
DTC P0171: System too Lean (bank 1)

CIRCUIT OPERATION

- Multiplicative or Additive adaption performed by ENGINE-ECU.

TECHNICAL DESCRIPTION

- If a malfunction occurs in the fuel system, the fuel trim value becomes too large.
- The ECU checks whether the fuel trim value is within a specified range.

DTC SET CONDITIONS**Check Conditions**

- Bank 1 too lean

Judgment Criteria

- MIL on after 2 drive cycles.

- No limp home.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

- Injector (Number 1, 3, 5) malfunctioning.
- Incorrect fuel pressure.
- Air drawn in from gaps in gasket, seals, etc.
- Use of incorrect or contaminated fuel.
- Refer to component locations [GROUP-70](#)
- Refer to configuration diagrams [GROUP-80](#)
- Refer to circuit diagrams [GROUP-90](#)

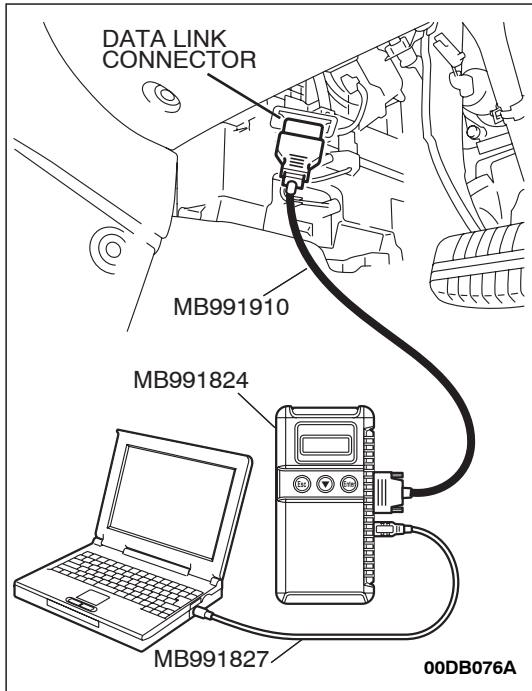
DIAGNOSIS**Required Special Tools:**

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

STEP 1. Check for intake system vacuum leak.**Q: Are there any abnormalities?**

YES : Repair it. Then go to Step 4.

NO : Go to Step 2.



STEP 2. Using diagnostic tool , check actuator test items 01, 03, 05: Injector.

⚠ CAUTION

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

- (1) Connect diagnostic tool to the data link connector. Refer to Actuator Test Table [P.13A-644](#)
- (2) Start the engine and run at idle.
- (3) Set diagnostic tool to the Actuator Test mode for MPI - Items 01, 03, 05: Injector.
- (4) Warm up the engine to normal operating temperature: 80°C to 95°C.
- (5) Perform Actuator test on each injector.
- (6) Conduct a Power Balance test on each cylinder. Refer to On-Vehicle Service - Injector Check [P.13A-670](#).

Q: Is each injector operating properly?

YES : YES: Go to Step 3.

NO : Refer to On-Vehicle Service - Injector Check [P.13A-670](#). If injector is malfunctioning replace and go to Step 3.

STEP 3. Check the fuel pressure.

Refer to On-vehicle Service – Fuel Pressure Test [P.13A-661](#).

Q: Is the fuel pressure normal?

YES : Go to Step 4.

NO : Repair it. Then go to Step 4.

STEP 4. Test the EOBD drive cycle.

- (1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0171 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0172: System too Rich (bank 1)

CIRCUIT OPERATION

- Multiplicative or Additive adaption performed by ENGINE-ECU.

TECHNICAL DESCRIPTION

- If a malfunction occurs in the fuel system, the fuel trim value becomes too small.
- The ECU checks whether the fuel trim value is within a specified range.

DTC SET CONDITIONS

Check Conditions

- Bank 1 too rich.

Judgment Criteria

- MIL on after 2 drive cycles.
- No limp home.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

- Injector (Number 1, 3, 5) malfunctioning.
- Incorrect fuel pressure.
- Refer to component locations [GROUP-70](#)
- Refer to configuration diagrams [GROUP-80](#)
- Refer to circuit diagrams [GROUP-90](#)

DIAGNOSIS

Required Special Tools:

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

STEP 1. Using diagnostic tool , check actuator test items 01, 03, 05: Injector.

CAUTION

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

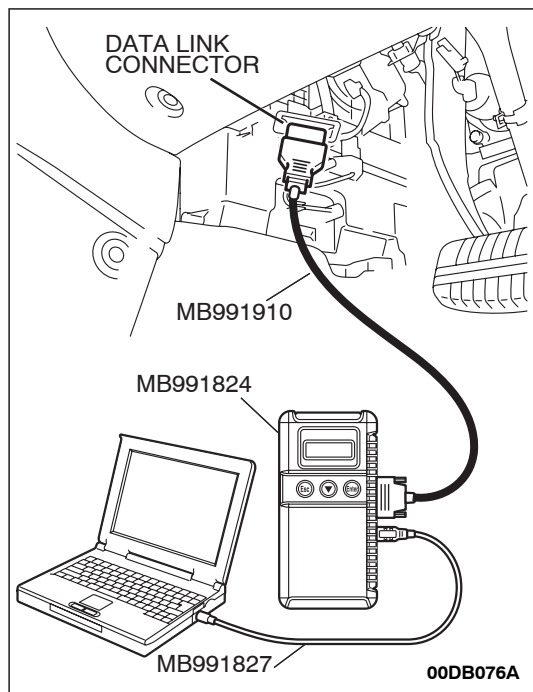
- (1) Connect diagnostic tool to the data link connector. Refer to Actuator Test Table [P.13A-644](#)
- (2) Start the engine and run at idle.
- (3) Set diagnostic tool to the Actuator Test mode for MPI - Items 01, 03, 05: Injector.
- (4) Warm up the engine to normal operating temperature: 80°C to 95°C.
- (5) Perform Actuator test on each injector.
- (6) Conduct a Power Balance test on each cylinder. Refer to On-Vehicle Service - Injector Check [P.13A-670](#).

Q: Is each injector operating properly?

YES : YES: Go to Step 2.

NO : Refer to On-Vehicle Service - Injector Check

[P.13A-670](#). If injector is malfunctioning replace and go to Step 3.



STEP 2. Check the fuel pressure.

Refer to On-vehicle Service – Fuel Pressure Test [P.13A-661](#).

Q: Is the fuel pressure normal?

YES : Go to Step 3.

NO : Repair it. Then go to Step 3.

STEP 3. Test the EOBD drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

Q: Is DTC P0172 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0174: System too Lean (bank 2)

CIRCUIT OPERATION

- Multiplicative or Additive adaption performed by ENGINE-ECU.

TECHNICAL DESCRIPTION

- If a malfunction occurs in the fuel system, the fuel trim value becomes too large.
- The ECU checks whether the fuel trim value is within a specified range.

DTC SET CONDITIONS

Check Conditions

- Bank 2 too lean

Judgment Criteria

- MIL on after 2 drive cycles.

- No limp home.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

- Injector (Number 2, 4, 6) malfunctioning.
- Incorrect fuel pressure.
- Air drawn in from gaps in gasket, seals, etc.
- Use of incorrect or contaminated fuel.
- Refer to component locations [GROUP-70](#)
- Refer to configuration diagrams [GROUP-80](#)
- Refer to circuit diagrams [GROUP-90](#)

DIAGNOSIS

Required Special Tools:

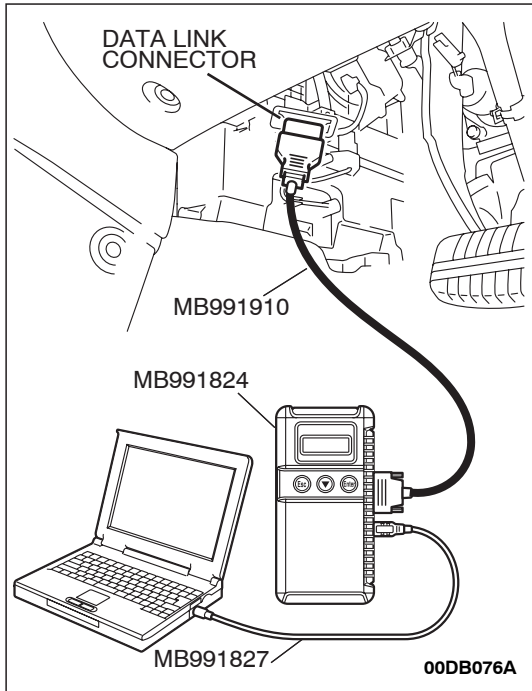
- Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991910: Main Harness A

STEP 1. Check for intake system vacuum leak.

Q: Are there any abnormalities?

YES : Repair it. Then go to Step 4.

NO : Go to Step 2.



**STEP 2. Using diagnostic tool , check actuator test items
02, 04, 06: Injector.**

⚠ CAUTION

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

- (1) Connect diagnostic tool to the data link connector. Refer to Actuator Test Table [P.13A-644](#)
- (2) Start the engine and run at idle.
- (3) Set diagnostic tool to the Actuator Test mode for MPI - Items 02, 04, 06: Injector.
- (4) Warm up the engine to normal operating temperature: 80°C to 95°C.
- (5) Perform Actuator test on each injector.
- (6) Conduct a Power Balance test on each cylinder. Refer to On-Vehicle Service - Injector Check [P.13A-670](#).

Q: Is each injector operating properly?

YES : YES: Go to Step 3.

NO : Refer to On-Vehicle Service - Injector Check [P.13A-670](#). If injector is malfunctioning replace and go to Step 3.

STEP 3. Check the fuel pressure.

Refer to On-vehicle Service – Fuel Pressure Test [P.13A-661](#).

Q: Is the fuel pressure normal?

YES : Go to Step 4.

NO : Repair it. Then go to Step 4.

STEP 4. Test the EOBD drive cycle.

- (1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0174 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0175: System too Rich (bank 2)

CIRCUIT OPERATION

- Multiplicative or Additive adaption performed by ENGINE-ECU.

TECHNICAL DESCRIPTION

- If a malfunction occurs in the fuel system, the fuel trim value becomes too small.
- The ECU checks whether the fuel trim value is within a specified range.

DTC SET CONDITIONS

Check Conditions

- Bank 2 too rich.

Judgment Criteria

- MIL on after 2 drive cycles.
- No limp home.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

- Injector (Number 2, 4, 6) malfunctioning.
- Incorrect fuel pressure.
- Refer to component locations [GROUP-70](#)
- Refer to configuration diagrams [GROUP-80](#)
- Refer to circuit diagrams [GROUP-90](#)

DIAGNOSIS

Required Special Tools:

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

STEP 1. Using diagnostic tool , check actuator test items 02, 04, 06: Injector.

CAUTION

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

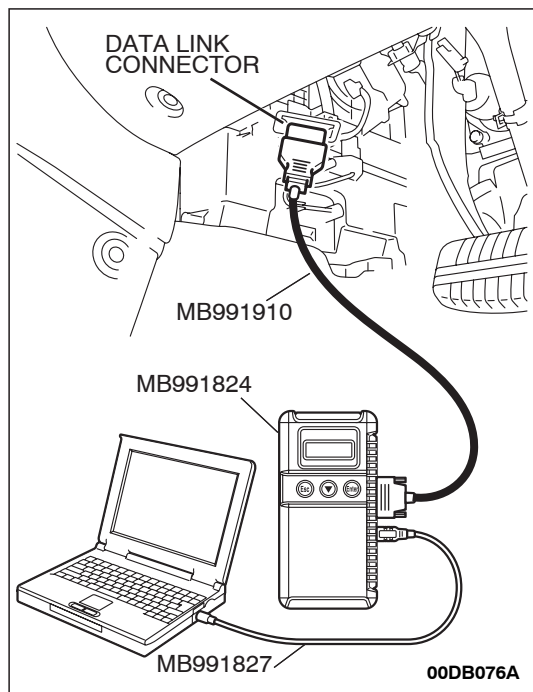
- (1) Connect diagnostic tool to the data link connector. Refer to Actuator Test Table [P.13A-644](#)
- (2) Start the engine and run at idle.
- (3) Set diagnostic tool to the Actuator Test mode for MPI - Items 02, 04, 06: Injector.
- (4) Warm up the engine to normal operating temperature: 80°C to 95°C.
- (5) Perform Actuator test on each injector.
- (6) Conduct a Power Balance test on each cylinder. Refer to On-Vehicle Service - Injector Check [P.13A-670](#).

Q: Is each injector operating properly?

YES : YES: Go to Step 2.

NO : Refer to On-Vehicle Service - Injector Check

[P.13A-670](#). If injector is malfunctioning replace and go to Step 3.



STEP 2. Check the fuel pressure.

Refer to On-vehicle Service – Fuel Pressure Test [P.13A-661](#).

Q: Is the fuel pressure normal?

YES : Go to Step 3.

NO : Repair it. Then go to Step 3.

STEP 3. Test the EOBD drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

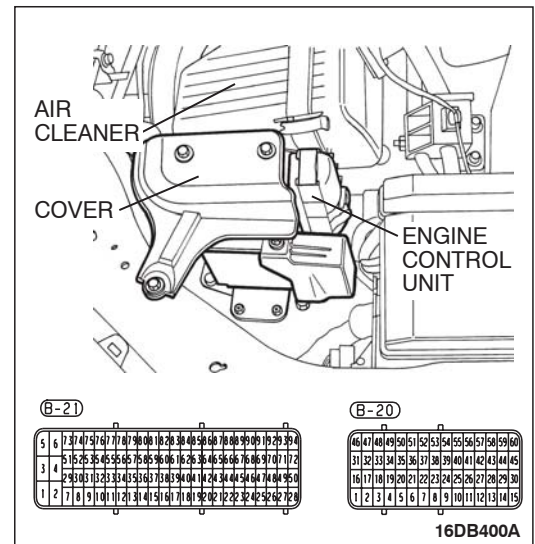
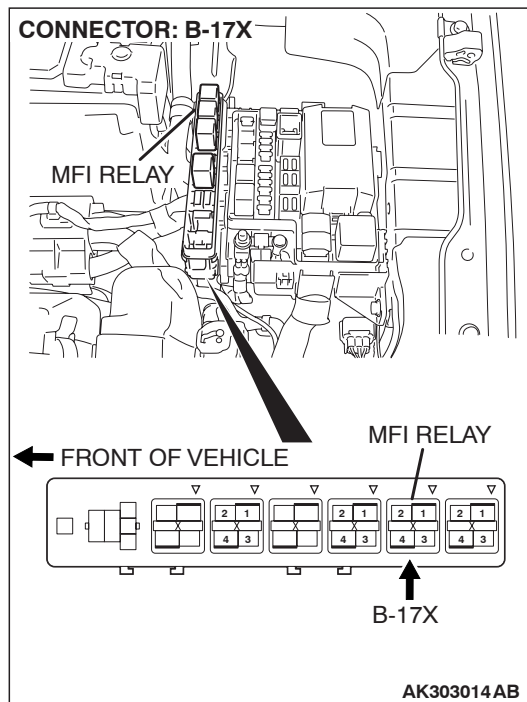
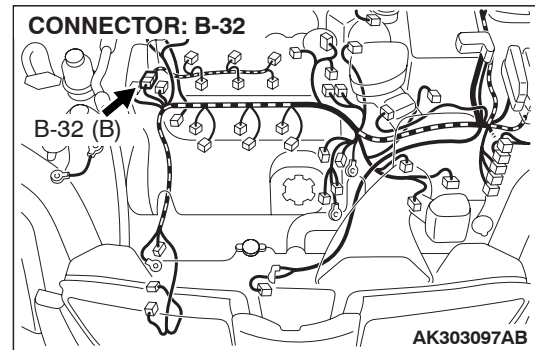
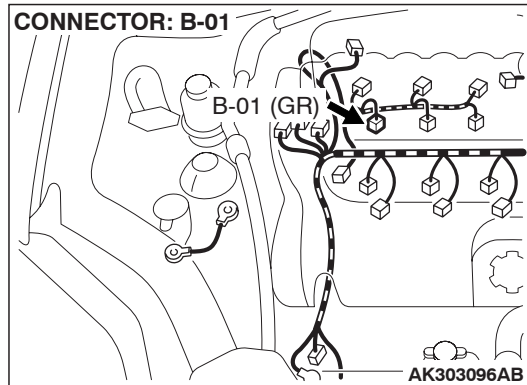
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0175 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0201: Injector Circuit Malfunction - Cylinder 1.



CIRCUIT OPERATION

- Refer to DTC P0300 - Random/Multiple Misfire- [P.13A-330](#) and Misfire Cylinder 1- [P.13A-334](#).
- The injector power is supplied from the MPI relay (terminal No. 4).
- The ECU controls the injector by turning the power transistor in the ECU "ON" and "OFF".

TECHNICAL DESCRIPTION

- The amount of fuel injected by the injector is controlled by the amount of continuity time the coil is grounded by the ECU.
- A surge voltage is generated when the injectors are switched on/off.
- The ECU monitors this surge voltage.

DTC SET CONDITIONS

Check Conditions

- Battery voltage is between 9.04 and 16.01vols.
- Engine speed is above 801 r/min.

Judgment Criteria

- IC internal test (open circuit, short to earth, short to battery).
- MIL on after 2 drive cycles.

- Misfire present.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle
[P.13A-11](#)

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

- No. 1 cylinder injector failed.
- Open or shorted to ground No.1 cylinder injector circuit.
- Shorted to battery, No.1 cylinder injector circuit.
- Harness or connector damage.
- Refer to component locations GROUP-70
- Refer to configuration diagrams GROUP-80
- Refer to circuit diagrams GROUP-90

DIAGNOSIS

Required Special Tools:

- Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991910: Main Harness A
- MB991658: Test Harness
- MB992044: Power Plant ECU Check Harness

STEP 1. Using diagnostic tool , check actuator test item 01: No. 1 Injector.

CAUTION

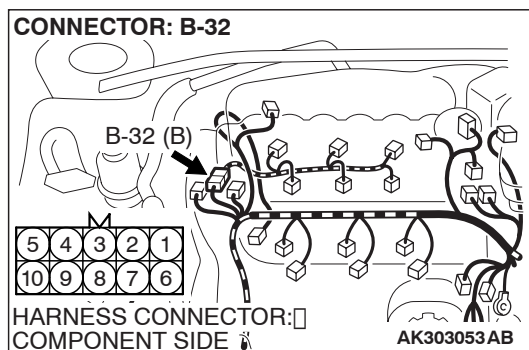
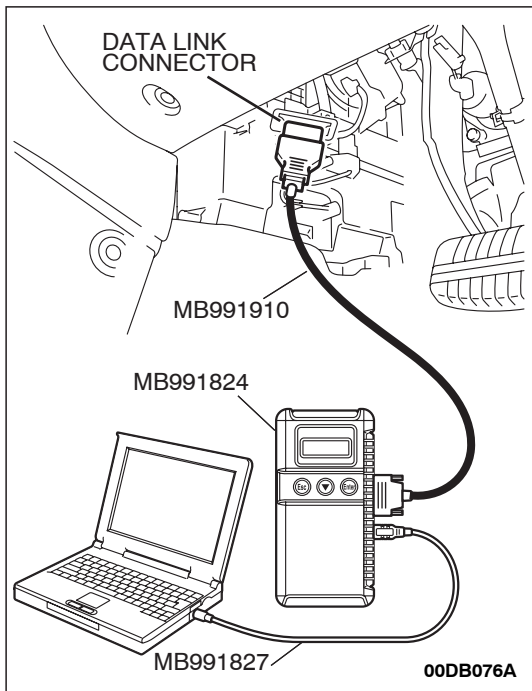
To prevent damage to diagnostic tool , always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool .

- (1) Connect diagnostic tool to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set diagnostic tool to the actuator testing mode for item 01, No. 1 injector.
- (4) Warm up the engine to normal operating temperature: 80°C to 95°C (176°F to 203°F).
 - The idle should become slightly rougher.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Does the idle vary or engine run "rough"?

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

NO : Go to Step 2.

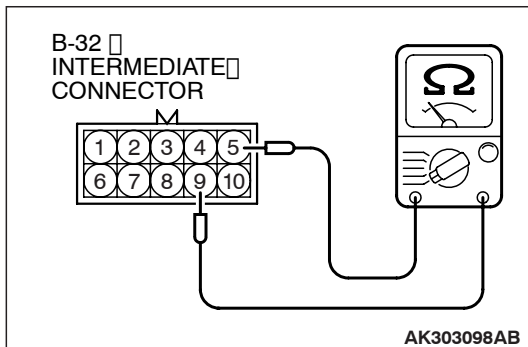
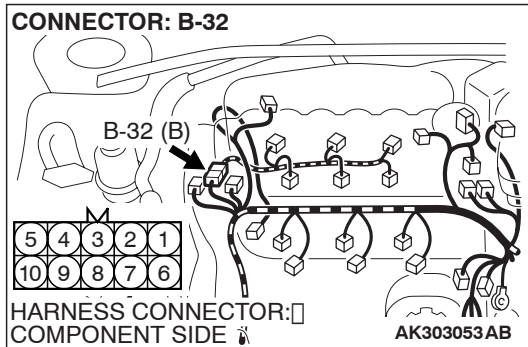


STEP 2. Check harness connector B- 32 at intermediate connector for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 3.

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



STEP 3. Check the No.1 cylinder injector resistance at intermediate connector B-32.

(1) Disconnect the intermediate connector B-32.

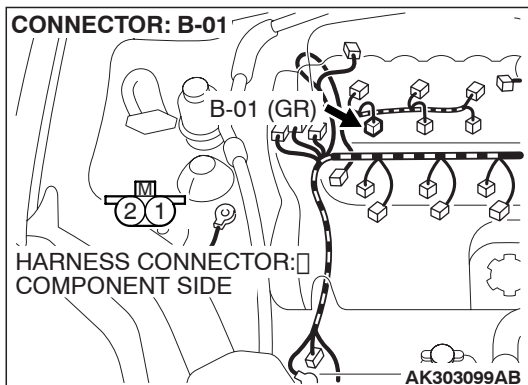
(2) Measure the resistance between terminal No. 5 and No. 9.

- Resistance should be between 10.5 and 13.5 ohms.

Q: Is the measured resistance between 10.5 and 13.5 ohms?

YES : Go to Step 6.

NO : Go to Step 4.



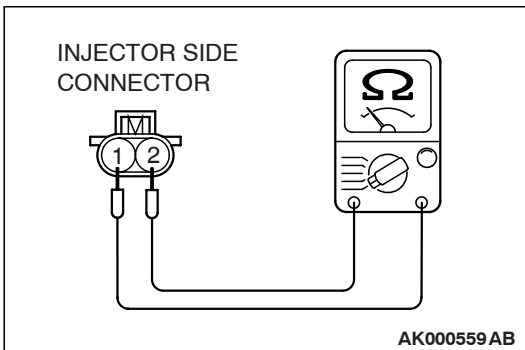
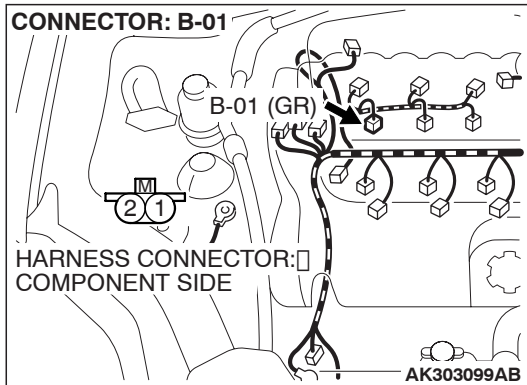
STEP 4. Check the harness connector B-01 at No. 1 cylinder injector for damage.

Remove the intake manifold.

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 12.



STEP 5. Check the No. 1 cylinder injector B-01.

(1) Disconnect the No. 1 cylinder injector connector B-01.

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

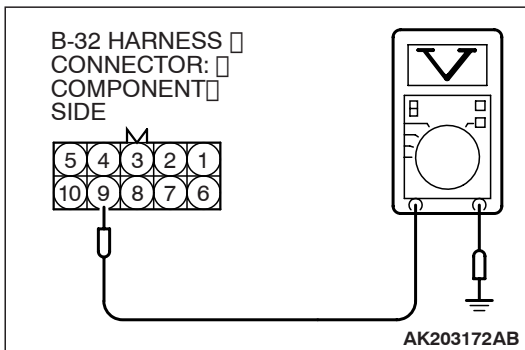
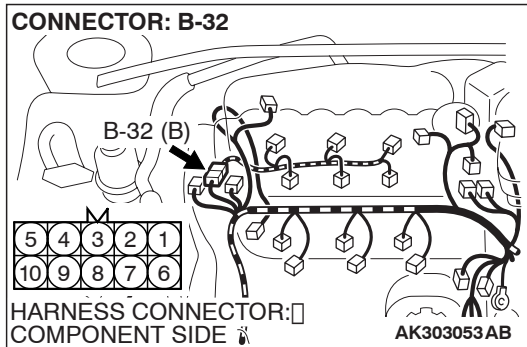
Standard value: 10.5 – 13.5 ohms [at 20°C (68°F)]

Q: Is the measured resistance between 10.5 and 13.5 ohms [at 20°C (68°F)]?

YES : Repair harness wire between intermediate connector B-32 (terminal No. 9) and injector connector B-01 (terminal No. 1) and harness wire between No.1 cylinder injector connector B-01 (terminal No. 2) and intermediate connector B-32 (terminal No. 5) because of open circuit or short circuit to ground or harness damage.

Then go to Step 12.

NO : Replace the No.1 cylinder injector. Then go to Step 12.



STEP 6. Measure the power supply voltage at intermediate connector B-32.

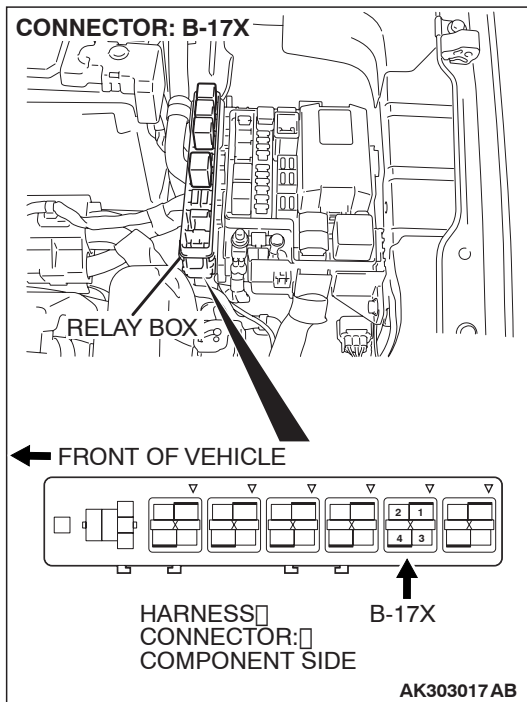
- (1) Disconnect the connector B-32 and measure at the female connector side.
- (2) Turn the ignition switch to the "ON" position.

- (3) Measure the voltage between terminal No. 9 and ground.
 - Voltage should be battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

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

YES : Go to Step 8.

NO : Go to Step 7.



STEP 7. Check harness connector B-17X at MFI relay for damage.

Q: Is the harness connector in good condition?

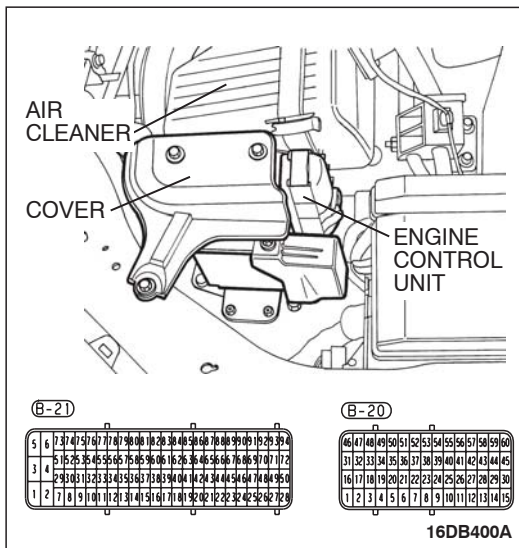
YES : Repair harness wire between MFI relay connector B-17X (terminal No. 4) and intermediate connector B-32 (terminal No. 9) because of open circuit or short circuit to ground. Then go to Step 12.

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

Q: Is the harness wire in good condition?

NO : Repair it. Then go to Step 12.



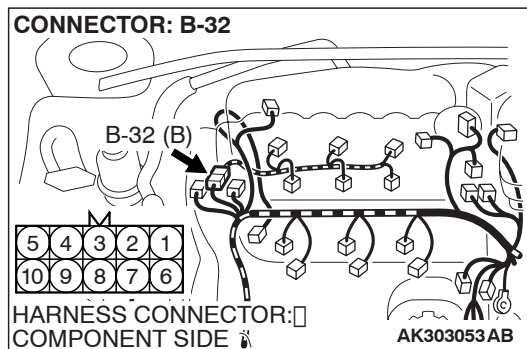


STEP 9. Check harness connector B-20 at ECU for damage.

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 12.

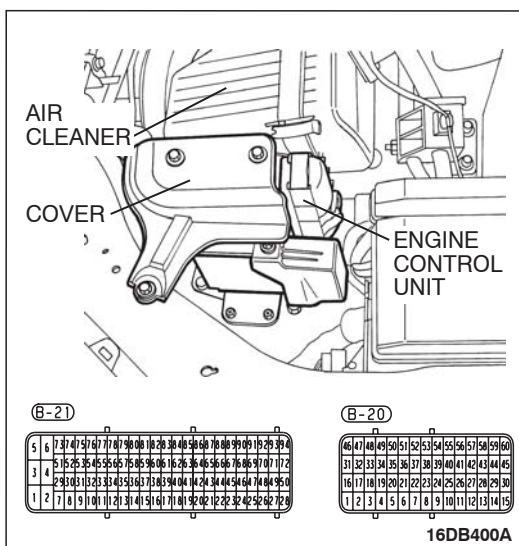


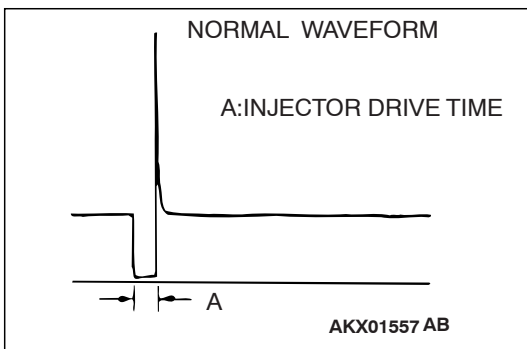
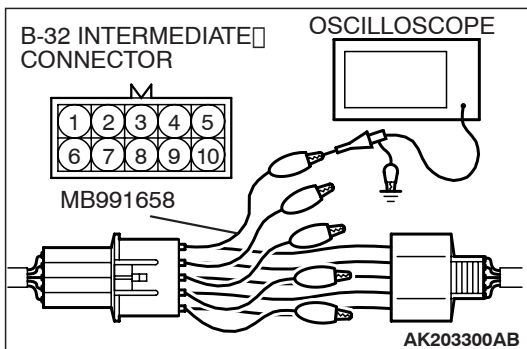
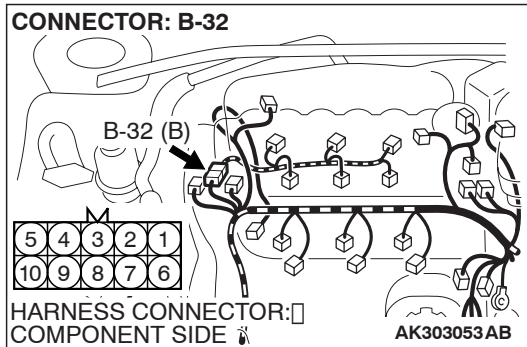
STEP 10. Check for open circuit and short circuit to ground and harness damage between intermediate connector B-32 (terminal No. 5) and ECU connector B-20 (terminal No. 03).

Q: Is the harness wire in good condition?

YES : Go to Step 11.

NO : Repair it. Then go to Step 12.





STEP 11. Using the oscilloscope, check the No. 1 cylinder injector.

- (1) Disconnect the intermediate connector B-32 and connect the test harness MB991658 between the separated connectors.

- (2) Connect the oscilloscope probe to injector intermediate connector terminal to No.5.

NOTE: When measuring with the ECU side connector, disconnect the all ECU connectors and connect check harness special tool (MB992044) between the separated connectors. Then connect an oscilloscope probe to the check harness connector terminal No.03.

- (3) Start the engine and run at idle.

- (4) Measure the waveform.

- The waveform should show a normal pattern similar to the illustration.

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

Q: Is the waveform normal?

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

NO : Replace the ECU. Then go to Step 12.

STEP 12. Test the EOBd drive cycle.

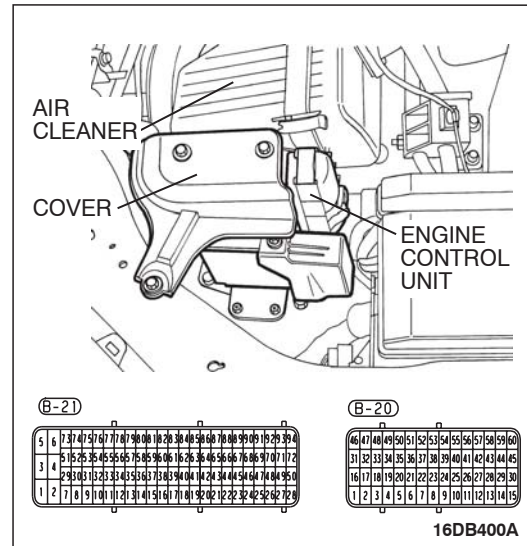
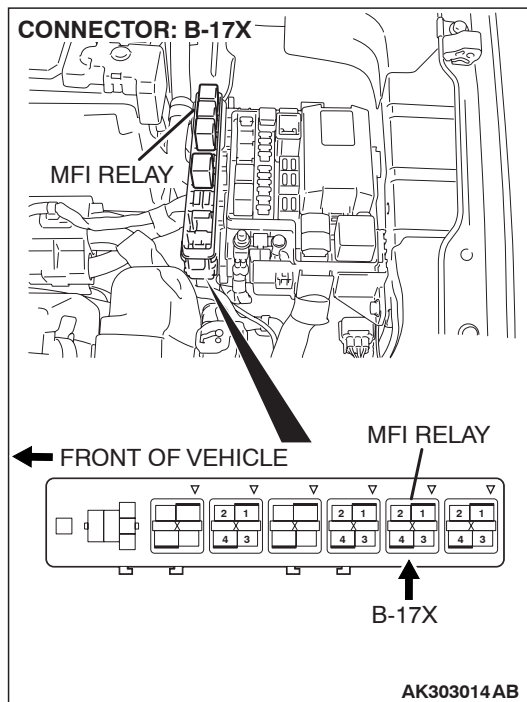
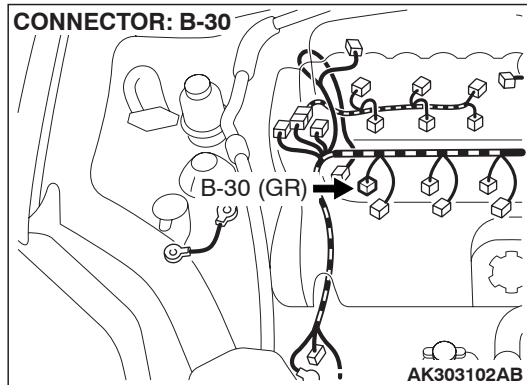
- (1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOBd Drive Cycle – [P.13A-11](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0201 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0202: Injector Circuit Malfunction - Cylinder 2.



CIRCUIT OPERATION

- Refer to DTC P0300 - Random/Multiple Misfire- [P.13A-330](#) and Misfire Cylinder 2- [P.13A-336](#).
- The injector power is supplied from the MPI relay (terminal No. 4).
- The ECU controls the injector by turning the power transistor in the ECU "ON" and "OFF".

TECHNICAL DESCRIPTION

- The amount of fuel injected by the injector is controlled by the amount of continuity time the coil is grounded by the ECU.
- A surge voltage is generated when the injectors are switched on/off.
- The ECU monitors this surge voltage.

DTC SET CONDITIONS <Circuit continuity – open circuit and shorted low>

Check Conditions

- Battery voltage is between 9.04 and 16.01vols.
- Engine speed is above 801 r/min.

Judgment Criteria

- IC internal test (open circuit, short to earth, short to battery).
- MIL on after 2 drive cycles.

- Misfire present.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle [P.13A-11](#).

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

- No. 2 cylinder injector failed.
- Open or shorted to ground No.2 cylinder injector circuit.
- Shorted to battery, No.2 cylinder injector circuit.
- Harness or connector damage.
- Refer to component locations GROUP-70
- Refer to configuration diagrams GROUP-80
- Refer to circuit diagrams GROUP-90

DIAGNOSIS

Required Special Tools:

- Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991910: Main Harness A
- MB991658: Test Harness
- MB992044: Power Plant ECU Check Harness

STEP 1. Using diagnostic tool , check actuator test item 02: No. 2 injector.

CAUTION

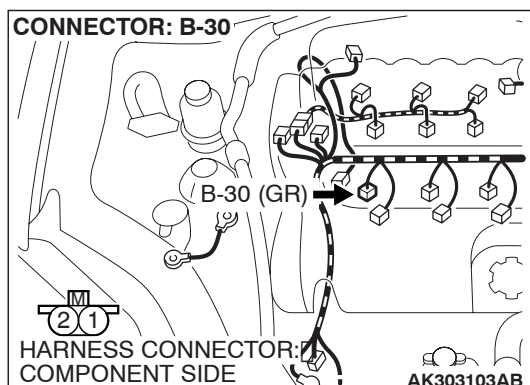
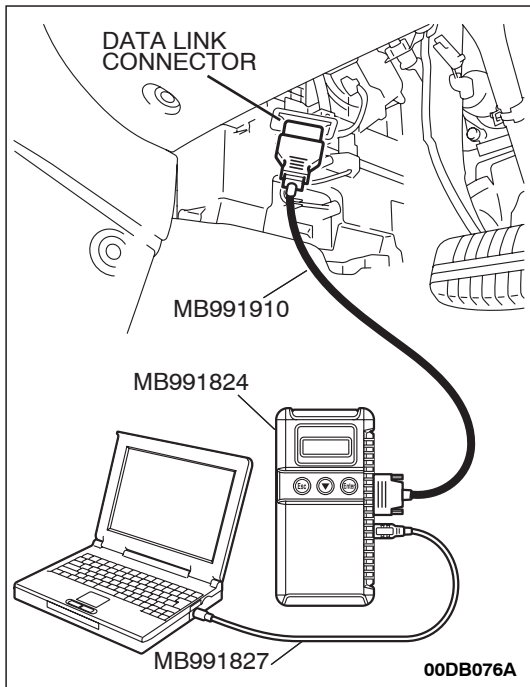
To prevent damage to diagnostic tool , always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool .

- (1) Connect diagnostic tool to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set diagnostic tool to the actuator testing mode for item 02, No. 2 injector.
- (4) Warm up the engine to normal operating temperature: 80°C to 95°C (176°F to 203°F).
 - The idle should become slightly rougher.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Does the idle vary or engine run "rough"?

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.

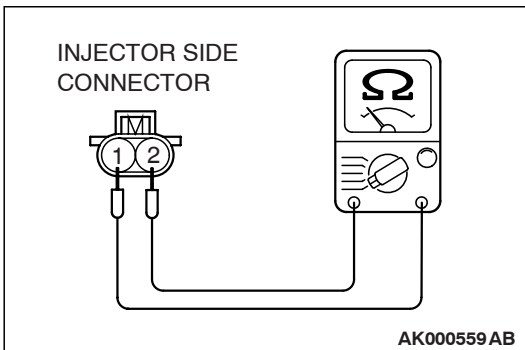
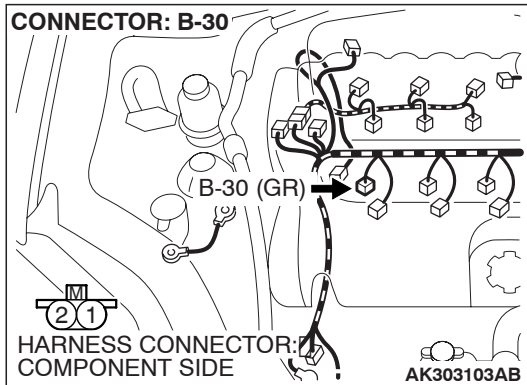


STEP 2. Check the harness connector B-30 at No. 2 cylinder injector for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 3.

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



STEP 3. Check the No. 2 cylinder injector.

(1) Disconnect the No. 2 cylinder injector connector B-30.

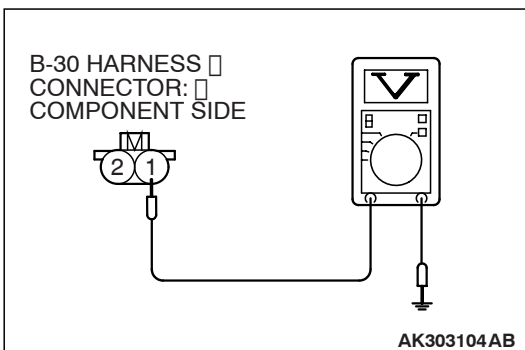
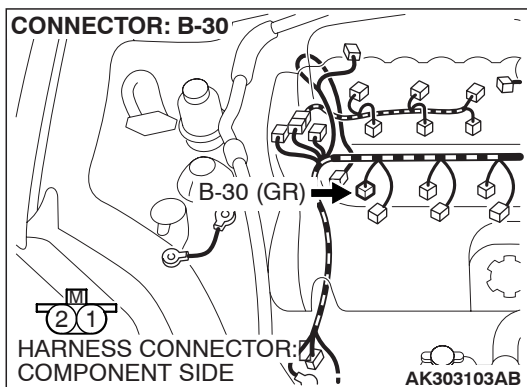
(2) Measure the resistance between injector side connector terminal No. 1 and No. 2.

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 4.

NO : Replace the No. 2 cylinder injector. Then go to Step 10.



STEP 4. Measure the power supply voltage at No.2 cylinder injector connector B-30.

(1) Disconnect connector B-30 and measure at the harness side.

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

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

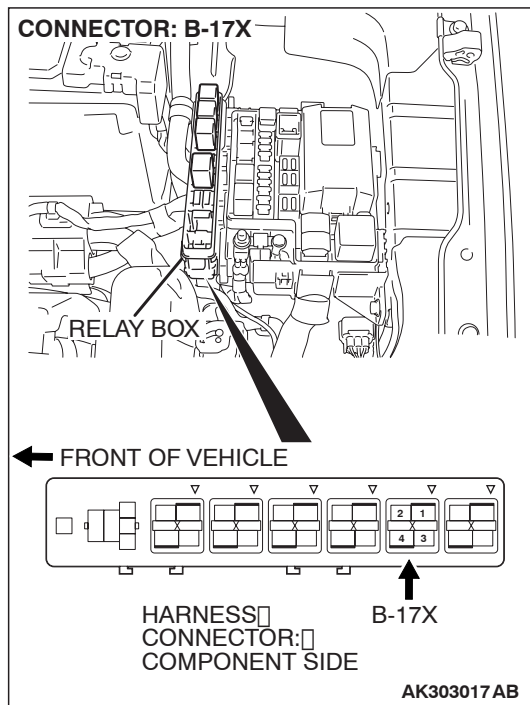
- Voltage should be battery positive voltage.

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

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

YES : Go to Step 6.

NO : Go to Step 5.



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

Q: Is the harness connector in good condition?

YES : Repair harness wire between MFI relay connector B-17X (terminal No. 4) and No.2 cylinder injector connector B-30 (terminal No. 1) because of open circuit or short circuit to ground.

Then go to Step 10.

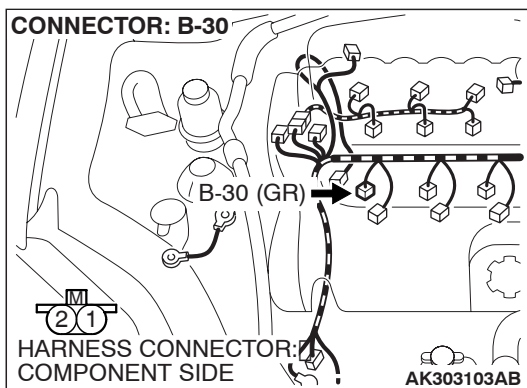
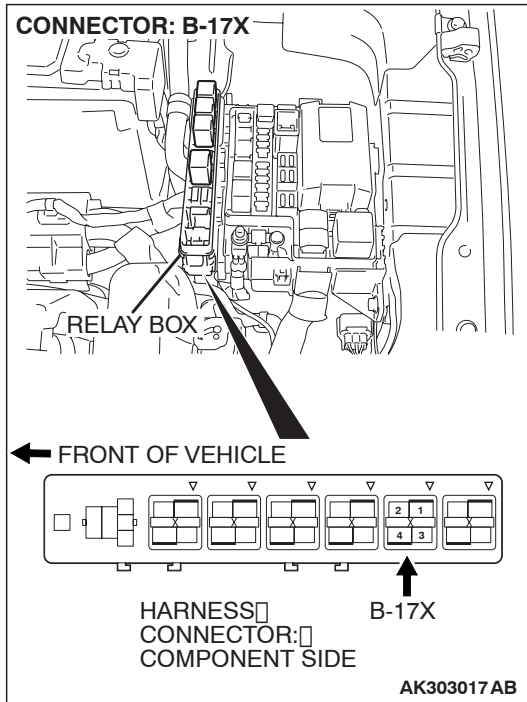
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 10.

STEP 6. Check for harness damage between MFI relay connector B-17X (terminal No.4) and No. 2 cylinder injector connector B-30.

Q: Is the harness wire in good condition?

YES : Go to Step 7.

NO : Repair it. Then go to Step 10.

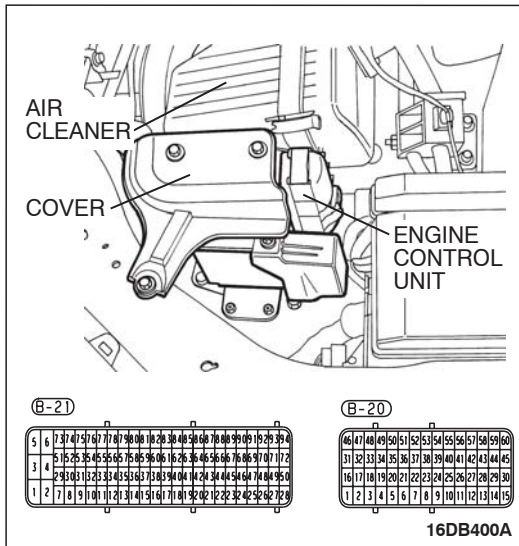


STEP 7. Check harness connector B-20 at ECU for damage.

Q: Is the 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 10.

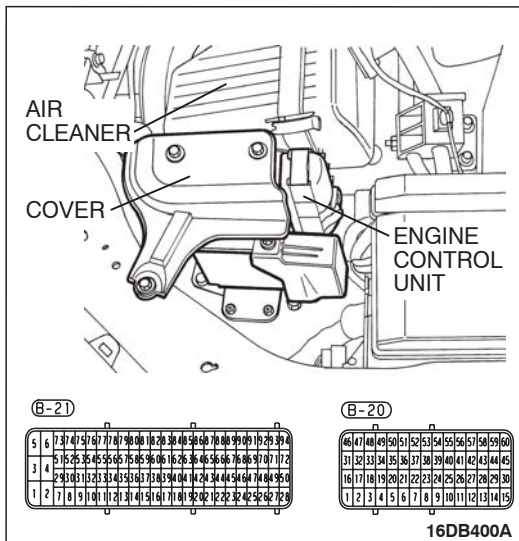
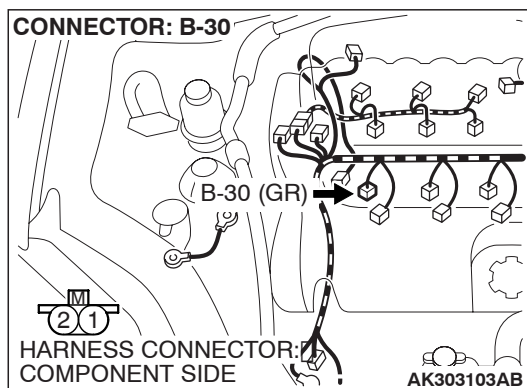


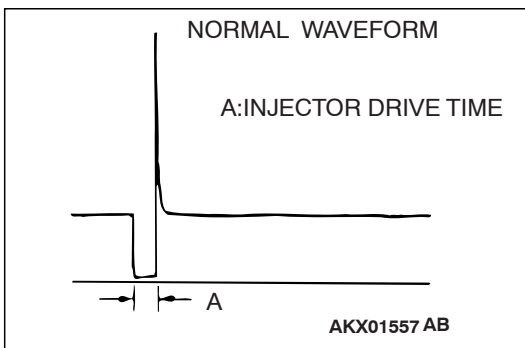
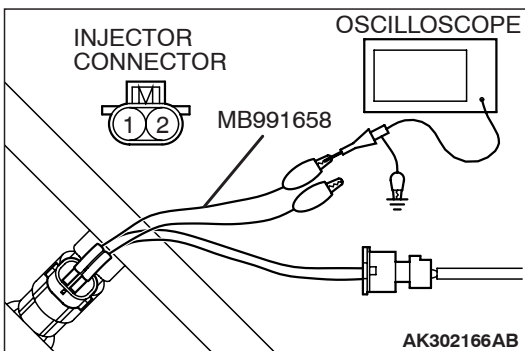
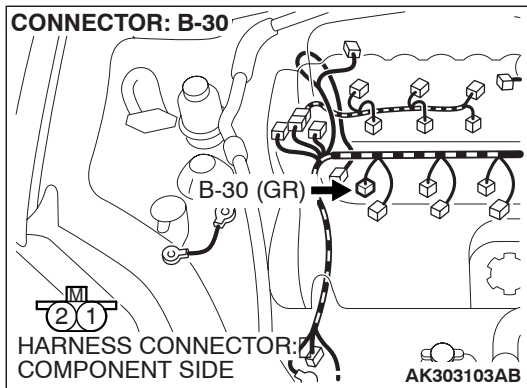
STEP 8. Check for open circuit and short circuit to ground and harness damage between No.2 cylinder injector connector B-30 (terminal No. 2) and ECU connector B-20 (terminal No. 04).

Q: Is the harness wire in good condition?

YES : Go to Step 9.

NO : Repair it. Then go to Step 10.





STEP 9. Using the oscilloscope, check the No.2 cylinder injector.

- (1) Disconnect the No. 2 cylinder injector connector B-30 and connect the test harness special tool (MB991658) between the separated connectors. (All terminals should be connected)

- (2) Connect the oscilloscope probe to the injector side connector terminal No. 2.

NOTE: When measuring with the ECU side connector, disconnect the all ECU connectors and connect check harness special tool (MB992044) between the separated connectors. Then connect an oscilloscope probe to the check harness connector terminal No. 04.

- (3) Start the engine and run at idle.

- (4) Measure the waveform.

- The waveform should show a normal pattern similar to the illustration.

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

Q: Is the waveform normal?

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

NO : Replace the ECU. Then go to Step 10.

STEP 10. Test the EOB drive cycle.

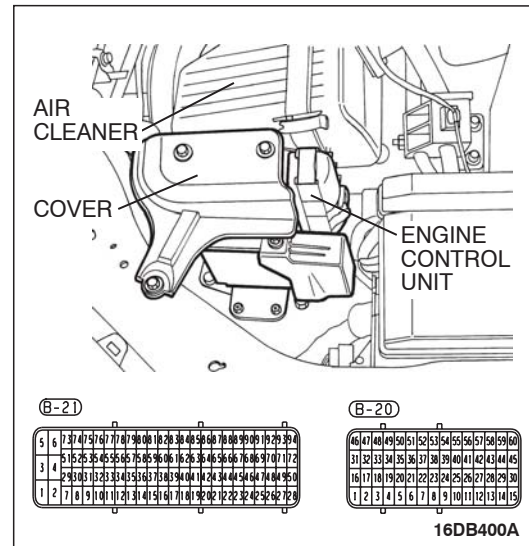
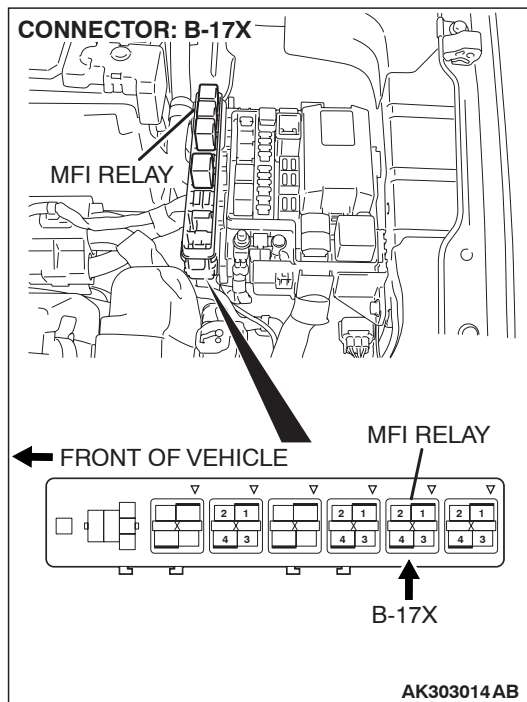
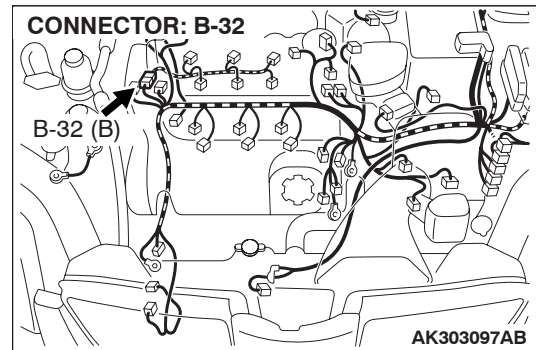
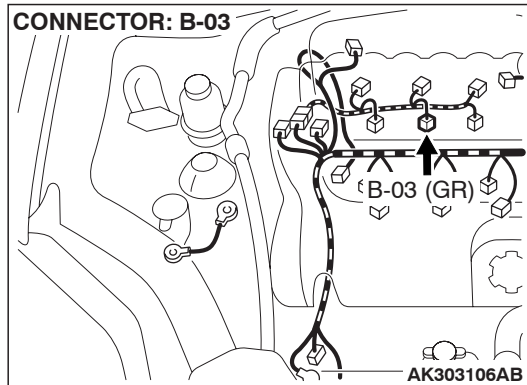
- (1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOB Drive Cycle – [P.13A-11](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0202 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0203: Injector Circuit Malfunction - Cylinder 3.



CIRCUIT OPERATION

- Refer to DTC P0300 - Random/Multiple Misfire- [P.13A-330](#) and Misfire Cylinder 3- [P.13A-338](#).
- The injector power is supplied from the MPI relay (terminal No. 4).
- The ECU controls the injector by turning the power transistor in the ECU "ON" and "OFF".

TECHNICAL DESCRIPTION

- The amount of fuel injected by the injector is controlled by the amount of continuity time the coil is grounded by the ECU.
- A surge voltage is generated when the injectors are switched on/off.
- The ECU monitors this surge voltage.

DTC SET CONDITIONS <Circuit continuity – open circuit and shorted low>

Check Conditions

- Battery voltage is between 9.04 and 16.01vols.
- Engine speed is above 801 r/min.

Judgment Criteria

- IC internal test (open circuit, short to earth, short to battery).
- MIL on after 2 drive cycles.

- Misfire present.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

- No. 3 cylinder injector failed.
- Open or shorted to ground No.3 cylinder injector circuit.
- Shorted to battery, No.3 cylinder injector circuit.
- Harness or connector damage.
- Refer to component locations GROUP-70
- Refer to configuration diagrams GROUP-80
- Refer to circuit diagrams GROUP-90

DIAGNOSIS

Required Special Tools:

- Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991910: Main Harness A
- MB991658: Test Harness
- MB992044: Power Plant ECU Check Harness

STEP 1. Using diagnostic tool , check actuator test item 03: No. 3 injector.

⚠ CAUTION

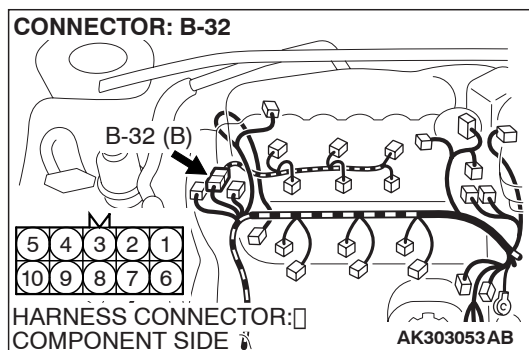
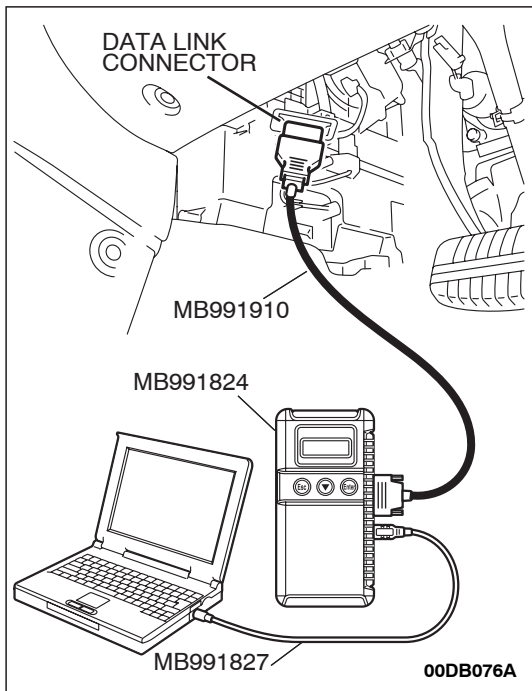
To prevent damage to diagnostic tool , always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool .

- (1) Connect diagnostic tool to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set diagnostic tool to the actuator testing mode for item 03, No. 3 injector.
- (4) Warm up the engine to normal operating temperature: 80°C to 95°C (176°F to 203°F).
 - The idle should become slightly rougher.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Does the idle vary or engine run "rough"?

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

NO : Go to Step 2.

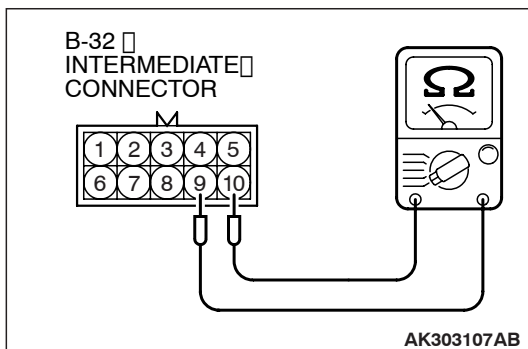
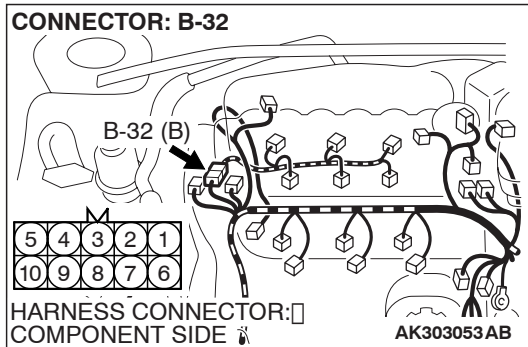


STEP 2. Check harness connector B-32 at intermediate connector for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 3.

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



STEP 3. Check the No. 3 cylinder injector resistance at intermediate connector B-32.

(1) Disconnect the intermediate connector B-32.

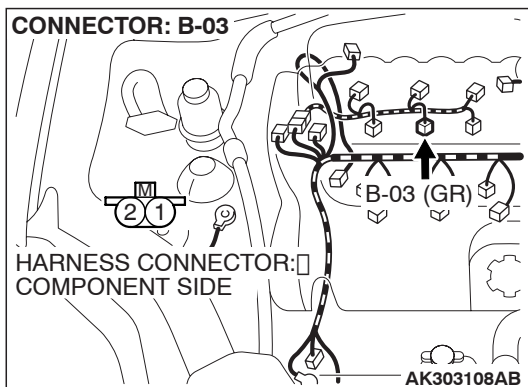
(2) Measure the resistance between terminal No. 9 and No. 10.

- Resistance should be between 10.5 and 13.5 ohms.

Q: Is the measured resistance between 10.5 and 13.5 ohms?

YES : Go to Step 6.

NO : Go to Step 4.



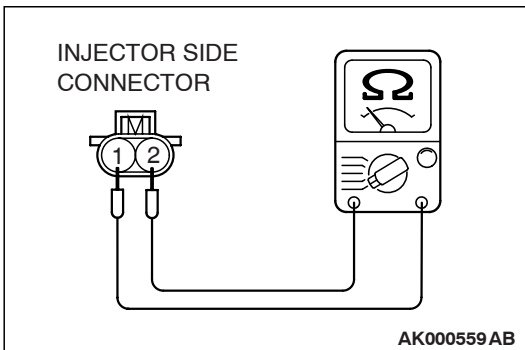
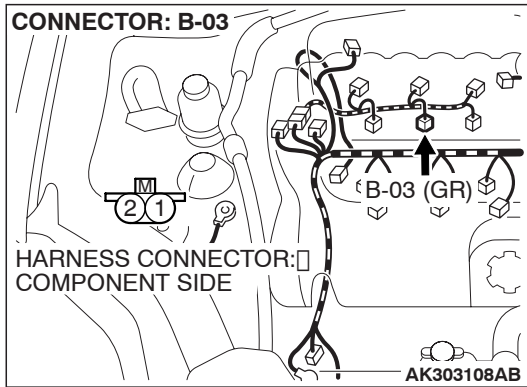
STEP 4. Check the connector B-03 at No. 3 cylinder injector for damage.

Remove the intake manifold.

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 12.



STEP 5. Check the No. 3 cylinder injector.

(1) Disconnect the No. 3 cylinder injector connector B-03.

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

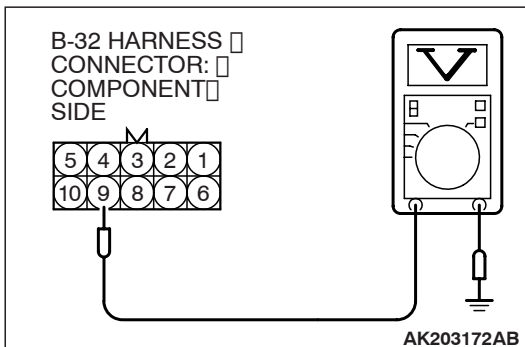
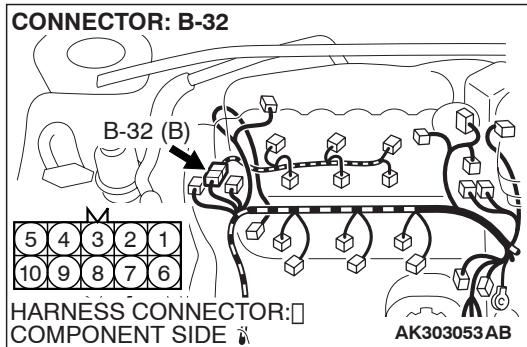
Standard value: 10.5 – 13.5 ohms [at 20°C (68°F)]

Q: Is the measured resistance between 10.5 and 13.5 ohms [at 20°C (68°F)]?

YES : Repair harness wire between intermediate connector B-32 (terminal No. 9) and injector connector B-03 (terminal No. 1) and harness wire between No.3 cylinder injector connector B-03 (terminal No. 2) and intermediate connector B-32 (terminal No. 10) because of open circuit or short circuit to ground or harness damage.

Then go to Step 12.

NO : Replace the No.3 cylinder injector. Then go to Step 12.



STEP 6. Measure the power supply voltage at intermediate connector B-32.

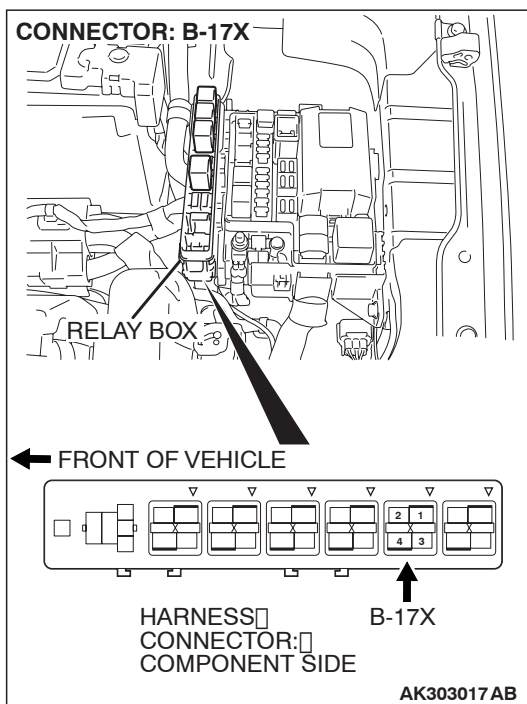
- (1) Disconnect the connector B-32 and measure at the female connector side.
- (2) Turn the ignition switch to the "ON" position.

- (3) Measure the voltage between terminal No. 9 and ground.
 - Voltage should be battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

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

YES : Go to Step 8.

NO : Go to Step 7.



STEP 7. Check harness connector B-17X at MFI relay for damage.

Q: Is the harness connector in good condition?

YES : Repair harness wire between MFI relay connector B-17X (terminal No. 4) and intermediate connector B-32 (terminal No. 9) because of open circuit or short circuit to ground. Then go to Step 12.

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

Q: Is the harness wire in good condition?

NO : Repair it. Then go to Step 12.

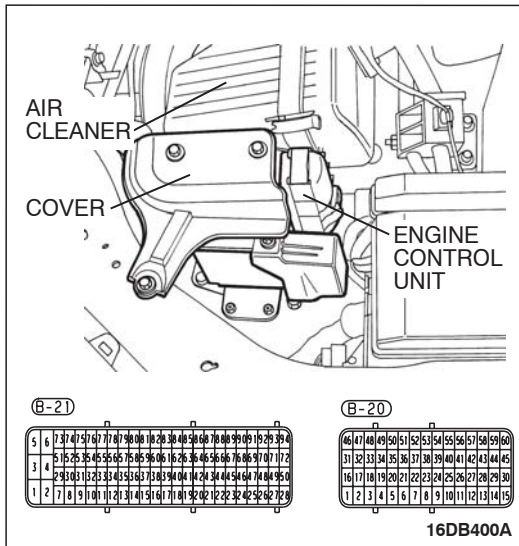


STEP 9. Check harness connector B-20 at ECU for damage.

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 12.

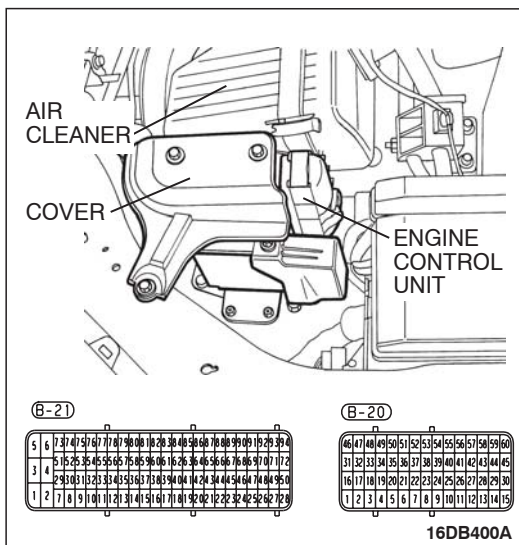
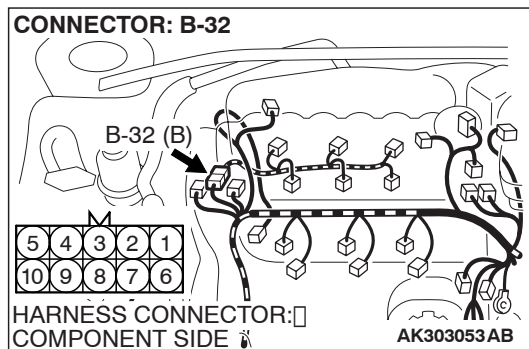


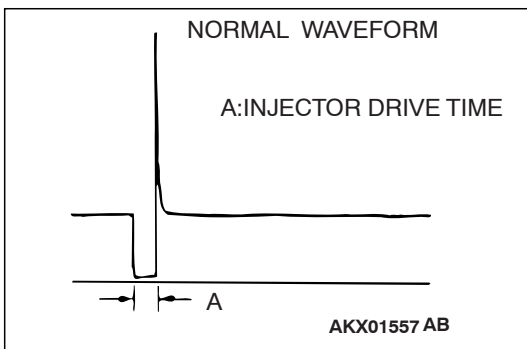
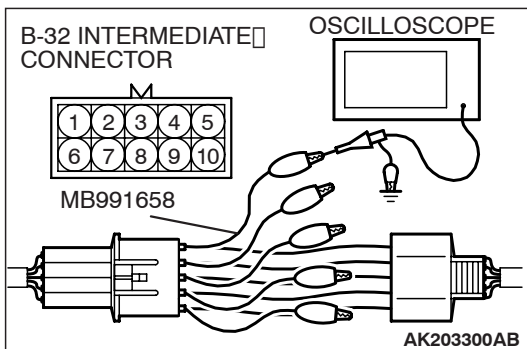
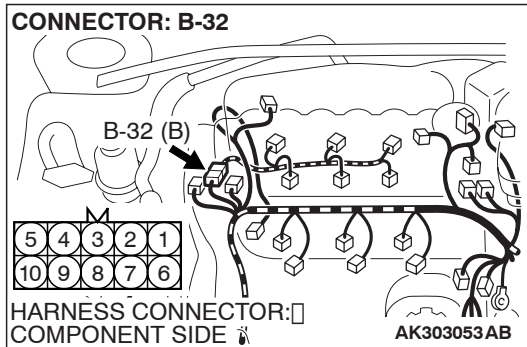
STEP 10. Check for open circuit and short circuit to ground and harness damage between intermediate connector B-32 (terminal No. 10) and ECU connector B-20 (terminal No. 34).

Q: Is the harness wire in good condition?

YES : Go to Step 11.

NO : Repair it. Then go to Step 12.





STEP 11. Using the oscilloscope, check the No. 3 cylinder injector.

- (1) Disconnect the intermediate connector B-32 and connect the test harness MB991658 between the separated connectors.

- (2) Connect the oscilloscope probe to injector intermediate connector terminal No. 10.

NOTE: When measuring with the ECU side connector, disconnect the all ECU connectors and connect check harness special tool (MB992044) between the separated connectors. Then connect an oscilloscope probe to the check harness connector terminal No. 34.

- (3) Start the engine and run at idle.

- (4) Measure the waveform.

- The waveform should show a normal pattern similar to the illustration.

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

Q: Is the waveform normal?

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

NO : Replace the ECU. Then go to Step 12.

STEP 12. Test the EOBd drive cycle.

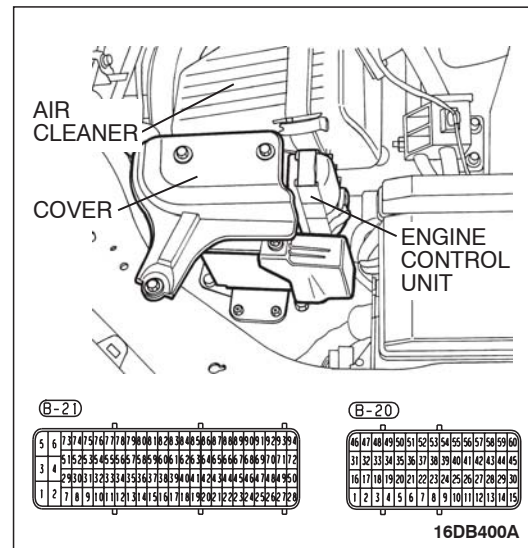
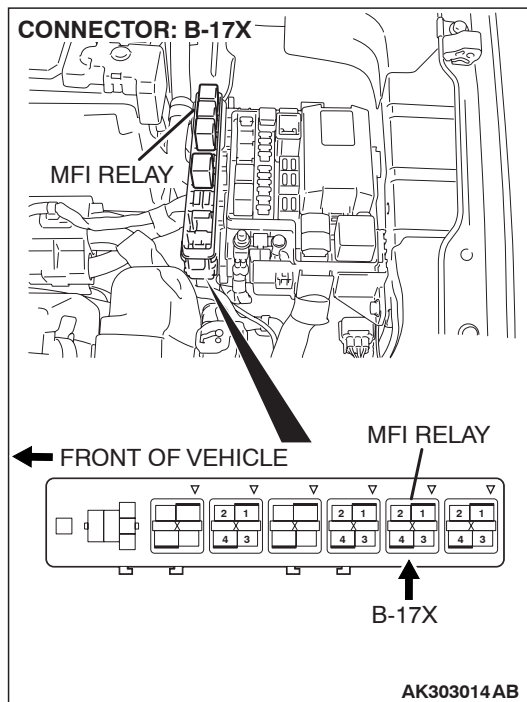
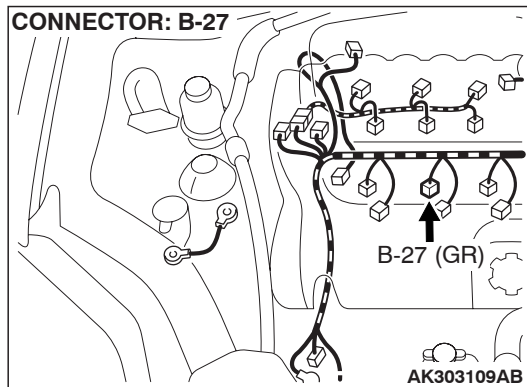
- (1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOBd Drive Cycle – [P.13A-11](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0203 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0204: Injector Circuit Malfunction - Cylinder 4.



CIRCUIT OPERATION

- Refer to DTC P0300 - Random/Multiple Misfire- [P.13A-330](#) and Misfire Cylinder 4- [P.13A-340](#).
- The injector power is supplied from the MPI relay (terminal No. 4).
- The ECU controls the injector by turning the power transistor in the ECU "ON" and "OFF".

TECHNICAL DESCRIPTION

- The amount of fuel injected by the injector is controlled by the amount of continuity time the coil is grounded by the ECU.
- A surge voltage is generated when the injectors are switched on/off.
- The ECU monitors this surge voltage.

DTC SET CONDITIONS <Circuit continuity – open circuit and shorted low>

Check Conditions

- Battery voltage is between 9.04 and 16.01vols.
- Engine speed is above 801 r/min.

Judgment Criteria

- IC internal test (open circuit, short to earth, short to battery).
- MIL on after 2 drive cycles.

- Misfire present.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

- No.4 cylinder injector failed.
- Open or shorted to ground No.4 cylinder injector circuit.
- Shorted to battery, No.4 cylinder injector circuit.
- Harness or connector damage.
- Refer to component locations GROUP-70
- Refer to configuration diagrams GROUP-80
- Refer to circuit diagrams GROUP-90

DIAGNOSIS

Required Special Tools:

- Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991910: Main Harness A
- MB991658: Test Harness Set
- MB992044: Power Plant ECU Check Harness

STEP 1. Using diagnostic tool , check actuator test item 04: No. 4 injector.

CAUTION

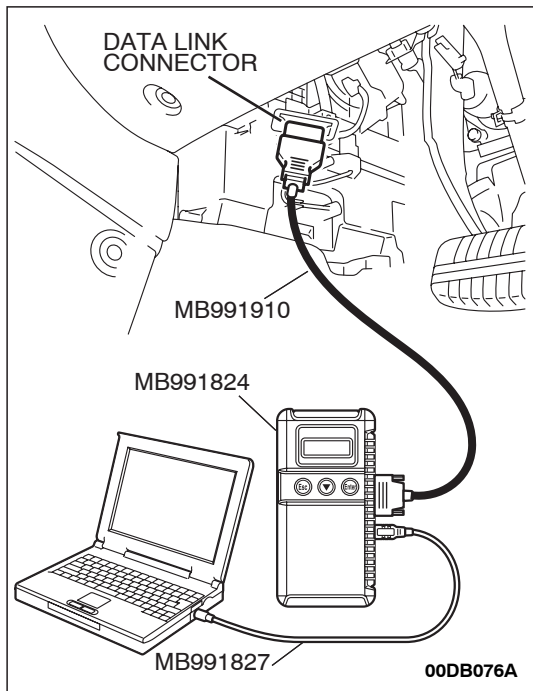
To prevent damage to diagnostic tool , always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool .

- (1) Connect diagnostic tool to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set diagnostic tool to the actuator testing mode for item 04, No. 4 injector.
- (4) Warm up the engine to normal operating temperature: 80°C to 95°C (176°F to 203°F).
 - The idle should become slightly rougher.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Does the idle vary or engine run "rough"?

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.

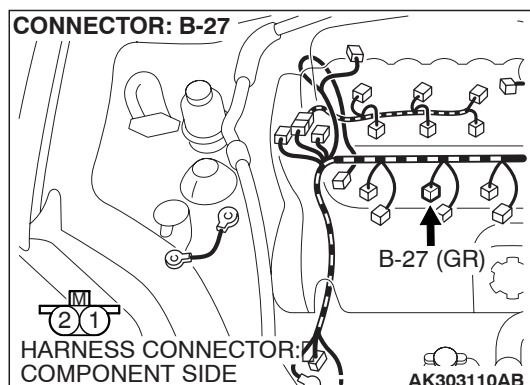


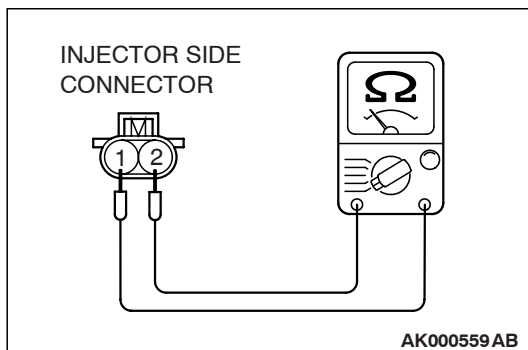
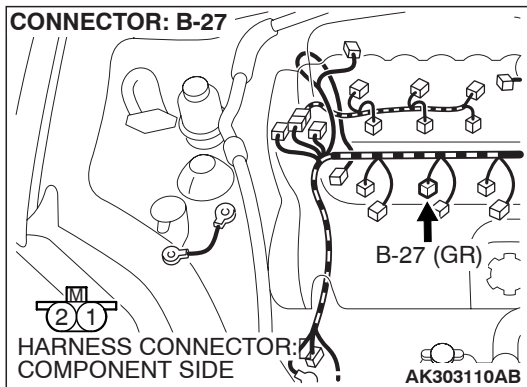
STEP 2. Check the harness connector B-27 at No. 4 cylinder injector for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 3.

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





STEP 3. Check the No. 4 cylinder injector.

(1) Disconnect the No.4 cylinder injector connector B-27.

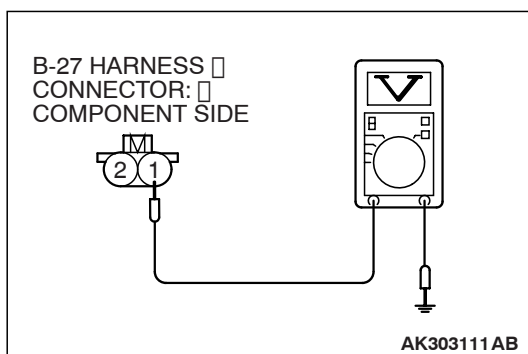
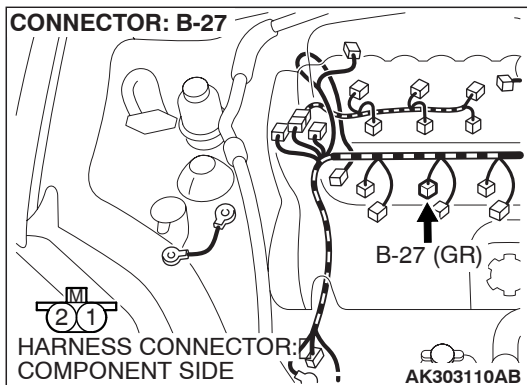
(2) Measure the resistance between injector side connector terminal No. 1 and No. 2.

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 4.

NO : Replace the No. 4 cylinder injector. Then go to Step 10.



STEP 4. Measure the power supply voltage at No. 4 cylinder injector connector B-27.

(1) Disconnect connector B-27 and measure at the harness side.

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

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

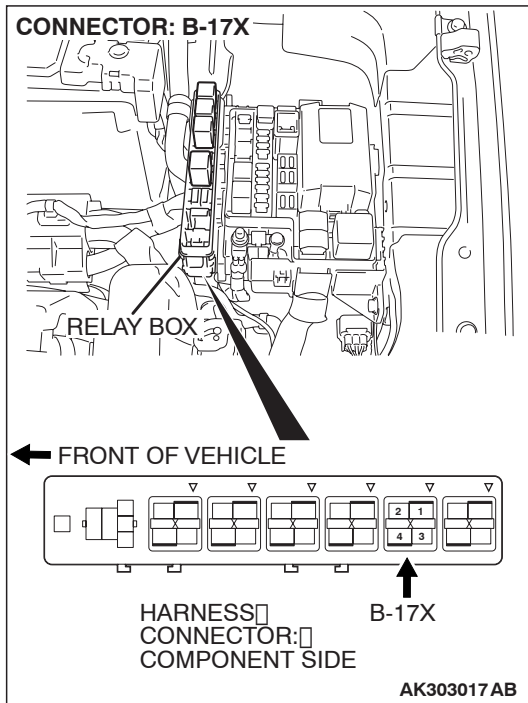
- Voltage should be battery positive voltage.

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

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

YES : Go to Step 6.

NO : Go to Step 5.



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

Q: Is the harness connector in good condition?

YES : Repair harness wire between MFI relay connector B-17X (terminal No. 4) and No. 4 cylinder injector connector B-27 (terminal No. 1) because of open circuit or short circuit to ground.

Then go to Step 10.

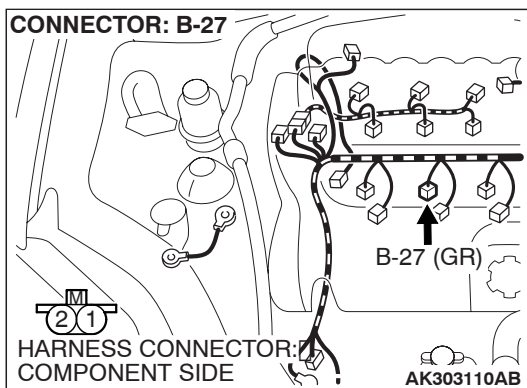
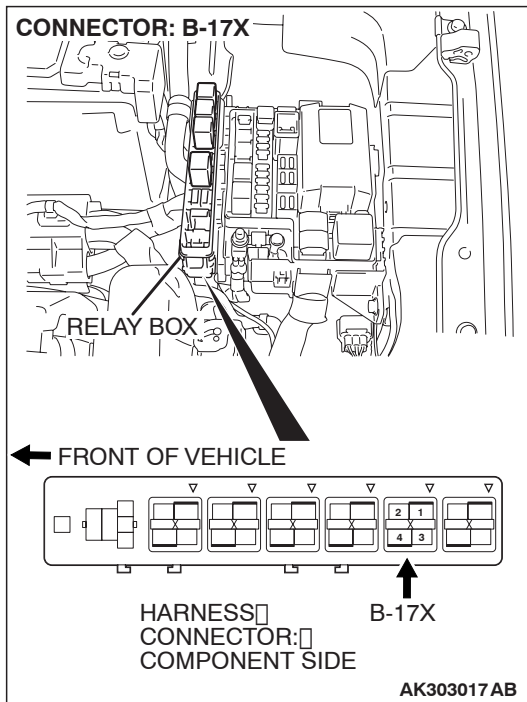
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 10.

STEP 6. Check for harness damage between MFI relay connector B-17X (terminal No. 4) and No. 4 cylinder injector connector B-27 (terminal No. 1).

Q: Is the harness wire in good condition?

YES : Go to Step 7.

NO : Repair it. Then go to Step 10.

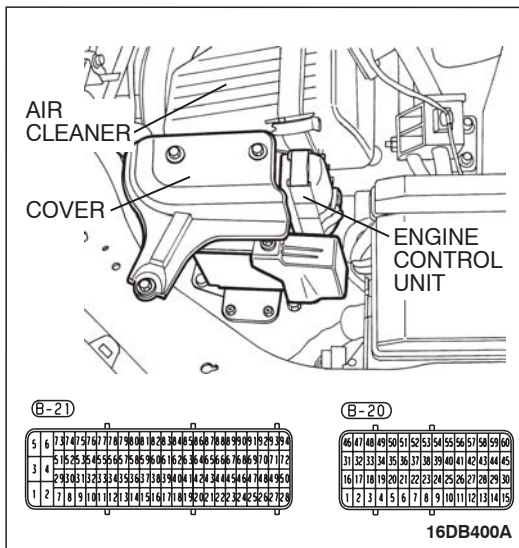


STEP 7. Check harness connector B-20 at ECU for damage.

Q: Is the 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 10.

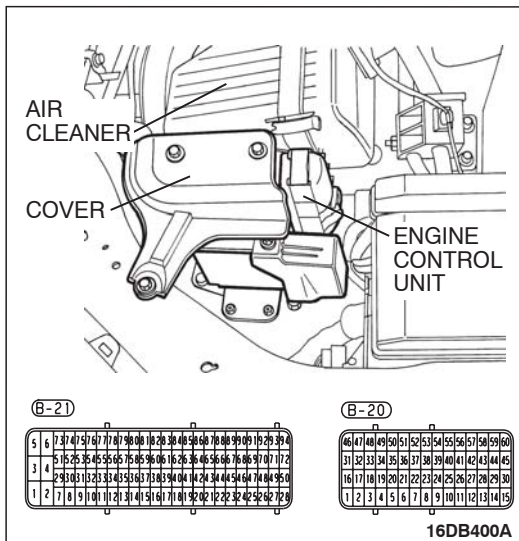
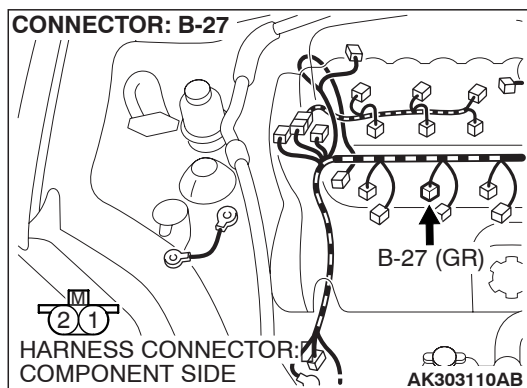


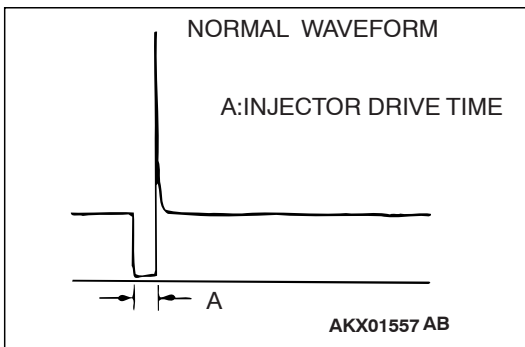
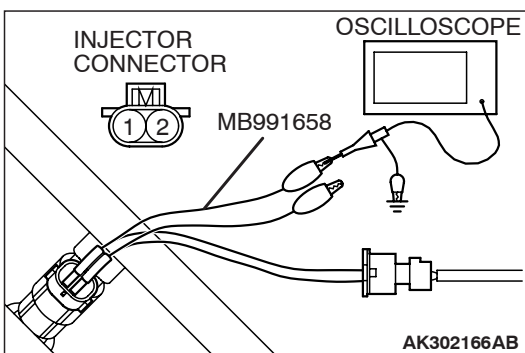
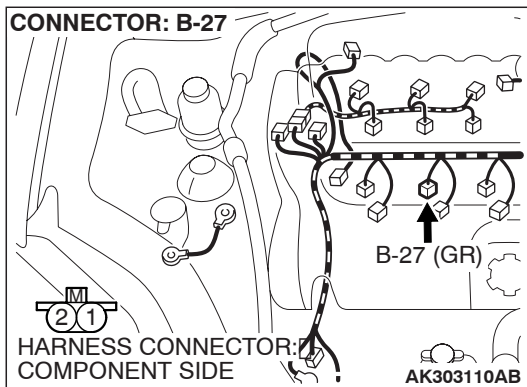
STEP 8. Check for open circuit and short circuit to ground and harness damage between No. 4 cylinder injector connector B-27 (terminal No. 2) and ECU connector B-20 (terminal No. 35).

Q: Is the harness wire in good condition?

YES : Go to Step 9.

NO : Repair it. Then go to Step 10.





STEP 9. Using the oscilloscope, check the No. 4 cylinder injector.

- (1) Disconnect the No. 4 cylinder injector B-27 and connect the test harness special tool (MB991658) between the separated connectors. (All terminals should be connected)

- (2) Connect the oscilloscope probe to the injector side connector terminal No. 2.

NOTE: When measuring with the ECU side connector, disconnect the all ECU connectors and connect check harness special tool (MB992044) between the separated connectors. Then connect an oscilloscope probe to the check harness connector terminal No. 35.

- (3) Start the engine and run at idle.

- (4) Measure the waveform.

- The waveform should show a normal pattern similar to the illustration.

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

Q: Is the waveform normal?

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

NO : Replace the ECU. Then go to Step 10.

STEP 10. Test the EOBd drive cycle.

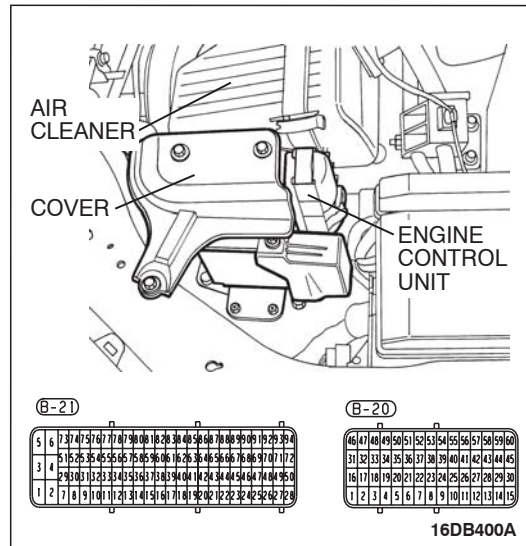
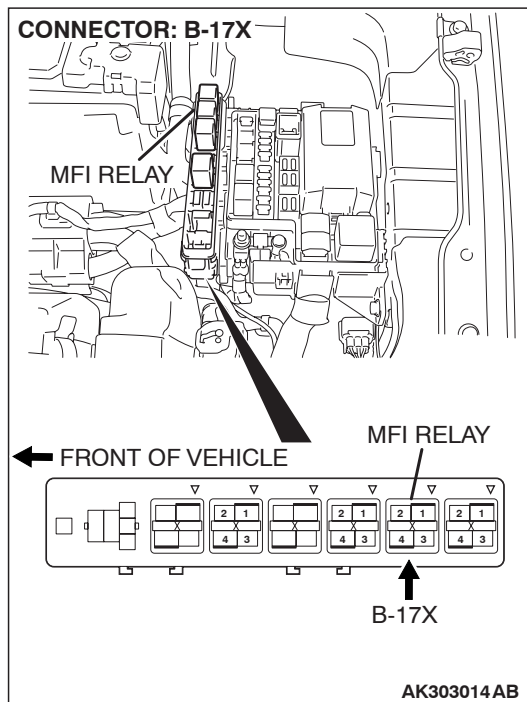
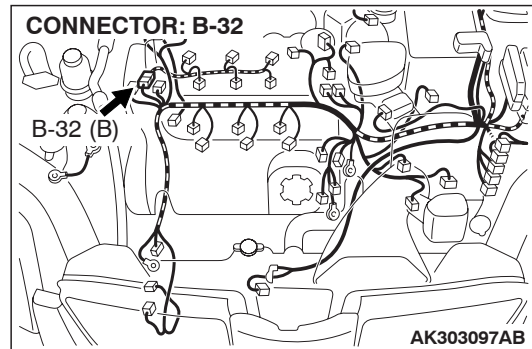
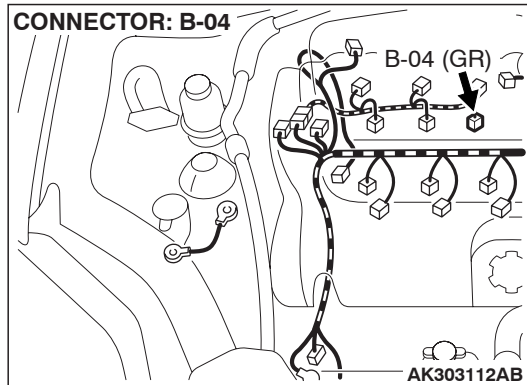
- (1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOBd Drive Cycle – [P.13A-11](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0204 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0205: Injector Circuit Malfunction - Cylinder 5.



CIRCUIT OPERATION

- Refer to DTC P0300 - Random/Multiple Misfire- [P.13A-330](#) and Misfire Cylinder 5- [P.13A-342](#).
- The injector power is supplied from the MPI relay (terminal No. 4).
- The ECU controls the injector by turning the power transistor in the ECU "ON" and "OFF".

TECHNICAL DESCRIPTION

- The amount of fuel injected by the injector is controlled by the amount of continuity time the coil is grounded by the ECU.
- A surge voltage is generated when the injectors are switched on/off.
- The ECU monitors this surge voltage.

DTC SET CONDITIONS <Circuit continuity – open circuit and shorted low>

Check Conditions

- Battery voltage is between 9.04 and 16.01vols.
- Engine speed is above 801 r/min.

Judgment Criteria

- IC internal test (open circuit, short to earth, short to battery).
- MIL on after 2 drive cycles.

- Misfire present.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

- No. 5 cylinder injector failed.
- Open or shorted to ground No.5 cylinder injector circuit.
- Shorted to battery, No.5 cylinder injector circuit.
- Harness or connector damage.
- Refer to component locations GROUP-70
- Refer to configuration diagrams GROUP-80
- Refer to circuit diagrams GROUP-90

DIAGNOSIS

Required Special Tools:

- Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991910: Main Harness A
- MB991658: Test Harness
- MB992044: Power Plant ECU Check Harness

STEP 1. Using diagnostic tool , check actuator test item 05: No. 5 injector.

CAUTION

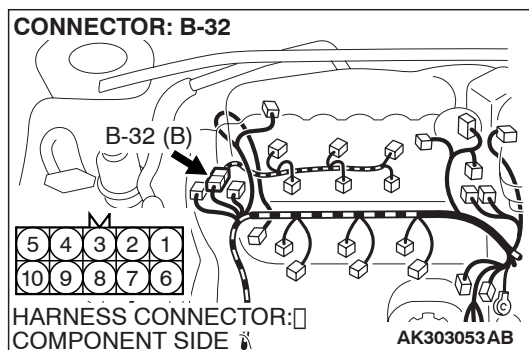
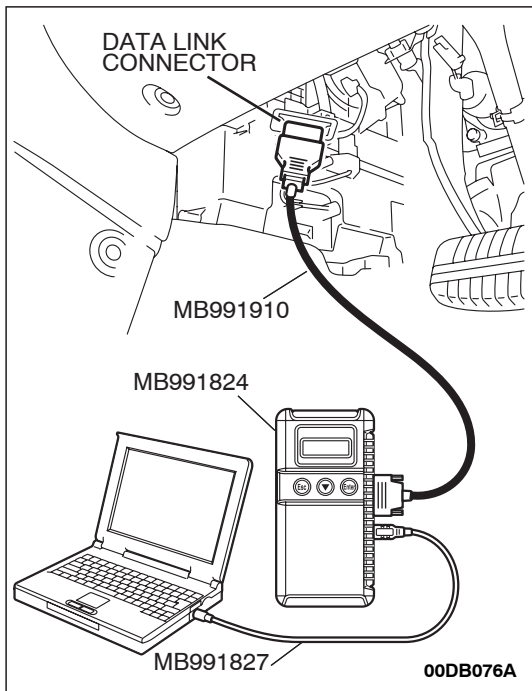
To prevent damage to diagnostic tool , always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool .

- (1) Connect diagnostic tool to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set diagnostic tool to the actuator testing mode for item 05 No. 5 cylinder injectors.
- (4) Warm up the engine to normal operating temperature: 80°C to 95°C (176°F to 203°F).
 - The idle should become slightly rougher.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Does the idle vary or engine run "rough"?

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

NO : Go to Step 2.

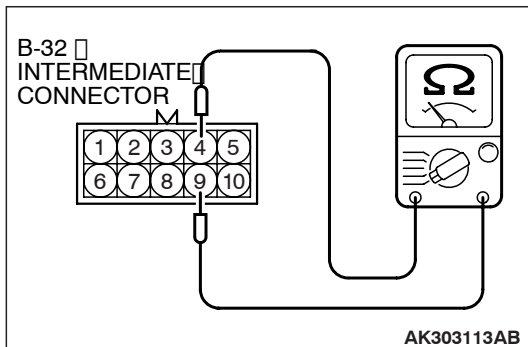
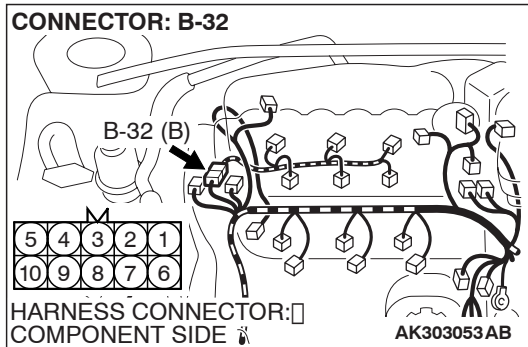


STEP 2. Check harness connector B-32 at intermediate connector for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 3.

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



STEP 3. Check the No. 5 cylinder injector resistance at intermediate connector B-32.

(1) Disconnect the intermediate connector B-32.

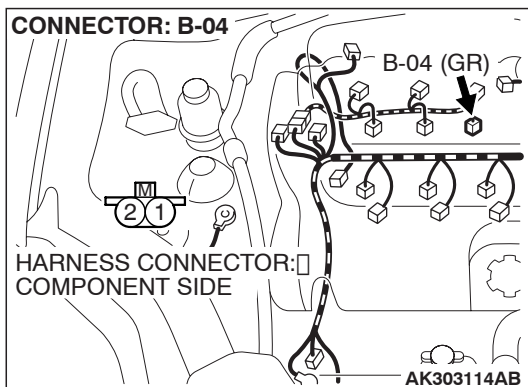
(2) Measure the resistance between terminal No. 4 and No. 9.

- Resistance should be between 10.5 and 13.5 ohms.

Q: Is the measured resistance between 10.5 and 13.5 ohms?

YES : Go to Step 6.

NO : Go to Step 4.



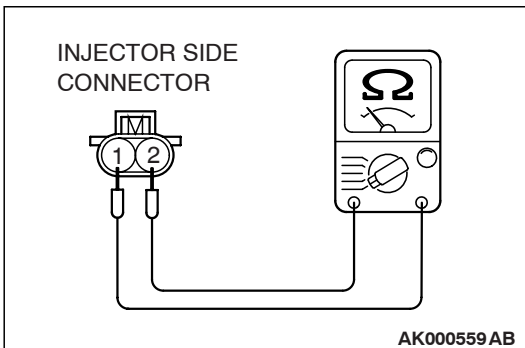
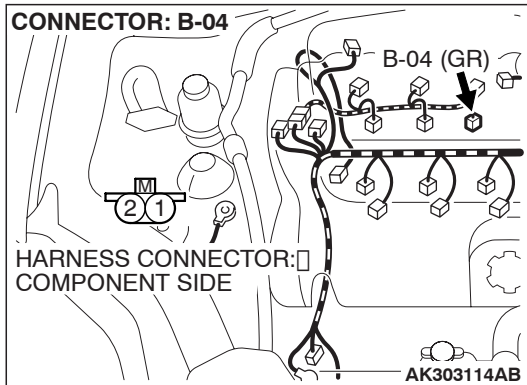
STEP 4. Check the harness connector B-04 at No. 5 cylinder injector for damage.

Remove the intake manifold.

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 12.



STEP 5. Check the No.5 cylinder injector.

(1) Disconnect the No. 5 cylinder injector connector B-04.

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

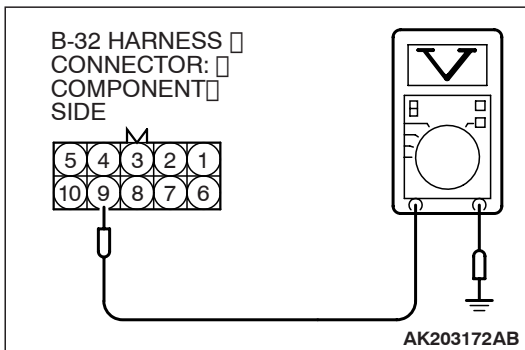
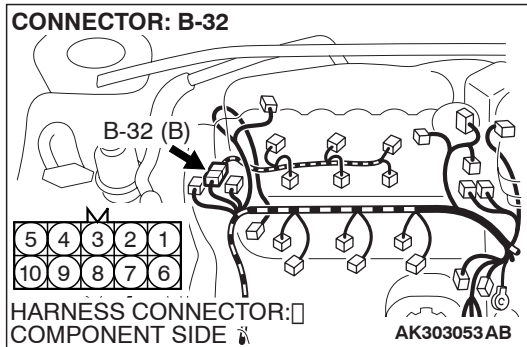
Standard value: 10.5 – 13.5 ohms [at 20°C (68°F)]

Q: Is the measured resistance between 10.5 and 13.5 ohms [at 20°C (68°F)]?

YES : Repair harness wire between intermediate connector B-32 (terminal No. 9) and injector connector B-04 (terminal No. 1) and harness wire between No. 5 cylinder injector connector B-04 (terminal No. 2) and intermediate connector B-32 (terminal No. 4) because of open circuit or short circuit to ground or harness damage.

Then go to Step 12.

NO : Replace the No. 5 cylinder injector. Then go to Step 12.



STEP 6. Measure the power supply voltage at intermediate connector B-32.

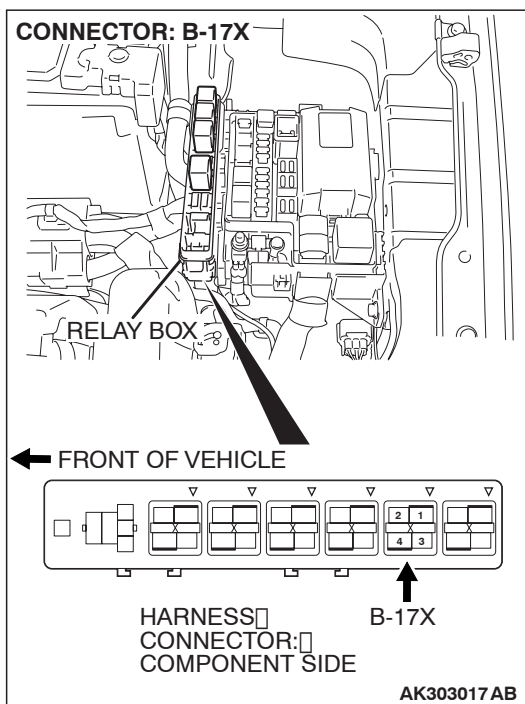
- (1) Disconnect the connector B-32 and measure at the female connector side.
- (2) Turn the ignition switch to the "ON" position.

- (3) Measure the voltage between terminal No. 9 and ground.
 - Voltage should be battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

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

YES : Go to Step 8.

NO : Go to Step 7.



STEP 7. Check harness connector B-17X at MFI relay for damage.

Q: Is the harness connector in good condition?

YES : Repair harness wire between MFI relay connector B-17X (terminal No. 4) and intermediate connector B-32 (terminal No. 9) because of open circuit or short circuit to ground. Then go to Step 12.

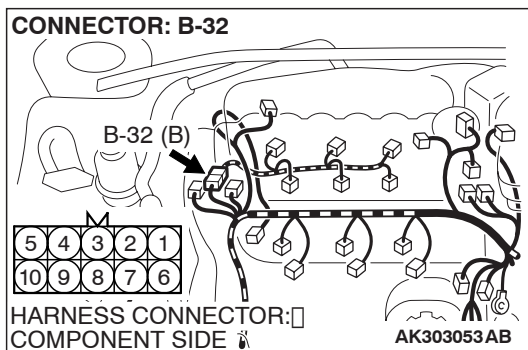
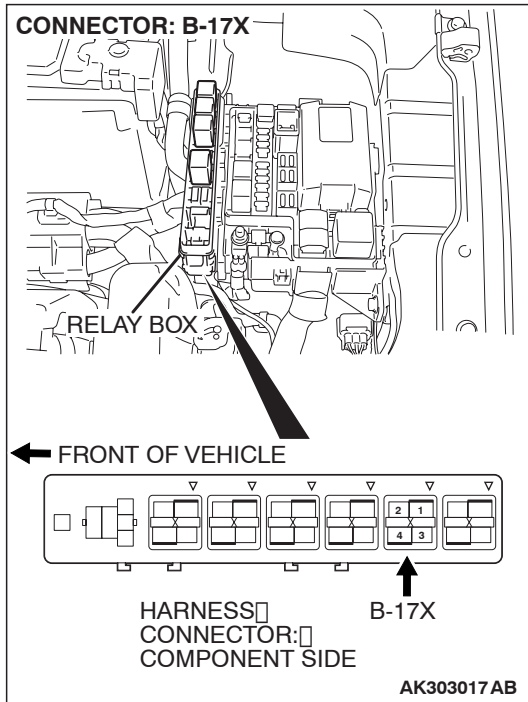
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 12.

STEP 8. Check for harness damage between MFI relay connector B-17X (terminal No. 4) and intermediate connector B-32 (terminal No. 9).

Q: Is the harness wire in good condition?

YES : Go to Step 9.

NO : Repair it. Then go to Step 12.

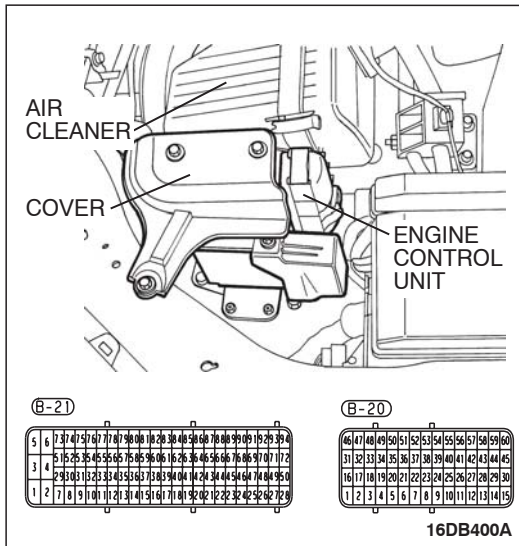


STEP 9. Check harness connector B-20 at ECU for damage.

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 12.

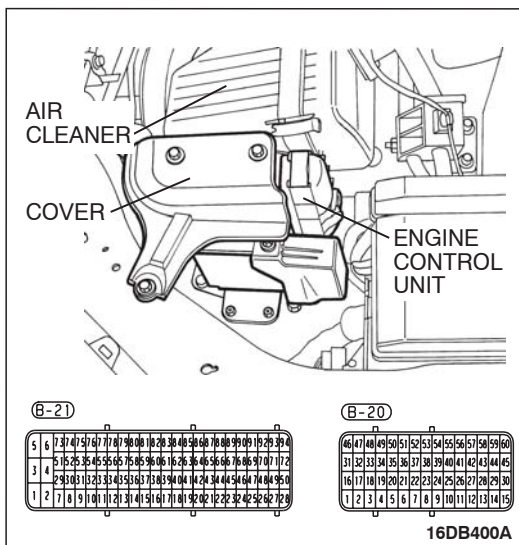
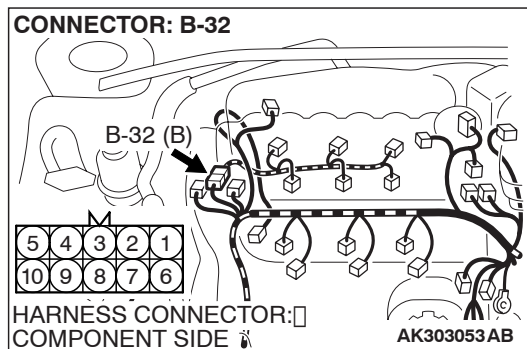


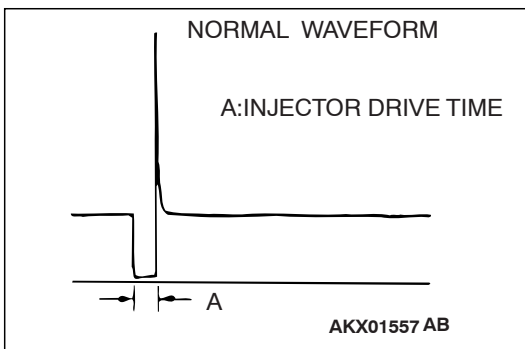
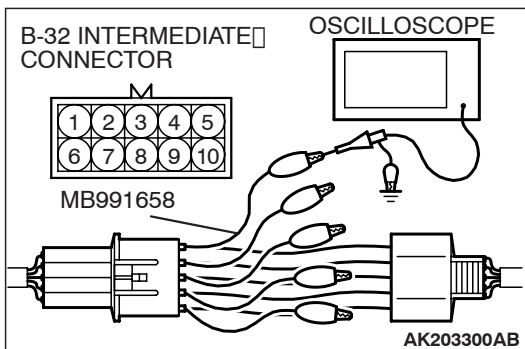
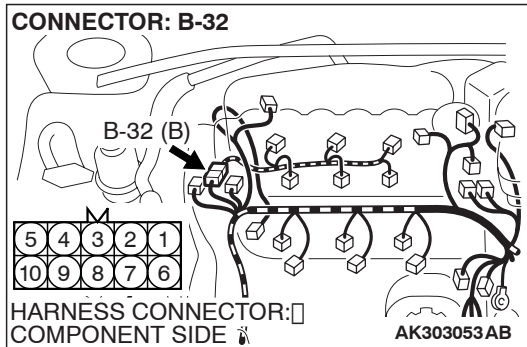
STEP 10. Check for open circuit and short circuit to ground and harness damage between intermediate connector B-32 (terminal No. 4) and ECU connector B-20 (terminal No. 16).

Q: Is the harness wire in good condition?

YES : Go to Step 11.

NO : Repair it. Then go to Step 12.





STEP 11. Using the oscilloscope, check the No. 5 cylinder injector.

- (1) Disconnect the intermediate connector B-32 and connect the test harness MB991658 between the separated connectors.

- (2) Connect the oscilloscope probe to injector intermediate connector terminal No. 4.

NOTE: When measuring with the ECU side connector, disconnect the all ECU connectors and connect check harness special tool (MB992044) between the separated connectors. Then connect an oscilloscope probe to the check harness connector terminal No. 16.

- (3) Start the engine and run at idle.

- (4) Measure the waveform.

- The waveform should show a normal pattern similar to the illustration.

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

Q: Is the waveform normal?

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

NO : Replace the ECU. Then go to Step 12.

STEP 12. Test the EOB Drive cycle.

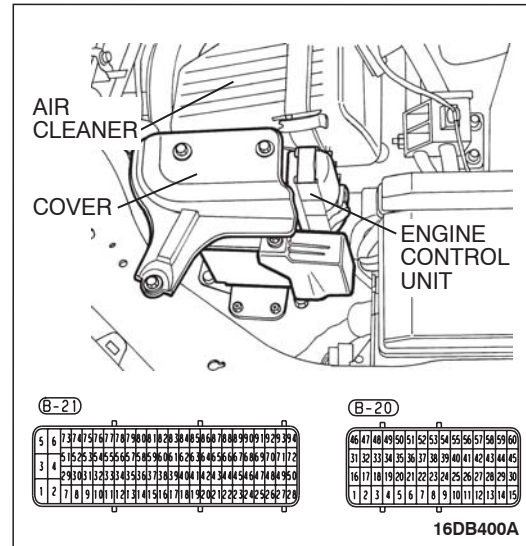
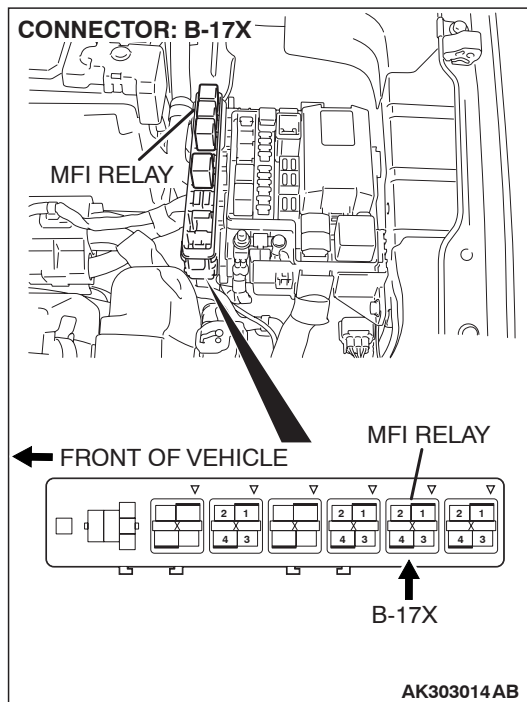
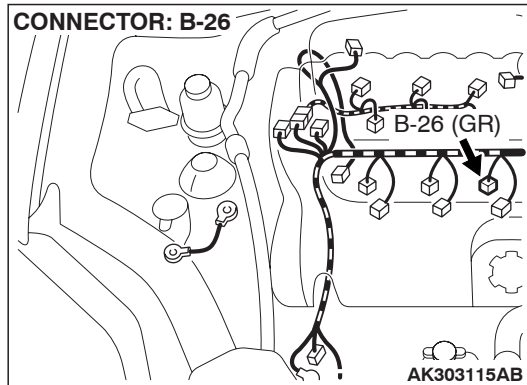
- (1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOB Drive Cycle – [P.13A-11](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0205 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0206: Injector Circuit Malfunction - Cylinder 6.



CIRCUIT OPERATION

- Refer to DTC P0300 - Random/Multiple Misfire- [P.13A-330](#) and Misfire Cylinder 6- [P.13A-344](#).
- The injector power is supplied from the MPI relay (terminal No. 4).
- The ECU controls the injector by turning the power transistor in the ECU "ON" and "OFF".

TECHNICAL DESCRIPTION

- The amount of fuel injected by the injector is controlled by the amount of continuity time the coil is grounded by the ECU.
- A surge voltage is generated when the injectors are switched on/off.
- The ECU monitors this surge voltage.

DTC SET CONDITIONS <Circuit continuity – open circuit and shorted low>

Check Conditions

- Battery voltage is between 9.04 and 16.01vols.
- Engine speed is above 801 r/min.

Judgment Criteria

- IC internal test (open circuit, short to earth, short to battery).
- MIL on after 2 drive cycles.

- Misfire present.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

- No. 6 cylinder injector failed.
- Open or shorted to ground No.6 cylinder injector circuit.
- Shorted to battery, No.6 cylinder injector circuit.
- Harness or connector damage.
- Refer to component locations GROUP-70
- Refer to configuration diagrams GROUP-80
- Refer to circuit diagrams GROUP-90

DIAGNOSIS

Required Special Tools:

- Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991910: Main Harness A
- MB991658: Test Harness
- MB992044: Power Plant ECU Check Harness

STEP 1. Using diagnostic tool , check actuator test item 02, 04, 06: No. 6 injector.

⚠ CAUTION

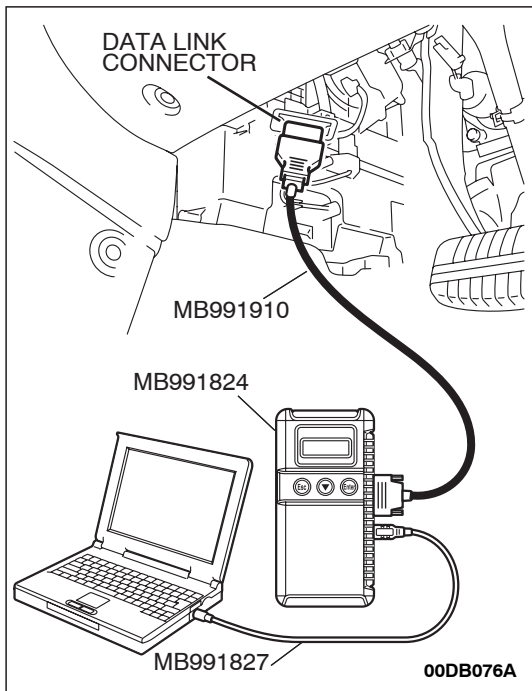
To prevent damage to diagnostic tool , always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool .

- (1) Connect diagnostic tool to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set diagnostic tool to the actuator testing mode for item 06, No. 6 Injector.
- (4) Warm up the engine to normal operating temperature: 80°C to 95°C (176°F to 203°F).
 - The idle should become slightly rougher.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Does the idle vary or engine run "rough"?

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.

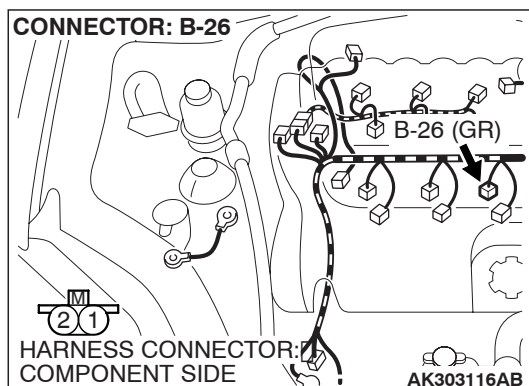


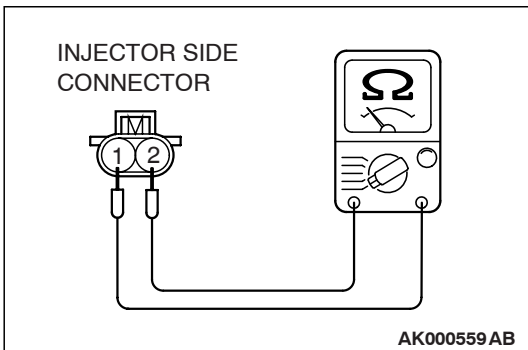
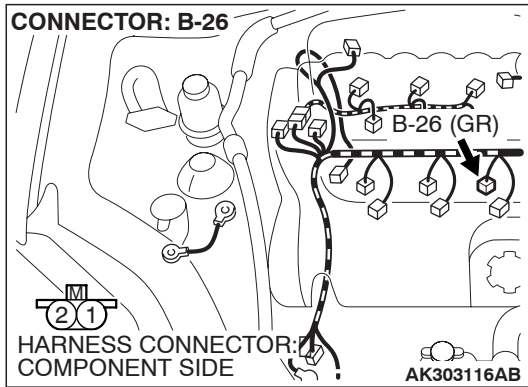
STEP 2. Check the harness connector B-26 at No. 6 cylinder injector for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 3.

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





STEP 3. Check the No. 6 cylinder injector.

(1) Disconnect the No.6 cylinder injector connector B-26.

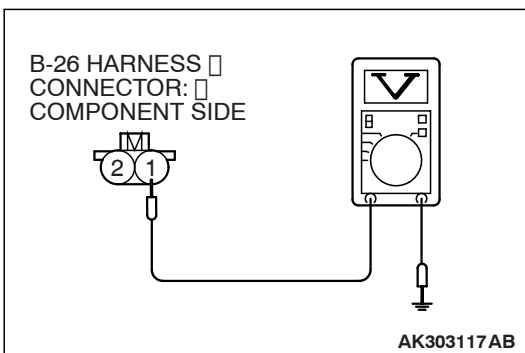
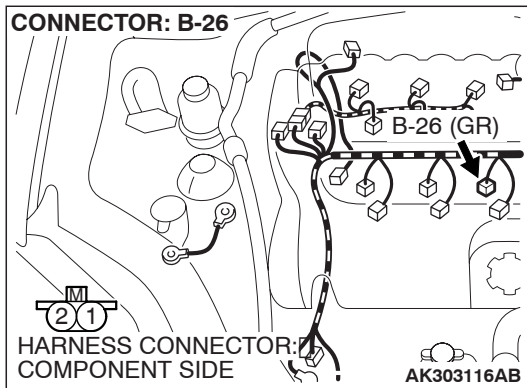
(2) Measure the resistance between injector side connector terminal No. 1 and No. 2.

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 4.

NO : Replace the No. 6 cylinder injector. Then go to Step 10.



STEP 4. Measure the power supply voltage at No. 6 cylinder injector connector B-26.

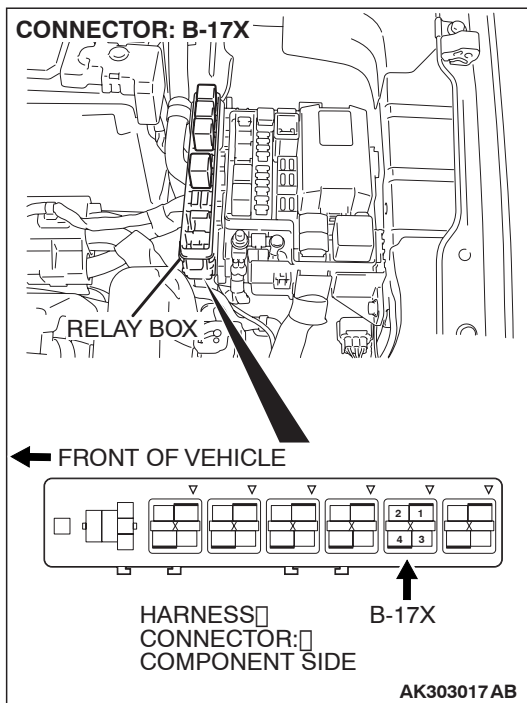
- (1) Disconnect connector B-26 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

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

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

YES : Go to Step 6.

NO : Go to Step 5.



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

Q: Is the harness connector in good condition?

YES : Repair harness wire between MFI relay connector B-17X (terminal No. 4) and injector connector B-26 (terminal No. 1) because of open circuit or short circuit to ground.

Then go to Step 10.

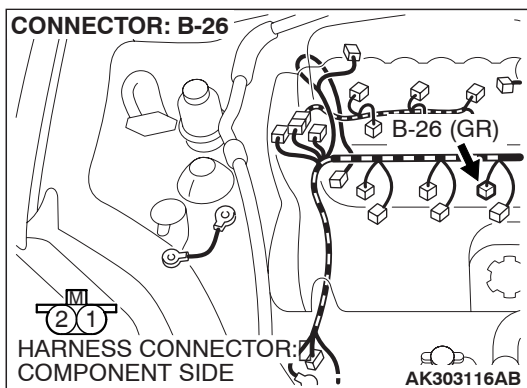
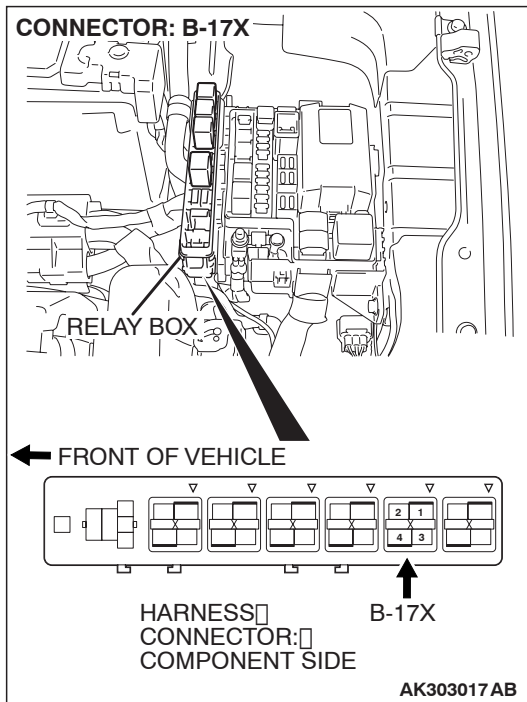
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 10.

STEP 6. Check for harness damage between MFI relay connector B-17X and No. 6 cylinder injector connector B-26 (terminal No. 1).

Q: Is the harness wire in good condition?

YES : Go to Step 7.

NO : Repair it. Then go to Step 10.

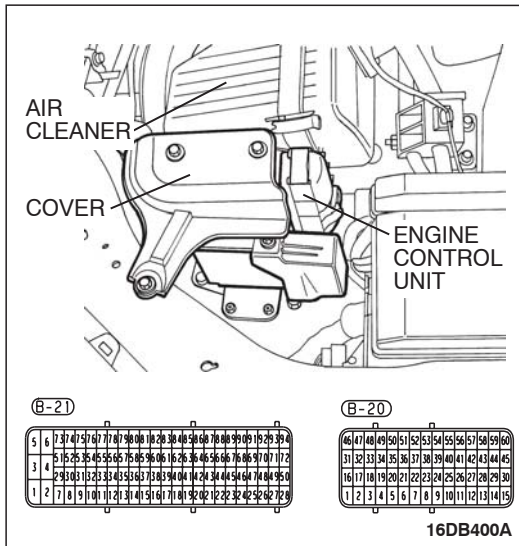


STEP 7. Check harness connector B-20 at ECU for damage.

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 10.

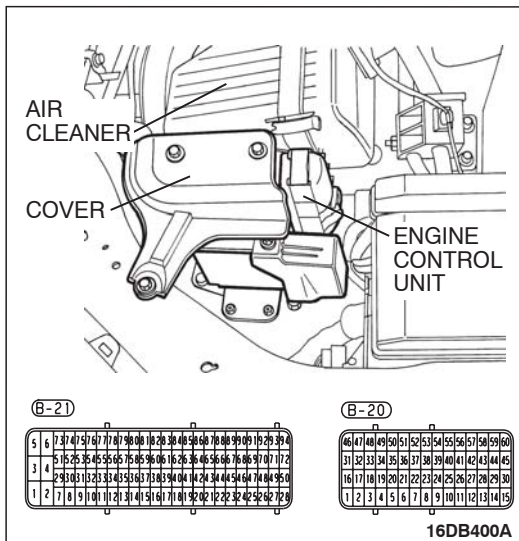
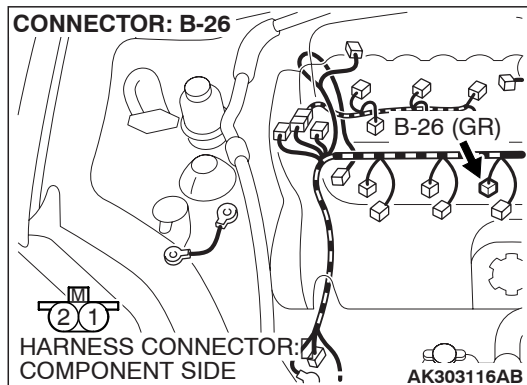


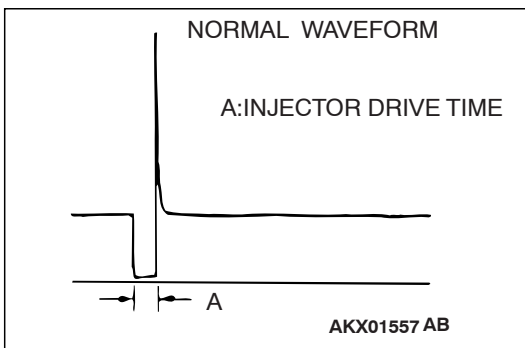
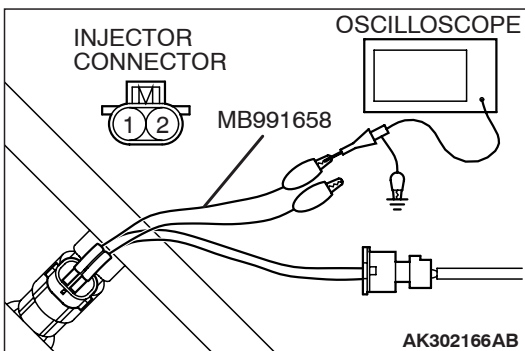
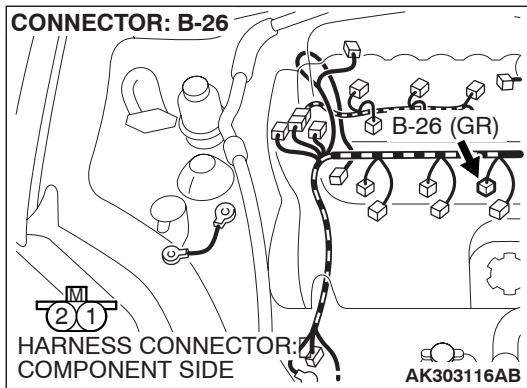
STEP 8. Check for open circuit and short circuit to ground and harness damage between No. 6 cylinder injector connector B-26 (terminal No. 2) and ECU connector B-20 (terminal No. 17).

Q: Is the harness wire in good condition?

YES : Go to Step 9.

NO : Repair it. Then go to Step 10.





STEP 9. Using the oscilloscope, check the No. 6 cylinder injector.

- (1) Disconnect the No. 6 cylinder injector connector B-26 and connect the test harness special tool (MB991658) between the separated connectors. (All terminals should be connected)

- (2) Connect the oscilloscope probe to the injector side connector terminal No. 2.

NOTE: When measuring with the ECU side connector, disconnect the all ECU connectors and connect check harness special tool (MB992044) between the separated connectors. Then connect an oscilloscope probe to the check harness connector terminal No. 17.

- (3) Start the engine and run at idle.

- (4) Measure the waveform.

- The waveform should show a normal pattern similar to the illustration.

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

Q: Is the waveform normal?

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

NO : Replace the ECU. Then go to Step 10.

STEP 10. Test the EOB drive cycle.

- (1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOB Drive Cycle – [P.13A-11](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0206 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0219: Engine Overspeed Condition

TECHNICAL DESCRIPTION

- The actual engine speed has exceeded the pre-set threshold value.

Check Conditions

- None.

Judgment Criteria

- Engine speed is greater than 6,600 r/min.
- No MIL.
- No Limp home.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle –
[P.13A-11](#).

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

- Refer to component locations GROUP-70
- Refer to configuration diagrams GROUP-80
- Refer to circuit diagrams GROUP-90
- Excessive engine speed.

DIAGNOSIS

Required Special Tools

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

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

⚠ CAUTION

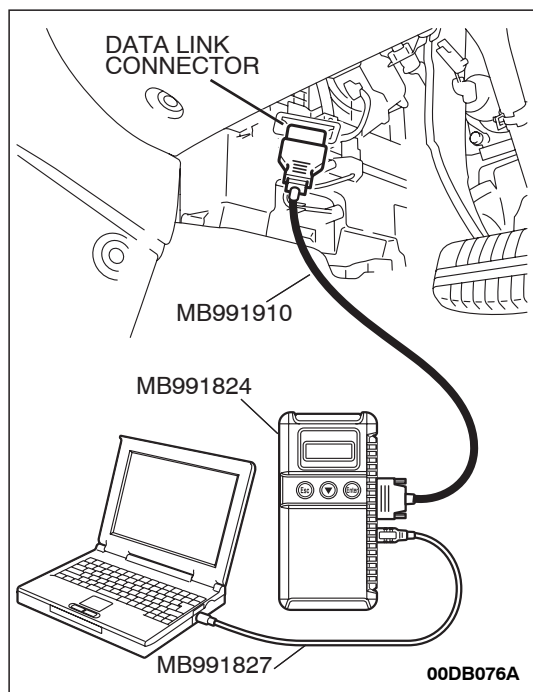
To prevent damage to diagnostic tool , always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool .

- (1) Connect diagnostic tool 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 a diagnostic trouble code other than P0219 set?

YES : Refer to Diagnostic Trouble Code Chart [P.13A-17](#).

NO : Go to Step 2.



STEP 2. Test the EOBD drive cycle.

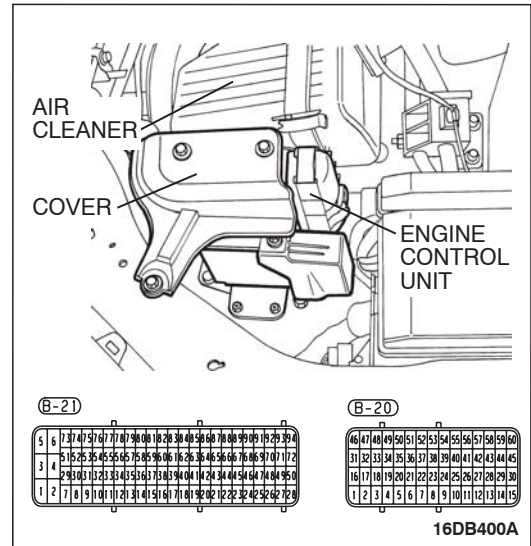
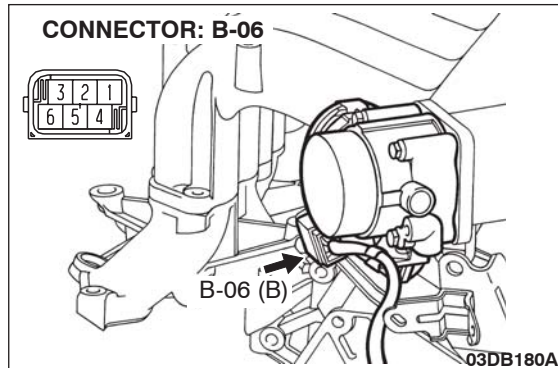
- (1) Carry out a test drive with the drive cycle pattern. Refer to –
[P.13A-11](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0219 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0222: Throttle Position Sensor (Sub) Circuit Low Input.



CIRCUIT OPERATION

- A 5-volt power supply is applied on the throttle position sensor (sub) power terminal (terminal No. 3) from the ECU (terminal No. 10). The throttle position sensor (sub) outputs a voltage from (terminal No. 5) to the ENGINE-ECU (terminal No. 57). The ground terminal (terminal No. 2) is grounded with ECU (terminal No. 27).

TECHNICAL DESCRIPTION

- The throttle position sensor (sub) outputs voltage which corresponds to the throttle valve opening angle.
- The ECU checks whether the voltage is within a specified range.

DTC SET CONDITIONS

Check Conditions

- Ignition switch is "ON" position.
- TPS is normal.

Judgement Criteria

- MIL is activated immediately.
- Vehicle in Limp home - Engine speed limited to 1500rpm.

EOBD DRIVE CYCLE PATTERN

None.

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

- Throttle position sensor failed.
- Open or short circuit to ground in throttle position sensor (sub) circuit. .
- Harness or connector damage.
- Refer to component locations GROUP-70
- Refer to configuration diagrams GROUP-80
- Refer to circuit diagrams GROUP-90

DIAGNOSIS

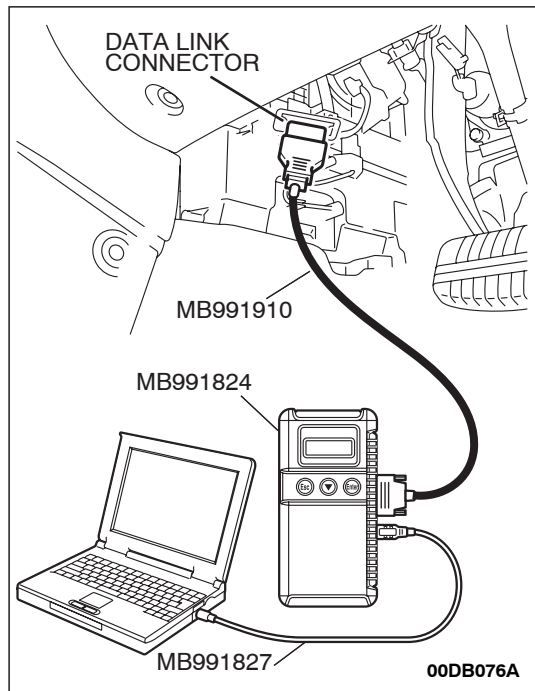
Required Special Tools:

- Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991910: Main Harness A
- MB992044: Power Plant ECU Check Harness

⚠ WARNING

If the air intake duct is removed from the throttle body take great care to keep fingers away from the throttle plate. The drive motor has very high torque and is capable of random movement at any time. Do not under any circumstances activate the throttle plate by hand. When removing the throttle body from the intake manifold disconnect the wiring first. During replacement connect the wiring last.

Do not activate the throttle body using a DC supply to test the motor, as permanent damage to the throttle body will result.



STEP 1. Using diagnostic tool , check data list item 15: Throttle Position Sensor (sub).

⚠ CAUTION

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

- (1) Connect diagnostic tool to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set diagnostic tool to the data reading mode for item 15, Throttle Position Sensor (sub).
- (4) Apply the accelerator pedal as required to check the following:
 - Output voltage should be between 1035 and 1250 mV when the throttle valve is fully close.
 - Output voltage should be approximately 4000 and 4824 mV when the throttle valve is fully open.
- (5) 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](#).

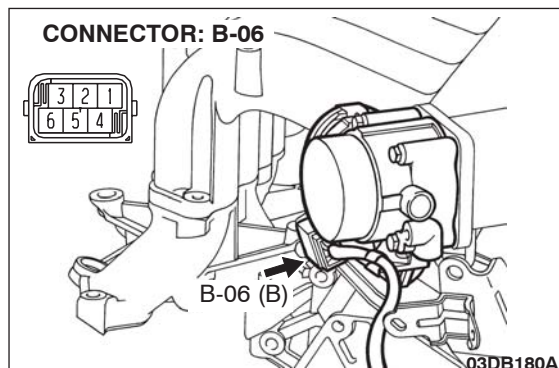
NO : Go to Step 2.

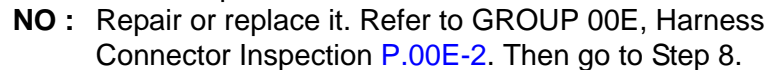
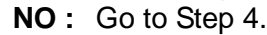
STEP 2. Check harness connector B-06 at throttle position sensor for damage.

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.



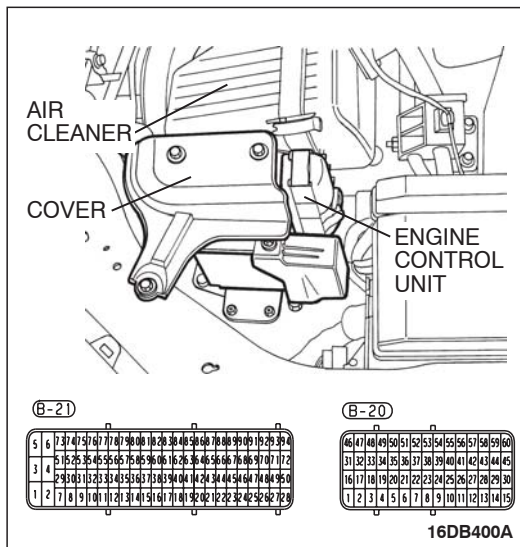
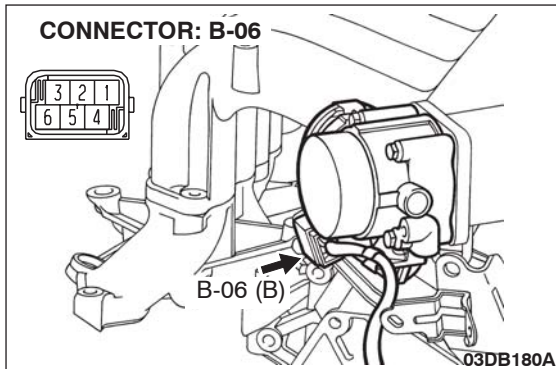


STEP 5. Check for open circuit and short circuit to ground between throttle position sensor connector B-06 (terminal No. 3) and ECU connector B-20 (terminal No. 10).

Q: Is the harness wire in good condition?

YES : Go to Step 6.

NO : Repair it. Then go to Step 8.

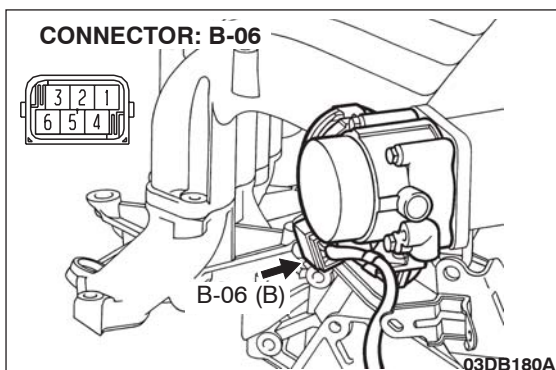
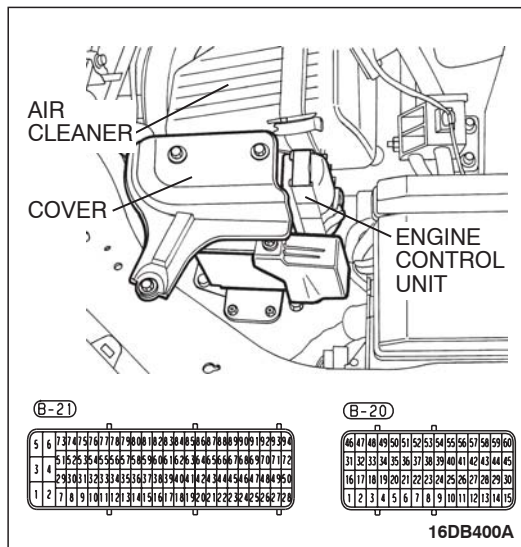
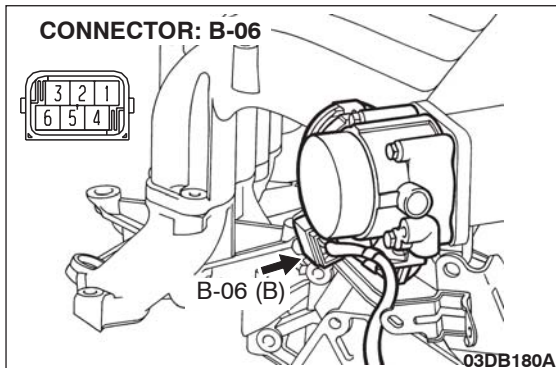


STEP 6. Check for open circuit, short circuit to ground and harness damage between throttle position sensor connector B-06 (terminal No. 6) and ECU connector B-20 (terminal No. 42).

Q: Is the harness wire in good condition?

YES : Go to Step 7.

NO : Repair it. Then go to Step 8.



STEP 7. 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 P0222 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

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

⚠ CAUTION

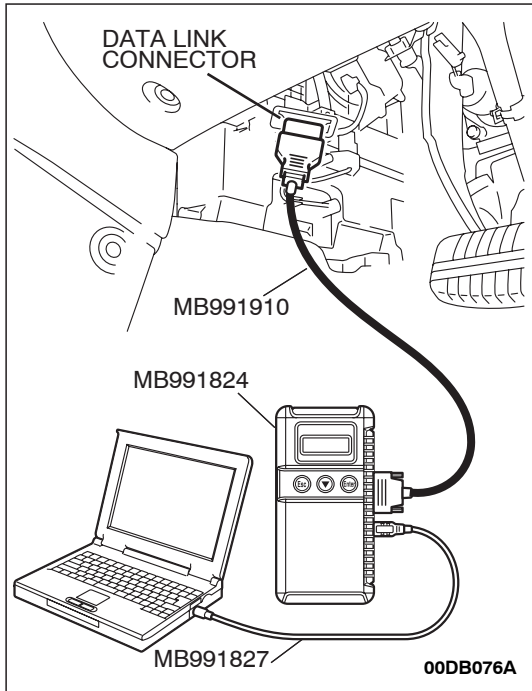
To prevent damage to diagnostic tool , always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting diagnostic tool .

- (1) Connect diagnostic tool 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.

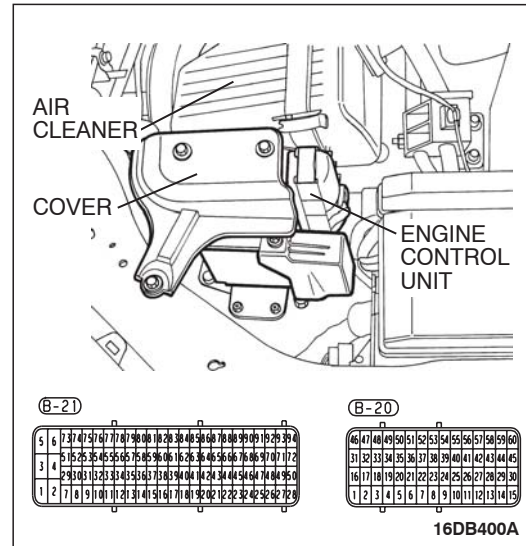
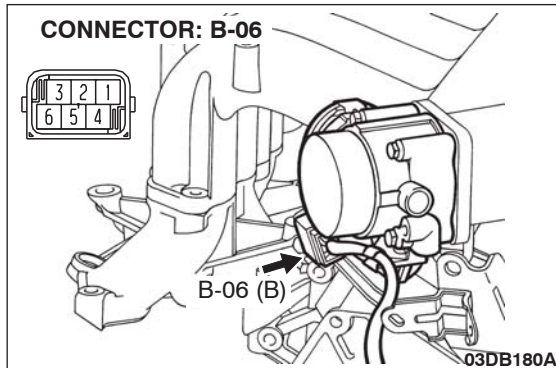
Q: Is DTC P0222 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.



DTC P0223: Throttle Position Sensor (Sub) Circuit High Input.



CIRCUIT OPERATION

- A 5-volt power supply is applied on the throttle position sensor (sub) power terminal (terminal No. 3) from the ENGINE-ECU(terminal No. 10). The throttle position sensor (sub) outputs a voltage from (terminal No. 5) to the ENGINE-ECU(terminal No. 57). The ground terminal (terminal No. 2) is grounded with ECU (terminal No. 27).

TECHNICAL DESCRIPTION

- The throttle position sensor (sub) outputs voltage which corresponds to the throttle valve opening angle.
- The ECU checks whether the voltage is within a specified range.

DTC SET CONDITIONS

Check Conditions

- Ignition switch is "ON" position.
- TPS is normal.

Judgement Criteria

- MIL is activated immediately.
- Vehicle in Limp home - Engine speed limited to 1500rpm.

EOBD DRIVE CYCLE PATTERN

None.

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

- Throttle position sensor failed.
- Short circuit to 5 Volts in throttle position sensor (sub) circuit.
- Harness or connector damage
- Refer to component locations [GROUP-70](#)
- Refer to configuration diagrams [GROUP-80](#)
- Refer to circuit diagrams [GROUP-90](#)

DIAGNOSIS

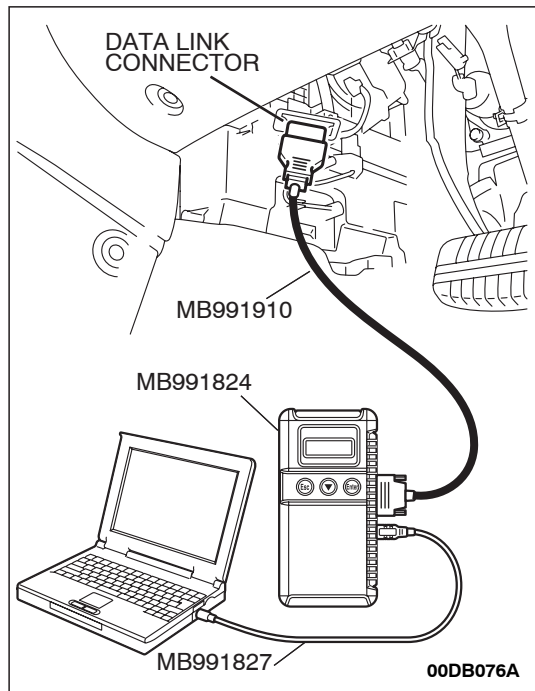
Required Special Tools:

- Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991910: Main Harness A
- MB992044: Power Plant ECU Check Harness

⚠ WARNING

If the air intake duct is removed from the throttle body take great care to keep fingers away from the throttle plate. The drive motor has very high torque and is capable of random movement at any time. Do not under any circumstances activate the throttle plate by hand. When removing the throttle body from the intake manifold disconnect the wiring first. During replacement connect the wiring last.

Do not activate the throttle body using a DC supply to test the motor, as permanent damage to the throttle body will result.



STEP 1. Using diagnostic tool , check data list item 15: Throttle Position Sensor (sub).

⚠ CAUTION

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

- (1) Connect diagnostic tool to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set diagnostic tool to the data reading mode for item 15, Throttle Position Sensor (sub).
- (4) Apply the accelerator pedal as required to check the following:
 - Output voltage should be between 1035 and 1250 mV when the throttle valve is fully close.
 - Output voltage should be approximately 4000 and 4824 mV when the throttle valve is fully open.
- (5) 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](#).

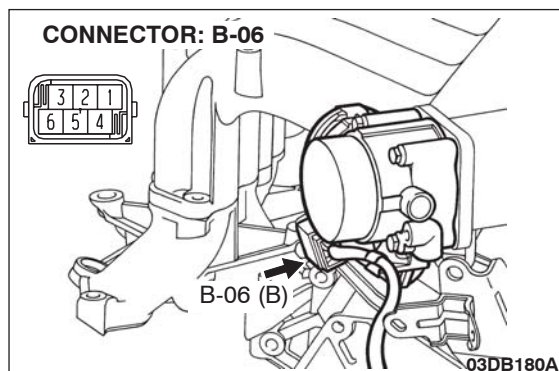
NO : Go to Step 2.

STEP 2. Check harness connector B-06 at throttle position sensor for damage.

Q: Is the harness connector in good condition?

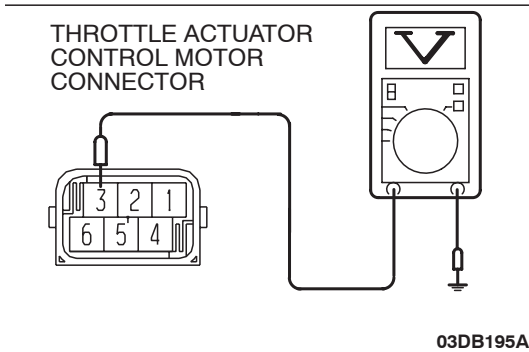
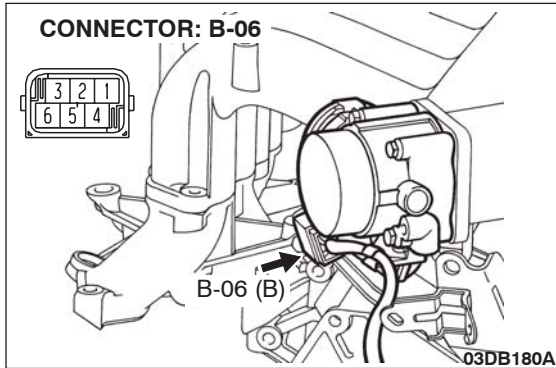
YES : Go to Step 3.

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 throttle position sensor harness side connector B-06.

(1) Disconnect the connector B-06 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.

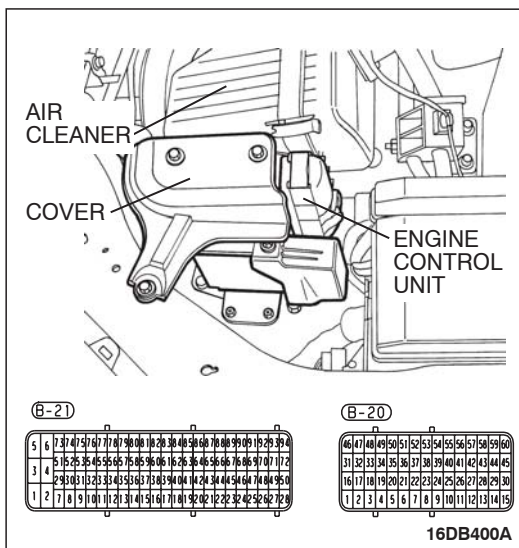
NO : Go to Step 4.

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

Q: Is the harness connector in good condition?

YES : Go to Step 5.

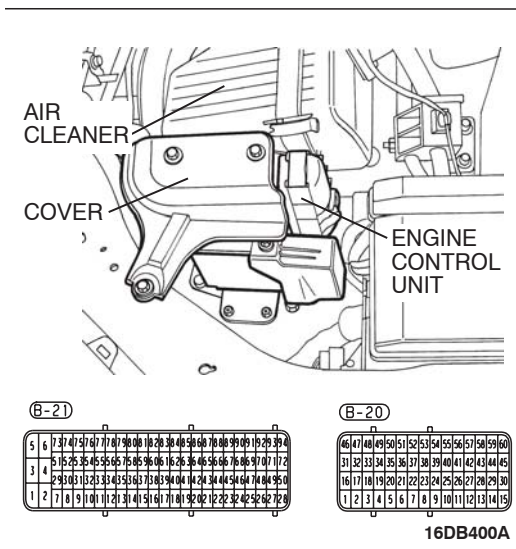
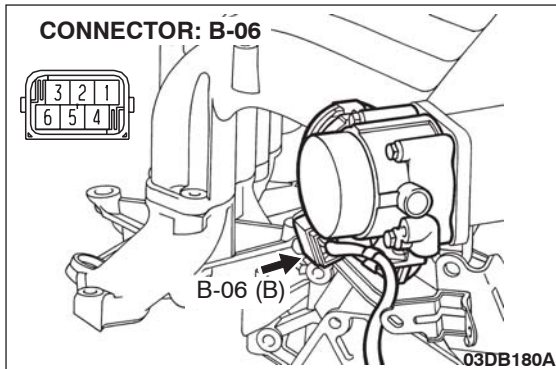
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 8.



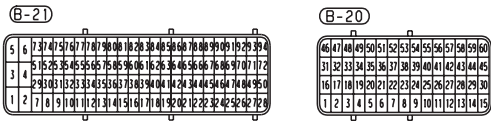
STEP 5. Check for short circuit to 5-Volts and harness damage between throttle position sensor connector B-06 (terminal No. 2) and ECU connector B-20 (terminal No. 27).
Q: Is the harness wire in good condition?

YES : Go to Step 6.

NO : Repair or replace it. Then go to Step 8.



NO : Repair or repalce it. Then go to Step 8.



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

⚠ CAUTION

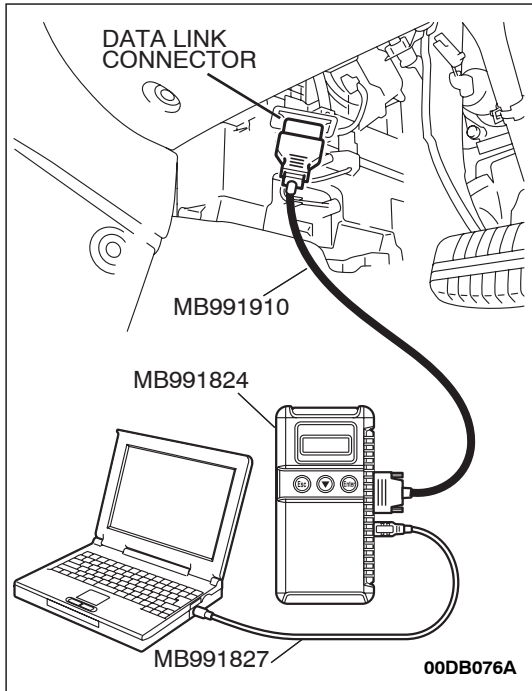
To prevent damage to diagnostic tool , always turn the ignition switch to the "LOCK"(OFF) position before connecting or disconnecting diagnostic tool .

- (1) Connect diagnostic tool 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 P0223 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.



DTC P0300: Random/Multiple Cylinder Misfire Detected

TECHNICAL DESCRIPTION

- If a misfire occurs while the engine is running, the engine speed changes for an instant.
- The ECU checks for such changes in engine speed.

DTC SET CONDITIONS

Check Conditions

- Engine speed is between idle and 6200 r/min.
- Engine torque is above 0.
- Engine speed during start is above 530 r/min.
- Ignition counter (starts when engine speed 530 r/min is exceeded) is above 6.
- Torque intervention by traction control is not active.
- Safety fuel cut off is not active.
- A/C compressor switching is not active. <M/T>
- Clutch pedal is not pressed. <M/T>.

Judgement Criteria (change in the angular acceleration of the crankshaft is used for misfire detection).

- MIL activated after 2 drive cycles.
- No Limp home.
- If MIL "blinks" in 1 Hz frequency, then there has been possible catalyst damage caused by the misfire.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle
[P.13A-11](#).

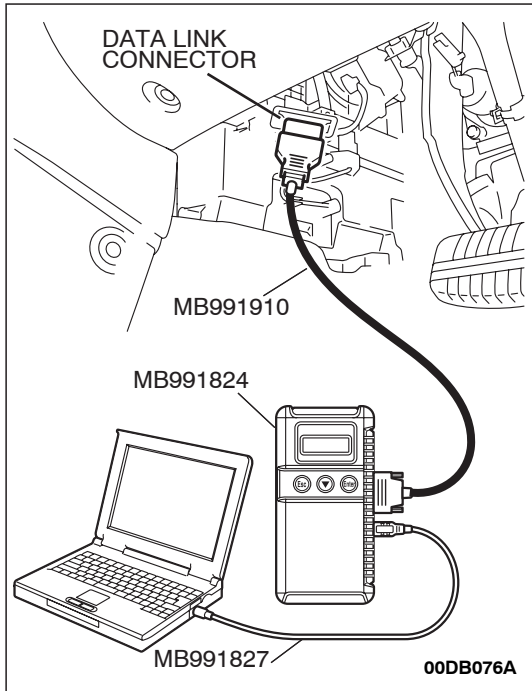
TROUBLESHOOTING HINTS (The most likely causes for this code to be set are:)

- Ignition system related part(s) failed.
- Poor crankshaft position sensor.
- Incorrect air/fuel ratio.
- Low compression pressure.
- Timing belt misalignment.
- Leaking vacuum hose connection
- ECU failed.
- Refer to component locations [GROUP-70](#)
- Refer to configuration diagrams [GROUP-80](#)
- Refer to circuit diagrams [GROUP-90](#)

DIAGNOSIS

Required Special Tools:

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



STEP 1. Using diagnostic tool , check data list item 02: Crank Angle Sensor.

⚠ CAUTION

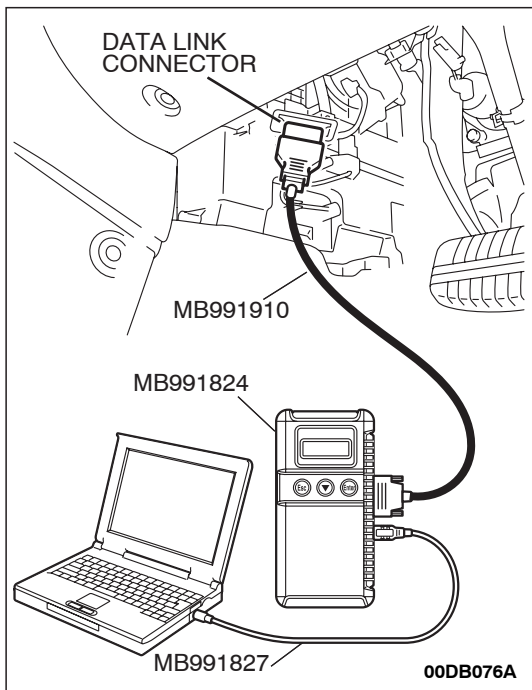
To prevent damage to diagnostic tool , always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool .

- (1) Connect diagnostic tool to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set diagnostic tool to the data reading mode for item 02, Crankshaft Angle Sensor.
- (4) Check the waveform of the crankshaft position sensor while keeping the engine speed constant.
 - The pulse width should be constant.

Q: Is the sensor operating properly?

YES : Go to Step 2.

NO : Refer to, DTC P0335 – Crankshaft Position Sensor Circuit Malfunction. [P.13A-354](#)



STEP 2. Using diagnostic tool , check data list item 28 <bank 1> and 29 <bank2>: Short-Term Fuel Trim.

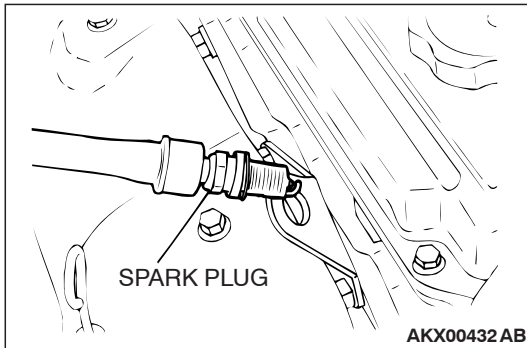
- (1) Start the engine and run at idle.
- (2) Set diagnostic tool to the data reading mode for item 28<bank 1> and 29 <bank2>, Short-Term Fuel Trim.
 - The fuel trim should be between –7.0 and +7.0 percent when the load is 2,500 r/min (during closed loop) after the engine is warmed.

Q: Is the specification normal?

YES : Go to Step 3.

NO : Refer to:

- DTC P0171 – System too Lean (bank 1) [P.13A-264](#),
- DTC P0172 – System too Rich (bank 1) [P.13A-266](#),
- DTC P0174 – System too Lean (bank 2) [P.13A-268](#),
- DTC P0175 – System too Rich (bank 2) [P.13A-270](#).



STEP 3. Check each ignition coil spark.

- (1) Remove the intake manifold.
- (2) Remove the ignition coil.
- (3) Remove the spark plug and connect to the ignition coil.
- (4) Ground the spark plug side electrode securely.
 - When the engine is cranked, the spark plug should spark.

⚠ CAUTION

If prolonged engine cranking is required disconnect Fuel Pump to prevent excessive unburnt fuel damaging the exhaust catalysts.

Q: Did it spark?

YES : Go to Step 5.

NO : Go to Step 4.

STEP 4. Check the spark plugs.

⚠ CAUTION

Do not attempt to adjust the gap of the iridium plug. Cleaning of the iridium plug may result in damage to the iridium and platinum tips. Therefore, if carbon deposits must be removed, use a plug cleaner and complete cleaning within 20 seconds to protect the electrode. Do not use a wire brush.

- (1) Check the plug gap and replace if the limit is exceeded.

Standard value: 1.0 – 1.1 mm

Q: Is the plug gap at the standard value?

YES : Refer to, INSPECTION PROCEDURE 27 – Ignition Circuit System [P.13A-628](#).

NO : Replace the faulty spark plug. Then go to Step 7.

STEP 5. Check the following items.

- (1) Check the following items, and repair or replace the defective component.
 - a. Check timing belt alignment.
 - b. Check compression.

Q: Are there any abnormalities?

YES : Repair or replace it. Then go to Step 7.

NO : Go to Step 7.

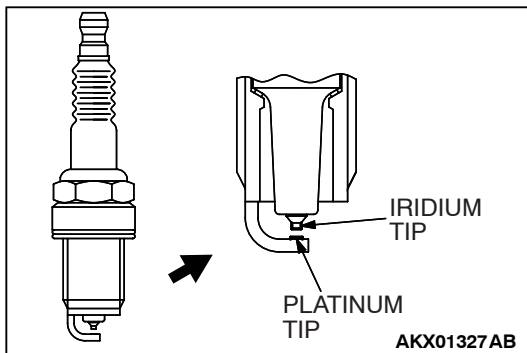
STEP 6. Check the trouble symptoms.

- (1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOB Drive Cycle–[P.13A-11](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0300 set?

YES : Replace the ECU. 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. Test the EOBD drive cycle.

- (1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0300 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0301: Cylinder 1 Misfire Detected

TECHNICAL DESCRIPTION

- If a misfire occurs while the engine is running, the engine speed changes for an instant.

- The ECU checks for such changes in engine speed.

DTC SET CONDITIONS

Check Conditions

- Engine speed is between idle and 6200 r/min.
- Engine torque is above 0.
- Engine speed during start is above 530 r/min.
- Ignition counter (starts when engine speed 530 r/min is exceeded) is above 6.
- Torque intervention by traction control is not active.
- Safety fuel cut off is not active.
- A/C compressor switching is not active. <M/T>
- Clutch pedal is not pressed. <M/T>.

- If MIL "blinks" in 1 Hz frequency, then there has been possible catalyst damage caused by the misfire.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

Judgement Criteria (change in the angular acceleration of the crankshaft is used for misfire detection).

- MIL activated after 2 drive cycles.
- No Limp home.

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

- Ignition system related part(s) failed.
- Low compression pressure.
- Refer to component locations [GROUP-70](#)
- Refer to configuration diagrams [GROUP-80](#)
- Refer to circuit diagrams [GROUP-90](#)

DIAGNOSIS

STEP 1. Check the No.1 cylinder ignition coil spark.

- (1) Remove the intake manifold.
- (2) Remove the No.1 cylinder ignition coil.
- (3) Remove the spark plug and connect to the No.1 cylinder ignition coil.
- (4) Ground the spark plug side electrode securely.
 - When the engine is cranked, the spark plug should spark.

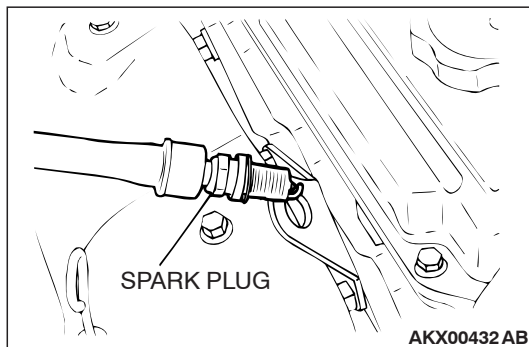
CAUTION

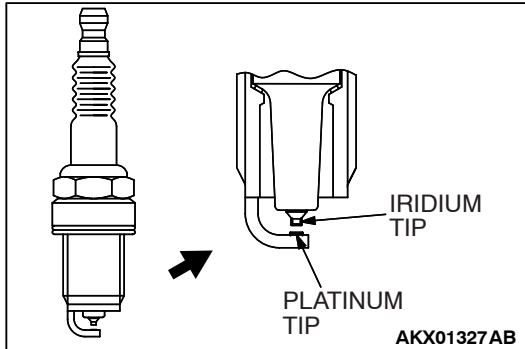
If prolonged engine cranking is required disconnect Fuel Pump to prevent excessive unburnt fuel damaging the exhaust catalysts.

Q: Did it spark?

YES : Go to Step 3.

NO : Go to Step 2.





STEP 2. Check the No.1 cylinder spark plug.

⚠ CAUTION

Do not attempt to adjust the gap of the iridium plug. Cleaning of the iridium plug may result in damage to the iridium and platinum tips. Therefore, if carbon deposits must be removed, use a plug cleaner and complete cleaning within 20 seconds to protect the electrode. Do not use a wire brush.

- (1) Inspect the spark plug.
- (2) Check the plug gap and replace if the limit is exceeded.

Standard value: 1.0 – 1.1 mm

Q: Is the plug gap at the standard value?

YES : Refer to, INSPECTION PROCEDURE 27 – Ignition Circuit System [P.13A-628](#).

NO : Replace the No.1 cylinder spark plug. Then go to Step 4.

STEP 3. Check the compression.

Refer to GROUP 11C, On-Vehicle Service – Compression Pressure Check [P.11A-10](#).

Q: Are there any abnormalities?

YES : Repair or replace it. Then go to Step 4.

NO : Go to Step 4.

STEP 4. Test the EOBD drive cycle.

- (1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0301 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0302: Cylinder 2 Misfire Detected

TECHNICAL DESCRIPTION

- If a misfire occurs while the engine is running, the engine speed changes for an instant.
- The ECU checks for such changes in engine speed.

DTC SET CONDITIONS

Check Conditions

- Engine speed is between idle and 6200 r/min.
- Engine torque is above 0.
- Engine speed during start is above 530 r/min.
- Ignition counter (starts when engine speed 530 r/min is exceeded) is above 6.
- Torque intervention by traction control is not active.
- Safety fuel cut off is not active.
- A/C compressor switching is not active. <M/T>
- Clutch pedal is not pressed. <M/T>.

Judgement Criteria (change in the angular acceleration of the crankshaft is used for misfire detection).

- MIL activated after 2 drive cycles.
- No Limp home.
- If MIL "blinks" in 1 Hz frequency, then there has been possible catalyst damage caused by the misfire.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

- Ignition system related part(s) failed.
- Low compression pressure.
- Refer to component locations GROUP-70
- Refer to configuration diagrams GROUP-80
- Refer to circuit diagrams GROUP-90

DIAGNOSIS

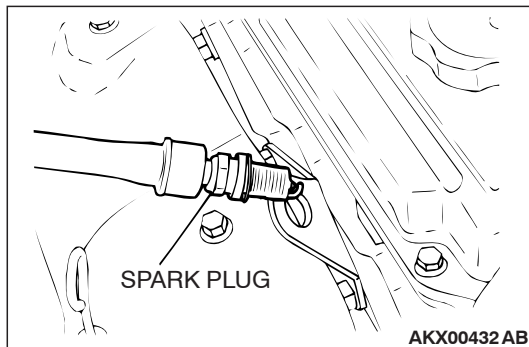
STEP 1. Check the No.2 cylinder ignition coil spark.

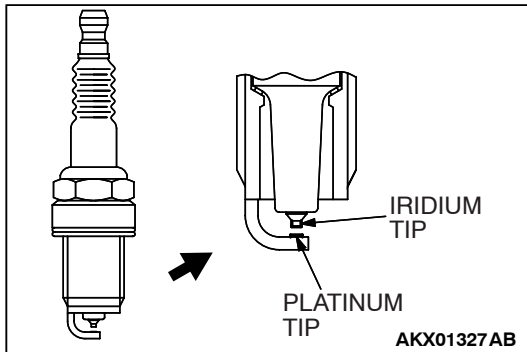
- (1) Remove the No.2 cylinder ignition coil.
- (2) Remove the No.2 cylinder spark plug and connect to the ignition coil.
- (3) Ground the No.2 cylinder spark plug side electrode securely.
 - When the engine is cranked, the spark plug should spark.

Q: Did it spark?

YES : Go to Step 3.

NO : Go to Step 2.





STEP 2. Check the No.2 cylinder spark plugs.

⚠ CAUTION

Do not attempt to adjust the gap of the iridium plug. Cleaning of the iridium plug may result in damage to the iridium and platinum tips. Therefore, if carbon deposits must be removed, use a plug cleaner and complete cleaning within 20 seconds to protect the electrode. Do not use a wire brush.

Check the plug gap and replace if the limit is exceeded.

Standard value: 1.0 – 1.1 mm

Q: Is the plug gap at the standard value?

YES : Refer to, INSPECTION PROCEDURE 27 – Ignition Circuit System [P.13A-628](#).

NO : Replace the No.2 cylinder spark plug. Then go to Step 4.

STEP 3. Check the compression.

Refer to GROUP 11B, On-Vehicle Service – Compression Pressure Check [P.11A-10](#).

Q: Are there any abnormalities?

YES : Repair or replace it. Then go to Step 4.

NO : Go to Step 4.

STEP 4. Test the EOBD drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

Q: Is DTC P0302 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0303: Cylinder 3 Misfire Detected

TECHNICAL DESCRIPTION

- If a misfire occurs while the engine is running, the engine speed changes for an instant.
- The ECU checks for such changes in engine speed.

DTC SET CONDITIONS

Check Conditions

- Engine speed is between idle and 6200 r/min.
- Engine torque is above 0.
- Engine speed during start is above 530 r/min.
- Ignition counter (starts when engine speed 530 r/min is exceeded) is above 6.
- Torque intervention by traction control is not active.
- Safety fuel cut off is not active.
- A/C compressor switching is not active. <M/T>
- Clutch pedal is not pressed. <M/T>.

Judgement Criteria (change in the angular acceleration of the crankshaft is used for misfire detection).

- MIL activated after 2 drive cycles.
- No Limp home.
- If MIL "blinks" in 1 Hz frequency, then there has been possible catalyst damage caused by the misfire.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

- Ignition system related part(s) failed.
- Low compression pressure.
- Refer to component locations GROUP-70
- Refer to configuration diagrams GROUP-80
- Refer to circuit diagrams GROUP-90

DIAGNOSIS

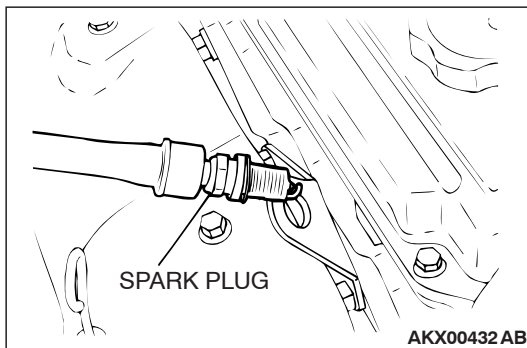
STEP 1. Check the No.3 cylinder ignition coil spark.

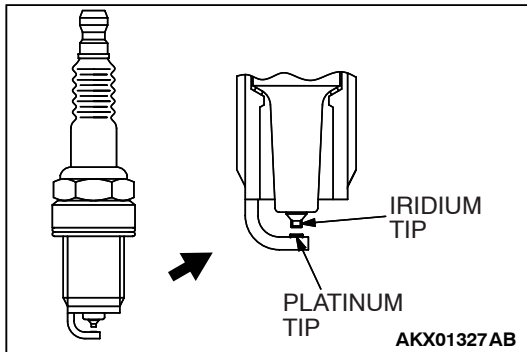
- (1) Remove the No.3 cylinder ignition coil.
- (2) Remove the No.3 cylinder spark plug and connect to the ignition coil.
- (3) Ground the No.3 cylinder spark plug side electrode securely.
 - When the engine is cranked, the spark plug should spark.

Q: Did it spark?

YES : Go to Step 3.

NO : Go to Step 2.





STEP 2. Check the No.3 cylinder spark plugs.

⚠ CAUTION

Do not attempt to adjust the gap of the iridium plug. Cleaning of the iridium plug may result in damage to the iridium and platinum tips. Therefore, if carbon deposits must be removed, use a plug cleaner and complete cleaning within 20 seconds to protect the electrode. Do not use a wire brush.

Check the plug gap and replace if the limit is exceeded.

Standard value: 1.0 – 1.1 mm

Q: Is the plug gap at the standard value?

YES : Refer to, INSPECTION PROCEDURE 27 – Ignition Circuit System [P.13A-628](#).

NO : Replace the No.3 cylinder spark plug. Then go to Step 4.

STEP 3. Check the compression.

Refer to GROUP 11C, On-Vehicle Service – Compression Pressure Check [P.11A-10](#).

Q: Are there any abnormalities?

YES : Repair or replace it. Then go to Step 4.

NO : Go to Step 4.

STEP 4. Test the EOBD drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

Q: Is DTC P0303 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0304: Cylinder 4 Misfire Detected

TECHNICAL DESCRIPTION

- If a misfire occurs while the engine is running, the engine speed changes for an instant.
- The ECU checks for such changes in engine speed.

DTC SET CONDITIONS

Check Conditions

- Engine speed is between idle and 6200 r/min.
- Engine torque is above 0.
- Engine speed during start is above 530 r/min.
- Ignition counter (starts when engine speed 530 r/min is exceeded) is above 6.
- Torque intervention by traction control is not active.
- Safety fuel cut off is not active.
- A/C compressor switching is not active. <M/T>
- Clutch pedal is not pressed. <M/T>.

Judgement Criteria (change in the angular acceleration of the crankshaft is used for misfire detection).

- MIL activated after 2 drive cycles.
- No Limp home.
- If MIL "blinks" in 1 Hz frequency, then there has been possible catalyst damage caused by the misfire.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

- Ignition system related part(s) failed.
- Low compression pressure.
- Refer to component locations GROUP-70
- Refer to configuration diagrams GROUP-80
- Refer to circuit diagrams GROUP-90

DIAGNOSIS

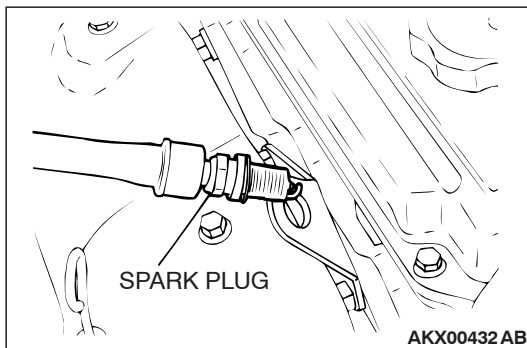
STEP 1. Check the No.4 cylinder ignition coil spark.

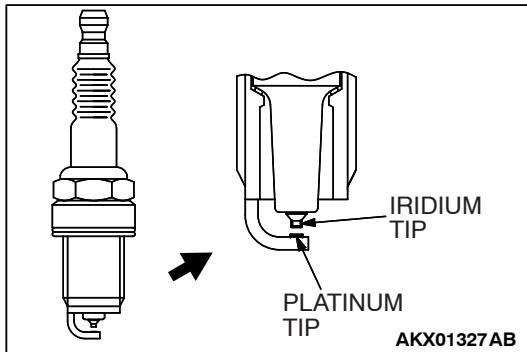
- (1) Remove the No.4 cylinder ignition coil.
- (2) Remove the No.4 cylinder spark plug and connect to the ignition coil.
- (3) Ground the No.4 cylinder spark plug side electrode securely.
 - When the engine is cranked, the spark plug should spark.

Q: Did it spark?

YES : Go to Step 3.

NO : Go to Step 2.





STEP 2. Check the No.4 cylinder spark plugs.

⚠ CAUTION

Do not attempt to adjust the gap of the iridium plug. Cleaning of the iridium plug may result in damage to the iridium and platinum tips. Therefore, if carbon deposits must be removed, use a plug cleaner and complete cleaning within 20 seconds to protect the electrode. Do not use a wire brush.

Check the plug gap and replace if the limit is exceeded.

Standard value: 1.0 – 1.1 mm

Q: Is the plug gap at the standard value?

YES : Refer to, INSPECTION PROCEDURE 27 – Ignition Circuit System [P.13A-628](#).

NO : Replace the No.4 cylinder spark plug. Then go to Step 4.

STEP 3. Check the compression.

Refer to GROUP 11C, On-Vehicle Service – Compression Pressure Check [P.11A-10](#).

Q: Are there any abnormalities?

YES : Repair or replace it. Then go to Step 4.

NO : Go to Step 4.

STEP 4. Test the EOBD drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

Q: Is DTC P0304 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0305: Cylinder 5 Misfire Detected

TECHNICAL DESCRIPTION

- If a misfire occurs while the engine is running, the engine speed changes for an instant.
- The ECU checks for such changes in engine speed.

DTC SET CONDITIONS

Check Conditions

- Engine speed is between idle and 6200 r/min.
- Engine torque is above 0.
- Engine speed during start is above 530 r/min.
- Ignition counter (starts when engine speed 530 r/min is exceeded) is above 6.
- Torque intervention by traction control is not active.
- Safety fuel cut off is not active.
- A/C compressor switching is not active. <M/T>
- Clutch pedal is not pressed. <M/T>.

Judgement Criteria (change in the angular acceleration of the crankshaft is used for misfire detection).

- MIL activated after 2 drive cycles.
- No Limp home.
- If MIL "blinks" in 1 Hz frequency, then there has been possible catalyst damage caused by the misfire.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

- Ignition system related part(s) failed.
- Low compression pressure.
- Refer to component locations GROUP-70
- Refer to configuration diagrams GROUP-80
- Refer to circuit diagrams GROUP-90

DIAGNOSIS

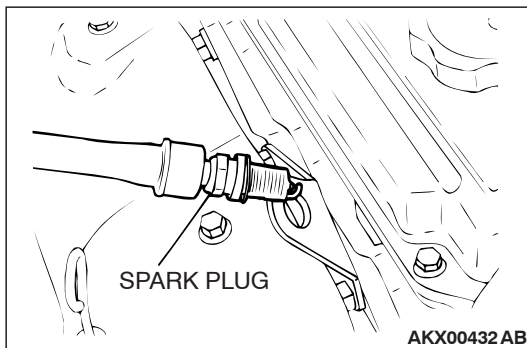
STEP 1. Check the No.5 cylinder ignition coil spark.

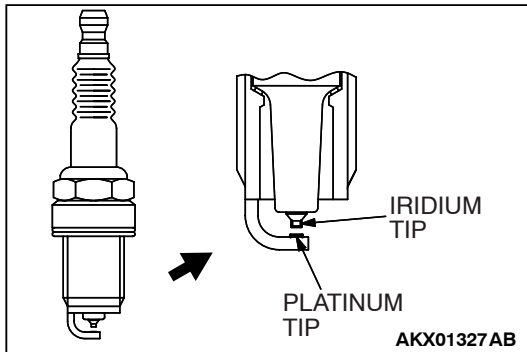
- (1) Remove the No.5 cylinder ignition coil.
- (2) Remove the No.5 cylinder spark plug and connect to the ignition coil.
- (3) Ground the No.5 cylinder spark plug side electrode securely.
 - When the engine is cranked, the spark plug should spark.

Q: Did it spark?

YES : Go to Step 3.

NO : Go to Step 2.





STEP 2. Check the No.5 cylinder spark plugs.

⚠ CAUTION

Do not attempt to adjust the gap of the iridium plug. Cleaning of the iridium plug may result in damage to the iridium and platinum tips. Therefore, if carbon deposits must be removed, use a plug cleaner and complete cleaning within 20 seconds to protect the electrode. Do not use a wire brush.

Check the plug gap and replace if the limit is exceeded.

Standard value: 1.0 – 1.1 mm

Q: Is the plug gap at the standard value?

YES : Refer to, INSPECTION PROCEDURE 27 – Ignition Circuit System [P.13A-628](#).

NO : Replace the No.5 cylinder spark plug. Then go to Step 4.

STEP 3. Check the compression.

Refer to GROUP 11C, On-Vehicle Service – Compression Pressure Check [P.11A-10](#).

Q: Are there any abnormalities?

YES : Repair or replace it. Then go to Step 4.

NO : Go to Step 4.

STEP 4. Test the EOBD drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

Q: Is DTC P0305 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0306: Cylinder 6 Misfire Detected

TECHNICAL DESCRIPTION

- If a misfire occurs while the engine is running, the engine speed changes for an instant.
- The ECU checks for such changes in engine speed.

DTC SET CONDITIONS

Check Conditions

- Engine speed is between idle and 6200 r/min.
- Engine torque is above 0.
- Engine speed during start is above 530 r/min.
- Ignition counter (starts when engine speed 530 r/min is exceeded) is above 6.
- Torque intervention by traction control is not active.
- Safety fuel cut off is not active.
- A/C compressor switching is not active. <M/T>
- Clutch pedal is not pressed. <M/T>.

Judgement Criteria (change in the angular acceleration of the crankshaft is used for misfire detection).

- MIL activated after 2 drive cycles.
- No Limp home.
- If MIL "blinks" in 1 Hz frequency, then there has been possible catalyst damage caused by the misfire.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

- Ignition system related part(s) failed.
- Low compression pressure.
- Refer to component locations GROUP-70
- Refer to configuration diagrams GROUP-80
- Refer to circuit diagrams GROUP-90

DIAGNOSIS

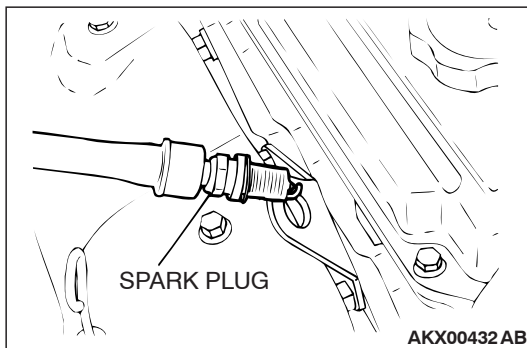
STEP 1. Check the No.6 cylinder ignition coil spark.

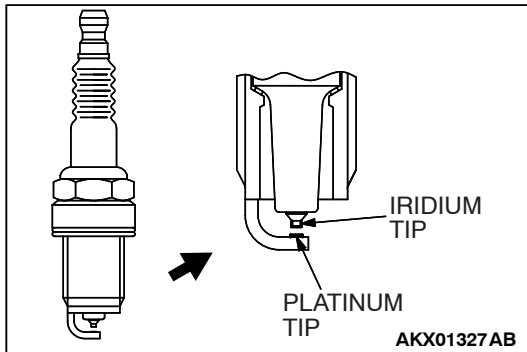
- (1) Remove the No.6 cylinder ignition coil.
- (2) Remove the No.6 cylinder spark plug and connect to the ignition coil.
- (3) Ground the No.6 cylinder spark plug side electrode securely.
 - When the engine is cranked, the spark plug should spark.

Q: Did it spark?

YES : Go to Step 3.

NO : Go to Step 2.





STEP 2. Check the No.6 cylinder spark plugs.

⚠ CAUTION

Do not attempt to adjust the gap of the iridium plug. Cleaning of the iridium plug may result in damage to the iridium and platinum tips. Therefore, if carbon deposits must be removed, use a plug cleaner and complete cleaning within 20 seconds to protect the electrode. Do not use a wire brush.

Check the plug gap and replace if the limit is exceeded.

Standard value: 1.0 – 1.1 mm

Q: Is the plug gap at the standard value?

YES : Refer to, INSPECTION PROCEDURE 27 – Ignition Circuit System [P.13A-628](#).

NO : Replace the No.6 cylinder spark plug. Then go to Step 4.

STEP 3. Check the compression.

Refer to GROUP 11C, On-Vehicle Service – Compression Pressure Check [P.11A-10](#).

Q: Are there any abnormalities?

YES : Repair or replace it. Then go to Step 4.

NO : Go to Step 4.

STEP 4. Test the EOBD drive cycle.

(1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

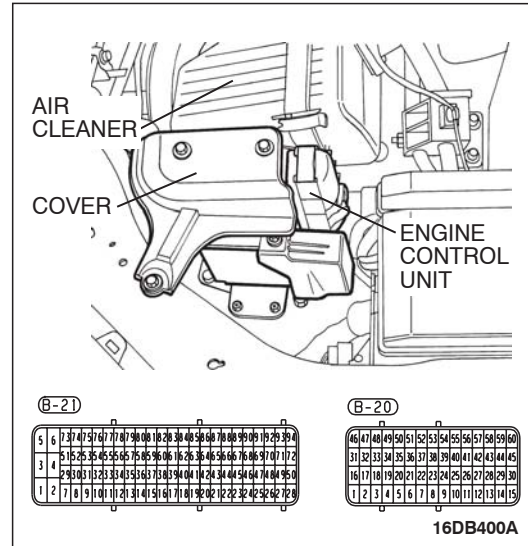
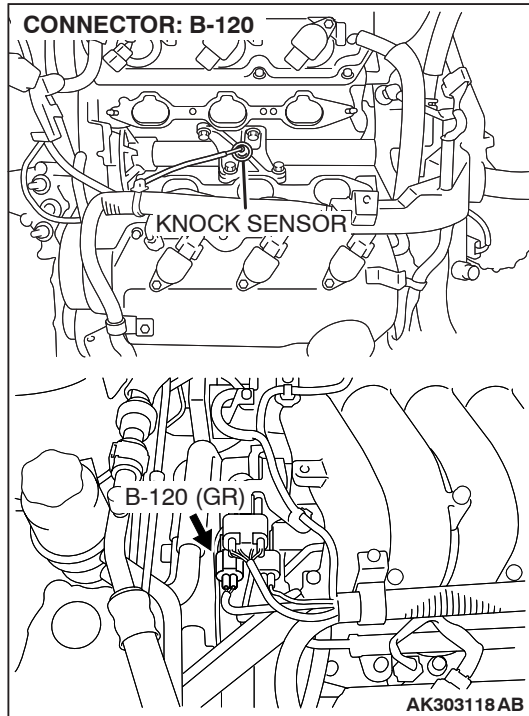
(2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0306 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

DTC P0325: Knock Sensor Circuit Malfunction.



CIRCUIT OPERATION

- The knock sensor sends a signal voltage to the ENGINE-ECU (terminal No. 28) and is grounded to the ENGINE-ECU(terminal 13).

TECHNICAL DESCRIPTION

- The knock sensor converts the vibration of the cylinder block into a voltage and outputs it. If there is a malfunction of the knock sensor, the voltage output will not change.
- The ECU checks whether the voltage output changes.

DTC SET CONDITIONS

Check Conditions

- ECU internal testing of IC chip for Knock Control(ECU internal failure)

Judgment Criteria

- No MIL or Limp home for Knock Control Zero Test.
- Engine speed limitation for sensor failure.

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

- Knock sensor failed.
- Open or shorted knock sensor circuit.
- Harness or connector damage.
- ECU failed.
- Refer to component locations GROUP-70
- Refer to configuration diagrams GROUP-80
- Refer to circuit diagrams GROUP-90

DIAGNOSIS

Required Special Tools:

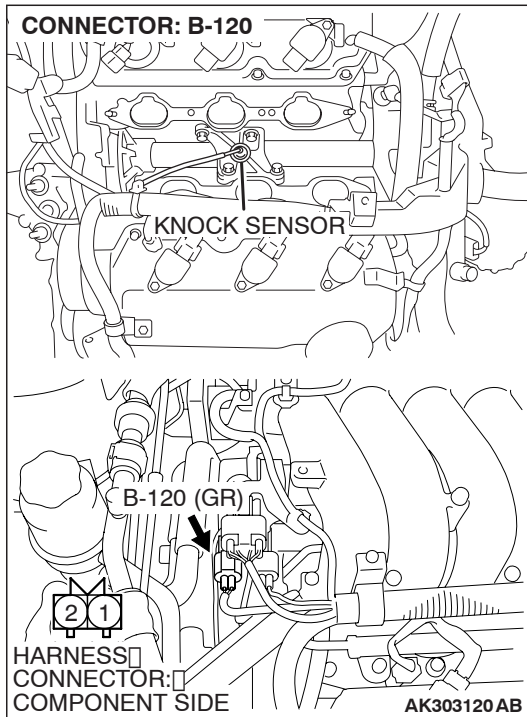
- Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991910: Main Harness A

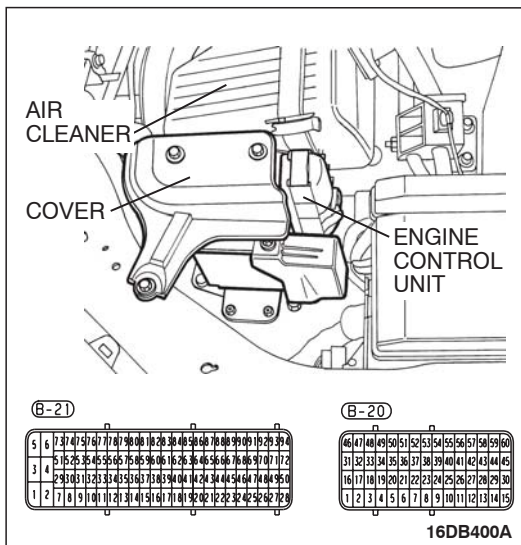
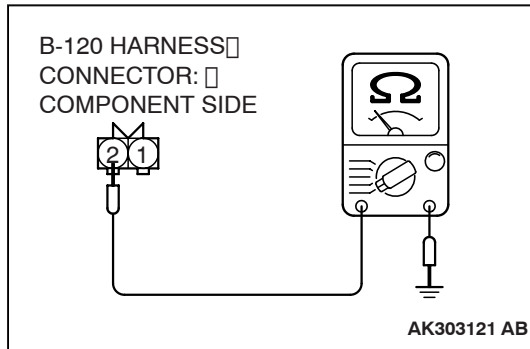
STEP 1. Check harness connector B-120 at the knock sensor for damage.

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 8.





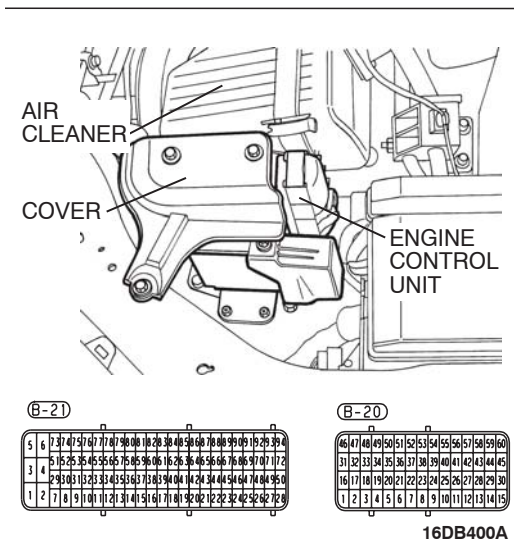
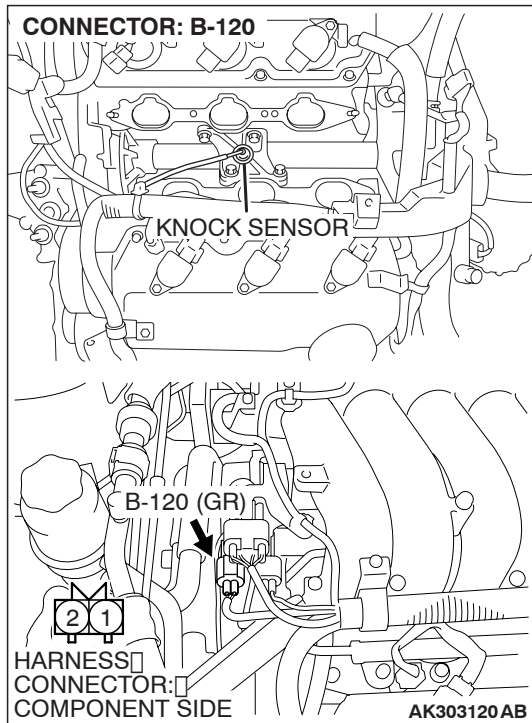
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 8.

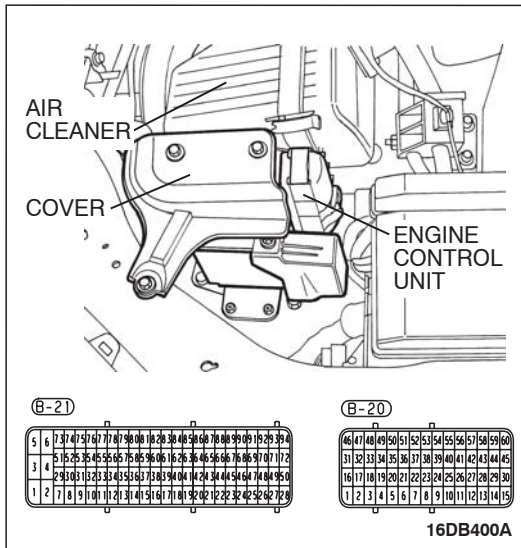
STEP 4. Check for open circuit and harness damage between knock sensor connector B-120 (terminal No. 2) and ECU connector B-20 (terminal No. 13).

Q: Is the harness wire in good condition?

YES : Go to Step 5.

NO : Repair it. Then go to Step 8.





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

Q: Is the harness connector in good condition?

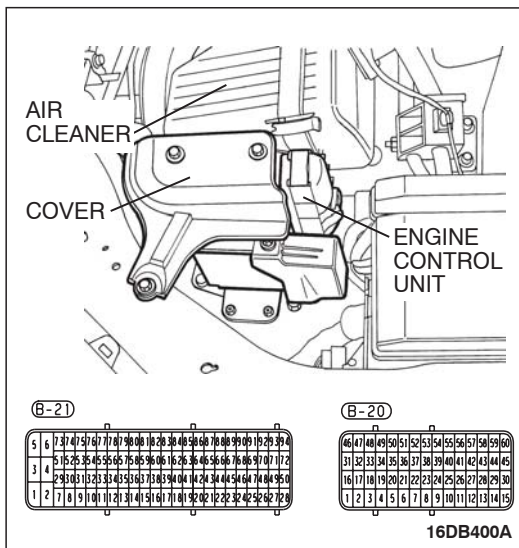
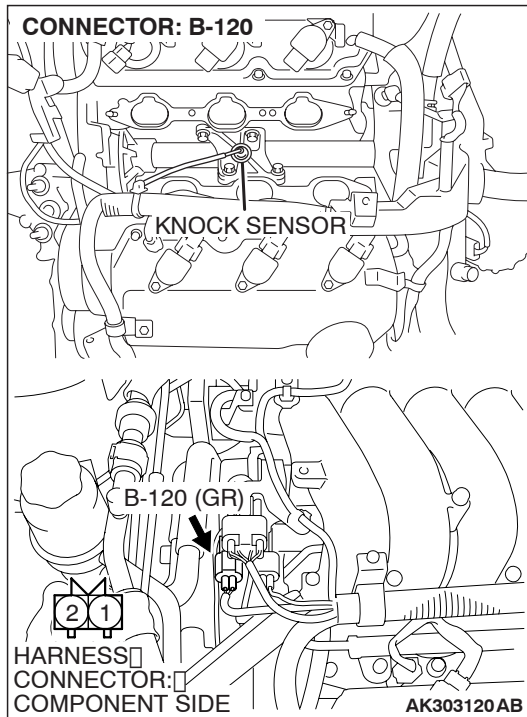
YES : Go to Step 6.

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

STEP 6. Check for open circuit, short circuit to ground and harness damage between knock sensor connector B-120 (terminal No. 1) and ECU connector B-20 (terminal No. 28).
Q: Is the harness wire in good condition?

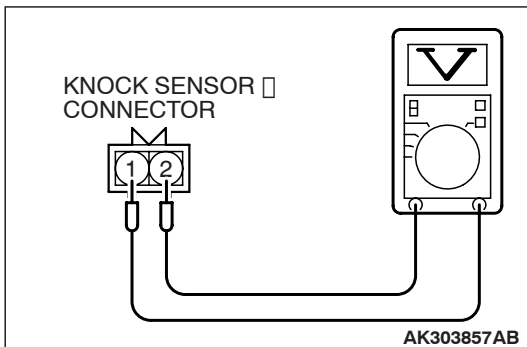
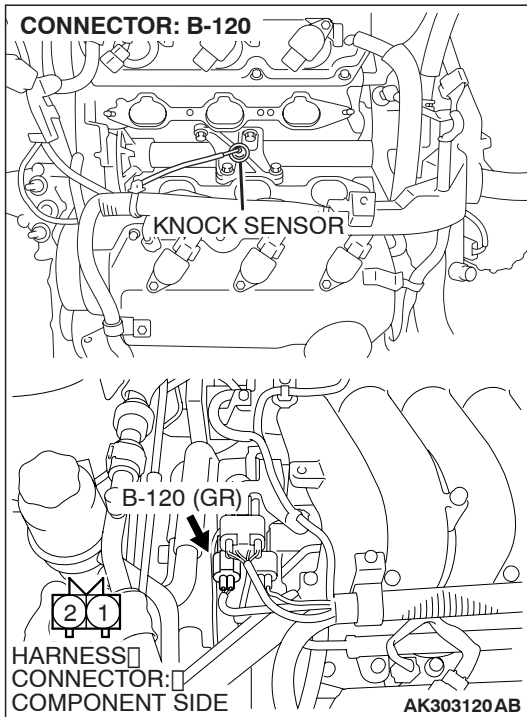
YES : Go to Step 7.

NO : Repair it. Then go to Step 8.



STEP 7. Check the knock sensor.

- (1) Disconnect the knock sensor connector B-120.
- (2) Start the engine and run at idle.



- (3) Measure the voltage between knock sensor side connector terminal No. 1 (output) and No. 2 (ground).
- (4) Gradually increase the engine speed.
 - The voltage increases with the increase in the engine speed.
- (5) Turn the ignition switch to the "LOCK"(OFF) position.

Q: Is the sensor operating properly?

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

NO : Replace the knock sensor. Then go to Step 8.

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

⚠ CAUTION

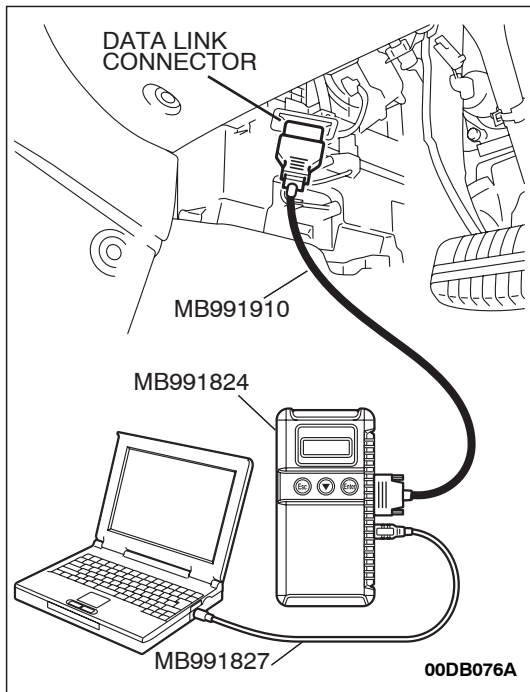
To prevent damage to diagnostic tool , always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool .

- (1) Connect diagnostic tool to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Erase the DTC.
- (4) Test drive under the following conditions:
 - Engine speed: 3000 – 5000r/min
 - Engine load: 40% or more
 - Drive a minimum of 3 seconds after the above conditions have been met.
- (5) After completing the test drive, check for DTC. Turn the ignition switch to the "LOCK" (OFF) position.
- (6) Turn the ignition switch to the "LOCK" (OFF) position.

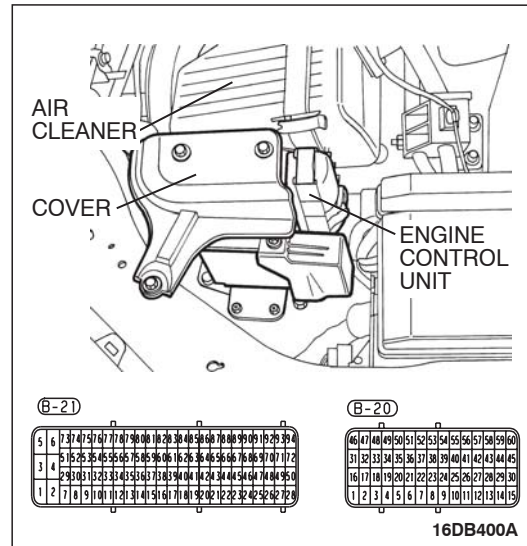
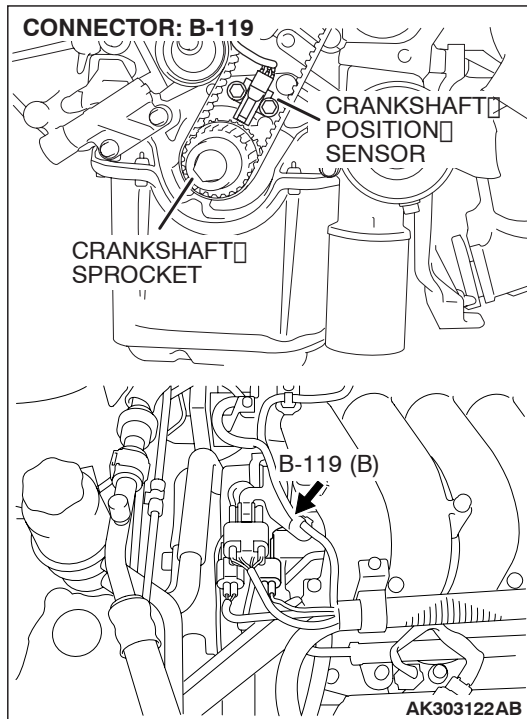
Q: Is DTC P0325 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.



DTC P0335: Crankshaft Position Sensor Circuit.



CIRCUIT OPERATION

- The crankshaft position sensor power is supplied from the ECU (terminal No. 25).
- Terminal No. 1 of the crankshaft position sensor is grounded with ECU (terminal No. 8).
- A 5-volt voltage is applied on the crankshaft position sensor output terminal (terminal No. 2) from the ECU (terminal No. 23). The crankshaft position sensor generates a pulse signal when the output terminal is opened and grounded.

TECHNICAL DESCRIPTION

- The crankshaft position sensor detects the crank angle (position) of each cylinder, and converts that data to pulse signals, then which are input to the ECU.
- When the engine is running, the crankshaft position sensor outputs a pulse signal.
- The ECU checks whether pulse signal is input while the engine is cranking.

DTC SET CONDITIONS <Range/Performance problem - Alignment>

Check Conditions, Judgment Criteria

- '+/- 1 tooth correction several times continuous or losing reference gap during engine running for 0.5 second.

- Crank angle signal frequently missing.

DTC SET CONDITIONS <Range/Performance problem - Circuit continuity>

Check Conditions

- Engine is being cranked.

Judgment Criteria

- no reference gap detection during engine start for 0.5 second.
- Crank angle signal missing.

EOBD DRIVE CYCLE PATTERN

Refer to Diagnostic Function – EOBD Drive Cycle – [P.13A-11](#).

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

- Crankshaft position sensor failed.

- Open or shorted crankshaft position sensor circuit. .
- Harness or connector damage.
- Refer to component locations GROUP-[70](#)
- Refer to configuration diagrams GROUP-[80](#)
- Refer to circuit diagrams GROUP-[90](#)

DIAGNOSIS

Required Special Tools:

- Diagnostic Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991910: Main Harness A
- MD998478: Test Harness (3pin, triangle)
- MB992044: Power Plant ECU Check Harness

STEP 1. Using diagnostic tool , check data list item 02: Crankshaft Position Sensor.

CAUTION

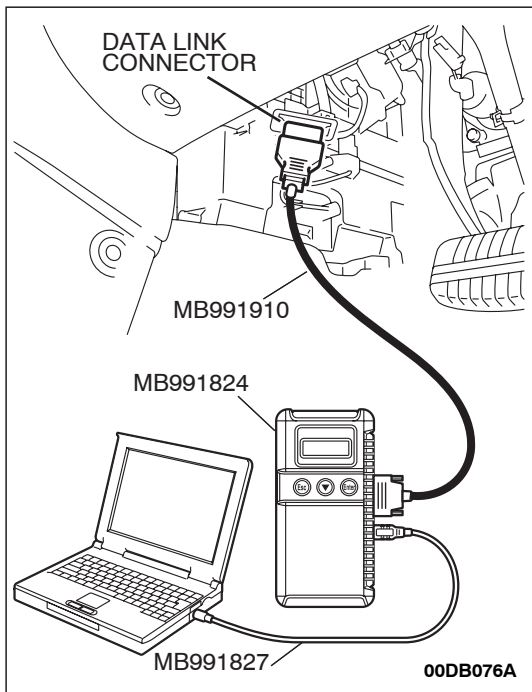
To prevent damage to diagnostic tool , always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool .

- (1) Connect diagnostic tool to the data link connector.
- (2) Start the engine and run at idle.
- (3) Set diagnostic tool to the data reading mode for item 02, Crankshaft Position Sensor.
 - The tachometer and engine speed indicated on the diagnostic tool should match.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

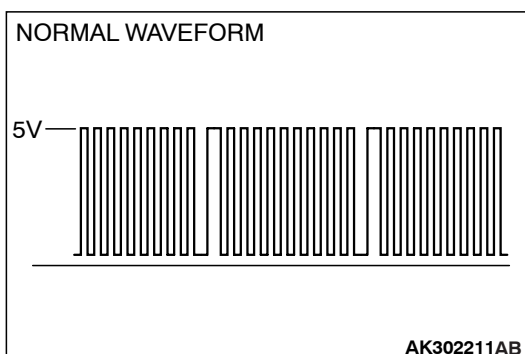
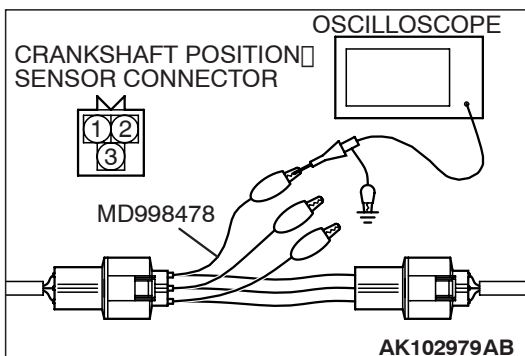
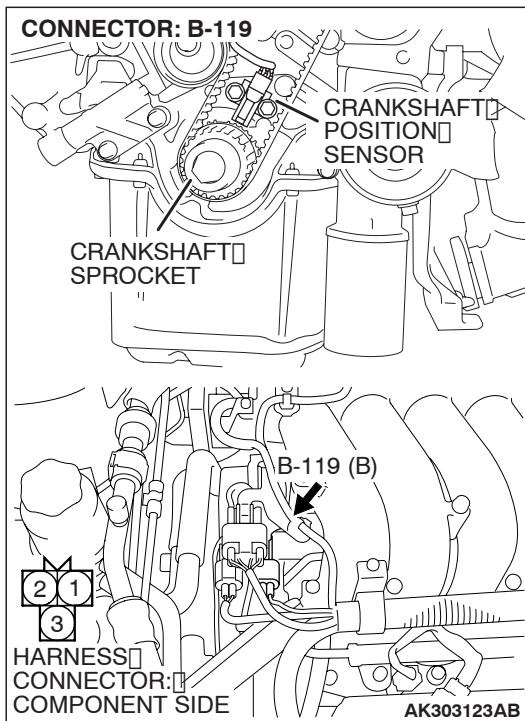
YES : It can be assumed that this malfunction is intermittent.
Refer to GROUP 00, How to Use
Troubleshooting/Inspection Service Points – How to
Cope with Intermittent Malfunctions [P.00-14](#).

NO : Go to Step 2.



STEP 2. Using the oscilloscope, check the crankshaft position sensor.

- (1) Disconnect the crankshaft position sensor connector B-119, and connect the test harness special tool (MD998478) between the separated connectors.



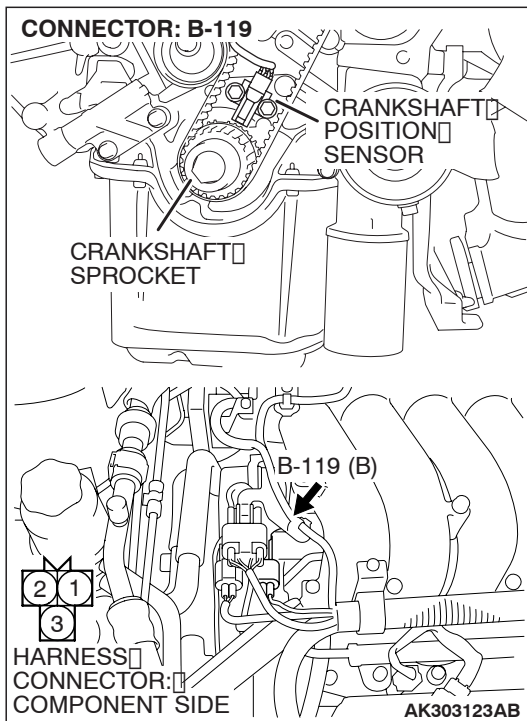
- (2) Connect the oscilloscope probe to crankshaft position sensor connector terminal No. 2 (black clip of special tool).
NOTE: When measuring with the ECU side connector, disconnect the all ECU connectors and connect check harness special tool (MB992044) between the separated connectors. then connector the oscilloscope probe to the check harness connector terminal No. 23.
- (3) Start the engine and run at idle.

- (4) Check the waveform.
• The waveform should show a pattern similar to the illustration.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the waveform normal?

YES : Go to Step 3.

NO : Go to Step 5.

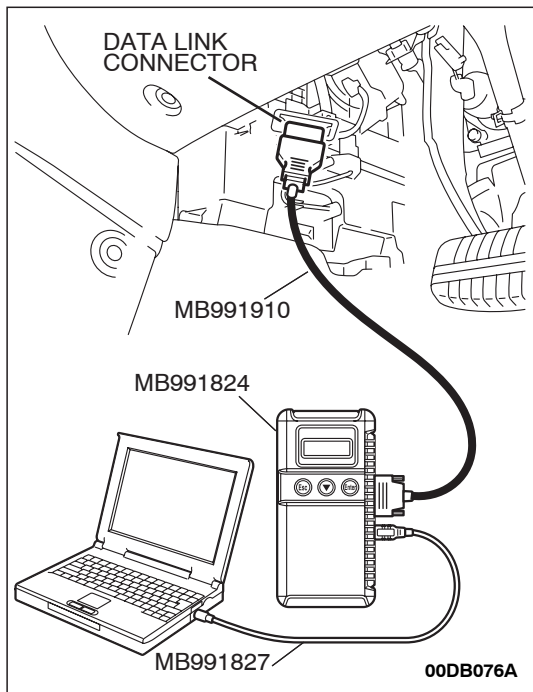


STEP 3. Check harness connector B-119 at the crankshaft position sensor for damage.

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 18.



STEP 4. Using diagnostic tool , check data list item 02: Crankshaft Position Sensor.

CAUTION

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

- (1) Connect diagnostic tool to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set diagnostic tool to the data reading mode for item 02, Crankshaft Position Sensor.
 - The tachometer and engine speed indicated on the diagnostic tool should match.
- (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](#).

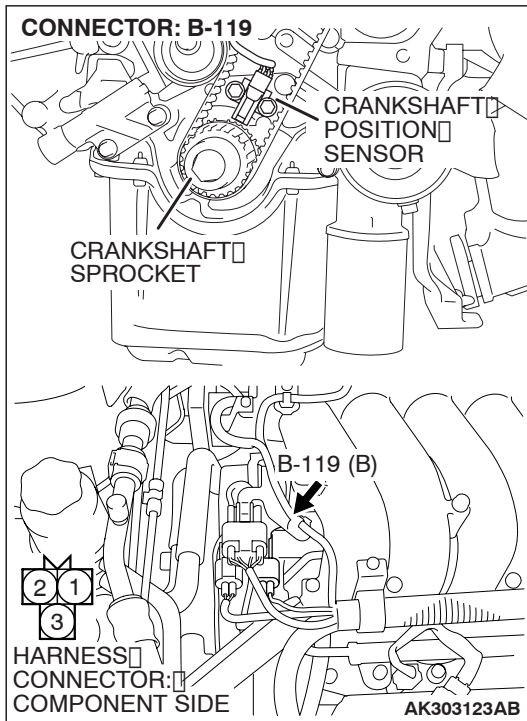
NO : Then go to Step 5.

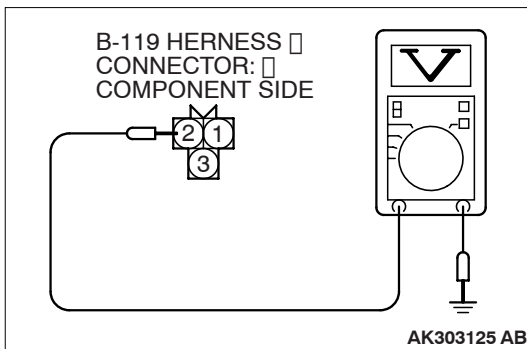
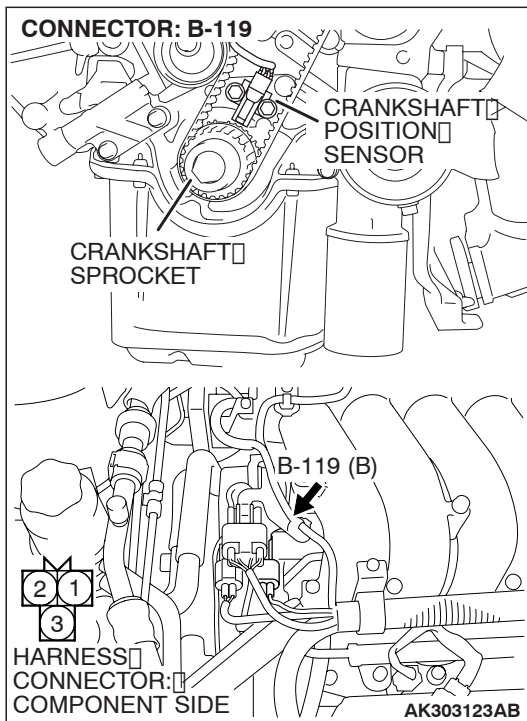
STEP 5. Check harness connector B-119 at the crankshaft position sensor for damage.

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 18.





STEP 6. Measure the sensor supply voltage at crankshaft position sensor harness side connector B-119.

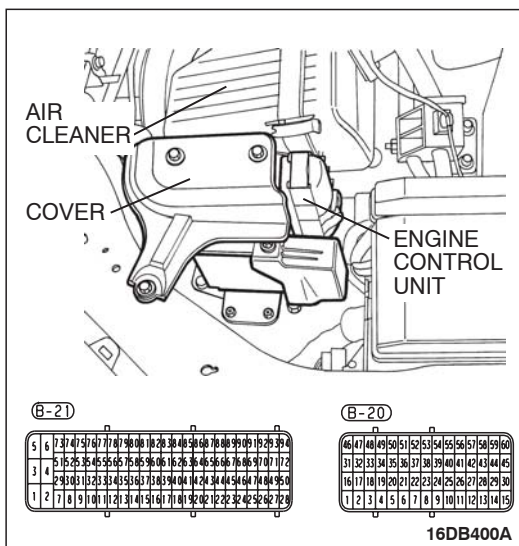
- (1) Disconnect the connector B-119 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

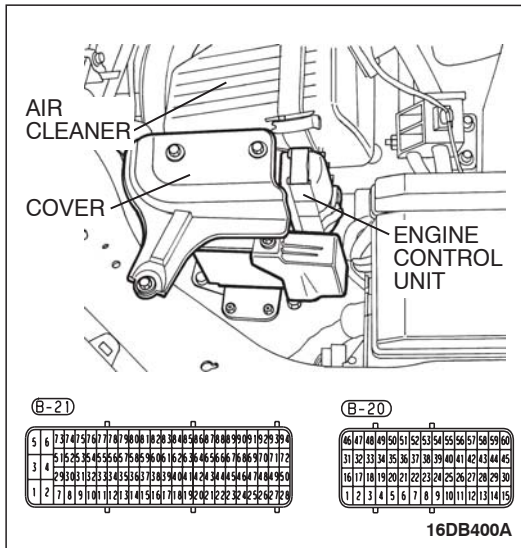
- (3) Measure the voltage between terminal No. 2 and ground.
 - Voltage should be between 4.9 and 5.1 volts.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

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

YES : Go to Step 11.

NO : Go to Step 7.





STEP 9. Check harness connector B-20 at ECU for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 10.

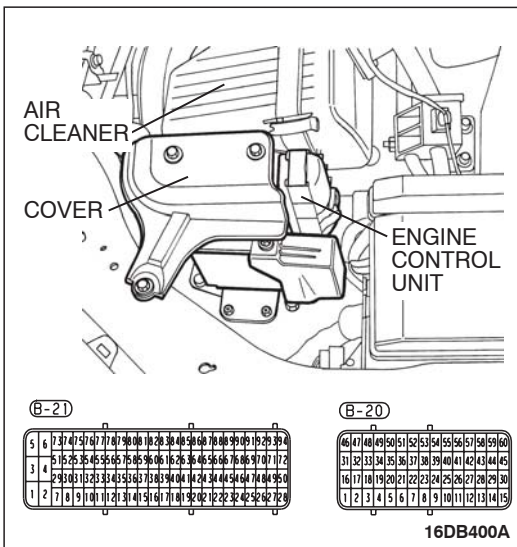
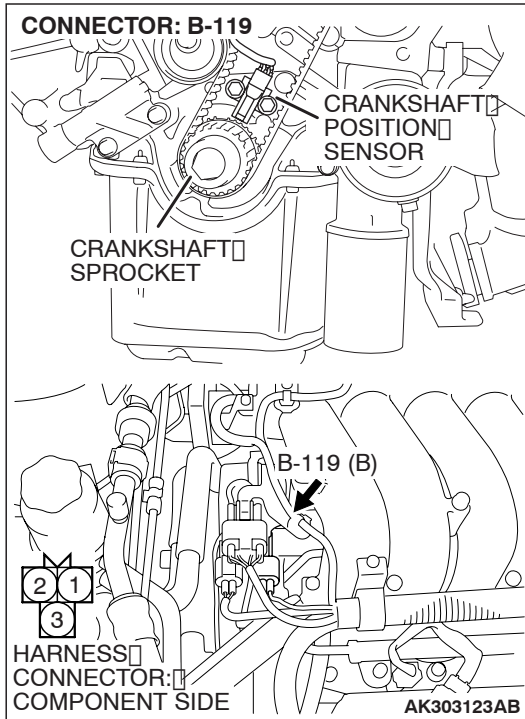
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 18.

STEP 10. Check for short circuit to ground between crankshaft position sensor connector B-119 (terminal No. 2) and ECU connector B-20 (terminal No. 23).

Q: Is the harness wire in good condition?

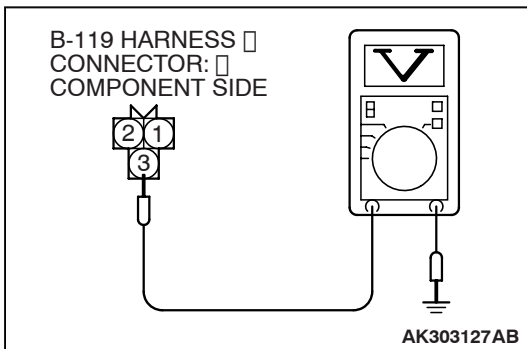
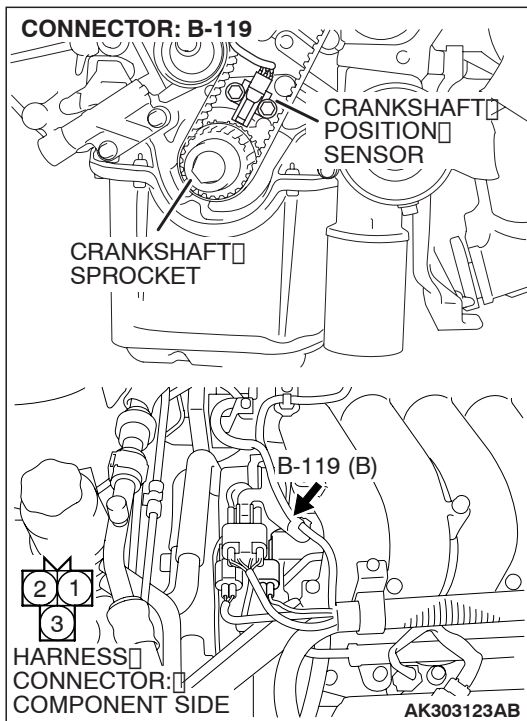
YES : Then go to Step 11.

NO : Repair it. Then go to Step 18.



STEP 11. Measure the power supply voltage at crankshaft position sensor harness side connector B-119.

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



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

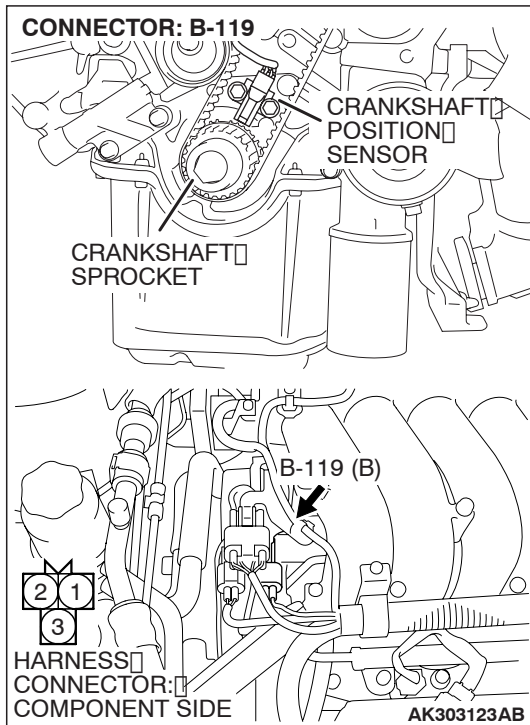
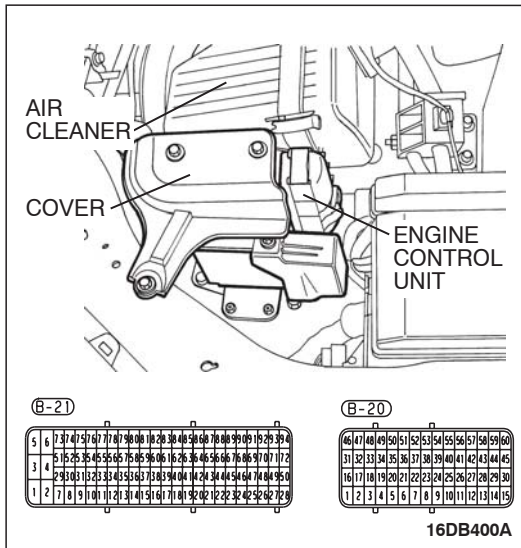
YES : Go to Step 13.

NO : Go to Step 12.

STEP 12. Check harness connector B-20 at ECU for damage.

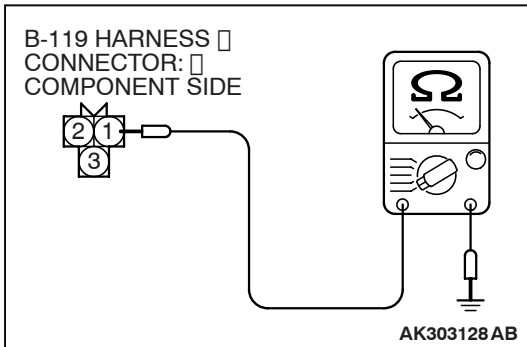
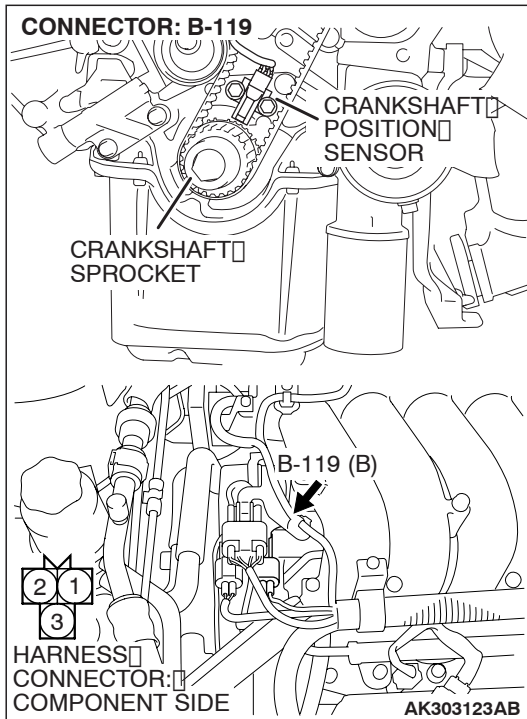
Q: Is the harness connector in good condition?

- YES :** Repair harness wire between ECU connector B-20 (terminal No. 25) and crankshaft position sensor connector B-119 (terminal No. 3) because of open circuit or short circuit to ground. Then go to Step 18.
- NO :** Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 18.



STEP 13. Check for continuity at crankshaft position sensor harness side connector B-119.

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

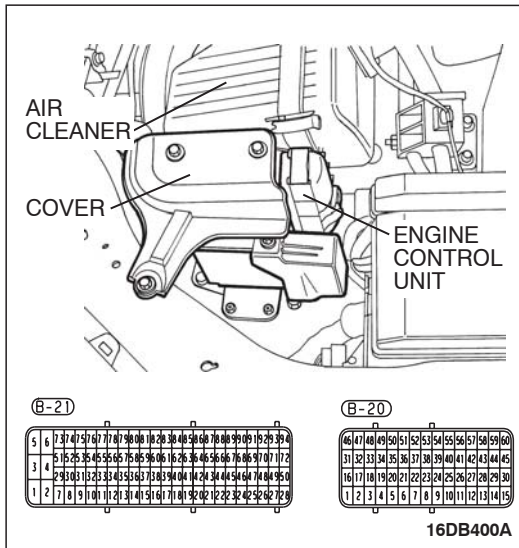


- (2) Check for the continuity between terminal No. 1 and ground.
- Should be less than 2 ohms.

Q: Does continuity exist?

YES : Go to Step 16.

NO : Go to Step 14.



STEP 14. Check harness connector B-20 at ECU for damage.

Q: Is the harness connector in good condition?

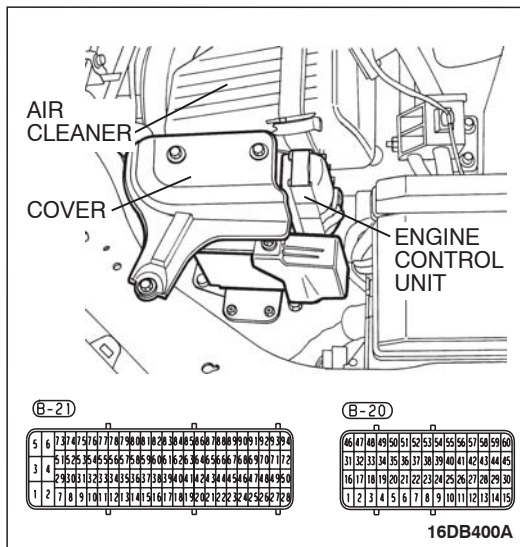
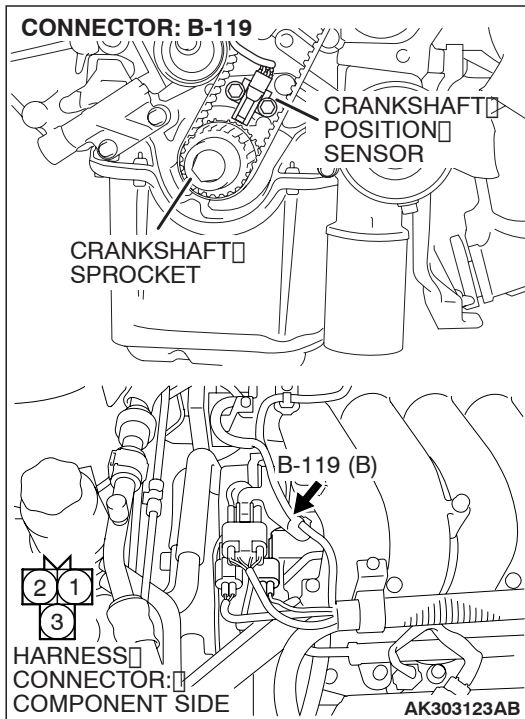
YES : Go to Step 15.

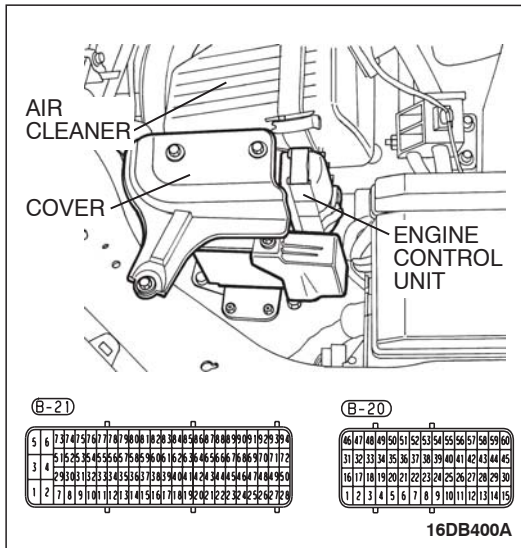
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 18.

STEP 15. Check for open circuit and harness damage between crankshaft position sensor connector B-119 (terminal No. 1) and ECU connector B-20 (terminal No. 8).
Q: Is the harness wire in good condition?

YES : Then go to Step 16.

NO : Repair it. Then go to Step 18.





STEP 16. Check harness connector B-20 at ECU for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 17.

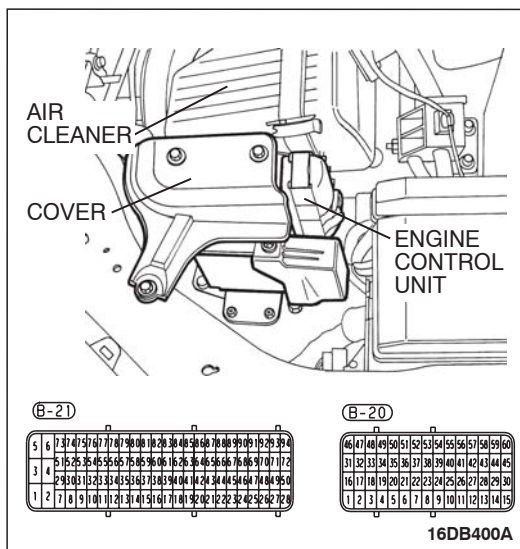
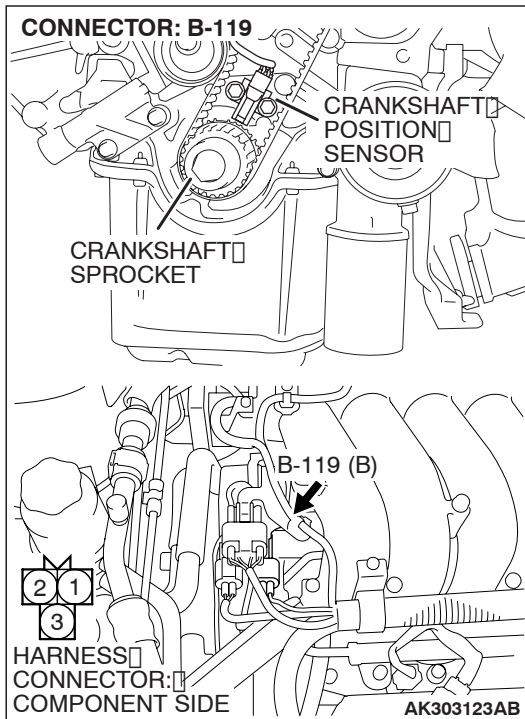
NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then go to Step 18.

STEP 17. Check for harness damage between crankshaft position sensor connector B-119 (terminal No. 2) and ECU connector B-20 (terminal No. 23).

Q: Is the harness wire in good condition?

YES : Go to Step 20.

NO : Repair it. Then go to Step 18.



STEP 18. Test the EOB D drive cycle.

- (1) Carry out a test drive with the drive cycle pattern. Refer to Diagnostic Function – EOB D Drive Cycle – [P.13A-11](#).
- (2) Check the diagnostic trouble code (DTC).

Q: Is DTC P0335 set?

YES : Retry the troubleshooting.

NO : The inspection is complete.

[NEXT PAGE](#)