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**DTC P0506: Idle Control System RPM Lower Than Expected**

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**⚠ CAUTION**

If DTC P0506 has been set, TCL related DTC U1120 is also set. After P0506 has been diagnosed, don't forget to erase DTC U1120.

**TECHNICAL DESCRIPTION**

- The amount of air taken in during idling is regulated by the opening and closing of the throttle valve.
- The PCM checks the difference between the actual engine speed and the target engine speed.

**DESCRIPTIONS OF MONITOR METHODS**

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

**MONITOR EXECUTION**

Continuous

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

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

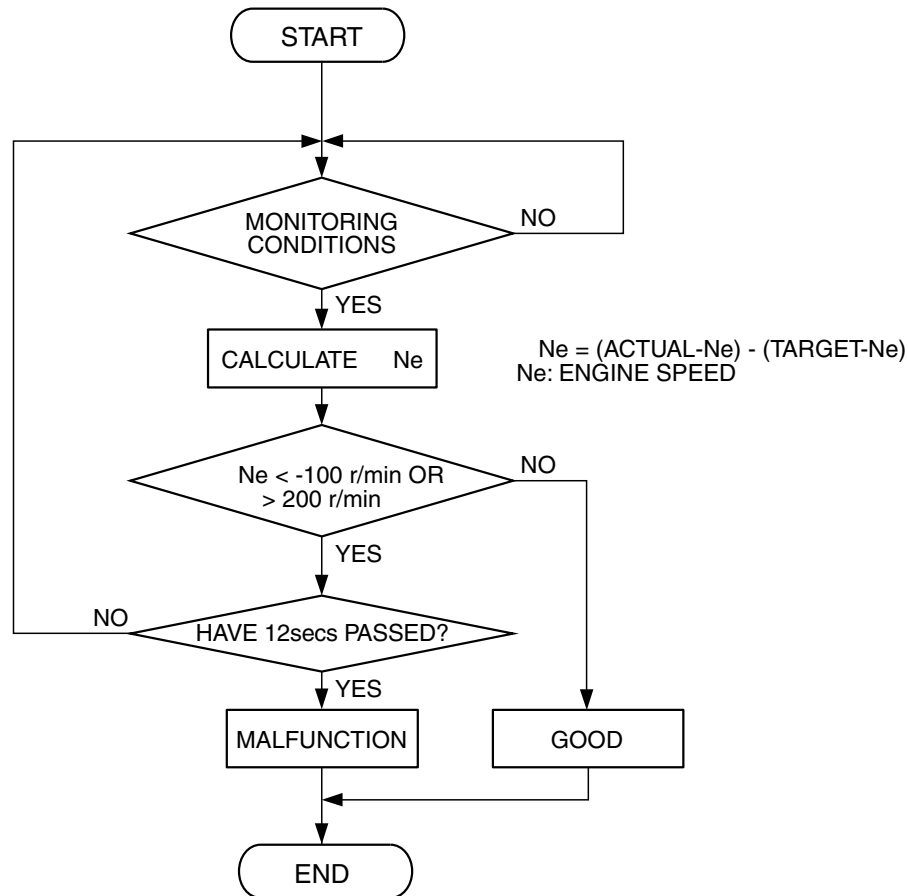
- Misfire monitor
- Exhaust gas recirculation (EGR) system monitor
- Fuel system monitor

**Sensor (The sensor below is determined to be normal)**

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

## DTC SET CONDITIONS

## Logic Flow Chart



AK302408

**Check Conditions**

- Under the closed loop idle speed control.
- The engine coolant temperature is more than 77°C (171°F).
- Battery positive voltage is higher than 10 volts.
- Power steering pressure switch: OFF.
- Volumetric efficiency is lower than 40 percent.
- Barometric pressure is higher than 76 kPa (22.4 in.Hg).
- Intake air temperature is higher than -10°C (14°F).
- 25 seconds have elapsed from the start of the previous monitoring.
- Target throttle actuator control motor position is more than 255 steps.

**Judgment Criteria**

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

**OBD-II DRIVE CYCLE PATTERN**

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

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

- Throttle valve area is dirty.
- PCM failed.
- Throttle body assembly 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).**

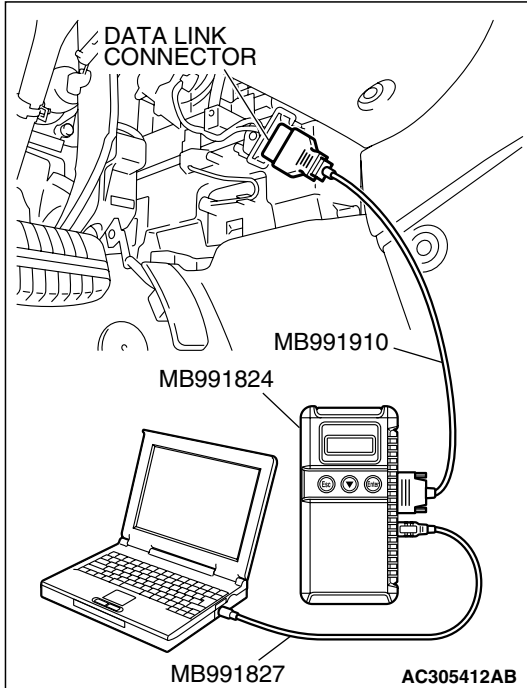
#### **⚠ CAUTION**

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 the diagnostic trouble code other than P0506 set?**

- YES** : Refer to Diagnostic Trouble Code Chart [P. 13B-34](#).  
**NO** : Go to Step 2.



**STEP 2. Check the throttle body. (throttle valve area)**

**Q: Is the throttle valve area dirty?**

- YES** : Perform cleaning. Refer to Throttle body (throttle valve area) cleaning [P. 13B-1178](#). Then go to Step 4.  
**NO** : Go to Step 3.

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

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

**Q: Is DTC P0506 set?**

- YES** : Replace the PCM. Then go to Step 4.  
**NO** : The inspection is complete.

**STEP 4. Test the OBD-II drive cycle.**

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

**Q: Is DTC P0506 set?**

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

**DTC P0507: Idle Control System RPM Higher Than Expected****⚠ CAUTION**

If DTC P0507 has been set, TCL related DTC U1120 is also set. After P0507 has been diagnosed, don't forget to erase DTC U1120.

**TECHNICAL DESCRIPTION**

- The amount of air taken in during idling is regulated by the opening and closing of the throttle valve.
- The PCM checks the difference between the actual engine speed and the target engine speed.

**DESCRIPTIONS OF MONITOR METHODS**

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

**MONITOR EXECUTION**

Continuous

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

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

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

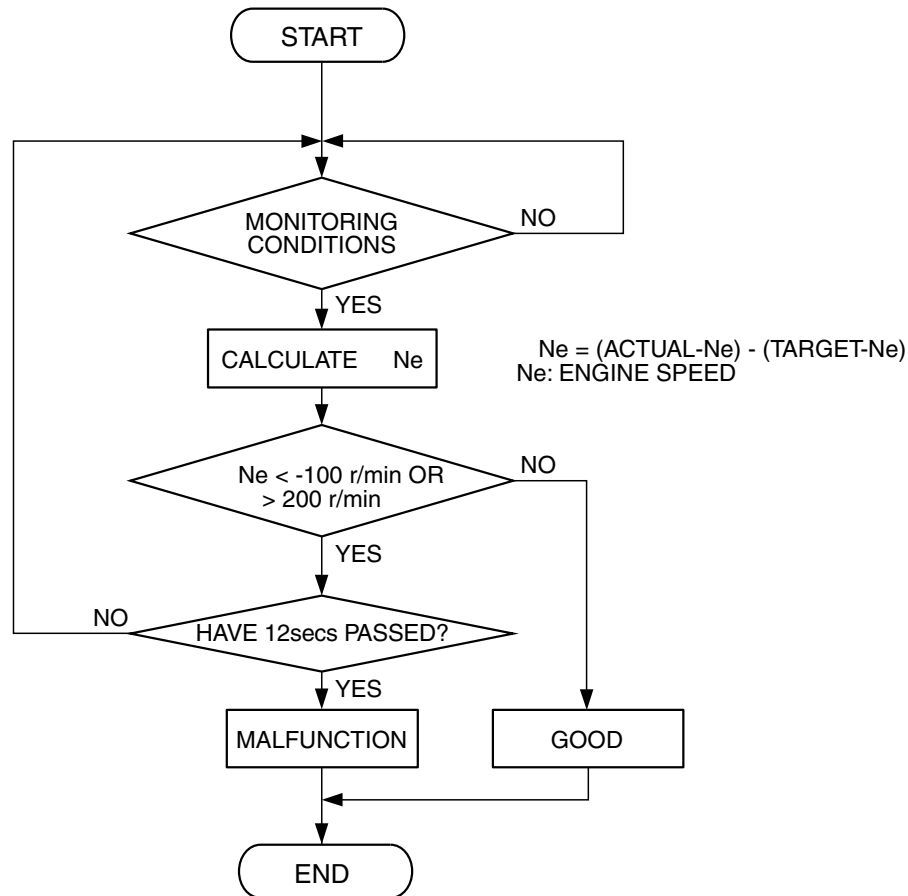
**Sensor (The sensor below is determined to be normal)**

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



DTC SET CONDITIONS

Logic Flow Chart



AK302408

**Check Conditions**

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

**Judgment Criteria**

- Actual idle speed has continued to be higher than the target idle speed by 200 r/min (300 r/min\*) or more for 12 seconds.
- \*: Specs in parentheses are applicable if the maximum air temperature during the previous operation was more than 45°C (113°F).

**OBD-II DRIVE CYCLE PATTERN**

Refer to Diagnostic Function – OBD-II Drive Cycle – Procedure 6 – Other Monitor P.13B-6.

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

- Intake system vacuum leak.
- PCM failed.
- Throttle body assy 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).**

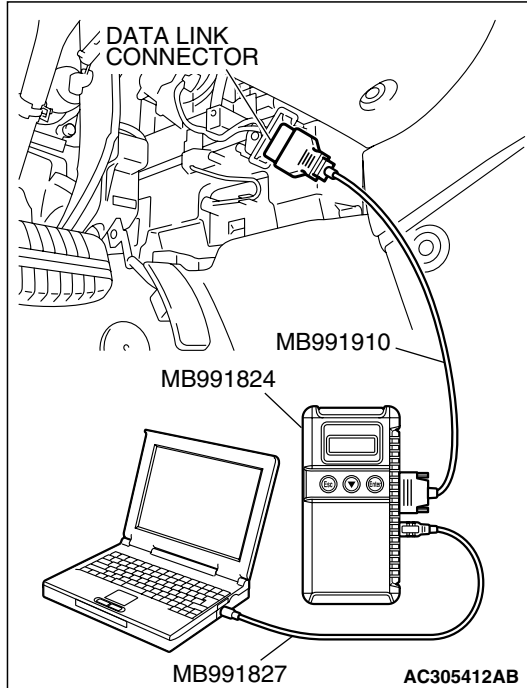
**⚠ CAUTION**

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 the diagnostic trouble code other than P0507 set?**

- YES** : Refer to Diagnostic Trouble Code Chart P. 13B-34.  
**NO** : Go to Step 2.



**STEP 2. Check the intake system vacuum leak.**

**Q: Are there any abnormalities?**

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

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

- (1) Replace the throttle body assembly.
- (2) 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 P0507 set?**

- YES** : Replace the PCM. Then go to Step 4.  
**NO** : The inspection is complete.

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**STEP 4. Test the OBD-II drive cycle.**

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

**Q: Is DTC P0507 set?**

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

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**DTC P0513: Immobilizer Malfunction**

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**TECHNICAL DESCRIPTION**

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

**DTC SET CONDITIONS**

**Check Conditions**

- Ignition switch: ON

**Judgment Criteria**

- When the communication error between PCM and the immobilizer-ECU continues for 2 seconds or more.

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

- Malfunction of harness or connector.
- Malfunction of immobilizer-ECU.
- Malfunction of PCM.

**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 immobilizer diagnostic trouble code (DTC).

**⚠ CAUTION**

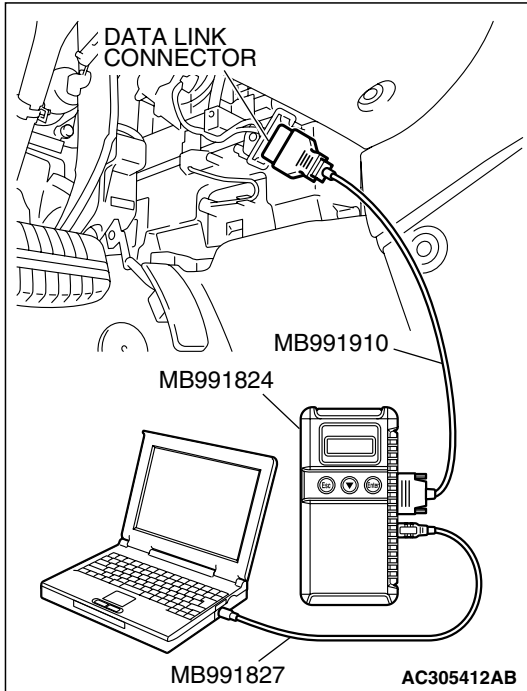
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

**Q: Is the immobilizer-DTC set?**

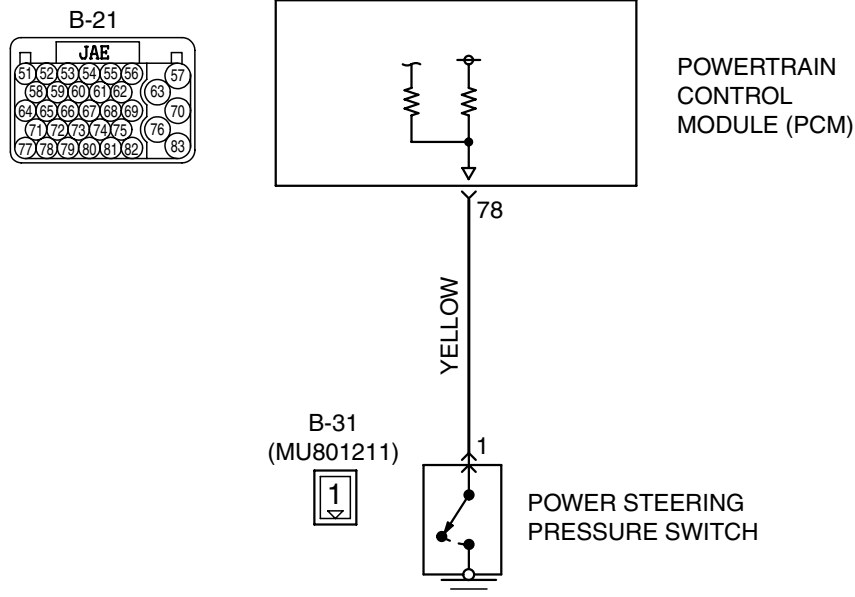
**YES :** Refer to GROUP 54A, Ignition Switch and Immobilizer System – Diagnostic Trouble Code Chart P.54A-12.

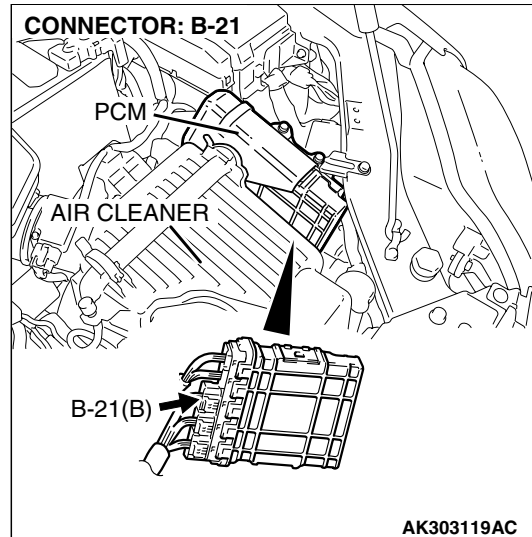
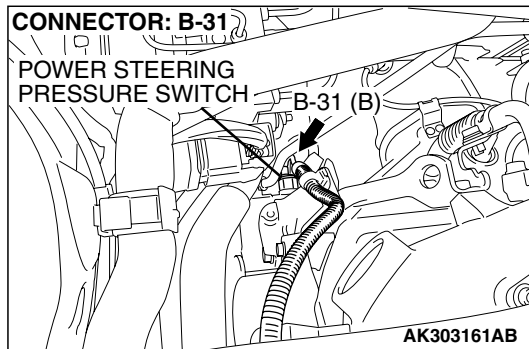
**NO :** If DTC P0513 is output again after the MFI-DTC has been erased, replace the PCM. Then check that the DTC P0513 does not reset.



**DTC P0551: Power Steering Pressure Switch Circuit Range/Performance**

**Power Steering Pressure Switch Circuit**





## CIRCUIT OPERATION

- A battery positive voltage is applied to the power steering pressure switch output terminal (terminal No. 1) from the PCM (terminal No. 78) via the resistor in the PCM.

## TECHNICAL DESCRIPTION

- The power steering pressure switch converts the existence of a power steering load into a high/low voltage, and inputs it into the PCM.
- When the steering wheel is turned, hydraulic pressure rises. The power steering pressure switch closes, and the applied battery positive voltage will be grounded. With this, the power steering pressure switch output voltage will fluctuate between 0 and 12 volts.
- While driving with the steering wheel held straight, the power steering pressure switch turns "OFF".

- The PCM checks whether the power steering pressure switch turns "OFF" or "ON" during driving.

## DESCRIPTIONS OF MONITOR METHODS

Power steering pressure switch stays on during specified go/stop operations.

## MONITOR EXECUTION

Continuous

## MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

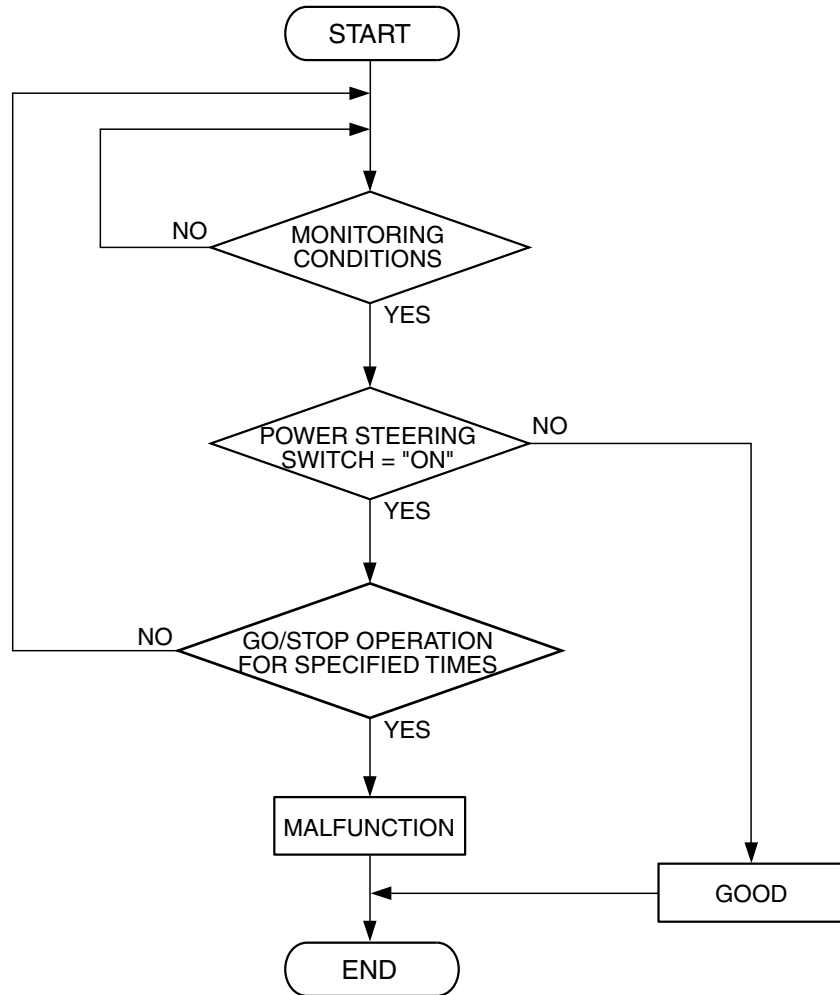
- Not applicable

**Sensor (The sensor below is determined to be normal)**

- Engine coolant temperature sensor

DTC SET CONDITIONS

Logic Flow Chart



AK302409

**Check Conditions**

- Engine coolant temperature is higher than 30°C (86°F).
- Drive for 4 seconds or more with the vehicle speed is 50 km/h (31 mph) or more. Stop the vehicle [vehicle speed is 1.5 km/h (1.0 mph) or less]. Repeat 10 times or more.

**Judgment Criteria**

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

**OBD-II DRIVE CYCLE PATTERN**

None.

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

- Power steering pressure switch failed.
- Open or shorted power steering pressure switch circuit, harness damage, or connector damage.
- PCM 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, check data list item 27: Power Steering Pressure Switch.**

### **⚠ CAUTION**

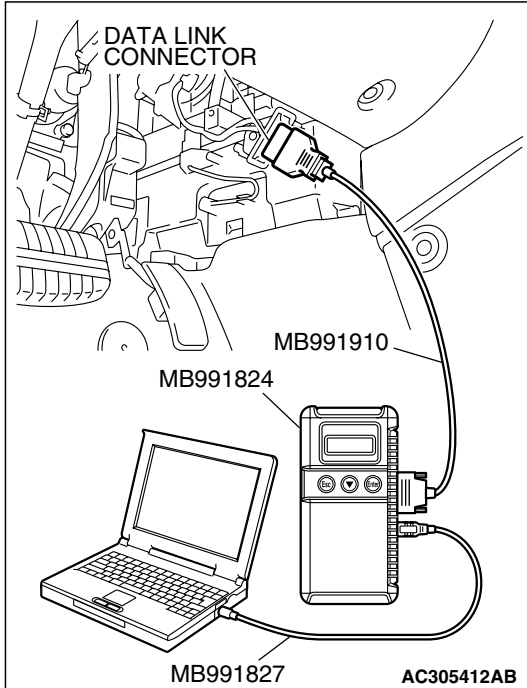
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

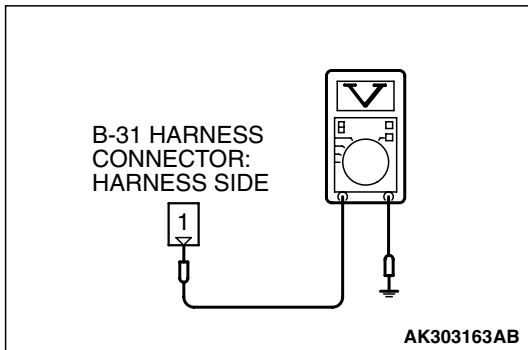
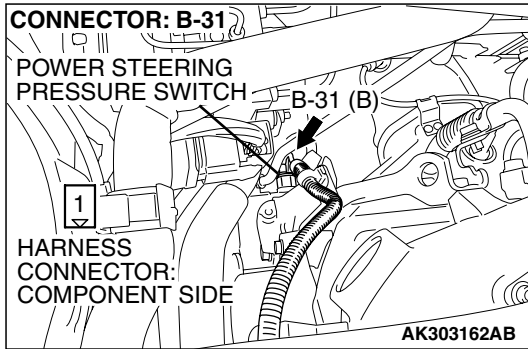
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set scan tool MB991958 to the data reading mode for item 27, Power Steering Pressure Switch.
  - If the steering wheel is not turned while idling, "OFF" will be displayed.
  - If the steering wheel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

### **Q: Is the switch operating properly?**

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

**NO :** Go to Step 2.





**STEP 2. Measure the power supply voltage at power steering pressure switch connector B-31 by backprobing.**

- (1) Do not disconnect the connector B-31.
- (2) Start the engine and run at idle.

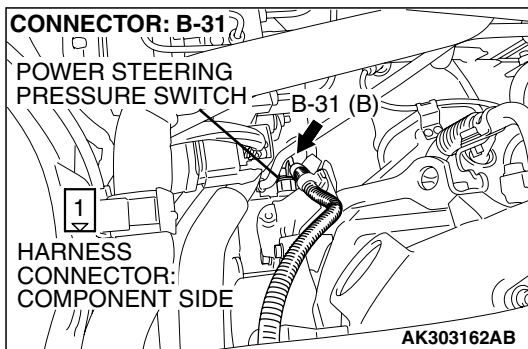
- (3) Measure the voltage between terminal No. 1 and ground by backprobing.

- When steering wheel is not turned, voltage should be battery positive voltage.
- When steering wheel is turned, voltage should be 1 volt or less.

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

**Q: Is the measured voltage within the specified range?**

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



**STEP 3. Check harness connector B-31 at power steering pressure switch for damage.**

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

- YES** : Go to Step 4.  
**NO** : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 14.



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

**⚠ CAUTION**

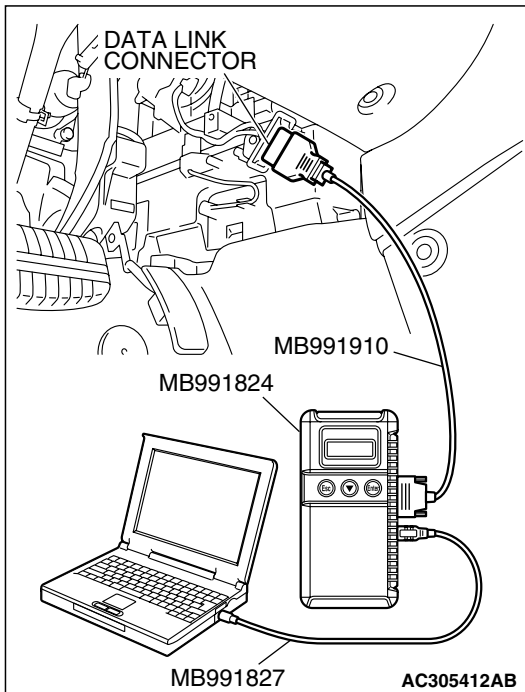
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

**Q: Is the switch operating properly?**

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

**NO :** Replace the PCM. Then go to Step 14.

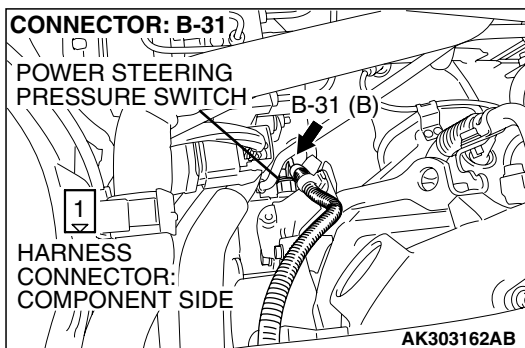


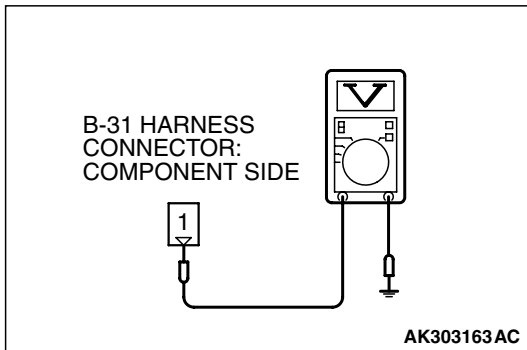
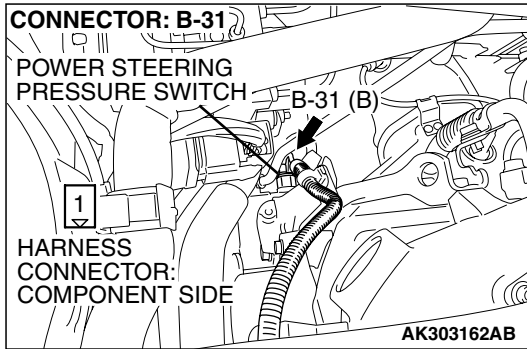
**STEP 5.** Check harness connector B-31 at power steering pressure switch for damage.

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

**YES :** Go to Step 6.

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





**STEP 6. Measure the power supply voltage at power steering pressure switch harness side connector B-31.**

- (1) Disconnect the connector B-31 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

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

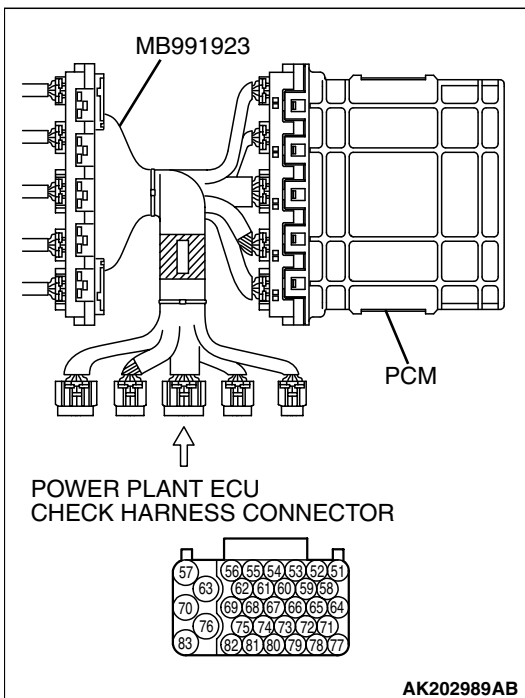
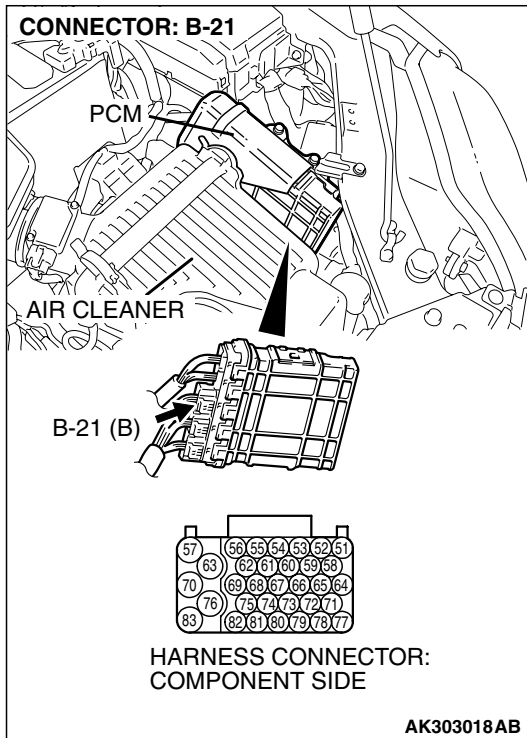
**Q: Is battery positive voltage (approximately 12 volts) present?**

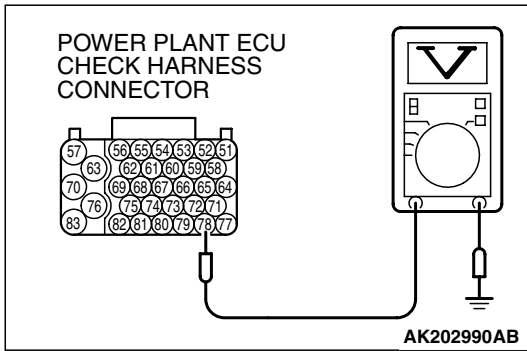
**YES :** Go to Step 11.

**NO :** Go to Step 7.

**STEP 7. Measure the power supply voltage at PCM connector B-21 by using power plant ECU check harness special tool MB991923.**

- (1) Disconnect the all PCM connectors and connect power plant ECU check harness special tool MB991923 between the separated connectors.
- (2) Disconnect the power steering pressure switch connector B-31.
- (3) Turn the ignition switch to the "ON" position.

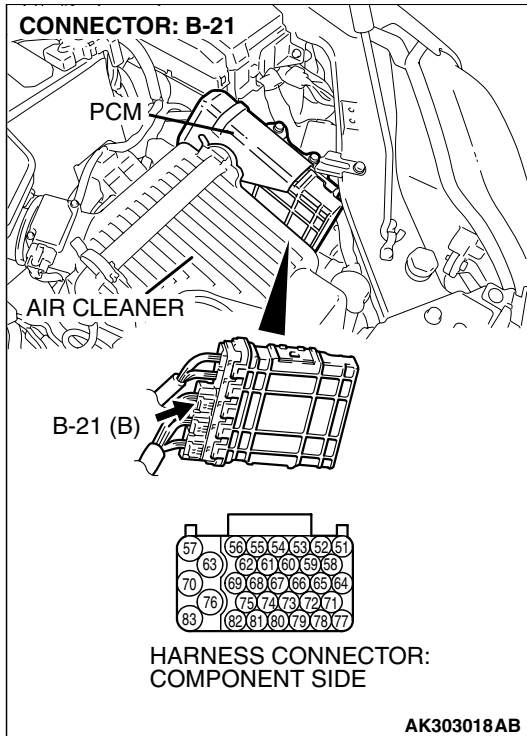




- (4) Measure the voltage between terminal No. 78 and ground.  
 • Voltage should be between battery positive voltage.  
 (5) Turn the ignition switch to the "LOCK" (OFF) position.

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

- YES** : Go to Step 8.  
**NO** : Go to Step 9.



**STEP 8. Check harness connector B-21 at PCM for damage.**

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

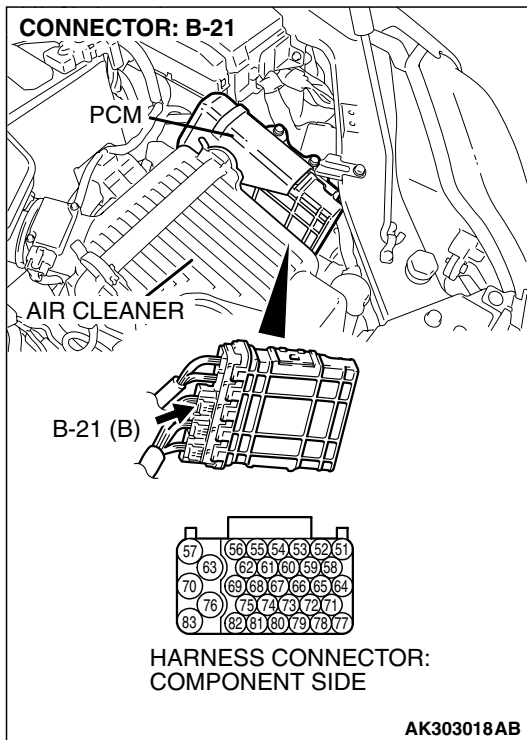
- YES** : Repair harness wire between power steering pressure switch connector B-31 (terminal No. 1) and PCM connector B-21 (terminal No. 78) because of open circuit. Then go to Step 14.  
**NO** : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 14.

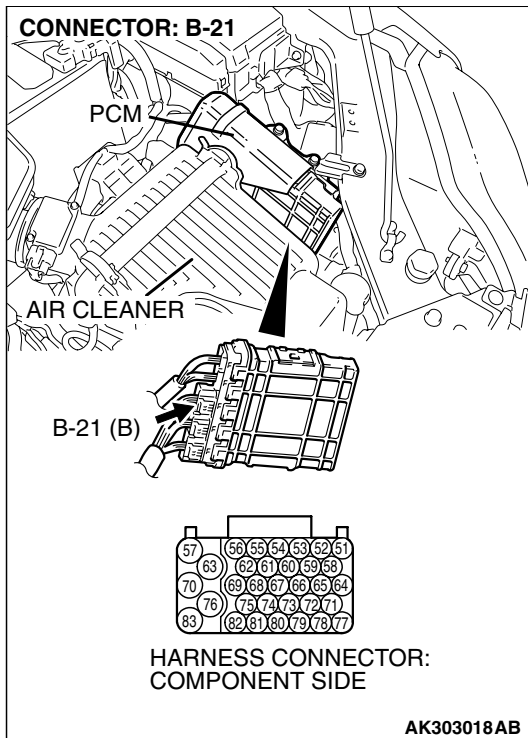
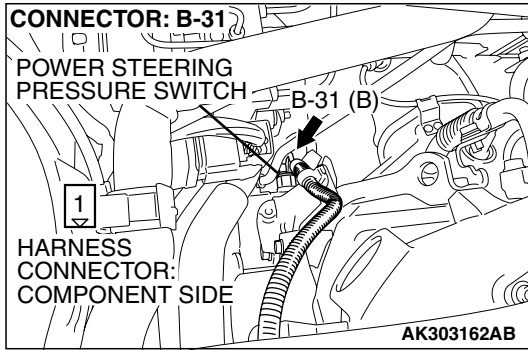
**STEP 9. Check harness connector B-21 at PCM for damage.**

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

**YES :** Go to Step 10.

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

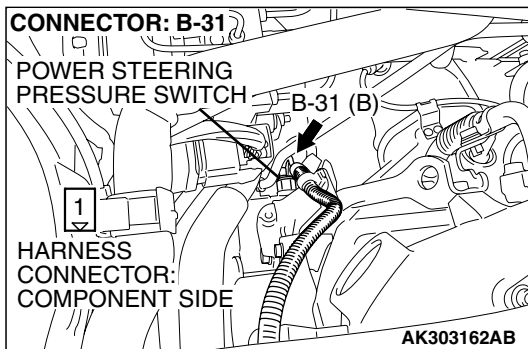




**STEP 10. Check for short circuit to ground between power steering pressure switch connector B-31 (terminal No. 1) and PCM connector B-21 (terminal No. 78).**

**Q: Is the harness wire in good condition?**

- YES :** Replace the PCM. Then go to Step 14.
- NO :** Repair it. Then go to Step 14.



**STEP 11. Replace the power steering pressure switch.**

- (1) Replace the power steering pressure switch.
- (2) Check the trouble symptoms.
- (3) Read in the diagnostic trouble code (DTC).

**Q: Is DTC P0551 set?**

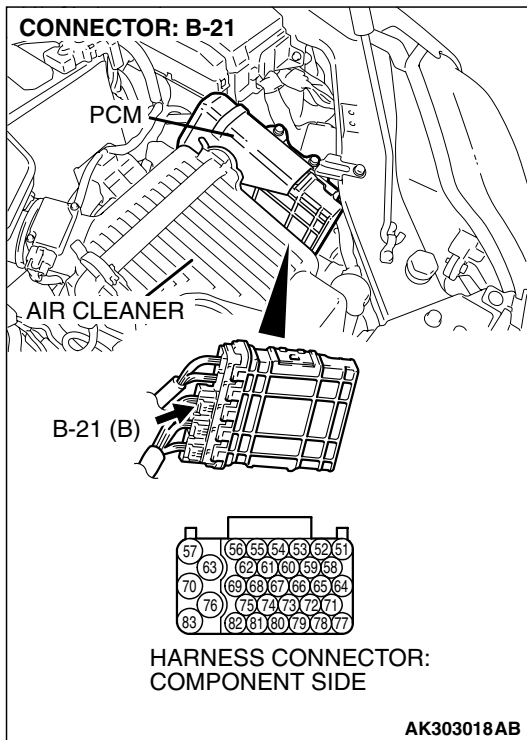
- YES :** Go to Step 12.
- NO :** Go to Step 14.

**STEP 12. Check harness connector B-21 at PCM for damage.**

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

**YES :** Go to Step 13.

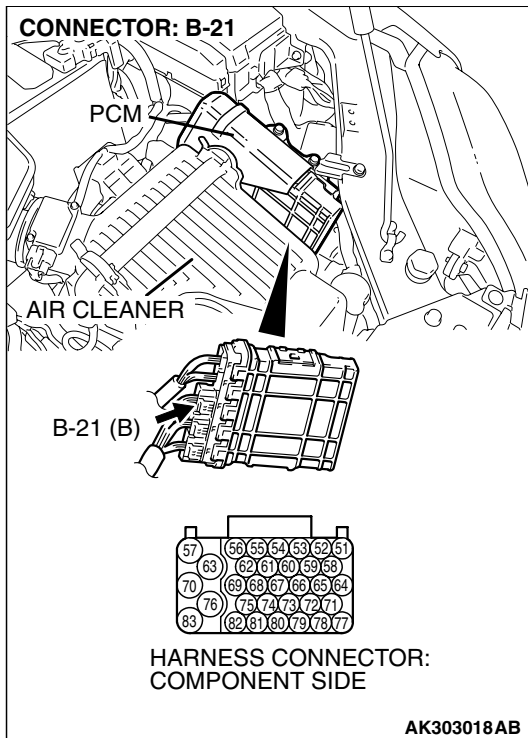
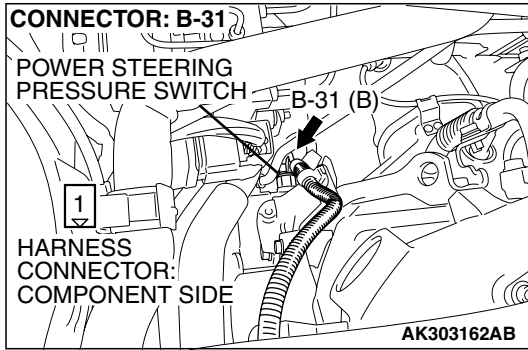
**NO :** Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 14.



**STEP 13. Check for harness damage between power steering pressure switch connector B-31 (terminal No. 1) and PCM connector B-21 (terminal No. 78).**

**Q: Is the harness wire in good condition?**

- YES :** Replace the PCM. Then go to Step 14.
- NO :** Repair it. Then go to Step 14.





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

**CAUTION**

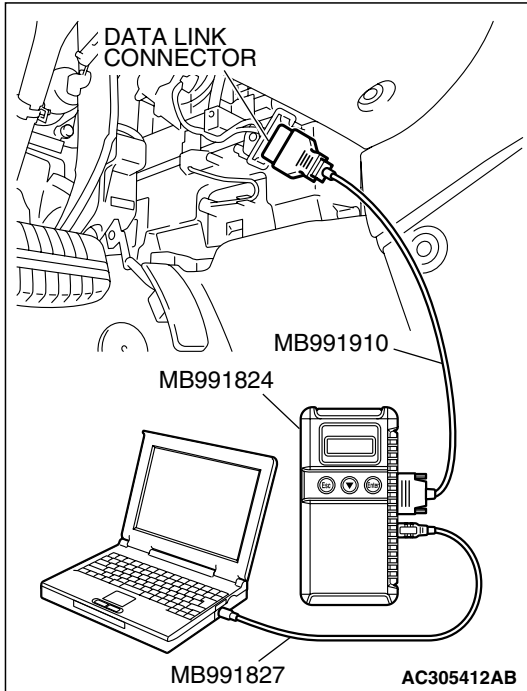
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

**Q: Is the switch operating properly?**

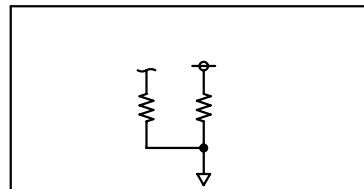
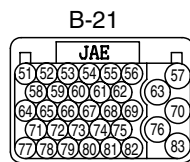
**YES :** The inspection is complete.

**NO :** Retry the troubleshooting.



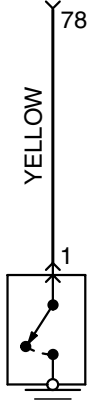
**DTC P0554: Power Steering Pressure Switch Circuit Intermittent**

**Power Steering Pressure Switch Circuit**

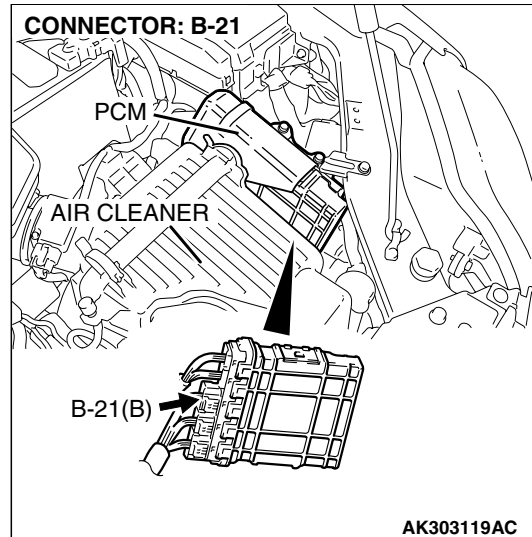
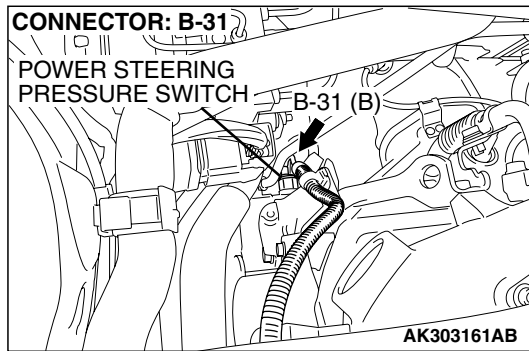


POWERTRAIN CONTROL MODULE (PCM)

B-31 (MU801211)



POWER STEERING PRESSURE SWITCH



## CIRCUIT OPERATION

- A battery positive voltage is applied to the power steering pressure switch output terminal (terminal No. 1) from the PCM (terminal No. 78) via the resistor in the PCM.

## TECHNICAL DESCRIPTION

- The power steering pressure switch converts the existence of a power steering load into a high/low voltage, and inputs it into the PCM.
- When the steering wheel is turned, hydraulic pressure rises. The power steering pressure switch closes, and the applied battery positive voltage will be grounded. With this, the power steering pressure switch output voltage will fluctuate between 0 and 12 volts.
- While driving with the steering wheel held straight, the power steering pressure switch turns "OFF".

- The PCM checks whether the power steering pressure switch turns "OFF" or "ON" during driving.

## DESCRIPTIONS OF MONITOR METHODS

Power steering pressure switch changes from off to on more than 10 times for 1 second.

## MONITOR EXECUTION

Continuous

## MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

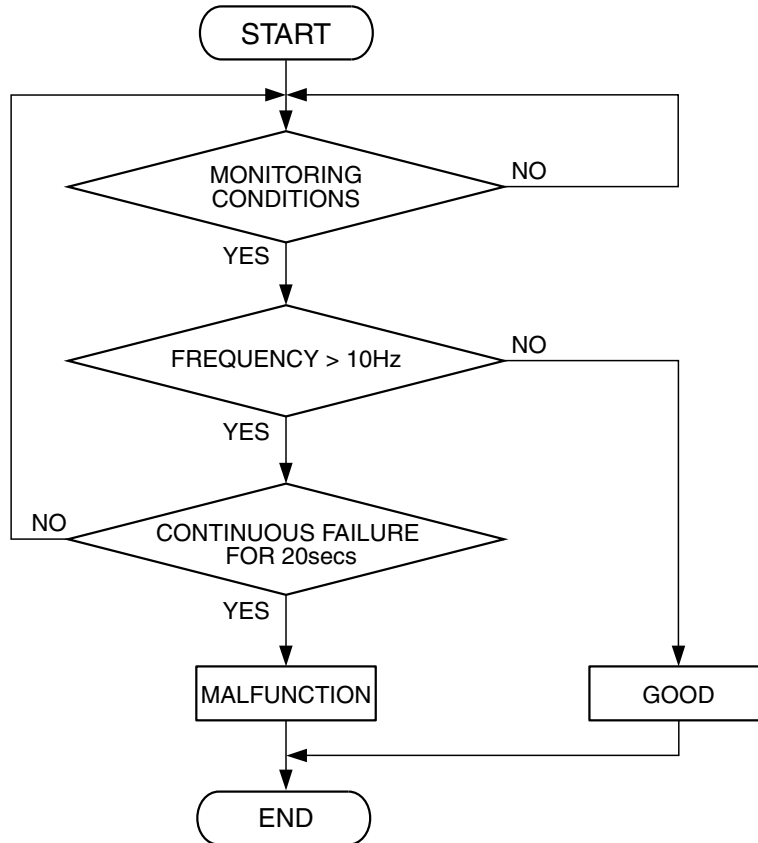
- Not applicable

**Sensor (The sensor below is determined to be normal)**

- Engine coolant temperature sensor

**DTC SET CONDITIONS**

**Logic Flow Chart**



AK302410

**Check Conditions**

- Engine coolant temperature is higher than 30°C (86°F).
- Vehicle speed is higher than 50 km/h (31 mph).

**Judgment Criteria**

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

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

- Power steering pressure switch failed.
- Incorrect power steering fluid level.
- Incorrect oil pump pressure.
- Harness damage in power steering pressure switch circuit, or connector damage.
- PCM failed.

**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, check data list item 27: Power Steering Pressure Switch.****⚠ CAUTION**

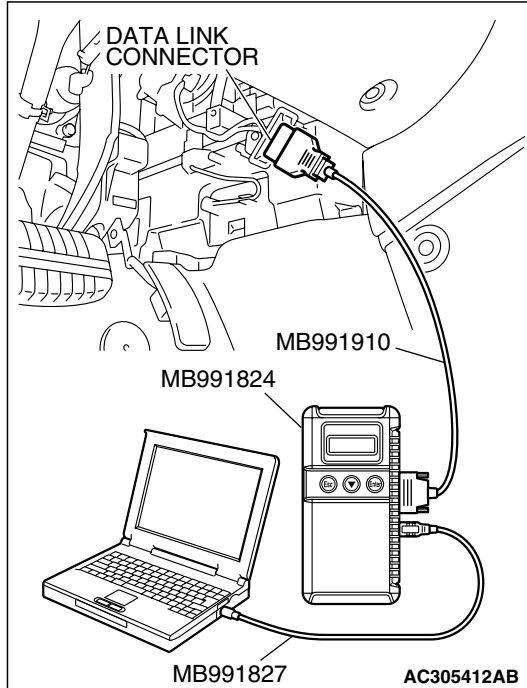
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

**Q: Is the sensor operating properly?**

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

**NO** : Go to Step 2.

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

Refer to GROUP 37, On-Vehicle Service – Fluid Level Check [P.37-20](#).

**Q: Are there any abnormalities?**

**YES** : Repair it. Then go to Step 7.

**NO** : Go to Step 3.

**STEP 3. Check the power steering pressure switch.**

Refer to GROUP 37, On-Vehicle Service – Power Steering Pressure Switch Check [P.37-23](#).

**Q: Are there any abnormalities?**

**YES** : Replace the power steering pressure switch. Then go to Step 7.

**NO** : Go to Step 4.

**STEP 4. Check the oil pump pressure .**

Refer to GROUP 37, On-Vehicle Service – Oil Pump Pressure Test [P.37-4](#).

**Q: Are there any abnormalities?**

**YES** : Repair it. Then go to Step 7.

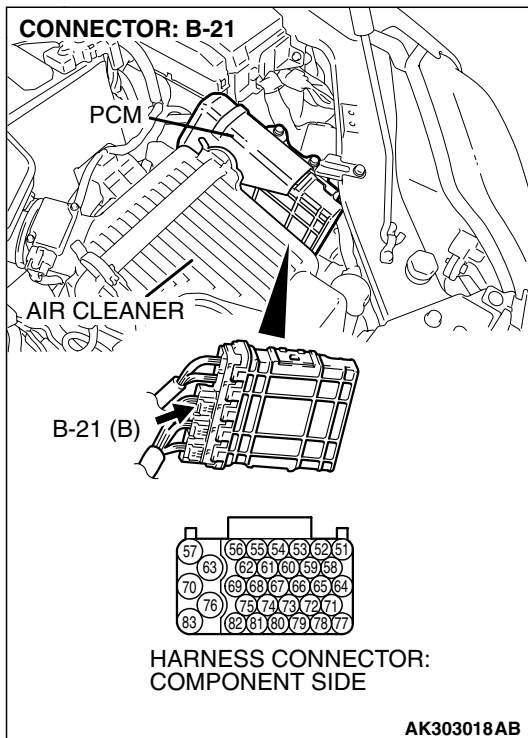
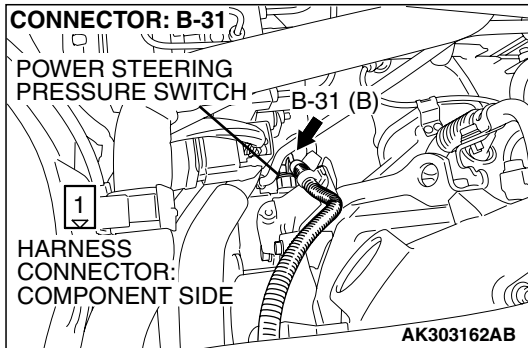
**NO** : Go to Step 5.

**STEP 5. Check harness connector B-31 at the power steering pressure switch and harness connector B-21 at PCM for damage.**

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

**YES** : Go to Step 6.

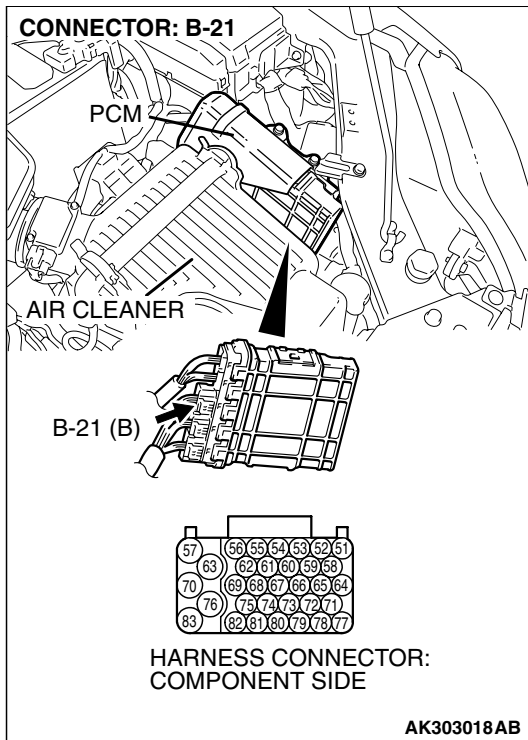
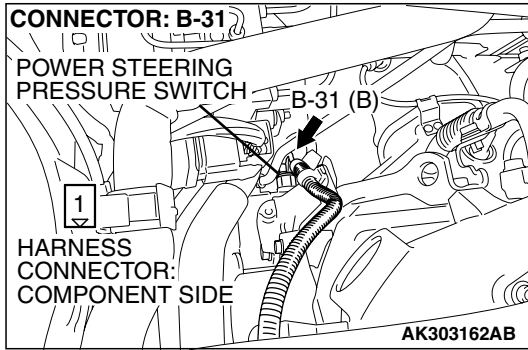
**NO** : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 7.



**STEP 6. Check for harness damage between power steering pressure switch connector B-31 (terminal No. 1) and PCM connector B-21 (terminal No. 78).**

**Q: Is the harness wire in good condition?**

- YES :** Replace the PCM. Then go to Step 7.
- NO :** Repair it. Then go to Step 7.



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

**⚠ CAUTION**

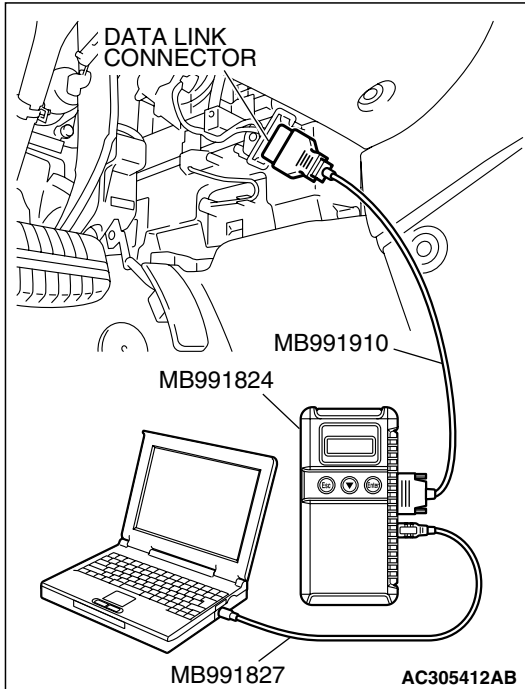
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

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

**Q: Is the switch operating properly?**

**YES :** The inspection is complete.

**NO :** Retry the troubleshooting.



## DTC P0603: EEP ROM Malfunction

### TECHNICAL DESCRIPTION

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

### DESCRIPTIONS OF MONITOR METHODS

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

### MONITOR EXECUTION

Once per driving cycle

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

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

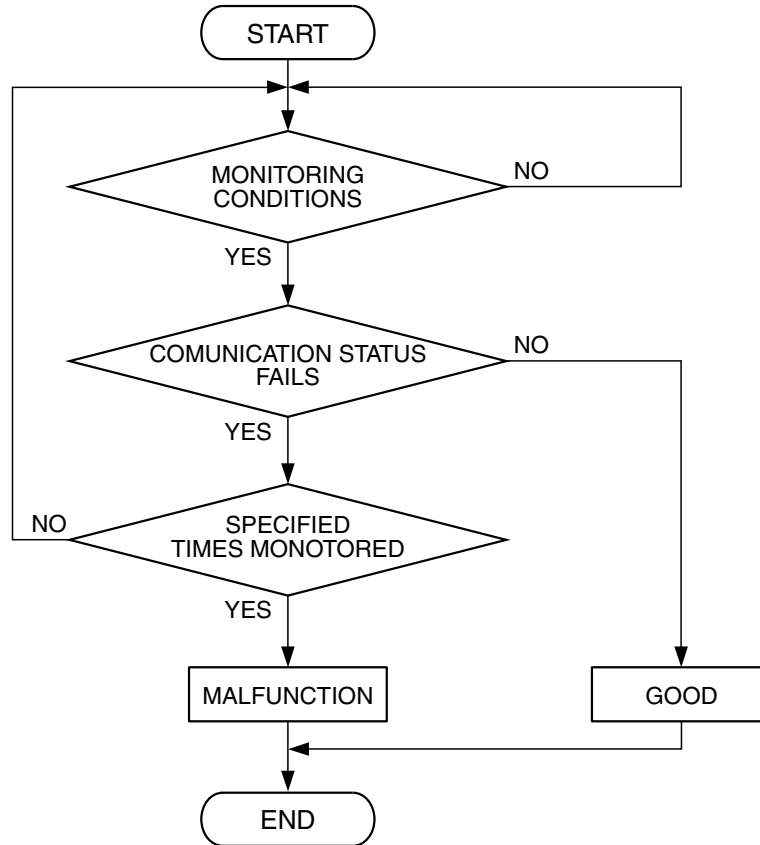
- Not applicable

**Sensor (The sensor below is determined to be normal)**

- Not applicable

**DTC SET CONDITIONS**

**Logic Flow Chart**



AK401535

**Check Conditions**

- Ignition switch is in "ON" position.

**Judgement Criteria**

- 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:)**

- PCM 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**

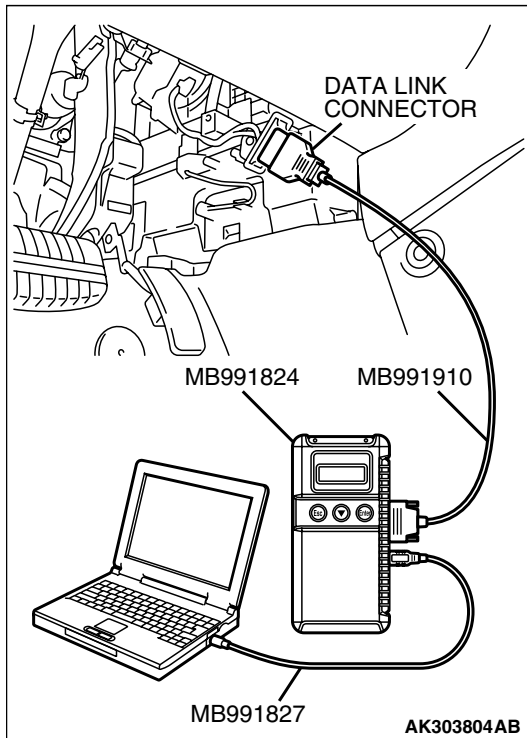
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 P0603 set?**

**YES :** Replace the PCM.

**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: Powertrain Control Module Main Processor Malfunction**

**TECHNICAL DESCRIPTION**

- Throttle actuator control module processor checks the PCM for abnormal conditions.

**DESCRIPTIONS OF MONITOR METHODS**

No watch dog pulse is detected.

**MONITOR EXECUTION**

Continuous

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

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

- Not applicable

**Sensor** (The sensor below is determined to be normal)

- Not applicable

**DTC SET CONDITIONS**

**Check Conditions**

- Ignition switch is "ON" position.

**Judgement Criteria**

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

**OBD-II DRIVE CYCLE PATTERN**

None.

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

- PCM 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**

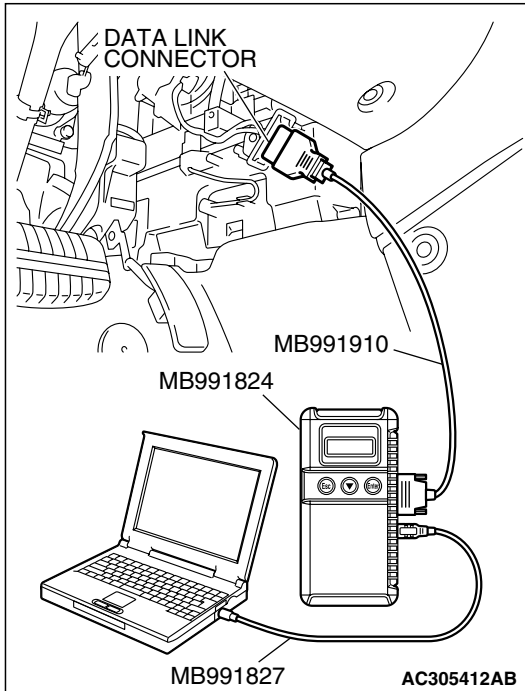
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 P0606 set?

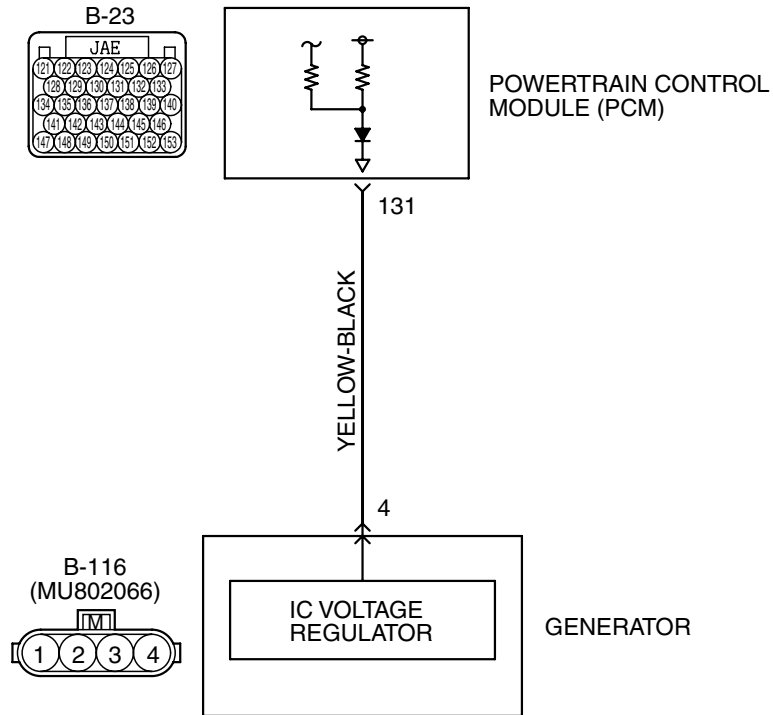
**YES** : Replace the PCM.

**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](#).

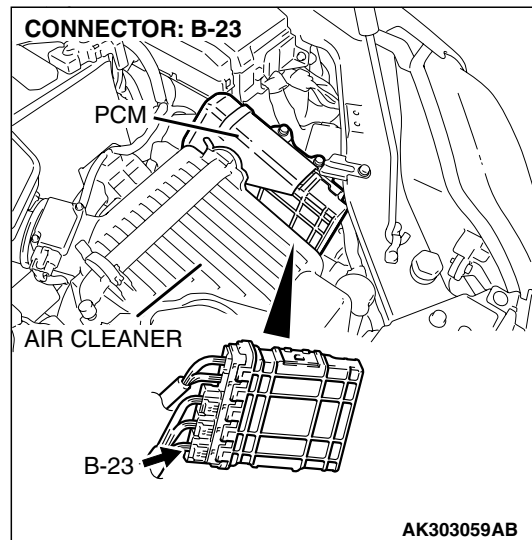
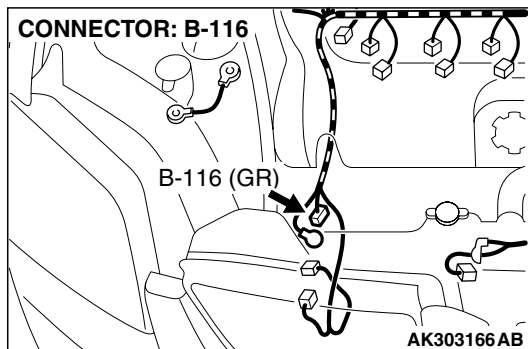


DTC P0622: Generator FR Terminal Circuit Malfunction

Generator Circuit



AK400895



**CIRCUIT OPERATION**

- The PCM (terminal No. 131) apply a battery positive voltage into the generator FR terminal No. 4 via resistance inside the unit.

**TECHNICAL DESCRIPTION**

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

**DTC SET CONDITIONS**

**Check Conditions**

- Engine speed is higher than 50 r/min.

**Judgement Criteria**

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

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

- )
- Generator failed.
  - Open or shorted circuit in generator FR terminal circuit, harness damage or connector damage.
  - PCM failed.

**DIAGNOSIS**

**Required Special Tools:**

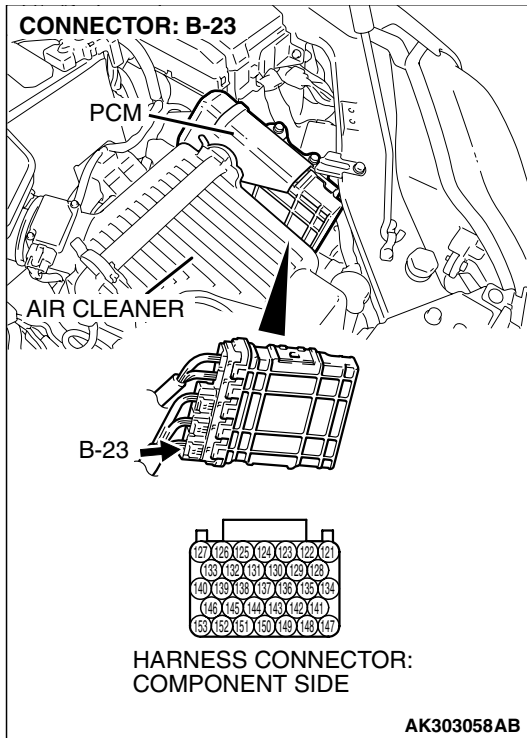
- MB991958: Scan tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MB991923: Power Plant ECU Check Harness

**STEP 1. Check harness connector B-23 at PCM connector for damage.**

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

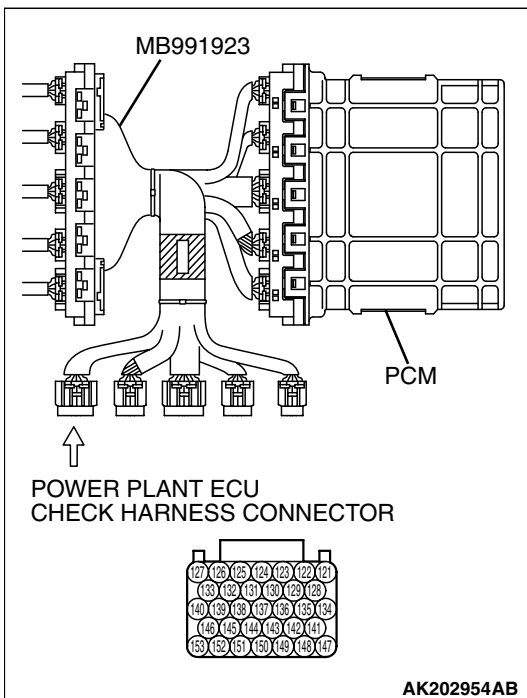
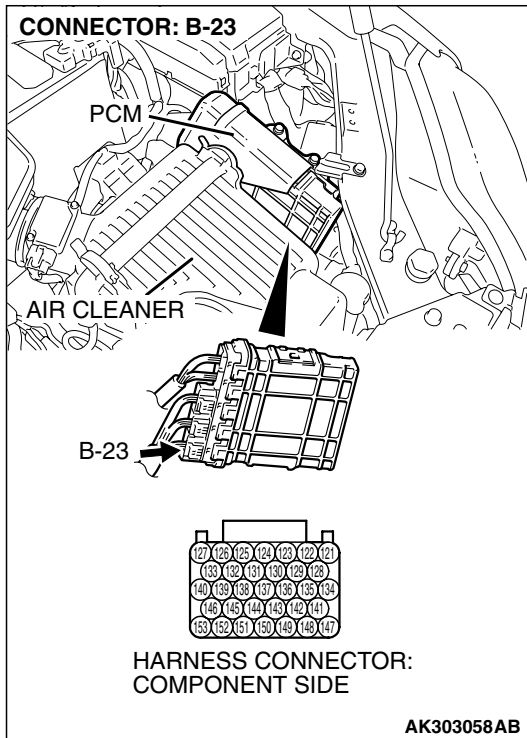
**YES :** Go to Step 2.

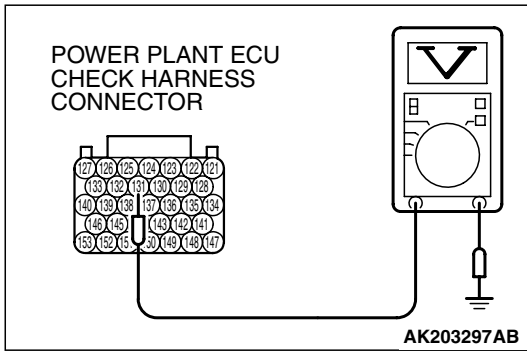
**NO :** Repair or replace it. Refer to GROUP 00E, Harness Conector Inspection [P.00E-2](#). Then go to Step 8.



**STEP 2. Measure the voltage at PCM connector B-23 by using power plant ECU check harness special tool MB991923.**

- (1) Disconnect the all PCM connectors and connect 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: Vehicles for Canada, the headlight, taillight, etc. remain lit even when the lighting switch is in "OFF" position but this is no problem for checks.*

- 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**

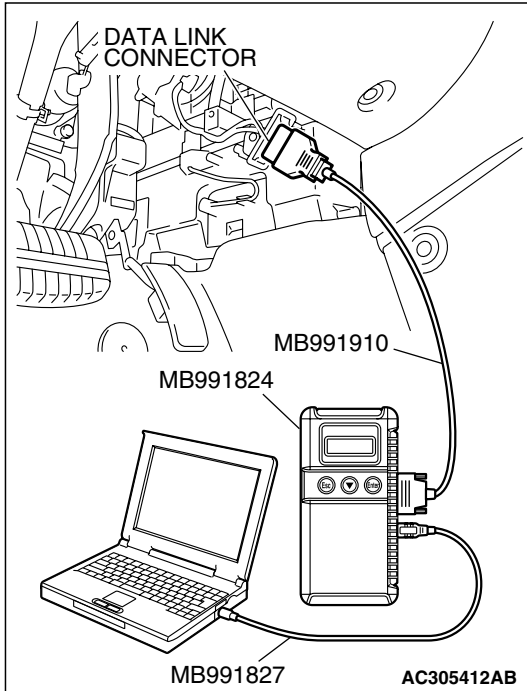
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (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 PCM. Then go to Step 8.

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

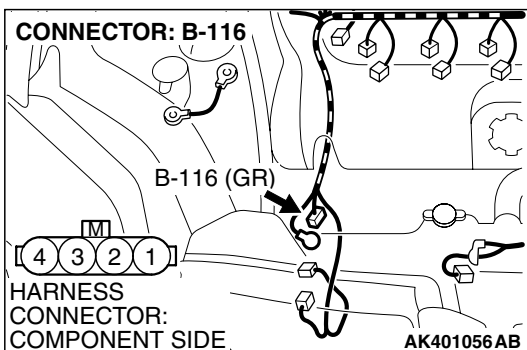


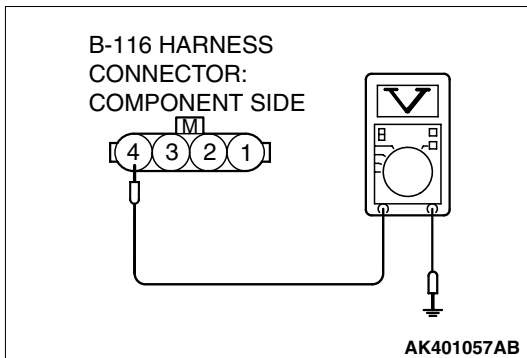
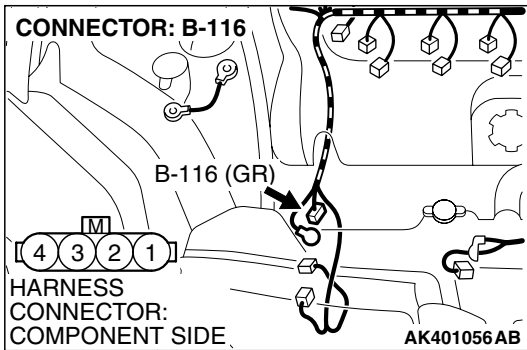
**STEP 4. Check harness connector B-116 at generator connector for damage.**

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

**YES** : Go to Step 5.

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





**STEP 5. Measure the voltage at generator harness side connector B-116.**

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

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

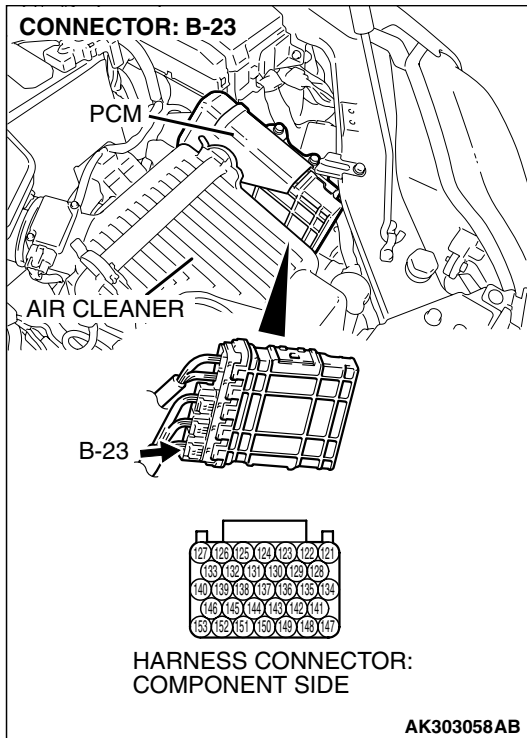
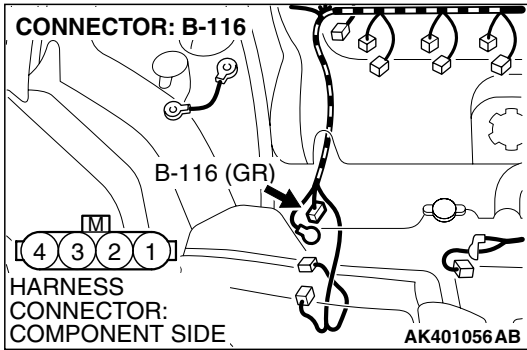
**Q: Is battery positive voltage (approximately 12 volts) present?**

- 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-116 (terminal No. 4) and PCM connector B-23 (terminal No. 131).**

**Q: Is the harness wire in good condition?**

- YES :** Replace the PCM. Then go to Step 8.
- NO :** Repair it. Then go to Step 8.

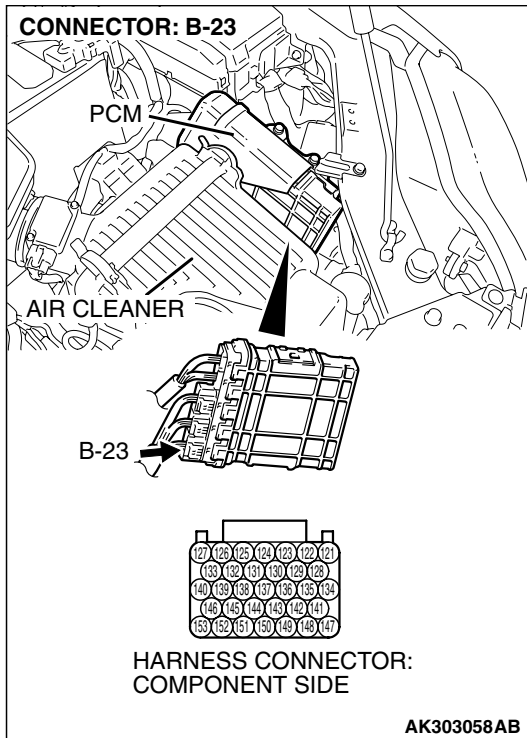
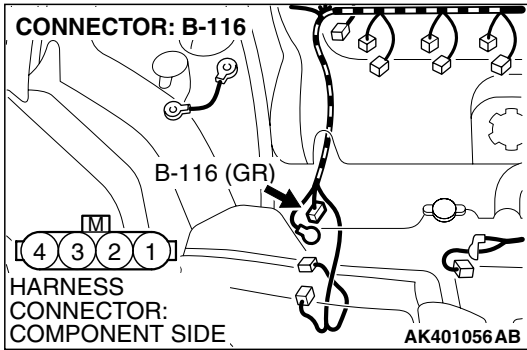


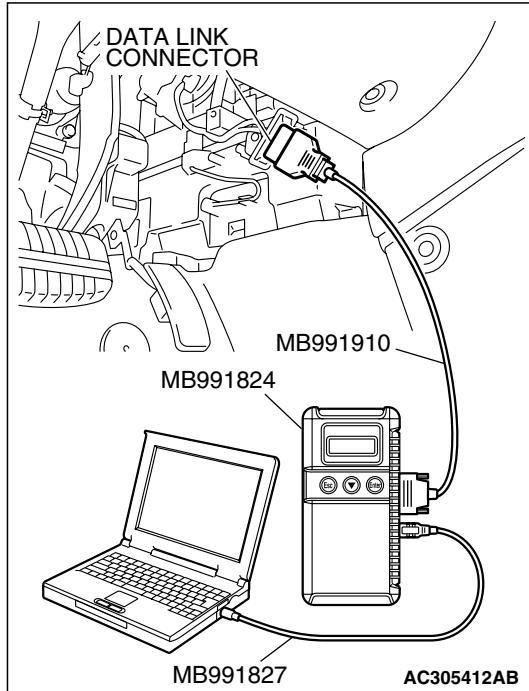


**STEP 7. Check for harness damage between generator connector B-116 (terminal No. 4) and PCM connector B-23 (terminal No. 131).**

**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 PCM by the vehicle manufacturer.

### DESCRIPTIONS OF MONITOR METHODS

The PCM 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)

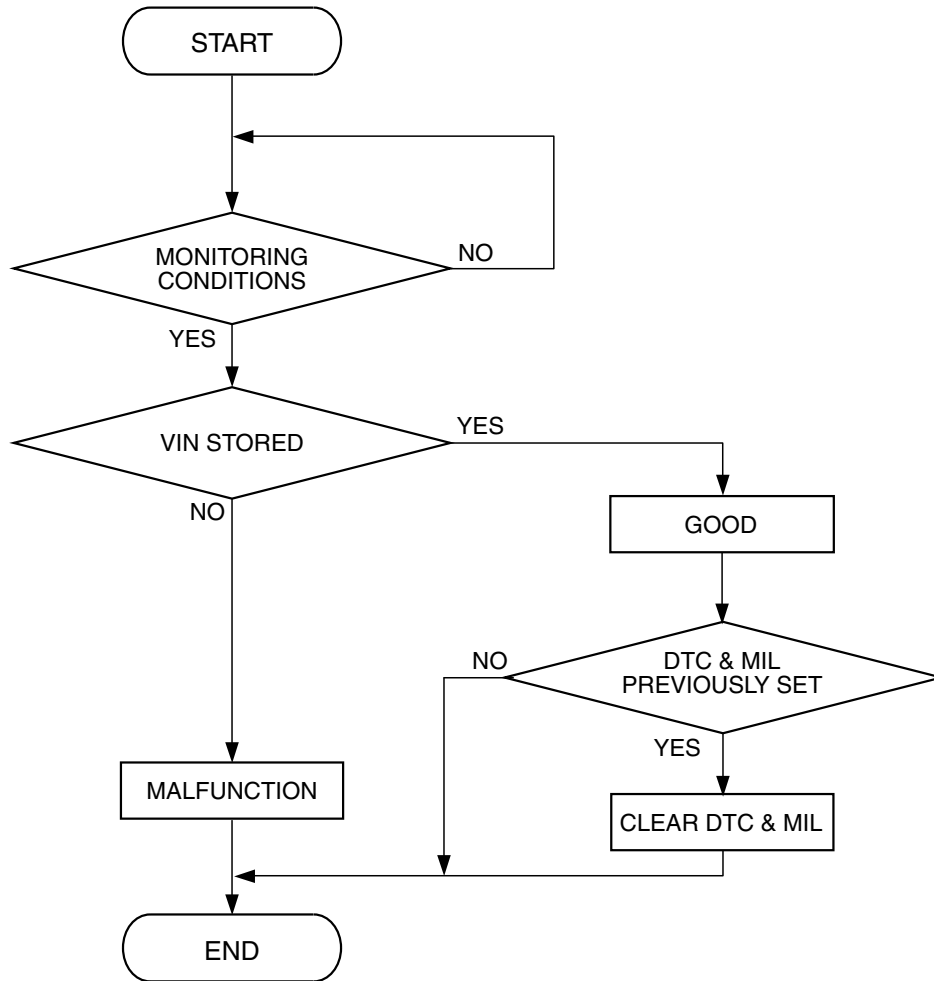
- Not applicable

**Sensor** (The sensor below is determined to be normal)

- Not applicable

**DTC SET CONDITIONS**

**Logic Flow Chart**



AK401536

**Check Conditions**

- Ignition switch is in "ON" position.
- EEPROM is normal.

**Judgement Criteria**

- VIN (current) has not been written.

**OBD-II DRIVE CYCLE PATTERN**

None.

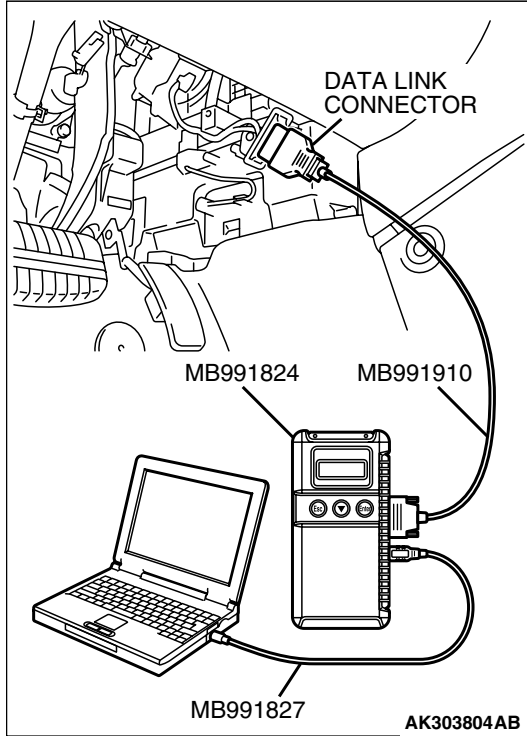
**TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)**

- PCM 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, check VIN Information.**

**⚠ CAUTION**

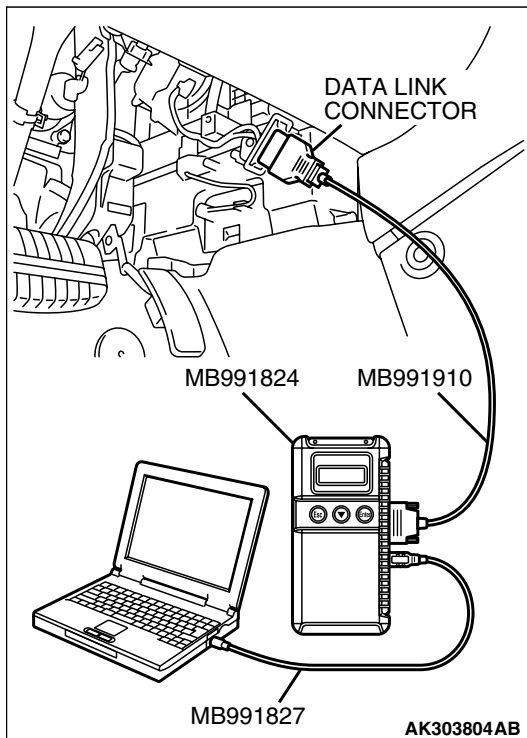
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (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 PCM.

**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 PCM.  
**NO** : The inspection is complete.

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

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**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.13B-932](#).

**CIRCUIT OPERATION**

- Refer to DTC P2101 – Throttle Actuator Control Motor Circuit [P.13B-932](#).

**TECHNICAL DESCRIPTION**

- PCM checks the electronic controlled throttle system for abnormal conditions.

**DESCRIPTIONS OF MONITOR METHODS**

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

**MONITOR EXECUTION**

Continuous

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

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

- Not applicable

**Sensor (The sensor below is determined to be normal)**

- Not applicable

**DTC SET CONDITIONS**

**Check Conditions**

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

**Judgement Criteria**

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

**Check Conditions**

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

**Judgement Criteria**

- Difference between throttle position sensor (main) output voltage and target throttle position sensor (main) voltage is 1 volt or higher for 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.
- PCM 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, check data list item 9A: Throttle Position Sensor (main) Mid Opening Learning Value.**

**⚠ CAUTION**

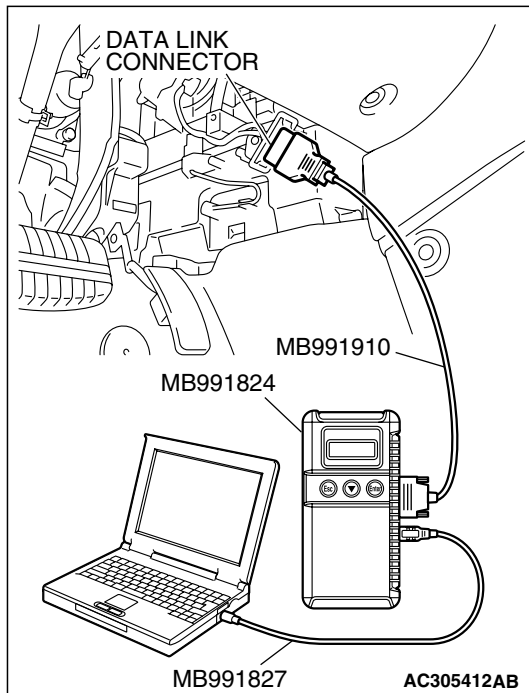
**To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.**

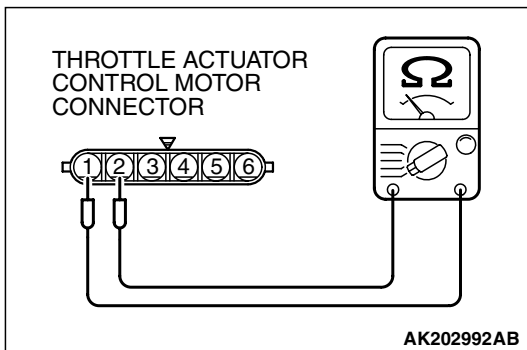
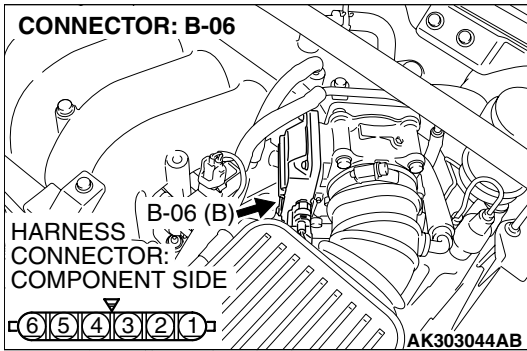
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 9A, Throttle position sensor (main) mid opening learning value.
  - Check that it is between 0.6 and 1.2 volts.
- (4) Turn the ignition switch to the "LOCK"(OFF) position.

**Q: Is the measured voltage 4 volts or less?**

**YES :** Go to Step 2. .

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





**STEP 2. Check the throttle actuator control motor.**

(1) Disconnect the connector B-06.

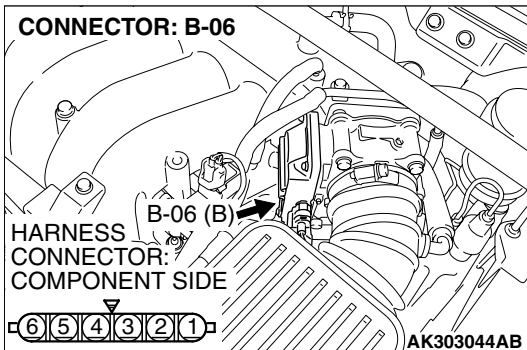
(2) Measure the resistance between throttle actuator control motor side connector terminal No. 1 and No. 2.

**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.

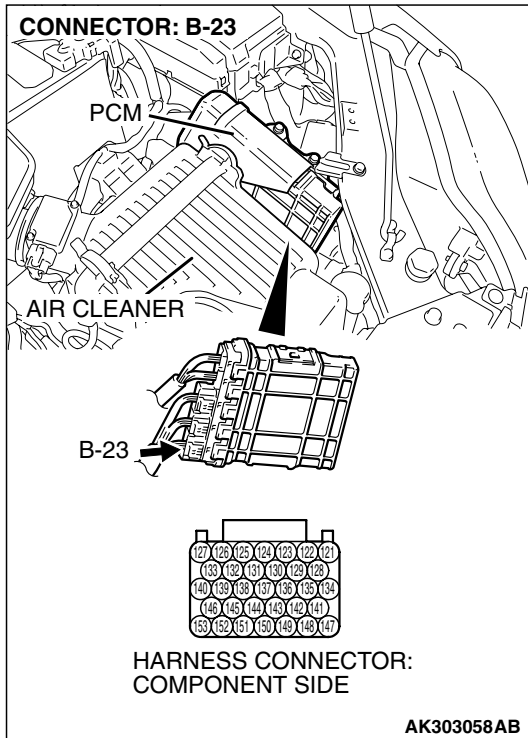


**STEP 3. Check harness connector B-06 at throttle actuator control motor for damage.**

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

**YES :** Go to Step 4.

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



**STEP 4. Check harness connector B-23 at PCM for damage.**

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

**YES :** Go to Step 5.

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

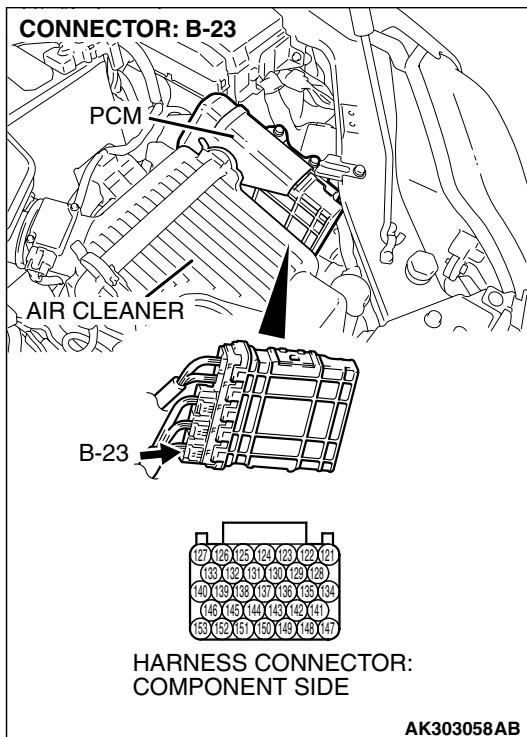
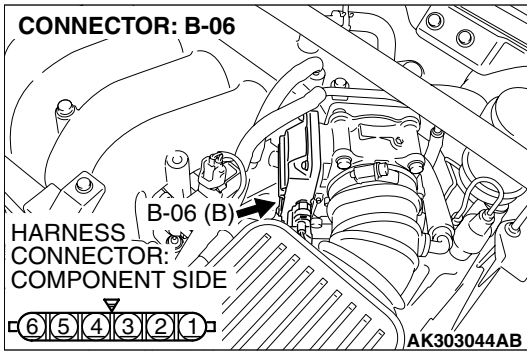


**STEP 5. Check for harness damage between throttle actuator control motor connector B-06 (terminal No. 1) and PCM connector B-23 (terminal No. 147).**

**Q: Is the harness wire in good condition?**

**YES :** Go to Step 6.

**NO :** Repair it. Then go to Step 8.

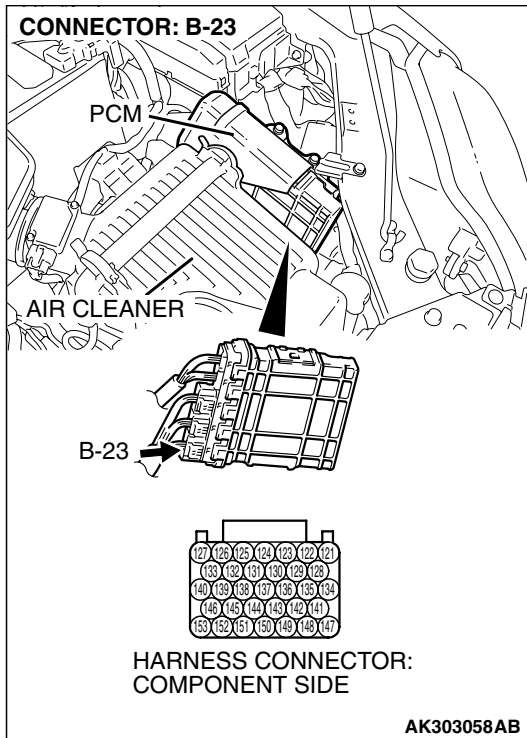
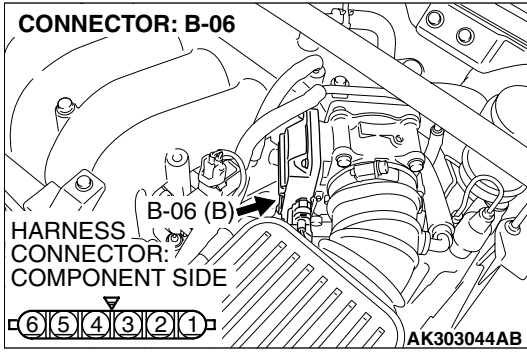


**STEP 6. Check for harness damage between throttle actuator control motor connector B-06 (terminal No. 2) and PCM connector B-23 (terminal No. 141).**

**Q: Is the harness wire in good condition?**

**YES :** Go to Step 7.

**NO :** Repair it. Then go to Step 8.



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

**⚠ CAUTION**

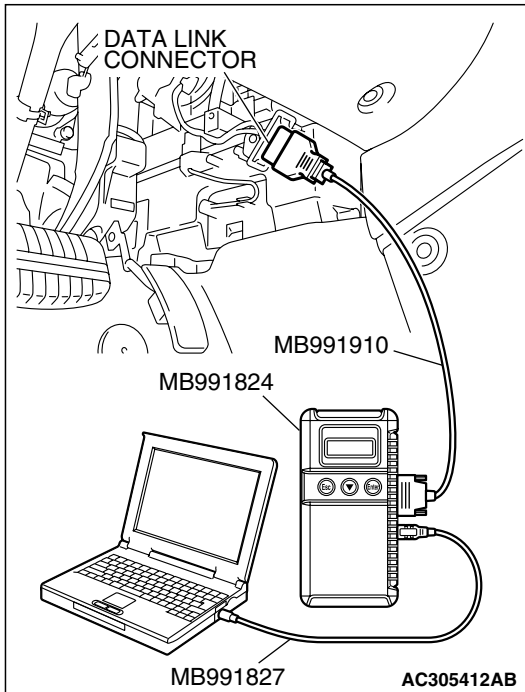
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

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

**Q: Is DTC P0638 set?**

**YES :** Replace the PCM. Then go to Step 8.

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



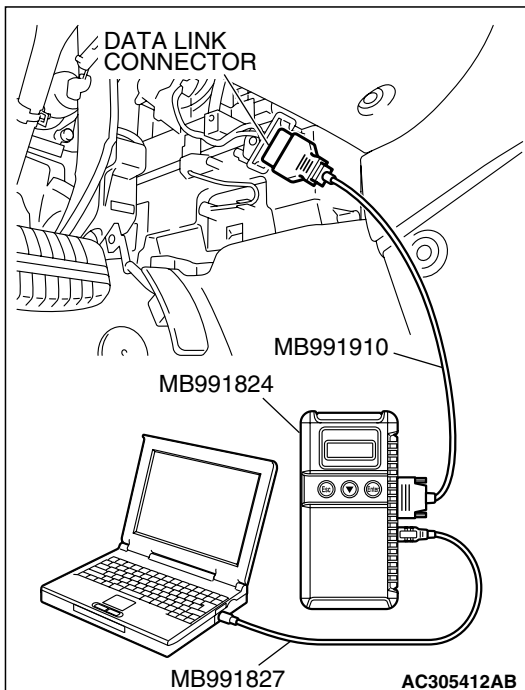
**STEP 8. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

- (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 P0638 set?**

**YES :** Retry the troubleshooting.

**NO :** The inspection is complete.



**DTC P0642: Throttle Position Sensor Power Supply**

---

**TECHNICAL DESCRIPTION**

- PCM 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:)**

- PCM 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**

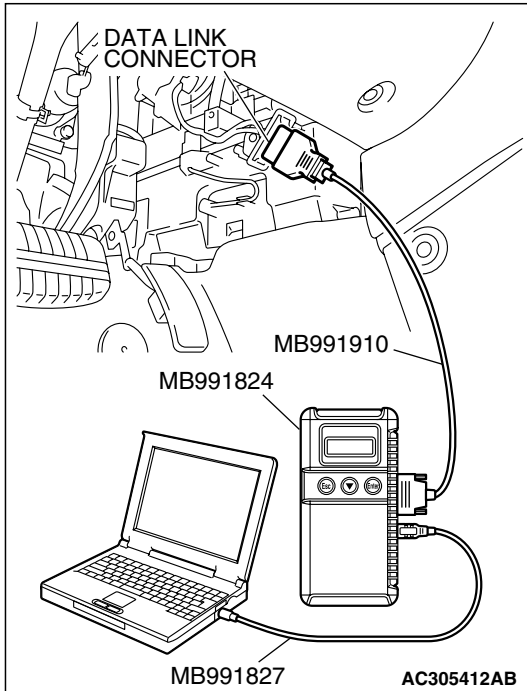
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 P0642 set?**

**YES** : Replace the PCM.

**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](#).

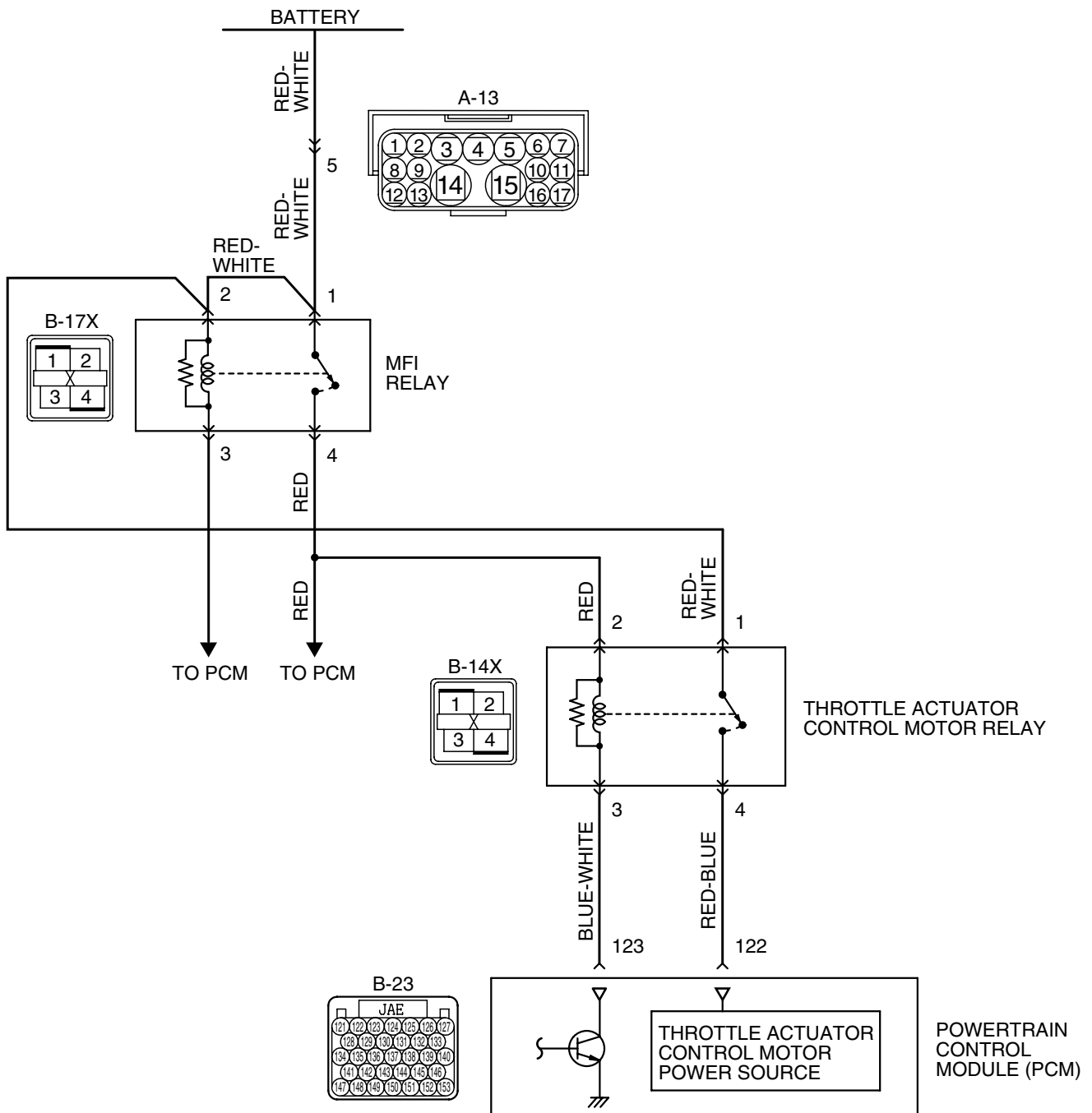


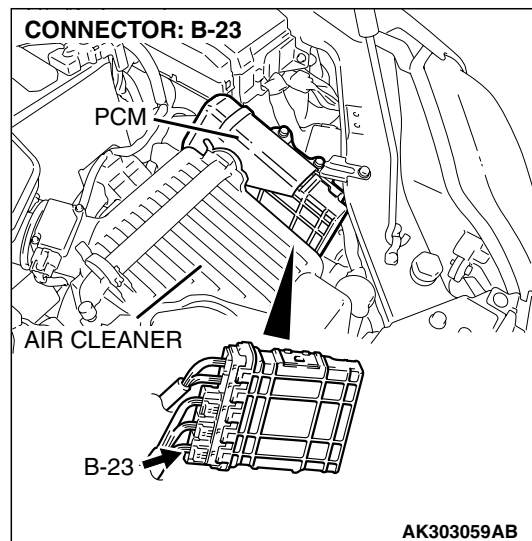
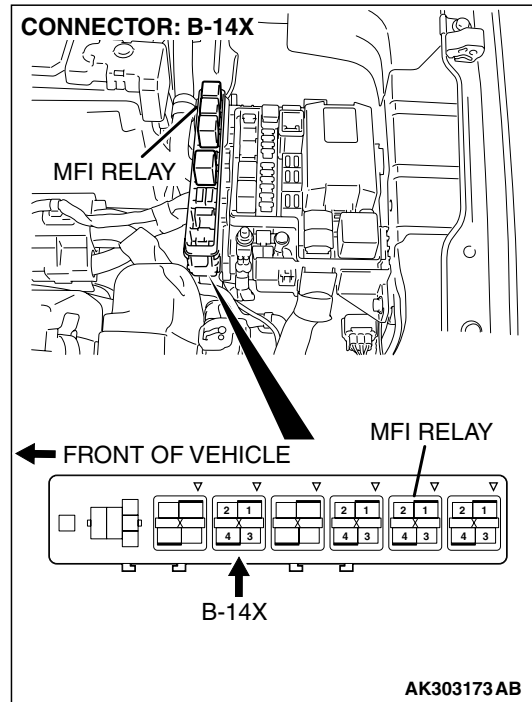
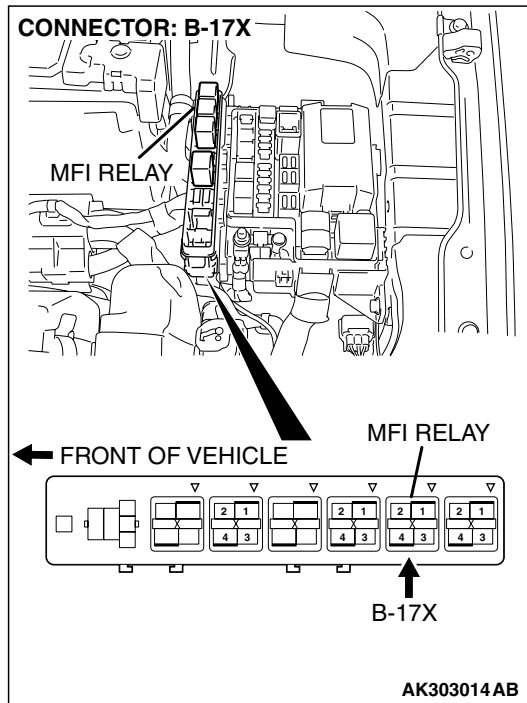
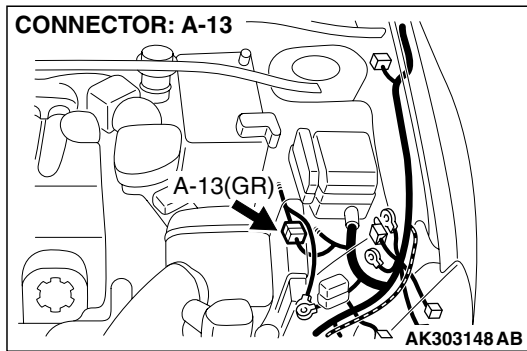
DTC P0657 Throttle Actuator Control Motor Relay Circuit Malfunction

**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 Control Motor Relay Circuit





## 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. 1).
- PCM (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. 1) to the PCM (terminal No. 122).

## TECHNICAL DESCRIPTION

- When the ignition switch ON signal is input into the PCM, the PCM turns ON the throttle actuator control motor relay.

## DTC SET CONDITIONS

### Check Condition

- Battery positive voltage is higher than 8.3 volts.

### Judgement Criteria

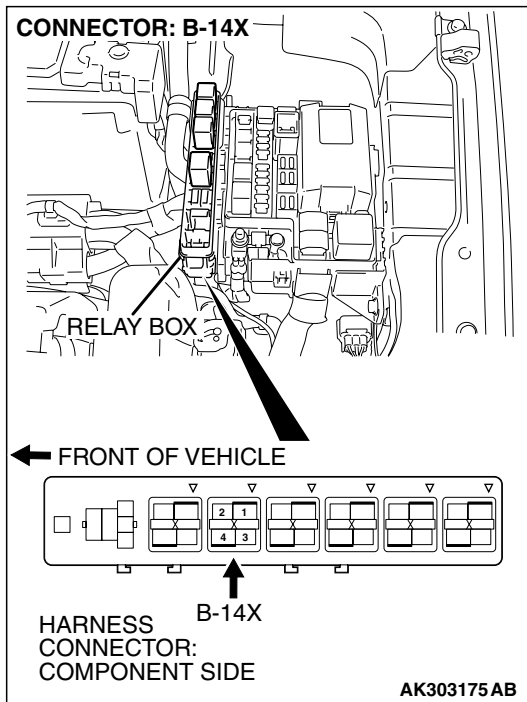
- The power line voltage of the electronic controlled throttle system should be 6.0 volts or less for 0.35 seconds.

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

- Throttle actuator control motor relay failed or mal-adjusted.
- Open or shorted throttle actuator control motor relay circuit, or loose connector.
- PCM 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. Check harness connector B-14X 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.

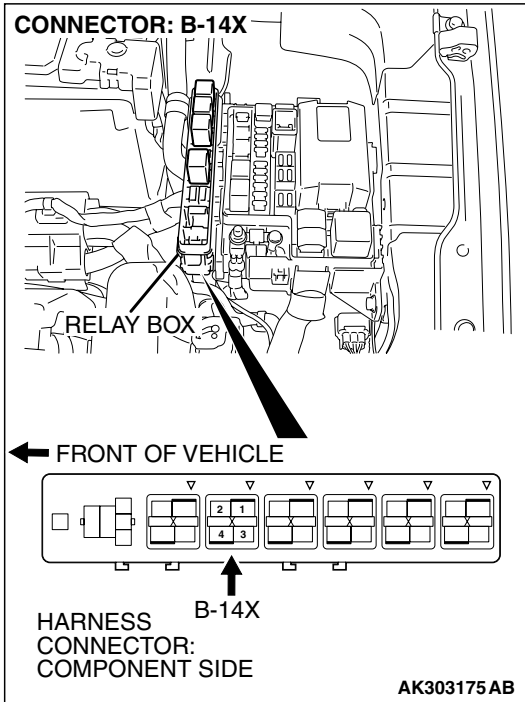


**STEP 2. Check the throttle actuator control motor relay.**

**⚠ CAUTION**

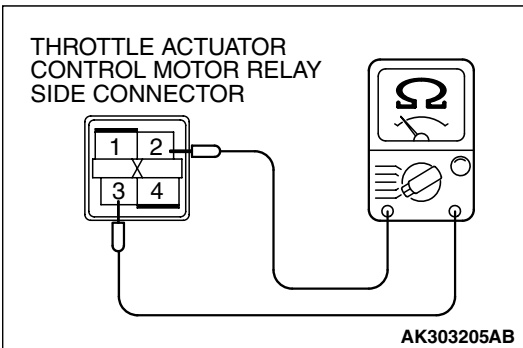
Because it is not possible to distinguish the top and the bottom of the throttle actuator control motor relay, inspect with the triangle mark printed on the relay facing upward.

(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.

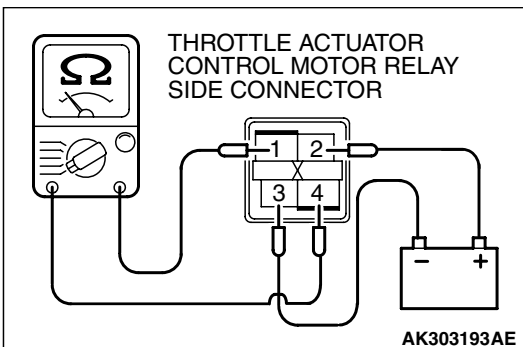
- Should be less than 2 ohms. (Negative battery terminal connected.)
- Should be open loop. (Negative battery terminal disconnected.)

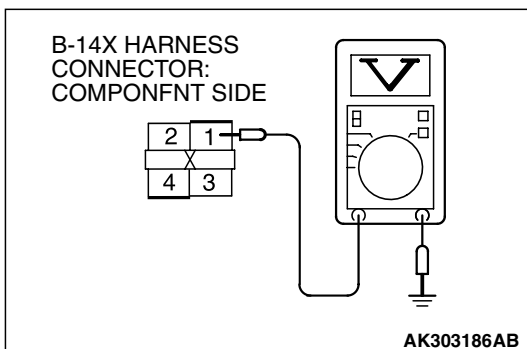
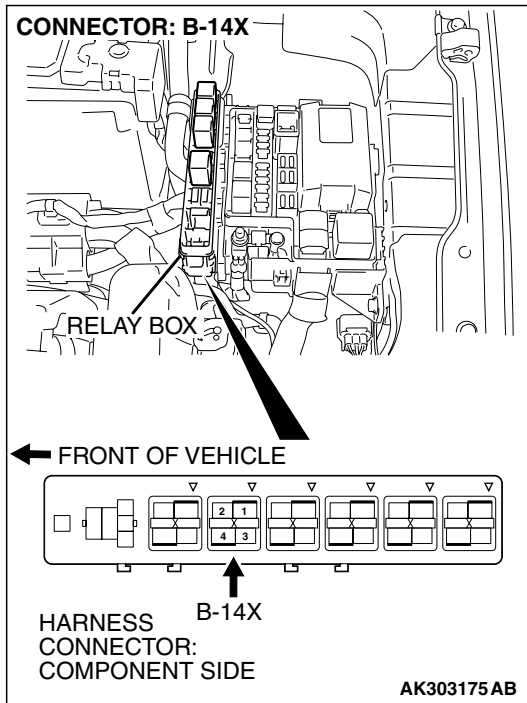
(5) Install the throttle actuator control motor relay.

**Q: Is the measured resistance normal?**

**YES** : Go to Step 3.

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





**STEP 3. Measure the power supply voltage at throttle actuator control motor relay harness side connector B-14X**

**⚠ CAUTION**

Because it is not possible to distinguish the top and the bottom of the throttle actuator control motor relay, inspect with the triangle mark printed on the relay connector at the wiring harness, inspect it by using triangle mark on the junction block as a reference.

(1) Disconnect the connector B-14X 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.

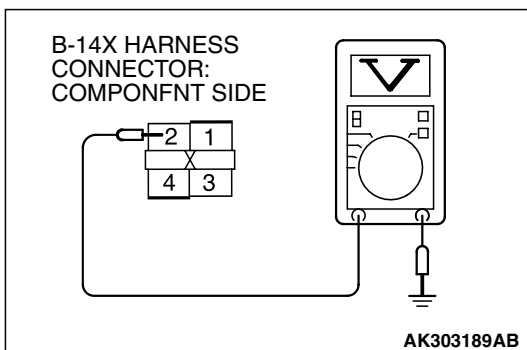
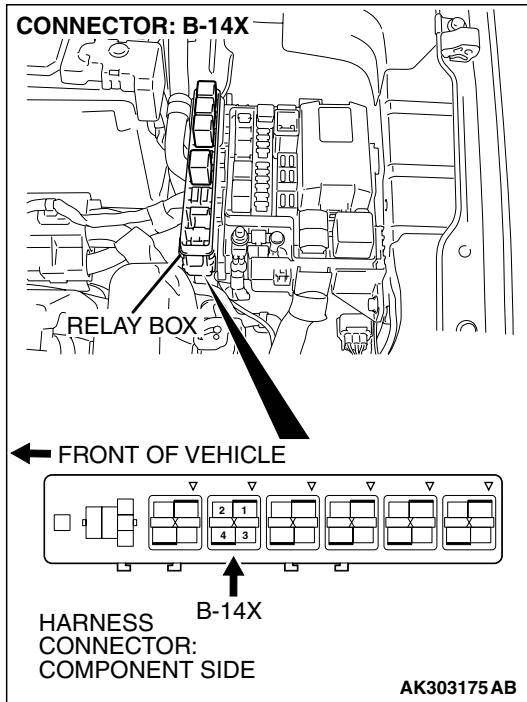
**NO :** Check harness connector A-13 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. If intermediate connector A-13 is in good condition, repair it because of open circuit or short circuit to ground between relay box (9) and throttle actuator control motor relay connector B-14X (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-14X.**

**⚠ CAUTION**

Because it is difficult to distinguish the top and the 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.

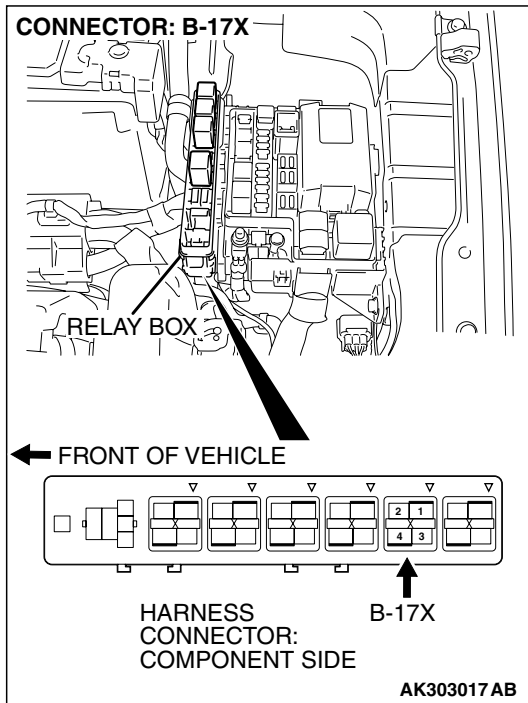
- (1) Disconnect the connector B-14X and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.



- (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?**

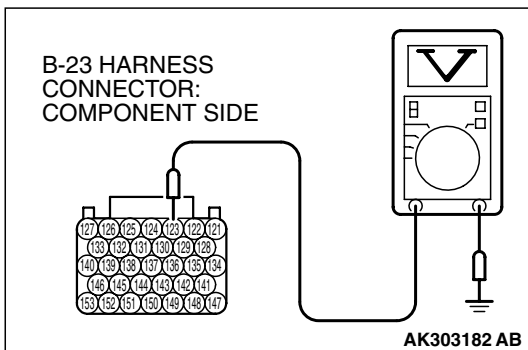
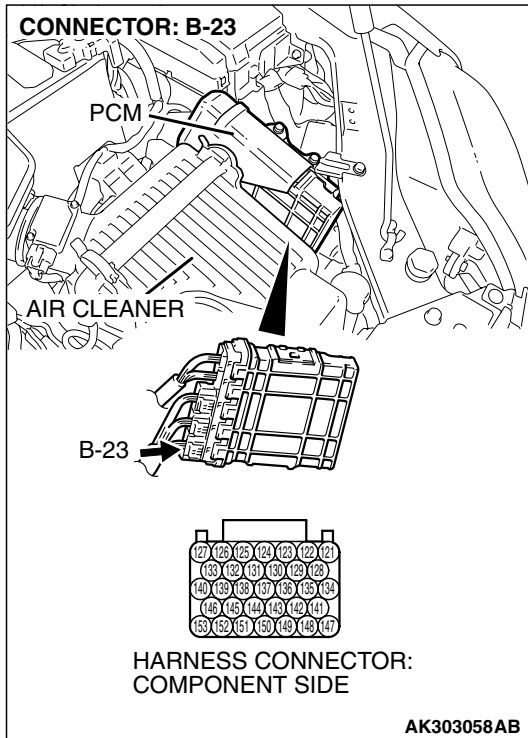
- YES :** Go to Step 6.  
**NO :** Go to Step 5.



**STEP 5. Check harness connector B-17X at MFI relay for damage.**

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

- YES :** Repair hamess wire between MFI relay connector B-17X (terminal No. 4) and throttle actuator control motor relay connector B-14X (terminal No. 1) because of open circuit or short circuit to ground. Then go to Step 14.
- NO :** Repair or replace it. Refer to GROUP 00E, Hamess Connector Inspection [P.00E-2](#). Then go to Step 14.



**STEP 6. Measure the power supply voltage at PCM harness side connector B-23.**

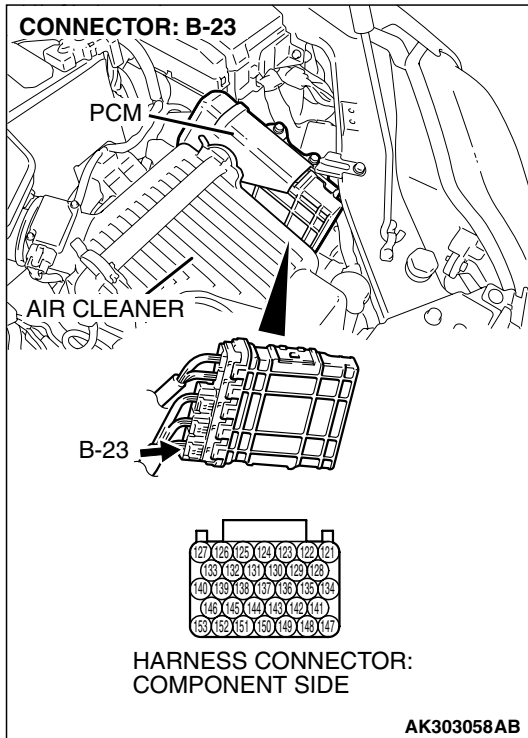
- (1) Disconnect the connector B-23 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

- (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?**

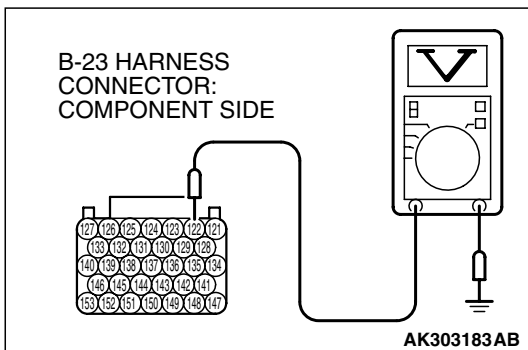
**YES :** Go to Step 7.

**NO :** Repair harness wire between throttle actuator control motor relay connector B-14X (terminal No. 3) and PCM connector B-23 (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 PCM harness side connector D-23.**

- (1) Disconnect the connector B-23 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.

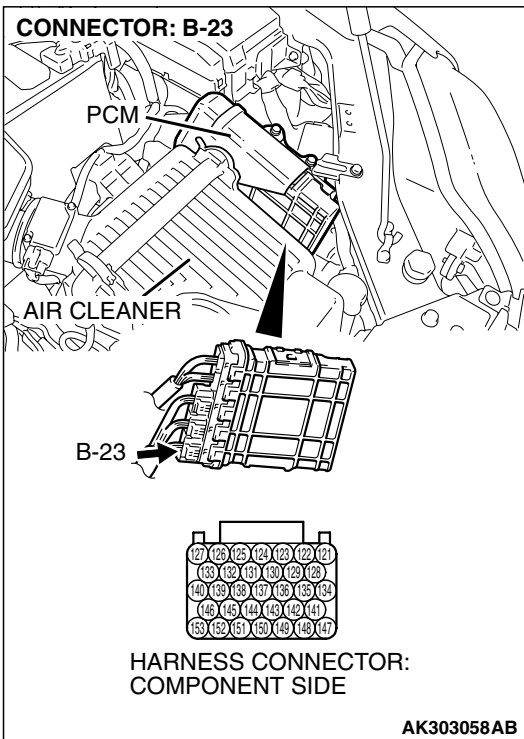
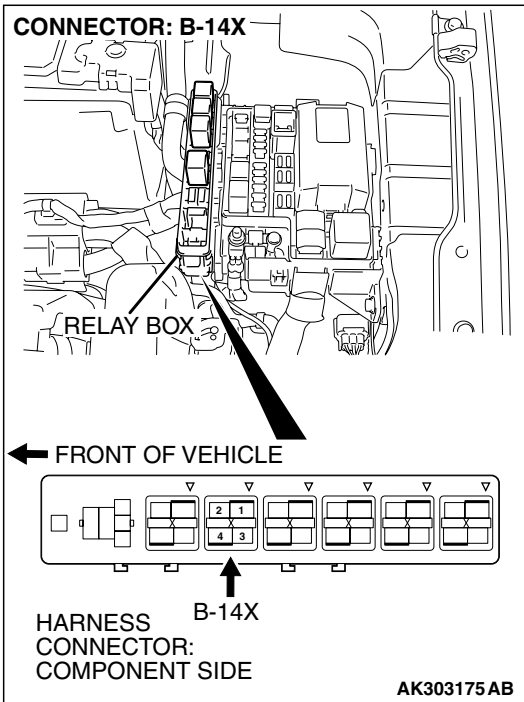
**NO :** Go to Step 8.

**STEP 8. Check for open circuit and short circuit to ground between throttle actuator control motor relay connector B-14X (terminal No. 4) and PCM connector B-23 (terminal No. 122).**

**Q: Is the harness wire in good condition?**

**YES :** Go to Step 9.

**NO :** Repair it. Then go to Step 14.

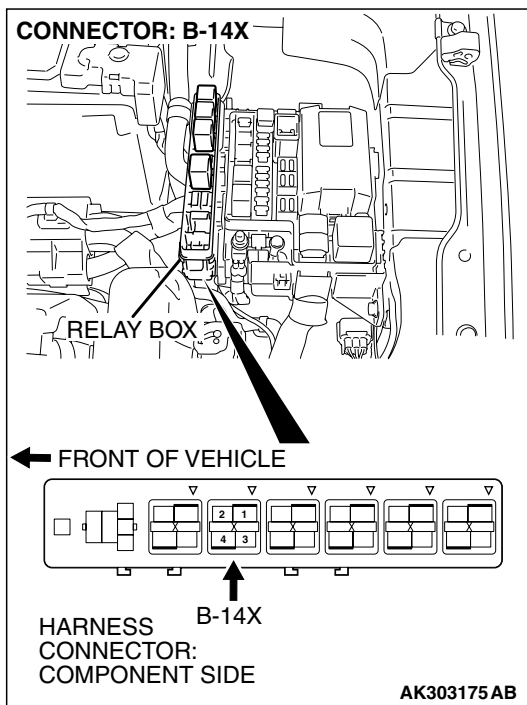
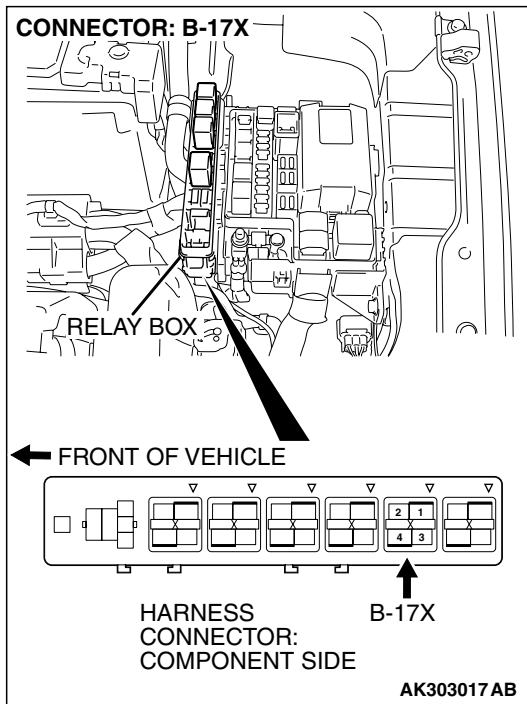


**STEP 9. Check for harness damage between MFI relay connector B-17X (terminal No. 4) and throttle actuator control motor relay connector B-14X (terminal No. 2).**

**Q: Is the harness wire in good condition?**

**YES :** Repair hamess wire between throttle actuator control motor relay connector B-14X (terminal No. 3) and PCM connector B-23 (terminal No. 123) because of harness damage. Then go to Step 14.

**NO :** Repair it. Then go to Step 14.



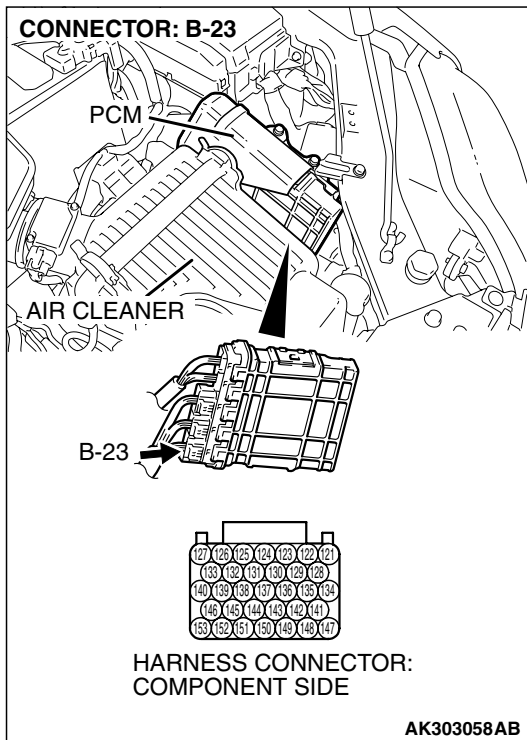


**STEP 10. Check harness connector B-23 at PCM for damage.**

**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.

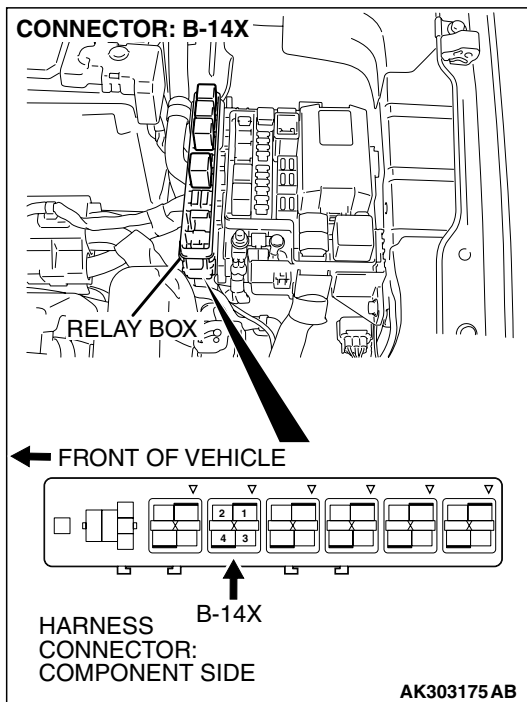


**STEP 11. Check for harness damage between battery and throttle actuator control motor relay connector B-14X (terminal No. 1).**

**Q: Is the harness wire in good condition?**

**YES :** Go to Step 12.

**NO :** Repair it. Then go to Step 14.

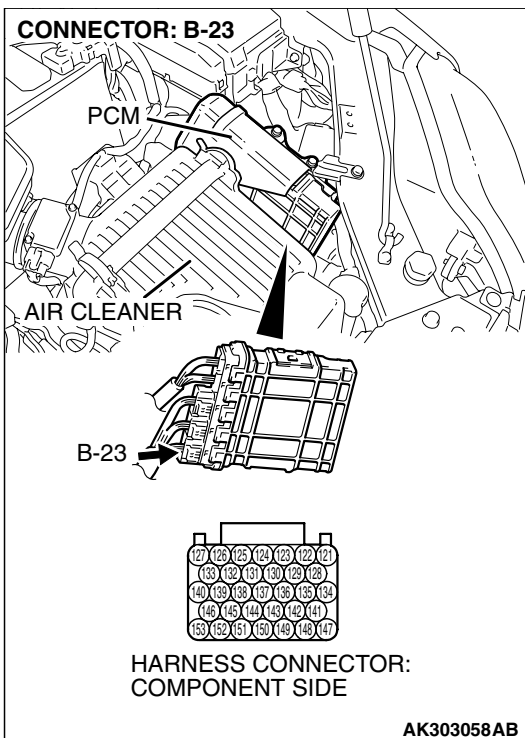
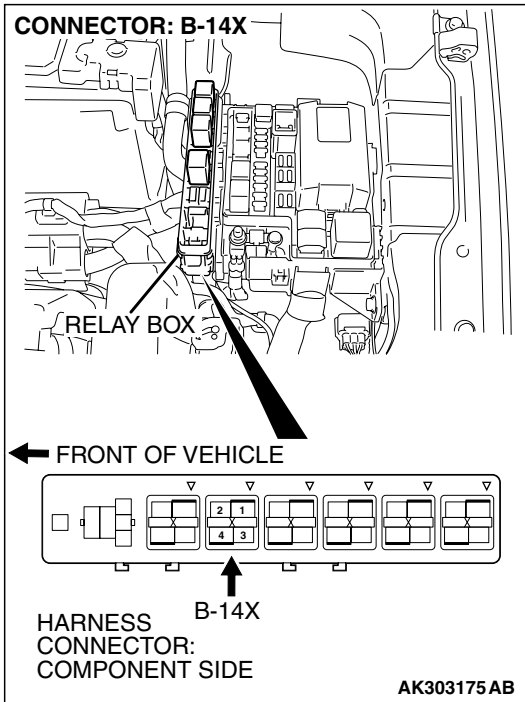


**STEP 12. Check for harness damage between throttle actuator control motor relay connector B-14X (terminal No. 4) and PCM connector B-23 (terminal No. 122).**

**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 MB991502, read the diagnostic trouble code (DTC).**

**⚠ CAUTION**

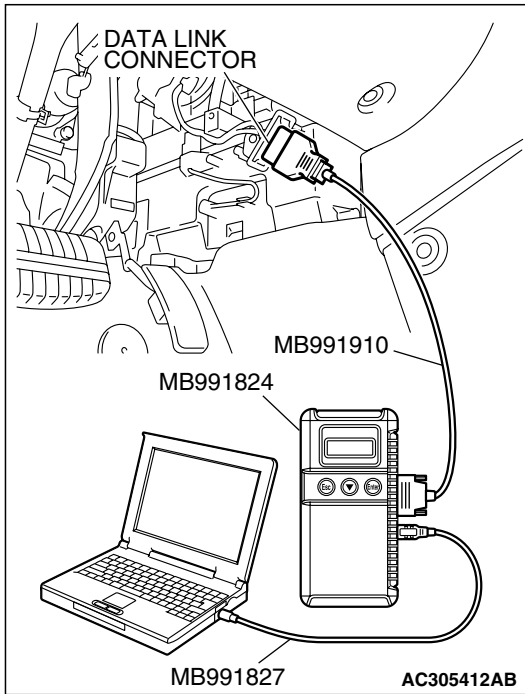
To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991502.

- (1) Connect scan tool MB991502 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 PCM. Then go to Step 14.

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



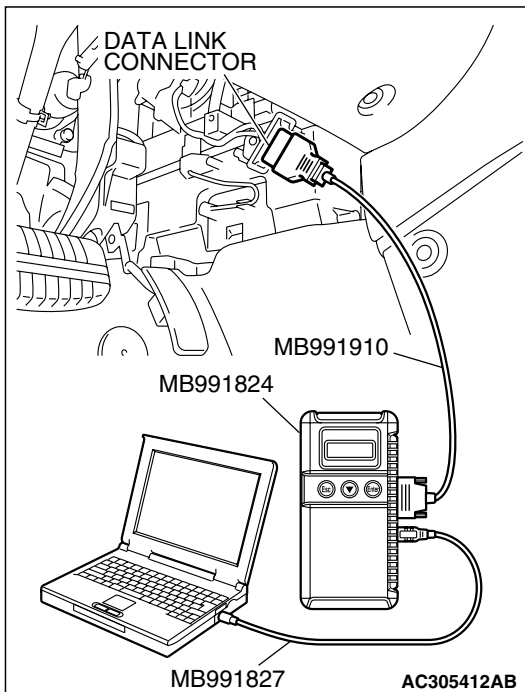
**STEP 14. Using scan tool MB991502, read the diagnostic trouble code (DTC).**

- (1) Connect scan tool MB991502 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 P1530: A/C1 Switch Circuit Intermittent****TECHNICAL DESCRIPTION**

- The A/C-ECU sends the "ON" signal of the A/C to the PCM.
- The PCM 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**

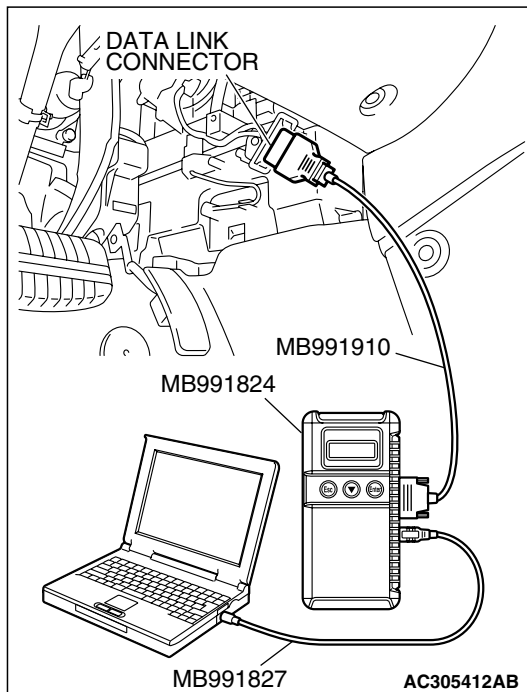
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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](#).



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**DTC P1602: Communication Malfunction (between PCM Main Processor and System LSI)**

---

**TECHNICAL DESCRIPTION**

- PCM checks the communication status for abnormal conditions.

**DESCRIPTIONS OF MONITOR METHODS**

Communication between PCM main processor and system LSI is impossible.

**MONITOR EXECUTION**

Continuous

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

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

- Not applicable

**Sensor (The sensor below is determined to be normal)**

- Not applicable

**DTC SET CONDITIONS**

**Check Conditions**

- Ignition switch is "ON" position.

**Judgement Criteria**

- PCM detects an error in communication between PCM 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:)**

- PCM 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**

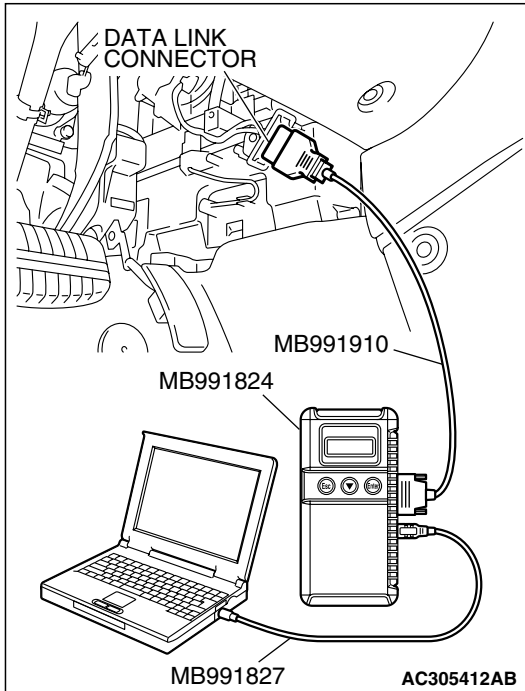
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 P01602 set?**

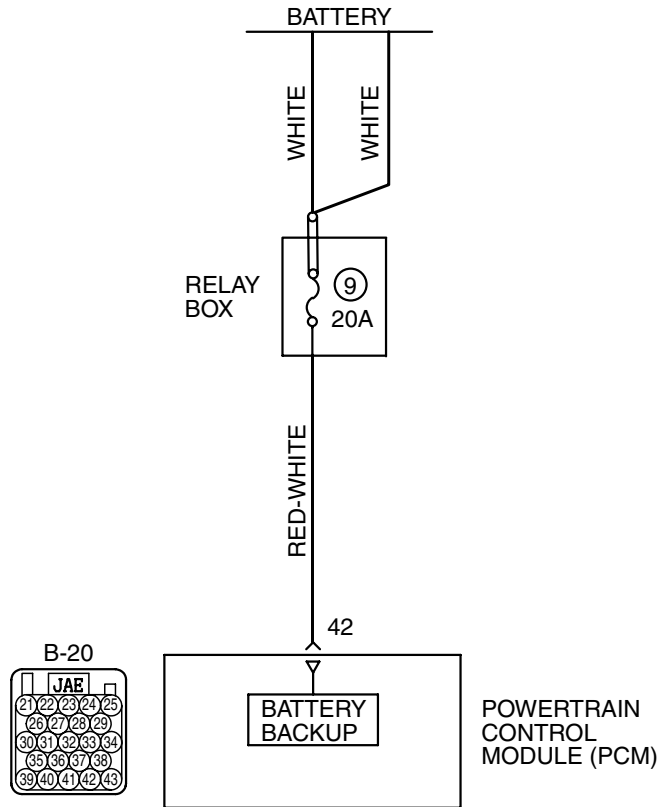
**YES** : Replace the PCM.

**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](#).

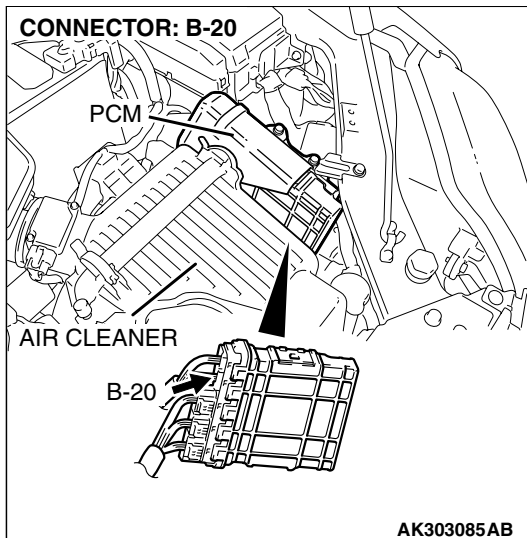


DTC P1603: Battery Backup Line Malfunction

Battery Backup Circuit



AK400898



**TECHNICAL DESCRIPTION**

- The PCM 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**

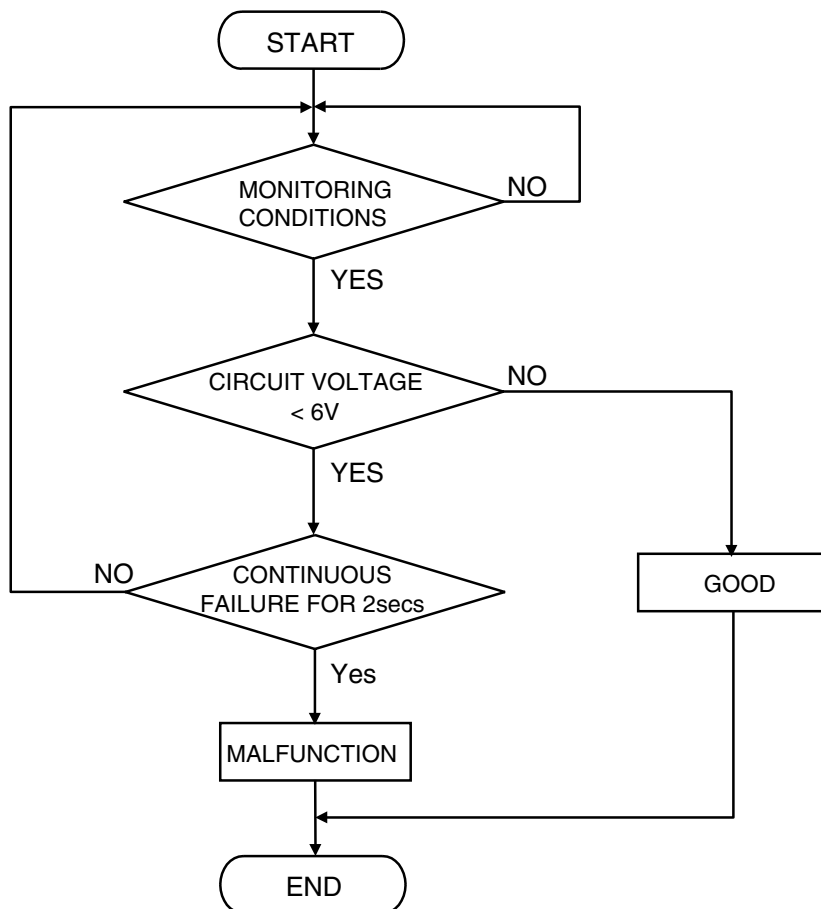
Battery backup line voltage is under specified value.

**MONITOR EXECUTION**

Continuous

**DTC SET CONDITIONS**

**Logic Flow Chart**



AK302411

**Check Conditions**

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

**Judgement Criteria**

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



## OBD-II DRIVE CYCLE PATTERN

None.

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

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

## 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**

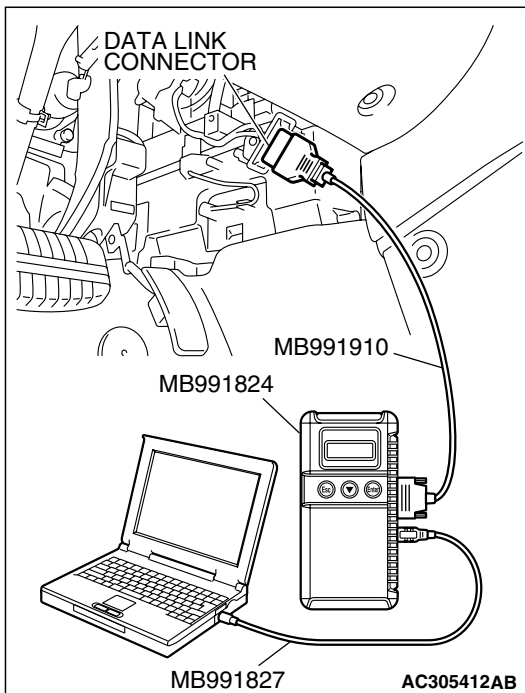
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (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?**

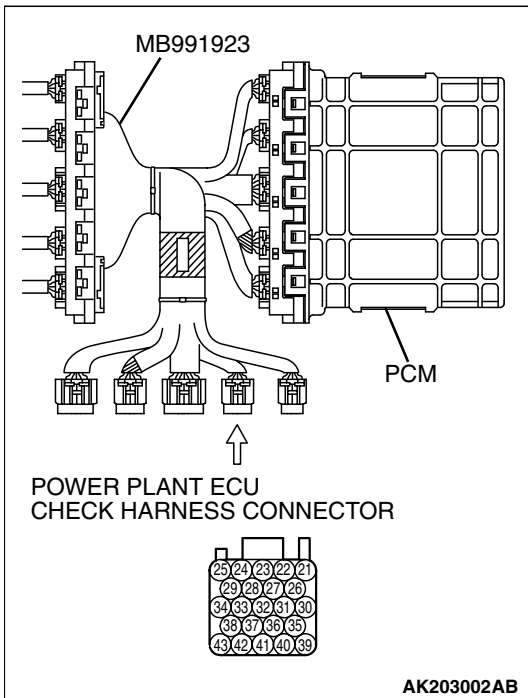
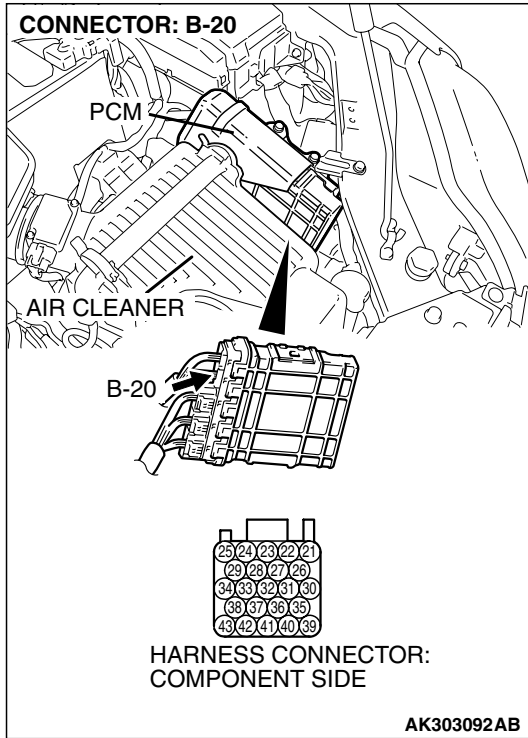
**YES** : Go to Step 2.

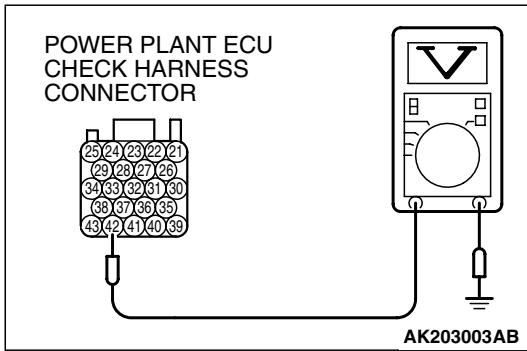
**NO** : The inspection is complete.



**STEP 2. Measure the backup power supply voltage at PCM connector B-20 by using power plant ECU check harness special tool MB991923.**

- (1) Disconnect the all PCM connectors and connect power plant ECU check harness special tool MB991923 between the separated connectors.





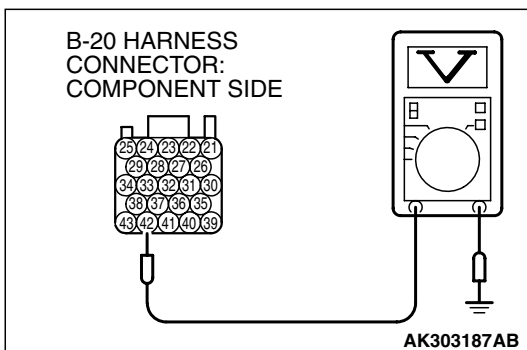
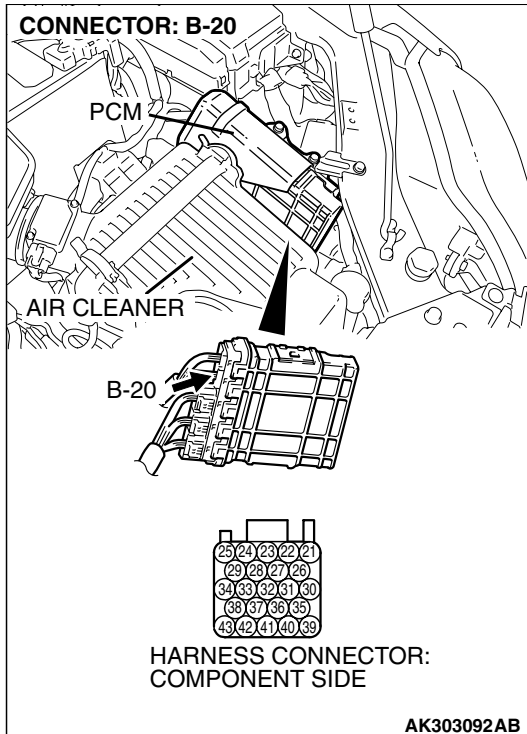
- (2) Measure the voltage between terminal No. 42 and ground.  
• Voltage should be battery positive voltage.

**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 PCM harness side connector B-20.**

- (1) Disconnect the PCM connector B-20 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?**

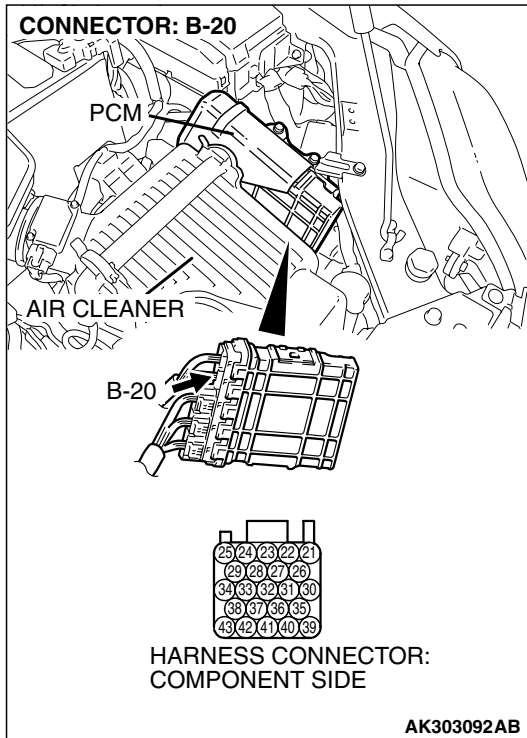
- YES :** Go to Step 4.  
**NO :** Repair harness wire between battery and PCM connector B-20 (terminal No. 42) because of open circuit or short circuit to ground. Then go to Step 6.

**STEP 4. Check harness connector B-20 at PCM for damage.**

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

**YES :** Repair hamess wire between battery and PCM connector B-20 (terminal No. 42) because of hamess damage. Then go to Step 6.

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

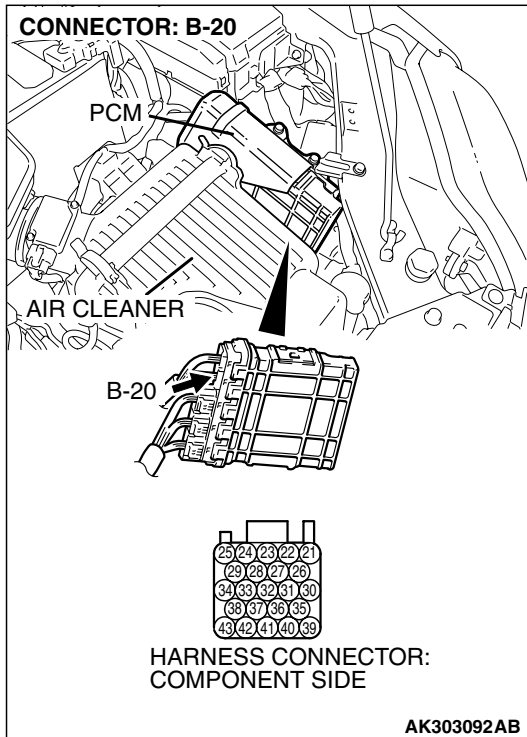


**STEP 5. Check harness connector B-20 at PCM for damage.**

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

**YES :** Replace the PCM. Then go to Step 6.

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



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

**⚠ CAUTION**

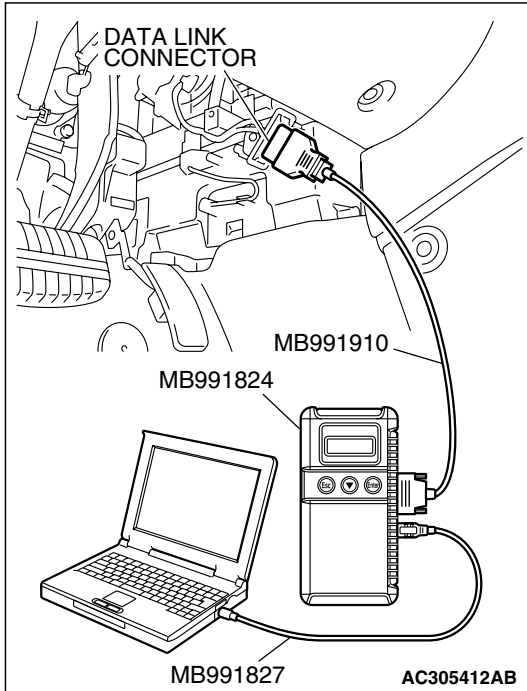
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (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?**

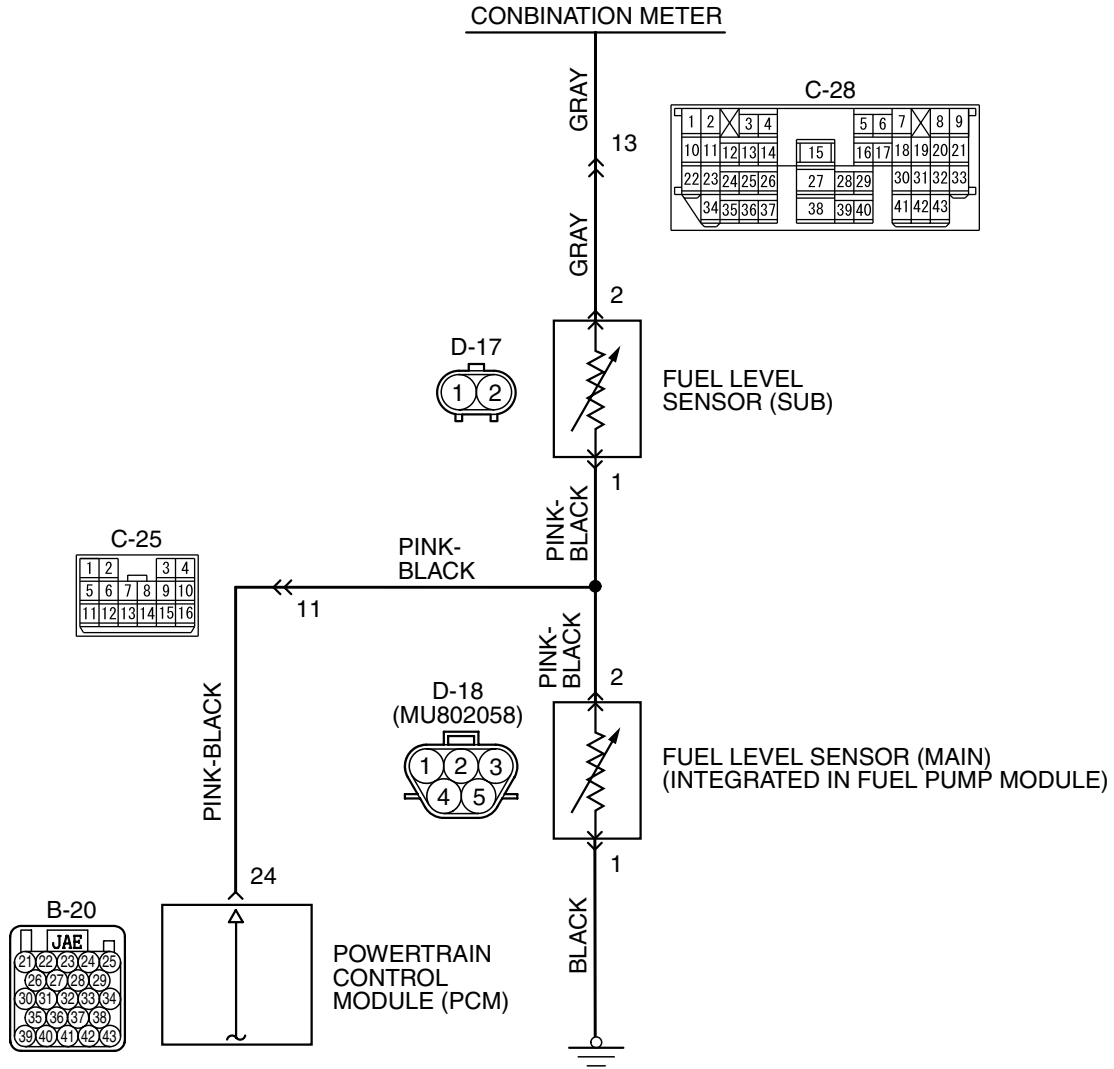
**YES :** Retry the troubleshooting.

**NO :** The inspection is complete.

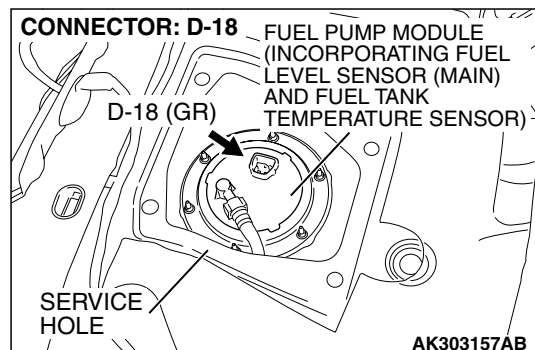
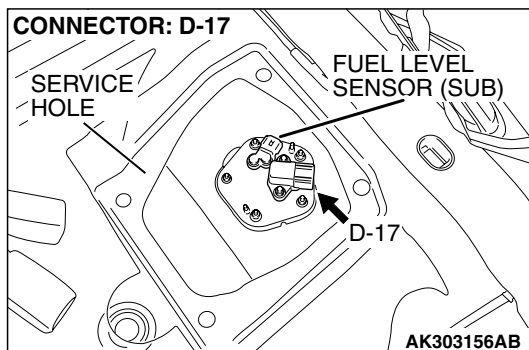


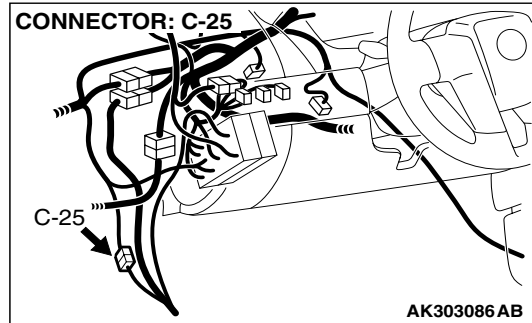
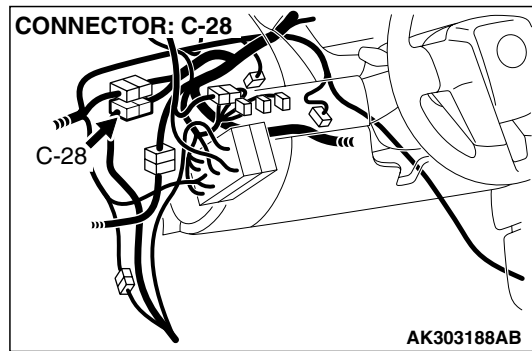
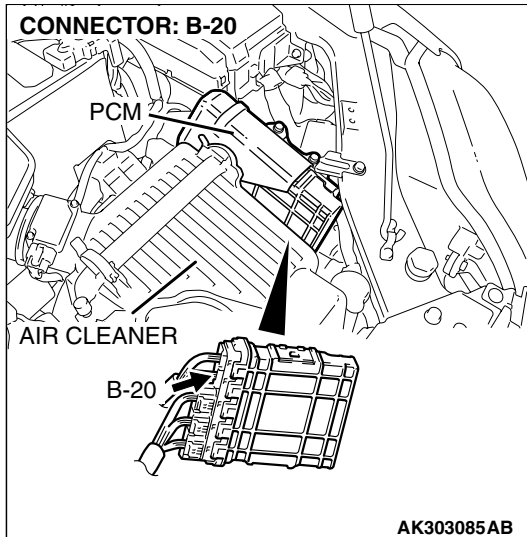
DTC P2066: Fuel Level Sensor (sub) Circuit Range/Performance

Fuel Level Sensor Circuit



AK400894





## 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)**

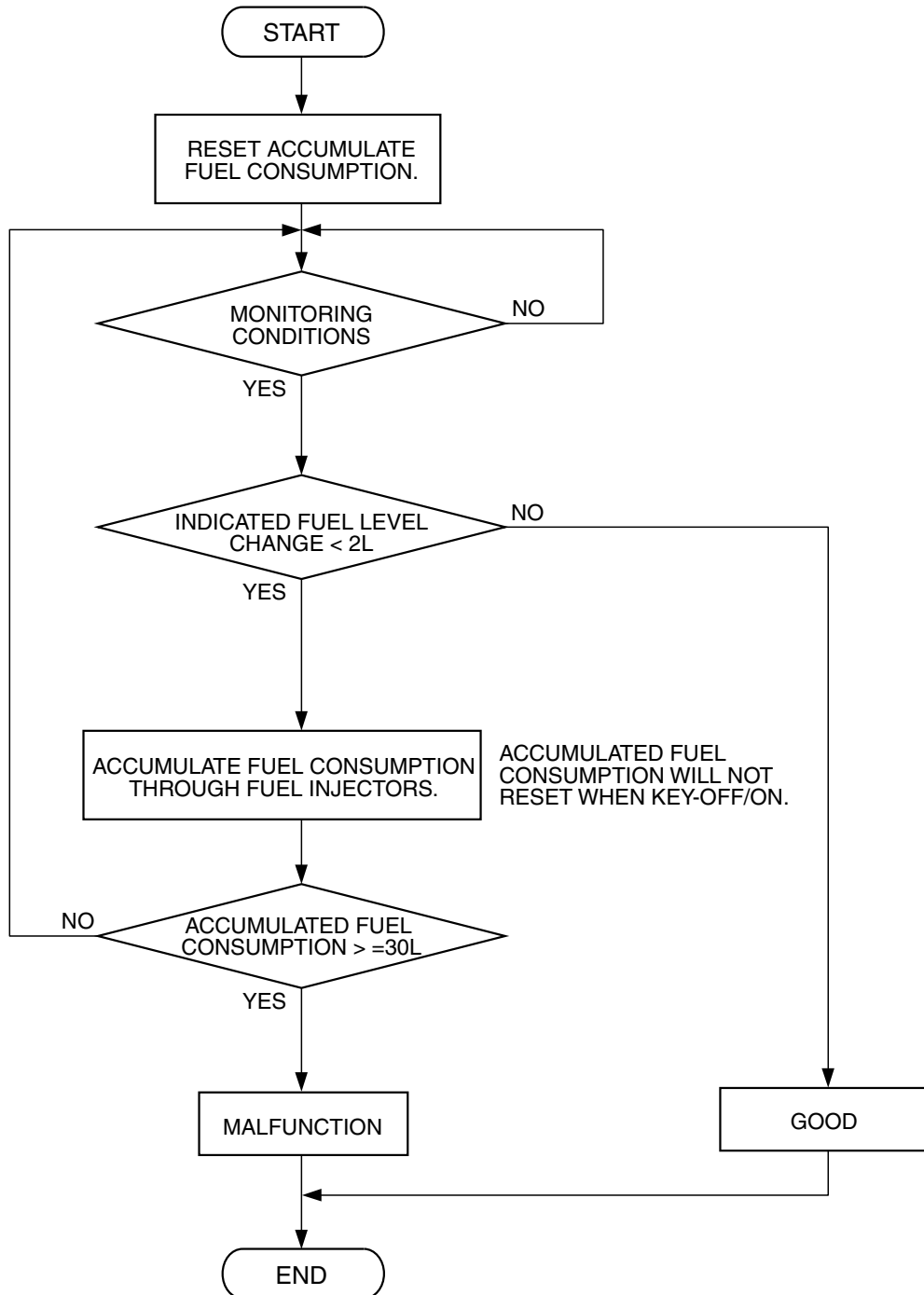
- Not applicable

**Sensor (The sensor below is determined to be normal)**

- Not applicable

DTC SET CONDITIONS

Logic Flow Chart



AK302407



### Check Conditions, Judgement Criteria

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

### OBD-II DRIVE CYCLE PATTERN

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

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

- Fuel pump module or fuel level sensor (sub) failed.
- PCM 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).

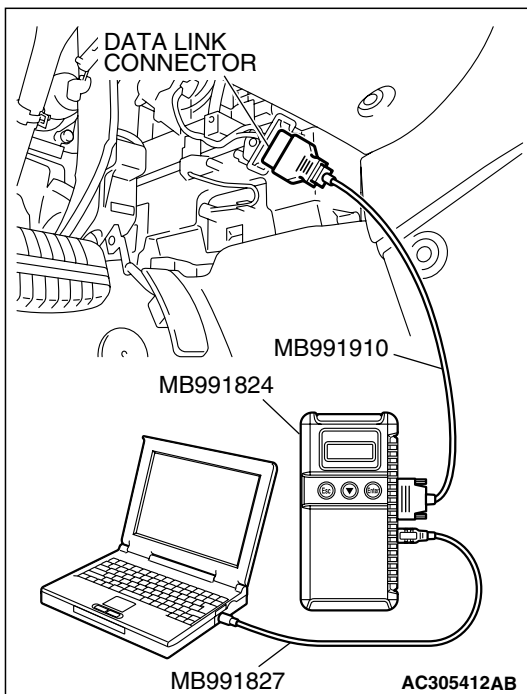
#### **CAUTION**

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) 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 Meters Assembly and Vehicle Speed Sensor – Symptom Chart [P.54A-16](#).

**STEP 3. Check the trouble symptoms.**

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

**Q: Is DTC P2066 set?**

- YES** : Replace the PCM. Then go to Step 6.
- NO** : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions [P.00-14](#).
- 

**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-104](#).

**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.**

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

**Q: Is DTC P2066 set?**

- YES** : Replace the PCM. Then go to Step 6.
- NO** : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions [P.00-14](#).
- 

**STEP 6. Test the OBD-II drive cycle.**

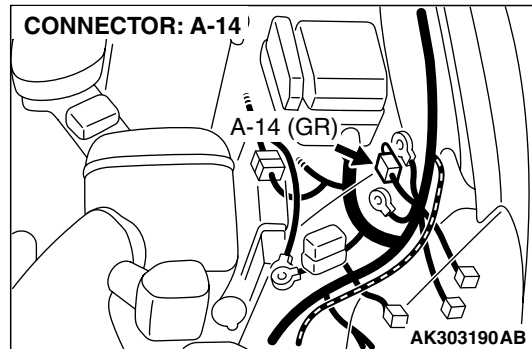
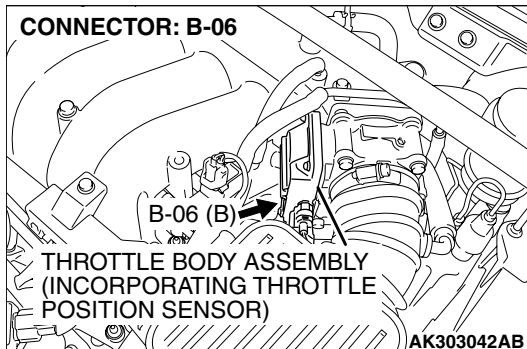
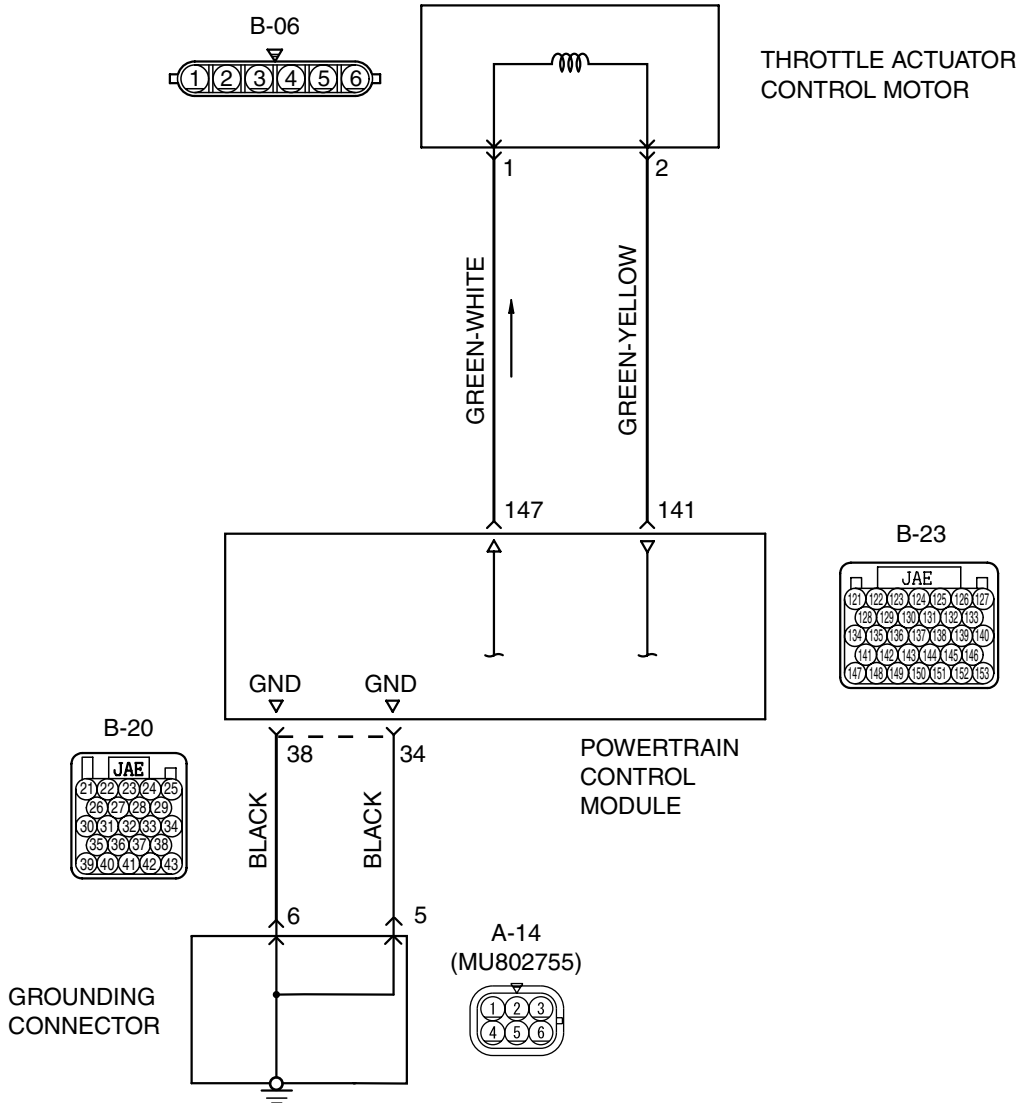
- (1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – OBD-II Drive Cycle – Procedure 6 – Other Monitor [P.13B-6](#).
- (2) Check the diagnostic trouble code (DTC).

**Q: Is DTC P2066 set?**

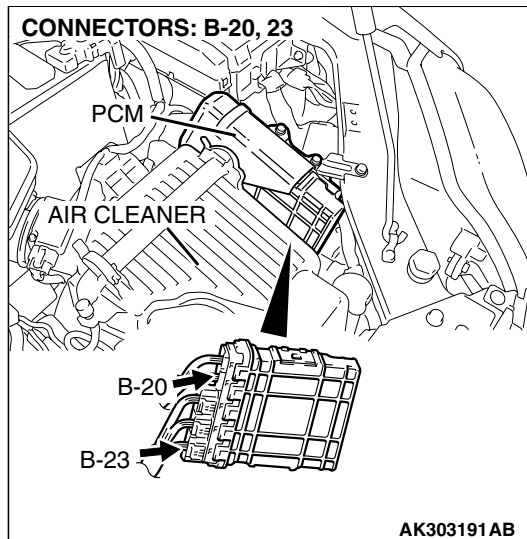
- YES** : Retry the troubleshooting.
- NO** : The inspection is complete.

DTC P2100: Throttle Actuator Control Motor Circuit (Open)

Throttle Actuator Control Motor Circuit



AK302870



## CIRCUIT OPERATION

- Controls the current that is applied from the PCM (terminals No. 141, No. 147) to the throttle actuator control motor (terminals No. 1, No. 2).

## TECHNICAL DESCRIPTION

- PCM 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.
- PCM failed.

## DIAGNOSIS

### Required Special Tools:

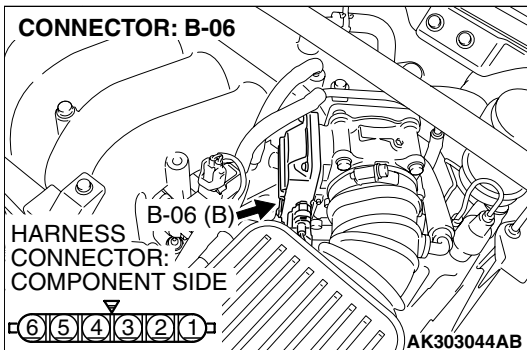
- MB991958: Scan tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

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

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

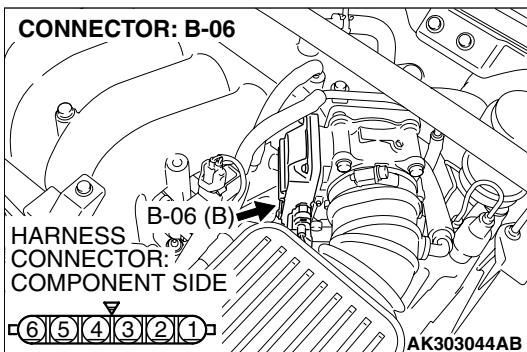
**YES :** Go to Step 2.

**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.



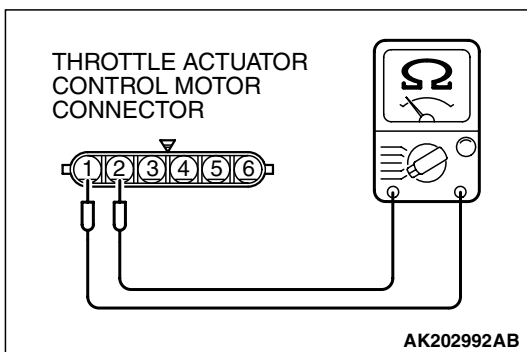
(2) Measure the resistance between throttle actuator control motor side connector terminal No. 1 and No. 2.

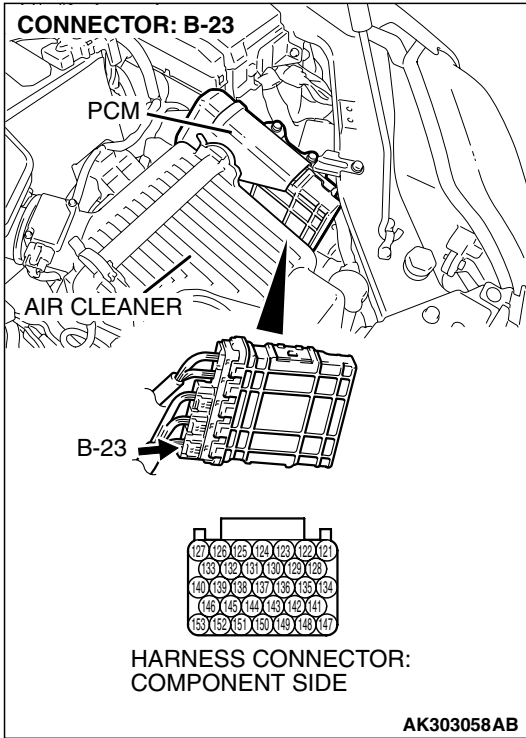
**Standard value: 0.3 – 80 ohms [at 20°C (68°F)]**

**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.



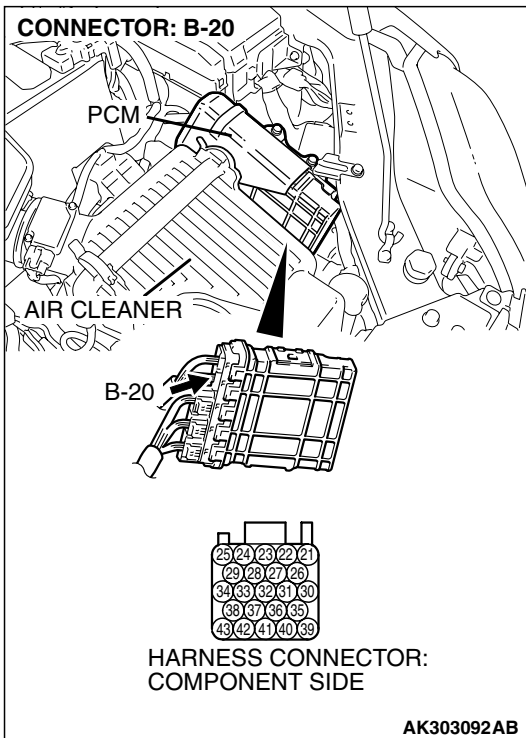


**STEP 3. Check harness connector B-23 at PCM for damage**

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

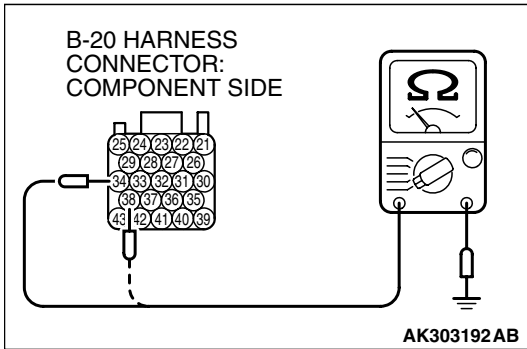
**YES :** Go to Step 4.

**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 PCM harness side connector B-20.**

(1) Disconnect the connector B-20 and measure at the harness side.



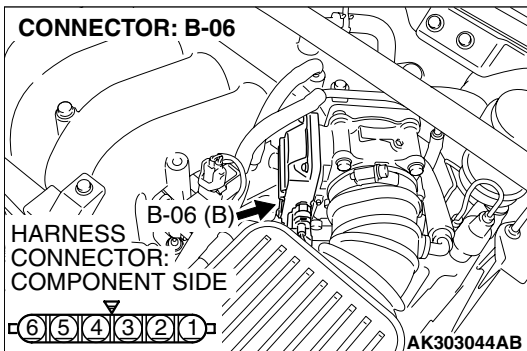
(2) Measure the continuity between terminals No. 34, No. 38 and ground.

- Should be less than 2 ohms.

**Q: Does continuity exist?**

**YES :** Go to Step 5.

**NO :** Repair harness wire between PCM connector B-20 (terminals No. 34, No. 38) and ground because of open circuit or harness damage. Then go to Step 8.

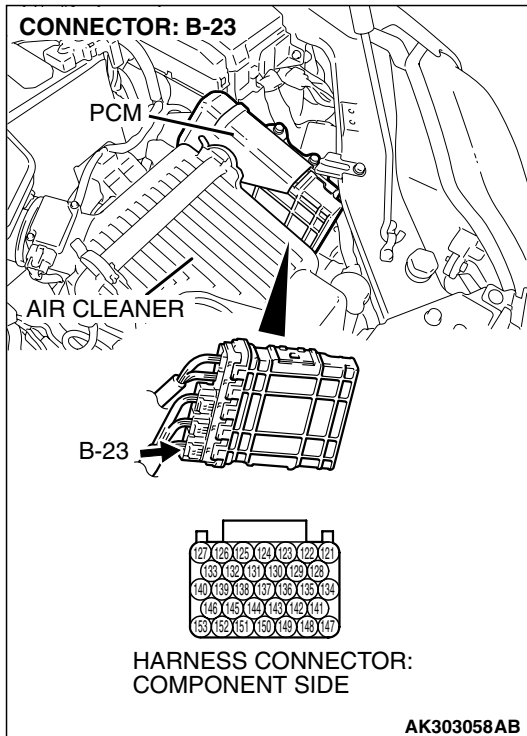


**STEP 5. Check for open circuit and harness damage between throttle actuator control motor connector B-06 (terminal No. 1) and PCM connector B-23 (terminal No. 147).**

**Q: Is the harness wire in good condition?**

**YES :** Go to Step 6.

**NO :** Repair it. Then go to Step 8.

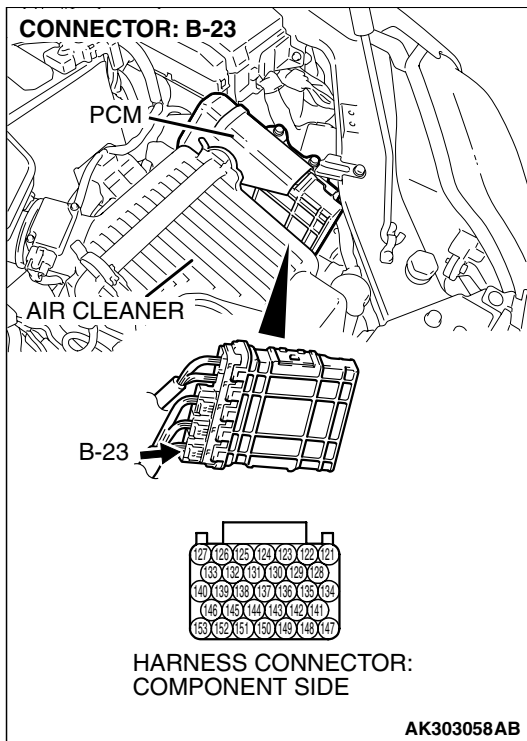
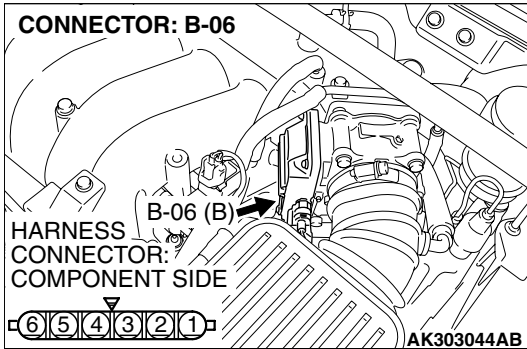


**STEP 6. Check for open circuit and harness damage between throttle actuator control motor connector B-06 (terminal No. 2) and PCM connector B-23 (terminal No. 141).**

**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**

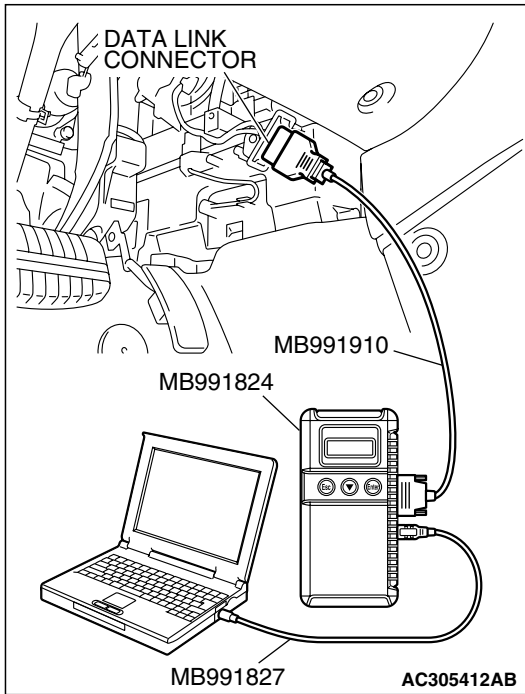
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 PCM. Then go to Step 8.

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



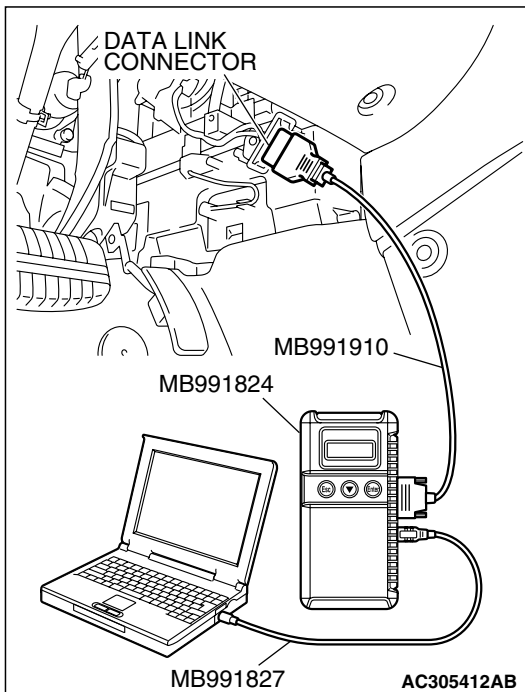
**STEP 8. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

- (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?**

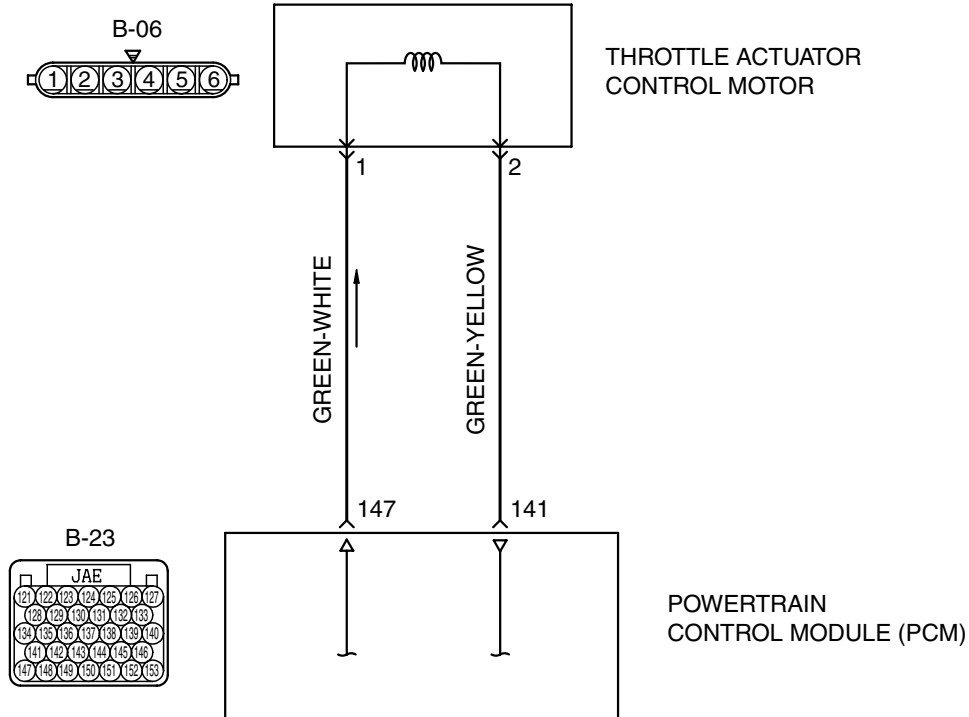
**YES :** Retry the troubleshooting.

**NO :** The inspection is complete.

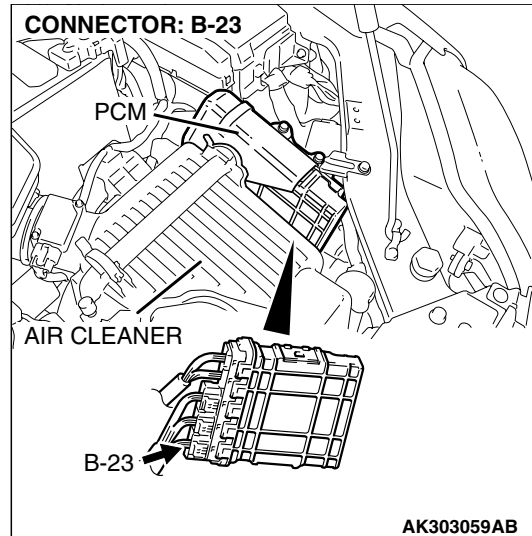
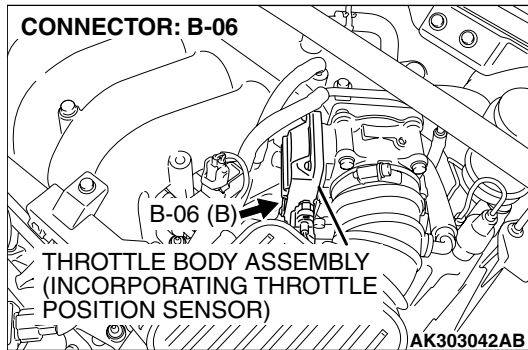


DTC P2101: Throttle Actuator Control Motor Magneto Malfunction

Throttle Actuator Control Motor Circuit



AK302871



**CIRCUIT OPERATION**

- Controls the current that is applied from the PCM (terminals No. 141, No. 147) to the throttle actuator control motor (terminals No. 1, No. 2).

**TECHNICAL DESCRIPTION**

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

**DESCRIPTIONS OF MONITOR METHODS**

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

## MONITOR EXECUTION

Continuous

## MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

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

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

## DTC SET CONDITIONS

### Check Condition

- Battery positive voltage is higher than 8.3 volts.

### Judgement Criteria

- The coil 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.
- PCM failed.

## DIAGNOSIS

### Required Special Tools:

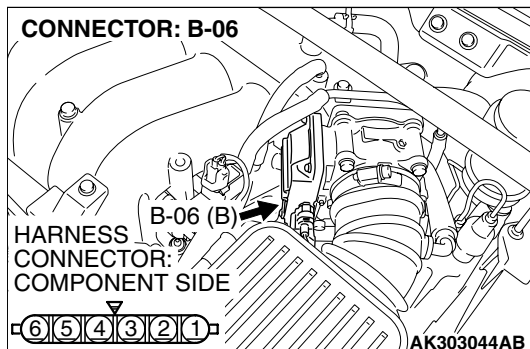
- MB991958: Scan tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

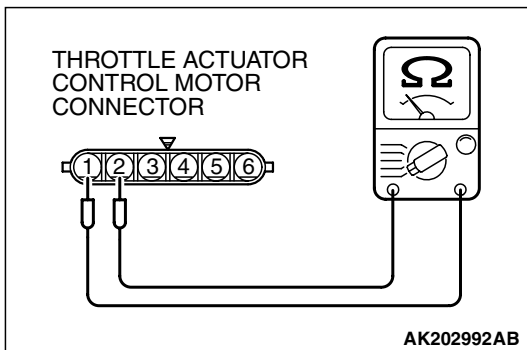
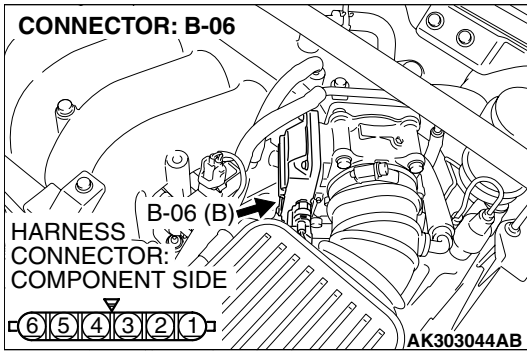
**STEP 1. Check harness connector B-06 at throttle actuator control motor for damage.**

**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.

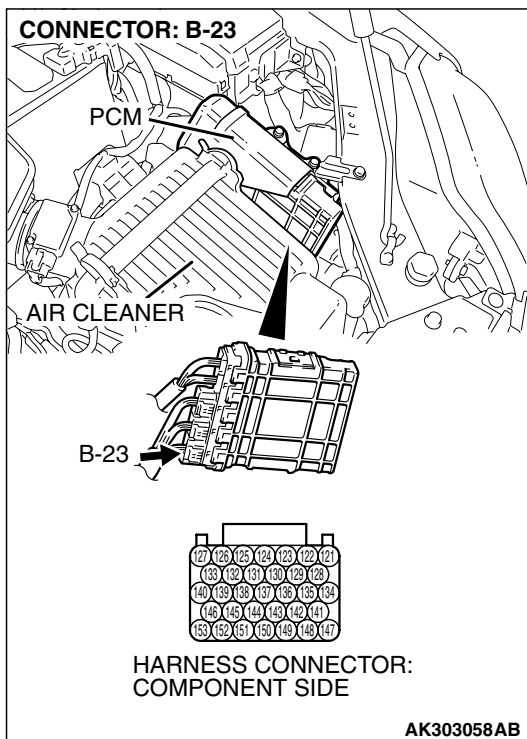
(2) Measure the resistance between throttle actuator control motor side connector terminal No. 1 and No. 2.

**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-23 at PCM for damage**

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

**YES :** Go to Step 4.

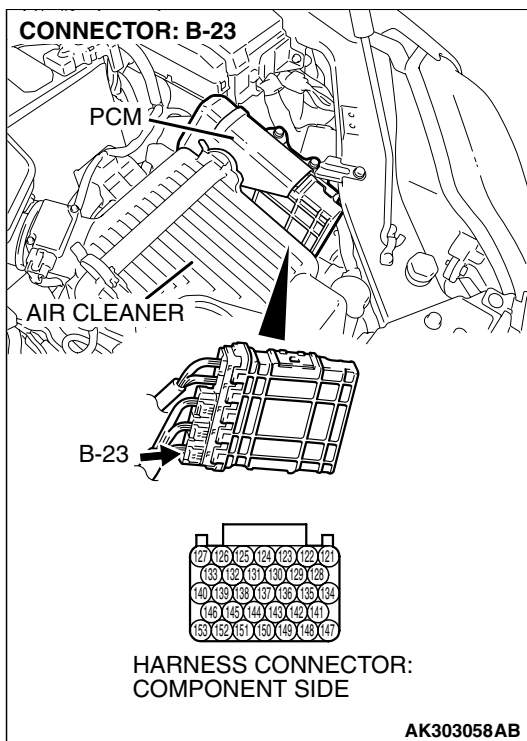
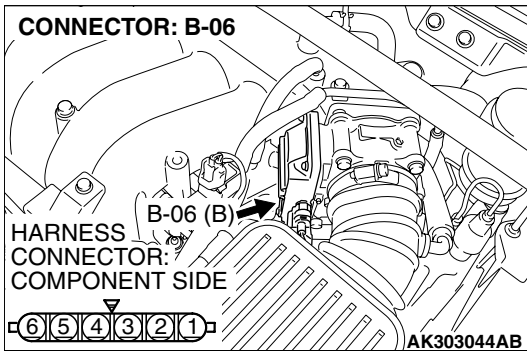
**NO :** Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 7.

**STEP 4. Check for short circuit to ground and harness damage between throttle actuator control motor connector B-06 (terminal No. 1) and PCM connector B-23 (terminal No. 147).**

**Q: Is the harness wire in good condition?**

**YES :** Go to Step 5.

**NO :** Repair it. Then go to Step 7.

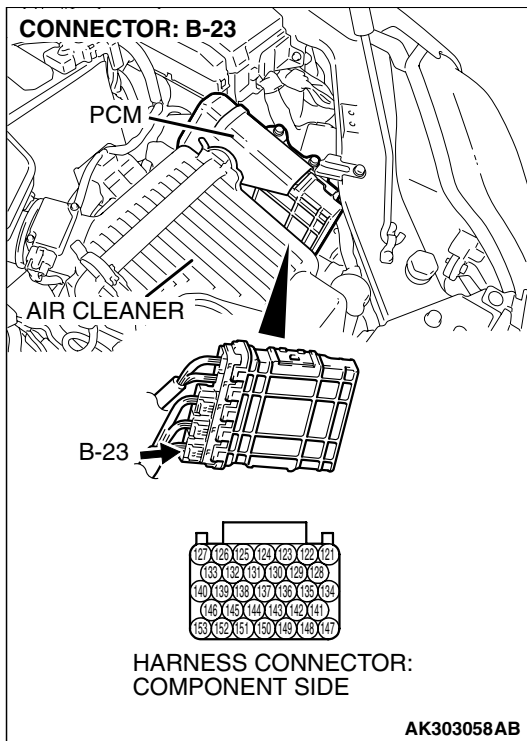
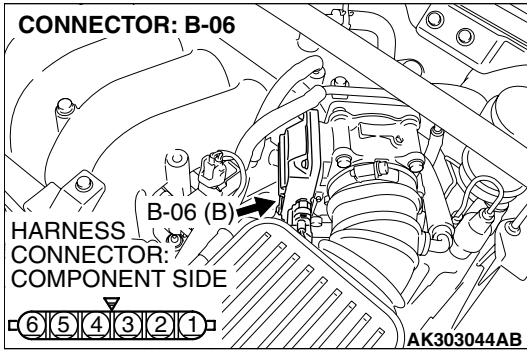


**STEP 5.** Check for short circuit to ground and harness damage between throttle actuator control motor connector B-06 (terminal No. 2) and PCM connector B-23 (terminal No. 141).

**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**

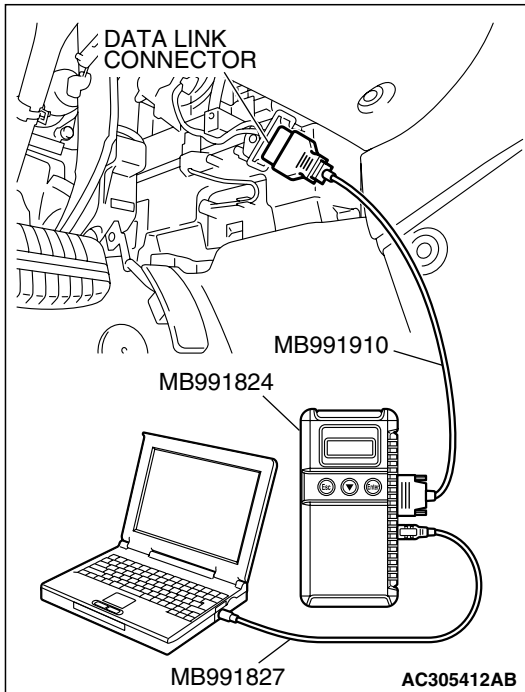
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 PCM. Then go to Step 7.

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



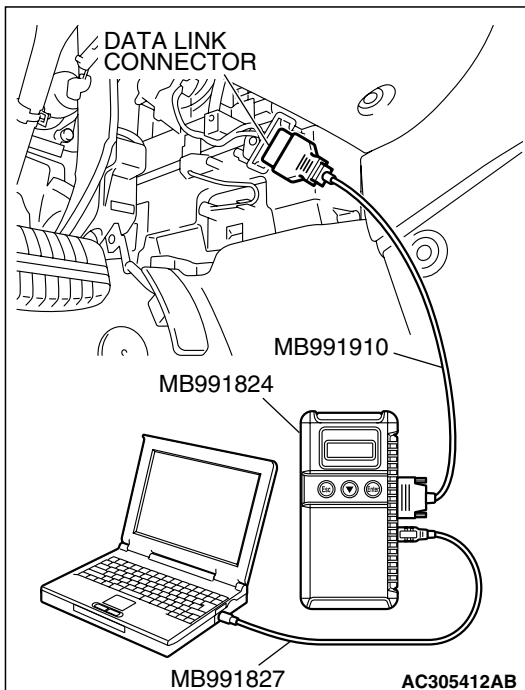
**STEP 7.** Using scan tool MB991958, read the diagnostic trouble code (DTC).

- (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.

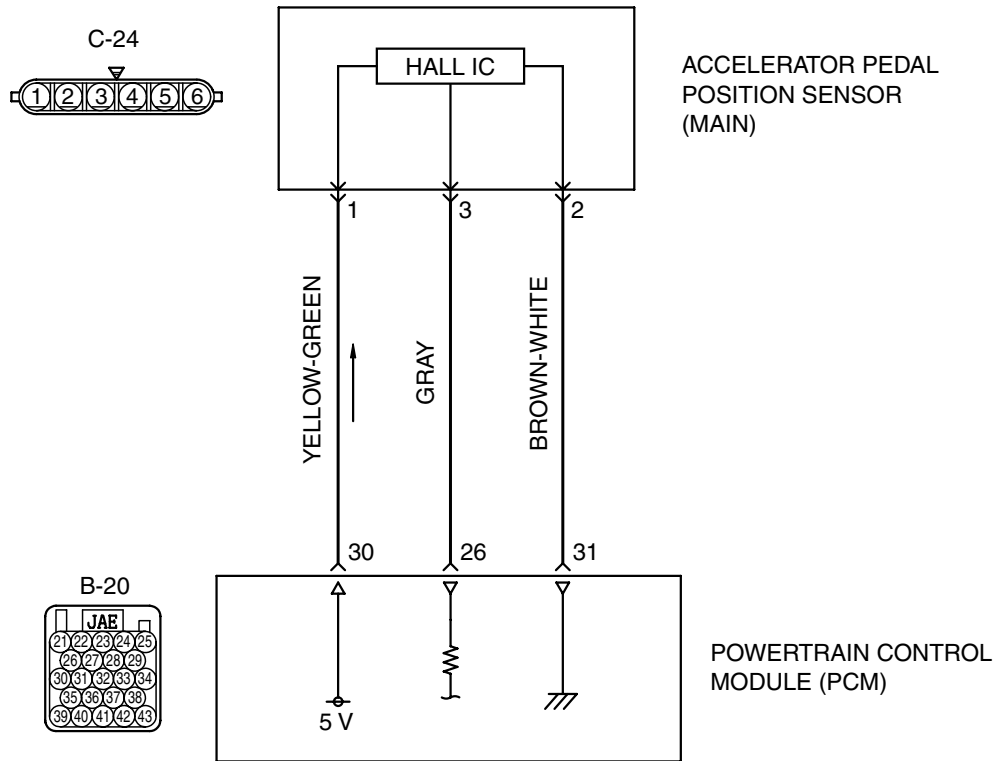


DTC P2122: Accelerator Pedal Position Sensor (main) Circuit Low Input

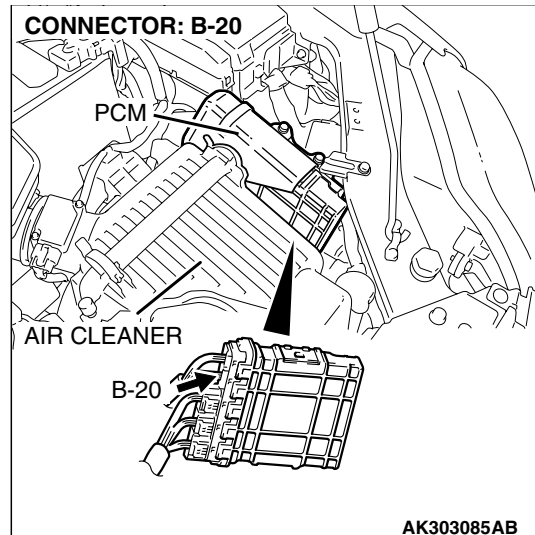
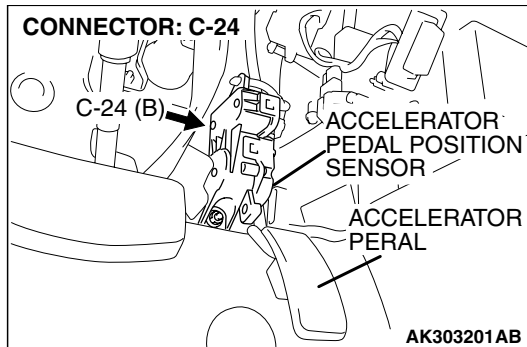
**CAUTION**

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



AK302872





### CIRCUIT OPERATION

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

### TECHNICAL DESCRIPTION

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

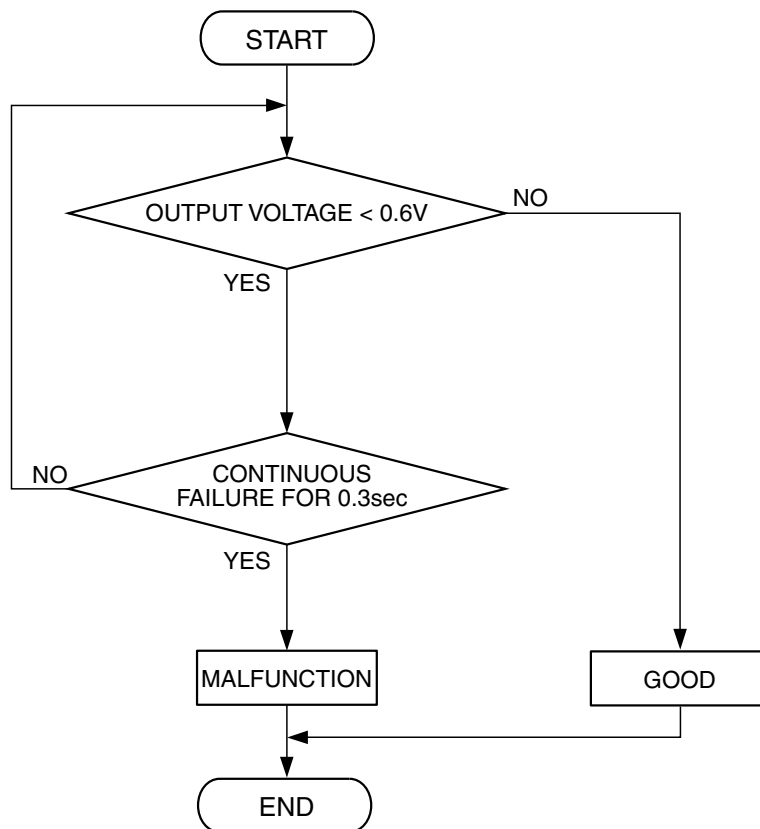
- Not applicable

### DESCRIPTIONS OF MONITOR METHODS

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

### DTC SET CONDITIONS

#### Logic Flow Chart



AK302413

**Check Conditions**

- Ignition switch is "ON" position.

**Judgement Criteria**

- 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.
- PCM 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, check data list item 78: Accelerator Pedal Position Sensor (main).**

**⚠ CAUTION**

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

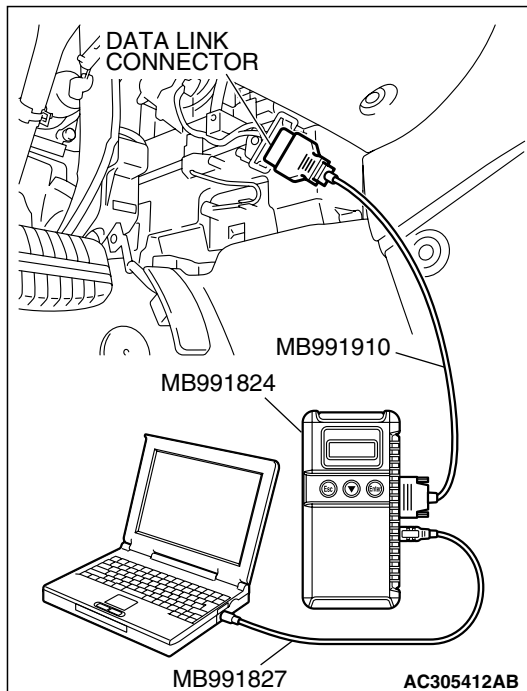
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 78, Accelerator Pedal Position Sensor (main).
  - Output voltage is between 0.735 and 1.335 volts when foot is released from 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.

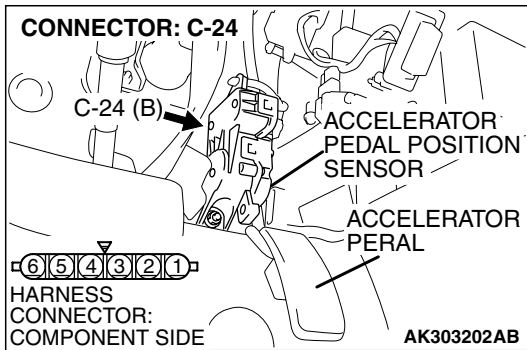
**Q: Is the sensor operating properly?**

**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.



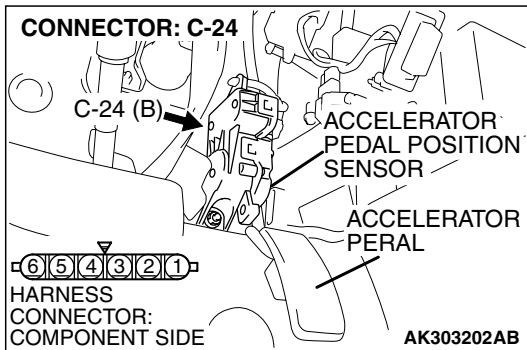


**STEP 2. Check harness connector C-24 at accelerator pedal position sensor for damage.**

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

**YES :** Go to Step 3.

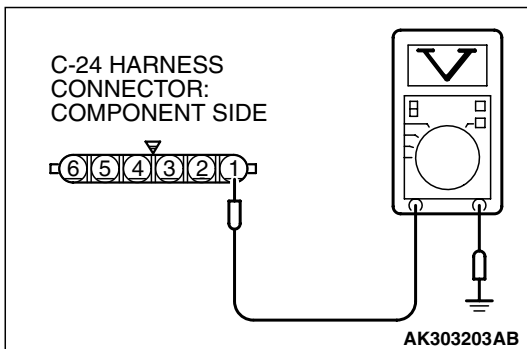
**NO :** Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 11.



**STEP 3. Measure the sensor supply voltage at accelerator pedal position sensor harness side connector C-24.**

(1) Disconnect the connector C-24 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.

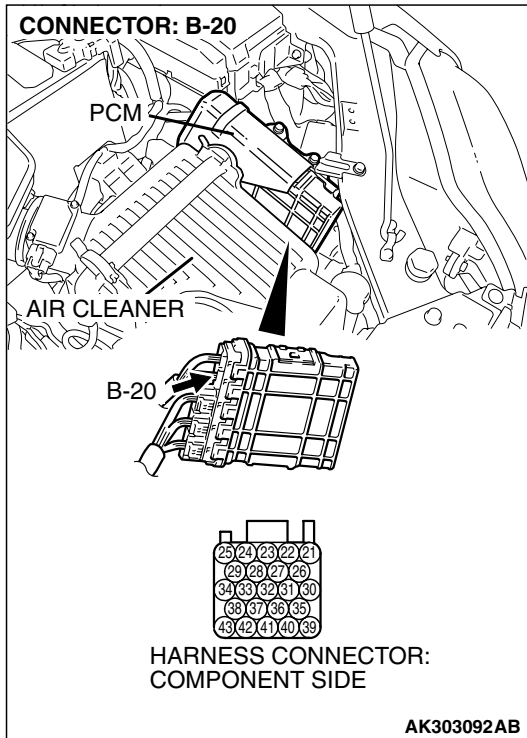
- Voltage should be between 4.9 and 5.1 volts.

(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-20 at PCM for damage.**

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

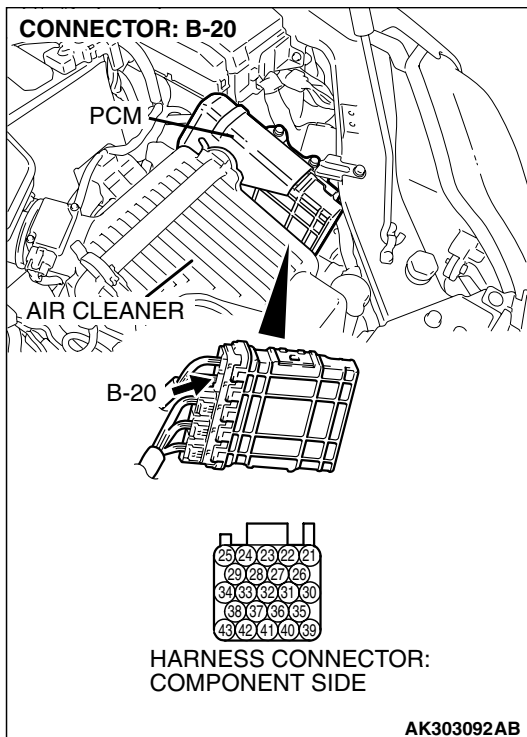
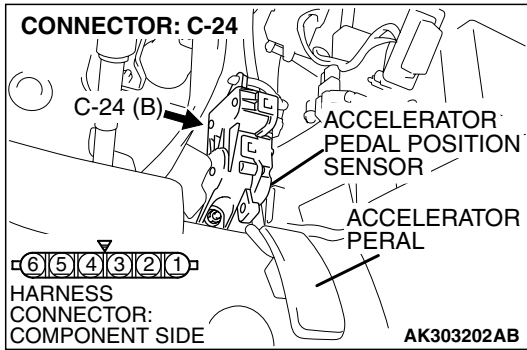
**YES :** Go to Step 5.

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

**STEP 5.** Check for open circuit and short circuit to ground between accelerator pedal position sensor connector C-24 (terminal No. 1) and PCM connector B-20 (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 78: Accelerator Pedal Position Sensor (main).

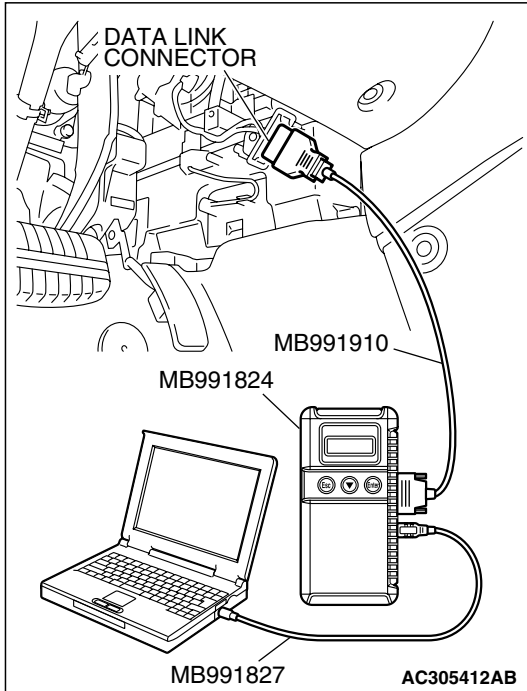
**⚠ CAUTION**

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

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 78, Accelerator Pedal Position Sensor (main).
  - Output voltage is between 0.735 and 1.335 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?**

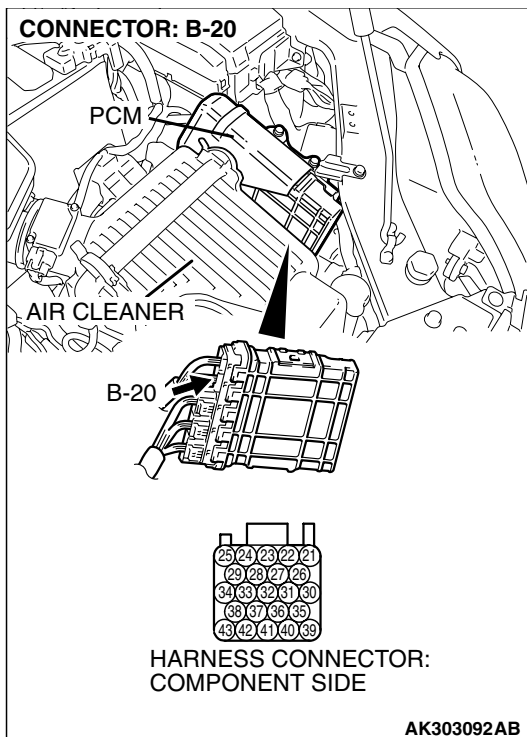
- YES :** It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions [P.00-14](#).
- NO :** Replace the PCM. Then go to Step 11.



**STEP 7.** Check harness connector B-20 at PCM 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.

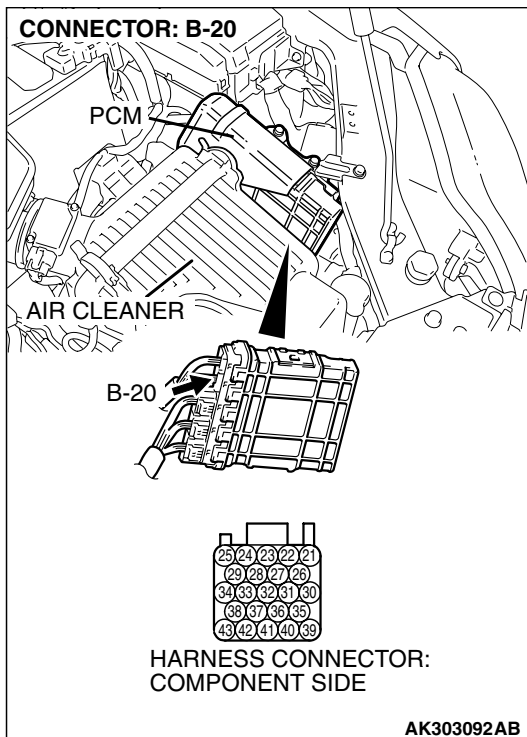
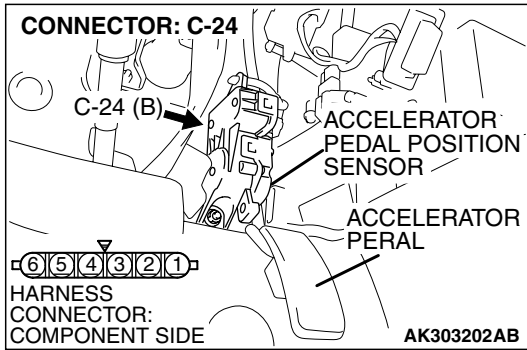


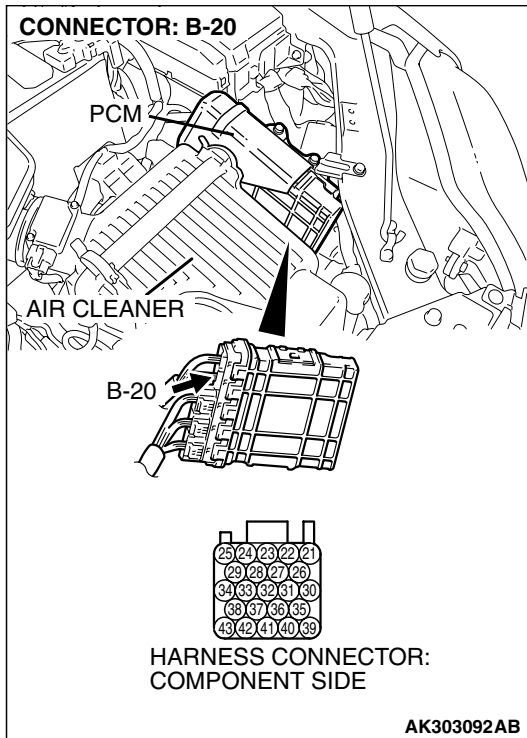
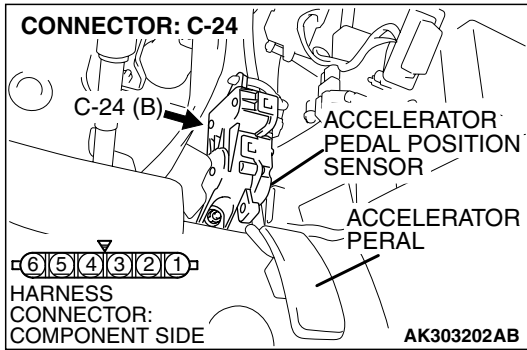
**STEP 8. Check for harness damage between accelerator pedal position sensor connector C-24 (terminal No. 1) and PCM connector B-20 (terminal No. 30).**

**Q: Is the harness wire in good condition?**

**YES :** Go to Step 9.

**NO :** Repair it. Then go to Step 11.



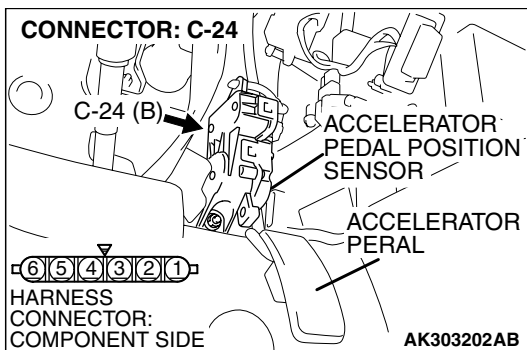


**STEP 9. Check for harness damage between accelerator pedal position sensor connector C-24 (terminal No. 3) and PCM connector B-20 (terminal No. 26).**

**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 PCM. Then go to Step 11.

**NO :** The inspection is complete.



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

**⚠ CAUTION**

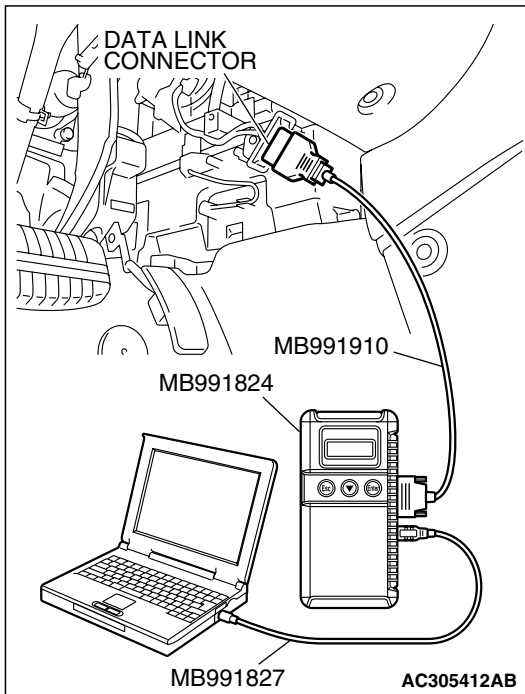
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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.

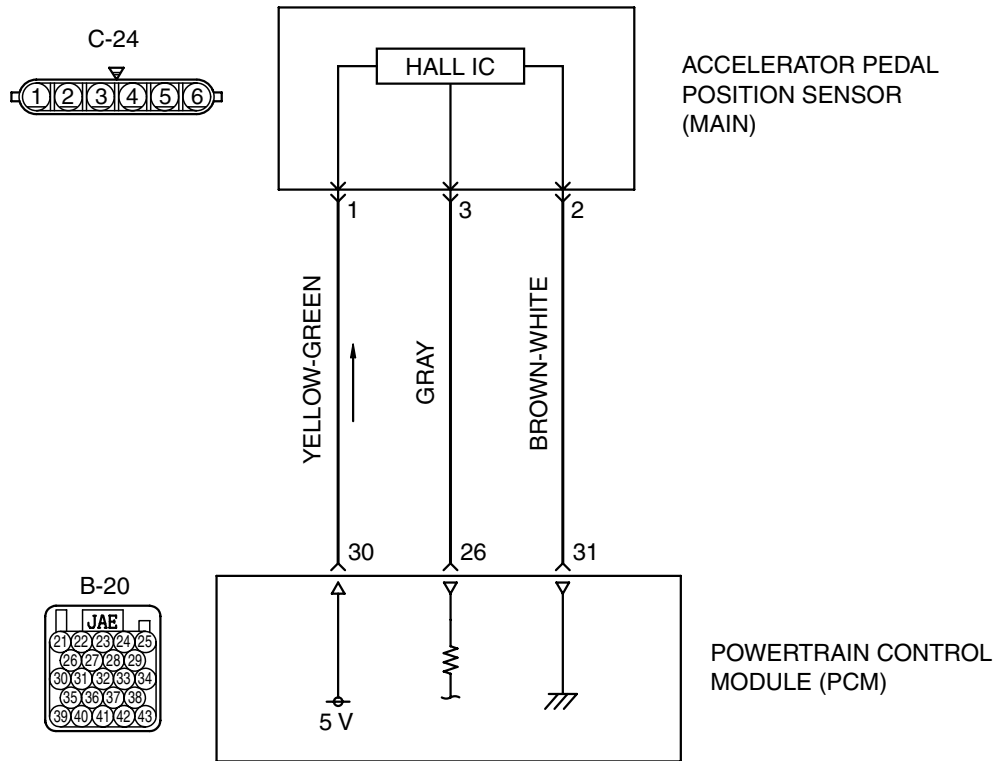


DTC P2123: Accelerator Pedal Position Sensor (main) Circuit High Input

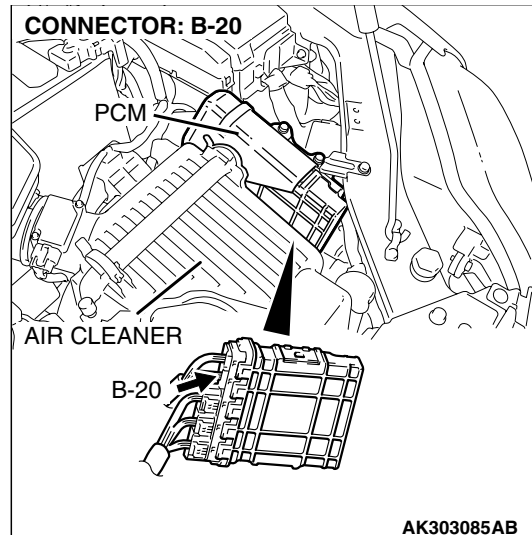
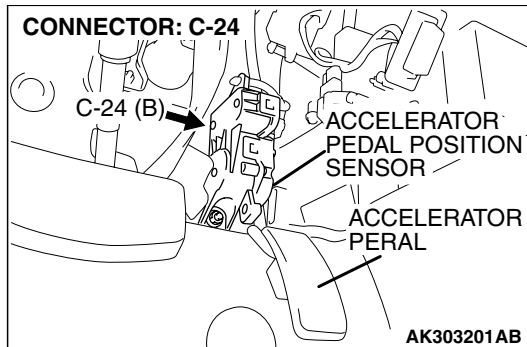
**CAUTION**

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



AK302872



### CIRCUIT OPERATION

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

### TECHNICAL DESCRIPTION

- The accelerator pedal position sensor (main) outputs voltage which corresponds to the accelerator pedal depression.
- The PCM 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.

### DTC SET CONDITIONS

#### Logic Flow Chart

### MONITOR EXECUTION

Continuous

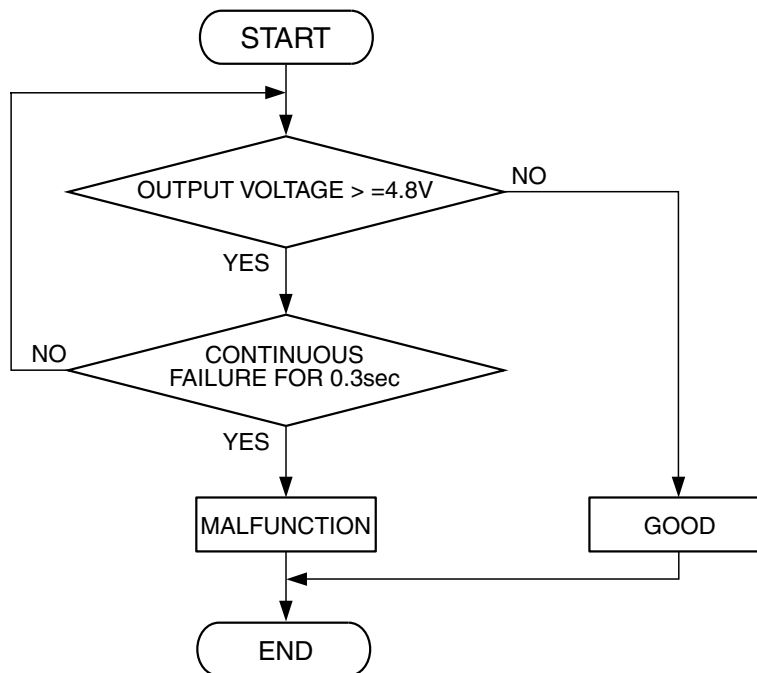
### MONITOR EXECUTION CONDITIONS (Other monitor and Sensor)

**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



AK401528

**Check Conditions**

- Ignition switch is "ON" position.

**Judgement Criteria**

- 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.
- PCM 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, check data list item 78: Accelerator Pedal Position Sensor (main).****⚠ CAUTION**

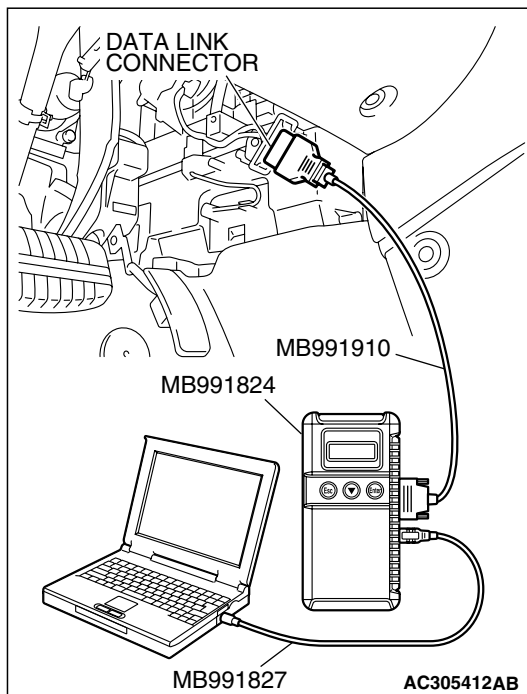
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

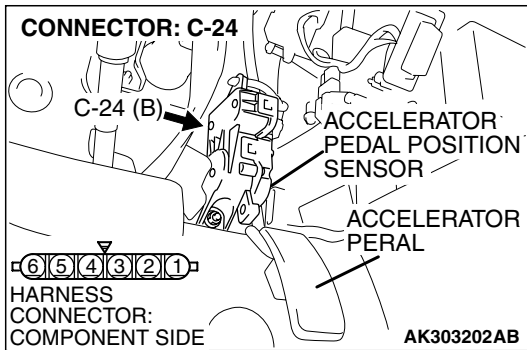
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 78, Accelerator Pedal Position Sensor (main).
  - Output voltage is between 0.735 and 1.335 volts when foot is released from 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.



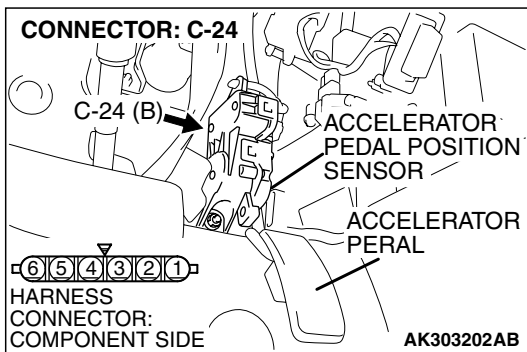


**STEP 2. Check harness connector C-24 at accelerator pedal position sensor for damage.**

**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-24.**

(1) Disconnect the connector C-24 and measure at the harness side.

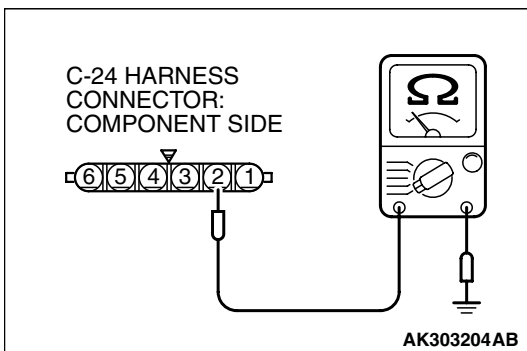
(2) Measure the continuity between terminal No. 2 and ground.

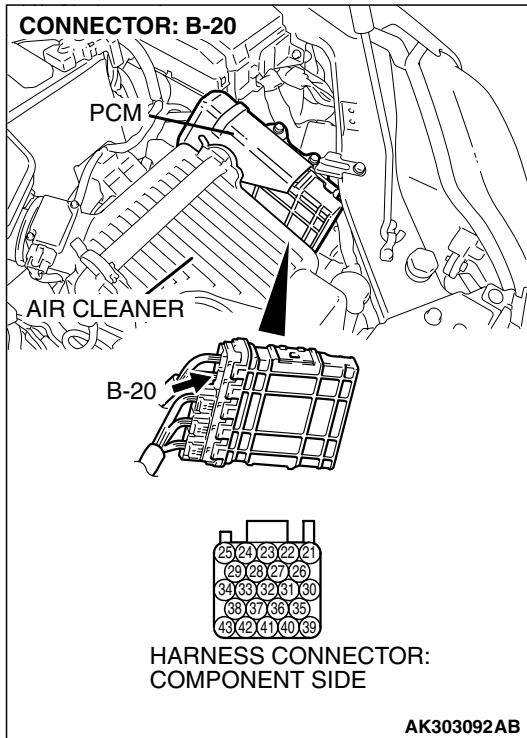
- Should be less than 2 ohms.

**Q: Does continuity exist?**

**YES :** Go to Step 6.

**NO :** Go to Step 4.





**STEP 4. Check harness connector B-20 at PCM for damage.**

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

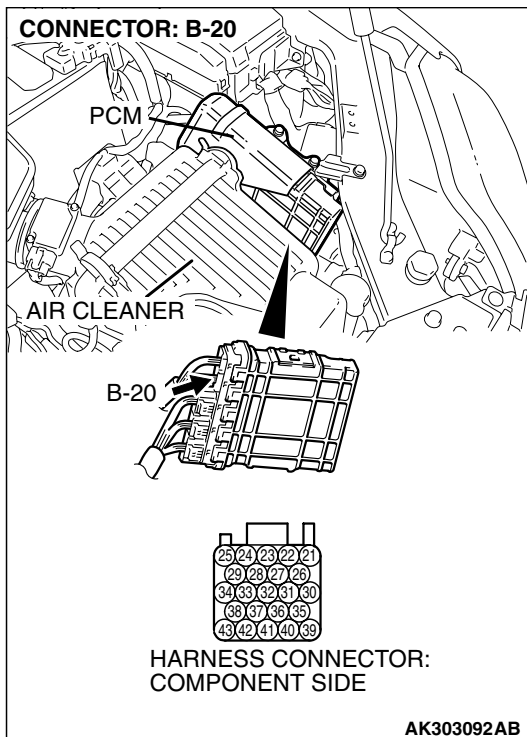
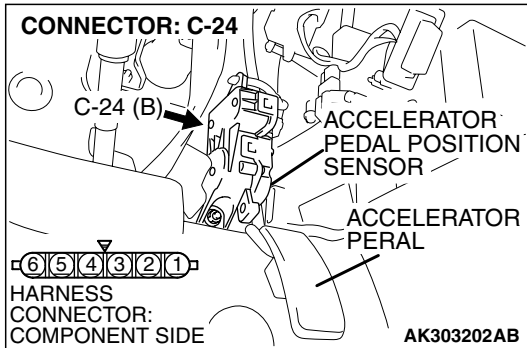
**YES :** Go to Step 5.

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

**STEP 5. Check for open circuit and harness damage between accelerator pedal position sensor connector C-24 (terminal No. 2) and PCM connector B-20 (terminal No. 31).  
Q: Is the harness wire in good condition?**

**YES :** Go to Step 7.

**NO :** Repair it. Then go to Step 8.



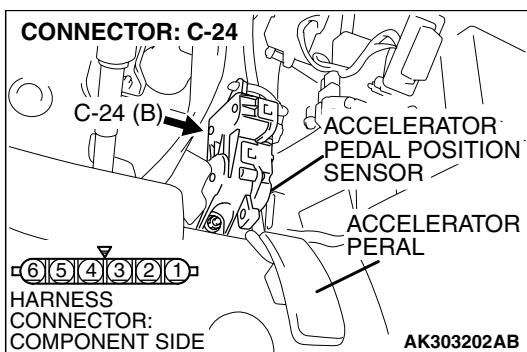
**STEP 6. Replace the accelerator pedal position sensor.**

- (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 PCM. Then go to Step 8.

**NO :** The inspection is complete.



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

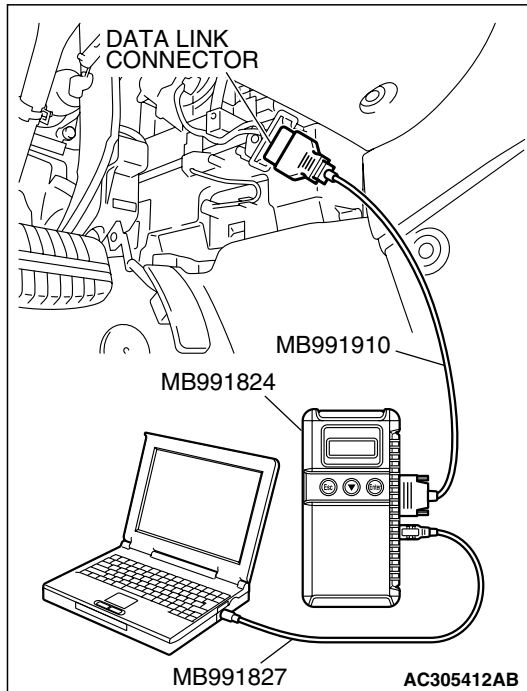
**⚠ CAUTION**

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

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 78, Accelerator Pedal Position Sensor (main).
  - Output voltage is between 0.7 and 1.3 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 PCM. Then go to Step 8.

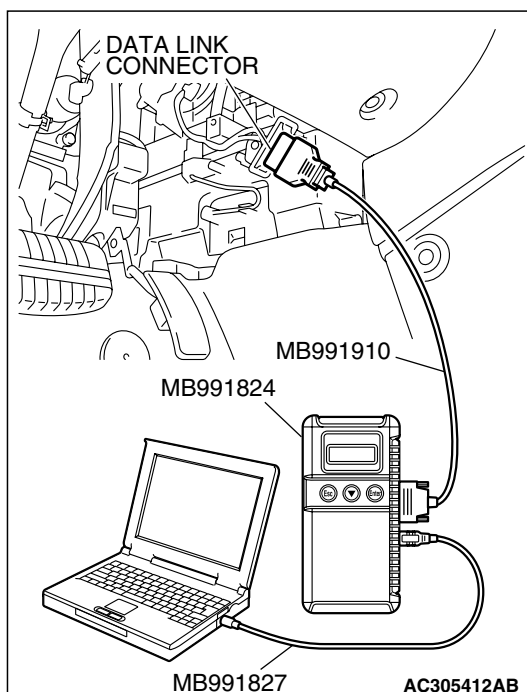


**STEP 8. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

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

**Q: Is DTC P2123 set?**

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



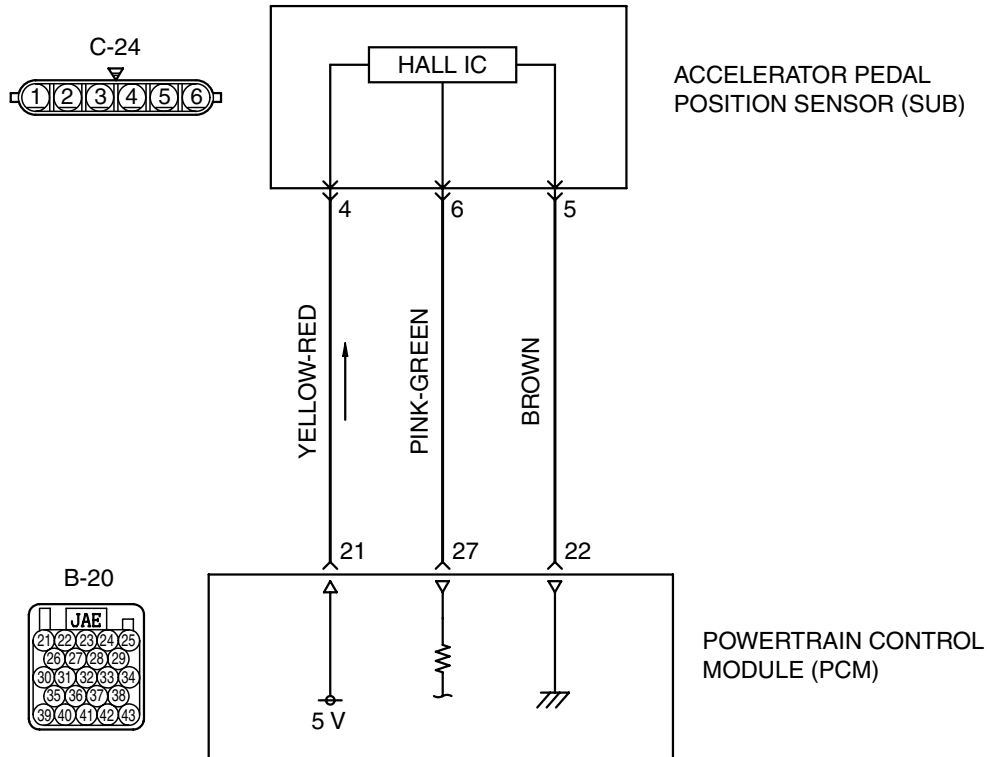


DTC P2127: Accelerator Pedal Position Sensor (sub) Circuit Low Input

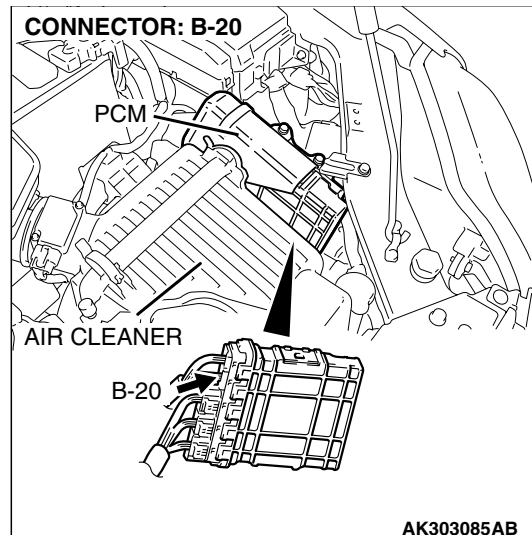
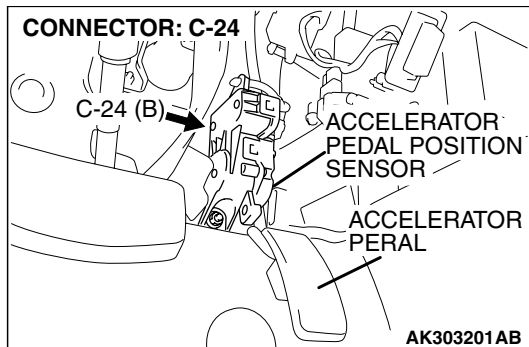
**CAUTION**

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



AK302873



**CIRCUIT OPERATION**

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

**TECHNICAL DESCRIPTION**

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

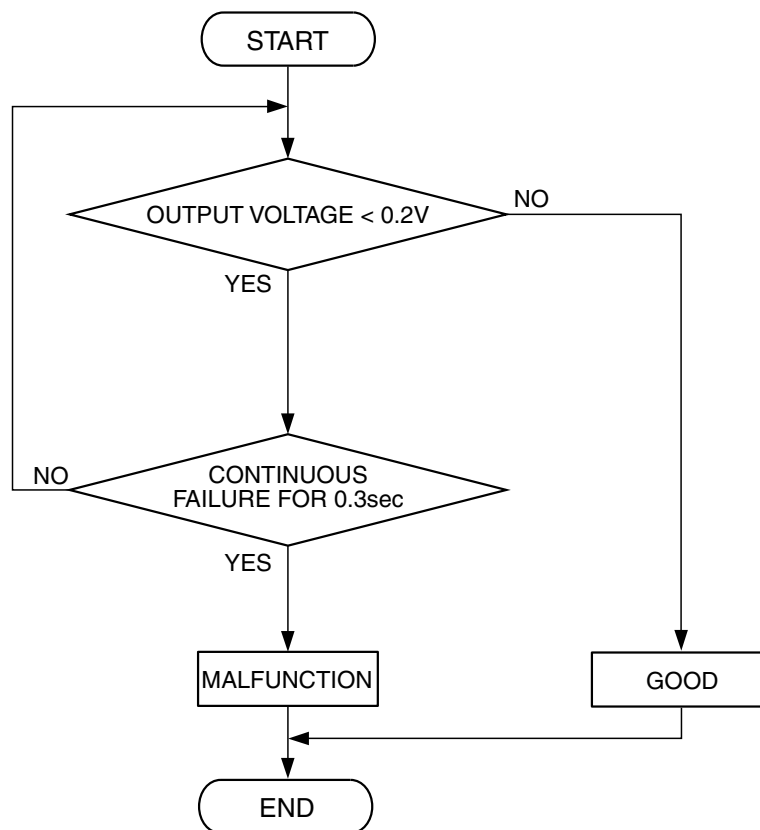
- Not applicable

**DESCRIPTIONS OF MONITOR METHODS**

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

**DTC SET CONDITIONS**

**Logic Flow Chart**



### Check Conditions

- Ignition switch is "ON" position.

### Judgement Criteria

- 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.
- PCM 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, check data list item 77: Accelerator Pedal Position Sensor (sub).**

#### **CAUTION**

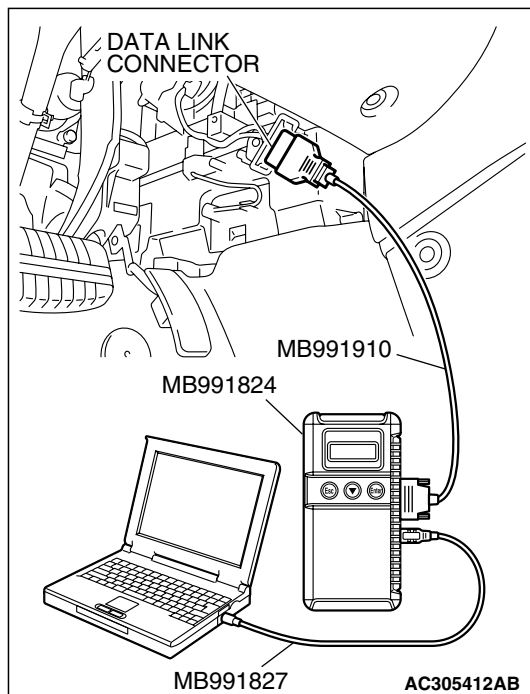
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

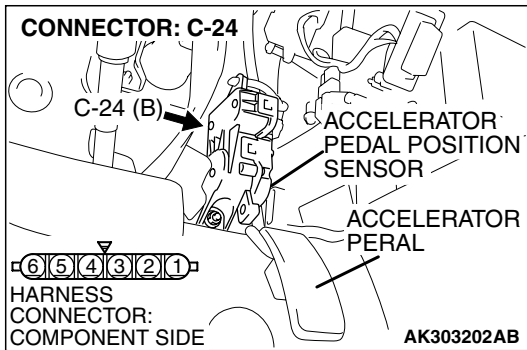
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 77, Accelerator Pedal Position Sensor (sub).
  - Output voltage is between 0.435 and 1.035 volts when foot is released from accelerator pedal.
  - Output voltage is 3.7 volts or higher when accelerator pedal is fully depressed.
- (4) Turn the ignition switch to the "LOCK"(OFF) position.

#### Q: Is the sensor operating properly?

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

**NO :** Go to Step 2.



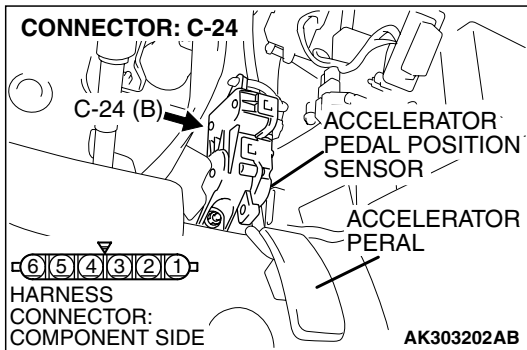


**STEP 2. Check harness connector C-24 at accelerator pedal position sensor for damage.**

**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-24.**

(1) Disconnect the connector C-24 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.

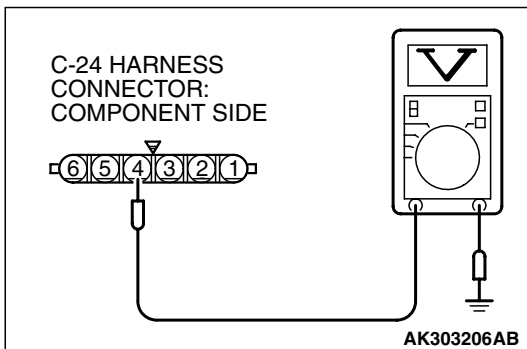
- Voltage should be between 4.9 and 5.1 volts.

(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.

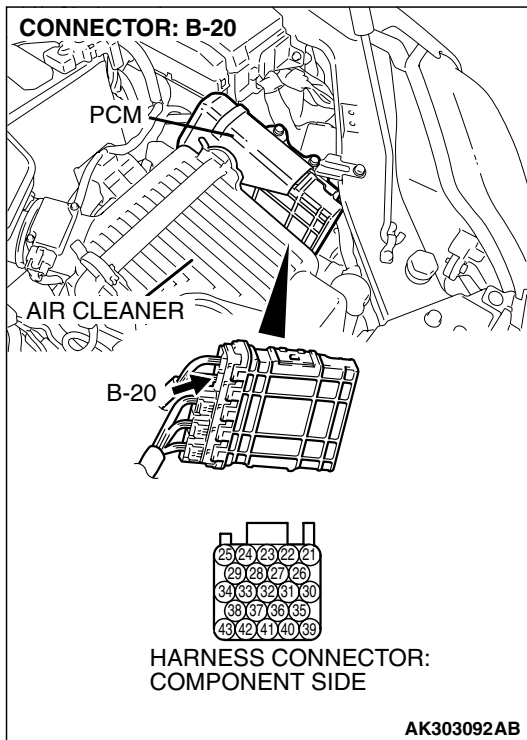


**STEP 4. Check harness connector B-20 at PCM for damage.**

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

**YES :** Go to Step 5.

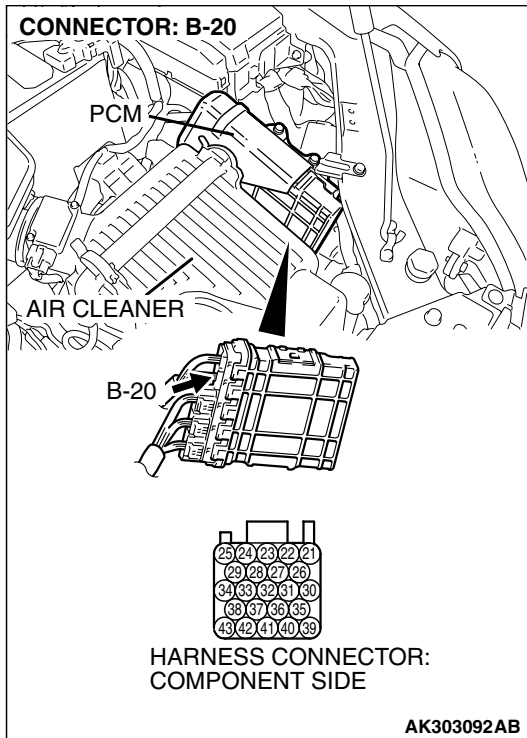
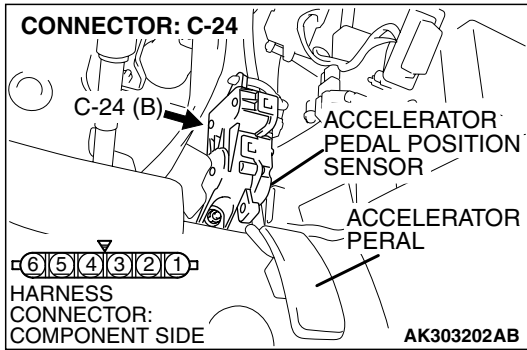
**NO :** Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 11.



**STEP 5.** Check for open circuit and short circuit to ground between accelerator pedal position sensor connector C-24 (terminal No. 4) and PCM connector B-20 (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 77: Accelerator Pedal Position Sensor (sub).

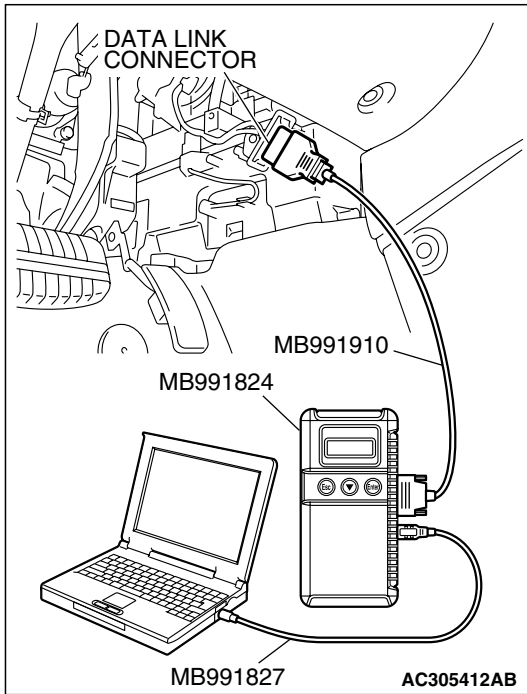
**⚠ CAUTION**

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

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 77, Accelerator Pedal Position Sensor (sub).
  - Output voltage is between 0.435 and 1.035 volts when foot is released from accelerator pedal.
  - Output voltage is 3.7 volts or higher when accelerator pedal is fully depressed.
- (4) Turn the ignition switch to the "LOCK"(OFF) position.

**Q: Is the sensor operating properly?**

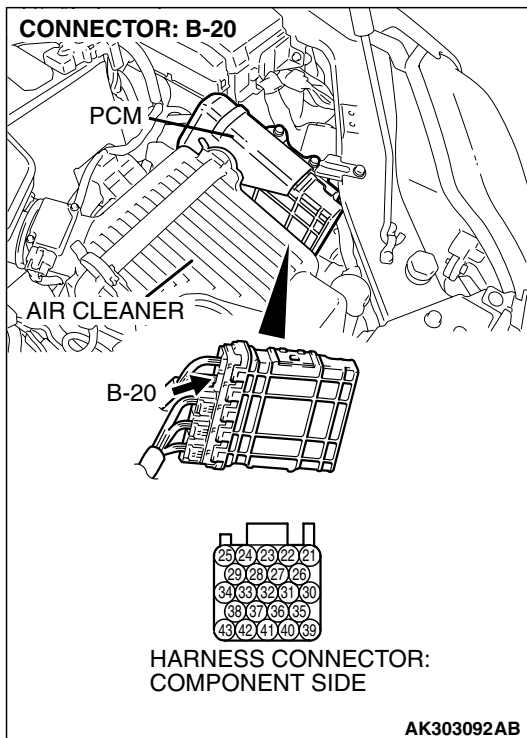
- YES :** It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions [P.00-14](#).
- NO :** Replace the PCM. Then go to Step 11.



**STEP 7.** Check harness connector B-20 at PCM 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.

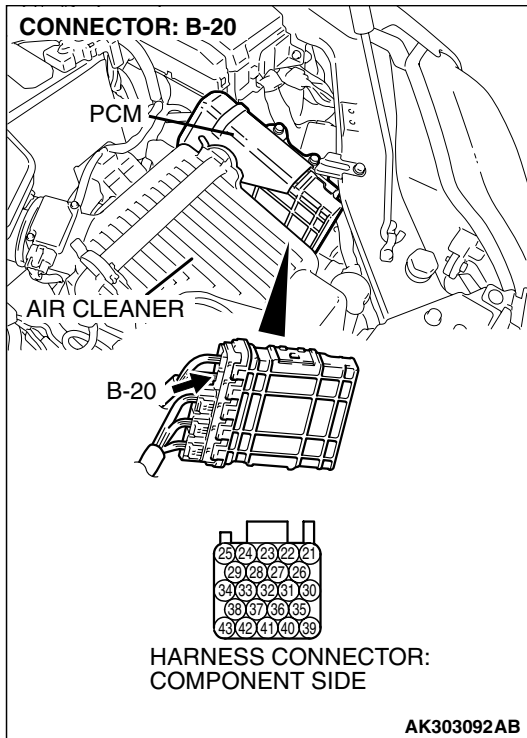
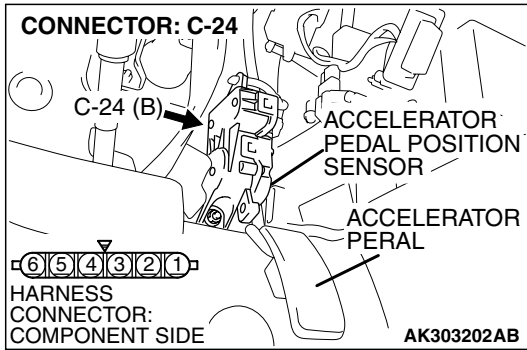


**STEP 8. Check for harness damage between accelerator pedal position sensor connector C-24 (terminal No. 4) and PCM connector B-20 (terminal No. 21).**

**Q: Is the harness wire in good condition?**

**YES :** Go to Step 9.

**NO :** Repair it. Then go to Step 11.



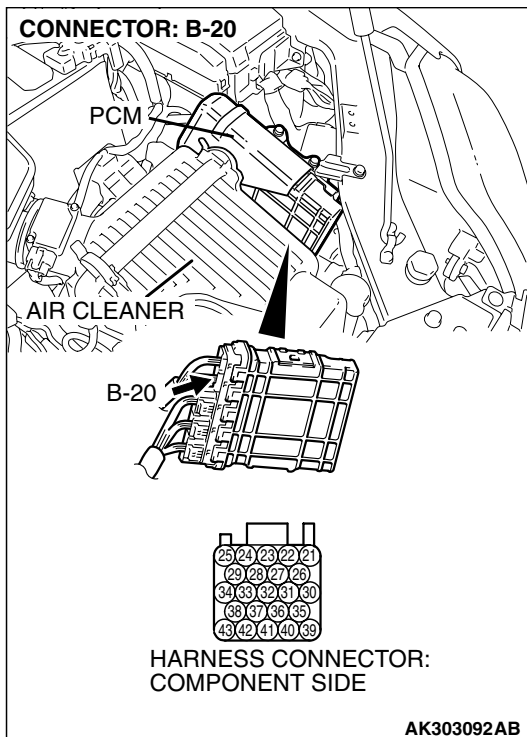
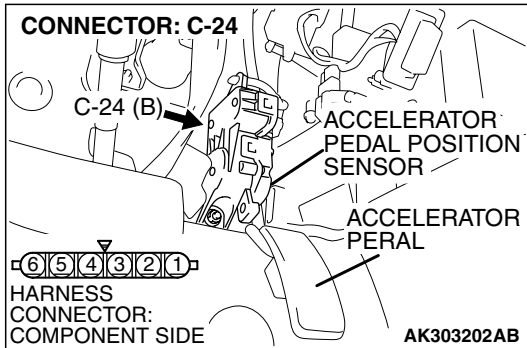


**STEP 9. Check for harness damage between accelerator pedal position sensor connector C-24 (terminal No. 6) and PCM connector B-20 (terminal No. 27)**

**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.

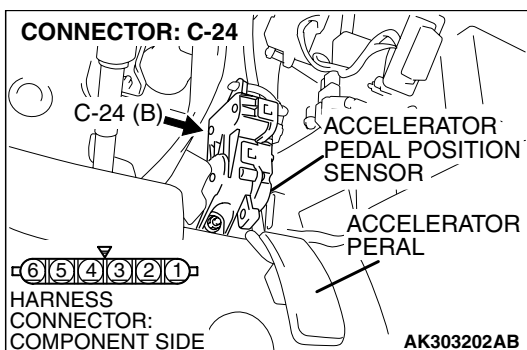
(3) After the DTC has been deleted, read the DTC again.

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

**Q: Is DTC P2127 set?**

**YES** : Replace the PCM. Then go to Step 11.

**NO** : The inspection is complete.



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

**⚠ CAUTION**

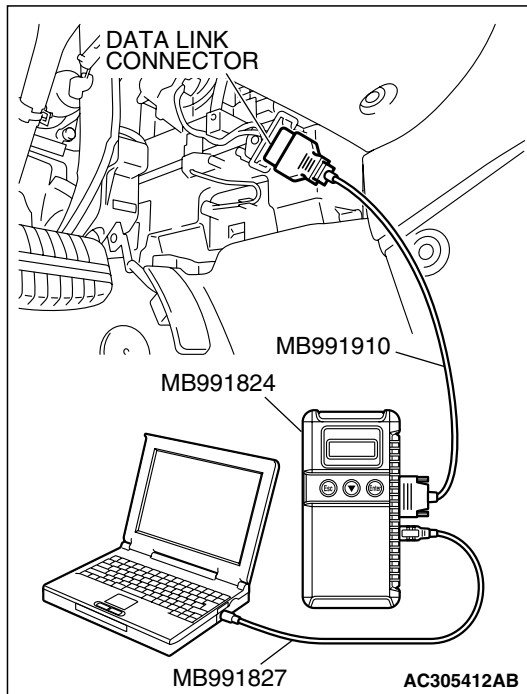
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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.

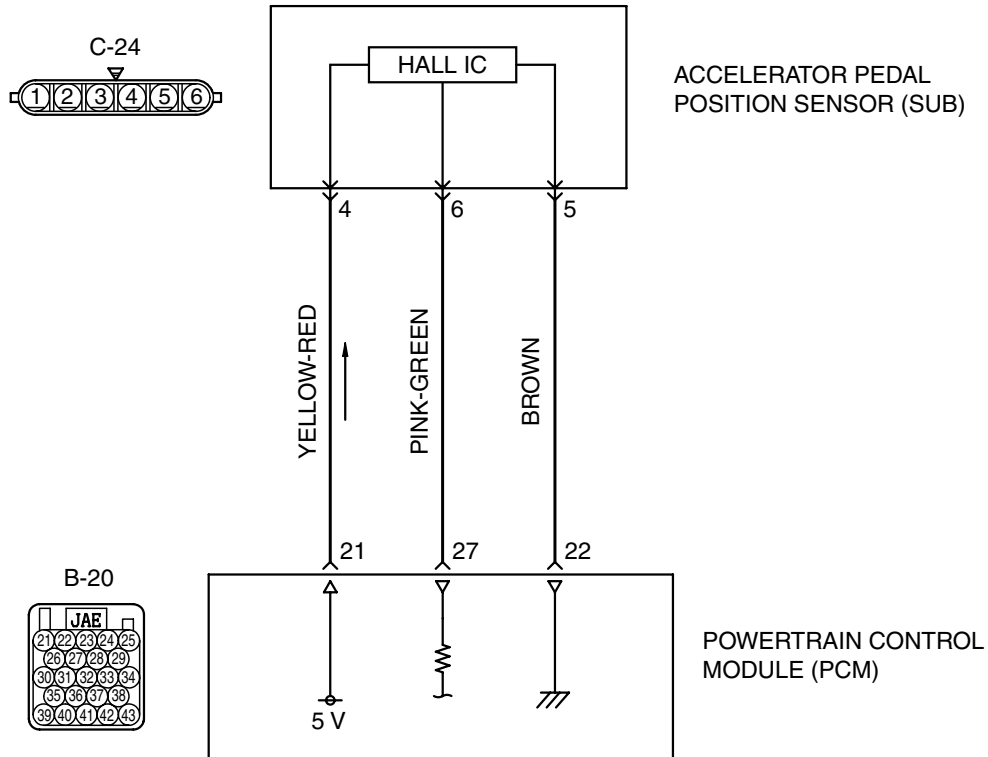


DTC P2128: Accelerator Pedal Position Sensor (Sub) Circuit High Input

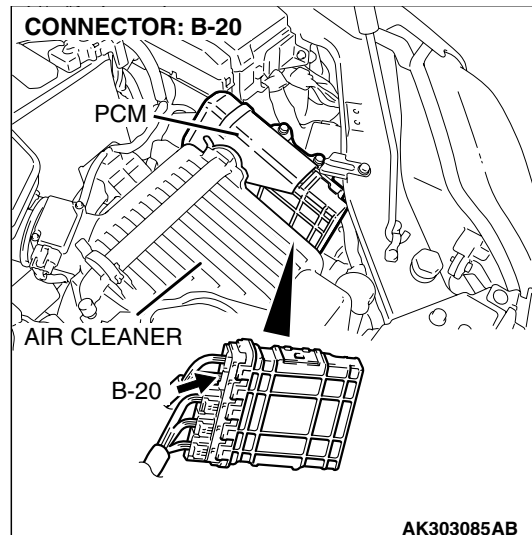
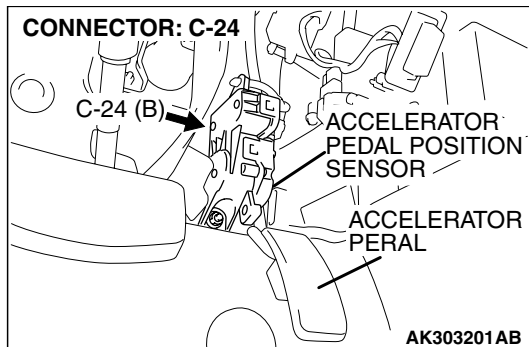
**CAUTION**

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



AK302873



**CIRCUIT OPERATION**

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

**TECHNICAL DESCRIPTION**

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

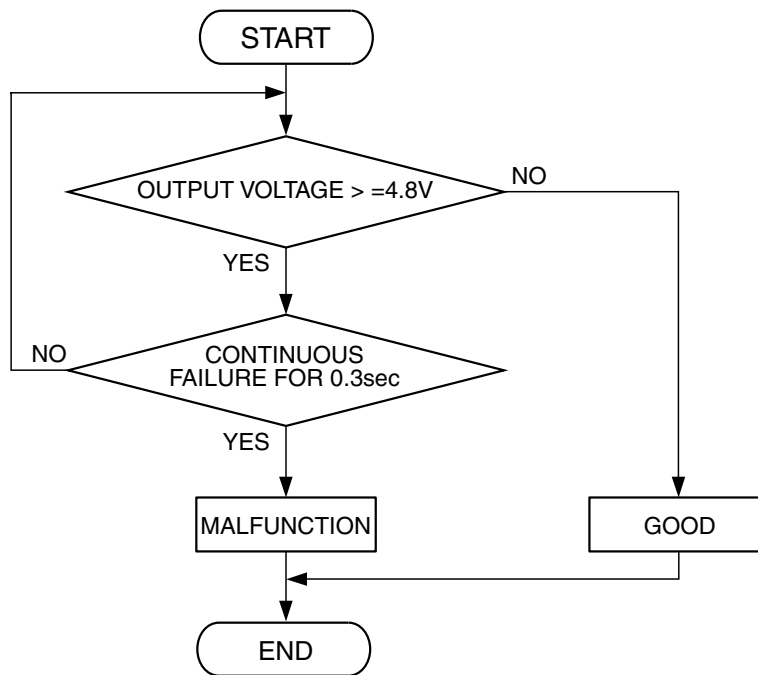
- Not applicable

**DESCRIPTIONS OF MONITOR METHODS**

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

**DTC SET CONDITIONS**

**Logic Flow Chart**



### Check Conditions

- Ignition switch is "ON" position.

### Judgement Criteria

- 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.
- PCM 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, check data list item 77: Accelerator Pedal Position Sensor (sub).**

#### **CAUTION**

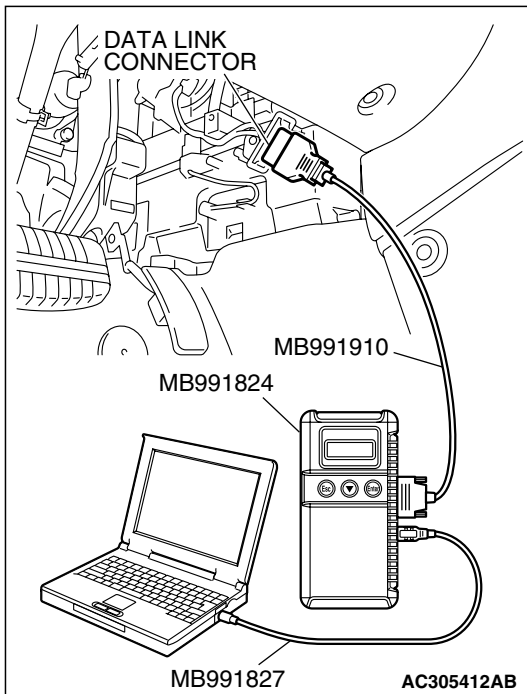
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

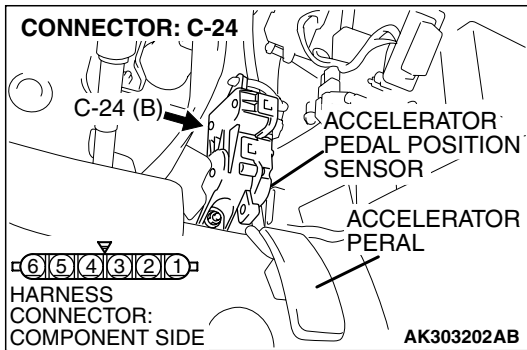
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 77, Accelerator Pedal Position Sensor (sub).
  - Output voltage is between 0.435 and 1.035 volts when foot is released from accelerator pedal.
  - Output voltage is 3.7 volts or higher when accelerator pedal is fully depressed.
- (4) Turn the ignition switch to the "LOCK"(OFF) position.

#### Q: Is the sensor operating properly?

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

**NO :** Go to Step 2.



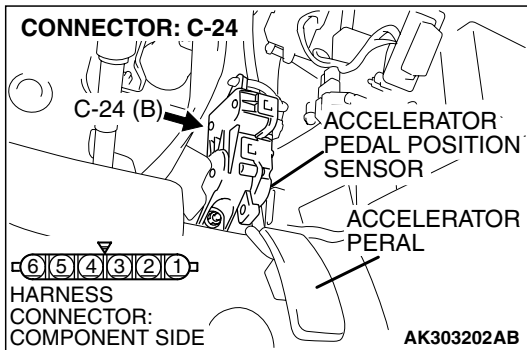


**STEP 2. Check harness connector C-24 at accelerator pedal position sensor for damage.**

**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-24.**

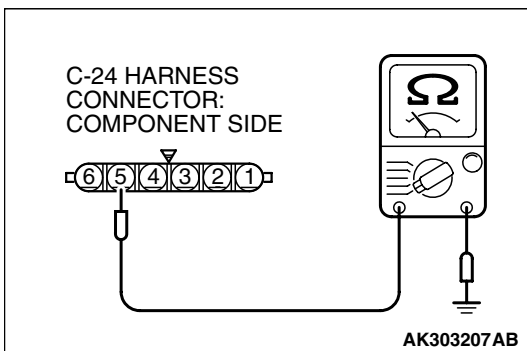
(1) Disconnect the connector C-24 and measure at the harness side.

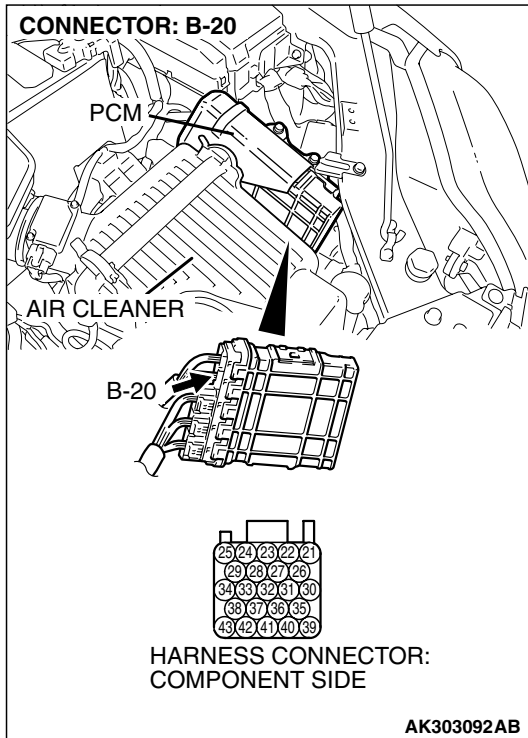
(2) Measure the continuity between terminal No. 5 and ground.  
• Should be less than 2 ohms.

**Q: Does continuity exist?**

**YES :** Go to Step 6.

**NO :** Go to Step 4.



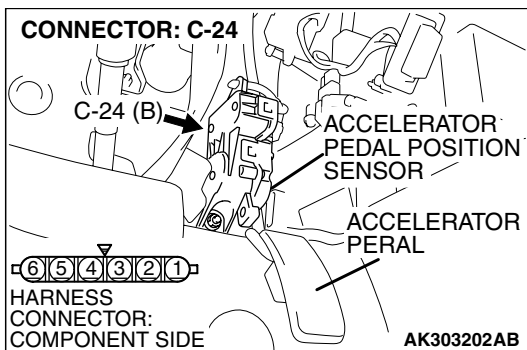
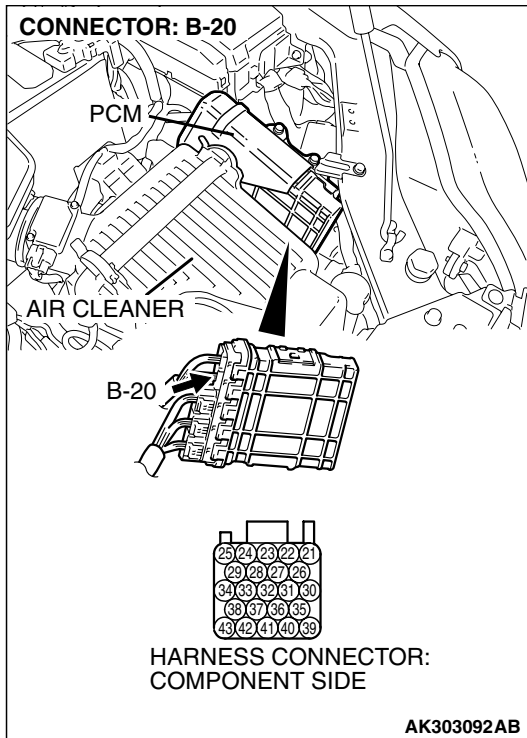
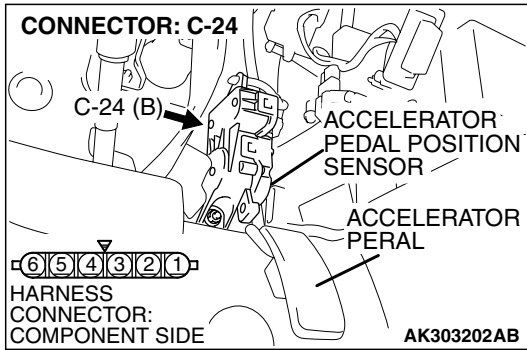


**STEP 4. Check harness connector B-20 at PCM for damage.**

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

**YES :** Go to Step 5.

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



**STEP 5. Check for open circuit and harness damage between accelerator pedal position sensor connector C-24 (terminal No. 5) and PCM connector B-20 (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 PCM. Then go to Step 8.

**NO :** The inspection is complete.



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

**⚠ CAUTION**

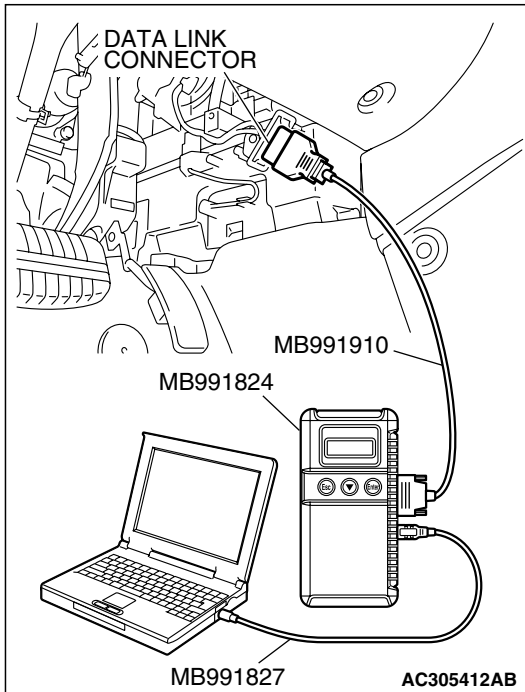
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 77, Accelerator Pedal Position Sensor (sub).
  - Output voltage is between 0.435 and 1.035 volts when foot is released from accelerator pedal.
  - Output voltage is 3.7 volts or higher when accelerator pedal is fully depressed.
- (4) Turn the ignition switch to the "LOCK"(OFF) position.

**Q: Is the sensor operating properly?**

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

**NO :** Replace the PCM. Then go to Step 8.



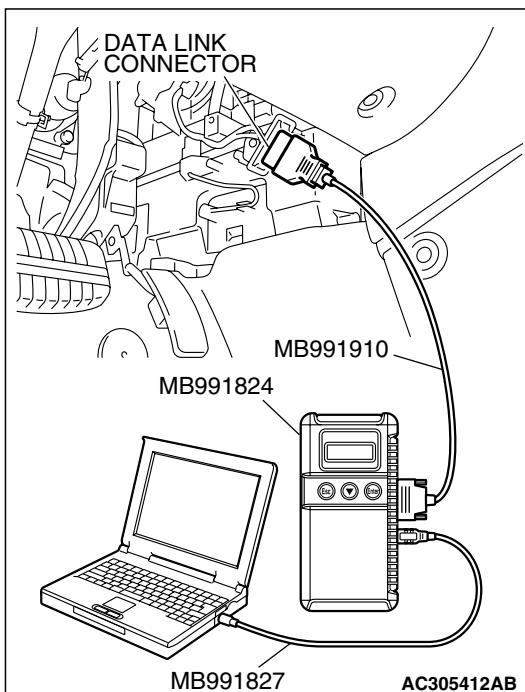
**STEP 8. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

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

**Q: Is DTC P2128 set?**

**YES :** Retry the troubleshooting.

**NO :** The inspection is complete.



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**DTC P2135: Throttle Position Sensor (Main and Sub) Range/Performance Problem**

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**⚠ 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.13B-162](#).
- Refer to DTC P0222 – Throttle Position Sensor (Sub) Circuit [P.13B-550](#).

**CIRCUIT OPERATION**

- Refer to DTC P0122 – Throttle Position Sensor (Main) Circuit [P.13B-162](#).
- Refer to DTC P0222 – Throttle Position Sensor (Sub) Circuit [P.13B-550](#).

**TECHNICAL DESCRIPTION**

- PCM 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)**

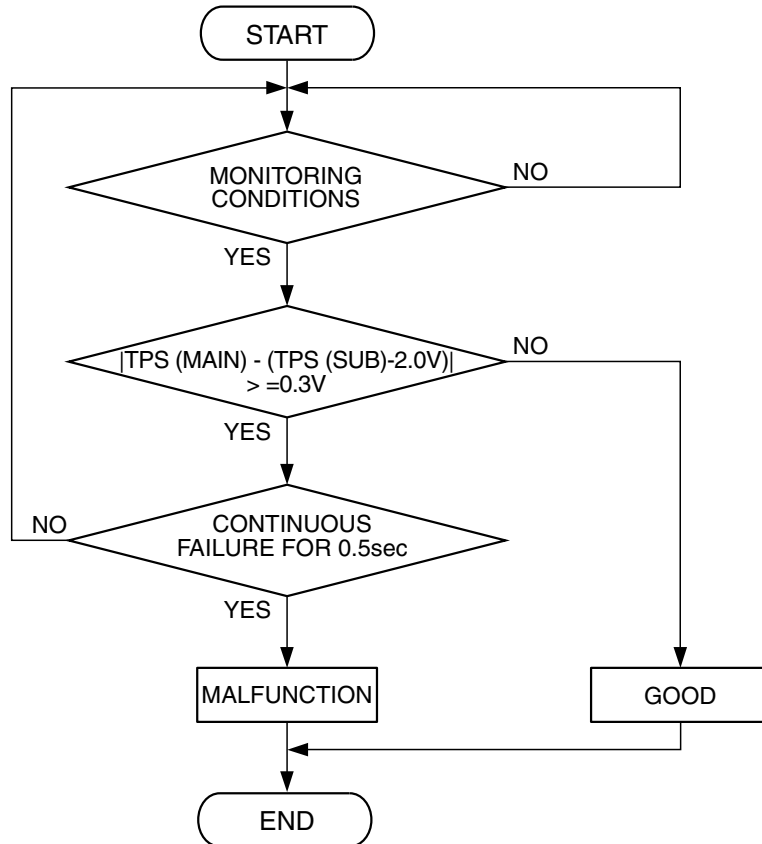
- Not applicable

**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**



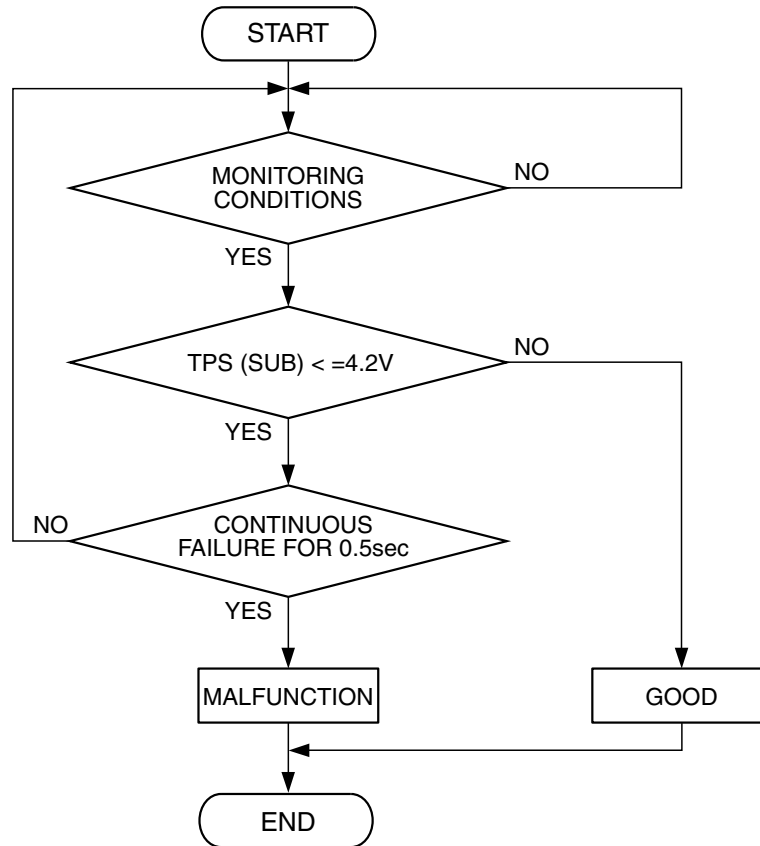
AK302391

**Check Conditions**

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

**Judgement Criteria**

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

**DTC SET CONDITIONS <Range/Performance problem -relation between main and sub>****Logic Flow Chart**

AK302392

**Check Conditions**

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

**Judgement Criteria**

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

**OBD-II DRIVE CYCLE PATTERN**

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

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

- Throttle position sensor failed.
- Shorted throttle position sensor circuit or connector damage.
- PCM failed.

## DIAGNOSIS

### Required Special Tools:

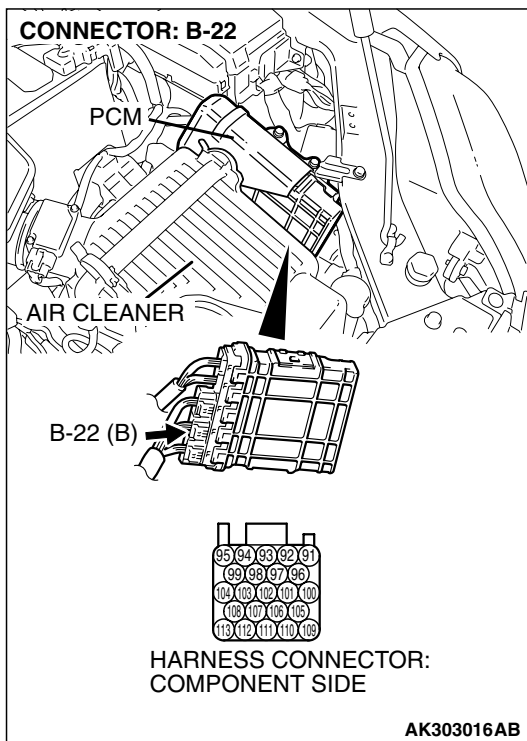
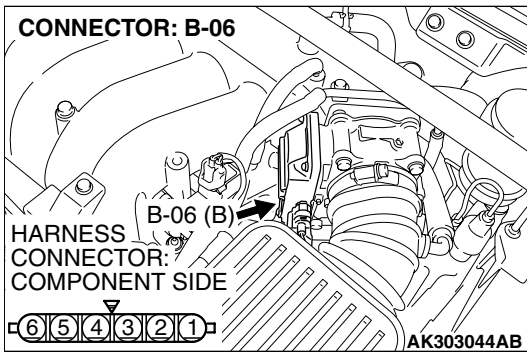
- MB991958: Scan tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

**STEP 1. Check harness connector B-06 at throttle position sensor and harness connector B-22 at PCM for damage.**

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

**YES :** Go to Step 2.

**NO :** Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 5.

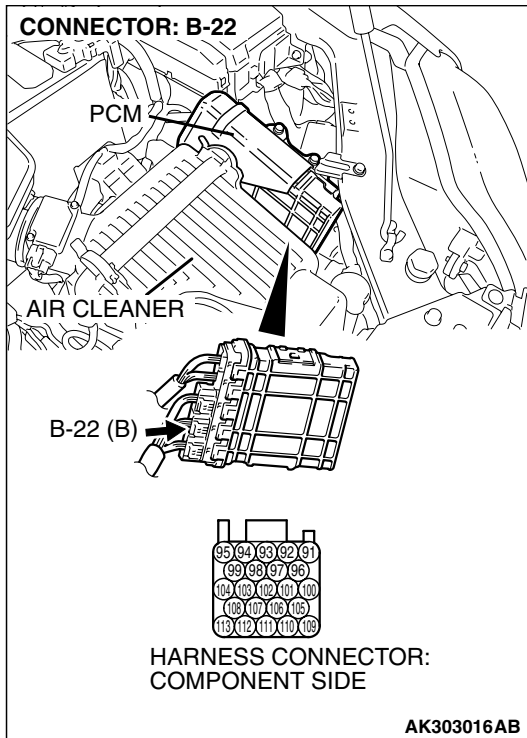
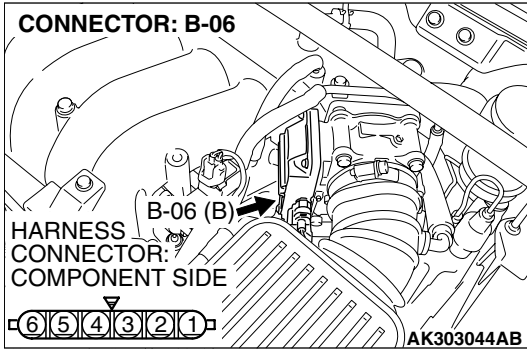


**STEP 2. Check for short circuit to ground between throttle position sensor connector B-06 (terminal No. 4) and PCM connector B-22 (terminal No. 99).**

**Q: Is the harness wire in good condition?**

**YES :** Go to Step 3.

**NO :** Repair it. Then go to Step 5.

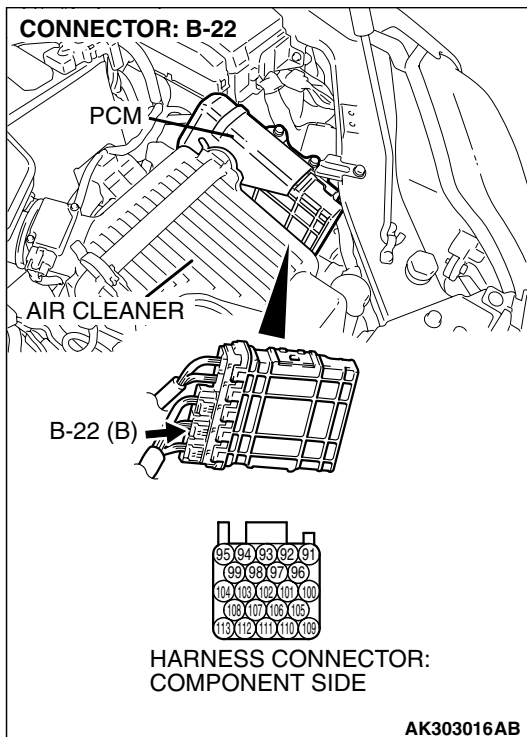
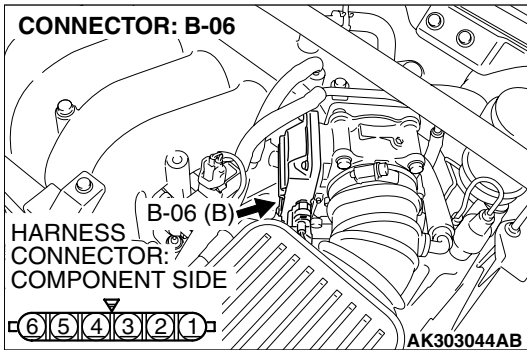


**STEP 3. Check for short circuit to ground between throttle position sensor connector B-06 (terminal No. 6) and PCM connector B-22 (terminal No. 98).**

**Q: Is the harness wire in good condition?**

**YES :** Go to Step 4.

**NO :** Repair it. Then go to Step 5.



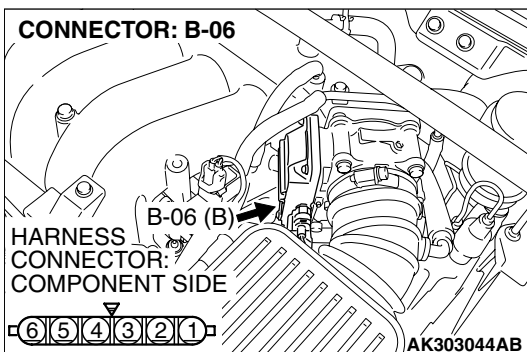
**STEP 4. Replace the throttle body assembly.**

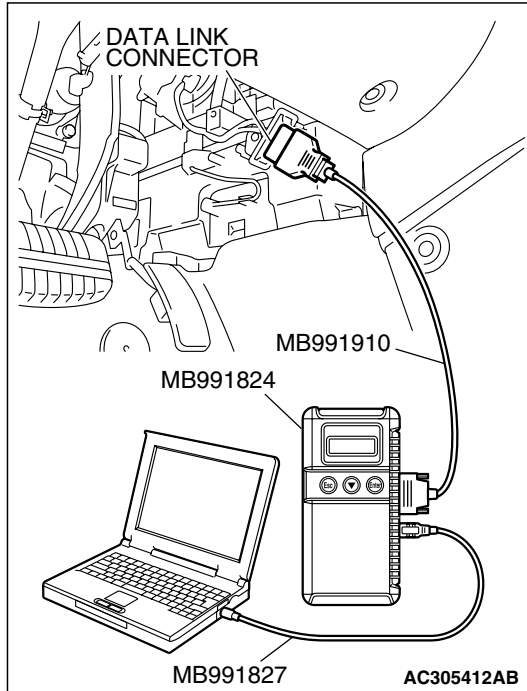
- (1) Replace the throttle body assembly.
- (2) Turn the ignition switch to the "ON" position.
- (3) After the DTC has been deleted, read the DTC again.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

**Q: Is DTC P2135 set?**

**YES :** Replace the PCM. Then go to Step 5.

**NO :** The inspection is complete.





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

**⚠ CAUTION**

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

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

**Q: Is DTC P2135 set?**

**YES :** Retry the troubleshooting.

**NO :** The inspection is complete.

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

**⚠ 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 CIRCUIT

- Refer to DTC P2122 – Accelerator Pedal Position Sensor (Main) Circuit [P.13B-938](#).
- Refer to DTC P2127 – Accelerator Pedal Position Sensor (Sub) Circuit [P.13B-955](#).

### CIRCUIT OPERATION

- Refer to DTC P2122 – Accelerator Pedal Position Sensor (Main) Circuit [P.13B-938](#).
- Refer to DTC P2127 – Accelerator Pedal Position Sensor (Sub) Circuit [P.13B-955](#).

### TECHNICAL DESCRIPTION

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

### DESCRIPTIONS OF MONITOR METHODS

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

### MONITOR EXECUTION

Continuous

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

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

- Not applicable

**Sensor (The sensor below is determined to be normal)**

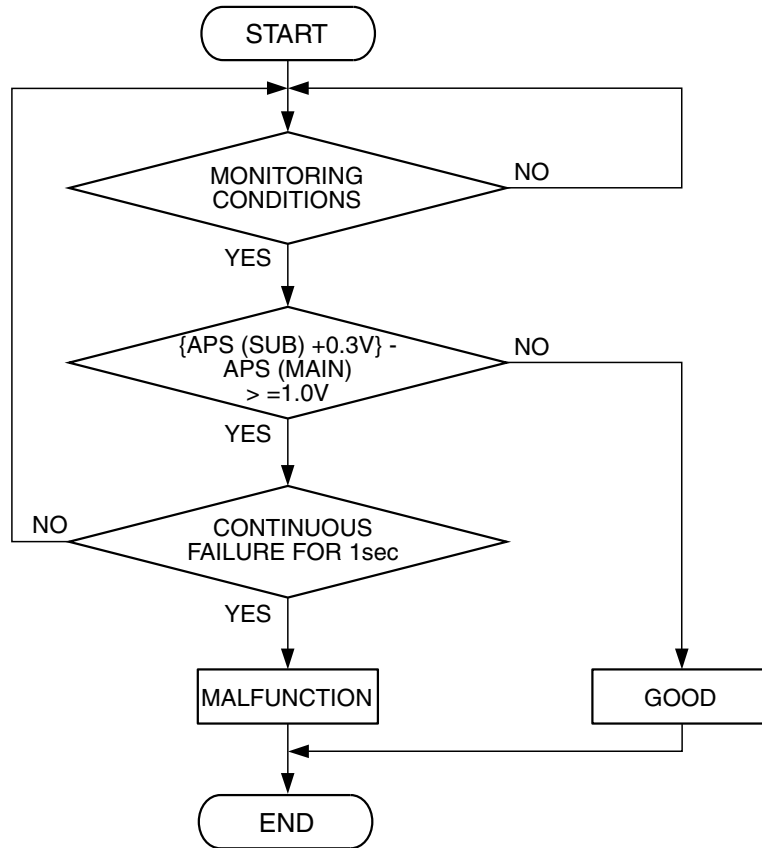
- Not applicable



**DTC SET CONDITIONS**

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

**Logic Flow Chart**



AK303910

**Check Condition**

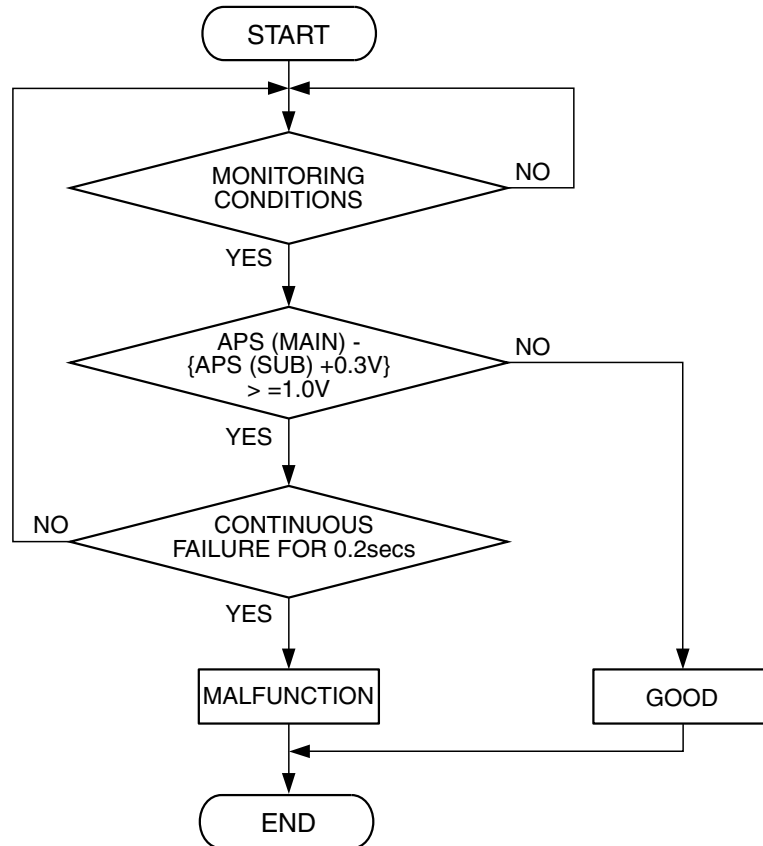
- Ignition switch is "ON" position.
- Accelerator pedal position sensor (main) output voltage is between 0.6 and 4.8 volts.
- Accelerator pedal position sensor (sub) output voltage is between 0.2 and 4.8 volts.
- Change of accelerator pedal position sensor (sub) output voltage per 25 milliseconds is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

**DTC SET CONDITIONS**

&lt;Range/Performance problem -relation between main and sub&gt;

**Logic Flow Chart**

AK303911

**Check Condition**

- 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 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.
- PCM failed.

## DIAGNOSIS

### Required Special Tools:

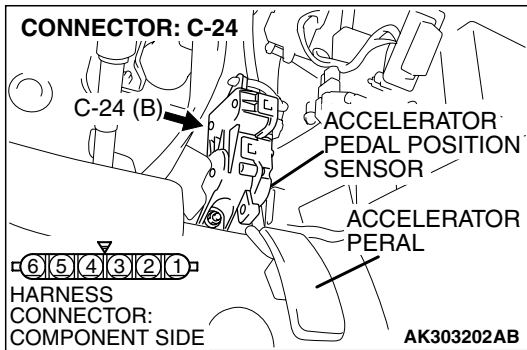
- MB991958: Scan tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A

### STEP 1. Check harness connector C-24 at accelerator pedal position sensor for damage.

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

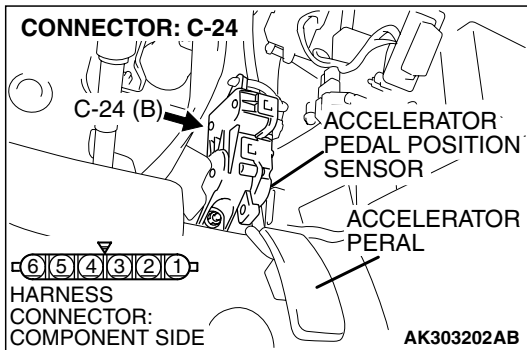
**YES** : Go to Step 2.

**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-24.

(1) Disconnect the connector C-24 and measure at the harness side.



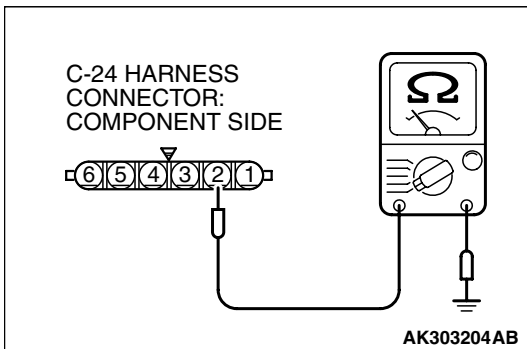
(2) Measure the continuity between terminal No. 2 and ground.

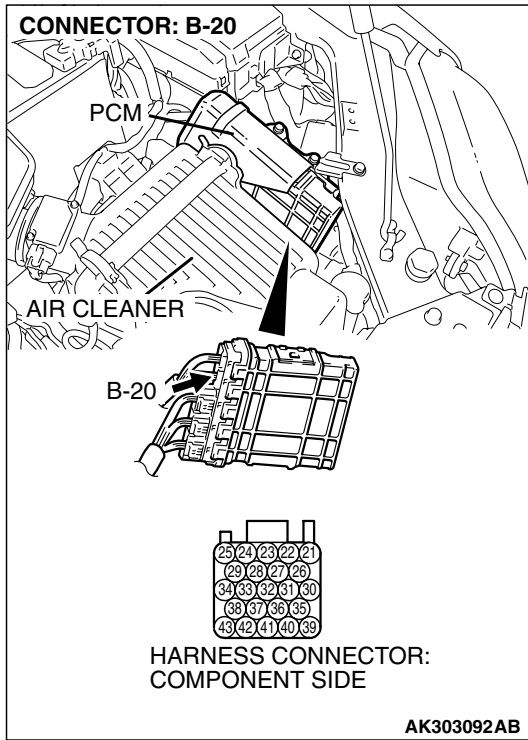
- Should be less than 2 ohms.

#### Q: Does continuity exist?

**YES** : Go to Step 6.

**NO** : Go to Step 3.





**STEP 3. Check harness connector B-20 at PCM for damage.**

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

**YES :** Go to Step 4.

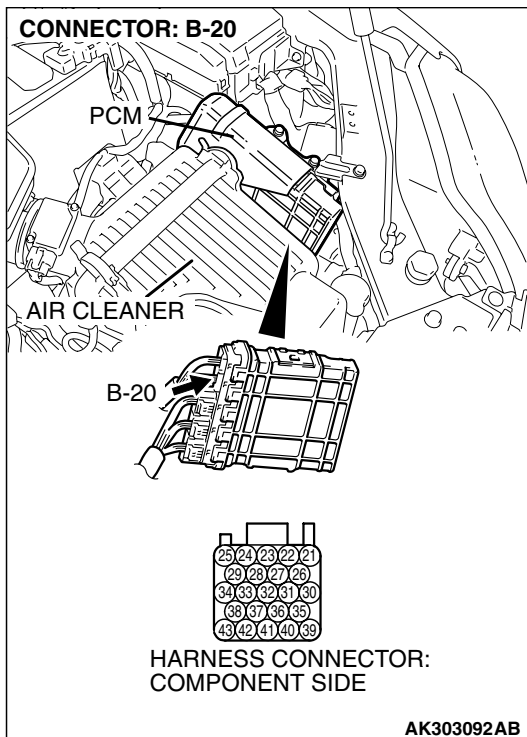
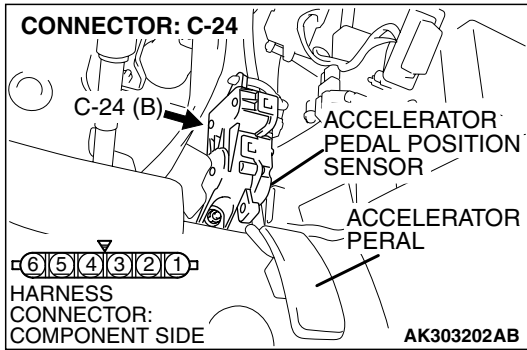
**NO :** Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 16.

**STEP 4. Check for harness damage between accelerator pedal position sensor connector C-24 (terminal No. 2) and PCM connector B-20 (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**

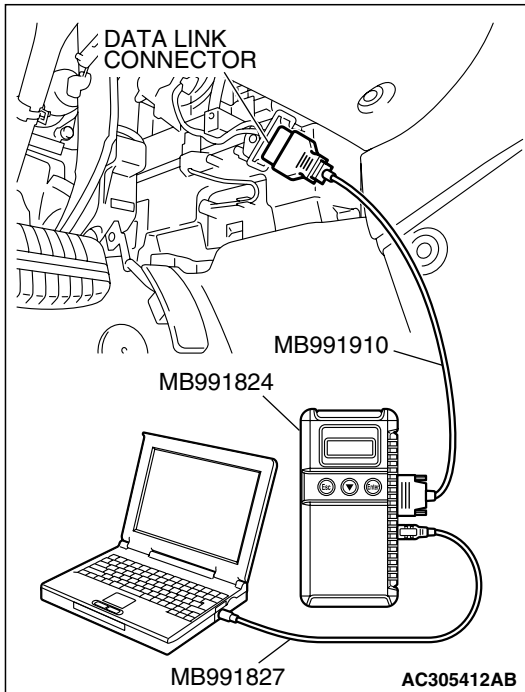
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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?**

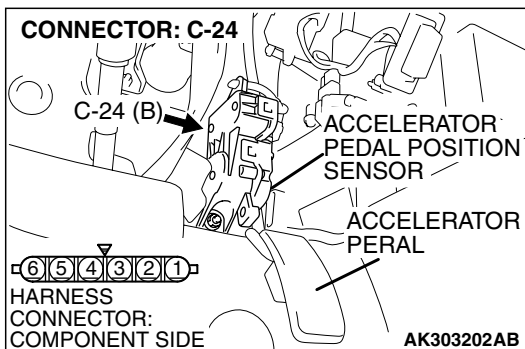
**YES :** Replace the PCM. Then go to Step 16.

**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-24.

- (1) Disconnect the connector C-24 and measure at the harness side.

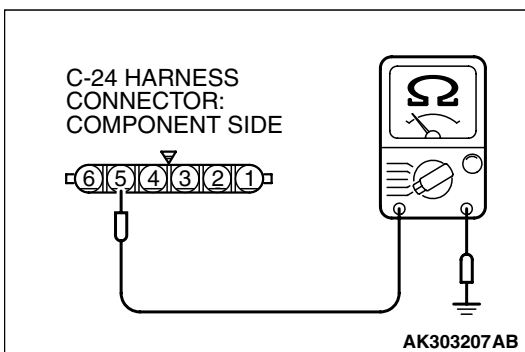


- (2) Measure the continuity between terminal No. 5 and ground.
  - Should be less than 2 ohms.

**Q: Does continuity exist?**

**YES :** Go to Step 10.

**NO :** Go to Step 7.

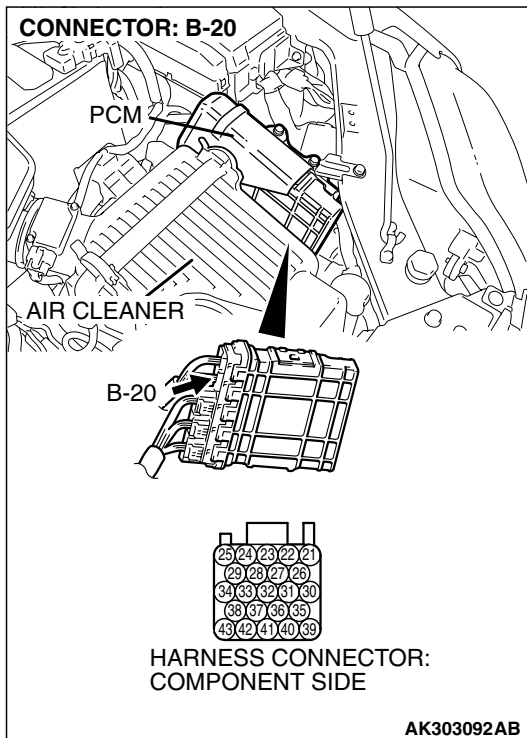


**STEP 7. Check harness connector B-20 at PCM for damage.**

**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.

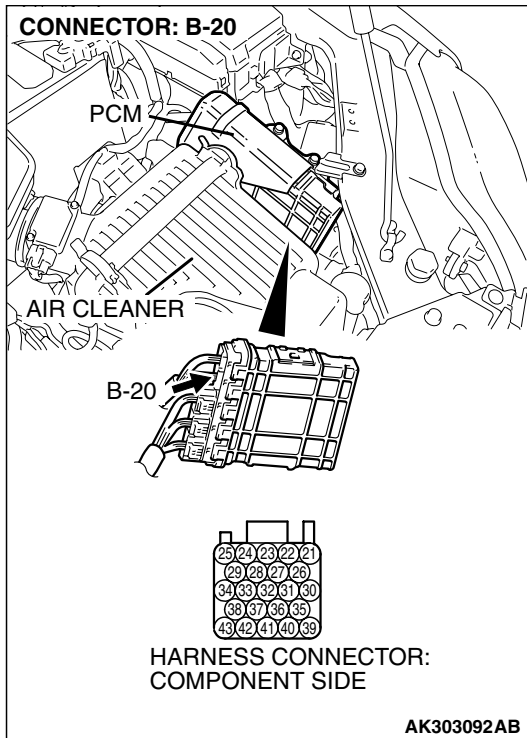
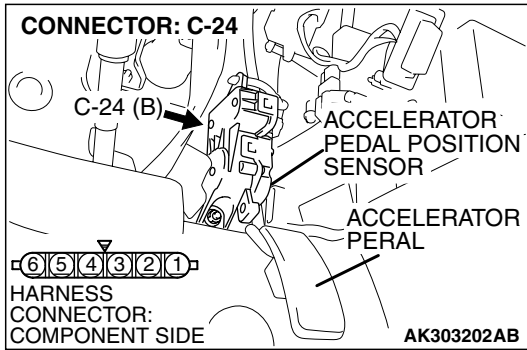


**STEP 8. Check for harness damage between accelerator pedal position sensor connector C-24 (terminal No. 5) and PCM connector B-20 (terminal No. 22).**

**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**

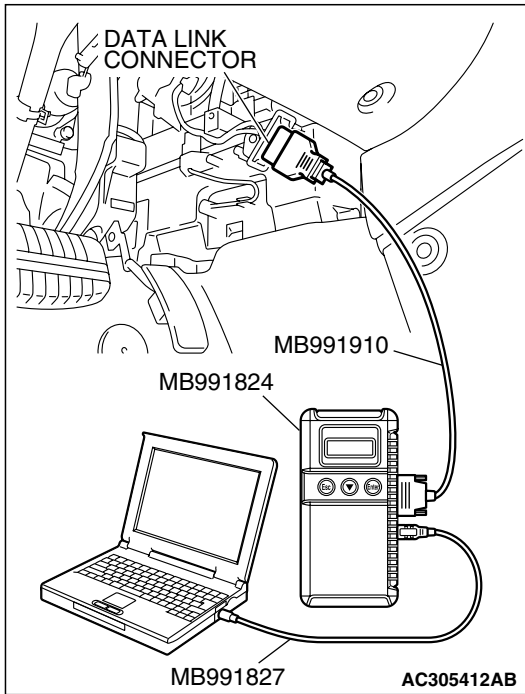
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting scan tool MB991958.

- (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 PCM. 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](#).

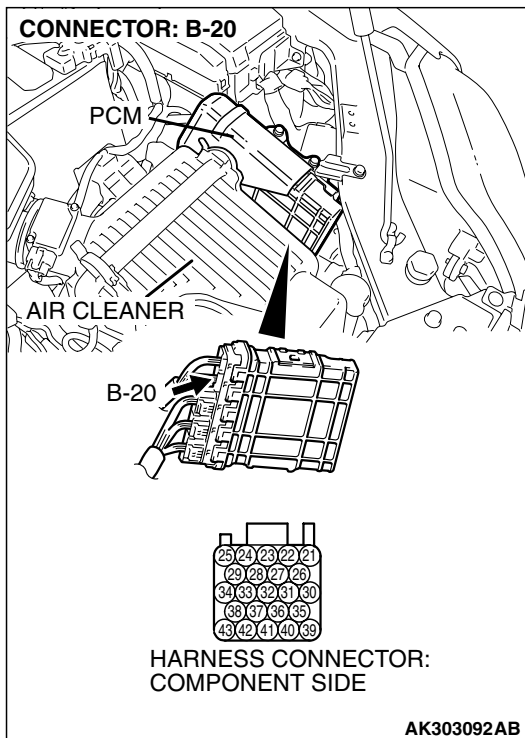


**STEP 10.** Check harness connector B-20 at PCM for damage.

**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.

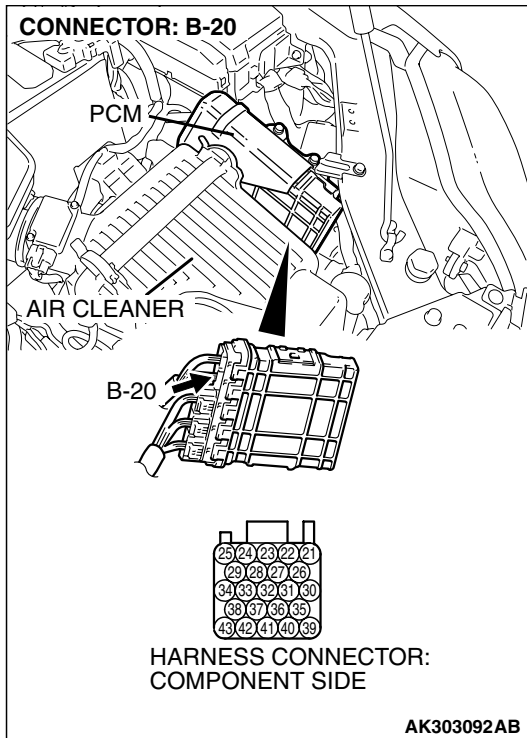
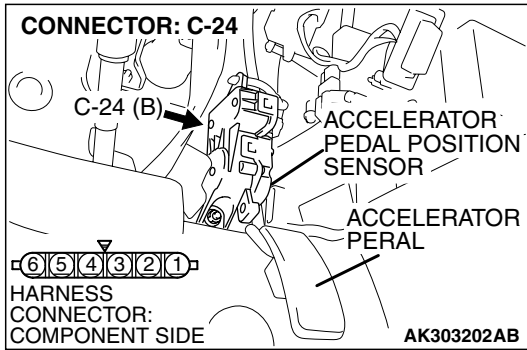


**STEP 11. Check for harness damage between accelerator pedal position sensor connector C-24 (terminal No. 1) and PCM connector B-20 (terminal No. 30).**

**Q: Is the harness wire in good condition?**

**YES :** Go to Step 12.

**NO :** Repair it. Then go to Step 16.

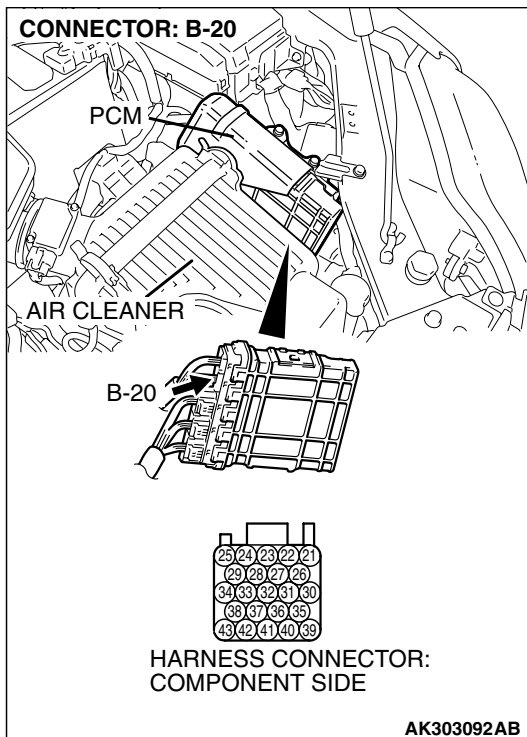
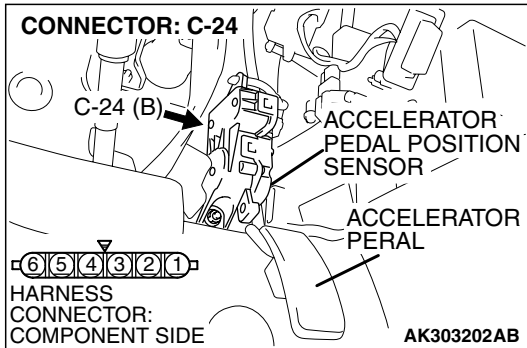


**STEP 12. Check for harness damage between accelerator pedal position sensor connector C-24 (terminal No. 4) and PCM connector B-20 (terminal No. 21).**

**Q: Is the harness wire in good condition?**

**YES :** Go to Step 13.

**NO :** Repair it. Then go to Step 16.

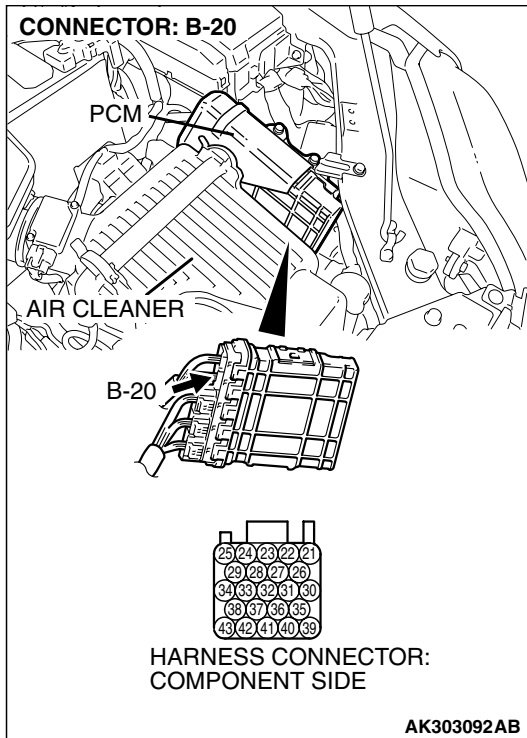
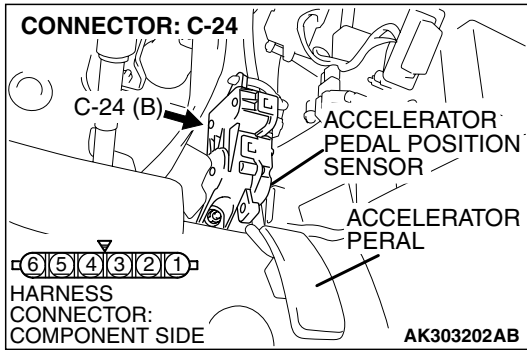


**STEP 13. Check for harness damage between accelerator pedal position sensor connector C-24 (terminal No. 3) and PCM connector B-20 (terminal No. 26).**

**Q: Is the harness wire in good condition?**

**YES :** Go to Step 14.

**NO :** Repair it. Then go to Step 16.

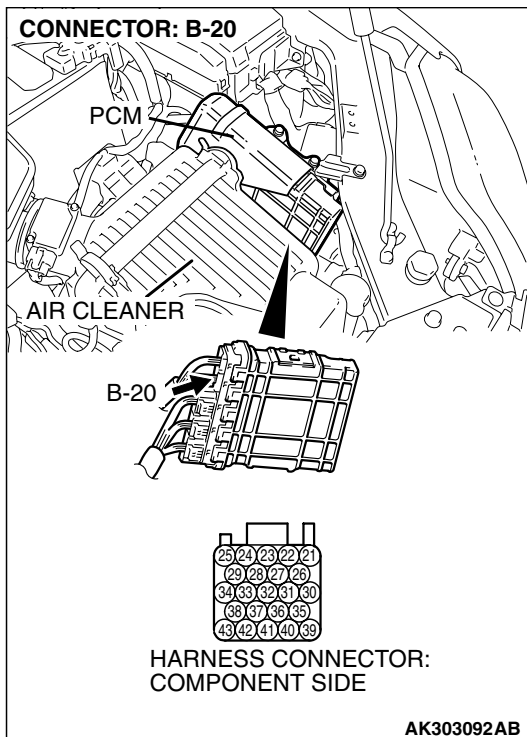
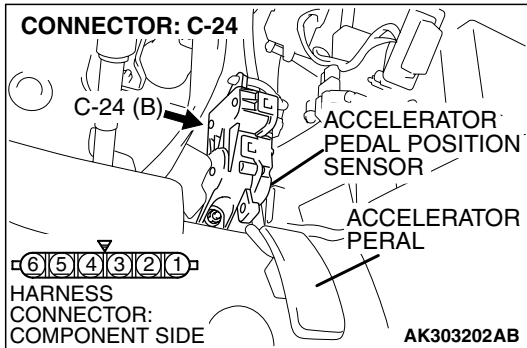


**STEP 14. Check for harness damage between accelerator pedal position sensor connector C-24 (terminal No. 6) and PCM connector B-20 (terminal No. 27).**

**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 acceletator pedal position sensor.**

(1) Replace the acelerator pedal position sensor.

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

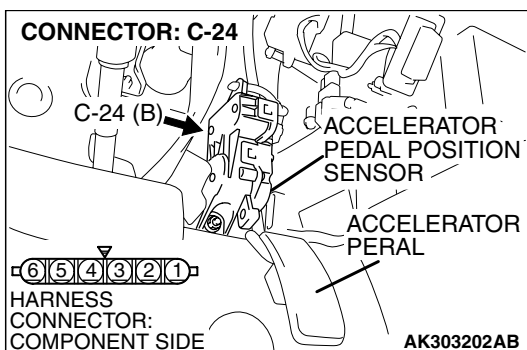
(3) After the DTC has been deleted, read the DTC again.

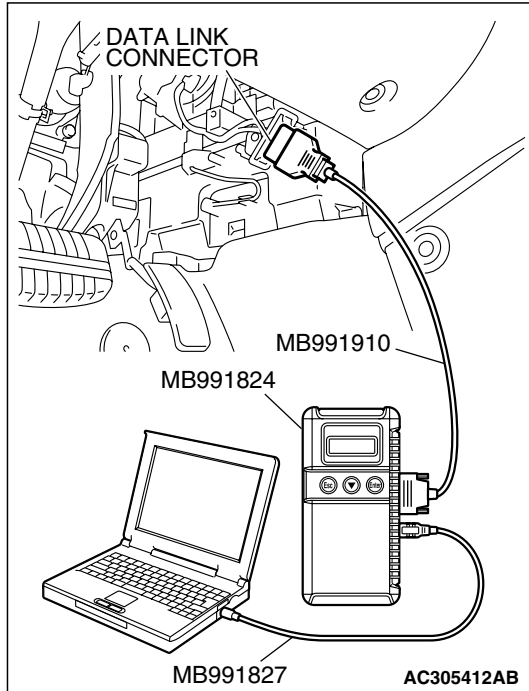
(4) Turn the ignition switch to the "LOCK" (OFF) position.

**Q: Is DTC P2138 set?**

**YES :** Replace the PCM. Then go to Step 16.

**NO :** The inspection is complete.





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

**⚠ CAUTION**

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

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

**Q: Is DTC P2138 set?**

**YES :** Retry the troubleshooting.

**NO :** The inspection is complete.

## DTC 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 PCM 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)**

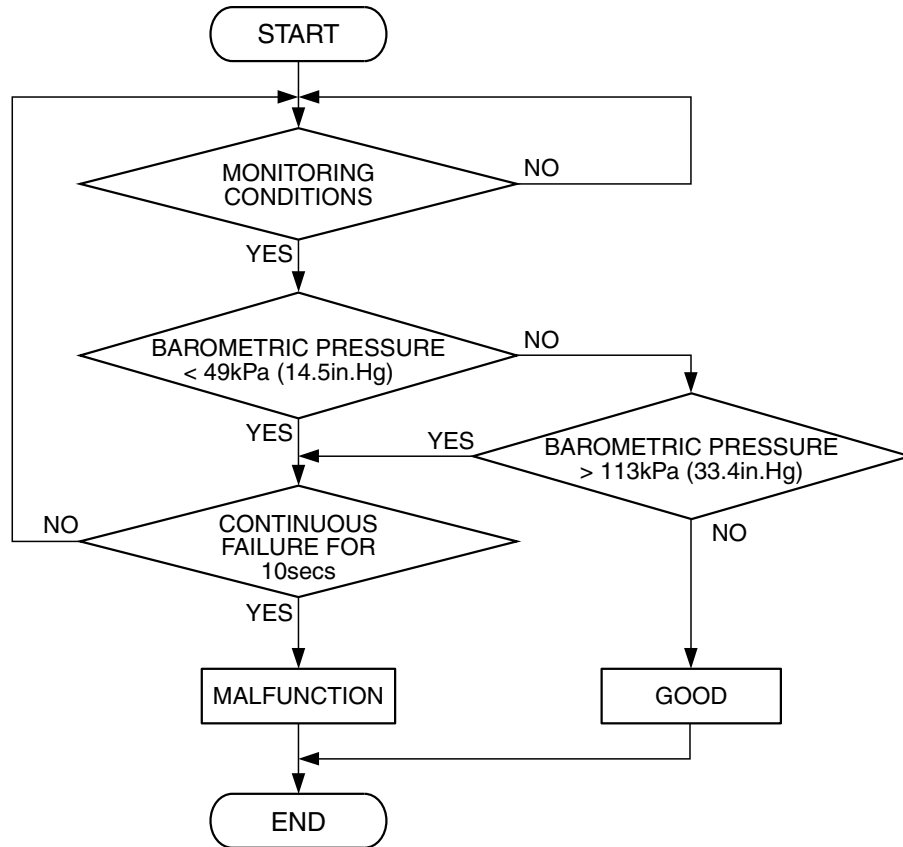
- Not applicable

**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 Criteria**

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

**OBD-II DRIVE CYCLE PATTERN**

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

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

- PCM 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, check data list item 25: Barometric Pressure Sensor.****⚠ CAUTION**

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

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 25, Barometric Pressure Sensor.
  - When altitude is 0 m (0 foot), 101 kPa (29.8 In.Hg).
  - When altitude is 600 m (1,969 feet), 95 kPa (28.1 In.Hg).
  - When altitude is 1,200 m (3,937 feet), 88 kPa (26.0 In.Hg).
  - When altitude is 1,800 m (5,906 feet), 81 kPa (23.9 In.Hg).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

**Q: Is the sensor operating properly?**

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

**NO** : Replace the PCM, then go to Step 2.

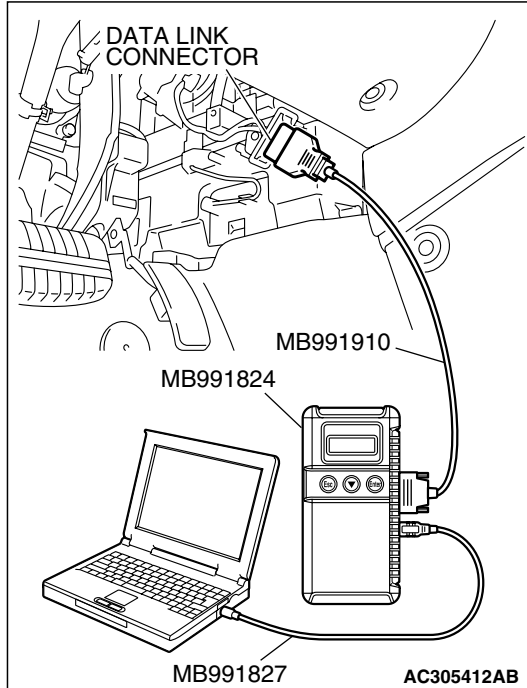
**STEP 2. Test the OBD-II drive cycle.**

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

**Q: Is DTC P2228 set?**

**YES** : Retry the troubleshooting.

**NO** : The inspection is complete.

**DTC P2229: Barometric Pressure Circuit High Input****⚠ 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 PCM 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)**

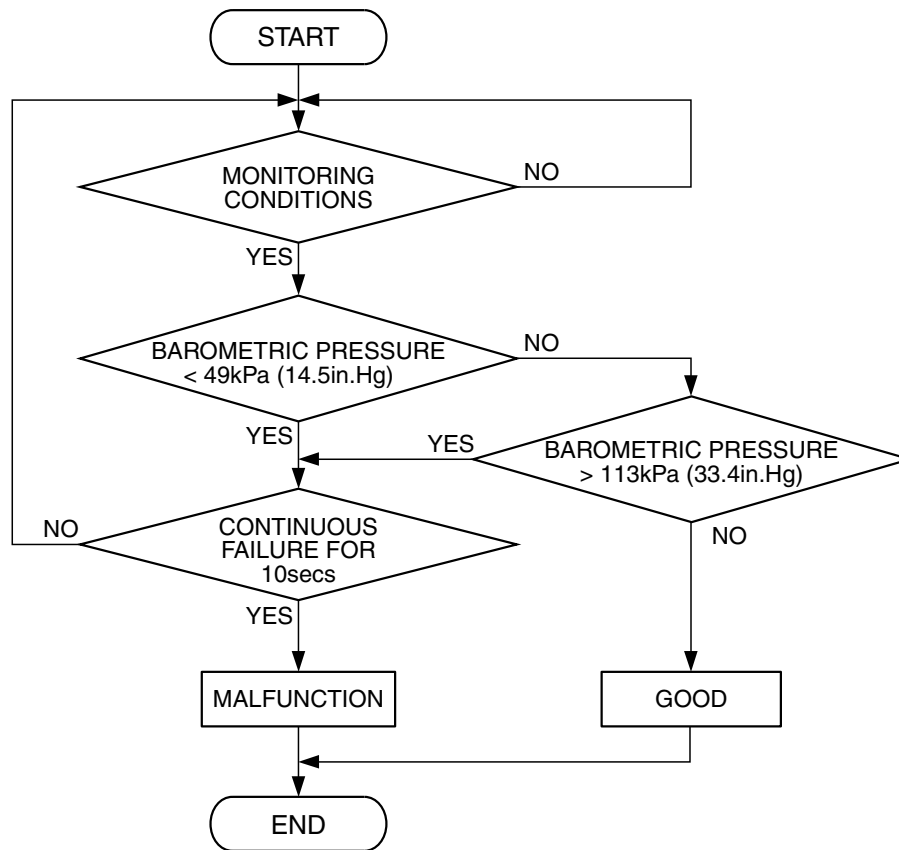
- Not applicable

**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 Criteria**

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

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

- PCM 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, check data list item 25: Barometric Pressure Sensor.****⚠ CAUTION**

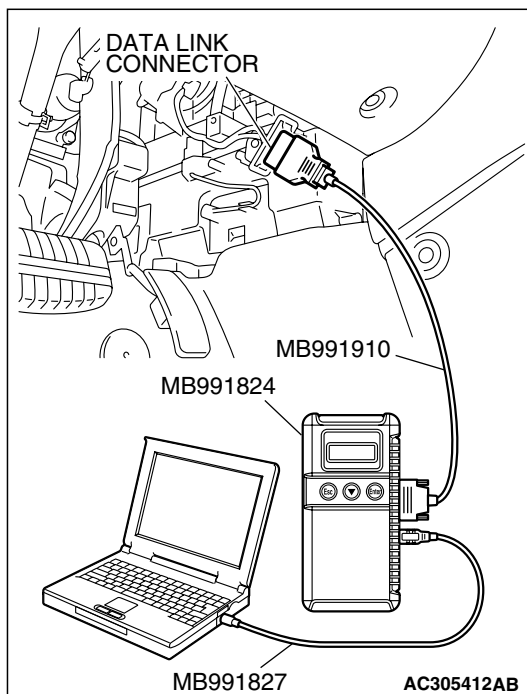
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for item 25, Barometric Pressure Sensor.
  - When altitude is 0 m (0 foot), 101 kPa (29.8 In.Hg).
  - When altitude is 600 m (1,969 feet), 95 kPa (28.1 In.Hg).
  - When altitude is 1,200 m (3,937 feet), 88 kPa (26.0 In.Hg).
  - When altitude is 1,800 m (5,906 feet), 81 kPa (23.9 In.Hg).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

**Q: Is the sensor operating properly?**

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

**NO** : Replace the PCM, then go to Step 2.

**STEP 2. Test the OBD-II drive cycle.**

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

**Q: Is DTC P2229 set?**

**YES** : Retry the troubleshooting.

**NO** : The inspection is complete.

**DTC U1073: Bus Off**

**CAUTION**

- If the PCM 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.
- PCM 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, diagnose CAN bus line.**

**CAUTION**

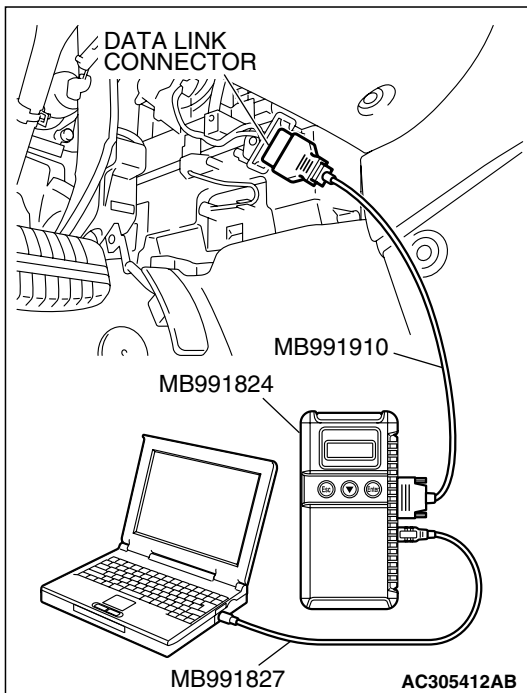
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

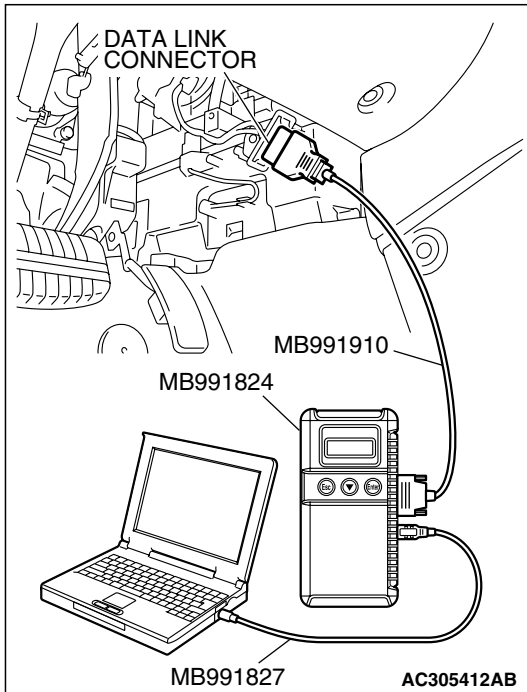
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Diagnose CAN bus line.
- (4) Turn the ignition switch the "LOCK" (OFF) position.

**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.**

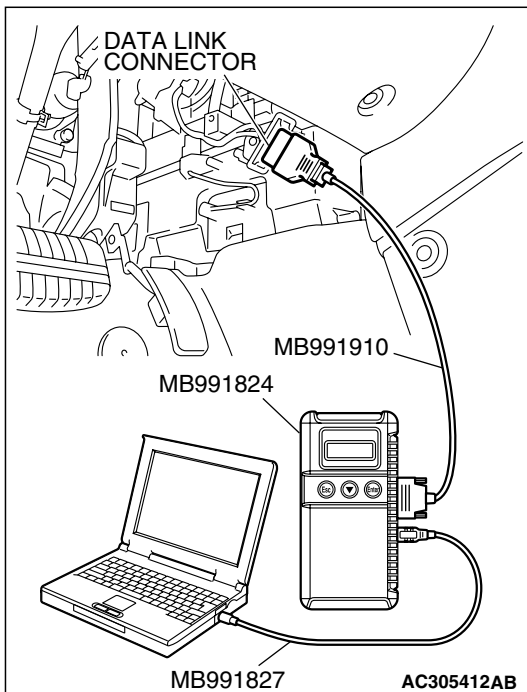
Check again if the DTC is set.

- (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 PCM. 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 PCM 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 Criteria**

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

**COMMENT**

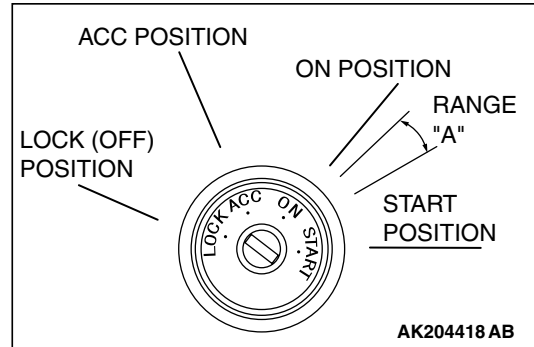
**Current Trouble**

- 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 PCM.

**Past Trouble**

- Proceed to troubleshoot based on a harness or connector damage on the CAN bus line between the PCM 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.
- PCM 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, diagnose CAN bus line.****⚠ CAUTION**

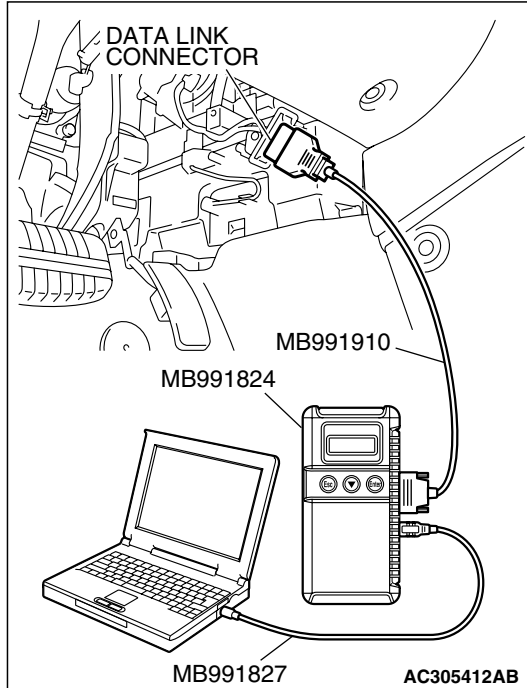
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (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.

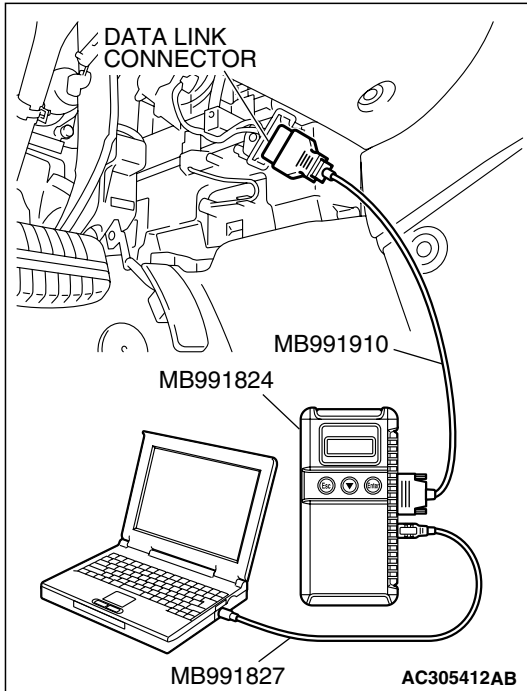


**STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Read the 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-9](#).
- NO :** Go to Step 3.

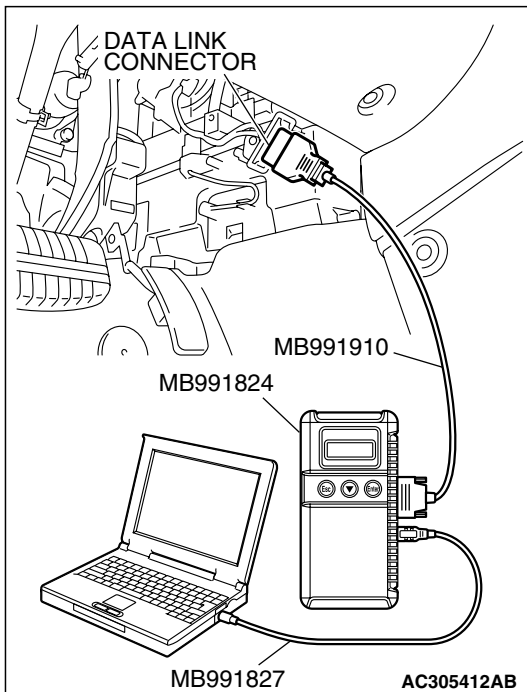


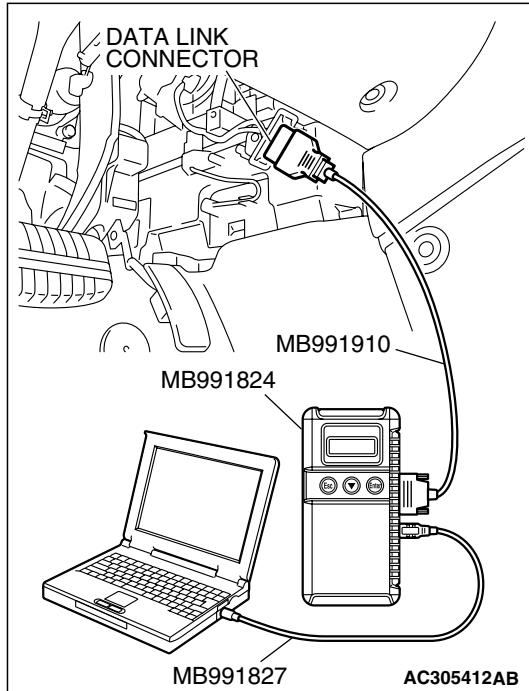
**STEP 3. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

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





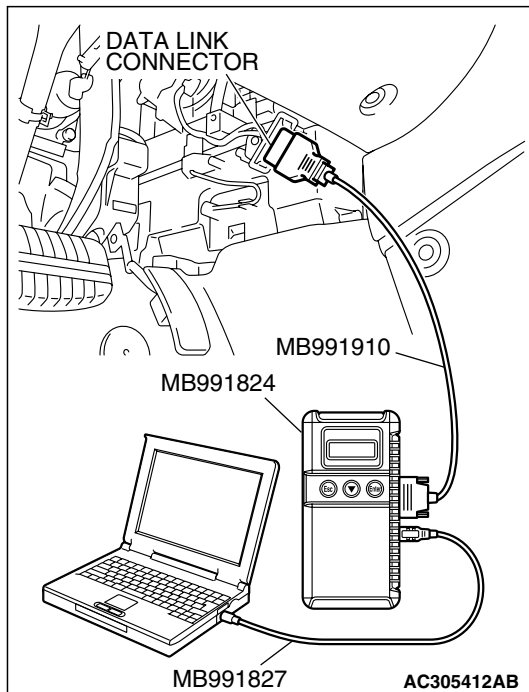
**STEP 4. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

- (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 PCM 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).**

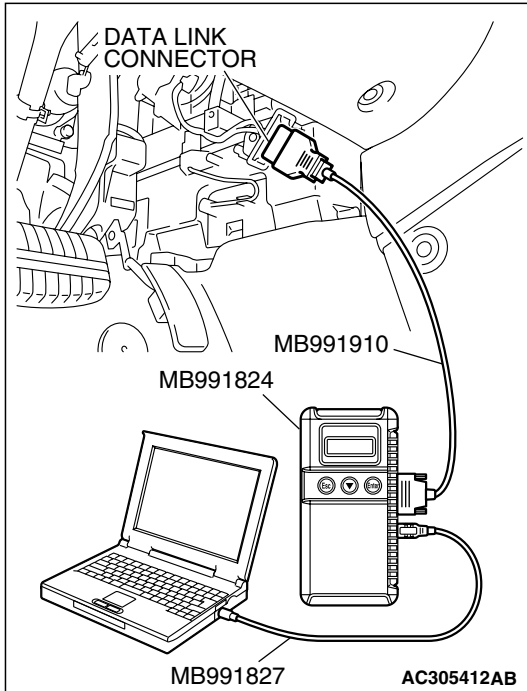
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) After the MFI-DTC has been deleted, read the MFI-DTC again.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

**Q: Is DTC U1102 set?**

**YES :** Replace the PCM. Then go to Step 6.

**NO :** It can be assumed that this malfunction is intermittent of CAN bus line between PCM 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 PCM 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 PCM.)

**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)

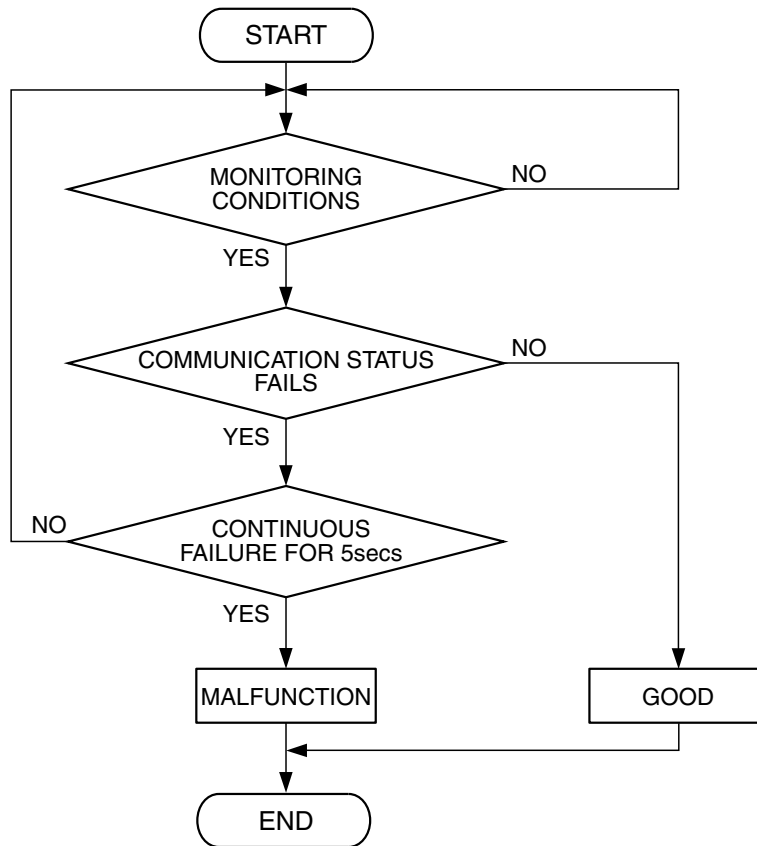
- Not applicable

**Sensor** (The sensor below is determined to be normal)

- Not applicable

## DTC SET CONDITIONS

## Logic Flow Chart



AK204025

**Check Conditions**

- Battery positive voltage is 10 volts or higher.

**Judgement Criteria**

- Unable to receive combination meter 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 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 PCM.

**Past Trouble**

- Proceed to troubleshoot based on a harness or connector damage on the CAN bus line between the PCM 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).*

## 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.
- PCM 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, diagnose CAN bus line.

#### **CAUTION**

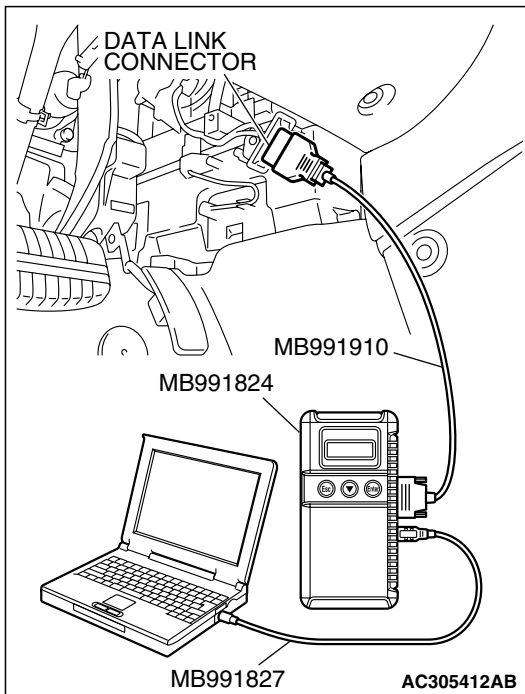
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

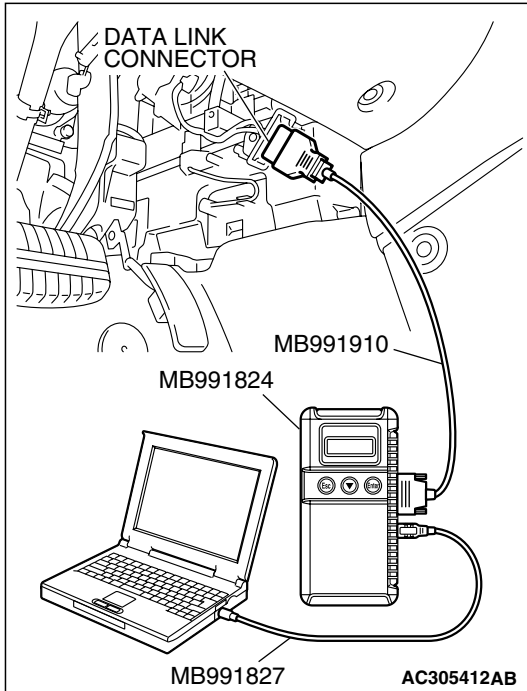
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Diagnose CAN bus line.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

#### 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.



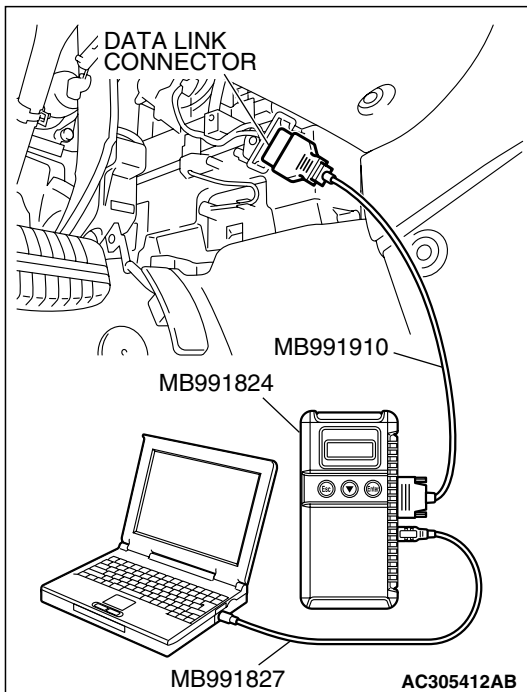


**STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

- (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-Diagnostic Trouble Code Chart [P.54A-12](#).
- NO :** Go to Step 3.

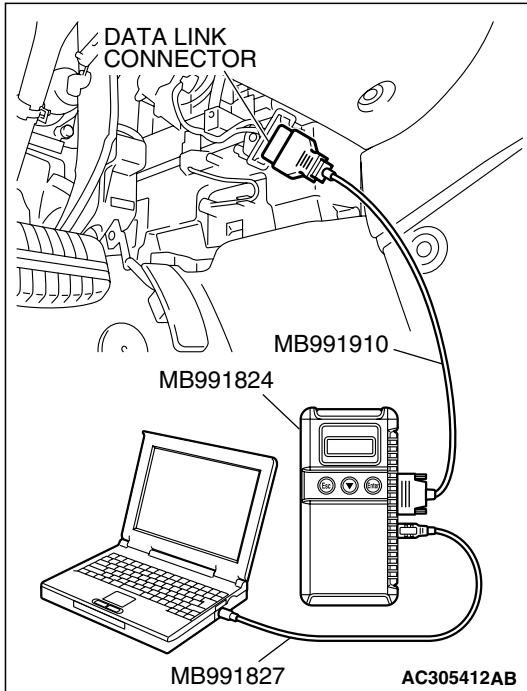


**STEP 3. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

- (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.



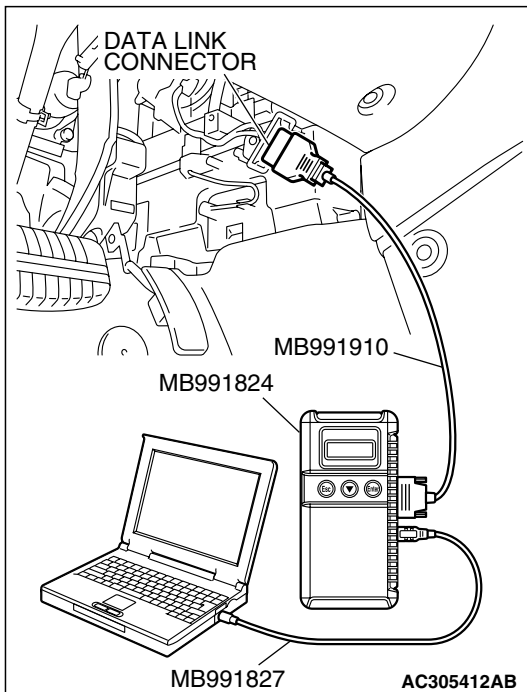
**STEP 4. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

- (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 PCM and combination meter. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions [P.00-14](#).



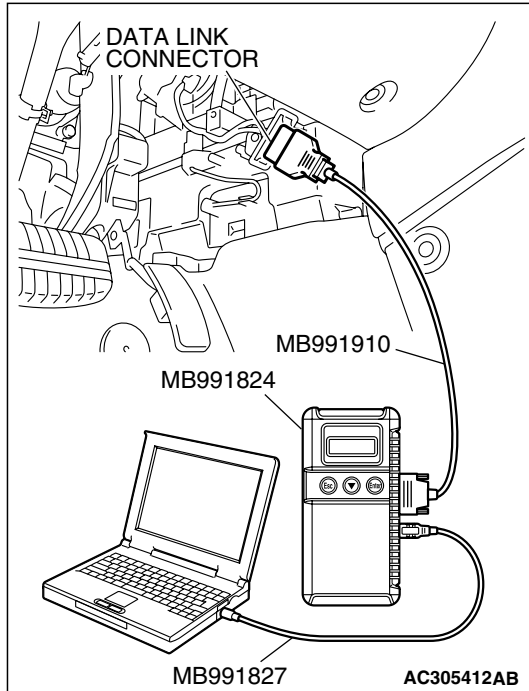
**STEP 5. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

- (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 PCM. Then go to Step 6.

**NO :** It can be assumed that this malfunction is intermittent of CAN bus line between PCM 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 U1110: A/C-ECU TIME-OUT****CAUTION**

- If the PCM 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 Criteria**

- Unable to receive A/C-ECU signals through the CAN bus line.

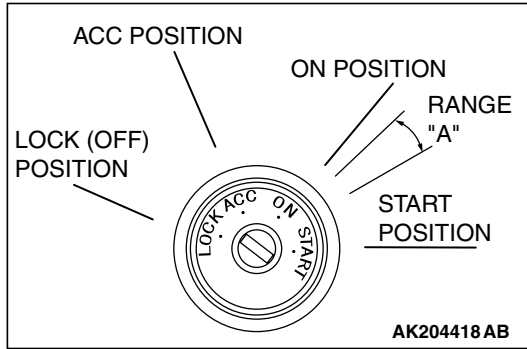
**COMMENT****Current Trouble**

- Some of the possible causes are a harness or connector damage between the PCM 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 PCM.

**Past Trouble**

- Proceed to troubleshoot based on a harness or connector damage on the CAN bus line between the PCM 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**



*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.
- PCM failed.

**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 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 –*

**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**

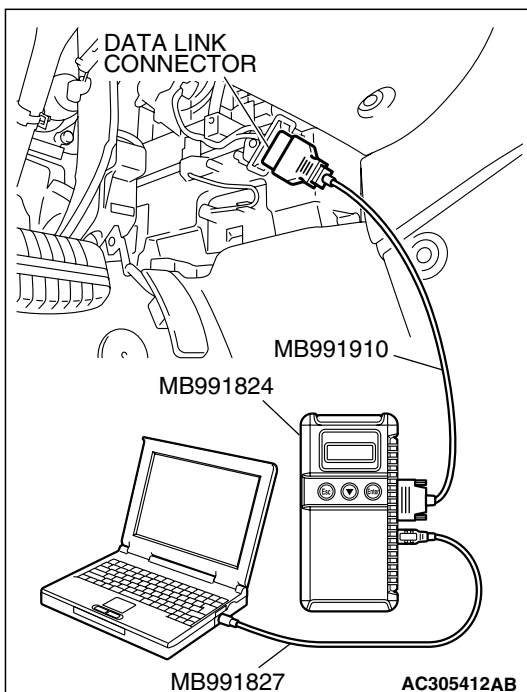
**To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.**

- (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.

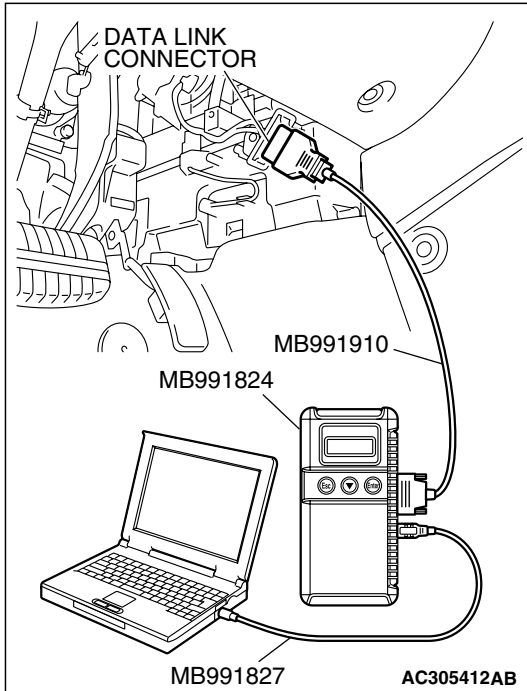
**Q: Is the CAN bus line normal?**

**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.





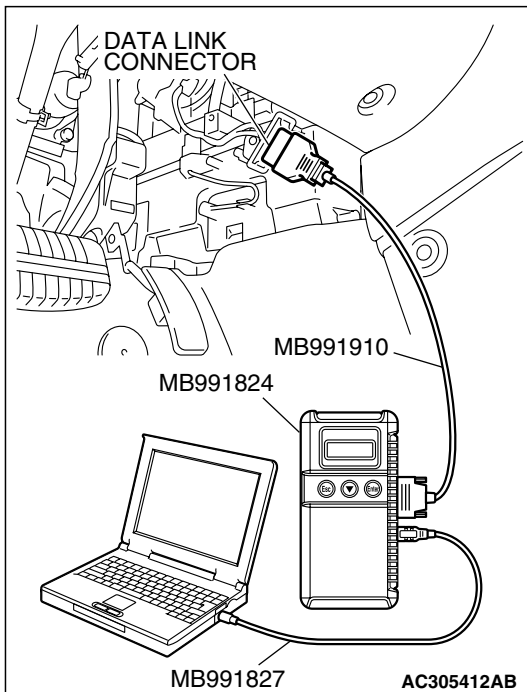


**STEP 2. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Read the 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-8](#).
- NO :** Go to Step 3.



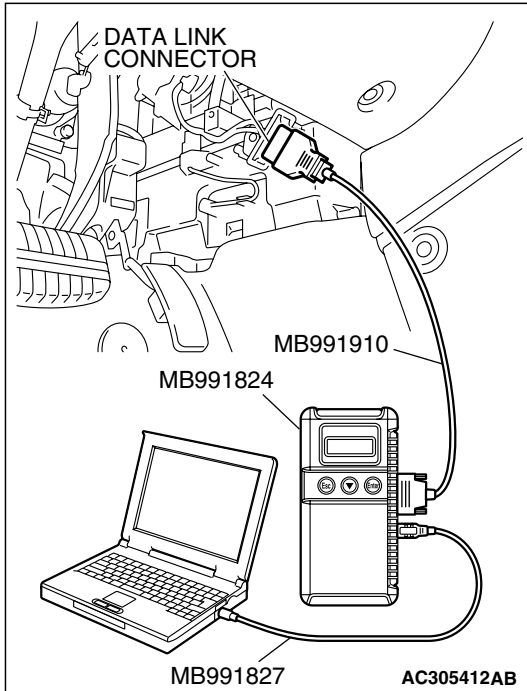
**STEP 3. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

- (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.





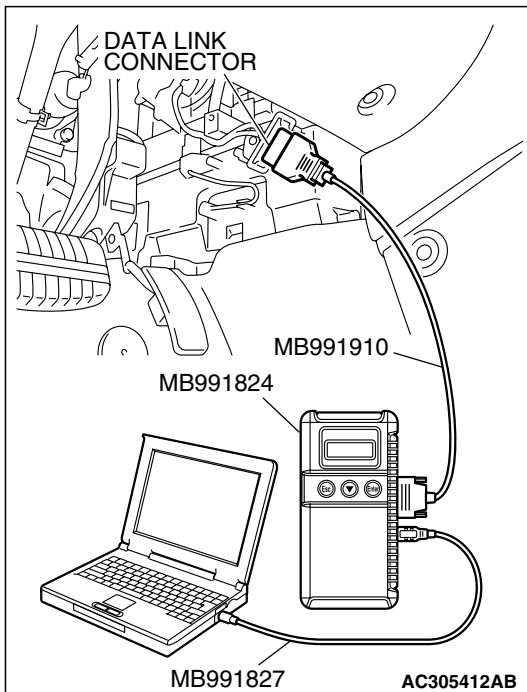
**STEP 4. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

- (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 PCM and A/C-ECU. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions [P.00-14](#).



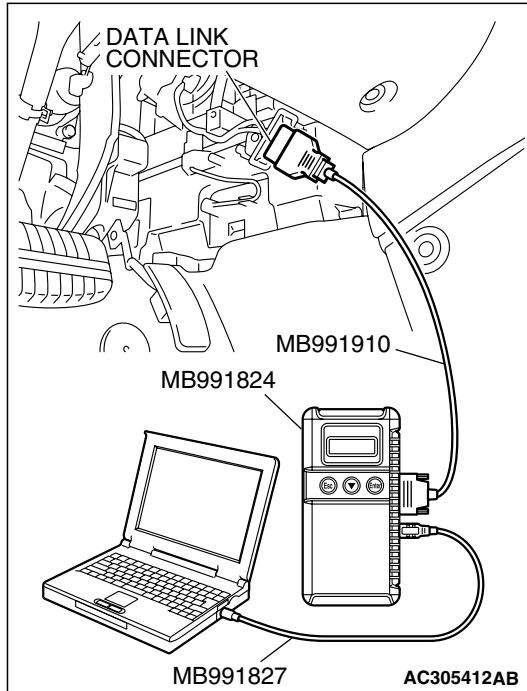
**STEP 5. Using scan tool MB991958, read the diagnostic trouble code (DTC).**

- (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 PCM. Then go to Step 6.

**NO :** It can be assumed that this malfunction is intermittent of CAN bus line between PCM 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.

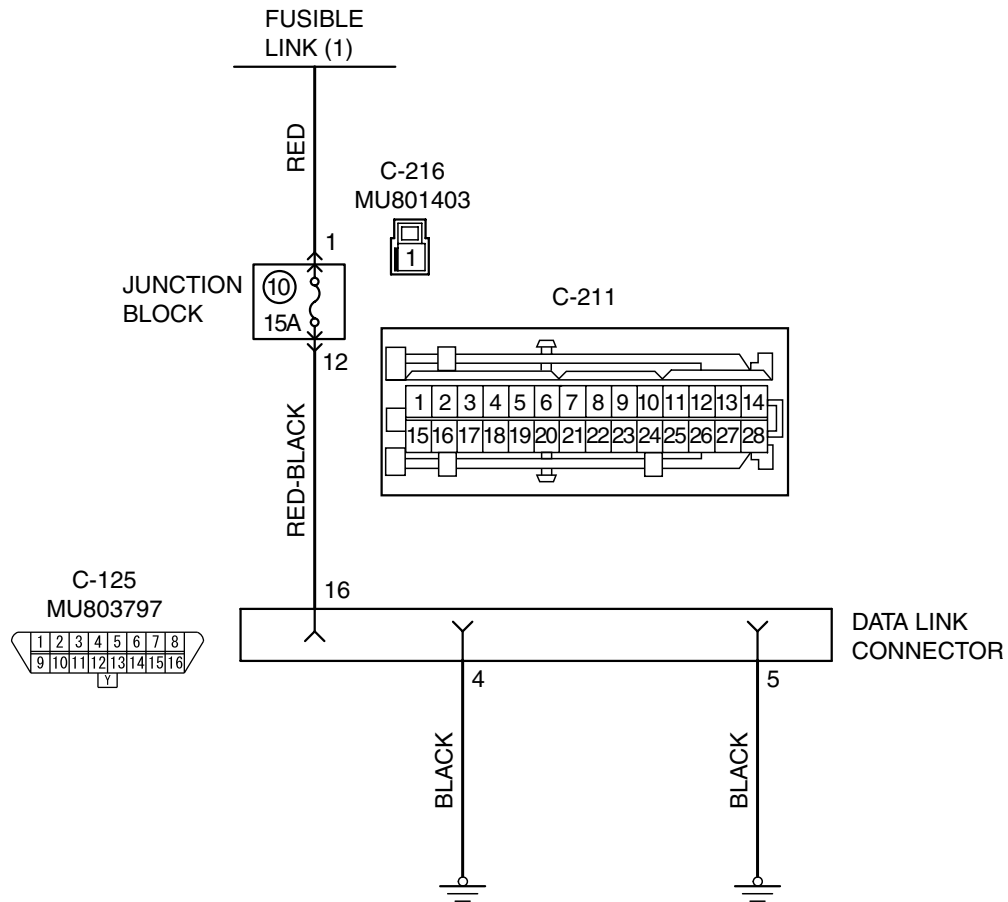
**Q: Is DTC U1110 set?**

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

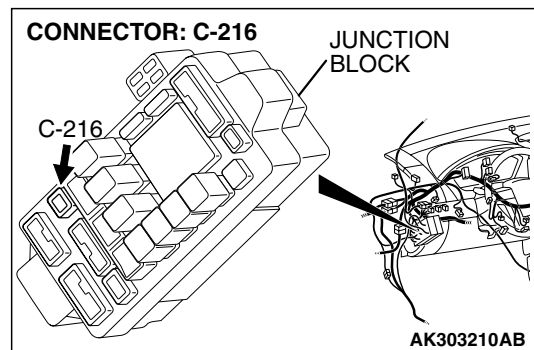
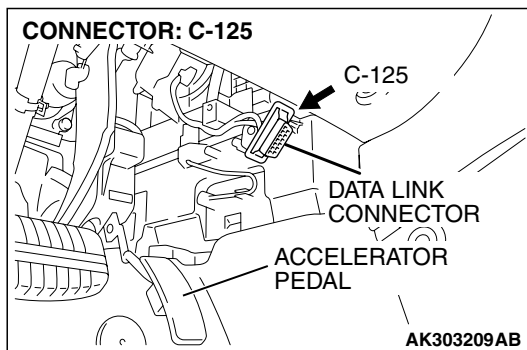
**SYMPTOM PROCEDURES**

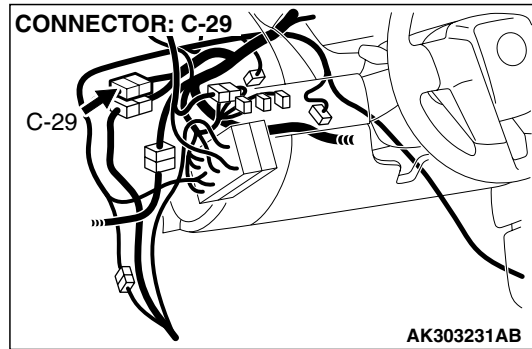
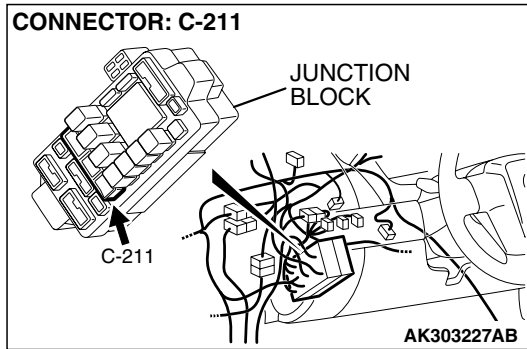
**INSPECTION PROCEDURE 1: Communication with Scan Tool Is Not Possible. (Communication with All Systems Is Not Possible.)**

**Data Link Connector Circuit**



AK400834





**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**

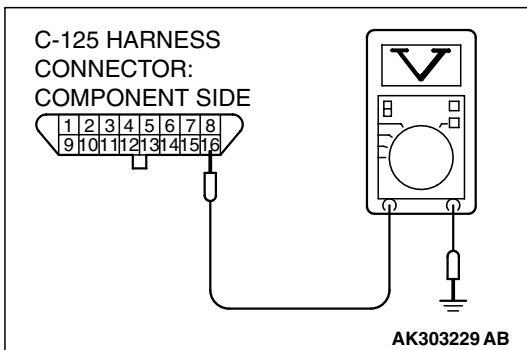
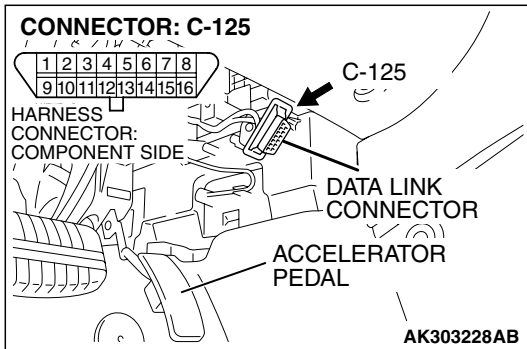
**STEP 1. Measure the power supply voltage at data link connector C-125.**

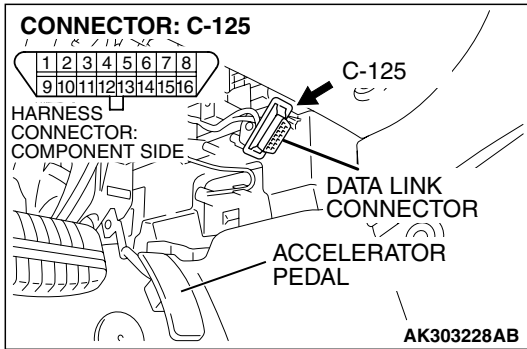
- (1) Measure voltage between terminal No. 16 and ground.
- Voltage should be battery positive voltage.

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

**YES :** Go to step 2.

**NO :** Check harness connectors C-211, C-216 and C-29 at intermediate connector for damage, and repair or replace as required. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. If intermediate connector C-211, C-216 and C-29 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.**

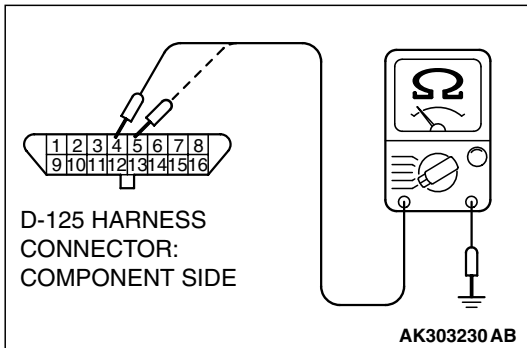
(1) Check for the continuity between terminal No. 4, No. 5 and ground.

- Should be less than 2 ohms.

**Q: Does continuity exist?**

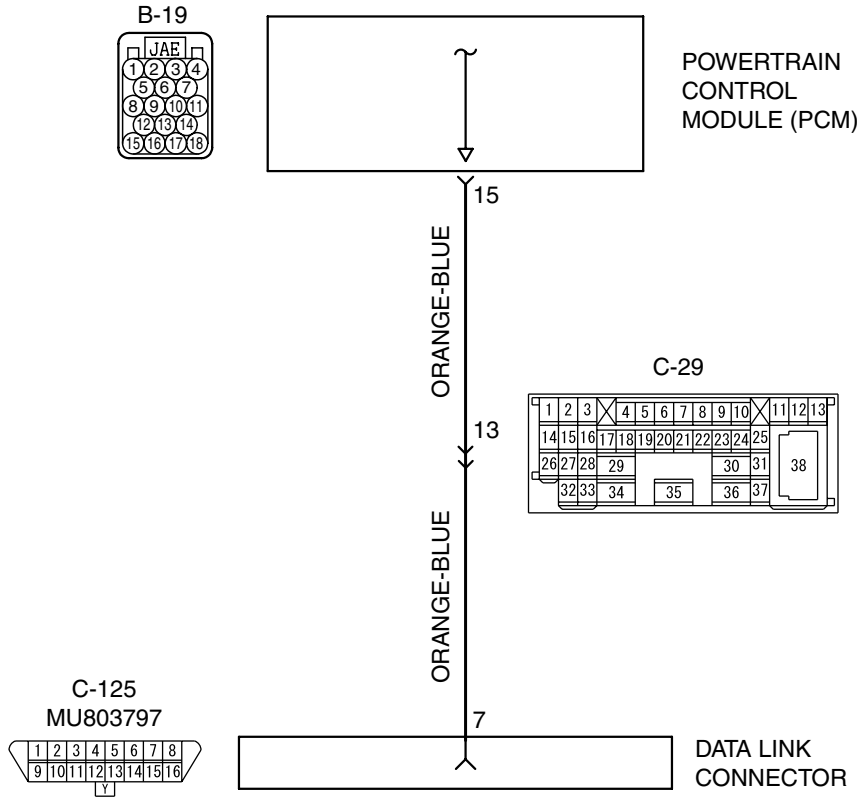
**YES** : Replace the scan tool. Then confirm that the malfunction symptom is eliminated.

**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.

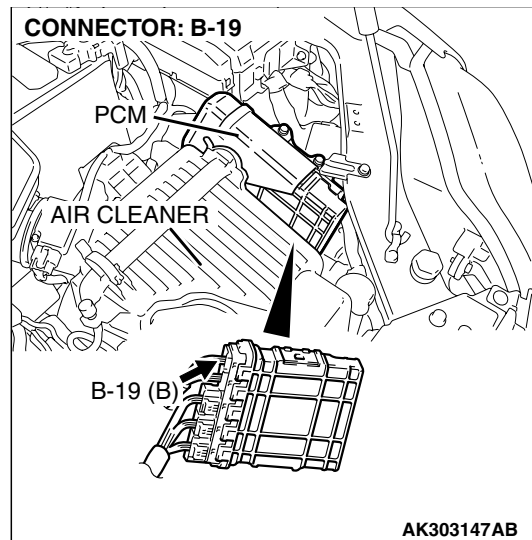
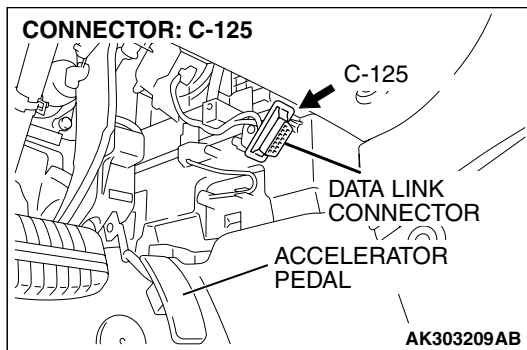


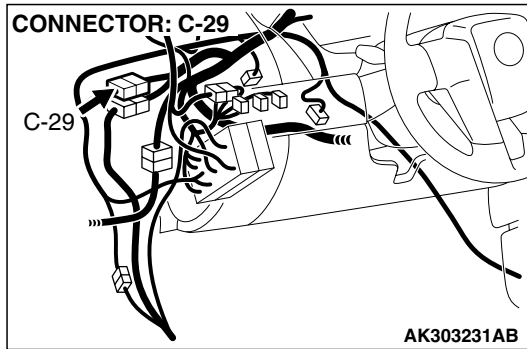
INSPECTION PROCEDURE 2: Scan Tool Communication with PCM Is Not Possible.

Data Link Connector Circuit



AK400835





### CIRCUIT OPERATION

- A diagnostic output is made from the PCM (terminal No. 15) to the diagnostic output terminal (terminal No. 7) of the data link connector.

### COMMENT

- No power supply to PCM.
- Defective ground circuit of PCM.
- Defective PCM.

- Improper communication line between PCM and scan tool.

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

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

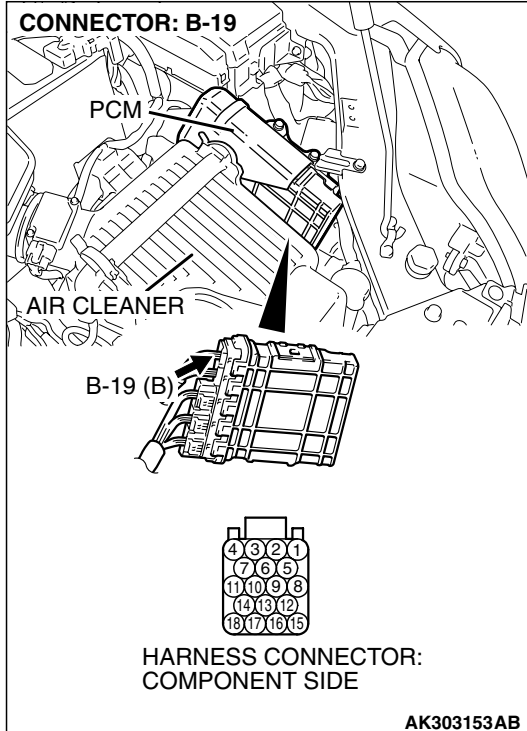
### DIAGNOSIS

**STEP 1. Check harness connector B-19 at PCM for damage.**

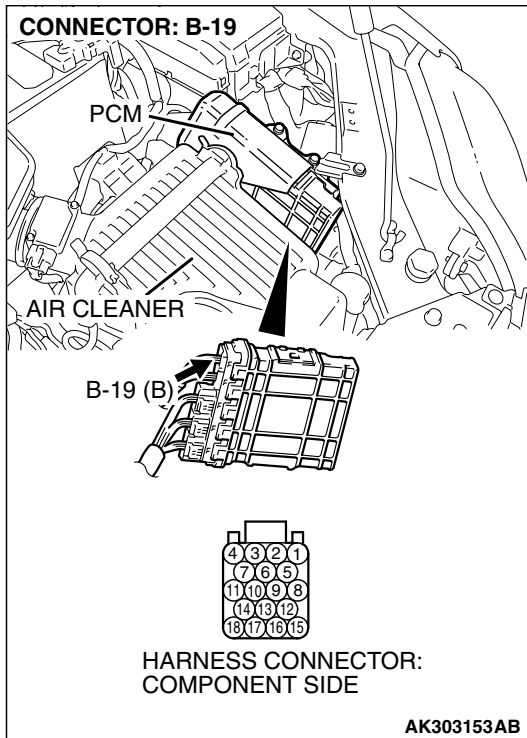
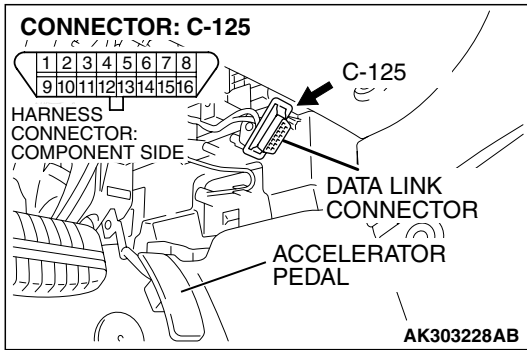
**Q: Is the harness connector in good condition?**

**YES :** Go to Step 2.

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



**STEP2.** Check for open circuit, short circuit to ground and harness damage between data link connector C-125 (terminal No. 7) and PCM connector B-19 (terminal No. 15).



*NOTE: Check harness after checking intermediate connectors C-29. If intermediate connector C-29 are damaged, repair or replace them. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then check that the malfunction is eliminated.*

**Q: Is the harness wire in good condition?**

**YES :** Refer to INSPECTION PROCEDURE 28 – Power Supply System and Ignition Switch-IG System P.13B-1096.

**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).**

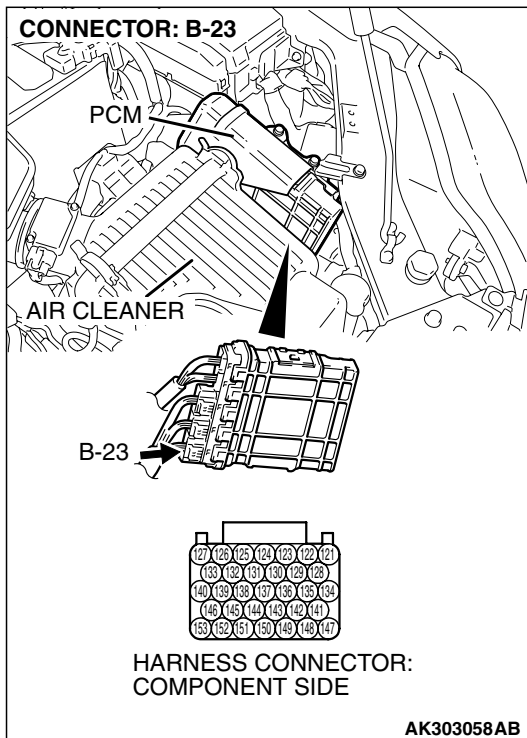
**⚠ CAUTION**

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.  
**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.

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

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**COMMENT**

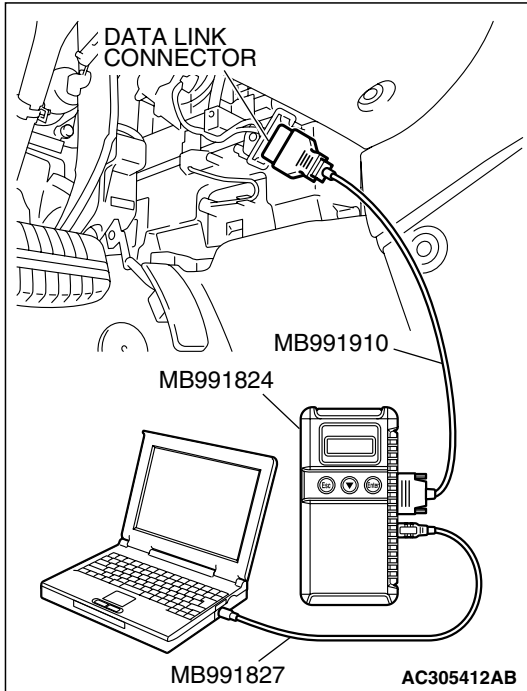
- In cases such as the above, the cause is probably that the PCM is detecting a problem in a sensor or actuator, or that one of the malfunctions listed at next has probably occurred.

**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.13B-34](#).

**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 30 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**

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**Cranks, Won't Start Circuit**

- Refer to Ignition circuit [P.13B-1125](#).

**CIRCUIT OPERATION**

- Refer to Ignition circuit [P.13B-1125](#).

**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 PCM.
- Contaminated fuel.
- Malfunction of the immobilizer system.

**DIAGNOSIS****Required Special Tools:**

- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MB991348: Test Harness Set

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**STEP 1. Measure the battery positive voltage.**

- (1) Measure the battery positive voltage during cranking.
- The voltage should be 8 volts or more.

**Q: Is the measured voltage 8 volts or more?**

**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).

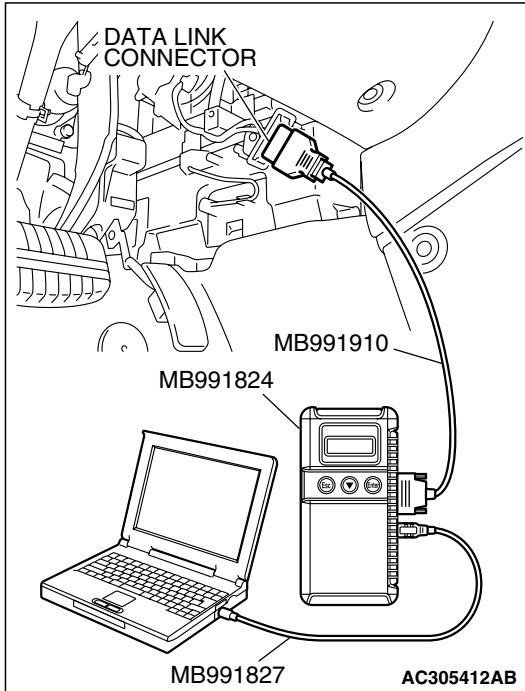
**⚠ CAUTION**

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 DTC set?**

- YES :** Refer to Diagnostic Trouble Code Chart [P.13B-34](#).  
**NO :** Go to Step 4.



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

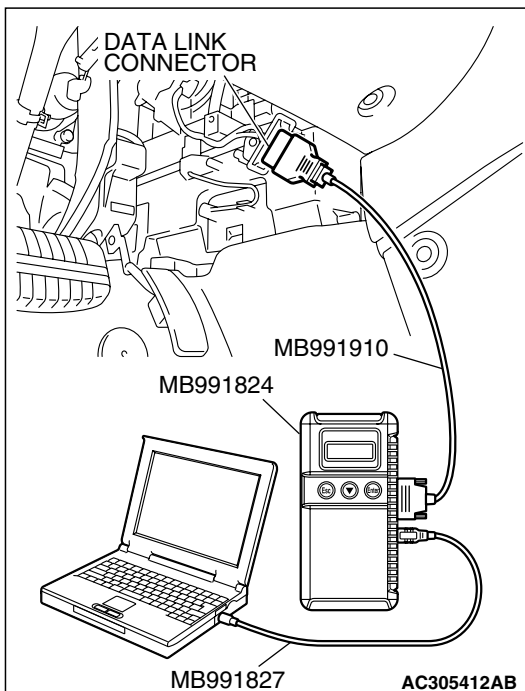
**⚠ CAUTION**

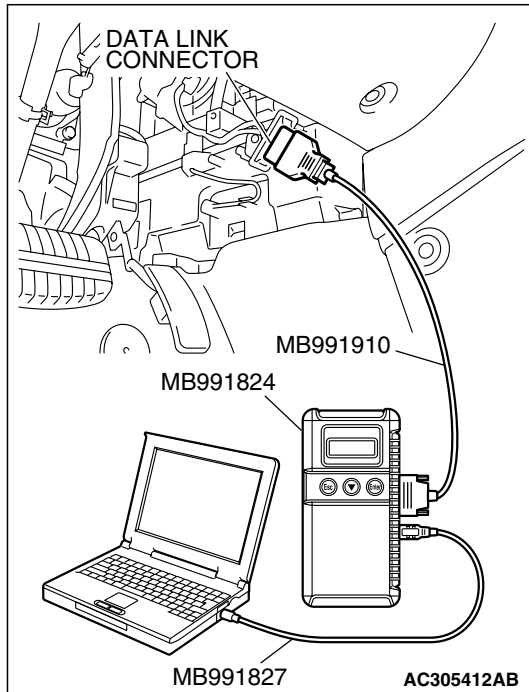
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (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.13B-1137](#).
  - a. Item 16: Power Supply Voltage.
  - b. Item 22: Crankshaft Position Sensor.
  - c. Item 21: Engine Coolant Temperature Sensor.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

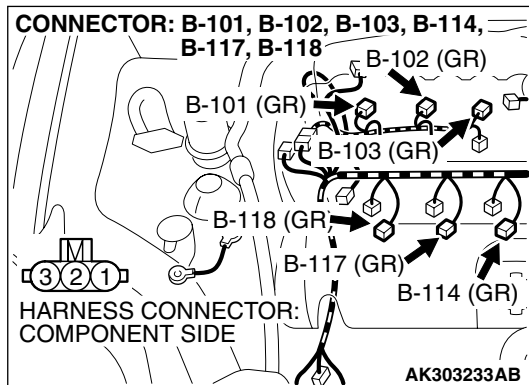
**Q: Are they operating properly?**

- YES :** Go to Step 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.13B-1152](#).
  - a. Item 07: Fuel pump.
- (3) Turn the ignition switch to the "LOCK" (OFF) position.

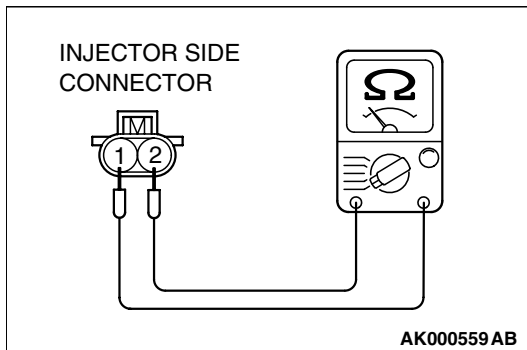
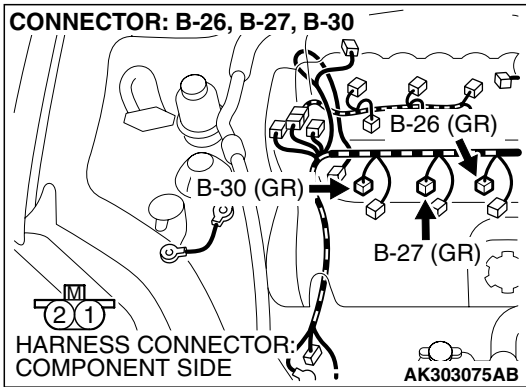
**Q: Is the actuator operating properly?****YES** : Go to Step 6.**NO** : Repair or replace it. Then confirm that the malfunction symptom is eliminated.**STEP 6. Check the ignition system.**

- (1) Connect the timing light to terminal No. 1 of the ignition coil connector B-114, B-117, B-118, B-102, B-103 or B-101 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 31 – Ignition Circuit System [P.13B-1125](#).**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 the left bank injector.**

(1) Disconnect the left bank injector connector B-27, B-26, B-30.

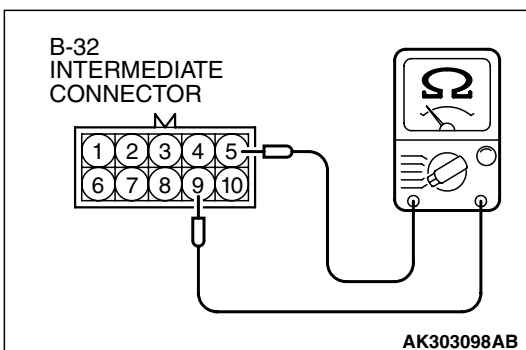
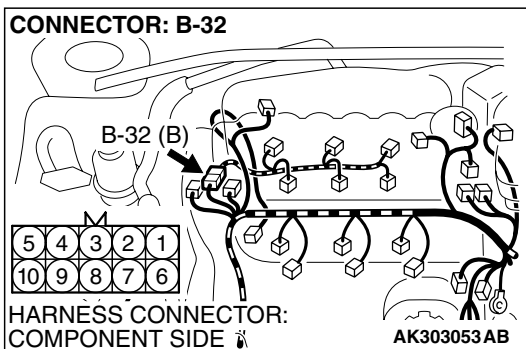
(2) Measure the resistance between each injector side connector terminal No. 1 and No. 2.

**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 9.

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



**STEP 9. Check the right bank injector resistance at intermediate connector B-32.**

(1) Disconnect the intermediate connector B-32.

(2) Measure the resistance between each male connector side terminal.

a. Measure the resistance between terminal No. 5 and No. 9 at No. 1 cylinder injector.

b. Measure the resistance between terminal No. 9 and No. 10 at No. 3 cylinder injector.

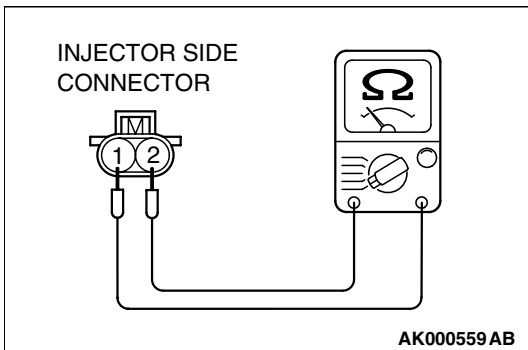
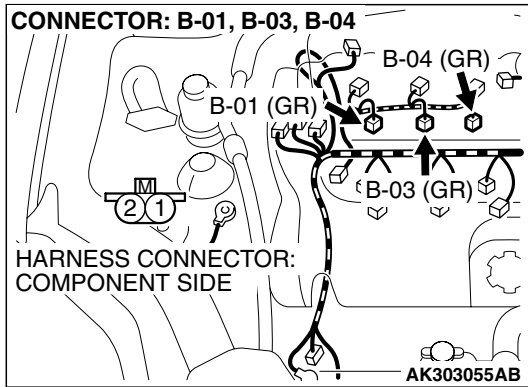
c. Measure the resistance between terminal No. 4 and No. 9 at No. 5 cylinder injector.

• Resistance should be between 10.5 and 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 12.

**NO :** Go to Step 10.



**STEP 10. Check the right bank injector.**

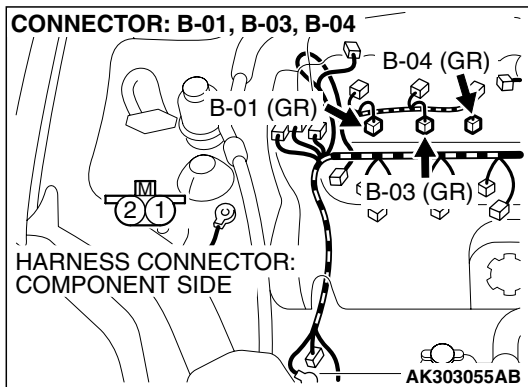
- (1) Remove the intake manifold.
- (2) Disconnect the right bank injector connector, which deviates from the standard value at Step 8.

- (3) Measure the resistance between 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 11.  
**NO :** Replace the injector. Then confirm that the malfunction symptom is eliminated.

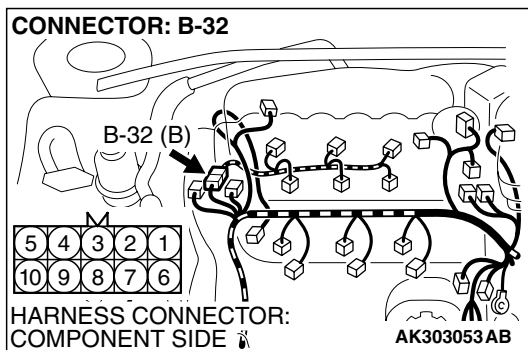


**STEP 11. Check harness connector B-03 or B-04 or B-01 at right bank injector for damage.**

- (1) Check the injector connector, which deviates from the standard value at Step 9.

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

- YES :** Repair harness wire between injector intermediate connector and right bank injector connector because of harness damage. Then confirm that the malfunction symptom is eliminated.  
**NO :** Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then confirm that the malfunction symptom is eliminated.

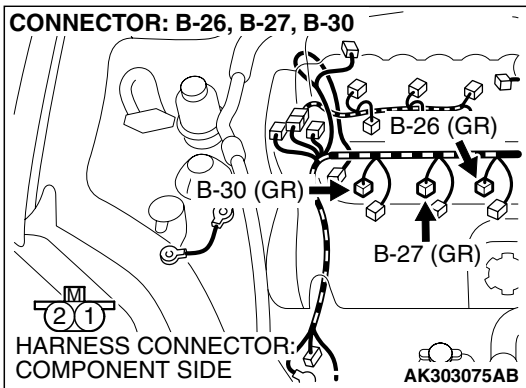


**STEP 12. Check harness connector B-32 at intermediate connector for damage.**

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

- YES :** Go to Step 13.  
**NO :** Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then confirm that the malfunction symptom is eliminated.



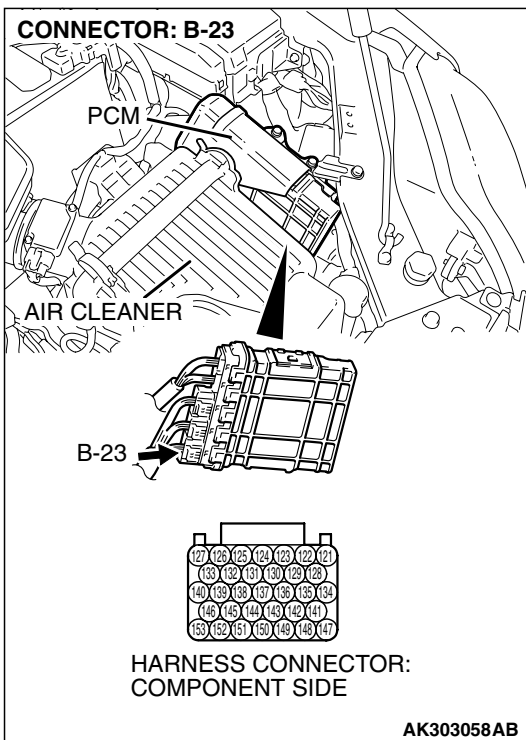


**STEP 13. Check harness connector B-27, B-26, B-30 at left bank injector for damage.**

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

**YES :** Go to Step 14.

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

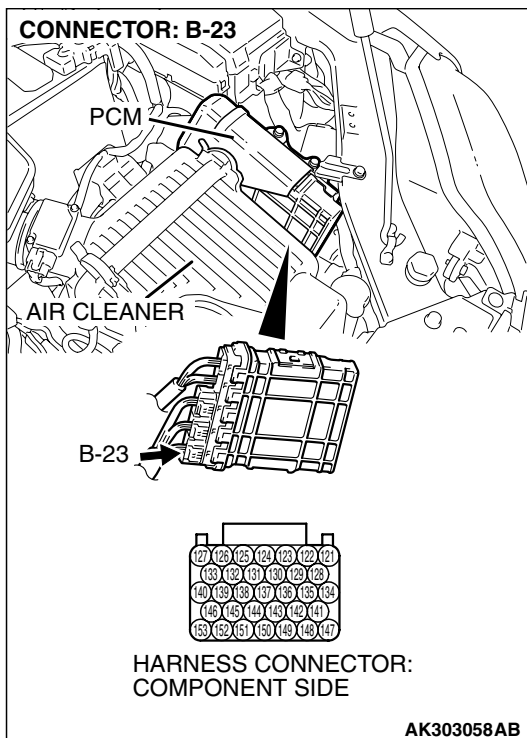
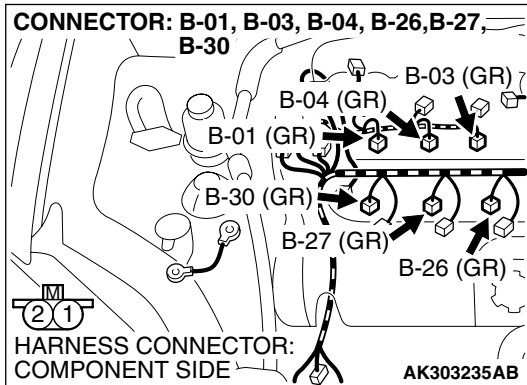


**STEP 14. Check harness connector B-23 at PCM for damage.**

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

**YES :** Go to Step 15.

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

**STEP 15. Check for harness damage between injector connector and PCM connector.**

- Check the harness wire between injector connector B-01 (terminal No. 2) and PCM connector B-23 (terminal No. 153) at No. 1 cylinder injector.
- Check the harness wire between injector connector B-30 (terminal No. 2) and PCM connector B-23 (terminal No. 146) at No. 2 cylinder injector.
- Check the harness wire between injector connector B-03 (terminal No. 2) and PCM connector B-23 (terminal No. 140) at No. 3 cylinder injector.
- Check the harness wire between injector connector B-27 (terminal No. 2) and PCM connector B-23 (terminal No. 139) at No. 4 cylinder injector.
- Check the harness wire between injector connector B-04 (terminal No. 2) and PCM connector B-23 (terminal No. 133) at No. 5 cylinder injector.
- Check the harness wire between injector connector B-26 (terminal No. 2) and PCM connector B-23 (terminal No. 127) at No. 6 cylinder injector.

**Q: Is the harness wire in good condition?**

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

- Check the ignition coil and spark plugs.
- Check if the injectors are clogged.
- Check if fuel is contaminated.
- Check compression.

Then confirm that the malfunction symptom is eliminated.

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

**INSPECTION PROCEDURE 6: Starts Up and Dies.****COMMENT**

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

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

- Malfunction of the ignition system.
- Malfunction of the injector system.
- Contaminated fuel.
- Poor compression.
- Dirtiness around throttle valve.
- Malfunction of the PCM.

## 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. Measure the battery positive voltage.

- (1) Measure the battery positive voltage during cranking.
  - The voltage should be 8 volts or more.

**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.](#)

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

#### **⚠ CAUTION**

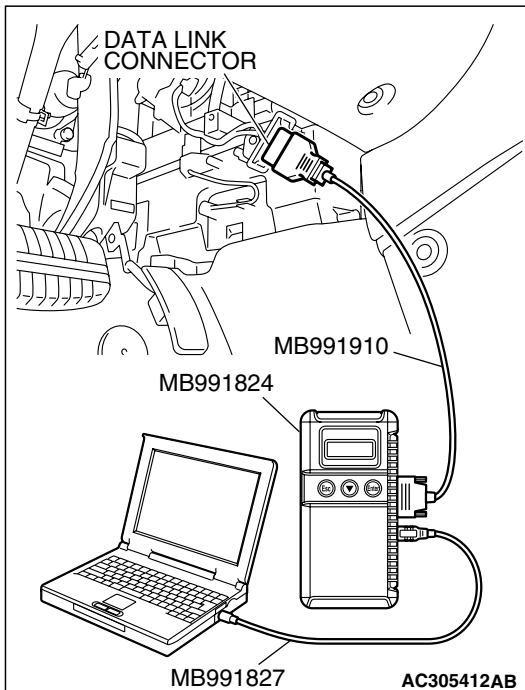
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

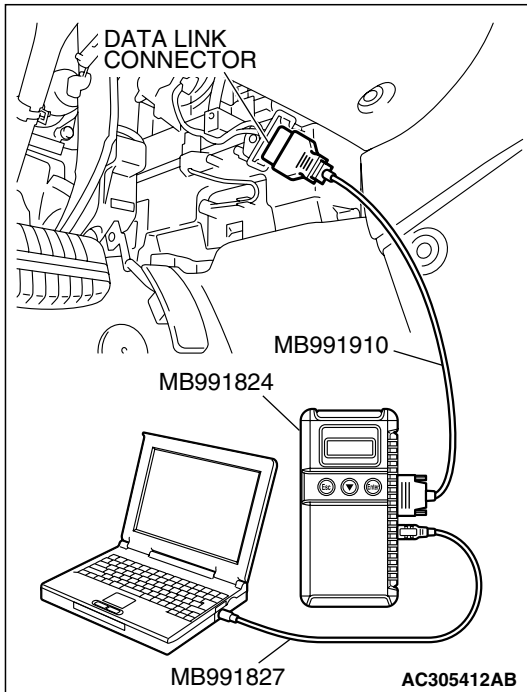
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Read the DTC.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

**Q: Is the DTC set?**

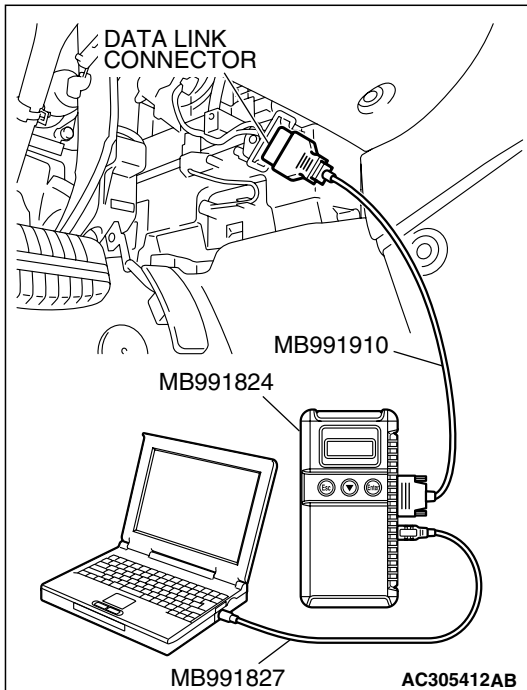
**YES :** Refer to Diagnostic Trouble Code Chart [P.13B-34.](#)

**NO :** Go to Step 3.



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

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items in the actuator test. Refer to Actuator Test Reference Table [P.13B-1152](#).
  - a. Item 07: Fuel Pump.
- (3) Turn the ignition switch to the "LOCK" (OFF) position.

**Q: Is the actuator operating properly?****YES** : Go to Step 4.**NO** : Repair or replace it. Then confirm that the malfunction symptom is eliminated.**STEP 4. Using scan tool 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.13B-1137](#).
  - a. Item 21: Engine Coolant Temperature Sensor.
- (3) Turn the ignition switch to the "LOCK" (OFF) position.

**Q: Is the sensor operating properly?****YES** : Go to Step 5.**NO** : Repair or replace it. Then confirm that the malfunction symptom is eliminated.

**STEP 5. 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.13B-1178](#).

**NO** : Go to Step 6.

**STEP 6. Check the ignition timing.**

(1) Check the ignition timing at cranking.

**Standard value: 5° BTDC ± 3°**

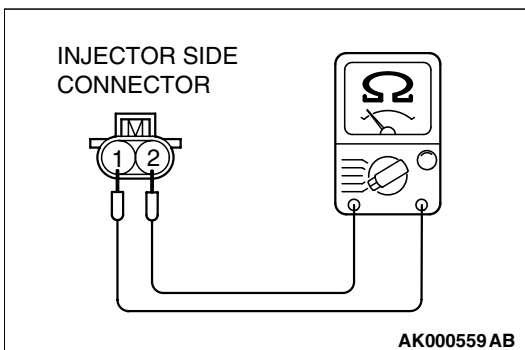
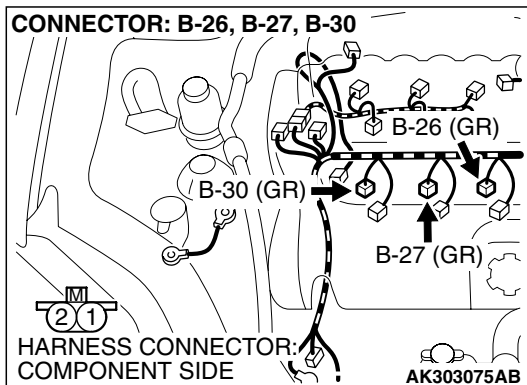
**Q: Is the ignition timing normal?**

**YES** : Go to Step 7.

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

**STEP 7. Check the left bank injector.**

(1) Disconnect the left bank injector connector B-27, B-26, B-30.



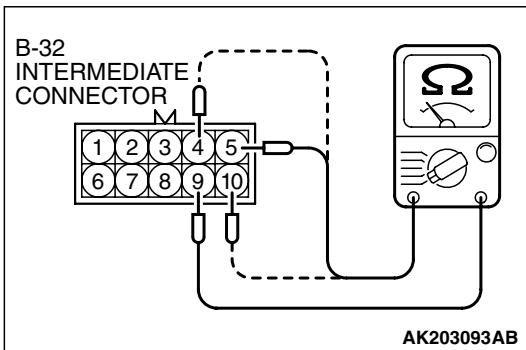
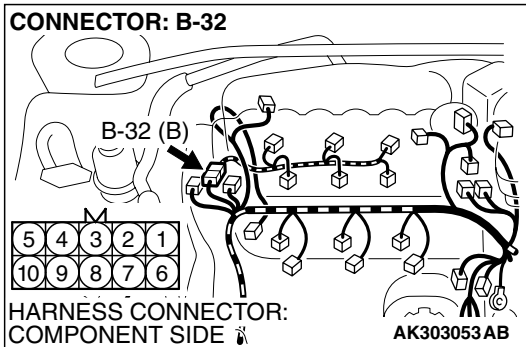
(2) Measure the resistance between each injector side connector terminal No. 1 and No. 2.

**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** : Replace the faulty injector. Then confirm that the malfunction symptom is eliminated.



**STEP 8. Check the right bank injector resistance at intermediate connector B-32.**

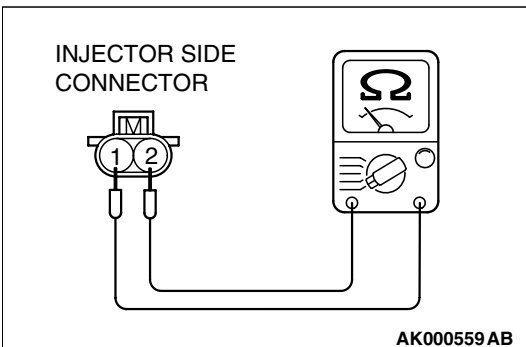
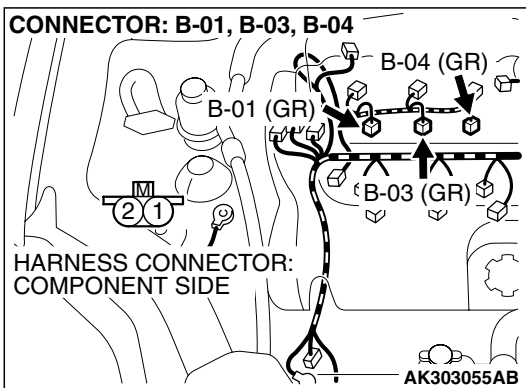
(1) Disconnect the intermediate connector B-32.

(2) Measure the resistance between each male connector side terminal.

- a. Measure the resistance between terminal No. 9 and No. 5 at No. 1 cylinder injector.
- b. Measure the resistance between terminal No. 9 and No. 10 at No. 3 cylinder injector.
- c. Measure the resistance between terminal No. 9 and No. 4 at No. 5 cylinder injector.
  - Resistance should be between 10.5 and 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 11.
- NO :** Go to Step 9.



**STEP 9. Check the right bank injector.**

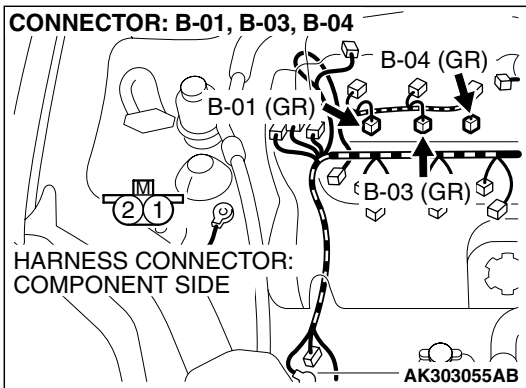
- (1) Remove the intake manifold.
- (2) Disconnect the right bank injector connector, which deviates from the standard value at Step 7.

(3) Measure the resistance between 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 :** Replace the injector. Then confirm that the malfunction symptom is eliminated.



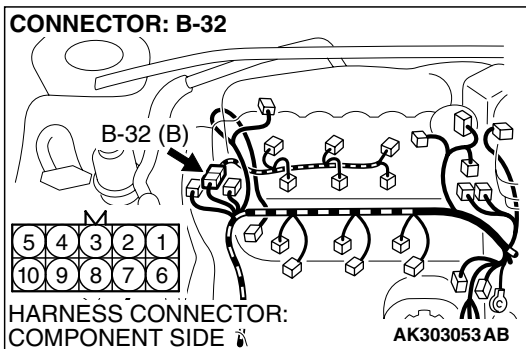
**STEP 10. Check harness connector B-03 or B-04 or B-01 at right bank injector for damage.**

(1) Check the injector connector, which deviates from the standard value at Step 9.

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

**YES :** Repair harness wire between injector intermediate connector and right bank injector connector because of harness damage. Then confirm that the malfunction symptom is eliminated.

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

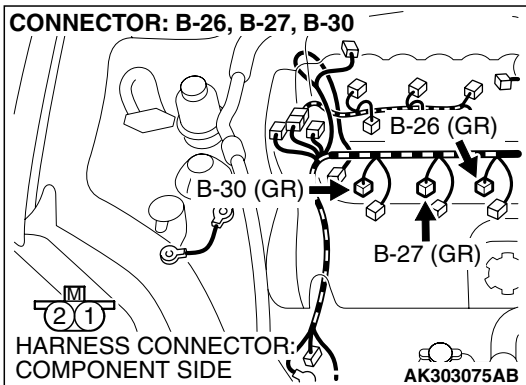


**STEP 11. Check harness connector B-32 at intermediate connector for damage.**

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

**YES :** Go to Step 12.

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

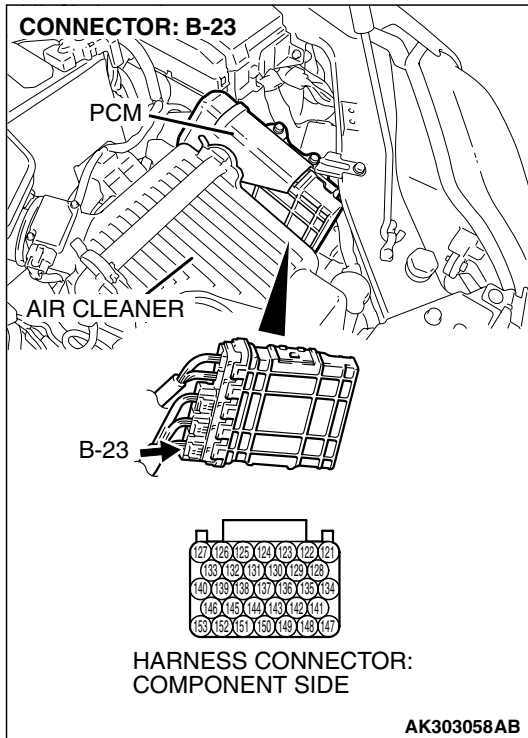


**STEP 12. Check harness connector B-27, B-26, B-30 at left bank injector for damage.**

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

**YES :** Go to Step 13.

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



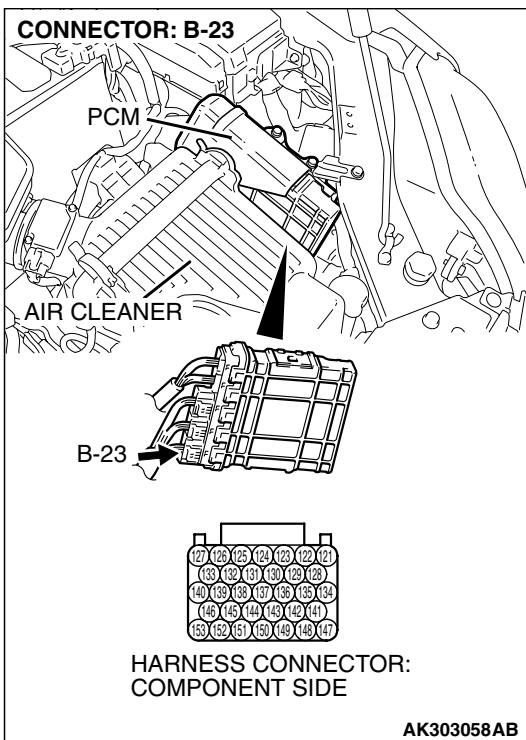
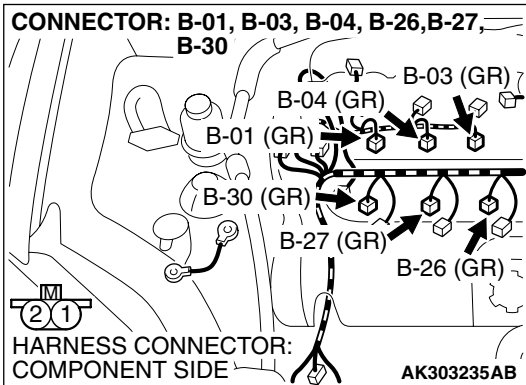
**STEP 13. Check harness connector B-23 at PCM for damage.**

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

**YES :** Go to Step 14.

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





**STEP 14. Check for harness damage between injector connector and PCM connector.**

- Check the harness wire between injector connector B-01 (terminal No. 2) and PCM connector B-23 (terminal No. 153) at No. 1 cylinder injector.
- Check the harness wire between injector connector B-30 (terminal No. 2) and PCM connector B-23 (terminal No. 146) at No. 2 cylinder injector.
- Check the harness wire between injector connector B-03 (terminal No. 2) and PCM connector B-23 (terminal No. 140) at No. 3 cylinder injector.
- Check the harness wire between injector connector B-27 (terminal No. 2) and PCM connector B-23 (terminal No. 139) at No. 4 cylinder injector.
- Check the harness wire between injector connector B-04 (terminal No. 2) and PCM connector B-23 (terminal No. 133) at No. 5 cylinder injector.
- Check the harness wire between injector connector B-26 (terminal No. 2) and PCM connector B-23 (terminal No. 127) at No. 6 cylinder injector.

**Q: Is the harness wire in good condition?**

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

- Check the ignition coil and spark plugs.
- Check if the injectors are clogged.
- Check compression pressure.
- Check fuel lines for clogging.
- Check if the foreign materials (water, kerosene, etc.) got into fuel.
- Check the EGR valve.

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.
- Dirtiness around throttle valve.
- Malfunction of the EGR 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. Measure the battery positive voltage.**

- (1) Measure the battery positive voltage during cranking.
  - The voltage is 8 volts or more.

**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**

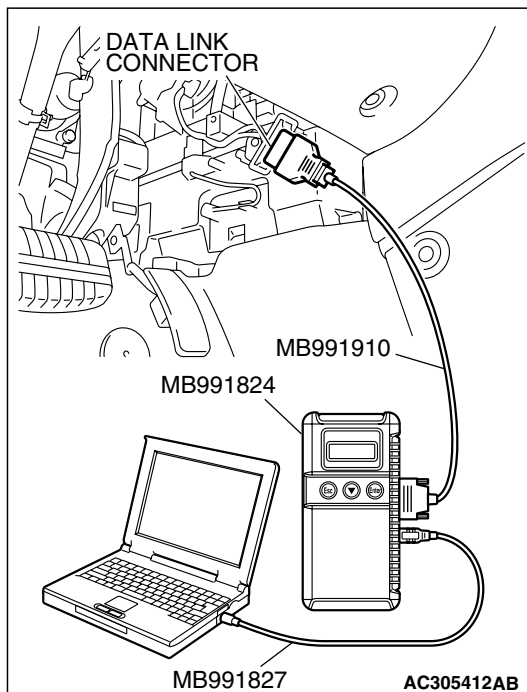
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

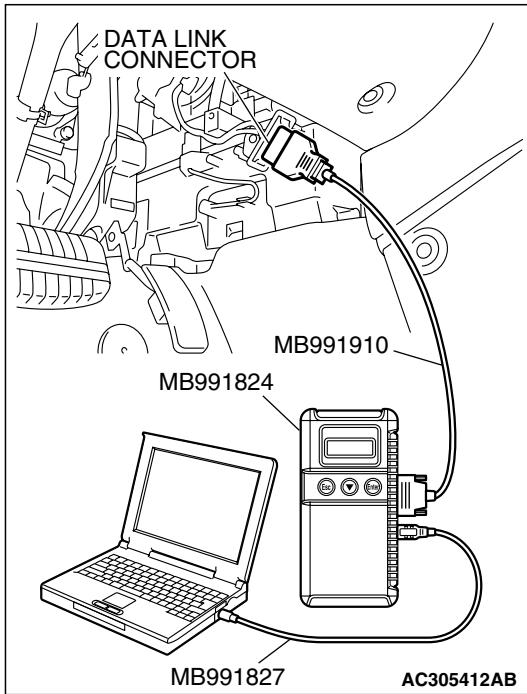
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Read the DTC.
- (4) Turn the ignition switch the "LOCK" (OFF) position.

**Q: Is the DTC set?**

**YES :** Refer to Diagnostic Trouble Code Chart [P.13B-34.](#)

**NO :** Go to Step 3.





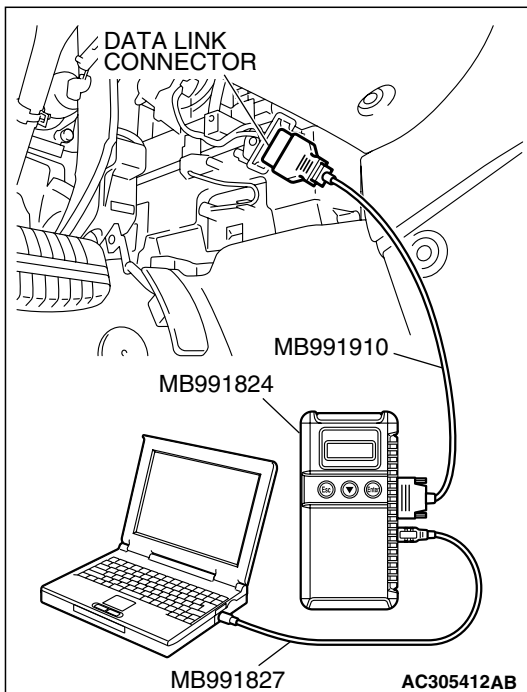
**STEP 3. Using scan tool MB991958, check actuator test.**

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the following items in the actuator test. Refer to Actuator Test Reference Table [P.13B-1152](#).
  - a. Item 07: Fuel Pump.
- (3) Turn the ignition switch to the "LOCK" (OFF) position.

**Q: Is the actuator operating properly?**

**YES** : Go to Step 4.

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



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

- (1) Turn the ignition switch the "ON" position.
- (2) Check the following items in the data list. Refer to Data List Reference Table [P.13B-1137](#).
  - a. Item 21: Engine Coolant Temperature Sensor.
- (3) Turn the ignition switch the "LOCK" (OFF) position.

**Q: Is the sensor operating properly?**

**YES** : Go to Step 5.

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

**STEP 5. Inspection of throttle body (throttle valve area) for dirtiness.****Q: Is the throttle valve area dirty?**

**YES** : Refer to On-vehicle service – Clean the throttle valve area [P.13B-1178](#).

**NO** : Go to Step 6.

**STEP 6. Check the ignition timing.**

(1) Check the ignition timing at cranking.

**Standard value:**  $5^{\circ}$  BTDC  $\pm 3^{\circ}$

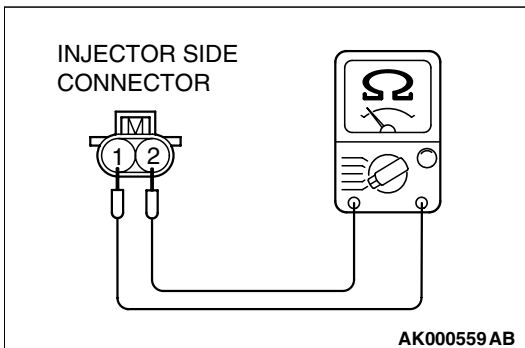
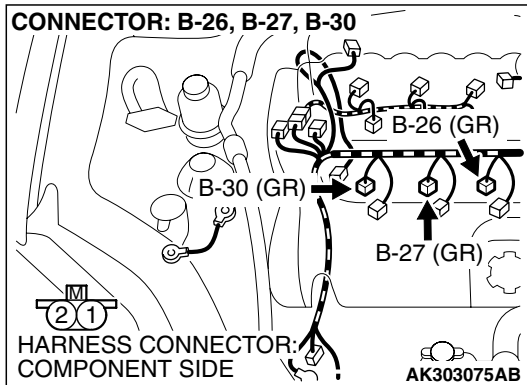
**Q: Is the ignition timing normal?**

**YES** : Go to Step 7.

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

**STEP 7. Check the left bank injector.**

(1) Disconnect the left bank injector connector B-27, B-26, B-30.



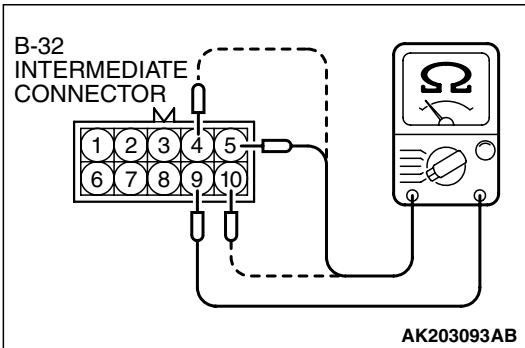
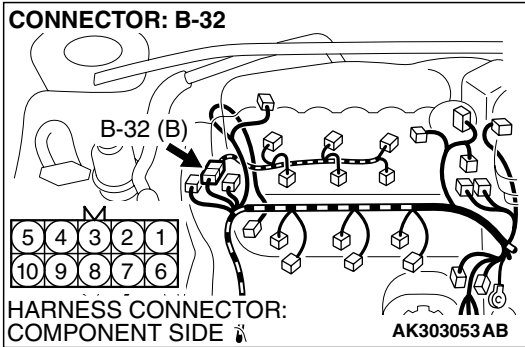
(2) Measure the resistance between each injector side connector terminal No. 1 and No. 2.

**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** : Replace the faulty injector. Then confirm that the malfunction symptom is eliminated.



**STEP 8. Check the right bank injector resistance at intermediate connector B-32.**

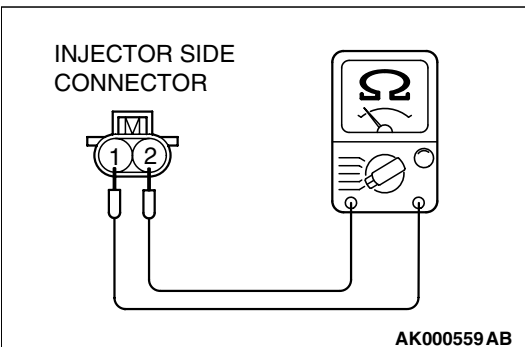
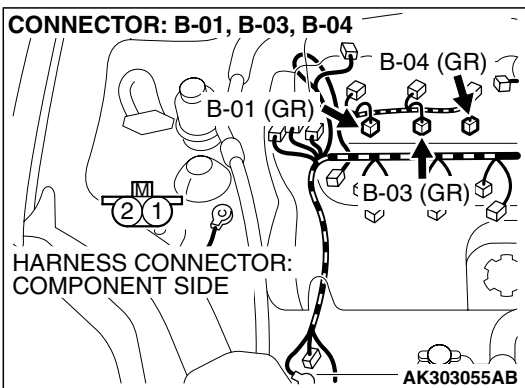
(1) Disconnect the intermediate connector B-32.

(2) Measure the resistance between each male connector side terminal.

- Measure the resistance between terminal No. 9 and No. 5 at No. 1 cylinder injector.
- Measure the resistance between terminal No. 9 and No. 10 at No. 3 cylinder injector.
- Measure the resistance between terminal No. 9 and No. 4 at No. 5 cylinder injector.
  - Resistance should be between 10.5 and 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 11.  
**NO :** Go to Step 9.



**STEP 9. Check the right bank injector.**

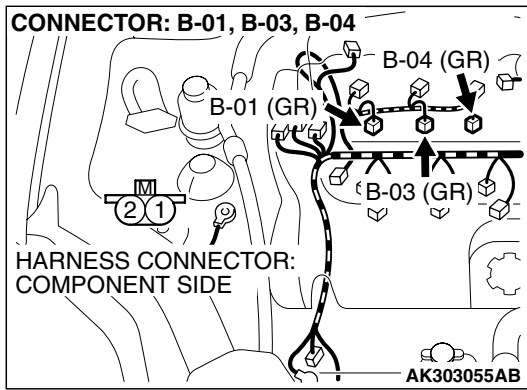
- Remove the intake manifold.
- Disconnect the right bank injector connector, which deviates from the standard value at Step 8.

(3) Measure the resistance between 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 :** Replace the injector. Then confirm that the malfunction symptom is eliminated.



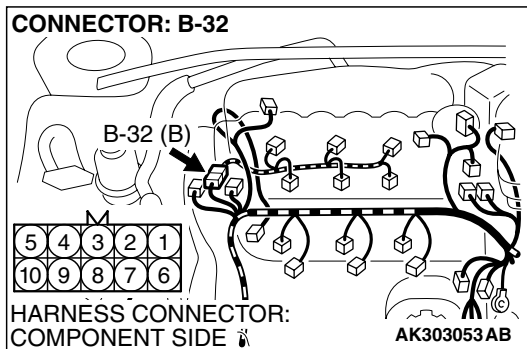
**STEP 10. Check harness connector B-03 or B-04 or B-01 at right bank injector for damage.**

(1) Check the injector connector, which deviated from the standard value listed in Step 8.

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

**YES :** Repair harness wire between injector intermediate connector and right bank injector connector because of harness damage. Then confirm that the malfunction symptom is eliminated.

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

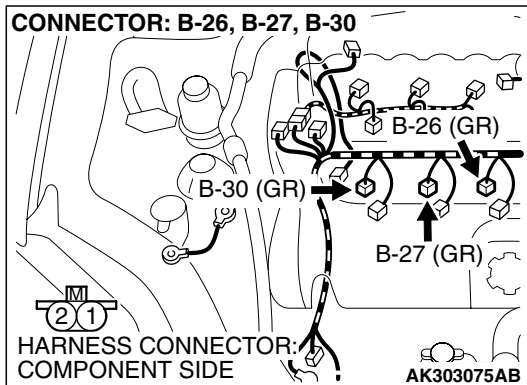


**STEP 11. Check harness connector B-32 at the intermediate connector for damage.**

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

**YES :** Go to Step 12.

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



**STEP 12. Check harness connector B-27, B-26, B-30 at the left bank injector for damage.**

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

**YES :** Go to Step 13.

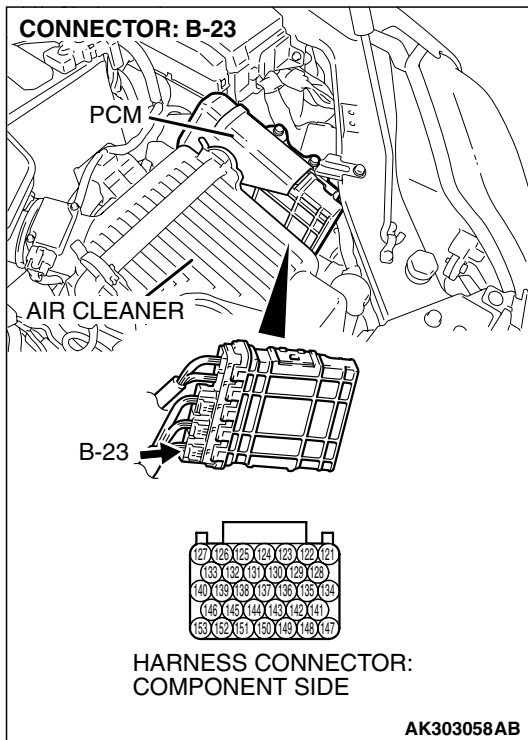
**NO :** Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then confirm that the malfunction symptom is eliminated.

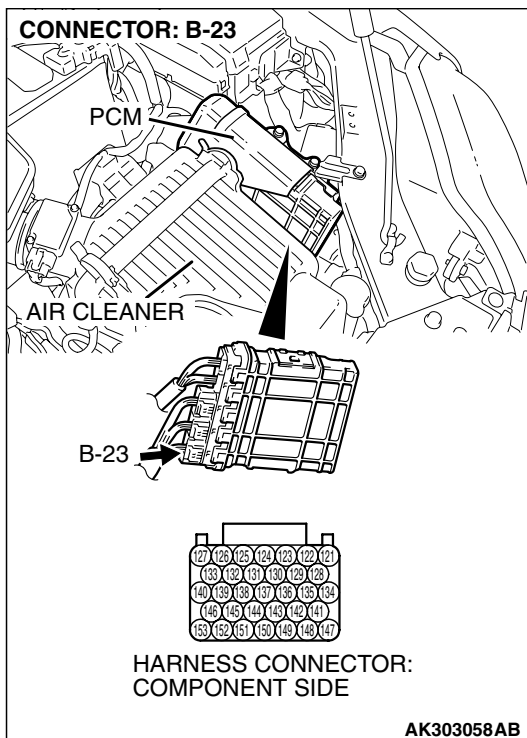
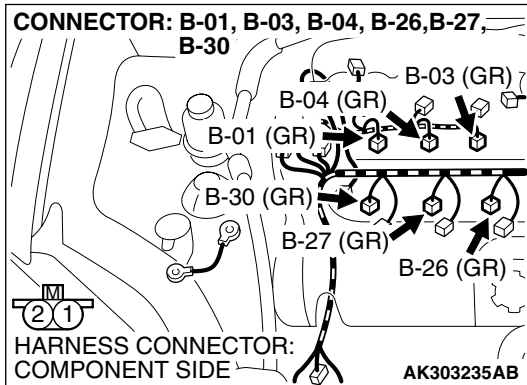
**STEP 13.** Check the harness connector B-23 at the PCM for damage.

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

**YES :** Go to Step 14.

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





### STEP 14. Check for harness damage between injector connector and PCM connector.

- Check the harness wire between injector connector B-01 (terminal No. 2) and PCM connector B-23 (terminal No. 153) at No. 1 cylinder injector.
- Check the harness wire between injector connector B-30 (terminal No. 2) and PCM connector B-23 (terminal No. 146) at No. 2 cylinder injector.
- Check the harness wire between injector connector B-03 (terminal No. 2) and PCM connector B-23 (terminal No. 140) at No. 3 cylinder injector.
- Check the harness wire between injector connector B-27 (terminal No. 2) and PCM connector B-23 (terminal No. 139) at No. 4 cylinder injector.
- Check the harness wire between injector connector B-04 (terminal No. 2) and PCM connector B-23 (terminal No. 133) at No. 5 cylinder injector.
- Check the harness wire between injector connector B-26 (terminal No. 2) and PCM connector B-23 (terminal No. 127) at No. 6 cylinder injector.

### Q: Is the harness wire in good condition?

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

- Check the ignition coil and spark plugs.
- Check if the injectors are clogged.
- Check the compression pressure.
- Check if the foreign materials (water, kerosene, etc.) got into fuel.

Then confirm that the malfunction symptom is eliminated.

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

## INSPECTION PROCEDURE 8: Unstable Idle (Rough Idle, Hunting).

### COMMENT

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

- 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.

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

- Malfunction of the ignition system.



## DIAGNOSIS

### Required Special Tools:

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

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### 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**

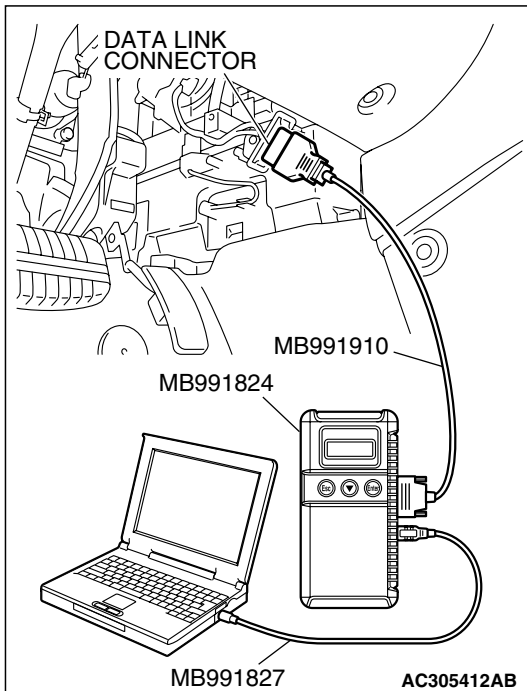
To prevent damage to scan tool MB991958, always turn the ignition switch is to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (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.13B-34](#).

**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.13B-1178](#).
- (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.

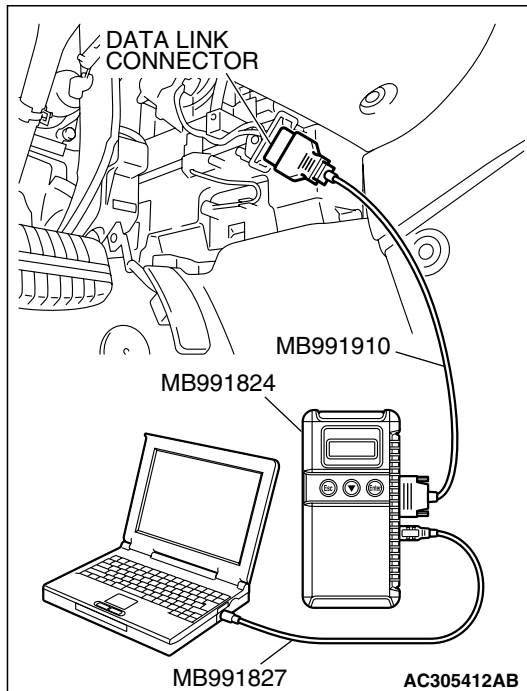
- a. Broken intake manifold gasket.
- b. Broken air intake hose.
- c. Broken vacuum hose.
- d. Positive crankcase ventilation valve does not operate.

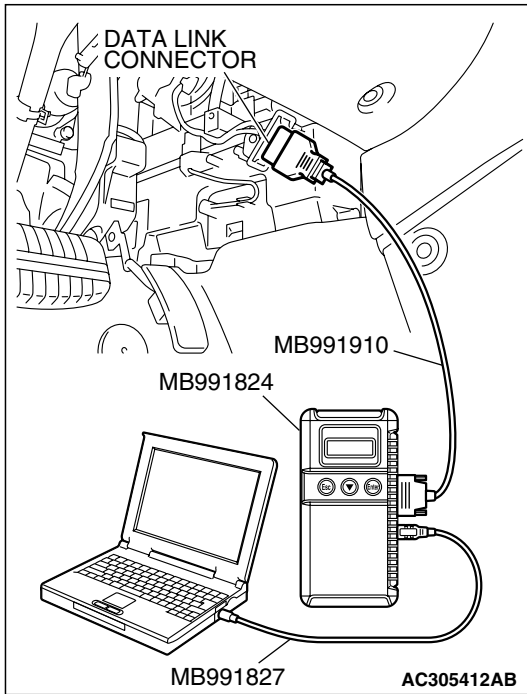
Then confirm that the malfunction symptom is eliminated.

**STEP 5. Using scan tool MB991958, check actuator test items 01, 02, 03, 04, 05, 06: 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.13B-1152](#).
  - a. Item 01, 02, 03, 04, 05, 06: 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 [P.13B-481](#), P0202 [P.13B-493](#), P0203 [P.13B-504](#), DTC P0204 [P.13B-516](#), P0205 [P.13B-527](#), P0206 [P.13B-539](#) – Injector Circuit.



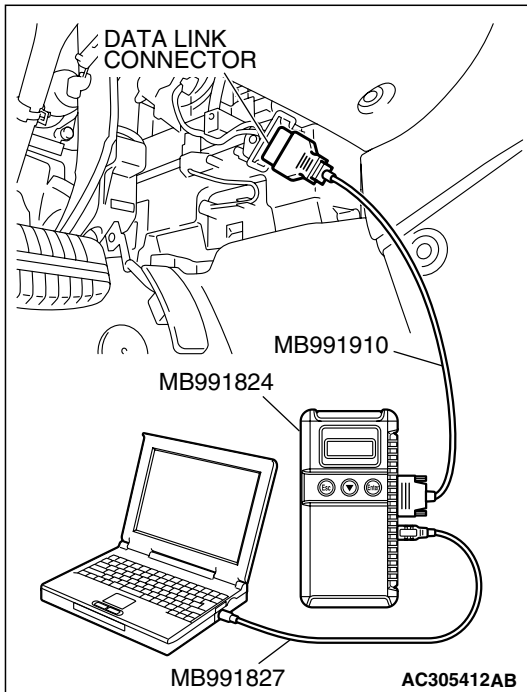
**STEP 6. Using scan tool MB991958, check data list.**

- (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.13B-1137](#).
  - a. Item 13: Intake Air Temperature Sensor.
  - b. Item 25: Barometric Pressure Sensor.
  - c. Item 21: Engine Coolant Temperature Sensor.
  - d. Item 69: Right Bank Heated Oxygen Sensor (rear).
  - e. Item 39: Right Bank Heated Oxygen Sensor (front).
  - f. Item 59: Left Bank Heated Oxygen Sensor (rear).
  - g. Item 11: Left Bank Heated Oxygen Sensor (front).
  - h. Item 27: 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 items in the actuator test. Refer to Actuator Test Reference Table [P.13B-1152](#).
  - a. Item 08: 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.13B-1179](#).

**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.

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**STEP 9. Check the ignition timing.**

Refer to GROUP 11, On-vehicle Service – Ignition Timing Check [P.11C-8](#).

**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.

**NEXT>>**