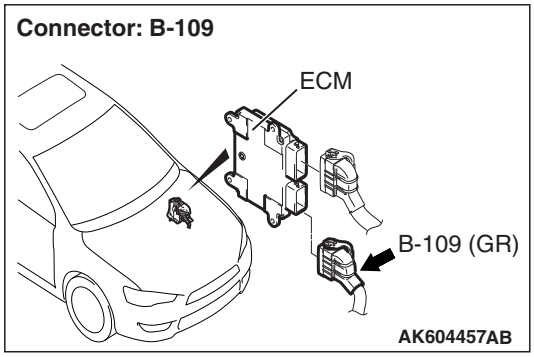
Q: Is DTC P0603 set?

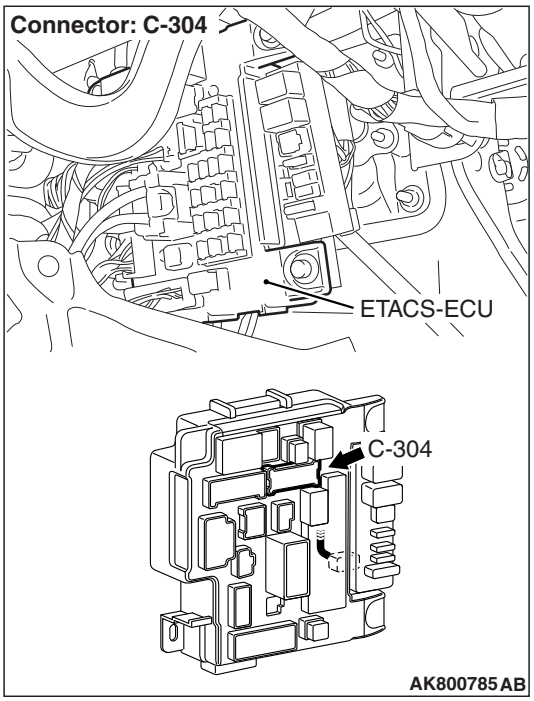
YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.

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.00-14.

DTC P0606: Engine Control Module Main Processor Malfunction







ENGINE CONTROL MODULE MAIN PROCESSOR MALFUNCTION

- Refer to Inspection Procedure 21 – Power Supply System and Ignition Switch – IG System P.13C-868.

CIRCUIT OPERATION

- Refer to Inspection Procedure 21 – Power Supply System and Ignition Switch – IG System P.13C-868.

TECHNICAL DESCRIPTION

- Throttle actuator control processor checks the ECM 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:)

- MFI relay failed.
- Shorted MFI relay circuit or connector damage.
- Open or shorted ignition switch-IG circuit, harness damage or connector damage.
- ECM failed.

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DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

STEP 1. Check the battery.

Refer to GROUP 54A, Battery – On-vehicle Service – Battery Test P.54A-8.

Q: Are there any abnormalities?

YES : Replace the battery. Then go to Step 11.
NO : Go to Step 2.

STEP 2. Check harness connector B-109 at ECM for damage.

Q: Is the harness connector in good condition?

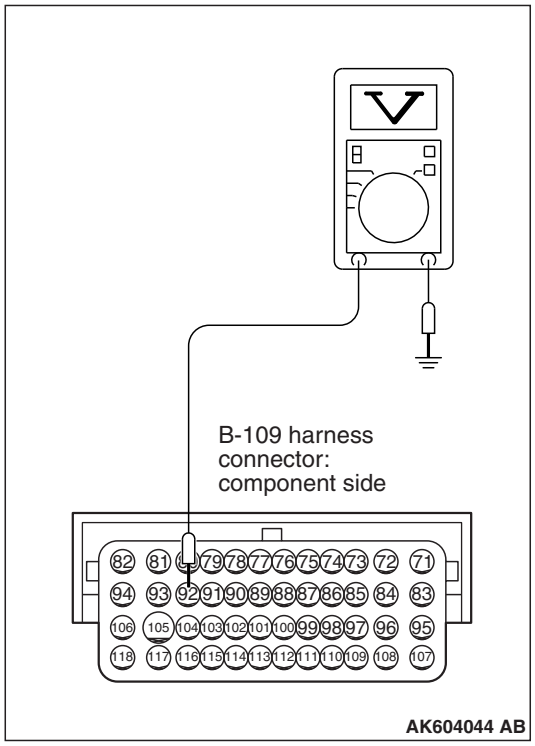
YES : Go to Step 3.
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 11.

STEP 3. Measure the ignition switch-IG signal voltage at ECM harness side connector B-109.

(1) Disconnect the connector B-109 and measure at the harness side.
(2) Turn the ignition switch to the "ON" position.
(3) Measure the voltage between terminal No. 92 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 5.
NO : Go to Step 4.



STEP 4. Check harness connector C-304 at ETACS-ECU for damage.

Q: Is the harness connector in good condition?

YES : Repair harness wire between ETACS-ECU connector C-304 (terminal No. 10) and ECM connector B-109 (terminal No. 92) because of open circuit or short circuit to ground. Then go to Step 11.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 11.

STEP 5. Check harness connector C-304 at ETACS-ECU 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 11.

STEP 6. Check for harness damage between ETACS-ECU connector C-304 (terminal No. 10) and ECM connector B-109 (terminal No. 92).

Q: Is the harness wire in good condition?

YES : Go to Step 7.

NO : Repair it. Then go to Step 11.

STEP 7. Check harness connector A-30X at MFI relay for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 8.

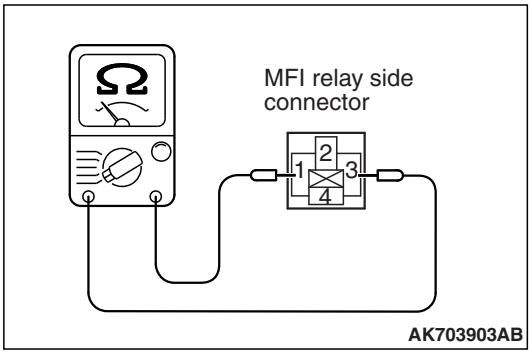
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 11.

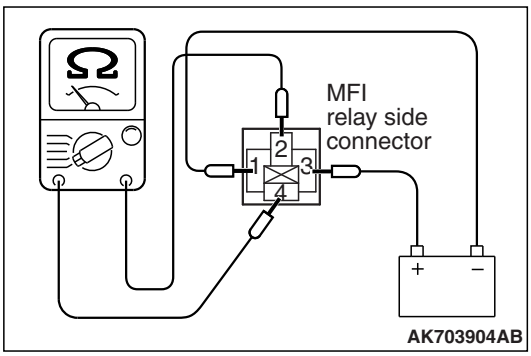
STEP 8. Check the MFI relay.

(1) Remove the MFI relay.

(2) Check for continuity between the MFI relay terminals No. 1 and No. 3.

- There should be continuity.





(3) Use jumper wires to connect MFI relay terminal No. 3 to the positive battery terminal and terminal No. 1 to the negative battery terminal.

(4) Check for continuity between the MFI relay terminals No. 4 and No. 2 while connecting and disconnecting the jumper wire at the negative battery terminal.

- Continuity (2 ohms or less) <Negative battery terminal connected>
- Should be open loop <Negative battery terminal disconnected>

(5) Install the MFI relay.

Q: Is the measured resistance within the specified range?

YES : Go to Step 9.

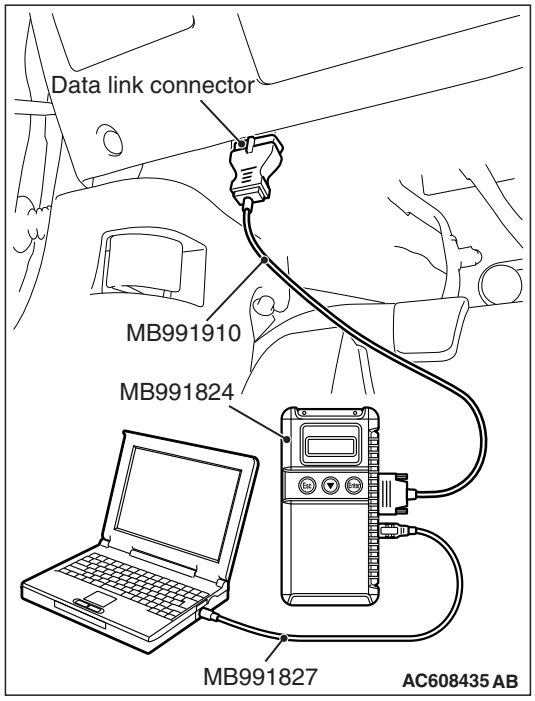
NO : Replace the MFI relay. Then go to Step 11.

STEP 9. Check for short circuit to ground between MFI relay connector A-30X (terminal No. 1) and ECM connector B-109 (terminal No. 73).

Q: Is the harness wire in good condition?

YES : Go to Step 10.

NO : Repair it. Then go to Step 11.



STEP 10. Using scan tool MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

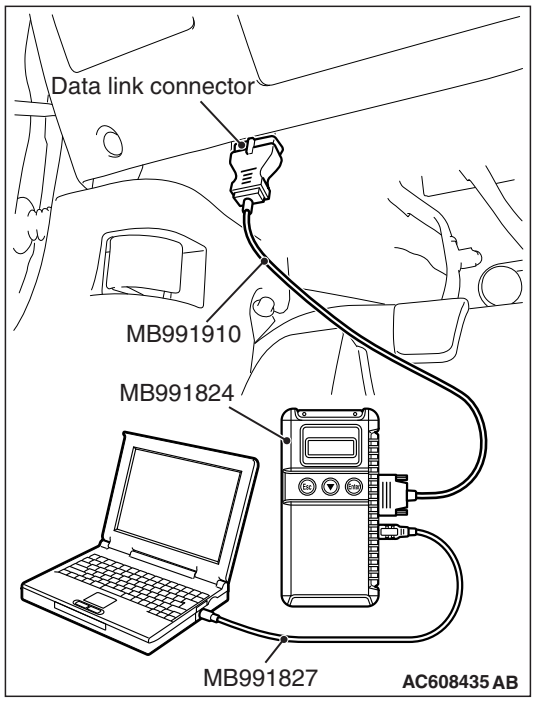
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(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 ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 11.

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.00-14.



STEP 11. 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.

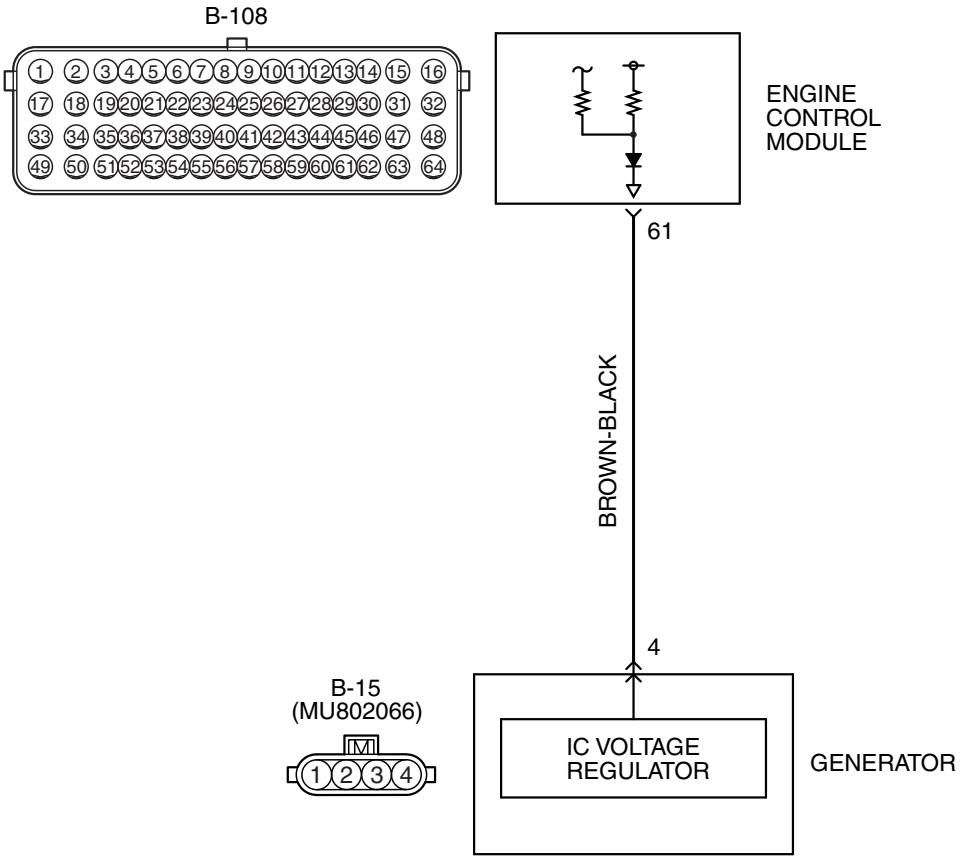
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P0606 set?

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

DTC P0622: Generator FR Terminal Circuit Malfunction

GENERATOR CIRCUIT



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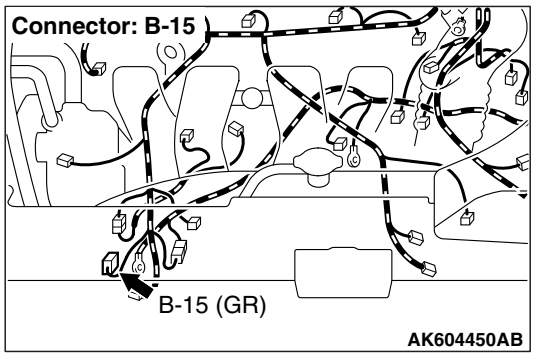
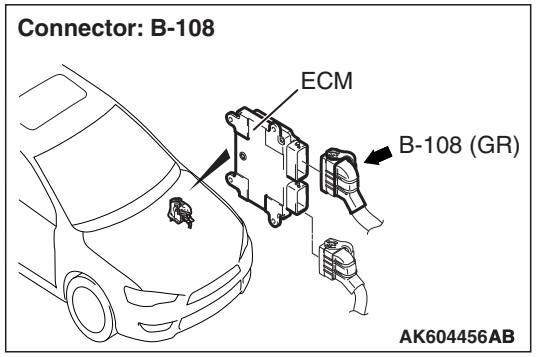




CIRCUIT OPERATION

- The ECM (terminal No. 61) apply a battery voltage into the generator FR terminal No. 4 via resistance inside the unit.

TECHNICAL DESCRIPTION

- When the generator field coils are controlled, the generator FR terminal inputs signal to the ECM.
- The ECM detects the generator output with the input signal, and controls the idle air control motor according to the generator output.

TSB Revision

DTC SET CONDITIONS

Check Condition

- Engine speed is higher than 50 r/min.

Judgement Criterion

- Input voltage from the generator FR terminal has continued to be battery positive voltage for 20 seconds.

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

- Generator failed.
- Open circuit in generator FR terminal circuit, harness damage or connector damage.
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MB992110: Power Plant ECU Check Harness

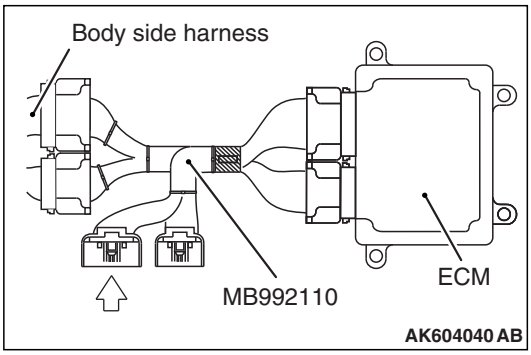
STEP 1. Check harness connector B-108 at ECM connector for damage.

Q: Is the harness connector in good condition?

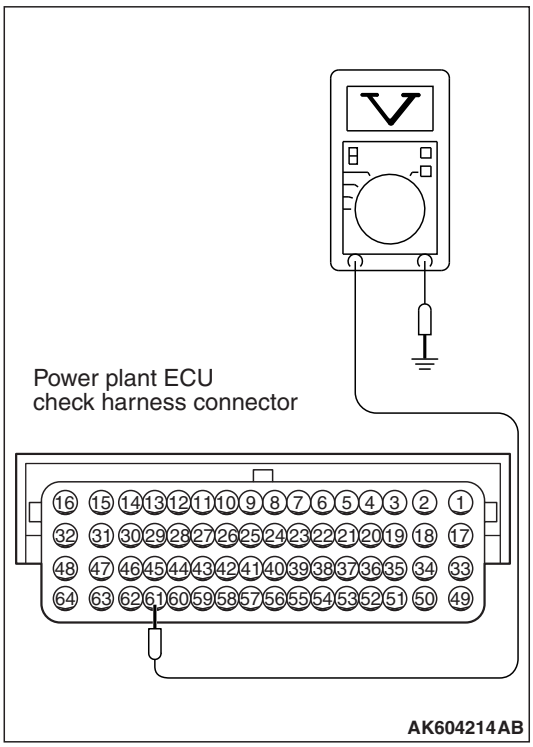
YES : Go to Step 2.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 8.

STEP 2. Measure the voltage at ECM connector B-108 by using power plant ECU check harness special tool MB992110.



(1) Disconnect all ECM connectors. Connect the power plant ECU check harness special tool MB992110 between the separated connectors.
(2) Start the engine and run at idle.



(3) Measure the voltage between terminal No. 61 and ground under the following driving.

NOTE: Vehicle for Canada, the headlight, taillight, etc. remain lit even when the lighting switch is in "OFF" position but this is no problem for checks.

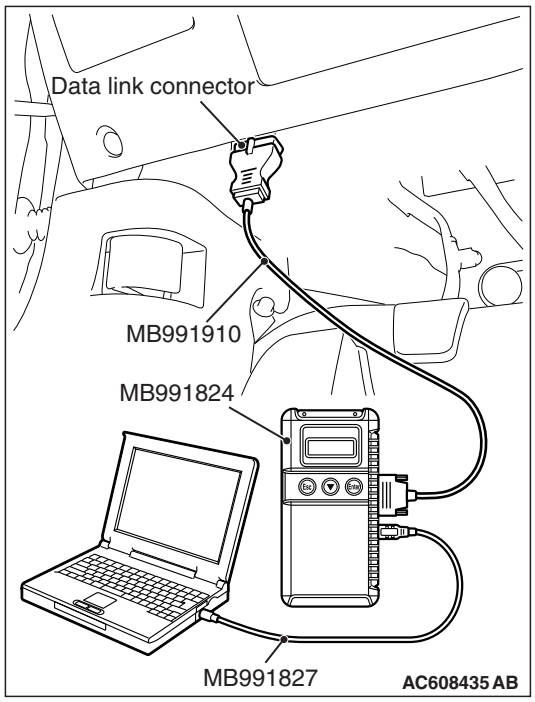
a. Engine: warming up
b. Radiator fan: stopped
c. Headlight switch: OFF to ON
d. Rear defogger switch: OFF to ON
e. Stoplight switch: OFF to ON

- Voltage should be drop.

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

Q: Did the measured voltage drop?

YES : Go to Step 3.
NO : Go to Step 4.



STEP 3. 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) Start the engine and run at idle.
(3) Read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P0622 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 8.

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.00-14.

STEP 4. Check harness connector B-15 at generator connector 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 8.

STEP 5. Measure the voltage at generator harness side connector B-15.

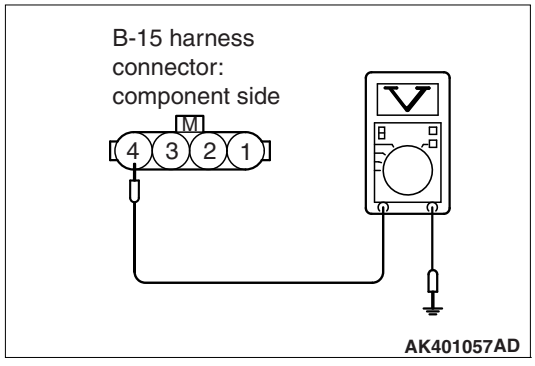
(1) Disconnect the connector B-15 and measure at the harness side.
(2) Turn the ignition switch to the "ON" position.
(3) Measure the voltage between terminal No. 4 and ground.
- Voltage should measure battery positive voltage.

(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 for open circuit and short circuit to ground between generator connector B-15 (terminal No. 4) and ECM connector B-108 (terminal No. 61).

Q: Is the harness wire in good condition?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 8.

NO : Repair it. Then go to Step 8.

STEP 7. Check for harness damage between generator connector B-15 (terminal No. 4) and ECM connector B-108 (terminal No. 61).

Q: Is the harness wire in good condition?

YES : Replace the generator. Then go to Step 8.

NO : Repair it. Then go to Step 8.

STEP 8. Using scan tool MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

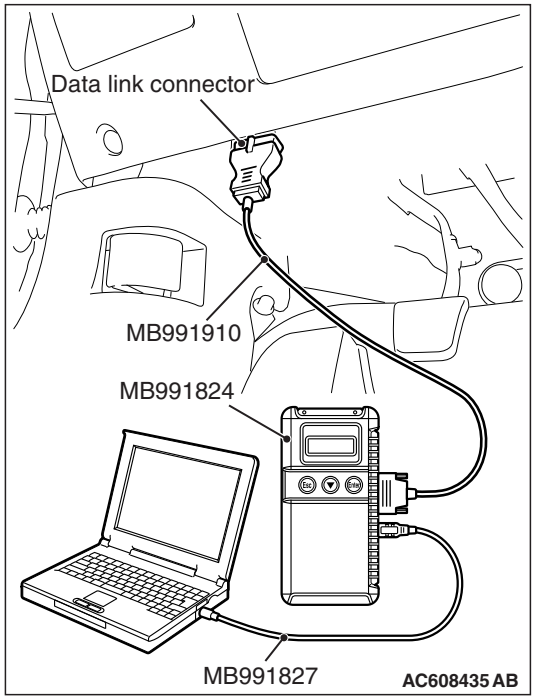
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Start the engine and run at idle.
(3) Read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P0622 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.



DTC P0630: Vehicle Identification Number (VIN) Malfunction

TECHNICAL DESCRIPTION

- The Vehicle Identification Number (VIN) is stored in the ECM by the vehicle manufacturer.

DESCRIPTIONS OF MONITOR METHODS

The ECM 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)

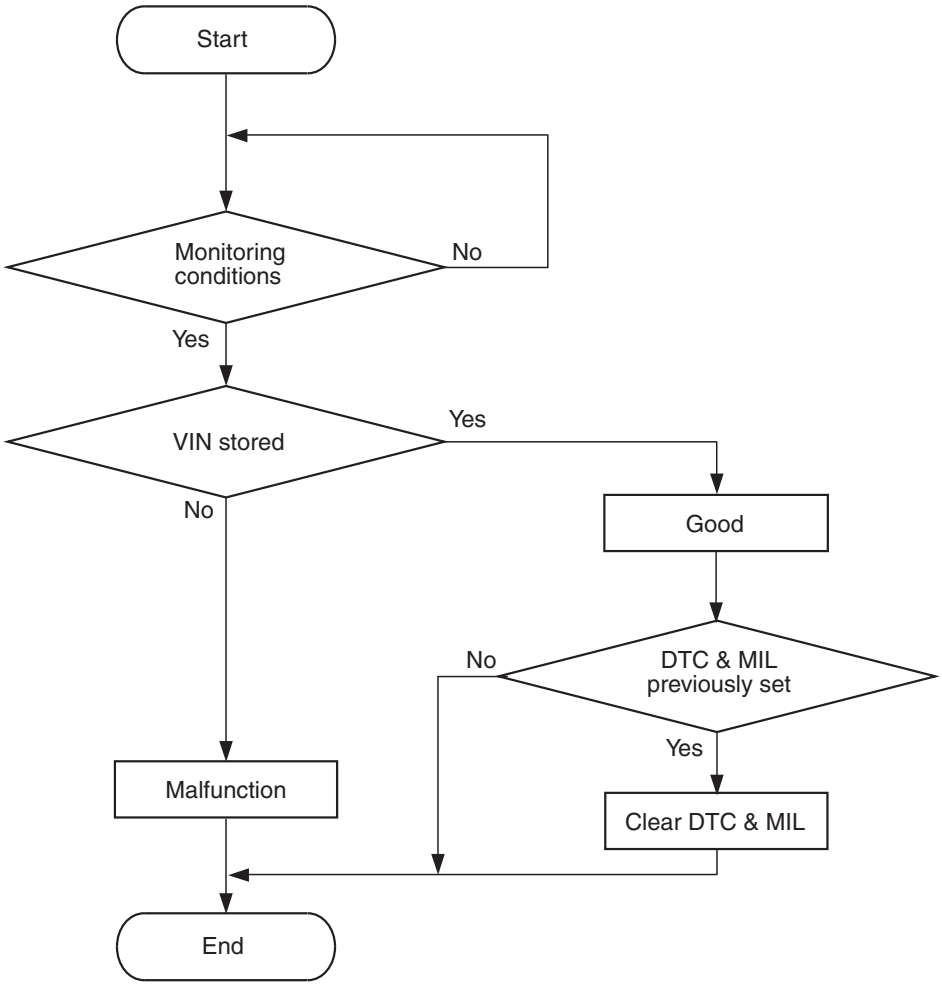
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



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Check Condition

- Ignition switch is "ON" position.

Judgement Criterion

- VIN (current) has not been written.

TSB Revision

OBD-II DRIVE CYCLE PATTERN

None.

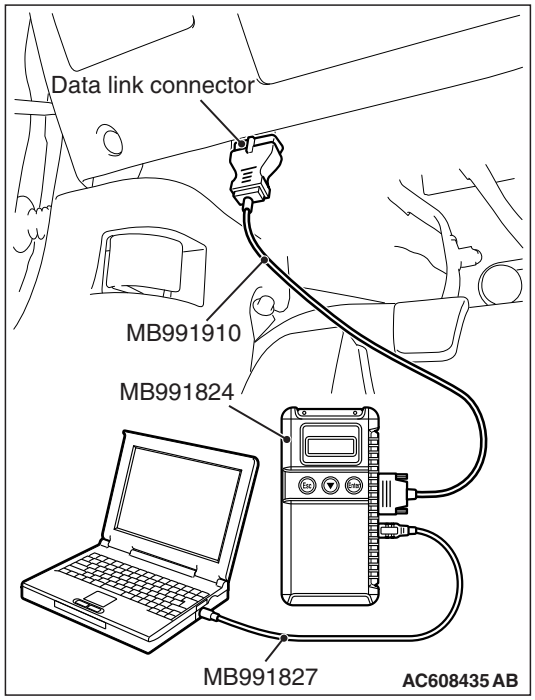
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- ECM failed.

DIAGNOSIS

Required Special Tools:

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



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).

Q: Is DTC P0630 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.
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.00-14.

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).

Q: Is DTC P0630 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.

NO : The inspection is complete.

DTC P0638: Throttle Actuator Control Motor Circuit Range/Performance Problem

THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE PROBLEM CIRCUIT

- Refer to DTC P2101 – Throttle Actuator Control Motor Magneto Malfunction P.13C-715.

CIRCUIT OPERATION

- Refer to DTC P2101 – Throttle Actuator Control Motor Magneto Malfunction P.13C-715.

TECHNICAL DESCRIPTION

- ECM 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 0.2 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 0.4 second.

Check Conditions

- Battery positive voltage is higher than 8.3 volts.
- Throttle position sensor (main) output voltage is between 0.2 and 4.8 volts.
- Target throttle position sensor (main) output voltage is 1.5 volts or lower.

Judgement Criterion

- Difference between throttle position sensor (main) output voltage and target throttle position sensor (main) voltage is 0.6 volt or higher for 0.4 second.

Check Conditions

- Battery positive voltage is higher than 8.3 volts.
- Throttle position sensor (main) output voltage is between 0.2 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 0.4 second.

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Check Conditions
- Battery positive voltage is higher than 8.3 volts.

Judgement Criterion
- Throttle position sensor (main) default opening learnt value is higher than 4 volts.

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 valve operation failed.
- Throttle actuator control motor failed.
- Harness damage in throttle actuator control motor circuit, or connector damage.
- ECM failed.

DIAGNOSIS

Required Special Tools:
- MB991958: Scan tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

STEP 1. Check harness connector B-10 at throttle actuator control motor for damage.

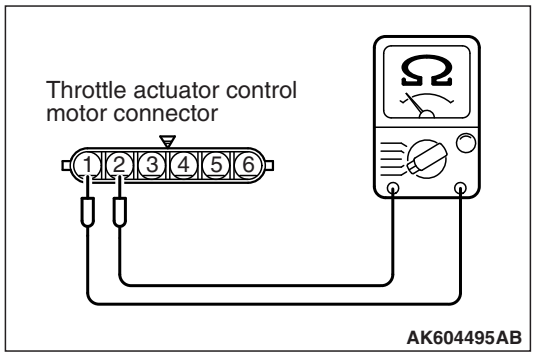
Q: Is the harness connector in good condition?

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

STEP 2. Check the throttle actuator control motor.

(1) Disconnect the connector B-10.
(2) Measure the resistance between throttle actuator control motor side connector terminal No. 1 and No. 2.

Standard value: 0.3 – 80 Ω [at 20°C (68°F)]



Q: Is the measured resistance between 0.3 and 80 Ω [at 20°C (68°F)]?

YES : Go to Step 3.
NO : Replace the throttle body assembly. Then go to Step 7.

STEP 3. Check harness connector B-108 at ECM 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 7.

STEP 4. Check for harness damage between throttle actuator control motor connector B-10 (terminal No. 1) and ECM connector B-108 (terminal No. 15).

Q: Is the harness wire in good condition?

YES : Go to Step 5.
NO : Repair it. Then go to Step 7.

STEP 5. Check for harness damage between throttle actuator control motor connector B-10 (terminal No. 2) and ECM connector B-108 (terminal No. 16).

Q: Is the harness wire in good condition?

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

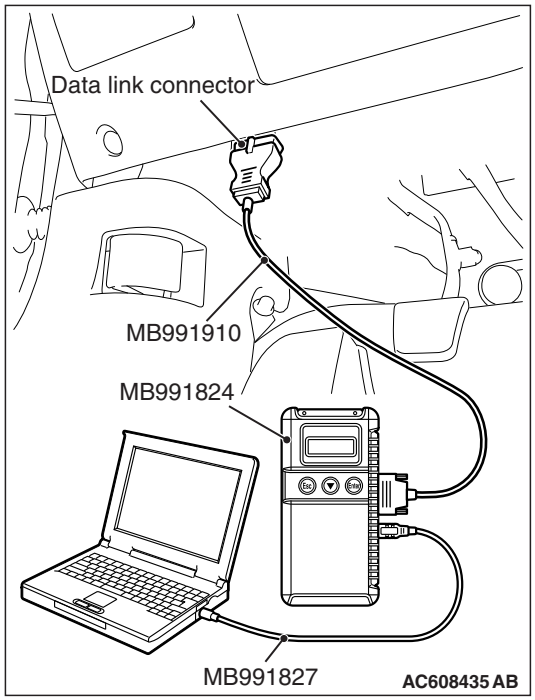
STEP 6. Using scan tool MB991958, read the diagnostic trouble code (DTC).

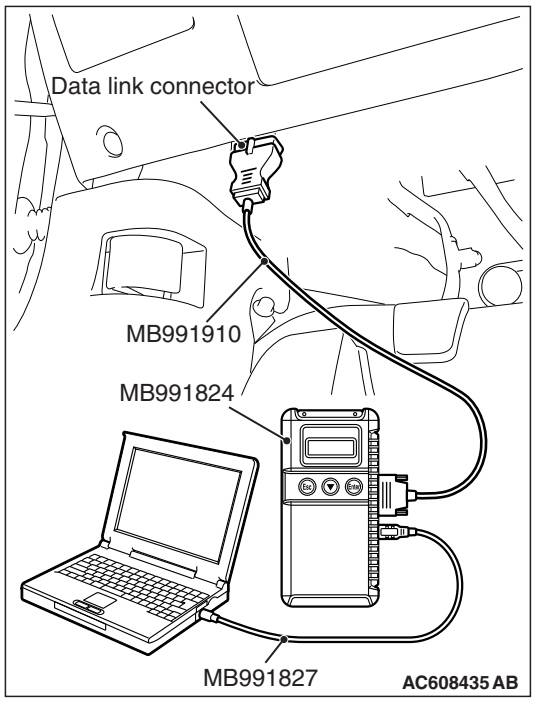
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) 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 ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. 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 Malfunctions P.00-14.





STEP 7. 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 : Retry the troubleshooting.
NO : The inspection is complete.

DTC P0642: Throttle Position Sensor Power Supply

TECHNICAL DESCRIPTION

- ECM 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 Conditions

- Battery positive voltage is higher than 6.3 volts.

Judgement Criteria

- Throttle position sensor power voltage should be 4.1 volts or less for 0.3 second.

OBD-II DRIVE CYCLE PATTERN

None.

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

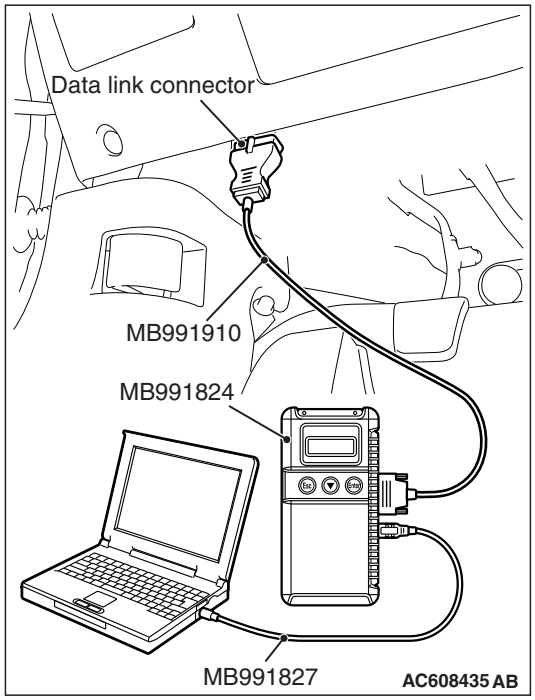
- ECM failed.

DIAGNOSIS

Required Special Tools:

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

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.

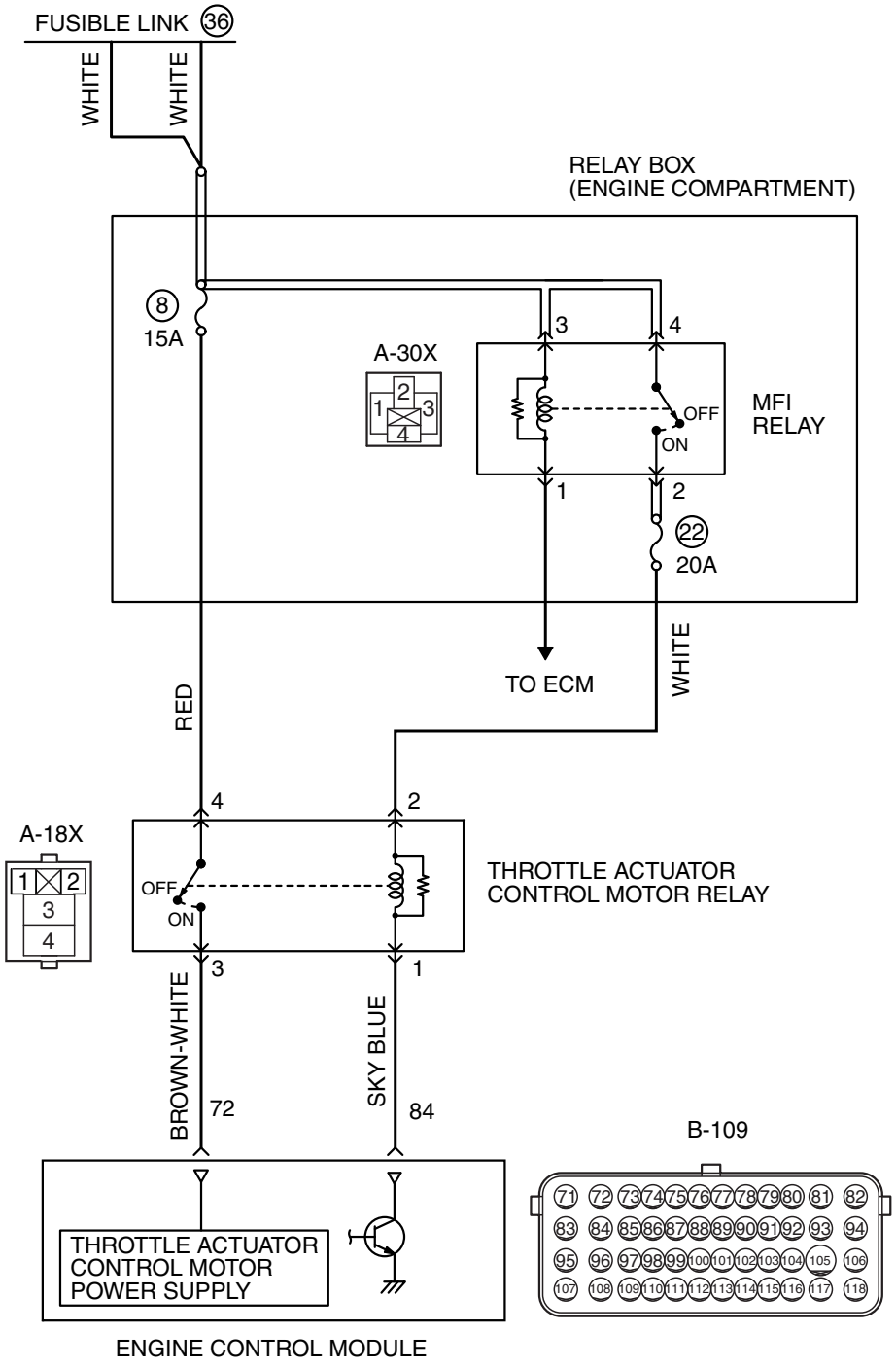
Q: Is DTC P0642 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.

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.00-14.

DTC P0657: Throttle Actuator Control Motor Relay Circuit Malfunction

THROTTLE ACTUATOR CONTROL MOTOR RELAY CIRCUIT



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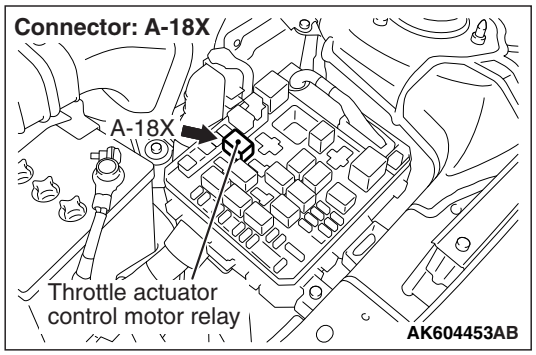
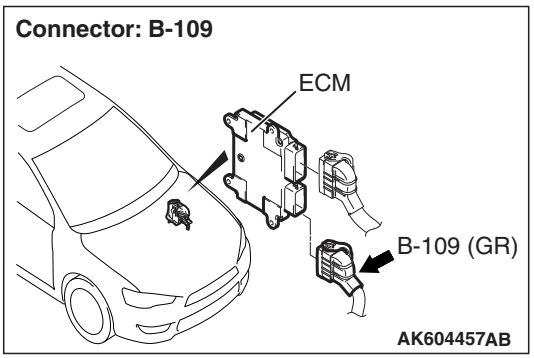
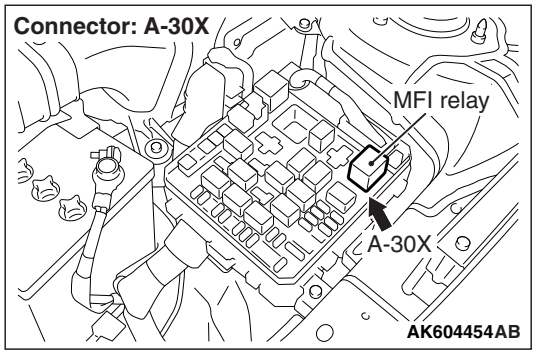






CIRCUIT OPERATION

- Battery positive voltage is applied to the throttle actuator control motor relay terminal (terminal No. 4).
- Battery positive voltage is applied to the throttle actuator control motor relay terminal (terminal No. 2) from the MFI relay (terminal No. 2).
- ECM (terminal No. 84) 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. 3) to the ECM (terminal No. 72).

TECHNICAL DESCRIPTION

- When the ignition switch ON signal is input into the ECM, the ECM 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, or connector damage.
- ECM failed.

TSB Revision

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

STEP 1. Check harness connector A-18X at throttle actuator control motor relay for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 2.

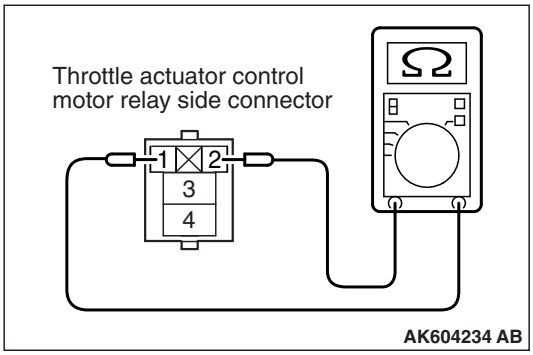
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 14.

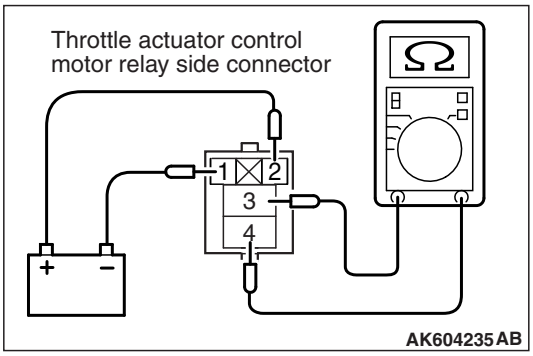
STEP 2. Check the throttle actuator control motor relay.

(1) Remove the throttle actuator control motor relay.

(2) Check for continuity between the throttle actuator control motor relay terminal No. 1 and No. 2.

- There should be continuity.





(3) Use jumper wires to connect throttle actuator control motor relay terminal No. 2 to the positive battery terminal and terminal No. 1 to the negative battery terminal.

(4) Check the continuity between the throttle actuator control motor relay terminal No. 3 and No. 4 while connecting and disconnecting the jumper wire at the negative battery terminal.

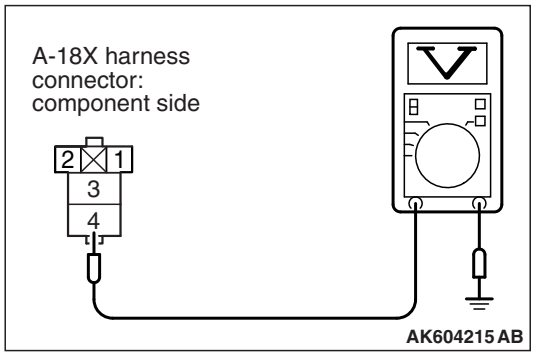
- Continuity (2 Ω or less) <Negative battery terminal connected.>
- Should be open loop. <Negative battery terminal disconnected.>

(5) Install the throttle actuator control motor relay.

Q: Is the measured resistance normal?

YES : Go to Step 3.

NO : Replace the throttle actuator control motor relay. Then go to Step 14.

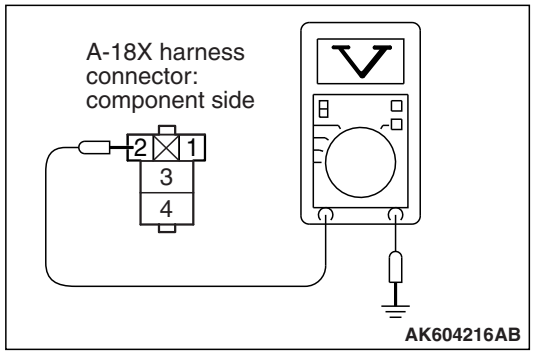


STEP 3. Measure the power supply voltage at throttle actuator control motor relay harness side connector A-18X

(1) Disconnect the connector A-18X and measure at the harness side.
(2) Measure the voltage between terminal No. 4 and ground.
- Voltage should be battery positive voltage.

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

YES : Go to Step 4.
NO : Repair it harness wire between battery and throttle actuator control motor relay connector A-18X (terminal No. 4) because of open circuit or short circuit to ground. Then go to Step 14.



STEP 4. Measure the power supply voltage at throttle actuator control motor relay harness side connector A-18X.

(1) Disconnect the connector A-18X 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.

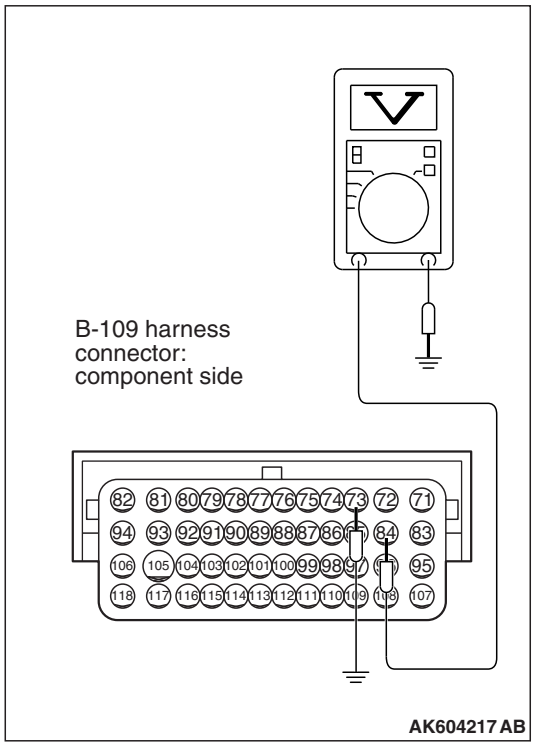
Q: Is battery positive voltage (approximately 12 volts) present?

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

STEP 5. Check harness connector A-30X at MFI relay for damage.

Q: Is the harness connector in good condition?

YES : Repair harness wire between MFI relay connector A-30X (terminal No. 2) and throttle actuator control motor relay connector A-18X (terminal No. 2) 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.



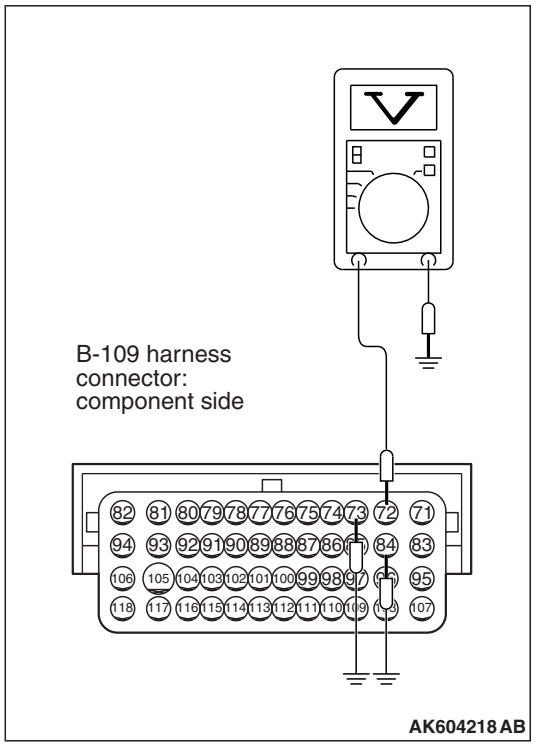
STEP 6. Measure the power supply voltage at ECM harness side connector B-109.

(1) Disconnect the connector B-109 and measure at the harness side.
(2) Short-circuit the terminal No. 73 of the ECM harness connector to the ground.
(3) Measure the voltage between terminal No. 84 and ground.
- Voltage should be battery positive voltage.

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 A-18X (terminal No. 1) and ECM connector B-109 (terminal No. 84) because of open circuit or short circuit to ground. Then go to Step 14.



STEP 7. Measure the power supply voltage at ECM harness side connector B-109.

(1) Disconnect the connector B-109 and measure at the harness side.
(2) Short-circuit the terminals No. 73 and No. 84 of the ECM harness connector to the ground.
(3) Measure the voltage between terminal No. 72 and ground.
- Voltage should be battery positive voltage.

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 A-18X (terminal No. 3) and ECM connector B-109 (terminal No. 72).

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 A-30X (terminal No. 2) and throttle actuator control motor relay connector A-18X (terminal No. 2).

Q: Is the harness wire in good condition?

YES : Repair harness wire between throttle actuator control motor relay connector A-18X (terminal No. 1) and ECM connector B-109 (terminal No. 84) because of harness damage. Then go to Step 14.
NO : Repair it. Then go to Step 14.

STEP 10. Check harness connector B-109 at ECM 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 go to Step 14.

STEP 11. Check for harness damage between battery and throttle actuator control motor relay connector A-18X (terminal No. 4).

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 A-18X (terminal No. 3) and ECM connector B-109 (terminal No. 72).

Q: Is the harness wire in good condition?

YES : Go to Step 13.

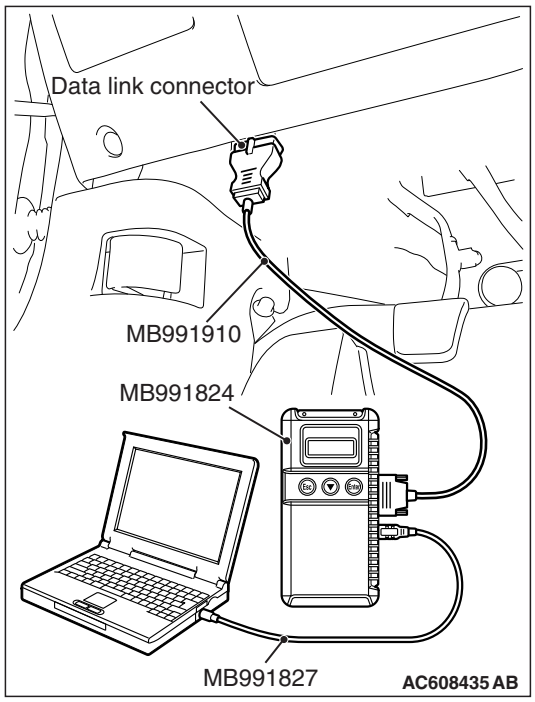
NO : Repair it. Then go to Step 14.

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.

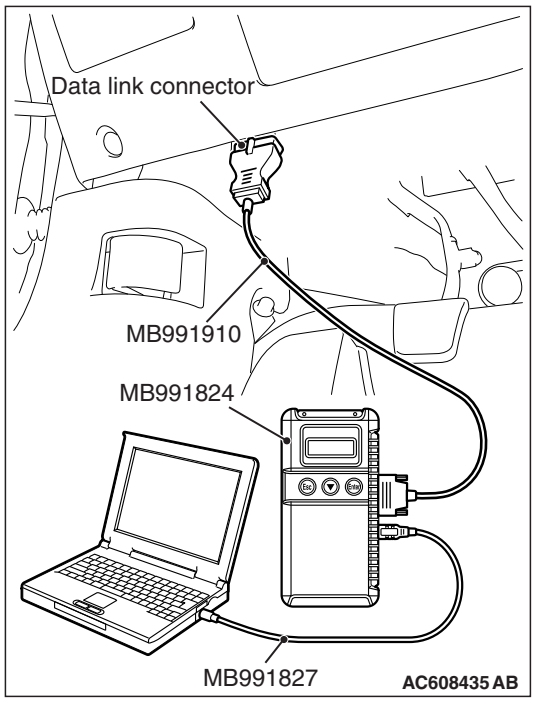
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK" (OFF) position.



Q: Is DTC P0657 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. 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.00-14.



STEP 14. 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 : Retry the troubleshooting.
NO : The inspection is complete.

DTC P1231: Active Stability Control Plausibility

TECHNICAL DESCRIPTION

- Checks for an abnormal signal of active stability control (ASC) via the CAN communication.

DTC SET CONDITIONS

Check Condition

- Ignition switch is "ON" position.

Judgment Criterion

- A torque demand signal from the active stability control is not normal.

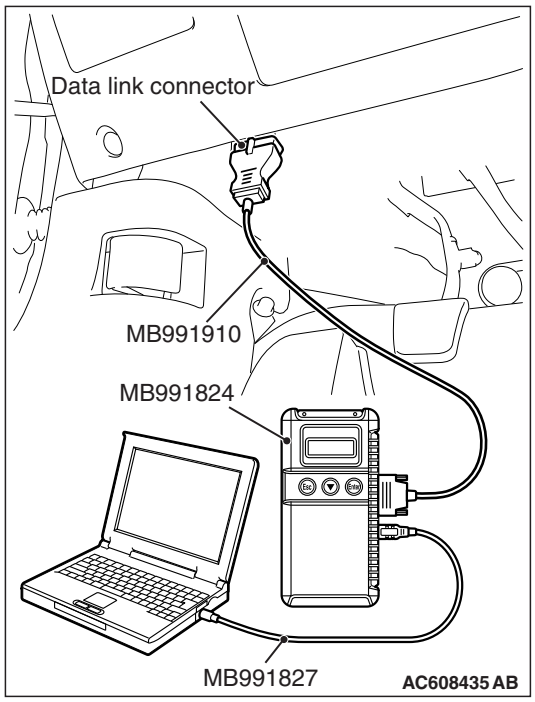
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Active stability control system failed.
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A



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 the DTC P1231 set?

YES : Go to Step 2.
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.00-14.

STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) After the DTC has been deleted, read the ASC-DTC.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the ASC-DTC set?

YES : Refer to GROUP 35C, Diagnosis – Diagnostic Trouble Code Chart P.35C-25.
NO : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.

DTC P1232: Fail Safe System

TECHNICAL DESCRIPTION

- To judge whether fail-safe control can be performed, check that power supply to the throttle actuator control motor circuit can be stopped by turning the throttle actuator control motor relay to OFF position momentarily.

DTC SET CONDITIONS

Check Condition

- Ignition switch is "ON" position.

Judgment Criterion

- Power supply to the throttle actuator control motor cannot be shut down (though power supply is stopped).

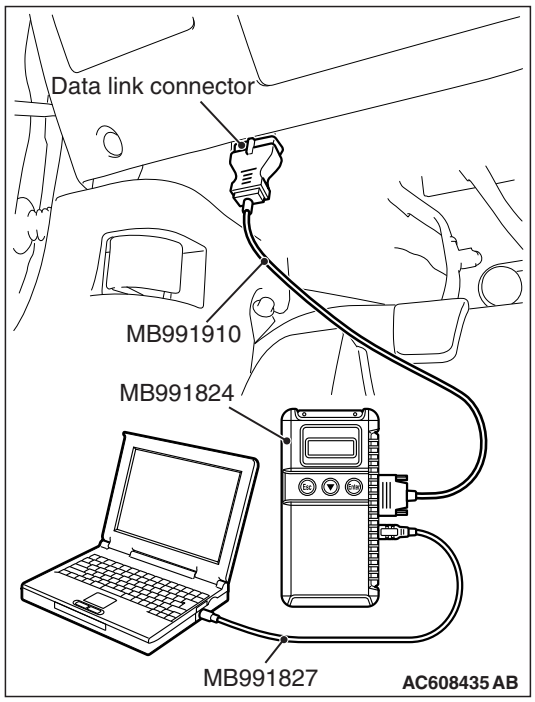
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Throttle actuator control motor relay circuit failed.
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A



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 the DTC P1232 set?

YES : Go to Step 2.
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.00-14.

STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).
(1) Turn the ignition switch to the "ON" position.
(2) After the DTC has been deleted, read the DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P0657 set?

YES : Refer to DTC P0657 – Throttle actuator control motor relay circuit malfunction P.13C-649.

NO : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.

DTC P1233: Throttle Position Sensor (main) Plausibility

TECHNICAL DESCRIPTION

Compare the actual measurement of volumetric efficiency by a mass airflow sensor signal with volumetric efficiency estimated from a throttle position sensor (main) signal.

MONITOR EXECUTION

Continuous

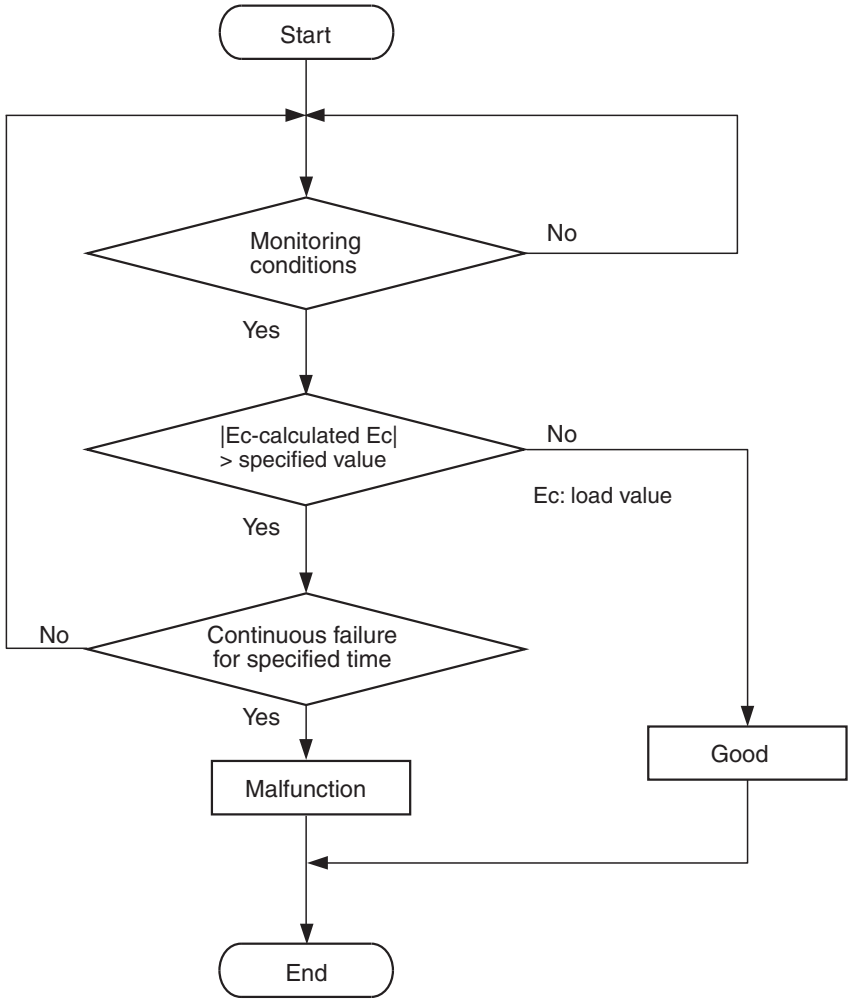
MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

- The difference between the actual volumetric efficiency and the volumetric efficiency estimated by the throttle position sensor (main) is 0 percent or more. Or, the volumetric efficiency is 60 percent or less.
- The engine speed is between 750 and 3,000 r/min. Or, the throttle position sensor (main) output voltage is 3 volts or less.

Judgment Criterion

- For 0.4 second, the difference between the actual volumetric efficiency and the volumetric efficiency estimated by the throttle position sensor (main) is 33 percent or more.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle Pattern 17 P.13C-11.

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

- Throttle position sensor (main) system failed.
- Intake system vacuum leak.
- There is some trash around mass airflow sensor.
- ECM failed.

TSB Revision

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

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

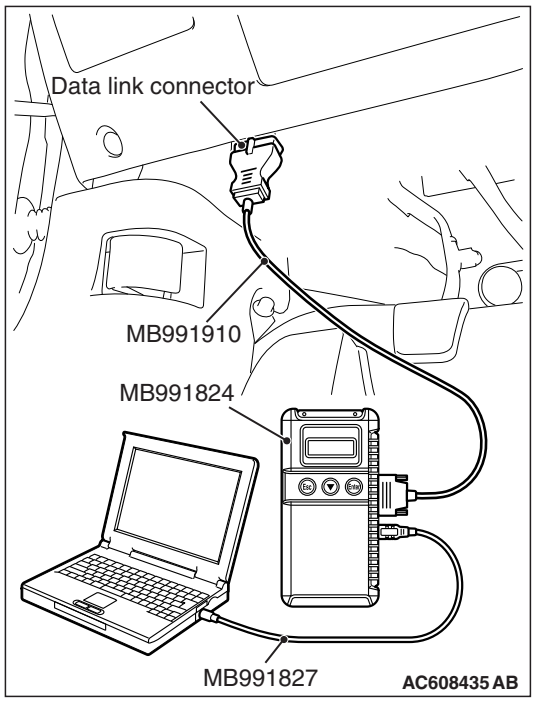
⚠ CAUTION

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 the diagnostic trouble code other than P1233 set?

YES : Refer to, Diagnostic Trouble Code Chart P.13C-48.
NO : Go to Step 2.



STEP 2. Using scan tool MB991958, check data list item 13: Throttle Position Sensor (main).

(1) Turn the ignition switch to the "ON" position.
(2) Detach the intake air hose at the throttle body.
(3) Disconnect the connector of the throttle position sensor.
(4) Use test harness special tool (MB991658) to connect only terminals No. 3, No. 4, No. 5, and No. 6.
(5) Set scan tool MB991958 to the data reading mode for item 13, Throttle Position Sensor (main).
  - Output voltage should be between 0.3 and 0.7 volt when the throttle valve is fully closed with your finger.
  - Output voltage should be 4.0 volts or more when the throttle valve is fully open with your finger.
(6) 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.00-14.
NO : Go to Step 3.

TSB Revision

STEP 3. Check for intake system vacuum leak.

Q: Are there any abnormalities?

YES : Repair it. Then go to Step 6.
NO : Go to Step 4.

STEP 4. Check for foreign matter being around the mass airflow sensor.

Q: Are there any foreign matter?

YES : Repair it. Then go to Step 6.
NO : Go to Step 5.

STEP 5. Check the trouble symptoms.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle Pattern 17 P.13C-11.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P1233 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 6.
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.00-14.

STEP 6. 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.13C-11.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P1233 set?

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

DTC P1234: Throttle Position Sensor (Sub) Plausibility

TECHNICAL DESCRIPTION

Compare the actual measurement of volumetric efficiency by a mass airflow sensor signal with volumetric efficiency estimated from a throttle position sensor (sub) signal.

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

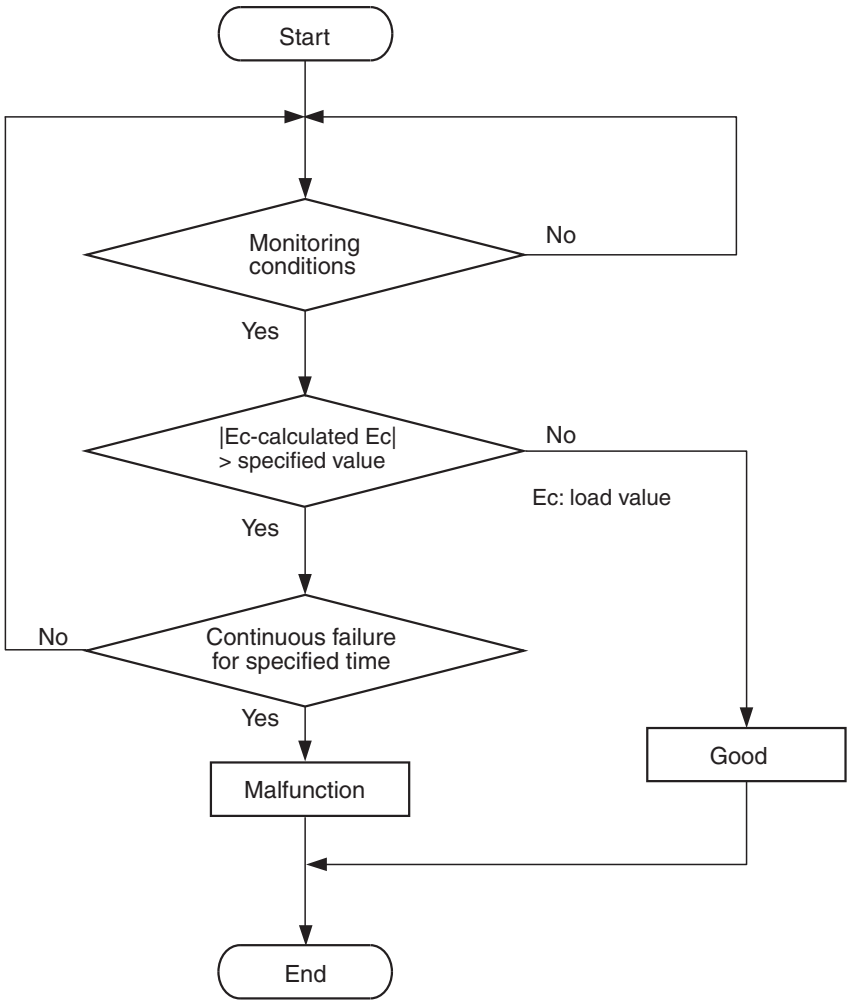
Sensor (The sensor below is determined to be normal)

- Not applicable

TSB Revision

DTC SET CONDITIONS

Logic Flow Chart



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Check Conditions

- The difference between the actual volumetric efficiency and the volumetric efficiency estimated by the throttle position sensor (sub) is 0 percent or more. Or, the volumetric efficiency is 60 percent or less.
- The engine speed is between 750 and 3,000 r/min. Or, the throttle position sensor (main) output voltage is 3 volts or less.

Judgment Criterion

- For 0.4 second, the difference between the actual volumetric efficiency and the volumetric efficiency estimated by the throttle position sensor (sub) is 33 percent or more.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle Pattern 17 P.13C-11.

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

- Throttle position sensor (sub) system failed.
- Intake system vacuum leak.
- There is some trash around mass airflow sensor.
- ECM failed.

TSB Revision

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

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

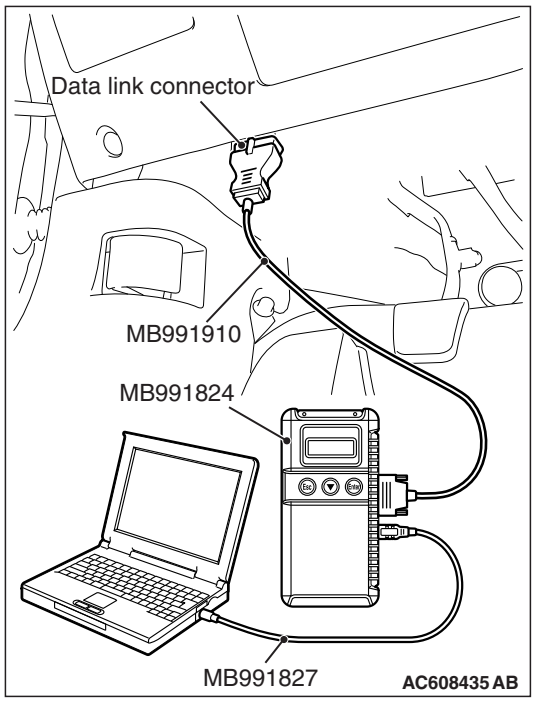
⚠ CAUTION

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 the diagnostic trouble code other than P1234 set?

YES : Refer to, Diagnostic Trouble Code Chart P.13C-48.
NO : Go to Step 2.



STEP 2. Using scan tool MB991958, check data list item 15: Throttle Position Sensor (sub).

(1) Turn the ignition switch to the "ON" position.
(2) Detach the intake air hose at the throttle body.
(3) Disconnect the connector of the throttle position sensor.
(4) Use test harness special tool (MB991658) to connect only terminals No. 3, No. 4, No. 5, and No. 6.
(5) Set scan tool MB991958 to the data reading mode for item 15, Throttle Position Sensor (sub).
  - Output voltage should be 4.0 volts or more when the throttle valve is fully closed with your finger.
  - Output voltage should be 1.0 volt or less when the throttle valve is fully open with your finger.
(6) 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.00-14.
NO : Go to Step 3.

TSB Revision

STEP 3. Check for intake system vacuum leak.

Q: Are there any abnormalities?

YES : Repair it. Then go to Step 6.
NO : Go to Step 4.

STEP 4. Check for foreign matter being around the mass airflow sensor.

Q: Are there any foreign matter?

YES : Repair it. Then go to Step 6.
NO : Go to Step 5.

STEP 5. Check the trouble symptoms.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle Pattern 17 P.13C-11.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P1234 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. The go to Step 6.
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.00-14.

STEP 6. 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.13C-11.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P1234 set?

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

DTC P1235: Mass Airflow Sensor Plausibility

TECHNICAL DESCRIPTION

Compare the actual measurement of volumetric efficiency by a mass airflow sensor signal with volumetric efficiency estimated from a throttle position sensor (main or sub) signal.

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

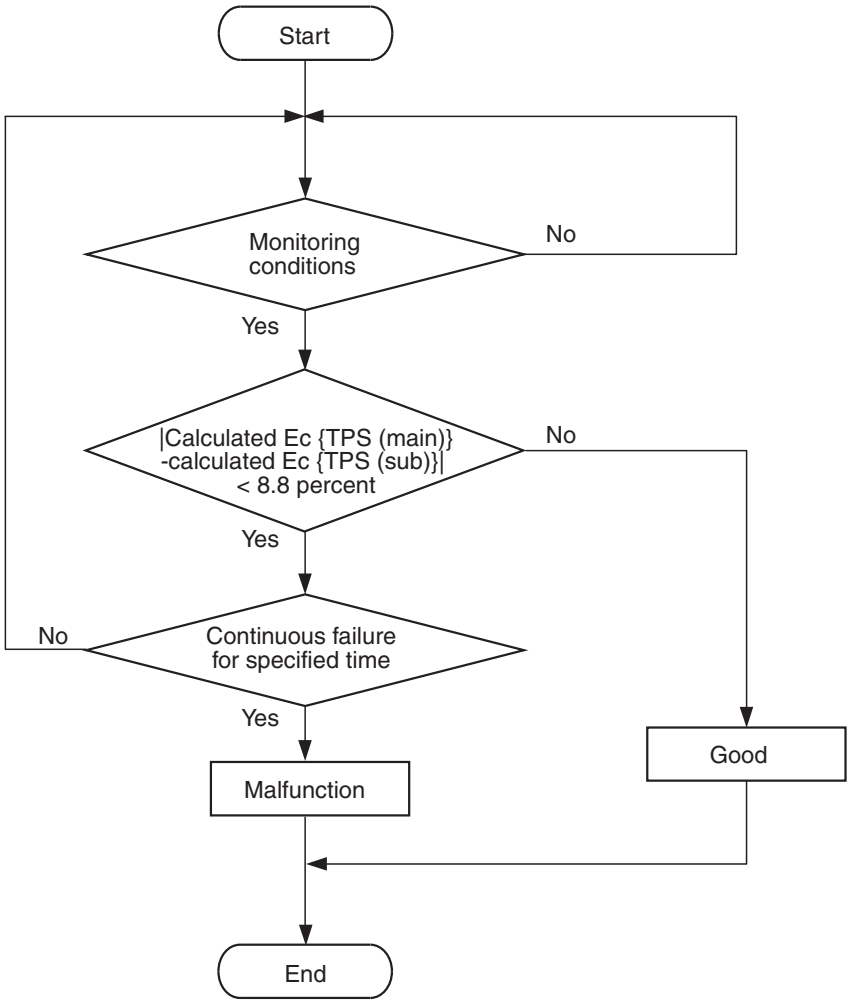
Sensor (The sensor below is determined to be normal)

- Not applicable

TSB Revision

DTC SET CONDITIONS

Logic Flow Chart



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Check Conditions

- The plausibility error of the throttle position sensor (main) is detected.
- The plausibility error of the throttle position sensor (sub) is detected.

Judgment Criterion

- For 0.36 second, the difference between the volumetric efficiency estimated by the throttle position sensor (main) and the volumetric efficiency estimated by the throttle position sensor (sub) is 8.8 percent or less.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle Pattern 17 P.13C-11.

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

- Mass airflow sensor system failed.
- Intake system vacuum leak.
- There is some trash around mass airflow sensor.
- ECM failed.

TSB Revision

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

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

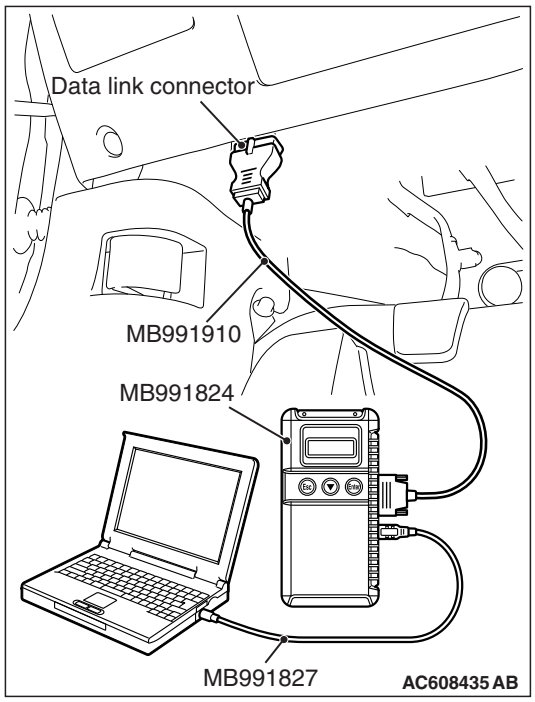
⚠ CAUTION

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 the diagnostic trouble code other than P1235 set?

YES : Refer to, Diagnostic Trouble Code Chart P.13C-48.
NO : Go to Step 2.



STEP 2. Using scan tool MB991958, check data list item 10: Mass Airflow Sensor.

(1) Start the engine and run at idle.
(2) Set scan tool MB991958 to the data reading mode for item 10, Mass Airflow Sensor.
(3) Warm up the engine to normal operating temperature: 80°C to 95°C (176°F to 203°F).
  - The standard value during idling should be between 1,350 and 1,670 mV.
  - When the engine is revved, the mass airflow rate should increase according to the increase in engine speed.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

YES : Go to Step 3.
NO : Refer to, DTC P0101 – Mass Airflow Circuit Range/Performance Problem P.13C-145, DTC P0102 – Mass Airflow Circuit Low Input P.13A-153, DTC P0103 – Mass Airflow Circuit High Input P.13C-158.

STEP 3. Check for intake system vacuum leak.

Q: Are there any abnormalities?

YES : Repair it. Then go to Step 6.
NO : Go to Step 4.

STEP 4. Check for foreign matter being around the mass airflow sensor.

Q: Are there any foreign matter?

YES : Repair it. Then go to Step 6.
NO : Go to Step 5.

STEP 5. Check the trouble symptoms.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle Pattern 17 P.13C-11.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P1235 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 6.
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.00-14.

STEP 6. 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.13C-11.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P1235 set?

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

DTC P1236: A/D Converter

TECHNICAL DESCRIPTION
Monitors whether input voltage from the accelerator pedal position sensor (sub) is normally converted into a digital signal in the ECM.

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.

Judgment Criterion
- When the input voltage from the accelerator pedal position sensor (sub) is periodically 0 V for 0.45 second, the digital value of the input voltage indicates 0.2 V or more.

OBD-II DRIVE CYCLE PATTERN
None.

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

DIAGNOSIS
Required Special Tools:
- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

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

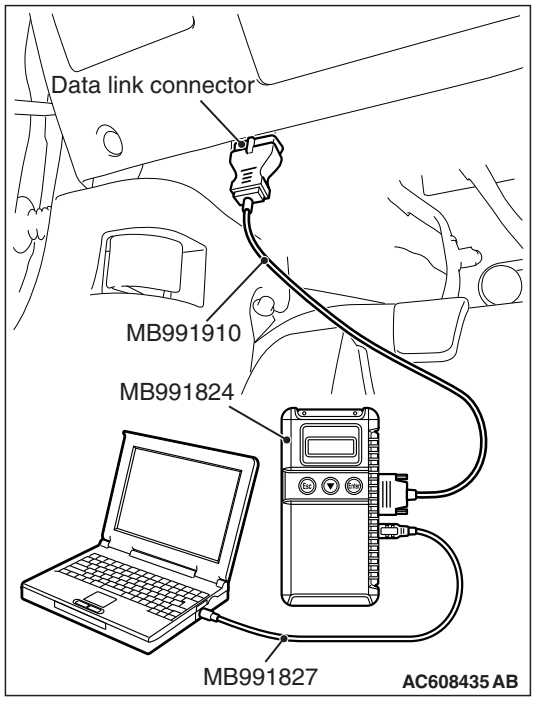
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(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 P1236 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.

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.00-14.



DTC P1237: Accelerator Pedal Position Sensor Plausibility

TECHNICAL DESCRIPTION
Compare the output value of the accelerator pedal position sensor (main) with that of the accelerator pedal position sensor (sub).

MONITOR EXECUTION
Continuous

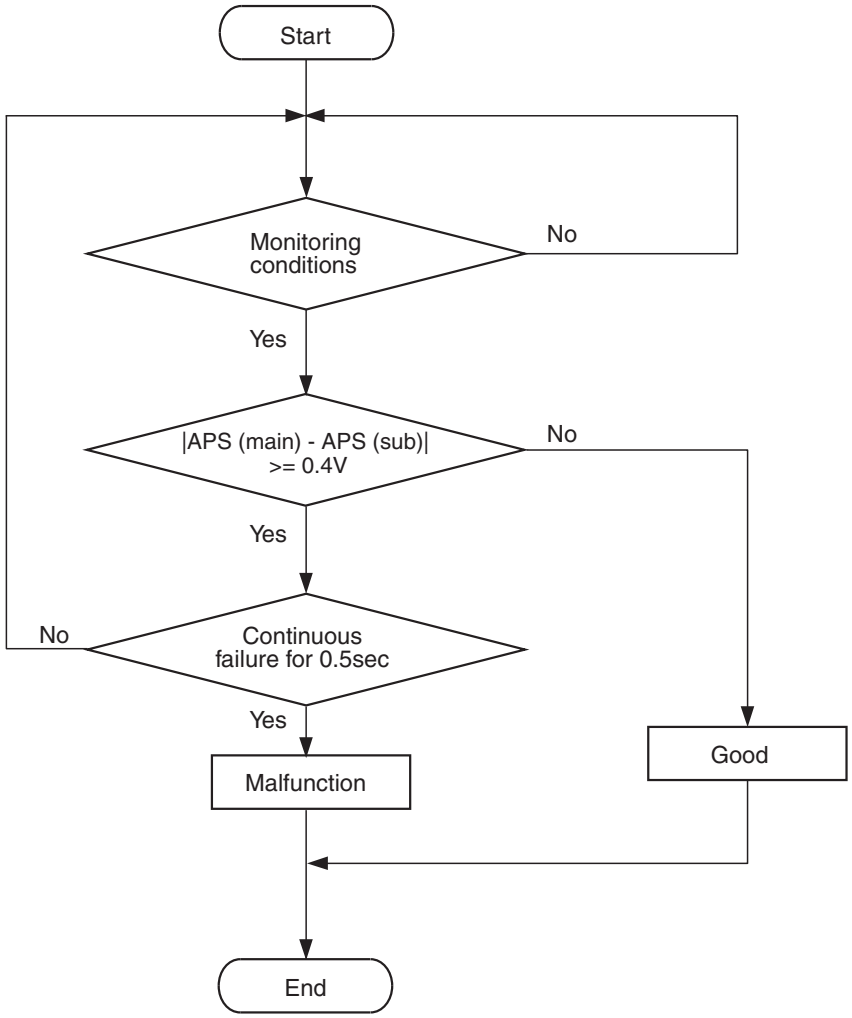
MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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
- Change of accelerator pedal position sensor (sub) output voltage per 40 milliseconds is lower than 0.06 volt.
- Range/performance error of accelerator pedal position sensor (main and sub) circuit is not detected.

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Judgment Criterion

- Voltage obtained with the formula given below is 0.4 volt or higher for 0.5 second: accelerator pedal position sensor (main) output voltage – accelerator pedal position sensor (sub) output voltage.

NOTE: The accelerator pedal position sensor voltage used for the judgement is converted into the accelerator pedal position sensor voltage for the internal processing by the ECM.

OBD-II DRIVE CYCLE PATTERN

None.

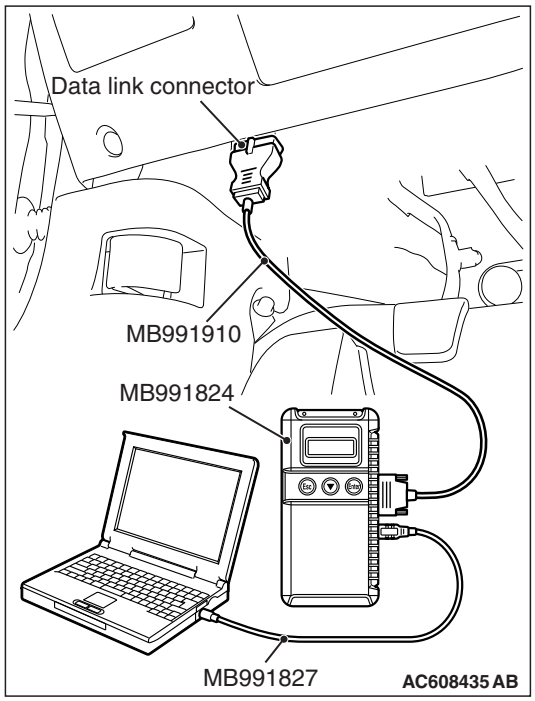
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Accelerator pedal position sensor failed.
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A



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 the diagnostic trouble code other than P1237 set?

YES : Refer to, Diagnostic Trouble Code Chart P.13C-48.
NO : Go to Step 2.

STEP 2. Using scan tool MB991958, check data list.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following item in the data list. Refer to Data List Reference Table P.13C-905.
   a. Item 11: Accelerator pedal position sensor (main)
   b. Item 12: Accelerator pedal position sensor (sub)
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

YES : Go to Step 3.
NO : Repair or replace it. Then go to Step 4.

STEP 3. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) After the DTC has been deleted, read the DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P1237 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. 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.00-14.

STEP 4. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) Read the DTC.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P1237 set?

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

DTC P1238: Mass Airflow Sensor Plausibility (Torque Monitor)

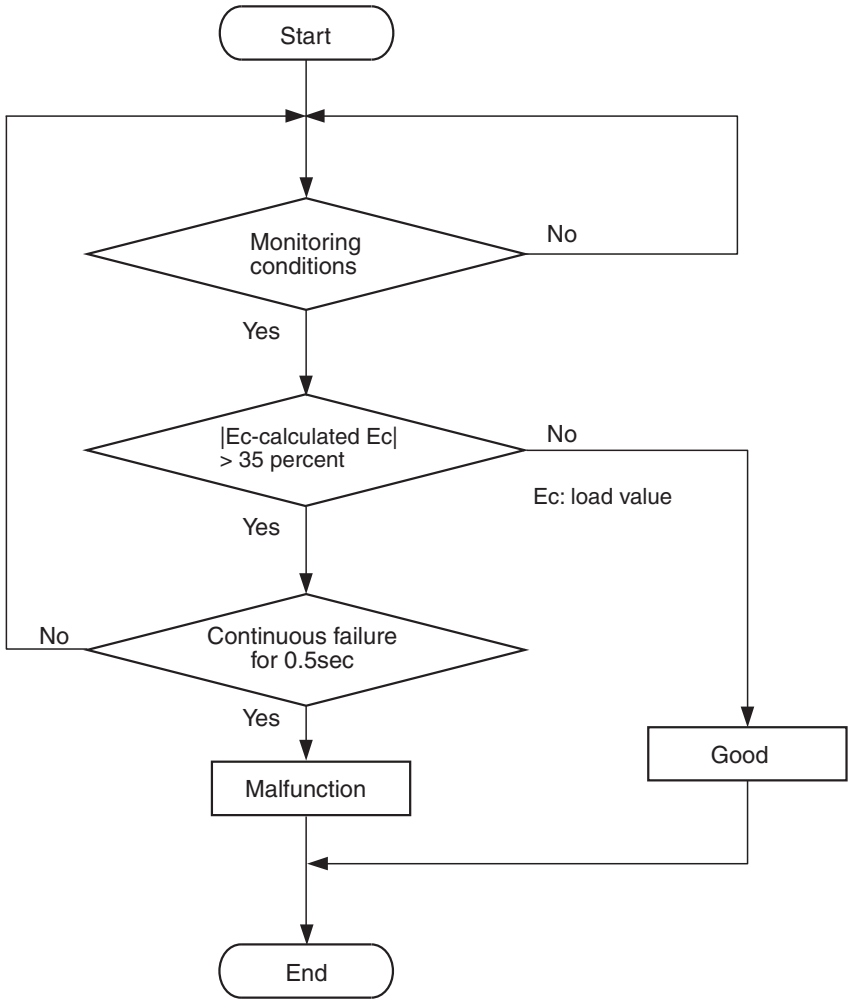
TECHNICAL DESCRIPTION
Compare the actual measurement of volumetric efficiency by a mass airflow sensor signal with volumetric efficiency estimated from a throttle position sensor (main or sub) signal.

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



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Check Conditions
- The difference between the actual volumetric efficiency and the volumetric efficiency estimated by the throttle position sensor (main) is 0 percent or more. Or, the volumetric efficiency is 60 percent or less.
- Engine speed is 750 r/min or higher.

TSB Revision

Judgment Criterion

- For 0.5 second, the difference between the actual volumetric efficiency and the volumetric efficiency estimated by the throttle position sensor (main) is 35 percent or more.

Check Condition

- The difference between the actual volumetric efficiency and the volumetric efficiency estimated by the throttle position sensor (sub) is 0 percent or more. Or, the volumetric efficiency is 60 percent or less.
- Engine speed is 750 r/min or higher.

Judgment Criterion

- For 0.5 second, the difference between the actual volumetric efficiency and the volumetric efficiency estimated by the throttle position sensor (sub) is 35 percent or more.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle Pattern 17 P.13C-11.

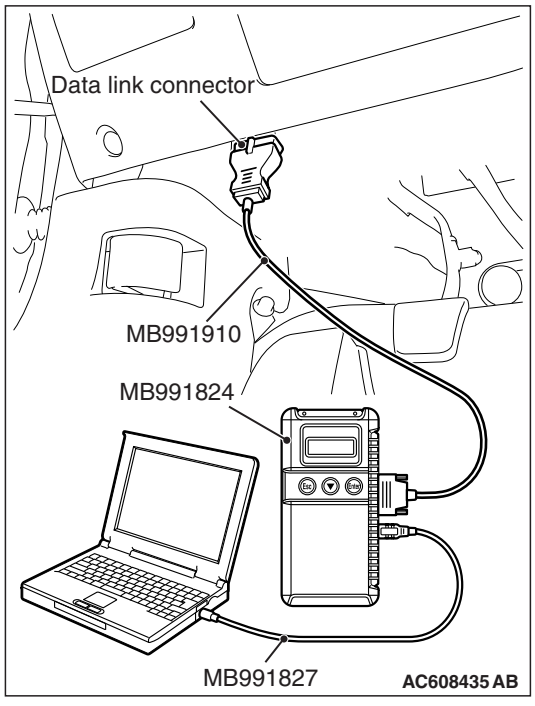
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Mass airflow sensor system failed.
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A



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 the diagnostic trouble code other than P1238 set?

YES : Refer to, Diagnostic Trouble Code Chart P.13C-48.
NO : Go to Step 2.

STEP 2. Using scan tool MB991958, check data list item 10: Mass Airflow Sensor.

(1) Start the engine and run at idle.
(2) Set scan tool MB991958 to the data reading mode for item 10, Mass Airflow Sensor.
(3) Warm up the engine to normal operating temperature: 80°C to 95°C (176°F to 203°F).
- The standard value during idling should be between 1,350 and 1,670 millivolts.
- When the engine is revved, the mass airflow rate should increase according to the increase in engine speed.

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

Q: Is the sensor operating properly?

YES : Go to Step 3.
NO : Refer to, DTC P0101 – Mass Airflow Circuit Range/Performance Problem P.13C-145, DTC P0102 – Mass Airflow Circuit Low Input P.13A-153, DTC P0103 – Mass Airflow Circuit High Input P.13C-158.

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 17 P.13C-11.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P1238 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. 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.00-14.

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 17 P.13C-11.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P1238 set?

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

DTC P1239: Engine RPM Plausibility

TECHNICAL DESCRIPTION

Compares the actual engine speed calculated from the crankshaft position sensor signal cycle with the estimated engine speed calculated from the number of the crankshaft position sensor signal pulses after a lapse of the specified time.

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)

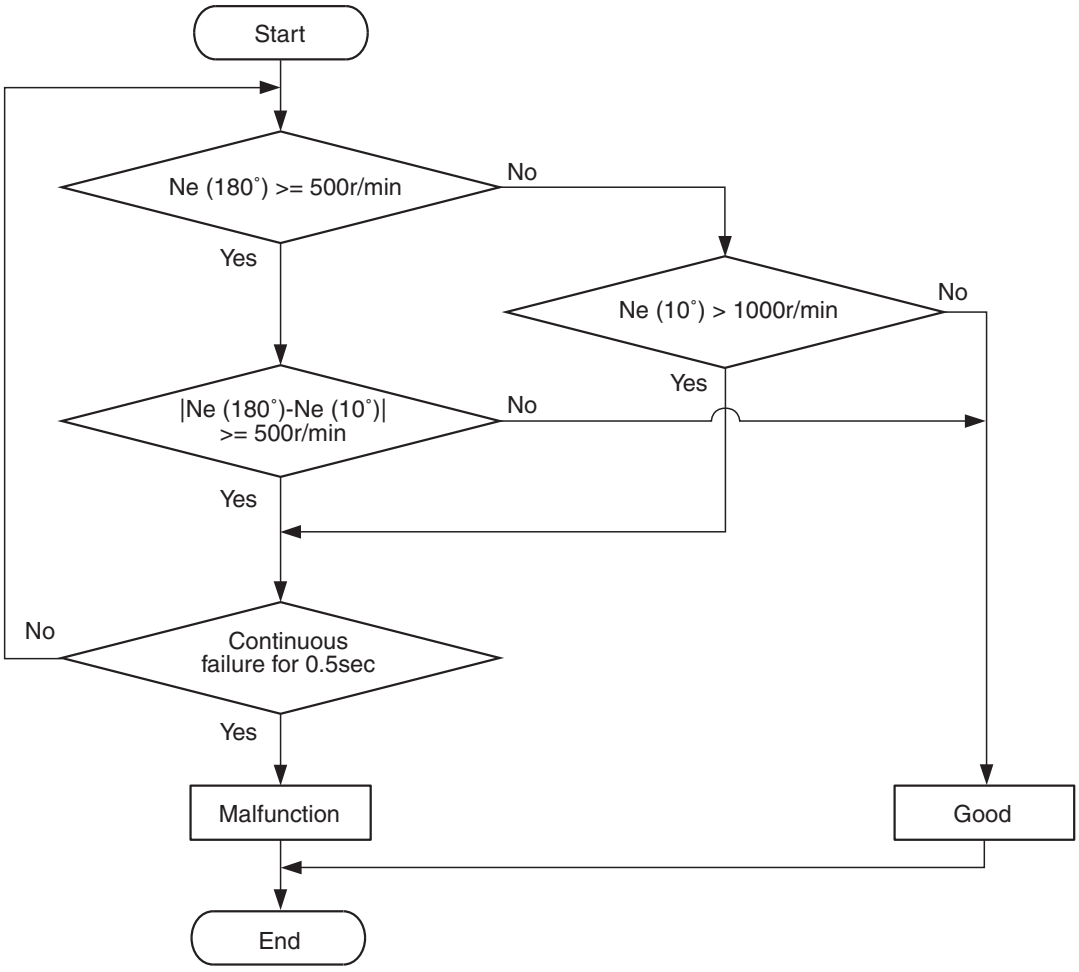
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



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Check Condition

- The engine speed monitored with a 180 degree-cycle pulse is 500 r/min or more.

TSB Revision

Judgment Criterion

- The difference between the engine speed monitored with a 180 degree-cycle pulse and the engine speed monitored with a 10 degree-cycle pulse is 500 r/min or more for 0.5 second.

Check Condition

- The engine speed monitored with a 180 degree-cycle pulse is 500 r/min or less.

Judgment Criterion

- The engine speed monitored with a 10 degree-cycle pulse is 1,000 r/min or more for 0.5 second.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle Pattern 23 P.13C-11.

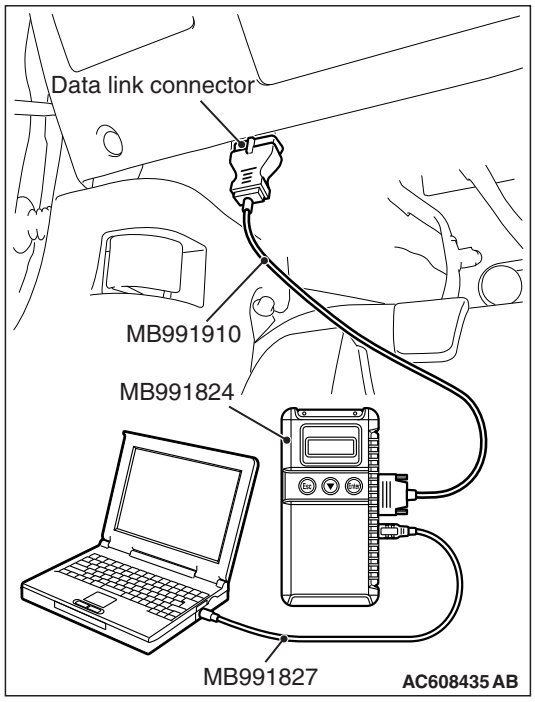
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Crankshaft position sensor system failed.
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A



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 the diagnostic trouble code other than P1239 set?

YES : Refer to, Diagnostic Trouble Code Chart P.13C-48.
NO : Go to Step 2.

STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).
(1) Turn the ignition switch to the "ON" position.
(2) After the DTC has been deleted, read the DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P1239 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. 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.00-14.

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 23 P.13C-11.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P1239 set?

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

DTC P1240: Ignition Angle

TECHNICAL DESCRIPTION

Checks for an abnormal ignition timing retard angle demand signal from the active stability control (ASC).

DTC SET CONDITIONS

Check Condition

- Ignition switch is "ON" position.

Judgment Criterion

- The ignition timing retard angle demand signal is not normal.

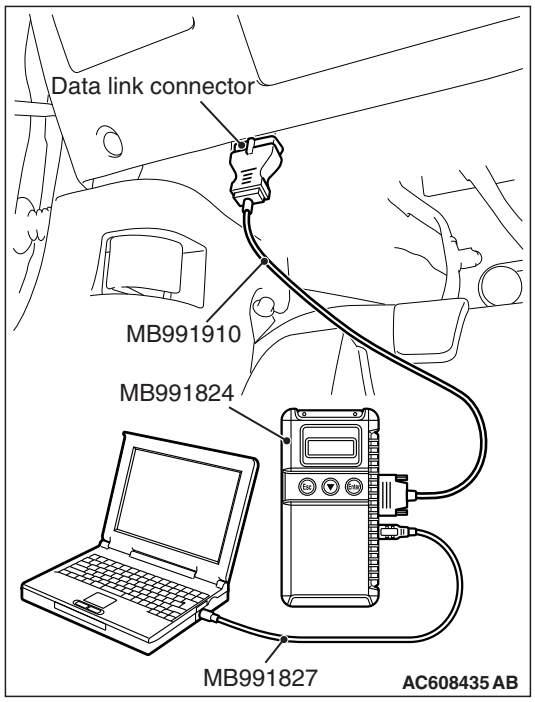
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A



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.

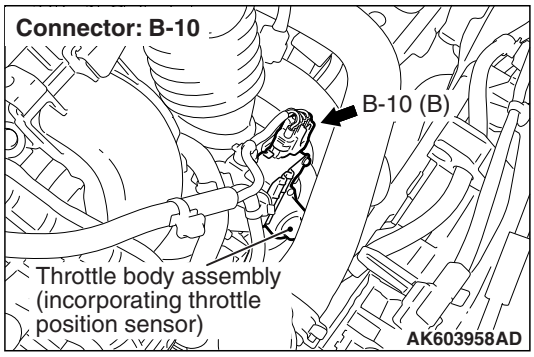
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

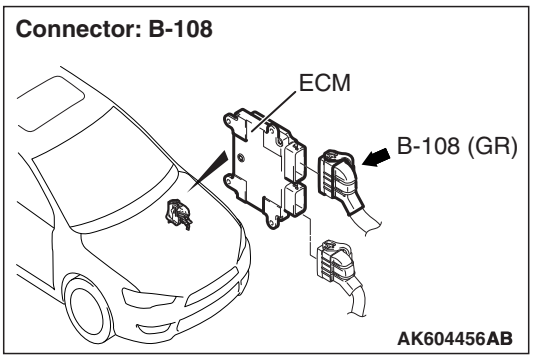
Q: Is the ASC-DTC set?

YES : Refer to GROUP 35C, Diagnosis – Diagnostic Trouble Code Chart P.35C-25.

NO : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.

DTC P1241: Torque Monitoring





TECHNICAL DESCRIPTION

Compares the actual torque signal computed from a mass air flow sensor signal with the driver demand torque signal computed from an accelerator pedal position sensor signal.

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

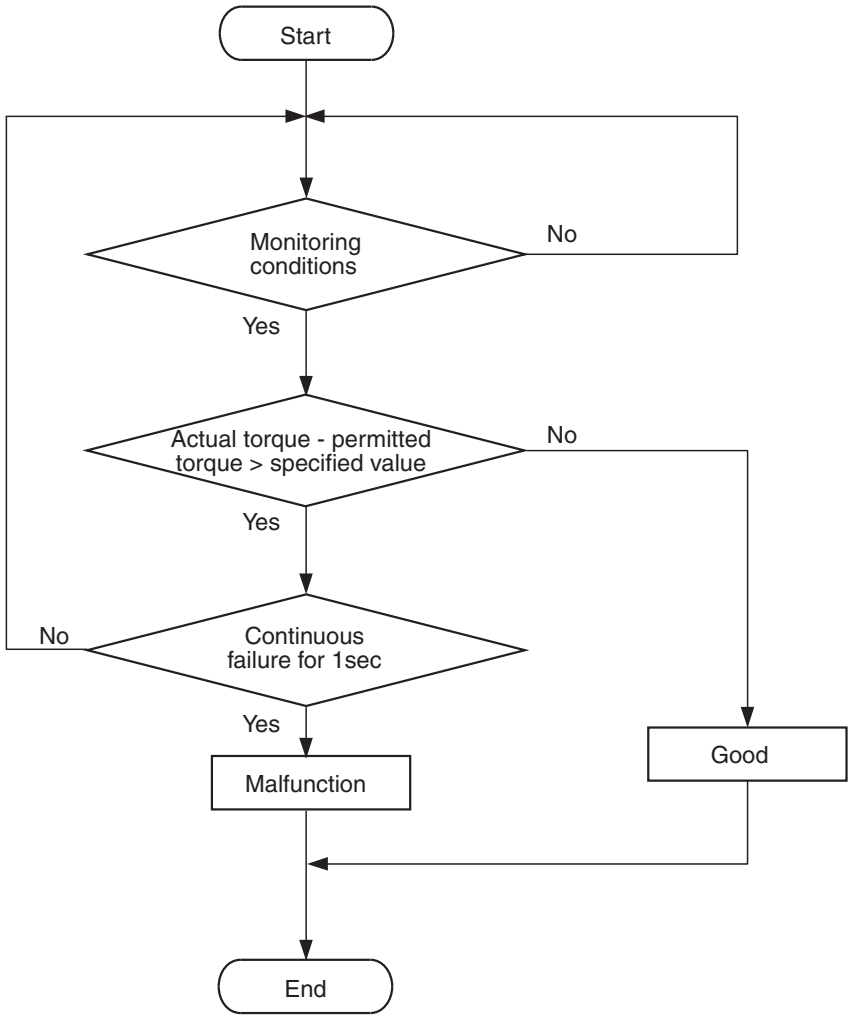
Sensor (The sensor below is determined to be normal)

- Not applicable

TSB Revision

DTC SET CONDITIONS

Logic Flow Chart



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Check Conditions

- Engine speed is 500 r/min or higher.
- Volumetric efficiency is 16 percent or higher.

Judgement Criterion

- For 1 second, the difference between the actual torque signal and the requested torque signal is 50 N·m (37 ft-lb) or more.

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

- Throttle actuator control motor failed.
- Connector damage.
- Harness damage.
- Intake system vacuum leak.
- There is some trash around mass airflow sensor.
- ECM failed

OBD-II DRIVE CYCLE PATTERN

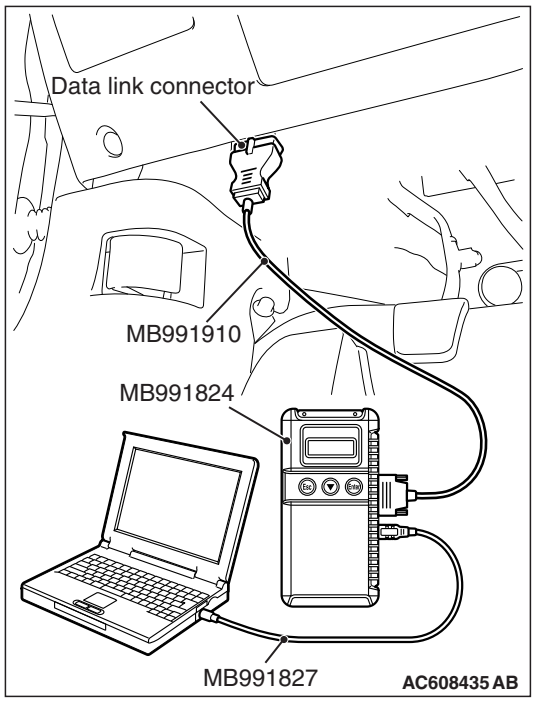
Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 17 P.13C-11.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

TSB Revision



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 the diagnostic trouble code other than P1241 set?

YES : Refer to, Diagnostic Trouble Code Chart P.13C-48.
NO : Go to Step 2.

STEP 2. Using scan tool MB991958, check data list.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following items in the data list. Refer to Data List Reference Table P.13C-905.
   a. Item 10: Mass Airflow Sensor.
   b. Item 11: Accelerator Pedal Position Sensor (main).
   c. Item 12: Accelerator Pedal Position Sensor (sub).
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

YES : Go to Step 3.
NO : Repair or replace it. Then go to Step 10.

STEP 3. Check for intake system vacuum leak.

Q: Are there any abnormalities?

YES : Repair it. Then go to Step 10.
NO : Go to Step 4.

STEP 4. Check for foreign matter being around the mass airflow sensor.

Q: Are there any foreign matter?

YES : Repair it. Then go to Step 10.
NO : Go to Step 5.

STEP 5. Check harness connector B-10 at throttle actuator control motor and harness connector B-108 at ECM for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 6.

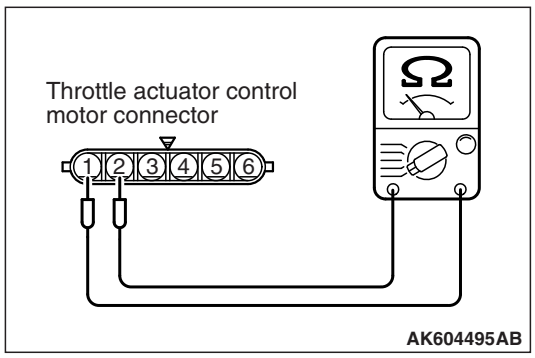
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 10.

STEP 6. Check the throttle actuator control motor.

(1) Disconnect the connector B-10.

(2) Measure the resistance between throttle actuator control motor side connector terminal No. 1 and No. 2.

Standard value: 0.3 – 80 Ω [at 20°C (68°C)]



Q: Is the measured resistance between 0.3 and 80 Ω [at 20°C (68°C)?

YES : Go to Step 7.

NO : Replace the throttle body assembly. Then go Step 10.

STEP 7. Check for harness damage between throttle actuator control motor connector B-10 (terminal No. 1) and PCM connector B-108 (terminal No. 15).

Q: Is the harness wire in good condition?

YES : Go to Step 8.

NO : Repair it. Then go to Step 10.

STEP 8. Check for harness damage between throttle actuator control motor connector B-10 (terminal No. 2) and PCM connector B-108 (terminal No. 16).

Q: Is the harness wire in good condition?

YES : Go to Step 9.

NO : Repair it. Then go to Step 10.

STEP 9. Check the trouble symptoms.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle Pattern 17 P.13C-11.

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

Q: Is DTC P1241 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 10.

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.00-14.

TSB Revision

STEP 10. 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.13C-11.

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

Q: Is DTC P1241 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P1242: Fail Safe Control Monitor

TECHNICAL DESCRIPTION

Monitors the engine speed during fail-safe control.

DTC SET CONDITIONS

Check Condition

- During fail safe control.

Judgment Criterion

- The engine speed is higher than assumed.

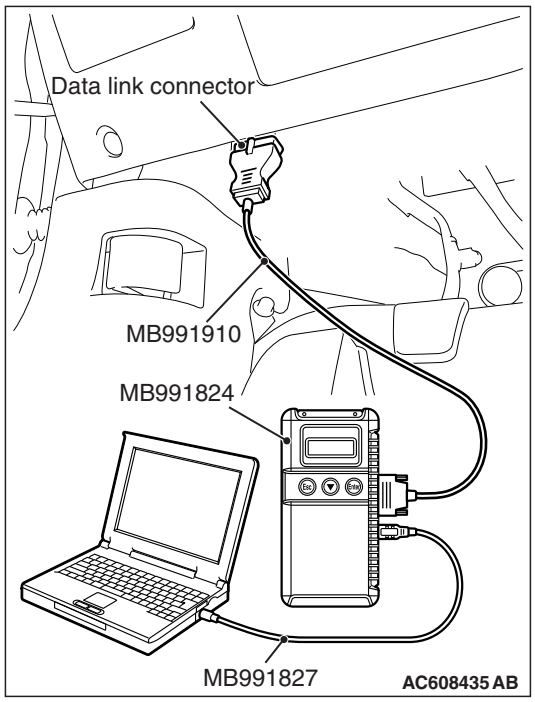
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A



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 the diagnostic trouble code other than P1242 set?

YES : Refer to, Diagnostic Trouble Code Chart P.13C-48.
NO : Go to Step 2 .

STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) After the DTC has been deleted, read the DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P1242 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.
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.00-14.

DTC P1243: Inquiry/Response Error

TECHNICAL DESCRIPTION

Monitors the computation function of the ECM.

DTC SET CONDITIONS

Check Condition

- Ignition switch is "ON" position.

Judgment Criterion

- ECM can not calculate input data.

TSB Revision

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

- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

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

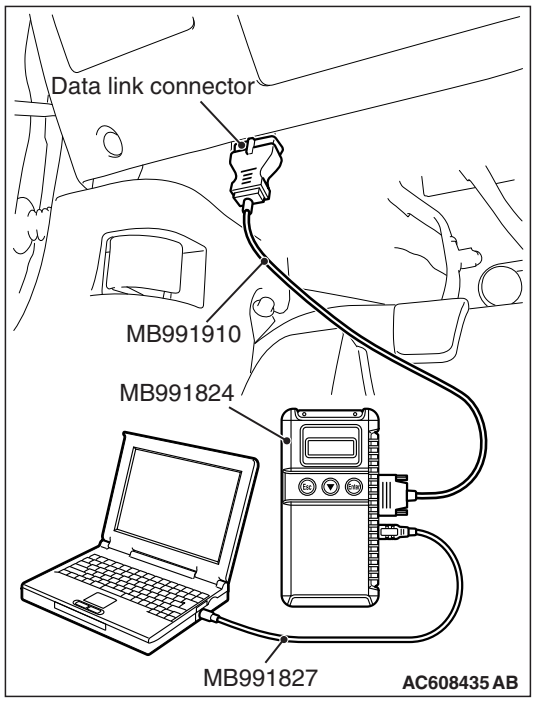
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(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 P1243 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.

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.00-14.



DTC P1244: RAM Test For All Area

TECHNICAL DESCRIPTION

Monitors the computation function of the ECM periodically.

DTC SET CONDITIONS

Check Condition

- Ignition switch is "ON" position.

Judgment Criterion

- All RAM data of ECM are defect.

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

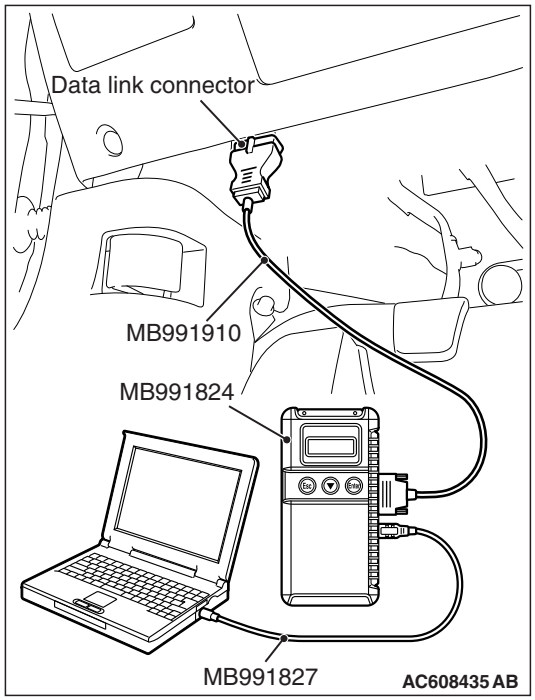
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)

- MB991824: V.C.I.
- MB991827: USB Cable
- MB991910: Main Harness A



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 P1244 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.

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.00-14.

DTC P1245: Cycle RAM Test (Engine)

TECHNICAL DESCRIPTION

Monitors the computation function of the ECM periodically.

DTC SET CONDITIONS

Check Condition

- Ignition switch is "ON" position.

Judgment Criterion

- RAM data (engine) is defect.

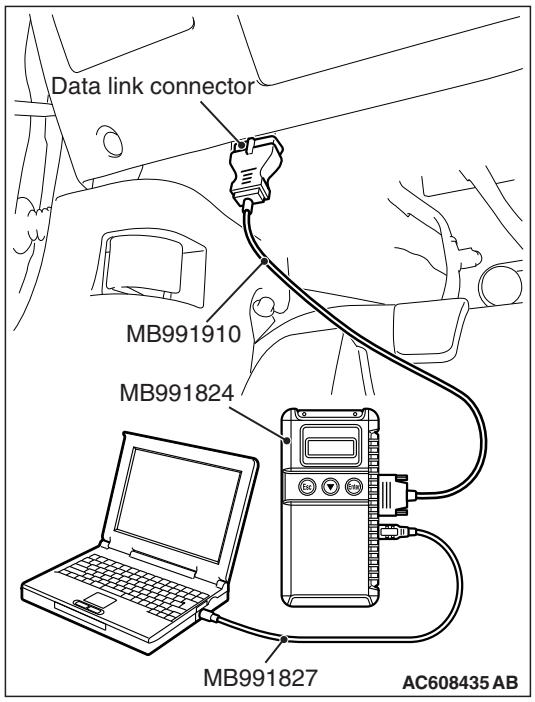
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A



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 P1245 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.

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.00-14.

DTC P1247: CVT Plausibility <CVT>

TECHNICAL DESCRIPTION
Checks for an abnormal signal of TCM.

DTC SET CONDITIONS

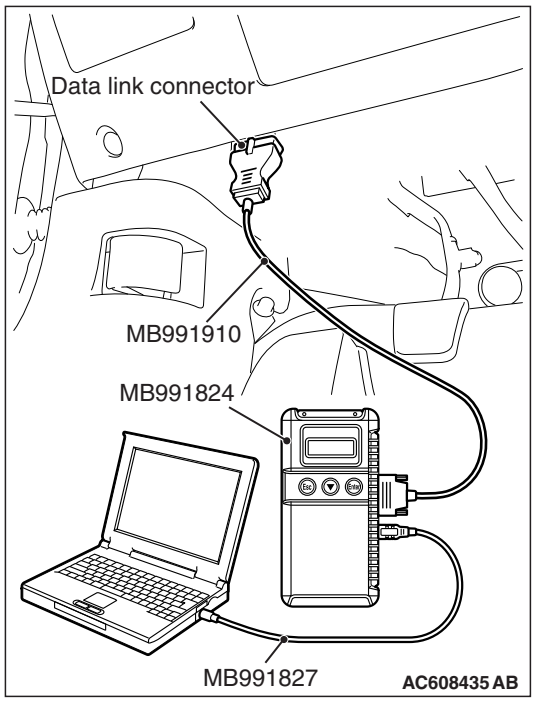
Check Condition
- Ignition switch is "ON" position.

Judgment Criterion
- A torque demand signal from TCM is not normal.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)
- CVT system failed.
- ECM failed.

DIAGNOSIS

Required Special Tools:
- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A



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

Q: Is the CVT-DTC set?

YES : Refer to GROUP 23A, Diagnosis – Diagnostic Trouble Code Chart P.23A-30.
NO : Go to Step 2 .

STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) After the DTC has been deleted, read the DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P1247 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.
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.00-14.

DTC P1506: Idle Control System RPM Lower Than Expected at Low Temperature

TECHNICAL DESCRIPTION

- The amount of air taken in during idling is regulated by the opening and closing of the throttle valve.
- The ECM 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)

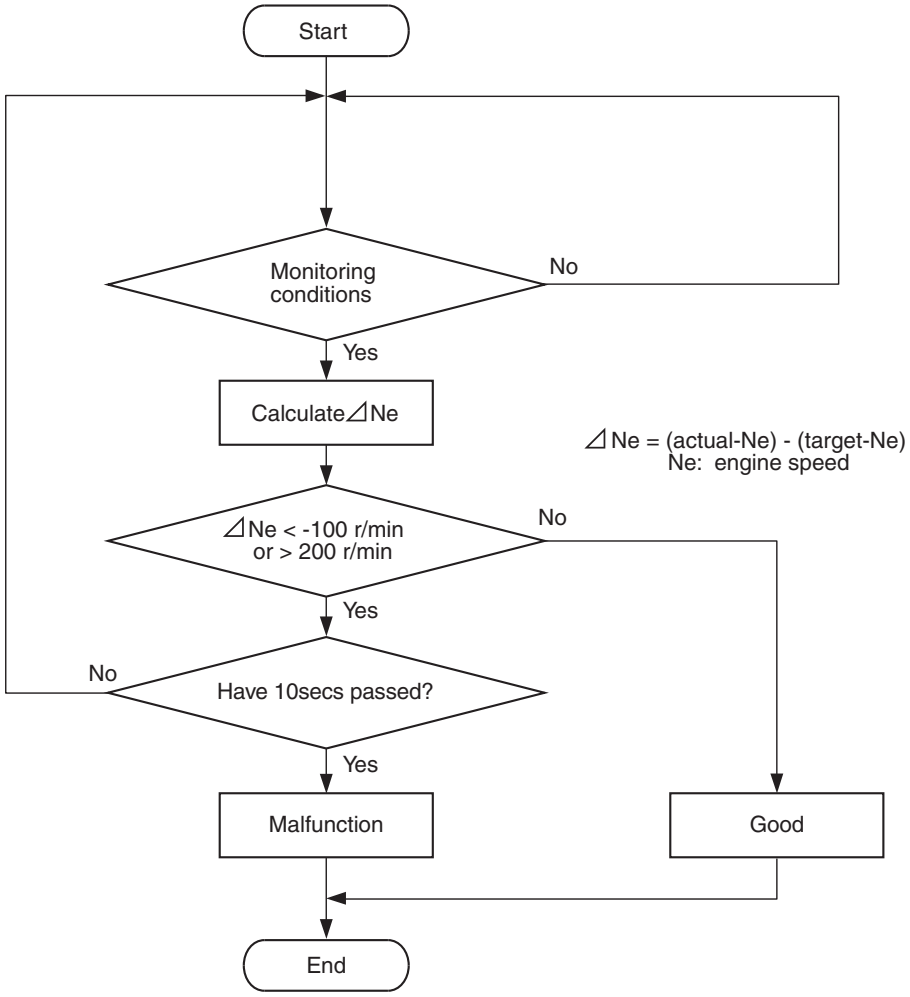
- Misfire monitor
- Exhaust gas recirculation (EGR) system monitor
- Fuel system monitor
- Vehicle speed sensor monitor <M/T>

Sensor (The sensor below is determined to be normal)

- Mass airflow sensor
- Engine coolant temperature sensor
- Intake air temperature sensor
- Barometric pressure sensor
- Throttle position sensor

DTC SET CONDITIONS

Logic Flow Chart



AK704413

TSB Revision

Check Conditions

- Under the closed loop idle speed control.
- The engine coolant temperature is between 7°C (45°F) and 41°C (106°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).
- More than 3 seconds have elapsed from the previous monitoring.
- Target air flow rate is more than 30 L/sec.

Judgment Criterion

- The actual idle speed is more than 100 r/min lower than the target idle speed for 10 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 18 P.13C-11.

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

- Throttle valve area is dirty.
- Throttle body assembly failed.
- ECM failed.

DIAGNOSIS

Required Special Tools

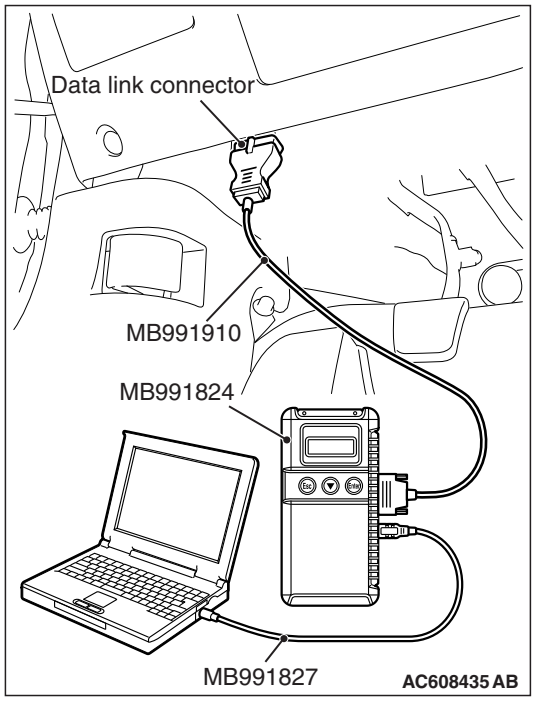
- MB991958: Scan tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

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 the diagnostic trouble code other than P1506 set?

YES : Refer to Diagnostic Trouble Code Chart P.13C-48.
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 Throttle body (throttle valve area) cleaning P.13A-961. Then go to Step 4.
NO : Go to Step 3.

TSB Revision

STEP 3. Replace the throttle body assembly.

(1) Replace the throttle body assembly.
(2) Carry out test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 18 P.13C-11.
(3) Check the diagnostic trouble code (DTC).

Q: Is DTC P1506 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 4.
NO : The inspection is complete.

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.13C-11.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P1506 set?

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

DTC P1507: Idle Control System RPM Higher Than Expected at Low Temperature

TECHNICAL DESCRIPTION

- The amount of air taken in during idling is regulated by the opening and closing of the throttle valve.
- The ECM 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)

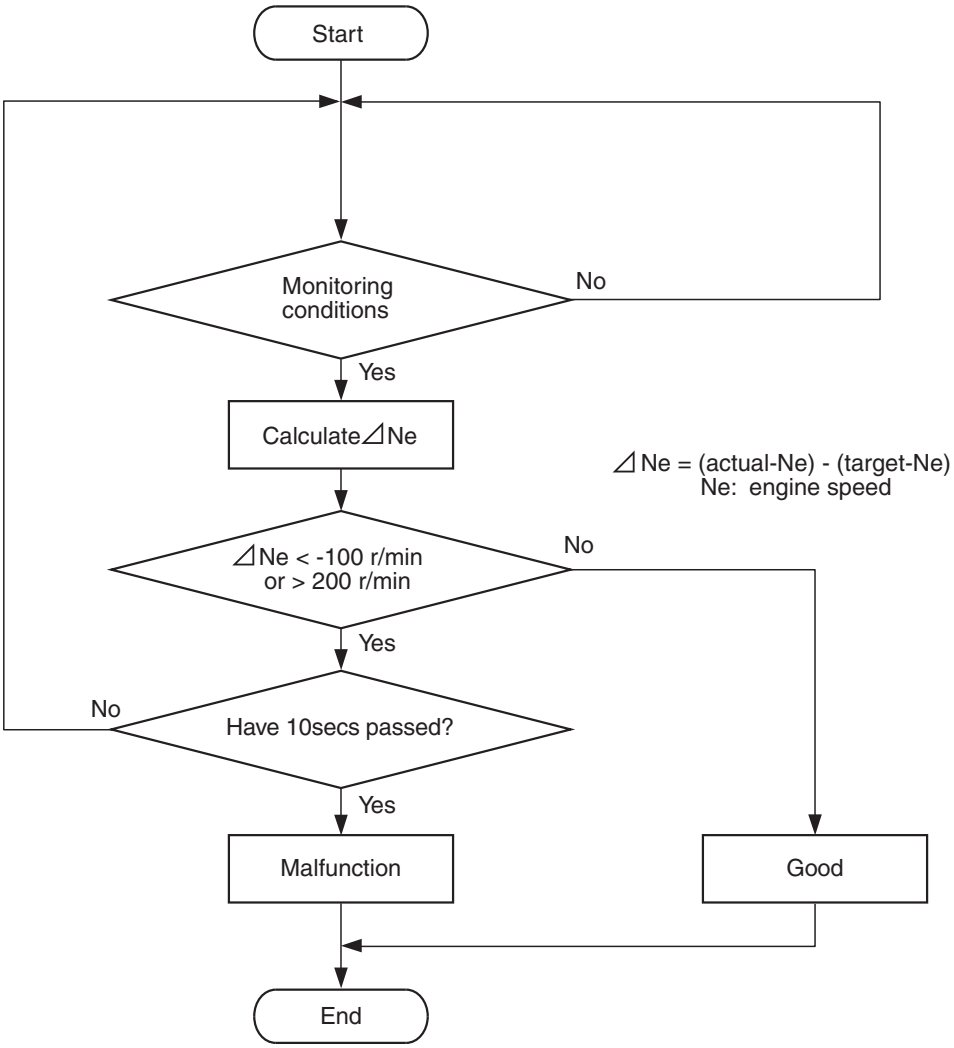
- Misfire monitor
- Exhaust gas recirculation (EGR) system monitor
- Fuel system monitor
- Vehicle speed sensor monitor <M/T>

Sensor (The sensor below is determined to be normal)

- Mass airflow sensor
- Engine coolant temperature sensor
- Intake air temperature sensor
- Barometric pressure sensor
- Throttle position sensor

DTC SET CONDITIONS

Logic Flow Chart



AK704413

Check Conditions

- Under the closed loop idle speed control.
- Engine coolant temperature is between 7°C (45°F) and 41°C (106°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).
- More than 3 seconds have elapsed from the previous monitoring.
- Target air flow rate is 0 L/sec.

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 10 seconds.

*: Specs in parentheses are applicable if the maximum air temperature during the previous operation was more than 45°C (113°F).

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 18 P.13C-11.

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

- Intake system vacuum leak.
- ECM failed.
- Throttle body assembly failed.

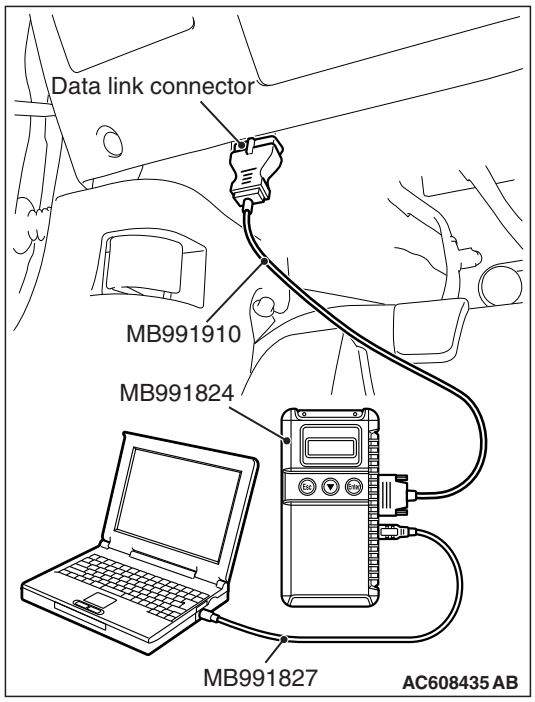
TSB Revision

DIAGNOSIS

Required Special Tools

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

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 the diagnostic trouble code other than P1507 set?

YES : Refer to Diagnostic Trouble Code Chart P.13C-48.
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. Replace the throttle body assembly.

(1) Replace the throttle body assembly.
(2) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 18 P.13C-11.
(3) Check the diagnostic trouble code (DTC).

Q: Is DTC P1507 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 4.
NO : The inspection is complete.

TSB Revision

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.13C-11.

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

Q: Is DTC P1507 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P1590: TCM to ECM Communication Error in Torque Reduction Request

TECHNICAL DESCRIPTIONS OF MONITOR METHODS

The ECM checks whether the errors in data communications sent by the TCM exist 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)

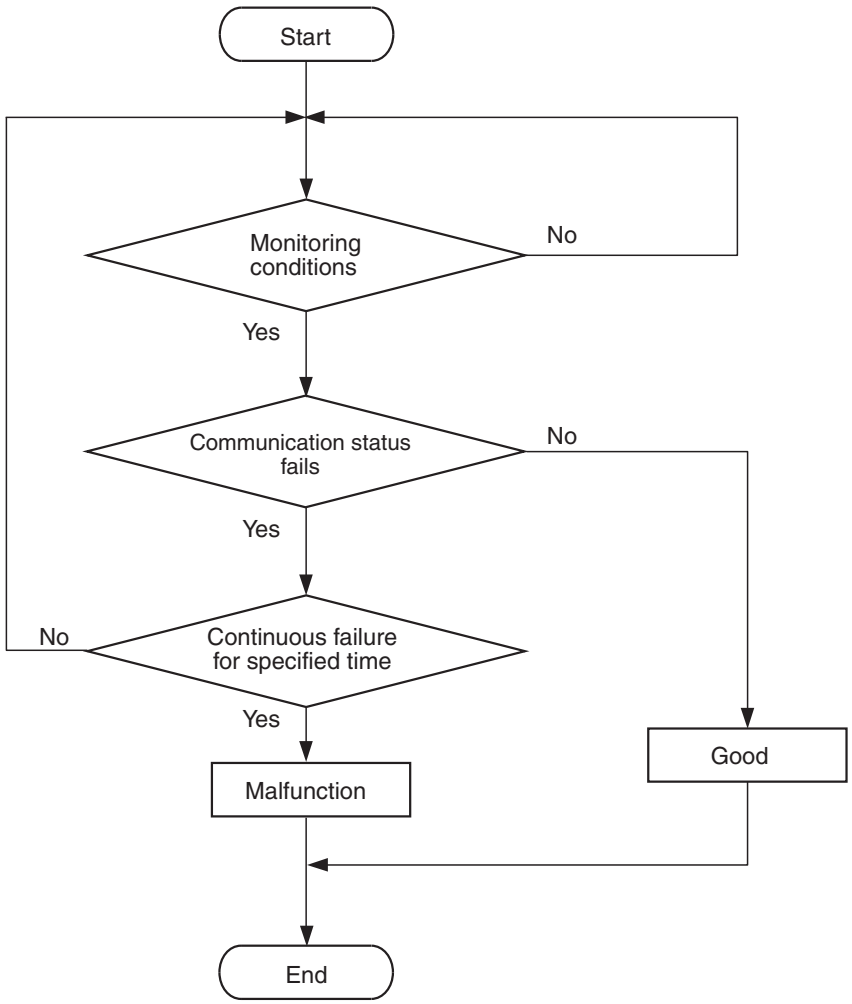
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK604369

Check Condition

- Ignition switch is "ON" position.

Judgment Criterion

- ECM detects an error in communication between ECM and TCM.

OBD-II DRIVE CYCLE PATTERN

None.

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

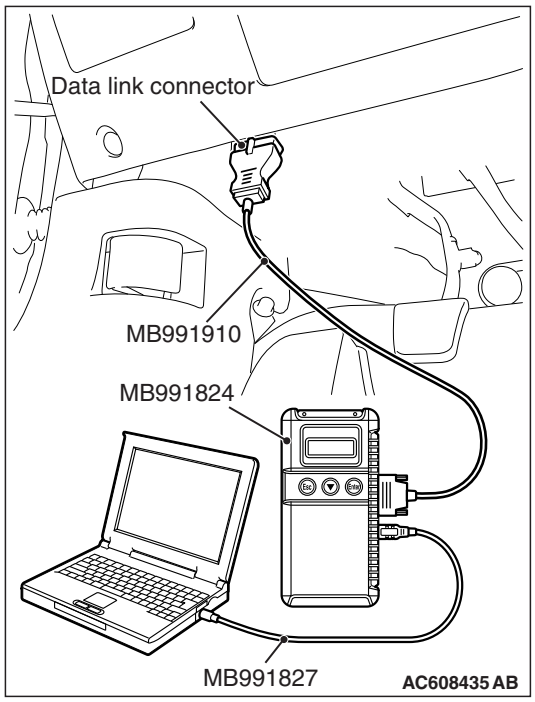
- CAN line harness damage or connector damage.
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

TSB Revision



STEP 1. Using scan tool MB991958, diagnose CAN bus line.

⚠ 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) Diagnose CAN bus line.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the CAN bus line normal?

YES : Go to Step 2 .
NO : Repair the CAN bus line. Refer to GROUP 54C, Can Bus Diagnostics Table P.54C-17.

STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).

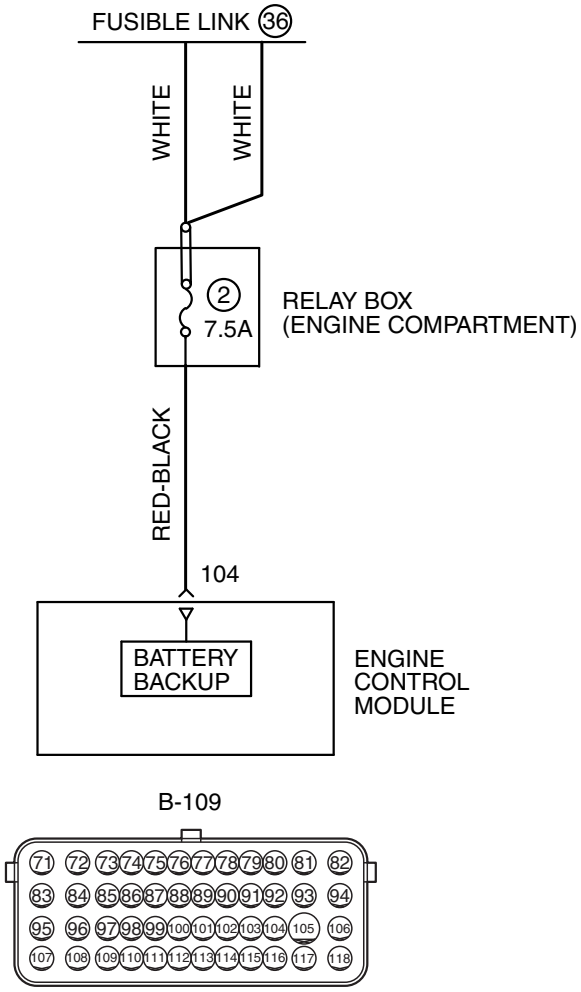
(1) Turn the ignition switch to the "ON" position.
(2) Read the DTC.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P1590 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.
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.00-14.

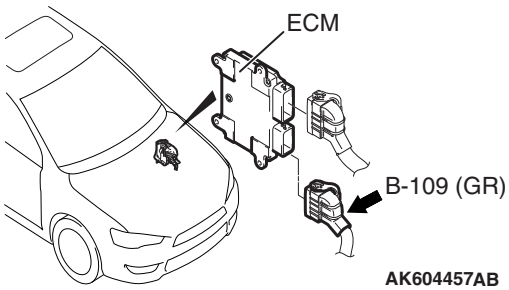
DTC P1603: Battery Backup Line Malfunction

BATTERY BACKUP CIRCUIT



AK604256AB

Connector: B-109



AK604457AB

TECHNICAL DESCRIPTION

- The ECM 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.

TSB Revision

MONITOR EXECUTION
Continuous

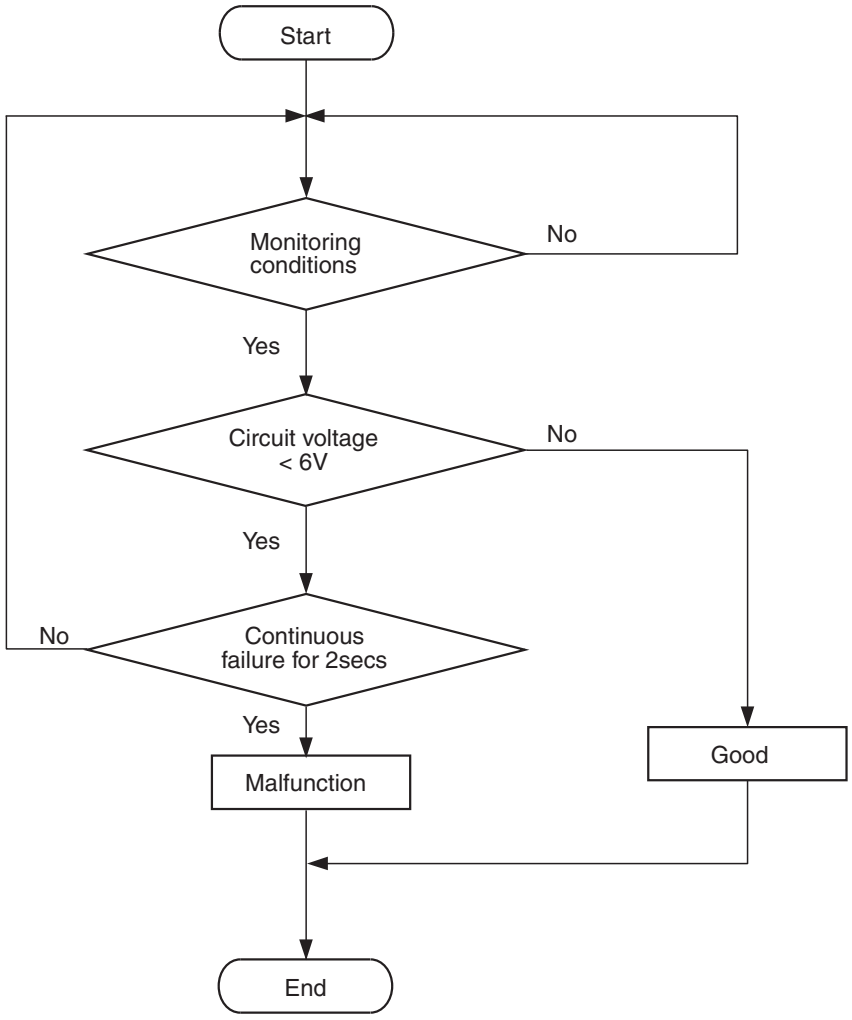
MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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



AK604357

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 6 volts or lower for 2 seconds.

OBD-II DRIVE CYCLE PATTERN

None.

TSB Revision

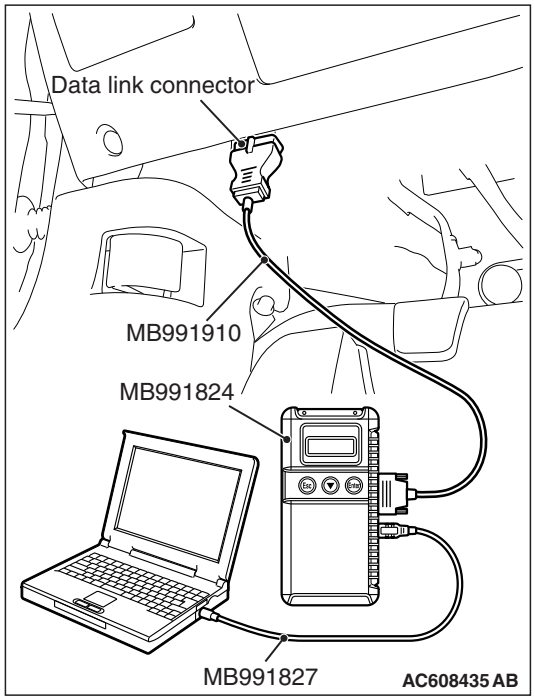
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Open or shorted battery backup line, harness damage or connector damage.
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MB992110: Power Plant ECU Check Harness



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 : 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.00-14.

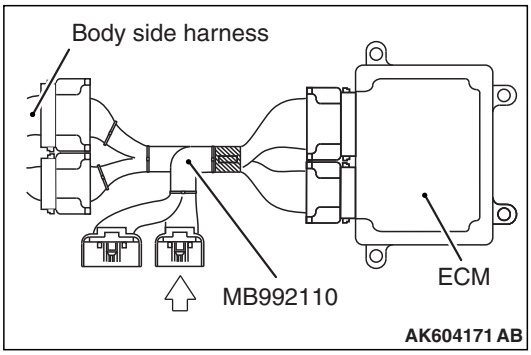
STEP 2. Check harness connector B-109 at ECM for damage.

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. Measure the backup power supply voltage at ECM connector B-109 by using power plant ECU check harness special tool MB992110.

(1) Disconnect all ECM connectors. Connect the power plant ECU check harness special tool MB992110 between the separated connectors.

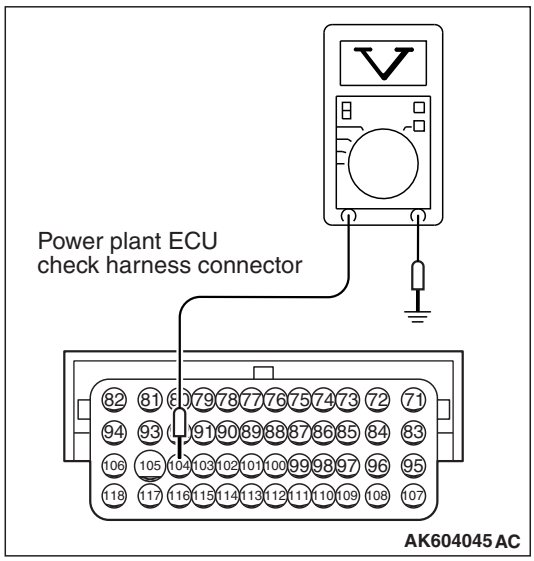


(2) Measure the voltage between terminal No. 104 and ground.
- Voltage should be battery positive voltage.

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

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 5.

NO : Go to Step 4.



STEP 4. Measure the backup power supply voltage at ECM harness side connector B-109.

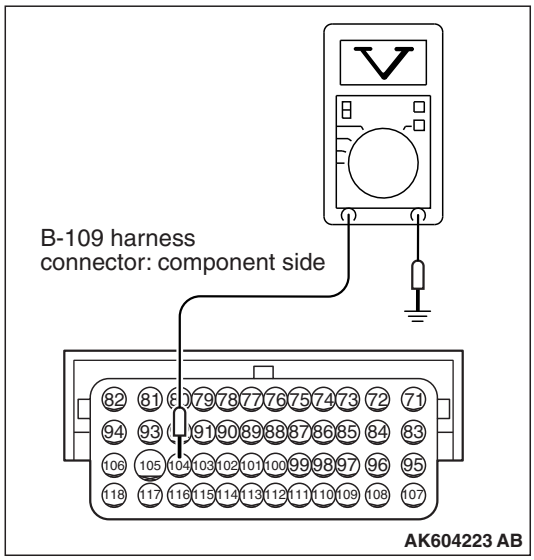
(1) Disconnect the ECM connector B-109 and measure at the harness side.

(2) Measure the voltage between terminal No. 104 and ground.
- Voltage should be battery positive voltage.

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

YES : Repair harness wire between battery and ECM connector B-109 (terminal No. 104) because of harness damage. Then go to Step 5.

NO : Repair harness wire between battery and ECM connector B-109 (terminal No. 104) because of open circuit or short circuit to ground. Then go to Step 5.



STEP 5. Using scan tool MB991958, read the diagnostic trouble code (DTC).
(1) Turn the ignition switch to the "ON" position.
(2) Read the DTC.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P1603 set?

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

DTC P1676: Variant Coding

TECHNICAL DESCRIPTION

- The ECM performs proper engine control based on vehicle information entered.
- A vehicle identification number (VIN) is entered at a plant before shipment. This diagnosis code occurs when no vehicle information is entered during ECM replacement.

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)

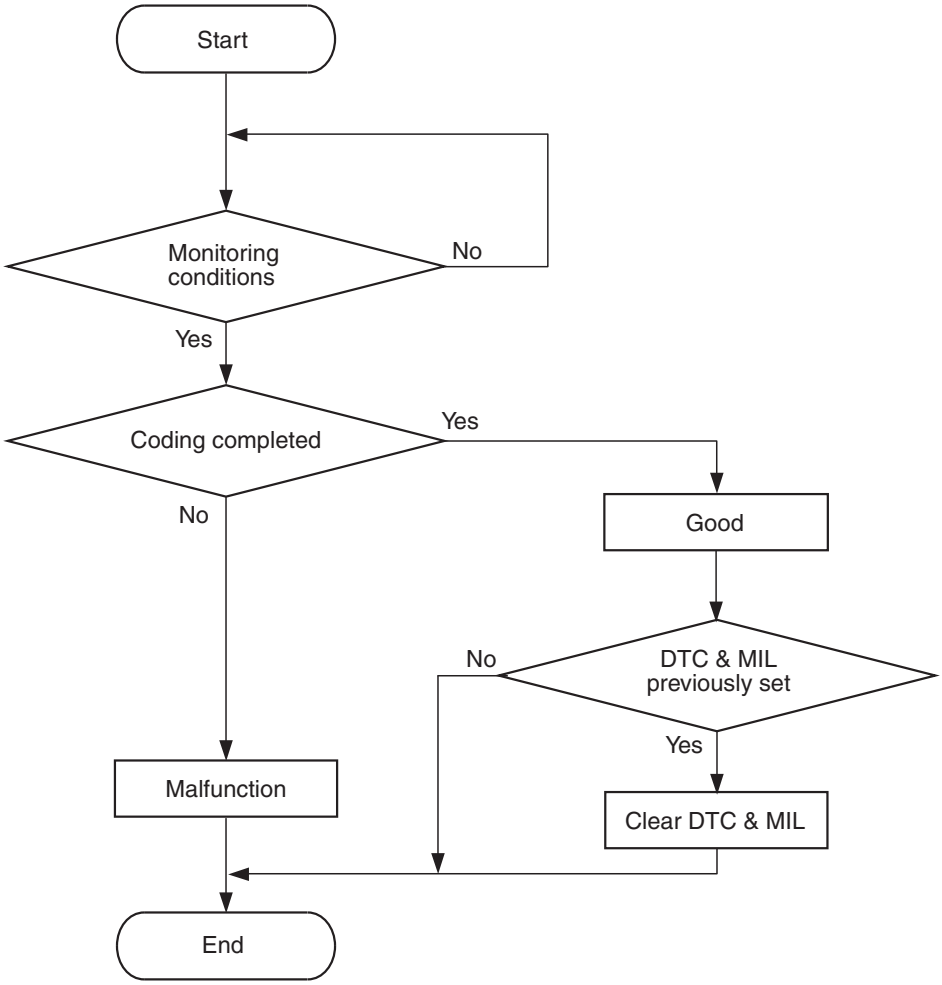
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK604358

Check Condition
- Ignition switch is "ON" position.

Judgment Criterion
- Vehicle information is not entered into the ECM.

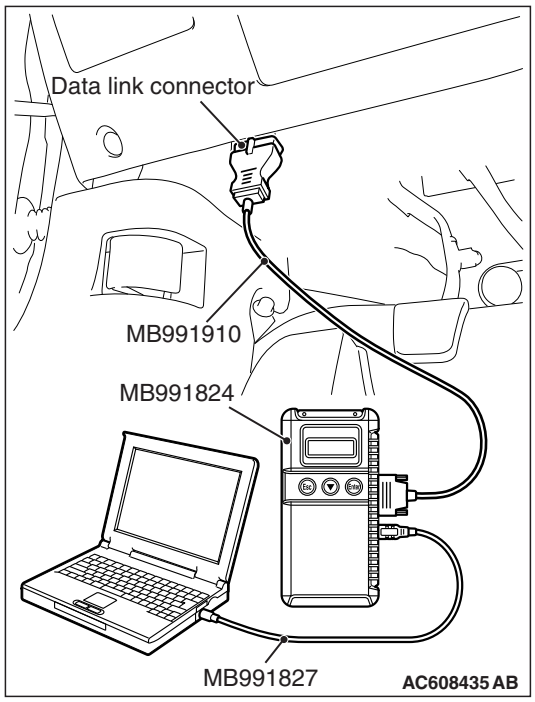
OBD-II DRIVE CYCLE PATTERN
None.

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

DIAGNOSIS

Required Special Tools:
- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

TSB Revision



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 P1676 set?

YES : Replace the ECM with one into which vehicle information is correctly entered.

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.00-14.

DTC P2096: Post Catalyst Fuel Trim System too Lean

TECHNICAL DESCRIPTION

- The ECM effects air/fuel ratio feedback control in accordance with the signals from the heated oxygen sensor (front).
- If the heated oxygen sensor (front) has deteriorated, corrections will be made by the heated oxygen sensor (rear).

DESCRIPTIONS OF MONITOR METHODS

- When an abnormality exists in the heated oxygen sensor (front), the amount of compensated fuel injection is abnormal. When this situation continues, it is judged to be faulty.
- If an abnormality exists in the heated oxygen sensor (rear), also it is judged to be faulty even though the heated oxygen sensor (front) is normal.

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)

- Heated oxygen sensor (front) monitor
- Heated oxygen sensor (rear) monitor
- Heated oxygen sensor (front) heater monitor
- Heated oxygen sensor (rear) heater monitor
- Heated oxygen sensor (front) inactive monitor
- Heated oxygen sensor offset voltage monitor
- Misfire monitor
- Fuel system monitor
- Air/fuel ratio feedback monitor
- Heated oxygen sensor (3rd) monitor <California>
- Heated oxygen sensor (3rd) heater monitor <California>

Sensor (The sensor below is determined to be normal)

- Mass airflow sensor
- Engine coolant temperature sensor
- Intake air temperature sensor
- Barometric pressure sensor
- Throttle position sensor

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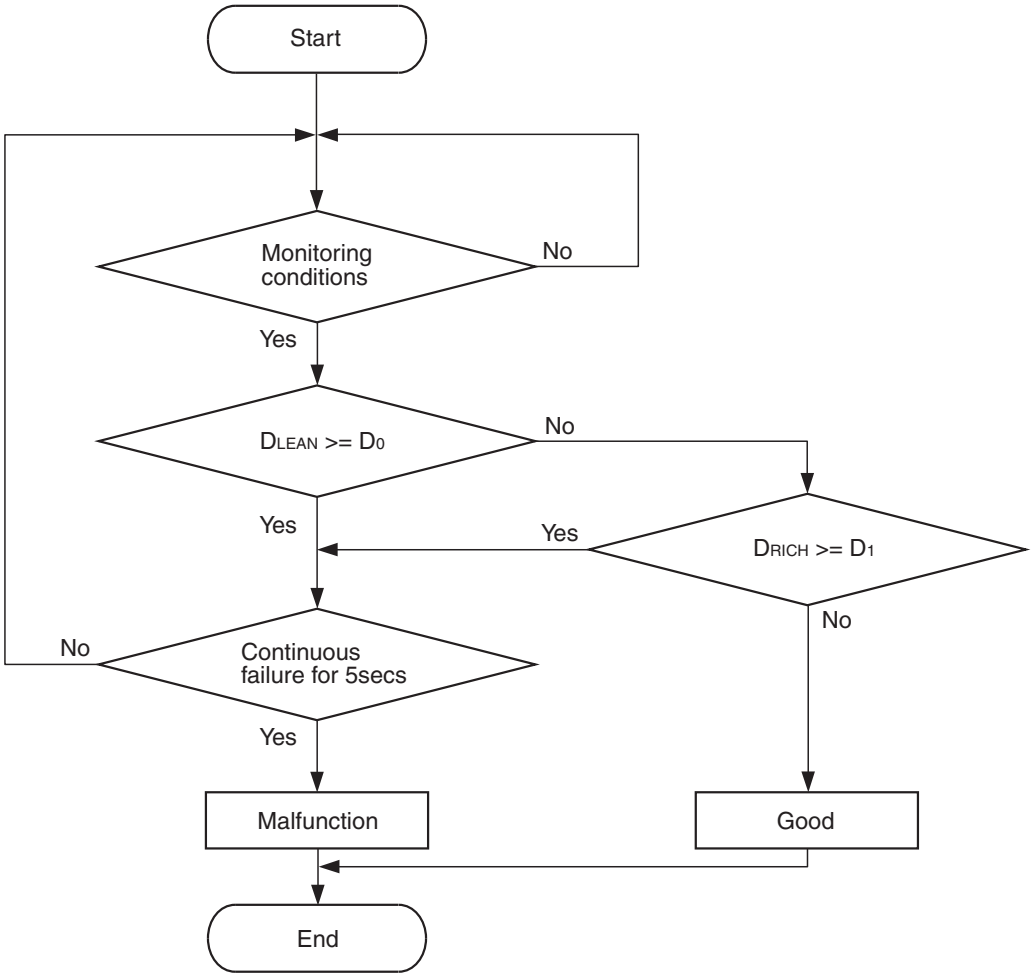
- Accelerator pedal position sensor

DTC SET CONDITIONS

Logic Flow Chart



DLEAN: Fuel trim based on heated oxygen sensor (rear) <to lean>
DLEAN: Fuel trim based on heated oxygen sensor (rear) <to rich>
D0: Maximum Limit of DLEAN
D1: Maximum Limit of DRICH

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Check Conditions

- Engine coolant temperature is more than 76°C (169°F).
- Under the closed loop air/fuel control.
- More than 90 seconds have passed since the engine starting sequence was completed.
- Mass airflow sensor output is more than 5 g/sec.

Judgement Criterion

- The amount of compensated rich air/fuel ratio is output by the heated oxygen sensor (rear). The status that the amount of compensated rich air/fuel ratio is greater than the specified amount continues for 5 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 1 P.13C-11.

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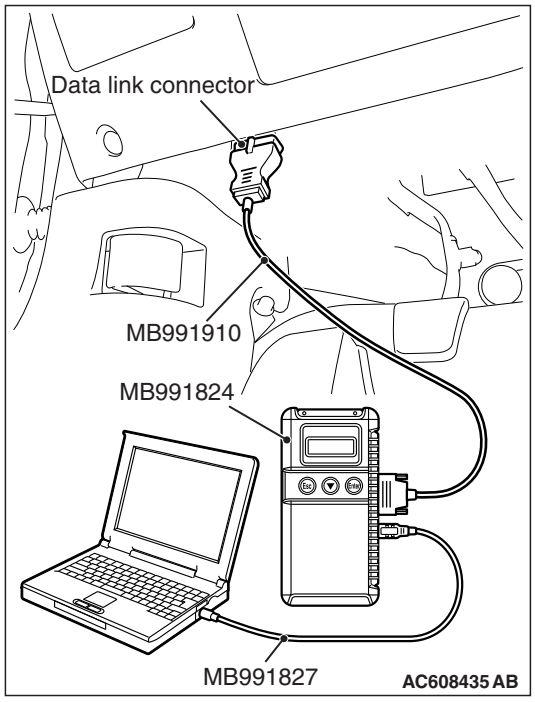
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Heated oxygen sensor (front) failed.
- Heated oxygen sensor (rear) failed.
- Injector failed.
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A



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 the diagnostic trouble code other than P2096 set?

YES : Refer to, Diagnostic Trouble Code Chart P.13C-48.
NO : Go to Step 2.

STEP 2. Replace the heated oxygen sensor (front).

(1) Replace the heated oxygen sensor (front).
(2) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 1 P.13C-11.
(3) Check the diagnostic trouble code (DTC).

Q: Is DTC P2096 set?

YES : Go to Step 3.
NO : The inspection is complete.

STEP 3. Replace the heated oxygen sensor (rear).
(1) Replace the heated oxygen sensor (rear).
(2) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 1 P.13C-11.
(3) Check the diagnostic trouble code (DTC).

Q: Is DTC P2096 set?

YES : Go to Step 4.
NO : The inspection is complete.

STEP 4. Replace the injector.
(1) Replace the injector.
(2) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 1 P.13C-11.
(3) Check the diagnostic trouble code (DTC).

Q: Is DTC P2096 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.
NO : The inspection is complete.

DTC P2097: Post Catalyst Fuel Trim System too Rich

TECHNICAL DESCRIPTION

- The ECM effects air/fuel ratio feedback control in accordance with the signals from the heated oxygen sensor (front).
- If the heated oxygen sensor (front) has deteriorated, corrections will be made by the heated oxygen sensor (rear).

DESCRIPTIONS OF MONITOR METHODS

- When an abnormality exists in the heated oxygen sensor (front), the amount of compensated fuel injection is abnormal. When this situation continues, it is judged to be faulty.
- If an abnormality exists in the heated oxygen sensor (rear), also it is judged to be faulty even though the heated oxygen sensor (front) is normal.

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)

- Heated oxygen sensor (front) monitor
- Heated oxygen sensor (rear) monitor
- Heated oxygen sensor (front) heater monitor
- Heated oxygen sensor (rear) heater monitor
- Heated oxygen sensor (front) inactive monitor
- Heated oxygen sensor offset voltage monitor
- Misfire monitor
- Fuel system monitor
- Air/fuel ratio feedback monitor
- Heated oxygen sensor (3rd) monitor <California>
- Heated oxygen sensor (3rd) heater monitor <California>

Sensor (The sensor below is determined to be normal)

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

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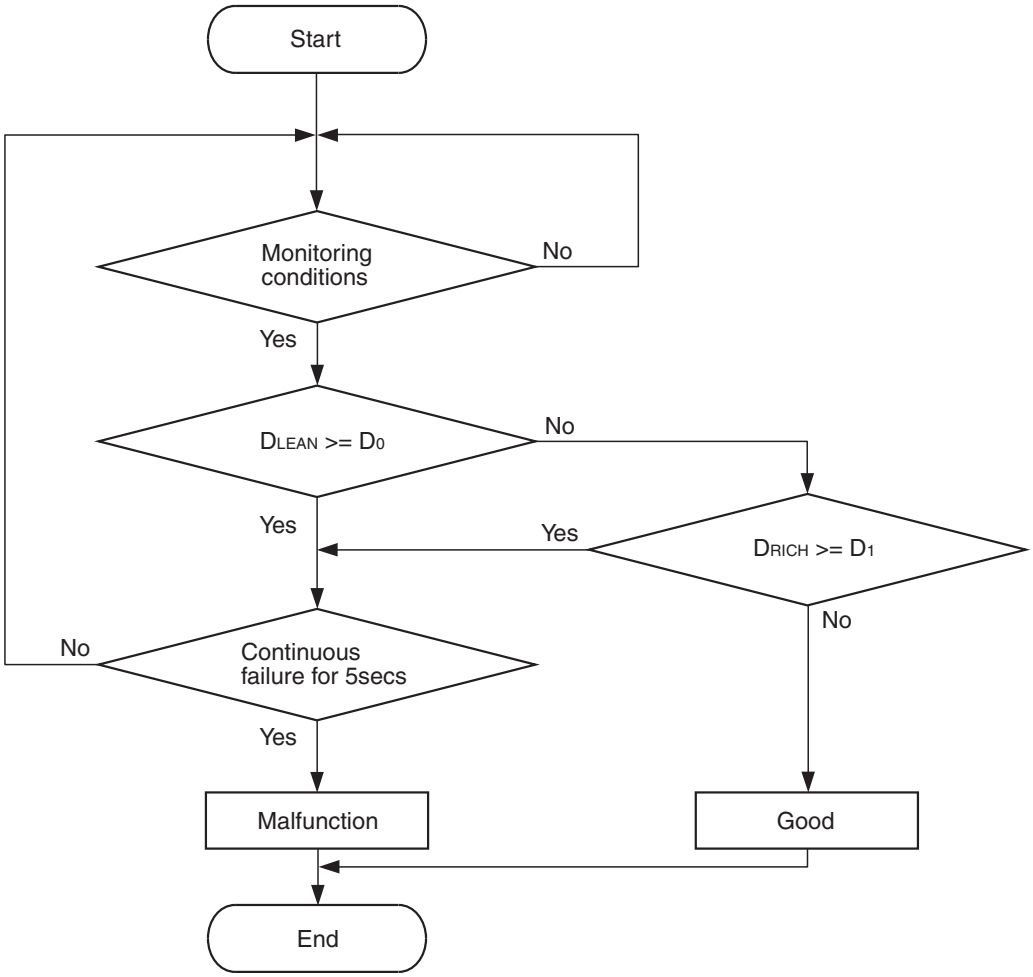
- Throttle position sensor
- Accelerator pedal position sensor

DTC SET CONDITIONS

Logic Flow Chart



DLEAN: Fuel trim based on heated oxygen sensor (rear) <to lean>
DLEAN: Fuel trim based on heated oxygen sensor (rear) <to rich>
D0: Maximum Limit of DLEAN
D1: Maximum Limit of DRICH

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Check Conditions

- Engine coolant temperature is more than 76°C (169°F).
- Under the closed loop air/fuel control.
- More than 90 seconds have passed since the engine starting sequence was completed.
- Mass airflow sensor output is more than 5 g/sec.

Judgement Criterion

- The amount of compensated lean air/fuel ratio is output by the heated oxygen sensor (rear). The status that the amount of compensated lean air/fuel ratio is greater than the specified amount continues for 5 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 1 P.13C-11.

TSB Revision

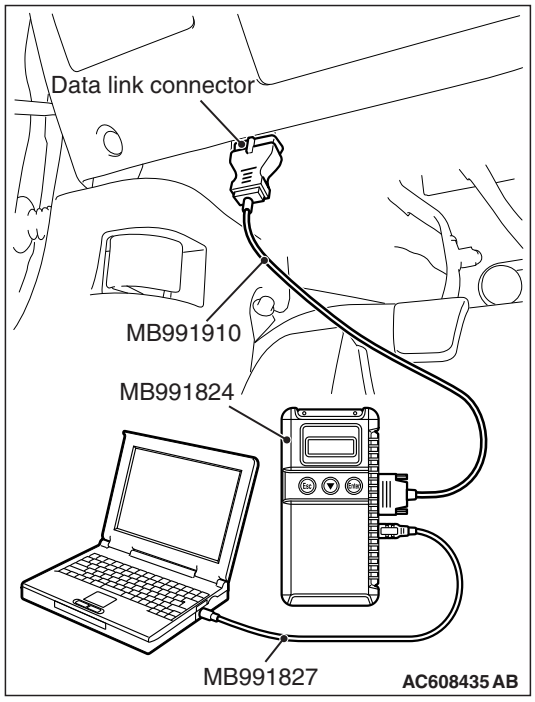
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Heated oxygen sensor (front) failed.
- Heated oxygen sensor (rear) failed.
- Injector failed.
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A



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 the diagnostic trouble code other than P2097 set?

YES : Refer to, Diagnostic Trouble Code Chart P.13C-48.
NO : Go to Step 2.

STEP 2. Replace the heated oxygen sensor (front).

(1) Replace the heated oxygen sensor (front).
(2) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 1 P.13C-11.
(3) Check the diagnostic trouble code (DTC).

Q: Is DTC P2097 set?

YES : Go to Step 3.
NO : The inspection is complete.

STEP 3. Replace the heated oxygen sensor (rear).

(1) Replace the heated oxygen sensor (rear).
(2) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 1 P.13C-11.
(3) Check the diagnostic trouble code (DTC).

Q: Is DTC P2097 set?

YES : Go to Step 4.
NO : The inspection is complete.

STEP 4. Replace the injector.

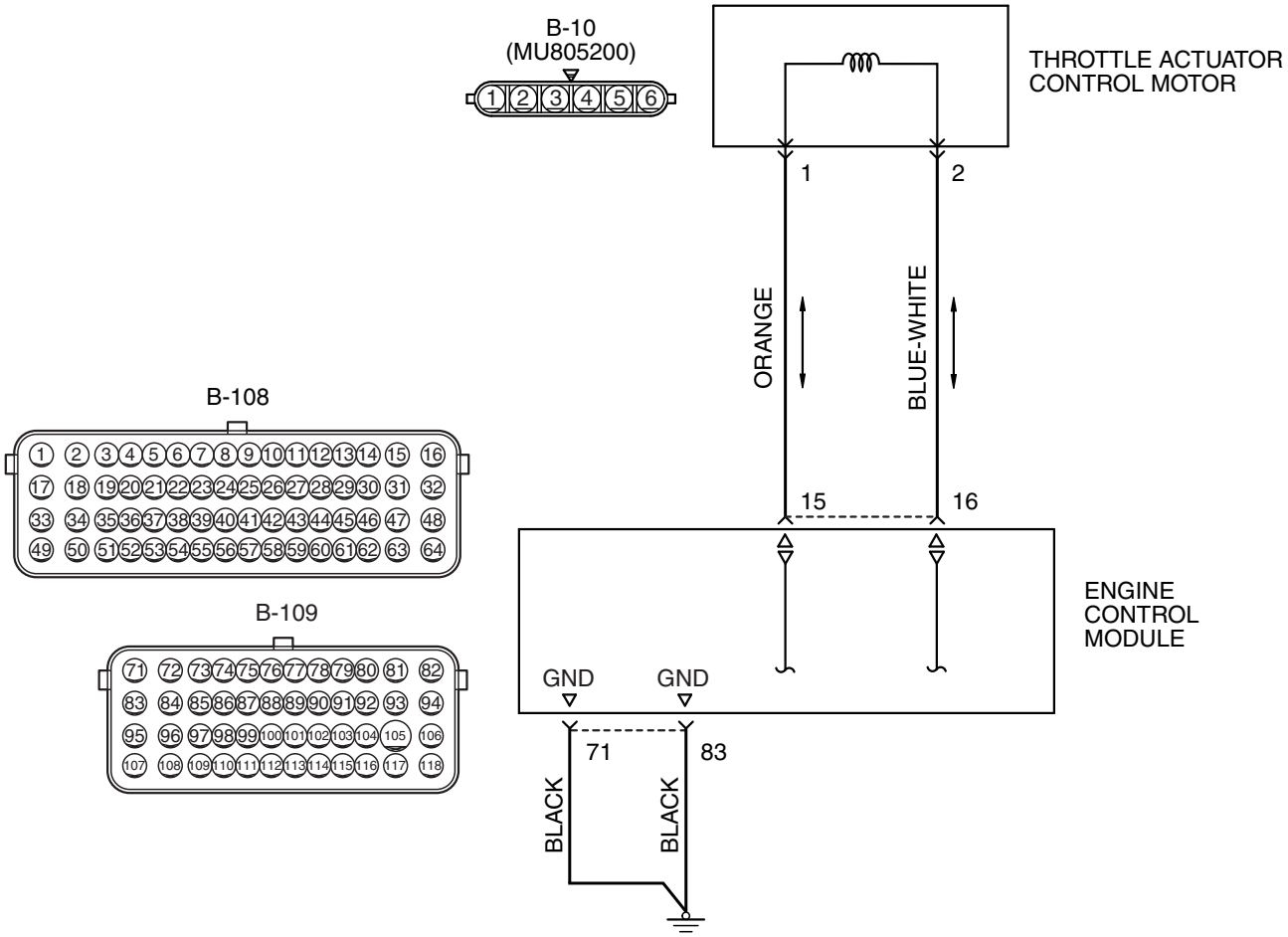
(1) Replace the injector.
(2) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 1 P.13C-11.
(3) Check the diagnostic trouble code (DTC).

Q: Is DTC P2097 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.
NO : The inspection is complete.

DTC P2100: Throttle Actuator Control Motor Circuit (open)

THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT



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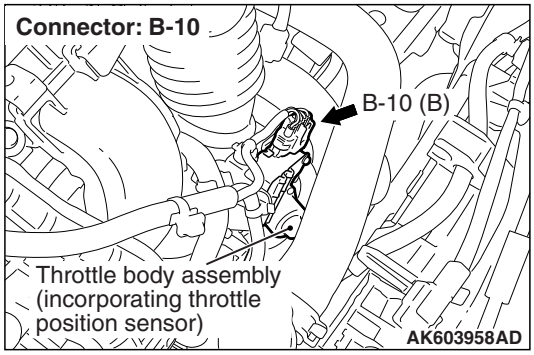
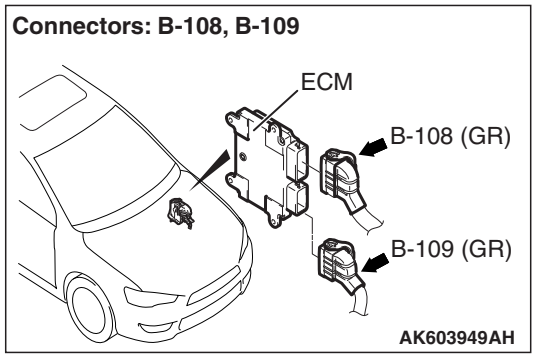




CIRCUIT OPERATION

- Controls the current that is applied from the ECM (terminals No. 15, No. 16) to the throttle actuator control motor (terminals No. 1, No. 2).

TSB Revision

TECHNICAL DESCRIPTION

- ECM varies the direction and the amperage of the current that is applied to the throttle actuator control motor in order to control the opening of the throttle valve.

DESCRIPTIONS OF MONITOR METHODS

The voltage difference between the throttle position sensor output voltage and the throttle position sensor output at the throttle actuator control motor relay off 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.
- The output voltage of the throttle position sensor (main) minus the proposed output voltage becomes 0.1 volt or more.
- The output voltage of the throttle position sensor (sub) minus the proposed output voltage becomes 0.1 volt or more.
- The drive duty of the throttle actuator control motor is 100 percent or more.

or

- Battery positive voltage is higher than 8.3 volts.
- The proposed output voltage minus the output voltage of the throttle position sensor (main) becomes 0.1 volt or more.
- The proposed output voltage minus the output voltage of the throttle position sensor (sub) becomes 0.1 volt or more.
- The drive duty of the throttle actuator control motor is 100 percent or more.

Judgement Criteria

- The output voltage of the throttle position sensor (main) minus the learning value of the middle -opened degree becomes 0.2 volt or less for 0.4 second.

or

- The output voltage of the throttle position sensor (sub) minus the learning value of the middle -opened degree becomes 0.2 volt or less for 0.4 second.

OBD-II DRIVE CYCLE PATTERN

None.

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

- Throttle actuator control motor failed.
- Open throttle actuator control motor circuit, harness damage or connector damage.
- ECM failed.

DIAGNOSIS

Required Special Tools:

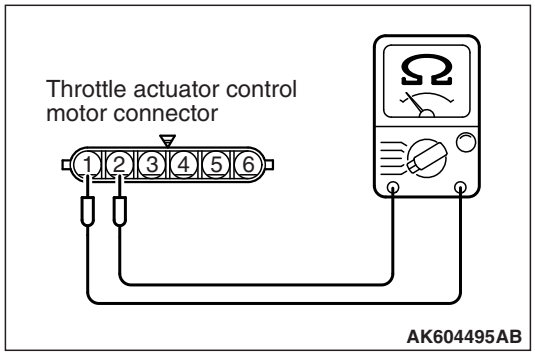
- MB991958: Scan tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

STEP 1. Check harness connector B-10 at throttle actuator control motor 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 9.



STEP 2. Check the throttle actuator control motor.

(1) Disconnect the connector B-10.
(2) Measure the resistance between throttle actuator control motor side connector terminal No. 1 and No. 2.

Standard value: 0.3 – 80 Ω [at 20°C (68°F)]

Q: Is the measured resistance between 0.3 and 80 Ω [at 20°C (68°F)]?

YES : Go to Step 3.
NO : Replace the throttle body assembly. Then go to Step 9.

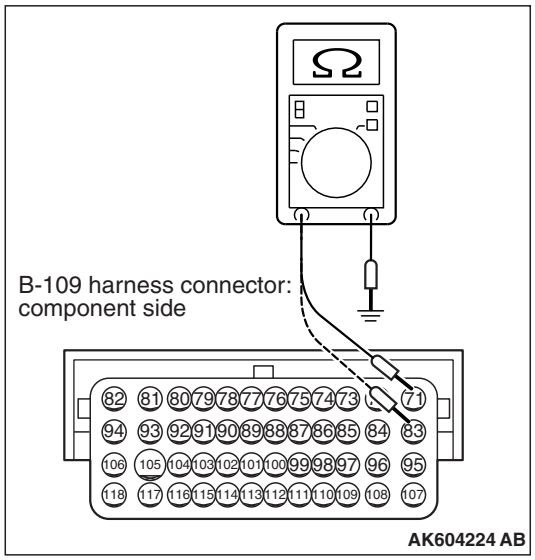
STEP 3. Check harness connector B-109 at ECM for damage

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 9.

STEP 4. Check the continuity at ECM harness side connector B-109.

(1) Disconnect the connector B-109 and measure at the harness side.
(2) Measure the continuity between terminals No. 71, No. 83 and ground.
- Continuity (2 Ω or less)



Q: Does continuity exist?

YES : Go to Step 5.
NO : Repair harness wire between ECM connector B-109 (terminals No. 71, No. 83) and ground because of open circuit or harness damage. Then go to Step 9.

STEP 5. Check harness connector B-108 at ECM 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 9.

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STEP 6. Check for open circuit and harness damage between throttle actuator control motor connector B-10 (terminal No. 1) and ECM connector B-108 (terminal No. 15).

Q: Is the harness wire in good condition?

YES : Go to Step 7.
NO : Repair it. Then go to Step 9.

STEP 7. Check for open circuit and harness damage between throttle actuator control motor connector B-10 (terminal No. 2) and ECM connector B-108 (terminal No. 16).

Q: Is the harness wire in good condition?

YES : Go to Step 8.
NO : Repair it. Then go to Step 9.

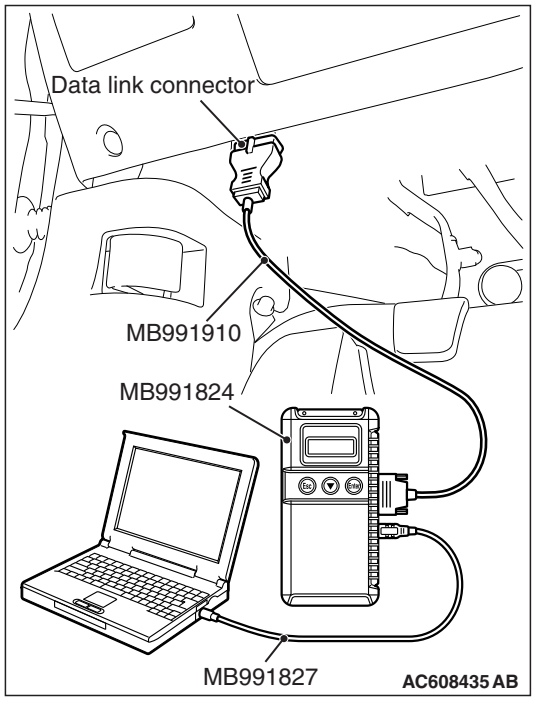
STEP 8. Using scan tool MB991958, read the diagnostic trouble code (DTC).

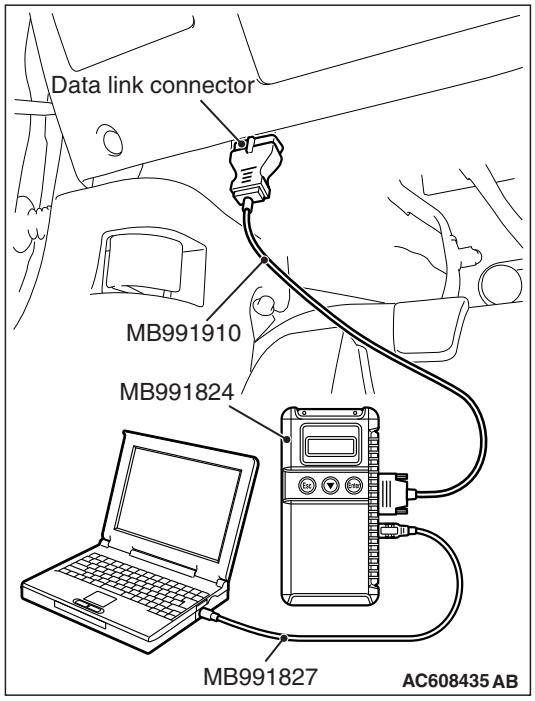
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(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 P2100 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 9.
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.00-14.





STEP 9. 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.

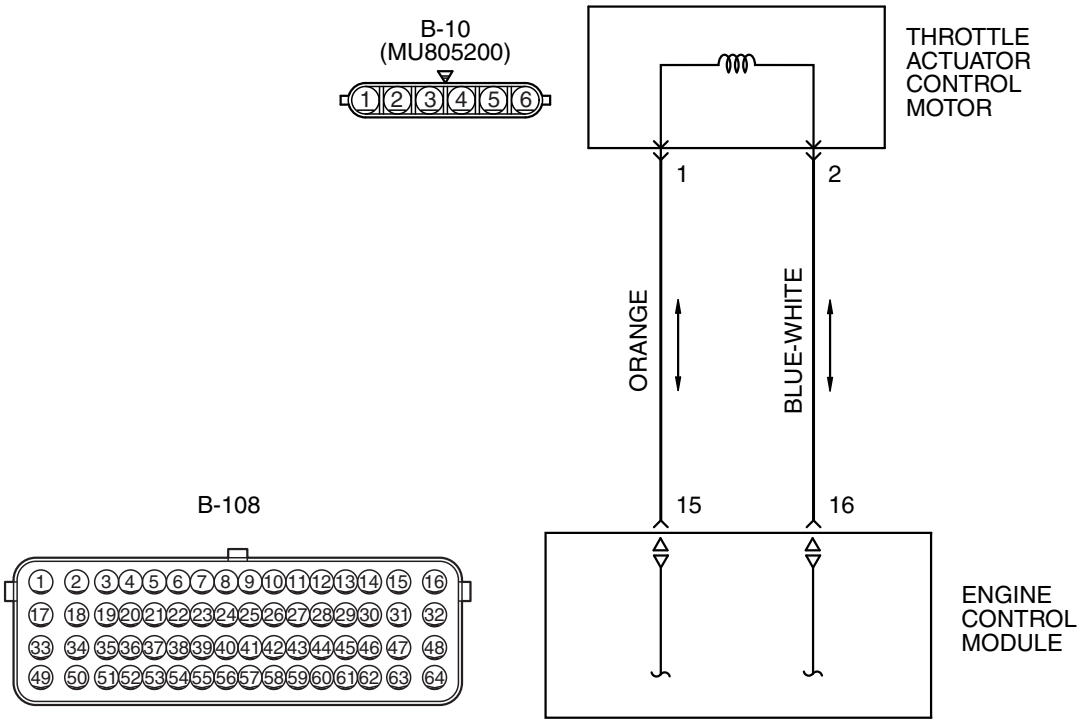
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P2100 set?

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

DTC P2101: Throttle Actuator Control Motor Magneto Malfunction

THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT



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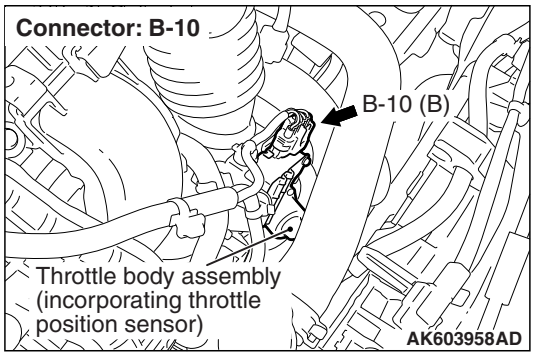
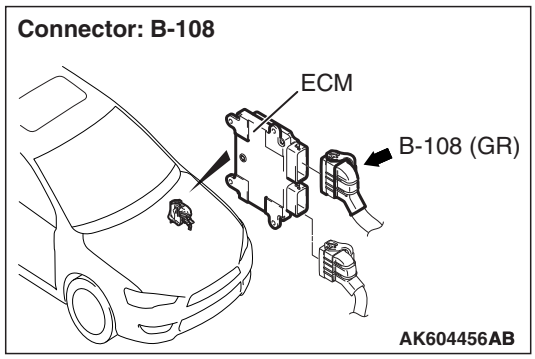




CIRCUIT OPERATION

- Controls the current that is applied from ECM (terminals No. 15, No. 16) to the throttle actuator control motor (terminals No. 1, No. 2)

TECHNICAL DESCRIPTION

- ECM check whether the throttle actuator control motor magneto has failed.

TSB Revision

DESCRIPTIONS OF MONITOR METHODS

Throttle actuator control motor intelligent power device detects shorted-high/low and overheat of itself.

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 coil current of the throttle actuator control motor is 8 ampere or more for 0.3 second.

OBD-II DRIVE CYCLE PATTERN

None.

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

- Throttle actuator control motor failed.
- Shorted throttle actuator control motor circuit, harness damage or connector damage.
- ECM failed.

DIAGNOSIS

Required Special Tools:

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

STEP 1. Check harness connector B-10 at throttle actuator control motor 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 7.

STEP 2. Check the throttle actuator control motor.

(1) Disconnect the connector B-10.

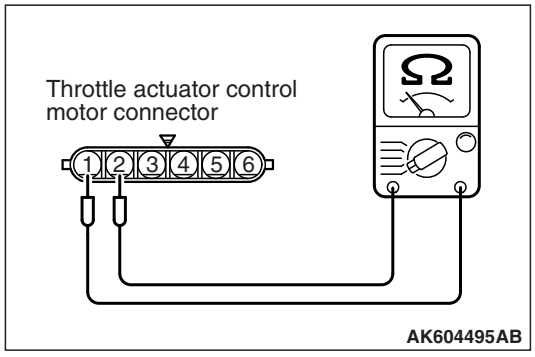
(2) Measure the resistance between throttle actuator control motor side connector terminal No. 1 and No. 2.

Standard value: 0.3 – 80 Ω [at 20°C (68°F)]

Q: Is the measured resistance between 0.3 and 80 Ω [at 20°C (68°F)]?

YES : Go to Step 3.

NO : Replace the throttle body assembly. Then go to Step 7.



STEP 3. Check harness connector B-108 at ECM 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 7.

STEP 4. Check for short circuit to ground between throttle actuator control motor connector B-10 (terminal No. 1) and ECM connector B-108 (terminal No. 15).

Q: Is the harness wire in good condition?

YES : Go to Step 5.
NO : Repair it. Then go to Step 7.

STEP 5. Check for short circuit to ground between throttle actuator control motor connector B-10 (terminal No. 2) and ECM connector B-108 (terminal No. 16).

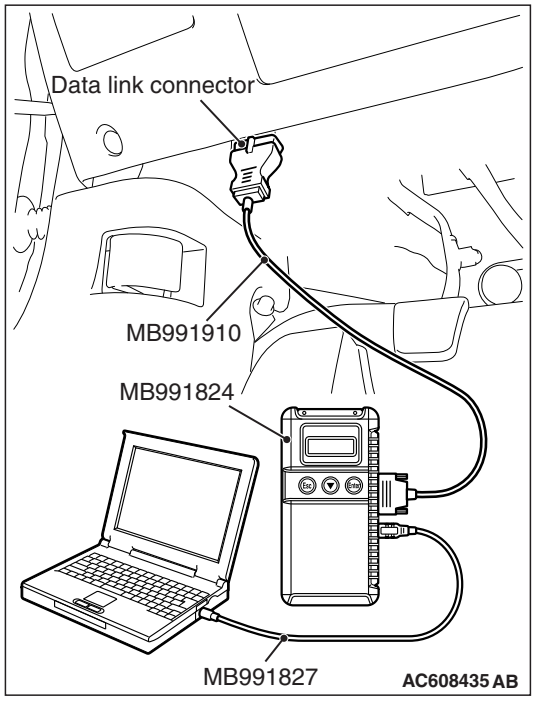
Q: Is the harness wire in good condition?

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

STEP 6. Using scan tool MB991958, read the diagnostic trouble code (DTC).

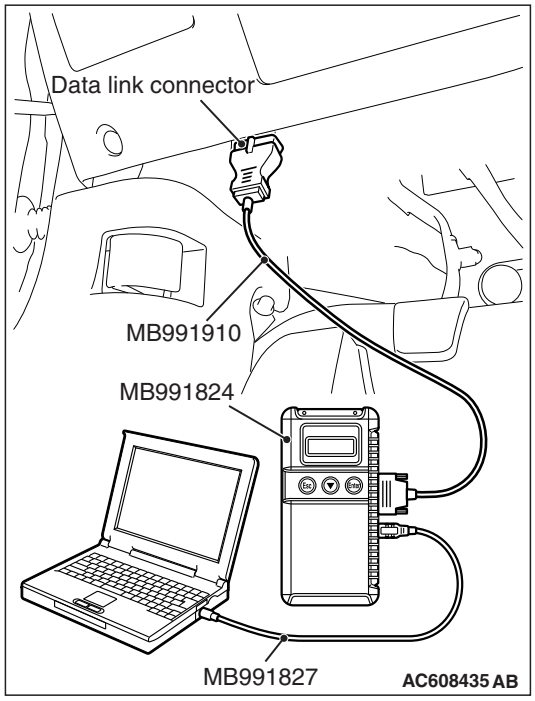
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK" (OFF) position.



Q: Is DTC P2101 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. 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 Malfunctions P.00-14.



STEP 7. 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.

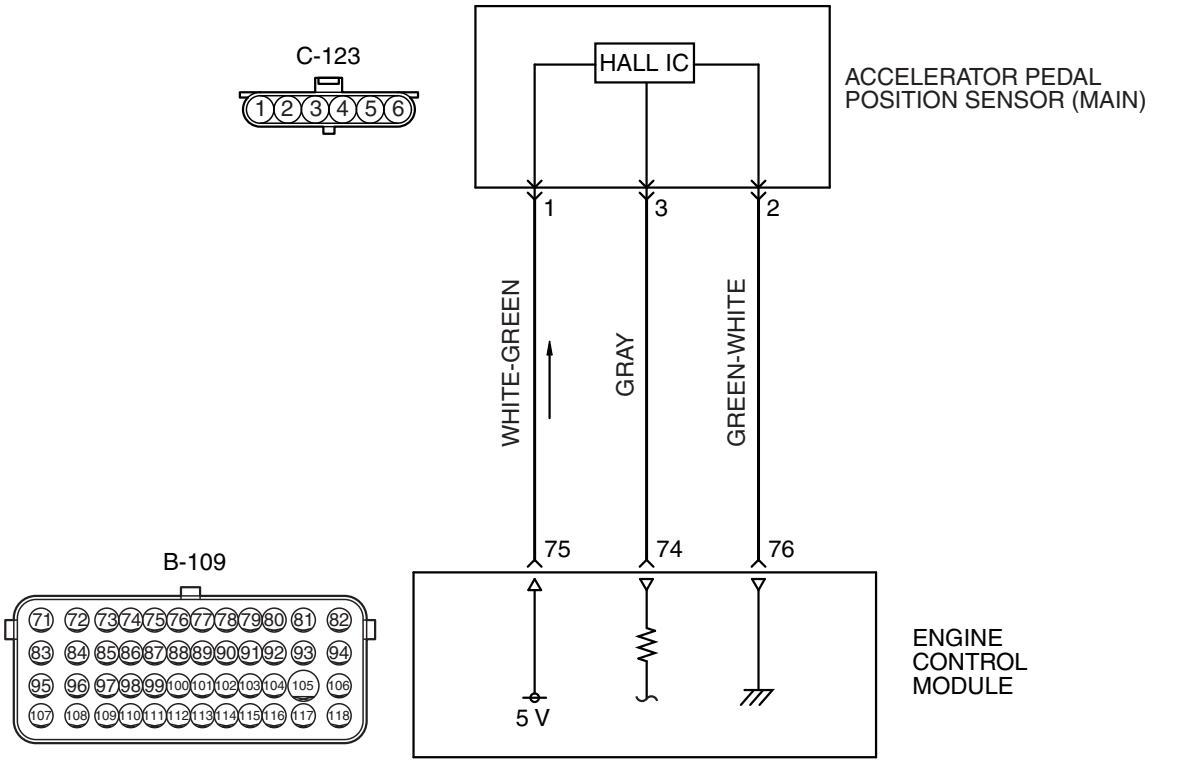
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P2101 set?

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

DTC P2122: Accelerator Pedal Position Sensor (main) Circuit Low Input

ACCELERATOR PEDAL POSITION SENSOR (MAIN) CIRCUIT



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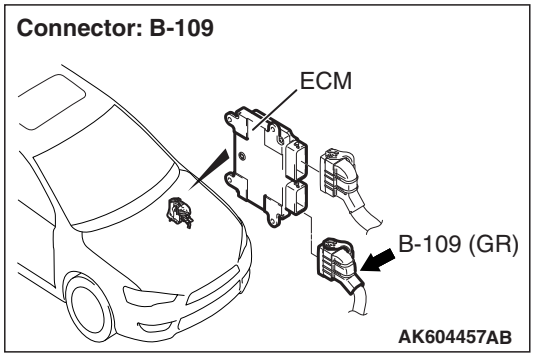
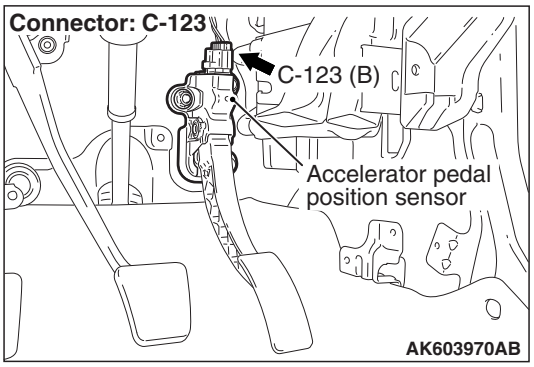




CIRCUIT OPERATION

- A 5-volt power supply is applied on the accelerator pedal position sensor (main) power terminal (terminal No. 1) from the ECM (terminal No. 75).
- A voltage that is according to the accelerator opening angle is sent to the ECM (terminal No. 74) from the accelerator pedal position sensor (main) output terminal (terminal No. 3).
- The ground terminal (terminal No. 2) is grounded with ECM (terminal No. 76).

TSB Revision

TECHNICAL DESCRIPTION

- The accelerator pedal position sensor (main) outputs voltage which corresponds to the accelerator pedal depression.
- The ECM checks whether the voltage is within a specified range.

DESCRIPTIONS OF MONITOR METHODS

Accelerator pedal position sensor (main) output voltage is out of specified range.

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)

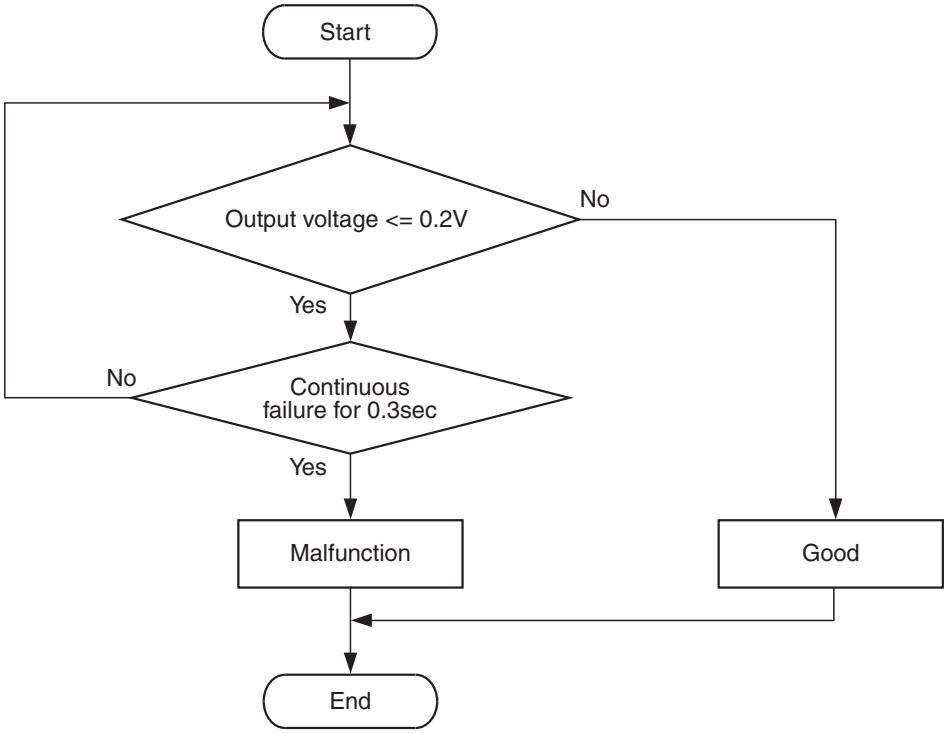
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



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Check Condition

- Ignition switch is "ON" position.

Judgement Criterion

- Accelerator pedal position sensor (main) output voltage is 0.2 volt or less for 0.3 second.

OBD-II DRIVE CYCLE PATTERN

None.

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

- Accelerator pedal position sensor failed.
- Open or shorted accelerator pedal position sensor (main) circuit, harness damage or connector damage.
- ECM failed.

TSB Revision

DIAGNOSIS

Required Special Tools:

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

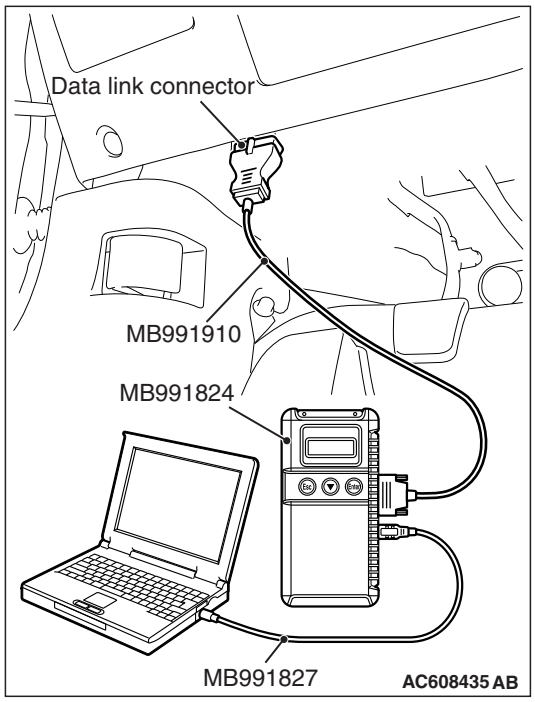
STEP 1. Using scan tool MB991958, check data list item 11: Accelerator Pedal Position Sensor (main).

⚠ 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 11, Accelerator Pedal Position Sensor (main).
  - Output voltage is between 0.9 and 1.1 volts when foot is released from accelerator pedal.
  - Output voltage is 4.0 volts or higher when accelerator pedal is fully depressed.

(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.00-14.

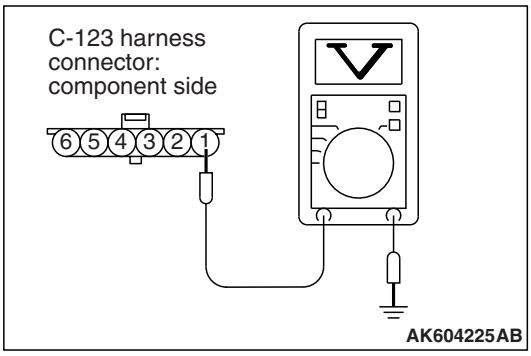
NO : Go to Step 2.

STEP 2. Check harness connector C-123 at accelerator pedal position 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 11.



STEP 3. Measure the sensor supply voltage at accelerator pedal position sensor harness side connector C-123.

(1) Disconnect the connector C-123 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 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 7.
NO : Go to Step 4.

STEP 4. Check harness connector B-109 at ECM 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 11.

STEP 5. Check for open circuit and short circuit to ground between accelerator pedal position sensor connector C-123 (terminal No. 1) and ECM connector B-109 (terminal No. 75).

Q: Is the harness wire in good condition?

YES : Go to Step 6.
NO : Repair it. Then go to Step 11.

STEP 6. Using scan tool MB991958, check data list item 11: Accelerator Pedal Position Sensor (main).

(1) Turn the ignition switch to the "ON" position.
(2) Set scan tool MB991958 to the data reading mode for item 11, Accelerator Pedal Position Sensor (main).
- Output voltage is between 0. 9 and 1.1 volts when foot is released from accelerator pedal.
- Output voltage is 4.0 volts or higher when accelerator pedal is fully depressed.

(3) 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.00-14.

NO : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 11.

STEP 7. Check harness connector B-109 at ECM 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 11.

STEP 8. Check for harness damage between accelerator pedal position sensor connector C-123 (terminal No. 1) and ECM connector B-109 (terminal No. 75).

Q: Is the harness wire in good condition?

YES : Go to Step 9.

NO : Repair it. Then go to Step 11.

STEP 9. Check for open circuit, short circuit to ground and harness damage between accelerator pedal position sensor connector C-123 (terminal No. 3) and ECM connector B-109 (terminal No. 74).

Q: Is the harness wire in good condition?

YES : Go to Step 10.

NO : Repair it. Then go to Step 11.

STEP 10. Replace the accelerator pedal position sensor.

(1) Replace the accelerator pedal position sensor.
(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 P2122 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 11.
NO : The inspection is complete.

STEP 11. Using scan tool MB991958, read the diagnostic trouble code (DTC).

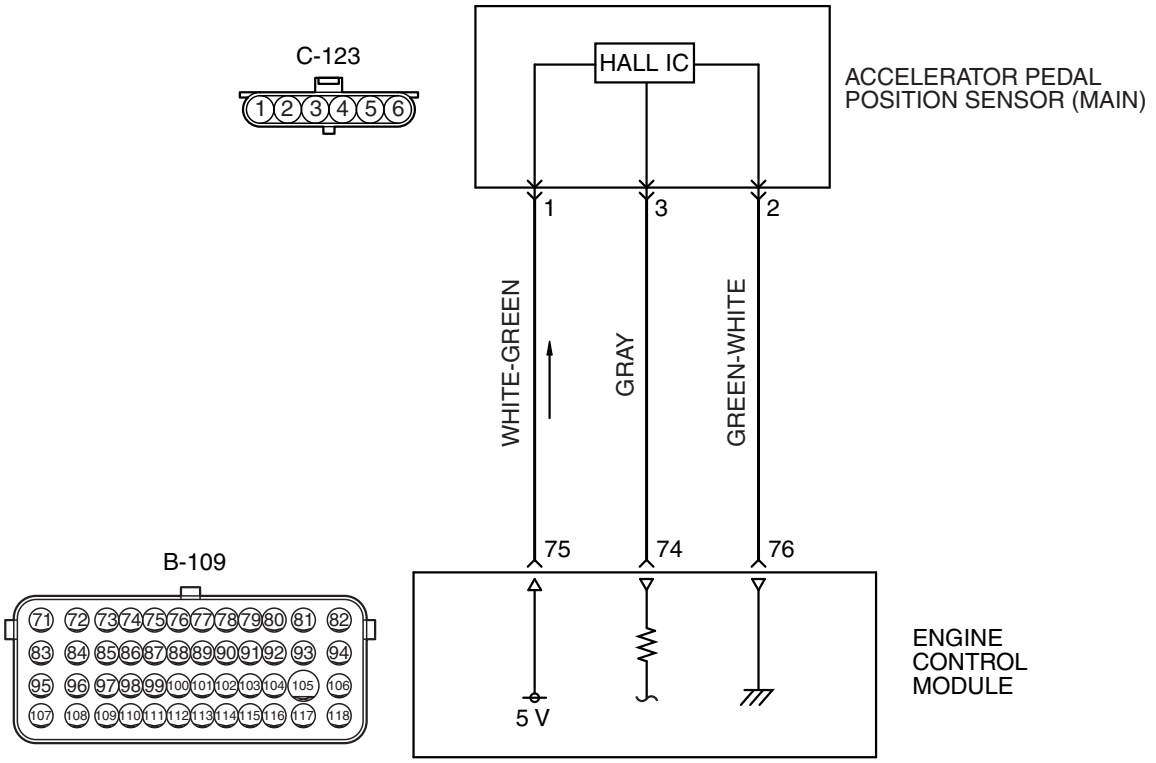
(1) Turn the ignition switch to the "ON" position.
(2) After the DTC has been deleted, read the DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P2122 set?

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

DTC P2123: Accelerator Pedal Position Sensor (main) Circuit High Input

ACCELERATOR PEDAL POSITION SENSOR (MAIN) CIRCUIT



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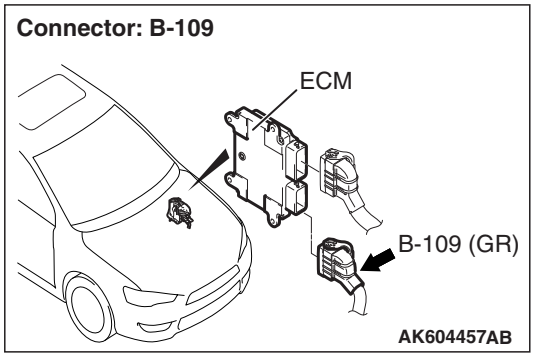
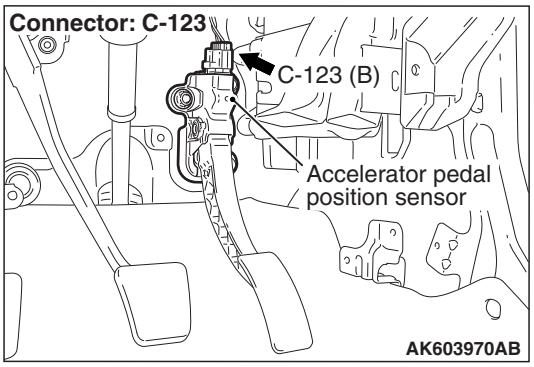




CIRCUIT OPERATION

- A 5-volt power supply is applied on the accelerator pedal position sensor (main) power terminal (terminal No. 1) from the ECM (terminal No. 75).
- A voltage that is according to the accelerator opening angle is sent to the ECM (terminal No. 74) from the accelerator pedal position sensor (main) output terminal (terminal No. 3).
- The ground terminal (terminal No. 2) is grounded with ECM (terminal No. 76).

TSB Revision

TECHNICAL DESCRIPTION

- The accelerator pedal position sensor (main) outputs voltage which corresponds to the accelerator pedal depression.
- The ECM checks whether the voltage is within a specified range.

DESCRIPTIONS OF MONITOR METHODS

Accelerator pedal position sensor (main) output voltage is out of specified range.

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)

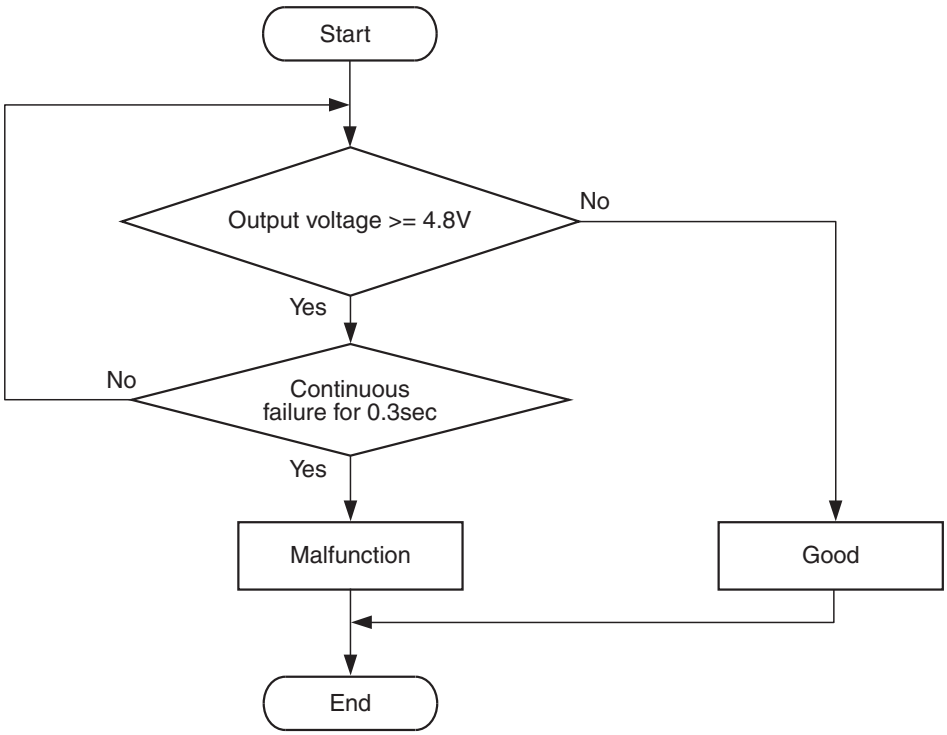
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



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Check Condition

- Ignition switch is "ON" position.

Judgement Criterion

- Accelerator pedal position sensor (main) output voltage should be 4.8 volts or higher for 0.3 second.

OBD-II DRIVE CYCLE PATTERN

None.

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

- Accelerator pedal position sensor failed.
- Open accelerator pedal position sensor (main) circuit, harness damage or connector damage.
- ECM failed.

TSB Revision

DIAGNOSIS

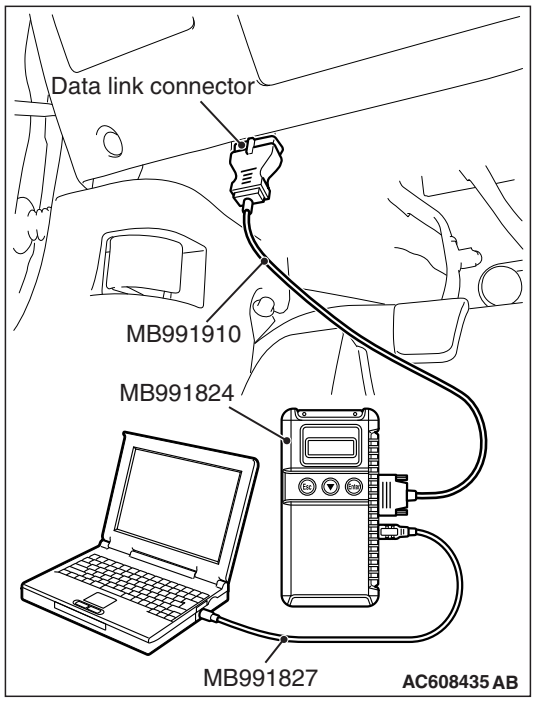
Required Special Tools:

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

STEP 1. Using scan tool MB991958, check data list item 11: Accelerator Pedal Position Sensor (main).

⚠ 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 11, Accelerator Pedal Position Sensor (main).
  - Output voltage is between 0.9 and 1.1 volts when foot is released from accelerator pedal.
  - Output voltage is 4.0 volts or higher when accelerator pedal is fully depressed.
(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.00-14.

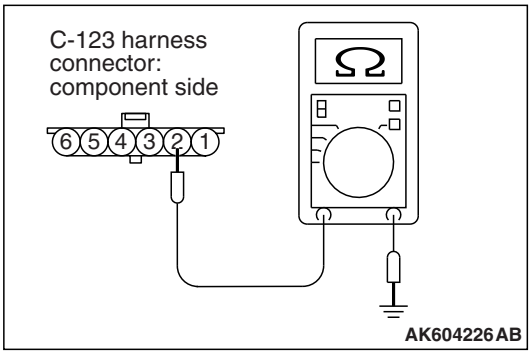
NO : Go to Step 2.

STEP 2. Check harness connector C-123 at accelerator pedal position 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 8.



STEP 3. Check the continuity at accelerator pedal position sensor harness side connector C-123.

(1) Disconnect the connector C-123 and measure at the harness side.
(2) Measure the continuity between terminal No. 2 and ground.
- Continuity (2 Ω or less)

Q: Does continuity exist?

YES : Go to Step 7.
NO : Go to Step 4.

STEP 4. Check harness connector B-109 at ECM 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 8.

STEP 5. Check for open circuit and harness damage between accelerator pedal position sensor connector C-123 (terminal No. 2) and ECM connector B-109 (terminal No. 76).

Q: Is the harness wire in good condition?

YES : Go to Step 6.
NO : Repair it. Then go to Step 8.

STEP 6. Using scan tool MB991958, check data list item 11: Accelerator Pedal Position Sensor (main).

(1) Turn the ignition switch to the "ON" position.
(2) Set scan tool MB991958 to the data reading mode for item 11, Accelerator Pedal Position Sensor (main).
- Output voltage is between 0.9 and 1.1 volts when foot is released from accelerator pedal.
- Output voltage is 4.0 volts or higher when accelerator pedal is fully depressed.

(3) 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.00-14.
NO : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 8.

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STEP 7. Replace the accelerator pedal position sensor.

(1) Replace the accelerator pedal position sensor.
(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 P2123 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 8.
NO : The inspection is complete.

STEP 8. Using scan tool MB991958, read the diagnostic trouble code (DTC).

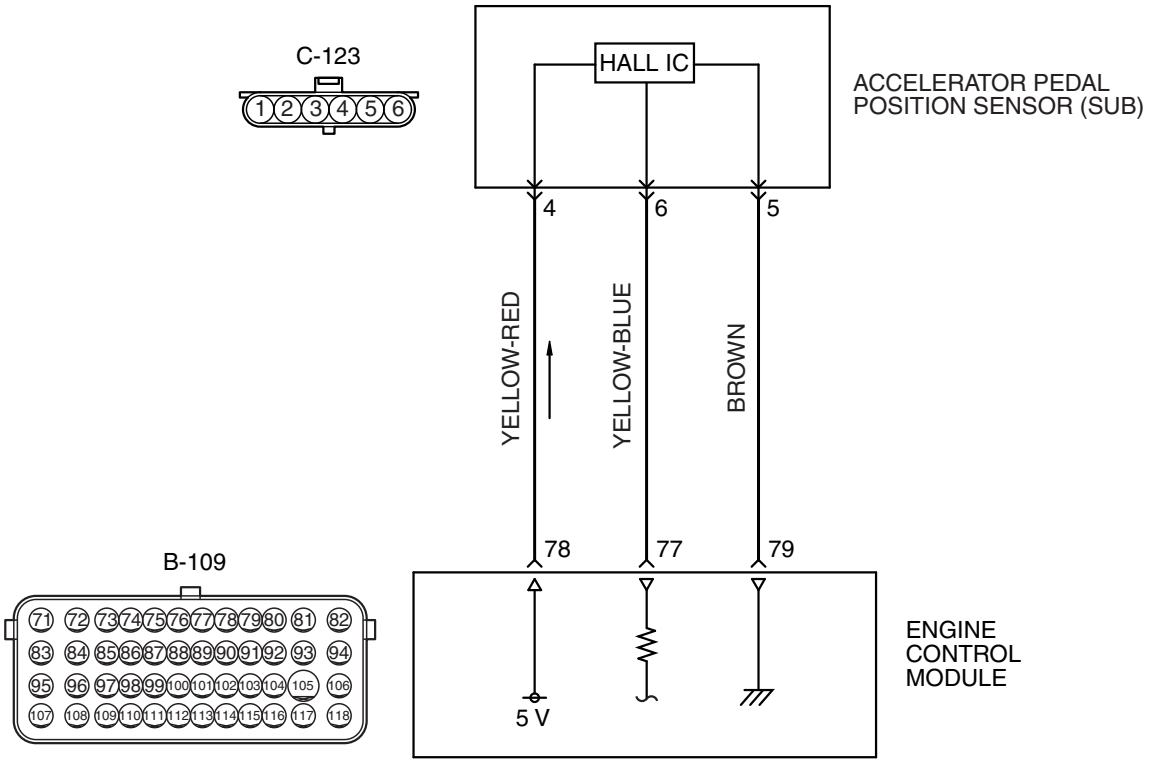
(1) Turn the ignition switch to the "ON" position.
(2) After the DTC has been deleted, read the DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P2123 set?

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

DTC P2127: Accelerator Pedal Position Sensor (sub) Circuit Low Input

ACCELERATOR PEDAL POSITION SENSOR (SUB) CIRCUIT



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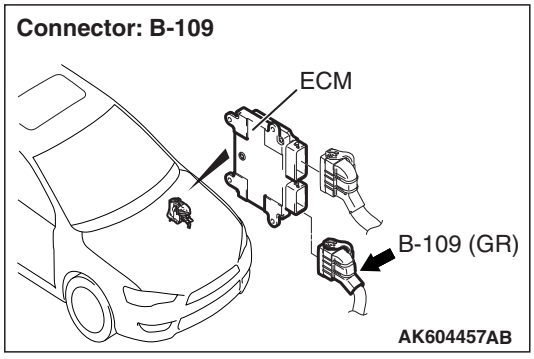
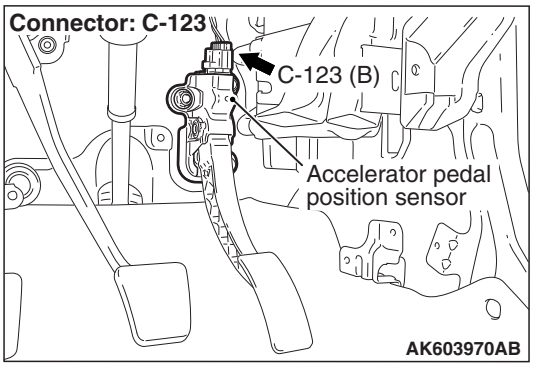




CIRCUIT OPERATION

- A 5-volt power supply is applied on the accelerator pedal position sensor (sub) power terminal (terminal No. 4) from the ECM (terminal No. 78).
- A voltage that is according to the accelerator opening angle is sent to the ECM (terminal No. 77) from the accelerator pedal position sensor (sub) output terminal (terminal No. 6).
- The ground terminal (terminal No. 5) is grounded with ECM (terminal No. 79).

TSB Revision

TECHNICAL DESCRIPTION

- The accelerator pedal position sensor (sub) outputs voltage which corresponds to the accelerator pedal depression.
- The ECM checks whether the voltage is within a specified range.

DESCRIPTIONS OF MONITOR METHODS

Accelerator pedal position sensor (sub) output voltage is out of specified range.

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)

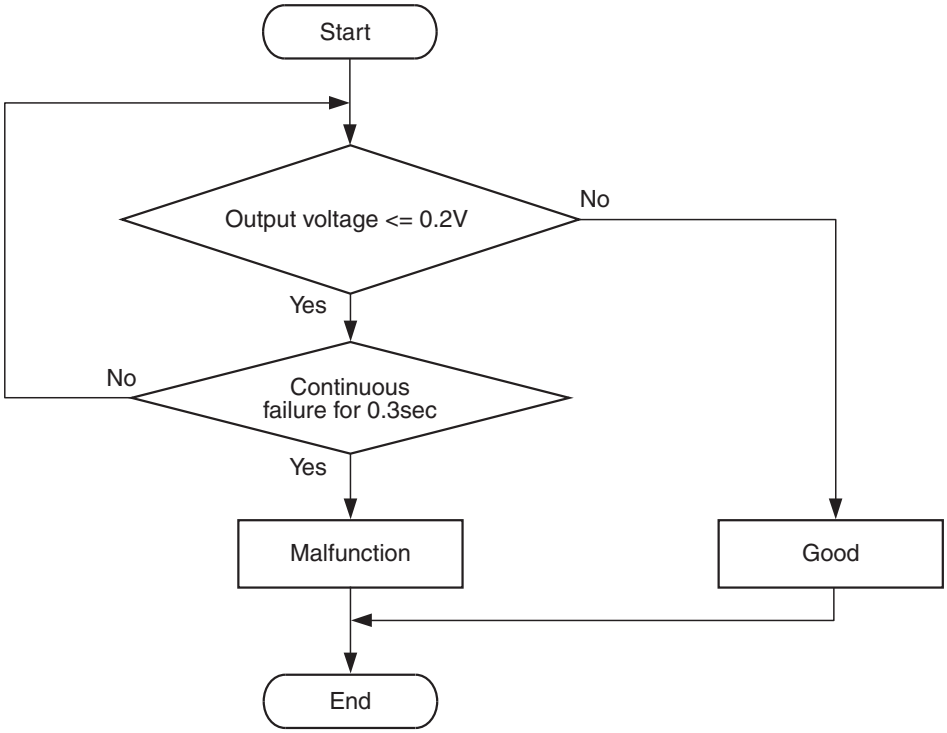
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



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Check Condition

- Ignition switch is "ON" position.

Judgement Criterion

- Accelerator pedal position sensor (sub) output voltage is 0.2 volt or less for 0.3 second.

OBD-II DRIVE CYCLE PATTERN

None.

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

- Accelerator pedal position sensor failed.
- Open or shorted accelerator pedal position sensor (sub) circuit, harness damage or connector damage.
- ECM failed.

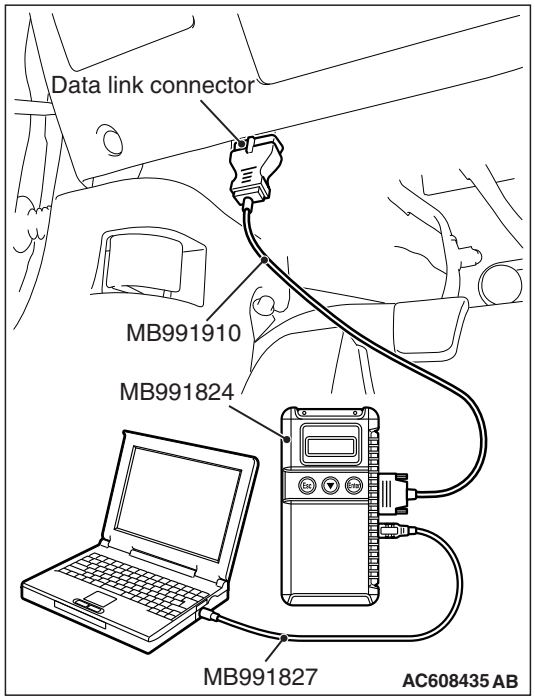
TSB Revision

DIAGNOSIS

Required Special Tools:

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

STEP 1. Using scan tool MB991958, check data list item 12: Accelerator Pedal Position Sensor (sub).



⚠ 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 12, Accelerator Pedal Position Sensor (sub).
  - Output voltage is between 0.4 and 0.6 volt when foot is released from accelerator pedal.
  - Output voltage is 2.0 volts or higher when accelerator pedal is fully depressed.

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

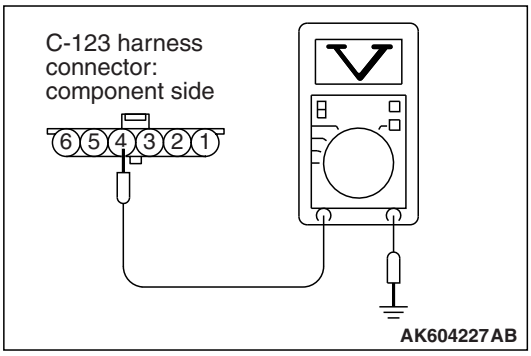
Q: Is the sensor operating properly?

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.00-14.
NO : Go to Step 2.

STEP 2. Check harness connector C-123 at accelerator pedal position 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 11.



STEP 3. Measure the sensor supply voltage at accelerator pedal position sensor harness side connector C-123.

(1) Disconnect the connector C-123 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 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 7.
NO : Go to Step 4.

STEP 4. Check harness connector B-109 at ECM 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 11.

STEP 5. Check for open circuit and short circuit to ground between accelerator pedal position sensor connector C-123 (terminal No. 4) and ECM connector B-109 (terminal No. 78).

Q: Is the harness wire in good condition?

YES : Go to Step 6.
NO : Repair it. Then go to Step 11.

STEP 6. Using scan tool MB991958, check data list item 12: Accelerator Pedal Position Sensor (sub).

(1) Turn the ignition switch to the "ON" position.
(2) Set scan tool MB991958 to the data reading mode for item 12, Accelerator Pedal Position Sensor (sub).
- Output voltage is between 0.4 and 0.6 volt when foot is released from accelerator pedal.
- Output voltage is 2.0 volts or higher when accelerator pedal is fully depressed.

(3) 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.00-14.

NO : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 11.

STEP 7. Check harness connector B-109 at ECM 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 11.

STEP 8. Check for harness damage between accelerator pedal position sensor connector C-123 (terminal No. 4) and ECM connector B-109 (terminal No. 78).

Q: Is the harness wire in good condition?

YES : Go to Step 9.

NO : Repair it. Then go to Step 11.

STEP 9. Check for open circuit, short circuit to ground and harness damage between accelerator pedal position sensor connector C-123 (terminal No. 6) and ECM connector B-109 (terminal No. 77)

Q: Is the harness wire in good condition?

YES : Go to Step 10.

NO : Repair it. Then go to Step 11.

STEP 10. Replace the accelerator pedal position sensor.

(1) Replace the accelerator pedal position sensor.
(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 P2127 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 11.

NO : The inspection is complete.

STEP 11. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) After the DTC has been deleted, read the DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

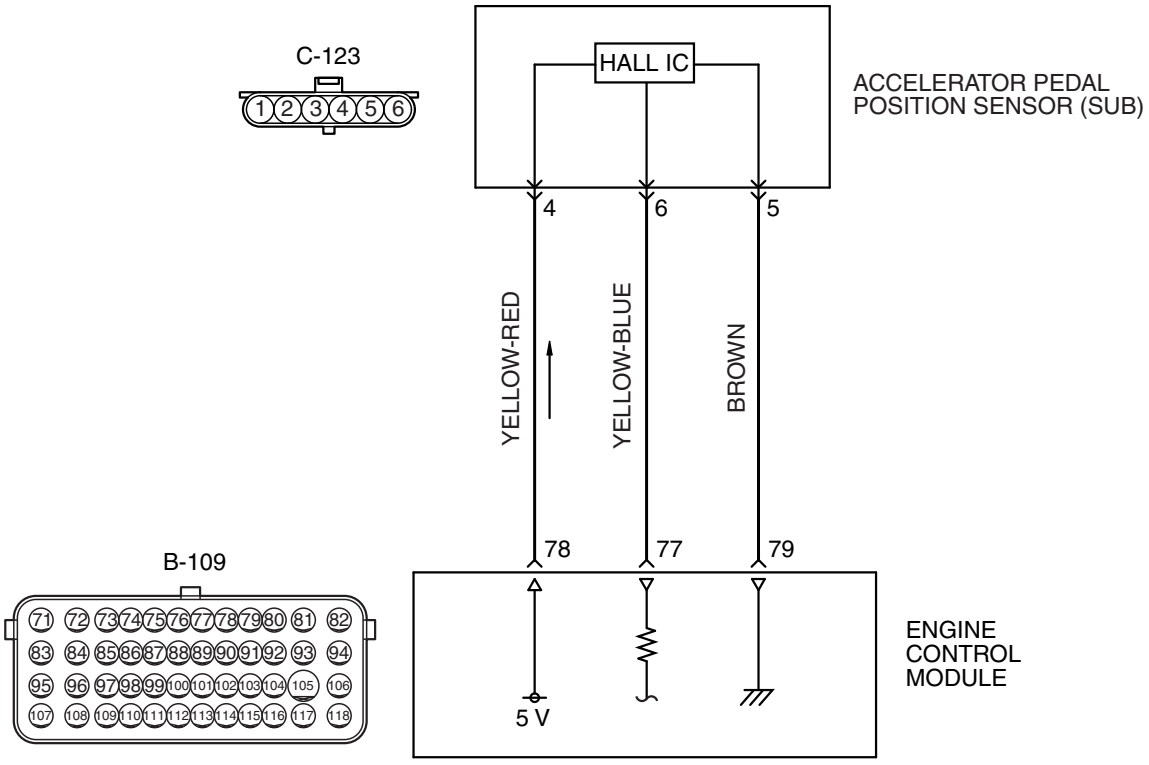
Q: Is DTC P2127 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P2128: Accelerator Pedal Position Sensor (sub) Circuit High Input

ACCELERATOR PEDAL POSITION SENSOR (SUB) CIRCUIT



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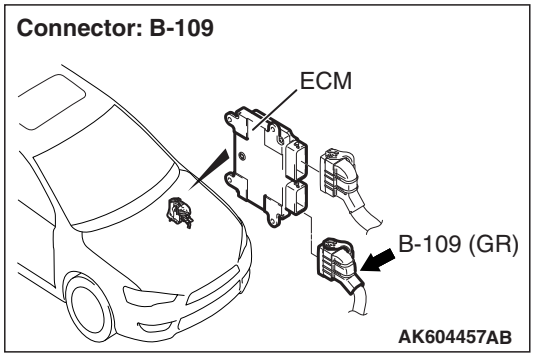
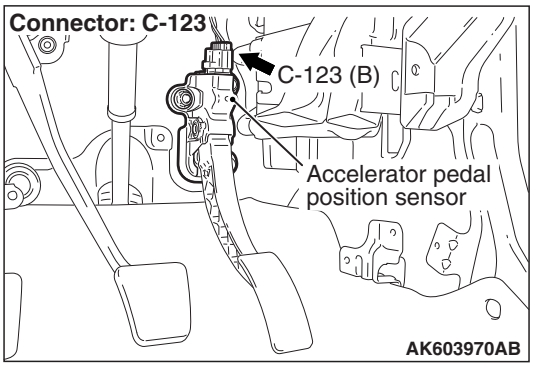




CIRCUIT OPERATION

- A 5-volt power supply is applied on the accelerator pedal position sensor (sub) power terminal (terminal No. 4) from the ECM (terminal No. 78).
- A voltage that is according to the accelerator opening angle is sent to the ECM (terminal No. 77) from the accelerator pedal position sensor (sub) output terminal (terminal No. 6).
- The ground terminal (terminal No. 5) is grounded with ECM (terminal No. 79).

TSB Revision

TECHNICAL DESCRIPTION

- The accelerator pedal position sensor (sub) outputs voltage which corresponds to the accelerator pedal depression.
- The ECM checks whether the voltage is within a specified range.

DESCRIPTIONS OF MONITOR METHODS

Accelerator pedal position sensor (sub) output voltage is out of specified range.

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)

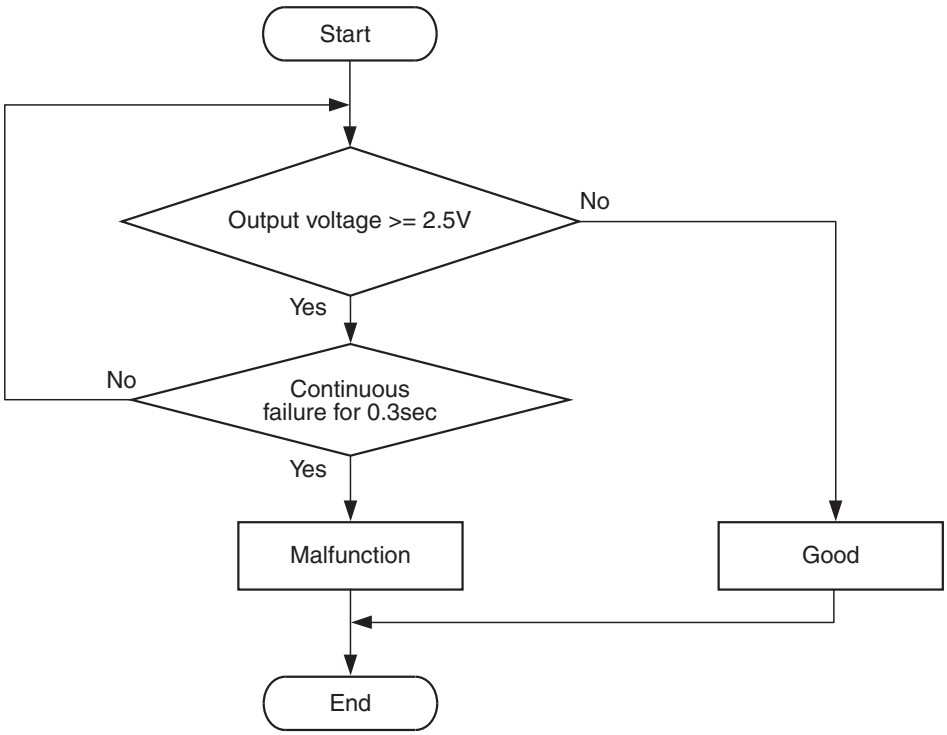
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK604340

Check Condition

- Ignition switch is "ON" position.

Judgement Criterion

- Accelerator pedal position sensor (sub) output voltage is 2.5 volts or higher for 0.3 second.

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

- Accelerator pedal position sensor failed.
- Open accelerator pedal position sensor (sub) circuit, harness damage or connector damage.
- ECM failed.

OBD-II DRIVE CYCLE PATTERN

None.

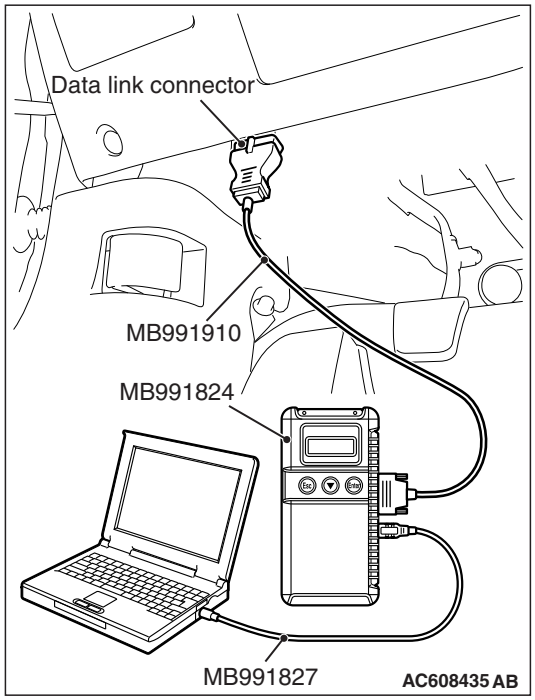
TSB Revision

DIAGNOSIS

Required Special Tools:

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

STEP 1. Using scan tool MB991958, check data list item 12: Accelerator Pedal Position Sensor (sub).



⚠ 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 12, Accelerator Pedal Position Sensor (sub).
  - Output voltage is between 0.4 and 0.6 volt when foot is released from accelerator pedal.
  - Output voltage is 2.0 volts or higher when accelerator pedal is fully depressed.

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

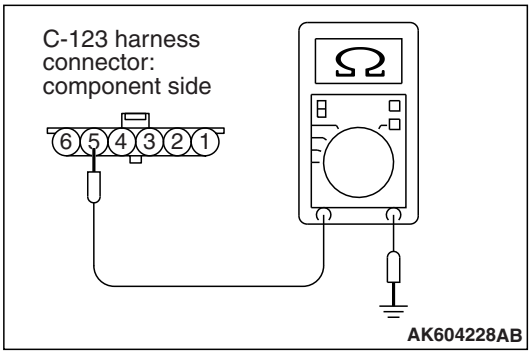
Q: Is the sensor operating properly?

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.00-14.
NO : Go to Step 2.

STEP 2. Check harness connector C-123 at accelerator pedal position 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 8.



STEP 3. Check the continuity at accelerator pedal position sensor harness side connector C-123.

(1) Disconnect the connector C-123 and measure at the harness side.
(2) Measure the continuity between terminal No. 5 and ground.
- Continuity (2 Ω or less)

Q: Does continuity exist?

YES : Go to Step 7.
NO : Go to Step 4.

STEP 4. Check harness connector B-109 at ECM 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 8.

STEP 5. Check for open circuit and harness damage between accelerator pedal position sensor connector C-123 (terminal No. 5) and ECM connector B-109 (terminal No. 79).

Q: Is the harness wire in good condition?

YES : Go to Step 6.
NO : Repair it. Then go to Step 8.

STEP 6. Using scan tool MB991958, check data list item 12: Accelerator Pedal Position Sensor (sub).

(1) Turn the ignition switch to the "ON" position.
(2) Set scan tool MB991958 to the data reading mode for item 12, Accelerator Pedal Position Sensor (sub).
- Output voltage is between 0.4 and 0.6 volt when foot is released from accelerator pedal.
- Output voltage is 2.0 volts or higher when accelerator pedal is fully depressed.

(3) 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.00-14.
NO : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 8.

TSB Revision

STEP 7. Replace the accelerator pedal position sensor.
(1) Replace the accelerator pedal position sensor.
(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 P2128 set?

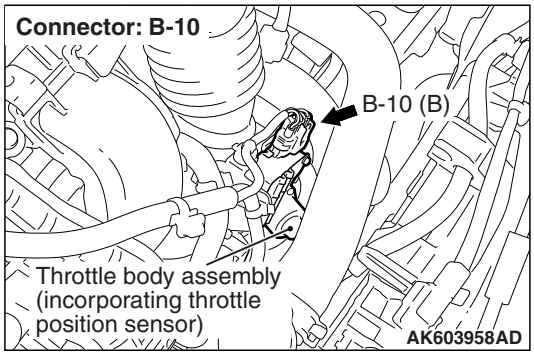
YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 8.
NO : The inspection is complete.

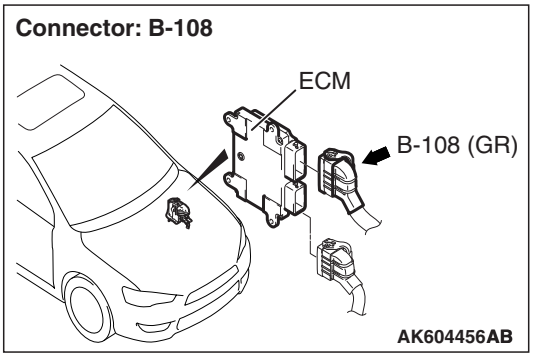
STEP 8. Using scan tool MB991958, read the diagnostic trouble code (DTC).
(1) Turn the ignition switch to the "ON" position.
(2) After the DTC has been deleted, read the DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P2128 set?

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

DTC P2135: Throttle Position Sensor (main and sub) Range/Performance Problem





THROTTLE POSITION SENSOR (main and sub) RANGE/PERFORMANCE PROBLEM CIRCUIT

- Refer to DTC P0122 – Throttle Position Sensor (main) Circuit Low Input P.13C-217.
- Refer to DTC P0222 – Throttle Position Sensor (sub) Circuit Low Input P.13C-420.

CIRCUIT OPERATION

- Refer to DTC P0122 – Throttle Position Sensor (main) Circuit Low Input P.13C-217.
- Refer to DTC P0222 – Throttle Position Sensor (sub) Circuit Low Input P.13C-420.

TECHNICAL DESCRIPTION

- ECM checks the throttle position sensor output signal characteristics for abnormal conditions.

DESCRIPTIONS OF MONITOR METHODS

Detect malfunction if the relation between throttle position sensor (main) and throttle position sensor (sub) is wrong.

MONITOR EXECUTION

Continuous

TSB Revision

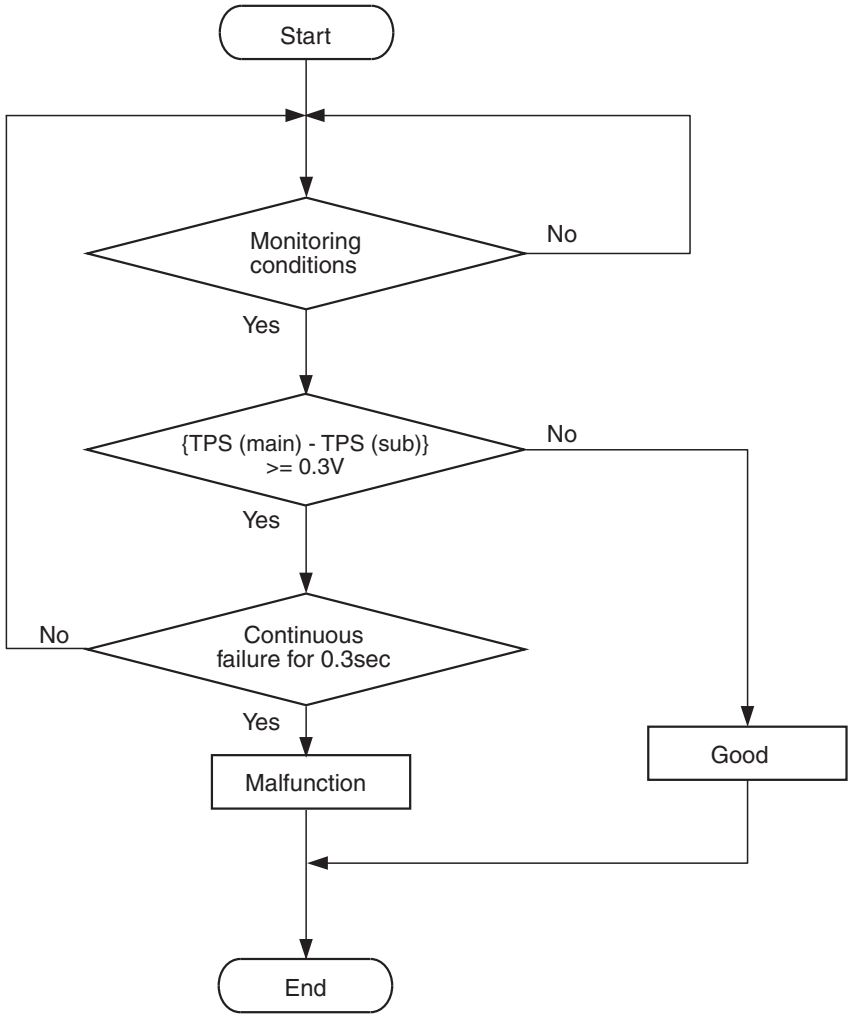
MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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 <Range/Performance problem-relation between main and sub>

Logic Flow Chart



AK604361

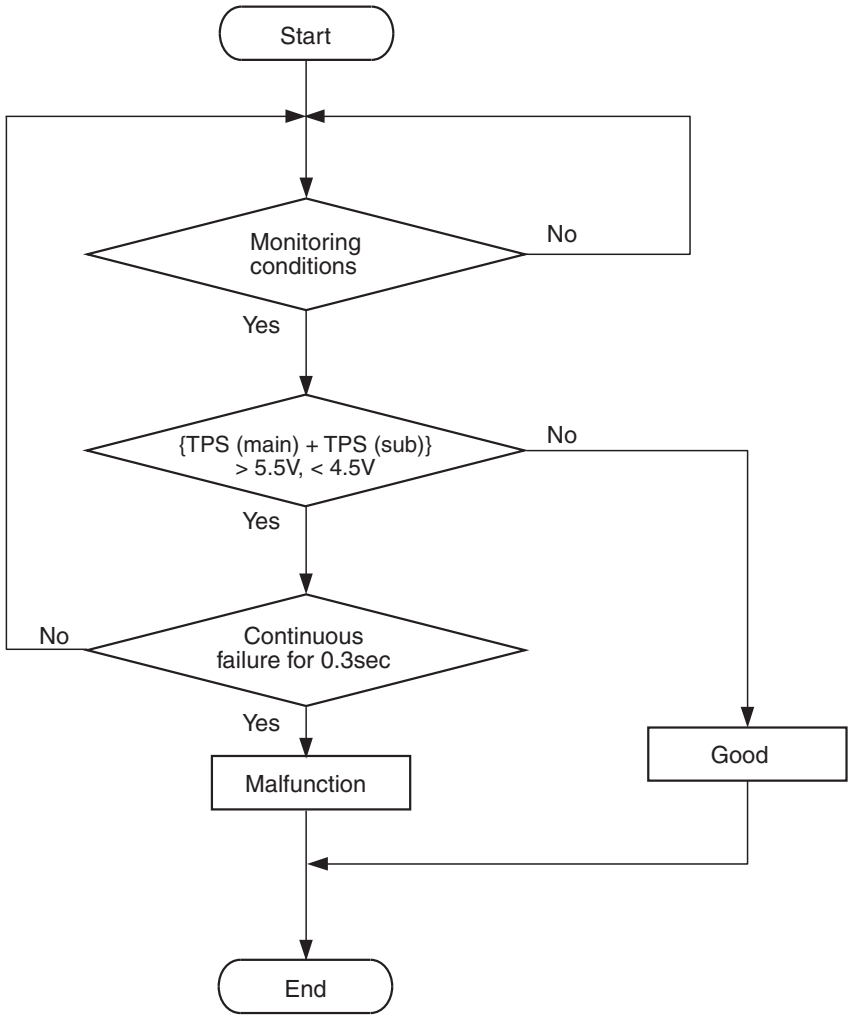
Check Conditions
- The target output voltage of the throttle position sensor is 0.9 volt or less.
- Throttle position sensor (main) output voltage is between 0.2 and 4.8 volts.
- Throttle position sensor (sub) output voltage is between 0.2 and 4.8 volts.
- Battery positive voltage is higher than 8.3 volts.

Judgement Criterion
- Voltage obtained with the formula given below is 0.3 volt or higher for 0.3 second: [throttle position sensor (main) voltage – throttle position sensor (sub) voltage]

  NOTE: The throttle position sensor voltage used for the judgement is converted into the throttle position sensor voltage for the internal processing by the ECM.

TSB Revision

Logic Flow Chart



AK604362

Check Conditions

- Throttle position sensor (main) output voltage is between 0.2 and 4.8 volts.
- Throttle position sensor (sub) output voltage is between 0.2 and 4.8 volts.

Judgement Criterion

- For 0.3 second, the sum of the output voltage of the throttle position sensors (main) and (sub) is 4.5 V or less, or 5.5 V or more.

OBD-II DRIVE CYCLE PATTERN

None.

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

- Throttle position sensor failed.
- Harness damage in throttle position sensor circuit or connector damage.
- ECM failed.

DIAGNOSIS

Required Special Tools:

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

TSB Revision

STEP 1. Check harness connector B-10 at throttle position sensor for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 2.

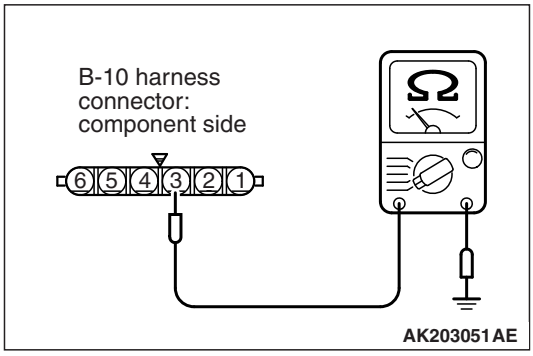
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 11.

STEP 2. Check the continuity at throttle position sensor harness side connector B-10.

(1) Disconnect the connector B-10 and measure at the harness side.

(2) Measure the continuity between terminal No. 3 and ground.

- Continuity (2 Ω or less)



Q: Does continuity exist?

YES : Go to Step 6.

NO : Go to Step 3.

STEP 3. Check harness connector B-108 at ECM for damage.

Q: Q: Is the harness connector in good condition?

YES : Go to Step 4.

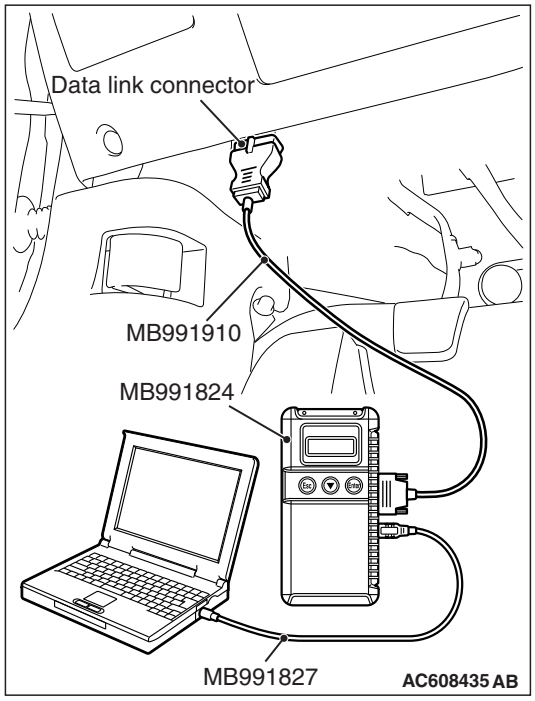
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 11.

STEP 4. Check for harness damage between throttle position sensor connector B-10 (terminal No. 3) and ECM connector B-108 (terminal No. 13).

Q: Is the harness wire in good condition?

YES : Go to Step 5.

NO : Repair it. Then go to Step 11.



STEP 5. 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) Depress the accelerator pedal fully for a few seconds.
(5) Check the DTC.
(6) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P2135 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 11.

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.00-14.

STEP 6. Check harness connector B-108 at ECM for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 7.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 11.

STEP 7. Check for harness damage between throttle position sensor connector B-10 (terminal No. 5) and ECM connector B-108 (terminal No. 12).

Q: Is the harness wire in good condition?

YES : Go to Step 8.

NO : Repair it. Then go to Step 11.

STEP 8. Check for harness damage between throttle position sensor connector B-10 (terminal No. 4) and ECM connector B-108 (terminal No. 10).

Q: Is the harness wire in good condition?

YES : Go to Step 9.

NO : Repair it. Then go to Step 11.

STEP 9. Check for harness damage between throttle position sensor connector B-10 (terminal No. 6) and ECM connector B-108 (terminal No. 11).

Q: Is the harness wire in good condition?

YES : Go to Step 10.
NO : Repair it. Then go to Step 11.

STEP 10. Replace the throttle body assembly.

(1) Replace the throttle body assembly.
(2) Turn the ignition switch to the "ON" position.
(3) Erase the DTC.
(4) Depress the throttle fully for a few seconds.
(5) Check the DTC.
(6) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P2135 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 11.
NO : The inspection is complete.

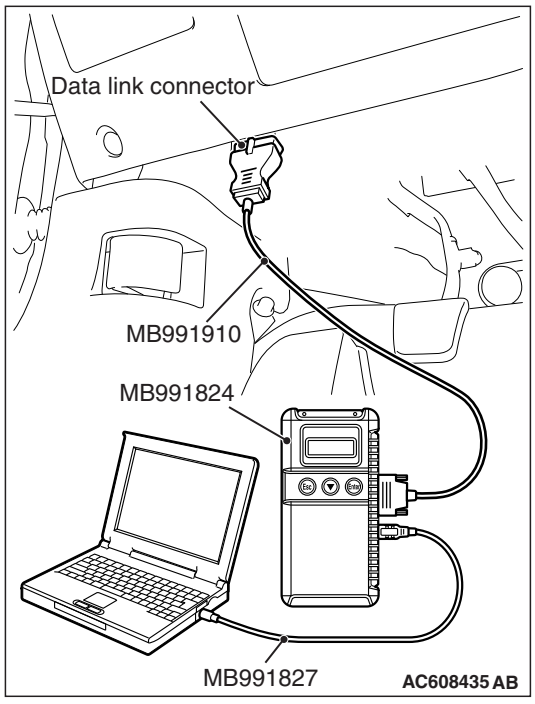
STEP 11. Using scan tool MB991958, read the diagnostic trouble code (DTC).

⚠ 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.

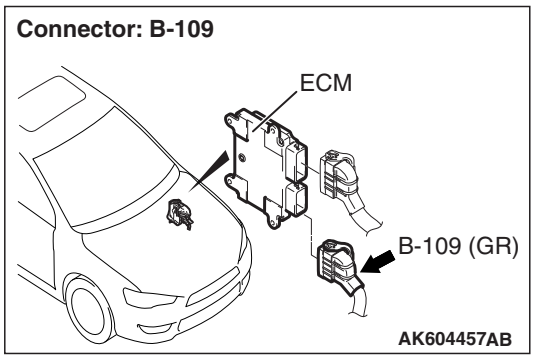
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Erase the DTC.
(4) Depress the throttle fully for a few seconds.
(5) Check the DTC.
(6) Turn the ignition switch to the "LOCK" (OFF) position.

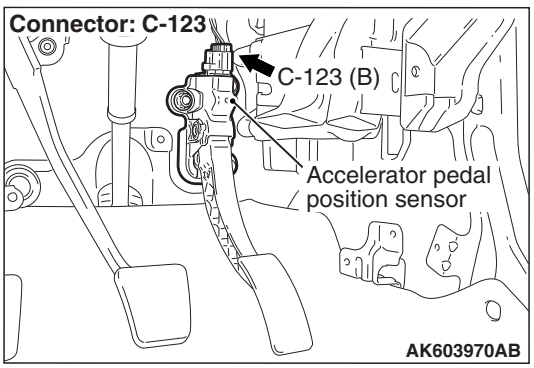
Q: Is DTC P2135 set?

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



DTC P2138: Accelerator Pedal Position Sensor (main and sub) Range/Performance Problem





ACCELERATOR PEDAL POSITION SENSOR (main and sub) RANGE/PERFORMANCE PROBLEM CIRCUIT

- Refer to DTC P2122 – Accelerator Pedal Position Sensor (main) Circuit Low Input P.13C-719.
- Refer to DTC P2127 – Accelerator Pedal Position Sensor (sub) Circuit Low Input P.13C-730.

CIRCUIT OPERATION

- Refer to DTC P2122 – Accelerator Pedal Position Sensor (main) Circuit Low Input P.13C-719.
- Refer to DTC P2127 – Accelerator Pedal Position Sensor (sub) Circuit Low Input P.13C-730.

TECHNICAL DESCRIPTION

- ECM checks the accelerator pedal position sensor output signal characteristics for abnormal conditions.

DESCRIPTIONS OF MONITOR METHODS

Detect malfunction if the relation between accelerator pedal position sensor (main) and accelerator pedal position sensor (sub) is wrong.

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)

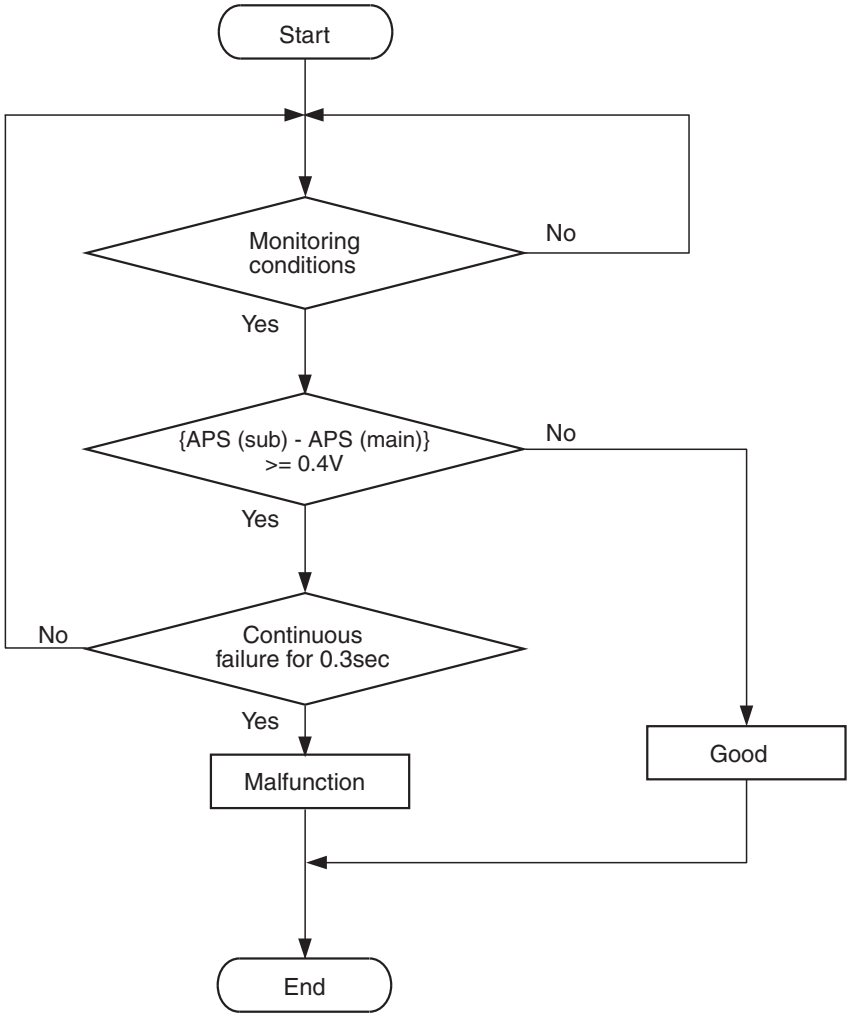
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS <Range/Performance problem -relation between main and sub>

Logic Flow Chart



AK604363

Check Conditions

- Change of accelerator pedal position sensor (sub) output voltage per 25 milliseconds is lower than 0.06 volt.

Judgement Criterion

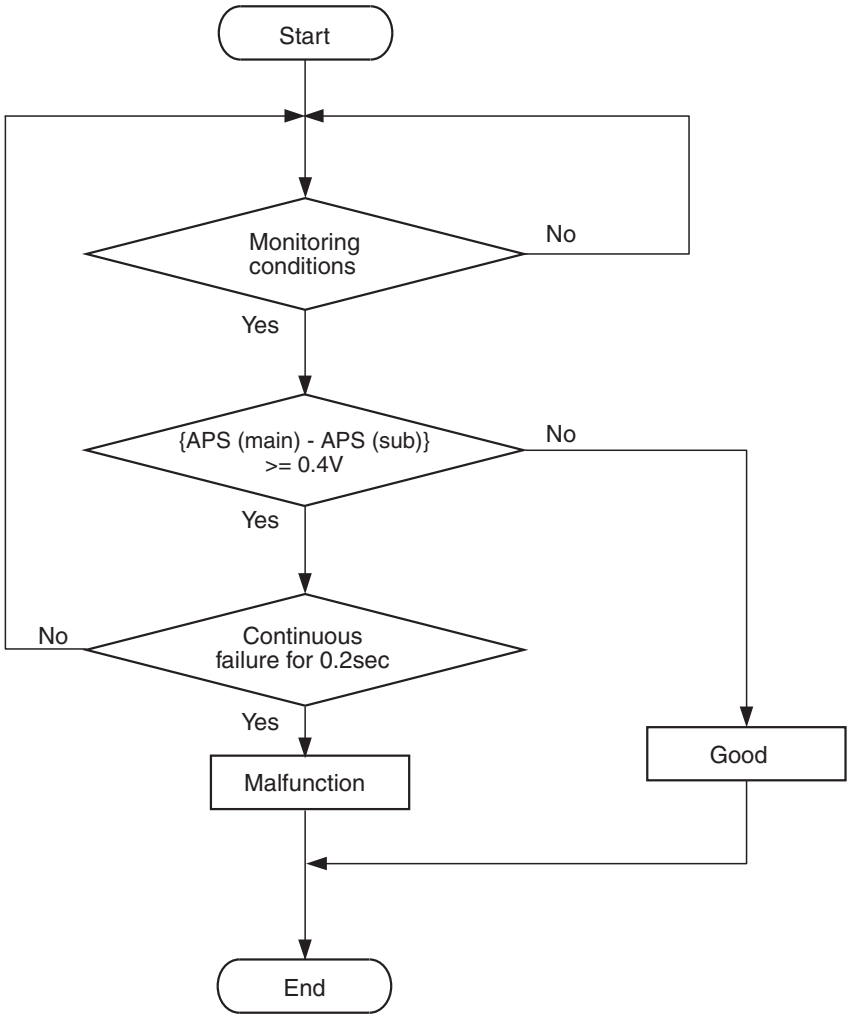
- Voltage obtained with the formula given below is 0.4 volt or higher for 0.3 second: [accelerator pedal position sensor (sub) voltage – accelerator pedal position sensor (main) voltage].

NOTE: The accelerator pedal position sensor voltage used for the judgement is converted into the accelerator pedal position sensor voltage for the internal processing by the ECM.

TSB Revision

DTC SET CONDITIONS <Range/Performance problem -relation between main and sub>

Logic Flow Chart



AK604364

Check Conditions

- Change of accelerator pedal position sensor (sub) output voltage per 25 milliseconds is lower than 0.06 volt.

Judgement Criterion

- Voltage obtained with the formula given below is 0.4 volt or higher for 0.2 second: [accelerator pedal position sensor (main) voltage – accelerator pedal position sensor (sub) voltage].

  NOTE: The accelerator pedal position sensor voltage used for the judgement is converted into the accelerator pedal position sensor voltage for the internal processing by the ECM.

OBD-II DRIVE CYCLE PATTERN

None.

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

- Accelerator pedal position sensor failed.
- Harness damage in accelerator pedal position sensor circuit or connector damage.
- ECM failed.

TSB Revision

DIAGNOSIS

Required Special Tools:

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

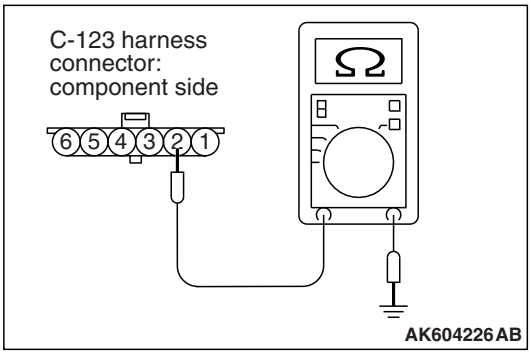
STEP 1. Check harness connector C-123 at accelerator pedal position sensor for damage.

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 16.

STEP 2. Check the continuity at accelerator pedal position sensor harness side connector C-123.

(1) Disconnect the connector C-123 and measure at the harness side.
(2) Measure the continuity between terminal No. 2 and ground.
- Continuity (2 Ω or less)



Q: Does continuity exist?

YES : Go to Step 6.
NO : Go to Step 3.

STEP 3. Check harness connector B-109 at ECM for damage.

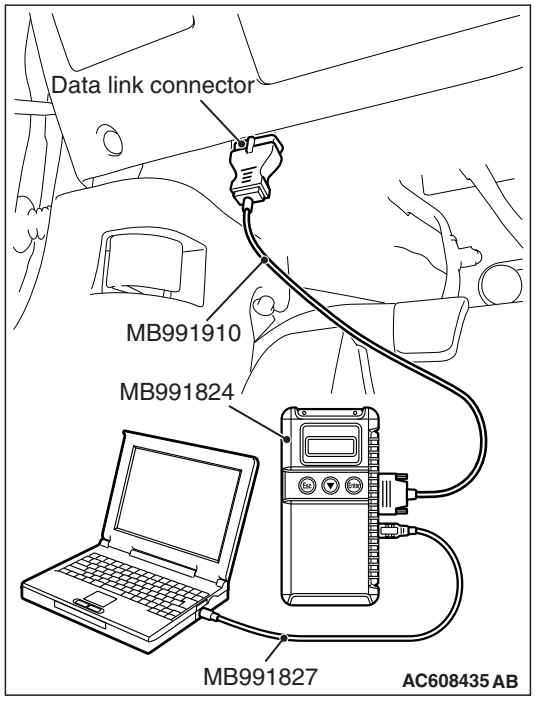
Q: Is the harness connector in good condition?

YES : Go to Step 4.
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 16.

STEP 4. Check for harness damage between accelerator pedal position sensor connector C-123 (terminal No. 2) and ECM connector B-109 (terminal No. 76).

Q: Is the harness wire in good condition?

YES : Go to Step 5.
NO : Repair it. Then go to Step 16.



STEP 5. Using scan tool MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

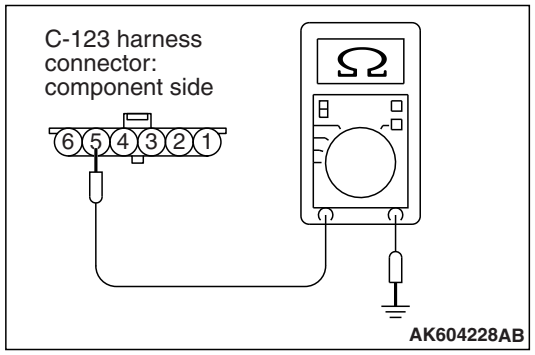
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(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 P2138 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 16.

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.00-14.



STEP 6. Check the continuity at accelerator pedal position sensor harness side connector C-123.

(1) Disconnect the connector C-123 and measure at the harness side.
(2) Measure the continuity between terminal No. 5 and ground.
- Continuity (2 Ω or less)

Q: Does continuity exist?

YES : Go to Step 10.
NO : Go to Step 7.

STEP 7. Check harness connector B-109 at ECM 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 16.

STEP 8. Check for harness damage between accelerator pedal position sensor connector C-123 (terminal No. 5) and ECM connector B-109 (terminal No. 79).

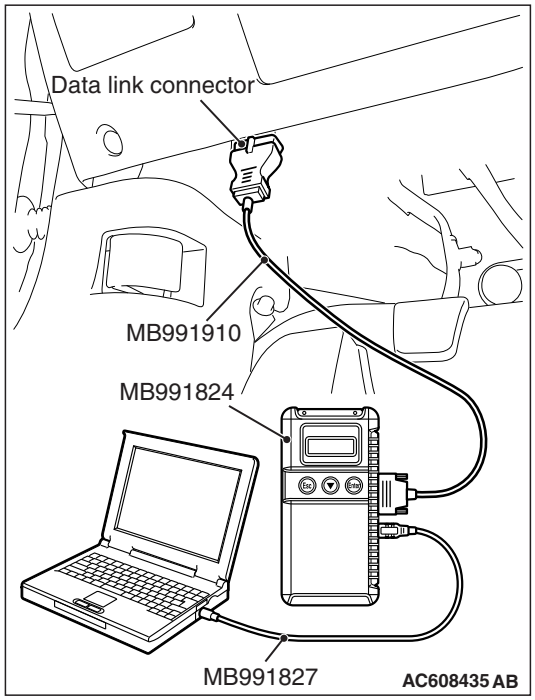
Q: Is the harness wire in good condition?

YES : Go to Step 9.
NO : Repair it. Then go to Step 16.

STEP 9. 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 P2138 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 16.
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.00-14.

STEP 10. Check harness connector B-109 at ECM 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 go to Step 16.

STEP 11. Check for harness damage between accelerator pedal position sensor connector C-123 (terminal No. 1) and ECM connector B-109 (terminal No. 75).

Q: Is the harness wire in good condition?

YES : Go to Step 12.
NO : Repair it. Then go to Step 16.

STEP 12. Check for harness damage between accelerator pedal position sensor connector C-123 (terminal No. 4) and ECM connector B-109 (terminal No. 78).

Q: Is the harness wire in good condition?

YES : Go to Step 13.
NO : Repair it. Then go to Step 16.

STEP 13. Check for harness damage between accelerator pedal position sensor connector C-123 (terminal No. 3) and ECM connector B-109 (terminal No. 74).

Q: Is the harness wire in good condition?

YES : Go to Step 14.
NO : Repair it. Then go to Step 16.

STEP 14. Check for harness damage between accelerator pedal position sensor connector C-123 (terminal No. 6) and ECM connector B-109 (terminal No. 77).

Q: Is the harness wire in good condition?

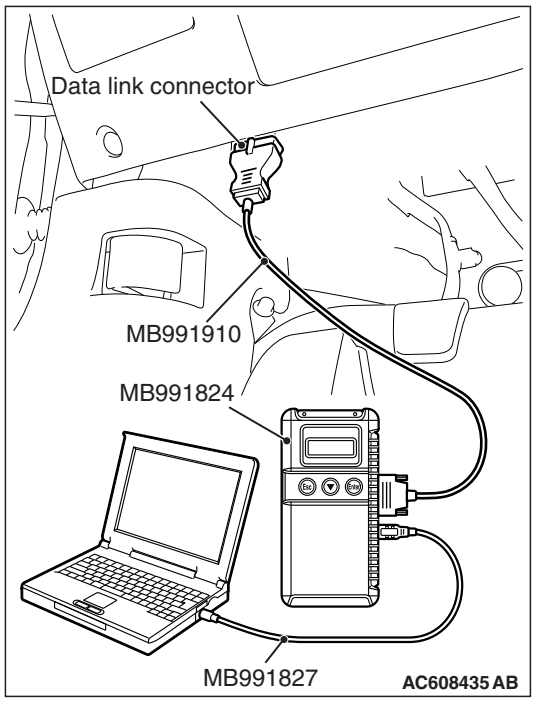
YES : Go to Step 15.
NO : Repair it. Then go to Step 16.

STEP 15. Replace the accelerator pedal position sensor.

(1) Replace the accelerator pedal position sensor.
(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 P2138 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 16.
NO : The inspection is complete.



STEP 16. Using scan tool MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

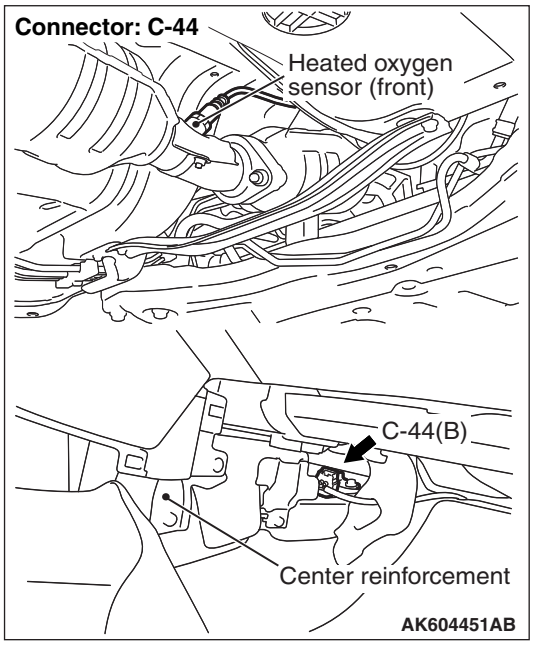
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(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 P2138 set?

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

DTC P2195: Heated Oxygen Sensor (front) Inactive <Except for California>



TECHNICAL DESCRIPTION

- The ECM effects air/fuel ratio feedback control in accordance with the signals from the heated oxygen sensor (front).
- If the heated oxygen sensor (front) has deteriorated, corrections will be made by the heated oxygen sensor (rear).
- DTC P2195 becomes stored in memory if a failure is detected in the heated oxygen sensor (front).

DESCRIPTIONS OF MONITOR METHODS

Heated oxygen sensor (front) output voltage does not cross lean/rich criteria (about 0.5 volt) within specified period.

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)

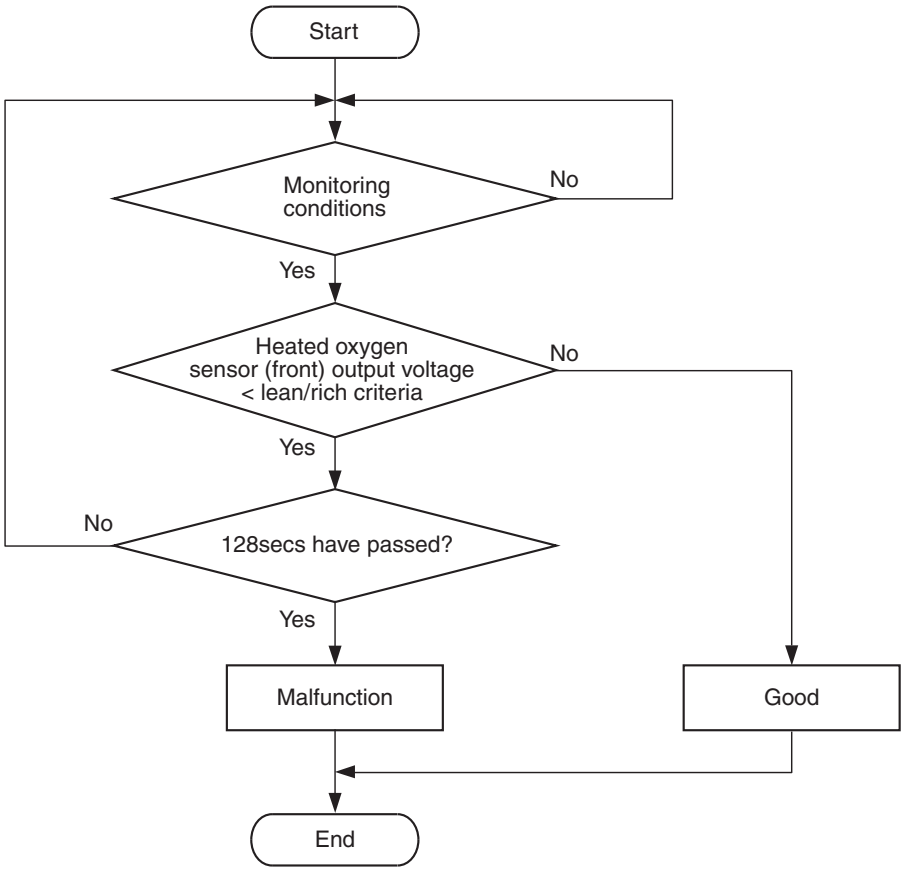
- Heated oxygen sensor (front) heater monitor
- Misfire monitor

TSB Revision

Sensor (The sensor below is determined to be normal)
- Engine coolant temperature sensor
- Intake air temperature sensor

DTC SET CONDITIONS

Logic Flow Chart



AK604365

Check Conditions
- More than 120 seconds have passed since the engine starting sequence was completed.
- Engine coolant temperature is higher than 0°C (32°F) or more.
- Under the closed loop air/fuel ratio control.
- Intake air temperature is more than –10°C (14°F).

Judgement Criterion
- Heated oxygen sensor (front) output voltage is less than lean/rich criteria (about 0.5 volt) for 128 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 22 P.13C-11.

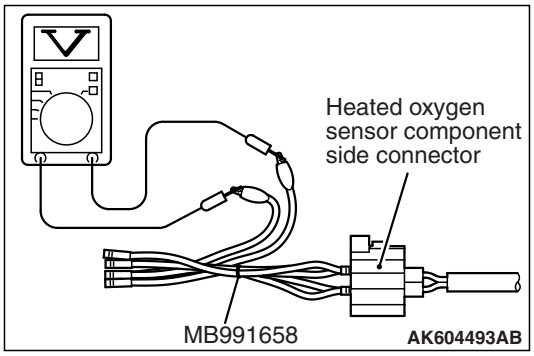
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Heated oxygen sensor (front) deteriorated.
- ECM failed.

DIAGNOSIS

Required Special Tools:
- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MB991658: Test Harness

TSB Revision



STEP 1. Check the heated oxygen sensor (front).

(1) Disconnect the heated oxygen sensor (front) connector C-44 and connect test harness special tool MB991658 to the connector on the heated oxygen sensor (front) side.
(2) Warm up the engine until engine coolant temperature reaches 80°C (176°F) or higher.
(3) Rev the engine for 5 minutes or more with the engine speed of 2,500 r/min.
(4) Connect a digital voltage meter between terminal No. 3 and terminal No. 4.
(5) While repeatedly revving the engine, measure the heated oxygen sensor (front) output voltage.

Standard value: 0.6 – 1.0 V

⚠ CAUTION

- **Be very careful when connecting the jumper wires; incorrect connection can damage the heated oxygen sensor.**
- **Be careful the heater can be damaged if a voltage beyond 8 volts is applied to the heated oxygen sensor heater.**

NOTE: If the temperature of sensing area does not reach the high temperature [of approximately 400°C (752°F) or more] even though the heated oxygen sensor is normal, the output voltage would be possibly low in spite of the rich air/fuel ratio. Therefore, if the output voltage is low, use a jumper wire to connect the terminal No. 1 and the terminal No. 2 of the heated oxygen sensor with the positive terminal and the negative terminal of 8 volts power supply respectively, then check again.

Q: Is the measured voltage between 0.6 and 1.0 volt?

YES : Go to Step 2.
NO : Replace the heated oxygen sensor (front). Then go to Step 3.

STEP 2. 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 22 P.13C-11.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P2195 set?

YES : Replace the PCM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. 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.00-14.

TSB Revision

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 22 P.13C-11.

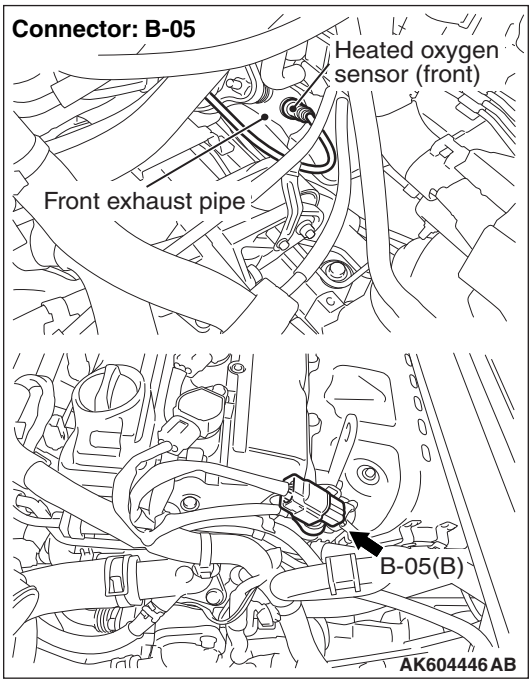
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P2195 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P2195: Heated Oxygen Sensor (front) Inactive <California>



TECHNICAL DESCRIPTION

- The ECM effects air/fuel ratio feedback control in accordance with the signals from the heated oxygen sensor (front).
- If the heated oxygen sensor (front) has deteriorated, corrections will be made by the heated oxygen sensor (rear).
- DTC P2195 becomes stored in memory if a failure is detected in the heated oxygen sensor (front).

DESCRIPTIONS OF MONITOR METHODS

Heated oxygen sensor (front) output voltage does not cross lean/rich criteria (about 0.5 volt) within specified period.

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)

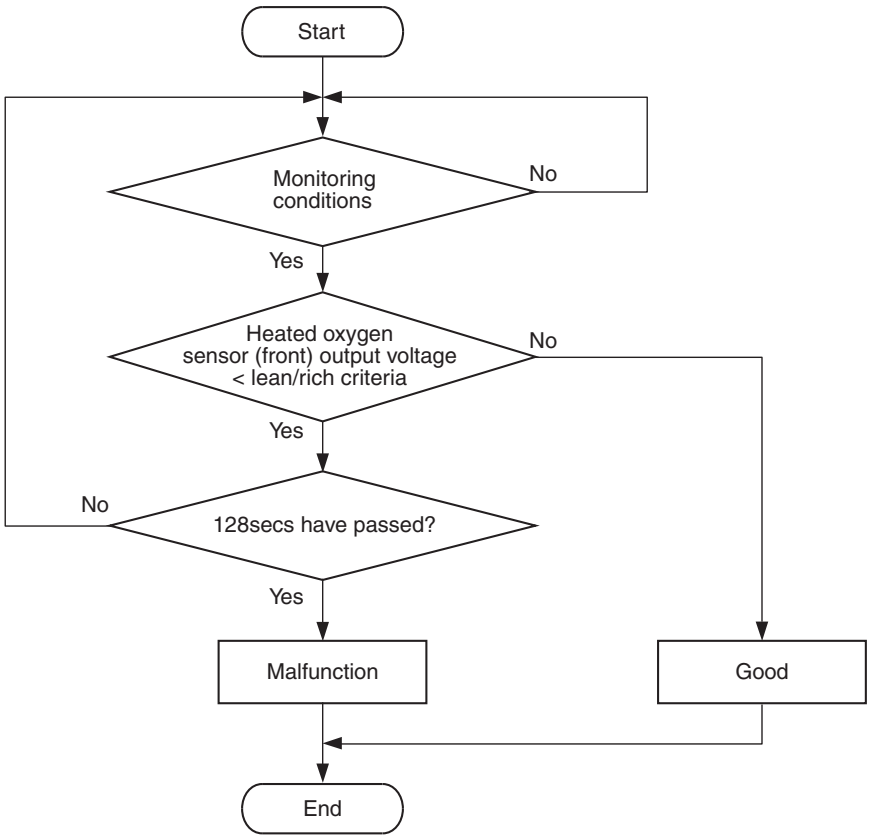
- Heated oxygen sensor (front) heater monitor
- Misfire monitor

Sensor (The sensor below is determined to be normal)

- Engine coolant temperature sensor
- Intake air temperature sensor

DTC SET CONDITIONS

Logic Flow Chart



AK604365

Check Conditions

- More than 120 seconds have passed since the engine starting sequence was completed.
- Engine coolant temperature is higher than 0°C (32°F) or more.
- Under the closed loop air/fuel ratio control.
- Intake air temperature is more than –10°C (14°F).

Judgement Criterion

- Heated oxygen sensor (front) output voltage is less than lean/rich criteria (about 0.5 volt) for 128 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 22 P.13C-11.

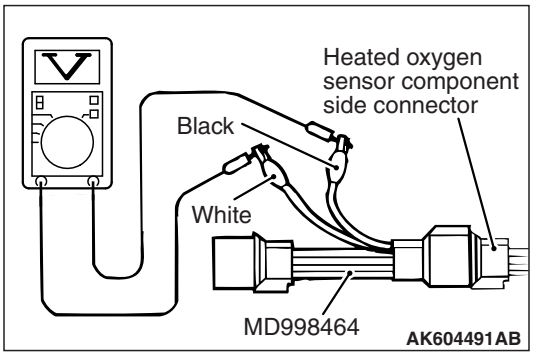
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Heated oxygen sensor (front) deteriorated.
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MD998464: Test Harness



STEP 1. Check the heated oxygen sensor (front).

(1) Disconnect the heated oxygen sensor (front) connector B-05 and connect test harness special tool MD998464 to the connector on the heated oxygen sensor (front) side.
(2) Warm up the engine until engine coolant temperature reaches 80°C (176°F) or higher.
(3) Rev the engine for 5 minutes or more with the engine speed of 2,500 r/min.
(4) Connect a digital voltage meter between terminal No. 2 (black clip) and terminal No. 4 (white clip).
(5) While repeatedly revving the engine, measure the heated oxygen sensor (front) output voltage.

Standard value: 0.6 – 1.0 V

⚠ CAUTION

- **Be very careful when connecting the jumper wires; incorrect connection can damage the heated oxygen sensor.**
- **Be careful the heater can be damaged if a voltage beyond 8 volts is applied to the heated oxygen sensor heater.**

NOTE: If the temperature of sensing area does not reach the high temperature [of approximately 400°C (752°F) or more] even though the heated oxygen sensor is normal, the output voltage would be possibly low in spite of the rich air/fuel ratio. Therefore, if the output voltage is low, use a jumper wire to connect the terminal No. 1 (red clip) and the terminal No. 3 (blue clip) of the heated oxygen sensor with the positive terminal and the negative terminal of 8 volts power supply respectively, then check again.

Q: Is the measured voltage between 0.6 and 1.0 volt?

YES : Go to Step 2.
NO : Replace the heated oxygen sensor (front). Then go to Step 3.

STEP 2. 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 22 P.13C-11.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P2195 set?

YES : Replace the PCM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. 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.00-14.

TSB Revision

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 22 P.13C-11.

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

Q: Is DTC P2195 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P2228: Barometric Pressure Circuit Low Input

TECHNICAL DESCRIPTION

- The barometric pressure sensor outputs a voltage which corresponds to the barometric pressure.
- The ECM checks whether this voltage is within a specified range.

DESCRIPTIONS OF MONITOR METHODS

Barometric pressure sensor output voltage is out of reasonable barometric pressure range.

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)

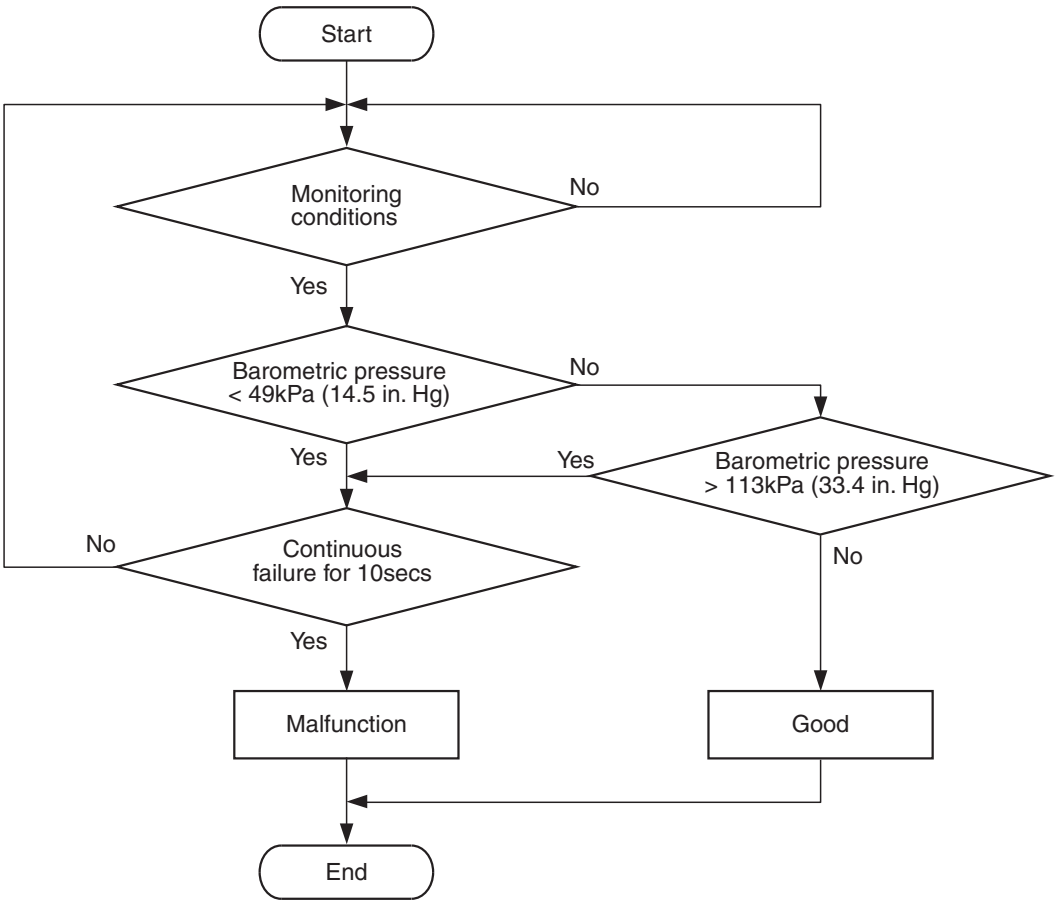
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK704299

Check Conditions

- 2 seconds or more have passed since the engine starting sequence was completed.
- Battery positive voltage is higher than 8 volts.

Judgement Criterion

- Barometric pressure sensor output signal has continued to be 49 kPa (14.5 in.Hg) or lower (approximately 15,000 ft above sea level) for 10 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 23 P.13C-11.

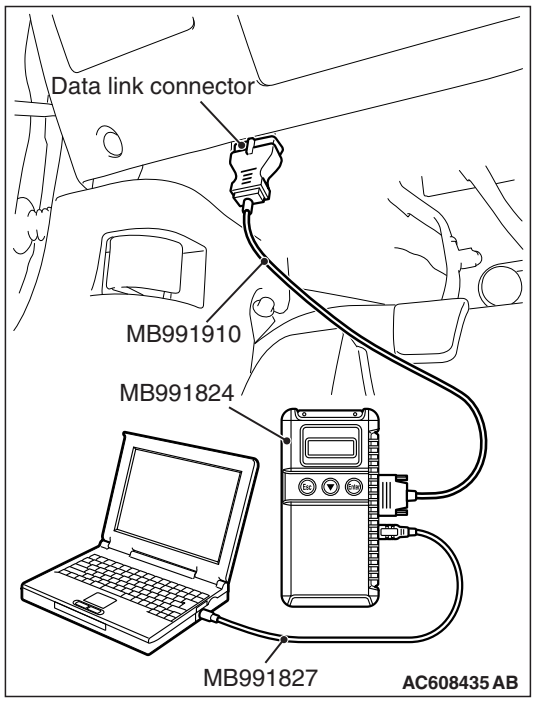
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A



STEP 1. Test the OBD-II drive cycle.

⚠ 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) Carry out the test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 23 P.13C-11.
(4) Check the diagnostic trouble code (DTC).

Q: Is DTC P2228 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.

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.00-14.

DTC P2229: Barometric Pressure Circuit High Input

TECHNICAL DESCRIPTION

- The barometric pressure sensor outputs a voltage which corresponds to the barometric pressure.
- The ECM checks whether this voltage is within a specified range.

DESCRIPTIONS OF MONITOR METHODS

Barometric pressure sensor output voltage is out of reasonable barometric pressure range.

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)

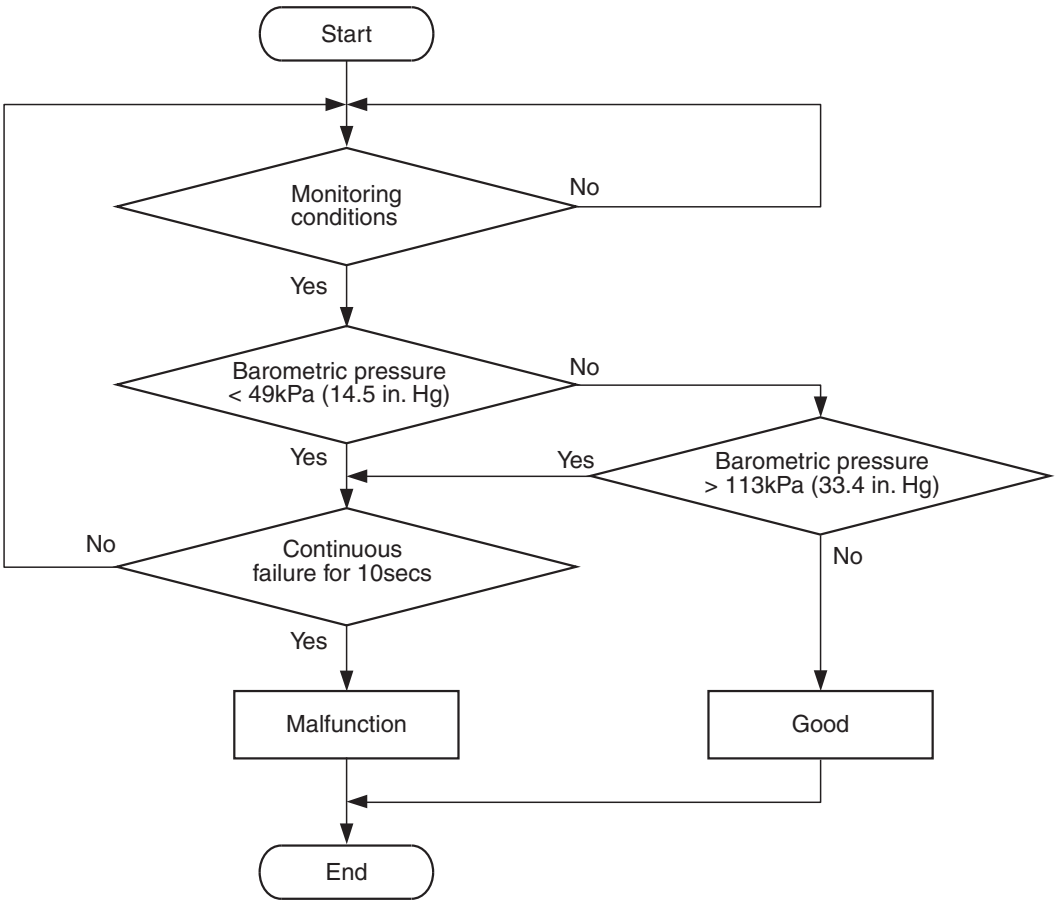
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK704299

Check Conditions

- 2 seconds or more have passed since the engine starting sequence was completed.
- Battery positive voltage is higher than 8 volts.

Judgement Criterion

- Barometric pressure sensor output signal has continued to be 113 kPa (33.4 in.Hg) or higher (approximately 4,000 ft below sea level) for 10 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 23 P.13C-11.

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

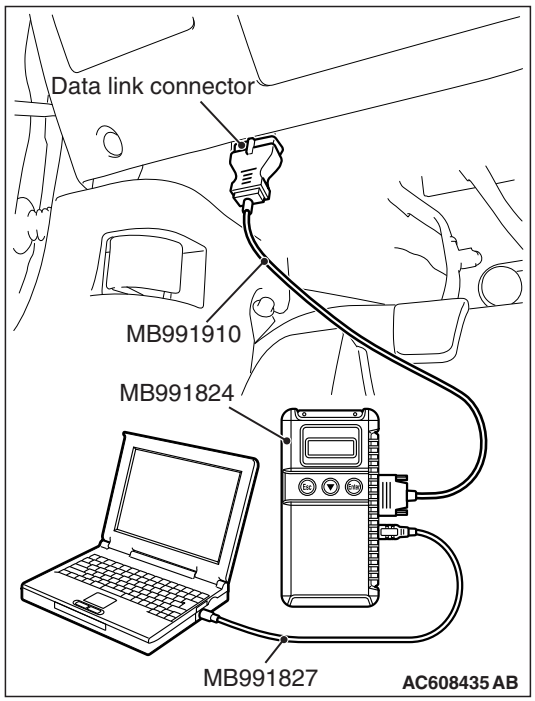
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

TSB Revision



STEP 1. Test the OBD-II drive cycle.

⚠ 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.

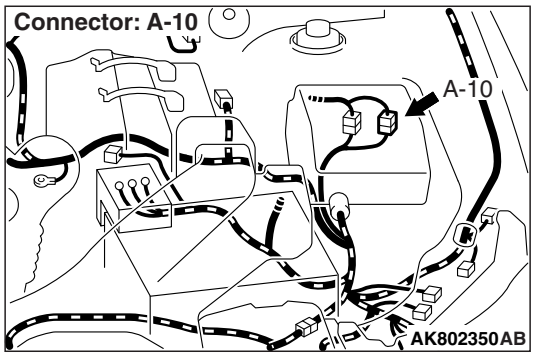
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Carry out the test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 23 P.13C-11.
(4) Check the diagnostic trouble code (DTC).

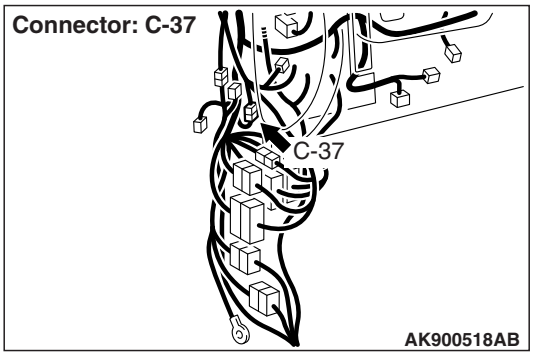
Q: Is DTC P2229 set?

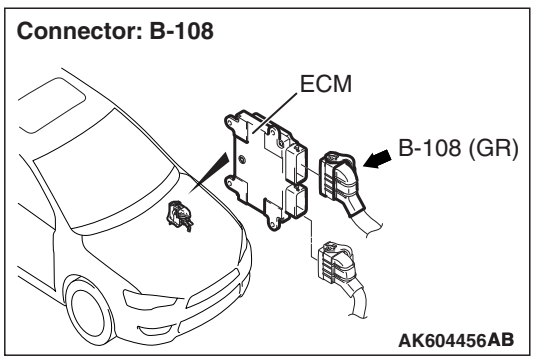
YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.

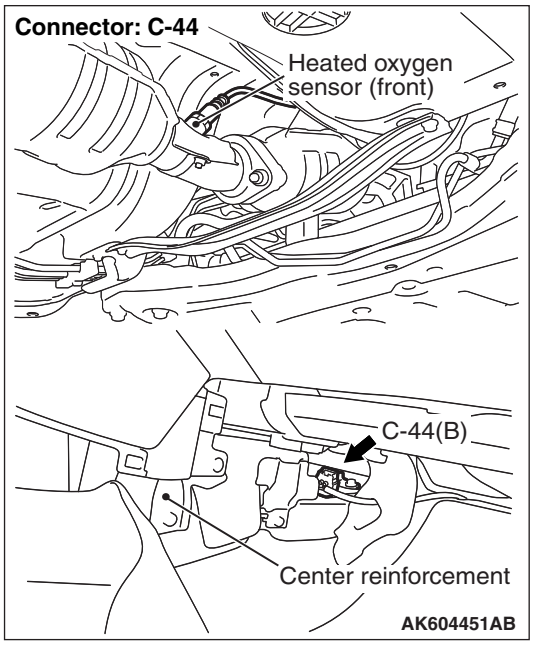
NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14.

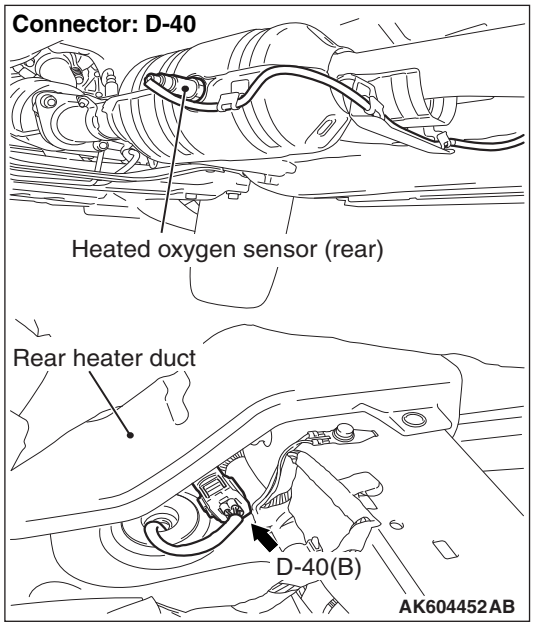
DTC P2252: Heated Oxygen Sensor Offset Circuit Low Voltage <Except for California>











HEATED OXYGEN SENSOR OFFSET CIRCUIT LOW VOLTAGE CIRCUIT

Refer to DTC P0131 – Heated Oxygen Sensor (front) Circuit Low Voltage <Except for California> P.13C-238.
Refer to DTC P0137 – Heated Oxygen Sensor (rear) Circuit Low Voltage <Except for California> P.13C-283.

CIRCUIT OPERATION

Refer to DTC P0131 – Heated Oxygen Sensor (front) Circuit Low Voltage <Except for California> P.13C-238.
Refer to DTC P0137 – Heated Oxygen Sensor (rear) Circuit Low Voltage <Except for California> P.13C-283.

TECHNICAL DESCRIPTION

- The ECM applies an offset voltage of 0.5 volt to the heated oxygen sensor.
- The ECM checks for heated oxygen sensor offset voltage.

DESCRIPTIONS OF MONITOR METHODS

Heated oxygen sensor offset voltage is under specified range.

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)

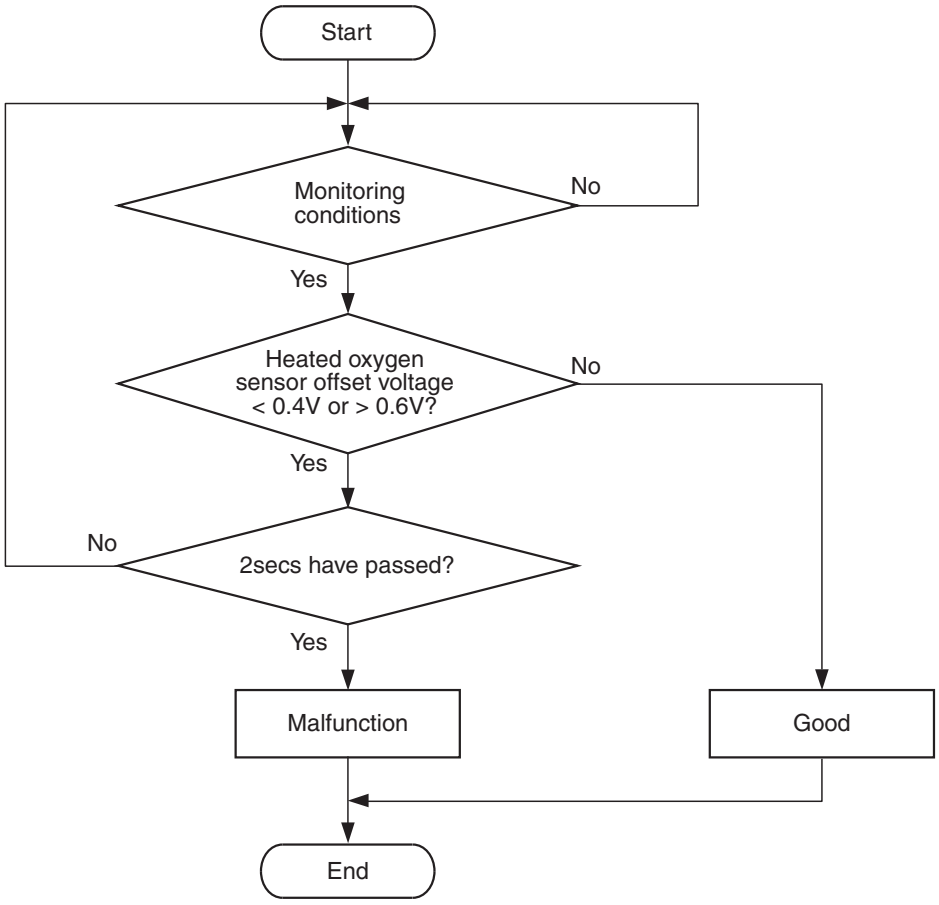
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITION

Logic Flow Chart



AK704300

Check Condition

- More than 2 seconds have passed since the engine starting sequence was completed.

Judgement Criterion

- Heated oxygen sensor offset voltage is less than 0.4 volt for 2 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnosis Function – OBD-II Drive Cycle – Pattern 23 P.13C-11.

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

- Heated oxygen sensor (front) failed.
- Heated oxygen sensor (rear) failed.
- Shorted heated oxygen sensor (front) circuit or connector damage.
- Shorted heated oxygen sensor (rear) circuit or connector damage.
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MB991658: Test Harness

TSB Revision

STEP 1. Check harness connector C-44 at heated oxygen sensor (front) and harness connector D-40 at heated oxygen sensor (rear) for damage.

Q: Are the harness connectors in good condition?

YES : Go to Step 2.

NO : Repair or replace them. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 11.

STEP 2. Check the heated oxygen sensor (front).

(1) Disconnect the heated oxygen sensor (front) connector C-44 and connect test harness special tool MB991658 to the connector on the heated oxygen sensor (front) side.

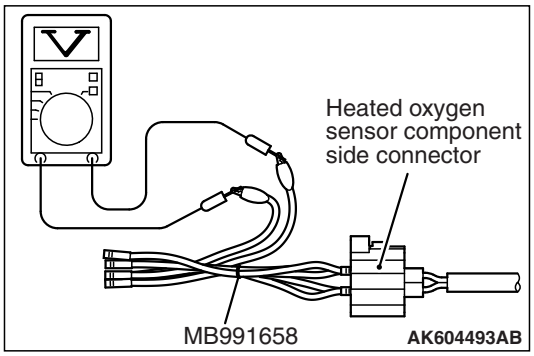
(2) Warm up the engine until engine coolant temperature reaches 80°C (176°F) or higher.

(3) Rev the engine for 5 minutes or more with the engine speed of 2,500 r/min.

(4) Connect a digital voltage meter between terminal No. 3 and terminal No. 4.

(5) While repeatedly revving the engine, measure the heated oxygen sensor (front) output voltage.

Standard value: 0.6 – 1.0 V



⚠ CAUTION

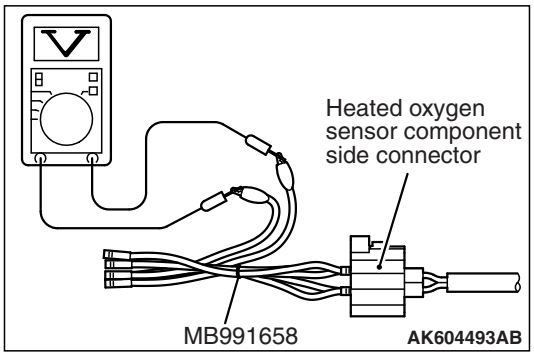
- **Be very careful when connecting the jumper wires; incorrect connection can damage the heated oxygen sensor.**
- **Be careful the heater can be damaged if a voltage beyond 8 volts is applied to the heated oxygen sensor heater.**

NOTE: If the temperature of sensing area does not reach the high temperature [of approximately 400°C (752°F) or more] even though the heated oxygen sensor is normal, the output voltage would be possibly low in spite of the rich air/fuel ratio. Therefore, if the output voltage is low, use a jumper wire to connect the terminal No. 1 and the terminal No. 2 of the heated oxygen sensor with the positive terminal and the negative terminal of 8 volts power supply respectively, then check again.

Q: Is the measured voltage between 0.6 and 1.0 volt?

YES : Go to Step 3.

NO : Replace the heated oxygen sensor (front). Then go to Step 11.



STEP 3. Check the heated oxygen sensor (rear).

(1) Disconnect the heated oxygen sensor (rear) connector D-40 and connect test harness special tool MB991658 to the connector on the heated oxygen sensor (rear) side.
(2) Warm up the engine until engine coolant temperature reaches 80°C (176°F) or higher.
(3) Drive at 50 km/h (31mph) or more for 10 minutes.
(4) Connect a digital voltage meter between terminal No. 3 and terminal No. 4.
(5) Measure the output voltage of heated oxygen sensor under the following driving.
- Transaxle: 2nd speed
- Drive with wide open throttle
- Engine: 3,500 r/min or more

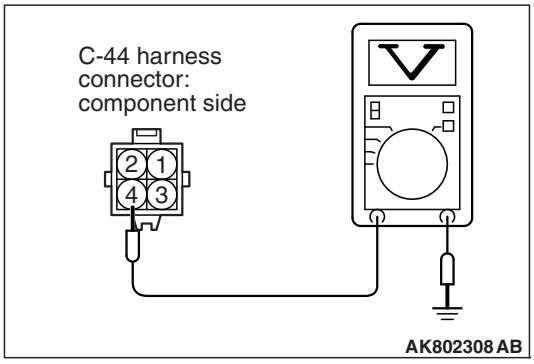
Standard value: 0.6 – 1.0 V

NOTE: If the temperature of sensing area does not reach the high temperature [of approximately 400°C (752°F) or more] even though the heated oxygen sensor is normal, the output voltage would be possibly low in spite of the rich air-fuel ratio.

NOTE: When the vehicle is driven with high loads, the temperature of the sensing area of the heated oxygen sensor is sufficiently high. Thus, it is not necessary to apply the voltage to the heater.

Q: Is the measured voltage between 0.6 and 1.0 volt?

YES : Go to Step 4.
NO : Replace the heated oxygen sensor (rear). Then go to Step 11.



STEP 4. Measure the sensor offset voltage at heated oxygen sensor (front) harness side connector C-44.

(1) Disconnect the connector C-44 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 between 0.4 and 0.6 volt.

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

Q: Is the measured voltage between 0.4 and 0.6 volt?

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

STEP 5. Check harness connector B-108 at ECM 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 11.

TSB Revision

STEP 6. Check for short circuit to ground between heated oxygen sensor (front) connector C-44 (terminal No. 4) and ECM connector B-108 (terminal No. 39).

NOTE: Check harness after checking intermediate connector A-10. If intermediate connector is damaged, repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 11.

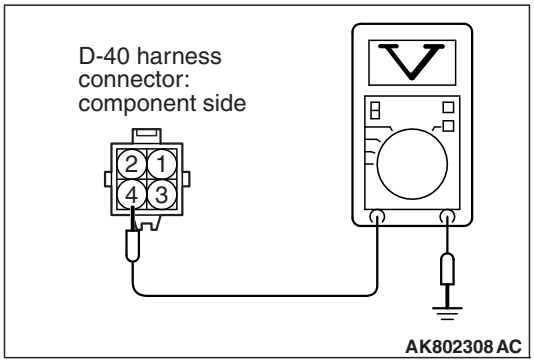
Q: Is the harness wire in good condition?

YES : Go to Step 10.
NO : Repair it. Then go to Step 11.

STEP 7. Measure the sensor offset voltage at heated oxygen sensor (rear) harness side connector D-40.

(1) Disconnect the connector D-40 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 between 0.4 and 0.6 volt.

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



Q: Is the measured voltage between 0.4 and 0.6 volt?

YES : Go to Step 10.
NO : Go to Step 8.

STEP 8. Check harness connector B-108 at ECM 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 go to Step 11.

STEP 9. Check for short circuit to ground between heated oxygen sensor (rear) connector D-40 (terminal No. 4) and ECM connector B-108 (terminal No. 41).

NOTE: Check harness after checking intermediate connectors A-10 and C-37. If intermediate connectors are damaged, repair or replace them. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 11.

Q: Is the harness wire in good condition?

YES : Go to Step 10.
NO : Repair it. Then go to Step 11.

STEP 10. Check the trouble symptoms.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 23 P.13C-11.

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

Q: Is DTC P2252 set?

YES : Replace the ECM (Refer to, Removal and Installation P.13C-972). Then go to Step 11.

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.00-14.

STEP 11. 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 23 P.13C-11.

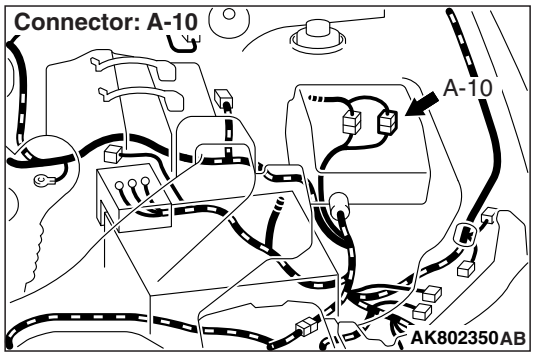
(2) Check the diagnostic trouble code (DTC).

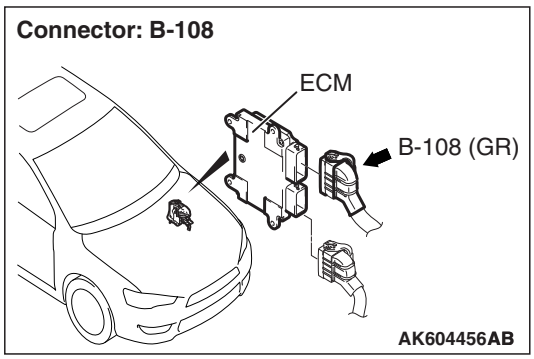
Q: Is DTC P2252 set?

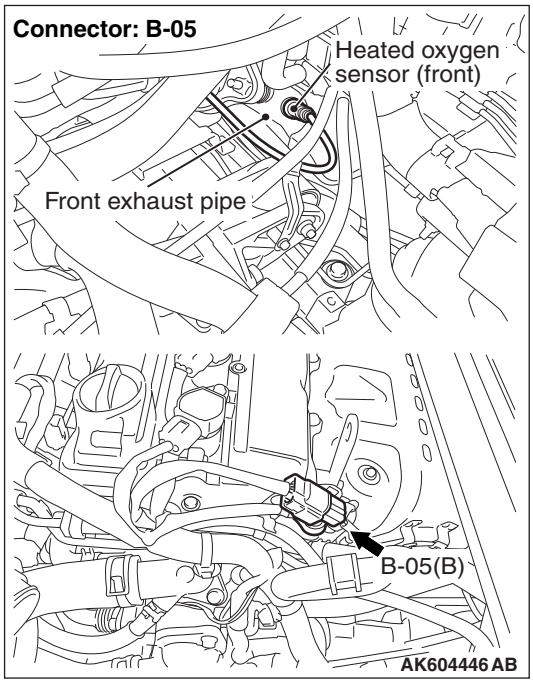
YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P2252: Heated Oxygen Sensor Offset Circuit Low Voltage <California>







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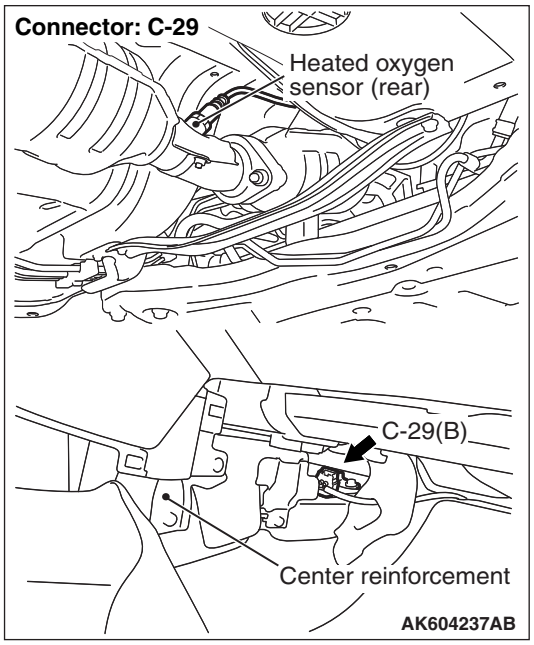
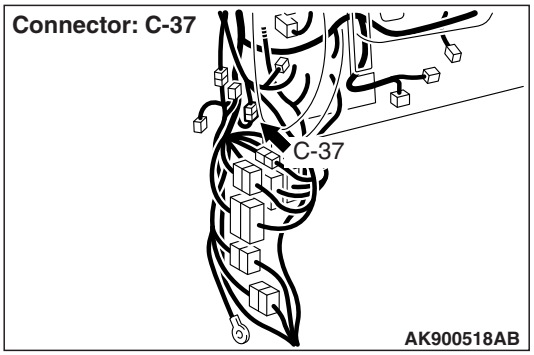
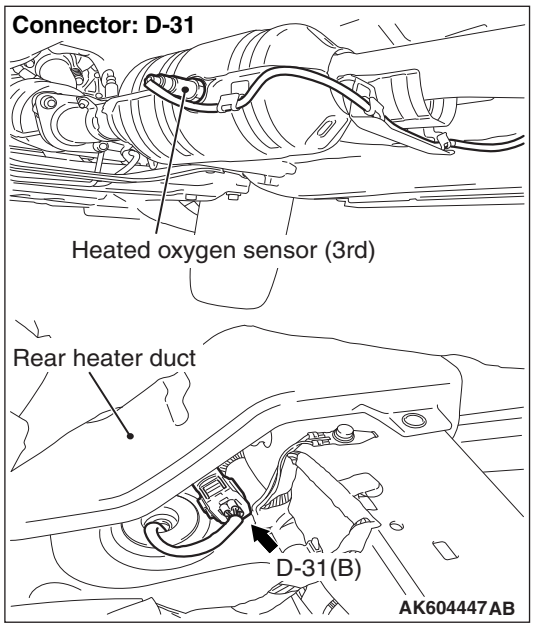






HEATED OXYGEN SENSOR OFFSET CIRCUIT LOW VOLTAGE CIRCUIT

Refer to DTC P0131 – Heated Oxygen Sensor (front) Circuit Low Voltage <California> P.13C-246.
Refer to DTC P0137 – Heated Oxygen Sensor (rear) Circuit Low Voltage <California> P.13C-292.
Refer to DTC P0143 – Heated Oxygen Sensor (3rd) Circuit Low Voltage <California> P.13C-327.

CIRCUIT OPERATION

Refer to DTC P0131 – Heated Oxygen Sensor (front) Circuit Low Voltage <California> P.13C-246.
Refer to DTC P0137 – Heated Oxygen Sensor (rear) Circuit Low Voltage <California> P.13C-292.
Refer to DTC P0143 – Heated Oxygen Sensor (3rd) Circuit Low Voltage <California> P.13C-327.

TECHNICAL DESCRIPTION

- The ECM applies an offset voltage of 0.5 volt to the heated oxygen sensor.
- The ECM checks for heated oxygen sensor offset voltage.

DESCRIPTIONS OF MONITOR METHODS

Heated oxygen sensor offset voltage is under specified range.

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)

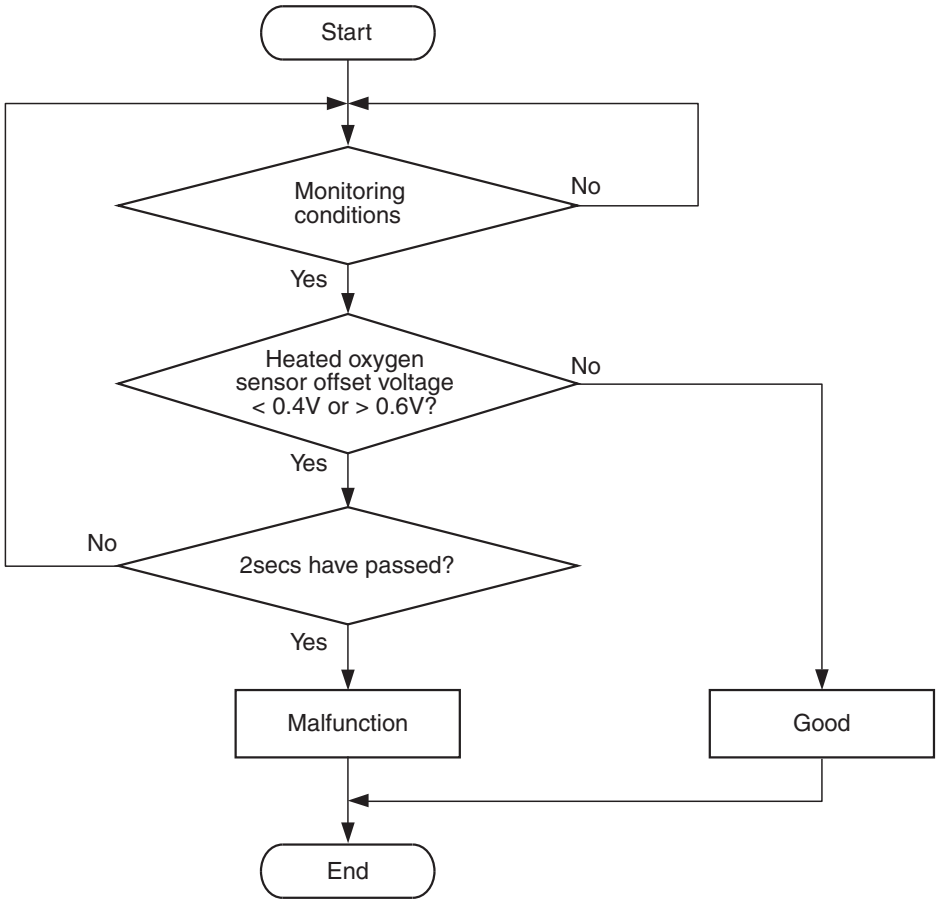
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITION

Logic Flow Chart



AK704300

Check Condition

- More than 2 seconds have passed since the engine starting sequence was completed.

Judgement Criterion

- Heated oxygen sensor offset voltage is less than 0.4 volt for 2 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnosis Function – OBD-II Drive Cycle – Pattern 23 P.13C-11.

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

- Heated oxygen sensor (front) failed.
- Heated oxygen sensor (rear) failed.
- Heated oxygen sensor (3rd) failed.
- Shorted heated oxygen sensor (front) circuit or connector damage.
- Shorted heated oxygen sensor (rear) circuit or connector damage.
- Shorted heated oxygen sensor (3rd) circuit or connector damage.
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MD998464: Test Harness
- MB991658: Test Harness

TSB Revision

STEP 1. Check harness connector B-05 at heated oxygen sensor (front), harness connector C-29 at heated oxygen sensor (rear) and D-31 at heated oxygen sensor (3rd) for damage.

Q: Are the harness connectors in good condition?

YES : Go to Step 2.

NO : Repair or replace them. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 15.

STEP 2. Check the heated oxygen sensor (front).

(1) Disconnect the heated oxygen sensor (front) connector B-05 and connect test harness special tool MD998464 to the connector on the heated oxygen sensor (front) side.

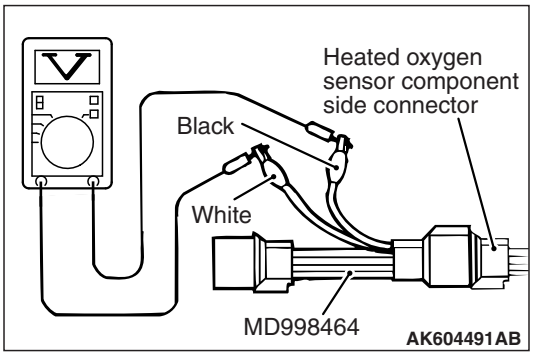
(2) Warm up the engine until engine coolant temperature reaches 80°C (176°F) or higher.

(3) Rev the engine for 5 minutes or more with the engine speed of 2,500 r/min.

(4) Connect a digital voltage meter between terminal No. 2 (black clip) and terminal No. 4 (white clip).

(5) While repeatedly revving the engine, measure the heated oxygen sensor (front) output voltage.

Standard value: 0.6 – 1.0 V



⚠ CAUTION

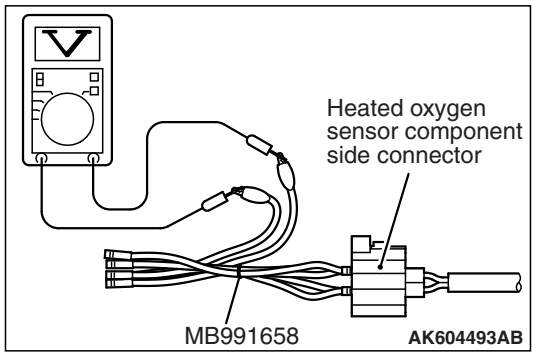
- **Be very careful when connecting the jumper wires; incorrect connection can damage the heated oxygen sensor.**
- **Be careful the heater can be damaged if a voltage beyond 8 volts is applied to the heated oxygen sensor heater.**

NOTE: If the temperature of sensing area does not reach the high temperature [of approximately 400°C (752°F) or more] even though the heated oxygen sensor is normal, the output voltage would be possibly low in spite of the rich air/fuel ratio. Therefore, if the output voltage is low, use a jumper wire to connect the terminal No. 1 (red clip) and the terminal No. 3 (blue clip) of the heated oxygen sensor with the positive terminal and the negative terminal of 8 volts power supply respectively, then check again.

Q: Is the measured voltage between 0.6 and 1.0 volt?

YES : Go to Step 3.

NO : Replace the heated oxygen sensor (front). Then go to Step 15.



STEP 3. Check the heated oxygen sensor (rear).

(1) Disconnect the heated oxygen sensor (rear) connector C-29 and connect test harness special tool MB991658 to the connector on the heated oxygen sensor (rear) side.
(2) Warm up the engine until engine coolant temperature reaches 80°C (176°F) or higher.
(3) Drive at 50 km/h (31mph) or more for 10 minutes.
(4) Connect a digital voltage meter between terminal No. 3 and terminal No. 4.
(5) Measure the output voltage of heated oxygen sensor under the following driving.
- Transaxle: 2nd speed (CVT: "L" range)
- Drive with wide open throttle
- Engine: 3,500 r/min or more

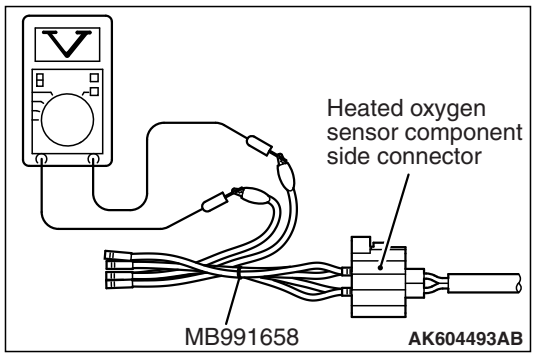
Standard value: 0.6 – 1.0 V

NOTE: If the temperature of sensing area does not reach the high temperature [of approximately 400°C (752°F) or more] even though the heated oxygen sensor is normal, the output voltage would be possibly low in spite of the rich air-fuel ratio.

NOTE: When the vehicle is driven with high loads, the temperature of the sensing area of the heated oxygen sensor is sufficiently high. Thus, it is not necessary to apply the voltage to the heater.

Q: Is the measured voltage between 0.6 and 1.0 volt?

YES : Go to Step 4.
NO : Replace the heated oxygen sensor (rear). Then go to Step 15.



STEP 4. Check the heated oxygen sensor (3rd).

(1) Disconnect the heated oxygen sensor (3rd) connector D-31 and connect test harness special tool MB991658 to the connector on the heated oxygen sensor (3rd) side.
(2) Warm up the engine until engine coolant temperature reaches 80°C (176°F) or higher.
(3) Drive at 50 km/h (31mph) or more for 10 minutes.
(4) Connect a digital voltage meter between terminal No. 3 and terminal No. 4.
(5) Measure the output voltage of heated oxygen sensor under the following driving.
- Transaxle: 2nd speed (CVT: "L" range)
- Drive with wide open throttle
- Engine: 3,500 r/min or more

Standard value: 0.6 – 1.0 V

NOTE: If the temperature of sensing area does not reach the high temperature [of approximately 400°C (752°F) or more] even though the heated oxygen sensor is normal, the output voltage would be possibly low in spite of the rich air-fuel ratio.

NOTE: When the vehicle is driven with high loads, the temperature of the sensing area of the heated oxygen sensor is sufficiently high. Thus, it is not necessary to apply the voltage to the heater.

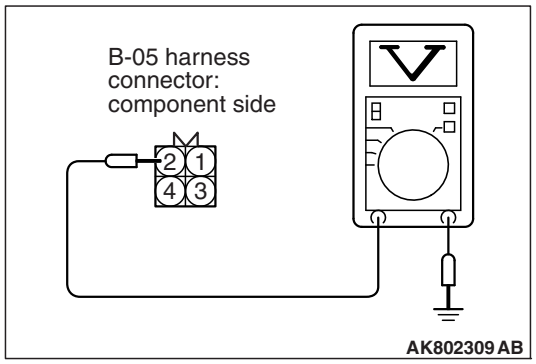
Q: Is the measured voltage between 0.6 and 1.0 volt?

YES : Go to Step 5.
NO : Replace the heated oxygen sensor (3rd). Then go to Step 15.

STEP 5. Measure the sensor offset voltage at heated oxygen sensor (front) harness side connector B-05.

(1) Disconnect the connector B-05 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 between 0.4 and 0.6 volt.

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



Q: Is the measured voltage between 0.4 and 0.6 volt?

YES : Go to Step 8.
NO : Go to Step 6.

STEP 6. Check harness connector B-108 at ECM for damage.

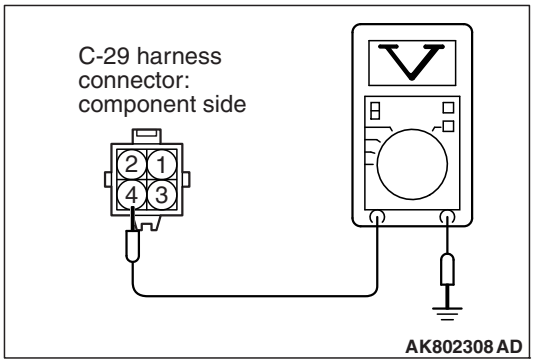
Q: Is the harness connector in good condition?

YES : Go to Step 7.
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 15.

STEP 7. Check for short circuit to ground between heated oxygen sensor (front) connector B-05 (terminal No. 2) and ECM connector B-108 (terminal No. 39).

Q: Is the harness wire in good condition?

YES : Go to Step 14.
NO : Repair it. Then go to Step 15.



STEP 8. Measure the sensor offset voltage at heated oxygen sensor (rear) harness side connector C-29.

(1) Disconnect the connector C-29 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 between 0.4 and 0.6 volt.

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

Q: Is the measured voltage between 0.4 and 0.6 volt?

YES : Go to Step 11.
NO : Go to Step 9.

STEP 9. Check harness connector B-108 at ECM 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 15.

STEP 10. Check for short circuit to ground between heated oxygen sensor (rear) connector C-29 (terminal No. 4) and ECM connector B-108 (terminal No. 41).

NOTE: Check harness after checking intermediate connector A-10. If intermediate connector is damaged, repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 15.

Q: Is the harness wire in good condition?

YES : Go to Step 14.
NO : Repair it. Then go to Step 15.

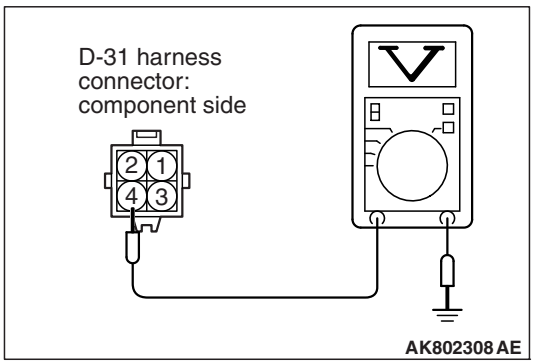
STEP 11. Measure the sensor offset voltage at heated oxygen sensor (3rd) harness side connector D-31.

(1) Disconnect the connector D-31 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 between 0.4 and 0.6 volt.

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

Q: Is the measured voltage between 0.4 and 0.6 volt?

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



STEP 12. Check harness connector B-108 at ECM 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 15.

STEP 13. Check for short circuit to ground between heated oxygen sensor (3rd) connector D-31 (terminal No. 4) and ECM connector B-108 (terminal No. 55).

NOTE: Check harness after checking intermediate connectors A-10 and C-37. If intermediate connectors are damaged, repair or replace them. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 15.

Q: Is the harness wire in good condition?

YES : Go to Step 14.
NO : Repair it. Then go to Step 15.

STEP 14. Check the trouble symptoms.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 23 P.13C-11.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P2252 set?

YES : Replace the ECM (Refer to, Removal and Installation P.13C-972). Then go to Step 15.
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.00-14.

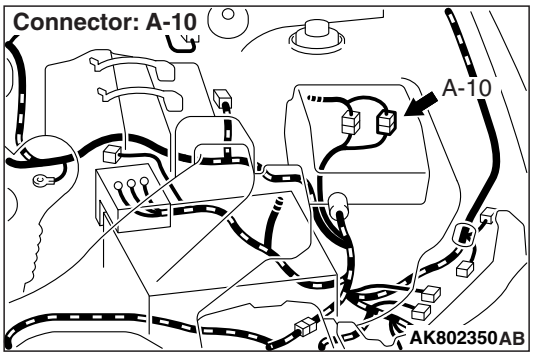
STEP 15. Test the OBD-II drive cycle.

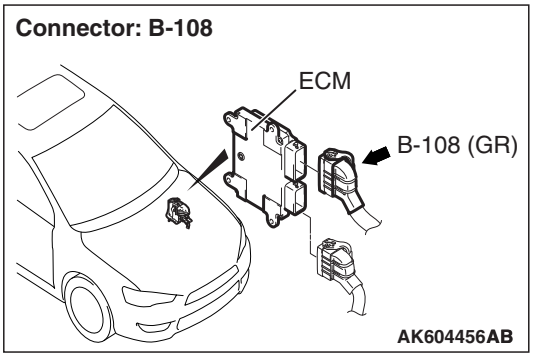
(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 23 P.13C-11.
(2) Check the diagnostic trouble code (DTC).

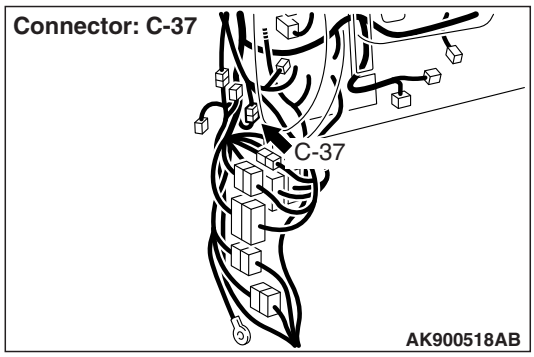
Q: Is DTC P2252 set?

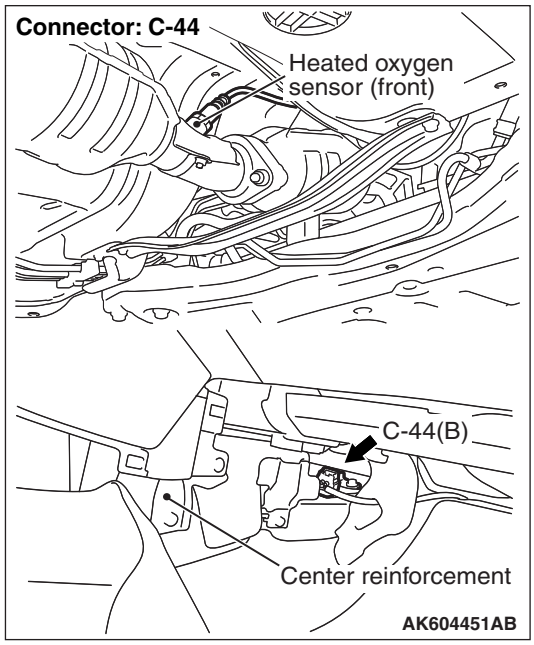
YES : Retry the troubleshooting.
NO : The inspection is complete.

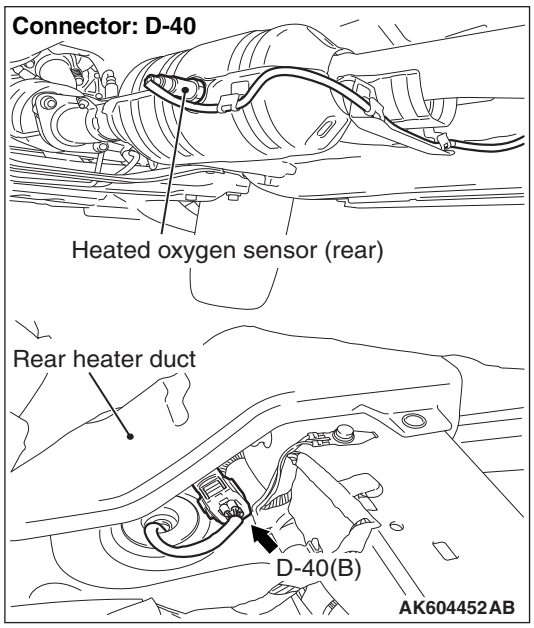
DTC P2253: Heated Oxygen Sensor Offset Circuit High Voltage <Except for California>











HEATED OXYGEN SENSOR OFFSET CIRCUIT HIGH VOLTAGE CIRCUIT

Refer to DTC P0131 – Heated Oxygen Sensor (front) Circuit Low Voltage <Except for California> P.13C-238.
Refer to DTC P0137 – Heated Oxygen Sensor (rear) Circuit Low Voltage <Except for California> P.13C-283.

CIRCUIT OPERATION

Refer to DTC P0131 – Heated Oxygen Sensor (front) Circuit Low Voltage <Except for California> P.13C-238.
Refer to DTC P0137 – Heated Oxygen Sensor (rear) Circuit Low Voltage <Except for California> P.13C-283.

TECHNICAL DESCRIPTION

- The ECM applies an offset voltage of 0.5 volt to the heated oxygen sensor.
- The ECM checks for heated oxygen sensor offset voltage.

TSB Revision

DESCRIPTIONS OF MONITOR METHODS

Heated oxygen sensor offset voltage is over specified range.

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)

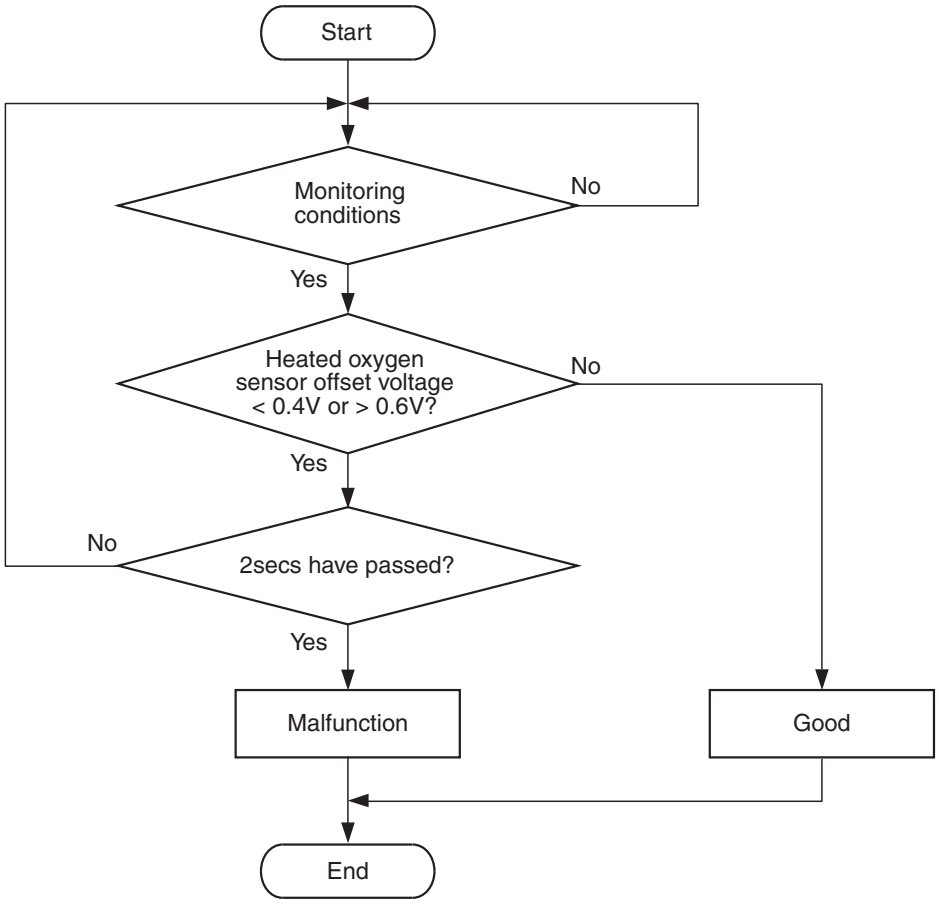
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITION

Logic Flow Chart



AK704300

Check Condition

- More than 2 seconds have passed since the engine starting sequence was completed.

Judgement Criterion

- Heated oxygen sensor offset voltage is more than 0.6 volt for 2 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnosis Function – OBD-II Drive Cycle – Pattern 23 P.13C-11.

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

- Heated oxygen sensor (front) failed.
- Heated oxygen sensor (rear) failed.
- Shorted heated oxygen sensor (front) circuit or connector damage.
- Shorted heated oxygen sensor (rear) circuit or connector damage.
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MB991658: Test Harness
- MB992110: Power Plant ECU Check Harness

STEP 1. Check harness connector C-44 at heated oxygen sensor (front) and harness connector D-40 at heated oxygen sensor (rear) for damage.

Q: Are the harness connectors in good condition?

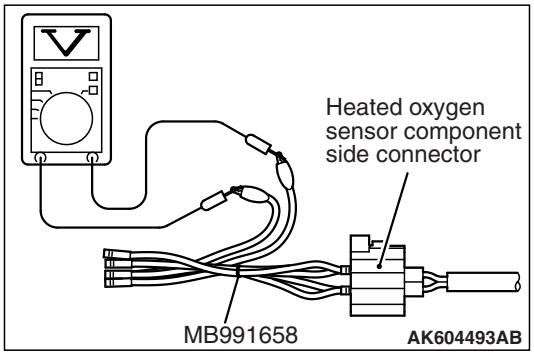
YES : Go to Step 2.

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

STEP 2. Check the heated oxygen sensor (front).

(1) Disconnect the heated oxygen sensor (front) connector C-44 and connect test harness special tool MB991658 to the connector on the heated oxygen sensor (front) side.
(2) Warm up the engine until engine coolant temperature reaches 80°C (176°F) or higher.
(3) Rev the engine for 5 minutes or more with the engine speed of 2,500 r/min.
(4) Connect a digital voltage meter between terminal No. 3 and terminal No. 4.
(5) While repeatedly revving the engine, measure the heated oxygen sensor (front) output voltage.

Standard value: 0.6 – 1.0 V



⚠ CAUTION

- **Be very careful when connecting the jumper wires; incorrect connection can damage the heated oxygen sensor.**
- **Be careful the heater can be damaged if a voltage beyond 8 volts is applied to the heated oxygen sensor heater.**

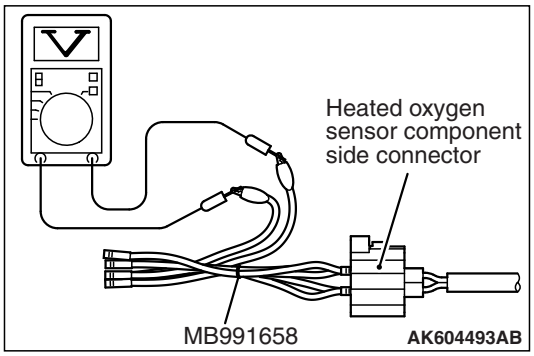
NOTE: If the temperature of sensing area does not reach the high temperature [of approximately 400°C (752°F) or more] even though the heated oxygen sensor is normal, the output voltage would be possibly low in spite of the rich air/fuel ratio. Therefore, if the output voltage is low, use a jumper wire to connect the terminal No. 1 and the terminal No. 2 of the heated oxygen sensor with the positive terminal and the negative terminal of 8 volts power supply respectively, then check again.

Q: Is the measured voltage between 0.6 and 1.0 volt?

YES : Go to Step 3.

NO : Replace the heated oxygen sensor (front). Then go to Step 12.

TSB Revision



STEP 3. Check the heated oxygen sensor (rear).

(1) Disconnect the heated oxygen sensor (rear) connector D-40 and connect test harness special tool MB991658 to the connector on the heated oxygen sensor (rear) side.
(2) Warm up the engine until engine coolant temperature reaches 80°C (176°F) or higher.
(3) Drive at 50 km/h (31mph) or more for 10 minutes.
(4) Connect a digital voltage meter between terminal No. 3 and terminal No. 4.
(5) Measure the output voltage of heated oxygen sensor under the following driving.
- Transaxle: 2nd speed
- Drive with wide open throttle
- Engine: 3,500 r/min or more

Standard value: 0.6 – 1.0 V

NOTE: If the temperature of sensing area does not reach the high temperature [of approximately 400°C (752°F) or more] even though the heated oxygen sensor is normal, the output voltage would be possibly low in spite of the rich air-fuel ratio.

NOTE: When the vehicle is driven with high loads, the temperature of the sensing area of the heated oxygen sensor is sufficiently high. Thus, it is not necessary to apply the voltage to the heater.

Q: Is the measured voltage between 0.6 and 1.0 volt?

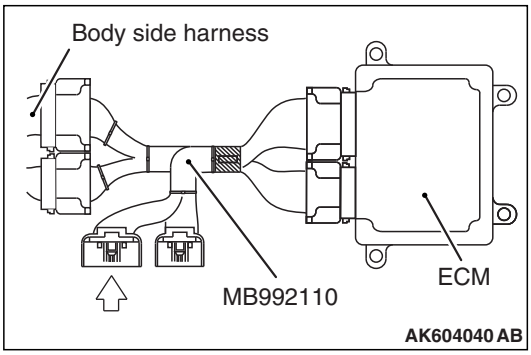
YES : Go to Step 4.
NO : Replace the heated oxygen sensor (rear). Then go to Step 12.

STEP 4. Check harness connector B-108 at ECM for damage.

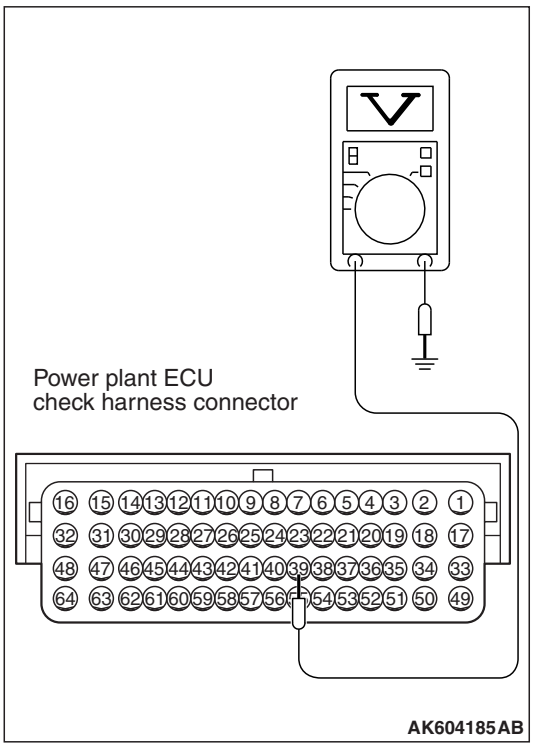
Q: Is the harness connector in good condition?

YES : Go to Step 5.
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.

STEP 5. Measure the sensor offset voltage at ECM connector B-108 by using power plant ECU check harness special tool MB992110.



(1) Disconnect all ECM connectors. Connect the power plant ECU check harness special tool MB992110 between the separated connectors.
(2) Turn the ignition switch to the "ON" position.



(3) Measure the voltage between terminal No. 39 and ground.
- Voltage should be between 0.4 and 0.6 volt.

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

Q: Is the measured voltage between 0.4 and 0.6 volt?

YES : Go to Step 8.
NO : Go to Step 6.

STEP 6. Check for short circuit to power supply between heated oxygen sensor (front) connector C-44 (terminal No. 4) and ECM connector B-108 (terminal No. 39).

NOTE: Check harness after checking intermediate connector A-10. If intermediate connector 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 : Go to Step 7.
NO : Repair it. Then go to Step 12.

STEP 7. Check for short circuit to power supply between heated oxygen sensor (front) connector C-44 (terminal No. 3) and ECM connector B-108 (terminal No. 38).

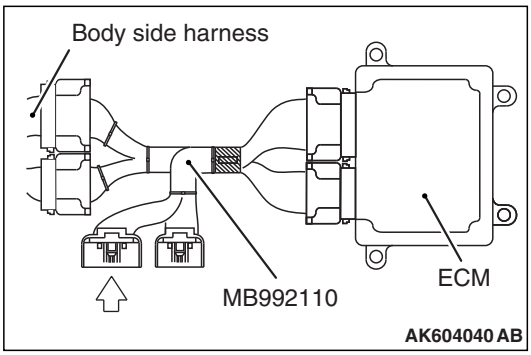
NOTE: Check harness after checking intermediate connector A-10. If intermediate connector is damaged, repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.

Q: Is the harness wire in good condition?

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

STEP 8. Measure the sensor offset voltage at ECM connector B-108 by using power plant ECU check harness special tool MB992110.

(1) Disconnect all ECM connectors. Connect the power plant ECU check harness special tool MB992110 between the separated connectors.
(2) Turn the ignition switch to the "ON" position.

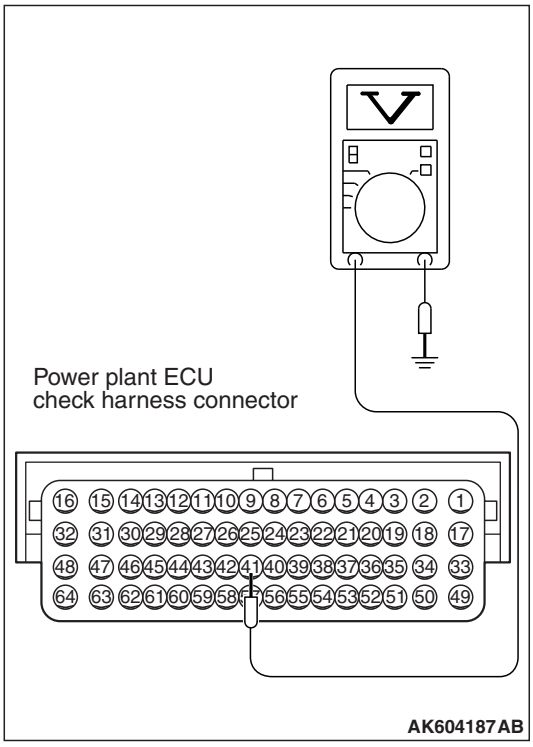


(3) Measure the voltage between terminal No. 41 and ground.
- Voltage should be between 0.4 and 0.6 volt.

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

Q: Is the measured voltage between 0.4 and 0.6 volt?

YES : Go to Step 11.
NO : Go to Step 9.



STEP 9. Check for short circuit to power supply between heated oxygen sensor (rear) connector D-40 (terminal No. 4) and ECM connector B-108 (terminal No. 41).

NOTE: Check harness after checking intermediate connectors A-10 and C-37. 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 10.
NO : Repair it. Then go to Step 12.

STEP 10. Check for short circuit to power supply between heated oxygen sensor (rear) connector D-40 (terminal No. 3) and ECM connector B-108 (terminal No. 40).

NOTE: Check harness after checking intermediate connectors A-10 and C-37. 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 the trouble symptoms.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 23 P.13C-11.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P2253 set?

YES : Replace the ECM (Refer to, Removal and Installation P.13C-972). Then go to Step 12.
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.00-14.

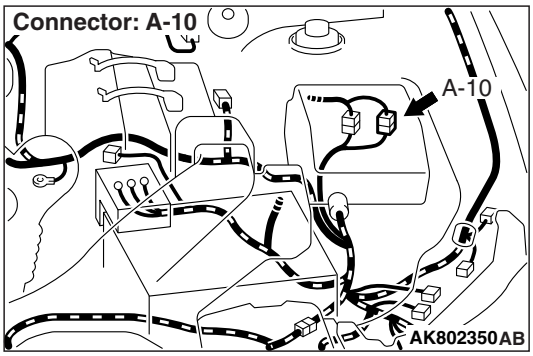
STEP 12. Test the OBD-II drive cycle.

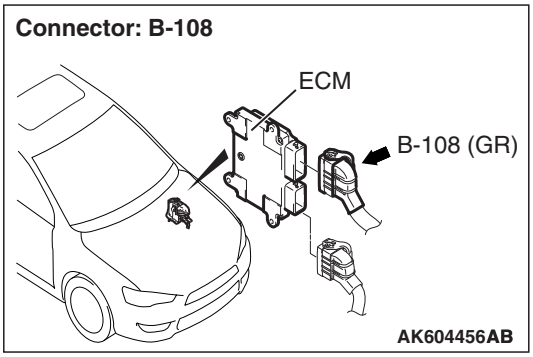
(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 23 P.13C-11.
(2) Check the diagnostic trouble code (DTC).

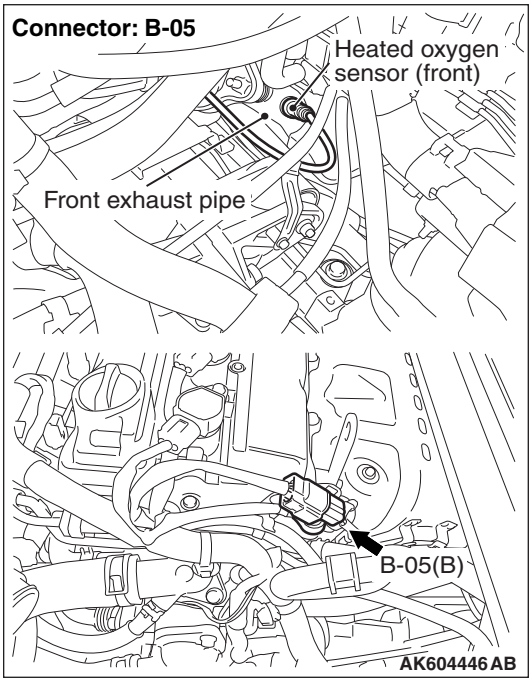
Q: Is DTC P2253 set?

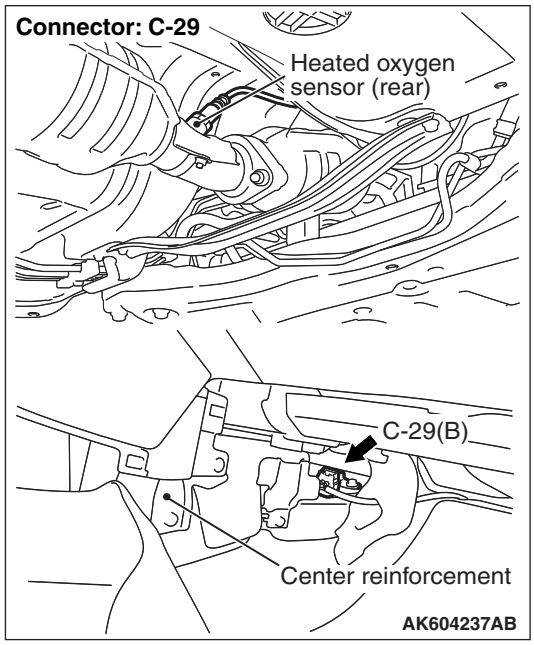
YES : Retry the troubleshooting.
NO : The inspection is complete.

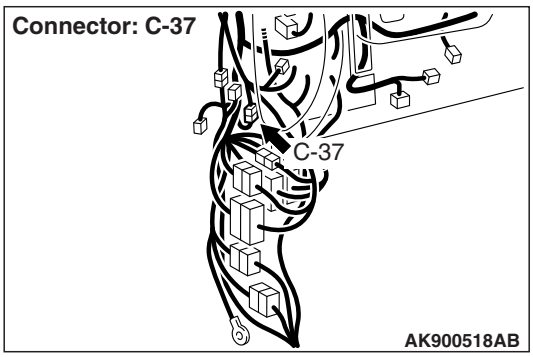
DTC P2253: Heated Oxygen Sensor Offset Circuit High Voltage <California>

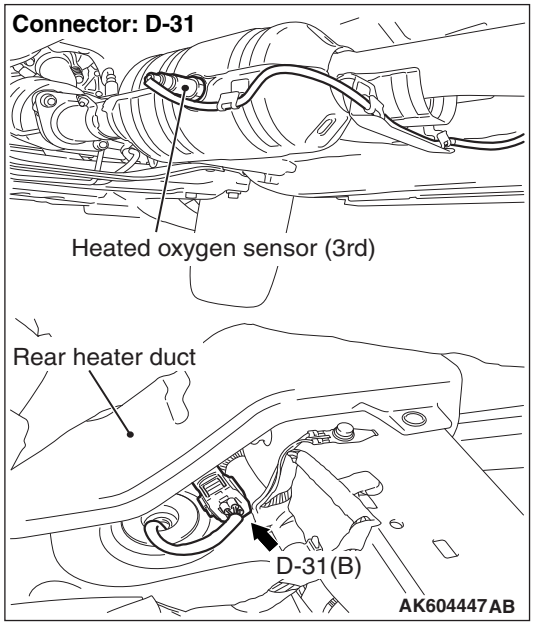












TSB Revision

HEATED OXYGEN SENSOR OFFSET CIRCUIT HIGH VOLTAGE CIRCUIT

Refer to DTC P0131 – Heated Oxygen Sensor (front) Circuit Low Voltage <California> P.13C-246.
Refer to DTC P0137 – Heated Oxygen Sensor (rear) Circuit Low Voltage <California> P.13C-292.
Refer to DTC P0143 – Heated Oxygen Sensor (3rd) Circuit Low Voltage <California> P.13C-327.

CIRCUIT OPERATION

Refer to DTC P0131 – Heated Oxygen Sensor (front) Circuit Low Voltage <California> P.13C-246.
Refer to DTC P0137 – Heated Oxygen Sensor (rear) Circuit Low Voltage <California> P.13C-292.
Refer to DTC P0143 – Heated Oxygen Sensor (3rd) Circuit Low Voltage <California> P.13C-327.

TECHNICAL DESCRIPTION

- The ECM applies an offset voltage of 0.5 volt to the heated oxygen sensor.
- The ECM checks for heated oxygen sensor offset voltage.

DESCRIPTIONS OF MONITOR METHODS

Heated oxygen sensor offset voltage is over specified range.

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)

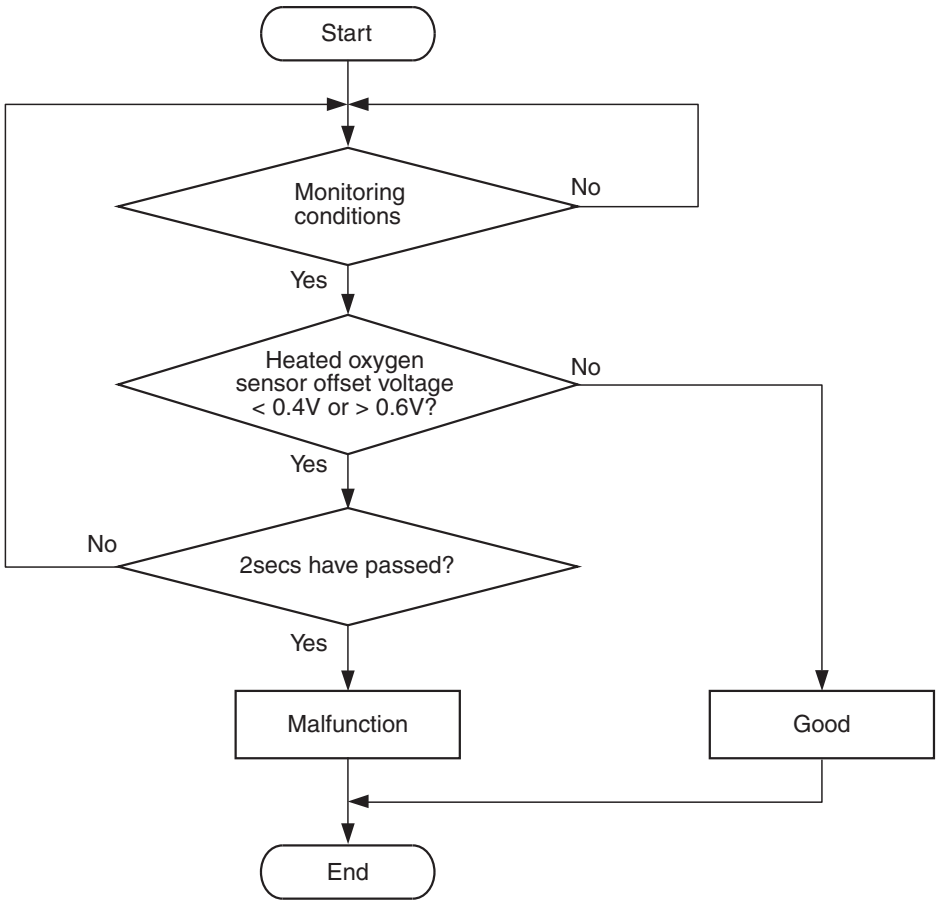
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITION

Logic Flow Chart



AK704300

TSB Revision

Check Condition

- More than 2 seconds have passed since the engine starting sequence was completed.

Judgement Criterion

- Heated oxygen sensor offset voltage is more than 0.6 volt for 2 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnosis Function – OBD-II Drive Cycle – Pattern 23 P.13C-11.

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

- Heated oxygen sensor (front) failed.
- Heated oxygen sensor (rear) failed.
- Heated oxygen sensor (3rd) failed.
- Shorted heated oxygen sensor (front) circuit or connector damage.
- Shorted heated oxygen sensor (rear) circuit or connector damage.
- Shorted heated oxygen sensor (3rd) circuit or connector damage.
- ECM failed.

DIAGNOSIS

Required Special Tools:

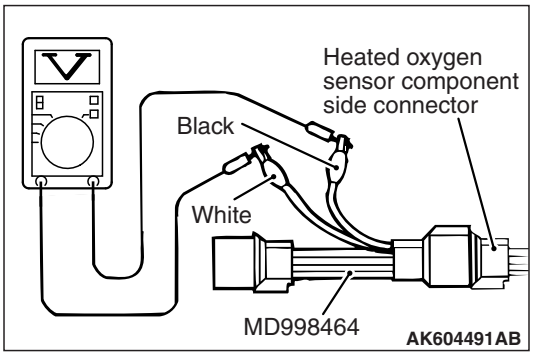
- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MB991658: Test Harness
- MD998464: Test Harness
- MB992110: Power Plant ECU Check Harness

STEP 1. Check harness connector B-05 at heated oxygen sensor (front), harness connector C-29 at heated oxygen sensor (rear) and D-31 at heated oxygen sensor (3rd) for damage.

Q: Are the harness connectors in good condition?

YES : Go to Step 2.

NO : Repair or replace them. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 16.



STEP 2. Check the heated oxygen sensor (front).

(1) Disconnect the heated oxygen sensor (front) connector B-05 and connect test harness special tool MD998464 to the connector on the heated oxygen sensor (front) side.
(2) Warm up the engine until engine coolant temperature reaches 80°C (176°F) or higher.
(3) Rev the engine for 5 minutes or more with the engine speed of 2,500 r/min.
(4) Connect a digital voltage meter between terminal No. 2 (black clip) and terminal No. 4 (white clip).
(5) While repeatedly revving the engine, measure the heated oxygen sensor (front) output voltage.

Standard value: 0.6 – 1.0 V

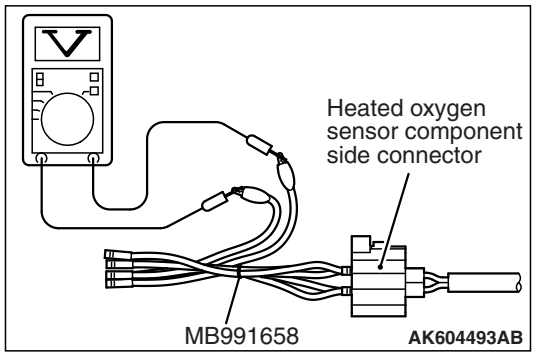
⚠ CAUTION

- **Be very careful when connecting the jumper wires; incorrect connection can damage the heated oxygen sensor.**
- **Be careful the heater can be damaged if a voltage beyond 8 volts is applied to the heated oxygen sensor heater.**

NOTE: If the temperature of sensing area does not reach the high temperature [of approximately 400°C (752°F) or more] even though the heated oxygen sensor is normal, the output voltage would be possibly low in spite of the rich air/fuel ratio. Therefore, if the output voltage is low, use a jumper wire to connect the terminal No. 1 (red clip) and the terminal No. 3 (blue clip) of the heated oxygen sensor with the positive terminal and the negative terminal of 8 volts power supply respectively, then check again.

Q: Is the measured voltage between 0.6 and 1.0 volt?

YES : Go to Step 3.
NO : Replace the heated oxygen sensor (front). Then go to Step 16.



STEP 3. Check the heated oxygen sensor (rear).

(1) Disconnect the heated oxygen sensor (rear) connector C-29 and connect test harness special tool MB991658 to the connector on the heated oxygen sensor (rear) side.
(2) Warm up the engine until engine coolant temperature reaches 80°C (176°F) or higher.
(3) Drive at 50 km/h (31mph) or more for 10 minutes.
(4) Connect a digital voltage meter between terminal No. 3 and terminal No. 4.
(5) Measure the output voltage of heated oxygen sensor under the following driving.
- Transaxle: 2nd speed (CVT: "L" range)
- Drive with wide open throttle
- Engine: 3,500 r/min or more

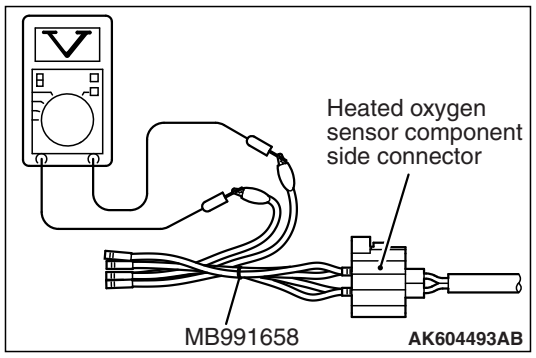
Standard value: 0.6 – 1.0 V

NOTE: If the temperature of sensing area does not reach the high temperature [of approximately 400°C (752°F) or more] even though the heated oxygen sensor is normal, the output voltage would be possibly low in spite of the rich air-fuel ratio.

NOTE: When the vehicle is driven with high loads, the temperature of the sensing area of the heated oxygen sensor is sufficiently high. Thus, it is not necessary to apply the voltage to the heater.

Q: Is the measured voltage between 0.6 and 1.0 volt?

YES : Go to Step 4.
NO : Replace the heated oxygen sensor (rear). Then go to Step 16.



STEP 4. Check the heated oxygen sensor (3rd).

(1) Disconnect the heated oxygen sensor (3rd) connector D-31 and connect test harness special tool MB991658 to the connector on the heated oxygen sensor (3rd) side.
(2) Warm up the engine until engine coolant temperature reaches 80°C (176°F) or higher.
(3) Drive at 50 km/h (31mph) or more for 10 minutes.
(4) Connect a digital voltage meter between terminal No. 3 and terminal No. 4.
(5) Measure the output voltage of heated oxygen sensor under the following driving.
- Transaxle: 2nd speed (CVT: "L" range)
- Drive with wide open throttle
- Engine: 3,500 r/min or more

Standard value: 0.6 – 1.0 V

NOTE: If the temperature of sensing area does not reach the high temperature [of approximately 400°C (752°F) or more] even though the heated oxygen sensor is normal, the output voltage would be possibly low in spite of the rich air-fuel ratio.

NOTE: When the vehicle is driven with high loads, the temperature of the sensing area of the heated oxygen sensor is sufficiently high. Thus, it is not necessary to apply the voltage to the heater.

Q: Is the measured voltage between 0.6 and 1.0 volt?

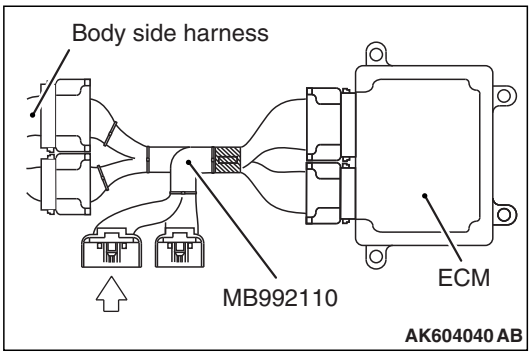
YES : Go to Step 5.
NO : Replace the heated oxygen sensor (3rd). Then go to Step 16.

STEP 5. Check harness connector B-108 at ECM for damage.

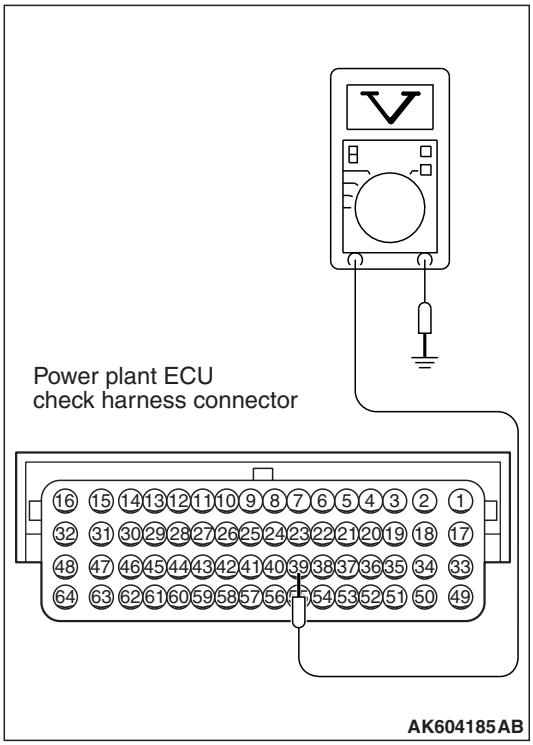
Q: Is the harness connector in good condition?

YES : Go to Step 6.
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 16.

STEP 6. Measure the sensor offset voltage at ECM connector B-108 by using power plant ECU check harness special tool MB992110.



(1) Disconnect all ECM connectors. Connect the power plant ECU check harness special tool MB992110 between the separated connectors.
(2) Turn the ignition switch to the "ON" position.



(3) Measure the voltage between terminal No. 39 and ground.
- Voltage should be between 0.4 and 0.6 volt.

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

Q: Is the measured voltage between 0.4 and 0.6 volt?

YES : Go to Step 9.
NO : Go to Step 7.

STEP 7. Check for short circuit to power supply between heated oxygen sensor (front) connector B-05 (terminal No. 2) and ECM connector B-108 (terminal No. 39).

Q: Is the harness wire in good condition?

YES : Go to Step 8.
NO : Repair it. Then go to Step 16.

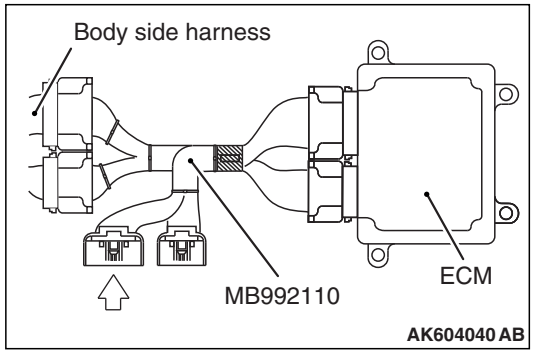
STEP 8. Check for short circuit to power supply between heated oxygen sensor (front) connector B-05 (terminal No. 4) and ECM connector B-108 (terminal No. 38).

Q: Is the harness wire in good condition?

YES : Go to Step 15.
NO : Repair it. Then go to Step 16.

STEP 9. Measure the sensor offset voltage at ECM connector B-108 by using power plant ECU check harness special tool MB992110.

(1) Disconnect all ECM connectors. Connect the power plant ECU check harness special tool MB992110 between the separated connectors.
(2) Turn the ignition switch to the "ON" position.

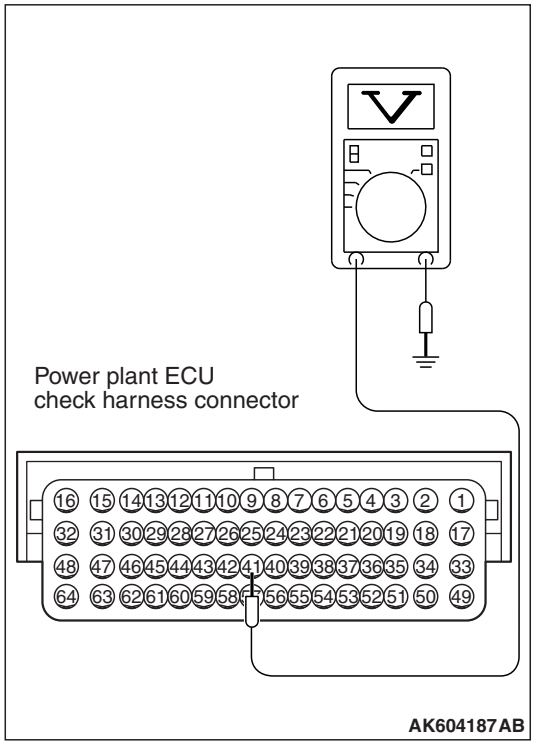


(3) Measure the voltage between terminal No. 41 and ground.
- Voltage should be between 0.4 and 0.6 volt.

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

Q: Is the measured voltage between 0.4 and 0.6 volt?

YES : Go to Step 12.
NO : Go to Step 10.



STEP 10. Check for short circuit to power supply between heated oxygen sensor (rear) connector C-29 (terminal No. 4) and ECM connector B-108 (terminal No. 41).

NOTE: Check harness after checking intermediate connector A-10. If intermediate connector is damaged, repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 16.

Q: Is the harness wire in good condition?

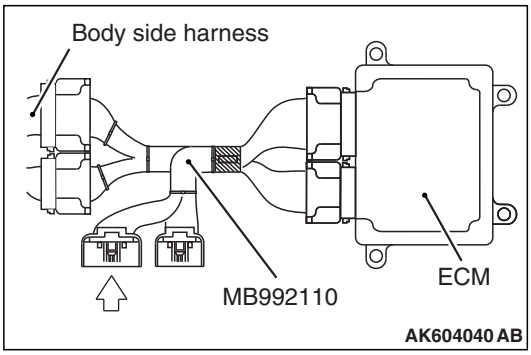
YES : Go to Step 11
NO : Repair it. Then go to Step 16.

STEP 11. Check for short circuit to power supply between heated oxygen sensor (rear) connector C-29 (terminal No. 3) and ECM connector B-108 (terminal No. 40).

NOTE: Check harness after checking intermediate connector A-10. If intermediate connector is damaged, repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 16.

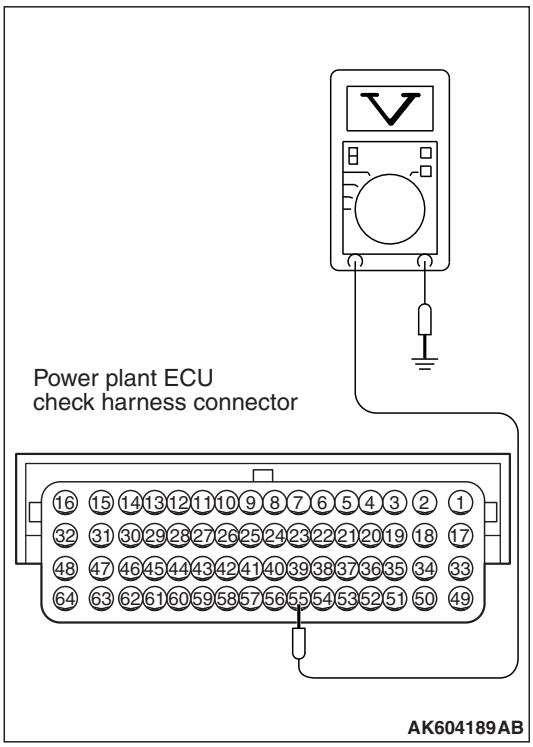
Q: Is the harness wire in good condition?

YES : Go to Step 15
NO : Repair it. Then go to Step 16.



STEP 12. Measure the sensor offset voltage at ECM connector B-108 by using power plant ECU check harness special tool MB992110.

(1) Disconnect all ECM connectors. Connect the power plant ECU check harness special tool MB992110 between the separated connectors.
(2) Turn the ignition switch to the "ON" position.



(3) Measure the voltage between terminal No. 55 and ground.
- Voltage should be between 0.4 and 0.6 volt.

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

Q: Is the measured voltage between 0.4 and 0.6 volt?

YES : Go to Step 15.
NO : Go to Step 13.

STEP 13. Check for short circuit to power supply between heated oxygen sensor (3rd) connector D-31 (terminal No. 4) and ECM connector B-108 (terminal No. 55).

NOTE: Check harness after checking intermediate connectors A-10 and C-37. If intermediate connectors are damaged, repair or replace them. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 16.

Q: Is the harness wire in good condition?

YES : Go to Step 14.
NO : Repair it. Then go to Step 16.

STEP 14. Check for short circuit to power supply between heated oxygen sensor (3rd) connector D-31 (terminal No. 3) and ECM connector B-108 (terminal No. 54).

NOTE: Check harness after checking intermediate connectors A-10 and C-37. If intermediate connectors are damaged, repair or replace them. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 16.

Q: Is the harness wire in good condition?

YES : Go to Step 15.
NO : Repair it. Then go to Step 16.

STEP 15. Check the trouble symptoms.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 23 P.13C-11.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P2253 set?

YES : Replace the ECM (Refer to, Removal and Installation P.13C-972). Then go to Step 16.
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.00-14.

STEP 16. 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 23 P.13C-11.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P2253 set?

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

DTC P2423: HC adsorber (HC trap catalyst) efficiency below threshold <California>

TECHNICAL DESCRIPTION

After the fuel cut-off during the deceleration, the rich control is performed. Depending on the point of time when the catalyst releases oxygen which is temporarily absorbed by the lean control, the HC adsorber (HC trap catalyst) within center exhaust pipe is judged on its deterioration in performance.

DESCRIPTIONS OF MONITOR METHODS

When the difference in the switching time into the rich control is below the specified time between the heated (rear) oxygen sensor and the heated oxygen sensor (3rd), it is judged that a malfunction exists.

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)

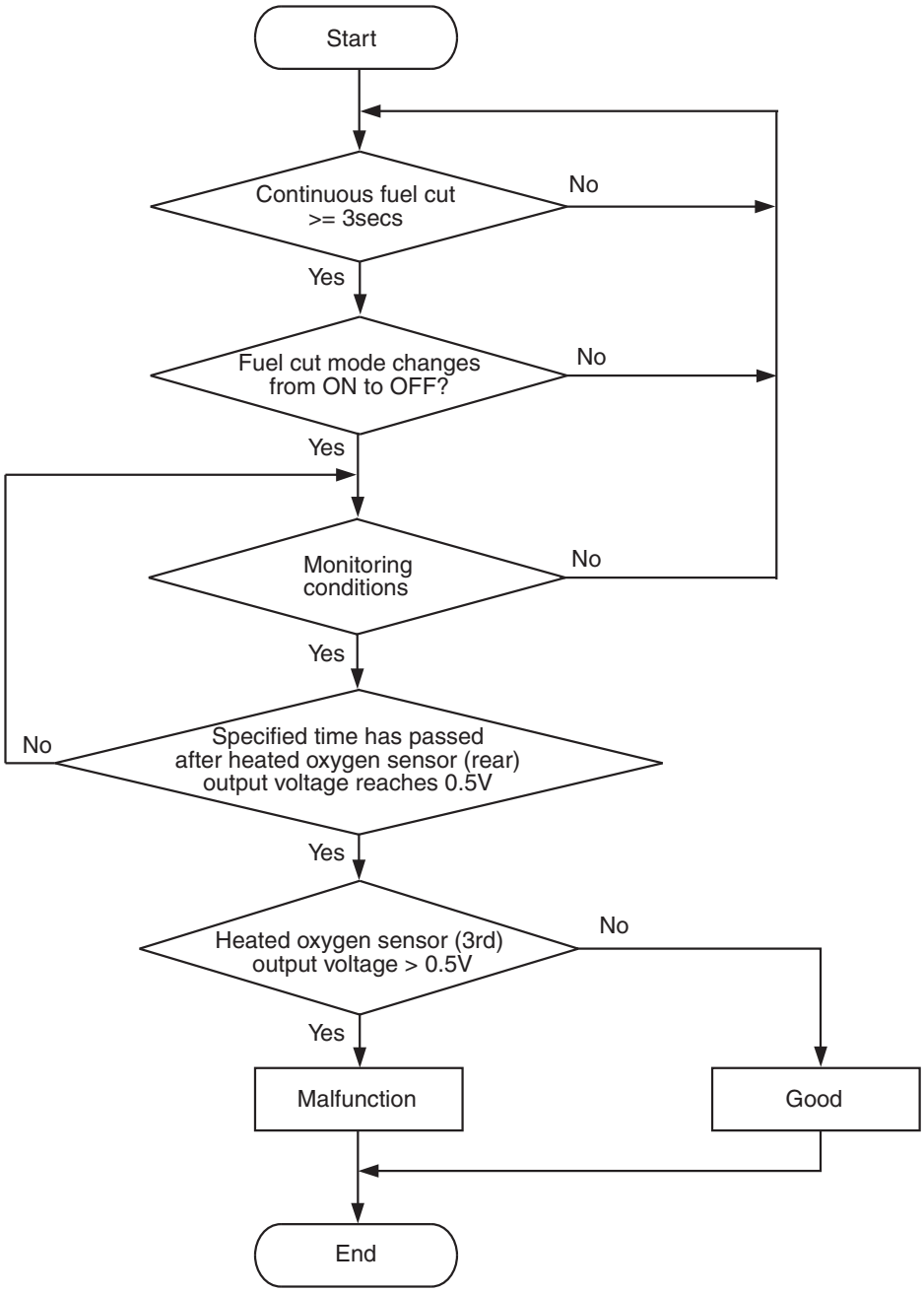
- Heated oxygen sensor (front) monitor
- Heated oxygen sensor (rear) monitor
- Heated oxygen sensor (3rd) monitor
- Heated oxygen sensor heater (front) monitor
- Heated oxygen sensor heater (rear) monitor
- Heated oxygen sensor heater (3rd) monitor
- Misfire monitor
- Fuel system monitor
- Air/fuel ratio feedback monitor

Sensor (The sensor below is determined to be normal)

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

DTC SET CONDITIONS

Logic Flow Chart



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Check Conditions

- Engine speed is lower than 1,656 r/min <M/T> or 1,313 r/min <CVT>.
- Volumetric efficiency is lower than 25 percent <M/T> or 35 percent <CVT>.
- The accelerator pedal is not depressed.
- Barometric pressure is higher than 76 kPa (22.4 in.Hg).
- Intake air temperature is higher than −10°C (14°F).
- The accumulative mass airflow is higher than 2,900 g.

TSB Revision

- The fuel shut-off mode continues for 3 seconds or more.
- After the fuel shut-off mode is terminated, the output voltage of the heated oxygen sensor (3rd) is 0.2 volt or less for 0.5 seconds.

Judgment Criterion

- After the output voltage of the heated oxygen sensor (rear) reaches 0.5 volt, the output voltage of the heated oxygen sensor (3rd) reaches 0.5 volt within 1.5 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 11 P.13C-11.

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

- HC trap catalyst deterioration within center exhaust pipe.
- ECM failed.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

STEP 1. Replace the center exhaust pipe.

(1) Replace the center exhaust pipe.
(2) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Pattern 11 P.13C-11.
(3) Check the diagnostic trouble code (DTC).

Q: Is DTC P2423 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.

NO : The inspection is complete.

DTC U0001: Bus Off

⚠ CAUTION
- **If the ECM output the DTC U0001, make sure to diagnose the CAN bus line.**
- **Before replacing the ECU, make sure that the communication circuit is operating normally.**

DTC SET CONDITIONS

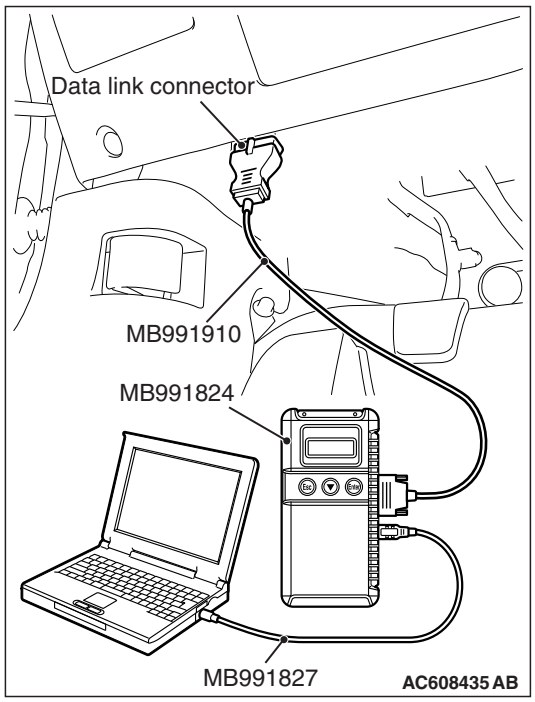
Check Conditions
- Always

Judgement Criteria
- Bus off error detected

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)
- CAN line harness damage or connector damage.
- ECM failed.

DIAGNOSIS

Required Special Tools:
- MB991958: Scan tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A



STEP 1. Using scan tool MB991958, diagnose CAN bus line.

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

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

Q: Is the CAN bus line normal?

YES : Go to Step 2.
NO : Repair the CAN bus line. Refer to GROUP 54C, Can bus Diagnostics Table P.54C-17. Then go to Step 3.

STEP 2. Recheck for diagnostic trouble code.
Check again if the DTC is set.
(1) Erase the DTC.
(2) Turn the ignition switch to the "ON" position.
(3) Check if the DTC is set.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U0001 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. 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.00-14.

STEP 3. Recheck for diagnostic trouble code.
Check again if the DTC is set.
(1) Erase the DTC.
(2) Turn the ignition switch to the "ON" position.
(3) Check if DTC is set.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U0001 set?

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

DTC U0101: TCM Time-out <CVT>

⚠ CAUTION
- **If the ECM output the DTC U0101, make sure to diagnose the CAN bus line.**
- **Before replacing the ECU, make sure that the communication circuit is operating normally.**

DESCRIPTIONS OF MONITOR METHODS
There is no data from TCM for the specified time.
(Meter also detect communication error with ECM.)

MONITOR EXECUTION
Continuous

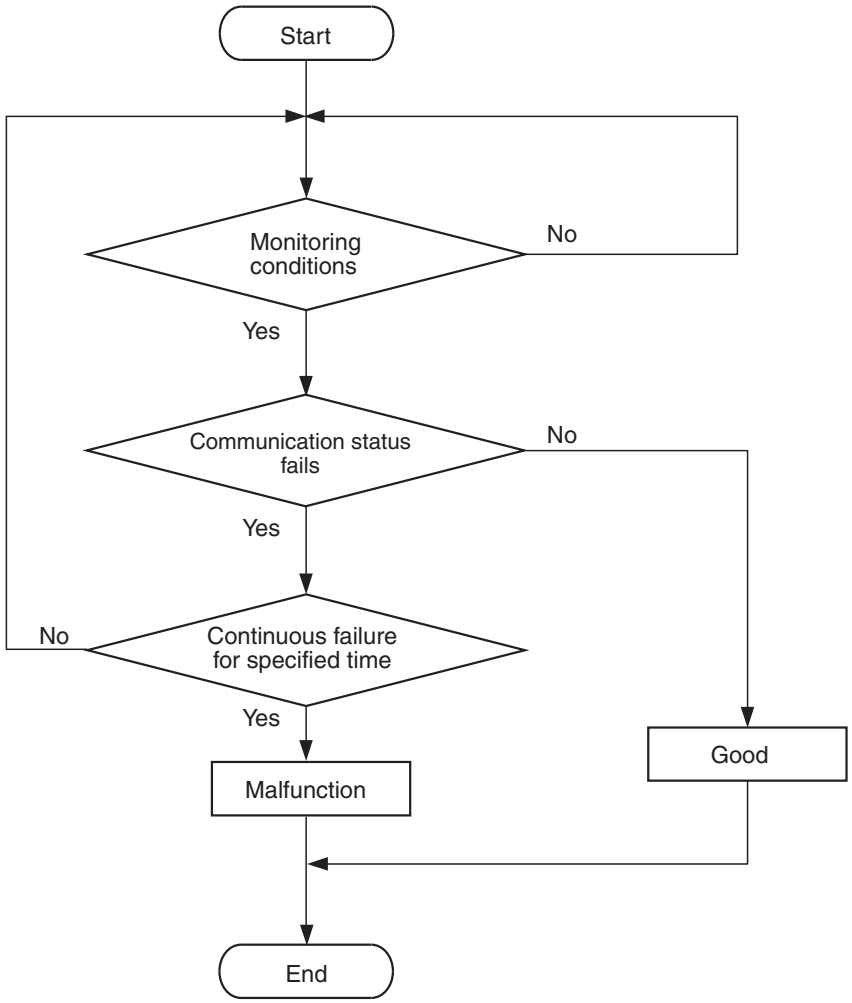
MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

- Battery positive voltage is between 10 and 16.5 volts.

Judgement Criterion

- Unable to receive TCM signals through the CAN bus line for 4 seconds.

Past Trouble

- Proceed to troubleshoot based on a harness or connector damage on the CAN bus line between the ECM and TCM, and a failure in the TCM power supply system. Refer to "How to cope with

COMMENT

Current Trouble

- Some of the possible causes are a harness or connector damage between the ECM and the TCM on the CAN bus line, a failure in the TCM power supply system, a failure in the TCM, or a failure in the ECM.

past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Treat Past Trouble P.00-15).

TSB Revision

NOTE: If a malfunction occurred in the past, a failure cannot be discovered through the M.U.T. – III CAN bus diagnosis even if there might be a problem with the CAN bus. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14. Furthermore, it is possible to narrow down the areas of the possible failures from the DTCs that are output by the ECUs, which are communicating on the CAN bus [Refer to GROUP 54C, Explanation about the Scan Tool (M.U.T.-III) CAN Bus Diagnostics P.54C-9].

OBD-II DRIVE CYCLE PATTERN

None.

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

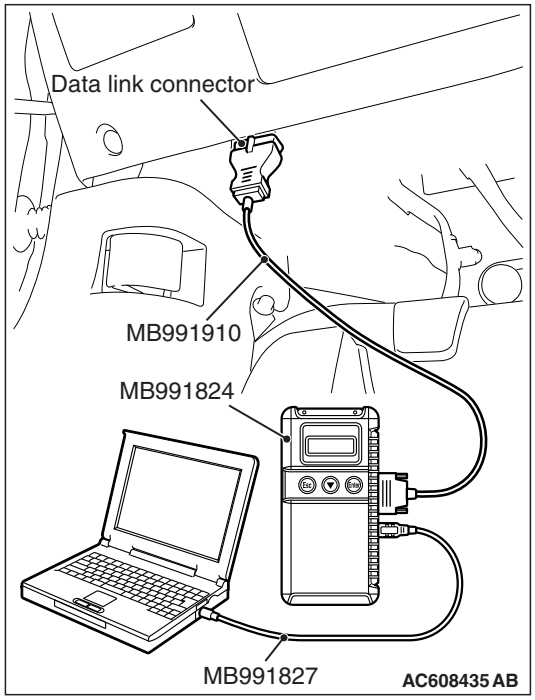
- CAN line harness damage or connector damage.
- TCM failed.
- ECM failed.

DIAGNOSIS

Required Special Tools:

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

STEP 1. Using scan tool MB991958, diagnose CAN bus line.



⚠ 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) Diagnose CAN bus line.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the CAN bus line normal?

YES : Go to Step 2.
NO : Repair the CAN bus line. Refer to GROUP 54C, Can Bus Diagnostics Table P.54C-17. Then go to Step 6.

STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).
(1) Turn the ignition switch to the "ON" position.
(2) Read the TCM-DTC.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the CVT-DTC set?

YES : Refer to GROUP 23A, Diagnosis – Diagnostic Trouble Code Chart P.23A-30.
NO : Go to Step 3.

STEP 3. Using scan tool MB991958, read the diagnostic trouble code (DTC).
(1) Turn the ignition switch to the "ON" position.
(2) Read the ABS-DTC/ASC-DTC and ETACS-DTC.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U0101 set?

YES : Go to Step 4.
NO : Go to Step 5.

STEP 4. Using scan tool MB991958, read the diagnostic trouble code (DTC).
(1) Turn the ignition switch to the "ON" position.
(2) After the MFI-DTC has been deleted, read the MFI-DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U0101 set?

YES : Replace the TCM. Then go to Step 6.
NO : It can be assumed that this malfunction is intermittent of CAN bus line between ECM and TCM. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14.

STEP 5. Using scan tool MB991958, read the diagnostic trouble code (DTC).
(1) Turn the ignition switch to the "ON" position.
(2) After the MFI-DTC has been deleted, read the MFI-DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U0101 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 6.
NO : It can be assumed that this malfunction is intermittent of CAN bus line between ECM and TCM. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14.

TSB Revision

STEP 6. Using scan tool MB991958, read the diagnostic trouble code (DTC).
(1) Turn the ignition switch to the "ON" position.
(2) After the MFI-DTC has been deleted, read the MFI-DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U0101 set?

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

DTC U0121: ASC-ECU Time-out

⚠ CAUTION
- **If the ECM output the DTC U0121, make sure to diagnose the CAN bus line.**
- **Before replacing the ECU, make sure that the communication circuit is operating normally.**

DTC SET CONDITIONS

Check Conditions
- Battery positive voltage is 10 volts or higher.
- At least 2 seconds have passed since the ignition switch is turned to "ON" position.

Judgement Criterion
- Unable to receive ASC-ECU signals through the CAN bus line for 4 seconds.

COMMENT

Current Trouble
- Some of the possible causes are a harness or connector damage between the ECM and the ASC-ECU on the CAN bus line, a failure in the ASC-ECU power supply system, a failure in the ASC-ECU, or a failure in the ECM.

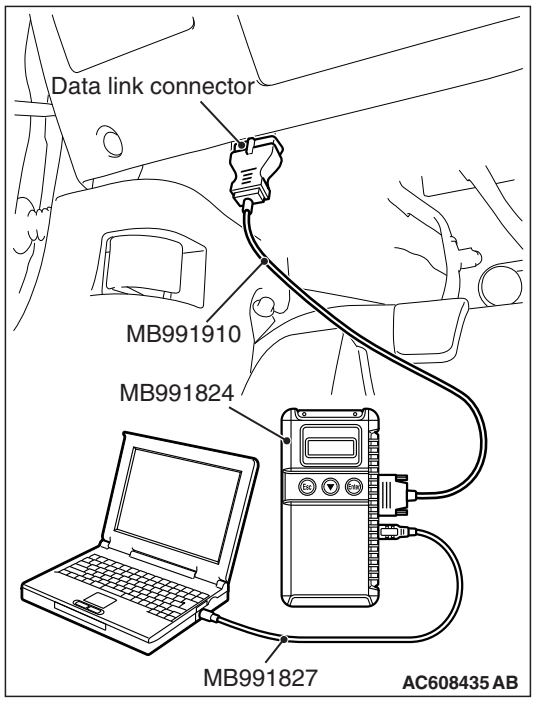
Past Trouble
- Proceed to troubleshoot based on a harness or connector damage on the CAN bus line between the ECM and ASC-ECU, and a failure in the ASC-ECU power supply system. Refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Treat Past Trouble P.00-15).

NOTE: If a malfunction occurred in the past, a failure cannot be discovered through the MB991958 CAN bus diagnosis even if there might be a problem with the CAN bus. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14. Furthermore, it is possible to narrow down the areas of the possible failures from the DTCs that are output by the ECUs, which are communicating on the CAN bus [Refer to GROUP 54C, Explanation about the Scan Tool (M.U.T.-III) CAN Bus Diagnostics P.54C-9].

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)
- CAN line harness damage or connector damage.
- ASC-ECU failed.
- ECM failed.

DIAGNOSIS

Required Special Tools:
- MB991958: Scan tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A



STEP 1. Using scan tool MB991958, diagnose CAN bus line.

⚠ 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) Diagnose CAN bus line.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the CAN bus line normal?

YES : Go to Step 2.
NO : Repair the CAN bus line. Refer to GROUP 54C, Can Bus Diagnostics Table P.54C-17. Then go to Step 6.

STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) Read the ASC-DTC.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the ASC-DTC set?

YES : Refer to GROUP 35C, Diagnosis – Diagnostic Trouble Code Chart P.35C-25.
NO : Go to Step 3.

STEP 3. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) Read the TCM-DTC and ETACS-DTC.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U0121 set?

YES : Go to Step 4.
NO : Go to Step 5.

STEP 4. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) After the MFI-DTC has been deleted, read the MFI-DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U0121 set?

YES : Replace the ASC-ECU. Then go to Step 6.
NO : It can be assumed that this malfunction is intermittent of CAN bus line between ECM and ASC-ECU. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14.

STEP 5. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) After the MFI-DTC has been deleted, read the MFI-DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U0121 set?

YES : Replace he ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, ID Code Registration Necessity Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 6.
NO : It can be assumed that this malfunction is intermittent of CAN bus line between ECM and ASC-ECU. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14.

STEP 6. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) After the MFI-DTC has been deleted, read the MFI-DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U0121 set?

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

DTC U0141: ETACS-ECU Time-out

⚠ CAUTION

- **If the ECM output the DTC U0141, make sure to diagnose the CAN bus line.**
- **Before replacing the ECU, make sure that the communication circuit is operating normally.**

DESCRIPTIONS OF MONITOR METHODS

There is no data from ETACS-ECU for the specified time. (ETACS-ECU also detect communication error with ECM.)

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)

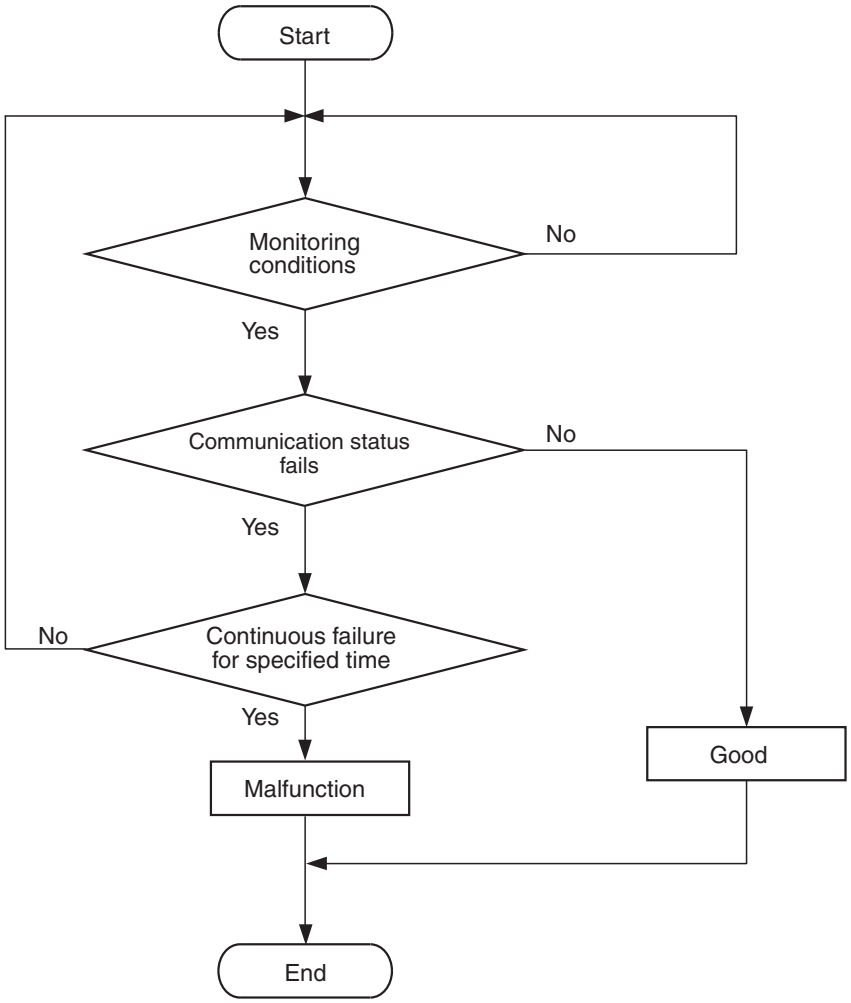
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



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TSB Revision

Check Condition
- Battery positive voltage is between 10 and 16.5 volts.

Judgement Criterion
- Unable to receive ETACS-ECU signals through the CAN bus line for 4 seconds.

COMMENT

Current Trouble
- Some of the possible causes are a harness or connector damage between the ECM and the ETACS-ECU on the CAN bus line, a failure in the ETACS-ECU power supply system, a failure in the ETACS-ECU, or a failure in the ECM.

Past Trouble
- Proceed to troubleshoot based on a harness or connector damage on the CAN bus line between the ECM and ETACS-ECU, and a failure in the ETACS power supply system. Refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Treat Past Trouble P.00-15).

NOTE: If a malfunction occurred in the past, a failure cannot be discovered through the MB991958 CAN bus diagnosis even if there might be a problem with the CAN bus. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14. Furthermore, it is possible to narrow down the areas of the possible failures from the DTCs that are output by the ECUs, which are communicating on the CAN bus [Refer to GROUP 54C, Explanation about the Scan Tool (M.U.T.-III) CAN Bus Diagnostics P.54C-9].

OBD-II DRIVE CYCLE PATTERN

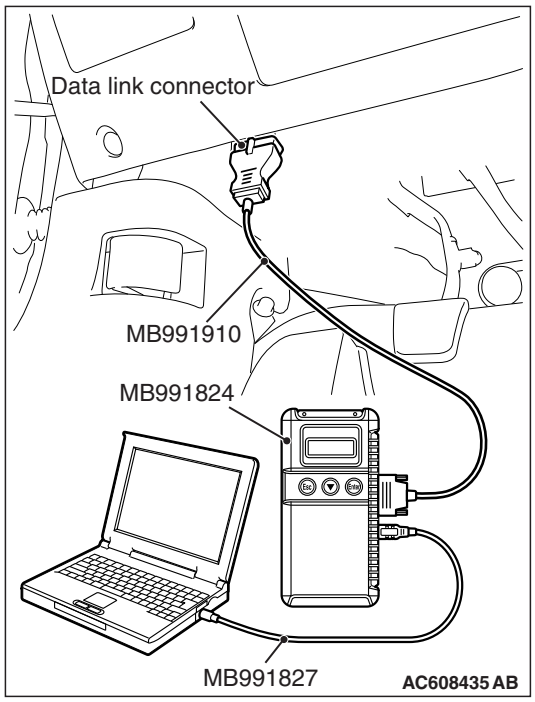
None.

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

- CAN line harness damage or connector damage.
- ETACS-ECU failed.
- ECM failed.

DIAGNOSIS

Required Special Tools:
- MB991958: Scan tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A



STEP 1. Using scan tool MB991958, diagnose CAN bus line.

⚠ 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) Diagnose CAN bus line.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the CAN bus line normal?

YES : Go to Step 2.
NO : Repair the CAN bus line. Refer to GROUP 54C, Can Bus Diagnostics Table P.54C-17. Then go to Step 6.

STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) Read the ETACS-DTC.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the ETACS-DTC set?

YES : Refer to GROUP 54A, ETACS – Diagnostic Trouble Code Chart P.54A-678.
NO : Go to Step 3.

STEP 3. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) Read the TCM-DTC, ABS-DTC/ASC-DTC, KOS-DTC or WCM-DTC, SRS-DTC, Occupant classification-DTC, Combination meter-DTC, CAN box unit-DTC, Satellite radio tuner-DTC, A/C-DTC and Heater control unit-DTC.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U0141 set?

YES : Go to Step 4.
NO : Go to Step 5.

STEP 4. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) After the MFI-DTC has been deleted, read the MFI-DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U0141 set?

YES : Replace the ETACS-ECU. Then go to Step 6.
NO : It can be assumed that this malfunction is intermittent of CAN bus line between ECM and ETACS-ECU. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14.

STEP 5. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) After the MFI-DTC has been deleted, read the MFI-DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U0141 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 6.
NO : It can be assumed that this malfunction is intermittent of CAN bus line between ECM and ETACS-ECU. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14.

STEP 6. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) After the MFI-DTC has been deleted, read the MFI-DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U0141 set?

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

DTC U0167: Immobilizer Communication Error

⚠ CAUTION
- **If the ECM output the DTC U0167, make sure to diagnose the CAN bus line.**
- **Before replacing the ECU, make sure that the communication circuit is operating normally.**

DTC SET CONDITIONS

Check Conditions
- Ignition switch is in "ON" position.
- Battery positive voltage is 8 volts or higher.

Judgement Criterion
- Unable to receive KOS-ECU/WCM (immobilizer-ECU) signals through the CAN bus line.

COMMENT

Current Trouble
- Some of the possible causes are a harness or connector damage between the ECM and the KOS-ECU/WCM (immobilizer-ECU) on the CAN bus line, a failure in the KOS-ECU/WCM (immobilizer-ECU) power supply system, a failure in the KOS-ECU/WCM (immobilizer-ECU), or a failure in the ECM.

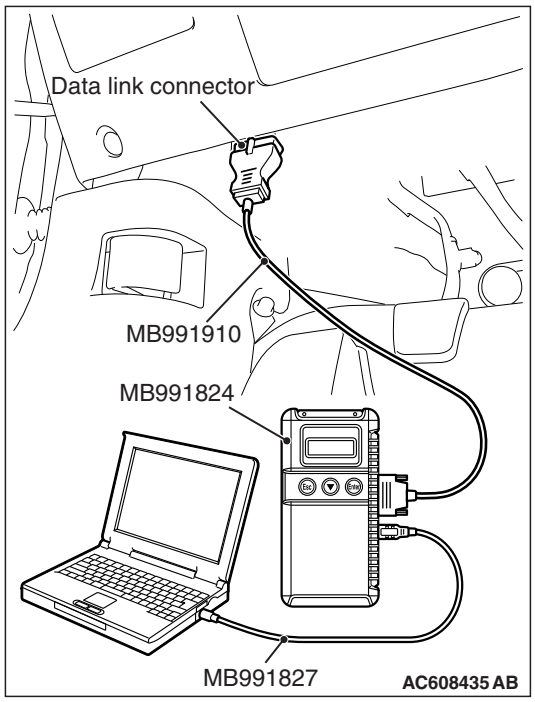
Past Trouble
- Proceed to troubleshoot based on a harness or connector damage on the CAN bus line between the ECM and KOS-ECU/WCM (immobilizer-ECU), and a failure in the KOS-ECU/WCM (immobilizer-ECU) power supply system. Refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Treat Past Trouble P.00-15).

NOTE: If a malfunction occurred in the past, a failure cannot be discovered through the MB991958 CAN bus diagnosis even if there might be a problem with the CAN bus. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14. Furthermore, it is possible to narrow down the areas of the possible failures from the DTCs that are output by the ECUs, which are communicating on the CAN bus [Refer to GROUP 54C, Explanation about the Scan Tool (M.U.T.-III) CAN Bus Diagnostics P.54C-9].

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)
- CAN line harness damage or connector damage.
- KOS-ECU/WCM (immobilizer-ECU) failed.
- ECM failed.

DIAGNOSIS

Required Special Tools:
- MB991958: Scan tool (M.U.T.-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A



STEP 1. Using scan tool MB991958, diagnose CAN bus line.

⚠ 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) Diagnose CAN bus line.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the CAN bus line normal?

YES : Go to Step 2.
NO : Repair the CAN bus line. Refer to GROUP 54C, Can Bus Diagnostics Table P.54C-17. 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) Read the immobilizer-DTC.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the immobilizer-DTC set?

YES : Refer to Refer to GROUP 42B, Keyless Operation System – Diagnosis Trouble Code Chart <Vehicles with KOS> P.42B-28 or GROUP 42C, Wireless Control Module – Diagnosis Trouble Code Chart <Vehicles with WCM> P.42C-17.
NO : Go to Step 3.

STEP 3. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) After the MFI-DTC has been deleted, read the MFI-DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U0167 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9.

NO : It can be assumed that this malfunction is intermittent of CAN bus line between ECM and KOS-ECU/WCM (immobilizer-ECU). Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14.

DTC U1180: Combination Meter Time-out

⚠ CAUTION

- **If the ECM output the DTC U1180, make sure to diagnose the CAN bus line.**
- **Before replacing the ECU, make sure that the communication circuit is operating normally.**

DESCRIPTIONS OF MONITOR METHODS

There is no data from combination meter for the specified time. (Meter also detect communication error with ECM.)

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)

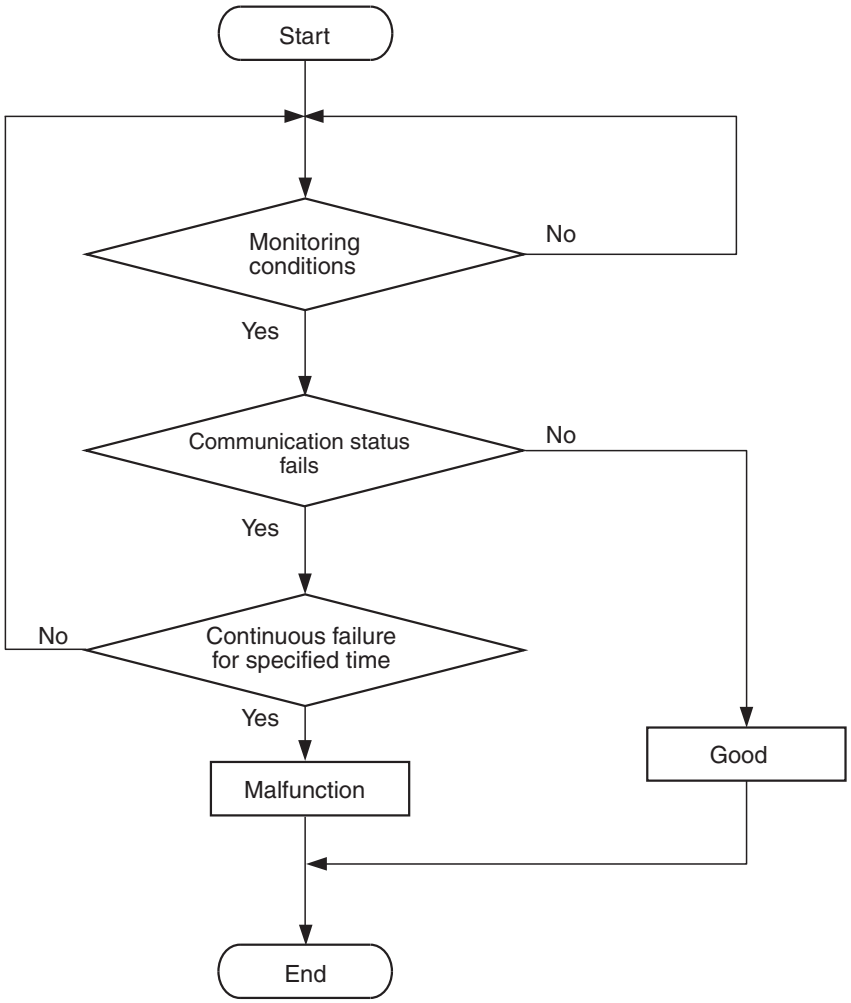
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



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Check Condition

- Battery positive voltage is between 10 and 16.5 volts.

Judgement Criterion

- Unable to receive combination meter signals through the CAN bus line for 4 seconds.

COMMENT

Current Trouble

- Some of the possible causes are a harness or connector damage between the ECM and the combination meter on the CAN bus line, a failure in the combination meter power supply system, a failure in the combination meter, or a failure in the ECM.

TSB Revision

Past Trouble

- Proceed to troubleshoot based on a harness or connector damage on the CAN bus line between the ECM and combination meter, and a failure in the combination meter power supply system. Refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Treat Past Trouble P.00-15).

NOTE: If a malfunction occurred in the past, a failure cannot be discovered through the M.U.T. – III CAN bus diagnosis even if there might be a problem with the CAN bus. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14. Furthermore, it is possible to narrow down the areas of the possible failures from the DTCs that are output by the ECUs, which are communicating on the CAN bus [Refer to GROUP 54C, Explanation about the Scan Tool (M.U.T.-III) CAN Bus Diagnostics P.54C-9].

OBD-II DRIVE CYCLE PATTERN

None.

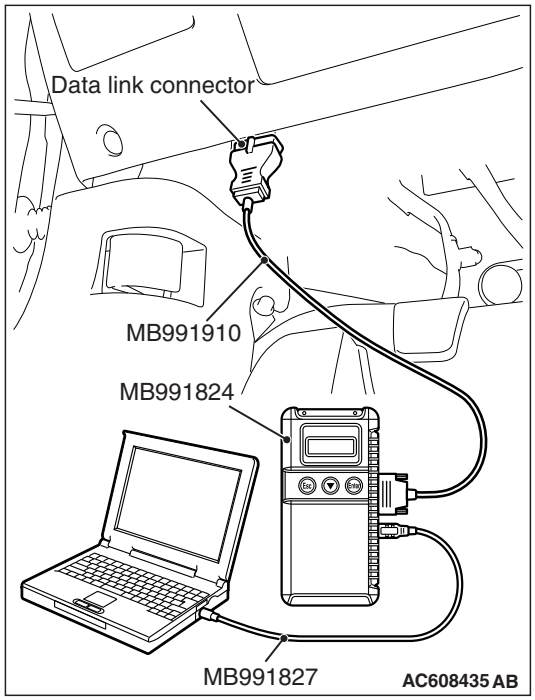
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- CAN line harness damage or connector damage.
- Combination meter failed.
- ECM failed.

DIAGNOSIS

Required Special Tools:

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



STEP 1. Using scan tool MB991958, diagnose CAN bus line.

⚠ 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) Diagnose CAN bus line.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the CAN bus line normal?

YES : Go to Step 2.
NO : Repair the CAN bus line. Refer to GROUP 54C, Can Bus Diagnostics Table P.54C-17. Then go to Step 4.

STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) Read the combination meter-DTC.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the combination meter-DTC set?

YES : Refer to GROUP 54A, Combination Meter – Diagnostic Trouble Code Chart P.54A-34.
NO : Go to Step 3.

STEP 3. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) After the MFI-DTC has been deleted, read the MFI-DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U1180 set?

YES : Replace the ECM. When the ECM is replaced, register the ID code. Refer to GROUP 42B, Diagnosis – ID Code Registration Judgment Table <Vehicles with KOS> P.42B-11 or GROUP 42C, Diagnosis – ID Codes Registration Judgment Table <Vehicles with WCM> P.42C-9. Then go to Step 4.
NO : It can be assumed that this malfunction is intermittent of CAN bus line between ECM and combination meter. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14.

STEP 4. Using scan tool MB991958, read the diagnostic trouble code (DTC).

(1) Turn the ignition switch to the "ON" position.
(2) After the MFI-DTC has been deleted, read the MFI-DTC again.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U1180 set?

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