GROUP 17

ENGINE AND EMISSION CONTROL

CONTENTS

Continued on next page

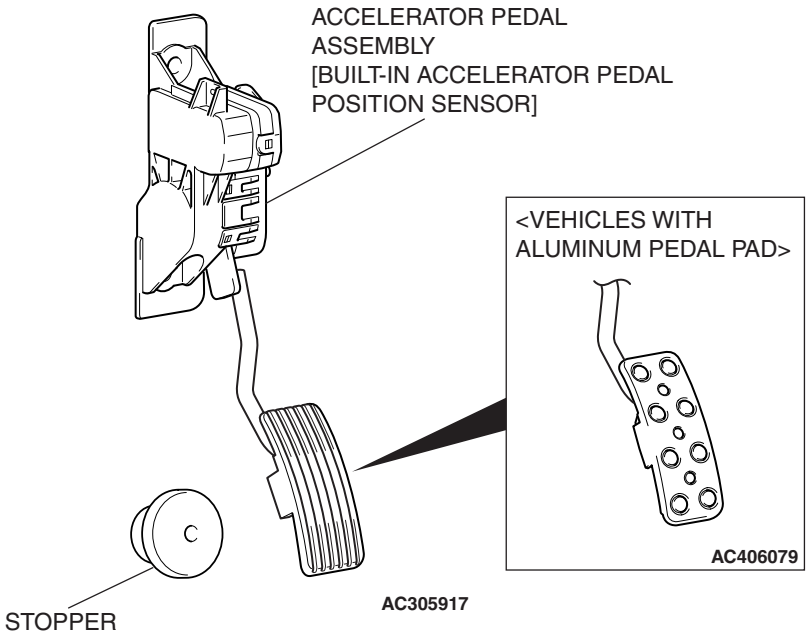
ENGINE CONTROL

GENERAL DESCRIPTION

M1171000100471

For the accelerator system, an electronic throttle actuator control system is utilized, eliminating the accelerator cable.

CONSTRUCTION DIAGRAM



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ENGINE CONTROL SYSTEM DIAGNOSIS

INTRODUCTION

M1171002000306

If there is a malfunction in the engine control system, the accelerator pedal or throttle body may be faulty.

TROUBLESHOOTING STRATEGY

M1171002100336

Use these steps to plan your diagnostic strategy. If you follow them carefully, you will be sure that you have exhausted most of the possible ways to find an engine control system fault.

1. Gather information from the customer.
2. Verify that the condition described by the customer exists.
3. Find the malfunction by following the Symptom Chart.
4. Verify that the malfunction is eliminated.

SYMPTOM CHART

M1171002200355

SYMPTOM	INSPECTION PROCEDURE	REFERENCE PAGE
Throttle valve will not fully open or close	1	P.17-4
Accelerator pedal operation not smooth (over acceleration)	2	P.17-6

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: Throttle Valve will not Fully Open or Close

COMMENT

The throttle body or accelerator pedal position sensor is suspected.

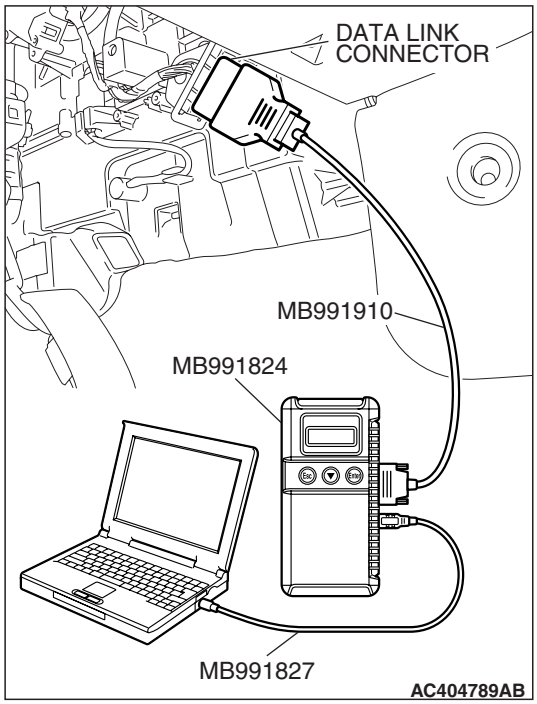
TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CASE:)

- Malfunction of the throttle body.
- Malfunction of the accelerator pedal position sensor.
- Malfunction of the ECM <M/T> or PCM <A/T>.

DIAGNOSIS

Required Special Tools:

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



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

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

(1) Ensure that the ignition switch is at the "LOCK" (OFF) position.
(2) Start up the personal computer.
(3) Connect special tool MB991827 to special tool MB991824 and the personal computer.
(4) Connect special tool MB991910 to special tool MB991824.
(5) Connect special tool MB991910 to the data link connector.
(6) Turn the power switch of special tool MB991824 to the "ON" position.

NOTE: When special tool MB991824 is energized, special tool MB991824 indicator light will be illuminated in a green color.

(7) Start the MUT-III system on the personal computer.
(8) Turn the ignition switch to the "ON" position.
(9) Check for MFI system diagnostic trouble code. (Refer to GROUP 13A, MFI Diagnosis – Diagnostic Function – How to Read and Erase Diagnostic Trouble Code P.13A-6) <2.4L engine> or (Refer to GROUP 13B, MFI Diagnosis – Diagnostic Function – How to Read and Erase Diagnostic Trouble Code P.13B-6) <3.8L engine>.
(10) Turn the ignition switch to the "LOCK" (OFF) position, and then remove scan tool MB991958 in the reverse order of installation.

Q: Is any DTC set?

YES : Repair MFI system. (Refer to GROUP 13A, MFI Diagnosis – Diagnostic Trouble Code Chart P.13A-41) <2.4L engine> or (Refer to GROUP 13B, MFI Diagnosis – Diagnostic Trouble Code Chart P.13B-43) <3.8L engine>. Then go to Step 2.
NO : Go to Step 2.

STEP 2. Retest the system.

Q: Does the throttle valve fully open and close?

YES : The procedure is complete.
NO : Return to Step 1.

INSPECTION PROCEDURE 2: Accelerator Pedal Operation not Smooth (Over Acceleration)

COMMENT
The accelerator pedal, its installation condition or the accelerator pedal position sensor is suspected.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CASE:)
- Malfunction of the accelerator pedal.
- Incorrectly installed accelerator pedal.
- Malfunction of the accelerator pedal position sensor.

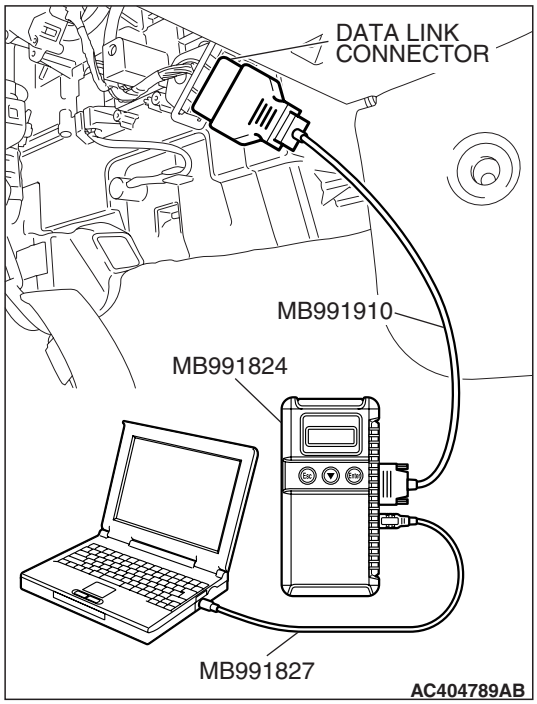
DIAGNOSIS
Required Special Tools:
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A

STEP 1. Check if the accelerator pedal is installed correctly.

Q: Is the accelerator pedal installed correctly?

YES : Go to Step 2.

NO : Remove and reinstall the accelerator pedal. (Refer to P.17-9). Go to Step 3.



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

⚠ CAUTION

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

(1) Ensure that the ignition switch is at the "LOCK" (OFF) position.
(2) Start up the personal computer.
(3) Connect special tool MB991827 to special tool MB991824 and the personal computer.
(4) Connect special tool MB991910 to special tool MB991824.
(5) Connect special tool MB991910 to the data link connector.
(6) Turn the power switch of special tool MB991824 to the "ON" position.

NOTE: When special tool MB991824 is energized, special tool MB991824 indicator light will be illuminated in a green color.

(7) Start the MUT-III system on the personal computer.
(8) Turn the ignition switch to the "ON" position.
(9) Check for MFI system diagnostic trouble code. (Refer to GROUP 13A, MFI Diagnosis –Diagnostic Function –How to Read and Erase Diagnostic Trouble Code P.13A-6) <2.4L engine> or (Refer to GROUP 13B, MFI Diagnosis – Diagnostic Function –How to Read and Erase Diagnostic Trouble Code P.13B-6) <3.8L engine>.
(10) Turn the ignition switch to the "LOCK" (OFF) position, and then remove scan tool MB991958 in the reverse order of installation.

Q: Is any DTC set?

YES : Repair MFI system. (Refer to GROUP 13A, MFI Diagnosis –Diagnostic Trouble Code Chart P.13A-41) <2.4L engine> or (Refer to GROUP 13B, MFI Diagnosis –Diagnostic Trouble Code Chart P.13B-43) <3.8L engine>. Then go to Step 3.
NO : Go to Step 3.

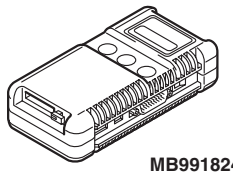
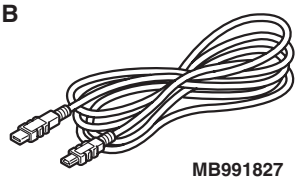
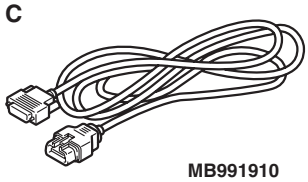
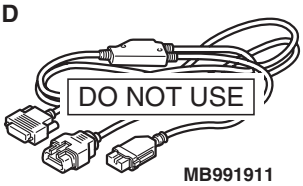
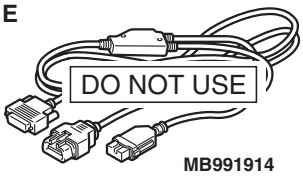
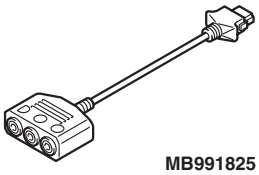
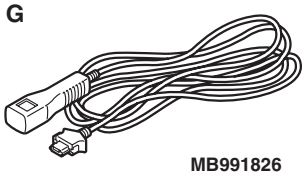
STEP 3. Retest the system.

Q: Does the accelerator pedal work normally?

YES : The procedure is complete.
NO : Return to Step 1.

SPECIAL TOOL

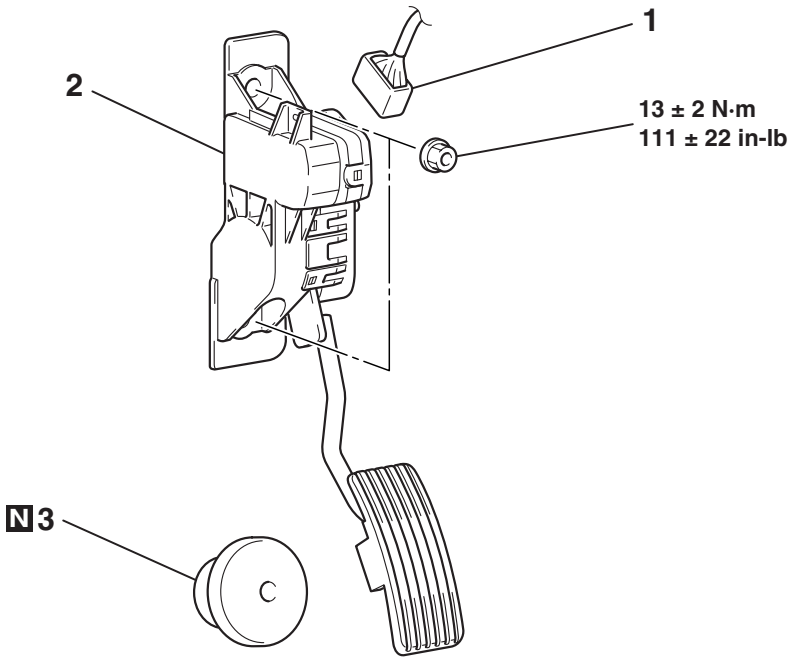
M1171000600089

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
A  MB991824 B  MB991827 C  MB991910 D  MB991911 E  MB991914 F  MB991825 G  MB991826 MB991958	MB991958 A: MB991824 B: MB991827 C: MB991910 D: MB991911 E: MB991914 F: MB991825 G: MB991826 MUT-III sub assembly A: Vehicle communication interface (V.C.I.) B: MUT-III USB cable C: MUT-III main harness A (Vehicles with CAN communication system) D: MUT-III main harness B (Vehicles without CAN communication system) E: MUT-III main harness C (for Daimler Chrysler models only) F: MUT-III measurement adapter G: MUT-III trigger harness	MB991824-KIT *NOTE: G: MB991826 MUT-III trigger harness is not necessary when pushing V.C.I. ENTER key.*	Checking diagnostic trouble codes **⚠ CAUTION** **For vehicles with CAN communication, use MUT-III main harness A to send simulated vehicle speed. If you connect MUT-III main harness B instead, the CAN communication does not function correctly.**

ACCELERATOR PEDAL

REMOVAL AND INSTALLATION

M1171003000172



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REMOVAL STEPS
1. ACCELERATOR PEDAL POSITION SENSOR CONNECTOR

REMOVAL STEPS (Continued)
2. ACCELERATOR PEDAL ASSEMBLY
3. ACCELERATOR STOPPER

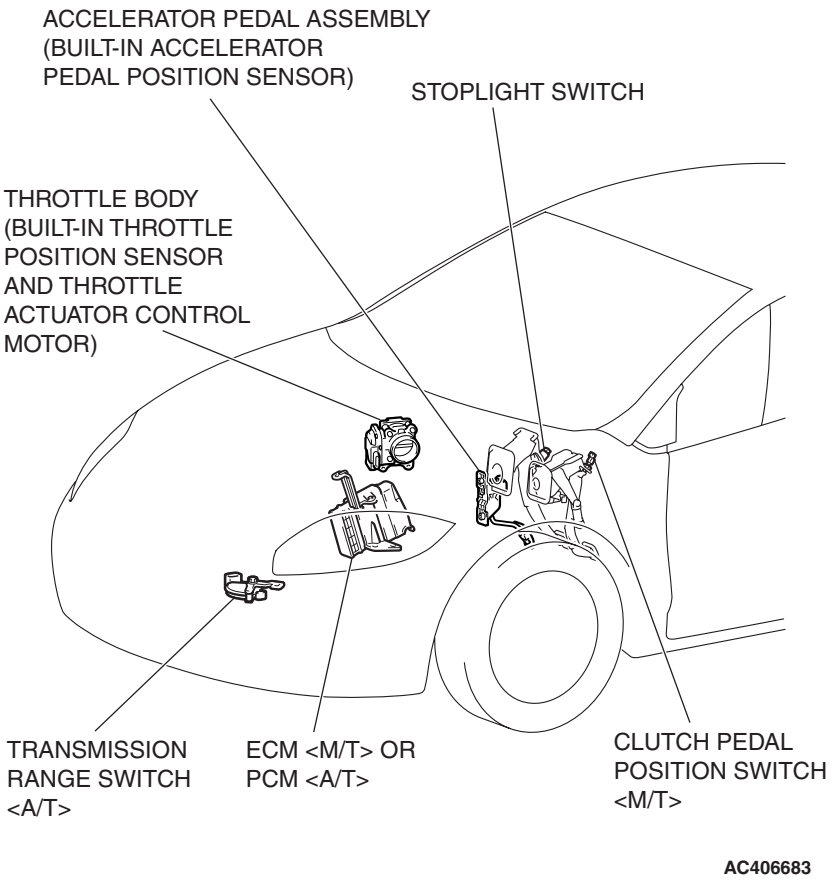
AUTO-CRUISE CONTROL

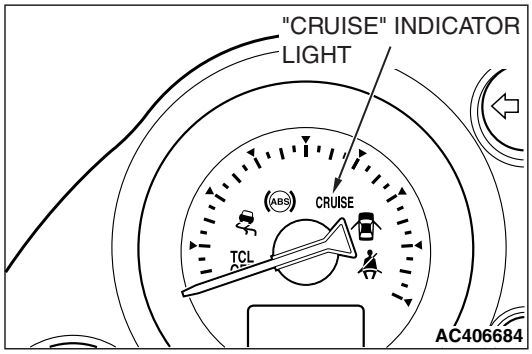
GENERAL DESCRIPTION

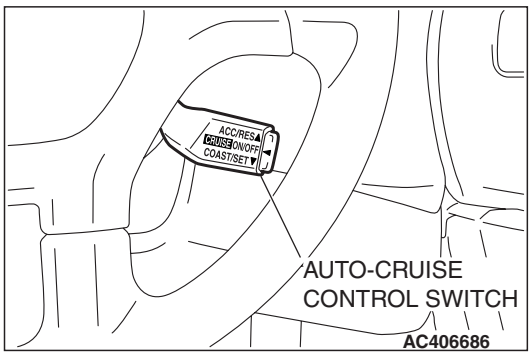
M1172000100429

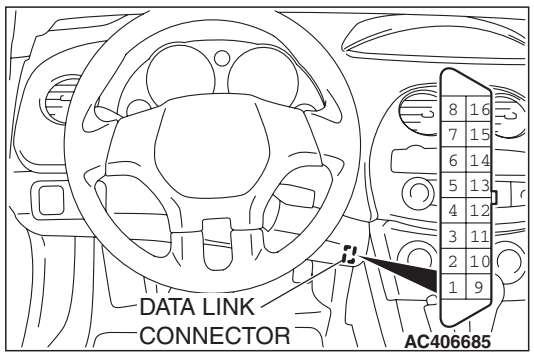
By using the auto-cruise control system, the driver can select and maintain a desired cruising speed [between 40 km/h (25 mph) and 200 km/h (124 mph)] without depressing the accelerator pedal.

CONSTRUCTION DIAGRAM









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AUTO-CRUISE CONTROL SYSTEM DIAGNOSIS

INTRODUCTION TO AUTO-CRUISE CONTROL SYSTEM DIAGNOSIS

M1172003300303

The auto-cruise control system allows driving without stepping on the accelerator pedal by setting a random speed between 40 km/h (25 mph) and 200 km/h (124 mph). Malfunctions in this system can be investigated by the following methods.

Auto-cruise control system diagnostic trouble codes

The auto-cruise control system consists of the engine control module (ECM) <M/T> or powertrain control module (PCM) <A/T>, control switches and sensors. The control switches and sensors monitor the state of the vehicle. The ECM <M/T> or PCM <A/T> controls the throttle valve opening angle in the throttle body in accordance with the input signals from the switches and sensors. If the PCM detects a malfunction on any of those components, the ECM <M/T> or PCM <A/T> estimates where the problem may be occurring, and will set a diagnostic trouble code. Diagnostic trouble codes cover the auto-cruise control switch, stoplight switch and ECM <M/T> or PCM <A/T>.

DIAGNOSTIC TROUBLESHOOTING STRATEGY

M1172002000547

Use these steps to plan your diagnostic strategy. If you follow them carefully, you will check most of the possible causes of an auto-cruise control system malfunction.

1. Gather information from the customer.
2. Verify that the condition described by the customer exists.
3. Check the vehicle for any auto-cruise control system DTC. (Refer to P.17-11, Diagnostic Function –How to Read Diagnostic Trouble Codes).
4. If you can verify the condition but no auto-cruise control system DTCs are set, the malfunction may be intermittent. (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions P.00-14).
5. If you can verify the condition but there are no auto-cruise control system DTCs, find the fault. (Refer to P.17-53, Symptom Chart).
6. If there is an auto-cruise control system DTC, record the number of the code, then erase the code. (Refer to P.17-11, Diagnostic Function – How to Erase Diagnostic Trouble Codes).
7. Re-create the auto-cruise control system DTC set conditions to see if the same auto-cruise control system DTC will set again. (Refer to P.17-11, Diagnostic Function –How to Read Diagnostic Trouble Codes).
   - If the same auto-cruise control system DTC sets again, perform the diagnostic procedures for the set code. (Refer to P.17-15, Diagnostic Trouble Code Chart).

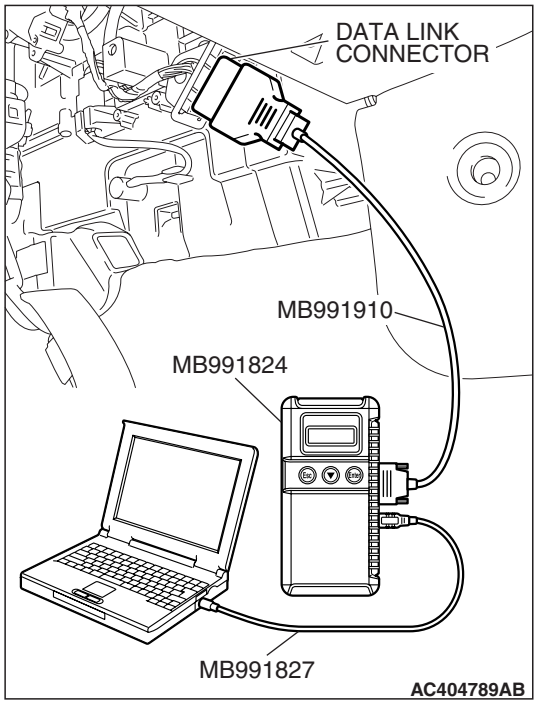
DIAGNOSTIC FUNCTION

M1172004900193

HOW TO CONNECT THE SCAN TOOL (MUT-III).

Required Special Tools:

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



⚠ CAUTION

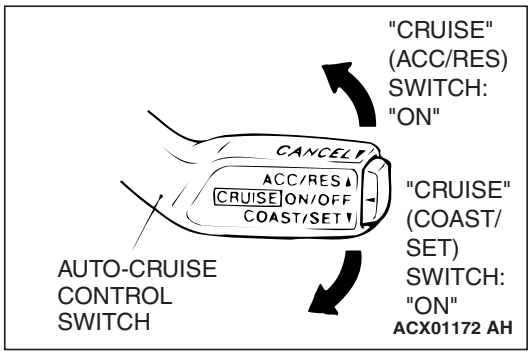
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

1. Ensure that the ignition switch is at the "LOCK" (OFF) position.
2. Start up the personal computer.
3. Connect special tool MB991827 to special tool MB991824 and the personal computer.
4. Connect special tool MB991910 to special tool MB991824.
5. Connect special tool MB991910 to the data link connector.
6. Turn the power switch of special tool MB991824 to the "ON" position.

   NOTE: When special tool MB991824 is energized, special tool MB991824 indicator light will be illuminated in green color.
7. Start the MUT-III system on the personal computer.

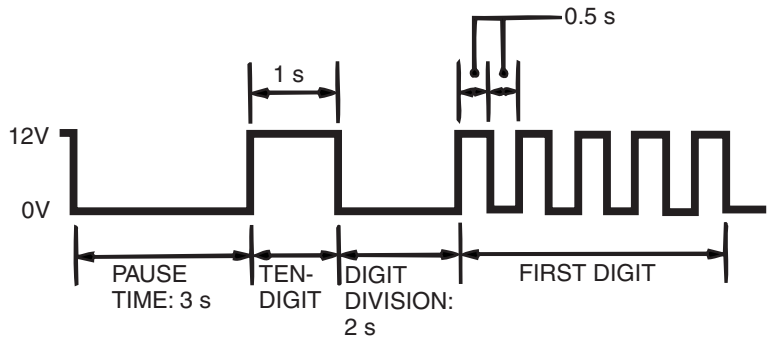
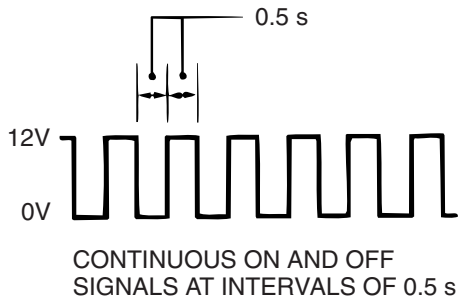
   NOTE: Disconnecting scan tool MB991958 is the reverse of the connecting sequence, making sure that the ignition switch is at the "LOCK" (OFF) position.

HOW TO READ DIAGNOSTIC TROUBLE CODES



1. Turn the ignition switch to the "ON" position while holding the auto-cruise control switch down to the "COAST/SET" position. Then, within one second, more the cruise control switch up to the "ACC/RES" position.
2. Read a diagnostic trouble code by observing the flash display pattern of the "CRUISE" indicator light in the combination meter.

DIAGNOSTIC RESULT DISPLAY METHOD WHEN USING THE "CRUISE" INDICATOR LIGHT

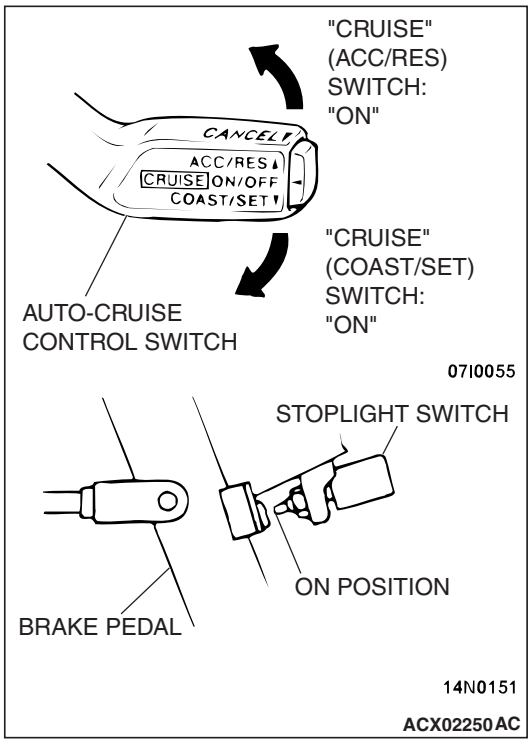
WHEN THE DIAGNOSTIC TROUBLE CODE NO.15 IS OUTPUT	WHEN NO DIAGNOSTIC TROUBLE CODE IS OUTPUT
	

NOTE: Other on-board diagnostic items are also output as voltage waveforms corresponding to diagnostic trouble code numbers.

HOW TO ERASE DIAGNOSTIC TROUBLE CODES

NOTE: The diagnostic trouble code will not be erased even if the negative battery terminal is disconnected.

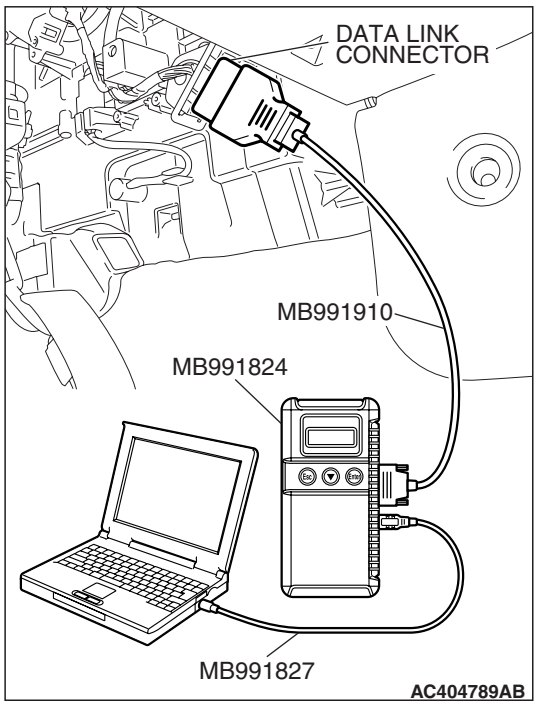
1. Turn the ignition switch to the "ON" position while holding the auto-cruise control switch down to the "COAST/SET" position. Then, within one second, more the cruise control switch up to the "ACC/RES" position.
2. Check to make sure the "CRUISE" indicator light on the instrument panel is flashing.
3. Put the auto-cruise control switch to the "COAST/SET" position. Depress the brake pedal and hold for five seconds or more. Release the brake pedal, auto-cruise control switch, then turn the ignition switch to the "LOCK" (OFF) position. The DTC are now erased.



HOW TO READ DATA LIST

Required Special Tools:

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



⚠ CAUTION

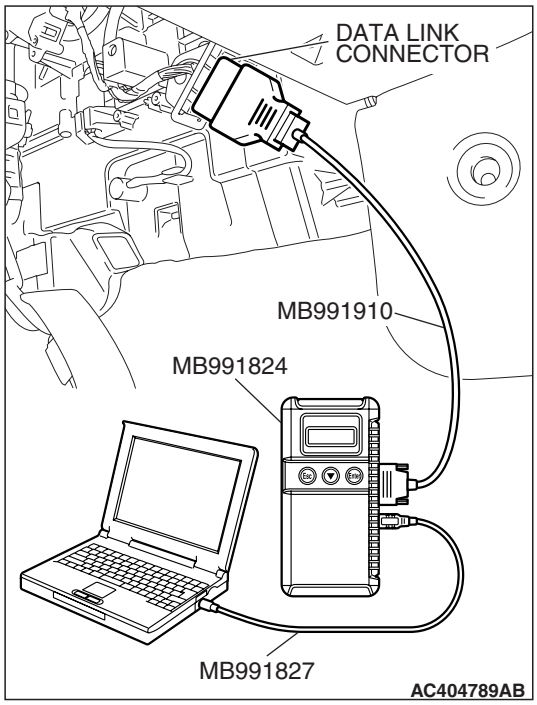
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

1. Connect scan tool MB991958 to the data link connector.
2. Turn the ignition switch to the "ON" position.
3. Select the "Interactive Diagnosis" from the start-up screen.
4. Select the "System Select."
5. Choose the "Auto-cruise Control System" from the "POWERTRAIN" tab.
6. Select the "Data List."
7. Choose an appropriate item.
8. Turn the ignition switch to the "LOCK" (OFF) position.
9. Disconnect scan tool MB991958.

HOW TO DIAGNOSE THE CAN BUS LINE

Required Special Tools:

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



⚠ CAUTION

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

1. Connect scan tool MB991958 to the data link connector.
2. Turn the ignition switch to the "ON" position.
3. Select the "CAN bus diagnosis" from the start-up screen.
4. When the vehicle information is displayed, confirm that it matches the vehicle whose CAN bus lines will be diagnosed.
   - If the information is correct, go to step 8.
   - If not, go to step 5.
5. Select the "view vehicle information" button.
6. Enter the vehicle information and select the "OK" button.
7. When the vehicle information is displayed, confirm again that it matches the vehicle which is diagnosed CAN bus line.
   - If they match, go to step 8.
   - If not, go to step 5.
8. Press the "OK" button.
9. When the optional equipment screen is displayed, choose the one which the vehicle is fitted with, and then select the "OK" button.

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10.Turn the ignition switch to the "LOCK" (OFF) position.
11.Disconnect scan tool MB991958.

DIAGNOSTIC TROUBLE CODE CHART

M1172002200422

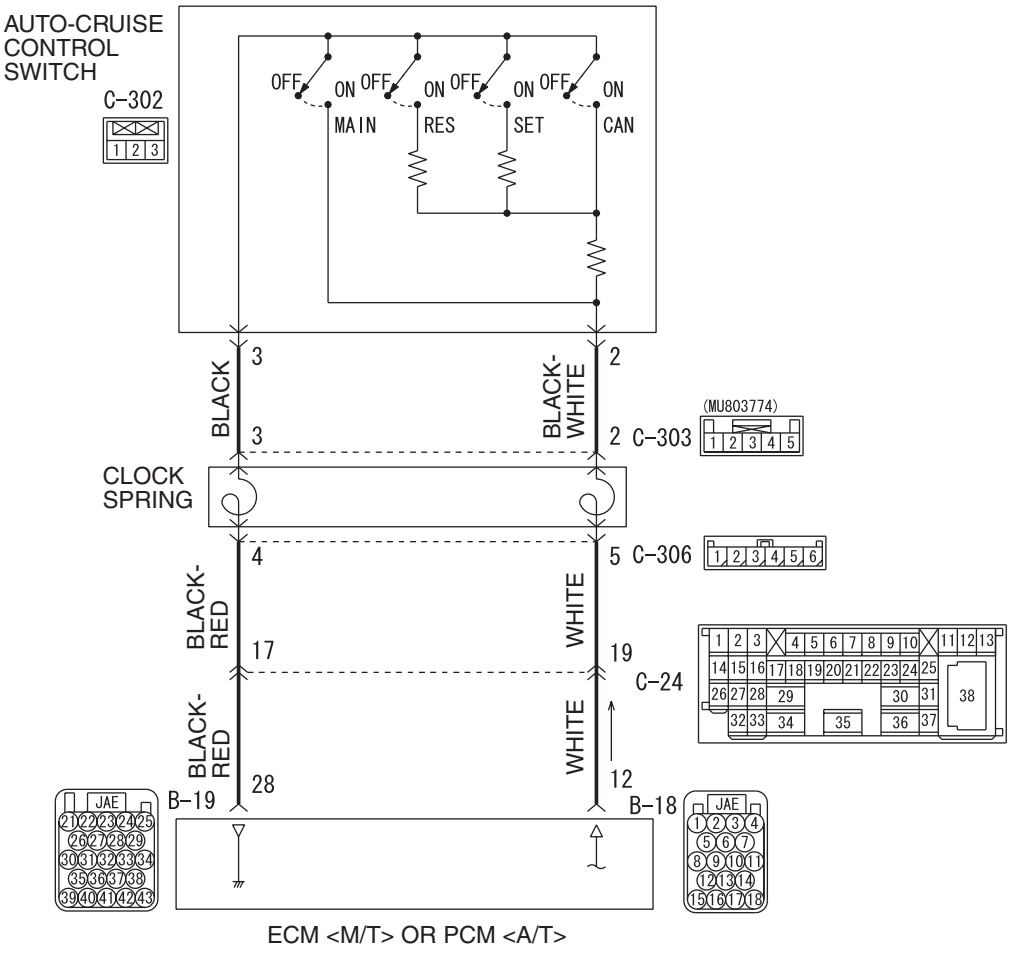
Check according to the inspection chart that is appropriate for the diagnostic trouble code.

DIAGNOSTIC TROUBLE CODE NO.	INSPECTION ITEM	REFERENCE PAGE
15	Auto-cruise control switch system	P.17-15
22	Stoplight switch system	P.17-32
23	ECM <M/T> or PCM <A/T> and its related components	P.17-51

DIAGNOSTIC TROUBLE CODE PROCEDURES

DTC P15: Auto-cruise Control Switch System

Auto-cruise Control Switch System Circuit



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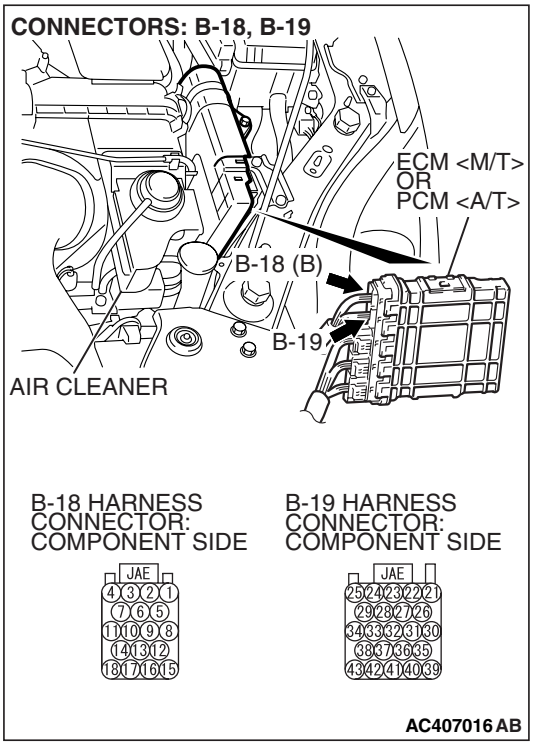

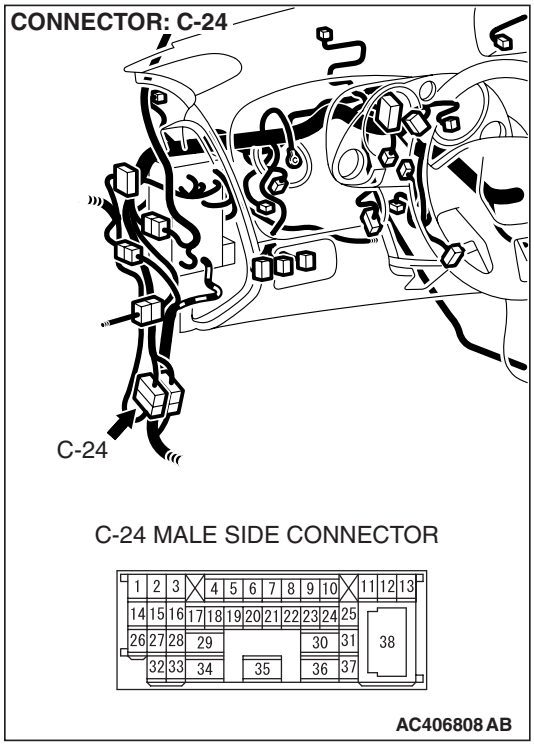

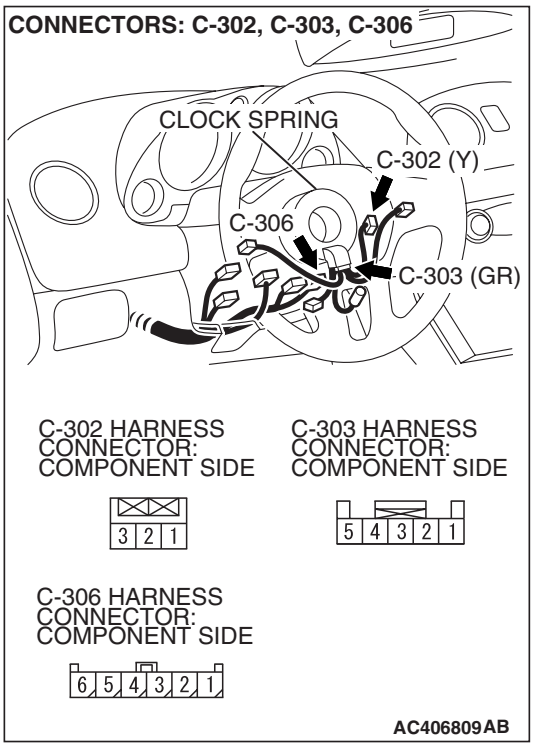

CIRCUIT OPERATION

This circuit judges the signals of each switch ("COAST/SET", "ACC/RES" and "CANCEL") of the auto-cruise control switch. The ECM <M/T> or PCM <A/T> detects the state of the auto-cruise control switch by sensing the voltages shown below.

- When all switches are OFF: 4.7 – 5.0 volts
- When the "CRUISE" (MAIN) switch is "ON": 0 – 0.3 volt
- When the "COAST/SET" switch is ON: 2.0 –2.8 volts
- When the "ACC/RES" switch is ON: 3.3 – 4.1 volts
- When the "CANCEL" switch is ON: 0.8 –1.5 volts

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DTC SET CONDITIONS

Check Condition

- The "CRUISE" indicator light illuminates.

Judgement Criteria

- If the auto-cruise control switch is operated, this DTC will be set when the ECM <M/T> or PCM <A/T> terminal voltage is different from the standard value.

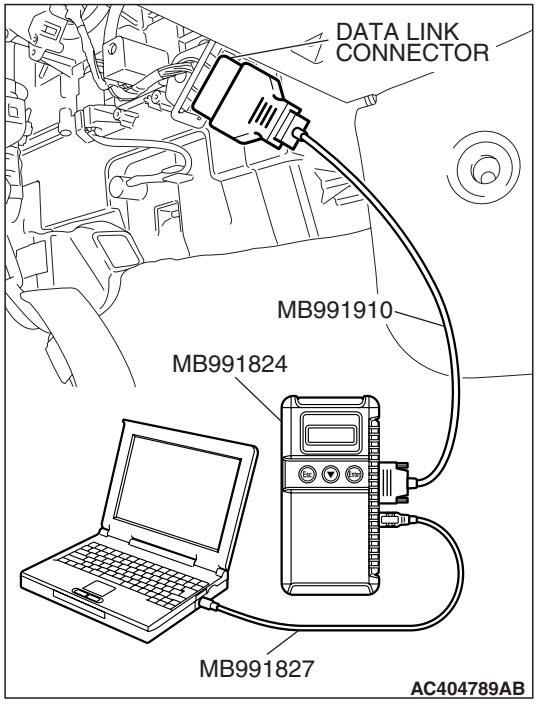
TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CASE:)

- Malfunction of the auto-cruise control switch.
- Malfunction of the clock spring.
- Damaged harness or connector.
- Malfunction of the ECM <M/T> or PCM <A/T>.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A
- MB991223: Harness Set
- MB992006: Extra Fine Probe
- MB991923: Power Plant ECU Check Harness



STEP 1. Using scan tool MB991958, check data list item 86: Main switch, list item 92: Set switch, item 91: Resume switch and list item 75: Cancel switch.

⚠ CAUTION

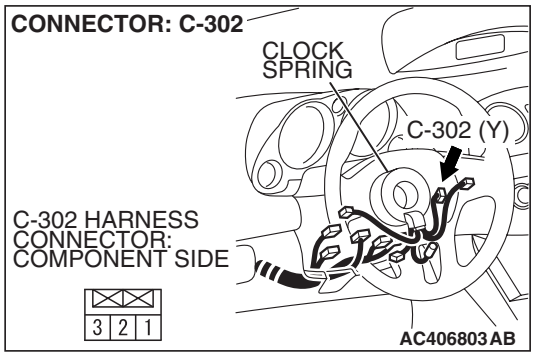
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to data reading mode for auto-cruise control system. (Refer to P.17-11).
- Item 86: Main switch.
  - When "CRUISE" (MAIN) switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
  - When "CRUISE" (MAIN) switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
- Item 92: Set switch.
  - When "COAST/SET" switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
  - When "COAST/SET" switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
- Item 91: Resume switch.
  - When "ACC/RES" switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
  - When "ACC/RES" switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
- Item 75: Cancel switch.
  - When "CANCEL" switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
  - When "CANCEL" switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".

(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

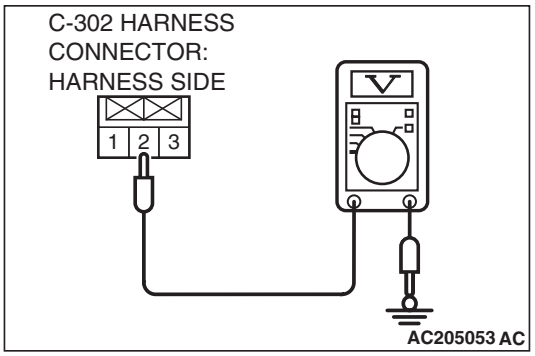
Q: Is the switch operating properly?

YES : Go to Step 17.
NO : Go to Step 2.



STEP 2. Measure the power supply voltage at auto-cruise control switch connector C-302 by backprobing.

(1) Remove the air bag module (driver's side). (Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-408).
(2) Connect the negative (−) battery cable.
(3) Do not disconnect auto-cruise control switch connector C-302.
(4) Turn the ignition switch to the "ON" position.
(5) The "CRUISE" (MAIN) switch to the "OFF" position.



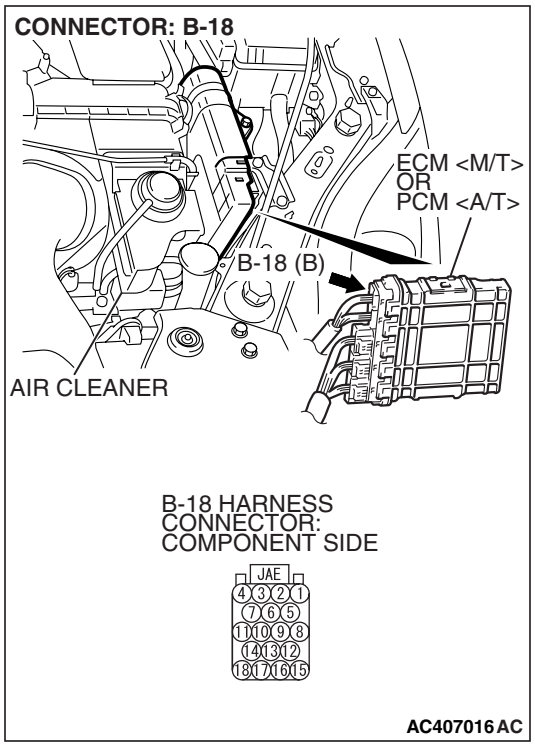
(6) Measure the power supply voltage between auto-cruise control switch connector C-302 terminal 2 and ground by backprobing.
(7) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage between 4.7 and 5.0 volts?

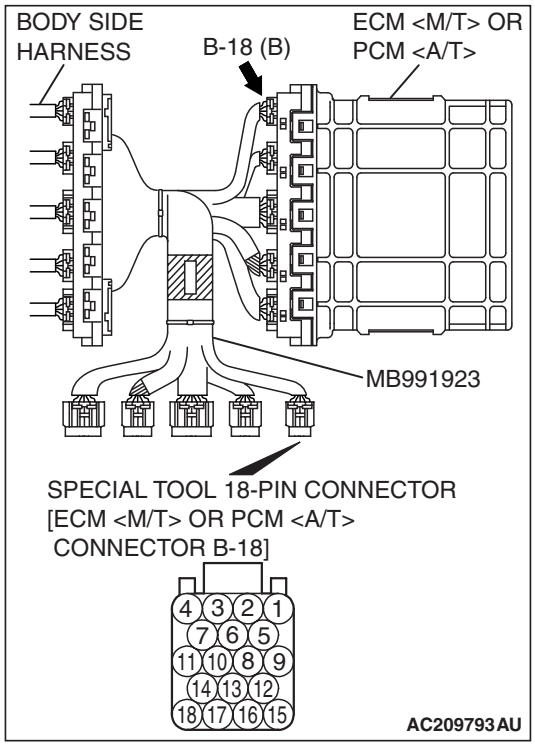
YES : Go to Step 9.
NO : Go to Step 3.

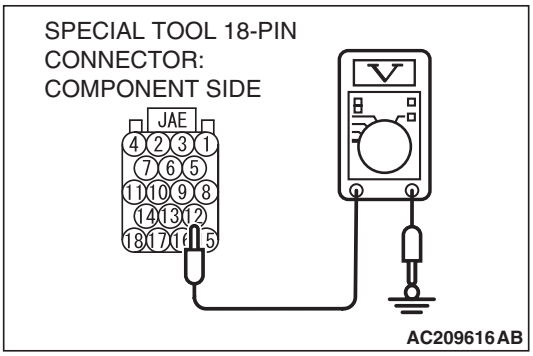
STEP 3. Measure the power supply voltage at ECM <M/T> or PCM <A/T> connector B-18.

(1) Disconnect all the connectors from the ECM <M/T> or PCM <A/T>.



(2) Connect special tool MB991923 between the ECM <M/T> or PCM <A/T> and the body-side harness connector.
(3) Turn the ignition switch to the "ON" position.
(4) The "CRUISE" (MAIN) switch to the "OFF" position.





(5) Measure the power supply voltage between special tool 18-pin connector terminal 12 (ECM <M/T> or PCM <A/T> connector B-18 terminal 12) and ground.
(6) Turn the ignition switch to the "LOCK" (OFF) position.
(7) Disconnect special tool MB991923 between the ECM <M/T> or PCM <A/T> and the body-side harness connector.
(8) Reconnect all the connectors to the ECM <M/T> or PCM <A/T>.

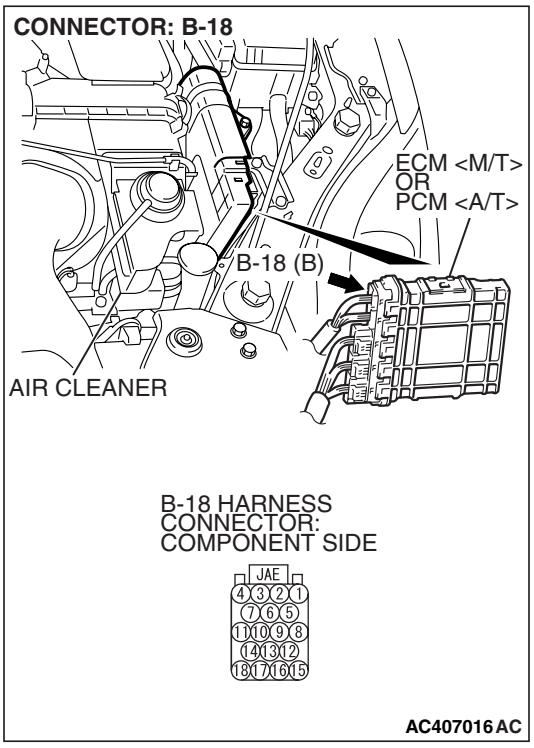
Q: Is the measured voltage between 4.7 and 5.0 volts?

YES : Go to Step 6.
NO : Go to Step 4.

STEP 4. Check ECM <M/T> or PCM <A/T> connector B-18 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

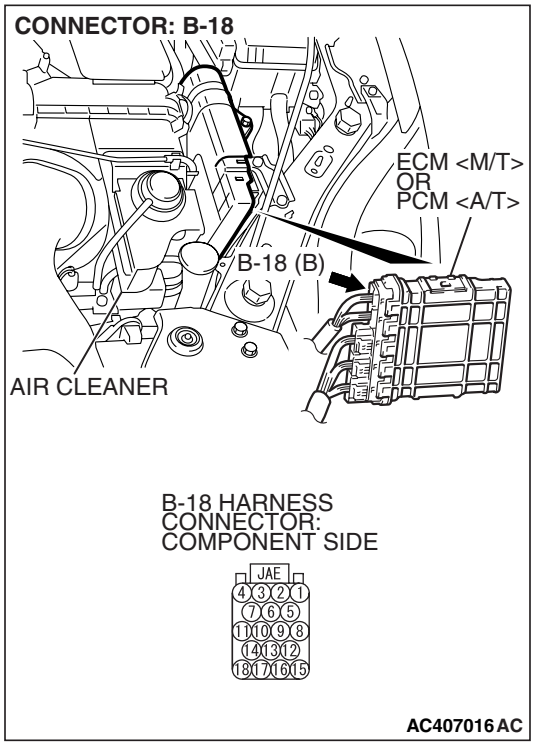
Q: Are the connector and terminals in good condition?

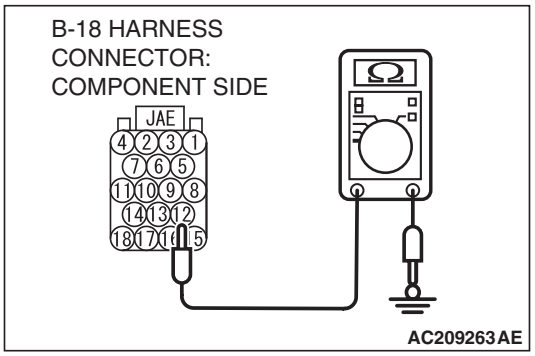
YES : Go to Step 5.
NO : Repair or replace the faulty connector. (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Install the air bag module (driver's side). (Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-408). Then go to Step 18.



STEP 5. Check the harness for short circuit to ground between the ECM <M/T> or PCM <A/T> connector B-18 terminal 12 and the auto-cruise control switch connector C-302 terminal 2.

(1) Disconnect ECM <M/T> or PCM <A/T> connector B-18 and measure at the harness connector side.
(2) Turn the ignition switch to the "LOCK" (OFF) position.





(3) Measure the continuity between ECM <M/T> or PCM <A/T> connector B-18 terminal 12 and ground.
(4) Reconnect ECM <M/T> or PCM <A/T> connector B-18.

Q: Is the measured continuity open circuit?

YES : Install the air bag module (driver's side). (Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-408). Then go to Step 17.

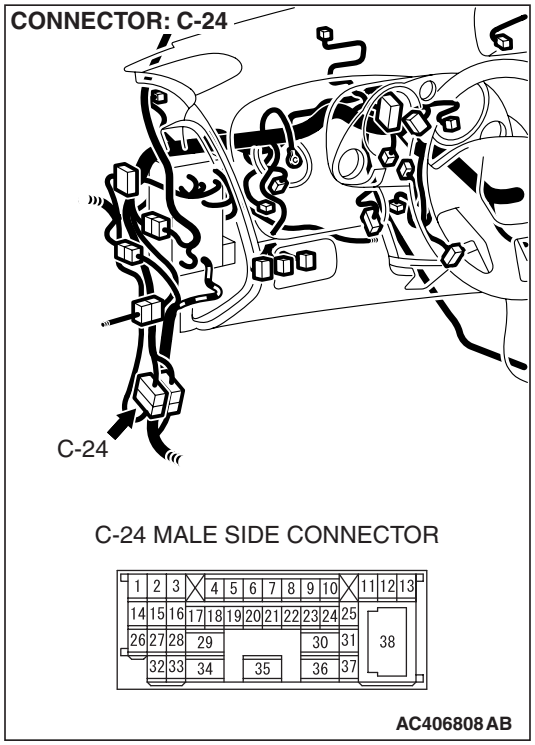
NO : Go to Step 6.

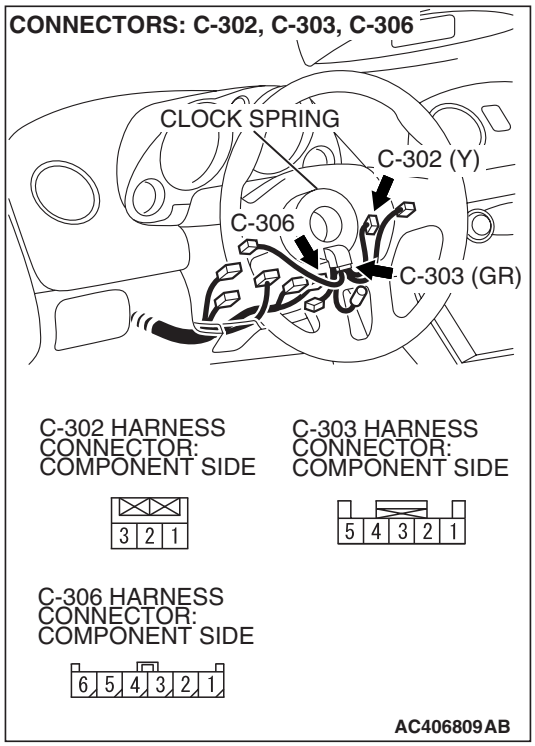
STEP 6. Check intermediate connector C-24, auto-cruise control switch connector C-302 and clock spring connectors C-303 and C-306 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

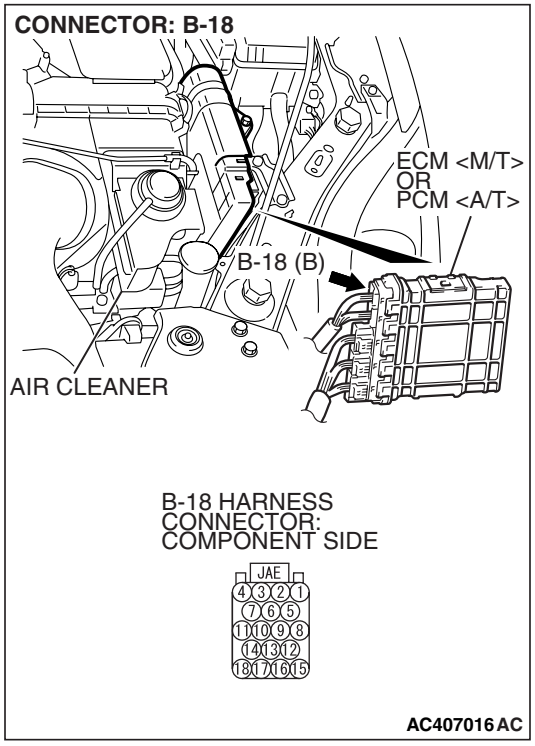
Q: Are the connectors and terminals in good condition?

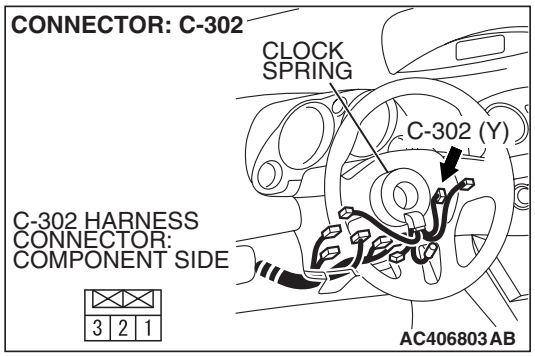
YES : Go to Step 7.

NO : Repair or replace the faulty connector. (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Install the air bag module (driver's side). (Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-408). Then go to Step 18.









STEP 7. Check the harness wire between ECM <M/T> or PCM <A/T> connector B-18 terminal 12 and auto-cruise control switch connector C-302 terminal 2 for damage.

Q: Are the harness wires in good condition?

YES : Go to Step 8.

NO : Repair the damaged harness wire and install the air bag module (driver's side). (Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-408). Then go to Step 18.

STEP 8. Check the clock spring.

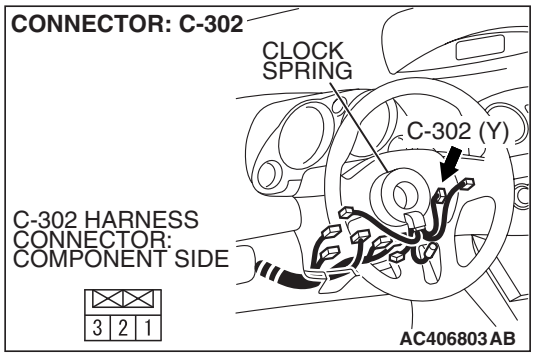
Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-414.

Q: Is the clock spring in good condition?

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 Malfunction P.00-14). Install the air bag module (driver's side). (Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-408). Then go to Step 18.

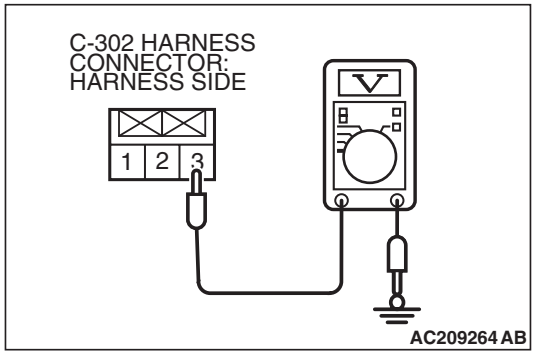
NO : Replace the clock spring and install the air bag module (driver's side). (Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-408). Then go to Step 18.

TSB Revision



STEP 9. Measure the ground voltage at auto-cruise control switch connector C-302 by backprobing.

(1) Do not disconnect auto-cruise control switch connector C-302.
(2) Turn the ignition switch to the "ON" position.
(3) Turn the "CRUISE" (MAIN) switch to the "ON" position.



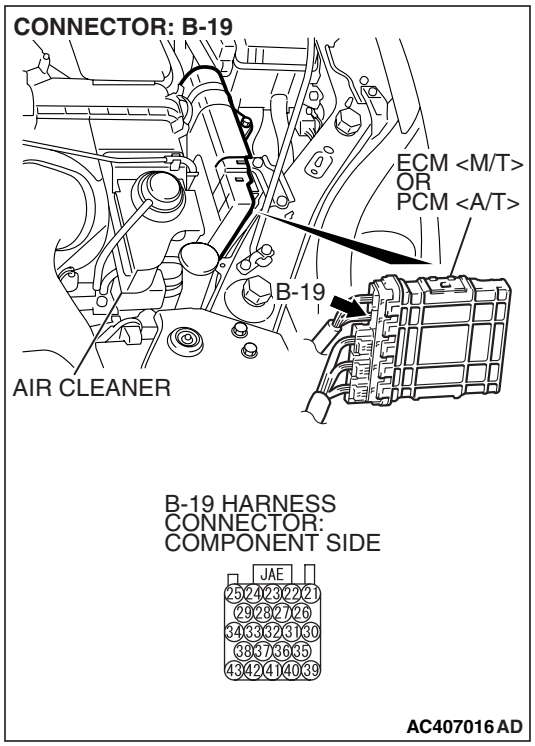
(4) Measure the ground voltage between auto-cruise control switch connector C-302 terminal 3 and ground by backprobing.
(5) Turn the "CRUISE" (MAIN) switch to the "OFF" position.
(6) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage 0.5 volt or less?

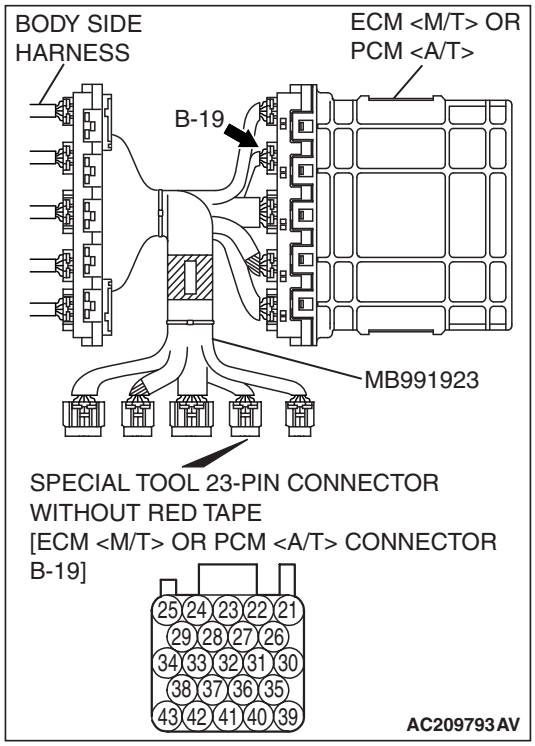
YES : Go to Step 15.
NO : Go to Step 10.

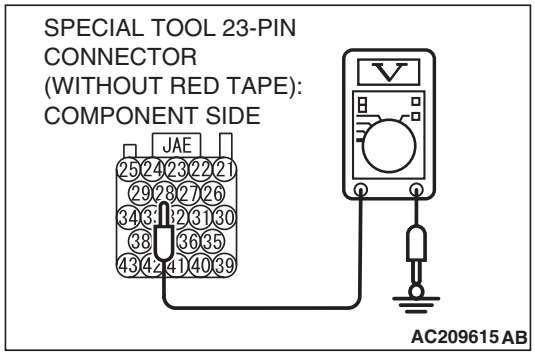
STEP 10. Measure the ground voltage at ECM <M/T> or PCM <A/T> connector B-19.

(1) Disconnect all the connectors from the ECM <M/T> or PCM <A/T>.



(2) Connect special tool MB991923 between the ECM <M/T> or PCM <A/T> and the body-side harness connector.
(3) Turn the ignition switch to the "ON" position.
(4) Turn the "CRUISE" (MAIN) switch to the "ON" position.



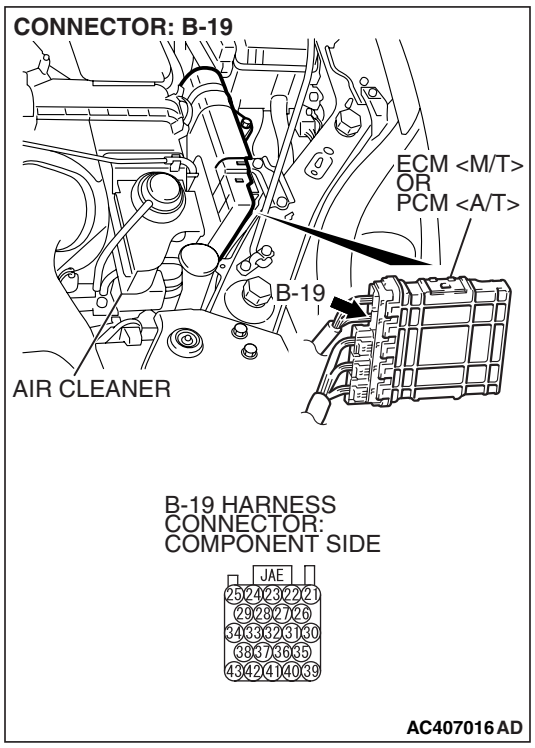


(5) Measure the ground voltage between special tool 23-pin connector (without red tape) terminal 28 (ECM <M/T> or PCM <A/T> connector B-19 terminal 28) and ground.
(6) Turn the "CRUISE" (MAIN) switch to the "OFF" position.
(7) Turn the ignition switch to the "LOCK" (OFF) position.
(8) Disconnect special tool MB991923 between the ECM <M/T> or PCM <A/T> and the body-side harness connector.
(9) Reconnect all the connectors to the ECM <M/T> or PCM <A/T>.

Q: Is the measured voltage 0.5 volt or less?

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

STEP 11. Check ECM <M/T> or PCM <A/T> connector B-19 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

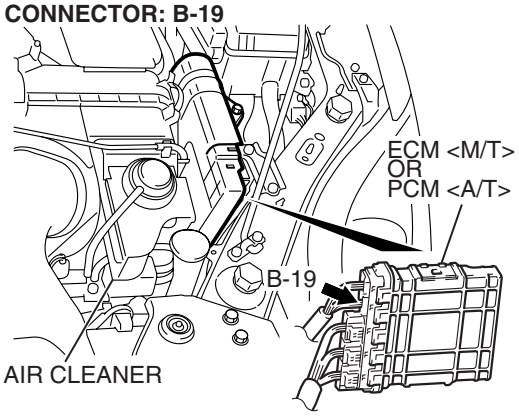


Q: Are the connector and terminals in good condition?

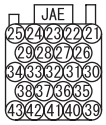
YES : Install the air bag module (driver's side). (Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-408). Then go to Step 17.
NO : Repair or replace the faulty connector. (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Install the air bag module (driver's side). (Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-408). Then go to Step 18.

STEP 12. Check ECM <M/T> or PCM <A/T> connector B-19, intermediate connector C-24, auto-cruise control switch connector C-302 and clock spring connectors C-303 and C-306 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

CONNECTOR: B-19



B-19 HARNESS CONNECTOR: COMPONENT SIDE



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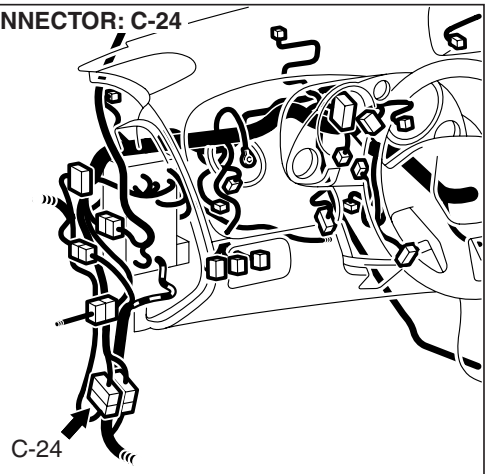
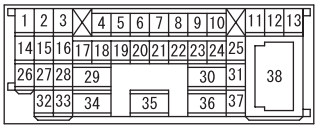
CONNECTOR: C-24



C-24 MALE SIDE CONNECTOR



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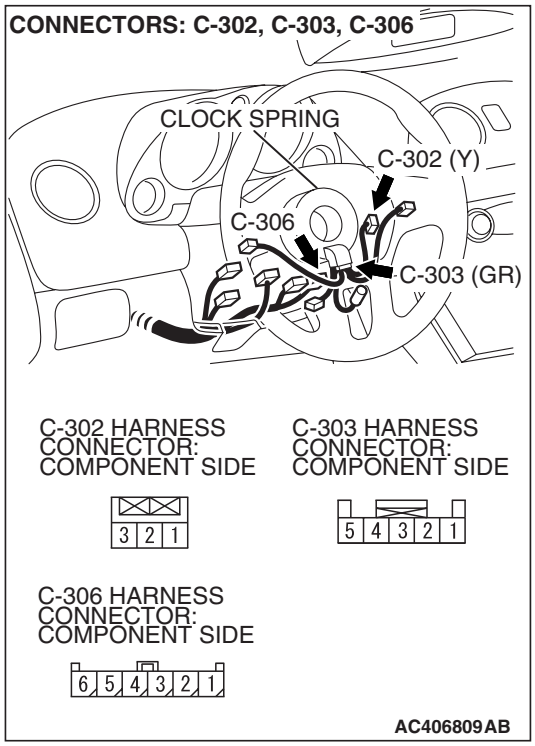
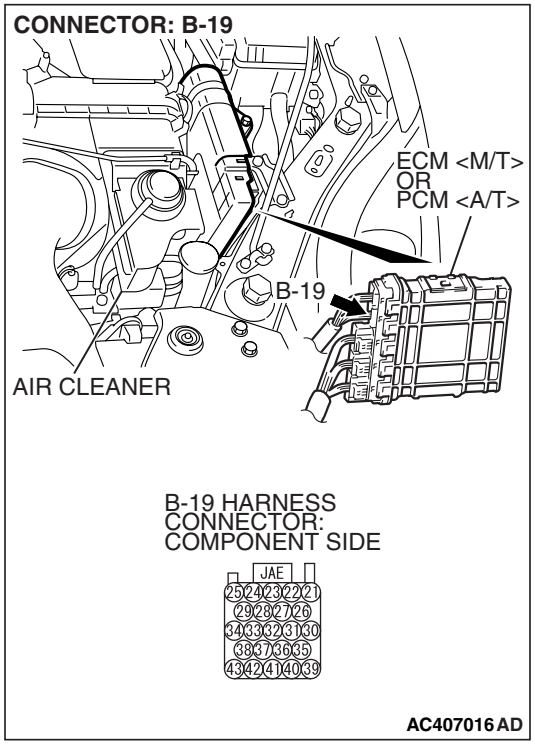
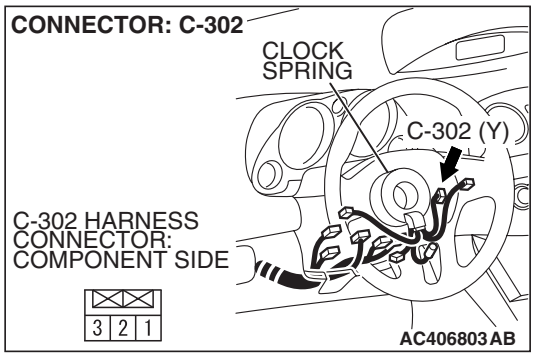


Q: Are the connectors and terminals in good condition?

YES : Go to Step 13.

NO : Repair or replace the faulty connector. (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Install the air bag module (driver's side). (Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-408). Then go to Step 18.





STEP 13. Check the harness wire between ECM <M/T> or PCM <A/T> connector B-19 terminal 28 and auto-cruise control switch connector C-302 terminal 3 for damage.

Q: Are the harness wires in good condition?

YES : Go to Step 14.

NO : Repair the damaged harness wire and install the air bag module (driver's side). (Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-408). Then go to Step 18.

STEP 14. Check the clock spring.

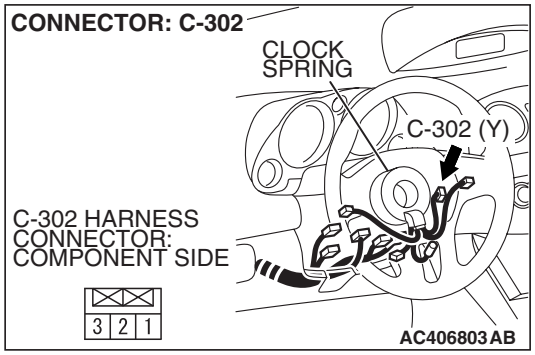
Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-414.

Q: Is the clock spring in good condition?

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 Malfunction P.00-14). Install the air bag module (driver's side). (Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-408). Then go to Step 18.

NO : Replace the clock spring and install the air bag module (driver's side). (Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-408). Then go to Step 18.

TSB Revision

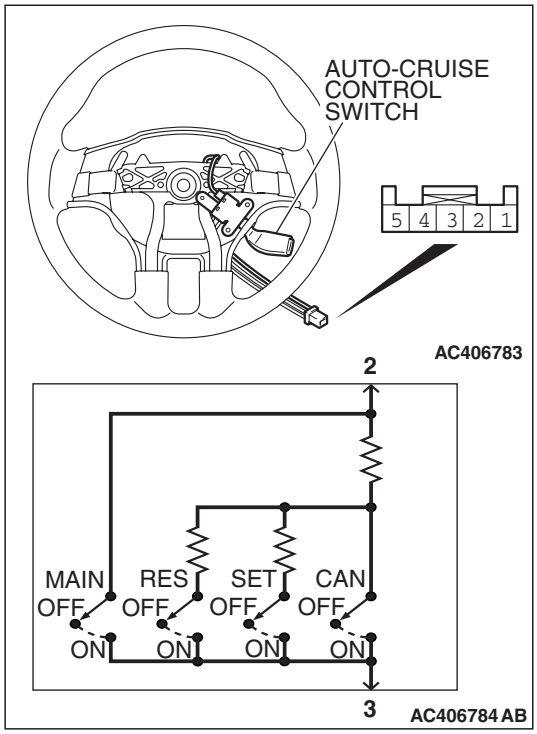


STEP 15. Check auto-cruise control switch connector C-302 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 16.

NO : Repair or replace the faulty connector. (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Install the air bag module (driver's side). (Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-408). Then go to Step 18.



STEP 16. Check the auto-cruise control switch.

(1) Remove the steering wheel assembly. (Refer to GROUP 37, Steering Wheel P.37-27).

(2) Measure the resistance between terminal 2 and terminal 3 when each of the "CRUISE" (MAIN), "COAST/SET", "ACC/RES" and "CANCEL" switch is pressed.

SWITCH POSITION	SPECIFIED CONDITION
"CRUISE" (MAIN) switch "OFF"	Open circuit
"CRUISE" (MAIN) switch "ON"	Less than 2 ohms
"CANCEL" switch ON	Approximately 100 Ω
"ACC/RES" switch ON	Approximately 887 Ω
"COAST/SET" switch ON	Approximately 300 Ω

Q: Is the resistance within specifications?

YES : Install the air bag module (driver's side). (Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-408). Then go to Step 17.

NO : Replace the auto-cruise control switch. (Refer to P.17-89). Install the air bag module (driver's side). (Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-408). Then go to Step 18.

STEP 17. Read the diagnostic trouble code.

Read the diagnostic trouble codes. (Refer to P.17-11).

Q: Is DTC P15 set?

YES : Replace the ECM <M/T> or PCM <A/T>. (Refer to GROUP 54A, Immobilizer System –Encrypted Code Registration Criteria Table P.54A-13). Then go to Step 18.

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 Malfunction P.00-14).

TSB Revision

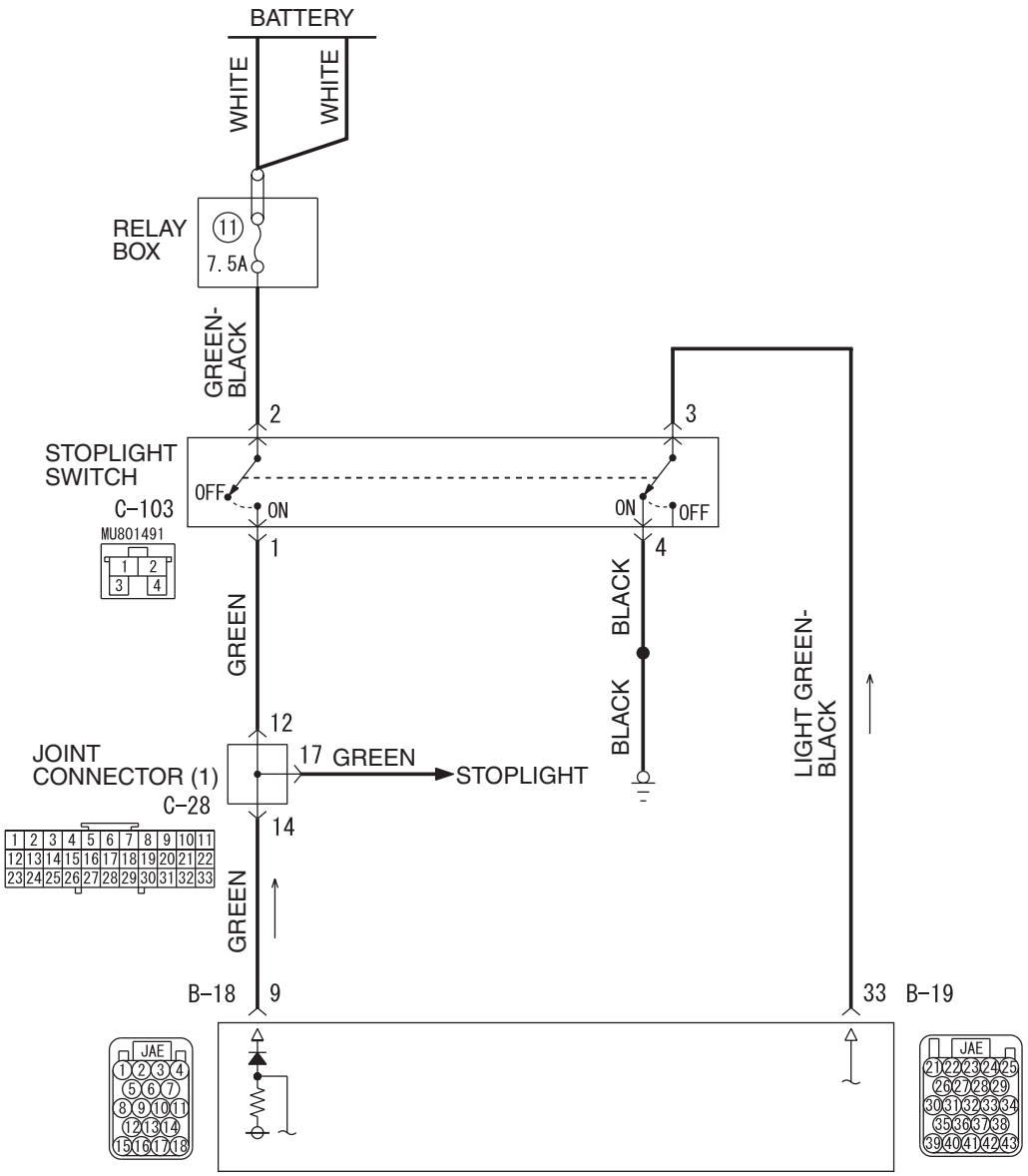
STEP 18. Read the diagnostic trouble code.
Read the diagnostic trouble codes. (Refer to P.17-11).

Q: Is DTC P15 set?

YES : Return to Step 1.
NO : The procedure is complete.

DTC 22: Stoplight Switch System

Stoplight Switch System Circuit



ECM <M/T> OR PCM <A/T>

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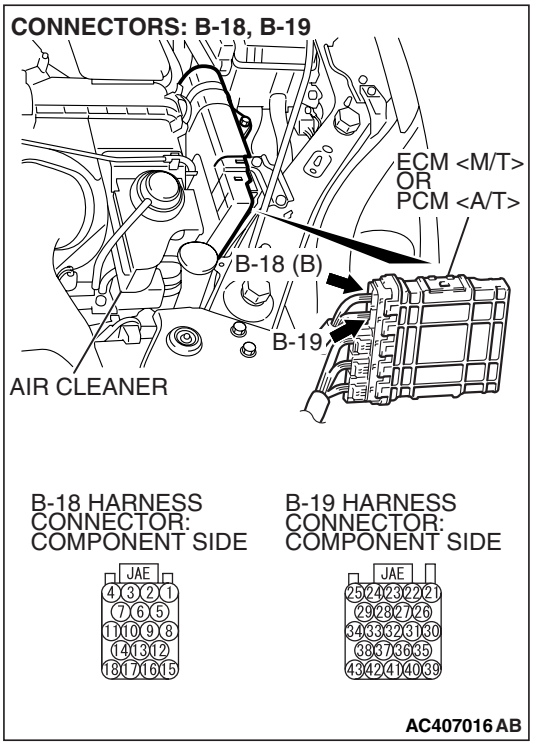
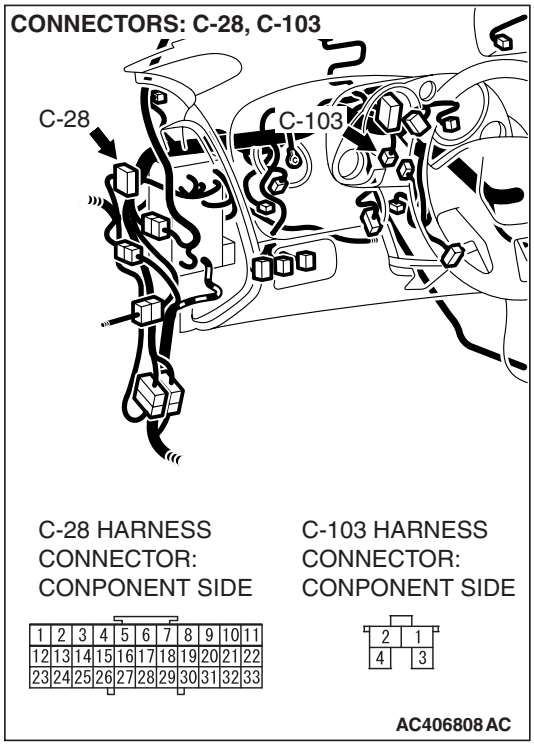
TSB Revision





CIRCUIT OPERATION

- Battery positive voltage is supplied to the stop-light switch (terminal 2 and 3).
- When the brake pedal is depressed, battery positive voltage is applied to the ECM <M/T> or PCM <A/T> (terminal 9 and 33).

DTC SET CONDITIONS

Check Condition

- The "CRUISE" indicator light illuminates.

Judgement Criteria

- Short in stop light switch circuit.
- Open circuit in the brake switch circuit (between ECM <M/T> or PCM <A/T> terminal 33 and ground).

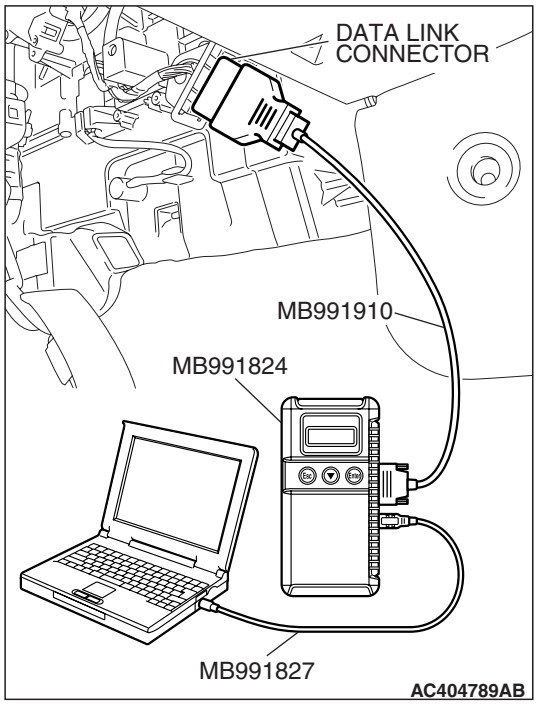
TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CASE:)

- Malfunction of the stoplight switch.
- Damaged harness or connector.
- Malfunction of the ECM <M/T> or PCM <A/T>.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A
- MB991223: Harness Set
- MB992006: Extra Fine Probe
- MB991923: Power Plant ECU Check Harness



STEP 1. Using scan tool MB991958, check data list item 74: Brake light switch.

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

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to data reading mode for auto-cruise control system. (Refer to P.17-11).
- Item 74, Brake light switch.
  - When the brake pedal is depressed, the display on scan tool MB991958 should be "ON".
  - When the brake pedal is released, the display on scan tool MB991958 should be "OFF".

(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 14.
NO : Go to Step 2.

STEP 2. Check the stoplight operation.

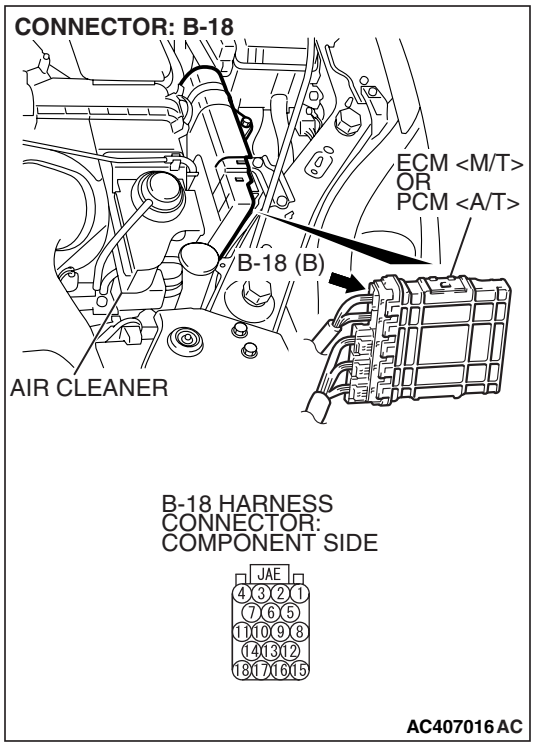
Check the stoplight operation.
- When the brake pedal is depressed, the stoplight will illuminate.
- When the brake pedal is released, the stoplight does not illuminate.

Q: Does the stoplight illuminate when the brake pedal is depressed and go out when the brake pedal is released?

YES : Go to Step 3.
NO : Go to Step 6.

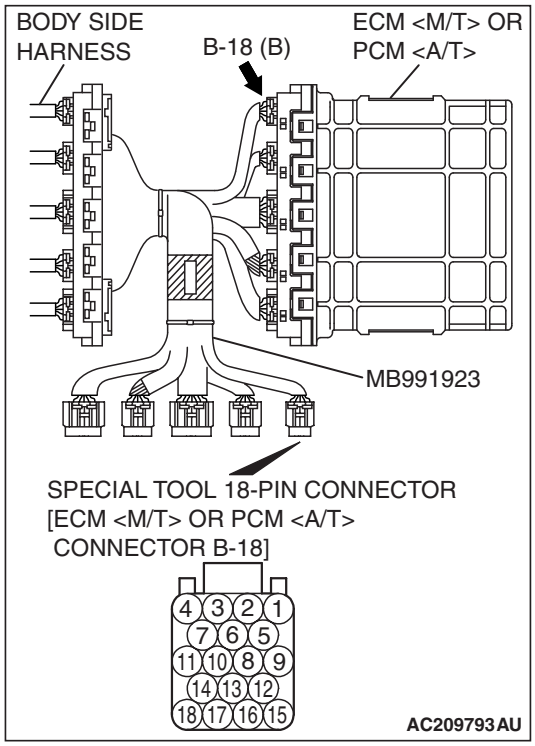
STEP 3. Measure the terminal voltage at ECM <M/T> or PCM <A/T> connector B-18.

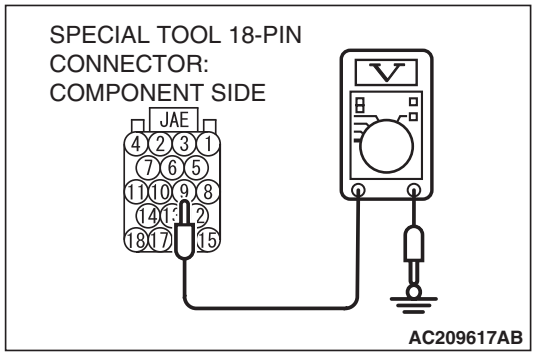
(1) Disconnect all the connectors from the ECM <M/T> or PCM <A/T>.



(2) Connect special tool MB991923 between the ECM <M/T> or PCM <A/T> and the body-side harness connector.

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





(4) Measure the terminal voltage between special tool 18-pin connector terminal 9 (ECM <M/T> or PCM <A/T> connector B-18 terminal 9) and ground.
- When the brake pedal is depressed, the voltage should measure battery positive voltage (approximately 12 volts).
- When the brake pedal is released, the voltage should measure 1 volt or less.

(5) Turn the ignition switch to the "LOCK" (OFF) position.
(6) Disconnect special tool MB991923 between the ECM <M/T> or PCM <A/T> and the body-side harness connector.
(7) Reconnect all the connectors to the ECM <M/T> or PCM <A/T>.

Q: Is the measured voltage battery positive voltage (approximately 12 volts) when the brake pedal is depressed and 1 volt or less when the brake pedal is released?

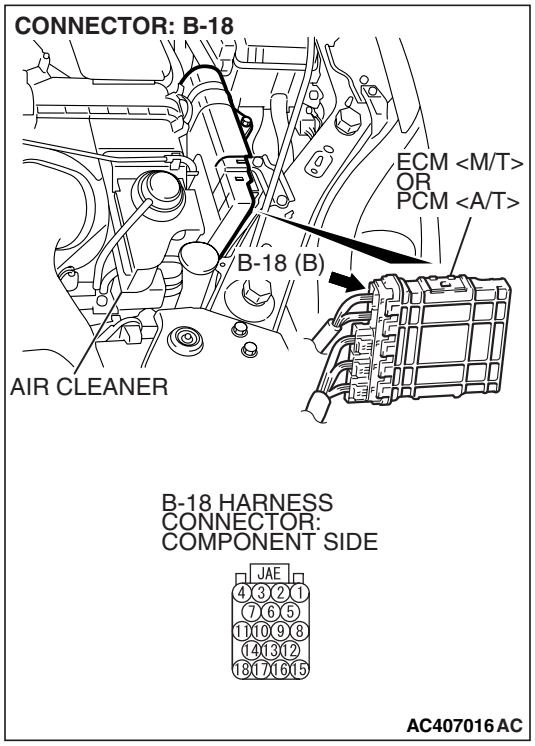
YES : Go to Step 13.
NO : Go to Step 4.

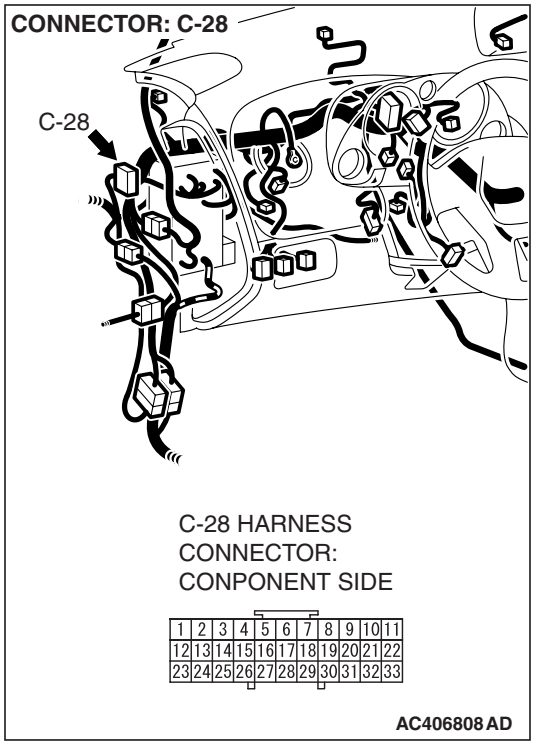
STEP 4. Check ECM <M/T> or PCM <A/T> connector B-18 and joint connector (1) C-28 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

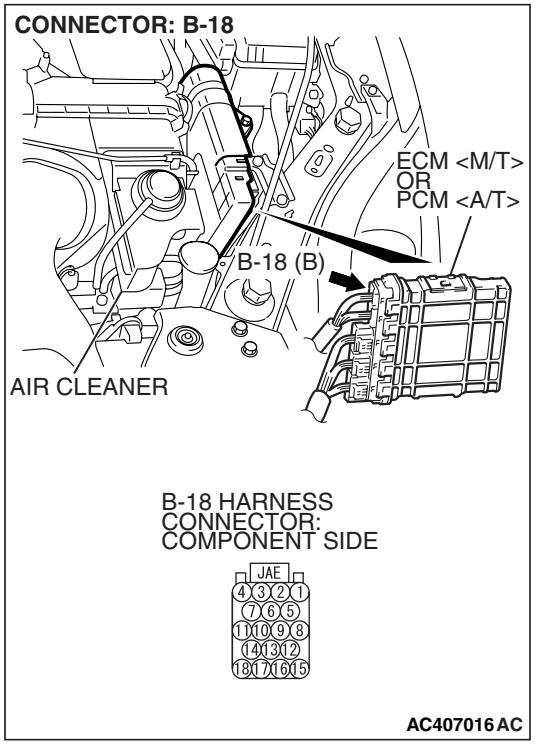
Q: Are the connectors and terminals in good condition?

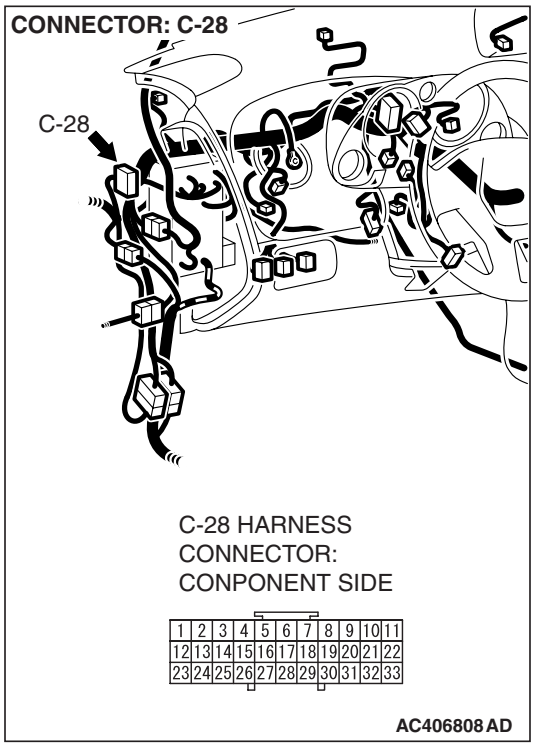
YES : Go to Step 5.

NO : Repair or replace the damaged components. (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Then go to Step 22.









STEP 5. Check the harness wire between ECM <M/T> or PCM <A/T> connector B-18 terminal 9 and joint connector (1) C-28 terminal 14 for damage.

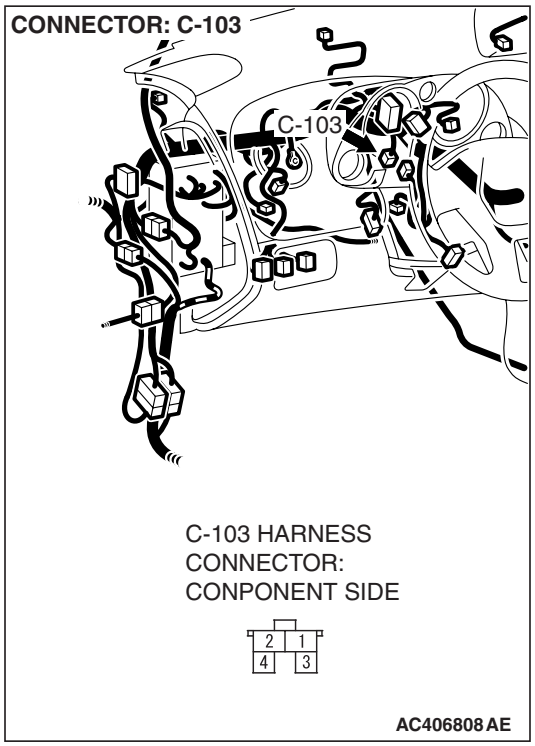
Q: Is the harness wire in good condition?

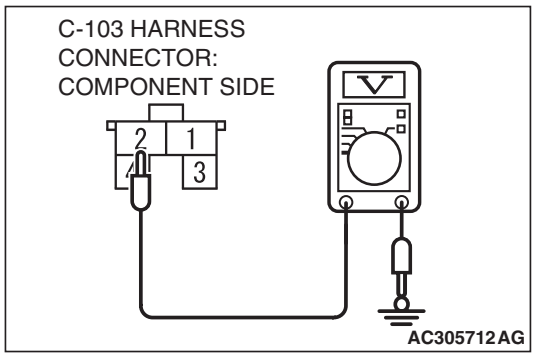
YES : Go to Step 13.

NO : Repair the damaged harness wire. Then go to Step 22.

STEP 6. Measure the power supply voltage at stoplight switch connector C-103 by backprobing.

(1) Disconnect stoplight switch connector C-103.





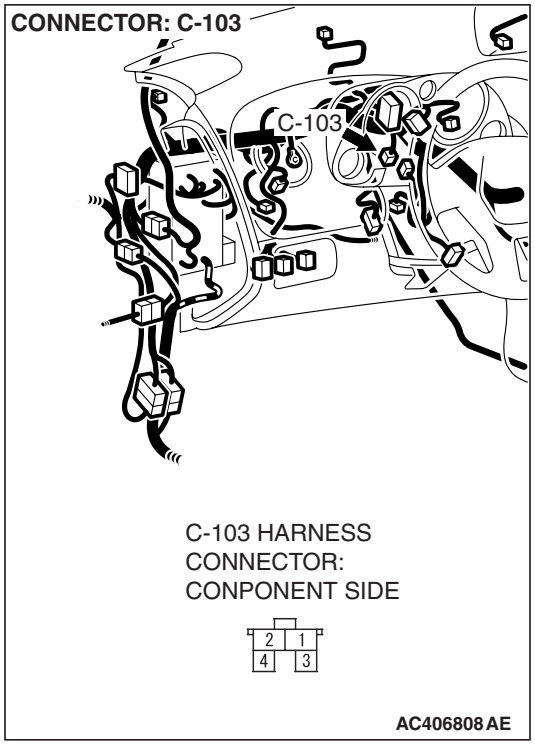
(2) Measure the power supply voltage between stoplight switch connector C-103 terminal 2 and ground.

(3) Reconnect stoplight switch connector C-103.

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

YES : Go to Step 10.

NO : Go to Step 7.



STEP 7. Check stoplight switch connector C-103 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 8.

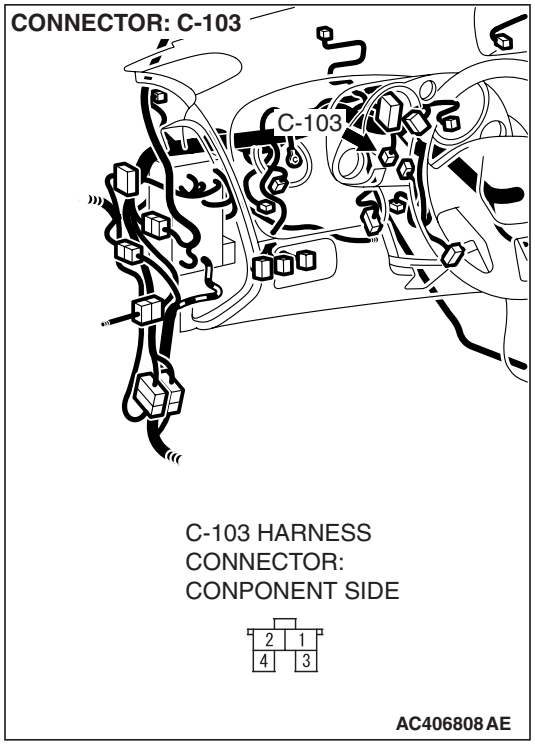
NO : Repair or replace the damaged components. (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Then go to Step 22.

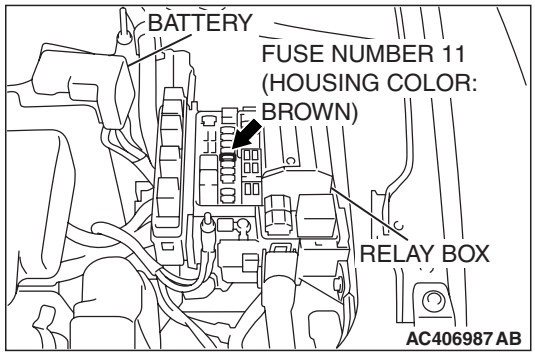
STEP 8. Check the harness wire between stoplight switch connector C-103 terminal 2 and fuse number 11 at the relay box at engine compartment for damage.

Q: Is the harness wire in good condition?

YES : Go to Step 9.

NO : Repair the damaged harness wire. Then go to Step 22.



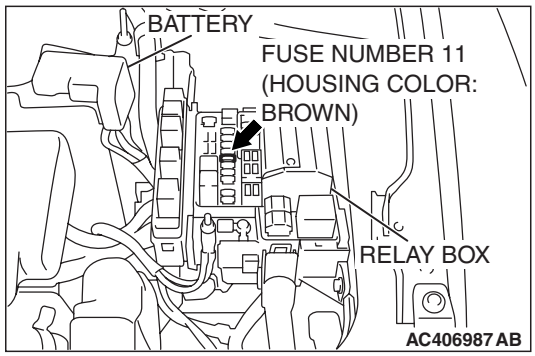


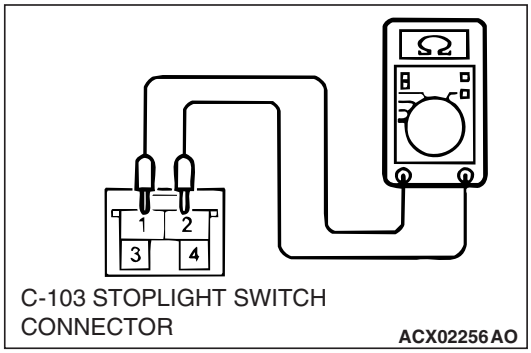
STEP 9. Check the fuse number 11 at the relay box at engine compartment.

Q: Is the fuse in good condition?

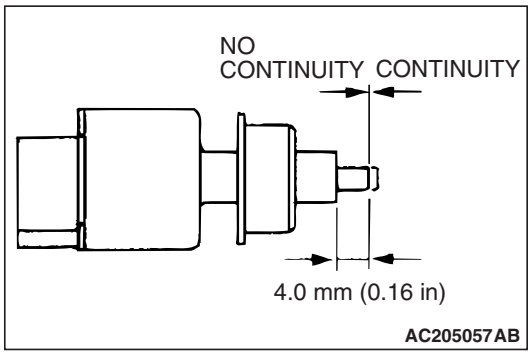
YES : Go to Step 10.

NO : Check the stoplight system harness and replace the fuse. Then go to Step 22.





C-103 STOPLIGHT SWITCH CONNECTOR
ACX02256AO



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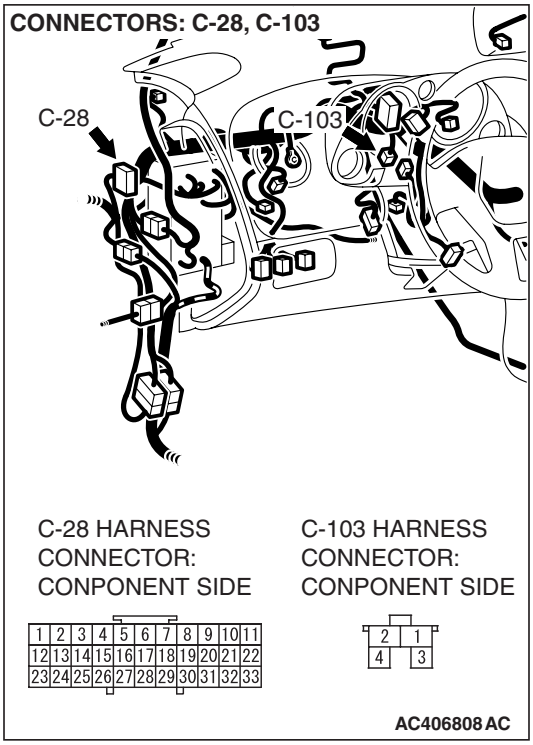
STEP 10. Check the stoplight switch.

(1) Remove the stoplight switch. (Refer to GROUP 35A, Brake Pedal P.35A-25).
(2) Connect an ohmmeter to the stoplight switch between terminals 1 and 2.
(3) Check for continuity between the terminals when the plunger of the stoplight switch is pushed in and when it is released.
(4) The stoplight switch is operating properly if the circuit is open between terminals 1 and 2 when the plunger is pushed in to a depth of within 4.0 mm (0.16 inch) from the outer case edge surface, and if the resistance value is less than 2 ohms between terminals 1 and 2 when it is released.

Q: Is the stoplight switch operating properly?

YES : Install the stoplight switch. (Refer to GROUP 35A, Brake Pedal P.35A-25). Then go to Step 11.
NO : Replace the stoplight switch. (Refer to GROUP 35A, Brake Pedal P.35A-25). Then go to Step 22.



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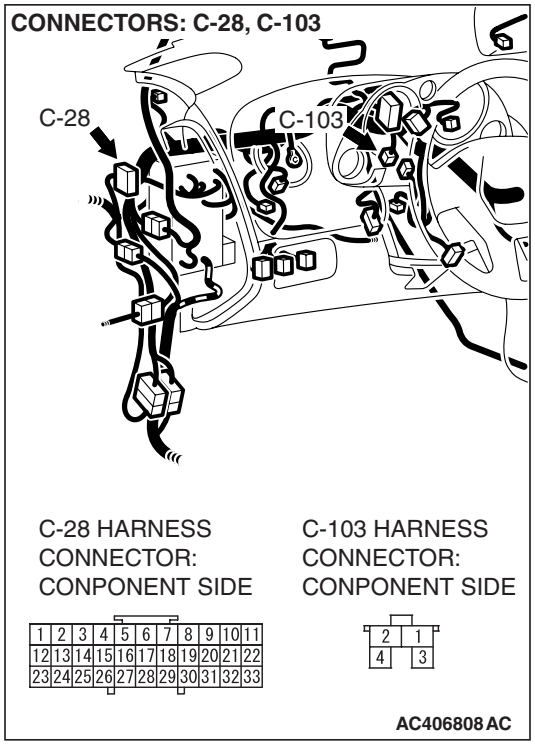
STEP 11. Check stoplight switch connector C-103 and joint connector (1) C-28 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 12.
NO : Repair or replace the damaged components. (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Then go to Step 22.

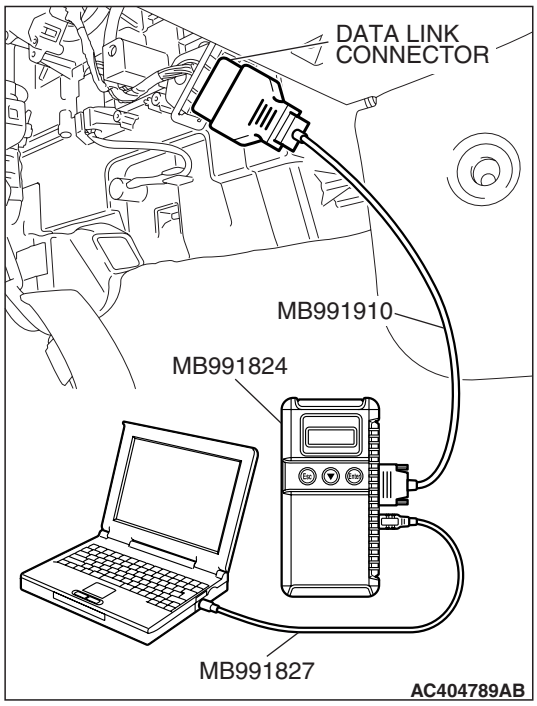


STEP 12. Check the harness wire between stoplight switch connector C-103 terminal 1 and joint connector (1) C-28 terminal 12 for damage.

Q: Is the harness wire in good condition?

YES : Go to Step 13.

NO : Repair the damaged harness wire. Then go to Step 22.



STEP 13. Using scan tool MB991958, check data list item 74: Brake light switch.

⚠ CAUTION

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

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).

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

(3) Set scan tool MB991958 to data reading mode for auto-cruise control system. (Refer to P.17-11).

- Item 74, Brake light switch.
  - When the brake pedal is depressed, the display on scan tool MB991958 should be "ON".
  - When the brake pedal is released, the display on scan tool MB991958 should be "OFF".

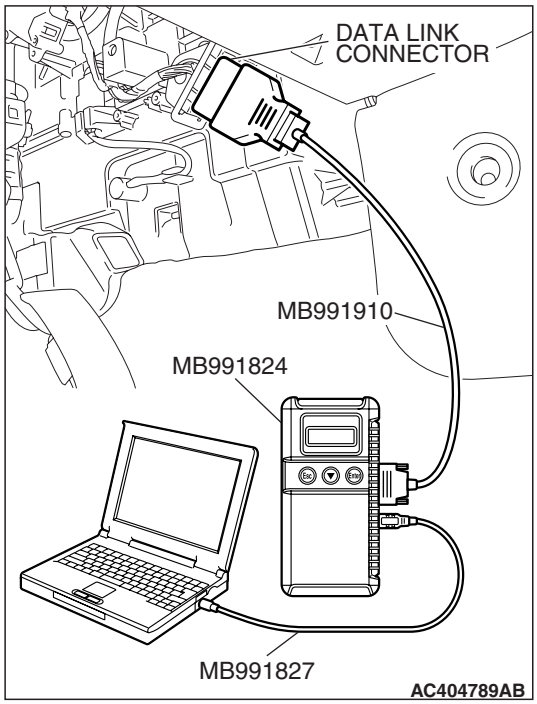
(4) Turn the ignition switch to the "LOCK" (OFF) position.

(5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 21.

NO : Replace the ECM <M/T> or PCM <A/T>. (Refer to GROUP 54A, Immobilizer System –Encrypted Code Registration Criteria Table P.54A-13). Then go to Step 22.



STEP 14. Using scan tool MB991958, check data list item 89: Normally closed brake switch.

⚠ CAUTION

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

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to data reading mode for auto-cruise control system. (Refer to P.17-11).
- Item 89, Normally closed brake switch.
  - When the brake pedal is depressed, the display on scan tool MB991958 should be "ON".
  - When the brake pedal is released, the display on scan tool MB991958 should be "OFF".

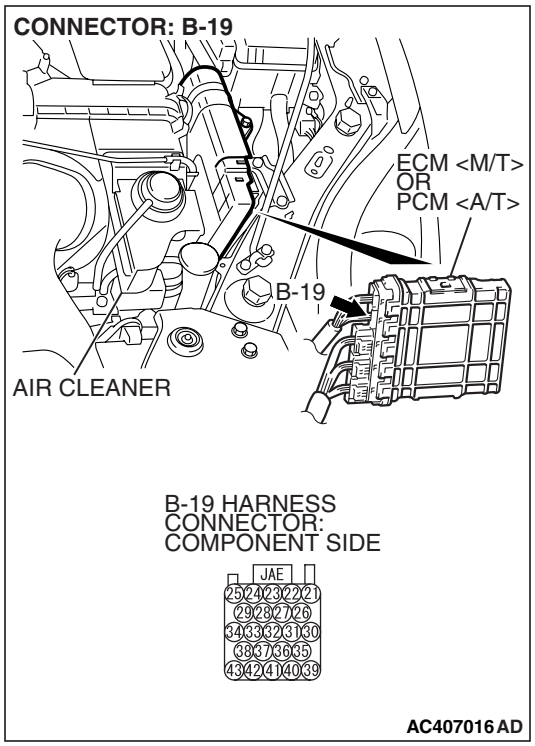
(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 21.
NO : Go to Step 15.

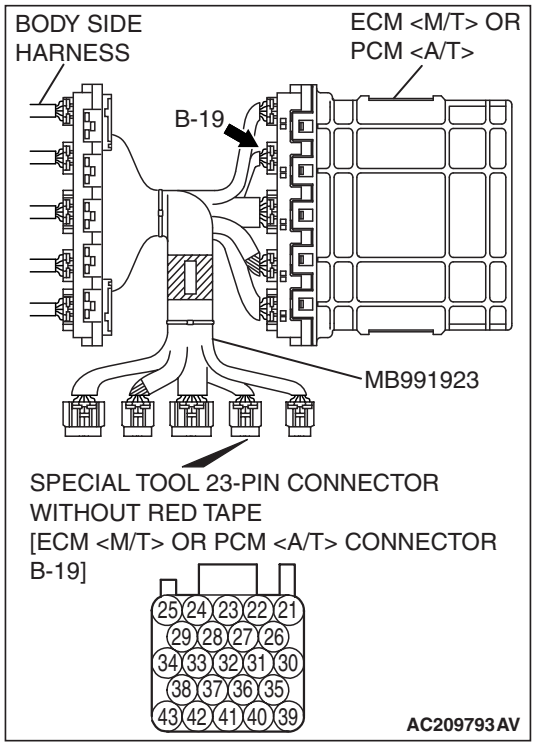
STEP 15. Measure the terminal voltage at ECM <M/T> or PCM <A/T> connector B-19.

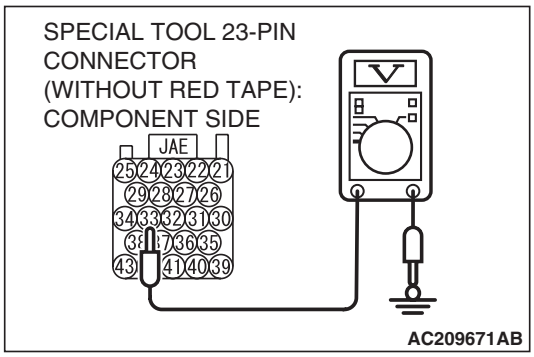
(1) Disconnect all the connectors from the ECM <M/T> or PCM <A/T>.



(2) Connect special tool MB991923 between the ECM <M/T> or PCM <A/T> and the body-side harness connector.

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





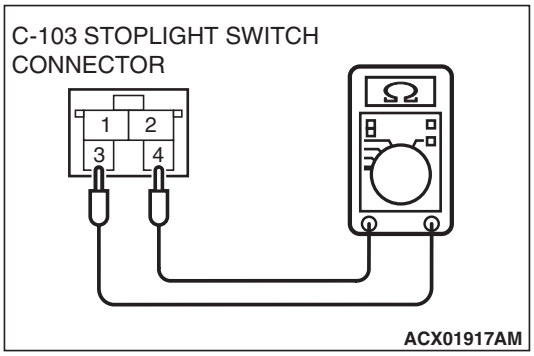
(4) Measure the terminal voltage between special tool 23-pin connector (without red tape) terminal 33 (ECM <M/T> or PCM <A/T> connector B-19 terminal 33) and ground.
- When the brake pedal is depressed, the voltage should measure battery positive voltage (approximately 12 volts).
- When the brake pedal is released, the voltage should measure 1 volt or less.

(5) Turn the ignition switch to the "LOCK" (OFF) position.
(6) Disconnect special tool MB991923 between the ECM <M/T> or PCM and the body-side harness connector.
(7) Reconnect all the connectors to the ECM <M/T> or PCM.

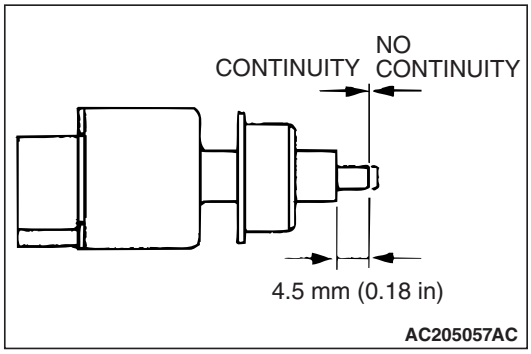
Q: Is the measured voltage battery positive voltage (approximately 12 volts) when the brake pedal is depressed and 1 volt or less when the brake pedal is released?

YES : Go to Step 20.
NO : Go to Step 16.

STEP 16. Check the stoplight switch.

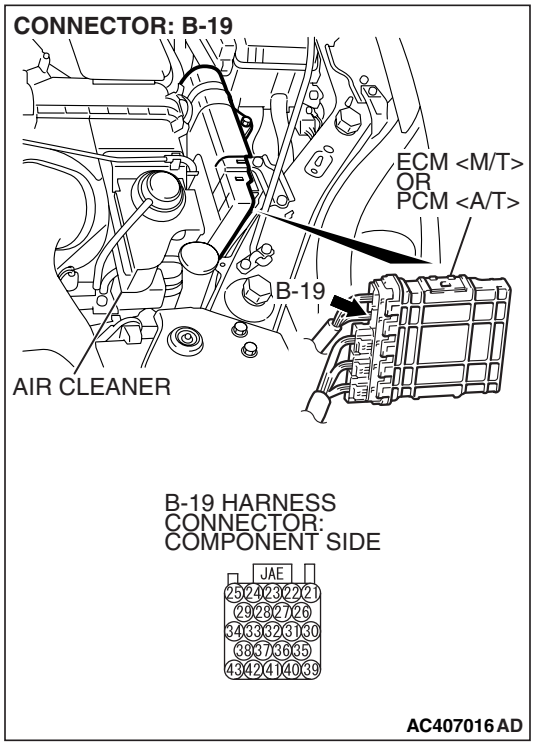


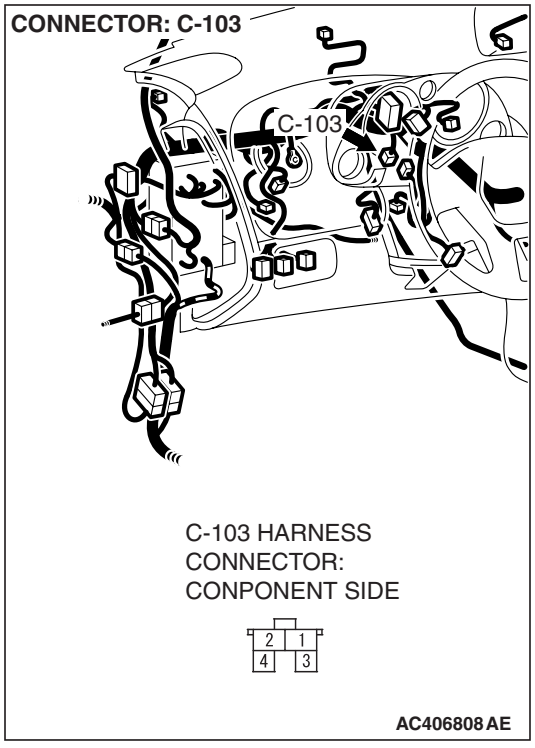
(1) Remove the stoplight switch. (Refer to GROUP 35A, Brake Pedal P.35A-25).
(2) Connect an ohmmeter to the stoplight switch between terminals 3 and 4.
(3) Check for continuity between the terminals when the plunger of the stoplight switch is pushed in and when it is released.
(4) The stoplight switch is operating properly if the circuit is open between terminals 3 and 4 when the plunger is released, and if resistance value is less than 2 ohms between terminals 3 and 4 when the plunger is pushed in to a depth of within 4.5 mm (0.18 inch) from the outer case edge surface.



Q: Is the stoplight switch operating properly?

YES : Install the stoplight switch. (Refer to GROUP 35A, Brake Pedal P.35A-25). Then go to Step 17.
NO : Replace the stoplight switch. (Refer to GROUP 35A, Brake Pedal P.35A-25). Then go to Step 22.





STEP 17. Check ECM <M/T> or PCM <A/T> connector B-19 and stoplight switch connector C-103 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

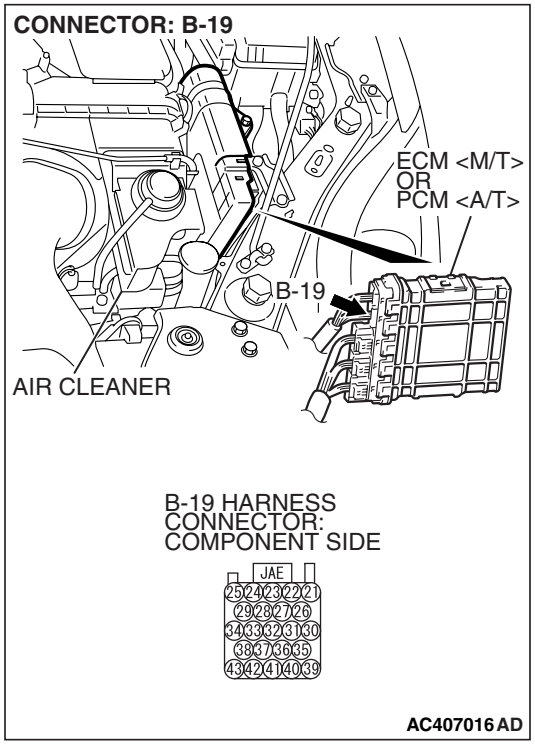
Q: Are the connectors and terminals in good condition?

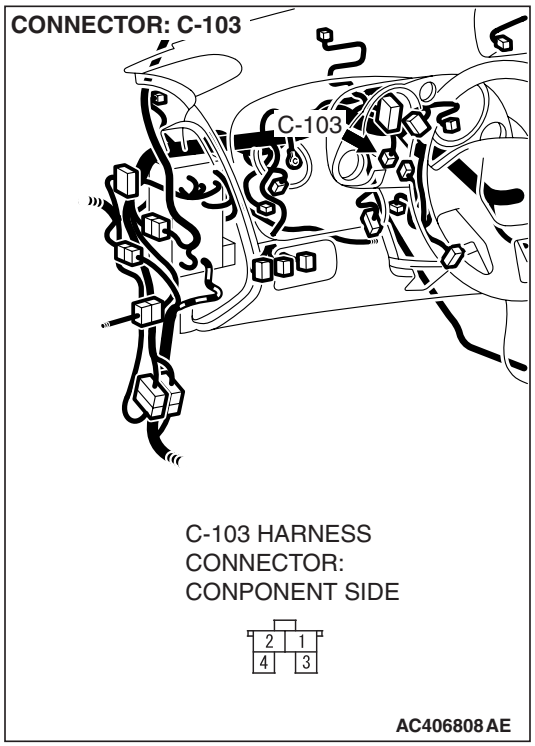
YES : Go to Step 18.

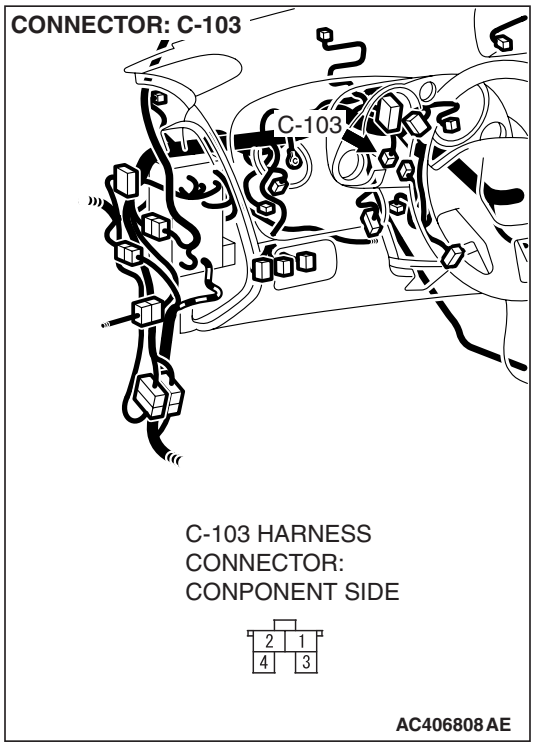
NO : Repair or replace the damaged components. (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Then go to Step 22.

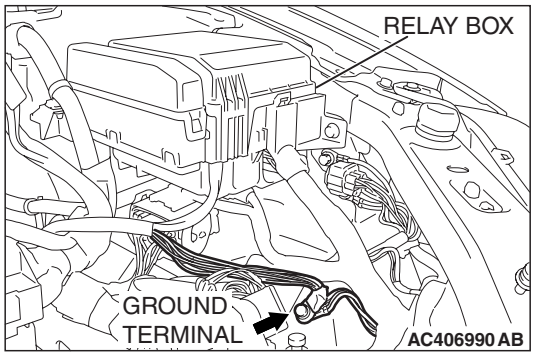
STEP 18. Check the harness wire between ECM <M/T> or PCM <A/T> connector B-19 terminal 33 and stoplight switch connector C-103 terminal 3 for damage.
Q: Is the harness wire in good condition?

YES : Go to Step 19.
NO : Repair the damaged harness wire. Then go to Step 22.



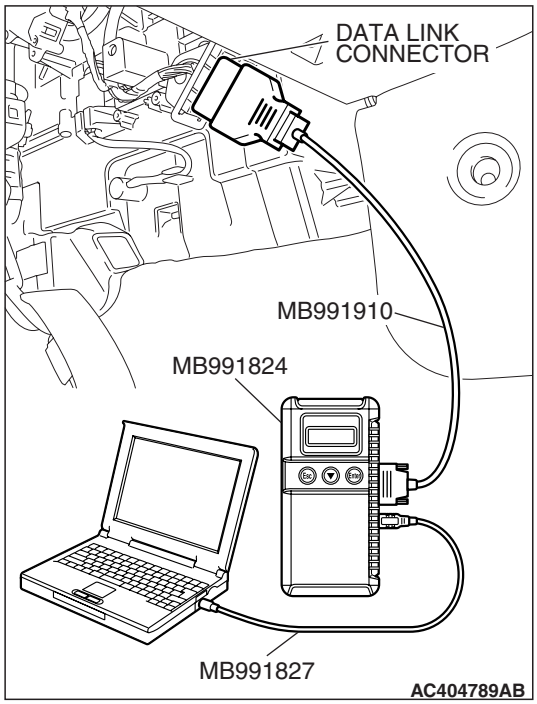






STEP 19. Check the harness wire between stoplight switch connector C-103 terminal 4 and ground for damage.
Q: Is the harness wire in good condition?

YES : Go to Step 20.
NO : Repair the damaged harness wire. Then go to Step 22.



STEP 20. Using scan tool MB991958, check data list item 89: Normally closed brake switch.

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

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to data reading mode for auto-cruise control system. (Refer to P.17-11).
- Item 89, Normally closed brake switch.
  - When the brake pedal is depressed, the display on scan tool MB991958 should be "ON".
  - When the brake pedal is released, the display on scan tool MB991958 should be "OFF".

(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 21.
NO : Replace the ECM <M/T> or PCM <A/T>. (Refer to GROUP 54A, Immobilizer System –Encrypted Code Registration Criteria Table P.54A-13). Then go to Step 22.

STEP 21. Read the diagnostic trouble codes.
Read the diagnostic trouble codes. (Refer to P.17-11).

Q: Is DTC P22 set?

YES : Replace the ECM <M/T> or PCM <A/T>. (Refer to GROUP 54A, Immobilizer System –Encrypted Code Registration Criteria Table P.54A-13). Then go to Step 22.
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 Malfunction P.00-14).

STEP 22. Read the diagnostic trouble codes.
Read the diagnostic trouble codes. (Refer to P.17-11).

Q: Is DTC P22 set?

YES : Return to Step 1.
NO : The procedure is complete.

DTC P23: ECM <M/T> or PCM <A/T> and Its Related Component

DTC SET CONDITIONS

This DTC is set when there is an failure in the ECM <M/T> or PCM <A/T> and its related components.

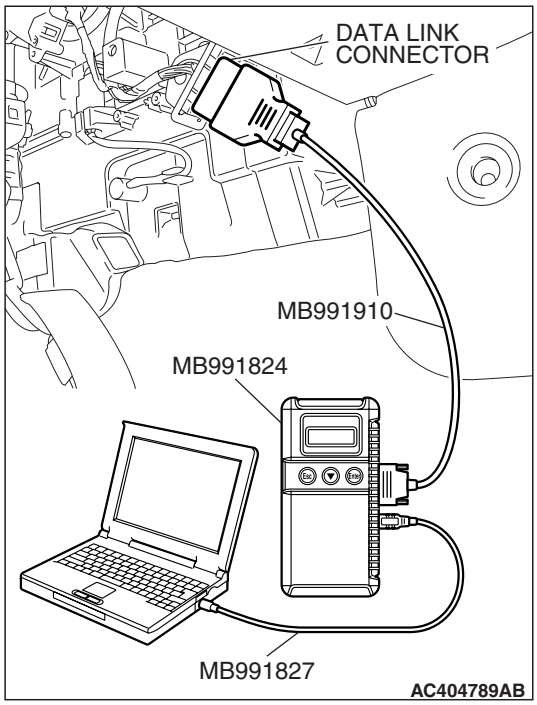
TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)

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

DIAGNOSIS

Required Special Tools:

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



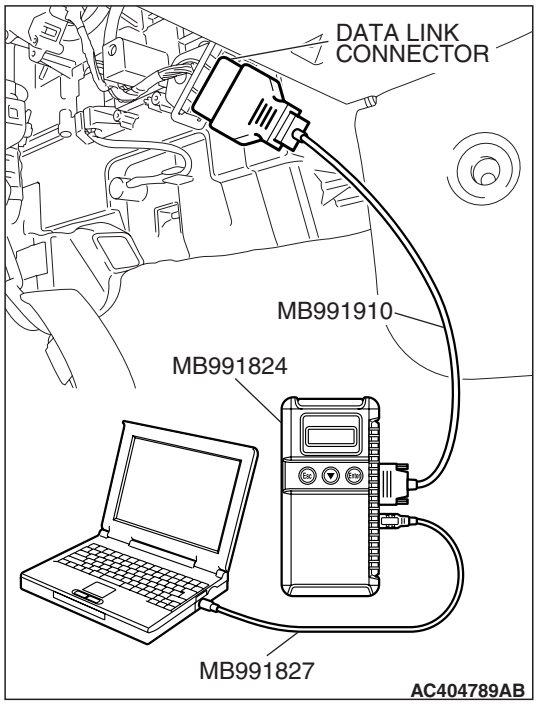
STEP 1. Using scan tool MB991958, read the MFI system diagnostic trouble code.

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

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Check for MFI system diagnostic trouble code. (Refer to GROUP 13A, MFI Diagnosis –Diagnostic Function –How to Read and Erase Diagnostic Trouble Code P.13A-6) <2.4L engine> or (Refer to GROUP 13B, MFI Diagnosis – Diagnostic Function –How to Read and Erase Diagnostic Trouble Code P.13B-6) <3.8L engine>.
(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

Q: Is any DTC set?

YES : Diagnose the MFI system. (Refer to GROUP 13A, MFI Diagnosis –Diagnostic Trouble Code Chart P.13A-41) <2.4L engine> or (Refer to GROUP 13B, MFI Diagnosis –Diagnostic Trouble Code Chart P.13B-43) <3.8L engine>. Then go to Step 4.
NO : Go to Step 3 <M/T> or Step 2 <A/T>.



STEP 2. Using scan tool MB991958, read the A/T system diagnostic trouble code <A/T>.

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

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Check for A/T system diagnostic trouble code. (Refer to GROUP 23A, A/T Diagnosis –Diagnostic Function –How to Read and Erase Diagnostic Trouble Code P.23A-16).
(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

Q: Is any DTC set?

YES : Diagnose the A/T system. (Refer to GROUP 23A, A/T Diagnosis –Diagnostic Trouble Code Chart P.23A-64). Then go to Step 4.
NO : Go to Step 3.

STEP 3. Read the auto-cruise control system diagnostic trouble code.

Read the auto-cruise control system diagnostic trouble codes. (Refer to P.17-11).

Q: Is DTC P23 set?

YES : Replace the ECM <M/T> or PCM <A/T>. (Refer to GROUP 54A, Immobilizer System –Encrypted Code Registration Criteria Table P.54A-13). Then go to Step 4.
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 Malfunction P.00-14).

STEP 4. Read the auto-cruise control system diagnostic trouble code.

Read the auto-cruise control system diagnostic trouble codes. (Refer to P.17-11).

Q: Is DTC P23 set?

YES : Return to Step 1.
NO : The procedure is complete.

SYMPTOM CHART

M1172002300548

SYMPTOM		INSPECTION PROCEDURE NO.	REFERENCE PAGE
Communication with scan tool is not possible	Communication with all systems is impossible	-	Group 13A, MFI Diagnosis – Symptom Procedures – Inspection Procedure 1 P.13A-1011 <2.4L engine>. Group 13B, MFI Diagnosis – Symptom Procedures – Inspection Procedure 1 P.13B-1085 <3.8L engine>.
	Communication with the ECM <M/T> or PCM <A/T> only is impossible	-	Group 13A, MFI Diagnosis – Symptom Procedures – Inspection Procedure 2 P.13A-1014 <2.4L engine>. Group 13B, MFI Diagnosis – Symptom Procedures – Inspection Procedure 2 P.13B-1088 <3.8L engine>.
Auto-cruise control system is not cancelled.	When brake pedal is depressed	1	P.17-54
	When clutch pedal is depressed <M/T>	2	P.17-55
	When selector lever is moved to "N" position <A/T>	3	P.17-64
	When "CANCEL" switch is turned ON	4	P.17-68
Auto-cruise control system cannot be set.		5	P.17-68
Hunting (repeated acceleration and deceleration) occurs at the set vehicle speed.		6	P.17-72
When "CRUISE" (MAIN) switch is turned "ON", "CRUISE" indicator light inside combination meter does not illuminate. (However, auto-cruise control system is normal).		7	P.17-75

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: When the Brake Pedal is Depressed, Auto-cruise Control System is not Cancelled.

COMMENT
The stoplight switch circuit is suspected.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CASE:)
- Malfunction of the stoplight switch.
- Damaged harness or connector.
- Malfunction of the ECM <M/T> or PCM <A/T>.

DIAGNOSIS

STEP 1. Read the auto-cruise control system diagnostic trouble code.
Read the auto-cruise control system diagnostic trouble codes. (Refer to P.17-11).

Q: Is DTC P15 set?

YES : Refer to P.17-15, Diagnostic Trouble Code Procedures –DTC P15: Stoplight Switch System.
NO : Go to Step 2.

STEP 2. Check the symptoms.

Q: When the brake pedal is depressed, auto-cruise control system is cancelled?

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 Malfunction P.00-14).
NO : Replace the ECM <M/T> or PCM <A/T>. (Refer to GROUP 54A, Immobilizer System –Encrypted Code Registration Criteria Table P.54A-13). Then go to Step 3.

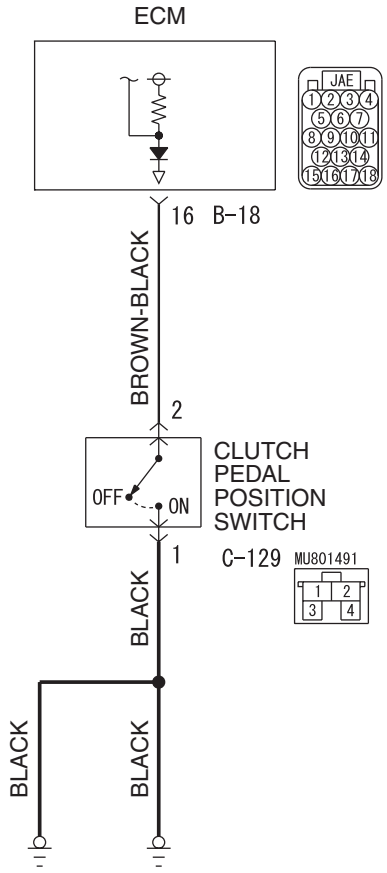
STEP 3. Check the symptoms.

Q: When the clutch pedal is depressed, auto-cruise control system is cancelled?

YES : The procedure is complete.
NO : Return to Step 1.

INSPECTION PROCEDURE 2: When Clutch Pedal is Depressed, Auto-cruise Control System is not Cancelled <M/T>.

Clutch Pedal Position Switch Circuit



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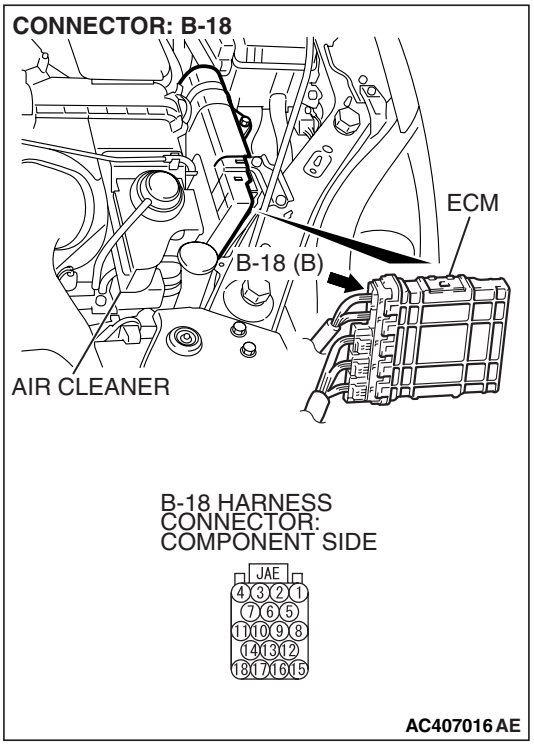
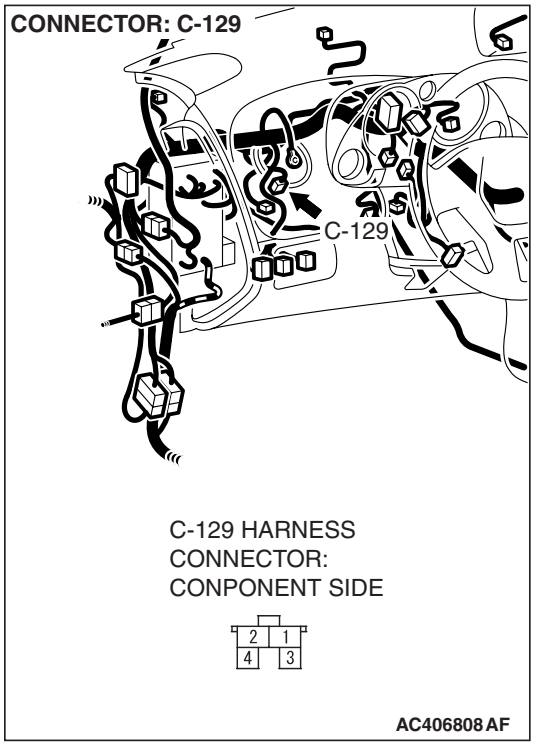




CIRCUIT OPERATION

This circuit judges the signals of clutch pedal position switch. The ECM detects the state of the clutch pedal position switch by sensing the voltages shown below.

- When the brake pedal is depressed (clutch pedal position switch are OFF): 0 – 0.3 volt.
- When the brake pedal is released (clutch pedal position switch are ON): 4.7 – 5.0 volts.

COMMENT

The clutch pedal position switch circuit is suspected.

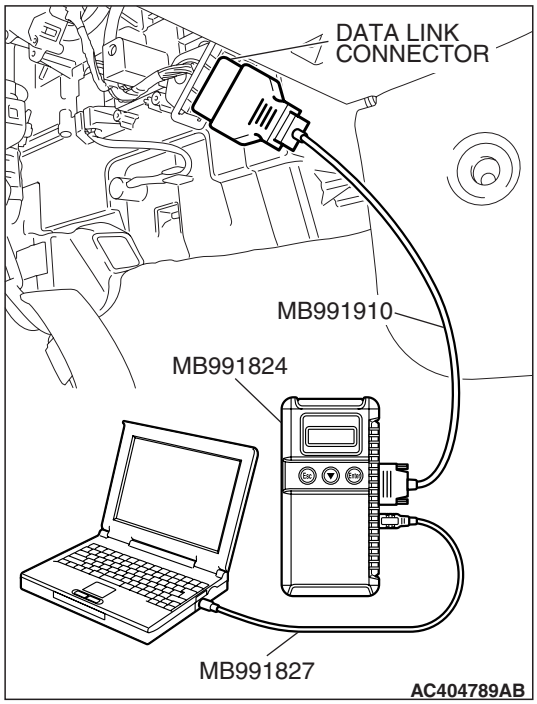
TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CASE:)

- Malfunction of the clutch pedal position switch.
- Damaged harness or connector.
- Malfunction of the ECM.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A
- MB991223: Harness Set
- MB992006: Extra Fine Probe
- MB991923: Power Plant ECU Check Harness



STEP 1. Using scan tool MB991958, check data list item 78: Clutch switch.

⚠ CAUTION

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

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to data reading mode for auto-cruise control system. (Refer to P.17-11).
- Item 78: Clutch switch.
  - When the clutch pedal is depressed, the display on scan tool MB991958 should be "ON".
  - When the clutch pedal is released, the display on scan tool MB991958 should be "OFF".

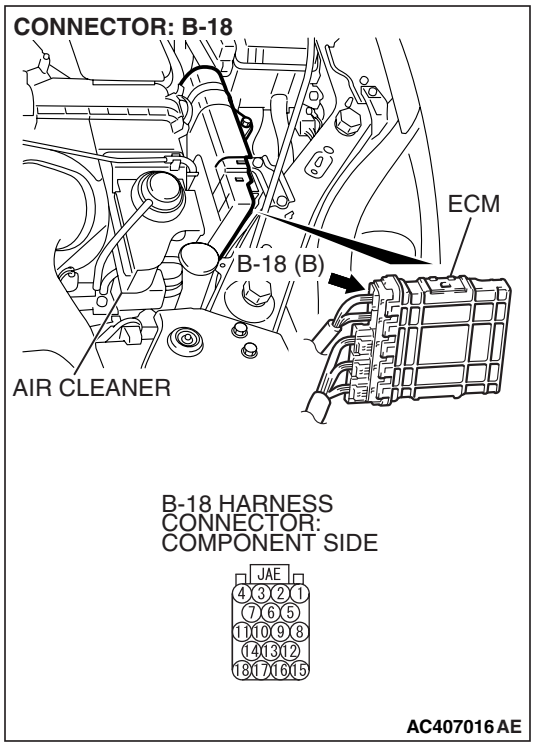
(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

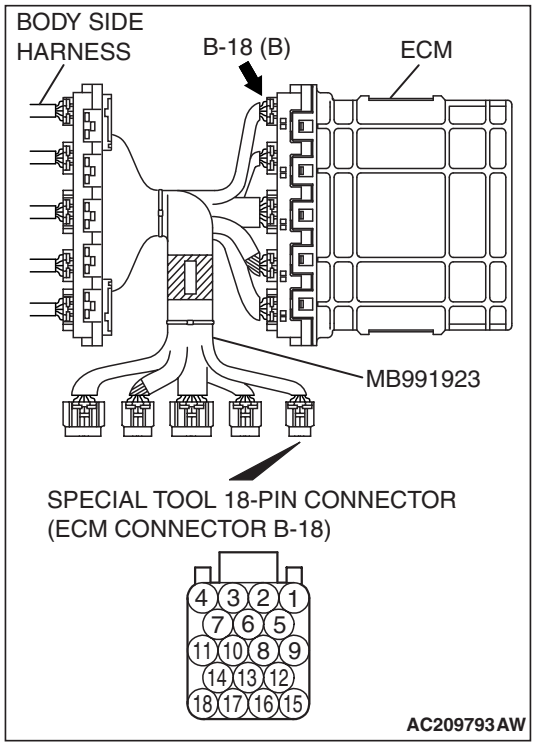
Q: Is the switch operating properly?

YES : Go to Step 7.
NO : Go to Step 2.

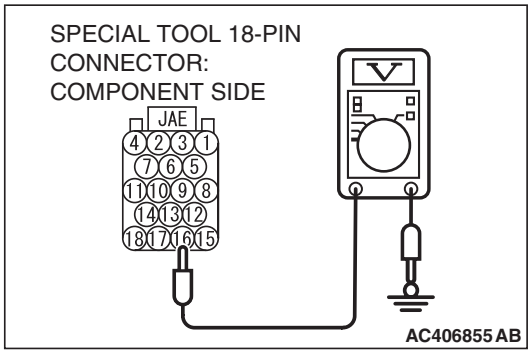
STEP 2. Measure the terminal voltage at ECM connector B-18.

(1) Disconnect all the connectors from the ECM.





(2) Connect special tool MB991923 between the ECM and the body-side harness connector.
(3) Turn the ignition switch to the "ON" position.

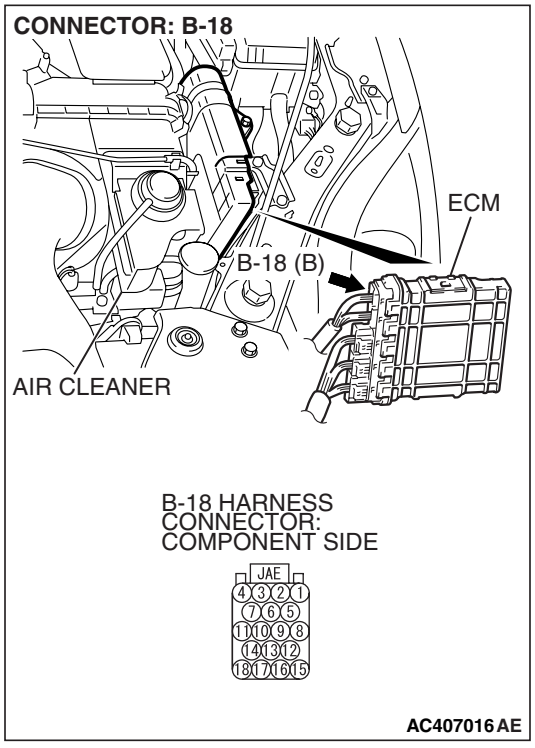


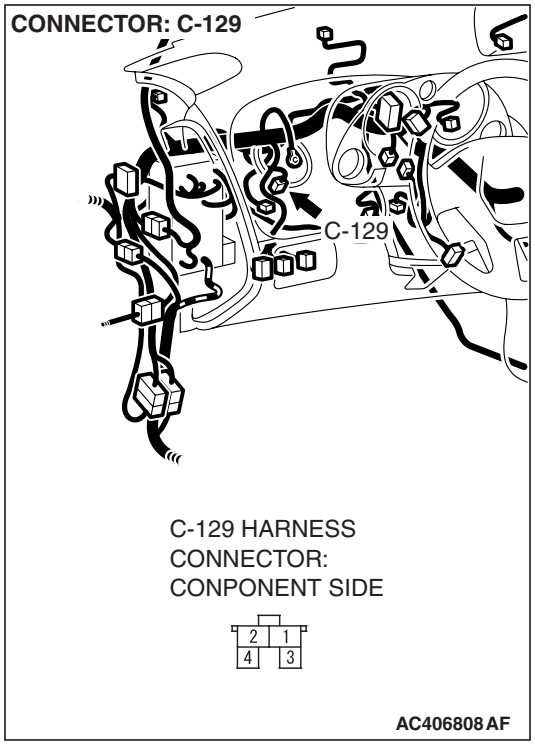
(4) Measure the terminal voltage between special tool 18-pin connector terminal 16 (ECM connector B-18 terminal 16) and ground.
- When the clutch pedal is depressed, the measured voltage is between 4.7 and 5.0 volts.
- When the brake pedal is released, the measured voltage is between 0 and 0.3 volt.

(5) Turn the ignition switch to the "LOCK" (OFF) position.
(6) Disconnect special tool MB991923 between the ECM and the body-side harness connector.
(7) Reconnect all the connectors to the ECM.

Q: Is the measured voltage between 4.7 and 5.0 volts when the brake pedal is depressed and between 0 and 0.3 volt when the brake pedal is released?

YES : Go to Step 7.
NO : Go to Step 3.





STEP 3. Check ECM connector B-18 and clutch pedal position switch connector C-129 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

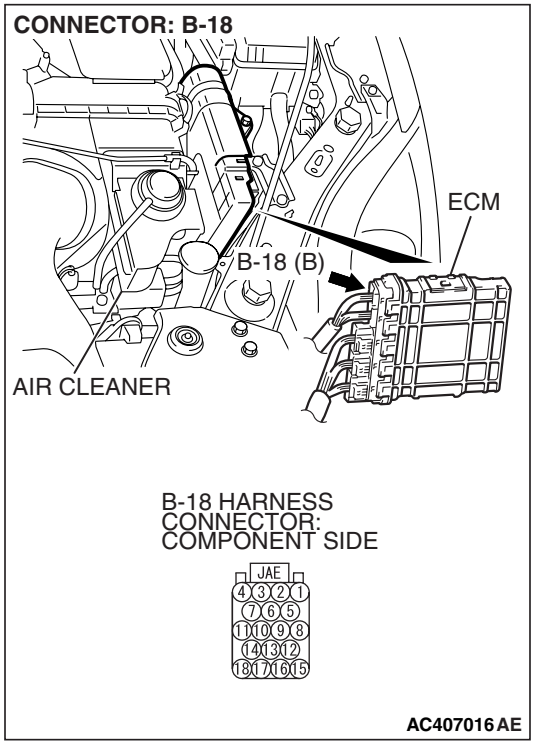
Q: Are the connectors and terminals in good condition?

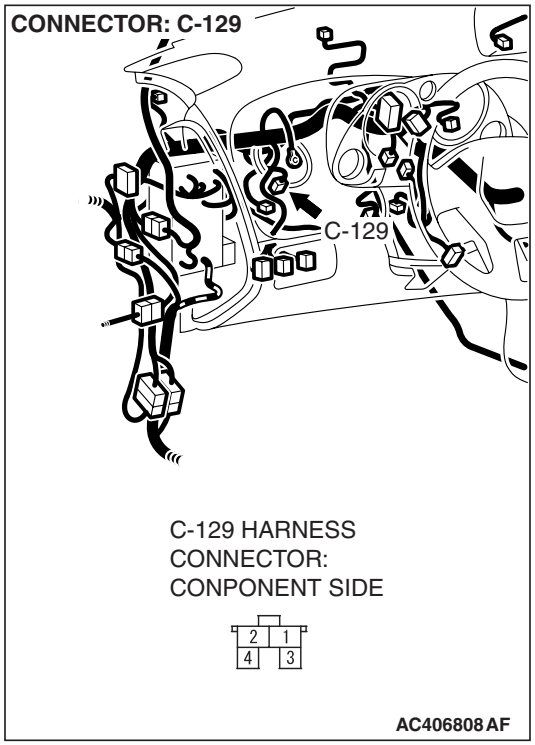
YES : Go to Step 4.

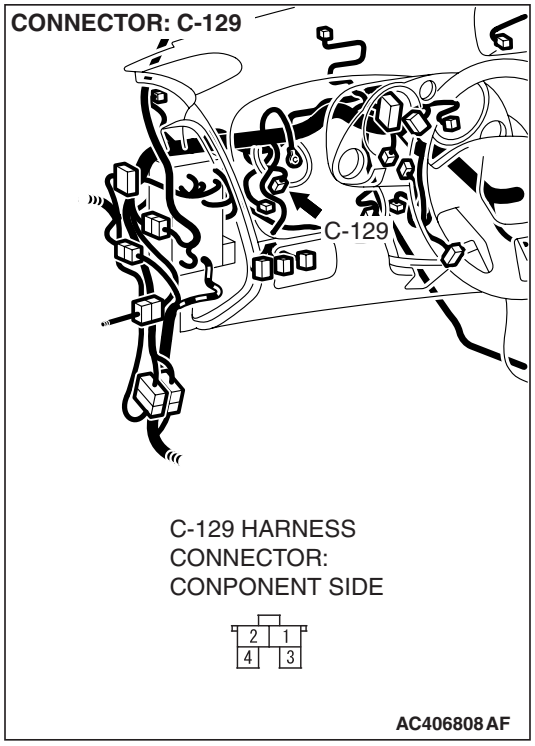
NO : Repair or replace the damaged components. (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Then go to Step 8.

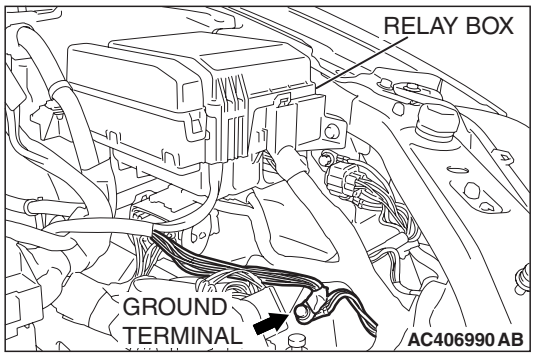
STEP 4. Check the harness wire between ECM connector B-18 terminal 16 and clutch pedal position switch connector C-129 terminal 2 for damage.
Q: Is the harness wire in good condition?

YES : Go to Step 5.
NO : Repair the damaged harness wire. Then go to Step 8.







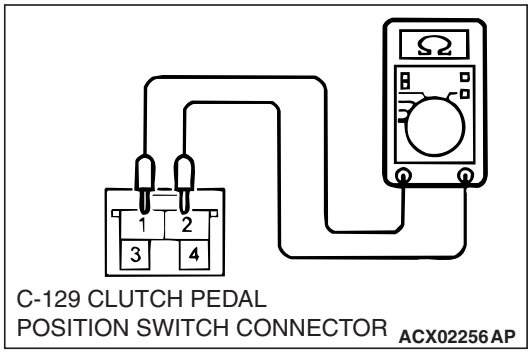


STEP 5. Check the harness wire between clutch pedal position switch connector C-129 terminal 1 and ground for damage.

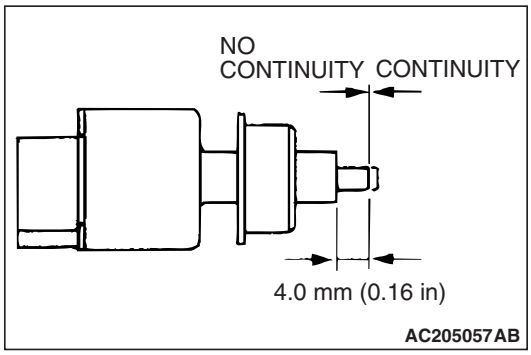
Q: Is the harness wire in good condition?

YES : Go to Step 6.

NO : Repair the damaged harness wire. Then go to Step 8.



C-129 CLUTCH PEDAL POSITION SWITCH CONNECTOR ACX02256AP



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STEP 6. Check the clutch pedal position switch.

(1) Remove the clutch pedal position switch. (Refer to GROUP 21A, Clutch Pedal P.21A-12).
(2) Connect an ohmmeter to the clutch pedal position switch between terminals 1 and 2.
(3) Check for continuity between the terminals when the plunger of the clutch pedal position switch is pushed in and when it is released.
(4) The clutch pedal position switch is operating properly if the circuit is open between terminals 1 and 2 when the plunger is pushed in to a depth of within 4.0 mm (0.16 inch) from the outer case edge surface, and if the resistance value is less than 2 ohms between terminals 1 and 2 when it is released.

Q: Is the clutch pedal position switch operating properly?

YES : Install the clutch pedal position switch. (Refer to GROUP 21A, Clutch Pedal P.21A-12). Then go to Step 7.
NO : Replace the clutch pedal position switch. (Refer to GROUP 21A, Clutch Pedal P.21A-12). Then go to Step 8.

STEP 7. Check the symptoms.

Q: When the clutch pedal is depressed, is auto-cruise control cancelled?

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 Malfunction P.00-14).
NO : Replace the ECM. (Refer to GROUP 54A, Immobilizer System –Encrypted Code Registration Criteria Table P.54A-13). Then go to Step 8.

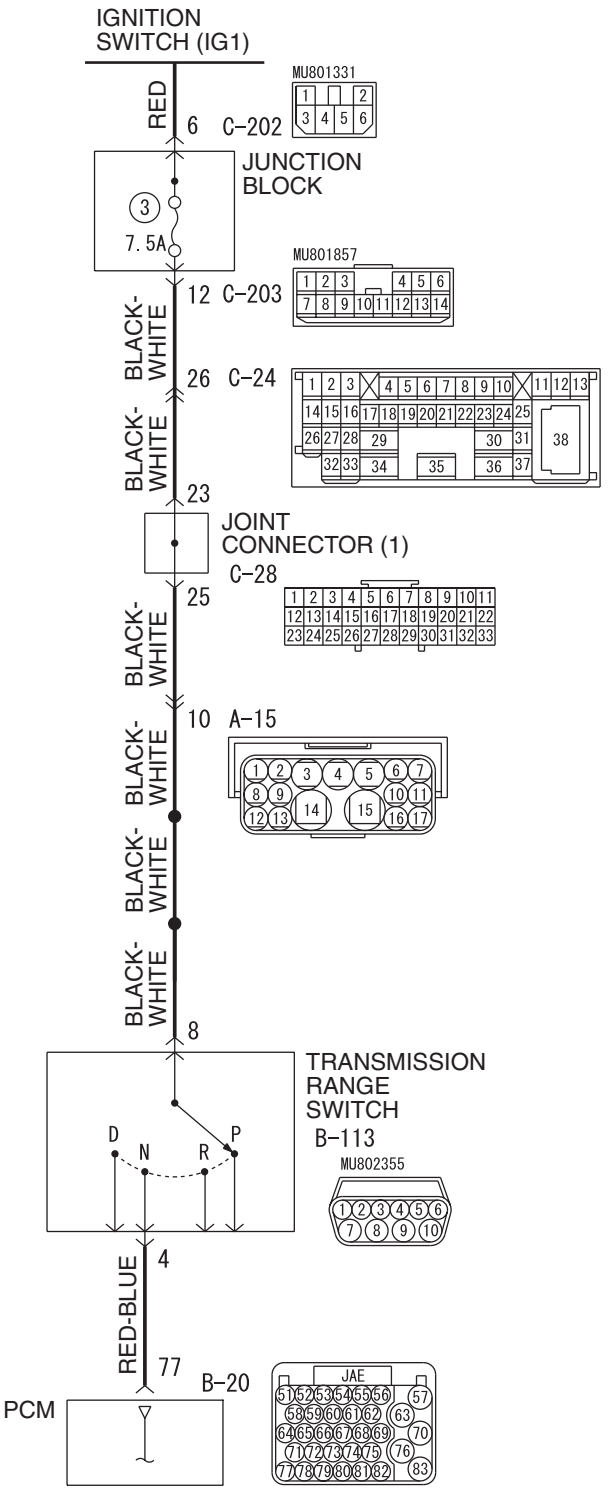
STEP 8. Check the symptoms.

Q: When the clutch pedal is depressed, is auto-cruise control cancelled?

YES : The procedure is complete.
NO : Return to Step 1.

INSPECTION PROCEDURE 3: When the Selector Lever is Moved to "N" Position, Auto-cruise Control System is not Cancelled <A/T>.

Transmission Range Switch Circuit



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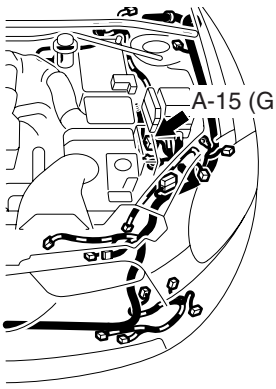
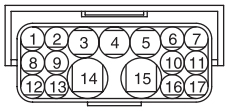
TSB Revision

CONNECTOR: A-15



A-15 MALE SIDE CONNECTOR



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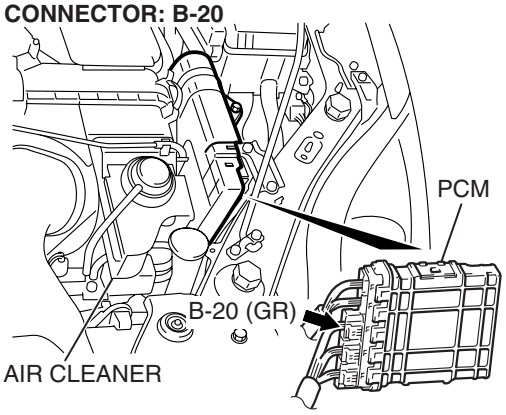
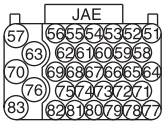
CONNECTOR: B-20



B-20 HARNESS CONNECTOR: COMPONENT SIDE



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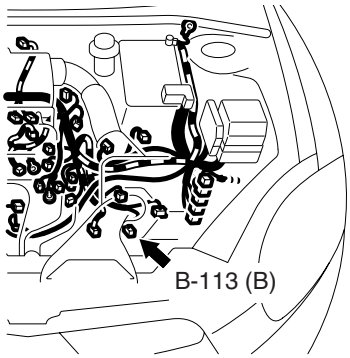
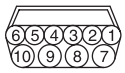
CONNECTOR: B-113



B-113 HARNESS CONNECTOR: COMPONENT SIDE



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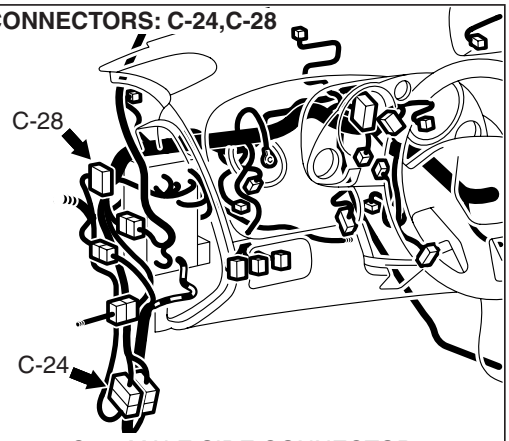
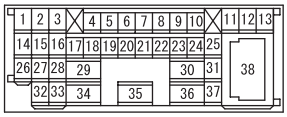
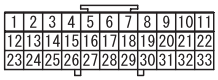
CONNECTORS: C-24,C-28



C-24 MALE SIDE CONNECTOR



C-28 HARNESS CONNECTOR: CONPONENT SIDE



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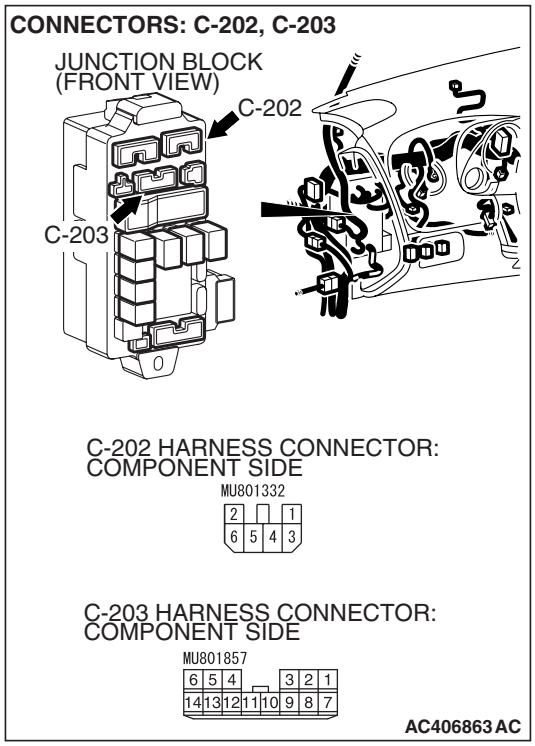


CIRCUIT OPERATION

- Battery positive voltage is applied to the transmission range switch (terminal 8) when the ignition switch is turned "ON."
- Battery positive voltage is applied to the PCM terminal 77 when the selector lever is in the "N" range. The PCM judges that the selector lever is in the "N" range when the battery positive voltage is applied.

COMMENT

The transmission range switch circuit is suspected.

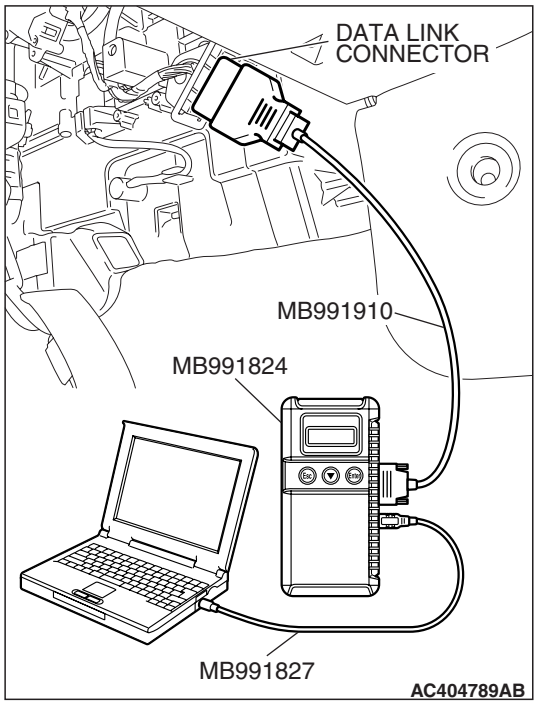
TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CASE:)

- Malfunction of the transmission range switch.
- Damaged harness or connector.
- Malfunction of the PCM.

DIAGNOSIS

Required Special Tools:

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



STEP 1. Using scan tool MB991958, check data list item 88: Neutral switch.

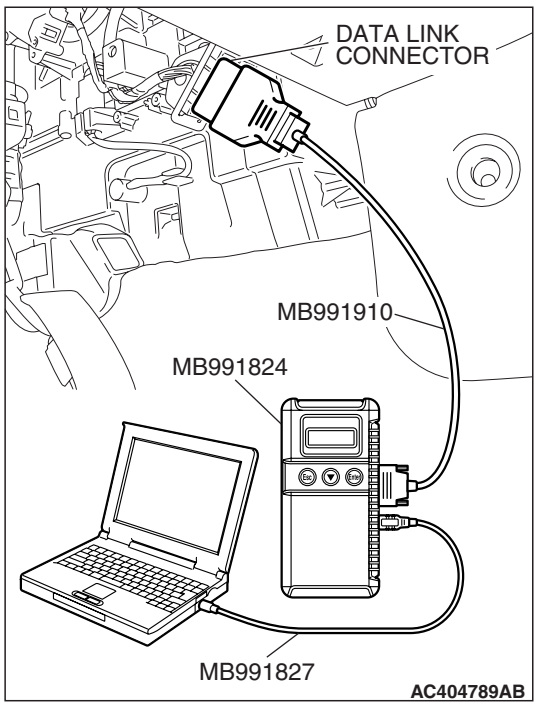
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to data reading mode for auto-cruise control system. (Refer to P.17-11).
- Item 88, Neutral switch.
  - When selector lever is at the "N" position, the display on scan tool MB991958 should be "ON".
  - When selector lever is other than "N" position, the display on scan tool MB991958 should be "OFF".

(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 3.
NO : Go to Step 2.



STEP 2. Using scan tool MB991958, read the A/T system diagnostic trouble code.

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

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Check for A/T system diagnostic trouble code. (Refer to GROUP 23A, A/T Diagnosis –Diagnostic Function –How to Read and Erase Diagnostic Trouble Code P.23A-16).
(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

Q: Is any DTC P1770 or P1771 set?

YES : Refer to GROUP 23A, A/T Diagnosis –Diagnostic Trouble Code Procedures –DTC P1770: Transmission Range Switch System (Open Circuit) P.23A-143, DTC P1771: Transmission Range Switch System (Short Circuit) P.23A-171. Then go to Step 4.
NO : Go to Step 3.

STEP 3. Check the symptoms.

Q: When the selector lever is moved to "N" position, auto-cruise control system is cancelled?

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 Malfunction P.00-14).

NO : Replace the PCM. (Refer to GROUP 54A, Immobilizer System –Encrypted Code Registration Criteria Table P.54A-13). Then go to Step 4.

STEP 4. Check the symptoms.

Q: When the selector lever is moved to "N" position, auto-cruise control system is cancelled?

YES : The procedure is complete.

NO : Return to Step 1.

INSPECTION PROCEDURE 4: When the Auto-cruise Control "CANCEL" Switch is Set to ON, Auto-cruise Control System is not Cancelled.

COMMENT

The cause is probably an open-circuit in the output in the circuit inside the "CANCEL" switch.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CASE:)

- Malfunction of the auto-cruise control switch.

DIAGNOSIS

Replace the auto-cruise control switch. (Refer to P.17-89, Auto-cruise Control).

INSPECTION PROCEDURE 5: Auto-cruise Control System cannot be Set.

COMMENT

The fail-safe function is probably canceling auto-cruise control system. In this case, checking the diagnostic trouble codes. The scan tool MB991958 can also be used to check if the circuits of each input switch are normal or not by checking the input switch codes.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CASE:)

- Malfunction of the auto-cruise control switch.
- Malfunction of the stoplight switch.
- Malfunction of the transmission range switch.
- Malfunction of the ECM <M/T> or PCM <A/T>.

DIAGNOSIS

Required Special Tools:

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

STEP 1. Read the diagnostic trouble code.

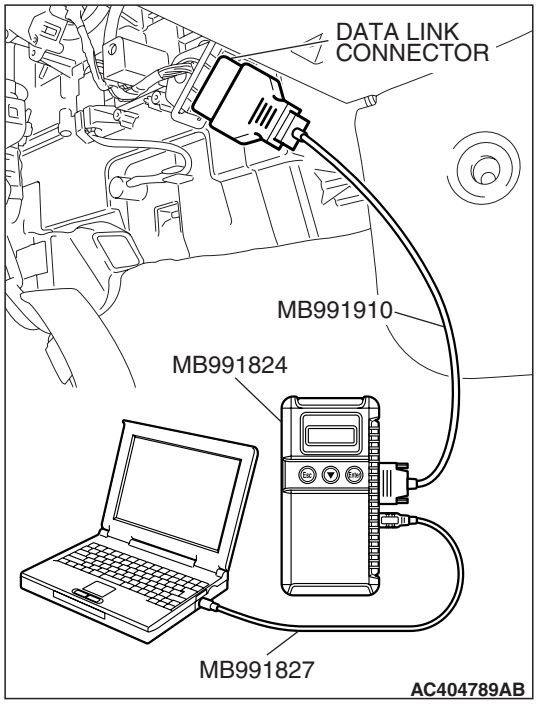
Read the auto-cruise control system diagnostic trouble code. (Refer to P.17-11).

Q: Is DTC set?

YES : Diagnose the auto-cruise control system. (Refer to P.17-15, Diagnostic Trouble Code Chart). Then go to Step 7.

NO : Go to Step 2.

STEP 2. Using scan tool MB991958, check data list item 75: Cancel switch.



⚠ CAUTION

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

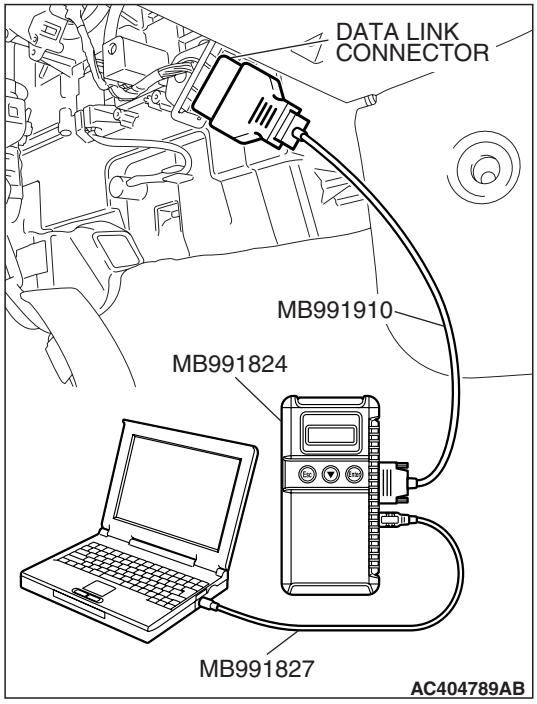
(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to data reading mode for auto-cruise control system. (Refer to P.17-11).
- Item 75, Cancel switch.
  - When "CANCEL" switch is at the ON position, the display on scan tool MB991958 should be "ON".
  - When "CANCEL" switch is at the OFF position, the display on scan tool MB991958 should be "OFF".

(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 3.

NO : Refer to P.17-68, Symptom Procedures –Inspection Procedure 4. Then go to Step 7.



STEP 3. Using scan tool MB991958, check data list item 74: Brake light switch and data list item 89: Normally closed brake switch.

⚠ CAUTION

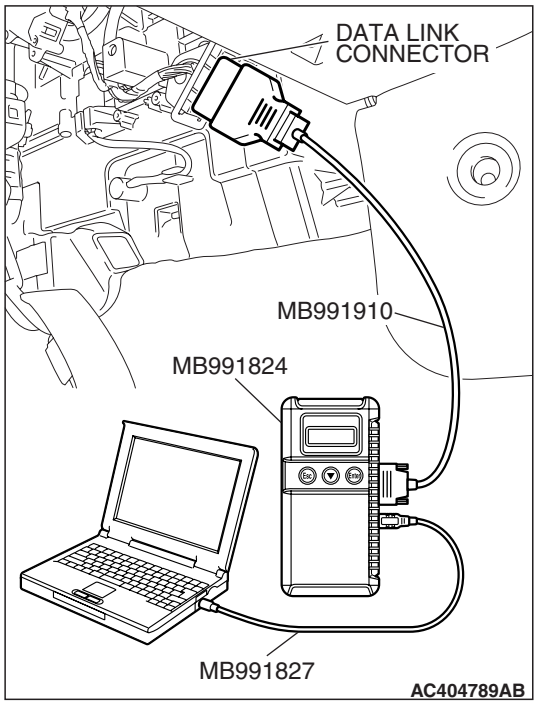
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to data reading mode for auto-cruise control system. (Refer to P.17-11).
- Item 74, Brake light switch.
  - When brake pedal is depressed, the display on scan tool MB991958 should be "ON".
  - When brake pedal is released, the display on scan tool MB991958 should be "OFF".
- Item 89, Normally closed brake switch.
  - When brake pedal is depressed, the display on scan tool MB991958 should be "ON".
  - When brake pedal is released, the display on scan tool MB991958 should be "OFF".

(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 4 <M/T> or Step 5 <A/T>.
NO : Refer to P.17-54, Symptom Procedures –Inspection Procedure 1. Then go to Step 7.



STEP 4. Using scan tool MB991958, check data list item 78: Clutch switch <M/T>.

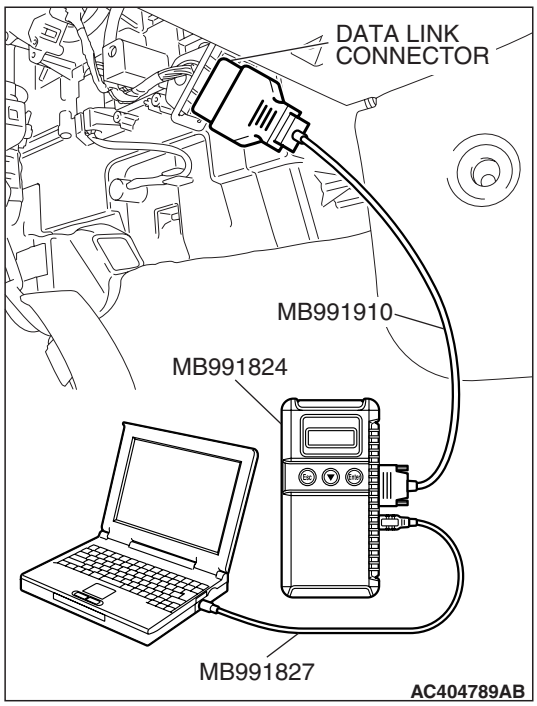
⚠ CAUTION
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to data reading mode for auto-cruise control system. (Refer to P.17-11).
- Item 78: Clutch switch.
  - When the clutch pedal is depressed, the display on scan tool MB991958 should be "ON".
  - When the clutch pedal is released, the display on scan tool MB991958 should be "OFF".

(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 6.
NO : Refer to P.17-55, Symptom Procedures –Inspection Procedure 2. Then go to Step 7.



STEP 5. Using scan tool MB991958, check data list item 88: Neutral switch <A/T>.

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

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Set scan tool MB991958 to data reading mode for auto-cruise control system. (Refer to P.17-11).
- Item 88, Neutral switch.
  - When selector lever is at the "N" position, the display on scan tool MB991958 should be "ON".
  - When selector lever is other than "N" position, the display on scan tool MB991958 should be "OFF".

(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 6.
NO : Refer to P.17-64, Symptom Procedures –Inspection Procedure 3. Then go to Step 7.

STEP 6. Check the symptoms.

Q: Can auto-cruise control be set?

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 Malfunction P.00-14).

NO : Replace the ECM <M/T> or PCM <A/T>. (Refer to GROUP 54A, Immobilizer System –Encrypted Code Registration Criteria Table P.54A-13). Then go to Step 7.

STEP 7. Check the symptoms.

Q: Can auto-cruise control be set?

YES : The procedure is complete.

NO : Return to Step 1.

INSPECTION PROCEDURE 6: Hunting (Repeated Acceleration and Deceleration) Occurs at the Set Vehicle Speed.

COMMENT

The output shaft speed sensor signal or the throttle body is suspected.

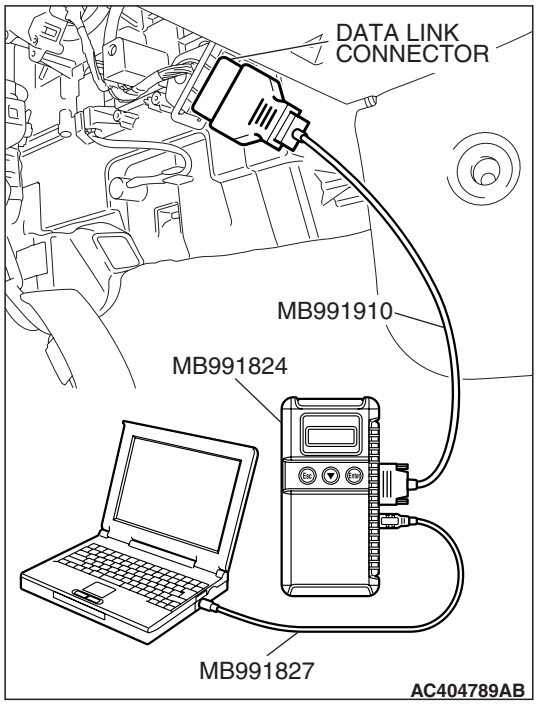
TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CASE:)

- Malfunction of the vehicle speed sensor <M/T>.
- Malfunction of the output shaft speed sensor <A/T>.
- Malfunction of the throttle body.
- Malfunction of the ECM <M/T> or PCM <A/T>.

DIAGNOSIS

Required Special Tools:

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



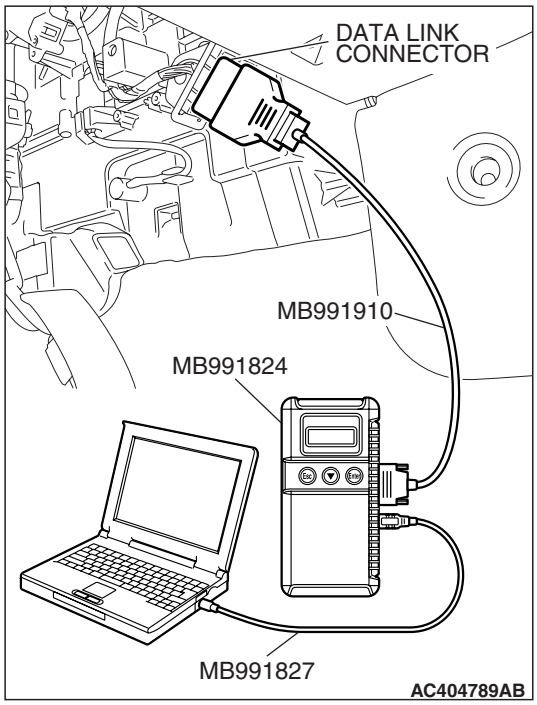
STEP 1. Using scan tool MB991958, read the MFI system diagnostic trouble code <M/T>.

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

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Check for MFI system diagnostic trouble code. (Refer to GROUP 13A, MFI Diagnosis –Diagnostic Function –How to Read and Erase Diagnostic Trouble Code P.13A-6) <2.4L engine> or (Refer to GROUP 13B, MFI Diagnosis – Diagnostic Function –How to Read and Erase Diagnostic Trouble Code P.13B-6) <3.8L engine>.
(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

Q: Is DTC P0500 set?

YES : Refer to GROUP 13A, MFI Diagnosis –Diagnostic Trouble Code Procedures –DTC P0500: Vehicle Speed Sensor Malfunction <M/T>P.13A-794 <2.4L engine> or Refer to GROUP 13B, MFI Diagnosis – Diagnostic Trouble Code Procedures –DTC P0500: Vehicle Speed Sensor Malfunction <M/T>P.13B-832 <3.8L engine>. Then go to Step 5.
NO : Go to Step 3.



STEP 2. Using scan tool MB991958, read the A/T system diagnostic trouble code <A/T>.

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

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Check for A/T system diagnostic trouble code. (Refer to GROUP 23A, A/T Diagnosis –Diagnostic Function –How to Read and Erase Diagnostic Trouble Code P.23A-16).
(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

Q: Is DTC P1767 set?

YES : Refer to GROUP 23A, A/T Diagnosis –Diagnostic Trouble Code Procedures –DTC P1767: Output Shaft Speed Sensor System P.23A-113. Then go to Step 5 .
NO : Go to Step 3.

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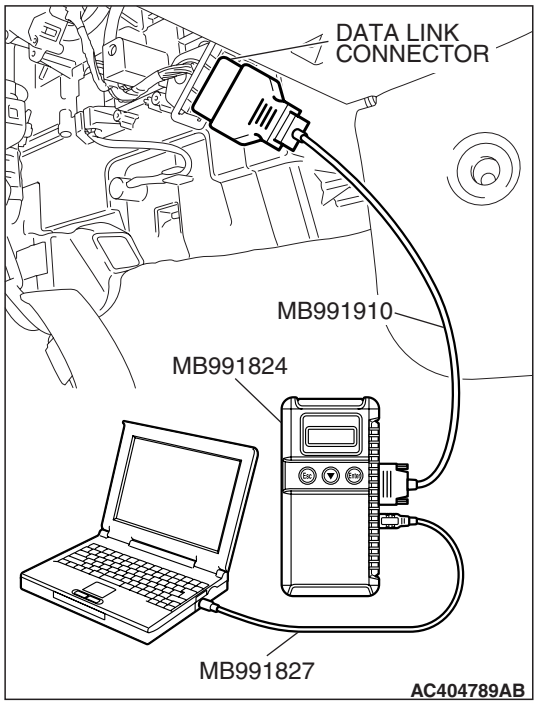


STEP 3. Using scan tool MB991958, read the MFI system diagnostic trouble code.

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

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Check for MFI system diagnostic trouble code (Refer to GROUP 13A, MFI Diagnosis –Diagnostic Function –How to Read and Erase Diagnostic Trouble Code P.13A-6) <2.4L engine> or (Refer to GROUP 13B, MFI Diagnosis – Diagnostic Function –How to Read and Erase Diagnostic Trouble Code P.13B-6) <3.8L engine>.
(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

Q: Is any DTC set?

YES : Diagnose the MFI system. (Refer to GROUP 13A, MFI Diagnosis –Diagnostic Trouble Code Chart P.13A-41) <2.4L engine> or (Refer to GROUP 13B, MFI Diagnosis –Diagnostic Trouble Code Chart P.13B-43) <3.8L engine>. Then go to Step 5.
NO : Go to Step 4.

STEP 4. Retest the system

Q: Does hunting occur?

YES : Replace the ECM <M/T> or PCM <A/T>. (Refer to GROUP 54A, Immobilizer System –Encrypted Code Registration Criteria Table P.54A-13). Then go to Step 5.
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 Malfunction P.00-14).

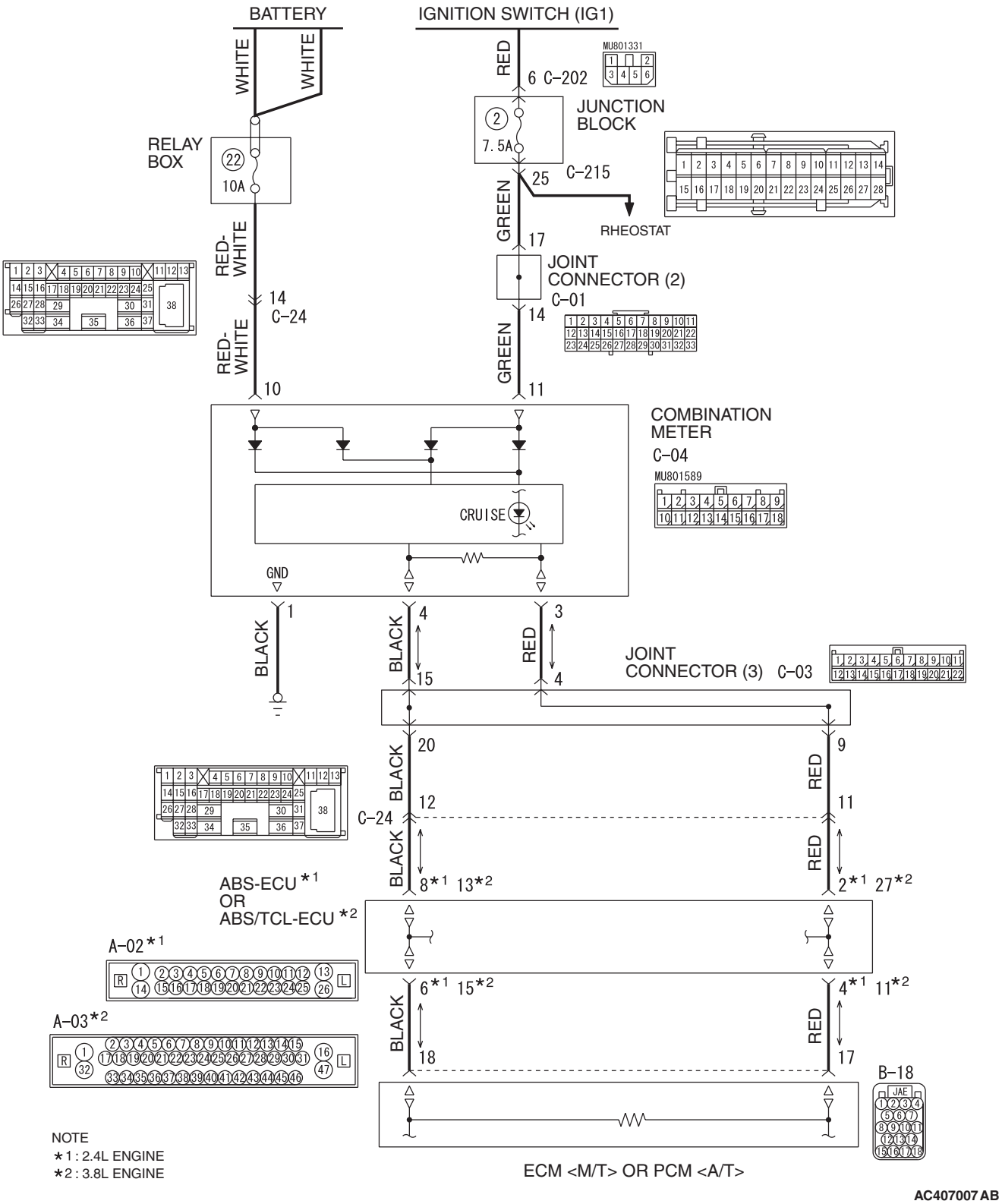
STEP 5. Retest the system

Q: Does hunting occur?

YES : Return to Step 1.
NO : The procedure is complete.

INSPECTION PROCEDURE 7: When "CRUISE" (MAIN) Switch is Turned "ON", "CRUISE" Indicator Light Inside Combination Meter does not Illuminate. (However, Auto-cruise Control System is Normal).

Auto-cruise Control Indicator Light Drive Circuit



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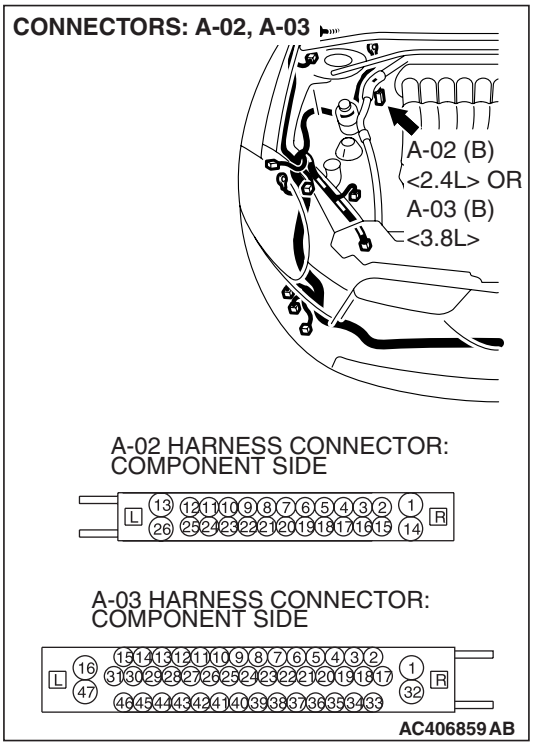

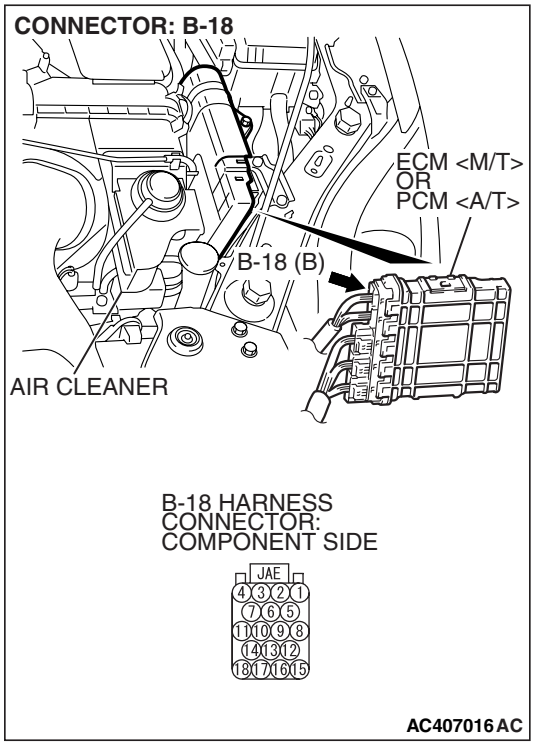

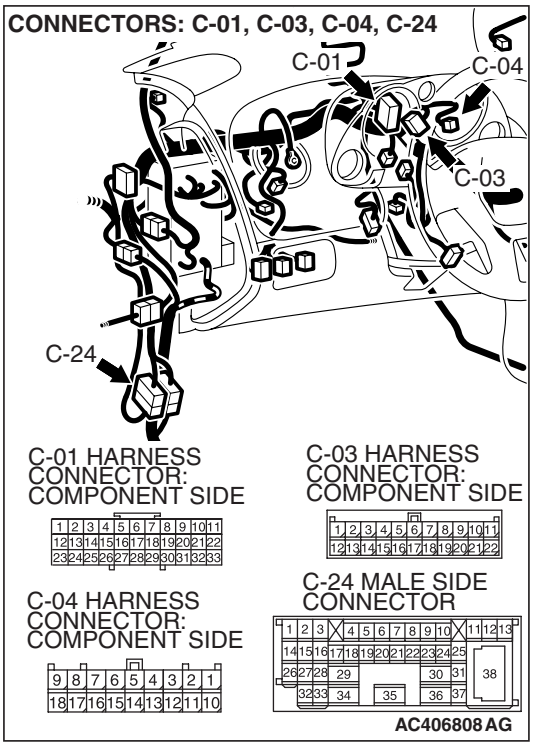

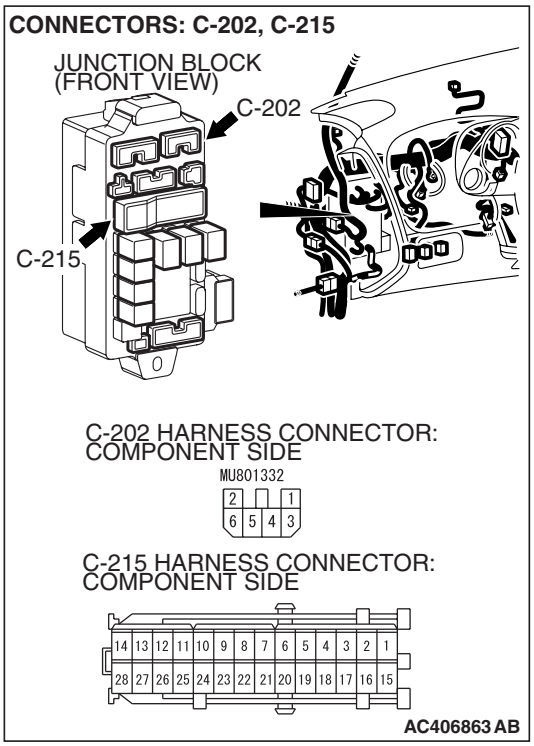

CIRCUIT OPERATION

The ECM <M/T> or PCM <A/T> detects "CRUISE" (MAIN) switch "ON" signal to illuminate the "CRUISE" indicator light on the combination meter.

COMMENT

Connector(s), wiring harness in the CAN bus line between the ECM <M/T> or PCM <A/T> and the combination meter, power supply to the ECM <M/T> or PCM <A/T>, the combination meter, the ECM <M/T> or PCM <A/T> may be defective.

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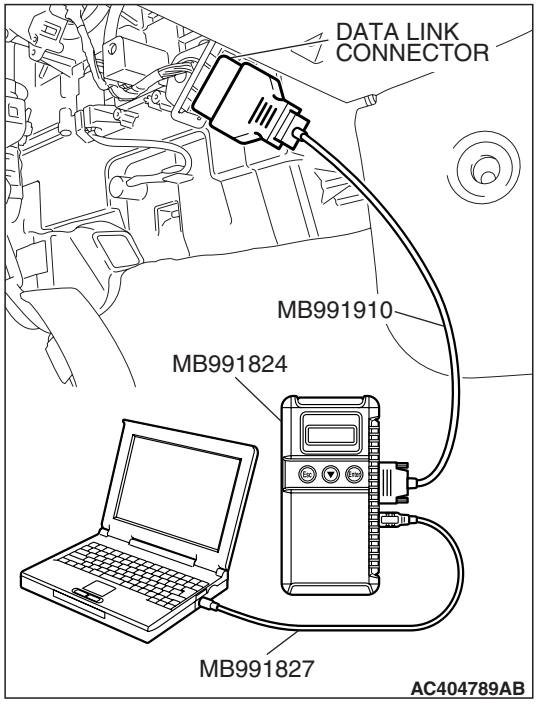
TROUBLESHOOTING HINTS

- Malfunction of the combination meter.
- Damaged harness or connector.
- Malfunction of the ECM <M/T> or PCM <A/T>.

DIAGNOSIS

Required Special Tools:

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



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

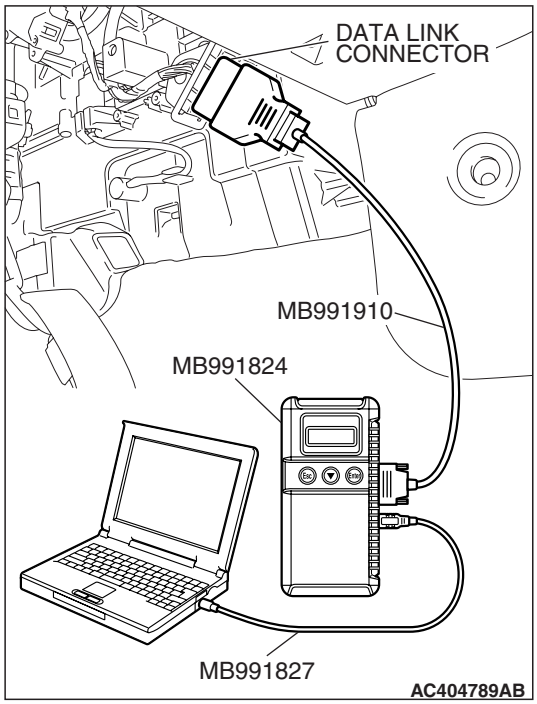
⚠ CAUTION

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

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Diagnose the CAN bus line. (Refer to P.17-11).
(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

Q: Is the check result satisfactory?

YES : Go to Step 2
NO : Repair the CAN bus lines. (Refer to GROUP 54C, Diagnosis –Can Bus Diagnostic Chart P.54C-14). Then go to Step 4.



STEP 2. Using scan tool MB991958, read the MFI diagnostic trouble code.

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

(1) Connect scan tool MB991958 to the data link connector. (Refer to P.17-11).
(2) Turn the ignition switch to the "ON" position.
(3) Check for MFI system diagnostic trouble code (Refer to GROUP 13A, MFI Diagnosis –Diagnostic Function –How to Read and Erase Diagnostic Trouble Code P.13A-6) <2.4L engine> or (Refer to GROUP 13B, MFI Diagnosis – Diagnostic Function –How to Read and Erase Diagnostic Trouble Code P.13B-6) <3.8L engine>.
(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Disconnect scan tool MB991958.

Q: Is DTC U1108 set?

YES : Refer to GROUP 13A, MFI Diagnosis –Diagnostic Trouble Code Procedures –DTC U1108: Combination Meter-ECU CAN Communication Time Out P.13A-995 <2.4L engine> or Refer to GROUP 13B, MFI Diagnosis –Diagnostic Trouble Code Procedures –DTC U1108: Combination Meter-ECU CAN Communication Time Out P.13B-1070 <3.8L engine>. Then go to Step 4.
NO : Go to Step 3.

STEP 3. Retest the system.

Q: Does the "CRUISE" indicator light illuminate when the "CRUISE" (MAIN) switch is turned "ON"?

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 Malfunction P.00-14).
NO : Replace the ECM <M/T> or PCM <A/T>. (Refer to GROUP 54A, Immobilizer System –Encrypted Code Registration Criteria Table P.54A-13). Then go to Step 4.

STEP 4. Retest the system.

Q: Does the "CRUISE" indicator light illuminate when the "CRUISE" (MAIN) switch is turned "ON"?

YES : The procedure is complete.
NO : Return to Step 1.

DATA LIST REFERENCE TABLE

M1172002400482

⚠ CAUTION

- **Driving tests always need two persons: one driver and one observer.**
- **When shifting the selector lever to "D" range apply the brakes should be applied so that the vehicle does not move forward <A/T>.**

*NOTE: *:After the inspection is completed, disconnect the throttle position sensor connector, and then delete the diagnostic trouble code using scan tool MB991958. (Refer to P.17-11).*

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM		INSPECTION REQUIREMENT		NORMAL CONDITION
APS (main)	11	Accelerator pedal position sensor (main)		Ignition switch: "ON"	Accelerator pedal: Released	735 –1,335 mV
					Accelerator pedal: Gradually depressed	Increases in response to the pedal depression stroke
					Accelerator pedal: Fully depressed	4,000 mV or more
Brake light switch	74	Stoplight switch		Brake pedal: Depressed		ON
				Brake pedal: Released		OFF
Cancel code	57	Cancel code		Ignition switch: "ON"		The cancel code, which set when the auto-cruise control system was cancelled at the last time.
Cancel switch	75	Auto-cruise control switch	CANCEL	"CANCEL" switch: ON		ON
				"CANCEL" switch: OFF		OFF
Clutch switch	78	Clutch pedal position switch <M/T>		Clutch pedal: Depressed		ON
				Clutch pedal: Released		OFF
Cruise switch	81	Auto-cruise control system operation		Auto-cruise control system: active		ON
				Auto-cruise control system: Inactive		OFF
Main switch	86	Auto-cruise control switch	CRUISE (MAIN)	"CRUISE" (MAIN) switch: "ON"		ON
				"CRUISE" (MAIN) switch: "OFF"		OFF
Neutral switch	88	Transmission range switch <A/T>		Transmission range switch: "N" position		ON
				Transmission range switch: Other than above		OFF
Normally closed brake switch	89	Stoplight switch (brake switch)		Brake pedal: Depressed		ON
				Brake pedal: Released		OFF
Resume switch	91	Auto-cruise control switch	ACC/RES	"ACC/RES" switch: ON		ON
				"ACC/RES" switch: OFF		OFF

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MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM		INSPECTION REQUIREMENT		NORMAL CONDITION
Set switch	92	Auto-cruise control switch	COAST/SET	"COAST/SET" switch: ON		ON
				"COAST/SET" switch: OFF		OFF
TPS (main)	13	Throttle position sensor (main)*		• Remove the intake air hose at the throttle body. • Disconnect the throttle position sensor connector, and then connect terminals 3, 4, 5 and 6 with the use of the special tool: MB991658 (Test harness). • Ignition switch: "ON"	Fully close the throttle valve with your finger	300 – 700 mV
					Fully open the throttle valve with your finger	4,000 mV or more
				No load		520 – 620 mV
				A/C switch: "OFF" to "ON"		Voltage rises
				Selector lever: "N" to "D"		Voltage rises
Vehicle speed sensor	4	Vehicle speed signal		Road test the vehicle		The speedometer and scan tool MB991958 display the same value.

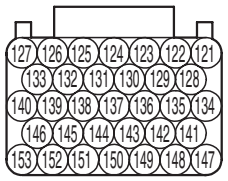
ECM <M/T> OR PCM <A/T> TERMINAL VOLTAGE REFERENCE CHART FOR AUTO-CRUISE CONTROL SYSTEM OPERATION

M1172006000044

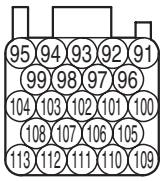
1. Disconnect the ECM <M/T> or PCM <A/T> connectors, and connect special tool MB991923 (Power plant ECU check harness) in between.
2. Measure the voltages between the check connector terminals of special tool MB991923 and ground terminals 63 or 76.

SPECIAL TOOL-POWER PLANT ECU CHECK HARNESS (MB991923) CONNECTOR: COMPONENT SIDE

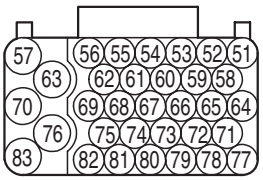
33-PIN CONNECTOR (PCM CONNECTOR B-23)



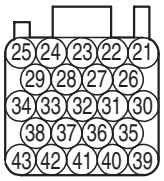
23-PIN CONNECTOR WITH RED TAPE (PCM CONNECTOR B-22)



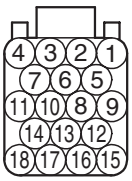
33-PIN CONNECTOR (PCM CONNECTOR B-21)



23-PIN CONNECTOR WITHOUT RED TAPE (PCM CONNECTOR B-20)



18-PIN CONNECTOR (PCM CONNECTOR B-19)



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TERMINAL NO.	CHECK ITEM	CHECK CONDITION		NORMAL CONDITION
9	Stoplight switch	Ignition switch: "ON"	Depress the brake pedal.	Battery positive voltage
			Release the brake pedal.	1V or less
12	Auto-cruise control switch power supply	Ignition switch: "ON"	All switches: OFF	4.7 – 5.0 V
			"CRUISE" (MAIN) switch: "ON"	0 – 0.3 V
			"COAST/SET" switch: ON	2.0 – 2.8 V
			"ACC/RES" switch: ON	3.3 – 4.1 V
			"CANCEL" switch: ON	0.8 – 1.5 V
16	Clutch pedal position switch <M/T>	Ignition switch: "ON"	Depress the clutch pedal.	4.9 – 5.1 V
			Release the clutch pedal.	1V or less
21	Sensor supplied voltage	Ignition switch: "ON"		4.9 – 5.1 V
26	Accelerator pedal position sensor (main)	Ignition switch: "ON"	Release the accelerator pedal	0.735 – 1.335 V
			Depress the accelerator pedal.	4.0 V or more
27	Accelerator pedal position sensor (sub)	Ignition switch: "ON"	Release the accelerator pedal	0.435 – 1.035 V
			Depress the accelerator pedal.	3.7 V or more
30	Power supply voltage applied to accelerator pedal position sensor (main)	Ignition switch: "ON"		4.9 – 5.1 V
33	Stoplight switch (brake switch)	Ignition switch: "ON"	Depress the brake pedal.	Battery positive voltage
			Release the brake pedal.	1V or less

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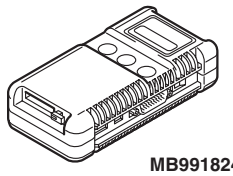
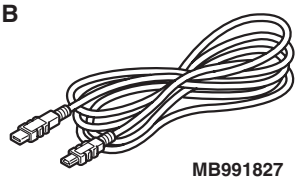
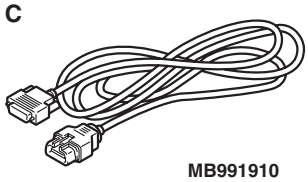
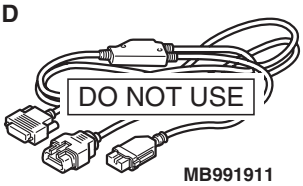
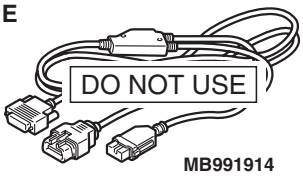
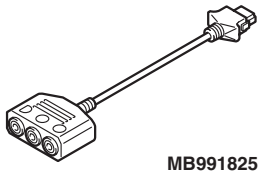
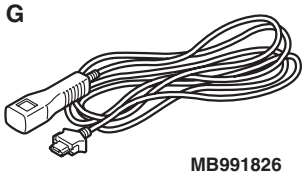
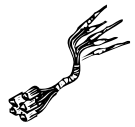
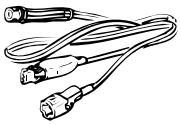
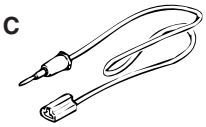
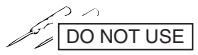
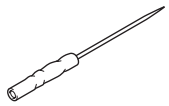
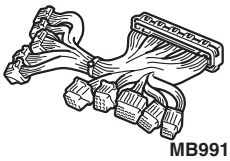
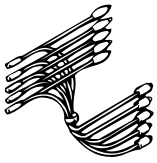
TERMINAL NO.	CHECK ITEM	CHECK CONDITION		NORMAL CONDITION
77	Transmission range switch: "N" <A/T>	Ignition switch: "ON"	Transmission range switch: "N" position	Battery positive voltage
			Transmission range switch: Other than above	1V or less
94	Power supply voltage applied to throttle position sensor	Ignition switch: "ON"		4.9 – 5.1 V
98	Throttle position sensor (sub)	• Remove the intake air hose at the throttle body • Disconnect the throttle position sensor, and then connect terminals 3, 4, 5 and 6 with the use of the special tool: MB991658 (Test harness). • Ignition switch: "ON"	Fully close the throttle valve with your finger	2.2 – 2.8 V
			Fully open the throttle valve with your finger	4.0 V or more
99	Throttle position sensor (main)	• Remove the intake air hose at the throttle body • Disconnect the throttle position sensor, and then connect terminals 3, 4, 5 and 6 with the use of the special tool: MB991658. • Ignition switch: "ON"	Fully close the throttle valve with your finger	0.3 – 0.7 V
			Fully open the throttle valve with your finger	4.0 V or more
141	Throttle actuator control motor (–)	• Ignition switch: "ON" • Accelerator pedal: fully closed to fully opened		Decreases slightly (approx. 2 V) from battery voltage.
147	Throttle actuator control motor (+)	• Ignition switch: "ON" • Accelerator pedal: fully opened to fully closed		Decreases slightly (approx. 2 V) from battery voltage.

SPECIAL TOOLS

M1172000600543

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
A  MB991824 B  MB991827 C  MB991910 D  MB991911 E  MB991914 F  MB991825 G  MB991826 MB991958	MB991958 A: MB991824 B: MB991827 C: MB991910 D: MB991911 E: MB991914 F: MB991825 G: MB991826 MUT-III sub assembly A: Vehicle communication interface (V.C.I.) B: MUT-III USB cable C: MUT-III main harness A (Vehicles with CAN communication system) D: MUT-III main harness B (Vehicles without CAN communication system) E: MUT-III main harness C (for Daimler Chrysler models only) F: MUT-III measurement adapter G: MUT-III trigger harness	MB991824-KIT *NOTE: G: MB991826 MUT-III trigger harness is not necessary when pushing V.C.I. ENTER key.*	Checking data list **⚠ CAUTION** **For vehicles with CAN communication, use MUT-III main harness A to send simulated vehicle speed. If you connect MUT-III main harness B or C instead, the CAN communication does not function correctly.**

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
A  B  C  D  MB991223AZ	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222 Harness set A: Test harness B: LED harness C: LED harness adaptor D: Probe	General service tools	Checking the continuity and measuring the voltage at the harness connector
 MB992006	MB992006 Extra fine probe	General service tool	Continuity check and voltage measurement at harness wire or connector for loose, corroded or damaged terminals, or terminals pushed back in the connector.
 MB991923	MB991923 Power plant ECU check harness	–	Measuring the terminal voltage at the ECM <M/T> or PCM <A/T>
 MB991658	MB991658 Test harness	Tool not available	Checking throttle position sensor

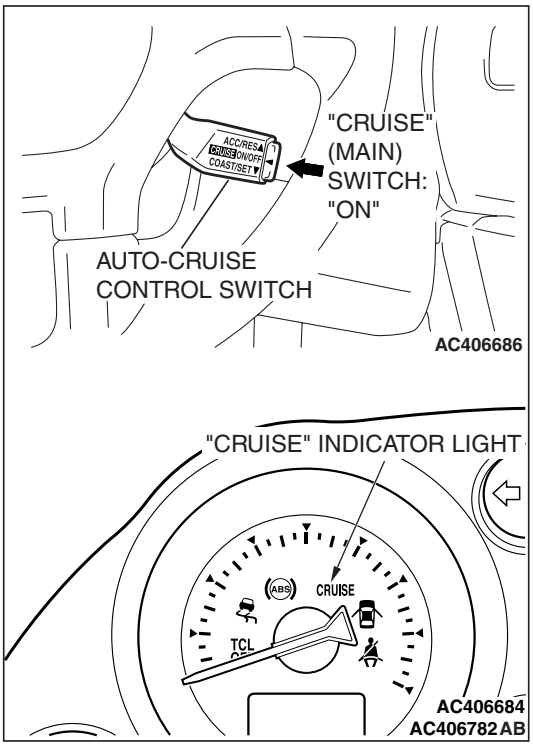
ON-VEHICLE SERVICE

AUTO-CRUISE CONTROL SWITCH CHECK

M1172001200140

AUTO-CRUISE CONTROL MAIN SWITCH CHECK

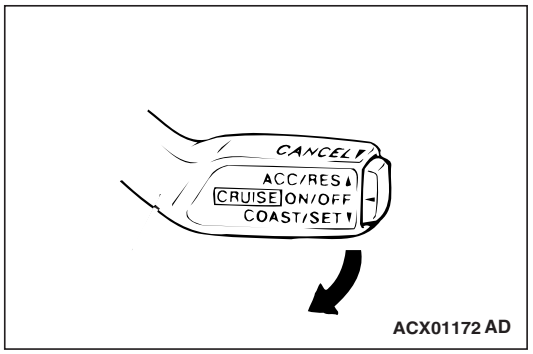
1. Turn the ignition switch to the "ON" position.
2. Check that the "CRUISE" indicator light within the combination meter illuminates when the "CRUISE" (MAIN) switch is switched "ON".



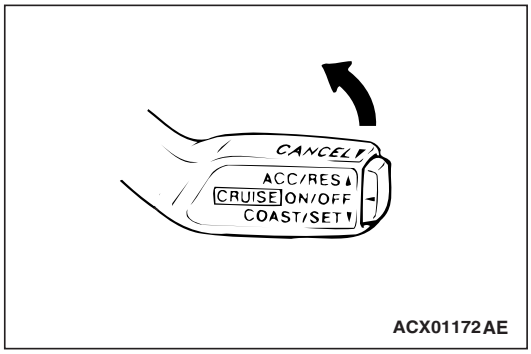
AUTO-CRUISE CONTROL SETTING

1. Switch "ON" the "CRUISE" (MAIN) switch.
2. Drive at the desired speed, above approximately 40 km/h (25 mph).
3. Push the auto-cruise control switch in the direction of the arrow.
4. Check to be sure that when the switch is released the speed is the constant speed.

   NOTE: If the vehicle speed decreases to approximately 15 km/h (9 mph) below the set speed because of climbing a hill for example, it is normal for the auto-cruise control to be cancelled.



SPEED-INCREASE SETTING

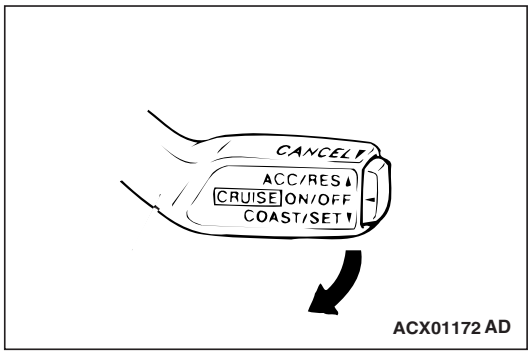


ACX01172AE

1. Switch "ON" the "CRUISE" (MAIN) switch.
2. Set to the desired speed, above approximately 40 km/h (25 mph).
3. Push the auto-cruise control switch in the direction of the arrow.
4. Check to be sure that acceleration continues while the switch is held, and that the speed at the time it was released becomes the constant driving speed.

   NOTE: Acceleration can be continued even if the vehicle speed has passed the high-speed limit [approximately 200 km/h (124 mph)]. But the constant driving speed when the auto-cruise control switch is released will be recorded as the high-speed limit.

SPEED-REDUCTION SETTING

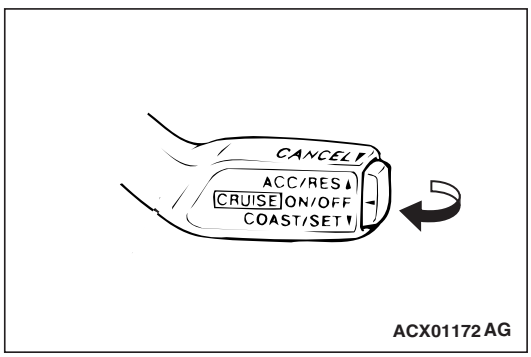


ACX01172 AD

1. Switch "ON" the "CRUISE" (MAIN) switch.
2. Set to the desired speed, above approximately 40 km/h (25 mph).
3. Push the auto-cruise control switch in the direction of the arrow.
4. Check to be sure that deceleration continues while the switch is pressed, and that the speed at the time it was released becomes the constant driving speed.

   NOTE: When the vehicle speed reaches the low limit [approximately 40 km/h (25 mph)] during deceleration, the auto-cruise control will be cancelled.

RETURN TO THE SET SPEED BEFORE CANCELLATION AND AUTO-CRUISE CONTROL CANCELLATION



ACX01172 AG

1. Switch "ON" the "CRUISE" (MAIN) switch.
2. Set to the desired speed, above approximately 40 km/h (25 mph).
3. When any of the following operations are performed while at constant speed during auto-cruise control, check if normal driving is resumed and deceleration occurs.
   (1) The auto-cruise control switch is pulled in the direction of the arrow.
   (2) The brake pedal is depressed.
   (3) The selector lever is moved to the "N" range.
4. At a vehicle speed of 40 km/h (25 mph) or higher, check if when the "ACC/RES" switch is switched ON, the vehicle speed returns to the speed before auto-cruise control driving was cancelled, and constant speed driving occurs.

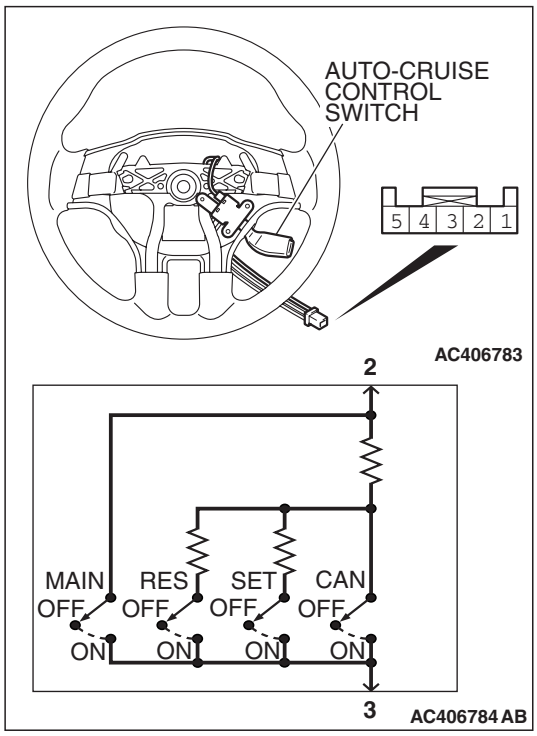
5. When the "CRUISE" (MAIN) switch is turned to the "OFF" while driving at constant speed, check if normal driving is resumed and deceleration occurs.

AUTO-CRUISE CONTROL SYSTEM COMPONENT CHECK

M1172001700510

AUTO-CRUISE CONTROL SWITCH CHECK

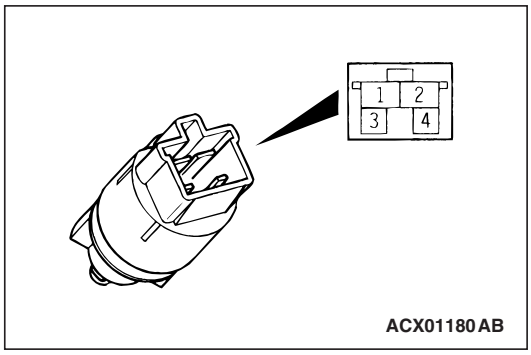
1. Remove the steering wheel assembly. (Refer to GROUP 37, Steering Wheel P.37-27).
2. Measure the resistance between terminal 2 and terminal 3 when each of the "COAST/SET", "ACC/RES", "CANCEL" and "CRUISE" (MAIN) switches is pressed. If values measured at the time each switch is pressed correspond to those in the table below, the resistance values are correct.



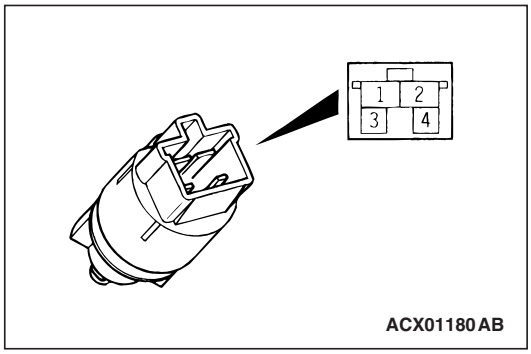
SWITCH POSITION	SPECIFIED CONDITION
"CRUISE" (MAIN) switch "OFF"	Open circuit
"CRUISE" (MAIN) switch "ON"	Less than 2 ohms
"CANCEL" switch ON	Approximately 100 Ω
"ACC/RES" switch ON	Approximately 887 Ω
"COAST/SET" switch ON	Approximately 300 Ω

STOPLIGHT SWITCH

1. Disconnect the connector.
2. Check for continuity between the terminals of the switch.



MEASUREMENT CONDITION	TERMINAL CONNECTOR OF TESTER	SPECIFIED CONDITION
When brake pedal is depressed.	1 – 2 (for stoplight switch)	Less than 2 ohms
	3 – 4 (for normally closed brake switch)	Open circuit
When brake pedal is not depressed.	1 – 2 (for stoplight switch)	Open circuit
	3 – 4 (for normally closed brake switch)	Less than 2 ohms



CLUTCH PEDAL POSITION SWITCH <M/T>

1. Disconnect the connector.
2. Check for continuity between the terminals of the switch.

MEASUREMENT CONDITION	TERMINAL CONNECTOR OF TESTER	SPECIFIED CONDITION
When clutch pedal is depressed.	1 – 2	Less than 2 ohms
When clutch pedal is not depressed.	1 – 2	Open circuit

TRANSMISSION RANGE SWITCH ("N" POSITION) <A/T>

Refer to GROUP 23A, On-vehicle Service –Essential Service P.23A-387.

THROTTLE POSITION SENSOR

Refer to GROUP 13A, On-vehicle Service –Throttle Actuator Control Motor Check P.13A-1207 <2.4L engine>.
Refer to GROUP 13B, On-vehicle Service –Throttle Actuator Control Motor Check P.13B-1288 <3.8L engine>.

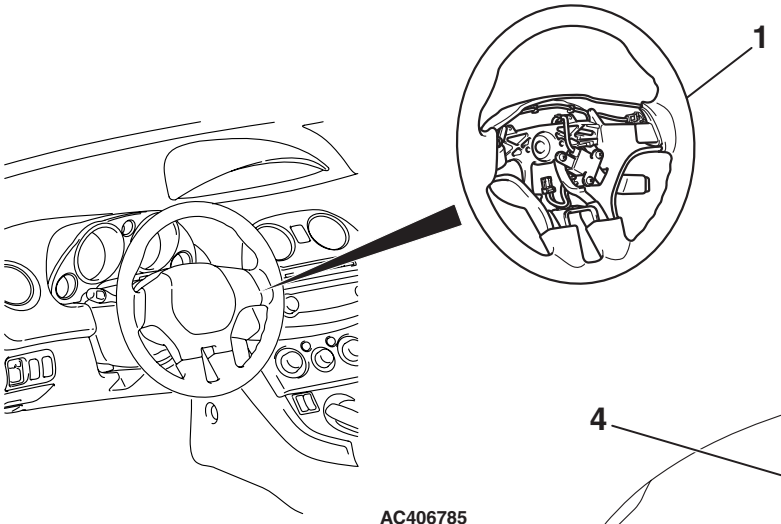
AUTO-CRUISE CONTROL

REMOVAL AND INSTALLATION

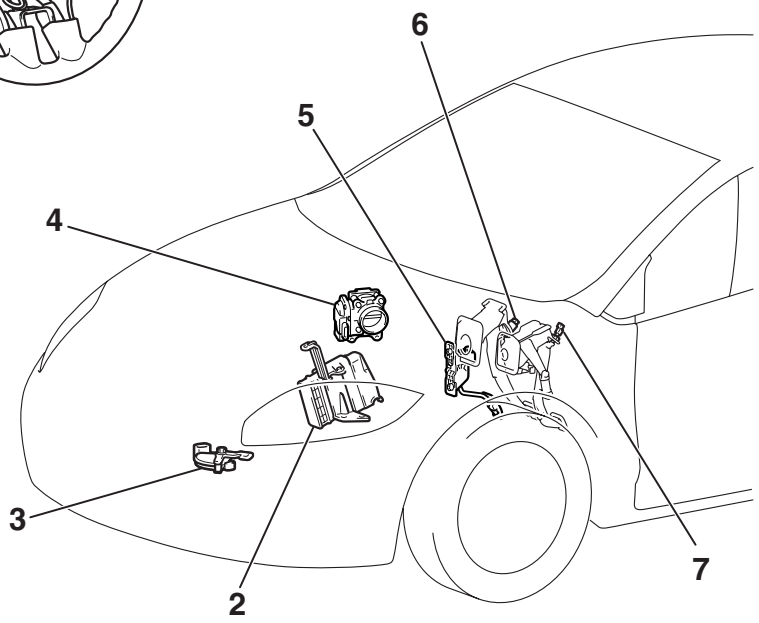
M1172001400489

⚠ CAUTION

Do not replace the ECM <M/T> or PCM <A/T> and the ETACS-ECU simultaneously. Always replace either one of the ECUs first, and register the encrypted code (Refer to GROUP 54A, Immobilizer System –Encrypted Code Registration Criteria Table P.54A-13). Then, replace the other ECU.



AC406785



AC406683
AC406786 AB

CONTROL SWITCH REMOVAL STEPS

1. STEERING WHEEL ASSEMBLY (BUILT-IN AUTO-CRUISE CONTROL SWITCH) (REFER TO GROUP 37, STEERING WHEEL P.37-27)

CONTROL UNIT REMOVAL

2. ECM <M/T> OR PCM <A/T> [REFER TO GROUP 13A, ENGINE CONTROL MODULE (ECM) <M/T> AND POWERTRAIN CONTROL MODULE (PCM) <A/T>P.13A-1214] <2.4L ENGINE> OR [REFER TO GROUP 13B, ENGINE CONTROL MODULE (ECM) <M/T> AND POWERTRAIN CONTROL MODULE (PCM) <A/T>P.13B-1295] <3.8L ENGINE>

SENSOR REMOVAL STEPS

3. TRANSMISSION RANGE SWITCH <A/T> (REFER TO GROUP 23B, TRANSAXLE P.23B-8 <4A/T> OR REFER TO GROUP 23C, TRANSAXLE P.23C-8) <5A/T>
4. THROTTLE BODY (BUILT-IN THROTTLE POSITION SENSOR AND THROTTLE ACTUATOR CONTROL MOTOR) (REFER TO GROUP 13A, THROTTLE BODY P.13A-1212) <2.4L ENGINE> OR (REFER TO GROUP 13B, THROTTLE BODY P.13B-1293) <3.8L ENGINE>
5. ACCELERATOR PEDAL (BUILT-IN ACCELERATOR PEDAL POSITION SENSOR) (REFER TO P.17-9)

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SENSOR REMOVAL STEPS

6. STOPLIGHT SWITCH (REFER TO GROUP 35A, BRAKE PEDAL P.35A-25)
7. CLUTCH PEDAL POSITION SWITCH <M/T> (REFER TO GROUP 21, CLUTCH PEDAL P.21A-12)

EMISSION CONTROL

GENERAL DESCRIPTION

M1173000100701

The emission control system consists of the following subsystems:

- Positive crankcase ventilation system
- Evaporative emission system
- Exhaust emission control system

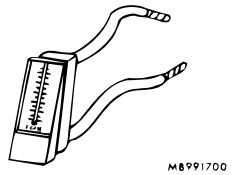
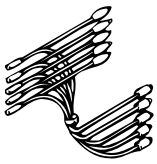
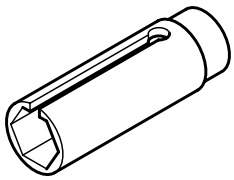
DIAGNOSIS

M1173000700190

SYMPTOM	PROBABLE CAUSE	REMEDY
Engine will not start or hard to start	Vacuum hose disconnected or damaged	Repair or replace
	The EGR valve (Stepper Motor) is not closed.	Repair or replace
	Malfunction of the evaporative emission purge solenoid	Repair or replace
Rough idle or engine stalls	The EGR valve (Stepper Motor) is not closed.	Repair or replace
	Vacuum hose disconnected or damaged.	Repair or replace
	Malfunction of the positive crankcase ventilation valve	Replace
	Malfunction of the purge control system	Check the system; If there is a problem, check its component parts.
Engine hesitates or poor acceleration	Malfunction of the exhaust gas recirculation system	Check the system; If there is a problem, check its component parts.
Excessive oil consumption	Positive crankcase ventilation line clogged	Check positive crankcase ventilation system
Poor fuel mileage	Malfunction of the exhaust gas recirculation system	Check the system; If there is a problem, check its component parts.

SPECIAL TOOLS

M1173000600405

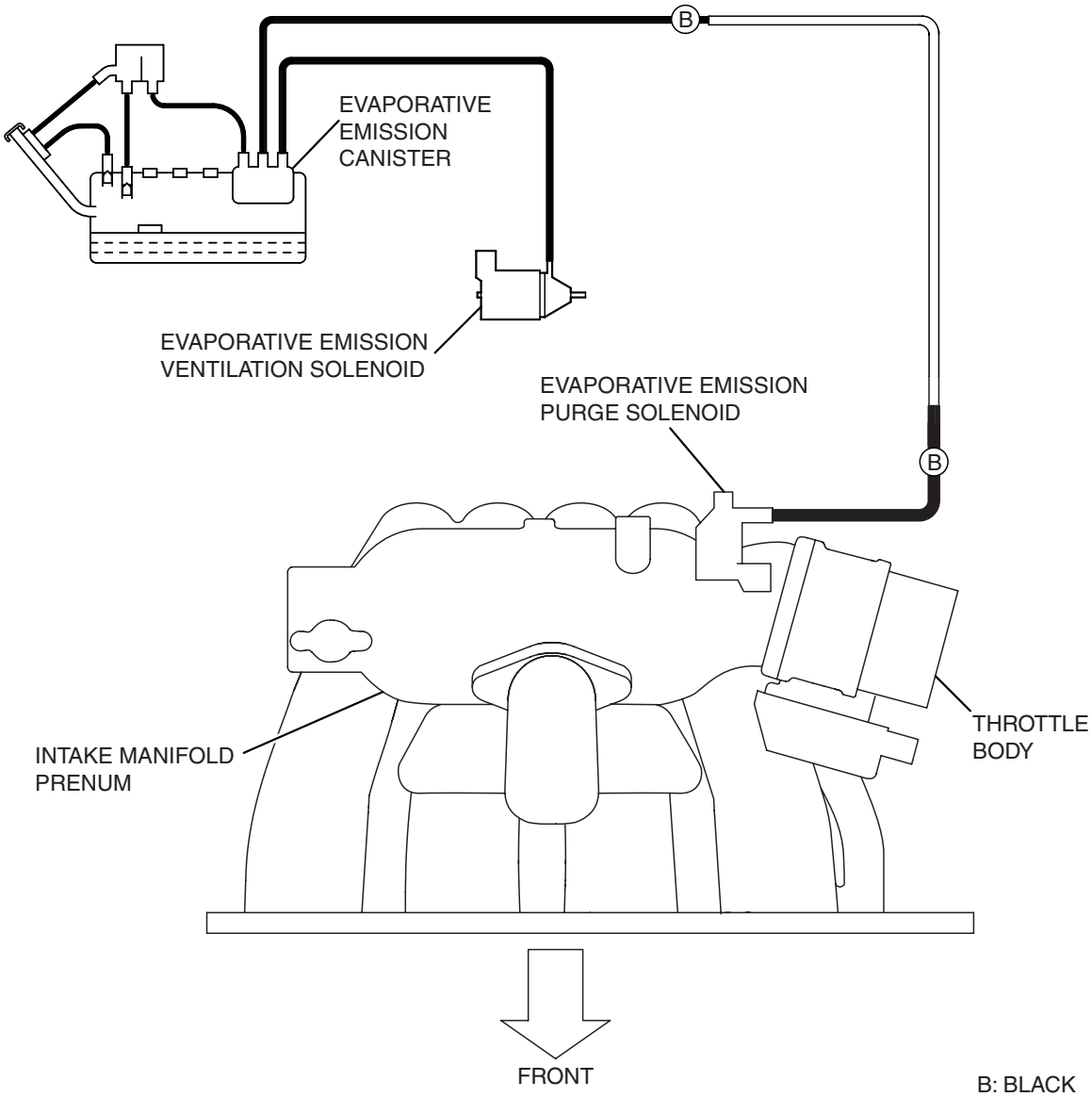
TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
	MB995061 Purge flow indicator	MLR6890A Part of MIT280220	Inspection of purge control system
	MB991658 Test harness set	Tool not available	Inspection of EGR valve (Stepper Motor)
	MD998770 Oxygen sensor wrench	MD998770-01 or General service tool	Removal/installation of heated oxygen sensor

VACUUM HOSES

VACUUM HOSE ROUTING

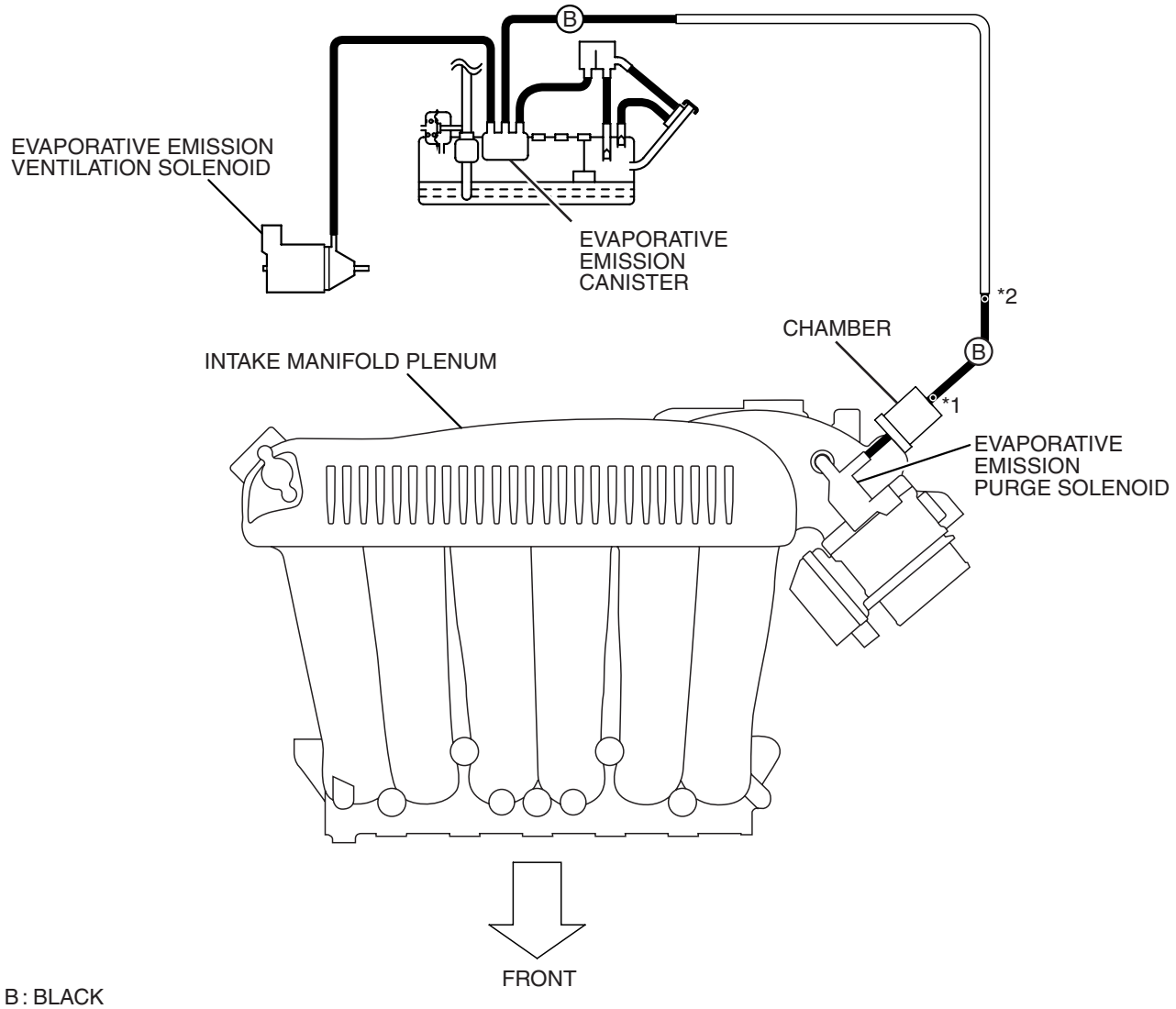
M1173000900763

<2.4L ENGINE>



AK404090AB

<3.8L ENGINE>



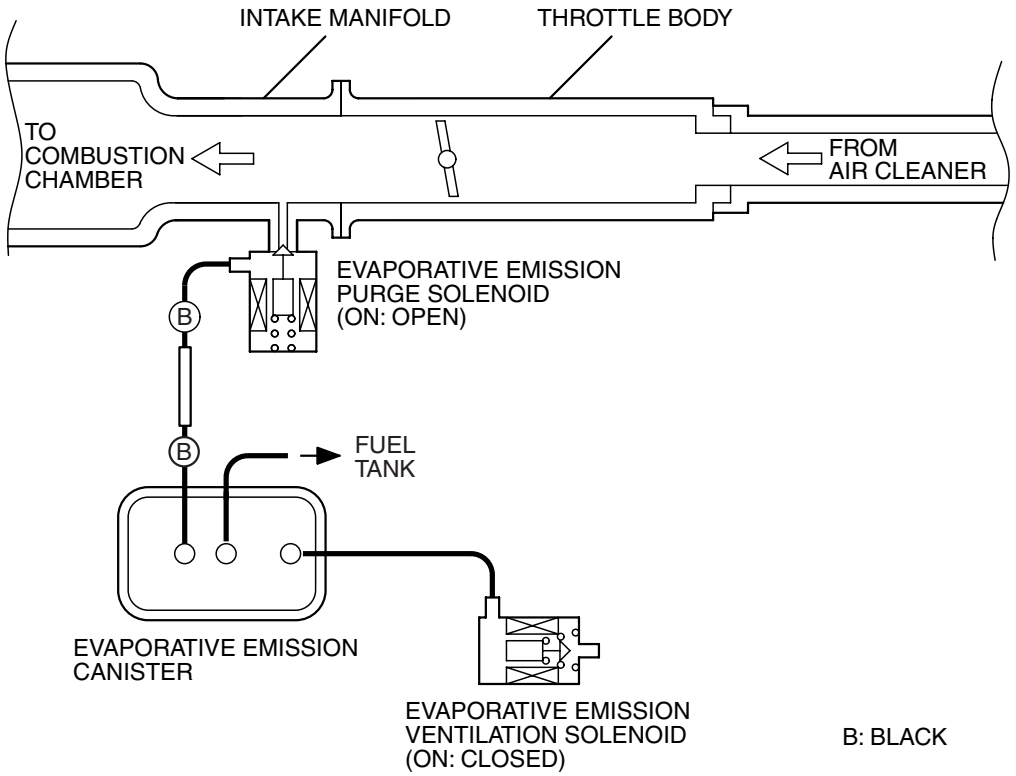
B : BLACK
*1:WHITE PAINT MARK
*2:YELLOW PAINT MARK

AK404091AB

VACUUM CIRCUIT DIAGRAM

M1173007100564

<2.4L ENGINE>



AK404092 AB

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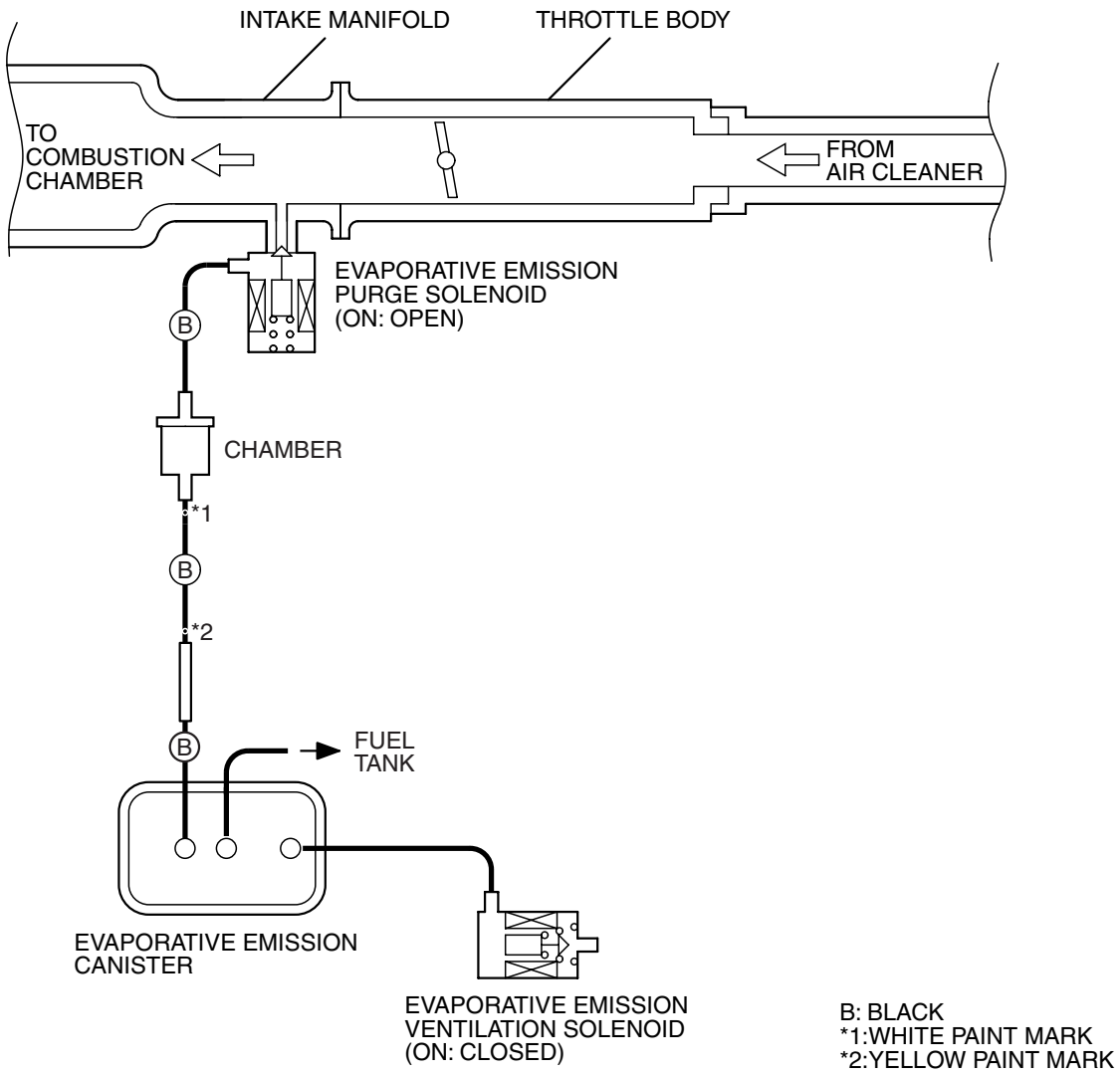

AK404093 AB

VACUUM HOSE INSTALLATION

M1173007200237

1. When connecting the vacuum hoses, they should be securely inserted onto the nipples.
2. Connect the hoses correctly, using the VACUUM HOSE ROUTING diagram as a guide.

VACUUM HOSE CHECK

M1173007300308

1. Using the VACUUM HOSE ROUTING diagram as a guide, check that the vacuum hoses are correctly connected.
2. Check the connection of the vacuum hoses, (removed, loose, etc.) and confirm that there are no sharp bends or damage.

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POSITIVE CRANKCASE VENTILATION SYSTEM

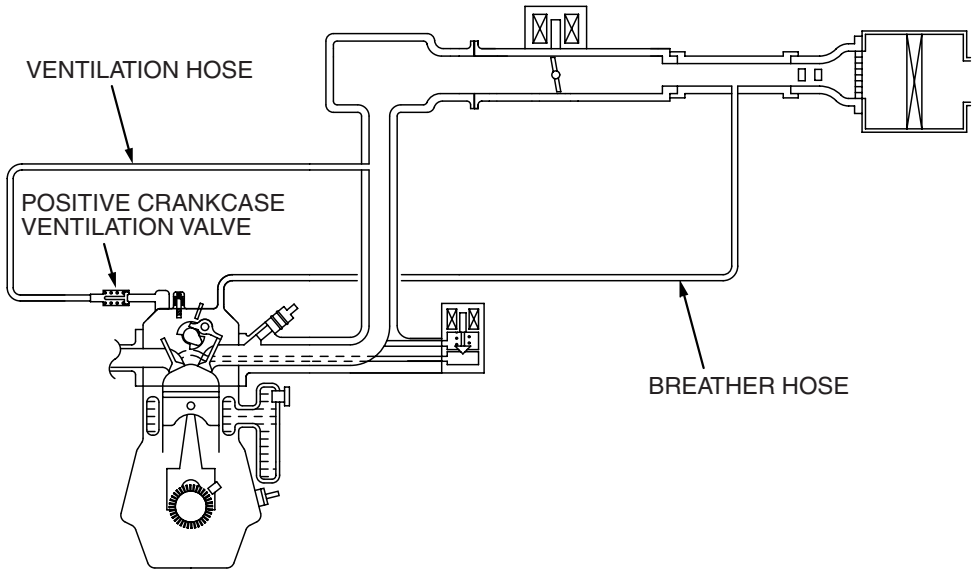
GENERAL DESCRIPTION (POSITIVE CRANKCASE VENTILATION SYSTEM)

M1173005000679

The positive crankcase ventilation (PCV) system prevents the escape of blow-by gases from inside the crankcase into the atmosphere.
Fresh air is sent from the air cleaner into the crankcase through the breather hose to be mixed with the blow-by gas inside the crankcase.
The blow-by gas inside the crankcase is drawn into the intake manifold through the PCV valve.
The PCV valve is designed to lift the plunger according to the intake manifold vacuum so as to regulate the flow of blow-by gas properly.
In other words, the blow-by gas flow is regulated during low load engine operation to maintain engine stability, while the flow is increased during high load operation to improve the ventilation performance.

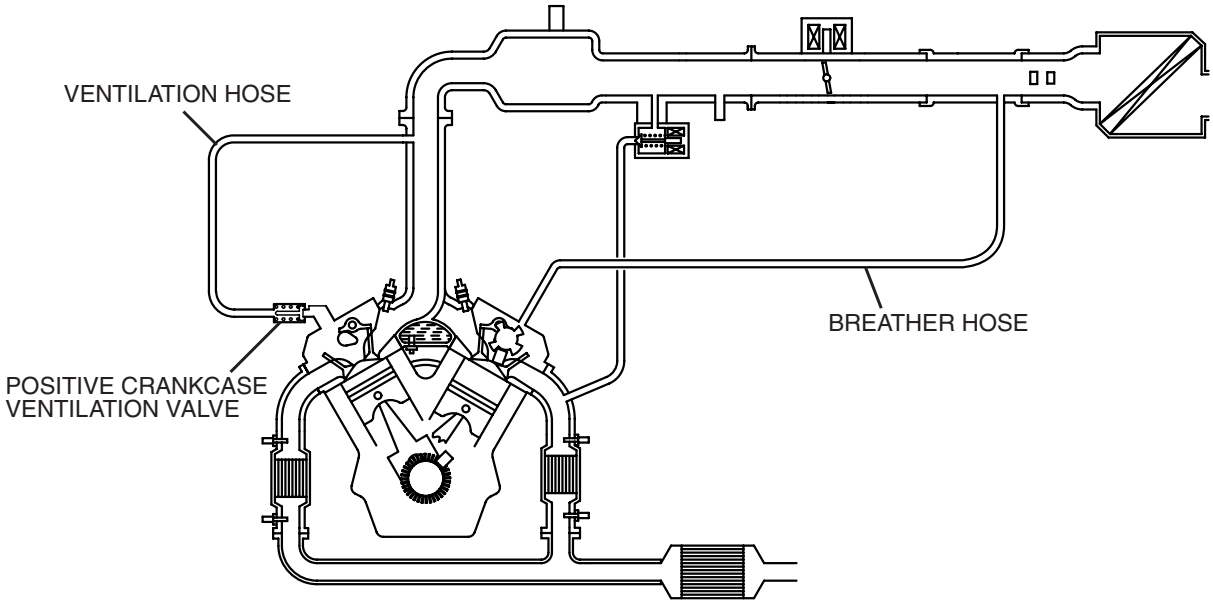
SYSTEM DIAGRAM

<2.4L ENGINE>



AK300553 AC

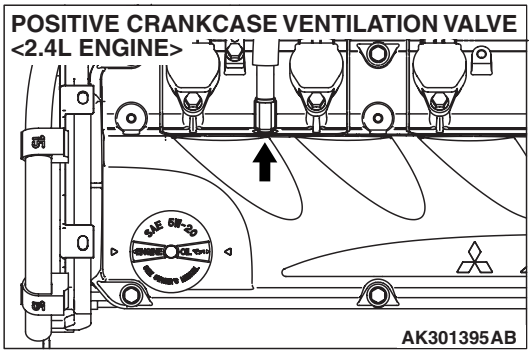
<3.8L ENGINE>



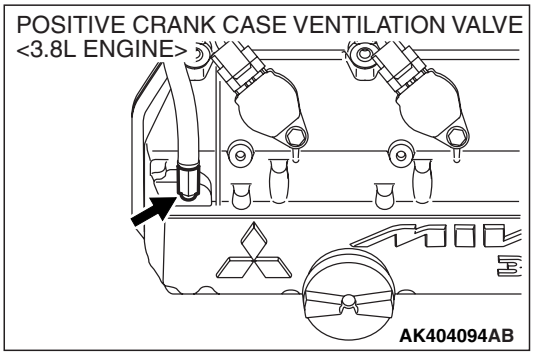
AK303639AB

COMPONENT LOCATION

M1173007400413



AK301395AB



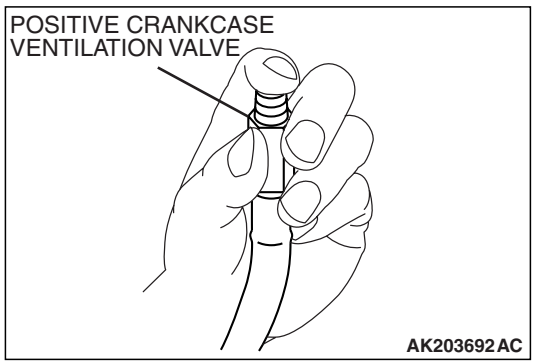
AK404094AB

POSITIVE CRANKCASE VENTILATION SYSTEM CHECK

M1173001100436

1. Remove the positive crankcase ventilation (PCV) valve from the rocker cover, then reconnect the PCV valve to the vacuum supply hose.
2. With the engine idling, put your finger on the open end of the PCV valve, and check for negative pressure (vacuum).

   NOTE: At this time, the plunger in the PCV valve should move back and forth as the open end is covered and uncovered.
3. If negative pressure is not felt, clean or replace the PCV valve. Inspect the vacuum supply hose and vacuum supply hose port for restriction or plugged condition.



AK203692AC

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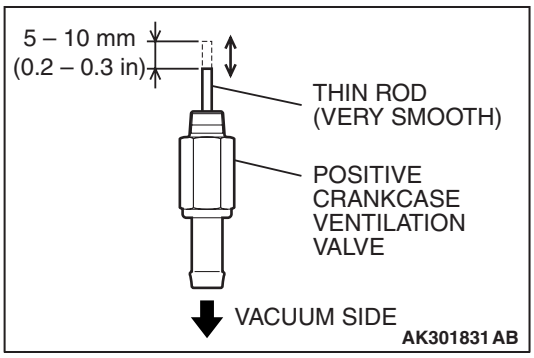


POSITIVE CRANKCASE VENTILATION VALVE CHECK

M1173001200392

1. Hold the positive crankcase ventilation (PCV) valve with the vacuum side down. Insert a thin rod, and using light pressure, depress the end of the PCV valve spring by 5 –10 mm (0.2 – 0.3 inch). Release pressure on the rod to see if the PCV valve spring will lift the rod to its original position.
2. If the rod returns quickly to its original position, the PCV valve is OK. If the stick does not return quickly, clean or replace the PCV valve.

EVAPORATIVE EMISSION CONTROL SYSTEM

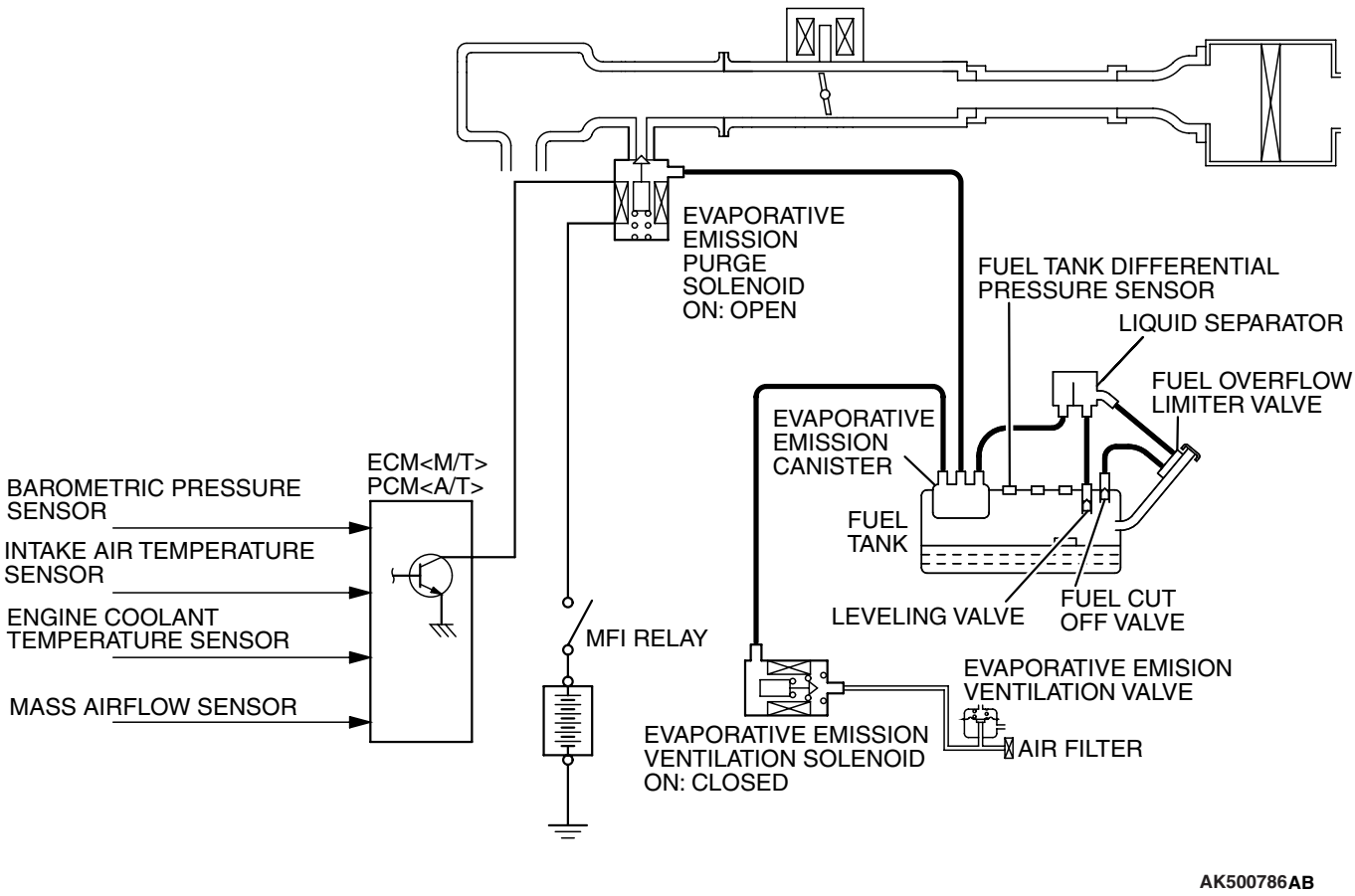
GENERAL DESCRIPTION (EVAPORATIVE EMISSION SYSTEM)

M1173005100825

The evaporative emission (EVAP) system prevents fuel vapors generated in the fuel tank from escaping into the atmosphere.
Fuel vapors from the fuel tank flow through the vapor pipe/hose to be stored temporarily in the EVAP canister.
When the vehicle is in operation, fuel vapors stored in the EVAP canister flow through the EVAP purge solenoid, purge port and intake manifold plenum to the combustion chamber.
When the engine coolant temperature is low or when the intake air quantity is small (when the engine is at idle, for example), the engine control module (ECM) or powertrain control module (PCM) brings the EVAP purge solenoid into the OFF state to shut off the fuel vapor flow to the intake manifold plenum. This ensures driveability when the engine is cold or running under low load and also stabilizes the emission level.
An EVAP ventilation solenoid is provided between the EVAP canister and atmosphere to monitor for OBD-II EVAP leaks. This solenoid is normally OFF. However, it turns ON when monitoring the OBD-II EVAP leaks and shuts off the atmosphere flow to the EVAP canister. Then the fuel tank differential pressure sensor monitors the fuel vapor pressure to detect OBD-II EVAP leaks. The fuel overflow limiter valve and the leveling valve prevent fuel from being overfilled. The fuel overflow limiter valve and the leveling valve prevents fuel leaks if the vehicle is rolled over in an accident.
The EVAP ventilation valve releases the air from the fuel tank through the EVAP canister into the atmosphere when the fuel tank pressure increases due to refueling, etc. The EVAP ventilation valve and the air filter supply the atmospheric air to the EVAP canister when the fuel tank pressure decreases.

SYSTEM DIAGRAM

<2.4L ENGINE>



AK500786AB

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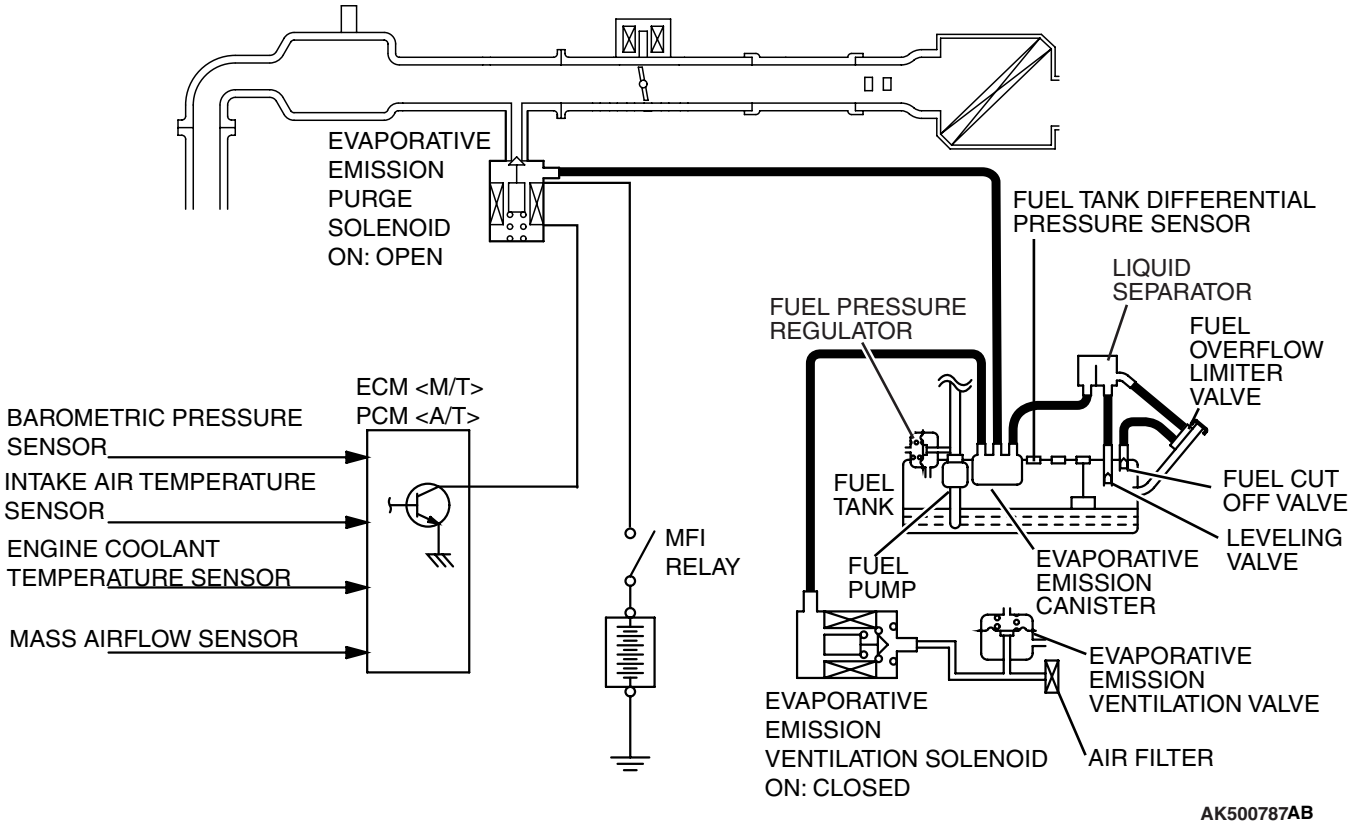
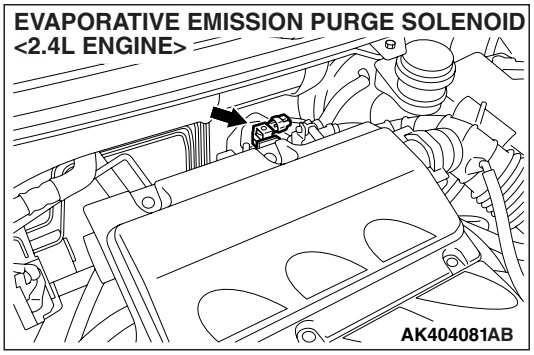
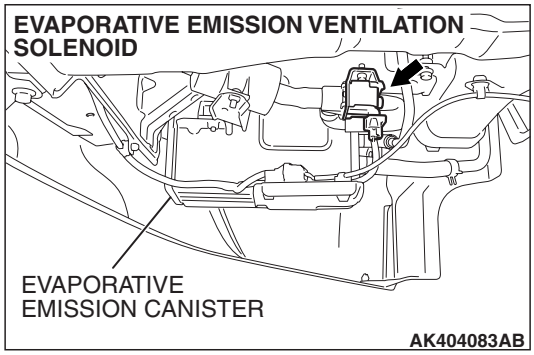
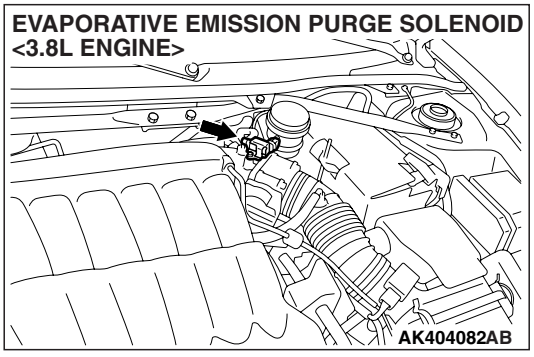


COMPONENT LOCATION

M1173007500421







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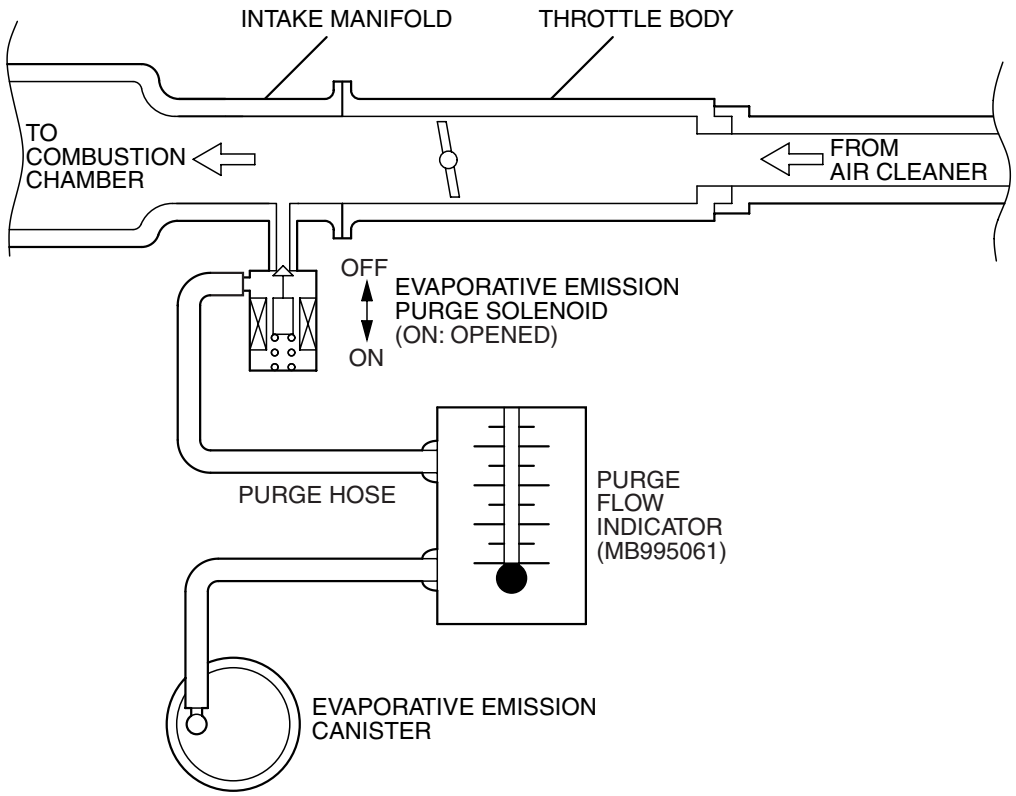
PURGE CONTROL SYSTEM CHECK (PURGE FLOW CHECK)

M1173001400749



AK500788 AB

Required Special Tool:
MB995061: Purge Flow Indicator

1. Disconnect the purge hose from the evaporative emission (EVAP) purge solenoid, and connect special tool MB995061 between the EVAP purge solenoid and the purge hose.
2. Before inspection, set the vehicle in the following conditions:
   - Engine coolant temperature: 80 – 95° C (176 – 203° F)
   - Lights, electric cooling fan and accessories: OFF
   - Transaxle: Neutral (P range on vehicles with A/T)

   NOTE: Vehicles for Canada, the headlight, taillight, etc. remain lit even when the lighting switch is in "OFF" position but this is no problem for checks.
3. Run the engine at idle for more than four minutes.
4. Check the purge flow volume when engine is revved suddenly several times.

   Standard value: Momentarily 20 cm^3/s (2.5 SCFH) or more.
5. If the purge flow volume is less than the standard value, check it again with the vacuum hose disconnected from the EVAP canister. If the purge flow volume is less than the standard value, check the vacuum port and the vacuum hose for clogging. Also check the EVAP purge solenoid. If the purge flow volume is at the standard value, replace the EVAP canister.

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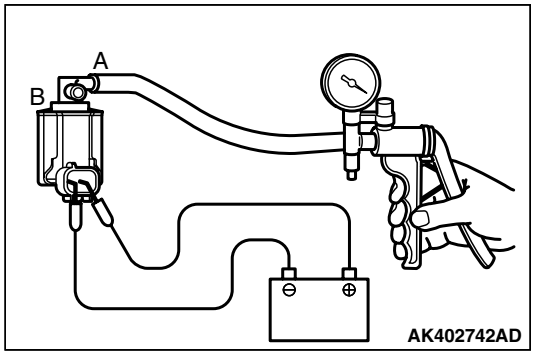
EVAPORATIVE EMISSION PURGE SOLENOID CHECK

M1173001700450

1. Disconnect the vacuum hose (black, black with red paint mark) from the evaporative emission (EVAP) purge solenoid.

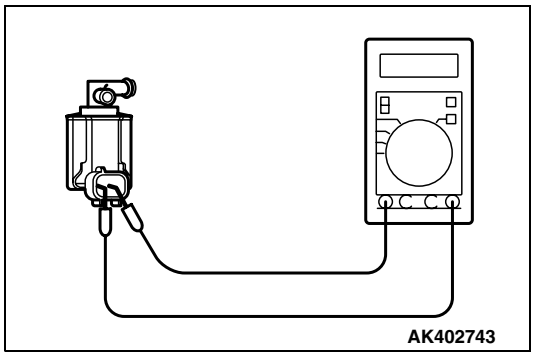
   NOTE: When disconnecting the vacuum hose, always place an identification mark so that it can be reconnected at its original position.
2. Disconnect the harness connector.
3. Connect a hand vacuum pump to nipple (A) of the EVAP purge solenoid (refer to the illustration at left).
4. As described in the chart below, check airtightness by applying a vacuum with voltage applied directly from the battery to the EVAP purge solenoid valve and without applying voltage.



BATTERY POSITIVE VOLTAGE	NORMAL CONDITION
Applied	Vacuum leaks
Not applied	Vacuum maintained

5. Measure the resistance between the terminals of the EVAP purge solenoid.

   Standard value: 22 – 26 ohms [at 20° C (68° F)]
6. Replace the solenoid if resistance is out of specification.



MASS AIRFLOW SENSOR CHECK

M1173050400138

<2.4L ENGINE>

To inspect these parts, refer to GROUP 13A, Multiport Fuel Injection (MFI) <2.4L Engine> –Multiport Fuel Injection (MFI) Diagnosis – Diagnostic Trouble Code Chart P.13A-41.

<3.8L ENGINE>

To inspect these parts, refer to GROUP 13B, Multiport Fuel Injection (MFI) <3.8L Engine> –Multiport Fuel Injection (MFI) Diagnosis – Diagnostic Trouble Code Chart P.13B-43.

BAROMETRIC PRESSURE SENSOR CHECK

M1173008000355

<2.4L ENGINE>

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) <2.4L Engine> –Multiport Fuel Injection (MFI) Diagnosis – Diagnostic Trouble Code Chart P.13A-41.

<3.8L ENGINE>

To inspect the sensor, refer to GROUP 13B, Multiport Fuel Injection (MFI) <3.8L Engine> –Multiport Fuel Injection (MFI) Diagnosis – Diagnostic Trouble Code Chart P.13B-43.

ENGINE COOLANT TEMPERATURE SENSOR CHECK

M1173008100697

<2.4L ENGINE>

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) <2.4L Engine> –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart P.13A-41.

<3.8L ENGINE>

To inspect the sensor, refer to GROUP 13B, Multiport Fuel Injection (MFI) <3.8L Engine> –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart P.13B-43.

INTAKE AIR TEMPERATURE SENSOR CHECK

M1173008200359

<2.4L ENGINE>

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) <2.4L Engine> –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart P.13A-41.

<3.8L ENGINE>

To inspect the sensor, refer to GROUP 13B, Multiport Fuel Injection (MFI) <3.8L Engine> –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart P.13B-43.

FUEL TANK DIFFERENTIAL PRESSURE SENSOR CHECK

M1173007700298

To inspect the sensor, refer to GROUP 13C, Fuel Supply –Fuel Tank –Fuel Tank Inspection –Fuel Tank Differential Pressure Sensor Check P.13C-15.

EVAPORATIVE EMISSION VENTILATION SOLENOID CHECK

M1173007800262

Refer to Emission Control –Evaporative Emission Canister and Fuel Tank Pressure Relief Valve –Inspection –Evaporative Emission Ventilation Solenoid Check P.17-111.

EXHAUST GAS RECIRCULATION (EGR) SYSTEM

GENERAL DESCRIPTION (EXHAUST GAS RECIRCULATION SYSTEM)

M1173005200662

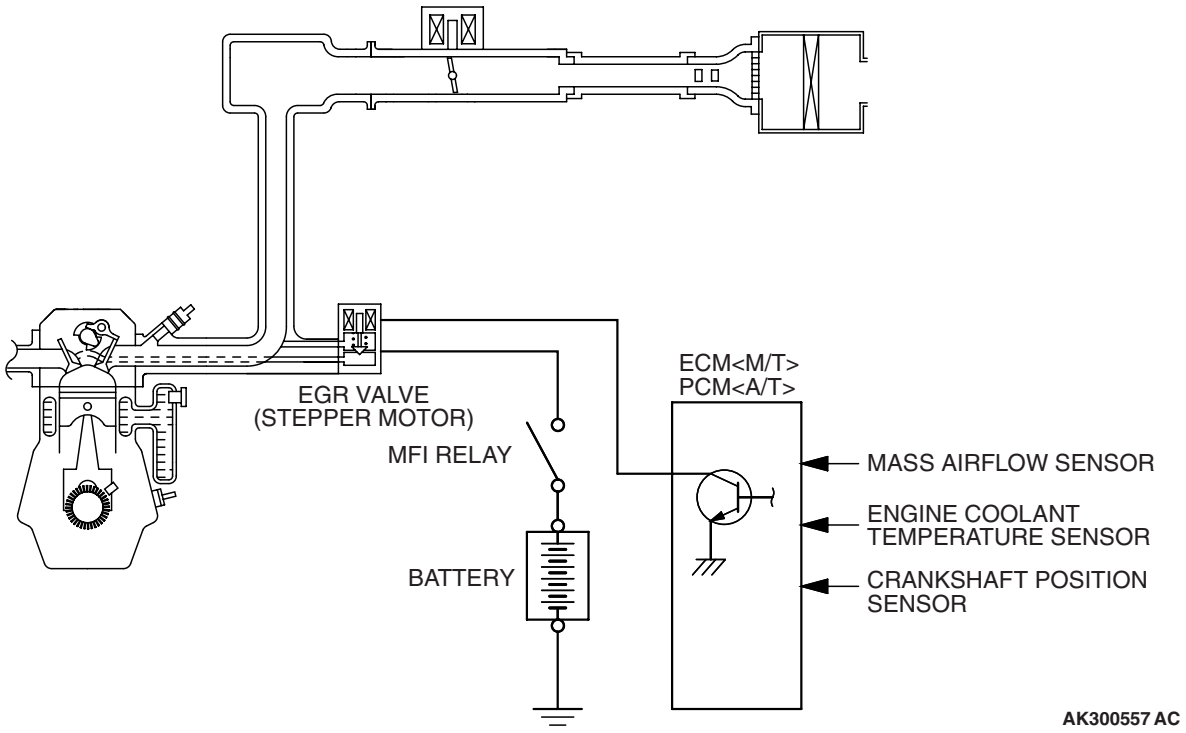
The exhaust gas recirculation system (EGR) lowers the nitrogen oxides (NOx) emission level. When the air/fuel mixture combustion temperature is high, a large quantity of NOx is generated in the combustion chamber. Therefore, this system recirculates part of exhaust gas from the exhaust port of the cylinder head to the combustion chamber through the intake manifold to decrease the air/fuel mixture combustion temperature, resulting in reduction of NOx. The EGR flow rate is controlled by the EGR valve (Stepper Motor) for driveability quality.

OPERATION

When the engine coolant temperature is low, when the engine is at idle or when a wide open throttle operation is performed, the EGR valve (Stepper Motor) is kept closed, achieving no EGR. After warming up the engine, the EGR valve (Stepper Motor) can be opened by the engine control module (ECM) or powertrain control module (PCM).
The ECM or PCM monitors the EGR system and illuminates the Malfunction Indicator Lamp (SERVICE ENGINE SOON or Check Engine Lamp) to indicate that there is a malfunction.

SYSTEM DIAGRAM

<2.4L ENGINE>



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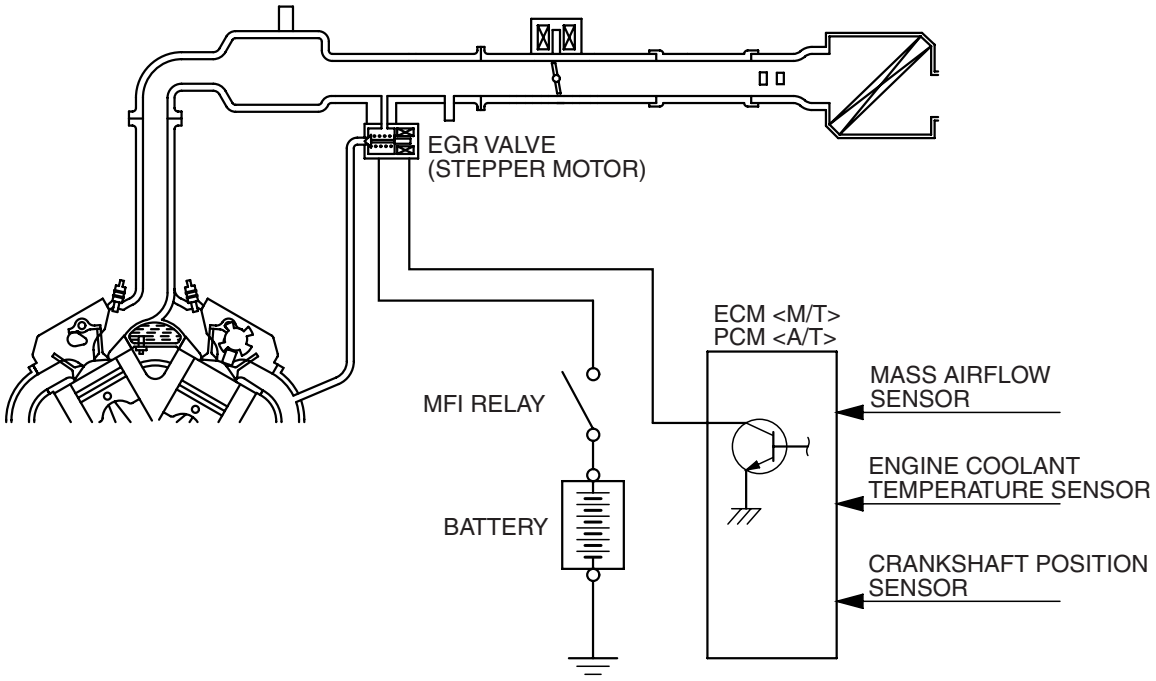
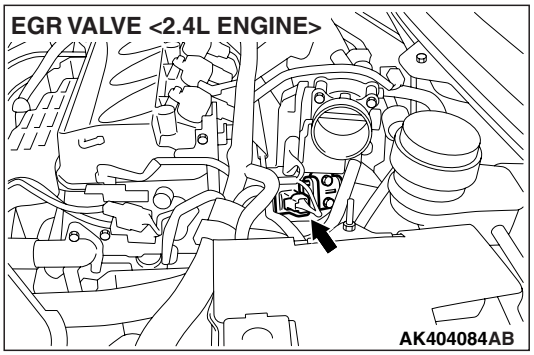
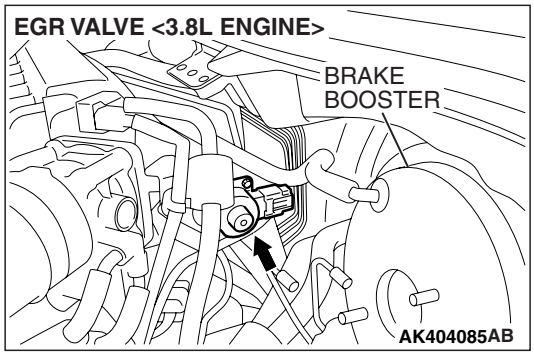


AK203696AD

COMPONENT LOCATION

M1173007600398





EGR VALVE (STEPPER MOTOR) CHECK

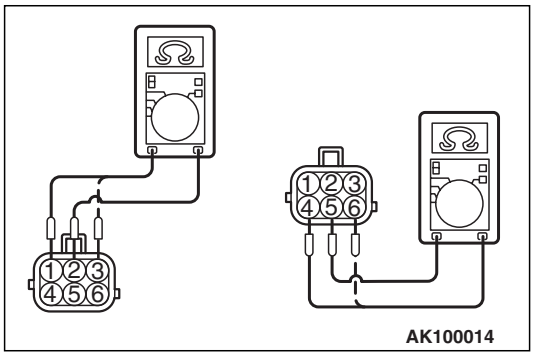
M1173050200286

Required Special Tool:
MB991658: Test Harness Set

Checking the Operation Sound

1. Check that the operation sound of the stepper motor can be heard from the EGR valve when the ignition switch is turned ON (without starting the engine).
2. If the operation sound cannot be heard, inspect the drive circuit of the stepper motor.

NOTE: If the operation sound is not heard, and the circuit is normal, either the stepper motor or the ECM or PCM may have failed.



Checking the Coil Resistance

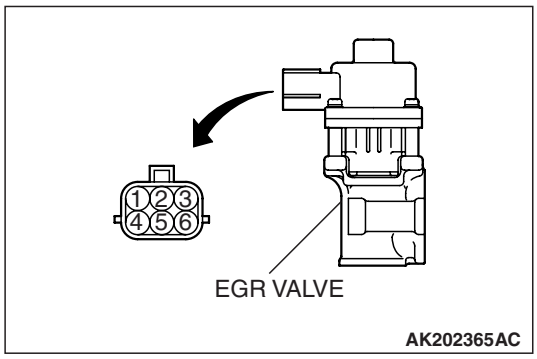
1. Remove the EGR valve.
2. Measure the resistance between terminal No. 2 and either terminal No. 1 or terminal No. 3 of the connector at the EGR valve.

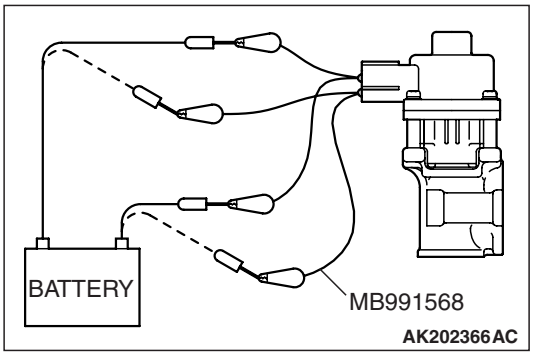
   Standard value: 20 – 24 Ω [at 20° C (68° F)]
3. If the resistance is not within the standard, replace the EGR valve.
4. Measure the resistance between terminal No. 5 and either terminal No. 6 or terminal No. 4 of the connector at the EGR valve.

   Standard value: 20 – 24 Ω [at 20° C (68° F)]
5. If the resistance is not within the standard, replace the EGR valve.

Operation Check

1. Remove the EGR valve.
2. Connect special tool MB991658 to the EGR valve.





3. Connect the battery positive (+) terminal to terminal No. 2.

⚠ CAUTION

Connecting battery voltage to the EGR valve for a long time could damage the coil.

4. Connect terminals 1 and 3 to the negative (-) terminal of the battery, in order to test whether the stepper motor vibrates (with a slight shudder), indicating that the stepper motor is operating.
5. Connect the battery positive (+) terminal to terminal No. 5.

⚠ CAUTION

Connecting battery voltage to the EGR valve for a long time could damage the coil.

6. Connect terminals 4 and 6 to the negative (-) terminal of the battery, in order to test whether the stepper motor vibrates (with a slight shudder), indicating that the stepper motor is operating.
7. If vibrations can be felt as a result of the test, the stepper motor is determined to be normal.

EGR VALVE (STEPPER MOTOR) CLEANING

M1173050300045

NOTE: DO not use solvents or other cleaning agents, which will enter the motor and cause a malfunction.
Remove the EGR valve and make sure that it is not stuck and does not have any carbon deposits. If there are any carbon deposits, use a wire brush to clean it.

MASS AIRFLOW SENSOR CHECK

M1173050400149

<2.4L ENGINE>

To inspect these parts, refer to GROUP 13A, Multiport Fuel Injection (MFI) <2.4L Engine> –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart P.13A-41.

<3.8L ENGINE>

To inspect these parts, refer to GROUP 13B, Multiport Fuel Injection (MFI) <3.8L Engine> –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart P.13B-43.

ENGINE COOLANT TEMPERATURE SENSOR CHECK

M1173008100705

<2.4L ENGINE>

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) <2.4L Engine> –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart P.13A-41.

<3.8L ENGINE>

To inspect the sensor, refer to GROUP 13B, Multiport Fuel Injection (MFI) <3.8L Engine> –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart P.13B-43.

CRANKSHAFT POSITION SENSOR CHECK

M1173008300356

<2.4L ENGINE>

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) <2.4L Engine> –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart P.13A-41.

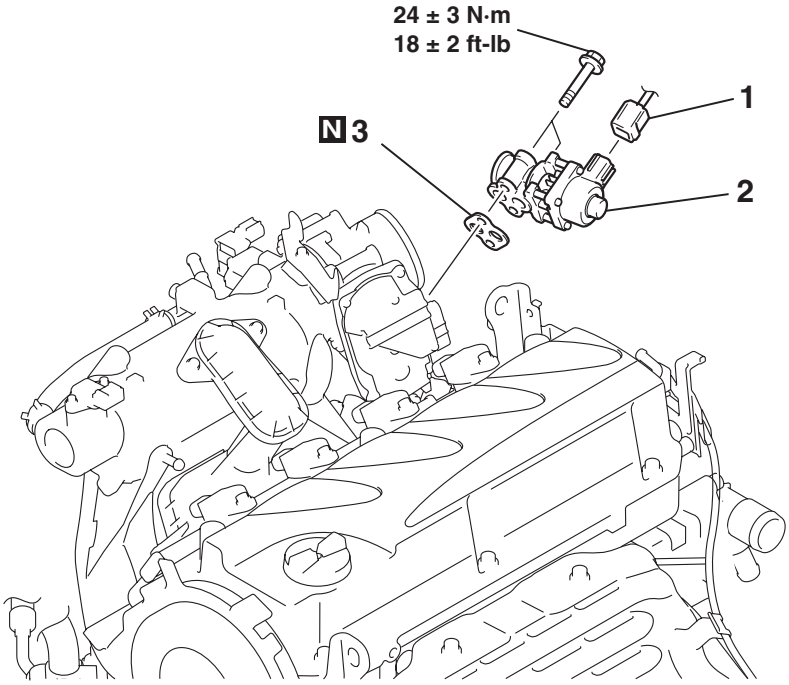
<3.8L ENGINE>

To inspect the sensor, refer to GROUP 13B, Multiport Fuel Injection (MFI) <3.8L Engine> –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart P.13B-43.

REMOVAL AND INSTALLATION <2.4L ENGINE>

M1173010500498

Pre-removal and Post-installation Operation
- Battery Removal and Installation.
- Air Intake Hose Resonator Removal and Installation (Refer to GROUP 15, Air Cleaner P.15-4).



AC406866 AB

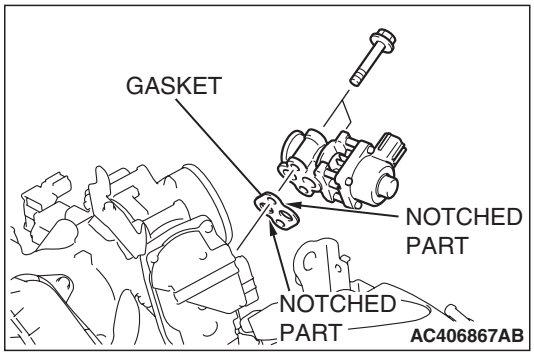
REMOVAL STEPS
1. EGR VALVE CONNECTOR

REMOVAL STEPS (Continued)
2. EGR VALVE
>>A<< 3. EGR VALVE GASKET

INSTALLATION SERVICE POINT

>>A<< EGR VALVE GASKET INSTALLATION

Install the EGR valve gasket as shown in the illustration.



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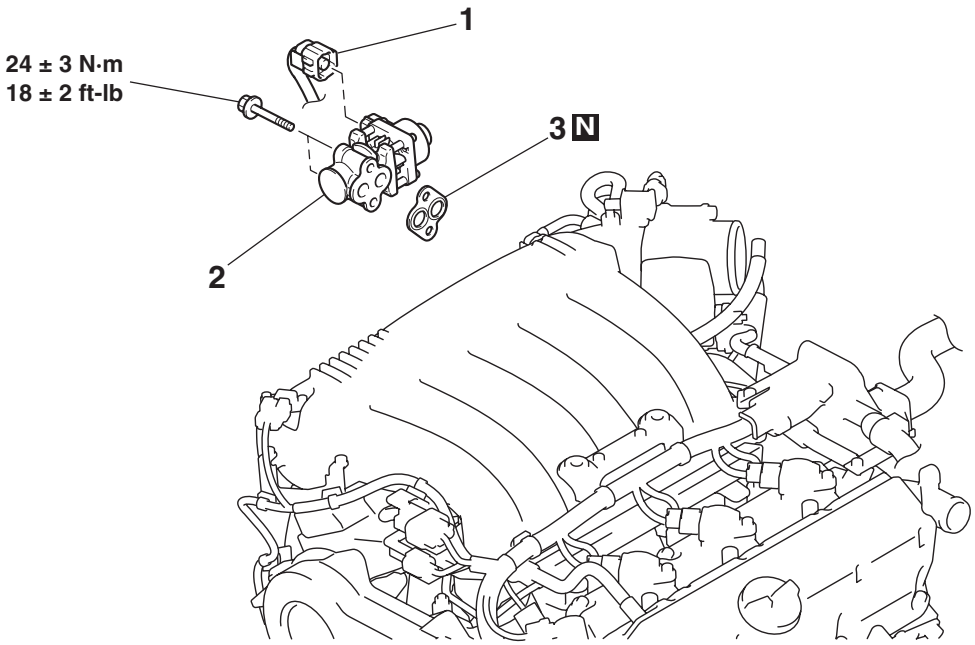
REMOVAL AND INSTALLATION <3.8L ENGINE>

M1173010500487

Pre-removal and Post-installation Operation
Strut Tower Bar Removal and Installation (Refer to GROUP 42, Strut Tower Bar P.42-12).



AC406789 AB

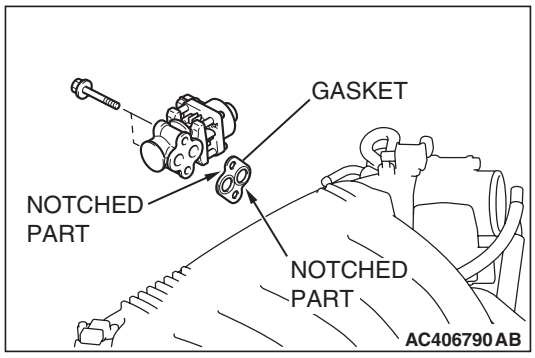
REMOVAL STEPS
1. EGR VALVE CONNECTOR

REMOVAL STEPS (Continued)
2. EGR VALVE
>>A<< 3. EGR VALVE GASKET

INSTALLATION SERVICE POINT

>>A<< EGR VALVE GASKET INSTALLATION

Install the EGR valve gasket as shown in the illustration.



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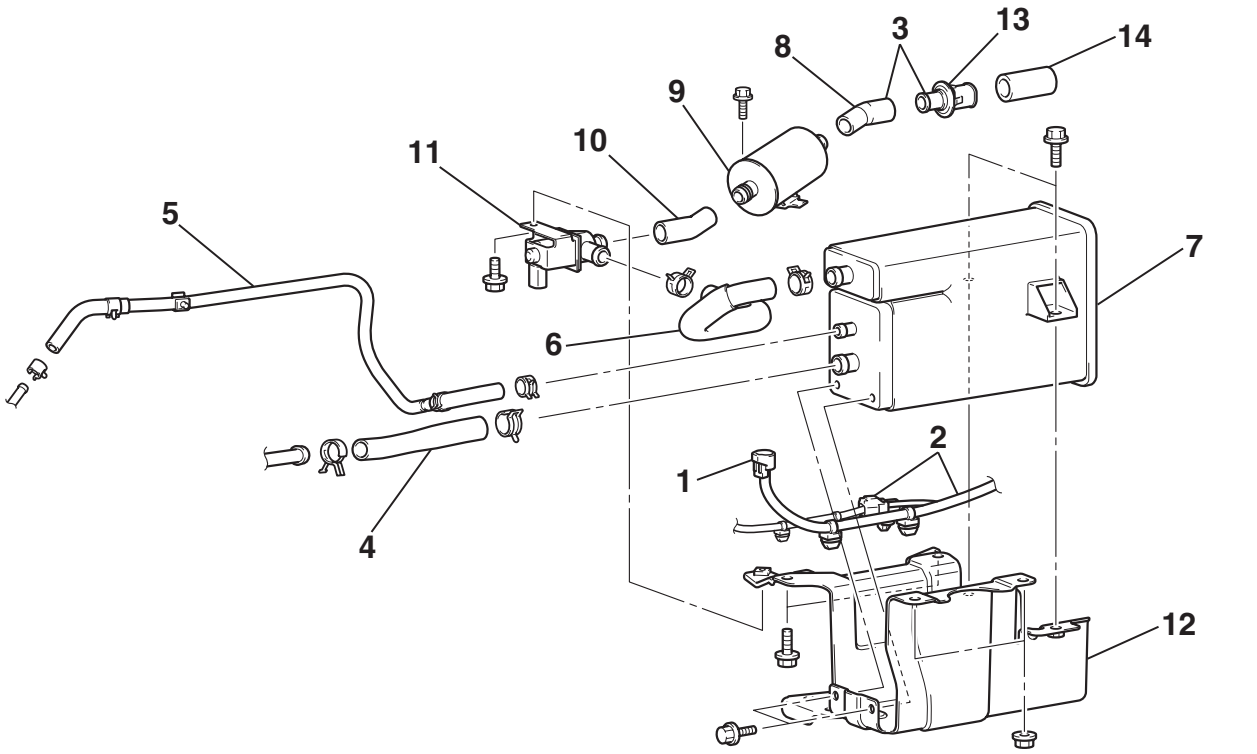
EVAPORATIVE EMISSION CANISTER AND FUEL TANK PRESSURE RELIEF VALVE

REMOVAL AND INSTALLATION

M1173004800412



AC406791 AB

REMOVAL STEPS

1. EVAPORATIVE EMISSION VENTILATION SOLENOID CONNECTOR
2. WIRING HARNESS CLAMP CONNECTION
3. VENT HOSE C AND VENT PIPE CONNECTION
4. VAPOR HOSE
5. PURGE HOSE ASSEMBLY
- EVAPORATIVE EMISSION CANISTER AND CANISTER BRACKET ASSEMBLY
6. VENT HOSE A

REMOVAL STEPS (Continued)

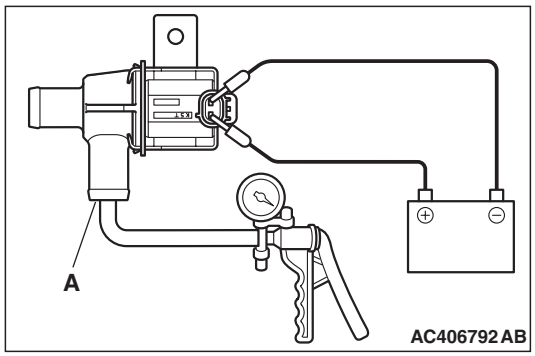
7. EVAPORATIVE EMISSION CANISTER
8. VENT HOSE C
9. AIR FILTER
10. VENT HOSE B
11. EVAPORATIVE EMISSION VENTILATION SOLENOID
12. EVAPORATIVE EMISSION CANISTER BRACKET
13. VENT PIPE
14. VENT HOSE D

TSB Revision

INSPECTION

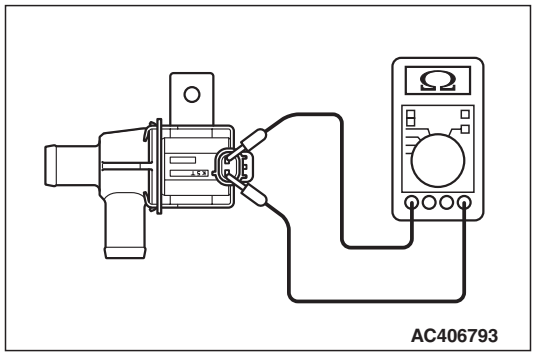
M1173004900174

EVAPORATIVE EMISSION VENTILATION SOLENOID CHECK



1. Connect a hand vacuum pump to nipple (A) of the solenoid.
2. Check air tightness by applying a vacuum with voltage applied directly from the battery to the evaporative emission ventilation solenoid and without applying voltage.

BATTERY VOLTAGE	NORMAL CONDITION
Applied	Vacuum maintained
Not applied	Vacuum leaks



3. Measure the resistance between the terminals of the solenoid.

   Standard value: 17 – 21 Ω [at 20° C (68° F)]

CATALYTIC CONVERTER

GENERAL DESCRIPTION (CATALYTIC CONVERTER)

M1173005300131

The three way catalytic converter, together with the closed loop air-fuel ratio control based on the oxygen sensor signal, oxidizes carbon monoxides (CO) and hydrocarbons (HC), also reduces nitrogen oxides (NOx).

When the mixture is controlled at stoichiometric air-fuel ratio, the three way catalytic converter provides the highest purification against the three constituents, namely, CO, HC and NOx.

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

M1173006400432

ITEM	SPECIFICATION
Emission control system	
EGR valve bolt	24 ± 3 N· m (18 ± 2 ft-lb)
Engine control system	
Accelerator pedal assembly nut	13 ± 2 N· m (111 ± 22 in-lb)

SERVICE SPECIFICATIONS

M1173000300620

ITEM	STANDARD VALUE
Emission control system	
EGR valve (Stepper Motor) connector resistance [at 20° C (68° F)] Ω	20 – 24
Evaporative emission purge solenoid coil resistance [at 20° C (68° F)] Ω	22 – 26
Evaporative emission ventilation solenoid coil resistance [at 20° C (68° F)] Ω	17 – 21
Purge flow cm^3/s (SCFH) [at 80 – 95° C (176 – 205° F) with sudden revving]	20 (2.5)