DTC P0603: EEPROM Malfunction

TECHNICAL DESCRIPTION

- ECM <M/T> or PCM <A/T> stored the information such as the idle learned value and so on in the memory of ECM <M/T> or PCM <A/T>.

DESCRIPTIONS OF MONITOR METHODS

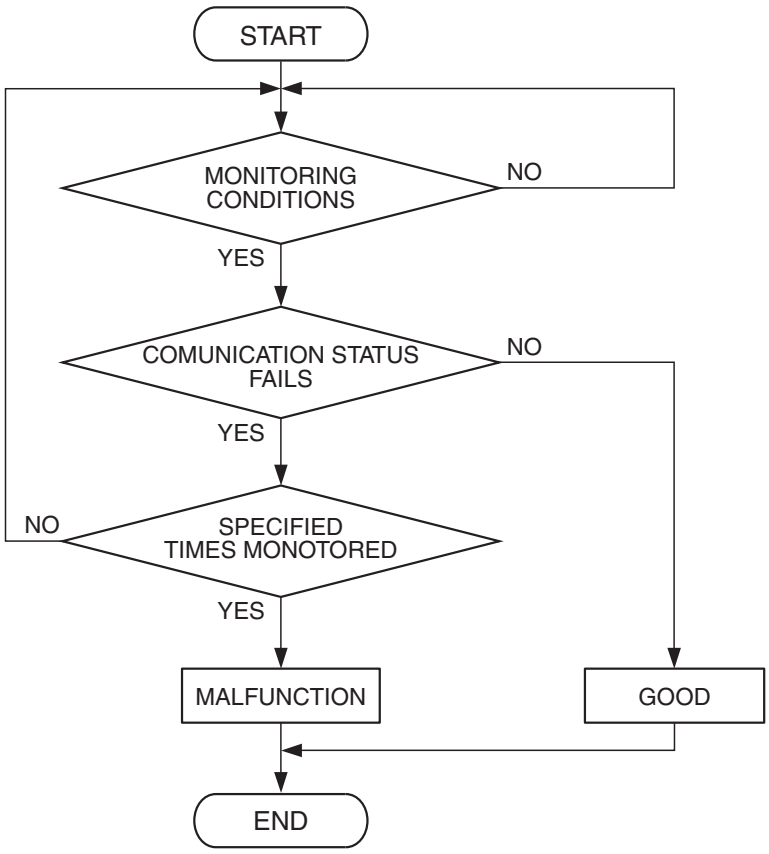
To check whether the information such as the idle learned value and so on is stored in the memory of ECM <M/T> or PCM <A/T>.

MONITOR EXECUTION

Once per driving cycle

DTC SET CONDITIONS

Logic Flow Chart



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MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

TSB Revision

Check Condition

- Ignition switch is in "ON" position.

Judgement Criterion

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

OBD-II DRIVE CYCLE PATTERN

None.

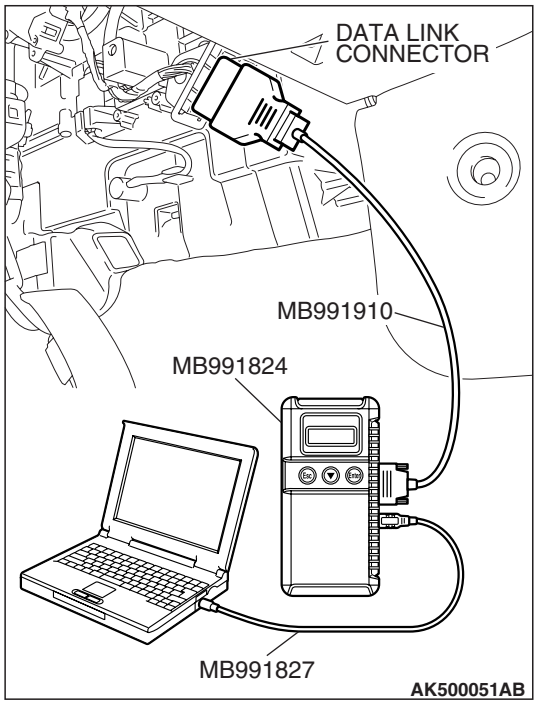
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

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

DIAGNOSIS

Required Special Tools:

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



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

⚠ CAUTION

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

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

Q: Is DTC P0603 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

DTC P0606: Engine Control Module <M/T> or Powertrain Control Module <A/T> Main Processor Malfunction

TECHNICAL DESCRIPTION

- Throttle actuator control processor checks the ECM <M/T> or the PCM <A/T> for abnormal conditions.

DESCRIPTIONS OF MONITOR METHODS

No watch dog pulse is detected.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Check Condition

- Ignition switch is "ON" position.

Judgement Criterion

- No surveillance pulse signals should be input for 0.5 second.

OBD-II DRIVE CYCLE PATTERN

None.

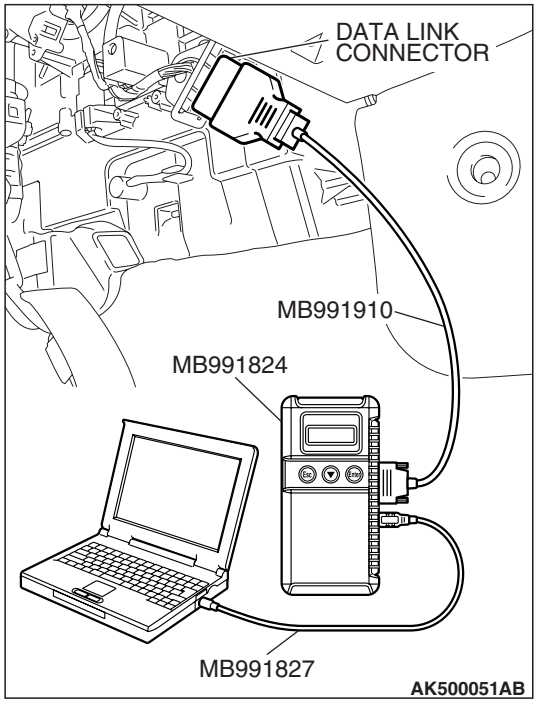
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

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

DIAGNOSIS

Required Special Tools:

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



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

⚠ CAUTION

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

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

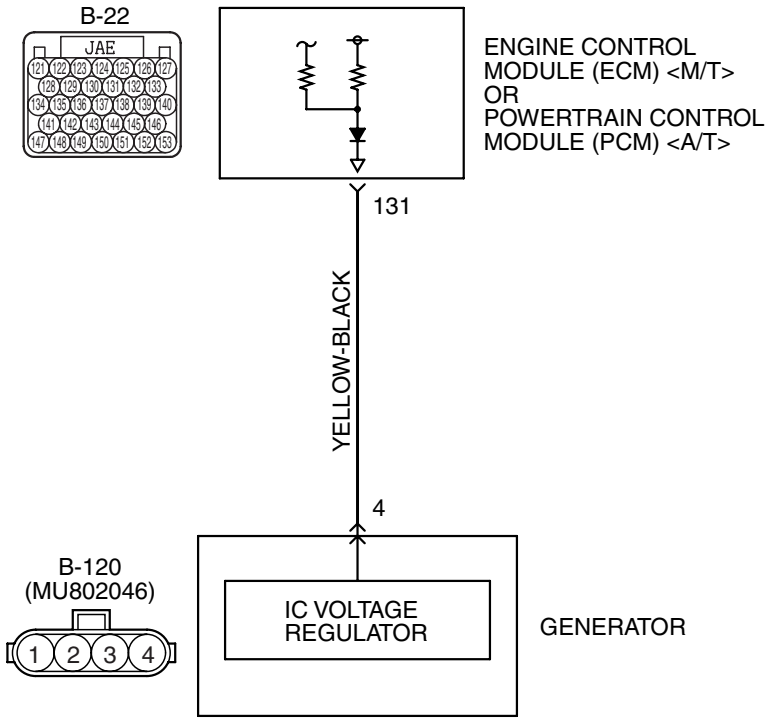
Q: Is DTC P0606 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

DTC P0622: Generator FR Terminal Circuit Malfunction

Generator Circuit



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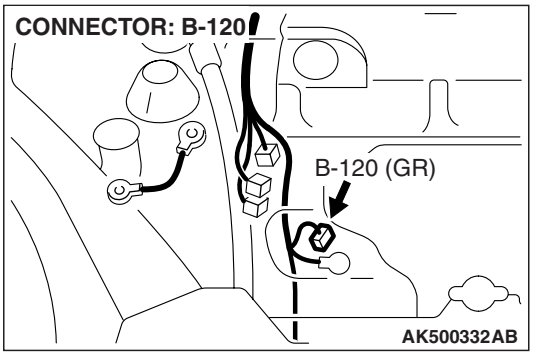

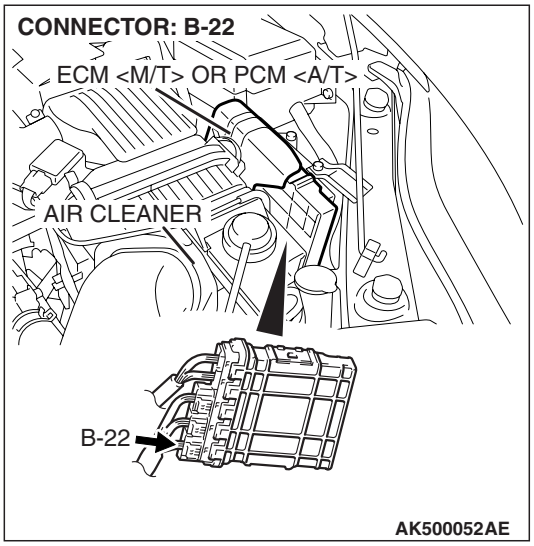

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CIRCUIT OPERATION

- The ECM <M/T> or the PCM <A/T> (terminal No. 131) apply a battery voltage into the generator FR terminal No. 4 via resistance inside the unit.

TECHNICAL DESCRIPTION

- When the generator field coils are controlled, the generator FR terminal inputs signal to the ECM <M/T> or the PCM <A/T>.
- The ECM <M/T> or the PCM <A/T> detects the generator output with the input signal, and controls the idle air control motor according to the generator output.

DTC SET CONDITIONS

Check Condition

- Engine speed is higher than 50 r/min.

Judgement Criterion

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

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

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

DIAGNOSIS

Required Special Tools:

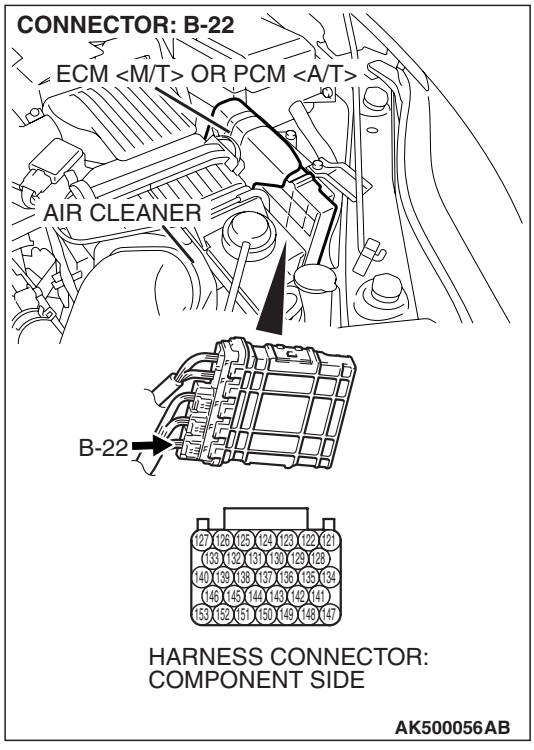
- MB991958: Scan tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MB991923: Power Plant ECU Check Harness

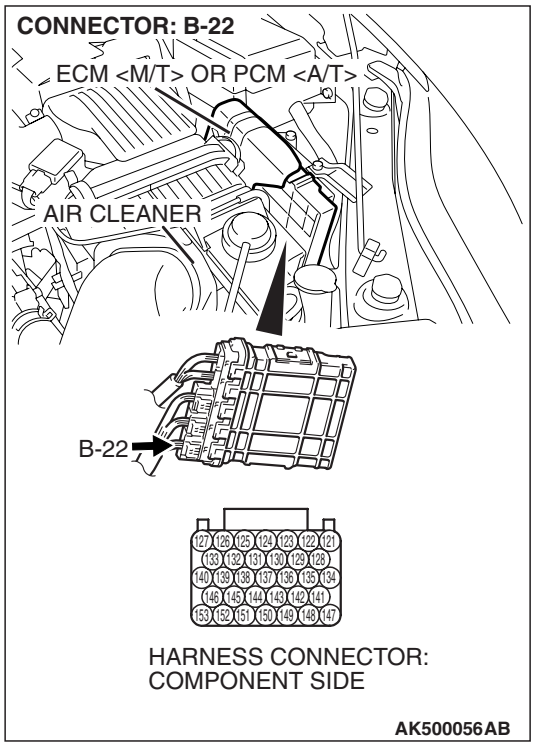
STEP 1. Check harness connector B-22 at ECM <M/T> or PCM <A/T> connector for damage.

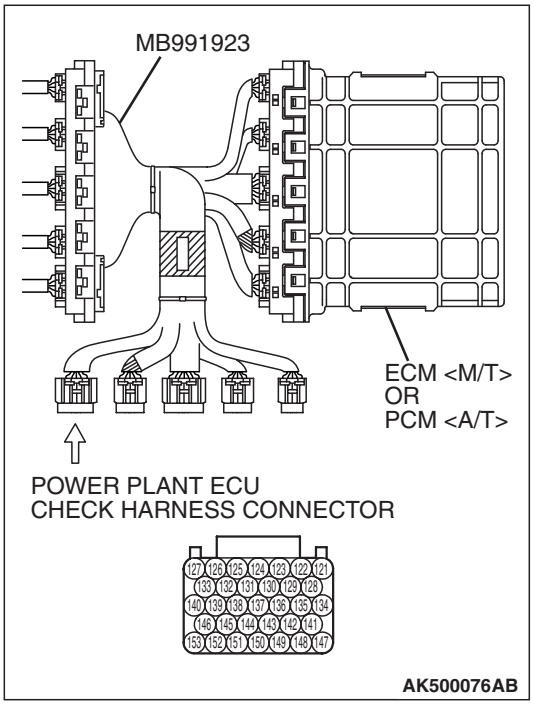
Q: Is the harness connector in good condition?

YES : Go to Step 2.

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

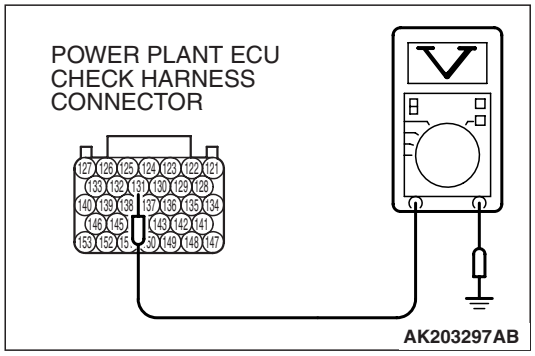






STEP 2. Measure the voltage at ECM <M/T> or PCM <A/T> connector B-22 by using power plant ECU check harness special tool MB991923.

(1) Disconnect all ECM <M/T> connectors or PCM <A/T> connectors. Connect the power plant ECU check harness special tool MB991923 between the separated connectors.
(2) Start the engine and run at idle.



(3) Measure the voltage between terminal No. 131 and ground.

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

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

- Voltage should be drop.

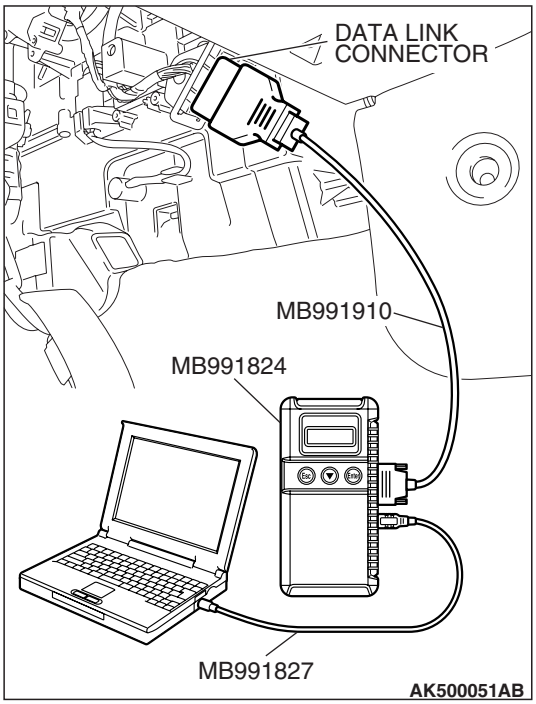
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Did the measured voltage drop?

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

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

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

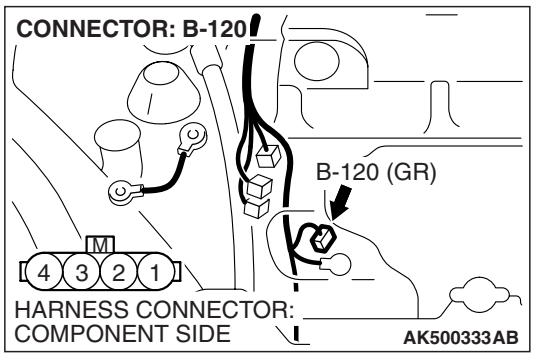


(1) Connect scan tool MB991958 to the data link connector.
(2) Start the engine and run at idle.
(3) Read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P0622 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 8.
NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

STEP 4. Check harness connector B-120 at generator connector for damage.



Q: Is the harness connector in good condition?

YES : Go to Step 5.
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 8.

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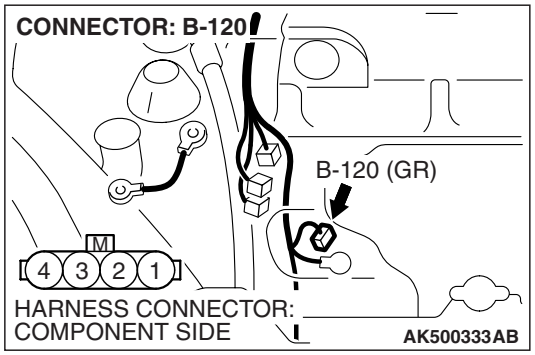
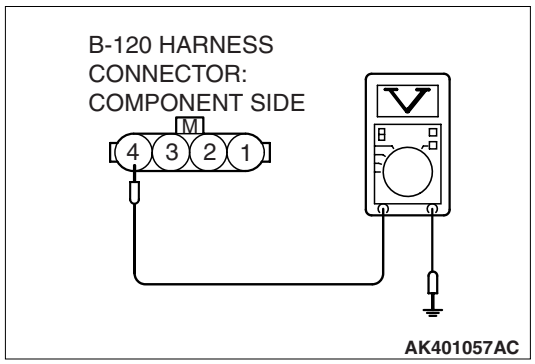


STEP 5. Measure the voltage at generator harness side connector B-120.

(1) Disconnect the connector B-120 and measure at the harness side.

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



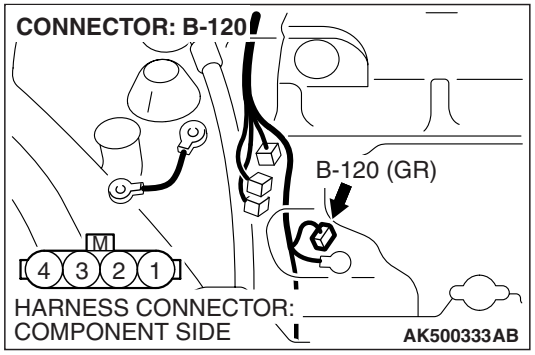
(3) Measure the voltage between terminal No. 4 and ground.
- Voltage should measure battery positive voltage.

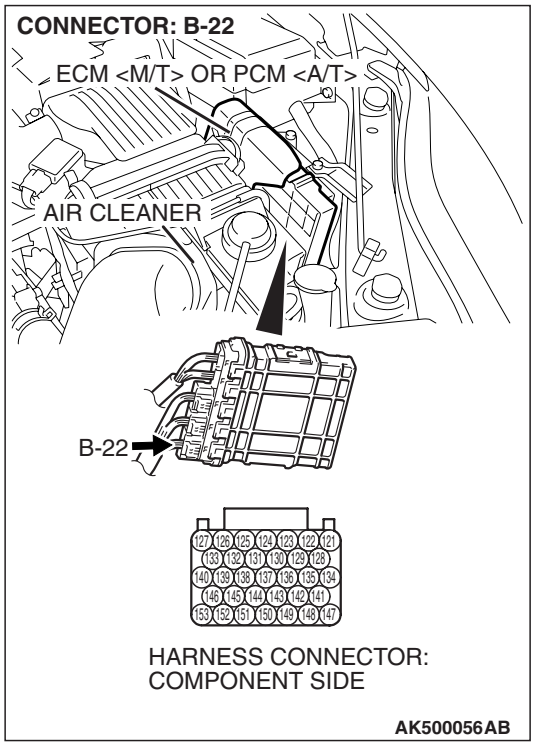
(4) Turn the ignition switch to the "LOCK" (OFF) position.

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

YES : Go to Step 7.

NO : Go to Step 6.



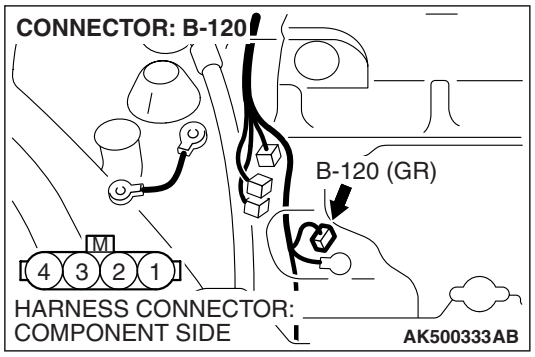


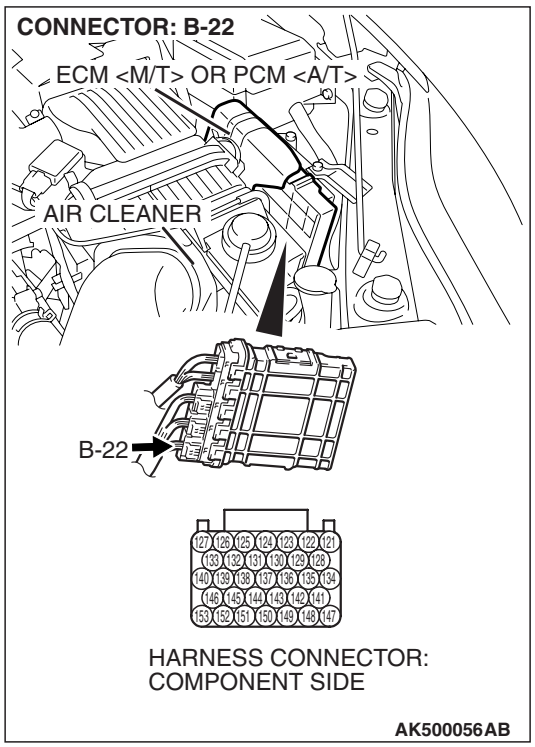
STEP 6. Check for open circuit and short circuit to ground between generator connector B-120 (terminal No. 4) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 131).

Q: Is the harness wire in good condition?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 8.

NO : Repair it. Then go to Step 8.



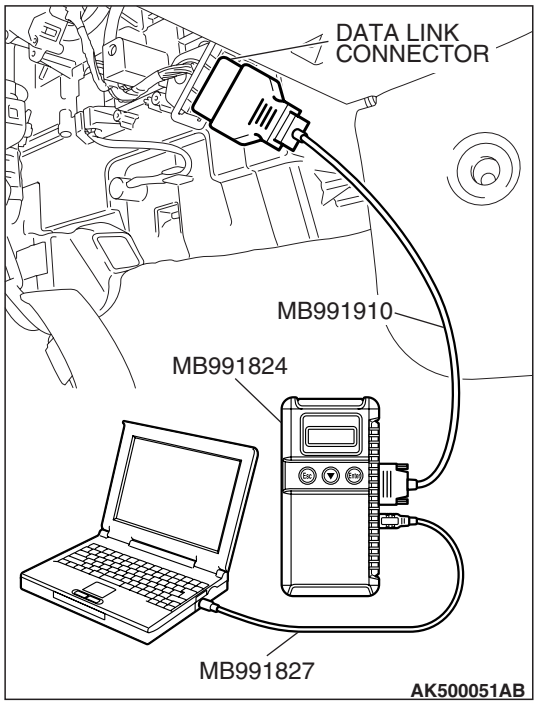


STEP 7. Check for harness damage between generator connector B-120 (terminal No. 4) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 131).

Q: Is the harness wire in good condition?

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

NO : Repair it. Then go to Step 8.



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

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

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

Q: Is DTC P0622 set?

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

DTC P0630: Vehicle Identification Number (VIN) Malfunction

TECHNICAL DESCRIPTION

- The Vehicle Identification Number (VIN) is stored in the ECM <M/T> or the PCM <A/T> by the vehicle manufacturer.

DESCRIPTIONS OF MONITOR METHODS

The ECM <M/T> or the PCM <A/T> checks whether the VIN is being entered or not.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

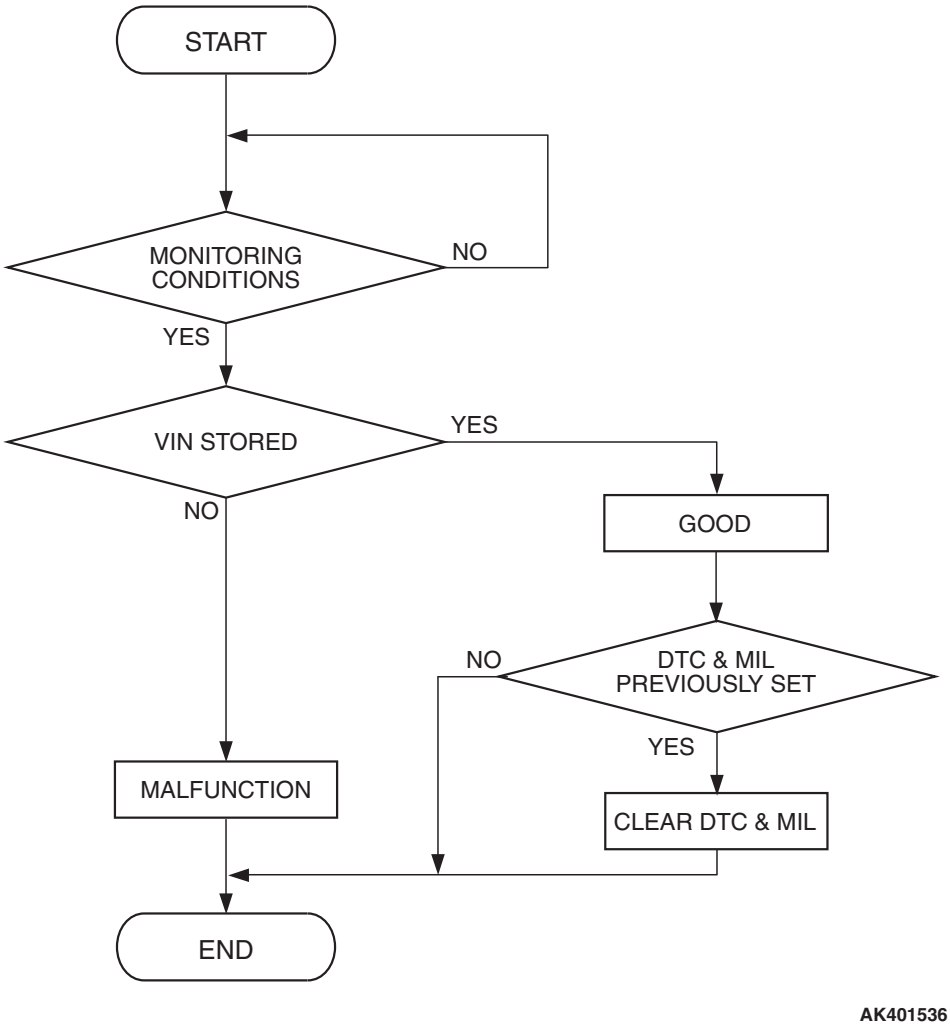
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



Check Condition
- Ignition switch is in "ON" position.

Judgement Criterion
- VIN (current) has not been written.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)
- ECM failed. <M/T>
- PCM failed. <A/T>

OBD-II DRIVE CYCLE PATTERN
None.

DIAGNOSIS

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

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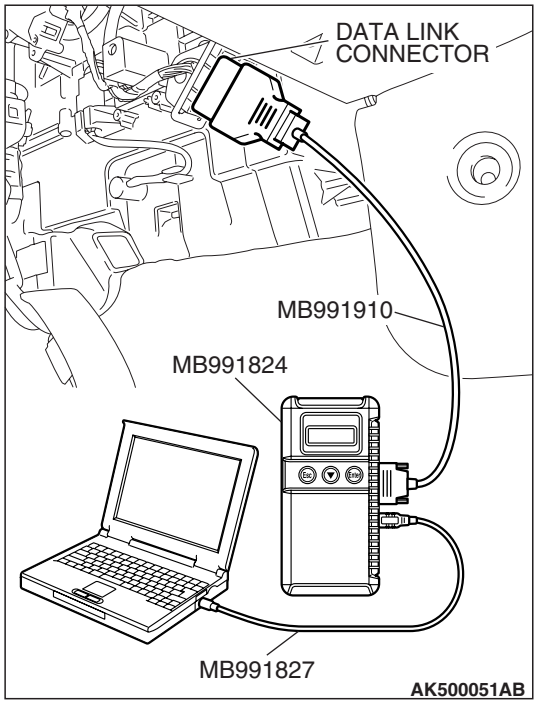


STEP 1. Using scan tool MB991958, check VIN Information.

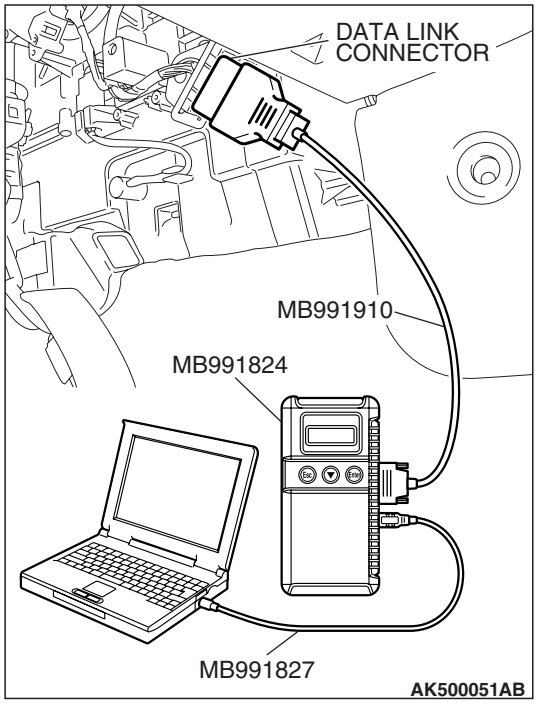
⚠ CAUTION

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

(1) Connect scan tool MB991958 to the data link connector.
(2) Set scan tool MB991958 to the coding mode for VIN Information.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Has VIN (current) been written?

YES : Go to Step 2.
NO : Write VIN. Then go to Step 3.

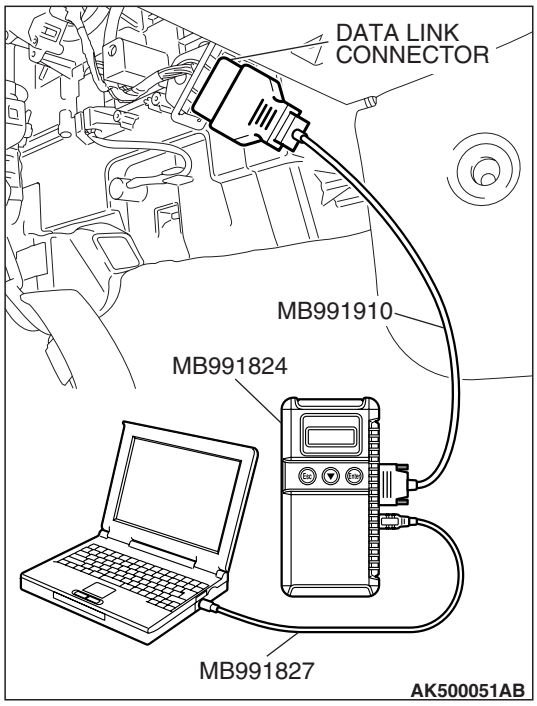


STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC)

(1) Turn the ignition switch to the "ON" position.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0630 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13.
NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.



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

(1) Turn the ignition switch to the "ON" position.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0630 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13.

NO : The inspection is complete.

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

⚠ CAUTION
If DTC P0638 has been set, TCL related DTC U1120 is also set. After P0638 has been diagnosed, don't forget to erase DTC U1120.

THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE PROBLEM CIRCUIT

- Refer to DTC P2101 –Throttle Actuator Control Motor Circuit P.13A-915.

CIRCUIT OPERATION

- Refer to DTC P2101 –Throttle Actuator Control Motor Circuit P.13A-915.

TECHNICAL DESCRIPTION

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

DESCRIPTIONS OF MONITOR METHODS

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

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Check Conditions

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

Judgement Criterion

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

Check Conditions

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

Judgement Criterion

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

OBD-II DRIVE CYCLE PATTERN

None.

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

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

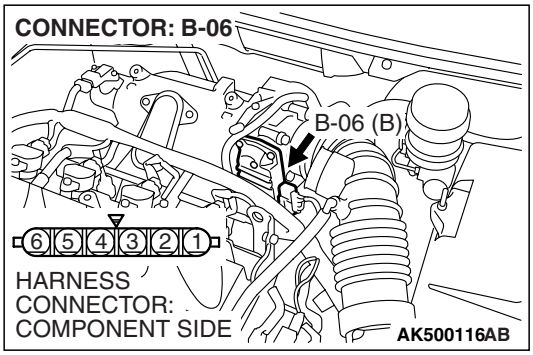
DIAGNOSIS

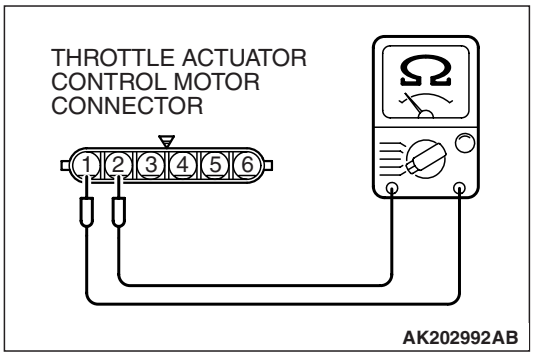
Required Special Tools:

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

STEP 1. Check the throttle actuator control motor.

(1) Disconnect the connector B-06.





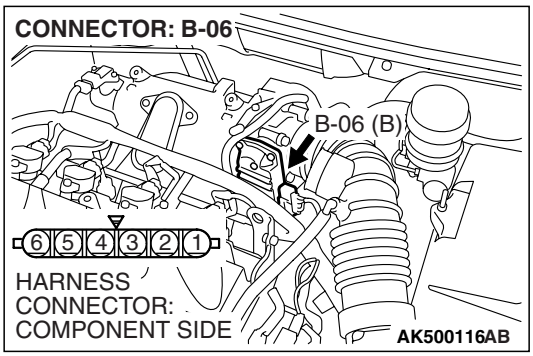
(2) Measure the resistance between throttle actuator control motor side connector terminal No. 1 and No. 2.

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

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

YES : Go to Step 2.

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

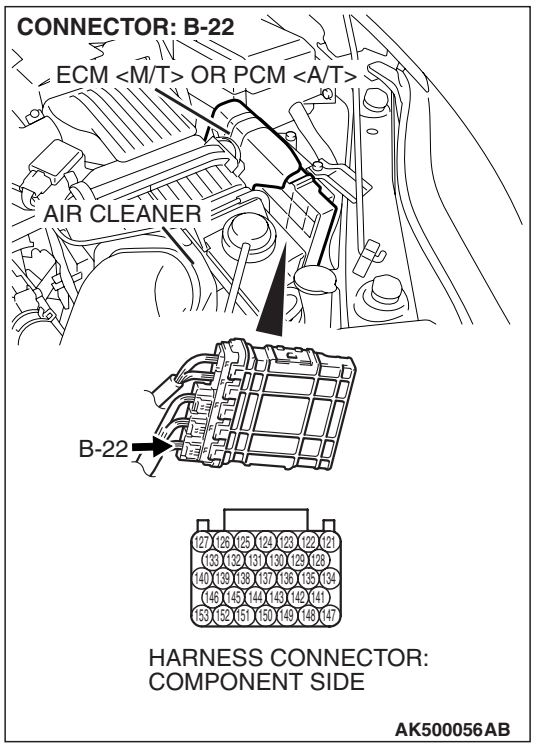


STEP 2. Check harness connector B-06 at throttle actuator control motor for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 3.

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

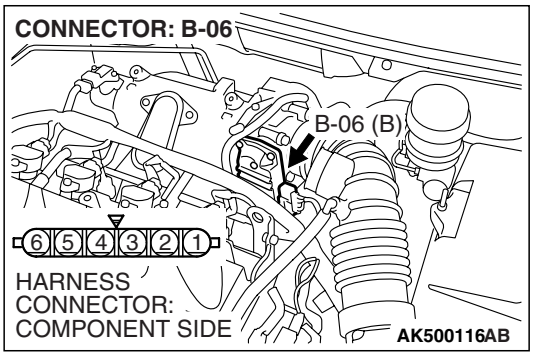


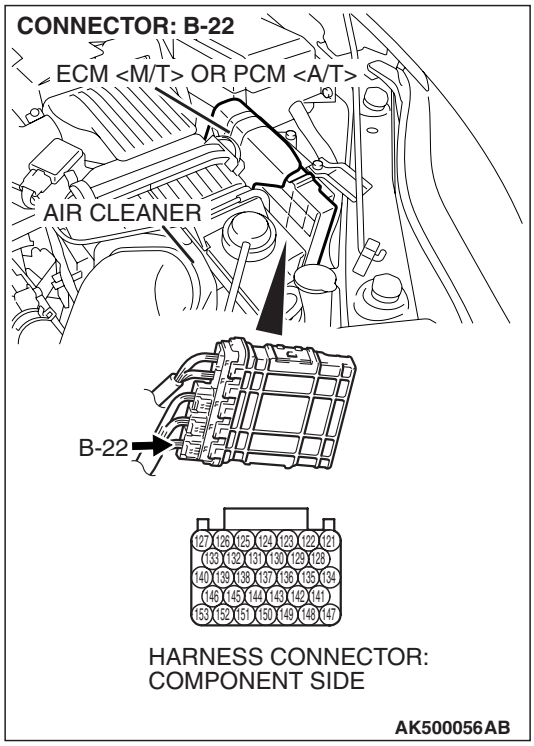
STEP 3. Check harness connector B-22 at ECM <M/T> or PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 4.

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



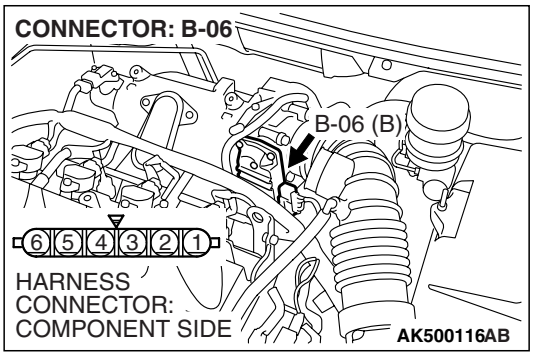


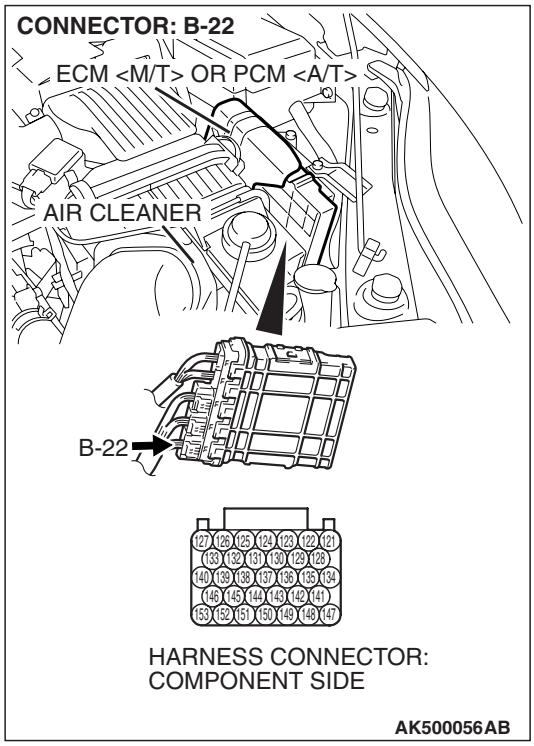
STEP 4. Check for harness damage between throttle actuator control motor connector B-06 (terminal No. 1) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 147).

Q: Is the harness wire in good condition?

YES : Go to Step 5.

NO : Repair it. Then go to Step 7.



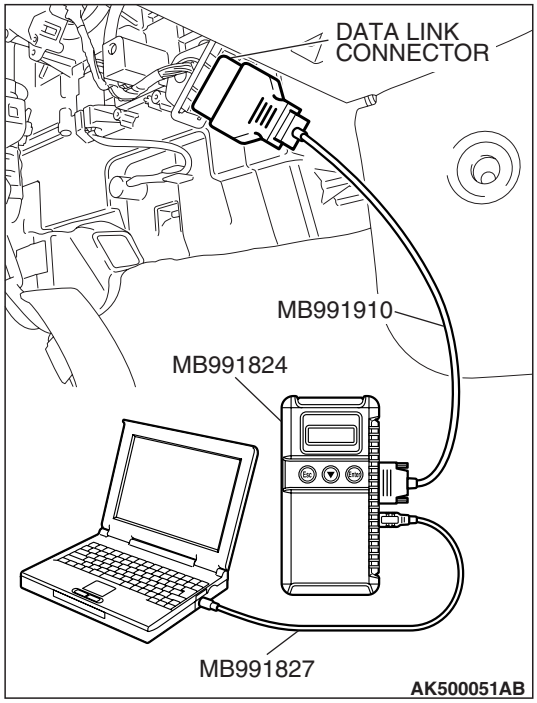


STEP 5. Check for harness damage between throttle actuator control motor connector B-06 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 141).

Q: Is the harness wire in good condition?

YES : Go to Step 6.

NO : Repair it. Then go to Step 7.



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

⚠ CAUTION

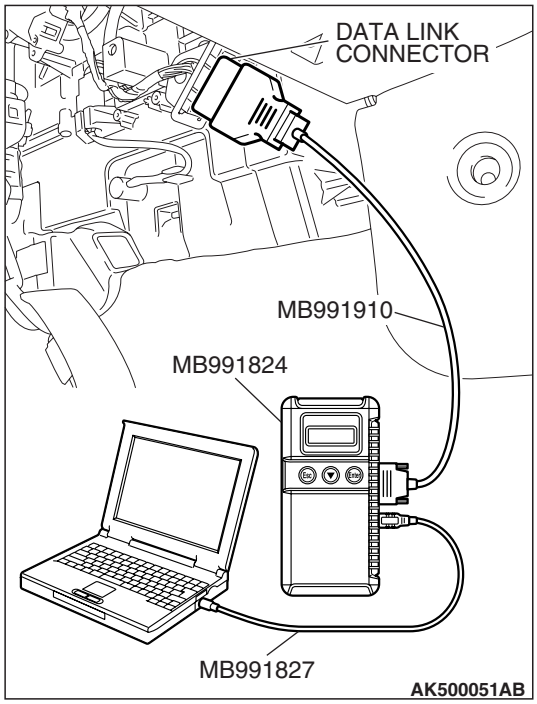
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is DTC P0638 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 7.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.



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

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

Q: Is DTC P0638 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0642: Throttle Position Sensor Power Supply

TECHNICAL DESCRIPTION

- ECM <M/T> or PCM <A/T> checks the throttle position sensor power voltage for abnormal conditions.

DESCRIPTIONS OF MONITOR METHODS

Throttle position sensor source voltage is smaller than the specified value.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Check Conditions

- Battery positive voltage is higher than 6.3 volts.

Judgement Criteria

- Throttle position sensor power voltage should be 4.1 volts or less for 0.5 second.

OBD-II DRIVE CYCLE PATTERN

None.

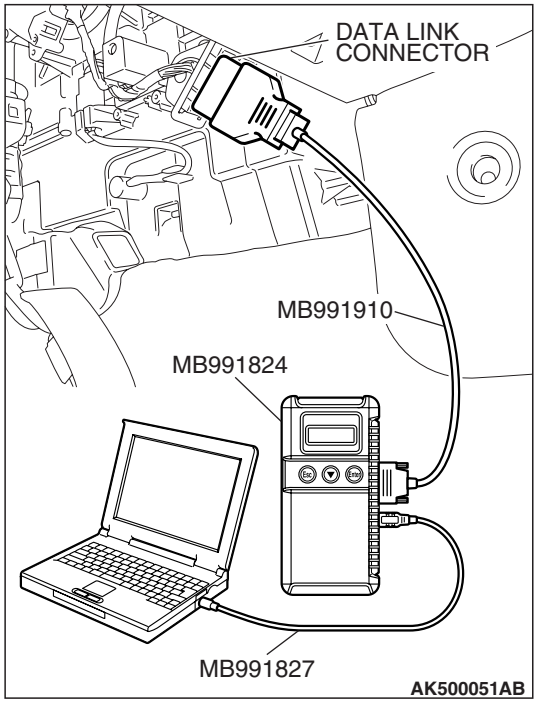
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

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

DIAGNOSIS

Required Special Tools:

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



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

⚠ CAUTION

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

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

Q: Is DTC P0642 set?

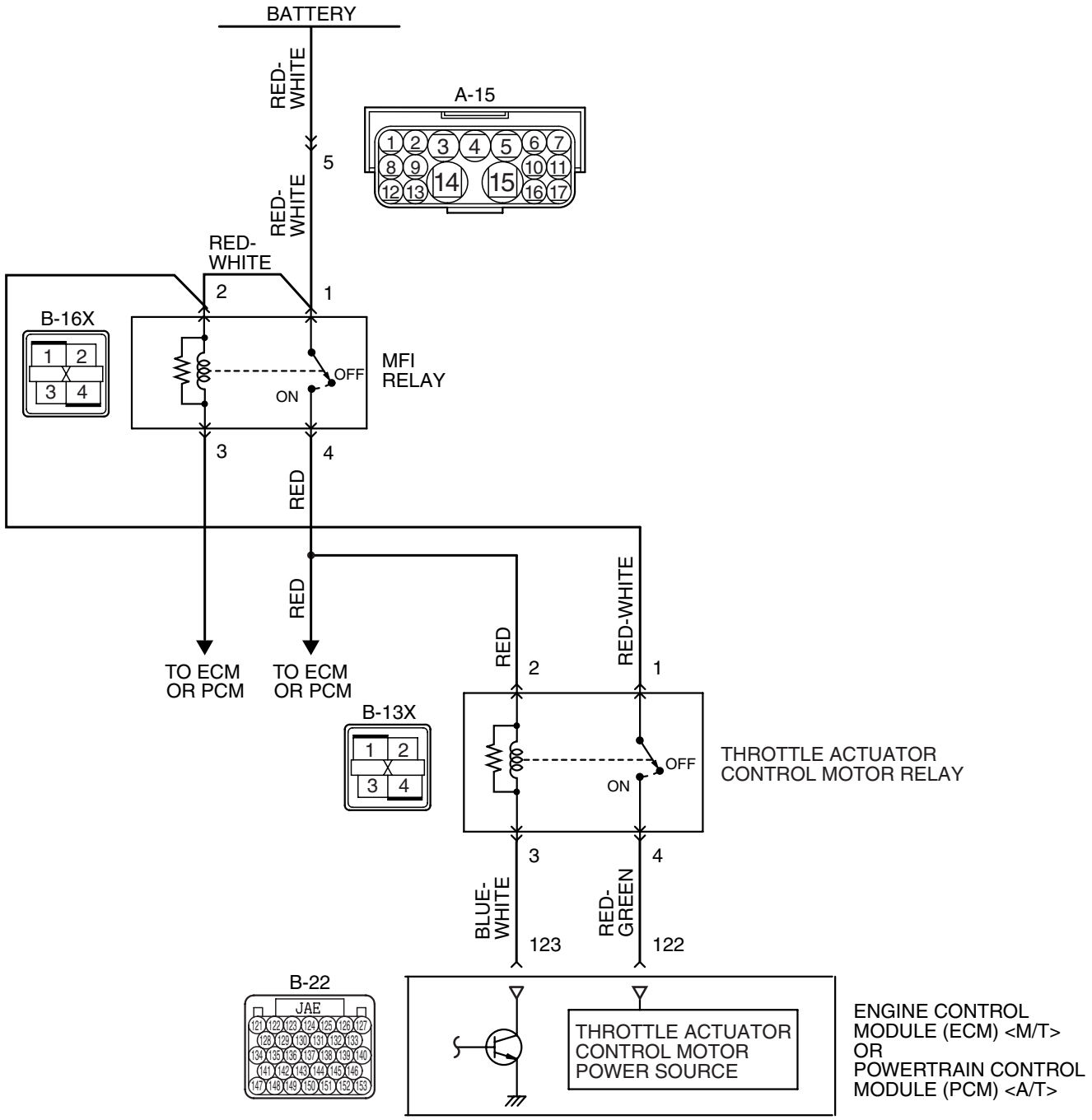
YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

DTC P0657: Throttle Actuator Control Motor Relay Circuit Malfunction

⚠ CAUTION
If DTC P0657 has been set, TCL related DTC U1120 is also set. After P0657 has been diagnosed, don't forget to erase DTC U1120.

Throttle Actuator Contorol Motor Relay Circuit



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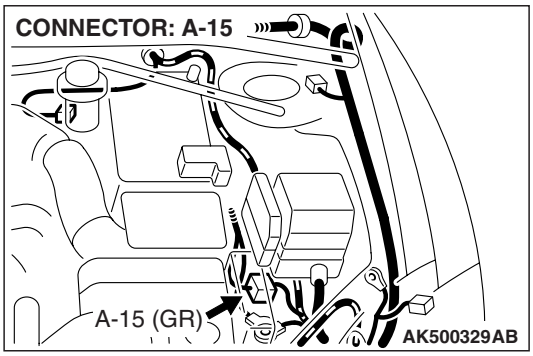

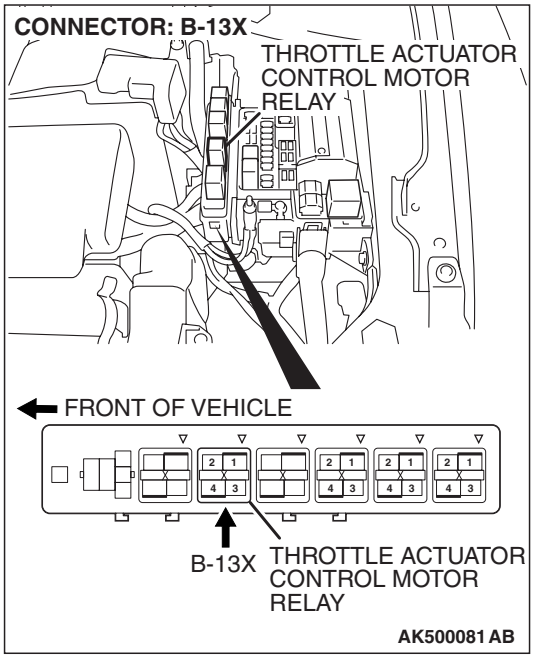

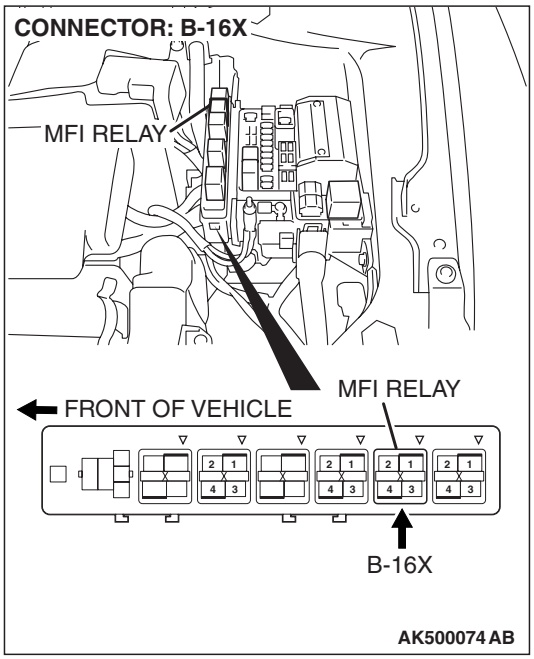

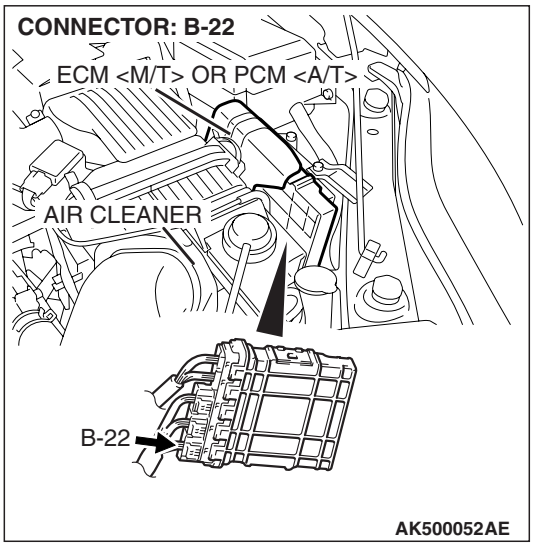

CIRCUIT OPERATION

- Battery positive voltage is applied to the throttle actuator control motor relay terminal (terminal No. 1).
- Battery positive voltage is applied to the throttle actuator control motor relay terminal (terminal No. 2) from the MFI relay (terminal No. 4).
- ECM <M/T> or PCM <A/T> (terminal No. 123) applies current to the throttle actuator control motor relay coil by turning ON the power transistor in the unit in order to turn the relay ON.
- When the throttle actuator control motor relay turns ON, battery positive voltage is supplied by the throttle actuator control motor relay (terminal No. 4) to the ECM <M/T> or the PCM <A/T> (terminal No. 122).

TECHNICAL DESCRIPTION

- When the ignition switch ON signal is input into the ECM <M/T> or the PCM <A/T>, the ECM <M/T> or the PCM <A/T> turns ON the throttle actuator control motor relay.

DESCRIPTIONS OF MONITOR METHODS

Throttle actuator control motor relay circuit voltage is smaller than the specified value.

MONITOR EXECUTION

Continuous

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MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

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

DTC SET CONDITIONS

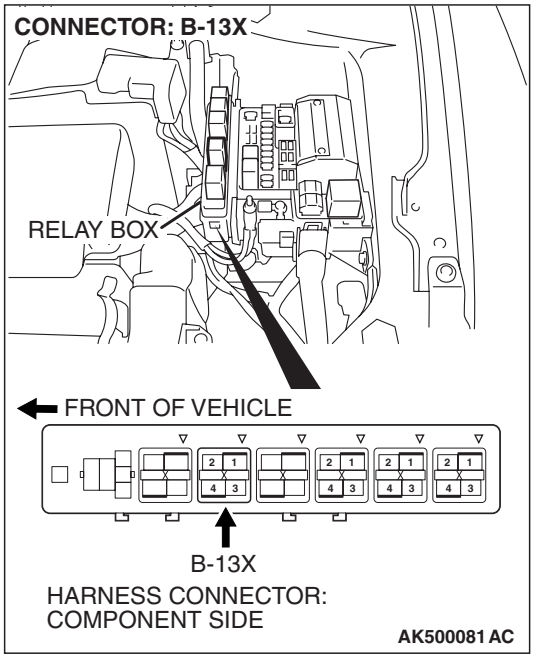
Check Condition
- Battery positive voltage is higher than 8.3 volts.

Judgement Criterion
- The power line voltage of the electronic controlled throttle valve system should be 6.0 volts or less for 0.35 second.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)
- Throttle actuator control motor relay failed.
- Open or shorted throttle actuator control motor relay circuit, or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

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



STEP 1. Check harness connector B-13X at throttle actuator control motor relay for damage.
Q: Is the harness connector in good condition?

YES : Go to Step 2.

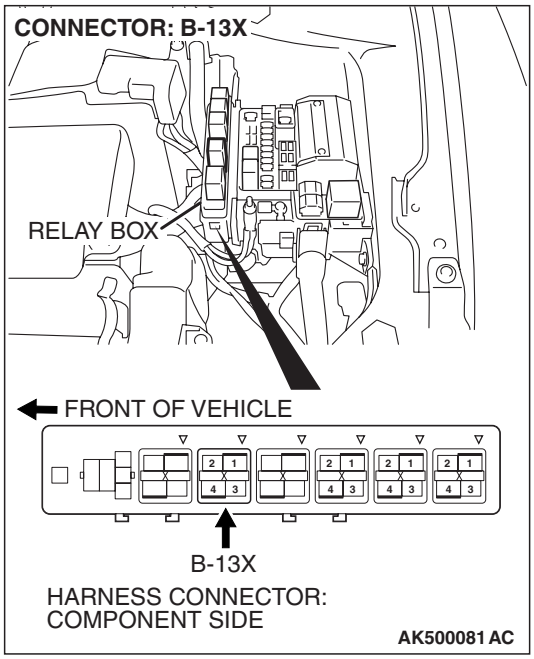
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 14.

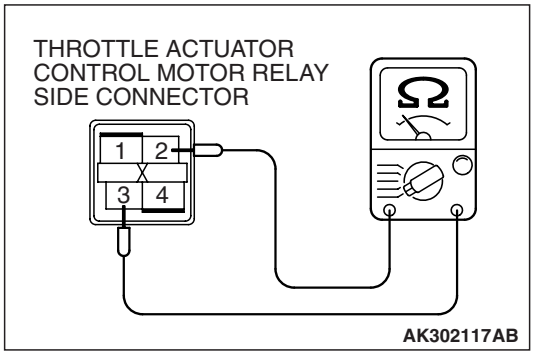
STEP 2. Check the throttle actuator control motor relay.

⚠ CAUTION

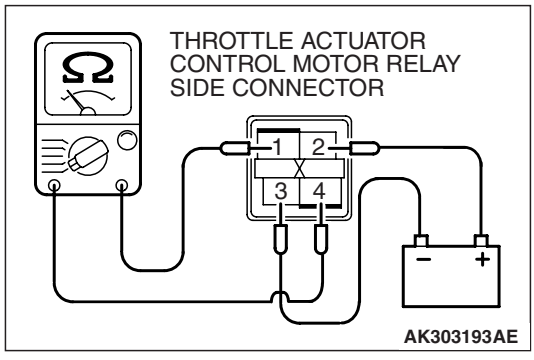
Because it is not possible to distinguish the top and the bottom of the throttle actuator control motor relay, inspect it with the triangle mark printed on the relay facing upward.

(1) Remove the throttle actuator control motor relay.





(2) Check for continuity between the throttle actuator control motor relay terminal No. 2 and No. 3.
- There should be continuity (approximately 70 ohms).



(3) Use jumper wires to connect throttle actuator control motor relay terminal No. 2 to the positive battery terminal and terminal No. 3 to the negative battery terminal.
(4) Check the continuity between the throttle actuator control motor relay terminal No. 1 and No. 4 while connecting and disconnecting the jumper wire at the negative battery terminal.
- Should be less than 2 ohms. (Negative battery terminal connected.)
- Should be open loop. (Negative battery terminal disconnected.)

(5) Install the throttle actuator control motor relay.

Q: Is the measured resistance normal?

YES : Go to Step 3.
NO : Replace the throttle actuator control motor relay. Then go to Step 14.

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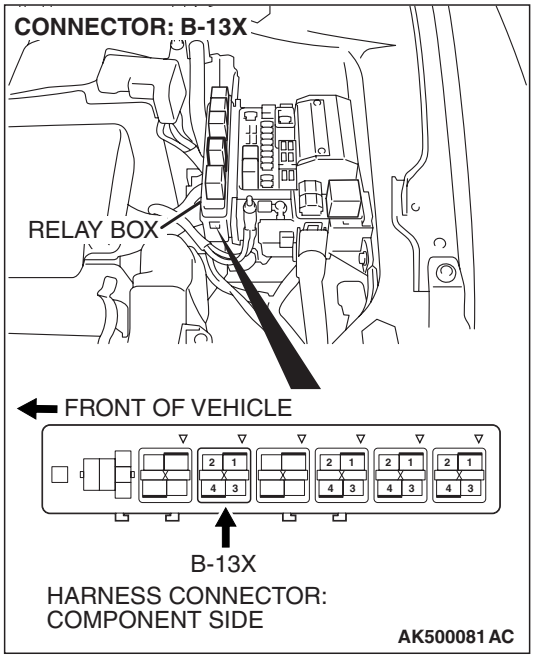
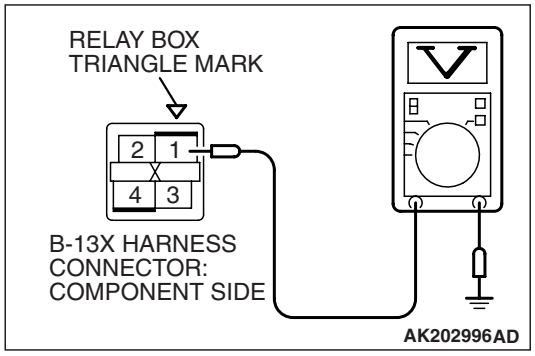
STEP 3. Measure the power supply voltage at throttle actuator control motor relay harness side connector B-13X

⚠ CAUTION

Because it is difficult to distinguish the top and bottom of the throttle actuator control motor relay connector at the wiring harness, inspect it by using triangle mark on the junction block as a reference.

(1) Disconnect the connector B-13X and measure at the harness side.





(2) 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 4.

NO : Check harness connector A-15 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. If intermediate connector A-15 is in good condition, repair it because of open circuit or short circuit to ground between battery and throttle actuator control motor relay connector B-13X (terminal No. 1). Then go to Step 14.

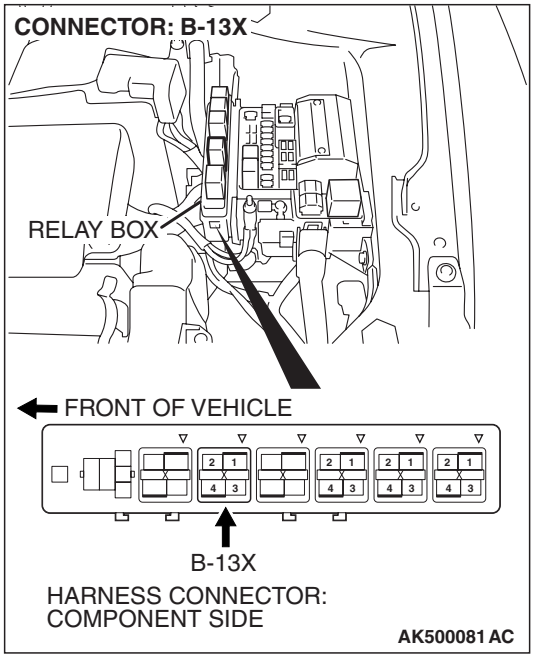
STEP 4. Measure the power supply voltage at throttle actuator control motor relay harness side connector B-13X.

⚠ CAUTION

Because it is difficult to distinguish the top and bottom of the throttle actuator control motor relay connector at the wiring harness, inspect it by using triangle mark on the junction block as a reference.

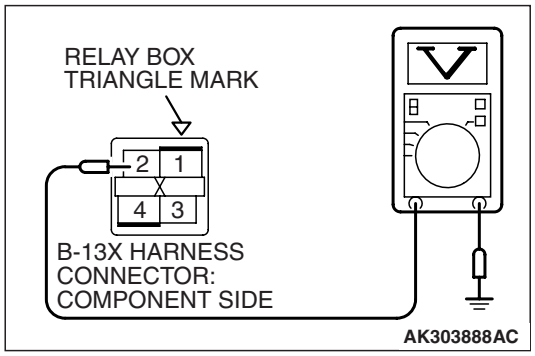
(1) Disconnect the connector B-13X and measure at the harness side.

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



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

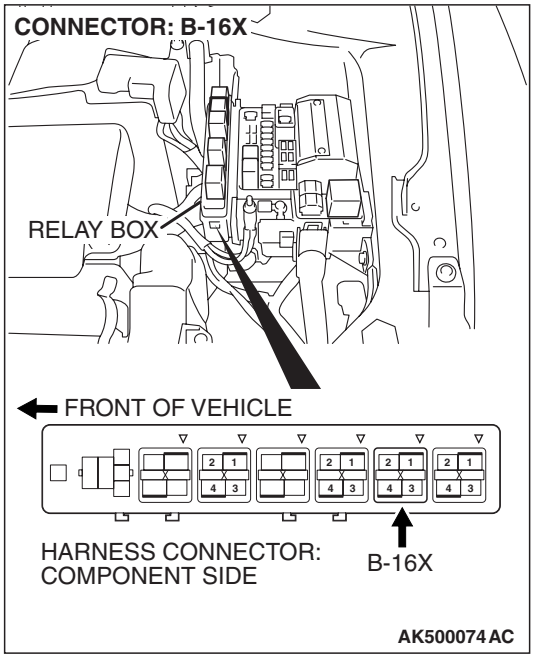
(4) Turn the ignition switch to the "LOCK" (OFF) position.



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

YES : Go to Step 6.

NO : Go to Step 5.



STEP 5. Check harness connector B-16X at MFI relay for damage.

Q: Is the harness connector in good condition?

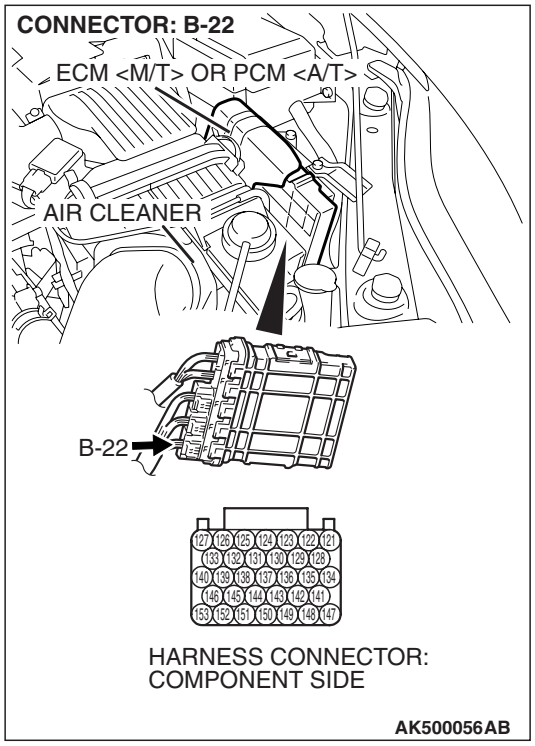
YES : Repair harness wire between MFI relay connector B-16X (terminal No. 4) and throttle actuator control motor relay connector B-13X (terminal No. 2) because of open circuit or short circuit to ground. Then go to Step 14.

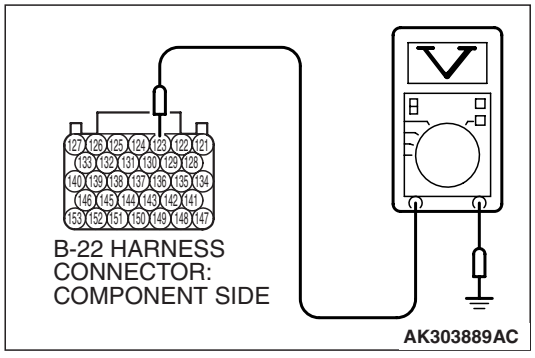
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 14.

STEP 6. Measure the power supply voltage at ECM <M/T> or PCM <A/T> harness side connector B-22.

(1) Disconnect the connector B-22 and measure at the harness side.

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





(3) Measure the voltage between terminal No. 123 and ground.
- Voltage should be battery positive voltage.

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

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

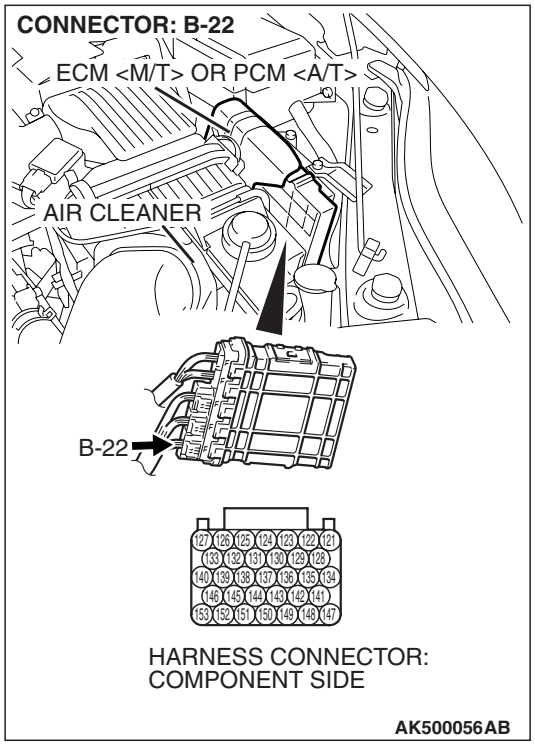
YES : Go to Step 7.

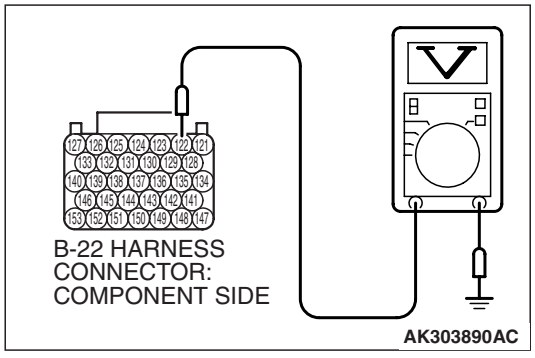
NO : Repair harness wire between throttle actuator control motor relay connector B-13X (terminal No. 3) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 123) because of open circuit or short circuit to ground. Then go to Step 14.

STEP 7. Measure the power supply voltage at ECM <M/T> or PCM <A/T> harness side connector B-22.

(1) Disconnect the connector B-22 and measure at the harness side.

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





(3) Measure the voltage between terminal No. 122 and ground.
- Voltage should be battery positive voltage.

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

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

YES : Go to Step 10.

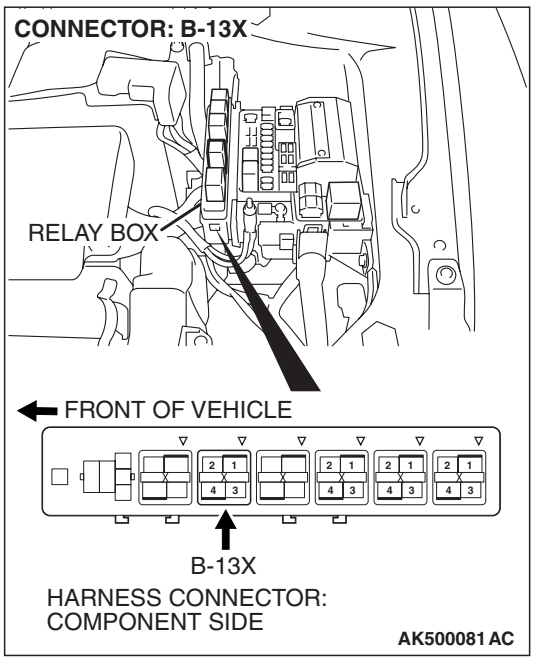
NO : Go to Step 8.

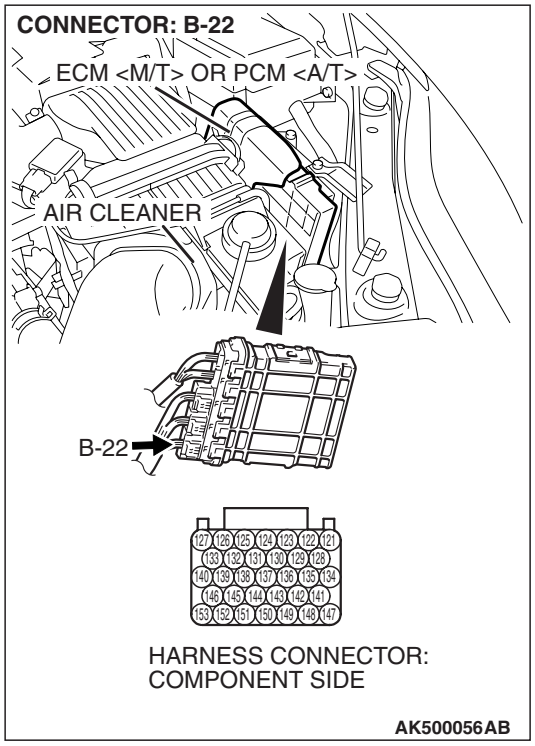
STEP 8. Check for open circuit and short circuit to ground between throttle actuator control motor relay connector B-13X (terminal No. 4) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 122).

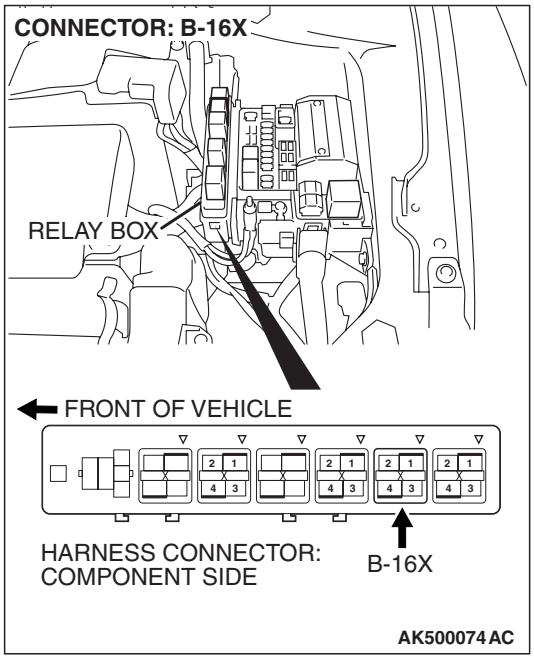
Q: Is the harness wire in good condition?

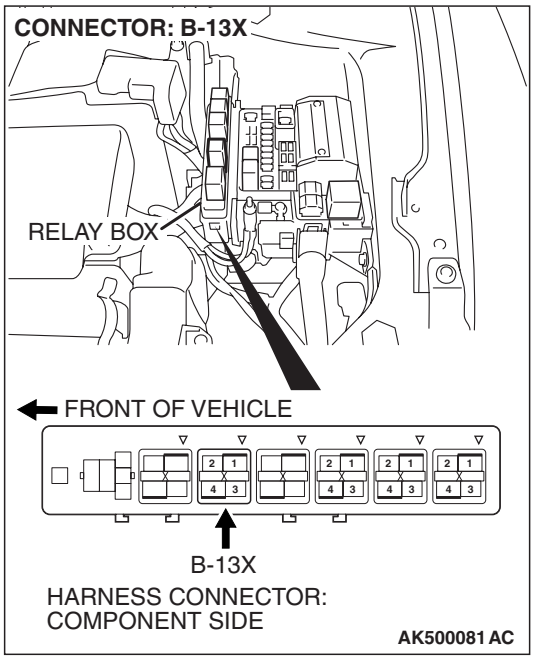
YES : Go to Step 9.

NO : Repair it. Then go to Step 14.







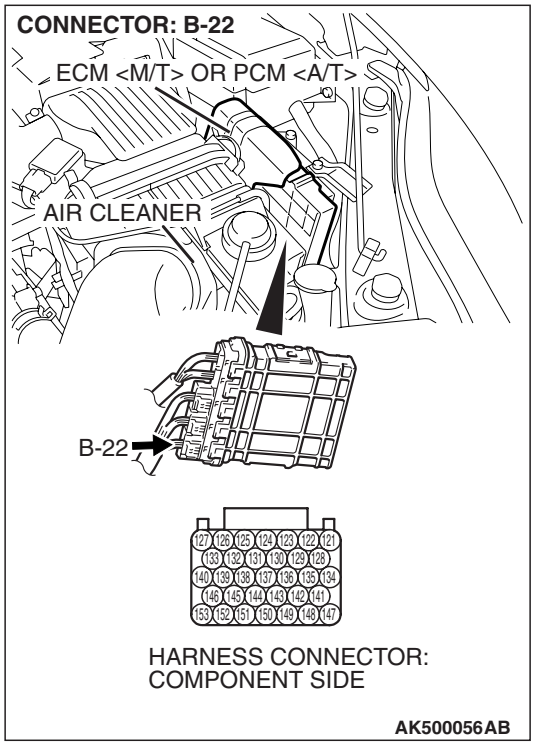


STEP 9. Check for harness damage between MFI relay connector B-16X (terminal No. 4) and throttle actuator control motor relay connector B-13X (terminal No. 2).

Q: Is the harness wire in good condition?

YES : Repair harness wire between throttle actuator control motor relay connector B-13X (terminal No. 3) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 123) because of harness damage. Then go to Step 14.

NO : Repair it. Then go to Step 14.

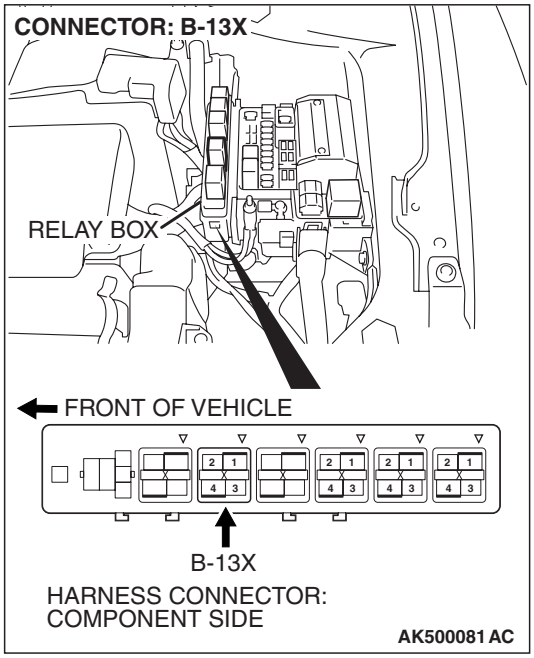


STEP 10. Check harness connector B-22 at ECM <M/T> or PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 11.

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



STEP 11. Check for harness damage between battery and throttle actuator control motor relay connector B-13X (terminal No. 1).

Q: Is the harness wire in good condition?

YES : Go to Step 12.

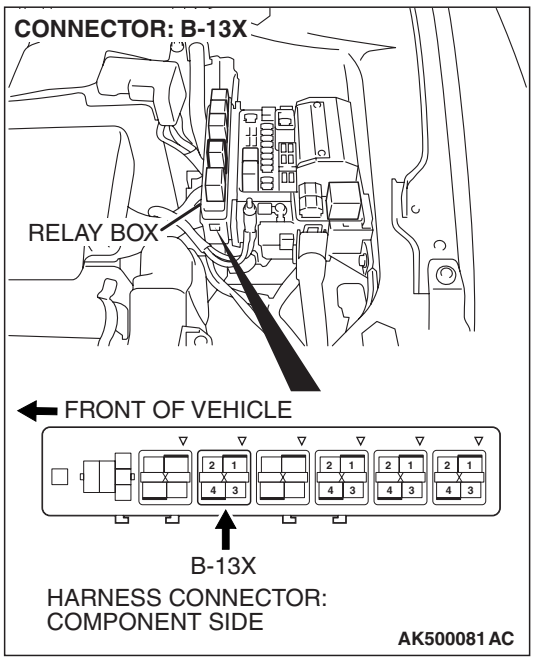
NO : Repair it. Then go to Step 14.

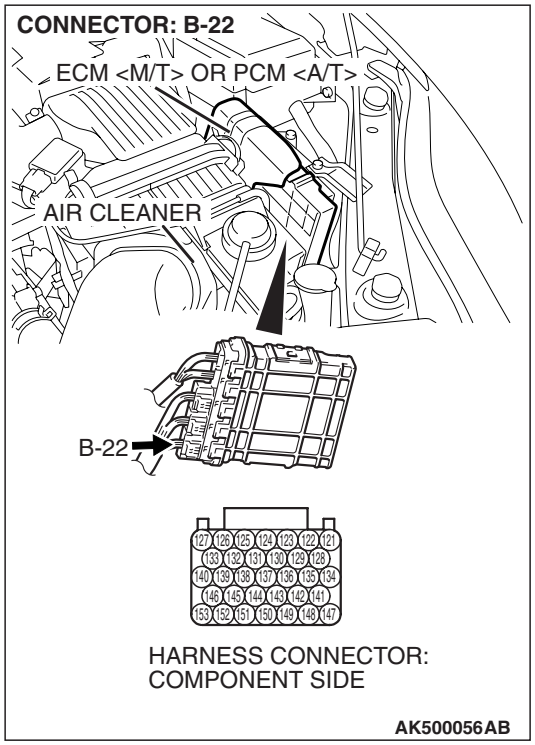
STEP 12. Check for harness damage between throttle actuator control motor relay connector B-13X (terminal No. 4) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 122).

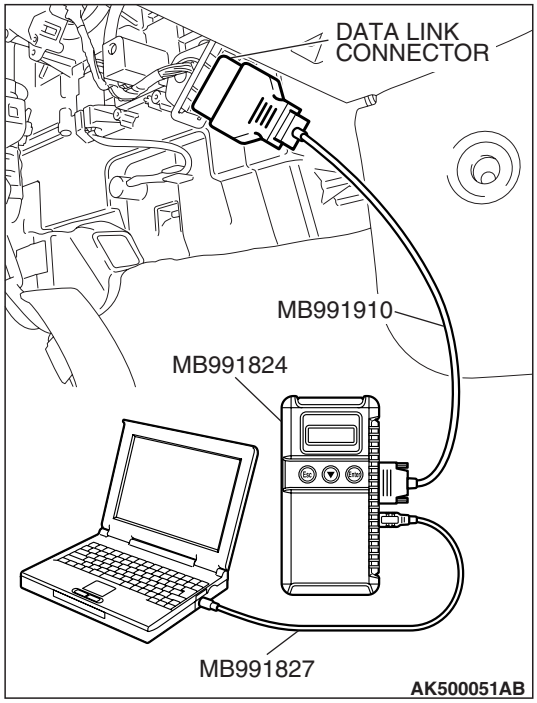
Q: Is the harness wire in good condition?

YES : Go to Step 13.

NO : Repair it. Then go to Step 14.







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

⚠ CAUTION

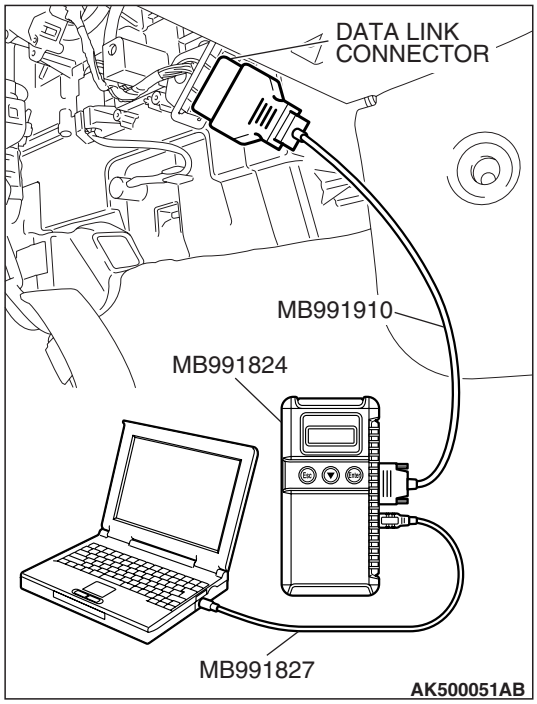
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is DTC P0657 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 14.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.



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

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

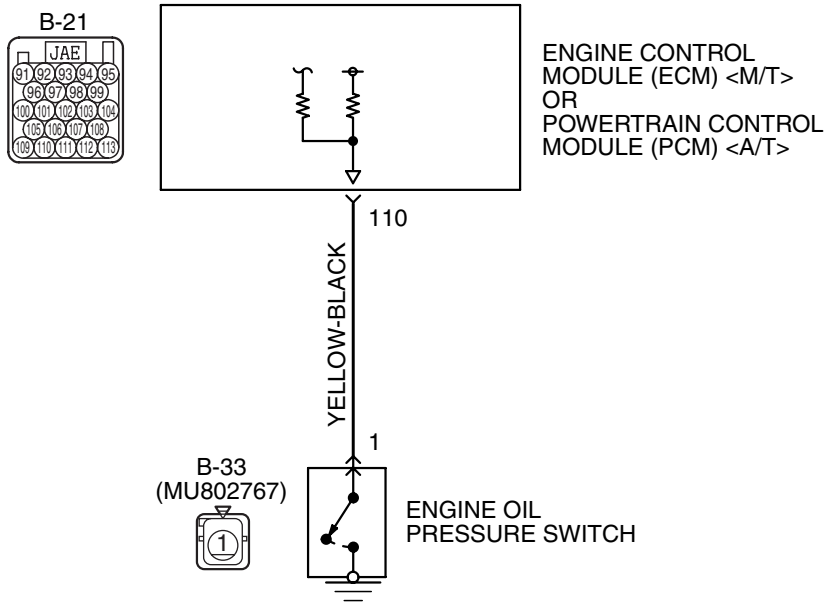
Q: Is DTC P0657 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

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

Engine Oil Pressure Switch Circuit



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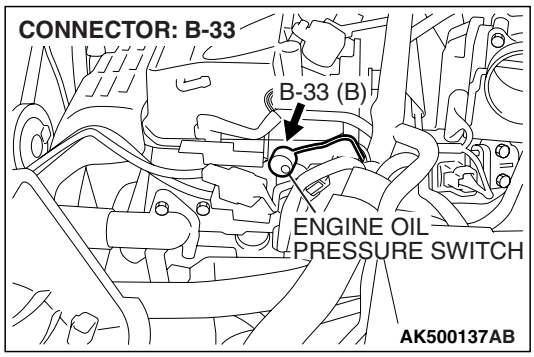
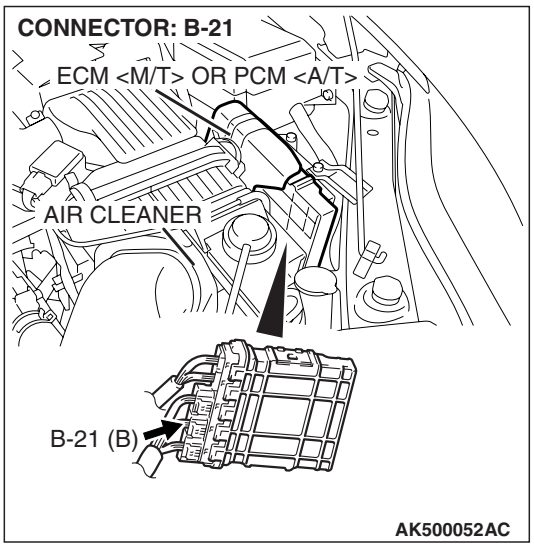




TSB Revision

CIRCUIT OPERATION

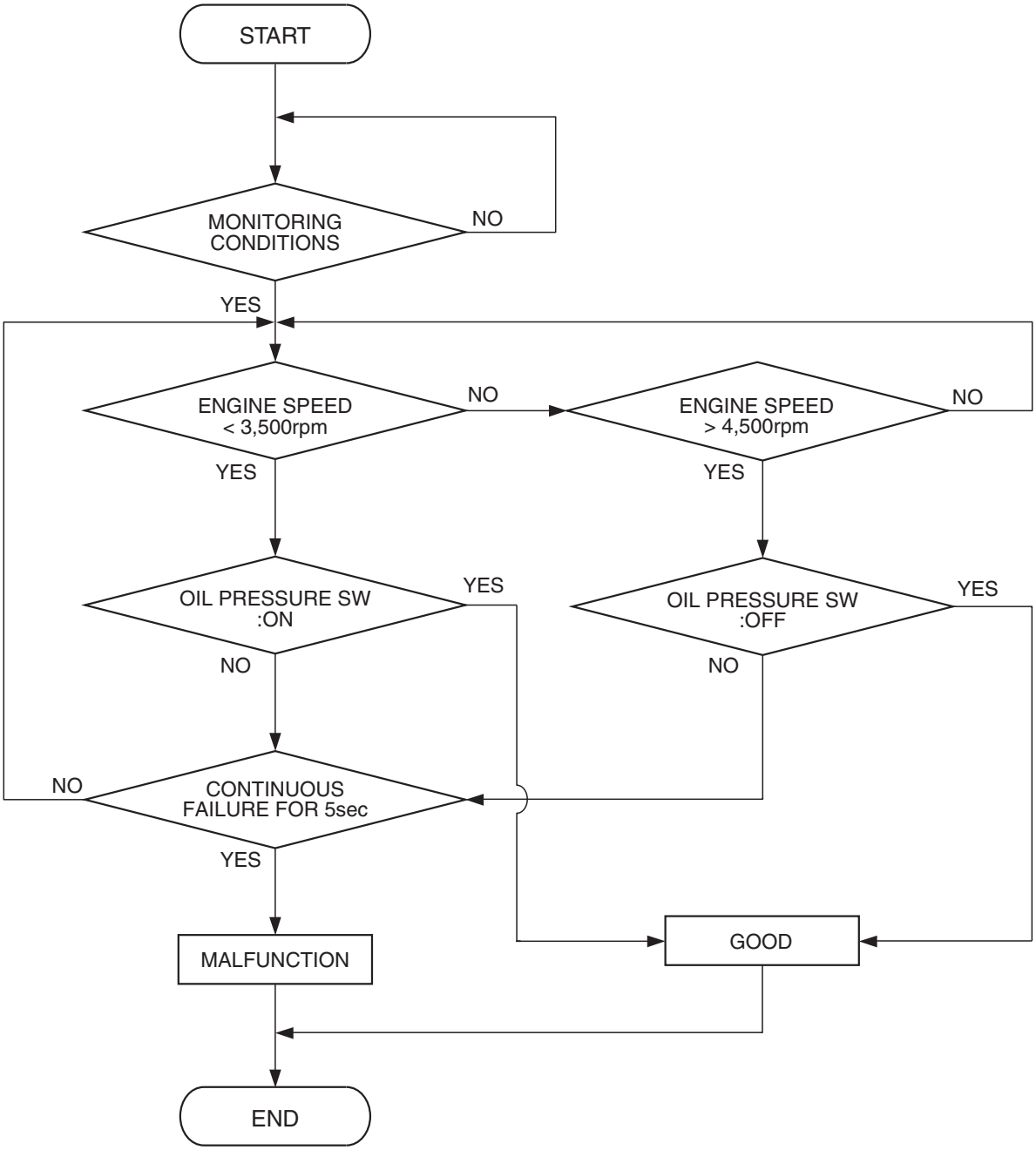
- A battery positive voltage is applied to the engine oil pressure switch output terminal (terminal No. 1) from the ECM <M/T> or the PCM <A/T> (terminal No. 110) via the resistor in the ECM <M/T> or the PCM <A/T>.

TECHNICAL DESCRIPTION

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

DTC SET CONDITIONS

Logic Flow Chart



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TSB Revision

Check Conditions

- 30 seconds or more have passed since the engine starting sequence was completed.
- Engine coolant temperature is 77° C (171° F) or higher.
- Battery positive voltage is between 10 and 16.5 volts.

Judgement Criteria

- Engine speed is 3,500 r/min or lower and engine oil pressure switch is OFF for 5 seconds.

or

- Engine speed is 4,500 r/min or higher and engine oil pressure switch is ON for 5 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function –OBD-II Drive Cycle – Pattern 19 P.13A-6.

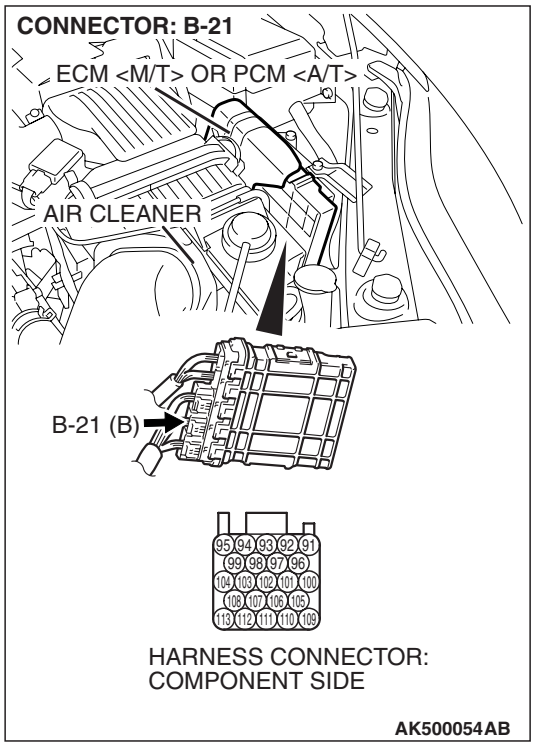
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

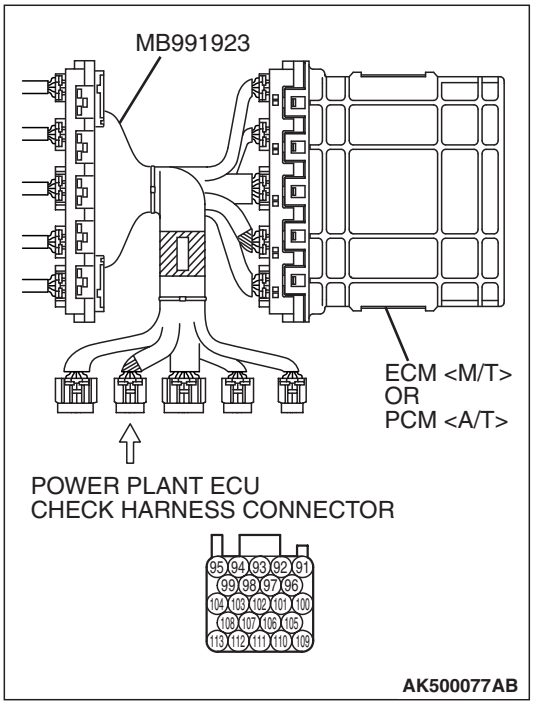
- Engine oil pressure switch failed.
- Engine oil control valve failed.
- Open or shorted engine oil pressure switch circuit, harness damage or connector damage.

DIAGNOSIS

Required Special Tools:

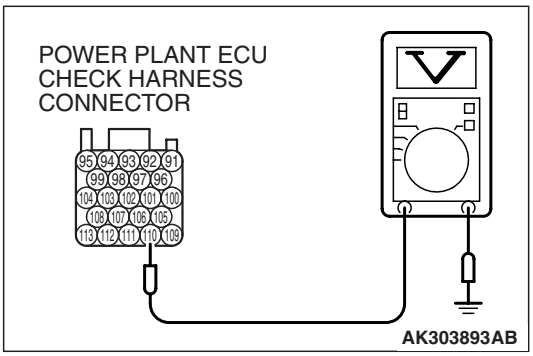
- MB991958: Scan tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MB991923: Power Plant ECU Check Harness





STEP 1. Measure the power supply voltage at ECM <M/T> or PCM <A/T> connector B-21 by using power plant ECU check harness special tool MB991923.

(1) Disconnect all ECM <M/T> connectors or PCM <A/T> connectors. Connect the power plant ECU check harness special tool MB991923 between the separated connectors.
(2) Start the engine and run at idle.



(3) Measure the voltage between terminal No. 110 and ground.
- Voltage should be 1 volt or less when engine is idling.
- Voltage should be battery positive voltage when engine speed is higher than 4,500 r/min.

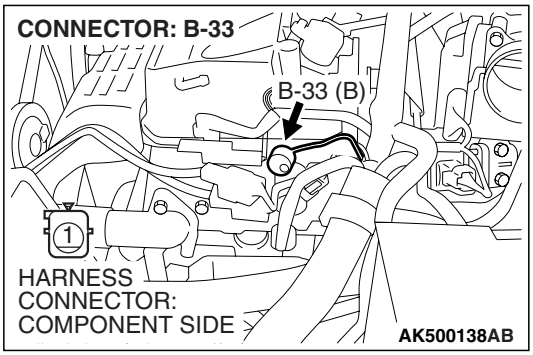
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage normal?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

NO : Go to Step 2.

STEP 2. Check harness connector B-33 at engine oil pressure switch for damage.

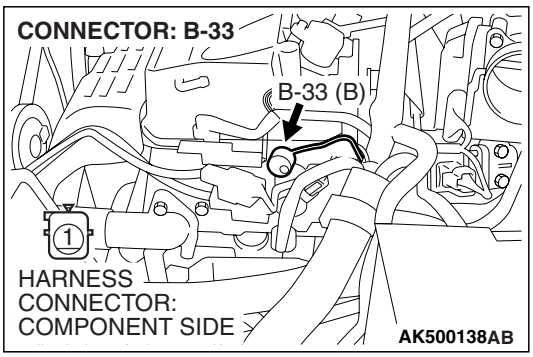


Q: Is the harness connector in good condition?

YES : Go to Step 3.

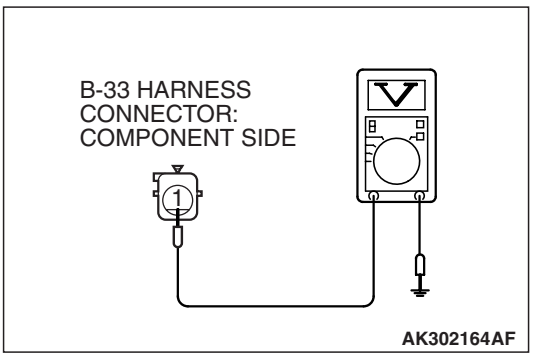
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 10.

STEP 3. Measure the power supply voltage at engine oil pressure switch connector B-33.



(1) Disconnect the connector B-33 and measure at the harness side.

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



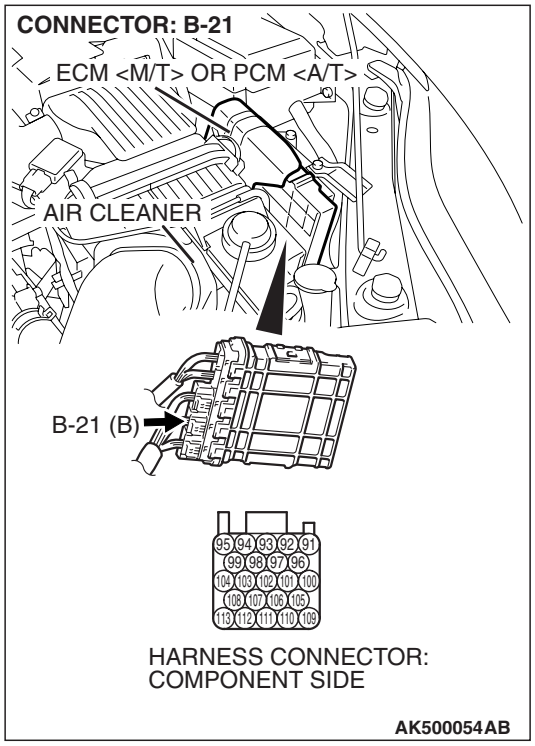
(3) Measure the voltage between terminal No. 1 and ground.
- Voltage should be battery positive voltage.

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

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

YES : Go to Step 6.

NO : Go to Step 4.

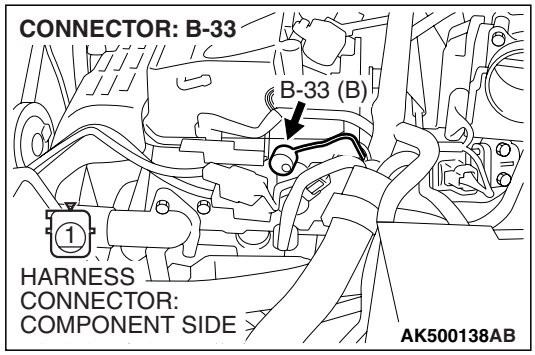


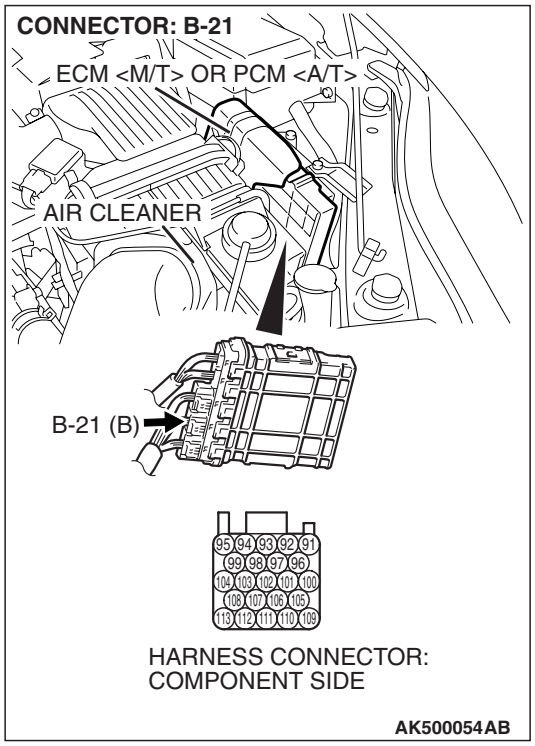
STEP 4. Check harness connector B-21 at ECM <M/T> or PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 5.

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



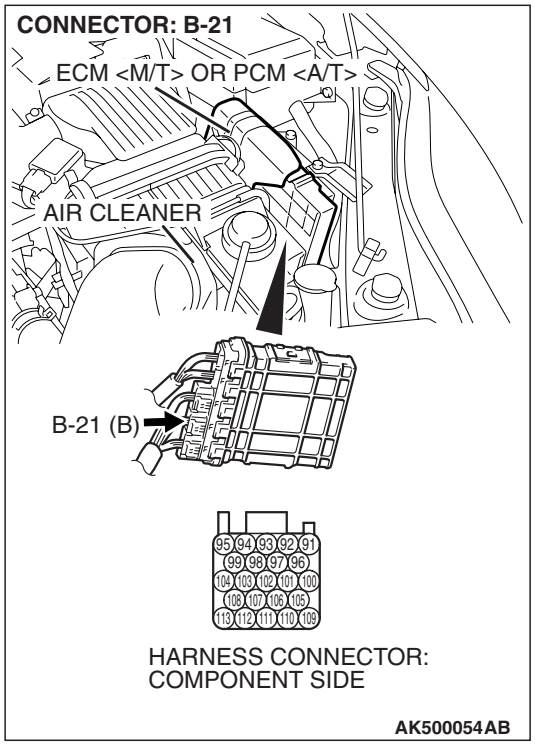


STEP 5. Check for open or shorted circuit to ground between engine oil pressure switch connector B-33 (terminal No. 1) and ECM <M/T> or PCM <A/T> connector B-21 (terminal No. 110).

Q: Is the harness wire in good condition?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 10.

NO : Repair it. Then go to Step 10.

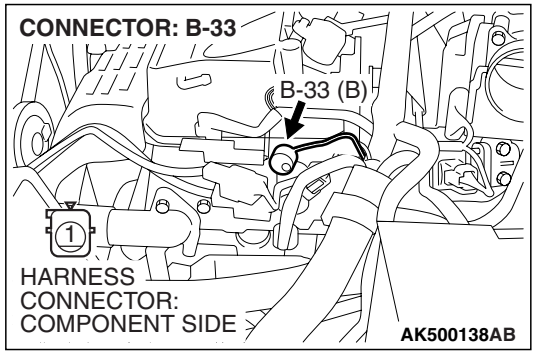


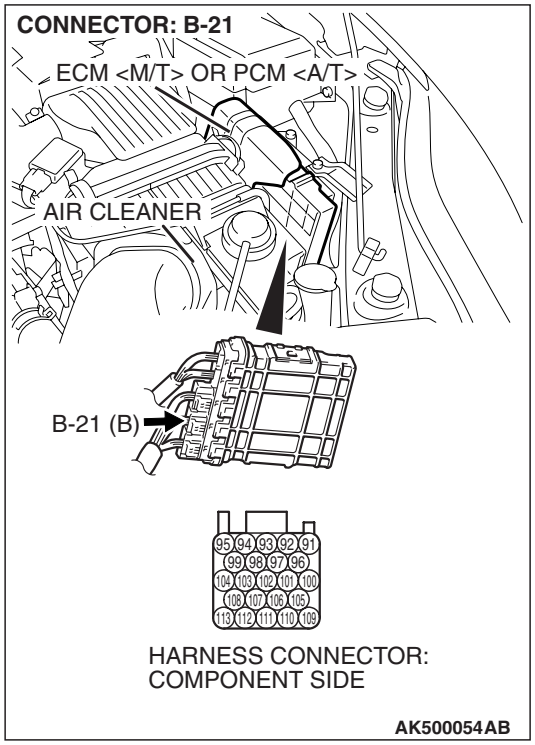
STEP 6. Check harness connector B-21 at ECM <M/T> or PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 7.

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



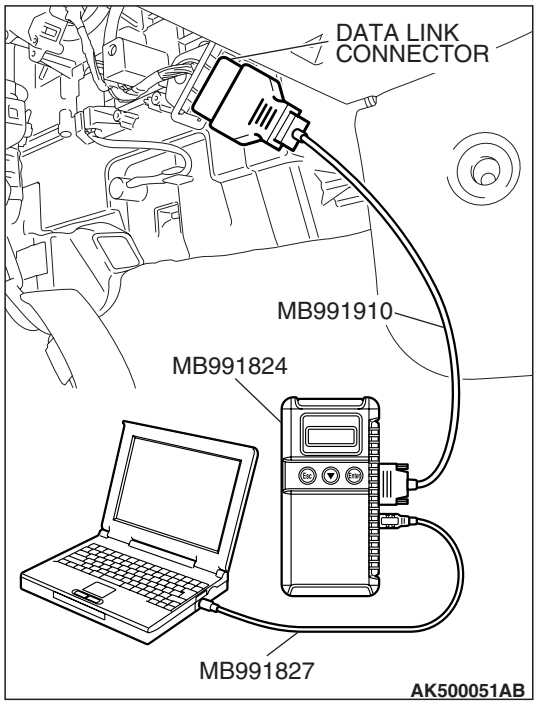


STEP 7. Check for harness damage between engine oil pressure switch connector B-33 (terminal No. 1) and ECM <M/T> or PCM <A/T> connector B-21 (terminal No. 110).

Q: Is the harness wire in good condition?

YES : Go to Step 8.

NO : Repair it. Then go to Step 10.



STEP 8. Using scan tool MB991958, check data list item 98: Engine Oil Control Valve.

⚠ CAUTION

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

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to the data reading mode for item 98, Engine oil control valve.
- Warm up the engine. With the engine is idling, the engine oil control valve should be "OFF"
- Warm up the engine. With the engine is 4,500 r/min, the engine oil control valve should be "ON"

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

Q: Is the engine oil control valve operating properly?

YES : Replace the engine oil pressure switch. Then go to Step 9.
NO : Replace the engine oil control valve. Then go to Step 10.

STEP 9. Check the trouble symptoms.

(1) Carry out test drive with the drive cycle pattern. Refer to Diagnostic Function –OBD-II Drive Cycle –Pattern 19 P.13A-6.
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P1020 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 10.
NO : The Inspection is complete.

STEP 10. Test the OBD-II drive cycle.

(1) Carry out test drive with the drive cycle pattern. Refer to Diagnostic Function –OBD-II Drive Cycle –Pattern 19 P.13A-6.
(2) Check the diagnostic trouble code (DTC).

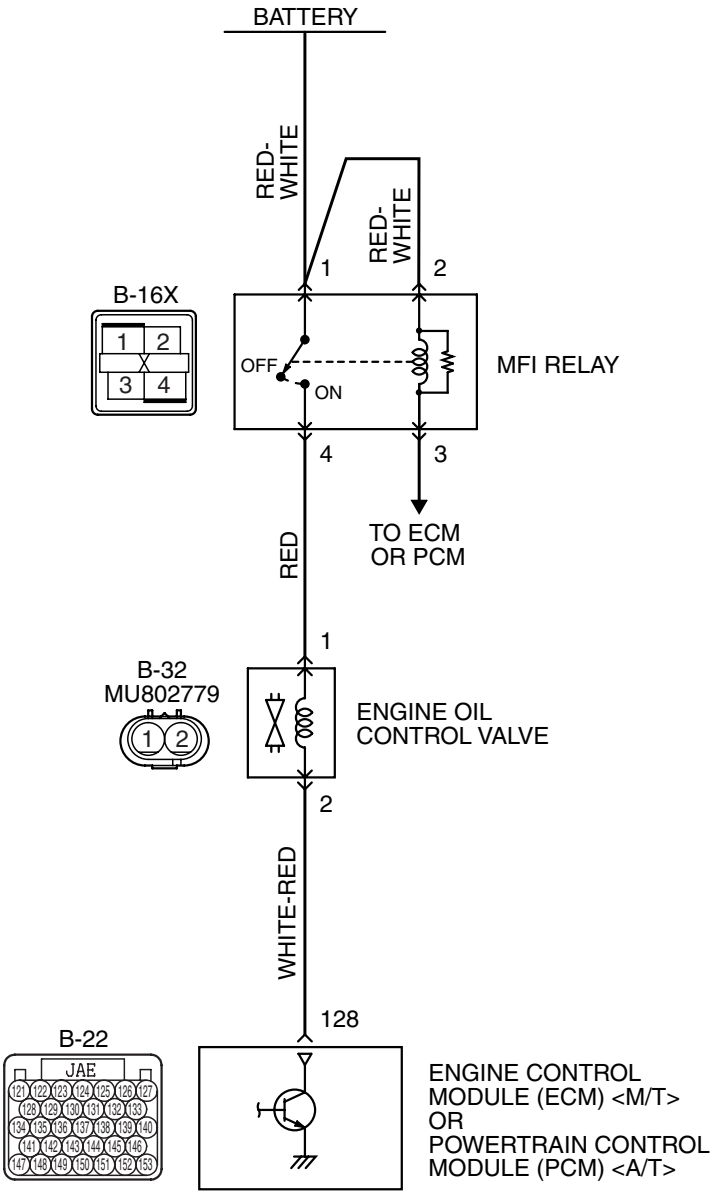
Q: Is DTC P1020 set?

YES : Retry the trouble shooting.
NO : The Inspection is complete.

TSB Revision

DTC P1021: Engine Oil Control Valve Circuit

Engine Oil Control Valve Circuit



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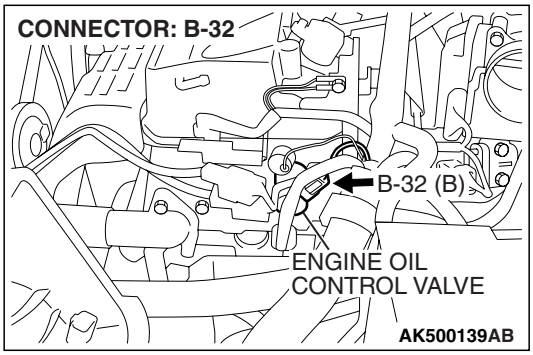
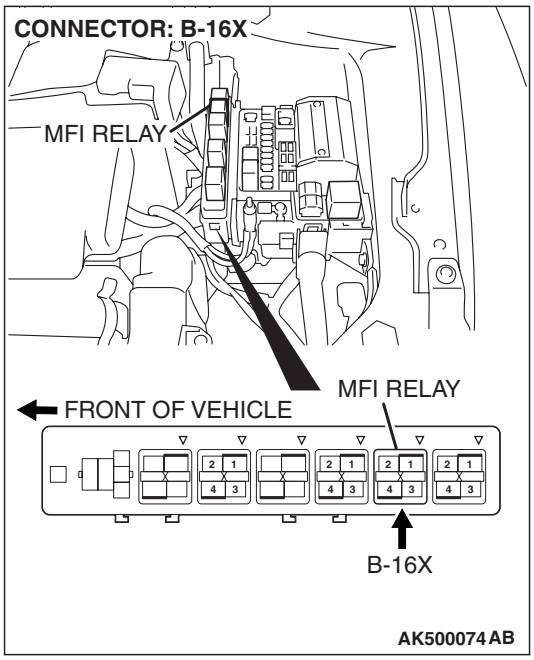
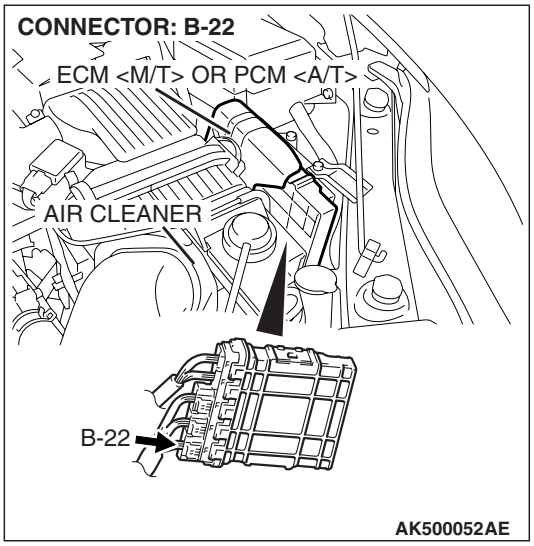
TSB Revision







CIRCUIT OPERATION

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

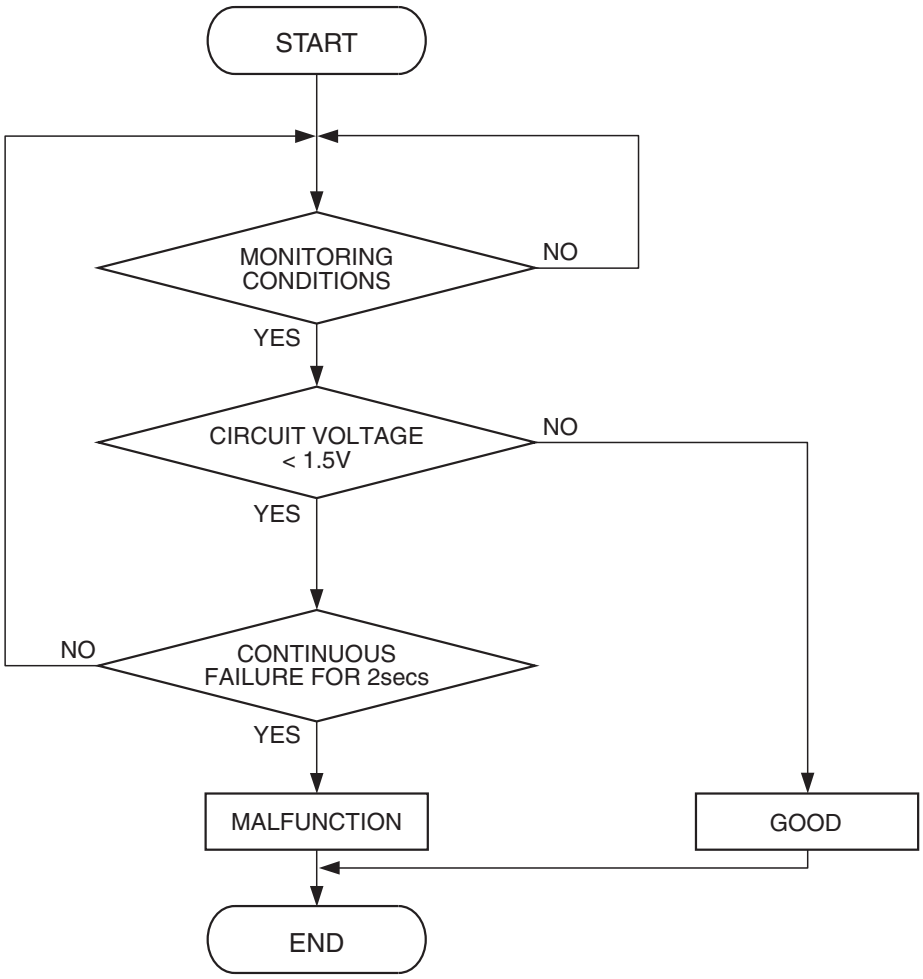
TECHNICAL DESCRIPTION

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

TSB Revision

DTC SET CONDITIONS

Logic Flow Chart



AK403642

Check Conditions

- Ignition switch: "ON"
- Engine oil control valve is "OFF"
- Battery positive voltage is between10 and 16.5 volts.
- 0.1 second has elapsed after the above mentions have been met.

Judgement Criterion

- The ECM <M/T> or the PCM <A/T> terminal voltage of engine control valve circuit is less than 1.5 volts for 2 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function –OBD-II Drive Cycle – Pattern 22 P.13A-6.

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

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

TSB Revision

DIAGNOSIS

Required Special Tools:

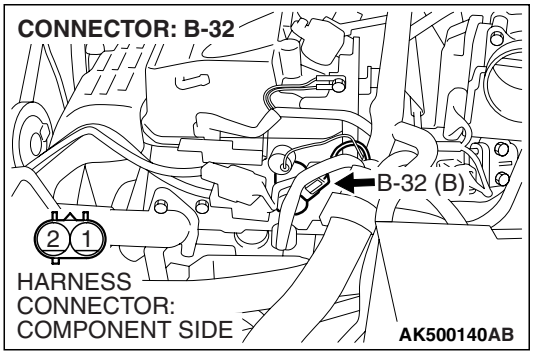
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MB991923: Power Plant ECU Check Harness

STEP 1. Check harness connector B-32 at the engine oil control valve for damage.

Q: Is the harness connector in good condition?

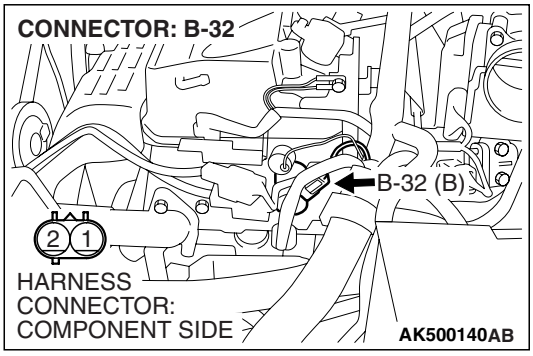
YES : Go to Step 2.

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



STEP 2. Check the engine oil control valve.

(1) Disconnect the engine oil control valve connector B-32.



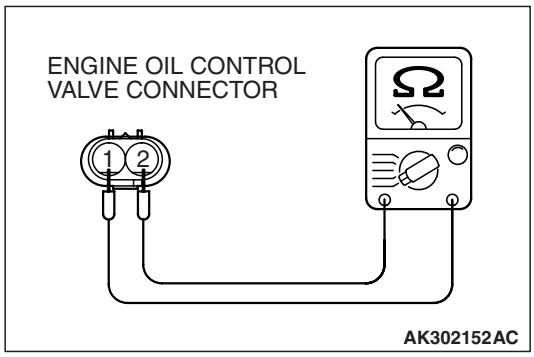
(2) Measure the resistance between engine oil control valve side connector terminal No. 1 and No. 2.

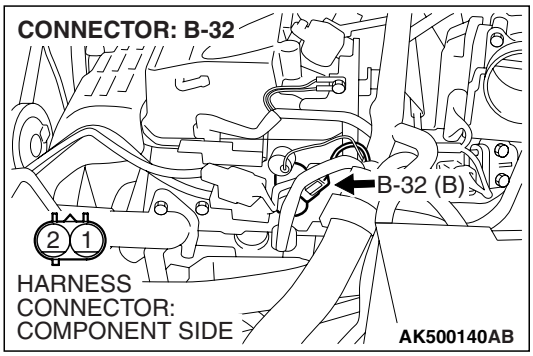
Standard value: 6.9 – 7.9 ohms [at 20° C (68° F)]

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

YES : Go to Step 3.

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

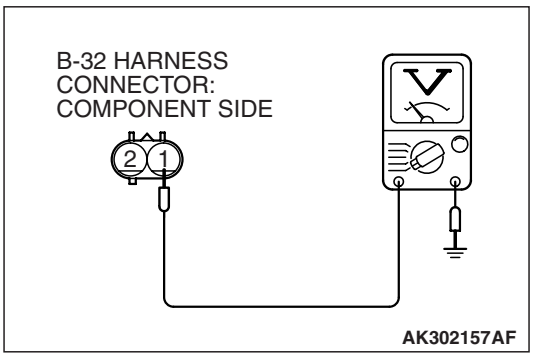




STEP 3. Measure the power supply voltage at engine oil control valve harness side connector B-32.

(1) Disconnect the connector B-32 and measure at the harness side.

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



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

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

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

YES : Go to Step 5.

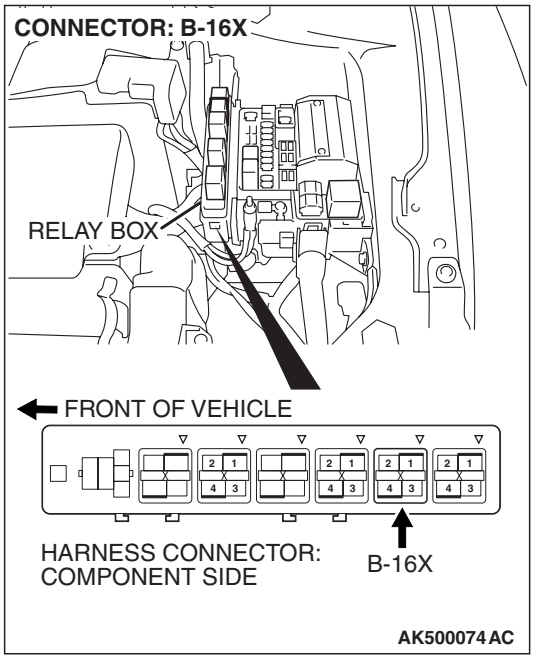
NO : Go to Step 4.

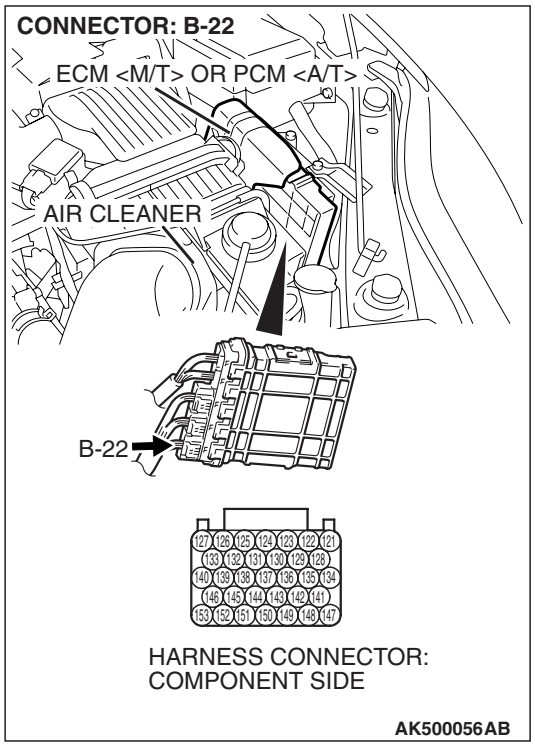
STEP 4. Check harness connector B-16X at MFI relay for damage.

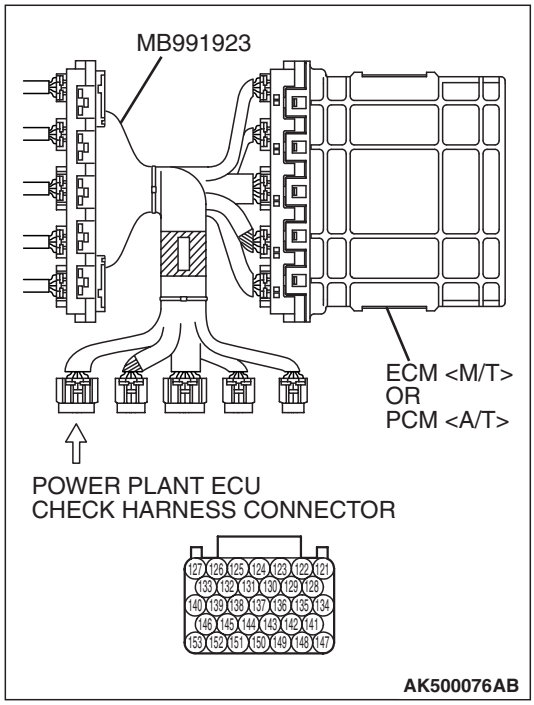
Q: Is the harness connector in good condition?

YES : Repair harness wire between MFI relay connector B-16X (terminal No. 4) and engine oil control valve connector B-32 (terminal No. 1) because of open circuit or short circuit to ground. Then go to Step 12.

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

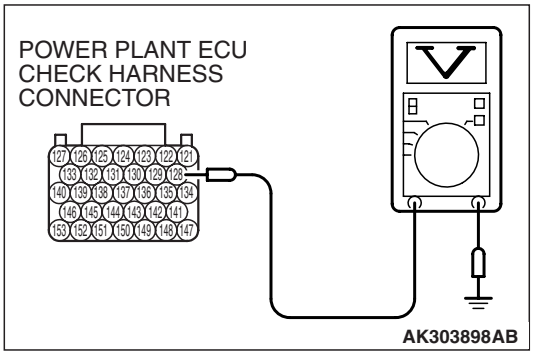






STEP 5. Measure the power supply voltage at ECM <M/T> or PCM <A/T> connector B-22 by using power plant ECU check harness special tool MB991923.

(1) Disconnect all ECM <M/T> connectors or PCM <A/T> connectors. Connect the power plant ECU check harness special tool MB991923 between the separated connectors.
(2) Turn the ignition switch to the "ON" position.



(3) Measure the voltage between terminal No. 128 and ground.
- Voltage should be battery positive voltage.

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

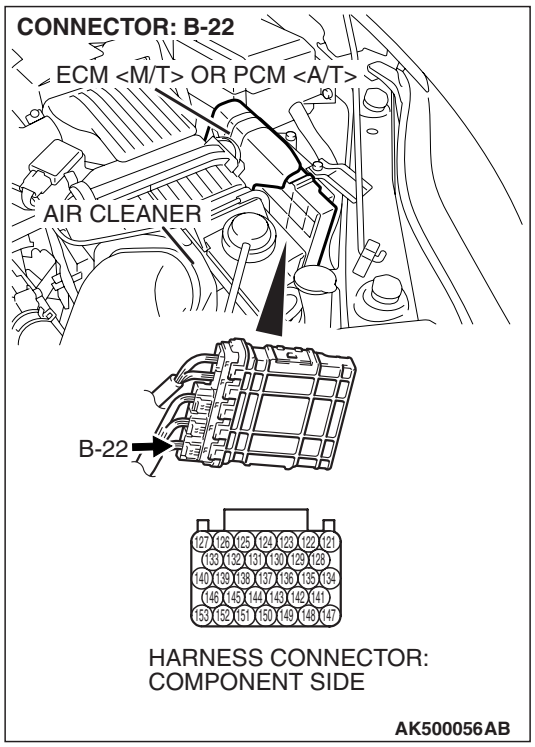
Q: Is battery positive voltage (approximately 12 volts) present?

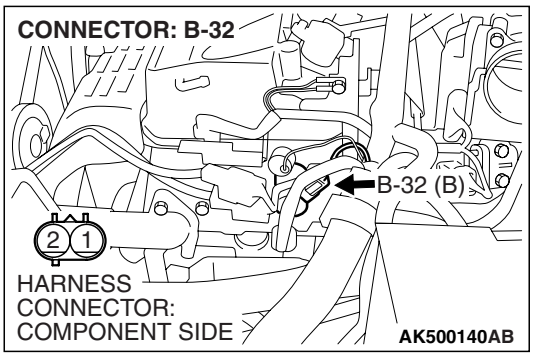
YES : Go to Step 8.
NO : Go to Step 6.

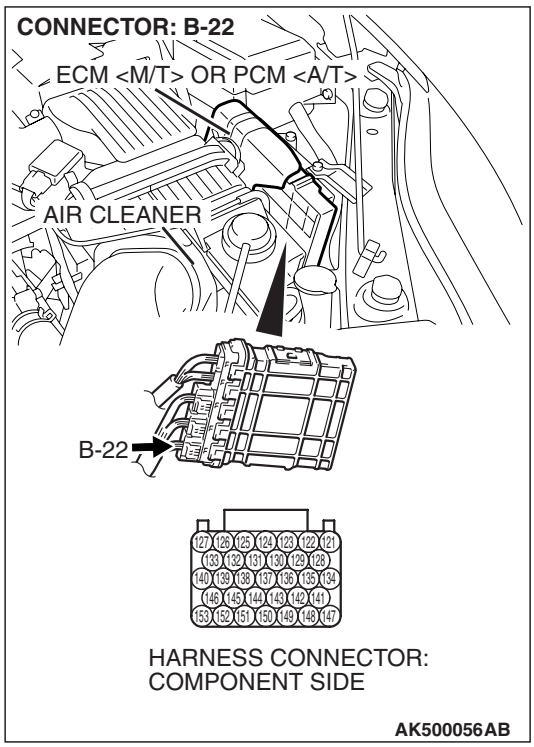
STEP 6. Check harness connector B-22 at ECM <M/T> or PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 7.
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 12.





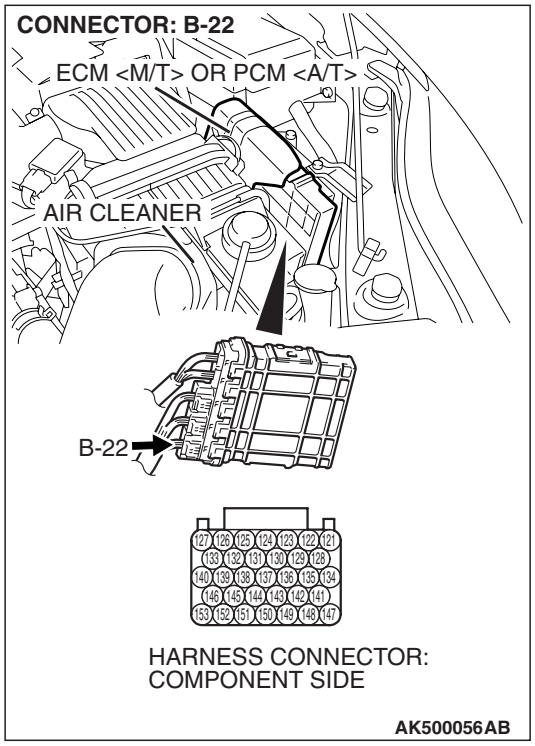


STEP 7. Check for open circuit and short circuit to ground between engine oil control valve connector B-32 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 128).

Q: Is the harness wire in good condition?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 12.

NO : Repair it. Then go to Step 12.

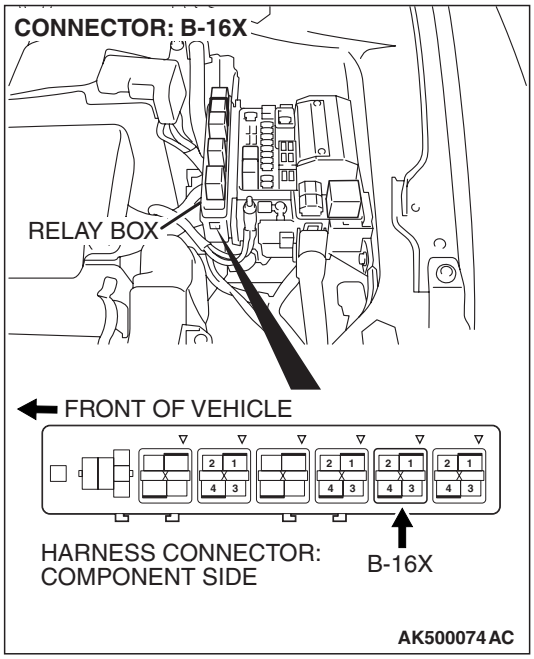


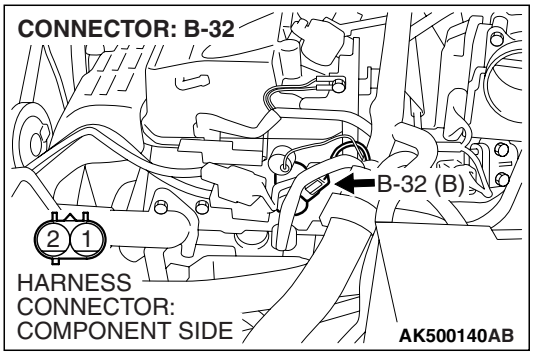
STEP 8. Check harness connector B-22 at ECM <M/T> or PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 9.

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



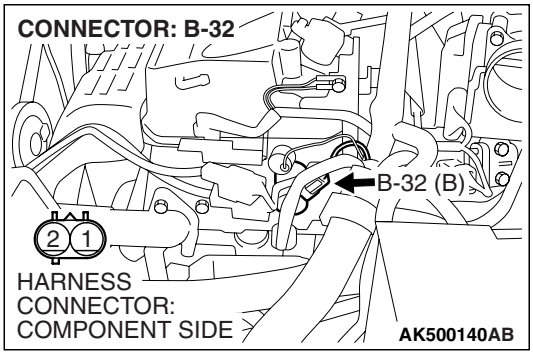


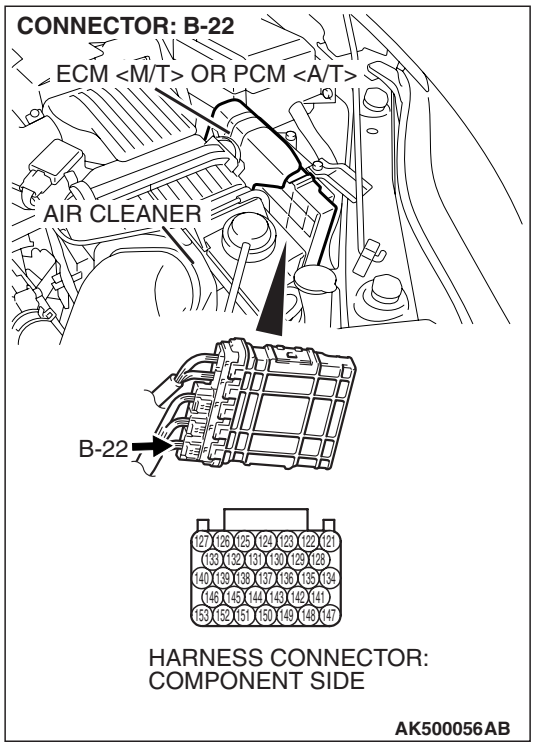
STEP 9. Check for harness damage between MFI relay connector B-16X (terminal No. 4) and engine oil control valve connector B-32 (terminal No. 1).

Q: Is the harness wire in good condition?

YES : Go to Step 10.

NO : Repair it. Then go to Step 12.





STEP 10. Check for harness damage between engine oil control valve connector B-32 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 128).

Q: Is the harness wire in good condition?

YES : Go to Step 11.

NO : Repair it. Then go to Step 12.

STEP 11.Check the trouble symptoms.

(1) Carry out test drive with the drive cycle pattern. Refer to Diagnostic Function –OBD-II Drive Cycle –Pattern 22 P.13A-6.

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

Q: Is DTC P1021 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 12.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

STEP 12. Test the OBD-II drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function –OBD-II Drive Cycle –Pattern 22 P.13A-6.

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

Q: Is DTC P1021 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P1530: A/C1 Switch Circuit Intermittent

TECHNICAL DESCRIPTION

- The A/C-ECU sends the "ON" signal of the A/C to the ECM <M/T> or the PCM <A/T>.
- The ECM <M/T> or the PCM <A/T> receives the "ON" signal sent by the A/C-ECU, and turns the A/C relay to "ON" position.

DTC SET CONDITIONS

Check Conditions

- Engine is running.

Judgement Criteria

- The A/C switch repeats on-off switches 255 times per second.

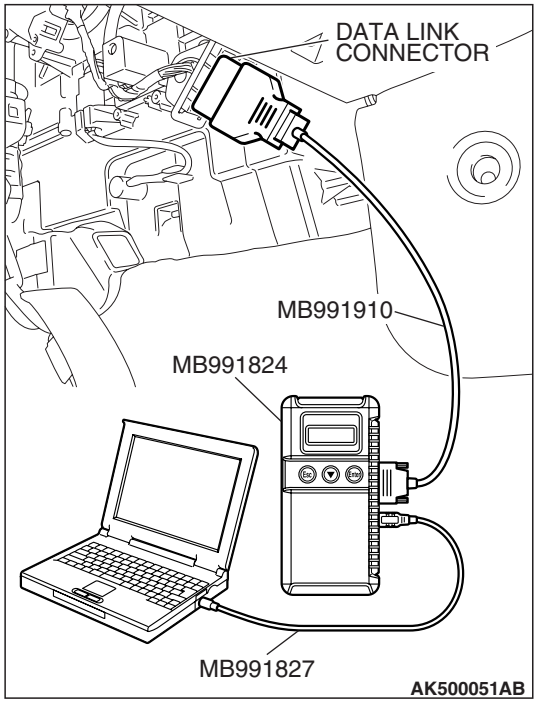
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- A/C-ECU failed.

DIAGNOSIS

Required Special Tools:

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



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

⚠ CAUTION

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

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

Q: Is DTC P1530 set?

YES : Replace the A/C-ECU.
NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

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

TECHNICAL DESCRIPTION

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

DESCRIPTIONS OF MONITOR METHODS

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

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Check Condition

- Ignition switch is "ON" position.

Judgement Criterion

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

OBD-II DRIVE CYCLE PATTERN

None.

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

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

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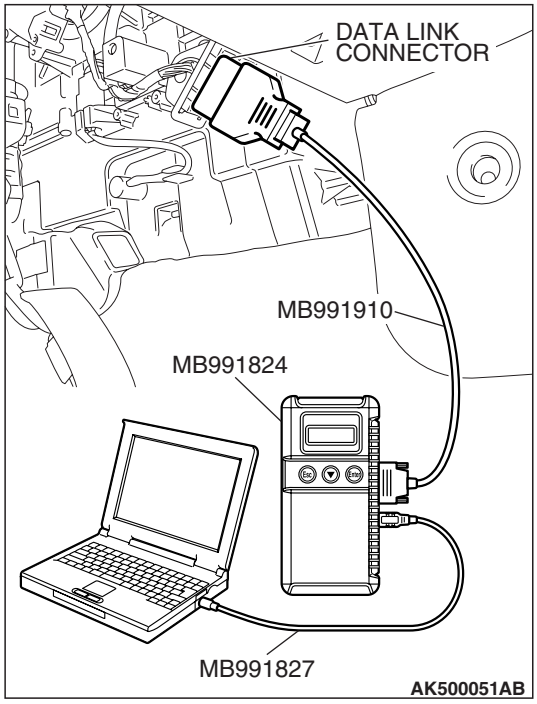
DIAGNOSIS

Required Special Tools:

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

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



⚠ CAUTION

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

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

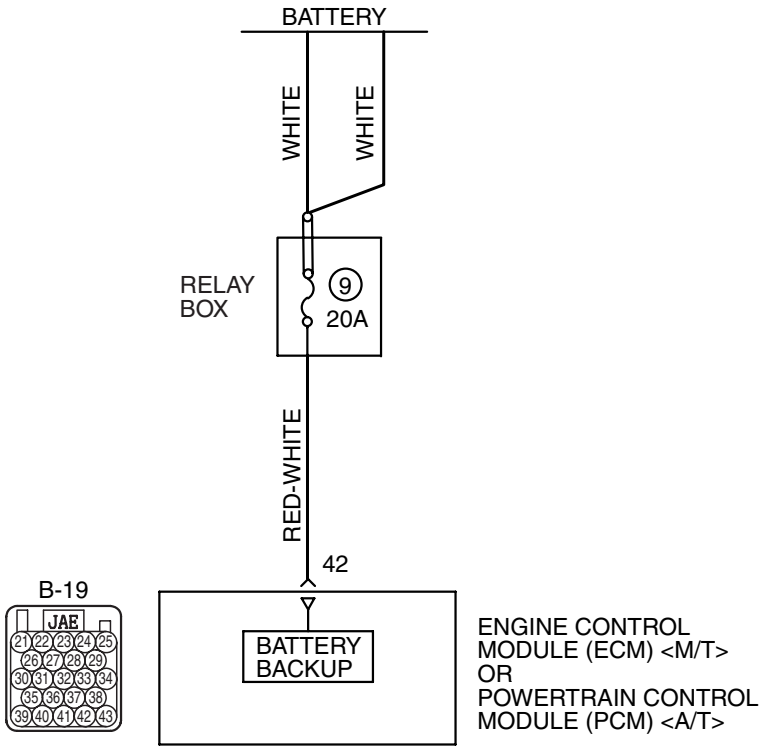
Q: Is DTC P01602 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

DTC P1603: Battery Backup Line Malfunction

Battery Backup Circuit



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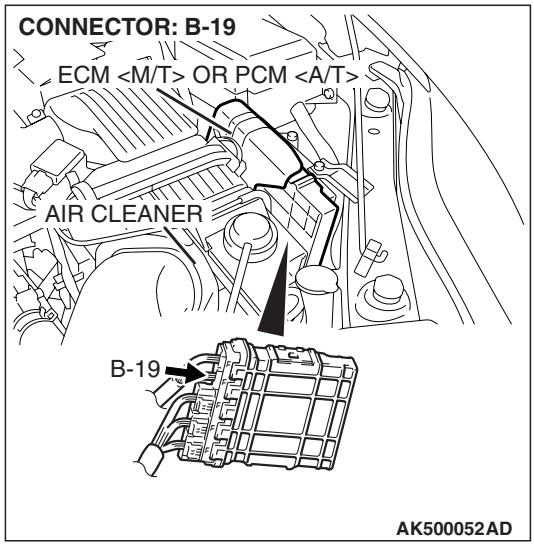

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TECHNICAL DESCRIPTION

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

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

DESCRIPTIONS OF MONITOR METHODS

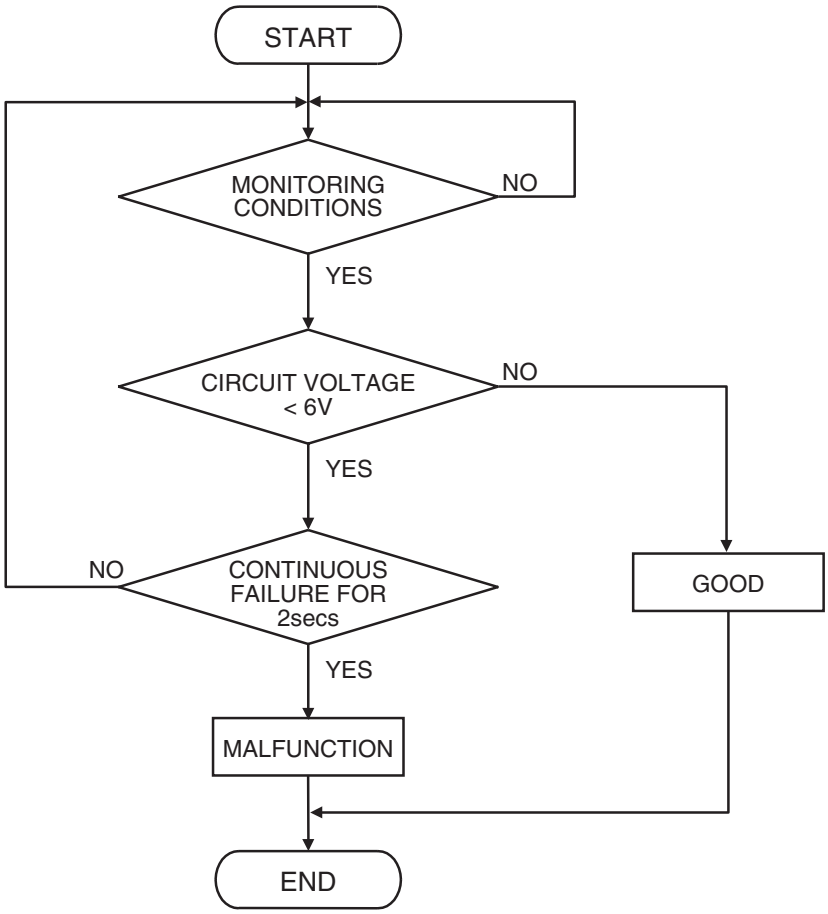
Battery backup line voltage is under specified value.

MONITOR EXECUTION

Continuous

DTC SET CONDITIONS

Logic Flow Chart



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MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

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

Judgement Criterion
- Battery backup line voltage has continued to be 6 volts or lower for 2 seconds.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)
- Open or shorted battery backup line, harness damage or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

OBD-II DRIVE CYCLE PATTERN
None.

DIAGNOSIS

Required Special Tools:
- MB991958: Scan tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MB991923: Power Plant ECU Check Harness

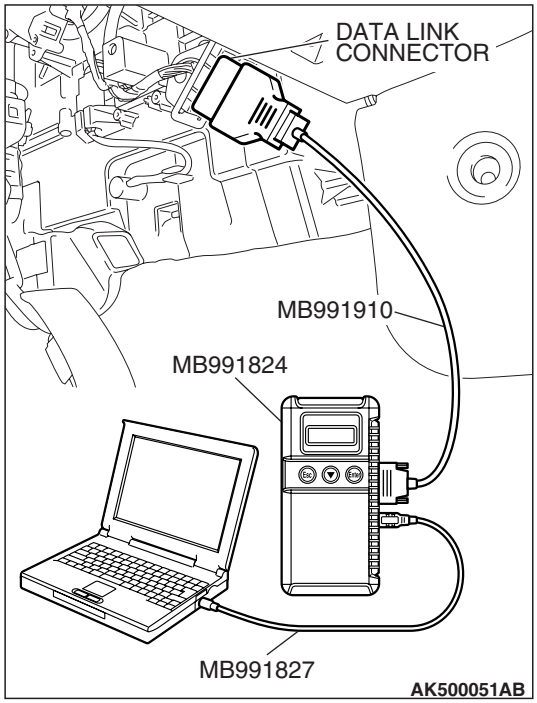
STEP 1. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

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

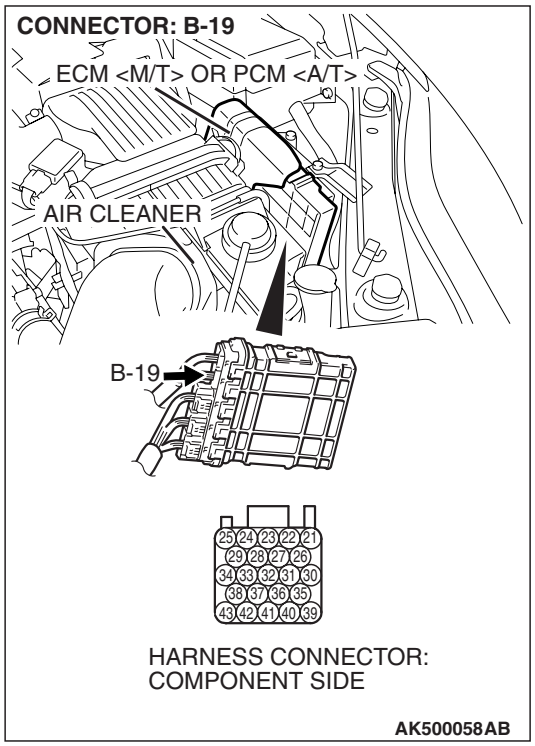
Q: Is DTC P1603 set?

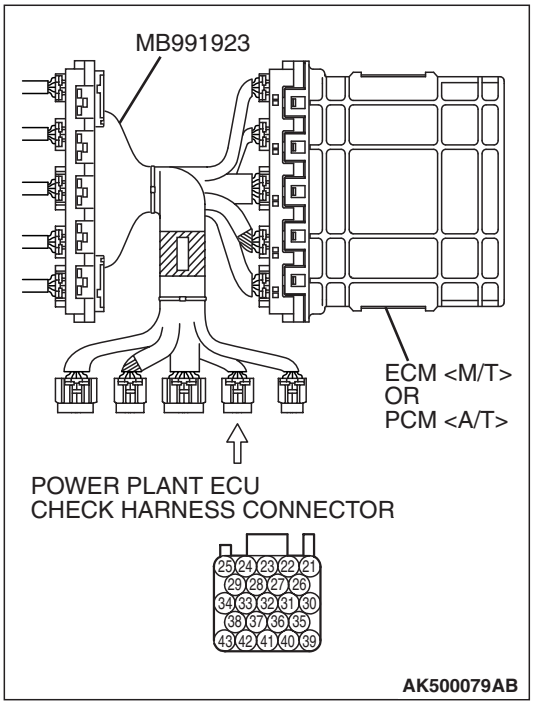
YES : Go to Step 2.
NO : The inspection is complete.

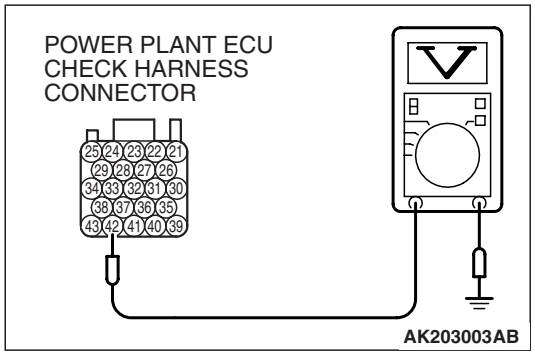


STEP 2. Measure the backup power supply voltage at ECM <M/T> or PCM <A/T> connector B-19 by using power plant ECU check harness special tool MB991923.

(1) Disconnect all ECM <M/T> connectors or PCM <A/T> connectors. Connect the power plant ECU check harness special tool MB991923 between the separated connectors.







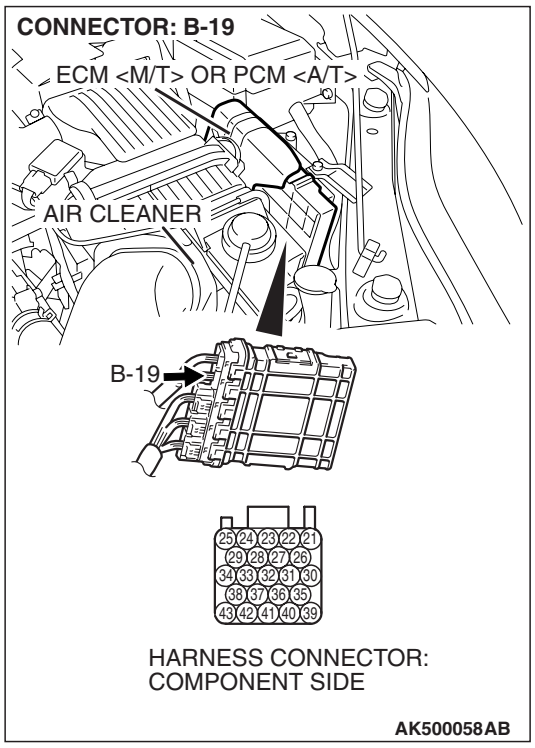
(2) Measure the voltage between terminal No. 42 and ground.
- Voltage should be battery positive voltage.

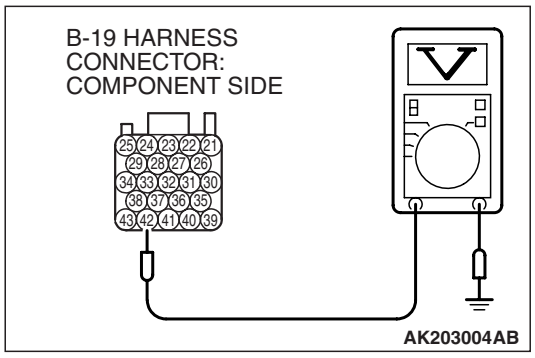
Q: Is battery positive voltage (approximately 12 volts) present?

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

STEP 3. Measure the backup power supply voltage at ECM <M/T> or PCM <A/T> harness side connector B-19.

(1) Disconnect the ECM <M/T> or PCM <A/T> connector B-19 and measure at the harness side.

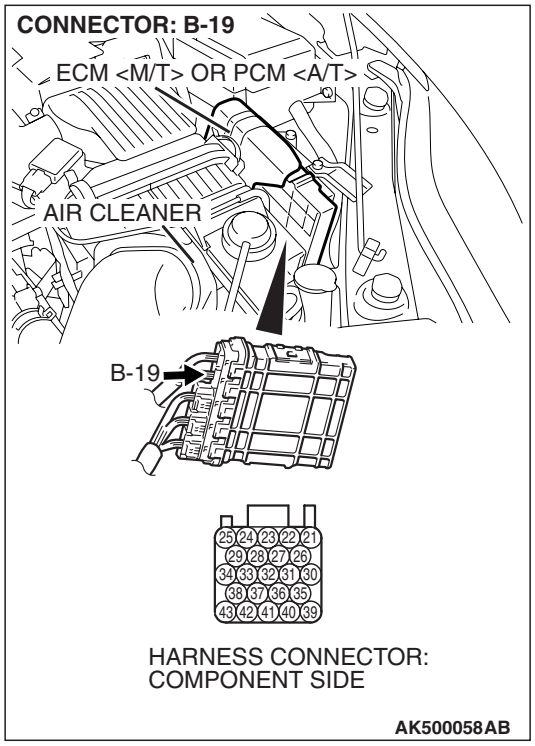




(2) Measure the voltage between terminal No. 42 and ground.
- Voltage should be battery positive voltage.

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

YES : Go to Step 4.
NO : Repair harness wire between battery and ECM <M/T> or PCM <A/T> connector B-19 (terminal No. 42) because of open circuit or short circuit to ground. Then go to Step 6.

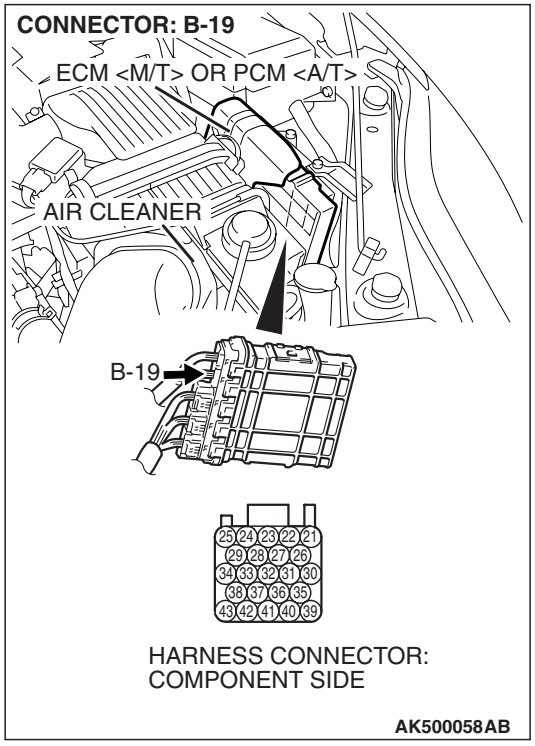


STEP 4. Check harness connector B-19 at ECM <M/T> or PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Repair harness wire between battery and ECM <M/T> or PCM <A/T> connector B-19 (terminal No. 42) because of harness damage. Then go to Step 6.

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

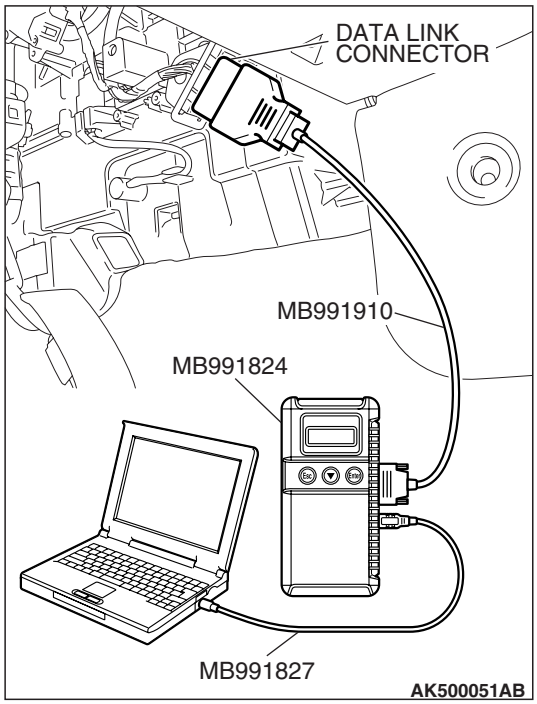


STEP 5. Check harness connector B-19 at ECM <M/T> or PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 6.

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



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

⚠ CAUTION

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

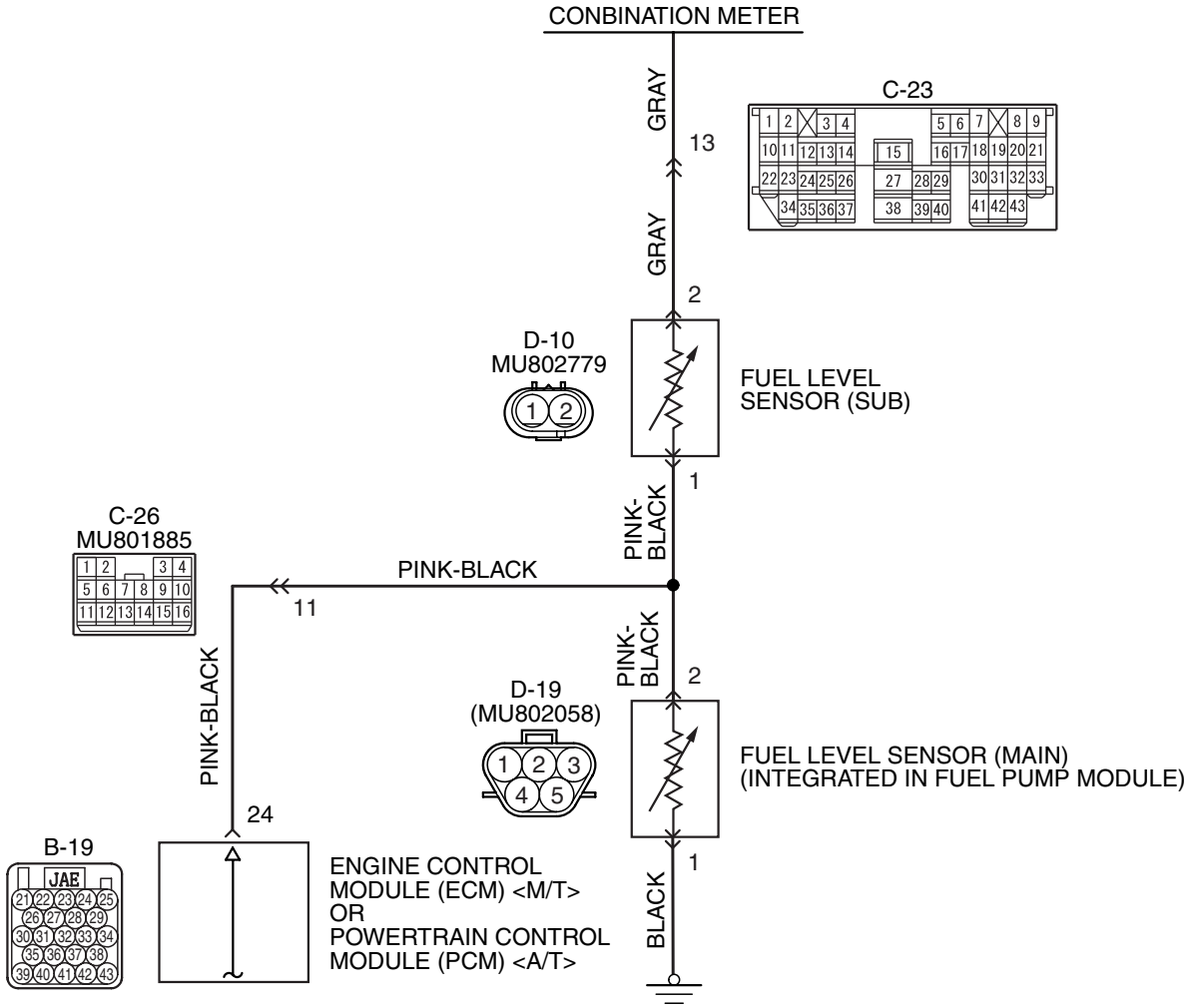
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P1603 set?

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

DTC P2066: Fuel Level Sensor (sub) Circuit Range/Performance

Fuel Level Sensor Circuit



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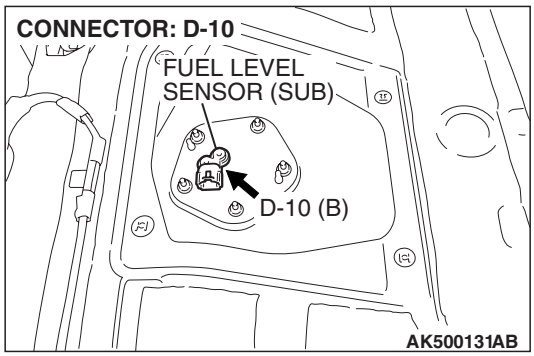

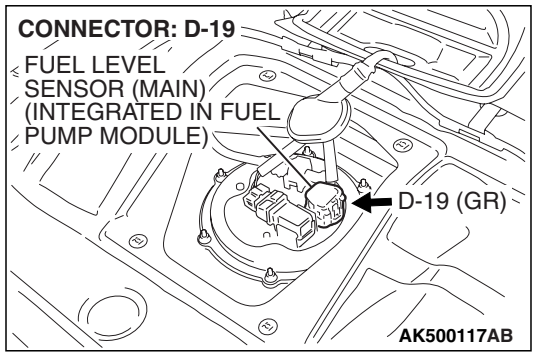

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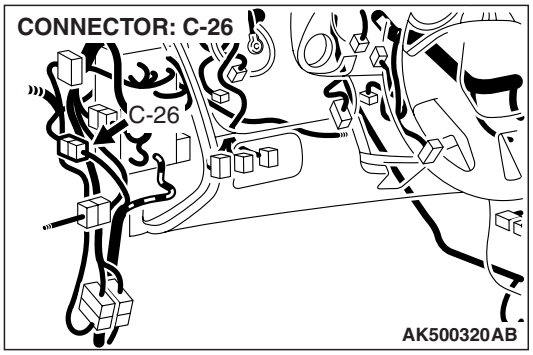
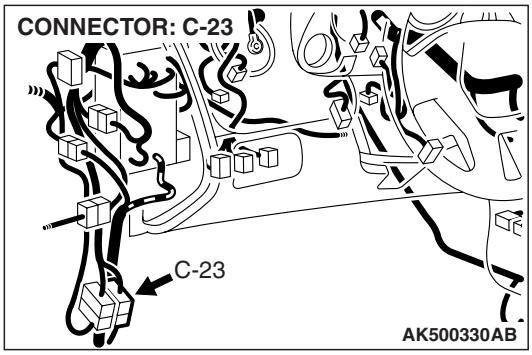
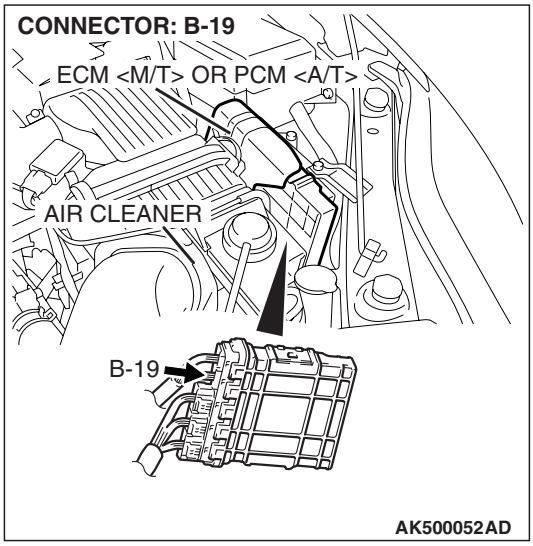






CIRCUIT OPERATION

- The fuel level sensor (sub) drive signal is input in combination meter (terminal No. 13).

TECHNICAL DESCRIPTION

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

DESCRIPTIONS OF MONITOR METHODS

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

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

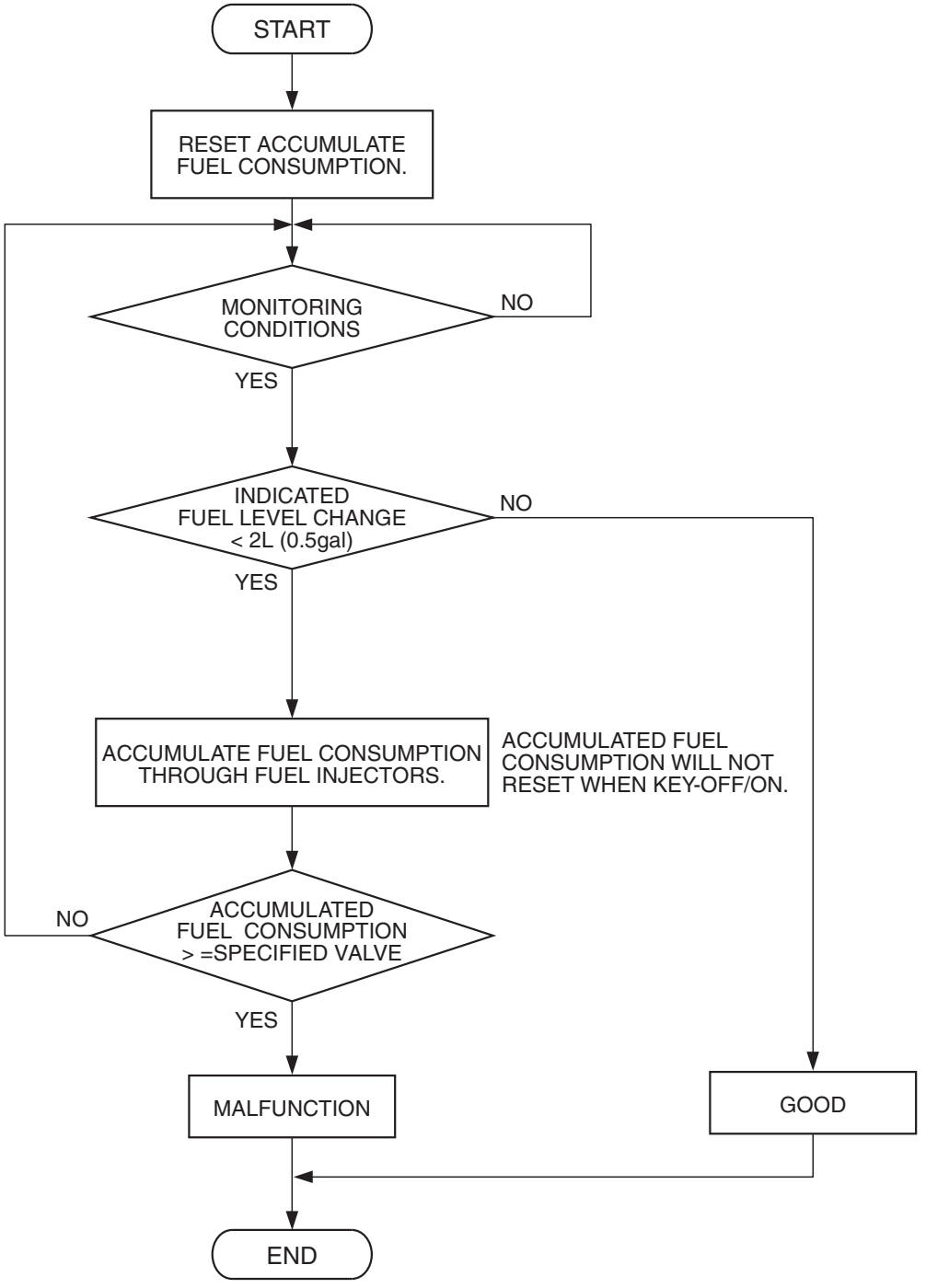
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



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Check Condition, Judgement Criterion

- When the fuel consumption calculated from the operation time of the injector amounts to 30 liters (7.9 gal), the diversity of the amount of fuel in tank calculated from the fuel level sensor is 2 liters (0.5 gal) or less.

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

- Fuel pump module or fuel level sensor (sub) failed.
- ECM failed. <M/T>
- PCM failed. <A/T>

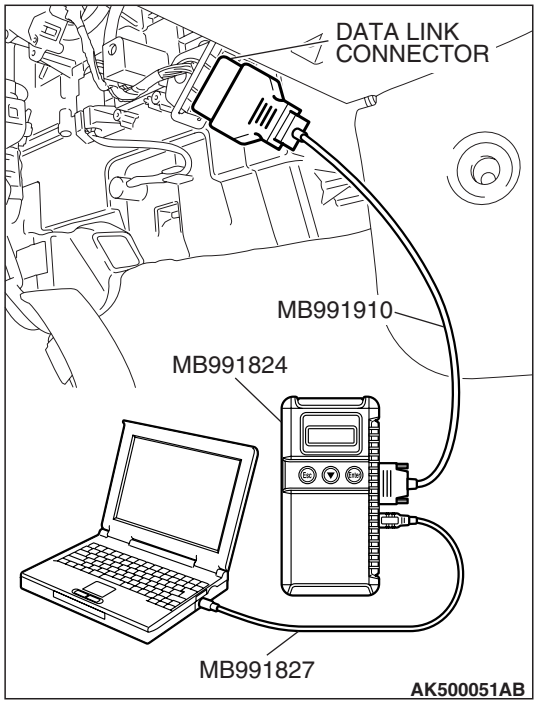
OBD-II DRIVE CYCLE PATTERN

None.

DIAGNOSIS

Required Special Tools:

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



STEP 1. 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 P0461 set?

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

STEP 2. Check fuel gauge.

Q: Is the fuel gauge functioning?

YES : Go to Step 3.
NO : Refer to GROUP 54A, Chassis Electrical – Combination Meter Assembly –Trouble Symptom Chart P.54A-93.

STEP 3. Check the trouble symptoms.
Check that the fuel gauge operates correctly.

Q: Does the fuel gauge operate correctly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

NO : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13.Then go to Step 6.

STEP 4. Check the fuel level sensor (sub).
Check to see if the fuel level sensor is normal. Refer to GROUP 54A, Chassis Electrical –Combination Meters Assembly and Vehicle Speed Sensor –On-Vehicle Service –Fuel Level Sensor Check P.54A-129.

Q: Is the fuel level sensor (sub) normal?

YES : Go to Step 5.

NO : Replace the fuel level sensor (sub). Then go to Step 6.

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

Q: Does the fuel gauge operate correctly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

NO : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13.Then go to Step 6.

STEP 6. Check the trouble symptoms.
Check that the fuel gauge operates correctly.

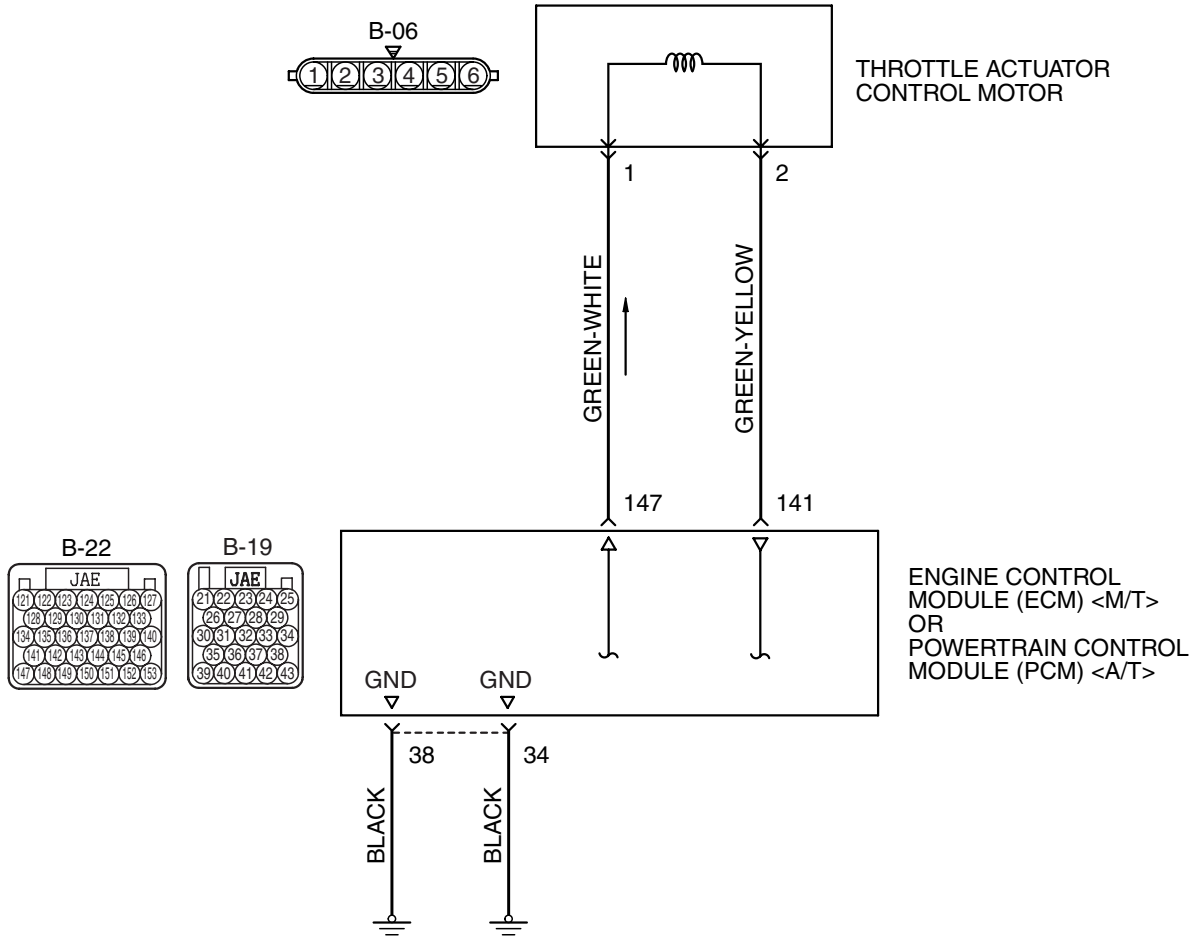
Q: Does the fuel gauge operate correctly?

YES : The inspection is complete.

NO : Retry the troubleshooting.

DTC P2100: Throttle Actuator Control Motor Circuit (open)

Throttle Actuator Control Motor Circuit



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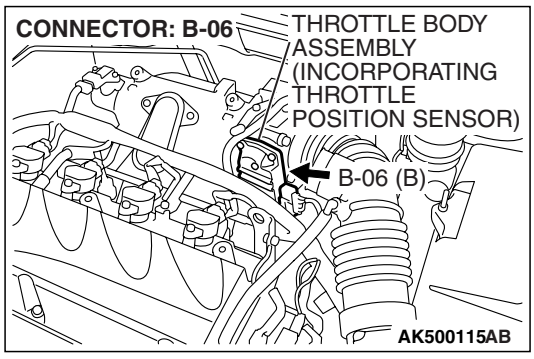

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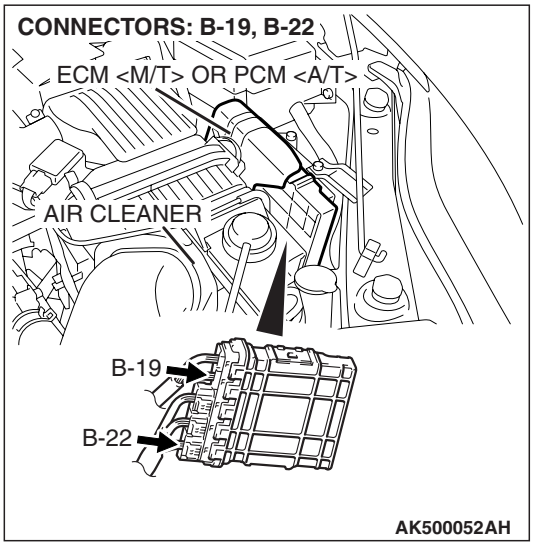

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TSB Revision

CIRCUIT OPERATION

- Controls the current that is applied from the ECM <M/T> or the PCM <A/T> (terminals No. 141, No. 147) to the throttle actuator control motor (terminals No. 1, No. 2).

TECHNICAL DESCRIPTION

- ECM <M/T> or PCM <A/T> varies the direction and the amperage of the current that is applied to the throttle actuator control motor in order to control the opening of the throttle valve.

DESCRIPTIONS OF MONITOR METHODS

Motor circuit current is smaller than the specified value.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Check Condition

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

or

- Battery positive voltage is higher than 8.3 volts.
- The proposed output voltage minus the output voltage of the (main) throttle position sensor becomes 1 volt or more.
- The proposed output voltage minus the output voltage of the (sub) throttle position sensor becomes 1 volt or more.

Judgement Criteria

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

or

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

OBD-II DRIVE CYCLE PATTERN

None.

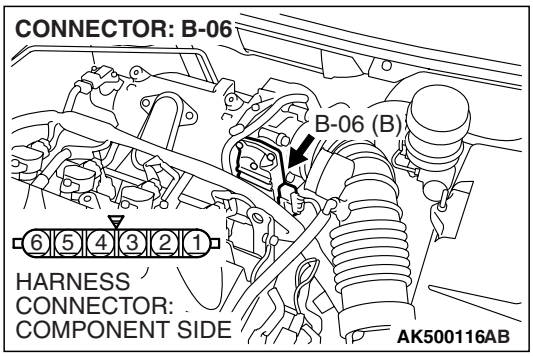
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Throttle actuator control motor failed.
- Open throttle actuator control motor circuit, harness damage or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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

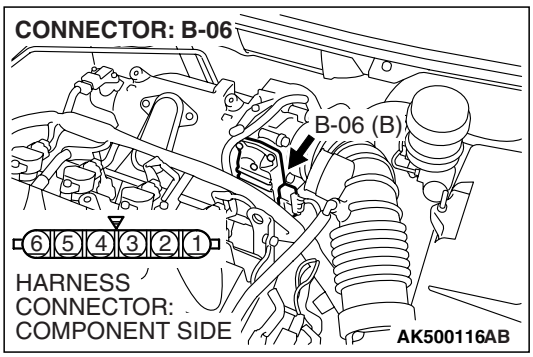


STEP 1. Check harness connector B-06 at throttle actuator control motor for damage.

Q: Is the harness connector in good condition?

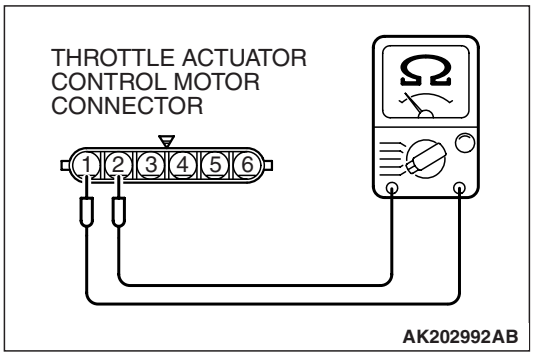
YES : Go to Step 2.

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



STEP 2. Check the throttle actuator control motor.

(1) Disconnect the connector B-06.



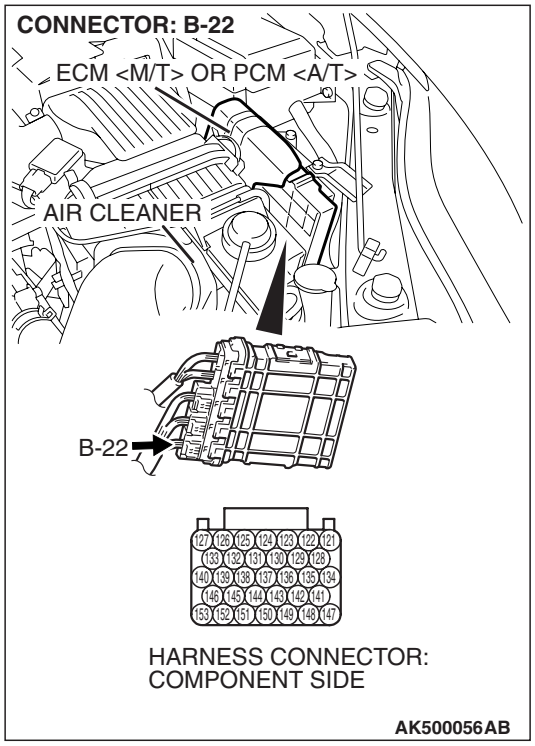
(2) Measure the resistance between throttle actuator control motor side connector terminal No. 1 and No. 2.

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

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

YES : Go to Step 3.

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



STEP 3. Check harness connector B-22 at ECM <M/T> or PCM <A/T> for damage

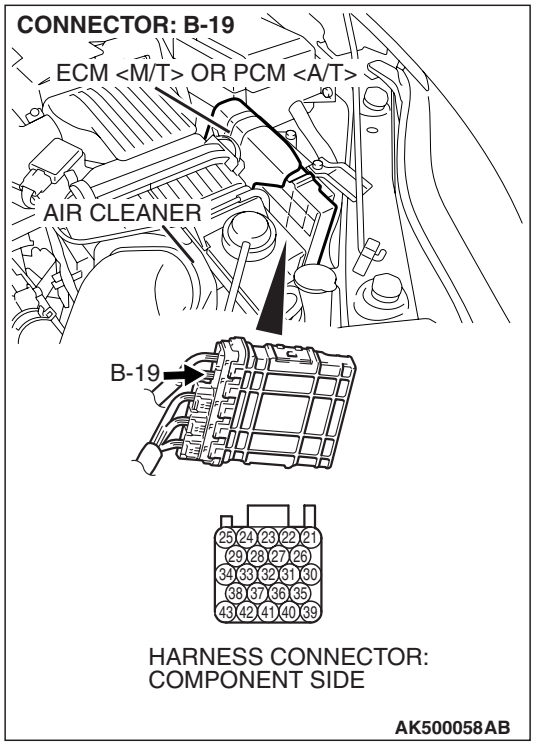
Q: Is the harness connector in good condition?

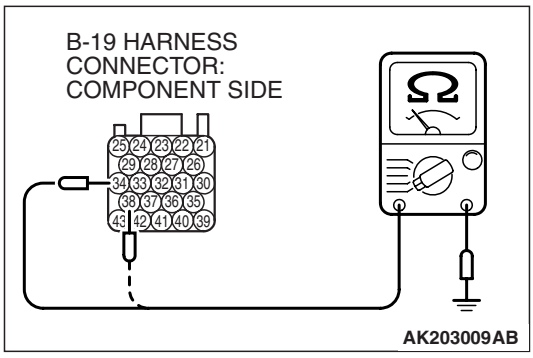
YES : Go to Step 4.

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

STEP 4. Check the continuity at ECM <M/T> or PCM <A/T> harness side connector B-19.

(1) Disconnect the connector B-19 and measure at the harness side.



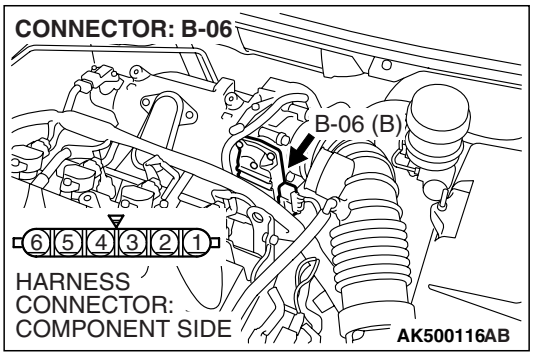


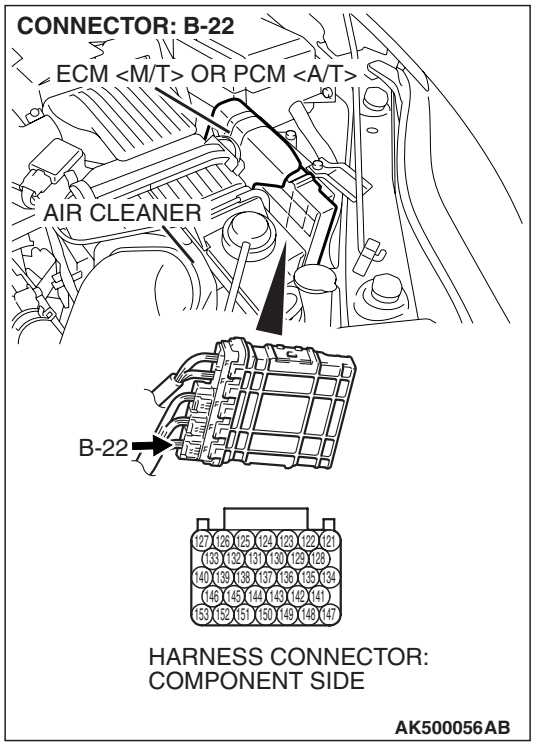
(2) Measure the continuity between terminals No. 34, No. 38 and ground.
- Should be less than 2 ohms.

Q: Does continuity exist?

YES : Go to Step 5.

NO : Repair harness wire between ECM <M/T> or PCM <A/T> connector B-19 (terminals No. 34, No. 38) and ground because of open circuit or harness damage. Then go to Step 8.



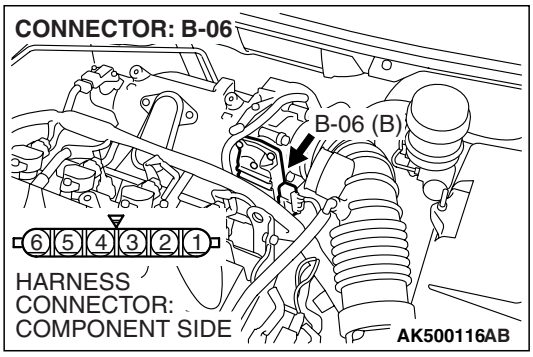


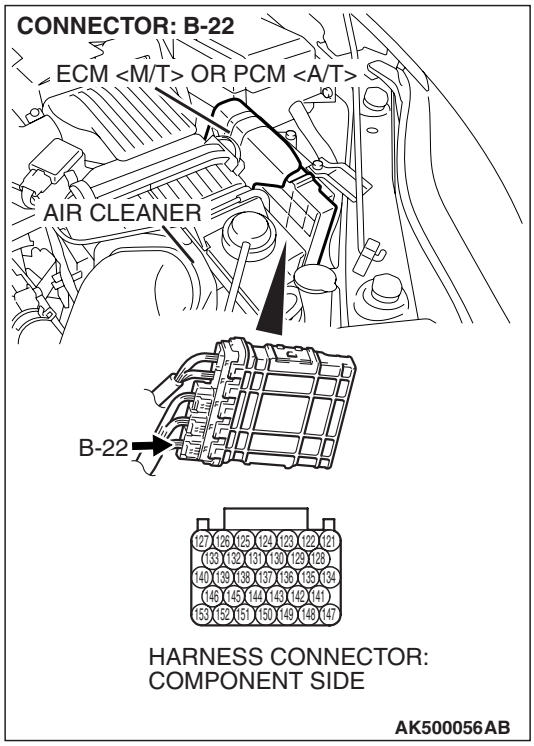
STEP 5. Check for open circuit and harness damage between throttle actuator control motor connector B-06 (terminal No. 1) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 147).

Q: Is the harness wire in good condition?

YES : Go to Step 6.

NO : Repair it. Then go to Step 8.



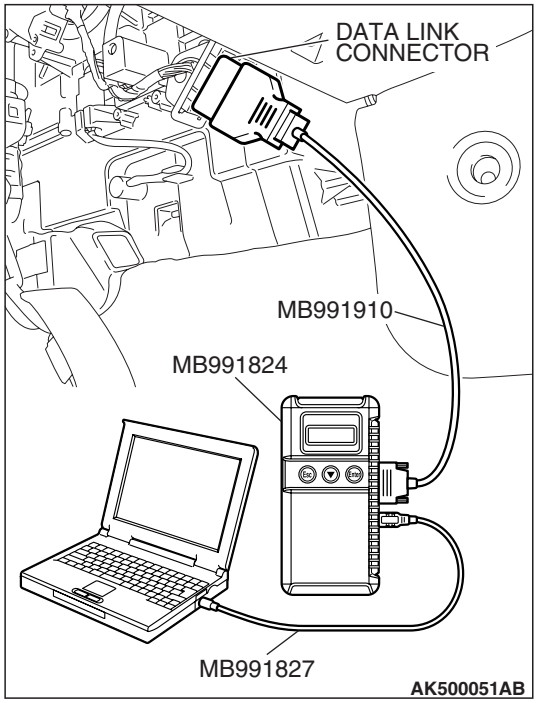


STEP 6. Check for open circuit and harness damage between throttle actuator control motor connector B-06 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 141).

Q: Is the harness wire in good condition?

YES : Go to Step 7.

NO : Repair it. Then go to Step 8.



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

⚠ CAUTION

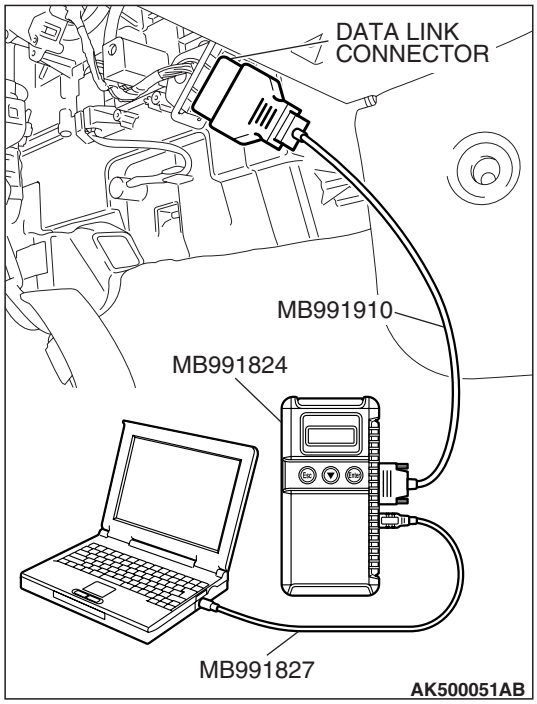
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is DTC P2100 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 8.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.



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

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

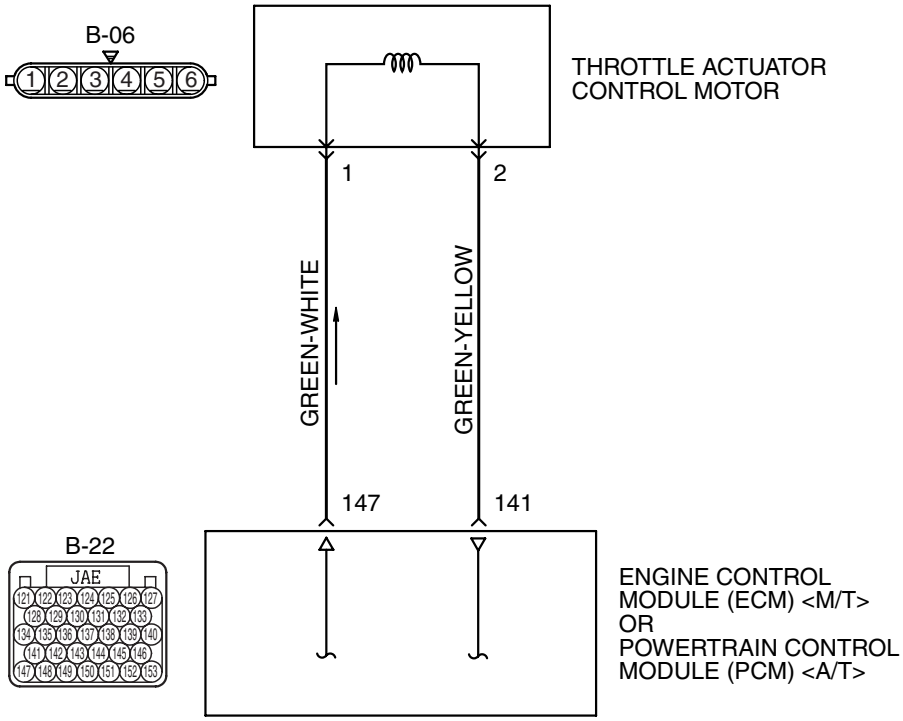
Q: Is DTC P2100 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P2101: Throttle Actuator Control Motor Magneto Malfunction

Throttle Actuator Control Motor Circuit



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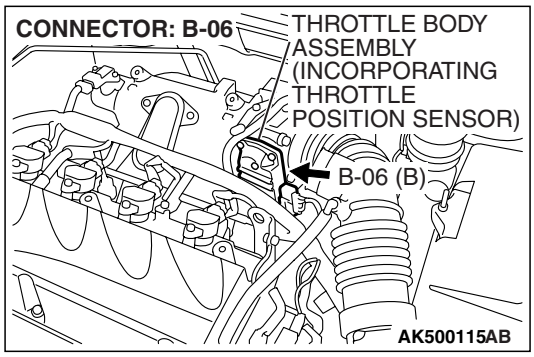

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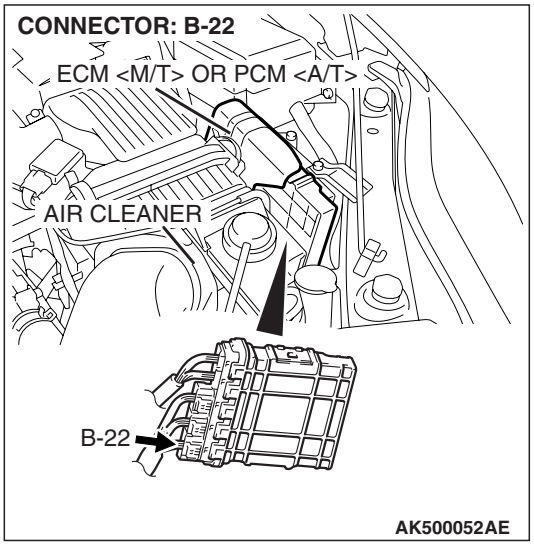

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CIRCUIT OPERATION

- Controls the current that is applied from ECM <M/T> or PCM <A/T> (terminals No. 141, No. 147) to the throttle actuator control motor (terminals No. 1, No. 2)

TECHNICAL DESCRIPTION

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

TSB Revision

DESCRIPTIONS OF MONITOR METHODS

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

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Check Condition

- Battery positive voltage is higher than 8.3 volts.

Judgement Criterion

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

OBD-II DRIVE CYCLE PATTERN

None.

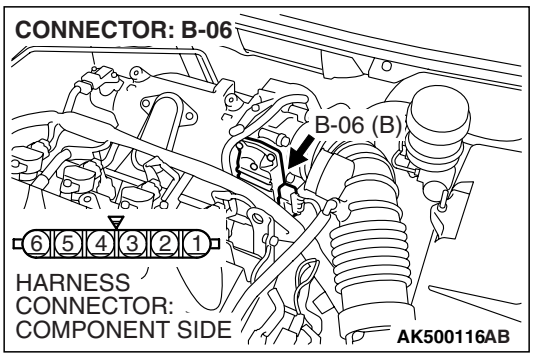
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Throttle actuator control motor failed.
- Shorted throttle actuator control motor circuit, harness damage or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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

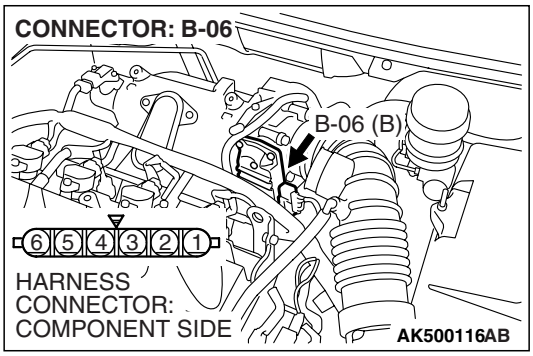


STEP 1. Check harness connector B-06 at throttle actuator control motor for damage.

Q: Is the harness connector in good condition?

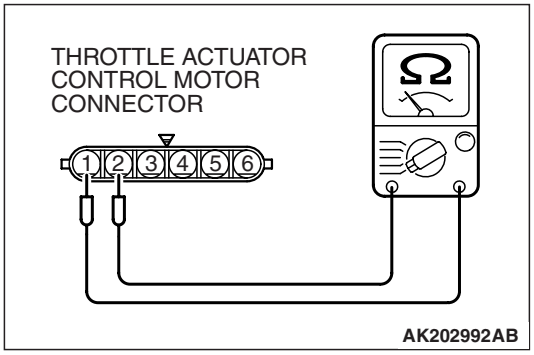
YES : Go to Step 2.

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



STEP 2. Check the throttle actuator control motor.

(1) Disconnect the connector B-06.



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

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

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

YES : Go to Step 3.

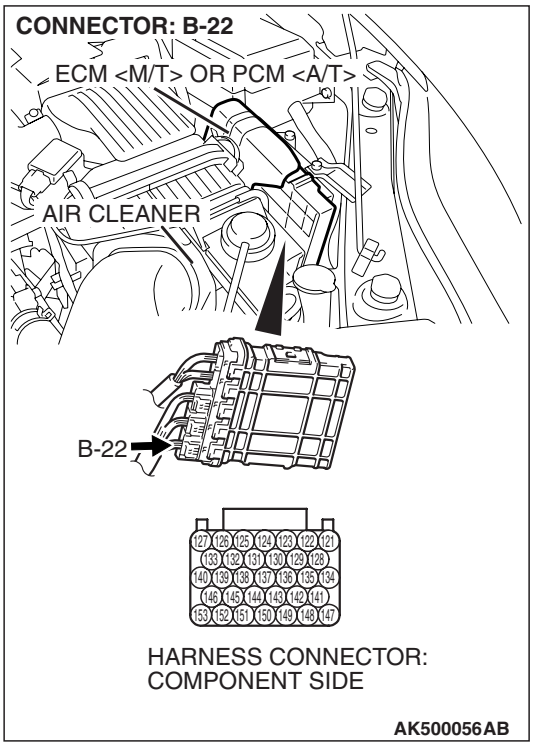
NO : Replace the throttle body assembly. Then go to Step 7.

STEP 3. Check harness connector B-22 at ECM <M/T> or PCM <A/T> for damage

Q: Is the harness connector in good condition?

YES : Go to Step 4.

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

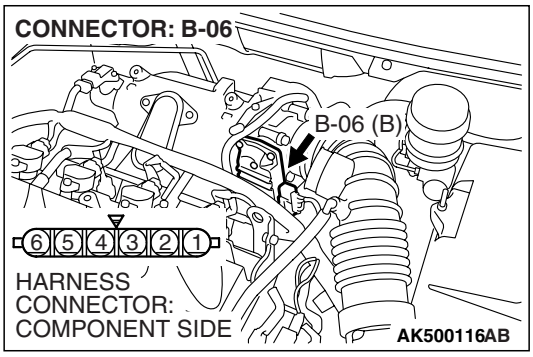


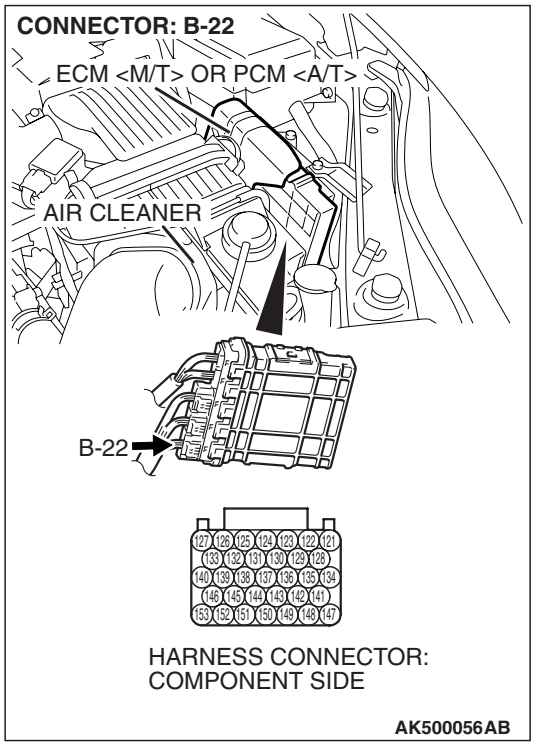
STEP 4. Check for short circuit to ground and harness damage between throttle actuator control motor connector B-06 (terminal No. 1) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 147).

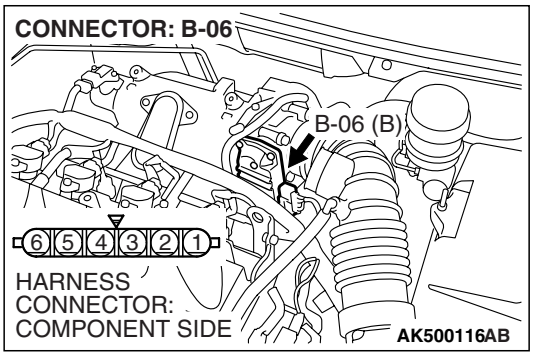
Q: Is the harness wire in good condition?

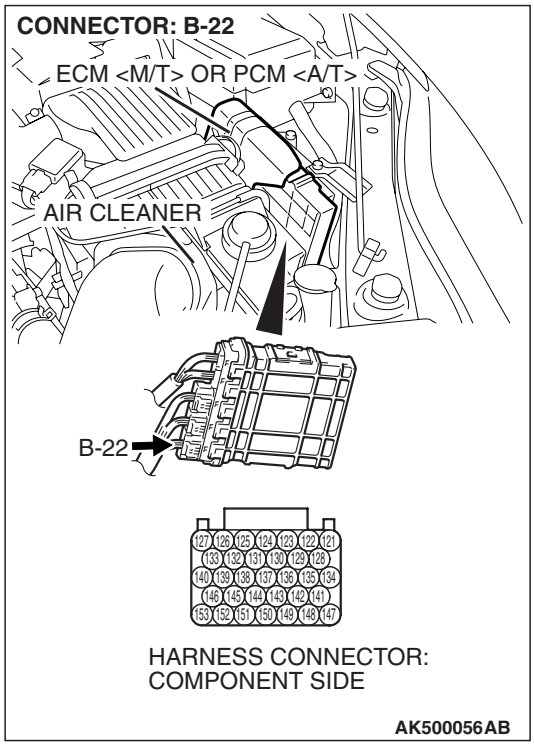
YES : Go to Step 5.

NO : Repair it. Then go to Step 7.







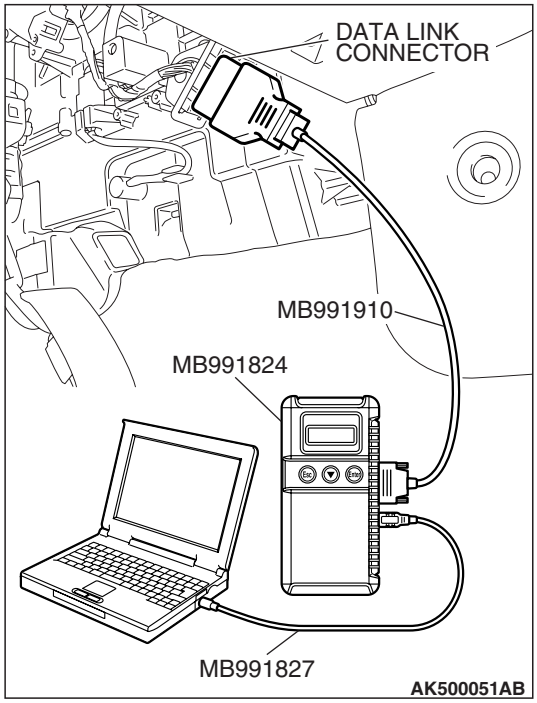


STEP 5. Check for short circuit to ground and harness damage between throttle actuator control motor connector B-06 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 141).

Q: Is the harness wire in good condition?

YES : Go to Step 6.

NO : Repair it. Then go to Step 7.



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

⚠ CAUTION

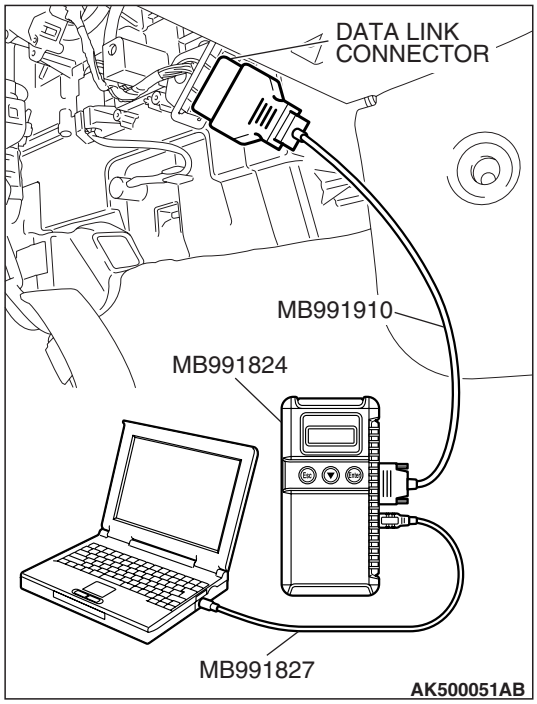
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is DTC P2101 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 7.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.



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

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

Q: Is DTC P2101 set?

YES : Retry the troubleshooting.

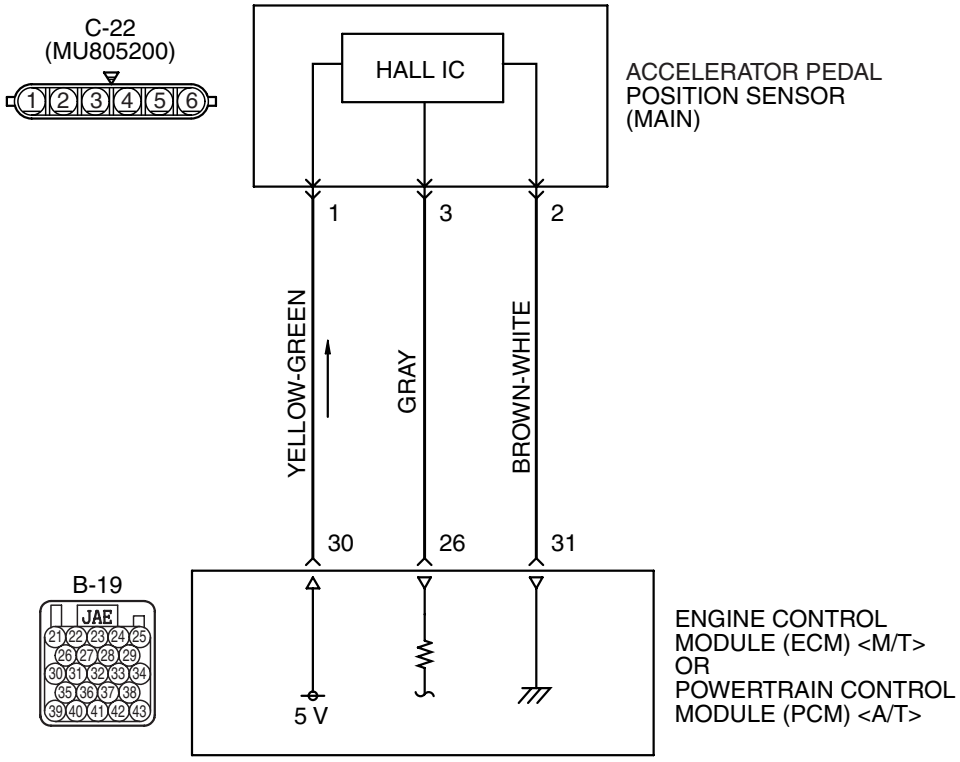
NO : The inspection is complete.

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

⚠ CAUTION

If DTC P2122 has been set, TCL related DTC U1120 and U1400 are also set. After P2122 has been diagnosed, don't forget to erase DTC U1120 and U1400.

Accelerator Pedal Position Sensor (main) Circuit



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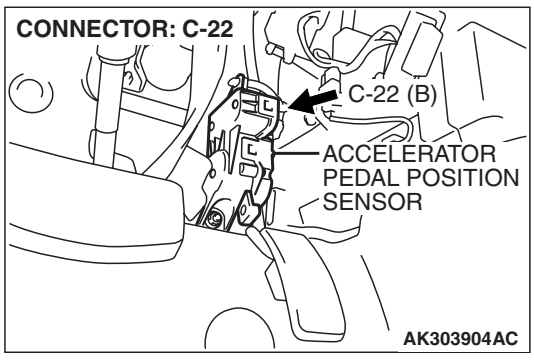
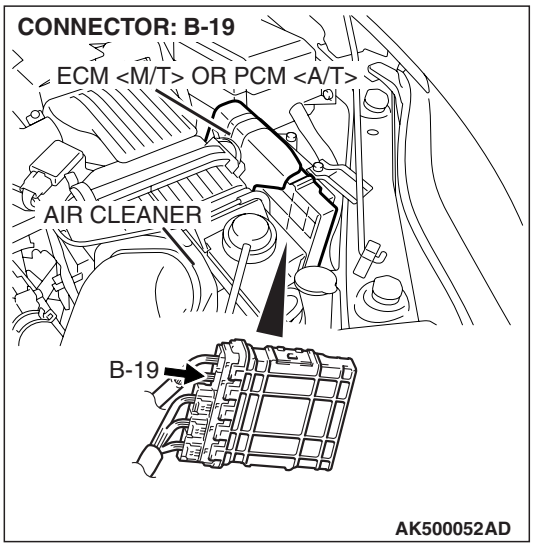




TSB Revision

CIRCUIT OPERATION

- A 5-volt power supply is applied on the accelerator pedal position sensor (main) power terminal (terminal No. 1) from the ECM <M/T> or the PCM <A/T> (terminal No. 30).
  The ground terminal (terminal No. 2) is grounded with ECM <M/T> or PCM <A/T> (terminal No. 31).

TECHNICAL DESCRIPTION

- The accelerator pedal position sensor (main) outputs voltage which corresponds to the accelerator pedal depression.
- The ECM <M/T> or the PCM <A/T> checks whether the voltage is within a specified range.

DESCRIPTIONS OF MONITOR METHODS

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

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

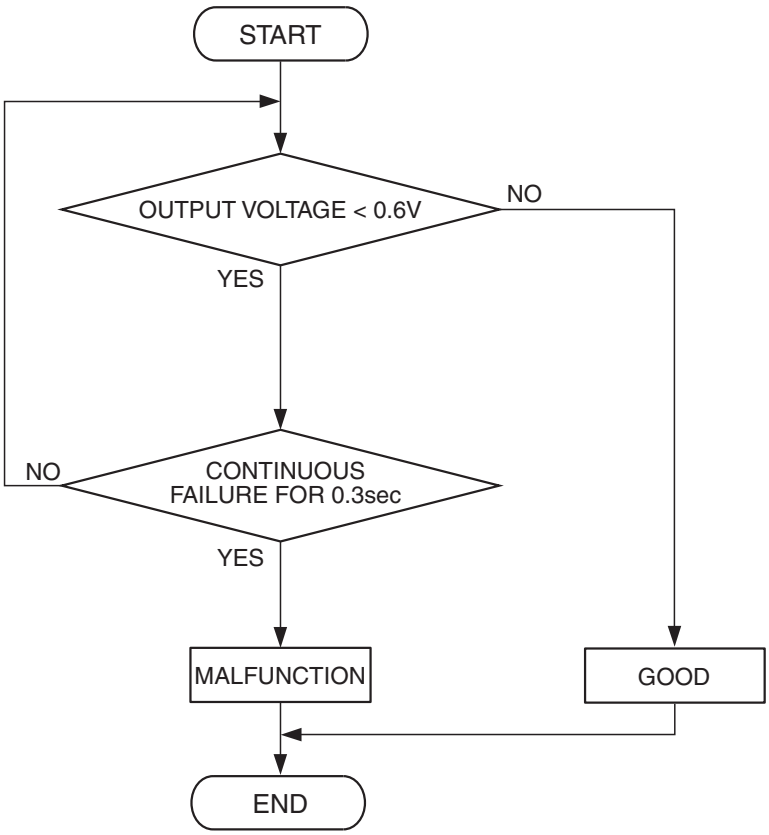
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK303905

TSB Revision

Check Condition

- Ignition switch is "ON" position.

Judgement Criterion

- Accelerator pedal position sensor (main) output voltage is 0.6 volt or less for 0.3 second.

OBD-II DRIVE CYCLE PATTERN

None.

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

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

DIAGNOSIS

Required Special Tools:

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

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

⚠ CAUTION

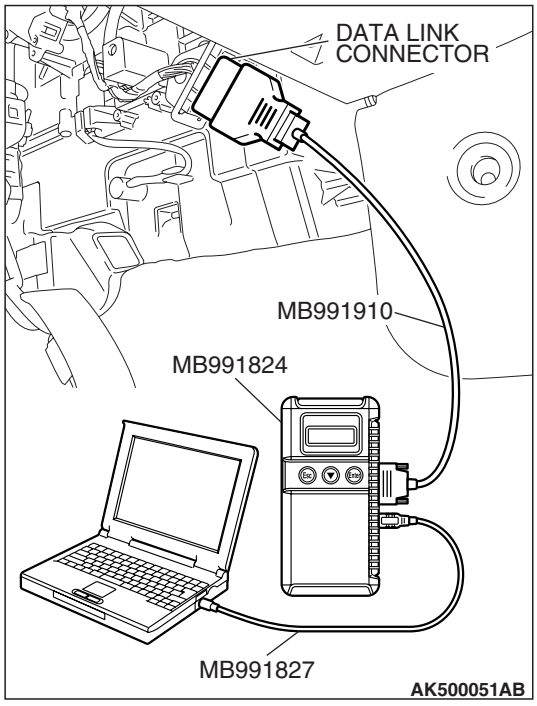
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

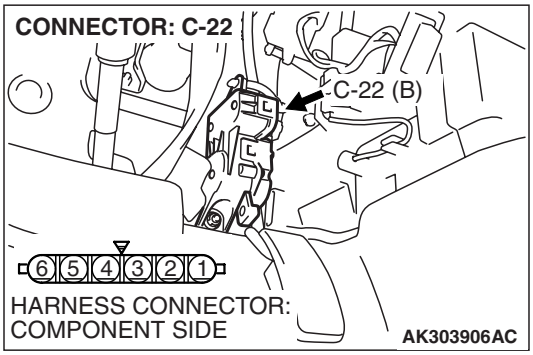
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to the data reading mode for item 11, Accelerator Pedal Position Sensor (main).
  - Output voltage is between 0.8 and 1.2 volts when foot is released from accelerator pedal.
  - Output voltage is 4.0 volts or higher when accelerator pedal is fully depressed.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

NO : Go to Step 2.



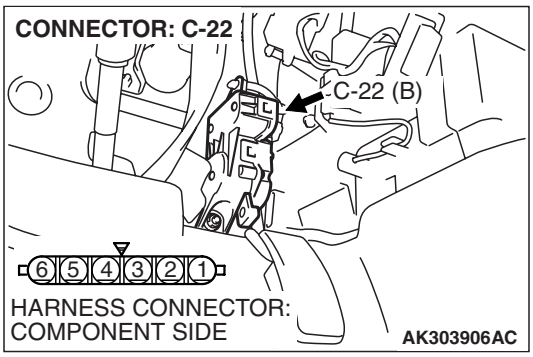


STEP 2. Check harness connector C-22 at accelerator pedal position sensor for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 3.

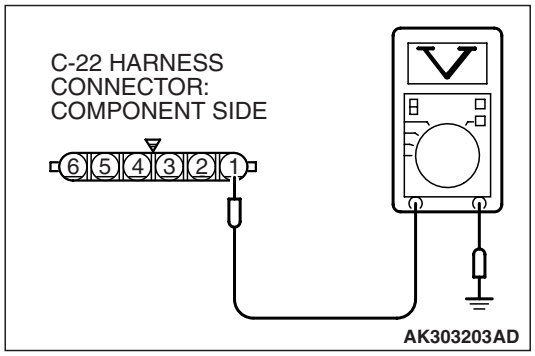
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 11.



STEP 3. Measure the sensor supply voltage at accelerator pedal position sensor harness side connector C-22.

(1) Disconnect the connector C-22 and measure at the harness side.

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



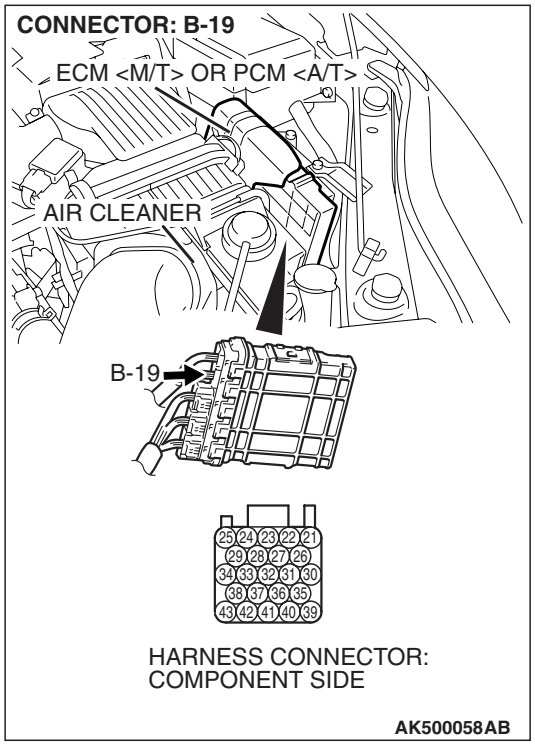
(3) Measure the voltage between terminal No. 1 and ground.
- Voltage should be between 4.9 and 5.1 volts.

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

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

YES : Go to Step 7.

NO : Go to Step 4.

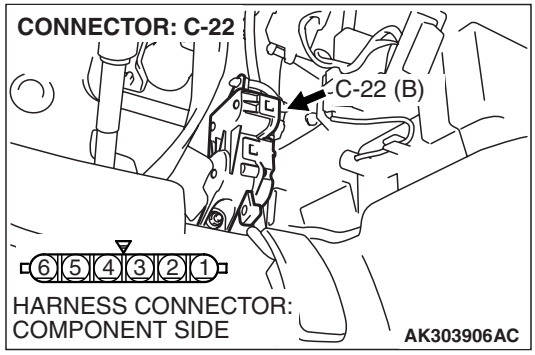


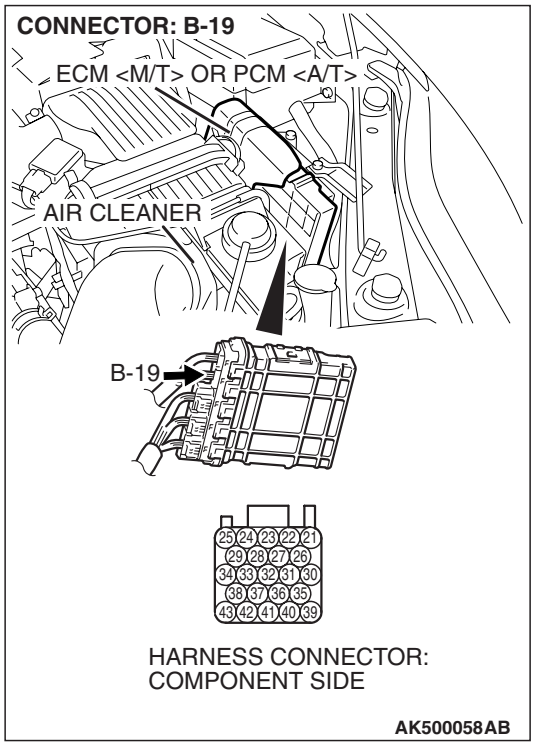
STEP 4. Check harness connector B-19 at ECM <M/T> or PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 5.

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



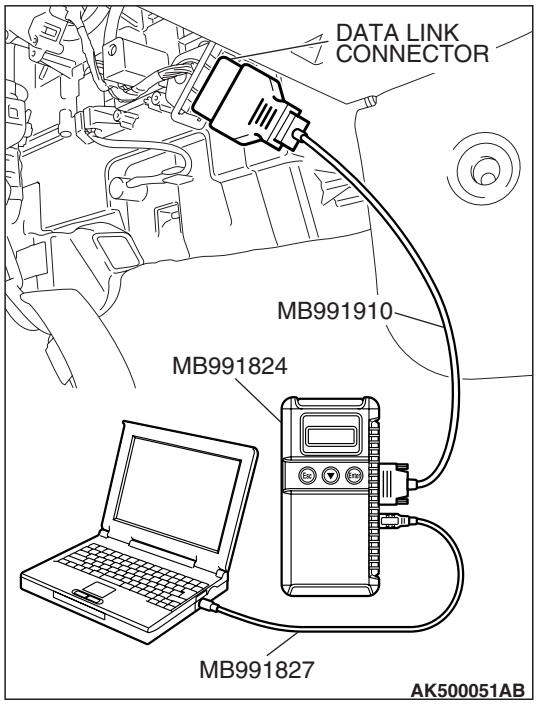


STEP 5. Check for open circuit and short circuit to ground between accelerator pedal position sensor connector C-22 (terminal No. 1) and ECM <M/T> or PCM <A/T> connector B-19 (terminal No. 30).

Q: Is the harness wire in good condition?

YES : Go to Step 6.

NO : Repair it. Then go to Step 11.



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

⚠ CAUTION

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

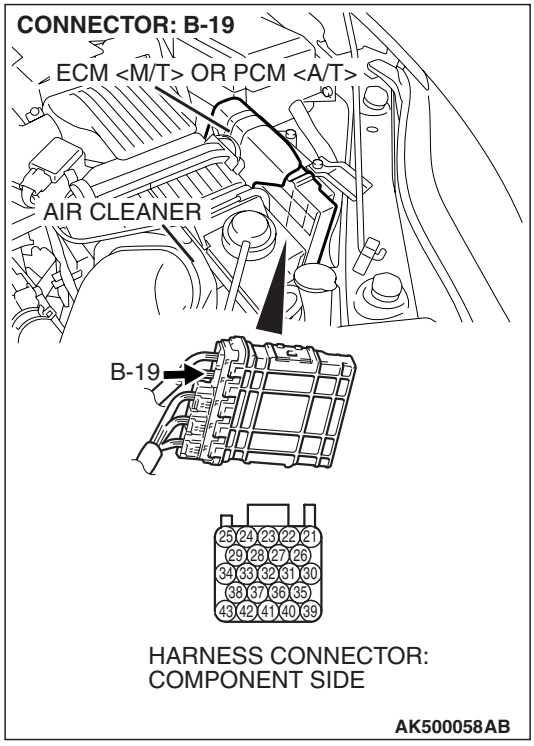
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to the data reading mode for item 11, Accelerator Pedal Position Sensor (main).
- Output voltage is between 0.8 and 1.2 volts when foot is released from accelerator pedal.
- Output voltage is 4.0 volts or higher when accelerator pedal is fully depressed.

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

Q: Is the sensor operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

NO : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 11.

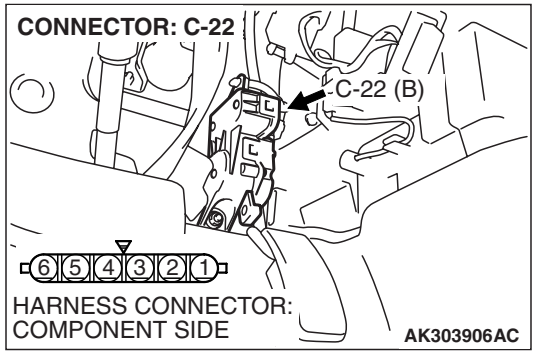


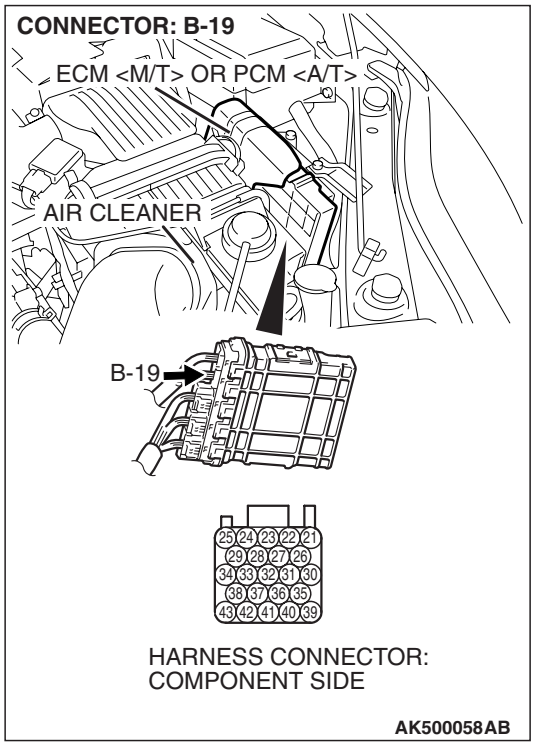
STEP 7. Check harness connector B-19 at ECM <M/T> or PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 8.

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





STEP 8. Check for harness damage between accelerator pedal position sensor connector C-22 (terminal No. 1) and ECM <M/T> or PCM <A/T> connector B-19 (terminal No. 30).

Q: Is the harness wire in good condition?

YES : Go to Step 9.

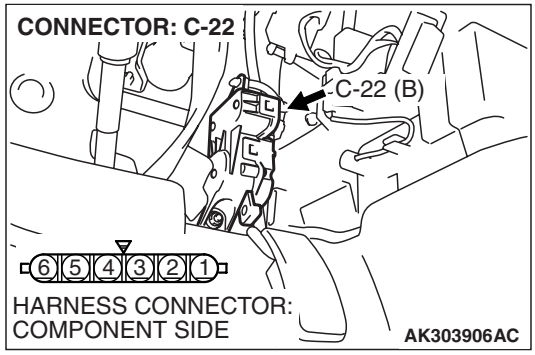
NO : Repair it. Then go to Step 11.

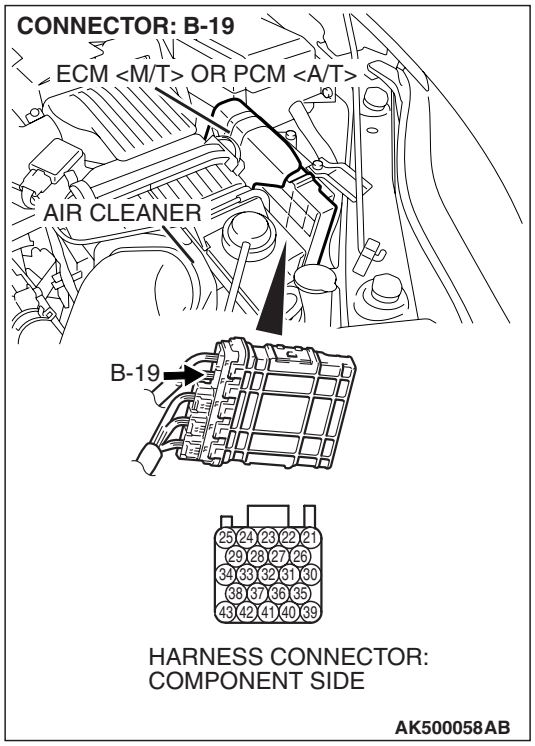
STEP 9. Check for harness damage between accelerator pedal position sensor connector C-22 (terminal No. 3) and ECM <M/T> or PCM <A/T> connector B-19 (terminal No. 26).

Q: Is the harness wire in good condition?

YES : Go to Step 10.

NO : Repair it. Then go to Step 11.





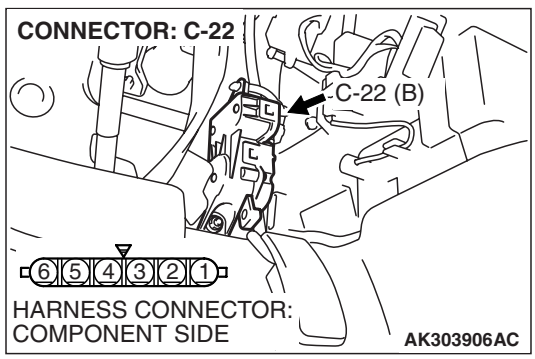
STEP 10. Replace the accelerator pedal position sensor.

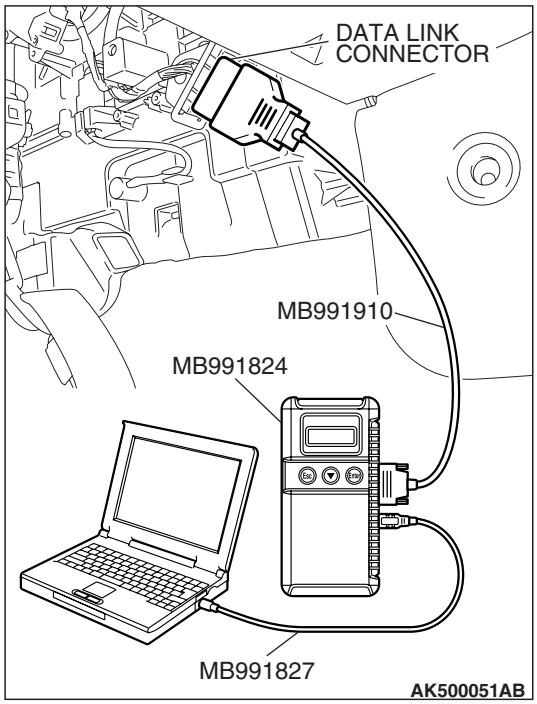
(1) Replace the accelerator pedal position sensor.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P2122 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 11.

NO : The inspection is complete.





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

⚠ CAUTION

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

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

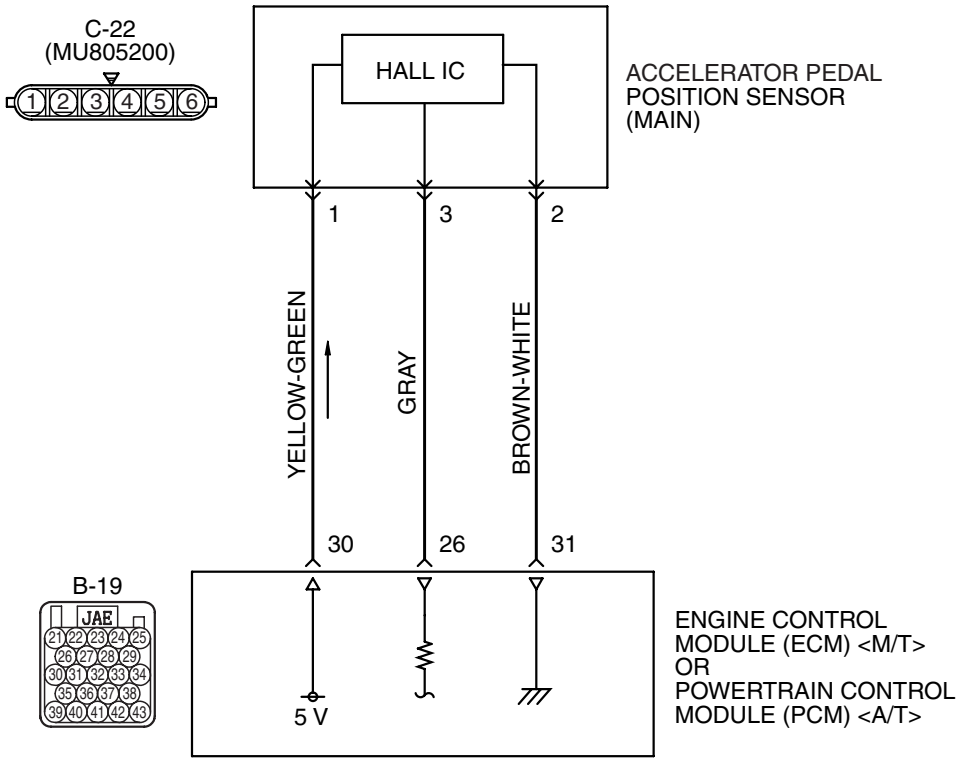
Q: Is DTC P2122 set?

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

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

⚠ CAUTION
If DTC P2123 has been set, TCL related DTC U1120 and U1400 are also set. After P2123 has been diagnosed, don't forget to erase DTC U1120 and U1400.

Accelerator Pedal Position Sensor (main) Circuit



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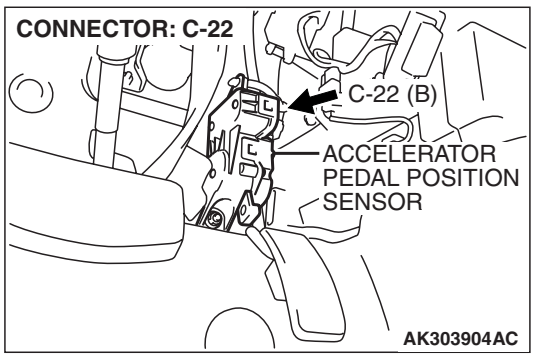
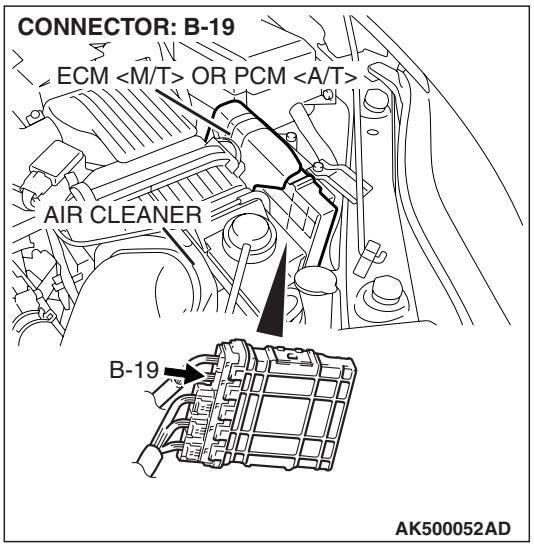




TSB Revision

CIRCUIT OPERATION

- A 5-volt power supply is applied on the accelerator pedal position sensor (main) power terminal (terminal No. 1) from the ECM <M/T> or the PCM <A/T> (terminal No. 30).
  The ground terminal (terminal No. 2) is grounded with ECM <M/T> or PCM <A/T> (terminal No. 31).

TECHNICAL DESCRIPTION

- The accelerator pedal position sensor (main) outputs voltage which corresponds to the accelerator pedal depression.
- The ECM <M/T> or the PCM <A/T> checks whether the voltage is within a specified range.

DESCRIPTIONS OF MONITOR METHODS

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

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

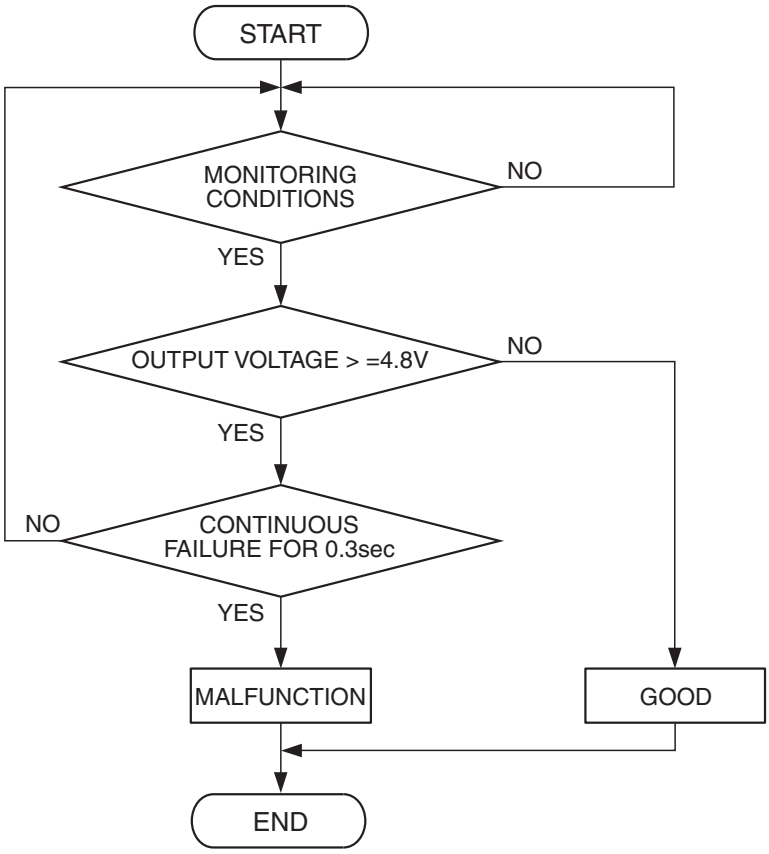
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



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TSB Revision

Check Condition
- Ignition switch is "ON" position.

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

OBD-II DRIVE CYCLE PATTERN
None.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)
- Accelerator pedal position sensor failed.
- Open accelerator pedal position sensor (main) circuit, harness damage or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

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

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

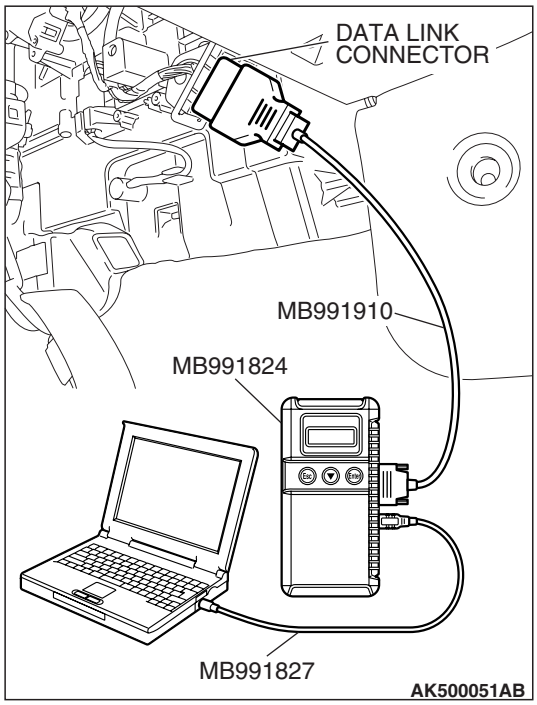
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

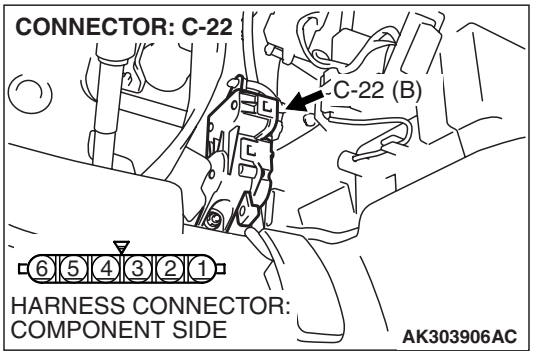
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to the data reading mode for item 11, Accelerator Pedal Position Sensor (main).
  - Output voltage is between 0.8 and 1.2 volts when foot is released from accelerator pedal.
  - Output voltage is 4.0 volts or higher when accelerator pedal is fully depressed.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

NO : Go to Step 2.



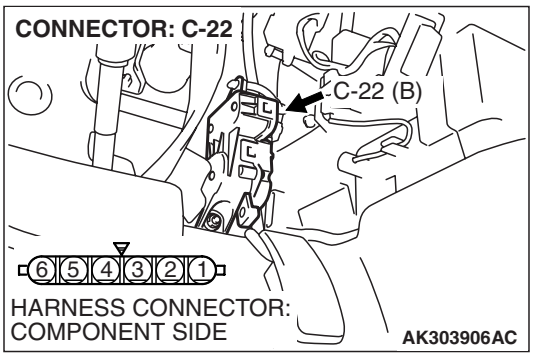


STEP 2. Check harness connector C-22 at accelerator pedal position sensor for damage.

Q: Is the harness connector in good condition?

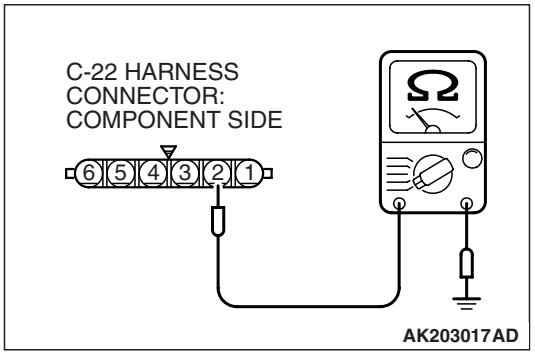
YES : Go to Step 3.

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



STEP 3. Check the continuity at accelerator pedal position sensor harness side connector C-22.

(1) Disconnect the connector C-22 and measure at the harness side.



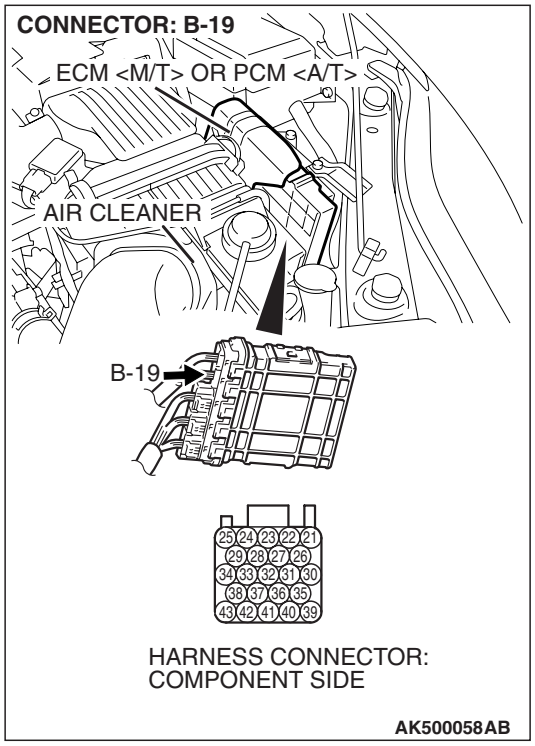
(2) Measure the continuity between terminal No. 2 and ground.

- Should be less than 2 ohms.

Q: Does continuity exist?

YES : Go to Step 6.

NO : Go to Step 4.



STEP 4. Check harness connector B-19 at ECM <M/T> or PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 5.

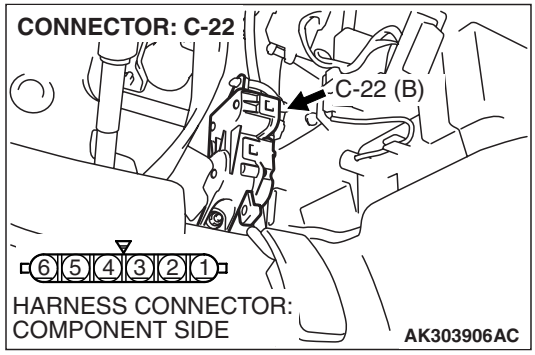
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 8.

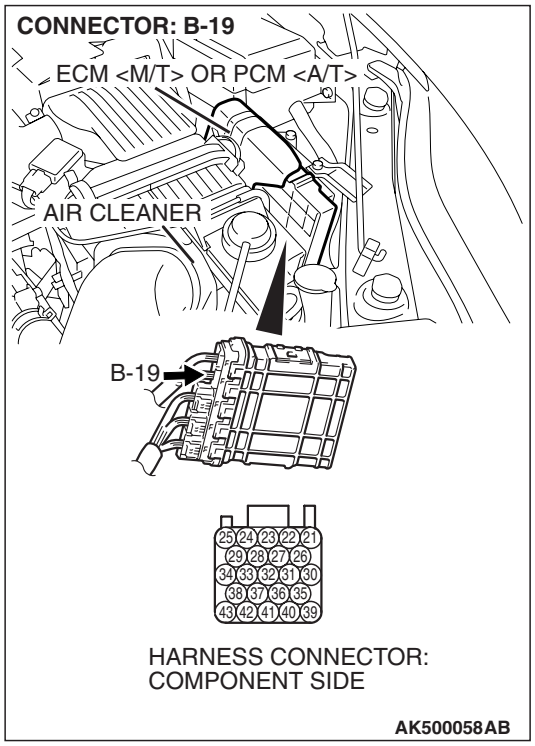
STEP 5. Check for open circuit and harness damage between accelerator pedal position sensor connector C-22 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-19 (terminal No. 31).

Q: Is the harness wire in good condition?

YES : Go to Step 7.

NO : Repair it. Then go to Step 8.





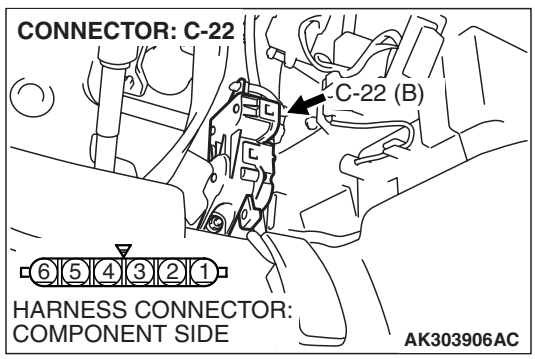
STEP 6. Replace the accelerator pedal position sensor.

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

Q: Is DTC P2123 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 8.

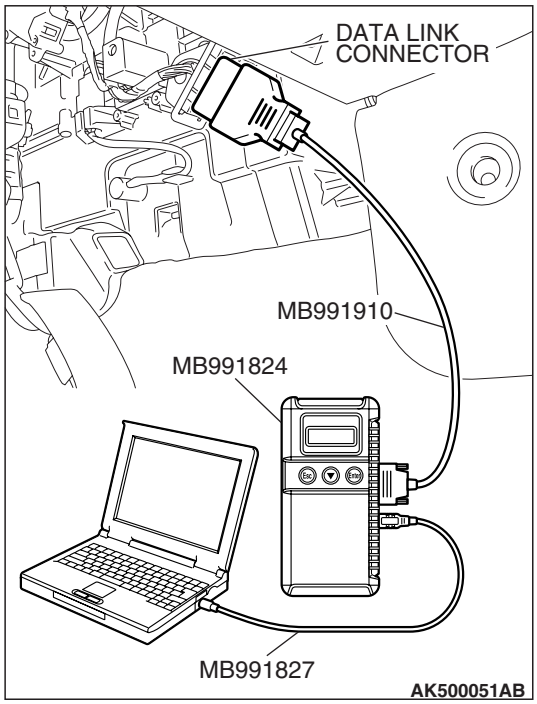
NO : The inspection is complete.



STEP 7. Using scan tool MB991958, check data list item 11: Accelerator Pedal Position Sensor (main).

⚠ CAUTION

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



(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to the data reading mode for item 11, Accelerator Pedal Position Sensor (main).
- Output voltage is between 0.8 and 1.2 volts when foot is released from accelerator pedal.
- Output voltage is 4.0 volts or higher when accelerator pedal is fully depressed.

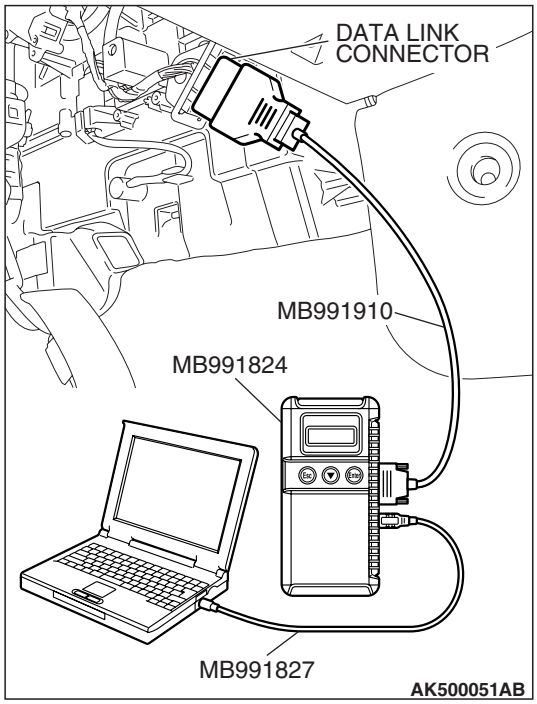
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

NO : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 8.

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



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

Q: Is DTC P2123 set?

YES : Retry the troubleshooting.

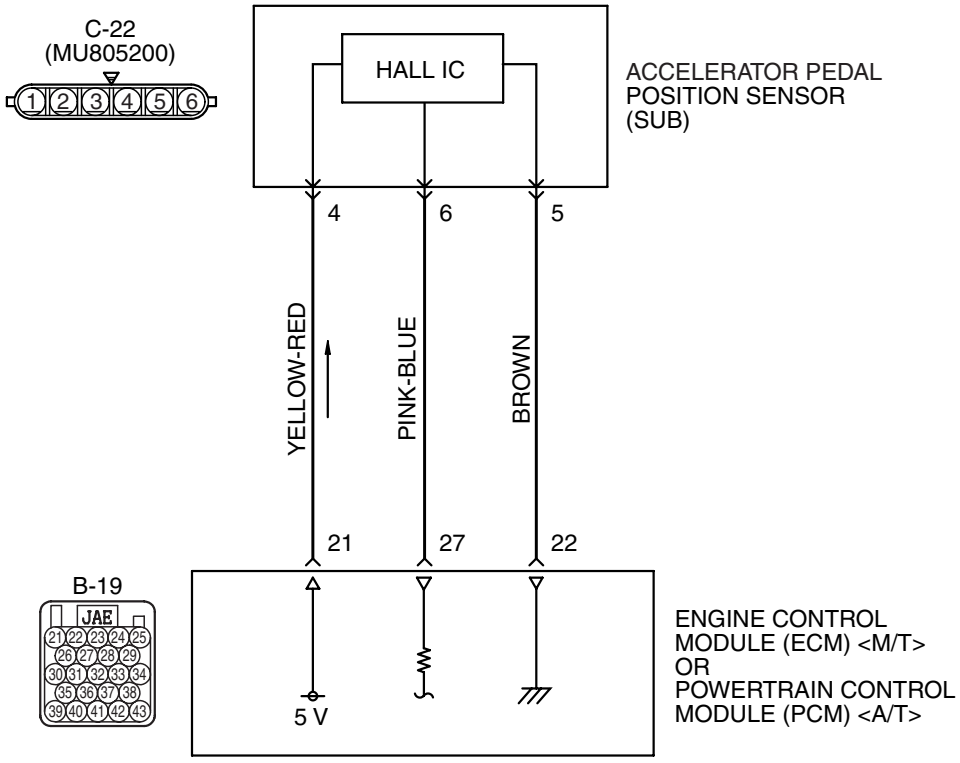
NO : The inspection is complete.

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

⚠ CAUTION

If DTC P2127 has been set, TCL related DTC U1120 is also set. After P2127 has been diagnosed, don't forget to erase DTC U1120.

Accelerator Pedal Position Sensor (sub) Circuit



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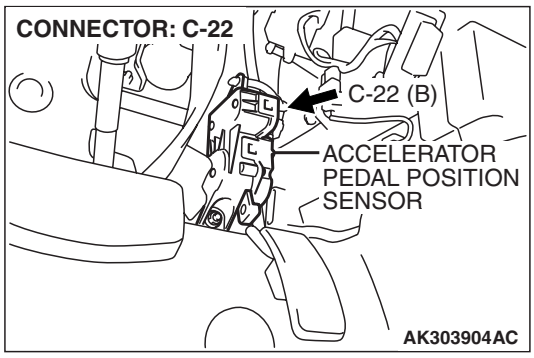
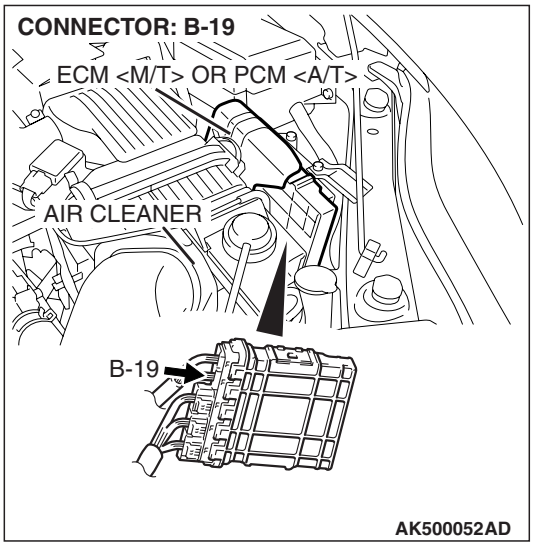




TSB Revision

CIRCUIT OPERATION

- A 5-volt power supply is applied on the accelerator pedal position sensor (sub) power terminal (terminal No. 4) from the ECM <M/T> or the PCM <A/T> (terminal No. 21).
  The ground terminal (terminal No. 5) is grounded with ECM <M/T> or PCM <A/T> (terminal No. 22).

TECHNICAL DESCRIPTION

- The accelerator pedal position sensor (sub) outputs voltage which corresponds to the accelerator pedal depression.
- The ECM <M/T> or the PCM <A/T> checks whether the voltage is within a specified range.

DESCRIPTIONS OF MONITOR METHODS

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

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

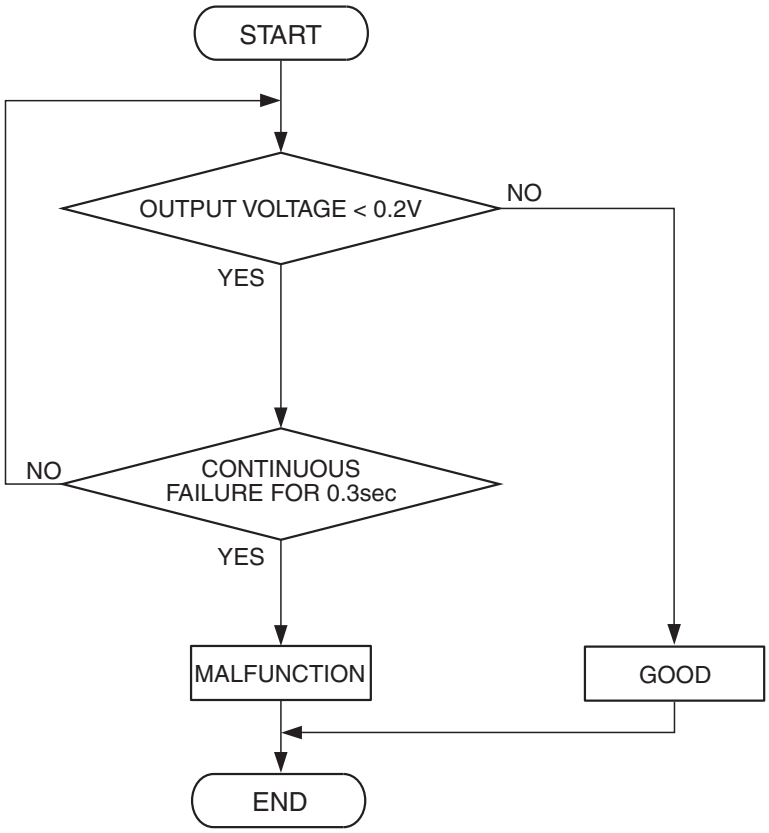
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



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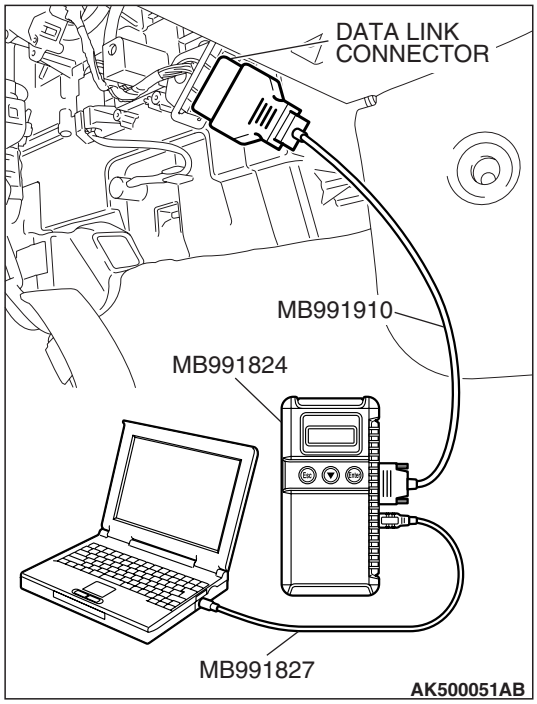
TSB Revision

Check Condition
- Ignition switch is "ON" position.

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

OBD-II DRIVE CYCLE PATTERN
None.



TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)
- Accelerator pedal position sensor failed.
- Open or shorted accelerator pedal position sensor (sub) circuit, harness damage or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

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

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

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

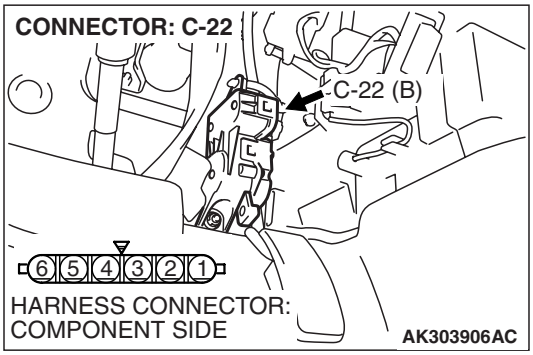
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to the data reading mode for item 12, Accelerator Pedal Position Sensor (sub).
- Output voltage is between 0.4 and 1.0 volts when foot is released from accelerator pedal.
- Output voltage is 3.6 volts or higher when accelerator pedal is fully depressed.

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

Q: Is the sensor operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

NO : Go to Step 2.

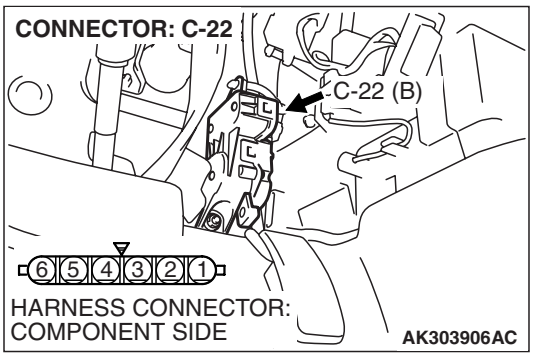


STEP 2. Check harness connector C-22 at accelerator pedal position sensor for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 3.

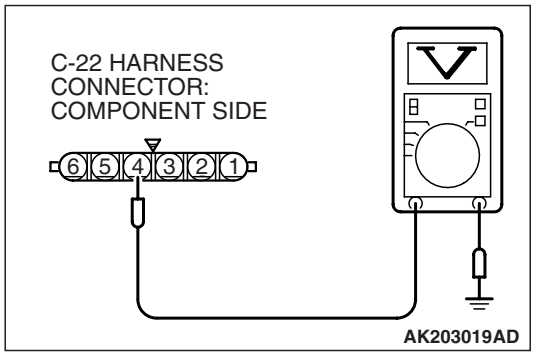
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 11.



STEP 3. Measure the sensor supply voltage at accelerator pedal position sensor harness side connector C-22.

(1) Disconnect the connector C-22 and measure at the harness side.

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



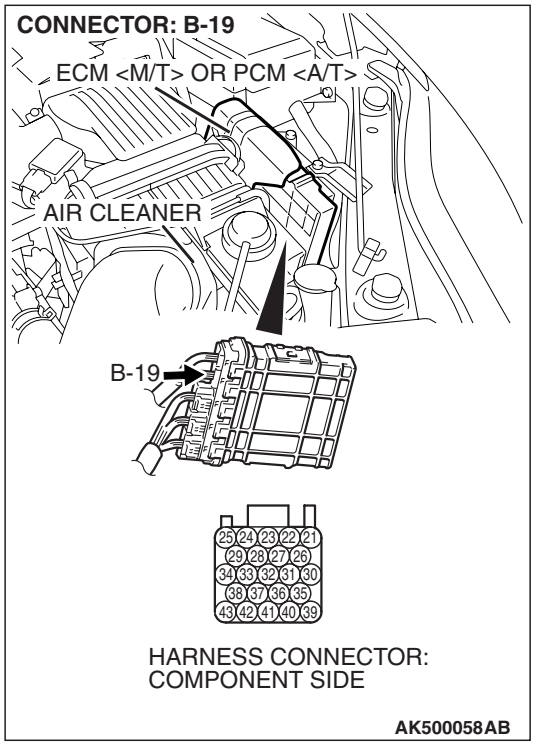
(3) Measure the voltage between terminal No. 4 and ground.
- Voltage should be between 4.9 and 5.1 volts.

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

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

YES : Go to Step 7.

NO : Go to Step 4.

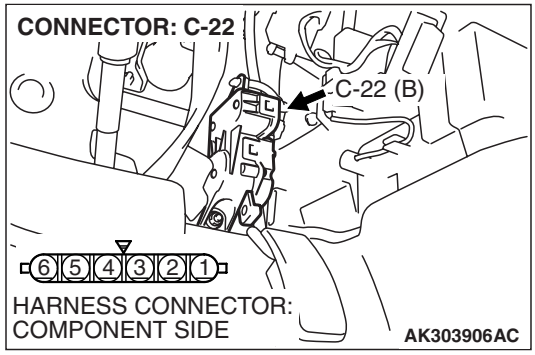


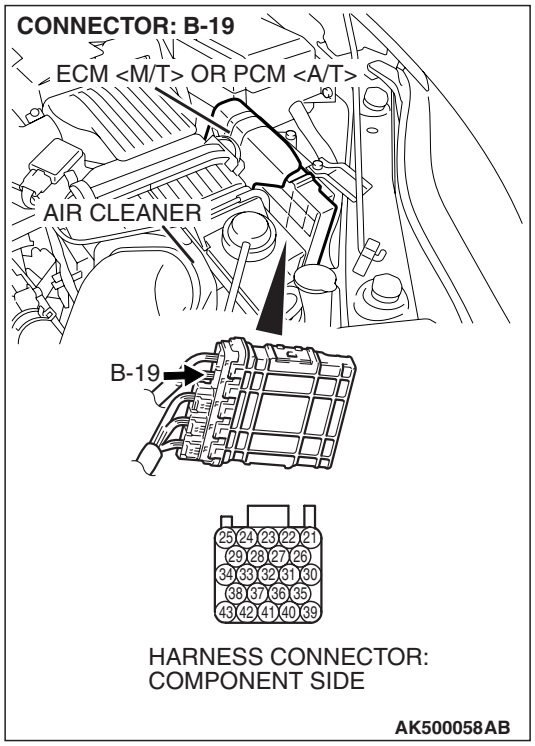
STEP 4. Check harness connector B-19 at ECM <M/T> or PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 5.

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



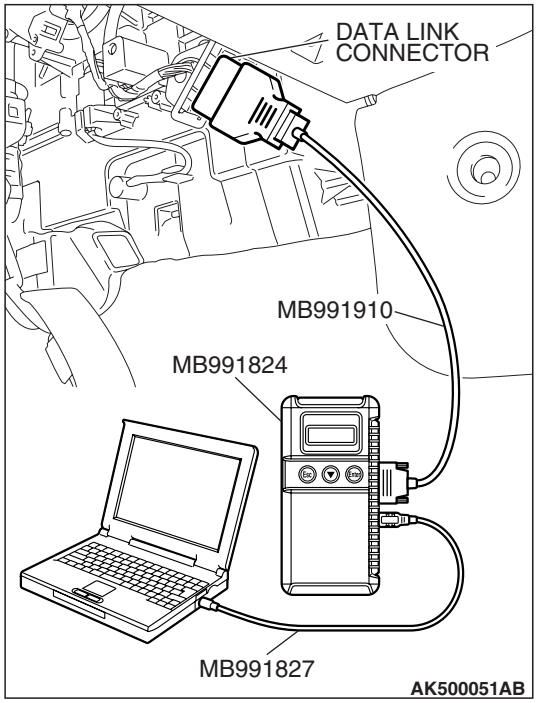


STEP 5. Check for open circuit and short circuit to ground between accelerator pedal position sensor connector C-22 (terminal No. 4) and ECM <M/T> or PCM <A/T> connector B-19 (terminal No. 21).

Q: Is the harness wire in good condition?

YES : Go to Step 6.

NO : Repair it. Then go to Step 11.



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

⚠ CAUTION

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

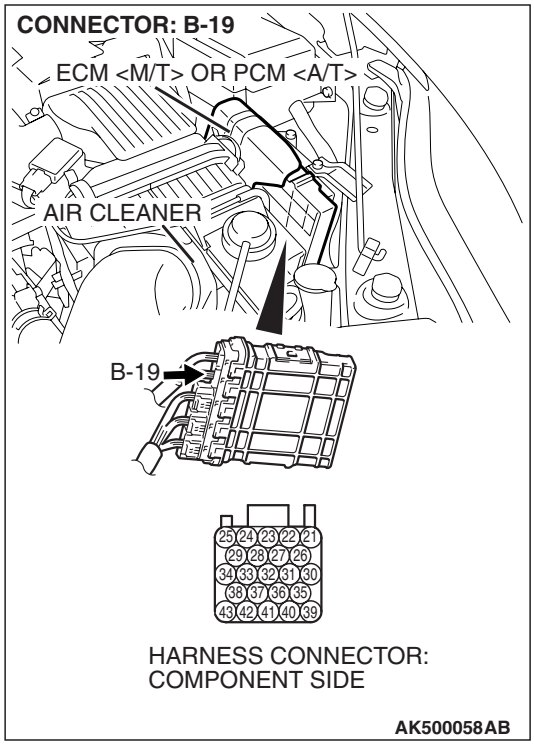
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to the data reading mode for item 12, Accelerator Pedal Position Sensor (sub).
- Output voltage is between 0.4 and 1.0 volts when foot is released from accelerator pedal.
- Output voltage is 3.6 volts or higher when accelerator pedal is fully depressed.

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

Q: Is the sensor operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

NO : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 11.

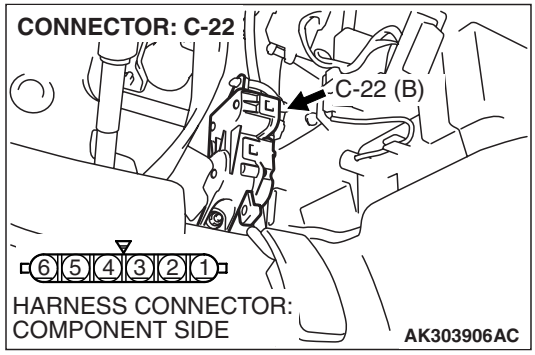


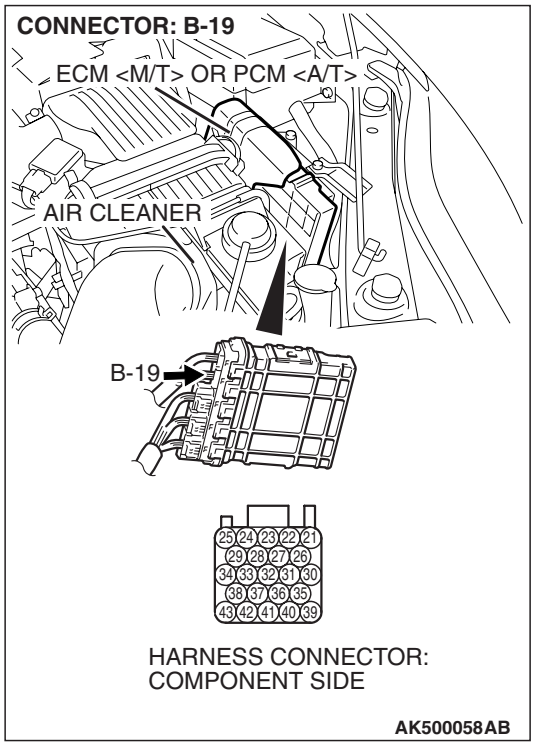
STEP 7. Check harness connector B-19 at ECM <M/T> or PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 8.

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





STEP 8. Check for harness damage between accelerator pedal position sensor connector C-22 (terminal No. 4) and ECM <M/T> or PCM <A/T> connector B-19 (terminal No. 21).

Q: Is the harness wire in good condition?

YES : Go to Step 9.

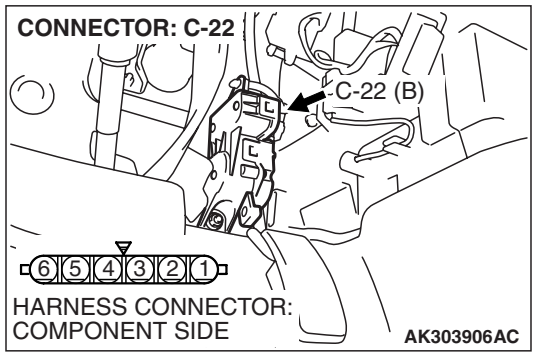
NO : Repair it. Then go to Step 11.

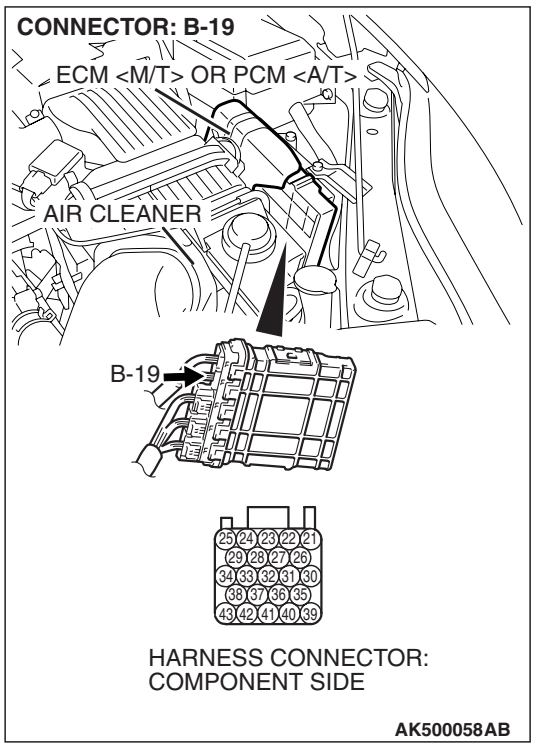
STEP 9. Check for harness damage between accelerator pedal position sensor connector C-22 (terminal No. 6) and ECM <M/T> or PCM <A/T> connector B-19 (terminal No. 27)

Q: Is the harness wire in good condition?

YES : Go to Step 10.

NO : Repair it. Then go to Step 11.





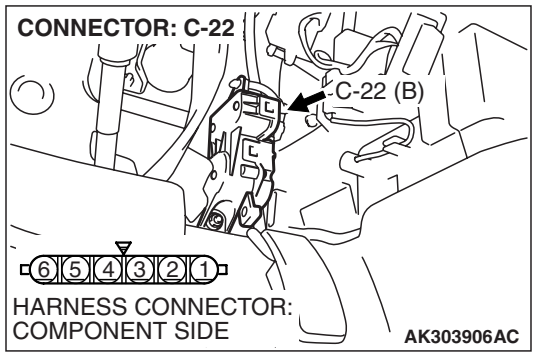
STEP 10. Replace the accelerator pedal position sensor.

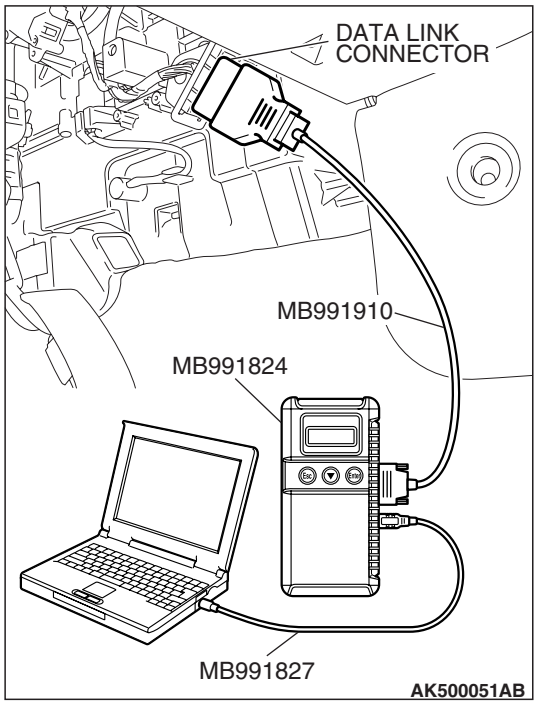
(1) Replace the accelerator pedal position sensor.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P2127 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 11.

NO : The inspection is complete.





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

⚠ CAUTION

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

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

Q: Is DTC P2127 set?

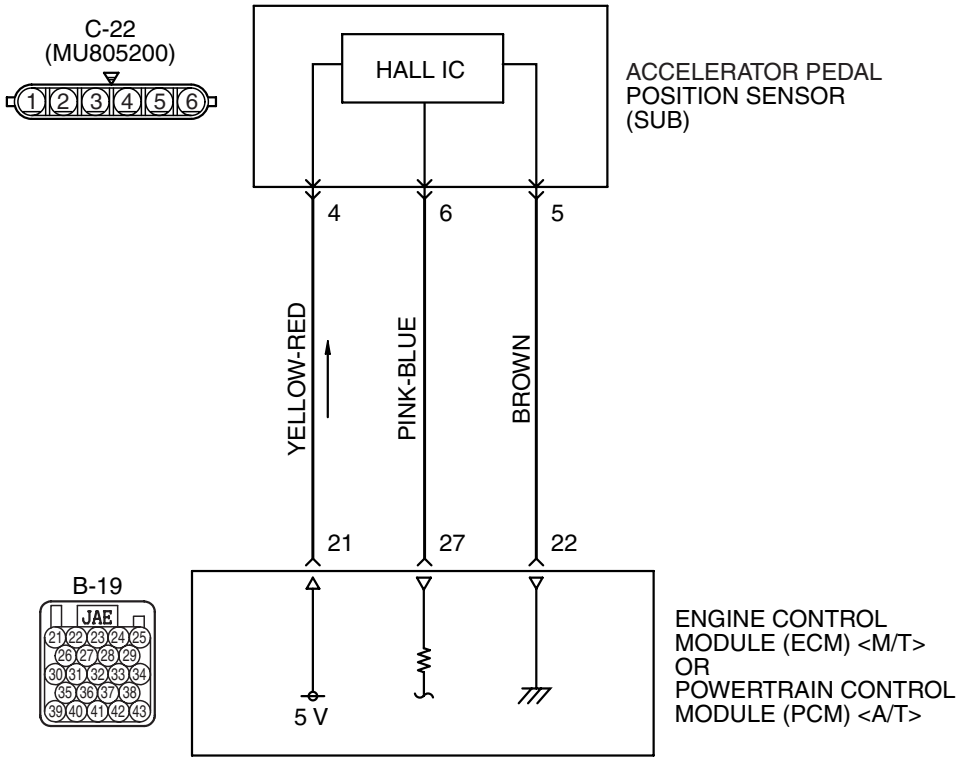
YES : Retry the troubleshooting.
NO : The inspection is complete.

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

⚠ CAUTION

If DTC P2128 has been set, TCL related DTC U1120 is also set. After P2128 has been diagnosed, don't forget to erase DTC U1120.

Accelerator Pedal Position Sensor (sub) Circuit



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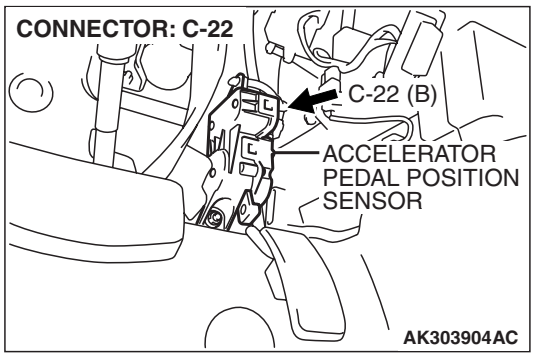
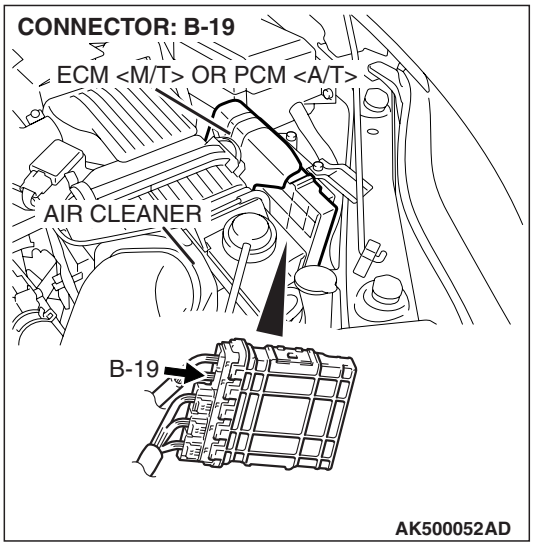




TSB Revision

CIRCUIT OPERATION

- A 5-volt power supply is applied on the accelerator pedal position sensor (sub) power terminal (terminal No. 4) from the ECM <M/T> or the PCM <A/T> (terminal No. 21).
  The ground terminal (terminal No. 5) is grounded with ECM <M/T> or PCM <A/T> (terminal No. 22).

TECHNICAL DESCRIPTION

- The accelerator pedal position sensor (sub) outputs voltage which corresponds to the accelerator pedal depression.
- The ECM <M/T> or the PCM <A/T> checks whether the voltage is within a specified range.

DESCRIPTIONS OF MONITOR METHODS

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

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

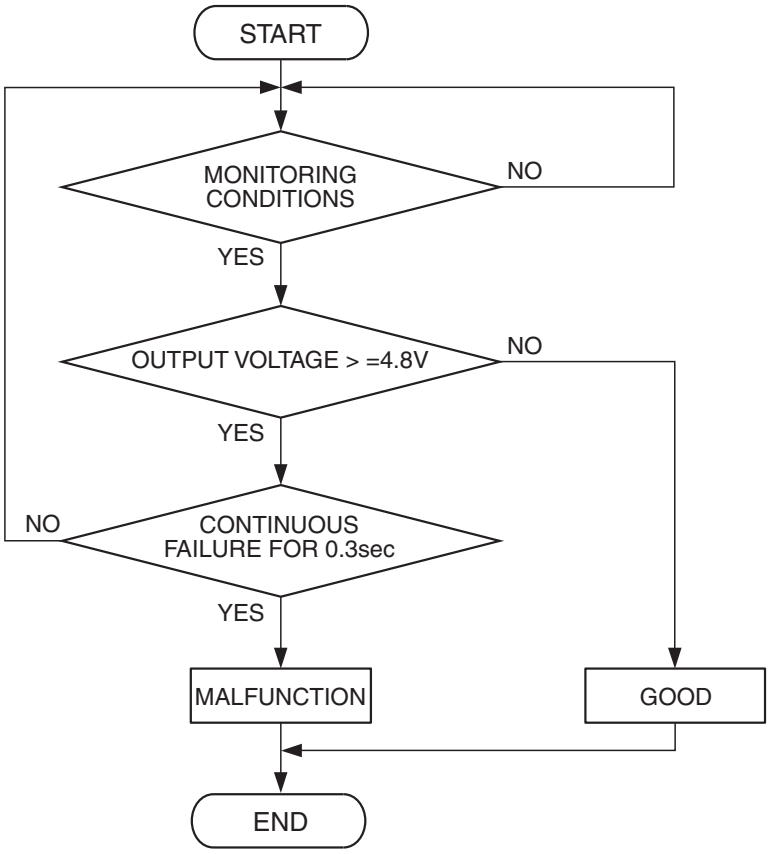
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



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TSB Revision

Check Condition
- Ignition switch is "ON" position.

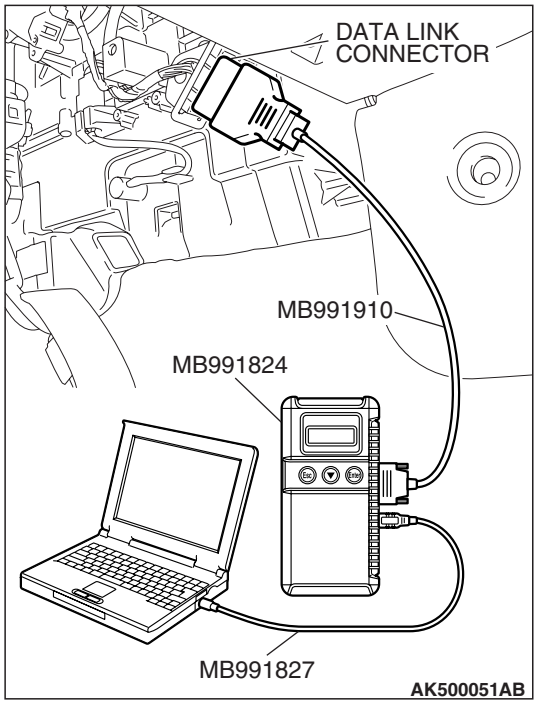
Judgement Criterion
- Accelerator pedal position sensor (sub) output voltage is 4.8 volts or higher for 0.3 second.

OBD-II DRIVE CYCLE PATTERN
None.

TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)
- Accelerator pedal position sensor failed.
- Open accelerator pedal position sensor (sub) circuit, harness damage or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

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



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

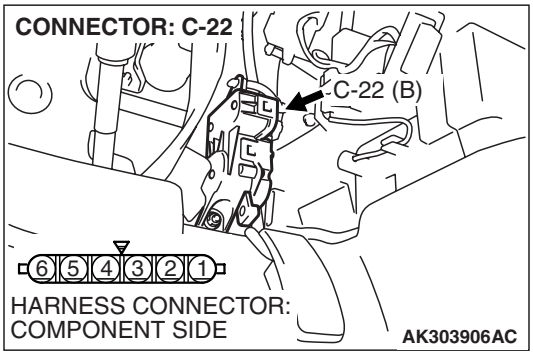
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to the data reading mode for item 12, Accelerator Pedal Position Sensor (sub).
  - Output voltage is between 0.4 and 1.0 volts when foot is released from accelerator pedal.
  - Output voltage is 3.6 volts or higher when accelerator pedal is fully depressed.
(4) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is the sensor operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

NO : Go to Step 2.

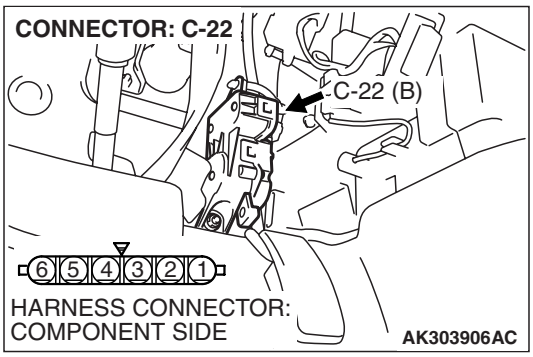


STEP 2. Check harness connector C-22 at accelerator pedal position sensor for damage.

Q: Is the harness connector in good condition?

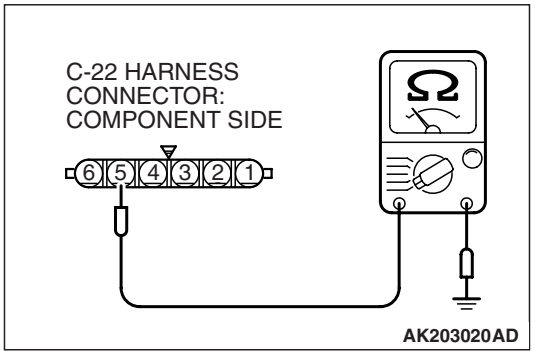
YES : Go to Step 3.

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



STEP 3. Check the continuity at accelerator pedal position sensor harness side connector C-22.

(1) Disconnect the connector C-22 and measure at the harness side.



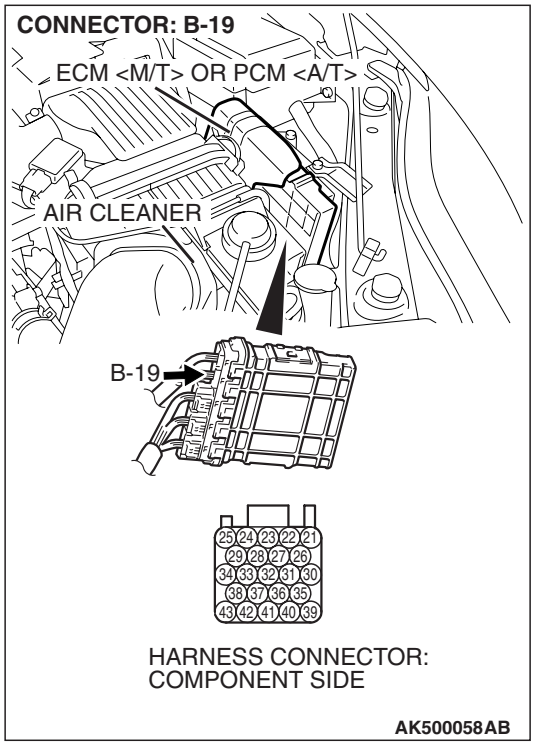
(2) Measure the continuity between terminal No. 5 and ground.

- Should be less than 2 ohms.

Q: Does continuity exist?

YES : Go to Step 6.

NO : Go to Step 4.



STEP 4. Check harness connector B-19 at ECM <M/T> or PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 5.

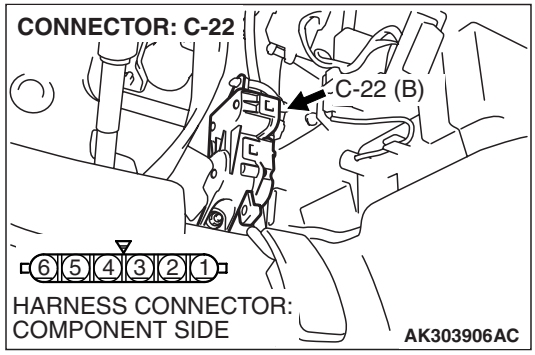
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 8.

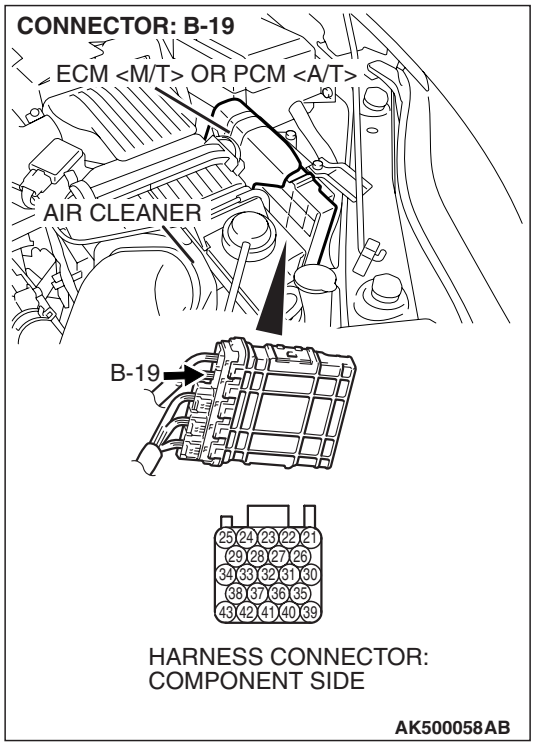
STEP 5. Check for open circuit and harness damage between accelerator pedal position sensor connector C-22 (terminal No. 5) and ECM <M/T> or PCM <A/T> connector B-19 (terminal No. 22).

Q: Is the harness wire in good condition?

YES : Go to Step 7.

NO : Repair it. Then go to Step 8.





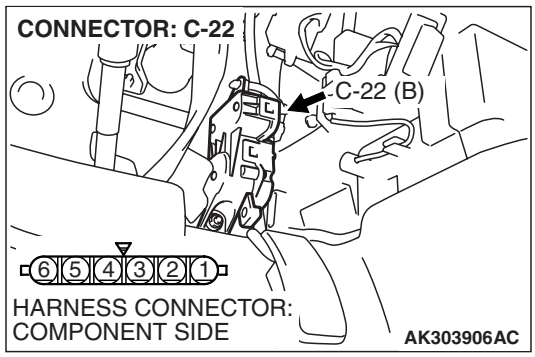
STEP 6. Replace the accelerator pedal position sensor.

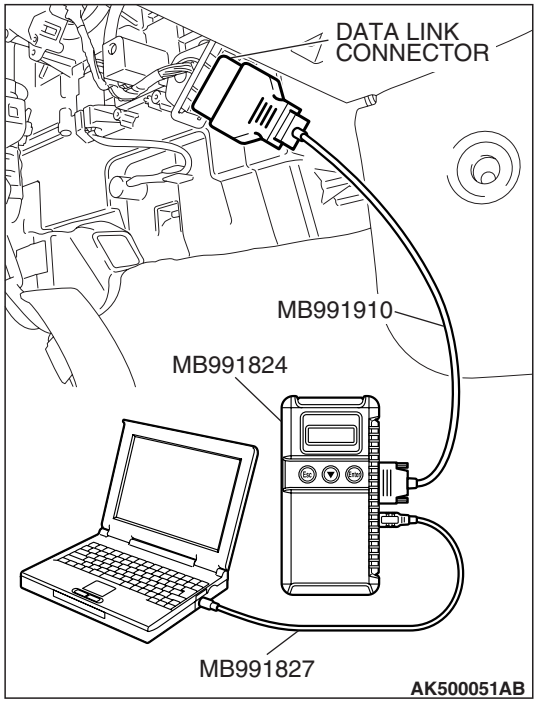
(1) Replace the accelerator pedal position sensor.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P2128 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 8.

NO : The inspection is complete.





STEP 7. Using scan tool MB991958, check data list item 12: Accelerator Pedal Position Sensor (sub).

⚠ CAUTION

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

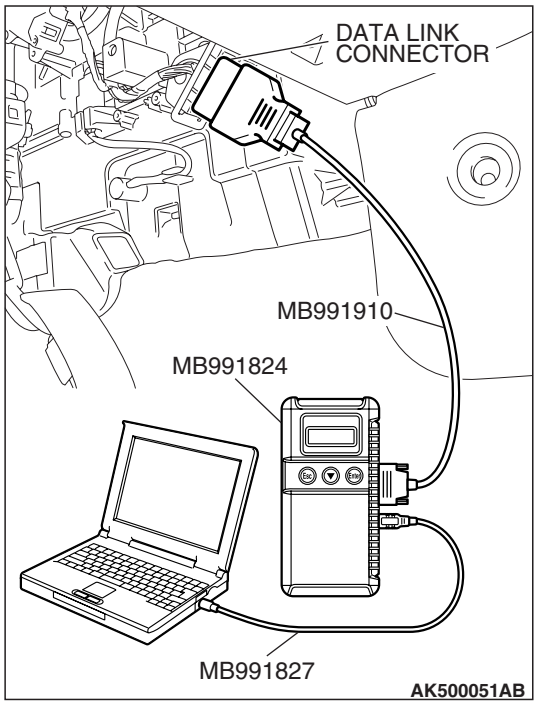
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to the data reading mode for item 12, Accelerator Pedal Position Sensor (sub).
- Output voltage is between 0.4 and 1.0 volts when foot is released from accelerator pedal.
- Output voltage is 3.6 volts or higher when accelerator pedal is fully depressed.

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

Q: Is the sensor operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

NO : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 8.



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

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

Q: Is DTC P2128 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

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

⚠ CAUTION
If DTC P2135 has been set, TCL related DTC U1120 is also set. After P2135 has been diagnosed, don't forget to erase DTC U1120.

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

- Refer to DTC P0122 –Throttle Position Sensor (main) Circuit P.13A-246.
- Refer to DTC P0222 –Throttle Position Sensor (sub) Circuit P.13A-512.

CIRCUIT OPERATION

- Refer to DTC P0122 –Throttle Position Sensor (main) Circuit P.13A-246.
- Refer to DTC P0222 –Throttle Position Sensor (sub) Circuit P.13A-512.

TECHNICAL DESCRIPTION

- ECM <M/T> or PCM <A/T> checks the throttle position sensor output signal characteristics for abnormal conditions.

DESCRIPTIONS OF MONITOR METHODS

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

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

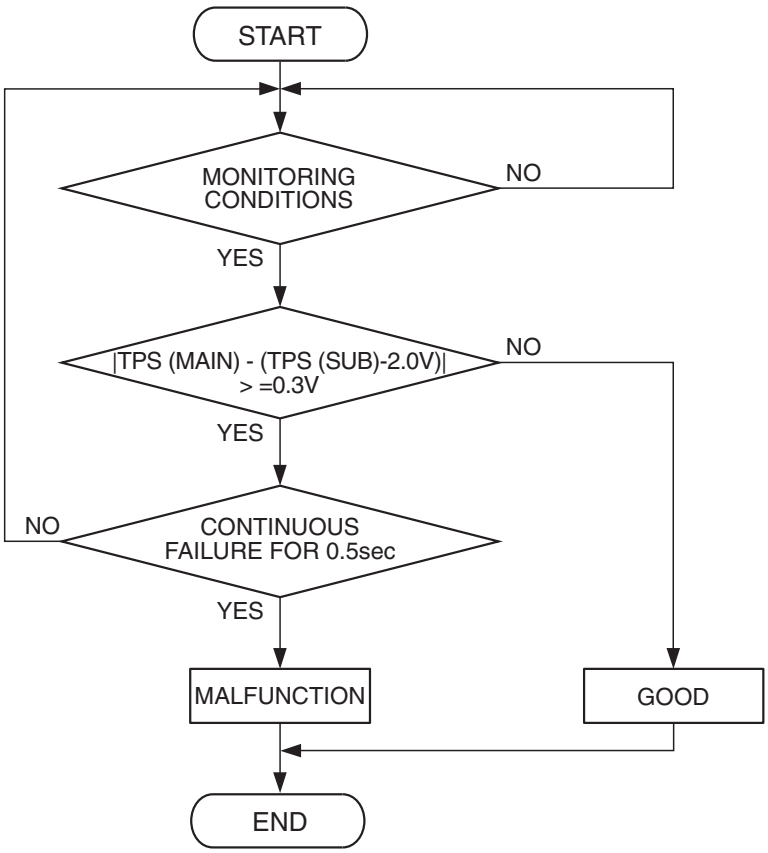
- Not applicable

Sensor (The sensor below is determined to be normal)

- Mass airflow sensor

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

Logic Flow Chart



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Check Conditions

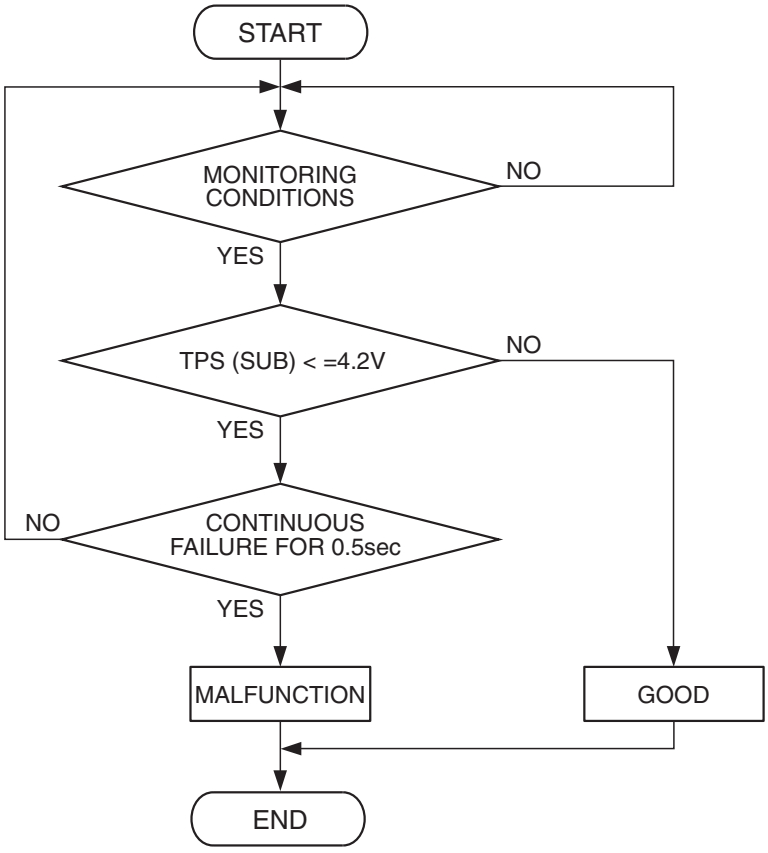
- Ignition switch is "ON" position.
- Throttle position sensor (main) output voltage is between 0.35 and 2.5 volts.
- Throttle position sensor (sub) output voltage is between 2.25 and 4.8 volts.

Judgement Criterion

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

TSB Revision

Logic Flow Chart



AK302048

Check Conditions

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

Judgement Criterion

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

OBD-II DRIVE CYCLE PATTERN

None.

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

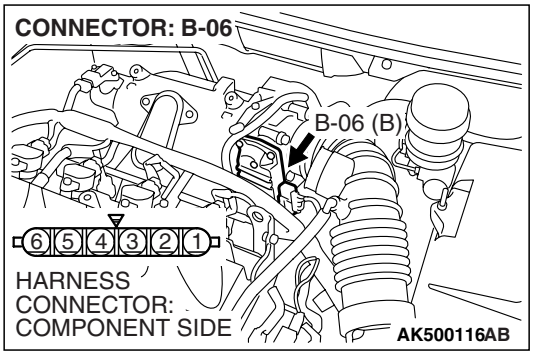
- Throttle position sensor failed.
- Shorted throttle position sensor circuit or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

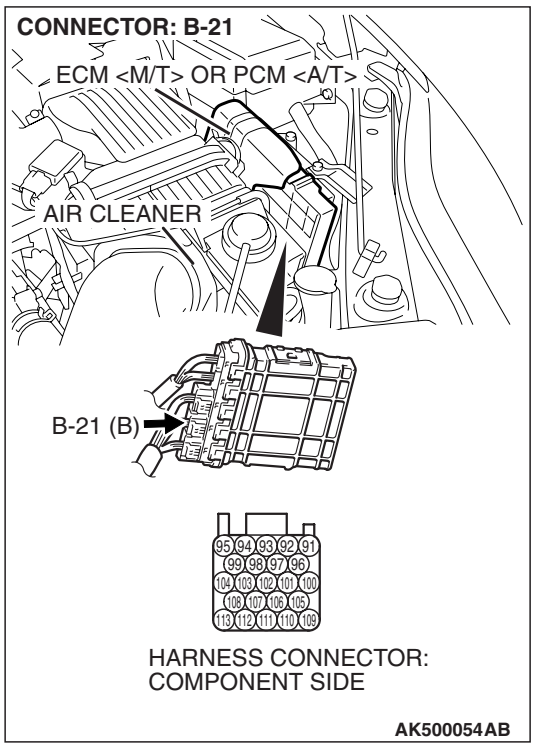
DIAGNOSIS

Required Special Tools:

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

TSB Revision





STEP 1. Check harness connector B-06 at throttle position sensor and harness connector B-21 at ECM <M/T> or PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 2.

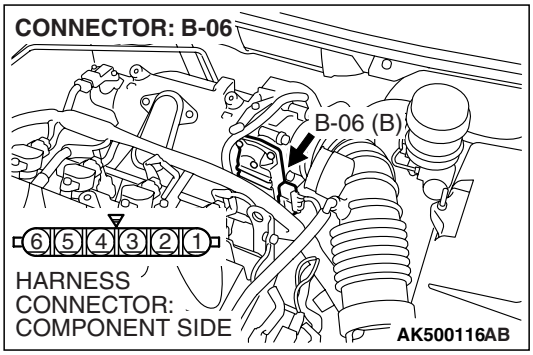
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 5.

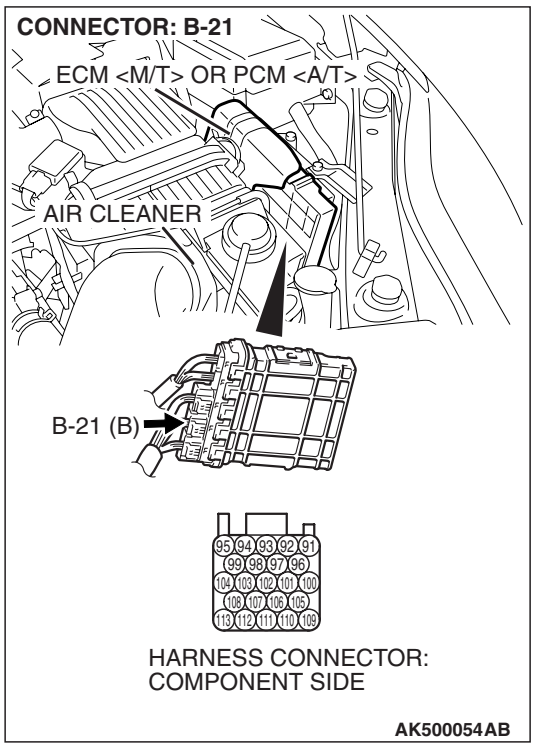
STEP 2. Check for short circuit to ground between throttle position sensor connector B-06 (terminal No. 6) and ECM <M/T> or PCM <A/T> connector B-21 (terminal No. 98).

Q: Is the harness wire in good condition?

YES : Go to Step 3.

NO : Repair it. Then go to Step 5.



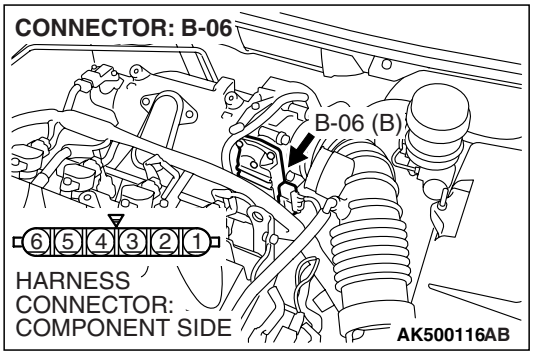


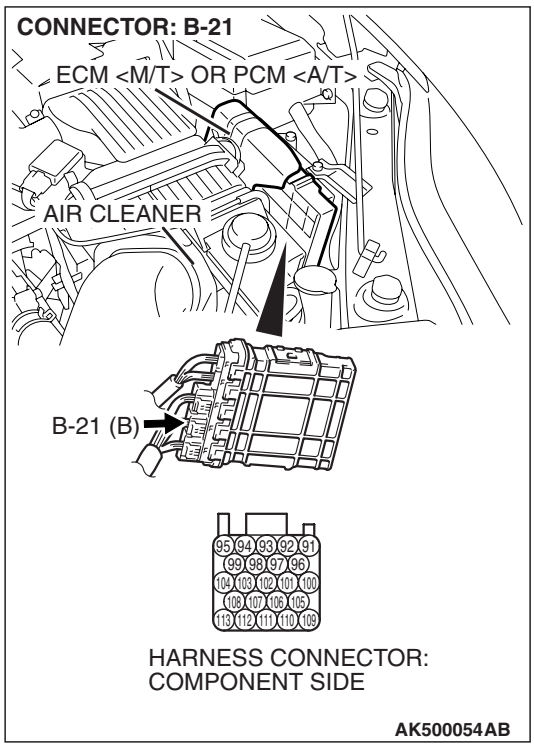
STEP 3. Check for short circuit to ground between throttle position sensor connector B-06 (terminal No. 4) and ECM <M/T> or PCM <A/T> connector B-21 (terminal No. 99).

Q: Is the harness wire in good condition?

YES : Go to Step 4.

NO : Repair it. Then go to Step 5.





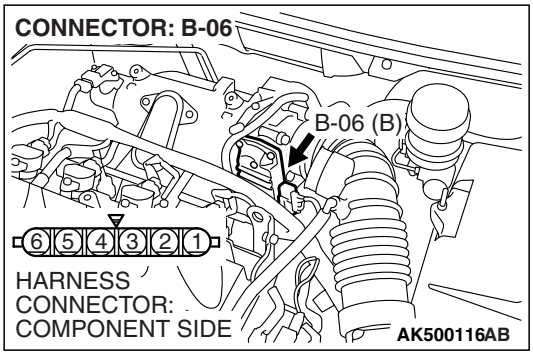
STEP 4. Replace the throttle body assembly.

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

Q: Is DTC P2135 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 5.

NO : The inspection is complete.



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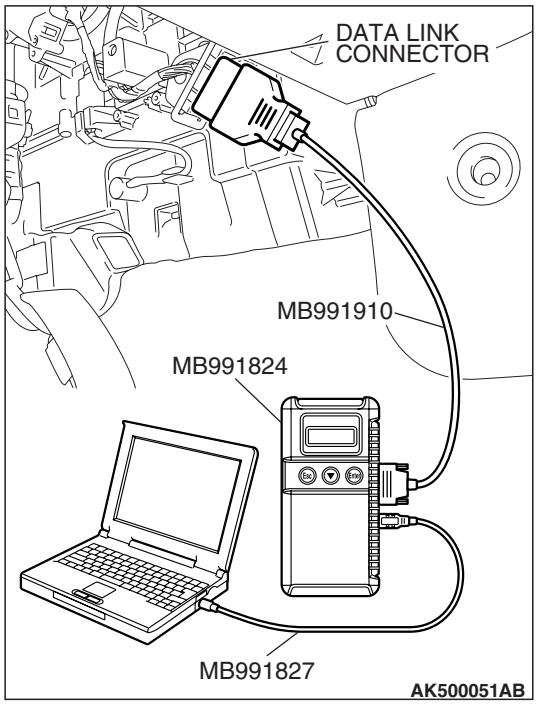


STEP 5. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

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

Q: Is DTC P2135 set?

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

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

⚠ CAUTION
If DTC P2138 has been set, TCL related DTC U1120 and U1400 are also set. After P2138 has been diagnosed, don't forget to erase DTC U1120 and U1400.

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

- Refer to DTC P2122 –Accelerator Pedal Position Sensor (main) Circuit P.13A-921.
- Refer to DTC P2127 –Accelerator Pedal Position Sensor (sub) Circuit P.13A-938.

CIRCUIT OPERATION

- Refer to DTC P2122 –Accelerator Pedal Position Sensor (main) Circuit P.13A-921.
- Refer to DTC P2127 –Accelerator Pedal Position Sensor (sub) Circuit P.13A-938.

TECHNICAL DESCRIPTION

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

DESCRIPTIONS OF MONITOR METHODS

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

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

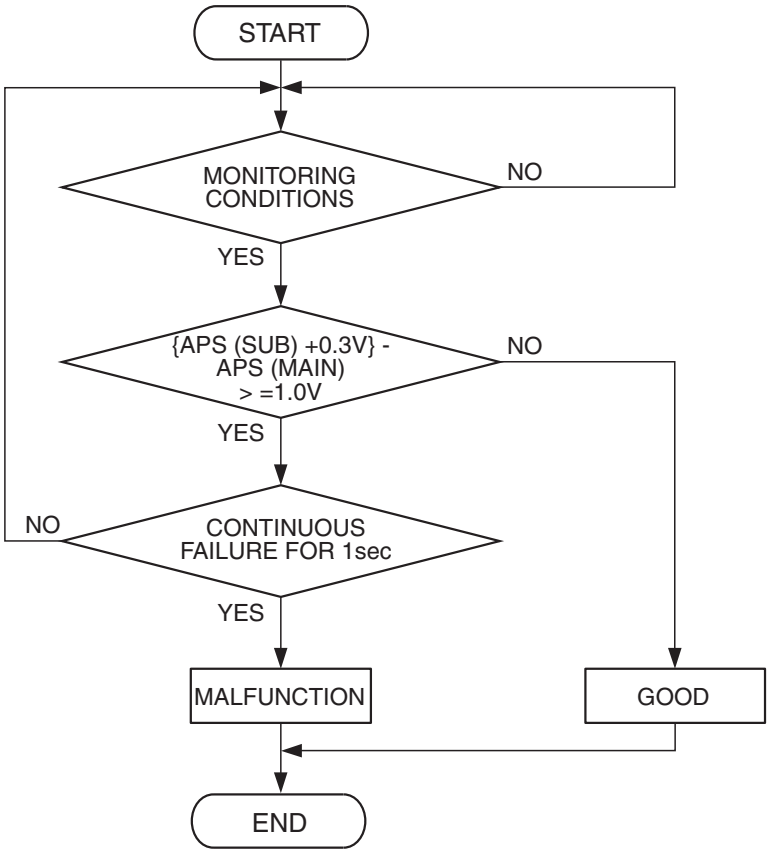
- Not applicable

Sensor (The sensor below is determined to be normal)

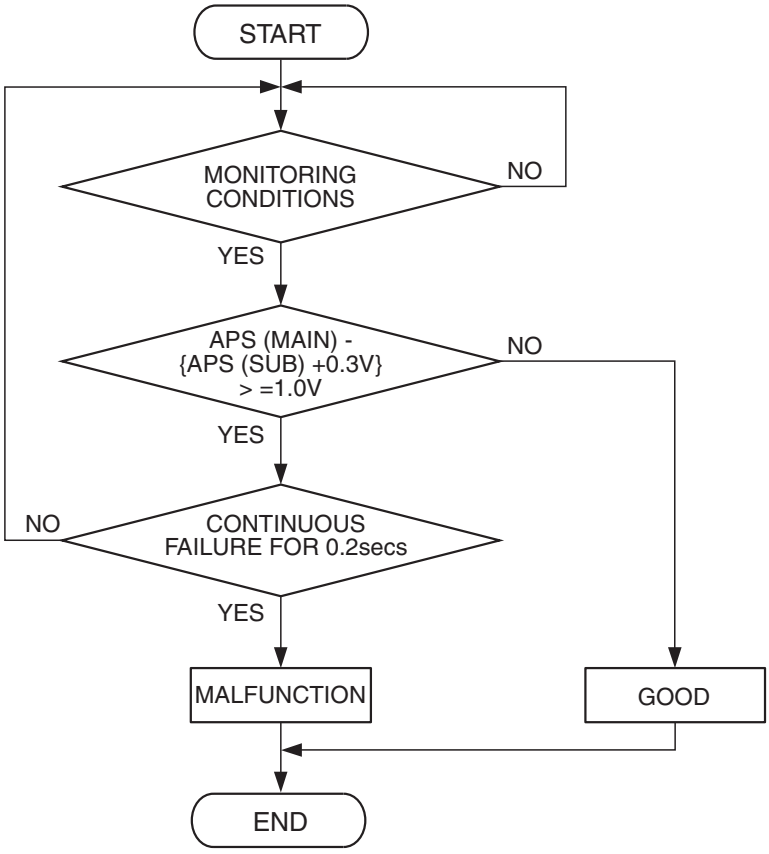
- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK303910



AK303911

Check Conditions

- Ignition switch is "ON" position.
- Accelerator pedal position sensor (main) output voltage is between 0.6 and 4.8 volts.
- Accelerator pedal position sensor (sub) output voltage is between 0.2 and 4.8 volts.
- Change of accelerator pedal position sensor (sub) output voltage per 25 milliseconds is lower than 0.06 volt.

Judgement Criteria

- Voltage obtained with the formula given below is 1.0 volt or higher for 1 second: [accelerator pedal position sensor (sub) output voltage +0.3 volt] – accelerator pedal position sensor (main) output voltage.
  or
- Voltage obtained with the formula given below is 1.0 volt or higher for 0.2 second: [accelerator pedal position sensor (main) output voltage – [accelerator pedal position sensor (sub) output voltage +0.3 volt].

OBD-II DRIVE CYCLE PATTERN

None.

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

- Accelerator pedal position sensor failed.
- Harness damage in accelerator pedal position sensor circuit or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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

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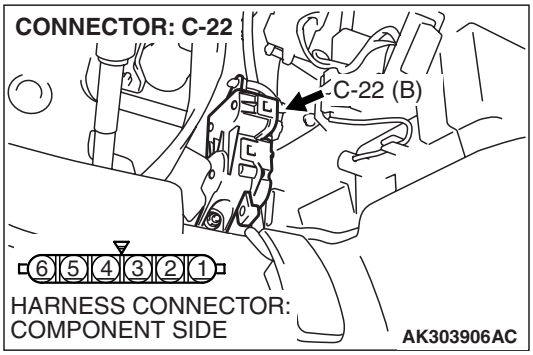
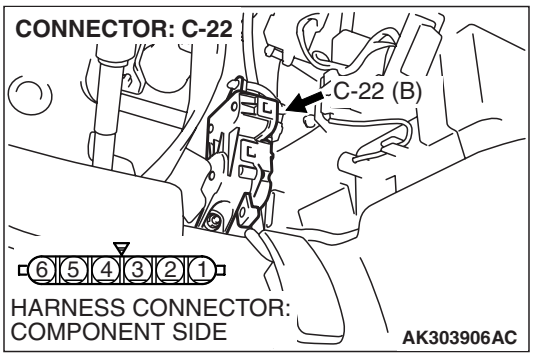


STEP 1. Check harness connector C-22 at accelerator pedal position sensor for damage.

Q: Is the harness connector in good condition?

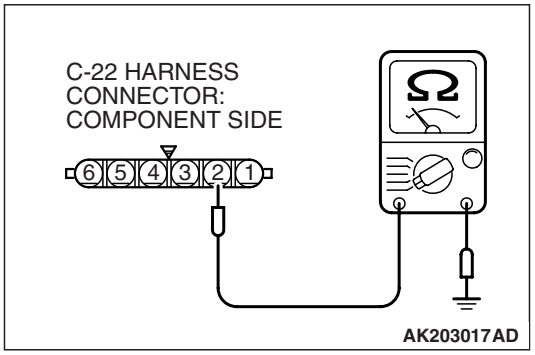
YES : Go to Step 2.

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



STEP 2. Check the continuity at accelerator pedal position sensor harness side connector C-22.

(1) Disconnect the connector C-22 and measure at the harness side.



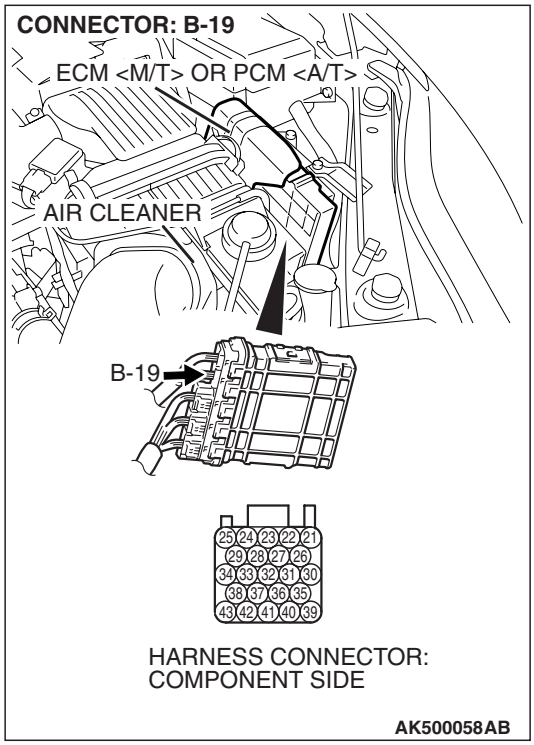
(2) Measure the continuity between terminal No. 2 and ground.

- Should be less than 2 ohms.

Q: Does continuity exist?

YES : Go to Step 6.

NO : Go to Step 3.

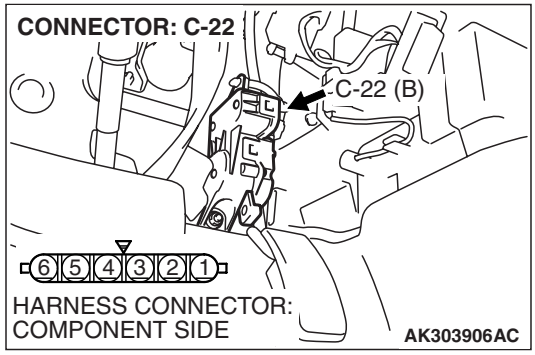


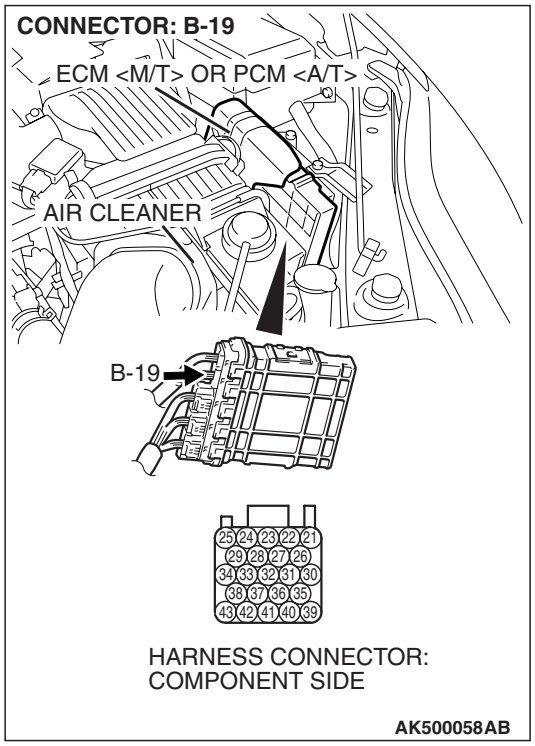
STEP 3. Check harness connector B-19 at ECM <M/T> or PCM <A/T> for damage.

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

YES : Go to Step 4.

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





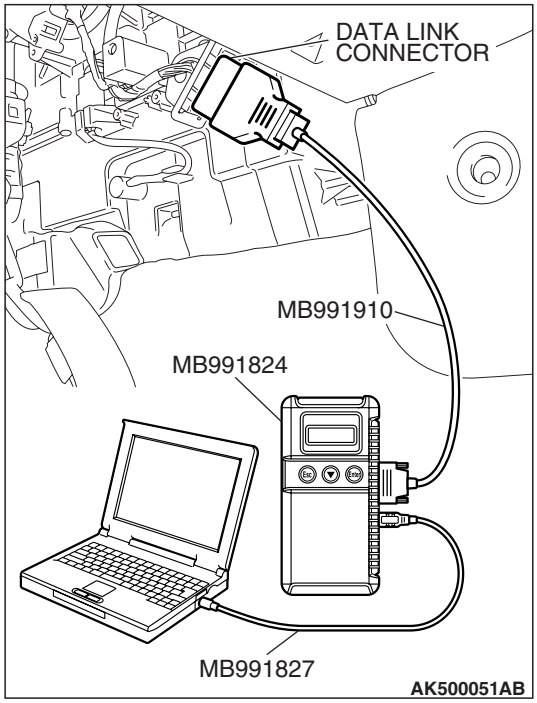
STEP 4. Check for harness damage between accelerator pedal position sensor connector C-22 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-19 (terminal No. 31).

Q: Is the harness wire in good condition?

YES : Go to Step 5.

NO : Repair it. Then go to Step 16.

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



⚠ CAUTION

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

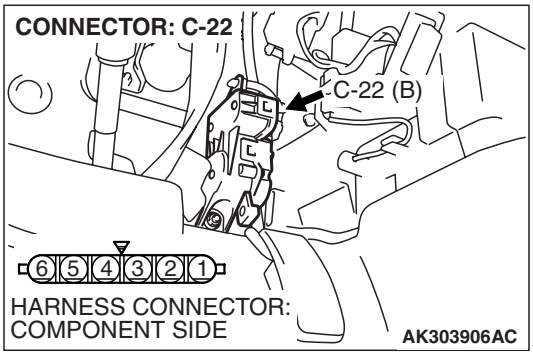
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) After the DTC has been deleted, read the DTC again.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC P2138 set?

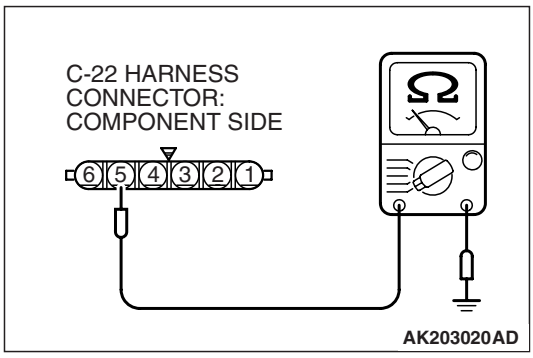
YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 16.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

STEP 6. Check the continuity at accelerator pedal position sensor harness side connector C-22.



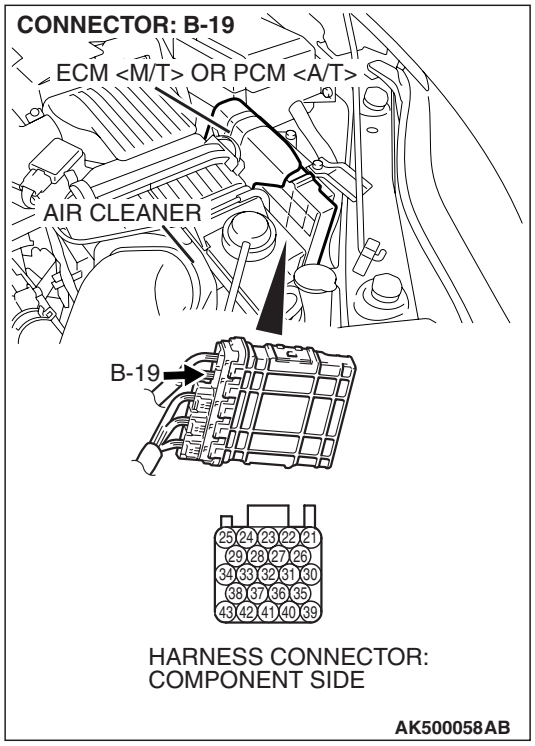
(1) Disconnect the connector C-22 and measure at the harness side.



(2) Measure the continuity between terminal No. 5 and ground.
- Should be less than 2 ohms.

Q: Does continuity exist?

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

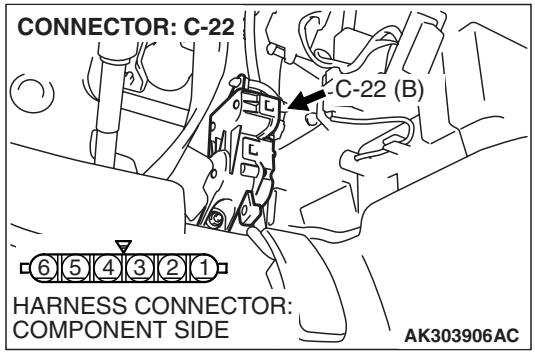


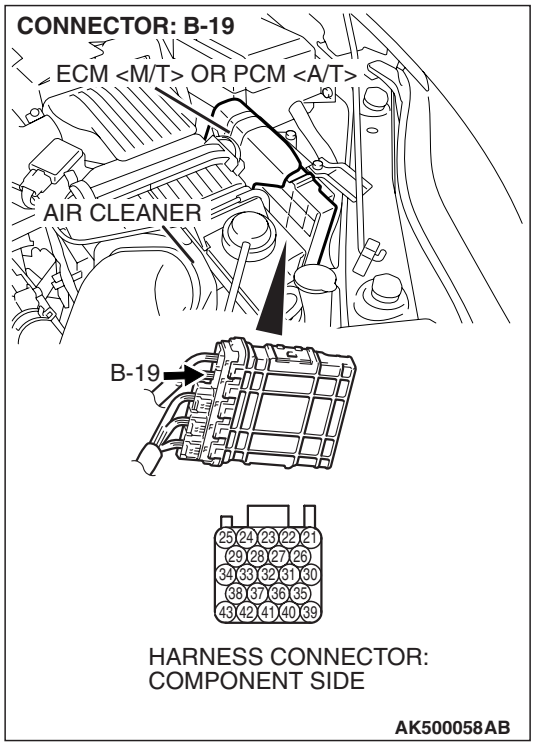
STEP 7. Check harness connector B-19 at ECM <M/T> or PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 8.

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



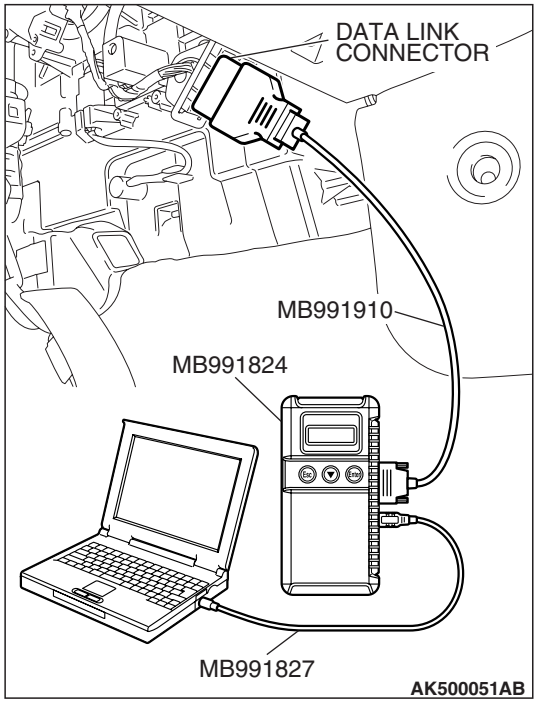


STEP 8. Check for harness damage between accelerator pedal position sensor connector C-22 (terminal No. 5) and ECM <M/T> or PCM <A/T> connector B-19 (terminal No. 22).

Q: Is the harness wire in good condition?

YES : Go to Step 9.

NO : Repair it. Then go to Step 16.



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

⚠ CAUTION

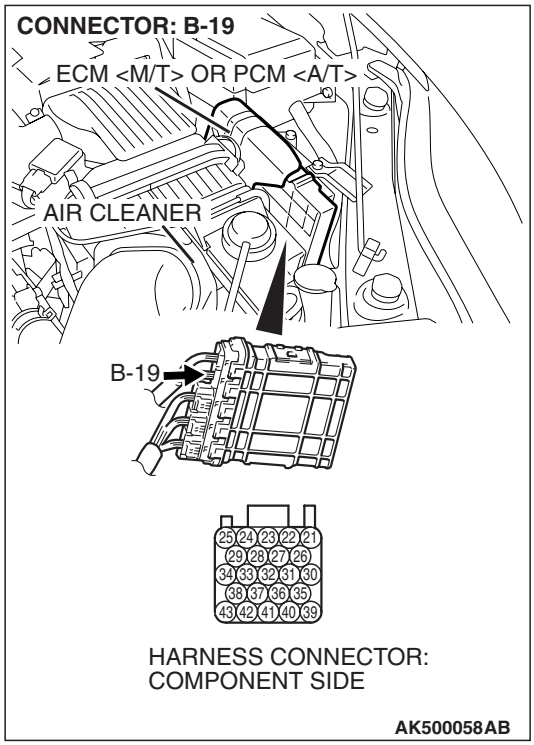
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is DTC P2138 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 16.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

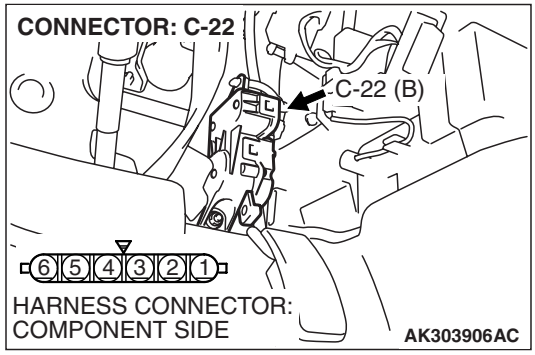


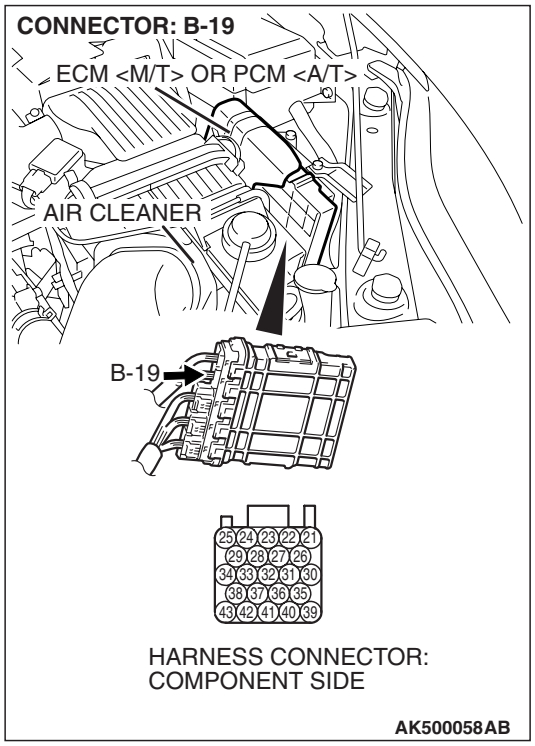
STEP 10. Check harness connector B-19 at ECM <M/T> or PCM <A/T> for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 11.

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



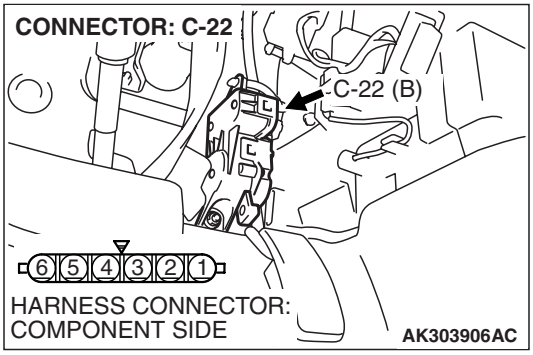


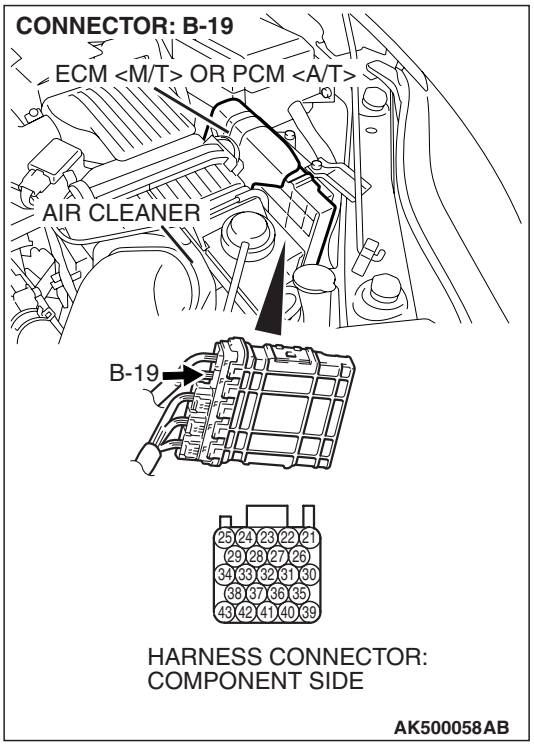
STEP 11. Check for harness damage between accelerator pedal position sensor connector C-22 (terminal No. 1) and ECM <M/T> or PCM <A/T> connector B-19 (terminal No. 30).

Q: Is the harness wire in good condition?

YES : Go to Step 12.

NO : Repair it. Then go to Step 16.



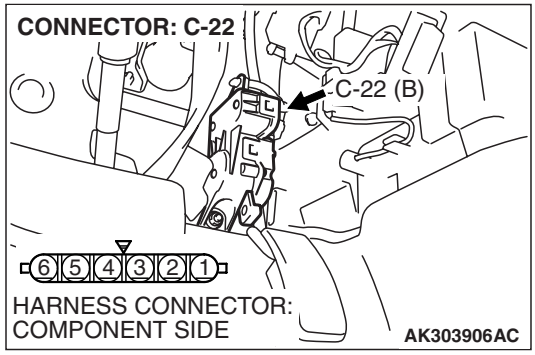


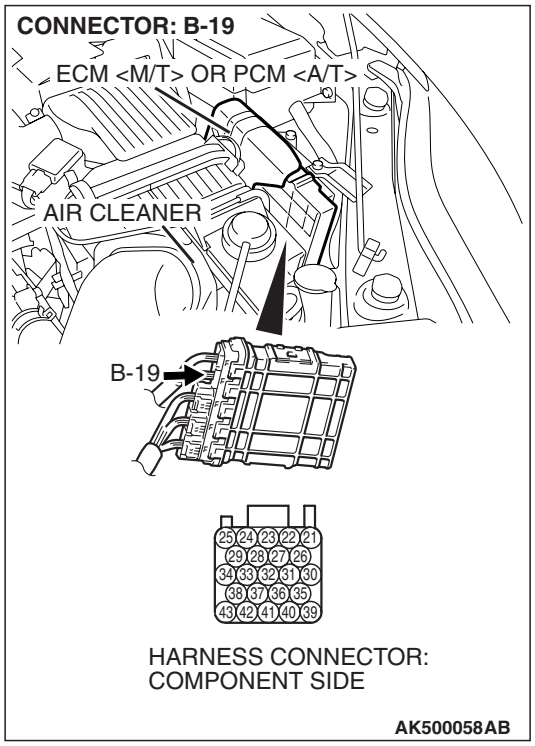
STEP 12. Check for harness damage between accelerator pedal position sensor connector C-22 (terminal No. 4) and ECM <M/T> or PCM <A/T> connector B-19 (terminal No. 21).

Q: Is the harness wire in good condition?

YES : Go to Step 13.

NO : Repair it. Then go to Step 16.





STEP 13. Check for harness damage between accelerator pedal position sensor connector C-22 (terminal No. 3) and ECM <M/T> or PCM <A/T> connector B-19 (terminal No. 26).

Q: Is the harness wire in good condition?

YES : Go to Step 14.

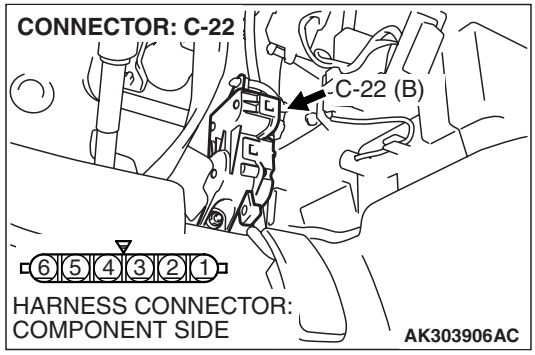
NO : Repair it. Then go to Step 16.

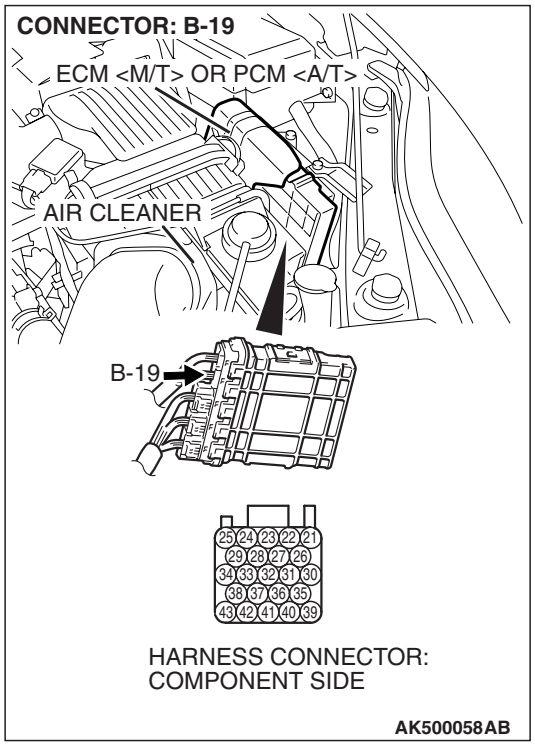
STEP 14. Check for harness damage between accelerator pedal position sensor connector C-22 (terminal No. 6) and ECM <M/T> or PCM <A/T> connector B-19 (terminal No. 27).

Q: Is the harness wire in good condition?

YES : Go to Step 15.

NO : Repair it. Then go to Step 16.





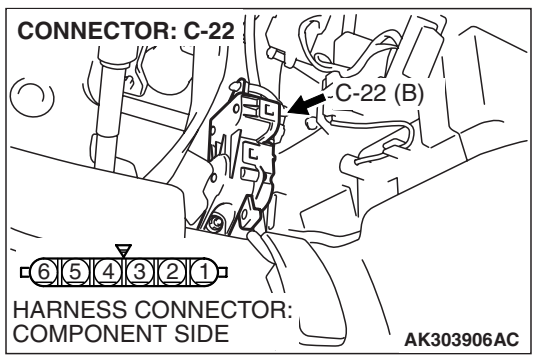
STEP 15. Replace the accelerator pedal position sensor.

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

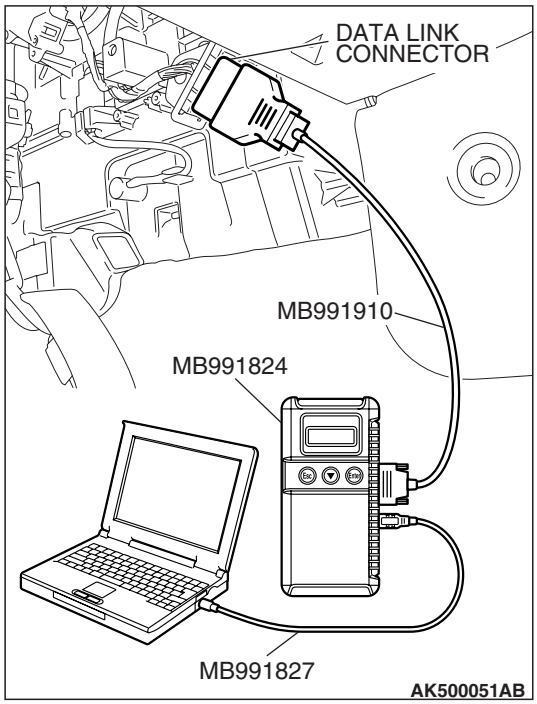
Q: Is DTC P2138 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 16.

NO : The inspection is complete.



TSB Revision



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

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

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

Q: Is DTC P2138 set?

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

DTC P2195: Cylinder 1, 4 Heated Oxygen Sensor (front) Inactive

⚠ CAUTION
If DTC P2195 has been set, TCL related DTC U1120 is also set. After P2195 has been diagnosed, don't forget to erase DTC U1120.

TECHNICAL DESCRIPTION

- The ECM <M/T> or the PCM <A/T> effects air/fuel ratio feedback control in accordance with the signals from the cylinder 1, 4 heated oxygen sensor (front).
- If the cylinder 1, 4 heated oxygen sensor (front) has deteriorated, corrections will be made by the cylinder 1, 4 heated oxygen sensor (rear).
- DTC P2195 becomes stored in memory if a failure is detected in the cylinder 1, 4 heated oxygen sensor (front).

DESCRIPTIONS OF MONITOR METHODS

Cylinder 1, 4 heated oxygen sensor (front) output voltage does not cross 0.5 volt within specified period.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

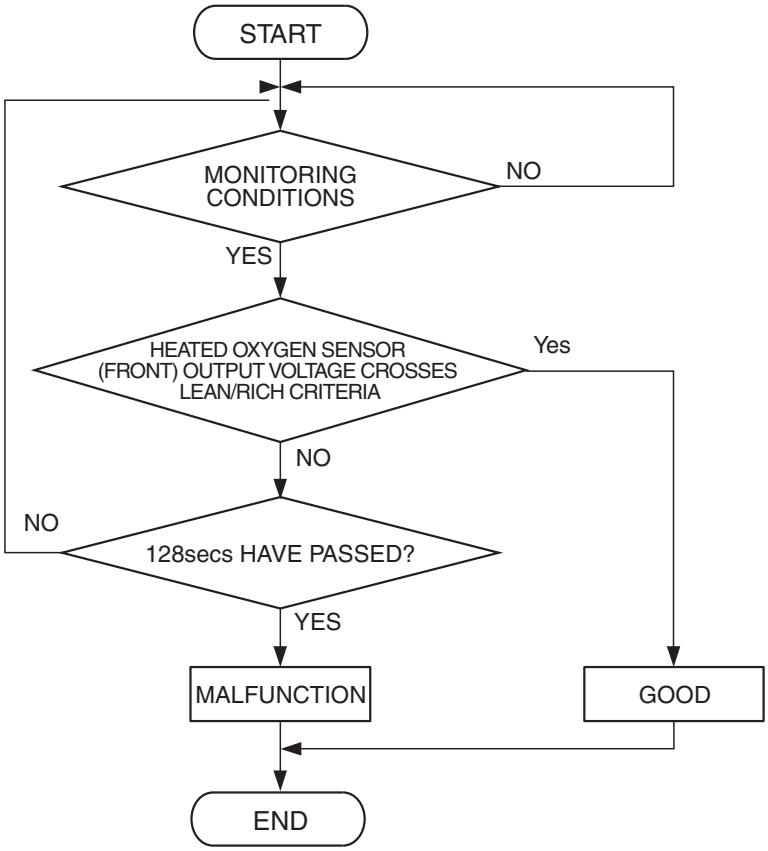
- Heated oxygen sensor (front) monitor
- Misfire monitor

Sensor (The sensor below is determined to be normal)

- Engine coolant temperature sensor
- Intake air temperature sensor

DTC SET CONDITIONS

Logic Flow Chart



AK500047

Check Conditions

- More than 20 seconds or more have passed since the engine starting sequence was completed.
- Engine coolant temperature is higher than 7°C (45°F) or more.
- Under the closed loop air/fuel ratio control.
- Intake air temperature is more than –10°C (14°F).

Judgement Criterion

- Cylinder 1, 4 heated oxygen sensor (front) output voltage is less than 0.5 volt for 128 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function –OBD-II Drive Cycle – Pattern 21 P.13A-6.

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

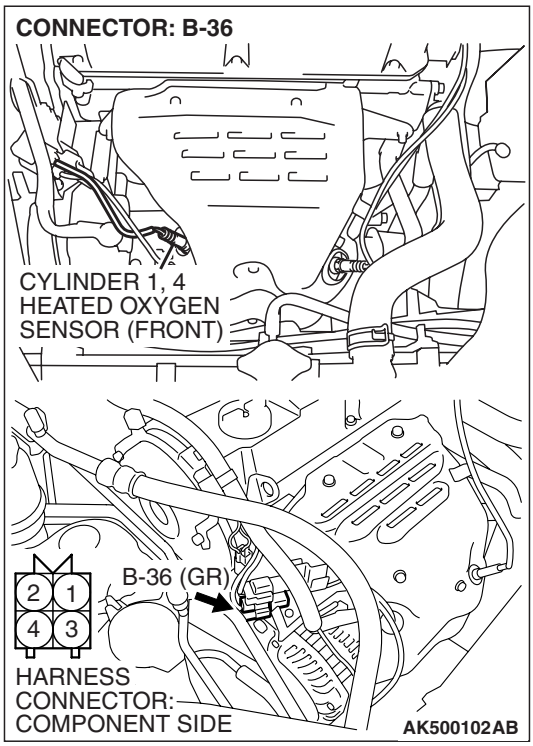
- Cylinder 1, 4 heated oxygen sensor (front) deteriorated.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

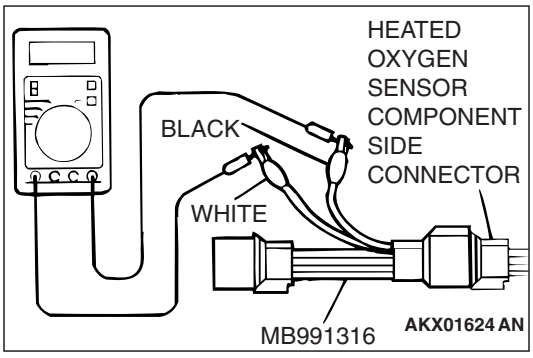
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MB991316: Test Harness

TSB Revision



STEP 1. Check the cylinder 1, 4 heated oxygen sensor (front).

(1) Disconnect the cylinder 1, 4 heated oxygen sensor (front) connector B-36 and connect test harness special tool MB991316 to the connector on the cylinder 1, 4 heated oxygen sensor (front) side.
(2) Warm up the engine until engine coolant temperature reaches 80° C (176° F) or higher.
(3) Rev the engine for 5 minutes or more with the engine speed of 4,500 r/min.



(4) Connect a digital voltage meter between terminal No. 2 (black clip) and terminal No. 4 (white clip).
(5) While repeatedly revving the engine, measure the cylinder 1, 4 heated oxygen sensor (front) output voltage.

Standard value: 0.6 – 1.0 volt

⚠ CAUTION

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

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

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

YES : Go to Step 2.
NO : Replace the cylinder 1, 4 heated oxygen sensor (front). Then go to Step 3.

STEP 2. Test the OBD-II drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function –OBD-II Drive Cycle –Pattern 21 P.13A-6.

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

Q: Is DTC P2195 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 3.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions.

STEP 3. Test the OBD-II drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function –OBD-II Drive Cycle –Pattern 21 P.13A-6.

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

Q: Is DTC P2195 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P2197: Cylinder 2, 3 Heated Oxygen Sensor (front) Inactive

⚠ CAUTION

If DTC P2197 has been set, TCL related DTC U1120 is also set. After P2197 has been diagnosed, don't forget to erase DTC U1120.

TECHNICAL DESCRIPTION

- The ECM <M/T> or the PCM <A/T> effects air/fuel ratio feedback control in accordance with the signals from the cylinder 2, 3 heater oxygen sensor (front).
- If the cylinder 2, 3 heated oxygen sensor (front) has deteriorated, corrections will be made by the cylinder 2, 3 heated oxygen sensor (rear).
- DTC P2197 becomes stored in memory if a failure is detected in the cylinder 2, 3 heated oxygen sensor (front).

DESCRIPTIONS OF MONITOR METHODS

Cylinder 2, 3 heated oxygen sensor (front) output voltage does not cross 0.5 volt within specified period.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

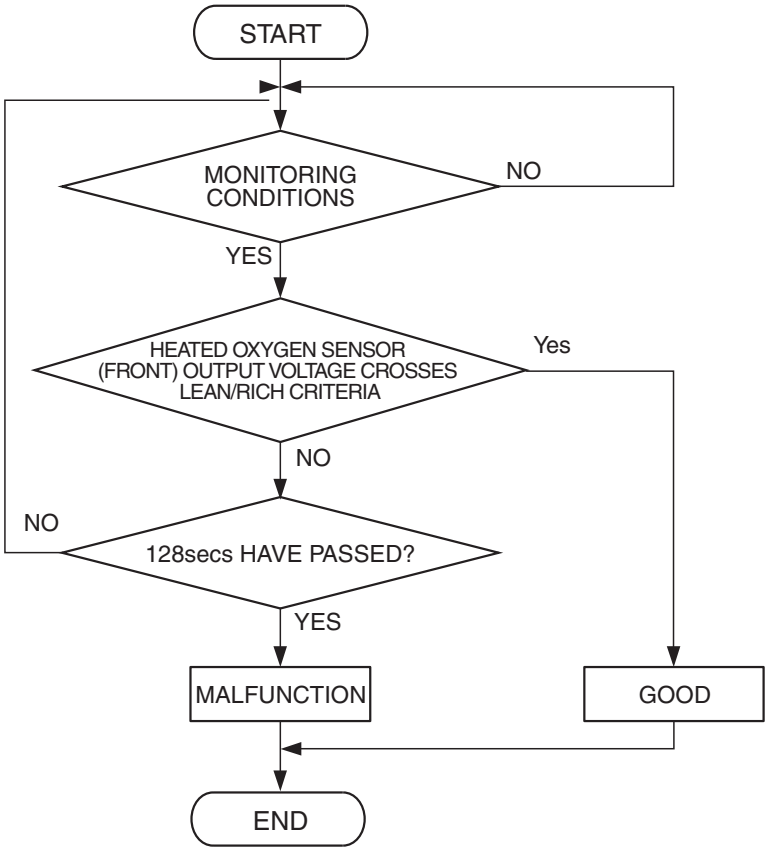
- Heated oxygen sensor (front) monitor
- Misfire monitor

Sensor (The sensor below is determined to be normal)

- Engine coolant temperature sensor
- Intake air temperature sensor

DTC SET CONDITIONS

Logic Flow Chart



AK500047

Check Conditions

- More than 20 seconds or more have passed since the engine starting sequence was completed.
- Engine coolant temperature is 7° C (45° F) or more.
- Under the closed loop air/fuel ratio control.
- Intake air temperature is more than –10° C (14° F).

Judgement Criterion

- Cylinder 2, 3 heated oxygen sensor (front) output voltage is less than 0.5 volt for 128 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function –OBD-II Drive Cycle – Pattern 21 P.13A-6.

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

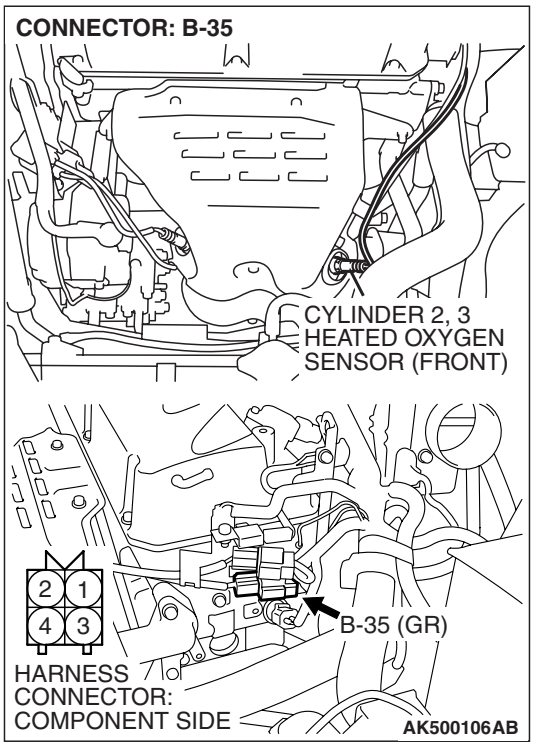
- Cylinder 2, 3 heated oxygen sensor (front) deteriorated.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

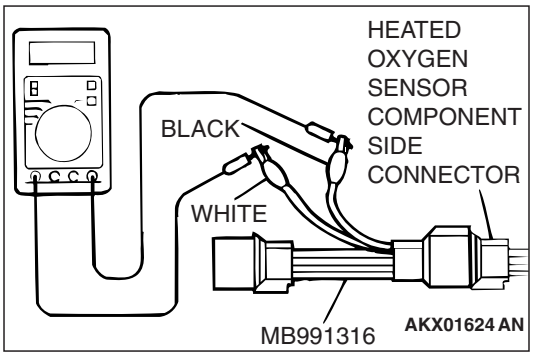
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MB991316: Test Harness

TSB Revision



STEP 1. Check the cylinder 2, 3 heated oxygen sensor (front).

(1) Disconnect the cylinder 2, 3 heated oxygen sensor (front) connector B-35 and connect test harness special tool MB991316, to the connector on the cylinder 2, 3 heated oxygen sensor (front) side.
(2) Warm up the engine until engine coolant temperature reaches 80° C (176° F) or higher.
(3) Rev the engine for 5 minutes or more with the engine speed of 4,500 r/min.



(4) Connect a digital voltage meter between terminal No. 2 (black clip) and terminal No. 4 (white clip).
(5) While repeatedly revving the engine, measure the cylinder 2, 3 heated oxygen sensor (front) output voltage.

Standard value: 0.6 – 1.0 volt

⚠ CAUTION

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

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

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

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

STEP 2. Test the OBD-II drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function –OBD-II Drive Cycle –Pattern 21 P.13A-6.

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

Q: Is DTC P2197 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 3.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions.

STEP 3. Test the OBD-II drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function –OBD-II Drive Cycle –Pattern 21 P.13A-6.

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

Q: Is DTC P2197 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P2228: Barometric Pressure Circuit Low Input

⚠ CAUTION

If DTC P2228 has been set, TCL related DTC U1120 is also set. After P2228 has been diagnosed, don't forget to erase DTC U1120.

TECHNICAL DESCRIPTION

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

DESCRIPTIONS OF MONITOR METHODS

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

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

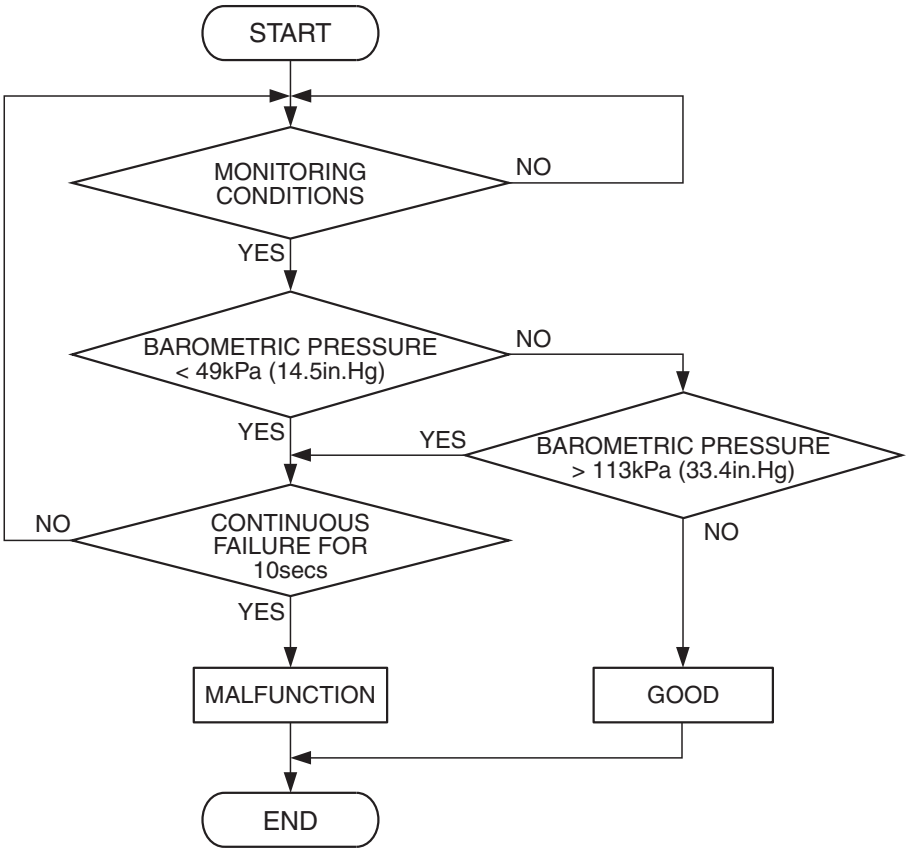
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK401684

Check Conditions

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

Judgement Criterion

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

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function –OBD-II Drive Cycle – Pattern 22 P.13A-6.

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

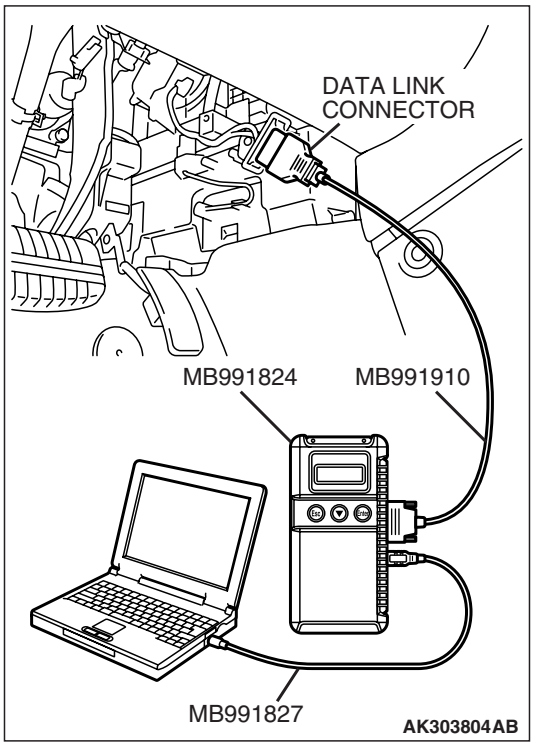
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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

TSB Revision



STEP 1. Test the OBD-II drive cycle.

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

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Carry out the test drive with the drive cycle pattern. Refer to DIagnostic Function –OBD-II Drive Cycle –Pattern 22 P.13A-6.
(4) Check the diagnostic trouble code (DTC).

Q: Is DTC P2228 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

DTC P2229: Barometric Pressure Circuit High Input

⚠ CAUTION
If DTC P2229 has been set, TCL related DTC U1120 is also set. After P2229 has been diagnosed, don't forget to erase DTC U1120.

TECHNICAL DESCRIPTION

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

DESCRIPTIONS OF MONITOR METHODS

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

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

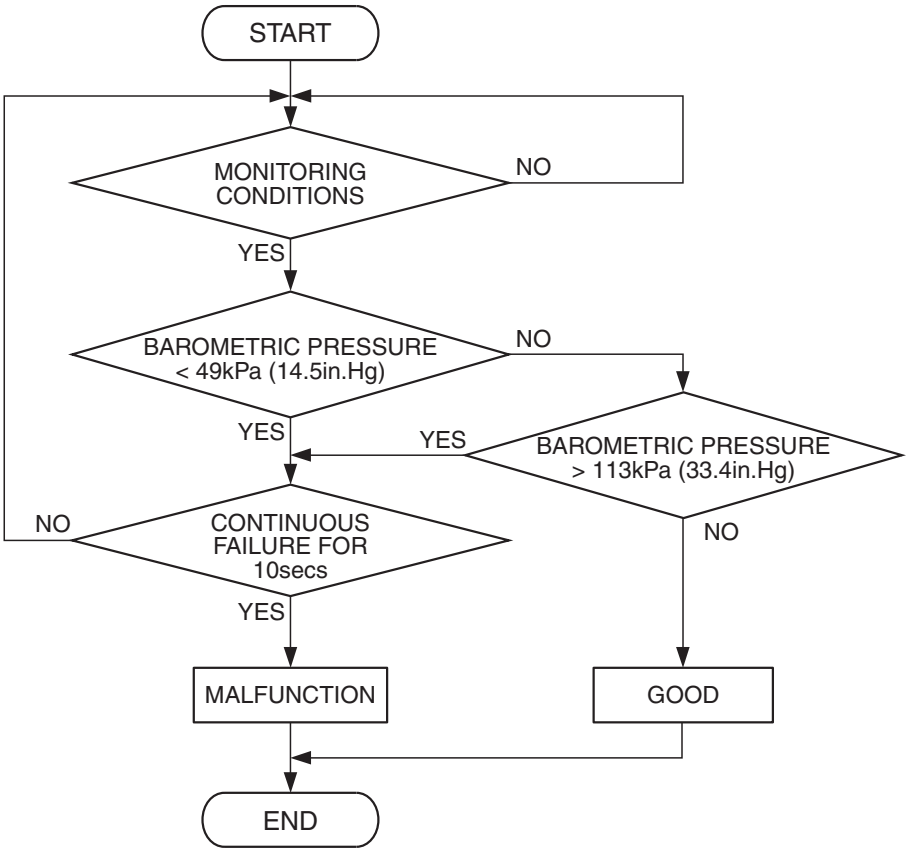
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK401684

Check Conditions

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

Judgement Criterion

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

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnostic Function –OBD-II Drive Cycle – Pattern 22 P.13A-6.

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

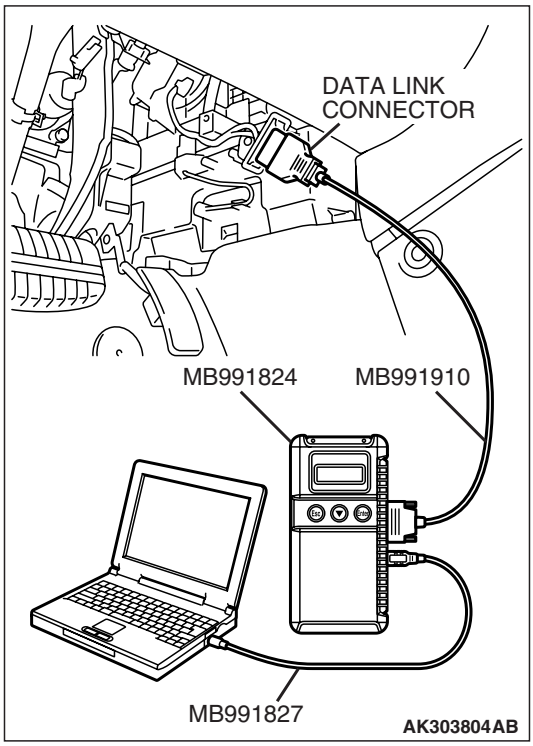
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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

TSB Revision



STEP 1. Test the OBD-II drive cycle.

⚠ CAUTION

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

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Carry out the test drive with the drive cycle pattern. Refer to DIagnostic Function –OBD-II Drive Cycle –Pattern 22 P.13A-6.
(4) Check the diagnostic trouble code (DTC).

Q: Is DTC P2229 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

DTC P2252: Heated Oxygen Sensor Offset Circuit Low Voltage

TECHNICAL DESCRIPTION

- The ECM <M/T> or the PCM <A/T> applies an offset voltage of 0.5 volt to the heated oxygen sensor.
- The PCM checks for heated oxygen sensor offset voltage.

DESCRIPTIONS OF MONITOR METHODS

Heated oxygen sensor offset voltage is under specified range.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

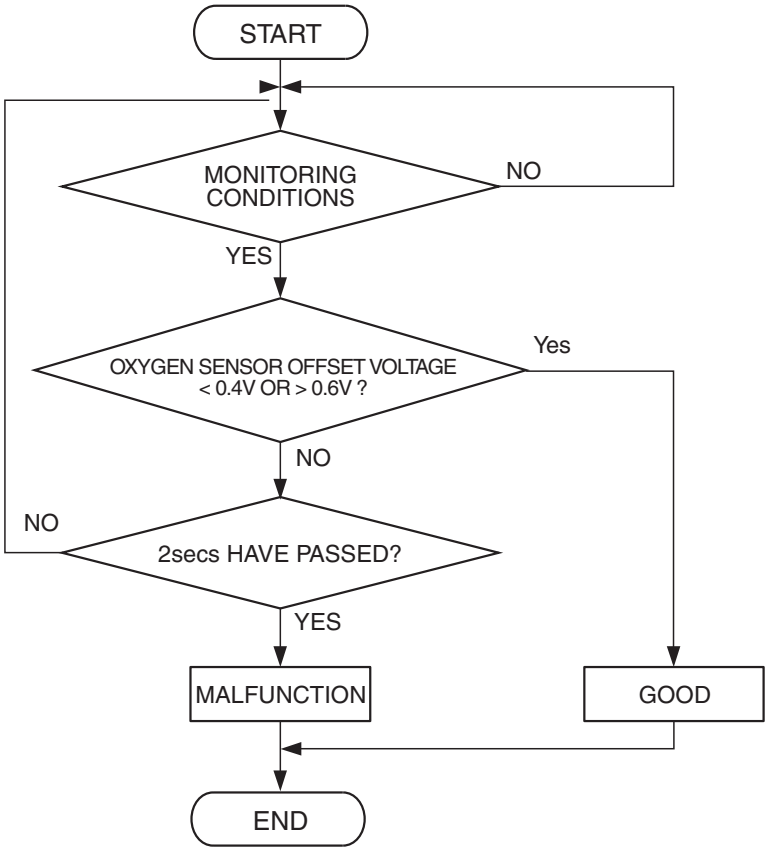
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITION

Logic Flow Chart



AK500048

Check Condition

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

Judgement Criterion

- Heated oxygen sensor offset voltage has continued to be 0.4 volt or lower for 2 seconds.

OBD-II DRIVE CYCLE PATTERN

Refer to Diagnosis Function –OBD-II Drive Cycle – Pattern 22 P.13A-6.

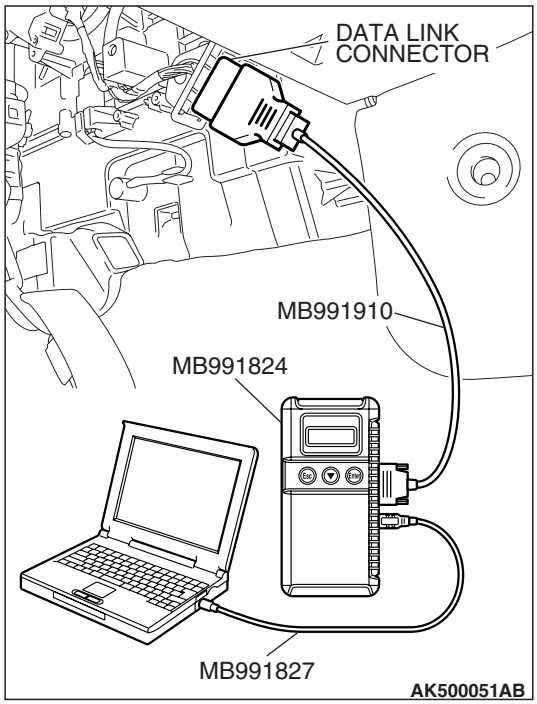
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

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

DIAGNOSIS

Required Special Tools:

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



STEP 1. Test the OBD-II drive cycle.

⚠ CAUTION

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

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Carry out the test drive with the drive cycle pattern. Refer to DIagnostic Function –OBD-II Drive Cycle –Pattern 22 P.13A-6.
(4) Check the diagnostic trouble code (DTC).

Q: Is DTC P2252 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

DTC P2253: Heated Oxygen Sensor Offset Circuit High Voltage

TECHNICAL DESCRIPTION

- The ECM <M/T> or the PCM <A/T> applies an offset voltage of 0.5 volt to the heated oxygen sensor
- The ECM <M/T> or the PCM <A/T> checks for heated oxygen sensor offset voltage.

DESCRIPTIONS OF MONITOR METHODS

Heated oxygen sensor offset voltage is over specified range.

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

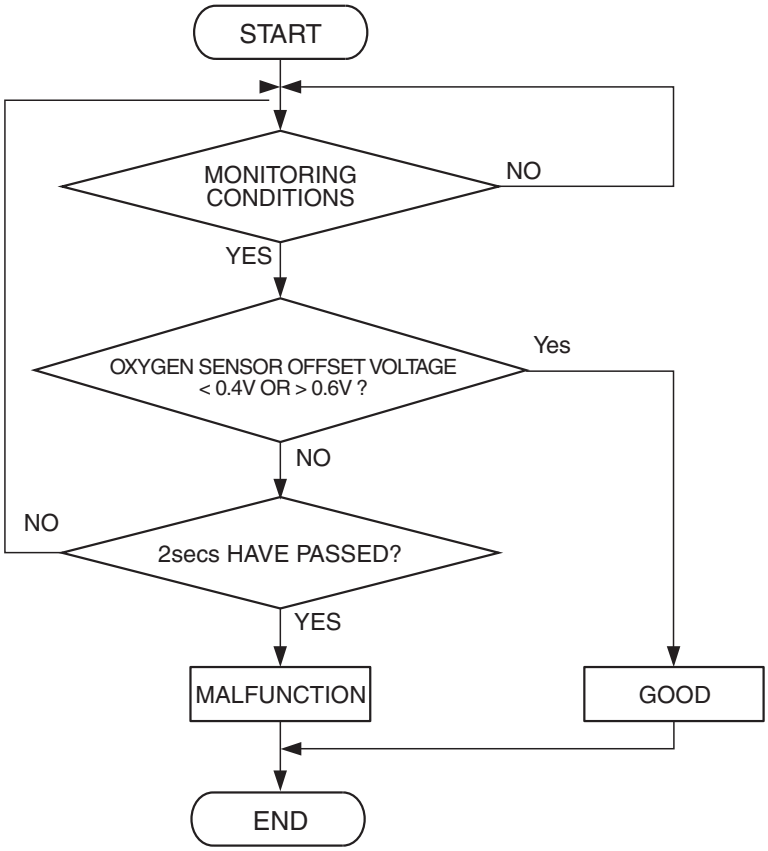
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITION

Logic Flow Chart



AK500048

Check Condition

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

Judgement Criterion

- Heated oxygen sensor offset voltage has continued to be 0.6 volt or higher for 2 seconds.

OBD-II DRIVE CYCLE PATTERN

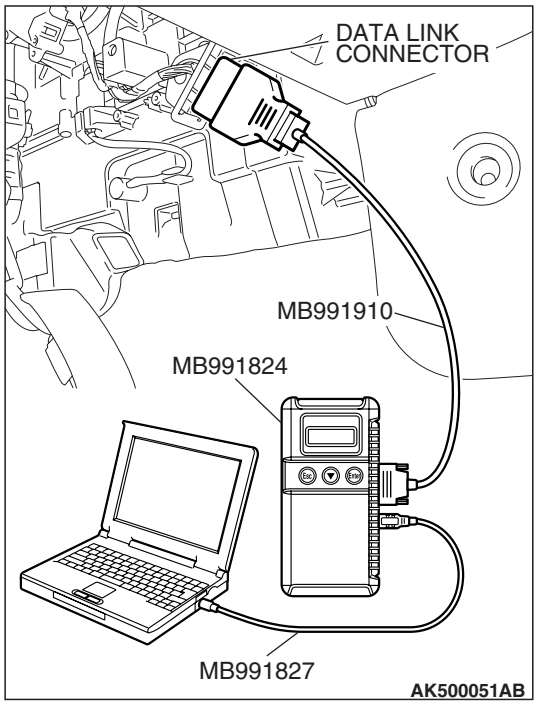
Refer to Diagnosis Function –OBD-II Drive Cycle – Pattern 22 P.13A-6.

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

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

TSB Revision

DIAGNOSIS



STEP 1. Test the OBD-II drive cycle.

⚠ CAUTION

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

(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Carry out the test drive with the drive cycle pattern. Refer to Diagnostic Function OBD-II Drive Cycle –Pattern 22 P.13A-6.
(4) Check the diagnostic trouble code (DTC).

Q: Is DTC P2253 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13.

NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

DTC U1073: Bus Off

⚠ CAUTION

- **If the ECM <M/T> or the PCM <A/T> output the DTC U1073, make sure to diagnose the CAN bus line.**
- **Before replacing the ECU, make sure that the communication circuit is operating normally.**

DTC SET CONDITIONS

Check Conditions

- Always

Judgement Criteria

- Bus off error detected

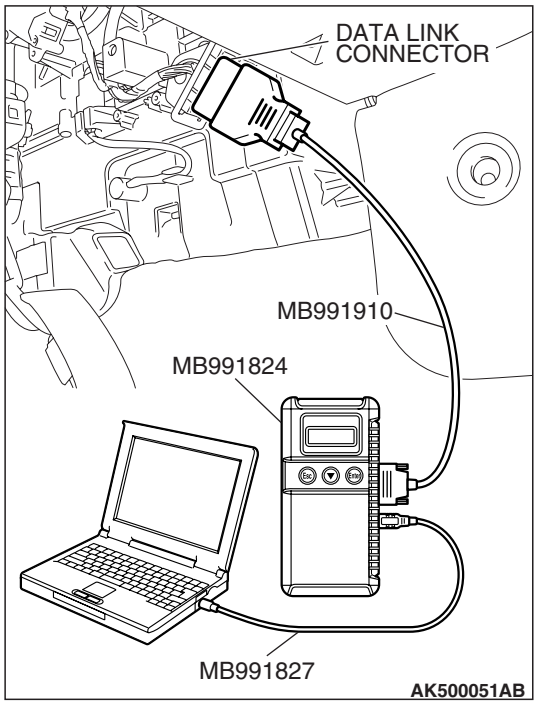
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- CAN line harness damage or connector damage.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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



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

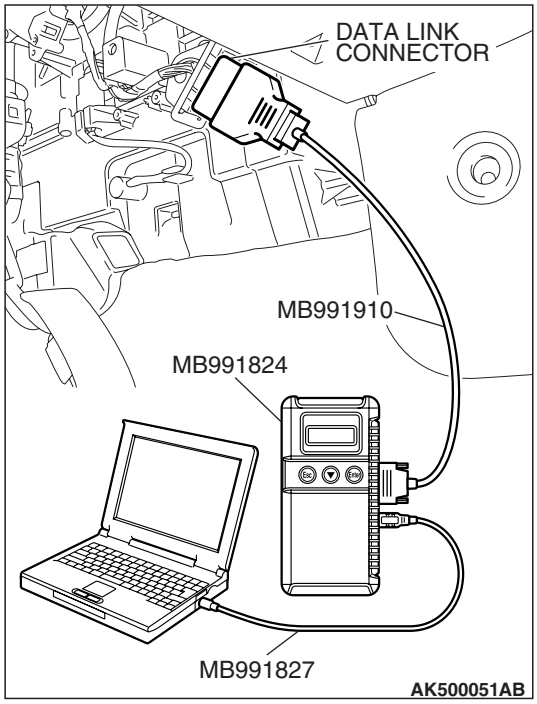
⚠ CAUTION

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

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

Q: Is the CAN bus line normal?

YES : Go to Step 2.
NO : Repair the CAN bus line. Refer to GROUP 54C, Can bus Diagnostics Table P.54C-14. Then go to Step 3.

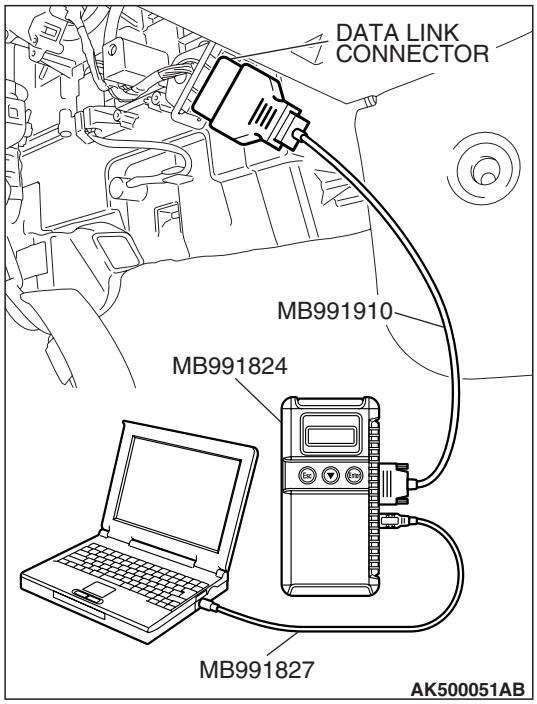


STEP 2. Recheck for diagnostic trouble code.

Check again if the DTC is set.
(1) Erase the DTC.
(2) Turn the ignition switch to the "ON" position.
(3) Check if the DTC is set.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U1073 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 3.
NO : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.



STEP 3. Recheck for diagnostic trouble code.
Check again if the DTC is set.
(1) Erase the DTC.
(2) Turn the ignition switch to the "ON" position.
(3) Check if DTC is set.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U1073 set?

YES : Go to Step 1.
NO : The inspection is complete.

DTC U1102: ABS-ECU TIME-OUT

⚠ CAUTION
- **If the ECM <M/T> or the PCM <A/T> output the DTC U1102, make sure to diagnose the CAN bus line.**
- **Before replacing the ECU, make sure that the communication circuit is operating normally.**

DTC SET CONDITIONS

Check Conditions
- Battery positive voltage is 10 volts or higher.
- Engine is not cranked, or at least 3 seconds have passed since engine was cranked.

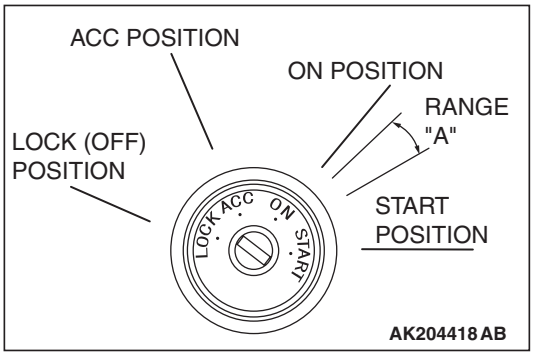
Judgement Criterion
- Unable to receive ABS-ECU signals through the CAN bus line.

COMMENT

Current Trouble
- Some of the possible causes are a harness or connector damage between the PCM and the ABS-ECU on the CAN bus line, a failure in the ABS-ECU power supply system, a failure in the ABS-ECU, or a failure in the ECM <M/T> or the PCM <A/T>.

Past Trouble
- Proceed to troubleshoot based on a harness or connector damage on the CAN bus line between the ECM <M/T> or the PCM <A/T> and ABS-ECU, and a failure in the ABS power supply system. Refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14).

⚠ CAUTION



When the ignition key is maintained within the range "A" (i.e., the ignition switch IG2 is in OFF position but the cranking does not start) for more than 1 second, PCM stores DTC U1102 (the past trouble).

NOTE: If a malfunction occurred in the past, a failure cannot be discovered through the MB991958 CAN bus diagnosis even if there might be a problem with the CAN bus. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14. Furthermore, it is possible to narrow down the areas of the possible failures from the DTCs that are output by the ECUs, which are communicating on the CAN bus (Refer to GROUP 54C, CAN bus line Diagnostics Flow P.54C-6).

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

- CAN line harness damage or connector damage.
- ABS-ECU failed.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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

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

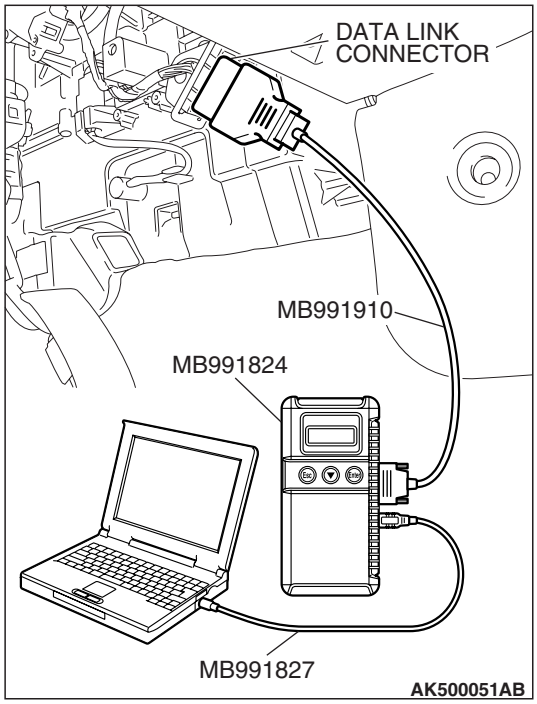
⚠ CAUTION

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

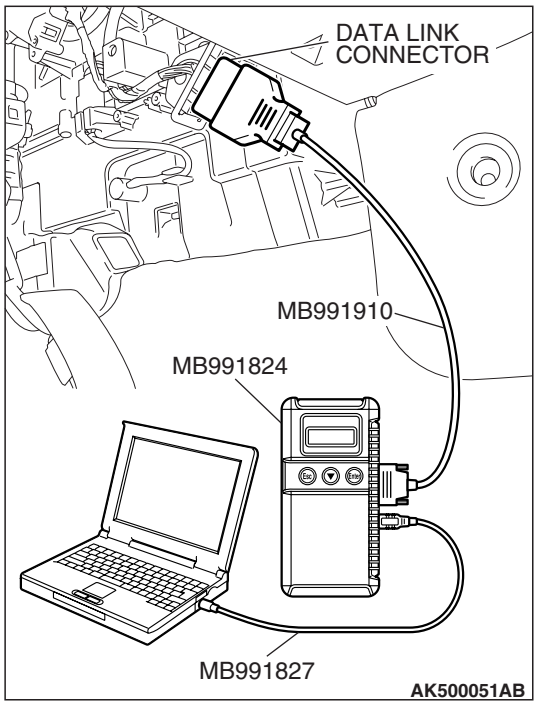
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Diagnose CAN bus line.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the CAN bus line normal?

YES : Go to Step 2.
NO : Repair the CAN bus line. Refer to GROUP 54C, Can Bus Diagnostics Table P.54C-14. Then go to Step 6.



TSB Revision

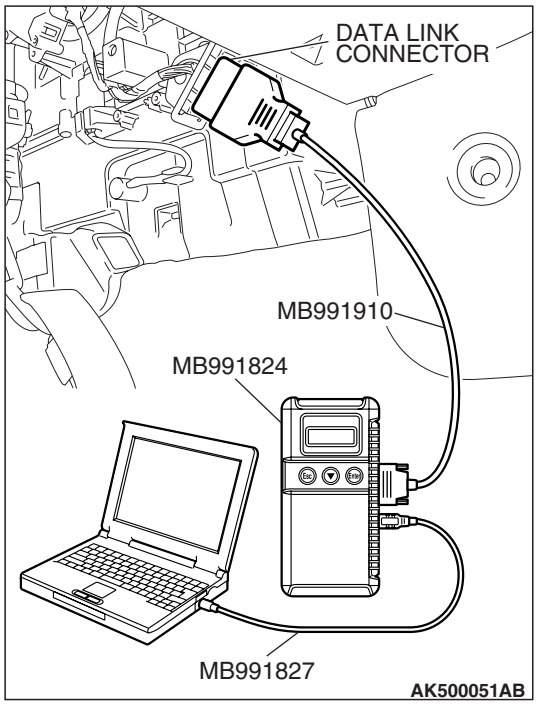


STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is the ABS-DTC set?

YES : Refer to GROUP 35B, Anti-Lock Braking System-Diagnostic Trouble Code Chart P.35B-10.
NO : Go to Step 3.

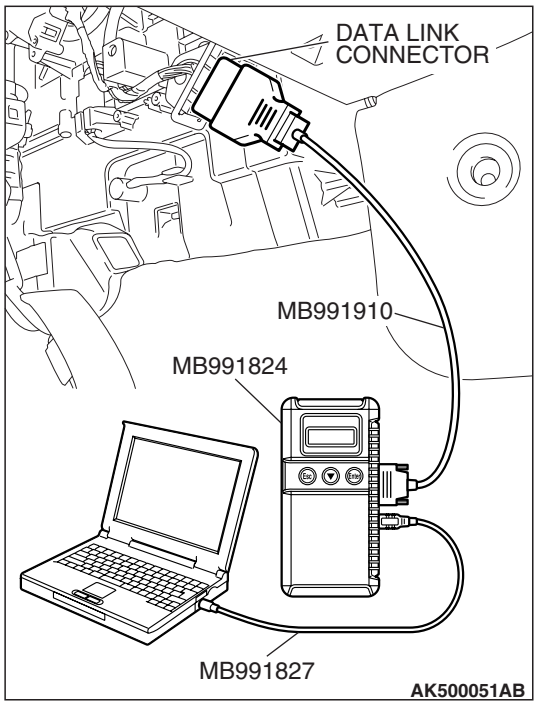


STEP 3. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is DTC U1102 set?

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

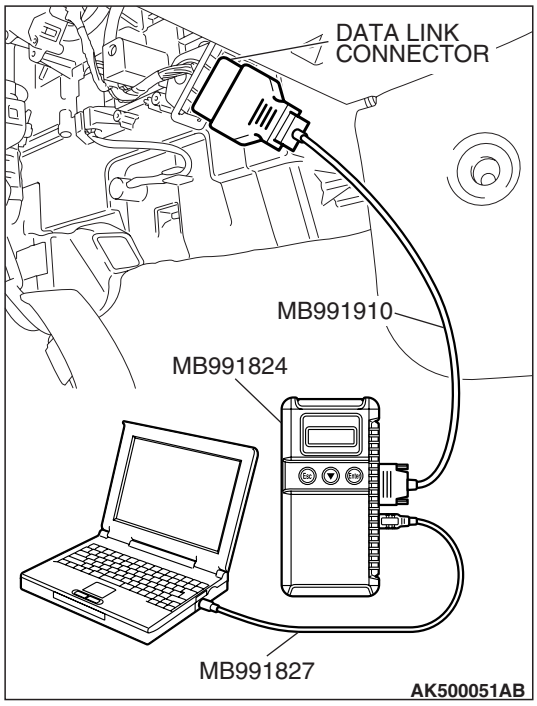


STEP 4. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is DTC U1102 set?

YES : Replace the ABS-ECU. Then go to Step 6.
NO : It can be assumed that this malfunction is intermittent of CAN bus line between ECM <M/T> or PCM <A/T> and ABS-ECU. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

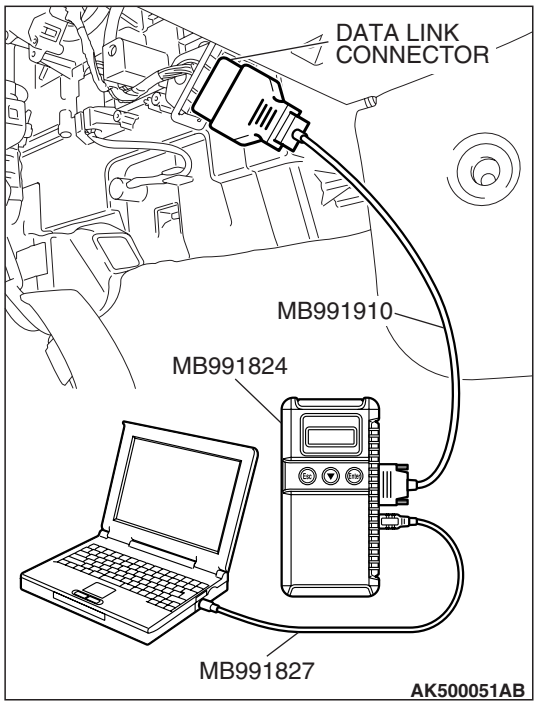


STEP 5. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is DTC U1102 set?

YES : Replace he ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 6.
NO : It can be assumed that this malfunction is intermittent of CAN bus line between ECM <M/T> or PCM <A/T> and ABS-ECU. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.



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

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

Q: Is DTC U1102 set?

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

DTC U1108: COMBINATION METER TIME-OUT

⚠ CAUTION

- **If the ECM <M/T> or the PCM <A/T> output the DTC U1102, make sure to diagnose the CAN bus line.**
- **Before replacing the ECU, make sure that the communication circuit is operating normally.**

DESCRIPTIONS OF MONITOR METHODS

There is no data from combination meter for the specified time. (Meter also detect communication error with ECM <M/T> or PCM <A/T>.)

MONITOR EXECUTION

Continuous

MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

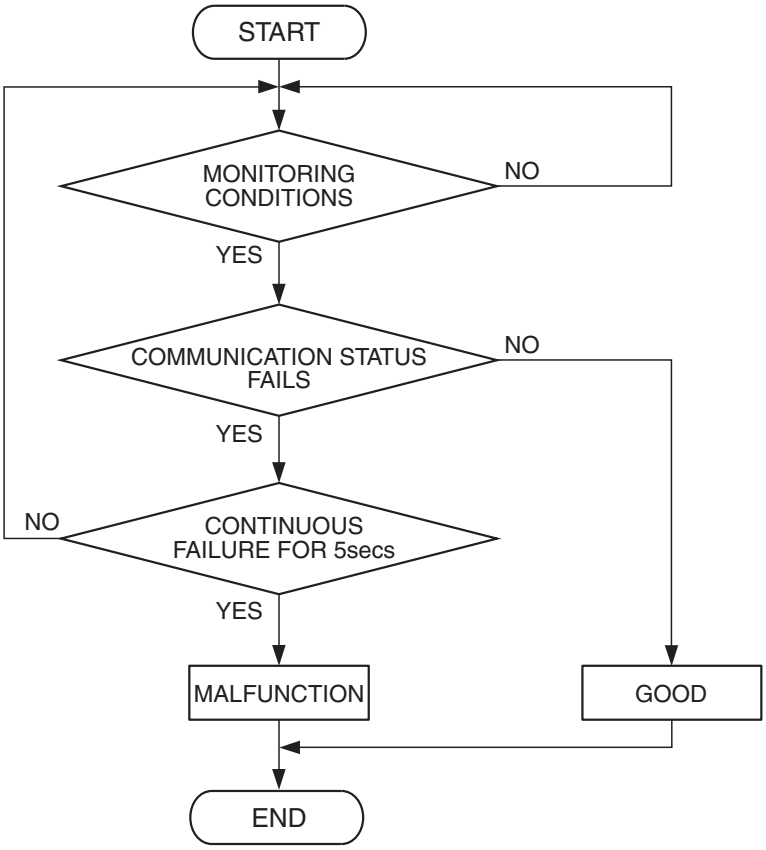
- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

DTC SET CONDITIONS

Lgic Flow Chart



AK204025

Check Condition

- Battery positive voltage is 10 volts or higher.

Judgement Criterion

- Unable to receive combination meter signals through the CAN bus line for 5 seconds.

COMMENT

Current Trouble

- Some of the possible causes are a harness or connector damage between the ECM <M/T> or the PCM <A/T> and the combination meter on the CAN bus line, a failure in the combination meter power supply system, a failure in the combination meter, or a failure in the ECM <M/T> or the PCM <A/T>.

Past Trouble

- Proceed to troubleshoot based on a harness or connector damage on the CAN bus line between the ECM <M/T> or the PCM <A/T> and combination meter, and a failure in the combination meter power supply system. Refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14).

NOTE: If a malfunction occurred in the past, a failure cannot be discovered through the MUT –III CAN bus diagnosis even if there might be a problem with the CAN bus. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14. Furthermore, it is possible to narrow down the areas of the possible failures from the DTCs that are output by the ECUs, which are communicating on the CAN bus (Refer to GROUP 54C, CAN bus line Diagnostics Flow P.54C-6).

TSB Revision

OBD-II DRIVE CYCLE PATTERN

None.

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

- CAN line harness damage or connector damage.
- Combination meter failed.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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

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

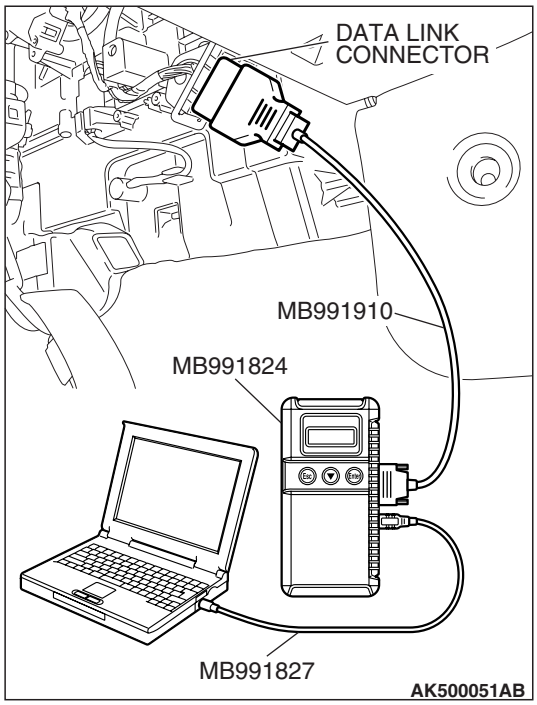
⚠ CAUTION

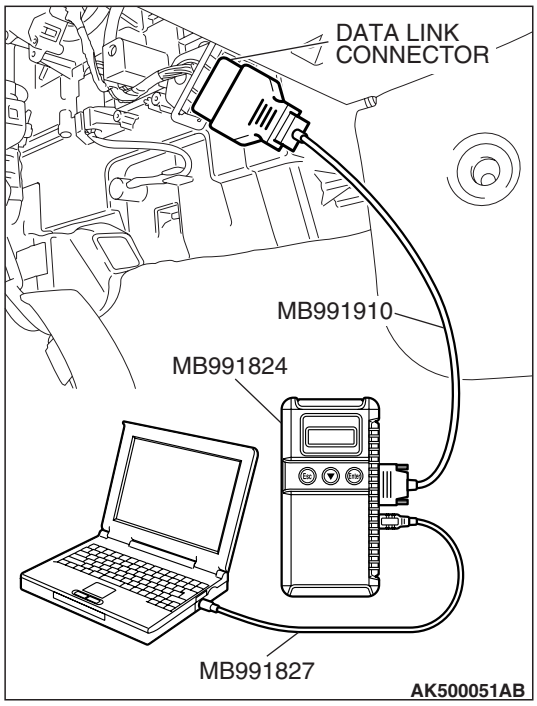
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is the CAN bus line normal?

YES : Go to Step 2.
NO : Repair the CAN bus line. Refer to GROUP 54C, Can Bus Diagnostics Table P.54C-14. Then go to Step 6.



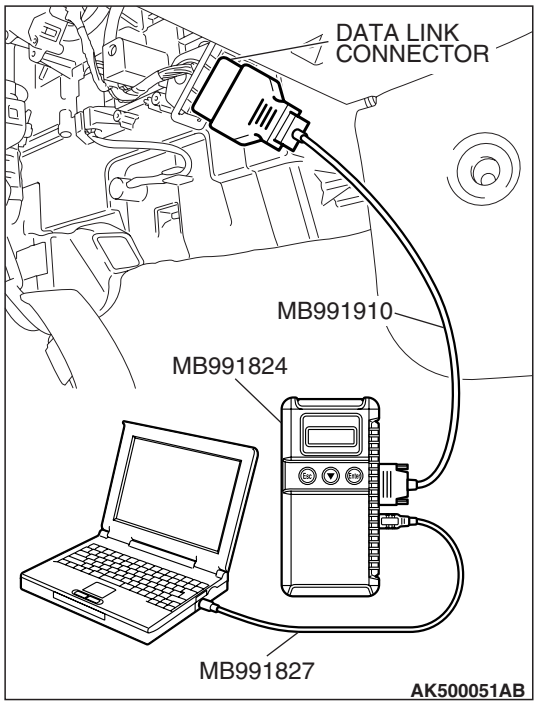


STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is the combination meter-DTC set?

YES : Refer to GROUP 54A, Chassis Electrical – Combination Meter Assembly –Diagnostic Trouble Code Chart P.54A-55.
NO : Go to Step 3.

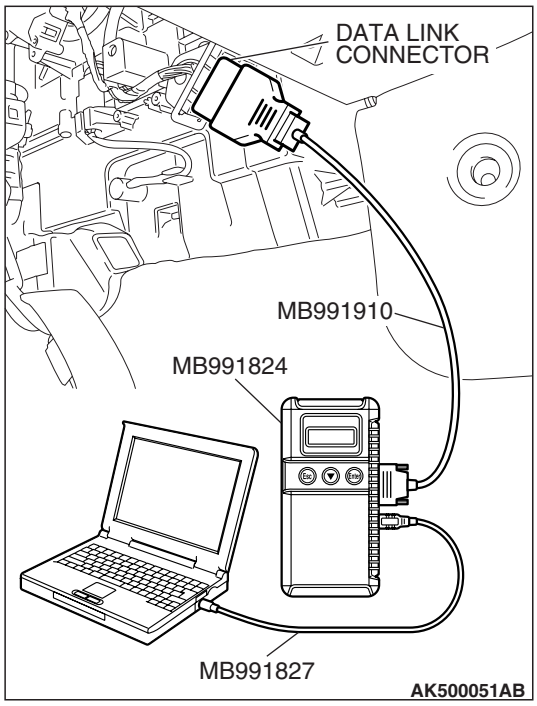


STEP 3. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is DTC 013 set?

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

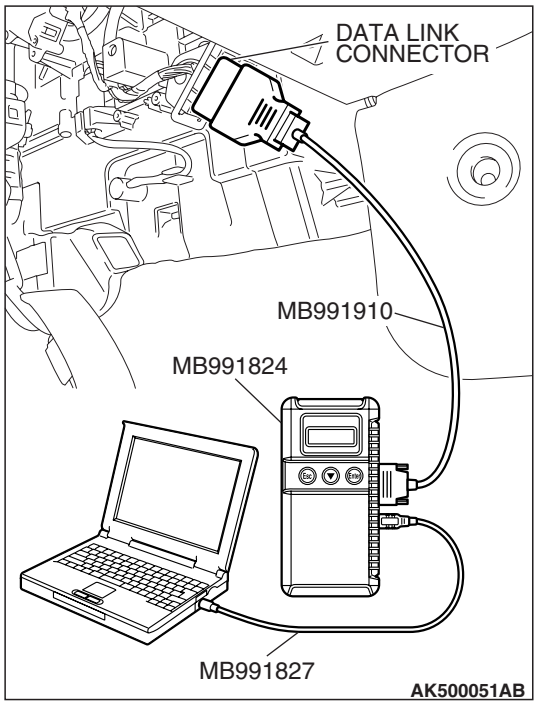


STEP 4. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is DTC U1108 set?

YES : Replace the combination meter. Then go to Step 6.
NO : It can be assumed that this malfunction is intermittent of CAN bus line between ECM <M/T> or PCM <A/T> and combination meter. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

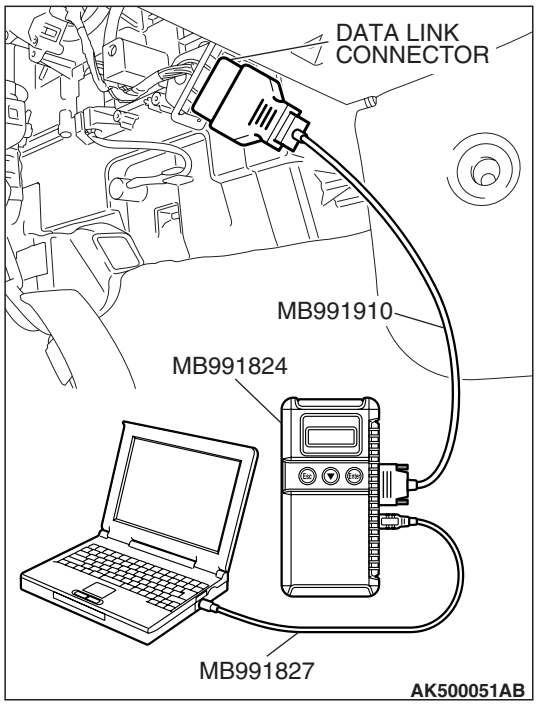


STEP 5. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is DTC U1108 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 6.
NO : It can be assumed that this malfunction is intermittent of CAN bus line between ECM <M/T> or PCM <A/T> and combination meter. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.



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

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

Q: Is DTC U1108 set?

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

DTC U1109: ETACS-ECU TIME-OUT

⚠ CAUTION

- **If the ECM <M/T> or the PCM <A/T> output the DTC U1109, make sure to diagnose the CAN bus line.**
- **Before replacing the ECU, make sure that the communication circuit is operating normally.**

DTC SET CONDITIONS

Check Conditions

- Battery positive voltage is 10 volts or higher.
- Engine is not cranked, or at least 3 seconds or more have passed since engine was cranked.

Judgement Criterion

- Unable to receive ETACS-ECU signals through the CAN bus line.

COMMENT

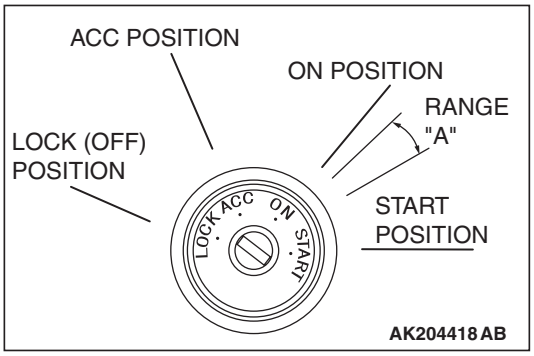
Current Trouble

- Some of the possible causes are a harness or connector damage between the ECM <M/T> or the PCM <A/T> and the ETACS-ECU on the CAN bus line, a failure in the ETACS-ECU power supply system, a failure in the ETACS-ECU, or a failure in the ECM <M/T> or the PCM <A/T>.

Past Trouble

- Proceed to troubleshoot based on a harness or connector damage on the CAN bus line between the ECM <M/T> or the PCM <A/T> and ETACS-ECU, and a failure in the ETACS power supply system. Refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14).

⚠ CAUTION



When the ignition key is maintained within the range "A" (i.e., the ignition switch IG2 is in OFF position but the cranking does not start) for more than 1 second, ECM <M/T> or PCM <A/T> stores DTC U1110 (the past trouble).

NOTE: If a malfunction occurred in the past, a failure cannot be discovered through the MB991958 CAN bus diagnosis even if there might be a problem with the CAN bus. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14. Furthermore, it is possible to narrow down the areas of the possible failures from the DTCs that are output by the ECUs, which are communicating on the CAN bus (Refer to GROUP 54C, CAN bus line Diagnostics Flow P.54C-6).

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

- CAN line harness damage or connector damage.
- ETACS-ECU failed.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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

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

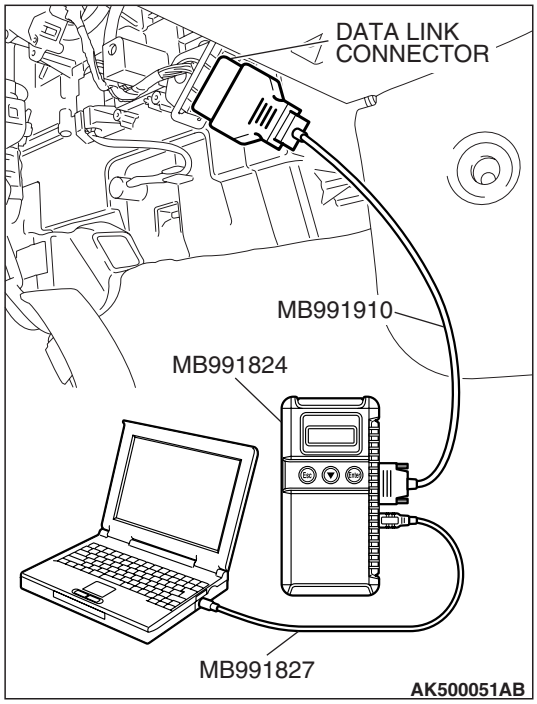
⚠ CAUTION

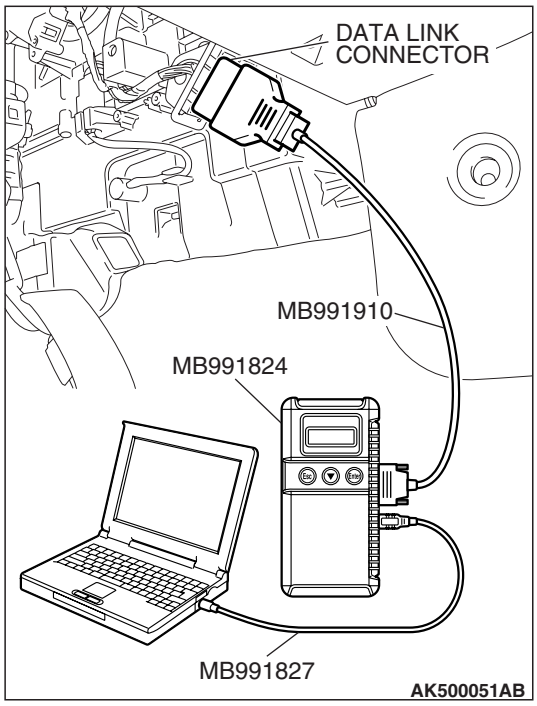
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is the CAN bus line normal?

YES : Go to Step 2.
NO : Repair the CAN bus line. Refer to GROUP 54C, Can Bus Diagnostics Table P.54C-14. Then go to Step 6.



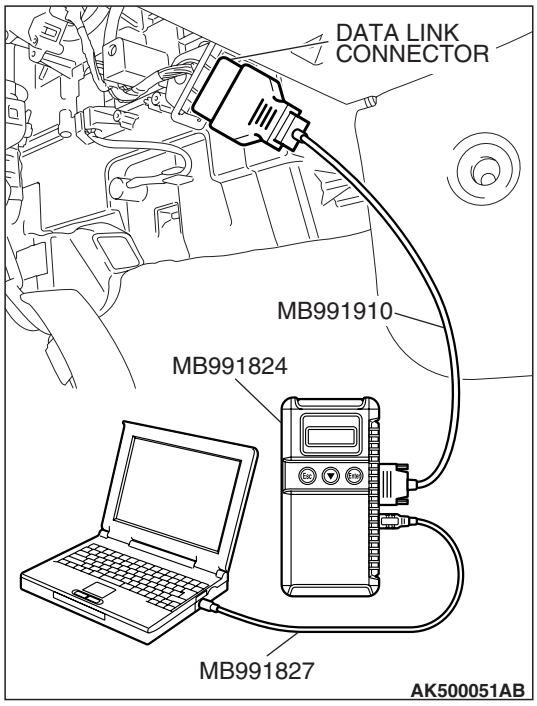


STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is the ETACS-DTC set?

YES : Refer to GROUP 54B, SWS Diagnosis –Diagnostic Trouble Code Chart P.54B-29.
NO : Go to Step 3.

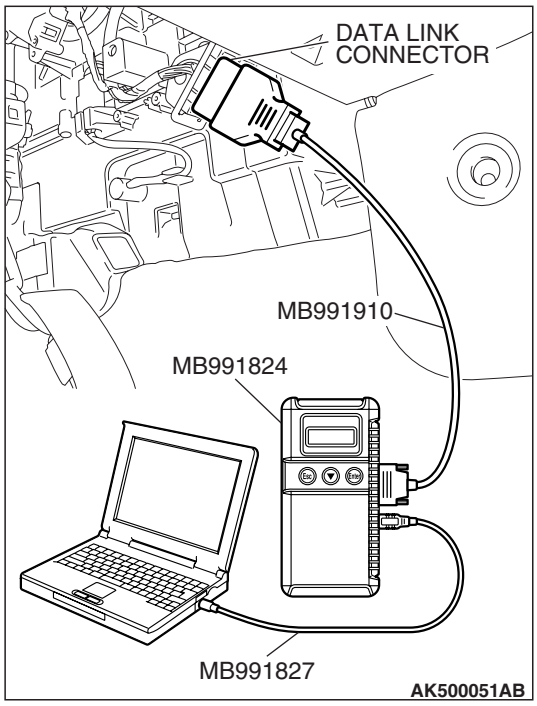


STEP 3. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is DTC U1109 set?

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



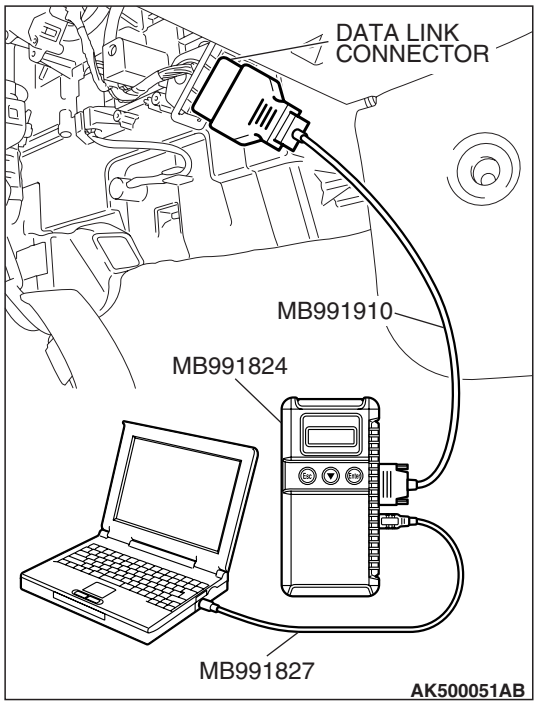
STEP 4. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is DTC U1109 set?

YES : Replace the ETACS-ECU. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 6.

NO : It can be assumed that this malfunction is intermittent of CAN bus line between ECM <M/T> or PCM <A/T> and ETACS-ECU. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.



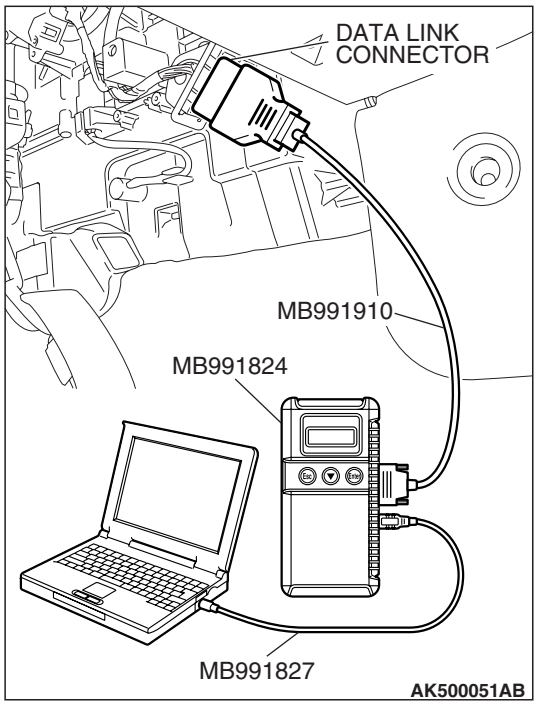
STEP 5. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is DTC U1109 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 6.

NO : It can be assumed that this malfunction is intermittent of CAN bus line between ECM <M/T> or PCM <A/T> and ETACS-ECU. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.



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

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

Q: Is DTC U1109 set?

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

DTC U1110: A/C-ECU TIME-OUT

⚠ CAUTION

- **If the ECM <M/T> or the PCM <A/T> output the DTC U1110, make sure to diagnose the CAN bus line.**
- **Before replacing the ECU, make sure that the communication circuit is operating normally.**

DTC SET CONDITIONS

Check Conditions

- Battery positive voltage is 10 volts or higher.
- Engine is not cranked, or at least 3 seconds or more have passed since engine was cranked.

Judgement Criterion

- Unable to receive A/C-ECU signals through the CAN bus line.

COMMENT

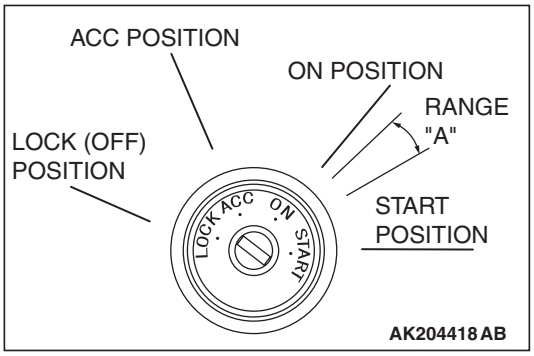
Current Trouble

- Some of the possible causes are a harness or connector damage between the ECM <M/T> or the PCM <A/T> and the A/C-ECU on the CAN bus line, a failure in the A/C-ECU power supply system, a failure in the A/C-ECU, or a failure in the ECM <M/T> or the PCM <A/T>.

Past Trouble

- Proceed to troubleshoot based on a harness or connector damage on the CAN bus line between the ECM <M/T> or the PCM <A/T> and A/C-ECU, and a failure in the A/C power supply system. Refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14).

⚠ CAUTION



When the ignition key is maintained within the range "A" (i.e., the ignition switch IG2 is in OFF position but the cranking does not start) for more than 1 second, ECM <M/T> or PCM <A/T> stores DTC U1110 (the past trouble).

NOTE: If a malfunction occurred in the past, a failure cannot be discovered through the MB991958 CAN bus diagnosis even if there might be a problem with the CAN bus. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14. Furthermore, it is possible to narrow down the areas of the possible failures from the DTCs that are output by the ECUs, which are communicating on the CAN bus (Refer to GROUP 54C, CAN bus line Diagnostics Flow P.54C-6).

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

- CAN line harness damage or connector damage.
- A/C-ECU failed.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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

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

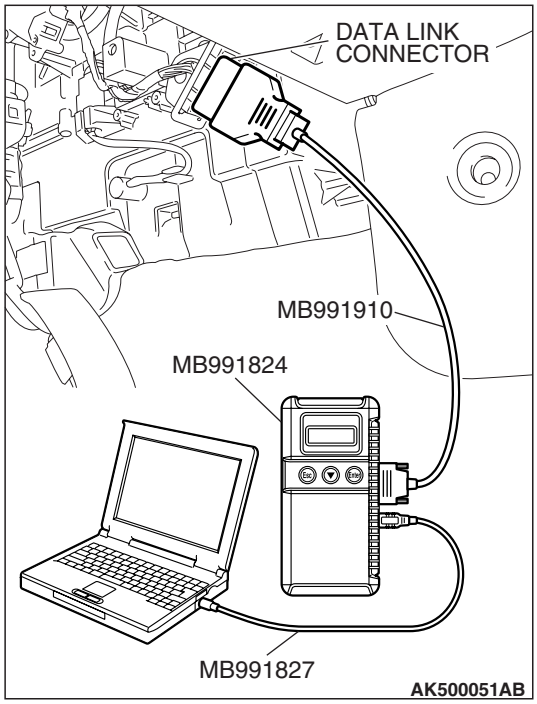
⚠ CAUTION

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

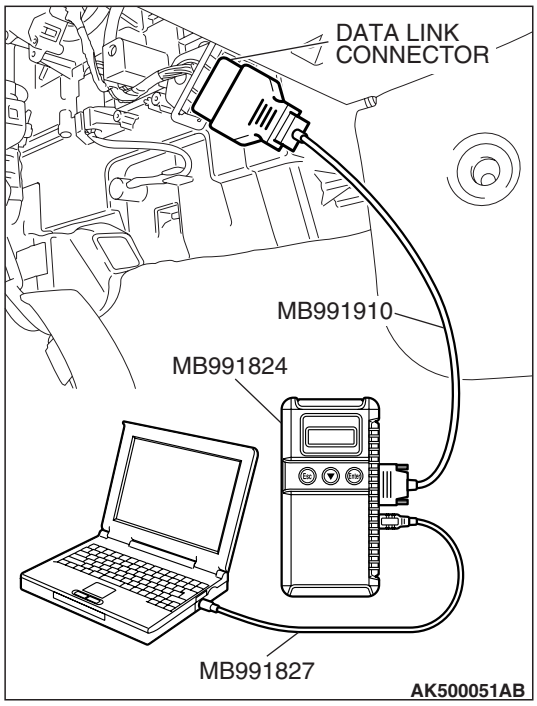
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Diagnose CAN bus line.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the CAN bus line normal?

YES : Go to Step 2.
NO : Repair the CAN bus line. Refer to GROUP 54C, Can Bus Diagnostics Table P.54C-14. Then go to Step 6.



TSB Revision

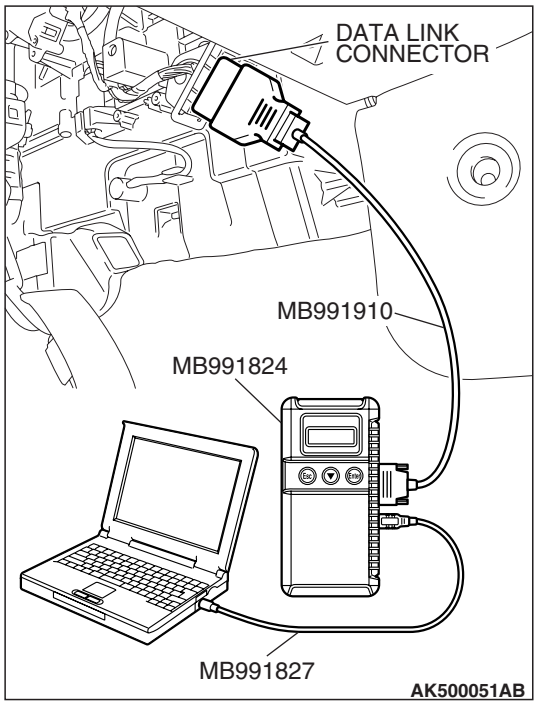


STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is the A/C-DTC set?

YES : Refer to GROUP 55B, Auto A/C Diagnosis – Diagnostic Trouble Code Chart P.55B-9.
NO : Go to Step 3.

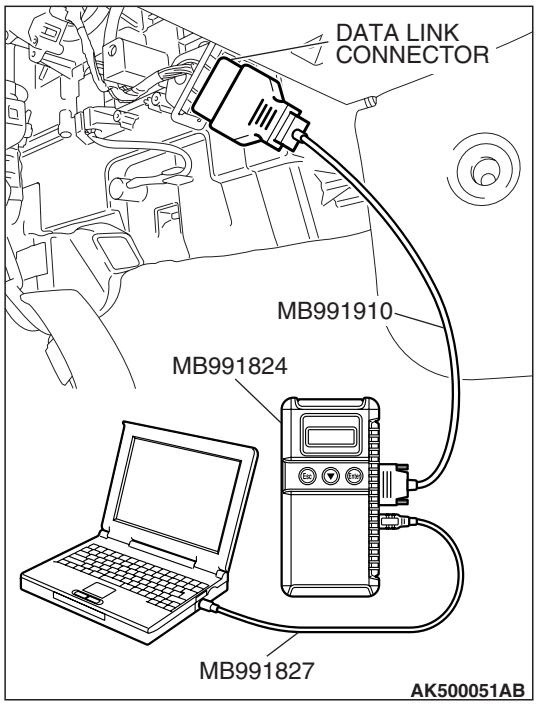


STEP 3. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is DTC 012 set?

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

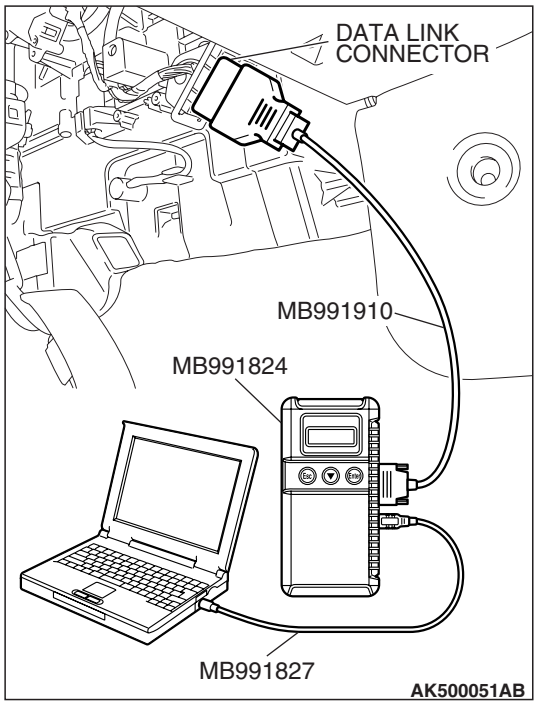


STEP 4. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is DTC U1110 set?

YES : Replace the A/C-ECU. Then go to Step 6.
NO : It can be assumed that this malfunction is intermittent of CAN bus line between ECM <M/T> or PCM <A/T> and A/C-ECU. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

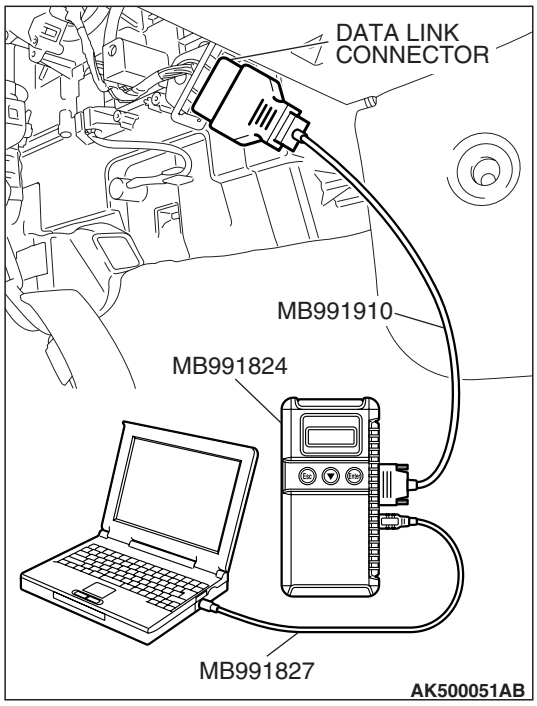


STEP 5. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is DTC U1110 set?

YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13. Then go to Step 6.
NO : It can be assumed that this malfunction is intermittent of CAN bus line between ECM <M/T> or PCM <A/T> and A/C-ECU. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.



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

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

Q: Is DTC U1110 set?

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

DTC U1117: IMMOBILIZER-ECU TIME-OUT

⚠ CAUTION

- **If the ECM <M/T> or the PCM <A/T> output the DTC U1117, make sure to diagnose the CAN bus line.**
- **Before replacing the ECU, make sure that the communication circuit is operating normally.**

DTC SET CONDITIONS

Check Condition

- Ignition switch is in ON position.

Judgement Criterion

- Unable to receive ETACS-ECU (immobilizer-ECU) signals through the CAN bus line.

COMMENT

Current Trouble

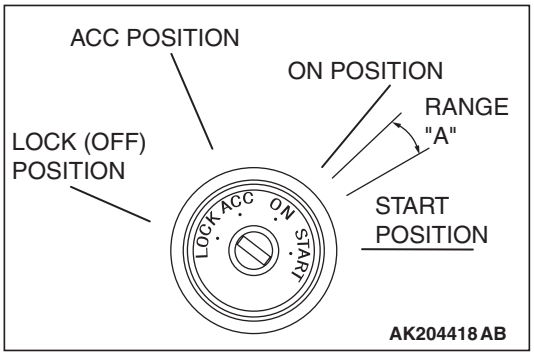
- Some of the possible causes are a harness or connector damage between the ECM <M/T> or the PCM <A/T> and the ETACS-ECU (immobilizer-ECU) on the CAN bus line, a failure in the ETACS-ECU (immobilizer-ECU) power supply system, a failure in the ETACS-ECU (immobilizer-ECU), or a failure in the ECM <M/T> or the PCM <A/T>.

Past Trouble

- Proceed to troubleshoot based on a harness or connector damage on the CAN bus line between the ECM <M/T> or the PCM <A/T> and ETACS-ECU (immobilizer-ECU), and a failure in the ETACS-ECU (immobilizer-ECU) power supply system. Refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14).

TSB Revision

⚠ CAUTION



When the ignition key is maintained within the range "A" (i.e., the ignition switch IG2 is in OFF position but the cranking does not start) for more than 1 second, ECM <M/T> or PCM <A/T> stores DTC U1117 (the past trouble).

NOTE: If a malfunction occurred in the past, a failure cannot be discovered through the MB991958 CAN bus diagnosis even if there might be a problem with the CAN bus. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14. Furthermore, it is possible to narrow down the areas of the possible failures from the DTCs that are output by the ECUs, which are communicating on the CAN bus (Refer to GROUP 54C, CAN bus line Diagnostics Flow P.54C-6).

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

- CAN line harness damage or connector damage.
- ETACS-ECU (immobilizer-ECU) failed.
- ECM failed. <M/T>
- PCM failed. <A/T>

DIAGNOSIS

Required Special Tools:

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

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

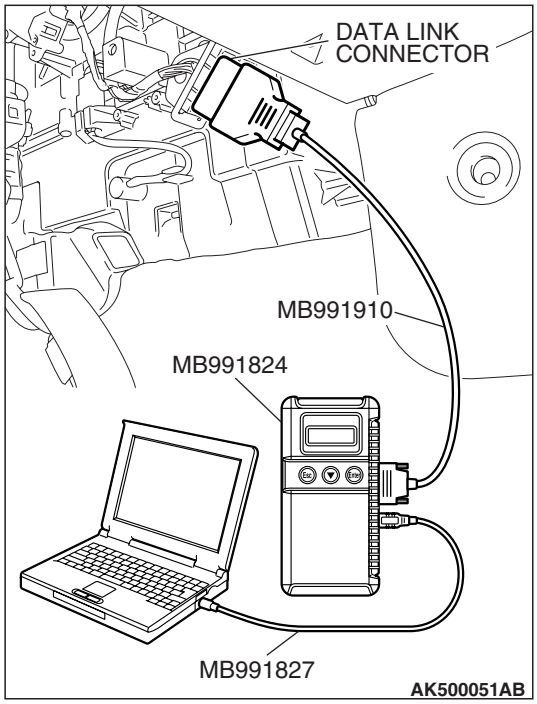
⚠ CAUTION

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

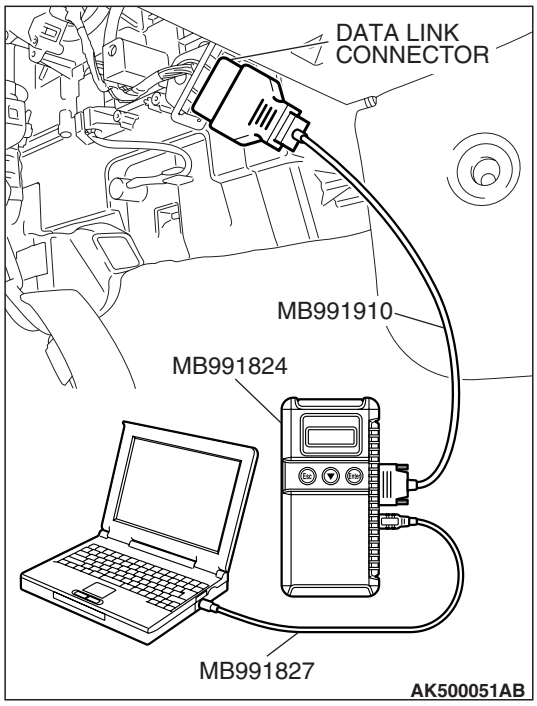
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Diagnose CAN bus line.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the CAN bus line normal?

YES : Go to Step 2.
NO : Repair the CAN bus line. Refer to GROUP 54C, Can Bus Diagnostics Table P.54C-14. Then go to Step 3.



TSB Revision



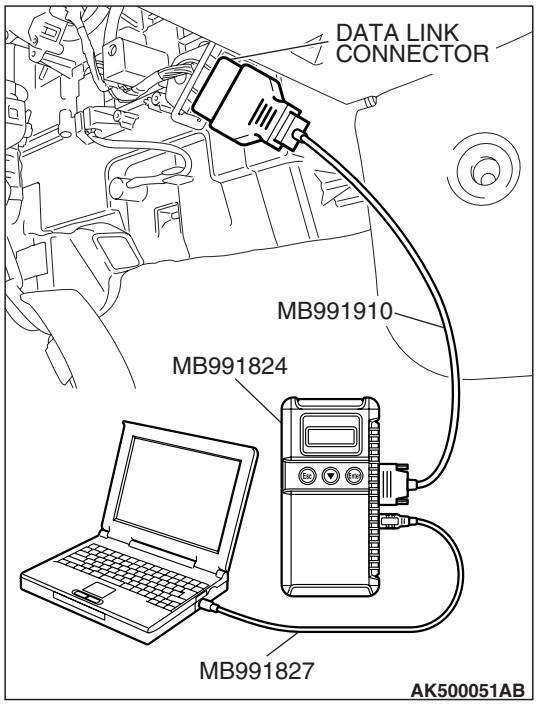
STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

Q: Is the immobilizer-DTC set?

YES : Refer to GROUP 54A, Immobilizer System – Diagnostic Trouble Code Chart P.54A-17.

NO : Go to Step 3.



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

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

Q: Is DTC U1117 set?

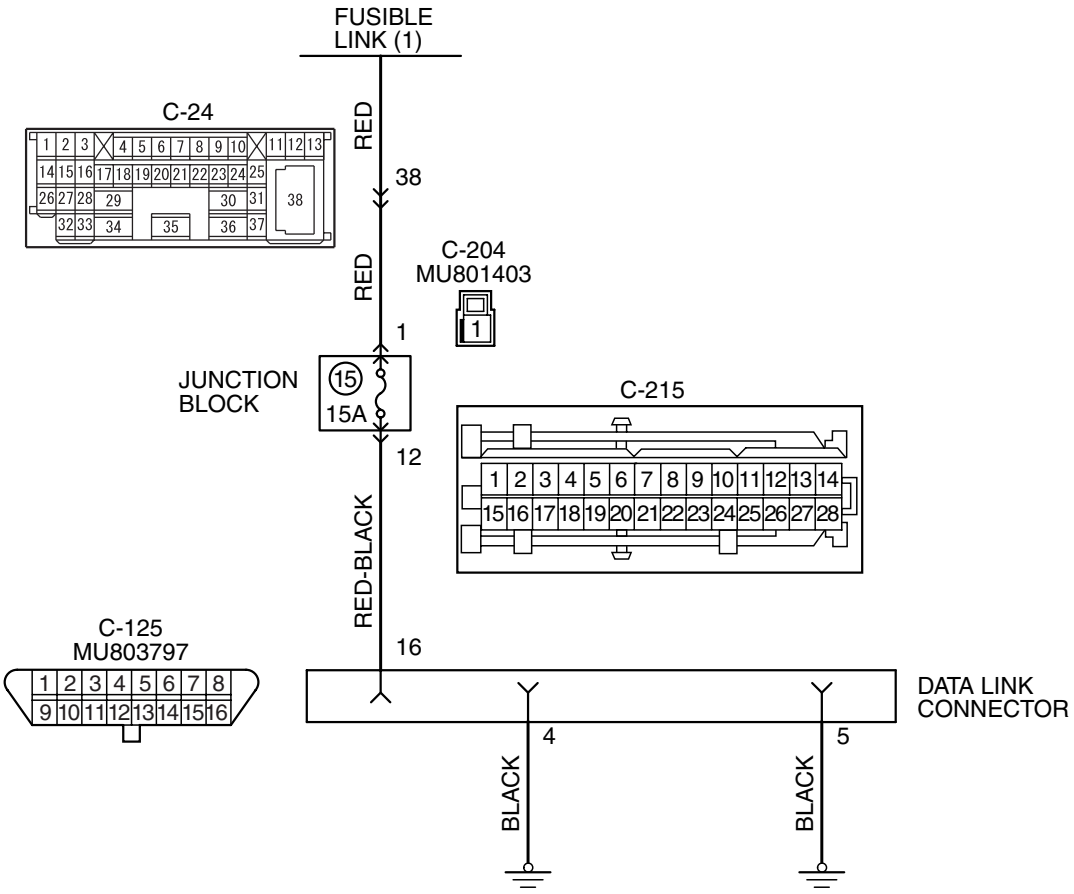
YES : Replace the ECM or the PCM. When the ECM or the PCM is replaced, register the encrypted code. Refer to GROUP 54A, Encrypted Code Registration Criteria Table P.54A-13.

NO : It can be assumed that this malfunction is intermittent of CAN bus line between ECM <M/T> or PCM <A/T> and ETACS-ECU (immobilizer-ECU). Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

SYMPTOM PROCEDURES

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

Data Link Connector Circuit



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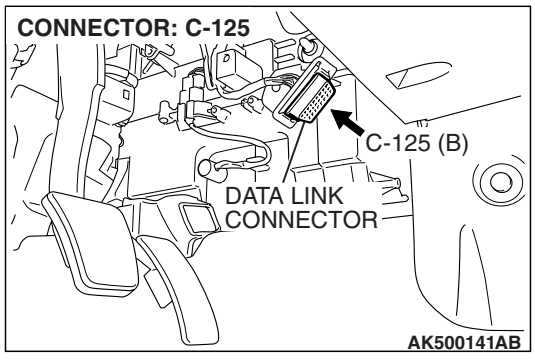

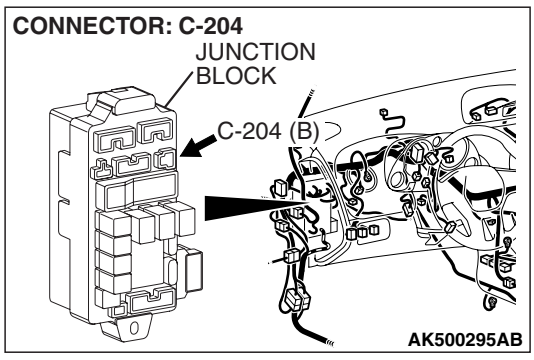

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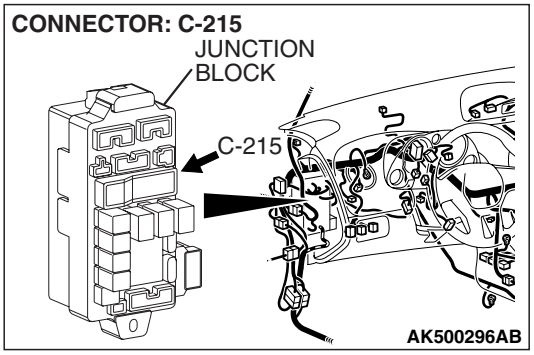
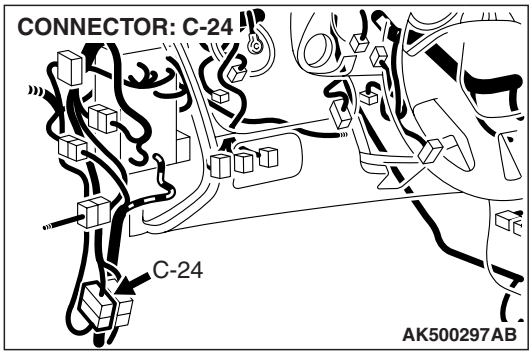




CIRCUIT OPERATION

- A battery positive voltage is applied on the data link connector power terminal (terminal No. 16). The ground terminals (terminal 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

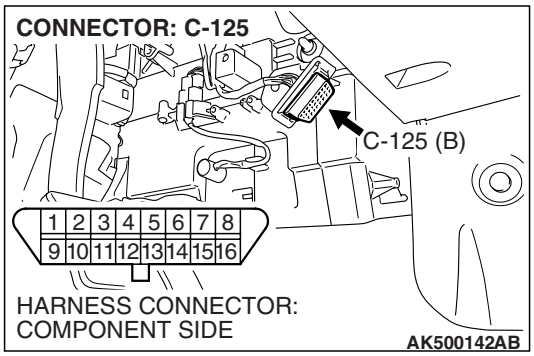
STEP 1. Measure the power supply voltage at data link connector C-125.

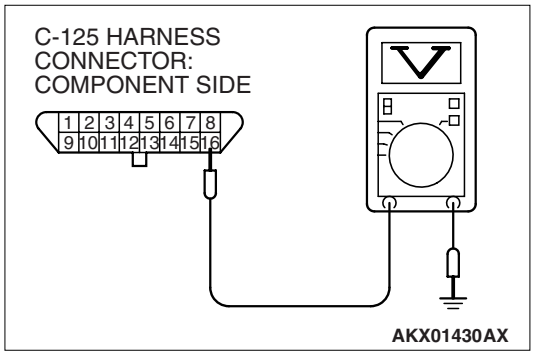
(1) Measure voltage between terminal No. 16 and ground.
- Voltage should be battery positive voltage.

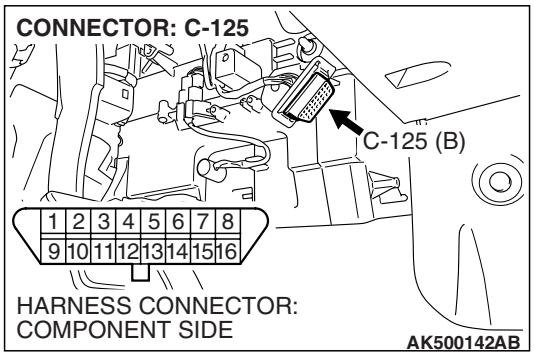
Q: Is battery positive voltage (approximately 12 volts) present?

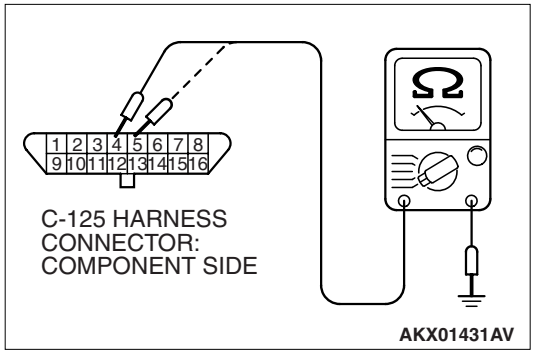
YES : Go to step 2.

NO : Check harness connectors C-24, C-204 and C-215 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. If intermediate connectors C-24, C-204 and C-215 are in good condition, repair an open circuit between fusible link (1) and data link connector C-125 (terminal No. 16). Then confirm that the malfunction symptom is eliminated.









STEP 2. Check the continuity at data link connector C-125.

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

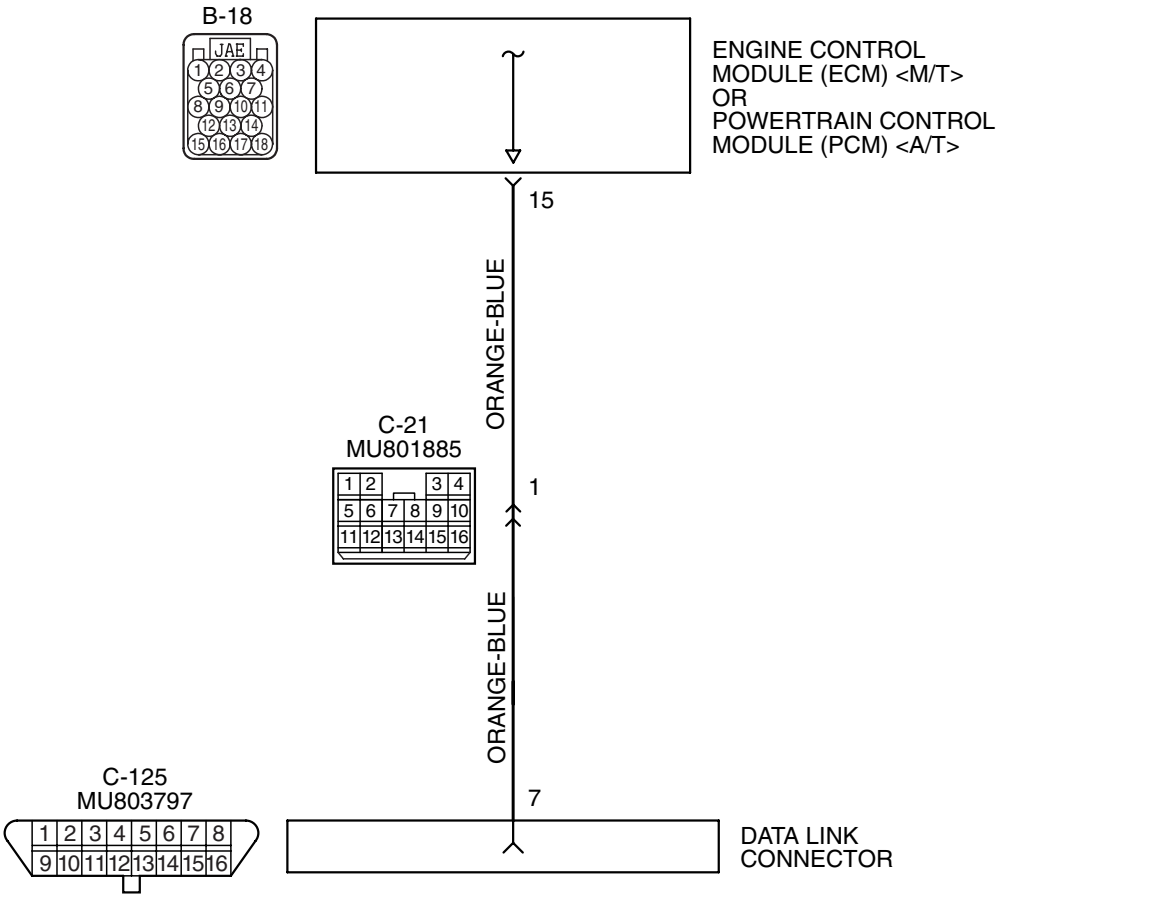
Q: Does continuity exist?

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

NO : Repair an open circuit or harness damage between data link connector C-125 (terminal No. 4, No. 5) and ground. Then confirm that the malfunction symptom is eliminated.

INSPECTION PROCEDURE 2: Scan Tool Communication with ECM <M/T> or PCM <A/T> Is Not Possible.

Data Link Connector Circuit



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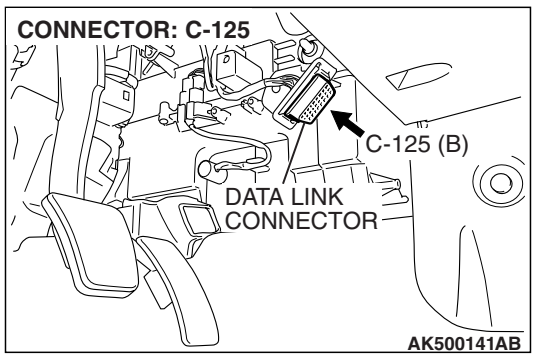
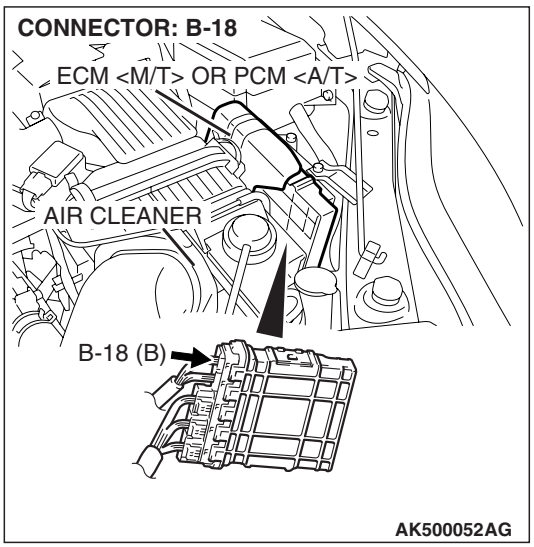
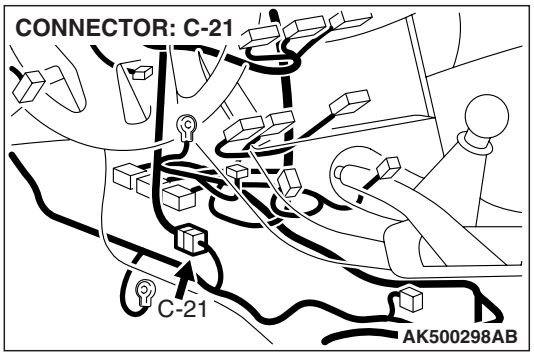




TSB Revision



CIRCUIT OPERATION

- A diagnostic output is made from the ECM <M/T> or the PCM <A/T> (terminal No. 15) to the diagnostic output terminal (terminal No. 7) of the data link connector.

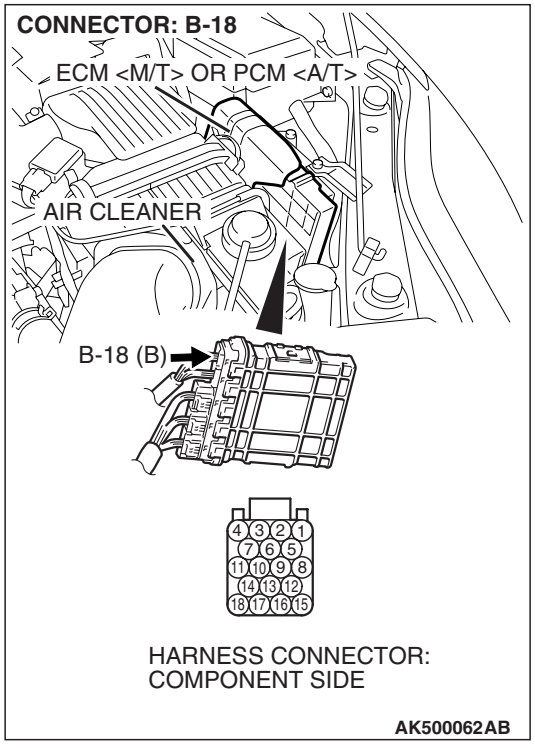
COMMENT

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

DIAGNOSIS



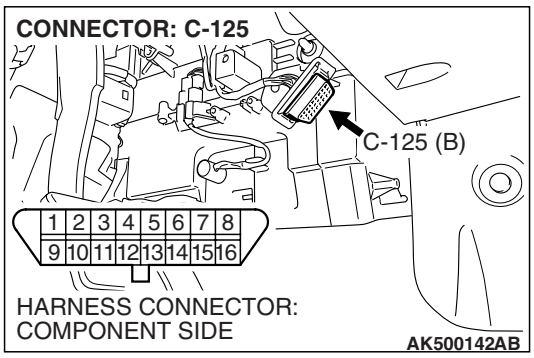
STEP 1. Check harness connector B-18 at ECM <M/T> or PCM <A/T> for damage.

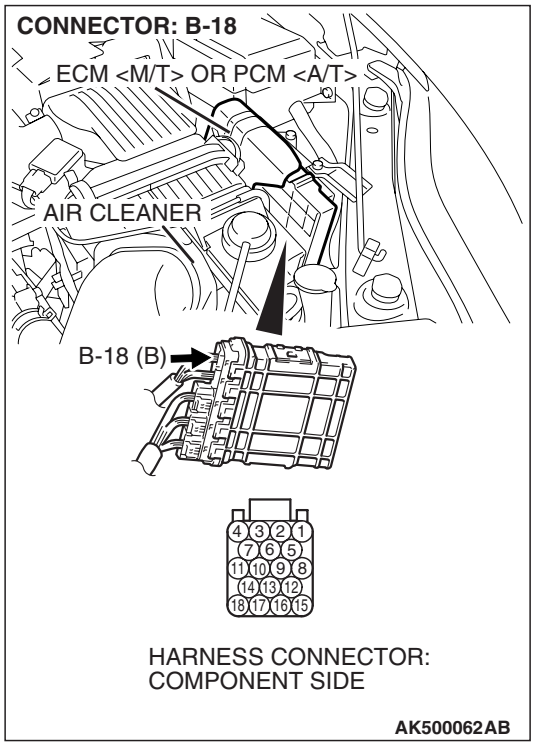
Q: Is the harness connector in good condition?

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-125 (terminal No. 7) and ECM <M/T> or PCM <A/T> connector B-18 (terminal No. 15).





NOTE: Check harness after checking intermediate connectors C-21. If intermediate connector C-21 is damaged, repair or replace it. 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 28 –Power Supply System and Ignition Switch-IG System P.13A-1099.

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.

COMMENT

- The combination meter causes the malfunction indicator lamp (SERVICE ENGINE SOON or Check Engine Lamp) to illuminate for 20 seconds immediately after the ignition switch is turned to the "ON" position occurred.

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

- Malfunction of the malfunction indicator lamp (SERVICE ENGINE SOON or Check Engine Lamp).
- Open or shorted malfunction indicator lamp (SERVICE ENGINE SOON or Check Engine Lamp) circuit.

DIAGNOSIS

Required Special Tools:

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

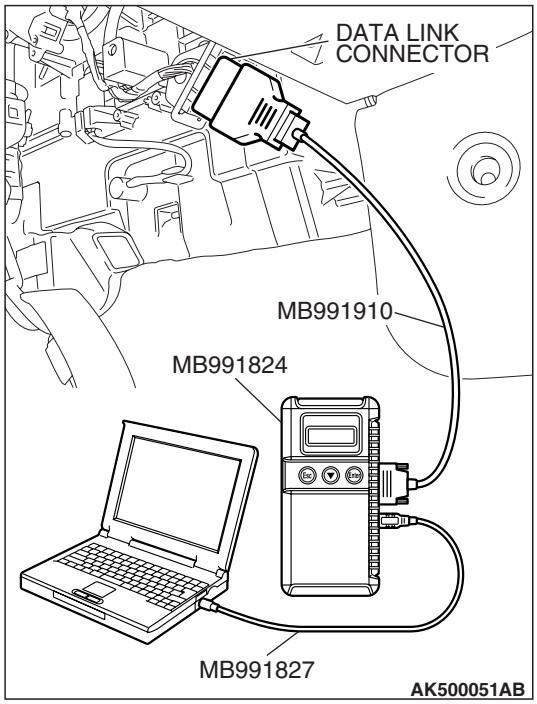
STEP 1. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

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

Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart P.13A-41.
NO : Go to step 2.



STEP 2. Check the trouble symptoms.

(1) Turn the ignition switch to the "ON" position.
- The malfunction indicator lamp (SERVICE ENGINE SOON or Check Engine Lamp) should illuminate immediately after the ignition switch is turned to the "ON" position.

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

Q: Does the malfunction indicator lamp (SERVICE ENGINE SOON or Check Engine Lamp) illuminate?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.

NO : Replace the combination meter.

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

COMMENT

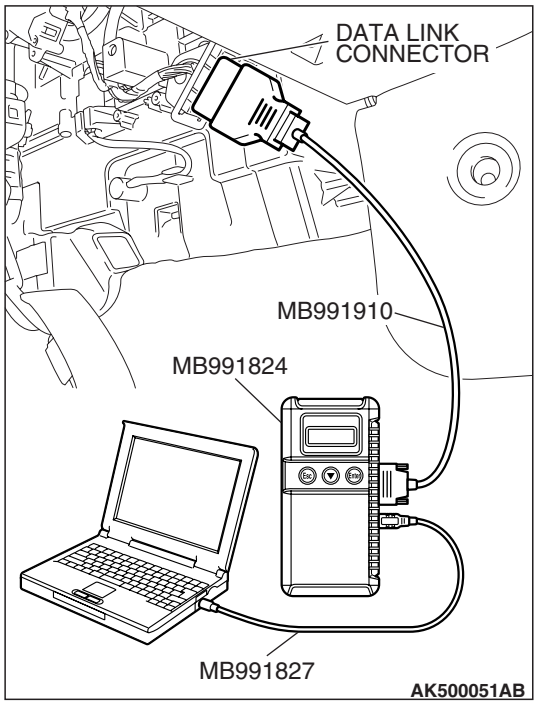
- In cases such as the above, the cause is probably that the ECM <M/T> or the PCM <A/T> is detecting a problem in a sensor or actuator, or that one of the malfunctions listed at next has probably occurred.

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

- Shorted the malfunction indicator lamp (SERVICE ENGINE SOON or Check Engine Lamp) circuit.

DIAGNOSIS

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



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

⚠ CAUTION

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

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

Q: Is DTC set?

YES : Refer to Diagnostic Trouble Code Chart P.13A-41.
NO : Go to Step. 2.

STEP 2. Check the trouble symptoms.

(1) Turn the ignition switch to the "ON" position.
- The malfunction indicator lamp (SERVICE ENGINE SOON or Check Engine Lamp) should go out when 20 seconds have passed after the ignition switch was turned to the "ON" position.

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

Q: Does the malfunction indicator lamp (SERVICE ENGINE SOON or Check Engine Lamp) go out?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14.
NO : Replace the combination meter.

INSPECTION PROCEDURE 5: Cranks, Won't Start

CRANKS, WON'T START CIRCUIT

- Refer to Ignition circuit P.13A-1136.

CIRCUIT OPERATION

- Refer to Ignition circuit P.13A-1136.

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 the PCM <A/T>.
- Contaminated fuel.

DIAGNOSIS

Required Special Tools:

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

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.

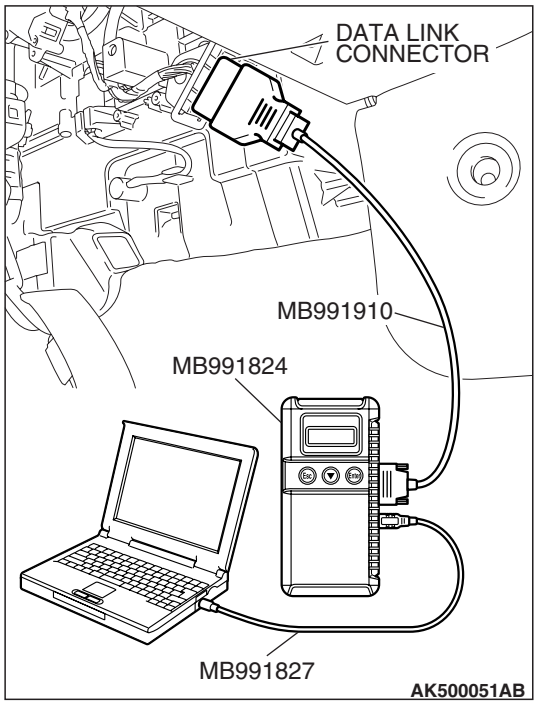
Q: Does the voltage remain greater than 8 volts while the engine is cranked?

YES : Go to Step 2.
NO : Check the battery. Refer to GROUP 54A, Battery – Battery check P.54A-5. 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, read the diagnostic trouble code (DTC).

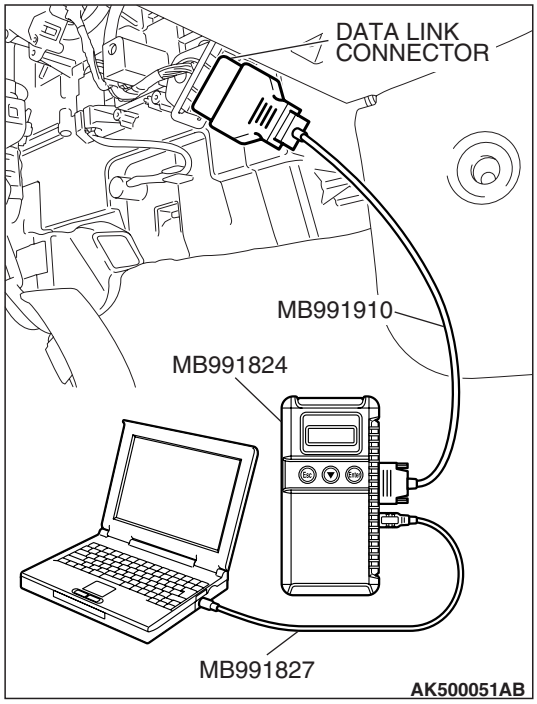
⚠ CAUTION

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-41.
NO : Go to Step 4.

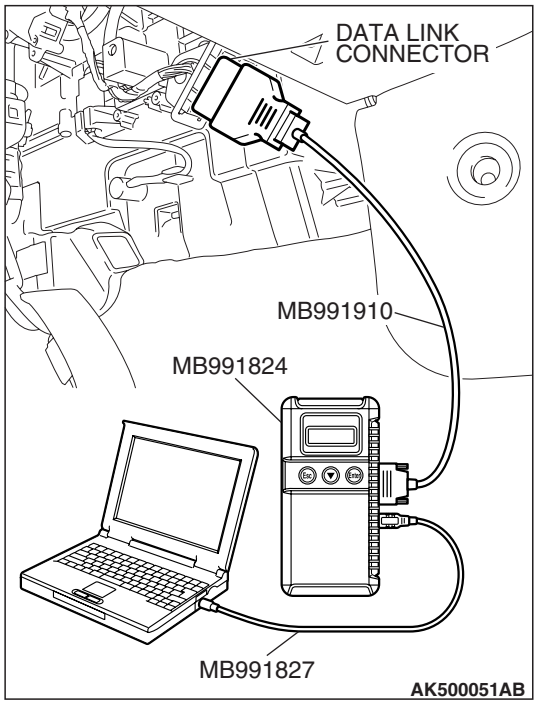


STEP 4. Using scan tool MB991958, check data list.

(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-1147.
   a. Item 1: Power Supply Voltage.
   b. Item 2: Crankshaft Position Sensor.
   c. Item 6: Engine Coolant Temperature Sensor.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

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

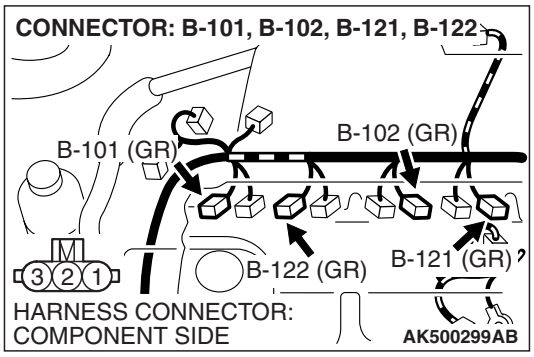


STEP 5. Using scan tool MB991958, check actuator test.

(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-1169.
   a. Item 9: Fuel pump.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

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



STEP 6. Check the ignition system.

(1) Connect the timing to terminal No. 1 of the ignition coil connector B-101, B-102, B-121 or B-122 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 7.
NO : Refer to INSPECTION PROCEDURE 32 –Ignition Circuit System P.13A-1136.

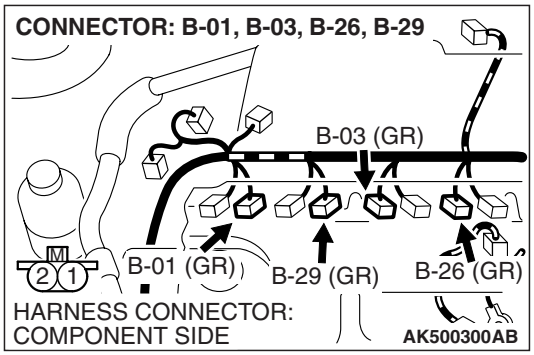
STEP 7. Check the ignition timing.

(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.

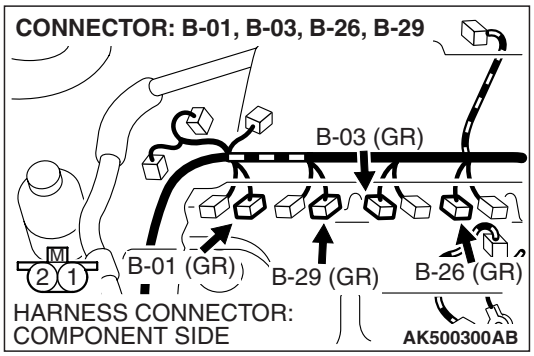


STEP 8. Check harness connector B-01 or B-03 or B-26 or B-29 at injector for damage.

Q: Is the harness connector in good condition?

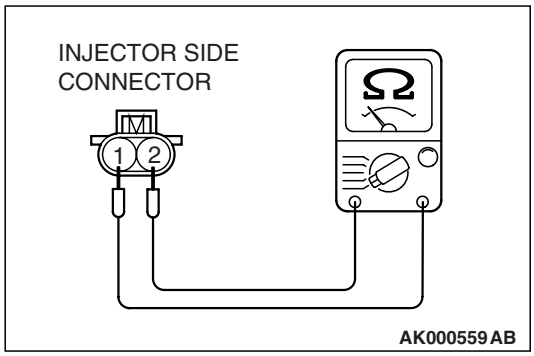
YES : Go to Step 9.

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 connector B-01, B-03, B-26 and B-29.



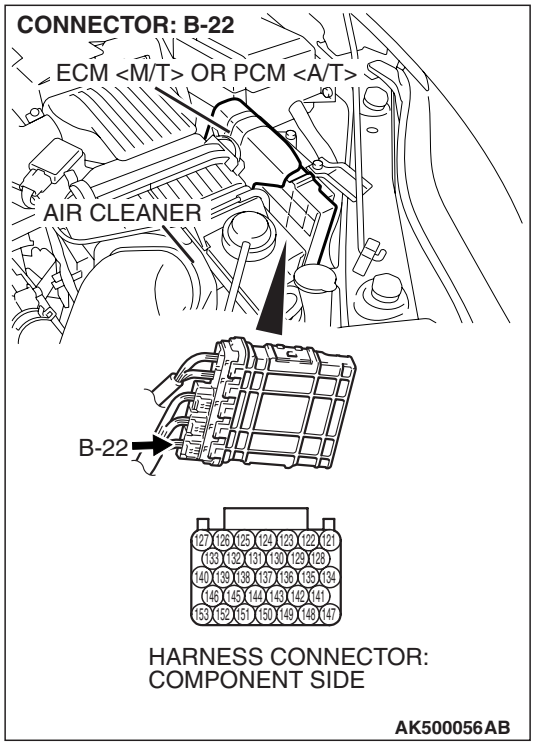
(2) Measure the resistance between each injector side connector terminal No. 1 and No. 2.

Standard value: 10.5 – 13.5 ohms [at 20° C (68° F)]

Q: Is the measured resistance between 10.5 and 13.5 ohms [at 20° C (68° F)]?

YES : Go to Step 10.

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

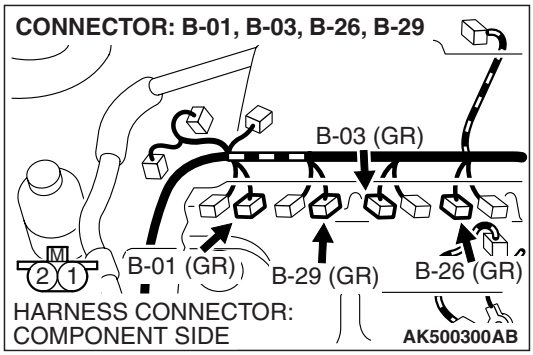


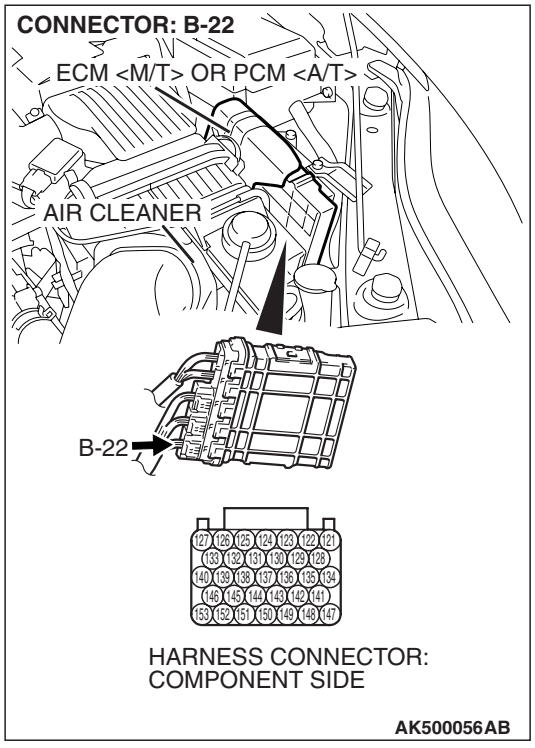
STEP 10. Check harness connector B-22 at ECM <M/T> or PCM <A/T> for damage.

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.

a. Check the harness wire between injector connector B-01 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 153) at No. 1 cylinder.
b. Check the harness wire between injector connector B-29 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 146) at No. 2 cylinder.
c. Check the harness wire between injector connector B-03 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 140) at No. 3 cylinder.
d. Check the harness wire between injector connector B-26 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 139) at No. 4 cylinder.

Q: Is the harness wire in good condition?

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

  Then confirm that the malfunction symptom is eliminated.

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

INSPECTION PROCEDURE 6: Starts Up and Dies.

COMMENT

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

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

- Malfunction of the ignition system.
- Malfunction of the injector system.
- Contaminated fuel.
- Poor compression.
- Dirtiness around throttle valve.
- Malfunction of the ECM <M/T> or the PCM <A/T>.

DIAGNOSIS

Required Special Tools:

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

STEP 1. Check the fuse number 23 (junction block).

Check the fuse number 23 (junction block)

Q: Is the fuse number 23 (junction block) normal?

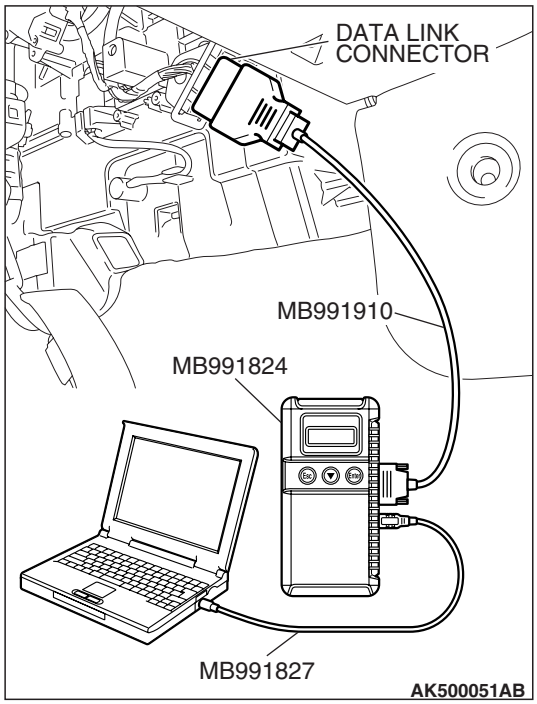
YES : Go to Step 2.
NO : Repair the fuse number 23 (junction block).

STEP 2. 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 3.
NO : Refer to GROUP 54A, Battery –Battery check P.54A-5.



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

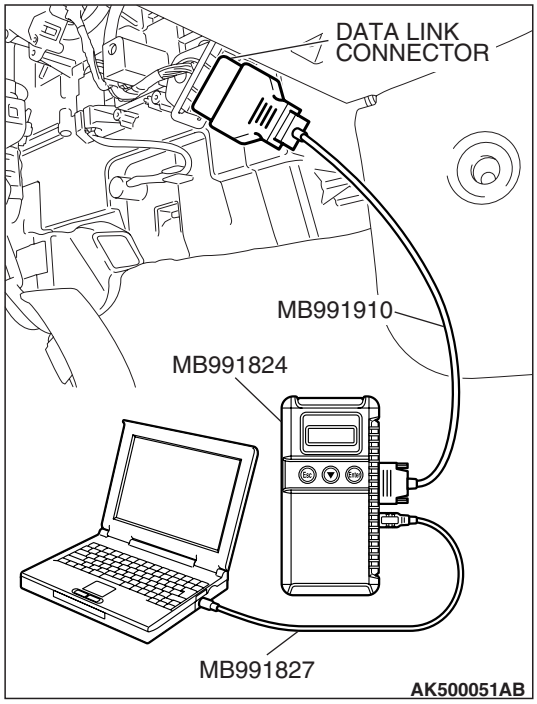
⚠ CAUTION

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

(1) Connect scan tool MB991958 to the data link connector.
(2) 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-41.
NO : Go to Step 4.

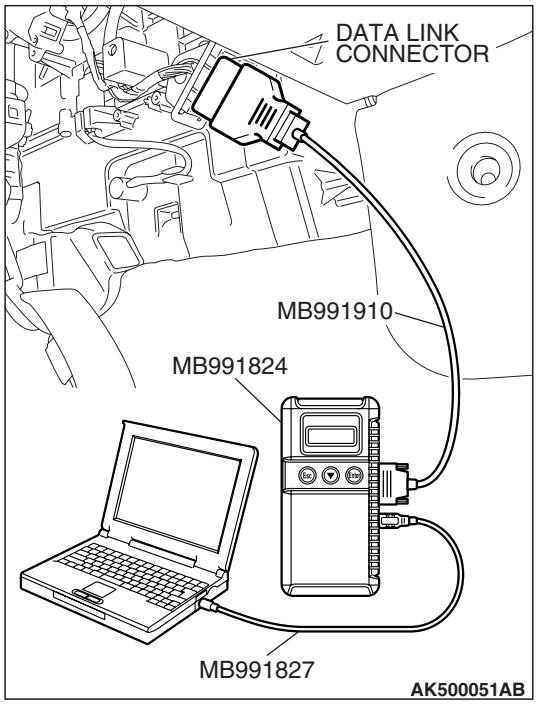


STEP 4. Using scan tool MB991958, check actuator test.

(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-1169.
  a. Item 9: Fuel Pump.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

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



STEP 5. 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-1147.
  a. Item 6: Engine Coolant Temperature Sensor.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

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

STEP 6. Inspection of throttle body (throttle valve area) for dirtiness.

Q: Is the throttle valve area dirty?

YES : Refer to On-vehicle Service –Throttle Body (Throttle Valve Area) Cleaning P.13A-1197.
NO : Go to Step 7.

STEP 7. Check the ignition timing.

(1) Check the ignition timing at cranking.

Standard value: 5° BTDC ±3°

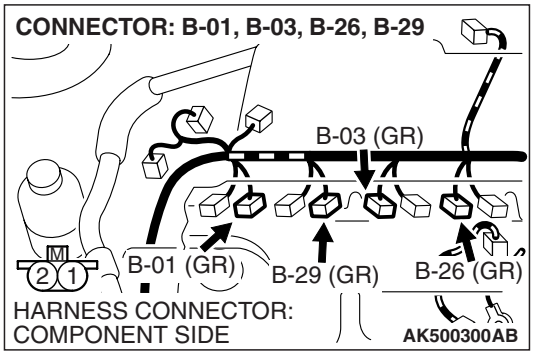
Q: Is the ignition timing normal?

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.

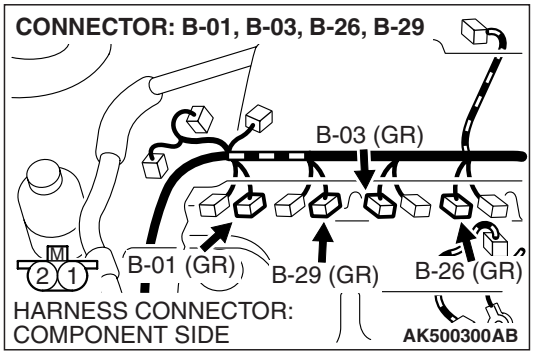
STEP 8. Check harness connector B-01 or B-03 or B-26 or B-29 at injector for damage.

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.

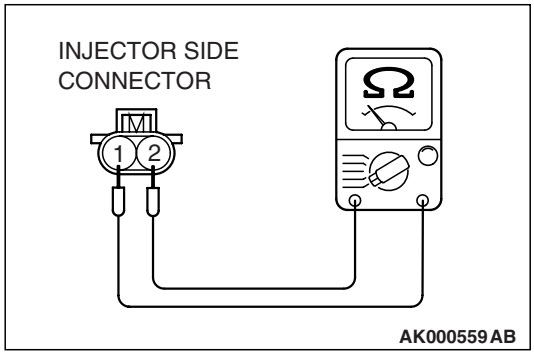


TSB Revision



STEP 9. Check the injector.

(1) Disconnect the injector connector B-01, B-03, B-26 and B-29.



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

Standard value: 10.5 – 13.5 ohms [at 20° C (68° F)]

Q: Is the measured resistance between 10.5 and 13.5 ohms [at 20° C (68° F)]?

YES : Go to Step 10.

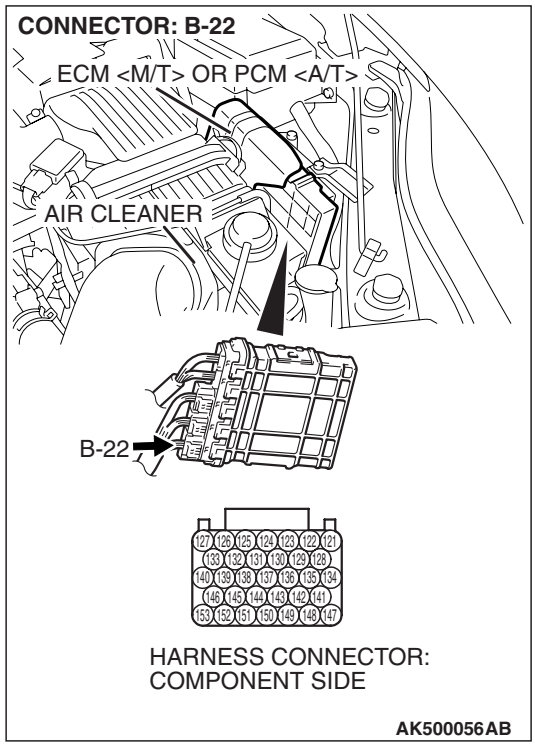
NO : Repair the injector. Then confirm that the malfunction symptom is eliminated.

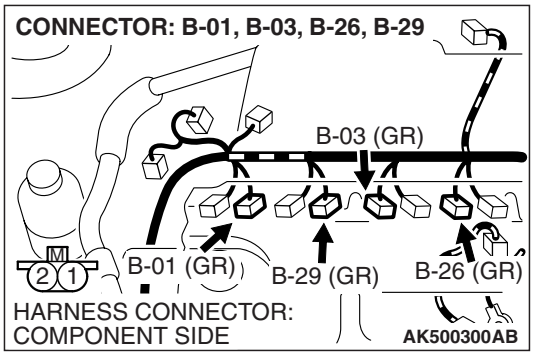
STEP 10. Check harness connector B-22 at ECM <M/T> or PCM <A/T> for damage.

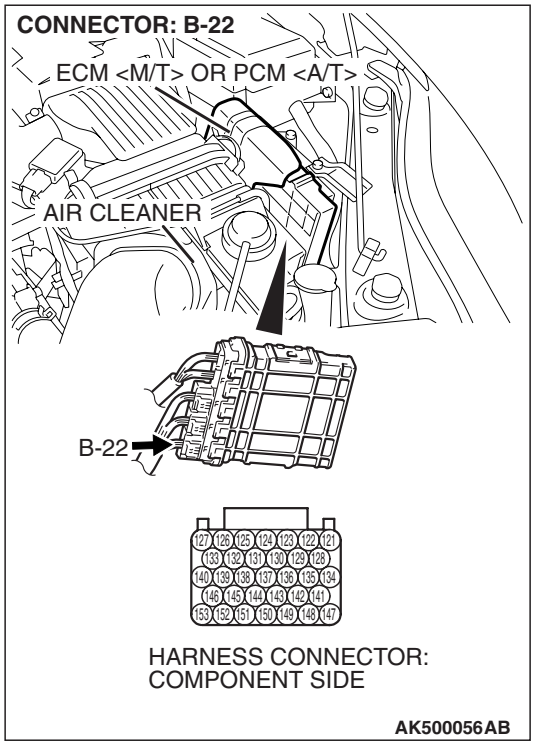
Q: Is the harness connector in good condition?

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.

a. Check the harness wire between injector connector B-01 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 153) at No. 1 cylinder.
b. Check the harness wire between injector connector B-29 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 146) at No. 2 cylinder.
c. Check the harness wire between injector connector B-03 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 140) at No. 3 cylinder.
d. Check the harness wire between injector connector B-26 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 139) at No. 4 cylinder.

Q: Is the harness wire in good condition?

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

  Then confirm that the malfunction symptom is eliminated.

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

INSPECTION PROCEDURE 7: Hard Starting

COMMENT

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

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

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

DIAGNOSIS

Required Special Tools:

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

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-5.

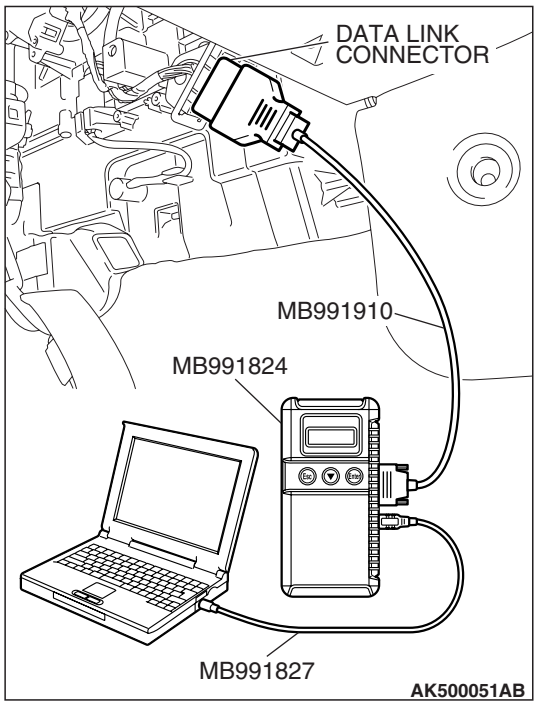
STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).

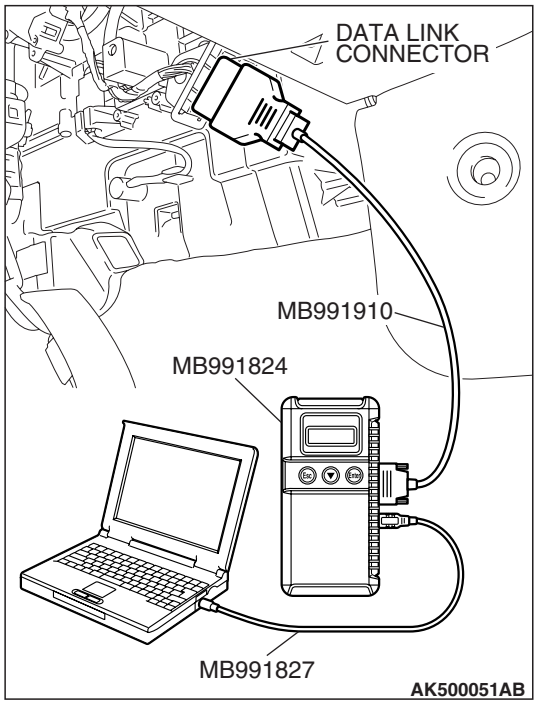
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(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-41.
NO : Go to Step 3.



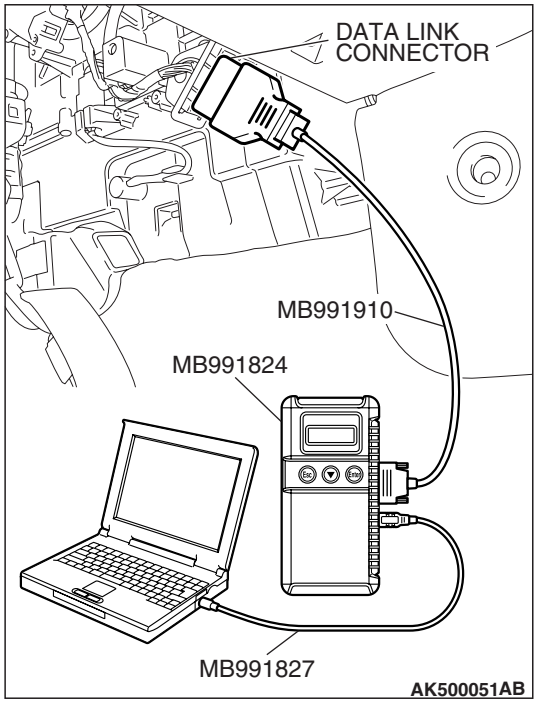


STEP 3. Using scan tool MB991958, check actuator test.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following item in the actuator test. Refer to Actuator Test Reference Table P.13A-1169.
   a. Item 9: Fuel Pump.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

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



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

(1) Turn the ignition switch to the "ON" position.
(2) Check the following item in the data list. Refer to Data List Reference Table P.13A-41.
   a. Item 6: Engine Coolant Temperature Sensor.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

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

STEP 5. Check the ignition timing.

(1) Check the ignition timing at cranking.

Standard value: 5° BTDC ±3°

Q: Is the ignition timing normal?

YES : Go to Step 6.

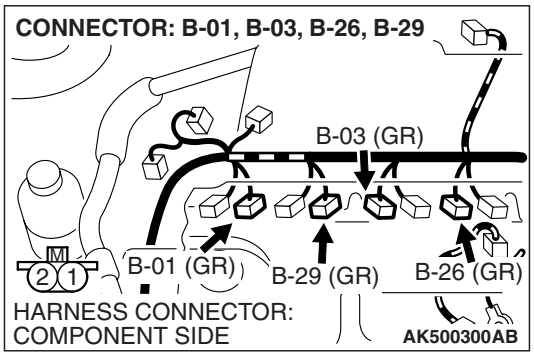
NO : Check that the crankshaft position sensor and timing belt cover are in the correct position. Then confirm that the malfunction symptom is eliminated.

STEP 6. Check harness connector B-01 or B-03 or B-26 or B-29 at injector for damage.

Q: Is the harness connector in good condition?

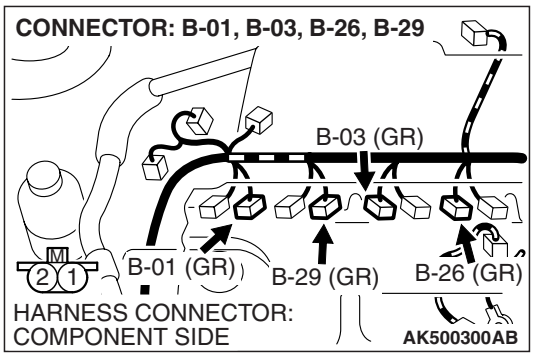
YES : Go to Step 7.

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



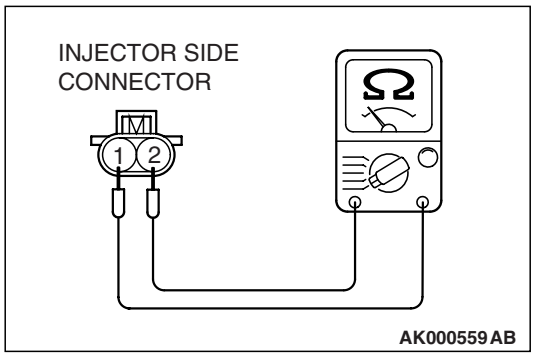
STEP 7. Check the injector.

(1) Disconnect the injector connector B-01, B-03, B-26 and B-29.



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

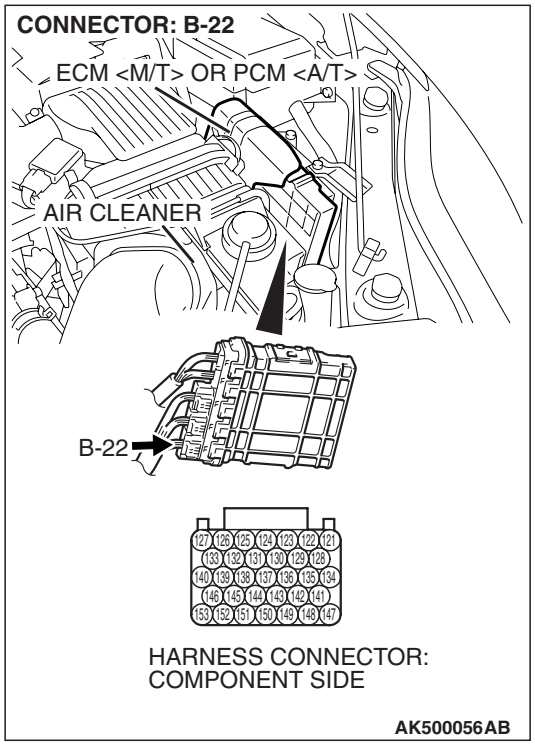
Standard value: 10.5 – 13.5 ohms [at 20° C (68° F)]



Q: Is the measured resistance between 10.5 and 13.5 ohms [at 20° C (68° F)]?

YES : Go to Step 8.

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

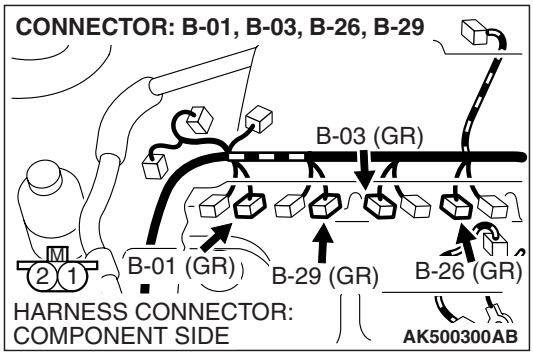


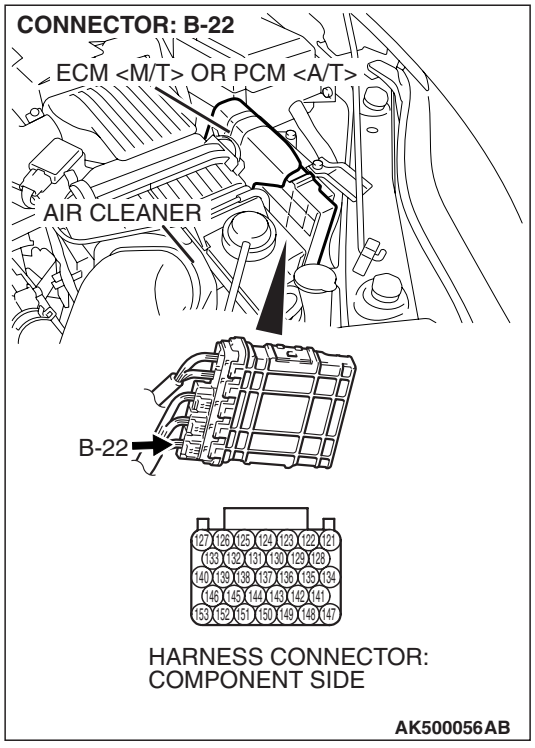
STEP 8. Check harness connector B-22 at ECM <M/T> or PCM <A/T> for damage.

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.

a. Check the harness wire between injector connector B-01 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 153) at No. 1 cylinder.
b. Check the harness wire between injector connector B-29 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 146) at No. 2 cylinder.
c. Check the harness wire between injector connector B-03 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 140) at No. 3 cylinder.
d. Check the harness wire between injector connector B-26 (terminal No. 2) and ECM <M/T> or PCM <A/T> connector B-22 (terminal No. 139) at No. 4 cylinder.

Q: Is the harness wire in good condition?

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

Then confirm that the malfunction symptom is eliminated.

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

INSPECTION PROCEDURE 8: Unstable Idle (rough idle, hunting).

COMMENT

- In cases such as the above, the cause is probably the air/fuel mixture or electronic control throttle valve system. 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 electronic control throttle valve system.
- Malfunction of the evaporative emission purge solenoid system.
- Malfunction of the EGR valve.
- Poor compression pressure.
- Vacuum leak.

TSB Revision

DIAGNOSIS

Required Special Tools:

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

STEP 1. Check 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.

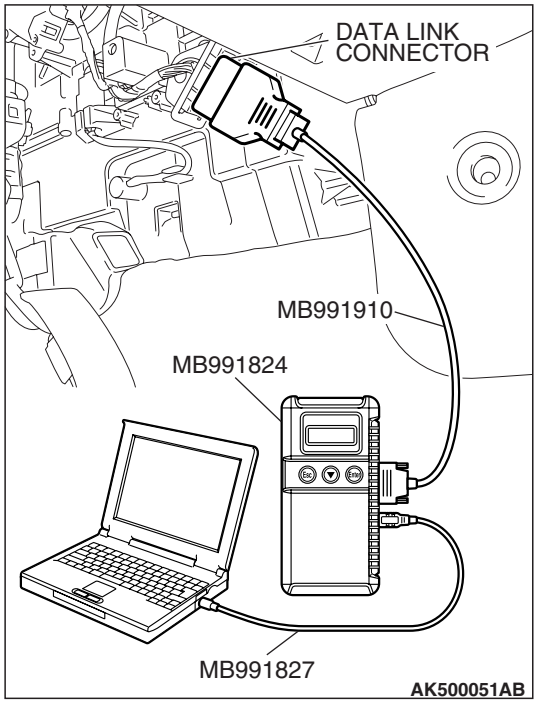
NO : Go to Step 2.

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 is 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-41.

NO : Go to Step 3.

STEP 3. Check the engine idling state.

Q: Is it noticeably hunting?

YES : Go to Step 4.

NO : Go to Step 5.

STEP 4. Check the following items.

(1) Carry out the following cleaning.
   a. Refer to On-vehicle Service –Clean the throttle valve area P.13A-1197.

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

Q: Is the malfunction symptom resolved?

YES : The check is completed.

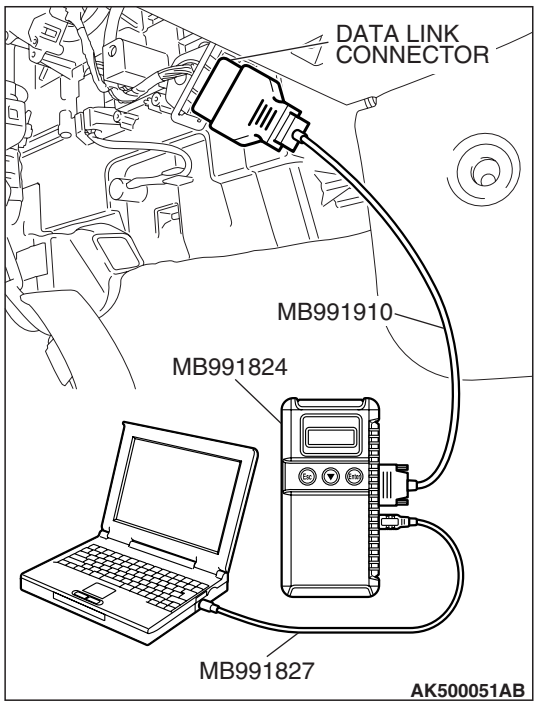
NO : Check the following items, and repair or replace the defective items.
   a. Broken intake manifold gasket.
   b. Broken air intake hose.
   c. Broken vacuum hose.
   d. Positive crankcase ventilation valve does not operate.

Then confirm that the malfunction symptom is eliminated.

STEP 5. Using scan tool MB991958, check actuator test items 1, 2, 3, 4: 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.

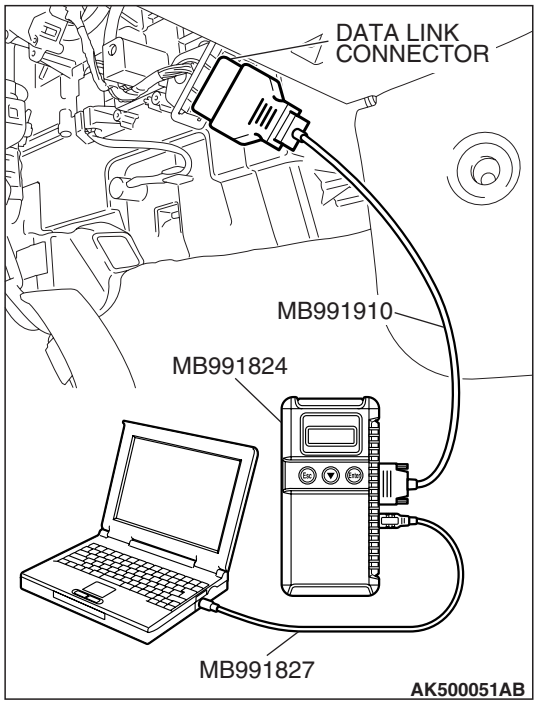


(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check following items in the actuator test. Refer to Actuator Test Reference Table P.13A-1169.
   a. Item 1, 2, 3, 4: Injector.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

YES : Go to Step 6.

NO : Refer to DTC P0201 –Injector Circuit-cylinder 1 P.13A-468, DTC P0202 –Injector Circuit-cylinder 2 P.13A-479, DTC P0203 –Injector Circuit-cylinder 3 P.13A-490, DTC P0204 –Injector Circuit-cylinder 4 P.13A-501.

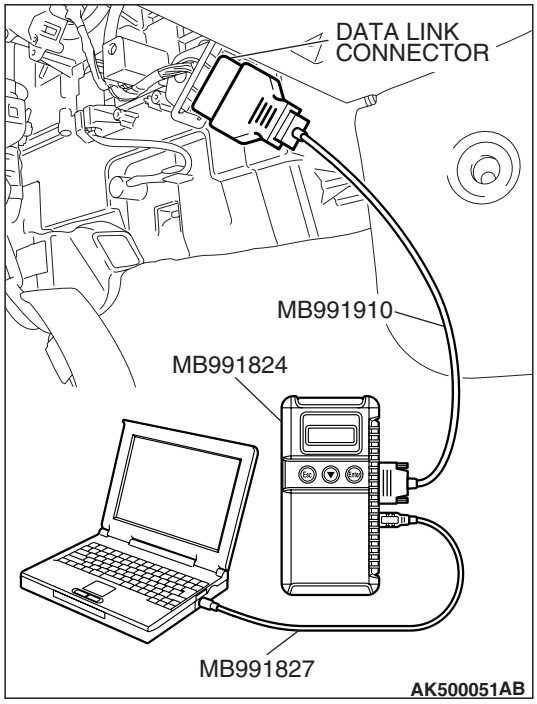


STEP 6. Using scan tool MB991958, check data list.

(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-1147.
   a. Item 5: Intake Air Temperature Sensor.
   b. Item 6: Engine Coolant Temperature Sensor.
   c. Item 83: Power Steering Pressure Switch.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

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



STEP 7. Using scan tool MB991958, check actuator test.

(1) Turn the ignition switch to the "ON" position.
(2) Check the following item in the actuator test. Refer to Actuator Test Reference Table P.13A-1169.
   a. Item 10: Evaporative Emission Purge Solenoid.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

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

STEP 8. Check the fuel pressure.
Refer to On-vehicle Service –Fuel Pressure Test P.13A-1197.

Q: Is the fuel pressure normal?

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

b. Injector clogged.

Then confirm that the malfunction symptom is eliminated.

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

STEP 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 and spark plugs.
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 valve.

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 electronic control throttle valve system.
- Malfunction of the throttle body.

DIAGNOSIS

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

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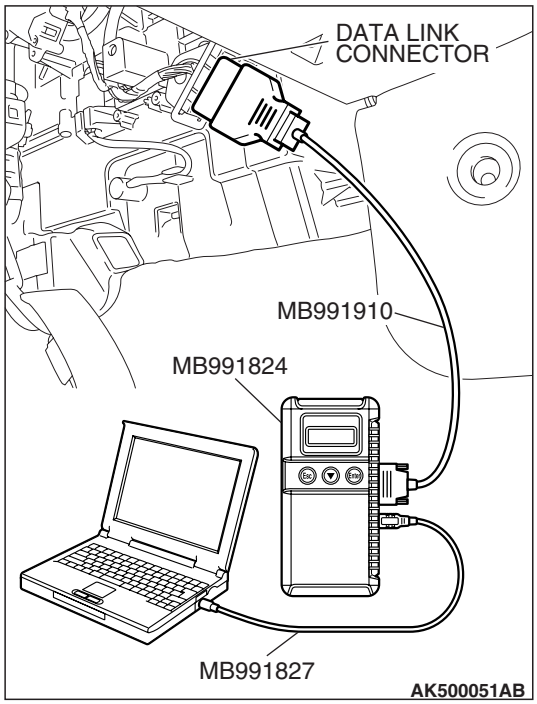


STEP 1. Using scan tool MB991958, read the diagnostic trouble code (DTC).

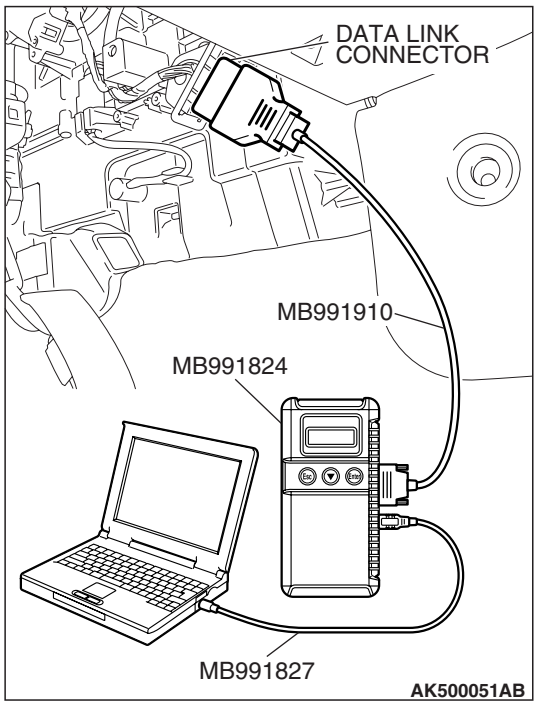
⚠ CAUTION

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

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

Q: Is the DTC set?

YES : Refer to Diagnostic Trouble Code Chart P.13A-41.
NO : Go to Step 2.



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

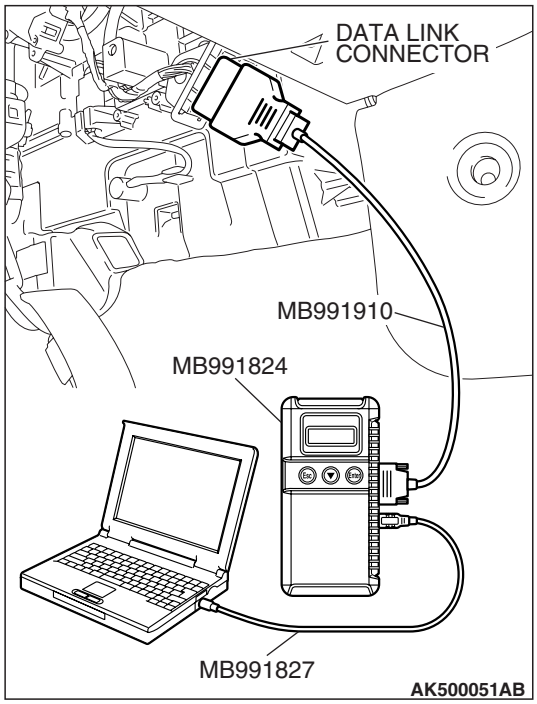
⚠ CAUTION

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 item in the data list. Refer to Data List Reference Table P.13A-1147.
  a. Item 6: Engine Coolant Temperature Sensor.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

YES : Go to Step 3.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.



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

(1) Turn the ignition switch to the "ON" position.
(2) Check the following item in the actuator test. Refer to Actuator Test Reference Table P.13A-1169.
  a. Item 10: Evaporative Emission Purge Solenoid.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : Refer to On-vehicle Service –Throttle Body (Throttle Valve Area) Cleaning P.13A-1197.

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

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.

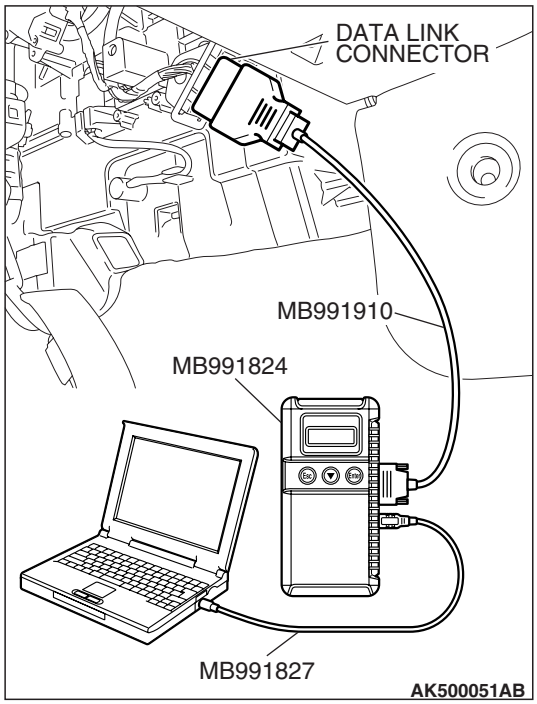
TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the electronic control throttle valve system.
- Malfunction of the throttle body.

DIAGNOSIS

Required Special Tools:

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



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

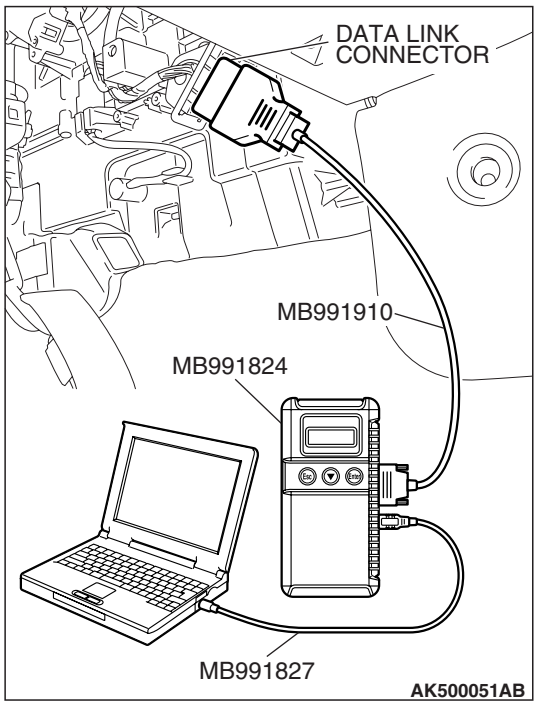
⚠ CAUTION

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

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

Q: Is the DTC set?

YES : Refer to Diagnostic Trouble Code Chart P.13A-41.
NO : Go to Step 2.



STEP 2. 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 item in the data list. Refer to Data List Reference Table P.13A-1147.
   a. Item 6: Engine Coolant Temperature Sensor.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

YES : Refer to On-vehicle Service –Throttle Body (Throttle Valve Area) Cleaning P.13A-1197.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

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 electronic control throttle valve 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
  - MB991910: Main Harness A

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

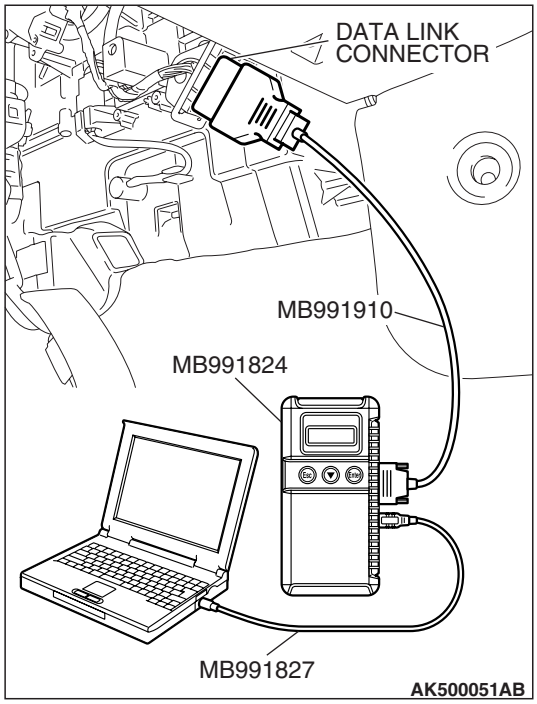
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(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-41.

NO : Go to Step 3.



STEP 3. Checking by depressing and releasing the accelerator pedal.

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

YES : Refer to On-vehicle Service –Throttle Body (Throttle Valve Area) Cleaning P.13A-1197.

NO : Go to Step 4.

STEP 4. Check the engine idling.

Q: Does it idle properly after warming up?

YES : Go to Step 5.

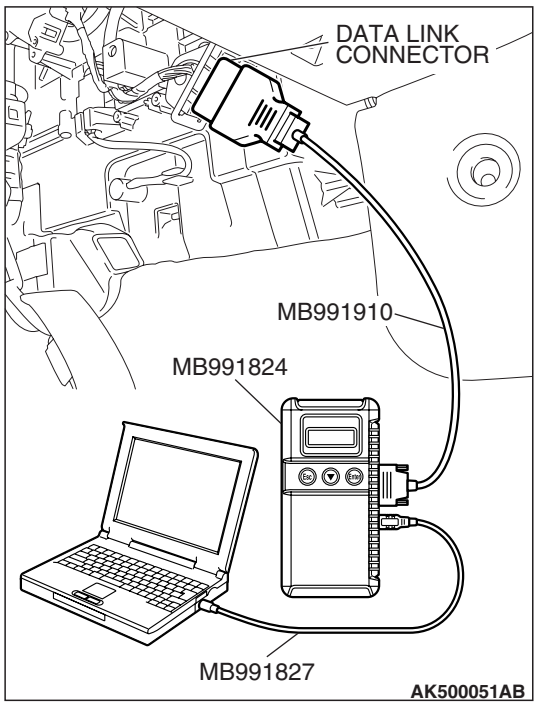
NO : Refer to, INSPECTION PROCEDURE 8 –Unstable Idle (Rough Idle, Hunting) P.13A-1035.

STEP 5. Using scan tool MB991958, check actuator test items 1, 2, 3, 4: 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.

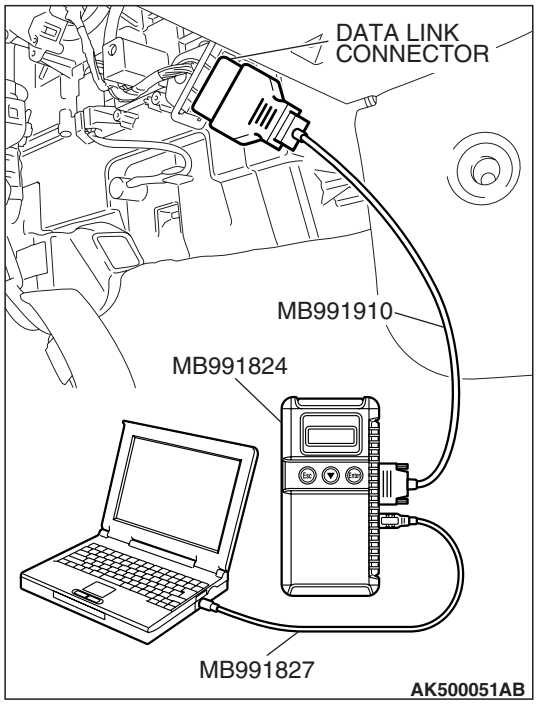
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check following items in the actuator test. Refer to Actuator Test Reference Table P.13A-1169.
  a. Item 1, 2, 3, 4: Injector.
(4) Turn the ignition switch to the "LOCK" (OFF) position.



Q: Are they operating properly?

YES : Go to Step 6.

NO : Refer to DTC P0201 –Injector Circuit-cylinder 1 P.13A-468, DTC P0202 –Injector Circuit-cylinder 2 P.13A-479, DTC P0203 –Injector Circuit-cylinder 3 P.13A-490, DTC P0204 –Injector Circuit-cylinder 4 P.13A-501.



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

(1) Turn the ignition switch to the "ON" position.
(2) Check the following item in the data list. Refer to Data List Reference Table P.13A-1147.
   a. Item 6: Engine Coolant Temperature Sensor.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

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

STEP 7. Check the fuel pressure.

Refer to On-vehicle Service –Fuel Pressure Test P.13A-1197.

Q: Is the fuel pressure normal?

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

STEP 8. 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 and spark plugs.
   b. Check compression pressure.
   c. Check the engine oil viscosity.
   d. Check the EGR valve.

   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, electronic control throttle valve system 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 electronic control throttle valve system.
- Malfunction of the EGR valve.
- Vacuum leak.
- Improper connector contact.

DIAGNOSIS

Required Special Tools:

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

STEP 1. Check 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

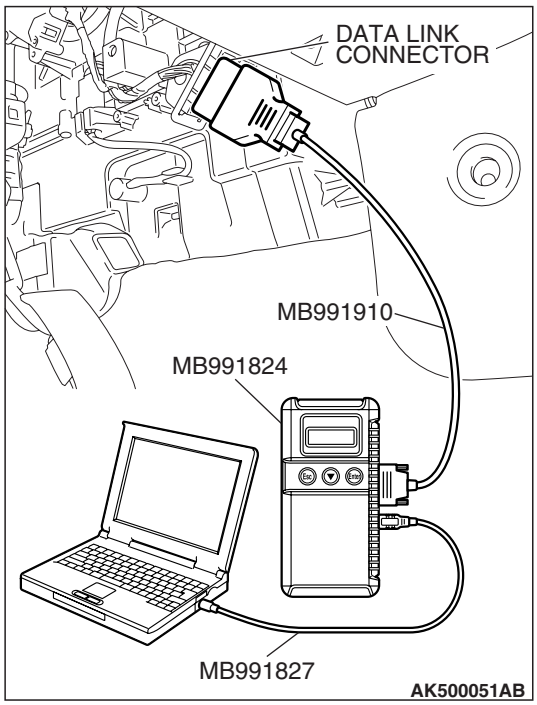
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

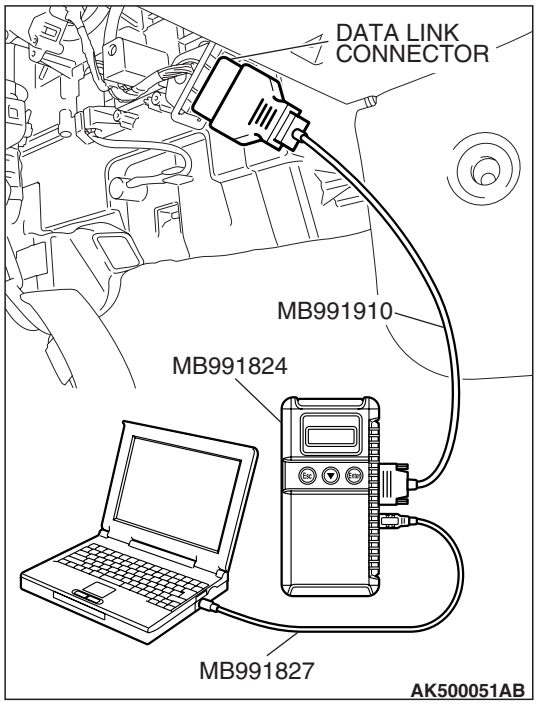
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the DTC set?

YES : Refer to Diagnostic Trouble Code Chart P.13A-41.

NO : Go to Step 3.





STEP 3. Using scan tool MB991958, check actuator test items 1, 2, 3, 4: 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-1169.
  a. Item 1, 2, 3, 4: Injector.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

YES : Go to Step 4.
NO : Refer to DTC P0201 –Injector Circuit-cylinder 1 P.13A-468, DTC P0202 –Injector Circuit-cylinder 2 P.13A-479, DTC P0203 –Injector Circuit-cylinder 3 P.13A-490, DTC P0204 –Injector Circuit-cylinder 4 P.13A-501.

STEP 4. Checking by depressing and releasing the accelerator pedal.

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

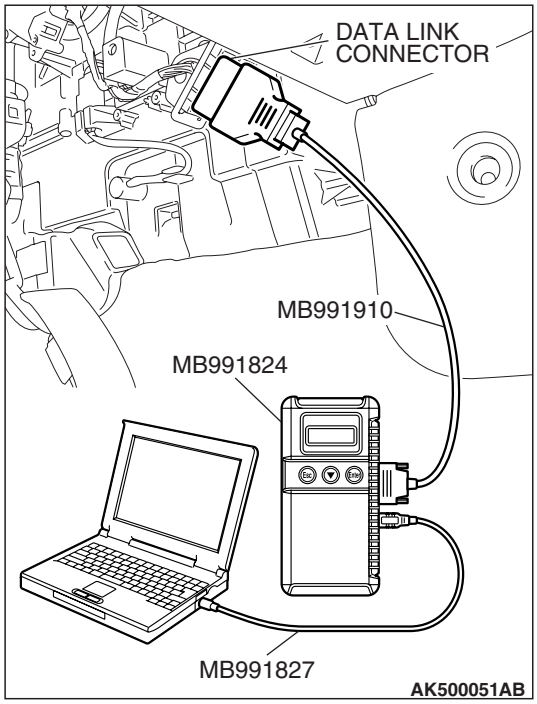
YES : Refer to On-vehicle Service –Throttle Body (Throttle Valve Area) Cleaning P.13A-1197.
NO : Go to Step 5.

STEP 5. Engine stall reproduction test.

Q: Is it easy to reproduce the engine stall?

YES : Go to Step 6.
NO : Check if the following signals change suddenly by wiggling the circuit harness and connectors.
  a. Crankshaft position sensor signal.
  b. Mass airflow sensor signal.
  c. Injector drive signal.
  d. Primary and secondary ignition signal.
  e. Fuel pump drive signal.
  f. ECM <M/T> or PCM <A/T> power supply voltage.

Repair or replace it. 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.

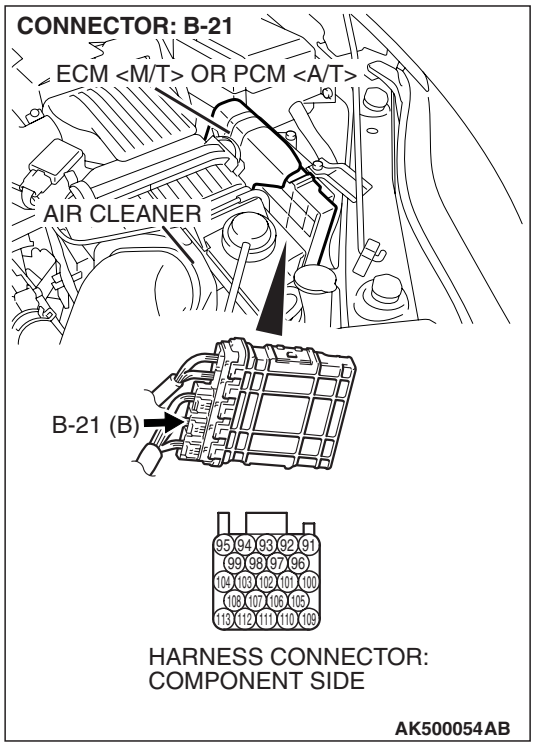
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check the following items in the data list. Refer to Data List Reference Table P.13A-1147.
   a. Item 5: Intake Air Temperature Sensor.
   b. Item 6: Engine Coolant Temperature Sensor.
   c. Item 83: Power Steering Pressure Switch.
   d. Item 31: EGR valve (stepper motor).
   e. Item 13: Throttle position sensor (main).
(4) Turn the ignition switch to the "LOCK" (OFF) position.

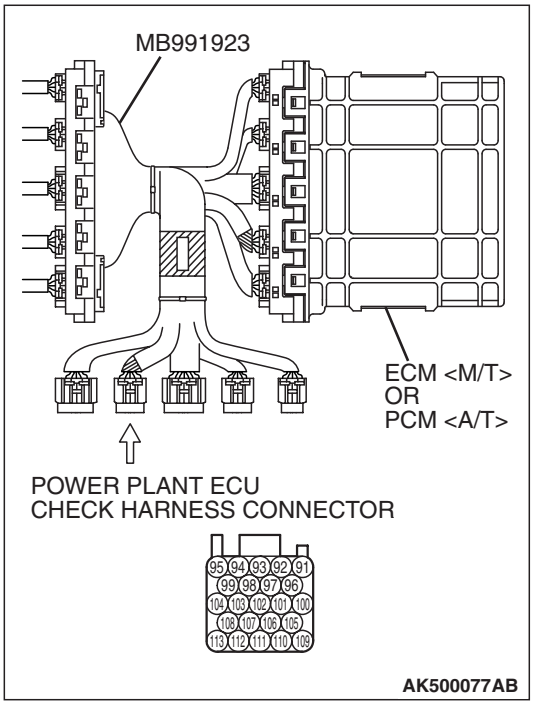
Q: Are they operating properly?

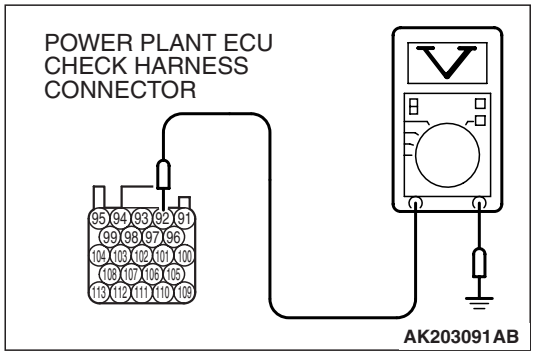
YES : Go to Step 7.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

STEP 7. Measure the sensor output voltage at ECM <M/T> or PCM <A/T> connector B-21 by using power plant ECU check harness special tool MB991923.

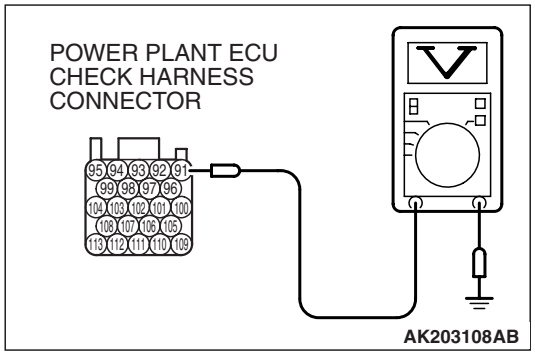
(1) Disconnect all ECM <M/T> connectors or PCM <A/T> connectors. Connect the power plant ECU check harness special tool MB991923 between the separated connectors.
(2) Start the engine and run at idle.







(3) Measure the voltage between terminal No. 92 and ground.
- Warm up the engine. When the engine is 2,500 r/min, the output voltage should repeat 0.5 to 1.4 volts alternately.



(4) Measure the voltage between terminal No. 91 and ground.
- Warm up the engine. When the engine is 2,500 r/min, the output voltage should repeat 0.5 to 1.4 volts alternately.

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

Q: Is the measured voltage within the specified range?

YES : Go to Step 9.
NO : Go to Step 8.

STEP 8. Check the fuel pressure.
Refer to On-vehicle Service –Fuel Pressure Test P.13A-1197.

Q: Is the fuel pressure normal?

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

b. Injector clogged.

Then confirm that the malfunction symptom is eliminated.

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

STEP 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 and spark plugs.
b. Check if the injectors are clogged.
c. Check compression pressure.
d. Check if the foreign materials (water, kerosene, etc.) got into fuel.
e. Check the EGR valve.
Then confirm that the malfunction symptom is eliminated.

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

INSPECTION PROCEDURE 13: The Engine Stalls when Accelerating (Pass Out).

COMMENT

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

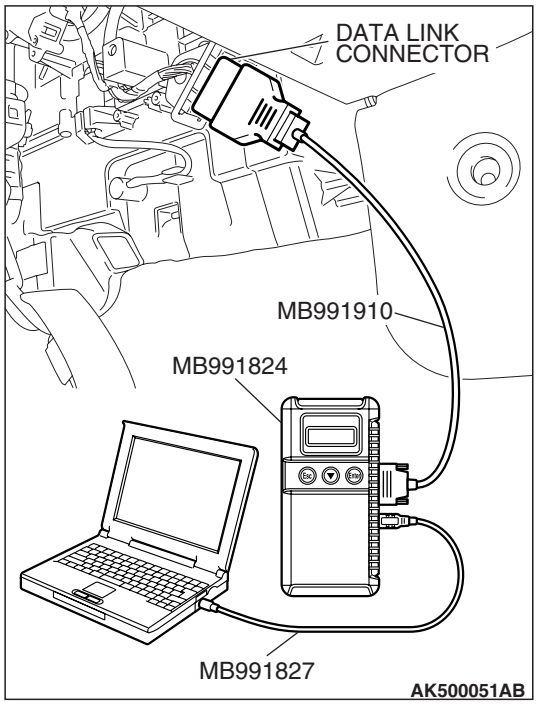
TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Vacuum leak.
- Malfunction of the ignition system.
- Malfunction of the emission control system.

DIAGNOSIS

Required Special Tools:

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



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

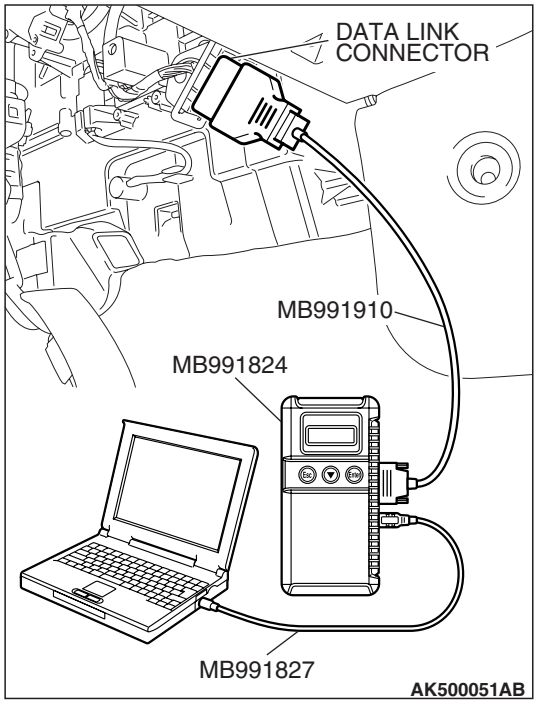
⚠ CAUTION

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

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

Q: Is the DTC set?

YES : Refer to Diagnostic Trouble Code Chart P.13A-41.
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 item in the actuator test. Refer to Actuator Test Reference Table P.13A-1169.
  a. Item 10: Evaporative Emission Purge Solenoid.
(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 and spark plugs.
  b. Check for vacuum leaks.
    - Broken intake manifold gasket.
    - Broken or disconnected vacuum hose.
    - Improper operation of the PCV valve.
    - Broken air intake hose.
  c. Check the EGR valve.

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

INSPECTION PROCEDURE 14: The engine stalls when decelerating.

COMMENT

- The intake air volume may be insufficient due to a defective electronic control throttle valve system.

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

- Malfunction of the electronic control throttle valve system.

DIAGNOSIS

Required Special Tools:

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

STEP 1. Check 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

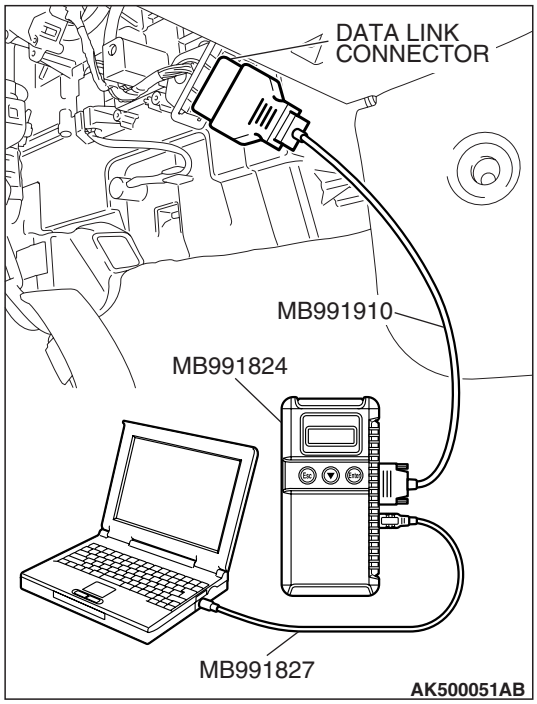
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

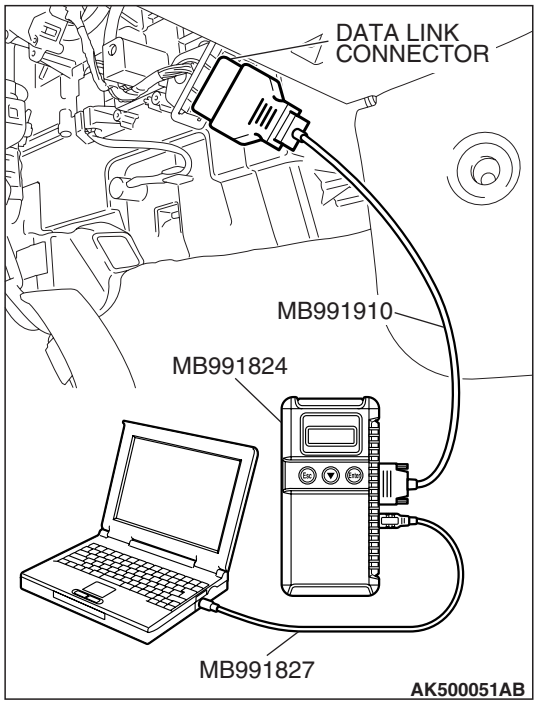
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Read the DTC.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the DTC set?

YES : Refer to Diagnostic Trouble Code Chart P.13A-41.

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-1147.
   a. Item 13: Throttle Position Sensor (main).
   b. Item 15: Throttle Position Sensor (sub).
   c. Item 11: Accelerator Pedal Position Sensor (main).
   d. Item 12: Accelerator Pedal Position Sensor (sub).
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

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

STEP 4. Inspection of throttle body (throttle valve area) for dirtiness.

Q: Is the throttle valve area dirty?

YES : Refer to On-vehicle Service –Throttle Body (Throttle Valve Area) Cleaning P.13A-1197.
NO : Check the following items, and repair, replace or clean the defective sections.
   a. Check the ignition coil and spark plugs.
   b. Check the EGR valve.

Then confirm that the malfunction symptom is eliminated.

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 system.
- Poor compression pressure.

DIAGNOSIS

Required Special Tools:

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

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

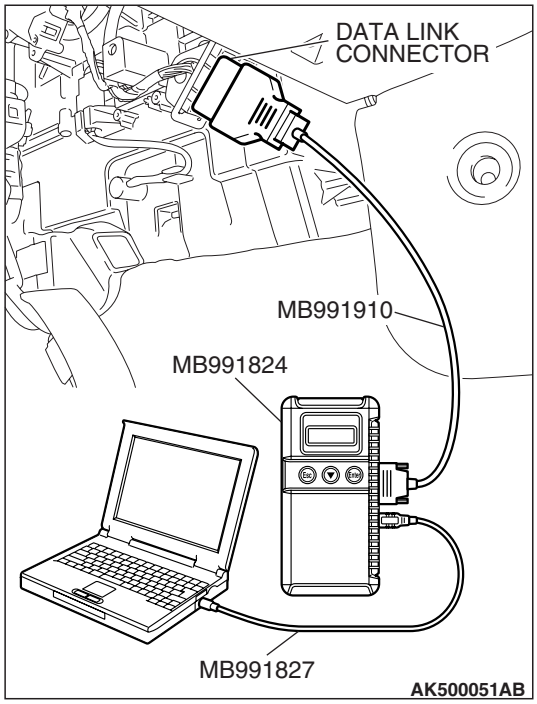
⚠ CAUTION

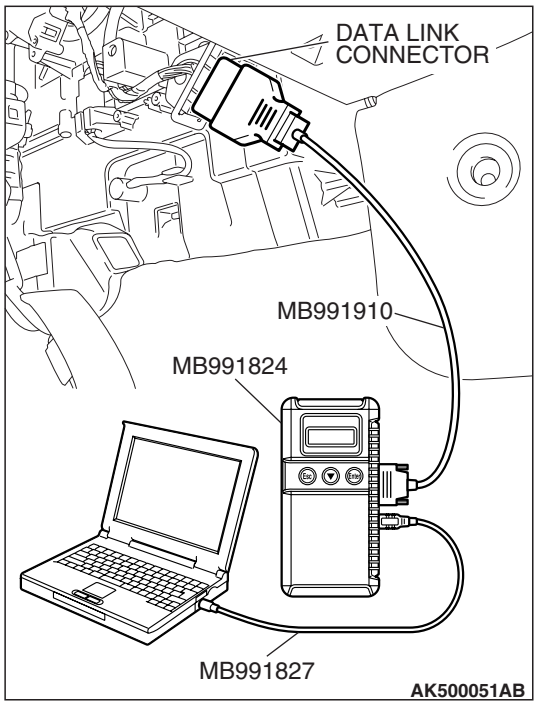
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

Q: Is the DTC set?

YES : Refer to Diagnostic Trouble Code Chart P.13A-41.
NO : Go to Step 2.





STEP 2. Using scan tool MB991958, check actuator test items 1, 2, 3, 4: Injector.

(1) Check following items in the actuator test. Refer to Actuator Test Reference Table P.13A-1169.
   a. Item 1, 2, 3, 4: Injector.

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

Q: Are they operating properly?

YES : Go to Step 3.

NO : Refer to DTC P0201 –Injector Circuit-cylinder 1 P.13A-468, DTC P0202 –Injector Circuit-cylinder 2 P.13A-479, DTC P0203 –Injector Circuit-cylinder 3 P.13A-490, DTC P0204 –Injector Circuit-cylinder 4 P.13A-501.

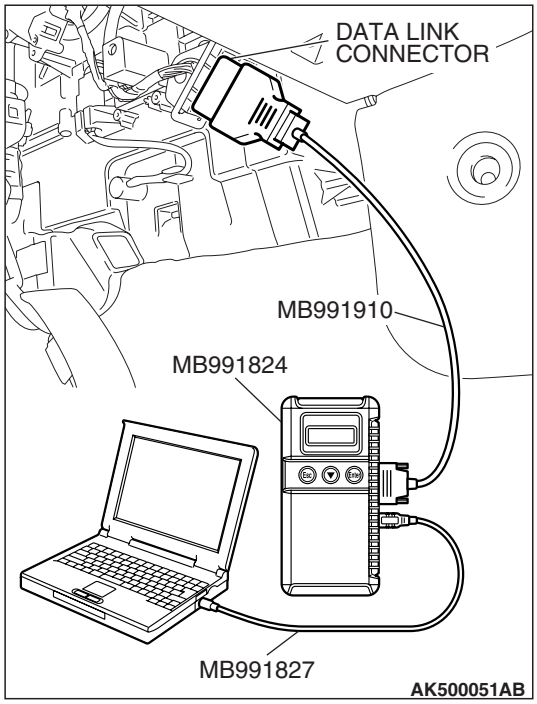
STEP 3. Check the ignition timing.

(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.

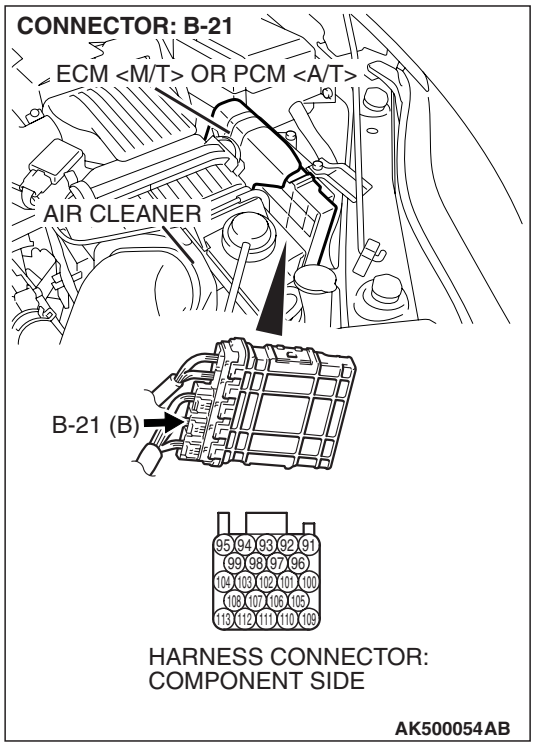
⚠ CAUTION

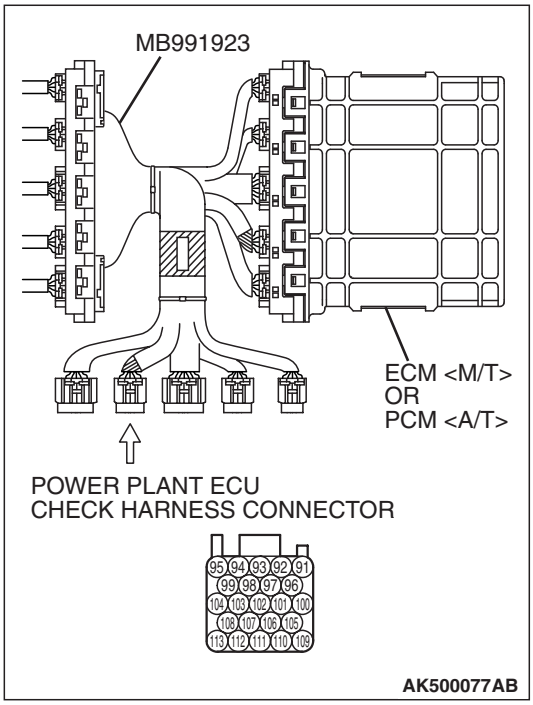
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(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-1147.
   a. Item 5: Intake Air Temperature Sensor.
   b. Item 6: Engine Coolant Temperature Sensor.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

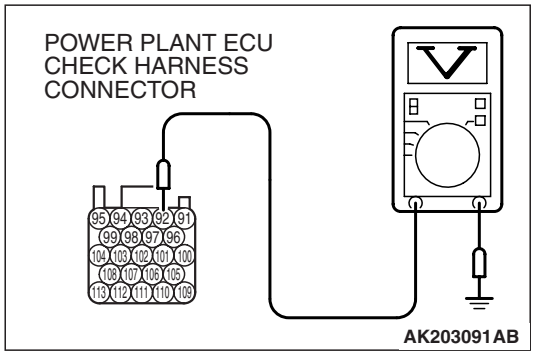
YES : Go to Step 5.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.



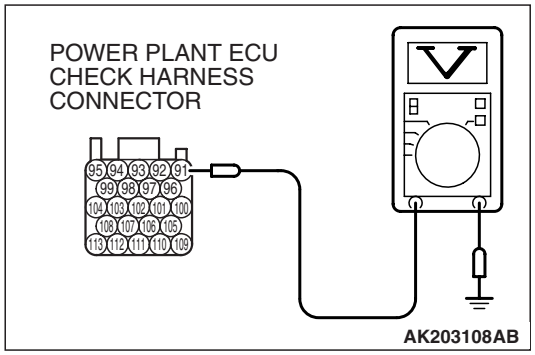


STEP 5. Measure the sensor output voltage at ECM <M/T> or PCM <A/T> connector B-21 by using power plant ECU check harness special tool MB991923.

(1) Disconnect all ECM <M/T> connectors or PCM <A/T> connectors. Connect the power plant ECU check harness special tool MB991923 between the separated connectors.
(2) Start the engine and run at idle.



(3) Measure the voltage between terminal No. 92 and ground.
- Warm up the engine. When the engine is 2,500 r/min, the output voltage should repeat 0.5 to 1.4 volts alternately.



(4) Measure the voltage between terminal No. 91 and ground.
- Warm up the engine. When the engine is 2,500 r/min, the output voltage should repeat 0.5 to 1.4 volts alternately.

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

Q: Is the measured voltage within the specified range?

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

STEP 6. Check the fuel pressure.
Refer to On-vehicle Service –Fuel Pressure Test P.13A-1197.

Q: Is the fuel pressure normal?

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

b. Injector clogged.

Then confirm that the malfunction symptom is eliminated.

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

STEP 7. Check the fuel pressure.
Refer to On-vehicle Service –Fuel Pressure Test P.13A-1197.

Q: Is the fuel pressure normal?

YES : Check the following items, and repair or replace the defective items.
a. Check the ignition coil and spark plugs.
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 it. Then confirm that the malfunction symptom is eliminated.

TSB Revision

INSPECTION PROCEDURE 16: Acceleration shock.

COMMENT

- There may be an ignition leak accompanying the increase in the spark plug demand voltage during acceleration or the electronic control throttle valve system failed.

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

- Malfunction of the ignition system.
- Malfunction of the electronic control throttle valve system.

DIAGNOSIS

Required Special Tools:

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

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

⚠ CAUTION

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

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

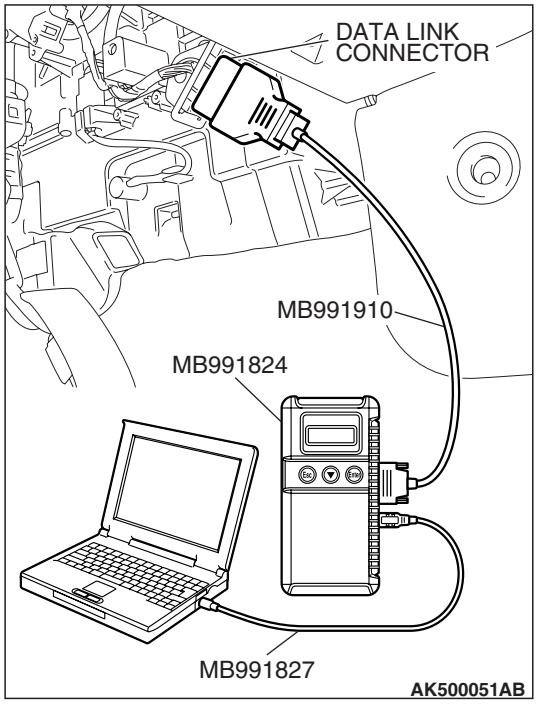
Q: Is the DTC set?

YES : Refer to Diagnostic Trouble Code Chart P.13A-41.

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

a. Check the ignition coil and spark plugs.
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 throttle valve, causing the vehicle to decelerate rapidly for an instant.

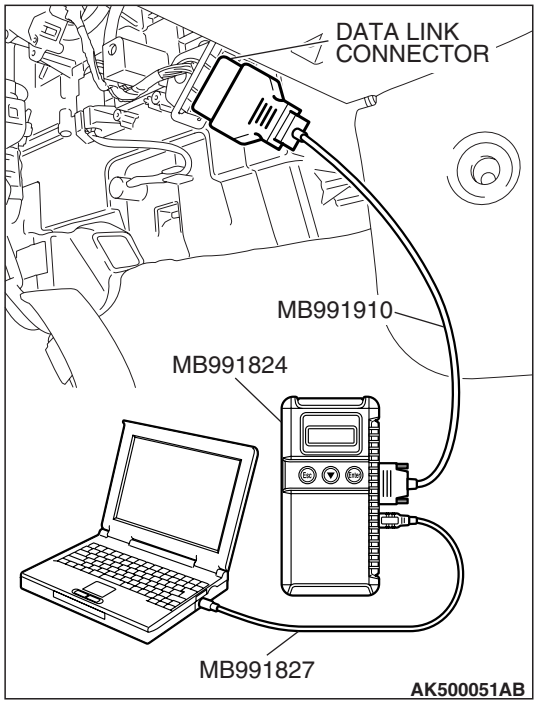
TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the electronic control throttle valve system.
- Dirtiness around throttle valve.

DIAGNOSIS

Required Special Tools:

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



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

⚠ CAUTION

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

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

Q: Is the DTC set?

YES : Refer to Diagnostic Trouble Code Chart P.13A-41.
NO : Refer to On-vehicle Service –Clean the throttle valve area.

INSPECTION PROCEDURE 18: Poor acceleration.

COMMENT

- Defective ignition system, abnormal air/fuel ratio, electronic control throttle valve system, poor compression pressure, etc. are suspected.

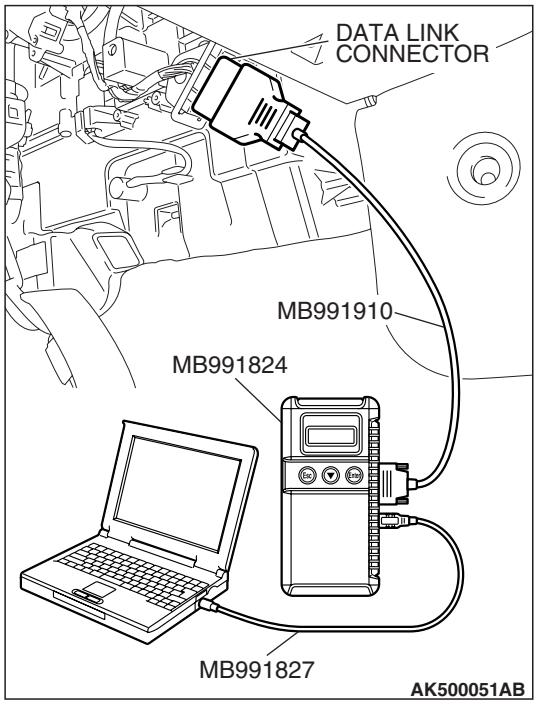
TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the ignition system.
- Malfunction of air/fuel ratio control system.
- Malfunction of the electronic control throttle valve 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
  - MB991910: Main Harness A



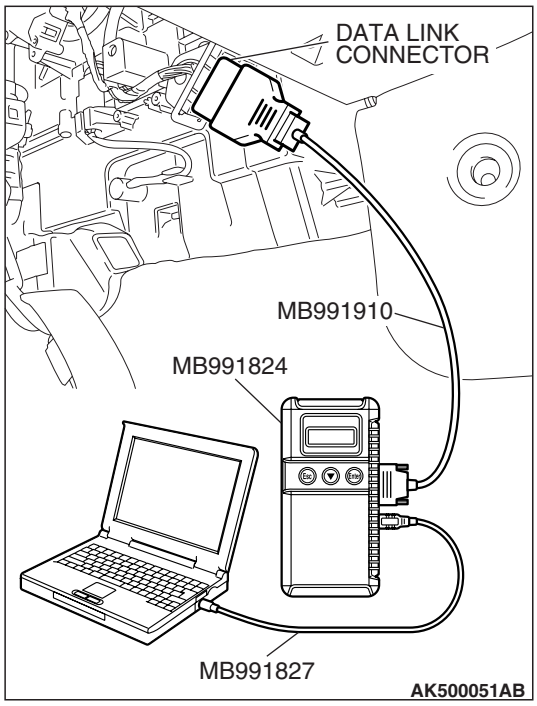
STEP 1. Using scan tool MB991958, read the diagnostic trouble code (DTC).

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

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

Q: Is the DTC set?

YES : Refer to Diagnostic Trouble Code Chart P.13A-41.
NO : Go to Step 2.



STEP 2. Using scan tool MB991958, check actuator test items 1, 2, 3, 4: 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-1169.
  a. Item 1, 2, 3, 4: Injector.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are they operating properly?

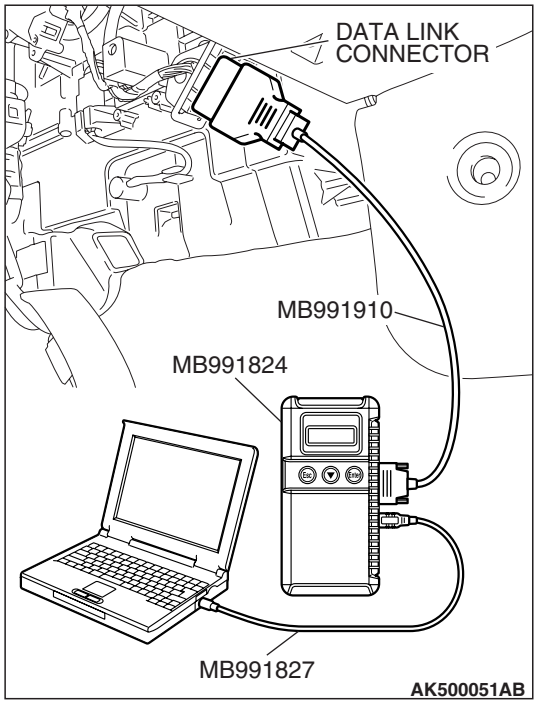
YES : Go to Step 3.
NO : Refer to DTC P0201 –Injector Circuit-cylinder 1 P.13A-468, DTC P0202 –Injector Circuit-cylinder 2 P.13A-479, DTC P0203 –Injector Circuit-cylinder 3 P.13A-490, DTC P0204 –Injector Circuit-cylinder 4 P.13A-501.

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.

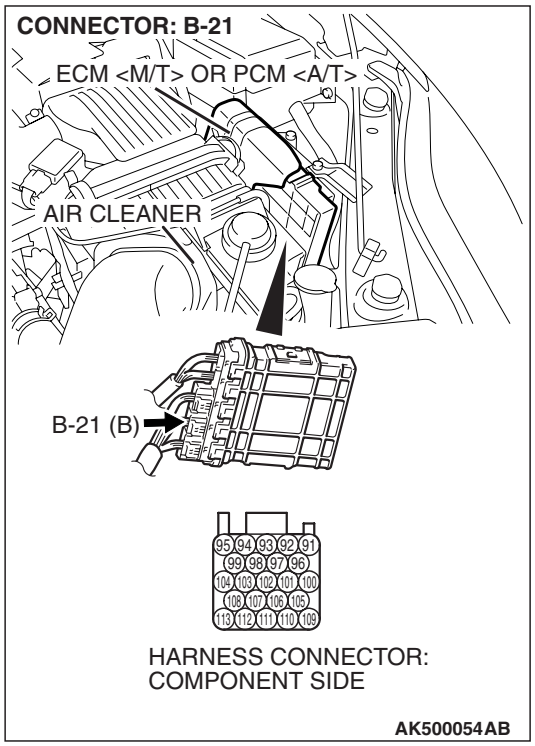
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check the following items in the data list. Refer to Data List Reference Table P.13A-1147.
   a. Item 5: Intake Air Temperature Sensor.
   b. Item 6: Engine Coolant Temperature Sensor.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

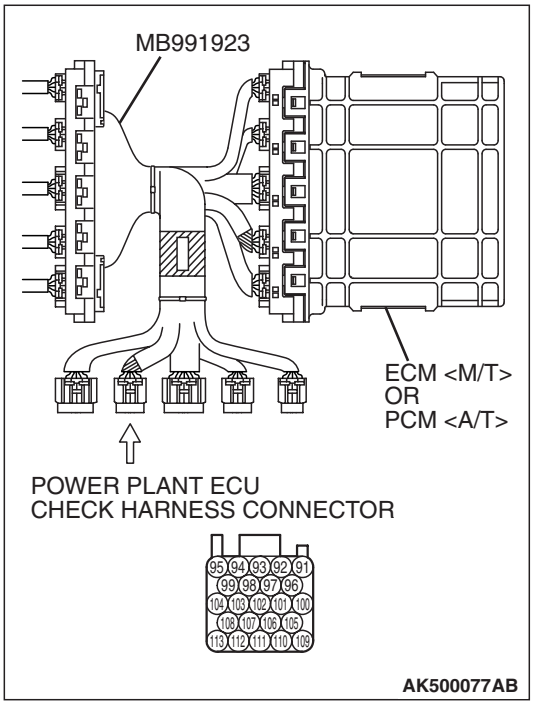
Q: Are they operating properly?

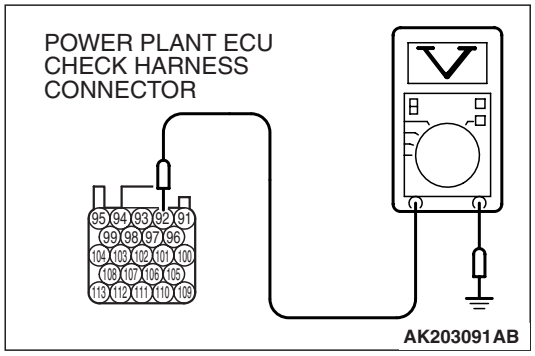
YES : Go to Step 5.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

STEP 5. Measure the sensor output voltage at ECM <M/T> or PCM <A/T> connector B-21 by using power plant ECU check harness special tool MB991923.

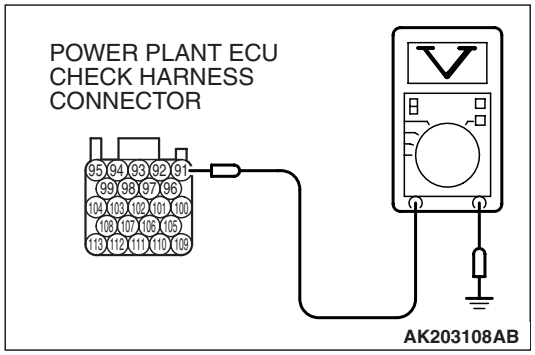
(1) Disconnect all ECM <M/T> connectors or PCM <A/T> connectors. Connect the power plant ECU check harness special tool MB991923 between the separated connectors.
(2) Start the engine and run at idle.







(3) Measure the voltage between terminal No. 92 and ground.
- Warm up the engine. When the engine is 2,500 r/min, the output voltage should repeat 0.5 to 1.4 volts alternately.



(4) Measure the voltage between terminal No. 91 and ground.
- Warm up the engine. When the engine is 2,500 r/min, the output voltage should repeat 0.5 to 1.4 volts alternately.

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

Q: Is the measured voltage within the specified range?

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

STEP 6. Check the fuel pressure.
Refer to On-vehicle Service –Fuel Pressure Test P.13A-1197.

Q: Is the fuel pressure normal?

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

b. Injector clogged.

Then confirm that the malfunction symptom is eliminated.

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

STEP 7. Check the fuel pressure.
Refer to On-vehicle Service –Fuel Pressure Test P.13A-1197.

Q: Is the fuel pressure normal?

YES : Check the following items, and repair or replace the defective items.
a. Check the ignition coil and spark plugs.
b. Check compression pressure.
c. Check the fuel filter or fuel line for clogging.
d. Check the EGR system.
e. Broken air intake hose.
f. Clogged air cleaner.
g. Clogged exhaust system.

Then confirm that the malfunction symptom is eliminated.

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

INSPECTION PROCEDURE 19: Surge.

COMMENT

- Defective ignition system, abnormal air/fuel ratio, the electronic control throttle valve system failed, etc. are suspected.

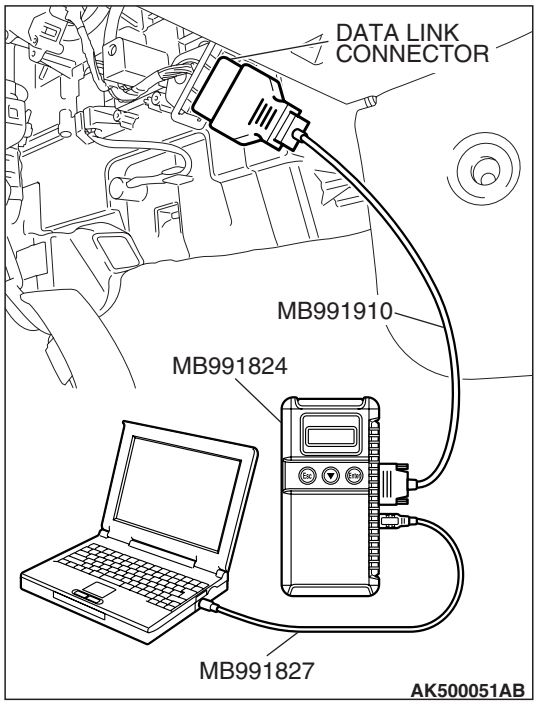
TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the ignition system.
- Malfunction of air/fuel ratio control system.
- Malfunction of the electronic control throttle valve system.
- Malfunction of the EGR system.

DIAGNOSIS

Required Special Tools:

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



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

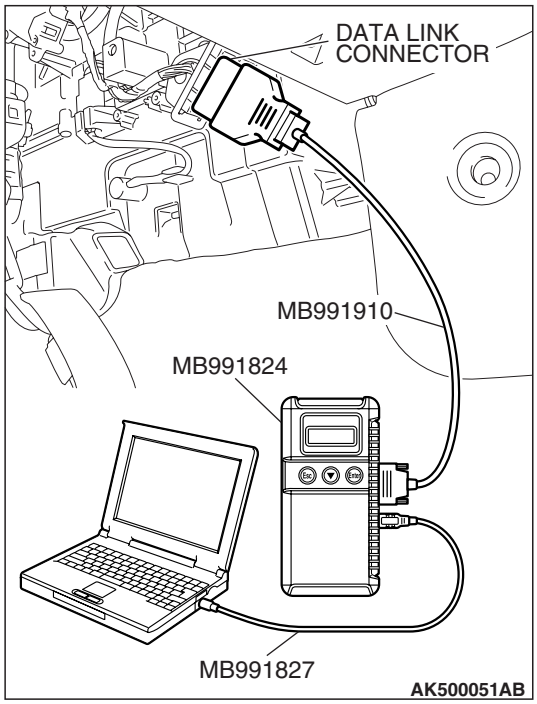
⚠ CAUTION

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

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

Q: Is the DTC set?

YES : Refer to Diagnostic Trouble Code Chart P.13A-41.
NO : Go to Step 2.



STEP 2. Using scan tool MB991958, check actuator test items 1, 2, 3, 4: 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-1169.
  a. Item 1, 2, 3, 4: Injector.
(3) Turn the ignition switch to the "ON" position.

Q: Are they operating properly?

YES : Go to Step 3.
NO : Refer to DTC P0201 –Injector Circuit-cylinder 1 P.13A-468, DTC P0202 –Injector Circuit-cylinder 2 P.13A-479, DTC P0203 –Injector Circuit-cylinder 3 P.13A-490, DTC P0204 –Injector Circuit-cylinder 4 P.13A-501.

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?

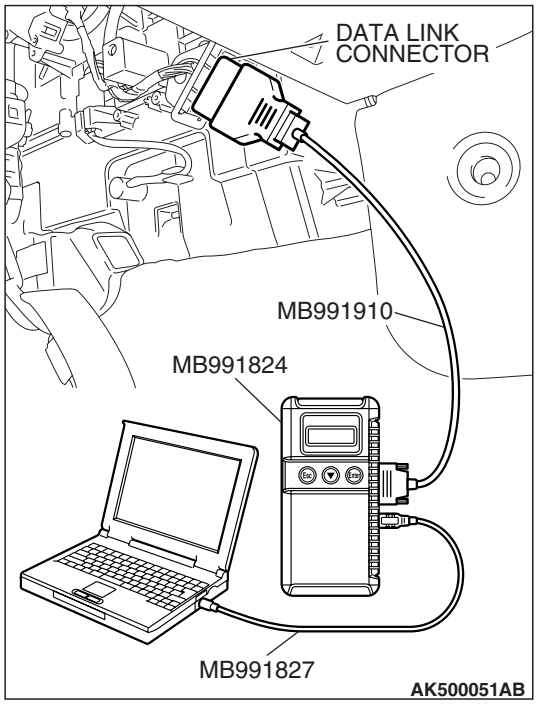
YES : Go to Step 4.

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-1147.
  a. Item 5: Intake Air Temperature Sensor.
  b. Item 6: Engine Coolant Temperature Sensor.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

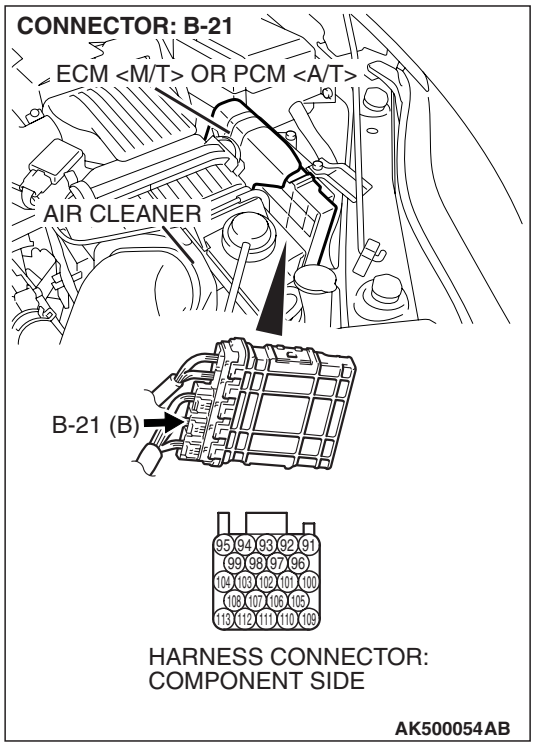
Q: Are they operating properly?

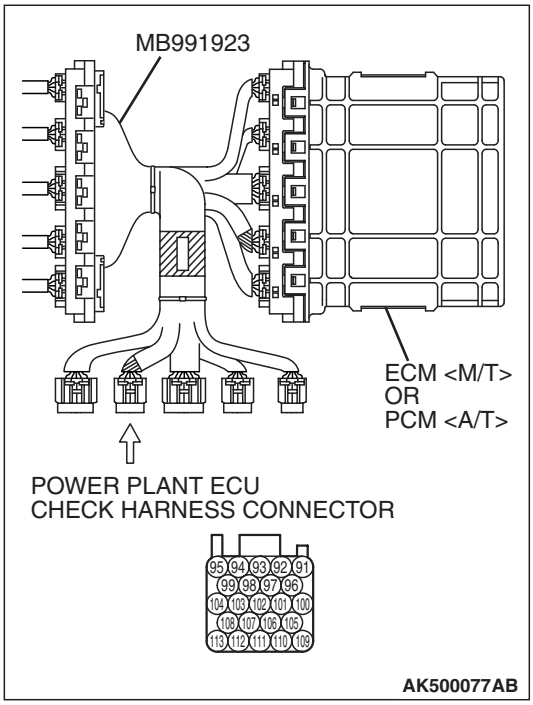
YES : Go to Step 5.

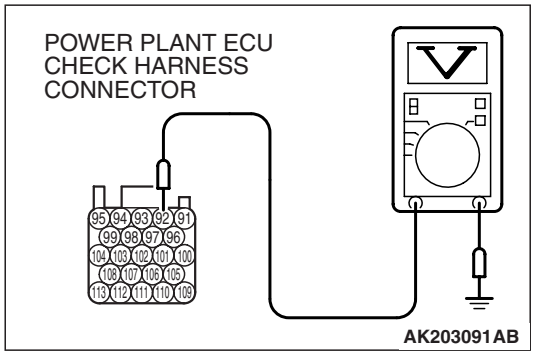
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

STEP 5. Measure the sensor output voltage at ECM <M/T> or PCM <A/T> connector B-21 by using power plant ECU check harness special tool MB991923.

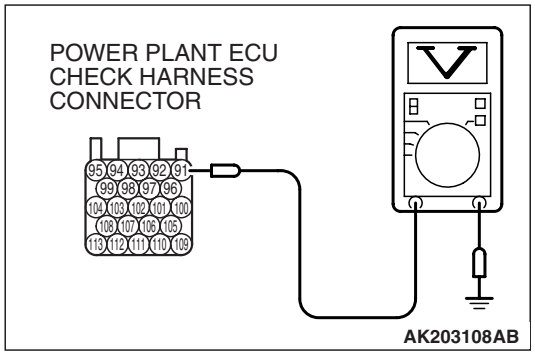
(1) Disconnect all ECM <M/T> connectors or PCM <A/T> connectors. Connect the power plant ECU check harness special tool MB991923 between the separated connectors.
(2) Start the engine and run at idle.







(3) Measure the voltage between terminal No. 92 and ground.
- Warm up the engine. When the engine is 2,500 r/min, the output voltage should repeat 0.5 to 1.4 volts alternately.



(4) Measure the voltage between terminal No. 91 and ground.
- Warm up the engine. When the engine is 2,500 r/min, the output voltage should repeat 0.5 to 1.4 volts alternately.

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

Q: Is the measured voltage within the specified range?

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

STEP 6. Check the fuel pressure.
Refer to On-vehicle Service –Fuel Pressure Test P.13A-1197.

Q: Is the fuel pressure normal?

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

b. Injector clogged.

Then confirm that the malfunction symptom is eliminated.

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

STEP 7. Check the fuel pressure.
Refer to On-vehicle Service –Fuel Pressure Test P.13A-1197.

Q: Is the fuel pressure normal?

YES : Check the following items, and repair or replace the defective items.
a. Check the ignition coil and spark plugs.
b. Check the EGR system.

Then confirm that the malfunction symptom is eliminated.

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

INSPECTION PROCEDURE 20: Knocking

COMMENT

- Incases 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
  - MB991910: Main Harness A

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

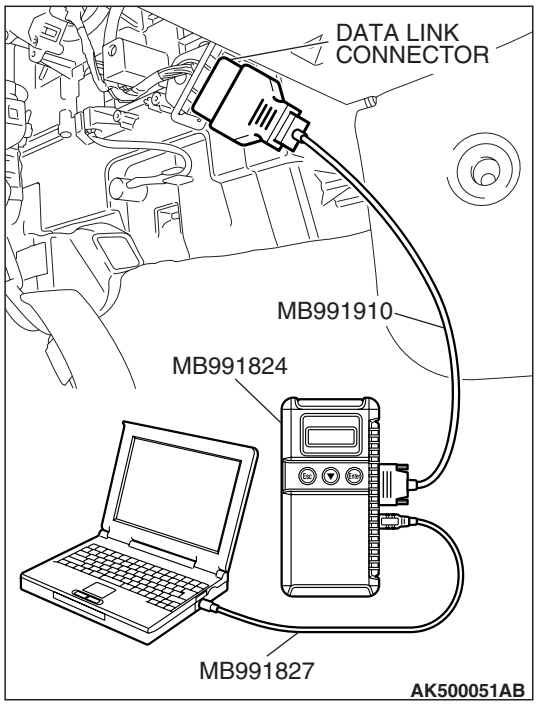
⚠ CAUTION

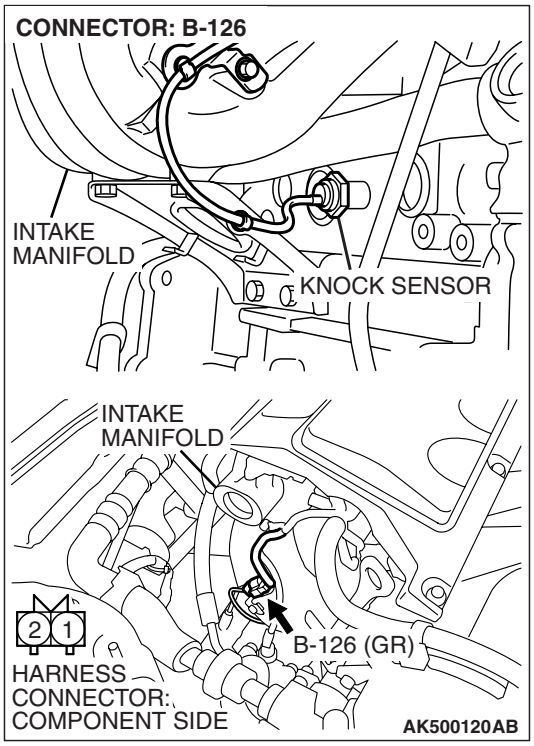
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(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 the DTC set?

YES : Refer to Diagnostic Trouble Code Chart P.13A-41.
NO : Go to Step 2.





STEP 2. Check the ignition timing.

(1) The ignition timing should retard more when knock sensor connector B-126 is disconnected than when it is connected.

Q: When the knock sensor connector B-126 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-551.

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:)

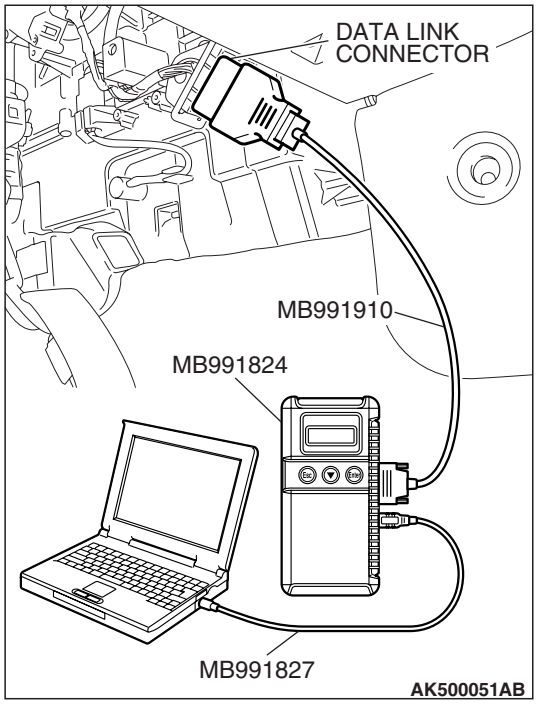
- Malfunction of air/fuel ratio control system.
- Deteriorated catalyst.

DIAGNOSIS

Required Special Tools:

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

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



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

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

Q: Is the DTC set?

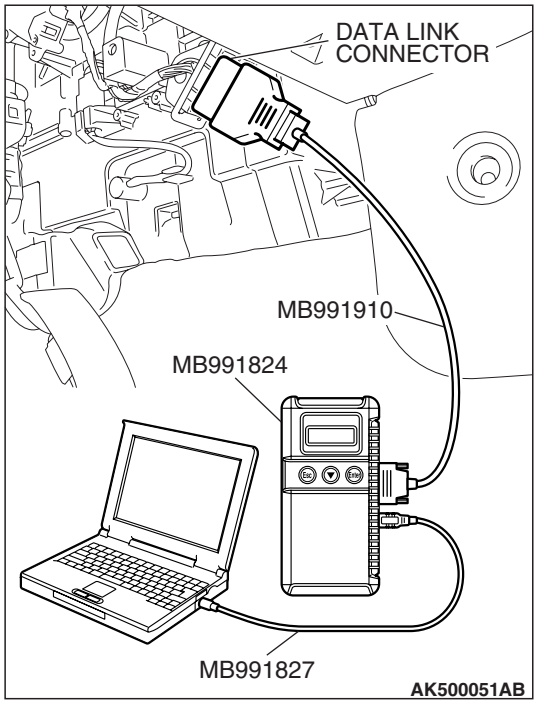
YES : Refer to Diagnostic Trouble Code Chart P.13A-41.
NO : Go to Step 2.

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.

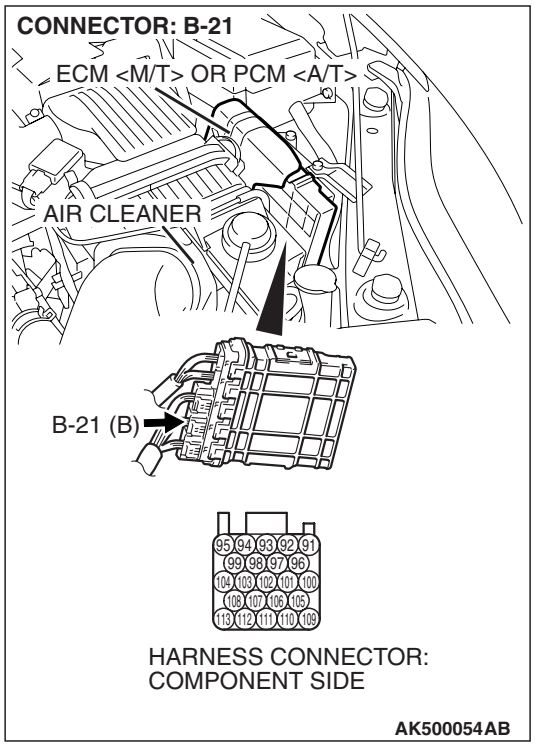
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check the following items in the data list. Refer to Data List Reference Table P.13A-1147.
   a. Item 6: Engine Coolant Temperature Sensor.
   b. Item 5: Intake Air Temperature Sensor.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

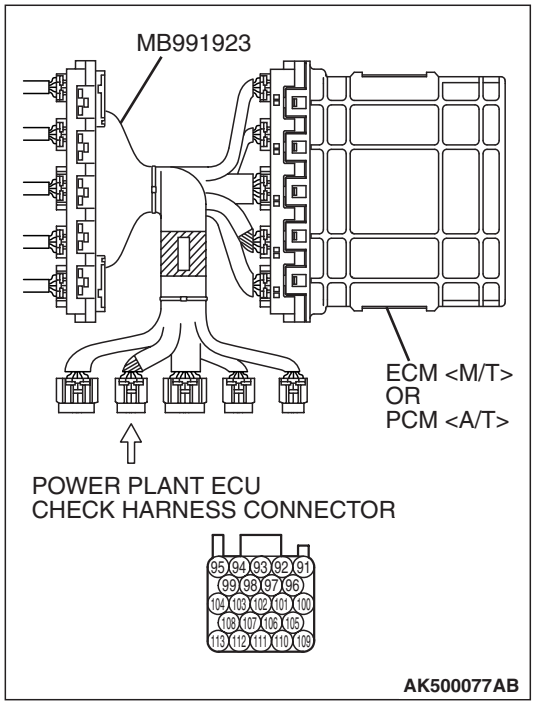
Q: Are they operating properly?

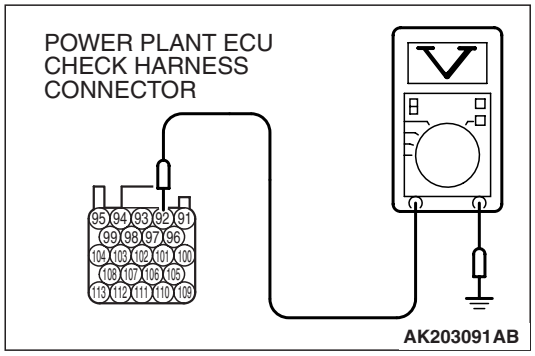
YES : Go to Step 4.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

STEP 4. Measure the sensor output voltage at ECM <M/T> or PCM <A/T> connector B-21 by using power plant ECU check harness special tool MB991923.

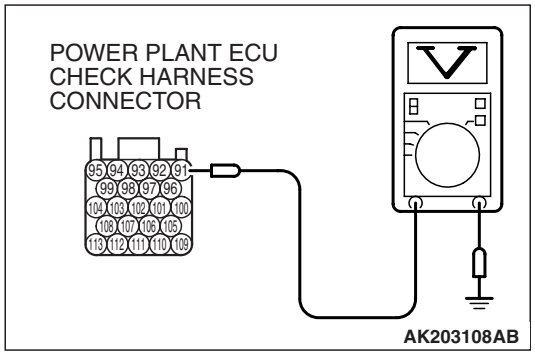
(1) Disconnect all ECM <M/T> connectors or PCM <A/T> connectors. Connect the power plant ECU check harness special tool MB991923 between the separated connectors.
(2) Start the engine and run at idle.







(3) Measure the voltage between terminal No. 92 and ground.
- Warm up the engine. When the engine is 2,500 r/min, the output voltage should repeat 0.5 to 1.4 volts alternately.



(4) Measure the voltage between terminal No. 91 and ground.
- Warm up the engine. When the engine is 2,500 r/min, the output voltage should repeat 0.5 to 1.4 volts alternately.

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

Q: Is the measured voltage within the specified range?

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-1197.

Q: Is the fuel pressure normal?

YES : Go to Step 6.

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

STEP 6. Check the following items.

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

(2) Then check the malfunction symptom.

Q: Is the malfunction symptom eliminated?

YES : The check is completed.

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

INSPECTION PROCEDURE 23: Transient, Mass Emission Tailpipe Test Failure.

COMMENT

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

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

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

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

DIAGNOSIS

Required Special Tools:

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

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

Q: Was the exhaust gas checked with engine warmed sufficiently?

YES : Go to Step 2.
NO : Check it again after enough warm up.

STEP 2. Check the following items.

(1) Check the following items.
   a. Check all vacuum hoses and connectors.
   b. Check electrical wires and connectors for obvious problems.
   c. Check the exhaust system for missing or damaged parts.

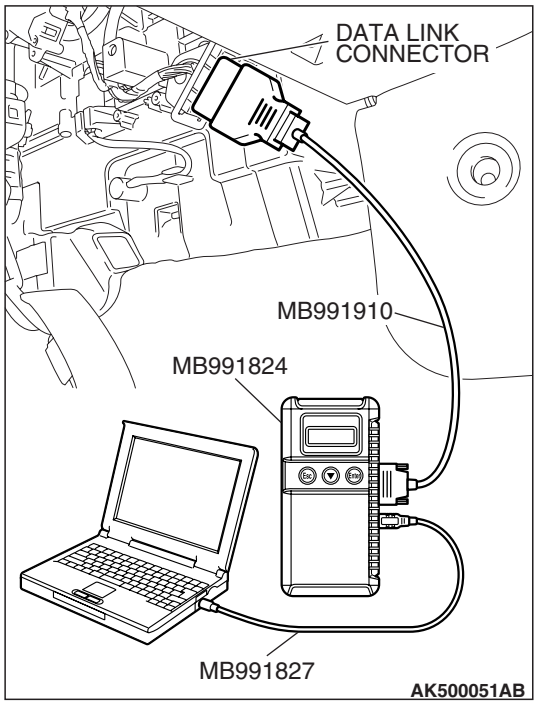
Q: Are they normal?

YES : Go to Step 3.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

STEP 3. Check the driveability.

Q: Is the driveability normal?

YES : Go to Step 4.
NO : Refer to Trouble Symptom Chart P.13A-46.



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 the DTC set?

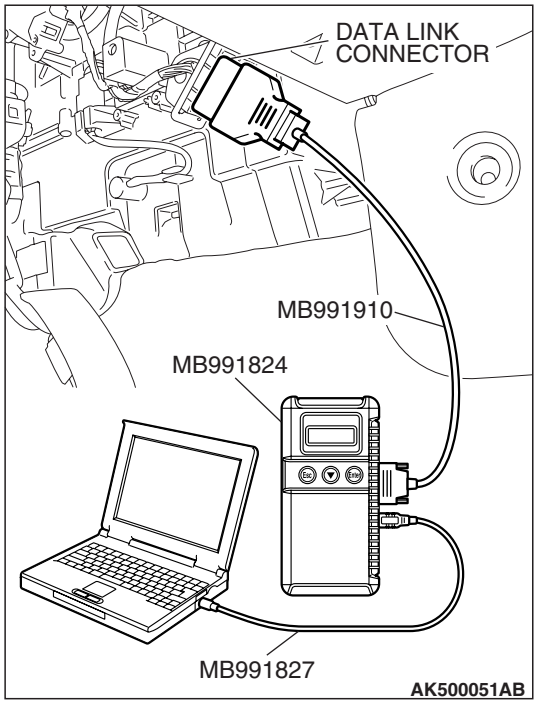
YES : Refer to Diagnostic Trouble Code Chart P.13A-41.
NO : Go to Step 5.

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.

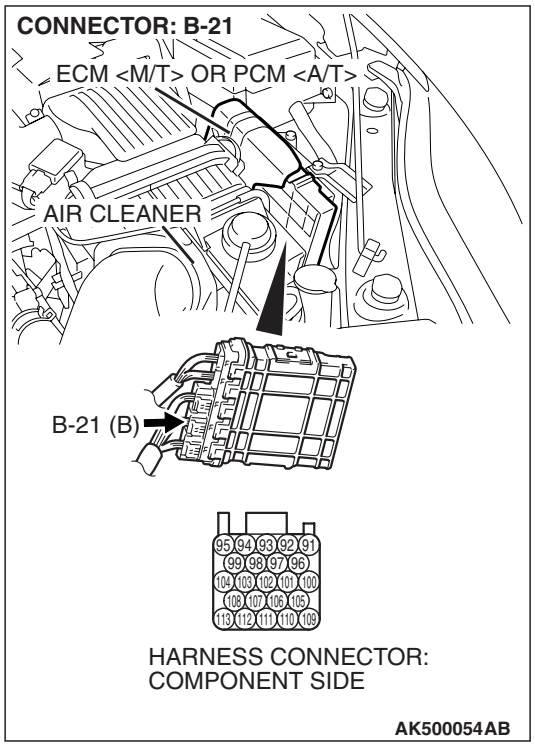
(1) Connect scan tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Check the following items in the data list. Refer to Data List Reference Table P.13A-1147.
  a. Item 6: Engine Coolant Temperature Sensor.
  b. Item 5: Intake Air Temperature Sensor.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

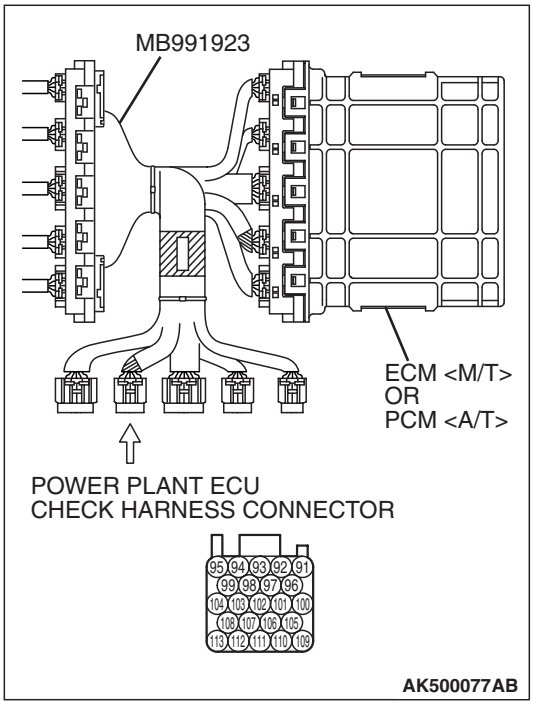
Q: Are they operating properly?

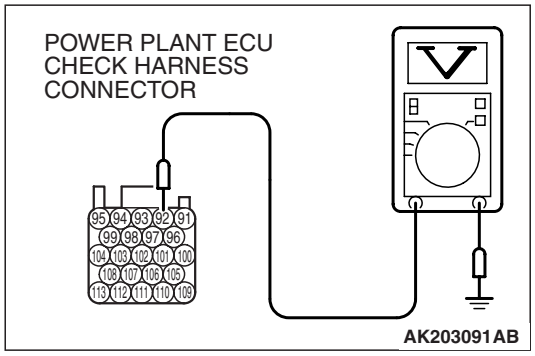
YES : Go to Step 7.
NO : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

STEP 7. Measure the sensor output voltage at ECM <M/T> or PCM <A/T> connector B-21 by using power plant ECU check harness special tool MB991923.

(1) Disconnect all ECM <M/T> connectors or PCM <A/T> connectors. Connect the power plant ECU check harness special tool MB991923 between the separated connectors.
(2) Start the engine and run at idle.







(3) Measure the voltage between terminal No. 92 and ground.
- Warm up the engine. When the engine is 2,500 r/min, the output voltage should repeat 0.5 to 1.4 volts alternately.

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

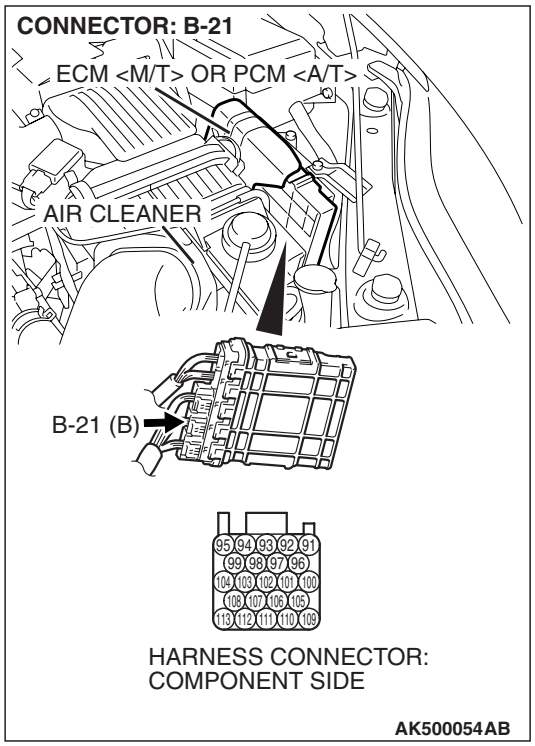
Q: Is the measured voltage within the specified range?

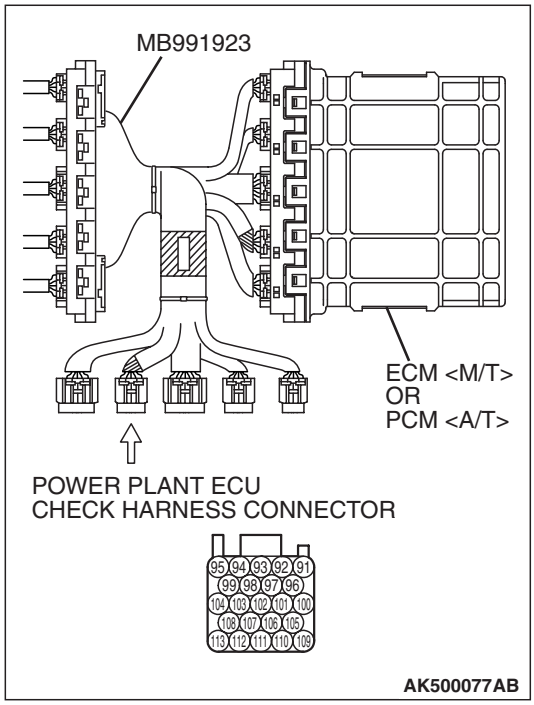
YES : Go to Step 8.

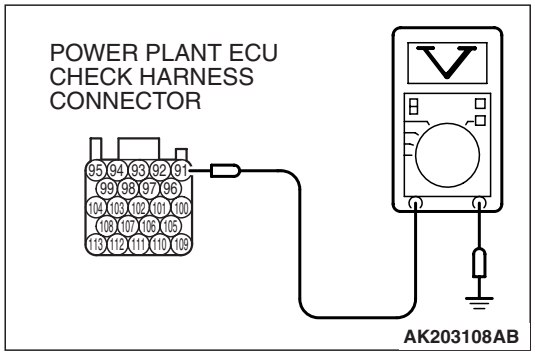
NO : Refer to DTC P0131 –Cylinder 1, 4 Heated Oxygen Sensor (front) Circuit Low Voltage P.13A-280, DTC P0132 –Cylinder 1, 4 Heated Oxygen Sensor (front) Circuit High Voltage P.13A-296, DTC P0133 – Cylinder 1, 4 Heated Oxygen Sensor (front) Circuit Slow Response P.13A-301, DTC P0134 –Cylinder 1, 4 Heated Oxygen Sensor (front) Circuit No Activity Detected P.13A-307.

STEP 8. Measure the sensor output voltage at ECM <M/T> or PCM <A/T> connector B-21 by using power plant ECU check harness special tool MB991923.

(1) Disconnect all ECM <M/T> connectors or PCM <A/T> connectors. Connect the power plant ECU check harness special tool MB991923 between the separated connectors.
(2) Start the engine and run at idle.







(3) Measure the voltage between terminal No. 91 and ground.
- Warm up the engine. When the engine is 2,500 r/min, the output voltage should repeat 0.5 to 1.4 volts alternately.

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

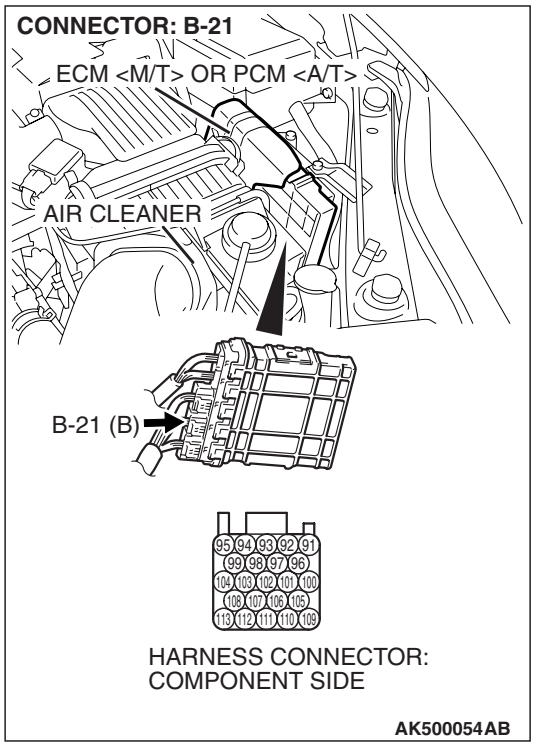
Q: Is the measured voltage within the specified range?

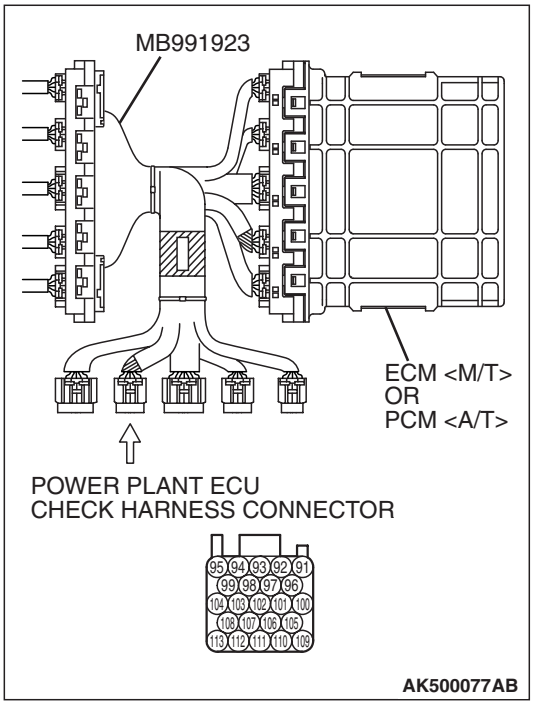
YES : Go to Step 9.

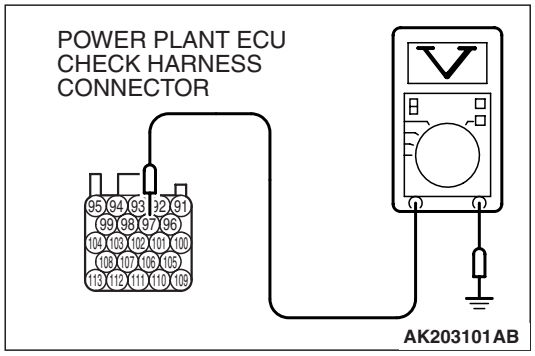
NO : Refer to DTC P0151 –Cylinder 2, 3 Heated Oxygen Sensor (front) Circuit Low Voltage P.13A-346, DTC P0152 –Cylinder 2, 3 Heated Oxygen Sensor (front) Circuit High Voltage P.13A-362, DTC P0153 – Cylinder 2, 3 Heated Oxygen Sensor (front) Circuit Slow Response P.13A-367, DTC P0154 –Cylinder 2, 3 Heated Oxygen Sensor (front) Circuit No Activity Detected P.13A-373.

STEP 9. Measure the sensor output voltage at ECM <M/T> or PCM <A/T> connector B-21 by using power plant ECU check harness special tool MB991923.

(1) Disconnect all ECM <M/T> connectors or PCM <A/T> connectors. Connect the power plant ECU check harness special tool MB991923 between the separated connectors.
(2) Start the engine and run at idle.







(3) Measure the voltage between terminal No. 97 and ground under the following driving.
   a. Transaxle: 2nd speed (A/T: "L" range)
   b. Drive with wide open throttle
   c. Engine: 3,500 r/min or more
      - The output voltage should be between 1.0 and 1.5 volts.

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

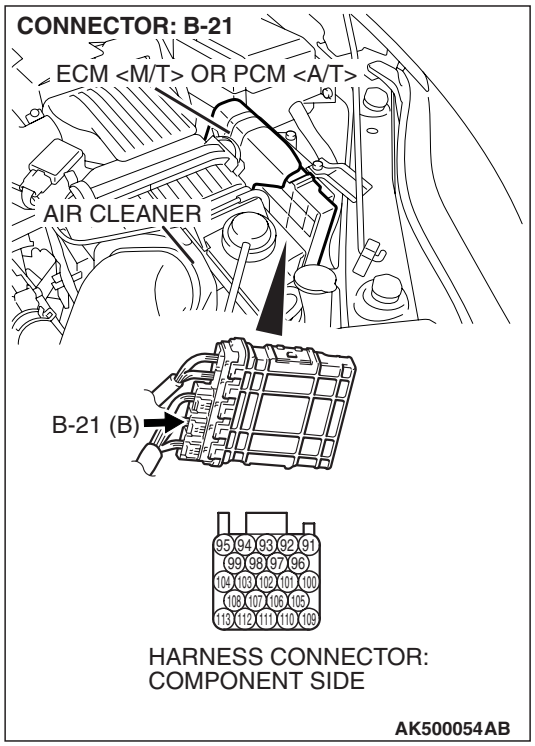
Q: Is the measured voltage between 1.0 and 1.5 volts?

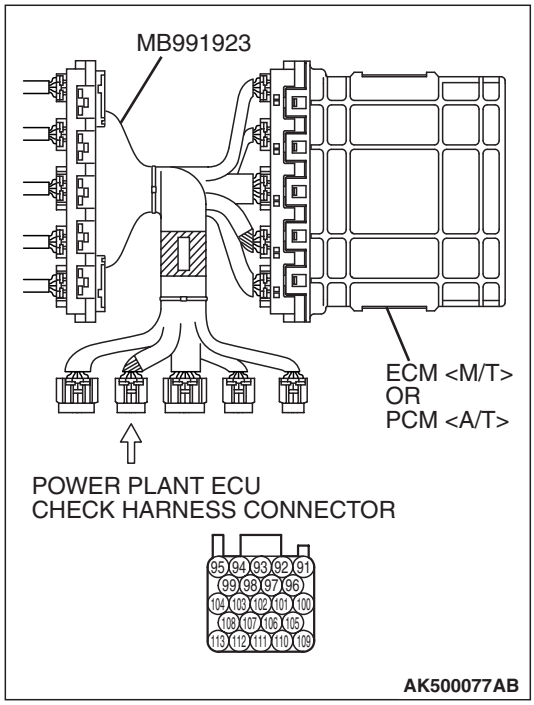
YES : Go to Step 10.

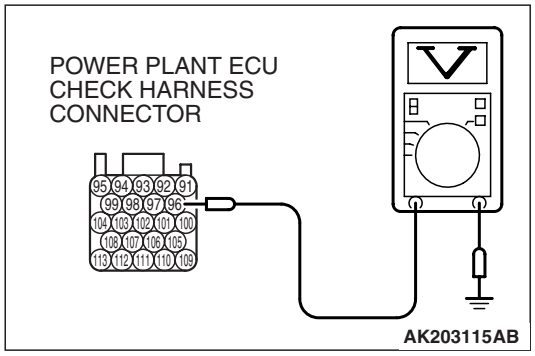
NO : Refer to DTC P0137 –Cylinder 1, 4 Heated Oxygen Sensor (rear) Circuit Low Voltage P.13A-317, DTC P0138 –Cylinder 1, 4 Heated Oxygen Sensor (rear) Circuit High Voltage P.13A-333, DTC P0139 – Cylinder 1, 4 Heated Oxygen Sensor (rear) Circuit Slow Response P.13A-338, DTC P0140 –Cylinder 1, 4 Heated Oxygen Sensor (rear) Circuit No Activity Detected P.13A-342.

STEP 10. Measure the sensor output voltage at ECM <M/T> or PCM <A/T> connector B-21 by using power plant ECU check harness special tool MB991923.

(1) Disconnect all ECM <M/T> connectors or PCM <A/T> connectors. Connect the power plant ECU check harness special tool MB991923 between the separated connectors.
(2) Start the engine and run at idle.







(3) Measure the voltage between terminal No. 96 and ground under the following driving.
   a. Transaxle: 2nd speed (A/T: "L" range)
   b. Drive with wide open throttle
   c. Engine: 3,500 r/min or more
      - The output voltage should be between 1.0 and 1.5 volts.

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

Q: Is the measured voltage between 1.0 and 1.5 volts?

YES : Go to Step 11.

NO : Refer to DTC P0157 –Cylinder 2, 3 Heated Oxygen Sensor (rear) Circuit Low Voltage P.13A-383, DTC P0158 –Cylinder 2, 3 Heated Oxygen Sensor (rear) Circuit High Voltage P.13A-399, DTC P0159 –Cylinder 2, 3 Heated Oxygen Sensor (rear) Circuit Slow Response P.13A-404, DTC P0160 –Cylinder 2, 3 Heated Oxygen Sensor (rear) Circuit No Activity Detected P.13A-408.

STEP 11. Check the EGR system.

Refer to GROUP 17, Emission Control System –General Description (EGR System) P.17-104.

Q: Is the EGR system normal?

YES : Go to Step 12.

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

STEP 12. Check the fuel pressure.

Refer to On-vehicle Service –Fuel Pressure Test P.13A-1197.

Q: Is the fuel pressure normal?

YES : Go to Step 13.

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

STEP 13. 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 and spark plugs.
   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 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.

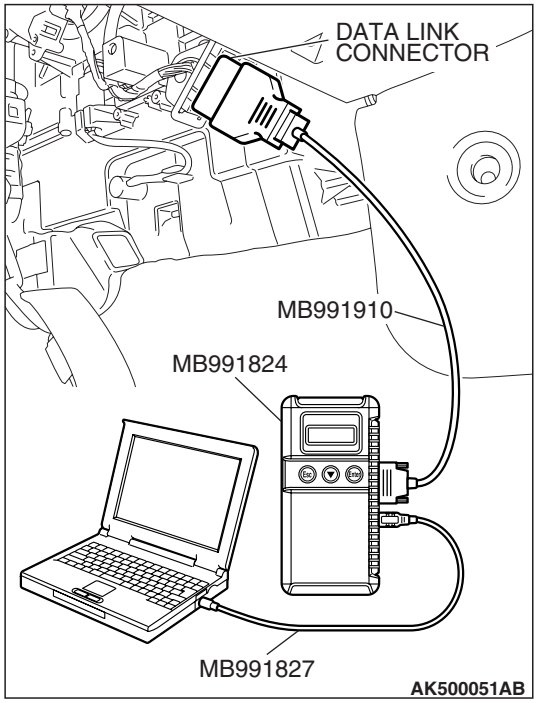
TROUBLESHOOTING HINTS (The most likely causes for this case:)

- 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
  - MB991910: Main Harness A



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

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

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

Q: Is the DTC set?

YES : Refer to Diagnostic Trouble Code Chart P.13A-41.
NO : Refer to GROUP 17, Emission Control System – Purge Control System Check (Purge Flow Check) P.17-101.

NEXT>>