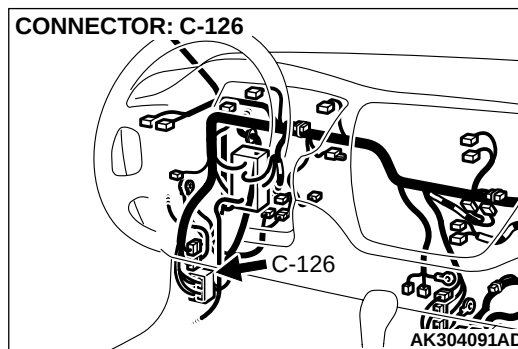
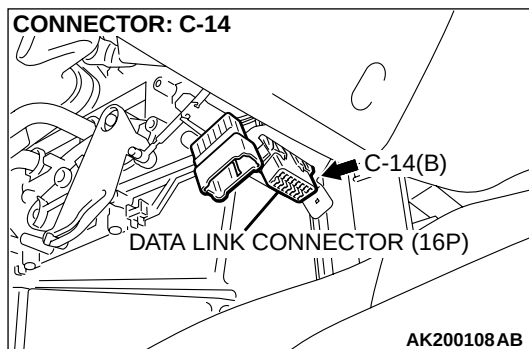
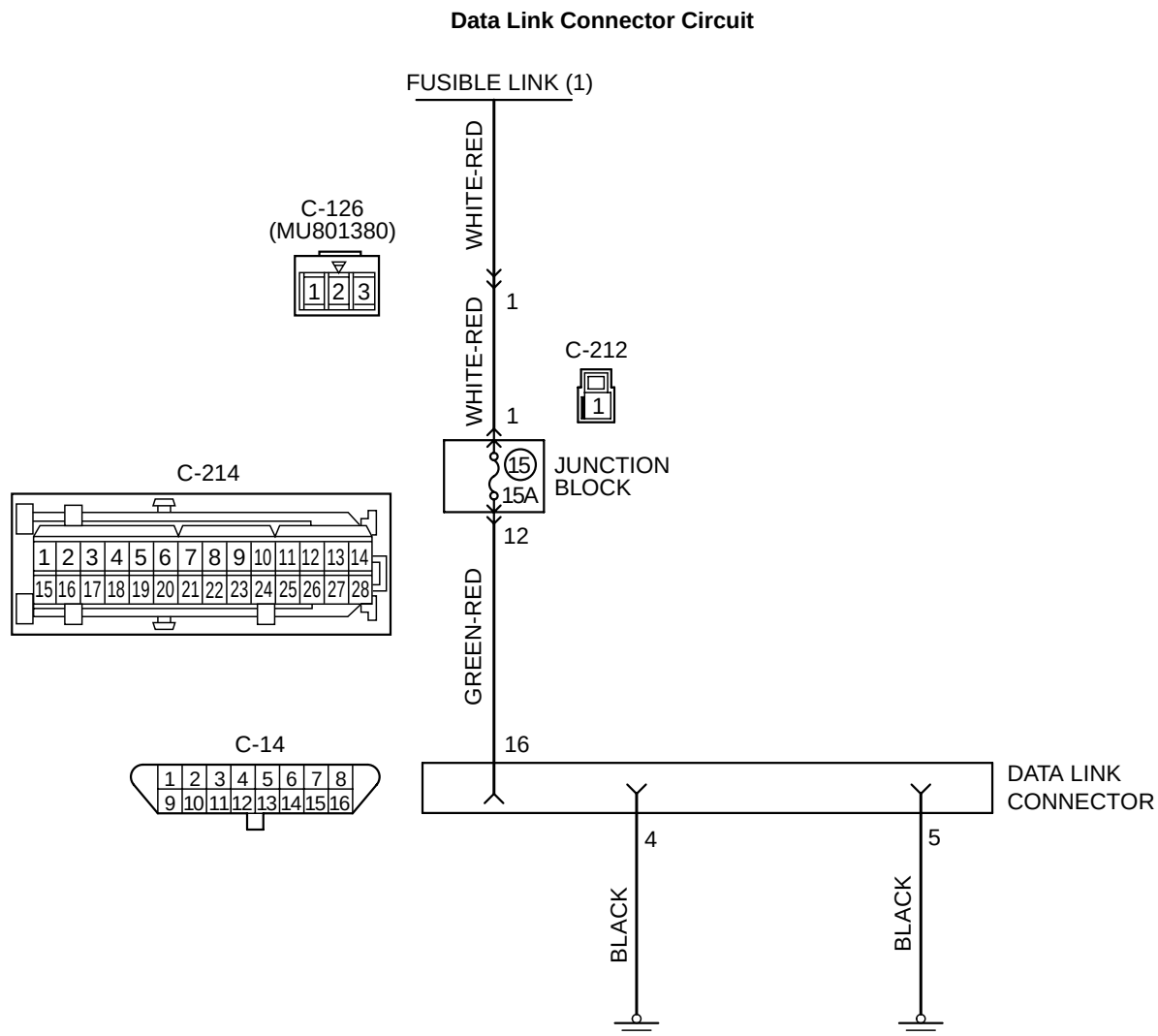
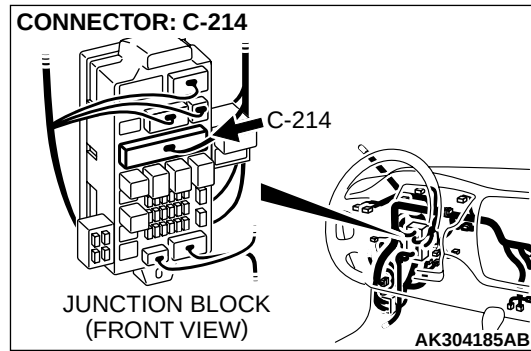
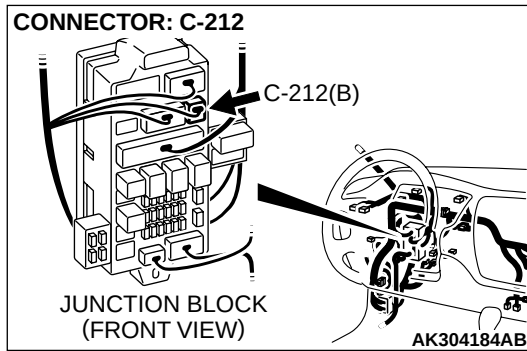


SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: Communication with Scan Tool Is Not Possible (Communication with All Systems Is Not Possible)





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

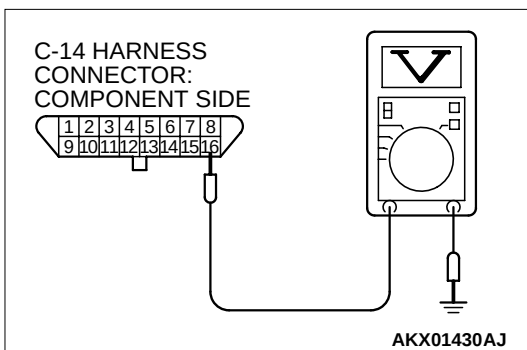
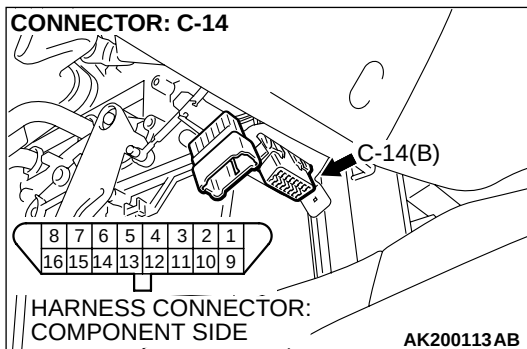
- The cause is probably a defect in power supply system (including ground) for the on-board diagnostic test mode line.

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.

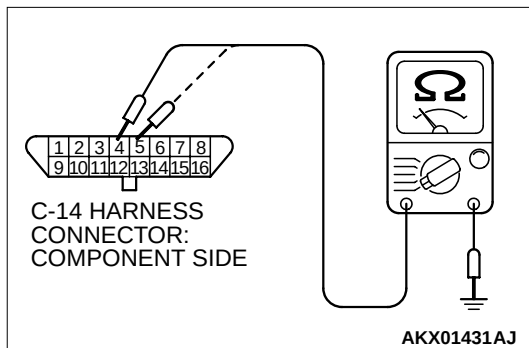
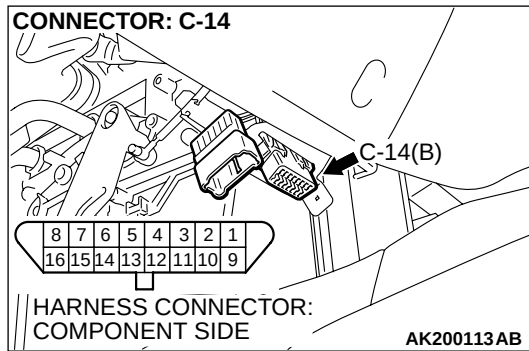


- Measure voltage between terminal No. 16 and ground.
 - Voltage should measure battery positive voltage.

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.

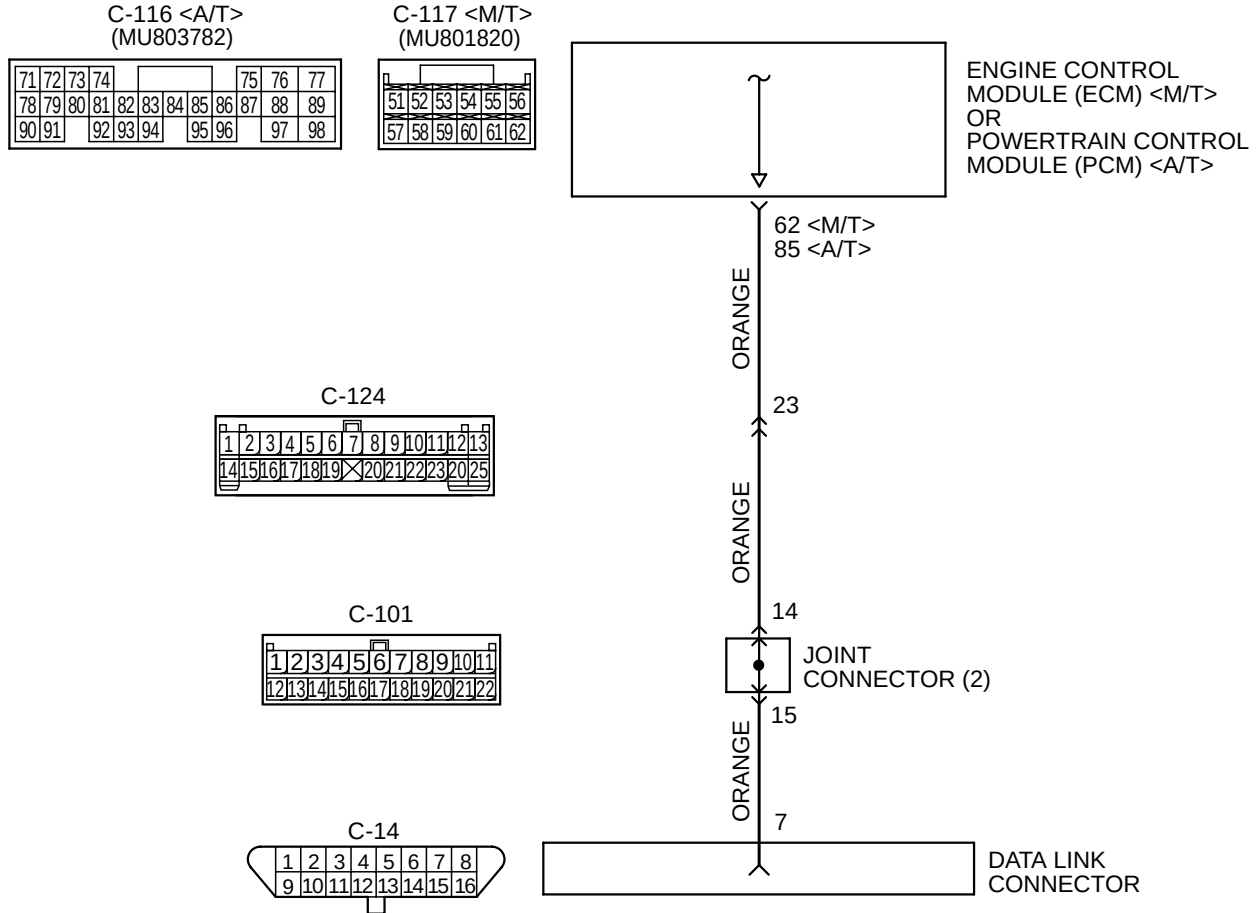
Q: Does continuity exist?

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

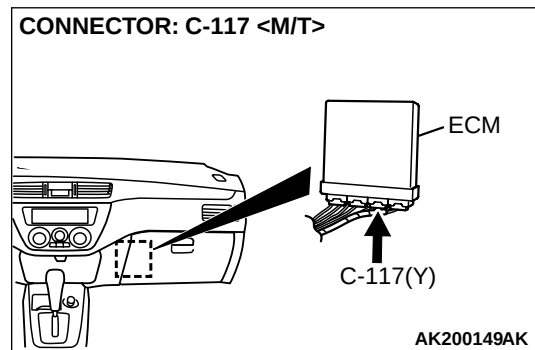
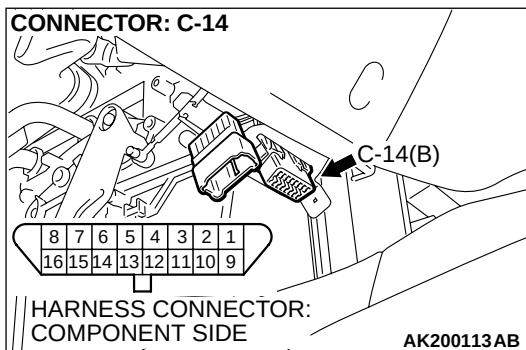
NO : Repair harness wire between data link connector C-14 (terminals No. 4, No. 5) and ground because of open circuit or harness damage. Then confirm that the malfunction symptom is eliminated.

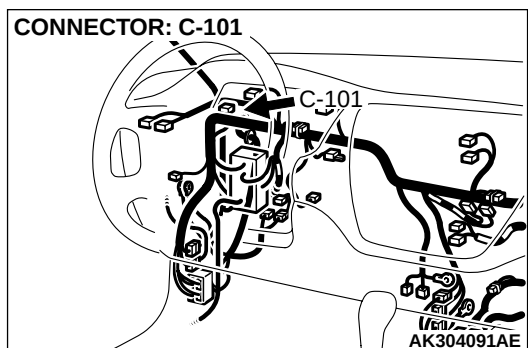
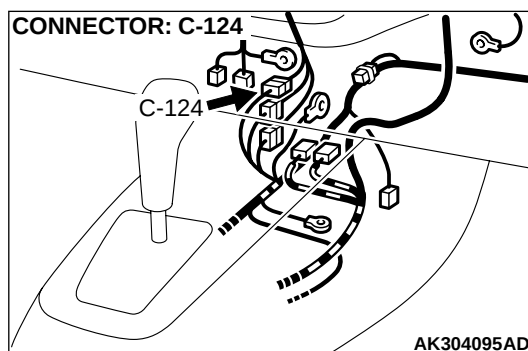
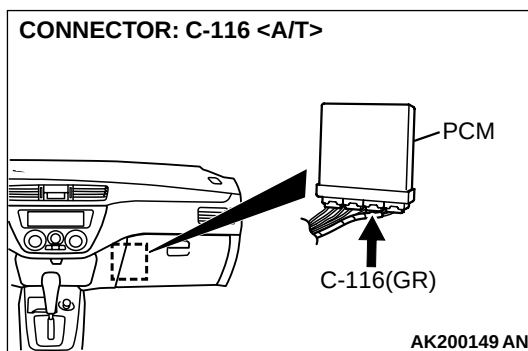
INSPECTION PROCEDURE 2: Communication with Scan Tool Is Not Possible (Communication with ECM or PCM Only Is Not Possible)

Data Link Connector Circuit



AK200446



**CIRCUIT OPERATION**

- A diagnostic output is made from the ECM (terminal No. 62) <M/T> or PCM (terminal No. 85) <A/T> to the diagnostic output terminal (terminal No. 7) of the data link connector.

COMMENT

- No power supply to ECM <M/T> or PCM <A/T>.
- Defective ground circuit of ECM <M/T> or PCM <A/T>.
- Defective ECM <M/T> or PCM <A/T>.

- Improper communication line between ECM <M/T> or PCM <A/T> and scan tool.

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

- Malfunction of ECM <M/T> or PCM <A/T> power supply circuit.
- Malfunction of the ECM <M/T> or PCM <A/T>.
- Open circuit between ECM <M/T> or PCM <A/T> and data link connector.

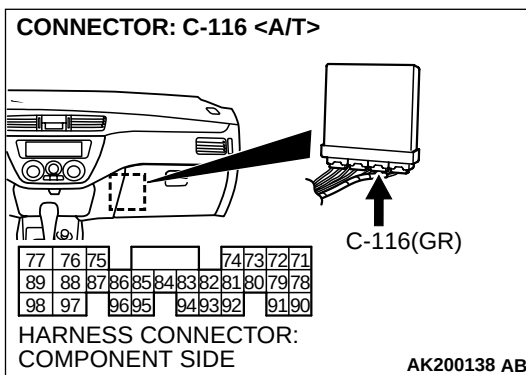
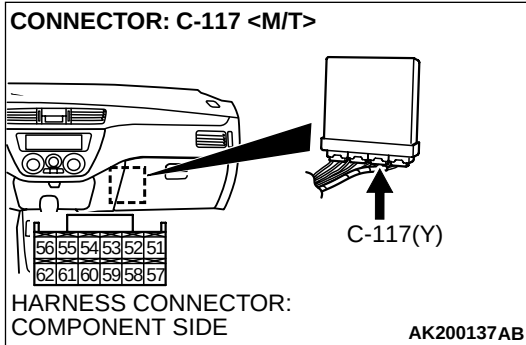
DIAGNOSIS

STEP 1. Check harness connector C-117 at ECM <M/T> or harness connector C-116 at PCM <A/T> for damage.

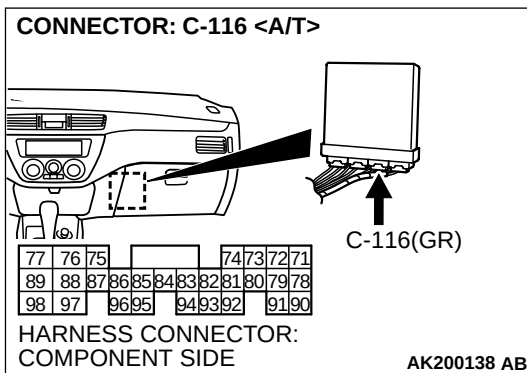
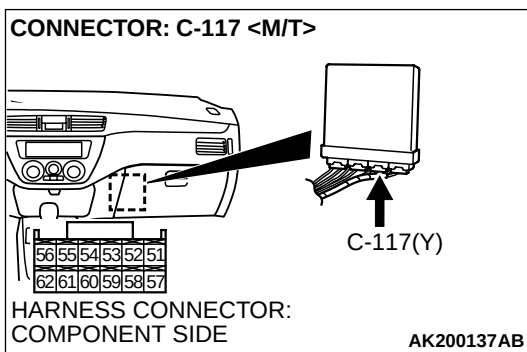
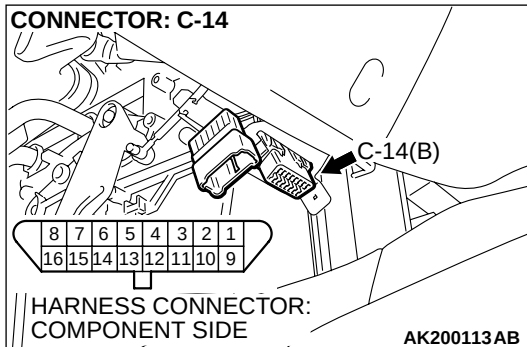
Q: Is the harness connector in good condition?

YES : Go to Step 2.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then 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) <M/T> or PCM connector C-116 (terminal No. 85) <A/T>.



NOTE: Check harness after checking intermediate connectors C-101 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.

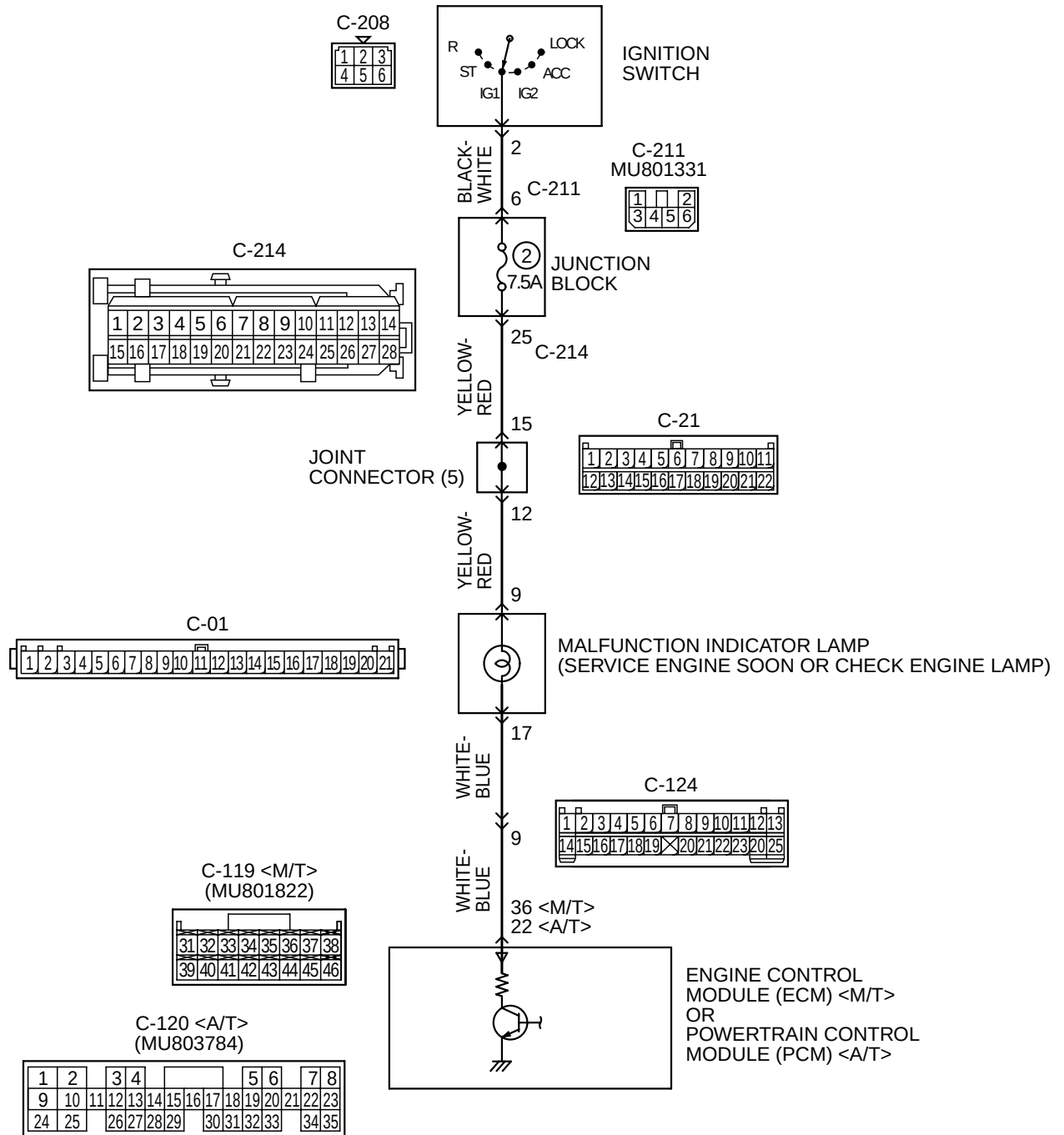
Q: Is the harness wire in good condition?

YES : Refer to, INSPECTION PROCEDURE 29 – Power Supply System and Ignition Switch – IG System
[P.13A-810](#).

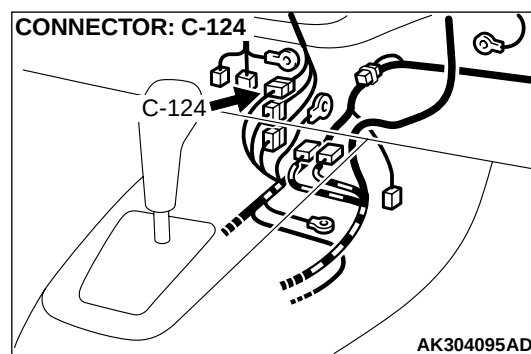
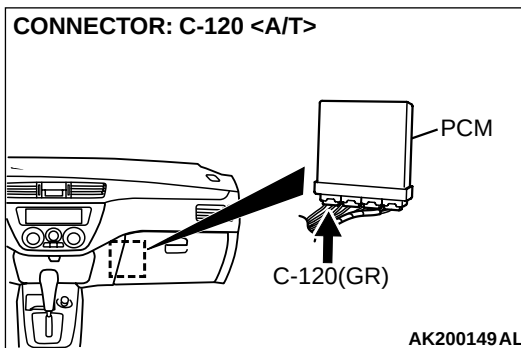
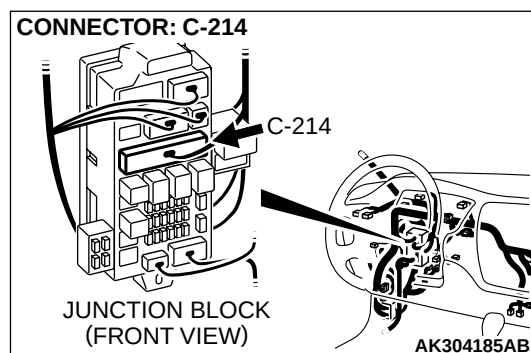
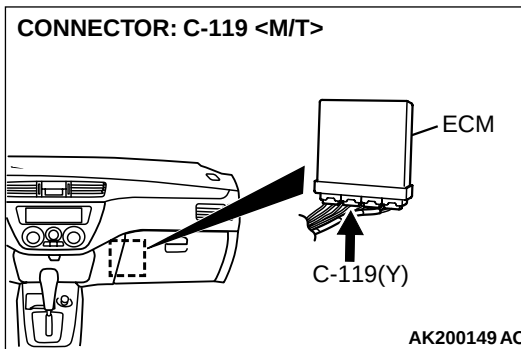
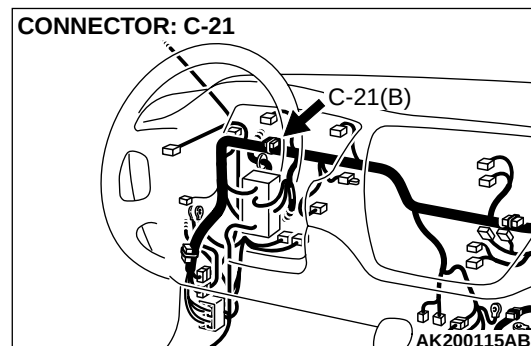
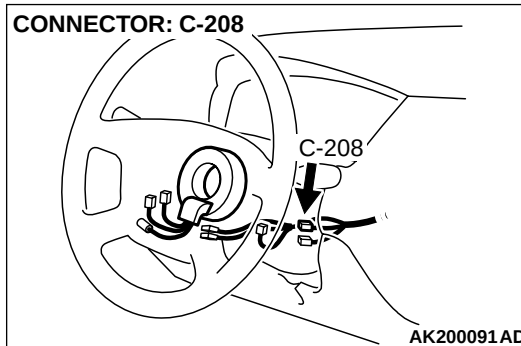
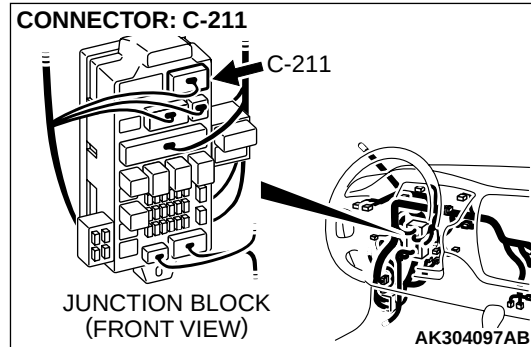
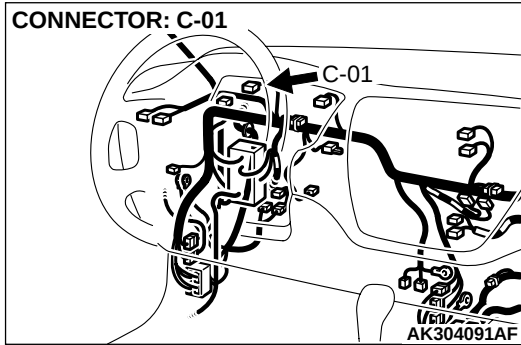
NO : Repair it. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 3: The Malfunction Indicator Lamp (SERVICE ENGINE SOON or Check Engine Lamp) Does Not Illuminate Right after the Ignition Switch Is Turned to the "ON" Position

Malfunction Indicator Lamp (SERVICE ENGINE SOON or Check Engine Lamp) Circuit



AK302716



CIRCUIT OPERATION

- The malfunction indicator lamp (SERVICE ENGINE SOON or Check Engine Lamp) power is supplied from the ignition switch.
- The ECM <M/T> or PCM <A/T> controls the ground of the malfunction indicator lamp (SERVICE ENGINE SOON or Check Engine Lamp) by turning the power transistor in the ECM <M/T> or PCM <A/T> ON and OFF.

COMMENT

- The ECM <M/T> or PCM <A/T> causes the malfunction indicator lamp (SERVICE ENGINE SOON or Check Engine Lamp) to illuminate for 5 seconds immediately after the ignition switch is turned to the "ON" position occurred.

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

- Burnt-out bulb.

- Defective malfunction indicator lamp (SERVICE ENGINE SOON or Check Engine Lamp) circuit.
- Malfunction of the ECM <M/T> or PCM <A/T>.

DIAGNOSIS

Required Special Tools:

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

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

⚠ CAUTION

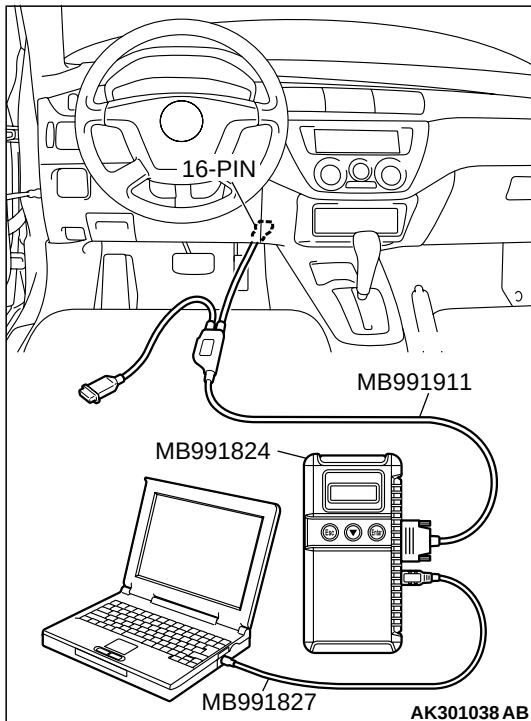
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 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-810.](#)

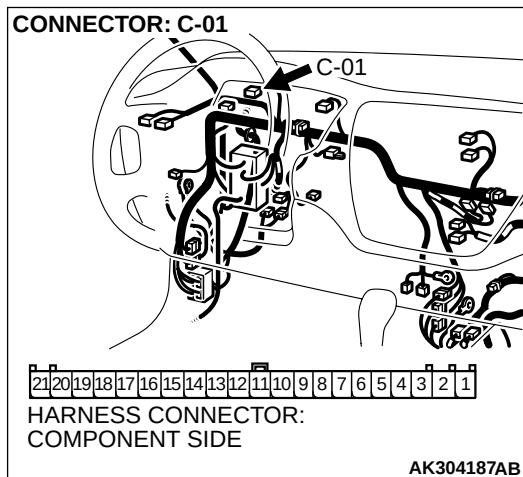


STEP 2. Check the burned-out bulb.

Q: Is the valve normal?

YES : Go to step 3.

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

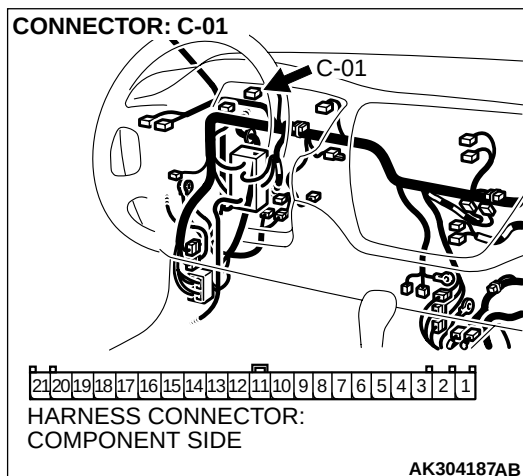


STEP 3. Check harness connector C-01 at the combination meter for damage.

Q: Is the harness connector in good condition?

YES : Go to step 4.

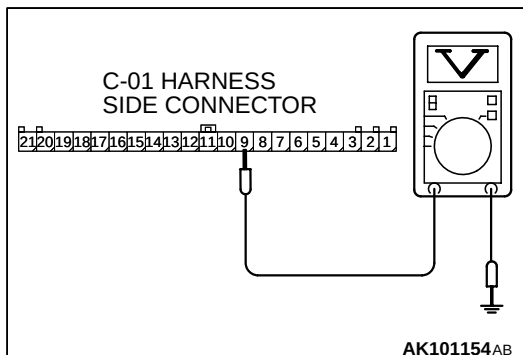
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then confirm that the malfunction symptom is eliminated.



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 be battery positive voltage.

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

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

YES : Go to Step 5.

NO : Check harness connectors C-21, 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.

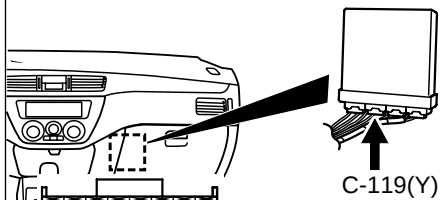
STEP 5. Check harness connector C-119 at ECM <M/T> or harness connector C-120 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 6.

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

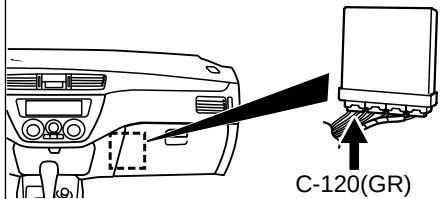
CONNECTOR: C-119 <M/T>



HARNESS CONNECTOR:
COMPONENT SIDE

AK200140AB

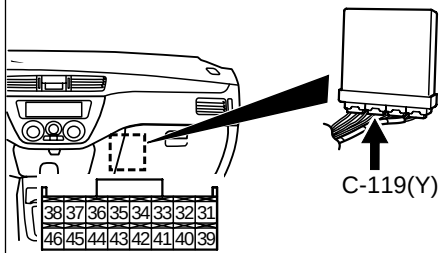
CONNECTOR: C-120 <A/T>



HARNESS CONNECTOR:
COMPONENT SIDE

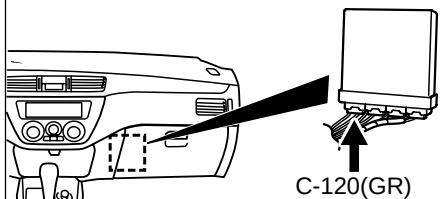
AK200143AB

CONNECTOR: C-119 <M/T>

HARNESS CONNECTOR:
COMPONENT SIDE

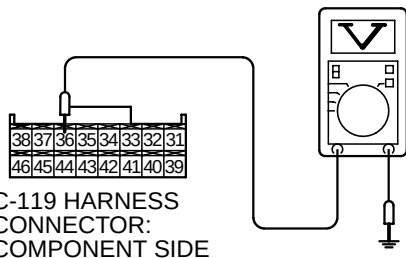
AK200140AB

CONNECTOR: C-120 <A/T>

HARNESS CONNECTOR:
COMPONENT SIDE

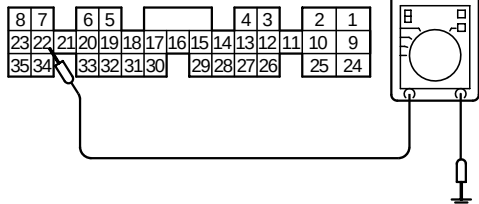
AK200143AB

<M/T>

C-119 HARNESS
CONNECTOR:
COMPONENT SIDE

AK000381AF

<A/T>

C-120 HARNESS
CONNECTOR:
COMPONENT SIDE

AK000377AJ

STEP 6. Measure the power supply voltage ECM connector C-119 <M/T> or PCM connector C-120 <A/T>.

- (1) Disconnect the connector C-119 <M/T> or C-120 <A/T> and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

- (3) Measure the voltage between terminal No. 36 <M/T> or No. 22 <A/T> and ground.

- Voltage should be battery positive voltage.

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

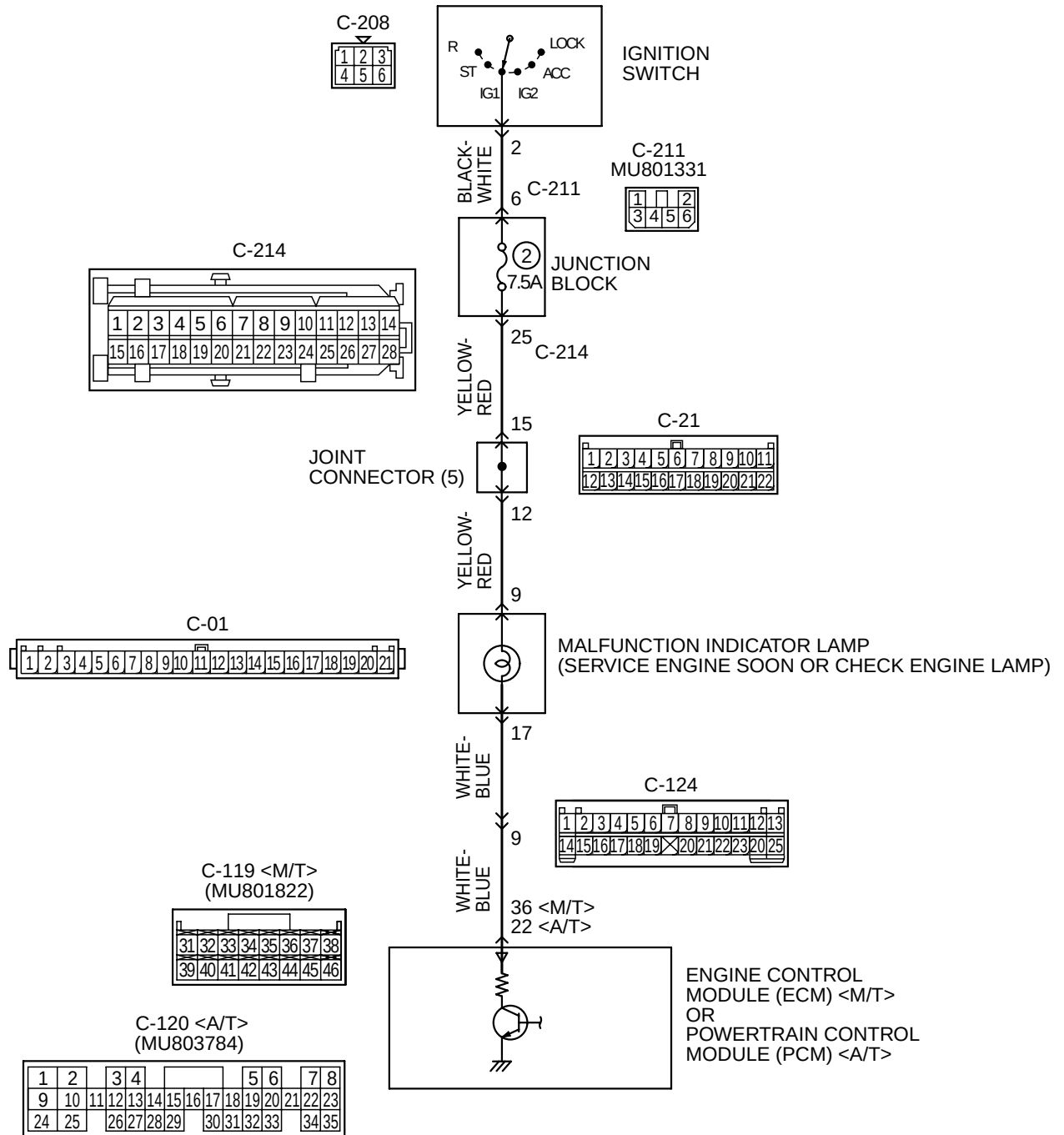
Q: Is battery positive voltage (approximately 12 volts) present?

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

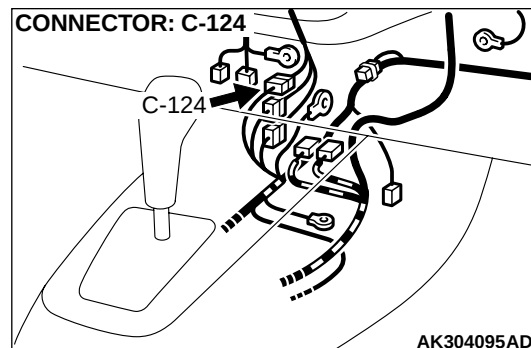
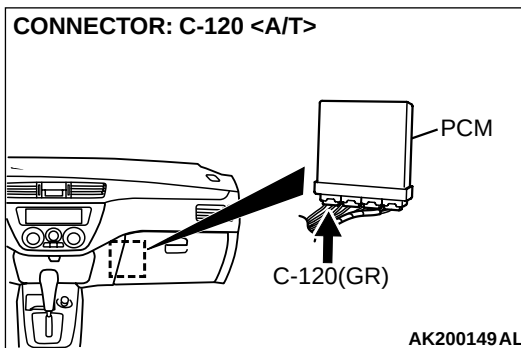
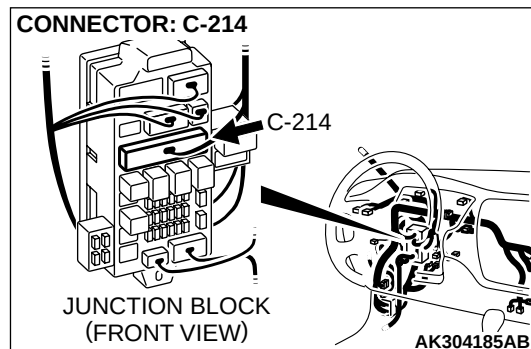
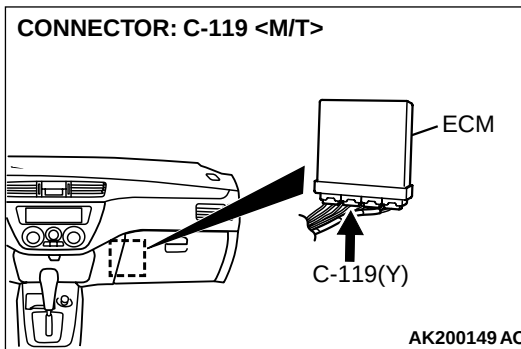
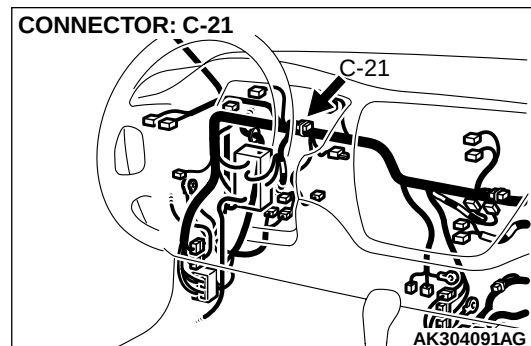
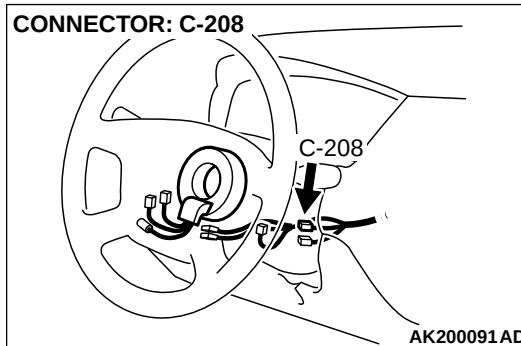
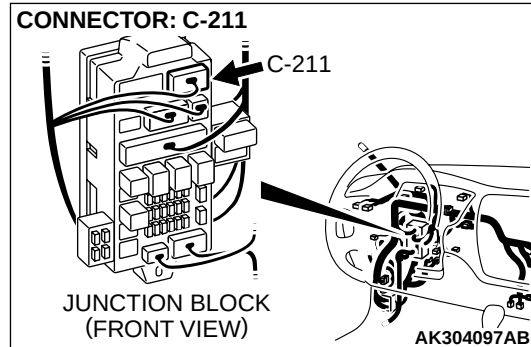
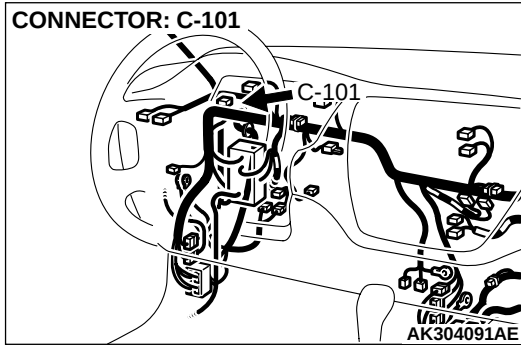
NO : Check harness connectors C-124 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connectors is in good condition, repair harness wire between combination meter connector C-01 (terminal No. 17) and ECM connector C-119 (terminal No. 36) <M/T> or PCM connector C-120 (terminal No. 22) <A/T> because of open circuit. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 4: The Malfunction Indicator Lamp (SERVICE ENGINE SOON or Check Engine Lamp) Remains Illuminated and Never Goes Out

Malfunction Indicator Lamp (SERVICE ENGINE SOON or Check Engine Lamp) Circuit



AK302716



CIRCUIT OPERATION

- The malfunction indicator lamp (SERVICE ENGINE SOON or Check Engine Lamp) power is supplied from the ignition switch.
- The ECM <M/T> or PCM <A/T> controls the ground of the malfunction indicator lamp (SERVICE ENGINE SOON or Check Engine Lamp) by turning the power transistor in the ECM <M/T> or PCM <A/T> ON and OFF.

COMMENT

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

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

- Short-circuit between the malfunction indicator lamp (SERVICE ENGINE SOON or Check Engine Lamp) and ECM <M/T> or PCM <A/T>.

- Malfunction of the ECM <M/T> or PCM <A/T>.

DIAGNOSIS

Required Special Tools:

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

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

⚠ CAUTION

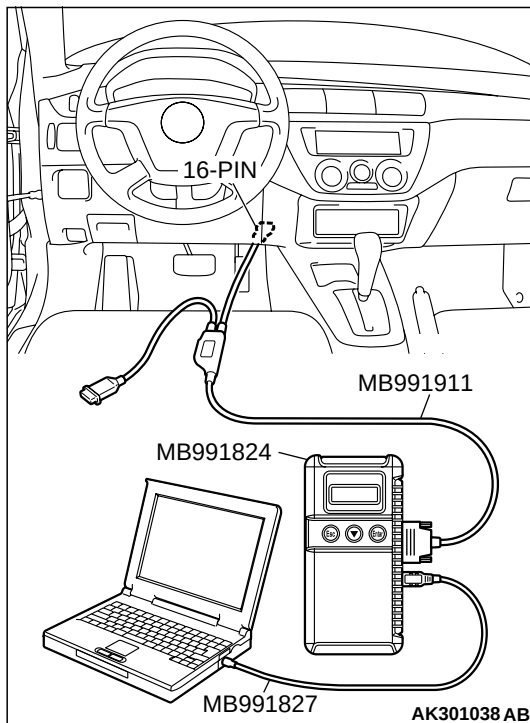
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

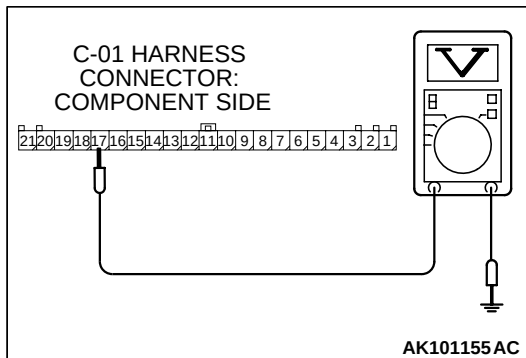
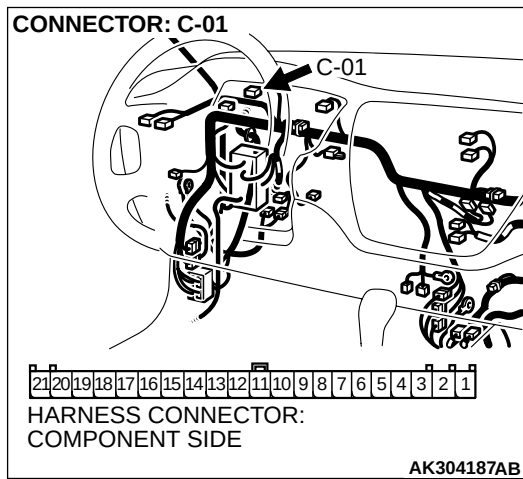
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Read the DTC.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-29](#).

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 or PCM. 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) <M/T> or PCM connector C-120 (terminal No. 22) <A/T> 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-846](#).

CIRCUIT OPERATION

- Refer to, Ignition circuit system [P.13A-846](#).

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 <M/T> or PCM <A/T>.
- Contaminated fuel.

DIAGNOSIS

Required Special Tools:

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

STEP 1. Measure the 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.

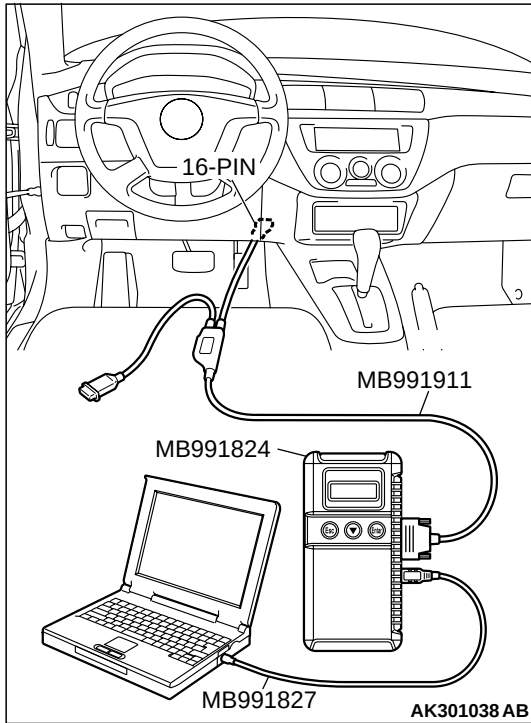
NO : Check the battery. Refer to GROUP 54A, Battery – Battery check [P.54A-4](#). Then confirm that the malfunction symptom is eliminated.

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 MB991958, check data list.****⚠ CAUTION**

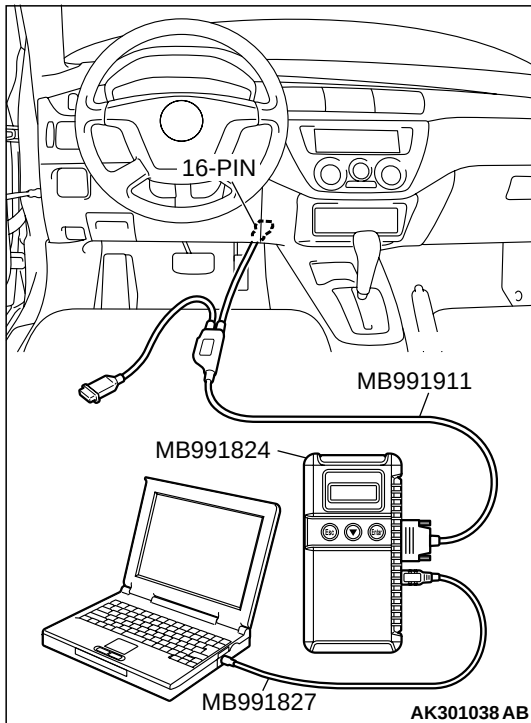
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check the following items in the data List. Refer to Data List Reference Table [P.13A-860](#).
 - 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. Then confirm that the malfunction symptom is eliminated.

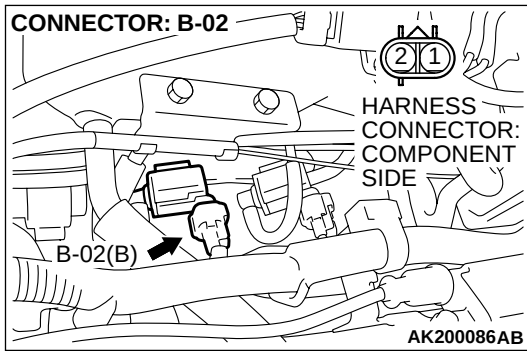
**STEP 4. Using scan tool MB991958, check actuator test.**

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items in the actuator test. Refer to Actuator Test Reference Table [P.13A-872](#).
 - 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. 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 connector B-16 or B-20, 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-846](#).

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.

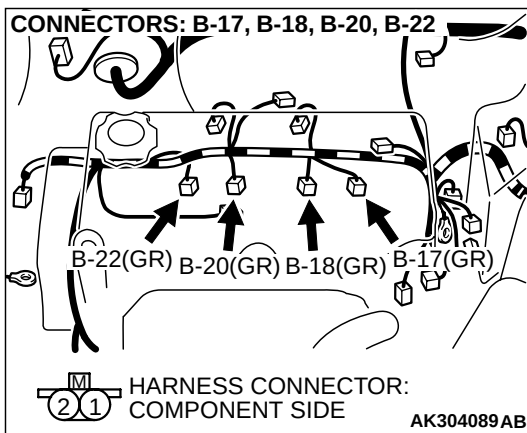
NO : Check that the crankshaft position sensor and timing belt cover are in the correct position. Then confirm that the malfunction symptom is eliminated.

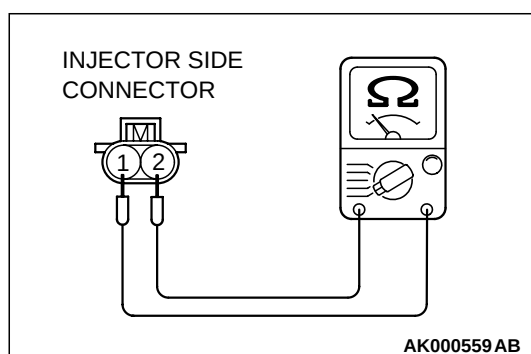
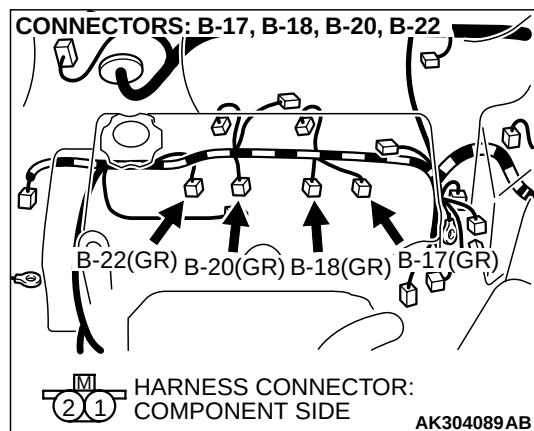
STEP 7. Check harness connectors B-17 or B-18 or B-20 or B-22 at injector for damage.

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: 13 – 16 ohms [at 20°C (68°F)]

Q: Is the resistance between 13 and 16 ohms [at 20°C (68°F)]?

YES : Go to Step 9.

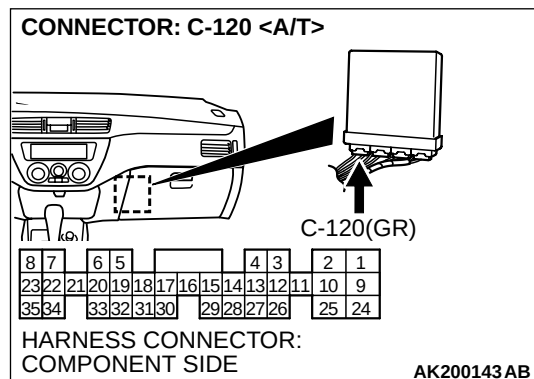
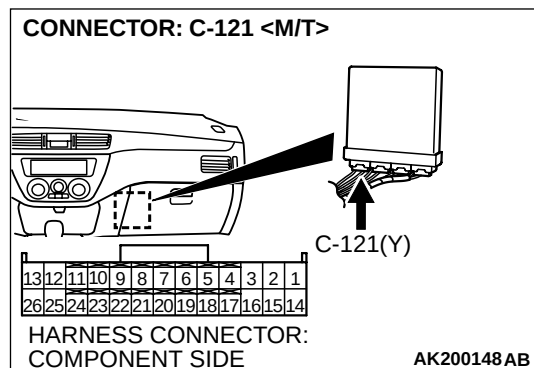
NO : Replace the injector. Then confirm that the malfunction symptom is eliminated.

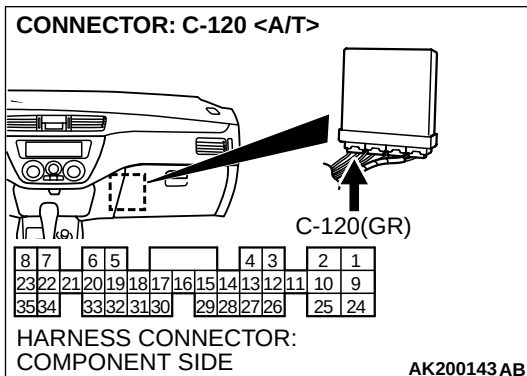
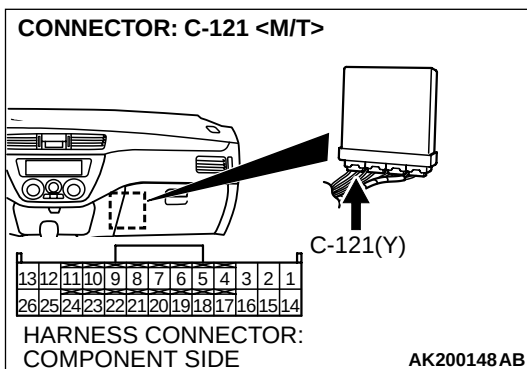
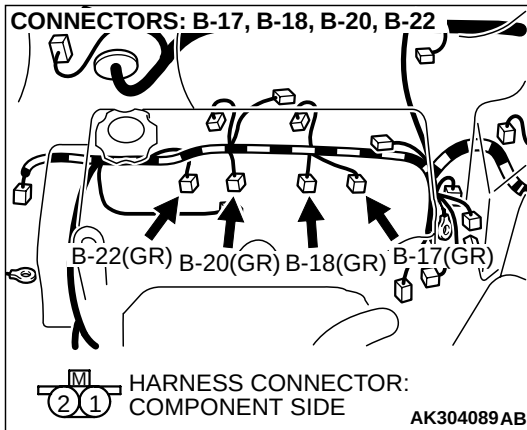
STEP 9. Check harness connector C-121 at ECM <M/T> or harness connector C-120 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 10.

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





STEP 10. Check for harness damage between injector connector and ECM <M/T> or PCM <A/T> connector.

- Check the harness wire between injector connector B-22 (terminal No. 2) and ECM connector C-121 (terminal No. 1) <M/T> or PCM connector C-120 (terminal No. 1) <A/T> when checking No.1 cylinder.
- Check the harness wire between injector connector B-20 (terminal No. 2) and ECM connector C-121 (terminal No. 14) <M/T> or PCM connector C-120 (terminal No. 9) <A/T> when checking No.2 cylinder.
- Check the harness wire between injector connector B-18 (terminal No. 2) and ECM connector C-121 (terminal No. 2) <M/T> or PCM connector C-120 (terminal No. 24) <A/T> when checking No.3 cylinder.
- Check the harness wire between injector connector B-17 (terminal No. 2) and ECM connector C-121 (terminal No. 15) <M/T> or PCM connector C-120 (terminal No. 2) <A/T> when checking No.4 cylinder.

Q: Is the harness wire in good condition?

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

- Check the ignition coil, spark plugs, spark plug cables.
- Check if the injectors are clogged.
- Check if fuel is contaminated.
- 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 <M/T> or PCM <A/T>.

DIAGNOSIS

Required Special Tools:

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

STEP 1. Measure the 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 54A, Battery – Battery check
[P.54A-4.](#)

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

⚠ CAUTION

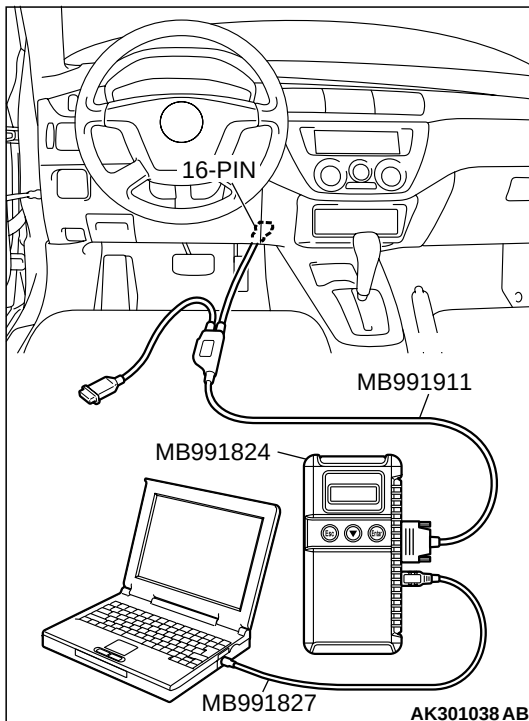
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

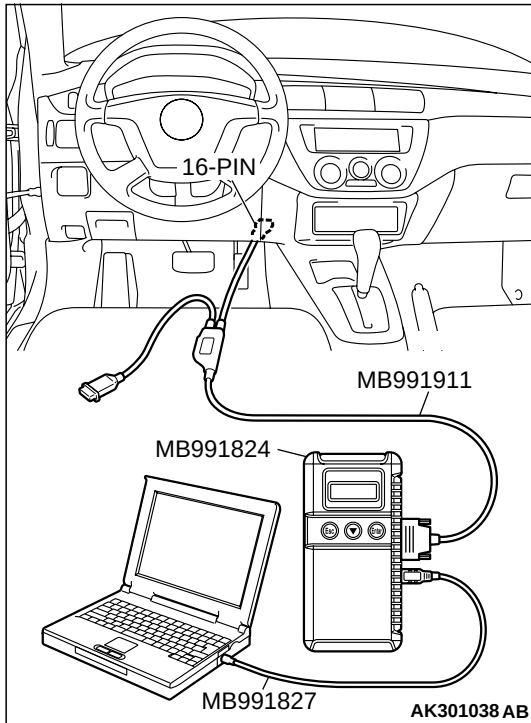
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Read the DTC.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-29.](#)

NO : Go to Step 3.





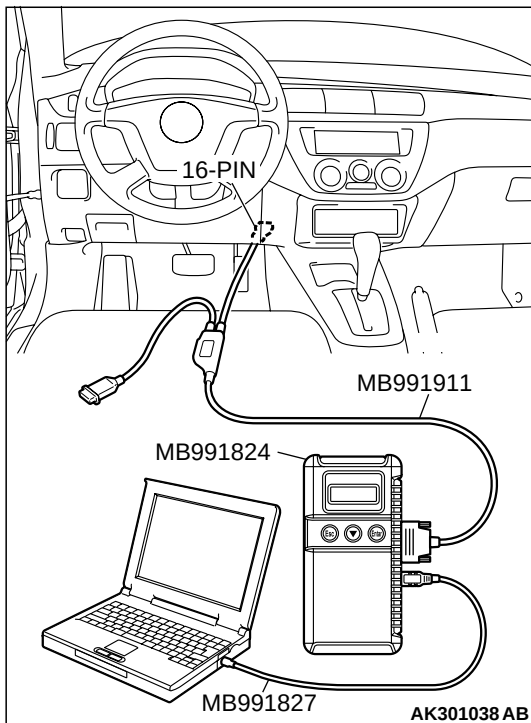
STEP 3. Using scan tool MB991958, check actuator test.

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items in the actuator test. Refer to Actuator Test Reference Table [P.13A-872](#).
 - 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.



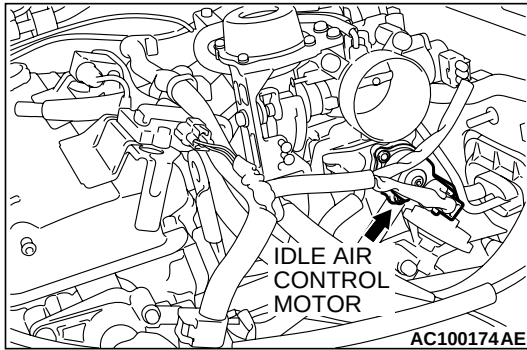
STEP 4. Using scan tool MB991958, check data list.

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items in the data list. Refer to Data List Reference Table [P.13A-860](#).
 - 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 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 On-vehicle Service – Clean the throttle valve area [P.13A-900](#).

NO : Refer to DTC P0506 Idle Control System RPM Lower Than Expected [P.13A-612](#), DTC P0507 Idle Control System RPM Higher Than Expected [P.13A-626](#).

STEP 7. Check the ignition timing.

(1) Check the ignition timing at cranking.

Standard value: 5°BTDC ± 3°

Q: Is the ignition timing normal?

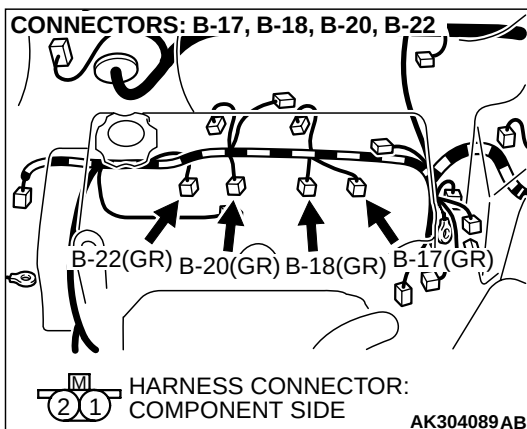
YES : Go to Step 8.

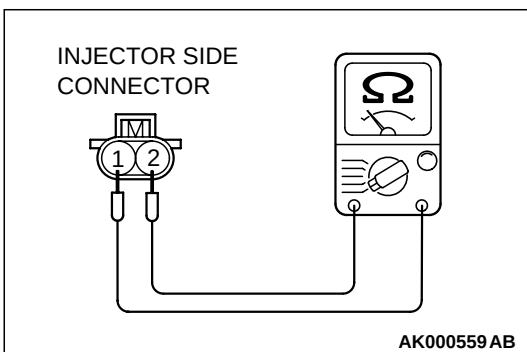
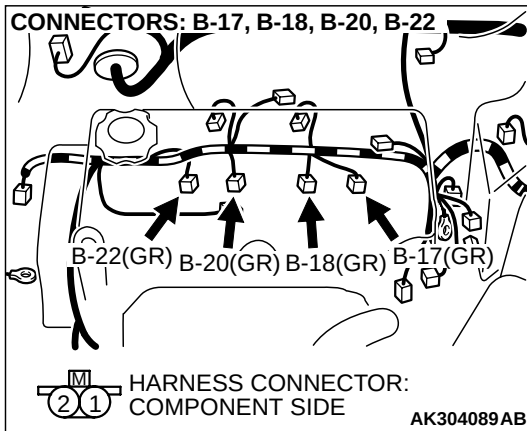
NO : Check that the crankshaft position sensor and timing belt cover are in the correct position. Then confirm that the malfunction symptom is eliminated.

STEP 8. Check harness connectors B-22, B-20, B-18 and 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 and B-22.

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

Standard value: 13 – 16 ohms [at 20°C (68°F)]

Q: Is the resistance between 13 and 16 ohms [at 20°C (68°F)]?

YES : Go to Step 10.

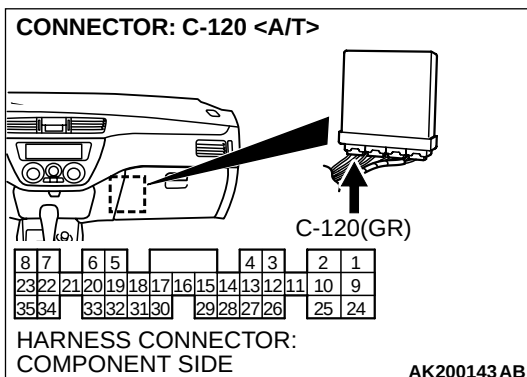
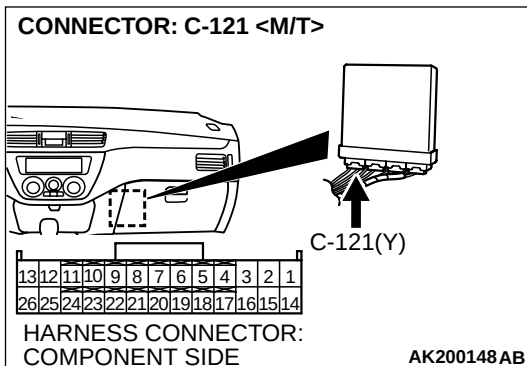
NO : Replace the injector. Then confirm that the malfunction symptom is eliminated.

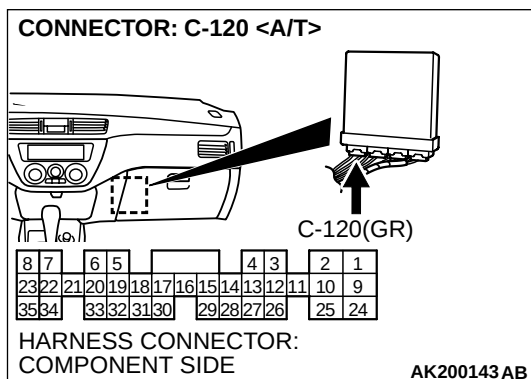
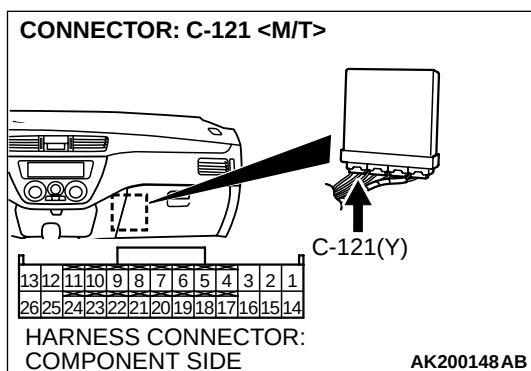
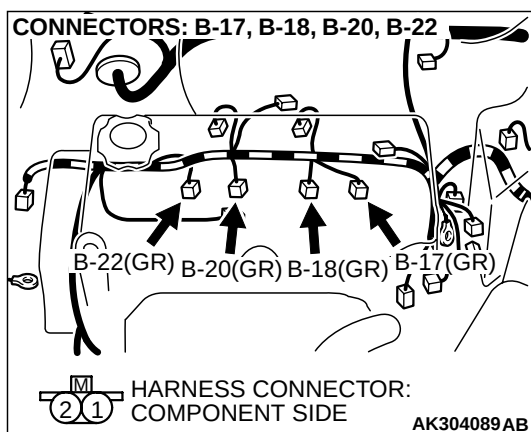
STEP 10. Check harness connector C-121 at ECM <M/T> or harness connector C-120 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 11.

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





STEP 11. Check for harness damage between injector connector and ECM <M/T> or PCM <A/T> connector.

- Check the harness wire between injector connector B-22 (terminal No. 2) and ECM connector C-121 (terminal No. 1) <M/T> or PCM connector C-120 (terminal No. 1) <A/T> when checking No. 1 cylinder.
- Check the harness wire between injector connector B-20 (terminal No. 2) and ECM connector C-121 (terminal No. 14) <M/T> or PCM connector C-120 (terminal No. 9) <A/T> when checking No. 2 cylinder.
- Check the harness wire between injector connector B-18 (terminal No. 2) and ECM connector C-121 (terminal No. 2) <M/T> or PCM connector C-120 (terminal No. 24) <A/T> when checking No. 3 cylinder.
- Check the harness wire between injector connector B-17 (terminal No. 2) and ECM connector C-121 (terminal No. 15) <M/T> or PCM connector C-120 (terminal No. 2) <A/T> when checking No. 4 cylinder.

Q: Is the harness wire in good condition?

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

- Check the ignition coil, spark plugs, spark plug cables.
- Check if the injectors are clogged.
- Check compression pressure.
- Check fuel lines for clogging.
- 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:

- 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-4.](#)

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

⚠ CAUTION

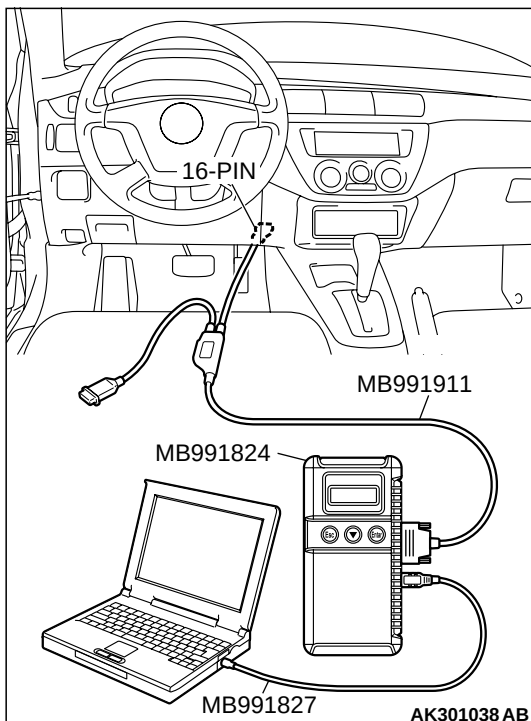
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

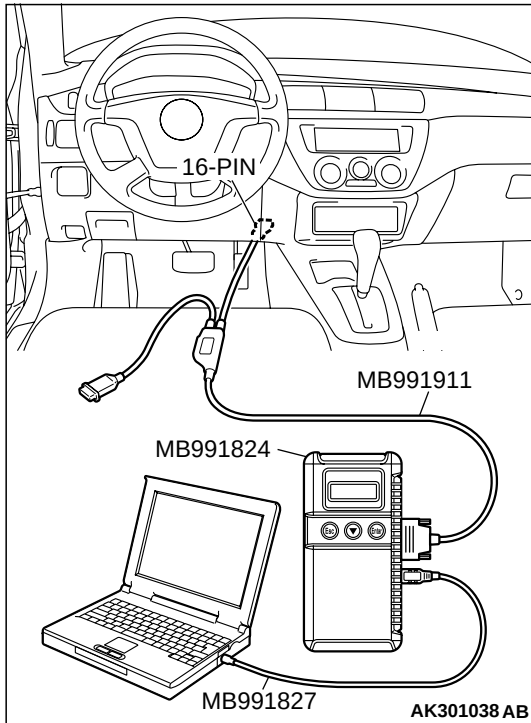
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Read the DTC.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-29.](#)

NO : Go to Step 3.



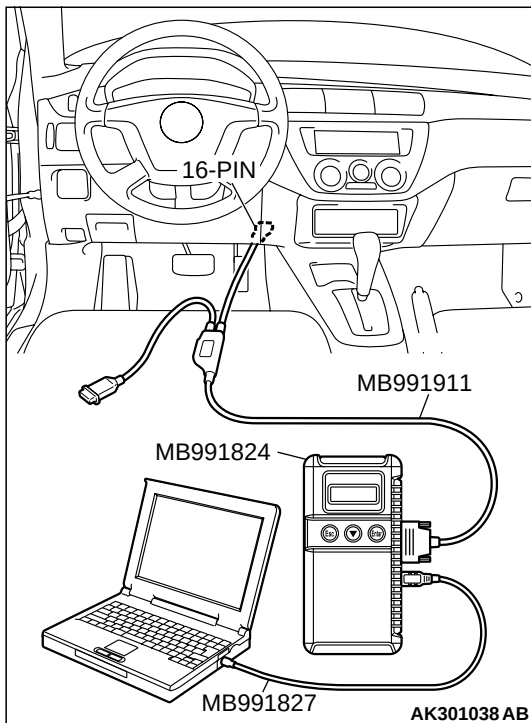
**STEP 3. Using scan tool MB991958, check actuator test.**

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items in the actuator test. Refer to Actuator Test Reference Table [P.13A-872](#).
 - 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 MB991958, check data list.**

- (1) Turn the ignition switch the "ON" position.
- (2) Check the following items in the data list. Refer to Data List Reference Table [P.13A-860](#).
 - 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: $5^{\circ}\text{BTDC} \pm 3^{\circ}$

Q: Is the ignition timing normal?

YES : Go to Step 6.

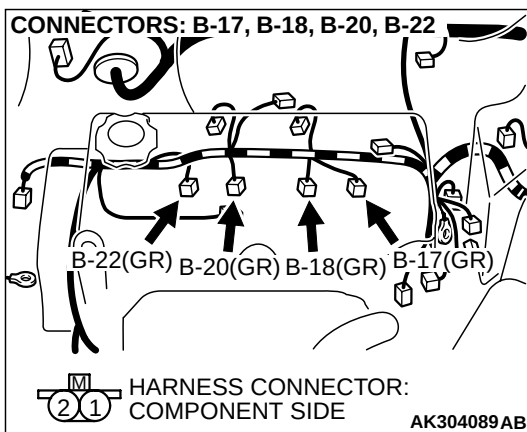
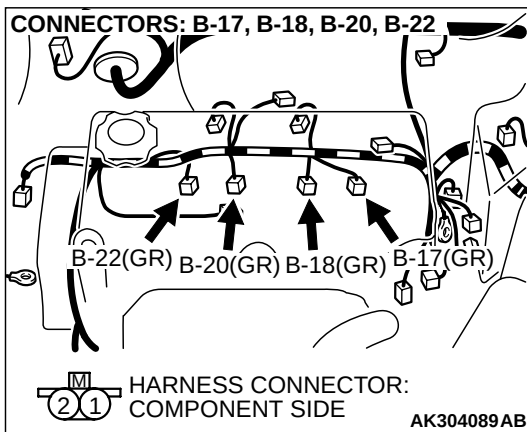
NO : Check that the crankshaft position sensor and timing belt cover are in the correct position. Then confirm that the malfunction symptom is eliminated.

STEP 6. Check harness connectors B-22, B-20, B-18 and 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 and B-22.

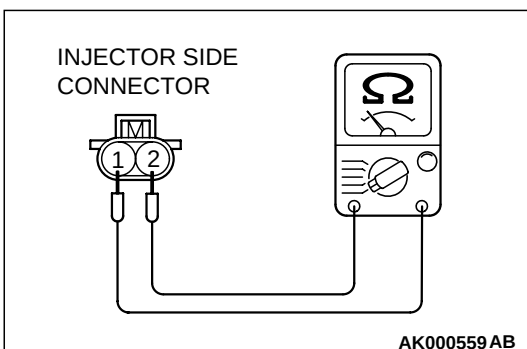
(2) Measure the resistance between each injector side connector terminal No. 1 and No. 2.

Standard value: 13 – 16 ohms [at 20°C (68°F)]

Q: Is the resistance between 13 and 16 ohms [at 20°C (68°F)]?

YES : Go to Step 8.

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

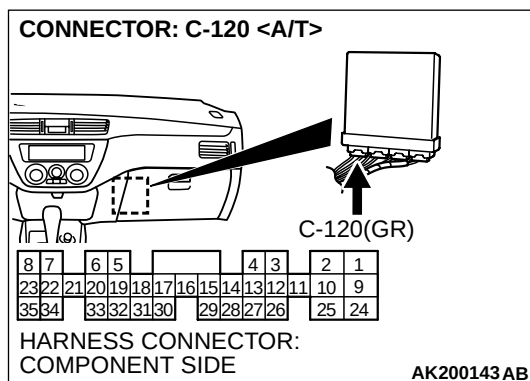
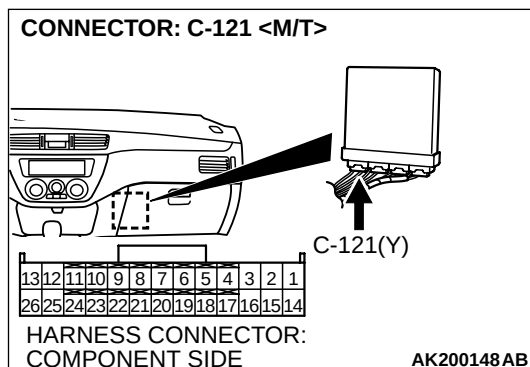


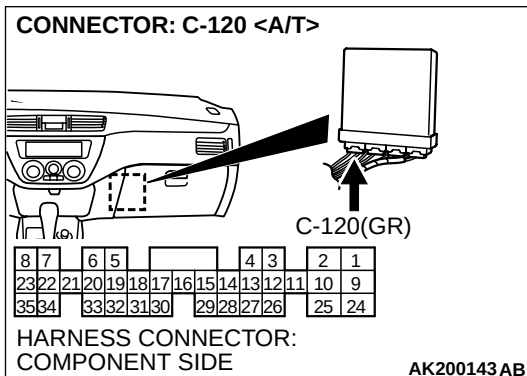
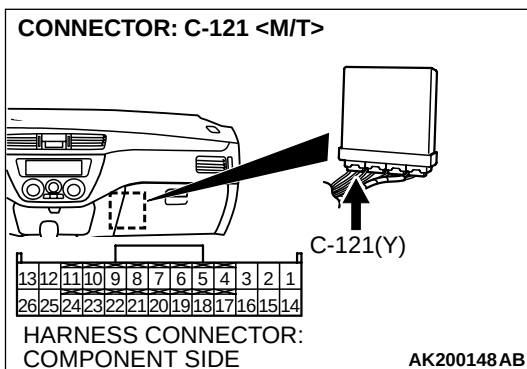
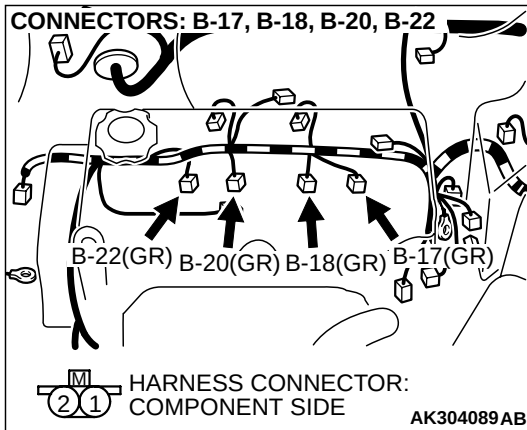
STEP 8. Check harness connector C-121 at ECM <M/T> or harness connector C-120 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 9.

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





STEP 9. Check for harness damage between injector connector and ECM <M/T> or PCM <A/T> connector.

- Check the harness wire between injector connector B-22 (terminal No. 2) and ECM connector C-121 (terminal No. 1) <M/T> or PCM connector C-120 (terminal No. 1) <A/T> when checking No. 1 cylinder.
- Check the harness wire between injector connector B-20 (terminal No. 2) and ECM connector C-121 (terminal No. 14) <M/T> or PCM connector C-120 (terminal No. 9) <A/T> when checking No. 2 cylinder.
- Check the harness wire between injector connector B-18 (terminal No. 2) and ECM connector C-121 (terminal No. 2) <M/T> or PCM connector C-120 (terminal No. 24) <A/T> when checking No. 3 cylinder.
- Check the harness wire between injector connector B-17 (terminal No. 2) and ECM connector C-121 (terminal No. 15) <M/T> or PCM connector C-120 (terminal No. 2) <A/T> when checking No. 4 cylinder.

Q: Is the harness wire in good condition?

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

- Check the ignition coil, spark plugs, spark plug cables.
- Check if the injectors are clogged.
- Check compression pressure.
- 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:**

- 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 MB991958, read the diagnostic trouble code (DTC).**⚠ CAUTION**

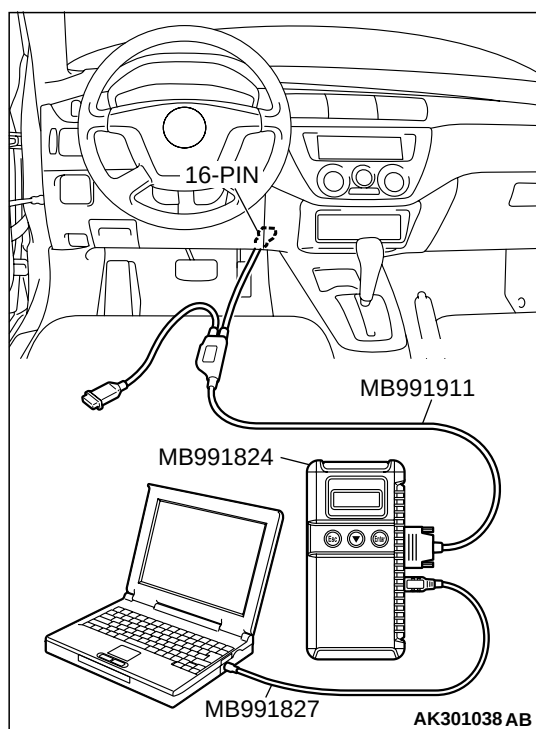
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-29](#).

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 On-vehicle Service – Throttle Body Cleaning. [P.13A-900](#)).
- (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).

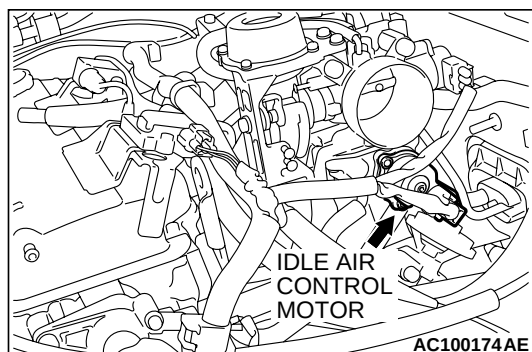
- An operation sound is heard.

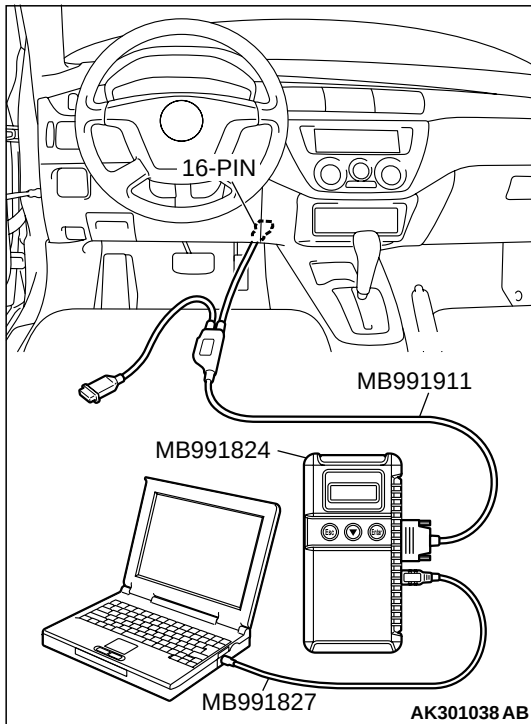
- (3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Did you hear the operation sound?

YES : Go to Step 6.

NO : Refer to DTC P0506 – Idle Control System RPM Lower Than Expected [P.13A-612](#), DTC P0507 – Idle Control System RPM Higher Than Expected [P.13A-626](#).





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

⚠ CAUTION

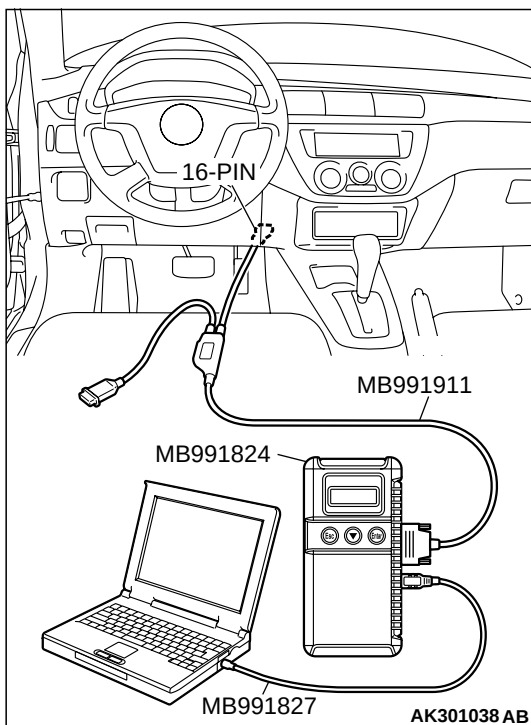
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check following items in the actuator test. Refer to Actuator Test Reference Table [P.13A-872](#).
 - 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 DTC P0201, P0202, P0203, P0204 – Injector Circuit [P.13A-342](#).



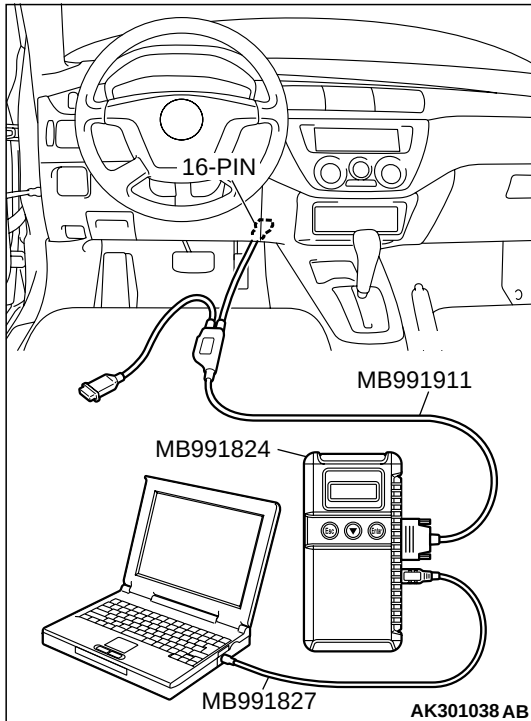
STEP 7. Using scan tool MB991958, check data list.

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items in the data list. Refer to Data List Reference Table [P.13A-860](#).
 - 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. Then confirm that the malfunction symptom is eliminated.



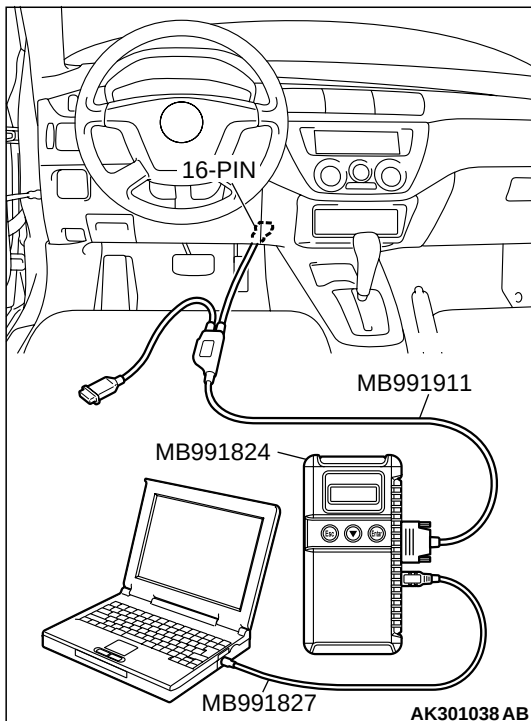
STEP 8. Using scan tool MB991958, check actuator test.

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items in the actuator test. Refer to Actuator Test Reference Table [P.13A-872](#).
 - 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. Then confirm that the malfunction symptom is eliminated.



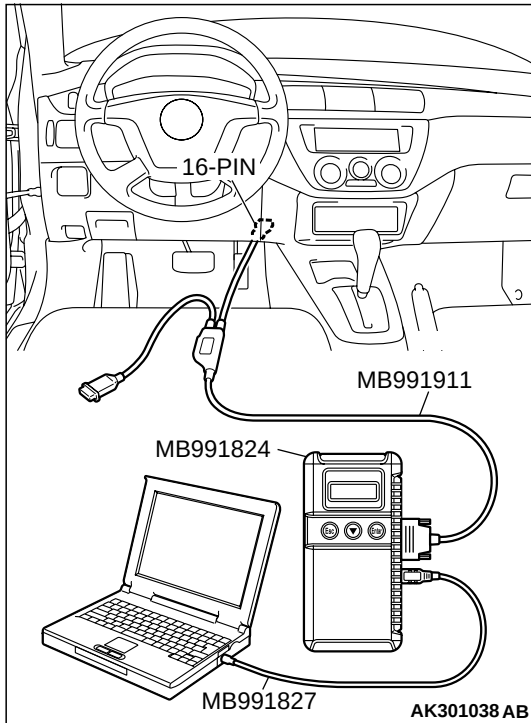
STEP 9. Using scan tool MB991958, check data list.

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items in the data list. Refer to Data List Reference Table [P.13A-860](#).
 - 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 On-vehicle Service – Basic Idle Speed Adjustment [P.13A-903](#). After adjusting, confirm.

**STEP 10. Using scan tool 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-860](#).
 - 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 On-vehicle Service – Fuel Pressure Test [P.13A-905](#).**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. 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-12](#).

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.

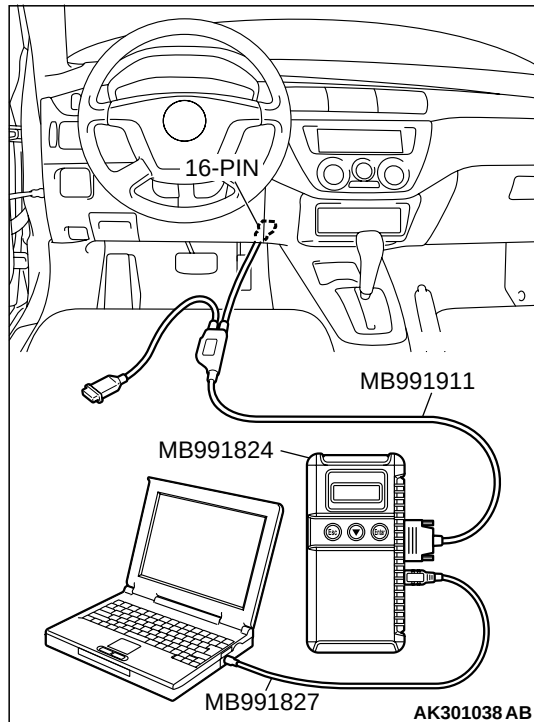
TROUBLESHOOTING HINTS (The most likely causes for this case:)

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

DIAGNOSIS

Required Special Tools:

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



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

⚠ CAUTION

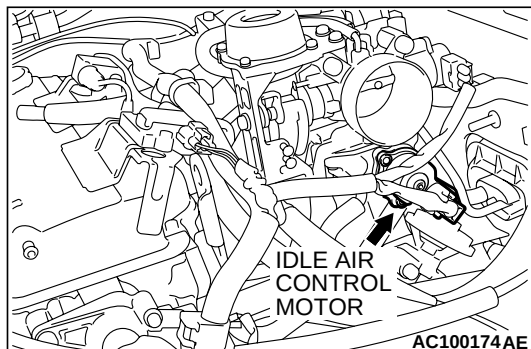
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-29](#).

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).

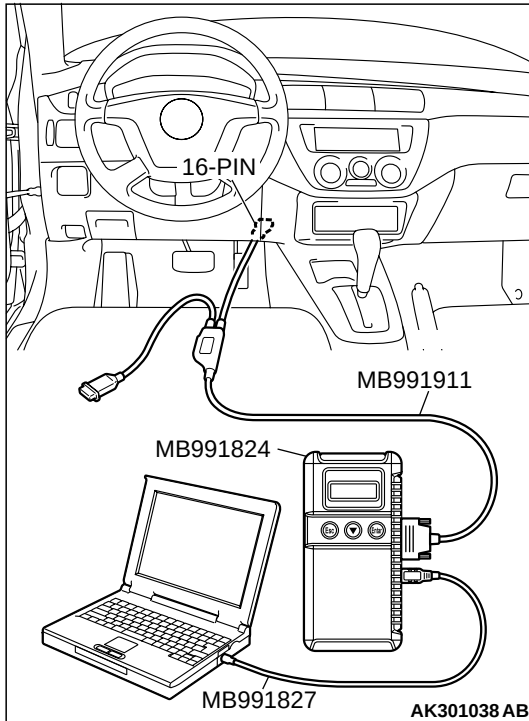
- An operation sound should be heard.

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

Q: Did you hear the operation sound?

YES : Go to Step 3.

NO : Refer to DTC P0506 – Idle Control System RPM Lower Than Expected [P.13A-612](#), DTC P0507 – Idle Control System RPM Higher Than Expected [P.13A-626](#).



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

⚠ CAUTION

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

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check the following items in the data list. Refer to Data List Reference Table [P.13A-860](#).
 - 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. Then confirm that the malfunction symptom is eliminated.

STEP 4. Adjust the basic idle speed.

Refer to On-vehicle Service – Basic Idle Speed Adjustment for the adjustment procedure [P.13A-903](#).

Standard value: 700 ± 50 r/min

Q: Is the Idle speed normal?

YES : Refer to On-vehicle Service – Clean the throttle valve area [P.13A-900](#).

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:

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

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

⚠ CAUTION

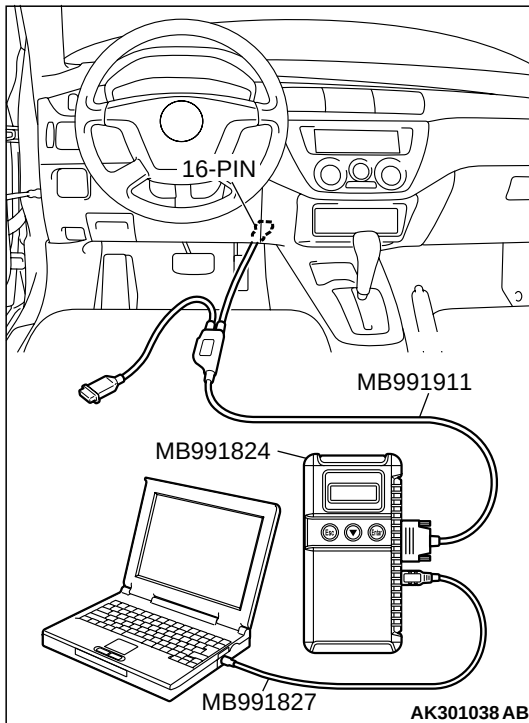
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

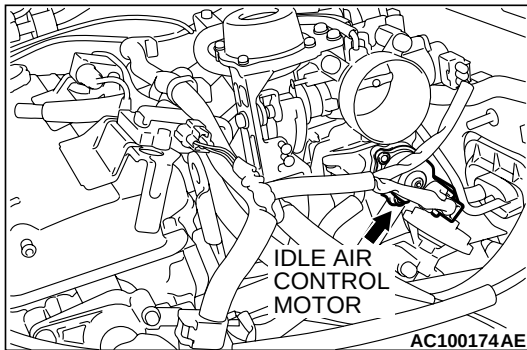
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Read the DTC.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-29](#).

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 DTC P0506 – Idle Control System RPM Lower Than Expected [P.13A-612](#), DTC P0507 – Idle Control System RPM Higher Than Expected [P.13A-626](#).

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

⚠ CAUTION

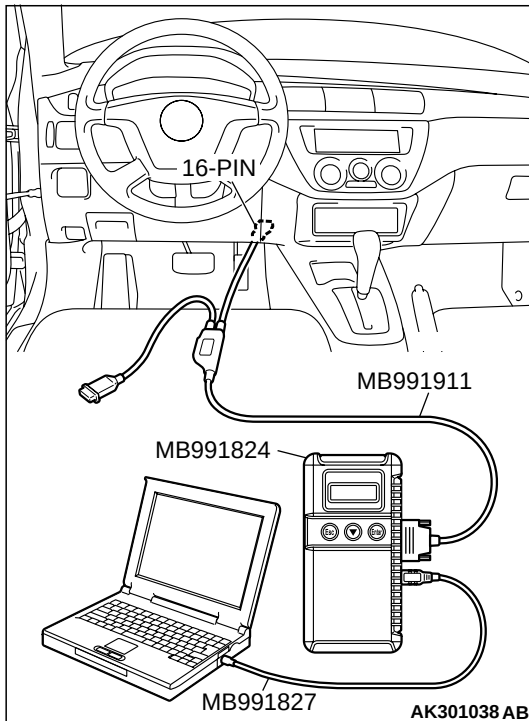
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check the following items in the data list. Refer to Data List Reference Table [P.13A-860](#).
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. Then confirm that the malfunction symptom is eliminated.



STEP 4. Adjust the basic idle speed.

Refer to On-vehicle Service – Basic Idle Speed Adjustment for the adjustment procedure [P.13A-903](#).

Standard value: 700 ± 50 r/min

Q: Is the idle speed normal?

YES : Refer to On-vehicle Service – Clean the throttle valve area [P.13A-900](#).

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.

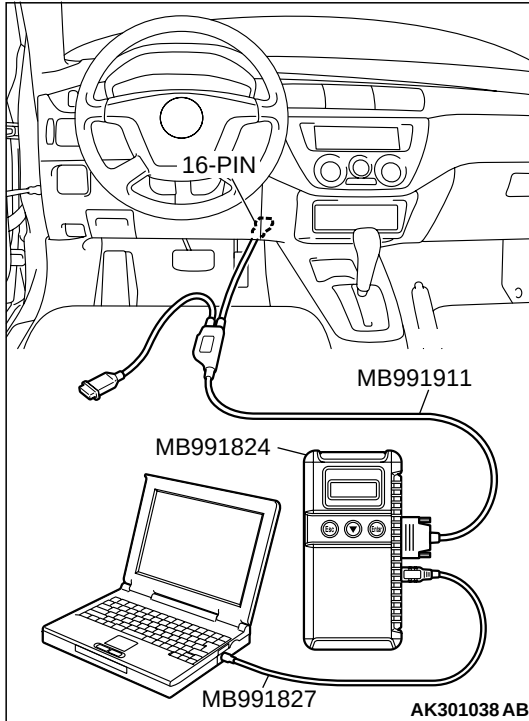
DIAGNOSIS**Required Special Tools:**

- 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 MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

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

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

Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-118](#).

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 On-vehicle Service – Clean the throttle valve area [P.13A-900](#).

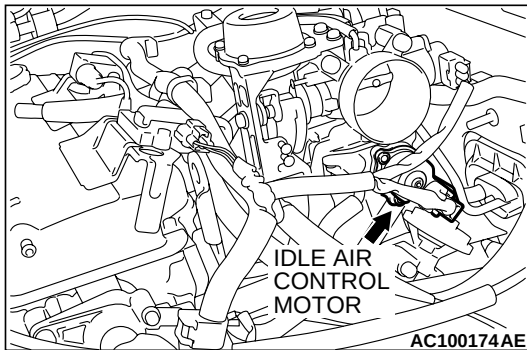
NO : Go to Step 4.

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-746](#).

**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 DTC P0506 – Idle Control System RPM Lower Than Expected [P.13A-612](#), DTC P0507 – Idle Control System RPM Higher Than Expected [P.13A-626](#).

STEP 6. Using scan tool MB991958, check actuator test items 01, 02, 03, 04: Injector.**⚠ CAUTION**

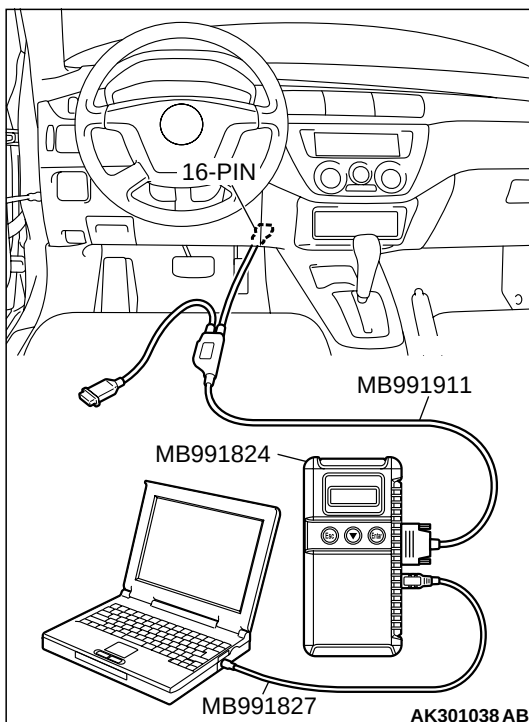
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

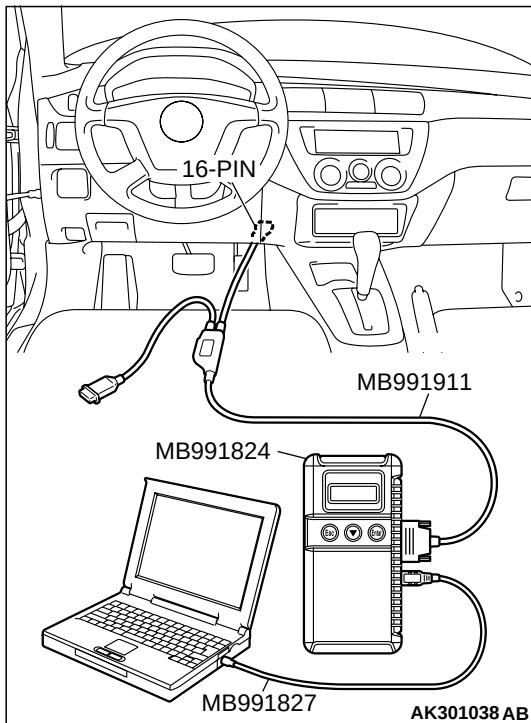
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check following items in the actuator test. Refer to Actuator Test Reference Table [P.13A-872](#).
 - a. Items 01, 02, 03, 04: Injector.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : Go to Step 7.

NO : Refer to DTC P0201, P0202, P0203, P0204 – Injector Circuit [P.13A-342](#).





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

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items in the data list. Refer to Data List Reference Table [P.13A-860](#).
 - 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. Then confirm that the malfunction symptom is eliminated.

STEP 8. Check the fuel pressure.

Refer to On-vehicle Service – Fuel Pressure Test [P.13A-905](#).

Q: Is the fuel pressure normal?

YES : Go to Step 9.

NO : Repair or replace. 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-12](#).

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 connector damage.

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:**

- 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 MB991958, read the diagnostic trouble code (DTC).**⚠ CAUTION**

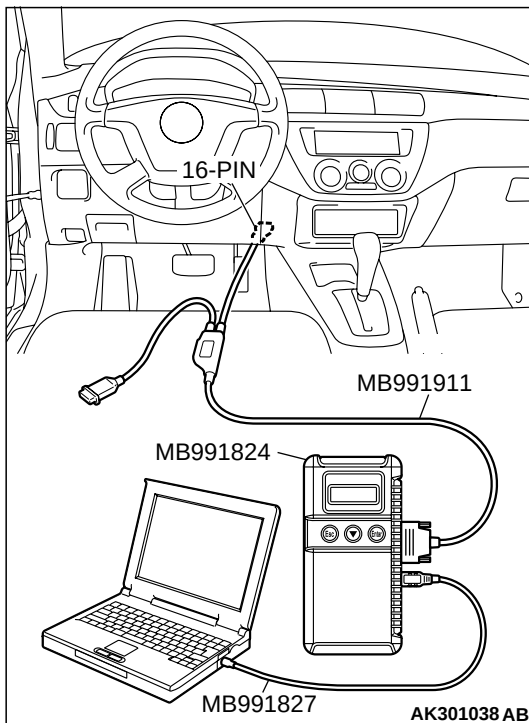
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

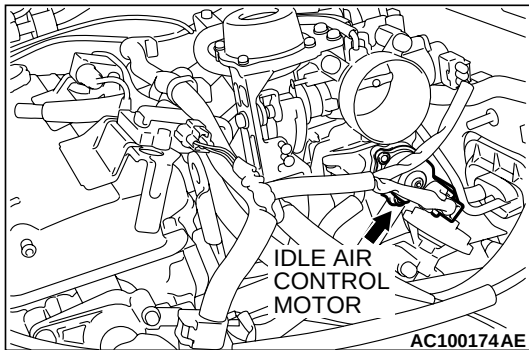
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Read the DTC.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-29](#).

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.

NO : Refer to DTC P0506 – Idle Control System RPM Lower Than Expected [P.13A-612](#), DTC P0507 – Idle Control System RPM Higher Than Expected [P.13A-626](#).

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

⚠ CAUTION

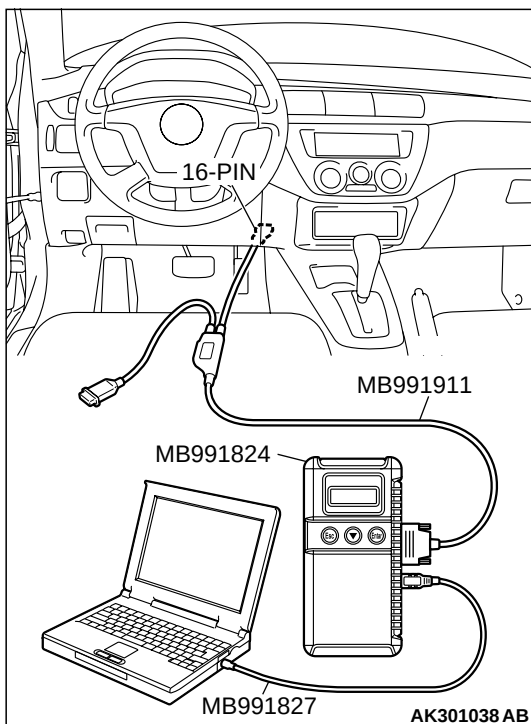
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check following items in the actuator test. Refer to Actuator Test Reference Table [P.13A-872](#).
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 DTC P0201, P0202, P0203, P0204 – Injector Circuit [P.13A-342](#).



STEP 5. Checking by operating the accelerator pedal.

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

YES : Refer to Clean the throttle valve area [P.13A-900](#).

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.

- Crankshaft position sensor signal.
- Volume airflow sensor signal.
- Injector drive signal.
- Primary and secondary ignition signal.
- Fuel pump drive signal.
- PCM or ECM power supply voltage.

Repair or replace. Then confirm that the malfunction symptom is eliminated.

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

CAUTION

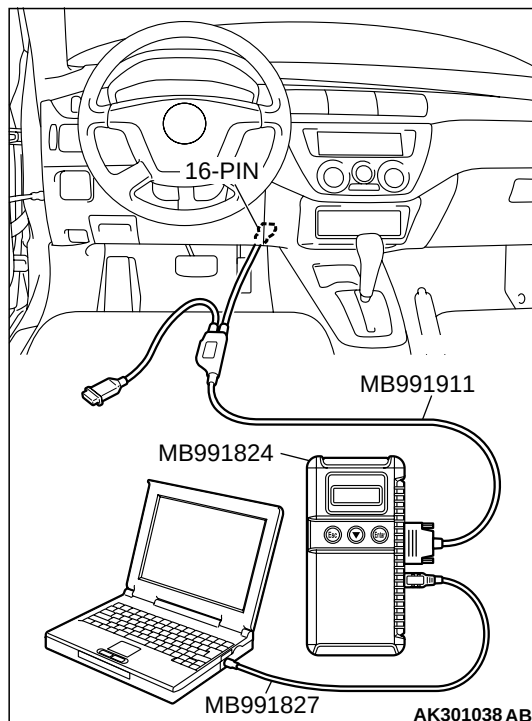
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

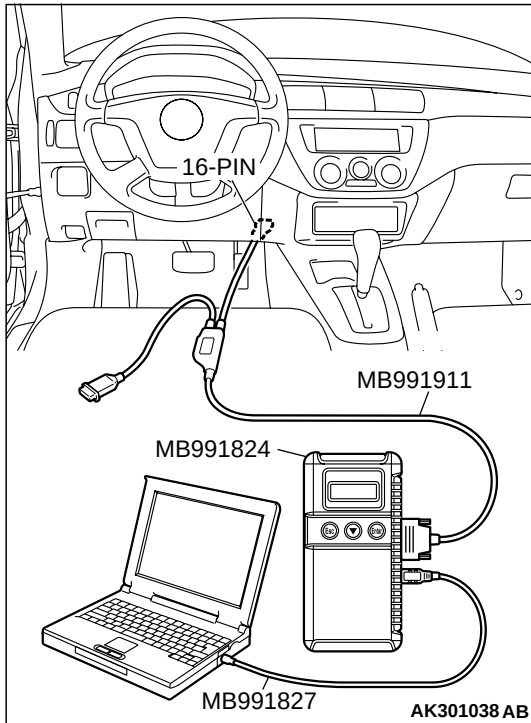
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check the following items in the data list. Refer to Data List Reference Table [P.13A-860](#).
 - a. Item 13: Intake Air Temperature Sensor.
 - b. Item 25: Barometric Pressure Sensor.
 - 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. Then confirm that the malfunction symptom is eliminated.





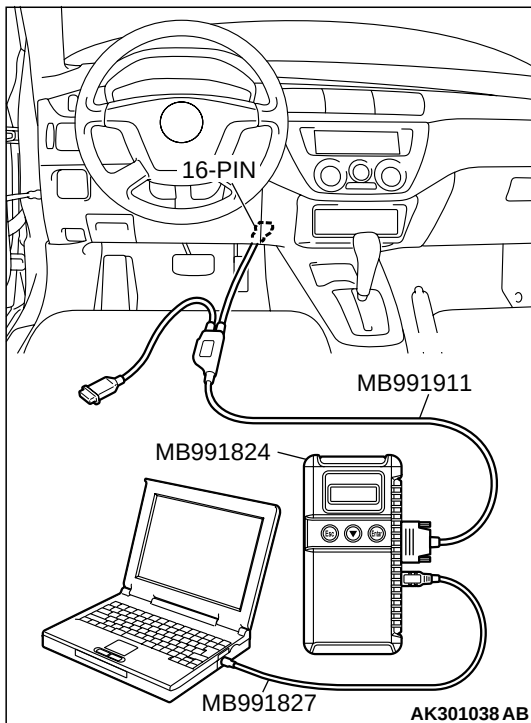
STEP 8. Using scan tool MB991958, check actuator test.

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items in the actuator test. Refer to Actuator Test Reference Table [P.13A-872](#).
 - 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. Then confirm that the malfunction symptom is eliminated.



STEP 9. Using scan tool 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-860](#).
 - 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 Fuel Pressure Test [P.13A-905](#).

Q: Is the fuel pressure normal?

YES : Go to Step 11.

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

STEP 11. Using scan tool MB991958, check data list.**⚠ CAUTION**

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

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check the following items in the data list. Refer to Data List Reference Table [P.13A-860](#).
 - 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.

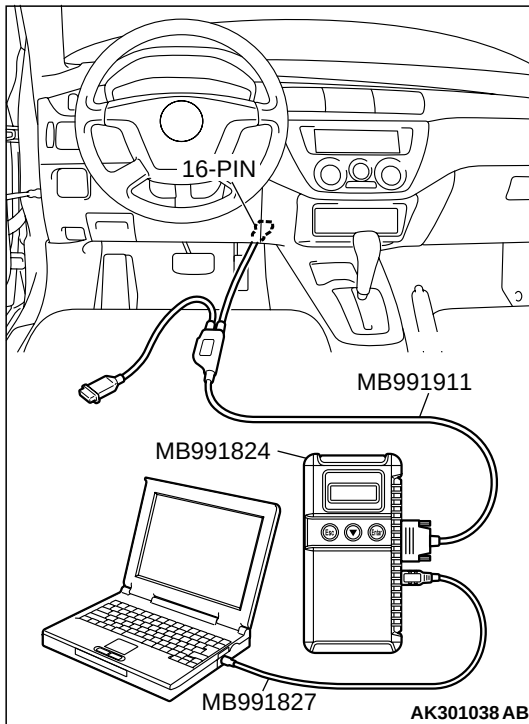
a. Vacuum leak.

- 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 On-vehicle Service – Basic Idle Speed Adjustment [P.13A-903](#).



STEP 12. Check the ignition timing.

Refer to GROUP 11A, On-vehicle Service – Ignition Timing
Check [P.11A-12](#).

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.

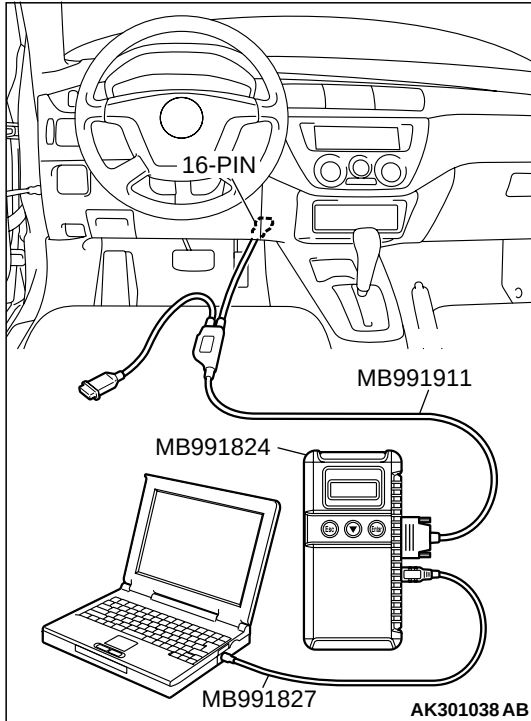
TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Vacuum leak.
- Malfunction of the ignition system.

DIAGNOSIS

Required Special Tools:

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



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

⚠ CAUTION

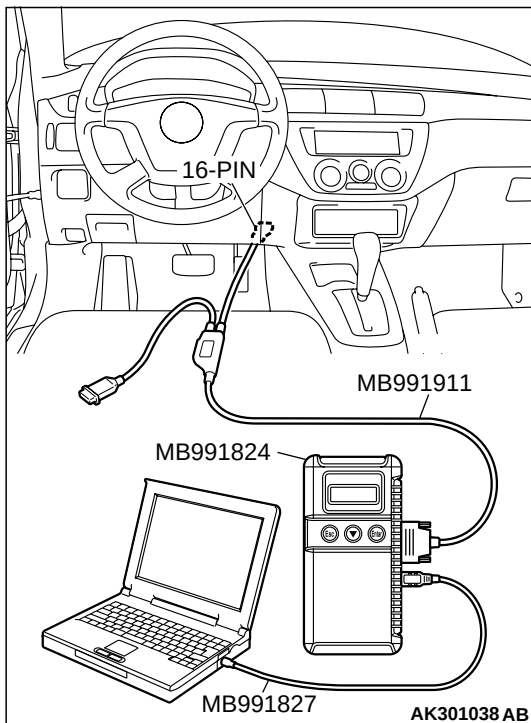
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) 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-29](#).

NO : Go to Step 2.



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

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items in the actuator test. Refer to Actuator Test Reference Table [P.13A-872](#).
 - 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, 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. 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:

- 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 MB991958, read the diagnostic trouble code (DTC).

⚠ CAUTION

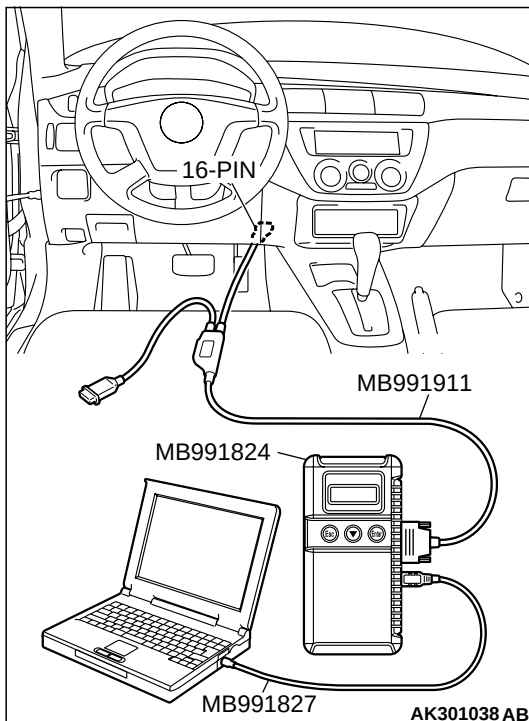
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

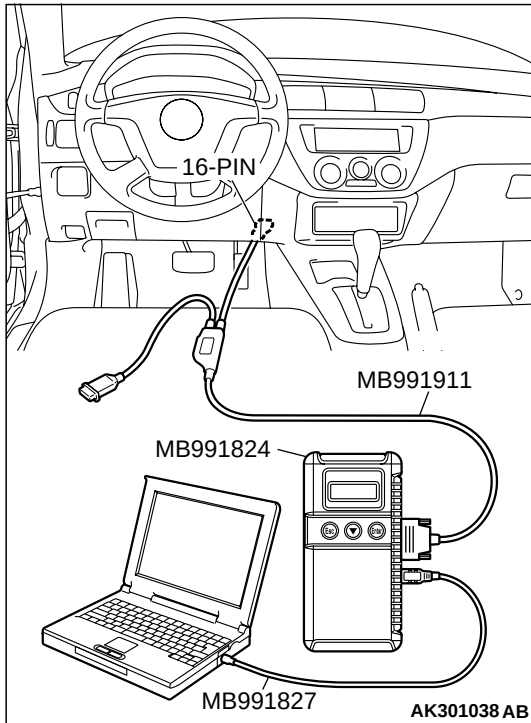
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Read the DTC.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the DTC set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-29](#).

NO : Go to Step 3.



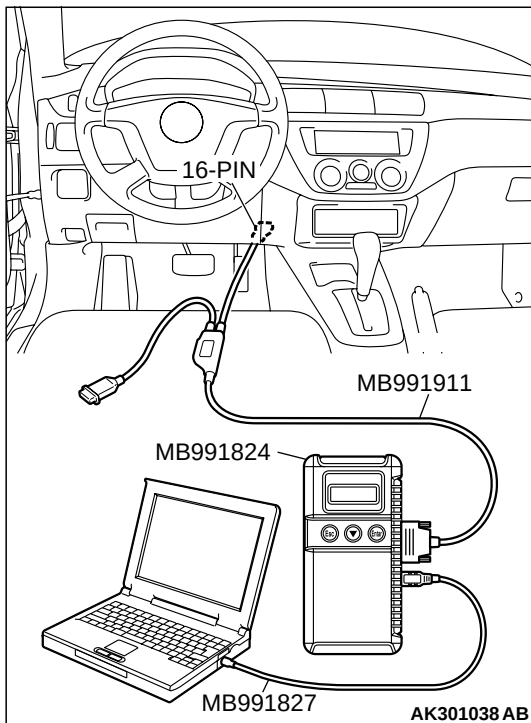
**STEP 3. Using scan tool MB991958, check data list.**

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items in the data list. Refer to Data List Reference Table [P.13A-860](#).
 - 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. Then confirm that the malfunction symptom is eliminated.

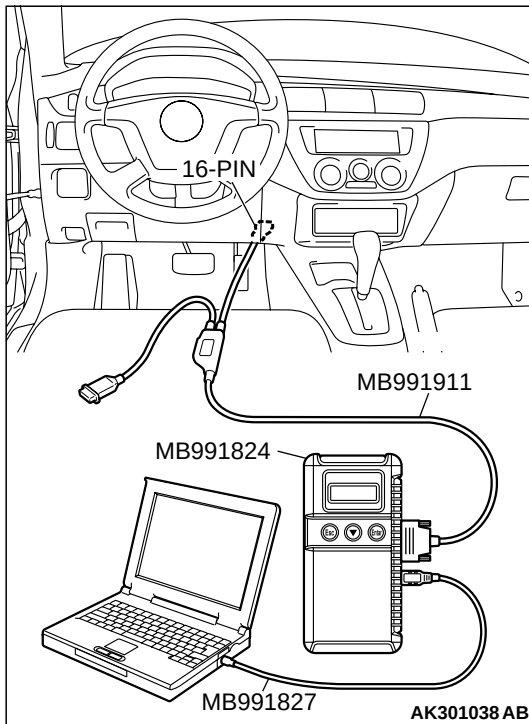
**STEP 4. Using scan tool MB991958, check actuator test.**

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items in the actuator test. Refer to Actuator Test Reference Table [P.13A-872](#).
 - 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. Then confirm that the malfunction symptom is eliminated.



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

- (1) Start the engine and run at idle.
- (2) Set scan tool 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 On-vehicle Service – Throttle Body Cleaning [P.13A-900.](#))

Then confirm that the malfunction symptom is eliminated.

NO : Refer to, DTC P0500 – Vehicle Speed Sensor <M/T> [P.13A-600](#) or refer to GROUP 23A, Automatic Transaxle Diagnosis – Diagnostic Trouble Code Procedures – DTC 23 Output Shaft Speed Sensor System <A/T> [P.23A-37.](#)

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.

DIAGNOSIS

Required Special Tools:

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

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

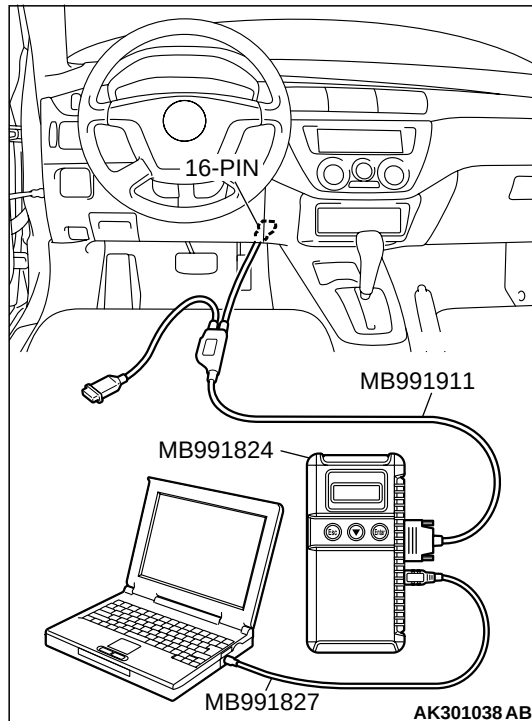
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

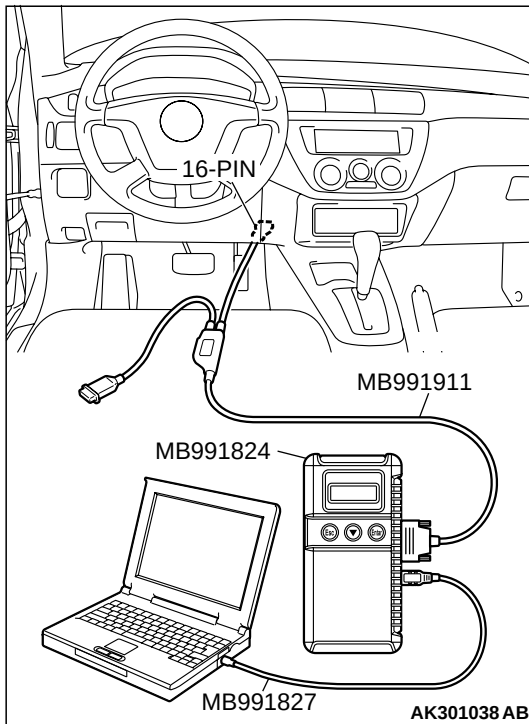
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Read the DTC.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-29](#).

NO : Go to Step 2.





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

- (1) Check following items in the actuator test. Refer to Actuator Test Reference Table [P.13A-872](#).
 - a. Items 01, 02, 03, 04: Injector.
- (2) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : Go to Step 3.

NO : Refer to DTC P0201, P0202, P0203, P0204 – Injector Circuit [P.13A-342](#).

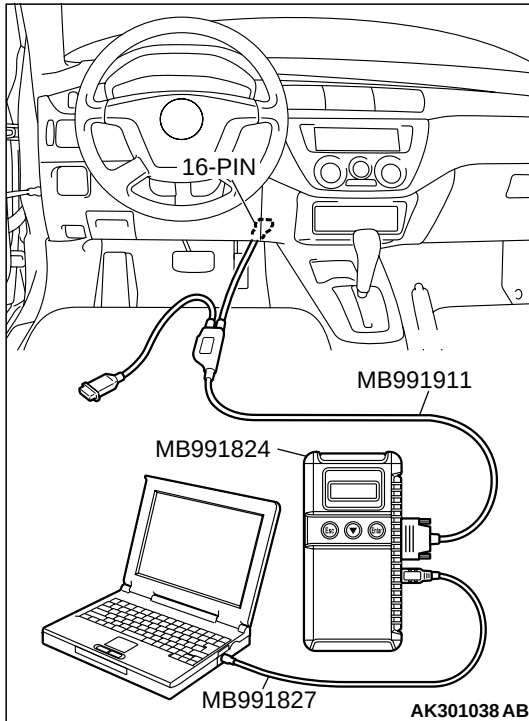
STEP 3. Check the ignition timing.

- (1) Refer to GROUP 11A, On-vehicle Service – Ignition Timing Check [P.11A-12](#).

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 MB991958, check data list.****⚠ CAUTION**

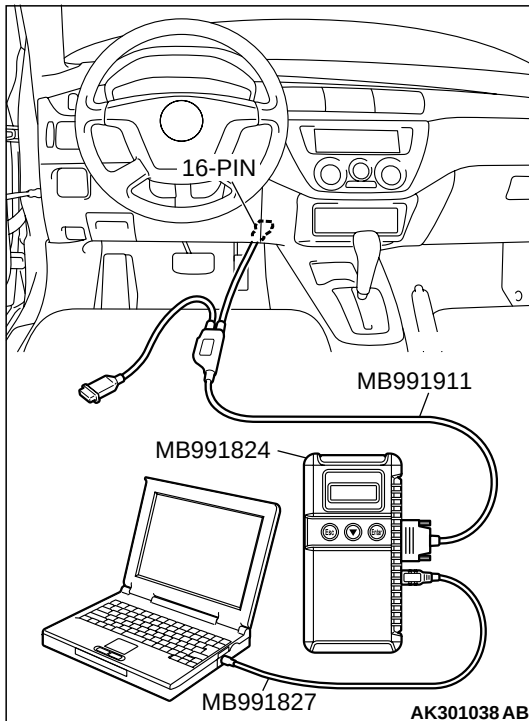
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check the following items in the data list. Refer to Data List Reference Table [P.13A-860](#).
 - 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. Then confirm that the malfunction symptom is eliminated.

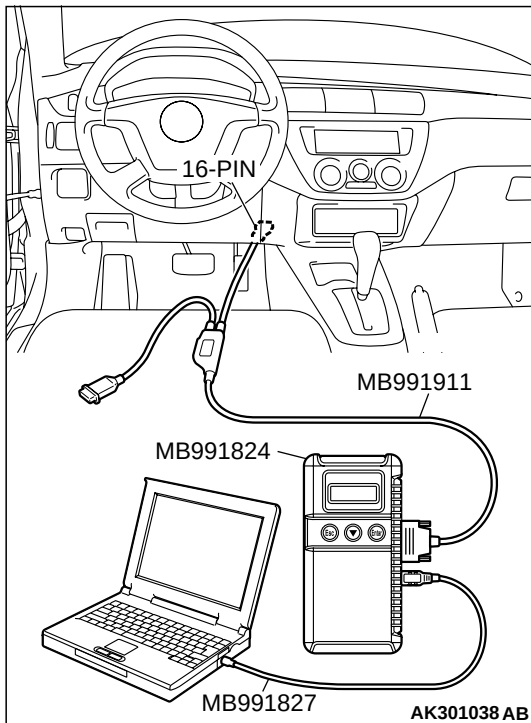
**STEP 5. Using scan tool MB991958, check actuator test.**

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items in the actuator test. Refer to Actuator Test Reference Table [P.13A-872](#).
 - 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. Then confirm that the malfunction symptom is eliminated.



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

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items of data list. Refer to Data List Reference Table [P.13A-860](#).
 - 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 On-vehicle Service – Fuel Pressure Test [P.13A-905](#).

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. Then confirm that the malfunction symptom is eliminated.

STEP 8. Check the fuel pressure.

Refer to, Fuel Pressure Test [P.13A-905](#).

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, spark plug cables.
- b. Check the EGR system.
- c. Check compression pressure.
- d. Check the fuel filter or fuel line for clogging.

Then confirm that the malfunction symptom is eliminated.

NO : Repair or replace. 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:**

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

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

⚠ CAUTION

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

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

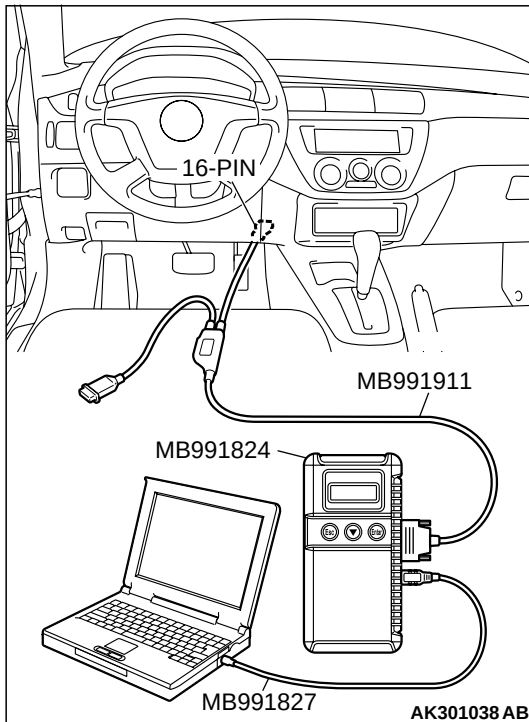
Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-29](#).

NO : Check the following items, and repair or replace the defective items.

- a. Check the ignition coil, spark plugs, 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 air flow through the IAC, causing the vehicle to decelerate rapidly for an instant.

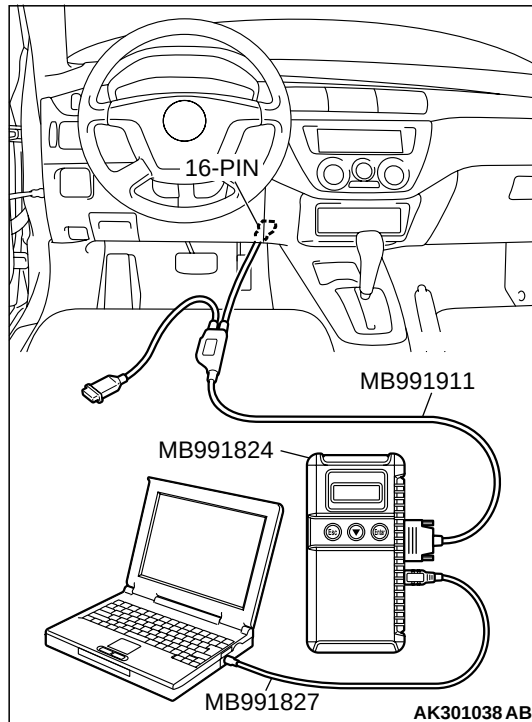
TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the IAC system.

DIAGNOSIS

Required Special Tools:

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



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

⚠ CAUTION

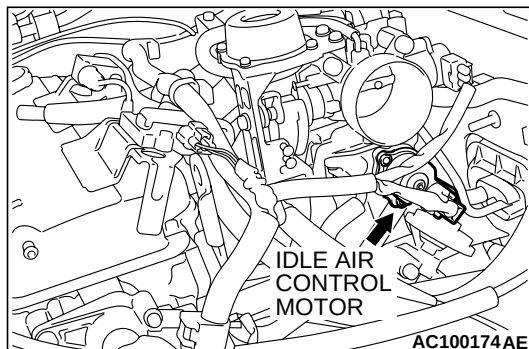
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-29](#).

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 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 DTC P0506 – Idle Control System RPM Lower Than Expected [P.13A-612](#), DTC P0507 – Idle Control System RPM Higher Than Expected [P.13A-626](#).

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

⚠ CAUTION

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

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check the following items in the data list. Refer to Data List Reference Table [P.13A-860](#).

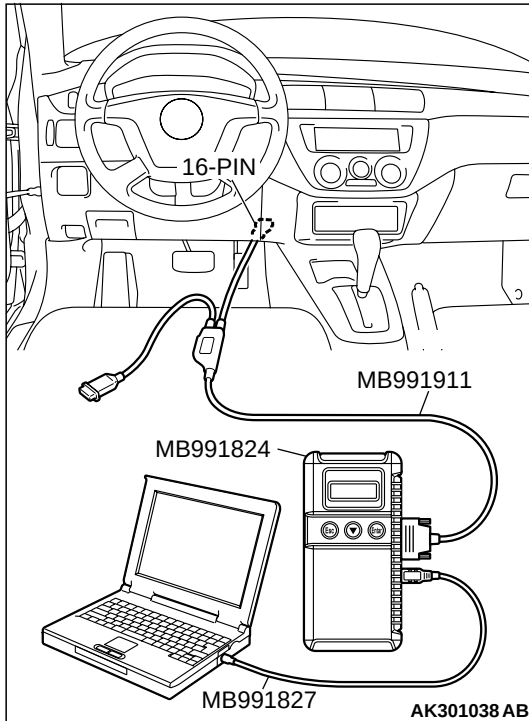
a. Item 14: Throttle Position Sensor.

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

Q: Is the sensor operating properly?

YES : Refer to On-vehicle Service – Clean the throttle valve area [P.13A-900](#).

NO : Repair or replace. 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.

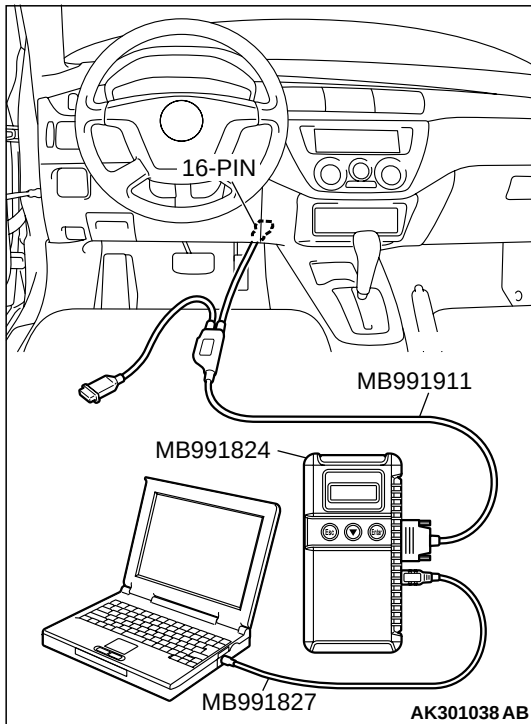
TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the ignition system.
- Malfunction of air/fuel ratio control system.
- Malfunction of the fuel supply system.
- Poor compression pressure.
- Clogged exhaust system.

DIAGNOSIS

Required Special Tools:

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



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

⚠ CAUTION

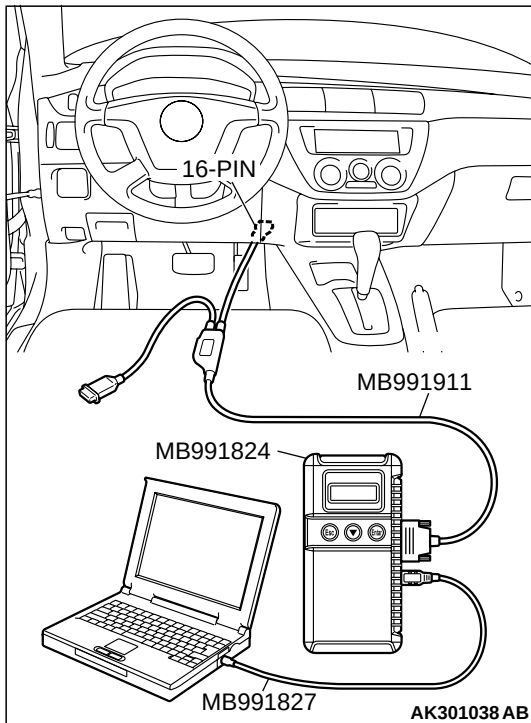
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-29](#).

NO : Go to Step 2.



STEP 2. Using scan tool 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 Actuator Test Table [P.13A-872](#).
 - a. Items 01, 02, 03, 04: Injector.
- (3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : Go to Step 3.

NO : Refer to DTC P0201, P0202, P0203, P0204 – Injector Circuit [P.13A-342](#).

STEP 3. Check the ignition timing.

Refer to GROUP 11A, On-vehicle Service – Ignition Timing
Check [P.11A-12](#).

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 MB991958, check data list.

⚠ CAUTION

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

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check the following items in the data list. Refer to Data List Reference Table [P.13A-860](#).

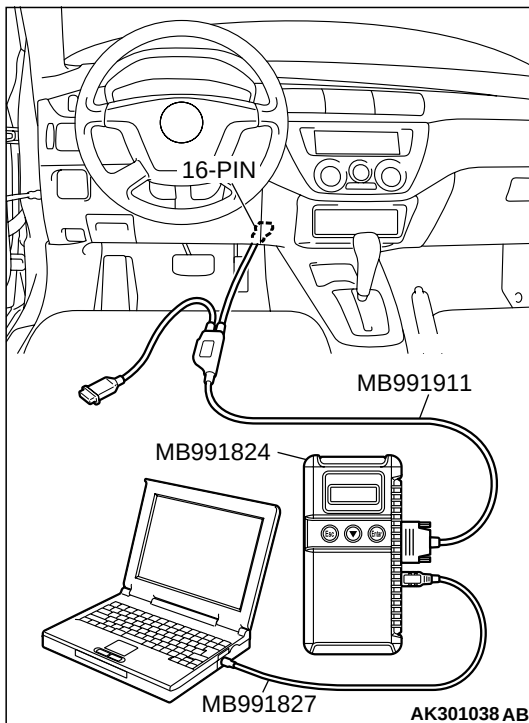
- a. Item 13: Intake Air Temperature Sensor.
- b. Item 25: Barometric Pressure Sensor.
- c. Item 21: Engine Coolant Temperature Sensor.
- d. Item 14: Throttle Position Sensor.
- e. Item 59: Heated Oxygen Sensor (rear).
- f. Item 11: Heated Oxygen Sensor (front).

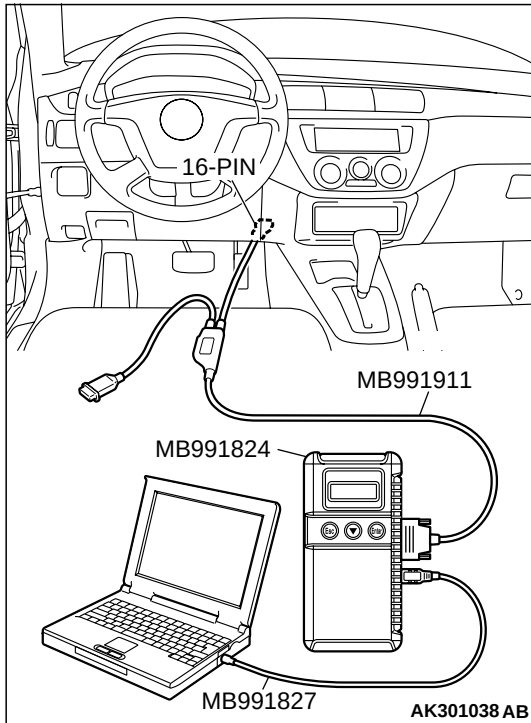
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

YES : Go to Step 5.

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



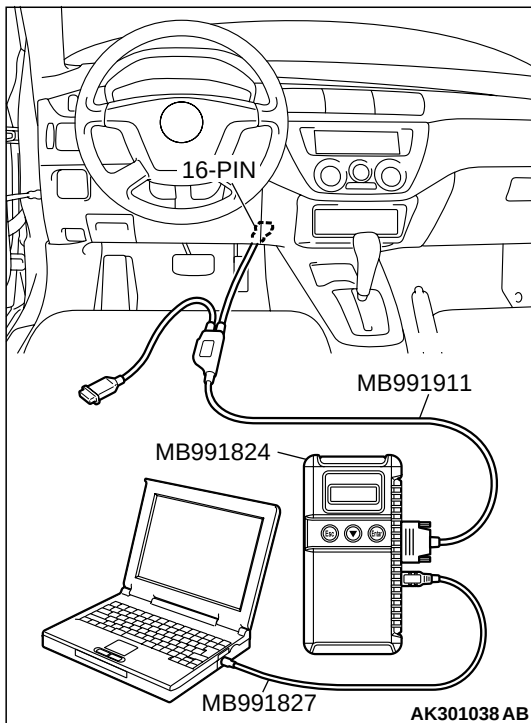
**STEP 5. Using scan tool MB991958, check actuator test.**

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items in the actuator test. Refer to Actuator Test Reference Table [P.13A-872](#).
 - a. 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 6.

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

**STEP 6. Using scan tool MB991958, check data list.**

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items of data list. Refer to Data List Reference Table [P.13A-860](#).
 - 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 On-vehicle Service – Fuel Pressure Test [P.13A-905](#).

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. Then confirm that the malfunction symptom is eliminated.

STEP 8. Check the fuel pressure.

Refer to On-vehicle Service – Fuel Pressure Test [P.13A-905](#).

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, spark plug cables.
- b. Check compression pressure.
- c. Check the fuel filter or fuel line for clogging.
- d. Broken air intake hose.
- e. Clogged air cleaner.
- f. Clogged exhaust system.

Then confirm that the malfunction symptom is eliminated.

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

INSPECTION PROCEDURE 19: Surge

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:

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

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

⚠ CAUTION

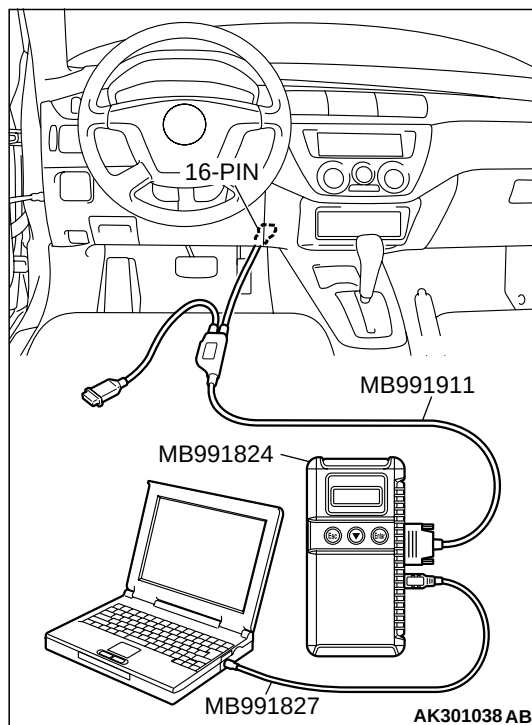
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

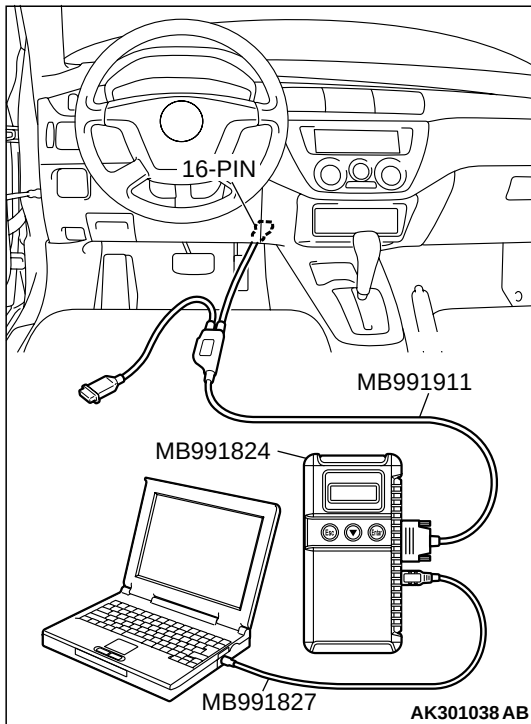
- Connect scan tool MB991958 to the data link connector.
- Turn the ignition switch to the "ON" position.
- Read the DTC.
- Turn the ignition switch to the "ON" position.

Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-29](#).

NO : Go to Step 2.





STEP 2. Using scan tool 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 Actuator Test Reference Table [P.13A-872](#).
 - a. Items 01, 02, 03, 04: Injector.
- (3) Turn the ignition switch to the "ON" position.

Q: Is the actuator operating properly?

YES : Go to Step 3.

NO : Refer to DTC P0201, P0202, P0203, P0204 – Injector Circuit [P.13A-342](#).

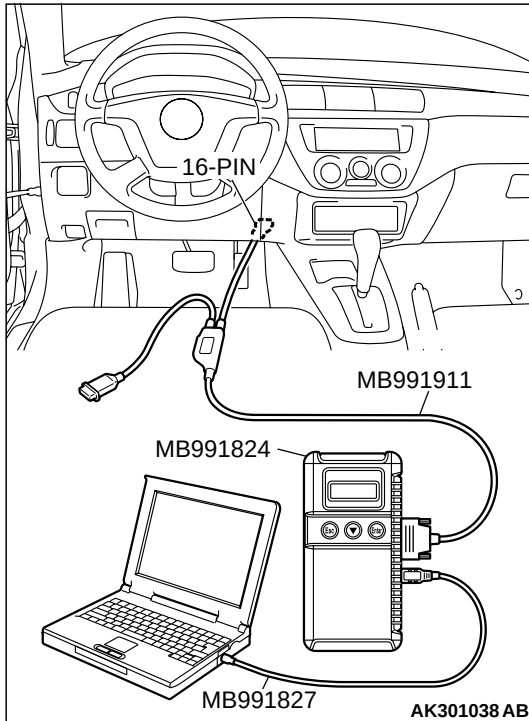
STEP 3. Check the ignition timing.

Refer to GROUP 11A, On-vehicle Service – Ignition Timing Check [P.11A-12](#).

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 MB991958, check data list.****⚠ CAUTION**

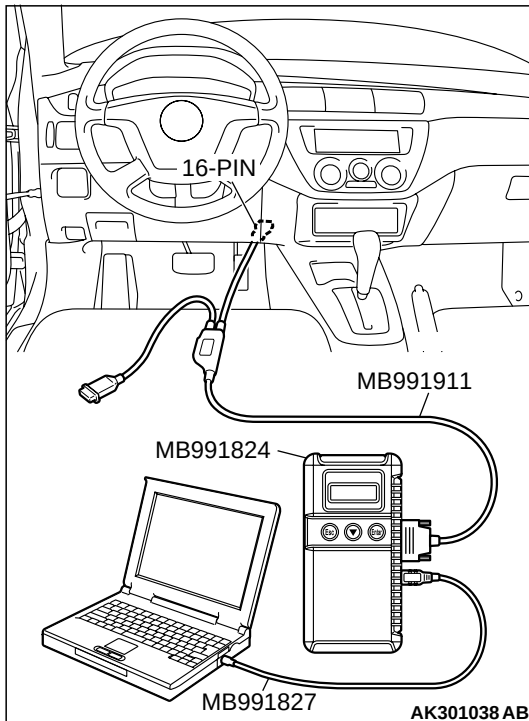
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check the following items in the data list. Refer to Data List Reference Table [P.13A-860](#).
 - 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. Then confirm that the malfunction symptom is eliminated.

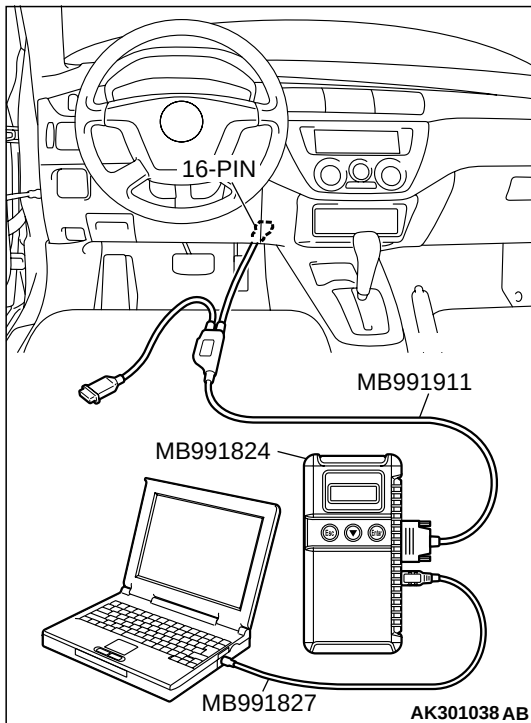
**STEP 5. Using scan tool MB991958, check actuator test.**

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items in the actuator test. Refer to Actuator Test Reference Table [P.13A-872](#).
 - 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. Then confirm that the malfunction symptom is eliminated.



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

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items of data list. Refer to Data List Reference Table [P.13A-860](#).
 - 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 On-vehicle Service – Fuel Pressure Test [P.13A-905](#).

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. Then confirm that the malfunction symptom is eliminated.

STEP 8. Check the fuel pressure.

Refer to On-vehicle Service – Fuel Pressure Test [P.13A-905](#).

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, spark plug cables.
- b. Check the EGR system.

Then confirm that the malfunction symptom is eliminated.

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

INSPECTION PROCEDURE 20: Knocking

COMMENT

- In case 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:**

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

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

⚠ CAUTION

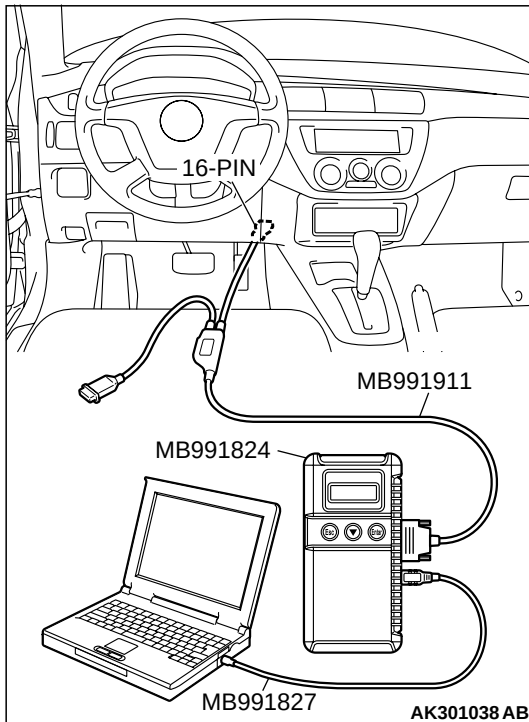
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is DTC set?

YES : Refer to, Diagnostic Trouble Code Chart [P.13A-29](#).

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.

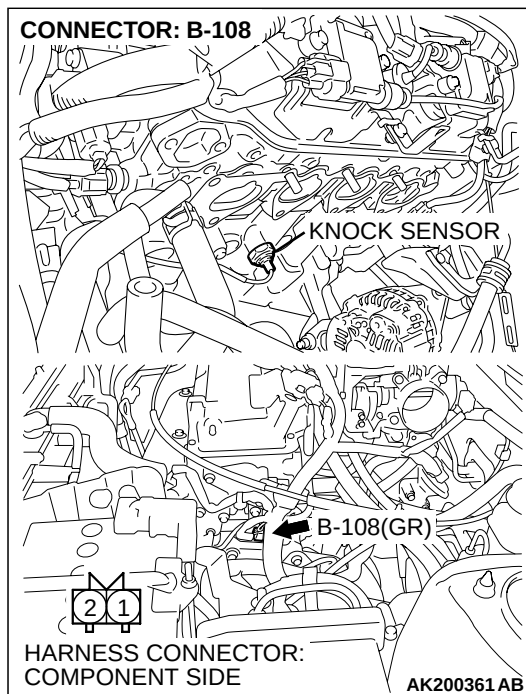
Q: When the knock sensor connector B-108 was disconnected, was the ignition timing delayed?

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-365](#).



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:**

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

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

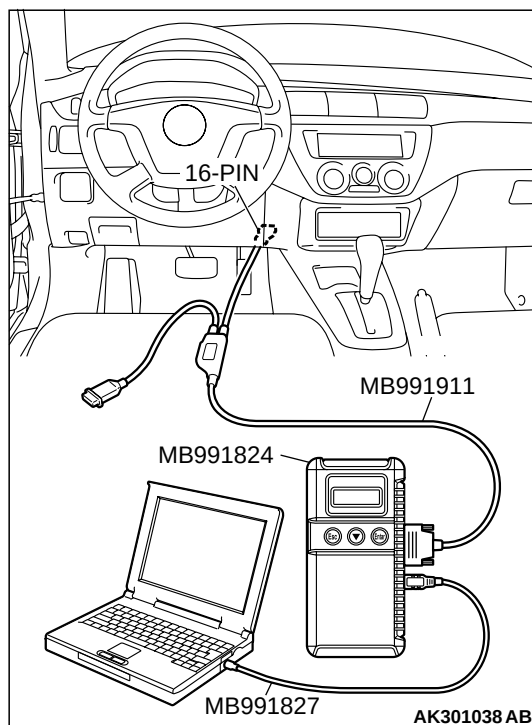
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-29](#).

NO : Go to Step 2.



STEP 2. Check the ignition timing.

Refer to GROUP 11A, On-vehicle Service – Ignition Timing
Check [P.11A-12](#).

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 MB991958, check data list.

⚠ CAUTION

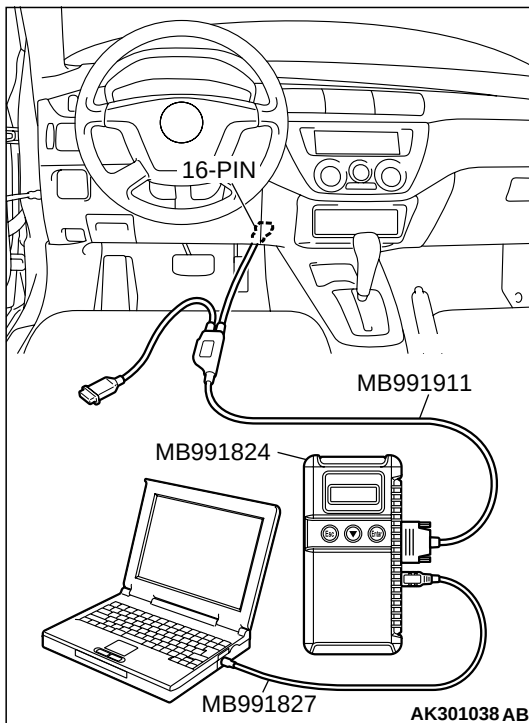
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

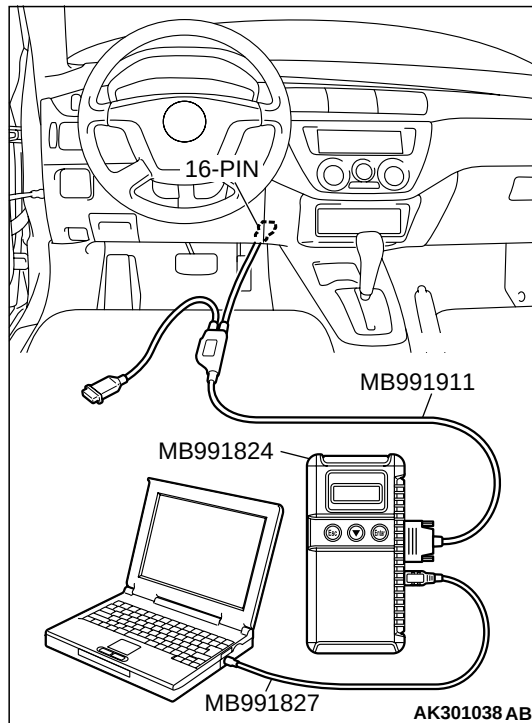
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check the following items in the data list. Refer to Data List Reference Table [P.13A-860](#).
 - a. Item 21: Engine Coolant Temperature Sensor.
 - b. Item 13: Intake Air Temperature 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. Then confirm that the malfunction symptom is eliminated.



**STEP 4. Using scan tool 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-860](#).
 - 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 On-vehicle Service – Fuel Pressure Test [P.13A-905](#).

Q: Is the fuel pressure normal?

YES : Go to Step 6.

NO : Repair or replace. 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, 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 is 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:

- 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. Then confirm that the malfunction symptom is eliminated.

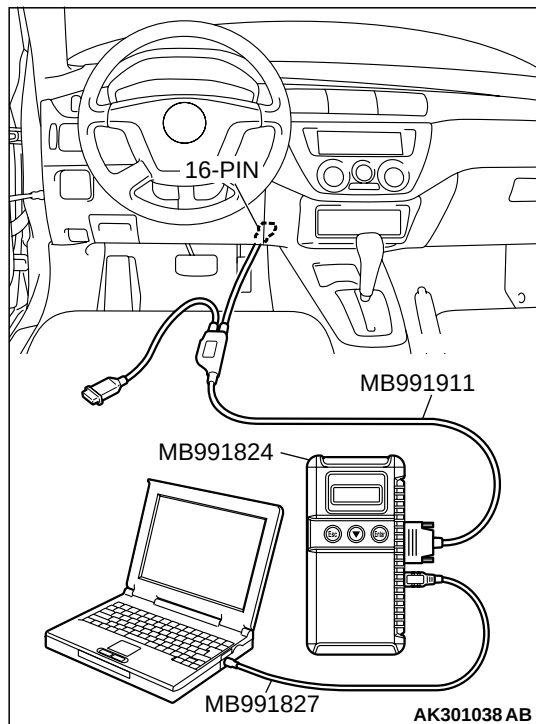
STEP 3. Check the drive ability.

(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 Trouble Symptom Chart [P.13A-32](#).



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

⚠ CAUTION

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

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

Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-29](#).

NO : Go to Step 5.

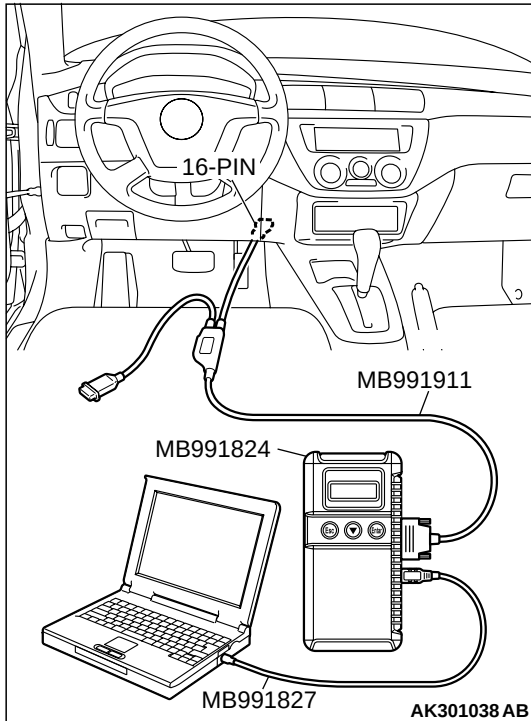
STEP 5. Check the ignition timing.

Refer to GROUP 11A, On-vehicle Service – Ignition Timing Check [P.11A-12](#).

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 MB991958, check data list.

⚠ CAUTION

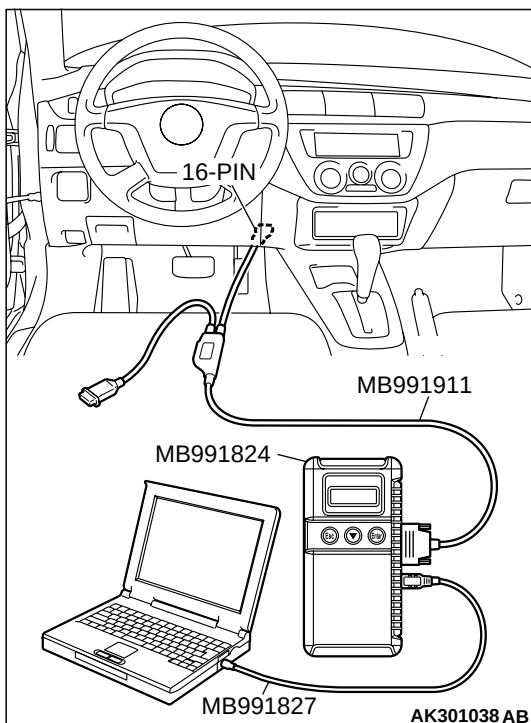
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check the following items in the data list. Refer to Data List Reference Table [P.13A-860](#).
 - 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. Then confirm that the malfunction symptom is eliminated.



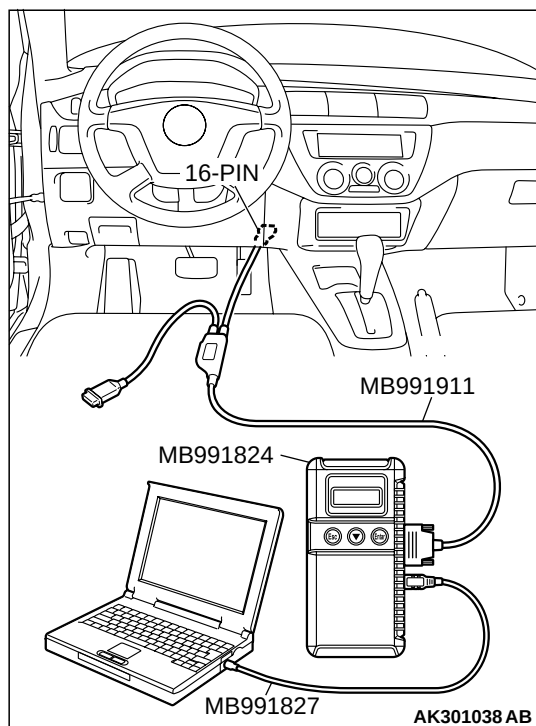
STEP 7. Using scan tool MB991958, check data list item 11: heated oxygen sensor (front).

- (1) Start the engine and run at idle.
- (2) Set scan tool 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 millivolts or less to 600 – 1,000 millivolts 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 DTC P0130 – Heated Oxygen Sensor Circuit (sensor 1) [P.13A-201](#), DTC P0131 – Heated Oxygen Sensor Low Voltage (sensor 1) [P.13A-216](#), DTC P0132 – Heated Oxygen Sensor Circuit High Voltage (sensor 1) [P.13A-223](#), DTC P0133 – Heated Oxygen Sensor Circuit Slow Response (sensor 1) [P.13A-228](#), DTC P0134 – Heated Oxygen Sensor Circuit No Activity Detected (sensor 1) [P.13A-232](#).

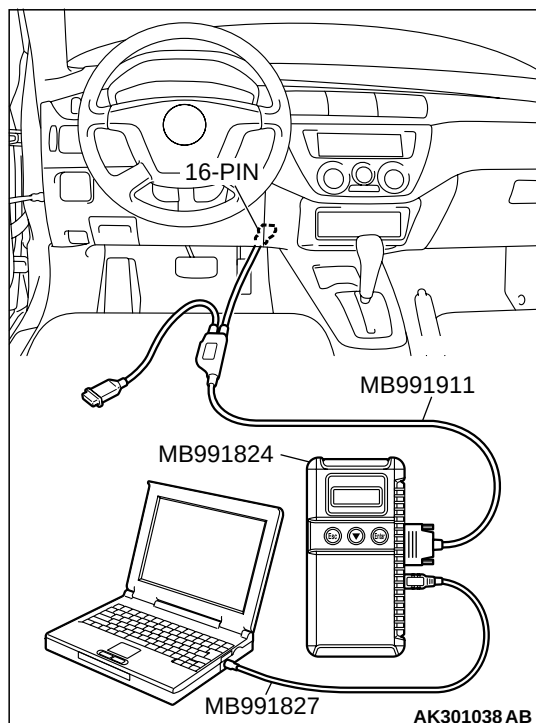
**STEP 8. Using scan tool MB991958, check data list item 11: Heated oxygen sensor (front).**

- (1) Start the engine and run at idle.
- (2) Set scan tool 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.17-223](#).

Q: Is the EGR system normal?**YES :** Go to Step 10.**NO :** Repair or replace. Then confirm that the malfunction symptom is eliminated.



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

⚠ CAUTION

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

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set scan tool MB991958 to the data reading mode for item 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 On-vehicle Service – Fuel Pressure Test [P.13A-905](#).

Q: Is the fuel pressure normal?

YES : Go to Step 12.

NO : Repair or replace. 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, 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:**

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

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

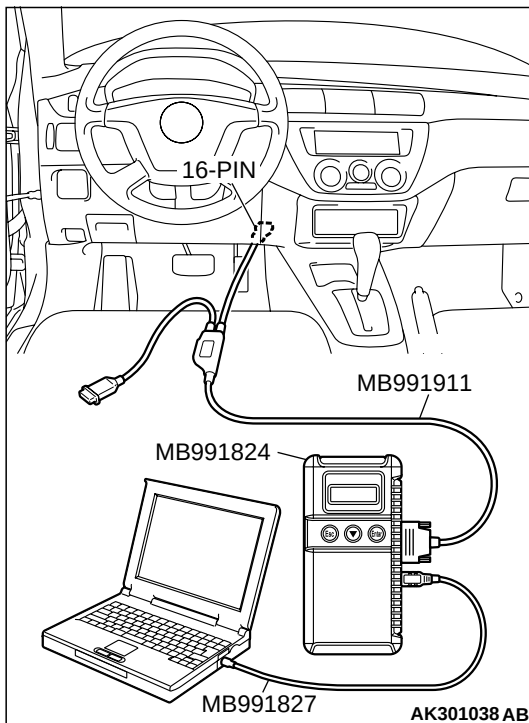
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-29](#).

NO : Refer to GROUP 17, Emission Control System – Purge Control System Check (Purge Flow Check) [P.17-216](#).



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 [P.17-218](#).

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 [P.17-220](#).

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.

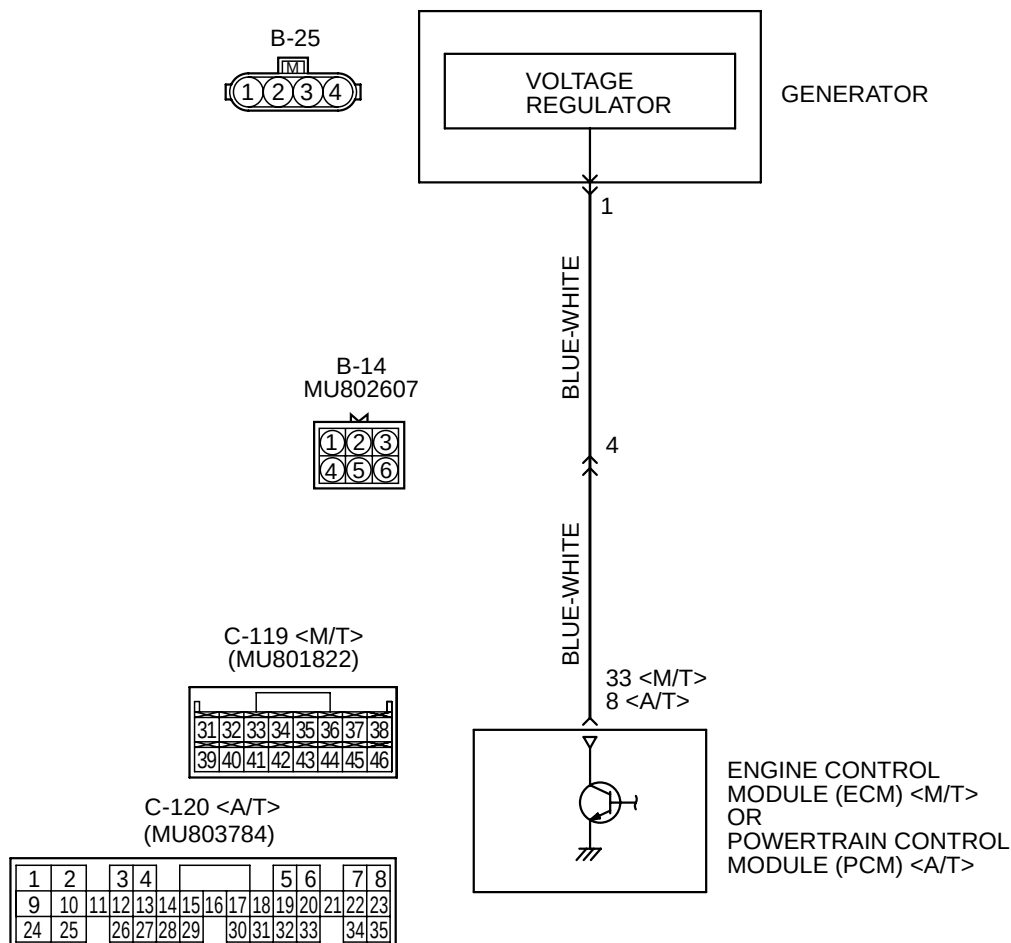
b. Check for leaks from the fuel tank.

Then confirm that the malfunction symptom is eliminated.

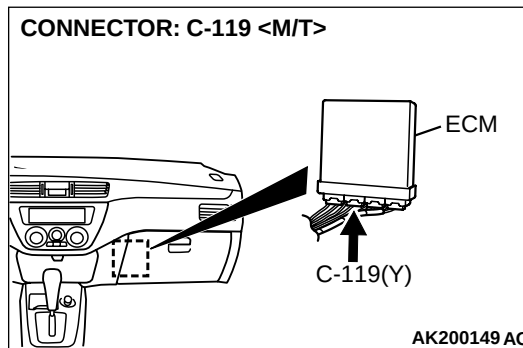
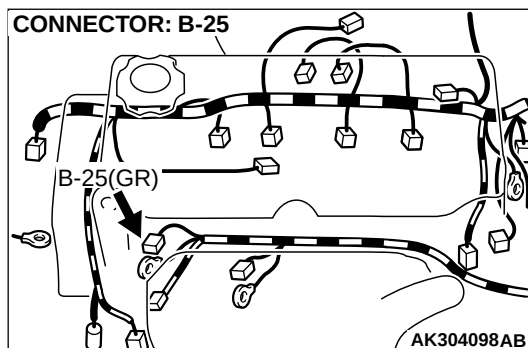
NO : Repair or replace. Then confirm that the malfunction symptom is eliminated.

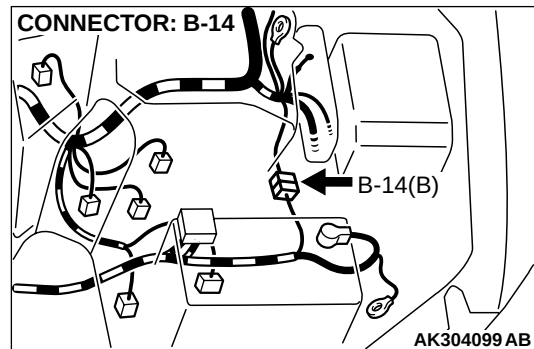
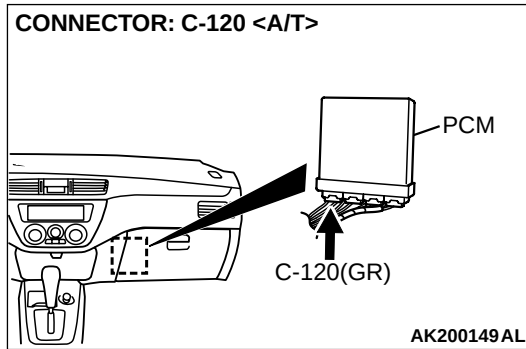
INSPECTION PROCEDURE 26: Generator Output Voltage Is Low (approximately 12.3 volts)

Generator Circuit



AK100041





CIRCUIT OPERATION

- The EMC <M/T> or PCM <A/T> controls generator out put current by duty-controlling continuity between the generator G terminal (terminal 1) and ground.

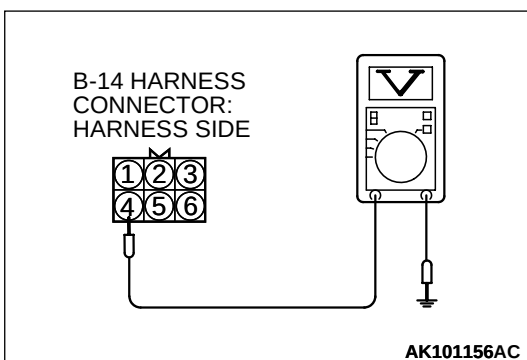
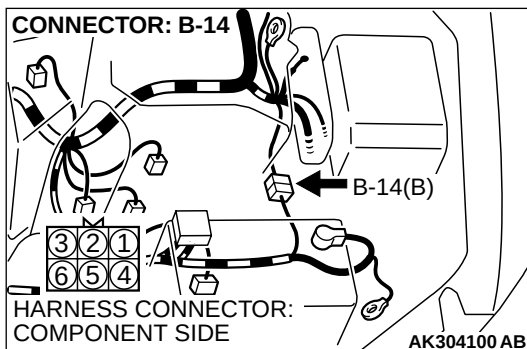
TROUBLESHOOTING HINTS (The most likely causes for this charging system:)

- Malfunction of the charging system.
- Short circuit in the harness between generator G terminal and ECM <M/T> or PCM <A/T>.
- ECM <M/T> or PCM <A/T> failed.

DIAGNOSIS

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

- Do not disconnect the connector B-14.
- Start the engine and run at idle.



- Measure the voltage between terminal No. 4 and ground by backprobing.

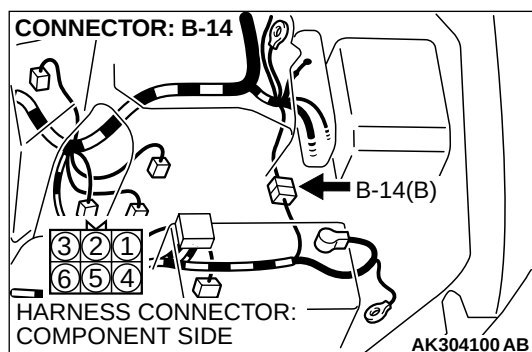
NOTE: Vehicles for Canada, the headlight, taillight, etc. remain lit even when the lighting switch is in "OFF" position but this is no problem for checks.

- Engine: warming up
 - Radiator fan: stopped
 - Headlight switch: OFF to ON
 - Rear defogger switch: OFF to ON
 - Stoplight switch: OFF to ON
 - Voltage rises by 0.2 – 3.5 volts.
- 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.

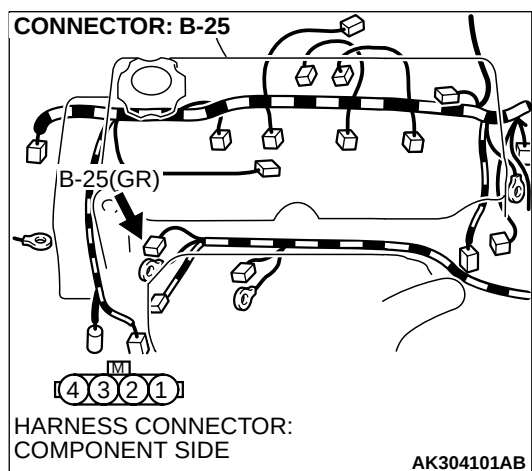


STEP 2. Check harness connector B-14 at generator intermediate harness connector for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 3.

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



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

Q: Is the harness connector in good condition?

YES : Go to Step 4

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

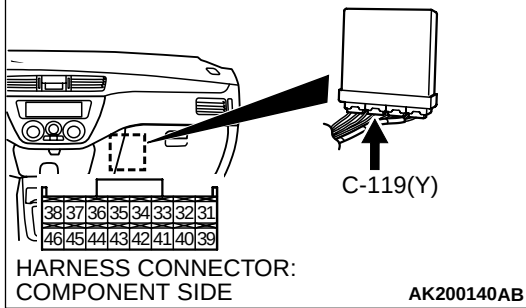
STEP 4. Check harness connector C-119 at ECM <M/T> or harness connector C-120 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

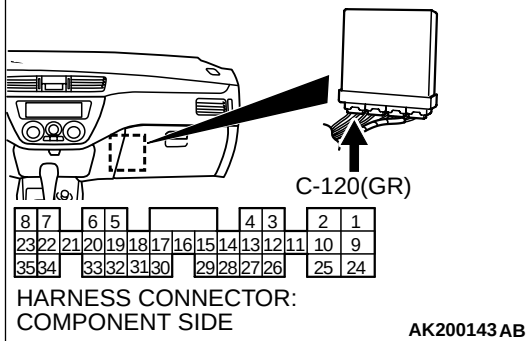
YES : Go to Step 5.

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

CONNECTOR: C-119 <M/T>



CONNECTOR: C-120 <A/T>

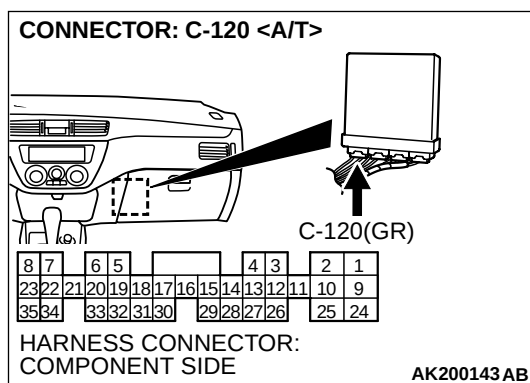
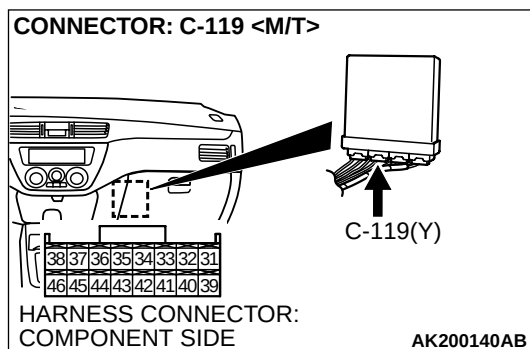
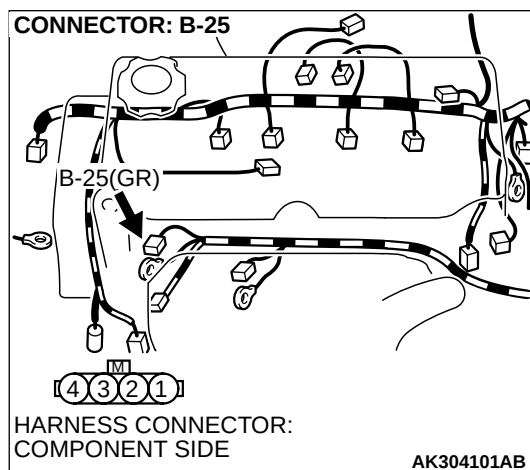


STEP 5. Check for open circuit and short circuit to ground and harness damage between generator connector B-25 (terminal No. 1) and ECM connector C-119 (terminal No. 33) <M/T> or PCM connector C-120 (terminal No. 8) <A/T>.

Q: Is the harness wire in good condition?

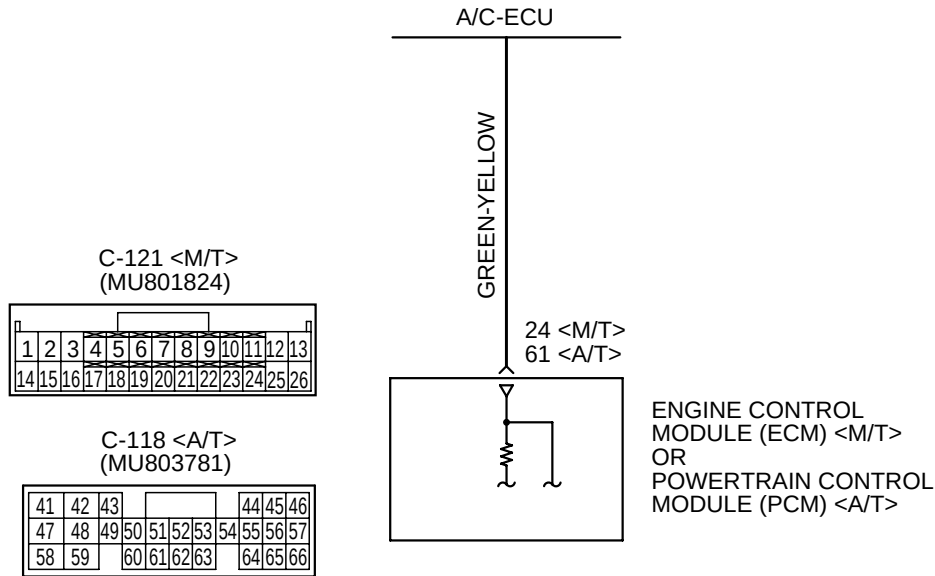
YES : Replace the ECM or PCM. Then confirm that the malfunction symptom is eliminated.

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

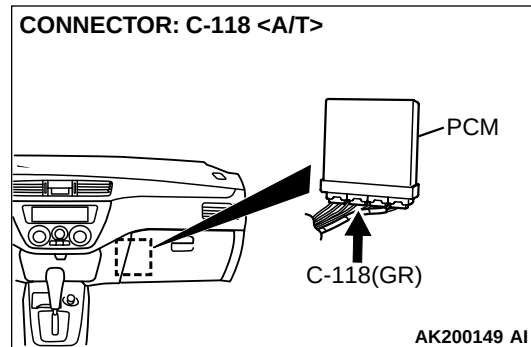
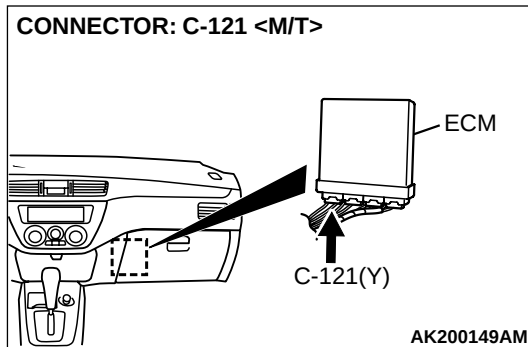


INSPECTION PROCEDURE 27: Incorrect Idle Speed when the A/C Is Operating (A/C Switch 2 Signal)

A/C Switch 2 Signal Circuit



AK100110



CIRCUIT OPERATION

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

<M/T> or PCM <A/T> receives this A/C switch 2 signal from the automatic compressor controller through terminal No. 24 <M/T> or terminal No. 61 <A/T>, 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 <M/T> or PCM <A/T> failed.

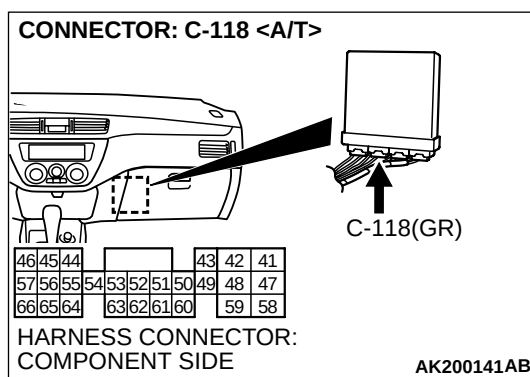
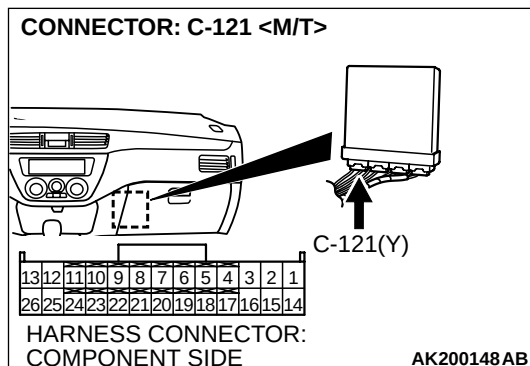
DIAGNOSIS

STEP 1. Check connector C-121 at ECM <M/T> or connector C-118 at PCM <A/T> for damage.

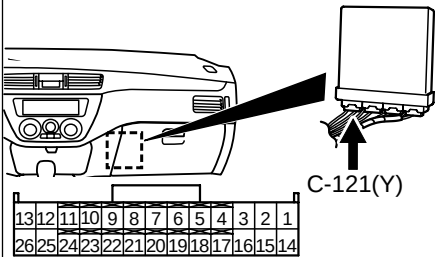
Q: Is the connector in good condition?

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.



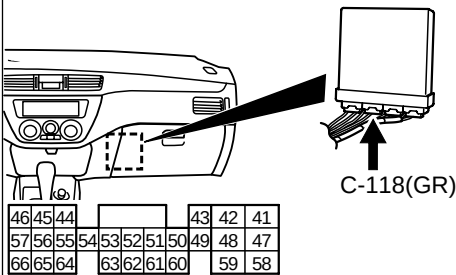
CONNECTOR: C-121 <M/T>



HARNESS CONNECTOR:
COMPONENT SIDE

AK200148AB

CONNECTOR: C-118 <A/T>

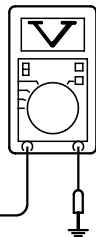
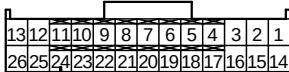


HARNESS CONNECTOR:
COMPONENT SIDE

AK200141AB

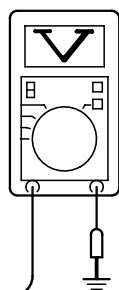
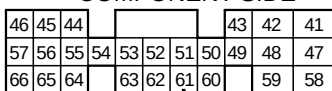
<M/T>

C-121 HARNESS
CONNECTOR:
COMPONENT SIDE



AK000390AG

<A/T> C-118 HARNESS
CONNECTOR:
COMPONENT SIDE



AKX01505AK

STEP 2. Measure the output voltage at ECM harness side connector C-121 <M/T> or PCM harness side connector C-118 <A/T>.

- (1) Disconnect the connector C-121 <M/T> or C-118 <A/T> 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 <M/T> or No. 61 <A/T> and ground.

- If atmospheric air temperature is 15°C (59°F) or less, the voltage should be 1 volt or less.
- If atmospheric air temperature is 18°C (64.4°F) more, the voltage should be battery positive voltage.

- (5) Turn the A/C switch "OFF".

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

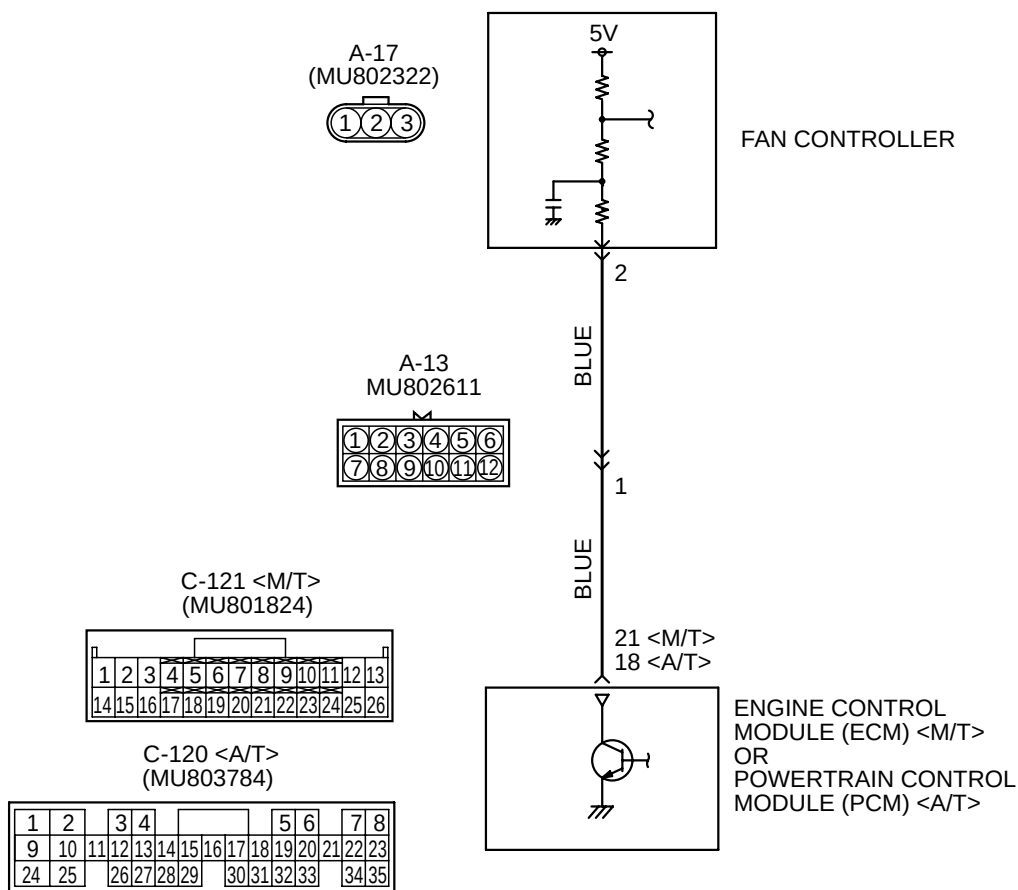
Q: Is the measured voltage within the specified range?

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

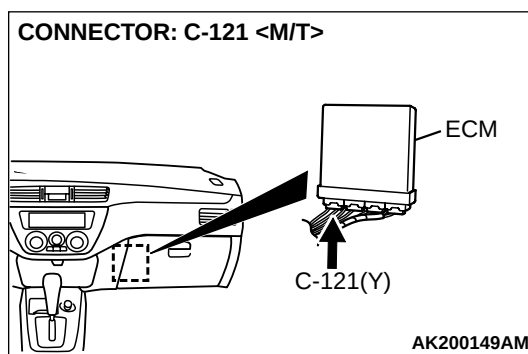
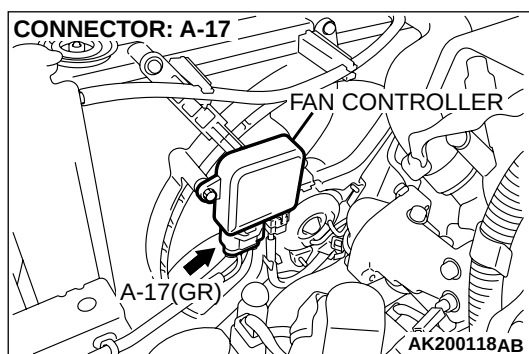
NO : Refer to GROUP 55A, Heater, Air Conditioning And Ventilation – Manual A/C Diagnosis – Symptom Chart P.55-5.

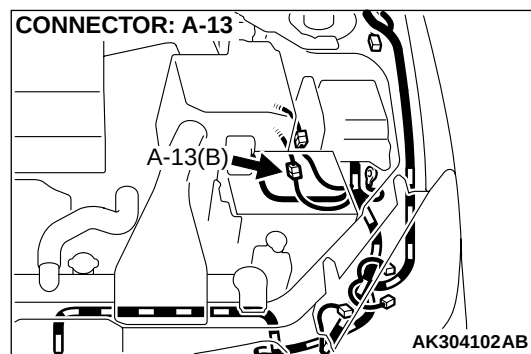
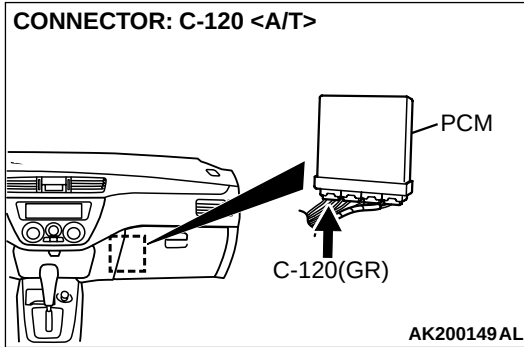
INSPECTION PROCEDURE 28: Fans (Radiator Fan and A/C Condenser Fan) are Inoperative

Radiator Fan, A/C Condenser Fan Circuit



AK100042





CIRCUIT OPERATION

- The ECM <M/T> or PCM <A/T> sends a duty signal to the fan controller 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 controller.
- Improper connector contact, open or short-circuited harness wire.
- ECM <M/T> or PCM <A/T> failed.

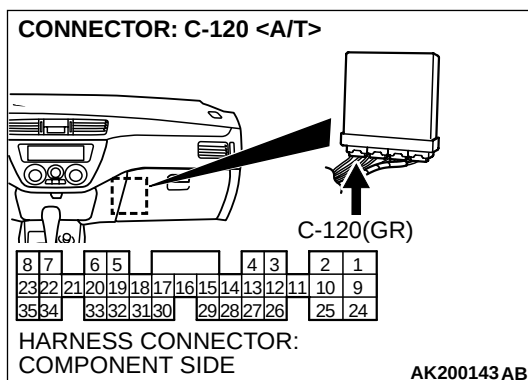
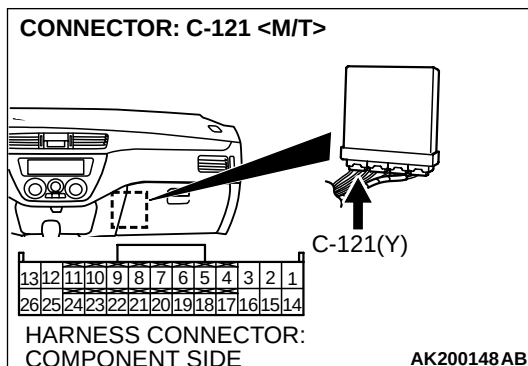
DIAGNOSIS

STEP 1. Check connector C-121 at ECM <M/T> or connector C-120 at PCM <A/T> for damage.

Q: Is the connector in good condition?

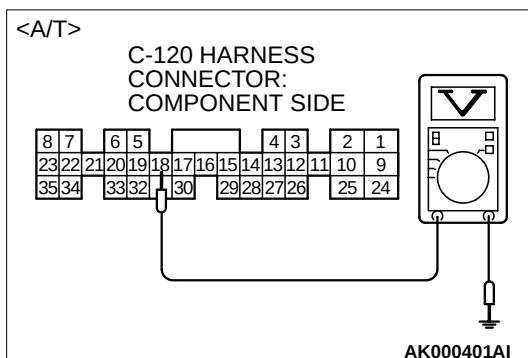
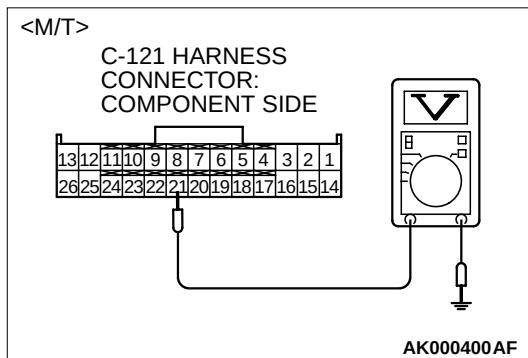
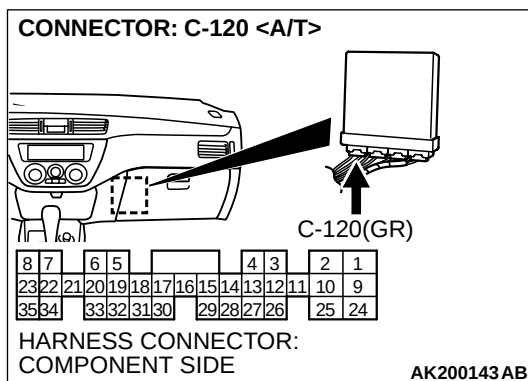
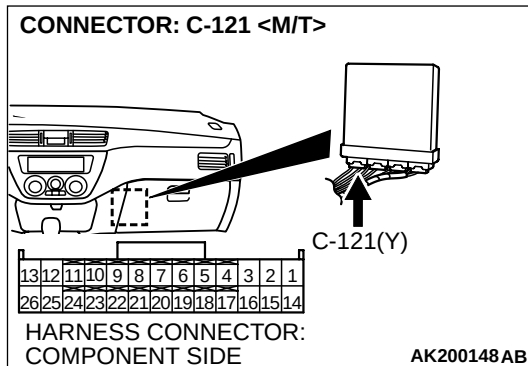
YES : Go to Step 2.

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 <M/T> or PCM harness side connector C-120 <A/T>.

- (1) Disconnect the connector C-121 <M/T> or C-120 <A/T> and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.



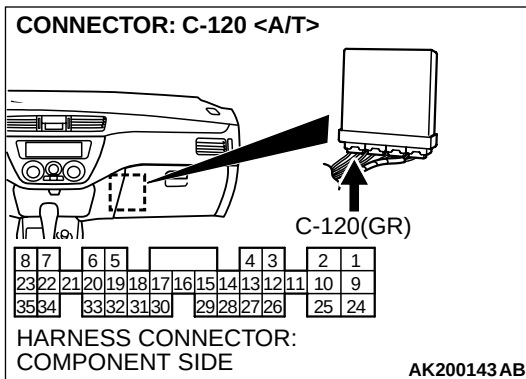
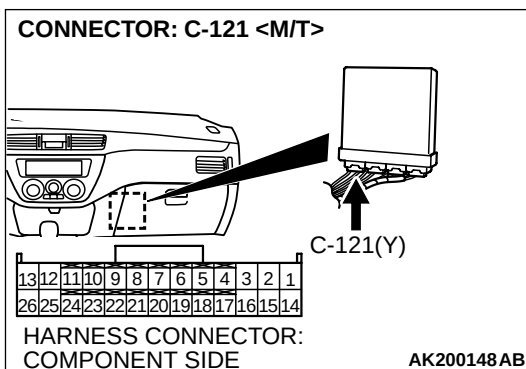
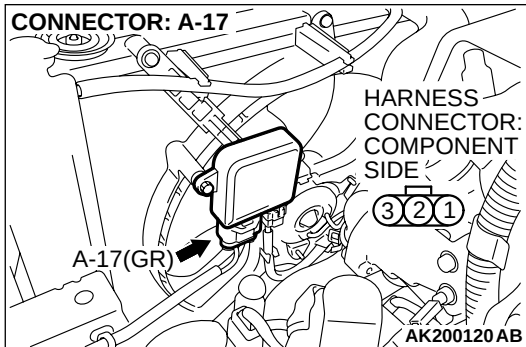
- (3) Measure the voltage between terminal No. 21 <M/T> or No. 18 <A/T> and ground.
 - Voltage should be between 4.8 and 5.2 volts. (Fan rotates at high speed.)
- (4) Connect a jumper cable between terminal No. 21 <M/T> or No. 18 <A/T> and ground.
 - The fan should stop.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the voltage and fan condition normal?

YES : Replace the ECM or PCM. 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 controller A-17 (terminal No. 2) and ECM connector C-121 (terminal No. 21) <M/T> or PCM connector C-120 (terminal No. 18) <A/T>.



NOTE: Check harness after checking intermediate connector A-13. If intermediate connector is damaged, repair or replace them. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then confirm that the malfunction symptom is eliminated.

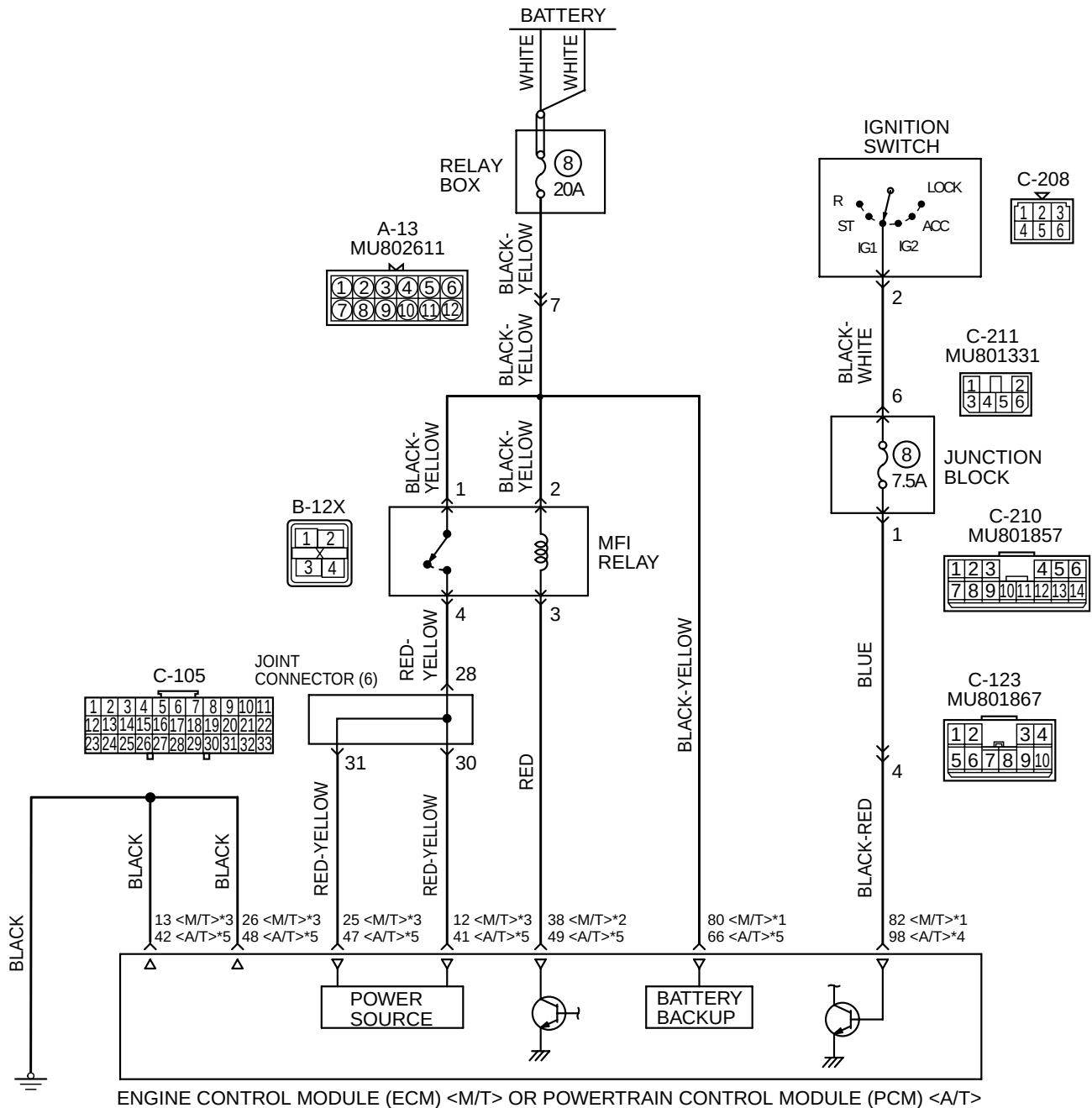
Q: Is the harness wire in good condition?

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: Power Supply System and Ignition Switch-IG System.

Power Supply and Ignition Switch-IG Circuit

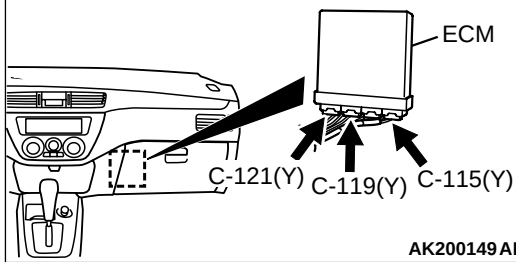


NOTE

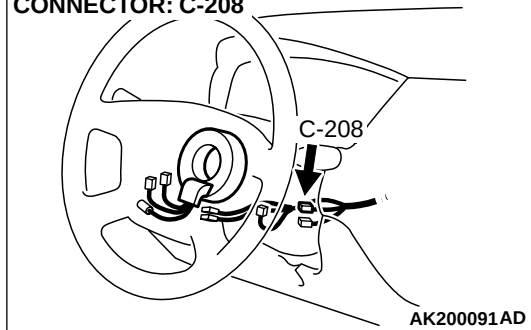
- *1: ECM connector C-115 <M/T>
- *2: ECM connector C-119 <M/T>
- *3: ECM connector C-121 <M/T>
- *4: PCM connector C-116 <A/T>
- *5: PCM connector C-118 <A/T>

AK304192

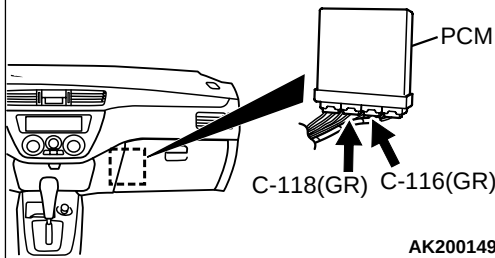
CONNECTORS: C-115, C-119, C-121 <M/T>



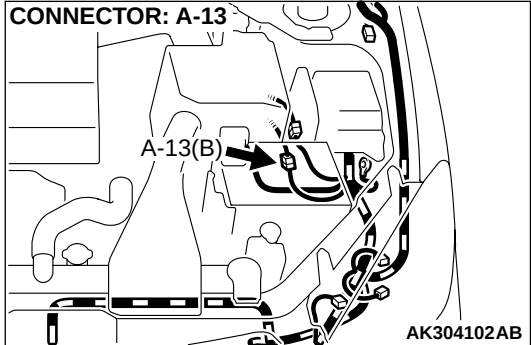
CONNECTOR: C-208



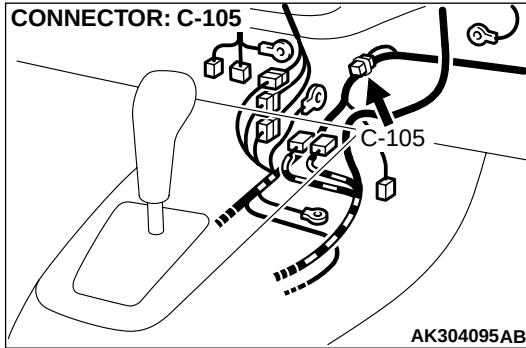
CONNECTORS: C-116, C-118 <A/T>



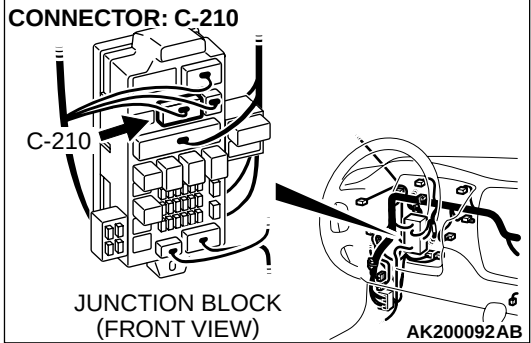
CONNECTOR: A-13



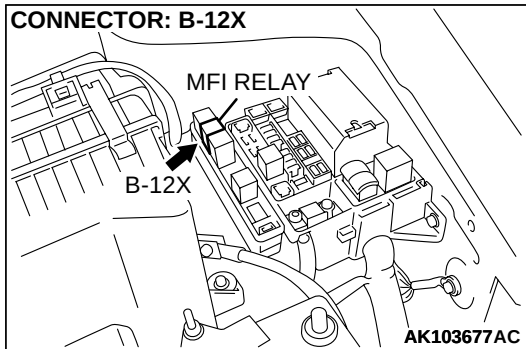
CONNECTOR: C-105



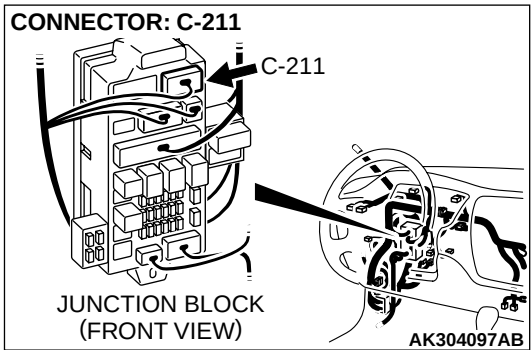
CONNECTOR: C-210



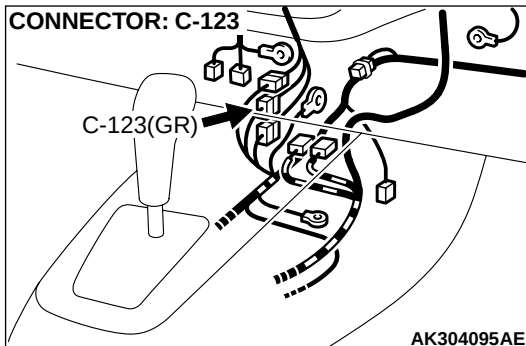
CONNECTOR: B-12X



CONNECTOR: C-211



CONNECTOR: C-123

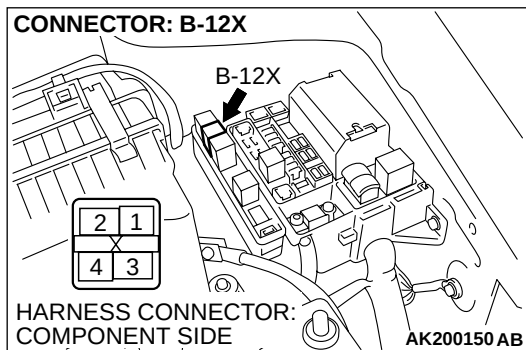


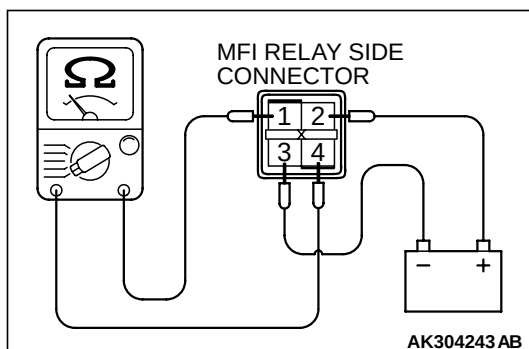
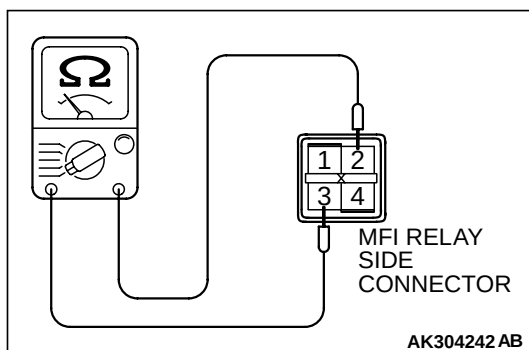
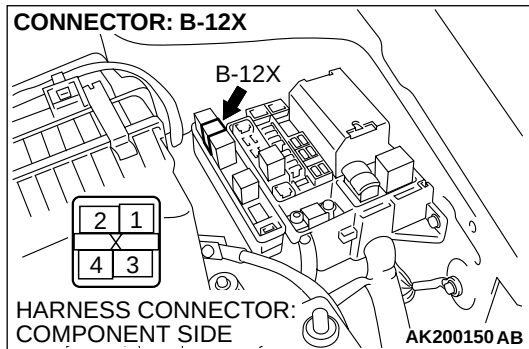
CIRCUIT OPERATION

- 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) <M/T> or PCM (terminal No. 98) <A/T>. When the battery positive voltage is applied, the ECM <M/T> or PCM <A/T> turns the power transistor in the ECM <M/T> or PCM <A/T> "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) <M/T> or PCM (terminals No. 41, No. 47) <A/T> from the MFI relay (terminal No. 4).
- Battery positive voltage is constantly supplied to the ECM (terminal No. 80) <M/T> or PCM (terminal No. 66) <A/T> as the backup power.
- The ECM (terminals No. 13, No. 26) <M/T> or PCM (terminals No. 42, No. 48) <A/T> 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 <M/T> or PCM <A/T> ground wire.
- Malfunction of the ECM <M/T> or PCM <A/T>.

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.

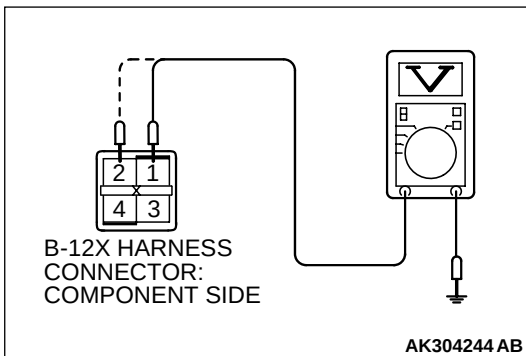
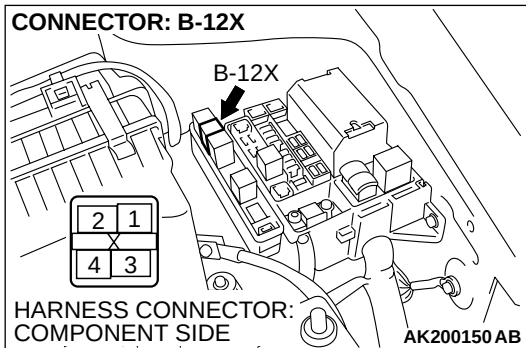
- Should be less than 2 ohms. (Negative battery terminal connected)
- Should be open loop. (Negative battery terminal disconnected)

(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 be battery positive voltage.

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

YES : Go to Step 4.

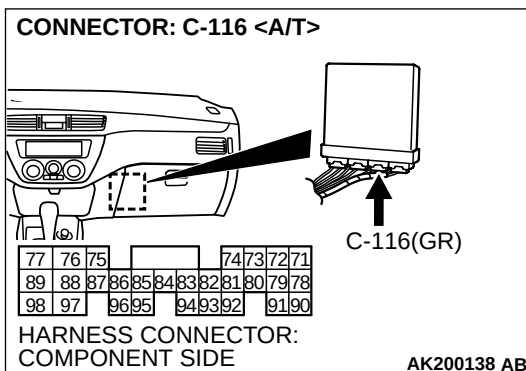
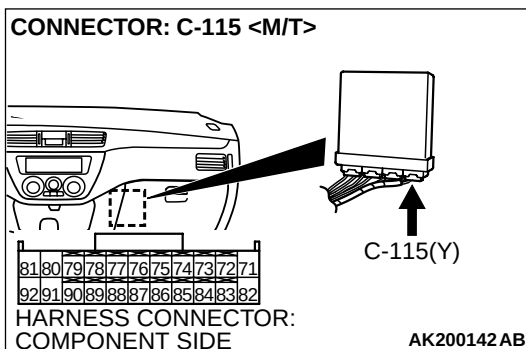
NO : Check harness connector A-13 at intermediate connector for damage, and repair or replace as required. Refer to, GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connector is in good condition, repair harness wire between relay box (fuse 8) and MFI relay connector B-12X (terminals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

STEP 4. Check harness connector C-115 at ECM <M/T> or harness connector C-116 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

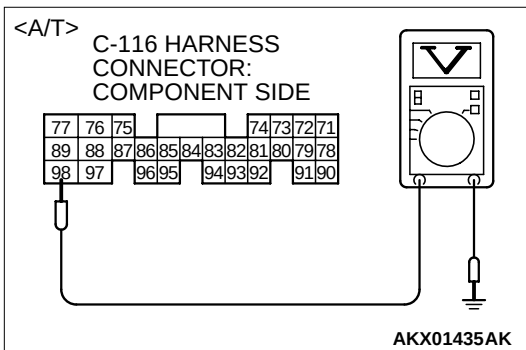
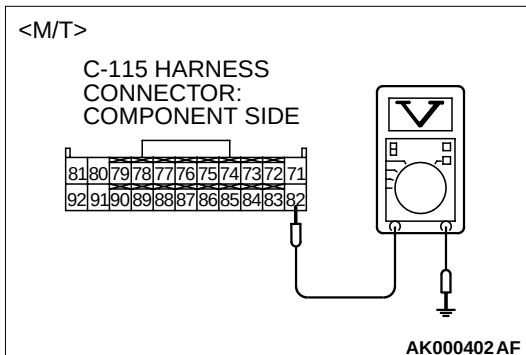
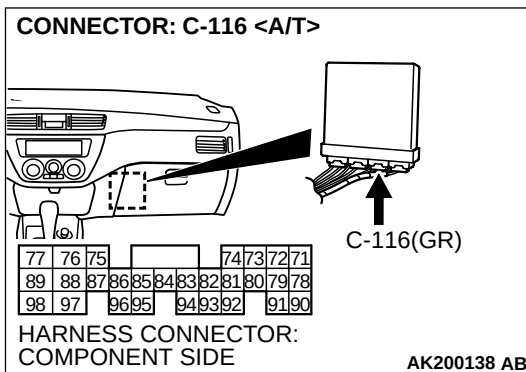
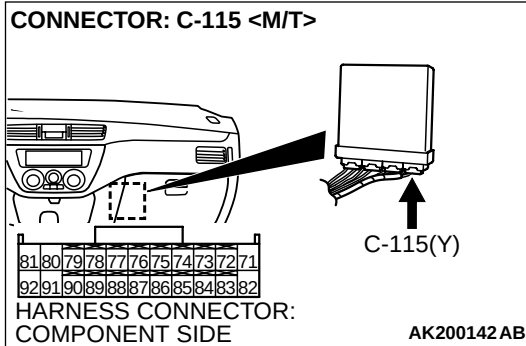
YES : Go to Step 5.

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



STEP 5. Measure the ignition switch-IG signal voltage at ECM harness side connector C-115 <M/T> or PCM harness side connector C-116 <A/T>.

- (1) Disconnect the connector C-115 <M/T> or C-116 <A/T> and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.



- (3) Measure the voltage between terminal No. 82 <M/T> or No. 98 <A/T> and ground.

- Voltage should be battery positive voltage.

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

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

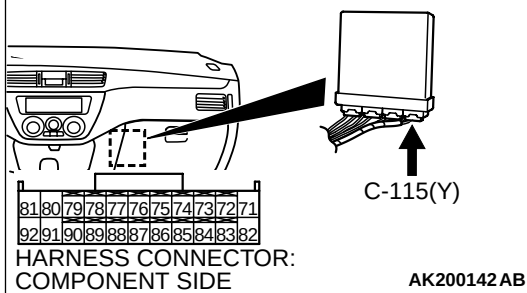
YES : Go to Step 6.

NO : 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) <M/T> or PCM connector C-116 (terminal No. 98) <A/T> because of open circuit. Then confirm that the malfunction symptom is eliminated.

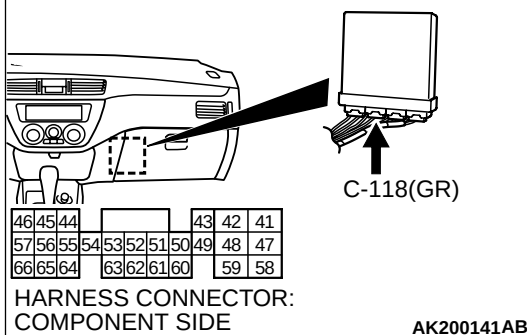
STEP 6. Measure the backup power supply voltage at ECM harness side connector C-115 <M/T> or PCM harness side connector C-118 <A/T>.

- (1) Disconnect the connector C-115 <M/T> or C-118 <A/T> and measure at the harness side.

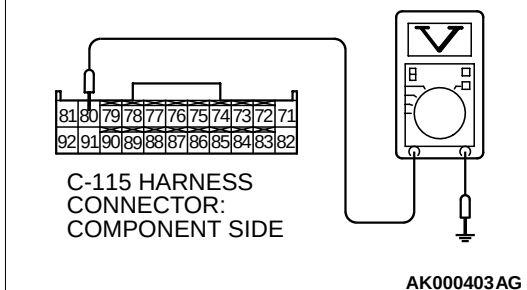
CONNECTOR: C-115 <M/T>



CONNECTOR: C-118 <A/T>



<M/T>



- (2) Measure the voltage between terminal No. 80 <M/T> or No. 66 <A/T> and ground.

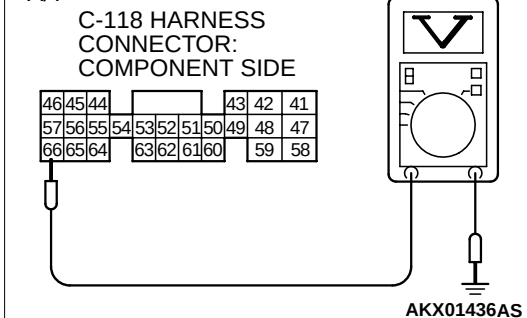
- Voltage should be battery positive voltage.

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

YES : Go to Step 7.

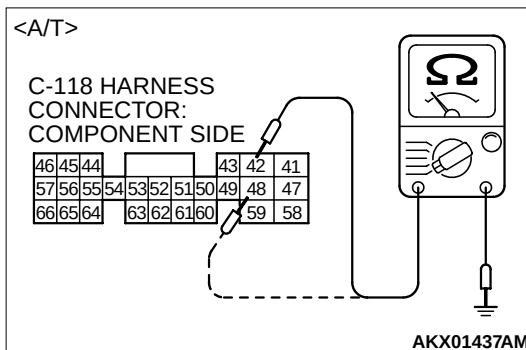
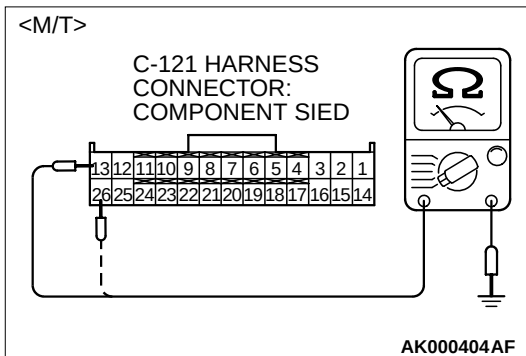
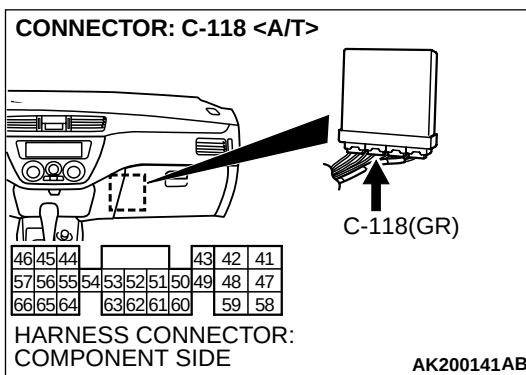
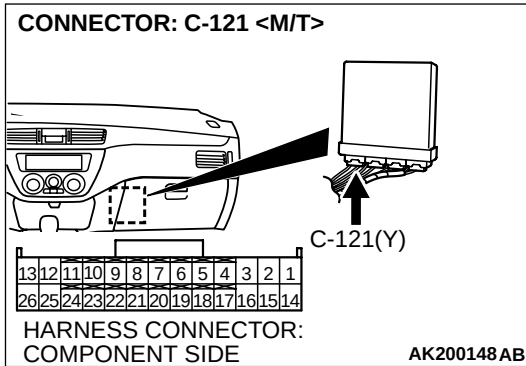
NO : Check harness connector A-13 at intermediate connector for damage, and repair or replace as required. Refer to, GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connectors are in good condition, repair harness wire between relay box (fuse 8) and ECM connector C-115 (terminal No. 80) <M/T> or PCM connector C-118 (terminal No. 66) <A/T> because of open circuit. Then confirm that the malfunction symptom is eliminated.

<A/T>



STEP 7. Check for continuity at ECM harness side connector C-121 <M/T> or PCM harness side connector C-118 <A/T>.

- (1) Disconnect the connector C-121 <M/T> or C-118 <A/T> and measure at the harness side.



- (2) Check for the continuity between terminals (No. 13, No. 26) <M/T> or (No. 42, No. 48) <A/T> and ground.
- Should be less than 2 ohms.

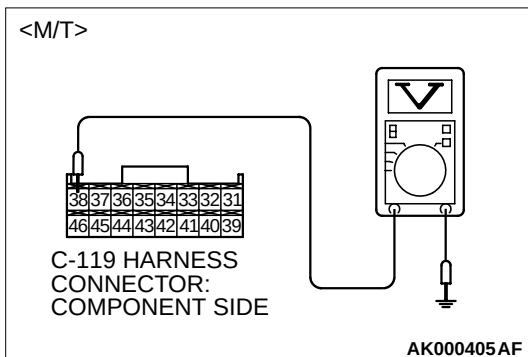
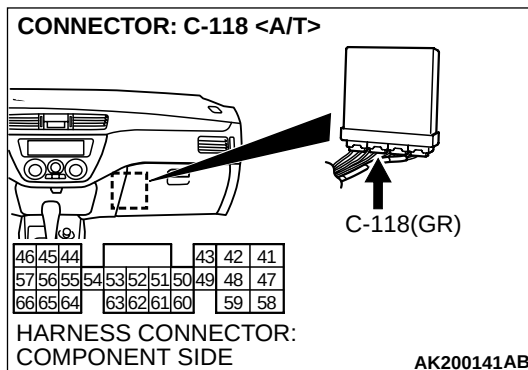
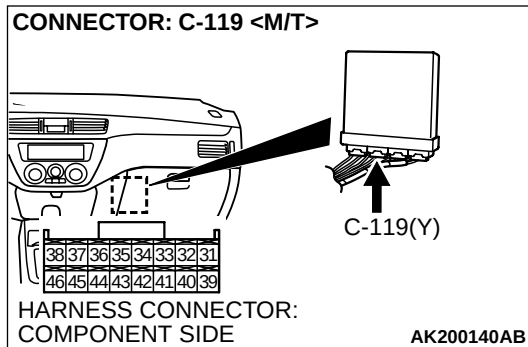
Q: Does continuity exist?

YES : Go to Step 8.

NO : Repair harness wire between ECM connector C-121 (terminals No. 13, No. 26) <M/T> or PCM connector C-118 (terminals No. 42, No. 48) <A/T> 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 <M/T> or PCM harness side connector C-118 <A/T>.

(1) Disconnect the connector C-119 <M/T> or C-118 <A/T> and measure at the harness side.



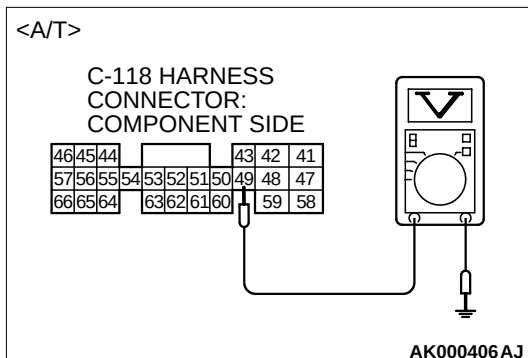
(2) Measure the voltage between terminal No. 38 <M/T> or No. 49 <A/T> and ground.

- Voltage should be battery positive voltage.

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

YES : Go to Step 9.

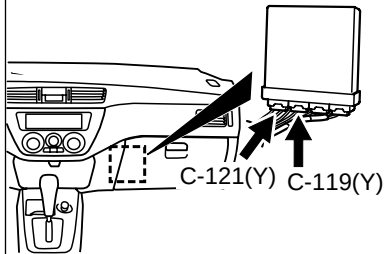
NO : Repair harness wire between MFI relay connector B-12X (terminal No. 3) and ECM connector C-119 (terminal No. 38) <M/T> or PCM connector C-118 (terminal No. 49) <A/T> because of open circuit. Then confirm that the malfunction symptom is eliminated.



STEP 9. Measure the power supply voltage at ECM harness side connector C-121, C-119 <M/T> or PCM harness side connector C-118 <A/T>.

(1) Disconnect the connectors C-121, C-119 <M/T> or C-118 <A/T> and measure at the harness side.

CONNECTORS: C-119, C-121 <M/T>



38	37	36	35	34	33	32	31
46	45	44	43	42	41	40	39

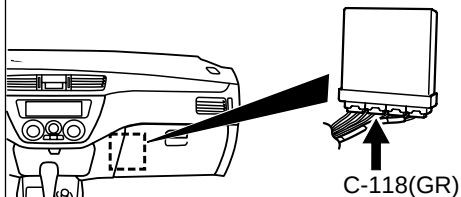
C-119 HARNESS CONNECTOR:
COMPONENT SIDE

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

C-121 HARNESS CONNECTOR:
COMPONENT SIDE

AK200136AB

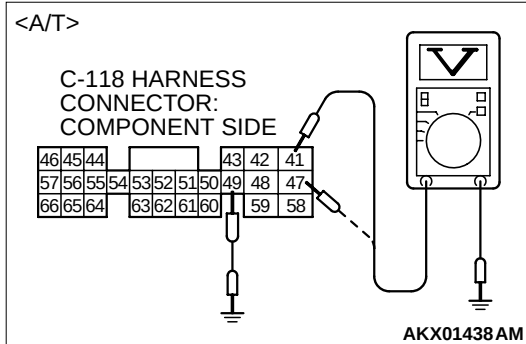
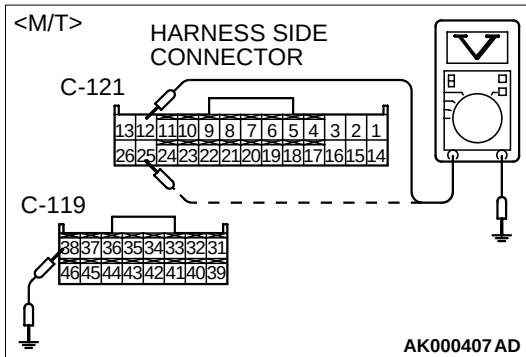
CONNECTOR: C-118 <A/T>



46	45	44				43	42	41
57	56	55	54	53	52	51	50	49
66	65	64		63	62	61	60	
							59	58

HARNESS CONNECTOR:
COMPONENT SIDE

AK200141AB



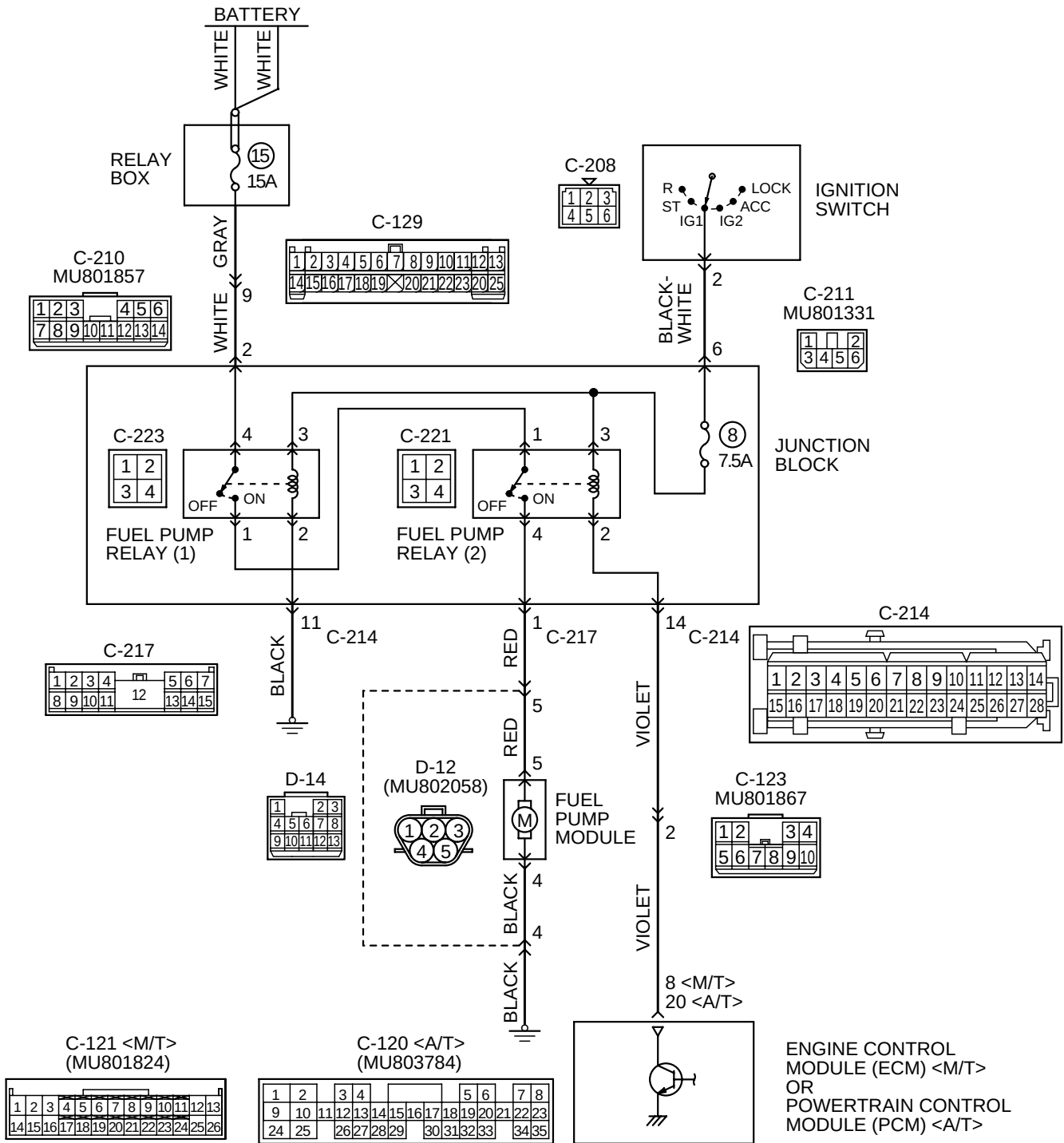
- (2) Using a jumper wire, connect terminal No. 38 <M/T> or No. 49 <A/T> to ground.
- (3) Measure the voltage between terminals (No. 12, No. 25) <M/T> or (No. 41, No. 47) <A/T> and ground.
 - Voltage should be battery positive voltage.

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

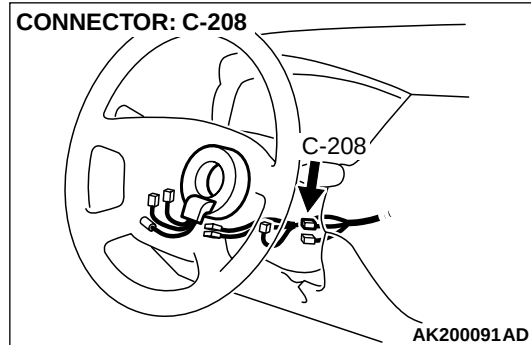
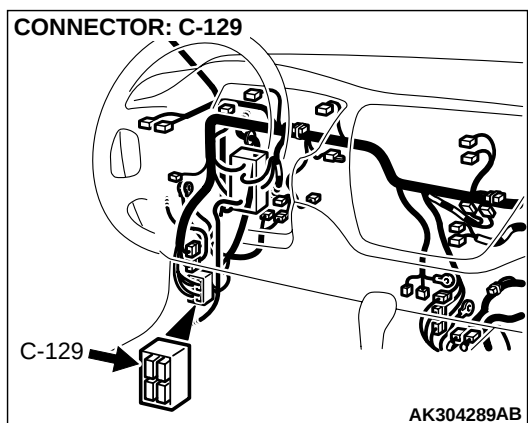
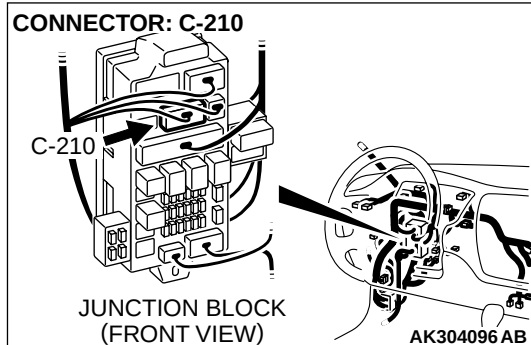
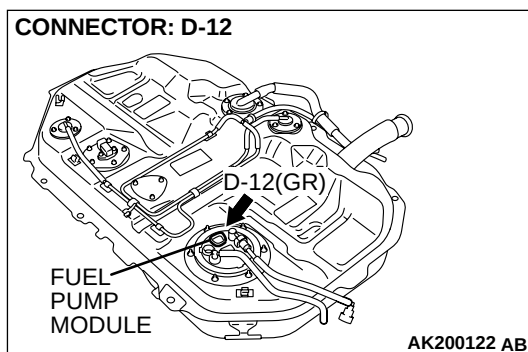
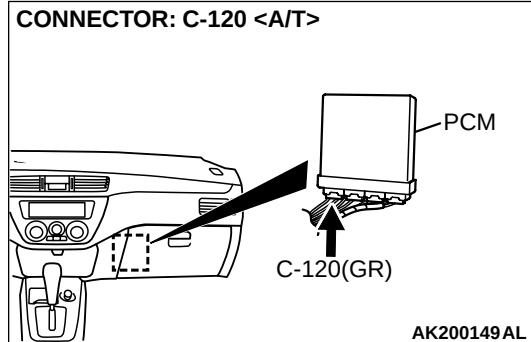
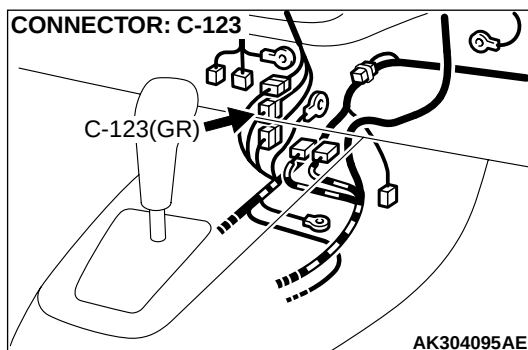
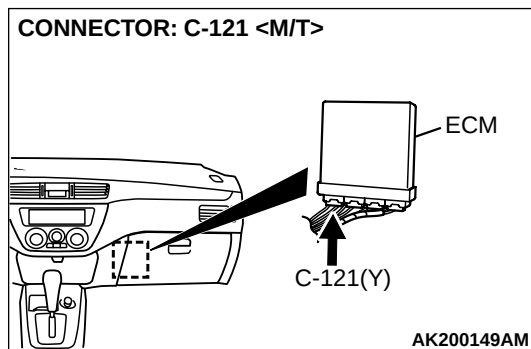
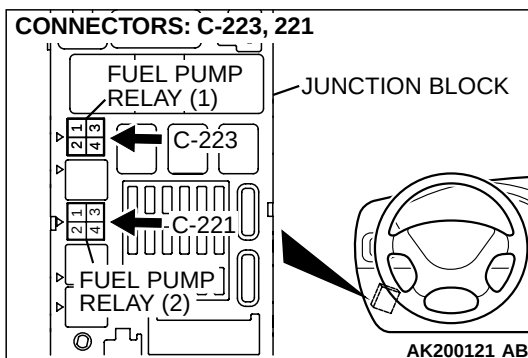
- YES :** Replace the ECM or PCM. Then confirm that the malfunction symptom is eliminated.
- NO :** Check connector C-105 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connector is in good condition, repair harness wire between MFI relay connector B-12X (terminal No. 4) and ECM connector C-121 (terminals No. 12, No. 25) <M/T> or PCM connector C-118 (terminals No. 41, No. 47) <A/T> because of open circuit. Then confirm that the malfunction symptom is eliminated.

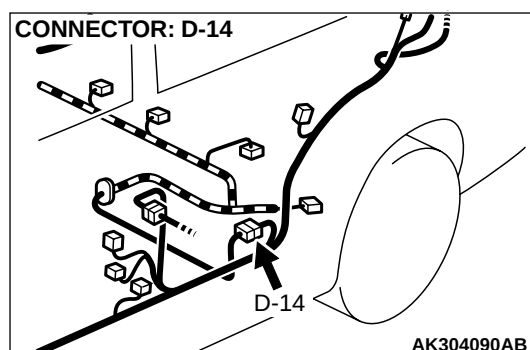
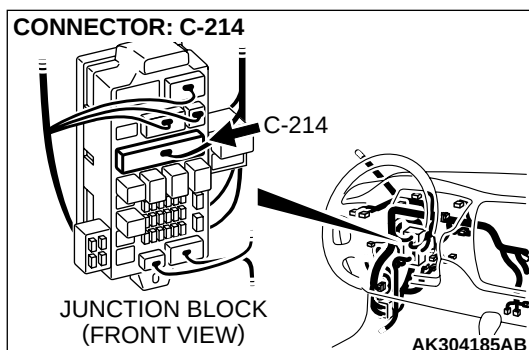
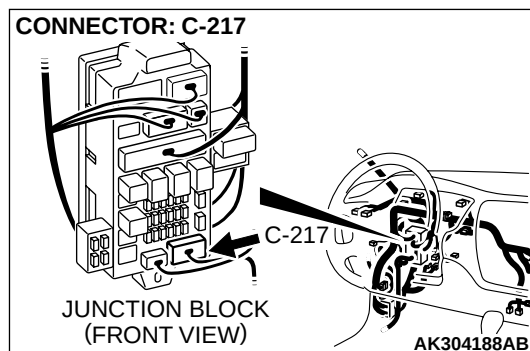
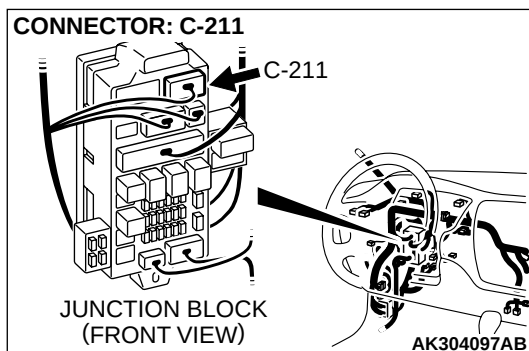
INSPECTION PROCEDURE 30: Fuel pump system.

Fuel Pump Circuit



AK304193





CIRCUIT OPERATION

- Battery positive voltage is applied to the fuel pump relay 1 (terminal No. 3) from the ignition switch-IG.
Ground is provided through terminal No. 2 to chassis ground.
- When the ignition switch is turned to the "ON" position, the battery positive voltage is applied to the fuel pump relay 2 (terminal No. 1) from the fuel pump relay 1 (terminal No. 1).
- A battery positive voltage is applied on the fuel pump relay 2 (terminal No. 3) from the ignition switch-IG.

- During cranking and while the engine is running, the ECM <M/T> or PCM <A/T> turns the power transistor in the ECM <M/T> or PCM <A/T> ON to ground the fuel pump relay 2 coil. With this, the fuel pump relay turns ON, and the battery positive voltage is supplied to the fuel pump from the fuel pump relay 2 (terminal No. 4).

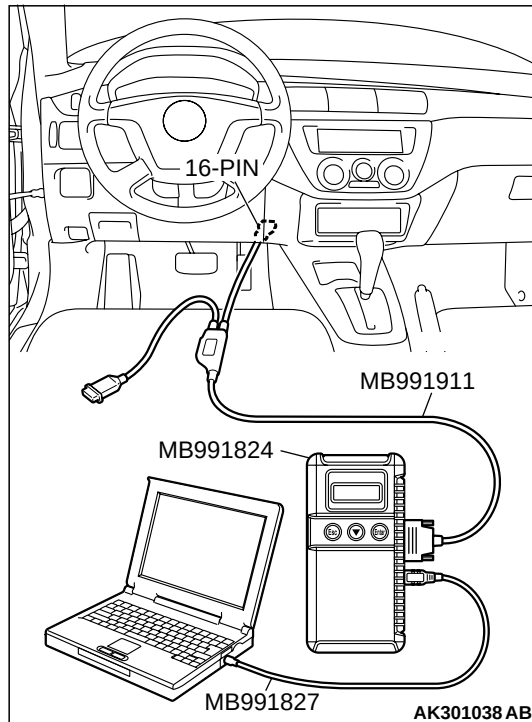
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Malfunction of the fuel pump relay.
- Malfunction of the fuel pump.
- Improper connector contact, open or short-circuited harness wire.
- Malfunction of the ECM <M/T> or PCM <A/T>.

DIAGNOSIS

Required Special Tools:

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



STEP 1. Using scan tool MB991958, check actuator test item 07: Fuel Pump.

⚠ CAUTION

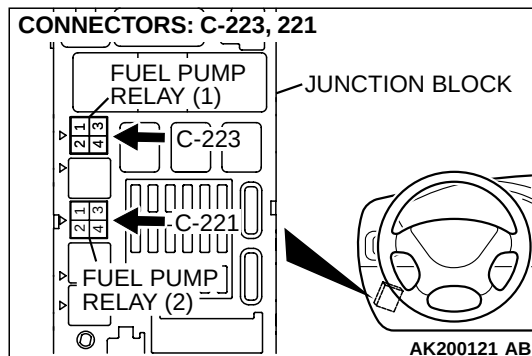
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the actuator test mode for item 07, Fuel Pump.
 - An operation sound of the fuel pump should be heard.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the fuel pump operating properly?

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

NO : Go to Step 2.



STEP 2. Check harness connector C-223 at fuel pump relay 1 and harness connector C-221 at fuel pump relay 2 for damage.

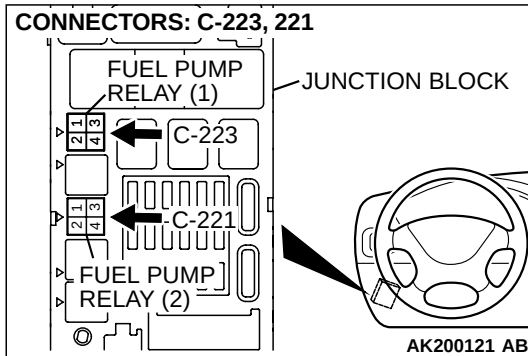
Q: Is the harness connector in good condition?

YES : Go to Step 3.

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

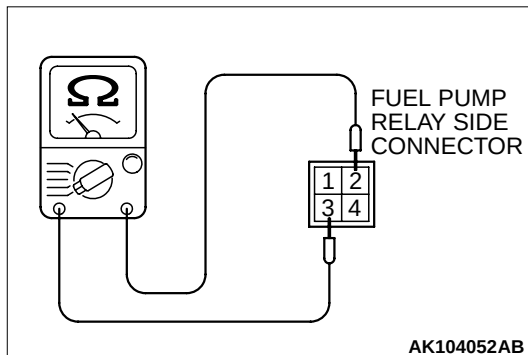
STEP 3. Check the fuel pump relay 1 and 2.

(1) Remove the fuel pump relay.



(2) Check for continuity between the fuel pump relay terminals No. 2 and No. 3.

- There should be continuity. (approximately 70 ohms)



(3) Use jumper wires to connect fuel pump relay terminal No. 3 to the positive battery terminal and terminal No. 2 to the negative battery terminal.

(4) Check for continuity between the fuel pump relay terminals No. 1 and No. 4 while connecting and disconnecting the jumper wire at the negative battery terminal.

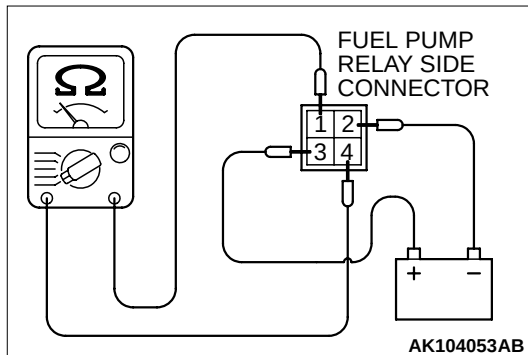
- Should be less than 2 ohms. (Negative battery terminal connected)
- Should be open loop. (Negative battery terminal disconnected)

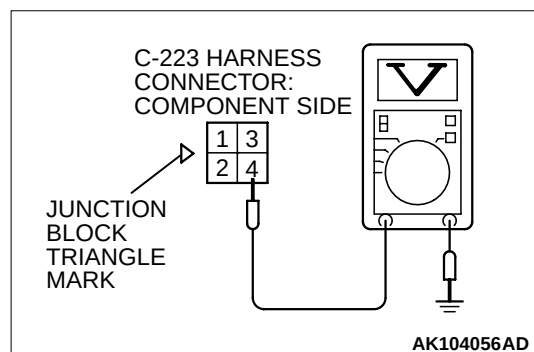
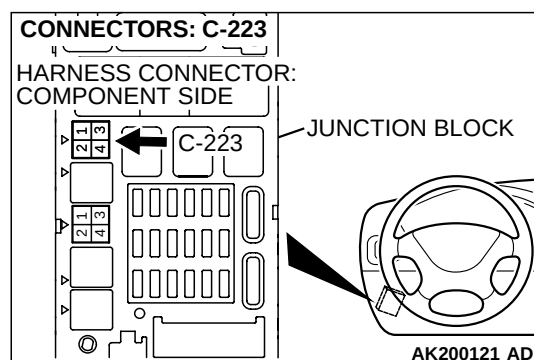
(5) Install the fuel pump relay.

Q: Is the resistance normal?

YES : Go to Step 4.

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





STEP 4. Measure the power supply voltage at fuel pump relay 1 harness side connector C-223.

(1) Disconnect the connector C-223 and measure at the harness side.

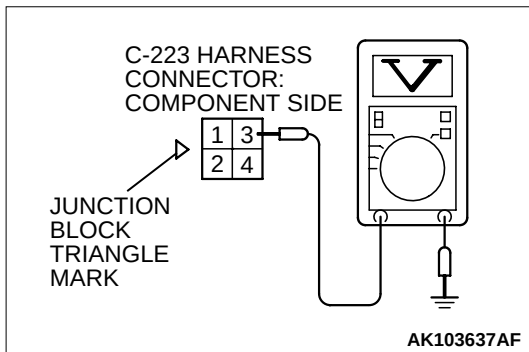
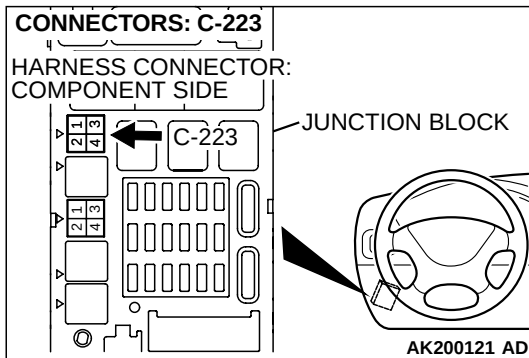
(2) Measure the voltage between terminal No. 4 and ground.

- Voltage should be battery positive voltage.

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

YES : Go to Step 5.

NO : Check harness connectors C-129 and C-210 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 dedicated fuse (15) and fuel pump relay 1 connector C-223 (terminal No. 4) because of open circuit. Then confirm that the malfunction symptom is eliminated.



STEP 5. Measure the power supply voltage at fuel pump relay 1 harness side connector C-223.

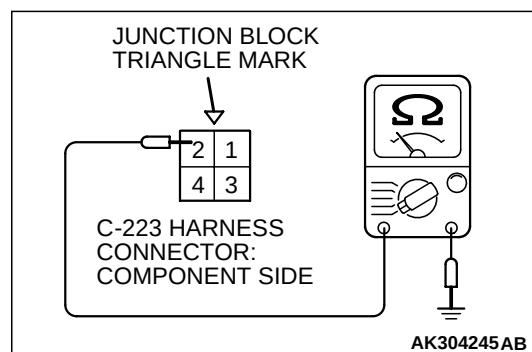
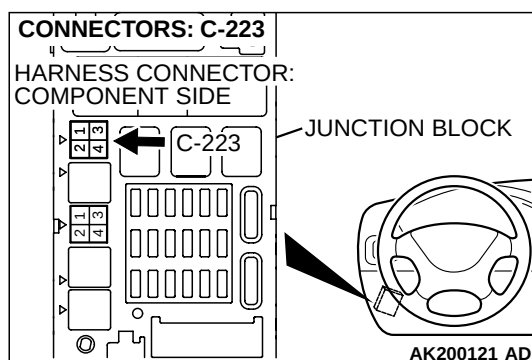
- (1) Disconnect the connector C-223 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

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

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

YES : Go to Step 6.

NO : Check harness connector 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 connector is in good condition, repair harness wire between ignition switch connector C-208 (terminal No. 2) and fuel pump relay 1 connector C-223 (terminal No. 3) because of open circuit. Then confirm that the malfunction symptom is eliminated.

**STEP 6. Check for continuity at fuel pump relay 1 harness side connector C-223.**

(1) Disconnect the connector C-223 and measure at the harness side.

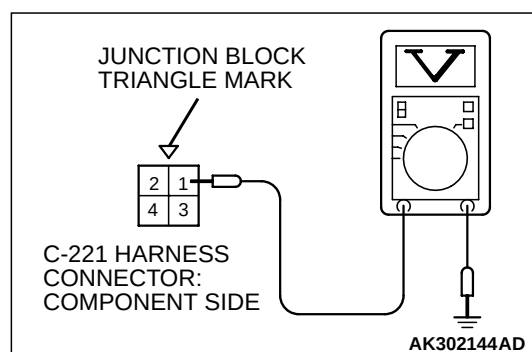
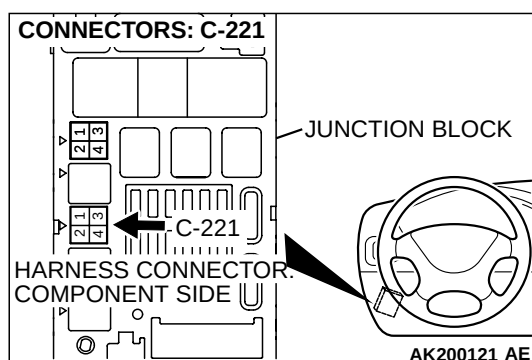
(2) Check for the continuity between terminal No. 2 and ground.

- Should be less than 2 ohms.

Q: Does continuity exist?

YES : Go to Step 7.

NO : Check harness connector 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 fuel pump relay 1 connector C-223 (terminal No. 2) and ground because of open circuit. Then confirm that the malfunction symptom is eliminated.

**STEP 7. Measure the power supply voltage at fuel pump relay 2 harness side connector C-221.**

(1) Disconnect the connector C-221 and measure at the harness side.

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

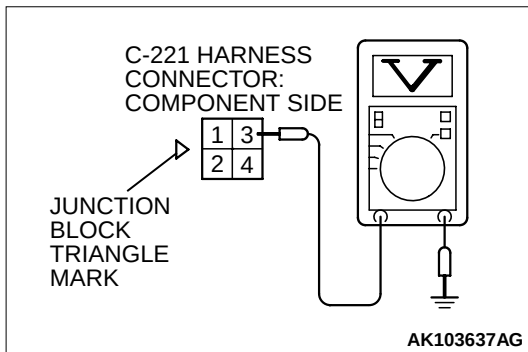
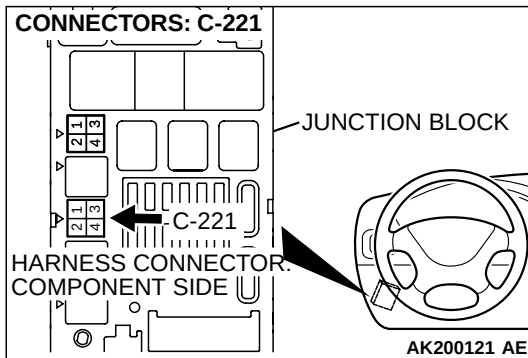
(3) Measure the voltage between terminal No. 1 and ground.

- Voltage should be battery positive voltage.

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

YES : Go to Step 8.

NO : Repair harness wire between fuel pump relay 1 connector C-223 (terminal No. 1) and fuel pump relay 2 connector C-221 (terminal No. 1) because of open circuit. Then confirm that the malfunction symptom is eliminated.



STEP 8. Measure the power supply voltage at fuel pump relay 2 harness side connector C-221.

- (1) Disconnect the connector C-221 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

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

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

YES : Go to Step 9.

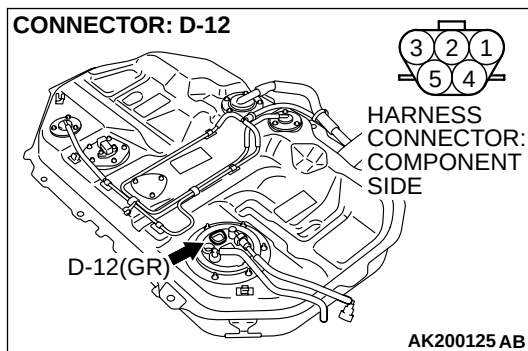
NO : Check harness connector C-211 at intermediate connector for damage, and repair or replace as required. Refer to, GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connector is in good condition, repair harness wire between ignition switch connector C-208 (terminal No. 2) and fuel pump relay 2 connector C-221 (terminal No. 3) because of open circuit. Then confirm that the malfunction symptom is eliminated.

STEP 9. Check harness connector D-12 at fuel pump for damage.

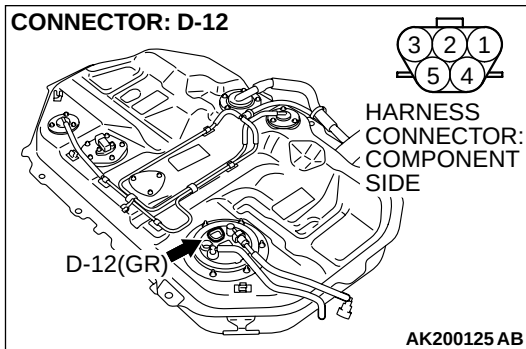
Q: Is the harness connector in good condition?

YES : Go to Step 10.

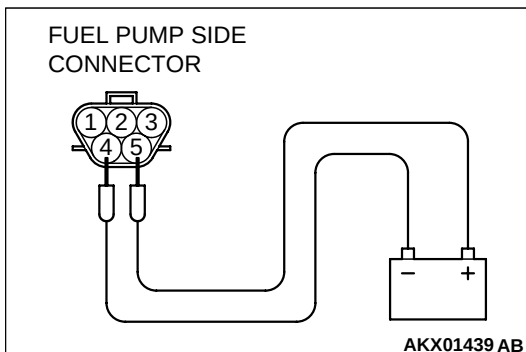
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then confirm that the malfunction symptom is eliminated.



CONNECTOR: D-12



FUEL PUMP SIDE CONNECTOR

**STEP 10. Check the fuel pump operation.**

(1) Disconnect fuel pump connector D-12.

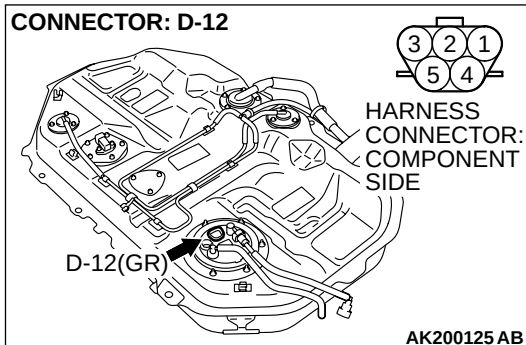
(2) Use jumper wires to connect fuel pump connector terminal No. 5 to the positive battery terminal and terminal No. 4 to the negative battery terminal.

- An operating sound of the fuel pump should be heard.

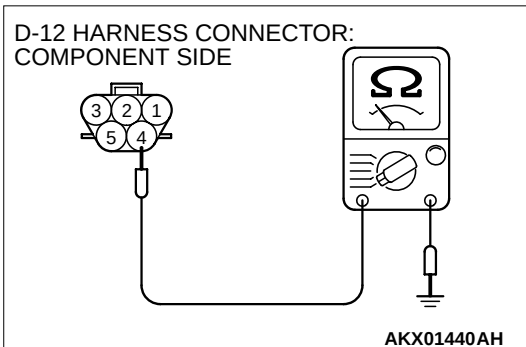
Q: Is the fuel pump operating properly?**YES :** Go to Step 11.**NO :** Replace the fuel pump. Then confirm that the malfunction symptom is eliminated.**STEP 11. Check for continuity at fuel pump harness side connector D-12.**

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

CONNECTOR: D-12



D-12 HARNESS CONNECTOR: COMPONENT SIDE

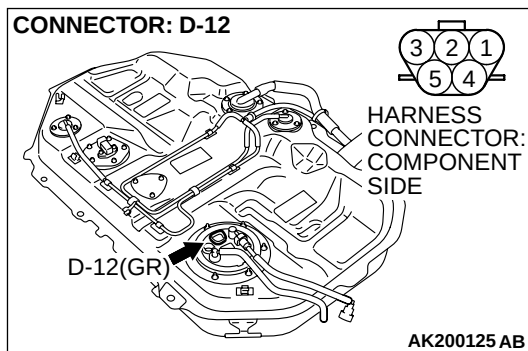
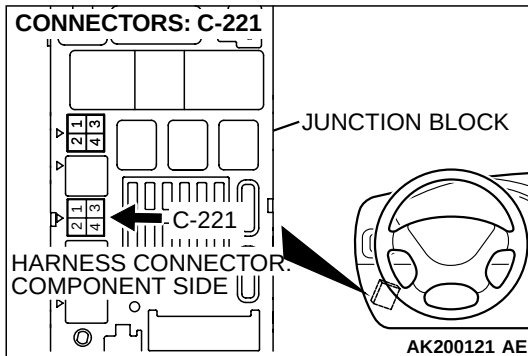


(2) Check for the continuity between terminal No. 4 and ground.

- Should be less than 2 ohms.

Q: Does continuity exist?**YES :** Go to Step 12.**NO :** Check harness connector D-14 at intermediate connector for damage, and repair or replace as required. Refer to, GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connector is in good condition, repair harness wire damage between fuel pump connector D-12 (terminal No. 4) and ground because of open circuit or harness damage. Then confirm that the malfunction symptom is eliminated.

STEP 12. Check for open circuit and short circuit to ground and harness damage between fuel pump relay 2 connector C-221 (terminal No. 4) and fuel pump connector D-12 (terminal No. 5).



NOTE: Check harness after checking intermediate connectors C-217 and D-14. If intermediate connectors are damaged, repair or replace them. After 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 : Go to Step 13.

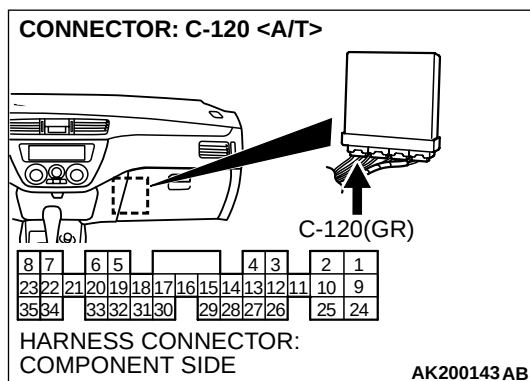
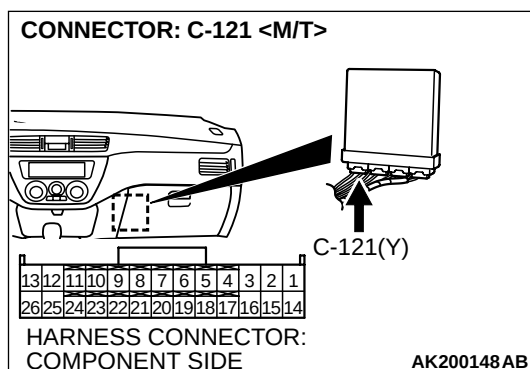
NO : Repair it. Then confirm that the malfunction symptom is eliminated.

STEP 13. Check harness connector C-121 at ECM <M/T> or harness connector C-120 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

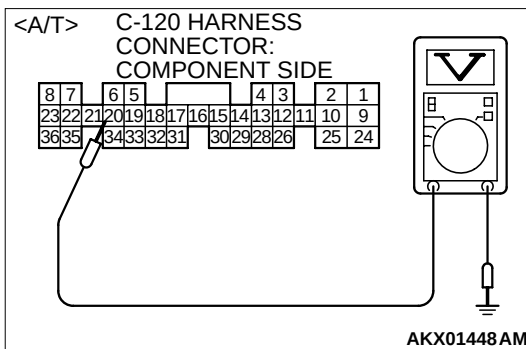
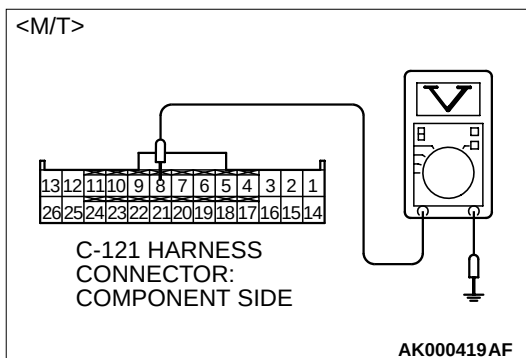
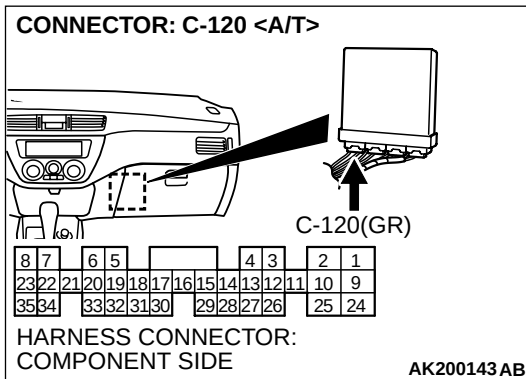
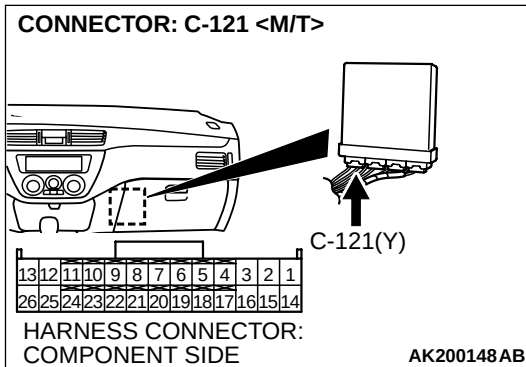
YES : Go to Step 14.

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



STEP 14. Measure the power supply voltage at ECM connector C-121 <M/T> or PCM connector C-120 <A/T>.

- (1) Disconnect the connector C-121 <M/T> or C-120 <A/T> and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.



- (3) Measure the voltage between terminal No. 8 <M/T> or No. 20 <A/T> and ground.

- Voltage should be battery positive voltage.

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

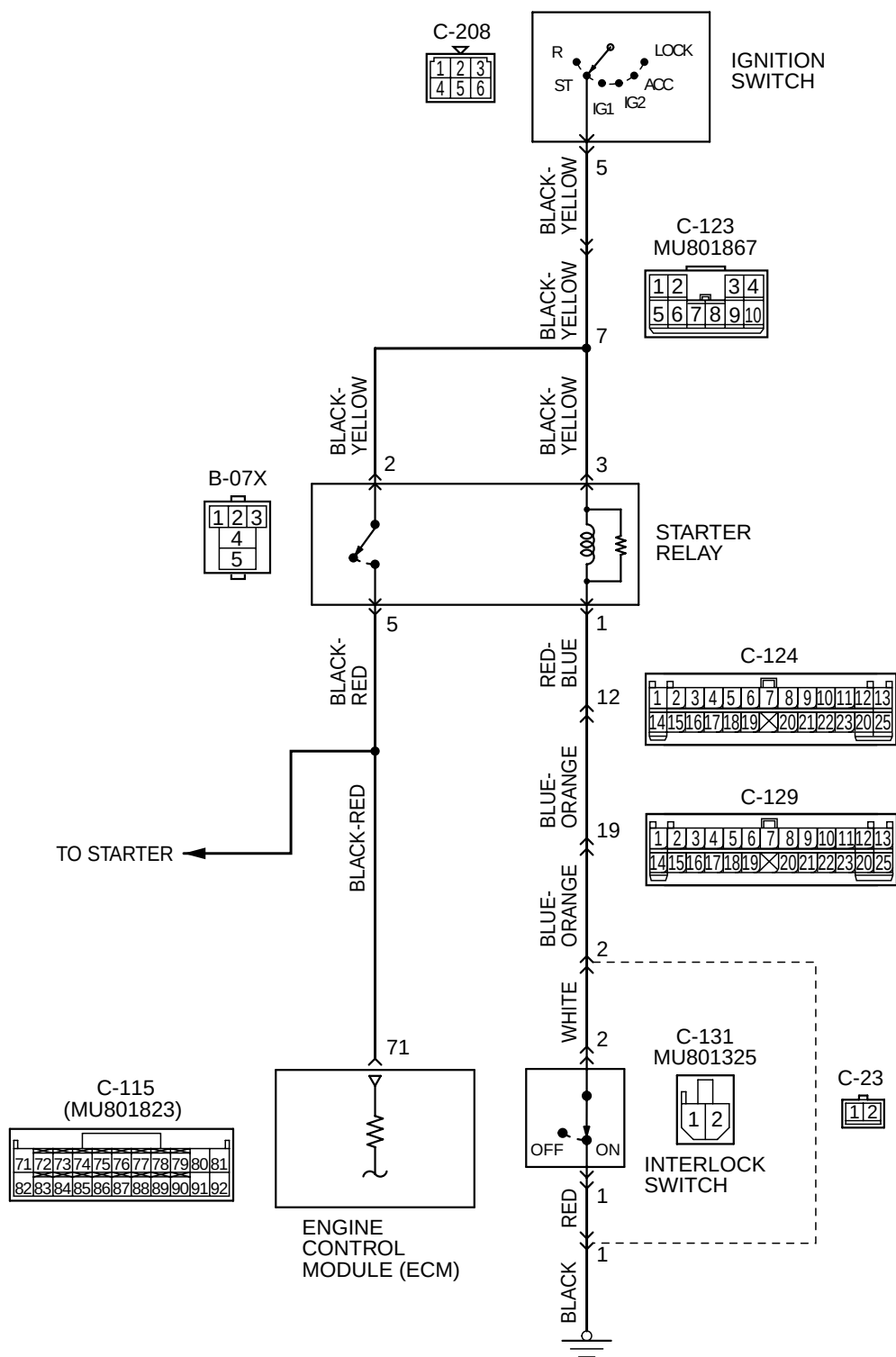
Q: Is battery positive voltage (approximately 12 volts) present?

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

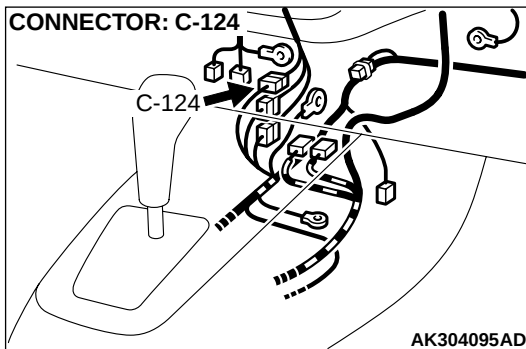
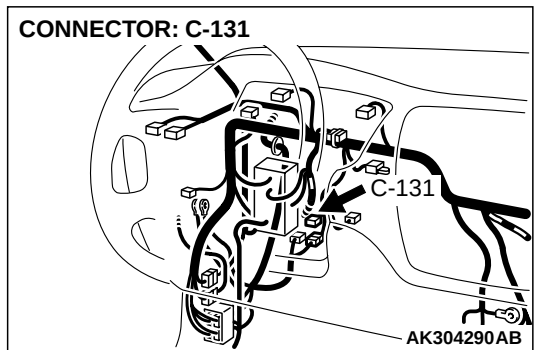
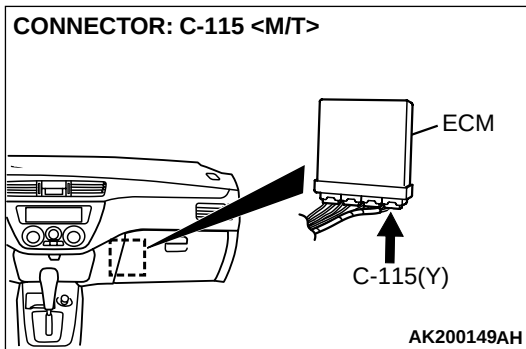
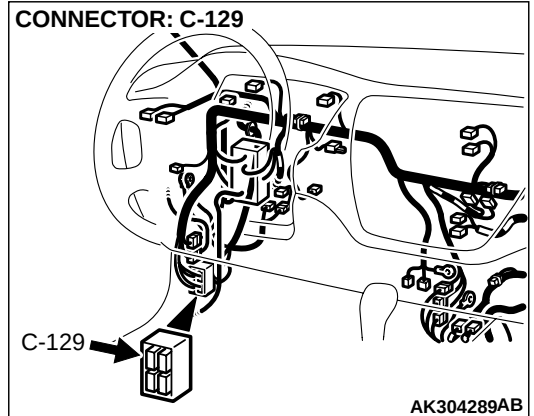
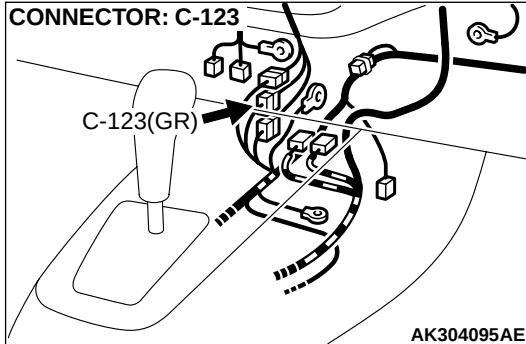
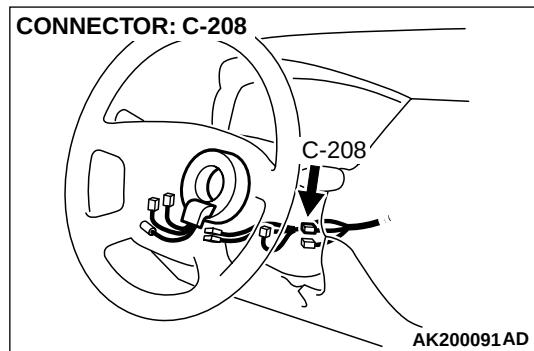
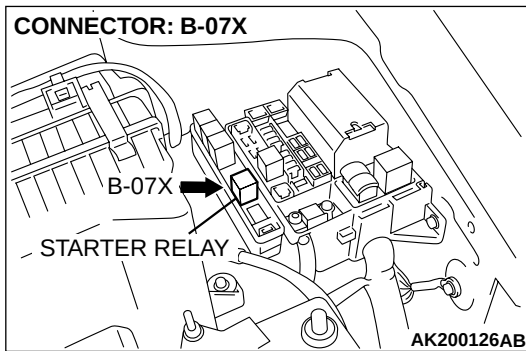
NO : Check harness connectors C-123 and C-214 at intermediate connector for damage, and repair or replace as required. Refer to, GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connectors are in good condition, repair harness wire between fuel pump relay 2 connector C-221 (terminal No. 2) and ECM connector C-121 (terminal No. 8) <M/T> or PCM connector C-120 (terminal No. 20) <A/T> because of open circuit. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 31: Ignition Switch-ST System <M/T>

Ignition Switch-ST Circuit



AK304194

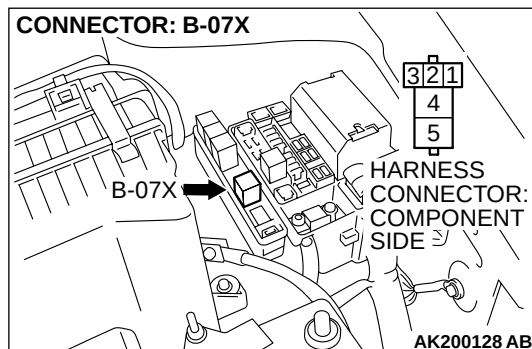


CIRCUIT OPERATION

- The battery positive voltage is supplied to the ECM (terminal No. 71) via the starter relay during engine cranking. With this, the ECM detects that the engine is being cranked.

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

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

DIAGNOSIS

STEP 1. Check harness connector B-07X at starter 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.

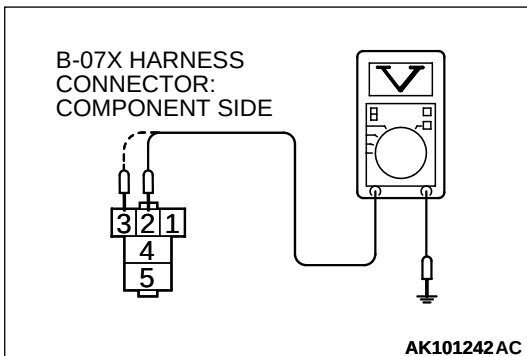
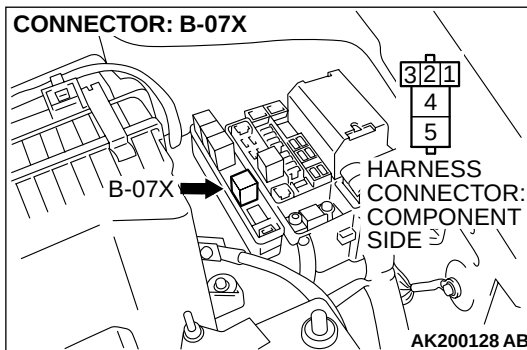
STEP 2. Check the starter relay.

Refer to GROUP 16, Starting system – On-vehicle Service – Starter relay check [P.16-26](#)

Q: Are there any abnormalities?

YES : Go to Step 3.

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



STEP 3. Measure the power supply voltage at starter relay connector B-07X.

- (1) Disconnect the connector B-07X and measure at the harness side.
- (2) Turn the ignition switch to the "START" position.

- (3) Measure the voltage between terminals No. 2, No. 3 and ground.

- Voltage should be battery positive voltage.

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

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

YES : Go to Step 4.

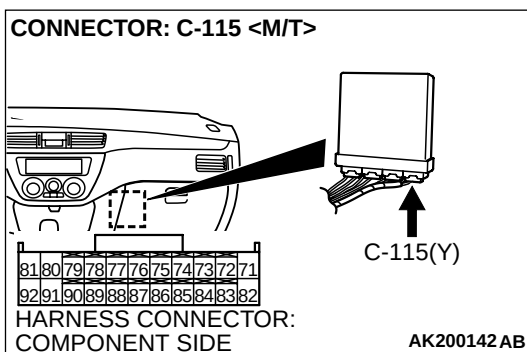
NO : Check connector C-123 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connector is in good condition, repair harness wire between ignition switch connector C-208 (terminal No. 5) and starter relay connector B-07X (terminals No. 2, No. 3) because of open circuit. Then confirm that the malfunction symptom is eliminated.

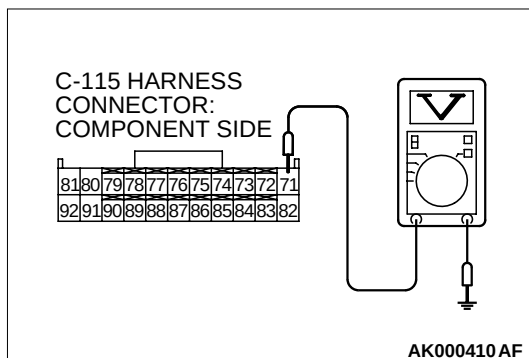
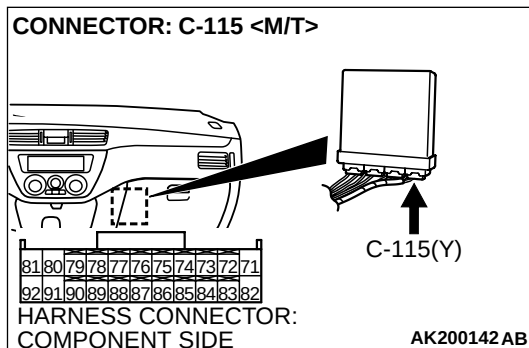
STEP 4. Check harness connector C-115 at ECM for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 5.

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



**STEP 5. Measure the power supply voltage at ECM connector C-115.**

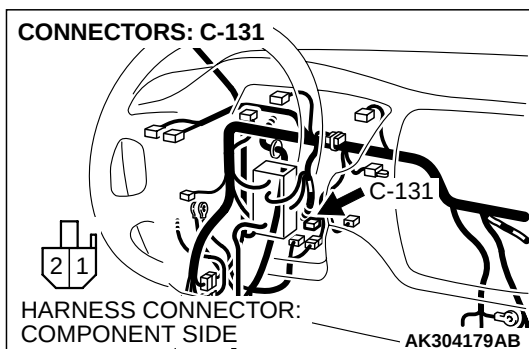
- (1) Disconnect the connector C-115 and measure at the harness side.
- (2) Turn the ignition switch to the "START" position.

- (3) Measure the voltage between terminal No. 71 and ground.
 - Voltage should be battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

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

YES : Go to Step 6.

NO : Repair harness wire between starter relay connector B-07X (terminal No. 5) and ECM connector C-115 (terminal No. 71) because of open circuit. Then confirm that the malfunction symptom is eliminated.

**STEP 6. Check harness connector C-131 at interlock switch 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.

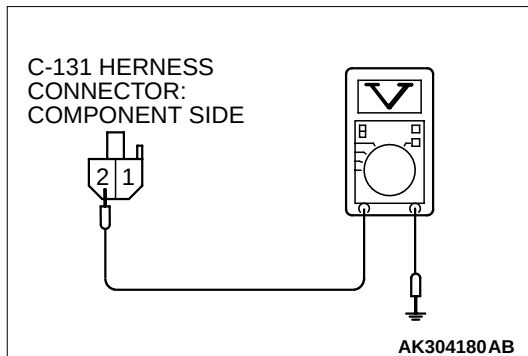
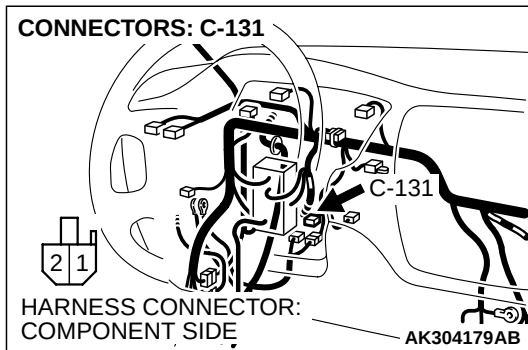
STEP 7. Check the interlock switch.

Refer to GROUP 21A, On-vehicle Service – Interlock switch check and adjustment [P.21A-11](#).

Q: Are there any abnormalities?

YES : Go to Step 8.

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



STEP 8. Measure the power supply voltage at interlock switch connector C-131.

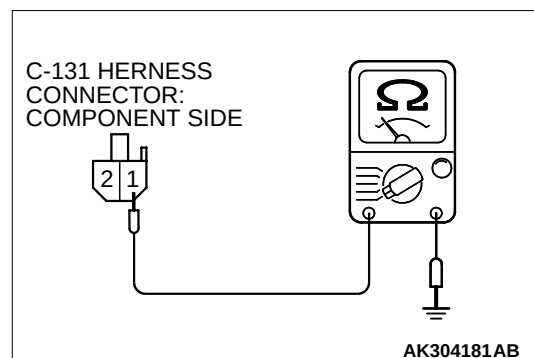
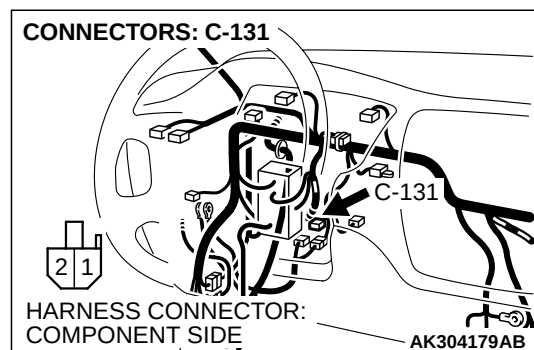
- (1) Disconnect the connector C-131 and measure at the harness side.
- (2) Turn the ignition switch to the "START" position.

- (3) Measure the voltage between terminal No. 2 and ground.
 - Voltage should be battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

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

YES : Go to Step 9.

NO : Check connectors C-23, C-124 and C-129 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 starter relay connector B-07X (terminal No. 1) and interlock switch connector C-131 (terminal No. 2) because of open circuit. Then confirm that the malfunction symptom is eliminated.

**STEP 9. Check for continuity at interlock switch harness side connector C-131.**

(1) Disconnect the connector C-131 and measure at the harness side.

(2) Check for the continuity between terminal No. 1 and ground.

- Should be less than 2 ohms.

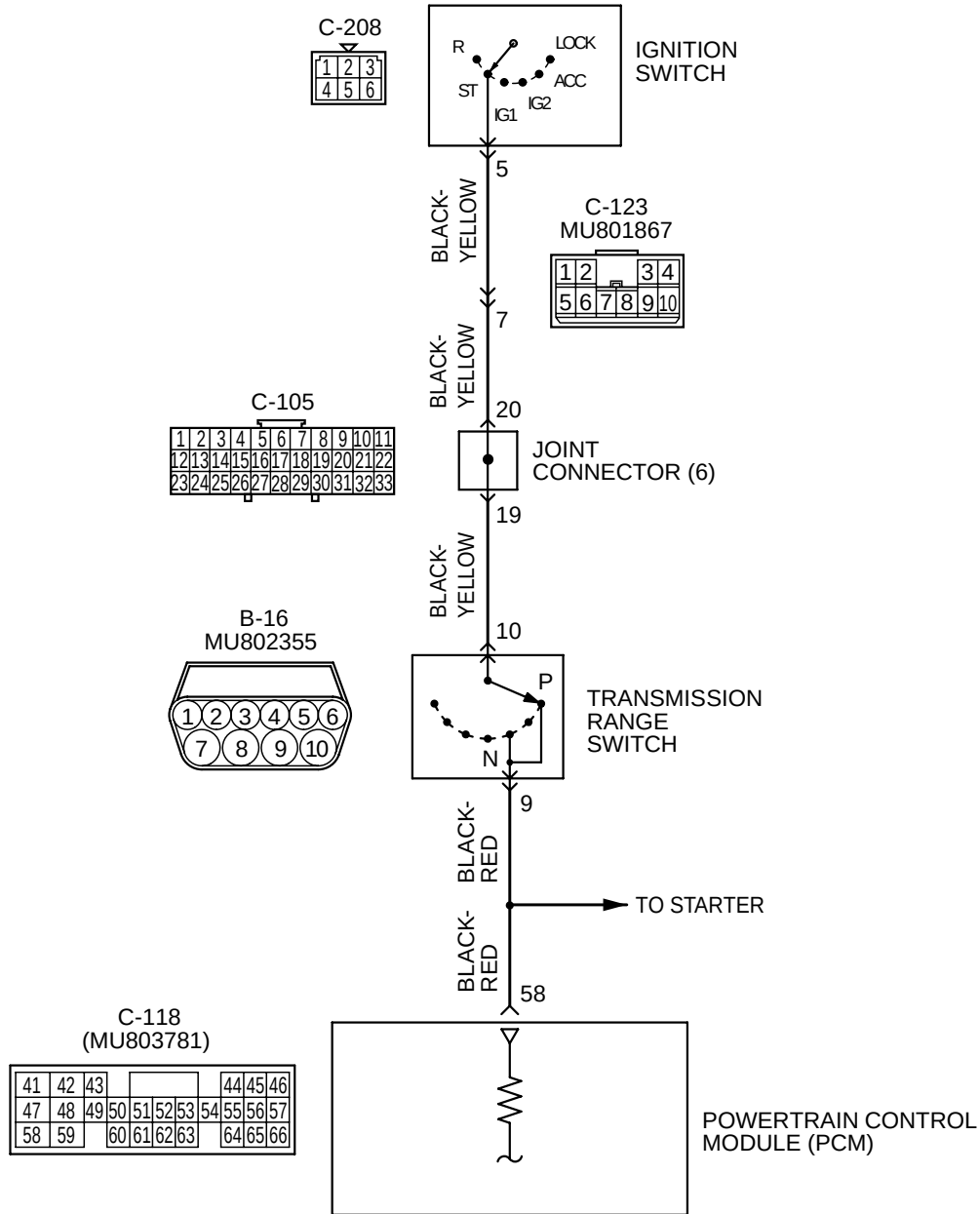
Q: Does continuity exist?

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

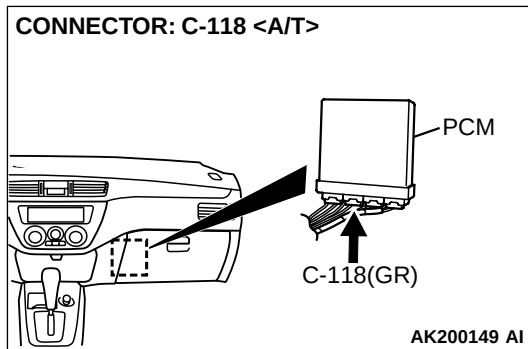
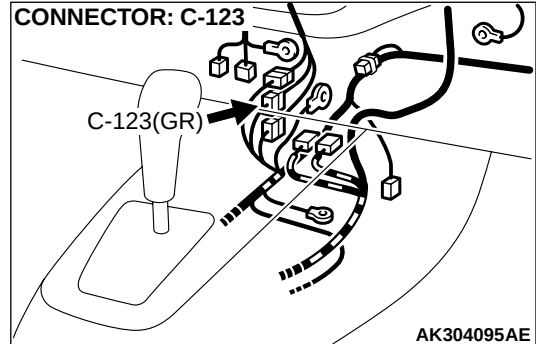
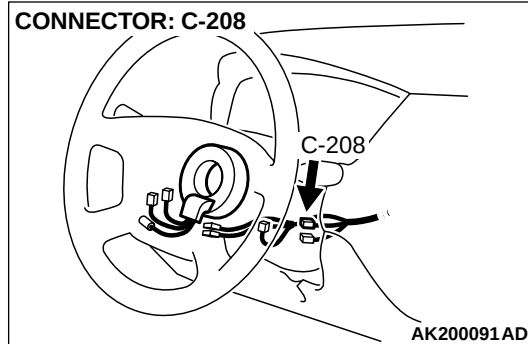
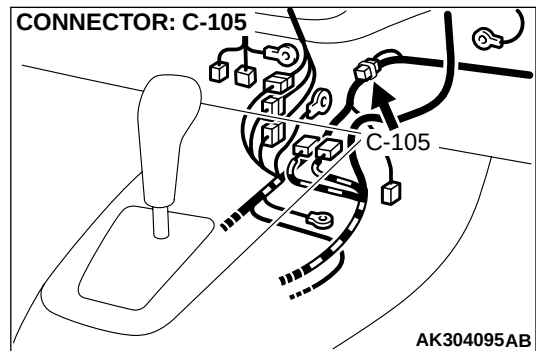
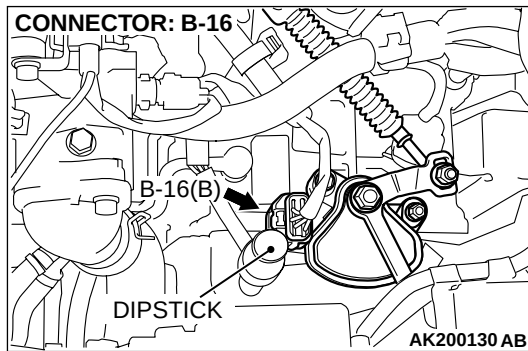
NO : Check connector C-23 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connector is in good condition, repair harness wire between interlock switch connector C-131 (terminal No. 1) and ground because of open circuit or harness damage. Then confirm that the malfunction symptom is eliminated.

**INSPECTION PROCEDURE 32: Ignition Switch – ST System and Transmission Range Switch System
<A/T>**

Ignition Switch-ST and Transmission Range Switch Circuit



AK304195

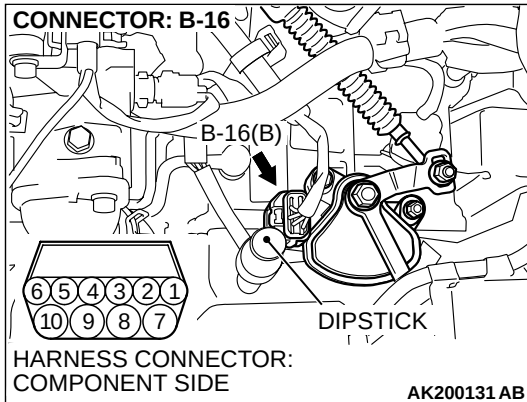
**COMMENT**

- If the selector lever is moved to "P" or "N" range and the ignition switch is turned to "START" position, battery positive voltage is supplied to PCM (terminal No. 58) through the ignition switch and transmission range switch. Because of this, the PCM detects that the engine is cranking.
- The transmission range switch detects the transmission range (P, N or other ranges) and converts it to a voltage signal (high or low). Then the transmission range switch sends that signal to the PCM.

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

- Malfunction of the ignition switch.
- Malfunction of the transmission range switch.
- Improper connector contact, open circuit or short-circuit in the harness wire.
- Malfunction of the PCM.

DIAGNOSIS



STEP 1. Check connector B-16 at transmission range switch 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.

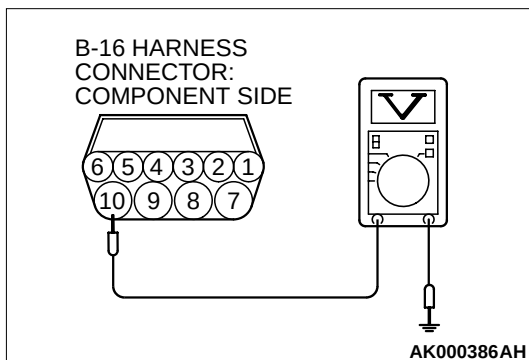
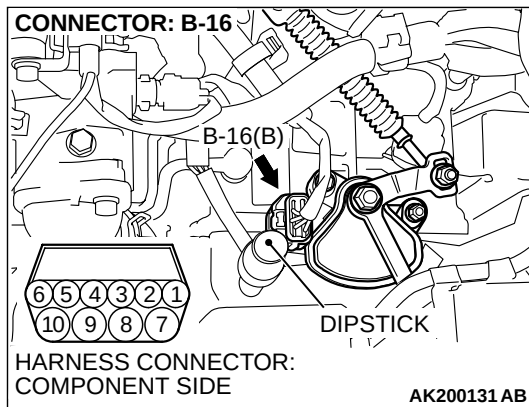
STEP 2. Check the transmission range switch.

Refer to GROUP 23A, On-vehicle Service – Essential Service – Transmission Range Switch Continuity Check [P.23A-339](#).

Q: Are there any abnormalities?

YES : Go to Step 3.

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



STEP 3. Measure the power supply voltage at transmission range switch connector B-16.

- (1) Disconnect the connector B-16 and measure at the harness side.
- (2) Turn the ignition switch to the "START" position.

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

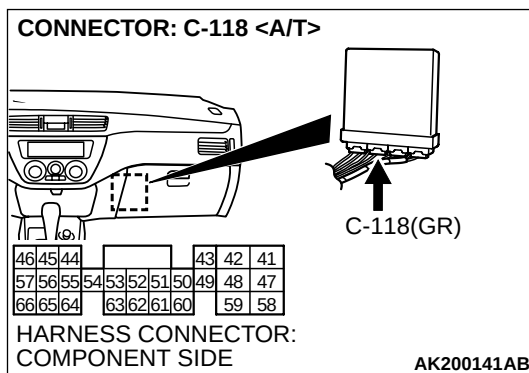
- Voltage should be battery positive voltage.

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

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

YES : Go to Step 4.

NO : Check connector C-105 and C-123 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connector are in good condition, repair harness wire between ignition switch connector C-208 (terminal No. 5) and transmission range switch connector B-16 (terminal No. 10) because of open circuit. Then confirm that the malfunction symptom is eliminated.



STEP 4. Check connector C-118 at PCM for damage.

Q: Is the connector in good condition?

YES : Go to Step 5.

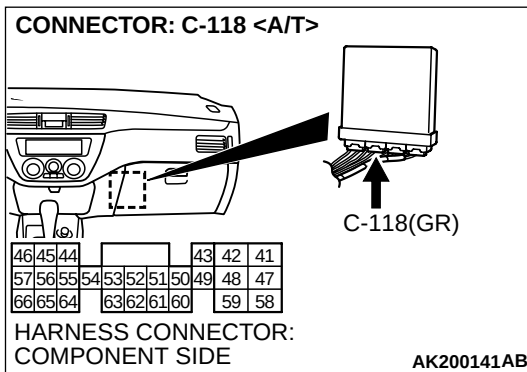
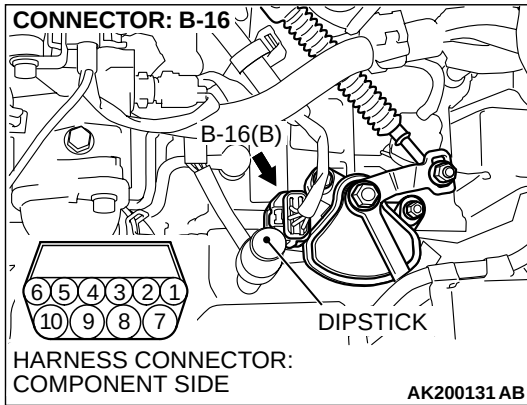
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then confirm that the malfunction symptom is eliminated.

STEP 5. Check for open circuit and short circuit to ground and harness damage between transmission range switch connector B-16 (terminal No. 9) and PCM connector C-118 (terminal No. 58).

Q: Is the harness wire in good condition?

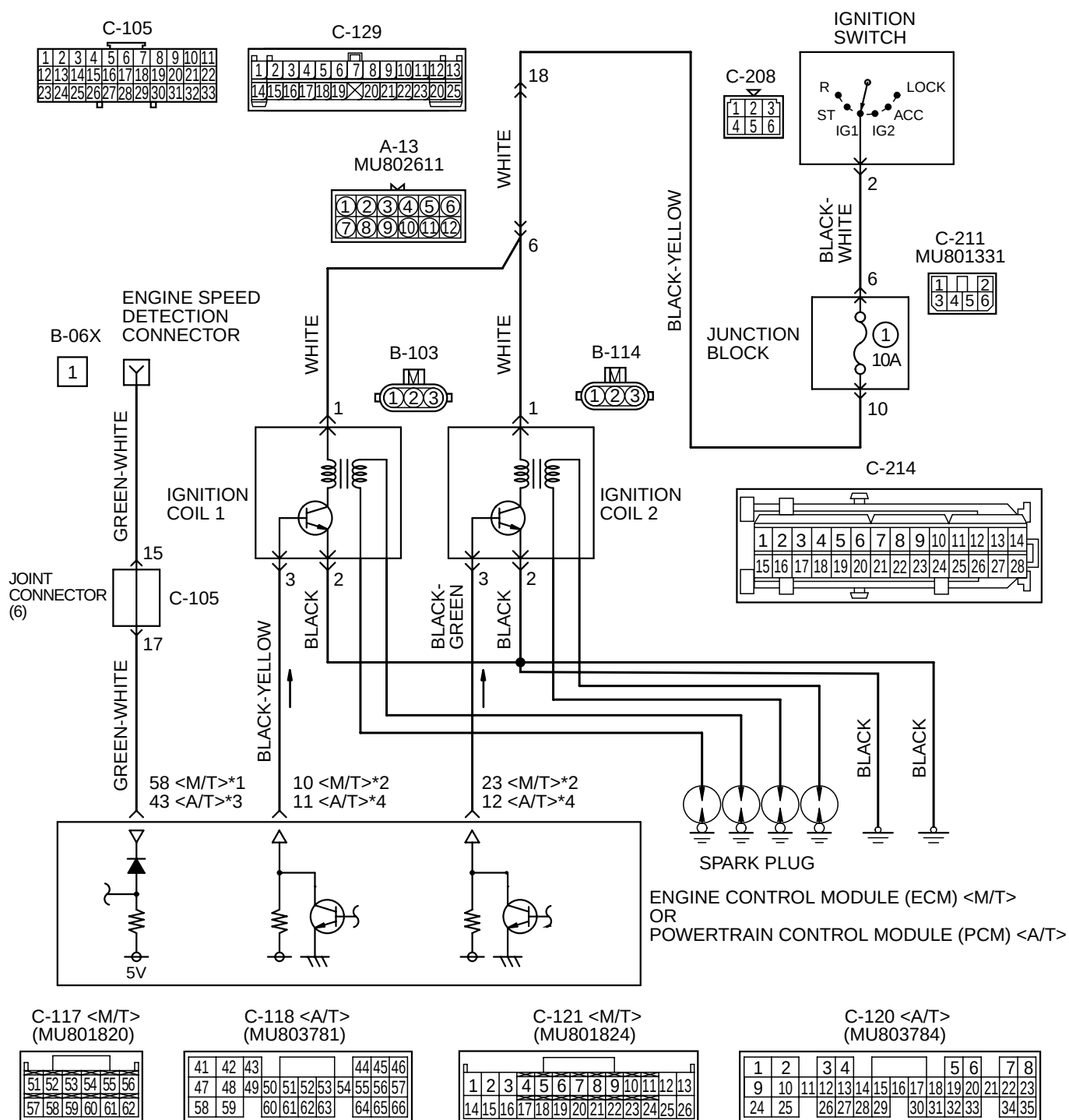
YES : Replace the PCM. Then confirm that the malfunction symptom is eliminated.

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



INSPECTION PROCEDURE 33: Ignition Circuit System

Ignition Circuit



NOTE

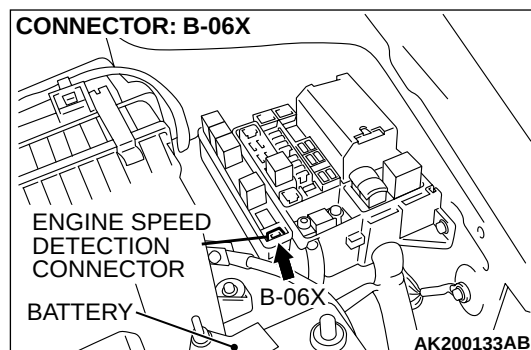
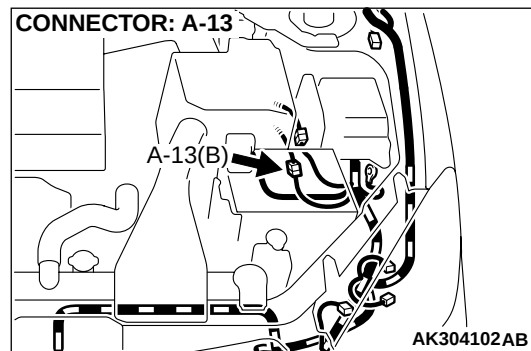
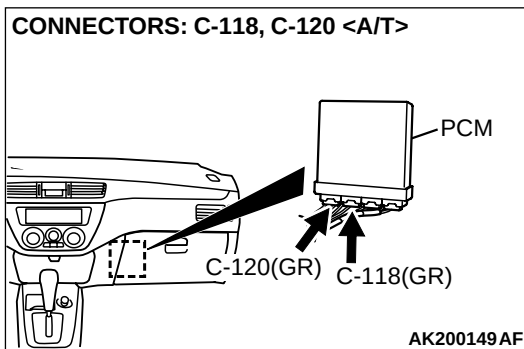
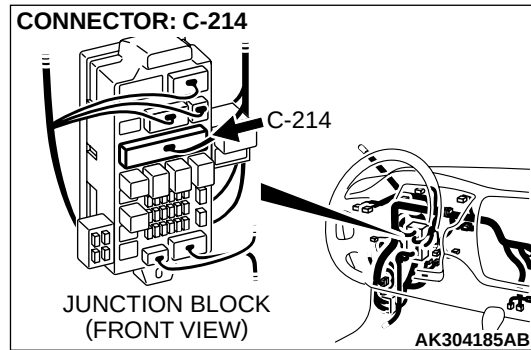
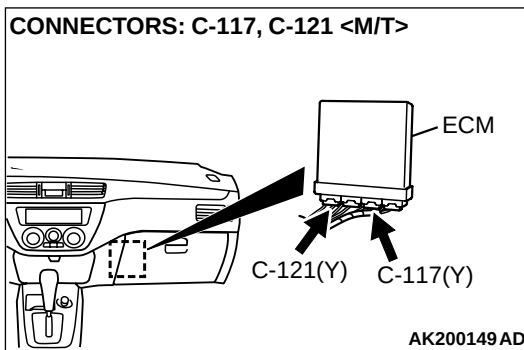
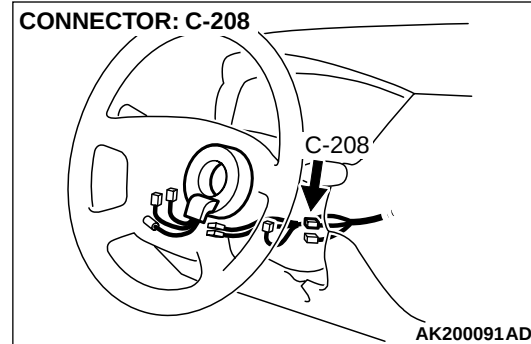
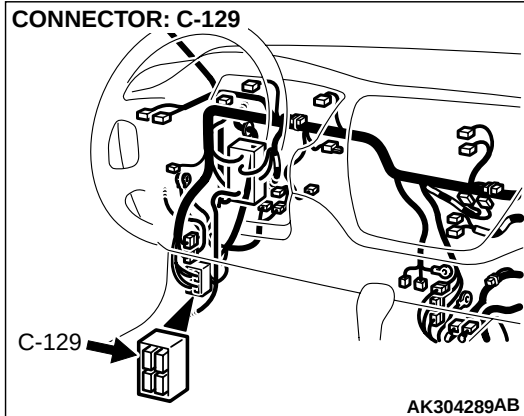
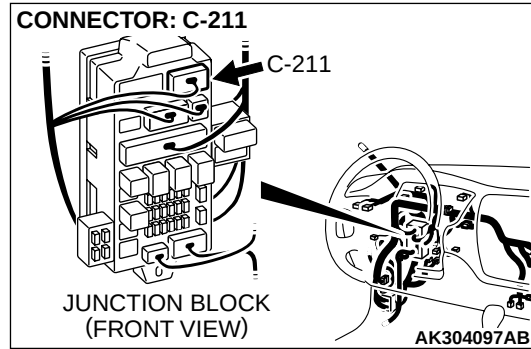
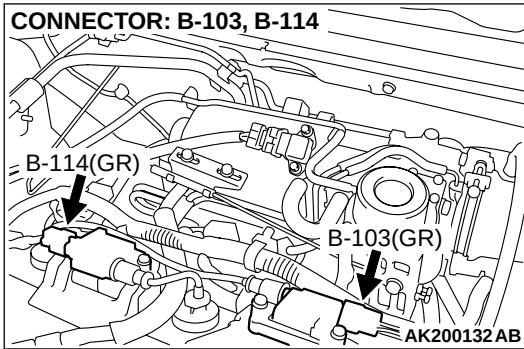
*1: ECM connector C-117 <M/T>

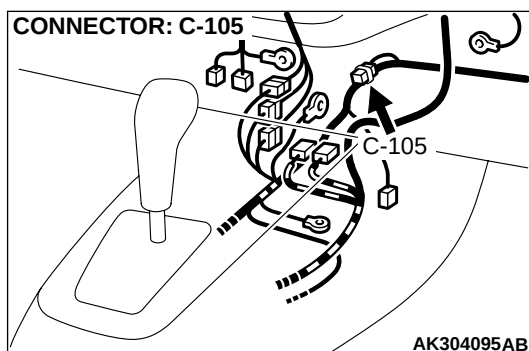
*2: ECM connector C-121 <M/T>

*3: PCM connector C-118 <A/T>

*4: PCM connector C-120 <A/T>

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**CIRCUIT OPERATION**

- The ignition coil is energized by Battery positive voltage from the ignition switch.
- When the ECM <M/T> or PCM <A/T> turns off its internal power transistor, battery positive voltage is applied to the ignition power transistor (terminal No. 3) inside the ignition coil, causing the ignition power transistor to be turned on.

- If the ignition power transistor is turned on, the primary circuit of the ignition coil is energized by grounding the ignition coil through terminal No. 2, causing the primary current to flow to the ignition coil.

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

- Malfunction of the ignition coil.
- Malfunction of the ignition power transistor.
- Improper connector contact, open circuit or short-circuited harness wire.
- Malfunction of the ECM <M/T> or PCM <A/T>.

DIAGNOSIS**STEP 1. Check the ignition coil.**

Refer to GROUP 16, Ignition System – On-vehicle service – Ignition Coil Check [P.16-40](#).

Q: Are there any abnormalities?

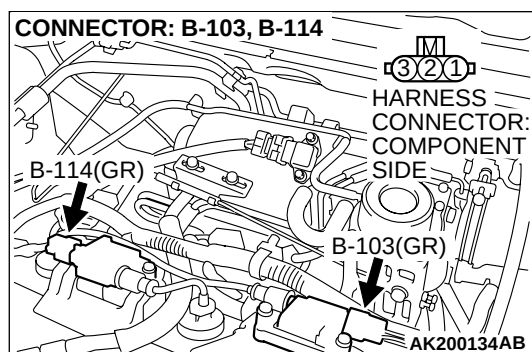
YES : Go to Step 2.

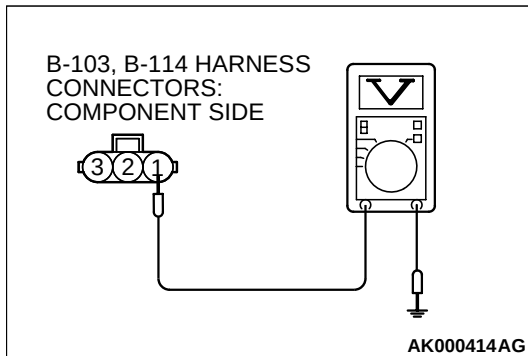
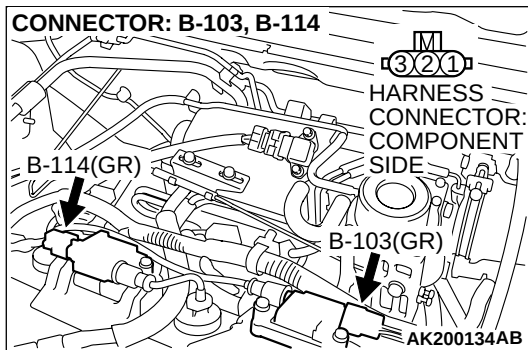
NO : Replace the ignition coil. Then confirm that the malfunction symptom is eliminated.

STEP 2. Check harness connectors B-103, B-114 at ignition coil for damage.**Q: Is the harness connector in good condition?**

YES : Go to Step 3.

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





STEP 3. Measure the power supply voltage at ignition coil connectors B-103, B-114.

- (1) Disconnect the connector B-103, B-114 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

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

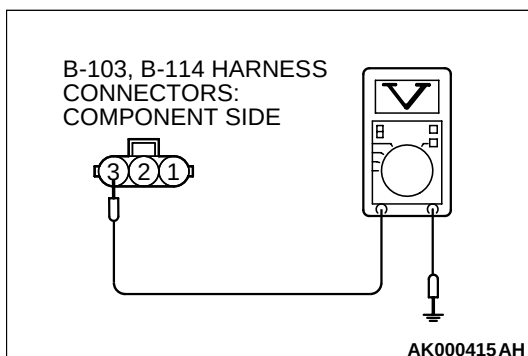
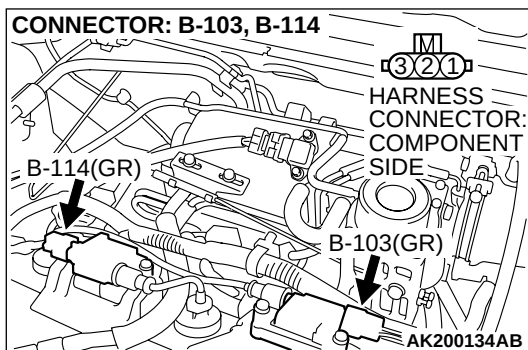
Q: Is battery positive voltage (approximately 12 volts) present?

YES : Go to Step 4.

NO : Check the connectors A-13, C-129, C-211 and C-214 at intermediate connectors for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connector are in good condition, repair harness wire between ignition switch connector C-201 (terminal No. 2) and ignition coil connector B-103, B-114 (terminal No. 1) because of open circuit. Then confirm that the malfunction symptom is eliminated.

STEP 4. Check the circuit at ignition coil harness side connectors B-103, B-114.

- (1) Disconnect the connectors B-103, B-114 and measure at the harness side.
- (2) Engine cranking.



- (3) Measure the voltage between terminal No. 3 and ground.
 - Voltage should measure 0.3 and 3.0 volts.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage between 0.3 and 3.0 volts?

YES : Go to Step 7.

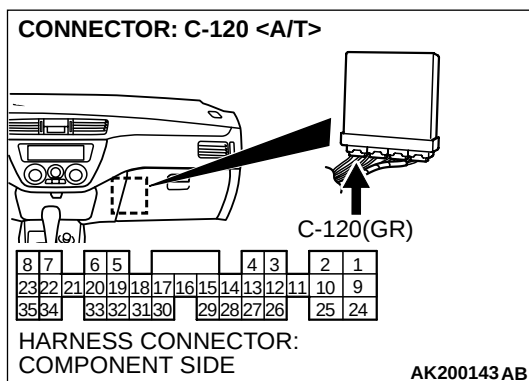
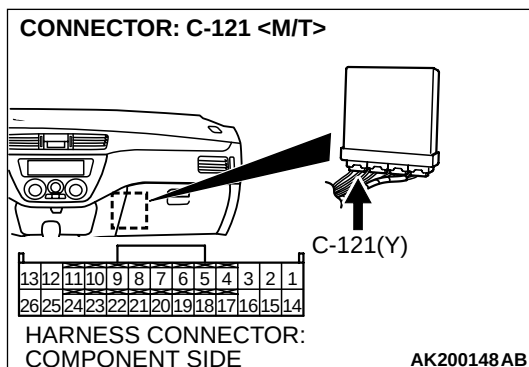
NO : Go to Step 5.

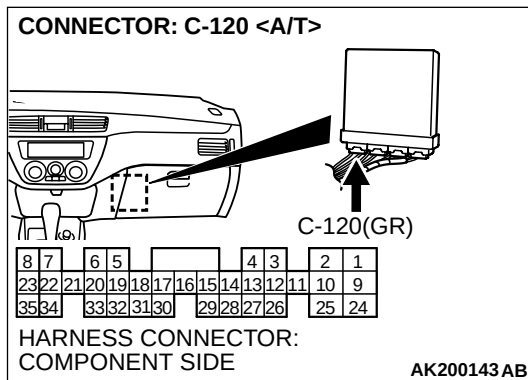
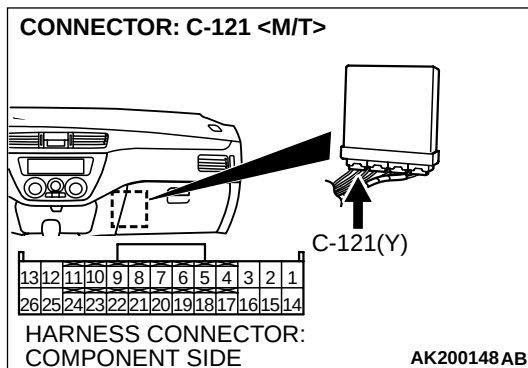
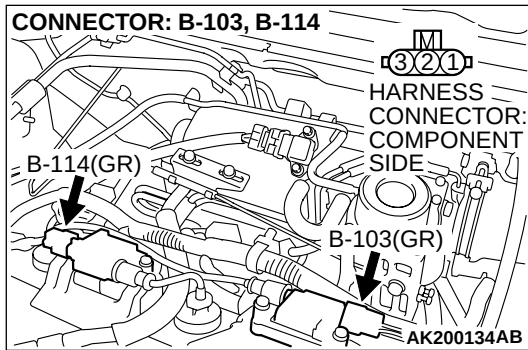
STEP 5. Check harness connector C-121 at ECM <M/T> or connector C-120 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 6.

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





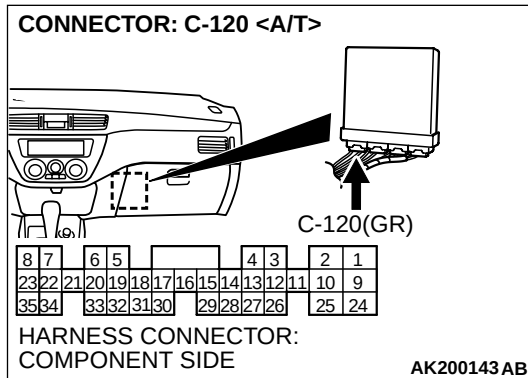
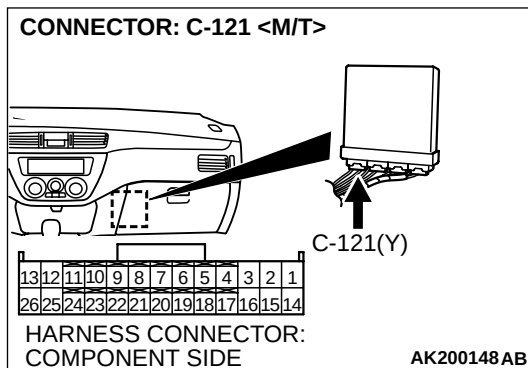
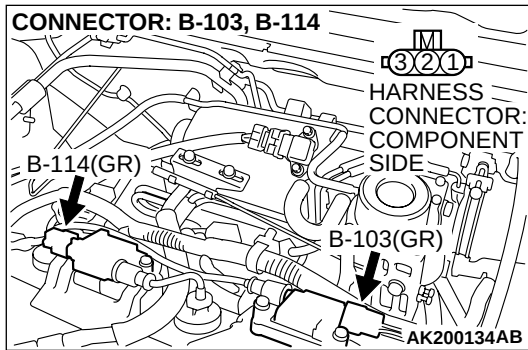
STEP 6. Check for open circuit and short circuit to ground between ignition coil connector and ECM connector <M/T> or PCM connector <A/T>.

- Check the harness wire between ignition coil connector B-103 (terminal No. 3) and ECM connector C-121 (terminal No. 10) <M/T> or PCM connector C-120 (terminal No. 11) <A/T> when checking ignition coil 1.
- Check the harness wire between ignition coil connector B-114 (terminal No. 3) and ECM connector C-121 (terminal No. 23) <M/T> or PCM connector C-120 (terminal No. 12) <A/T> when checking ignition coil 2.

Q: Is the harness wire in good condition?

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

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



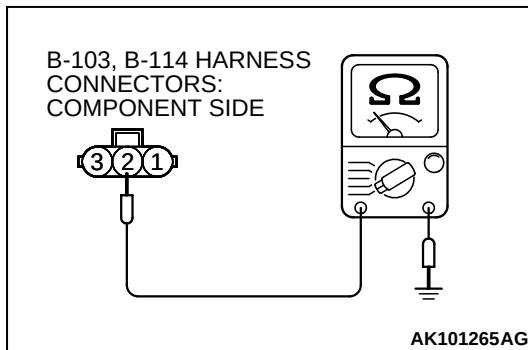
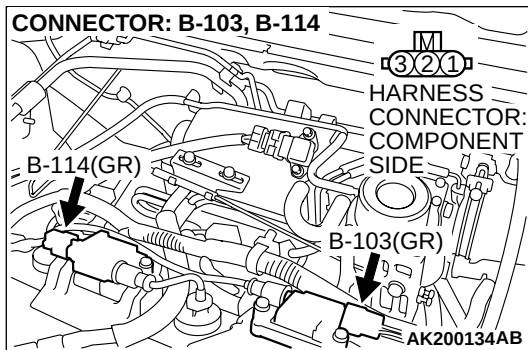
STEP 7. Check for harness damage between ignition coil connector and ECM connector <M/T> or PCM connector <A/T>.

- Check the harness wire between ignition coil connector B-103 (terminal No. 3) and ECM connector C-121 (terminal No. 10) <M/T> or PCM connector C-120 (terminal No. 11) <A/T> when checking ignition coil 1.
- Check the harness wire between ignition coil connector B-114 (terminal No. 3) and ECM connector C-121 (terminal No. 23) <M/T> or PCM connector C-120 (terminal No. 12) <A/T> when checking ignition coil 2.

Q: Is the harness wire in good condition?

YES : Go to Step 8.

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



STEP 8. Check for continuity at ignition coil harness side connectors B-103, B-114.

(1) Disconnect the connectors B-103, B-114 and measure at the harness side.

(2) Check for continuity between terminal No. 2 and ground.
• Should be less than 2 ohms.

Q: Does continuity exist?

YES : Go to Step 9.

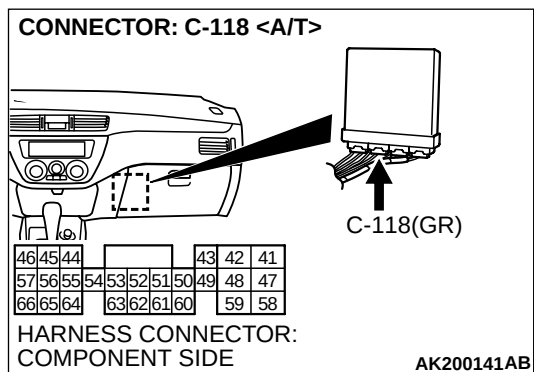
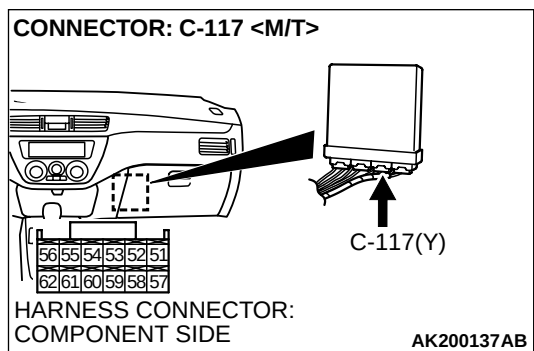
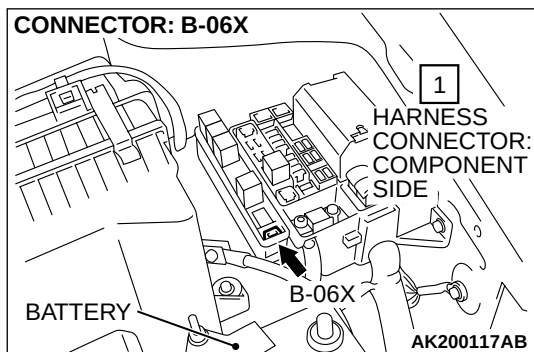
NO : Repair harness wire between ignition coil connectors B-103, B-114 (terminal No. 2) and ground because of open circuit or harness damage. Then confirm that the malfunction symptom is eliminated.

STEP 9. Check harness connector B-06X at engine speed detection and harness connector C-117 at ECM <M/T> or connector C-118 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 10.

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

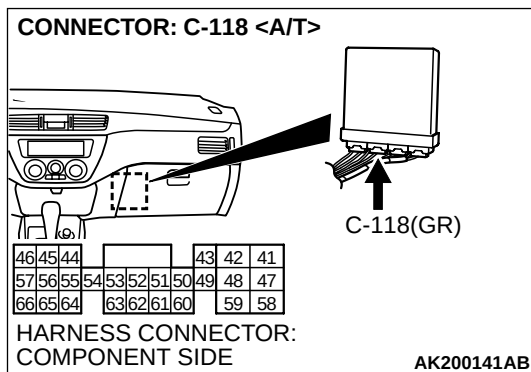
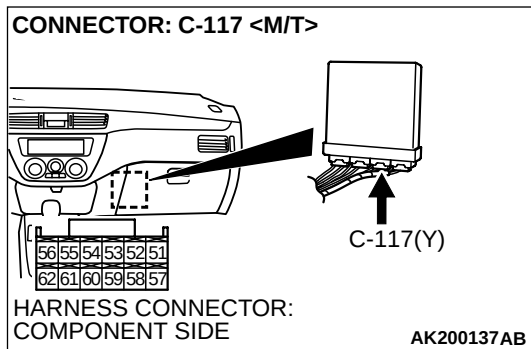
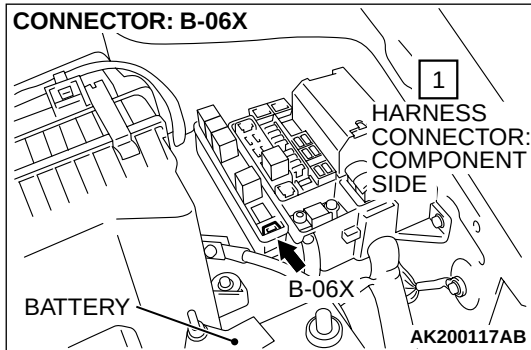


STEP 10. Check for open circuit and short circuit to ground and harness damage between engine speed detection connector B-06X and ECM connector C-117 (terminal No. 58) <M/T> or PCM connector C-118 (terminal No. 43) <A/T>

Q: Is the harness wire in good condition?

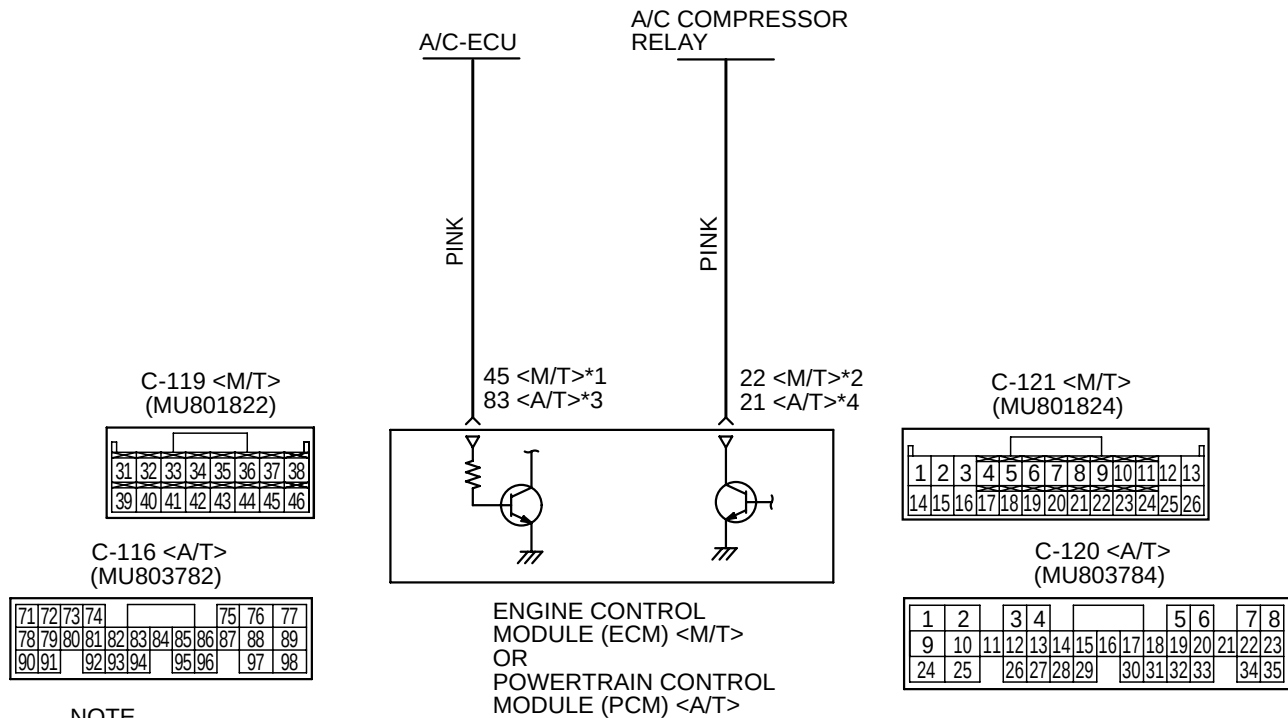
YES : Check the connector C-105 at intermediate connectors for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). If intermediate connector is in good condition, replace the ECM or PCM. Then confirm that the malfunction symptom is eliminated.

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



INSPECTION PROCEDURE 34: A/C system.

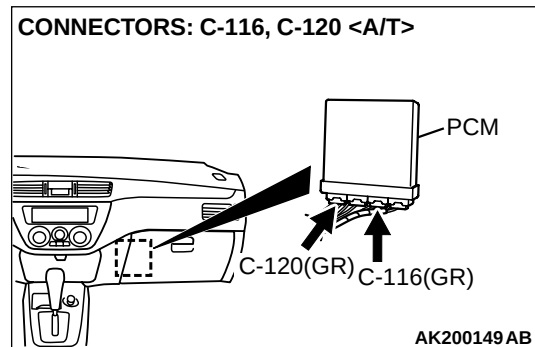
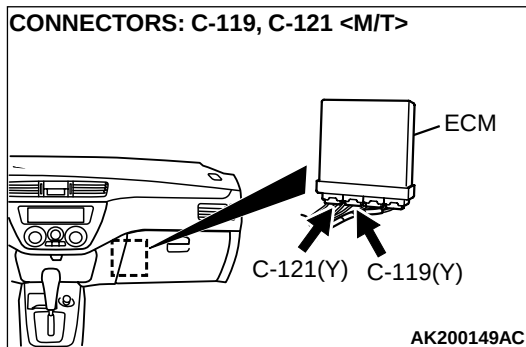
A/C Circuit



NOTE

- *1: ECM connector C-119 <M/T>
- *2: ECM connector C-121 <M/T>
- *3: PCM connector C-116 <A/T>
- *4: PCM connector C-120 <A/T>

AK100111



COMMENT

- When the A/C is "ON", the battery positive voltage is applied on the ECM (terminal No. 45) <M/T> PCM (terminal No. 83) <A/T> from the automatic compressor controller.

When battery positive voltage is applied to the ECM <M/T> or PCM <A/T>, the ECM <M/T> or PCM <A/T> turns "ON" the power transistor in the ECM <M/T> or PCM <A/T>. The ECM <M/T> or PCM <A/T> delays A/C engagement momentarily while it increases idle r/min. Then the A/C compressor clutch relay coil will be energized. With this, the A/C compressor clutch relay turns "ON", and the A/C compressor clutch functions.

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

- Malfunction of the A/C control system.
- Malfunction of the A/C switch.

- Improper connector contact, open circuit or short-circuited harness wire.
- Malfunction of the ECM <M/T> or PCM <A/T>.

DIAGNOSIS

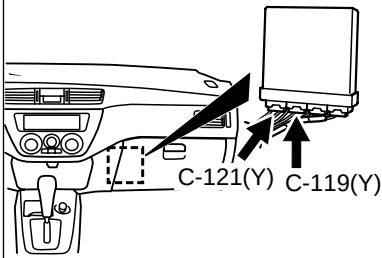
STEP 1. Check harness connector C-119, C-121 at ECM <M/T> or harness connector C-116, C-120 at PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 2.

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

CONNECTORS: C-119, C-121 <M/T>



38	37	36	35	34	33	32	31
46	45	44	43	42	41	40	39

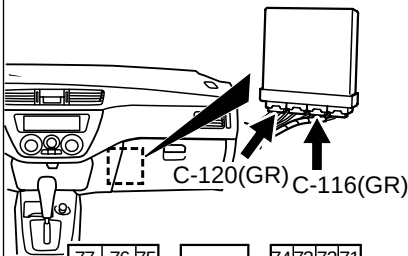
**C-119 HARNESS CONNECTOR:
COMPONENT SIDE**

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

**C-121 HARNESS CONNECTOR:
COMPONENT SIDE**

AK200136AB

CONNECTORS: C-116, C-120 <A/T>



77	76	75			74	73	72	71
89	88	87	86	85	84	83	82	81
98	97	96	95	94	93	92	91	90

**C-116 HARNESS CONNECTOR:
COMPONENT SIDE**

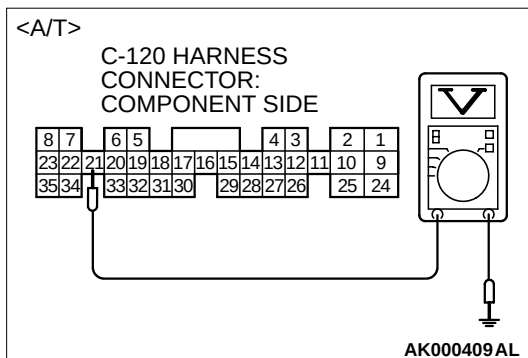
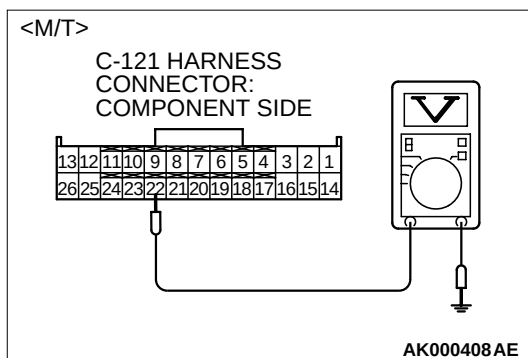
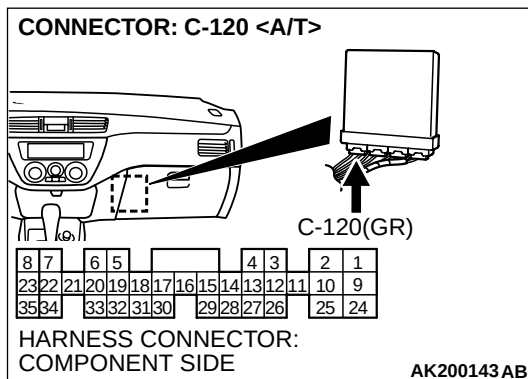
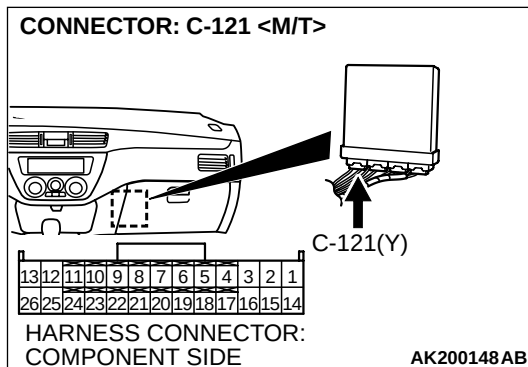
8	7	6	5			4	3	2	1
23	22	21	20	19	18	17	16	15	14
35	34	33	32	31	30	29	28	27	26

**C-120 HARNESS CONNECTOR:
COMPONENT SIDE**

AK200135AB

STEP 2. Check the circuit at ECM connector C-121 <M/T> or PCM connector C-120 <A/T>.

- (1) Disconnect the connectors C-121 <M/T> or C-120 <A/T> and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.



- (3) Measure the voltage between terminal No. 22 <M/T> or No. 21 <A/T> and ground.
 - Voltage should be battery positive voltage.
- (4) Using a jumper wire, connect terminal No. 22 <M/T> or No. 21 <A/T> to ground.
 - A/C compressor relay should turn "ON".
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

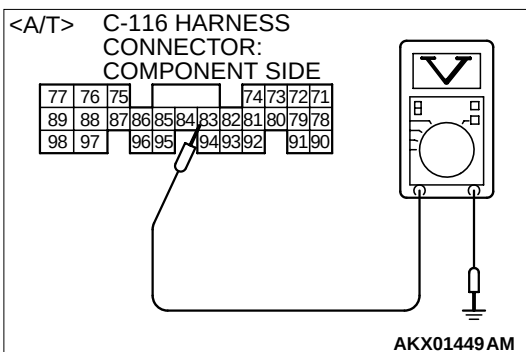
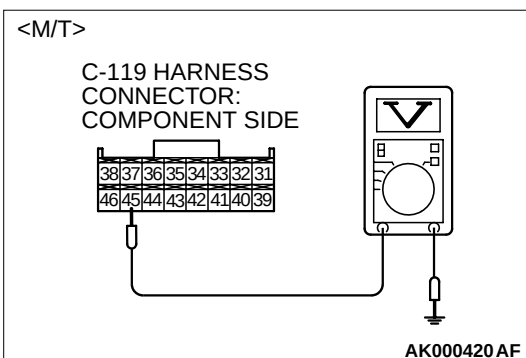
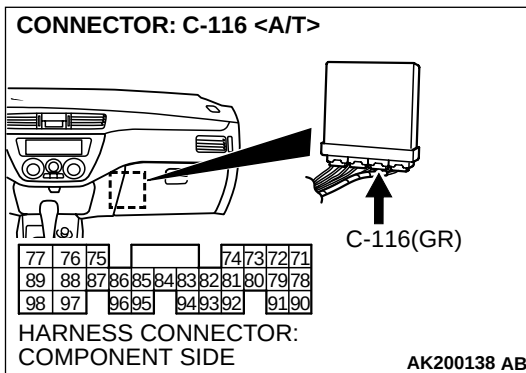
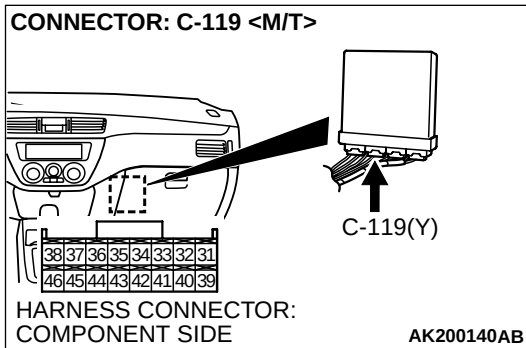
Q: Is the voltage and A/C compressor relay condition normal?

YES : Go to Step 3.

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

STEP 3. Check the circuit at ECM connector C-119 <M/T> or PCM connector C-116 <A/T>.

- (1) Disconnect the connectors C-119 <M/T> or C-116 <A/T> and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.



- (3) Measure the voltage between terminal No. 45 <M/T> or No. 83 <A/T> and ground.

- Voltage should be 1 volt or less when the A/C switch is "OFF".
- Voltage should be battery positive voltage when the A/C switch is "ON".

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

Q: Is the measured voltage within the specified range?

YES : Replace the ECM or PCM. 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.

DATA LIST REFERENCE TABLE

⚠ CAUTION

- When shifting the select lever to D range, the brakes should be applied so that the vehicle does not move forward.
- Driving tests always need two persons: one driver and one observer.

NOTE: *1: If the idle speed is lower than the standard value on a very cold engine [approximately -20 °C (-4 °F)] even when the IAC motor is fully opened, the air volume limiter built in the throttle body could be defective.

NOTE: *2: In a new vehicle [driven approximately 500 km (311 mile) or less], the step of the stepper motor is sometimes 30 steps greater than the standard value.

NOTE: *3: The injector drive time represents the time when the cranking speed is at 250 r/min or below when the power supply voltage is 11 volts.

NOTE: *4: In a new vehicle [driven approximately 500 km (311 mile) or less], the injector drive time is sometimes 10% longer than the standard time.

NOTE: *5: In a new vehicle [driven approximately 500 km (311 mile) or less], the volume airflow sensor output frequency is sometimes 10% higher than the standard frequency.

NOTE: *6: GST items. [Data list items consist of MUT-III items and GST items. GST items can be accessed through the use of a general scan tool (GST). When scan tool MB991958 (MUT-III sub assembly) is used, MUT-III items appear alphabetically; then, GST items appear alphabetically. The black and white characters of the GST items are inverted from the MUT-III items.]

NOTE: *7: Vehicles for Canada, the headlight, taillight, etc. remain lit even when the lighting switch is in "OFF" position but this is no problem for checks.

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.	REFERENCE PAGE
A/C RELAY	49	A/C compressor clutch relay	• Engine: idling • A/C switch: "OFF"		OFF	Procedure No. 34	P.13A-856
			• Engine: idling • A/C switch: "ON"	A/C compressor clutch is not operating	OFF		
				A/C compressor clutch is operating	ON		
A/C SWITCH	28	A/C switch	• Engine: idling • A/C switch: "OFF"		OFF	Procedure No. 34	P.13A-856
			• Engine: idling • A/C switch: "ON"	A/C compressor clutch is not operating	OFF		
				A/C compressor clutch is operating	ON		

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.	REFERENCE PAGE
BARO SENSOR	25	Barometric pressure sensor	Ignition switch: "ON"	At altitude of 0 m (0 ft)	101 kPa (29.8 in. Hg)	Code No. P0106, P0107, P0108	P.13A-676 , P.13A-684 , P.13A-703
				At altitude of 600 m (1,969 ft)	95 kPa (28.1 in. Hg)		
				At altitude of 1,200 m (3,937 ft)	88 kPa (26.0 in. Hg)		
				At altitude of 1,800 m (5,906 ft)	81 kPa (23.9 in. Hg)		
BATT VOLTAGE	16	power supply voltage	Ignition switch: "ON"		Battery positive voltage	Procedure No. 29	P.13A-810
CKP SENSOR	22	Crankshaft position sensor *1	- Engine: cranking - Engine tachometer: connected		Engine speeds displayed on the scan tool and engine tachometer are identical	Code No. P0335	P.13A-371
			Engine: idling	Engine coolant temperature is –20°C (–4°F)	1,380 – 1,580 r/min		
				Engine coolant temperature is 0°C (32°F)	1,220 – 1,420 r/min		
				Engine coolant temperature is 20°C (68°F)	1,100 – 1,300 r/min		
				Engine coolant temperature is 40°C (104°F)	880 – 1,080 r/min		
				Engine coolant temperature is 80°C (176°F)	600 – 800 r/min		
CRANK. SIGNAL	18	Cranking signal (ignition switch-ST)	Ignition switch: "ON"	Engine: stopped	OFF	Procedure No. 31 <M/T> Procedure No. 32 <A/T>	P.13A-834 <M/T> P.13A-841 <A/T>
				Engine: cranking	ON		

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.	REFERENCE PAGE
ECT SENSOR	21	Engine coolant temperature sensor	Ignition switch: "ON" or with engine running	Engine coolant temperature is –20°C (–4°F)	–20°C (–4°F)	Code No. P0116, P0117, P0118	P.13A-127 , P.13A-139 , P.13A-146
				Engine coolant temperature is 0°C (32°F)	0°C (32°F)		
				Engine coolant temperature is 20°C (68°F)	20°C (68°F)		
				Engine coolant temperature is 40°C (104°F)	40°C (104°F)		
				Engine coolant temperature is 80°C (176°F)	80°C (176°F)		
ECT SENSOR	21*6	Engine coolant temperature sensor	Ignition switch: "ON" or with engine running	Engine coolant temperature is –20°C (–4°F)	–20°C (4°F)	Code No. P0116, P0117, P0118	P.13A-127 , P.13A-139 , P.13A-146
				Engine coolant temperature is 0°C (32°F)	0°C (32°F)		
				Engine coolant temperature is 20°C (68°F)	20°C (68°F)		
				Engine coolant temperature is 40°C (104°F)	40°C (104°F)		
				Engine coolant temperature is 80°C (176°F)	80°C (176°F)		
ENGINE LOAD	87*6	Calculated load value	• Engine: warming up	Engine is idling	9 – 29 %	–	–
				2,500 r/min	8 – 28 %		

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.	REFERENCE PAGE
ENGINE SPEED	22*6	Crankshaft position sensor *1	- Engine: cranking - Tachometer: connected		Engine speeds displayed on the scan tool and tachometer are identical.	Code No. P0335	P.13A-371
			Engine: idling	Engine coolant temperature is -20°C (-40°F)	1,380 – 1,580 r/min		
				Engine coolant temperature is 0°C (32°F)	1,220 – 1,420 r/min		
				Engine coolant temperature is 20°C (68°F)	1,100 – 1,300 r/min		
				Engine coolant temperature is 40°C (104°F)	880 – 1,080 r/min		
				Engine coolant temperature is 80°C (176°F)	600 – 800 r/min		
FUEL TEMP	4A	Fuel tank temperature sensor	- In cooled state - Ignition switch: "ON"		Approximately the same as the outdoor temperature	Code No. P0181, P0182, P0183	P.13A-312 , P.13A-324 , P.13A-332

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.	REFERENCE PAGE
HO2S BANK2 S1	11	Heated oxygen sensor (front)	Engine: Warming up (air/fuel mixture is made leaner when decelerating, and is made richer when revving.)	When at 4000 r/min, engine is suddenly decelerated	200 mV or less → 600 – 1,000 mV (After several seconds have elapsed)	Code No. P0130, P0131, P0132, P0133, P0134	P.13A-201 , P.13A-216 , P.13A-223 , P.13A-228 , P.13A-232
			Engine: Warming up (the heated oxygen sensor signal is used to check the air/fuel mixture ratio, and control condition is also checked by the ECM <M/T> or PCM <A/T>)	Engine is idling 2,500 r/min	Voltage changes repeatedly between 400 mV or less and 600 – 1,000 mV		
HO2S BANK1 S1	A1*6	Heated oxygen sensor (front)	Engine: Warming up (air/fuel mixture is made leaner when decelerating, and is made richer when revving.)	When at 4, 000 r/min, engine is suddenly decelerated	0.2 V or less → 0.6 – 1 V (After several seconds have elapsed)	Code No. P0130, P0131, P0132, P0133, P0134	P.13A-201 , P.13A-216 , P.13A-223 , P.13A-228 , P.13A-232
			Engine: Warming up (the heated oxygen sensor signal is used to check the air/fuel mixture ratio, and control condition is also checked by the ECM <M/T> or PCM <A/T>)	Engine is idling 2,500 r/min	Voltage changes repeatedly between 0.4 V or less and 0.6 – 1 V.		

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.	REFERENCE PAGE
HO2S BANK2 S2	59	Heated oxygen sensor (rear)	Engine: warming up	Revving	0 and 600 – 1,000 mV alternate.	Code No. P0136, P0137, P0138, P0139	P.13A-252 , P.13A-268 , P.13A-275 , P.13A-280
HO2S BANK1 S2	A2* ⁶	Heated oxygen sensor (rear)	Engine: warming up	Revving	0 and 0.6 – 1 V alternate.	Code No. P0136, P0137, P0138, P0139	P.13A-252 , P.13A-268 , P.13A-275 , P.13A-280
IAC VALVE POS	45	Idle air control (stepper) position * ²	- Engine coolant temperature : 80 – 95°C (176 – 203°F) - Lights, electric cooling fan and all accessories : "OFF"*⁷ - Transaxle: neutral (A/T: "P" range) - Engine: idling (when A/C switch is "ON". A/C compressor should be operating)	A/C switch: "OFF"	2 – 25 STEP	–	–
				A/C switch: "OFF" → "ON"	Increases by 10 – 80 STEP		
				- A/C switch: "OFF" - Selector lever: "N" → "D" range	Increases by 5 – 50 STEP		
IAT SENSOR	13	Intake air temperature sensor	Ignition switch: "ON" or with engine running	Intake air temperature is –20 °C (–4°F)	–20°C (–4°F)	Code No. P0111, P0112, P0113	P.13A-102 , P.13A-111 , P.13A-118
				Intake air temperature is 0°C (32°F)	0°C (32°F)		
				Intake air temperature is 20°C (68°F)	20°C (68°F)		
				Intake air temperature is 40°C (104°F)	40°C (104°F)		
				Intake air temperature is 80°C (176°F)	80°C (176°F)		

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.	REFERENCE PAGE
IAT SENSOR	13 ^{*6}	Intake air temperature sensor	Ignition switch: "ON" or with engine running	Intake air temperature is –20 °C (–4°F)	–20°C (–4°F)	Code No. P0111, P0112, P0113	P.13A-102 , P.13A-111 , P.13A-118
				Intake air temperature is 0°C (32°F)	0°C (32°F)		
				Intake air temperature is 20°C (68°F)	20°C (68°F)		
				Intake air temperature is 40°C (104°F)	40°C (104°F)		
				Intake air temperature is 80°C (176°F)	80°C (176°F)		
IG. TIMING ADV	44	Ignition coils and ignition power transistor	- Engine: warming up - Timing light is set (to check actual ignition timing)	Engine is idling	0 – 16°BTDC	–	–
				2,500 r/min	18 – 38°BTDC		
IG. TIMING ADV	44 ^{*6}	Ignition coils and ignition power transistor	- Engine: warming up - Timing light is set (to check actual ignition timing)	Engine is idling	0 – 16 deg	–	–
				2,500 r/min	18 – 38 deg		

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.	REFERENCE PAGE
INJECTOR BNK2	41	Injectors ^{*3}	Engine: cranking	When engine coolant temperature is 0°C (32°F)	48 – 64 ms	—	—
				When engine coolant temperature is 20°C (68°F)	22 – 38 ms		
				When engine coolant temperature is 80°C (176°F)	1.4 – 2.6 ms		
		Injectors ^{*4}	• Engine coolant temperature : 80 – 95°C (176 – 203°F) • Lights, electric cooling fan and all accessories : "OFF"^{*7} • Transaxle: neutral (A/T: "P" range)	Engine is idling	1.4 – 2.6 ms		
				2,500 r/min	1.4 – 2.6 ms		
				When engine is suddenly revved	Increases		
LONG TRIM B1	81 ^{*6}	Long-term fuel trim	Engine: warming up, 2,500 r/min without any load (during closed loop)		–12.5 – 12.5%	Code No. P0171, P0172	P.13A-297 , P.13A-306

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.	REFERENCE PAGE
MAP SENSOR	95	Manifold absolute pressure sensor	- Engine coolant temperature : 80 - 90°C (176 - 203°F) - Lights, electric cooling fan and all accessories : "OFF"*7 - Transaxle : Neutral(A/T : P range) - Ignition switch : ON	Engine stopped [At altitude of 0 m (0 ft.)]	101 kPa (29.8 in.Hg)	Code No. P0106, P0107, P0108	P.13A-57 , P.13A-71 , P.13A-90
				Engine stopped [At altitude of 600 m (1,969 ft.)]	95 kPa (28.1 in.Hg)		
				Engine stopped [At altitude of 1,200 m (3,973 ft.)]	88 kPa (26.0 in.Hg)		
				Engine stopped [At altitude of 1,800 m (5,906 ft.)]	81 kPa (23.9 in.Hg)		
				Engine : Idling	16 – 36 kPa (4.7 – 10.6 in.Hg)		
				When engine is suddenly raced	Varies		
MAP/MD P SNSR.	32*6	Manifold absolute pressure sensor	- Engine coolant temperature : 80 - 90°C (176 - 203°F) - Lights, electric cooling fan and all accessories : "OFF"*7 - Transaxle : Neutral(A/T : P range) - Ignition switch : ON	Engine stopped [At altitude of 0 m (0 ft.)]	101 kPa (29.8 in.Hg)	Code No. P0106, P0107, P0108	P.13A-57 , P.13A-71 , P.13A-90
				Engine stopped [At altitude of 600 m (1,969 ft.)]	95 kPa (28.1 in.Hg)		
				Engine stopped [At altitude of 1,200 m (3,973 ft.)]	88 kPa (26.0 in.Hg)		
				Engine stopped [At altitude of 1,800 m (5,906 ft.)]	81 kPa (23.9 in.Hg)		
				Engine : Idling	16 – 36 kPa (4.7 – 10.6 in.Hg)		
				When engine is suddenly raced	Varies		

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.	REFERENCE PAGE
PSP SWITCH	27	Power steering pressure switch	Engine: idling	Steering wheel stationary	OFF	Code No. P0551, P0554	P.13A-639 , P.13A-652
				Steering wheel turning	ON		
SHORT TRIM B1	82*6	Short-term fuel trim	Engine: warming up, 2,500 r/min without any load (during closed loop)		-25 to 25%	Code No. P0171, P0172	P.13A-297 , P.13A-306
SYS. STATUS B1	88*6	Fuel control condition	Engine: warming up	2,500 r/min	Closed loop	-	-
				When engine is suddenly revved	Open loop - drive condition		
TANK PRS. SNSR	73	Fuel tank differential pressure sensor	- Ignition switch: "ON" - Fuel tank filler tube cap removal		-3.3 to 3.3 kPa (-0.97 to 0.97 in. Hg)	-	-
TP SENSOR	14	Throttle position sensor	Ignition switch: "ON"	Set to idle position	335 - 935 mV	Code No. P0121, P0122, P0123	P.13A-156 , P.13A-169 , P.13A-179
				Gradually open	Increases in proportion to throttle opening angle		
				Open fully	4,390 - 5,290 mV		
TP SENSOR	8A*6	Throttle position sensor	Ignition switch: "ON"	Set to idle position	6 - 20%	Code No. P0121, P0122, P0123	P.13A-156 , P.13A-169 , P.13A-179
				Gradually open	Increases in proportion to throttle opening angle		
				Open fully	80 - 100%		
VAF RESET SIG	34	Volume airflow sensor reset signal	Engine: warming up	Engine is idling	ON	-	-
				2,500 r/min	OFF		

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.	REFERENCE PAGE
VAF SENSOR	12	Volume airflow sensor (mass airflow rate) *5	- Engine coolant temperature : 80 – 95°C (176 – 203°F) - Lights, electric cooling fan and all accessories : "OFF"*7 - Transaxle: neutral (A/T: "P" range)	Engine is idling	20 – 46 HZ	—	—
				2,500 r/min	70 – 110 Hz		
				Engine is revved	Frequency (or air flow volume) increases in response to revving		

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.	REFERENCE PAGE
VAF/MAF SNSR.	12 ^{*6}	Volume airflow sensor (mass airflow rate) ^{*5}	- Engine coolant temperature : 80 – 95°C (176 – 203°F) - Lights, electric cooling fan and all accessories : "OFF"^{*7} - Transaxle: neutral (A/T: "P" range)	Engine is idling	1.3 – 3.3 gm/s	—	—
				2,500 r/min	6.6 – 10.2 gm/s		
				Engine is revved	Frequency (or air flow volume) increases in response to revving		
VSS	24 ^{*6}	Vehicle speed sensor <M/T>	Drive at 40 km/h (25 mph).		Approximately 40 km/h (25 mph)	Code No. P0500	P.13A-600

ACTUATOR TEST REFERENCE TABLE

M1131152500600

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	DRIVE CONTENTS	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.	REFERENCE PAGE
BASIC TIMING	17*	Basic ignition timing	Set to ignition timing adjustment mode	- Engine: idling - Connect timing light		5°BTDC	-	-
EGR SOLENOID	10	EGR vacuum regulator solenoid valve	Solenoid valve turns from OFF to ON.	Ignition switch: "ON"		Clicks when solenoid valve is driven.	Code No. P0403	P.13A-405
EVAP PURGE SOL	08	Evaporative emission purge solenoid	Solenoid valve turns from OFF to ON.	Ignition switch: "ON"		Clicks when solenoid valve is driven.	Code No. P0443	P.13A-440
EVAP VENT	29	Evaporative emission ventilation solenoid	Solenoid valve turns from OFF to ON.	Ignition switch: "ON"		Clicks when solenoid valve is driven.	Code No. P0446	P.13A-451
FUEL PUMP	07	Fuel pump	Fuel pump operates and fuel is recirculated	Ignition switch: "ON"	Pinch the return hose with fingers to feel the pulse of the fuel being recirculated	Pulse is felt	Procedure No. 30	P.13A-821
					Listen near the fuel tank for the sound of fuel pump operation	Sound of operation is heard		

**MULTIPOINT FUEL INJECTION (MFI) <2.0L ENGINE>
MULTIPOINT FUEL INJECTION (MFI) DIAGNOSIS**

13A-873

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	DRIVE CONTENTS	INSPECTION REQUIREMENT	NORMAL CONDITION	INSPECTION PROCEDURE NO.	REFERENCE PAGE
NO. 1 INJECT OR	01	Injectors	Cut fuel to No.1 injector	Engine: warm, idle (cut the fuel supply to each injector in turn and check cylinders which don't affect idling.)	Idling condition becomes different (becomes unstable)	Code No. P0201, P0202, P0203, P0204	P.13A-34 2
NO. 2 INJECT OR	02		Cut fuel to No.2 injector				
NO. 3 INJECT OR	03		Cut fuel to No.3 injector				
NO. 4 INJECT OR	04		Cut fuel to No.4 injector				
RADIAT. FAN LO	21	Fan controller	Drive the fan motor	Ignition switch: "ON"	Radiator fan and condenser fan rotate at high speed	Procedur e No. 28	P.13A-80 6

NOTE: *: Continues for 27 minutes. Can be released by pressing the CLEAR key.

**CHECK AT THE ENGINE CONTROL MODULE (ECM) <M/T> OR POWERTRAIN
CONTROL MODULE (PCM) <A/T>**

M1131153700221

TERMINAL VOLTAGE CHECK CHART

NOTE: *¹: The average voltage through an analog voltmeter is described in this service manual (because the average voltage is too stable to be shown on a digital voltmeter).

NOTE: *²: Vehicles for Canada, the headlight, taillight, etc. remain lit even when the lighting switch is in "OFF" position but this is no problem for checks.

ECM <M/T> or PCM <A/T> Connector Terminal Arrangement

<M/T>

1	2	3	4	5	6	7	8	9	10	11	12	13	31	32	33	34	35	36	37	38	51	52	53	54	55	56	71	72	73	74	75	76	77	78	79	80	81
14	15	16	17	18	19	20	21	22	23	24	25	26	39	40	41	42	43	44	45	46	57	58	59	60	61	62	82	83	84	85	86	87	88	89	90	91	92

<A/T>

1	2	3	4			5	6	7	8	41	42	43			44	45	46	71	72	73	74			75	76	77	101	102	103	104			105	106	107															
9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	47	48	49	50	51	52	53	54	55	56	57	78	79	80	81	82	83	84	85	86	87	88	89	108	109	110	111	112	113	114	115	116	117	118	119	120
24	25		26	27	28	29		30	31	32	33		34	35	58	59		60	61	62	63		64	65	66	90	91		92	93	94		95	96		97	98	121	122	123	124	125		126	127	128		129	130	

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TERMINAL NO. <M/T>	TERMINAL NO. <A/T>	INSPECTION ITEM	INSPECTION CONDITION (ENGINE CONDITION)	NORMAL CONDITION
1	1	No. 1 injector	- Engine: warming up, idling - Suddenly depress the accelerator pedal	From 11 – 14 V* ¹ momentarily drops slightly
14	9	No. 2 injector		
2	24	No. 3 injector		
15	2	No. 4 injector		
4	14	Stepper motor coil <A1>	NOTE: Vehicles for Canada, the headlight, taillight, etc. remain lit even when the lighting switch is in "OFF" position but this is no problem for checks. - Engine: warming up, idling - A/C switch: OFF → ON - Headlight switch: OFF → ON	B+ ⇔ 1 V or less* ¹ (changes repeatedly)
17	28	Stepper motor coil <A2>		
5	15	Stepper motor coil <B1>		
18	29	Stepper motor coil <B2>		
6	6	EGR vacuum regulator solenoid valve	Ignition switch: "ON"	B+
			- Engine: idling - Suddenly depress the accelerator pedal.	From B+, momentarily drops * ¹
8	20	Fuel pump relay	Ignition switch: "ON"	B+
			Engine: idling	1 V or less
9	34	Evaporative emission purge solenoid	Ignition switch: "ON"	B+
			Engine: warm up, 3,000 r/min	3 – 13 V * ¹
10	11	Ignition coil – No. 1, No. 4 (Ignition power transistor)	Engine: 3,000 r/min	0.3 – 3.0 V * ¹
23	12	Ignition coil – No. 2, No. 3 (Ignition power transistor)		

TERMINAL NO. <M/T>	TERMINAL NO. <A/T>	INSPECTION ITEM	INSPECTION CONDITION (ENGINE CONDITION)		NORMAL CONDITION
12	41	Power supply	Ignition switch: "ON"		B+
25	47				
19	19	Volume airflow sensor reset signal	Engine: idling		0 – 1 V
			Engine: 3,000 r/min		6 – 9 V
21	18	Fan controller	Radiator fan and condenser fan are not operating		0 – 0.3 V
			Radiator fan and condenser fan are operating		0.7 V or more
22	21	A/C compressor clutch relay	- Engine: idling - A/C switch: OFF → ON (A/C compressor is operating)		B+ → 1 V or less as A/C clutch cycles
24	61	A/C switch 2	Engine: idling Outside air temperature: 25°C or more	when A/C is MAX. COOL condition (when the load by A/C is high)	1 V or less
				when A/C is MAX. HOT condition (when the load by A/C is low)	B+
33	8	Generator G terminal	- Engine: warming up, idling (radiator fan: stopped) - Headlight: OFF to ON*2 - Rear defogger switch: OFF to ON - Stoplight switch: OFF to ON		Voltage rises by 0.2 – 3.5 V
36	22	Malfunction Indicator Lamp (SERVICE ENGINE SOON or Check Engine Lamp)	Ignition switch: "LOCK" (OFF) → "ON"		1 V or less → 9 – 13 V (after several seconds have elapsed)
37	52	Power steering pressure switch	Engine: warming up, idling	When steering wheel is stationary	B+
				When steering wheel is turned	1 V or less
38	49	MFI relay (power supply)	Ignition switch: "OFF"		B+
			Ignition switch: "ON"		1 V or less
41	54	Generator FR terminal	- Engine: warming up, idling (radiator fan: stopped) - Headlight: OFF to ON*2 - Rear defogger switch: OFF to ON - Stop light switch: OFF to ON		Voltage drops
45	83	A/C switch	Engine: idling	Turn the A/C switch OFF	1 V or less
				Turn the A/C switch ON (A/C compressor is operating)	B+
54	26	Heated oxygen sensor heater (rear)	Engine: warming up, idling		1 V or less
			Engine: Revving		B+

TERMINAL NO. <M/T>	TERMINAL NO. <A/T>	INSPECTION ITEM	INSPECTION CONDITION (ENGINE CONDITION)		NORMAL CONDITION
55	35	Evaporative emission ventilation solenoid	Ignition switch: "ON"		B+
			Carry out the Actuator test to drive the solenoid valve		For approximately Six seconds 1 V or less
58	43	Engine Tachometer signal	Engine: 3,000 r/min		0.3 – 3.0 V* ¹
60	3	Heated oxygen sensor heater (front)	Engine: warming up, idling		9 – 11 V* ¹
			Engine: Revving		9 – 11 V → B+* ¹ (momentarily)
61	92	Fuel tank differential pressure sensor	Engine: idling		1.2 – 3.8 V
71	58	Ignition switch-ST	Engine: cranking		8 V or more
72	64	Intake air temperature sensor	Ignition switch: "ON"	When Intake air temperature is –20°C (–4°F)	3.8 – 4.4 V
				When Intake air temperature is 0°C (32°F)	3.2 – 3.8 V
				When Intake air temperature is 20°C (68°F)	2.3 – 2.9 V
				When Intake air temperature is 40°C (104°F)	1.5 – 2.1 V
				When Intake air temperature is 60°C (140°F)	0.8 – 1.4 V
				When Intake air temperature is 80°C (176°F)	0.4 – 1.0 V
73	91	Manifold absolute pressure sensor	Ignition switch: "ON"	At altitude of 0 m (0 ft.)	3.8 – 4.2 V
				At altitude of 600 m (1,969 ft.)	3.5 – 3.9 V
				At altitude of 1,200 m (3,937 ft.)	3.3 – 3.7 V
				At altitude of 1,800 m (5,906 ft.)	3.0 – 3.4 V
			Engine: warming up, idling		0.9 – 1.5 V
			When engine is suddenly revved.		Voltage varies
75	73	Heated oxygen sensor (rear)	- Engine: warming up - Revving		0 and 0.6 – 1.0 V alternates
76	71	Heated oxygen sensor (front)	Engine: warming, 2,500 r/min (check using a digital type voltmeter)		0 ⇔ 0.8 V (changes repeatedly)

TERMINAL NO. <M/T>	TERMINAL NO. <A/T>	INSPECTION ITEM	INSPECTION CONDITION (ENGINE CONDITION)		NORMAL CONDITION
77	51	Fuel tank temperature sensor	Ignition switch: "ON"	When fuel tank temperature is 0°C (32°F)	2.7 – 3.1 V
				When fuel tank temperature is 20°C (68°F)	2.1 – 2.5 V
				When fuel tank temperature is 40°C (104°F)	1.6 – 2.0 V
				When fuel tank temperature is 80°C (176°F)	0.8 – 1.2 V
80	66	Backup power supply	Ignition switch: "LOCK" (OFF)		B+
81	46	Sensor supplied voltage	Ignition switch: "ON"		4.5 – 5.5 V
82	98	Ignition switch-IG	Ignition switch: "ON"		B+
83	44	Engine coolant temperature sensor	Ignition switch: "ON"	When engine coolant temperature is –20°C (–4°F)	3.9 – 4.5 V
				When engine coolant temperature is 0°C (32°F)	3.2 – 3.8 V
				When engine coolant temperature is 20°C (68°F)	2.3 – 2.9 V
				When engine coolant temperature is 40°C (104°F)	1.3 – 1.9 V
				When engine coolant temperature is 60°C (140°F)	0.7 – 1.3 V
				When engine coolant temperature is 80°C (176°F)	0.3 – 0.9 V
84	78	Throttle position sensor	Ignition switch: "ON" (check for smooth voltage increase as throttle is moved from closed throttle position to wide open throttle)	Idle	0.335 – 0.935 V
				Wide open throttle	4.4 – 5.3 V
85	55	Barometric pressure sensor	Ignition switch: "ON"	When altitude is 0 m (0 ft)	3.7 – 4.3 V
				When altitude is 600 m (1,969 ft)	3.4 – 4.0 V
				When altitude is 1,200 m (3,937 ft)	3.2 – 3.8 V
				When altitude is 1,800 m (5,906 ft)	2.9 – 3.5 V
86	–	Vehicle speed sensor	- Ignition switch: "ON" - Move the vehicle slowly forward		0 ⇔ 8 – 12 V* ¹ (changes repeatedly)
87	79	Closed throttle position signal	Ignition switch: "ON"	Set throttle valve to closed throttle position	0 – 1 V
				Open throttle slightly	4 V or more

TERMINAL NO. <M/T>	TERMINAL NO. <A/T>	INSPECTION ITEM	INSPECTION CONDITION (ENGINE CONDITION)	NORMAL CONDITION
88	56	Camshaft position sensor	Engine: cranking	0.4 – 3.0 V* ¹
			Engine: idling	1.5 – 3.0 V* ¹
89	45	Crankshaft position sensor	Engine: cranking	0.4 – 4.0 V* ¹
			Engine: idling	1.5 – 2.5 V* ¹
90	65	Volume airflow sensor	Engine: idling	2.2 – 3.2 V
			Engine: 2,500 r/min	

TERMINAL RESISTANCE AND CONTINUITY CHECK

ECM <M/T> or PCM <A/T> Connector Terminal Arrangement

<M/T>

81	80	79	78	77	76	75	74	73	72	71	56	55	54	53	52	51	38	37	36	35	34	33	32	31	13	12	11	10	9	8	7	6	5	4	3	2	1
92	91	90	89	88	87	86	85	84	83	82	62	61	60	59	58	57	46	45	44	43	42	41	40	39	26	25	24	23	22	21	20	19	18	17	16	15	14

<A/T>

107	106	105				104	103		102	101	77	76	75				74	73	72	71	46	45	44				43	42	41	8	7		6	5				4	3		2	1								
120	119	118	117	116	115	114	113	112	111	110	109	108	89	88	87	86	85	84	83	82	81	80	79	78	57	56	55	54	53	52	51	50	49	48	47	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9
130	129		128	127	126		125	124		123	122	121	98	97		96	95		94	93	92		91	90	66	65	64	63	62	61	60		59	58	35	34		33	32	31	30		29	28	27	26		25	24	

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TERMINAL NO.	TERMINAL NO.	INSPECTION ITEM	NORMAL CONDITION (INSPECTION CONDITION)
1 – 12	1 – 41	No. 1 injector	13 – 16 ohms [at 20°C (68°F)]
14 – 12	9 – 41	No. 2 injector	
2 – 12	24 – 41	No. 3 injector	
15 – 12	2 – 41	No. 4 injector	
4 – 12	14 – 41	Stepper motor coil (A1)	28 – 33 ohms [at 20°C (68°F)]
17 – 12	28 – 41	Stepper motor coil (A2)	
5 – 12	15 – 41	Stepper motor coil (B1)	
18 – 12	29 – 41	Stepper motor coil (B2)	
6 – 12	6 – 41	EGR vacuum regulator solenoid valve	29 – 35 ohms [at 20°C (68°F)]
9 – 12	34 – 41	Evaporative emission purge solenoid	30 – 34 ohms [at 20°C (68°F)]
13 – Body ground	42 – Body ground	ECM or PCM ground	Continuity (2 ohms or less)
26 – Body ground	48 – Body ground	ECM or PCM ground	
54 – 12	26 – 41	Heated oxygen sensor heater (rear)	11 – 18 ohms [at 20°C (68°F)]
55 – 12	35 – 41	Evaporative emission ventilation solenoid	17 – 21 ohms [at 20°C (68°F)]
60 – 12	3 – 41	Heated oxygen sensor heater (front)	4.5 – 8.0 ohms [at 20°C (68°F)]
72 – 92	57 – 64	Intake air temperature sensor	13 – 17 kΩ [when intake air temperature is –20°C (–4°F)]
			5.3 – 6.7 kΩ [when intake air temperature is 0°C (32°F)]
			2.3 – 3.0 kΩ [when intake air temperature is 20°C (68°F)]
			1.0 – 1.5 kΩ [when intake air temperature is 40°C (104°F)]
			0.56 – 0.76 kΩ [when intake air temperature is 60°C (140°F)]
			0.30 – 0.42 kΩ [when intake air temperature is 80°C (176°F)]

TERMINAL NO.	TERMINAL NO.	INSPECTION ITEM	NORMAL CONDITION (INSPECTION CONDITION)
83 – 92	44 – 57	Engine coolant temperature sensor	14 – 17 k Ω [when engine coolant temperature is –20°C (–4°F)]
			5.1 – 6.5 k Ω [when engine coolant temperature is 0°C (32°F)]
			2.1 – 2.7 k Ω [when engine coolant temperature is 20°C (68°F)]
			0.9 – 1.3 k Ω [when engine coolant temperature is 40°C (104°F)]
			0.48 – 0.68 k Ω [when engine coolant temperature is 60°C (140°F)]
			0.26 – 0.36 k Ω [when engine coolant temperature is 80°C (176°F)]

INSPECTION PROCEDURE USING AN OSCILLOSCOPE

M1131154500684

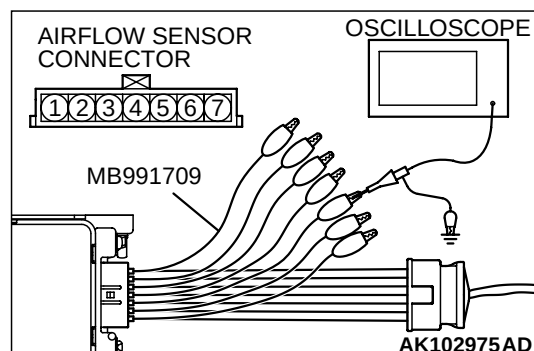
VOLUME AIRFLOW SENSOR

Required Special Tool:

MB991709: Test Harness Set

Measurement Method

1. Disconnect the volume airflow sensor connector, and connect the test harness special tool (MB991709) in between. (All terminals should be connected.)
2. Connect the oscilloscope probe to volume airflow sensor connector terminal No. 3.



Alternate method (Test harness not available)

<M/T>

1. Connect the oscilloscope probe to ECM terminal No. 90.

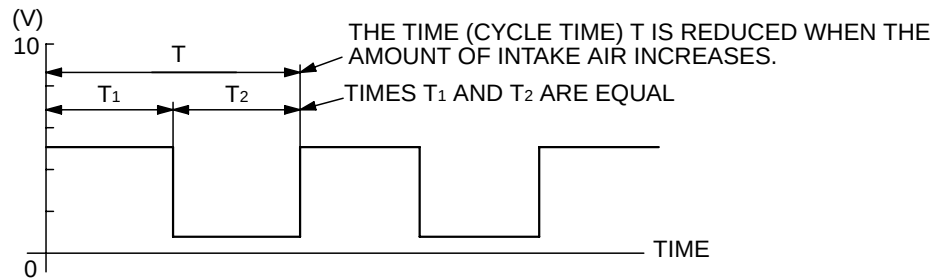
<A/T>

1. Connect the oscilloscope probe to PCM terminal No. 65.

Standard Wave Pattern

Observation conditions	
Function	Special pattern
Pattern height	Low
Pattern selector	Display
Engine r/min	Idle speed

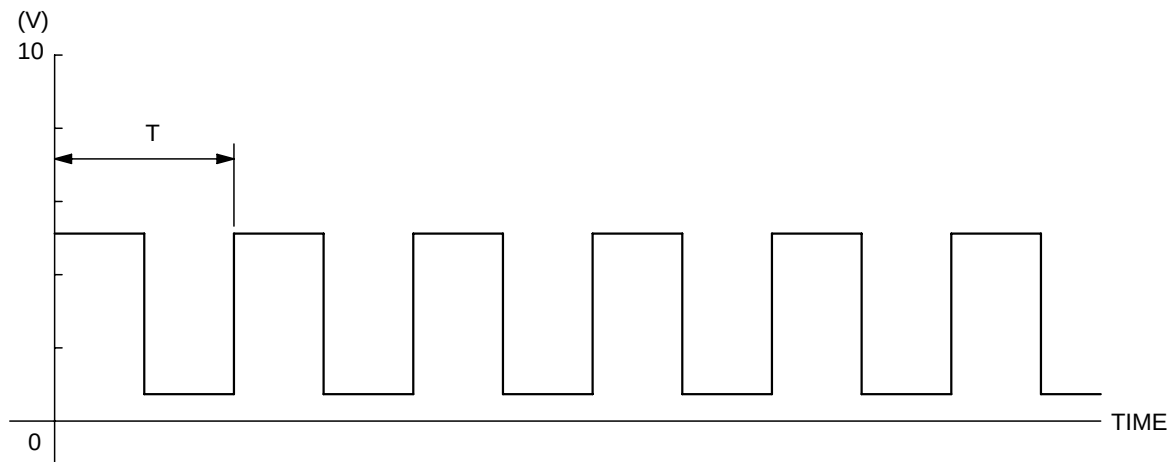
Standard wave pattern



AKX01595 AB

Observation conditions
Rev engine, observe T ₁ and T ₂ remain equal.

Standard wave pattern



AKX01596 AB

Wave Pattern Observation Points

Check that cycle time T becomes shorter and the frequency increases when the engine speed is increased.

Examples of Abnormal Wave Patterns**Example 1**

Cause of problem

- Sensor interface malfunction.

Wave pattern characteristics

- Rectangular wave pattern is output even when the engine is not started.

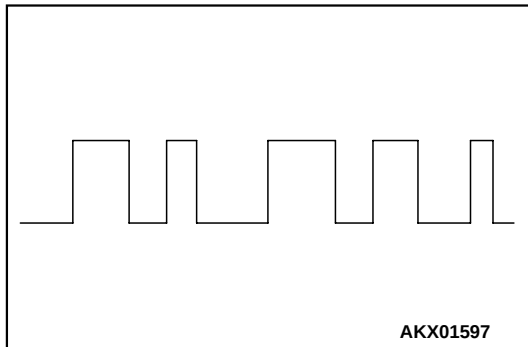
Example 2

Cause of problem

- Damaged rectifier or vortex generation column.

Wave pattern characteristics

- Unstable wave pattern with non-uniform frequency. An ignition leak will distort the wave pattern temporarily, even if the volume airflow sensor is normal.

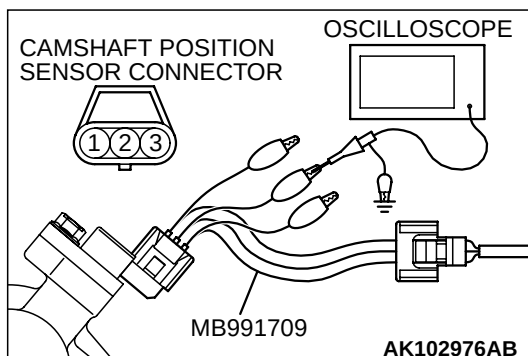
**CAMSHAFT POSITION SENSOR AND CRANKSHAFT POSITION SENSOR****Required Special Tools:**

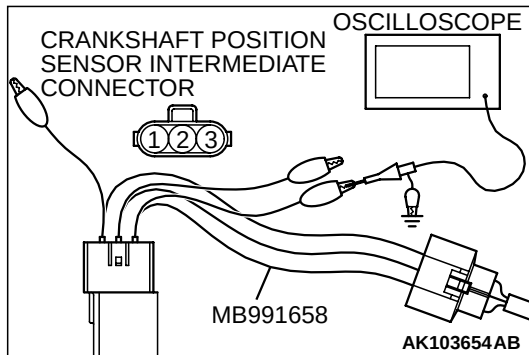
MB991709: Test Harness Set

MB991658: Test Harness Set

Measurement Method

1. Disconnect the camshaft position sensor connector, and connect the test harness special tool (MB991709) in between. (All terminals should be connected.)
2. Connect the oscilloscope probe to camshaft position sensor connector terminal No. 2.
3. Disconnect the crankshaft position sensor connector, and connect the test harness special tool (MB991658) in between. (All terminals should be connected.)





4. Connect the oscilloscope probe to crankshaft position sensor connector terminal No. 3.

Alternate method (Test harness not available)

<M/T>

1. Connect the oscilloscope probe to ECM terminal No. 88.
(Check the camshaft position sensor signal wave pattern.)
2. Connect the oscilloscope probe to ECM terminal No. 89.
(Check the crankshaft position sensor signal wave pattern.)

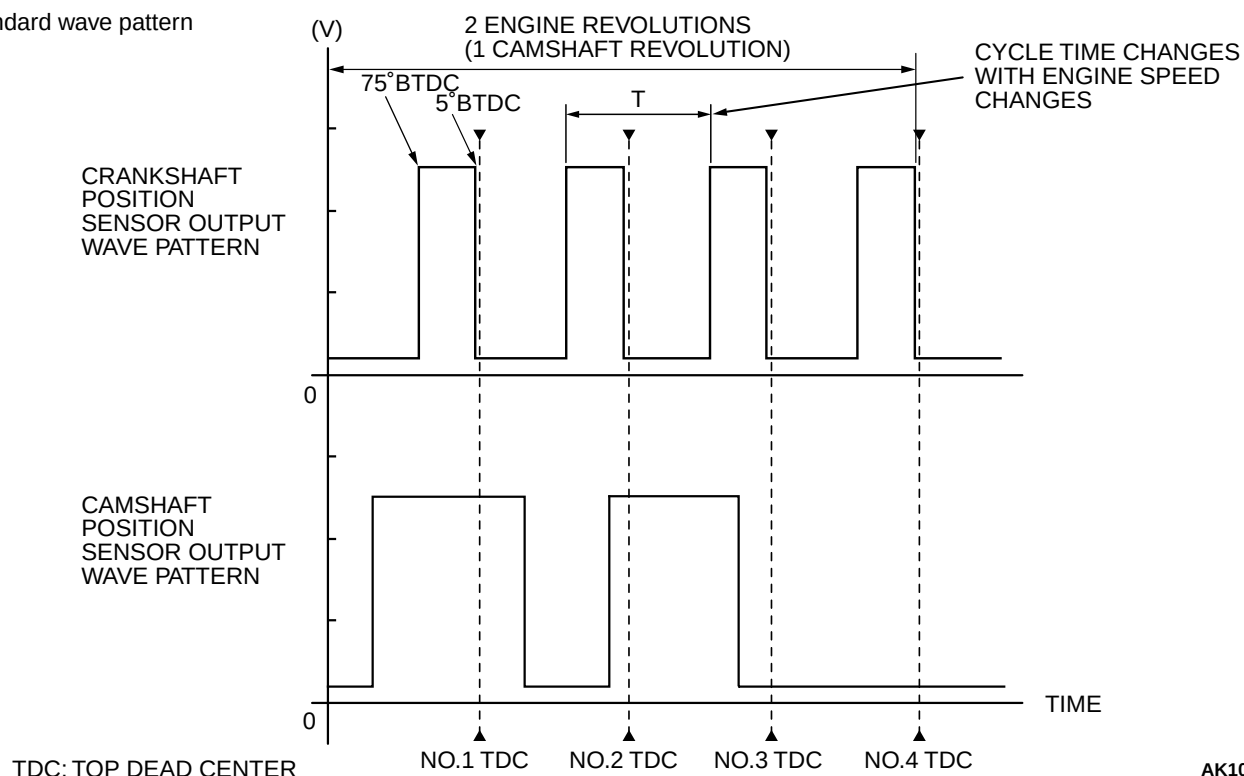
<A/T>

1. Connect the oscilloscope probe to PCM terminal No. 56.
(Check the camshaft position sensor signal wave pattern.)
2. Connect the oscilloscope probe to PCM terminal No. 45.
(Check the crankshaft position sensor signal wave pattern.)

Standard Wave Pattern

Observation conditions	
Function	Special pattern
Pattern height	Low
Pattern selector	Display
Engine r/min	Idle speed

Standard wave pattern



AK100594AB

Wave Pattern Observation Points

Check that cycle time T becomes shorter when the engine speed increased.

Examples of Abnormal Wave Patterns

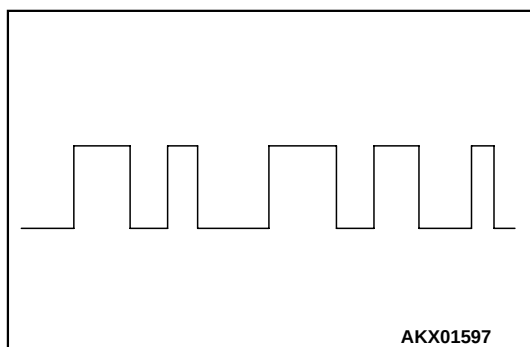
Example 1

Cause of problem

- Sensor interface malfunction.

Wave pattern characteristics

- Rectangular wave pattern is output even when the engine is not started.



AKX01597

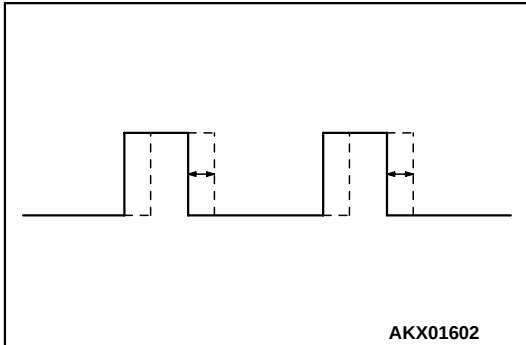
Example 2

Cause of problem

- Loose timing belt.
- Abnormality in sensor disc.

Wave pattern characteristics

- Wave pattern is displaced to the left or right.



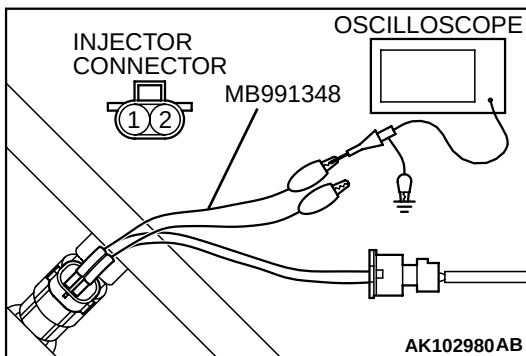
INJECTOR

Required Special Tools:

MB991348: Test Harness Set

Measurement Method

1. Disconnect the injector connector, and connect the test harness special tool (MB991348) in between. (All terminals should be connected.)
2. Connect the oscilloscope probe to injector connector terminal No. 2.



Alternate method (Test harness not available)**<M/T>**

1. Connect the oscilloscope probe to ECM terminal No. 1.
(When checking the number 1 cylinder.)
2. Connect the oscilloscope probe to ECM terminal No.14.
(When checking the number 2 cylinder.)
3. Connect the oscilloscope probe to ECM terminal No. 2.
(When checking the number 3 cylinder.)
4. Connect the oscilloscope probe to ECM terminal No. 15.
(When checking the number 4 cylinder.)

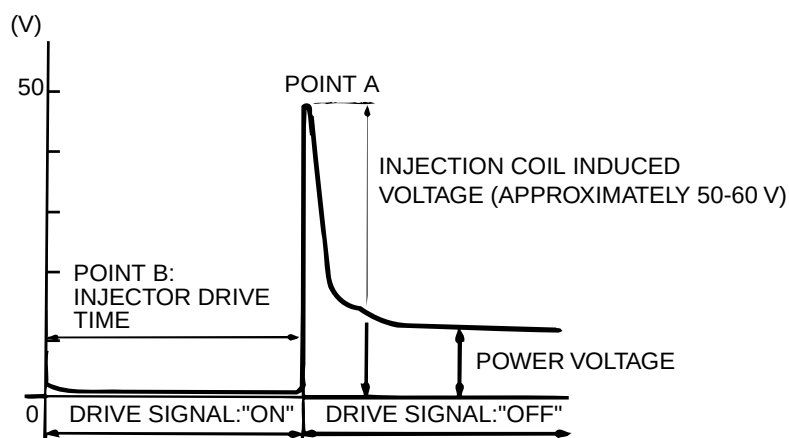
<A/T>

1. Connect the oscilloscope probe to PCM terminal No. 1.
(When checking the number 1 cylinder.)
2. Connect the oscilloscope probe to PCM terminal No. 9.
(When checking the number 2 cylinder.)
3. Connect the oscilloscope probe to PCM terminal No. 24.
(When checking the number 3 cylinder.)
4. Connect the oscilloscope probe to PCM terminal No. 2.
(When checking the number 4 cylinder.)

Standard Wave Pattern

Observation conditions	
Function	Special pattern
Pattern height	Variable
Variable knob	Adjust while viewing the wave pattern
Pattern selector	Display
Engine r/min	Idle speed

Standard wave pattern



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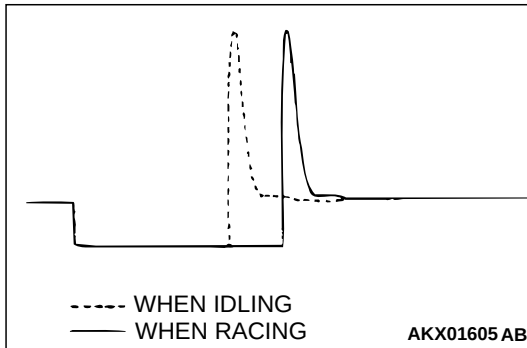
Wave Pattern Observation Points

Point A: Height of injector coil induced voltage.

CONTRAST WITH STANDARD WAVE PATTERN	PROBABLE CAUSE
Injector coil induced voltage is low or doesn't appear at all	Short in the injector solenoid

Point B: Injector drive time

1. The injector drive time should be synchronized with the scan tool tester display.
2. When the engine is suddenly revved, the drive time will be greatly extended at first, but the drive time will soon return to original length.



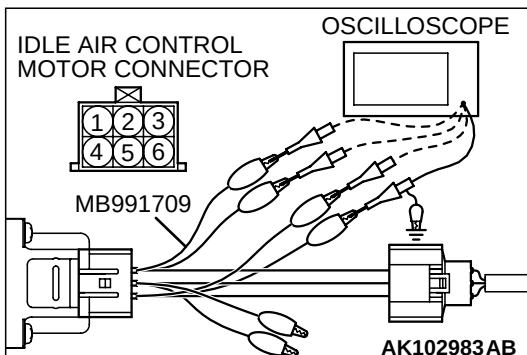
IDLE AIR CONTROL MOTOR (STEPPER MOTOR)

Required Special Tool:

MB991709: Test Harness Set

Measurement Method

1. Disconnect the idle air control motor connector, and connect the test harness special tool (MB991709) in between. (All terminals should be connected.)
2. Connect the oscilloscope probe to the idle air control motor connector terminal No. 1, terminal No. 3, terminal No. 4 and terminal No. 6 respectively.



Alternate method (Test harness not available)**<M/T>**

1. Connect the oscilloscope probe to the ECM terminal No. 4, terminal No. 5, terminal No. 17 and terminal No. 18 respectively.

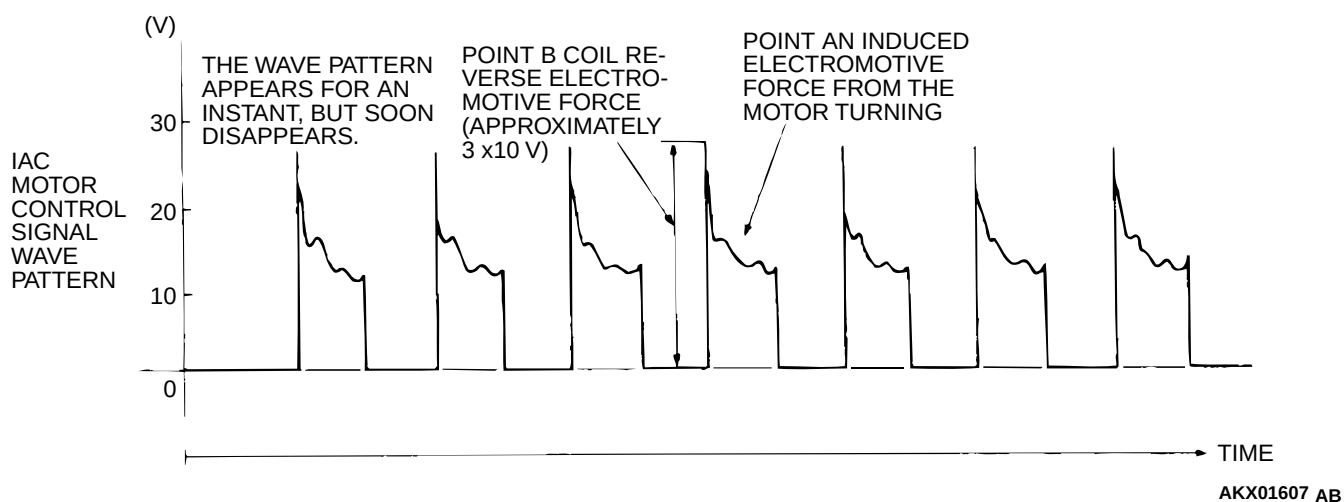
<A/T>

1. Connect the oscilloscope probe to the PCM terminal No. 14, terminal No. 15, terminal No.28 and terminal No.29 respectively.

Standard Wave Pattern

Observation conditions	
Function	Special pattern
Pattern height	High
Pattern selector	Display
Engine condition	Turn the ignition switch from "LOCK" (OFF) to "ON" (without starting the engine).
	While the engine is idling, turn the A/C switch to "ON."
	Immediately after starting the warm the engine (approximately one minute).

Standard wave pattern



Wave Pattern Observation Points

Check that the standard wave pattern appears when the idle air control motor is operating.

Point A: Presence or absence of induced electromotive force from the motor turning. (Refer to abnormal wave pattern.)

CONTRAST WITH STANDARD WAVE PATTERN	PROBABLE CAUSE
Induced electromotive force does not appear or is extremely small	Malfunction of motor

Point B: Height of coil back electromotive force

CONTRAST WITH STANDARD WAVE PATTERN	PROBABLE CAUSE
Coil reverse electromotive force does not appear or is extremely small	Short in the coil

Examples of Abnormal Wave Patterns

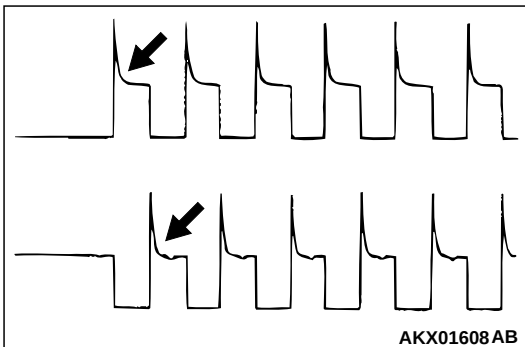
Example 1

Cause of problem

- Malfunction of motor. (Motor is not operating.)

Wave pattern characteristics

- Induced electromotive force from the motor turning does not appear.



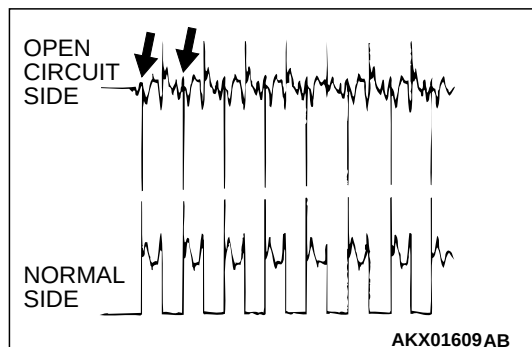
Example 2

Cause of problem

- Open circuit in the line between the idle air control motor and the ECM <M/T> or PCM <A/T>.

Wave pattern characteristics

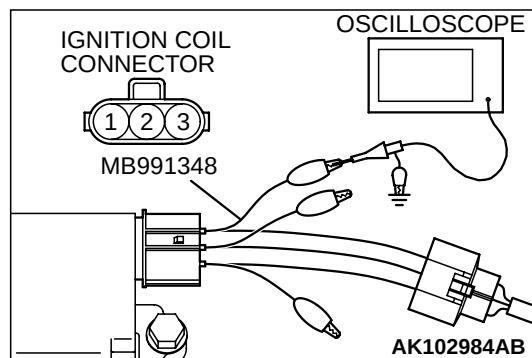
- Current is not supplied to the motor coil on the open circuit side. (Voltage does not drop to 0 volt.) Furthermore, the induced electromotive force wave pattern at the normal side is slightly different from the normal wave pattern.

**IGNITION COIL AND IGNITION POWER TRANSISTOR****Required Special Tool:**

MB991348: Test Harness Set

Measurement Method

1. Disconnect the ignition coil connector, and connect test harness special tool, MB991348, in between. (All terminals should be connected.)
2. Connect the oscilloscope probe to ignition coil connector terminal No. 3.



Alternate method (Test harness not available)

<M/T>

1. Connect the oscilloscope probe to the ECM terminal No. 10 (for number 1 – number 4), terminal No. 23 (for number 2 – number 3).

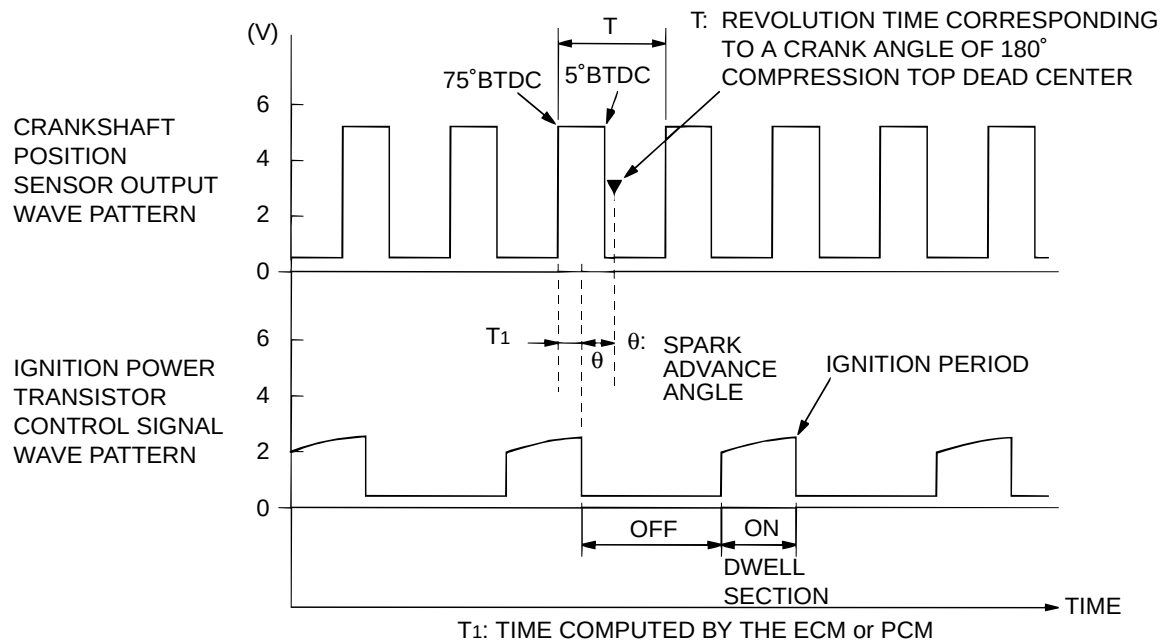
<A/T>

1. Connect the oscilloscope probe to the PCM terminal No. 11 (for number 1 – number 4), terminal No. 12 (for number 2 – number 3).

Standard Wave Pattern

Observation conditions	
Function	Special pattern
Pattern height	Low
Pattern selector	Display
Engine r/min	Approximately 1,200 r/min

Standard wave pattern



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Wave Pattern Observation Points

Point: Condition of wave pattern build-up section and maximum voltage (Refer to abnormal wave pattern examples 1 and 2).

CONDITION OF WAVE PATTERN BUILD-UP SECTION AND MAXIMUM VOLTAGE	PROBABLE CAUSE
Rises from approximate 2 volts to approximate 4.5 volts at the top-right	Normal
2-volt rectangular wave	Open-circuit in ignition primary circuit
Rectangular wave at power voltage	Ignition power transistor malfunction

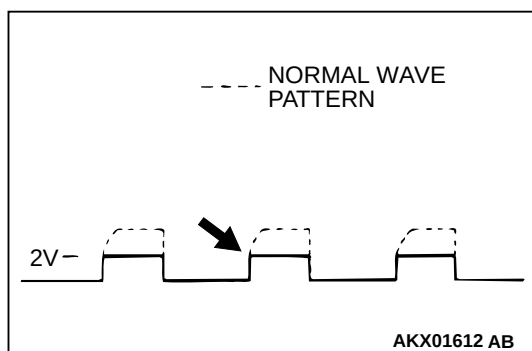
Examples of Abnormal Wave Patterns**Example 1 (Wave pattern during engine cranking)**

Cause of problem

- Open-circuit in ignition primary circuit

Wave pattern characteristics

- Top-right part of the build-up section cannot be seen, and voltage value is approximately 2 volts too low.

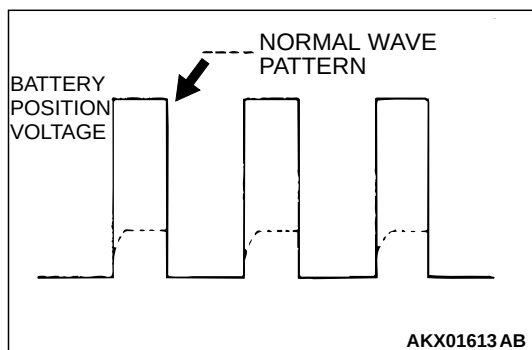
**Example 2 (Wave pattern during engine cranking)**

Cause of problem

- Malfunction in ignition power transistor

Wave pattern characteristics

- Power voltage results when the ignition power transistor is ON.



Continue