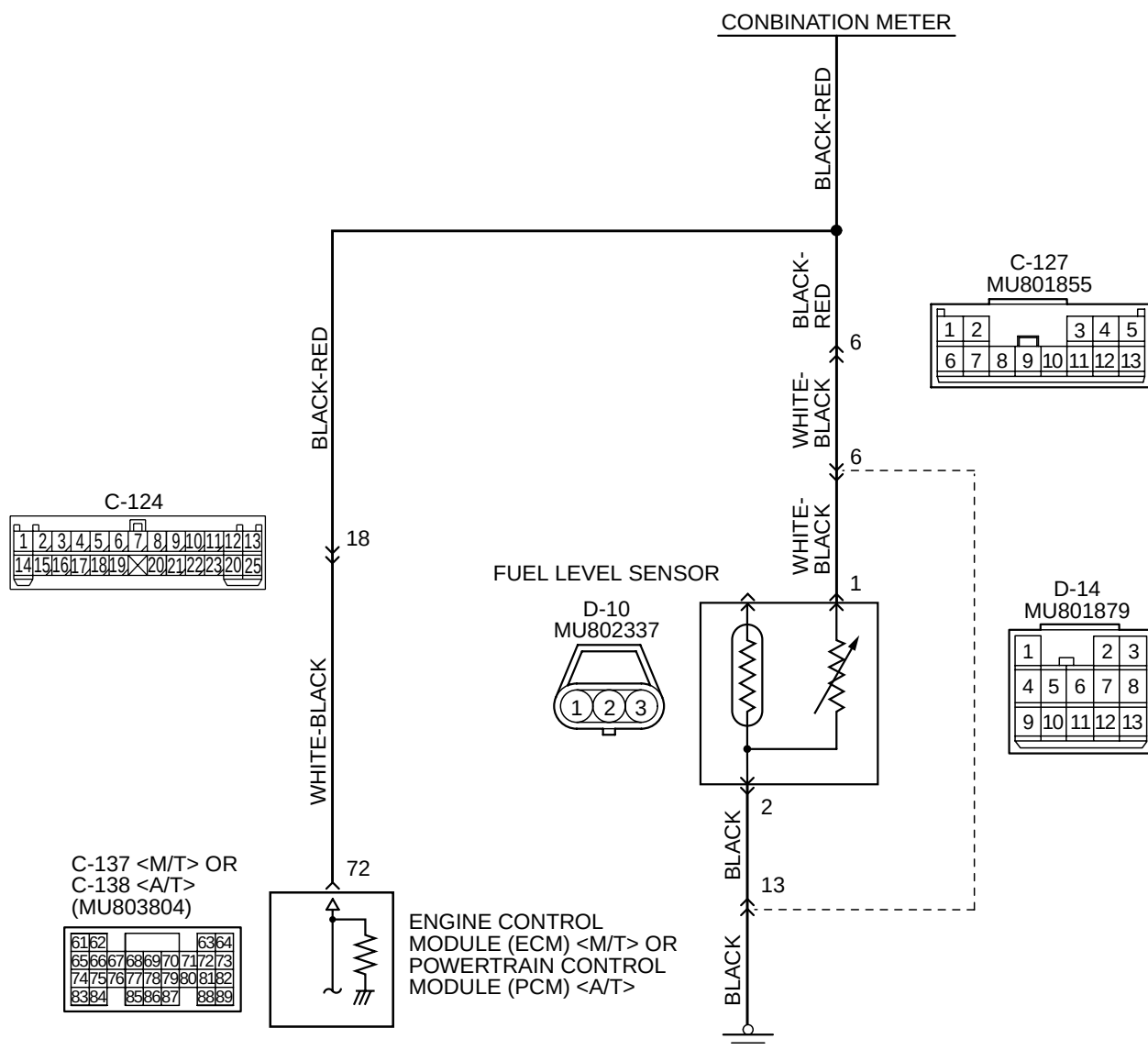
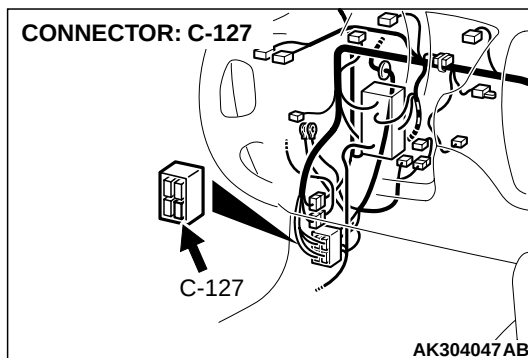
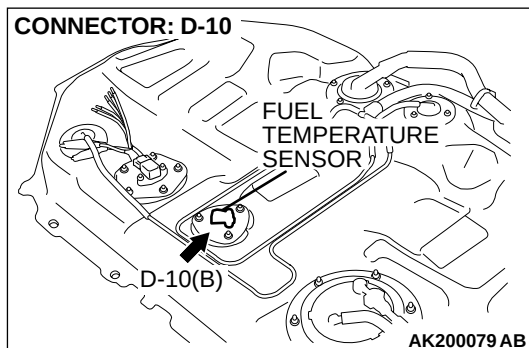


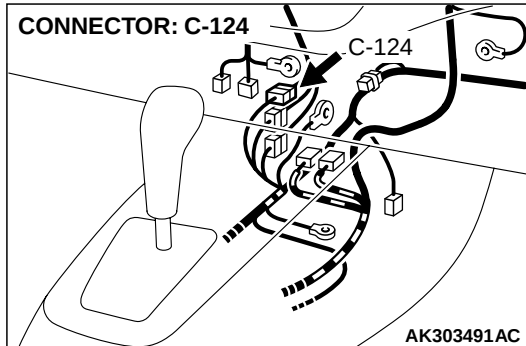
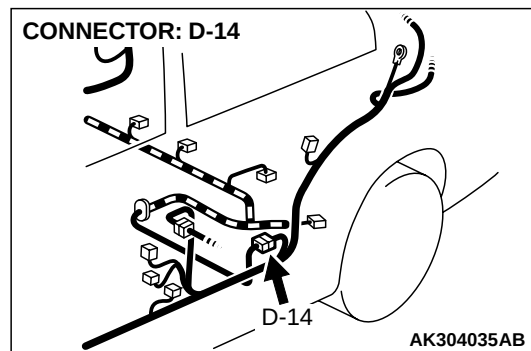
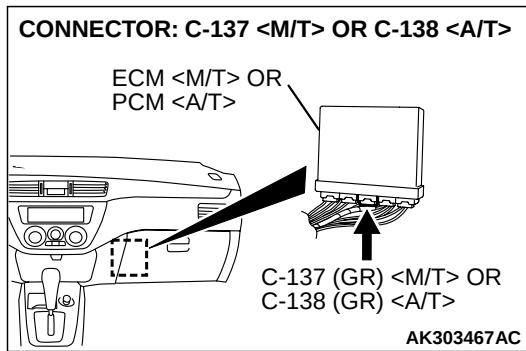
DTC P0461: Fuel Level Sensor Circuit Range/Performance

Fuel Level Sensor Circuit



AK303996





CIRCUIT OPERATION

- The fuel level sensor drive signal is input in ECM <M/T> or PCM <A/T> (terminal No. 72).

TECHNICAL DESCRIPTION

- Branch the drive signal from the fuel level sensor circuit, and input it into ECM <M/T> or PCM <A/T>.
- The ECM <M/T> or PCM <A/T> detects the amount of fuel left in the fuel tank with this signal, and also controls the fuel level warning light.

DESCRIPTIONS OF MONITOR METHODS

Detect malfunction if change of fuel level sensor output voltage is small when sum of fuel injection is large.

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)

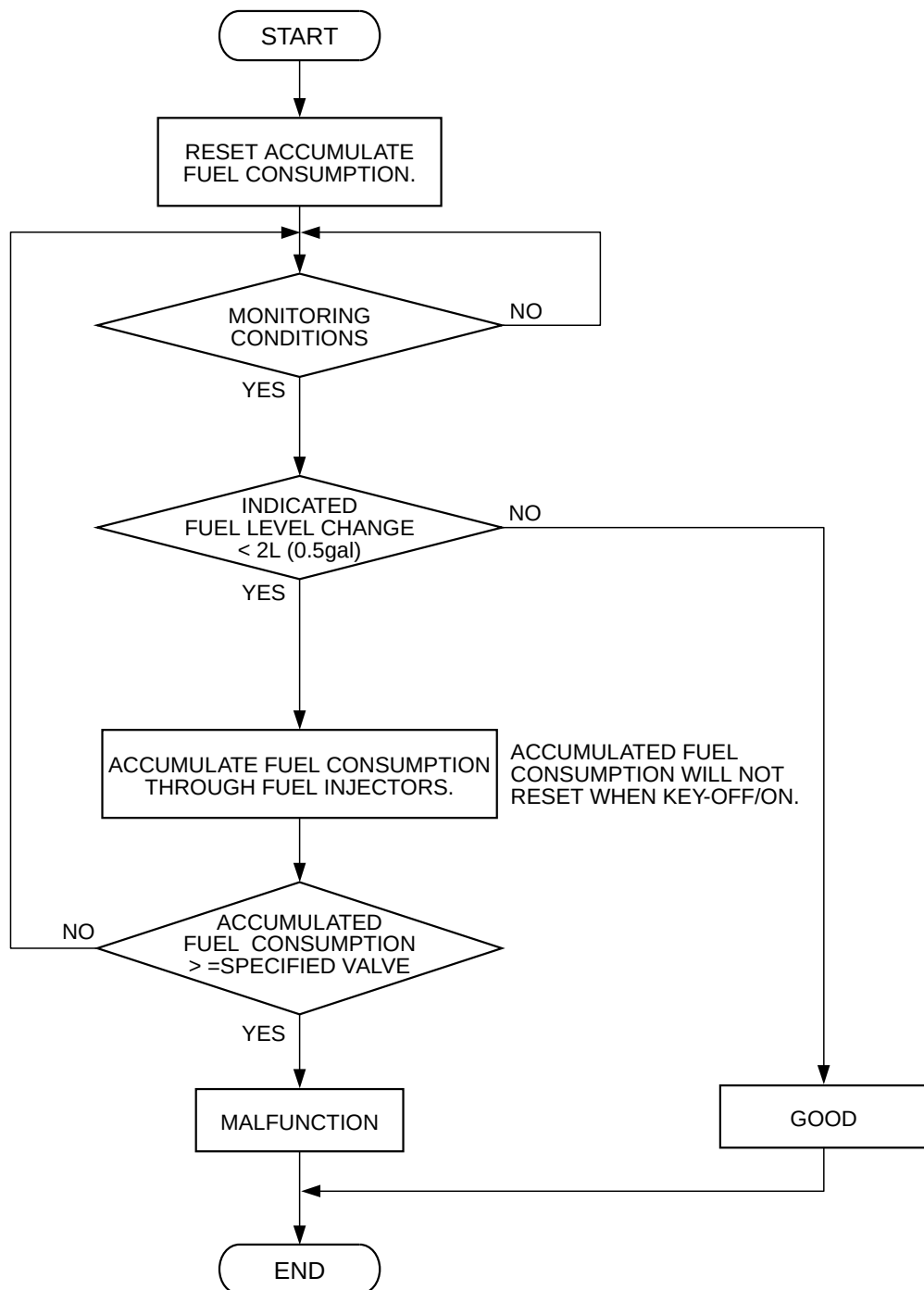
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK302040

Check Conditions, Judgement Criteria

liters (0.5 gal) or less.

- When the fuel consumption calculated from the operation time of the injector amounts to 20 liters (5.3 gal), the diversity of the amount of fuel in tank calculated from the fuel level sensor is 2

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle –
Procedure 6 – Other Monitor [P.13B-6](#).

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

- Fuel level sensor failed.
- Open or shorted fuel level sensor circuit, harness damage or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

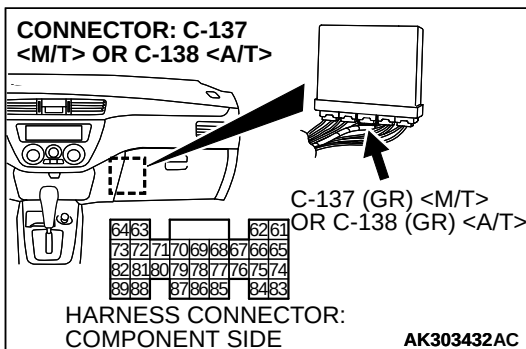
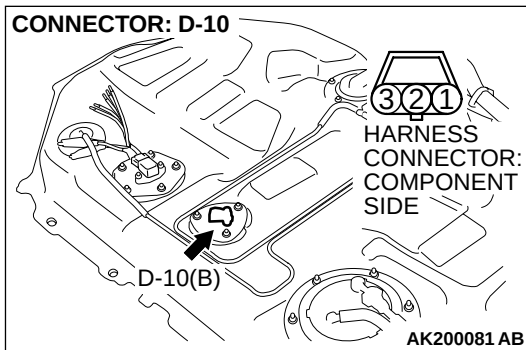
STEP 1. Check fuel gauge.

Q: Is the fuel gauge functioning?

YES : Go to Step 3.

NO : Go to Step 2.

STEP 2. Check for short circuit to ground between fuel level sensor connector D-10 (terminal No. 1) and ECM connector C-137 <M/T> or PCM connector C-138 <A/T> (terminal No. 72).

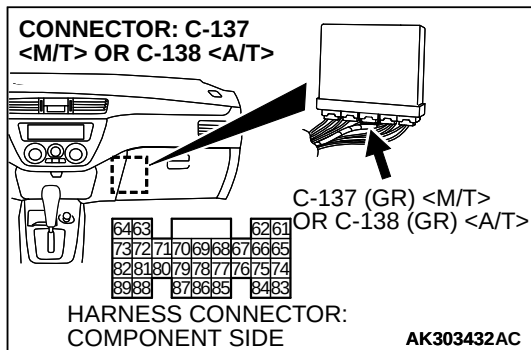


NOTE: Check harness after checking intermediate connectors C-124, C-127 and D-14. If intermediate connectors are damaged, repair or replace them. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 6.

Q: Is the harness wire in good condition?

YES : Refer to GROUP 54A, Chassis Electrical – Combination Meters Assembly and Vehicle Speed Sensor – Equipment Diagnosis – Symptom Chart [P.54A-11](#).

NO : Repair it. Then go to Step 6.



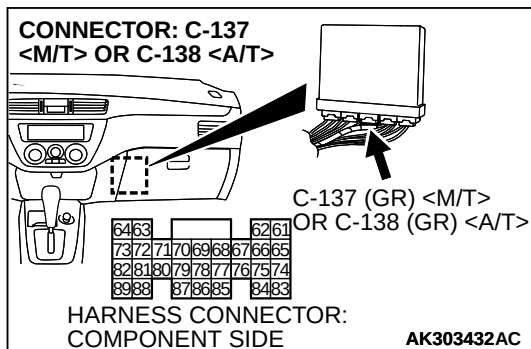
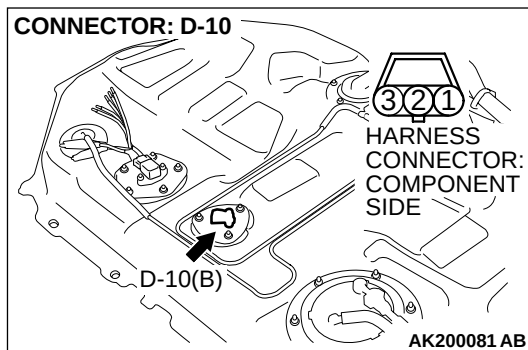
STEP 3. Check harness connector C-137 at ECM <M/T> or C-138 at PCM <A/T> for damage.

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 6.

STEP 4. Check for open circuit or harness damage between fuel level sensor connector D-10 (terminal No. 1) and ECM connector C-137 <M/T> or PCM connector C-138 <A/T> (terminal No. 72).



NOTE: Check harness after checking intermediate connectors C-124, C-127 and D-14. If intermediate connectors are damaged, repair or replace them. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 6.

Q: Is the harness wire in good condition?

YES : Go to Step 5.

NO : Repair it. Then go to Step 6.

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 – Procedure 6 – Other Monitor [P.13B-6](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0461 set?

YES : Replace the ECM or PCM. 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 [P.00-6](#).

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 – Procedure 6 – Other Monitor [P.13B-6](#).
- (2) Check the diagnostic trouble code (DTC).

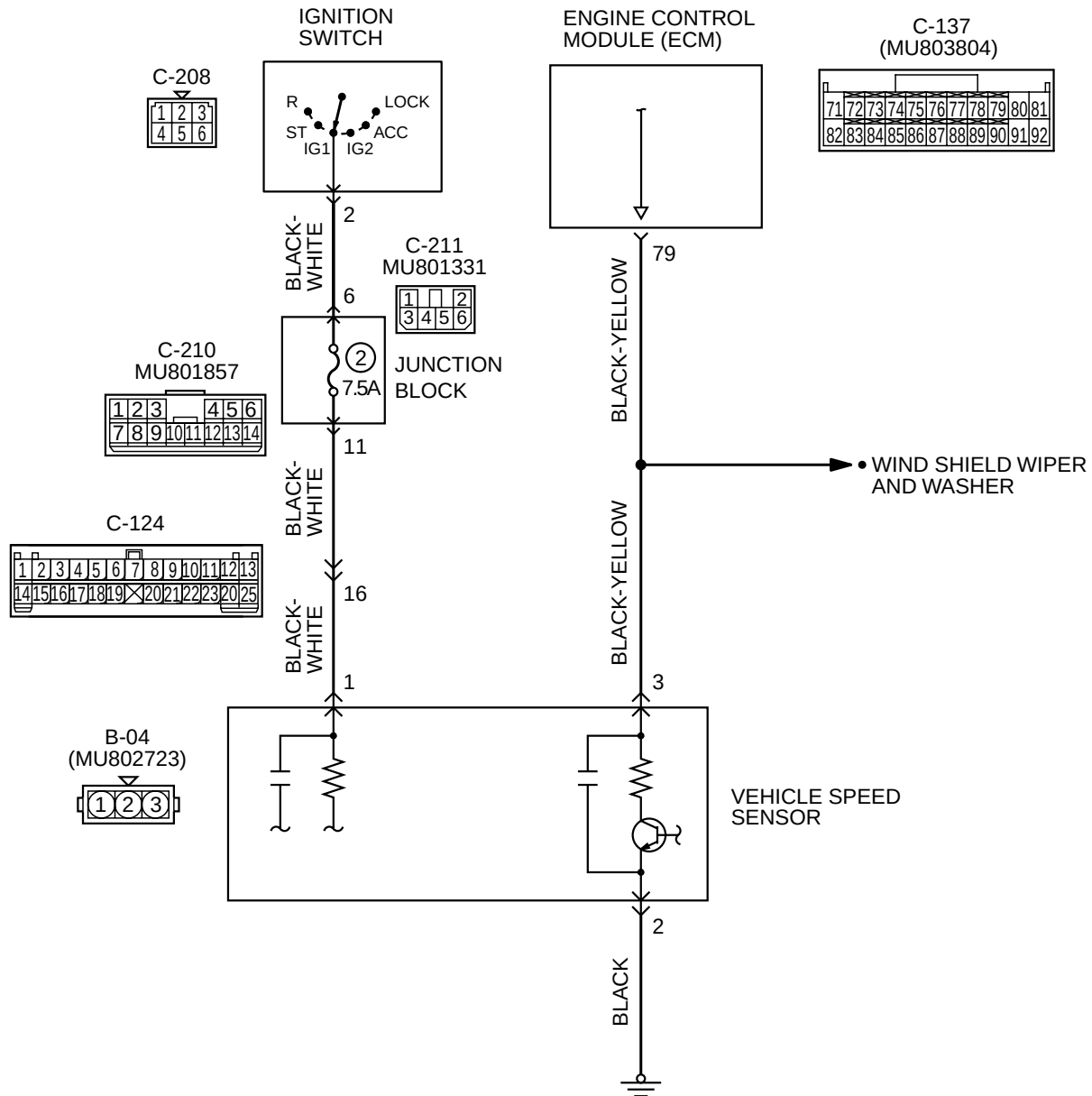
Q: Is DTC P0461 is set?

YES : Retry the troubleshooting.

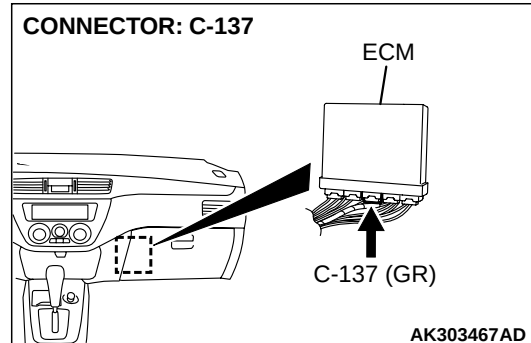
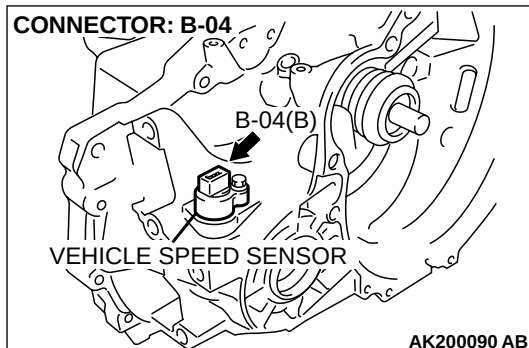
NO : The inspection is complete.

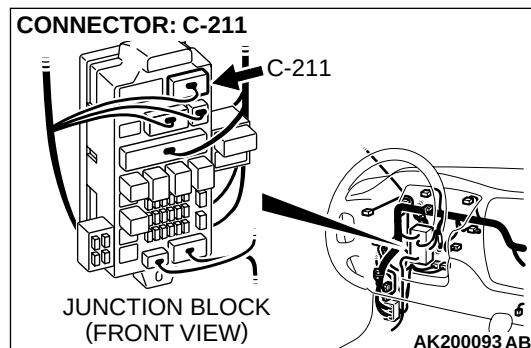
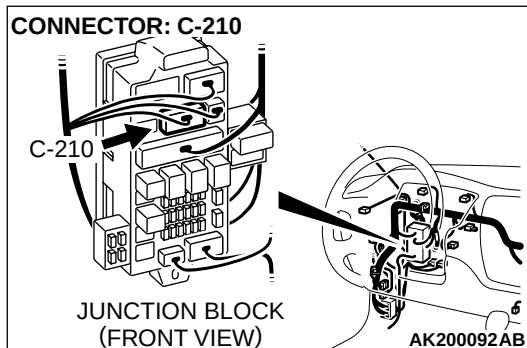
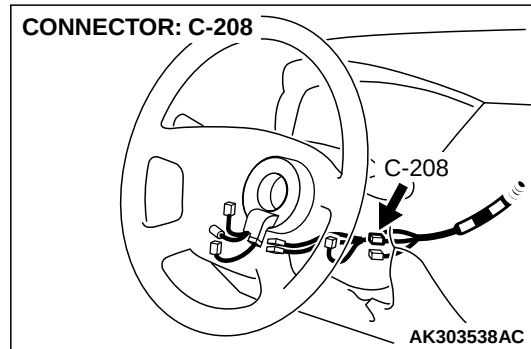
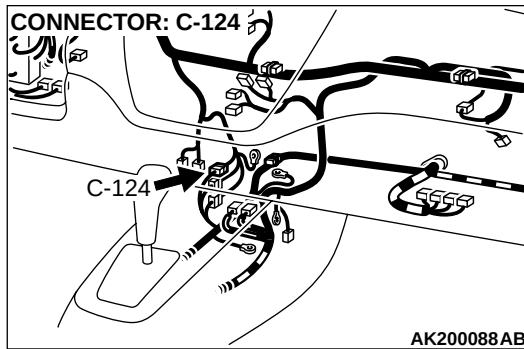
DTC P0500: Vehicle Speed Sensor <M/T>

Vehicle Speed Sensor Circuit



AK304021





CIRCUIT OPERATION

- A 5-volt voltage is applied to the vehicle speed sensor output terminal (terminal No. 3) from the ECM (terminal No. 79). The vehicle speed sensor generates a pulse signal when the output terminal is opened and grounded.

TECHNICAL DESCRIPTION

- The vehicle speed sensor converts the vehicle speed into pulse signals and inputs them to the ECM.
- The vehicle speed sensor outputs a pulse signal while the vehicle is driven.
- The ECM checks whether the pulse signal is output.

DESCRIPTIONS OF MONITOR METHODS

- If the vehicle speed sensor output does not change while the vehicle is being driven in the medium- to high-speed range, a malfunction is determined to have occurred.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

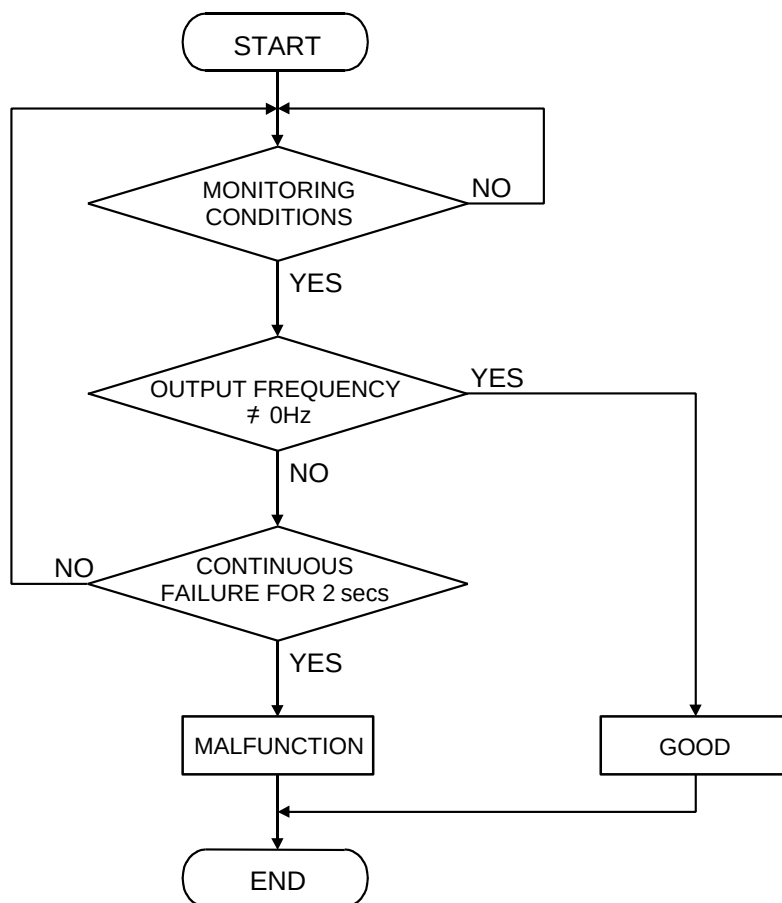
- Not applicable

Sensor (The sensor below is determined to be normal)

- Volume air flow sensor

DTC SET CONDITIONS

Logic Flow Chart



AK200919

Check Conditions

- Two seconds or more have passed the starting sequence was completed.
- Engine speed is at between 2,000 and 4,000 r/min.
- Volumetric efficiency is at between 45 and 100 percent.

Judgement Criteria

- Vehicle speed sensor output voltage has not changed (no pulse signal is input) for 2 seconds.

OBD-II DRIVE CYCLE PATTERN

None

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

- Vehicle speed sensor failed.
- Open or shorted vehicle speed sensor circuit, or loose connector.
- ECM failed.

DIAGNOSIS

Required Special Tools:

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

STEP 1. Using scan tool MB991958, check data list item 24: Vehicle Speed Sensor.

⚠ CAUTION

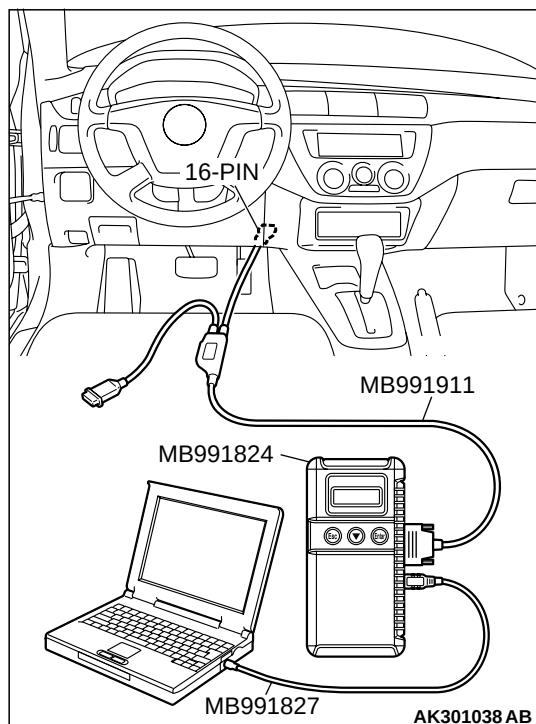
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Start the engine.
- (3) Set scan tool MB991958 to the data reading mode for item 24, Vehicle Speed Sensor.
 - Check that the speedometer and MUT-III display speed match when traveling at a vehicle speed of 40 km/h (25 mph).
- (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 [P.00-6](#).

NO : Go to Step 2.

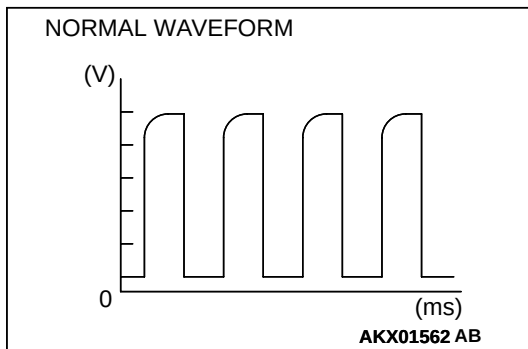
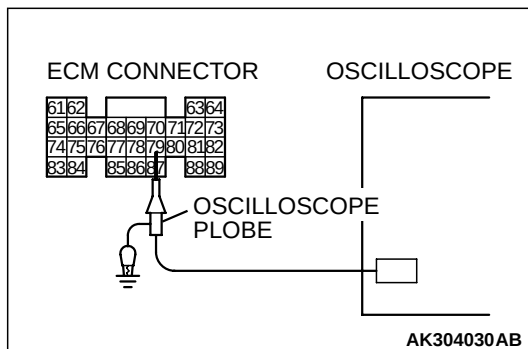
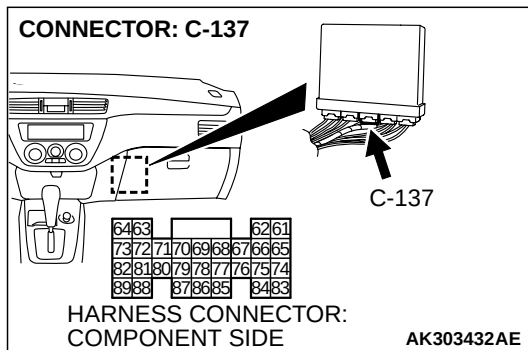


STEP 2. Check speed meter.

Q: Is the speed meter functioning?

YES : Go to Step 3.

NO : Go to Step 8.

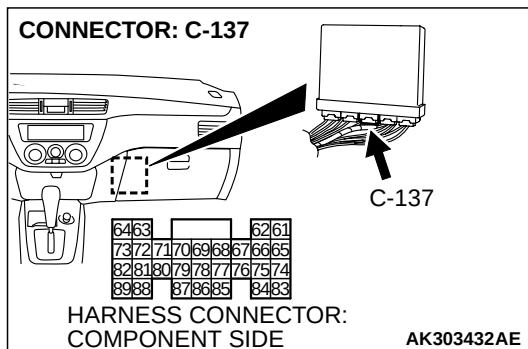


STEP 3. Using the oscilloscope, check the sensor output voltage at ECM connector C-137.

- (1) Do not disconnect the ECM connector C-137.
- (2) Disconnect the combination meter connector, auto-cruise control-ECU connector and A/C-ECU connector.
- (3) Connect the oscilloscope probe to ECM terminal No. 79 by backprobing.
- (4) Start the engine.
- (5) Check the waveform.
 - The waveform should show a pattern similar to the illustration while the vehicle is being moved.
- (6) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the waveform normal?

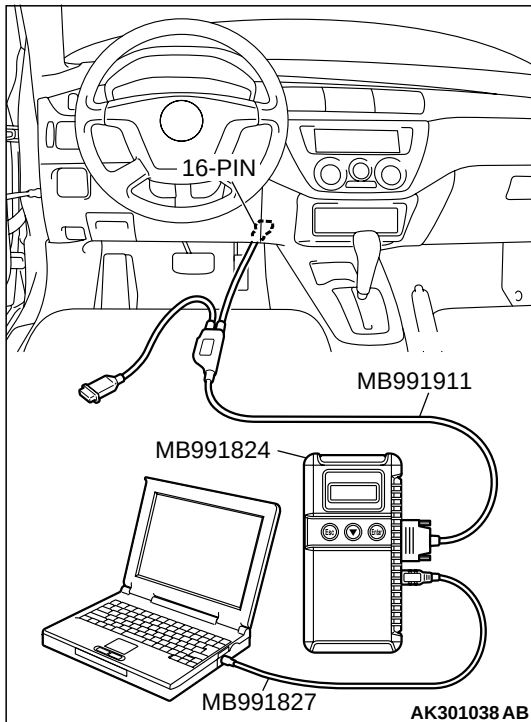
- YES :** Go to Step 4.
- NO :** Go to Step 6.



STEP 4. Check connector C-137 at ECM for damage.

Q: Is the 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 17.



STEP 5. Using scan tool MB991958, check data list item 24: Vehicle Speed Sensor.

⚠ CAUTION

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

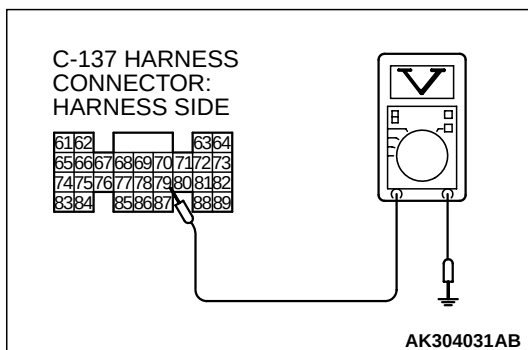
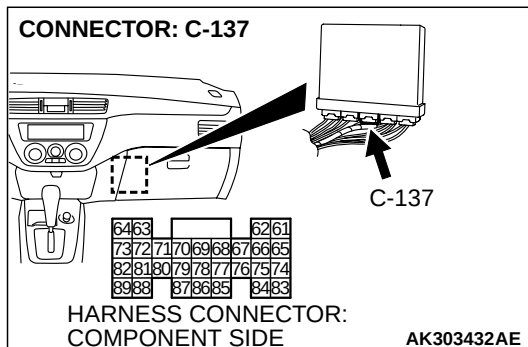
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Start the engine.
- (3) Set scan tool MB991958 to the data reading mode for item 24, Vehicle Speed Sensor.
 - Check that the speedometer and MUT-III display speed match when traveling at a vehicle speed of 40 km/h (25 mph).
- (4) Turn 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 [P.00-6](#).

NO : Replace the ECM. Then go to Step 17.



STEP 6. Measure the sensor supply voltage at ECM connector C-137 by backprobing.

- (1) Do not disconnect the ECM connector C-137.
- (2) Disconnect the vehicle speed sensor connector B-04.
- (3) Turn the ignition switch to the "ON" position.

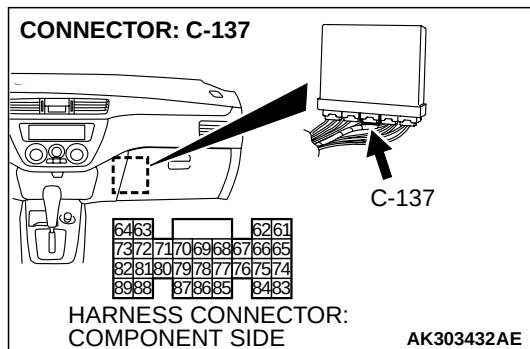
- (4) Measure the voltage between terminal No. 79 and ground by backprobing.
 - Voltage should measure between 4.8 and 5.2 volts.

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

Q: Is the measured voltage between 4.8 and 5.2 volts?

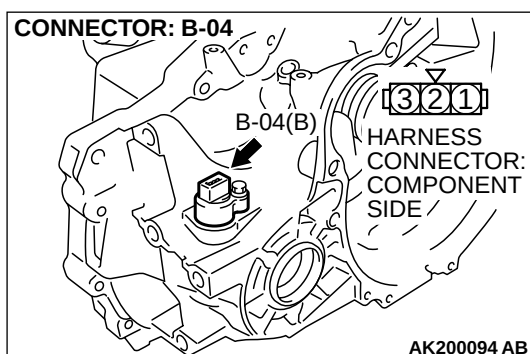
YES : Go to Step 7.

NO : Replace the ECM. Then go to Step 17.

**STEP 7. Check connector C-137 at ECM for damage.****Q: Is the connector in good condition?**

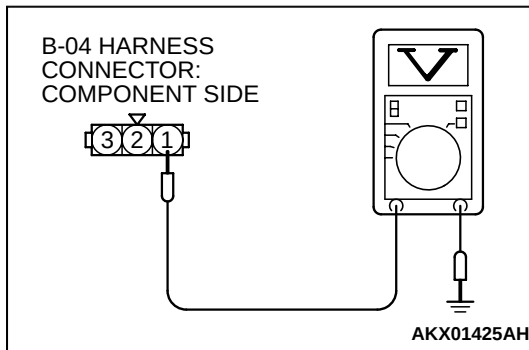
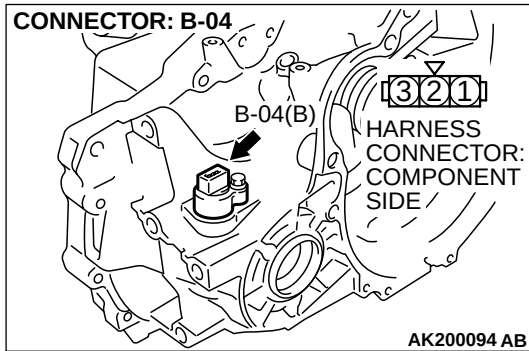
YES : Repair harness wire between vehicle speed sensor connector B-04 (terminal No. 3) and ECM connector C-137 (terminal No. 79) because of open circuit. Then go to Step 17.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 17.

**STEP 8. Check connector B-04 at vehicle speed sensor for damage.****Q: Is the 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 17.



STEP 9. Measure the power supply voltage at vehicle speed sensor harness side connector B-04.

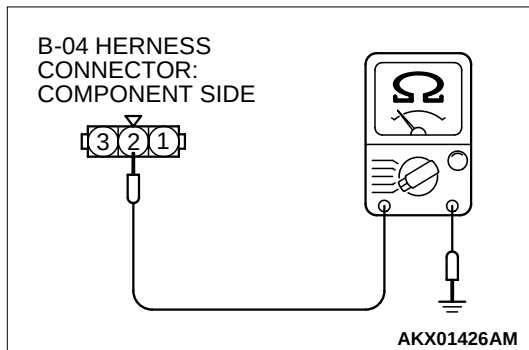
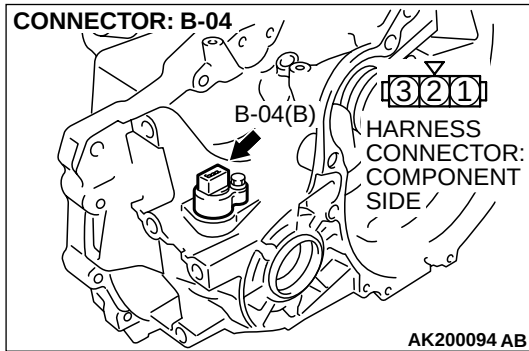
- (1) Disconnect connector B-04 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

- (3) Measure the voltage between terminal No. 1 and ground.
 - Voltage should 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 10.

NO : Check connectors C-124, C-210 and C-211 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connectors are in good condition, repair harness wire between ignition switch connector C-208 (terminal No. 2) and vehicle speed sensor connector B-04 (terminal No. 1) because of open circuit or short circuit to ground. Then go to Step 17.



STEP 10. Check for continuity at vehicle speed sensor harness side connector B-04.

(1) Disconnect connector B-04 and measure at the harness side.

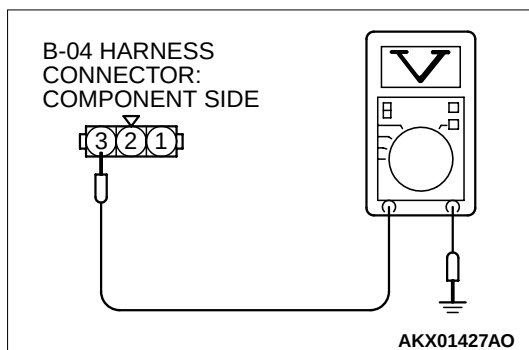
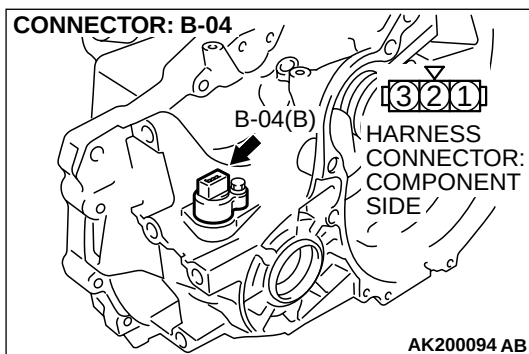
(2) Check for the continuity between terminal No. 2 and ground.

- Should be less than 2 ohms.

Q: Does continuity exist?

YES : Go to Step 11.

NO : Repair harness wire between vehicle speed sensor connector B-04 (terminal No. 2) and ground because of open circuit or harness damage. Then go to Step 17.



STEP 11. Measure the sensor supply voltage at vehicle speed sensor harness side connector B-04.

(1) Disconnect the vehicle speed sensor connector B-04 and measure at the harness side.

(2) Disconnect the combination meter connector and ETACS-ECU connector.

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

(4) Measure the voltage between terminal No. 3 and ground.

- Voltage should measure between 4.8 and 5.2 volts.

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

Q: Is the measured voltage between 4.8 and 5.2 volts?

YES : Go to Step 12.

NO : Repair harness wire between vehicle speed sensor connector B-04 (terminal No. 3) and ECM connector C-137 (terminal No. 79) because of short circuit to ground or harness damage. Then go to Step 17.

STEP 12. Check the vehicle speed sensor.

Refer to GROUP 54A, Combination Metre – Inspection – Vehicle Speed Sensor Check [P.54A-47](#).

Q: Is the vehicle speed sensor normal?

YES : Go to Step 13.

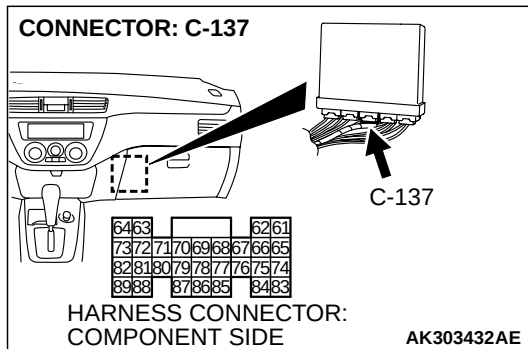
NO : Replace the vehicle speed sensor. Then go to Step 17.

STEP 13. Check connector C-137 at ECM for damage.

Q: Is the connector in good condition?

YES : Go to Step 14.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 17.

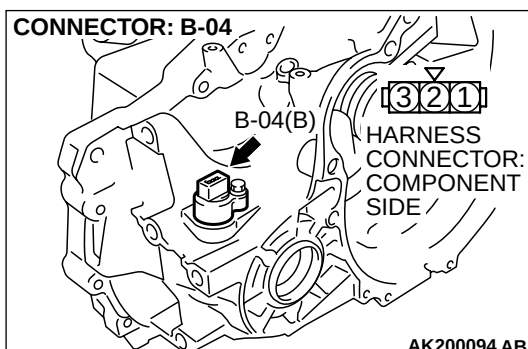
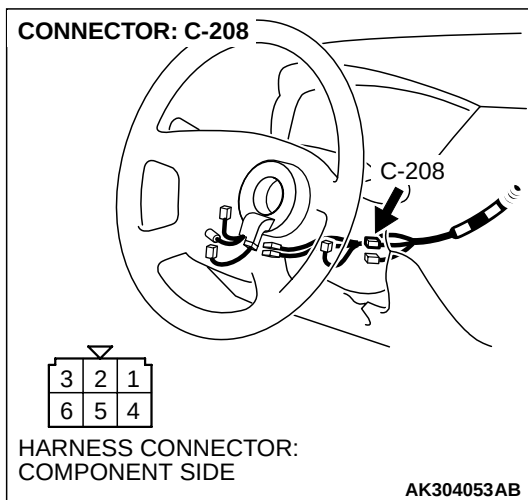


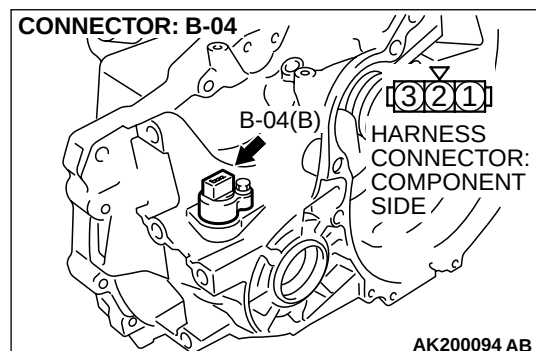
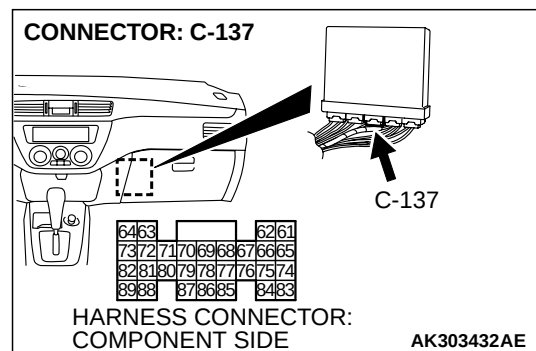
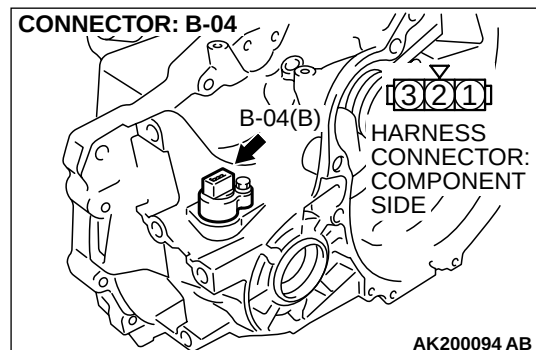
STEP 14. Check for harness damage between ignition switch connector C-208 (terminal No. 2) and vehicle speed sensor connector B-04 (terminal No. 1).

Q: Is the harness wire in good condition?

YES : Go to Step 15.

NO : Repair it. Then go to Step 17.





STEP 15. Check for harness damage between vehicle speed sensor connector B-04 (terminal No. 3) and ECM connector C-137 (terminal No. 79).

Q: Is the harness wire in good condition?

YES : Go to Step 16.

NO : Repair it. Then go to Step 17.

STEP 16. Check for harness damage between vehicle speed sensor connector B-04 (terminal No. 2) and ground.

Q: Is the harness wire in good condition?

YES : Check for harness wire between vehicle speed sensor connector B-04 (terminal No. 3) and other system because of short circuit to ground. Then go to Step 17.

NO : Repair it. Then go to Step 17.

STEP 17. Using scan tool MB991958, check data list item 24: Vehicle Speed Sensor.

⚠ CAUTION

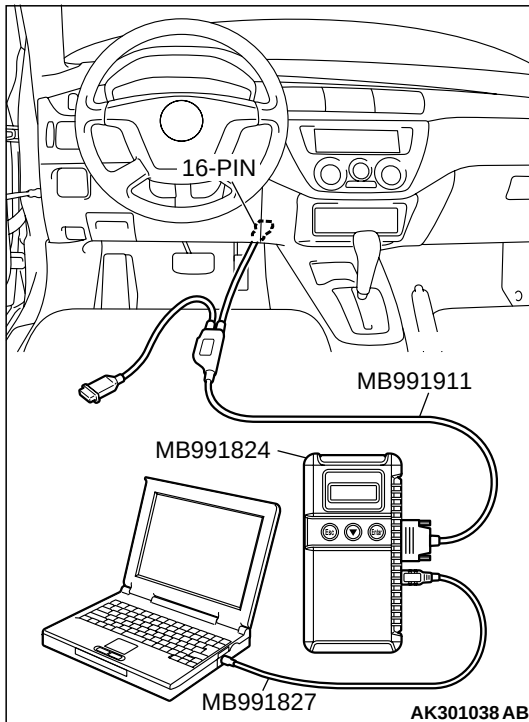
To prevent damage to scan tool MB991958, always turn the ignition switch to "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Start the engine.
- (3) Set scan tool MB991958 to the data reading mode for item 24, Vehicle Speed Sensor.
 - Check that the speedometer and MUT-III display speed match when traveling at a vehicle speed of 40 km/h (25 mph).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

YES : The procedure is complete.

NO : Repeat the troubleshooting.



DTC P0506: Idle Control Sytem 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 <M/T> or PCM <A/T> checks the difference between the actual engine speed and the target engine speed.

DESCRIPTIONS OF MONITOR METHODS

Difference between actual and target idle speed is over the specified value.

MONITOR EXECUTION

Continuous

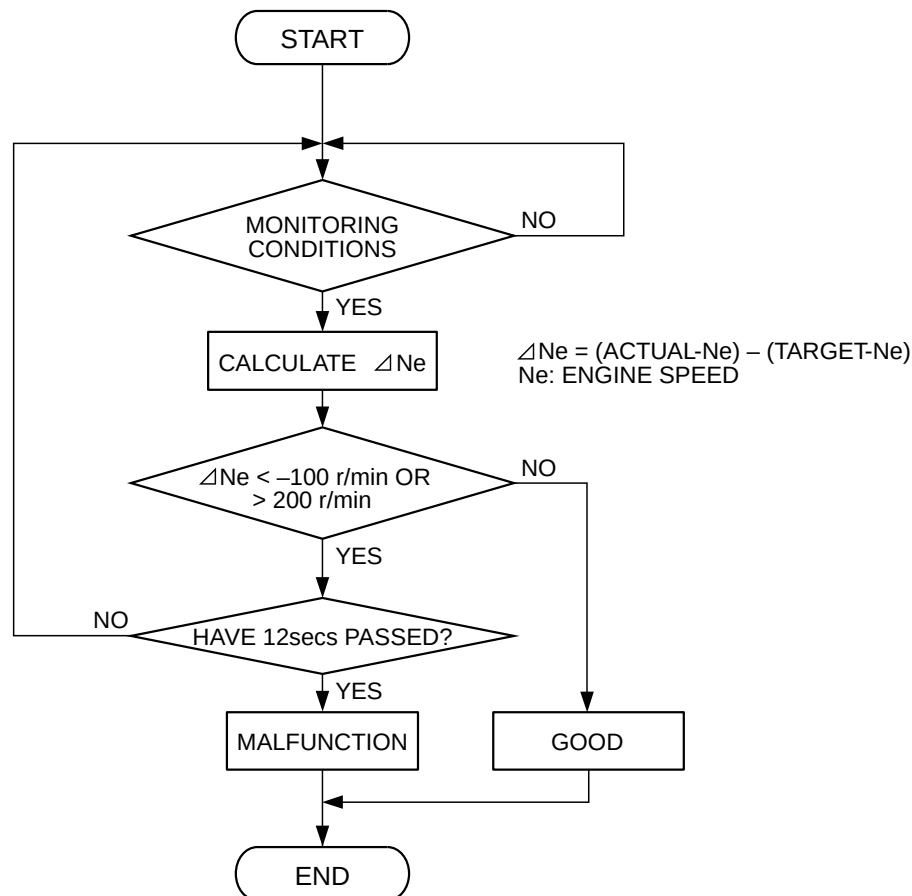
MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

- Misfire monitor
- Exhaust gas recirculation (EGR) system monitor
- Fuel system monitor

Sensor (The sensor below is determined to be normal)

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

DTC SET CONDITIONS**Logic Flow Chart**

AK302165

Check Conditions

- Under the closed loop idle speed control.
- The engine coolant temperature is more than 77°C (171°F).
- Battery positive voltage is higher than 10 volts.
- Power steering pressure switch: OFF
- Volumetric efficiency is lower than 40 percent.
- Barometric pressure is higher than 76 kPa (22.4 in.Hg).
- Intake air temperature is higher than -10°C (14°F).
- 25 seconds have elapsed from the start of the previous monitoring.
- Target throttle actuator control motor position is more than 100 steps.

Judgment Criteria

- The actual idle speed is more than 100 r/min lower than the target idle speed for 12 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Procedure 6 – Other Monitor [P.13B-6](#).

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

- Throttle valve area is dirty.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools

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

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

⚠ CAUTION

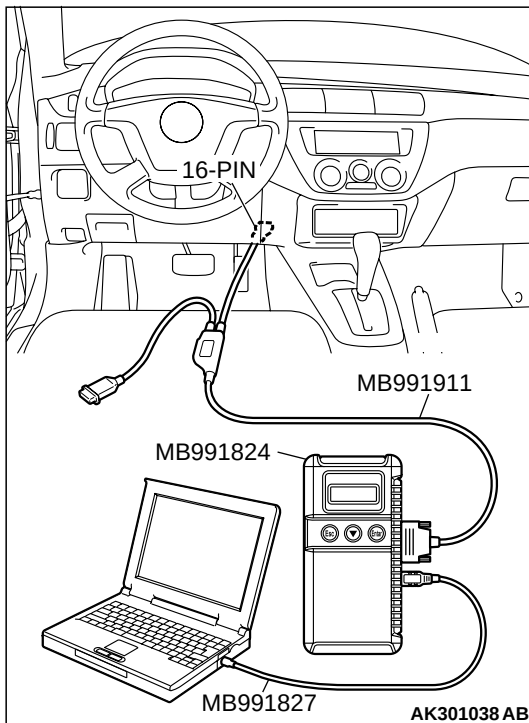
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is the diagnostic trouble code other than P0506 set?

YES : Refer to Diagnostic Trouble Code Chart [P.13B-31](#).

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.13B-901](#). Then go to Step 4.

NO : Go to Step 3.

STEP 3. Check the trouble symptoms.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Procedure 6 – Other Monitor [P.13B-6](#).

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

Q: Is DTC P0506 set?

YES : Replace the ECM or PCM. Then go to Step 4.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspectu in Service Points [P.00-6](#).

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 – Procedure 6 – Other Monitor [P.13B-6](#).

(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 Sytem 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 <M/T> or PCM <A/T> checks the difference between the actual engine speed and the target engine speed.

DESCRIPTIONS OF MONITOR METHODS

Difference between actual and target idle speed is over the specified value.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

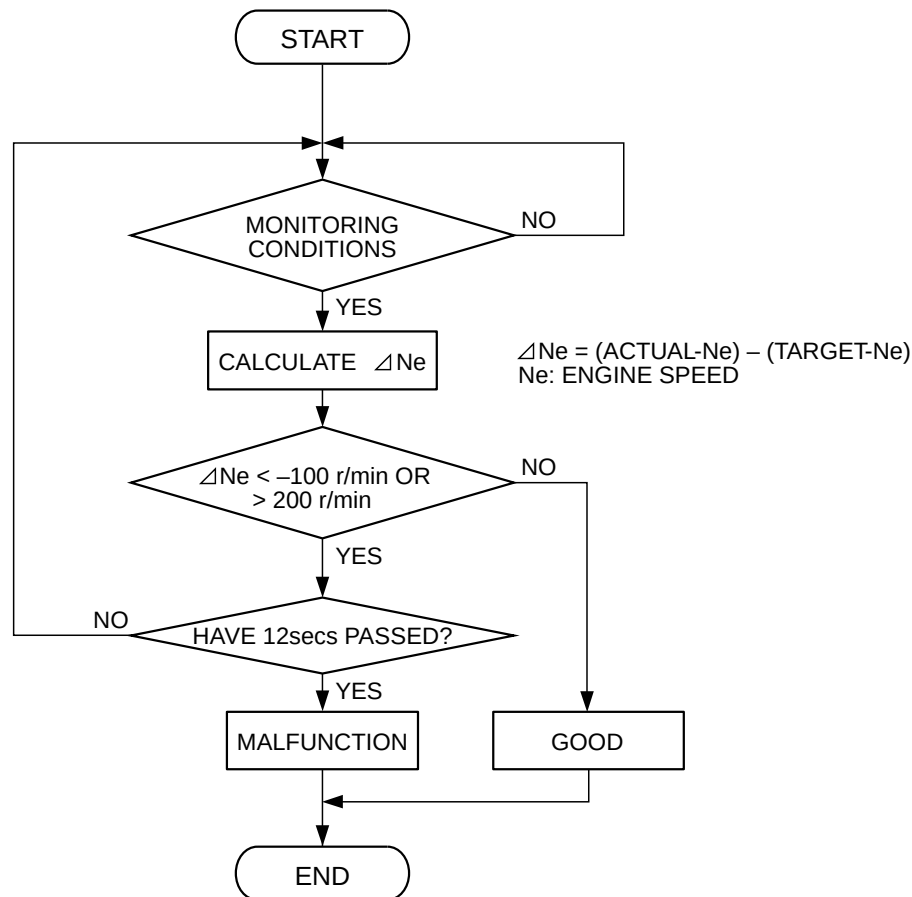
- Misfire monitor
- Exhaust gas recirculation (EGR) system monitor
- Fuel system monitor

Sensor (The sensor below is determined to be normal)

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

DTC SET CONDITIONS

Logic Flow Chart



AK302165

Check Conditions

- Vehicle speed has reached 1.5 km/h (1.0 mph) or more at least once.
- Under the closed loop idle speed control.
- Engine coolant temperature is higher than 77°C (171°F).
- Battery positive voltage is higher than 10 volts.
- Barometric pressure is higher than 76 kPa (22.4 in.Hg).
- Intake air temperature is higher than -10°C (14°F).
- 25 seconds have elapsed from the start of the previous monitoring.
- Target throttle actuator control motor position is 0 step.

Judgment Criteria

- Actual idle speed has continued to be higher than the target idle speed by 200 r/min (300 r/min*) or more for 12 seconds.

*: Specs in parenthesis is 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 – Procedure 6 – Other Monitor [P.13B-6](#).

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

- Intake system vacuum leak.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools

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

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

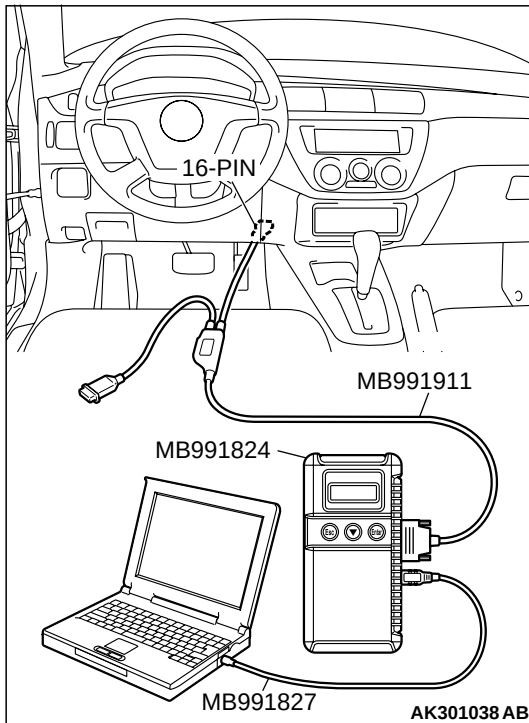
⚠ CAUTION

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

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

Q: Is the diagnostic trouble code other than P0507 set?

- YES** : Refer to Diagnostic Trouble Code Chart [P.13B-31](#).
NO : Go to Step 2.



STEP 2. Check the intake system vacuum leak.

Q: Are there any abnormalities?

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

STEP 3. Check the trouble symptoms.

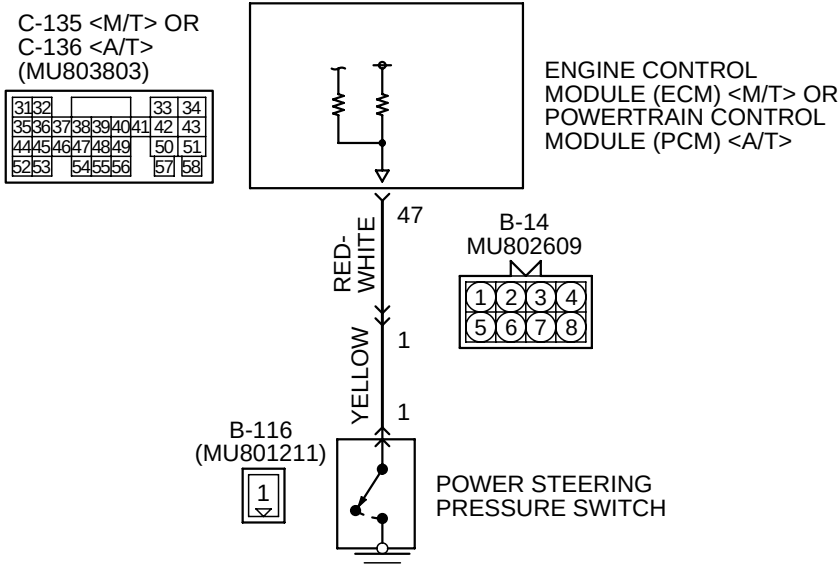
- (1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Procedure 6 – Other Monitor [P.13B-6](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0507 set?

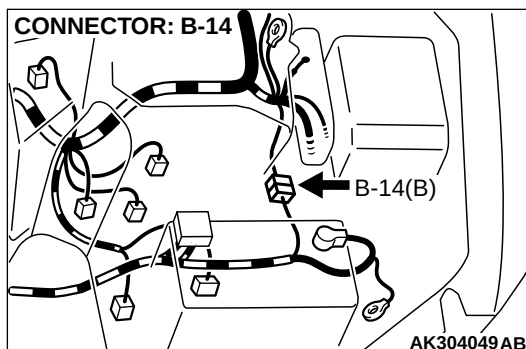
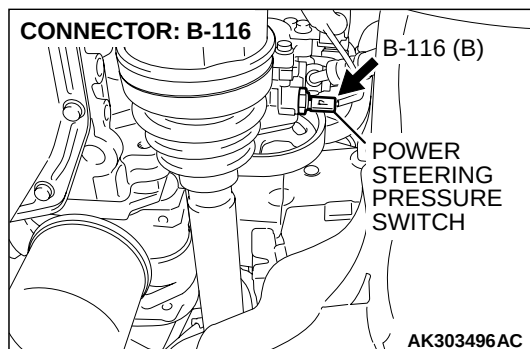
- YES** : Replace the ECM or PCM. Then go to Step 4.
NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspectuain Service Points [P.00-6](#).

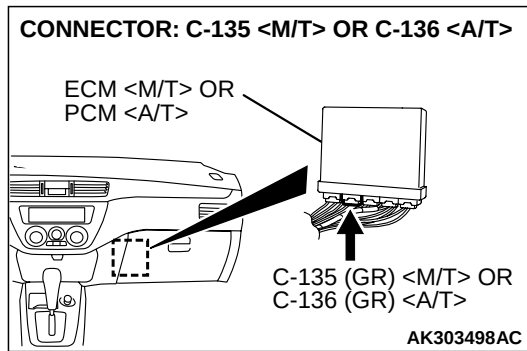
STEP 4. Test the OBD-II drive cycle.

- (1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Procedure 6 – Other Monitor [P.13B-6](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0507 set?**YES** : Retry the troubleshooting.**NO** : The inspection is complete.**DTC P0551: Power Steering Pressure Switch Circuit Range/Performance****Power Steering Pressure Switch Circuit**

AK303997





CIRCUIT OPERATION

- A battery positive voltage is applied to the power steering pressure switch output terminal (terminal No. 1) from the ECM <M/T> or PCM <A/T> (terminal No. 47) via the resistor in the ECM <M/T> or PCM <A/T>.

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 <M/T> or PCM <A/T>.
- When the steering wheel is turned, hydraulic pressure rises. The power steering pressure switch closes, and the applied battery positive voltage will be grounded. With this, the power steering pressure switch output voltage will fluctuate between 12 volts and 0 volt.
- While driving with the steering wheel held straight, the power steering pressure switch turns "OFF".

- The ECM <M/T> or PCM <A/T> 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)

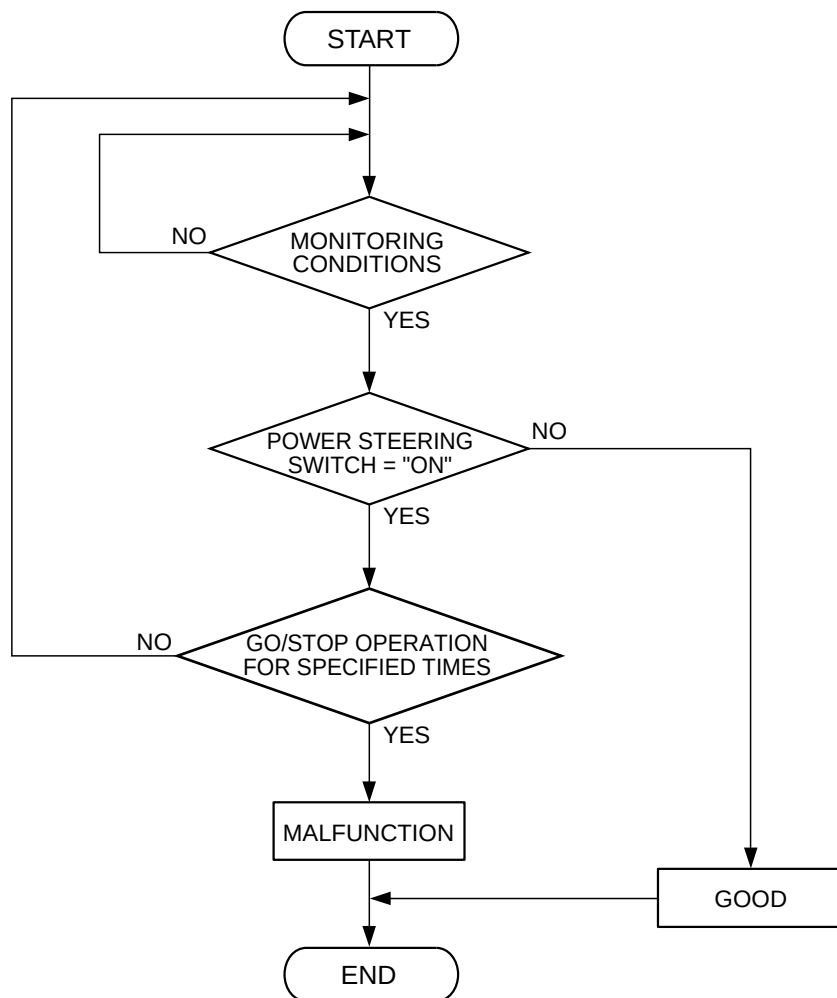
- Not applicable

Sensor (The sensor below is determined to be normal)

- Engine coolant temperature sensor

DTC SET CONDITIONS

Logic Flow Chart



AK302169

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 (0.93 mph) or less]. Repeat 10 times or more.

Judgment Criteria

- 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. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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

STEP 1. Using scan tool MB991958, check data list item 27: Power Steering Pressure Switch.

⚠ CAUTION

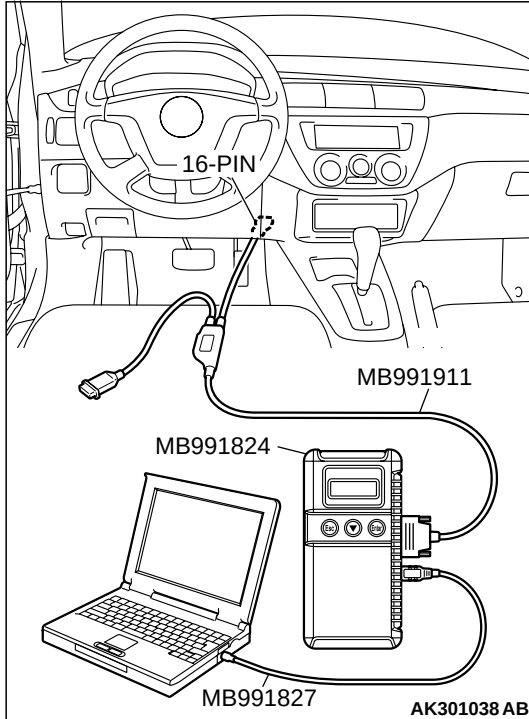
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

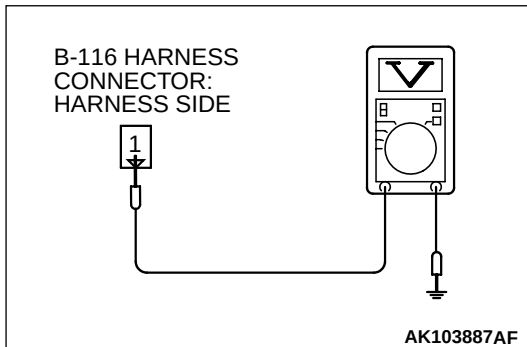
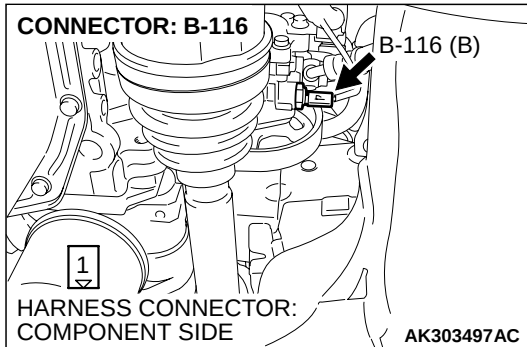
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set scan tool MB991958 to the data reading mode for item 27, Power Steering Pressure Switch.
 - If the steering wheel is not turned while idling, "OFF" will be displayed.
 - If the steering wheel is turned while idling, "ON" will be displayed.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

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

NO : Go to Step 2.



**STEP 2. Measure the power supply voltage at power steering pressure switch connector B-116 by backprobing.**

(1) Do not disconnect the connector B-116.

(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 measure battery positive voltage.
- When steering wheel is turned, voltage should measure 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.

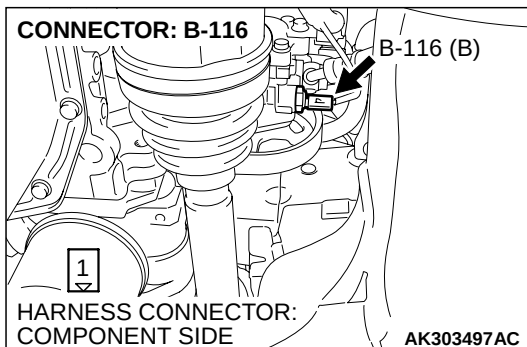
NO : Go to Step 5.

STEP 3. Check harness connector B-116 at power steering pressure switch for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 4.

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



STEP 4. Using scan tool MB991958, check data list item 27: Power Steering Pressure Switch.

⚠ CAUTION

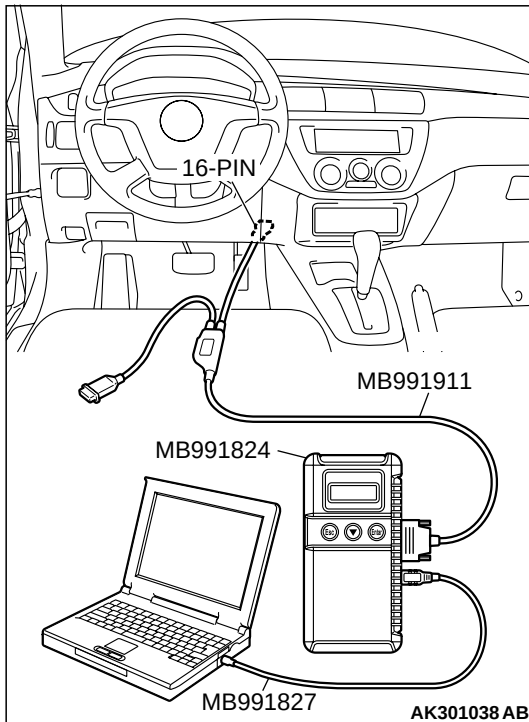
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set scan tool MB991958 to the data reading mode for item 27, Power Steering Pressure Switch.
 - If the steering wheel is not turned while idling, "OFF" will be displayed.
 - If the steering wheel is turned while idling, "ON" will be displayed.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

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

NO : Replace the ECM or PCM. Then go to Step 14.

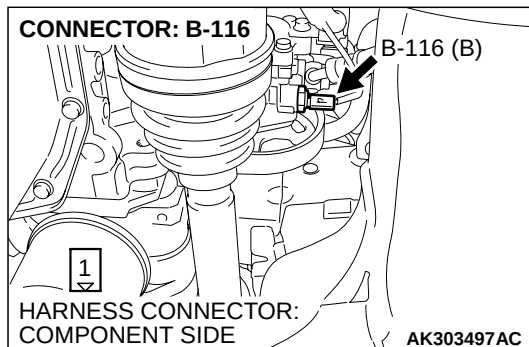


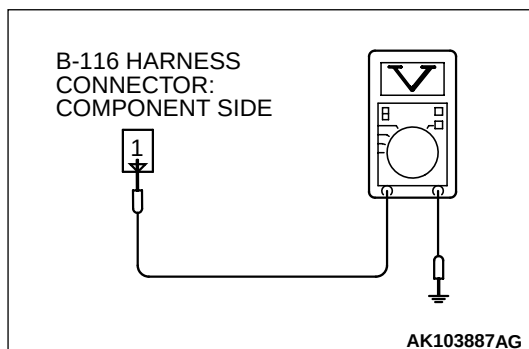
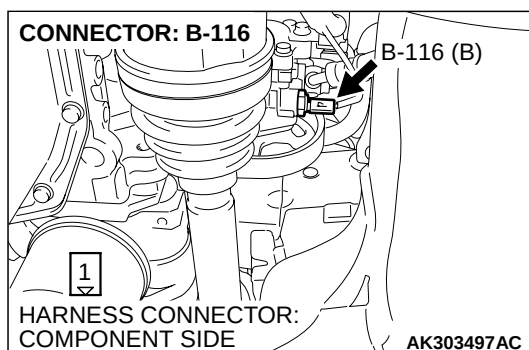
STEP 5. Check harness connector B-116 at power steering pressure switch for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 6.

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





STEP 6. Measure the power supply voltage at power steering pressure switch harness side connector B-116.

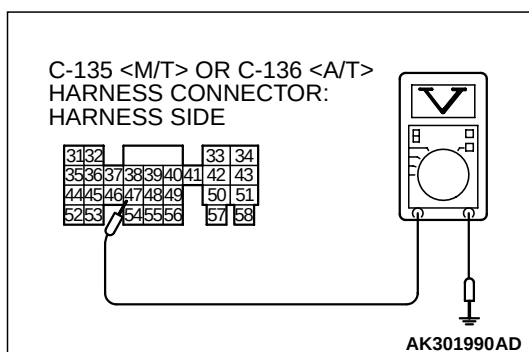
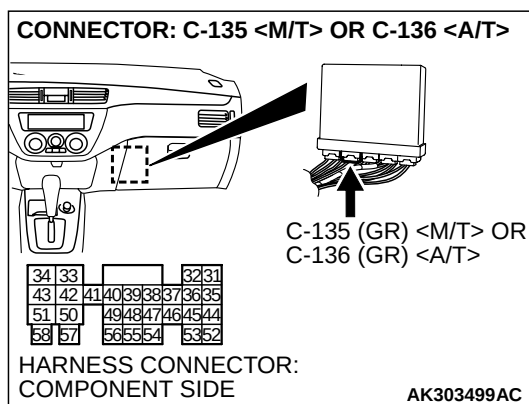
- (1) Disconnect the connector B-116 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

- (3) Measure the voltage between terminal No. 1 and ground.
 - Voltage should be battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

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

YES : Go to Step 11.

NO : Go to Step 7.



STEP 7. Measure the power supply voltage at ECM connector C-135 <M/T> or PCM connector C-136 <A/T> by backprobing.

- (1) Do not disconnect the ECM connector C-135 <M/T> or PCM connector C-136 <A/T>.
- (2) Disconnect the power steering pressure switch connector B-116.
- (3) Turn the ignition switch to the "ON" position.

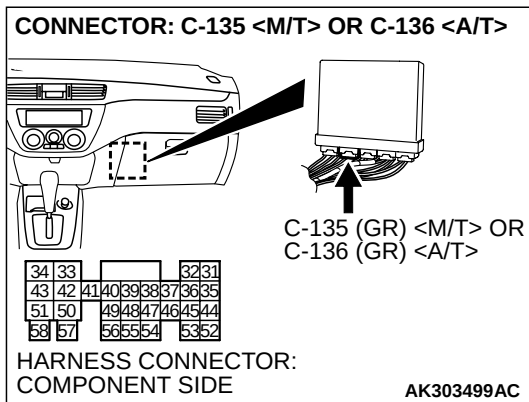
- (4) Measure the voltage between terminal No. 47 and ground by backprobing.
 - Voltage should be battery positive voltage.

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

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

YES : Go to Step 8.

NO : Go to Step 9.

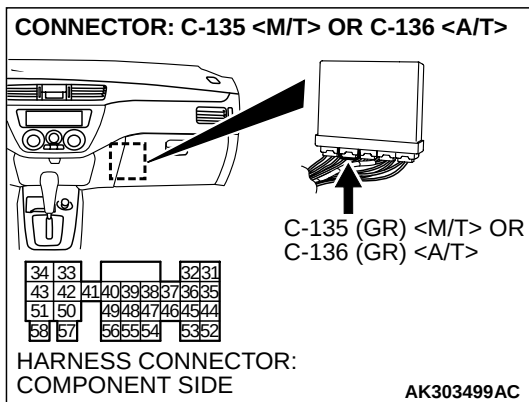


STEP 8. Check harness connector C-135 at ECM <M/T> or C-136 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Check harness connector B-14 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connector is in good condition, repair harness wire between power steering pressure switch connector B-116 (terminal No. 1) and ECM connector C-135 <M/T> or PCM connector C-136 <A/T> (terminal No. 47) because of open circuit. Then go to Step 14.

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

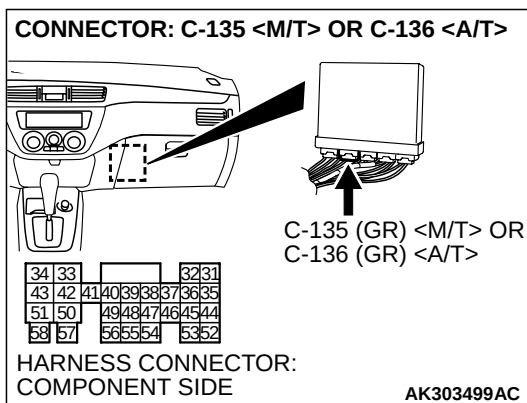
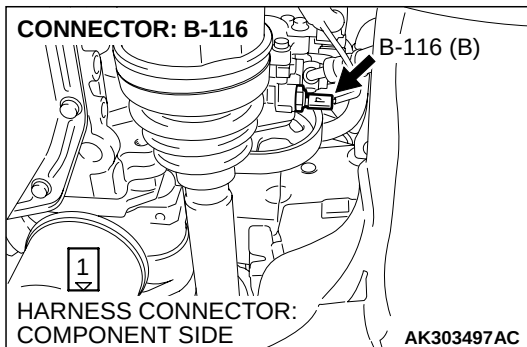


STEP 9. Check harness connector C-135 at ECM <M/T> or C-136 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 10.

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

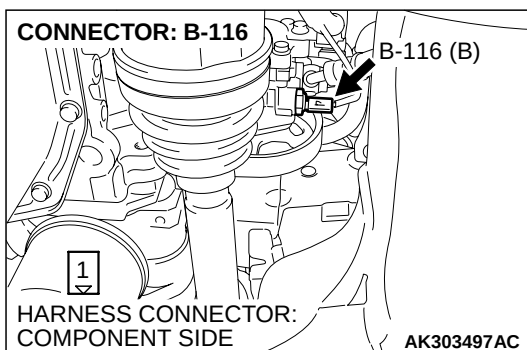


STEP 10. Check for short circuit to ground between power steering pressure switch connector B-116 (terminal No. 1) and ECM connector C-135 <M/T> or PCM connector C-136 <A/T> (terminal No. 47).

Q: Is the harness wire in good condition?

YES : Replace the ECM or PCM. Then go to Step 14.

NO : Repair it. Then go to Step 14.



STEP 11. Replace the power steering pressure switch.

(1) Replace the power steering pressure switch.

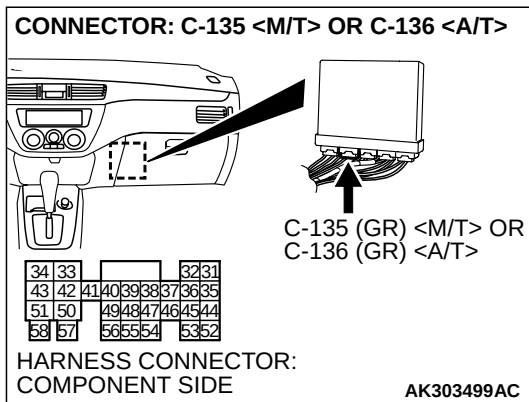
(2) Retest the system.

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

Q: Is DTC P0551 set?

YES : Go to Step 12.

NO : Go to Step 14.



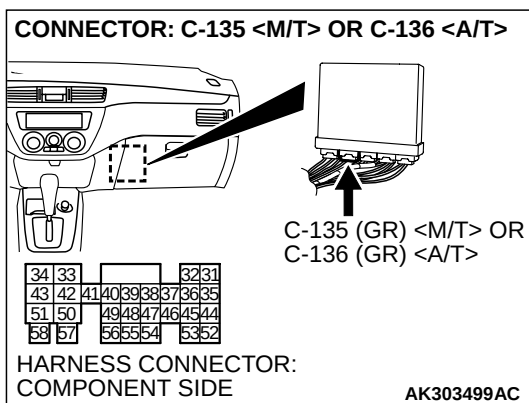
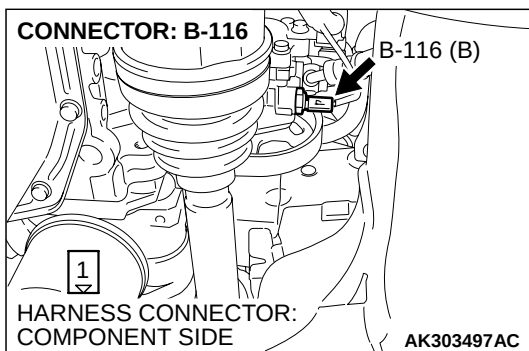
STEP 12. Check connector C-135 at ECM <M/T> or C-136 at PCM <A/T> for damage.

Q: Is the connector in good condition?

YES : Go to Step 13.

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

STEP 13. Check for harness damage between power steering pressure switch connector B-116 (terminal No. 1) and ECM connector C-135 <M/T> or PCM connector C-136 <A/T> (terminal No. 47).

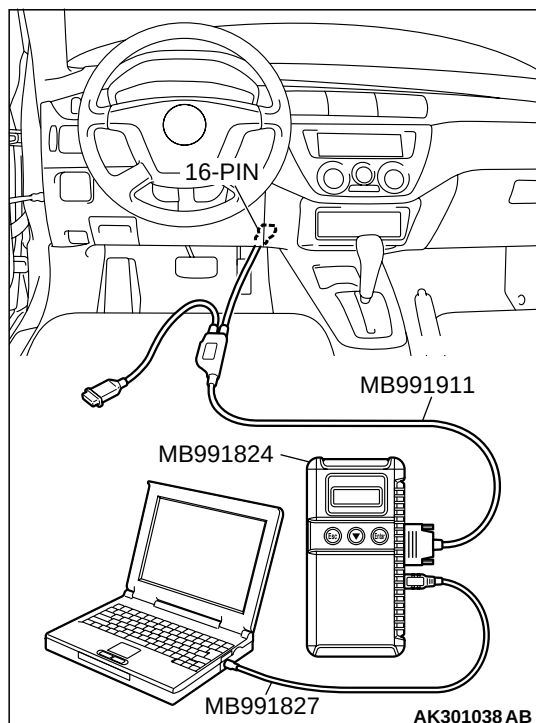


NOTE: Check harness after checking intermediate connector B-14. If intermediate connector is damaged, repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 14.

Q: Is the harness wire in good condition?

YES : Replace the ECM or PCM. Then go to Step 14.

NO : Repair it. Then go to Step 14.



STEP 14. Using scan tool MB991958, check data list item 27: Power Steering Pressure Switch.

⚠ CAUTION

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

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set scan tool MB991958 to the data reading mode for item 27, Power Steering Pressure Switch.
 - If the steering wheel is not turned while idling, "OFF" will be displayed.
 - If the steering wheel is turned while idling, "ON" will be displayed.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

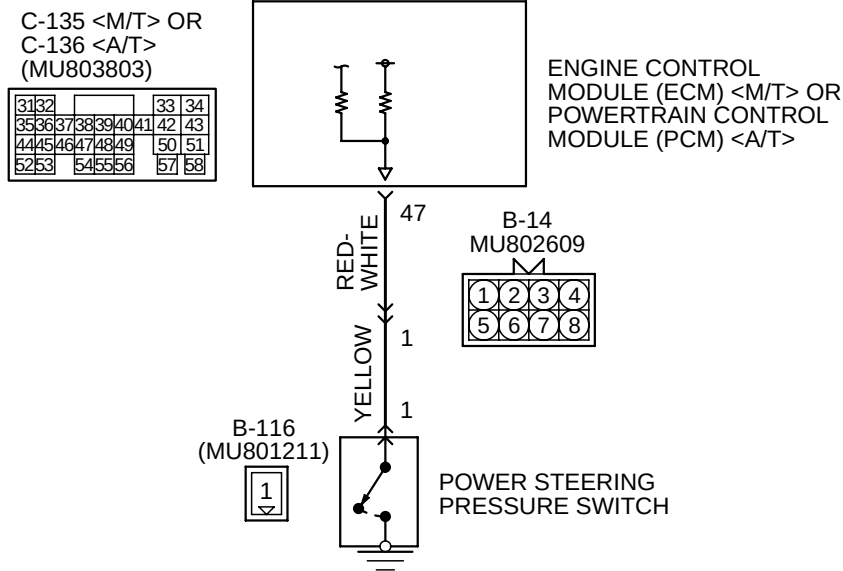
Q: Is the switch operating properly?

YES : The inspection is complete.

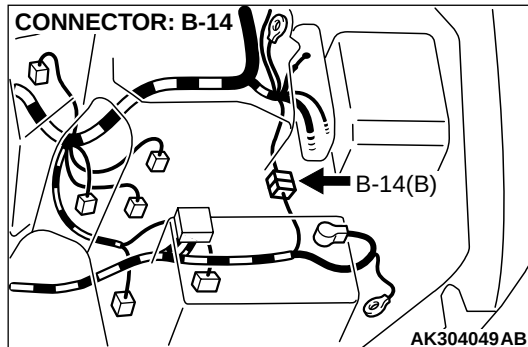
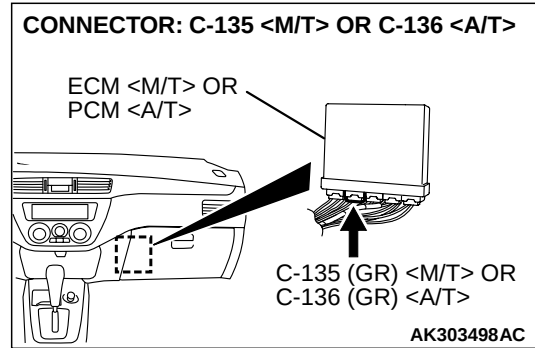
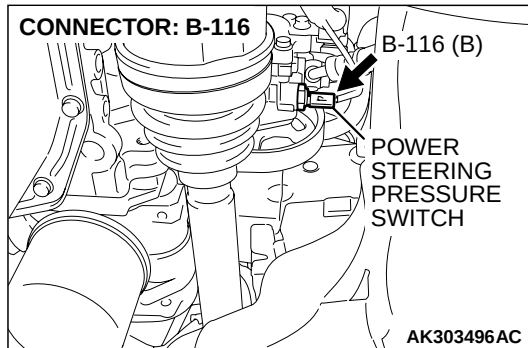
NO : Retry the troubleshooting.

DTC P0554: Power Steering Pressure Switch Circuit Intermittent

Power Steering Pressure Switch Circuit



AK303997



CIRCUIT OPERATION

- A battery positive voltage is applied to the power steering pressure switch output terminal (terminal No. 1) from the ECM <M/T> or PCM <A/T> (terminal No. 47) via the resistor in the ECM <M/T> or PCM <A/T>.

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 <M/T> or PCM <A/T>.
- When the steering wheel is turned, hydraulic pressure rises. The power steering pressure switch closes, and the applied battery positive voltage will be grounded. With this, the power steering pressure switch output voltage will fluctuate between 12 volts and 0 volt.
- While driving with the steering wheel held straight, the power steering pressure switch turns "OFF".

- The ECM <M/T> or PCM <A/T> 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)

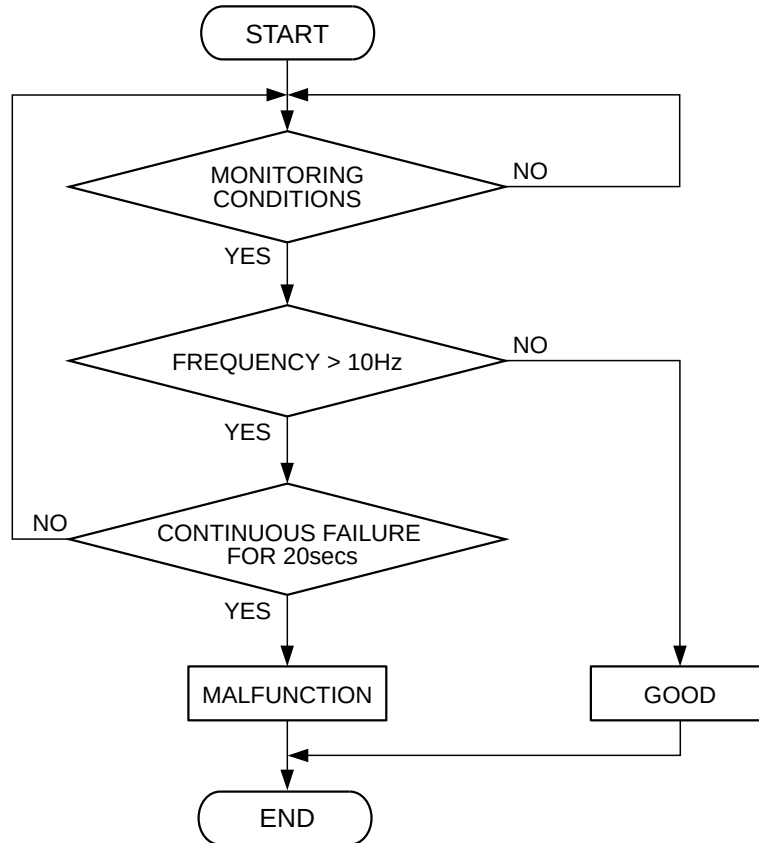
- Not applicable

Sensor (The sensor below is determined to be normal)

- Engine coolant temperature sensor

DTC SET CONDITIONS

Logic Flow Chart



AK302041

Check Conditions

- Engine coolant temperature is higher than 20°C (68°F).
- Vehicle speed is higher than 50 km/h (31 mph).

Judgment Criteria

- The ON/OFF frequency of a power steering pressure switch is 10 Hz or more for 20 seconds.

OBD-II DRIVE CYCLE PATTERN

None.

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. <M/T>
- PCM failed. <A/T>

DIAGNOSIS**Required Special Tools:**

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

STEP 1. Using scan tool MB991958, check data list item 27: Power Steering Pressure Switch.**⚠ CAUTION**

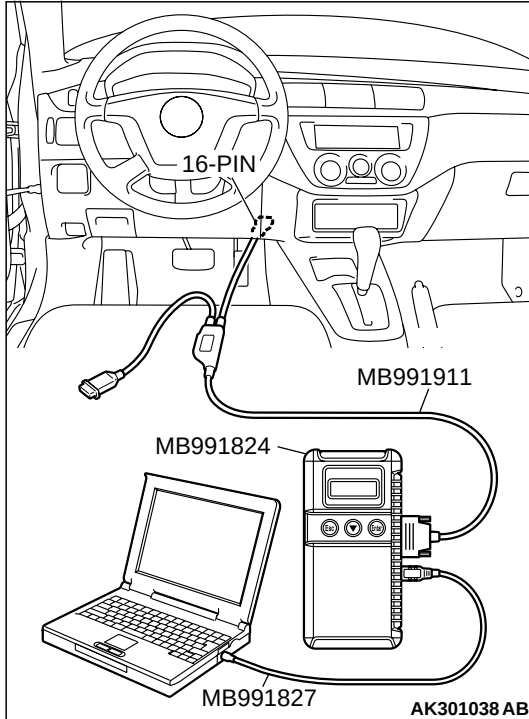
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set scan tool MB991958 to the data reading mode for item 27, Power Steering Pressure Switch.
 - If the steering wheel is not turned while idling, "OFF" will be displayed.
 - If the steering wheel is turned while idling, "ON" will be displayed.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

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

NO : Go to Step 2.

**STEP 2. Check the power steering fluid level.**

Refer to GROUP 37, On-Vehicle Service – Fluid Level Check [P.37A-19](#).

Q: Are there any abnormalities?

YES : Repair it. Then go to Step 7.

NO : Go to Step 3.

STEP 3. Check the power steering pressure switch.

Refer to GROUP 37, On-Vehicle Service – Power Steering Pressure Switch Check [P.37A-22](#).

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.37A-4](#).

Q: Are there any abnormalities?

YES : Repair it. Then go to Step 7.

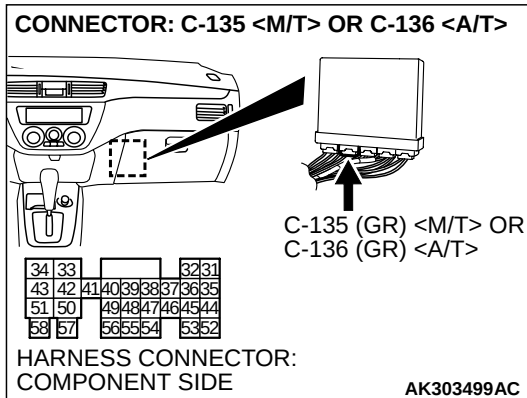
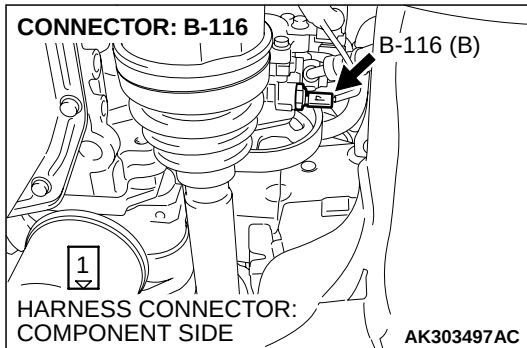
NO : Go to Step 5.

STEP 5. Check harness connector B-116 at the power steering pressure switch and harness connector C-135 at ECM <M/T> or C-136 at PCM <A/T> for damage.

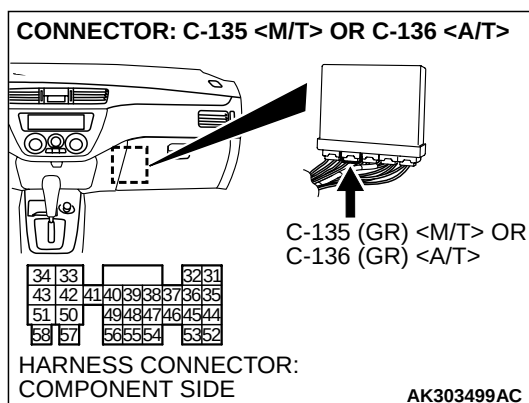
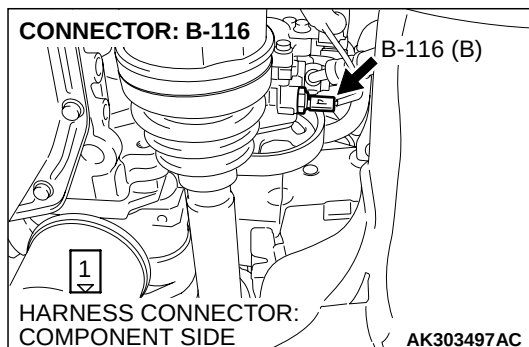
Q: Is the harness connector in good condition?

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-116 (terminal No. 1) and ECM connector C-135 <M/T> or PCM connector C-136 <A/T> (terminal No. 47).



NOTE: Check harness after checking intermediate connector B-14. If intermediate connector is damaged, repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 7.

Q: Is the harness wire in good condition?

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

NO : Repair it. Then go to Step 7.

**STEP 7. Using scan tool MB991958, check data list item 27:
Power Steering Pressure Switch.**

⚠ CAUTION

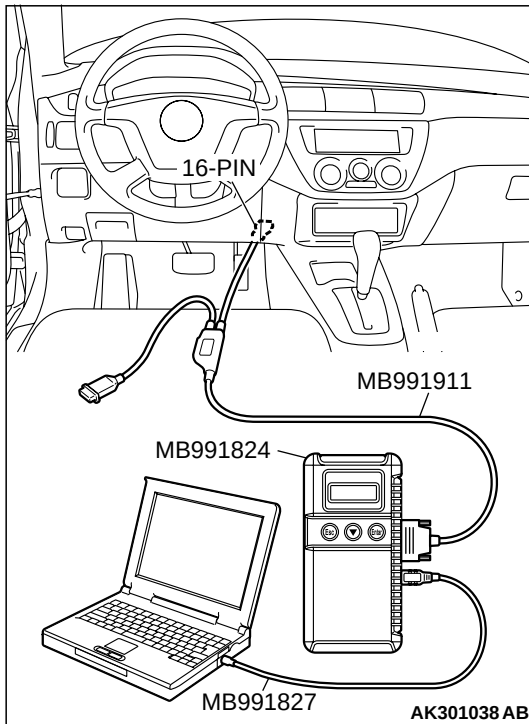
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set scan tool MB991958 to the data reading mode for item 27, Power Steering Pressure Switch.
 - If the steering wheel is not turned while idling, "OFF" will be displayed.
 - If the steering wheel is turned while idling, "ON" will be displayed.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the switch operating properly?

YES : The inspection is complete.

NO : Retry the troubleshooting.



DTC P0606: Engine Control Module or Powertrain Control Module Main Processor Malfunction

TECHNICAL DESCRIPTION

- System LSI checks the ECM <M/T> or PCM <A/T> 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 Conditions**

- Ignition switch is "ON" position.

Judgement Criteria

- 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:)

- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS**Required Special Tools:**

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

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

⚠ CAUTION

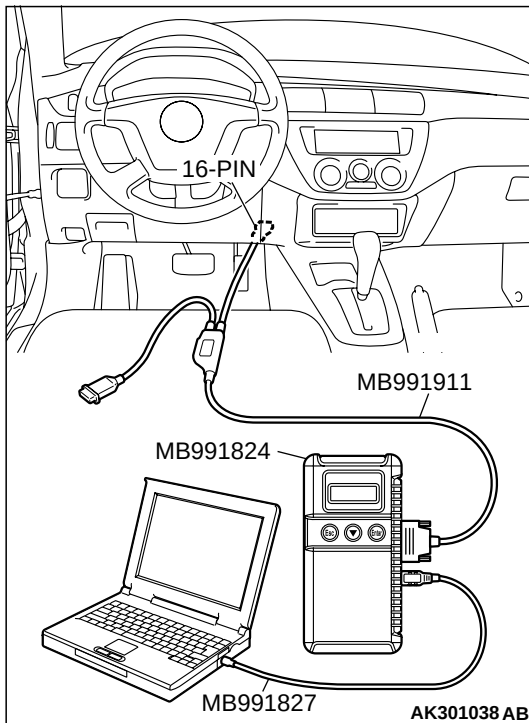
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is DTC P0606 set?

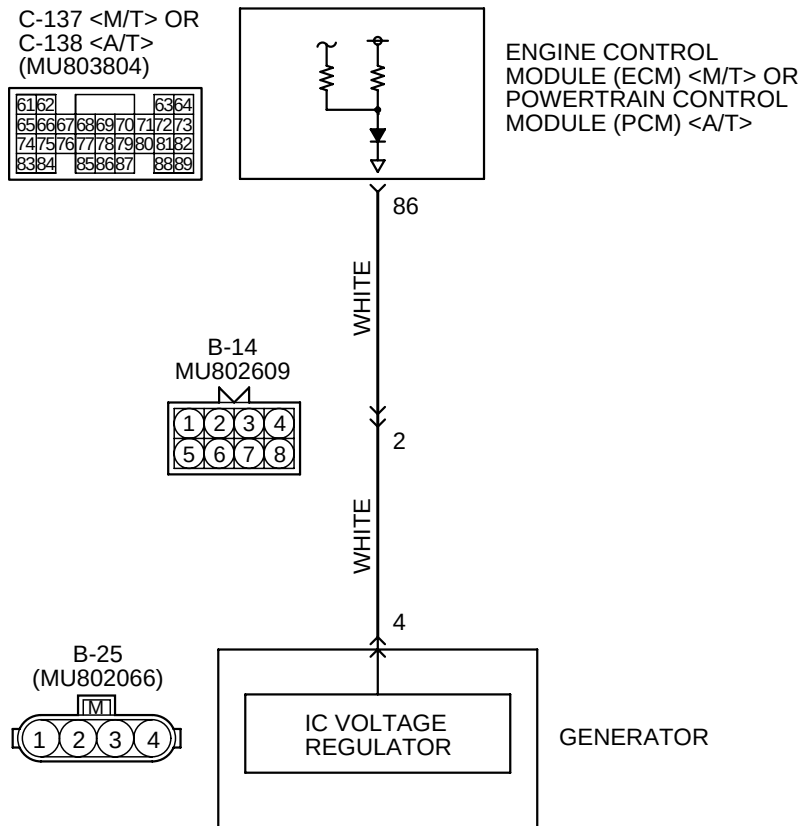
YES : Replace the ECM or PCM.

NO : It can be assumed that this malfunction is intermittent.
Refer to GROUP 00, How to Use
Troubleshooting/Inspection Service Points [P.00-6](#).

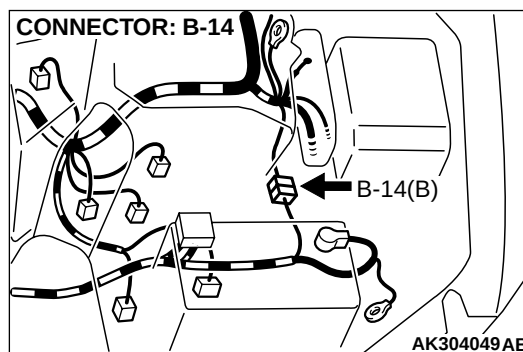
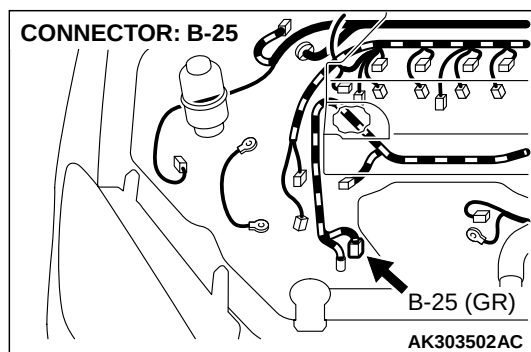


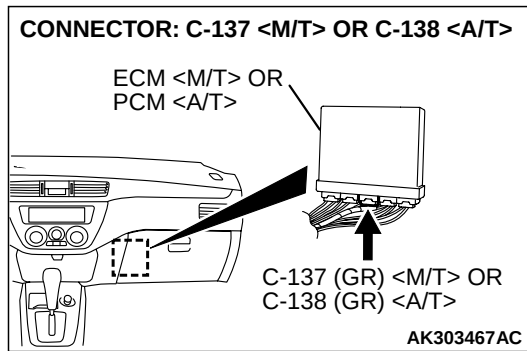
DTC P0622: Generator FR Terminal Circuit Malfunction

Generator Circuit



AK303998





CIRCUIT OPERATION

- The ECM <M/T> or PCM <A/T> (terminal No. 86) apply a battery positive 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 <M/T> or PCM <A/T>.
- The ECM <M/T> or PCM <A/T> detects the generator output with the input signal, and controls the idle air control motor according to the generator output.

DTC SET CONDITIONS

Check Conditions

- Engine speed is higher than 50 r/min.

Judgement Criteria

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

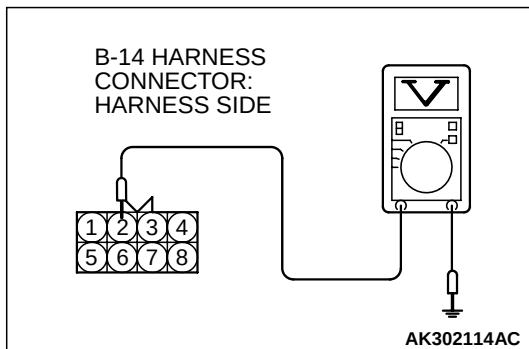
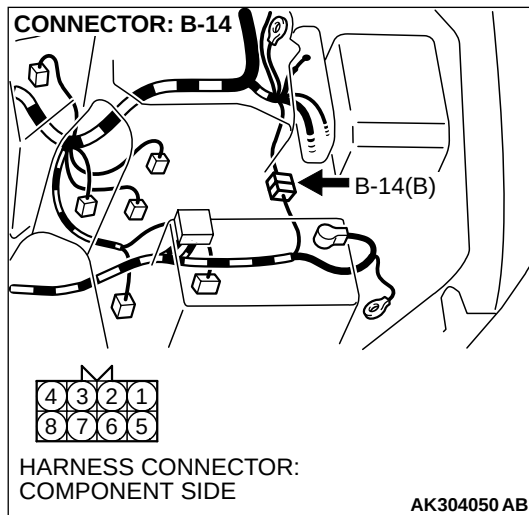
TROUBLESHOOTING HINTS (The most likely causes for this code to be set area:)

- Generator failed.
- Open or shorted circuit in generator FR terminal circuit, harness damage or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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


STEP 1. Measure the voltage at generator intermediate connector B-14 by backprobing.

- (1) Do not disconnect the connector B-14.
- (2) Start the engine and run at idle.

- (3) Measure the voltage between terminal No. 2 and ground by backprobing.

- 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 drops.

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

Q: Did the measured voltage drop?

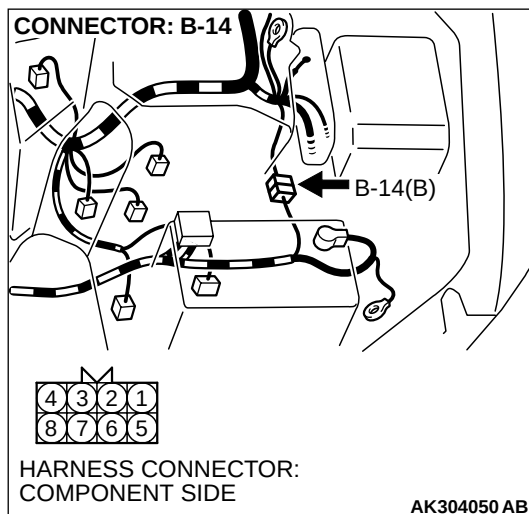
YES : Go to Step 2.

NO : Go to Step 4.

STEP 2. Check harness connector B-14 at generator intermediate connector 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 10.



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

⚠ CAUTION

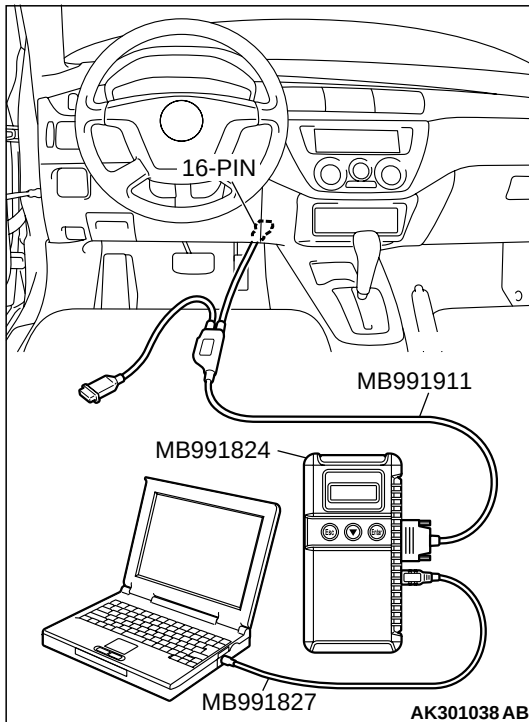
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (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 or PCM. 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 [P.00-6](#).

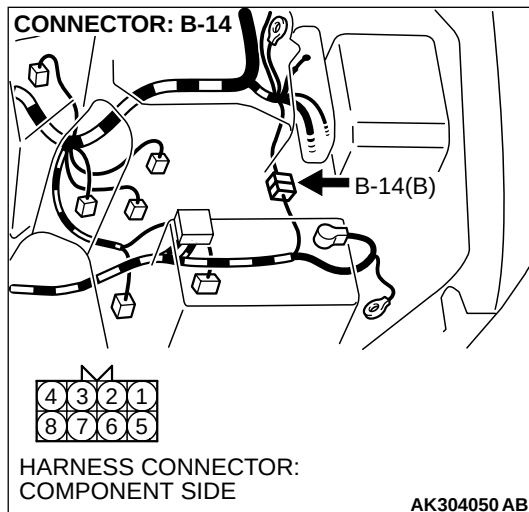


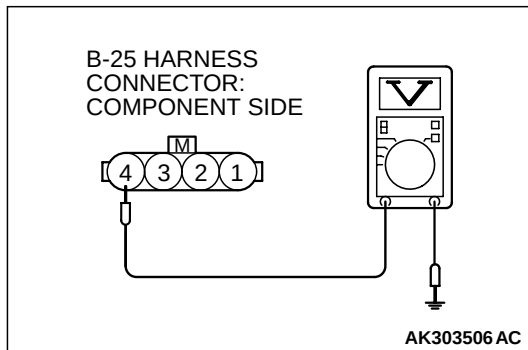
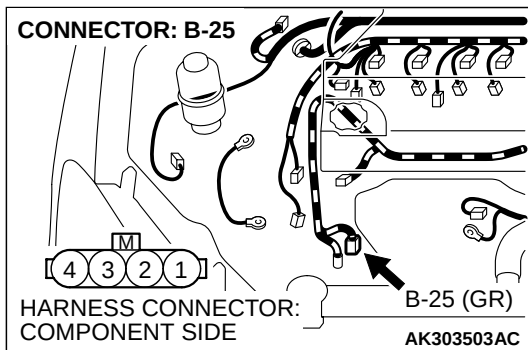
STEP 4. Check harness connector B-14 at generator intermediate connector for damage.

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 10.





STEP 5. Measure the voltage at generator harness side connector B-25.

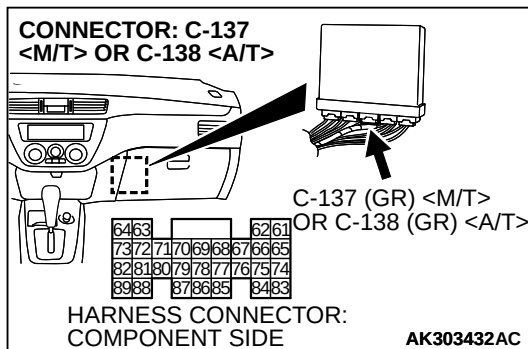
- (1) Disconnect the connector B-25 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

- (3) Measure the voltage between terminal No. 4 and ground.
 - Voltage should be battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

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

YES : Go to Step 8.

NO : Go to Step 6.



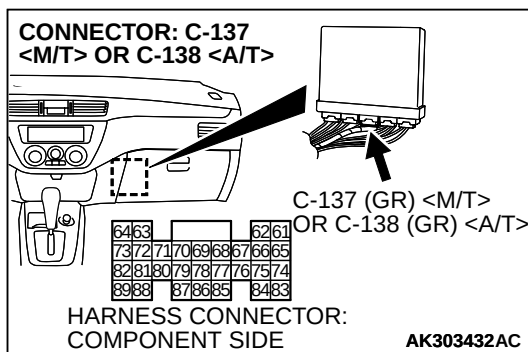
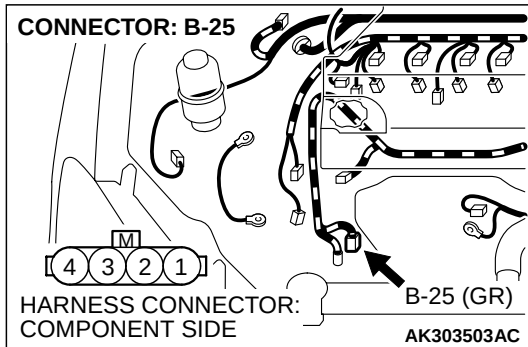
STEP 6. Check harness connector C-137 at ECM <M/T> or C-138 at PCM <A/T> for damage.

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 10.

STEP 7. Check for open circuit and short circuit to ground between generator connector B-25 (terminal No. 4) and ECM connector C-137 <M/T> or PCM connector C-138 <A/T> (terminal No. 86).



NOTE: Check harness after checking intermediate connector B-14. If intermediate connector is damaged, repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 10.

Q: Is the harness wire in good condition?

YES : Replace the ECM or PCM. Then go to Step 10.

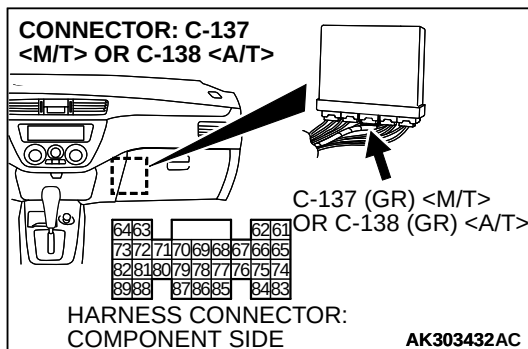
NO : Repair it. Then go to Step 10.

STEP 8. Check harness connector C-137 at ECM <M/T> or C-138 at PCM <A/T> for damage.

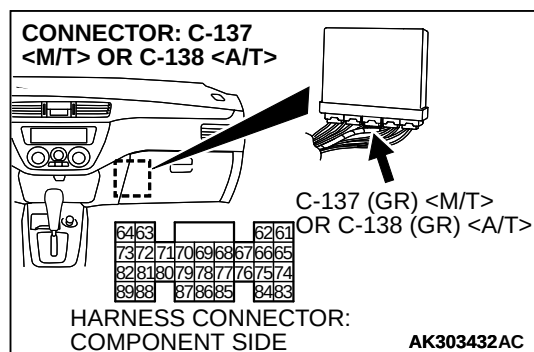
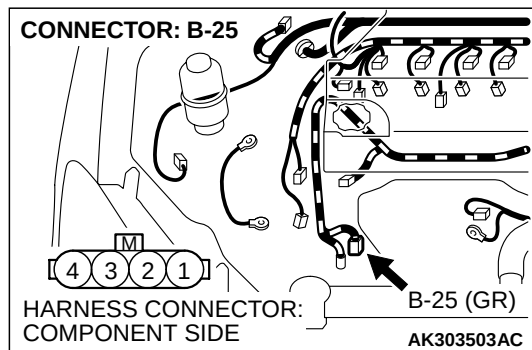
Q: Is the harness connector in good condition?

YES : Go to Step 9.

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



STEP 9. Check for harness damage between generator connector B-25 (terminal No. 4) and ECM connector C-137 <M/T> or PCM connector C-138 <A/T> (terminal No. 86).



NOTE: Check harness after checking intermediate connector B-14. If intermediate connector is damaged, repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 10.

Q: Is the harness wire in good condition?

YES : Replace the generator. Then go to Step 10.

NO : Repair it. Then go to Step 10.

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

⚠ CAUTION

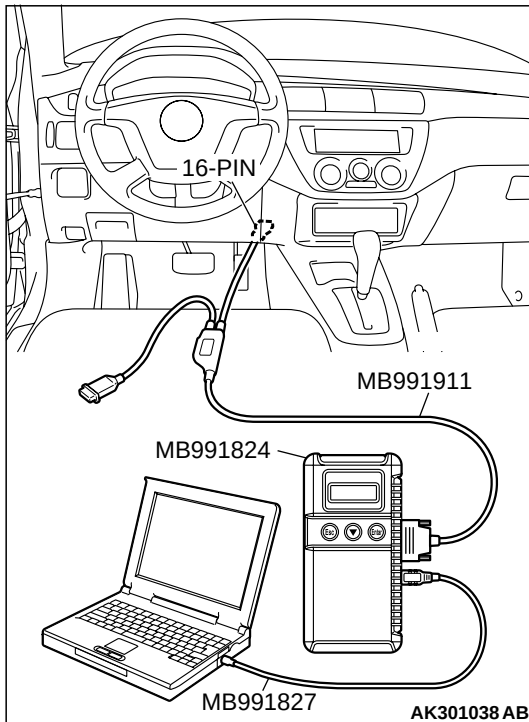
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) 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 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 Circuit [P.13B-634](#).

CIRCUIT OPERATION

- Refer to, DTC P2101 – Throttle Actuator Control Motor Circuit [P.13B-634](#).

TECHNICAL DESCRIPTION

- ECM <M/T> or PCM <A/T> checks the electronic controlled throttle system for abnormal conditions.

DESCRIPTIONS OF MONITOR METHODS

Difference between throttle position sensor (main) output and target opening is greater than the specified value.

MONITOR EXECUTION

Continuous

**MONITOR EXECUTION CONDITIONS (Other
monitor and Sensor)**

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

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS**Check Conditions**

- Battery positive voltage is higher than 8.3 volts.
- Throttle position sensor (main) output voltage is between 0.35 and 4.8 volts.
- Drop of throttle position sensor (main) output voltage per 100 milliseconds is more than 0.04 volt.

Judgement Criteria

- Throttle position sensor (main) output voltage has continued to be higher than the target throttle position sensor (main) voltage by 0.5 volt or more for 0.5 second.

Check Conditions

- Battery positive voltage is higher than 8.3 volts.
- Throttle position sensor (main) output voltage is between 0.35 and 4.8 volts.

Judgement Criteria

- Difference between throttle position sensor (main) output voltage and target throttle position sensor (main) voltage is 1 volt or higher for 4 seconds.

OBD-II DRIVE CYCLE PATTERN

None.

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

- Throttle valve return spring failed.
- Throttle valve operation failed.
- Throttle actuator control motor failed.
- Harness damage in throttle actuator control motor circuit, or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS**Required Special Tools:**

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

STEP 1. Using scan tool MB991958, check data list item 9A: Throttle Position Sensor (main) Mid Opening Learning Value.

⚠ CAUTION

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

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 9A, Throttle position sensor (main) mid opening learning value.

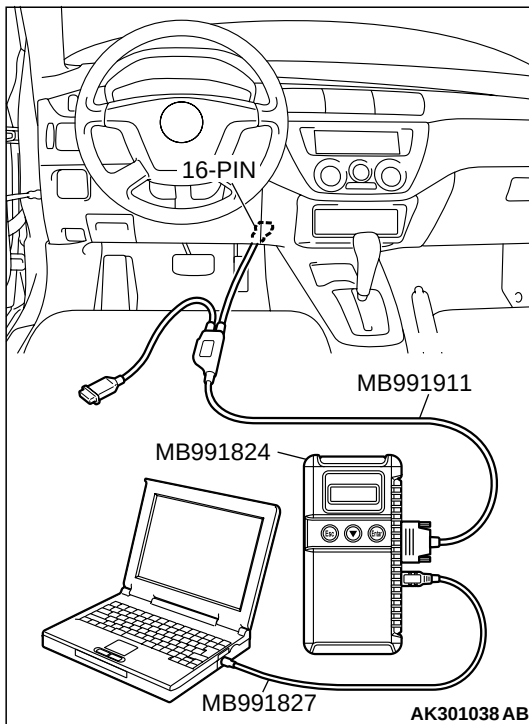
- Check that it is between 0.6 and 1.2 volts.

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

Q: Is voltage between 0.6 and 1.2 volts?

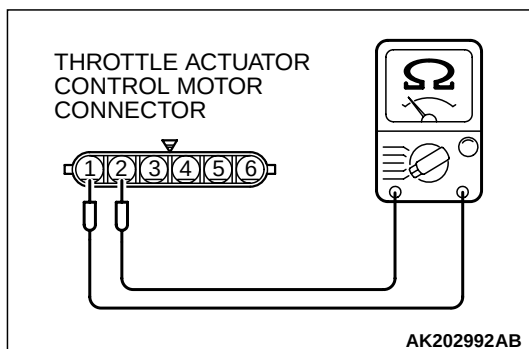
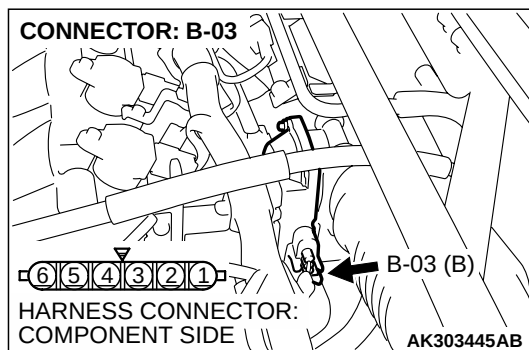
YES : Go to Step 2.

NO : Replace the throttle body assembly. Then go to Step 8.



STEP 2. Check the throttle actuator control motor.

- (1) Disconnect the connector B-03.



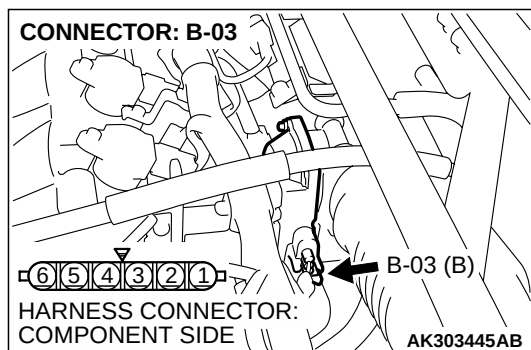
- (2) Measure the resistance between throttle actuator control motor side connector terminal No. 1 and No. 2.

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

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

YES : Go to Step 3.

NO : Replace the throttle body assembly. Then go to Step 8.

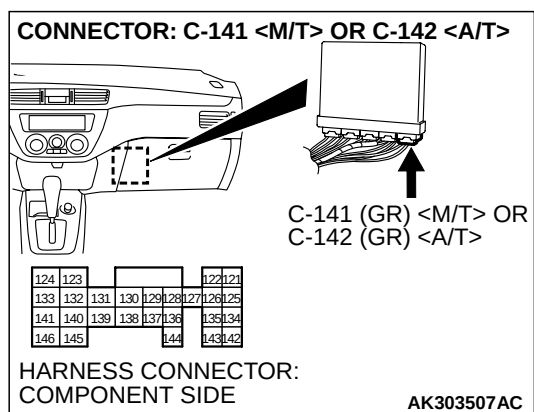


STEP 3. Check harness connector B-03 at throttle actuator control motor for damage.

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 8..



STEP 4. Check harness connector C-141 at ECM <M/T> or C-142 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 5.

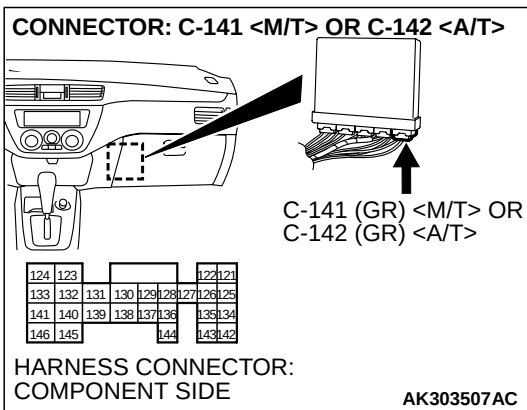
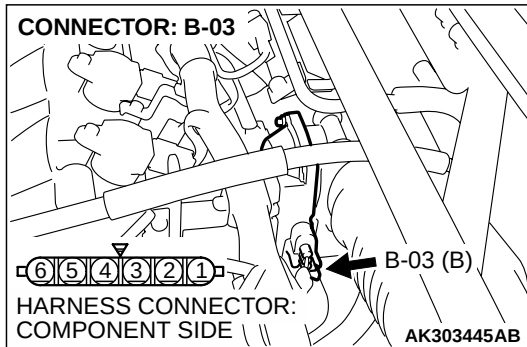
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 8.

STEP 5. Check for harness damage between throttle actuator control motor connector B-03 (terminal No. 1) and ECM connector C-141 <M/T> or PCM connector C-142 <A/T> (terminal No. 133).

Q: Is the harness wire in good condition?

YES : Go to Step 6.

NO : Repair it. Then go to Step 8.

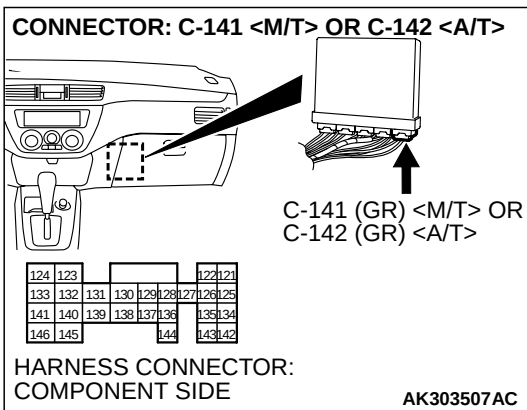
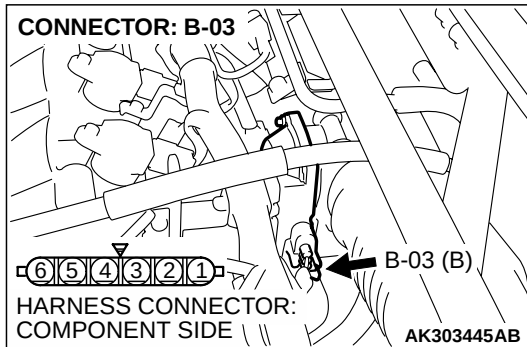


STEP 6. Check for harness damage between throttle actuator control motor connector B-03 (terminal No. 2) and ECM connector C-141 <M/T> or PCM connector C-142 <A/T> (terminal No. 141).

Q: Is the harness wire in good condition?

YES : Go to Step 7.

NO : Repair it. Then go to Step 8.



STEP 7. Using scan tool MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

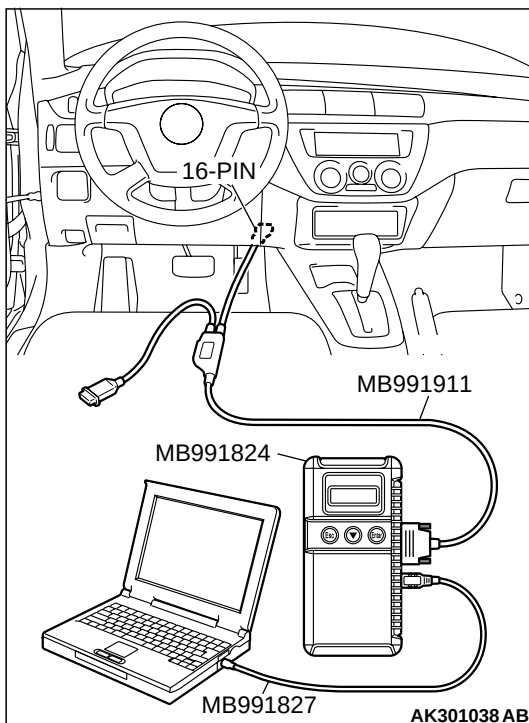
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

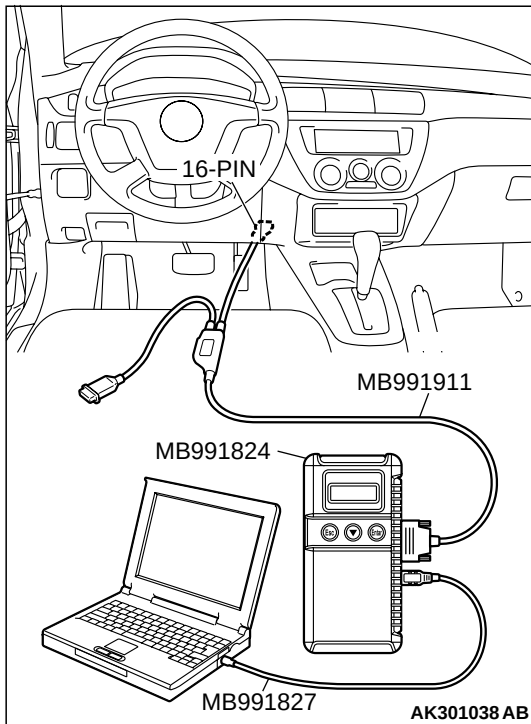
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) After the DTC has been deleted, read the DTC again.
- (4) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is DTC P0638 set?

YES : Replace the ECM or PCM. 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 [P.00-6](#).





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

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

Q: Is DTC P0638 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0642: Throttle Position Sensor Power Supply

TECHNICAL DESCRIPTION

- ECM <M/T> or PCM <A/T> 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 0.5 second.

OBD-II DRIVE CYCLE PATTERN

None.

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

- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS**Required Special Tools:**

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

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

⚠ CAUTION

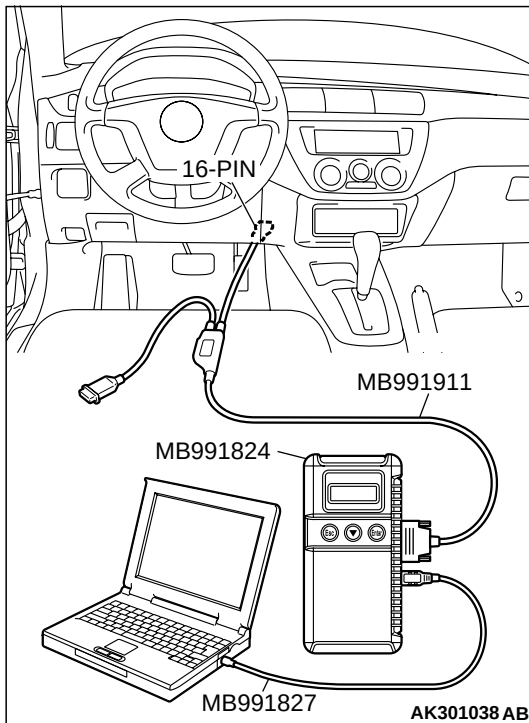
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is DTC P0642 set?

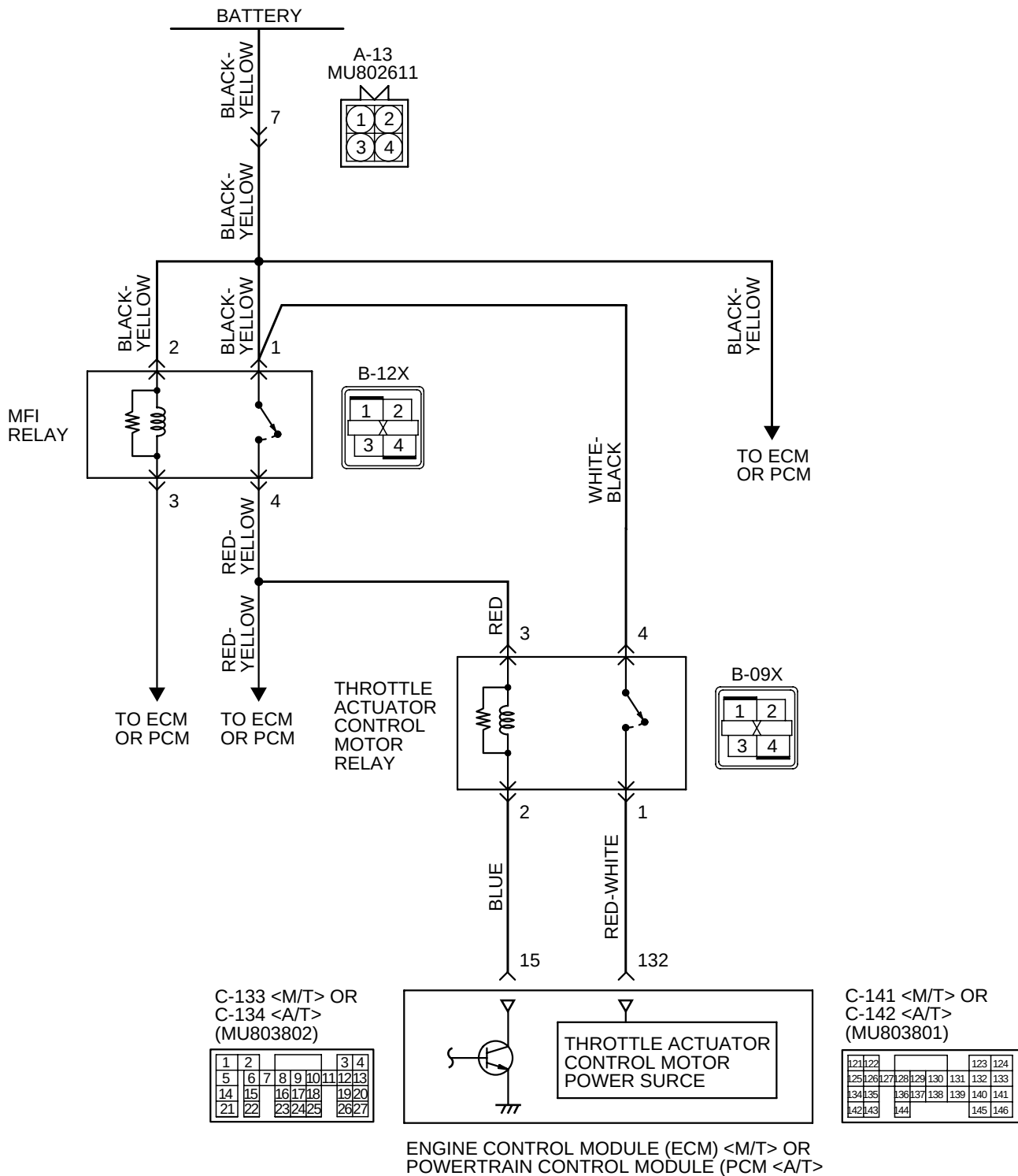
YES : Replace the ECM or PCM.

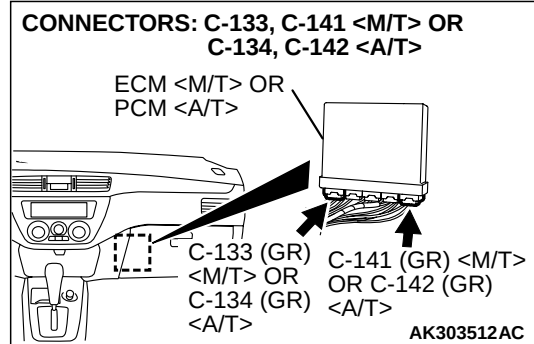
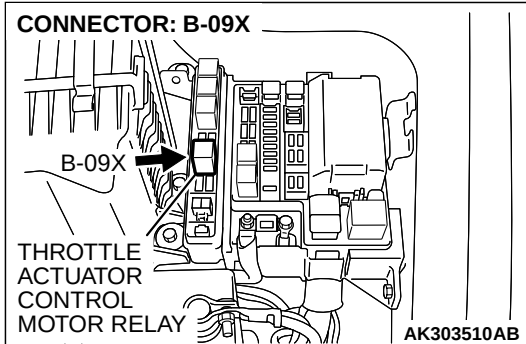
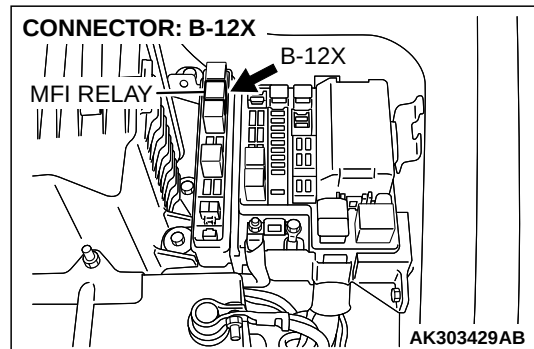
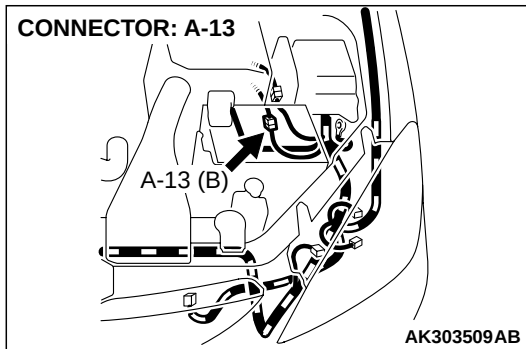
NO : It can be assumed that this malfunction is intermittent.
Refer to GROUP 00, How to Use
Troubleshooting/Inspection Service Points [P.00-6](#).



DTC P0657: Throttle Actuator Control Motor Relay Circuit Malfunction

Throttle Actuator Control Motor Relay Circuit





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. 3) from the MFI relay (terminal No. 4).
- ECM <M/T> or PCM <A/T> (terminal No. 15) applies current to the throttle actuator control motor relay coil by turning ON the power transistor in the unit in order to turn the relay ON.
- When the throttle actuator control motor relay turns ON, battery positive voltage is supplied by the throttle actuator control motor relay (terminal No. 1) to the ECM <M/T> or PCM <A/T> (terminal No. 132).

TECHNICAL DESCRIPTION

- When the ignition switch ON signal is input into the ECM <M/T> or PCM <A/T>, the ECM <M/T> or PCM <A/T> 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

- Ignition switch is "ON" position.

Judgement Criteria

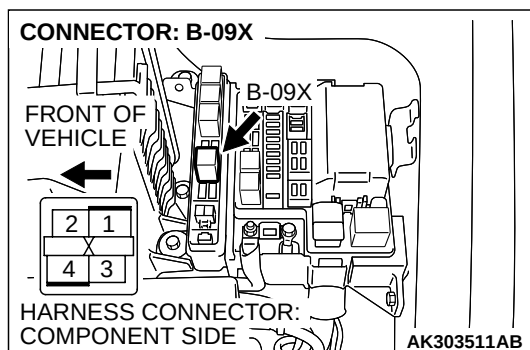
- The power line voltage of the electronic controlled throttle system should be 4.0 volts or less for 1 second.

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. <M/T>
- PCM failed. <A/T>

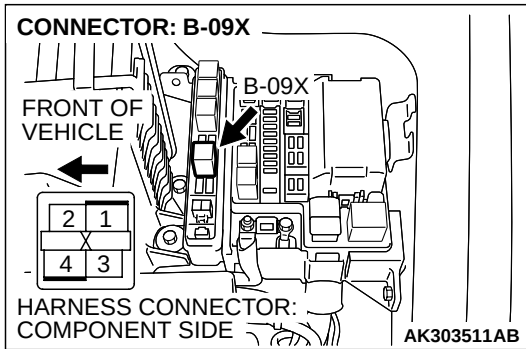
DIAGNOSIS**Required Special Tools:**

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

STEP 1. Check connector B-09X at throttle actuator control motor relay for damage.**Q: Is the 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.

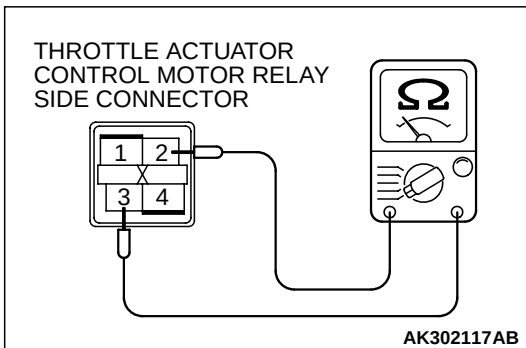
STEP 2. Check the throttle actuator control motor relay.

(1) Remove the throttle actuator control motor relay.



(2) Check for continuity between the throttle actuator control motor relay terminal No. 2 and No. 3.

- There should be continuity (approximately 70 ohms).



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

(4) Check the continuity between the throttle actuator control motor relay terminal No. 1 and No. 4 while connecting and disconnecting the jumper wire at the negative battery terminal.

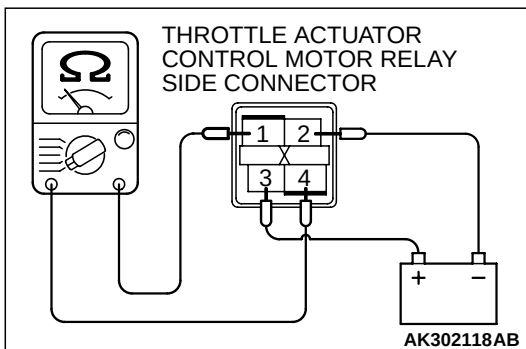
- Should be less than 2 ohms. (Negative battery terminal connected.)
- Should be open loop. (Negative battery terminal disconnected.)

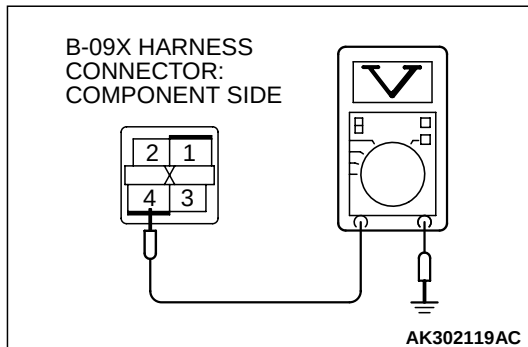
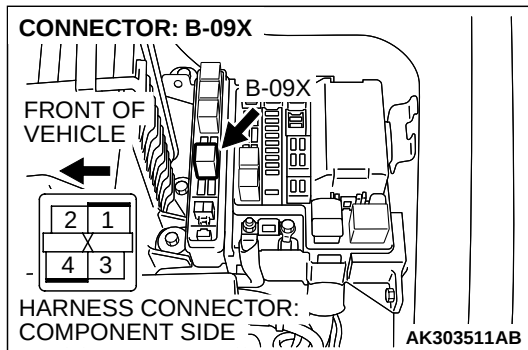
(5) Install the throttle actuator control motor relay.

Q: Is the resistance normal?

YES : Go to Step 3.

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





STEP 3. Measure the power supply voltage at throttle actuator control motor relay harness side connector B-09X

- (1) Disconnect the connector B-09X and measure at the harness side.

- (2) Measure the voltage between terminal No. 4 and ground.
- Voltage should be battery positive voltage.

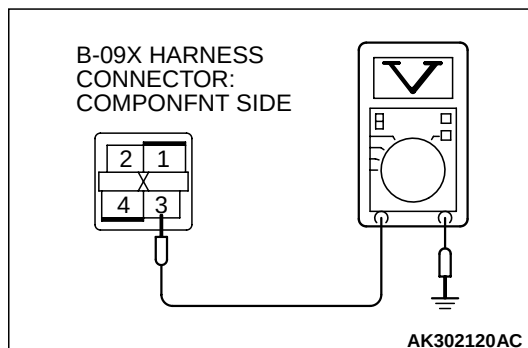
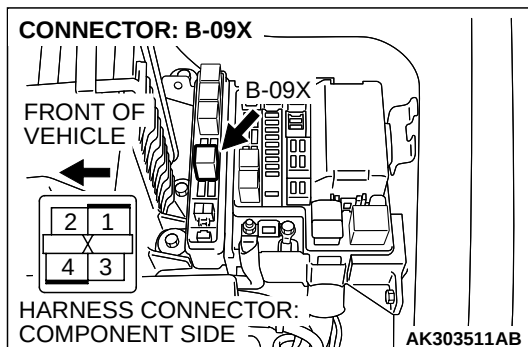
Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 4.

NO : Check harness connector A-13 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connector A-13 is in good condition, repair it because of open circuit or short circuit to ground between battery and throttle actuator control motor relay connector B-09X (terminal No. 4). Then go to Step 14.

STEP 4. Measure the power supply voltage at throttle actuator control motor relay harness side connector B-09X.

- (1) Disconnect the connector B-09X and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

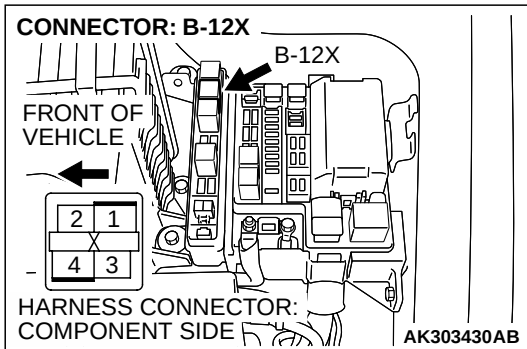


- (3) Measure the voltage between terminal No. 3 and ground.
- Voltage should be battery positive voltage.
- (4) Turn the ignition switch to the "LOCK"(OFF) position.

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

YES : Go to Step 6.

NO : Go to Step 5.

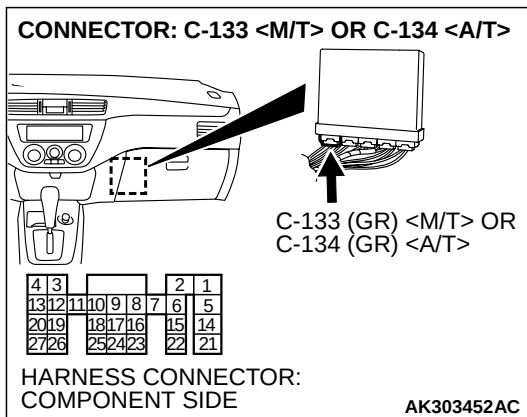


STEP 5. Check connector B-12X at MFI relay for damage.

Q: Is the connector in good condition?

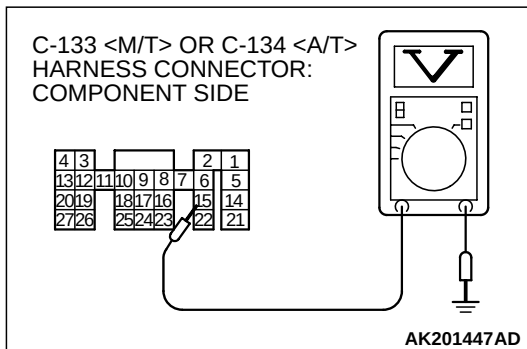
YES : Repair harness wire between MFI relay connector B-12X (terminal No. 4) and throttle actuator control motor relay connector B-09X (terminal No. 3) because of open circuit or short circuit to ground. Then go to Step 14.

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 C-133 <M/T> or PCM harness side connector C-134 <A/T>.

- (1) Disconnect the connector C-133 <M/T> or C-134 <A/T> and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.



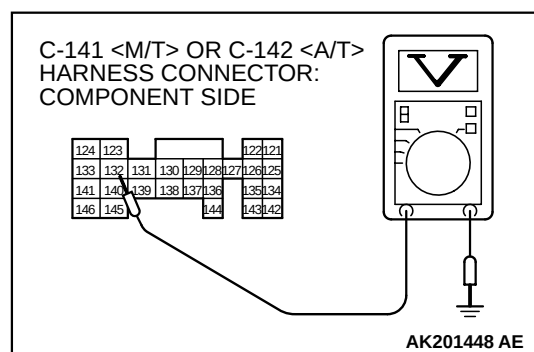
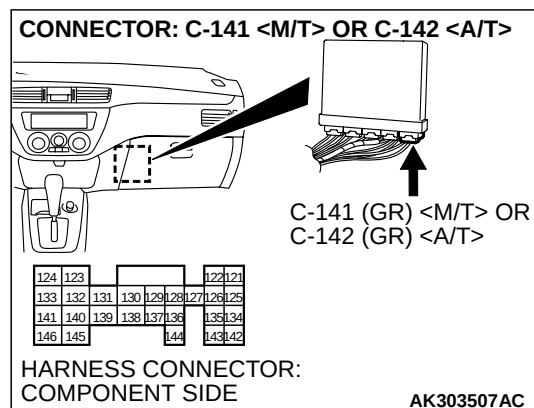
- (3) Measure the voltage between terminal No. 15 and ground.
 - Voltage should be battery positive voltage.

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

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

YES : Go to Step 7.

NO : Repair harness wire between throttle actuator control motor relay connector B-09X (terminal No. 2) and ECM connector C-133 <M/T> or PCM connector C-134 <A/T> (terminal No. 15) because of open circuit or short circuit to ground. Then go to Step 14.



STEP 7. Measure the power supply voltage at ECM harness side connector C-141 <M/T> or PCM harness side connector C-142 <A/T>.

- (1) Disconnect the connector C-141 <M/T> or C-142 <A/T> and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

- (3) Measure the voltage between terminal No. 132 and ground.
 - Voltage should be battery positive voltage.
- (4) Turn the ignition switch to the "LOCK"(OFF) position.

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

YES : Go to Step 10.

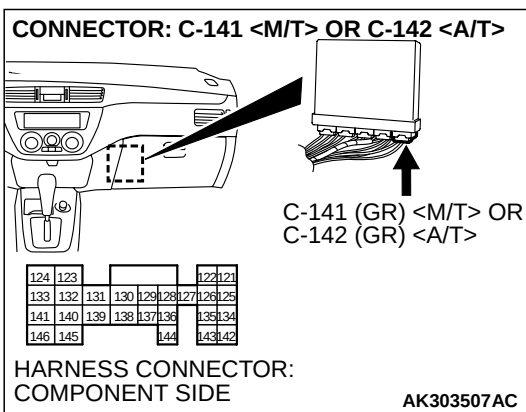
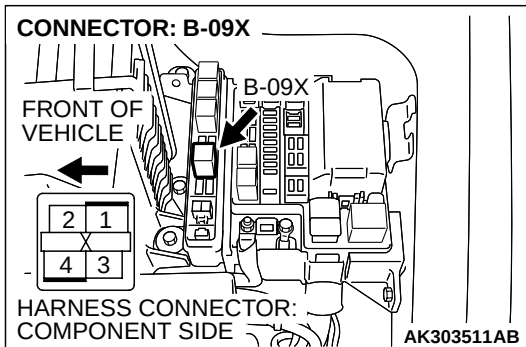
NO : Go to Step 8.

STEP 8. Check for open circuit and short circuit to ground between throttle actuator control motor relay connector B-09X (terminal No. 1) and ECM connector C-141 <M/T> or PCM connector C-142 <A/T> (terminal No. 132).

Q: Is the harness wire in good condition?

YES : Go to Step 9.

NO : Repair it. Then go to Step 14.

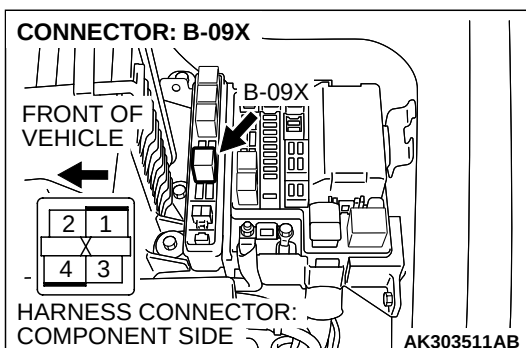
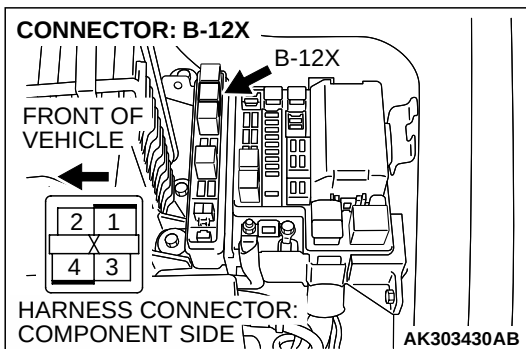


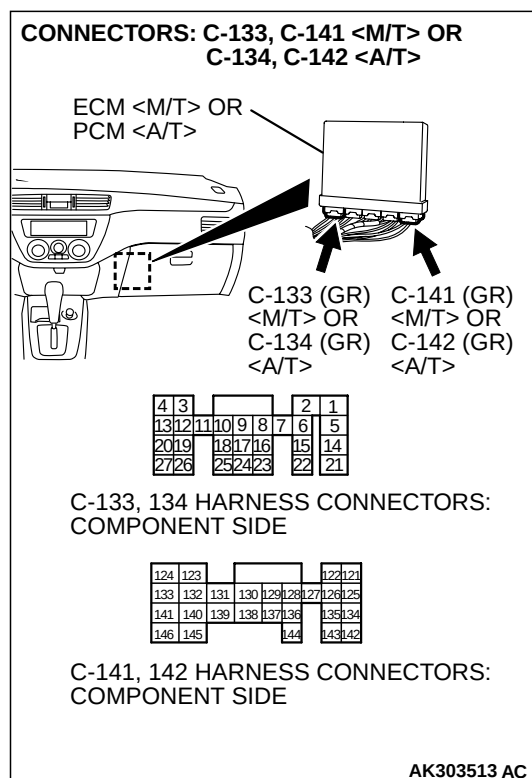
STEP 9. Check for harness damage between MFI relay connector B-12X (terminal No. 4) and throttle actuator control motor relay connector B-09X (terminal No. 3).

Q: Is the harness wire in good condition?

YES : Repair harness wire between throttle actuator control motor relay connector B-09X (terminal No. 2) and ECM connector C-133 <M/T> or PCM connector C-134 <A/T> (terminal No. 15) because of harness damage. Then go to Step 14.

NO : Repair it. Then go to Step 14.

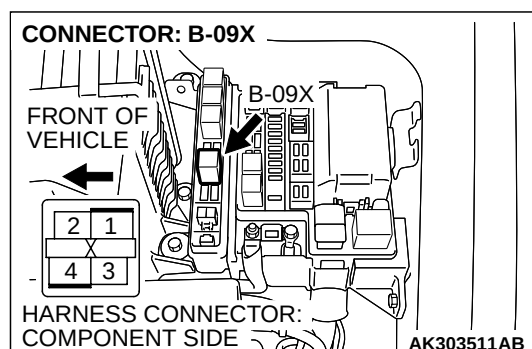




STEP 10. Check harness connector C-133 and C-141 at ECM <M/T> or C-134 and C-142 at PCM <A/T> for damage.
Q: Is the harness connector in good condition?

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 B-09X (terminal No. 4).

NOTE: Check harness after checking intermediate connector A-13. If intermediate connector is damaged, repair or replace it. refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 14.

Q: Is the harness wire in good condition?

YES : Go to Step 12.

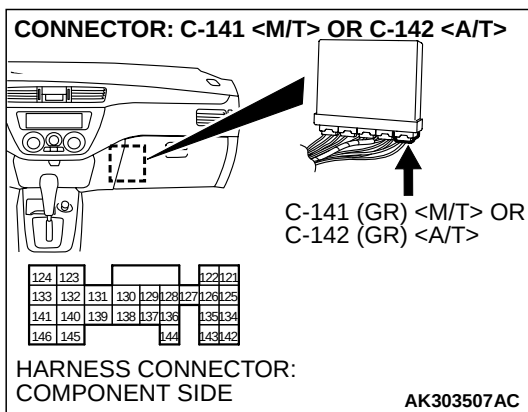
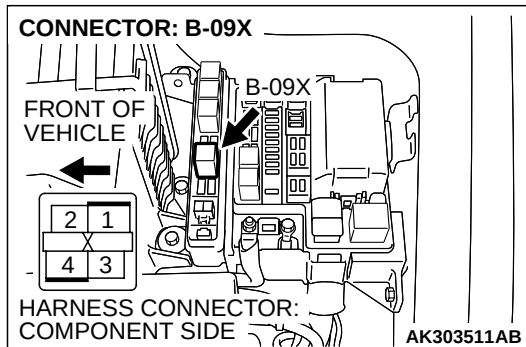
NO : Repair it. Then go to Step 14.

STEP 12. Check for harness damage between throttle actuator control motor relay connector B-09X (terminal No. 1) and ECM connector C-141 <M/T> or PCM connector C-142 <A/T> (terminal No. 132).

Q: Is the harness wire in good condition?

YES : Go to Step 13.

NO : Repair it. Then go to Step 14.



STEP 13. Using scan tool MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

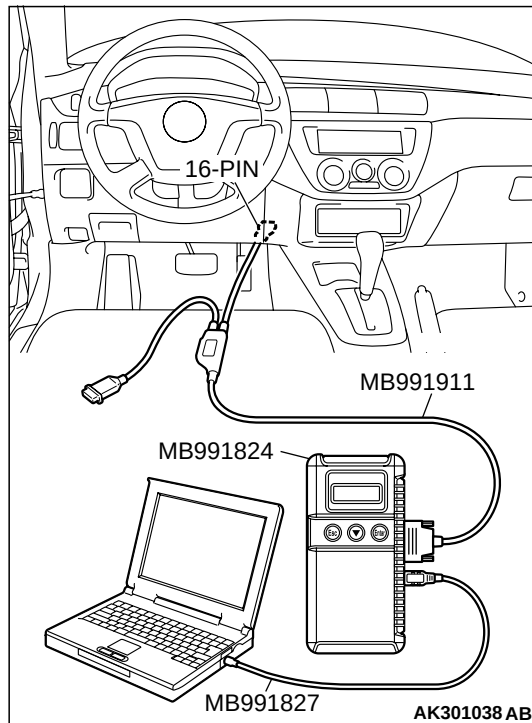
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is DTC P0657 set?

YES : Replace the ECM or PCM. Then go to Step 14.

NO : It can be assumed that this malfunction is intermittent.
Refer to GROUP 00, How to Use
Troubleshooting/Inspection Service Points [P.00-6](#).



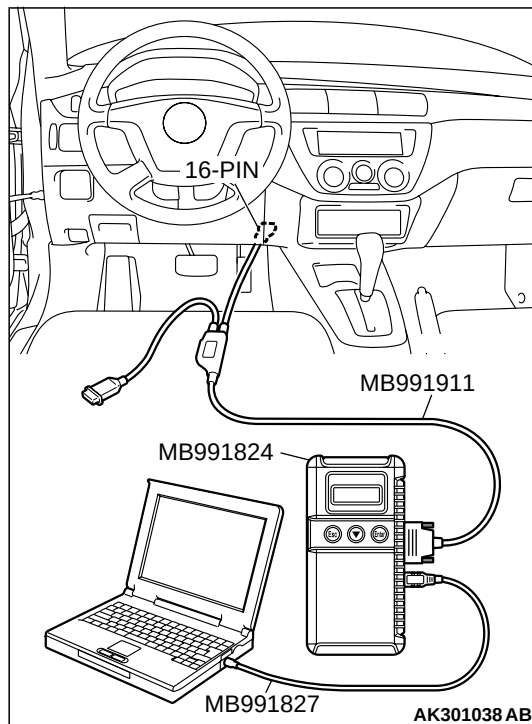
STEP 14. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is DTC P0657 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

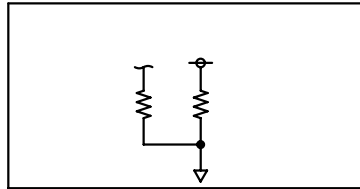


**DTC P1020: Mitsubishi Innovative Valve Timing and Lift Electronic Control System (MIVEC)
Performance Problem**

Engine Oil Pressure Switch Circuit

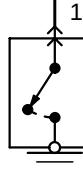
C-133 <M/T> OR
C-134 <A/T>
(MU803802)

1	2			3	4
5	6	7	8	9	10
11	12	13	14	15	16
17	18	19	20	21	22
23	24	25	26	27	

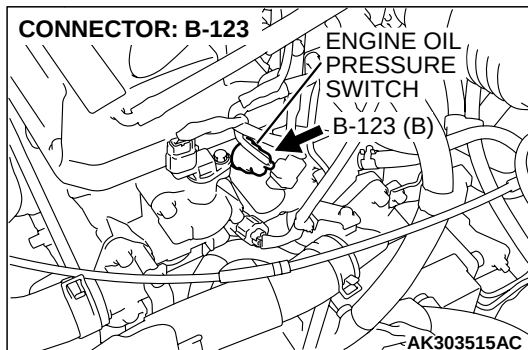


ENGINE CONTROL
MODULE (ECM) <M/T> OR
POWERTRAIN CONTROL
MODULE (PCM) <A/T>

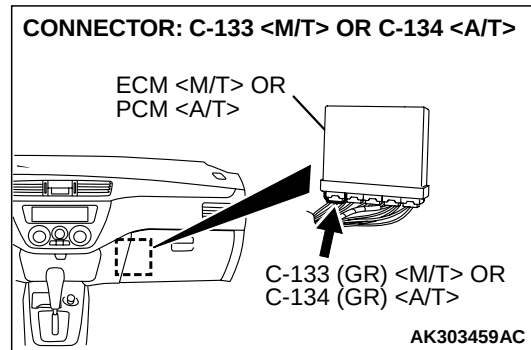
B-123
(MU802767)



ENGINE OIL
PRESSURE SWITCH



AK304000



CIRCUIT OPERATION

- A battery positive voltage is applied to the engine oil pressure switch output terminal (terminal No. 1) from the ECM <M/T> or PCM <A/T> (terminal No. 27) via the resistor in the ECM <M/T> or PCM <A/T>.

TECHNICAL DESCRIPTION

- The engine oil pressure switch converts the existence of a engine oil pressure into a high/low voltage, and inputs it into the ECM <M/T> or PCM <A/T>.

- When the engine oil control valve operates, the engine oil pressure in the MIVEC system rises. The engine oil pressure switch opens, thus interrupting the application of the battery positive voltage. As a result, the output voltage of the engine oil pressure switch will fluctuate between 0 and 12 volts.
- The ECM <M/T> or PCM <A/T> checks whether the engine oil pressure switch turns "OFF" or "ON" during driving.

DTC SET CONDITIONS**Check Conditions**

- 30 seconds or more have passed since the engine starting sequence was completed.
- Engine coolant temperature is 77°C (171°F) or higher.
- Battery positive voltage is 10 volts or higher.

Judgment Criteria

- Engine speed is 3,000 r/min or lower and engine oil pressure switch is OFF for 2 seconds.

or

- Engine speed is 4,000 r/min or higher and engine oil pressure switch is ON for 2 seconds.

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

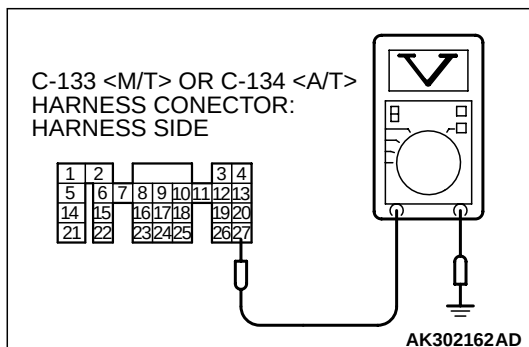
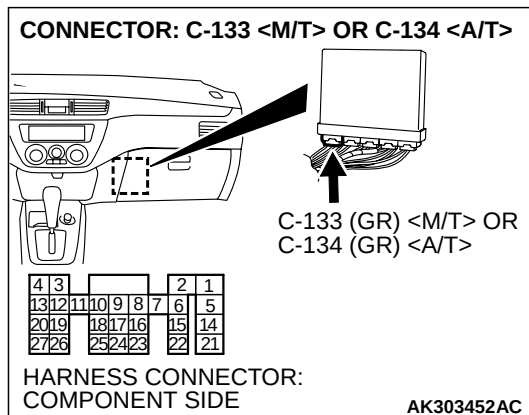
- Engine oil pressure switch failed.
- Engine oil control valve failed.
- Open or shorted engine oil pressure switch circuit, harness damage, or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS**Required Special Tools:**

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

STEP 1. Measure the power supply voltage at ECM connector C-133 <M/T> or PCM connector C-134 <A/T> by backprobing.

- (1) Do not disconnect the ECM connector C-133 <M/T> or PCM connector C-134 <A/T>.
- (2) Start the engine and run at idle.

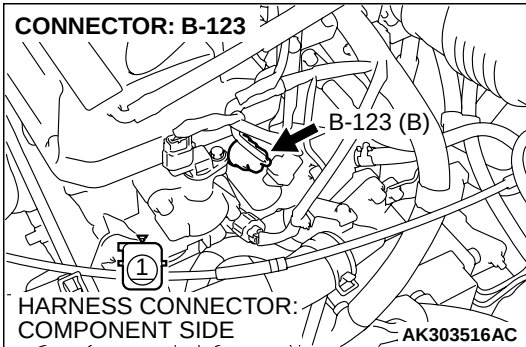


- (3) Measure the voltage between terminal No. 27 and ground.
 - Voltage should be 1 volt or less when engine is idling.
 - Voltage should be battery positive voltage when engine speed is higher than 4,000 r/min.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage normal?

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

NO : Go to Step 2.

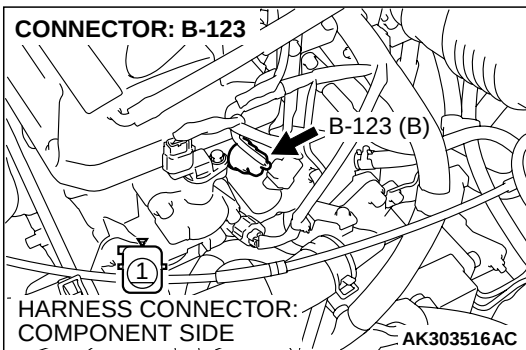


STEP 2. Check harness connector B-123 at engine oil pressure switch for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 3.

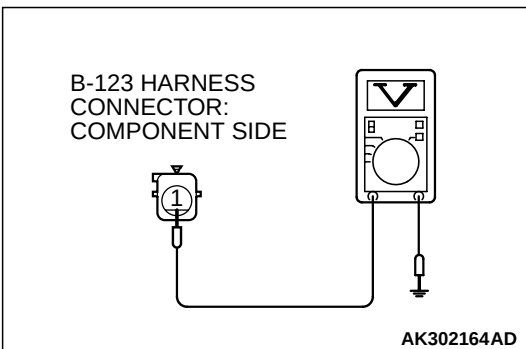
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 10.



STEP 3. Measure the power supply voltage at engine oil pressure switch connector B-123.

(1) Disconnect the connector B-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.

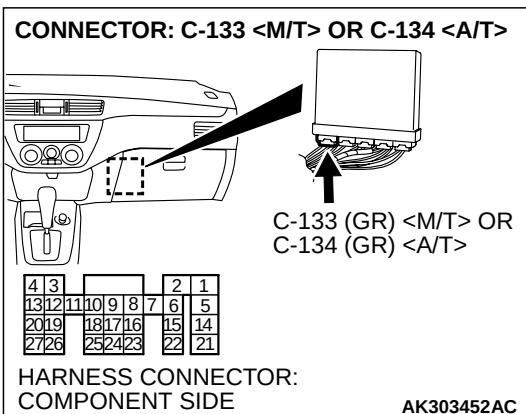
- Voltage should be battery positive voltage.

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

Q: Is the voltage normal?

YES : Go to Step 6.

NO : Go to Step 4.



STEP 4. Check harness connector C-133 at ECM <M/T> or C-134 <A/T> at PCM for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 5.

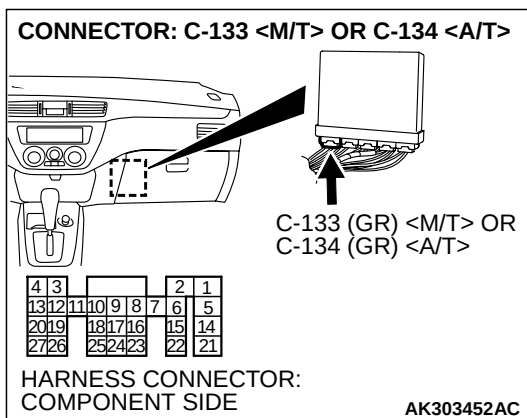
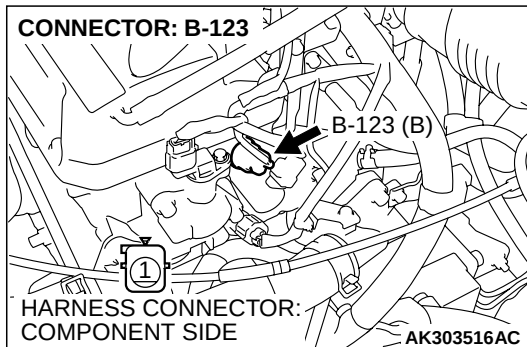
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 10.

STEP 5. Check for open or shorted circuit to ground between engine oil pressure switch connector B-123 (terminal No. 1) and ECM connector C-133 <M/T> or PCM connector C-134 <A/T> (terminal No. 27).

Q: Is the harness wire in good condition?

YES : Replace the ECM or PCM. Then go to Step 10.

NO : Repair it. Then go to Step 10.

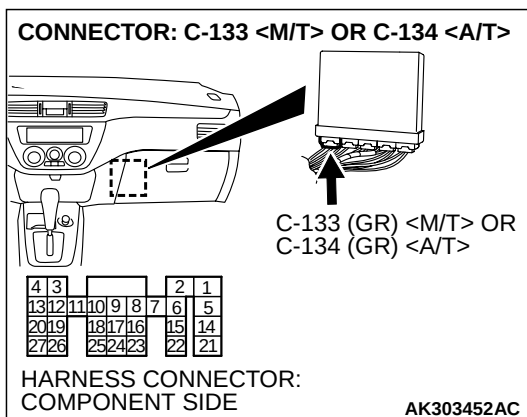


STEP 6. Check harness connector C-133 at ECM <M/T> or C-134 <A/T> at PCM for damage.

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 10.

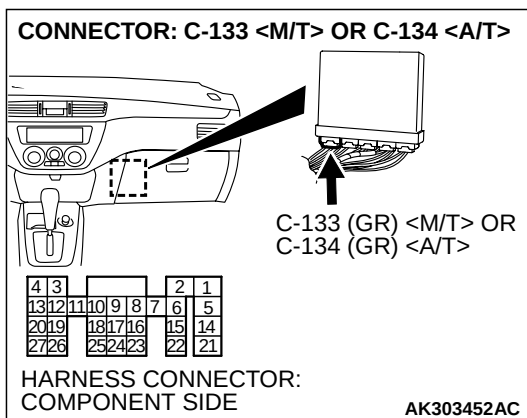
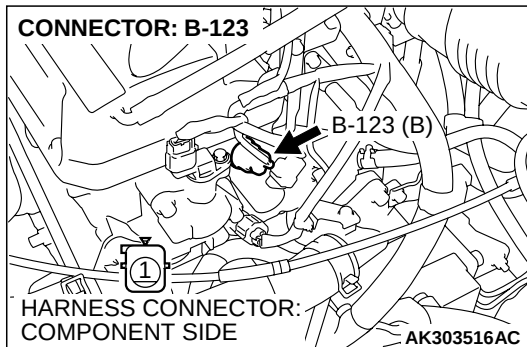


STEP 7. Check for harness damage between engine oil pressure switch connector B-123 (terminal No. 1) and ECM connector C-133 <M/T> or PCM connector C-134 <A/T> (terminal No. 27).

Q: Is the harness wire in good condition?

YES : Go to Step 8.

NO : Repair it. Then go to Step 10.



STEP 8. Using scan tool MB991958, check actuator test item 22: Engine Oil Control Valve.

⚠ CAUTION

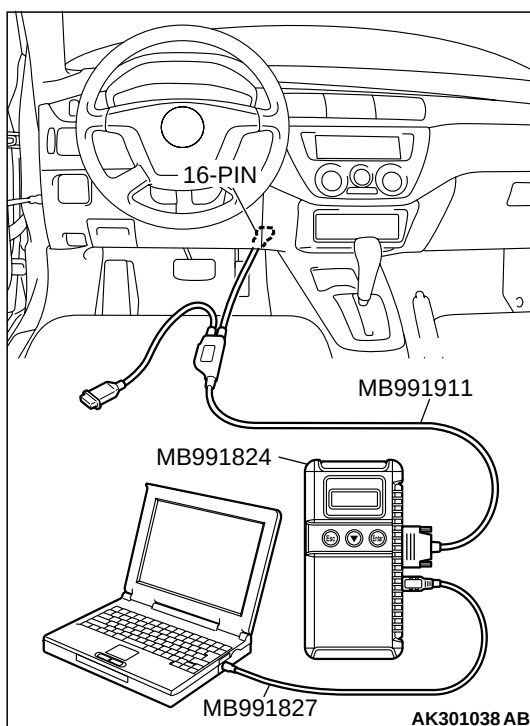
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

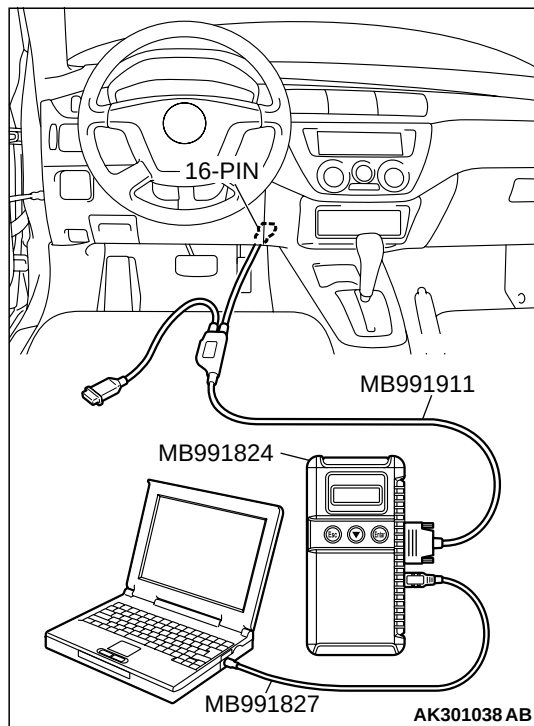
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the actuator test mode for item 22, Engine oil control valve.
 - An operation sound should be heard and vibration should be felt when the evaporative emission purge solenoid is operated.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the engine oil control valve operating properly?

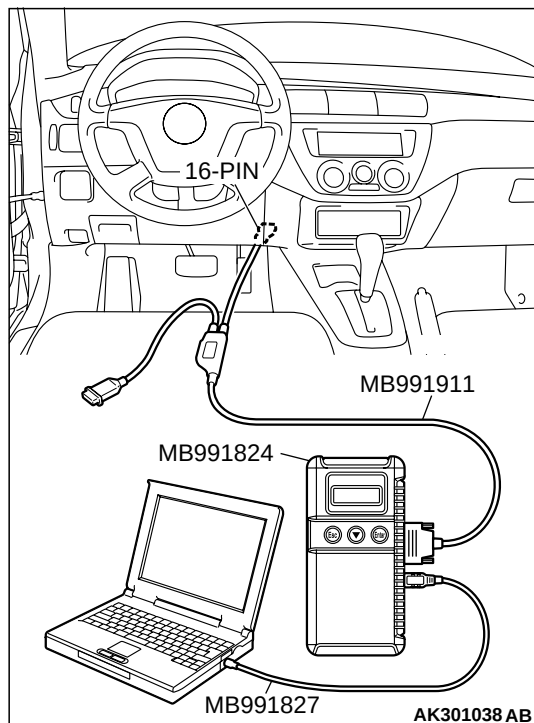
YES : Replace the engine oil pressure switch. Then go to Step 9.

NO : Replace the engine oil control valve. Then go to Step 10.



**STEP 9. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

- (1) Turn the ignition switch to the "ON" position.
- (2) Erase the DTC.
- (3) Warm up the engine until engine coolant temperature reaches 80°C (176°F) or higher.
- (4) 30 seconds or more have passed since the engine starting sequence was completed, read the DTC. Turn the ignition switch to the "LOCK" (OFF) position.

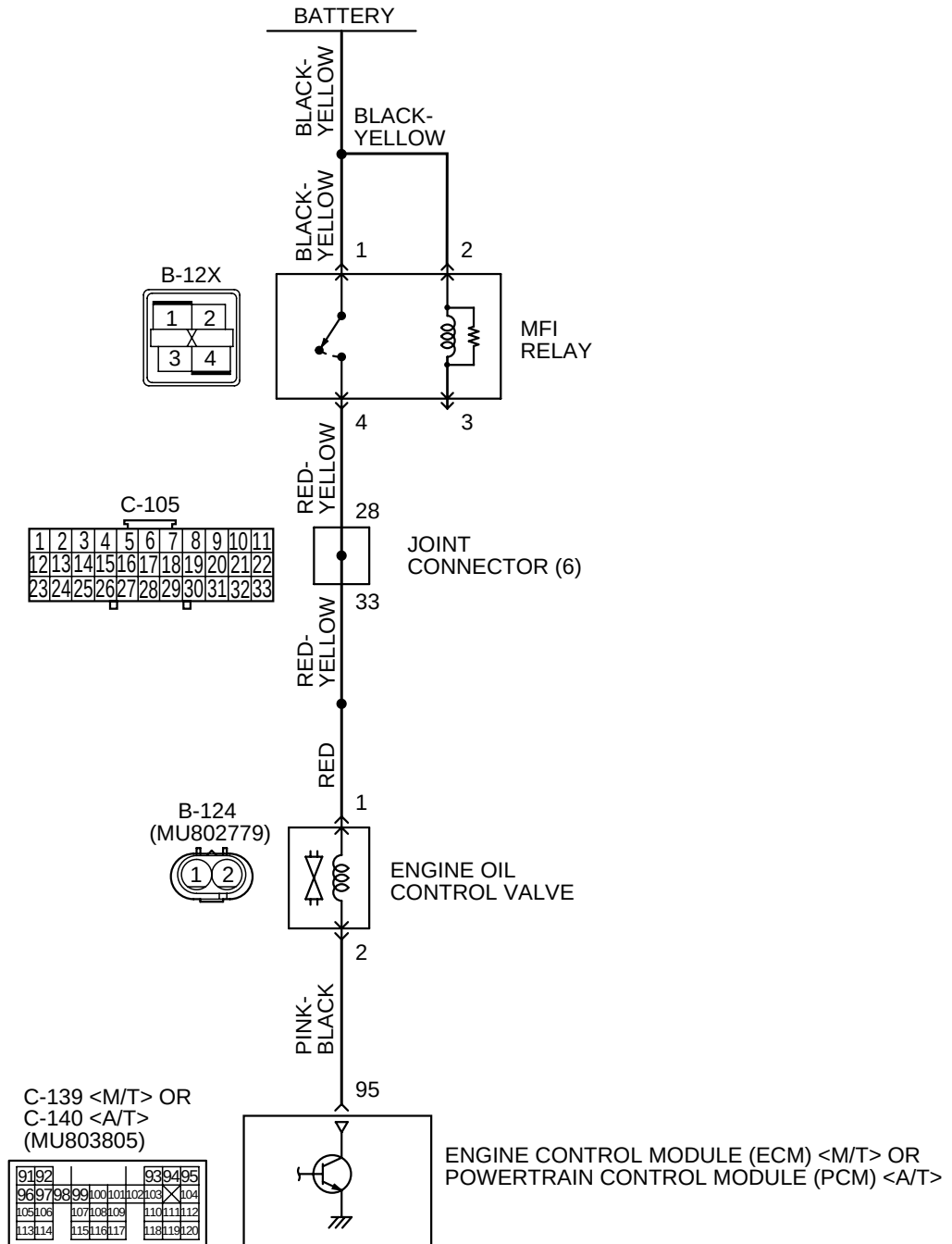
Q: Is DTC P1020 set?**YES** : Replace the ECM or PCM. Then go to Step 10.**NO** : The Inspection is complete.**STEP 10. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

- (1) Turn the ignition switch to the "ON" position.
- (2) Erase the DTC.
- (3) Warm up the engine until engine coolant temperature reaches 80°C (176°F) or higher.
- (4) 30 seconds or more have passed since the engine starting sequence was completed, read the DTC. Turn the ignition switch to the "LOCK" (OFF) position.

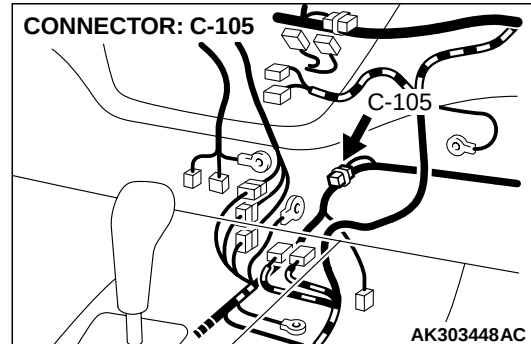
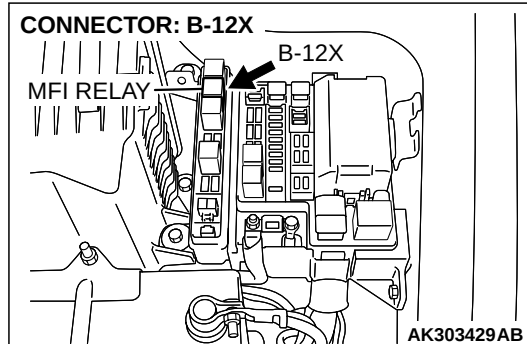
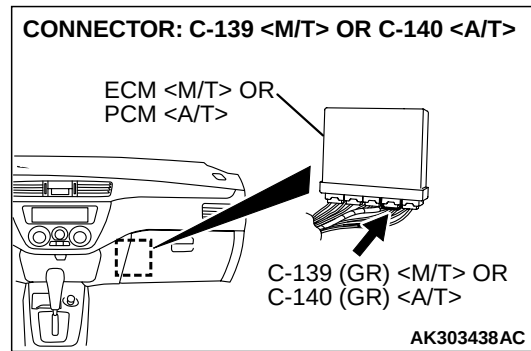
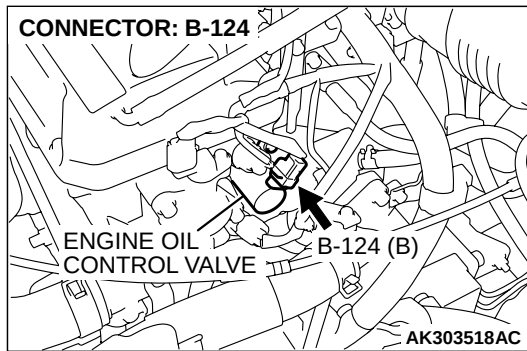
Q: Is DTC P1020 set?**YES** : Retry the trouble shooting.**NO** : The Inspection is complete.

DTC P1021: Engine Oil Control Valve Circuit

Engine Oil Control Valve Circuit



AK304001



CIRCUIT OPERATION

- The engine oil control valve power is supplied from the MFI relay (terminal No. 4).
- The ECM <M/T> or PCM <A/T> controls ground engine oil control valve by turning the power transistor in the ECM <M/T> or PCM <A/T> "ON" and "OFF".

TECHNICAL DESCRIPTION

- The engine oil control valve switches the cams to operate the MIVEC system in the low-speed or high-speed mode in accordance with the signals from the ECM <M/T> or PCM <A/T>.

DTC SET CONDITIONS

Check Conditions

- Ignition switch: ON
- Battery positive voltage is higher than 10 volts.
- MIVEC operating in the low-speed mode.

Judgment Criteria

- The ECM <M/T> or PCM <A/T> terminal voltage of engine control valve circuit is less than 1.5 volts.

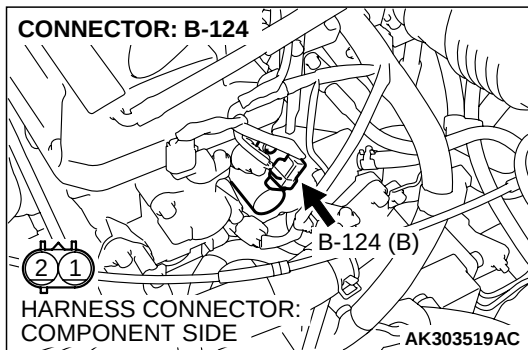
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Engine oil control valve failed.
- Open or shorted engine oil control valve circuit, or harness damage, or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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

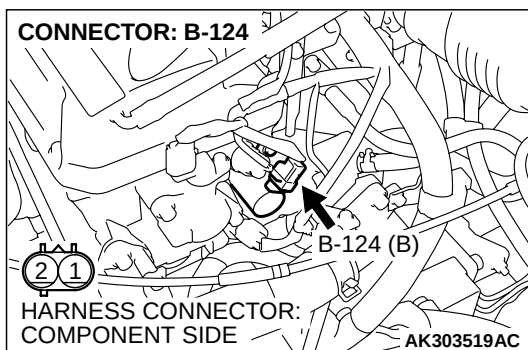


STEP 1. Check harness connector B-124 at the engine oil control valve for damage.

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 12.



STEP 2. Check the engine oil control valve.

(1) Disconnect the engine oil control valve connector B-124.

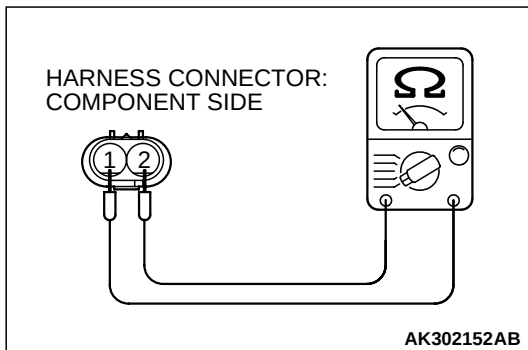
(2) Measure the resistance between engine oil control valve side connector terminal No. 1 and No. 2.

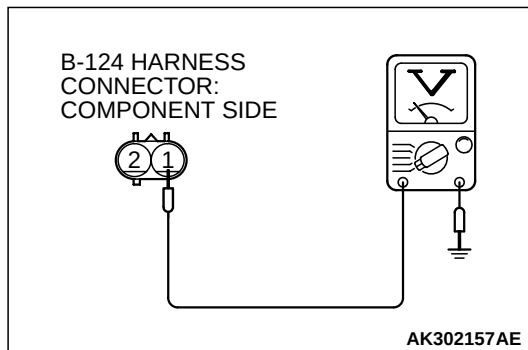
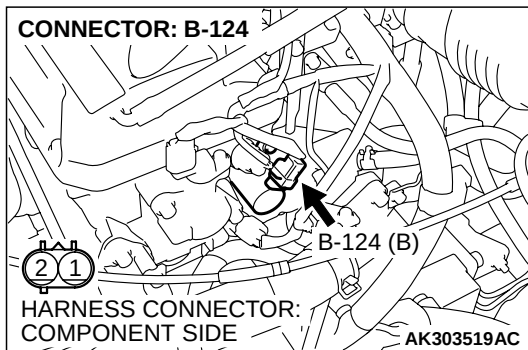
Standard value: 6.9 – 7.9 ohms [at 20°C (68°F)]

Q: Is the measured resistance between 6.9 and 7.9 ohms [at 20°C (68°F)]?

YES : Go to Step 3.

NO : Replace the engine oil control valve. Then go to Step 12.





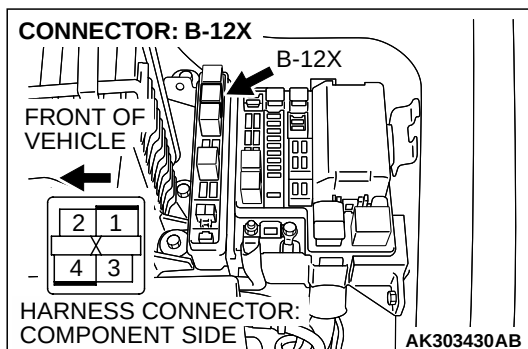
STEP 3. Measure the power supply voltage at engine oil control valve harness side connector B-124.

- (1) Disconnect the connector B-124 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?

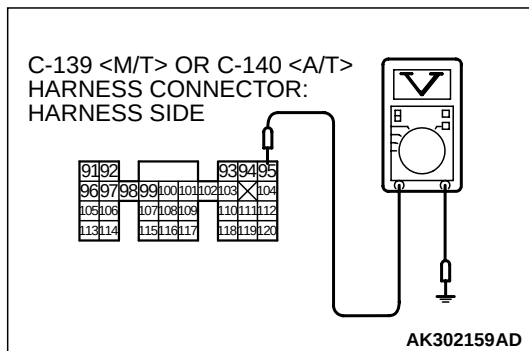
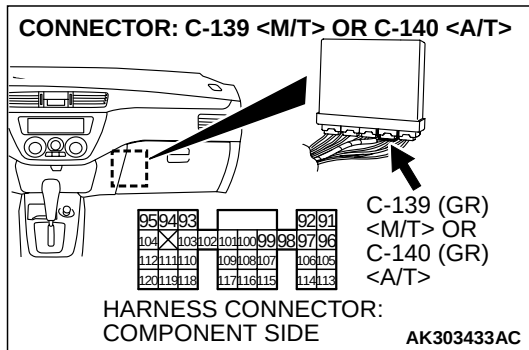
- YES :** Go to Step 5.
NO : Go to Step 4.



STEP 4. Check harness connector B-12X at MFI relay for damage.

Q: Is the harness connector in good condition?

- YES :** Check harness connector C-105 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connector is in good condition, repair harness wire between MFI relay connector B-12X (terminal No. 4) and engine oil control valve connector B-124 (terminal No. 1) because of open circuit or short circuit to ground. Then go to Step 12.
- NO :** Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 12.



STEP 5. Measure the power supply voltage at ECM connector C-139 <M/T> or PCM connector C-140 <A/T> by backprobing.

- (1) Do not disconnect the connector C-139 <M/T> or C-140 <A/T>.
- (2) Turn the ignition switch to the "ON" position.

- (3) Measure the voltage between terminal No. 95 and ground by backprobing.

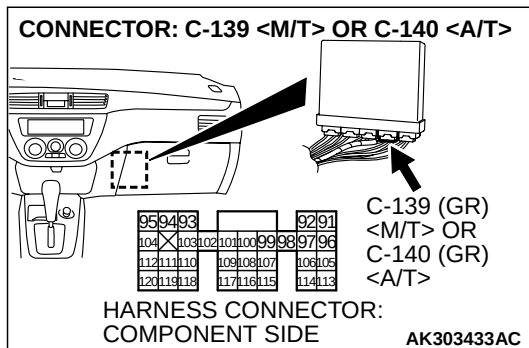
- Voltage should be battery positive voltage.

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

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

YES : Go to Step 8.

NO : Go to Step 6.

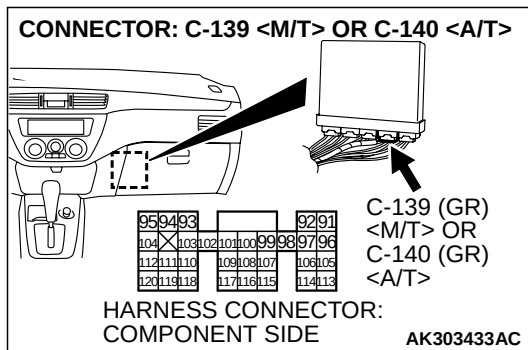
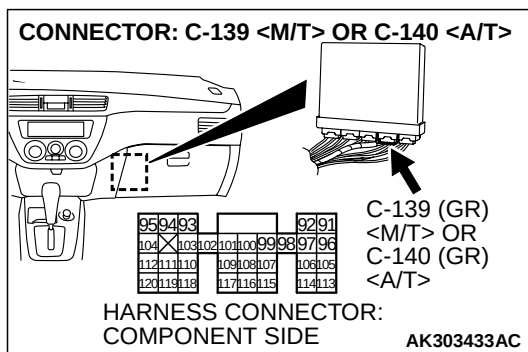
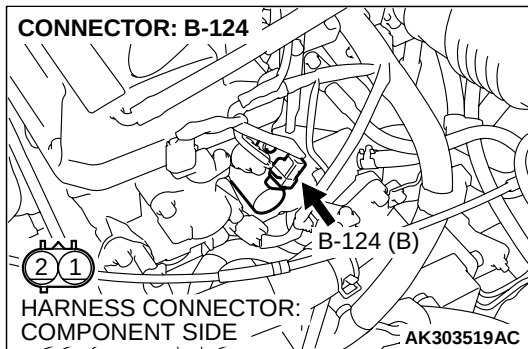


STEP 6. Check harness connector C-139 at ECM <M/T> or C-140 at PCM <A/T> for damage.

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 12.



STEP 7. Check for open circuit and short circuit to ground between engine oil control valve connector B-124 (terminal No. 2) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 95).

Q: Is the harness wire in good condition?

YES : Replace the ECM or PCM. Then go to Step 12.

NO : Repair it. Then go to Step 12.

STEP 8. Check harness connector C-139 at ECM <M/T> or C-140 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 9.

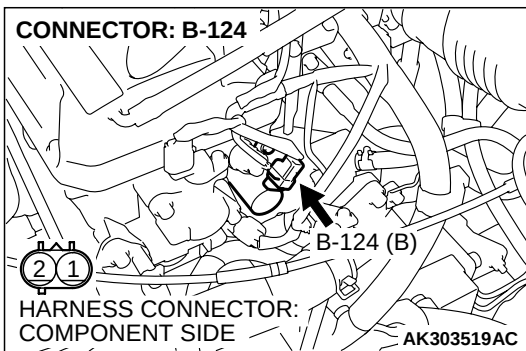
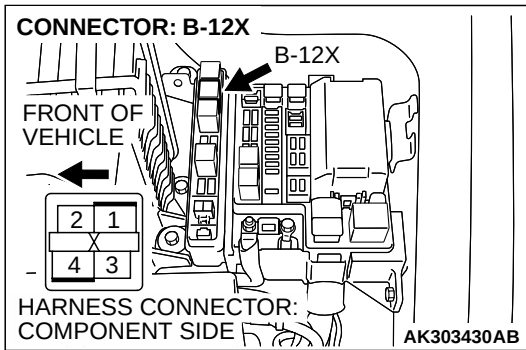
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 12.

STEP 9. Check for harness damage between MFI relay connector B-12X (terminal No. 4) and engine oil control valve connector B-124 (terminal No. 1).

Q: Is the harness wire in good condition?

YES : Go to Step 10.

NO : Repair it. Then go to Step 12.

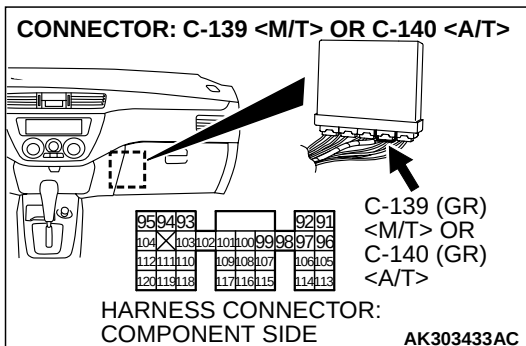
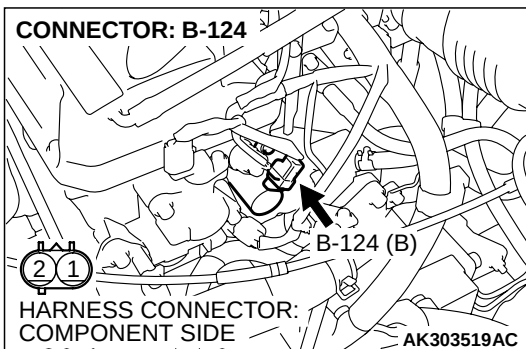


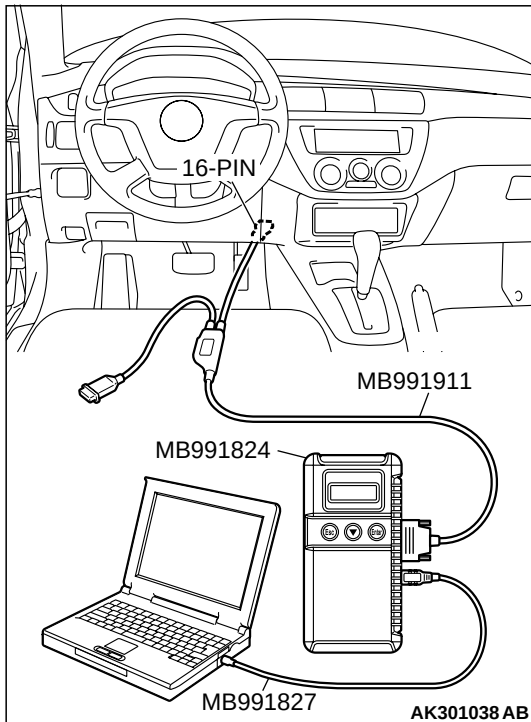
STEP 10. Check for harness damage between engine oil control valve connector B-124 (terminal No. 2) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 95).

Q: Is the harness wire in good condition?

YES : Go to Step 11.

NO : Repair it. Then go to Step 12.





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

⚠ CAUTION

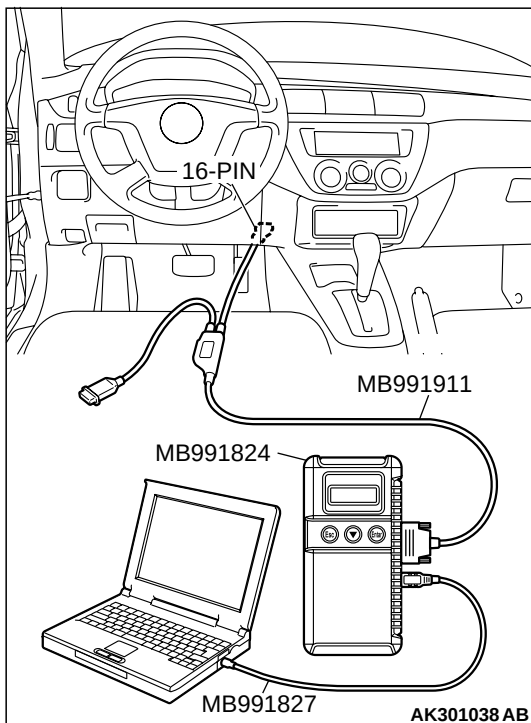
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 P1021 set?

YES : Replace the ECM or PCM. 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 [P.00-6](#).



STEP 12. 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 P1021 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P1602: Communication Malfunction (between ECM <M/T> or PCM <A/T> Main Processor and System LSI)

TECHNICAL DESCRIPTION

- ECM <M/T> or PCM <A/T> checks the communication status for abnormal conditions.

DESCRIPTIONS OF MONITOR METHODS

Communication between ECM <M/T> or PCM <A/T> main processor and system LSI is impossible.

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

- Ignition switch is "ON" position.

Judgement Criteria

- ECM <M/T> or PCM <A/T> detects an error in communication between ECM <M/T> or PCM <A/T> main processor and system LSI for 0.07 second.

OBD-II DRIVE CYCLE PATTERN

None.

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

- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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

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

⚠ CAUTION

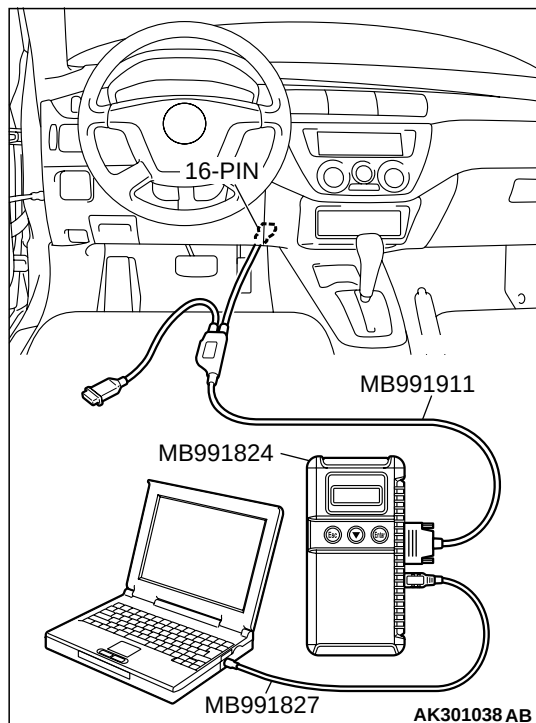
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is DTC P01602 set?

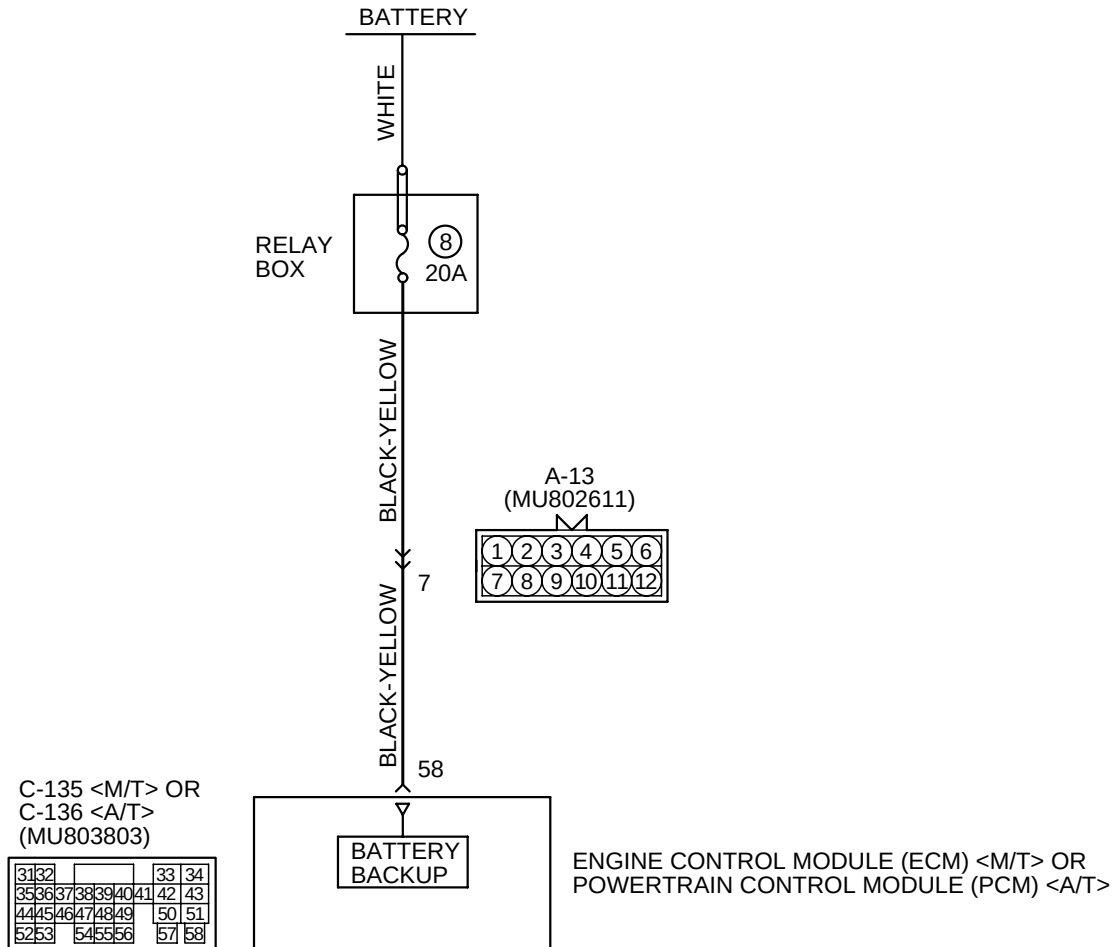
YES : Replace the ECM or PCM.

NO : It can be assumed that this malfunction is intermittent.
Refer to GROUP 00, How to Use
Troubleshooting/Inspection Service Points [P.00-6](#).

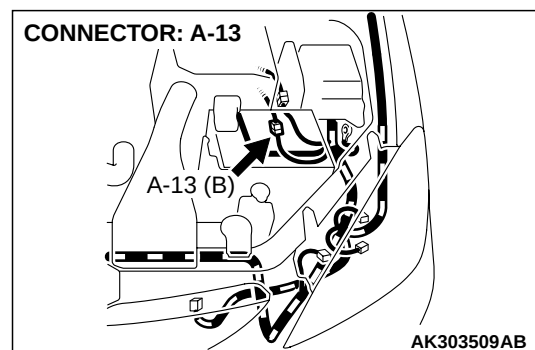
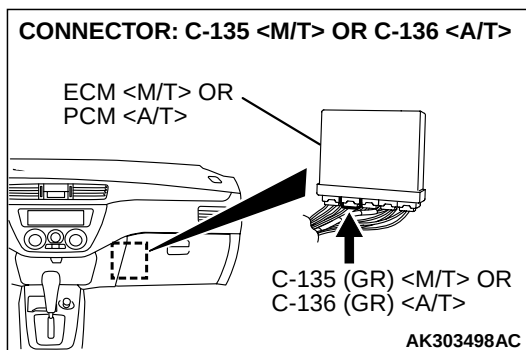


DTC P1603: Battery Backup Line Malfunction

Battery Backup Circuit



AK304002



TECHNICAL DESCRIPTION

- The ECM <M/T> or PCM <A/T> checks the open circuit of battery backup line.

NOTE: When the system detects an open circuit in the battery backup line, it makes 1 failure judgment of other diagnostic trouble codes (DTCs).

DESCRIPTIONS OF MONITOR METHODS

Battery backup line voltage is under specified value.

MONITOR EXECUTION

Continuous

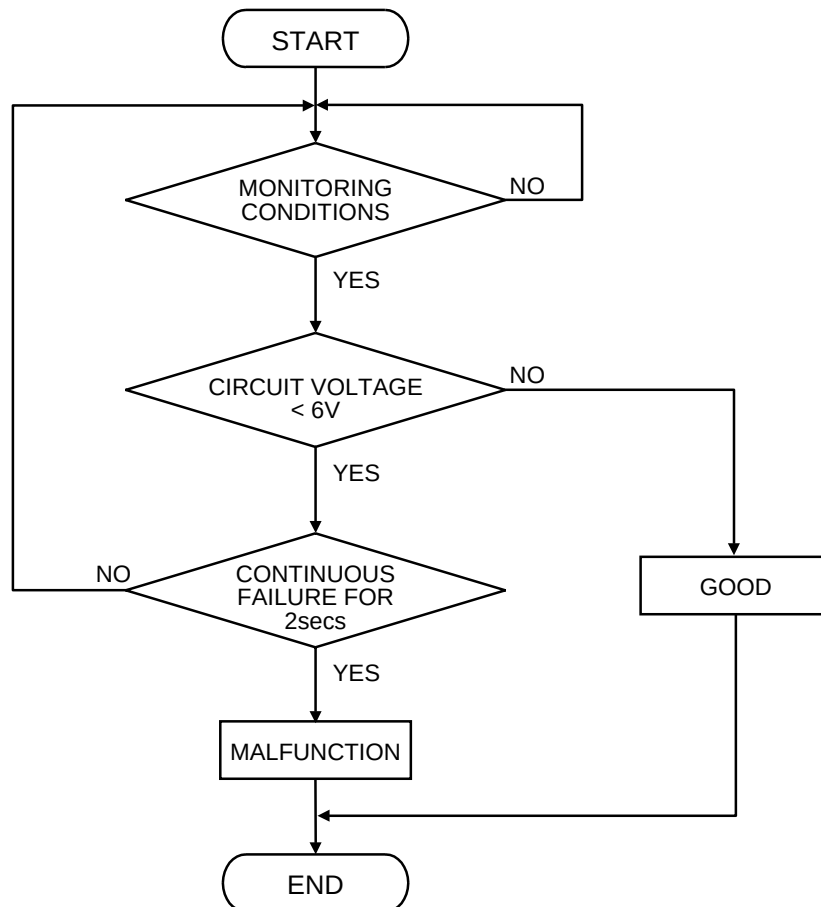
MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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**

AK302042

Check Conditions

- Engine starting sequence was completed.
- Battery positive voltage is higher than 10 volts.

Judgement Criteria

- Battery backup line voltage is lower than 6 volts for 2 seconds.

OBD-II DRIVE CYCLE PATTERN

None.

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

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

- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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

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

⚠ CAUTION

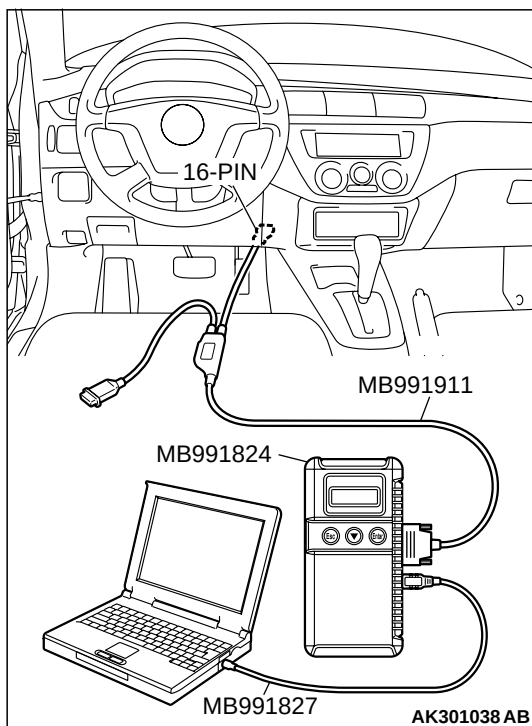
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

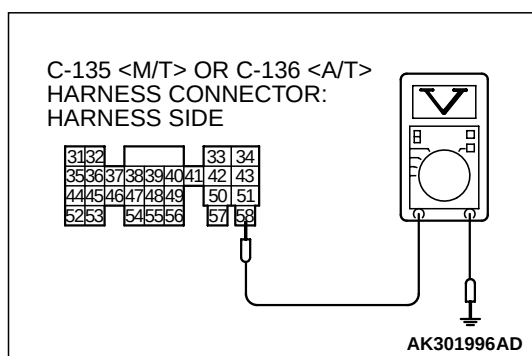
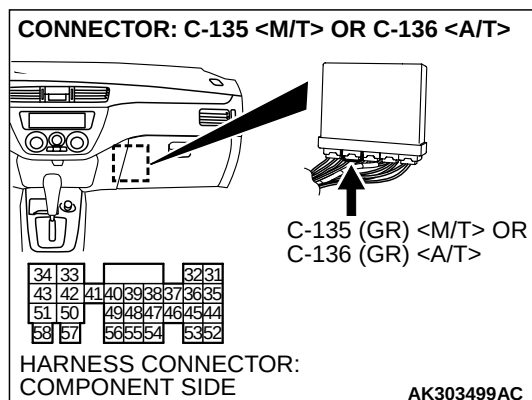
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Erase the DTC.
- (4) Start the engine and run it at idle.
- (5) Read the DTC.
- (6) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P1603 set?

YES : Go to Step 2.

NO : The inspection is complete.





STEP 2. Measure the backup power supply voltage at ECM connector C-135 <M/T> or PCM connector C-136 <A/T> by backprobing.

- (1) Do not disconnect the ECM connector C-135 <M/T> or PCM connector C-136 <A/T>.

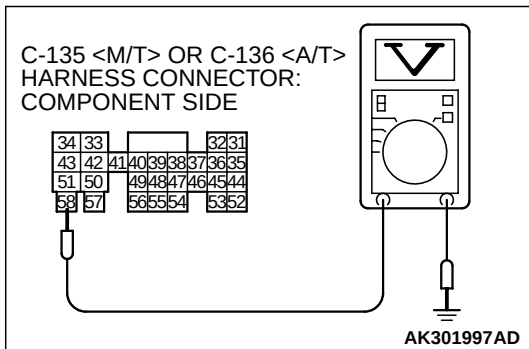
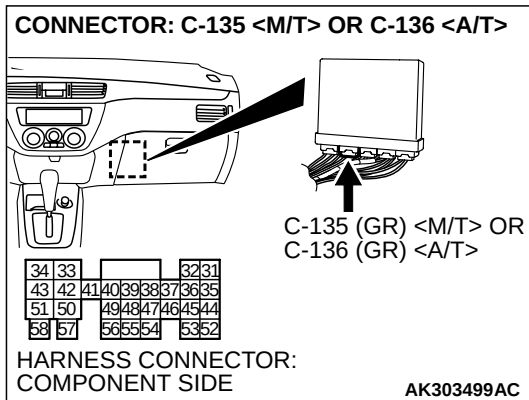
- (2) Measure the voltage between terminal No. 58 and ground by backprobing.

- Voltage should be battery positive voltage.

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

YES : Go to Step 5.

NO : Go to Step 3.



STEP 3. Measure the backup power supply voltage at ECM harness side connector C-135 <M/T> or PCM harness side connector C-136 <A/T>.

(1) Disconnect the ECM connector C-135 <M/T> or PCM connector C-136 <A/T> and measure at the harness side.

(2) Measure the voltage between terminal No. 58 and ground.
• Voltage should be battery positive voltage.

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

YES : Go to Step 4.

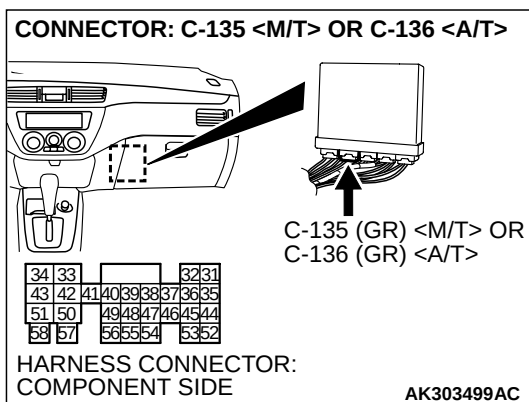
NO : Check connector A-13 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connector is in good condition, repair harness wire between battery and ECM connector C-135 <M/T> or PCM connector C-136 <A/T> (terminal No. 58) because of open circuit or short circuit to ground. Then go to Step 6.

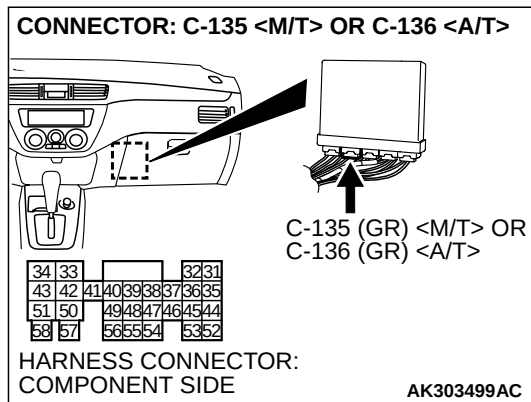
STEP 4. Check harness connector C-135 at ECM <M/T> or C-136 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Check harness connector A-13 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connector is in good condition, repair harness wire between battery and ECM connector C-135 <M/T> or PCM connector C-136 <A/T> (terminal No. 58) because of harness damage. Then go to Step 6.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 6.





STEP 5. Check harness connector C-135 at ECM <M/T> or C-136 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Replace the ECM or PCM. Then go to Step 6.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 6.

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

CAUTION

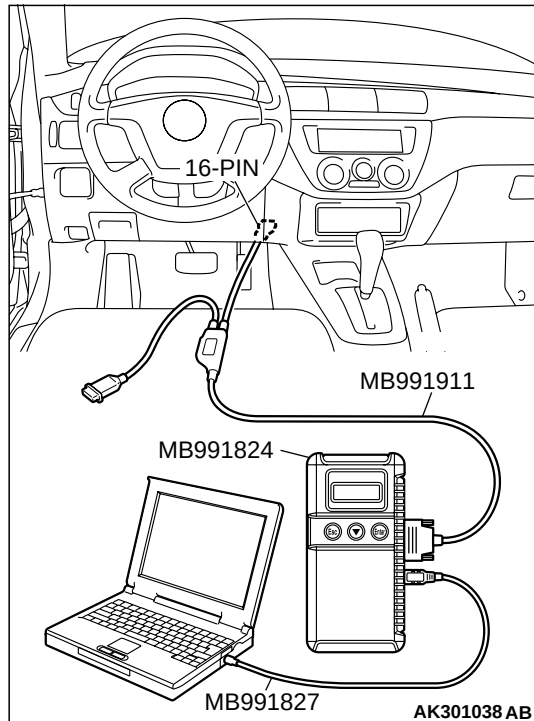
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is DTC P1603 set?

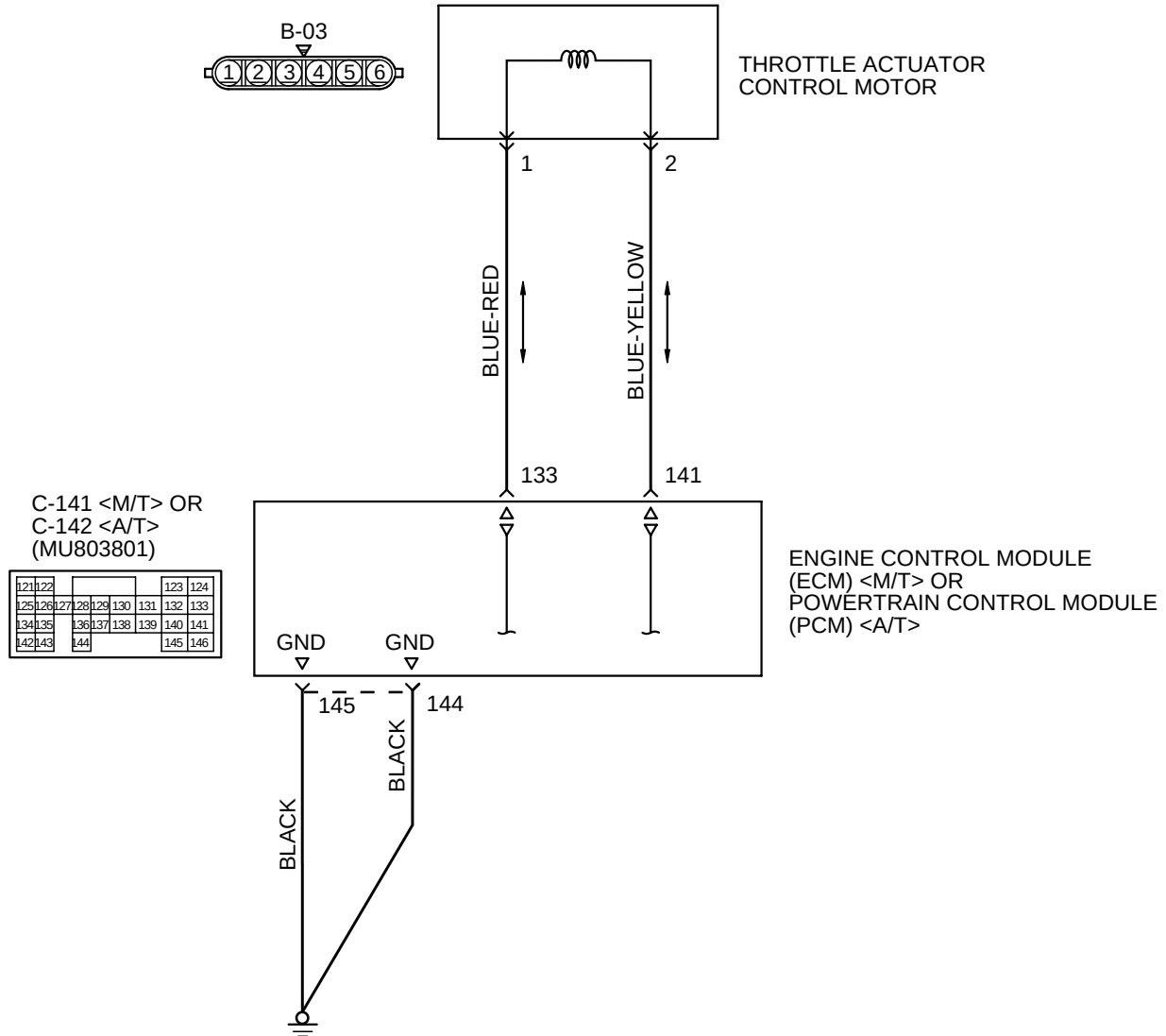
YES : Retry the troubleshooting.

NO : The inspection is complete.

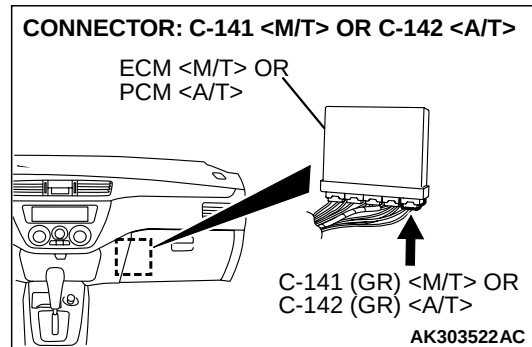
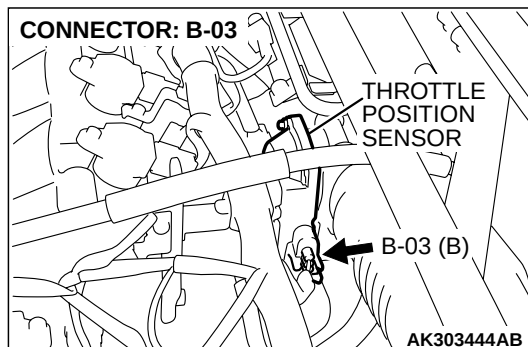


DTC P2100: Throttle Actuator Control Motor Circuit (open)

Throttle Actuator Control Motor Circuit



AK304003



CIRCUIT OPERATION

- Controls the current that is applied from the ECM <M/T> or PCM <A/T> (terminals No. 141, No. 133) to the throttle actuator control motor (terminals No. 1, No. 2).

TECHNICAL DESCRIPTION

- ECM <M/T> or PCM <A/T> 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

Motor circuit current 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 Criteria

- Throttle actuator control motor current should be 0.1 amperes or less for 0.72 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, or harness damage, or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS**Required Special Tools:**

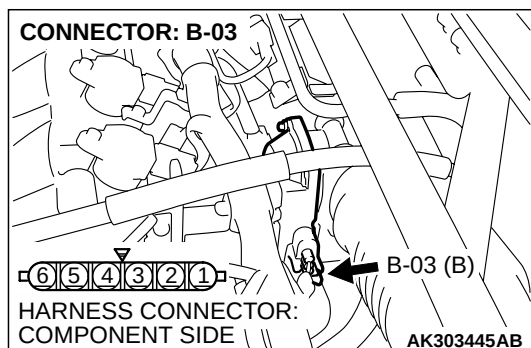
- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991911: Main Harness B

STEP 1. Check harness connector B-03 at throttle actuator control motor for damage.

Q: Is the harness connector in good condition?

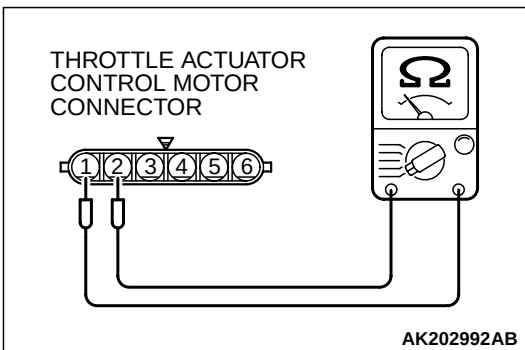
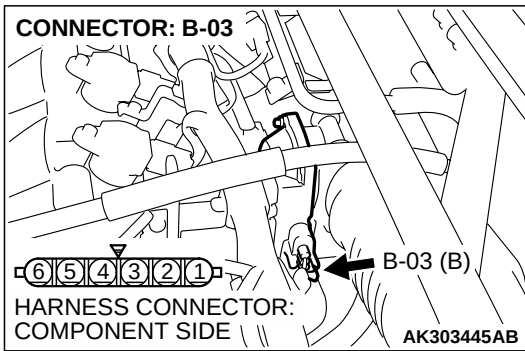
YES : Go to Step 2.

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



STEP 2. Check the throttle actuator control motor.

(1) Disconnect the connector B-03.



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

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

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

YES : Go to Step 3.

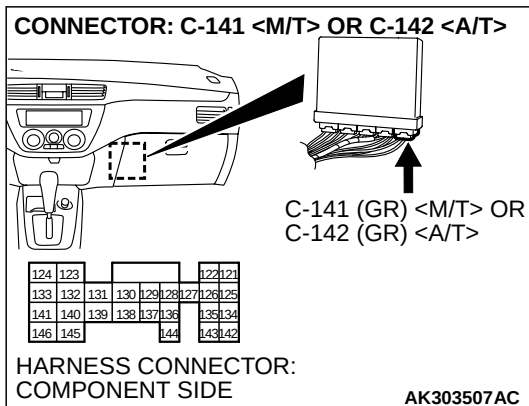
NO : Replace the throttle body assembly. Then go to Step 8.

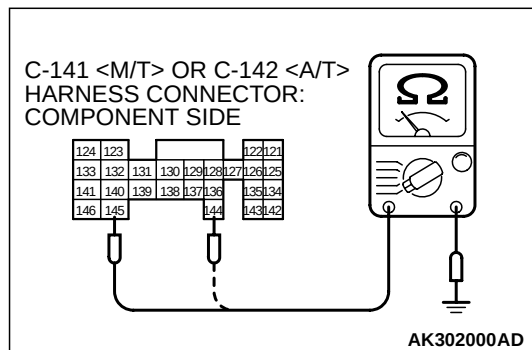
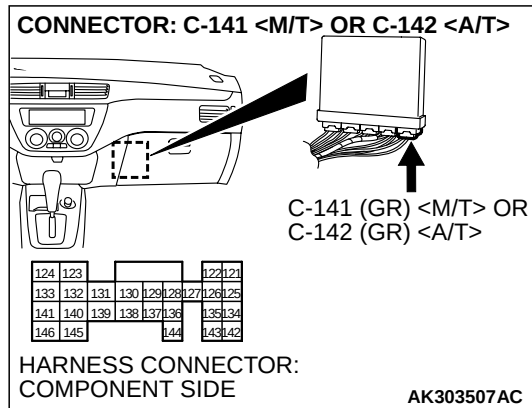
STEP 3. Check harness connector C-141 at ECM <M/T> or C-142 at PCM <A/T> for damage

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 8.





STEP 4. Check the continuity at ECM harness side connector C-141 <M/T> or PCM harness side connector C-142 <A/T>.

(1) Disconnect the connector C-141 <M/T> or C-142 <A/T> and measure at the harness side.

(2) Measure the continuity between terminals No. 144, No. 145 and ground.

- Should be less than 2 ohms.

Q: Does continuity exist?

YES : Go to Step 5.

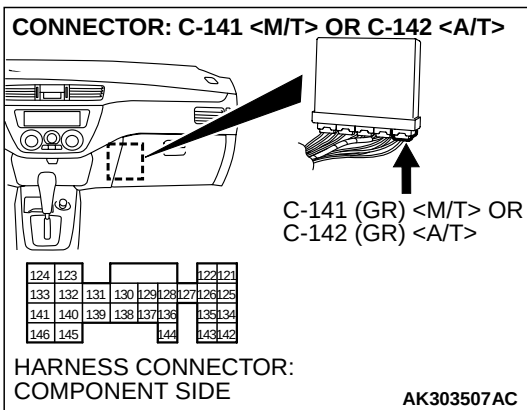
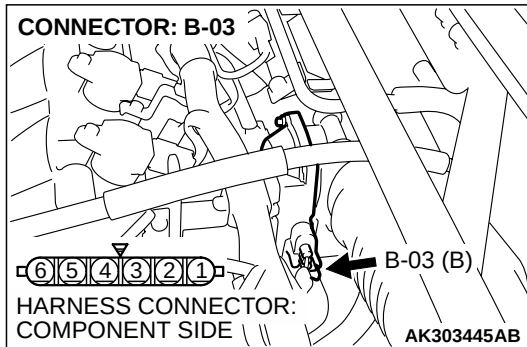
NO : Repair harness wire between ECM connector C-141 <M/T> or PCM connector C-142 <A/T> (terminals No. 144, No. 145) and ground because of open circuit or harness damage. Then go to Step 8.

STEP 5. Check for open circuit and harness damage between throttle actuator control motor connector B-03 (terminal No. 1) and ECM connector C-141 <M/T> or PCM connector C-142 <A/T> (terminal No. 133).

Q: Is the harness wire in good condition?

YES : Go to Step 6.

NO : Repair it. Then go to Step 8.

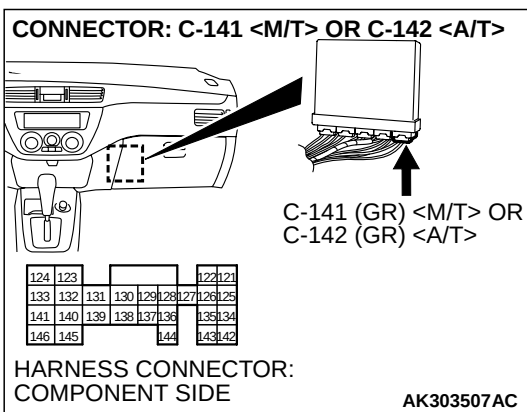
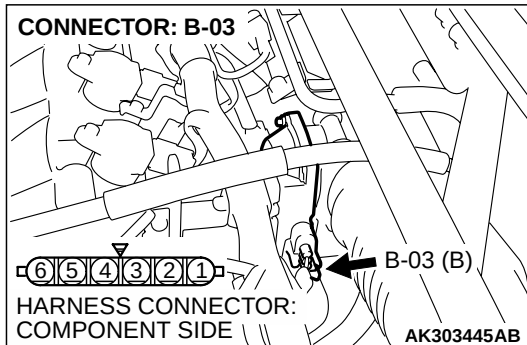


STEP 6. Check for open circuit and harness damage between throttle actuator control motor connector B-03 (terminal No. 2) and ECM connector C-141 <M/T> or PCM connector C-142 <A/T> (terminal No. 141).

Q: Is the harness wire in good condition?

YES : Go to Step 7.

NO : Repair it. Then go to Step 8.



STEP 7. Using scan tool MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

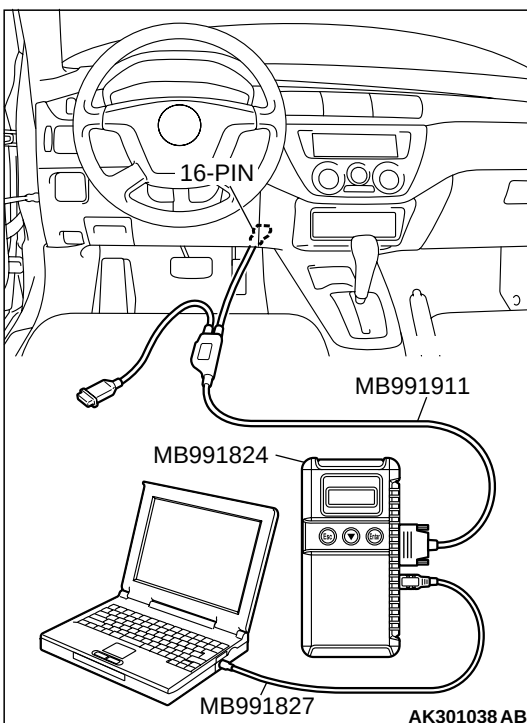
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

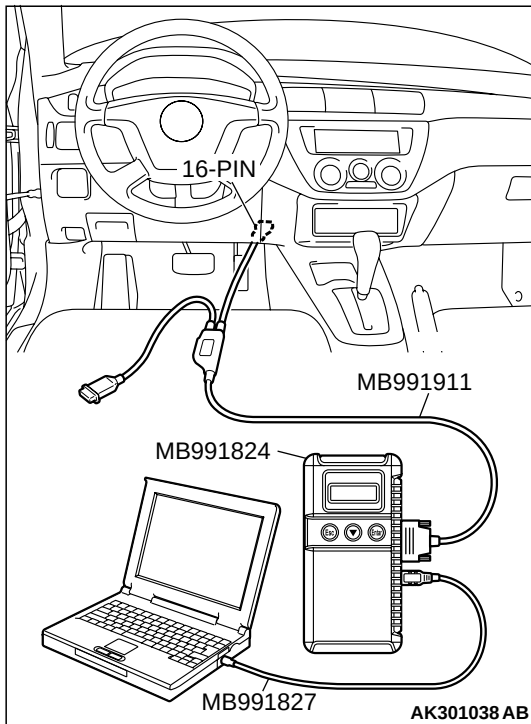
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) After the DTC has been deleted, read the DTC again.
- (4) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is DTC P2100 set?

YES : Replace the ECM or PCM. 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 [P.00-6](#).





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

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

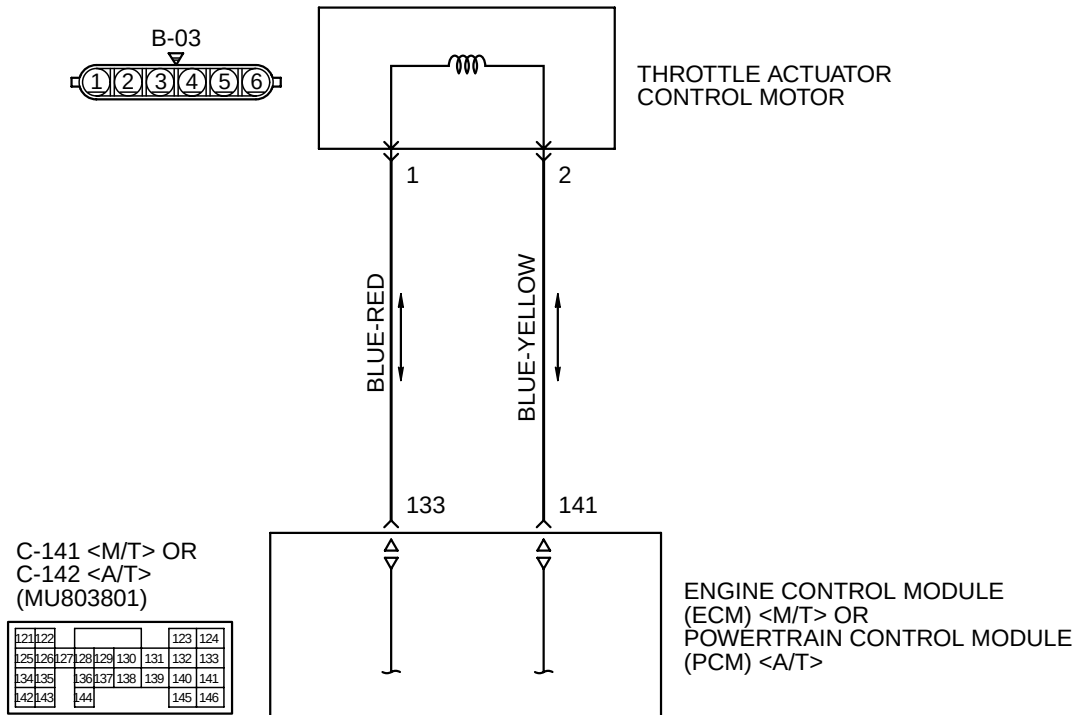
Q: Is DTC P2100 set?

YES : Retry the troubleshooting.

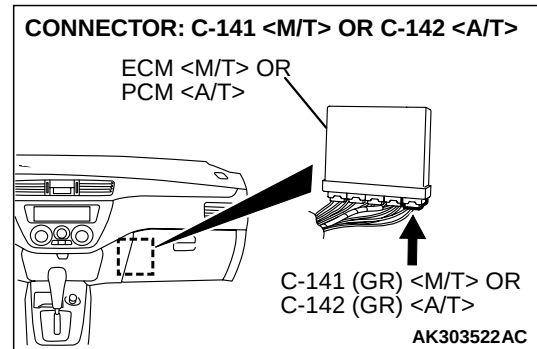
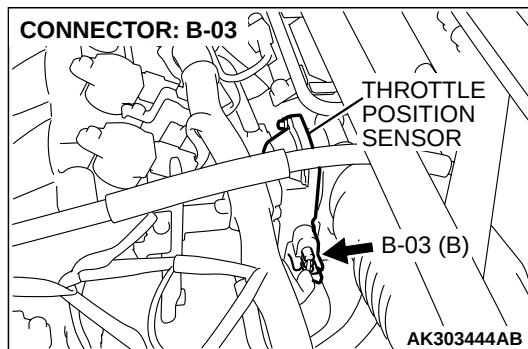
NO : The inspection is complete.

DTC P2101: Throttle Actuator Control Motor Magneto Malfunction

Throttle Actuator Control Motor Circuit



AK304004



CIRCUIT OPERATION

- Controls the current that is applied from the ECM <M/T> or PCM <A/T> (terminals No. 133, No. 141) to the throttle actuator control motor (terminals No. 1, No. 2).

TECHNICAL DESCRIPTION

- ECM <M/T> or PCM <A/T> check whether the throttle actuator control motor magneto has failed.

DESCRIPTIONS OF MONITOR METHODS

Throttle actuator control motor intelligent power device detects it is overheating.

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 Criteria

- The coil temperature of the throttle actuator control motor should be 180°C (356°F) or higher for 0.8 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, or harness damage, or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

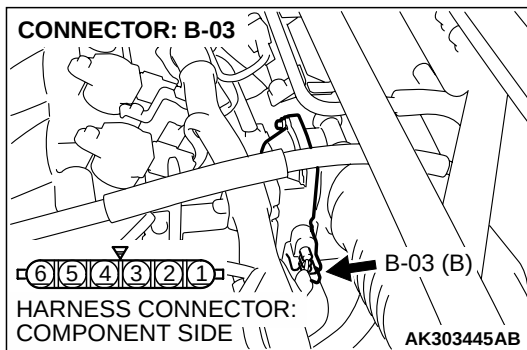
- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991911: Main Harness B

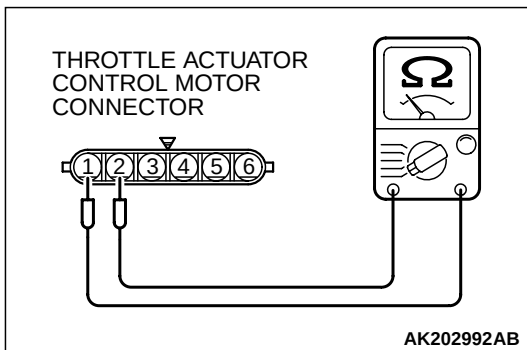
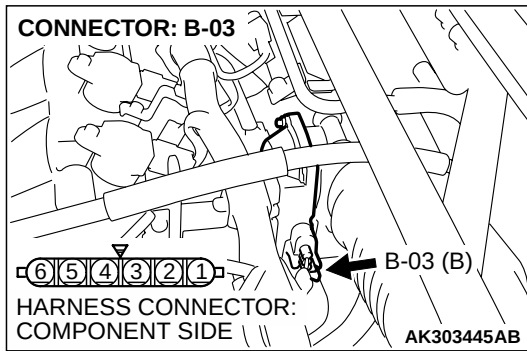
STEP 1. Check harness connector B-03 at throttle actuator control motor for damage.

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-03.

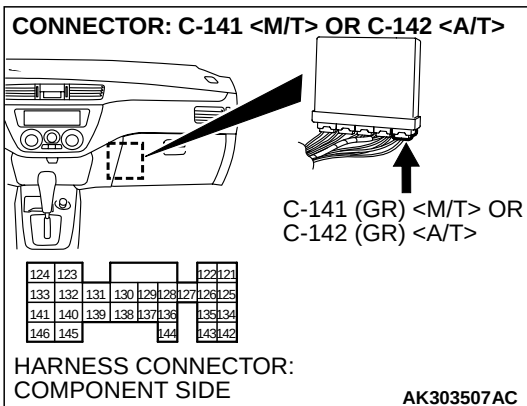
(2) Measure the resistance between throttle actuator control motor side connector terminal No. 1 and No. 2.

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

Q: Is the measured resistance between 0.3 and 80 ohms [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 C-141 at ECM <M/T> or C-142 at PCM <A/T> for damage**

Q: Is the harness connector in good condition?

YES : Go to Step 4.

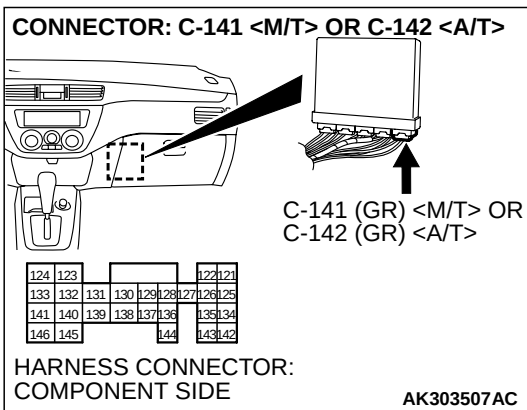
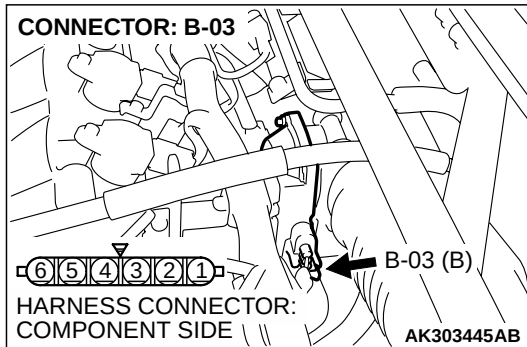
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 7.

STEP 4. Check for short circuit to ground and harness damage between throttle actuator control motor connector B-03 (terminal No. 1) and ECM connector C-141 <M/T> or PCM connector C-142 <A/T> (terminal No. 133).

Q: Is the harness wire in good condition?

YES : Go to Step 5.

NO : Repair it. Then go to Step 7.

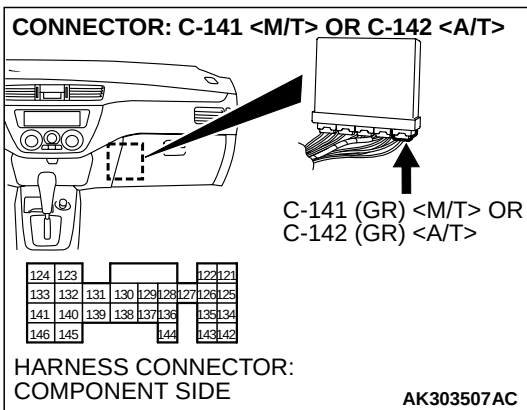
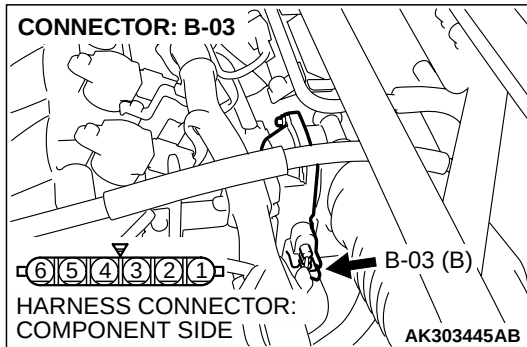


STEP 5. Check for short circuit to ground and harness damage between throttle actuator control motor connector B-03 (terminal No. 2) and ECM connector C-141 <M/T> or PCM connector C-142 <A/T> (terminal No. 141).

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

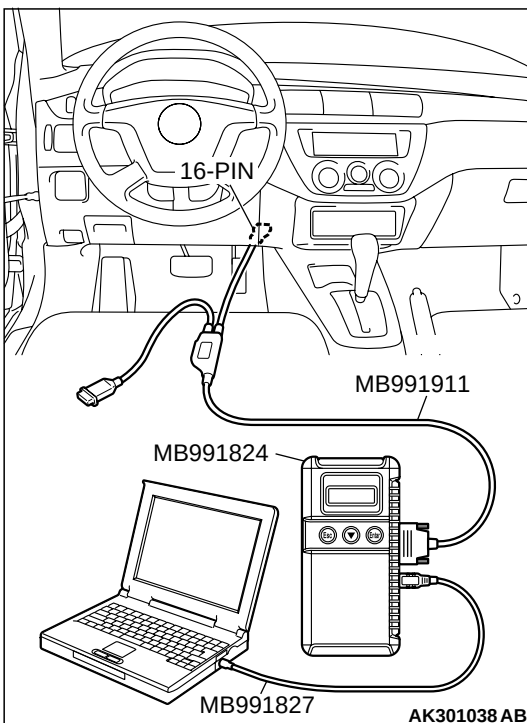
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

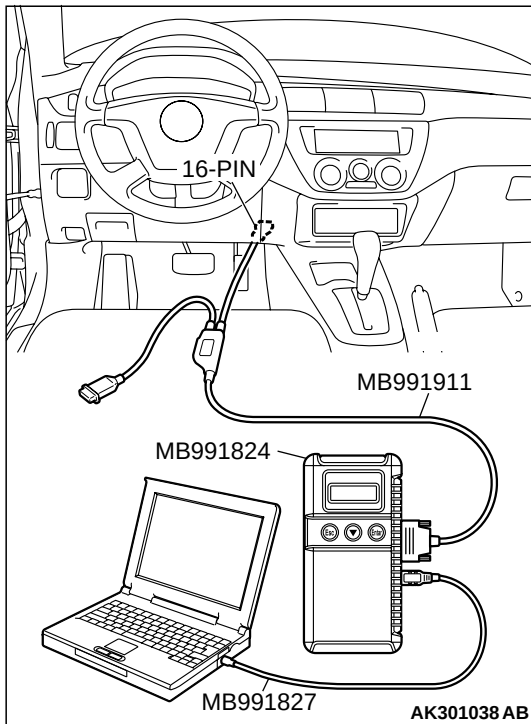
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) After the DTC has been deleted, read the DTC again.
- (4) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is DTC P2101 set?

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

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points [P.00-6](#).





STEP 7. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

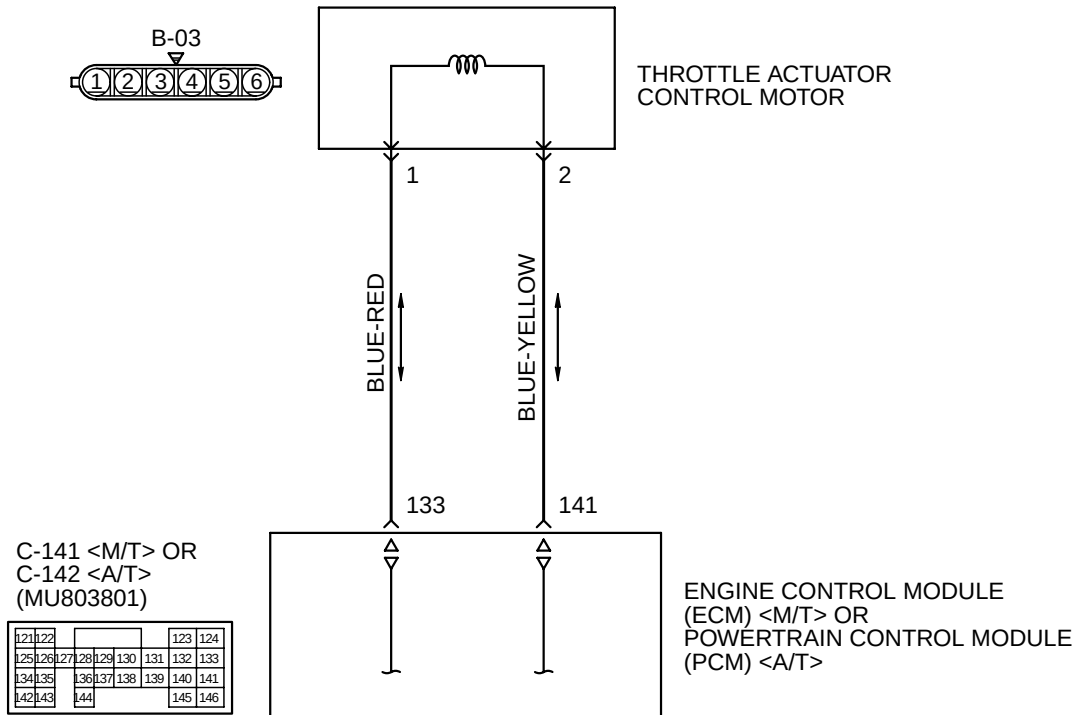
Q: Is DTC P2101 set?

YES : Retry the troubleshooting.

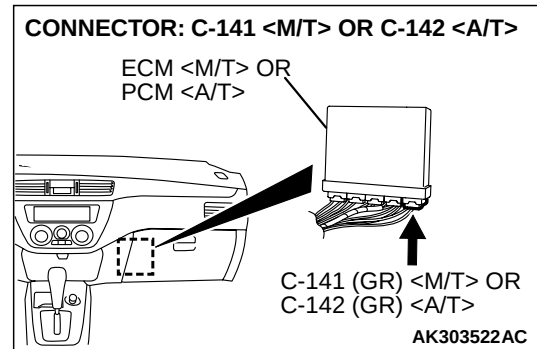
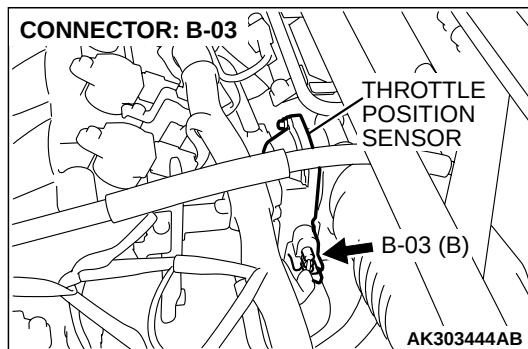
NO : The inspection is complete.

DTC P2102: Throttle Actuator Control Motor Circuit (Shorted Low)

Throttle Actuator Control Motor Circuit



AK304004



CIRCUIT OPERATION

- Controls the current that is applied from the ECM <M/T> or PCM <A/T> (terminals No. 133, No. 141) to the throttle actuator control motor (terminals No. 1, No. 2).

TECHNICAL DESCRIPTION

- ECM <M/T> or PCM <A/T> 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

Motor intelligent power device detects shorted-low malfunction.

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 Criteria

- Throttle actuator control motor current is 12 amperes or higher for 0.8 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, or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

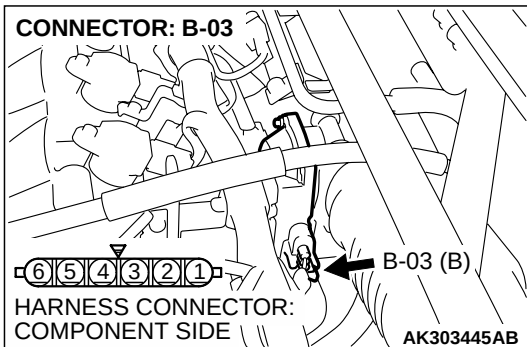
- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991911: Main Harness B

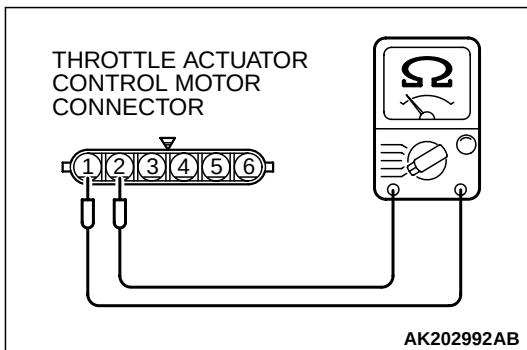
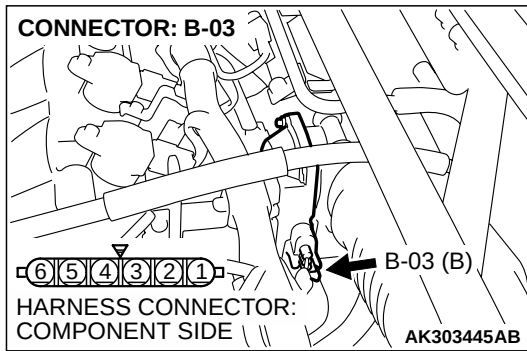
STEP 1. Check harness connector B-03 at throttle actuator control motor for damage.

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-03.

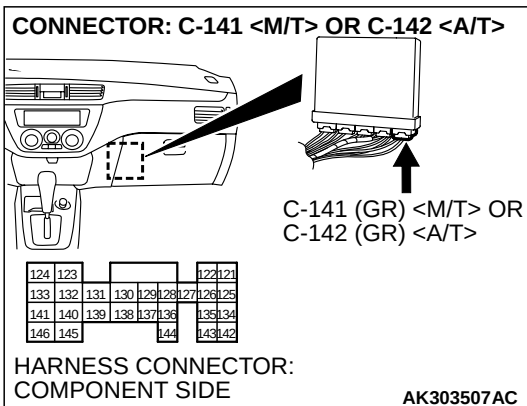
(2) Measure the resistance between throttle actuator control motor side connector terminals No. 1 and No. 2.

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

Q: Is the measured resistance between 0.3 and 80 ohms [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 C-141 at ECM <M/T> or C-142 at PCM <A/T> for damage.**

Q: Is the harness connector in good condition?

YES : Go to Step 4.

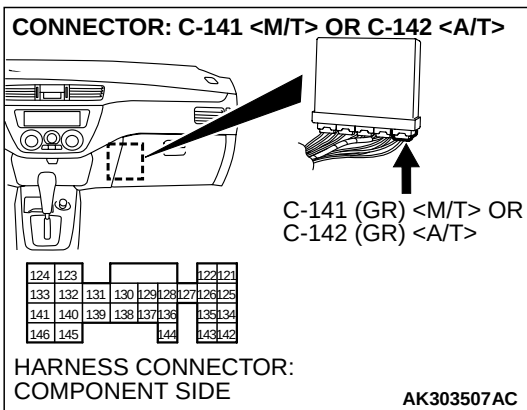
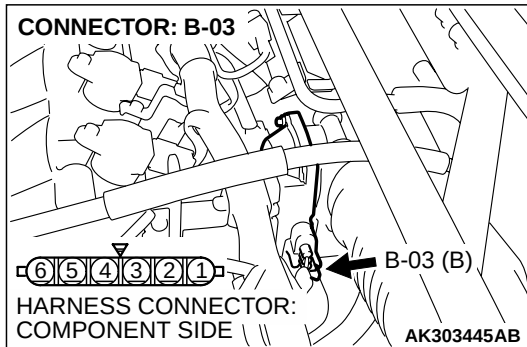
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 7.

STEP 4. Check for short circuit to ground between throttle actuator control motor connector B-03 (terminal No. 1) and ECM connector C-141 <M/T> or PCM connector C-142 <A/T> (terminal No. 133).

Q: Is the harness wire in good condition?

YES : Go to Step 5.

NO : Repair it. Then go to Step 7.

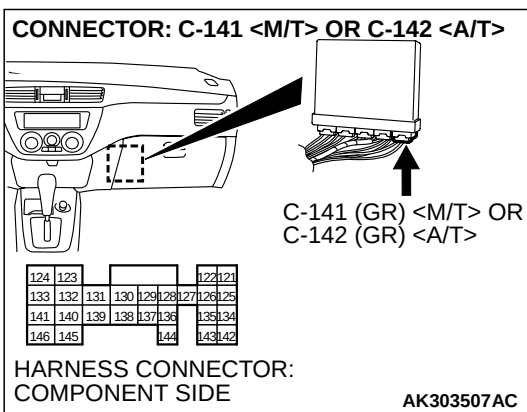
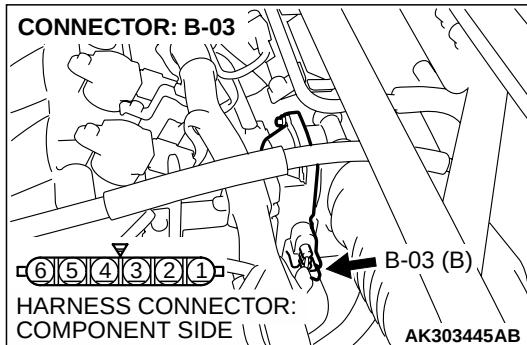


STEP 5. Check for short circuit to ground between throttle actuator control motor connector B-03 (terminal No. 2) and ECM connector C-141 <M/T> or PCM connector C-142 <A/T> (terminal No. 141).

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

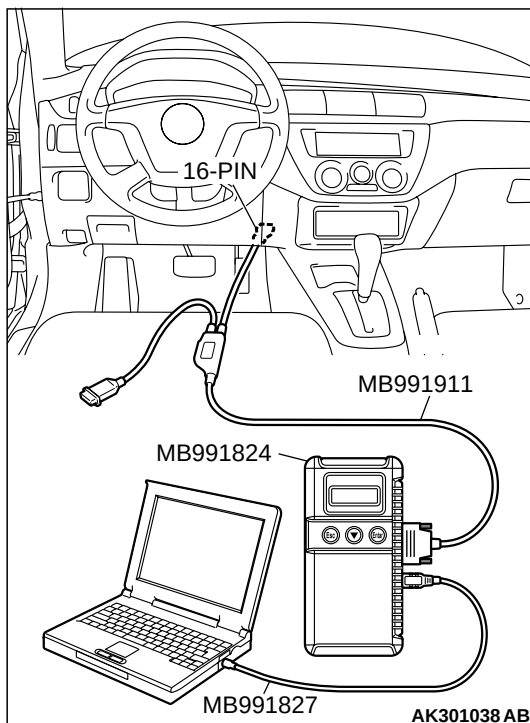
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

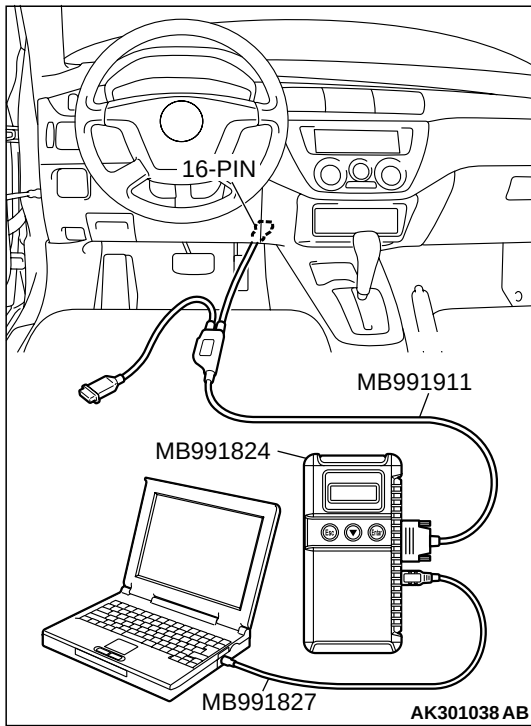
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) After the DTC has been deleted, read the DTC again.
- (4) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is DTC P2102 set?

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

NO : It can be assumed that this malfunction is intermittent.
Refer to GROUP 00, How to Use
Troubleshooting/Inspection Service Points [P.00-6](#).





STEP 7. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

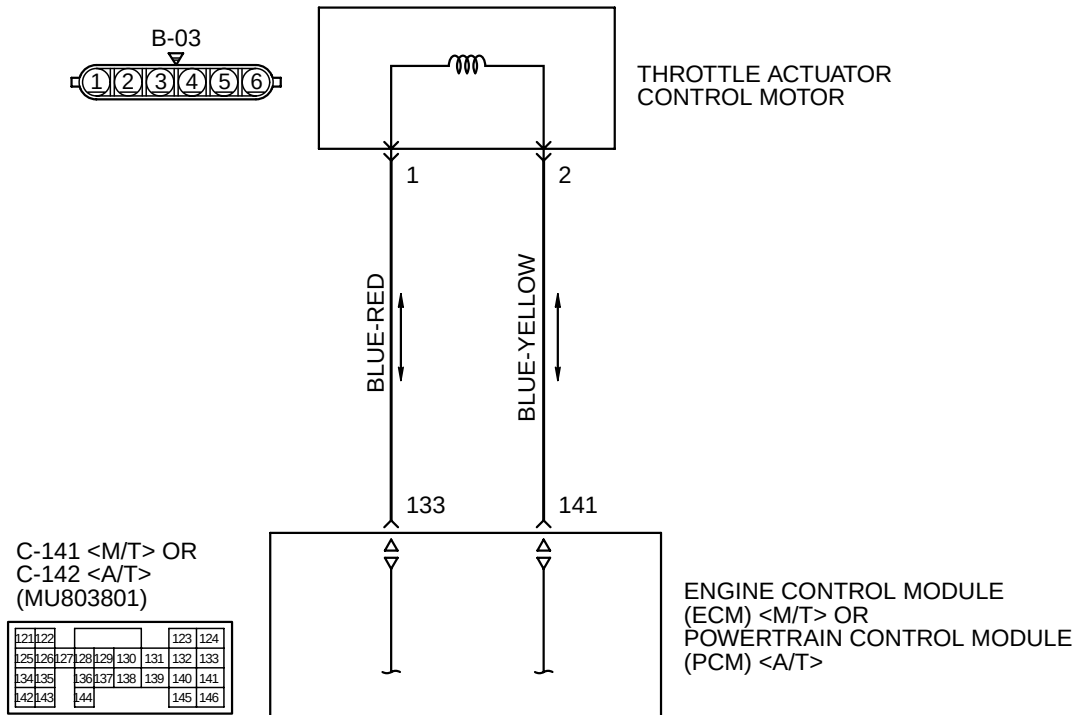
Q: Is DTC P2102 set?

YES : Retry the troubleshooting.

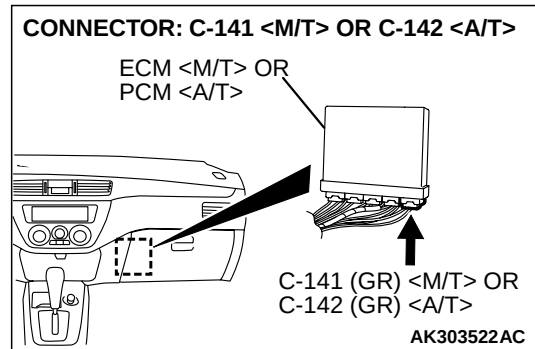
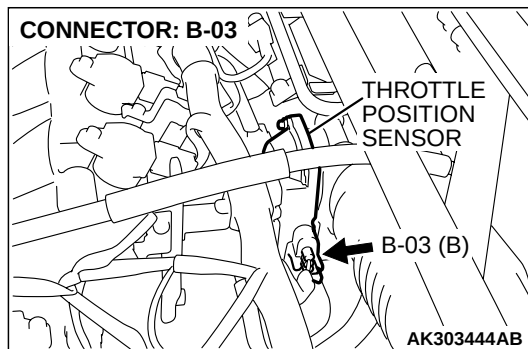
NO : The inspection is complete.

DTC P2103: Throttle Actuator Control Motor Circuit (Shorted High)

Throttle Actuator Control Motor Circuit



AK304004



CIRCUIT OPERATION

- Controls the current that is applied from the ECM <M/T> or PCM <A/T> (terminals No. 133, No. 141) to the throttle actuator control motor (terminals No. 1, No. 2).

TECHNICAL DESCRIPTION

- ECM <M/T> or PCM <A/T> 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

Motor intelligent power device detects shorted-high malfunction.

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.

Judgement Criteria

- Throttle actuator control motor current is 8 amperes or higher for 0.8 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, or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

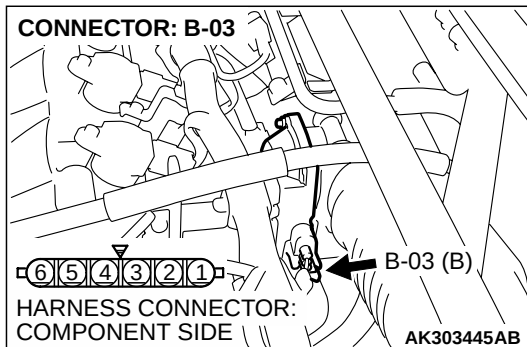
- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991911: Main Harness B

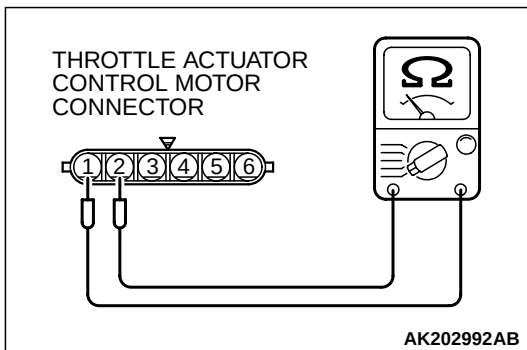
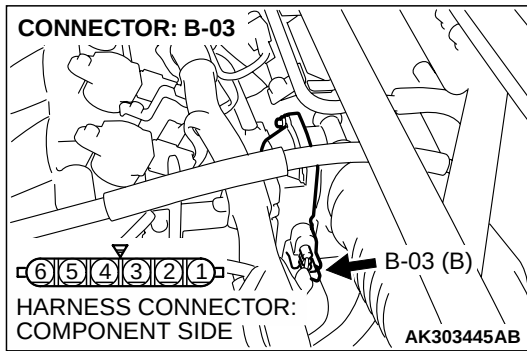
STEP 1. Check harness connector B-03 at throttle actuator control motor for damage.

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-03.

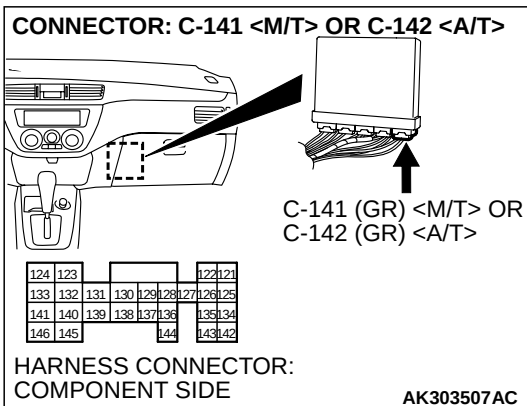
(2) Measure the resistance between throttle actuator control motor side connector terminals No. 1 and No. 2.

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

Q: Is the measured resistance between 0.3 and 80 ohms [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 C-141 at ECM <M/T> or C-142 at PCM <A/T> for damage.**

Q: Is the harness connector in good condition?

YES : Go to Step 4.

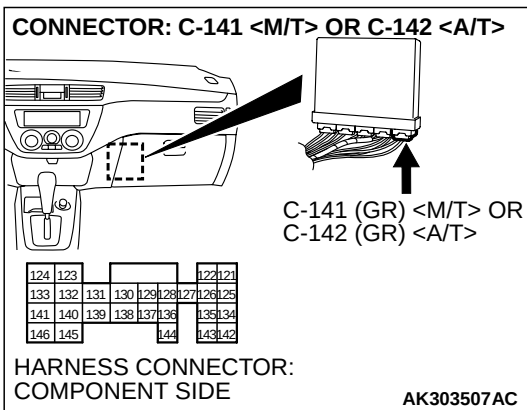
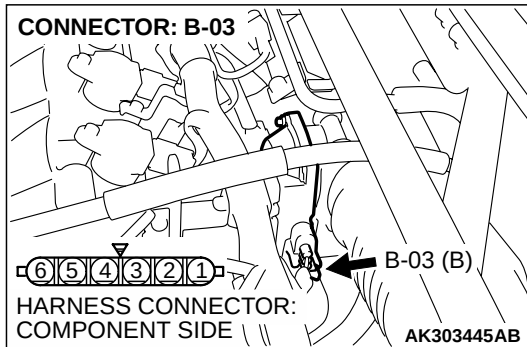
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 7.

STEP 4. Check for short circuit to ground between throttle actuator control motor connector B-03 (terminal No. 1) and ECM connector C-141 <M/T> or PCM connector C-142 <A/T> (terminal No. 133).

Q: Is the harness wire in good condition?

YES : Go to Step 5.

NO : Repair it. Then go to Step 7.

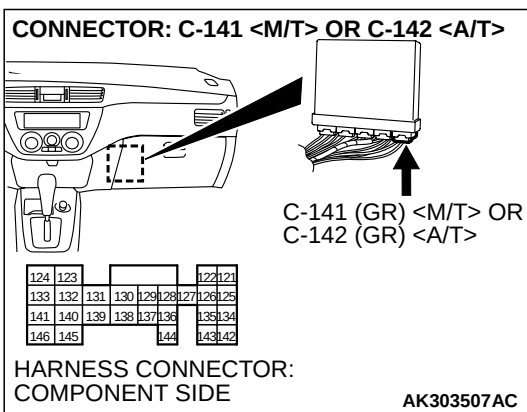
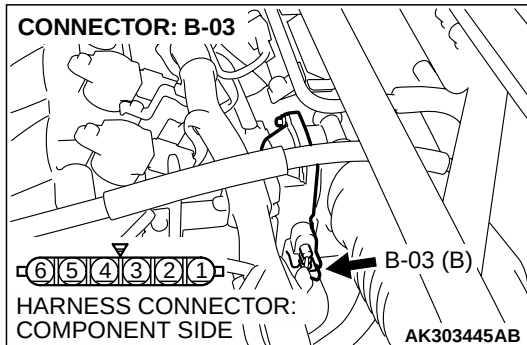


STEP 5. Check for short circuit to ground between throttle actuator control motor connector B-03 (terminal No. 2) and ECM connector C-141 <M/T> or PCM connector C-142 <A/T> (terminal No. 141).

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

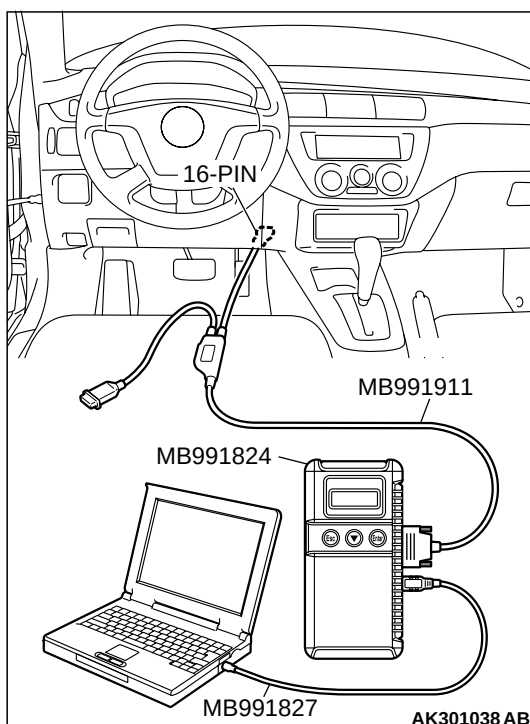
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

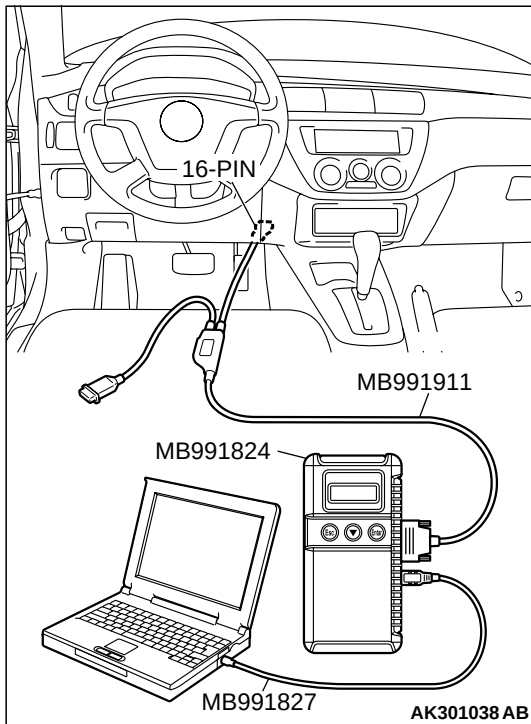
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) After the DTC has been deleted, read the DTC again.
- (4) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is DTC P2103 set?

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

NO : It can be assumed that this malfunction is intermittent.
Refer to GROUP 00, How to Use
Troubleshooting/Inspection Service Points [P.00-6](#).





STEP 7. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is DTC P2103 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P2121: Accelerator Pedal Position Sensor (main) Circuit Range/Performance Problem

**ACCELERATOR PEDAL POSITION SENSOR
(MAIN) CIRCUIT RANGE/PERFORMANCE
PROBLEM CIRCUIT**

- Refer to, DTC P2122 – Accelerator Pedal Position Sensor (main) Circuit [P.13B-661](#).
- Refer to INSPECTION PROCEDURE 35 – Accelerator Pedal Position Switch Circuit [P.13B-857](#).

CIRCUIT OPERATION

- Refer to, DTC P2122 – Accelerator Pedal Position Sensor (main) Circuit [P.13B-661](#).
- Refer to INSPECTION PROCEDURE 35 – Accelerator Pedal Position Switch Circuit [P.13B-857](#).

TECHNICAL DESCRIPTION

- ECM <M/T> or PCM <A/T> checks the accelerator pedal position sensor (main) output signal characteristics for abnormal conditions.

DESCRIPTIONS OF MONITOR METHODS

- Accelerator pedal position sensor (main) output voltage is greater than that the specified value when the accelerator pedal position switch is on.

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)**

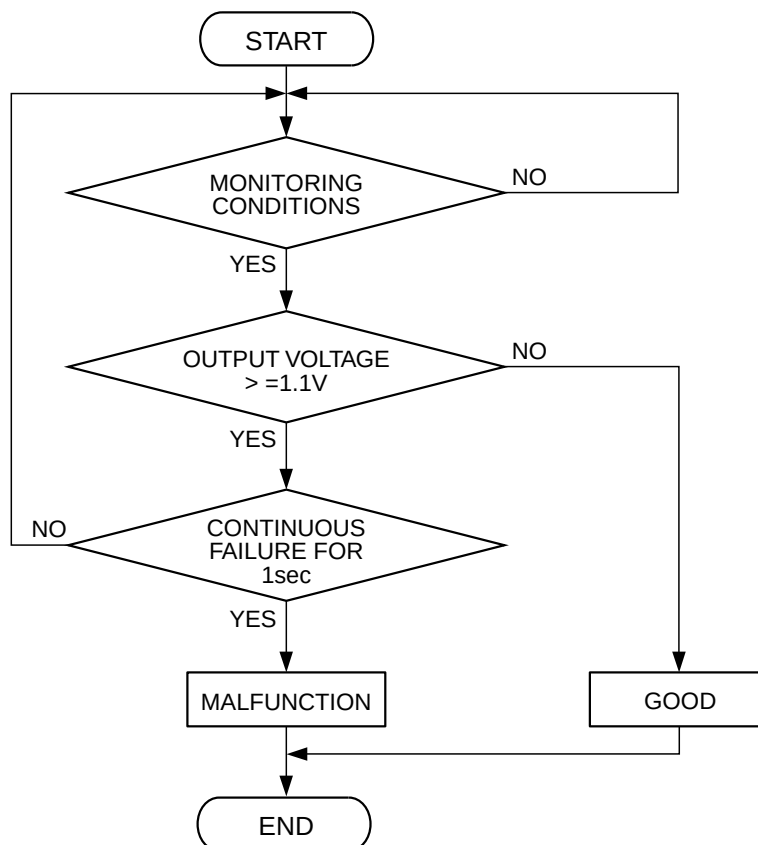
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK304088

Check Conditions

- Ignition switch "ON" position.
- Accelerator pedal position switch: ON
- Accelerator pedal position sensor (sub) output voltage is 1.88 volts or less.

Judgement Criteria

- Accelerator pedal position sensor (main) output voltage is 1.88 volts or higher for 1 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 or maladjusted.
- Open or shorted accelerator pedal position sensor (main) circuit, or loose connector.
- Accelerator pedal position switch failed or maladjusted.
- Open or shorted accelerator pedal position switch circuit, or loose connector.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS**Required Special Tools:**

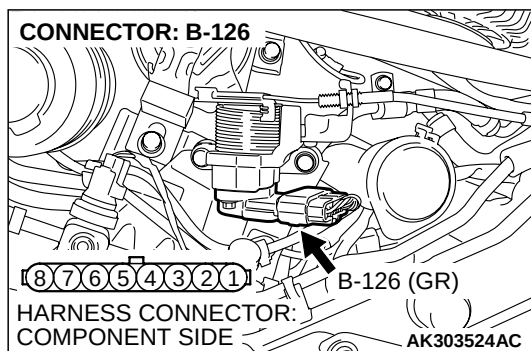
- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991911: Main Harness B

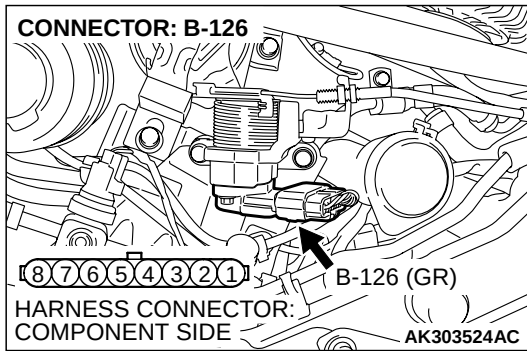
STEP 1. Check harness connector B-126 at accelerator pedal position sensor and accelerator pedal position switch for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 2.

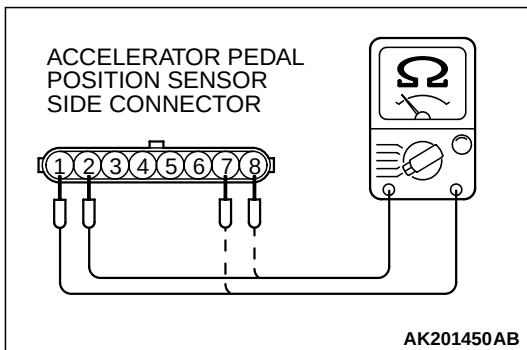
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 11.





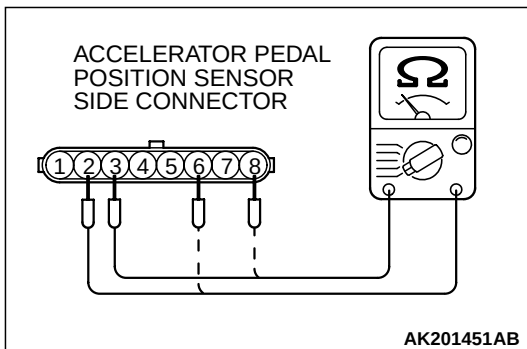
STEP 2. Check the accelerator pedal position sensor.

- (1) Disconnect the accelerator pedal position sensor connector B-126.



- (2) Measure resistance between terminal No. 1 and No. 2 and between terminal No. 7 and No. 8.

Standard value: 3.5 – 6.5 k Ω



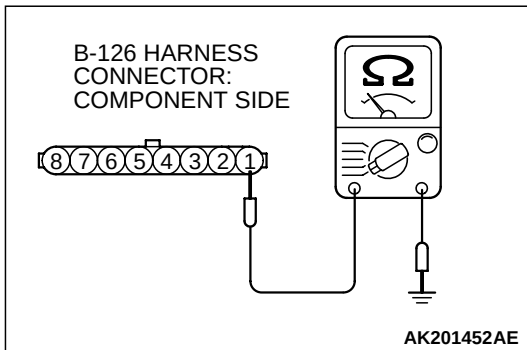
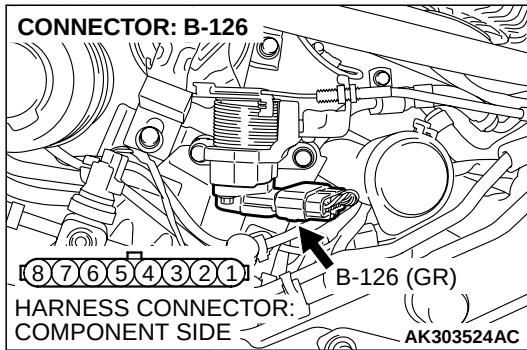
- (3) Measure resistance between terminal No. 2 and No. 3 and between terminal No. 6 and No. 8 when the accelerator pedal is gently depressed from idle position to the full open position.

- Resistance value changes in accordance with the accelerator pedal depression smoothly.

Q: Is the resistance normal?

YES : Go to Step 3.

NO : Replace the accelerator pedal position sensor. Then go to Step 11.



STEP 3. Check the continuity at accelerator pedal position sensor harness side connector B-126.

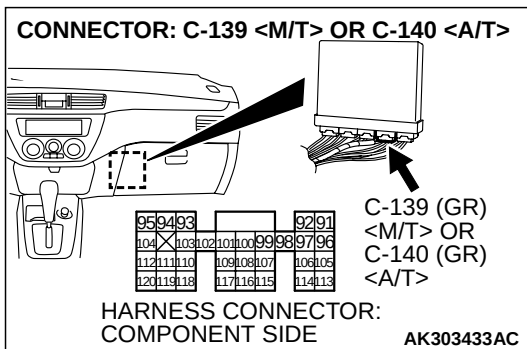
(1) Disconnect the connector B-126 and measure at the harness side.

(2) Measure the continuity between terminal No. 1 and ground.
• Should be less than 2 ohms.

Q: Does continuity exist?

YES : Go to Step 7.

NO : Go to Step 4.



STEP 4. Check harness connector C-139 at ECM <M/T> or C-140 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 5.

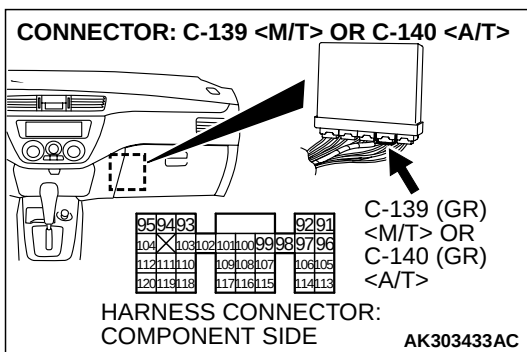
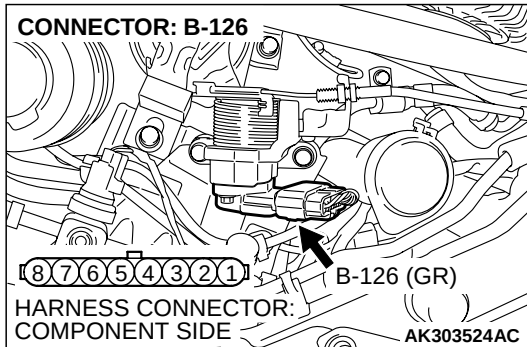
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 11.

STEP 5. Check for harness damage between accelerator pedal position sensor connector B-126 (terminal No. 1) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 91).

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, read the diagnostic trouble code (DTC).

CAUTION

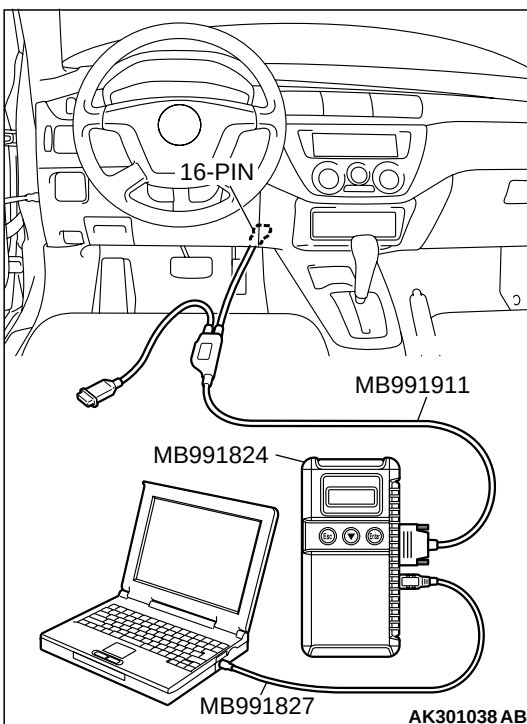
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

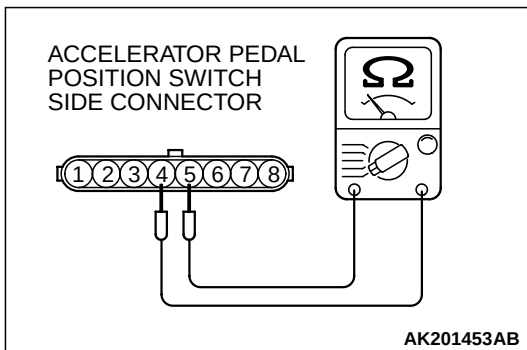
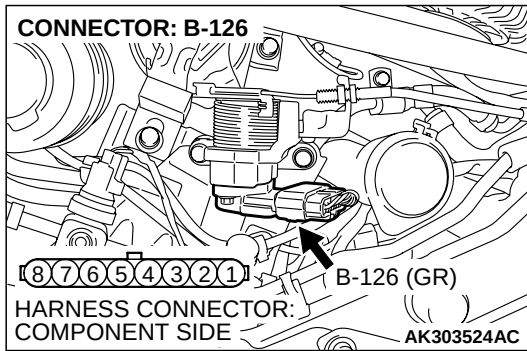
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) After the DTC has been deleted, read the DTC again.
- (4) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is DTC P2121 set?

YES : Replace the ECM or PCM. 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 [P.00-6](#).



**STEP 7. Check the accelerator pedal position switch.**

(1) Disconnect the accelerator pedal position switch connector B-126.

(2) Check the continuity between accelerator pedal position switch side connector terminal No. 4 and No. 5.

Standard value:

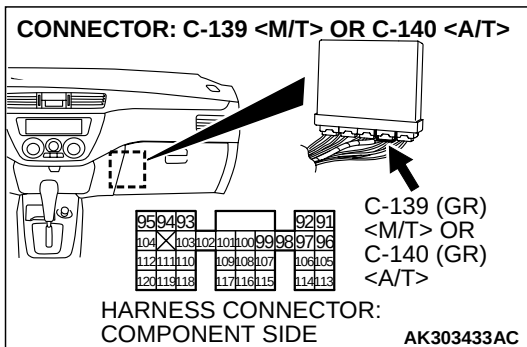
Continuity (foot released from accelerator pedal)

Non-continuity (accelerator pedal depressed)

Q: Is the switch operating properly?

YES : Go to Step 8.

NO : Replace the accelerator pedal position switch. Then go to Step 11.

**STEP 8. Check harness connector C-139 at ECM <M/T> or C-140 at PCM <A/T> for damage.**

Q: Is the harness connector in good condition?

YES : Go to Step 9.

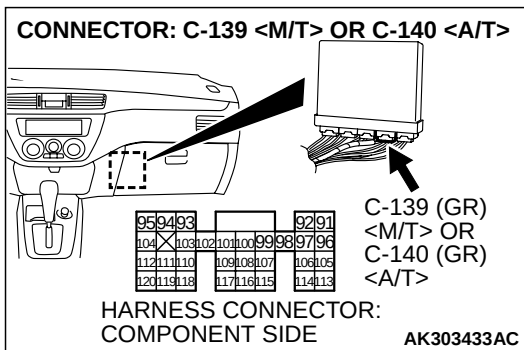
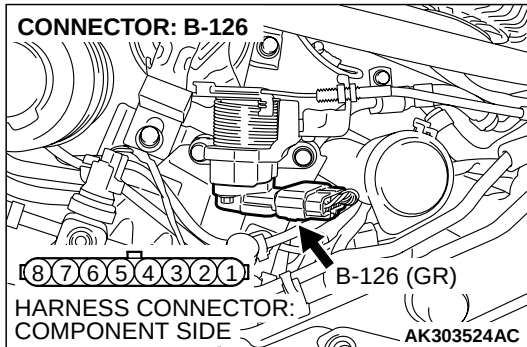
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 11.

STEP 9. Check for short circuit to ground between accelerator pedal position switch connector B-126 (terminal No. 4) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 38).

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

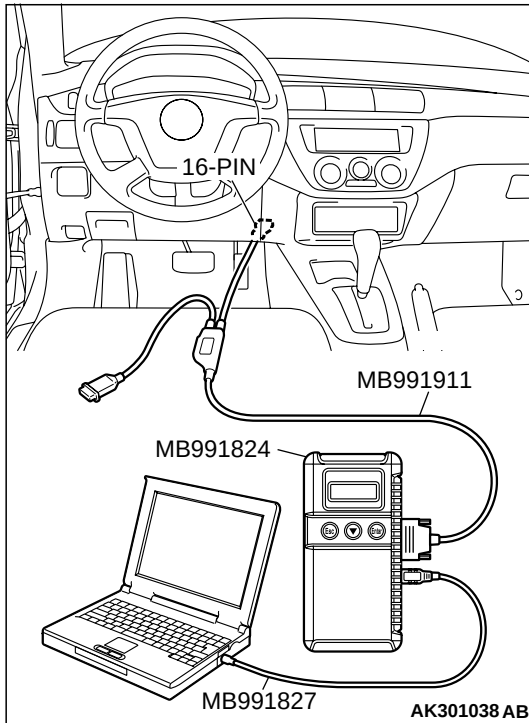
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 P2121 set?

YES : Replace the ECM or PCM. 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 [P.00-6](#).



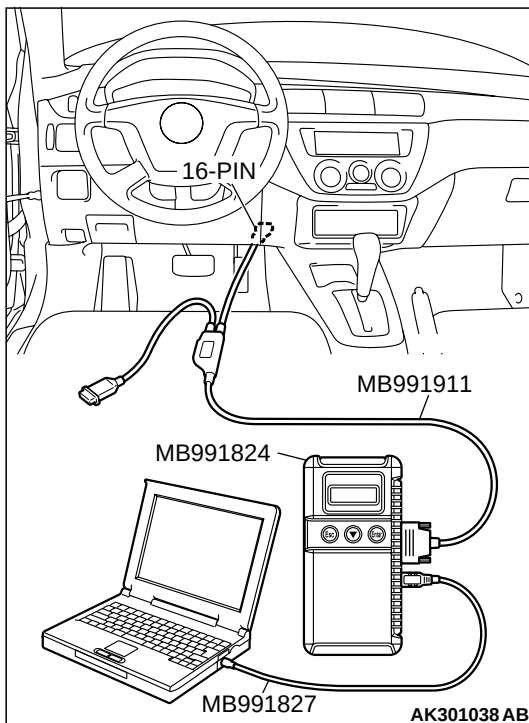
STEP 11. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is DTC P2121 set?

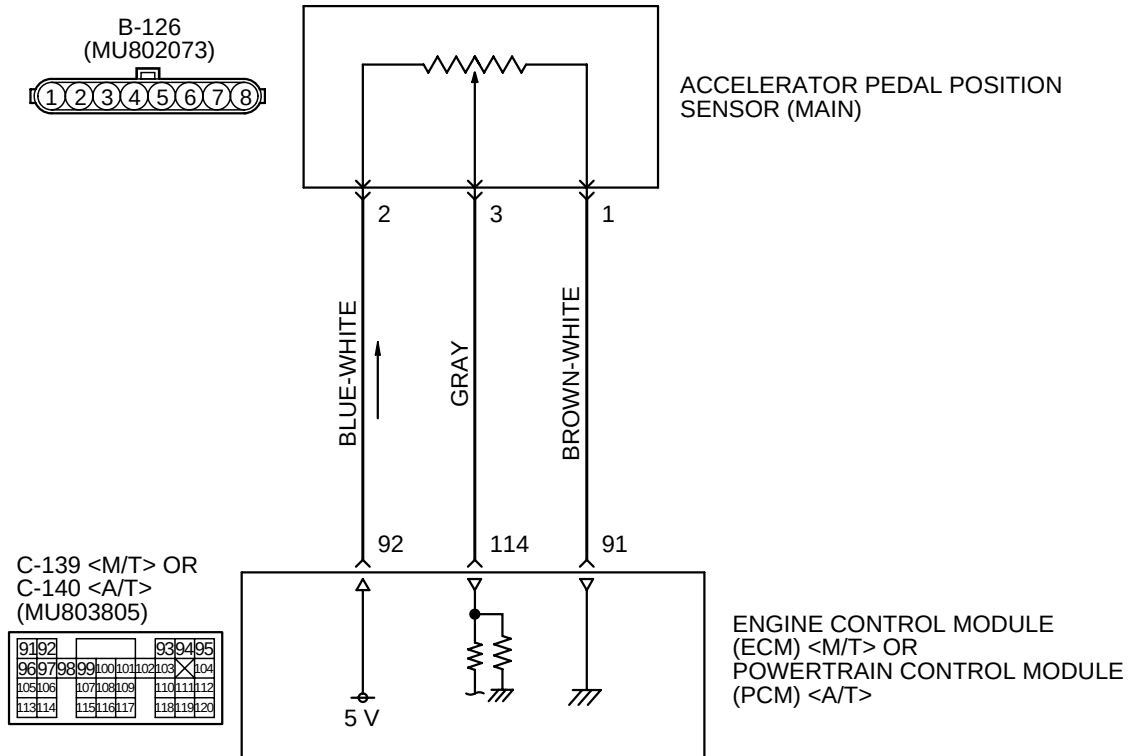
YES : Retry the troubleshooting.

NO : The inspection is complete.

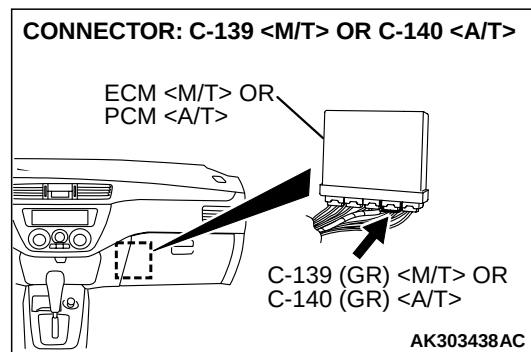
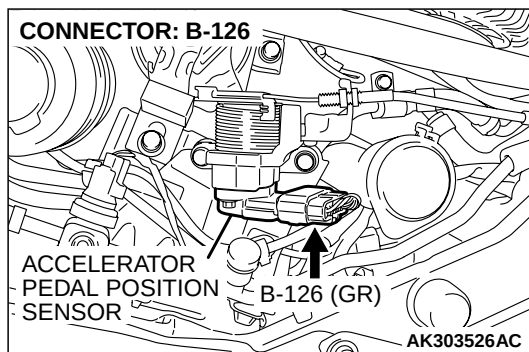


DTC P2122: Accelerator Pedal Position Sensor (main) Circuit Low Input

Accelerator Pedal Position Sensor (main) Circuit



AK304005



CIRCUIT OPERATION

- A 5-volt power supply is applied on the accelerator pedal position sensor (main) power terminal (terminal No. 2) from the ECM <M/T> or PCM <A/T> (terminal No. 92). The ground terminal (terminal No. 1) is grounded with ECM <M/T> or PCM <A/T> (terminal No. 91).

- When the accelerator pedal is moved from the idle position to the fully opened position, the resistance between the accelerator pedal position sensor (main) output terminal (terminal No. 3) and ground terminal will increase according to the rotation.

TECHNICAL DESCRIPTION

- The accelerator pedal position sensor (main) outputs voltage which corresponds to the accelerator pedal depression.
- The ECM <M/T> or PCM <A/T> 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

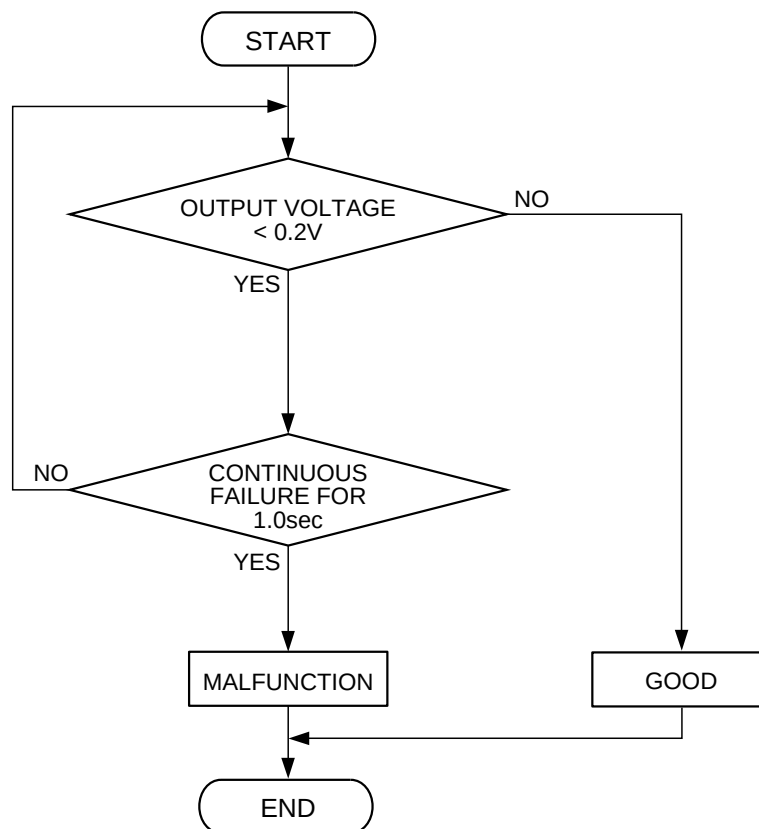
MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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**

AK302044

Check Conditions

- Ignition switch is "ON" position.

OBD-II DRIVE CYCLE PATTERN

None.

Judgement Criteria

- Accelerator pedal position sensor (main) output voltage is 0.2 volt or less for 1 second.

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

- Accelerator pedal position sensor failed or maladjusted.
- Open or shorted accelerator pedal position sensor (main) circuit, or loose connector.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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

STEP 1. Using scan tool MB991958, check data list item 78: Accelerator Pedal Position Sensor (main).

⚠ CAUTION

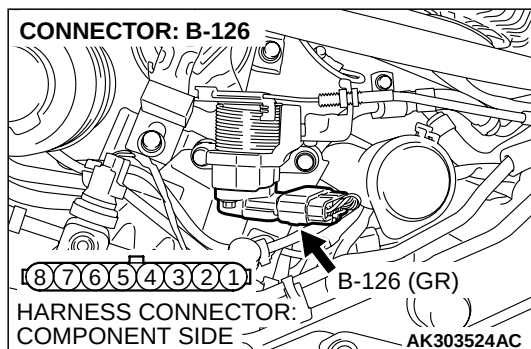
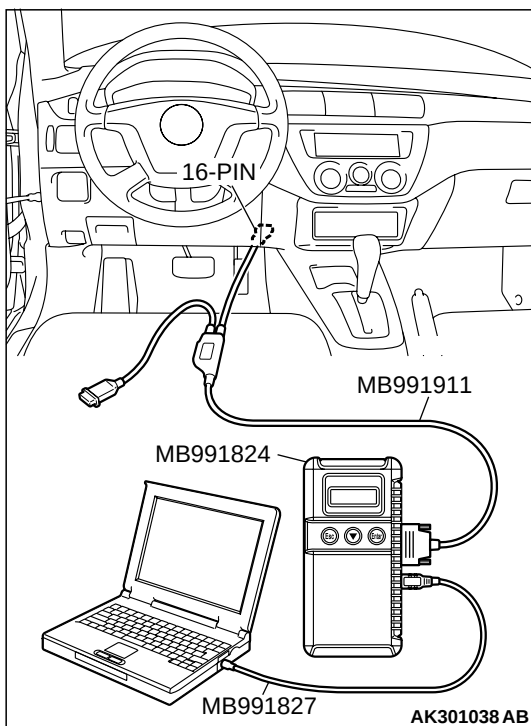
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 78, Accelerator Pedal Position Sensor (main).
 - Output voltage is between 0.335 and 0.935 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 [P.00-6](#).

NO : Go to Step 2.

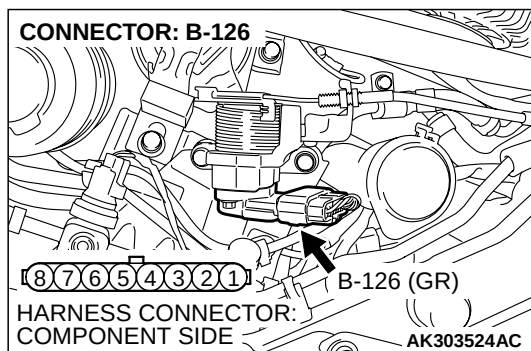


STEP 2. Check harness connector B-126 at accelerator pedal position sensor for damage.

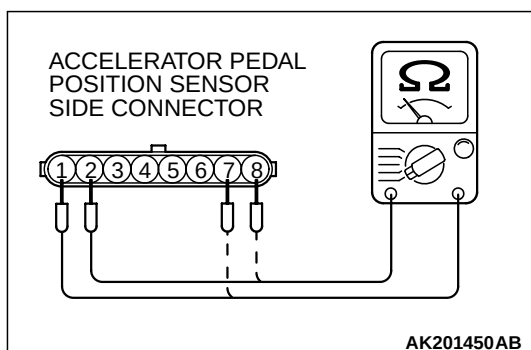
Q: Is the harness connector in good condition?

YES : Go to Step 3.

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

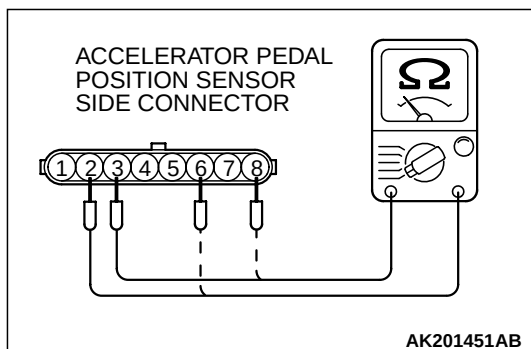
**STEP 3. Check the accelerator pedal position sensor.**

- (1) Disconnect the accelerator pedal position sensor connector B-126.



- (2) Measure resistance between terminal No. 1 and No. 2 and between terminal No. 7 and No. 8.

Standard value: 3.5 – 6.5 k Ω



- (3) Measure resistance between terminal No. 2 and No. 3 and between terminal No. 6 and No. 8 when the accelerator pedal is gently depressed from idle position to the full open position.

- Resistance value changes in accordance with the accelerator pedal depression smoothly.

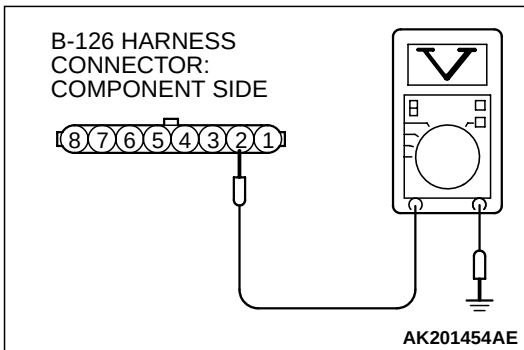
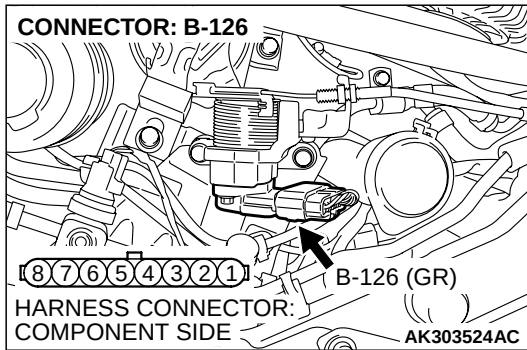
Q: Is the resistance normal?

YES : Go to Step 4.

NO : Replace the accelerator pedal position sensor. Then go to Step 12.

STEP 4. Measure the sensor supply voltage at accelerator pedal position sensor harness side connector B-126.

(1) Disconnect the connector B-126 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 4.8 and 5.2 volts.
(4) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is the measured voltage between 4.8 and 5.2 volts?

YES : Go to Step 8.

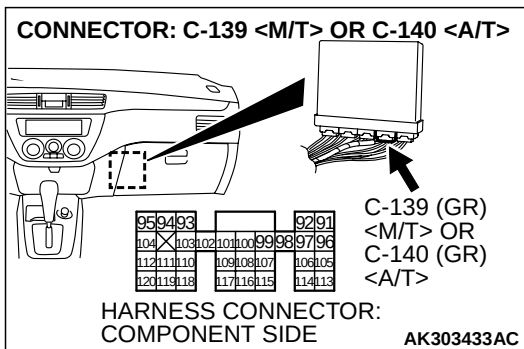
NO : Go to Step 5.

STEP 5. Check harness connector C-139 at ECM <M/T> or C-140 at PCM <A/T> 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 12.

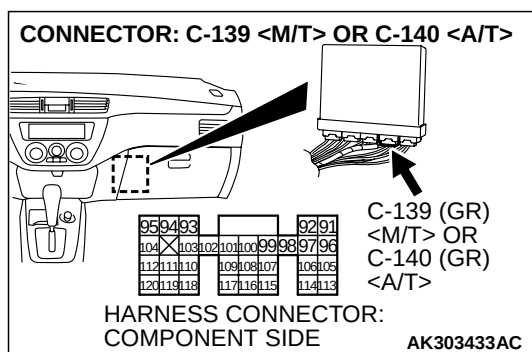
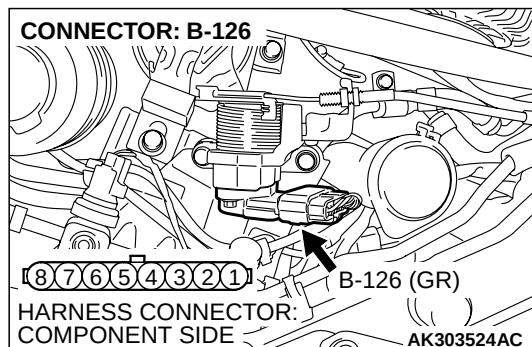


STEP 6. Check for open circuit and short circuit to ground between accelerator pedal position sensor connector B-126 (terminal No. 2) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 92).

Q: Is the harness wire in good condition?

YES : Go to Step 7.

NO : Repair it. Then go to Step 12.



STEP 7. Using scan tool MB991958, check data list item 78: Accelerator Pedal Position Sensor (main).

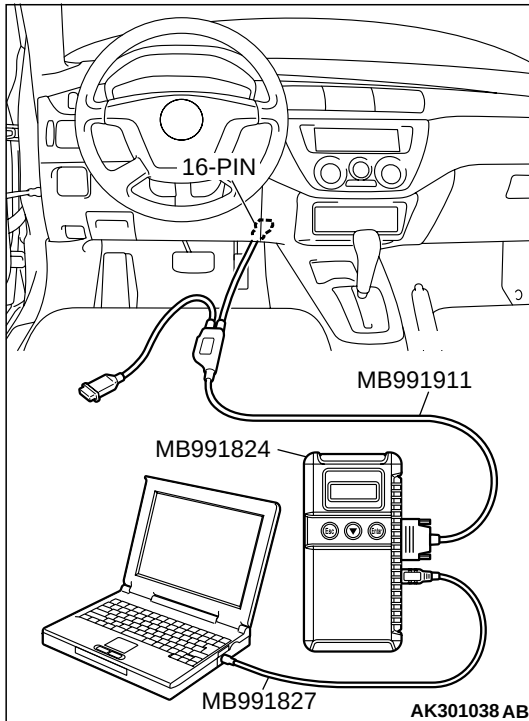
⚠ CAUTION

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 78, Accelerator Pedal Position Sensor (main).
 - Output voltage is between 0.335 and 0.935 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?

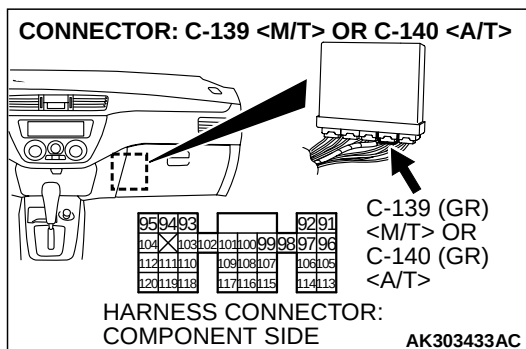
- YES :** It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection. Service Points [P.00-6](#).
- NO :** Replace the ECM or PCM. Then go to Step 12.



STEP 8. Check harness connector C-139 at ECM <M/T> or C-140 at PCM <A/T> 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 12.

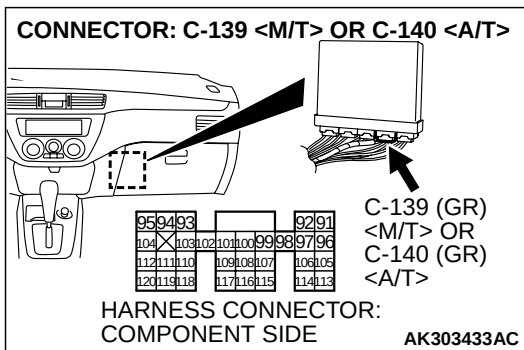
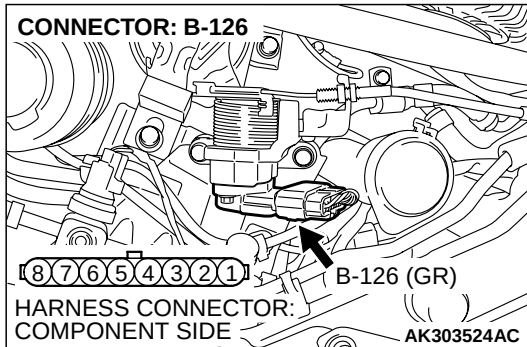


STEP 9. Check for harness damage between accelerator pedal position sensor connector B-126 (terminal No. 2) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 92).

Q: Is the harness wire in good condition?

YES : Go to Step 10.

NO : Repair it. Then go to Step 12.

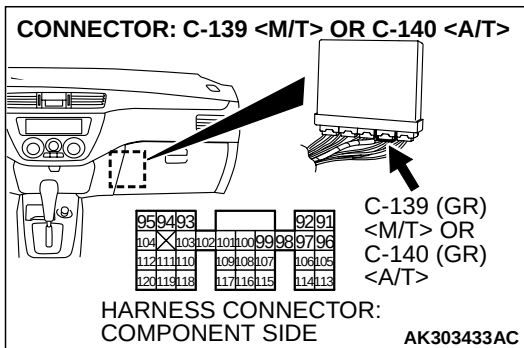
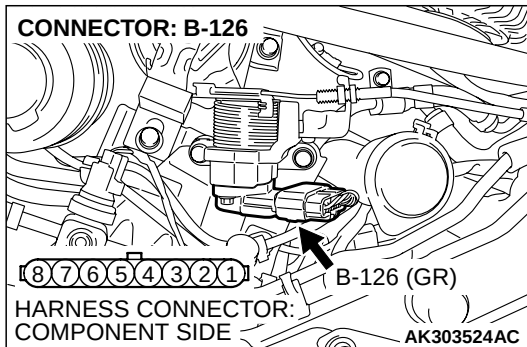


STEP 10. Check for harness damage between accelerator pedal position sensor connector B-126 (terminal No. 3) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 114).

Q: Is the harness wire in good condition?

YES : Go to Step 11.

NO : Repair it. Then go to Step 12.



STEP 11. Using scan tool MB991958, check data list item 78: Accelerator Pedal Position Sensor (main).

⚠ CAUTION

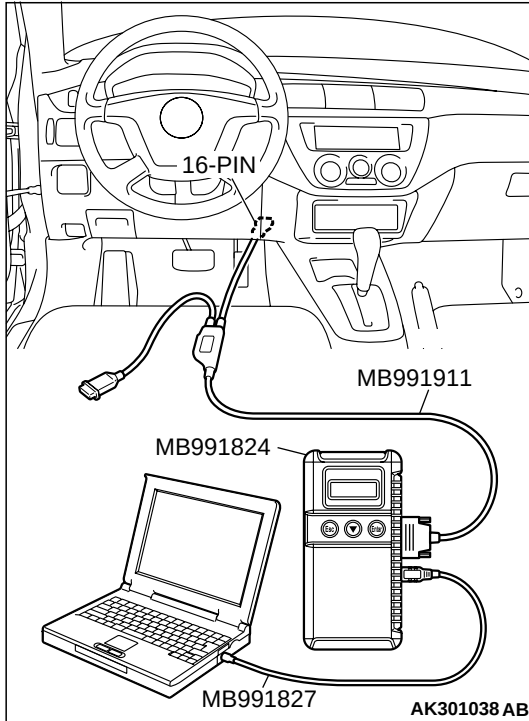
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 78, Accelerator Pedal Position Sensor (main).
 - Output voltage is between 0.335 and 0.935 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 [P.00-6](#).

NO : Replace the ECM or PCM. Then go to Step 12.



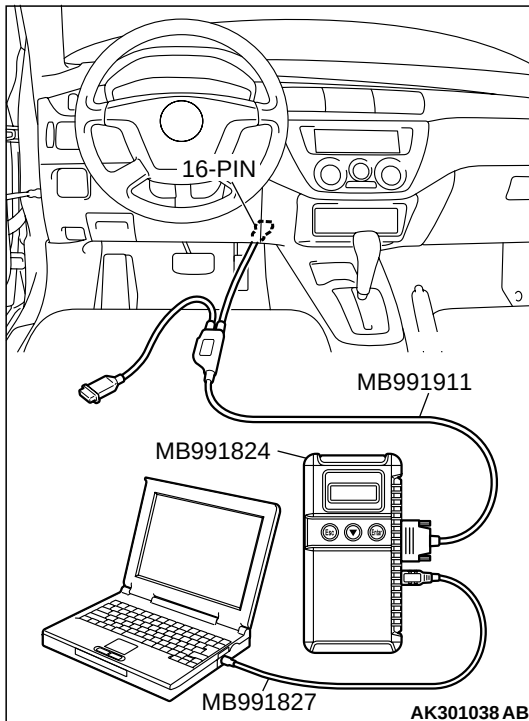
STEP 12. Using scan tool MB991958, read the diagnostic trouble code (DTC).

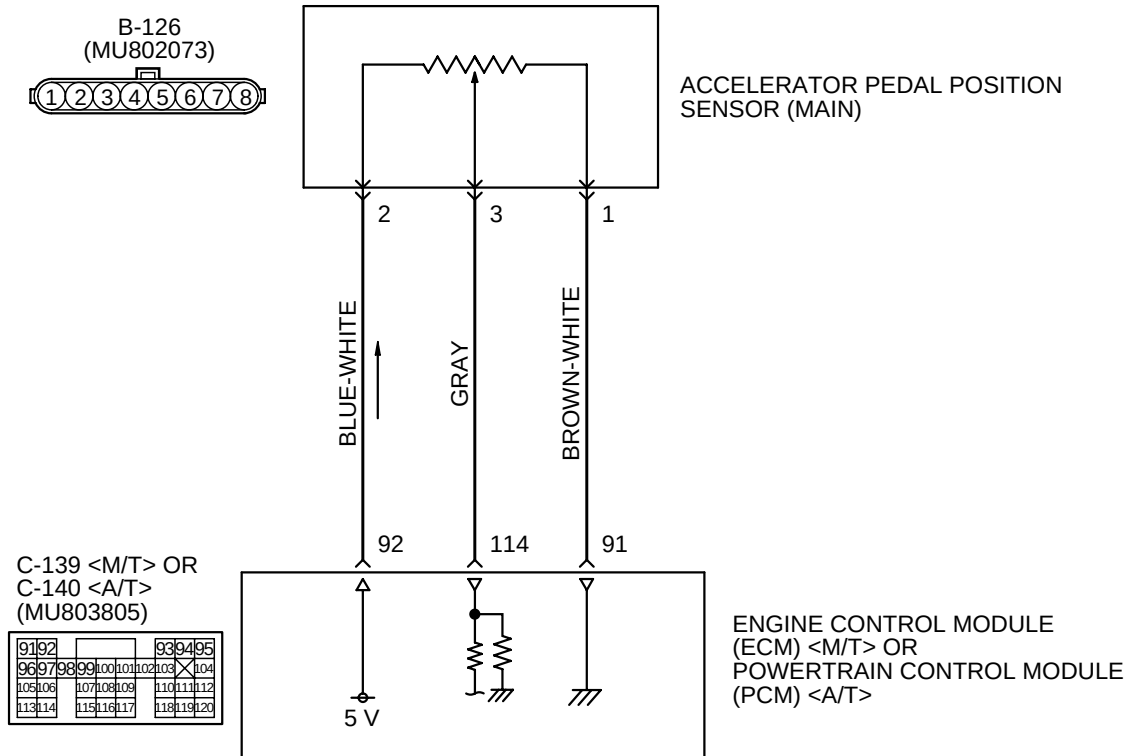
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) After the DTC has been deleted, read the DTC again.
- (4) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is DTC P2122 set?

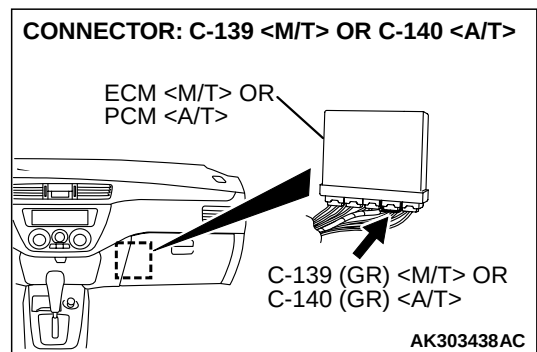
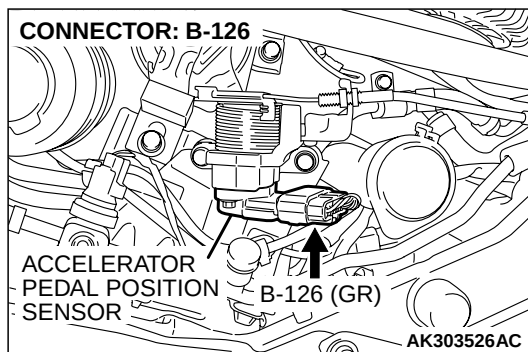
YES : Retry the troubleshooting.

NO : The inspection is complete.



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

AK304005

**CIRCUIT OPERATION**

- A 5-volt power supply is applied on the accelerator pedal position sensor (main) power terminal (terminal No. 2) from the ECM <M/T> or PCM <A/T> (terminal No. 92). The ground terminal (terminal No. 1) is grounded with ECM <M/T> or PCM <A/T> (terminal No. 91).

- When the accelerator pedal is moved from the idle position to the fully opened position, the resistance between the accelerator pedal position sensor (main) output terminal (terminal No. 3) and ground terminal will increase according to the rotation.

TECHNICAL DESCRIPTION

- The accelerator pedal position sensor (main) outputs voltage which corresponds to the accelerator pedal depression.
- The ECM <M/T> or PCM <A/T> 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)

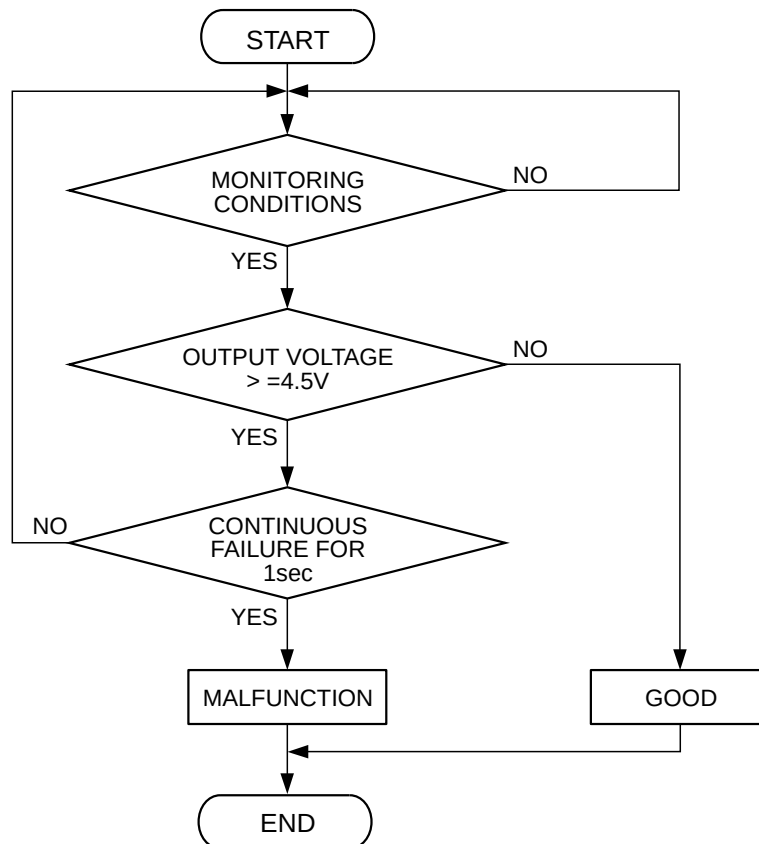
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK302045

Check Conditions

- Ignition switch is "ON" position.
- Accelerator pedal position sensor (sub) output voltage is between 0.2 and 2.5 volts.

Judgement Criteria

- Accelerator pedal position sensor (main) output voltage should be 4.5 volts or higher for 1 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 or maladjusted.
- Open or shorted accelerator pedal position sensor (main) circuit, or loose connector.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS**Required Special Tools:**

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

STEP 1. Using scan tool MB991958, check data list item 78: Accelerator Pedal Position Sensor (main).**⚠ CAUTION**

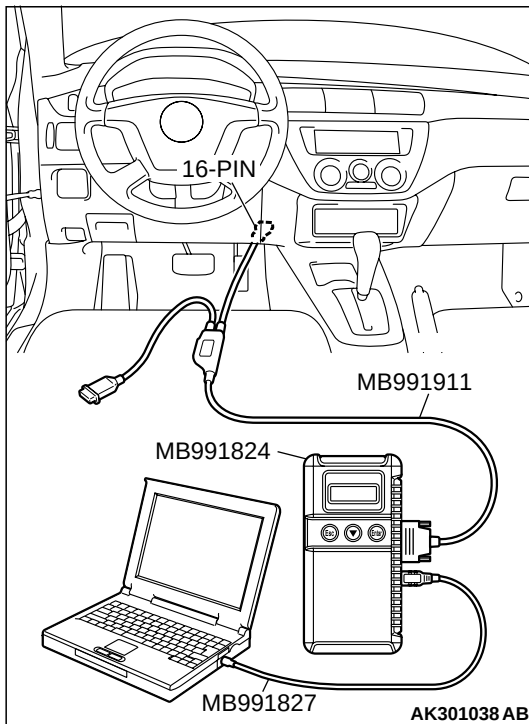
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 78, Accelerator Pedal Position Sensor (main).
 - Output voltage is between 0.335 and 0.935 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?

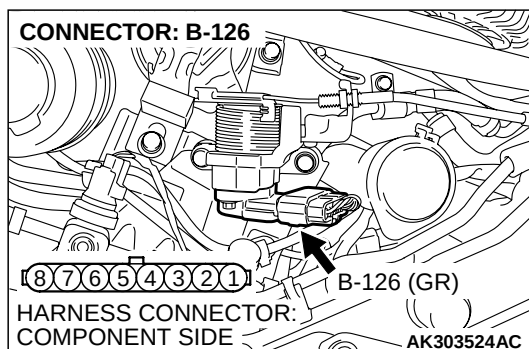
YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection. Service Points [P.00-6](#).

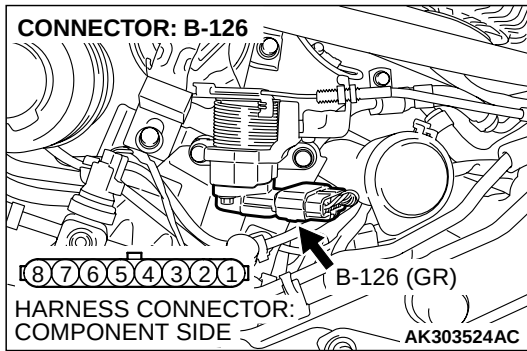
NO : Go to Step 2.

**STEP 2. Check harness connector B-126 at accelerator pedal position sensor for damage.****Q: Is the harness connector in good condition?**

YES : Go to Step 3.

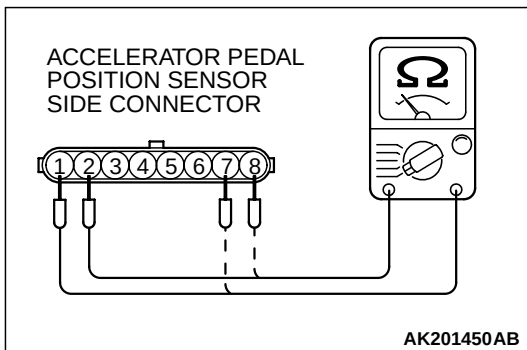
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 8.





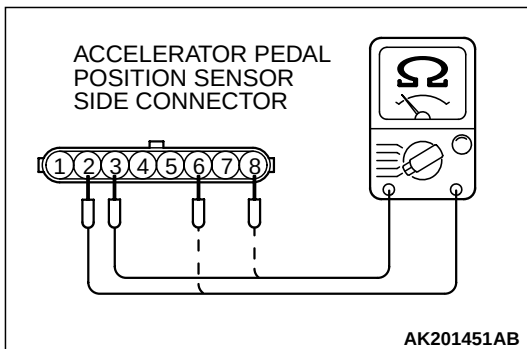
STEP 3. Check the accelerator pedal position sensor.

- (1) Disconnect the accelerator pedal position sensor connector B-126.



- (2) Measure resistance between terminal No. 1 and No. 2 and between terminal No. 7 and No. 8.

Standard value: 3.5 – 6.5 k Ω



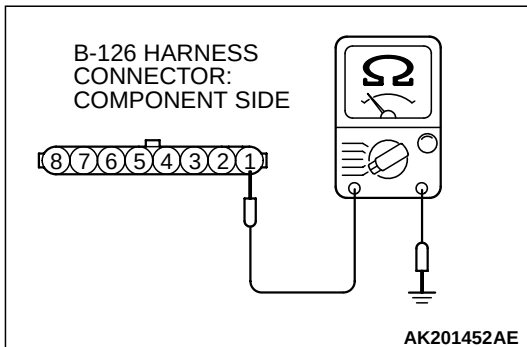
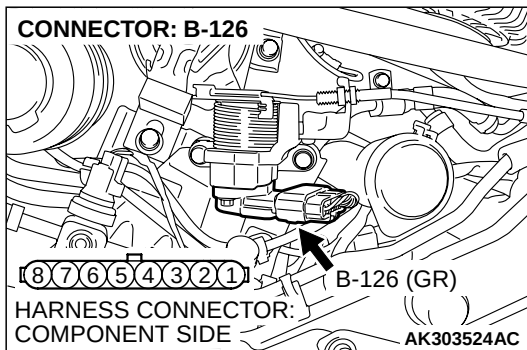
- (3) Measure resistance between terminal No. 2 and No. 3 and between terminal No. 6 and No. 8 when the accelerator pedal is gently depressed from idle position to the full open position.

- Resistance value changes in accordance with the accelerator pedal depression smoothly.

Q: Is the resistance normal?

YES : Go to Step 4.

NO : Replace the accelerator pedal position sensor. Then go to Step 8.



STEP 4. Check the continuity at accelerator pedal position sensor harness side connector B-126.

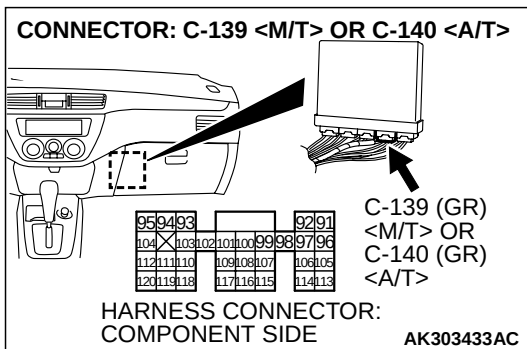
(1) Disconnect the connector B-126 and measure at the harness side.

(2) Measure the continuity between terminal No. 1 and ground.
• Should be less than 2 ohms.

Q: Does continuity exist?

YES : Go to Step 7.

NO : Go to Step 5.



STEP 5. Check harness connector C-139 at ECM <M/T> or C-140 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 6.

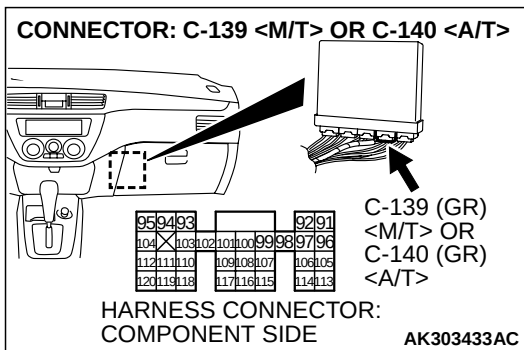
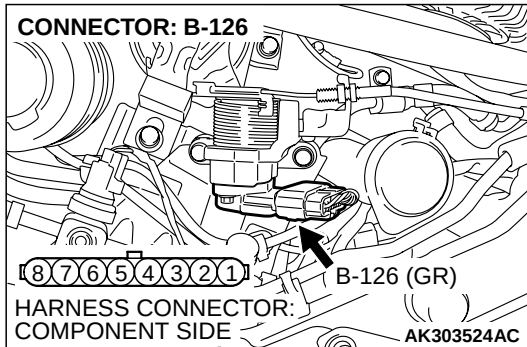
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 8.

STEP 6. Check for open circuit and harness damage between accelerator pedal position sensor connector B-126 (terminal No. 1) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 91).

Q: Is the harness wire in good condition?

YES : Go to Step 7.

NO : Repair it. Then go to Step 8.



STEP 7. Using scan tool MB991958, check data list item 78: 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.

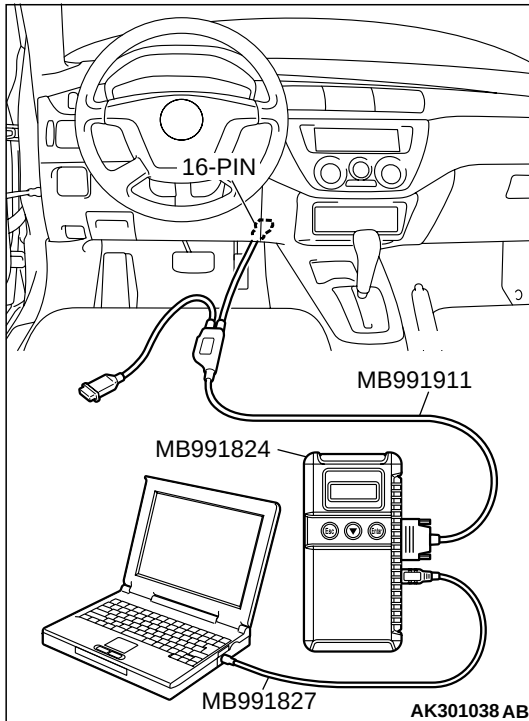
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 78, Accelerator Pedal Position Sensor (main).
 - Output voltage is between 0.335 and 0.935 volts when foot is released from 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 [P.00-6](#).

NO : Replace the ECM or PCM. Then go to Step 8.



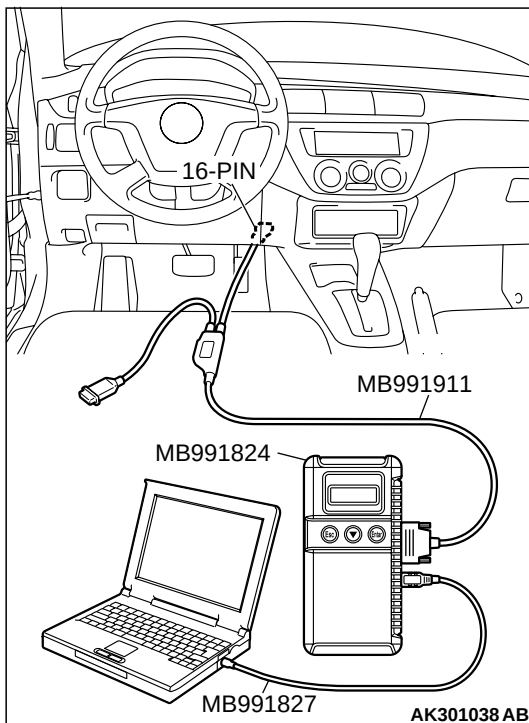
STEP 8. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is DTC P2123 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.



DTC P2126: Accelerator Pedal Position Sensor (sub) Circuit Range/Performance Problem

**ACCELERATOR PEDAL POSITION SENSOR
(SUB) CIRCUIT RANGE/PERFORMANCE
PROBLEM CIRCUIT**

- Refer to, DTC P2127 – Accelerator Pedal Position Sensor (Sub) Circuit [P.13B-686](#).
- Refer to INSPECTION PROCEDURE 35 – Accelerator Pedal Position Switch Circuit [P.13B-857](#).

CIRCUIT OPERATION

- Refer to, DTC P2127 – Accelerator Pedal Position Sensor (sub) Circuit [P.13B-686](#).
- Refer to INSPECTION PROCEDURE 35 – Accelerator Pedal Position Switch Circuit [P.13B-857](#).

TECHNICAL DESCRIPTION

- ECM <M/T> or PCM <A/T> checks the accelerator pedal position sensor (sub) output signal characteristics for abnormal conditions.

DESCRIPTIONS OF MONITOR METHODS

- Accelerator pedal position sensor (sub) output voltage is greater than that the specified value when the accelerator pedal position switch is on.

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)

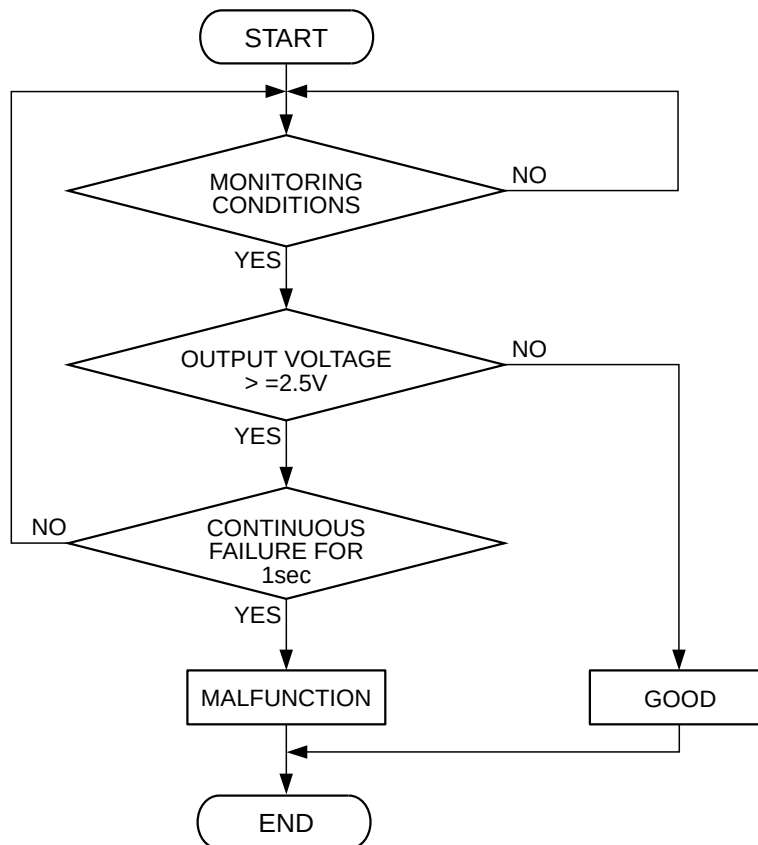
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK302046

Check Condition

- Ignition switch is "ON" position.
- Accelerator pedal position switch: ON
- Accelerator pedal position sensor (main) failure detected.

Judgement Criteria

- Accelerator pedal position sensor (sub) output voltage is 2.5 volts or higher for 1 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 or maladjusted.
- Open or shorted accelerator pedal position sensor (sub) circuit, or loose connector.
- Accelerator pedal position switch failed or maladjusted.
- Open or shorted accelerator pedal position switch circuit, or loose connector.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

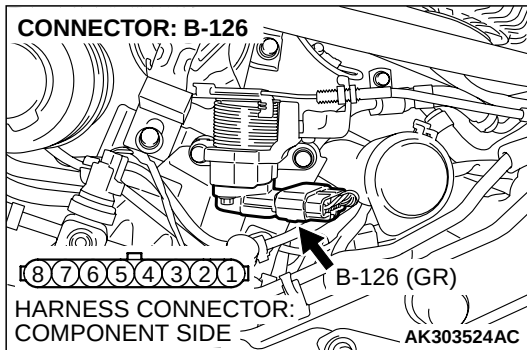
- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991911: Main Harness B

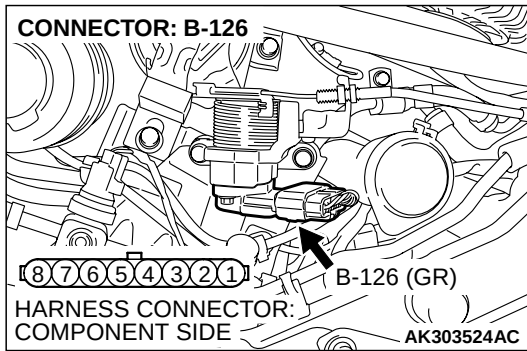
STEP 1. Check harness connector B-126 at accelerator pedal position sensor and accelerator pedal position switch for damage.

Q: Is the harness connector in good condition?

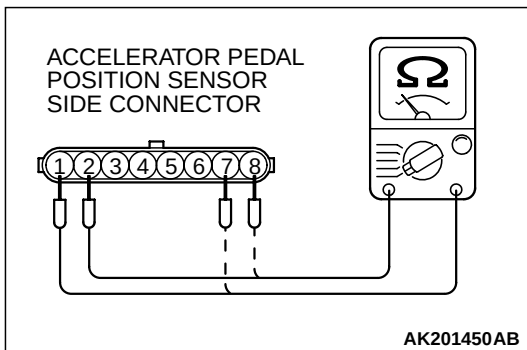
YES : Go to Step 2.

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



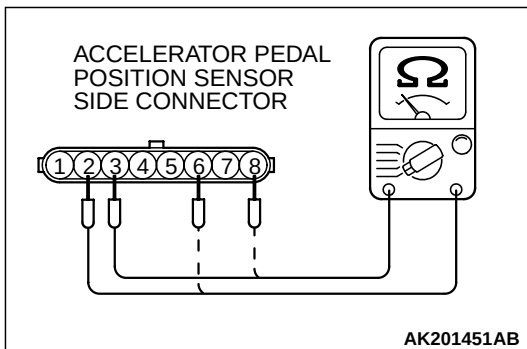
**STEP 2. Check the accelerator pedal position sensor.**

- (1) Disconnect the accelerator pedal position sensor connector B-126.



- (2) Measure resistance between terminal No. 1 and No. 2 and between terminal No. 7 and No. 8.

Standard value: 3.5 – 6.5 k Ω



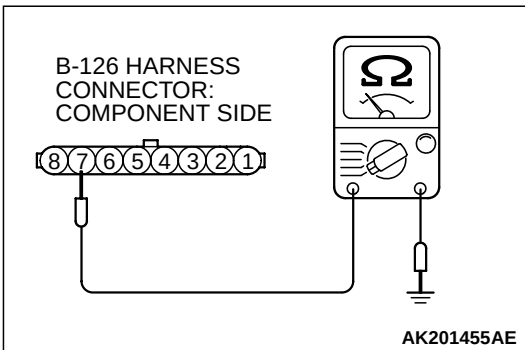
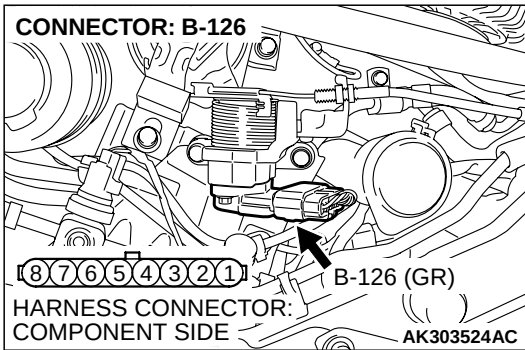
- (3) Measure resistance between terminal No. 2 and No. 3 and between terminal No. 6 and No. 8 when the accelerator pedal is gently depressed from idle position to the full open position.

- Resistance value changes in accordance with the accelerator pedal depression smoothly.

Q: Is the resistance normal?

YES : YES: Go to Step 3.

NO : Replace the accelerator pedal position sensor.
Then go to Step 11.



STEP 3. Check the continuity at accelerator pedal position sensor harness side connector B-126.

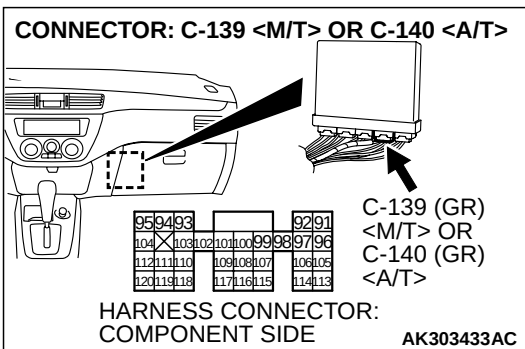
(1) Disconnect the connector B-126 and measure at the harness side.

(2) Measure the continuity between terminal No. 7 and ground.
• Should be less than 2 ohms.

Q: Does continuity exist?

YES : Go to Step 7.

NO : Go to Step 4.

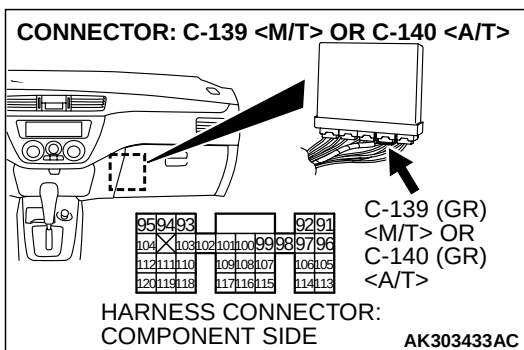
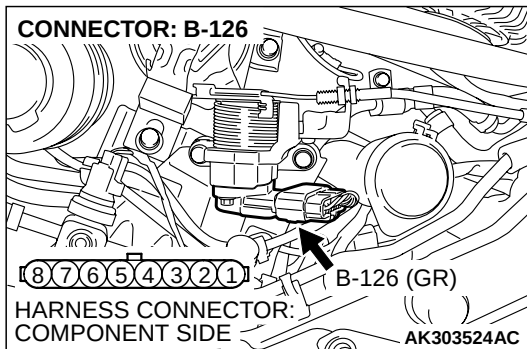


STEP 4. Check harness connector C-139 at ECM <M/T> or C-140 at PCM <A/T> for damage.

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.

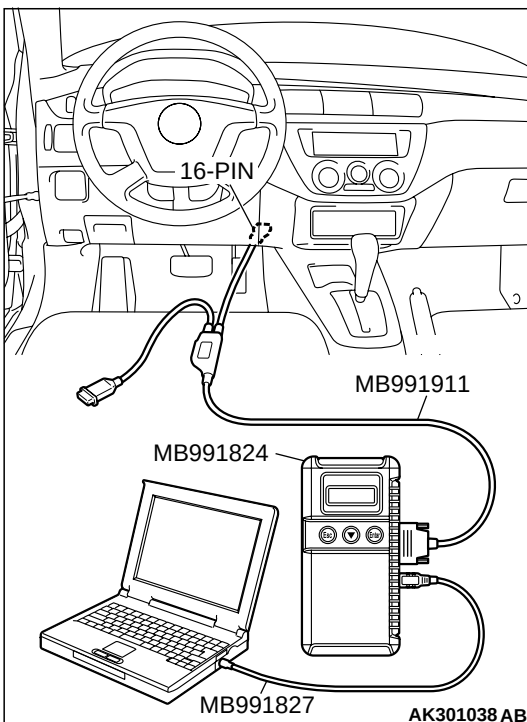


STEP 5. Check for harness damage between accelerator pedal position sensor connector B-126 (terminal No. 7) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 96).

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, read the diagnostic trouble code (DTC).

⚠ CAUTION

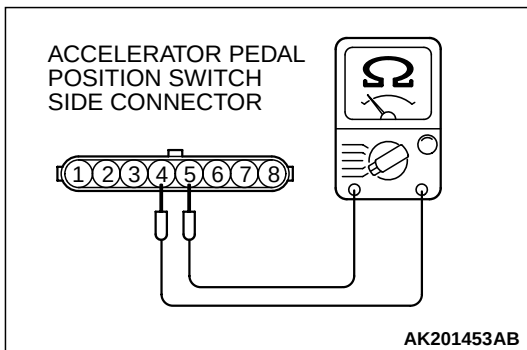
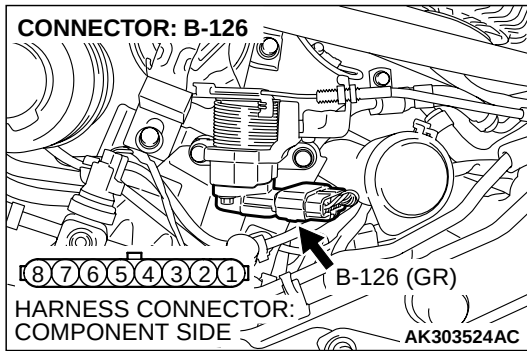
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 P2126 set?

YES : Replace the ECM or PCM. 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 [P.00-6](#).



STEP 7. Check the accelerator pedal position switch.

(1) Disconnect the accelerator pedal position switch connector B-126.

(2) Check the continuity between accelerator pedal position switch side connector terminal No. 4 and No. 5.

Standard value:

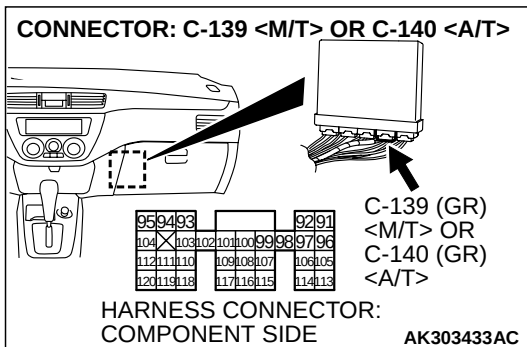
Continuity (foot released from accelerator pedal)

Non-continuity (accelerator pedal depressed)

Q: Is the switch operating properly?

YES : Go to Step 8.

NO : Replace the accelerator pedal position sensor. Then go to Step 11.

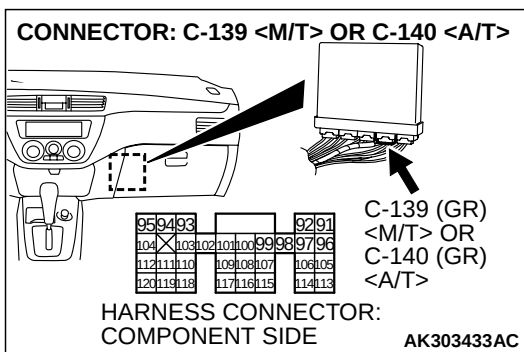
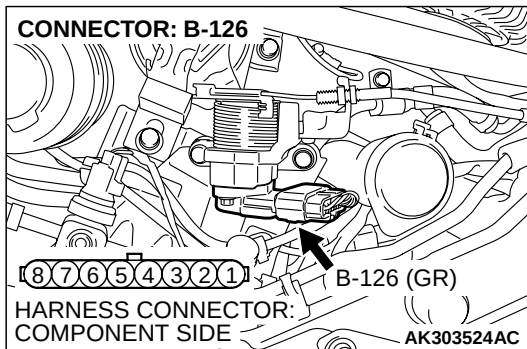


STEP 8. Check harness connector C-139 at ECM <M/T> or C-140 at PCM <A/T> for damage.

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.

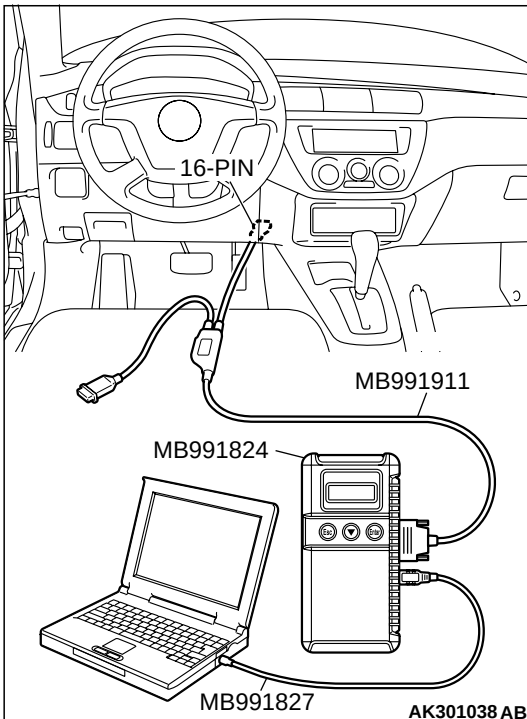


STEP 9. Check for short circuit to ground between accelerator pedal position switch connector B-126 (terminal No. 4) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 38).

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

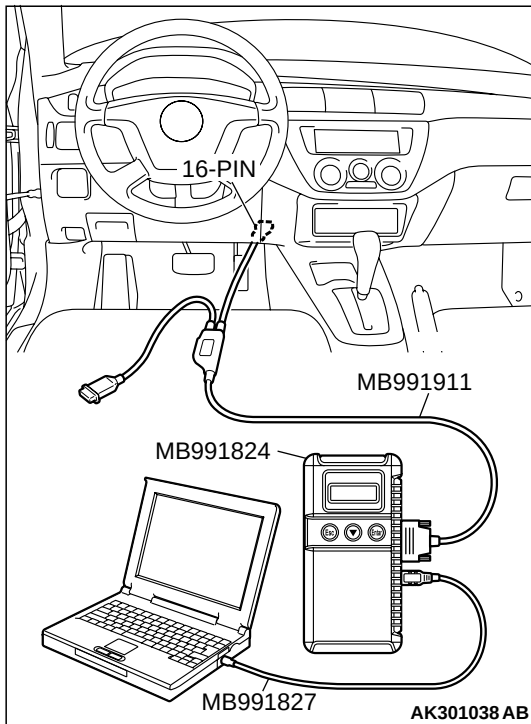
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 P2126 set?

YES : Replace the ECM or PCM. 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 [P.00-6](#).



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

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

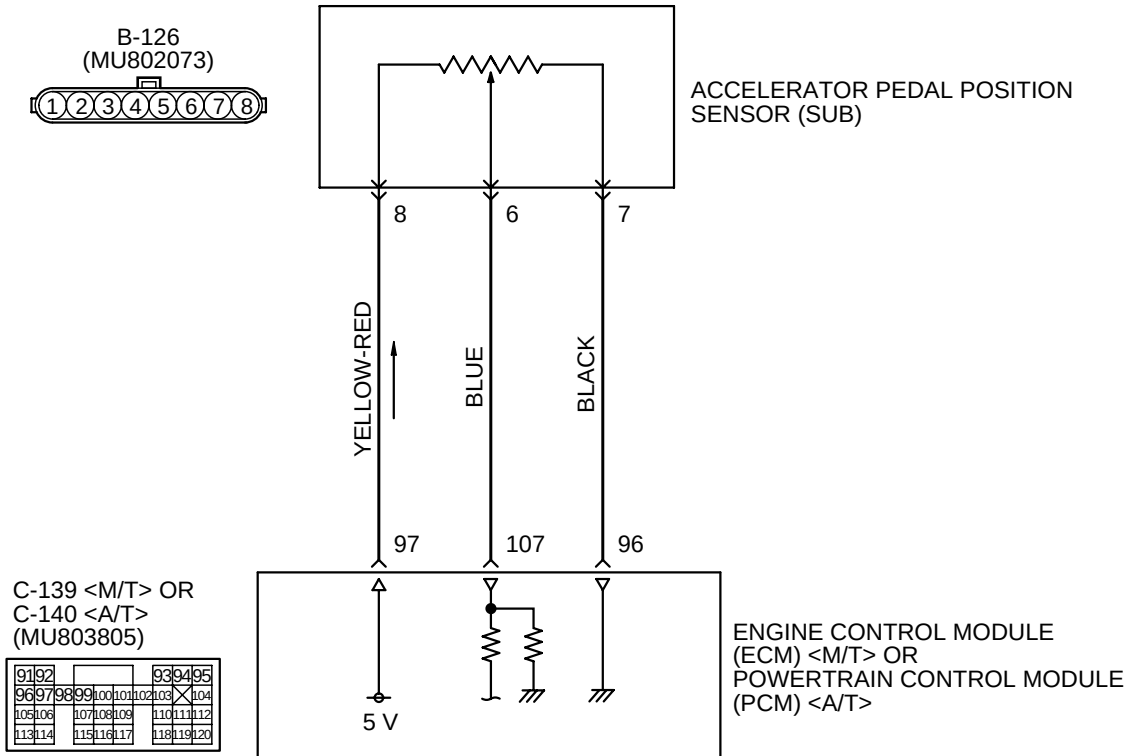
Q: Is DTC P2126 set?

YES : Retry the troubleshooting.

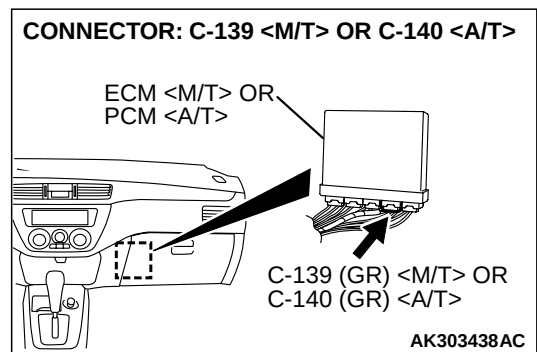
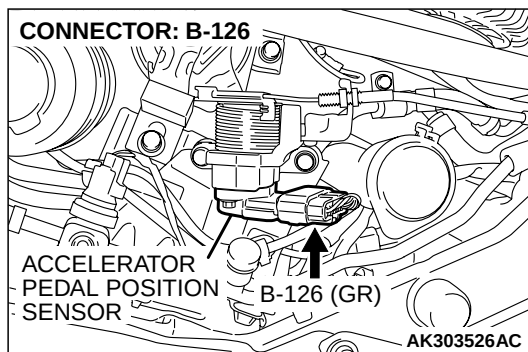
NO : The inspection is complete.

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

Accelerator Pedal Position Sensor (sub) Circuit



AK304006



CIRCUIT OPERATION

- A 5-volt power supply is applied on the accelerator pedal position sensor (sub) power terminal (terminal No. 8) from the ECM <M/T> or PCM <A/T> (terminal No. 97). The ground terminal (terminal No. 7) is grounded with ECM <M/T> or PCM <A/T> (terminal No. 96).

- When the accelerator pedal is moved from the idle position to the fully opened position, the resistance between the accelerator pedal position sensor (sub) output terminal (terminal No. 6) and ground terminal will increase according to the rotation.

TECHNICAL DESCRIPTION

- The accelerator pedal position sensor (sub) outputs voltage which corresponds to the accelerator pedal depression.
- The ECM <M/T> or PCM <A/T> 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)

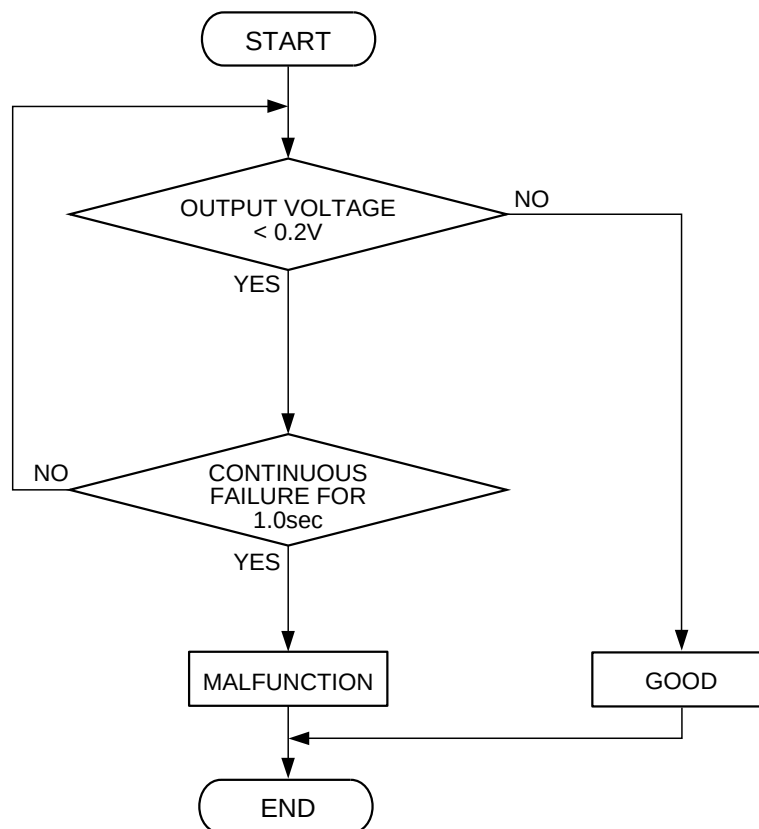
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK302044

Check Conditions

- Ignition switch is "ON" position.

Judgement Criteria

- Accelerator pedal position sensor (sub) output voltage is 0.2 volts or less for 1 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 or maladjusted.
- Open or shorted accelerator pedal position sensor (sub) circuit, or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS**Required Special Tools:**

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

STEP 1. Using scan tool MB991958, check data list item 77: Accelerator Pedal Position Sensor (sub).**⚠ CAUTION**

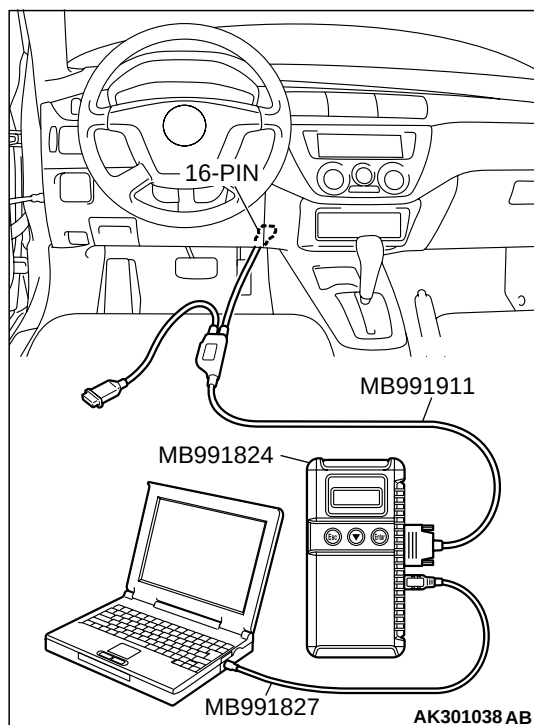
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 77, Accelerator Pedal Position Sensor (sub).
 - Output voltage is between 0.335 and 0.935 volts when foot is released from accelerator pedal.
 - Output voltage is 3.7 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?

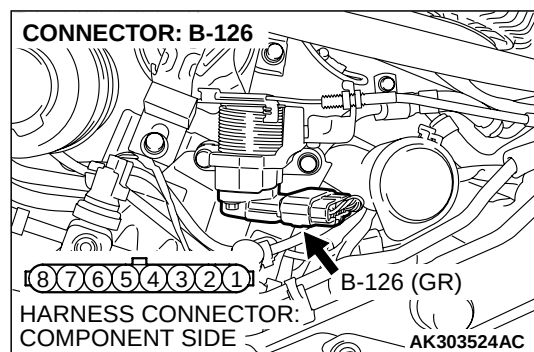
YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points [P.00-6](#).

NO : Go to Step 2.

**STEP 2. Check harness connector B-126 at accelerator pedal position sensor for damage.****Q: Is the harness connector in good condition?**

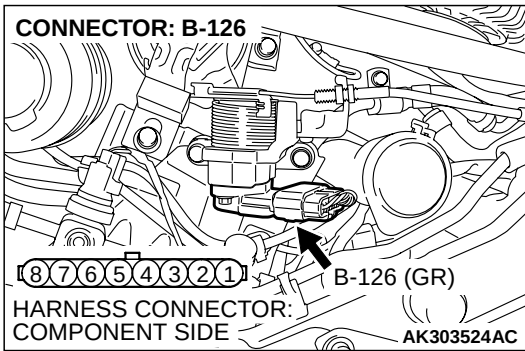
YES : Go to Step 3.

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



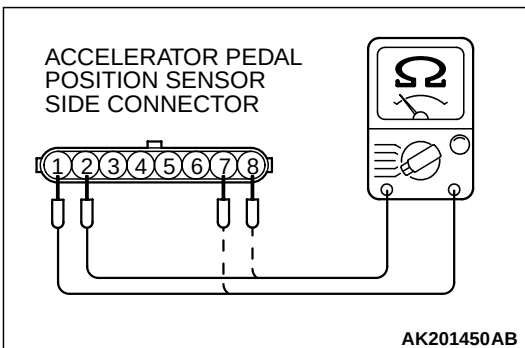
STEP 3. Check the accelerator pedal position sensor.

- (1) Disconnect the accelerator pedal position sensor connector B-126.



- (2) Measure resistance between terminal No. 1 and No. 2 and between terminal No. 7 and No. 8.

Standard value: 3.5 – 6.5 k Ω



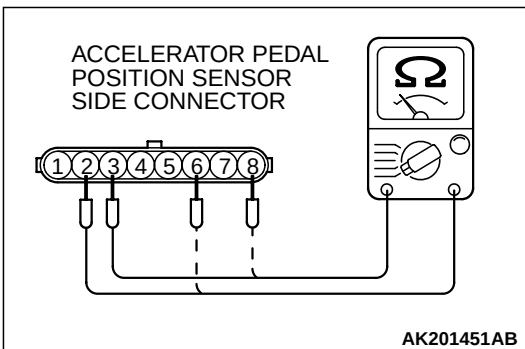
- (3) Measure resistance between terminal No. 2 and No. 3 and between terminal No. 6 and No. 8 when the accelerator pedal is gently depressed from idle position to the full open position.

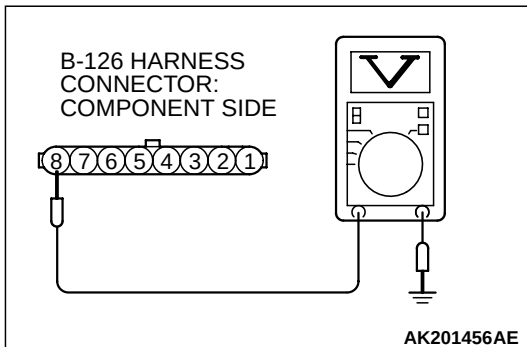
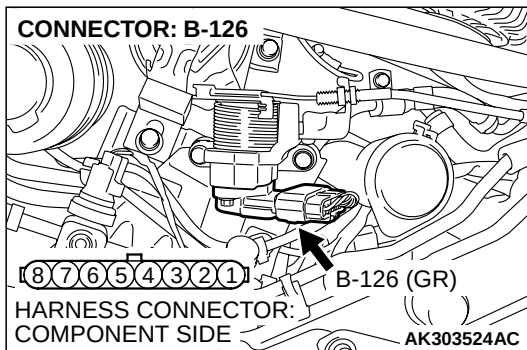
- Resistance value changes in accordance with the accelerator pedal depression smoothly.

Q: Is the resistance normal?

YES : Go to Step 4.

NO : Replace the accelerator pedal position sensor. Then go to Step 12.





STEP 4. Measure the sensor supply voltage at accelerator pedal position sensor harness side connector B-126.

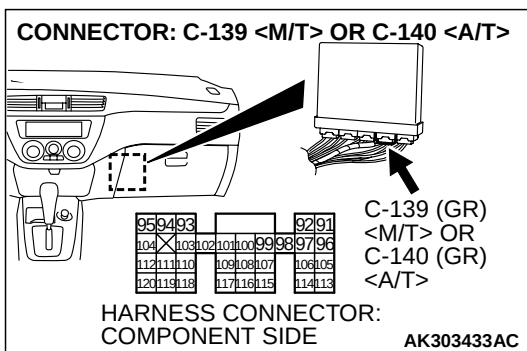
- (1) Disconnect the connector B-126 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

- (3) Measure the voltage between terminal No. 8 and ground.
 - Voltage should be between 4.8 and 5.2 volts.
- (4) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is the measured voltage between 4.8 and 5.2 volts?

YES : Go to Step 8.

NO : Go to Step 5.

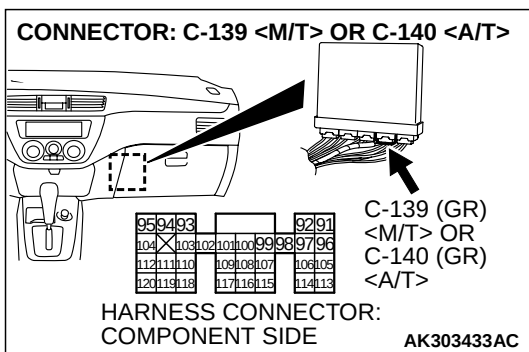
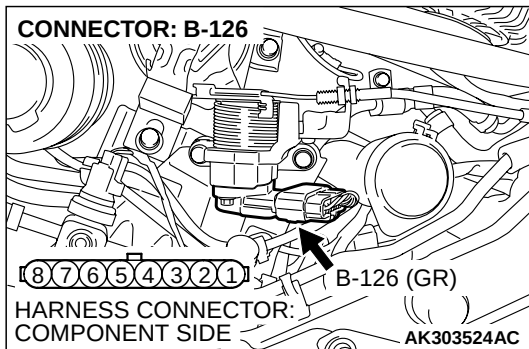


STEP 5. Check harness connector C-139 at ECM <M/T> or C-140 at PCM <A/T> for damage.

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 12.



STEP 6. Check for open circuit and short circuit to ground between accelerator pedal position sensor connector B-126 (terminal No. 8) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 97).

Q: Is the harness wire in good condition?

YES : Go to Step 7.

NO : Repair it. Then go to Step 12.

STEP 7. Using scan tool MB991958, check data list item 77: Accelerator Pedal Position Sensor (sub).

⚠ CAUTION

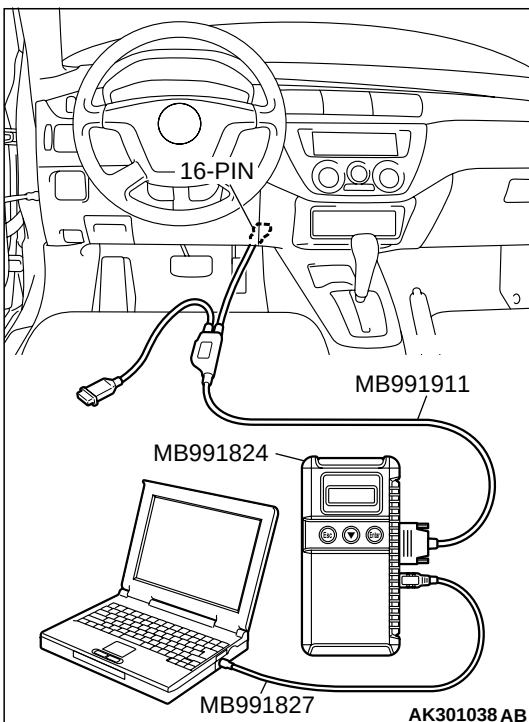
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

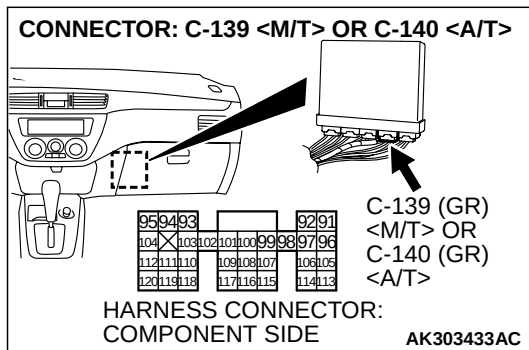
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 77, Accelerator Pedal Position Sensor (sub).
 - Output voltage is between 0.335 and 0.935 volts when foot is released from accelerator pedal.
 - Output voltage is 3.7 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 [P.00-6](#).

NO : Replace the ECM or PCM. Then go to Step 12.



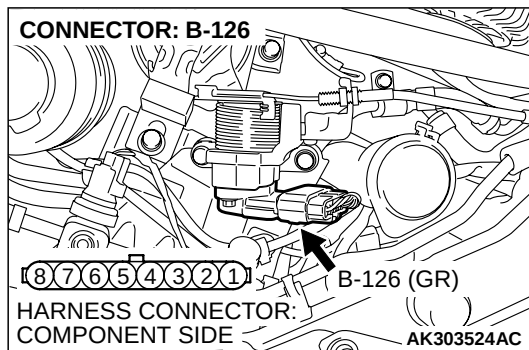


STEP 8. Check harness connector C-139 at ECM <M/T> or C-140 at PCM <A/T> for damage.

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 12.

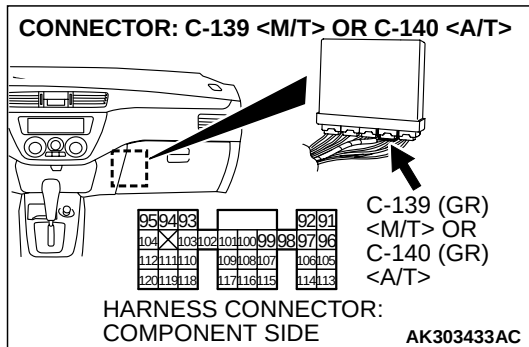


STEP 9. Check for harness damage between accelerator pedal position sensor connector B-126 (terminal No. 8) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 97).

Q: Is the harness wire in good condition?

YES : Go to Step 10.

NO : Repair it. Then go to Step 12.

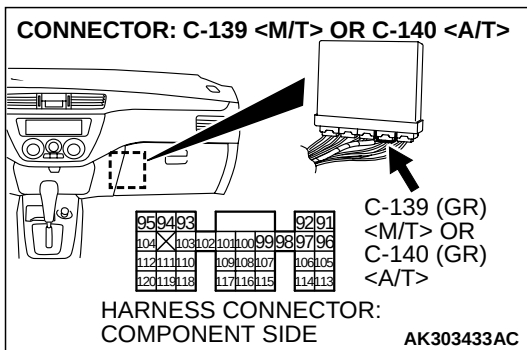
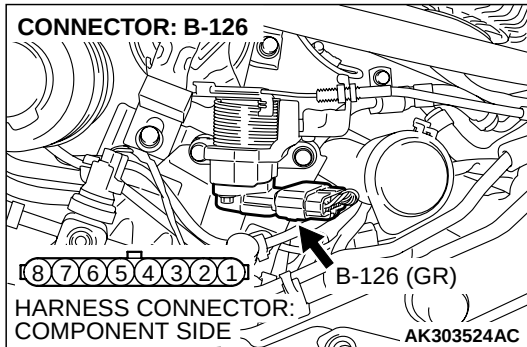


STEP 10. Check for harness damage between accelerator pedal position sensor connector B-126 (terminal No. 6) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 107).

Q: Is the harness wire in good condition?

YES : Go to Step 11.

NO : Repair it. Then go to Step 12.



STEP 11. Using scan tool MB991958, check data list item 77: Accelerator Pedal Position Sensor (sub).

⚠ CAUTION

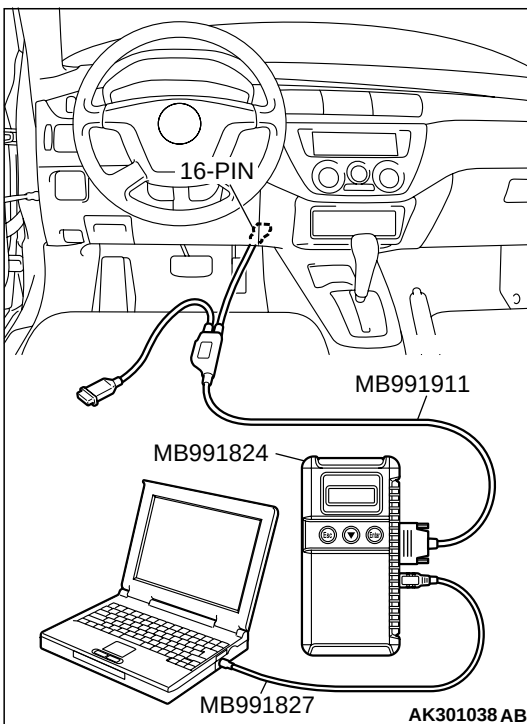
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

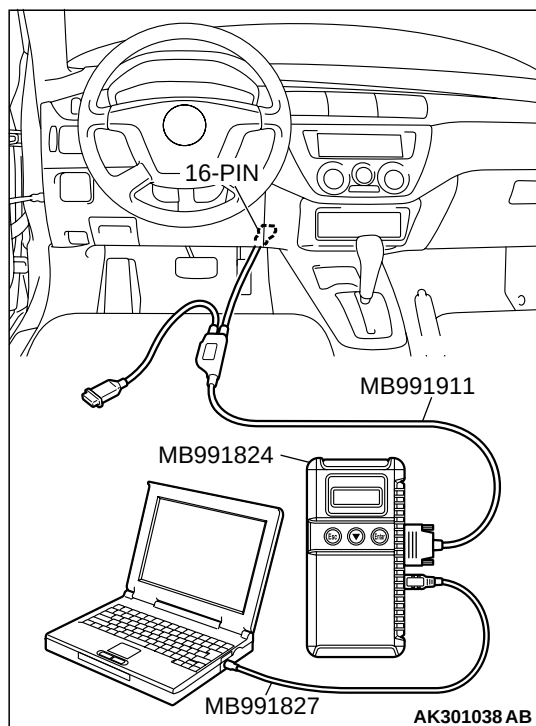
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 77, Accelerator Pedal Position Sensor (sub).
 - Output voltage is between 0.335 and 0.935 volts when foot is released from accelerator pedal.
 - Output voltage is 3.7 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 [P.00-6](#).

NO : Replace the ECM or PCM. Then go to Step 12.



**STEP 12. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

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

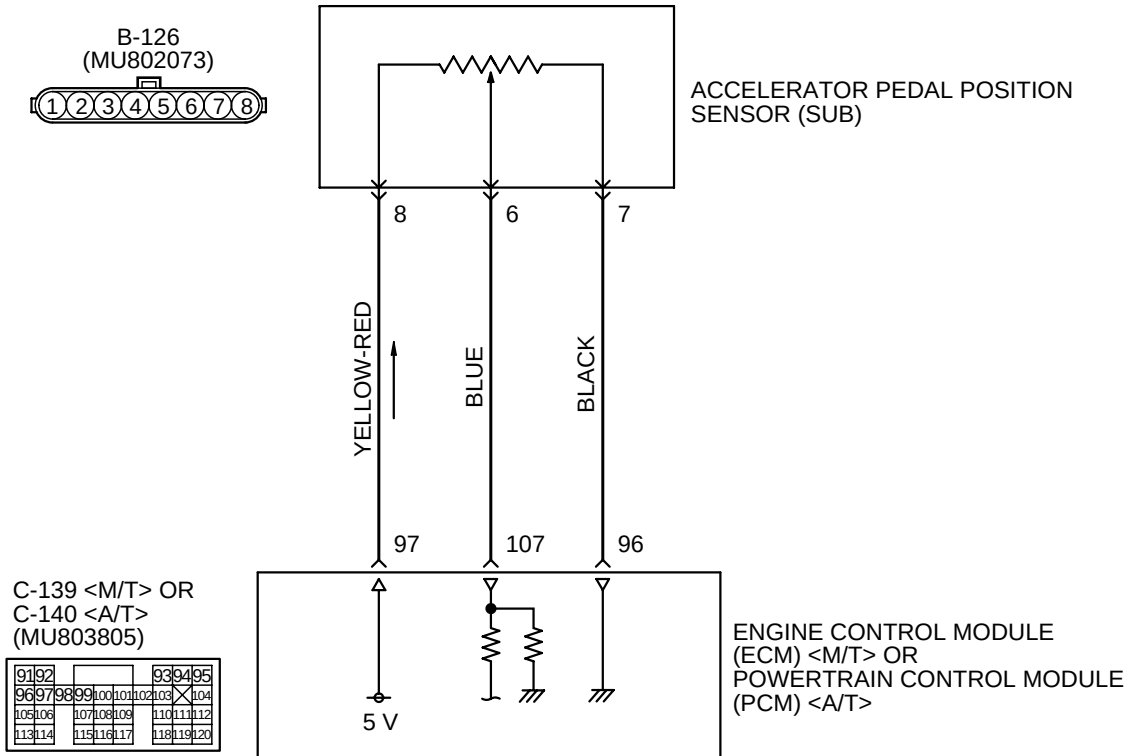
Q: Is DTC P2127 set?

YES : Retry the troubleshooting.

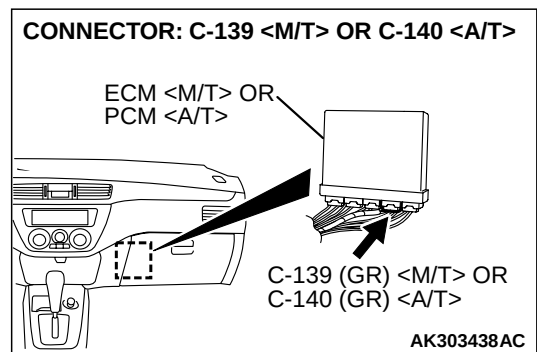
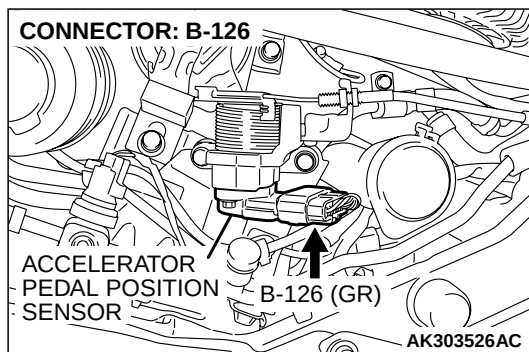
NO : The inspection is complete.

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

Accelerator Pedal Position Sensor (sub) Circuit



AK304006



CIRCUIT OPERATION

- A 5-volt power supply is applied on the accelerator pedal position sensor (sub) power terminal (terminal No. 8) from the ECM <M/T> or PCM <A/T> (terminal No. 97). The ground terminal (terminal No. 7) is grounded with ECM <M/T> or PCM <A/T> (terminal No. 96).

- When the accelerator pedal is moved from the idle position to the fully opened position, the resistance between the accelerator pedal position sensor (sub) output terminal (terminal No. 6) and ground terminal will increase according to the rotation.

TECHNICAL DESCRIPTION

- The accelerator pedal position sensor (sub) outputs voltage which corresponds to the accelerator pedal depression.
- The ECM <M/T> or PCM <A/T> 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

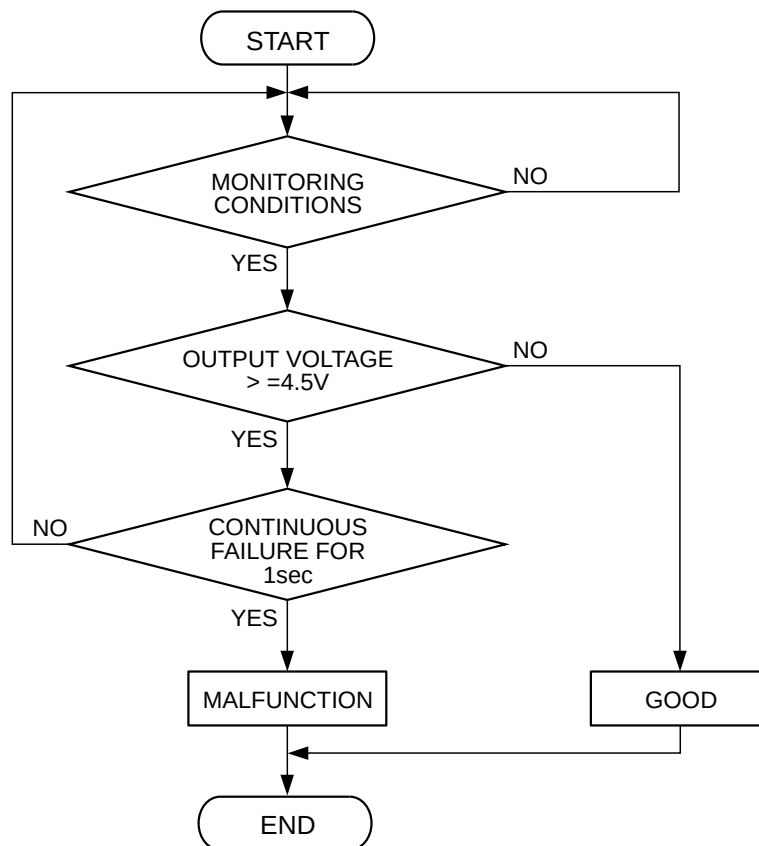
MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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**

AK302045

Check Conditions

- Ignition switch is "ON" position.
- Accelerator pedal position sensor (main) output voltage is between 0.2 and 2.5 volts.

Judgement Criteria

- Accelerator pedal position sensor (sub) output voltage is 4.5 volts or higher for 1 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 or maladjusted.

- Open or shorted accelerator pedal position sensor (sub) circuit, or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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

STEP 1. Using scan tool MB991958, check data list item 77: Accelerator Pedal Position Sensor (sub).

⚠ CAUTION

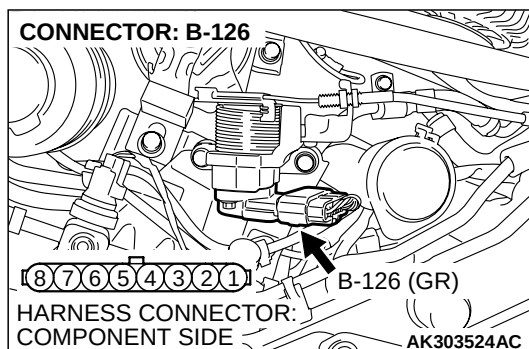
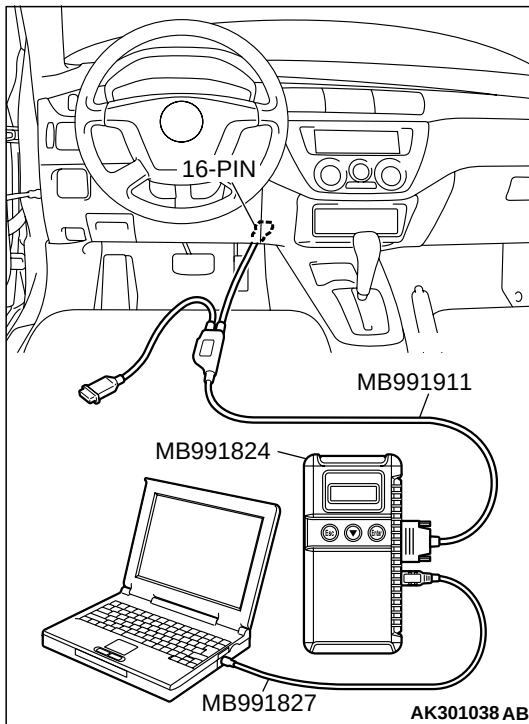
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 77, Accelerator Pedal Position Sensor (sub).
 - Output voltage is between 0.335 and 0.935 volts when foot is released from accelerator pedal.
 - Output voltage is 3.7 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 [P.00-6](#).

NO : Go to Step 2.

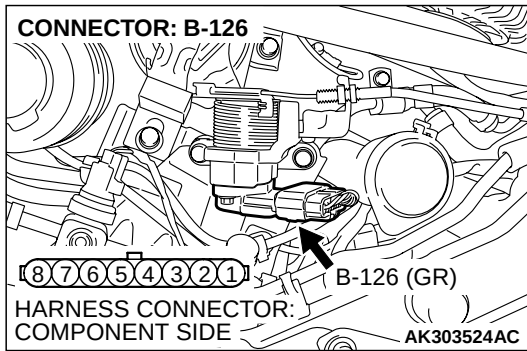


STEP 2. Check harness connector B-126 at accelerator pedal position sensor for damage.

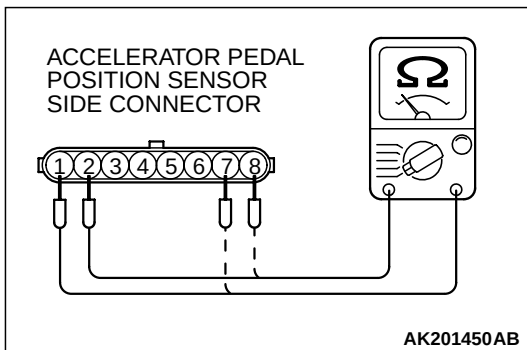
Q: Is the harness connector in good condition?

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.

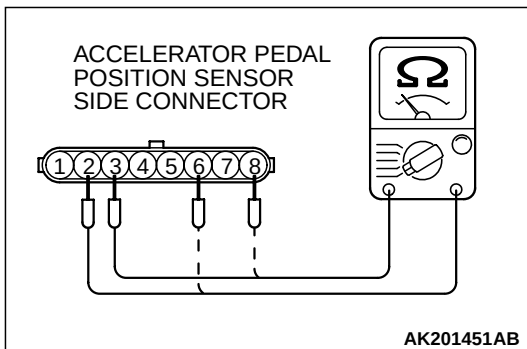
**STEP 3. Check the accelerator pedal position sensor.**

- (1) Disconnect the accelerator pedal position sensor connector B-126.



- (2) Measure resistance between terminal No. 1 and No. 2 and between terminal No. 7 and No. 8.

Standard value: 3.5 – 6.5 k Ω



- (3) Measure resistance between terminal No. 2 and No. 3 and between terminal No. 6 and No. 8 when the accelerator pedal is gently depressed from idle position to the full open position.

- Resistance value changes in accordance with the accelerator pedal depression smoothly.

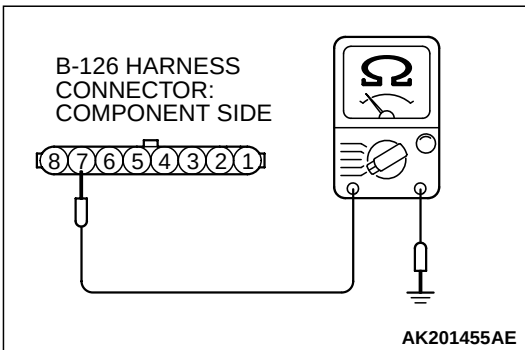
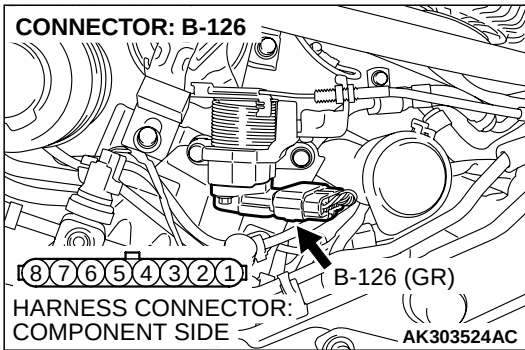
Q: Is the resistance normal?

YES : Go to Step 4.

NO : Replace the accelerator pedal position sensor. Then go to Step 8.

STEP 4. Check the continuity at accelerator pedal position sensor harness side connector B-126.

(1) Disconnect the connector B-126 and measure at the harness side.



(2) Measure the continuity between terminal No. 7 and ground.
• Should be less than 2 ohms.

Q: Does continuity exist?

YES : Go to Step 7.

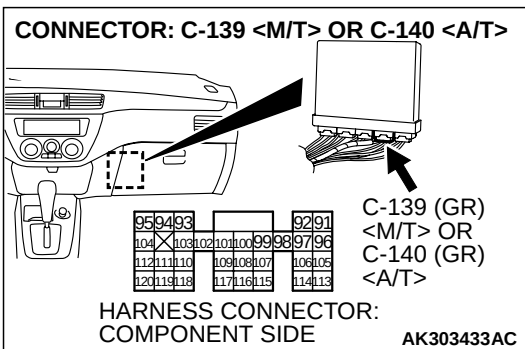
NO : Go to Step 5.

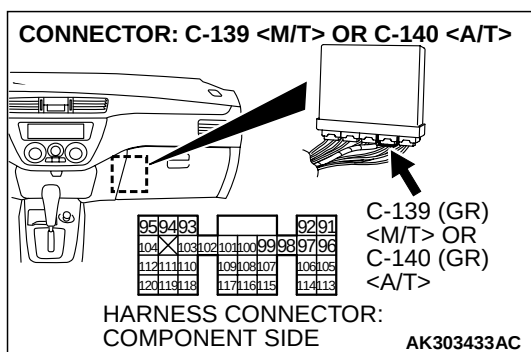
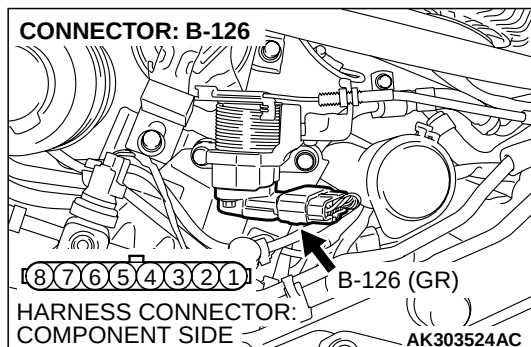
STEP 5. Check harness connector C-139 at ECM <M/T> or C-140 at PCM <A/T> for damage.

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 8.



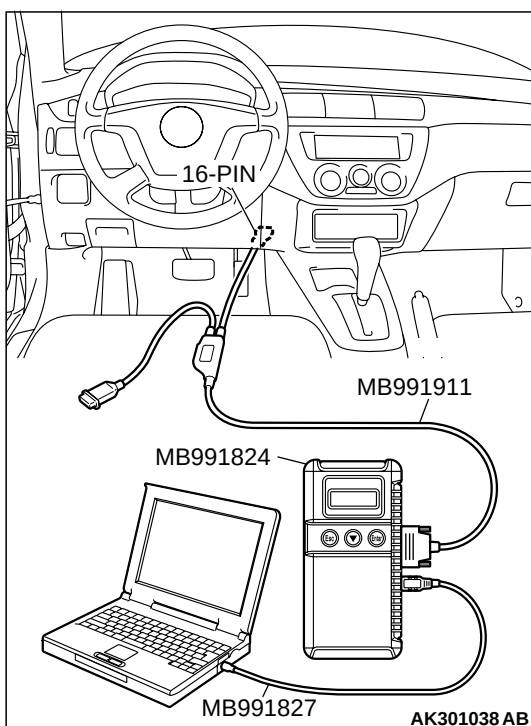


STEP 6. Check for open circuit and harness damage between accelerator pedal position sensor connector B-126 (terminal No. 7) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 96.)

Q: Is the harness wire in good condition?

YES : Go to Step 7.

NO : Repair it. Then go to Step 8.



STEP 7. Using scan tool MB991958, check data list item 77: Accelerator Pedal Position Sensor (sub).

⚠ CAUTION

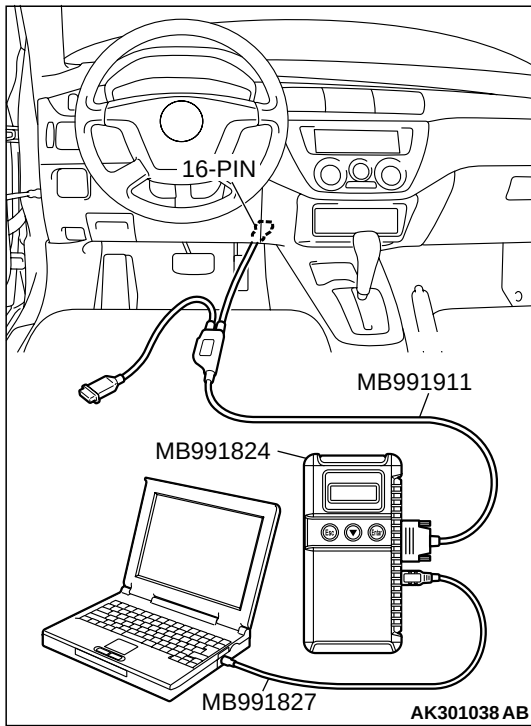
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 77, Accelerator Pedal Position Sensor (sub).
 - Output voltage is between 0.335 and 0.935 volts when foot is released from accelerator pedal.
 - Output voltage is 3.7 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 [P.00-6](#).

NO : Replace the ECM or PCM. Then go to Step 8.



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

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

Q: Is DTC 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 [P.13B-136](#).
- Refer to, DTC P0222 – Throttle Position Sensor (sub) Circuit [P.13B-299](#).

CIRCUIT OPERATION

- Refer to, DTC P0122 – Throttle Position Sensor (main) Circuit [P.13B-136](#).
- Refer to, DTC P0222 – Throttle Position Sensor (sub) Circuit [P.13B-299](#).

TECHNICAL DESCRIPTION

- ECM <M/T> or PCM <A/T> 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

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

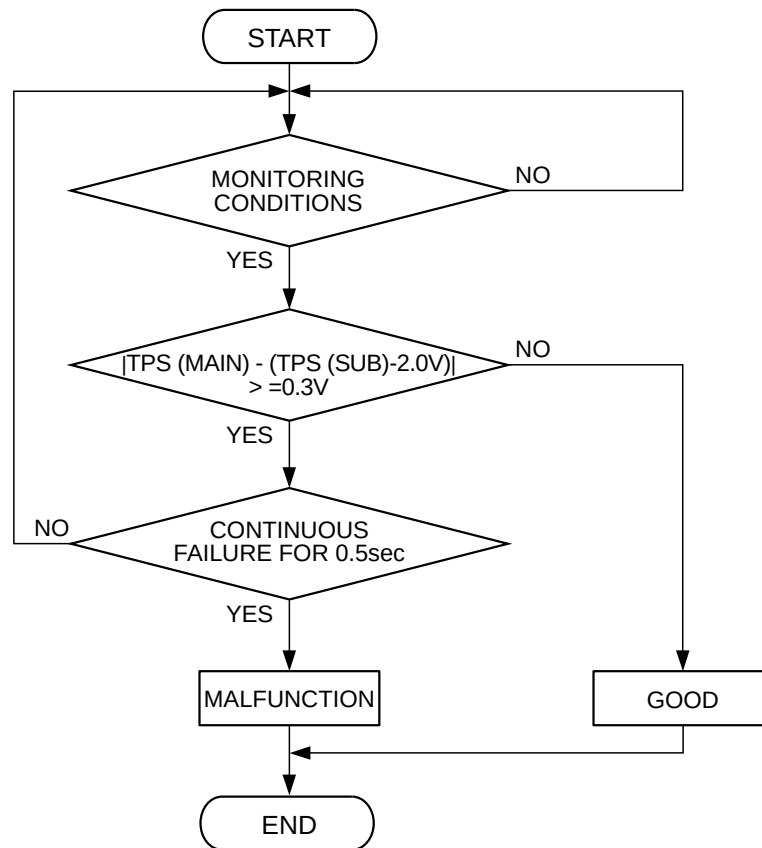
- Not applicable

Sensor (The sensor below is determined to be normal)

- Mass airflow sensor

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

Logic Flow Chart



AK302047

Check Conditions

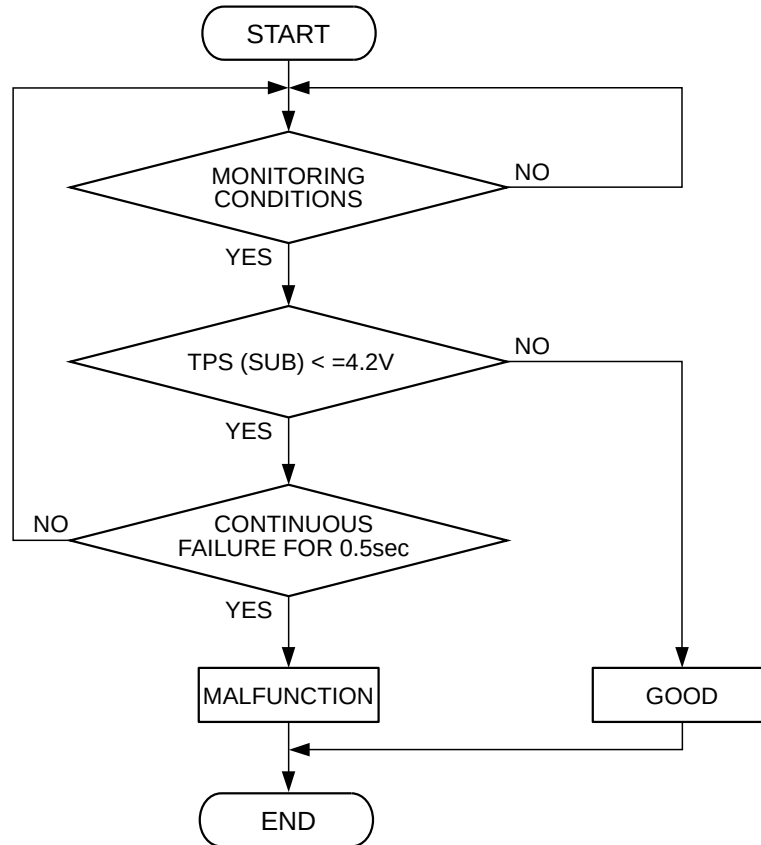
- Ignition switch is "ON" position.
- Throttle position sensor (main) output voltage is between 0.35 and 2.5 volts.
- Throttle position sensor (sub) output voltage is between 2.25 and 4.8 volts.

Judgement Criteria

- Voltage obtained with the formula given below is 0.3 volt or higher for 0.5 second: throttle position sensor (main) output voltage – [throttle position sensor (sub) output voltage] – 2 volts

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

Logic Flow Chart



AK302048

Check Conditions

- Ignition switch is "ON" position.
- Throttle position sensor (main) output voltage is between 2.5 and 4.8 volts.
- Throttle position sensor (sub) output voltage is higher than 2.25 volts.

Judgement Criteria

- Throttle position sensor (sub) output voltage is 4.2 volts or lower.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Procedure 6 – Other Monitor [P.13B-6](#).

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

- Throttle position sensor failed.
- Shorted throttle position sensor circuit, or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS**Required Special Tools:**

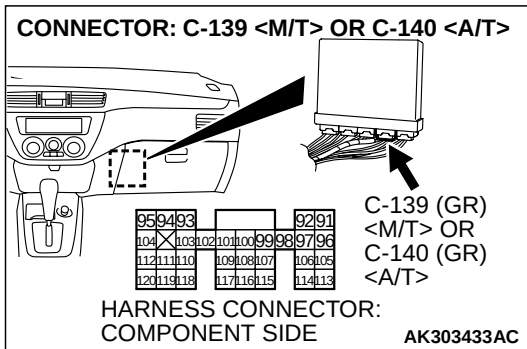
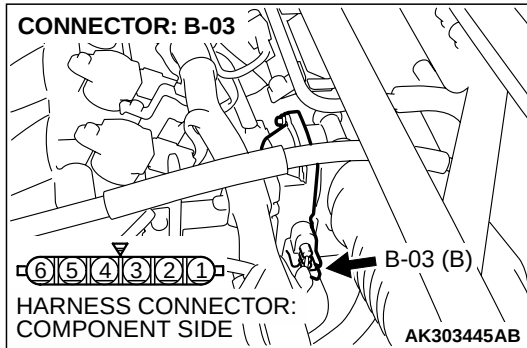
- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991911: Main Harness B

STEP 1. Check harness connector B-03 at throttle position sensor and harness connector C-139 at ECM <M/T> or C-140 at PCM <A/T> 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 5.

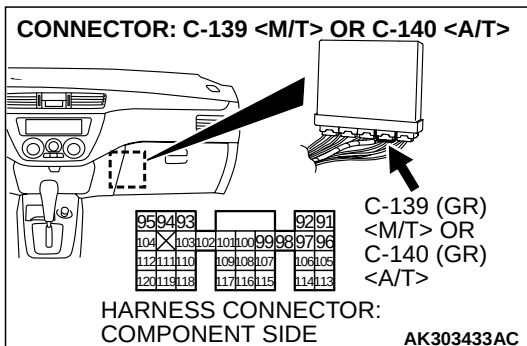
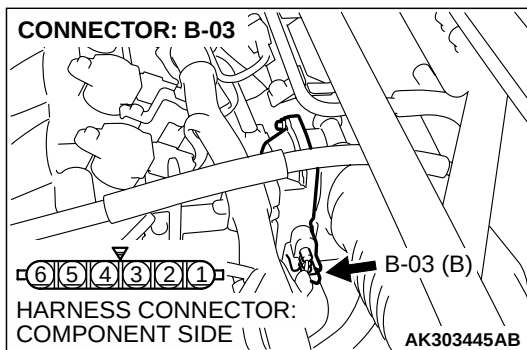


STEP 2. Check for short circuit to ground between throttle position sensor connector B-03 (terminal No. 4) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 115).

Q: Is the harness wire in good condition?

YES : Go to Step 3.

NO : Repair it. Then go to Step 5.

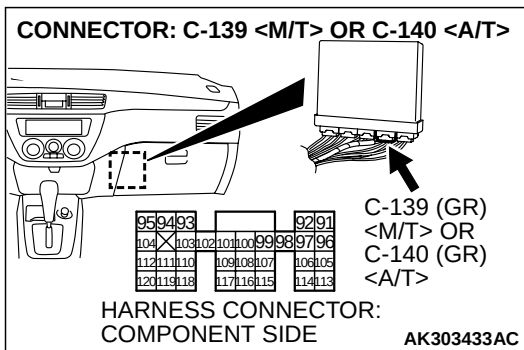
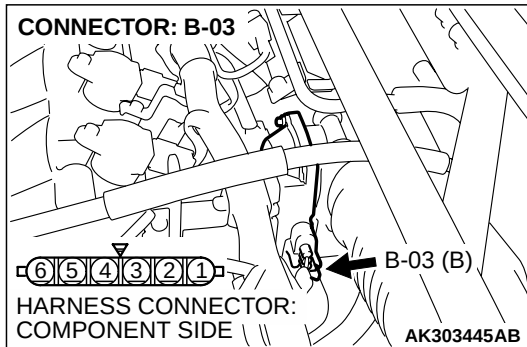


STEP 3. Check for short circuit to ground between throttle position sensor connector B-03 (terminal No. 6) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 113).

Q: Is the harness wire in good condition?

YES : Go to Step 4.

NO : Repair it. Then go to Step 5.



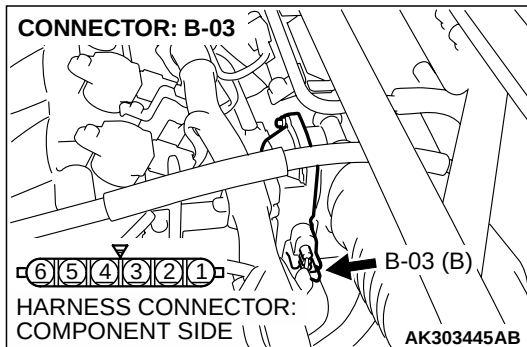
STEP 4. Replace the throttle body assembly.

- (1) Replace the throttle body assembly.
- (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 P2135 set?

YES : Replace the ECM or PCM. Then go to Step 5.

NO : The procedure is complete.



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

⚠ CAUTION

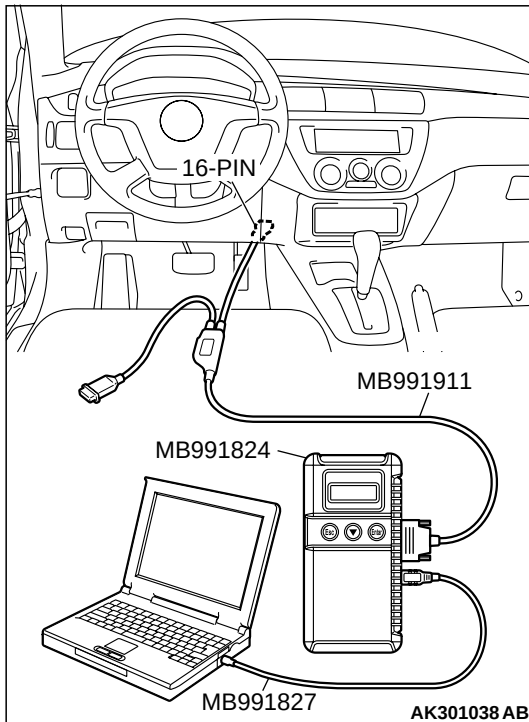
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 P2135 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.



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

ACCELERATOR PEDAL POSITION SENSOR (MAIN AND SUB) RANGE/PERFORMANCE PROBLEM CIRCUIT

- Refer to, DTC P2122 – Accelerator Pedal Position Sensor (main) Circuit [P.13B-661](#).
- Refer to, DTC P2127 – Accelerator Pedal Position Sensor (sub) Circuit [P.13B-686](#).

CIRCUIT OPERATION

- Refer to, DTC P2122 – Accelerator Pedal Position Sensor (main) Circuit [P.13B-661](#).
- Refer to, DTC P2127 – Accelerator Pedal Position Sensor (sub) Circuit [P.13B-686](#).

TECHNICAL DESCRIPTION

- ECM <M/T> or PCM <A/T> 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)

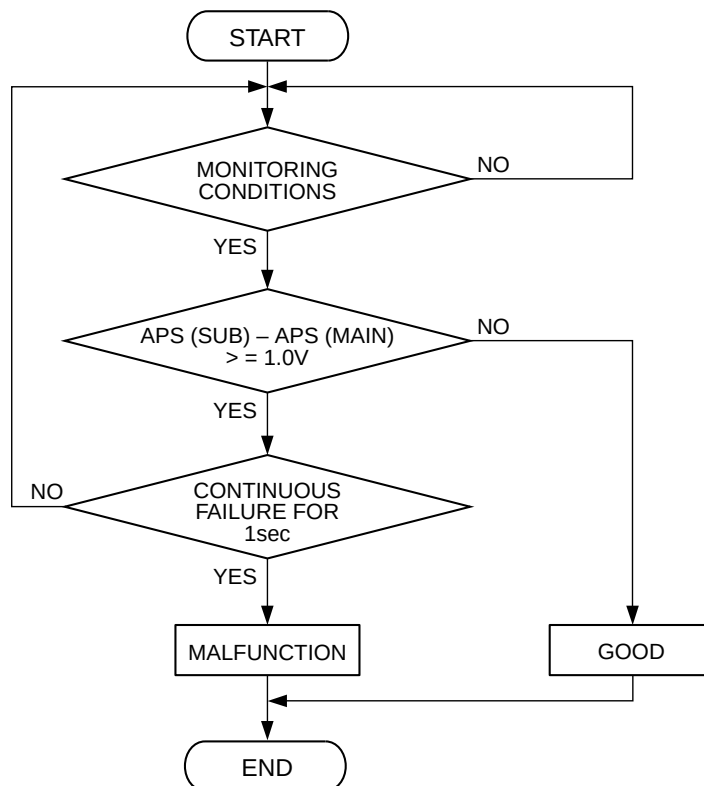
- Not applicable

Sensor (The sensor below is determined to be normal)

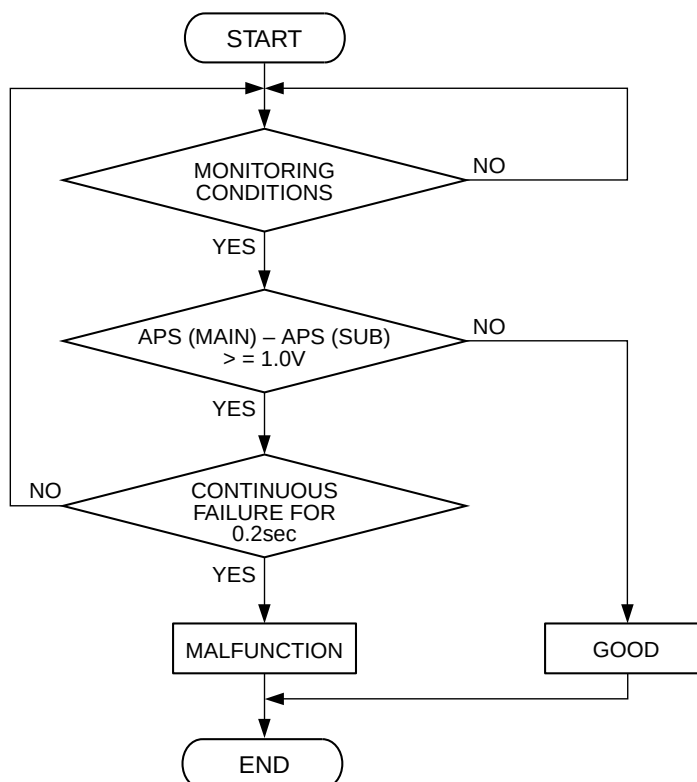
- Not applicable

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

Logic Flow Chart



AK302049



AK302050

Check Condition

- Ignition switch is "ON" position.
- Accelerator pedal position sensor (main) output voltage is between 0.2 and 4.5 volts.
- Accelerator pedal position sensor (sub) output voltage is between 0.2 and 4.5 volts.
- Change of accelerator pedal position sensor (sub) output voltage per 25 milliseconds is lower than 0.1 volt.

Judgement Criteria

- Accelerator pedal position sensor (sub) output voltage minus accelerator pedal position sensor (main) output voltage should be 1 volt or higher for 1 second.

- Accelerator pedal position sensor (main) output voltage minus accelerator pedal position sensor (sub) output voltage should be 1 volt or higher for 0.2 seconds.

OBD-II DRIVE CYCLE PATTERN

None.

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

- Accelerator pedal position sensor failed or maladjusted.
- Open or shorted accelerator pedal position sensor circuit, or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

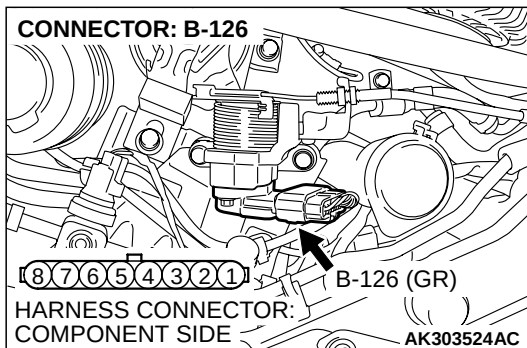
- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991911: Main Harness B

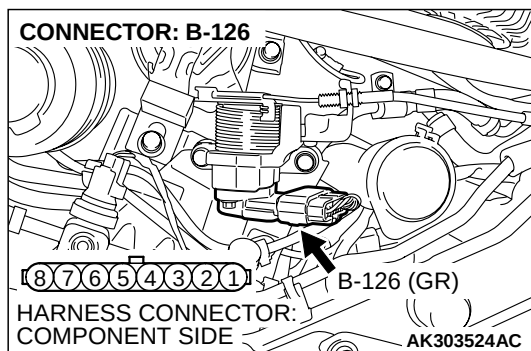
STEP 1. Check harness connector B-126 at accelerator pedal position sensor for damage.

Q: Is the harness connector in good condition?

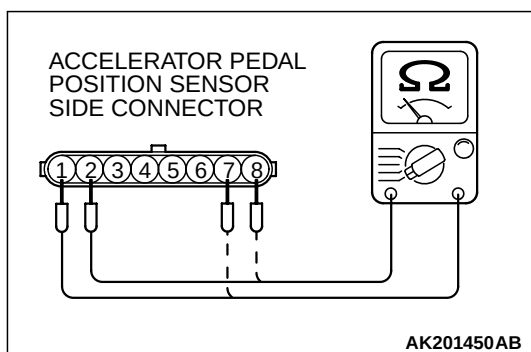
YES : Go to Step 2.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 17.



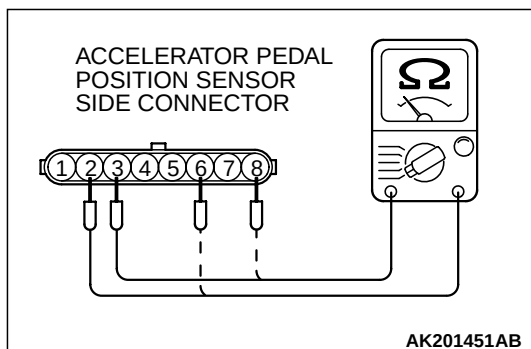
**STEP 2. Check the accelerator pedal position sensor.**

- (1) Disconnect the accelerator pedal position sensor connector B-126.



- (2) Measure resistance between terminal No.1 and No. 2 and between terminal No. 7 and No. 8.

Standard value: 3.5 – 6.5 k Ω



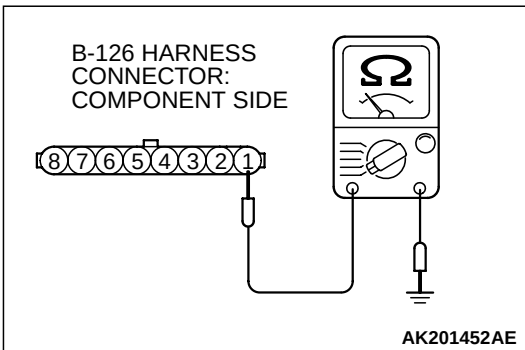
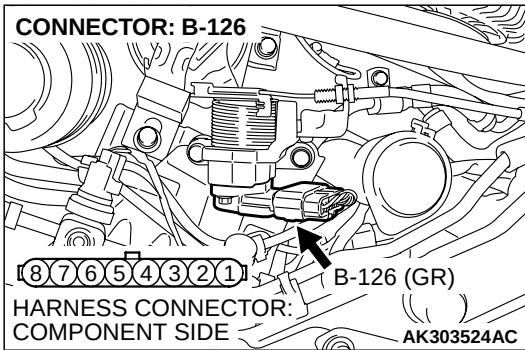
- (3) Measure resistance between terminal No. 2 and No. 3 and between terminal No. 6 and No. 8 when the accelerator pedal is gently depressed from idle position to the full open position.

- Resistance value changes in accordance with the accelerator pedal depression smoothly.

Q: Is the resistance normal?

YES : Go to Step 3.

NO : Replace the accelerator pedal position sensor. Then go to Step 17.



STEP 3. Check the continuity at accelerator pedal position sensor harness side connector B-126.

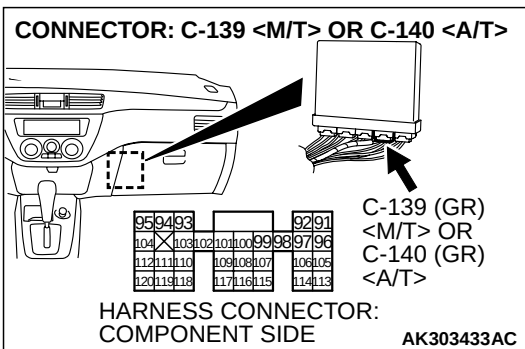
(1) Disconnect the connector B-126 and measure at the harness side.

(2) Measure the continuity between terminal No. 1 and ground.
• Should be less than 2 ohms.

Q: Does continuity exist?

YES : Go to Step 7.

NO : Go to Step 4.

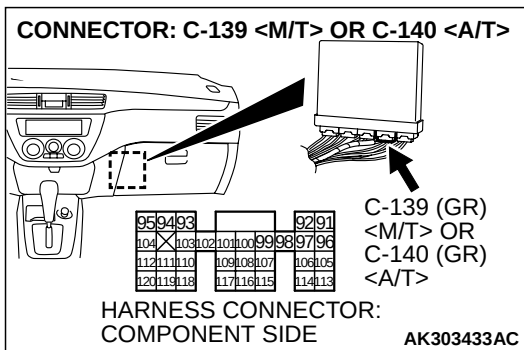
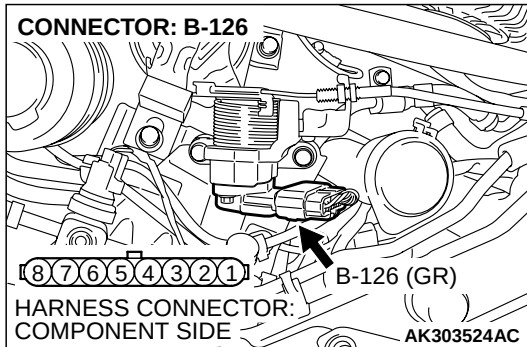


STEP 4. Check harness connector C-139 at ECM <M/T> or C-140 <A/T> at PCM for damage.

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 17.



STEP 5. Check for harness damage between accelerator pedal position sensor connector B-126 (terminal No. 1) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 91).

Q: Is the harness wire in good condition?

YES : Go to Step 6.

NO : Repair it. Then go to Step 17.

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

⚠ CAUTION

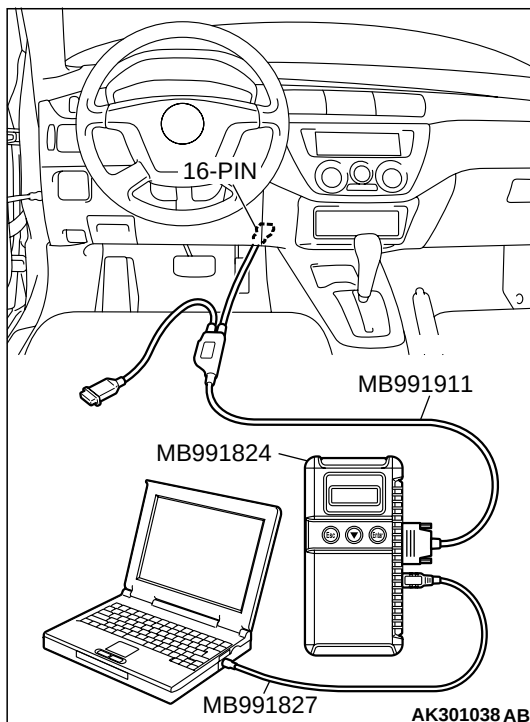
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 P2138 set?

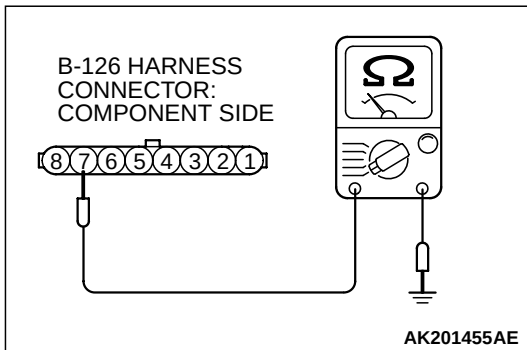
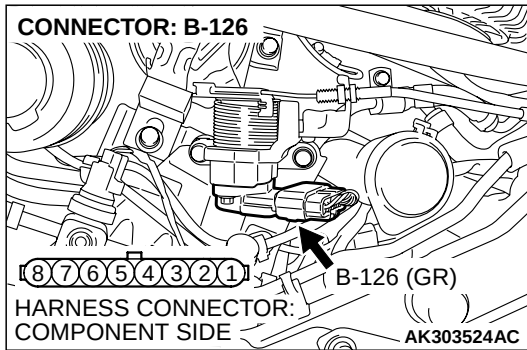
YES : Replace the ECM or PCM. Then go to Step 17.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points [P.00-6](#).



STEP 7. Check the continuity at accelerator pedal position sensor harness side connector B-126.

(1) Disconnect the connector B-126 and measure at the harness side.



(2) Measure the continuity between terminal No. 7 and ground.
• Should be less than 2 ohms.

Q: Does continuity exist?

YES : Go to Step 11.

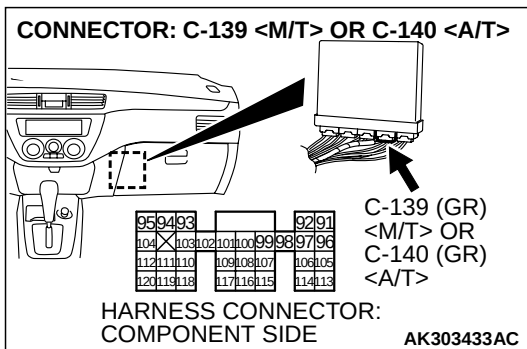
NO : Go to Step 8.

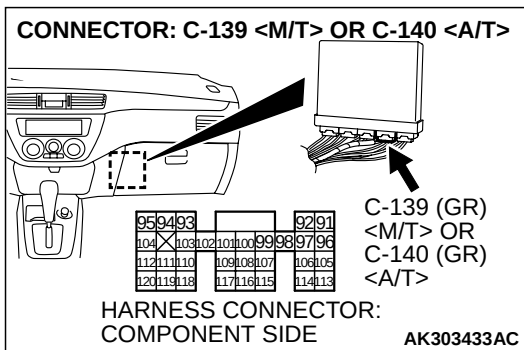
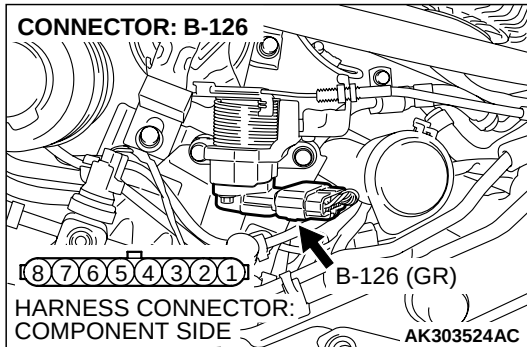
STEP 8. Check harness connector C-139 at ECM <M/T> or C-140 <A/T> for damage.

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 17.





STEP 9. Check for harness damage between accelerator pedal position sensor connector B-126 (terminal No. 7) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 96).

Q: Is the harness wire in good condition?

YES : Go to Step 10.

NO : Repair it. Then go to Step 17.

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

⚠ CAUTION

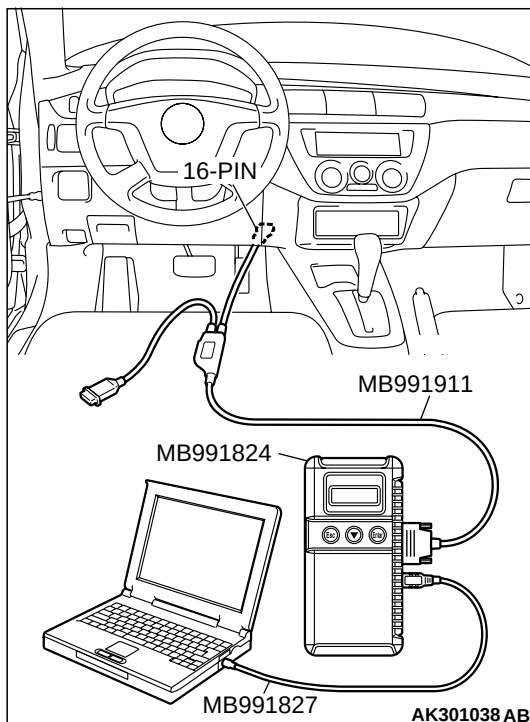
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

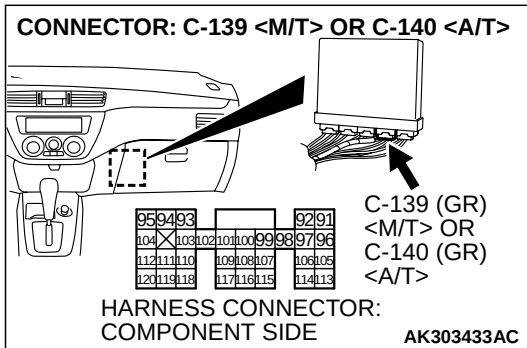
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) After the DTC has been deleted, read the DTC again.
- (4) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is DTC P2138 set?

YES : Replace the ECM or PCM. Then go to Step 17.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points [P.00-6](#).



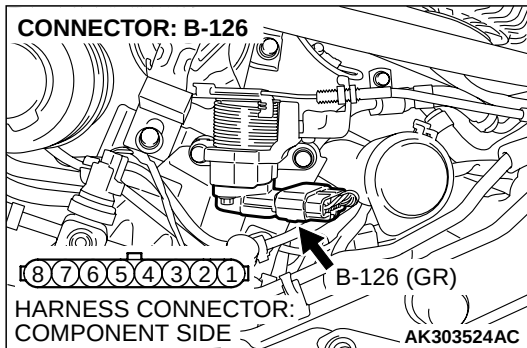


STEP 11. Check harness connector C-139 at ECM <M/T> or C-140 <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 12.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 17.

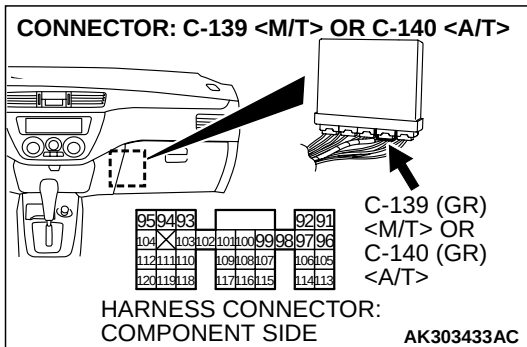


STEP 12. Check for harness damage between accelerator pedal position sensor connector B-126 (terminal No. 2) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 92).

Q: Is the harness wire in good condition?

YES : Go to Step 13.

NO : Repair it. Then go to Step 17.

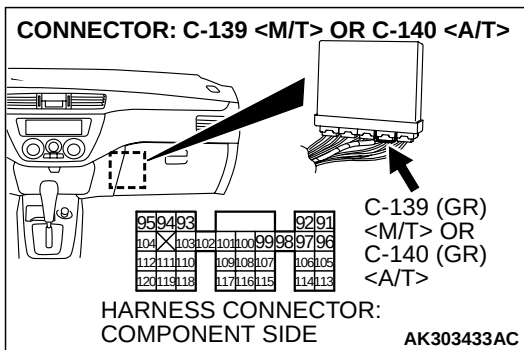
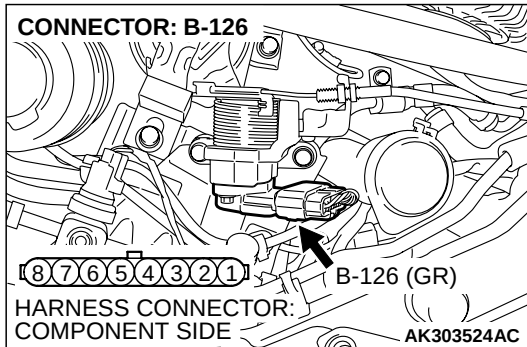


STEP 13. Check for harness damage between accelerator pedal position sensor connector B-126 (terminal No. 8) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 97).

Q: Is the harness wire in good condition?

YES : Go to Step 14.

NO : Repair it. Then go to Step 17.

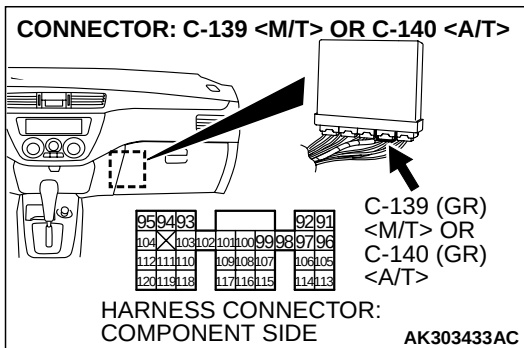
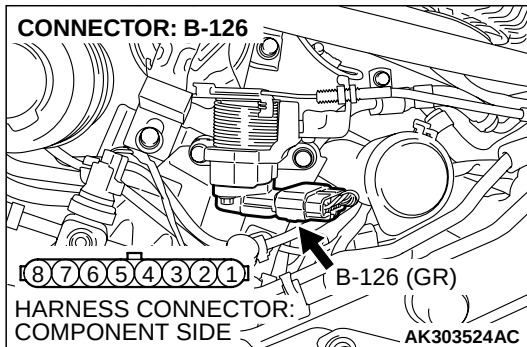


STEP 14. Check for harness damage between accelerator pedal position sensor connector B-126 (terminal No. 3) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 114).

Q: Is the harness wire in good condition?

YES : Go to Step 15.

NO : Repair it. Then go to Step 17.

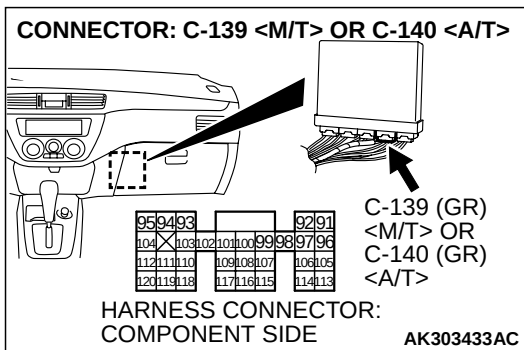
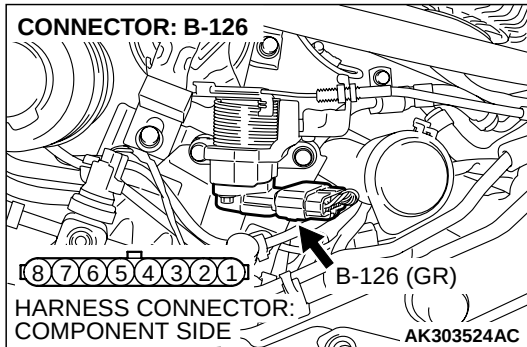


STEP 15. Check for harness damage between accelerator pedal position sensor connector B-126 (terminal No. 6) and ECM connector C-139 <M/T> or PCM connector C-140 <A/T> (terminal No. 107).

Q: Is the harness wire in good condition?

YES : Go to Step 16.

NO : Repair it. Then go to Step 17.



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

⚠ CAUTION

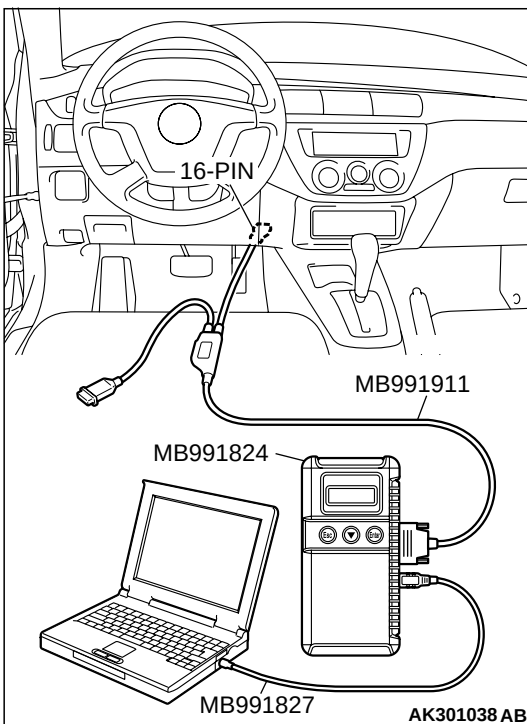
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

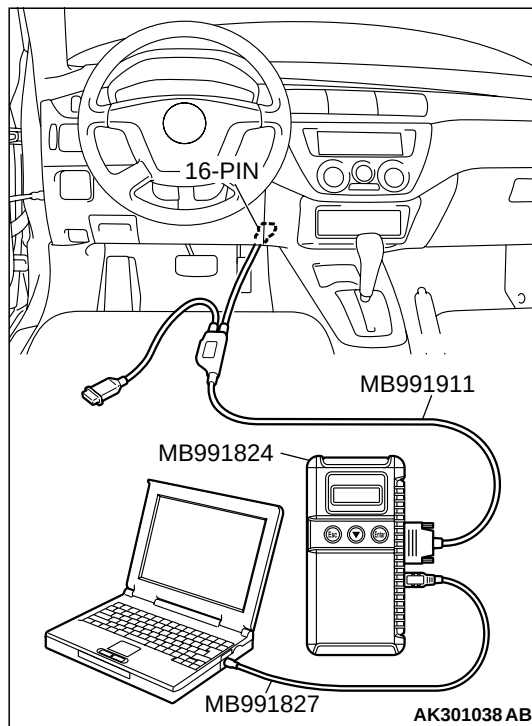
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) After the DTC has been deleted, read the DTC again.
- (4) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is DTC P2138 set?

YES : Replace the ECM or PCM. Then go to Step 17.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points [P.00-6](#).



**STEP 17. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

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

Q: Is DTC P2138 set?**YES :** Retry the troubleshooting.**NO :** The inspection is complete.**DTC P2173: Abnormal Intake Air Amount****TECHNICAL DESCRIPTION**

- ECM <M/T> or PCM <A/T> decides the allowable intake air amount in accordance with the engine speed and the target opening angle of throttle valve.
- ECM <M/T> or PCM <A/T> checks whether the actual intake air amount is more than the allowable intake air amount.

DESCRIPTIONS OF MONITOR METHODS

The actual intake air amount is more than the allowable intake air amount.

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**

- Engine is running.

Judgment Criteria

- The actual intake air amount is more than the allowable intake air amount for 1.5 seconds.

OBD-II DRIVE CYCLE PATTERN

None.

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

- Mass airflow sensor failed.
- Throttle valve faulty operation.
- Throttle position sensor failed.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools

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

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

⚠ CAUTION

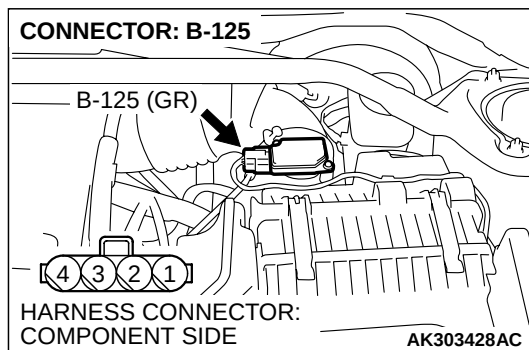
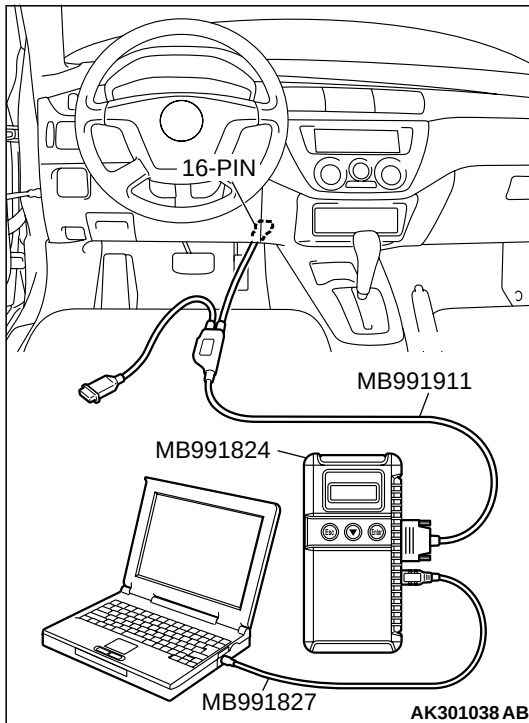
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is the diagnostic trouble code other than P2173 output?

YES : Refer to, Diagnostic Trouble Code Chart [P.13B-31](#).

NO : Go to Step 2.



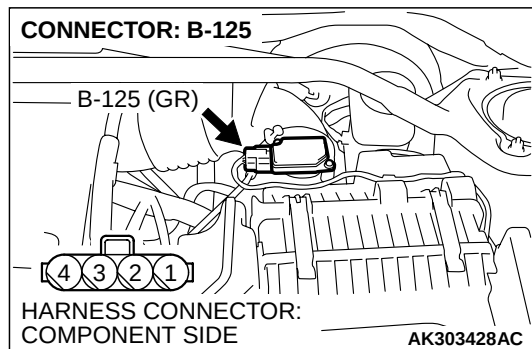
STEP 2. Replace the mass airflow sensor.

- (1) Replace the mass airflow sensor.
- (2) Turn the ignition switch to the "ON" position.
- (3) Erase the DTC.
- (4) Start the engine and run at idle for a few seconds.
- (5) Read the DTC.
- (6) Turn the ignition switch to the "OFF" position.

Q: Is DTC P2173 set?

YES : Go to Step 3.

NO : The inspection is complete.

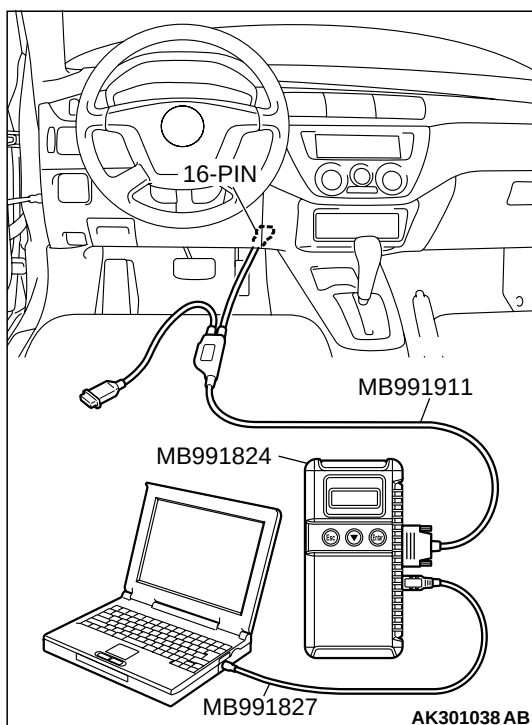
**STEP 3. Replace the throttle body assembly.**

- (1) Replace the throttle body assembly.
- (2) Turn the ignition switch to the "ON" position.
- (3) Erase the DTC.
- (4) Start the engine and run at idle for a few seconds.
- (5) Read the DTC.
- (6) Turn the ignition switch to the "OFF" position.

Q: Is DTC P2173 set?

YES : Replace the ECM or PCM, then Go to Step 4.

NO : The inspection is complete.

**STEP 4. Using scan tool MB991958, read the DTC.**

- (1) Turn the ignition switch to the "ON" position.
- (2) Erase the DTC.
- (3) Start the engine and run at idle for a few seconds.
- (4) Read the DTC.
- (5) Turn the ignition switch to the "OFF" position.

Q: Is DTC P2173 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P2227: Barometric Pressure Circuit Range/Performance Problem

TECHNICAL DESCRIPTION

- The barometric pressure sensor outputs a voltage which corresponds to the barometric pressure.
- The ECM <M/T> or PCM <A/T> checks whether this voltage is within a specified range.

DESCRIPTIONS OF MONITOR METHODS

Barometric pressure sensor output voltage does not change for specified period. (approximately 1 week)

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)

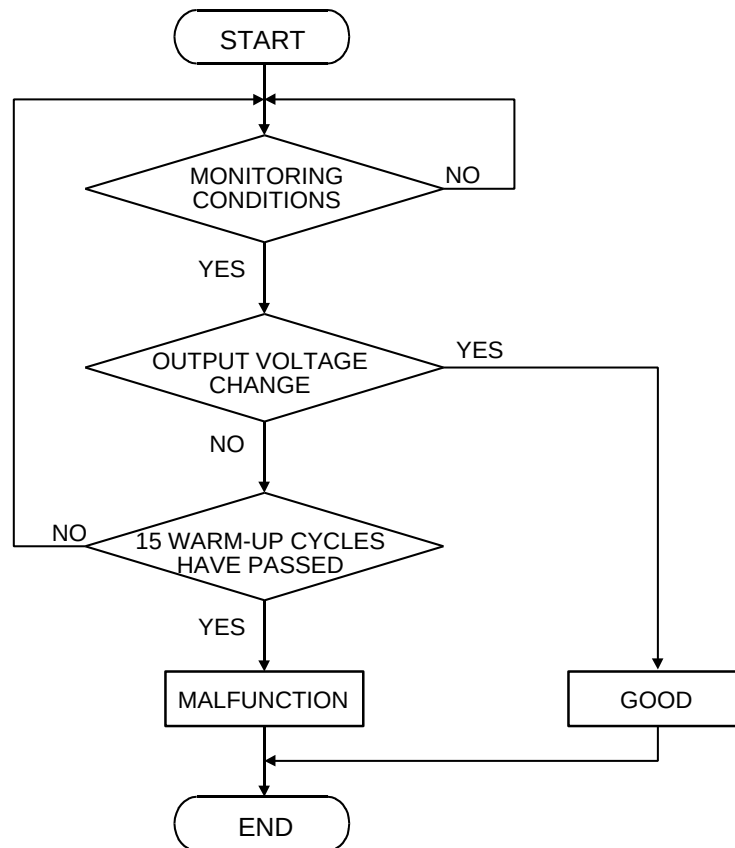
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK302051

Check Conditions

- Barometric pressure is lower than 76 kPa (22.4 in.Hg).

Judgement Criteria

- During 15 times of driving, the changes in the sensor output voltage should be 0.015 volt [equivalent to 0.4 kPa (0.12 in.Hg)] or less.
- Make sure that the engine coolant temperature is 72°C (160°F) or higher during each of the 15 times of driving. Also, during each of the 15 times of driving, make sure that after the engine has been started, the engine coolant temperature has increased to 23°C (40°F) or higher.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function – OBD-II Drive Cycle – Procedure 6 – Other Monitor [P.13B-6](#).

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

- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS**Required Special Tools:**

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

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

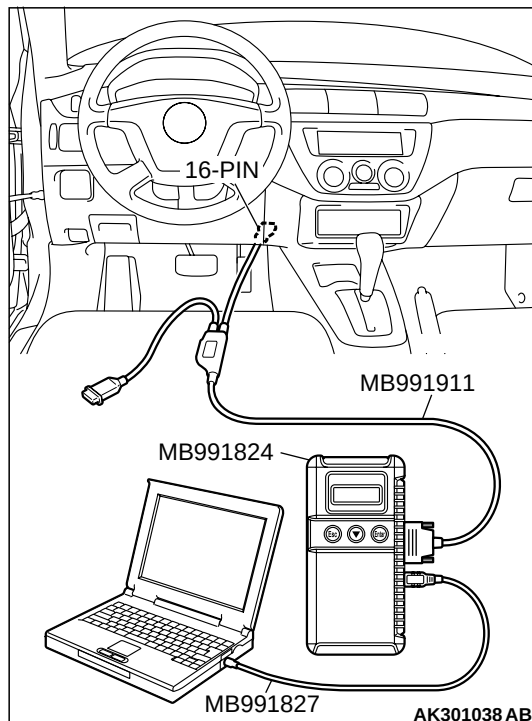
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- Connect scan tool MB991958 to the data link connector.
- Turn the ignition switch to the "ON" position.
- Erase the DTC.
- Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Procedure 6 – Other Monitor [P.13B-6](#).
- Check the diagnostic trouble code (DTC).

Q: Is DTC P2227 set?

YES : Replace the ECM or PCM.

NO : It can be assumed that this malfunction is intermittent.
Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points [P.00-6](#).



DTC P2228: Barometric Pressure Circuit Low Input

TECHNICAL DESCRIPTION

- The barometric pressure sensor outputs a voltage which corresponds to the barometric pressure.
- The ECM <M/T> or PCM <A/T> 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)

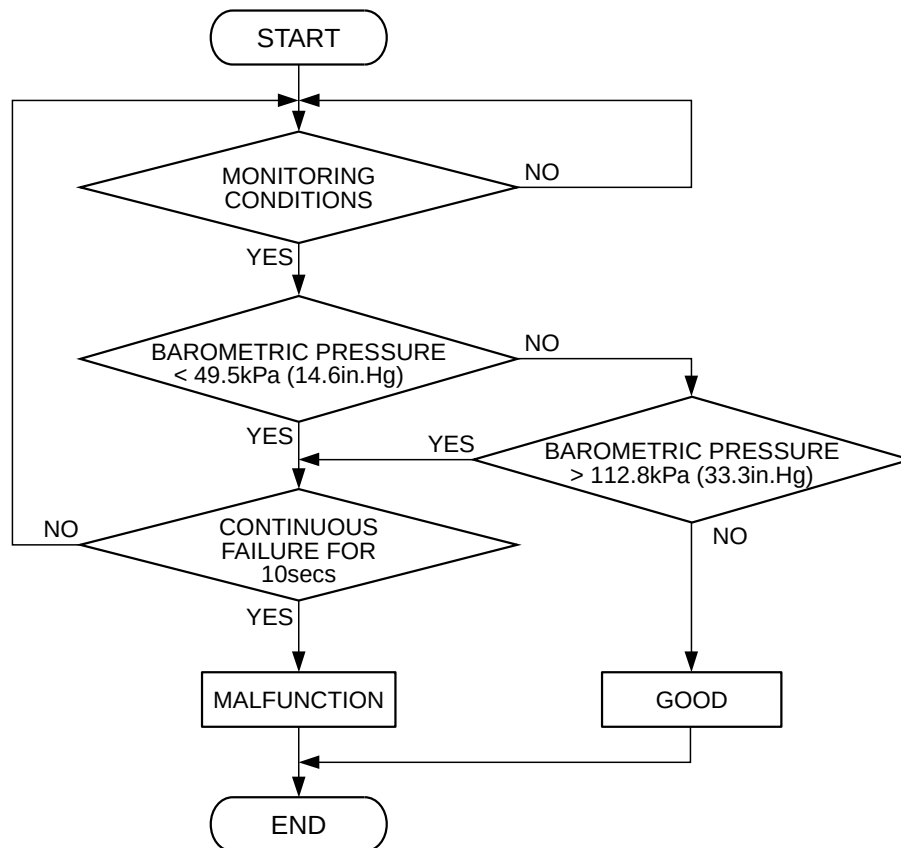
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK302052

Check Conditions

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

Judgement Criteria

- Barometric pressure sensor output signal has continued to be 49.5 kPa (14.6 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 – Procedure 6 – Other Monitor [P.13B-6](#).

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

- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS**Required Special Tools:**

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

STEP 1. Using scan tool MB991958, check data list item 25: Barometric Pressure Sensor.**⚠ CAUTION**

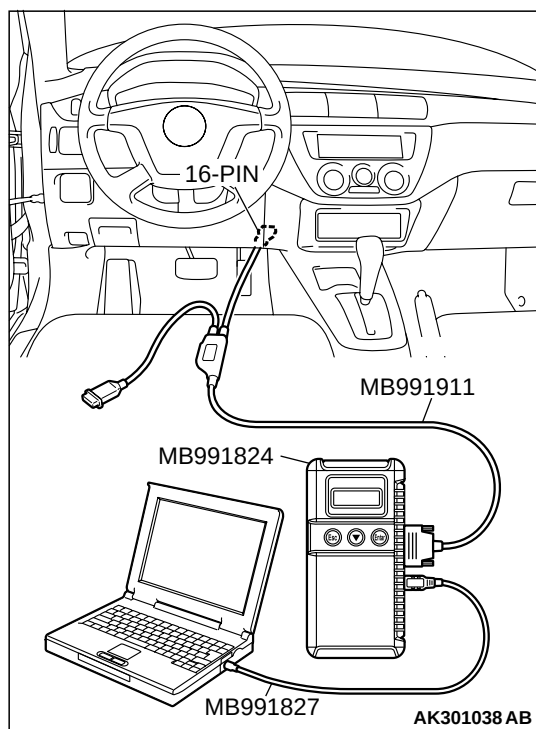
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 25, Barometric Pressure Sensor.
 - When altitude is 0 m (0 foot), 101 kPa (29.8 in.Hg).
 - When altitude is 600 m (1,969 feet), 95 kPa (28.1 in.Hg).
 - When altitude is 1,200 m (3,937 feet), 88 kPa (26.0 in.Hg).
 - When altitude is 1,800 m (5,906 feet), 81 kPa (23.9 in.Hg).
- (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 [P.00-6](#).

NO : Replace the ECM or PCM, then go to Step 2.

**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 – Procedure 6 – Other Monitor [P.13B-6](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P2228 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P2229: Barometric Pressure Circuit High Input

TECHNICAL DESCRIPTION

- The barometric pressure sensor outputs a voltage which corresponds to the barometric pressure.
- The ECM <M/T> or PCM <A/T> 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)

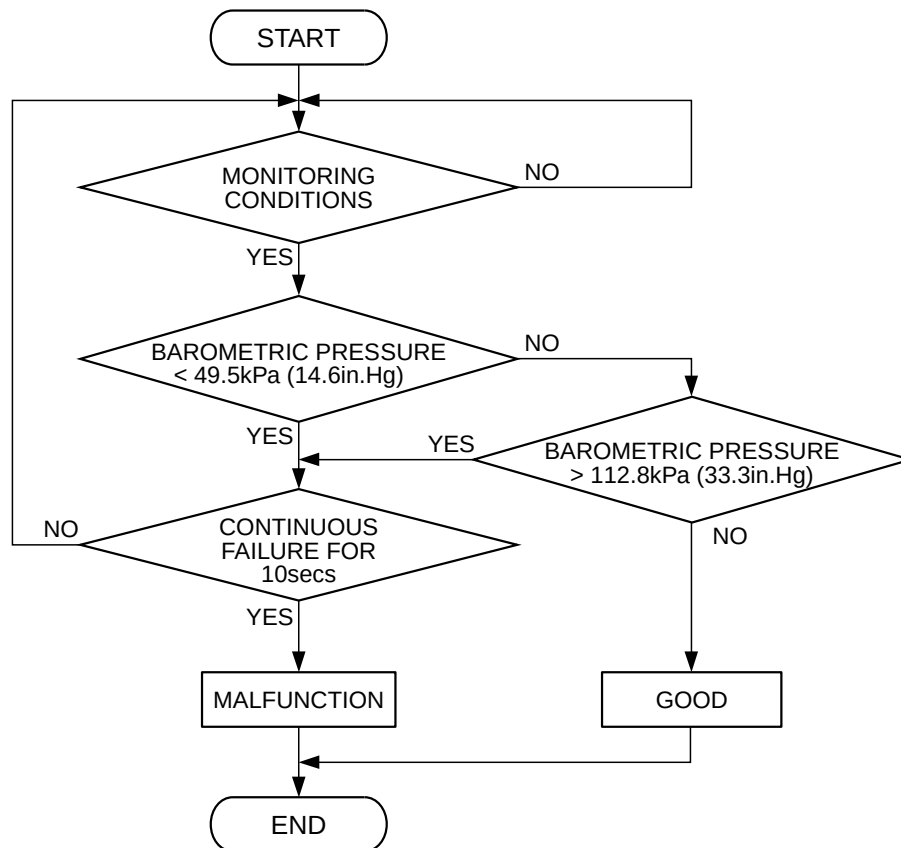
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK302052

Check Conditions

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

Judgement Criteria

- Barometric pressure sensor output signal has continued to be 112.8 kPa (33.3 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 – Procedure 6 – Other Monitor [P.13B-6](#).

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

- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS**Required Special Tools:**

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

STEP 1. Using scan tool MB991958, check data list item 25: Barometric Pressure Sensor.**⚠ CAUTION**

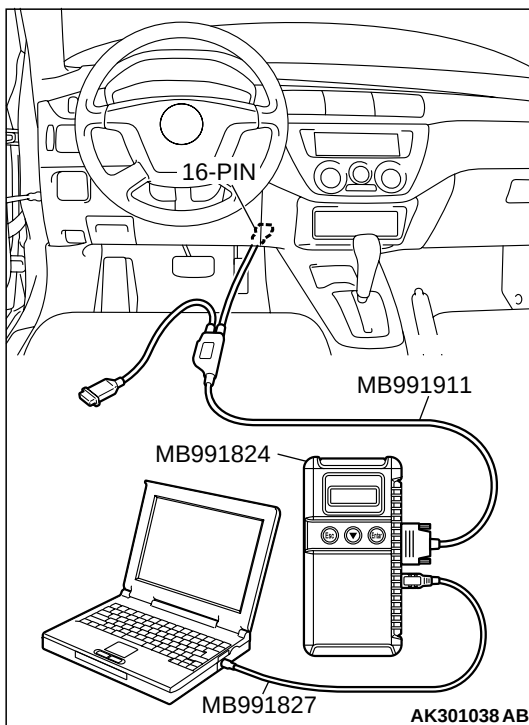
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 25, Barometric Pressure Sensor.
 - When altitude is 0 m (0 foot), 101 kPa (29.8 In.Hg).
 - When altitude is 600 m (1,969 feet), 95 kPa (28.1 In.Hg).
 - When altitude is 1,200 m (3,937 feet), 88 kPa (26.0 In.Hg).
 - When altitude is 1,800 m (5,906 feet), 81 kPa (23.9 In.Hg).
- (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 [P.00-6](#).

NO : Replace the ECM or PCM, then go to Step 2.

**Continue****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 – Procedure 6 – Other Monitor [P.13B-6](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P2229 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.