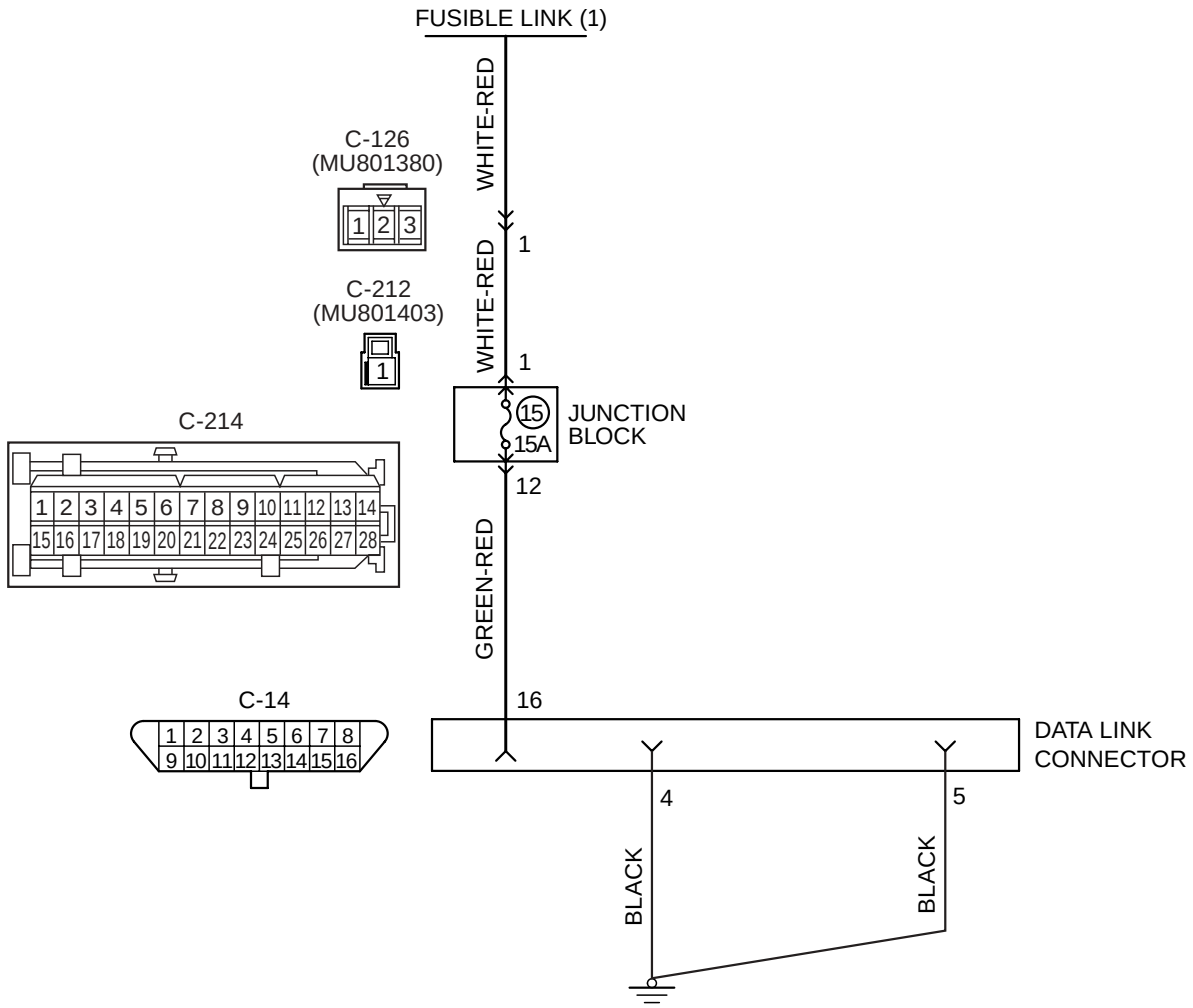
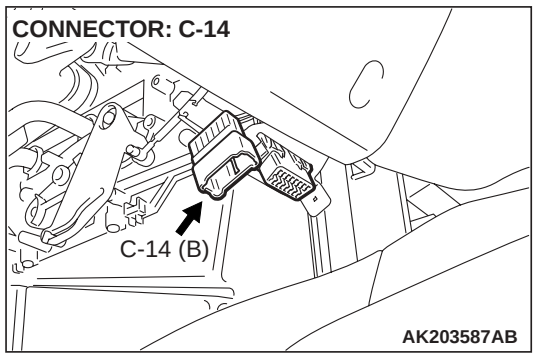
SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: COMMUNICATION WITH SCAN TOOL IS NOT POSSIBLE (COMUNICATION WITH ALL SYSTEMS IS NOT POSSIBLE)

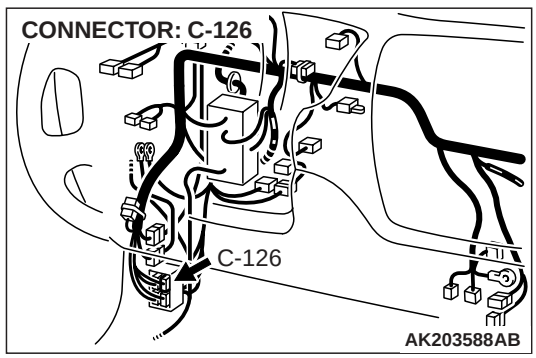
Data Link Connector Circuit



AK203574

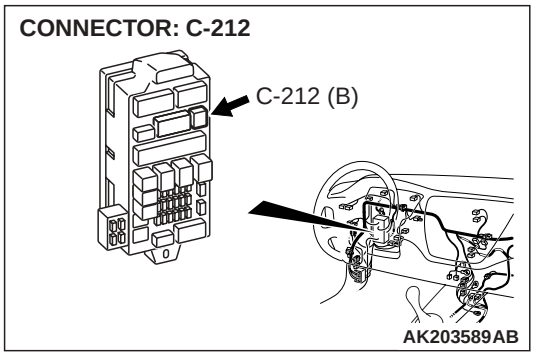


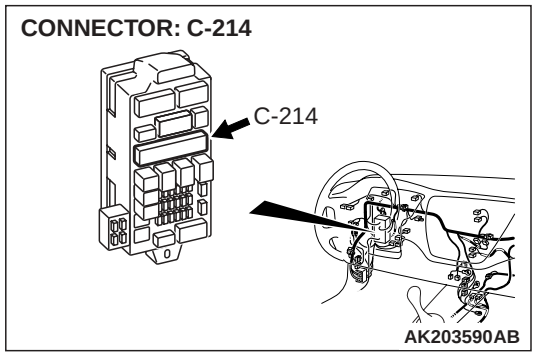
AK203587AB



AK203588AB

TSB Revision





CIRCUIT OPERATION

- A battery positive voltage is applied on the data link connector power terminal (terminal No. 16). The ground terminals (terminals No. 4, No. 5) are grounded to the vehicle body.

COMMENT

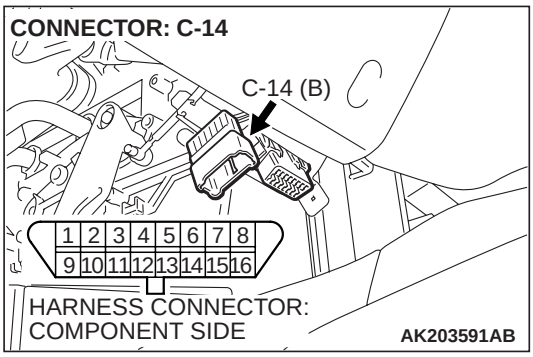
- The cause is probably a defect in power supply system (including ground) for the on-board diagnostic test mode line.

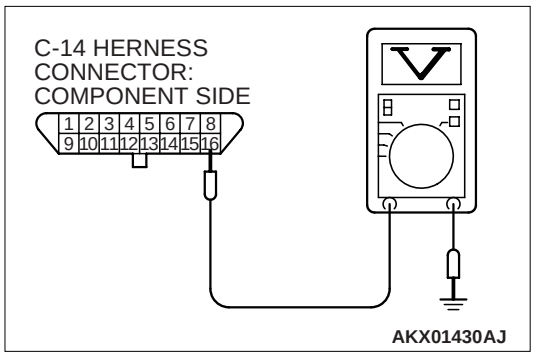
TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the data link connector.
- Damaged harness wire.

DIAGNOSIS

STEP 1. Measure the power supply voltage at data link connector C-14.





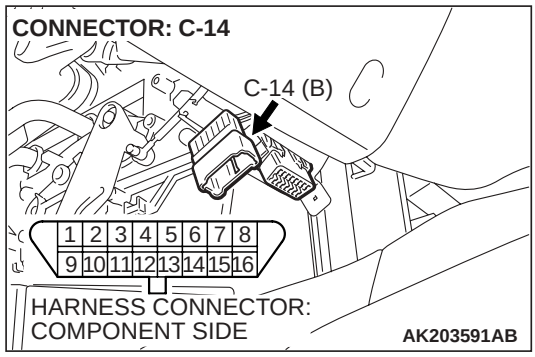
(1) Measure voltage between terminal No. 16 and ground.
- Voltage should measure battery positive voltage.

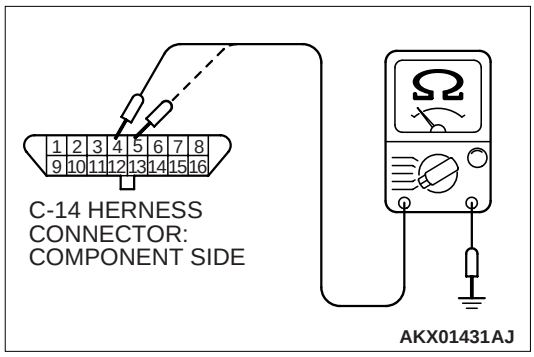
Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to step 2.

NO : Check harness connectors C-126, C-212 and C-214 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 fusible link (1) and data link connector C-14 (terminal No. 16) because of open circuit. Then confirm that the malfunction symptom is eliminated.

STEP 2. Check for continuity at data link connector C-14.





(1) Check for the continuity between terminals No. 4, No. 5 and ground.
- Should be less than 2 ohms.

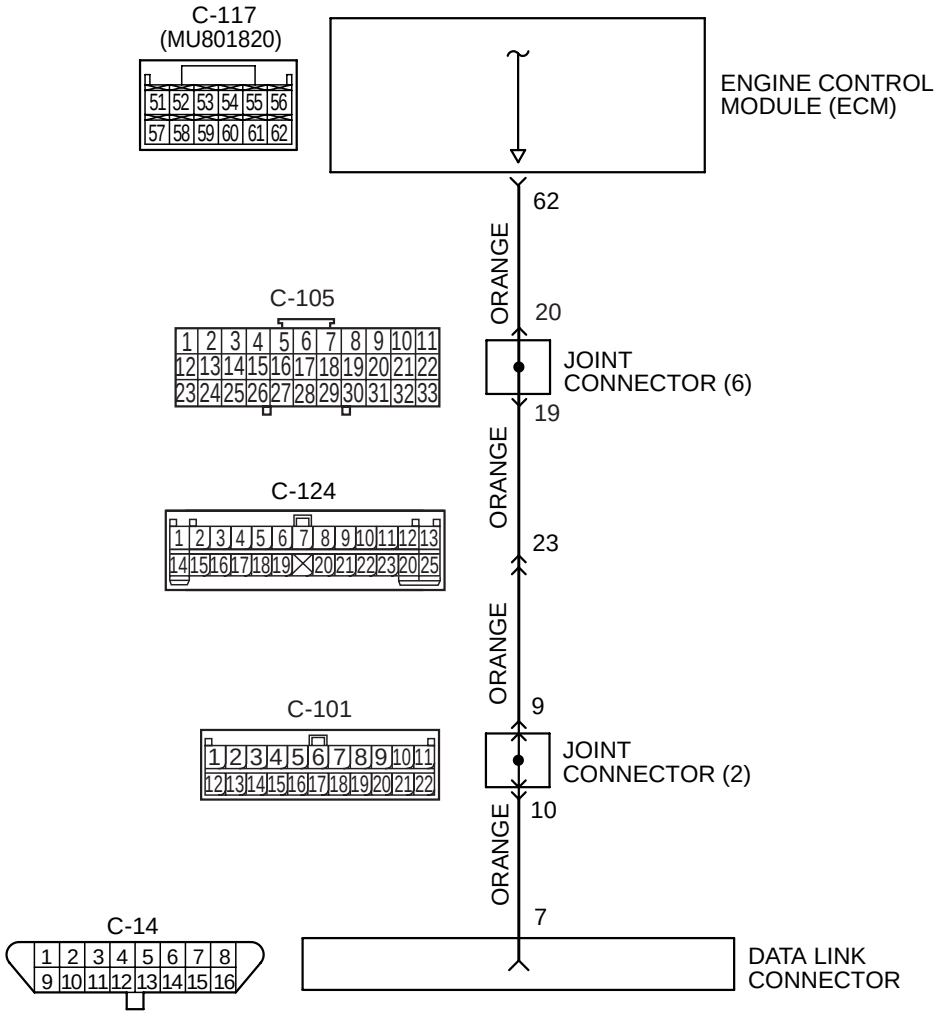
Q: Does continuity exist?

YES : Replace the scan tool. Then confirm that the malfunction symptom is eliminated.

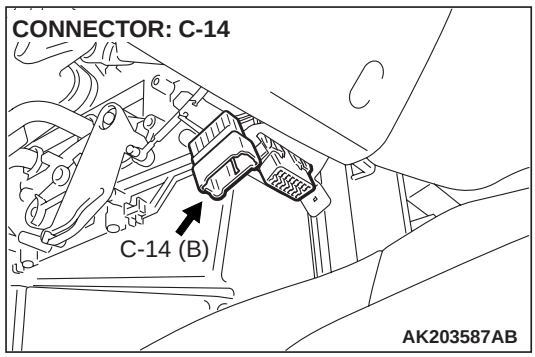
NO : Repair harness wire between data link connector C-14 (terminals No. 4, No. 5) and ground because of open circuit or harness damage. Then confirm that the malfunction symptom is eliminated.

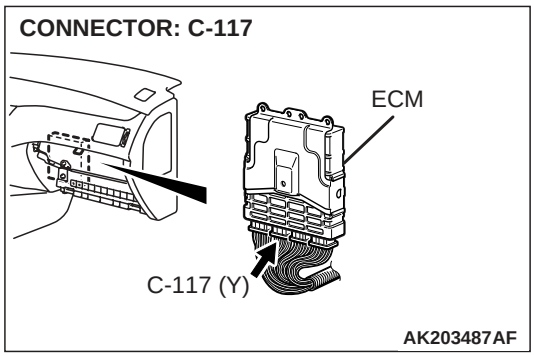
INSPECTION PROCEDURE 2: COMMUNICATION WITH SCAN TOOL IS NOT POSSIBLE (COMMUNICATION WITH ECM ONLY IS NOT POSSIBLE)

Data Link Connector Circuit

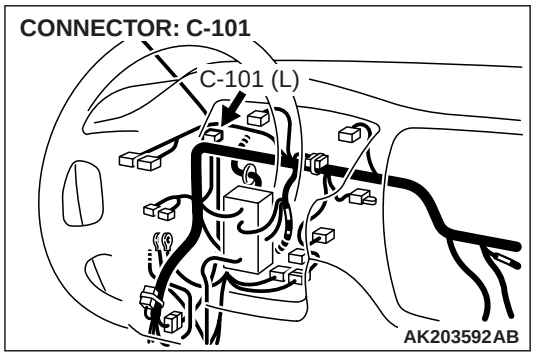


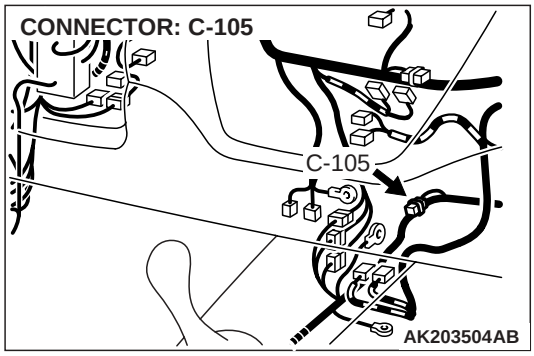
AK203575

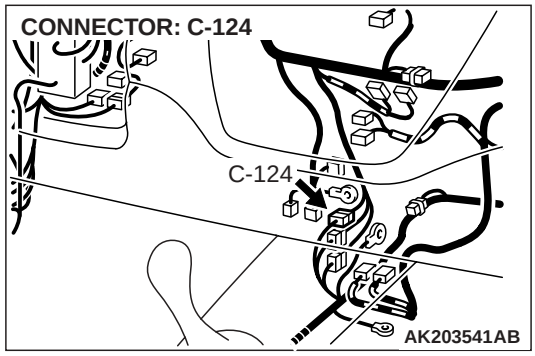




TSB Revision







CIRCUIT OPERATION

- A diagnostic output is made from the ECM (terminal No. 62) to the diagnostic output terminal (terminal No. 7) of the data link connector.

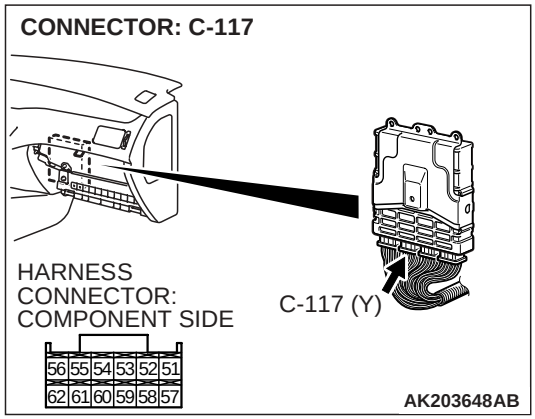
COMMENT

- No power supply to ECM.
- Defective ground circuit of ECM.
- Defective ECM.
- Improper communication line between ECM and scan tool.

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

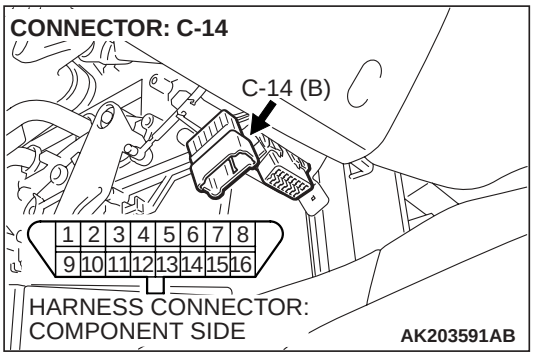
- Malfunction of ECM power supply circuit.
- Malfunction of the ECM.
- Open circuit between ECM and data link connector.

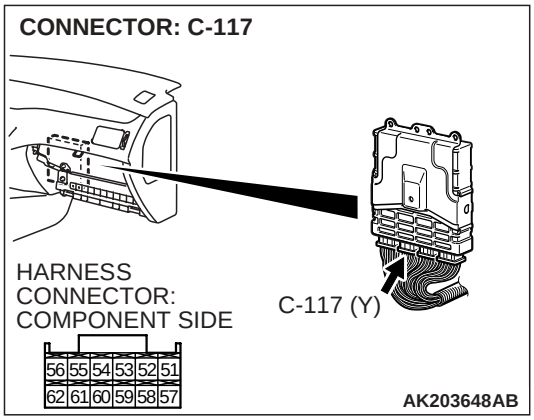
DIAGNOSIS



STEP 1. Check connector C-117 at ECM 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 confirm that the malfunction symptom is eliminated.





STEP 2. Check for open circuit, short circuit to ground and harness damage between data link connector C-14 (terminal No. 7) and ECM connector C-117 (terminal No. 62).

NOTE: Check harness after checking intermediate connectors C-101, C-105 and C-124. If intermediate connectors are damaged, repair or replace them. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then check that the malfunction is eliminated.

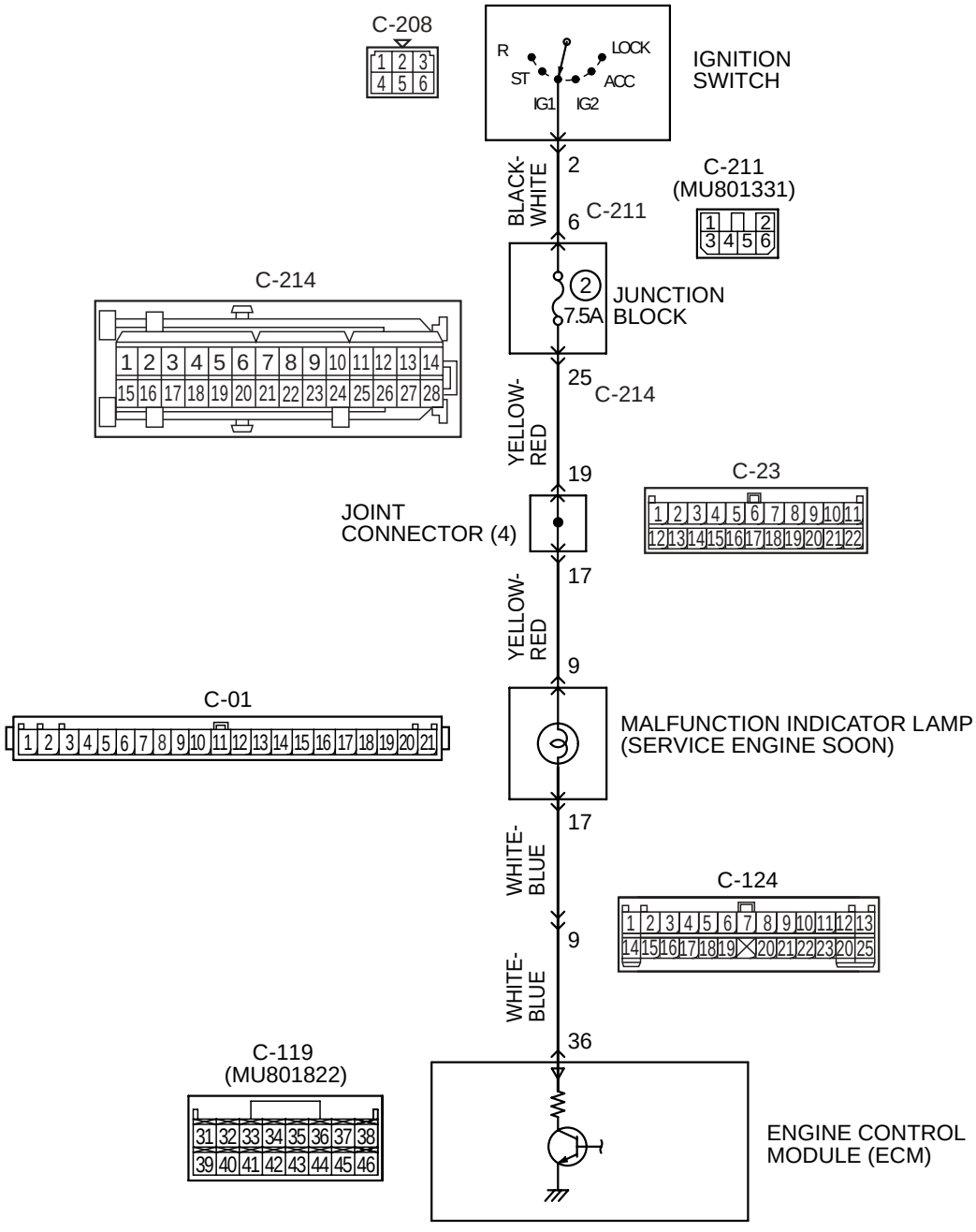
Q: Is the harness wire in good condition?

YES : Refer to, INSPECTION PROCEDURE 30 – Power Supply System and Ignition Switch – IG System P.13A-663.

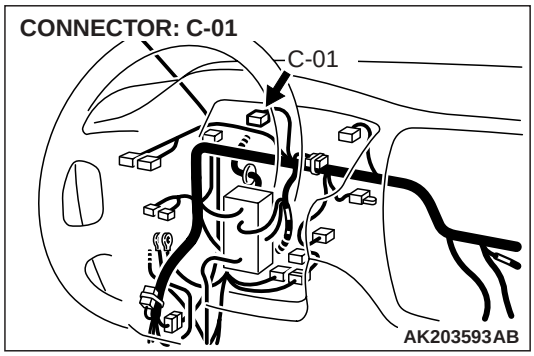
NO : Repair it. Then confirm that the malfunction symptom is eliminated.

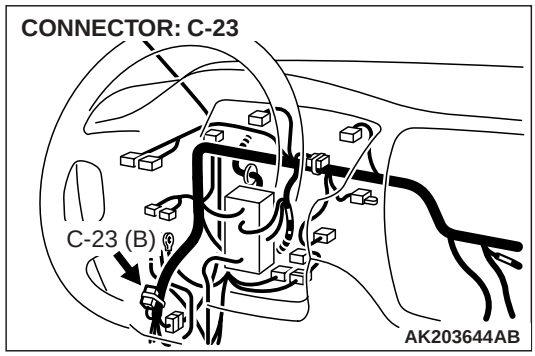
INSPECTION PROCEDURE 3: THE MALFUNCTION INDICATOR LAMP (SERVICE ENGINE SOON) DOES NOT ILLUMINATE RIGHT AFTER THE IGNITION SWITCH IS TURNED TO THE "ON" POSITION

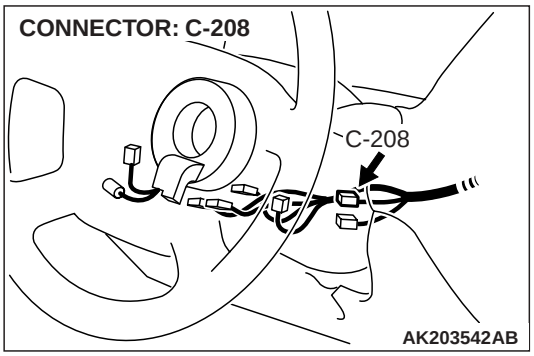
Malfunction Indicator Lamp (SERVICE ENGINE SOON) Circuit

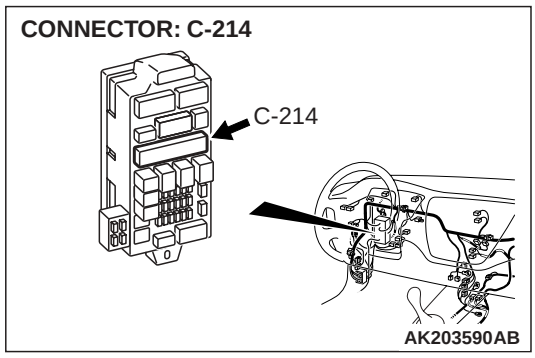


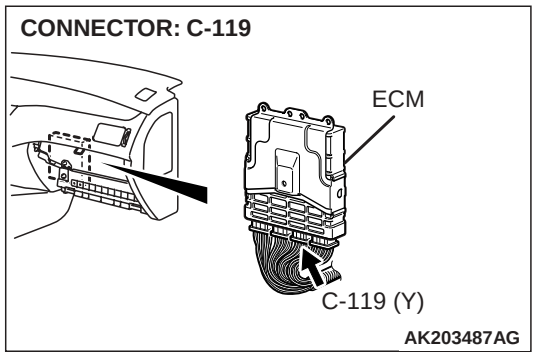
AK203576

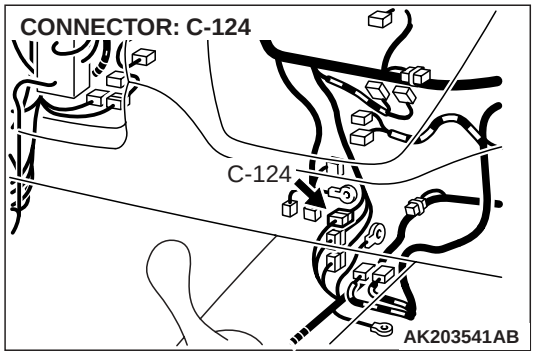


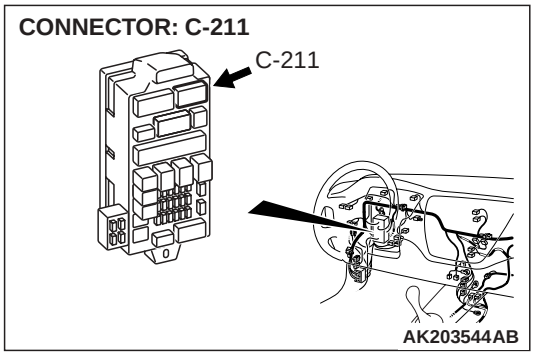












CIRCUIT OPERATION

- The malfunction indicator lamp (SERVICE ENGINE SOON) power is supplied from the ignition switch.
- The ECM controls the ground of the malfunction indicator lamp (SERVICE ENGINE SOON) by turning the power transistor in the ECM ON and OFF.

COMMENT

- The ECM causes the malfunction indicator lamp (SERVICE ENGINE SOON) to illuminate for 5 seconds immediately after the ignition switch is turned to the "ON" position occurred.

TSB Revision

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

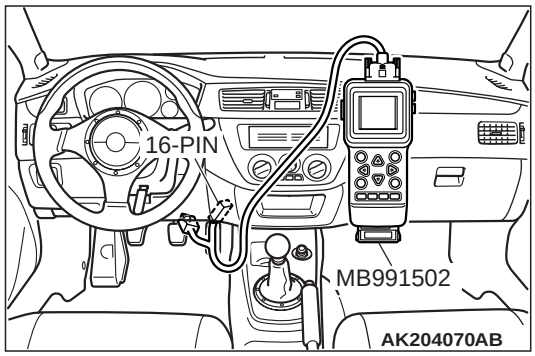
- Burnt-out bulb.
- Defective malfunction indicator lamp (SERVICE ENGINE SOON) circuit.
- Malfunction of the ECM.

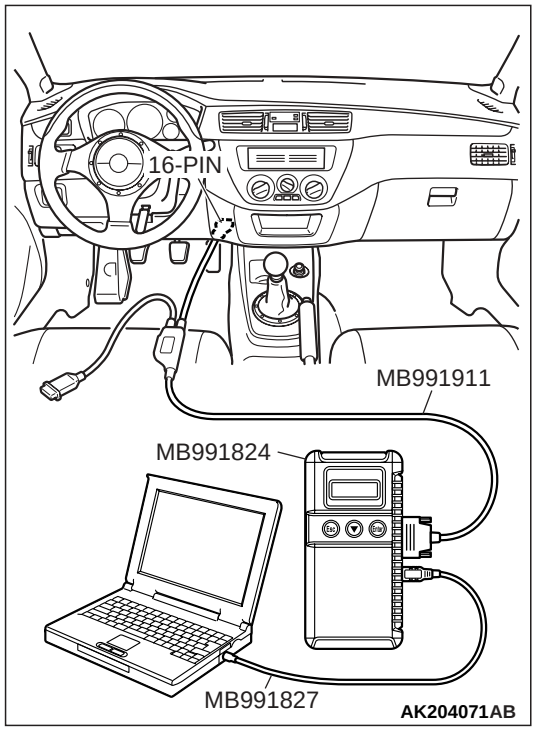
DIAGNOSIS

Required Special Tools:

- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991502 or MB991958, check data list item 16: Power Supply Voltage.





⚠ CAUTION

To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before. connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991502 or MB991958 to the data reading mode for item 16, Power Supply Voltage.
  - 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?

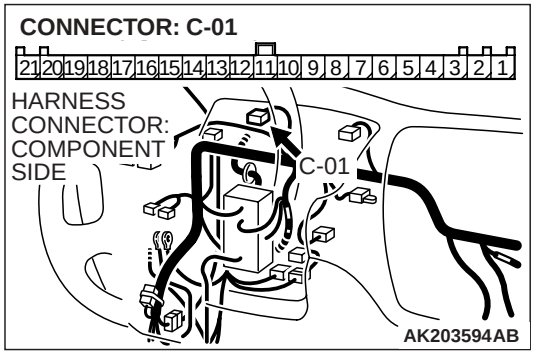
YES : Go to Step 2.
NO : Refer to INSPECTION PROCEDURE 29 – Power Supply System and Ignition Switch – IG System P.13A-663.

STEP 2. Check the burned-out bulb.

Q: Is the bulb normal?

YES : Go to step 3.
NO : Replace the bulb. Then confirm that the malfunction symptom is eliminated.

TSB Revision

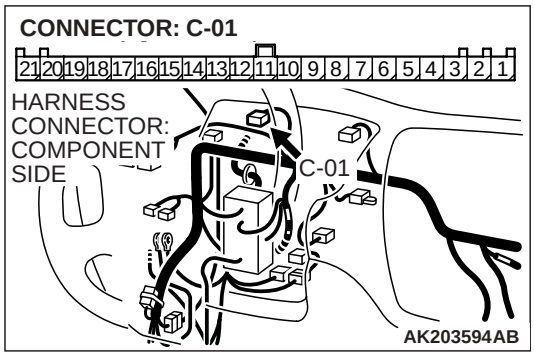


STEP 3. Check connector C-01 at the combination meter for damage.

Q: Is the connector in good condition?

YES : Go to step 4.

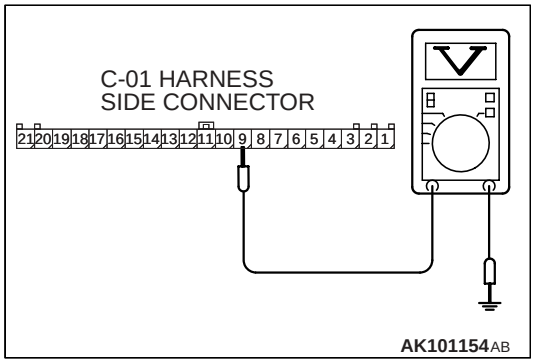
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then confirm that the malfunction symptom is eliminated.



STEP 4. Measure the power supply voltage at combination meter harness side connector C-01.

(1) Disconnect the connector C-01 and measure at the harness side.

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



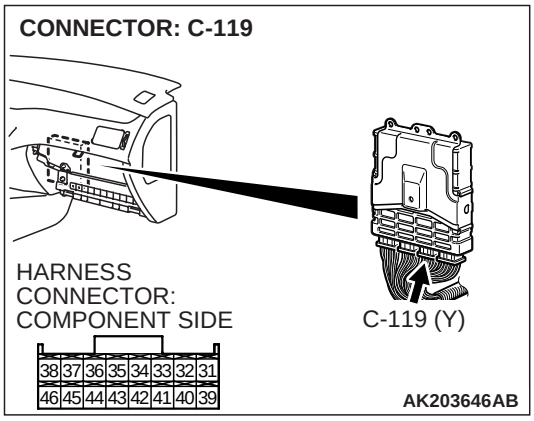
(3) Measure the voltage between terminal No. 9 and ground.
- Voltage should measure battery positive voltage.

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

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

YES : Go to Step 5.

NO : Check harness connectors C-23, C-211 and C-214 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 combination meter connector C-01 (terminal No. 9) because of open circuit. Then confirm that the malfunction symptom is eliminated.

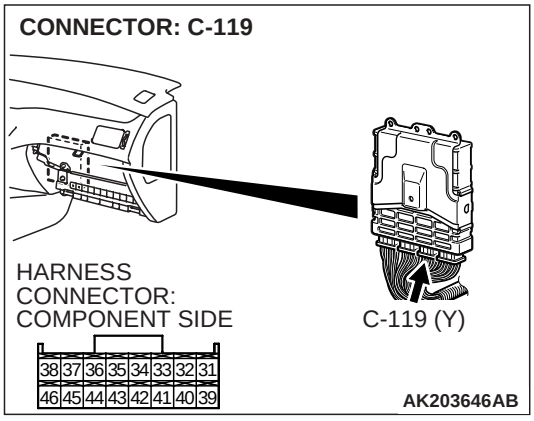


STEP 5. Check connector C-119 at ECM for damage.

Q: Is the connector in good condition?

YES : Go to Step 6.

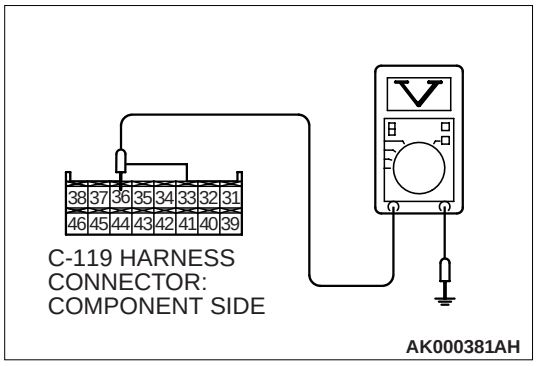
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then confirm that the malfunction symptom is eliminated.



STEP 6. Measure the power supply voltage ECM connector C-119.

(1) Disconnect the connector C-119 and measure at the harness side.

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



(3) Measure the voltage between terminal No. 36 and ground.
- Voltage should measure battery positive voltage.

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

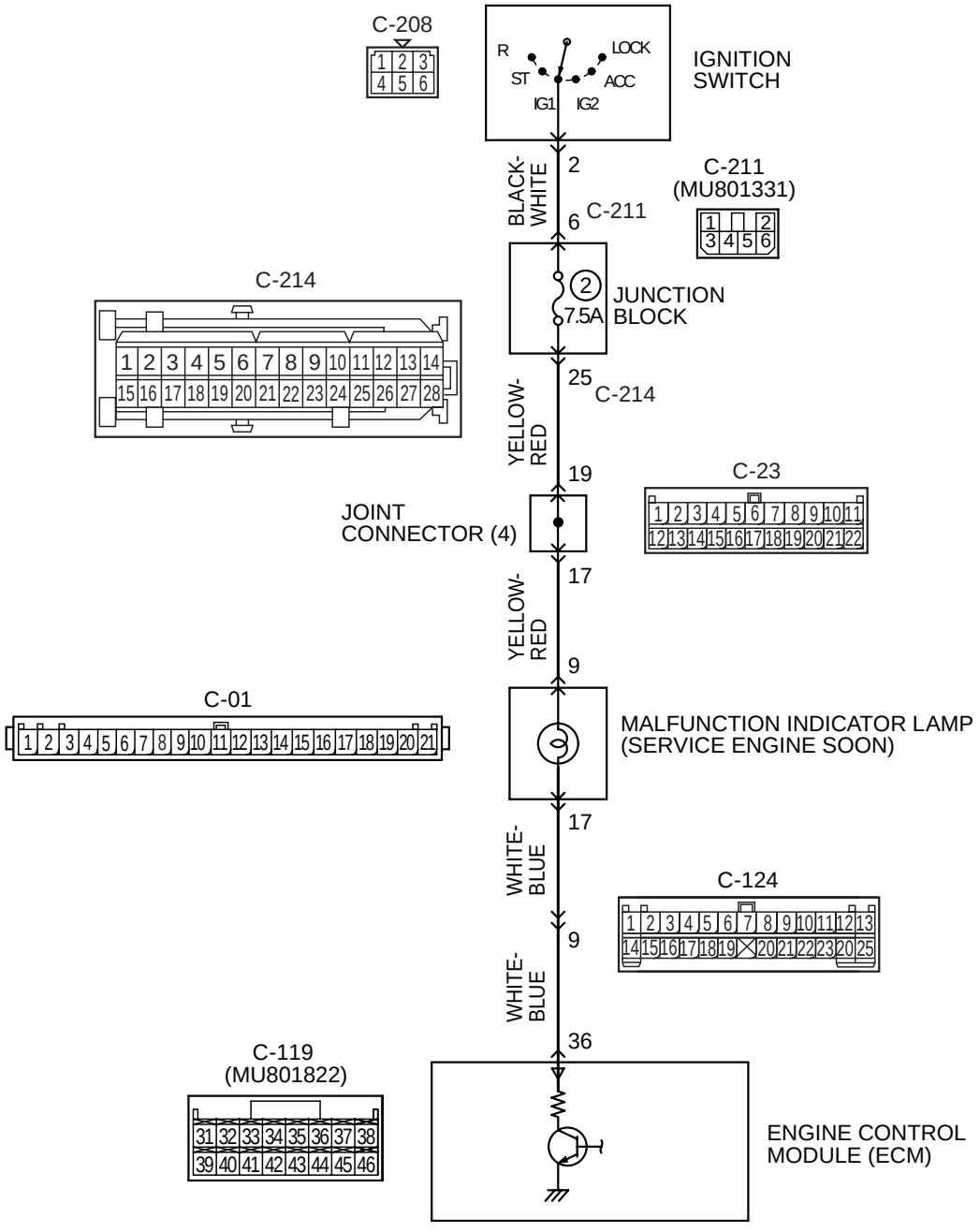
Q: Is battery positive voltage (approximately 12 volts) present?

YES : Replace the ECM. Then confirm that the malfunction symptom is eliminated.

NO : Check harness connectors C-124 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. If intermediate connectors is in good condition, repair harness wire between combination meter connector C-01 (terminal No. 17) and ECM connector C-119 (terminal No. 36) because of open circuit. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 4: THE MALFUNCTION INDICATOR LAMP (SERVICE ENGINE SOON) REMAINS ILLUMINATED AND NEVER GOES OUT

Malfunction Indicator Lamp (SERVICE ENGINE SOON) Circuit



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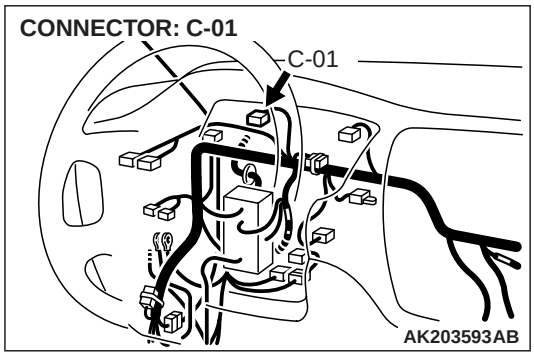
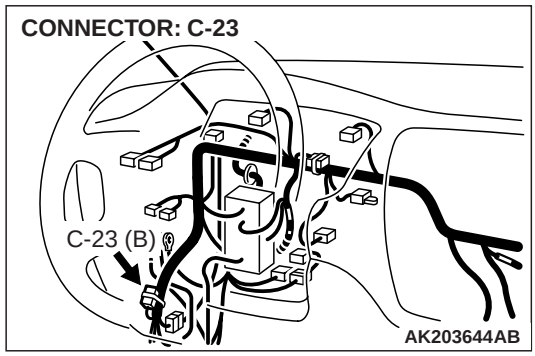
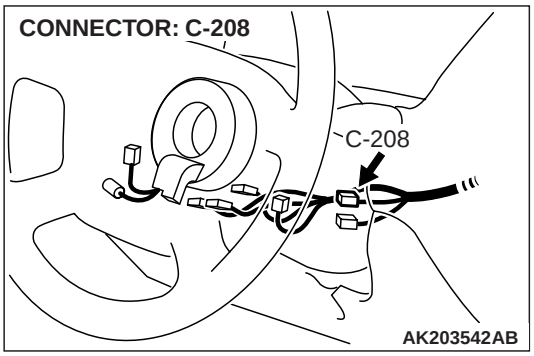
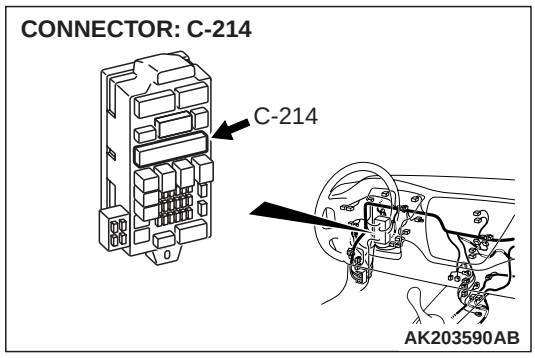
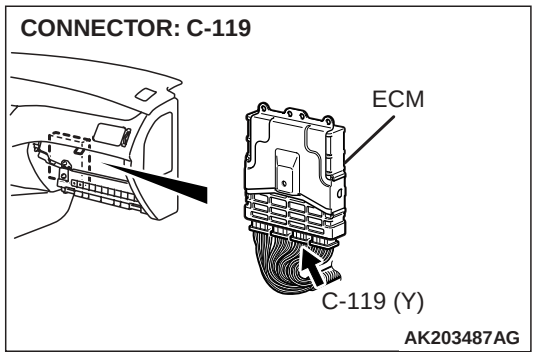
TSB Revision

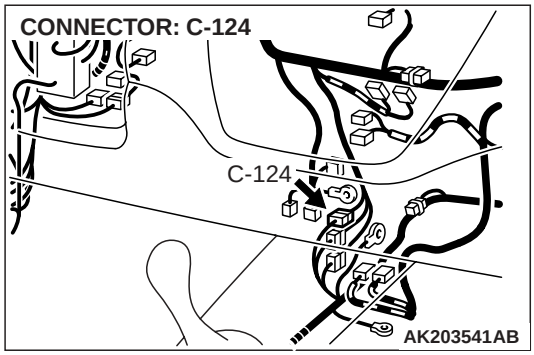


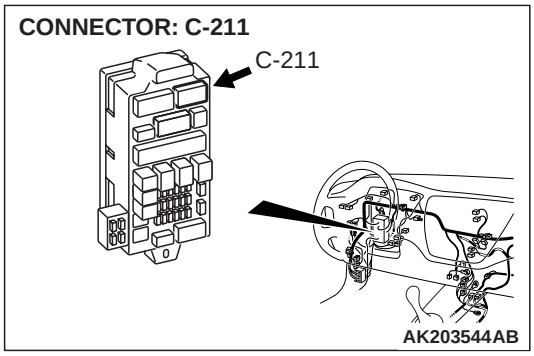












CIRCUIT OPERATION

- The malfunction indicator lamp (SERVICE ENGINE SOON) power is supplied from the ignition switch.
- The ECM controls the ground of the malfunction indicator lamp (SERVICE ENGINE SOON) by turning the power transistor in the ECM ON and OFF.

COMMENT

- In cases such as the above, the cause is probably that the ECM is detecting a problem in a sensor or actuator, or that one of the malfunctions listed at right has probably occurred.

TSB Revision

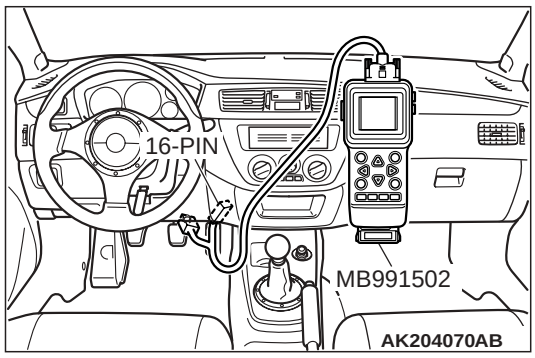
TROUBLESHOOTING HINTS (The most likely causes for this case:)

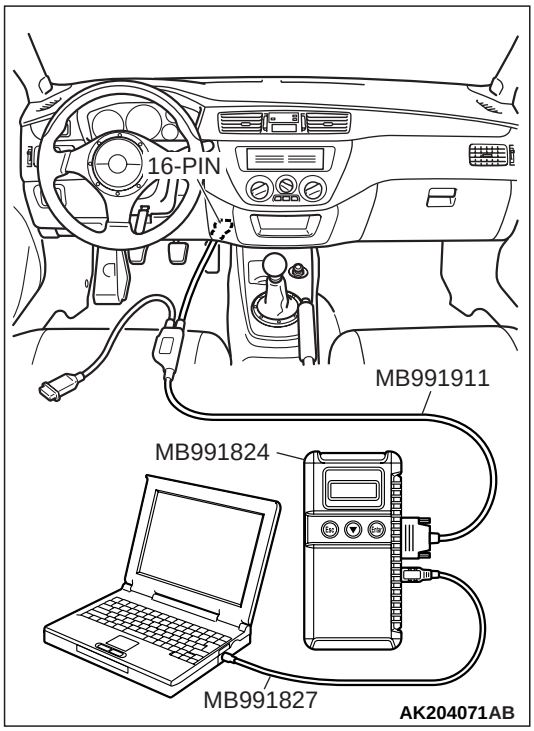
- Short-circuit between the malfunction indicator lamp (SERVICE ENGINE SOON) and ECM.
- Malfunction of the ECM.

DIAGNOSIS

Required Special Tools:

- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B





STEP 1. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

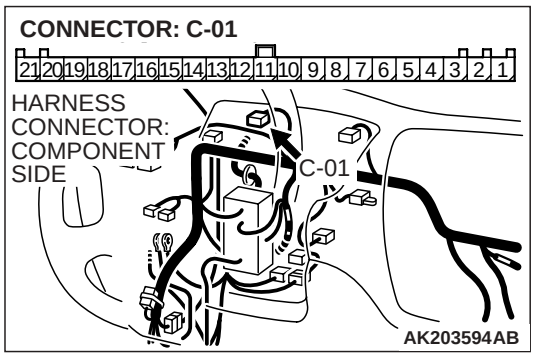
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

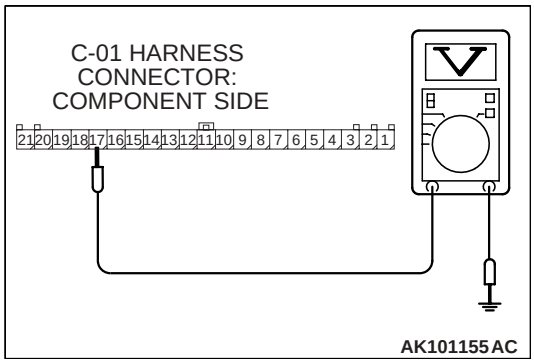
(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC set?

YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-25.

NO : Go to Step. 2.





STEP 2. Check for continuity at combination meter harness side connector C-01.

(1) Disconnect the connector C-01 and measure at the harness side.

(2) Check for the continuity between terminal No. 17 and ground.
- Should be open loop.

Q: Does continuity exist?

YES : Replace the ECM. Then confirm that the malfunction symptom is eliminated.

NO : Check harness connectors C-124 at the intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. If intermediate connectors is in good condition, repair harness wire between combination meter connector C-01 (terminal No. 17) and ECM connector C-119 (terminal No. 36) because of short circuit to ground. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 5: CRANKS, WON'T START

Cranks, Won't Start Circuit
- Refer to, Ignition circuit system P.13A-695.

CIRCUIT OPERATION
- Refer to, Ignition circuit system P.13A-695.

COMMENT
- In cases such as the above, the cause is probably no spark, fuel delivery, or fuel quality problems. In addition, foreign materials (water, kerosene, etc.) may be mixed with the fuel.

TROUBLESHOOTING HINTS (The most likely causes for this case:)
- Malfunction of the ignition system.
- Malfunction of the fuel pump system.
- Malfunction of the injector system.
- Malfunction of the ECM.
- Contaminated fuel.

DIAGNOSIS

Required Special Tools:
- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Measure the battery positive voltage.

(1) Measure the battery positive voltage during cranking.
- The voltage should remain greater than 8 volts while the engine is cranked.

Q: Dose the voltage remain greater than 8 volts while the engine is cranked?

YES : Go to Step 2.

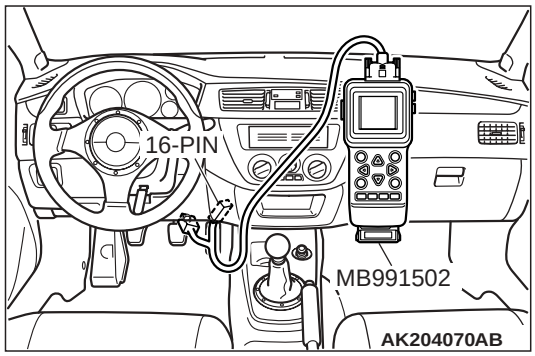
NO : Check the battery. Refer to GROUP 54A, Battery – Battery check P.54A-3. Then confirm that the malfunction symptom is eliminated.

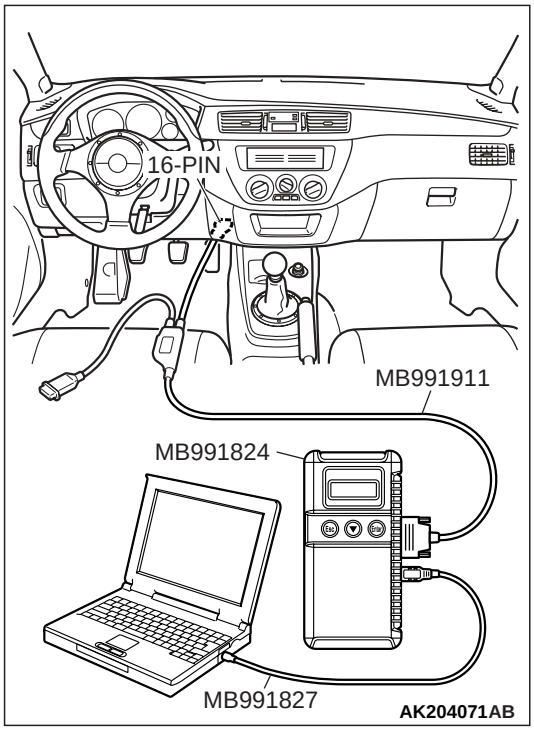
STEP 2. Check the timing belt for breaks.

Q: Is the timing belt good condition?

YES : Go to Step 3.

NO : Replace timing belt. Then confirm that the malfunction symptom is eliminated.





STEP 3 Using scan tool MB991502 or MB991958, check data list.

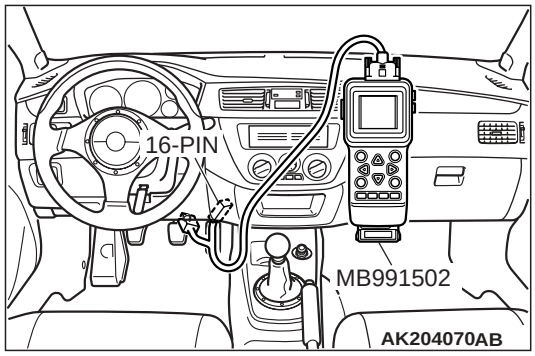
⚠ CAUTION

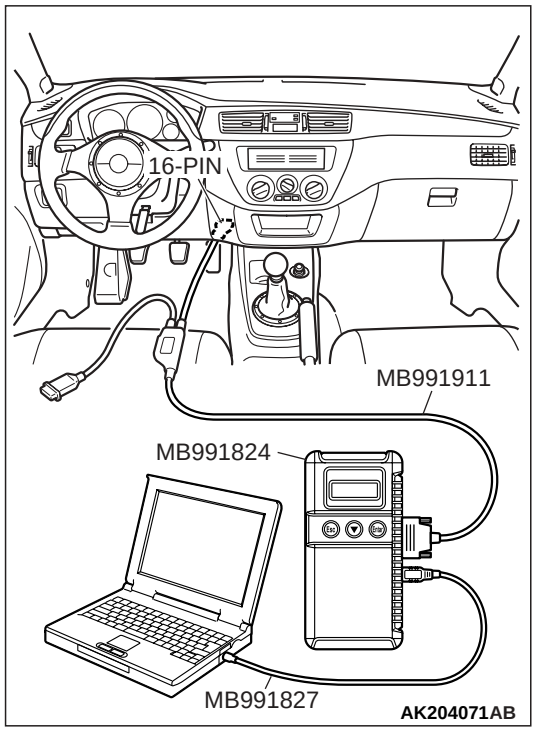
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check the following items in the data List. Refer to GROUP 13A, Data List Reference Table P.13A-723.
  a. Item 16: Power Supply Voltage.
  b. Item 22: Crankshaft Position Sensor.
  c. Item 21: Engine Coolant Temperature Sensor.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

YES : Go to Step 4.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.



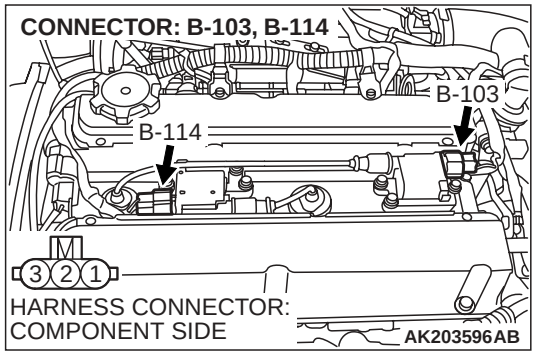


STEP 4. Using scan tool MB991502 or MB991958, check actuator test.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following items in the actuator test. Refer to GROUP 13A, Actuator Test Reference Table P.13A-732.
   a. Item 07: Fuel pump.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : Go to Step 5.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.



STEP 5. Check the ignition system.

(1) Connect the timing light to terminal No. 1 of the ignition coil connectors B-103 or B-114, in order.
(2) Crank the engine.
   • The timing light flashes.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Does the timing light flash?

YES : Go to Step 6.
NO : Refer to INSPECTION PROCEDURE 33 – Ignition Circuit System P.13A-695.

STEP 6. Check the ignition timing.

(1) Check the ignition timing at cranking.

Standard value: 5°BTDC ± 3°

Q: Is the ignition timing normal?

YES : Go to Step 7.

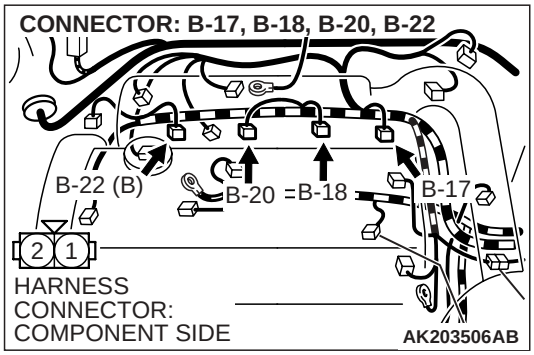
NO : Check that the crankshaft position sensor and timing belt cover are in the correct position. Then confirm that the malfunction symptom is eliminated.

STEP 7. Check harness connectors B-17 or B-18 or B-20 or B-22 at injector for damage.

Q: Is the harness connector in good condition?

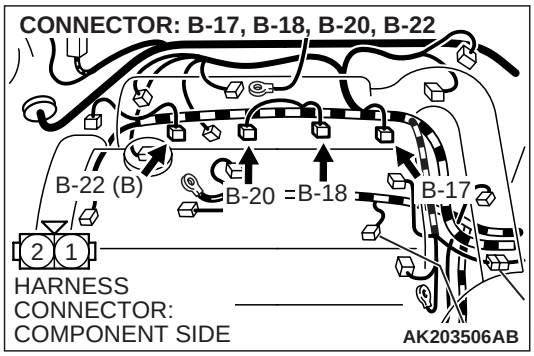
YES : Go to Step 8.

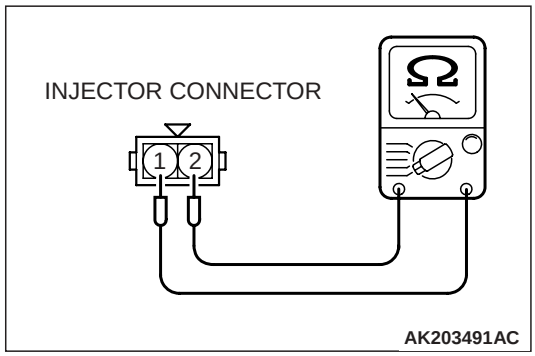
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then confirm that the malfunction symptom is eliminated.



STEP 8. Check the injector.

(1) Disconnect the injector connectors B-17, B-18, B-20, B-22.





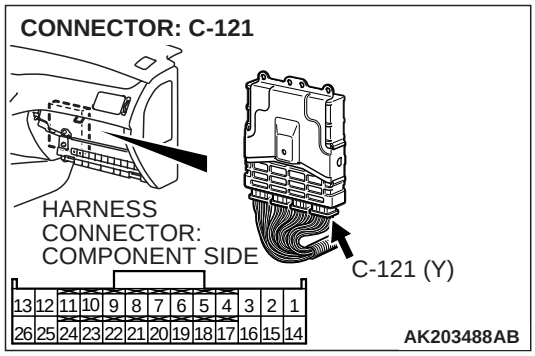
(2) Measure the resistance between each injector side connector terminal No. 1 and No. 2.

Standard value: 2 – 3 ohms [at 20°C (68°F)]

Q: Is the resistance between 2 and 3 ohms [at 20°C (68°F)]?

YES : Go to Step 9.

NO : Replace the injector. Then confirm that the malfunction symptom is eliminated.

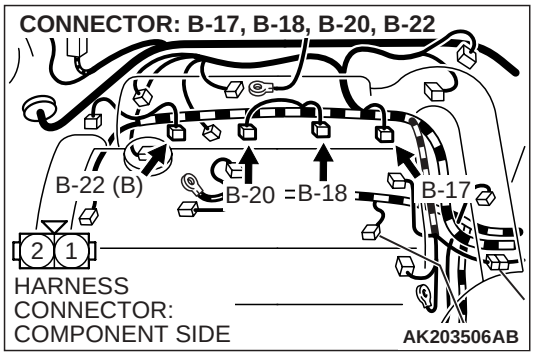


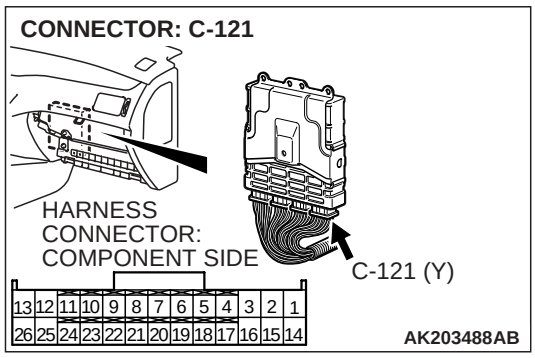
STEP 9. Check connector C-121 at ECM for damage.

Q: Is the 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 confirm that the malfunction symptom is eliminated.





STEP 10. Check for harness damage between injector connector and ECM connector.

a. Check the harness wire between injector connector B-22 (terminal No. 2) and ECM connector C-121 (terminal No. 1) at No.1 cylinder.

b. Check the harness wire between injector connector B-20 (terminal No. 2) and ECM connector C-121 (terminal No. 14) at No.2 cylinder.

c. Check the harness wire between injector connector B-18 (terminal No. 2) and ECM connector C-121 (terminal No. 2) at No.3 cylinder.

d. Check the harness wire between injector connector B-17 (terminal No. 2) and ECM connector C-121 (terminal No. 15) at No.4 cylinder.

Q: Is the harness wire in good condition?

YES : Check the following items, and repair or replace the defective items.
- a. Check the ignition coil, spark plugs and spark plug cables.
- b. Check if the injectors are clogged.
- c. Check if fuel is contaminated.
- d. Check compression.

Then confirm that the malfunction symptom is eliminated.

NO : Repair it. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 6: STARTS UP AND DIES

COMMENT

- In such cases as the above, the cause is usually improper air/fuel mixture. It is possible, though less likely, that the spark plugs are generating sparks but the sparks are weak.

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

- Malfunction of the ignition system.
- Malfunction of the injector system.
- Contaminated fuel.
- Poor compression.
- Malfunction of the ECM.

TSB Revision

DIAGNOSIS

Required Special Tools:

- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

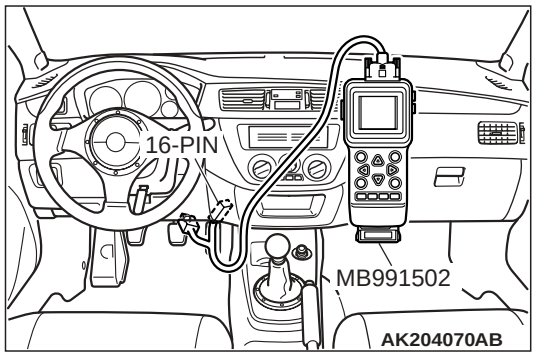
STEP 1. Measure the battery positive voltage.

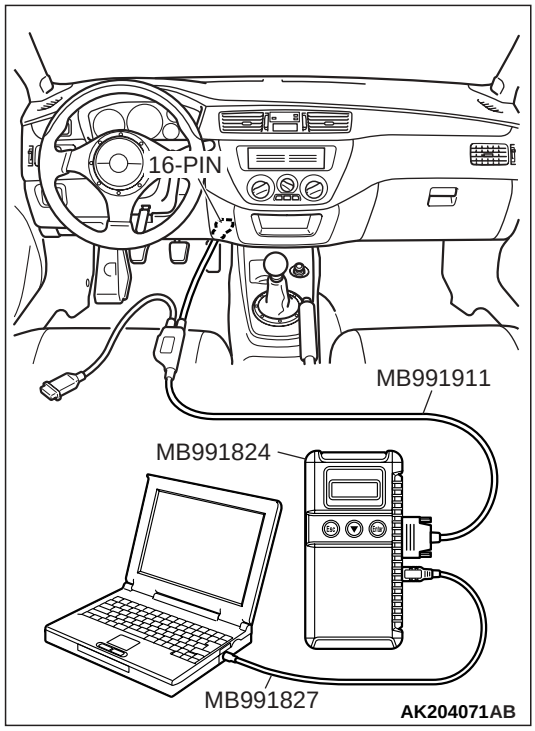
(1) Measure the battery positive voltage during cranking.
- The voltage should remain greater than 8 volts while the engine is cranked.

Q: Does the voltage remain greater than 8 volts while the engine is cranked?

YES : Go to Step 2.

NO : Refer to GROUP 8A, Battery – Battery check P.54A-3.





STEP 2. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

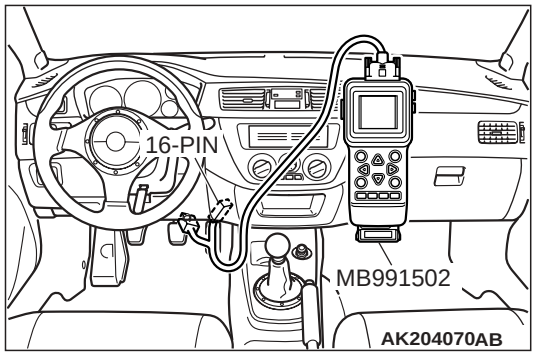
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

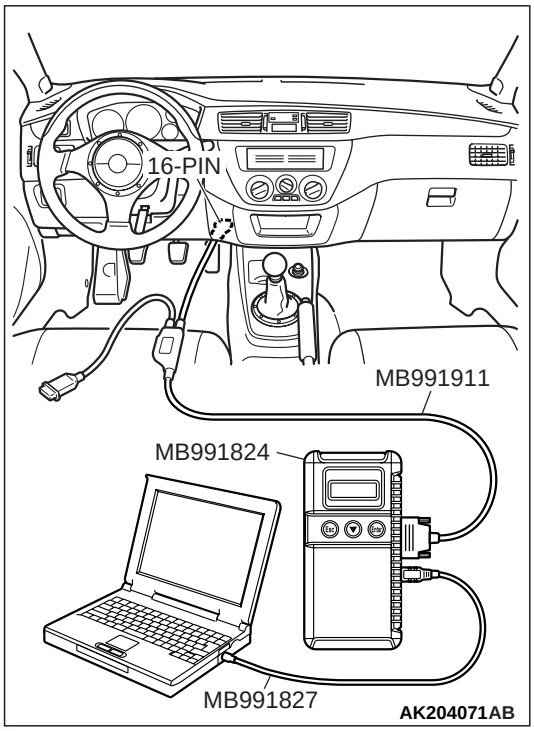
(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC set?

YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-25.

NO : Go to Step 3.



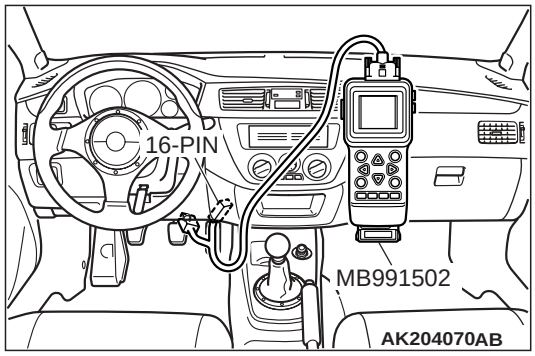


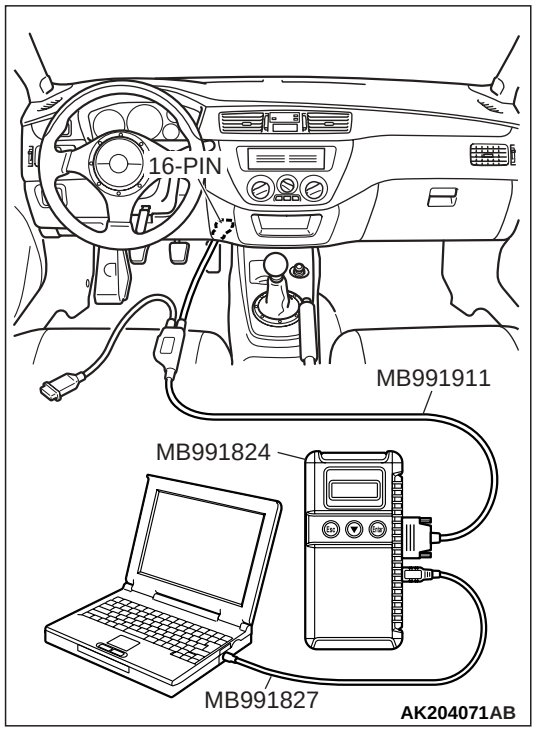
STEP 3. Using scan tool MB991502 or MB991958, check actuator test.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following items in the actuator test. Refer to GROUP 13A, Actuator Test Reference Table P.13A-732.
  a. Item 07: Fuel Pump.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : Go to Step 4.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.





STEP 4. Using scan tool MB991502 or MB991958, check data list.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following items in the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
  a. Item 21: Engine Coolant Temperature Sensor.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

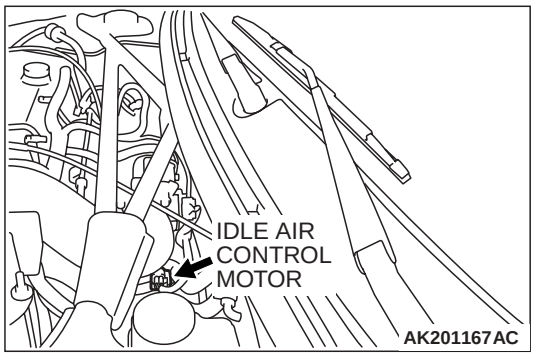
YES : Go to Step 5.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

STEP 5. Check the engine start-ability.

(1) Depress the accelerator pedal slightly, and start the engine.

Q: Is the start ability good?

YES : Go to Step 6.
NO : Go to Step 7.



STEP 6. Check the idle air control (IAC) motor operation sound.

(1) Check that the engine coolant temperature is 20°C (68°F) or below.

NOTE: If necessary, you can disconnect the engine coolant temperature sensor connector and connect the harness side of the connector to another engine coolant temperature sensor that is at 20°C (68°F) or below.

(2) Check that the operation sound of the IAC motor can be heard after the ignition is switched to the "ON" position (but without starting the engine).
- An operation sound is heard.

Q: Did you hear the operation sound?

YES : Refer to GROUP 13A, On-vehicle Service – Clean the throttle valve area P.13A-758.

NO : Refer to GROUP 13A, DTC P0506 Idle Control System RPM Lower Than Expected P.13A-477, DTC P0507 Idle Control System RPM Higher Than Expected P.13A-487.

STEP 7. Check the ignition timing.

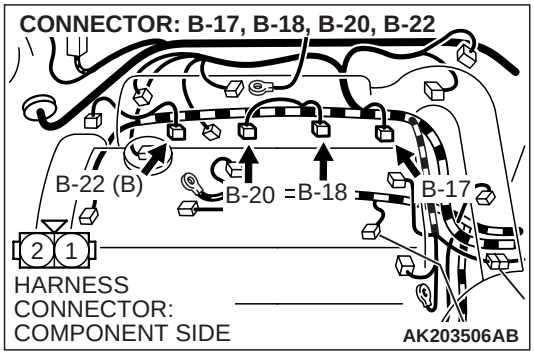
(1) Check the ignition timing at cranking.

Standard value: 5°BTDC ± 3°

Q: Is the ignition timing normal?

YES : Go to Step 8.

NO : Check that the crankshaft position sensor and timing belt cover are in the correct position. Then confirm that the malfunction symptom is eliminated.

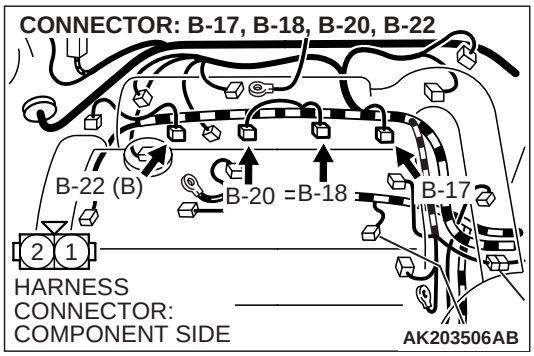


STEP 8. Check harness connectors B-22 or B-20 or B-18 or B-17 at injector for damage.

Q: Is the harness connector in good condition?

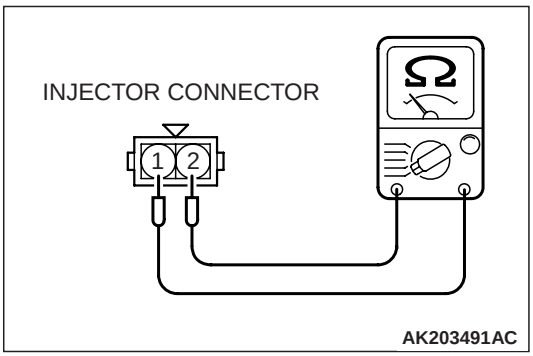
YES : Go to Step 9.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then confirm that the malfunction symptom is eliminated.



STEP 9. Check the injector.

(1) Disconnect the injector connectors B-17, B-18, B-20, B-22.



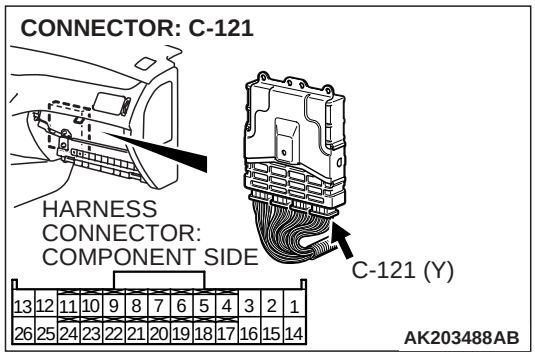
(2) Measure the resistance between each injector side connector terminal No. 1 and No. 2.

Standard value: 2 – 3 ohms [at 20°C (68°F)]

Q: Is the resistance between 2 and 3 ohms [at 20°C (68°F)]?

YES : Go to Step 10.

NO : Replace the injector. Then confirm that the malfunction symptom is eliminated.

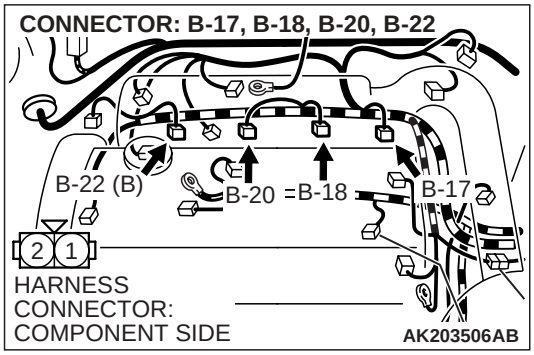


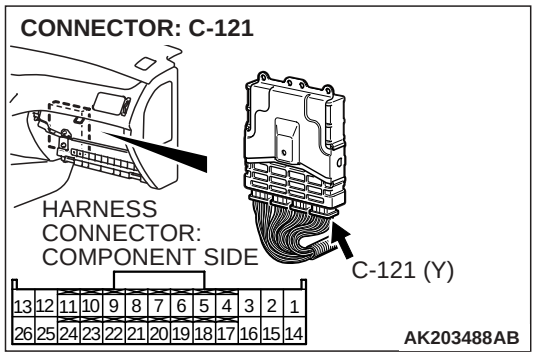
STEP 10. Check connector C-121 at ECM for damage.

Q: Is the connector in good condition?

YES : Go to Step 11.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then confirm that the malfunction symptom is eliminated.





STEP 11. Check for harness damage between injector connector and ECM connector.

a. Check the harness wire between injector connector B-22 (terminal No. 2) and ECM connector C-121 (terminal No. 1) at No. 1 cylinder.
b. Check the harness wire between injector connector B-20 (terminal No. 2) and ECM connector C-121 (terminal No. 14) at No. 2 cylinder.
c. Check the harness wire between injector connector B-18 (terminal No. 2) and ECM connector C-121 (terminal No. 2) at No. 3 cylinder.
d. Check the harness wire between injector connector B-17 (terminal No. 2) and ECM connector C-121 (terminal No. 15) at No. 4 cylinder.

Q: Is the harness wire in good condition?

YES : Check the following items, and repair or replace the defective items.
a. Check the ignition coil, spark plugs and spark plug cables.
b. Check if the injectors are clogged.
c. Check compression pressure.
d. Check fuel lines for clogging.
e. Check if the foreign materials (water, kerosene, etc.) got into fuel.
Then confirm that the malfunction symptom is eliminated.

NO : Repair it. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 7: HARD STARTING

COMMENT

- In cases such as the above, the cause is usually either weak spark, improper air-fuel mixture or low compression.

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

- Malfunction of the ignition system.
- Malfunction of the injector system.
- Poor fuel quality. (Contamination)
- Poor compression.

DIAGNOSIS

Required Special Tools:

- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Measure the battery positive voltage.

(1) Measure the battery positive voltage during cranking.
- The voltage should remain greater than 8 volts while the engine is cranked.

Q: Dose the voltage remain greater than 8 volts while the engine is cranked?

YES : Go to Step 2.

NO : Refer to GROUP 54A, Batter – Battery check P.54A-3.

STEP 2. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

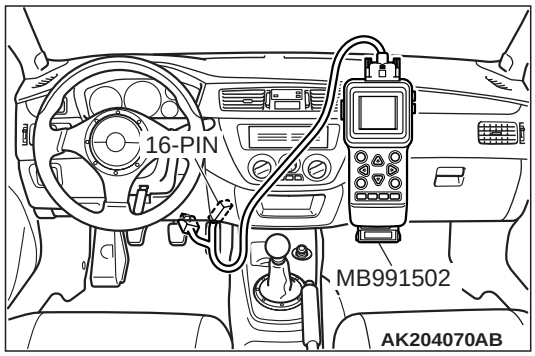
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

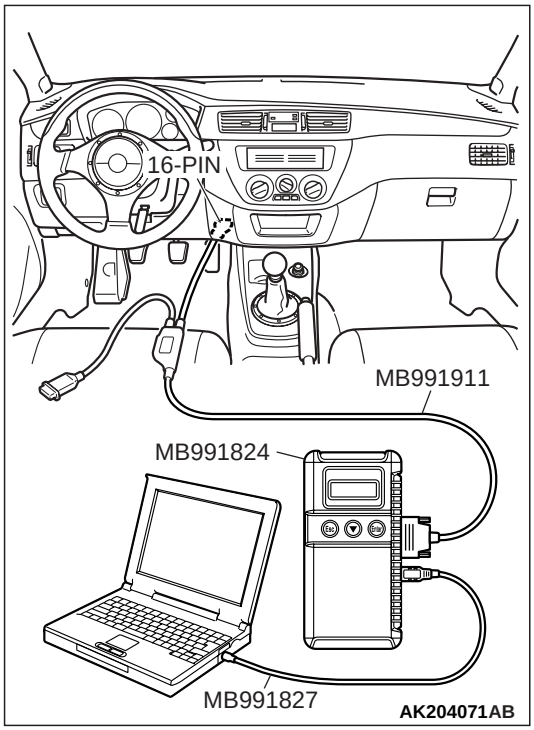
(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

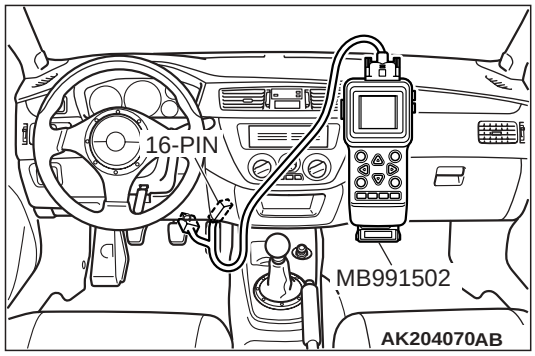
Q: Is DTC set?

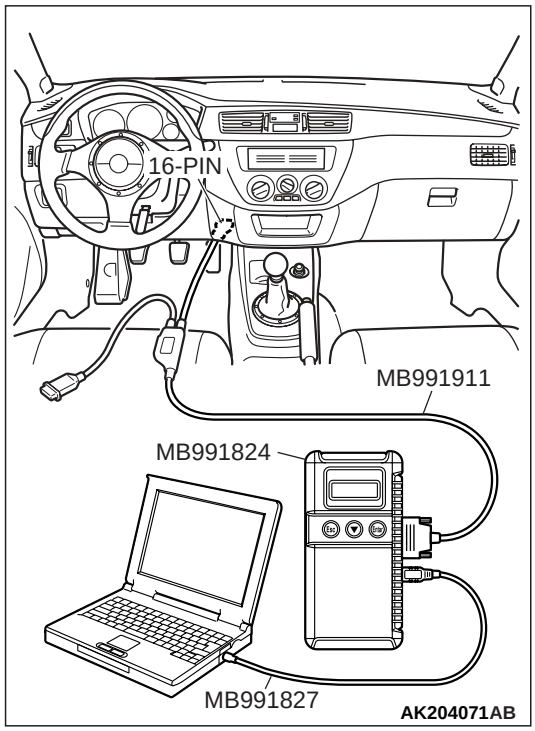
YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-25.

NO : Go to Step 3.







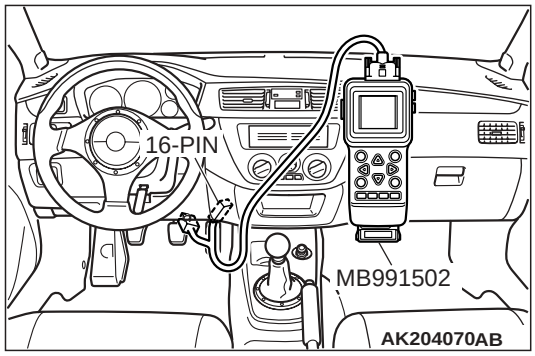


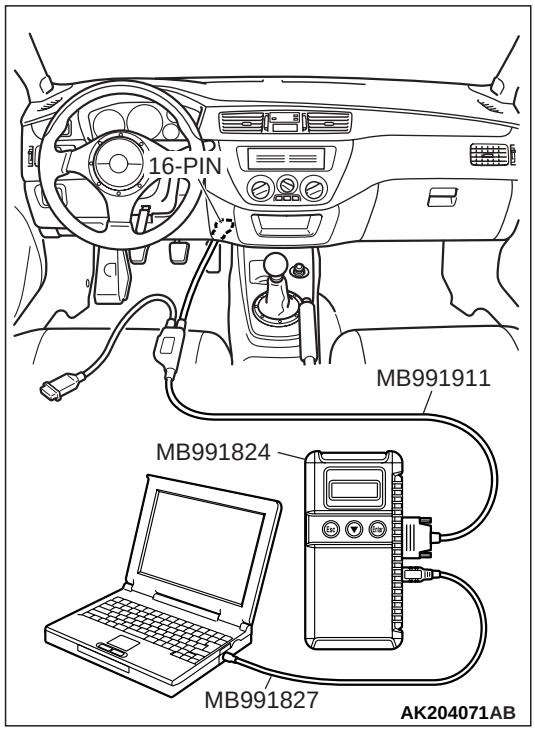
STEP 3. Using scan tool MB991502 or MB991958, check actuator test.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following items in the actuator test. Refer to GROUP 13A, Actuator Test Reference Table P.13A-732.
  a. Item 07: Fuel Pump.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : Go to Step 4.
NO : Repair or Replace. Then confirm that the malfunction symptom is eliminated.





STEP 4. Using scan tool MB991502 or MB991958, check data list.

(1) Turn the ignition switch the "ON" position.
(2) Check the following items in the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
  a. Item 21: Engine Coolant Temperature Sensor.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

YES : Go to Step 5.
NO : Repair or Replace. Then confirm that the malfunction symptom is eliminated.

STEP 5. Check the ignition timing.

(1) Check the ignition timing at cranking.

Standard value: 5°BTDC ± 3°

Q: Is the ignition timing normal?

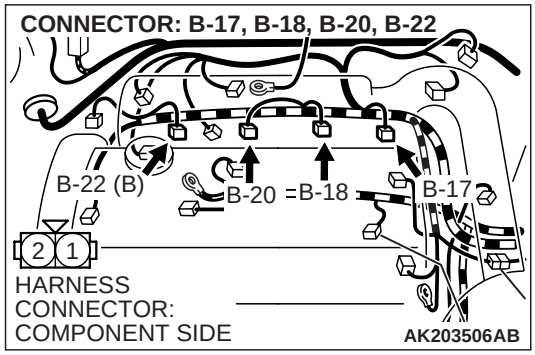
YES : Go to Step 6.
NO : Check that the crankshaft position sensor and timing belt cover are in the correct position. Then confirm that the malfunction symptom is eliminated.

STEP 6. Check harness connectors B-22 or B-20 or B-18 or B-17 at injector for damage.

Q: Is the harness connector in good condition?

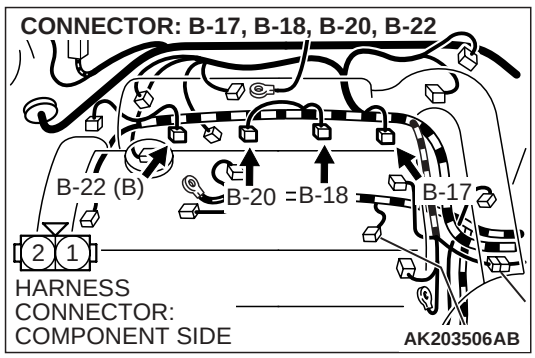
YES : Go to Step 7.

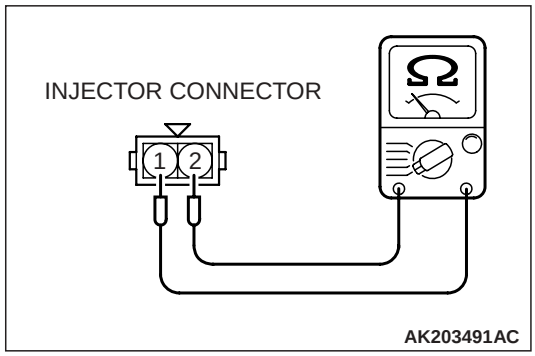
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then confirm that the malfunction symptom is eliminated.



STEP 7. Check the injector.

(1) Disconnect the injector connectors B-17, B-18, B-20, B-22.





(2) Measure the resistance between each injector side connector terminals No. 1 and No. 2.

Standard value: 2 – 3 ohms [at 20°C (68°F)]

Q: Is the resistance between 2 and 3 ohms [at 20°C (68°F)]?

YES : Go to Step 8.

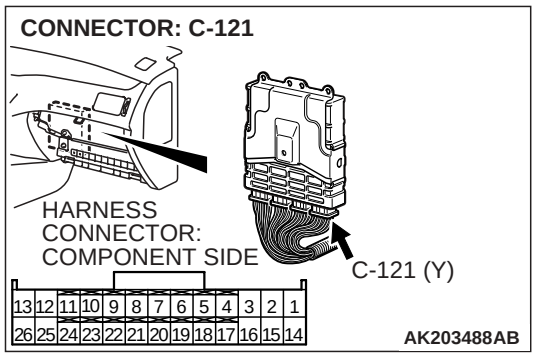
NO : Replace the injector. Then confirm that the malfunction symptom is eliminated.

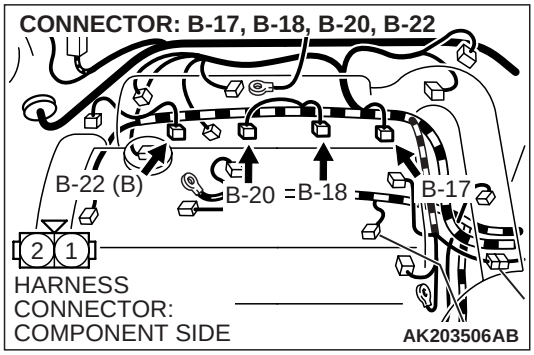
STEP 8. Check connector C-121 at ECM for damage.

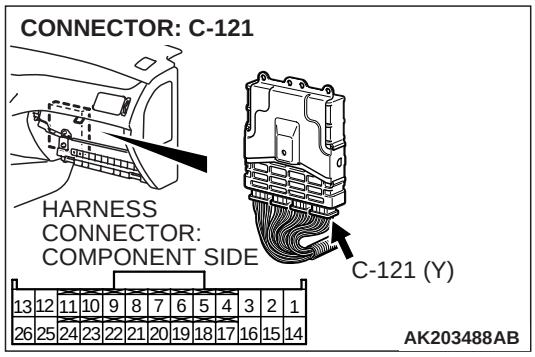
Q: Is the connector in good condition?

YES : Go to Step 9.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then confirm that the malfunction symptom is eliminated.







STEP 9. Check for harness damage between injector connector and ECM connector.

a. Check the harness wire between injector connector B-22 (terminal No. 2) and ECM connector C-121 (terminal No. 1) at No. 1 cylinder.
b. Check the harness wire between injector connector B-20 (terminal No. 2) and ECM connector C-121 (terminal No. 14) at No. 2 cylinder.
c. Check the harness wire between injector connector B-18 (terminal No. 2) and ECM connector C-121 (terminal No. 2) at No. 3 cylinder.
d. Check the harness wire between injector connector B-17 (terminal No. 2) and ECM connector C-121 (terminal No. 15) at No. 4 cylinder.

Q: Is the harness wire in good condition?

YES : Check the following items, and repair or replace the defective items.
a. Check the ignition coil, spark plugs and spark plug cables.
b. Check if the injectors are clogged.
c. Check compression pressure.
d. Check if the foreign materials (water, kerosene, etc.) got into fuel.
Then confirm that the malfunction symptom is eliminated.

NO : Repair it. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 8: UNSTABLE IDLE (ROUGH IDLE, HUNTING)

COMMENT

- In cases such as the above, the cause is probably the air/fuel mixture or idle air control motor. Other systems affecting idle quality include the ignition system and compression.

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

- Malfunction of the ignition system.
- Malfunction of air/fuel ratio control system.
- Malfunction of the IAC system.
- Malfunction of the evaporative emission purge solenoid system.
- Poor compression pressure.
- Vacuum leak.
- Malfunction of the EGR vacuum regulator solenoid valve system.

DIAGNOSIS

Required Special Tools:

- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Check if the battery terminal is disconnected.

Q: Has the battery terminal been disconnected lately?

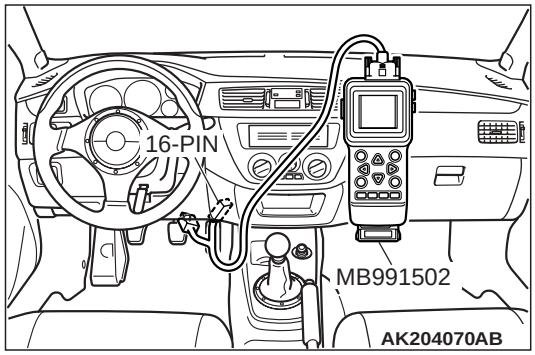
YES : Start the engine and let it run at idle for approximate 10 minutes after engine warm up. Then, if a malfunction occurs, go to Step 2.

NO : Go to Step 2.

STEP 2. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch is to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

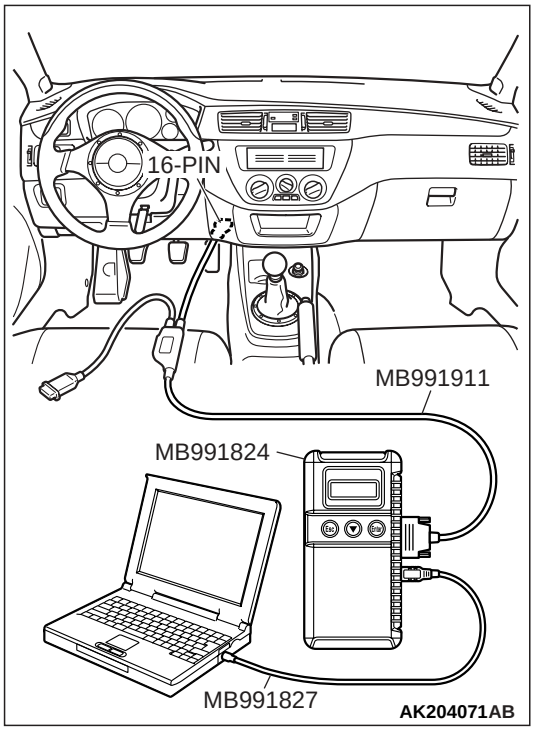


(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC set?

YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-25.

NO : Go to Step 3.



STEP 3. Check the engine idling state.

Q: Is it hunting remarkably?

YES : Go to Step 4.

NO : Go to Step 5.

STEP 4. Check the following items.

(1) Carry out the following cleaning.
   a. Clean the throttle valve area (Refer to GROUP 13A, On-vehicle Service – Throttle Body Cleaning. P.13A-758).

(2) After cleaning, confirm that the malfunction symptom is eliminated.

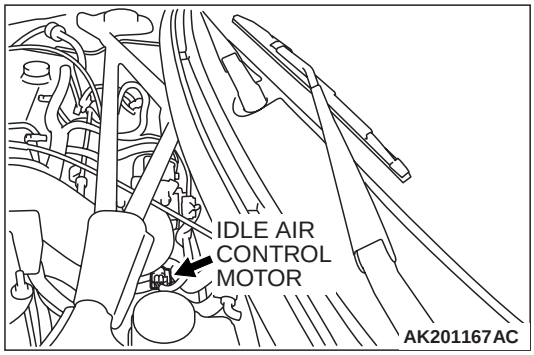
Q: Is the malfunction symptom resolved?

YES : The check is completed.

NO : Check the following items, and repair or replace the defective items.
   a.Broken intake manifold gasket.
   b.Broken air intake hose.
   c.Broken vacuum hose.
   d.Positive crankcase ventilation valve does not operate.

Then confirm that the malfunction symptom is eliminated.

STEP 5. Check the idle air control (IAC) motor operation sound.



(1) Check that the engine coolant temperature is 20°C (68°F) or below.

NOTE: Disconnecting the engine coolant temperature sensor connector and connecting the harness side of the connector to another engine coolant temperature sensor that is at 20°C (68°F) or below is also okay.

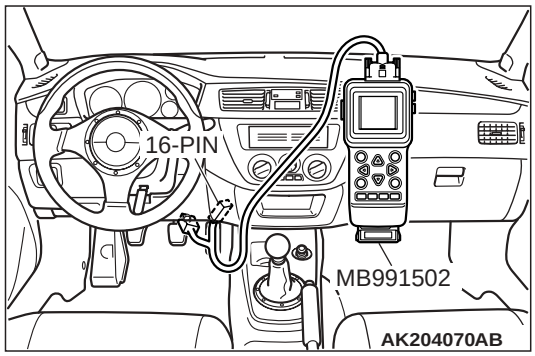
(2) Check the operation sound of the IAC motor can be heard after the ignition is switched to the "ON" position (but without starting the engine).
   • An operation sound is heard.

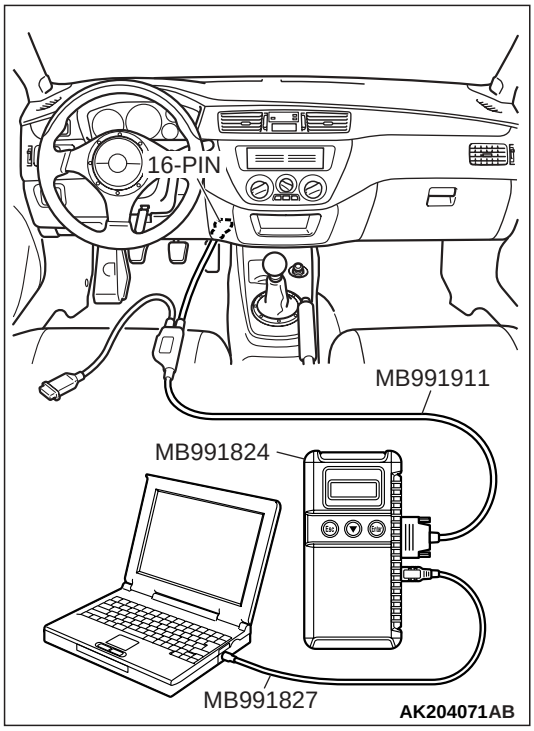
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Did you hear the operation sound?

YES : Go to Step 6.

NO : Refer to GROUP 13A, DTC P0506 – Idle Control System RPM Lower Than Expected P.13A-477, DTC P0507 – Idle Control System RPM Higher Than Expected P.13A-487.





STEP 6. Using scan tool MB991502 or MB991958, check actuator test items 01, 02, 03, 04: Injector.

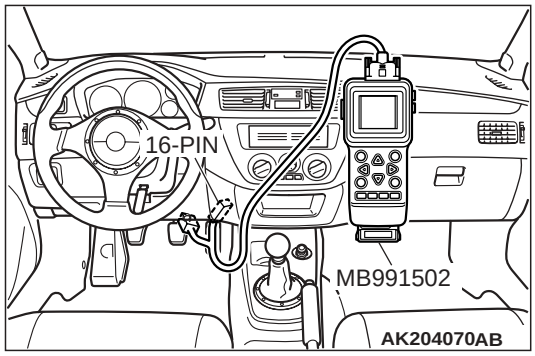
⚠ CAUTION

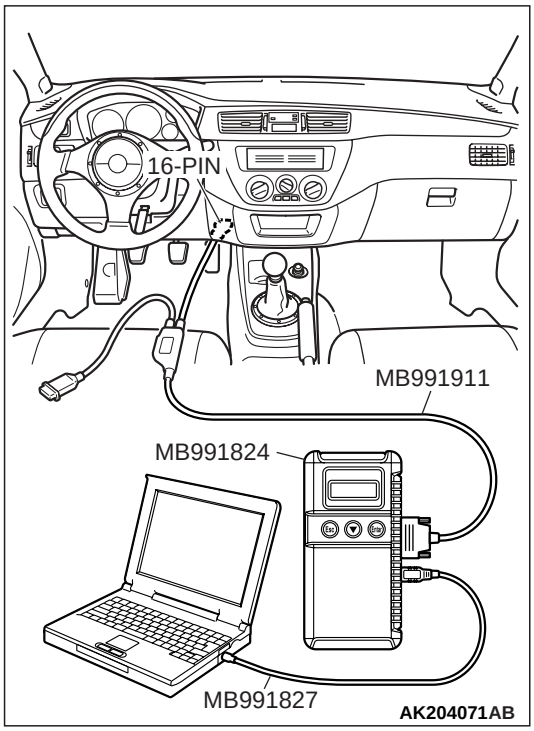
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check following items in the actuator test. Refer to GROUP 13A, Actuator Test Reference Table P.13A-732.
  a. Items 01, 02, 03, 04: Injector.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : Go to Step 7.
NO : Refer to GROUP 13A, DTC P0201, P0202, P0203, P0204 – Injector Circuit P.13A-267.



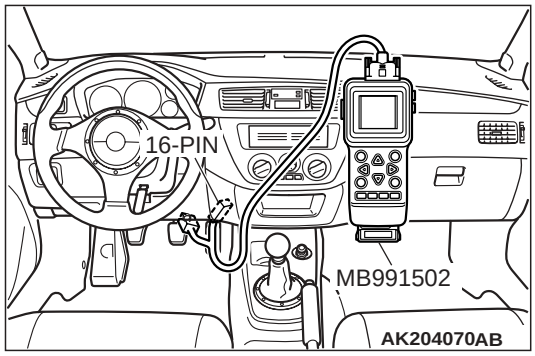


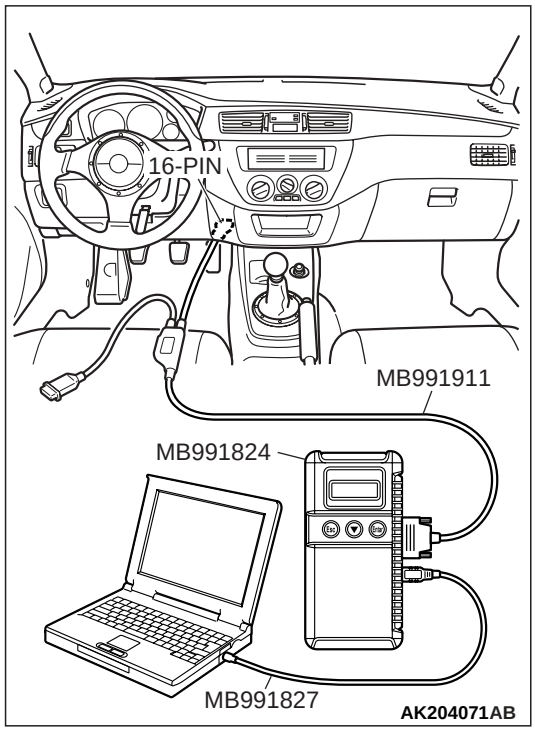
STEP 7. Using scan tool MB991502 or MB991958, check data list.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following items in the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
   a. Item 13: Intake Air Temperature Sensor.
   b. Item 25: Barometric Pressure Sensor.
   c. Item 21: Engine Coolant Temperature Sensor.
   d. Item 59: Heated Oxygen Sensor (rear).
   e. Item 11: Heated Oxygen Sensor (front).
   f. Item 27: Power Steering Pressure Switch.
   g. Item 28: A/C Switch.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

YES : Go to Step 8.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.



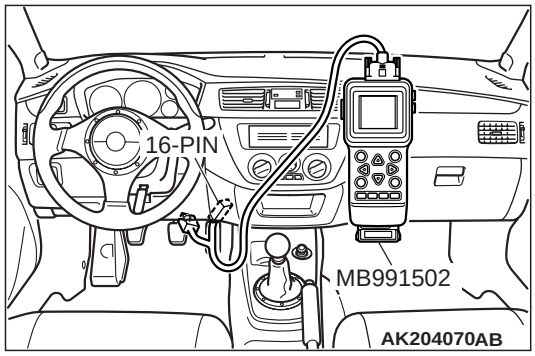


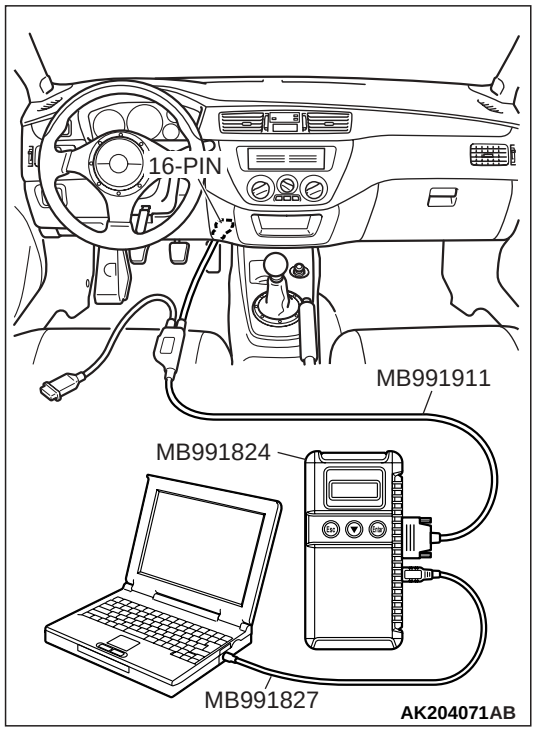
STEP 8. Using scan tool MB991502 or MB991958, check actuator test.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following items in the actuator test. Refer to GROUP 13A, Actuator Test Reference Table P.13A-732.
   a. Item 08: Evaporative Emission Purge Solenoid.
   b. Item 10: EGR Vacuum Regulator Solenoid Valve.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

YES : Go to Step 9.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.



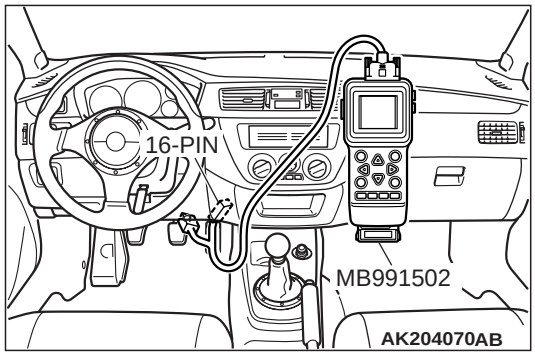


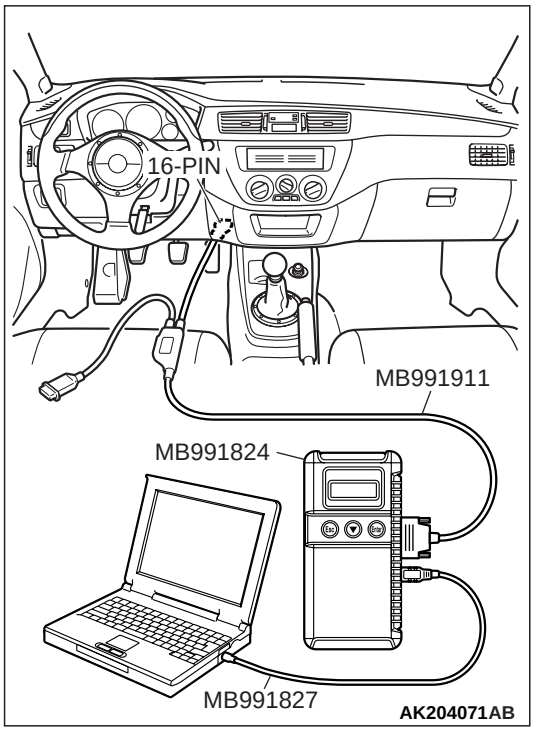
STEP 9. Using scan tool MB991502 or MB991958, check data list.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following items in the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
  a. Item 45: Idle Air Control Motor Position.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : Go to Step 10.
NO : Adjust the basic idle speed. Refer to GROUP 13A, On-vehicle Service – Basic Idle Speed Adjustment P.13A-760. After adjusting, confirm.





STEP 10. Using scan tool MB991502 or MB991958, check data list.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following items of the data list. Refer to, Data List Reference Table P.13A-723.
  a. Item 11: Heated Oxygen Sensor (front).
  - Voltage should fluctuate between 0 – 0.4 volt and 0.6 – 1.0 volt while idling after the engine has been warmed.

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

Q: Is the sensor operating properly?

YES : Go to Step 12.
NO : Go to Step 11.

STEP 11. Check the fuel pressure.

Refer to GROUP 13A, On-vehicle Service – Fuel Pressure Test P.13A-762.

Q: Is the fuel pressure normal?

YES : Check the following items, and repair or replace the defective items.
a.Vacuum leak.
- Broken intake manifold gasket.
- Broken air intake hose.
- Broken vacuum hose.
- Positive crankcase ventilation valve does not operate.

b.Injector clogged.
Then confirm that the malfunction symptom is eliminated.

NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

STEP 12. Check the ignition timing.
Refer to GROUP 11A, On-vehicle Service – Ignition Timing Check P.11A-11.

Q: Is the ignition timing normal?

YES : Check the following items, and repair or replace the defective items.
a. Check the ignition coil, spark plugs, spark plug cables.
b. Check the purge control system.
c. Check compression pressure.
d. Check if the foreign materials (water, kerosene, etc.) got into fuel.
e. Check the EGR control system.
Then confirm that the malfunction symptom is eliminated.

NO : Check that the crankshaft position sensor and timing belt cover are in the correct position. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 9: IDLE SPEED IS HIGH (IMPROPER IDLE SPEED)

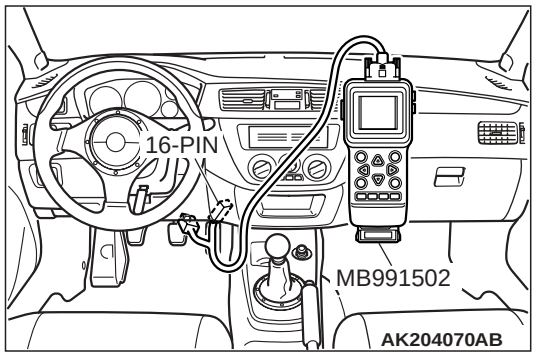
COMMENT
- In such cases as the above, the cause is probably that the intake air volume during idle is too great.

TROUBLESHOOTING HINTS (The most likely causes for this case:)
- Malfunction of the IAC system.
- Malfunction of the throttle body.

DIAGNOSIS

Required Special Tools:
- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).



⚠ CAUTION

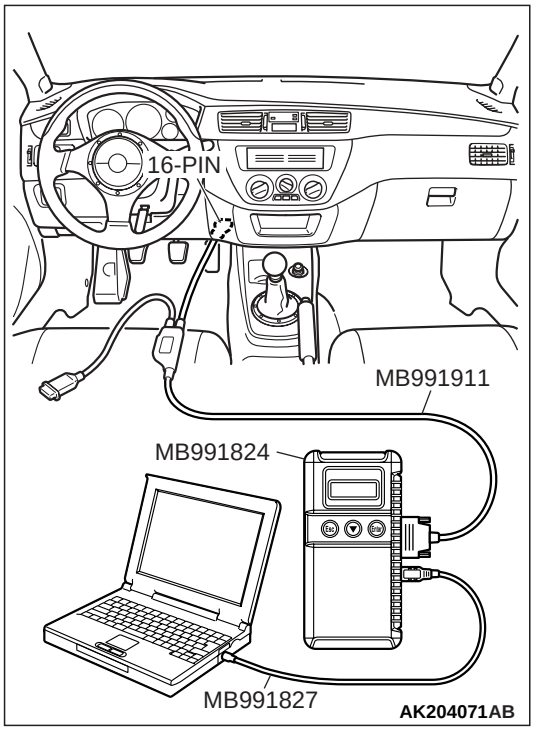
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or 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.

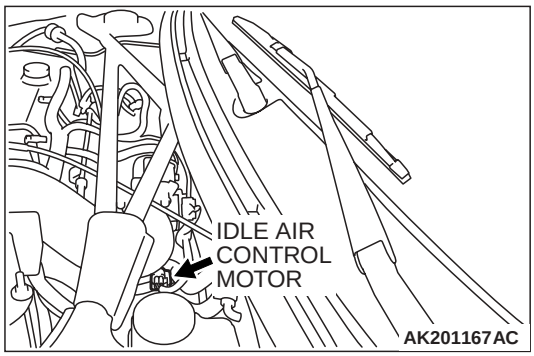
Q: Is DTC set?

YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-25.

NO : Go to Step 2.



STEP 2. Check the idle air control (IAC) motor operation sound.



(1) Check that the engine coolant temperature is 20°C (68°F) or below.

NOTE: Disconnecting the engine coolant temperature sensor connector and connecting the harness side of the connector to another engine coolant temperature sensor that is at 20°C (68°F) or below is also okay.

(2) Check the operation sound of the IAC motor can be heard after the ignition is switched to the "ON" position (but without starting the engine).
- An operation sound should be heard.

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

Q: Did you hear the operation sound?

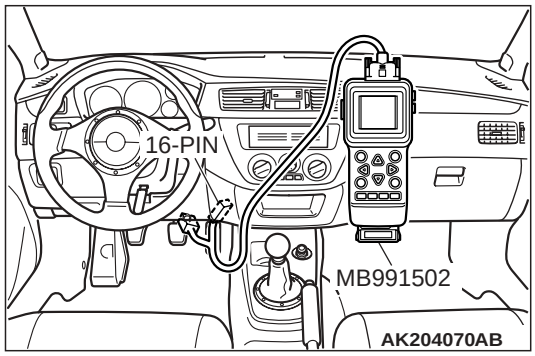
YES : Go to Step 3.

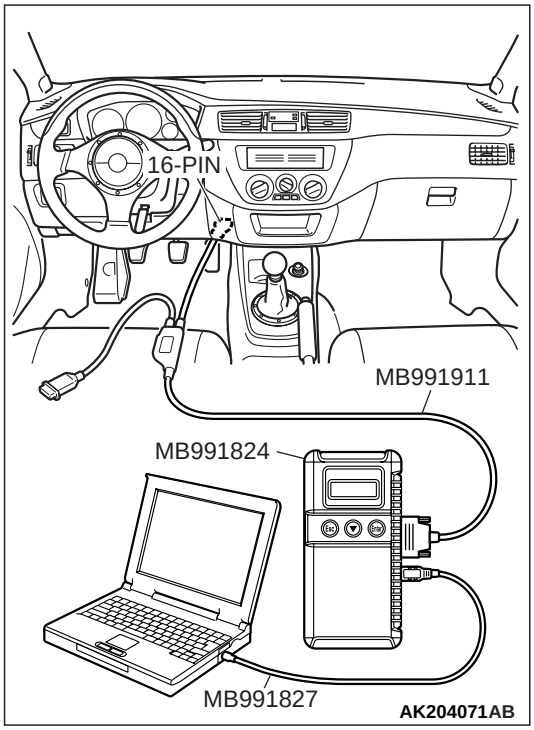
TSB Revision

NO : Refer to GROUP 13A, DTC P0506 – Idle Control System RPM Lower Than Expected P.13A-477, DTC P0507 – Idle Control System RPM Higher Than Expected P.13A-487.

STEP 3. Using scan tool MB991502 or MB991958, check data list.

⚠ CAUTION
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.





(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check the following items in the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
  a. Item 21: Engine Coolant Temperature Sensor.
  b. Item 28: A/C Switch.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

YES : Go to Step 4.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

STEP 4. Adjust the basic idle speed.

Refer to GROUP 13A, On-vehicle Service – Basic Idle Speed Adjustment for the adjustment procedure P.13A-760.

Standard value: 850 ± 50 r/min

Q: Is the Idle speed normal?

YES : Refer to GROUP 13A, On-vehicle Service – Clean the throttle valve area P.13A-758.
NO : The check is completed.

INSPECTION PROCEDURE 10: IDLE SPEED IS LOW (IMPROPER IDLE SPEED)

COMMENT

- In cases such as the above, the cause is probably that the intake air volume during idle is too small.

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

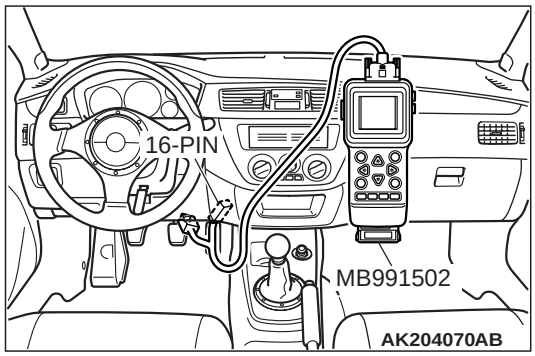
- Malfunction of the IAC system.
- Malfunction of the throttle body.

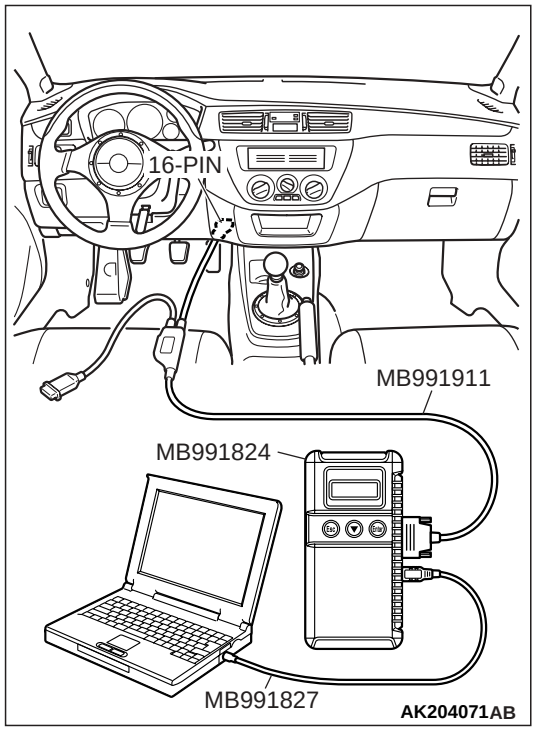
DIAGNOSIS

Required Special Tools:

- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).





⚠ CAUTION

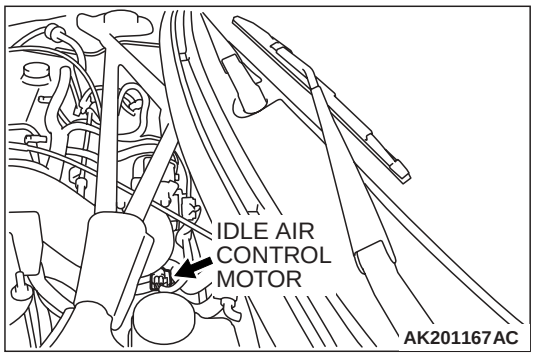
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or 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 set?

YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-25.

NO : Go to Step 2.



STEP 2. Check the idle air control (IAC) motor operation sound.

(1) Check that the engine coolant temperature is 20°C (68°F) or below.

NOTE: If necessary, you can disconnect the engine coolant temperature sensor connector and connect the harness side of the connector to another engine coolant temperature sensor that is at 20°C (68°F) or below.

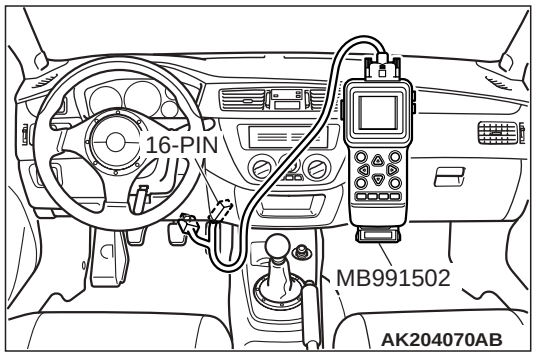
(2) Check that the operation sound of the IAC motor can be heard after the ignition is switched to the "ON" position (but without starting the engine).
- An operation sound should be heard.

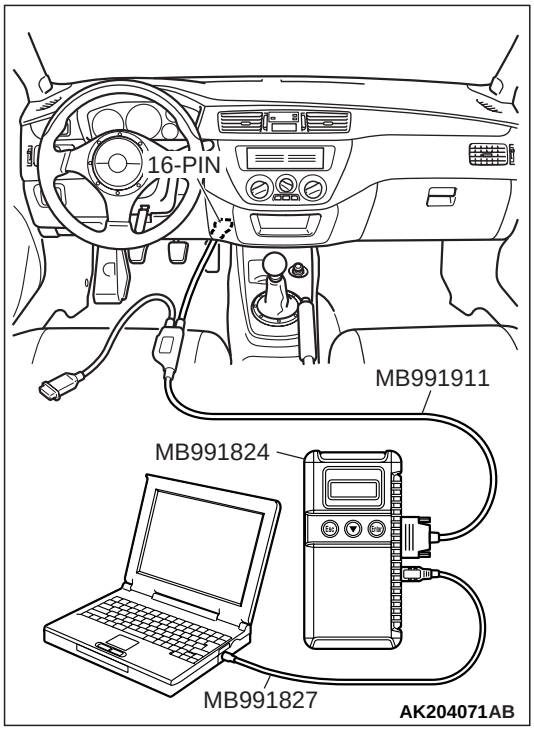
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Did you hear the operation sound?

YES : Go to Step 3.

NO : Refer to GROUP 13A, DTC P0506 – Idle Control System RPM Lower Than Expected P.13A-477, DTC P0507 – Idle Control System RPM Higher Than Expected P.13A-487.





STEP 3. Using scan tool MB991502 or MB991958, check data list.

⚠ CAUTION
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check the following item in the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
  a. Item 21: Engine Coolant Temperature Sensor.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

YES : Go to Step 4.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

STEP 4. Adjust the basic idle speed.

Refer to GROUP 13A, On-vehicle Service – Basic Idle Speed Adjustment for the adjustment procedure P.13A-760.

Standard value: 850 ± 50 r/min

Q: Is the idle speed normal?

YES : Refer to GROUP 13A, On-vehicle Service – Clean the throttle valve area P.13A-758.
NO : The check is completed.

INSPECTION PROCEDURE 11: WHEN THE ENGINE IS COLD, IT STALLS AT IDLE (DIE OUT)

COMMENT

- In such cases as the above, the air/fuel mixture may be inappropriate when the engine is cold.

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

- Malfunction of the IAC system.
- Malfunction of the throttle body.
- Malfunction of the injector system.
- Malfunction of the ignition system.

DIAGNOSIS

Required Special Tools:

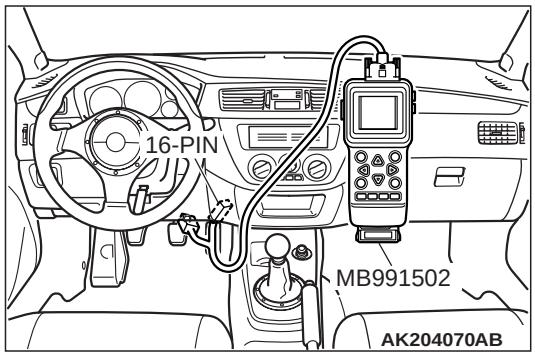
- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

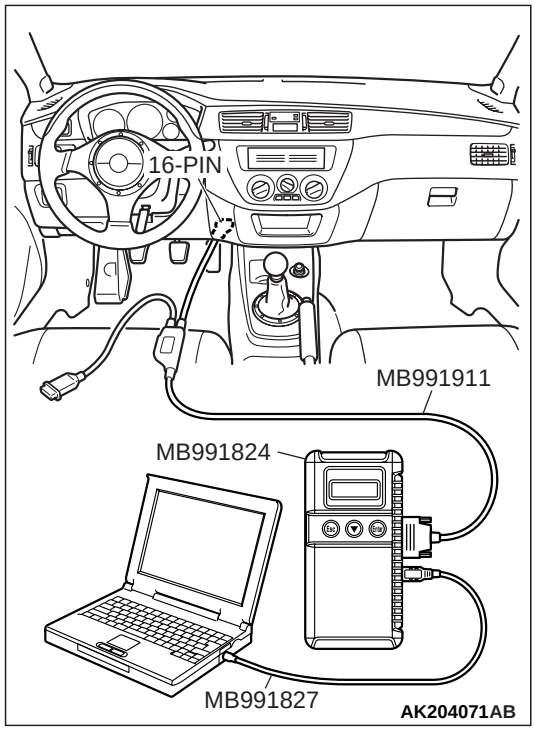
STEP 1. Check if the battery terminal is disconnected.

Q: Has the battery terminal been disconnected lately?

YES : Start the engine and let it run at idle for approximate 10 minutes after engine warm up. Then, if a malfunction occurs, go to Step 2.

NO : Go to Step 2





STEP 2. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or 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 set?

YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-94.
NO : Go to Step 3.

STEP 3. Checking by operating the accelerator pedal.

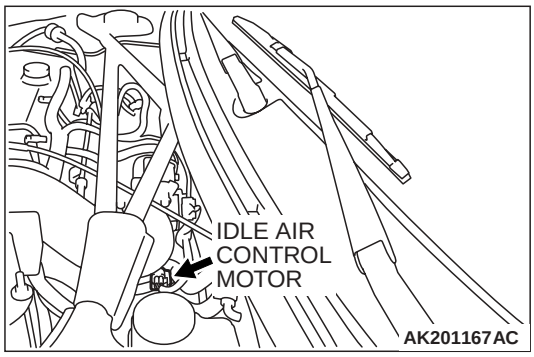
Q: Does the engine stall right after the accelerator pedal is released?

YES : Refer to GROUP 13A, On-vehicle Service – Clean the throttle valve area P.13A-758.
NO : Go to Step 4.

STEP 4. Check the engine idling.

Q: Is the idling good enough after warm up?

YES : Go to Step 5.
NO : Refer to, INSPECTION PROCEDURE 8 – Unstable Idle (Rough Idle, Hunting) P.13A-582.



STEP 5. Check the idle air control (IAC) motor operation sound.

(1) Check that the engine coolant temperature is 20°C (68°F) or below.

NOTE: If necessary, you can disconnect the engine coolant temperature sensor connector and connect the harness side of the connector to another engine coolant temperature sensor that is at 20°C (68°F) or below.

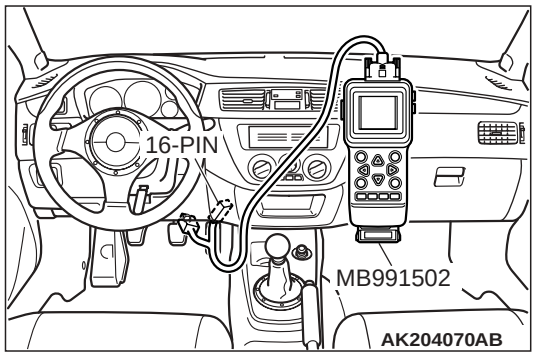
(2) Check the operation sound of the IAC motor can be heard after the ignition is switched to the "ON" position (but without starting the engine).
- An operation sound should be heard.

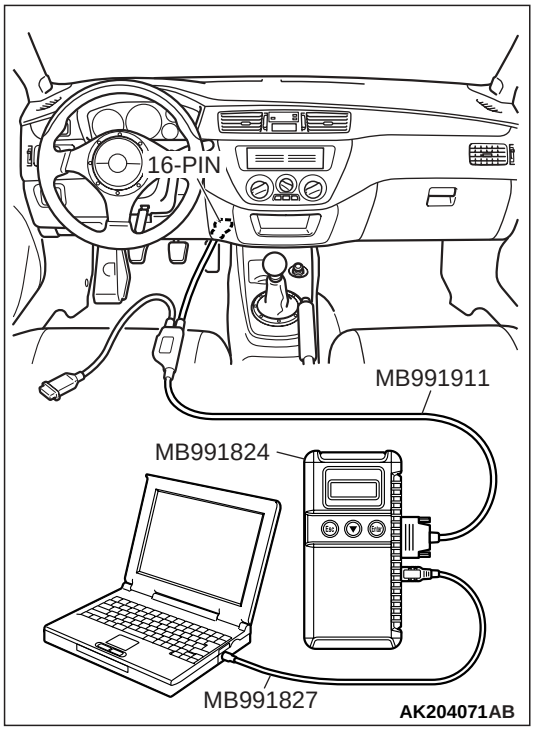
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Did you hear the operation sound?

YES : Go to Step 6.

NO : Refer to GROUP 13A, DTC P0506 – Idle Control System RPM Lower Than Expected P.13A-477, DTC P0507 – Idle Control System RPM Higher Than Expected P.13A-487.





STEP 6. Using scan tool MB991502 or MB991958, check actuator test items 01, 02, 03, 04: Injector.

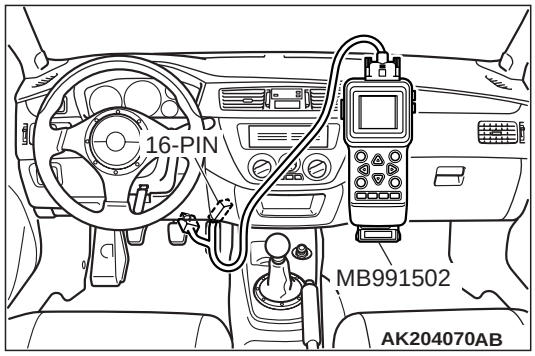
⚠ CAUTION

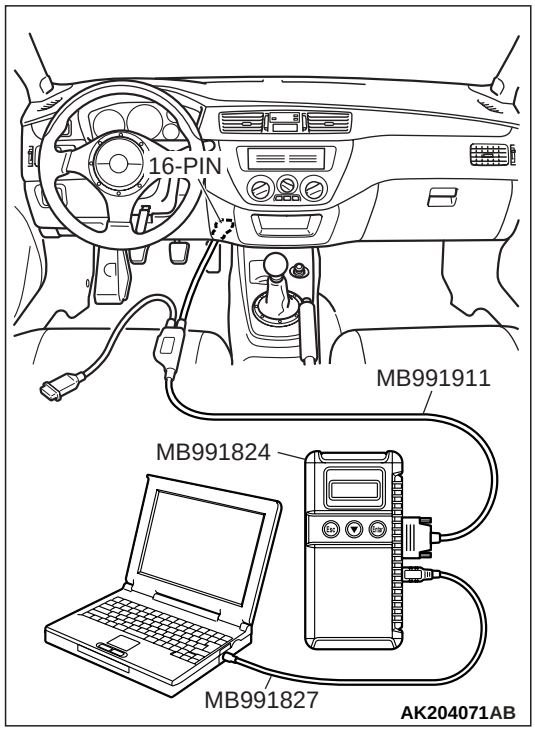
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check following items in the actuator test. Refer to GROUP 13A, Actuator Test Reference Table P.13A-732.
  a. Items 01, 02, 03, 04: Injector.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : Go to Step 7.
NO : Refer to GROUP 13A, DTC P0201, P0202, P0203, P0204 – Injector Circuit P.13A-267.





STEP 7. Using scan tool MB991502 or MB991958, check data list.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following item in the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
  a. Item 21: Engine Coolant Temperature Sensor.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

YES : Go to Step 8.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

STEP 8. Check the fuel pressure.

Refer to GROUP 13A, On-vehicle Service – Fuel Pressure Test P.13A-762.

Q: Is the fuel pressure normal?

YES : Go to Step 9.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

STEP 9. Check the ignition timing.

Refer to GROUP 11A, On-vehicle Service – Ignition Timing Check P.11A-11.

Q: Is the ignition timing normal?

YES : Check the following items, and repair or replace the defective items.
a. Check the ignition coil, spark plugs, spark plug cables.
b. Check compression pressure.
c. Check the engine oil viscosity.
Then confirm that the malfunction symptom is eliminated.

NO : Check that the crankshaft position sensor and timing belt cover are in the correct position. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 12: WHEN THE ENGINE IS HOT, IT STALLS AT IDLE (DIE OUT)

COMMENT

- In cases such as the above, the ignition system, air/fuel mixture, idle air control motor or compression pressure may be faulty. In addition, if the engine suddenly stalls, the cause may also be a loose connector.

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

- Malfunction of the ignition system.
- Malfunction of air/fuel ratio control system.
- Malfunction of the IAC system.
- Vacuum leak.
- Improper connector contact.

DIAGNOSIS

Required Special Tools:

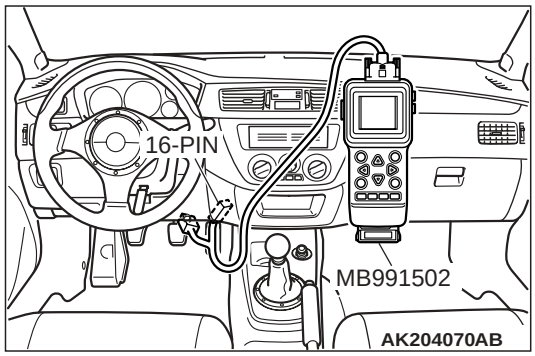
- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

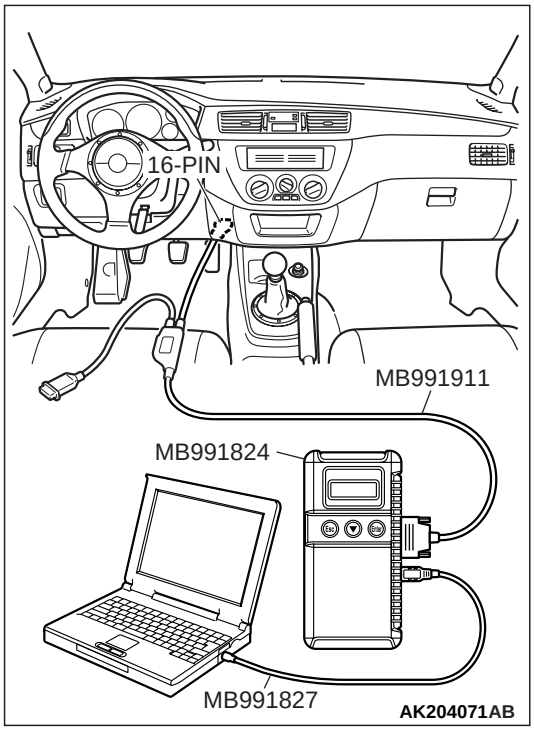
STEP 1. Check if the battery terminal is disconnected.

Q: Has the battery terminal been disconnected lately?

YES : Start the engine and let it run at idle for approximate 10 minutes after engine warm up. Then, if a malfunction occurs, go to step 2.

NO : Go to Step 2.





STEP 2. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

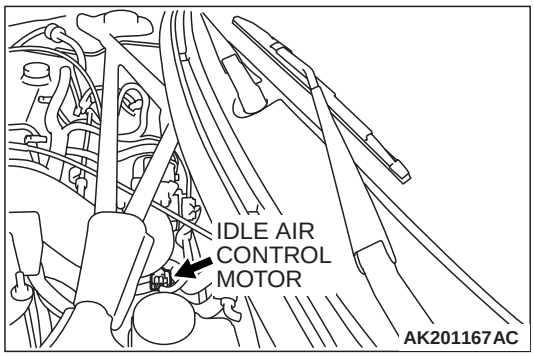
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or 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 set?

YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-25.

NO : Go to Step 3.



STEP 3. Check the idle air control (IAC) motor operation sound.

(1) Check that the engine coolant temperature is 20°C (68°F) or below.

NOTE: If necessary, you can disconnect the engine coolant temperature sensor connector and connect the harness side of the connector to another engine coolant temperature sensor that is at 20°C (68°F) or below.

(2) Check that the operation sound of the IAC motor can be heard after the ignition is switched to the "ON" position (but without starting the engine).
- An operation sound should be heard.

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

Q: Did you hear the operation sound?

YES : Go to Step 4

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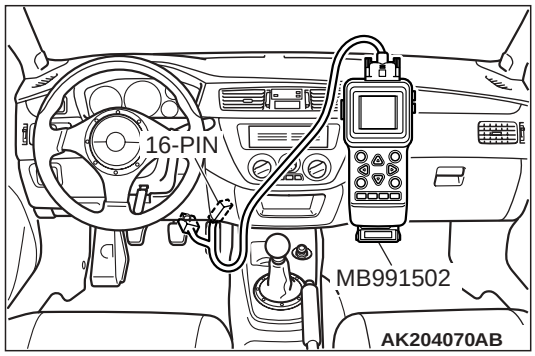
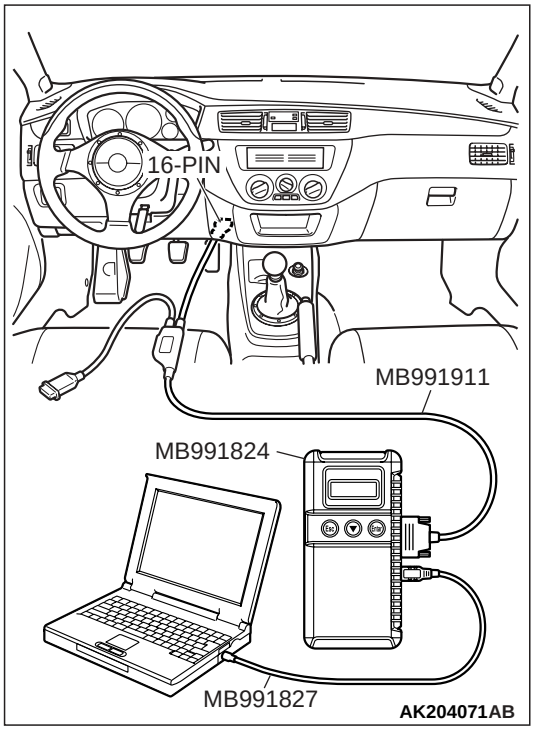
NO : Refer to GROUP 13A, DTC P0506 – Idle Control System RPM Lower Than Expected P.13A-477, DTC P0507 – Idle Control System RPM Higher Than Expected P.13A-487.

STEP 4. Using scan tool MB991502 or MB991958, check actuator test items 01, 02, 03, 04: Injector.

⚠ CAUTION
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.



(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check following items in the actuator test. Refer to GROUP 13A, Actuator Test Reference Table P.13A-732.
  a. Items 01, 02, 03, 04: Injector.
(4) Turn the ignition switch to the "LOCK" (OFF) position.



Q: Is the actuator operating properly?
YES : Go to Step 5.
NO : Refer to GROUP 13A, DTC P0201, P0202, P0203, P0204 – Injector Circuit P.13A-267.

STEP 5. Checking by operating the accelerator pedal.

Q: Does the engine stall right after the accelerator pedal is released?
YES : Refer to GROUP 13A, Clean the throttle valve area P.13A-758.
NO : Go to Step 6.

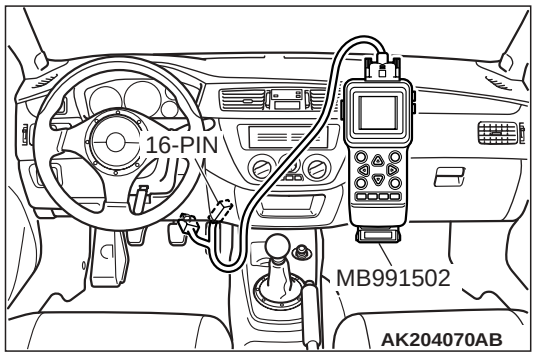
STEP 6. Engine stall reproduction test.

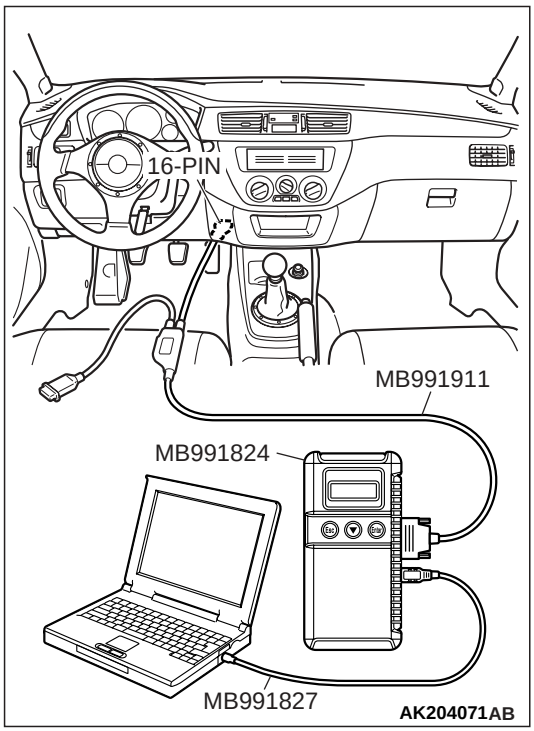
Q: Is it easy to reproduce the engine stall?
YES : Go to Step 7.

NO : Check if the following signals change suddenly by wiggling the circuit harness and connectors.
a.Crankshaft position sensor signal.
b.Volume airflow sensor signal.
c.Injector drive signal.
d.Primary and secondary ignition signal.
e.Fuel pump drive signal.
f.ECM power supply voltage.
Repair or replace it. Then confirm that the malfunction symptom is eliminated.

STEP 7. Using scan tool MB991502 or MB991958, check data list.

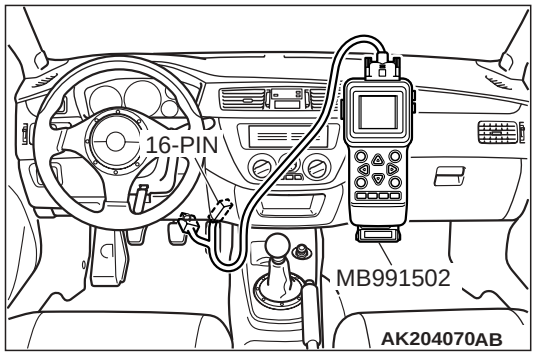
⚠ CAUTION
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

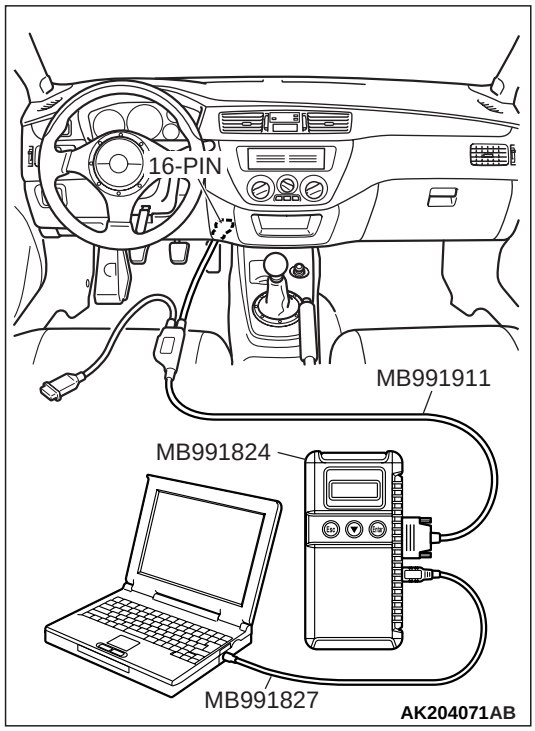




(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check the following items in the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
a. Item 13: Intake Air Temperature Sensor.
b. Item 25: Barometric Pressure Sensor.
c. Item 21: Engine Coolant Temperature Sensor.
d. Item 59: Heated Oxygen Sensor (rear).
e. Item 11: Heated Oxygen Sensor (front).
f. Item 27: Power Steering Pressure Switch.
g. Item 28: A/C Switch.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?
YES : Go to Step 8.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.



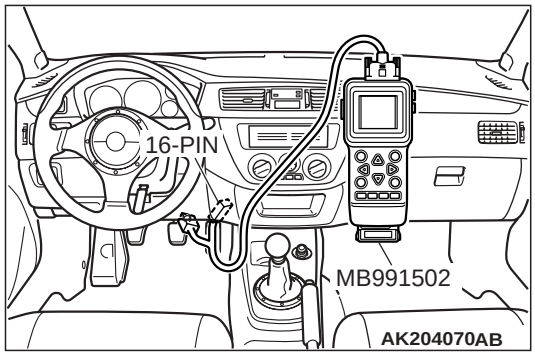


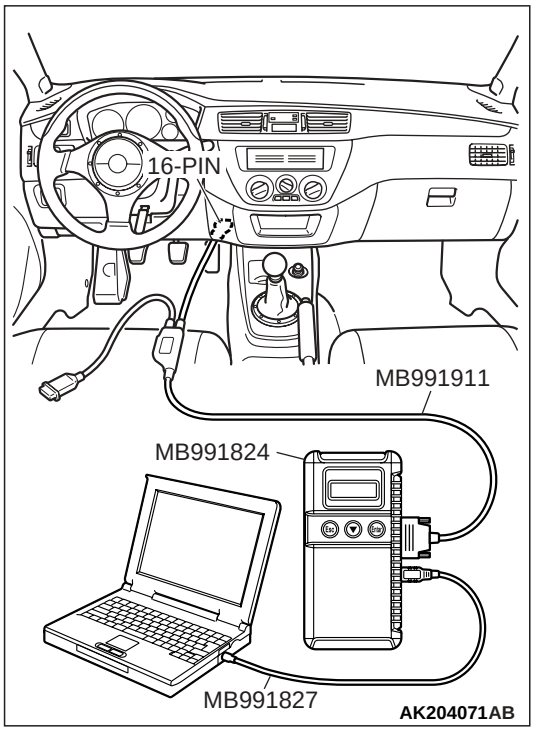
STEP 8. Using scan tool MB991502 or MB991958, check actuator test.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following item in the actuator test. Refer to GROUP 13A, Actuator Test Reference Table P.13A-732.
   a. Item 10: EGR Vacuum Regulator Solenoid Valve.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : Go to Step 9.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.





STEP 9. Using scan tool MB991502 or MB991958, check data list.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following item of the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
   a. Item 11: Heated Oxygen Sensor (front).
   - Fluctuates between 0 – 0.4 volt and 0.6 – 1.0 volt while idling after the engine has been warmed.

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

Q: Is the sensor operating properly?

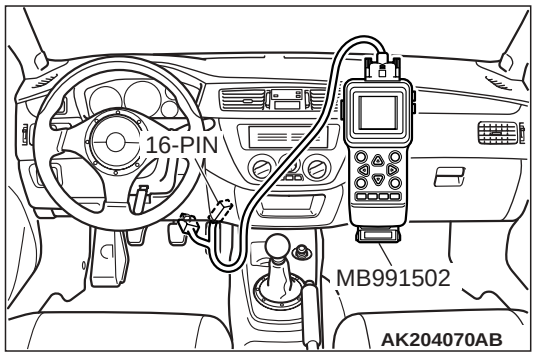
YES : Go to Step 12.
NO : Go to Step 10.

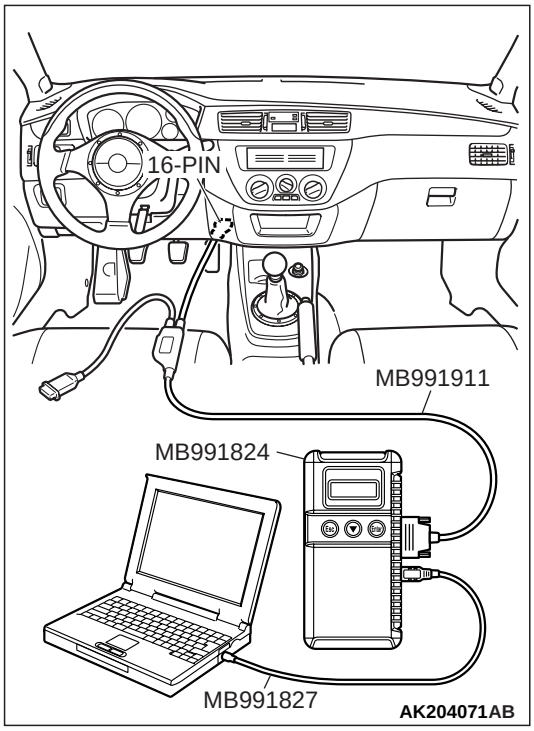
STEP 10. Check the fuel pressure.

Refer to GROUP 13A, Fuel Pressure Test P.13A-762.

Q: Is the fuel pressure normal?

YES : Go to Step 11.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.





STEP 11. Using scan tool MB991502 or MB991958, check data list.

⚠ CAUTION
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check the following item in the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
  a. Item 45: Idle Air Control Motor Position.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : Check the following items, and repair or replace the defective items.
a.Vacuum leak.
- Broken intake manifold gasket.
- Broken air intake hose.
- Broken vacuum hose.
- Positive crankcase ventilation valve does not operate.

b.Injector clogged.
Then confirm that the malfunction symptom is eliminated.

NO : Adjusting the basic idle speed. Refer to GROUP 13A, On-vehicle Service – Basic Idle Speed Adjustment P.13A-760.

STEP 12. Check the ignition timing.
Refer to GROUP 11A, On-vehicle Service – Ignition Timing Check P.11A-11.

Q: Is the ignition timing normal?

YES : Check the following items, and repair or replace the defective items.
a.Check the ignition coil, spark plugs, spark plug cables.
b.Check if the injectors are clogged.
c.Check compression pressure.
d.Check if the foreign materials (water, kerosene, etc.) got into fuel.
Then confirm that the malfunction symptom is eliminated.

NO : Check that the crankshaft position sensor and timing cover are in the correct position. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 13: THE ENGINE STALLS WHEN ACCELERATING (PASS OUT)

COMMENT

- In case such as the above, the cause is probably misfiring due to a weak spark, or an inappropriate air/fuel mixture. When the accelerator pedal is depressed.

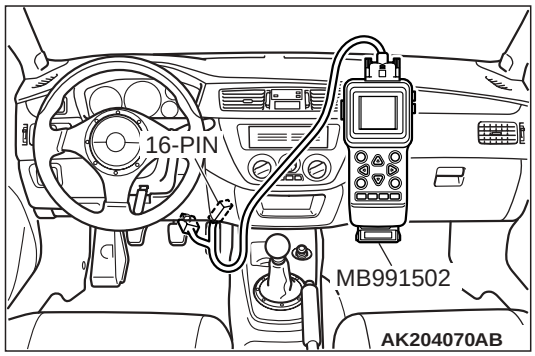
TROUBLESHOOTING HINTS (The most likely causes for this case:)

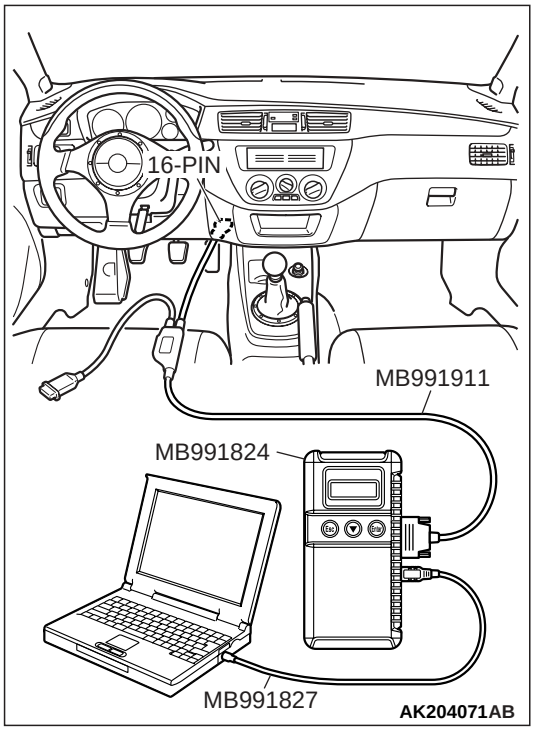
- Vacuum leak.
- Malfunction of the ignition system.

DIAGNOSIS

Required Special Tools:

- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B





STEP 1. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

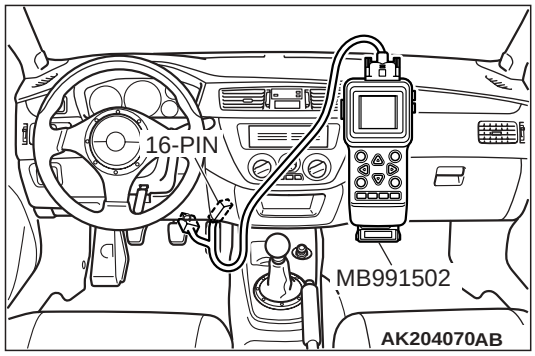
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

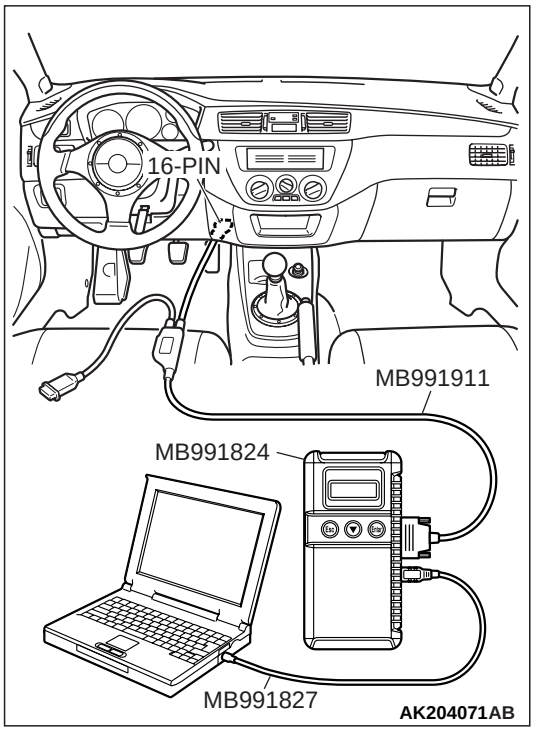
(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC set?

YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-25.

NO : Go to Step 2.





STEP 2. Using scan tool MB991502 or MB991958, check actuator test.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following item in the actuator test. Refer to GROUP 13A, Actuator Test Reference Table P.13A-732.
  a. Item 10: EGR Vacuum Regulator Solenoid Valve.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : Check the following items, and repair or replace the defective items.
  a.Check the ignition coil, spark plugs and spark plug cables.
  b.Check for vacuum leaks.
    •Broken intake manifold gasket.
    •Broken or disconnected vacuum hose.
    •Improper operation of the PCV valve.
    •Broken air intake hose.
  Then confirm that the malfunction symptom is eliminated.

NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 14: THE ENGINE STALLS WHEN DECELERATING

COMMENT

- The intake air volume may be insufficient due to a defective idle air control motor system.

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

- Malfunction of the IAC system.

DIAGNOSIS

Required Special Tools:

- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Check if the battery terminal is disconnected.

Q: Has the battery terminal been disconnected lately?

YES : Start the engine and let it run at idle for approximate 10 minutes after engine warm up. Then if a malfunction occurs, go to step 2.

NO : Go to Step 2.

STEP 2. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

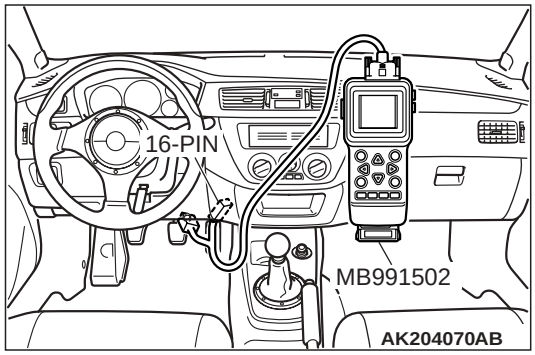
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

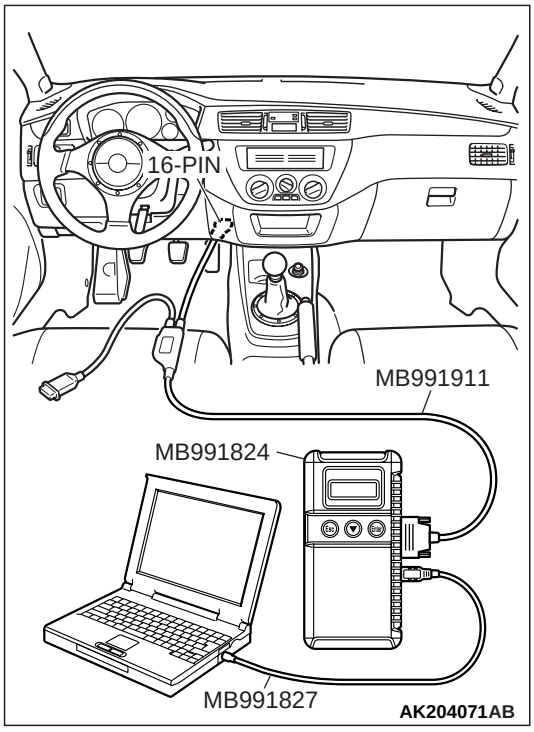
(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

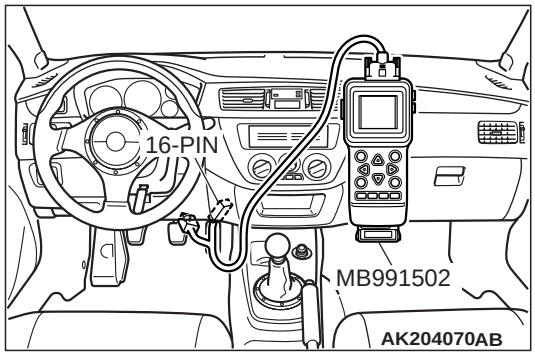
Q: Is the DTC is output?

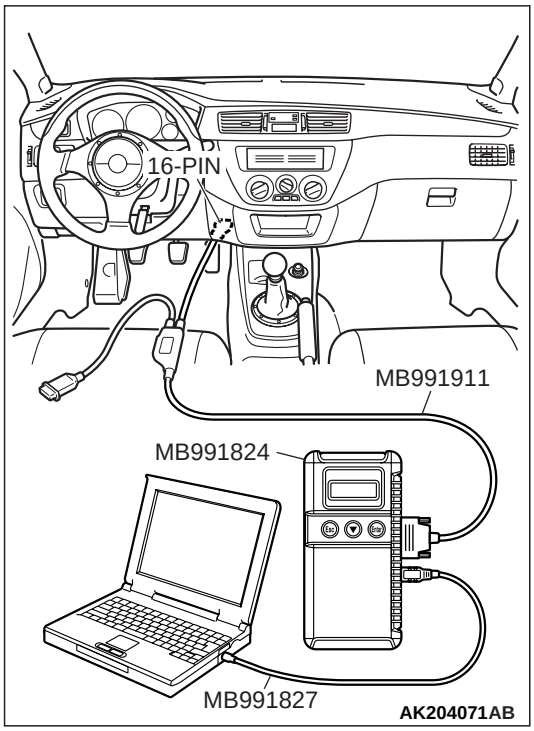
YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-25.

NO : Go to Step 3.







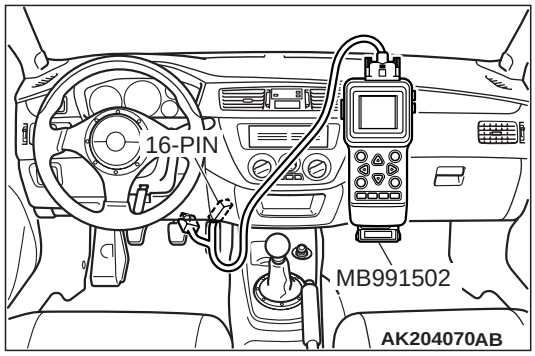


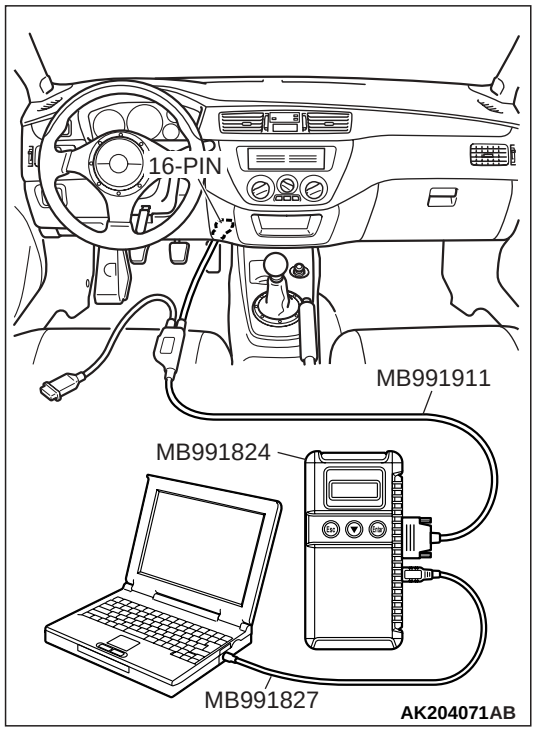
STEP 3. Using scan tool MB991502 or MB991958, check data list.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following item in the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
  a. Item 14: Throttle Position Sensor.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

YES : Go to Step 4.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.



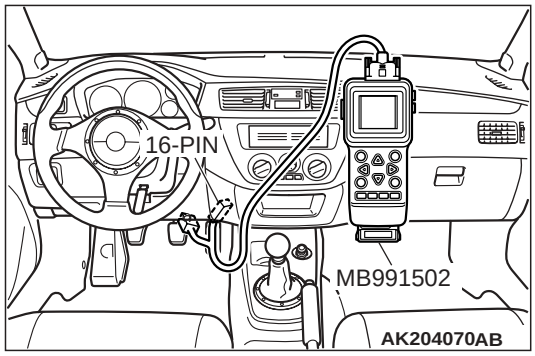


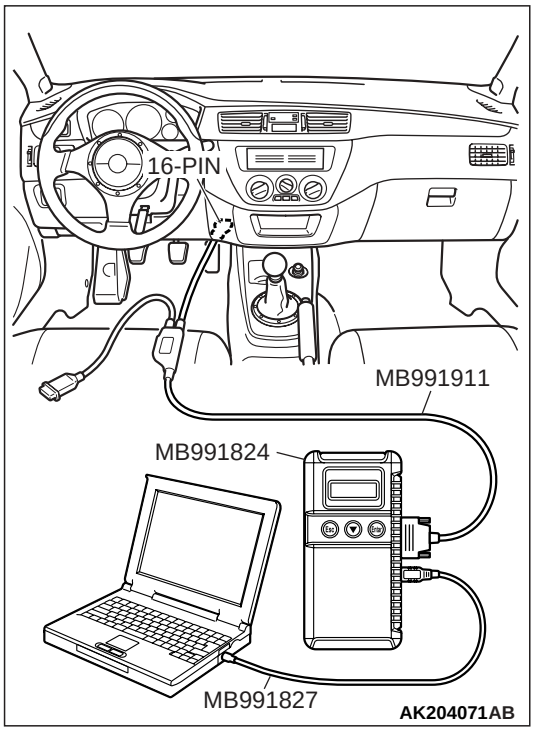
STEP 4. Using scan tool MB991502 or MB991958, check actuator test.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following item in the actuator test. Refer to GROUP 13A, Actuator Test Reference Table P.13A-732.
  a. Item 10: EGR Vacuum Regulator Solenoid Valve.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : Go to Step 5.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.





STEP 5. Using scan tool MB991502 or MB991958, check data list item 45: Idle Air Control Position.

(1) Start the engine and run at idle.
(2) Set scan tool MB991502 or MB991958 to the data reading mode for item 45, Idle Air Control Position.
  a. The idle air control motor should drop to the 0 – 2 position during deceleration (from 1,000 r/min or more).
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operation properly?

YES : Check the following items, and repair, replace or clean the defective sections.
  a.Check the ignition coil, spark plugs, spark plug cables.
  b.Check the throttle valve area. (Refer to GROUP 13A, On-vehicle Service – Throttle Body Cleaning P.13A-758.)
Then confirm that the malfunction symptom is eliminated.

NO : Refer to, DTC P0500 – Vehicle Speed Sensor P.13A-465 .

INSPECTION PROCEDURE 15: HESITATION, SAG OR STUMBLE

COMMENT

- In cases such as the above, the ignition system, air/fuel mixture or compression pressure may be defective.

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

- Malfunction of the ignition system.
- Malfunction of air/fuel ratio control system.
- Malfunction of the fuel supply system.
- Malfunction of the EGR vacuum regulator solenoid valve system.
- Poor compression pressure.
- Malfunction of turbocharger system.

DIAGNOSIS

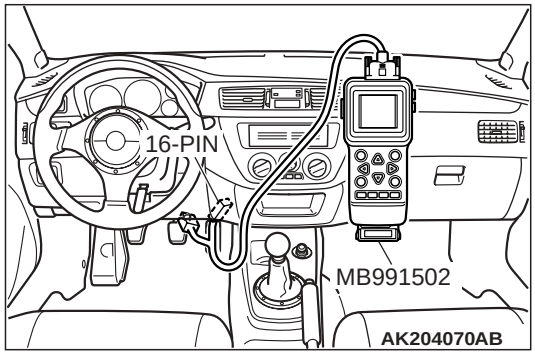
Required Special Tools:

- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

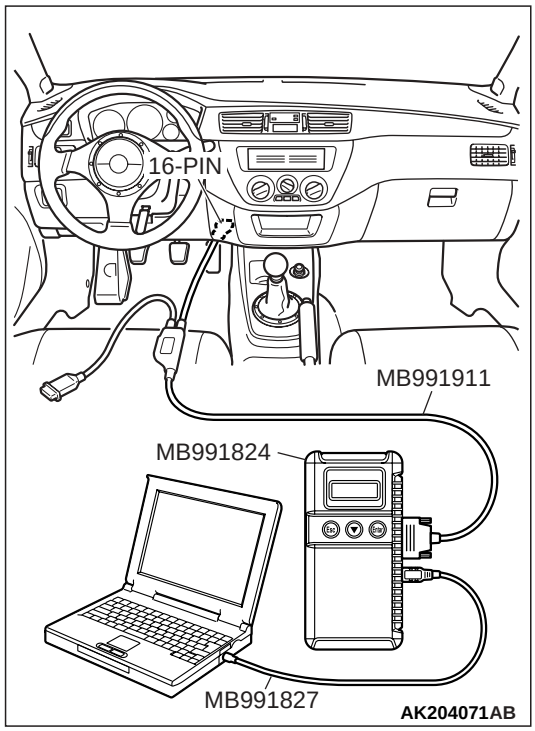


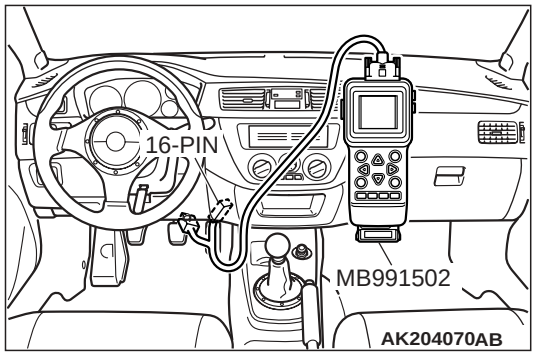
(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

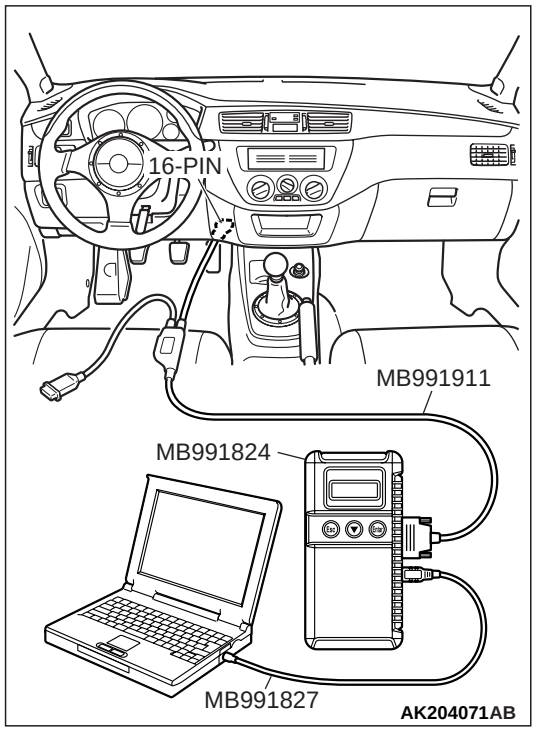
Q: Is DTC set?

YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-25.

NO : Go to Step 2.







STEP 2. Using scan tool MB991502 or MB991958, check actuator test items 01, 02, 03, 04: Injector.

(1) Check following items in the actuator test. Refer to GROUP 13A, Actuator Test Reference Table P.13A-732.
   a. Items 01, 02, 03, 04: Injector.
(2) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are the actuators operating properly?

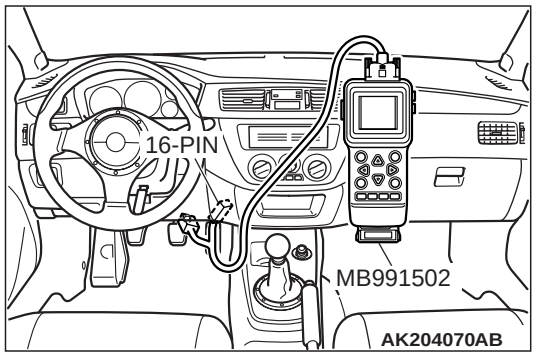
YES : Go to Step 3.
NO : Refer to GROUP 13A, DTC P0201, P0202, P0203, P0204 – Injector Circuit P.13A-267.

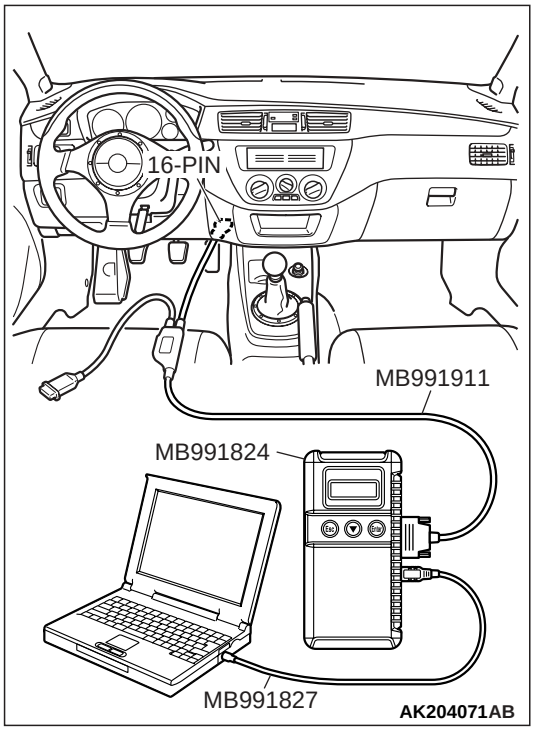
STEP 3. Check the ignition timing.

(1) Refer to GROUP 11A, On-vehicle Service – Ignition Timing Check P.11A-11.

Q: Is the ignition timing normal?

YES : Go to Step 4.
NO : Check that the crankshaft position sensor and timing belt cover are in the correct position. Then confirm that the malfunction symptom is eliminated.





STEP 4. Using scan tool MB991502 or MB991958, check data list.

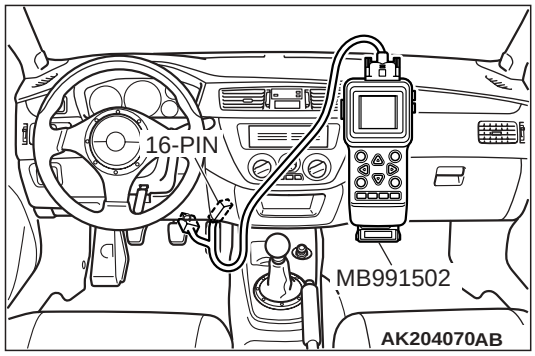
⚠ CAUTION

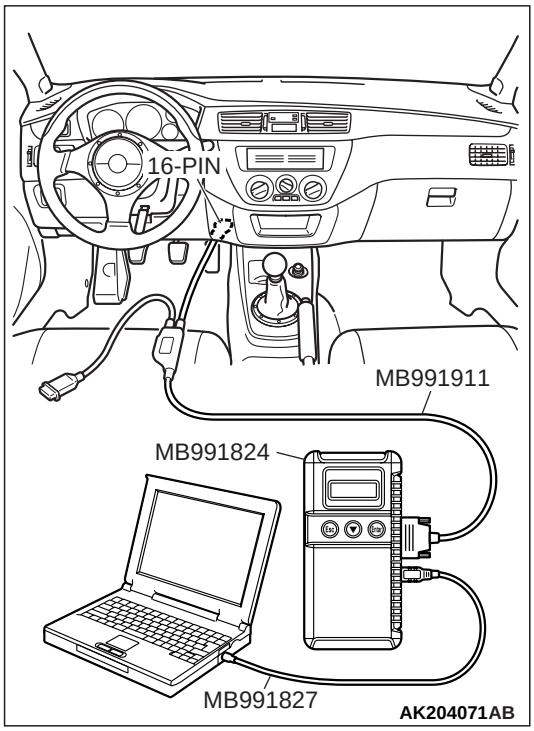
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check the following items in the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
  a. Item 13: Intake Air Temperature Sensor.
  b. Item 25: Barometric pressure Sensor.
  c. Item 21: Engine Coolant Temperature Sensor.
  d. Item 14: Throttle Position Sensor.
  e. Item 59: Heated Oxygen Sensor (rear).
  f. Item 11: Heated Oxygen Sensor (front).
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

YES : Go to Step 5.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.



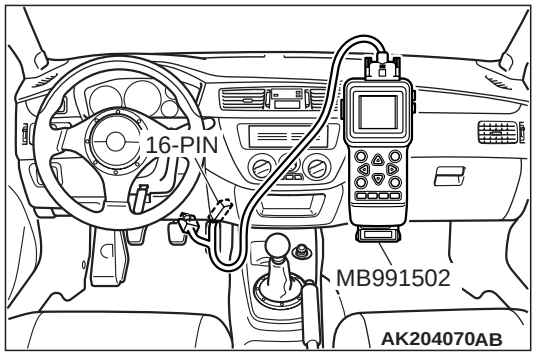


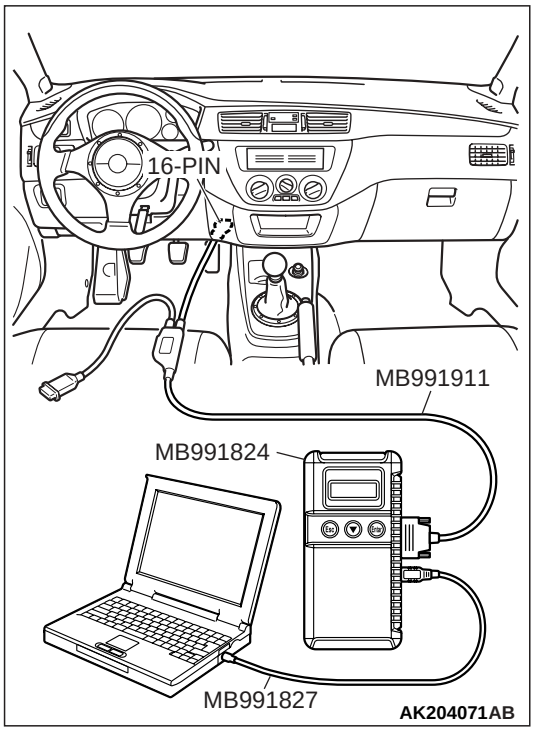
STEP 5. Using scan tool MB991502 or MB991958, check actuator test.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following items in the actuator test. Refer to GROUP 13A, Actuator Test Reference Table P.13A-732.
   a. Item 10: EGR Vacuum Regulator Solenoid Valve.
   b. Item 09: Fuel pressure solenoid.
   c. Item 12: Turbocharger wastegate solenoid.
   d. Item 13: Fuel pump relay 3.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they actuator operating properly?

YES : Go to Step 6.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.





STEP 6. Using scan tool MB991502 or MB991958, check data list.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following items of data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
  a. Item 11: Heated Oxygen Sensor (front).
  - Voltage should fluctuate between 0 – 0.4 volt and 0.6 – 1.0 volt while idling after the engine has warmed-up.

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

Q: Is the sensor operating properly?

YES : Go to Step 8.
NO : Go to Step 7.

STEP 7. Check the fuel pressure.

Refer to GROUP 13A, On-vehicle Service – Fuel Pressure Test P.13A-762.

Q: Is the fuel pressure normal?

YES : Check the following items, and repair or replace the defective items.
  a.Vacuum leak.
    •Broken intake manifold gasket.
    •Broken air intake hose.
    •Broken vacuum hose.
    •Positive crankcase ventilation valve does not operate.
  b.Injector clogged.

Then confirm that the malfunction symptom is eliminated.

NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

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STEP 8. Check the fuel pressure.
Refer to, Fuel Pressure Test P.13A-762.

Q: Is the fuel pressure normal?

YES : Check the following items, and repair or replace the defective items.
a. Check the ignition coil, spark plugs and spark plug cables.
b. Check supercharging pressure.
c. Check intake charge pressure control system.
d. Check rotating resistance of turbocharger turbine wheel. (Does the wheel rotate smoothly?)
e. Check the EGR system.
f. Check compression pressure.
g. Check the fuel filter or fuel line for clogging.
Then confirm that the malfunction symptom is eliminated.

NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

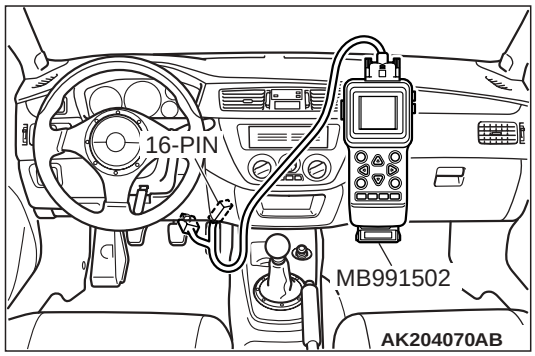
INSPECTION PROCEDURE 16: ACCELERATION SHOCK

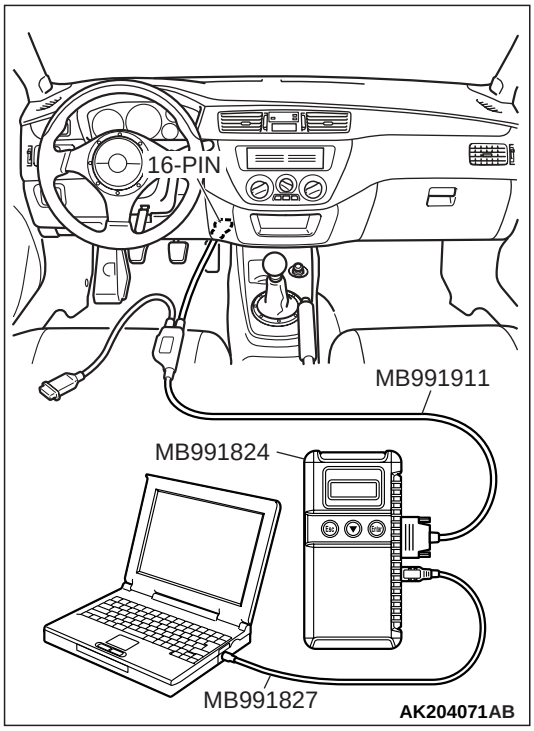
COMMENT
- There may be an ignition leak accompanying the increase in the spark plug demand voltage during acceleration.

TROUBLESHOOTING HINTS (The most likely causes for this case:)
- Malfunction of the ignition system.

DIAGNOSIS

Required Special Tools:
- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B





STEP 1. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or 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 set?

YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-25.

NO : Check the following items, and repair or replace the defective items.
a. Check the ignition coil, spark plugs and spark plug cables.
b. Check for occurrence of ignition leak.
Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 17: DECELERATION SHOCK

COMMENT

- There may be a sudden change in airflow through the IAC, causing the vehicle to decelerate rapidly for an instant.

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

- Malfunction of the IAC system.

DIAGNOSIS

Required Special Tools:

- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

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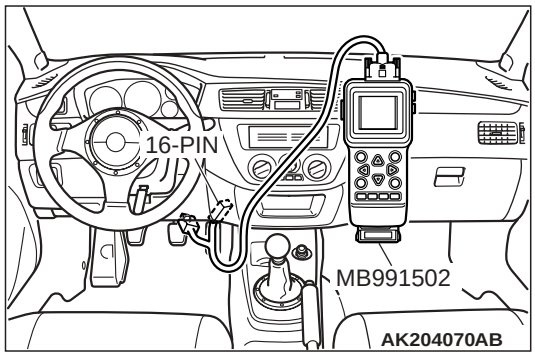
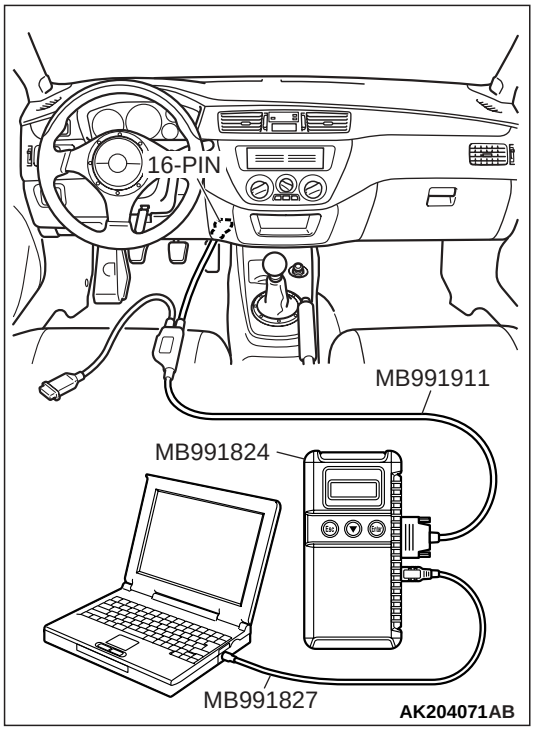




STEP 1. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

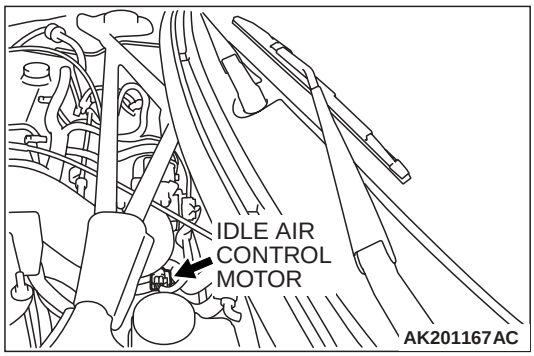
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or 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 set?

YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-25.

NO : Go To Step 2.



STEP 2. Check the idle air control (IAC) motor operation sound.

(1) Check that the engine coolant temperature is 20°C (68°F) or below.

NOTE: If necessary, you can disconnect the engine coolant temperature sensor connector and connect the harness side of the connector to another engine coolant temperature sensor that is at 20°C (68°F) or below.

(2) Check the operation sound of the IAC motor can be heard after the ignition is switched to the "ON" position (but without starting the engine).
- An operation sound should heard.

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

Q: Did you hear the operation sound?

YES : Go to Step 3.

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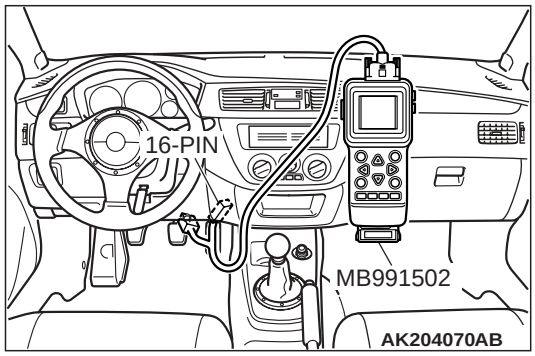
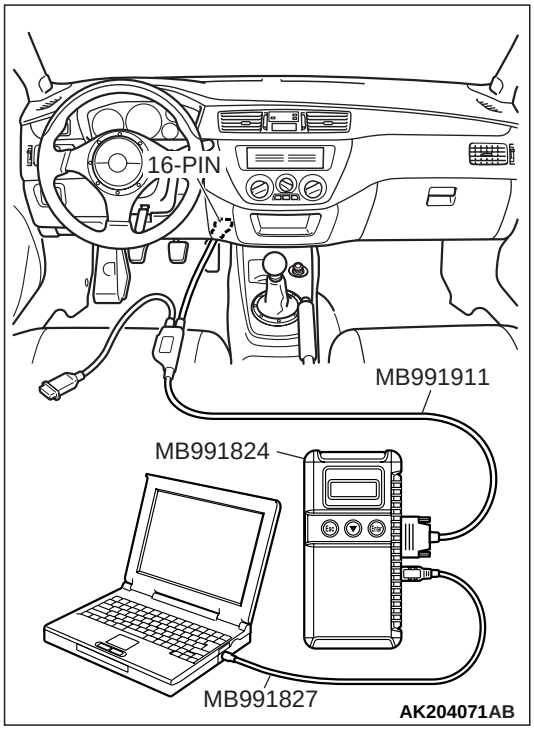
NO : Refer to GROUP 13A, DTC P0506 – Idle Control System RPM Lower Than Expected P.13A-477, DTC P0507 – Idle Control System RPM Higher Than Expected P.13A-487.

STEP 3. Using scan tool MB991502 or MB991958, check data list.

⚠ CAUTION
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.



(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check the following items in the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
  a. Item 14: Throttle Position Sensor.
(4) Turn the ignition switch to the "LOCK" (OFF) position.



Q: Is the sensor operating properly?

YES : Refer to GROUP 13A, On-vehicle Service – Clean the throttle valve area P.13A-758.

NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 18: POOR ACCELERATION

COMMENT
- Defective ignition system, abnormal air/fuel ratio, poor compression pressure, etc. are suspected.

TROUBLESHOOTING HINTS (The most likely causes for this case:)
- Malfunction of the ignition system.
- Malfunction of air/fuel ratio control system.
- Malfunction of the fuel supply system.
- Poor compression pressure.
- Clogged exhaust system.
- Malfunction of turbocharger system.

TSB Revision

DIAGNOSIS

Required Special Tools:

- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

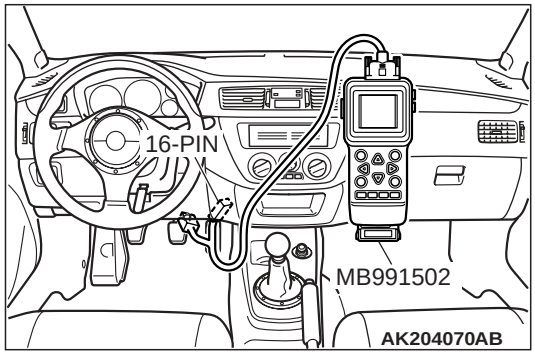
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

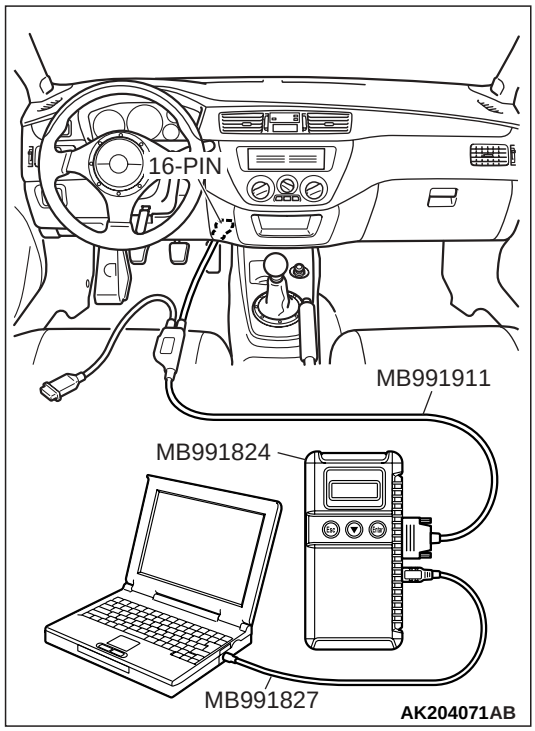
(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

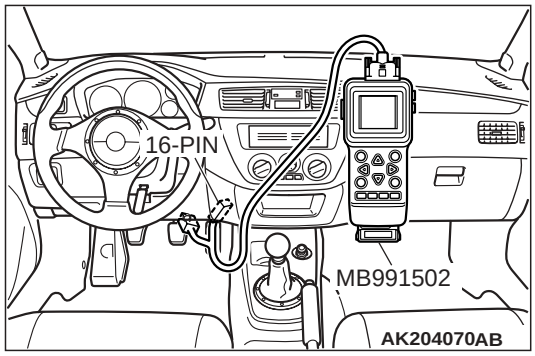
Q: Is DTC set?

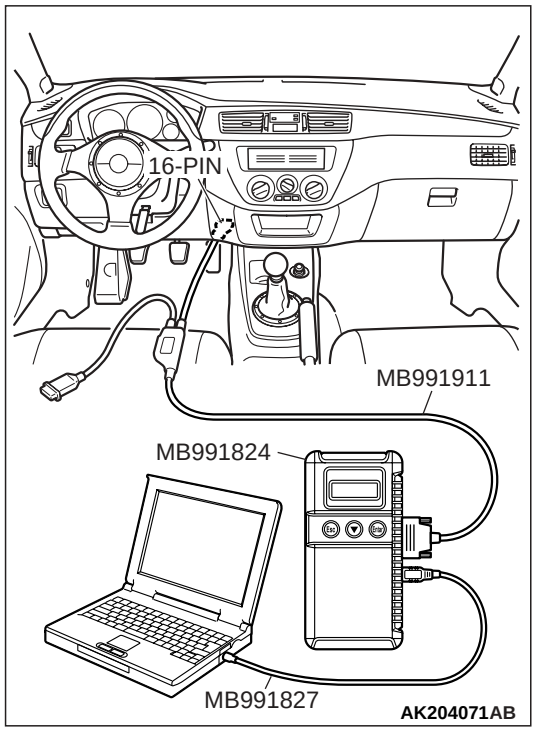
YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-25.

NO : Go to Step 2.









STEP 2. Using scan tool MB991502 or MB991958, check actuator test items 01, 02, 03, 04: Injector.

(1) Turn the ignition switch to the "ON" position.
(2) Check following items in the actuator test. Refer to GROUP 13A, Actuator Test Table P.13A-732.
  a. Items 01, 02, 03, 04: Injector.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are the actuators operating properly?

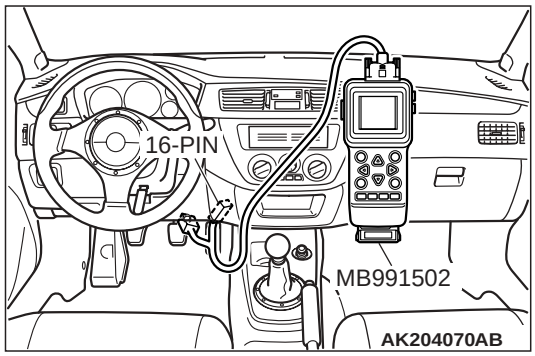
YES : Go to Step 3.
NO : Refer to GROUP 13A, DTC P0201, P0202, P0203, P0204 – Injector Circuit P.13A-267.

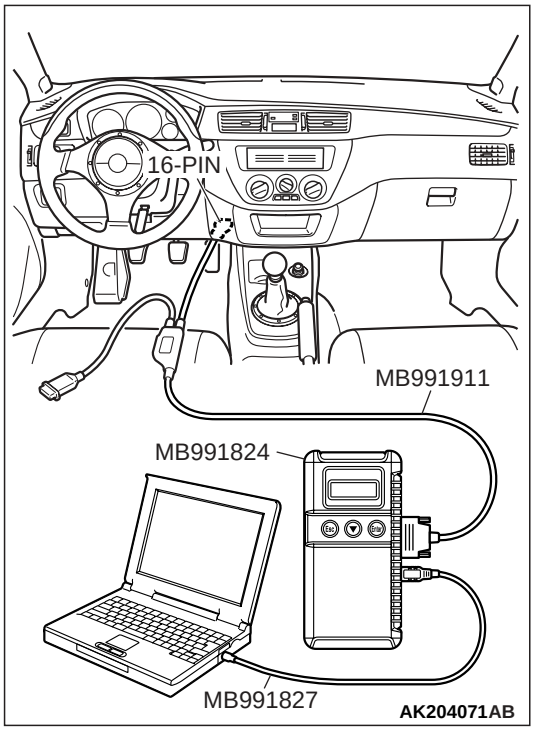
STEP 3. Check the ignition timing.

Refer to GROUP 11A, On-vehicle Service – Ignition Timing Check P.11A-11.

Q: Is the ignition timing normal?

YES : Go to Step 4.
NO : Check that the crankshaft position sensor and timing belt cover are in the correct position. Then confirm that the malfunction symptom is eliminated.





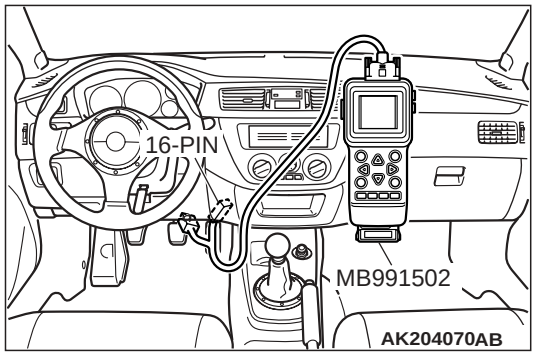
STEP 4. Using scan tool MB991502 or MB991958, check data list.

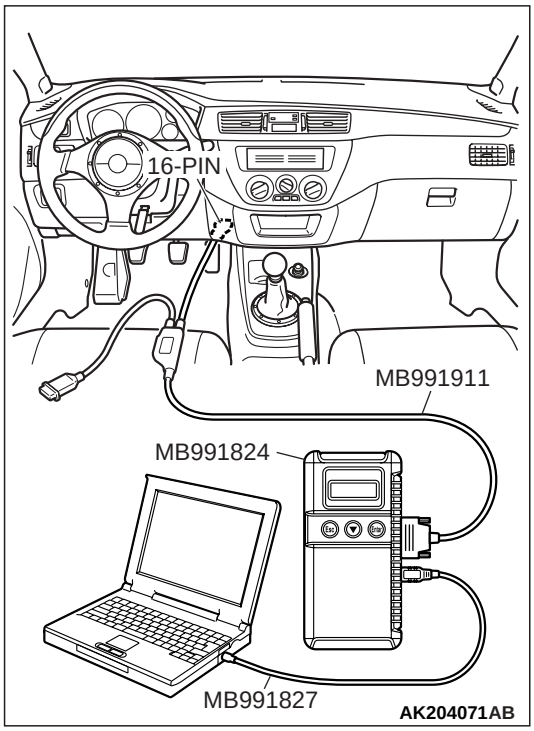
⚠ CAUTION
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check the following items in the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
  a. Item 13: Intake Air Temperature Sensor.
  b. Item 25: Barometric Pressure Sensor.
  c. Item 21: Engine Coolant Temperature Sensor.
  d. Item 14: Throttle Position Sensor.
  e. Item 59: Heated Oxygen Sensor (rear).
  f. Item 11: Heated Oxygen Sensor (front).
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

YES : Go to Step 5.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.



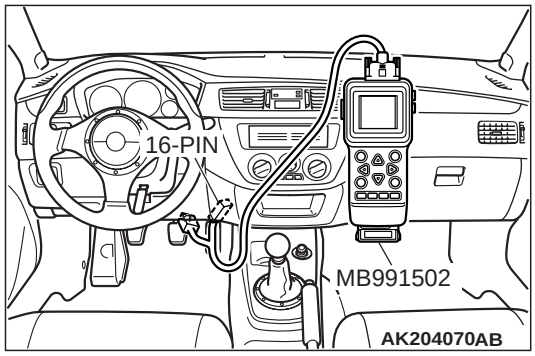


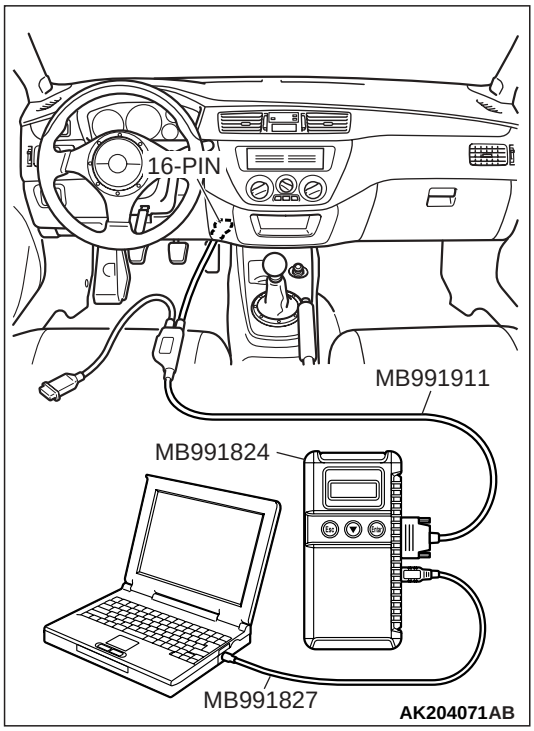
STEP 5. Using scan tool MB991502 or MB991958, check actuator test.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following items in the actuator test. Refer to GROUP 13A, Actuator Test Reference Table P.13A-732.
   a. Item 10: EGR Vacuum Regulator Solenoid Valve.
   b. Item 09: Fuel pressure solenoid.
   c. Item 12: Turbocharger wastegate solenoid.
   d. Item 13: Fuel pump relay 3.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are the actuators operating properly?

YES : Go to Step 6.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.





STEP 6. Using scan tool MB991502 or MB991958, check data list.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following items of data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
  a. Item 11: Heated Oxygen Sensor (front).
  - Voltage should fluctuate between 0 – 0.4 volt and 0.6 – 1.0 volt while idling after the engine has been warmed.

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

Q: Is the sensor operating properly?

YES : Go to Step 8.
NO : Go to Step 7.

STEP 7. Check the fuel pressure.

Refer to GROUP 13A, On-vehicle Service – Fuel Pressure Test P.13A-762.

Q: Is the fuel pressure normal?

YES : Check the following items, and repair or replace the defective items.
  a.Vacuum leak.
    •Broken intake manifold gasket.
    •Broken air intake hose.
    •Broken vacuum hose.
    •Positive crankcase ventilation valve does not operate.
  b.Injector clogged.

Then confirm that the malfunction symptom is eliminated.

NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

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STEP 8. Check the fuel pressure.

Refer to GROUP 13A, On-vehicle Service – Fuel Pressure Test P.13A-762.

Q: Is the fuel pressure normal?

YES : Check the following items, and repair or replace the defective items.

a. Check the ignition coil, spark plugs and spark plug cables.
b. Check supercharging pressure.
c. Check intake charge pressure control system.
d. Check rotating resistance of turbocharger turbine wheel. (Does the wheel rotate smoothly?)
e. Check compression pressure.
f. Check the fuel filter or fuel line for clogging.
g. Broken air intake hose.
h. Clogged air cleaner.
i. Clogged exhaust system.

Then confirm that the malfunction symptom is eliminated.

NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 19: SURGEK

COMMENT

- Defective ignition system, abnormal air/fuel ratio, etc. are suspected.

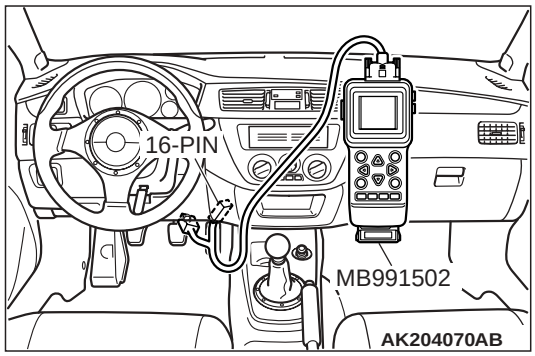
TROUBLESHOOTING HINTS (The most likely causes for this case:)

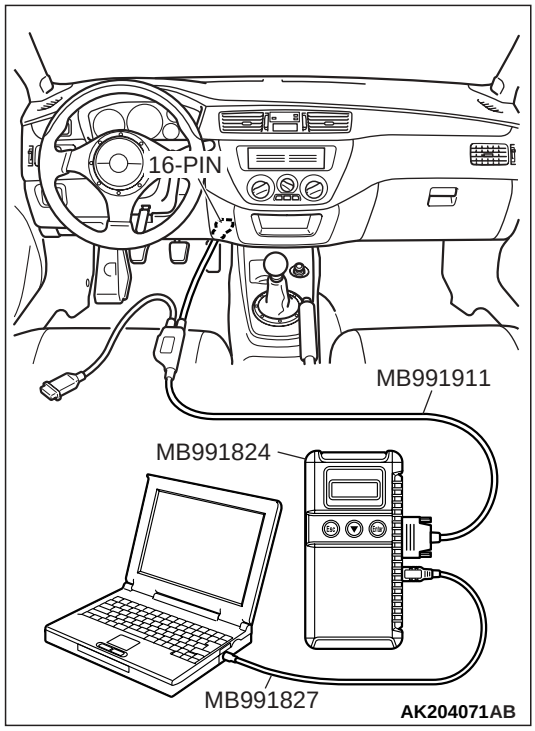
- Malfunction of the ignition system.
- Malfunction of air/fuel ratio control system.
- Malfunction of the EGR vacuum regulator solenoid valve system.

DIAGNOSIS

Required Special Tools:

- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B





STEP 1. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

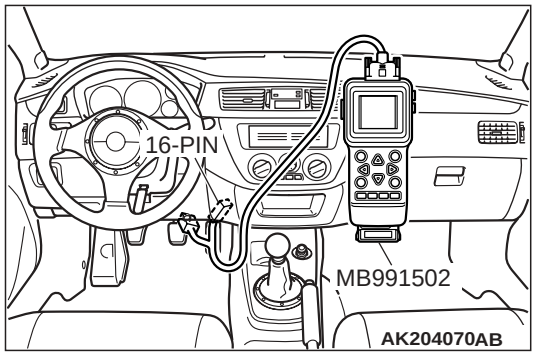
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

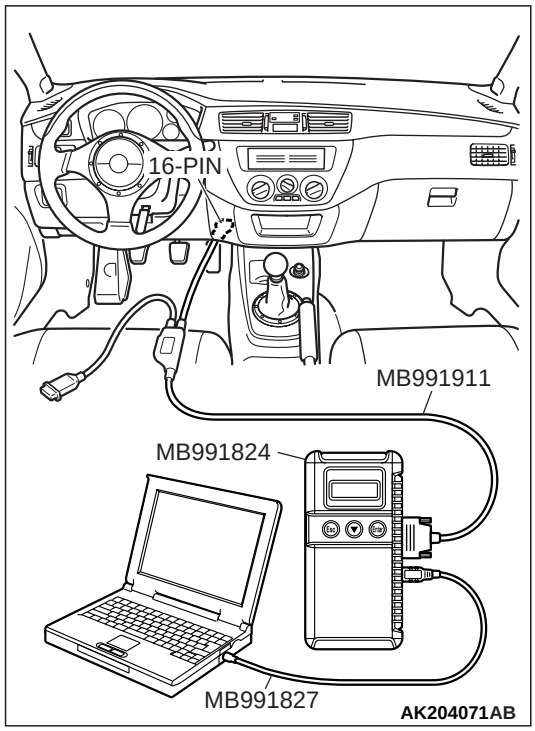
(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Read the DTC.
(4) Turn the ignition switch to the "ON" position.

Q: Is DTC set?

YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-25.

NO : Go to Step 2.





STEP 2. Using scan tool MB991502 or MB991958, check actuator test items 01, 02, 03, 04: Injector.

(1) Turn the ignition switch to the "ON" position.
(2) Check following items in the actuator test. Refer to GROUP 13A, Actuator Test Reference Table P.13A-732.
  a. Items 01, 02, 03, 04: Injector.
(3) Turn the ignition switch to the "ON" position.

Q: Are the actuators operating properly?

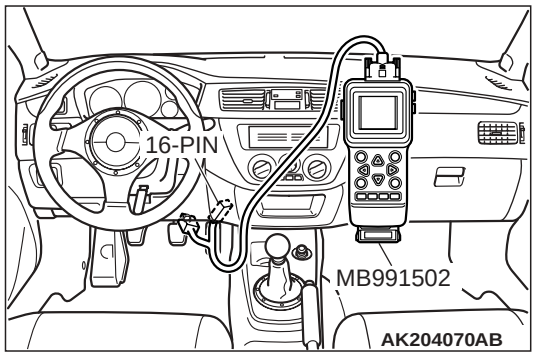
YES : Go to Step 3.
NO : Refer to GROUP 13A, DTC P0201, P0202, P0203, P0204 – Injector Circuit P.13A-267.

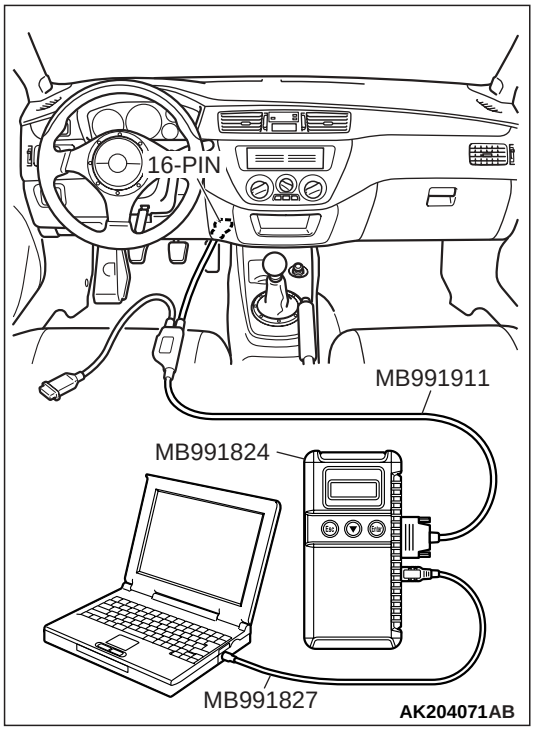
STEP 3. Check the ignition timing.

Refer to GROUP 11A, On-vehicle Service – Ignition Timing Check P.11A-11.

Q: Is the ignition timing normal?

YES : Go to Step 4.
NO : Check that the crankshaft position sensor and timing belt cover are in the correct position. Then confirm that the malfunction symptom is eliminated.





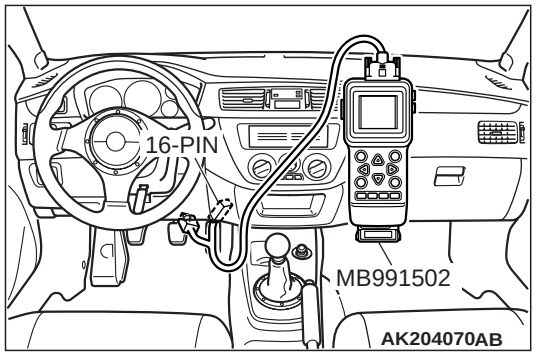
STEP 4. Using scan tool MB991502 or MB991958, check data list.

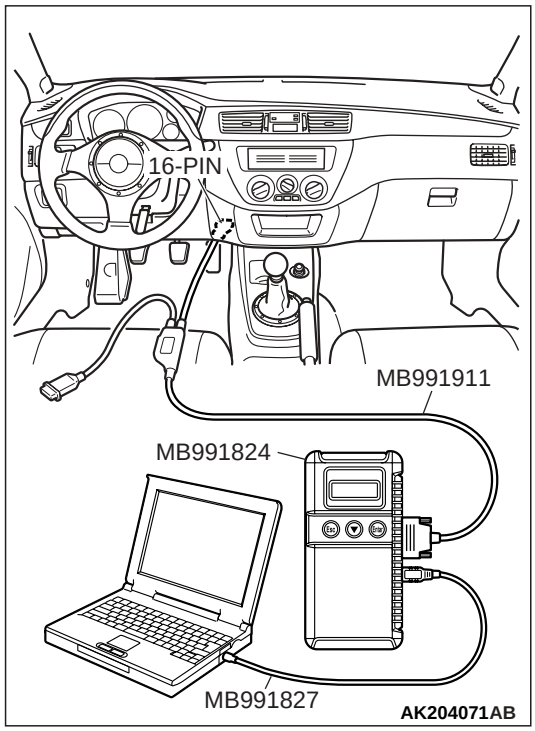
⚠ CAUTION
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check the following items in the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
  a. Item 13: Intake Air Temperature Sensor.
  b. Item 25: Barometric pressure Sensor.
  c. Item 21: Engine Coolant Temperature Sensor.
  d. Item 14: Throttle Position Sensor.
  e. Item 59: Heated Oxygen Sensor (rear).
  f. Item 11: Heated Oxygen Sensor (front).
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

YES : Go to Step 5.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.



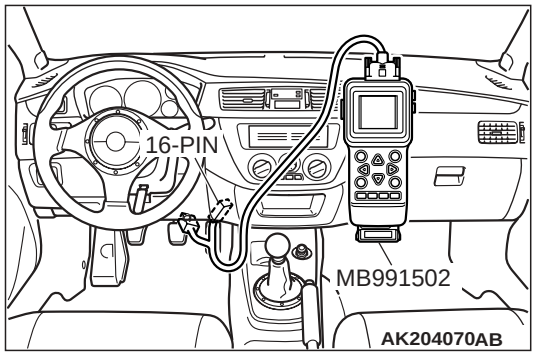


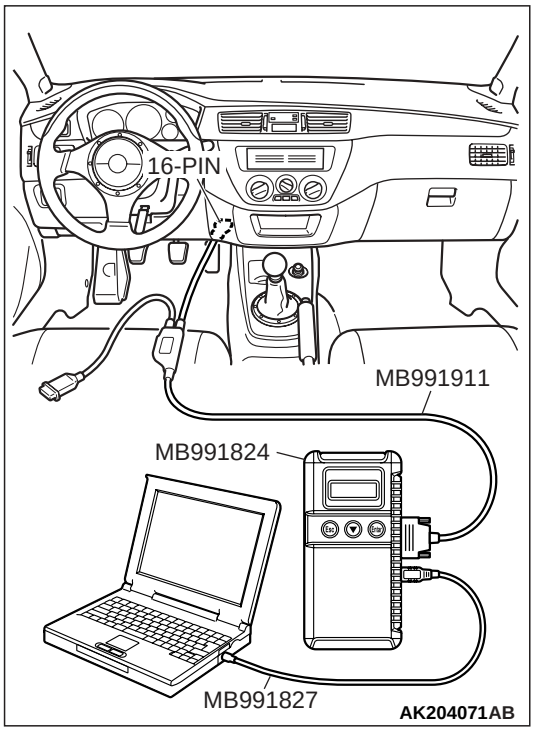
STEP 5. Using scan tool MB991502 or MB991958, check actuator test.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following item in the actuator test. Refer to GROUP 13A, Actuator Test Reference Table P.13A-732.
  a. Item 10: EGR Vacuum Regulator Solenoid Valve.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : Go to Step 6.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.





STEP 6. Using scan tool MB991502 or MB991958, check data list.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following items of data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
   a. Item 11: Heated Oxygen Sensor (front).
   - Voltage should fluctuate between 0 – 0.4 volt and 0.6 – 1.0 volt while idling after the engine has been warmed.

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

Q: Is the sensor operating properly?

YES : Go to Step 8.
NO : Go to Step 7.

STEP 7. Check the fuel pressure.

Refer to GROUP 13A, On-vehicle Service – Fuel Pressure Test P.13A-762.

Q: Is the fuel pressure normal?

YES : Check the following items, and repair or replace the defective items.
   a.Vacuum leak.
   - •Broken intake manifold gasket.
   - •Broken air intake hose.
   - •Broken vacuum hose.
   - •Positive crankcase ventilation valve does not operate.

   b.Injector clogged.

Then confirm that the malfunction symptom is eliminated.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

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STEP 8. Check the fuel pressure.
Refer to GROUP 13A, On-vehicle Service – Fuel Pressure Test P.13A-762.

Q: Is the fuel pressure normal?

YES : Check the following items, and repair or replace the defective items.
a. Check the ignition coil, spark plugs and spark plug cables.
b. Check the EGR system.
c. Check the turbocharger wastegate actuator.
Then confirm that the malfunction symptom is eliminated.

NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

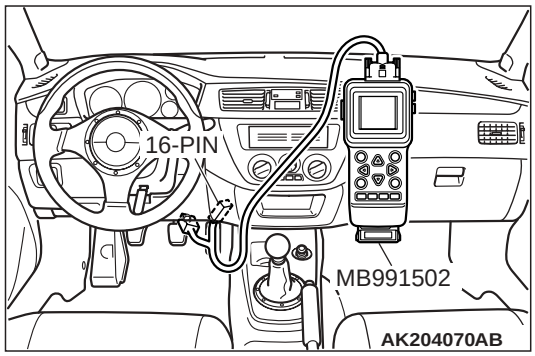
INSPECTION PROCEDURE 20: KNOCKING

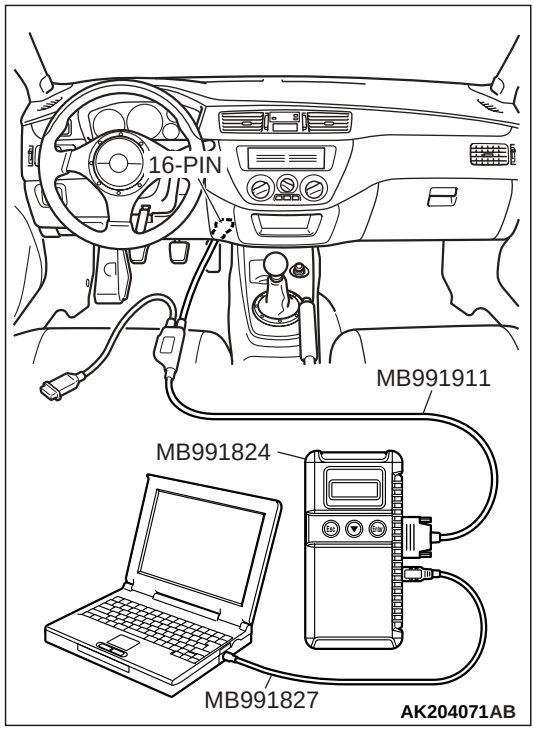
COMMENT
- Incase such as the above, the cause is probably that the detonation control is defective or the heat value of the spark plug is inappropriate.

TROUBLESHOOTING HINTS (The most likely causes for this case:)
- Defective knock sensor.
- Incorrect heat value of the spark plug.

DIAGNOSIS

Required Special Tools:
- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B





STEP 1. Using the scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).

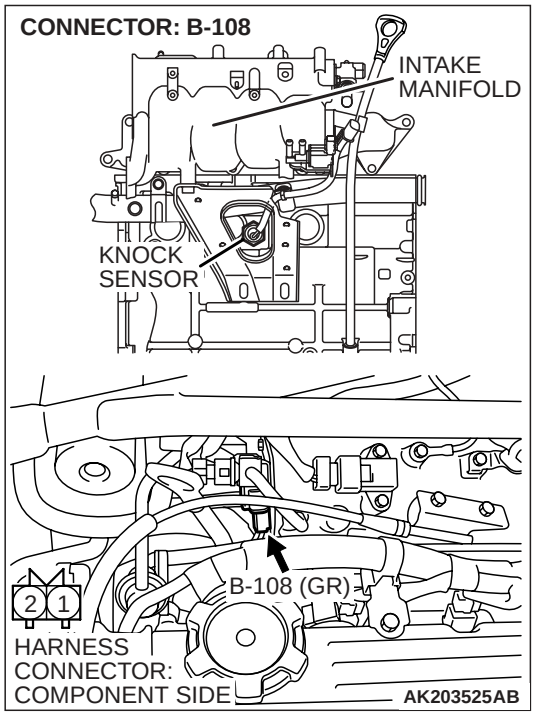
⚠ CAUTION

To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or 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 set?

YES : Refer to, Diagnostic Trouble Code Chart P.13A-25.
NO : Go to Step 2.



STEP 2. Check the ignition timing.

(1) The ignition timing should retard more when knock sensor connector B-108 is disconnected than when it is connected.

Q: When the knock sensor connector B-108 was disconnected, was the ignition timing delayed?

YES : Check the following items, and repair or replace the defective items.

a.Check the spark plugs.

b.Fuel quality, octane level.

c.Check if the foreign materials (water, kerosene, etc.) got into fuel.

Then confirm that the malfunction symptom is eliminated.

NO : Refer to, DTC P0325 – Knock Sensor Circuit P.13A-296.

INSPECTION PROCEDURE 21: Dieseling (Run-on)

COMMENT

- Fuel leakage from injectors is suspected, or carbon build up.

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

- Fuel leakage from injectors.

DIAGNOSIS

STEP 1. Check the injectors for fuel leakage.

Replace the leaking injector. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 22: TOO HIGH CO AND HC CONCENTRATION WHEN IDLING

COMMENT

- Abnormal air/fuel ratio is suspected.

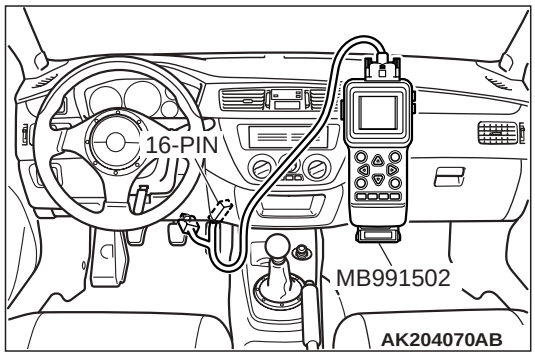
TROUBLESHOOTING HINTS (The most likely causes for this case:)

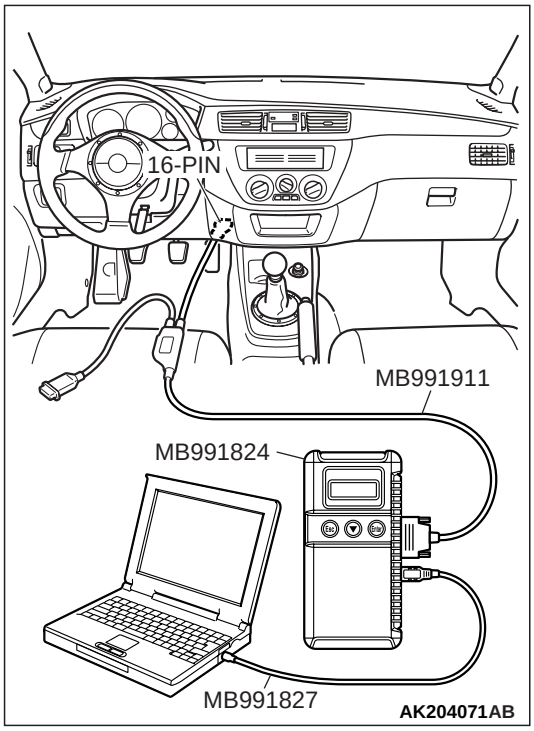
- Malfunction of air/fuel ratio control system.
- Deteriorated catalyst.

DIAGNOSIS

Required Special Tools:

- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B





STEP 1. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or 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 set?

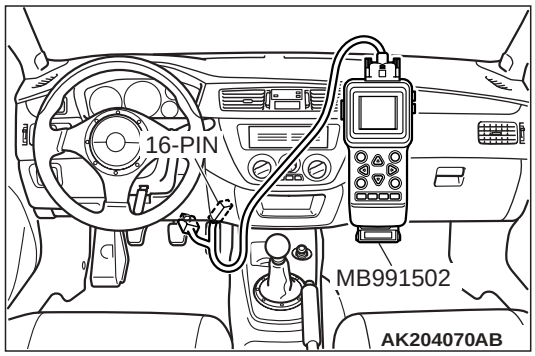
YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-25.
NO : Go to Step 2.

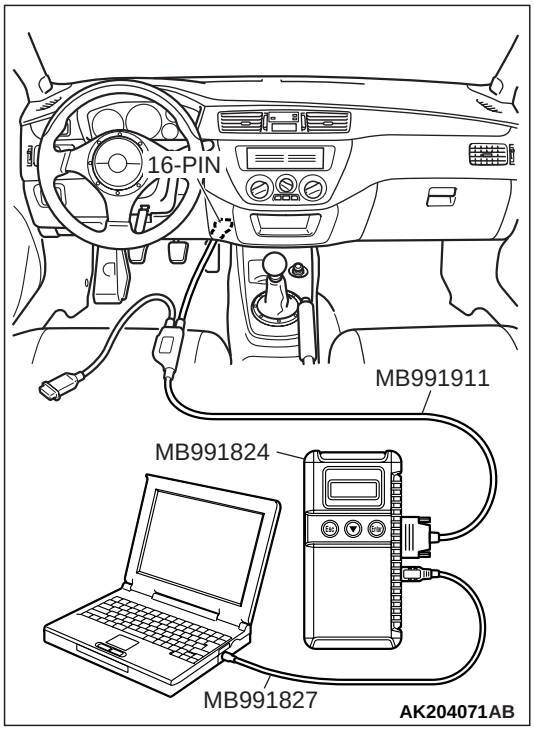
STEP 2. Check the ignition timing.

Refer to GROUP 11A, On-vehicle Service – Ignition Timing Check P.11A-11.

Q: Is the ignition timing normal?

YES : Go to Step 3.
NO : Check that the crankshaft position sensor and timing belt cover are in the correct position. Then confirm that the malfunction symptom is eliminated.





STEP 3. Using scan tool MB991502 or MB991958, check data list.

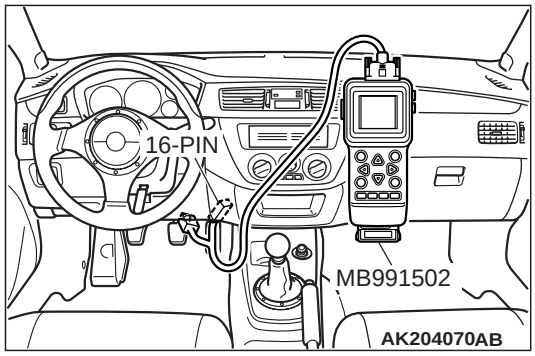
⚠ CAUTION

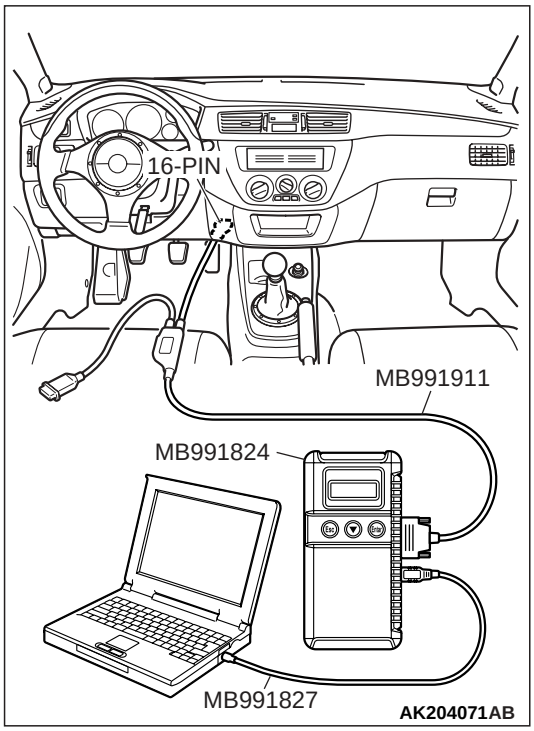
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check the following items in the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
   a. Item 21: Engine Coolant Temperature Sensor.
   b. Item 13: Intake Air Temperature Sensor.
   c. Item 25: Barometric pressure Sensor.
   d. Item 59: Heated Oxygen Sensor (rear).
   e. Item 11: Heated Oxygen Sensor (front).
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

YES : Go to Step 4.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.





STEP 4. Using scan tool MB991502 or MB991958, check data list.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following items of the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
   a. Item 11: Heated Oxygen Sensor (front).
   - Voltage should fluctuate between 0 – 0.4 volt and 0.6 – 1.0 volt while idling after the engine has been warmed.

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

Q: Is the sensor operating properly?

YES : Replace the heated oxygen sensor (front). Then confirm that the malfunction symptom is eliminated. If not resolved, go to step 6.
NO : Go to Step 5.

STEP 5. Check the fuel pressure.

Refer to GROUP 13A, On-vehicle Service – Fuel Pressure Test P.13A-762.

Q: Is the fuel pressure normal?

YES : Go to Step 6.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

STEP 6. Check the following items.

(1) Check the following items, and repair or replace the defective items.
   a. Check the injectors for fuel leakage.
   b. Check the ignition coil, spark plugs and spark plug cables.
   c. Check compression pressure.
   d. Check the positive crank case ventilation system.
   e. Check the evaporative emission system.
   f. Check the EGR system.

(2) Then check the malfunction symptom.

Q: Is the malfunction symptom eliminated.

YES : The check is completed.

NO : Replace the catalytic converter. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 23: TRANSIENT, MASS EMISSION TAILPIPE TEST FAILURE

COMMENT

- The test is failed when the air/fuel ratio is not controlled to the ideal air/fuel ratio. This occurs due to the feedback control by heated oxygen sensor signals, insufficient EGR flow rate, or deteriorated catalyst.

NOTE: If the three-way catalyst temperature is low when checking the exhaust gas, the three-way catalyst cannot sufficiently clean the emissions. Warm up the engine sufficiently before checking the exhaust, and check immediately.

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

- Malfunction of air/fuel ratio control system.
- Malfunction of the EGR system.
- Deteriorated catalyst.

DIAGNOSIS

Required Special Tools:

- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B

STEP 1. Check the exhaust gas with the engine at normal operating temperature.

Q: After enough warm up, was the exhaust gas checked enough?

YES : Go to Step 2.

NO : Check it again after enough warm up.

STEP 2. Check the following items.

(1) Check the following items.

a. Check all vacuum hoses and connectors.

b. Check electrical wires and connectors for obvious problems.

c. Check the exhaust system for missing or damaged parts.

Q: Are they normal?

YES : Go to Step 3.

NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

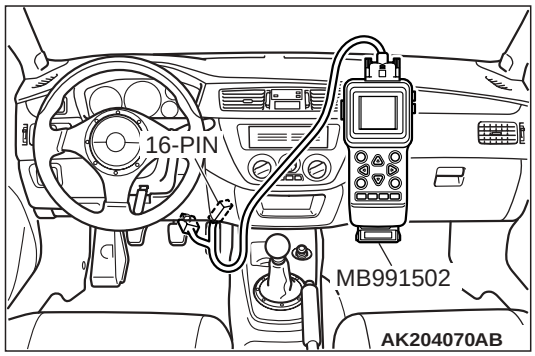
STEP 3. Check the drive ability.

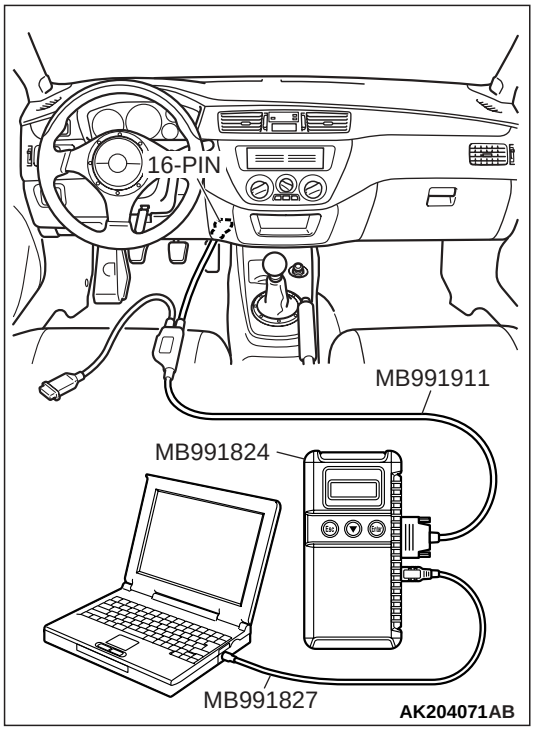
(1) Check if the malfunction symptom described on the symptom chart is occurring.

Q: Is the drive-ability normal?

YES : Go to Step 4.

NO : Refer to GROUP 13A, Trouble Symptom Chart P.13A-27.





STEP 4. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or 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 set?

YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-25.

NO : Go to Step 5.

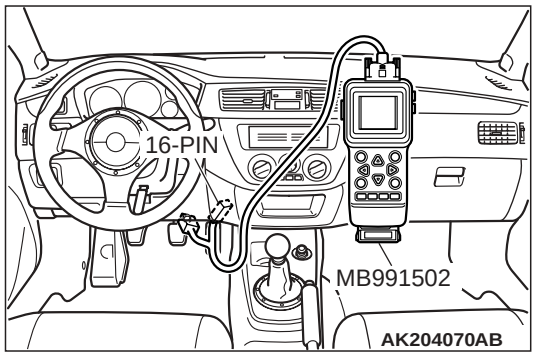
STEP 5. Check the ignition timing.

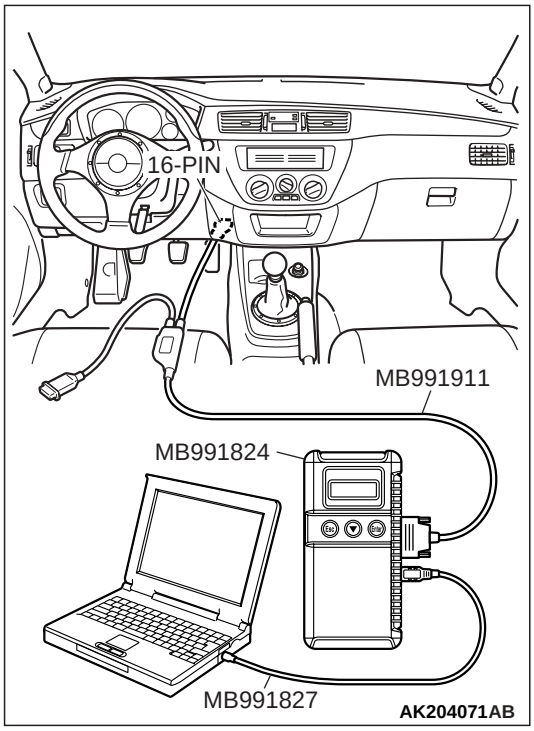
Refer to GROUP 11A, On-vehicle Service – Ignition Timing Check P.11A-11.

Q: Is the ignition timing normal?

YES : Go to Step 6.

NO : Check that the crankshaft position sensor and timing belt cover are in the correct position. Then confirm that the malfunction symptom is eliminated.





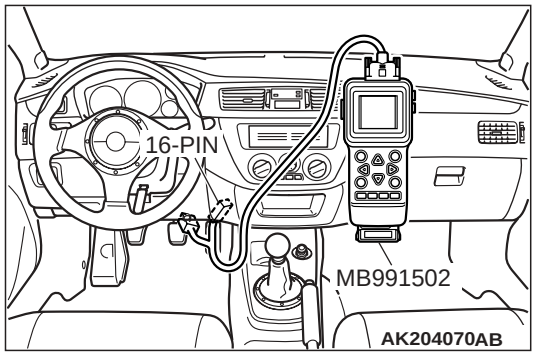
STEP 6. Using scan tool MB991502 or MB991958, check data list.

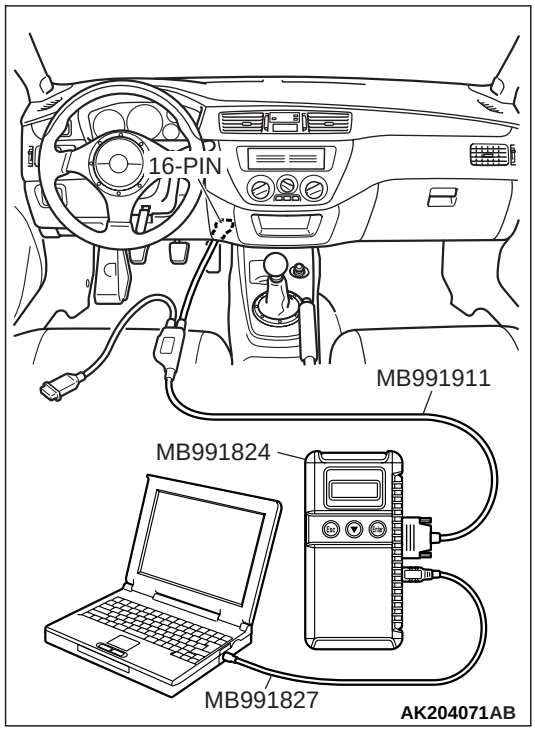
⚠ CAUTION
To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check the following items in the data list. Refer to GROUP 13A, Data List Reference Table P.13A-723.
  a. Item 21: Engine Coolant Temperature Sensor.
  b. Item 13: Intake Air Temperature Sensor.
  c. Item 25: Barometric pressure Sensor.
  d. Item 59: Heated Oxygen Sensor (rear).
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

YES : Go to Step 7.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.





STEP 7. Using scan tool MB991502 or MB991958, check data list item 11: heated oxygen sensor (front).

(1) Start the engine and run at idle.

(2) Set scan tool MB991502 or MB991958 to the data reading mode for item 11, Heated Oxygen Sensor (front).

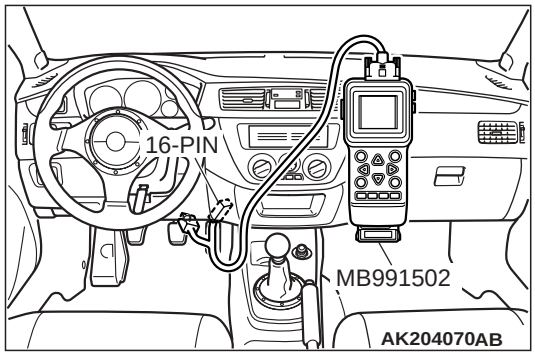
- Warm up the engine. When the engine is decelerated suddenly from 4,000 r/min, the output voltage should increase from 200 mV or less to 600 – 1,000 mV in a few seconds.

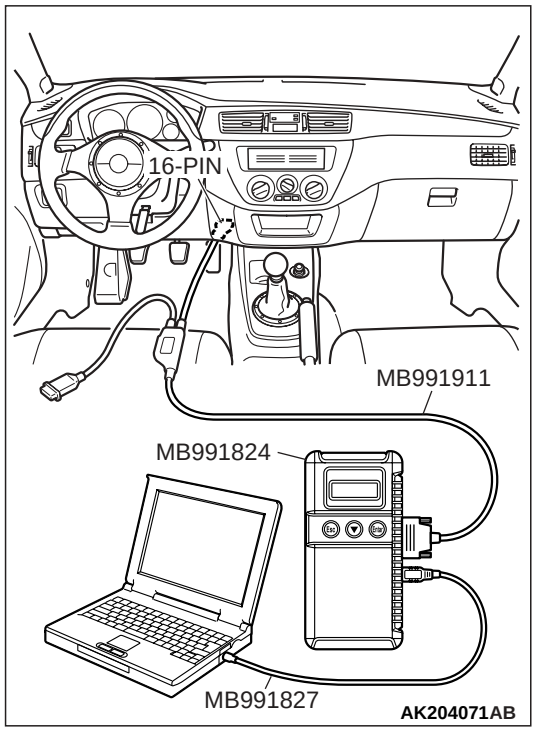
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

YES : Go to Step 8.

NO : Refer to GROUP 13A, DTC P0130 – Heated Oxygen Sensor Circuit (sensor 1) P.13A-156, DTC P0131 – Heated Oxygen Sensor Low Voltage (sensor 1) P.13A-170, DTC P0132 – Heated Oxygen Sensor Circuit High Voltage (sensor 1) P.13A-176, DTC P0133 – Heated Oxygen Sensor Circuit Slow Response (sensor 1) P.13A-180, DTC P0134 – Heated Oxygen Sensor Circuit No Activity Detected (sensor 1) P.13A-185.





STEP 8. Using scan tool MB991502 or MB991958, check data list item 11: Heated oxygen sensor (front).

(1) Start the engine and run at idle.
(2) Set scan tool MB991502 or MB991958 to the data reading mode for item 11, Heated Oxygen Sensor (front).
- Voltage should fluctuate between 0 – 0.4 volt and 0.6 – 1.0 volt while after the engine has been warmed.

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

Q: Is the sensor operating properly?

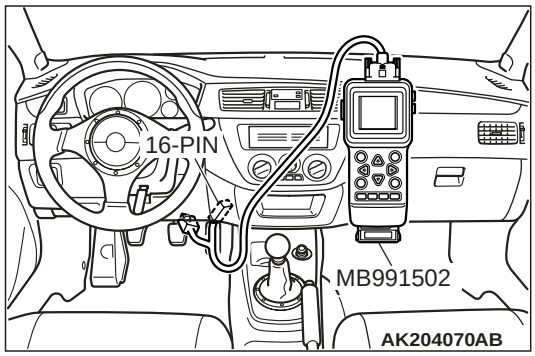
YES : Go to Step 9.
NO : Go to Step 11.

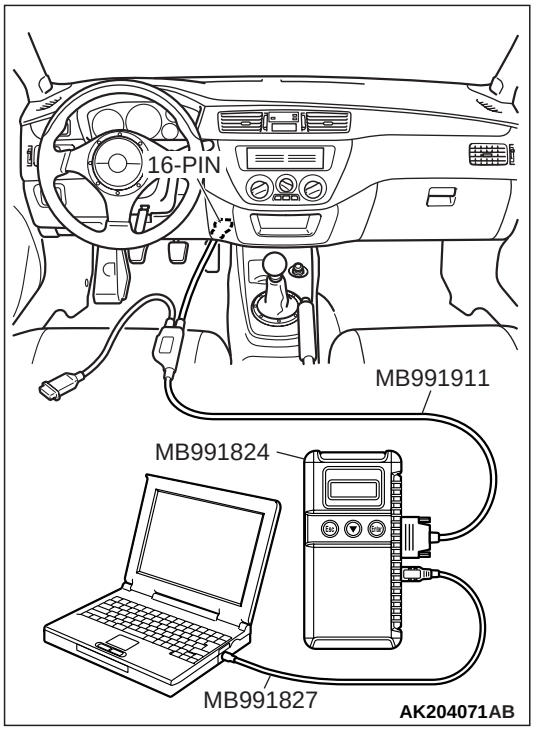
STEP 9. Check the EGR system.

Refer to GROUP 17, Emission Control System – EGR System Check P.17-17.

Q: Is the EGR system normal?

YES : Go to Step 10.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.





STEP 10. Using scan tool MB991502 or MB991958, check data list item 59: Heated oxygen sensor (rear).

⚠ CAUTION

To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or MB991958 to the data link connector.
(2) Start the engine and run at idle.
(3) Set scan tool MB991502 or MB991958 to the data reading mode for item 59, Heated Oxygen Sensor (rear).
- Average voltage should measure 0.6 volts or less, when idling.

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

Q: Is the sensor operating properly?

YES : Go to Step 12.
NO : Replace the heated oxygen sensor (front). Then confirm that the malfunction symptom is eliminated.

STEP 11. Check the fuel pressure.

Refer to GROUP 13A, On-vehicle Service – Fuel Pressure Test P.13A-762.

Q: Is the fuel pressure normal?

YES : Go to Step 12.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

STEP 12. Check the following items.

(1) Check the following items, and repair or replace the defective items.
   a. Check the injectors for fuel leakage.
   b. Check the ignition coil, spark plugs and spark plug cables.
   c. Check compression pressure.
   d. Check the positive crankcase ventilation system.
   e. Check the evaporative emission system.

(2) Then check the malfunction symptom.

Q: Is the malfunction symptom is eliminated?

YES : The check is completed.

NO : Replace the catalytic converter. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 24: PURGE FLOW TEST OF THE EVAPORATIVE EMISSION CANISTER FAILURE

COMMENT

- The test fails when the purge line or purge port is clogged or if the evaporative emission purge solenoid fails.

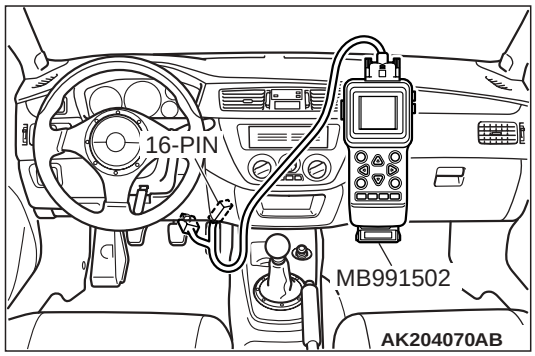
TROUBLESHOOTING HINTS (The most likely causes for this case:)

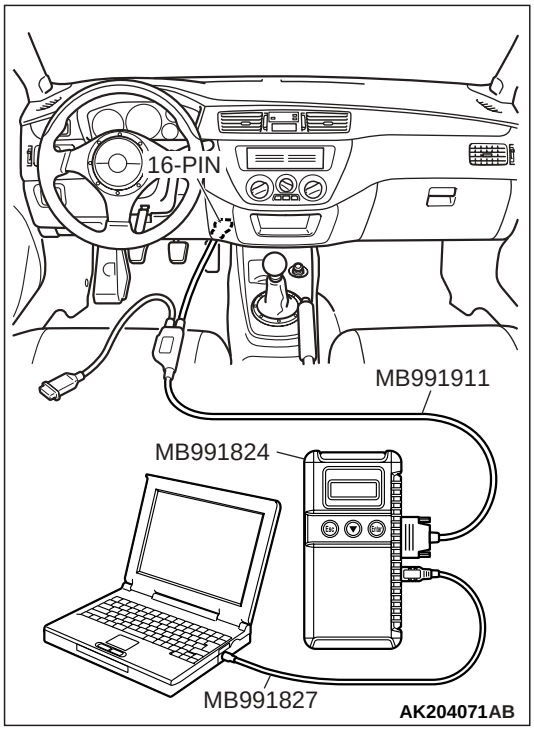
- Purge line or purge port is clogged.
- Malfunction of the evaporative emission purge solenoid.
- Evaporative emission canister is clogged.

DIAGNOSIS

Required Special Tools:

- MB991502: Scan Tool (MUT-II)
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991911: Main Harness B





STEP 1. Using scan tool MB991502 or MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

To prevent damage to scan tool MB991502 or MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502 or MB991958.

(1) Connect scan tool MB991502 or 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 set?

YES : Refer to GROUP 13A, Diagnostic Trouble Code Chart P.13A-25.

NO : Refer to GROUP 17, Emission Control System – Purge Control System Check (Purge Flow Check) P.17-13.

INSPECTION PROCEDURE 25: Pressure Test of the Evaporative System Failure

COMMENT

- The test fails if there is a leak from the fuel tank or vapor line.

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

- Loose fuel tank filler tube cap.
- Broken seal in fuel tank, vapor line evaporative emission canister.

DIAGNOSIS

STEP 1. Check the evaporative emission purge solenoid
Refer to GROUP 17, Emission Control System – Evaporative Emission Purge Solenoid Check .

Q: Is the evaporative emission purge solenoid normal?

YES : Go to Step 2.

NO : Repair or replace. Then confirm that the malfunction symptom is eliminated.

STEP 2. Check the evaporative emission ventilation solenoid.
Refer to GROUP 17, Emission Control System – Evaporative Emission Ventilation Solenoid Check .

Q: Is the evaporative emission ventilation solenoid normal?

YES : Check the following items, and repair or replace the defective items.

a. Check for leaks from the vapor line or evaporative emission canister.

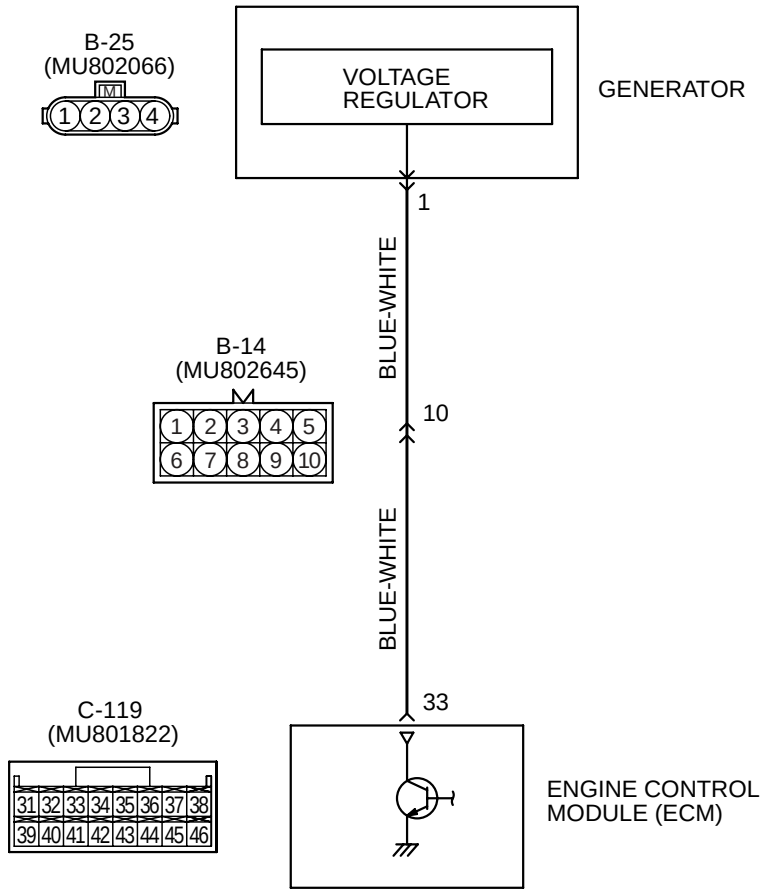
b. Check for leaks from the fuel tank.

Then confirm that the malfunction symptom is eliminated.

NO : Repair or replace. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 26: GENERATOR OUTPUT VOLTAGE IS LOW (APPROXIMATELY 12.3 VOLTS)

Generator Circuit



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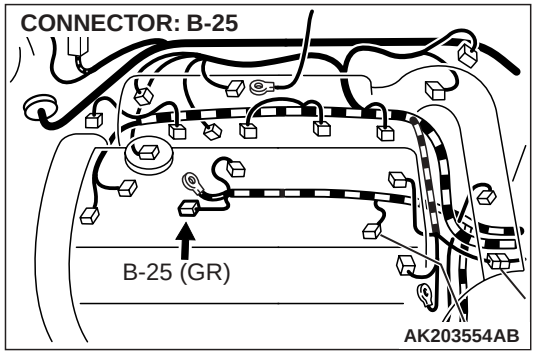
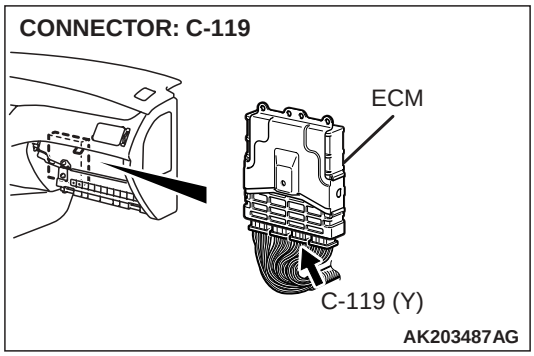
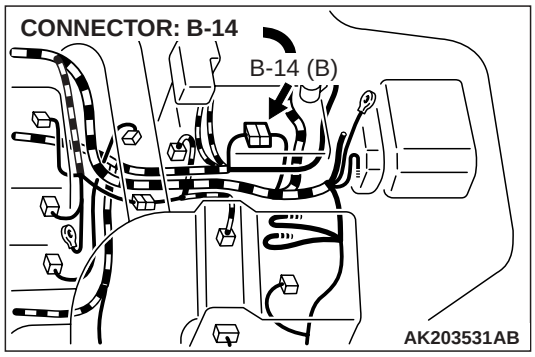




TSB Revision



CIRCUIT OPERATION

- The ECM controls generator out put current by duty-controlling continuity between the generator G terminal (terminal 1) and ground.

TROUBLESHOOTING HINTS (The most likely causes for this charging system:)

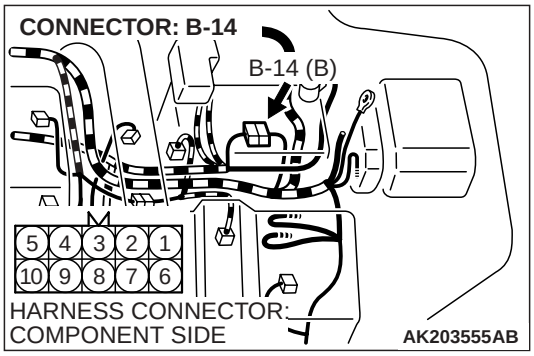
- Malfunction of the charging system.
- Short circuit in the harness between generator G terminal and ECM.
- ECM failed.

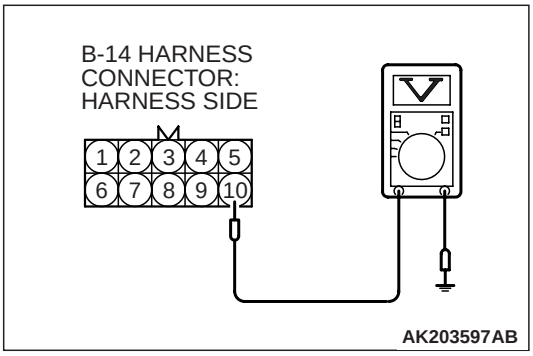
DIAGNOSIS

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.





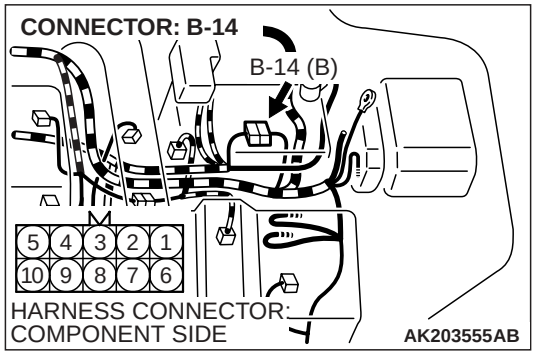
(3) Measure the voltage between terminal No. 10 and ground by backprobing.
   a. Engine: warming up
   b. Radiator fan: stopped
   c. Headlight switch: OFF to ON
   d. Rear defogger switch: OFF to ON
   e. Stoplight switch: OFF to ON
   - Voltage rises by 0.2 – 3.5 volts.

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

Q: Is the measured voltage between 0.2 and 3.5 volts?

YES : Replace the generator. Then confirm that the malfunction symptom is eliminated.

NO : Go to Step 2.

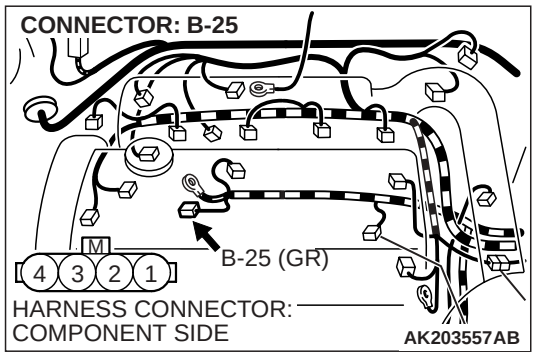


STEP 2. Check connector B-14 at generator intermediate connector for damage.

Q: Is the connector in good condition?

YES : Go to Step 3.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then confirm that the malfunction symptom is eliminated.

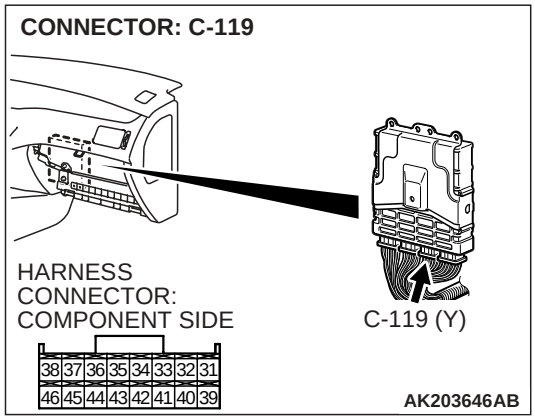


STEP 3. Check connector B-25 at generator connector for damage.

Q: Is the 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 confirm that the malfunction symptom is eliminated.

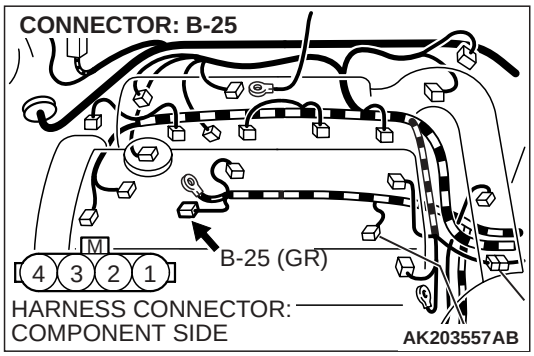


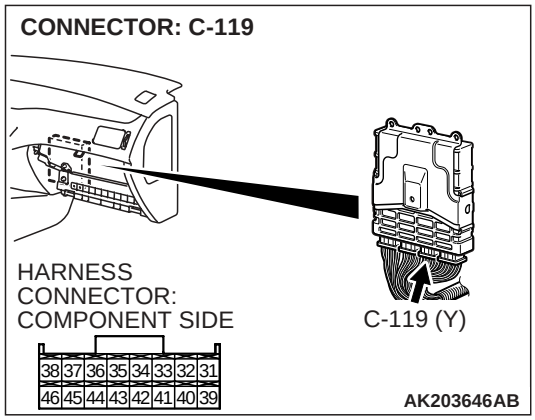
STEP 4. Check connector C-119 at ECM for damage.

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 confirm that the malfunction symptom is eliminated.





STEP 5. Check for open circuit and short circuit to ground and harness damage between generator connector B-25 (terminal No. 1) and ECM connector C-119 (terminal No. 33).

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. The confirm that the malfunction symptom is eliminated.

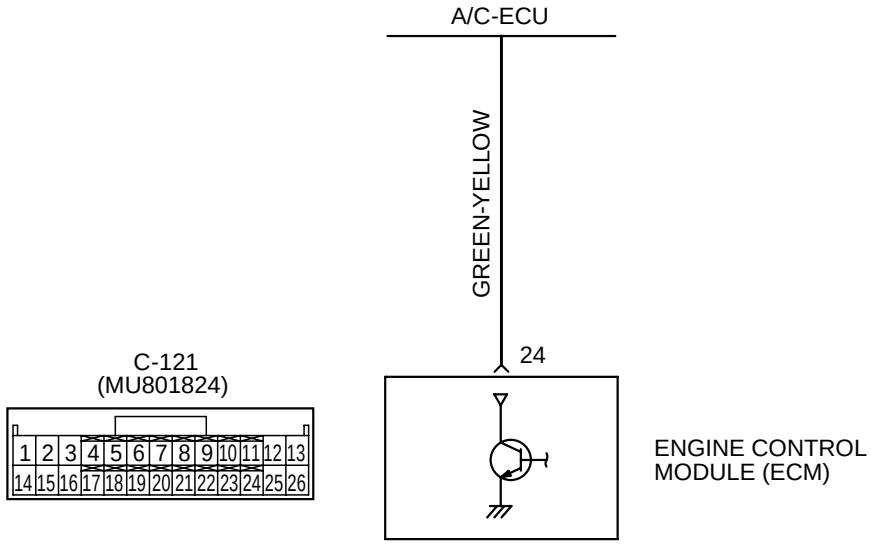
Q: Is the harness wire in good condition?

YES : Replace the ECM. Then confirm that the malfunction symptom is eliminated.

NO : Repair it. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 27: INCORRECT IDLE SPEED WHEN THE A/C IS OPERATING (A/C SWITCH 2 SIGNAL)

A/C Switch 2 Signal Circuit



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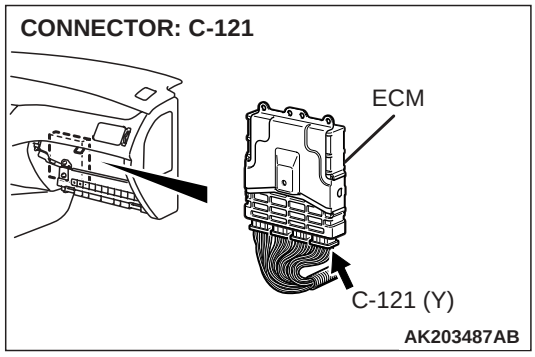


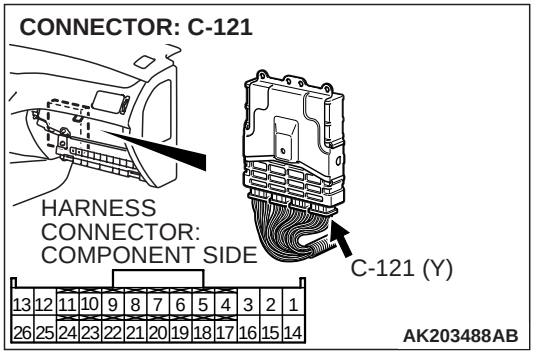
CIRCUIT OPERATION

- The ECM increases the engine idle speed by driving the IAC motor when the automatic compressor-ECU sends a "A/C on" signal to the module.
- The A/C-ECU detects how the air conditioning is applying load to the engine, and converts the information to a voltage signal (High voltage = low load, Low voltage = high load). This voltage signal is called "A/C switch 2 signal". The ECM receives this A/C switch 2 signal from the automatic compressor controller through terminal No. 24, and determines the idle-up speed according to the high or low air conditioning load.

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

- Malfunction of the A/C control system.
- Open or shorted circuit, or improper connector contact.
- ECM failed.

DIAGNOSIS

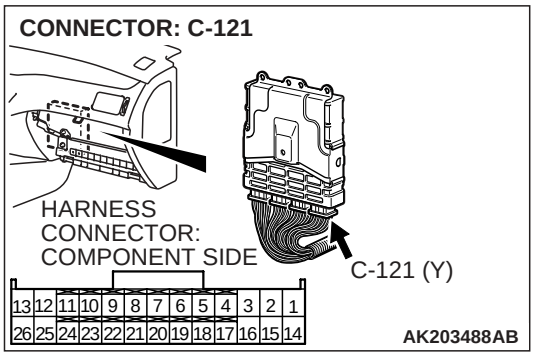


STEP 1. Check connector C-121 at ECM for damage.

Q: Is the connector in good condition?

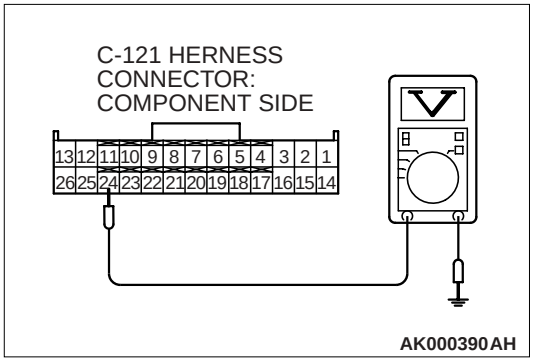
YES : Go to Step 2.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then confirm that the malfunction symptom is eliminated.



STEP 2. Measure the output voltage at ECM harness side connector C-121.

(1) Disconnect the connector C-121 and measure at the harness side.
(2) Start the engine and run at idle.
(3) Turn the A/C switch "ON".



(4) Measure the voltage between terminal No. 24 and ground.
- If atmospheric air temperature is 15°C (59°F) or less, the voltage should measure 1 volt or less.
- If atmospheric air temperature is 18°C (65.4°F) more, the voltage should measure battery positive voltage.

(5) Turn the A/C switch "OFF".
(6) Turn the ignition switch to the "LOCK" (OFF) position.

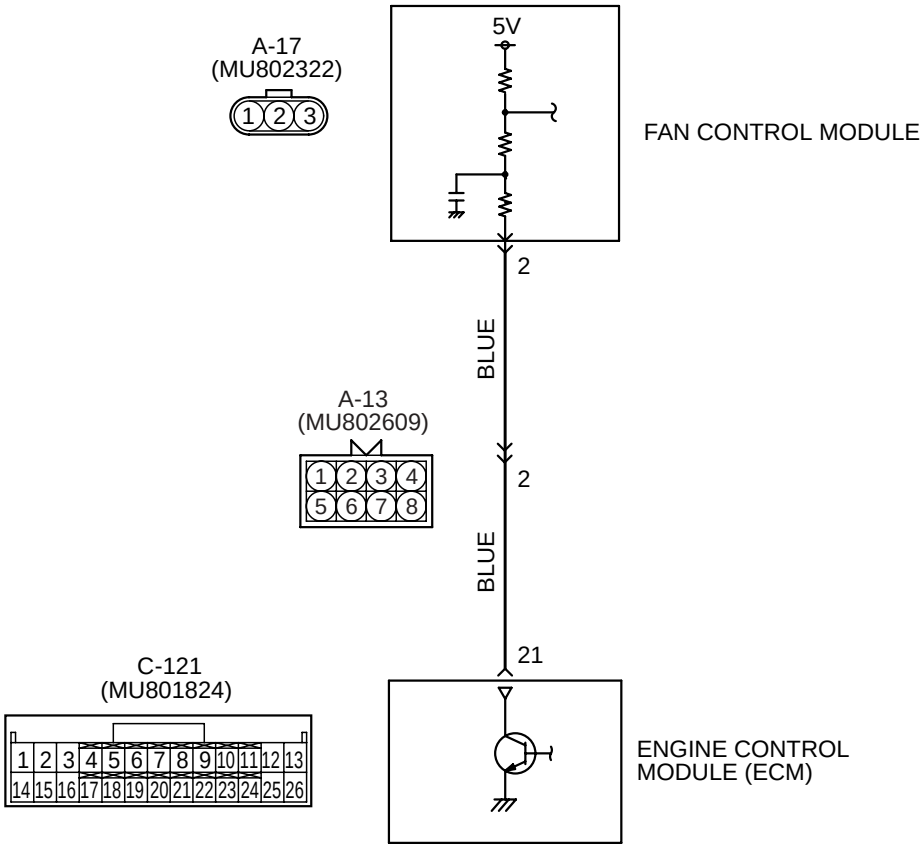
Q: Is the measured voltage within the specified range?

YES : Replace the ECM. Then confirm that the malfunction symptom is eliminated.

NO : Refer to GROUP 55A, Heater, Air Conditioning And Ventilation – Manual A/C Diagnosis – Symptom Chart P.55-5.

INSPECTION PROCEDURE 28: RADIATOR FAN IS INOPERATIVE

Radiator Fan Circuit



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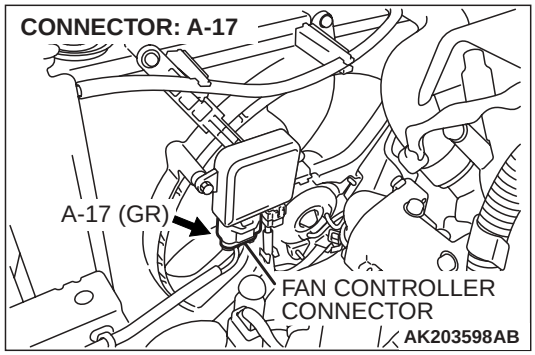
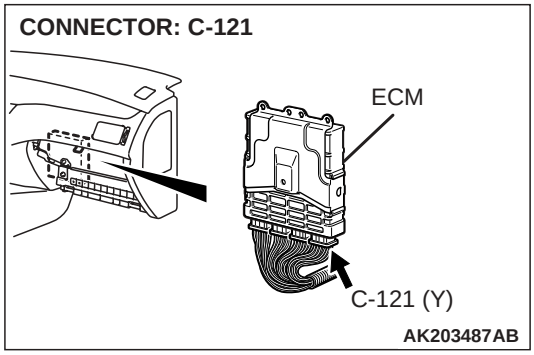
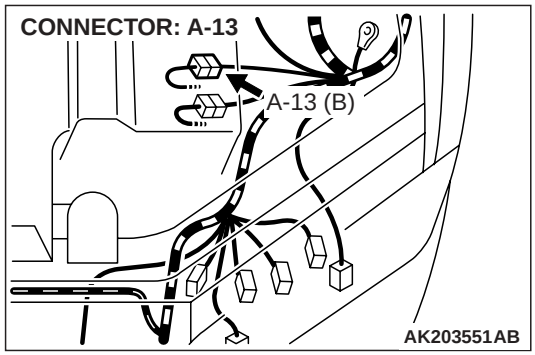






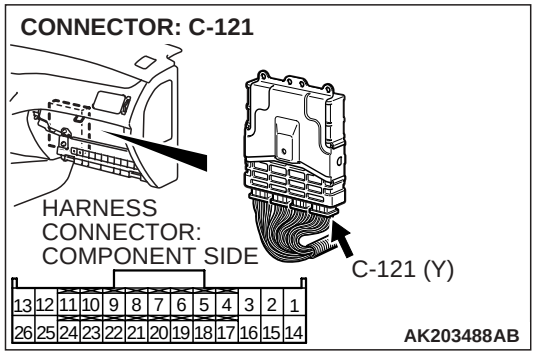
CIRCUIT OPERATION

- The ECM sends a duty signal to the fan control module according to engine coolant temperature, vehicle speed, and the condition of the A/C switch. (The closer the average voltage at the terminal comes to five volts, the higher the fan speed becomes.)

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

- Malfunction of the fan motor relay.
- Malfunction of the fan motor.
- Malfunction of the fan control module.
- Improper connector contact, open or short-circuited harness wire.
- ECM failed.

DIAGNOSIS



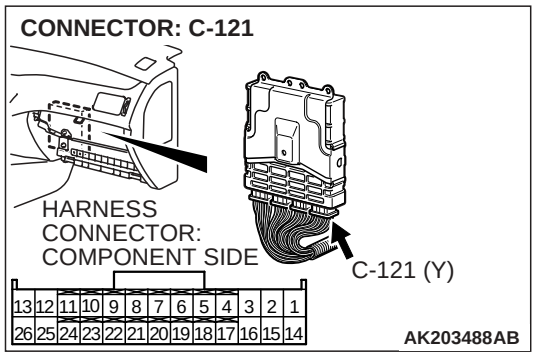
STEP 1. Check connector C-121 at ECM for damage.
Q: Is the connector in good condition?

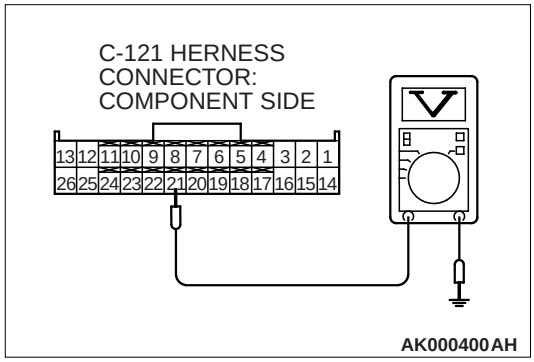
YES : Go to Step 2.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then confirm that the malfunction symptom is eliminated.

STEP 2. Check the output voltage at ECM harness side connector C-121.

(1) Disconnect the connector C-121 and measure at the harness side.
(2) Turn the ignition switch to the "ON" position.





(3) Measure the voltage between terminal No. 21 and ground.
- Voltage should measure between 4.8 and 5.2 volts. (Fan rotates at high speed.)

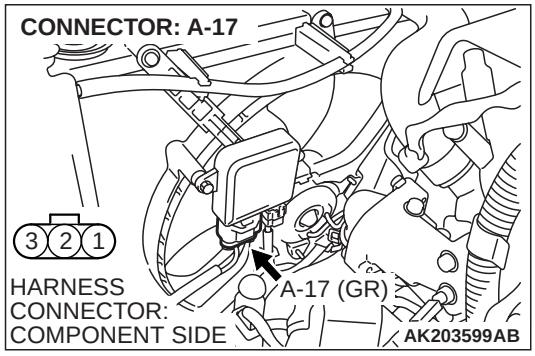
(4) Connect a jumper cable between terminal No. 21 and ground.
- The fan should stop.

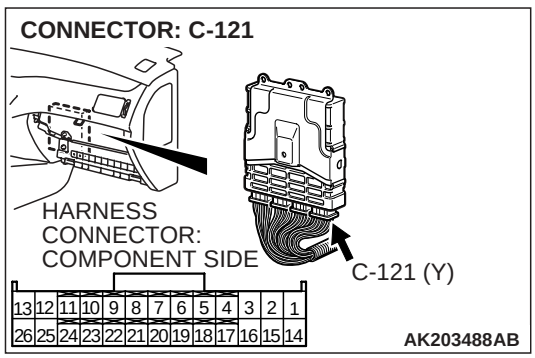
(5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the voltage and fan condition normal?

YES : Replace the ECM. Then confirm that the malfunction symptom is eliminated.
NO : Go to Step 3.

STEP 3. Check for open circuit and short circuit to ground and harness damage between fan control module A-17 (terminal No. 2) and ECM connector C-121 (terminal No. 21).





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 confirm that the malfunction symptom is eliminated.

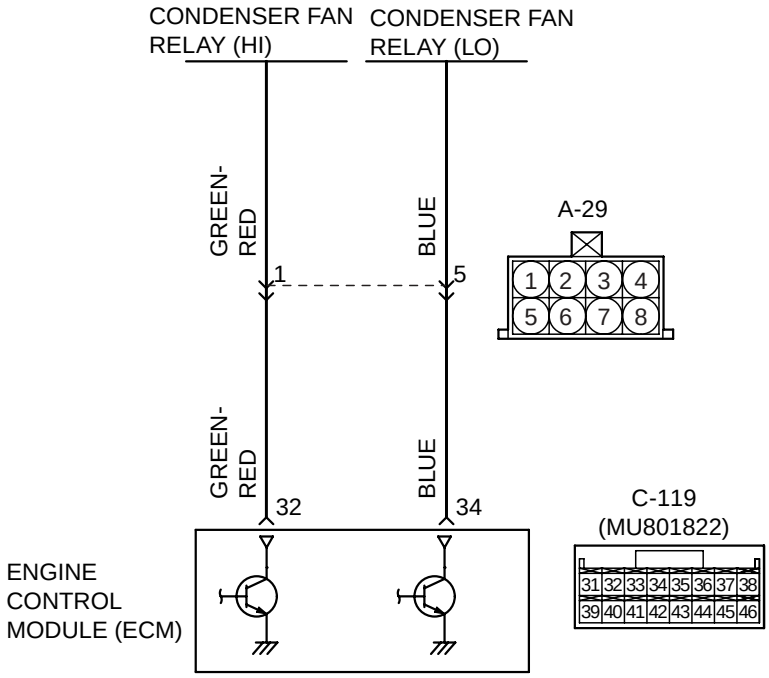
Q: Is the harness wire in good condition?

YES : Refer to GROUP 14, Engine Cooling Diagnosis – Symptom Chart P.14-4.

NO : Repair it. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 29: A/C CONDENSER FAN IS INOPERATIVE

A/C Condenser Fan Circuit



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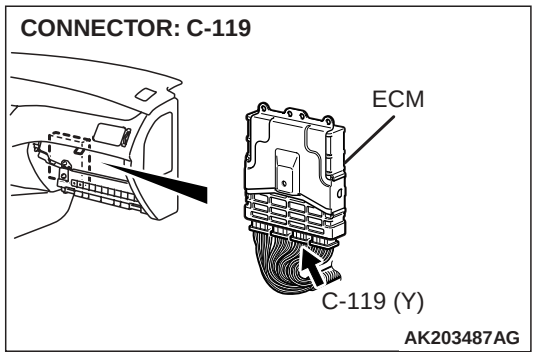
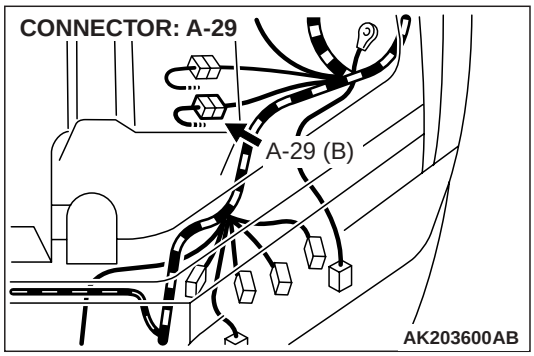




CIRCUIT OPERATION

- The battery positive voltage is applied on the ECM (terminal No. 34) from the condensor fan control relay (LO).
- The battery voltage is applied on the ECM (terminal 32) from the condensor fan control relay (HI).
- When the ECM switches on those power transistors, the condensor fan control relay coil is energized, causing current to flow in the circuit.

TSB Revision

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

- Malfunction of the condensor fan control relay.
- Malfunction of the condenser fan motor.
- Improper connector contact, open or short-circuited harness wire.
- ECM failed.

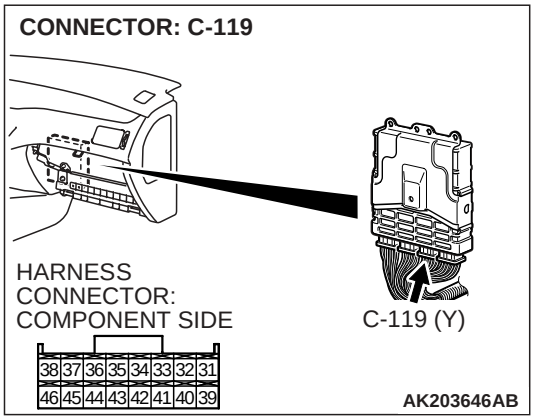
DIAGNOSIS

STEP 1. Check harness connector C-119 at PCM for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 2.

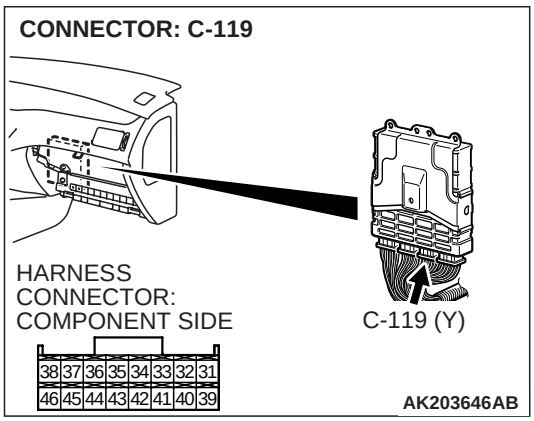
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then confirm that the malfunction symptom is eliminated.

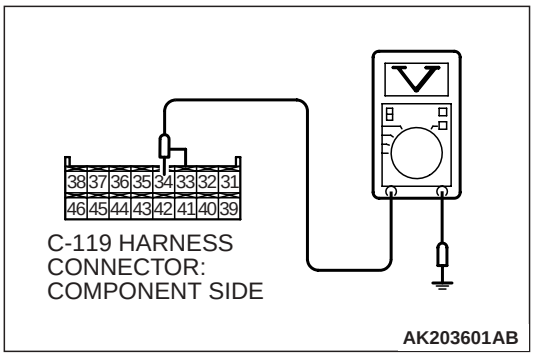


STEP 2. Measure the output voltage at ECM harness side connector C-119.

(1) Disconnect the connector C-119 and measure at the harness side.

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





(3) Measure the voltage between terminal No. 34 and ground.
- Voltage should be battery positive voltage.

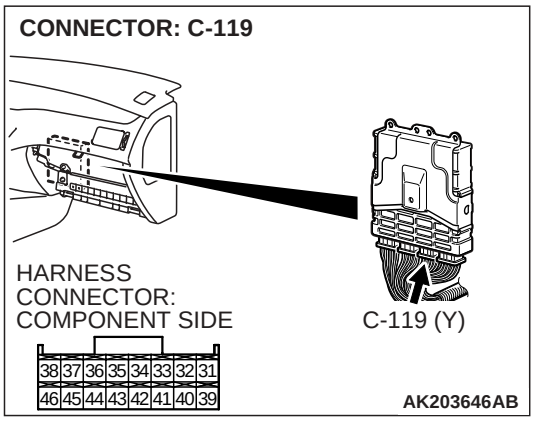
(4) Check the condenser fan condition.
- When the terminal No. 34 is disconnected, the fan should stop.
- When the terminal No. 34 is grounded by the jumper cable, the fan should run.

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

Q: Is the voltage and fan condition normal?

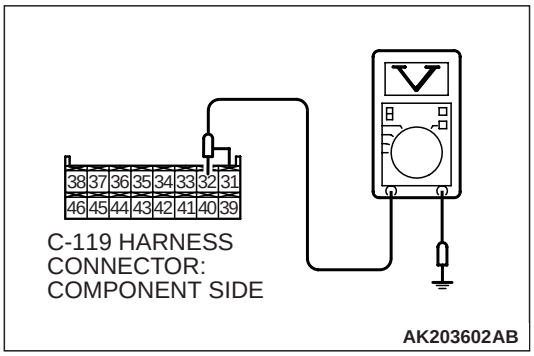
YES : Go to Step 3.

NO : Refer to GROUP 55, Introduction To Heater, Air Conditioning And Ventilation Diagnosis P.55-5.



STEP 3. Measure the output voltage at ECM harness side connector C-119.

(1) Disconnect the connector C-119 and measure at the harness side.
(2) Turn the ignition switch to the "ON" position.



(3) Measure the voltage between terminal No. 32 and ground.
- Voltage should be battery positive voltage.

(4) Check the condenser fan condition.
- When the terminal No. 32 is disconnected, the fan should stop.
- When the terminal No. 32 is grounded by the jumper cable, the fan should run.

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

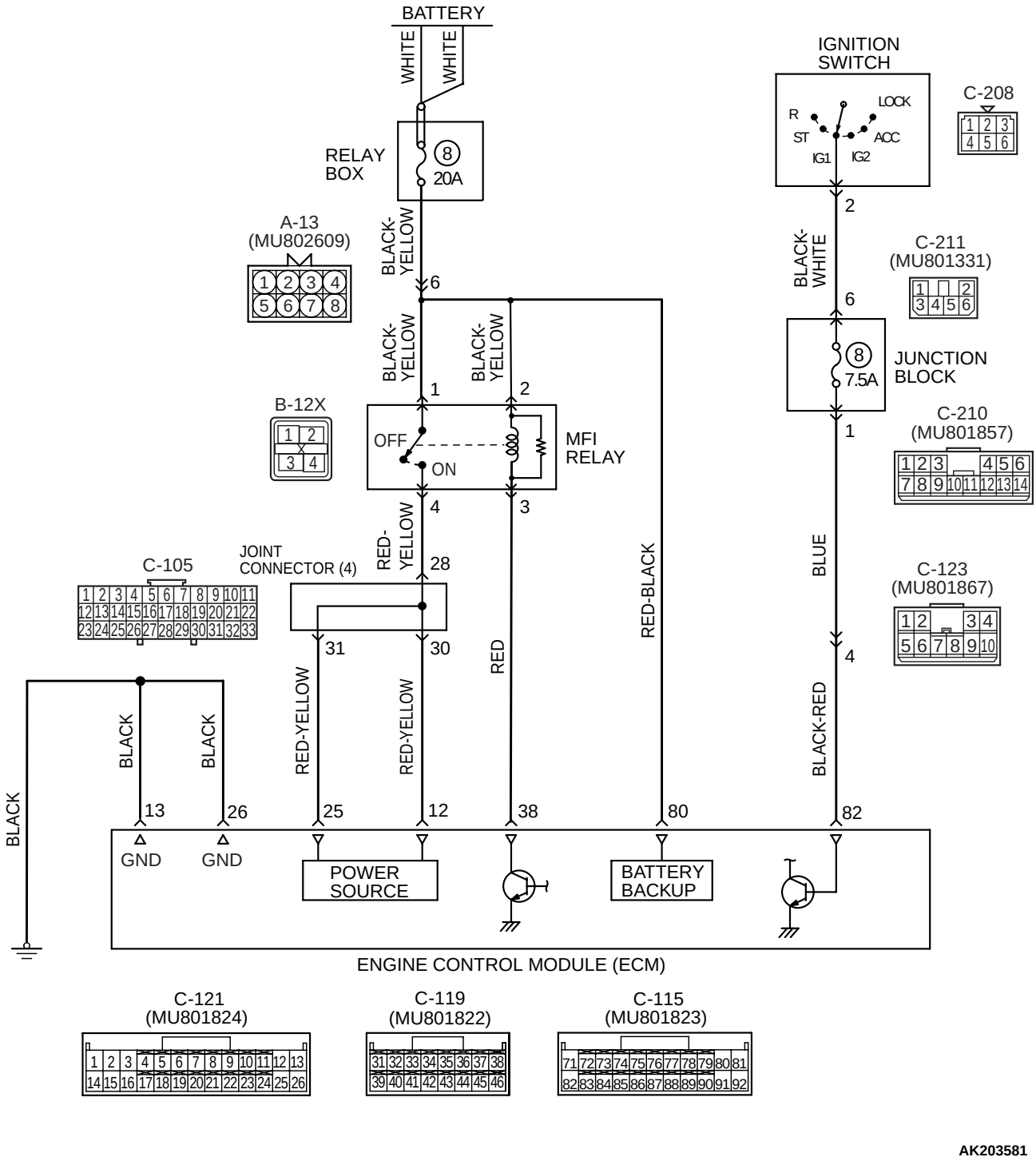
Q: Is the voltage and fan condition normal?

YES : Replace the ECM. Then confirm that the malfunction symptom is eliminated.

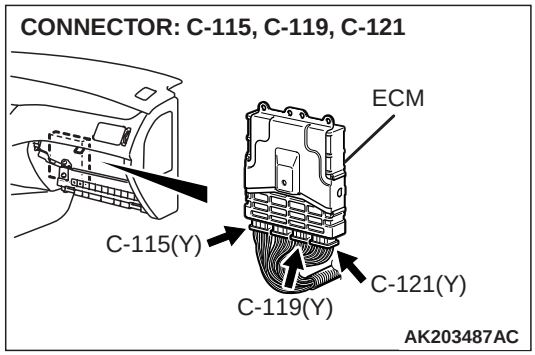
NO : Refer to GROUP 55, Introduction To Heater, Air Conditioning And Ventilation Diagnosis P.55-5.

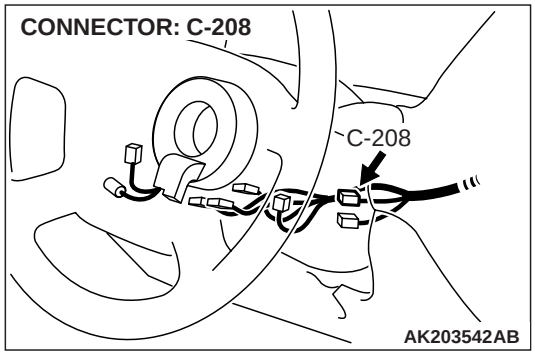
INSPECTION PROCEDURE 30: POWER SUPPLY SYSTEM AND IGNITION SWITCH-IG SYSTEM

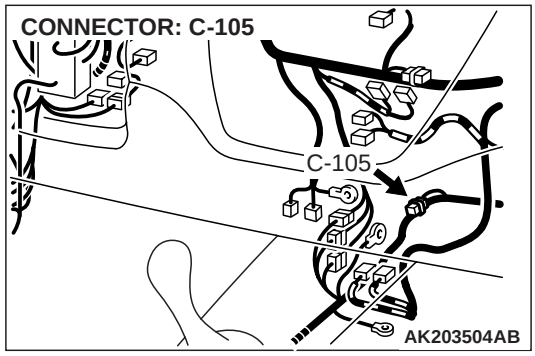
Power Supply and Ignition Switch-IG Circuit

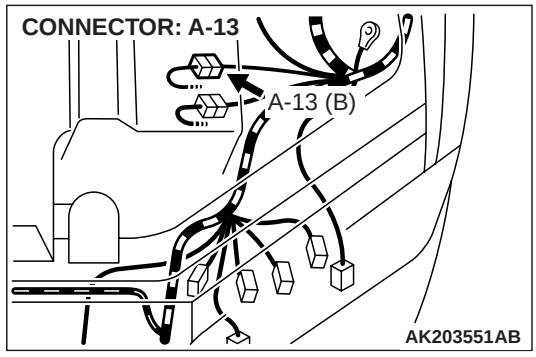


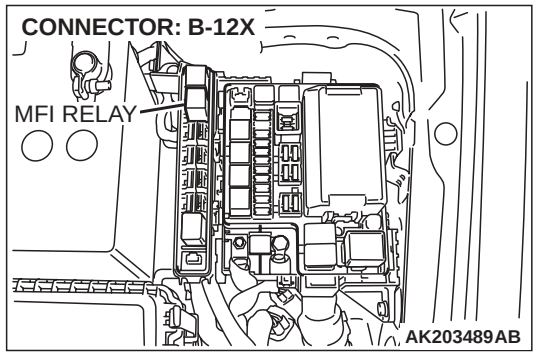
TSB Revision

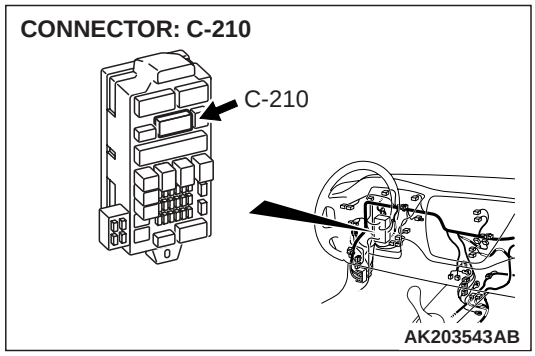


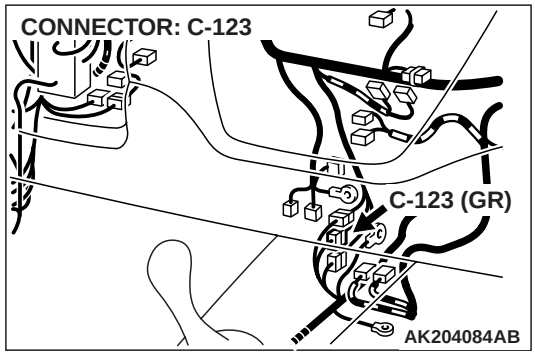


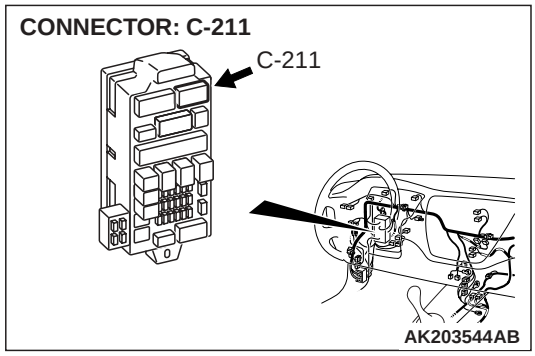












CIRCUIT OPERATION

- Battery positive voltage is applied to the MFI relay (terminals No. 1, No. 2).
- When the ignition switch is turned to the "ON" position, the battery positive voltage is applied to the ECM (terminal No. 82). When the battery positive voltage is applied, the ECM turns the power transistor in the ECM "ON" and grounds the MFI relay coil. With this, the MFI relay turns "ON" and the battery positive voltage is supplied to the ECM (terminals No. 12, No. 25) from the MFI relay (terminal No. 4).
- Battery positive voltage is constantly supplied to the ECM (terminal No. 80) as the backup power.

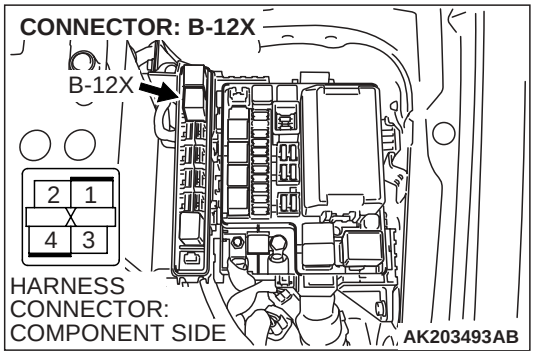
TSB Revision

- The ECM (terminals No. 13, No. 26) is grounded to the vehicle body.

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

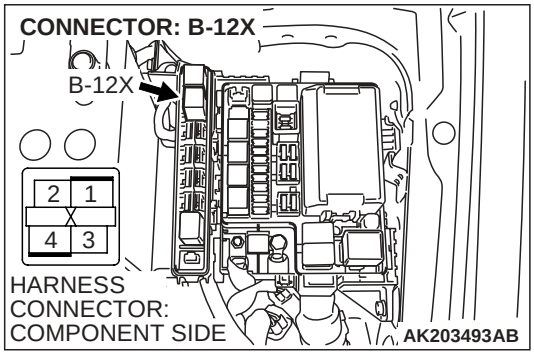
- Malfunction of the ignition switch.
- Malfunction of the MFI relay.
- Improper connector contact, open circuit or short-circuited harness wire.
- Disconnected ECM ground wire.
- Malfunction of the ECM.

DIAGNOSIS



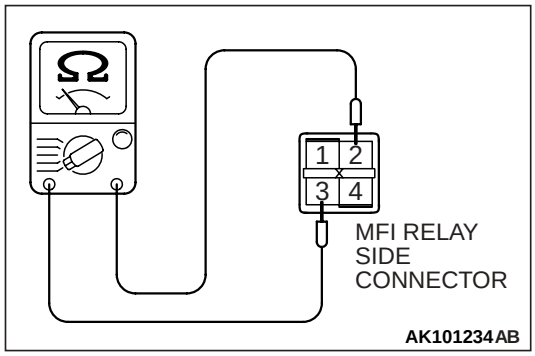
STEP 1. Check connector B-12X at MFI relay for damage.
Q: Is the connector in good condition?

YES : Go to Step 2.
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then confirm that the malfunction symptom is eliminated.

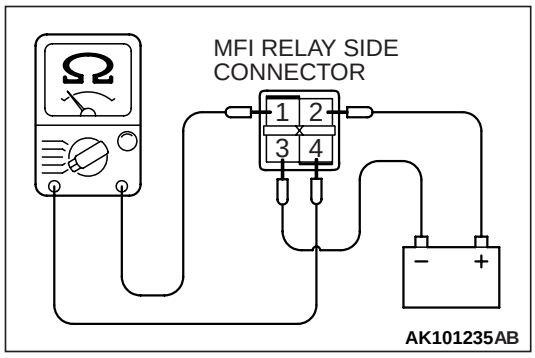


STEP 2. Check the MFI relay.

(1) Remove the MFI relay.



(2) Check for continuity between the MFI relay terminals No. 2 and No. 3.
- There should be continuity. (approximately 70 ohms)



(3) Use jumper wires to connect MFI relay terminal No. 2 to the positive battery terminal and terminal No. 3 to the negative battery terminal.
(4) Check for continuity between the MFI relay terminals 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 MFI relay.

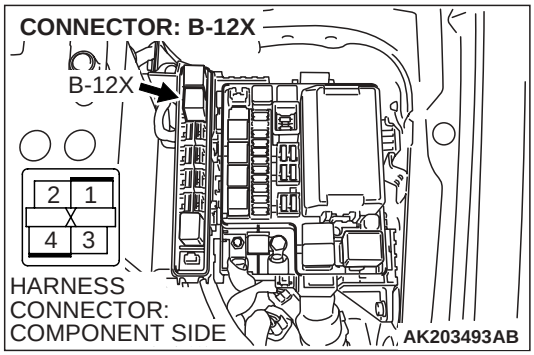
Q: Is the measured voltage within the specified range?

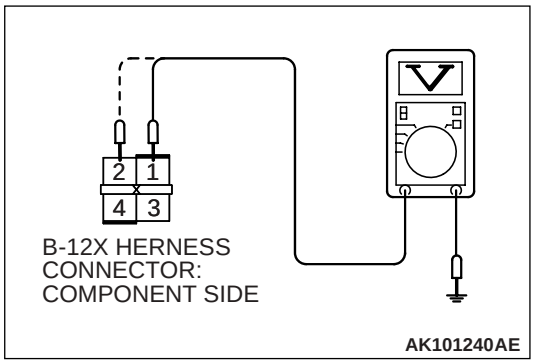
YES : Go to Step 3.

NO : Replace the MFI relay. Then confirm that the malfunction symptom is eliminated.

STEP 3. Measure the power supply voltage at MFI relay harness side connector B-12X.

(1) Disconnect the connector B-12X and measure at the harness side.





(2) Measure the voltage between terminals No. 1, No. 2 and ground.
- Voltage should measure battery positive voltage.

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

YES : Go to Step 4.

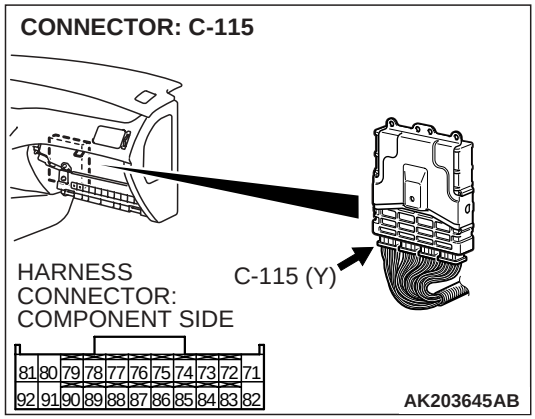
NO : Check harness connector A-13 at intermediate connector for damage, and repair or replace as required. Refer to, GROUP 00E, Harness Connector Inspection P.00E-2. If intermediate connector is in good condition, repair harness wire between relay box (fuse 8) and MFI relay connector B-12X (terminals No. 1, No. 2) because of open circuit. Then confirm that the malfunction symptom is eliminated.

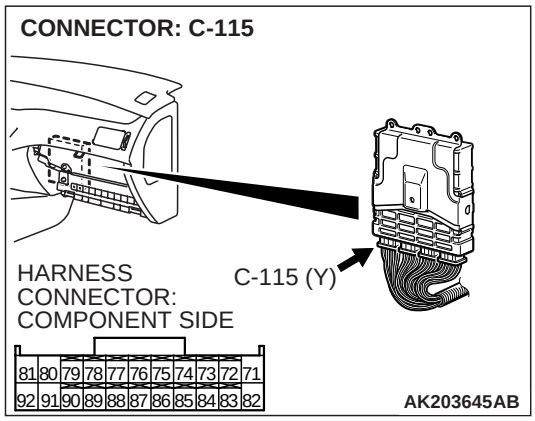
STEP 4. Check connector C-115 at ECM for damage.

Q: Is the connector in good condition?

YES : Go to Step 5.

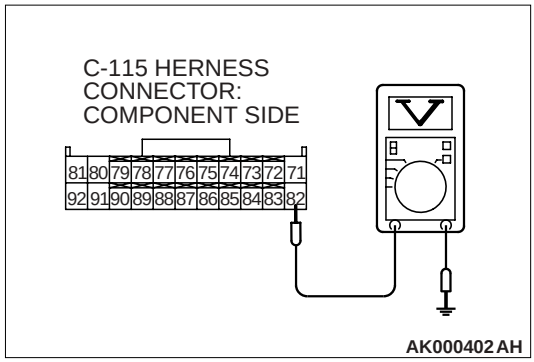
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then confirm that the malfunction symptom is eliminated.





STEP 5. Measure the ignition switch-IG signal voltage at ECM harness side connector C-115.

(1) Disconnect the connector C-115 and measure at the harness side.
(2) Turn the ignition switch to the "ON" position.



(3) Measure the voltage between terminal No. 82 and ground.
- Voltage should measure battery positive voltage.

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

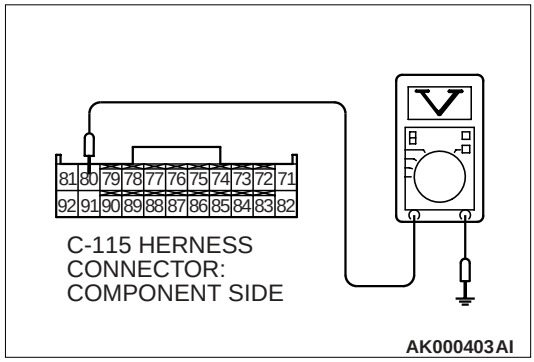
Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 6.

NO : Check harness connector C-123, 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 ECM connector C-115 (terminal No. 82) because of open circuit. Then confirm that the malfunction symptom is eliminated.

STEP 6. Measure the backup power supply voltage at ECM harness side connector C-115.

(1) Disconnect the connector C-115 and measure at the harness side.
(2) Measure the voltage between terminal No. 80 and ground.
- Voltage should measure battery positive voltage.



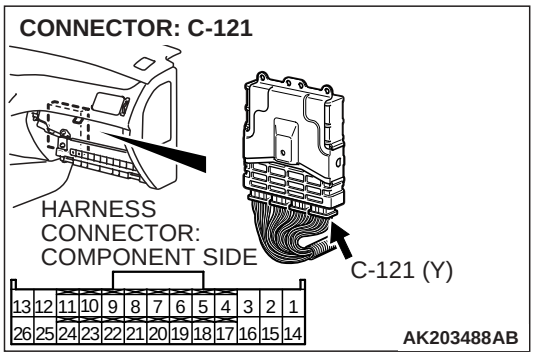
Q: Is battery positive voltage (approximately 12 volts) present?

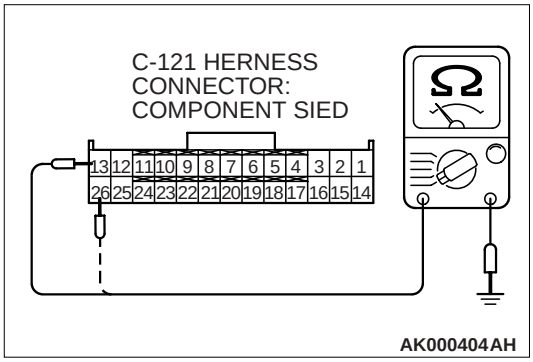
YES : Go to Step 7.

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 connectors are in good condition, repair harness wire between relay box (fuse 8) and ECM connector C-115 (terminal No. 80) because of open circuit. Then confirm that the malfunction symptom is eliminated.

STEP 7. Check for continuity at ECM harness side connector C-121.

(1) Disconnect the connector C-121 and measure at the harness side.





(2) Check for the continuity between terminals (No. 13, No. 26) and ground.
- Should be less than 2 ohms.

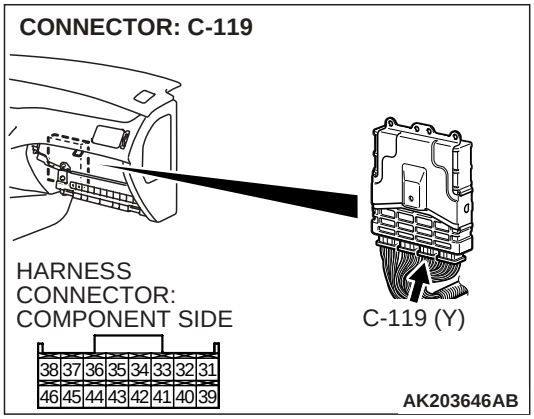
Q: Does continuity exist?

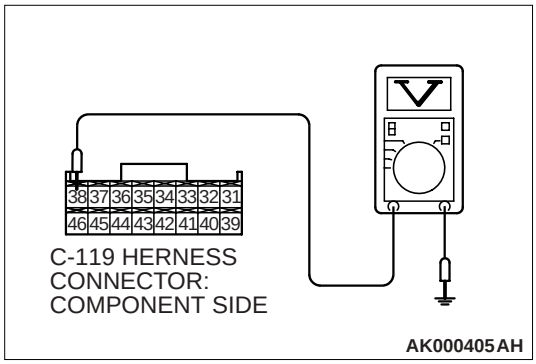
YES : Go to Step 8.

NO : Repair harness wire between ECM connector C-121 (terminals No. 13, No. 26) and ground because of open circuit. Then confirm that the malfunction symptom is eliminated.

STEP 8. Measure the power supply voltage at ECM harness side connector C-119.

(1) Disconnect the connector C-119 and measure at the harness side.





(2) Measure the voltage between terminal No. 38 and ground.
- Voltage should measure battery positive voltage.

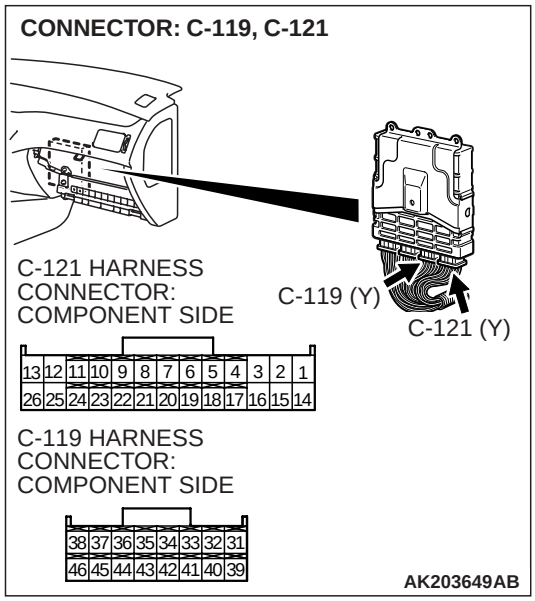
Q: Is battery positive voltage (approximately 12 volts) present?

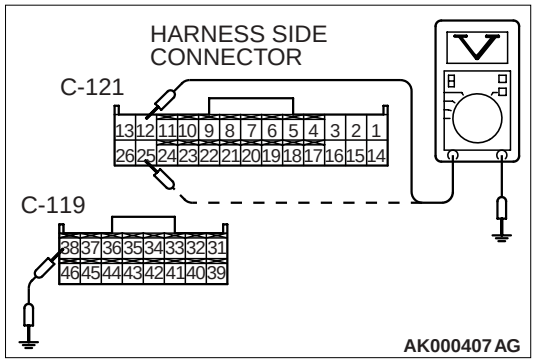
YES : Go to Step 9.

NO : Repair harness wire between MFI relay connector B-12X (terminal No. 3) and ECM connector C-119 (terminal No. 38) because of open circuit. Then confirm that the malfunction symptom is eliminated.

STEP 9. Measure the power supply voltage at ECM harness side connector C-121, C-119.

(1) Disconnect the connectors C-121, C-119 and measure at the harness side.





(2) Using a jumper wire, connect terminal No. 38 to ground.
(3) Measure the voltage between terminals (No. 12, No. 25) and ground.
- Voltage should measure battery positive voltage.

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

YES : Replace the ECM. Then confirm that the malfunction symptom is eliminated.

NO : Check 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 ECM connector C-121 (terminals No. 12, No. 25) because of open circuit. Then confirm that the malfunction symptom is eliminated.